KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

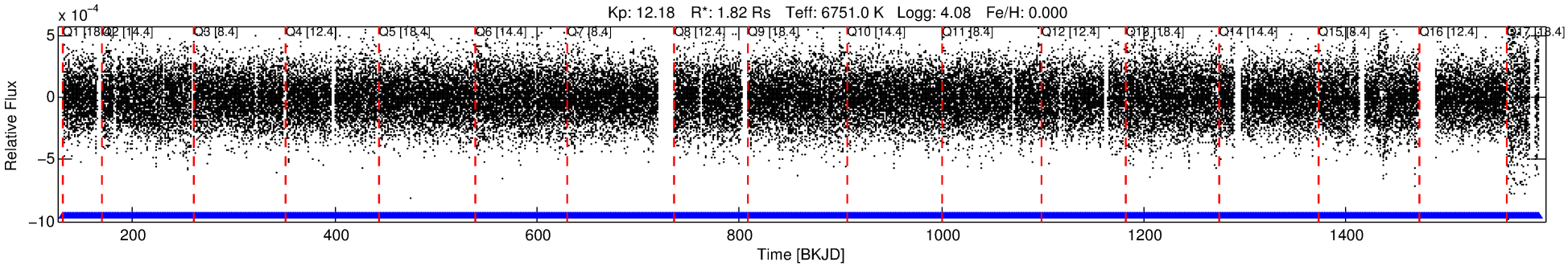
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

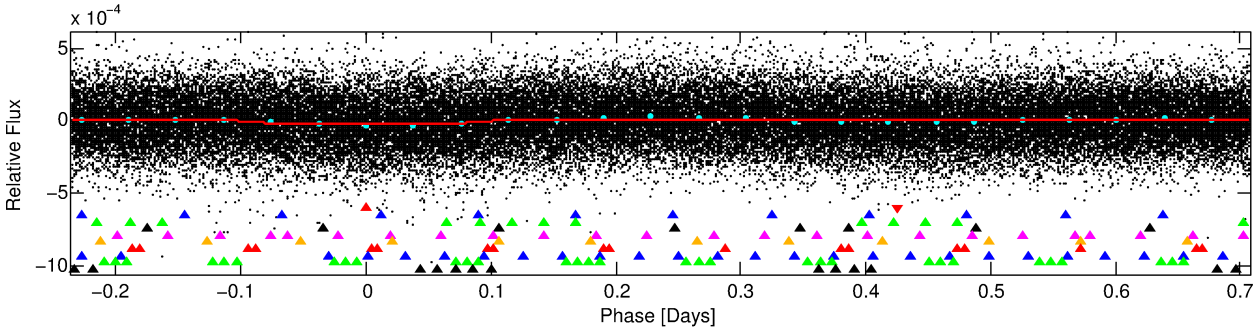
Ephemeris Match Information For 009536870-01

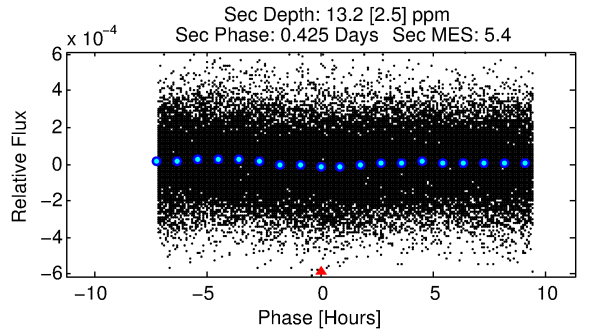
No Significant Match Found

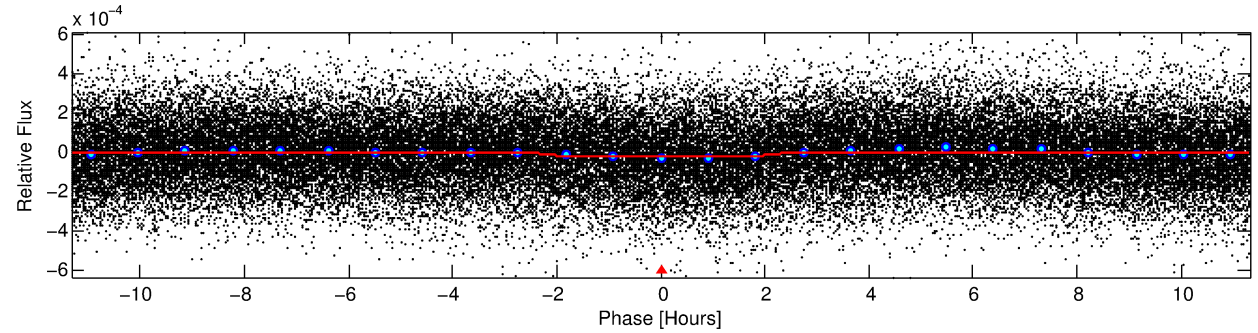
DV One-Page Summary

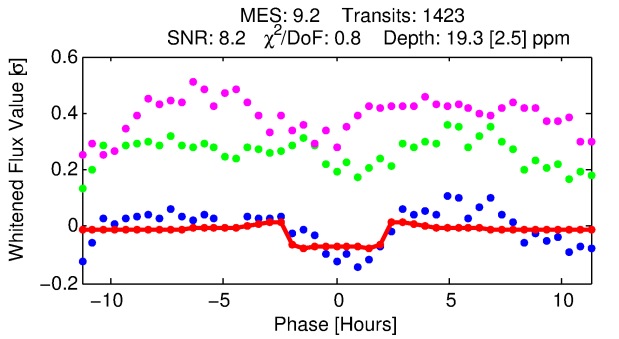
KIC: 9536870 Candidate: 1 of 10 Period: 0.943 d

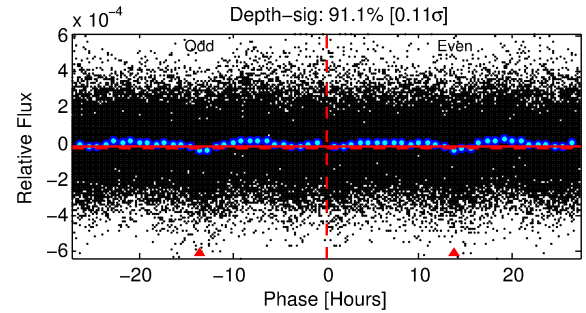


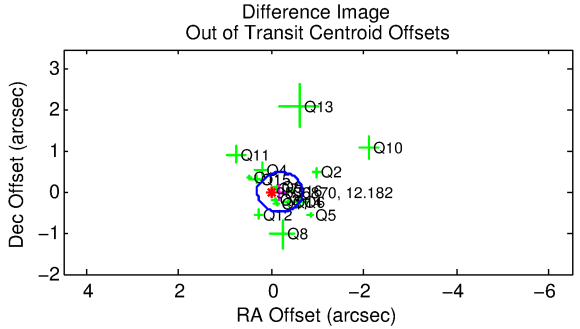












DV Fit Results:

Period = 0.94332 [0.00001] d
Epoch = 131.8793 [0.0036] BKJD
Rp/R* = 0.0043 [0.0010]
a/R* = 1.43 [0.89]
b = 0.67 [1.02]

Seff = 13538.30 [3473.50]
Teq = 2751 [176] K
Rp = 0.85 [0.24] Re
a = 0.0213 [0.0034] AU

Ag = 4.60 [2.49] [1.44σ]
Teffp = 6226 [756] K [4.47σ]

DV Diagnostic Results:

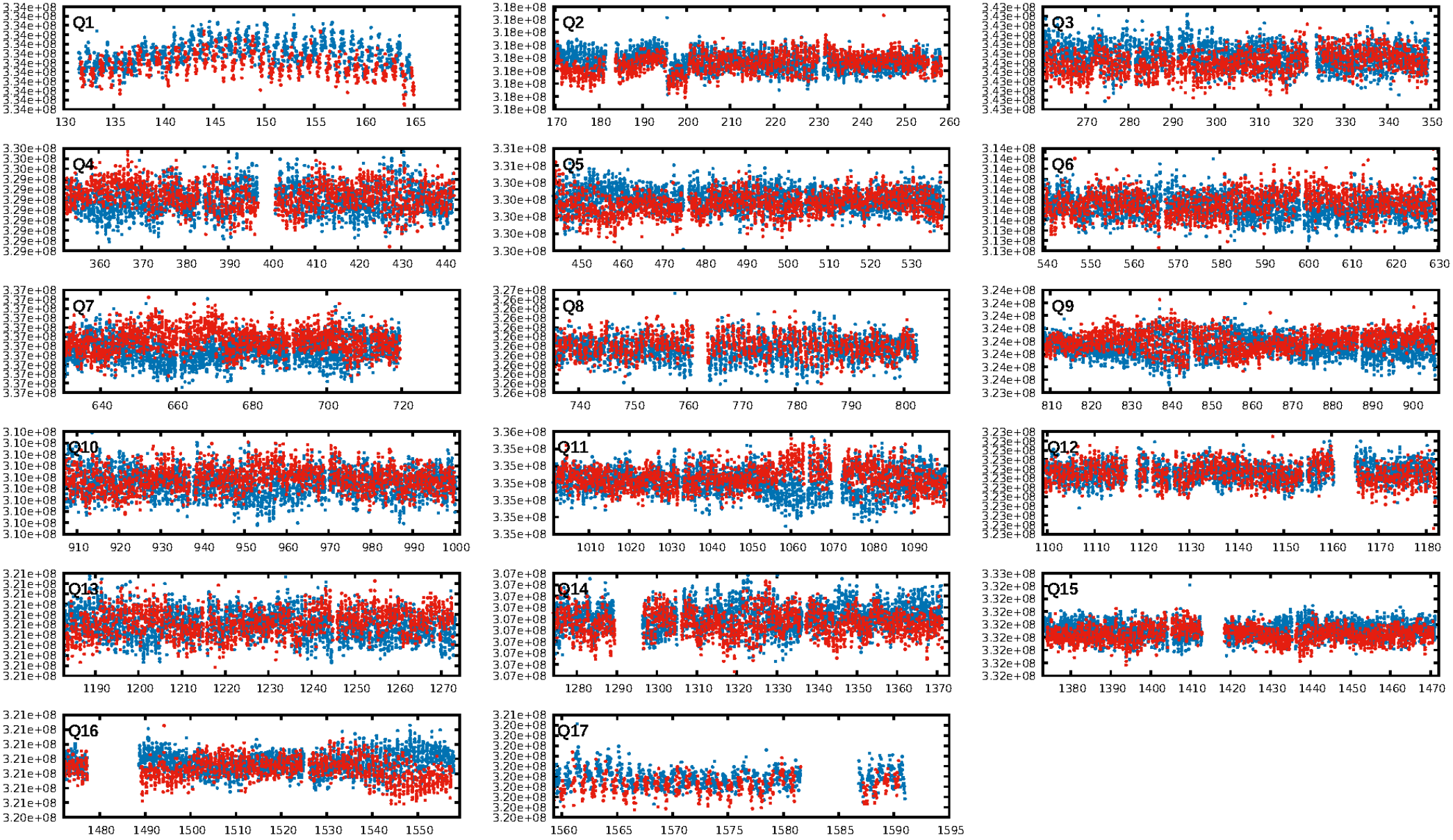
ShortPeriod−sig: N/A
LongPeriod−sig: 100.0% [228.66σ]
ModelChiSquare2−sig: N/A
ModelChiSquareGof−sig: N/A
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [1360/1360]
GhostDiagnostic−chr: −29.22

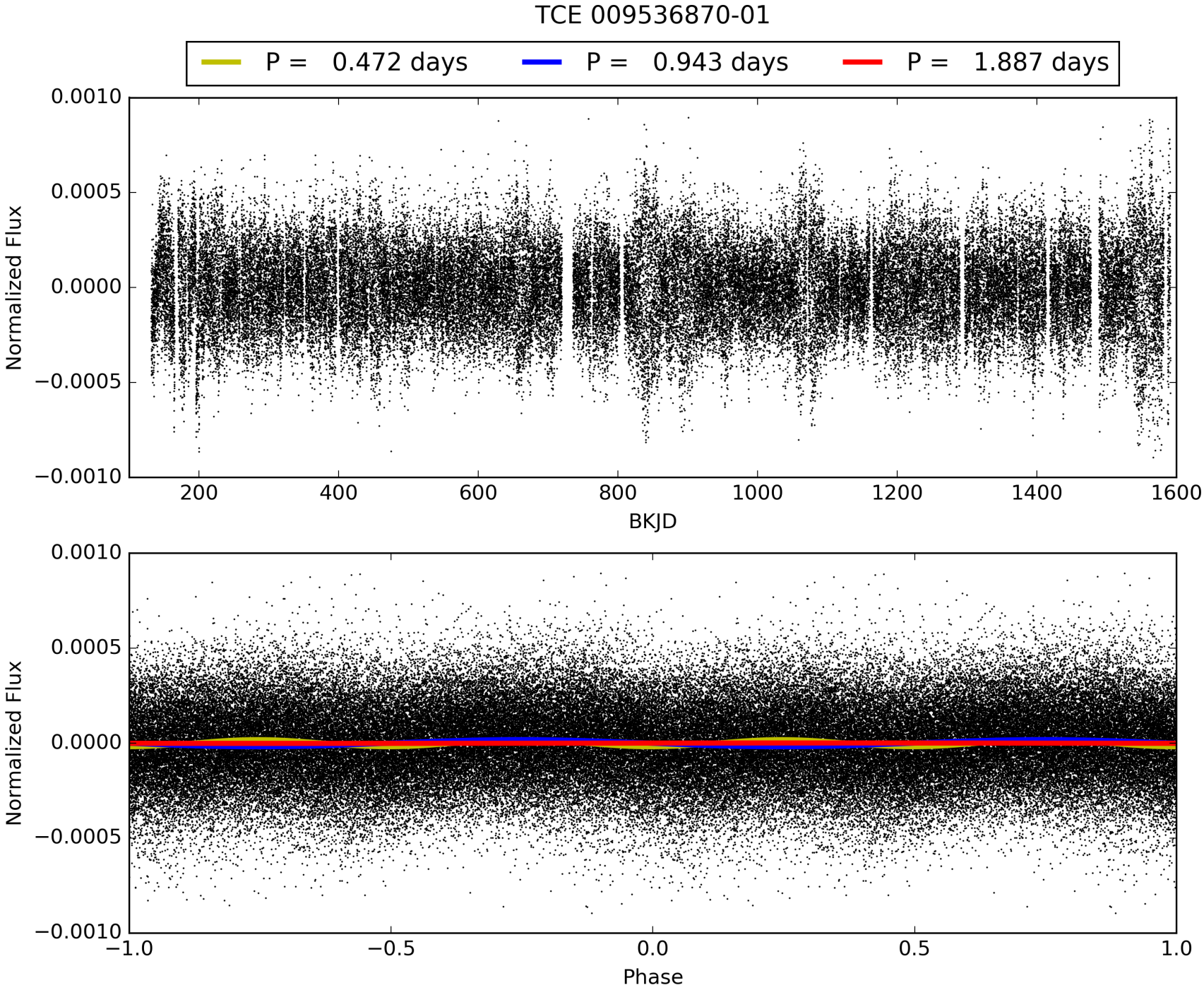
Centroid−sig: 10.7%
Centroid−so: 0.372 arcsec [0.82σ]
OotOffset−rm: 0.181 arcsec [1.11σ]
KicOffset−rm: 0.217 arcsec [1.36σ]
OotOffset−st: 4/4/4/5 [17]
KicOffset−st: 4/4/4/5 [17]
DiffImageQuality−fgm: 0.53 [9/17]
DiffImageOverlap−fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:21:59 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009536870-01, PDC Light Curves

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P = 0.472 days
P = 0.943 days
P = 1.887 days
Normalized Flux
0.0010
0.0005
0.0000
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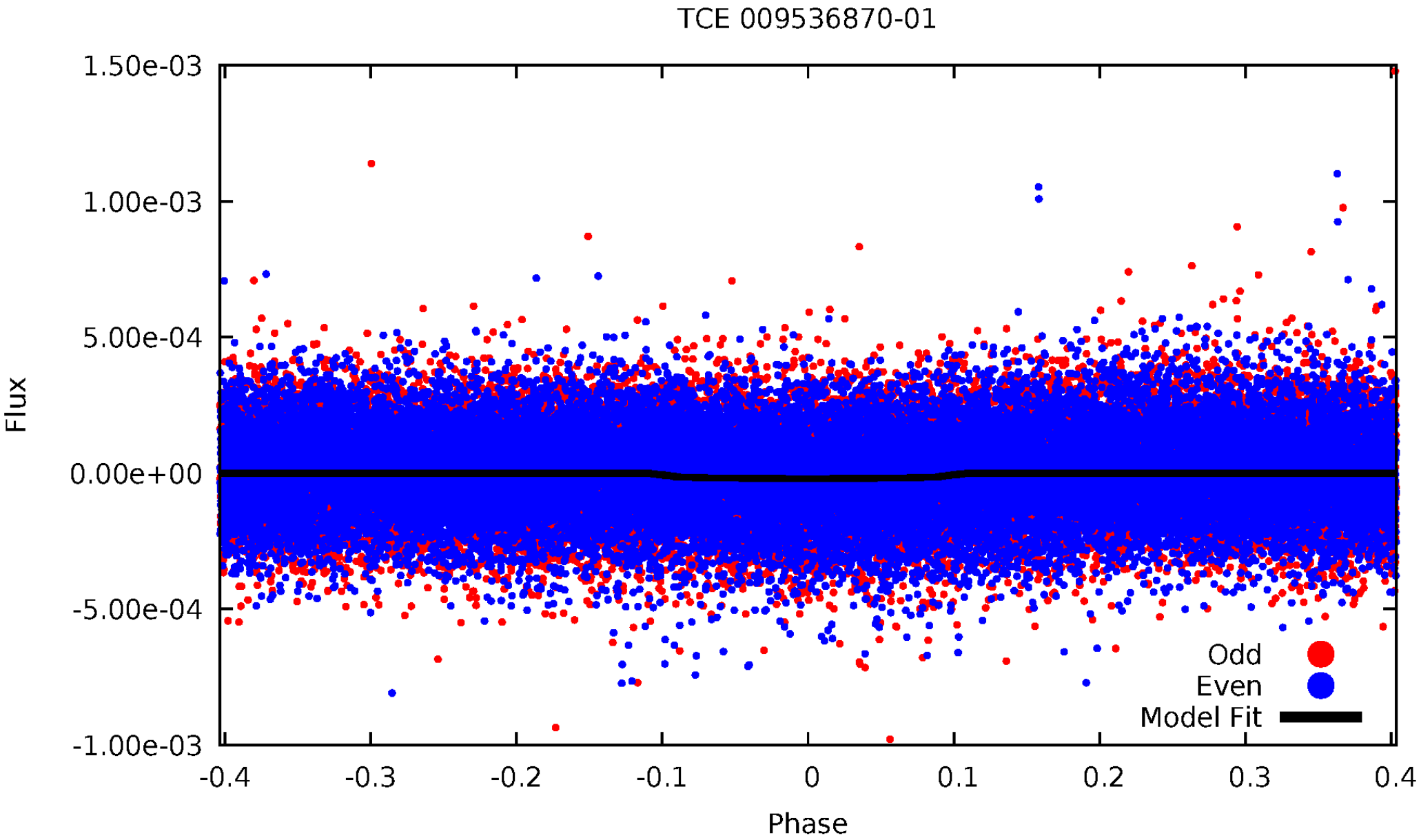
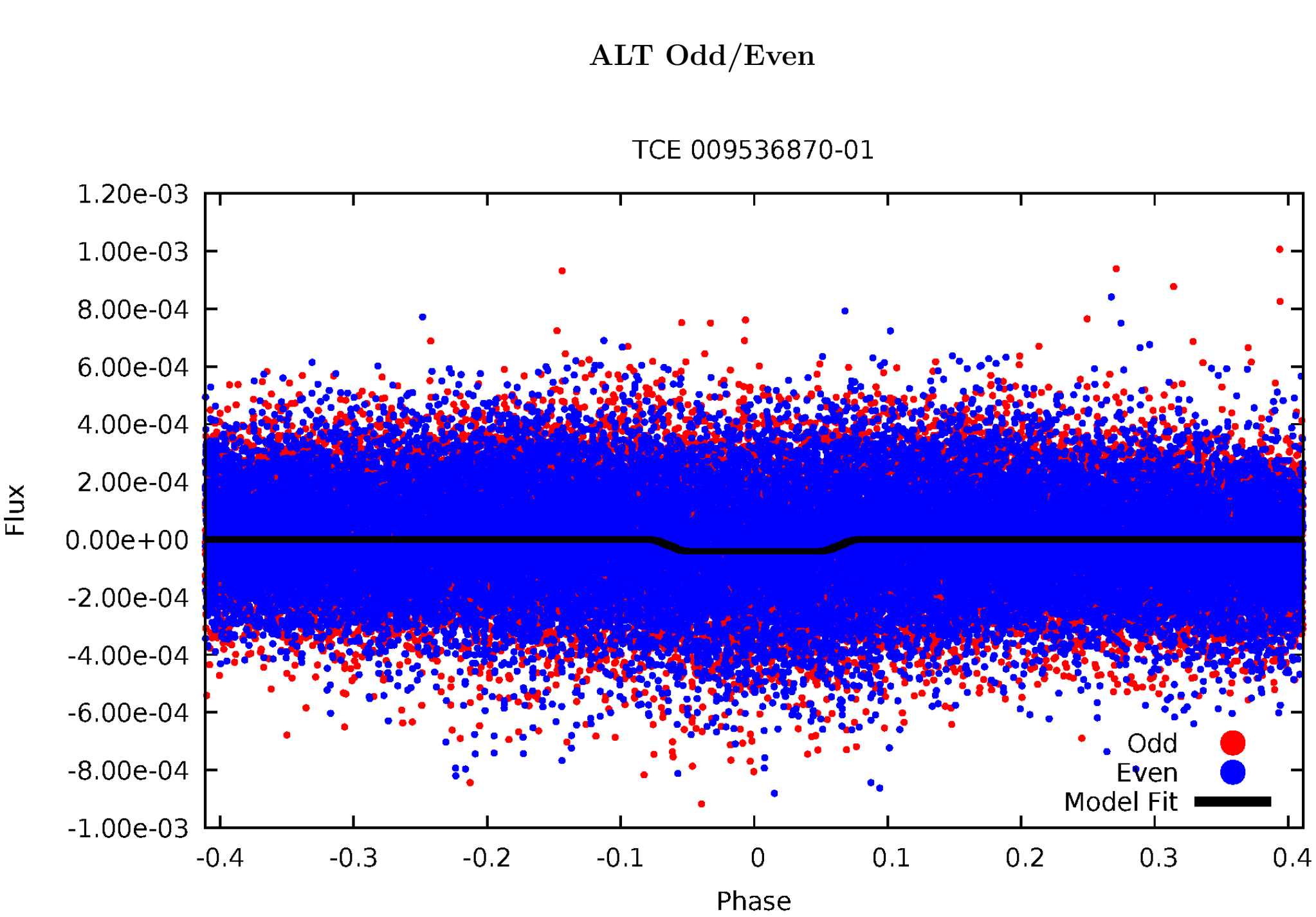
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

DV Odd/Even


TCE 009536870-01
1.50e-03
1.00e-03
5.00e-04
0.00e+00
-5.00e-04
-1.00e-03
Flux
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-01
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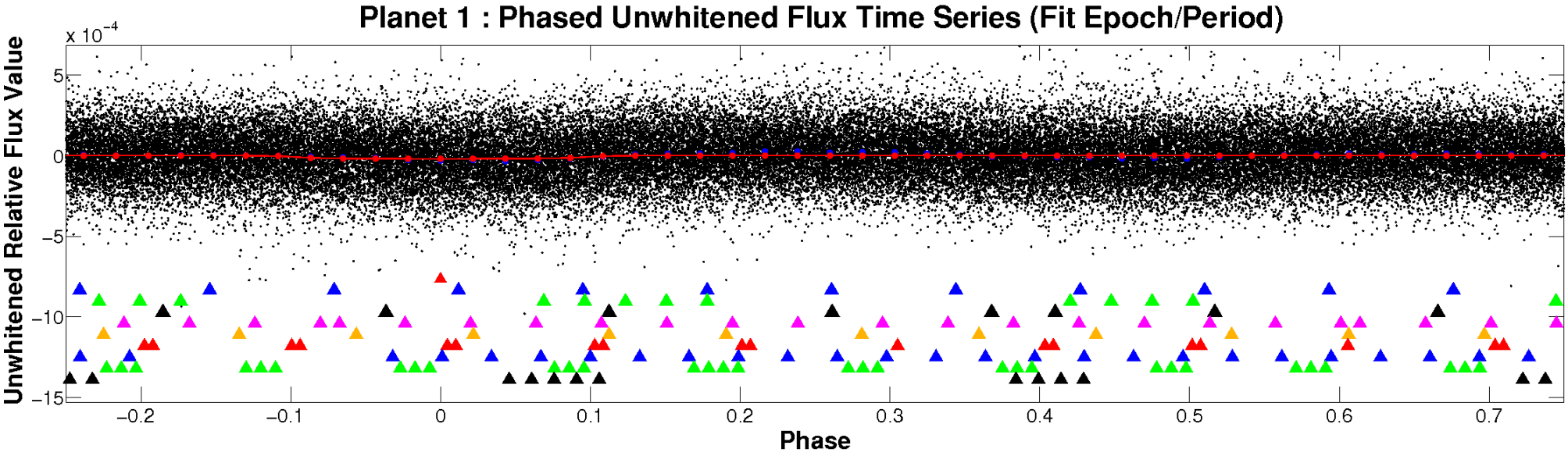
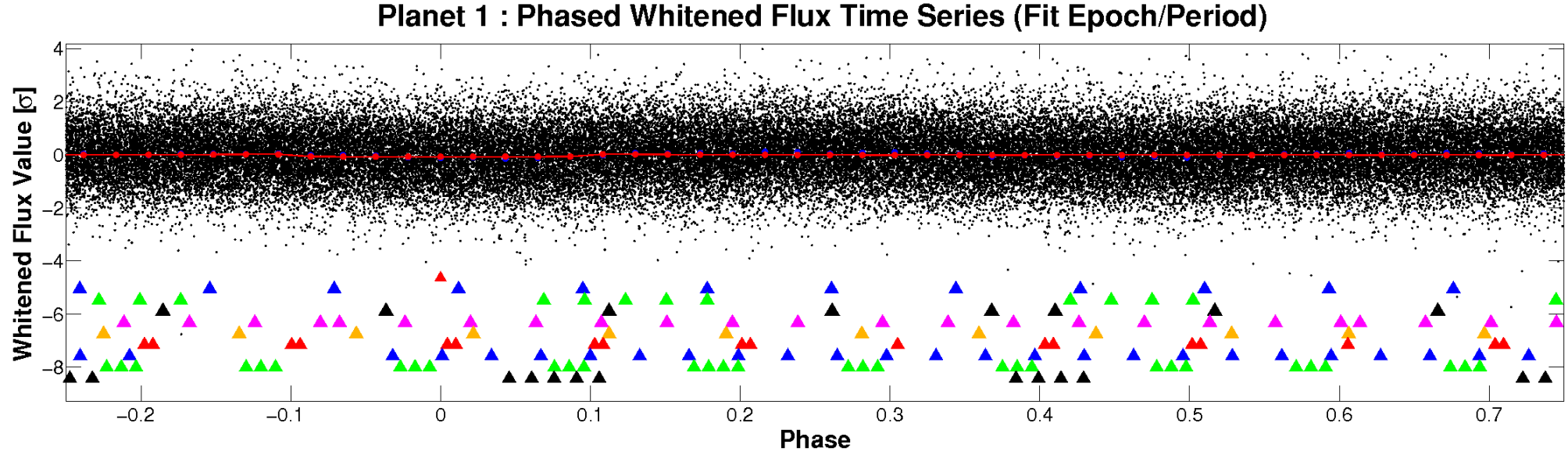
1.00e-03
8.00e-04
6.00e-04
4.00e-04
2.00e-04
0.00e+00
-2.00e-04
-4.00e-04
-6.00e-04
-8.00e-04
-1.00e-03
Flux
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
Phase
Odd
Even
Model Fit

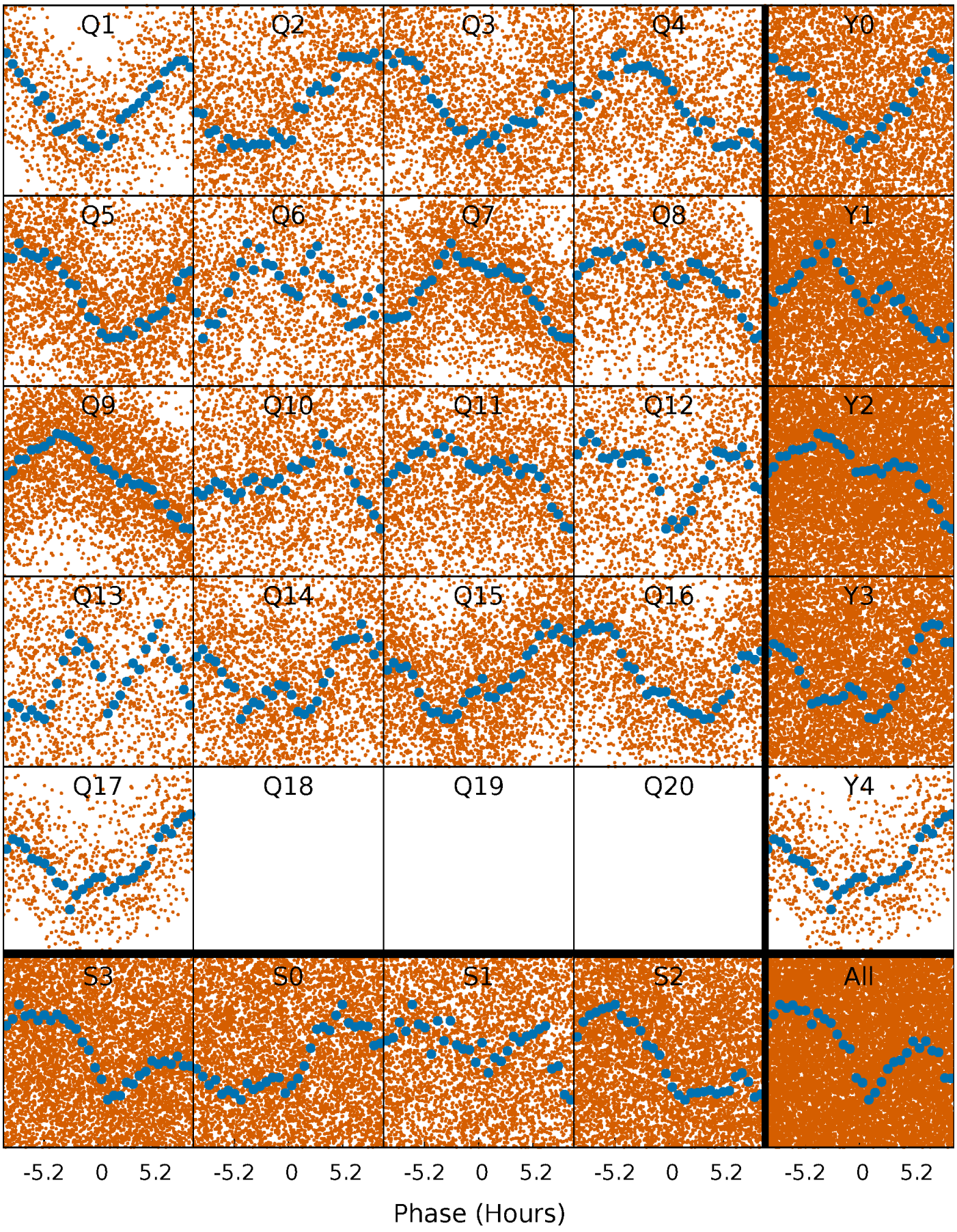
Non-Whitened Vs. Whitened Light Curve





PDC Quarter-Phased Transit Curves

TCE 009536870-01 P= 0.943322 Days T_0=131.879292 (BKJD)



DV Quarter-Phased Transit Curves

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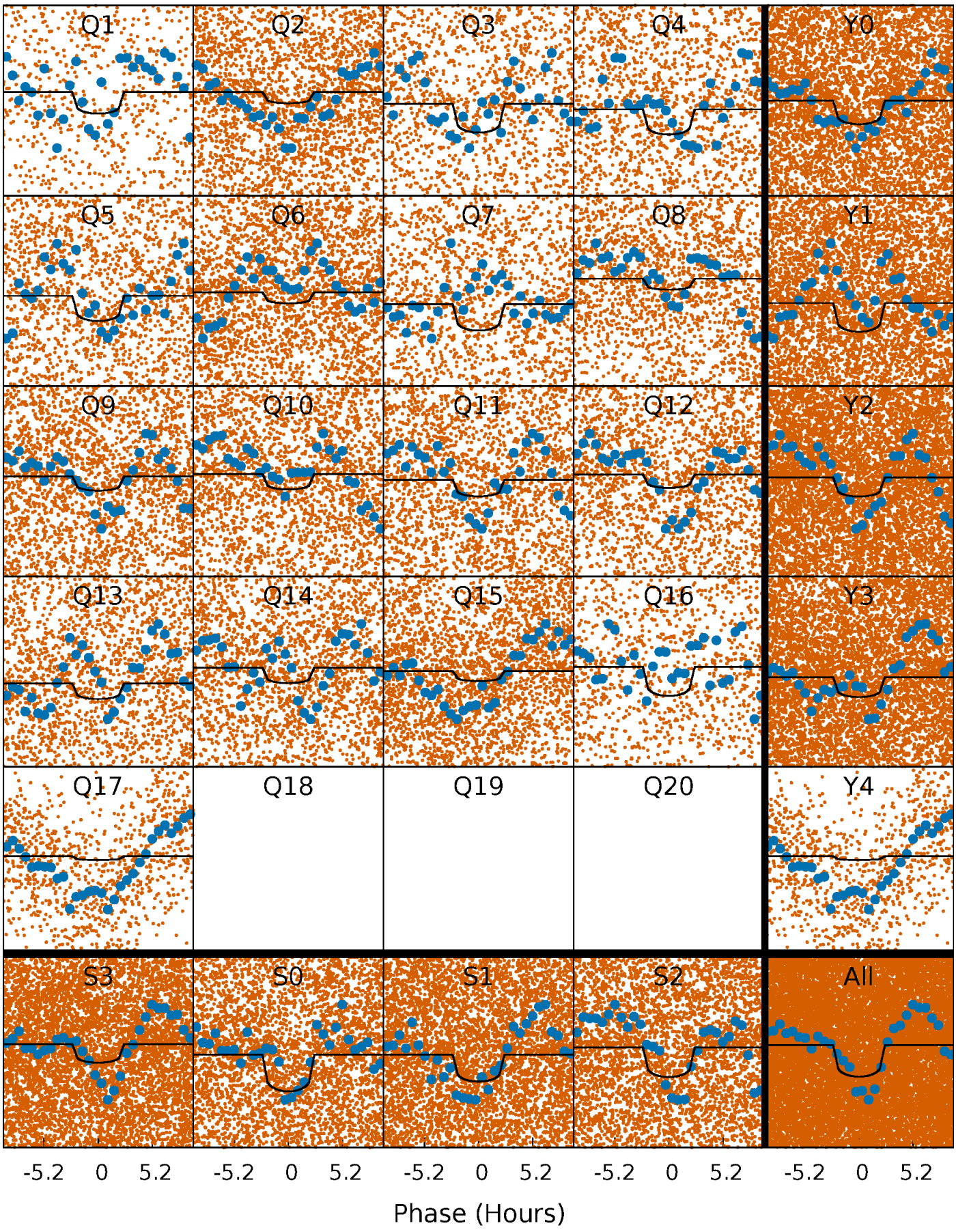
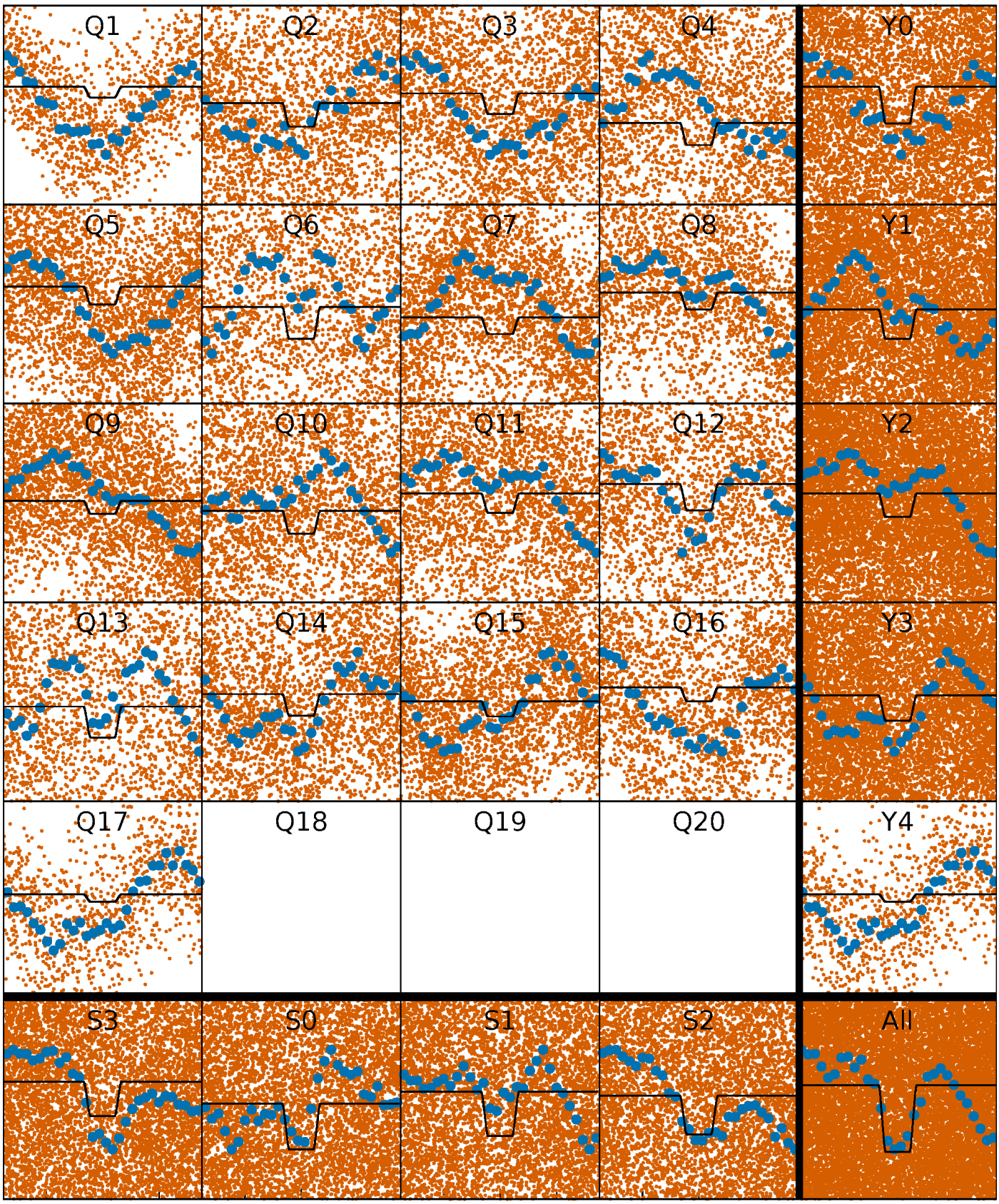


Alt. Detrend Quarter-Phased Transit Curves

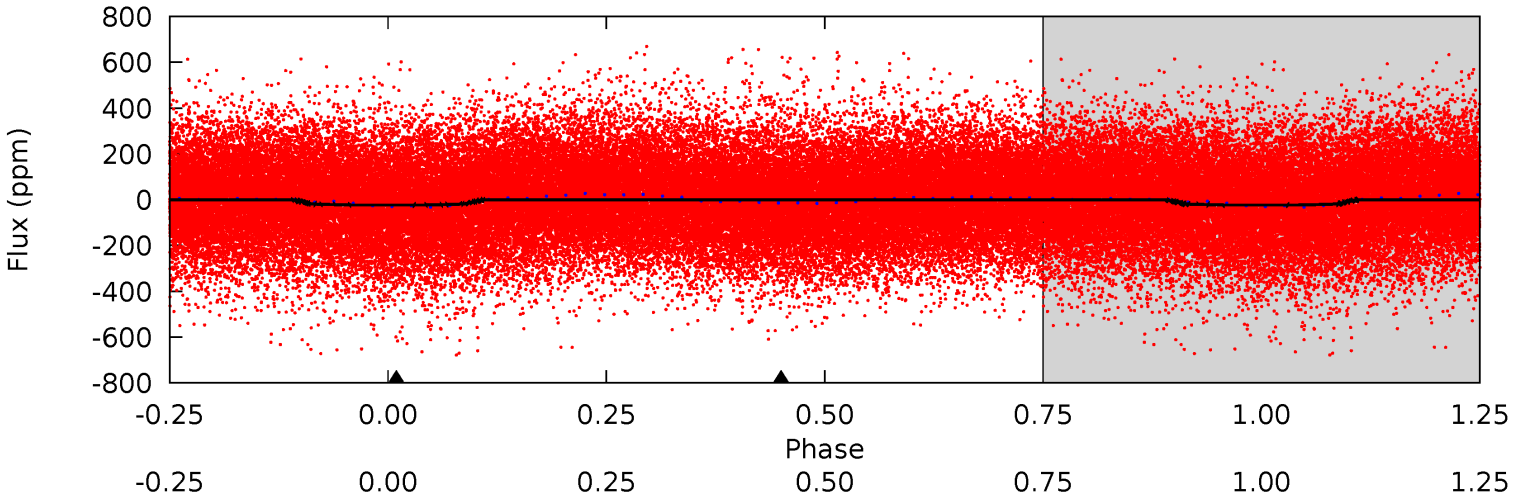
TCE 009536870-01 P= 0.943391 Days T_0=131.865087 (BKJD)

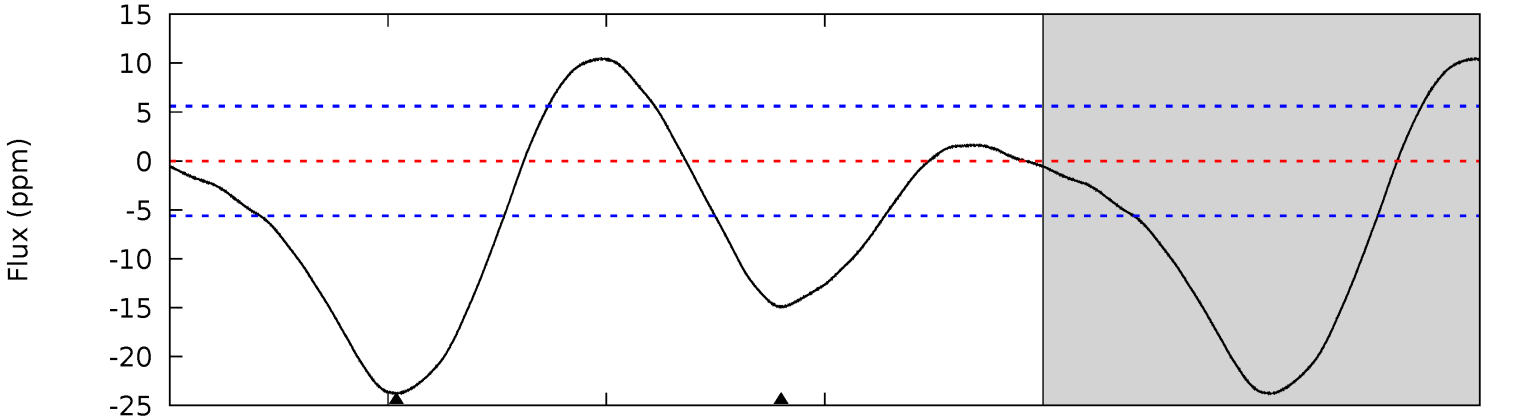


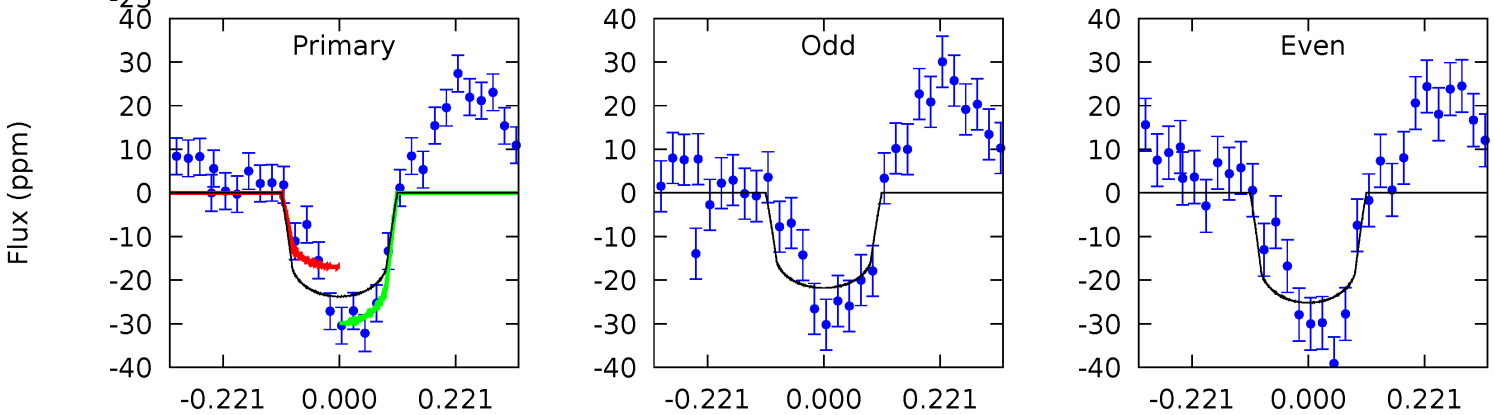
DV Model-Shift Uniqueness Test

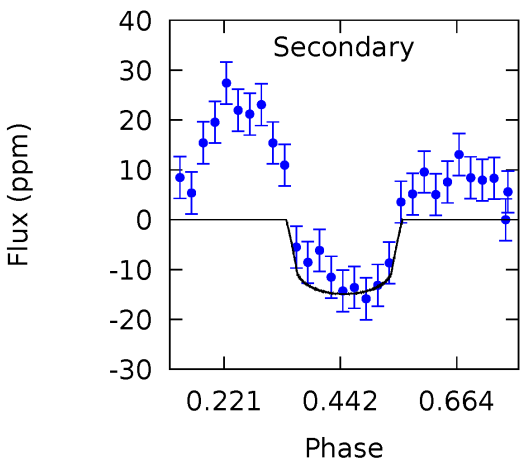
009536870-01, P = 0.943322 Days, E = 130.935970 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.6	11.7	0	0	4.40	1.22	0.87	18.6	18.6	11.7	11.7	1.33	1.01	0.31	4.89





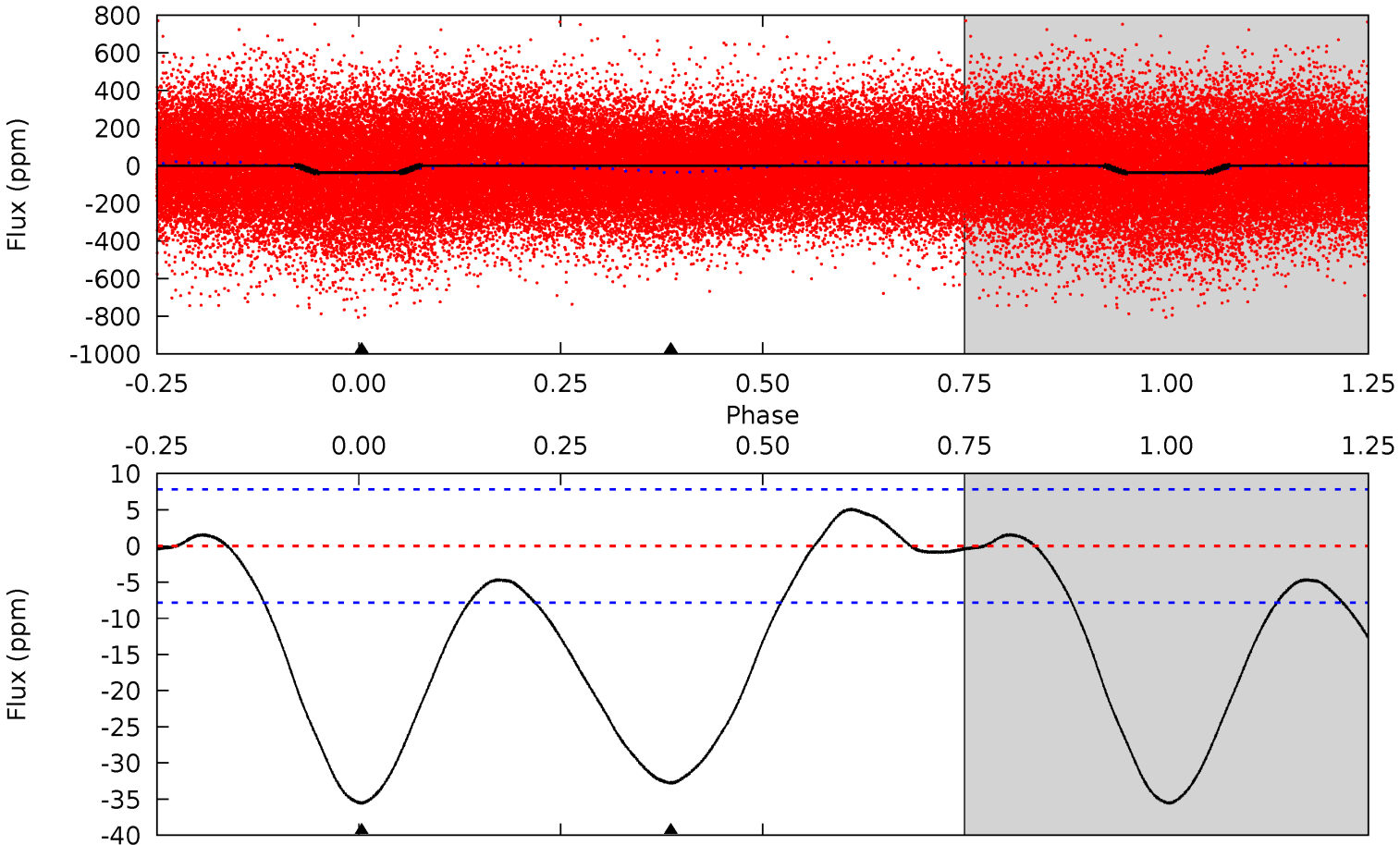


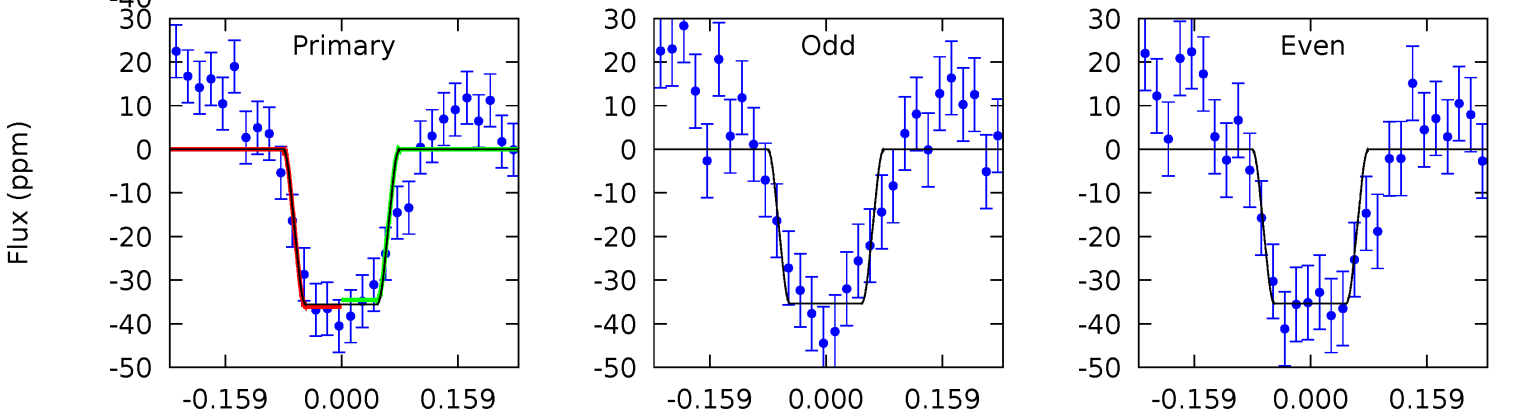


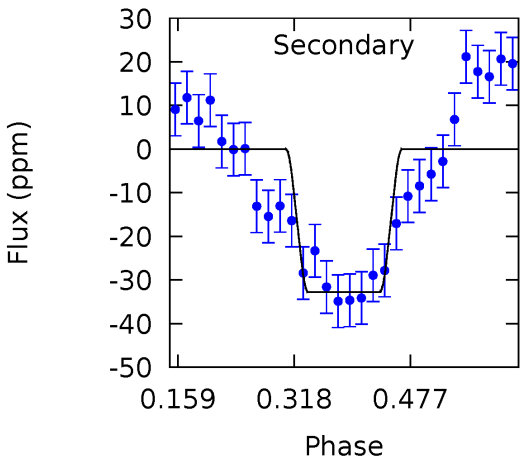
Alt Model-Shift Uniqueness Test

009536870-01, P = 0.943391 Days, E = 130.921696 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.3	18.7	0	0	4.47	1.41	1.89	20.3	20.3	18.7	18.7	0.00	1.15	0.12	0.44







Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-01 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-15±1	$0.84^{+0.21}_{-0.19}$	3837^{+177}_{-185}	6334^{+922}_{-693}	$5.316^{+3.658}_{-1.999}$
Alt.	-33±2	$1.25^{+0.22}_{-0.22}$	3834^{+179}_{-190}	6266^{+560}_{-445}	$5.180^{+2.485}_{-1.426}$

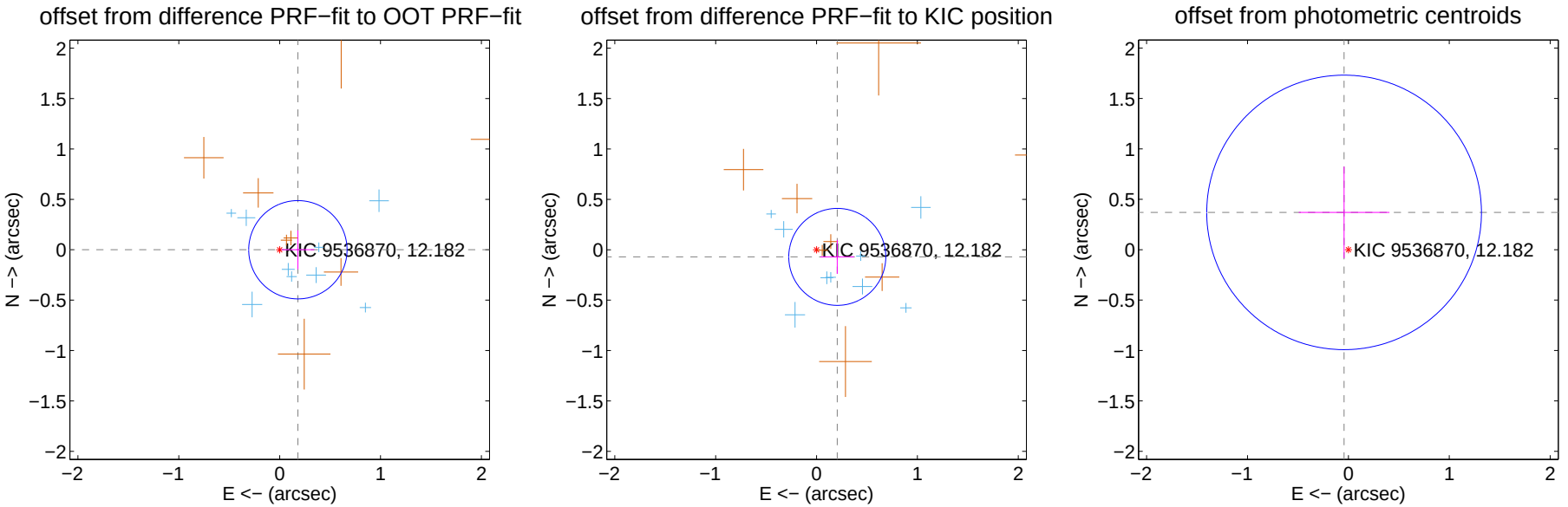
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

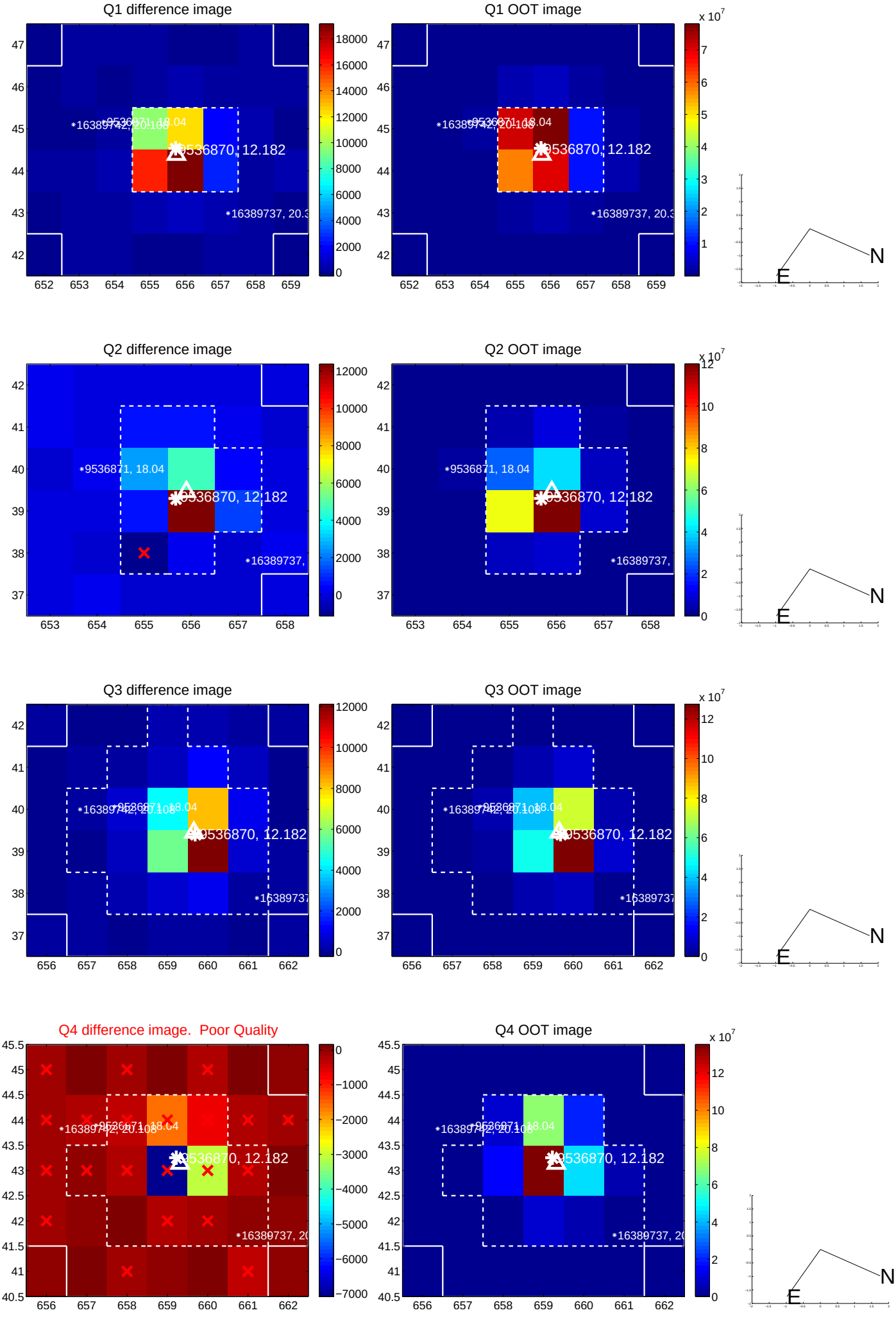
Supplemental centroid analysis for 009536870-01. Kepler magnitude: 12.18. Transit SNR 8.22
There are 9 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.181 ± 0.163	1.11	-0.181 ± 0.163	0.000 ± 0.192
PRF-fit source offset from KIC position	0.217 ± 0.160	1.36	-0.206 ± 0.167	-0.071 ± 0.168
photometric centroid source offset	0.37 ± 0.45	0.82	0.04 ± 0.45	0.37 ± 0.45

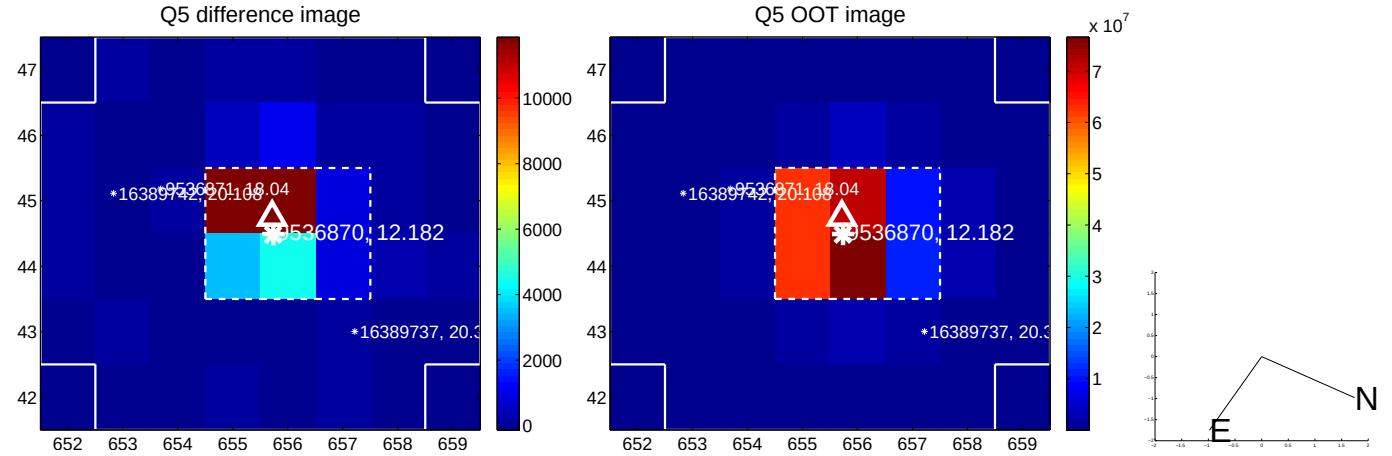


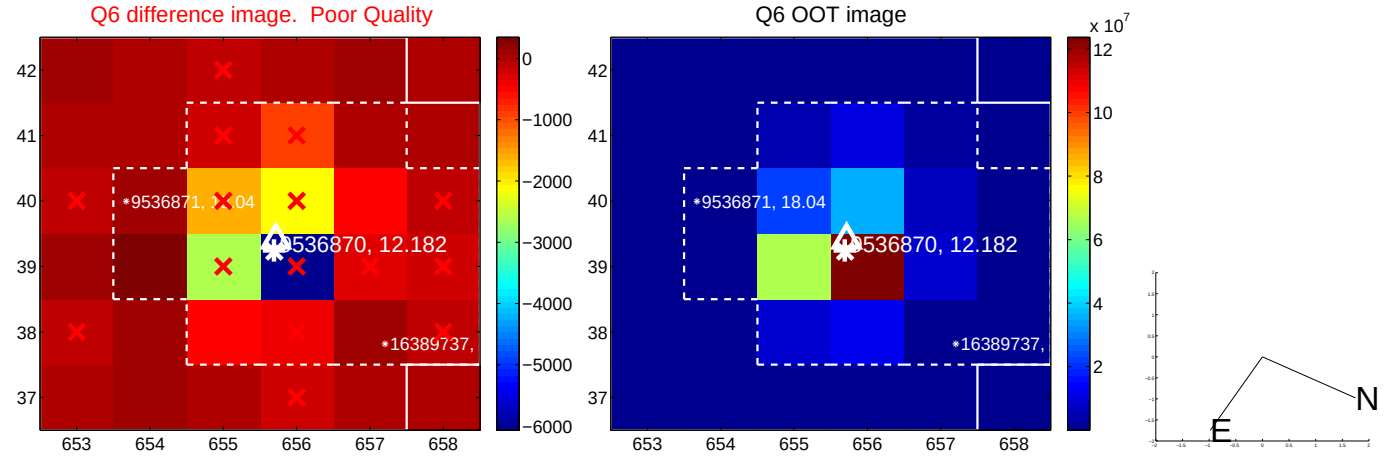
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

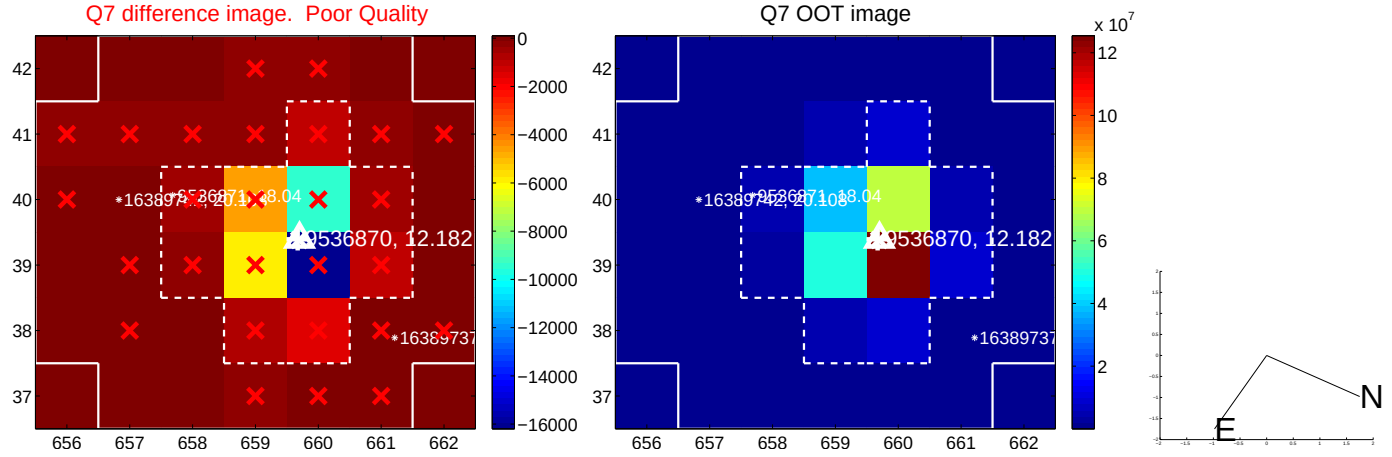
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

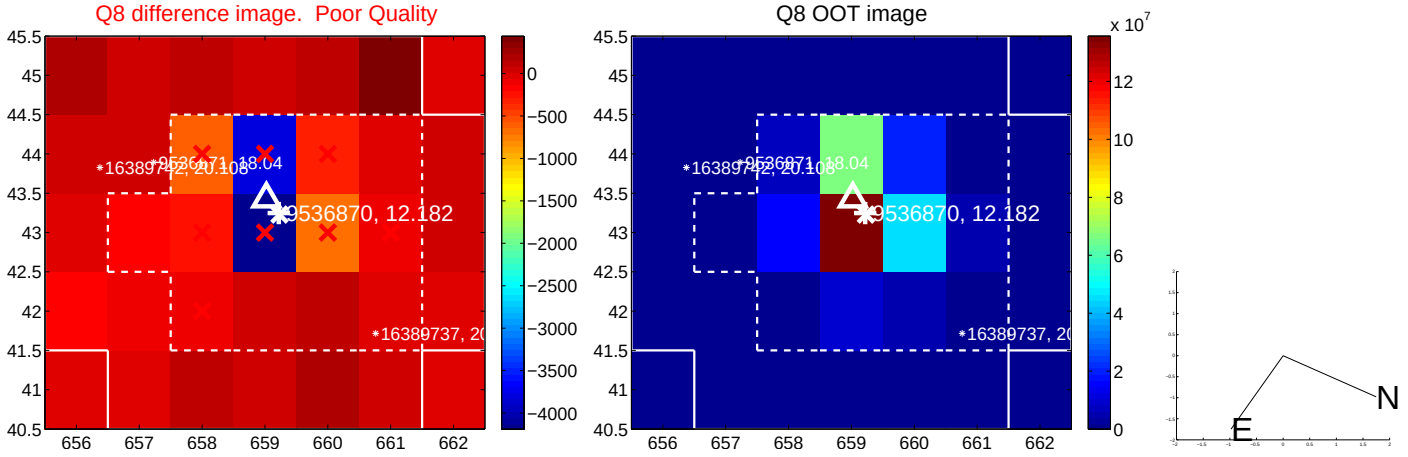


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

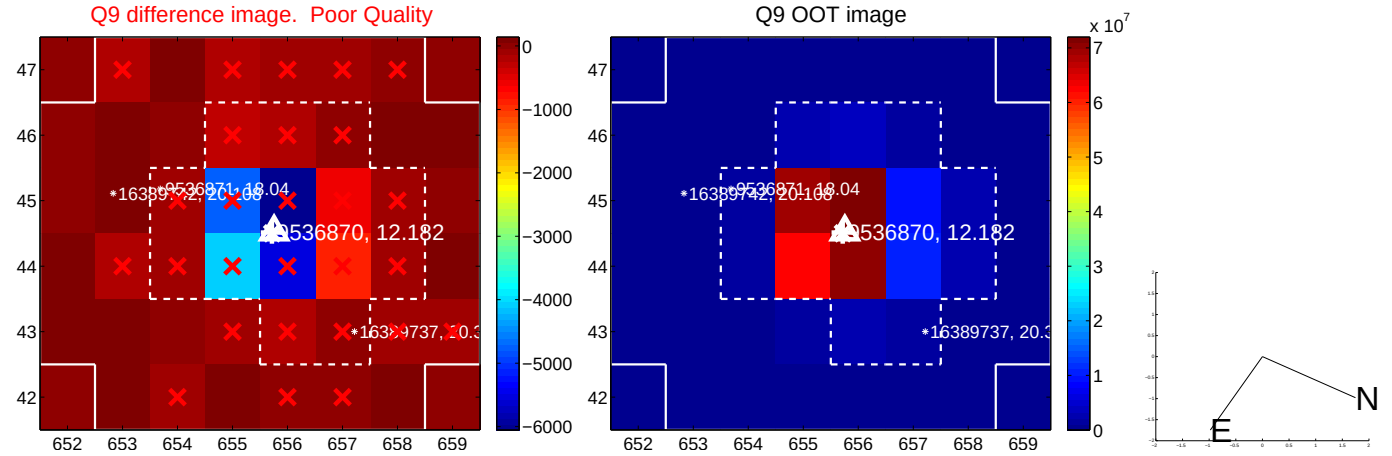


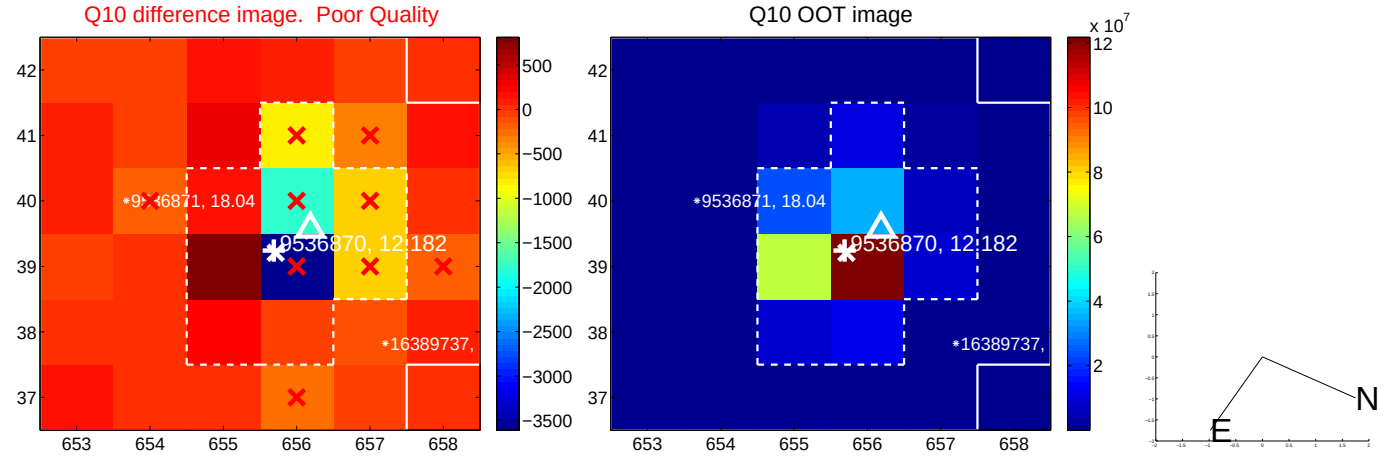


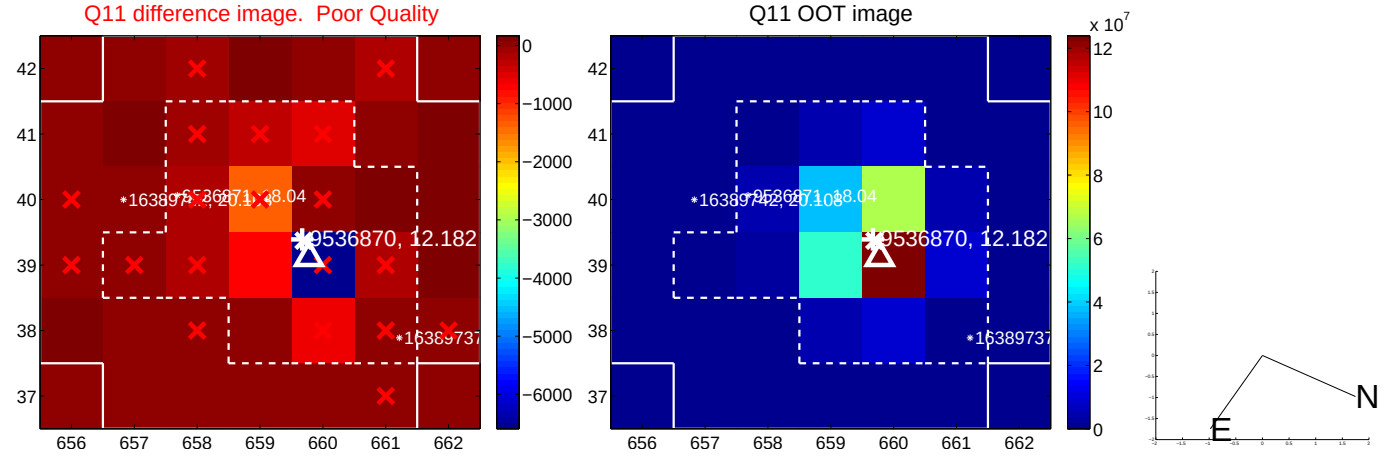


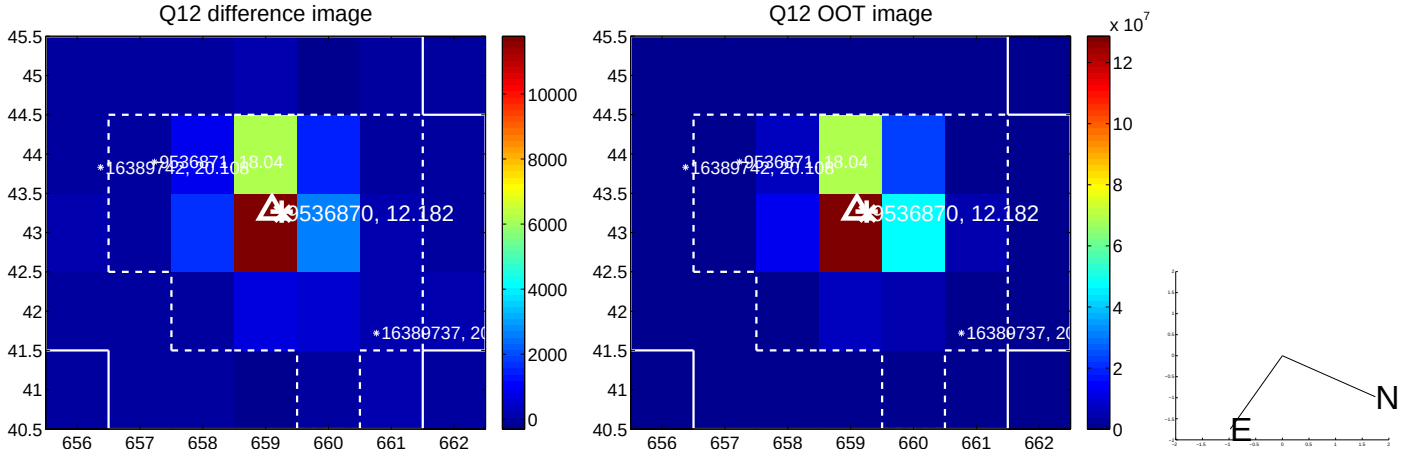


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

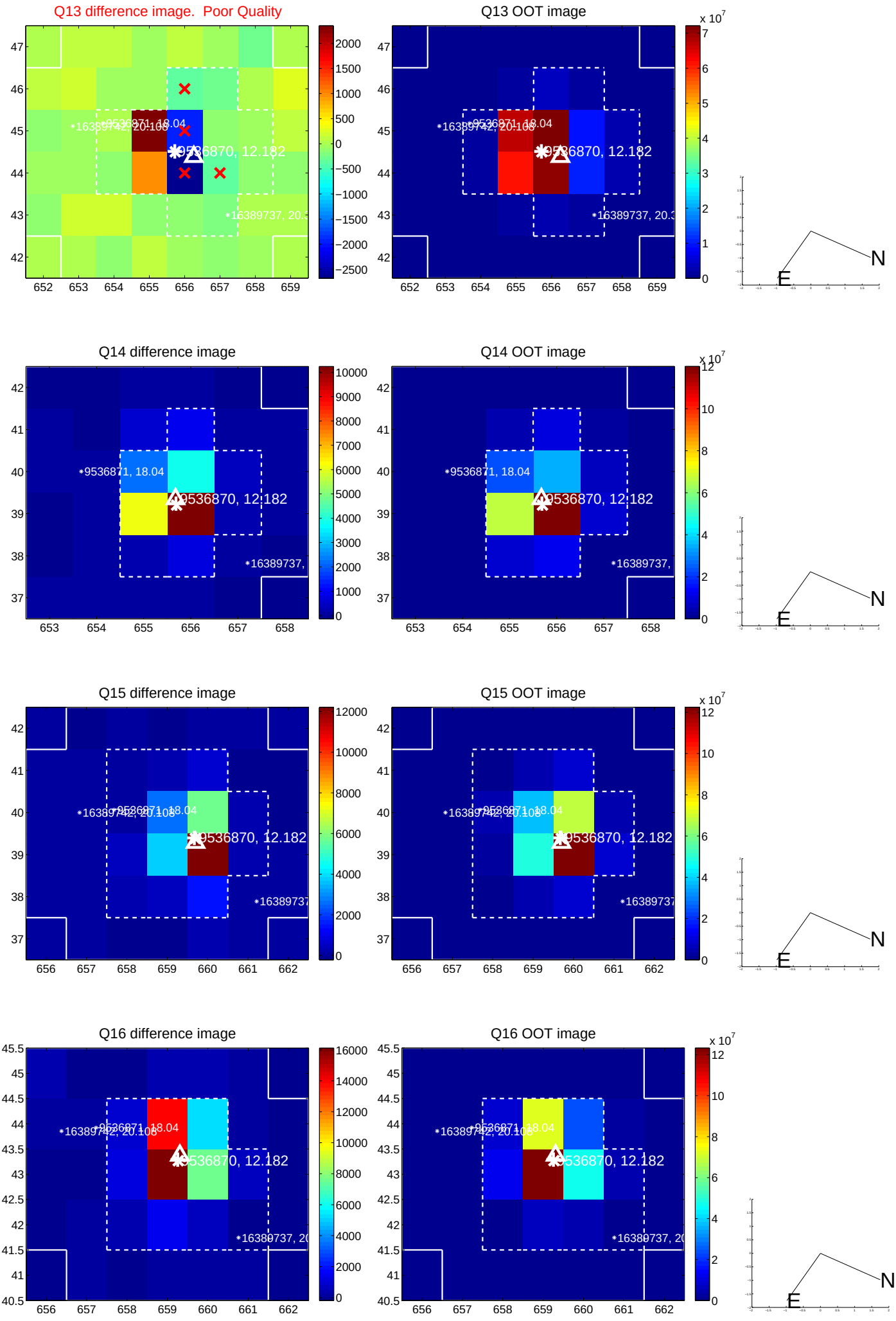




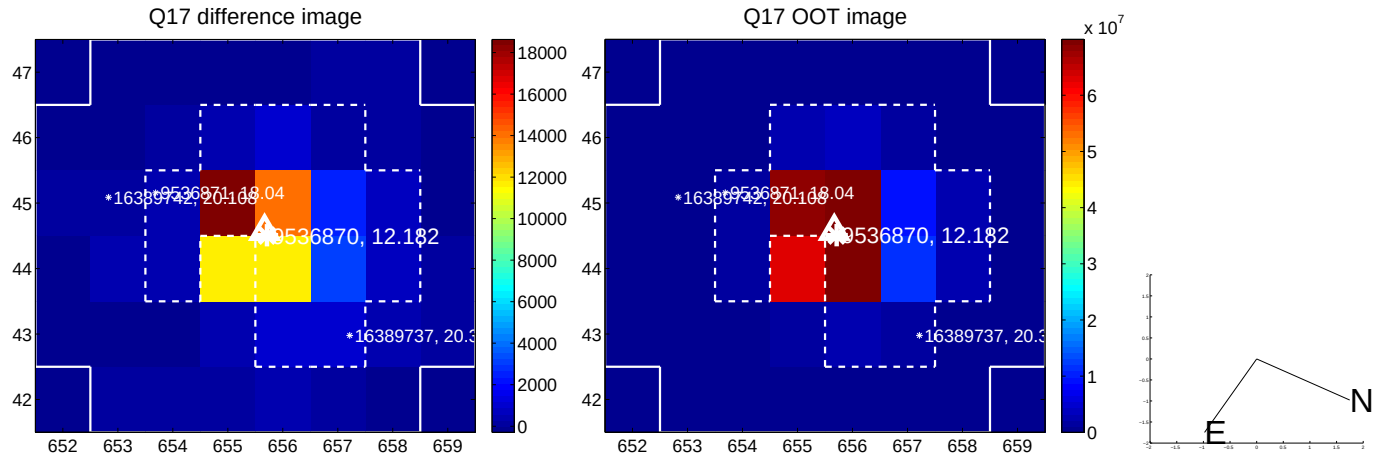


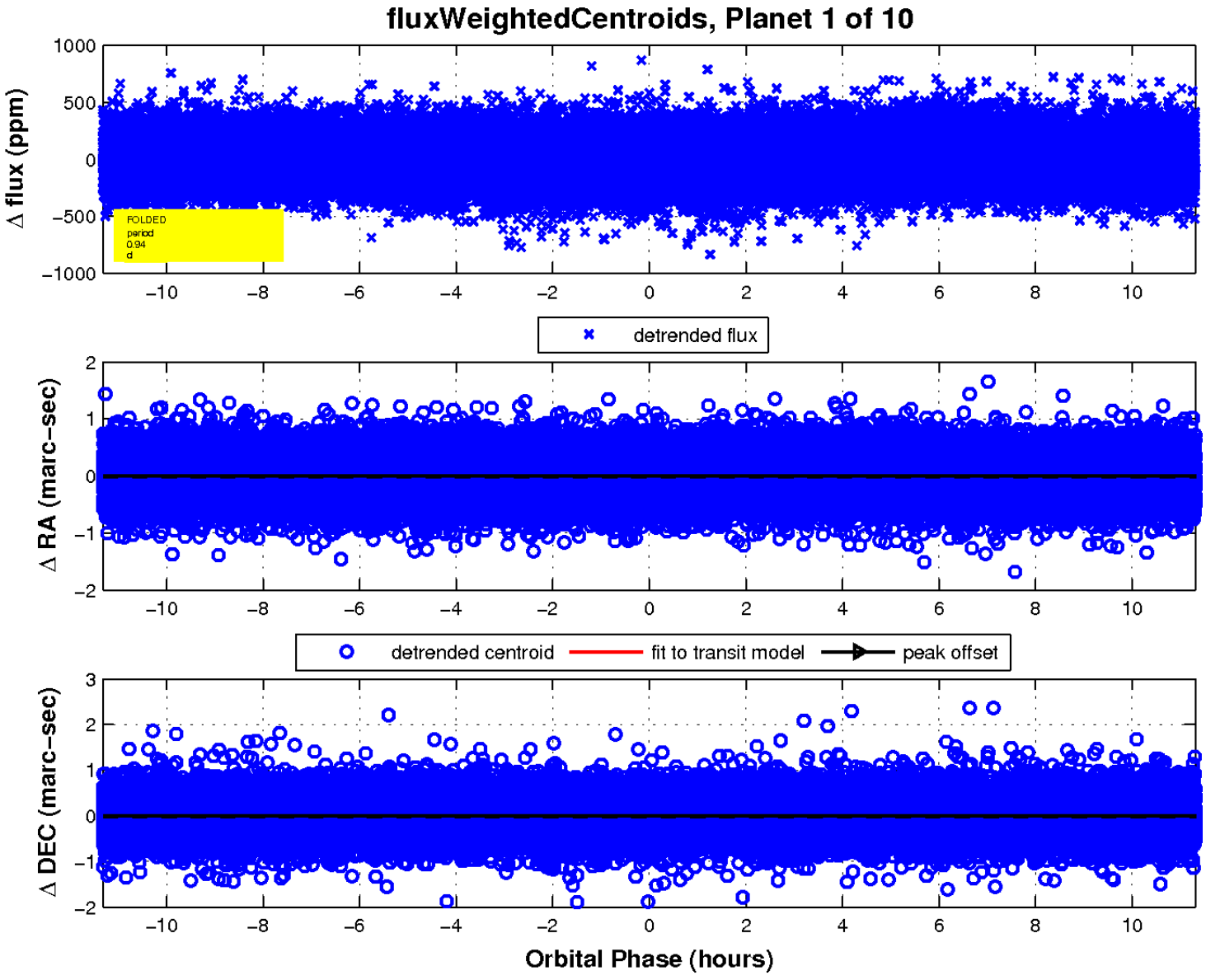


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

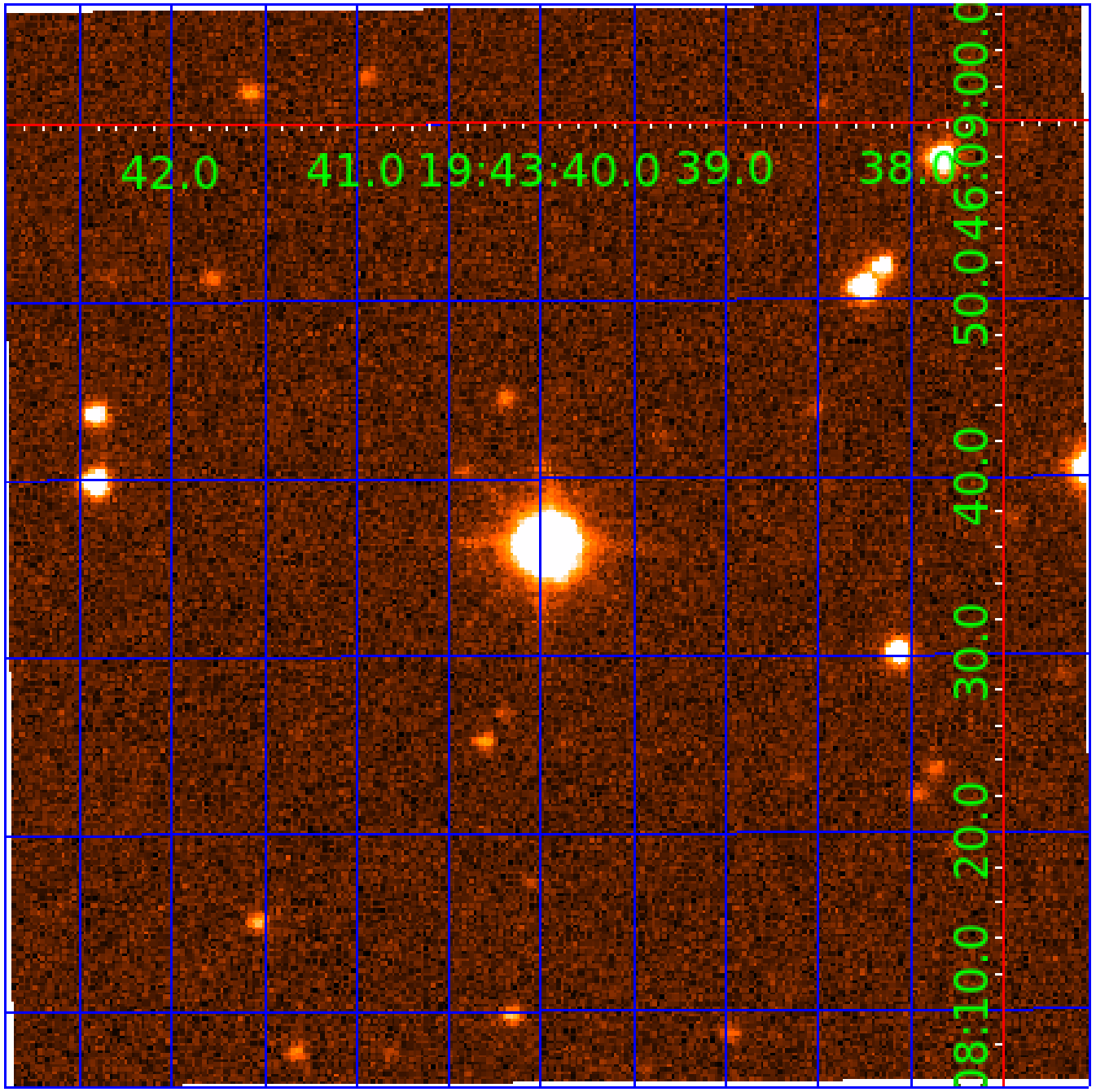


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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46:
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40.0
30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

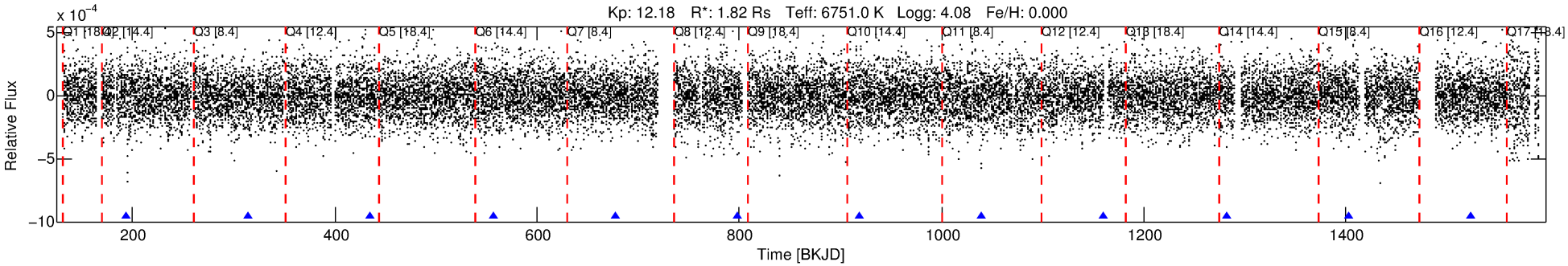
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

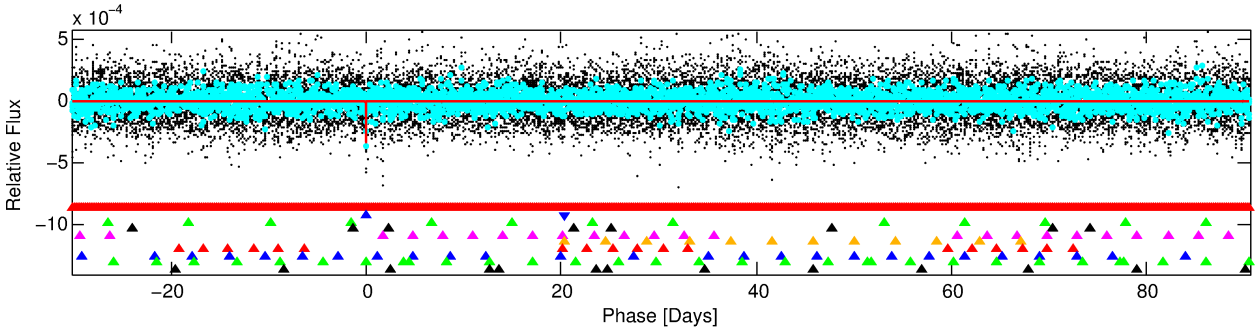
Ephemeris Match Information For 009536870-02

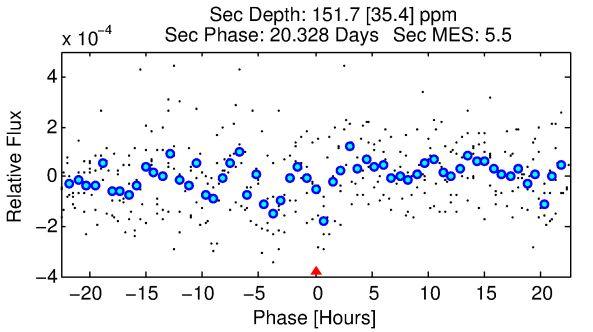
No Significant Match Found

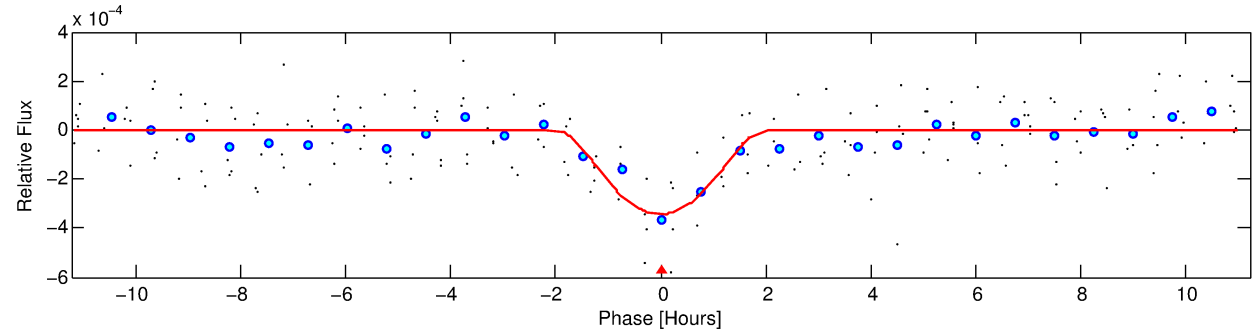
DV One-Page Summary

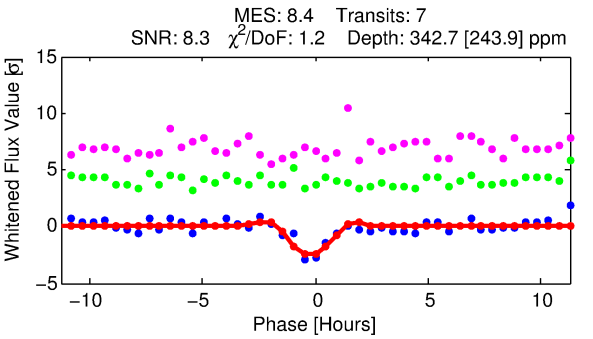
KIC: 9536870 Candidate: 2 of 10 Period: 120.824 d

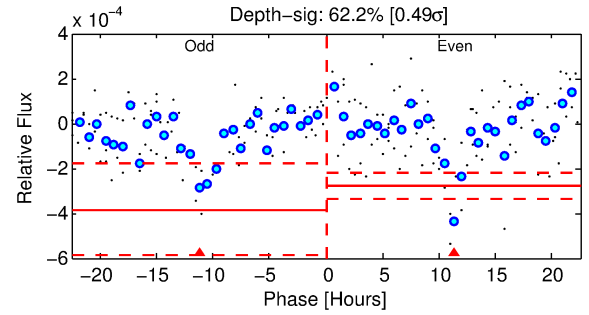


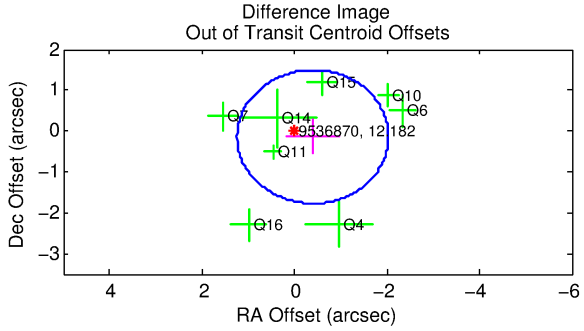












DV Fit Results:

Period = 120.82351 [0.00416] d
Epoch = 193.9932 [0.0338] BKJD
Rp/R* = 0.0329 [0.1350]
a/R* = 63.80 [70.86]
b = 1.00 [0.21]

Seff = 20.97 [5.38]
Teq = 546 [35] K
Rp = 6.53 [26.78] Re
a = 0.5410 [0.0874] AU

Ag = 573.64 [4706.74] [0.12σ]
Teffp = 4129 [8465] K [0.42σ]

DV Diagnostic Results:

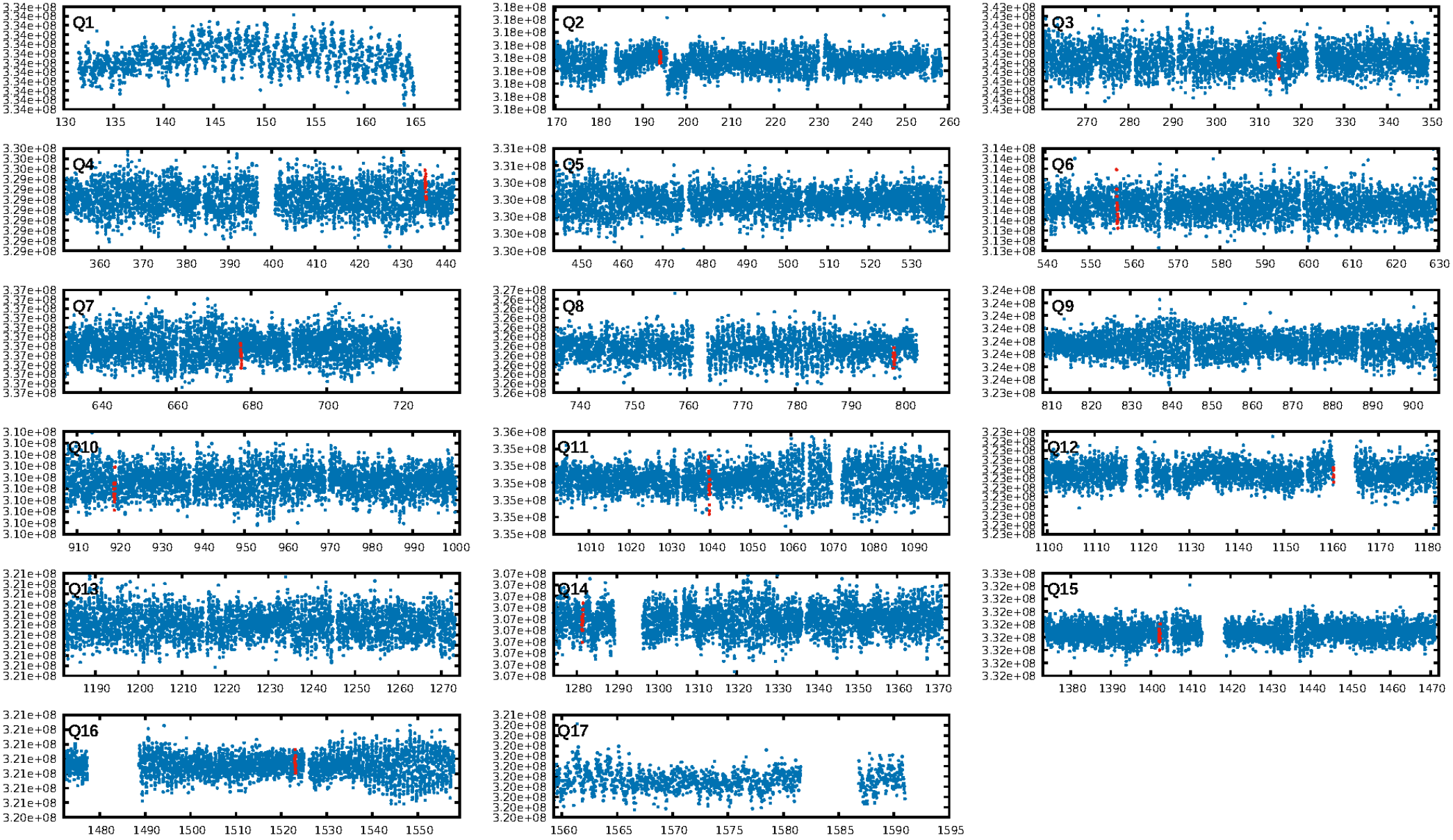
ShortPeriod−sig: 100.0% [39.19σ]
LongPeriod−sig: 100.0% [22.53σ]
ModelChiSquare2−sig: 48.4%
ModelChiSquareGof−sig: 100.0%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [7/7]
GhostDiagnostic−chr: −1.4

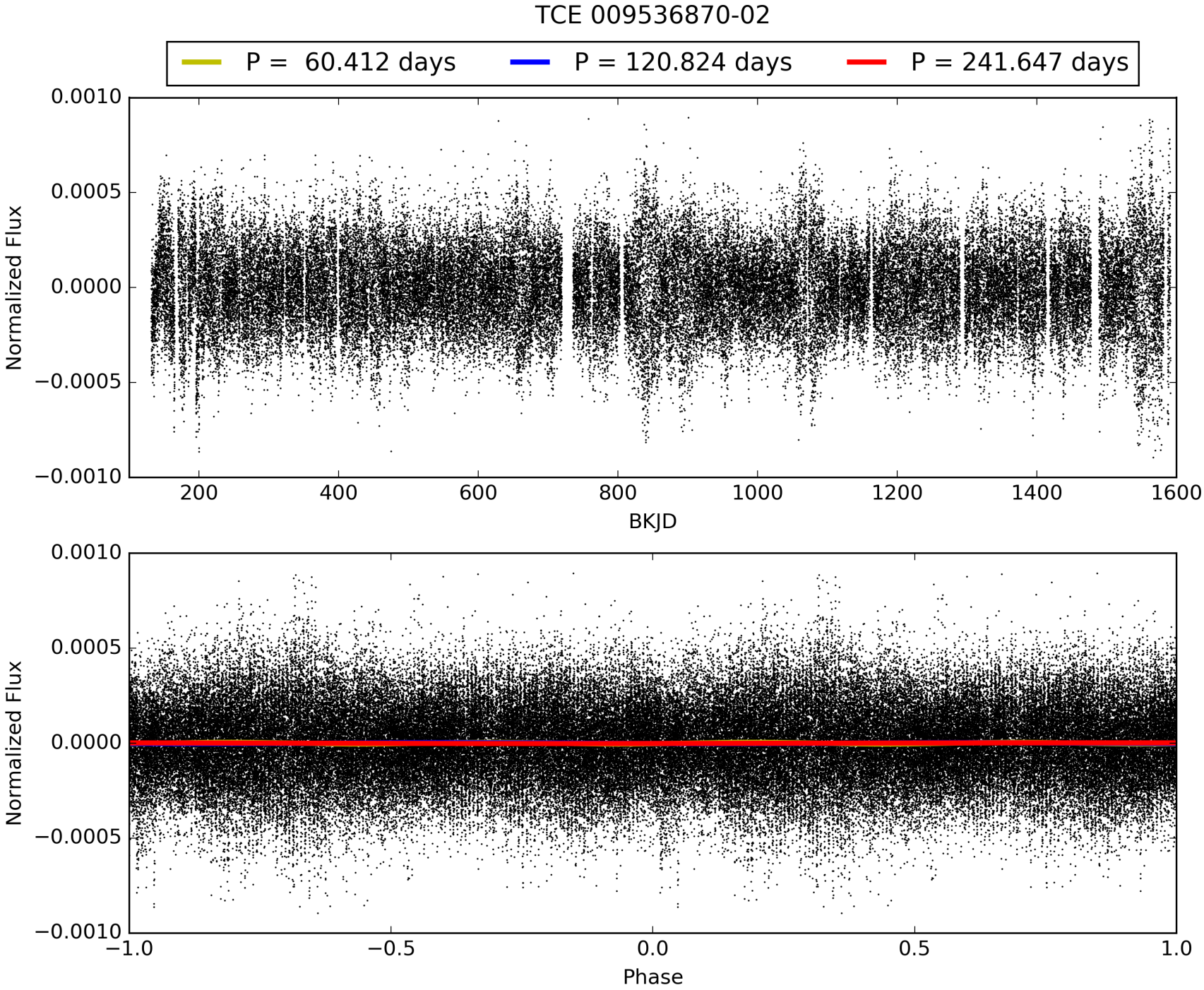
Centroid−sig: 39.5%
Centroid−so: 0.464 arcsec [1.06σ]
OotOffset−rm: 0.419 arcsec [0.77σ]
KicOffset−rm: 0.496 arcsec [0.93σ]
OotOffset−st: 3/3/2/0 [8]
KicOffset−st: 3/3/2/0 [8]
DiffImageQuality−fgm: 0.75 [6/8]
DiffImageOverlap−fno: 0.00 [0/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:11 Z

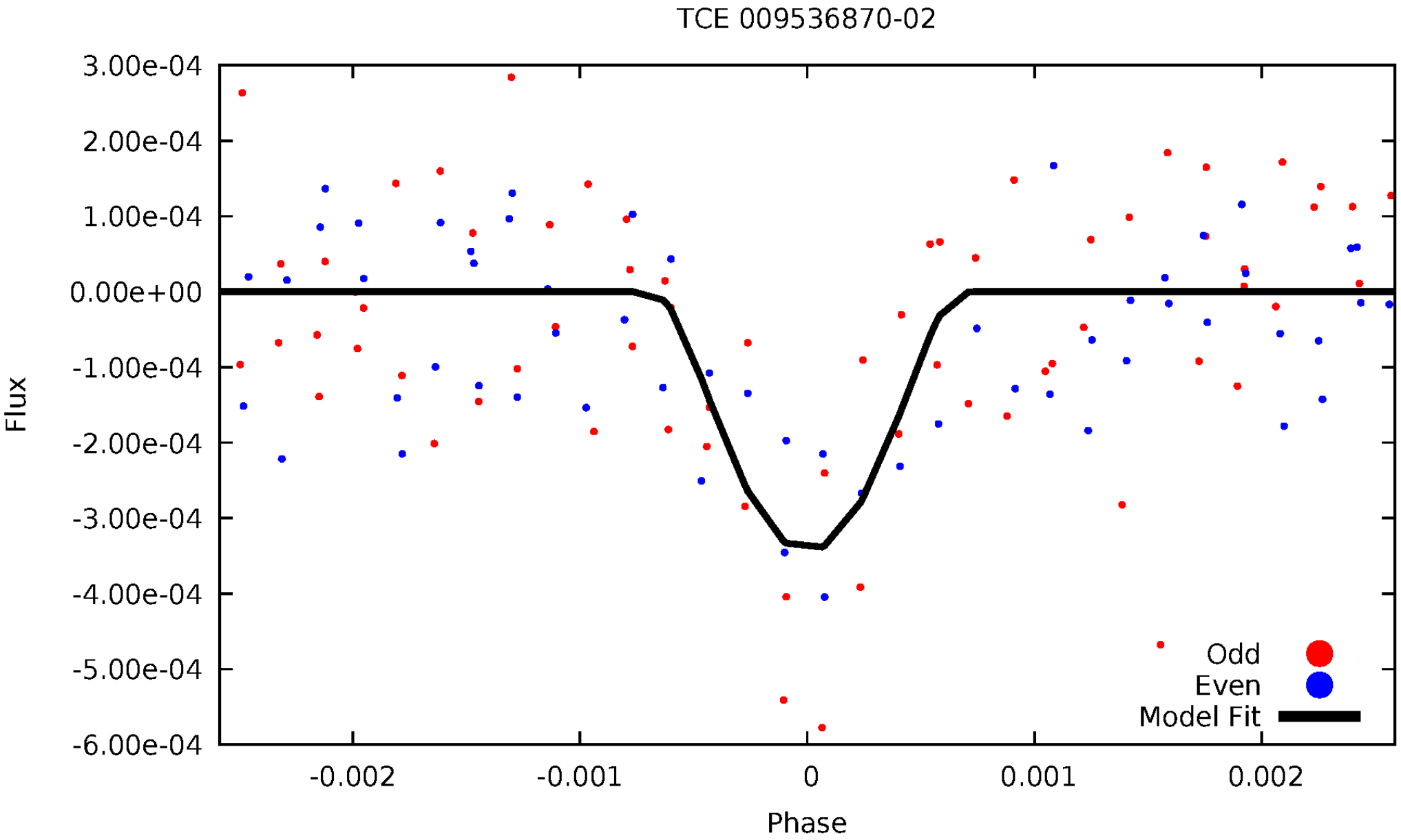
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

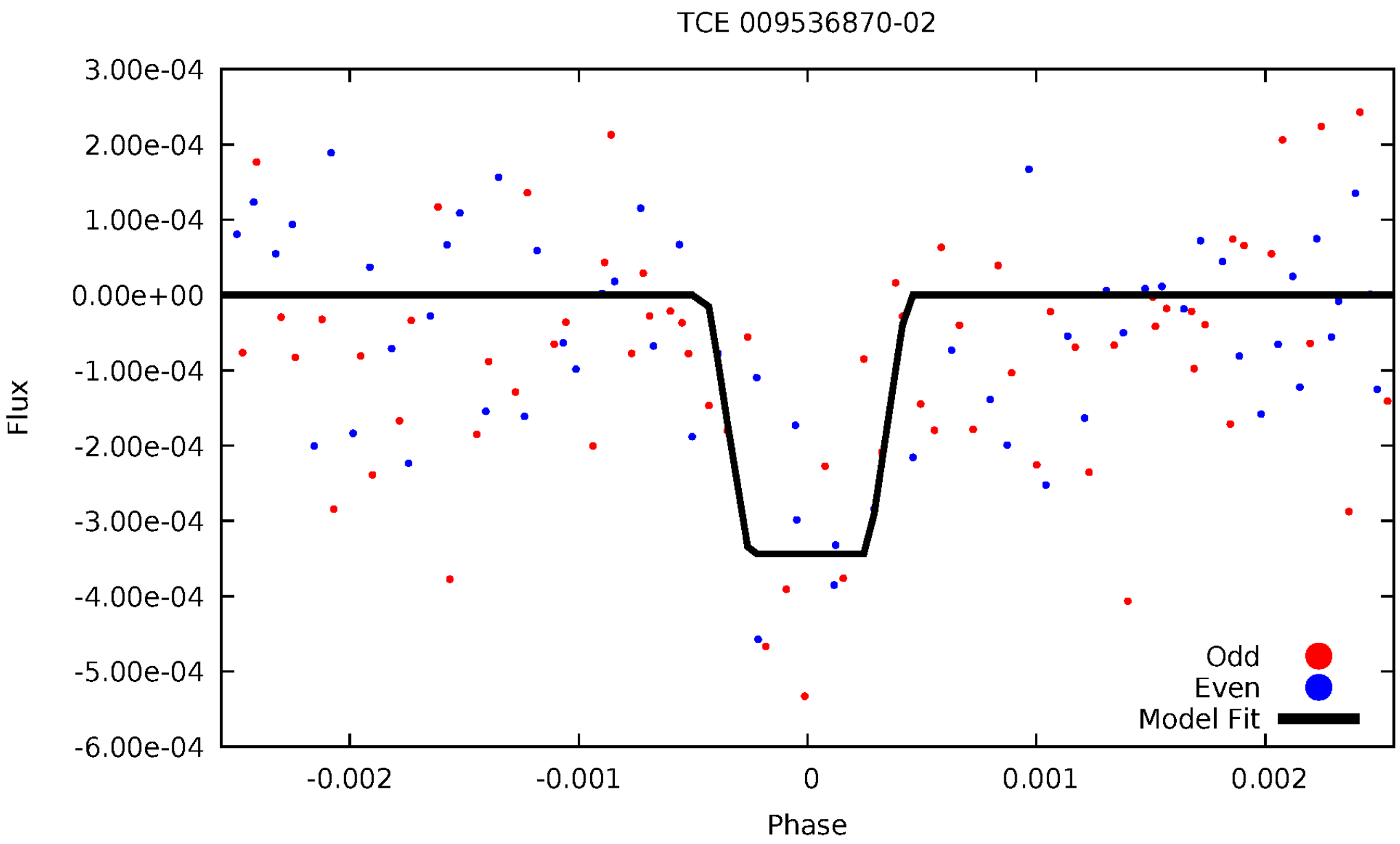
TCE 009536870-02, PDC Light Curves



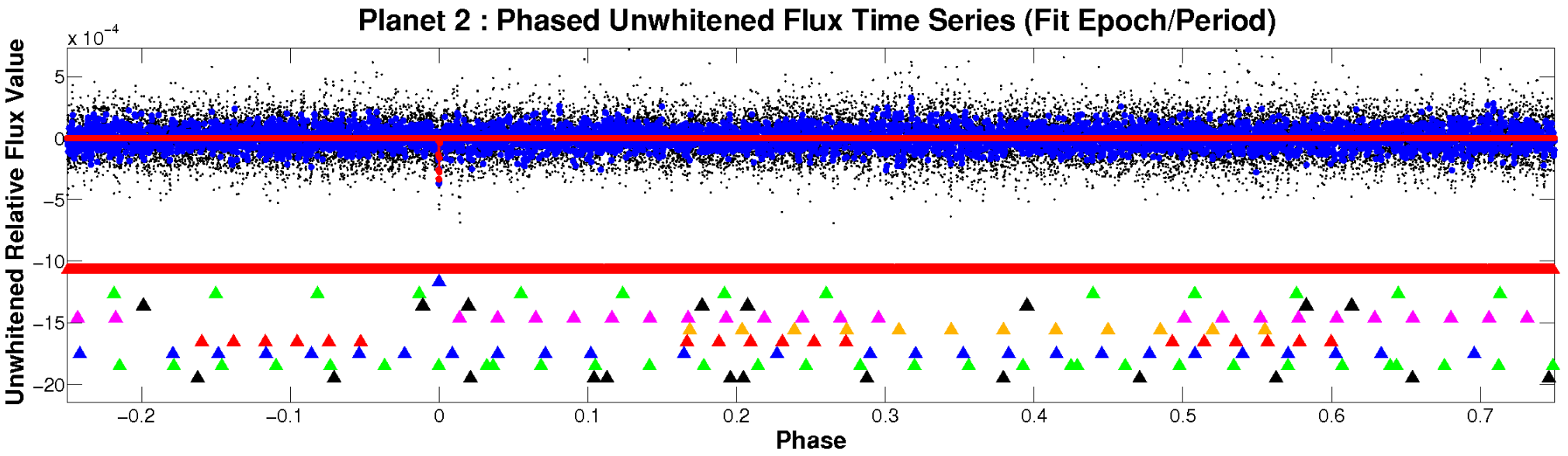

TCE 009536870-02
P = 60.412 days
P = 120.824 days
P = 241.647 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

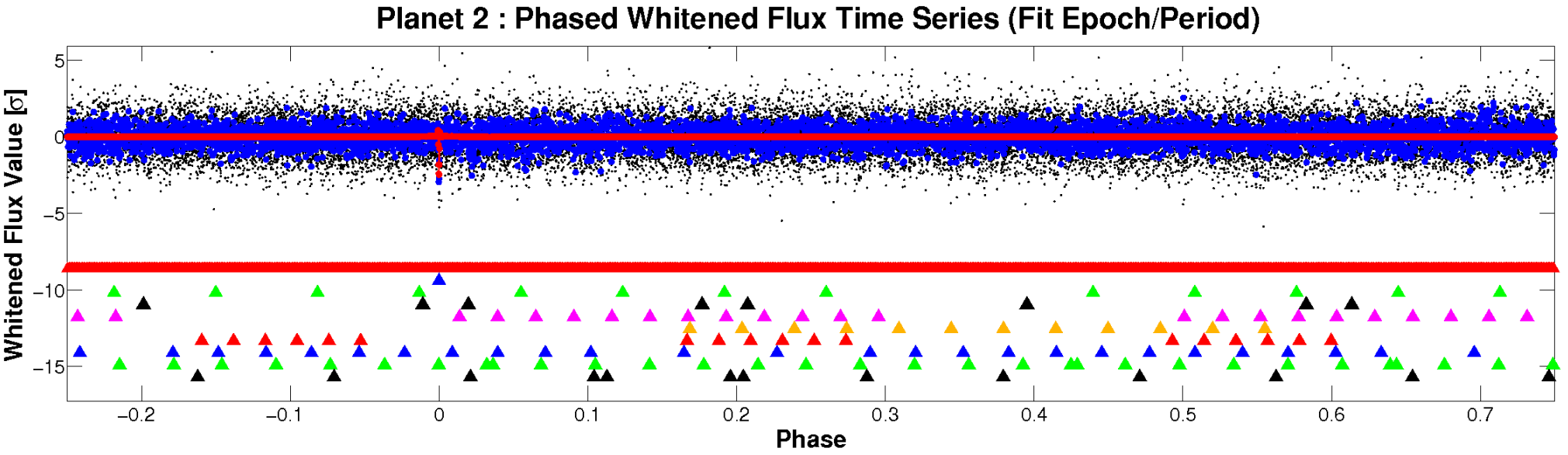
DV Odd/Even


TCE 009536870-02
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
-6.00e-04
Flux
-0.002
-0.001
0
0.001
0.002
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-02
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
-6.00e-04
Flux
-0.002
-0.001
0
0.001
0.002
Phase
Odd
Even
Model Fit

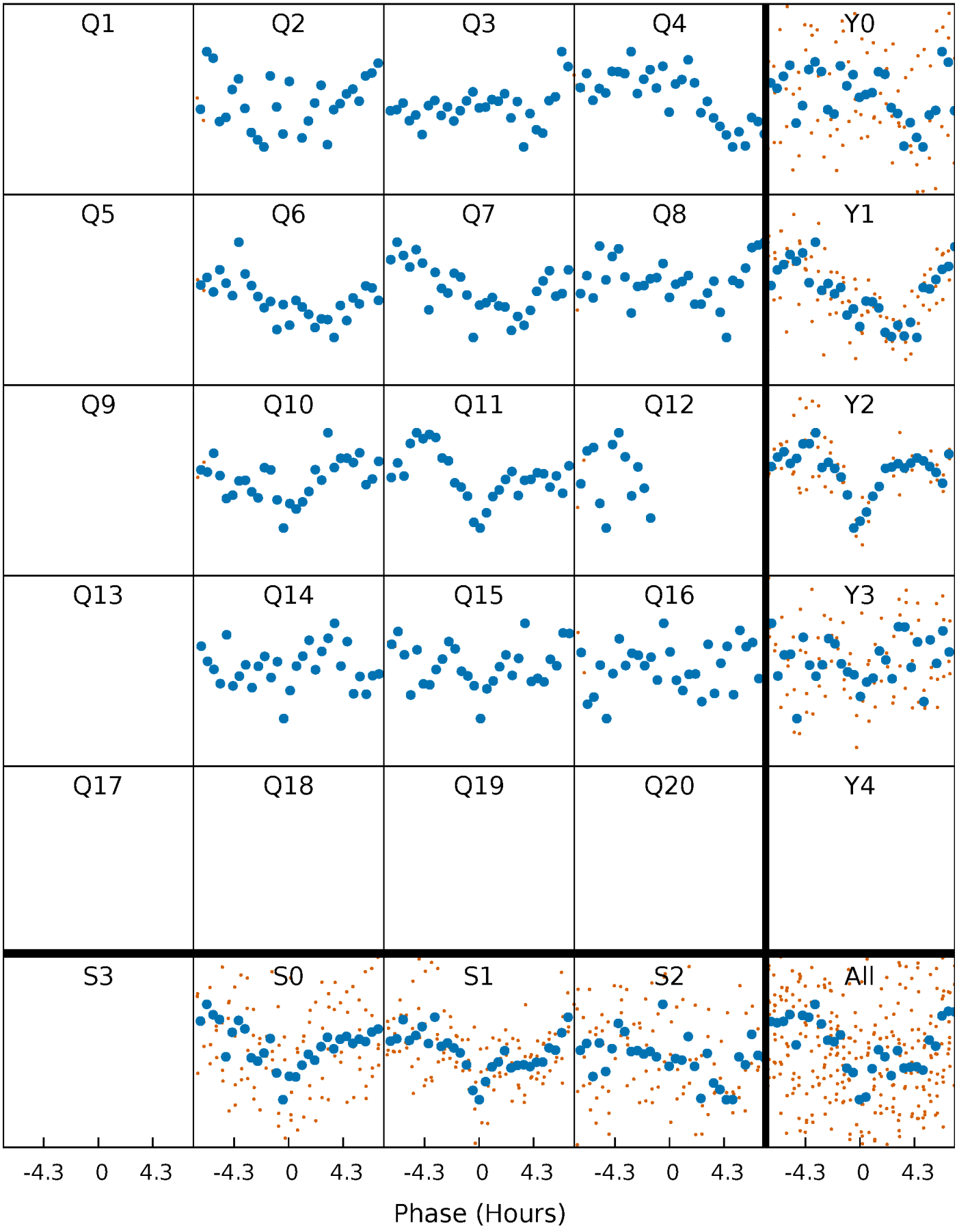
Non-Whitened Vs. Whitened Light Curve





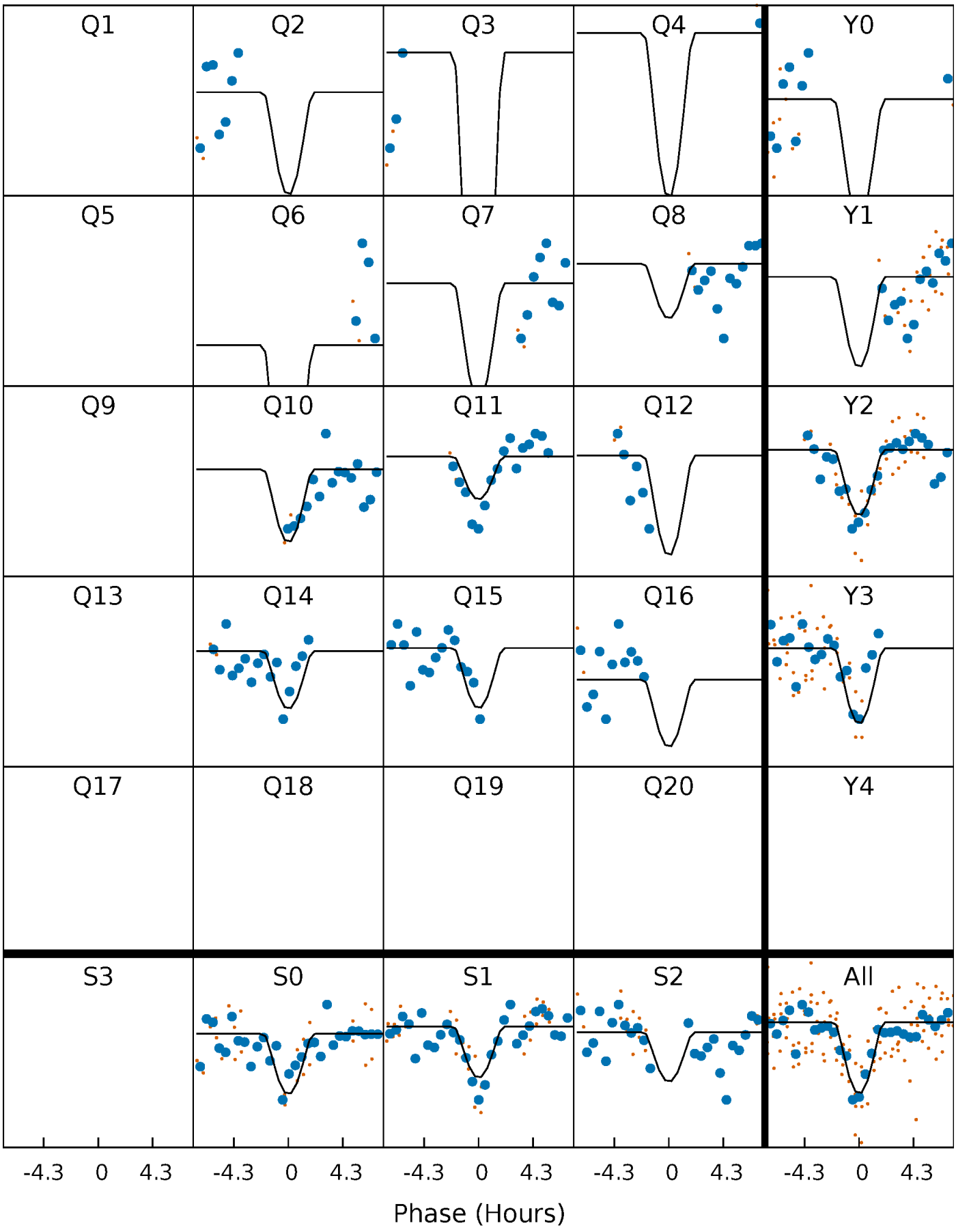
PDC Quarter-Phased Transit Curves

TCE 009536870-02 P=120.823506 Days T_0=193.993213 (BKJD)



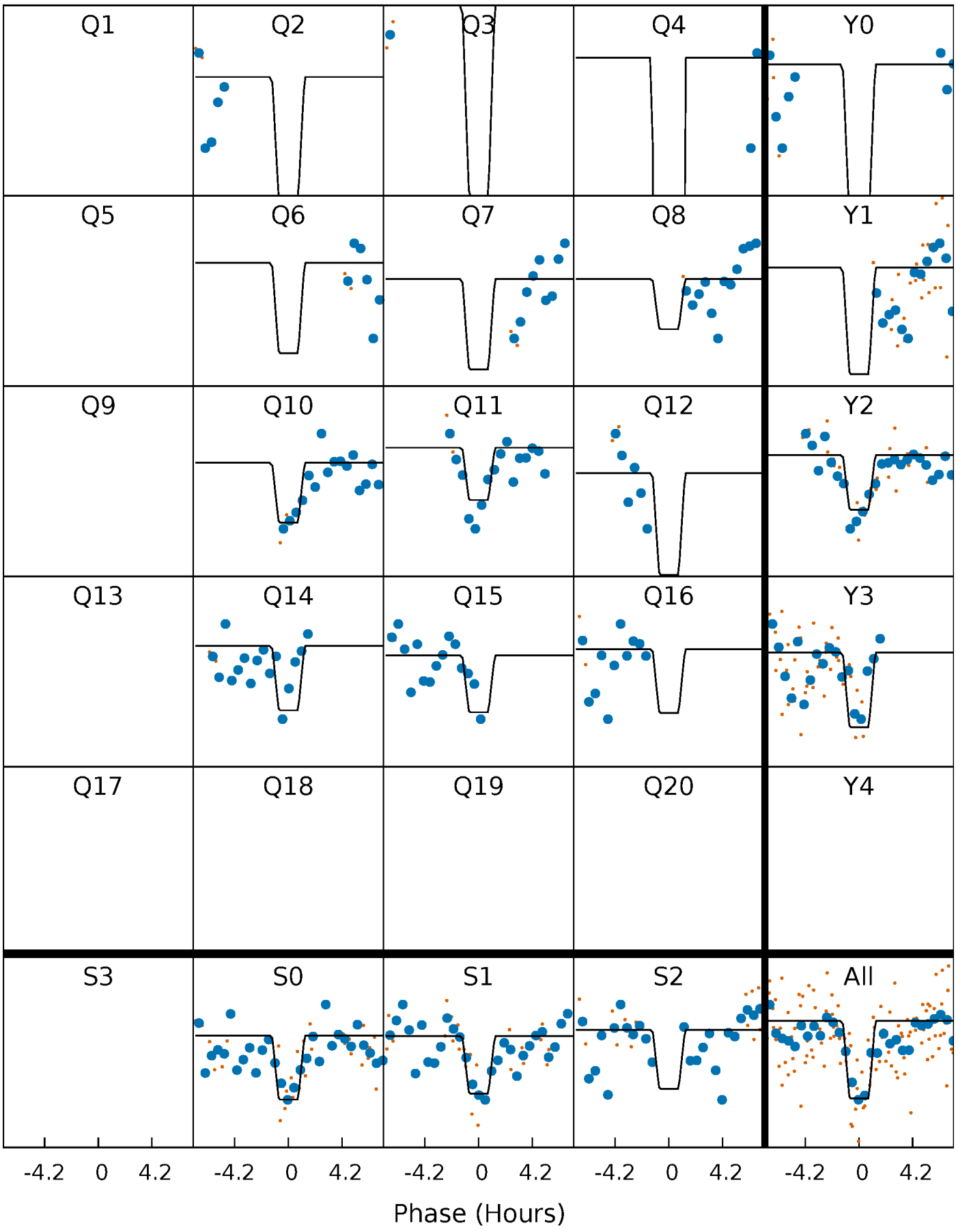
DV Quarter-Phased Transit Curves

TCE 009536870-02 P=120.823506 Days T_0=193.993213 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

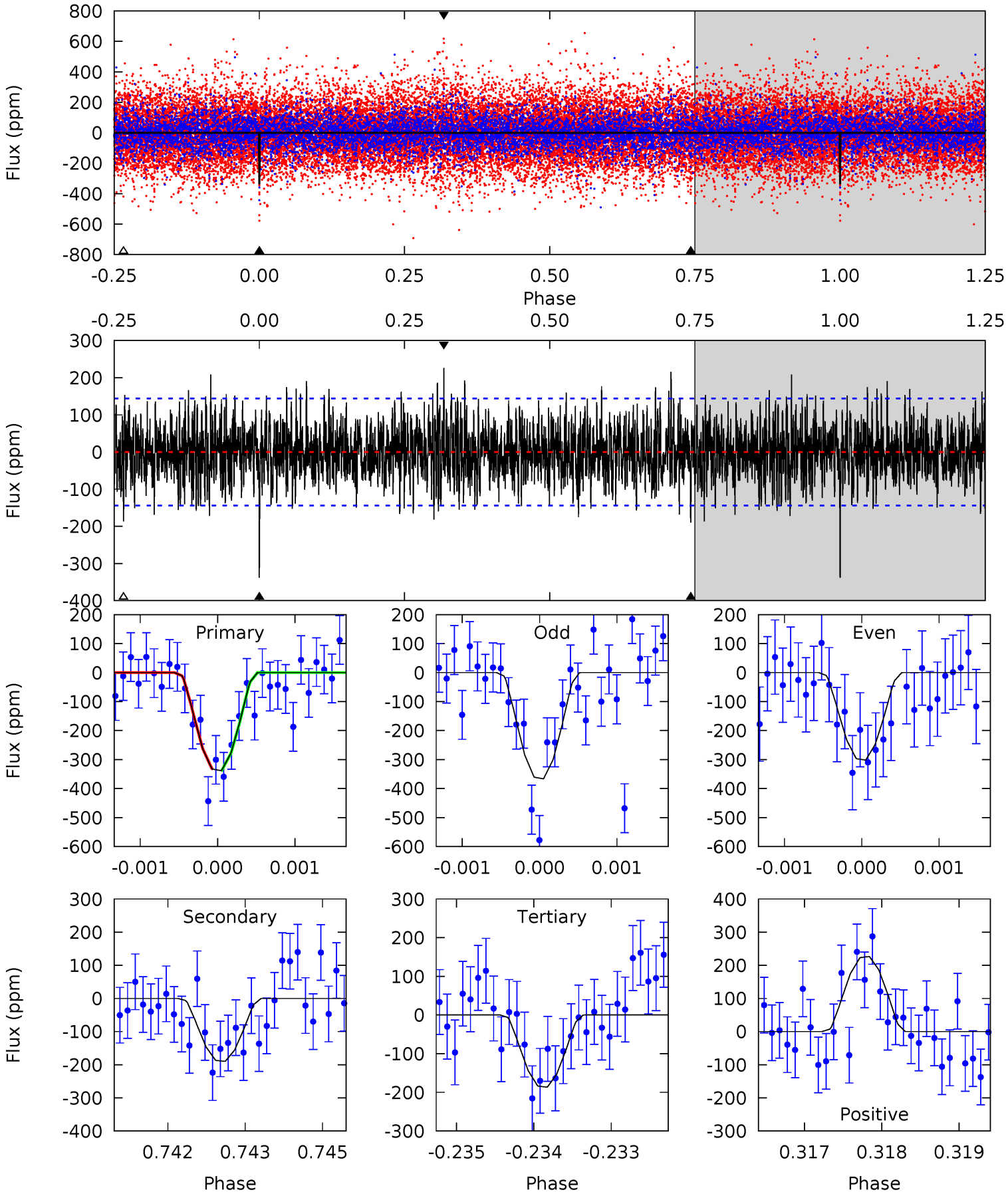
TCE 009536870-02 P=120.818797 Days T_0=194.035554 (BKJD)



DV Model-Shift Uniqueness Test

009536870-02, P = 120.823506 Days, E = 73.169707 Days

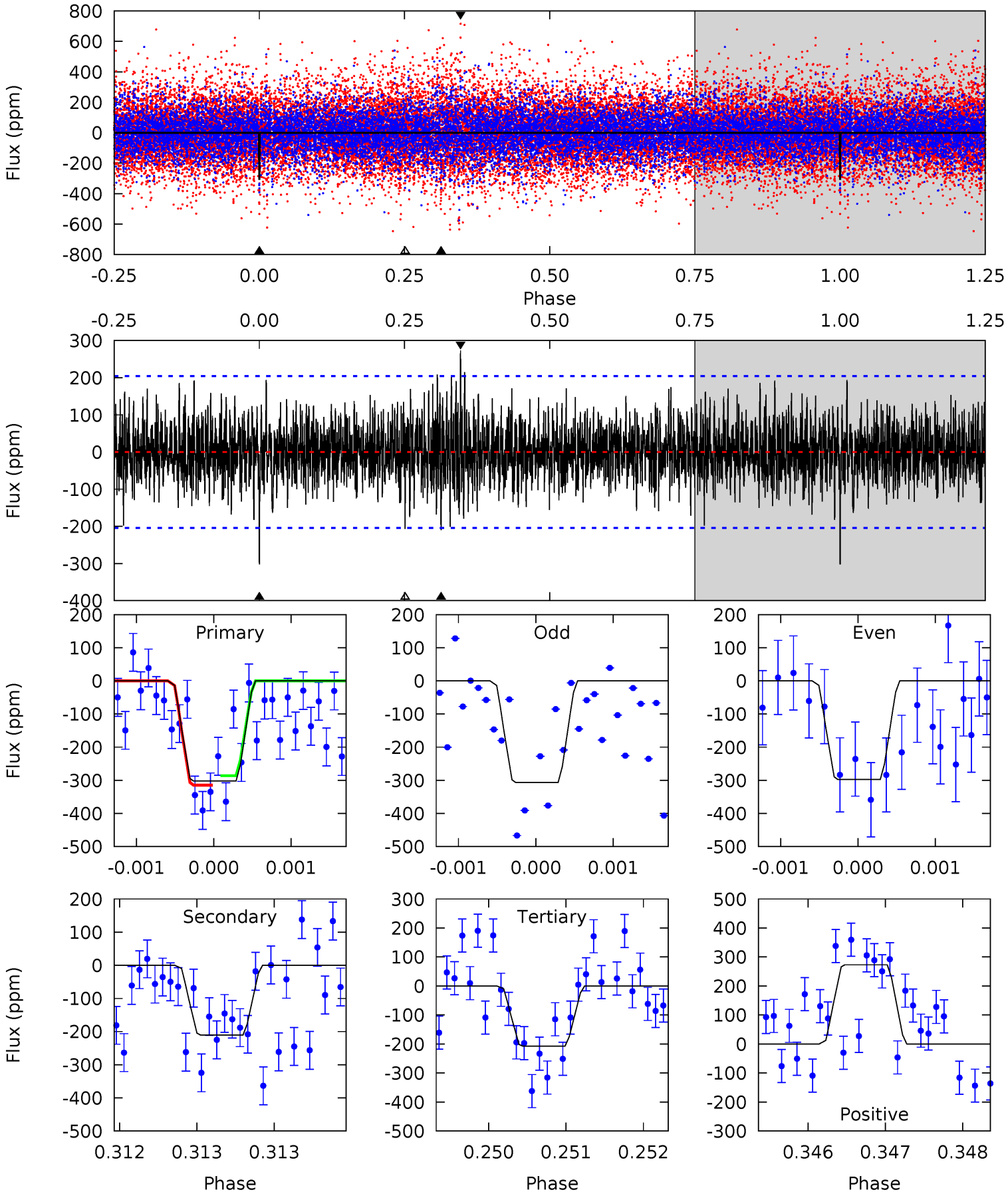
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	7.11	6.98	8.47	5.39	3.20	2.27	5.67	4.18	0.13	-1.36	1.17	0.98	0.40	0.13



Alt Model-Shift Uniqueness Test

009536870-02, P = 120.818797 Days, E = 73.216757 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.12	5.65	5.56	7.33	5.48	3.34	1.62	2.56	0.79	0.09	-1.68	0.12	1.04	0.47	0.39



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-02 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-190±27	$19.84^{+21.12}_{-13.27}$	758^{+35}_{-35}	3100^{+1382}_{-554}	80^{+625}_{-62}
Alt.	-210±37	$19.37^{+19.98}_{-13.42}$	760^{+37}_{-35}	3207^{+1522}_{-611}	92^{+863}_{-71}

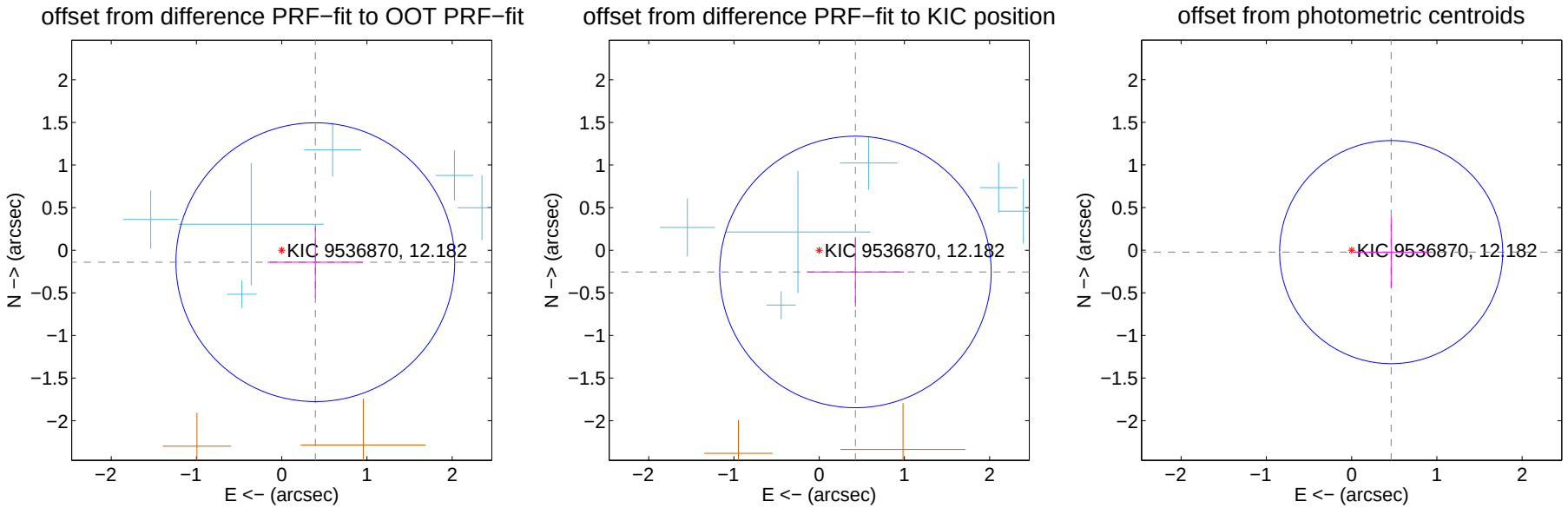
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

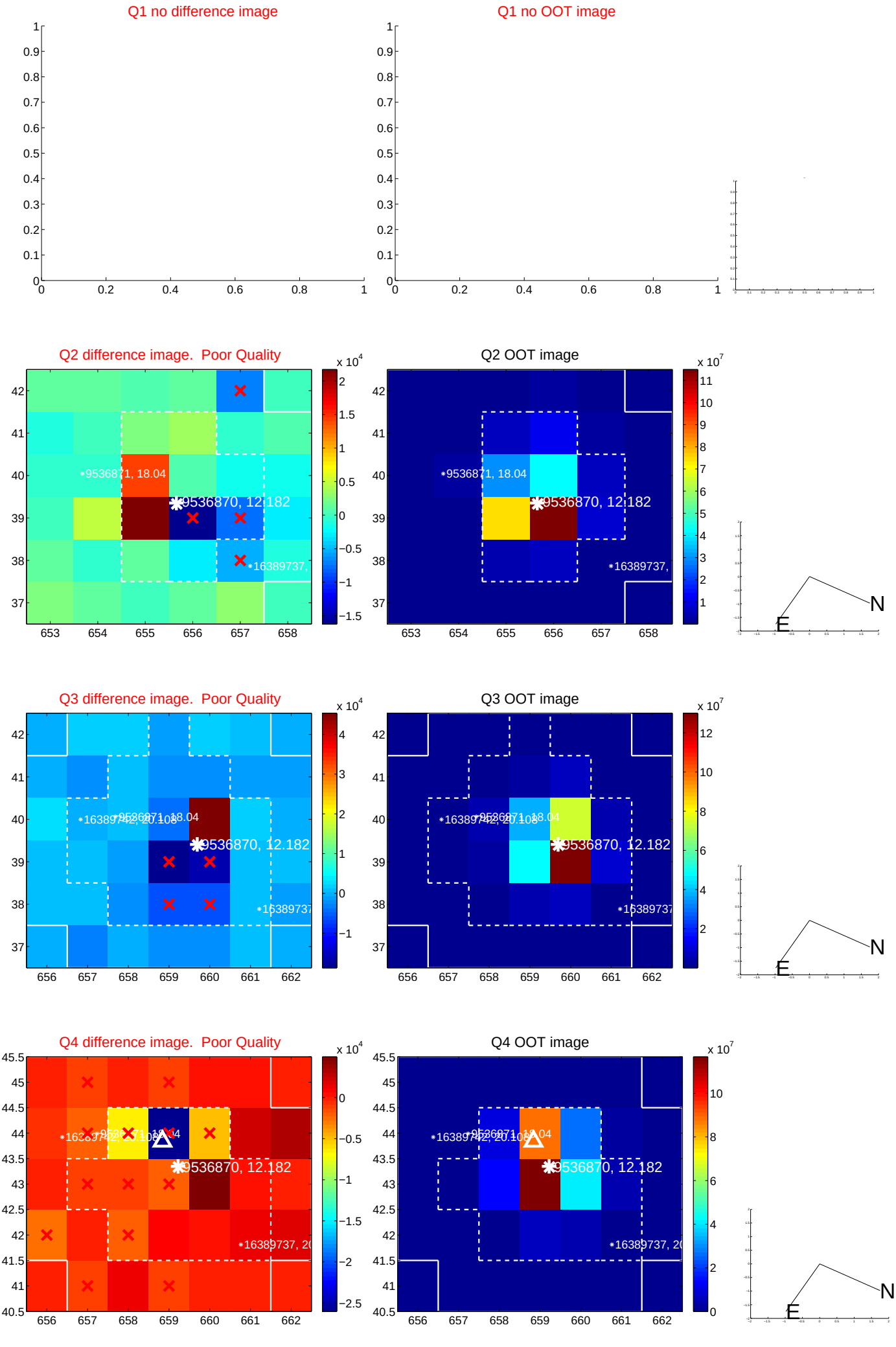
Supplemental centroid analysis for 009536870-02. Kepler magnitude: 12.18. Transit SNR 8.27
There are 6 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.419 ± 0.545	0.77	-0.394 ± 0.560	-0.140 ± 0.412
PRF-fit source offset from KIC position	0.496 ± 0.531	0.93	-0.425 ± 0.569	-0.255 ± 0.408
photometric centroid source offset	0.46 ± 0.44	1.06	-0.46 ± 0.44	-0.02 ± 0.42

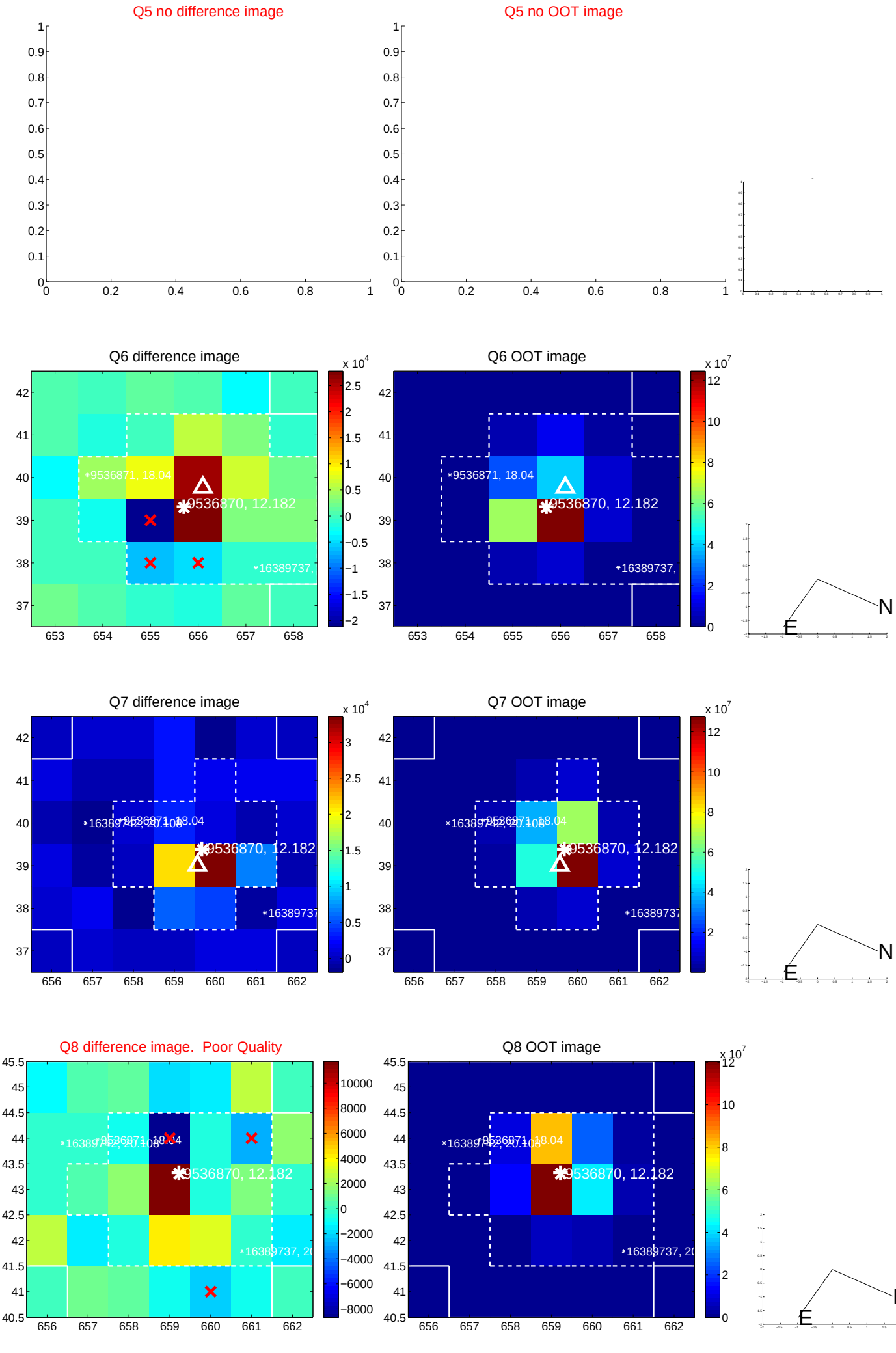


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

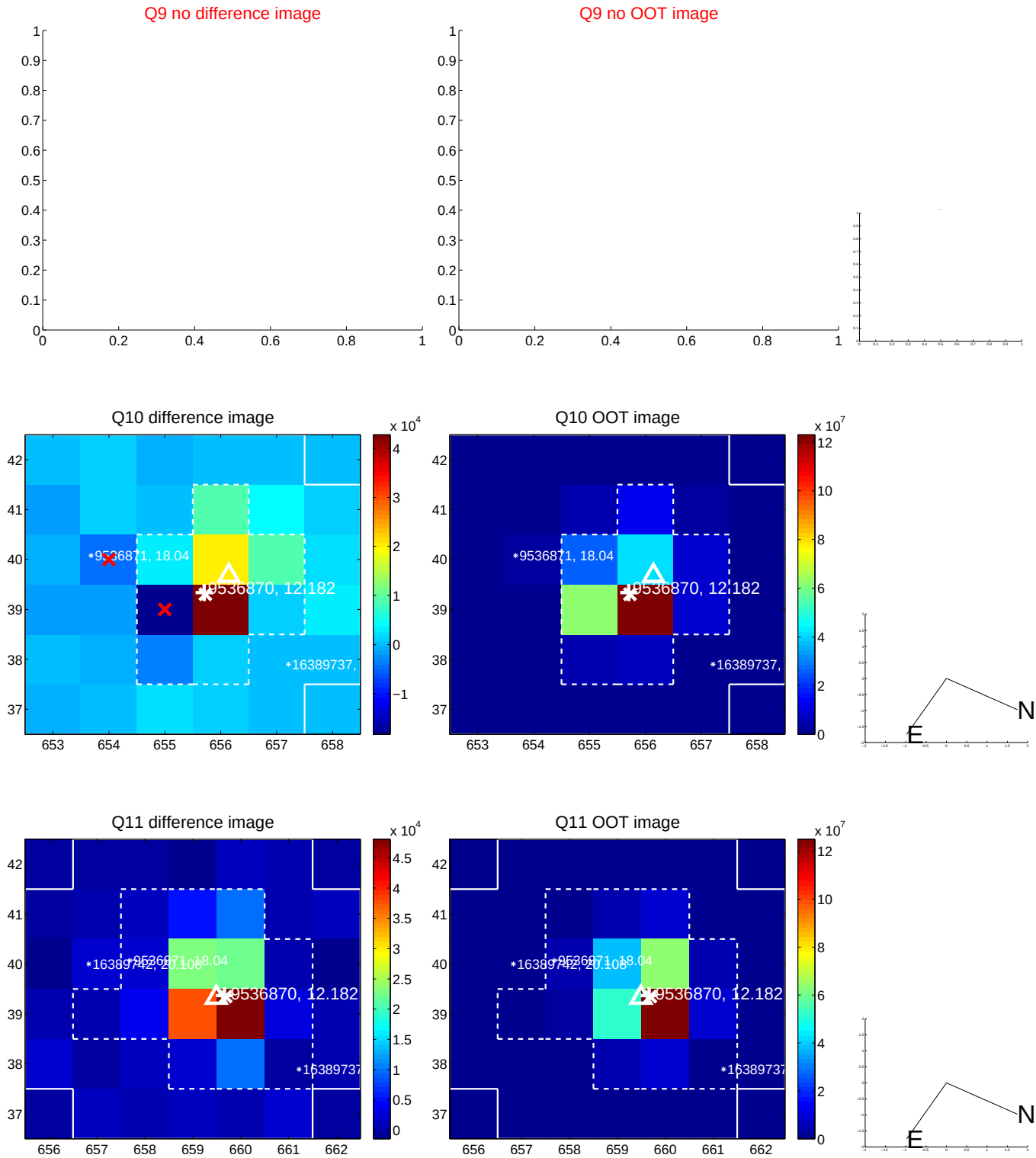
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



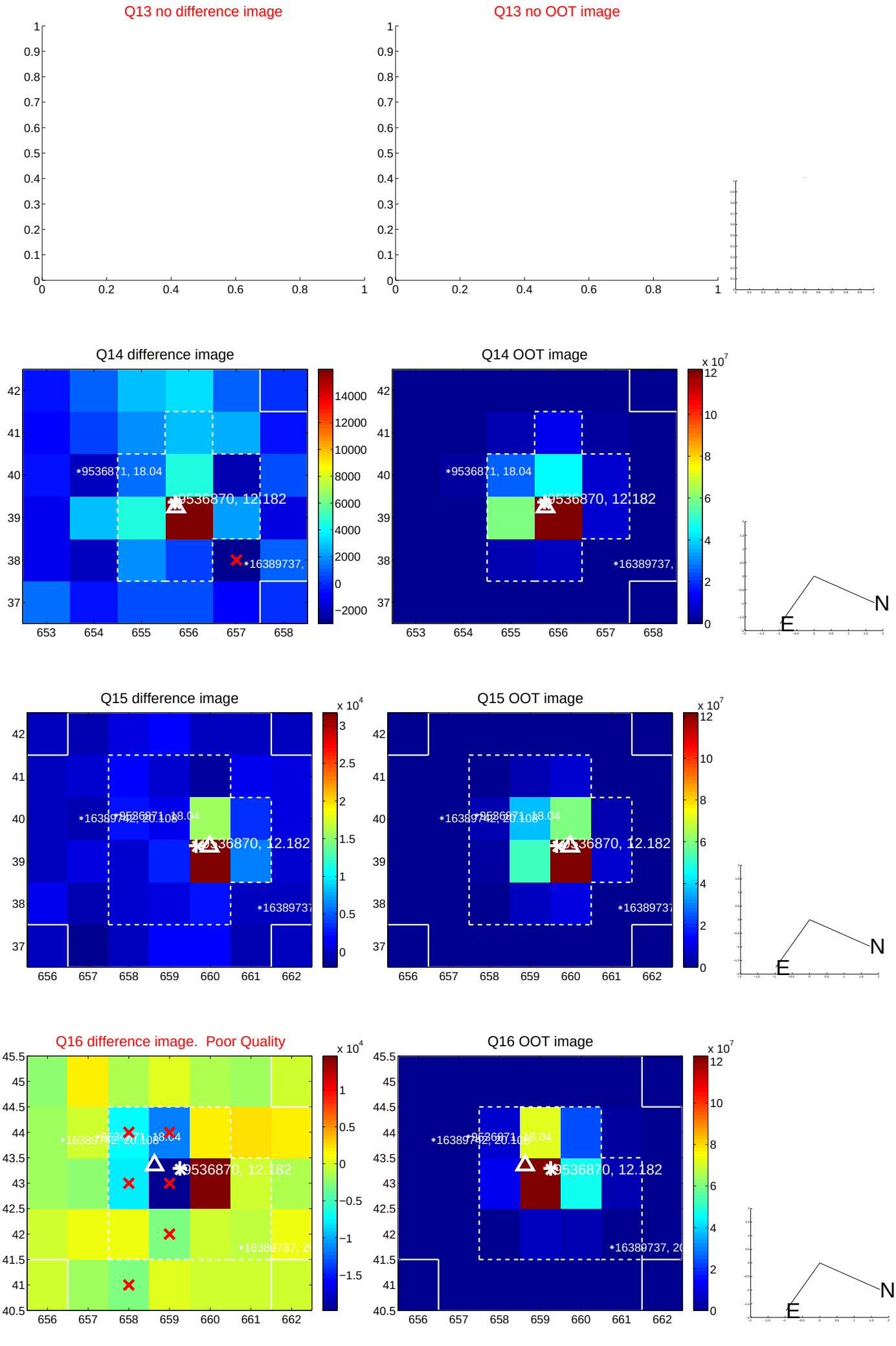
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



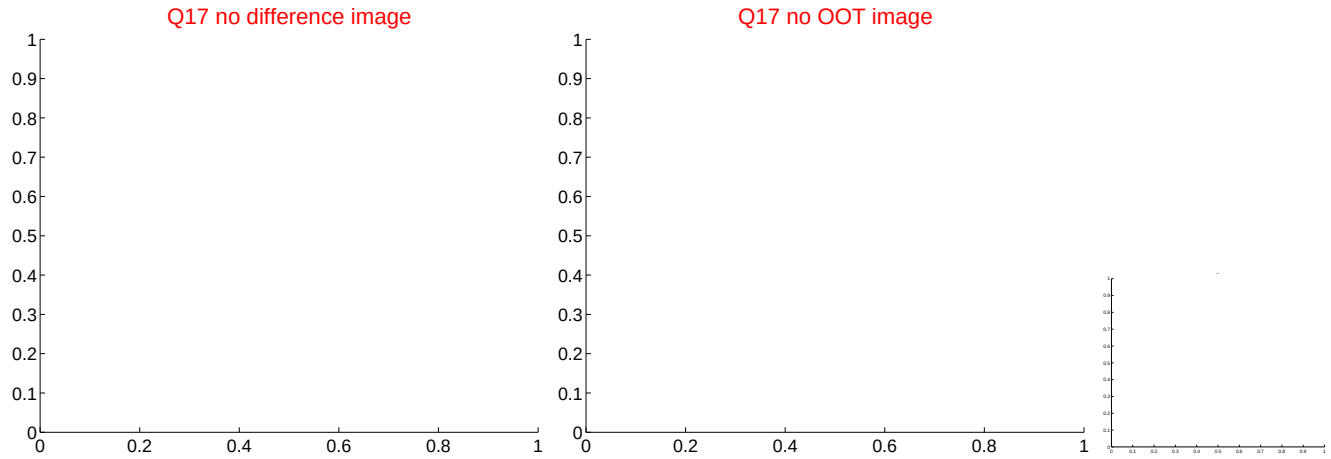
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

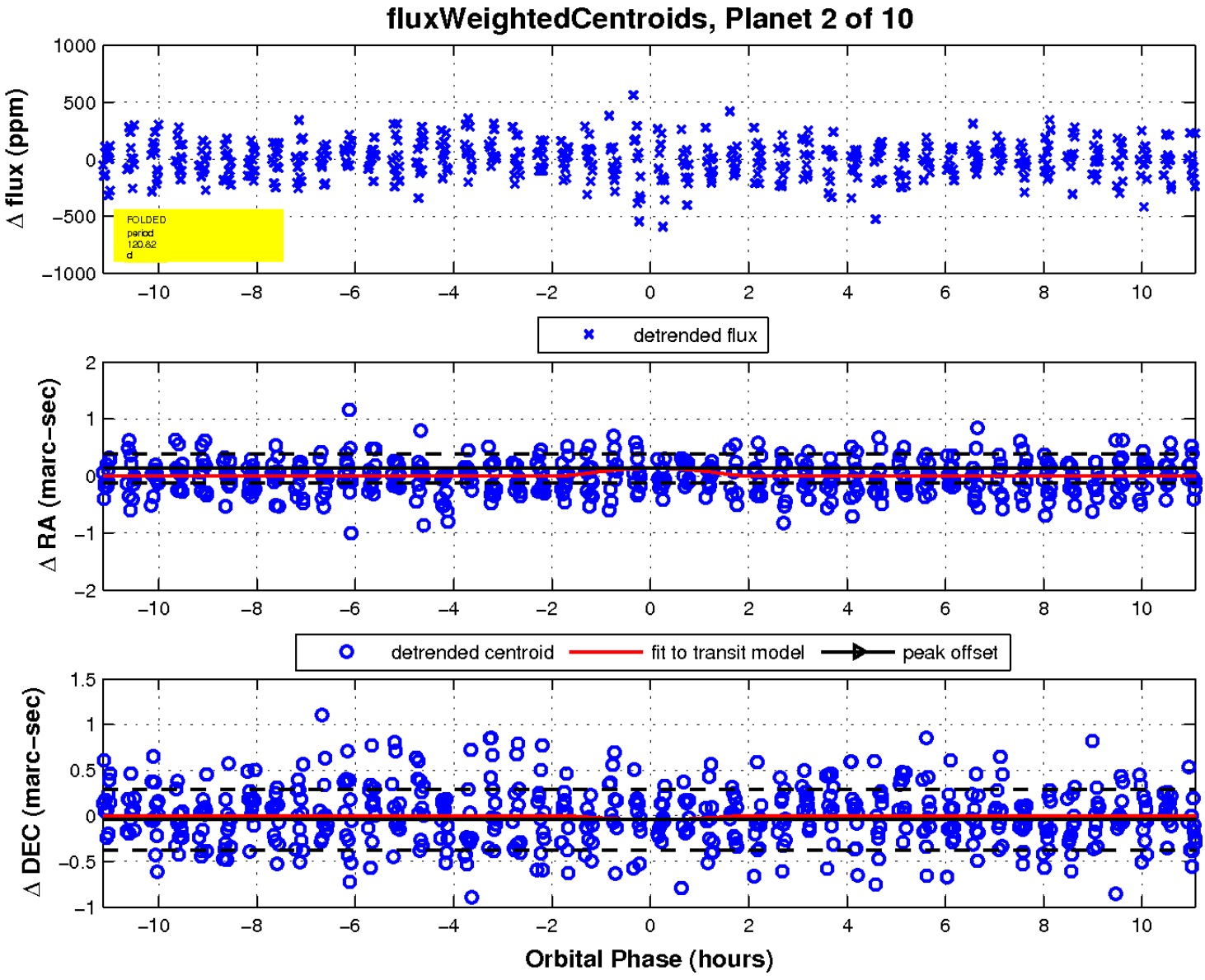


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

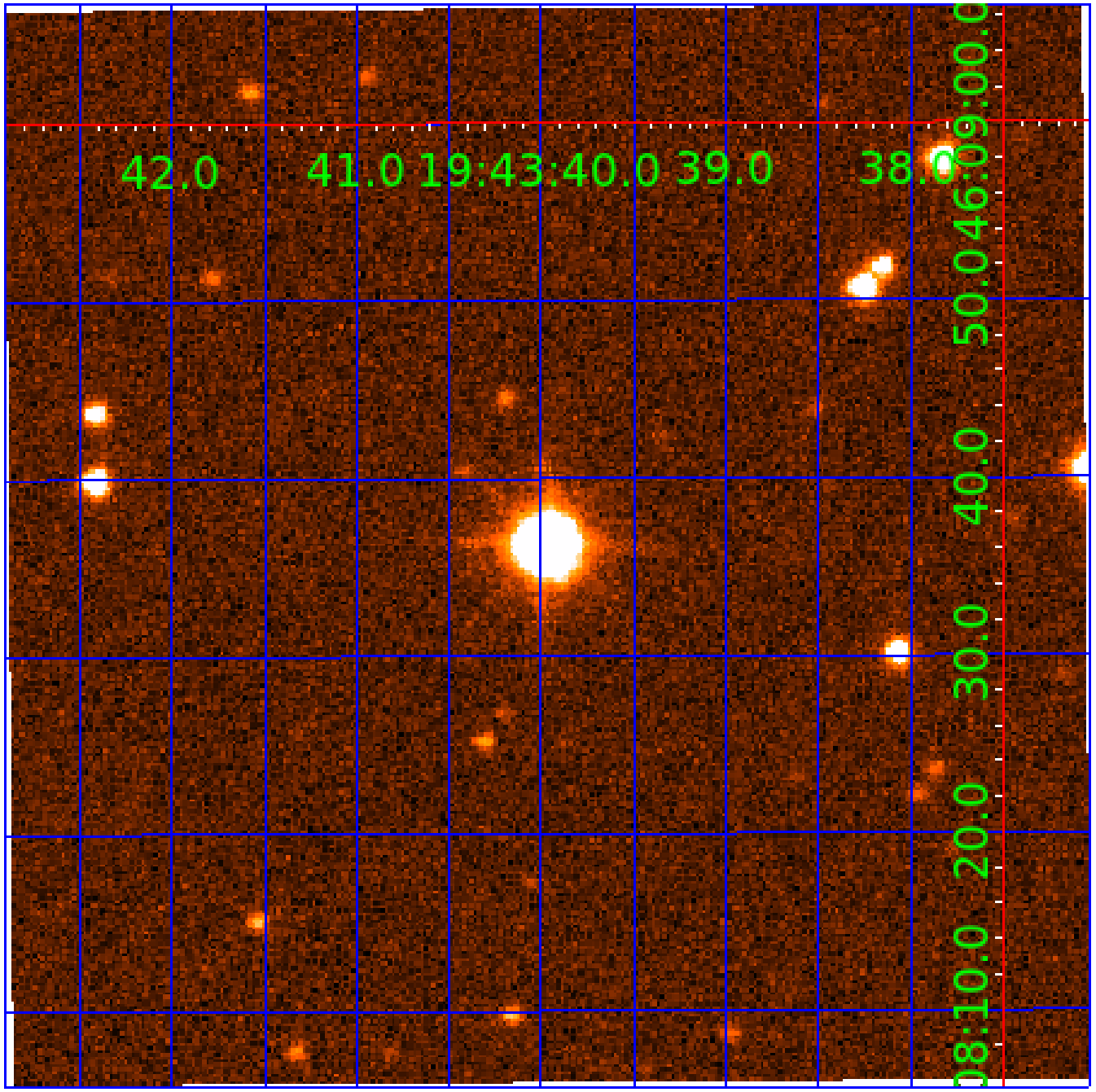


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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46:
50.0
40.0
30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

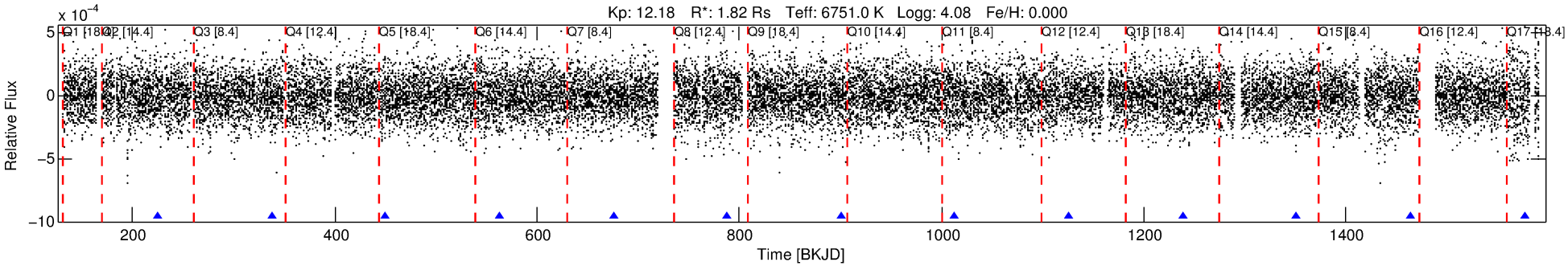
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

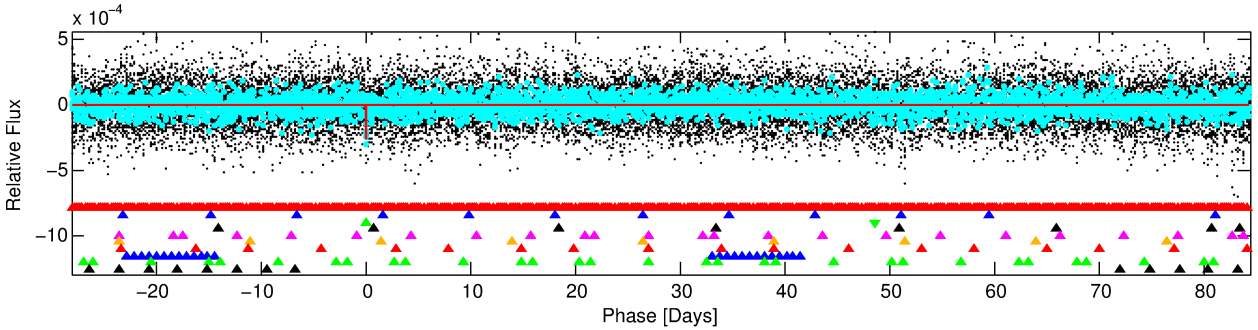
Ephemeris Match Information For 009536870-03

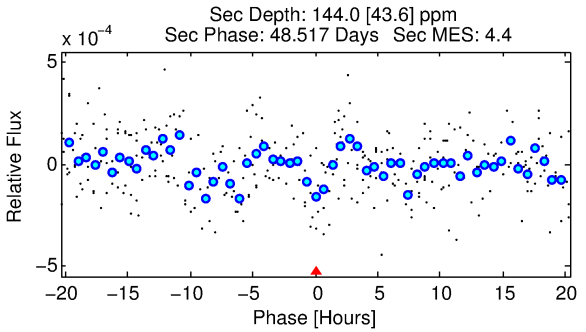
No Significant Match Found

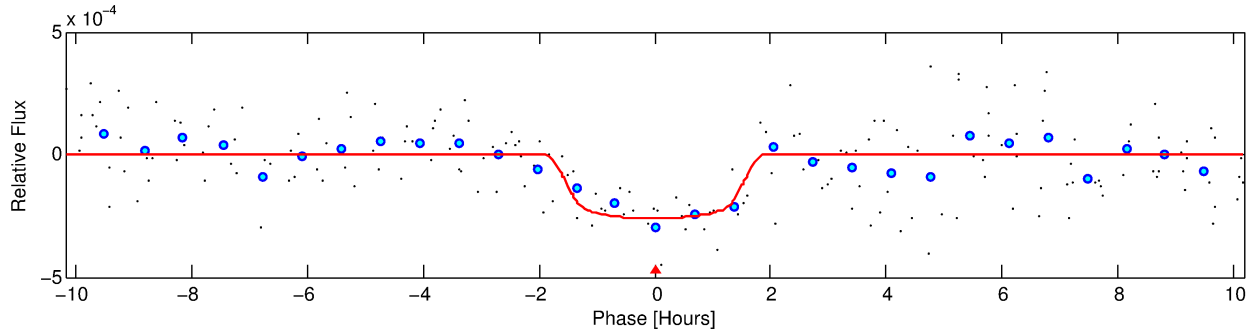
DV One-Page Summary

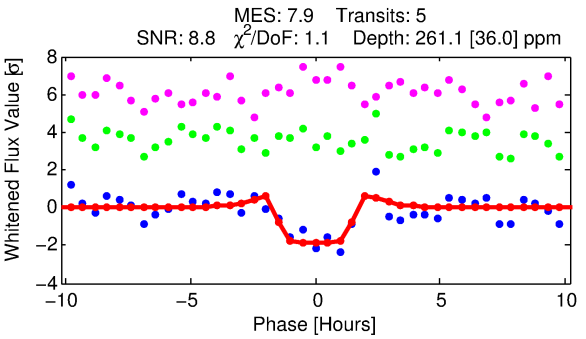
KIC: 9536870 Candidate: 3 of 10 Period: 112.561 d

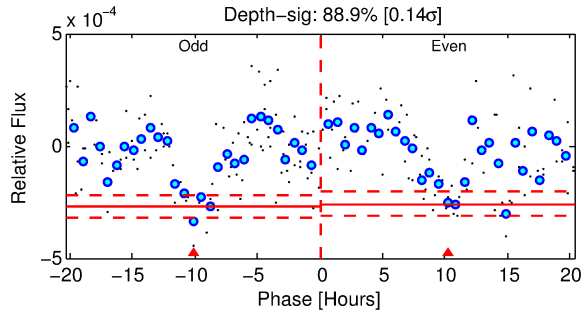


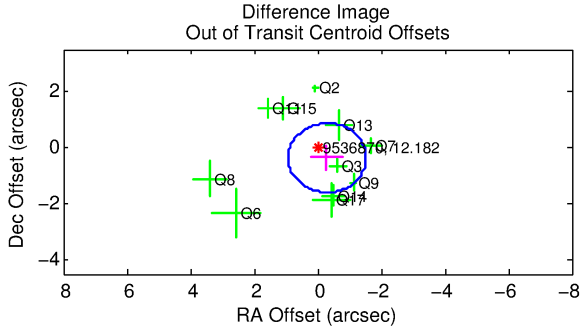












DV Fit Results:

Period = 112.56116 [0.00116] d
Epoch = 225.4361 [0.0075] BKJD
Rp/R* = 0.0171 [0.0065]
a/R* = 124.56 [270.52]
b = 0.89 [0.51]

Seff = 23.05 [5.91]
Teq = 559 [36] K
Rp = 3.40 [1.43] Re
a = 0.5161 [0.0834] AU

Ag = 1830.53 [1569.34] [1.17σ]
Teffp = 5650 [1162] K [4.38σ]

DV Diagnostic Results:

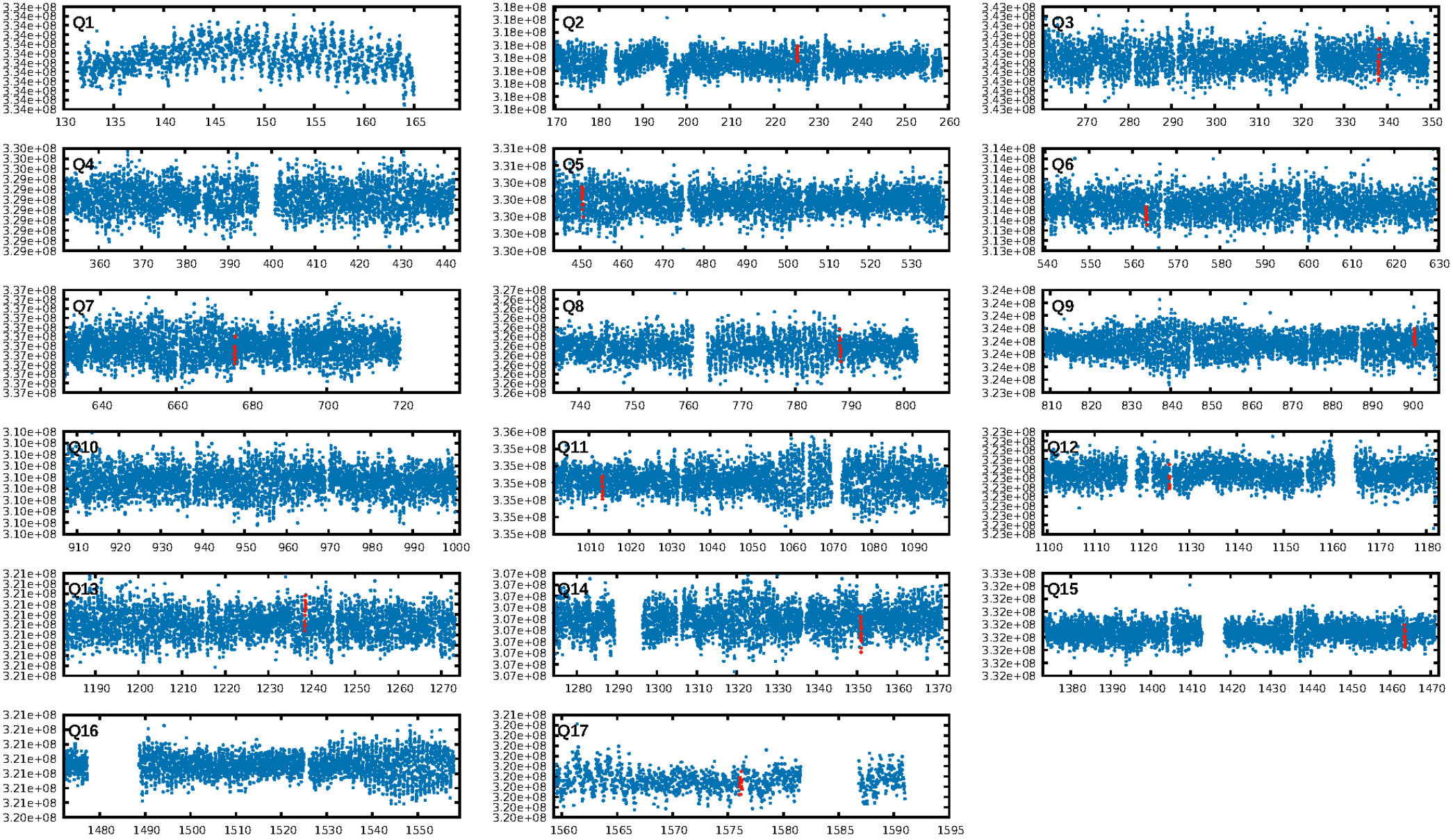
ShortPeriod−sig: 100.0% [17.25σ]
LongPeriod−sig: 100.0% [39.19σ]
ModelChiSquare2−sig: 62.0%
ModelChiSquareGof−sig: 99.8%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [5/5]
GhostDiagnostic−chr: 5.92

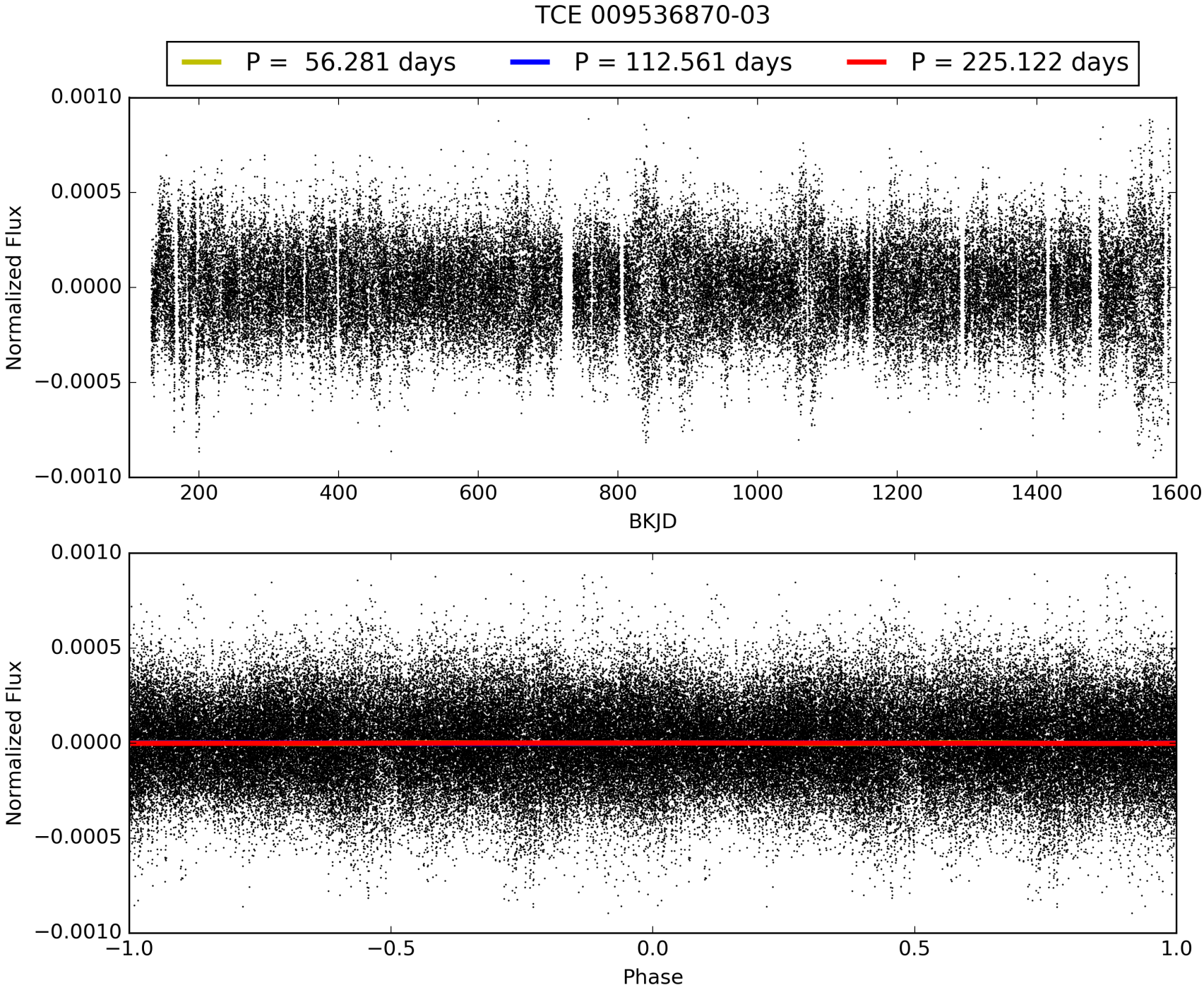
Centroid−sig: 43.5%
Centroid−so: 0.135 arcsec [0.32σ]
OotOffset−rm: 0.466 arcsec [1.14σ]
KicOffset−rm: 0.549 arcsec [1.39σ]
OotOffset−st: 3/4/1/3 [11]
KicOffset−st: 3/4/1/3 [11]
DiffImageQuality−fgm: 0.64 [7/11]
DiffImageOverlap−fno: 0.17 [2/12]

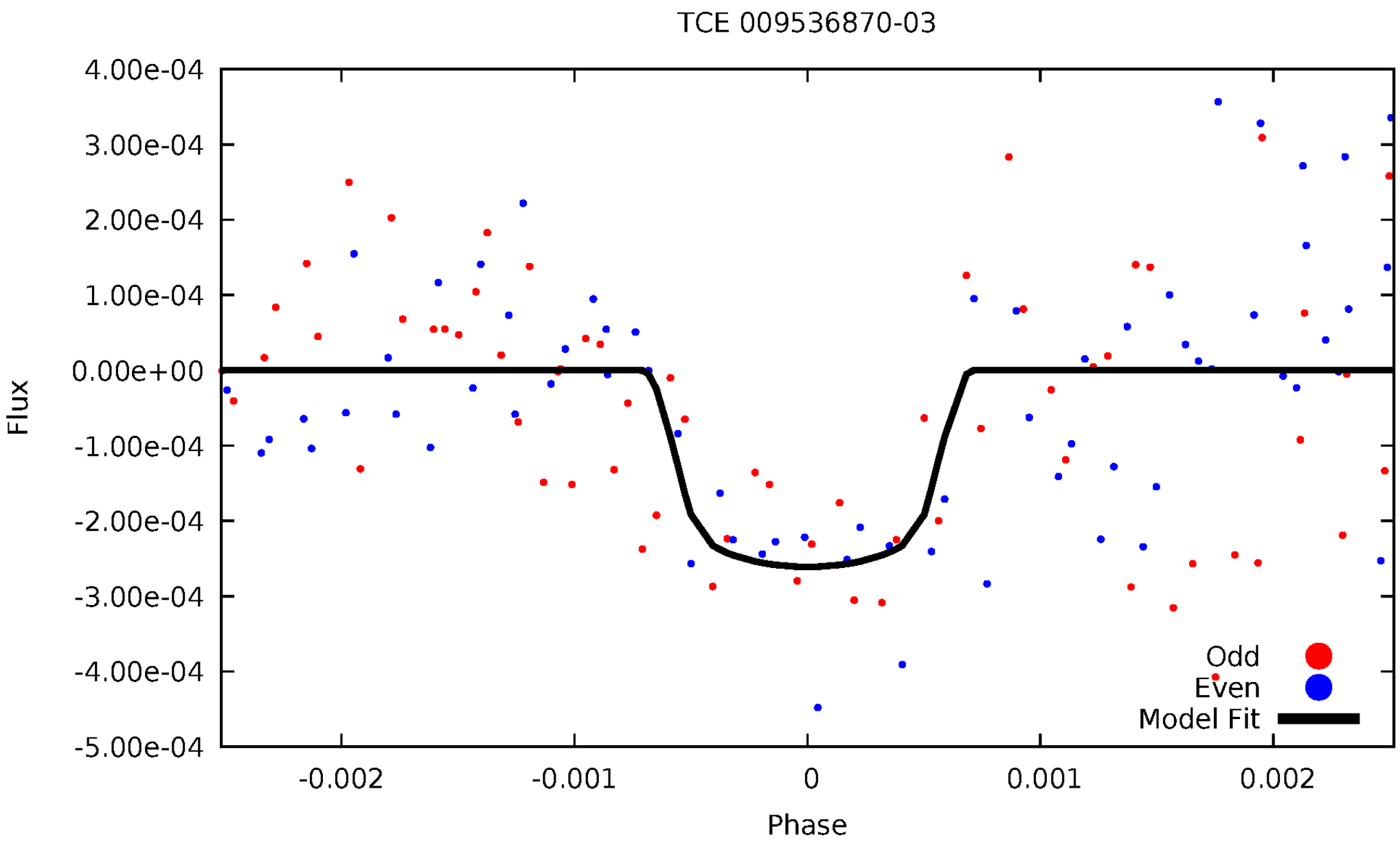
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:17 Z

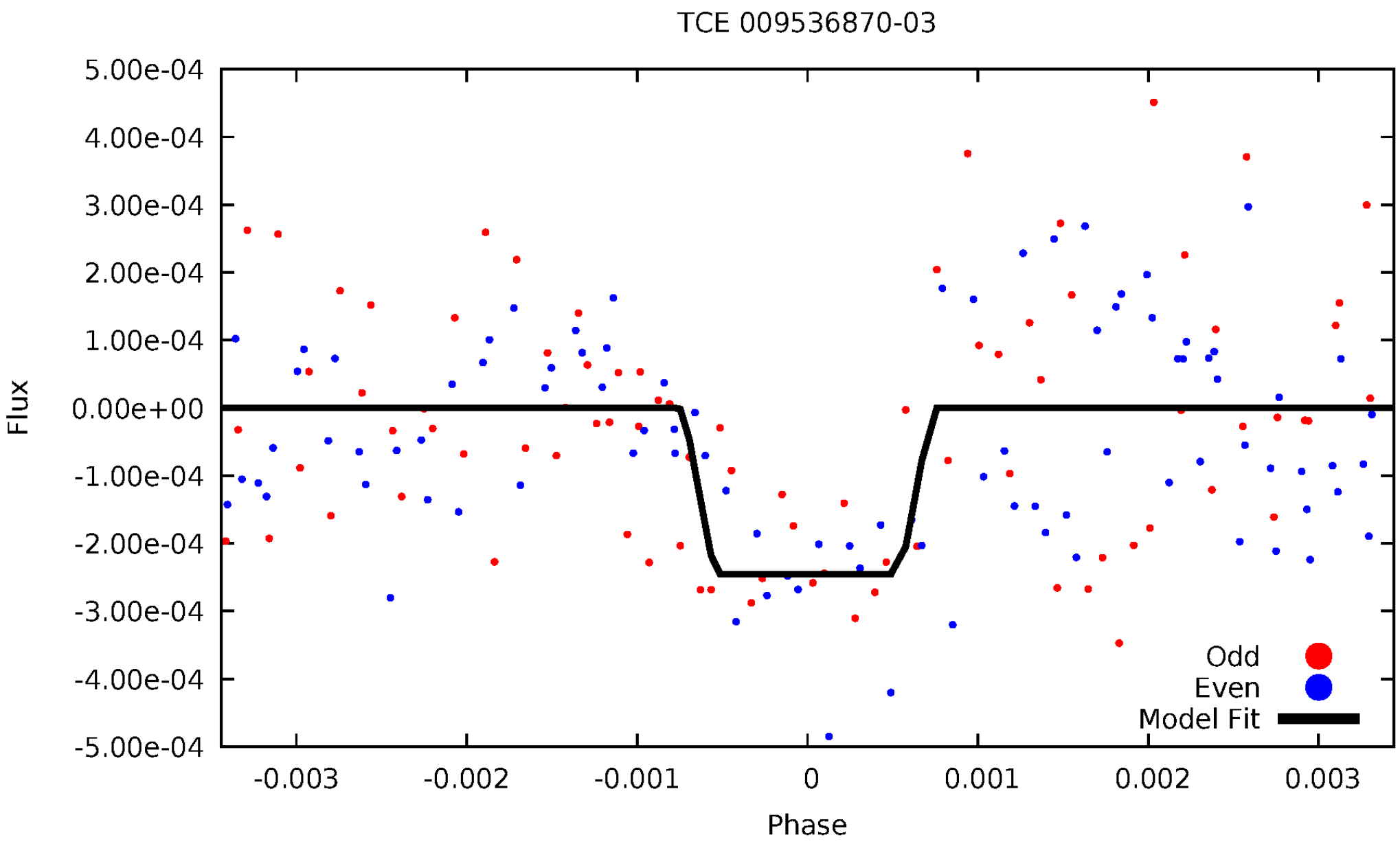
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009536870-03, PDC Light Curves

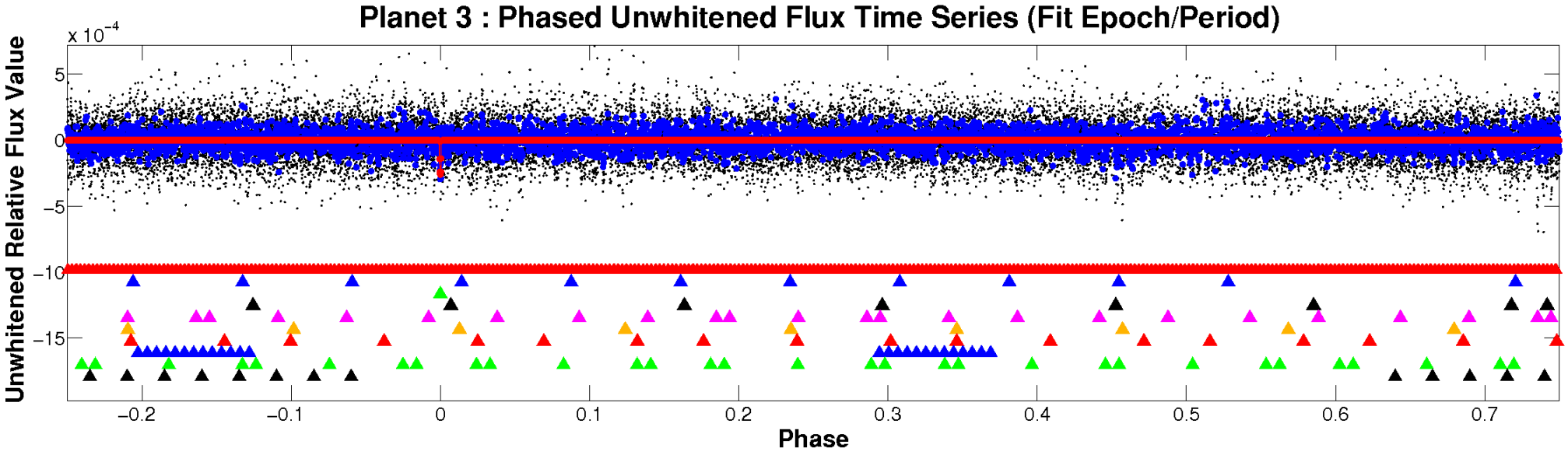


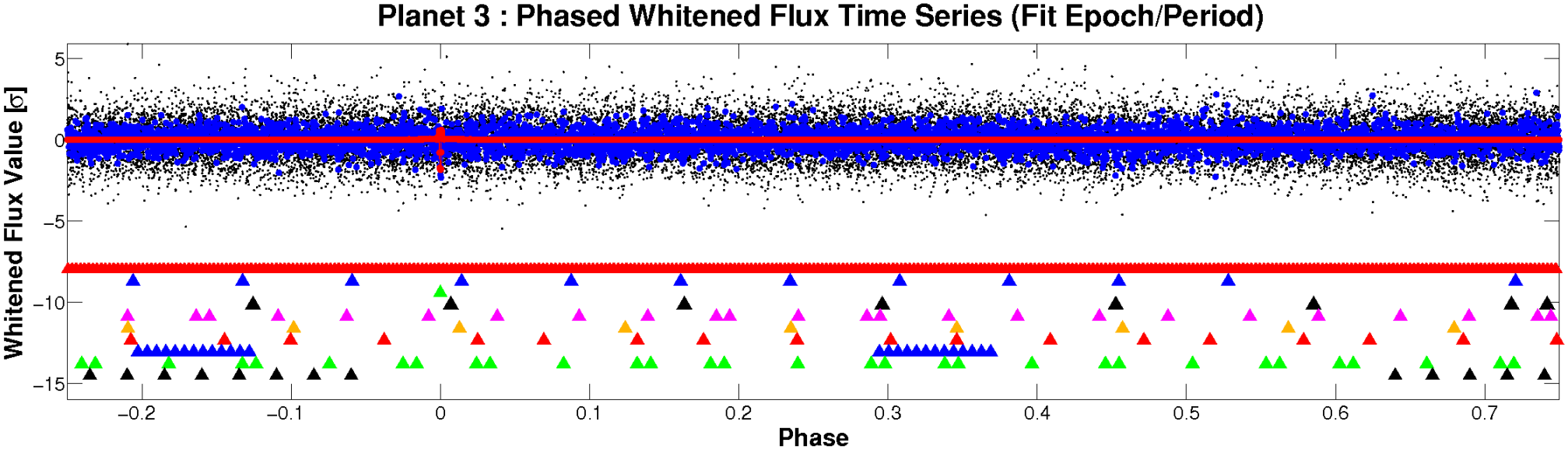

TCE 009536870-03
P = 56.281 days
P = 112.561 days
P = 225.122 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase


DV Odd/Even
TCE 009536870-03
4.00e-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
Flux
-0.002
-0.001
0
0.001
0.002
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-03
5.00e-04
4.00e-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
Flux
-0.003
-0.002
-0.001
0
0.001
0.002
0.003
Phase
Odd
Even
Model Fit

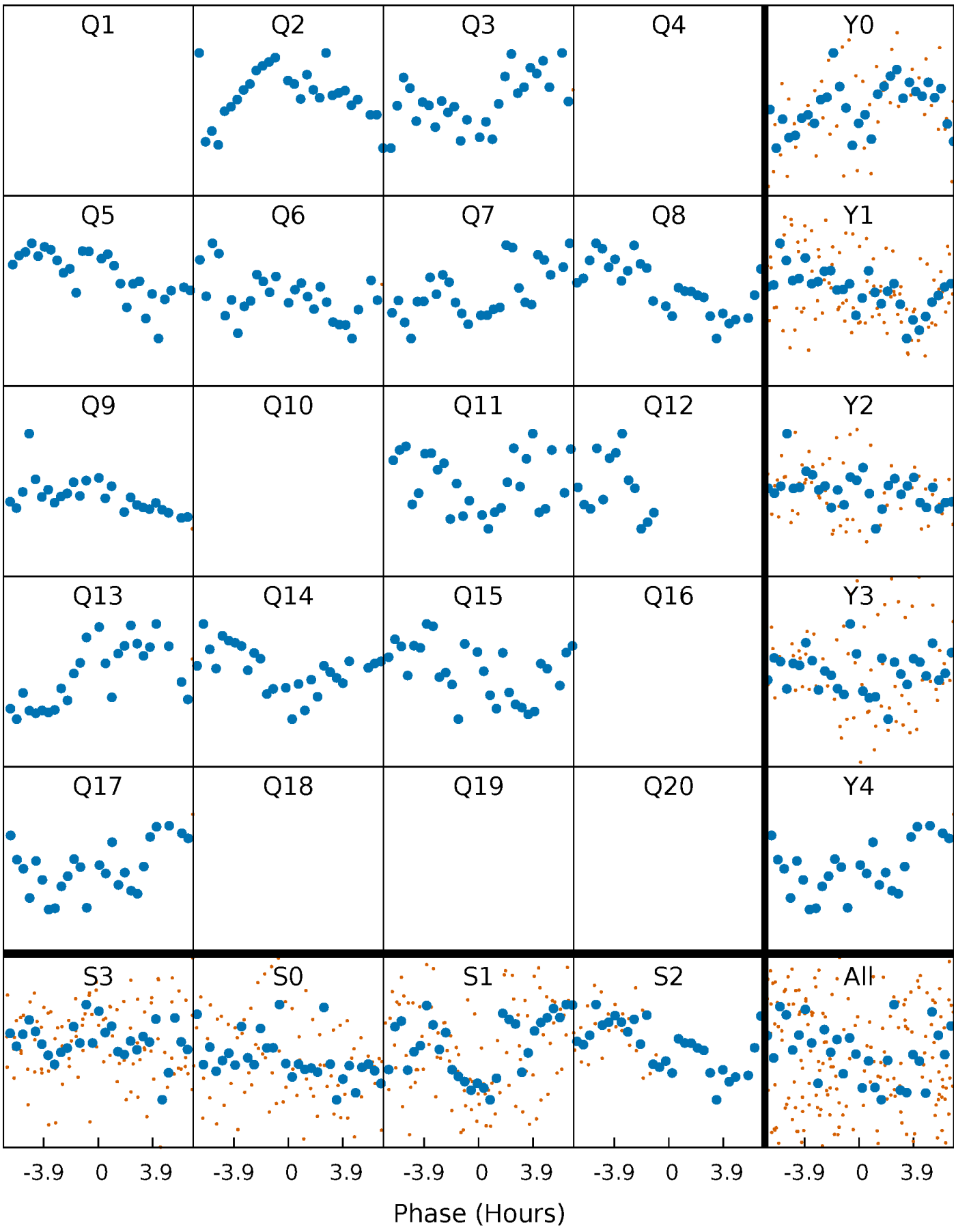
Non-Whitened Vs. Whitened Light Curve





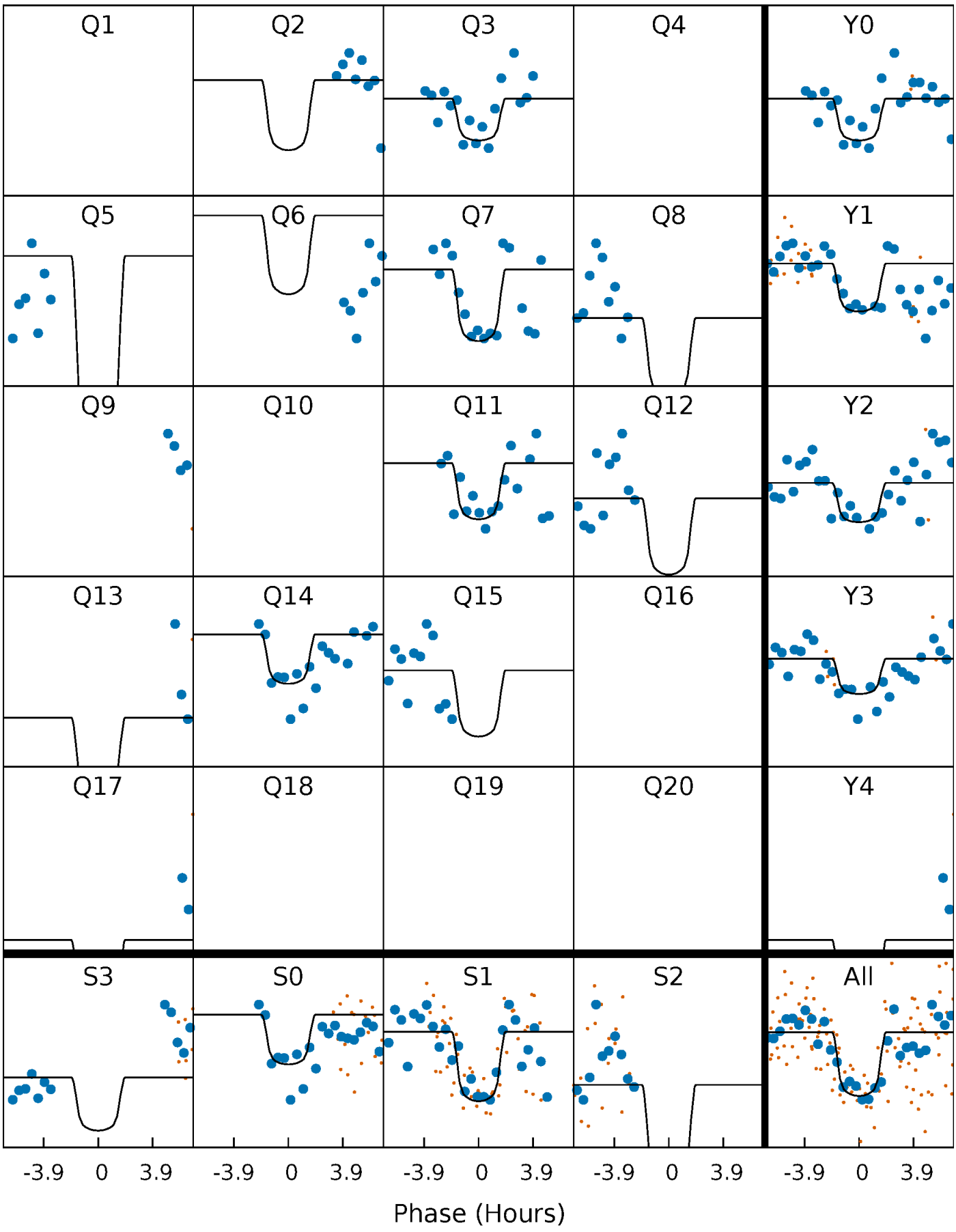
PDC Quarter-Phased Transit Curves

TCE 009536870-03 P=112.561159 Days T_0=225.436123 (BKJD)



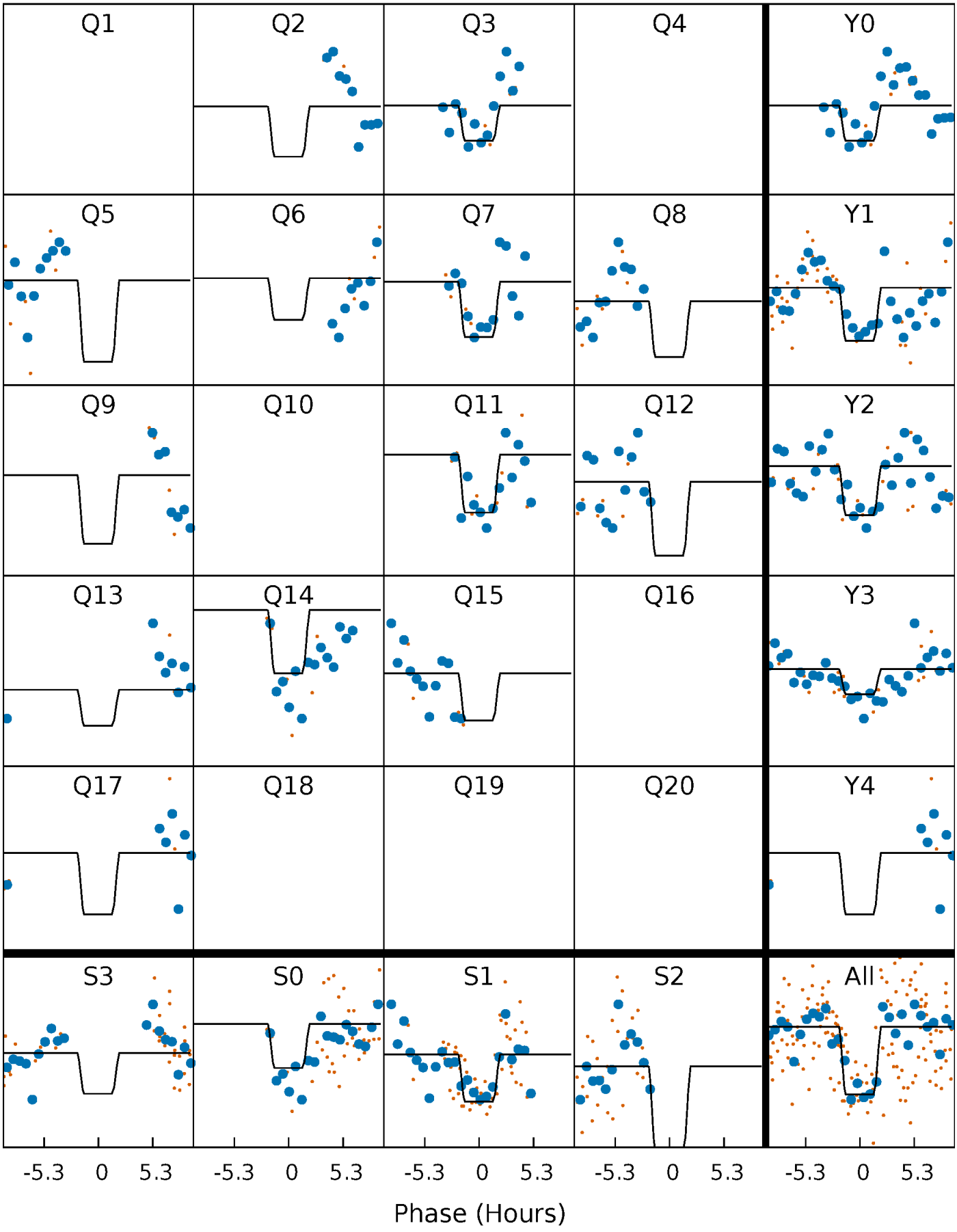
DV Quarter-Phased Transit Curves

TCE 009536870-03 P=112.561159 Days T_0=225.436123 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

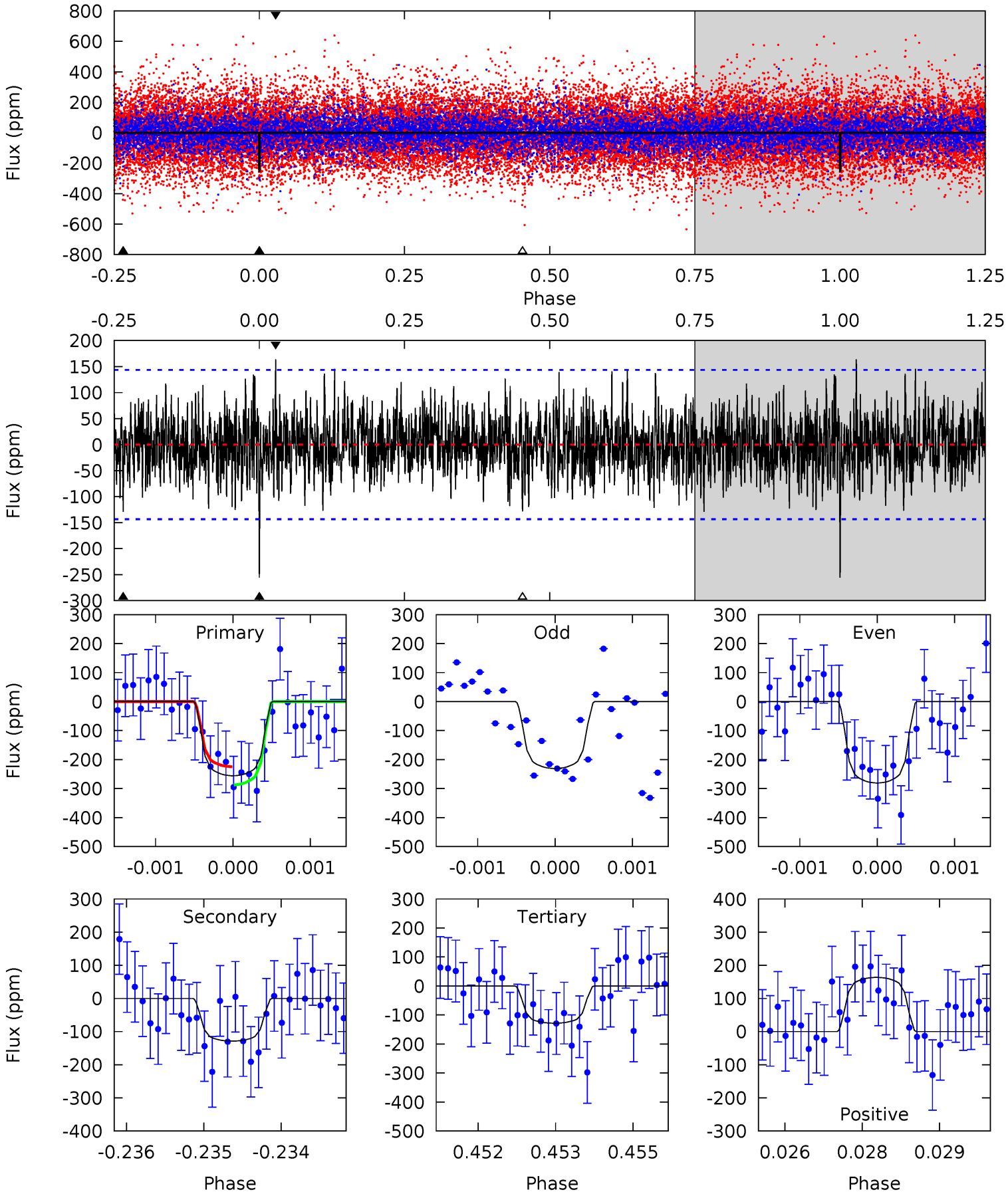
TCE 009536870-03 P=112.561088 Days T_0=225.427628 (BKJD)



DV Model-Shift Uniqueness Test

009536870-03, P = 112.561159 Days, E = 112.874964 Days

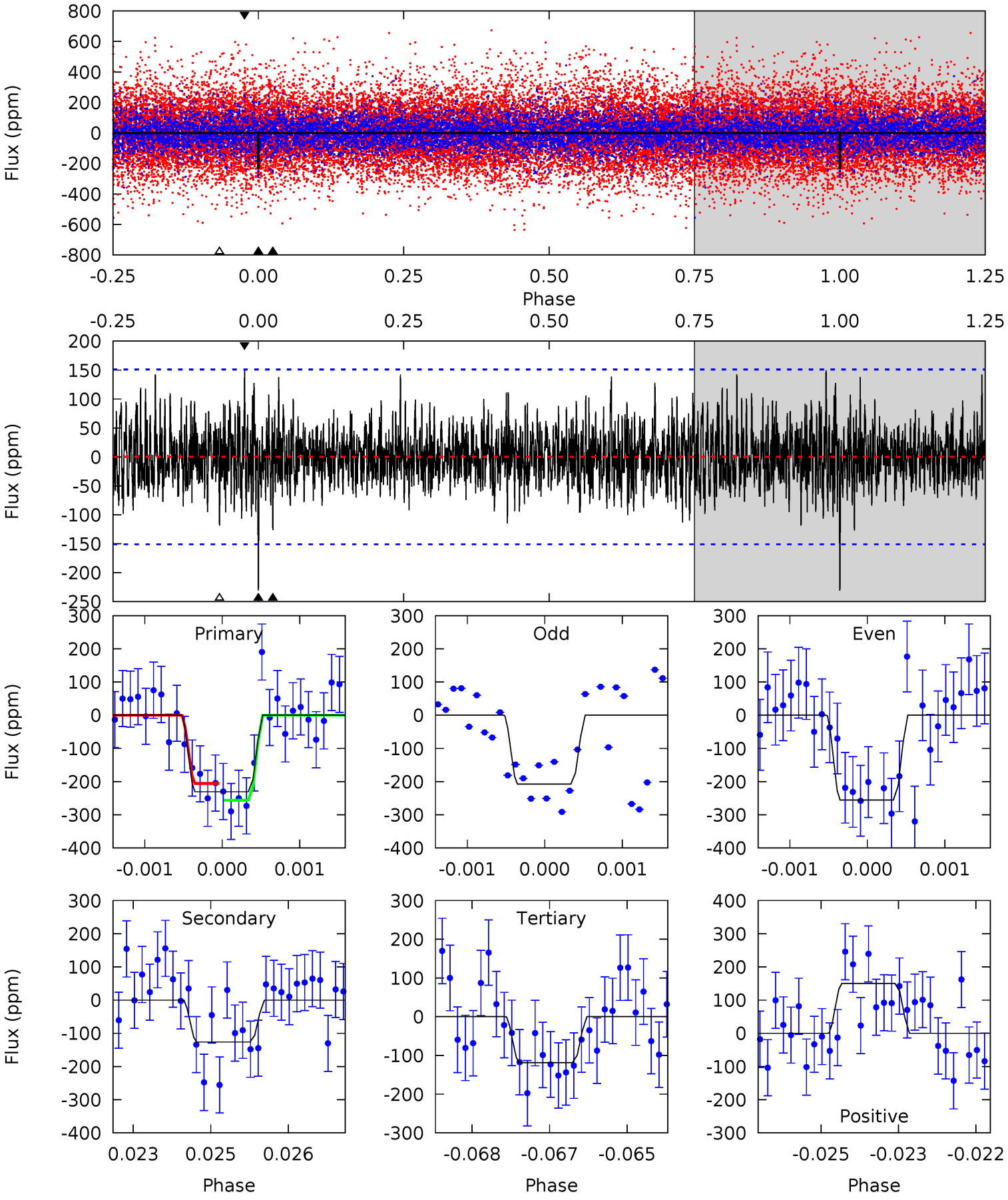
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.61	4.84	4.82	6.14	5.39	3.20	1.65	4.79	3.47	0.02	-1.30	0.94	1.07	0.39	1.18



Alt Model-Shift Uniqueness Test

009536870-03, P = 112.561088 Days, E = 112.866540 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.23	4.51	4.23	5.34	5.38	3.18	1.46	4.00	2.89	0.28	-0.84	0.85	1.03	0.39	0.90



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-03 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-129±27	$3.40^{+1.24}_{-1.33}$	777^{+36}_{-36}	5487^{+1641}_{-757}	1612^{+3002}_{-790}
Alt.	-126±28	$3.06^{+1.38}_{-1.27}$	776^{+39}_{-37}	5684^{+1975}_{-867}	1943^{+4233}_{-1072}

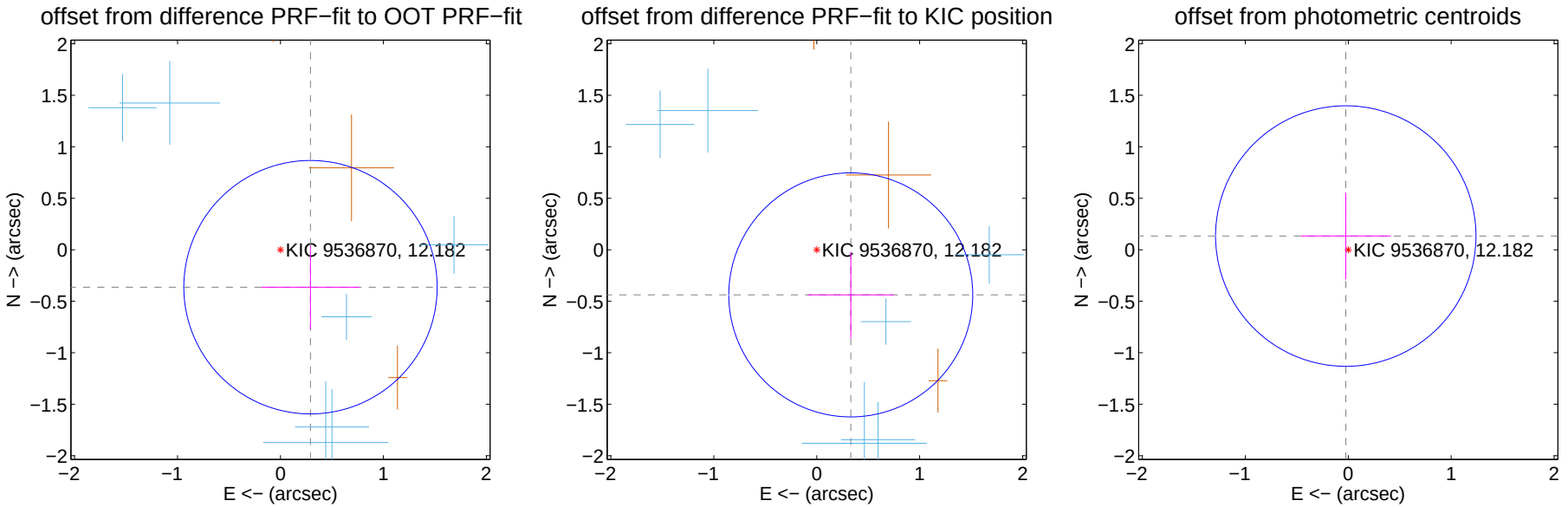
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

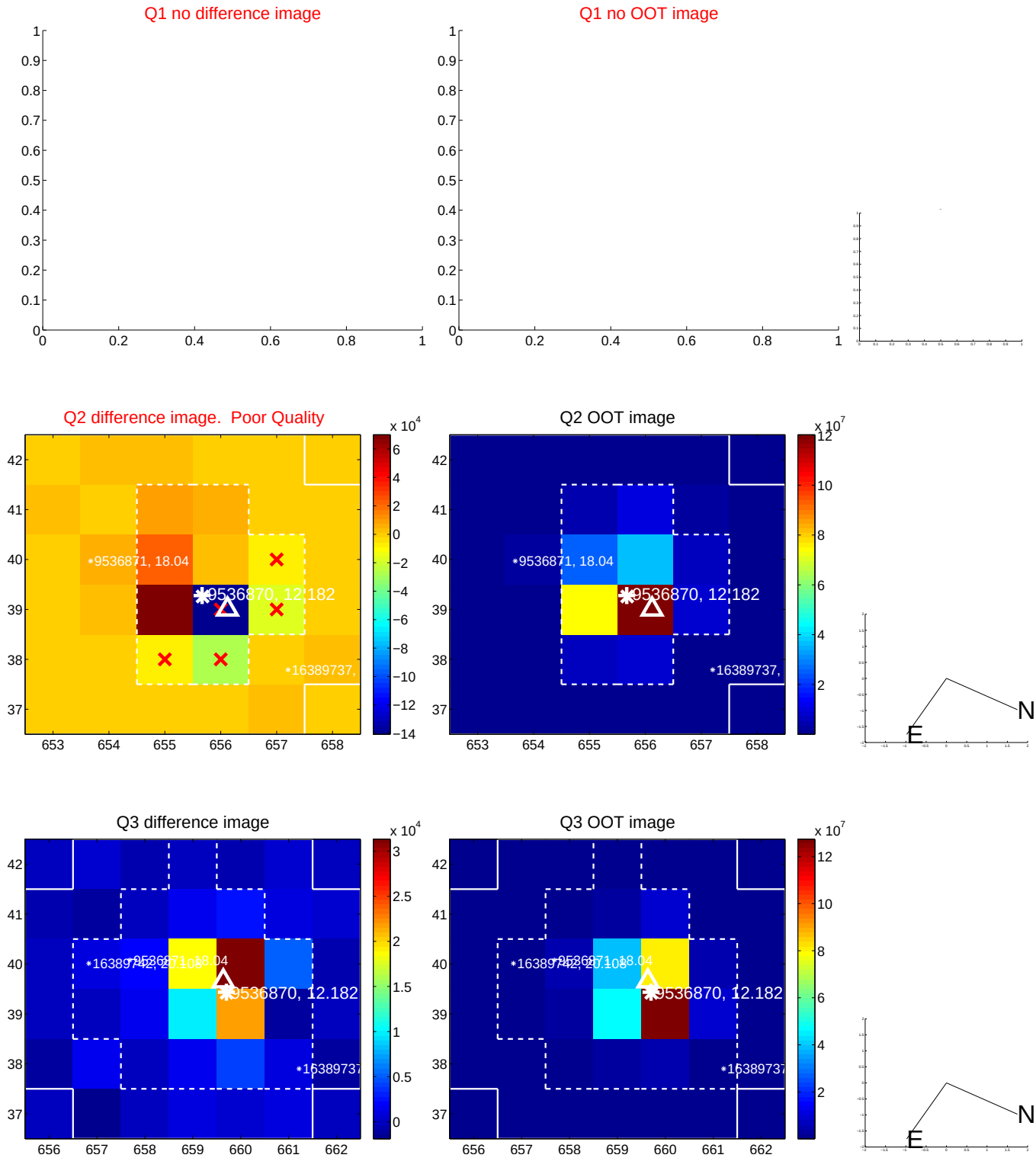
Supplemental centroid analysis for 009536870-03. Kepler magnitude: 12.18. Transit SNR 8.76
There are 7 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.466 ± 0.410	1.14	-0.292 ± 0.475	-0.364 ± 0.408
PRF-fit source offset from KIC position	0.549 ± 0.395	1.39	-0.331 ± 0.416	-0.438 ± 0.418
photometric centroid source offset	0.14 ± 0.42	0.32	0.02 ± 0.44	0.13 ± 0.42

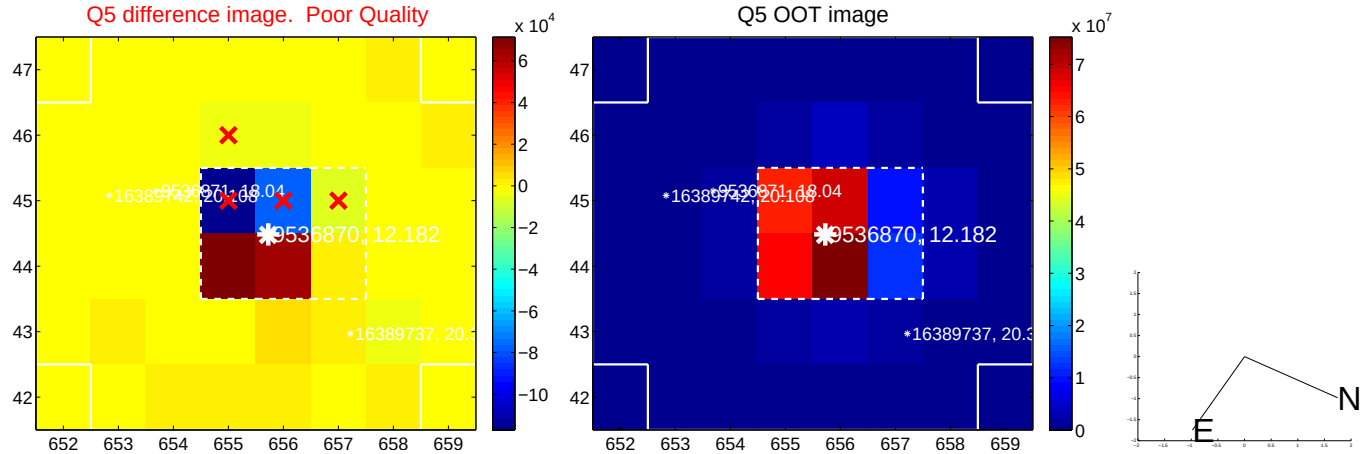


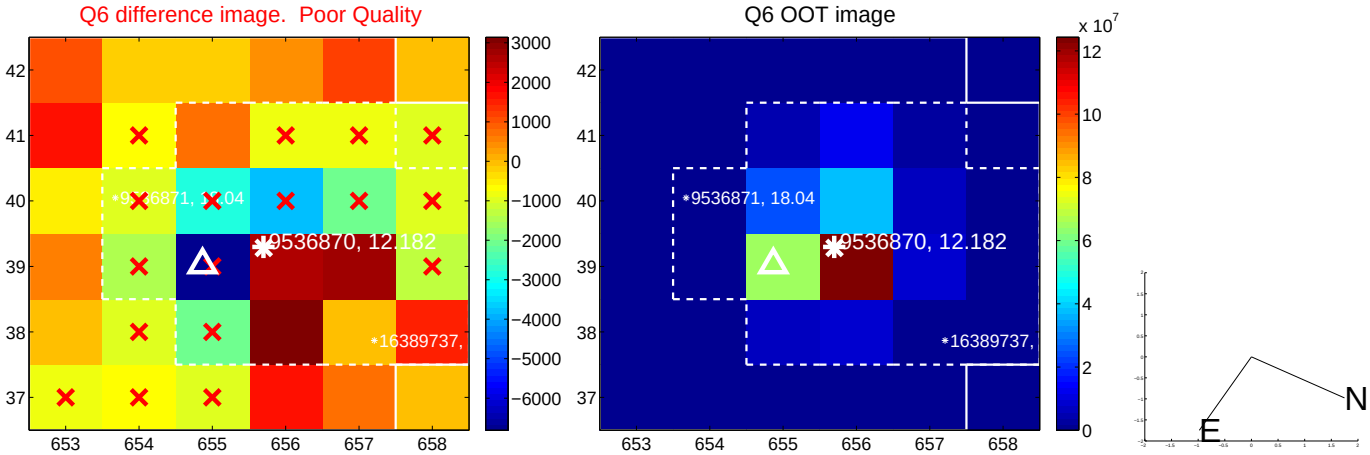
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

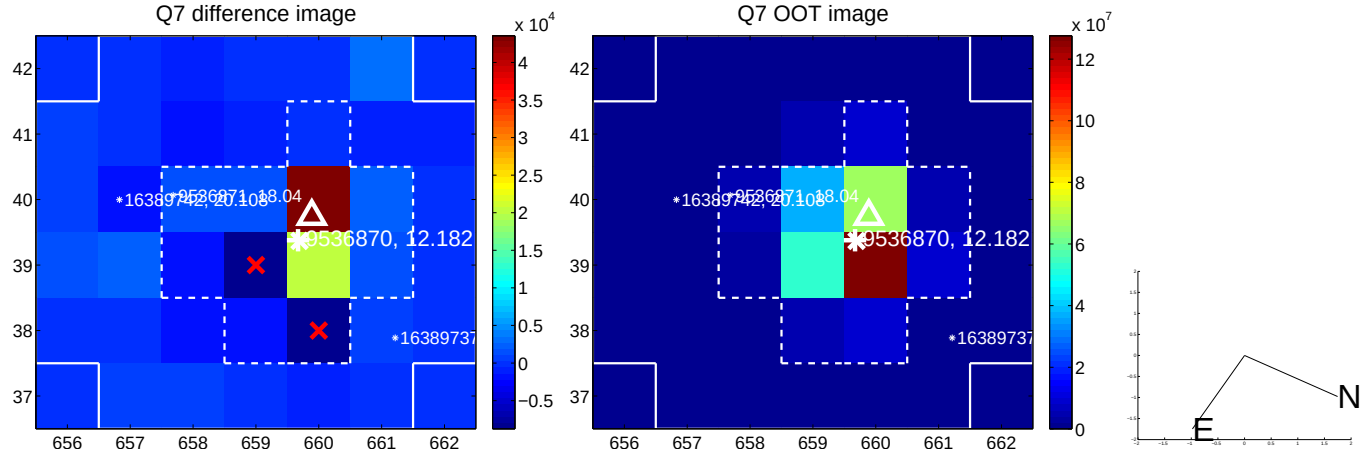
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

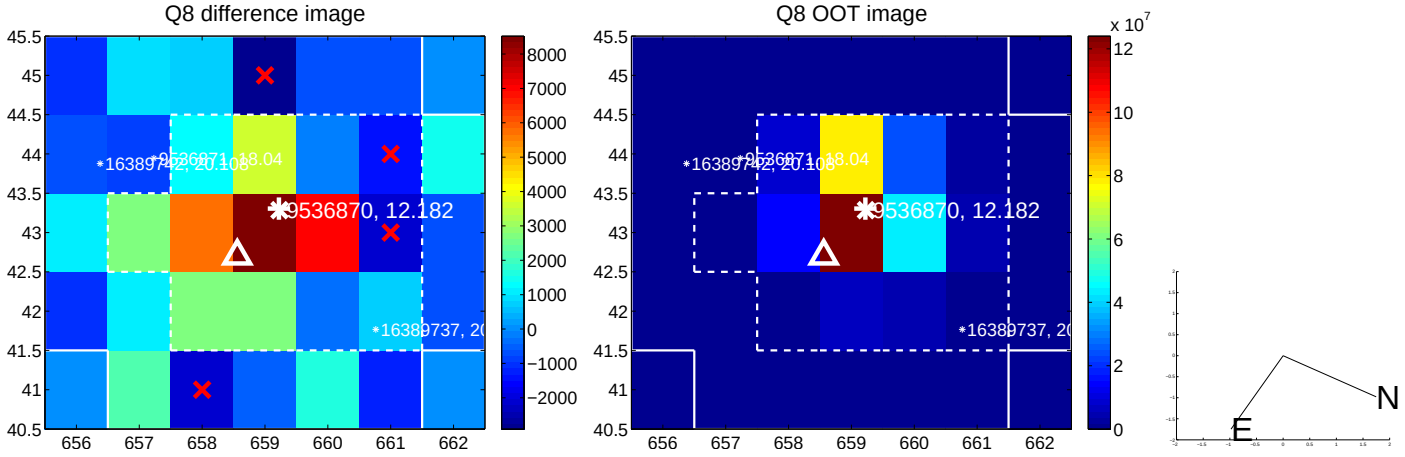


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

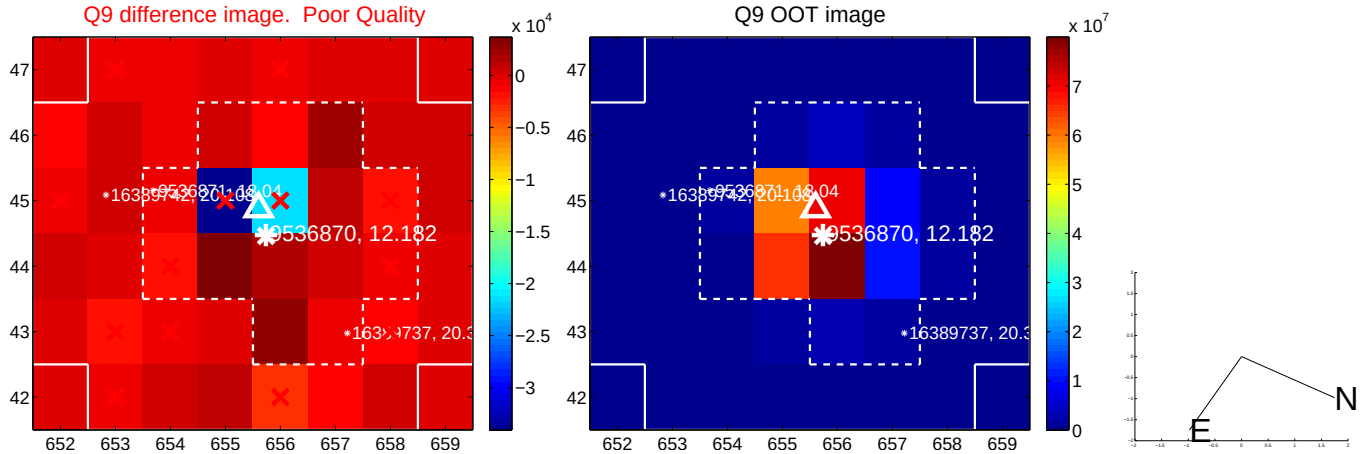


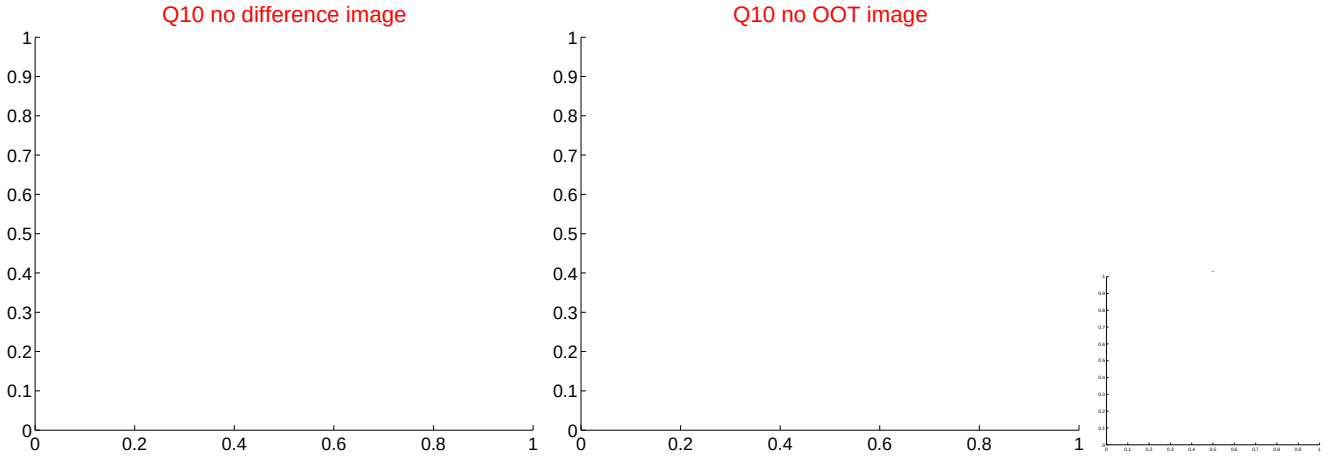


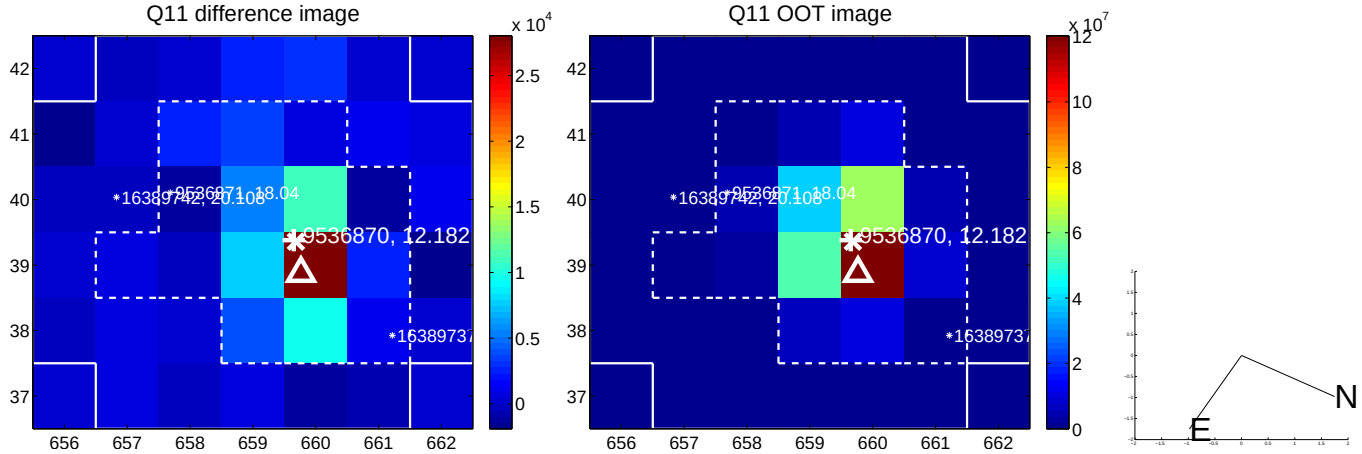


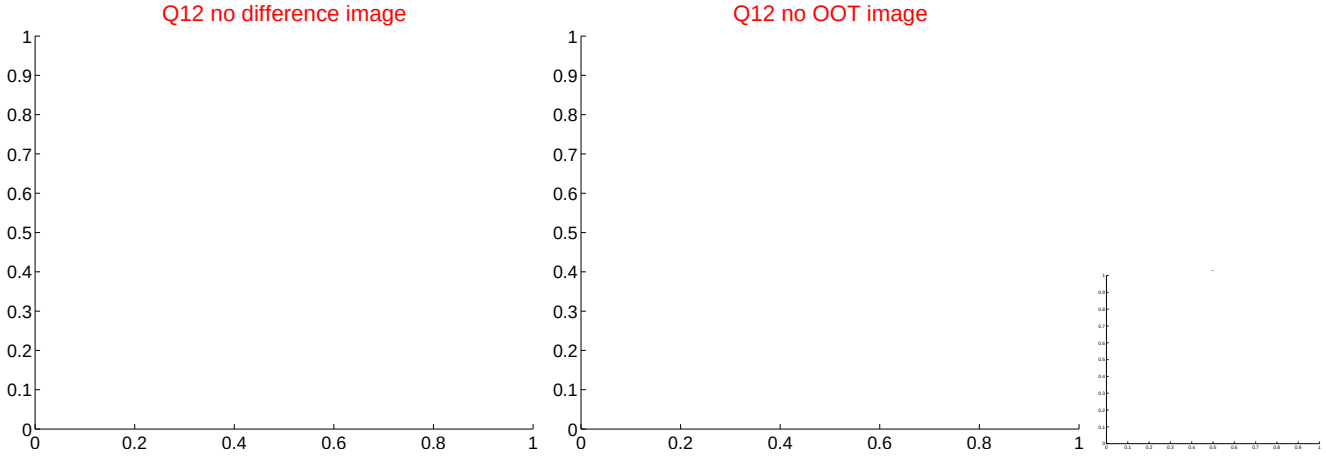


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

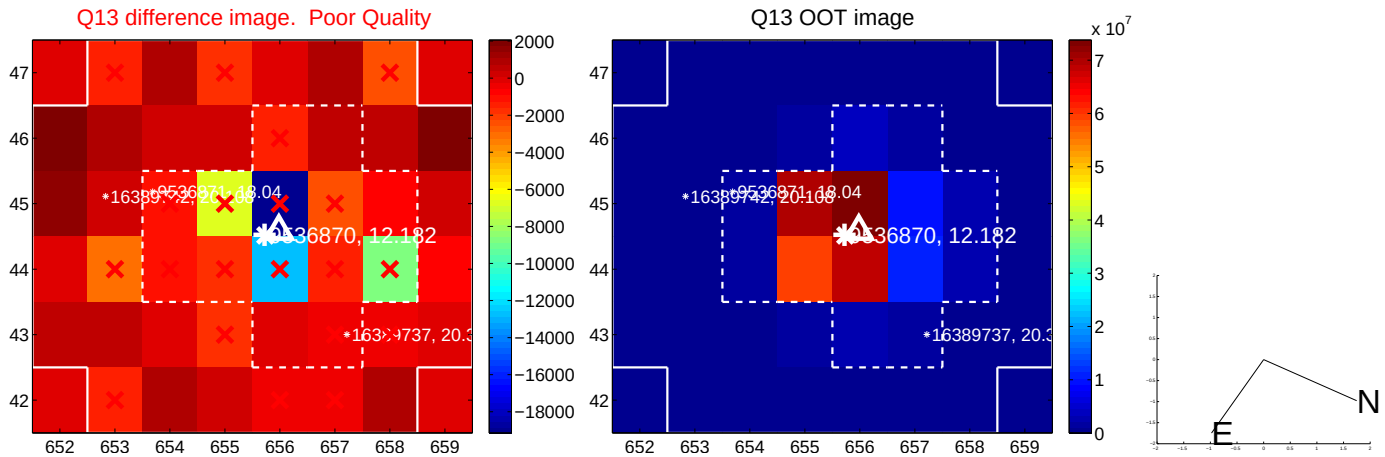


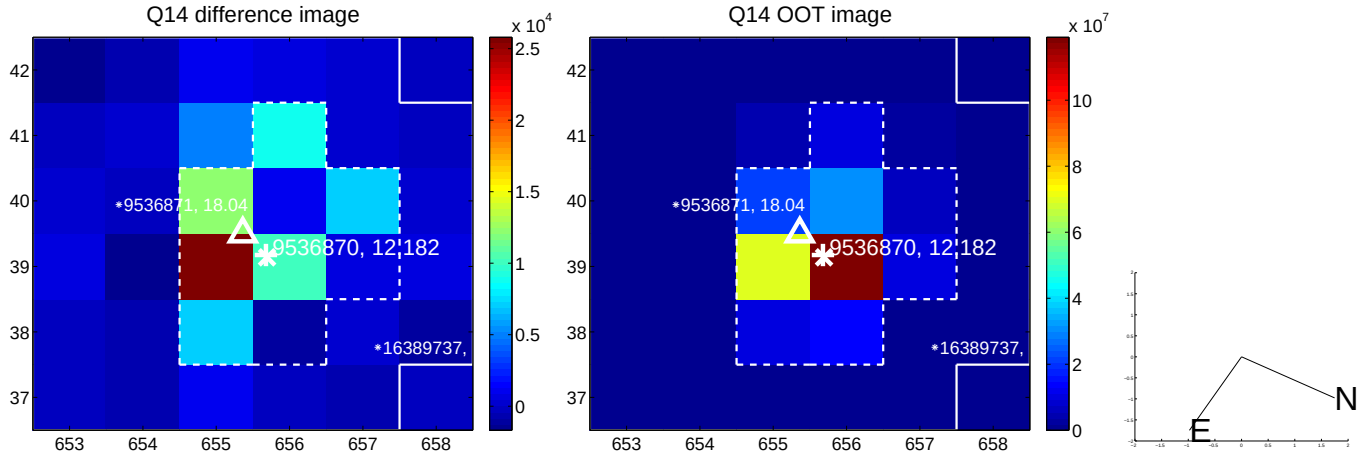


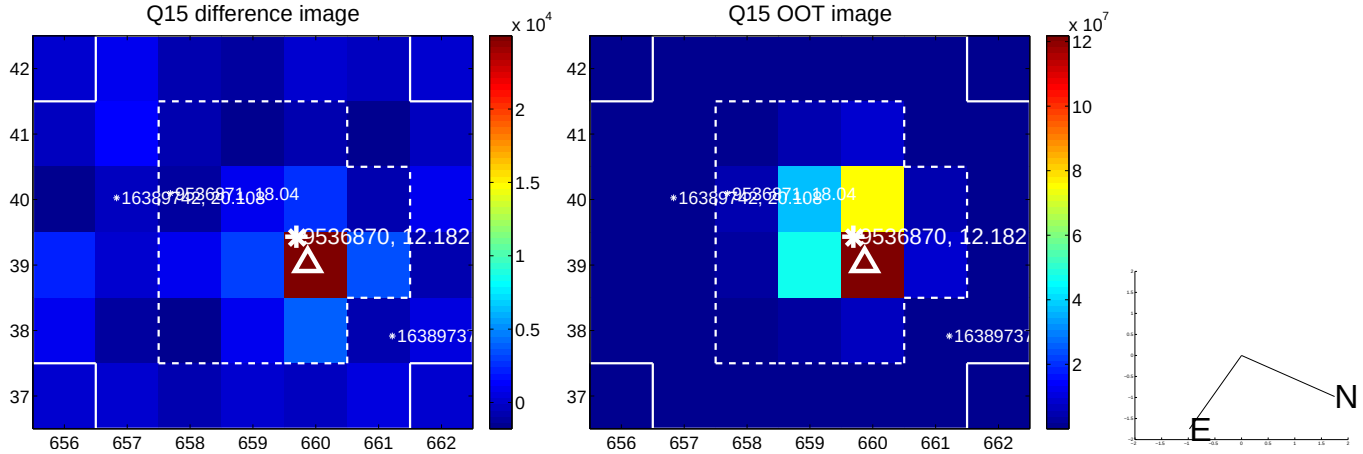


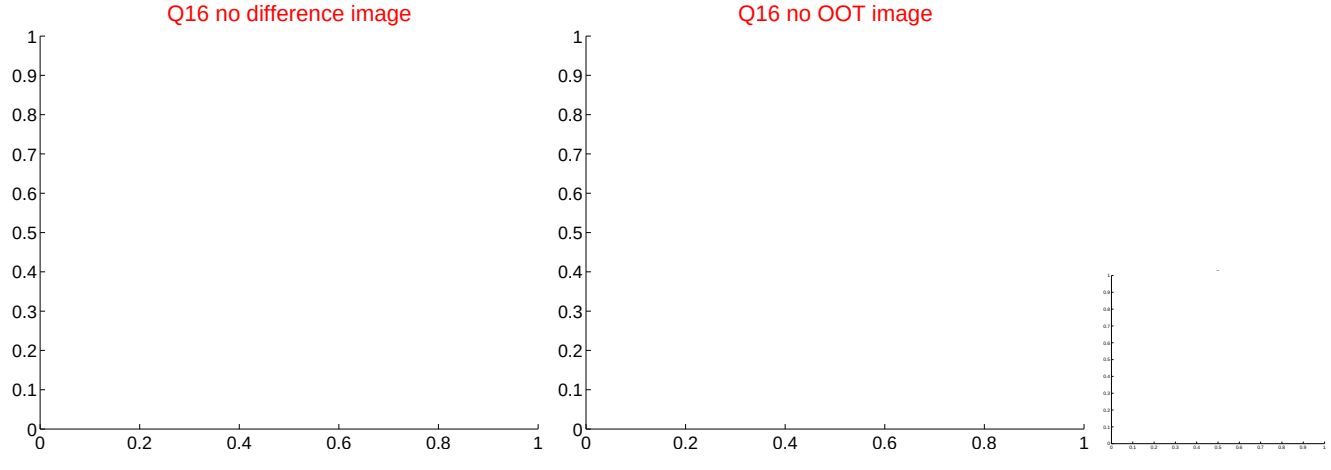


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

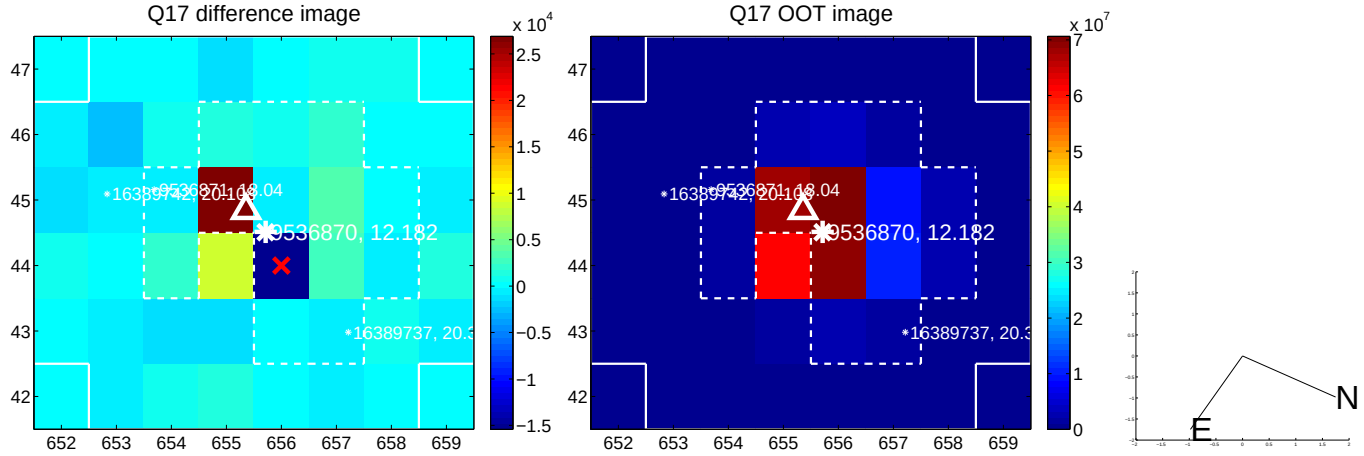


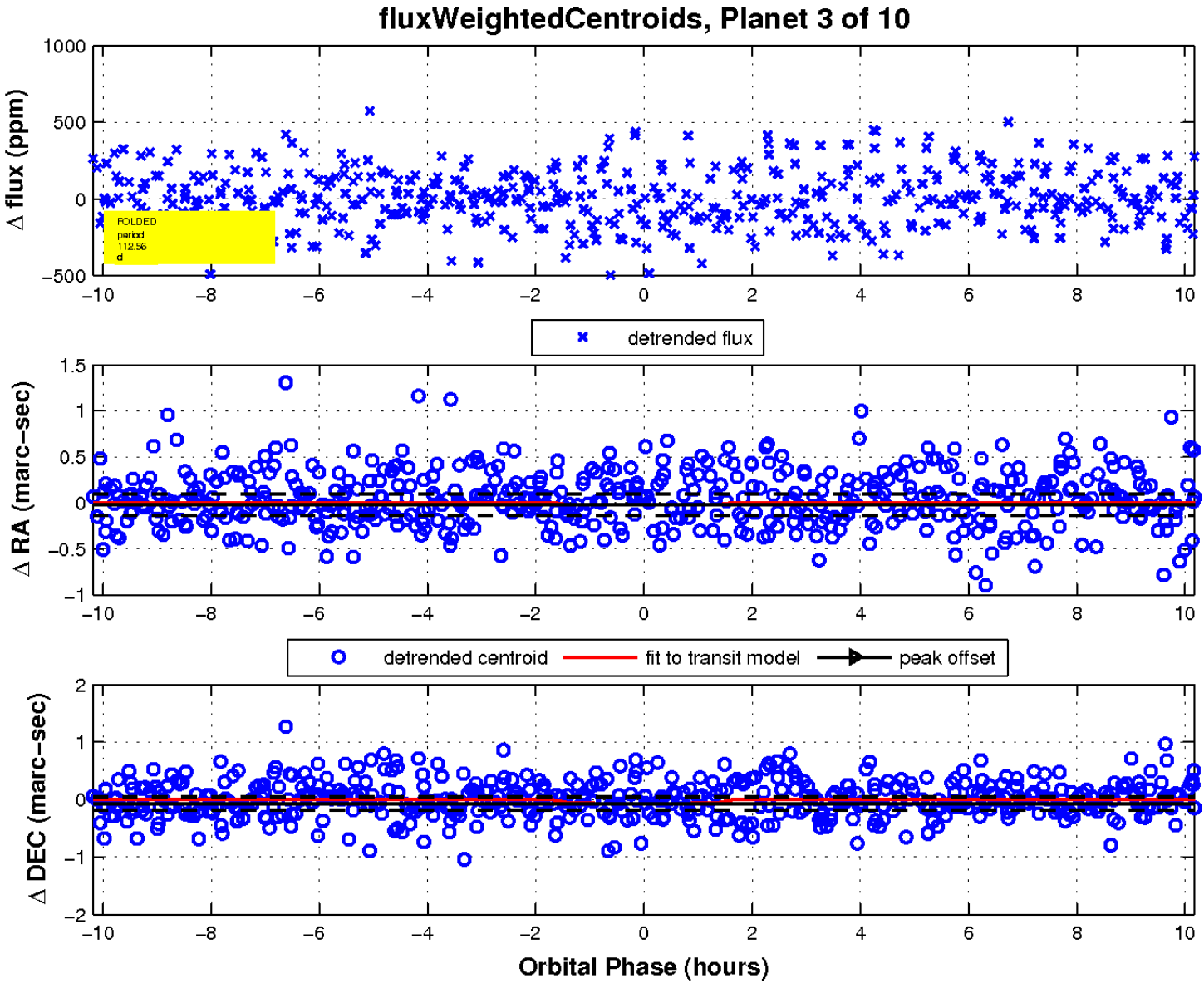




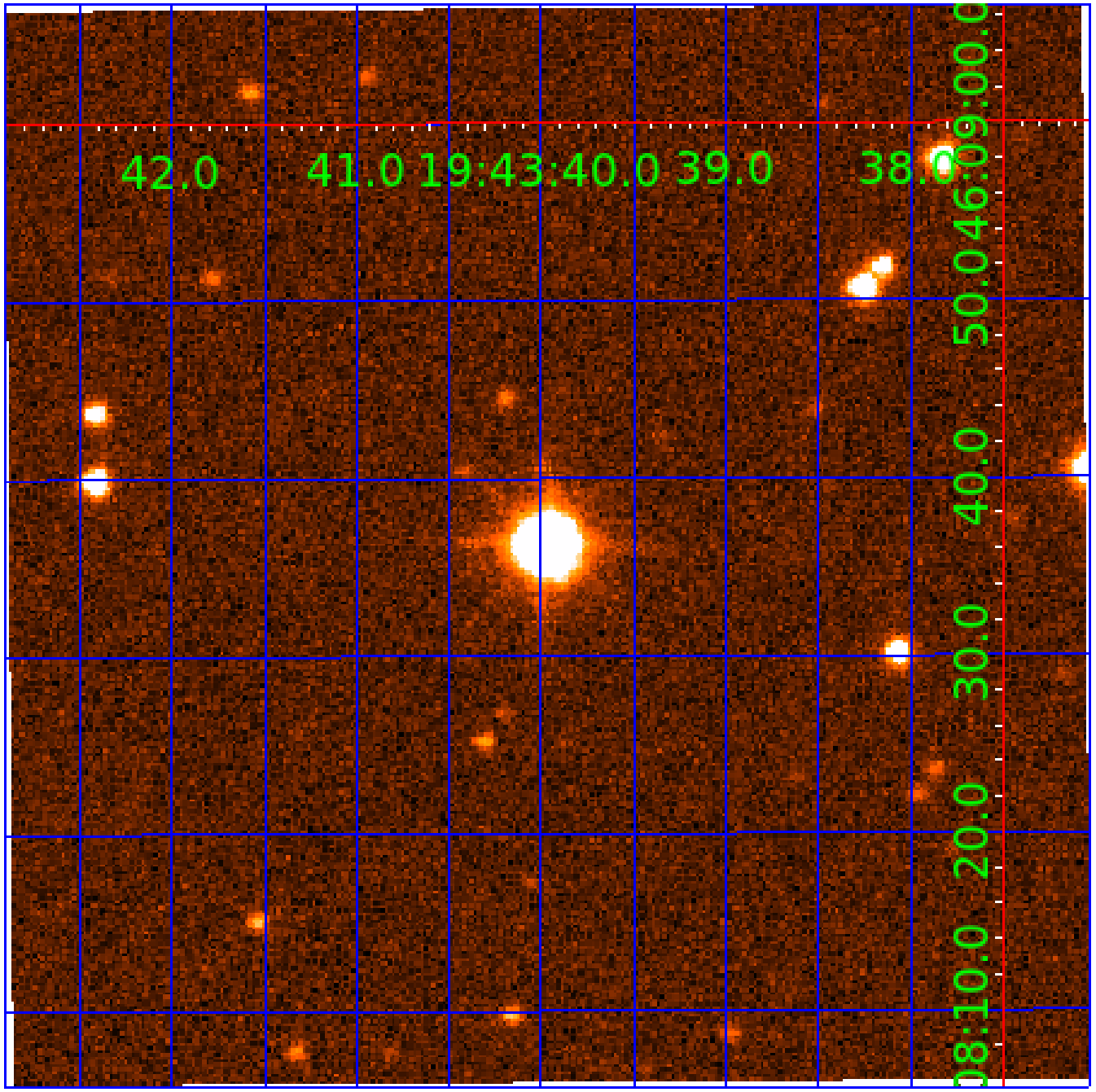


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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09:00.0
46:
50.0
40.0
30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

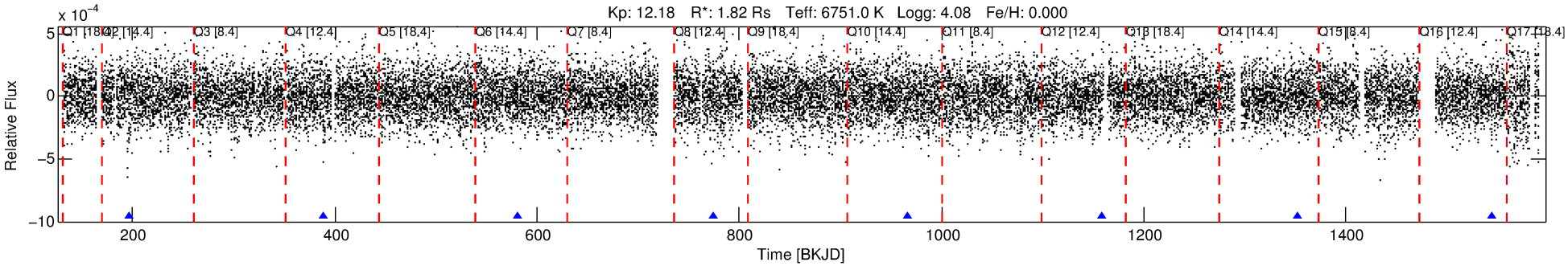
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

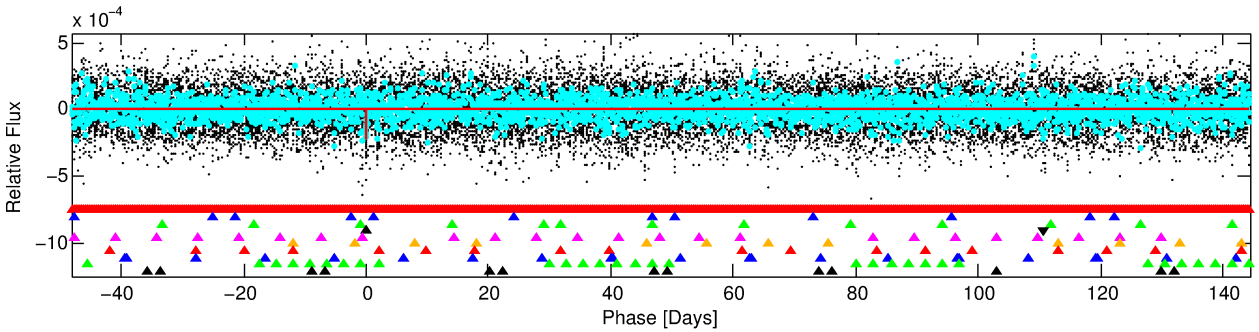
Ephemeris Match Information For 009536870-04

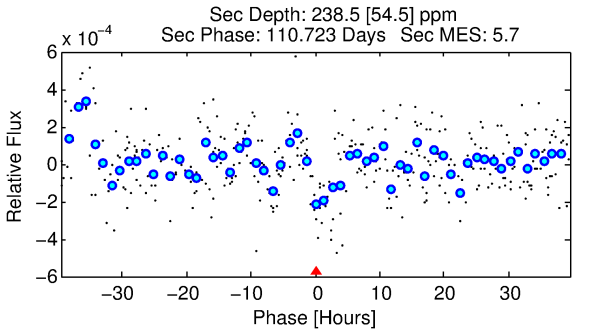
No Significant Match Found

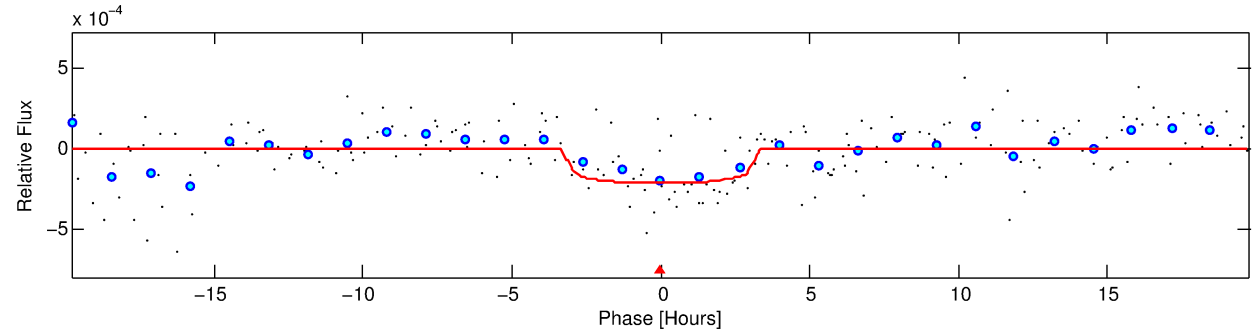
DV One-Page Summary

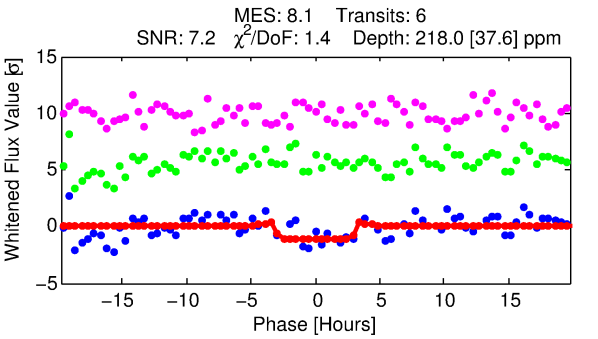
KIC: 9536870 Candidate: 4 of 10 Period: 192.578 d

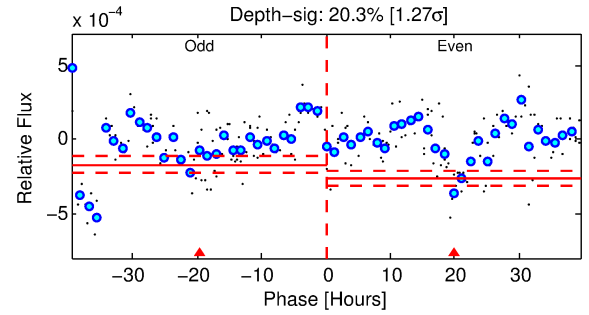


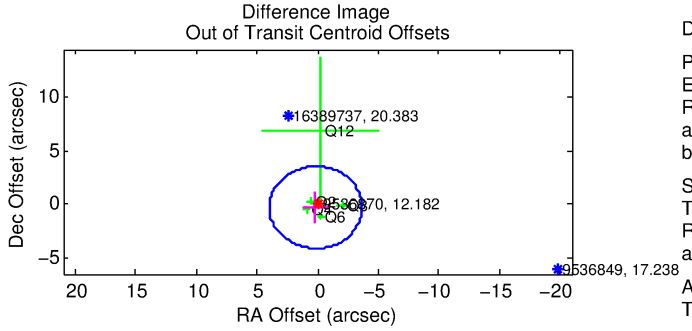












DV Fit Results:

Period = 192.57813 [0.00364] d
Epoch = 196.3723 [0.0169] BKJD
Rp/R* = 0.0151 [0.0062]
a/R* = 129.59 [302.03]
b = 0.83 [0.86]

Seff = 11.26 [2.89]
Teq = 467 [30] K
Rp = 3.00 [1.35] Re
a = 0.7382 [0.1193] AU

Ag = 7941.89 [7084.00] [1.12σ]
Teffp = 6818 [1463] K [4.34σ]

DV Diagnostic Results:

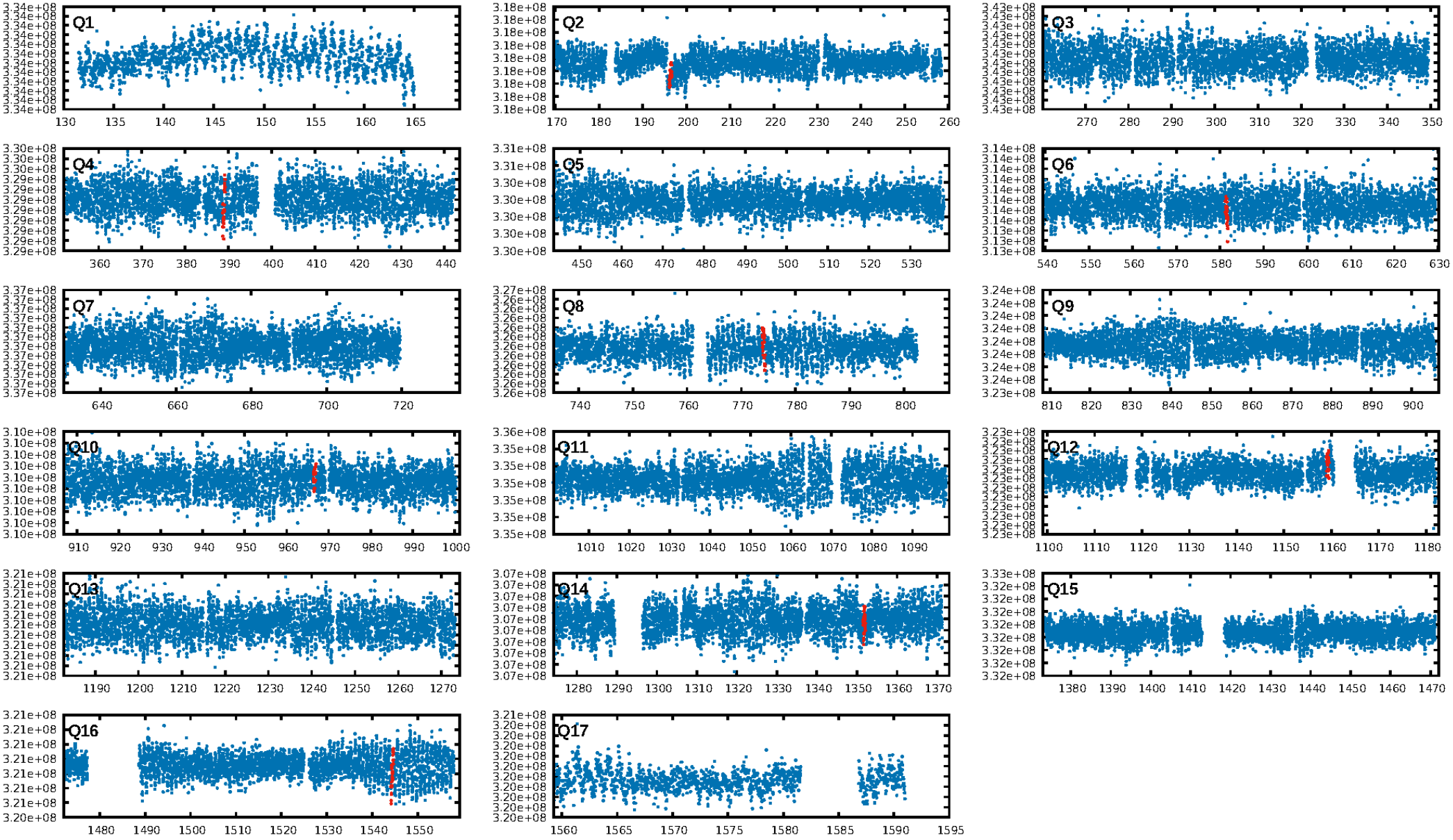
ShortPeriod−sig: 100.0% [229.47σ]
LongPeriod−sig: N/A
ModelChiSquare2−sig: 0.2%
ModelChiSquareGof−sig: 100.0%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [6/6]
GhostDiagnostic−chr: −3.142

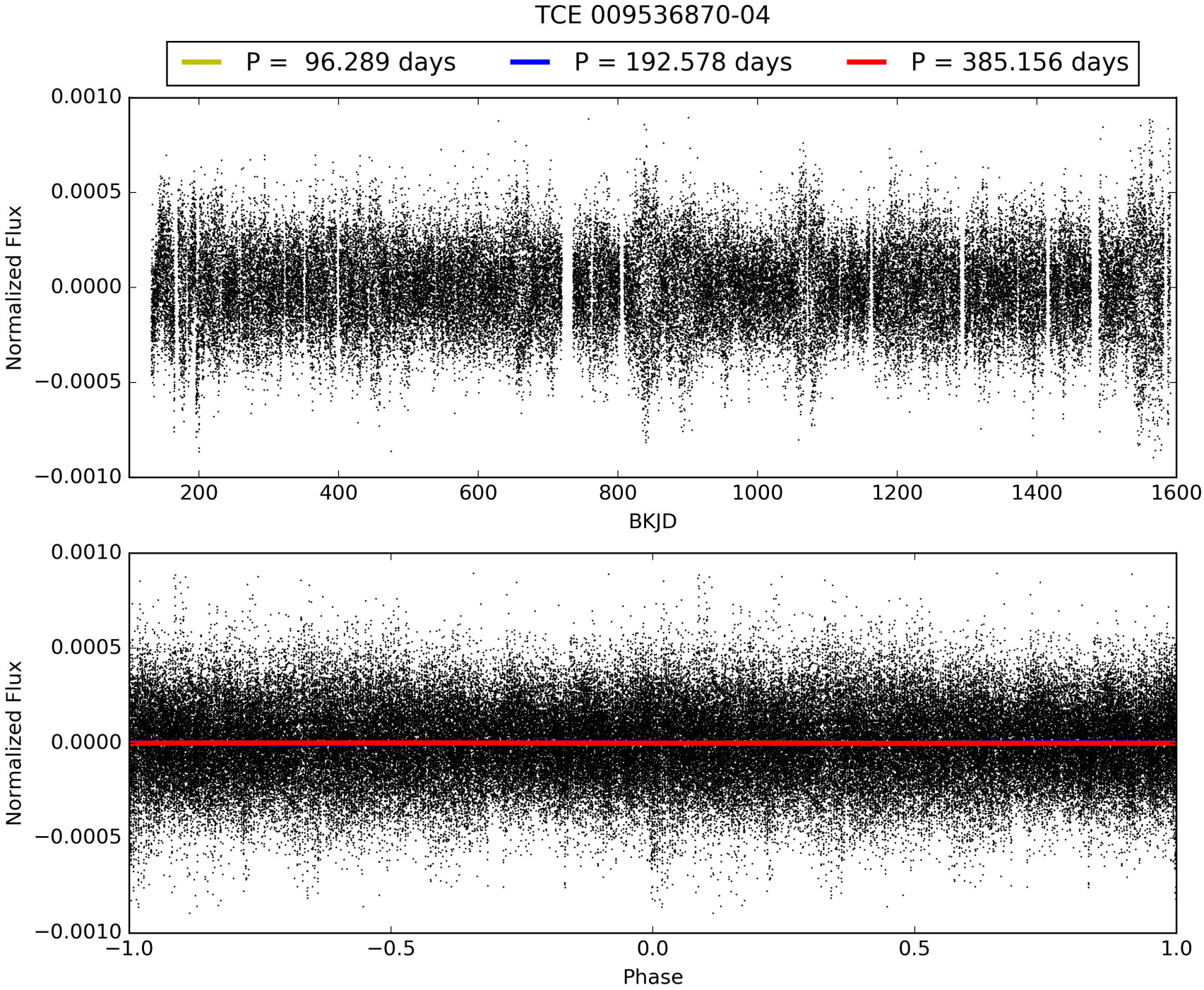
Centroid−sig: 88.0%
Centroid−so: 0.148 arcsec [0.29σ]
OotOffset−rm: 0.324 arcsec [0.25σ]
KicOffset−rm: 0.359 arcsec [0.25σ]
OotOffset−st: 2/0/3/0 [5]
KicOffset−st: 2/0/3/0 [5]
DiffImageQuality−fgm: 0.40 [2/5]
DiffImageOverlap−fno: 0.00 [0/7]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:22 Z

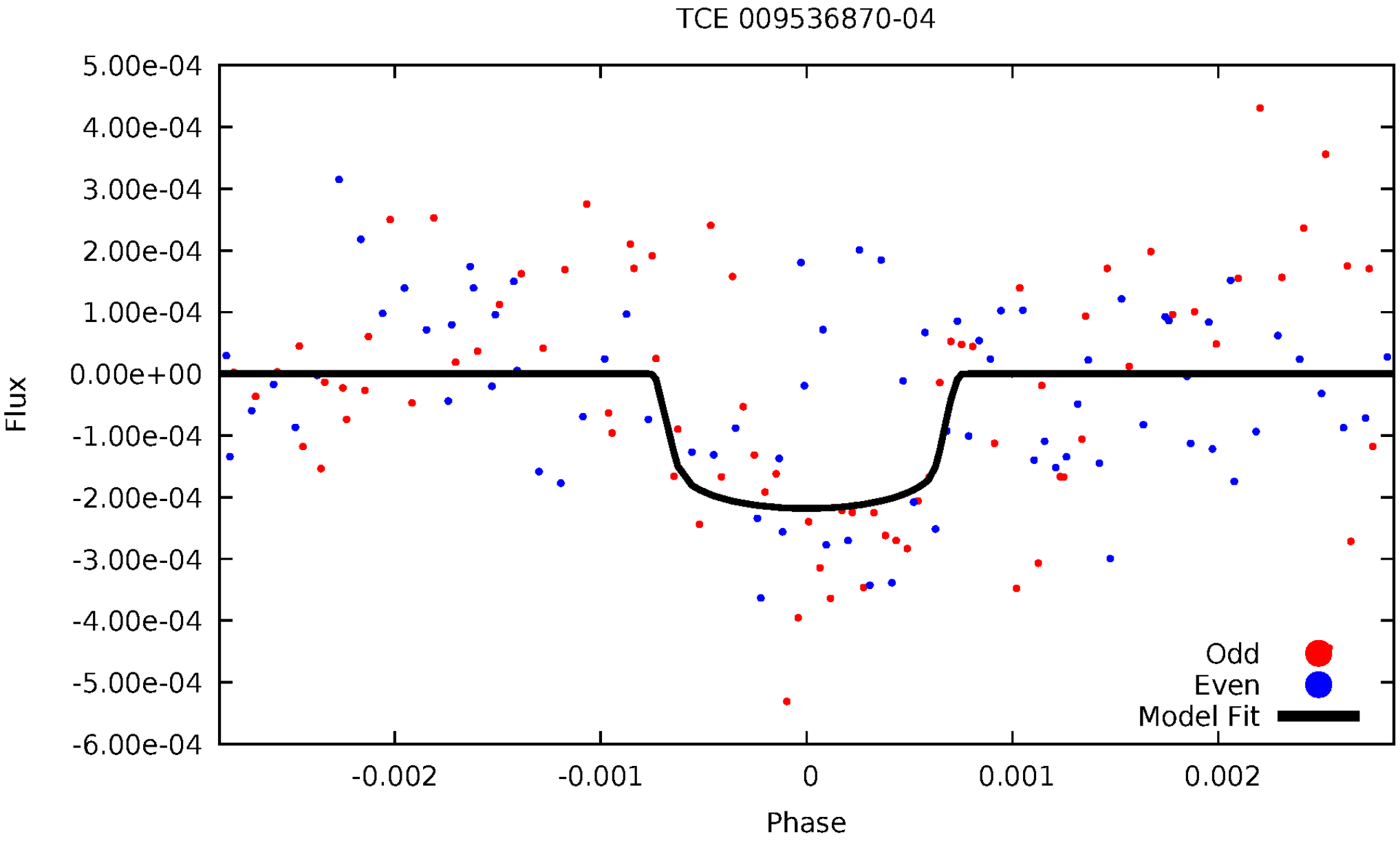
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

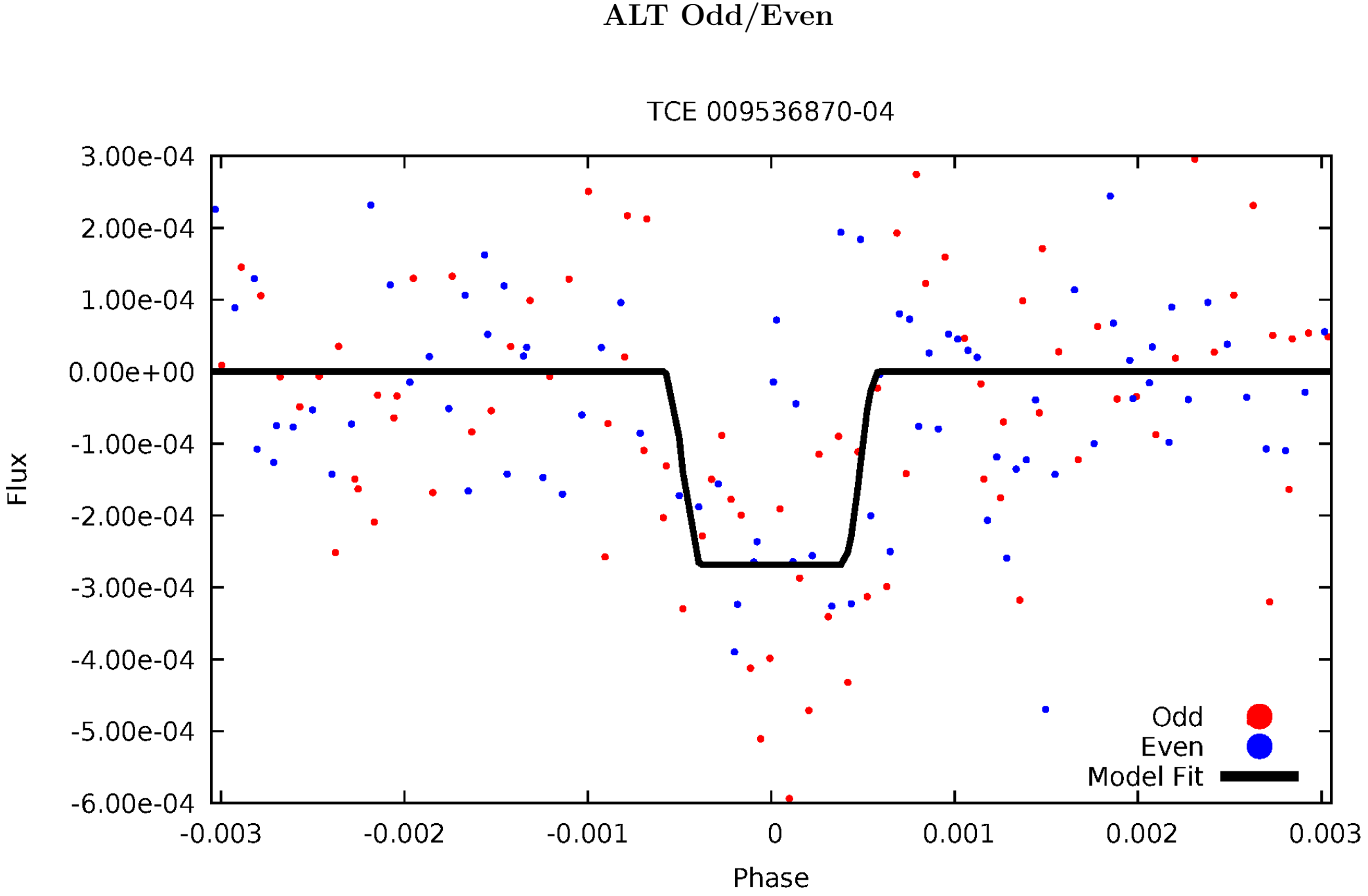
TCE 009536870-04, PDC Light Curves



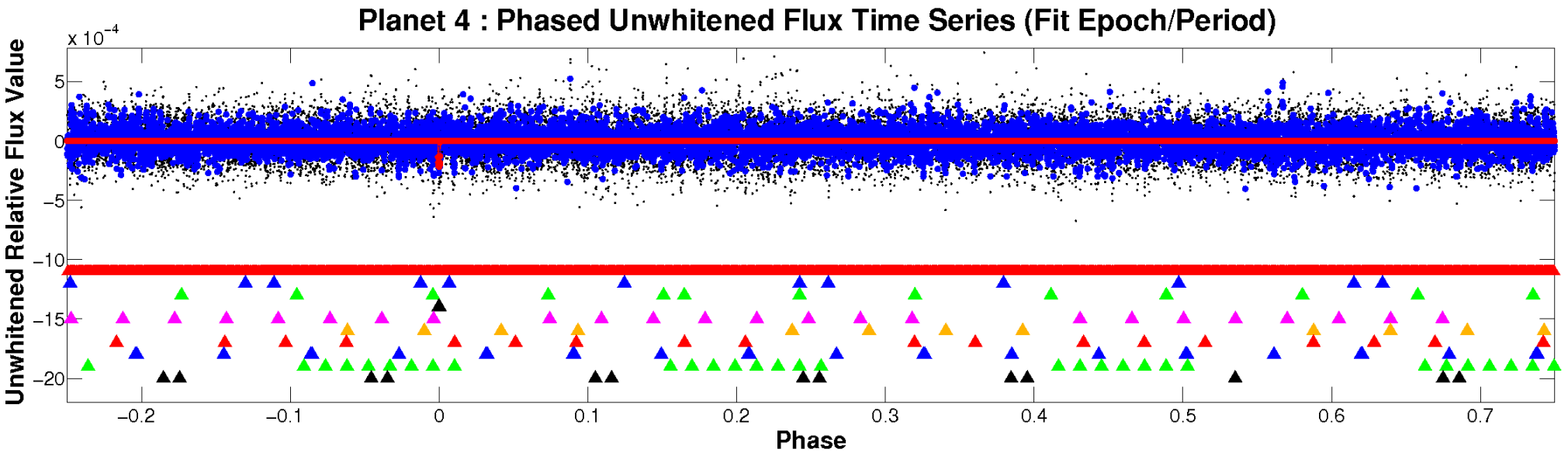

TCE 009536870-04
P = 96.289 days
P = 192.578 days
P = 385.156 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

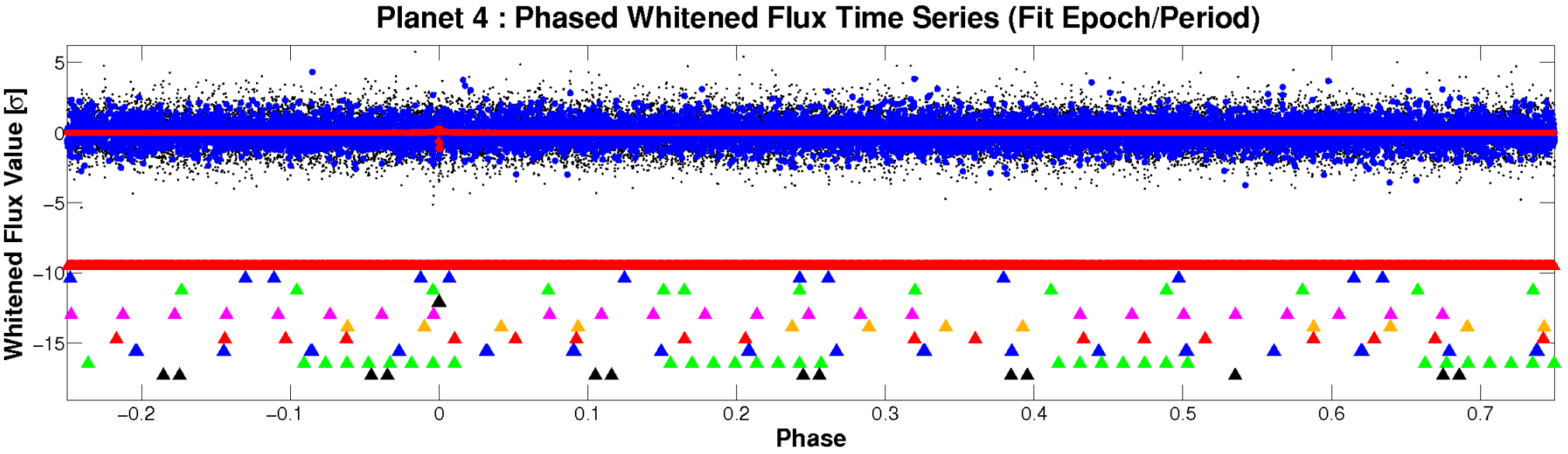
DV Odd/Even


TCE 009536870-04
5.00e-04
4.00e-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
-6.00e-04
Flux
-0.002
-0.001
0
0.001
0.002
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
-6.00e-04
Flux
-0.003
-0.002
-0.001
0
0.001
0.002
0.003
Phase
Odd
Even
Model Fit

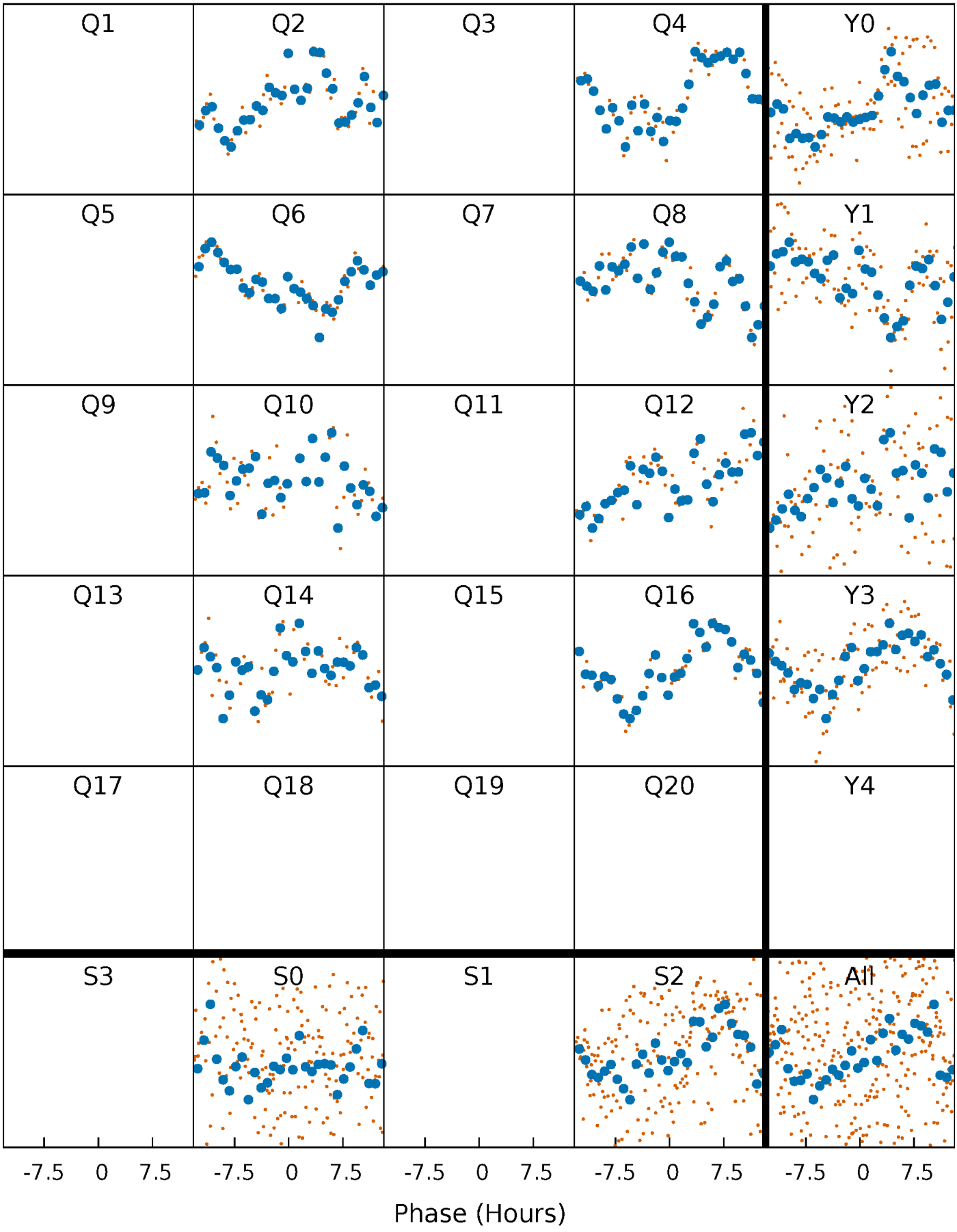
Non-Whitened Vs. Whitened Light Curve





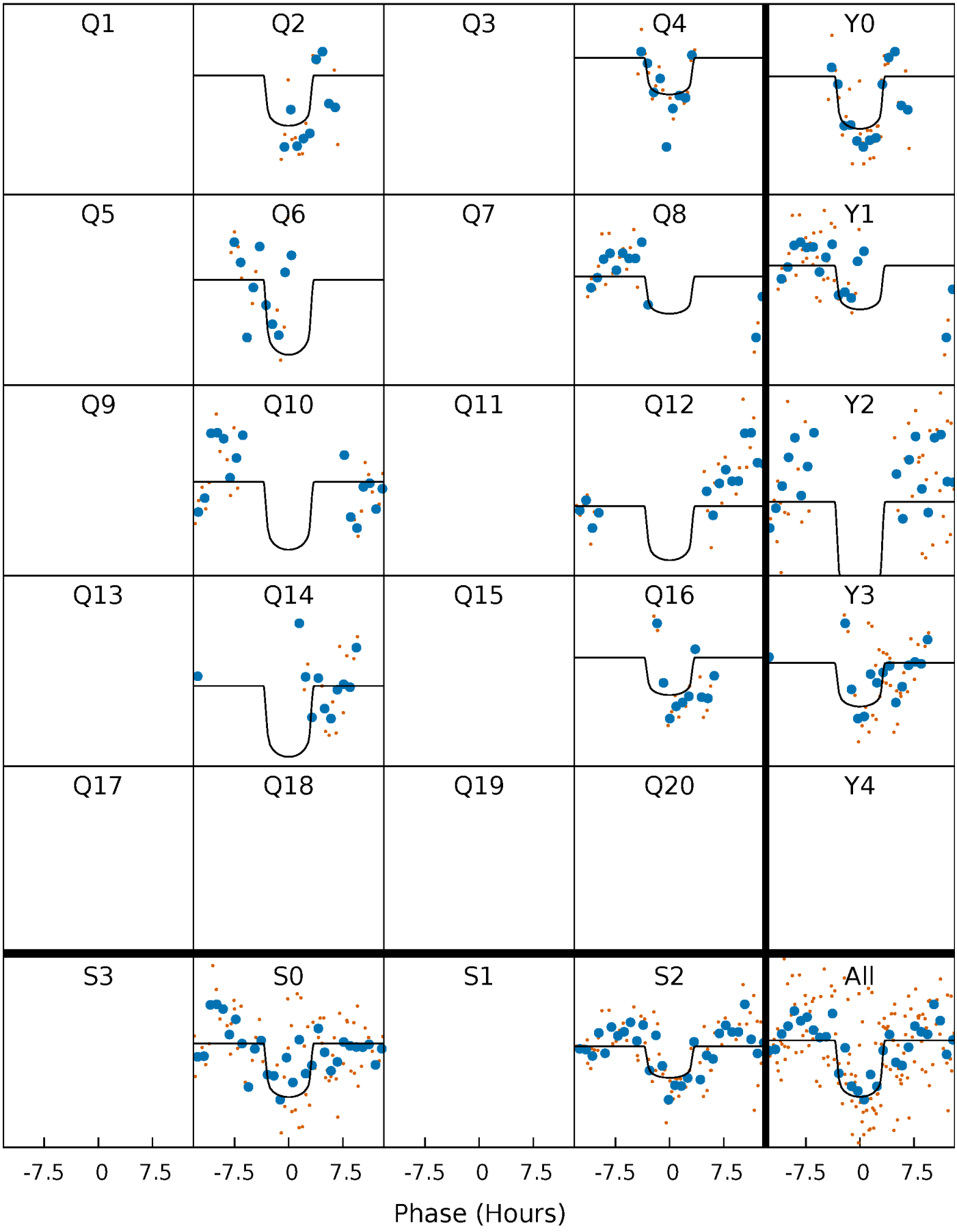
PDC Quarter-Phased Transit Curves

TCE 009536870-04 P=192.578125 Days T_0=196.372269 (BKJD)



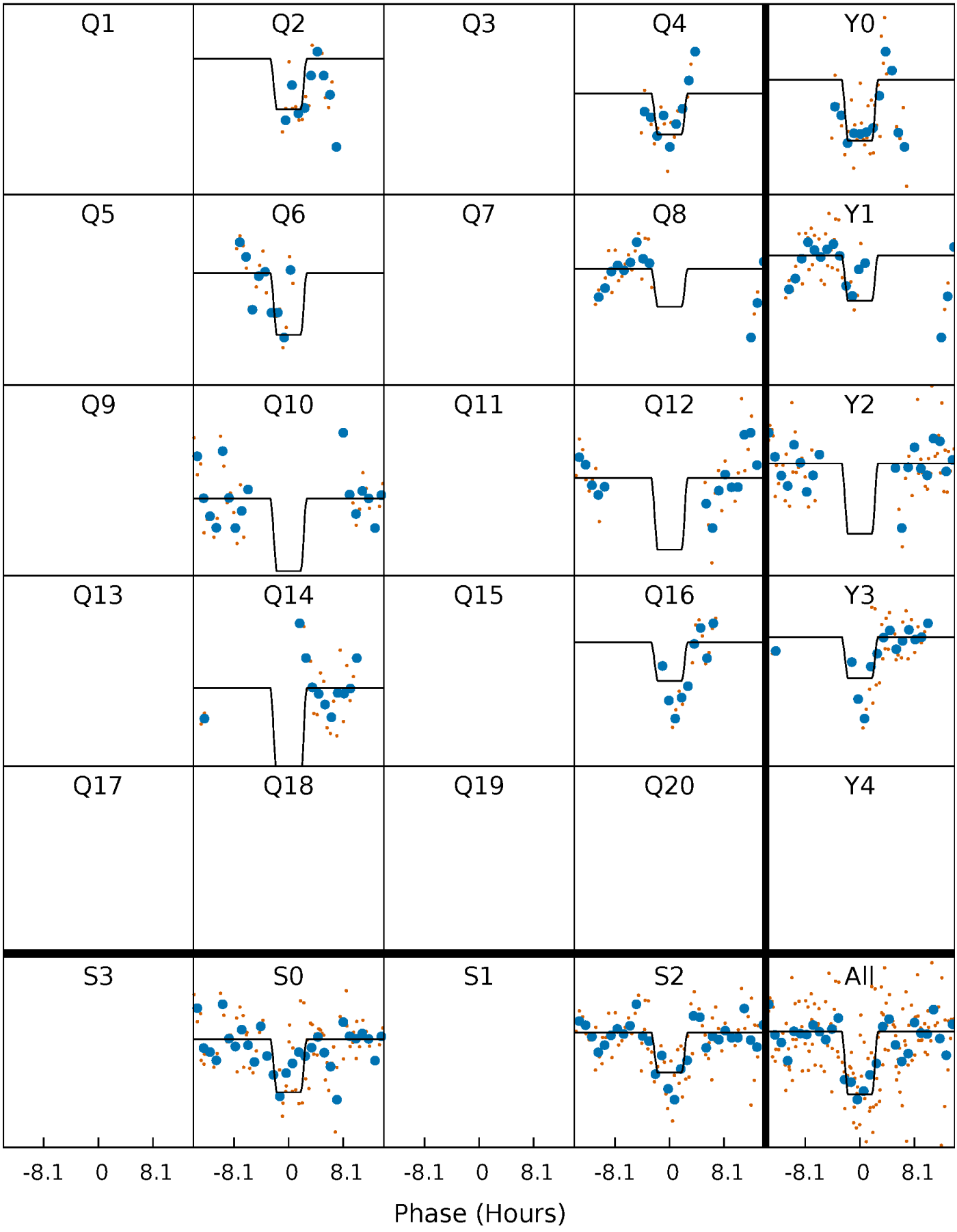
DV Quarter-Phased Transit Curves

TCE 009536870-04 P=192.578125 Days T_0=196.372269 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

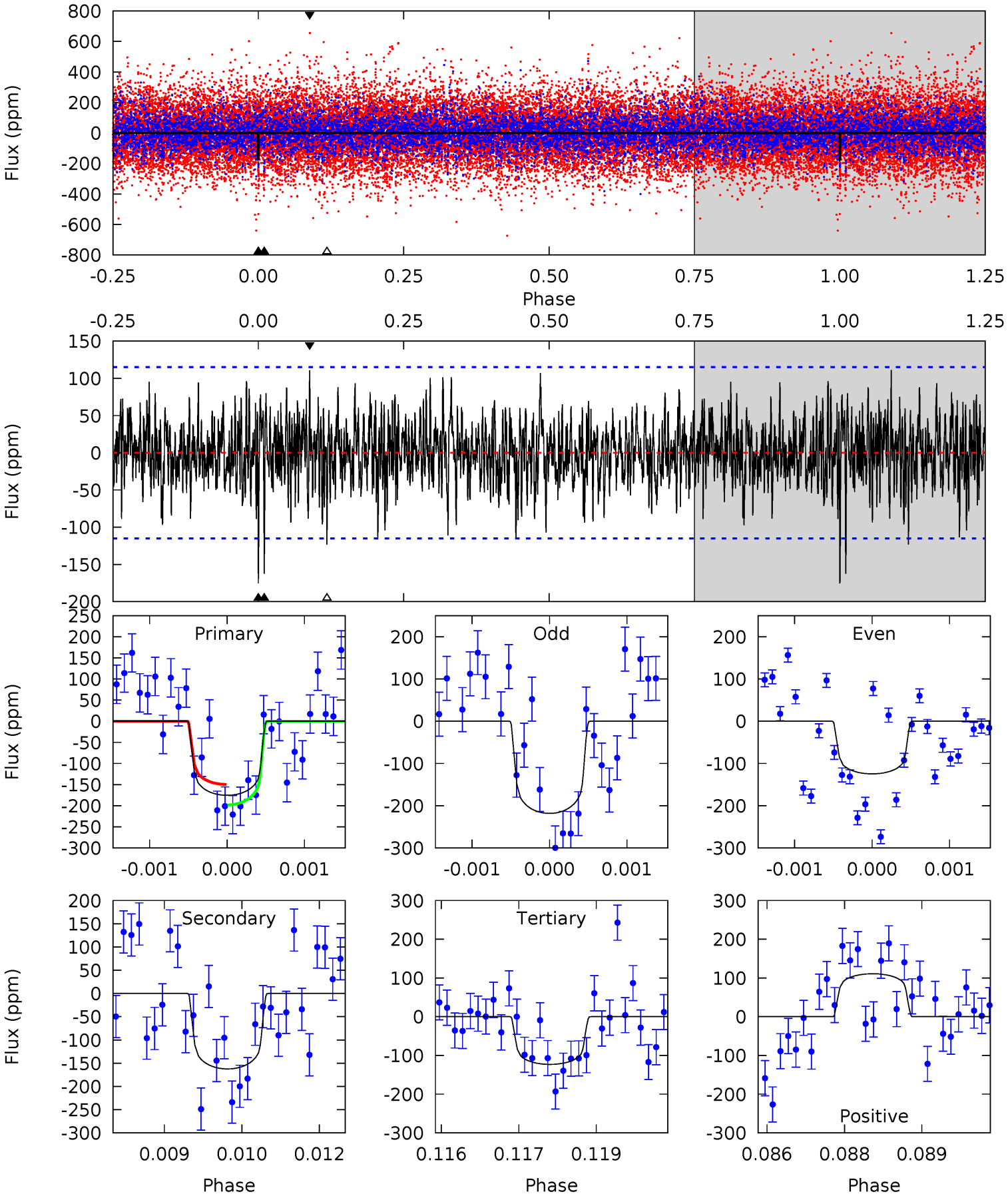
TCE 009536870-04 P=192.574871 Days T_0=196.368083 (BKJD)



DV Model-Shift Uniqueness Test

009536870-04, P = 192.578125 Days, E = 3.794144 Days

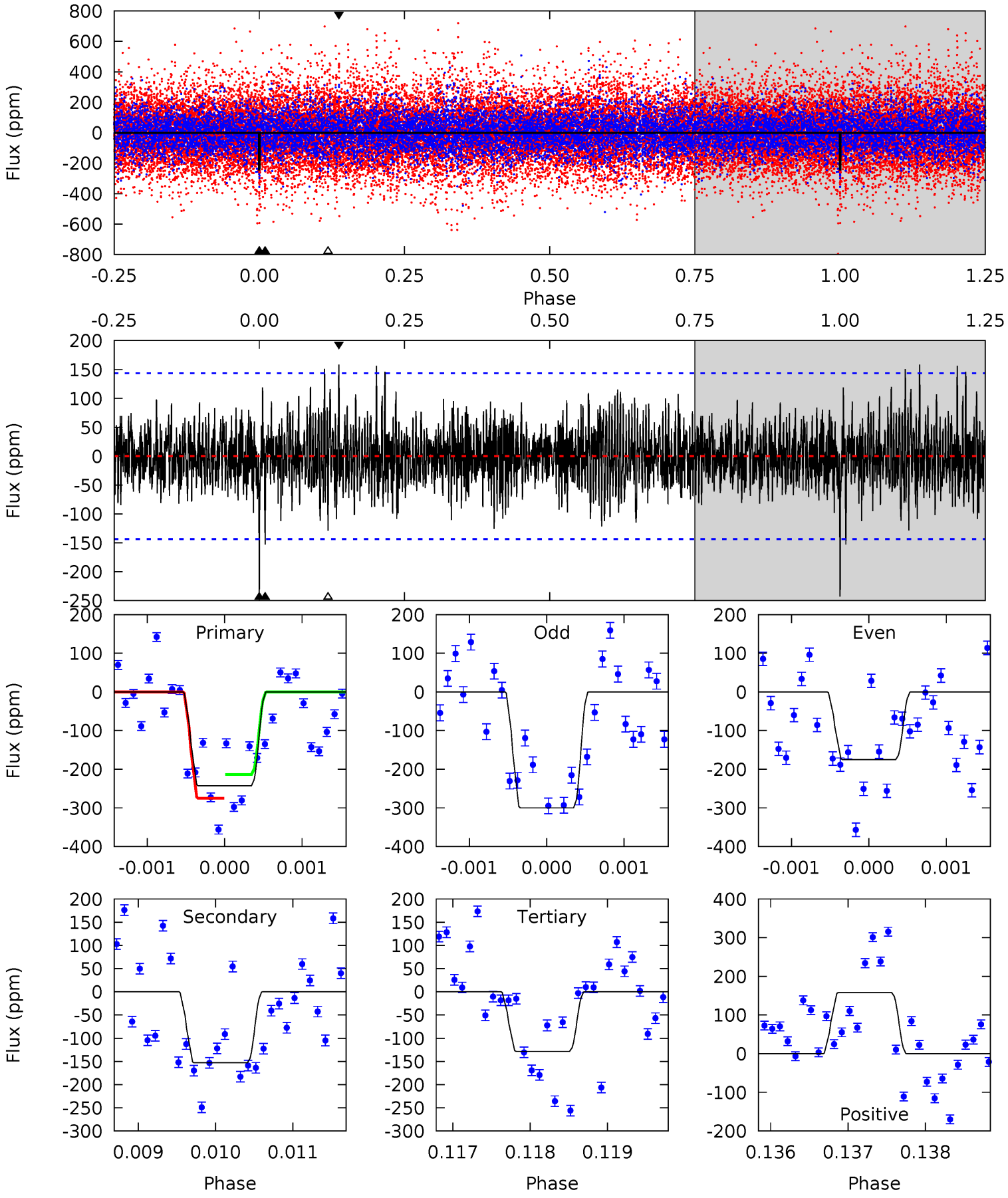
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.20	7.59	5.76	5.18	5.38	3.18	1.62	2.44	3.02	1.83	2.41	2.18	0.73	0.39	1.13



Alt Model-Shift Uniqueness Test

009536870-04, P = 192.574871 Days, E = 3.793212 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.19	5.80	4.87	5.99	5.44	3.27	1.53	4.32	3.21	0.93	-0.19	2.39	0.71	0.39	1.16



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-04 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-162±21	$3.07^{+1.26}_{-1.26}$	651^{+32}_{-33}	6027^{+1930}_{-863}	5132^{+9455}_{-2521}
Alt.	-153±26	$3.17^{+1.44}_{-1.14}$	651^{+31}_{-32}	5825^{+1465}_{-863}	4449^{+6212}_{-2305}

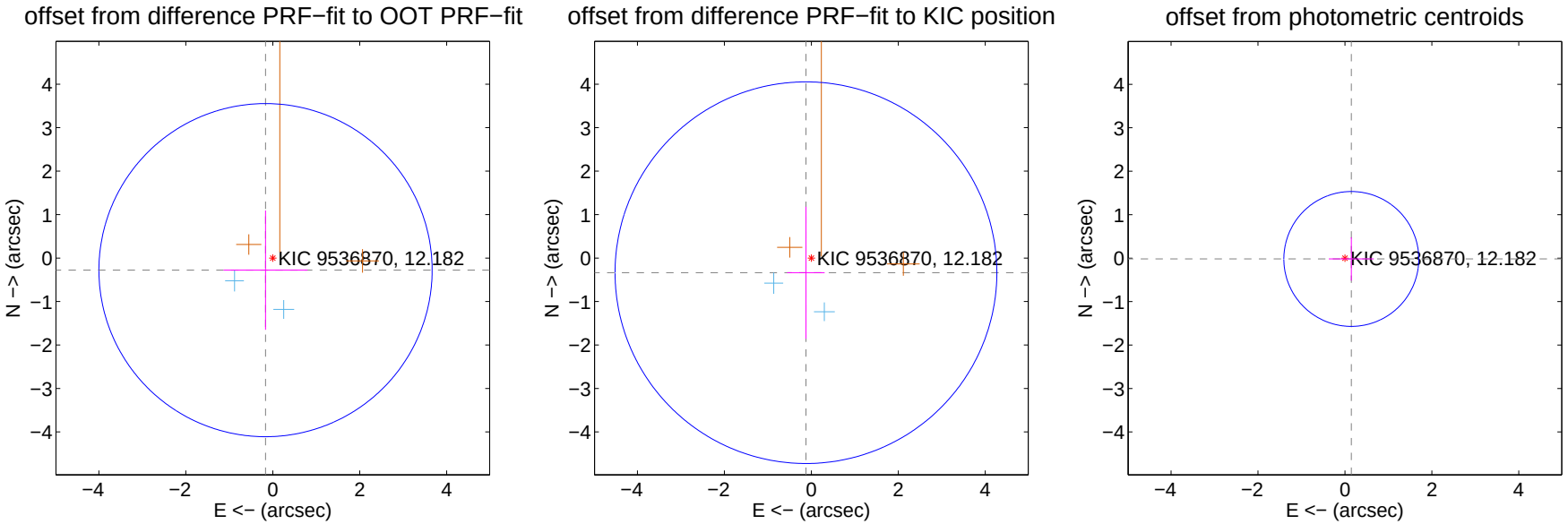
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

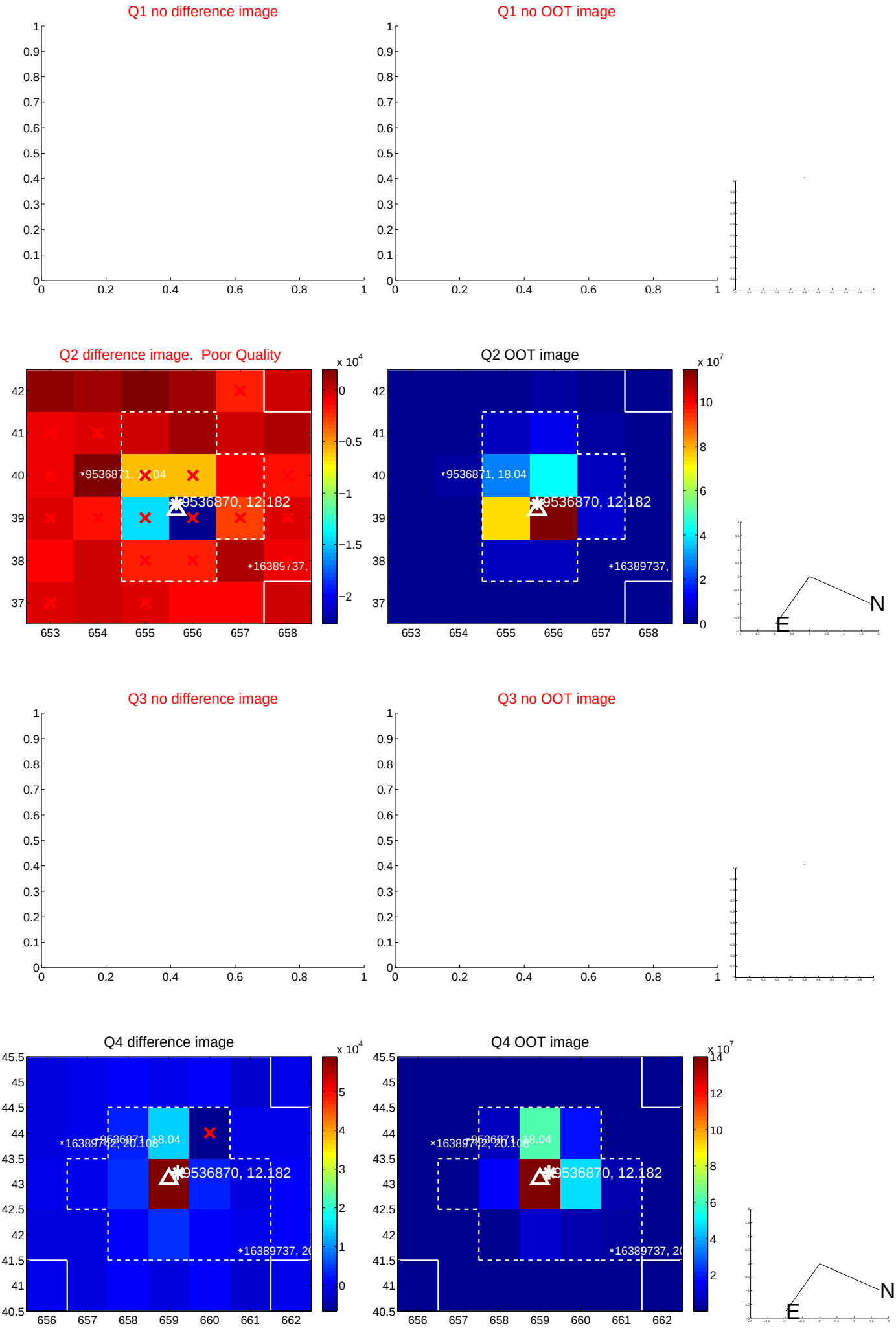
Supplemental centroid analysis for 009536870-04. Kepler magnitude: 12.18. Transit SNR 7.23
There are 2 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.324 ± 1.277	0.25	0.167 ± 0.966	-0.278 ± 1.372
PRF-fit source offset from KIC position	0.359 ± 1.463	0.25	0.124 ± 0.431	-0.337 ± 1.519
photometric centroid source offset	0.15 ± 0.52	0.29	-0.15 ± 0.52	-0.02 ± 0.50

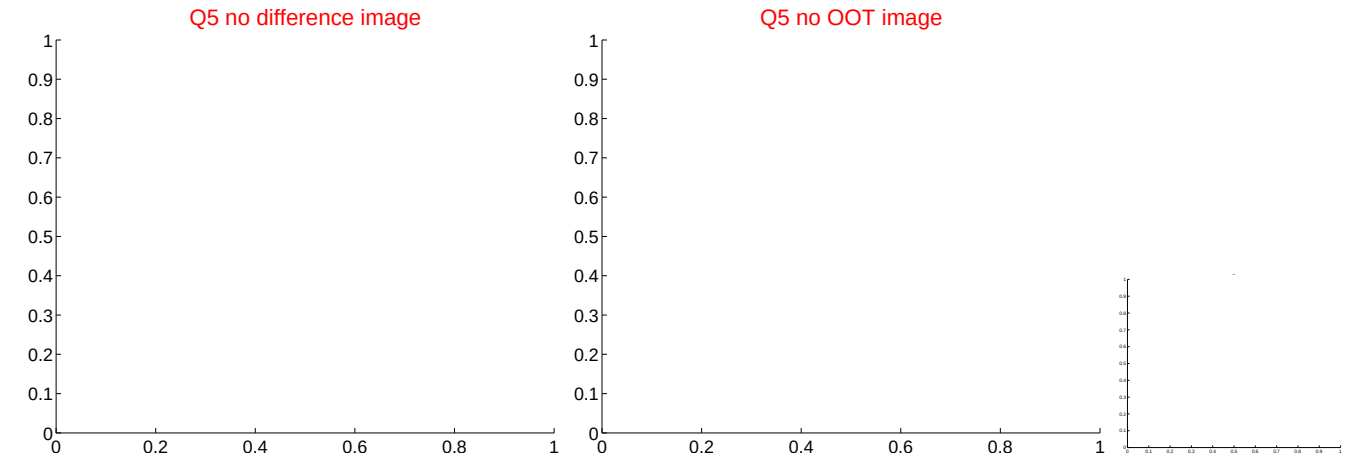


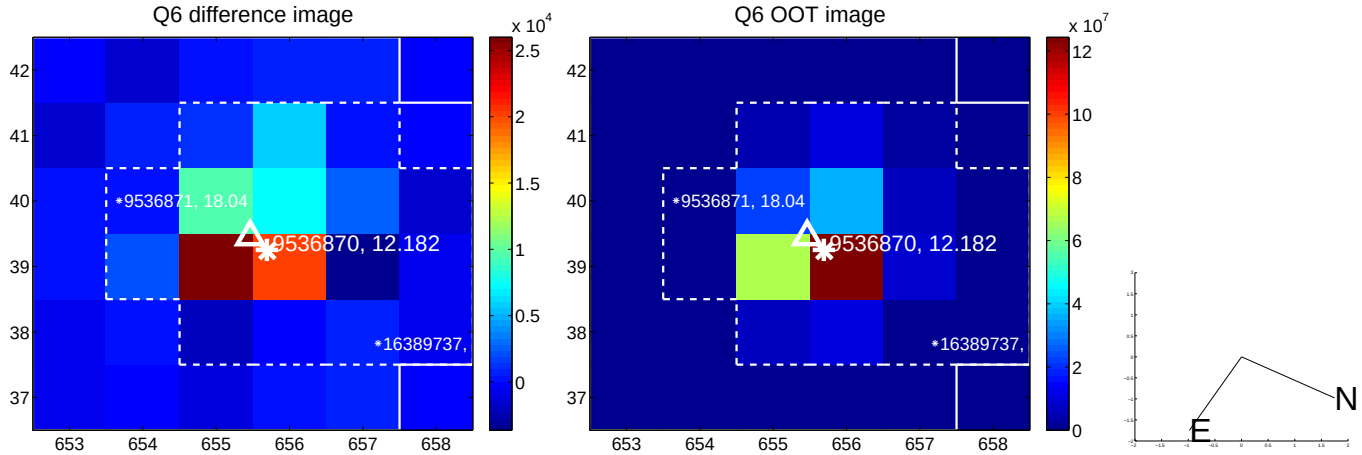
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

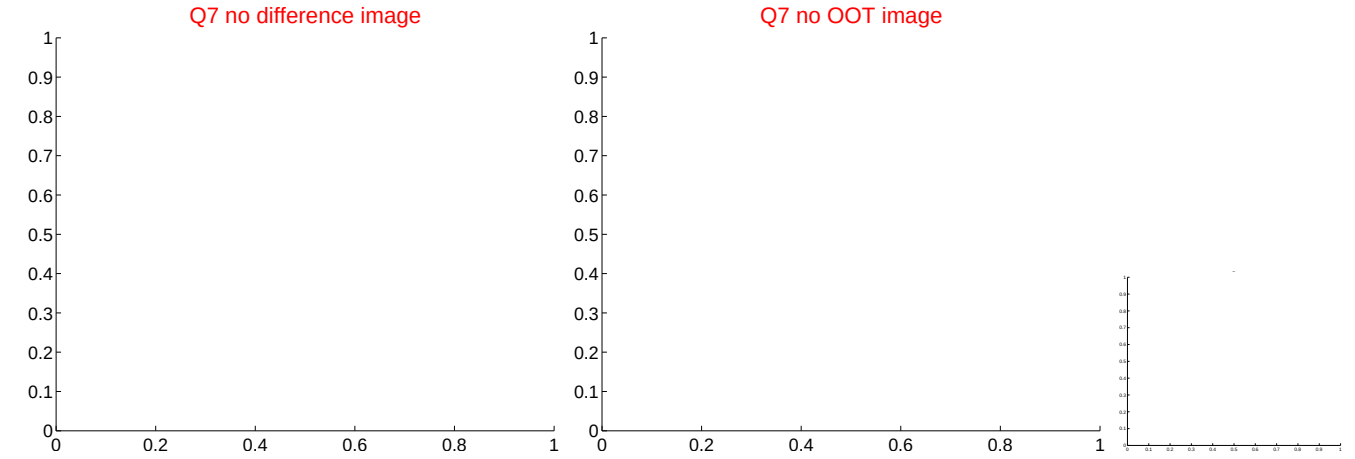
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

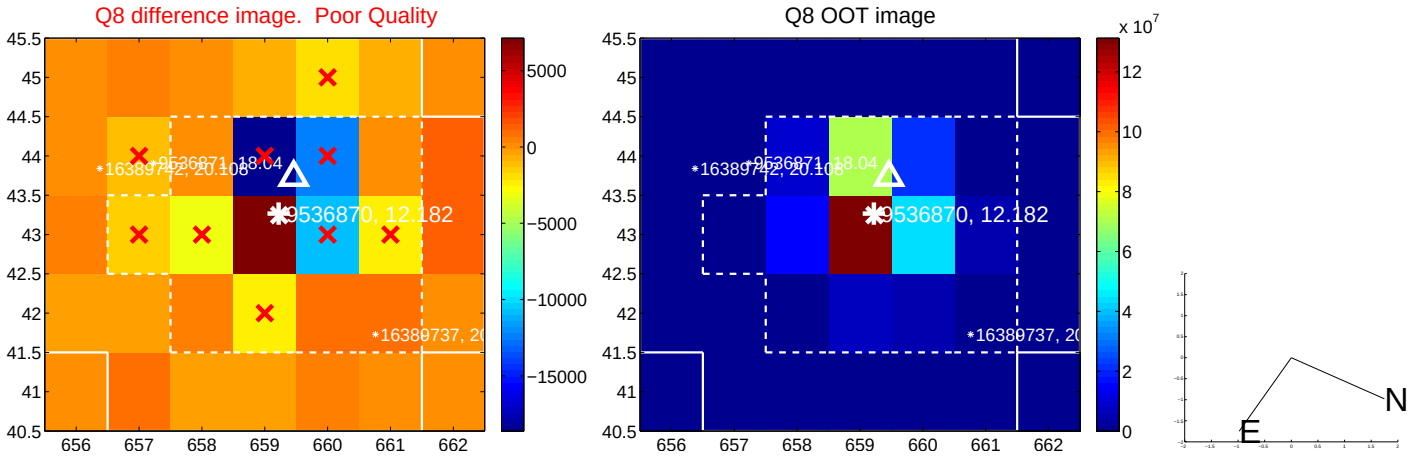


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

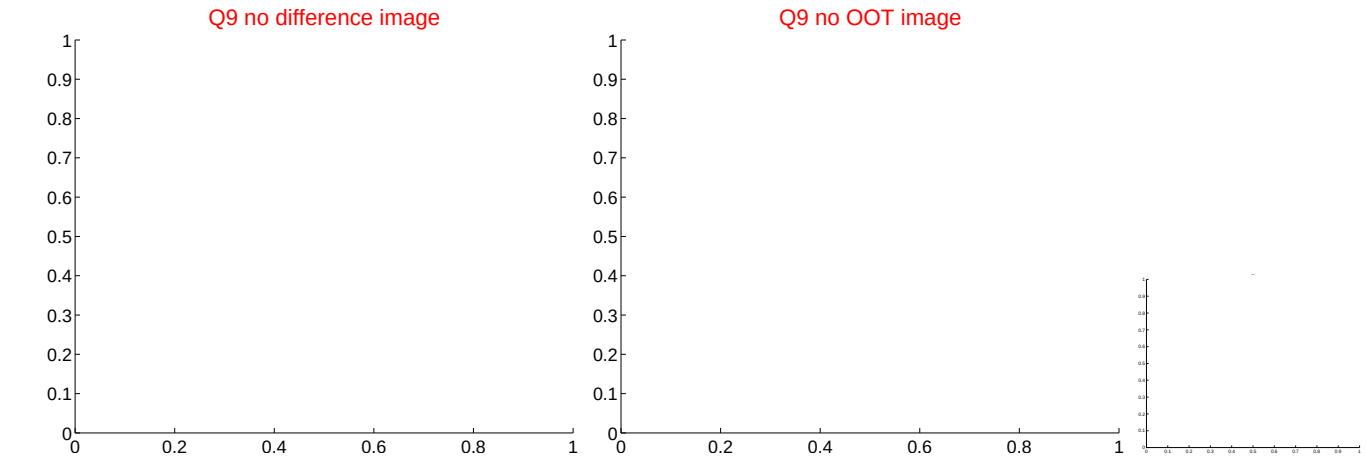


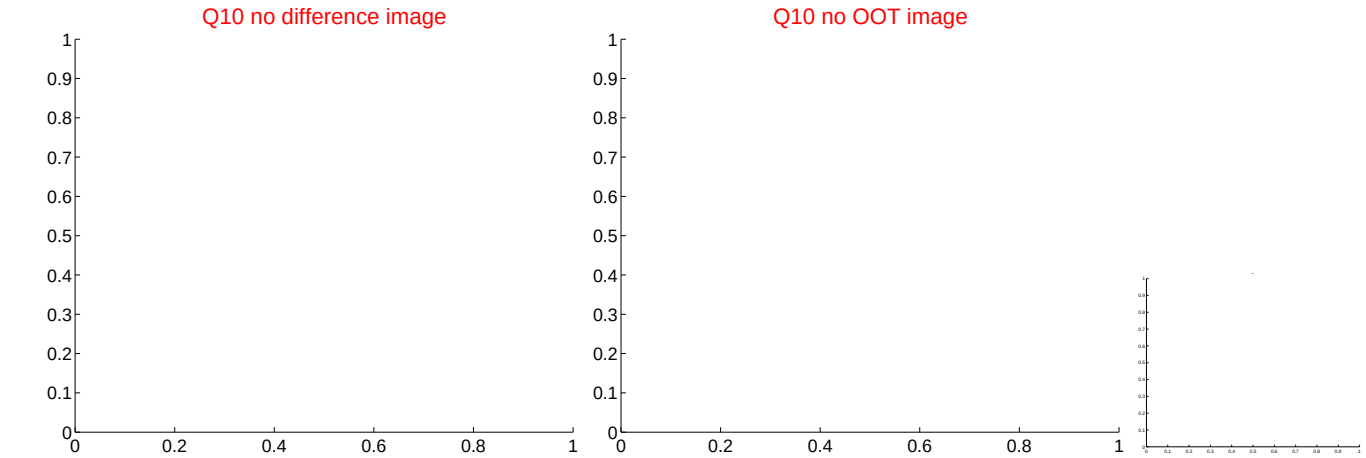


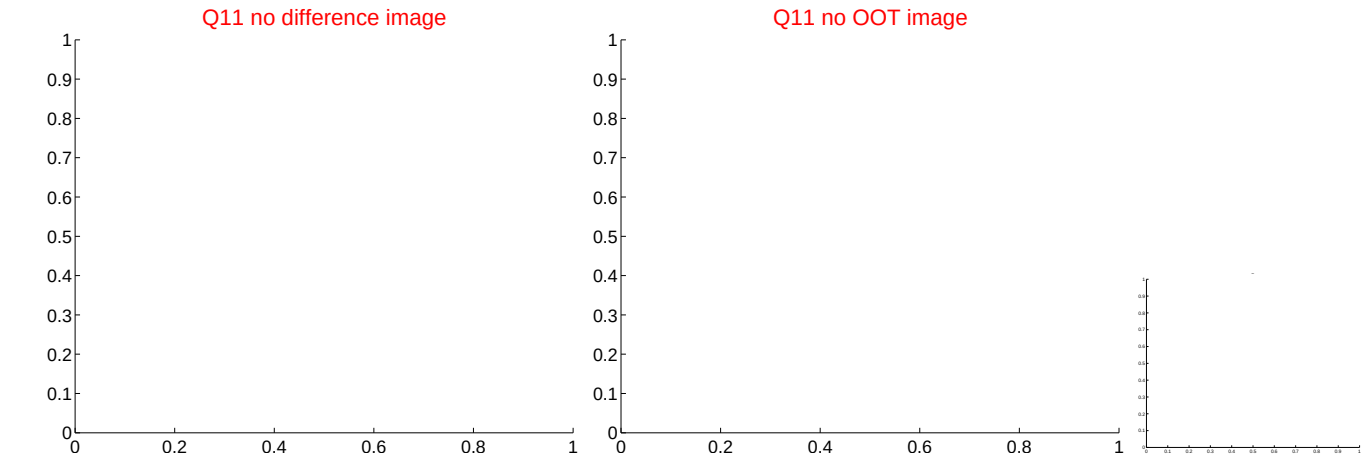


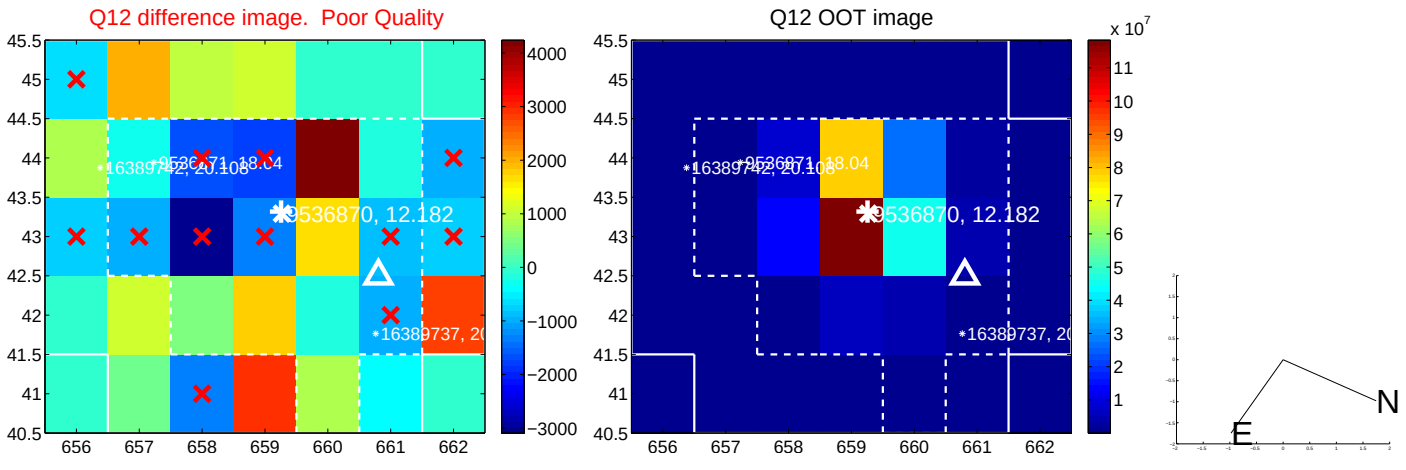


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

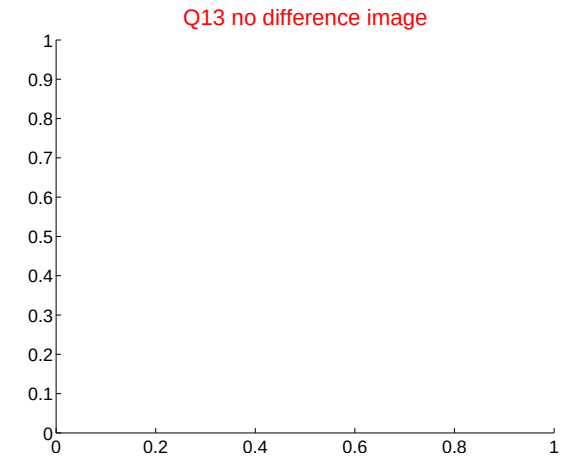


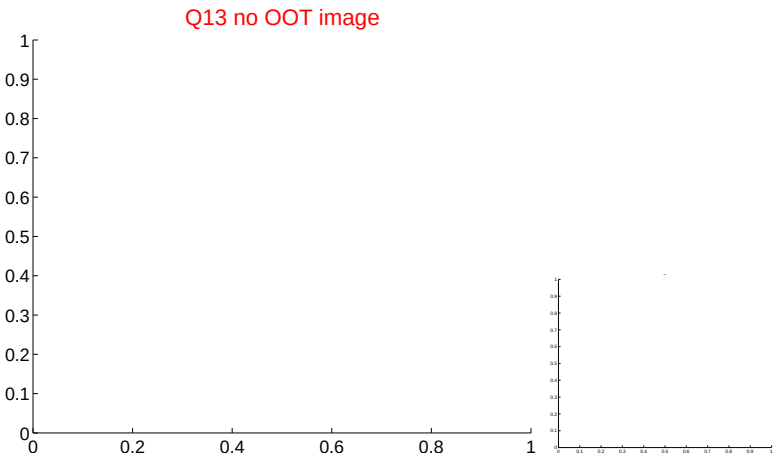


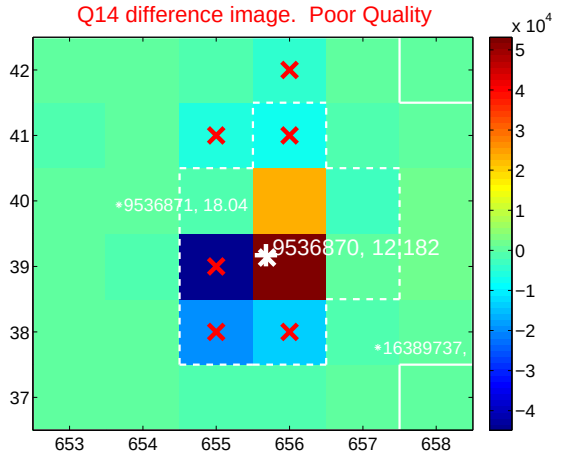


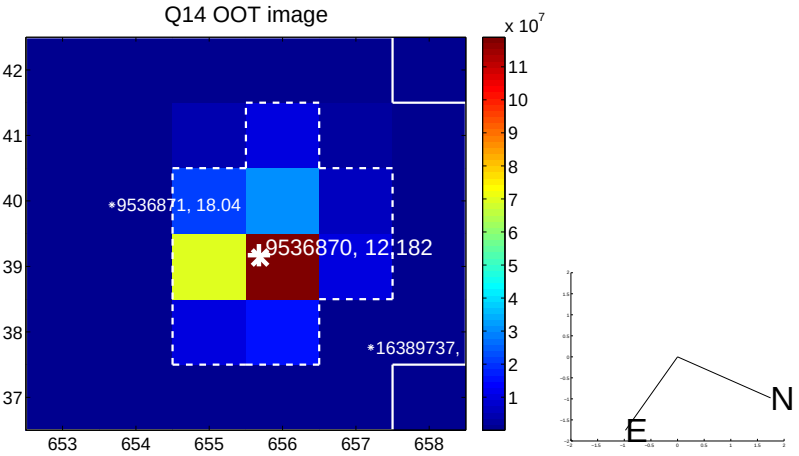


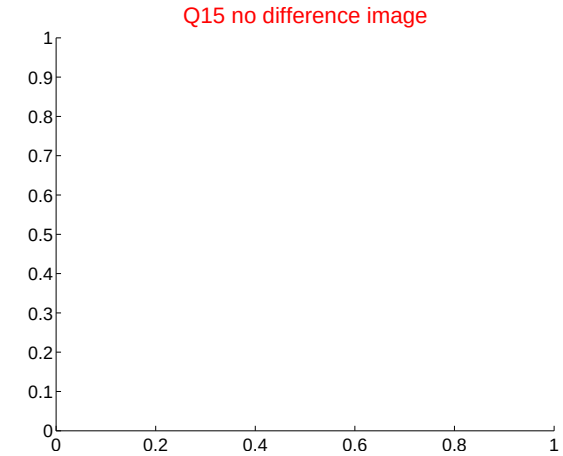
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

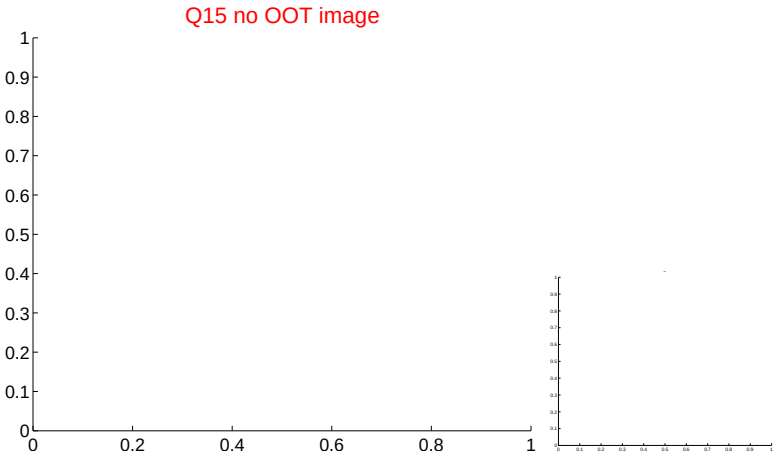


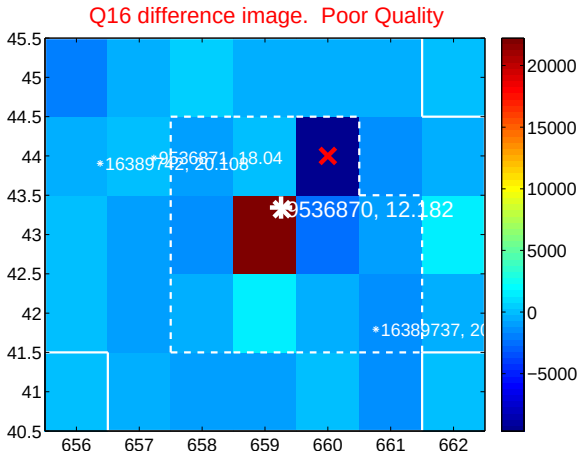


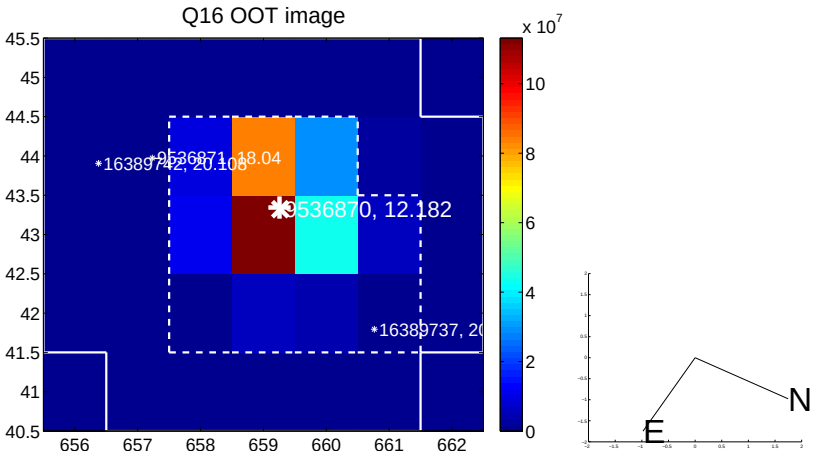




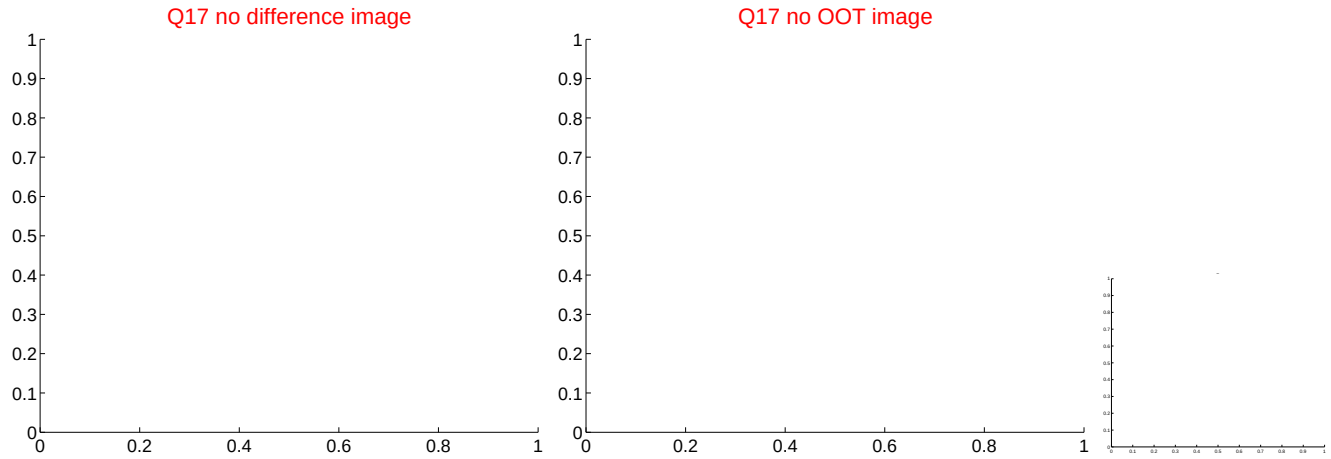


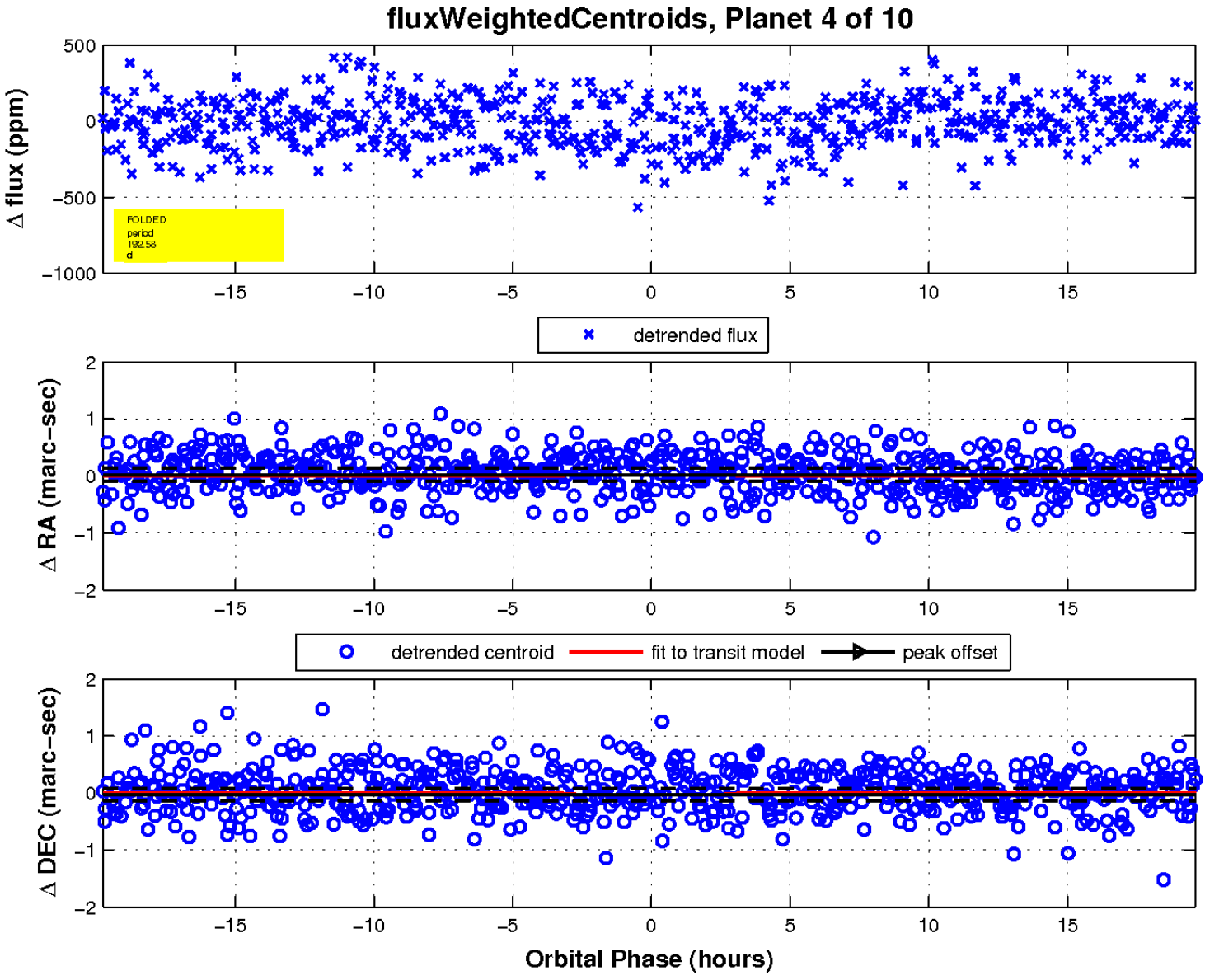




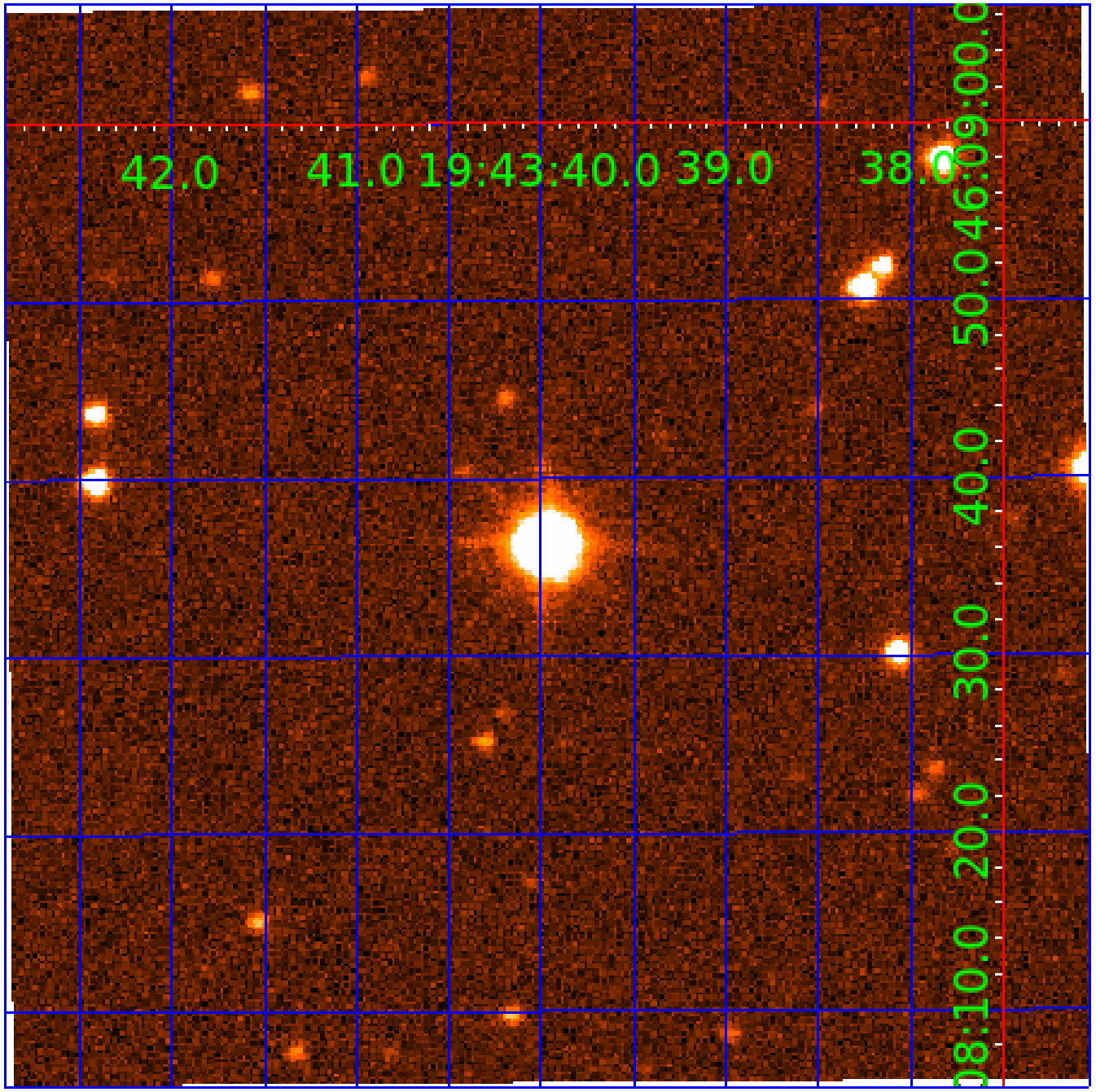


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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39.0
38.0
09:00.0
46:
50.0
40.0
30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

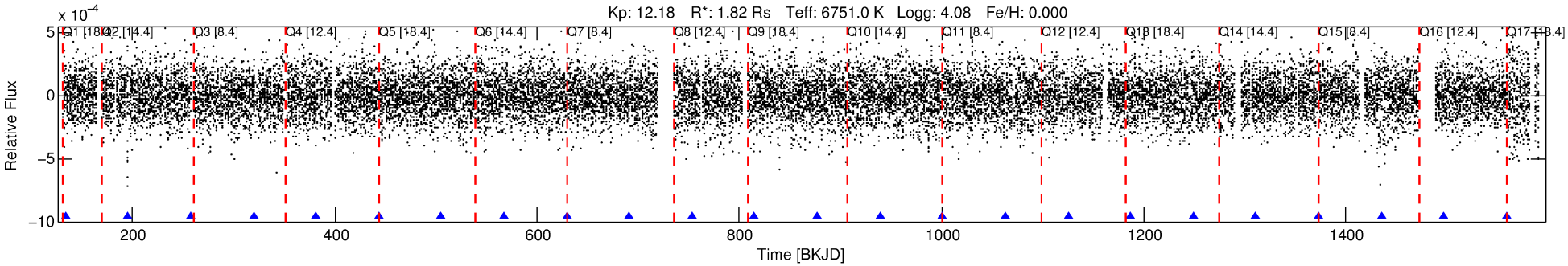
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

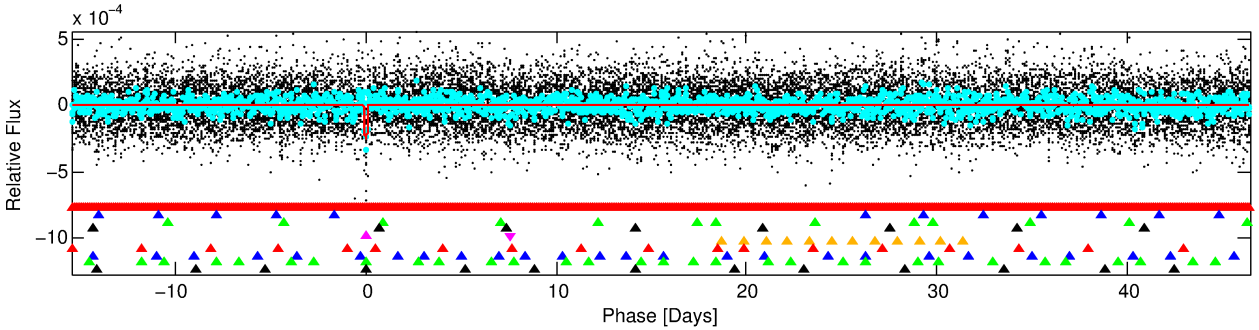
Ephemeris Match Information For 009536870-05

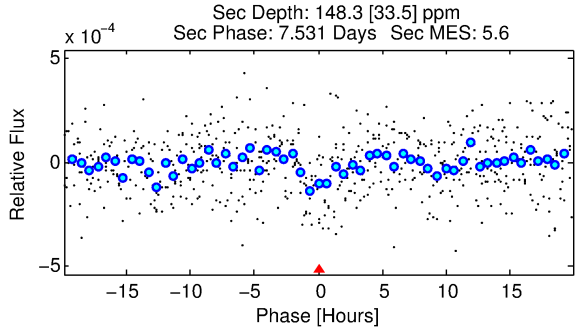
No Significant Match Found

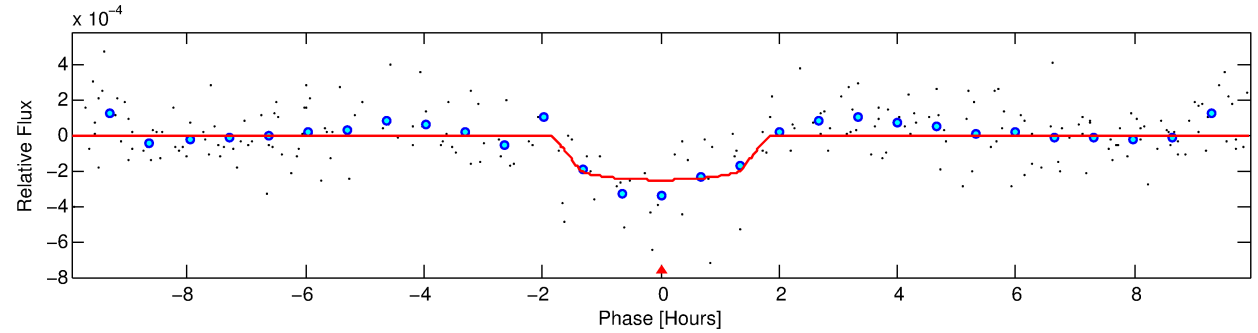
DV One-Page Summary

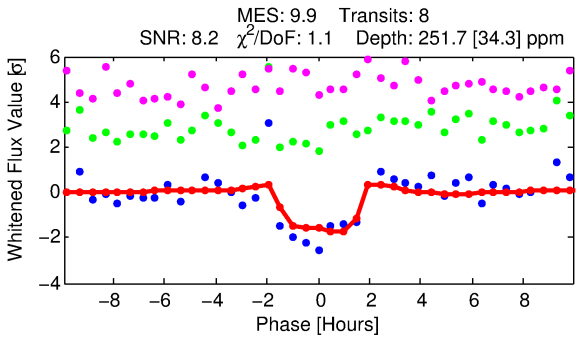
KIC: 9536870 Candidate: 5 of 10 Period: 61.959 d

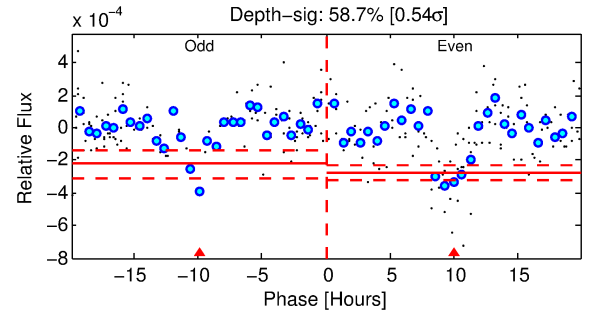


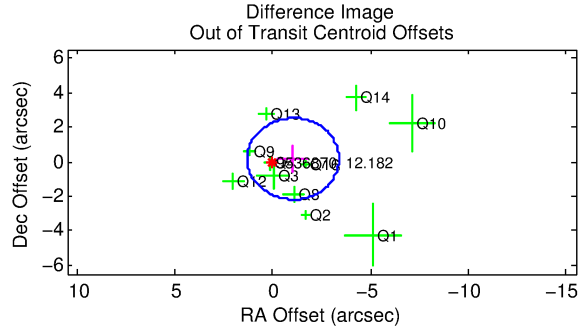












DV Fit Results:

Period = 61.95854 [0.00075] d
Epoch = 133.7023 [0.0077] BKJD
Rp/R* = 0.0155 [0.0156]
a/R* = 107.15 [606.93]
b = 0.68 [4.43]

Seff = 51.09 [13.11]
Teq = 682 [44] K
Rp = 3.07 [3.14] Re
a = 0.3466 [0.0560] AU

Ag = 1037.35 [2113.64] [0.49σ]
Teffp = 5982 [3025] K [1.75σ]

DV Diagnostic Results:

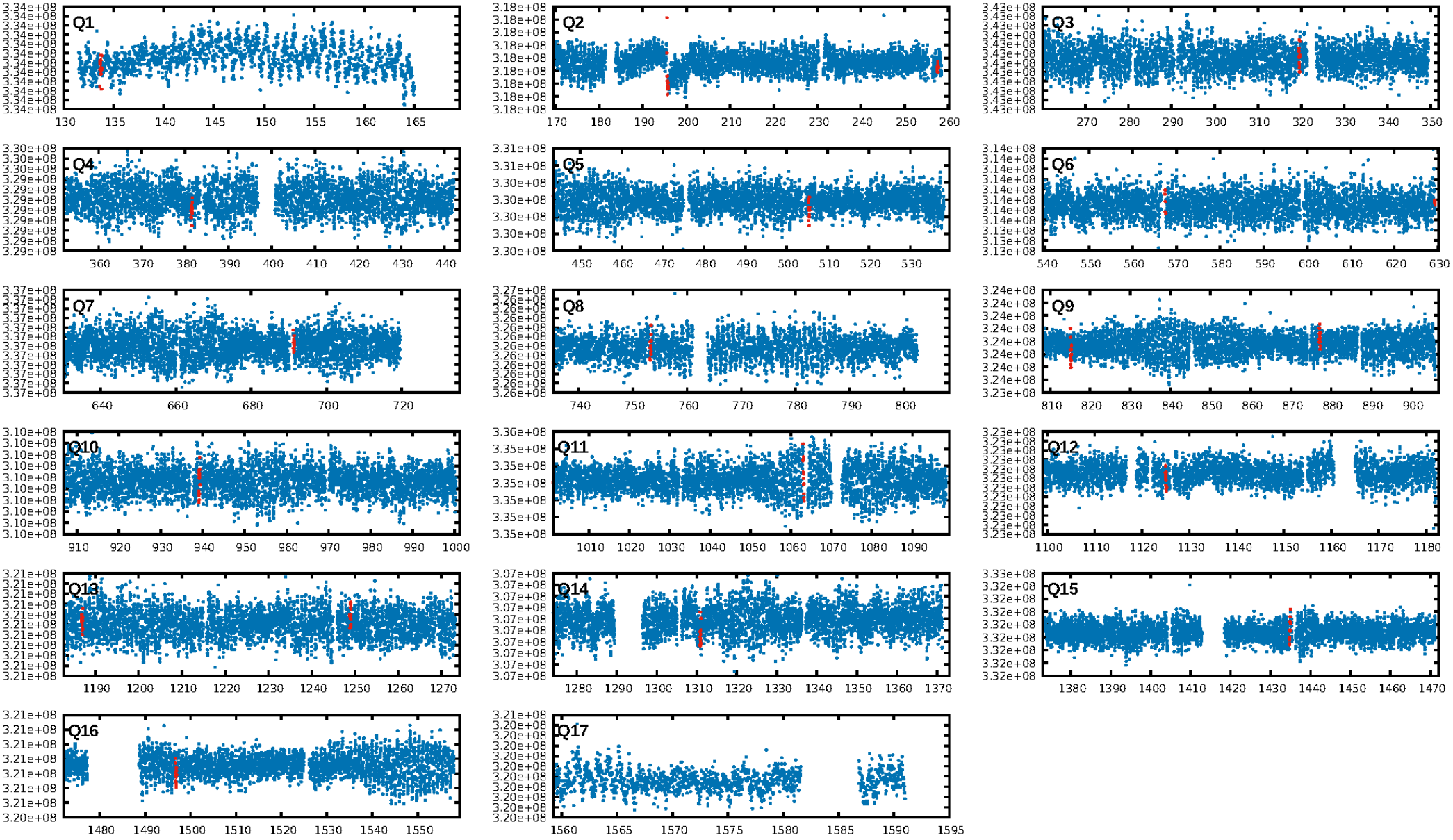
ShortPeriod−sig: 100.0% [29.00σ]
LongPeriod−sig: 100.0% [54.37σ]
ModelChiSquare2−sig: 0.1%
ModelChiSquareGof−sig: 99.9%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [8/8]
GhostDiagnostic−chr: −43.18

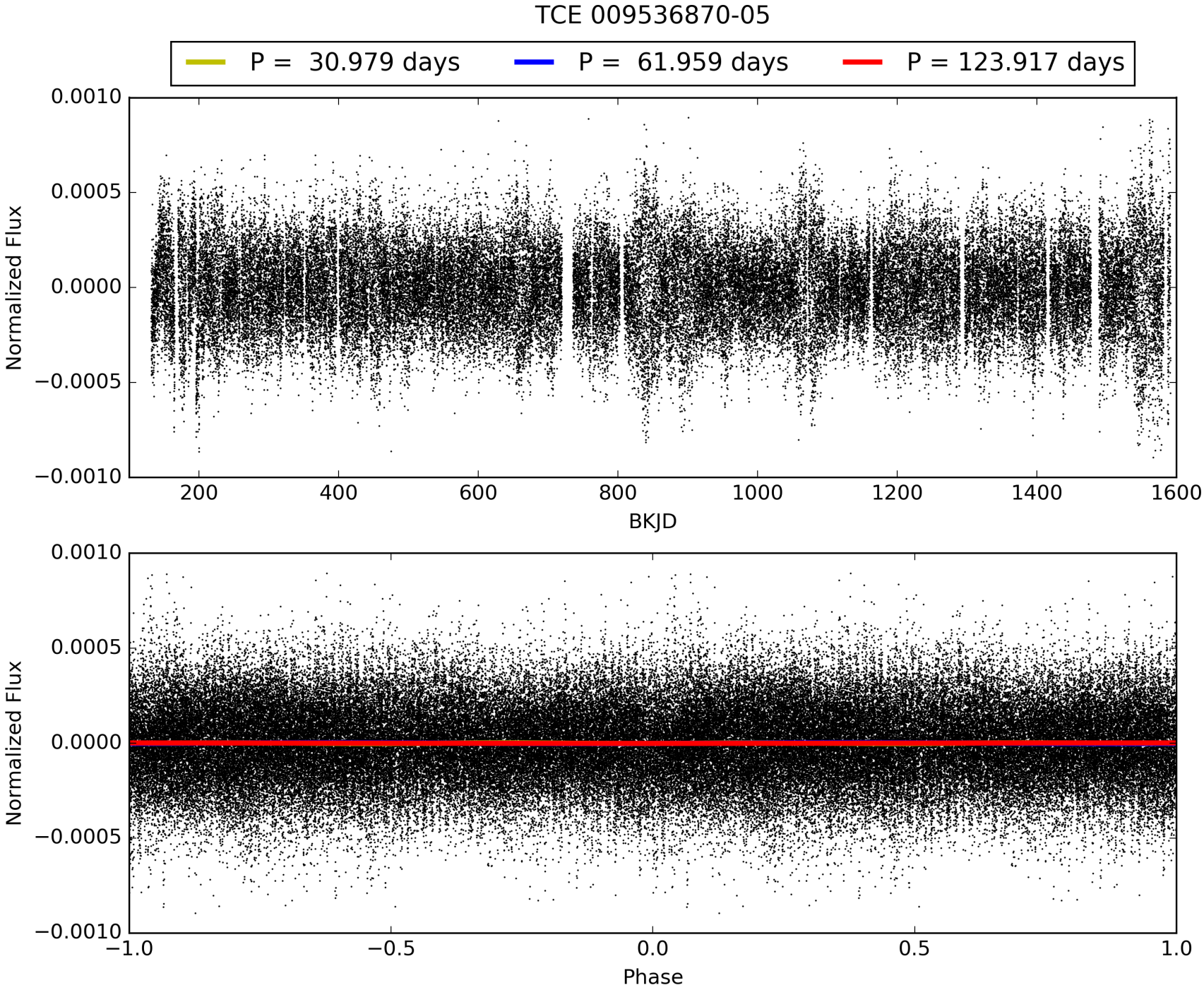
Centroid−sig: 73.1%
Centroid−so: 0.010 arcsec [0.03σ]
OotOffset−rm: 1.050 arcsec [1.34σ]
KicOffset−rm: 1.072 arcsec [1.37σ]
OotOffset−st: 3/1/4/3 [11]
KicOffset−st: 3/1/4/3 [11]
DiffImageQuality−fgm: 0.73 [8/11]
DiffImageOverlap−fno: 0.08 [1/12]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:27 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009536870-05, PDC Light Curves

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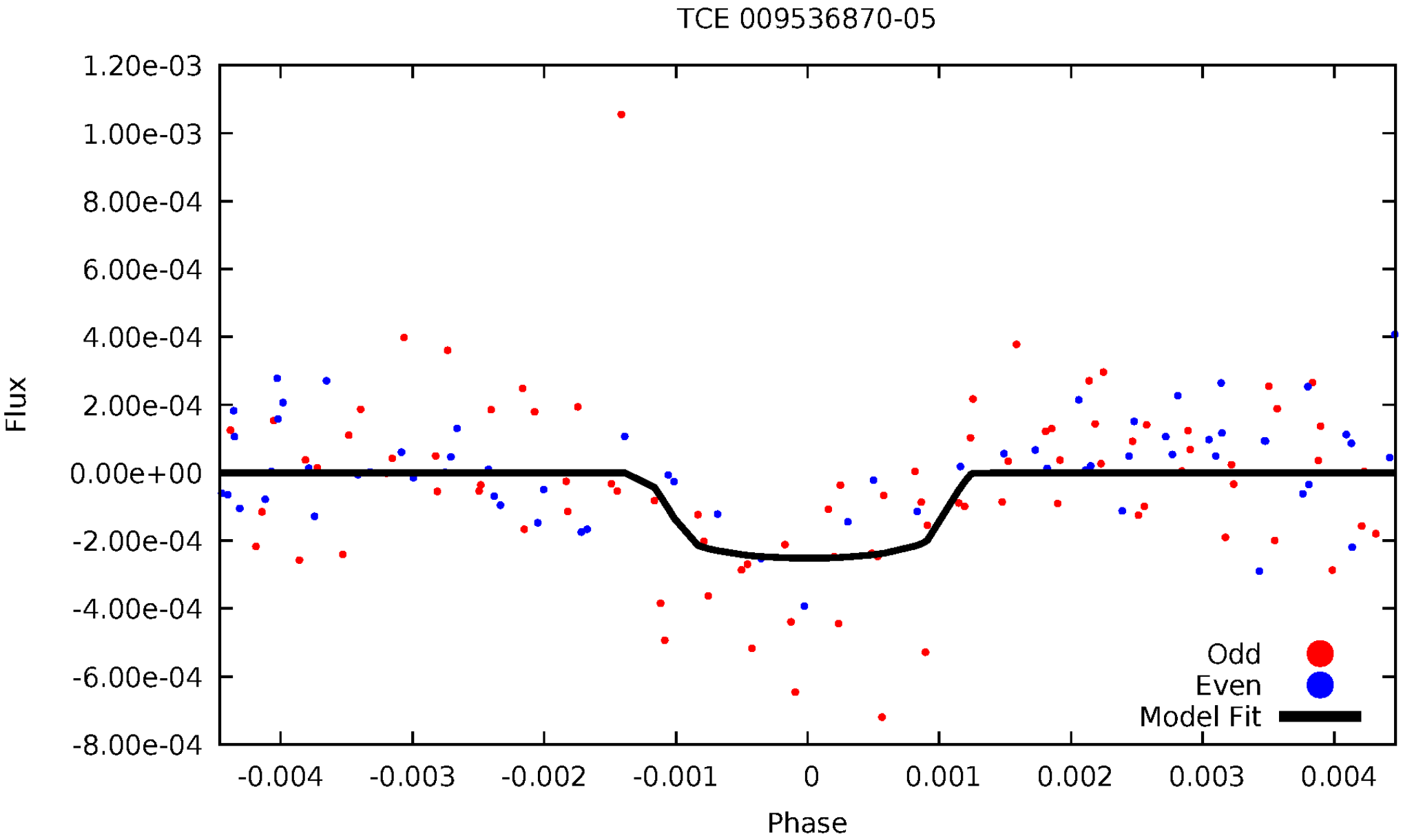
P = 30.979 days
P = 61.959 days
P = 123.917 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

DV Odd/Even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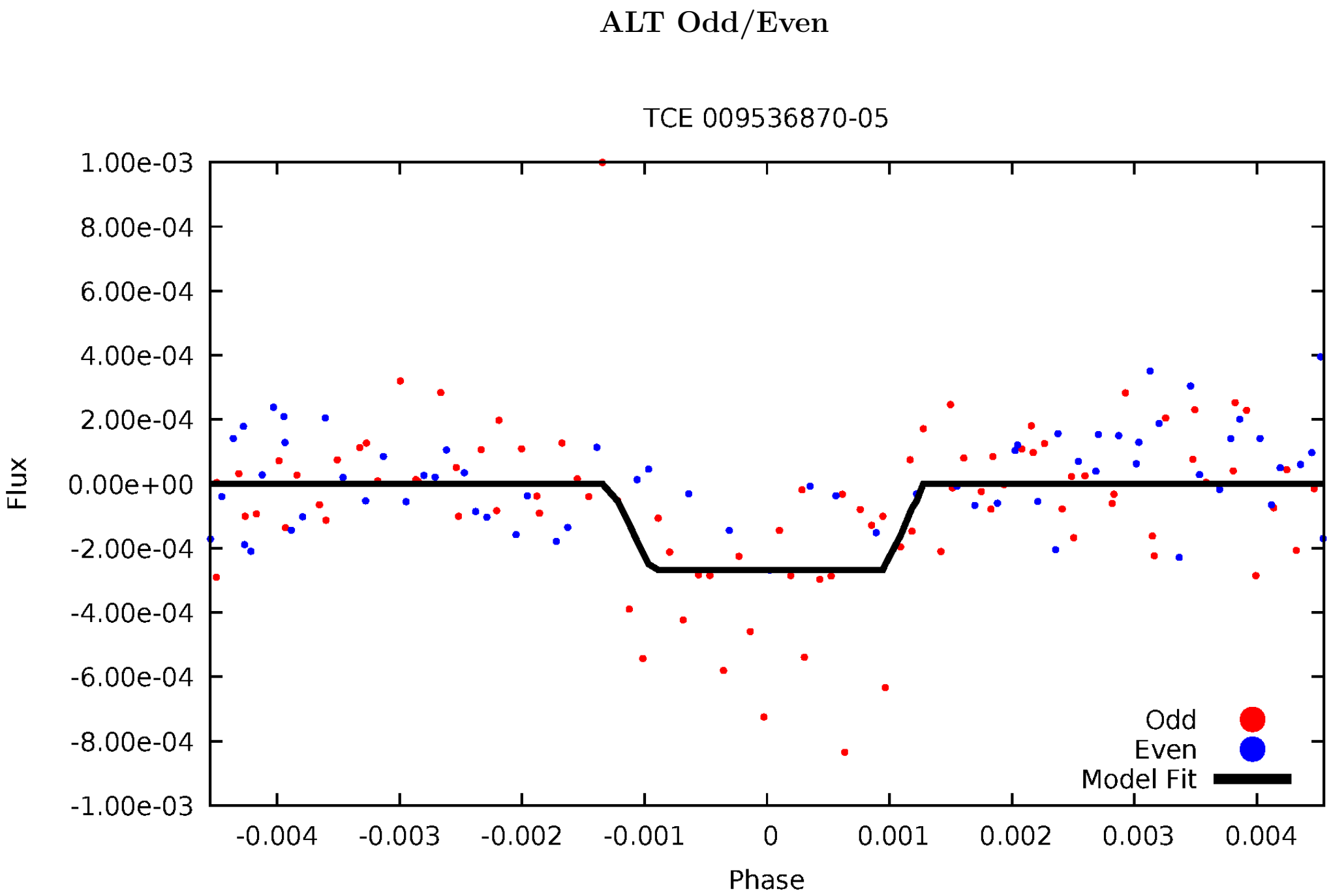
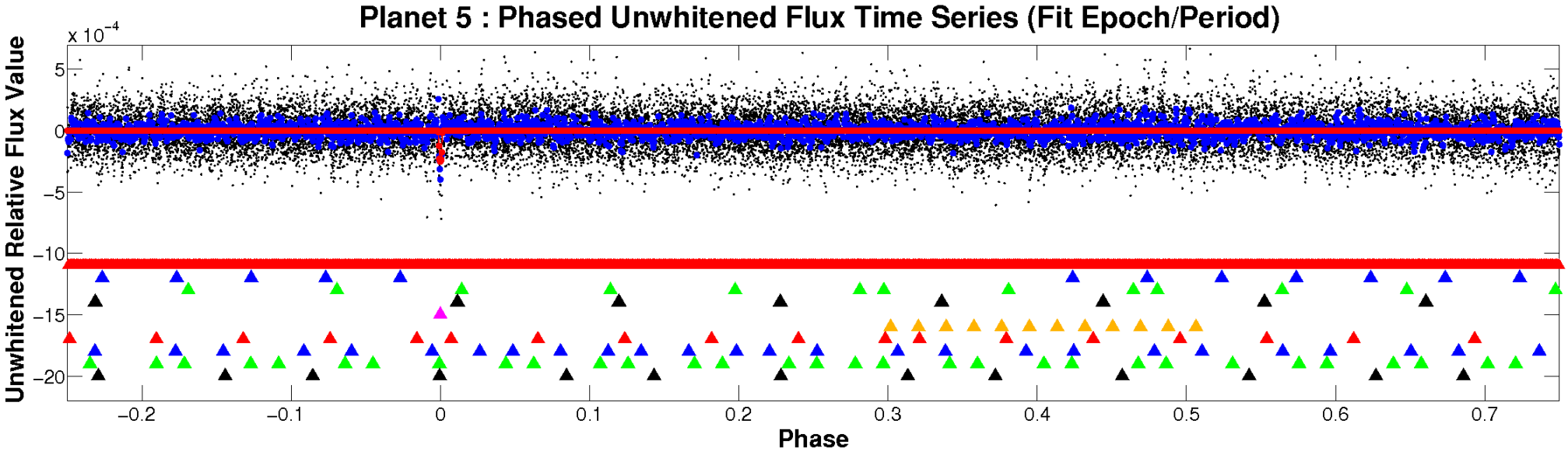
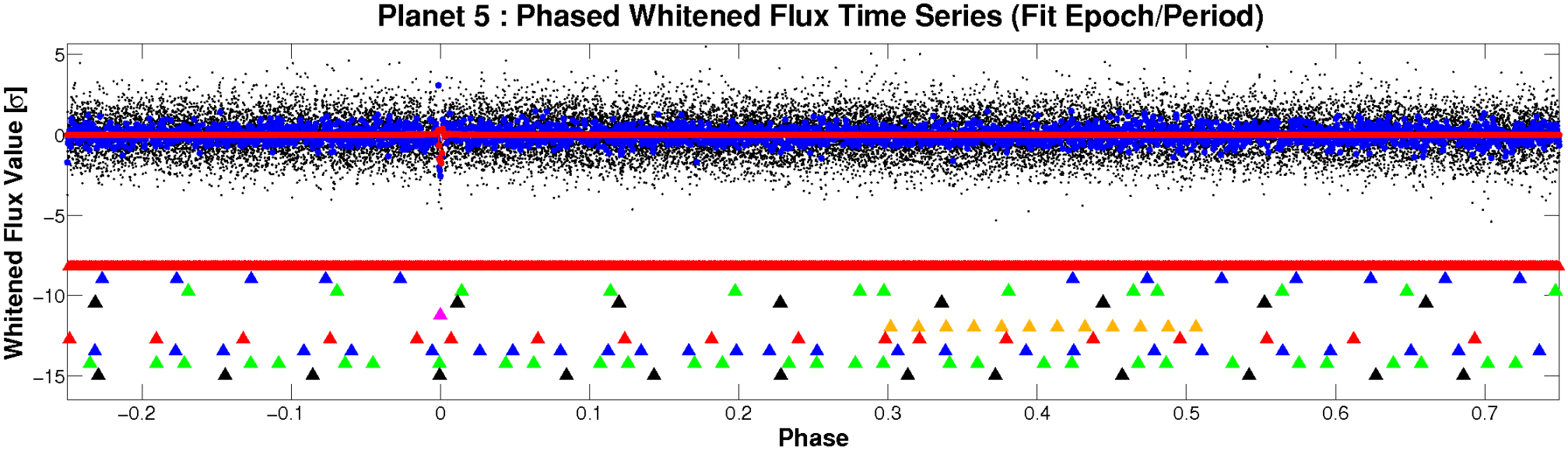
1.00e-03
8.00e-04
6.00e-04
4.00e-04
2.00e-04
0.00e+00
-2.00e-04
-4.00e-04
-6.00e-04
-8.00e-04
Flux
-0.004
-0.003
-0.002
-0.001
0
0.001
0.002
0.003
0.004
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-05
1.00e-03
8.00e-04
6.00e-04
4.00e-04
2.00e-04
0.00e+00
-2.00e-04
-4.00e-04
-6.00e-04
-8.00e-04
-1.00e-03
Flux
-0.004
-0.003
-0.002
-0.001
0
0.001
0.002
0.003
0.004
Phase
Odd
Even
Model Fit

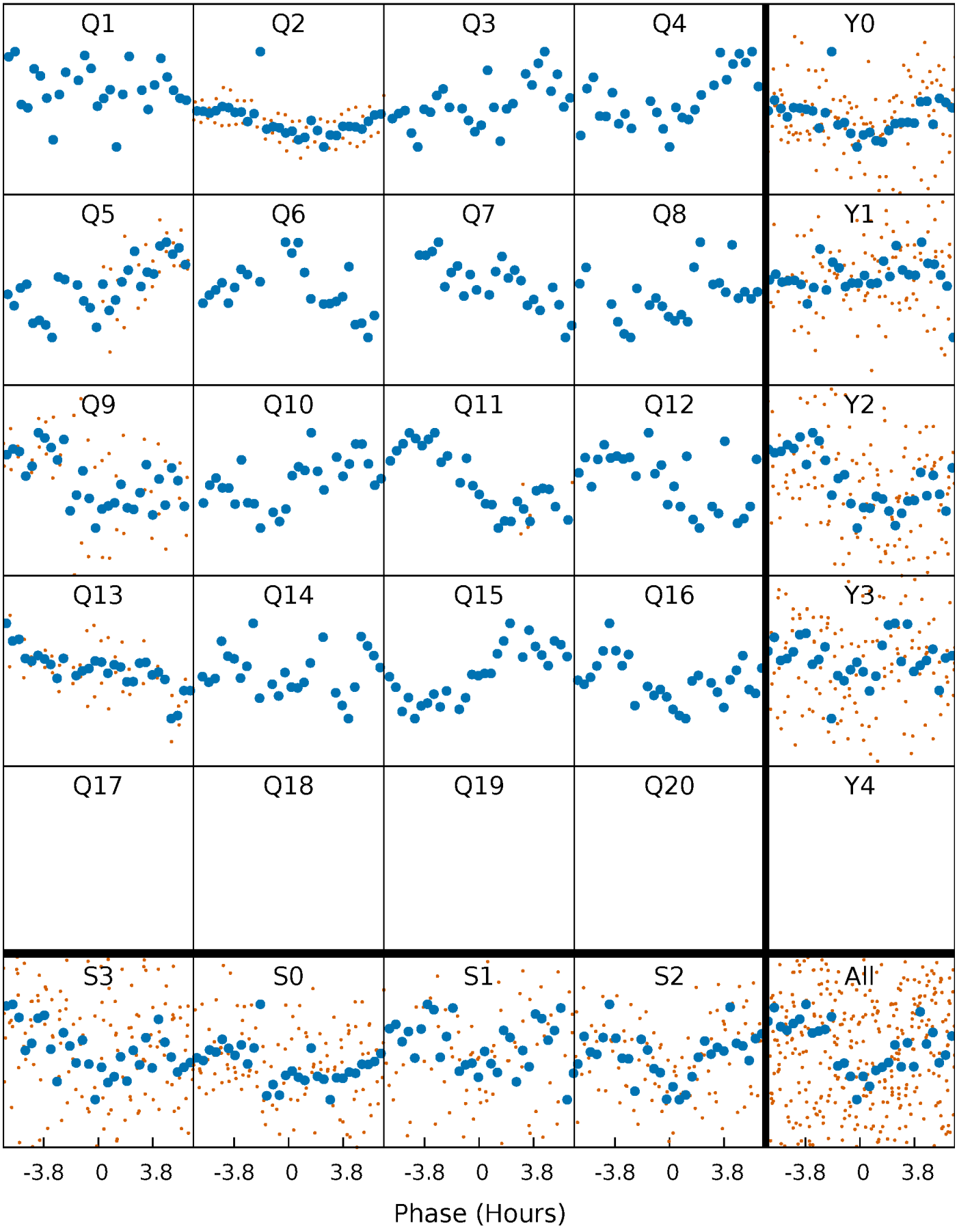
Non-Whitened Vs. Whitened Light Curve





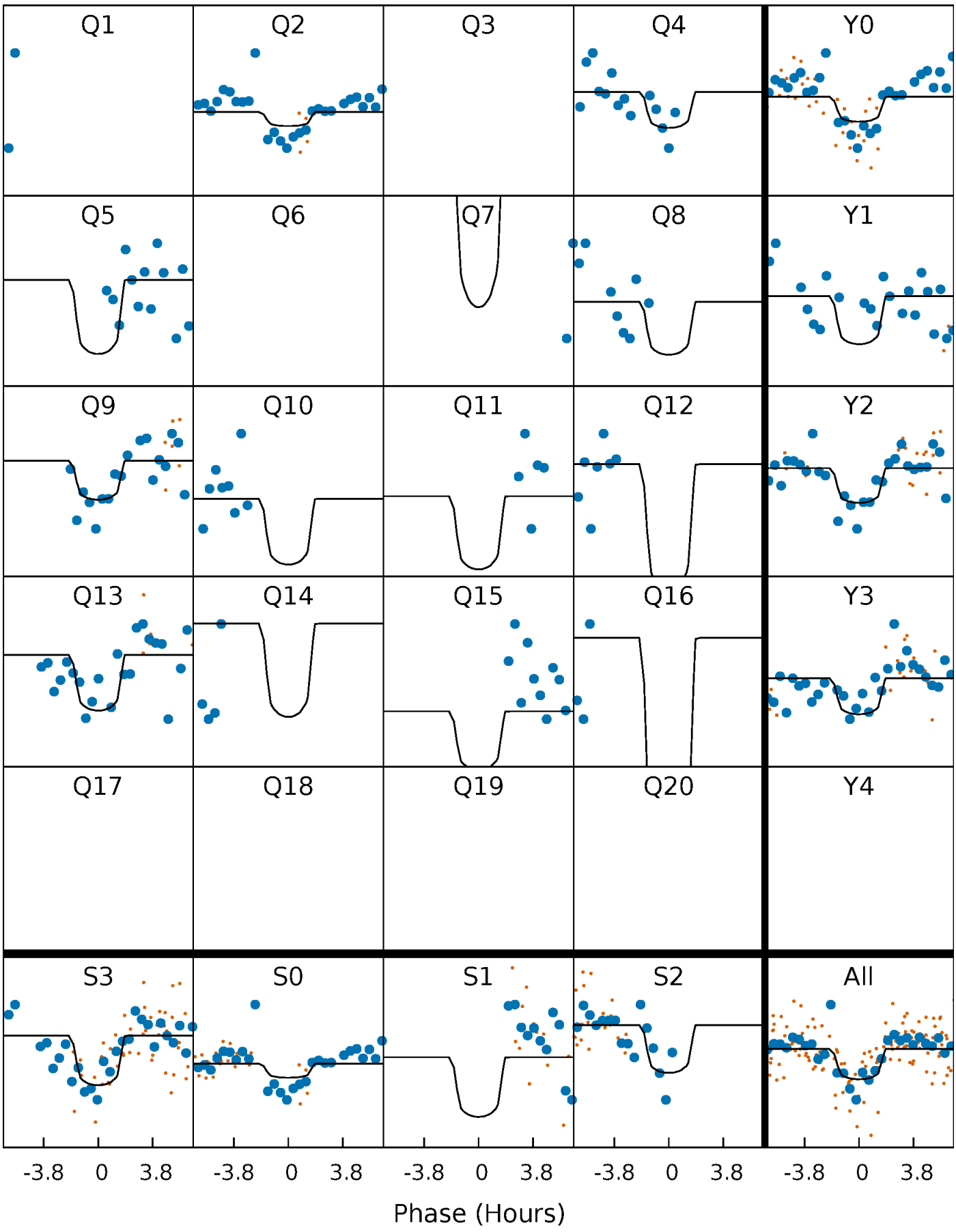
PDC Quarter-Phased Transit Curves

TCE 009536870-05 P= 61.958544 Days T_0=133.702333 (BKJD)



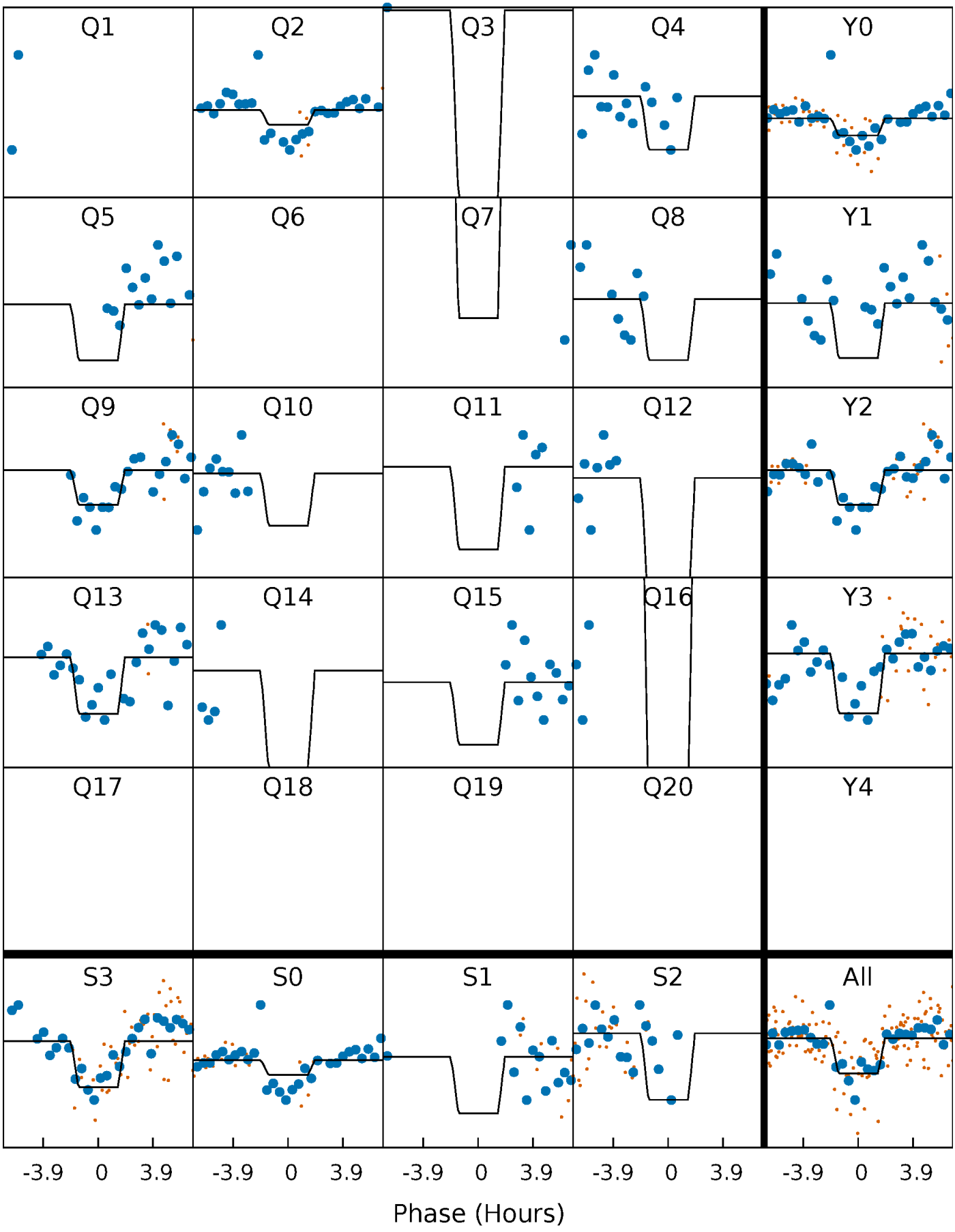
DV Quarter-Phased Transit Curves

TCE 009536870-05 P= 61.958544 Days T_0=133.702333 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

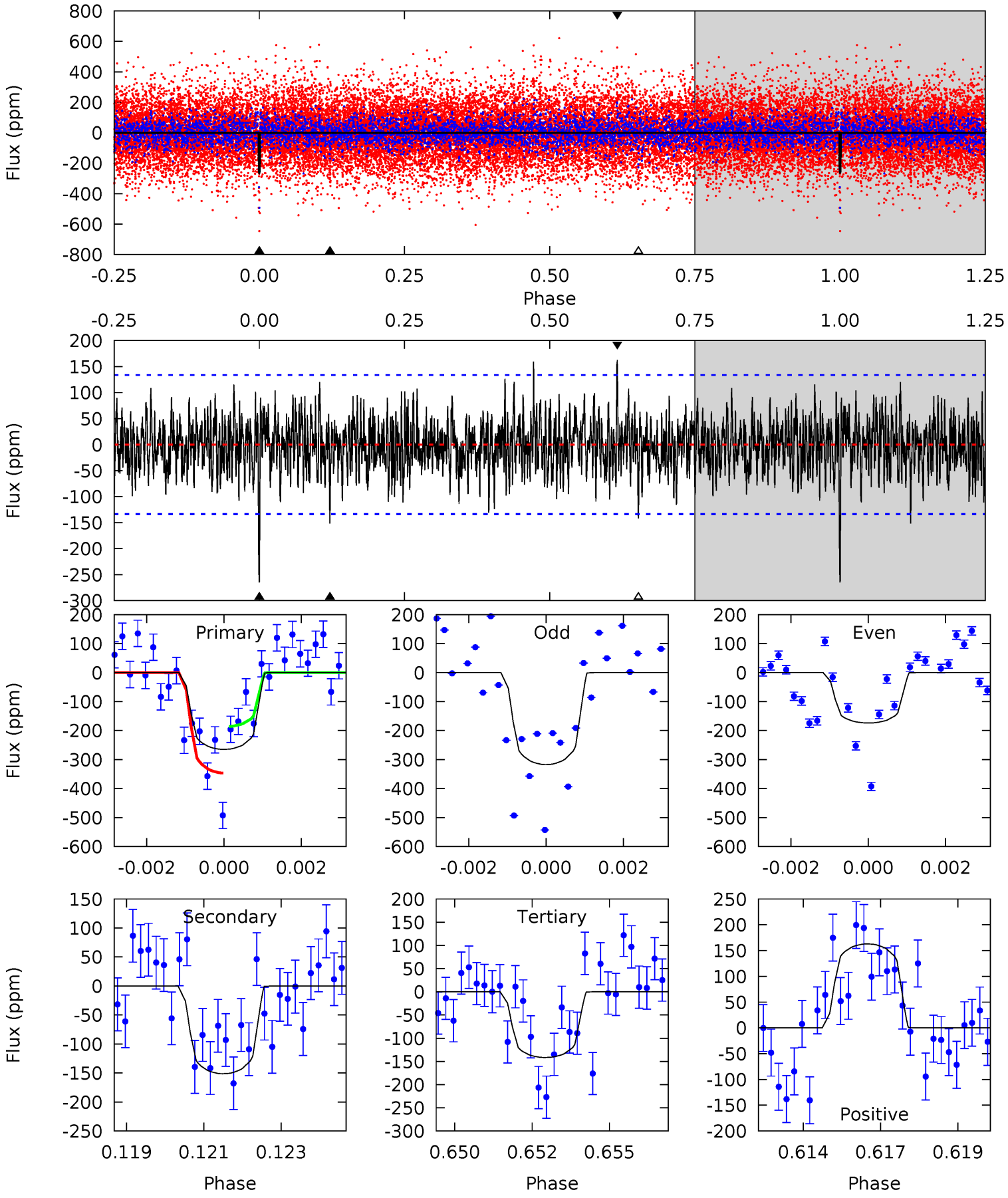
TCE 009536870-05 P= 61.959032 Days T_0=133.697527 (BKJD)



DV Model-Shift Uniqueness Test

009536870-05, P = 61.958544 Days, E = 71.743789 Days

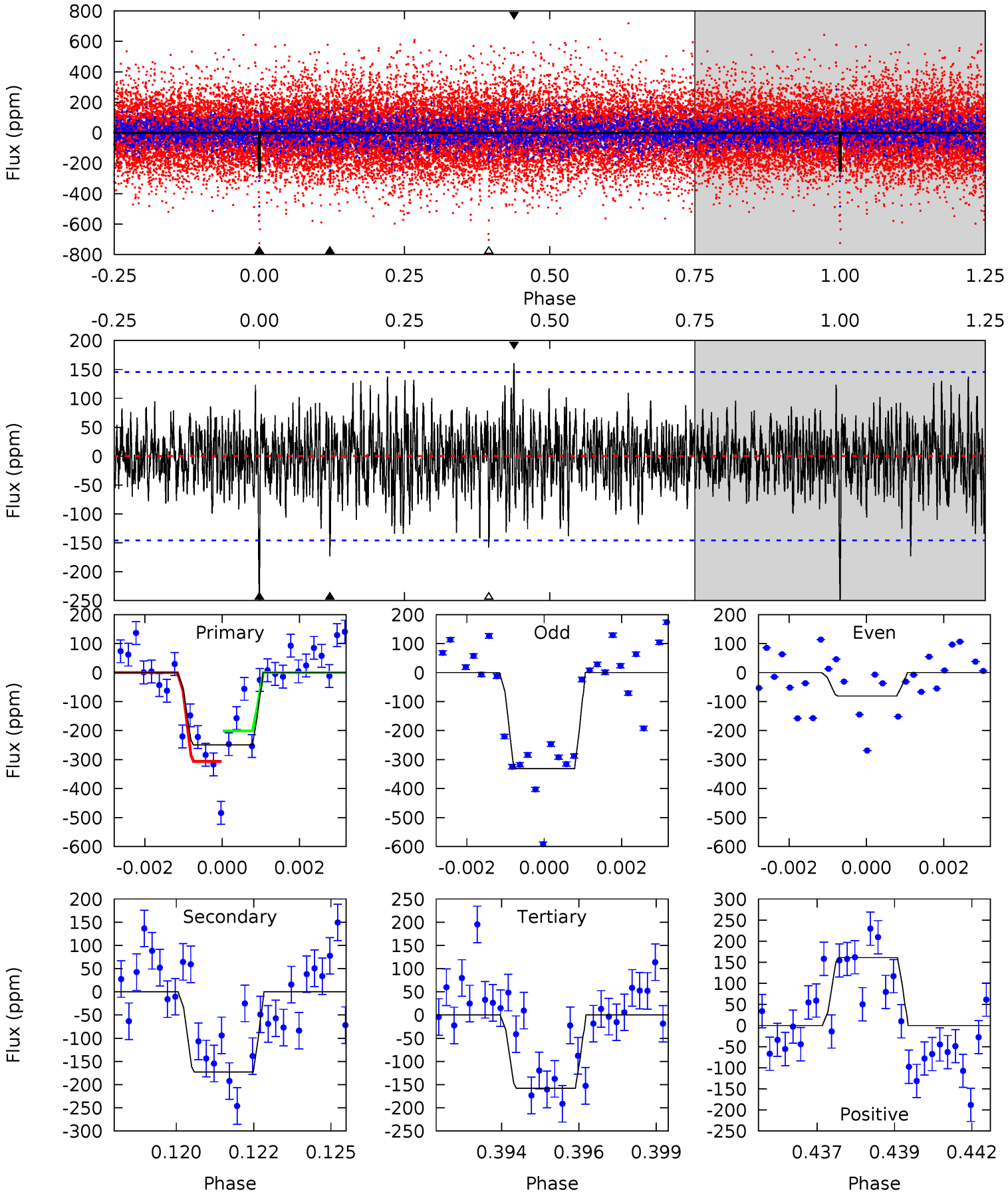
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	5.99	5.61	6.45	5.30	3.04	1.64	4.88	4.04	0.38	-0.46	2.54	1.19	0.38	3.17



Alt Model-Shift Uniqueness Test

009536870-05, P = 61.959032 Days, E = 71.738495 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.07	6.28	5.73	5.85	5.29	3.04	1.60	3.34	3.22	0.55	0.43	4.14	1.55	0.39	1.91



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-05 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-151±25	$3.51^{+3.16}_{-2.19}$	950^{+48}_{-53}	5531^{+4380}_{-1242}	796^{+5159}_{-580}
Alt.	-173±28	$3.59^{+2.81}_{-2.15}$	950^{+45}_{-48}	5656^{+4134}_{-1201}	860^{+4832}_{-588}

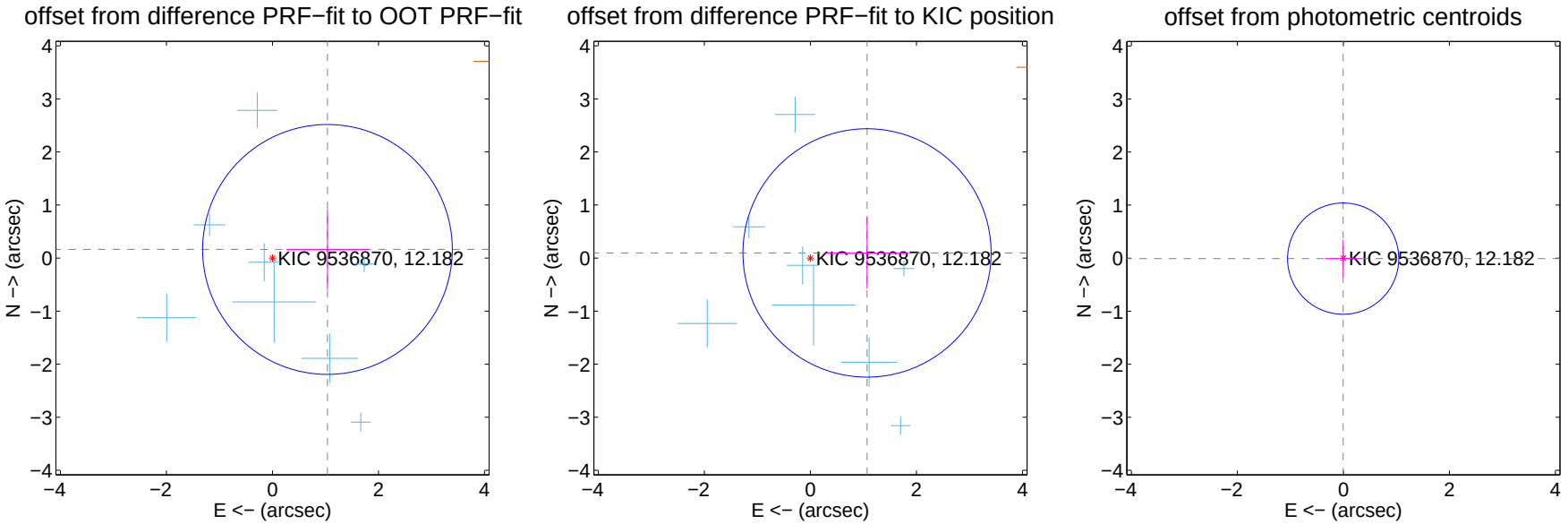
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

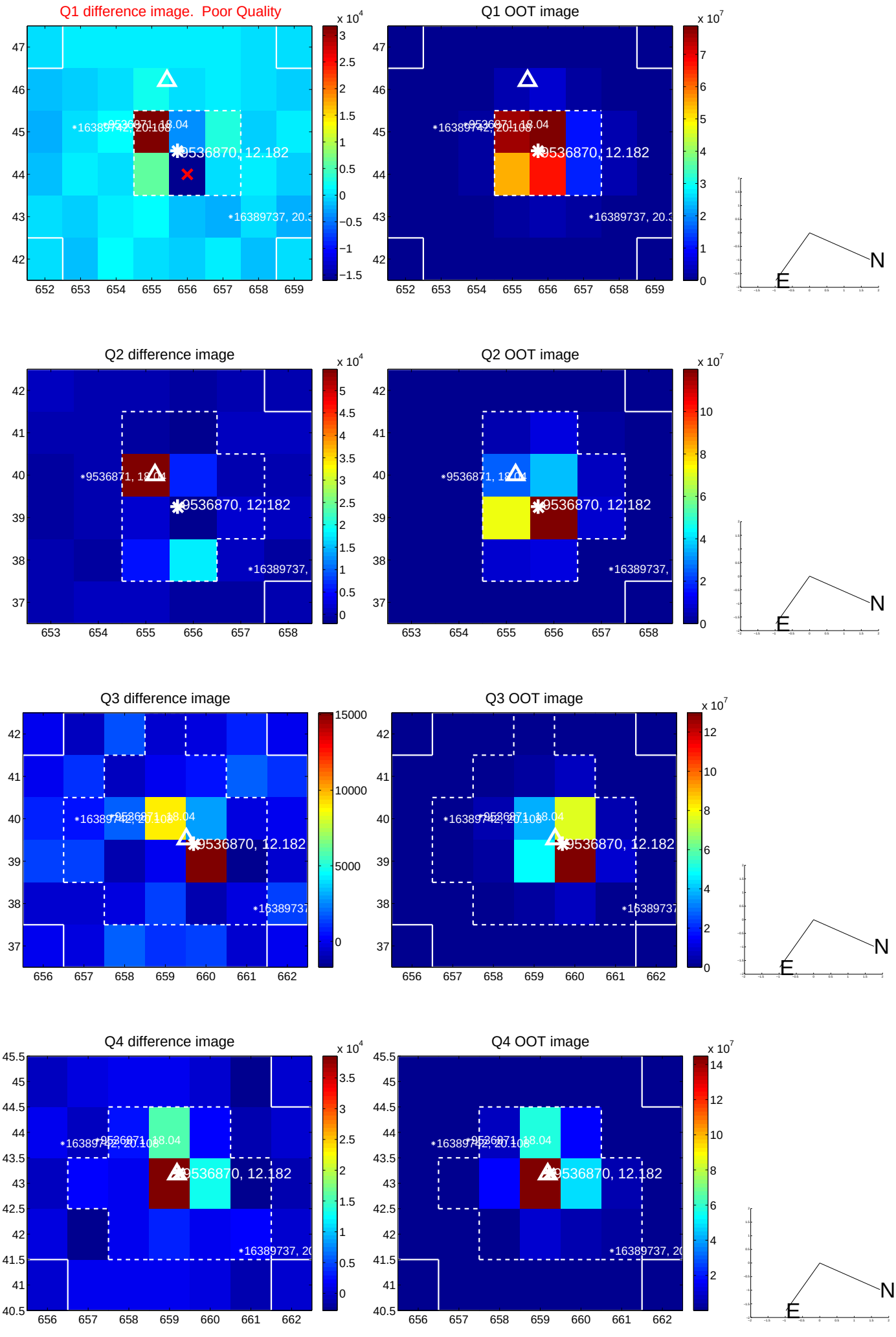
Supplemental centroid analysis for 009536870-05. Kepler magnitude: 12.18. Transit SNR 8.20
There are 8 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.050 ± 0.785	1.34	-1.038 ± 0.775	0.163 ± 0.755
PRF-fit source offset from KIC position	1.072 ± 0.780	1.37	-1.068 ± 0.781	0.097 ± 0.676
photometric centroid source offset	0.01 ± 0.35	0.03	0.00 ± 0.34	-0.01 ± 0.35

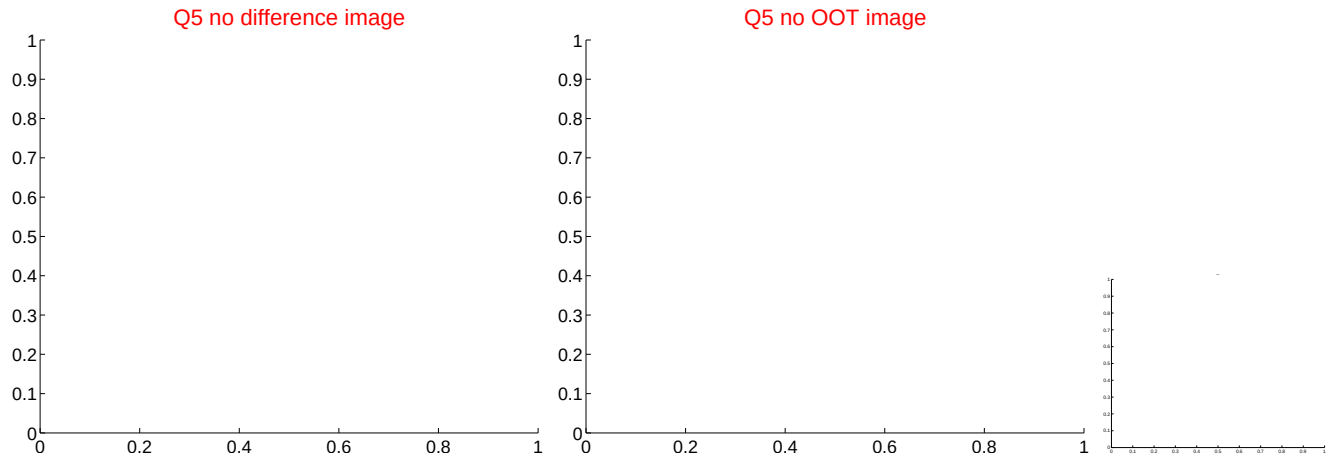


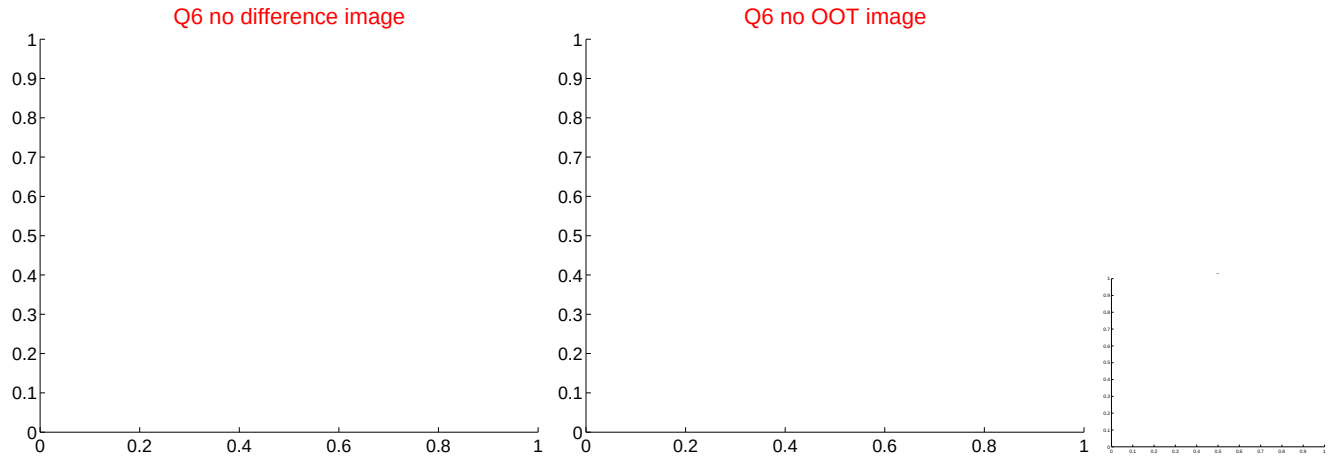
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

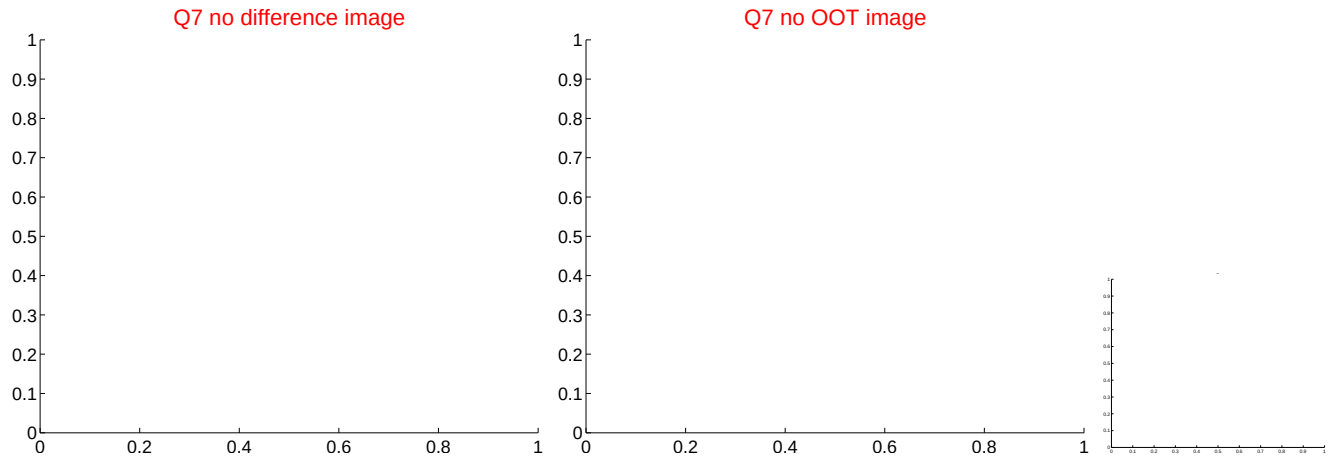
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

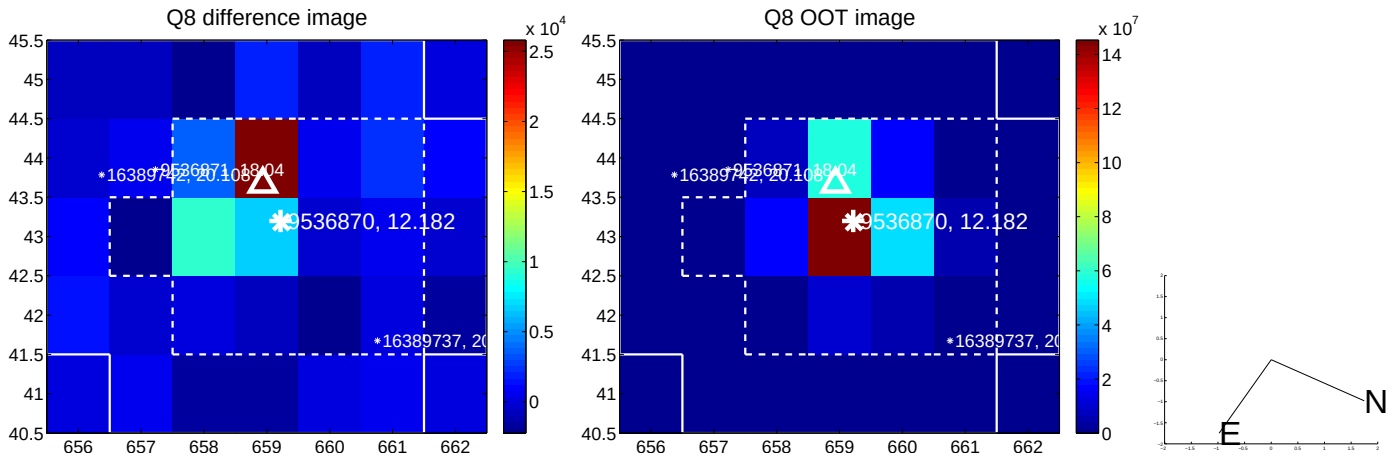


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

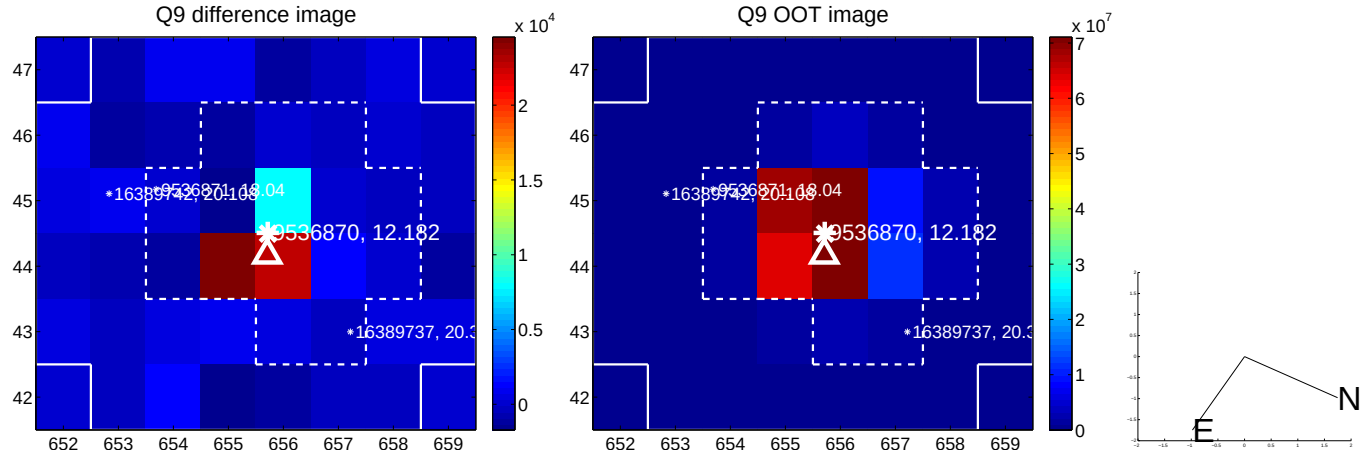


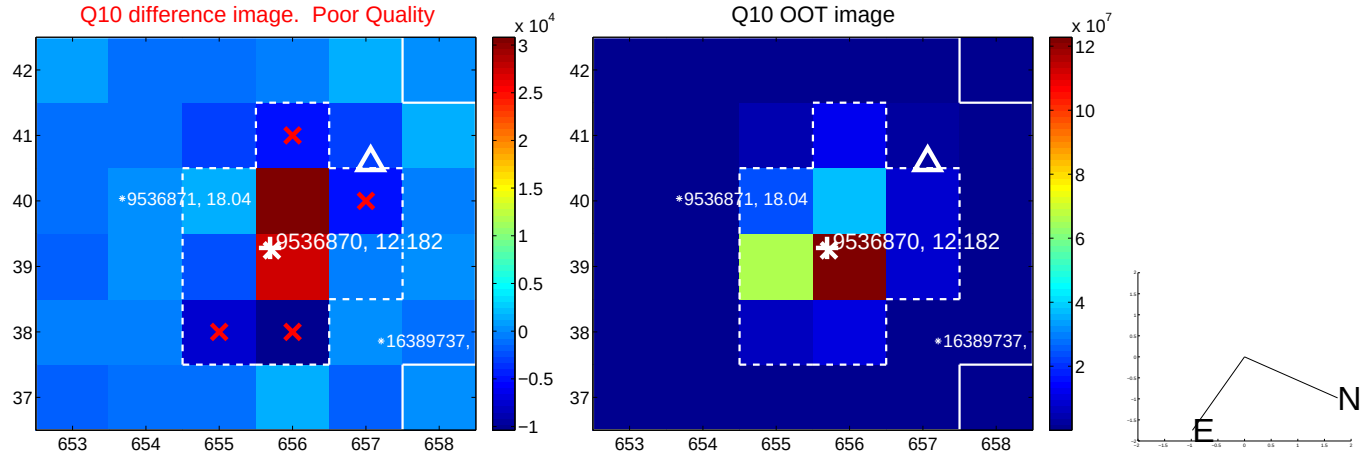


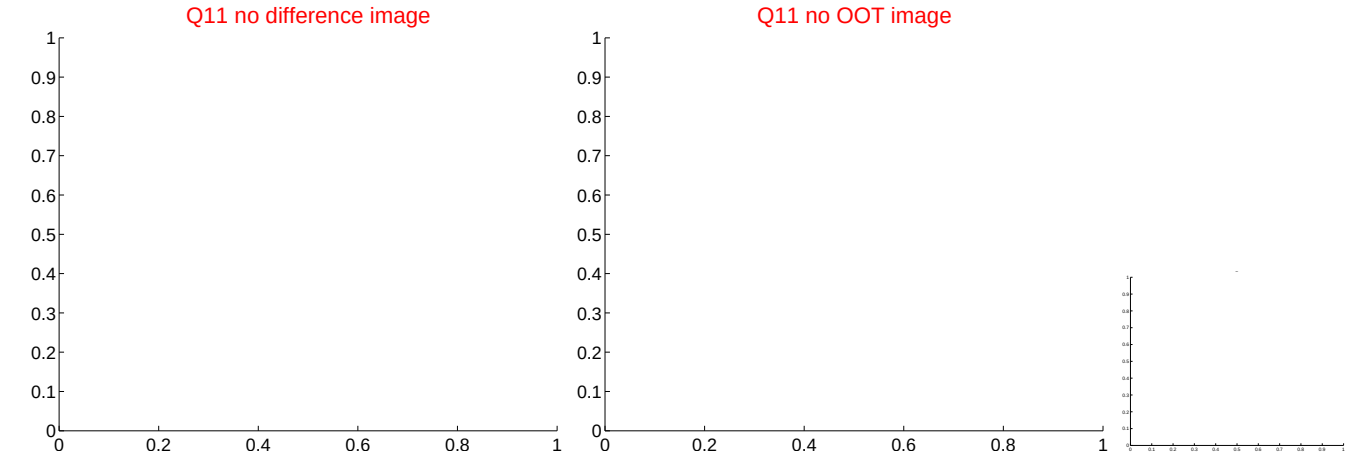


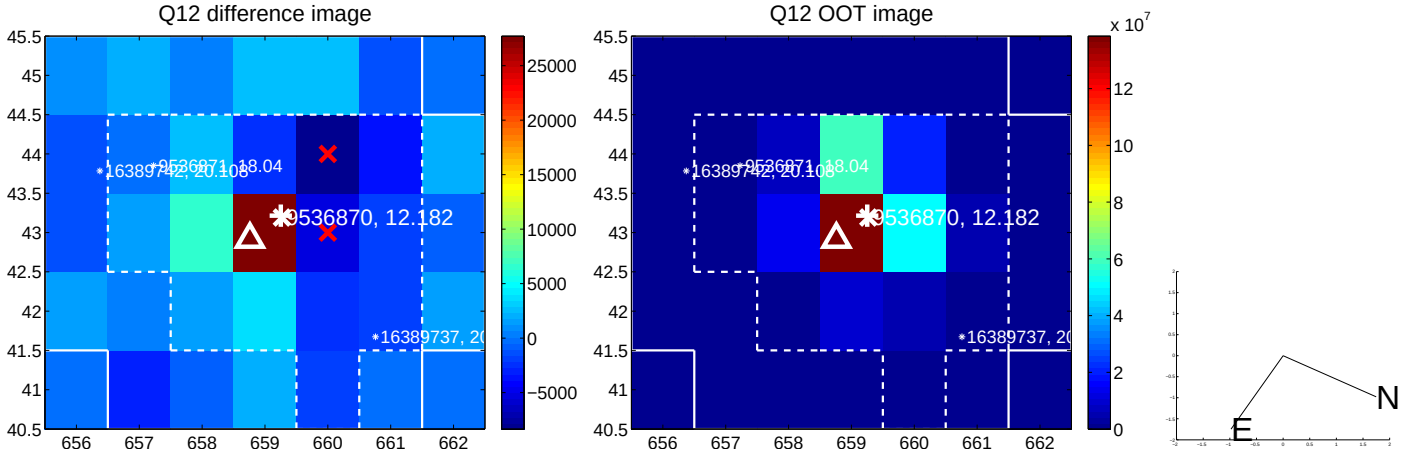


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

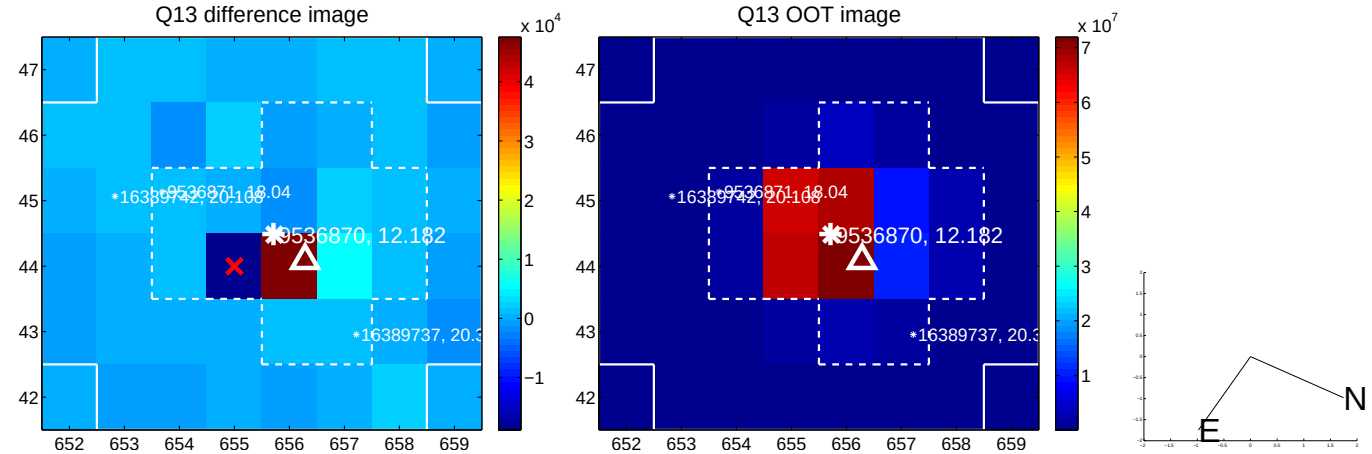


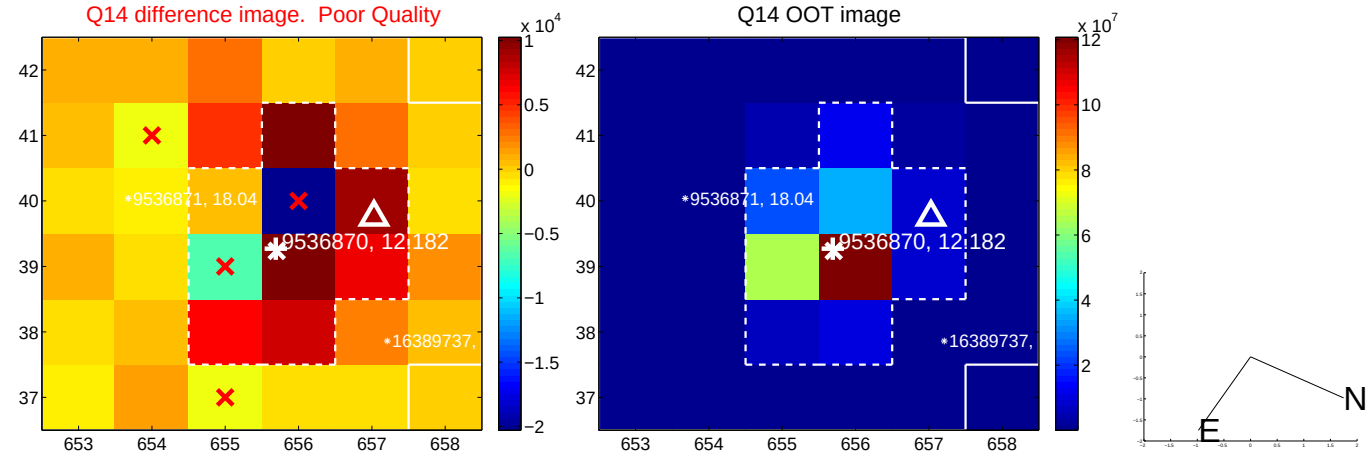


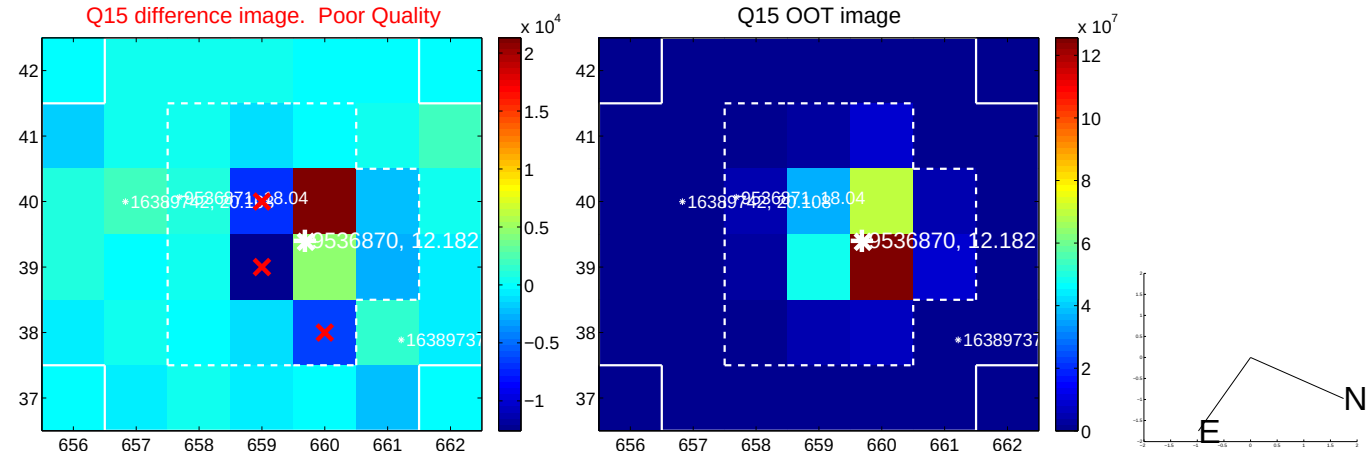


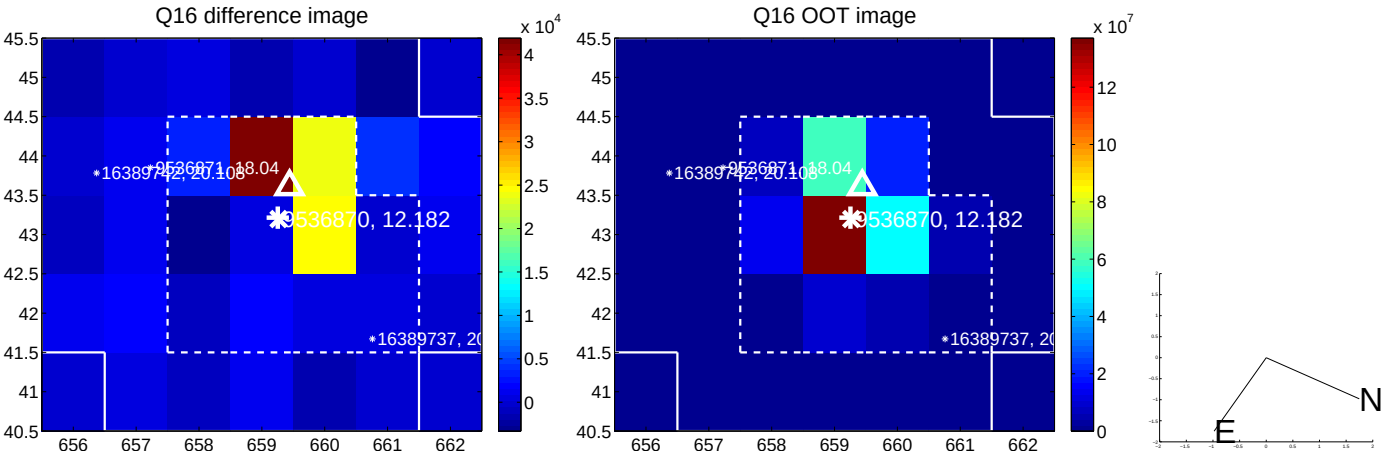


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

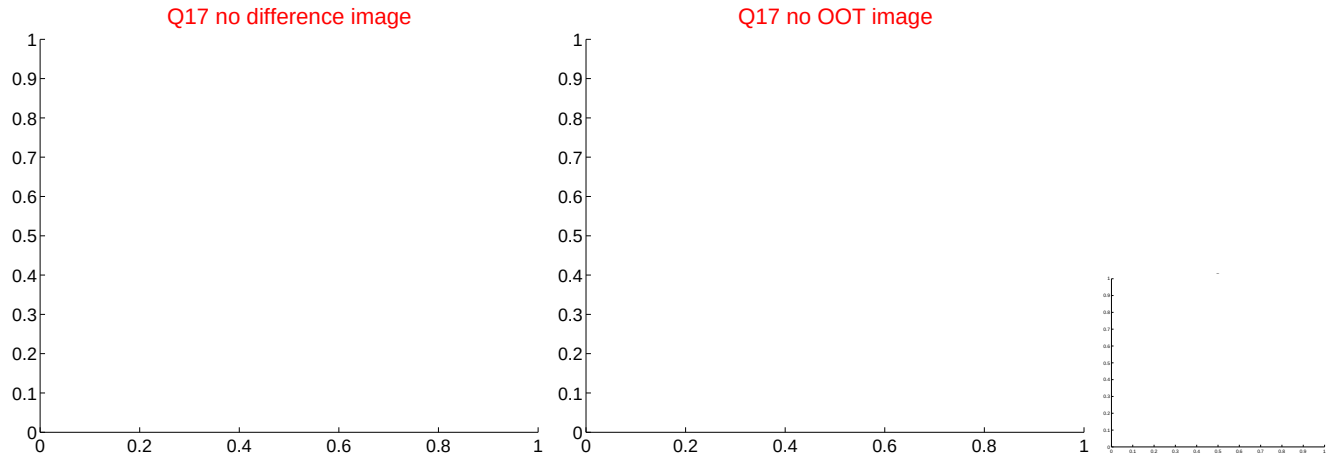


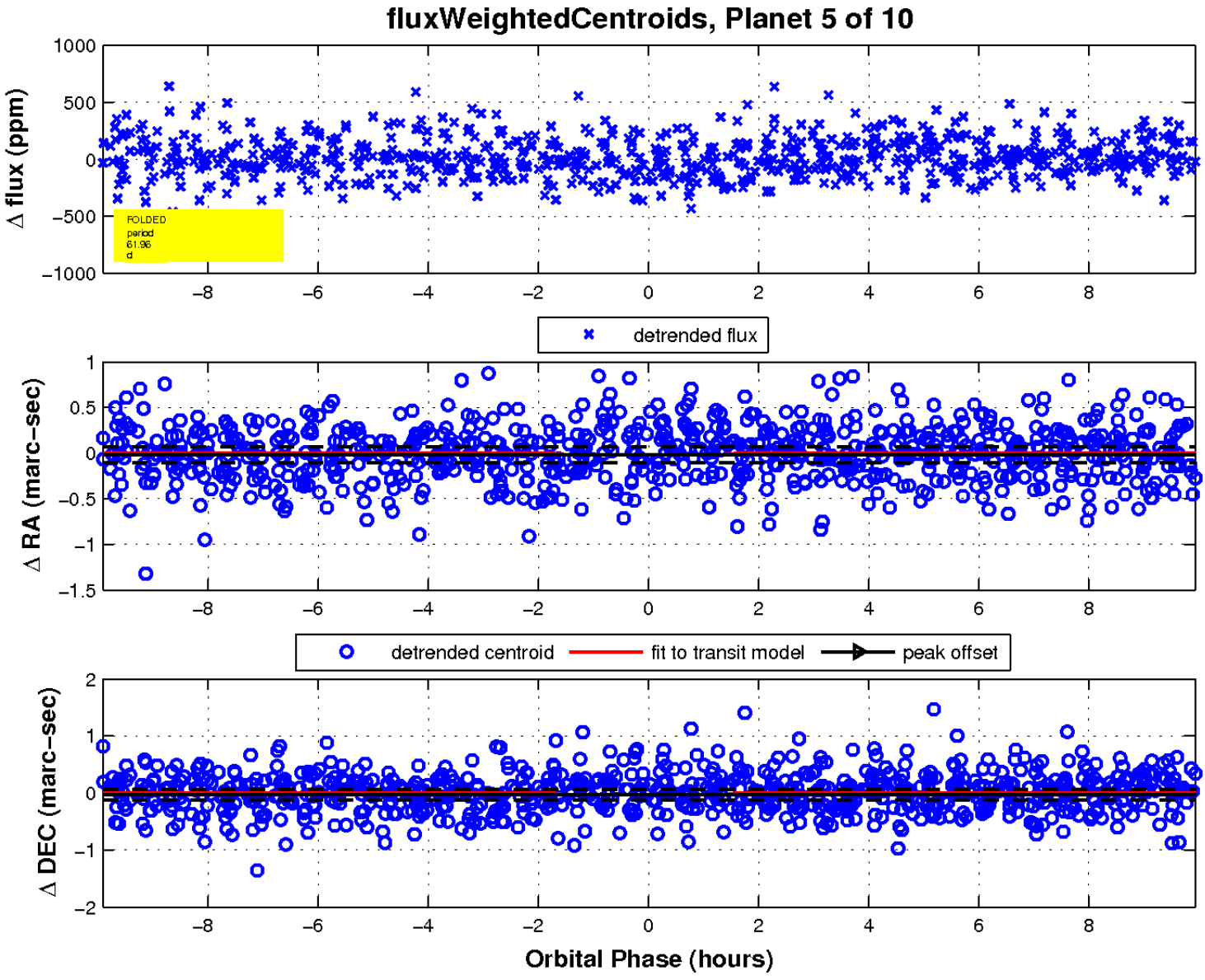




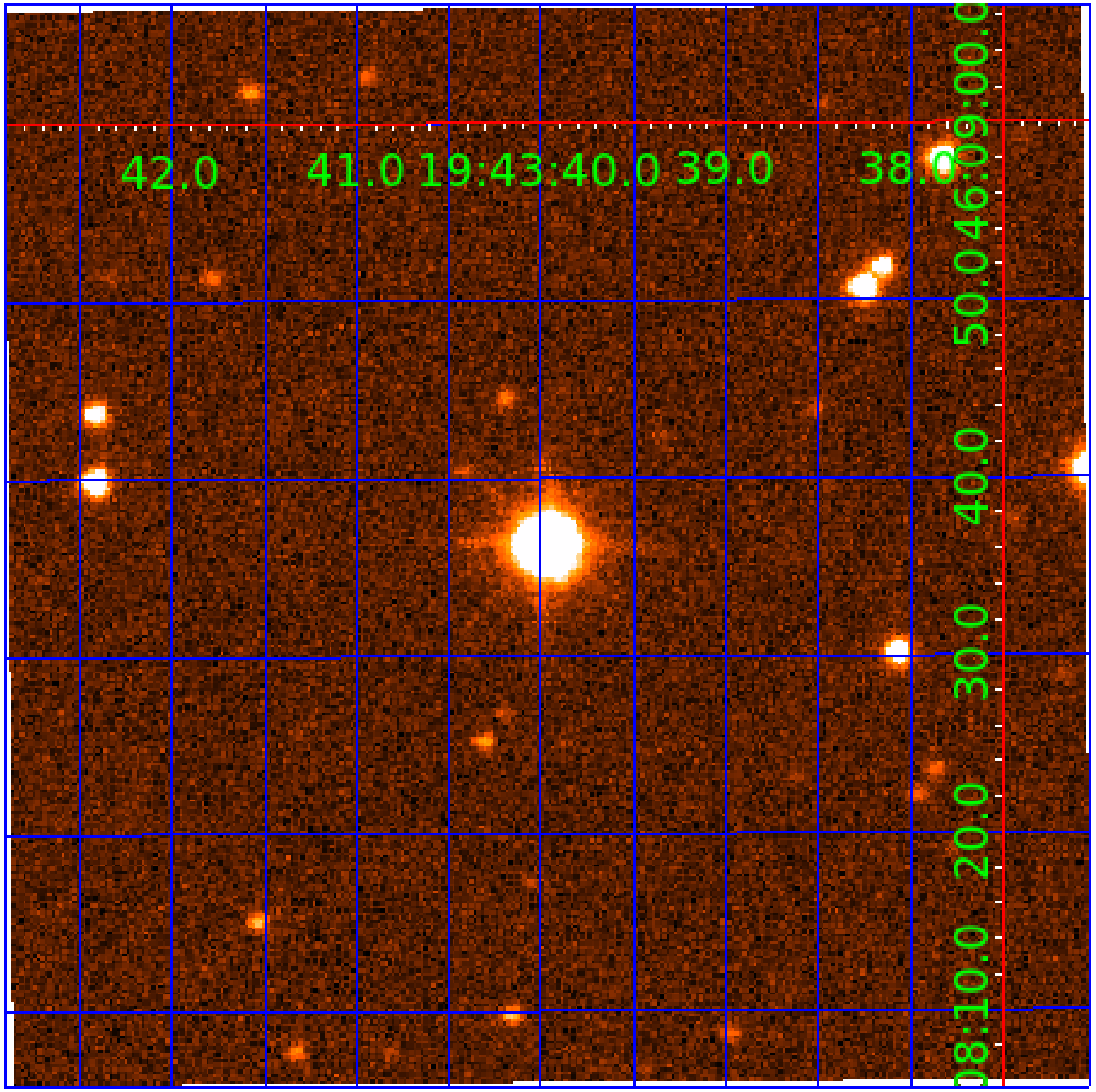


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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46:
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40.0
30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

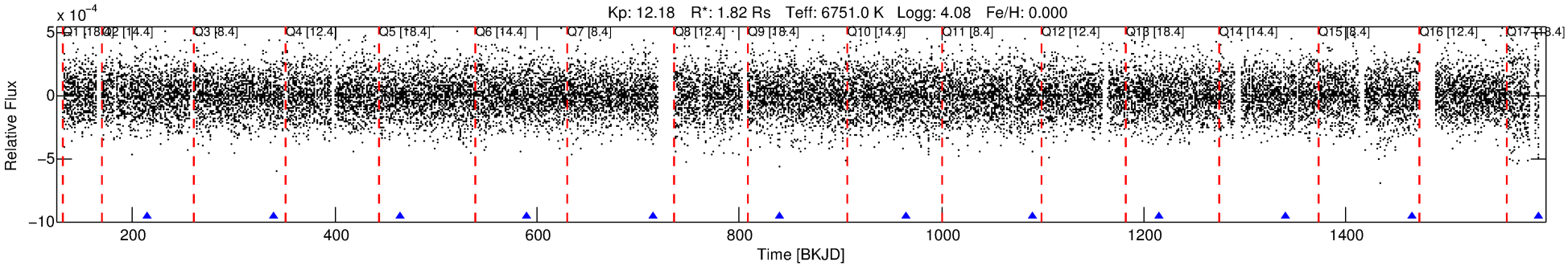
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

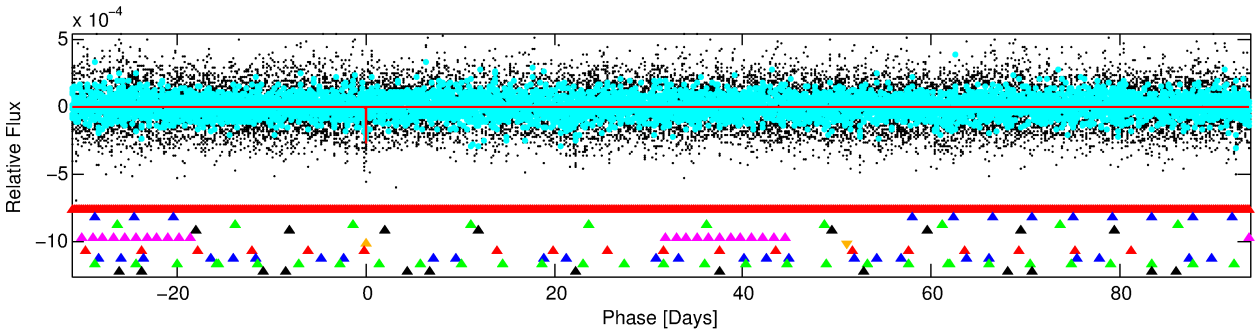
Ephemeris Match Information For 009536870-06

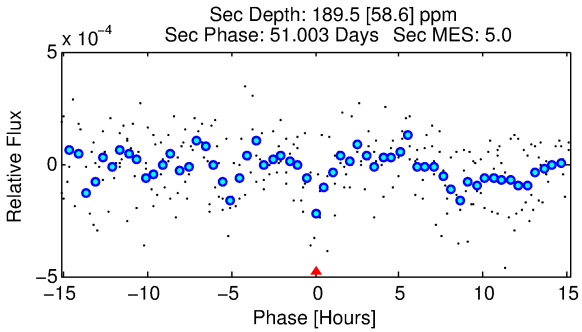
No Significant Match Found

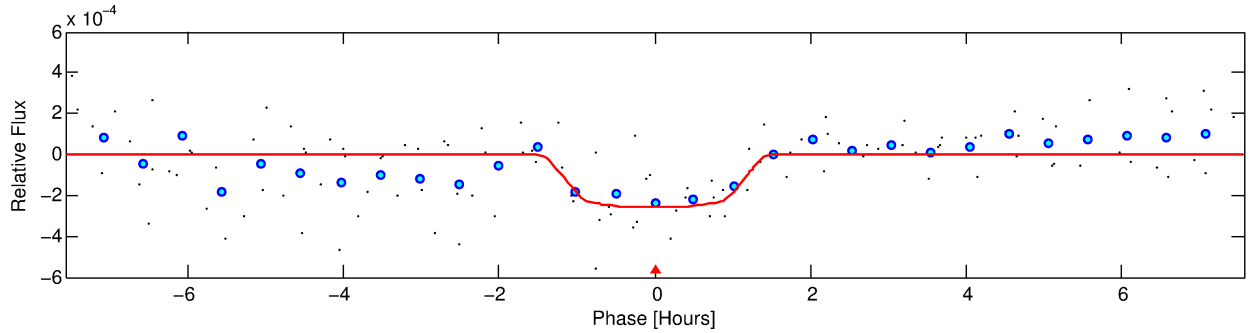
DV One-Page Summary

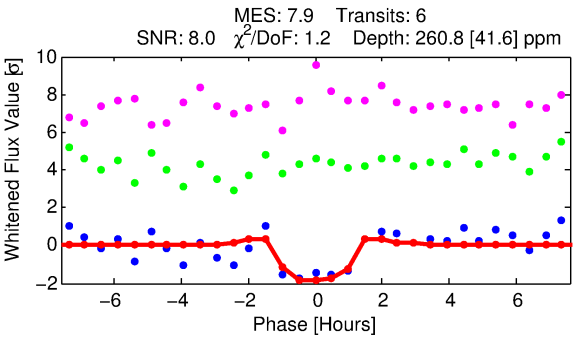
KIC: 9536870 Candidate: 6 of 10 Period: 125.070 d

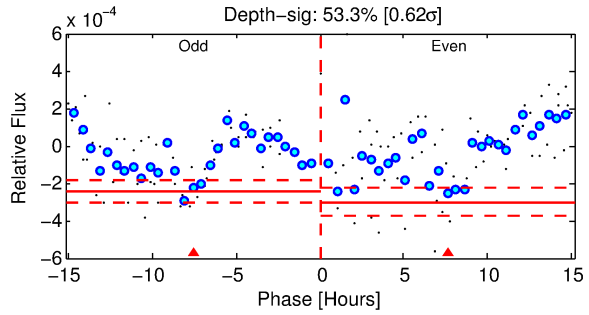


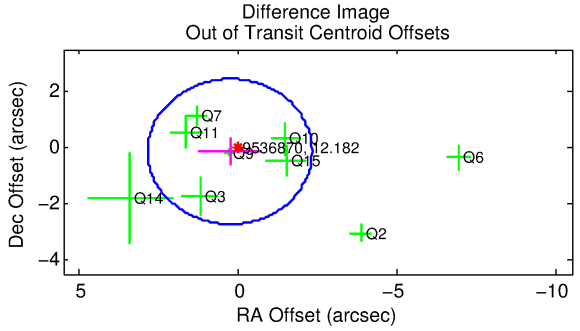












DV Fit Results:

Period = 125.06973 [0.00107] d
Epoch = 214.3611 [0.0056] BKJD
Rp/R* = 0.0167 [0.0197]
a/R* = 212.48 [1453.22]
b = 0.85 [2.31]

Seff = 20.03 [5.14]
Teq = 539 [35] K
Rp = 3.31 [3.95] Re
a = 0.5536 [0.0895] AU

Ag = 2919.62 [6989.04] [0.42σ]
Teffp = 6130 [3650] K [1.53σ]

DV Diagnostic Results:

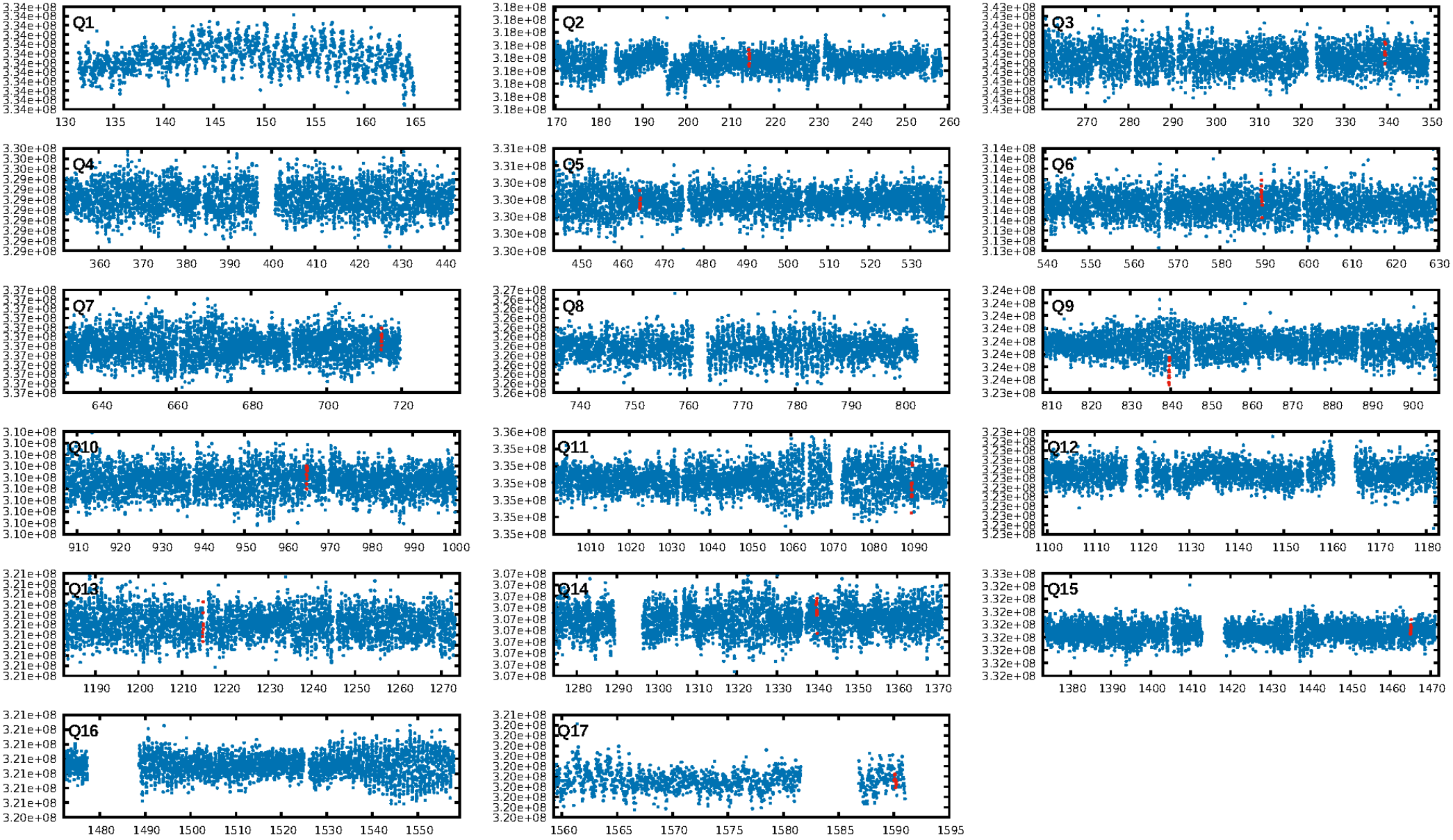
ShortPeriod−sig: 100.0% [22.53σ]
LongPeriod−sig: 100.0% [229.47σ]
ModelChiSquare2−sig: 8.9%
ModelChiSquareGof−sig: 99.1%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [6/6]
GhostDiagnostic−chr: −1.041

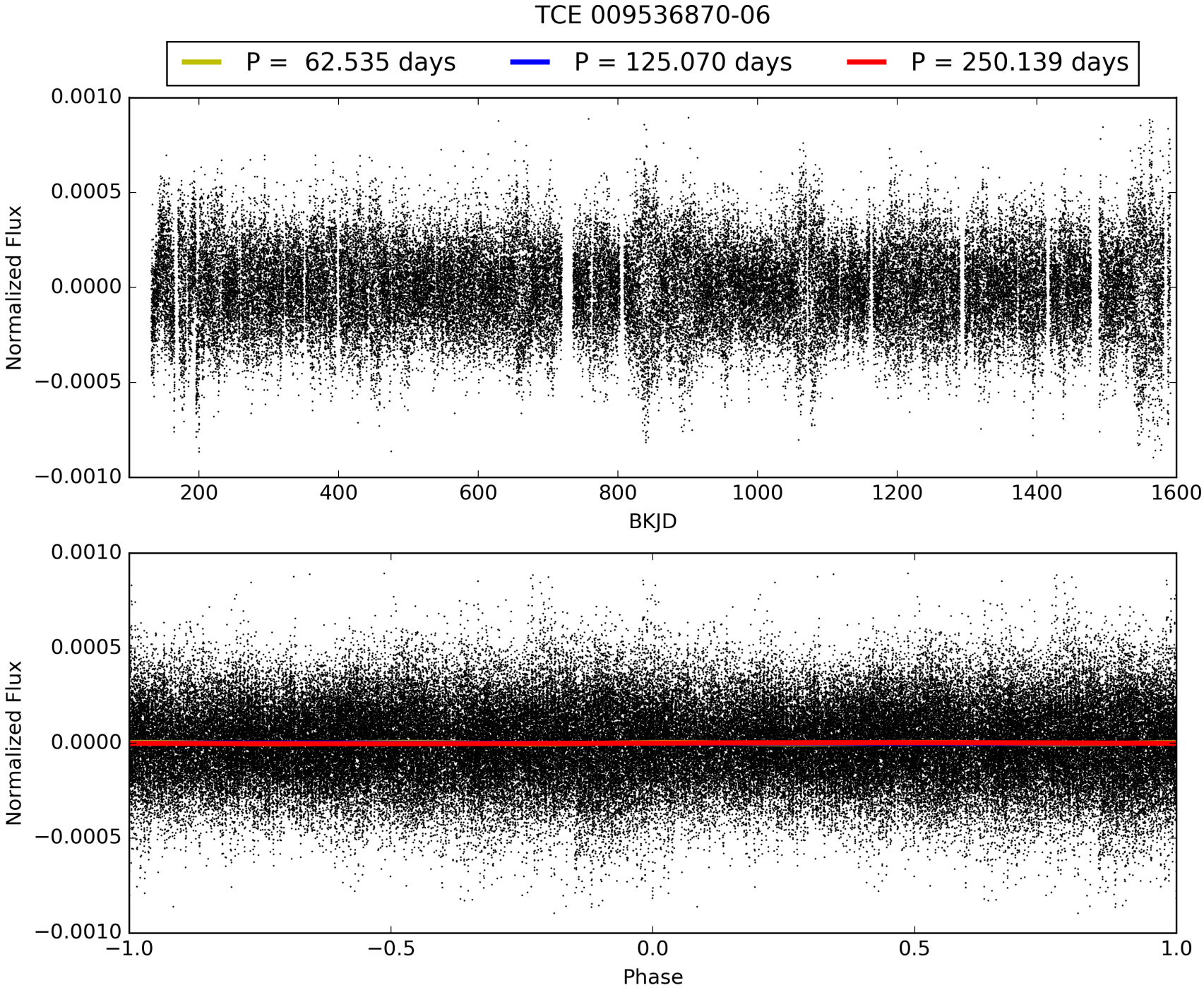
Centroid−sig: 14.0%
Centroid−so: 0.695 arcsec [1.39σ]
OotOffset−rm: 0.293 arcsec [0.34σ]
KicOffset−rm: 0.187 arcsec [0.43σ]
OotOffset−st: 4/4/0/1 [9]
KicOffset−st: 4/4/0/1 [9]
DiffImageQuality−fgm: 0.44 [4/9]
DiffImageOverlap−fno: 0.09 [1/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:34 Z

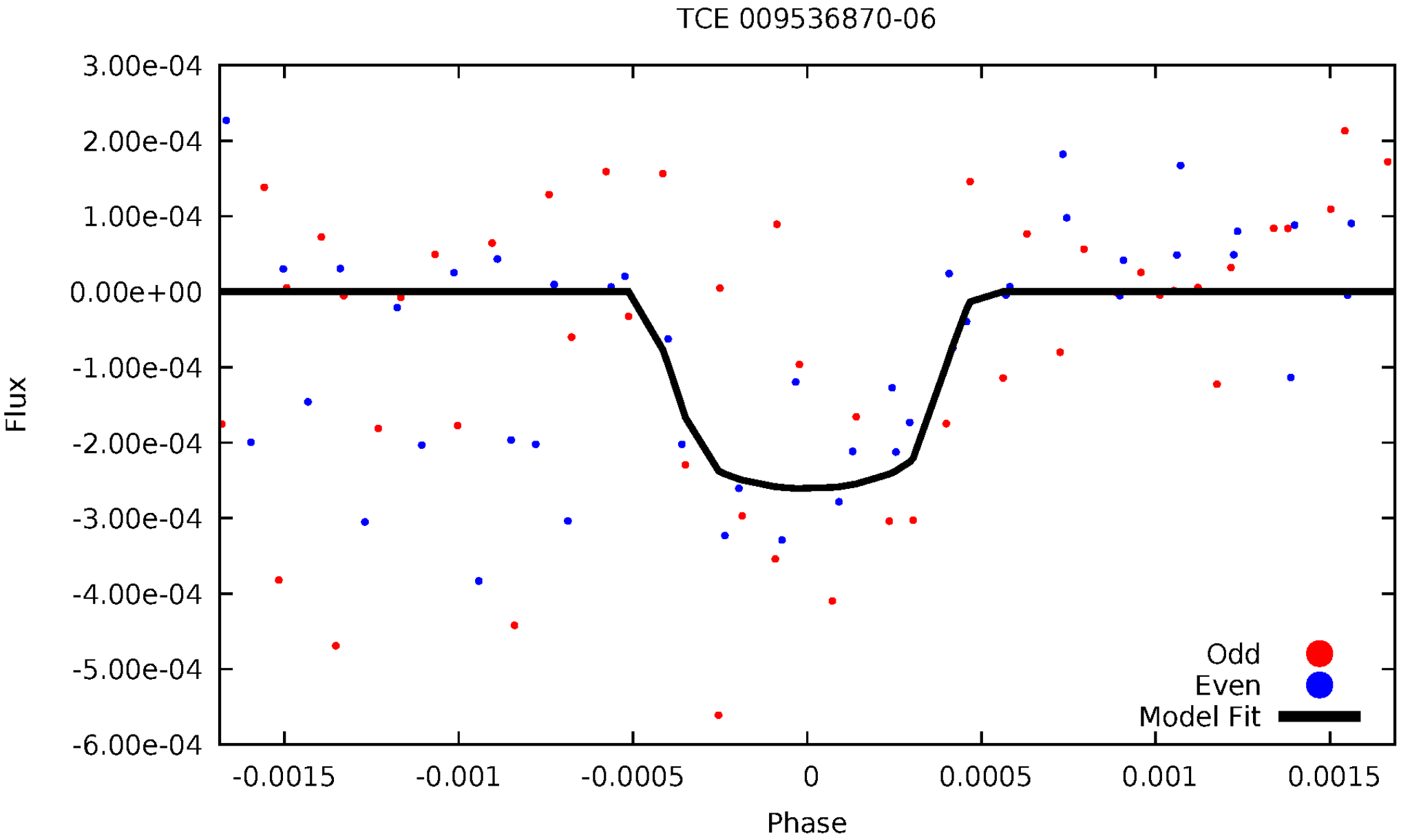
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009536870-06, PDC Light Curves




TCE 009536870-06
P = 62.535 days
P = 125.070 days
P = 250.139 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

DV Odd/Even


TCE 009536870-06
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
-6.00e-04
Flux
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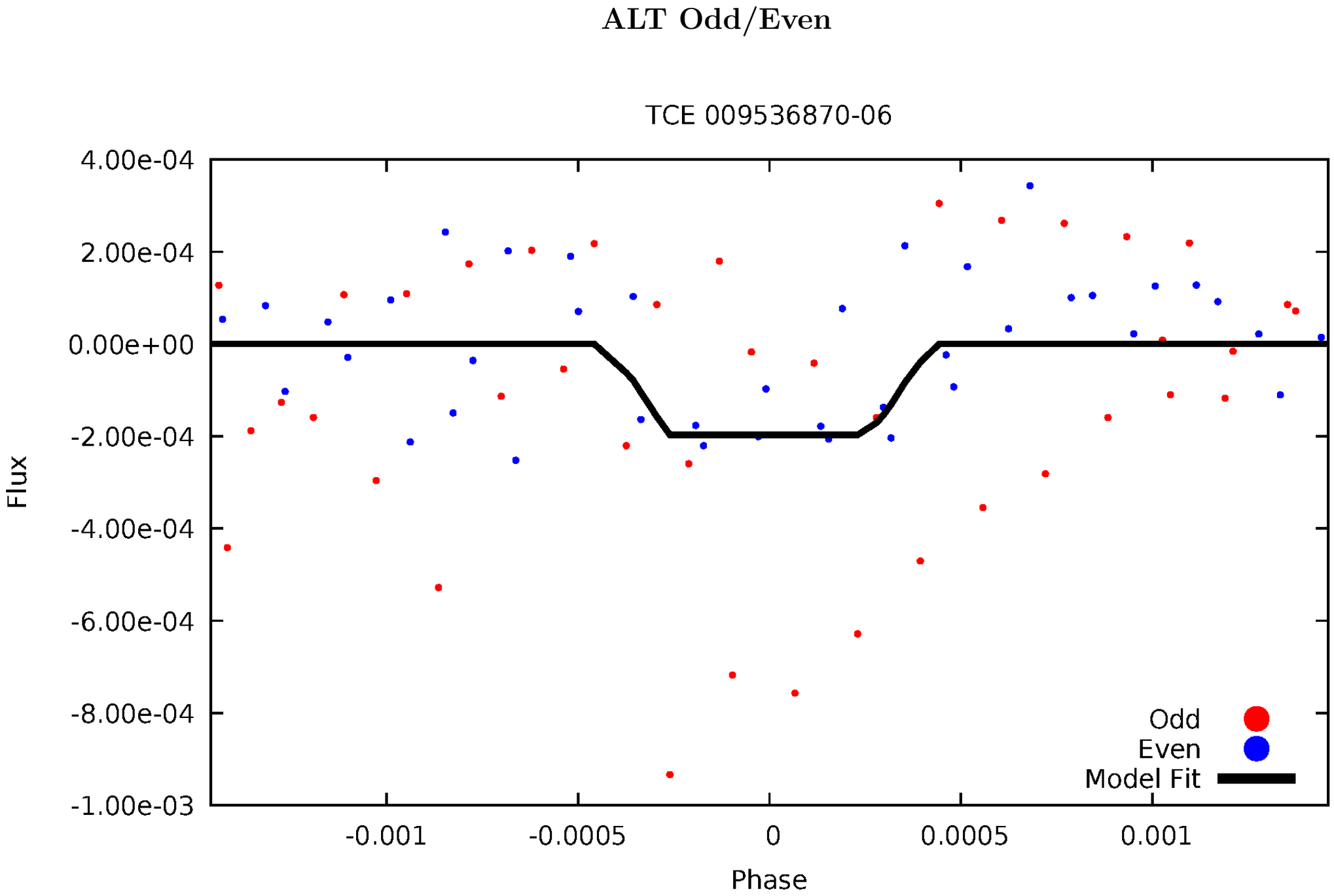
-0.001
-0.0005
0
0.0005
0.001
0.0015
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-06
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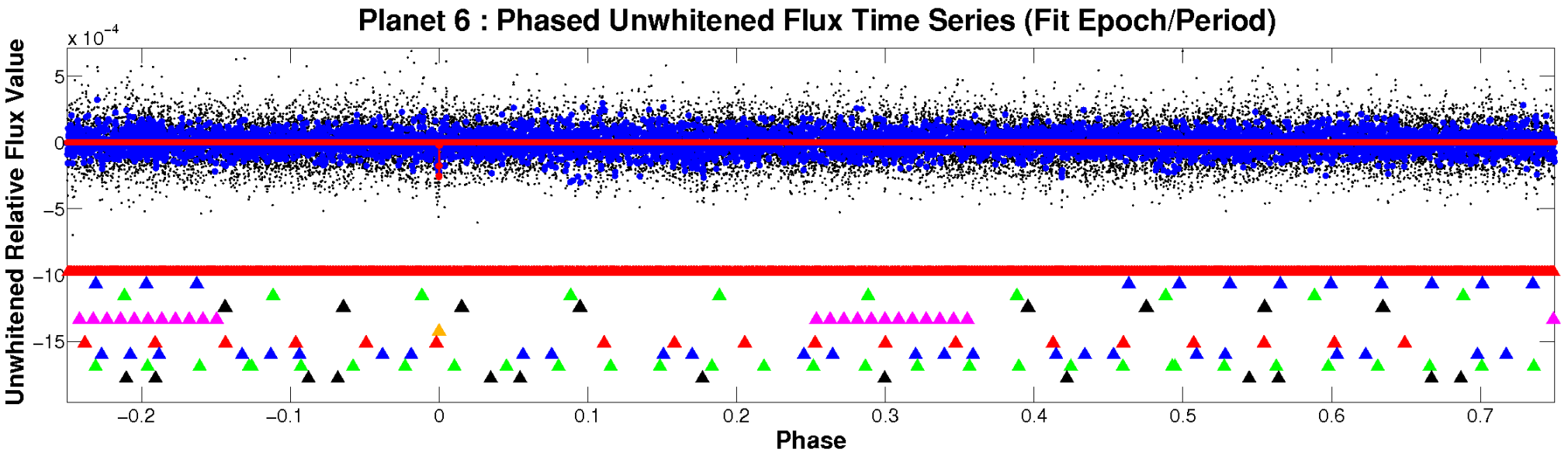
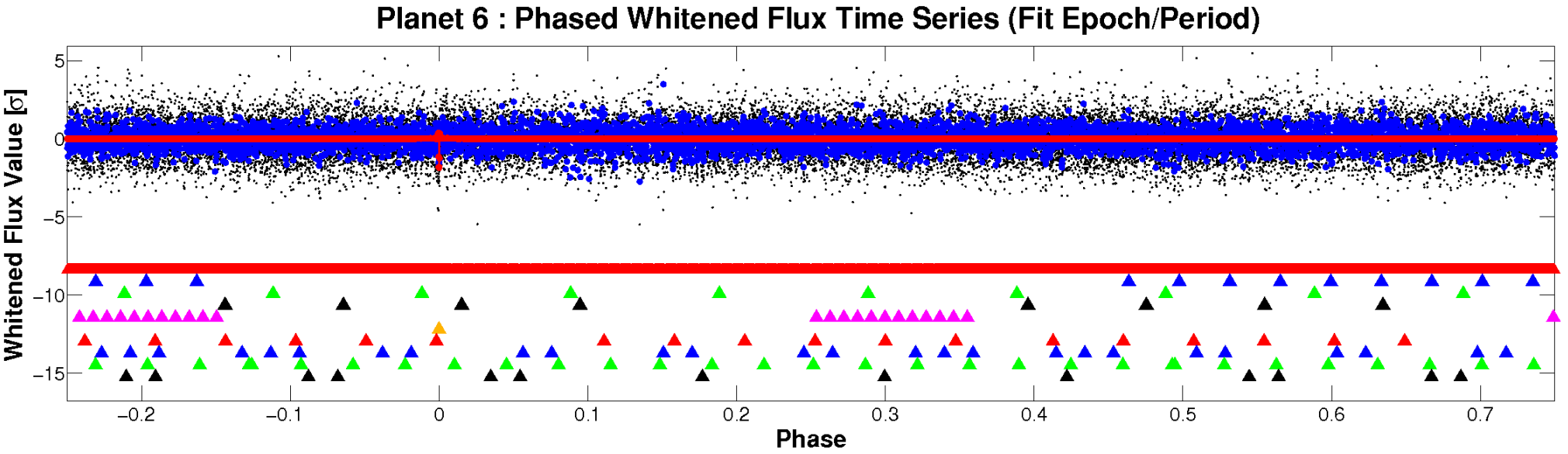
2.00e-04
0.00e+00
-2.00e-04
-4.00e-04
-6.00e-04
-8.00e-04
-1.00e-03
Flux
-0.001
-0.0005
0
0.0005
0.001
Phase
Odd
Even
Model Fit

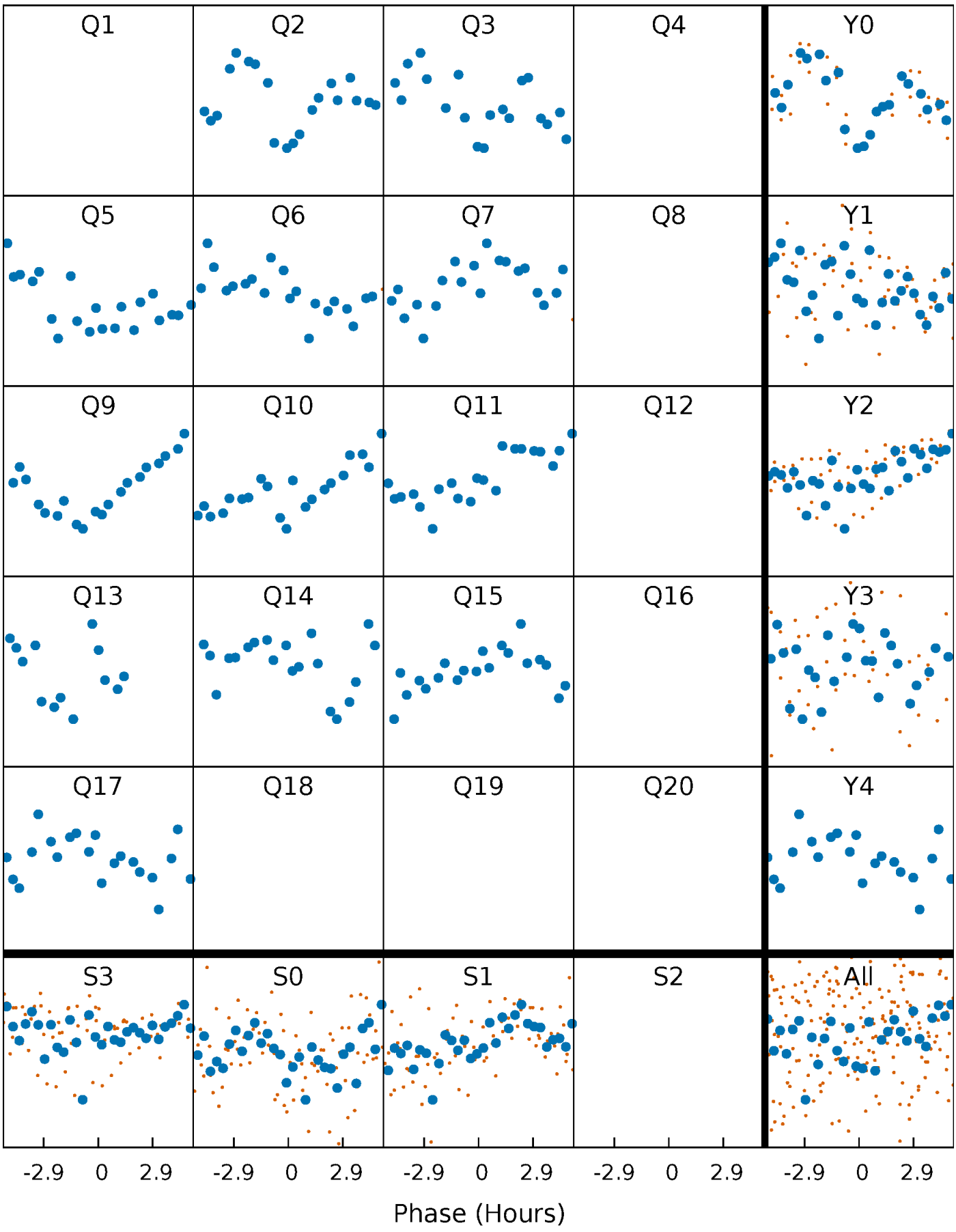
Non-Whitened Vs. Whitened Light Curve





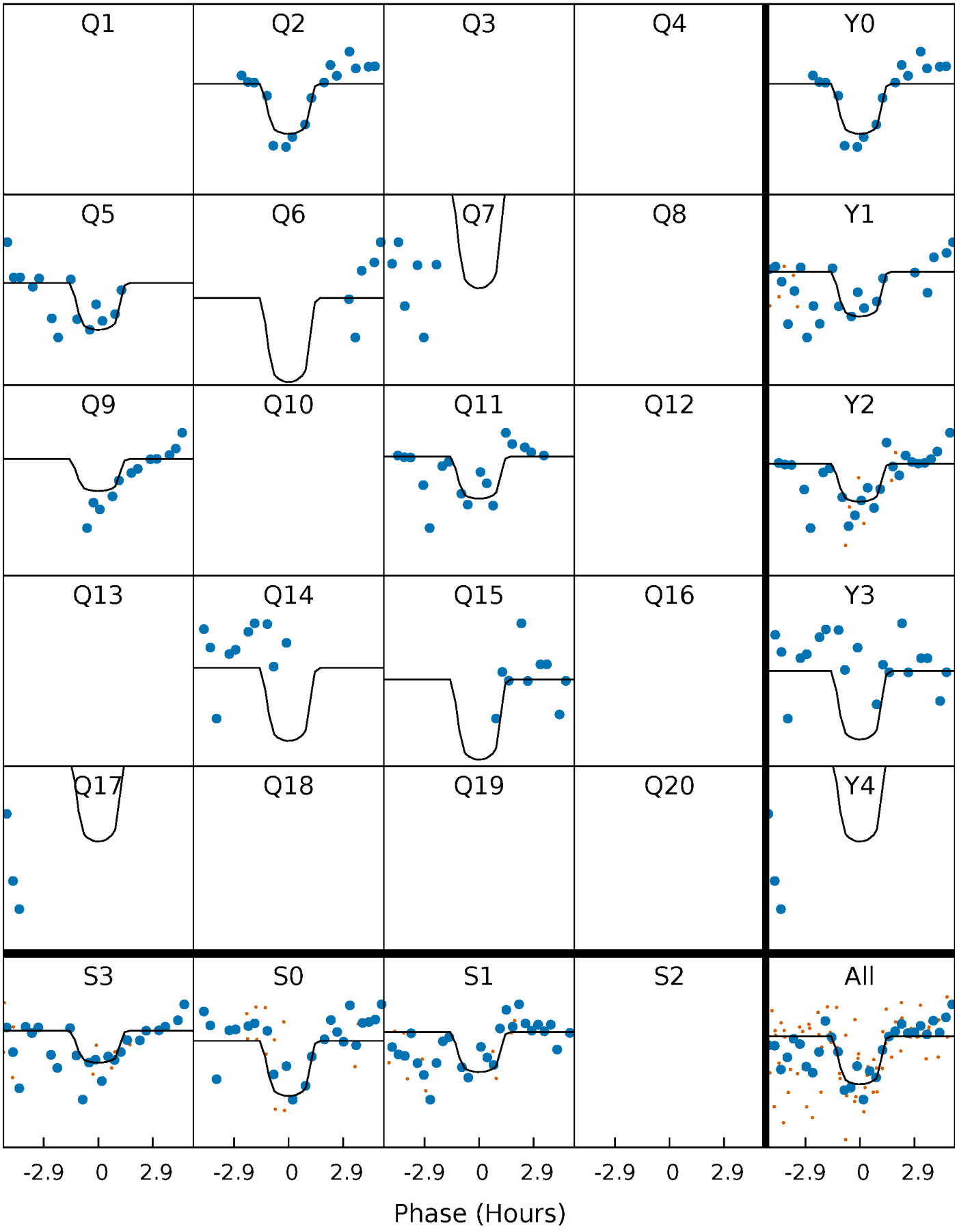
PDC Quarter-Phased Transit Curves

TCE 009536870-06 P=125.069727 Days T_0=214.361056 (BKJD)



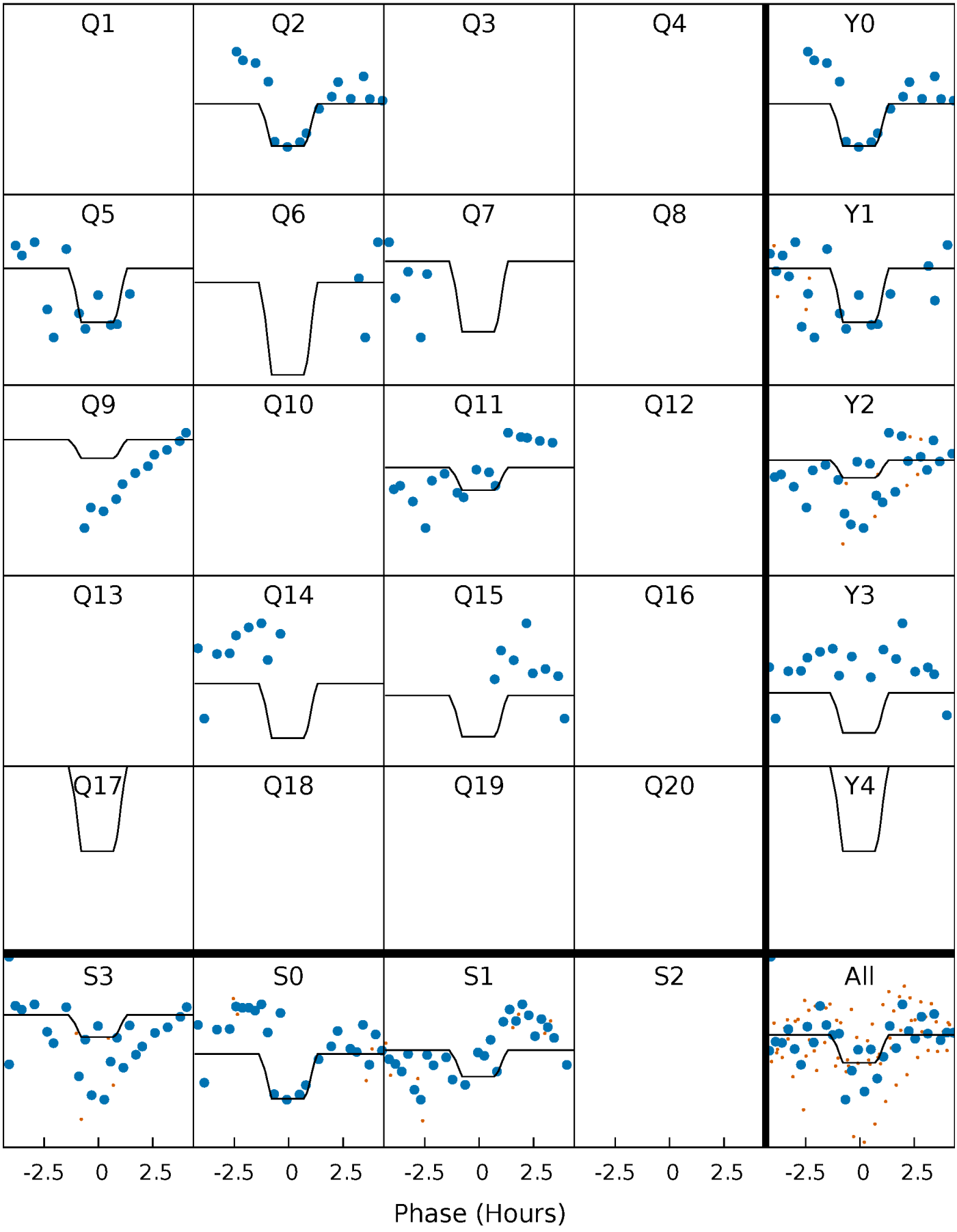
DV Quarter-Phased Transit Curves

TCE 009536870-06 P=125.069727 Days T_0=214.361056 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

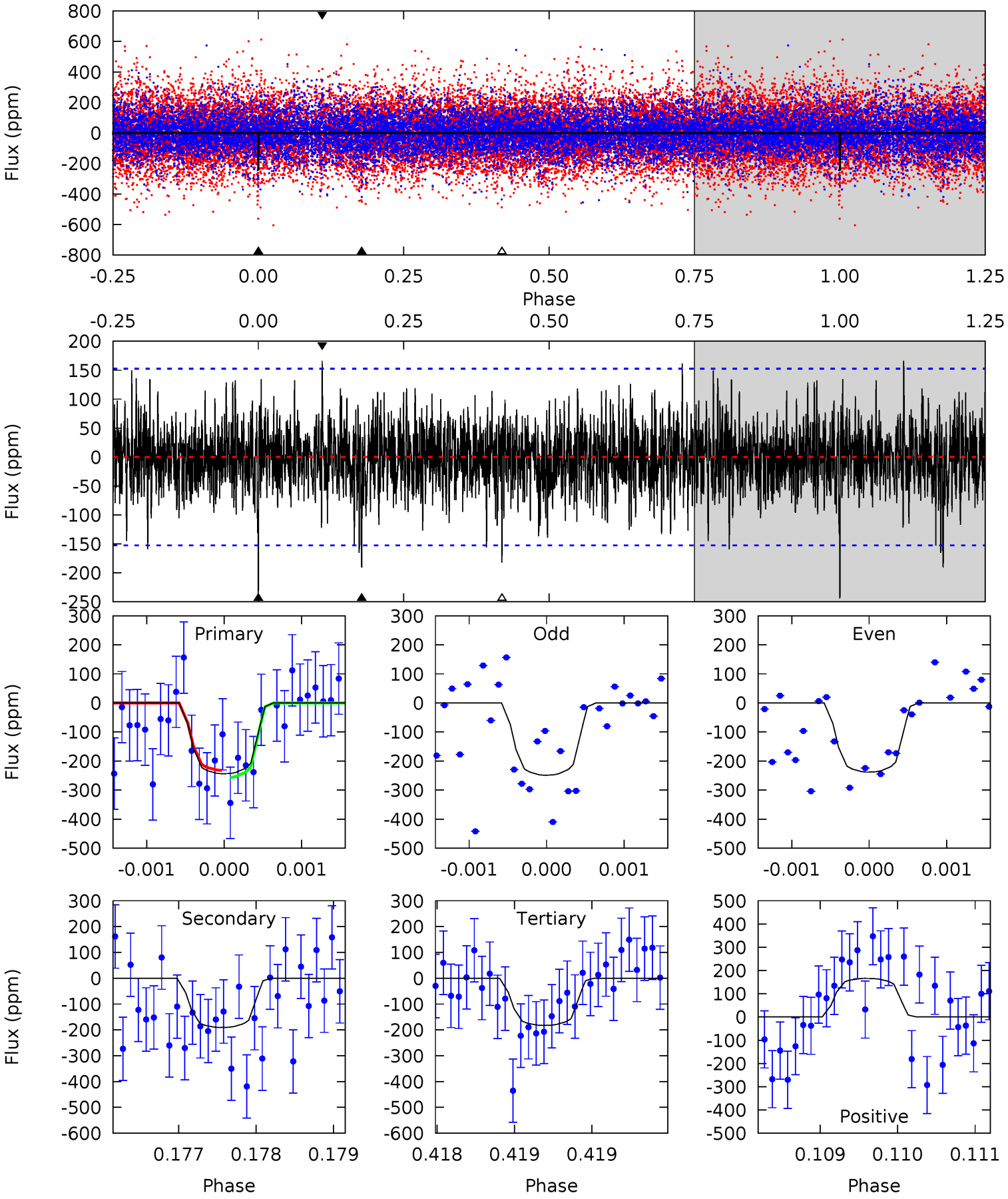
TCE 009536870-06 P=125.070935 Days T_0=214.355644 (BKJD)



DV Model-Shift Uniqueness Test

009536870-06, P = 125.069727 Days, E = 89.291329 Days

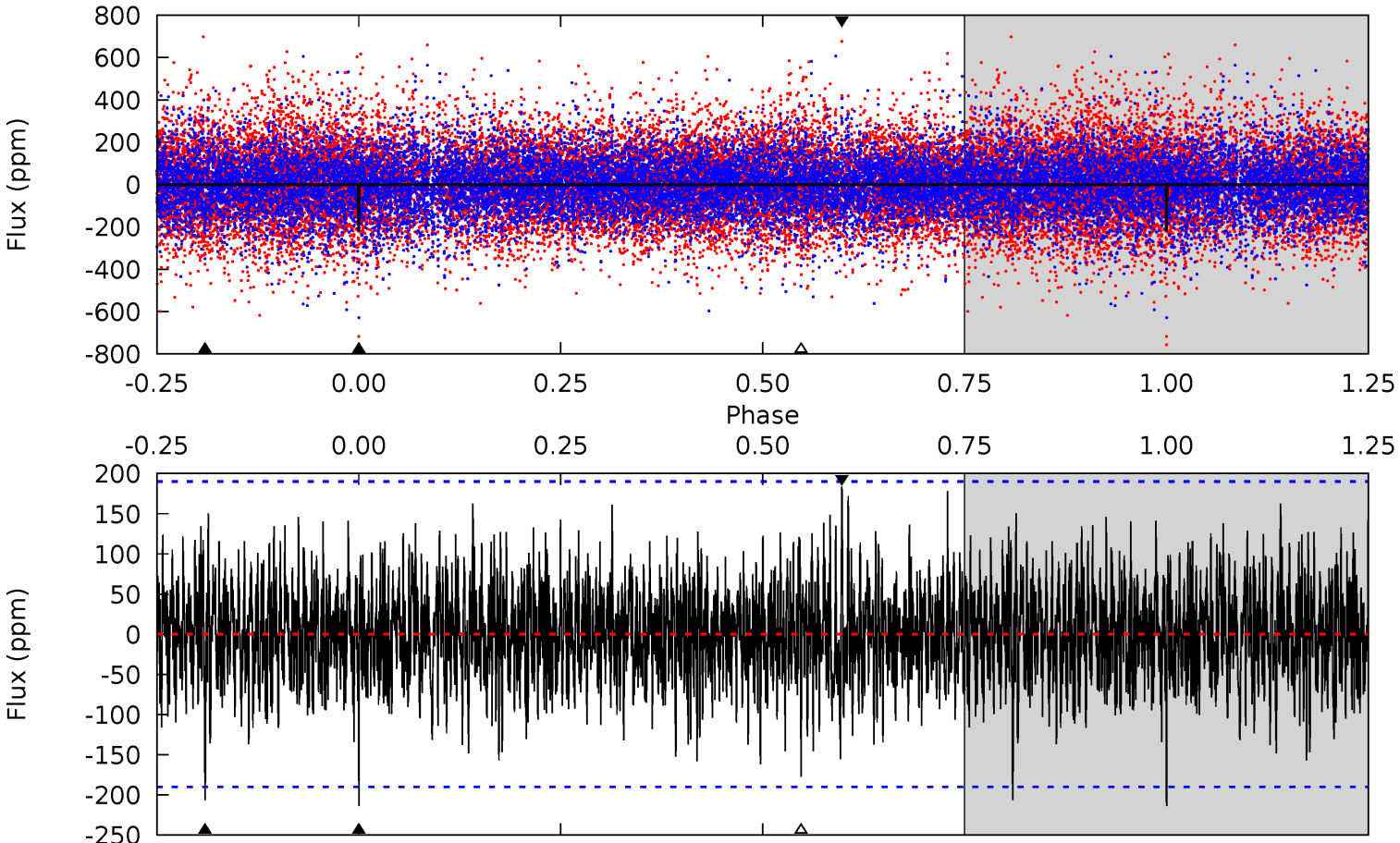
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.75	6.85	6.56	5.96	5.47	3.33	1.64	2.20	2.79	0.29	0.89	0.19	0.90	0.41	0.45

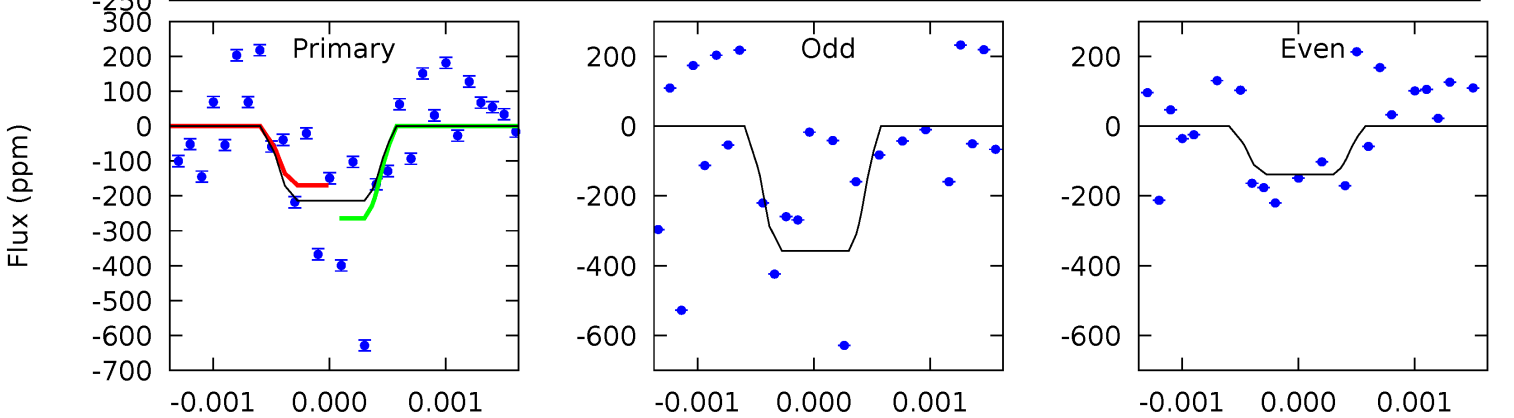


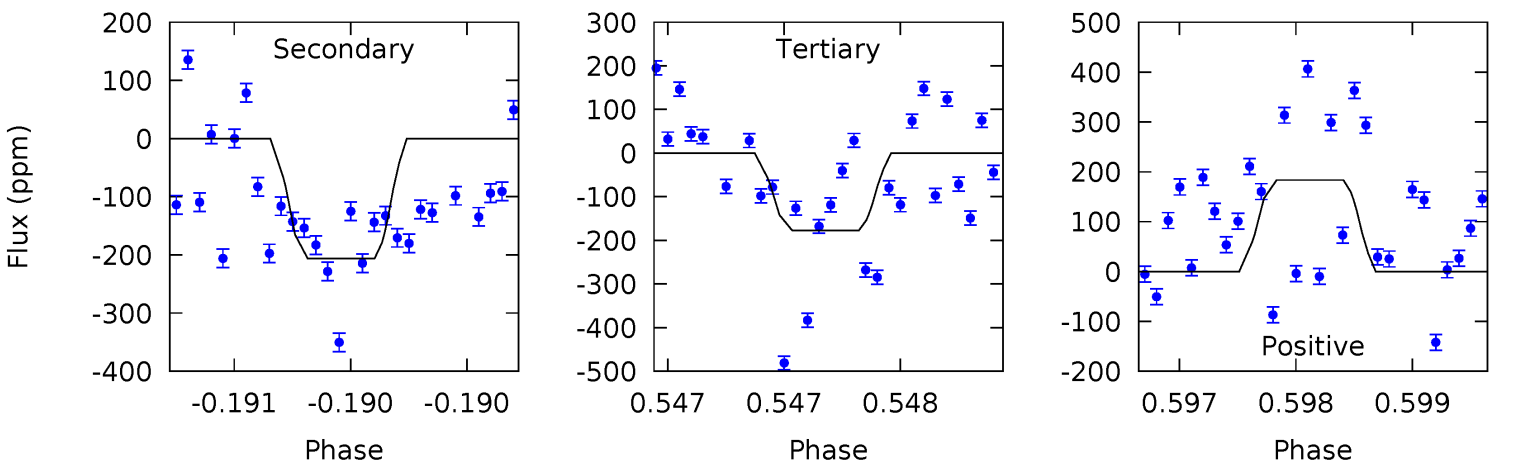
Alt Model-Shift Uniqueness Test

009536870-06, P = 125.070935 Days, E = 89.284709 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.18	5.98	5.12	5.31	5.50	3.36	1.51	1.06	0.87	0.85	0.67	3.23	1.09	0.46	1.37







Stellar Parameters For KIC 009536870

	$T_{eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-06 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-191±28	$4.33^{+3.52}_{-2.82}$	754^{+35}_{-38}	5365^{+4142}_{-1136}	1725^{+11651}_{-1220}
Alt.	-207±35	$3.63^{+3.68}_{-2.35}$	752^{+31}_{-39}	5895^{+5466}_{-1506}	2623^{+18685}_{-1979}

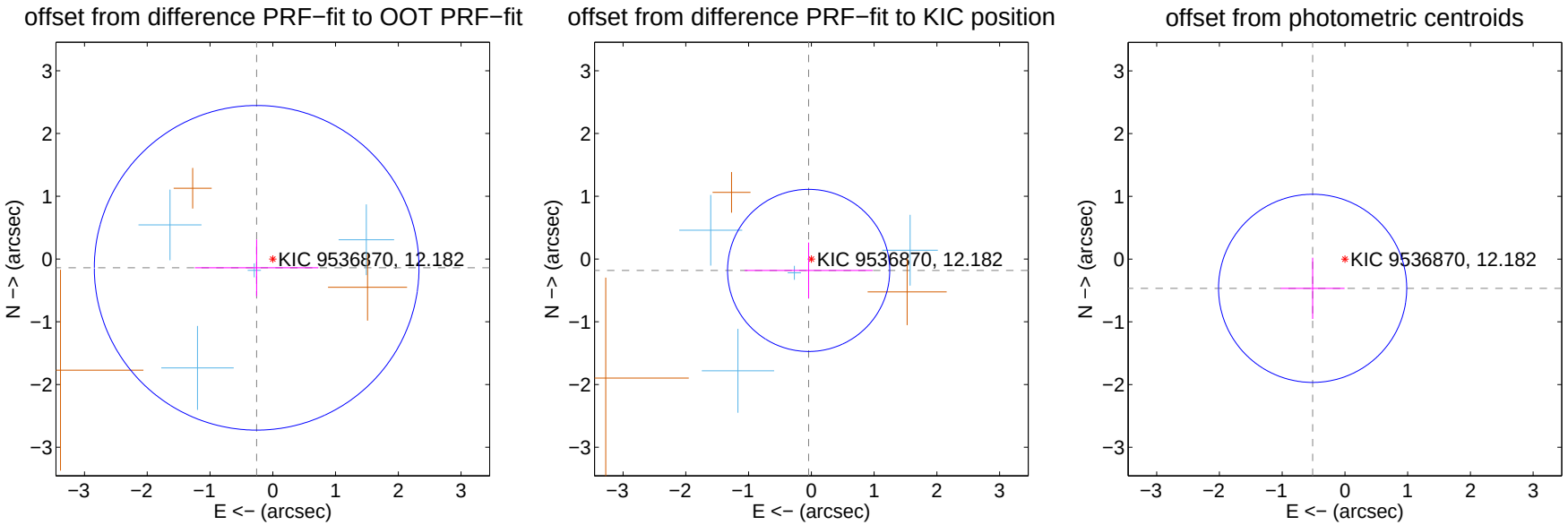
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

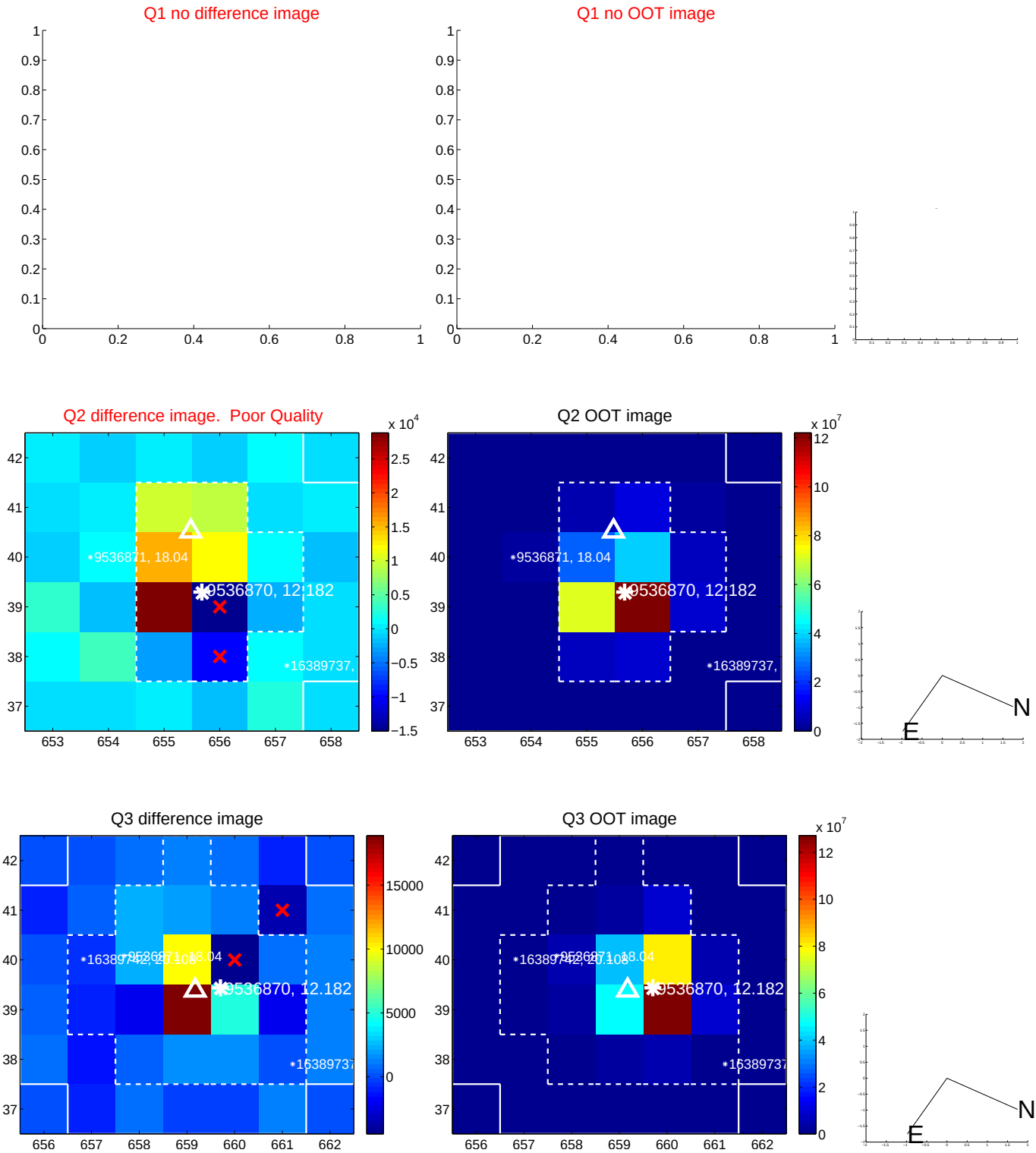
Supplemental centroid analysis for 009536870-06. Kepler magnitude: 12.18. Transit SNR 7.98
There are 4 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.293 ± 0.862	0.34	0.257 ± 0.984	-0.140 ± 0.451
PRF-fit source offset from KIC position	0.187 ± 0.431	0.43	0.043 ± 1.020	-0.182 ± 0.444
photometric centroid source offset	0.69 ± 0.50	1.39	0.51 ± 0.51	-0.47 ± 0.49

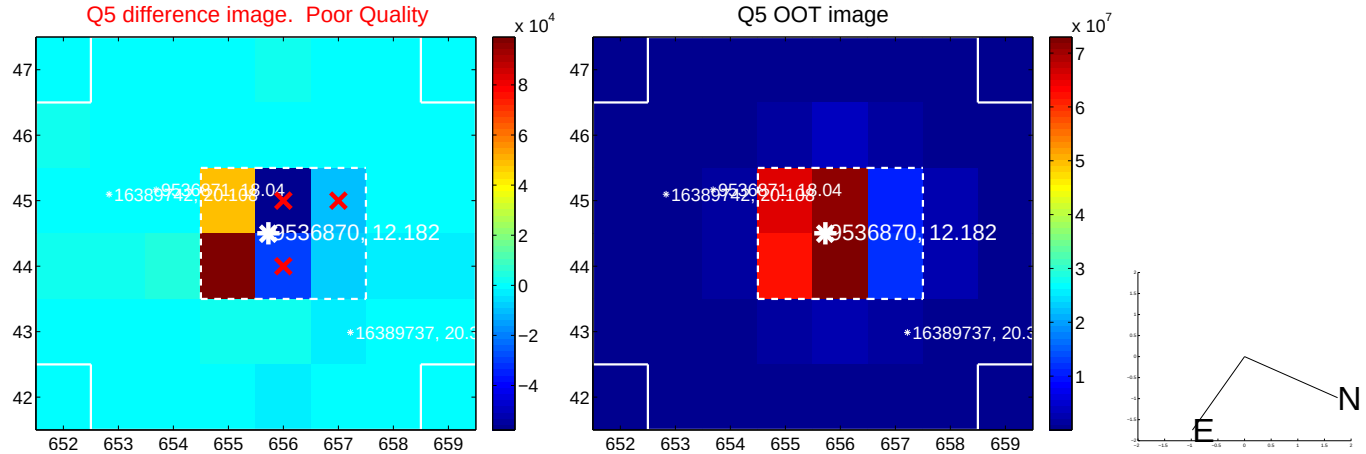


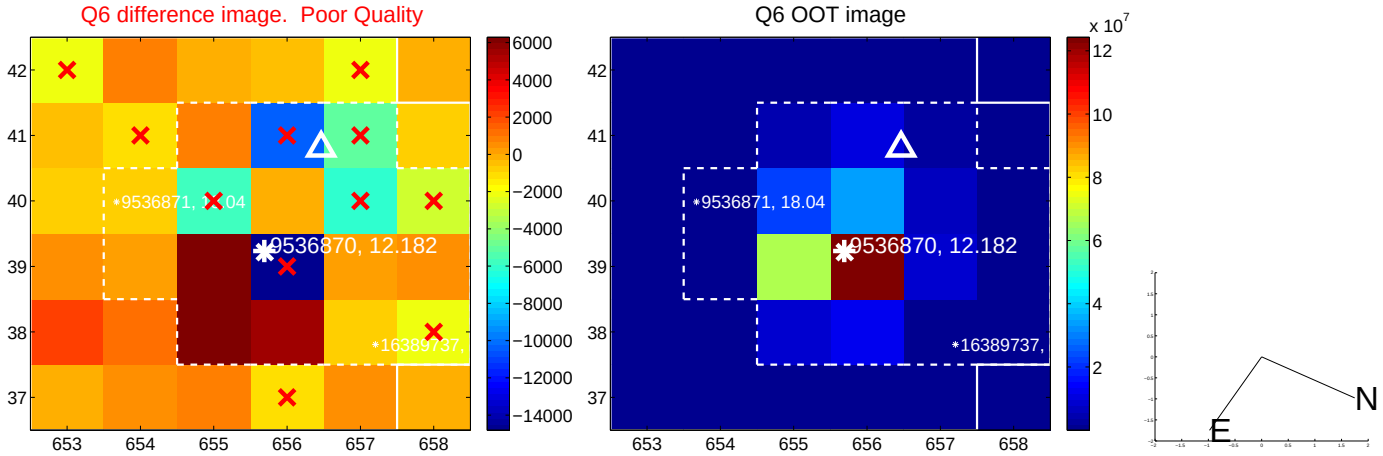
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

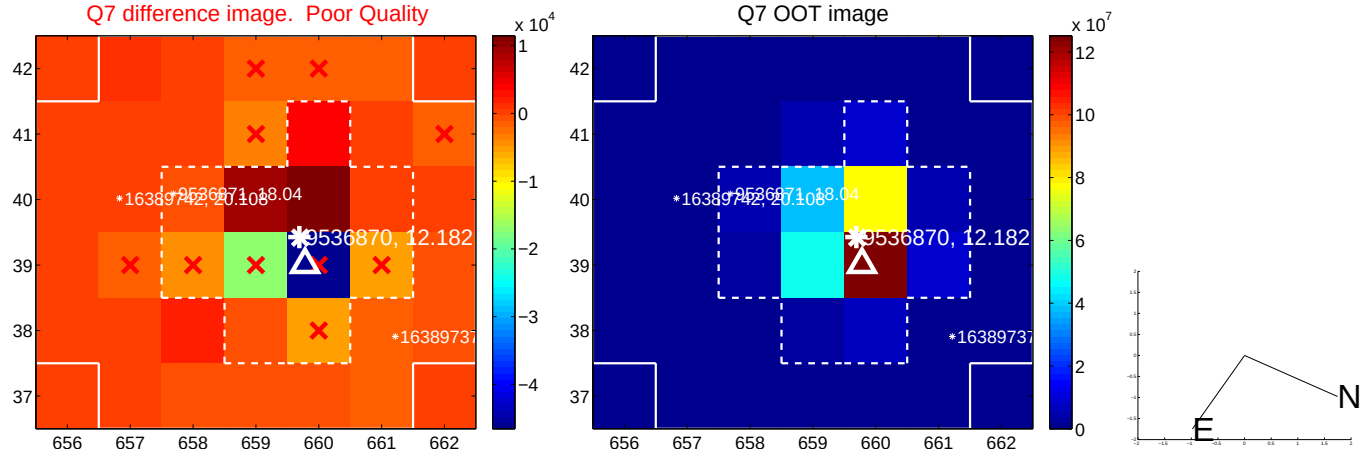
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

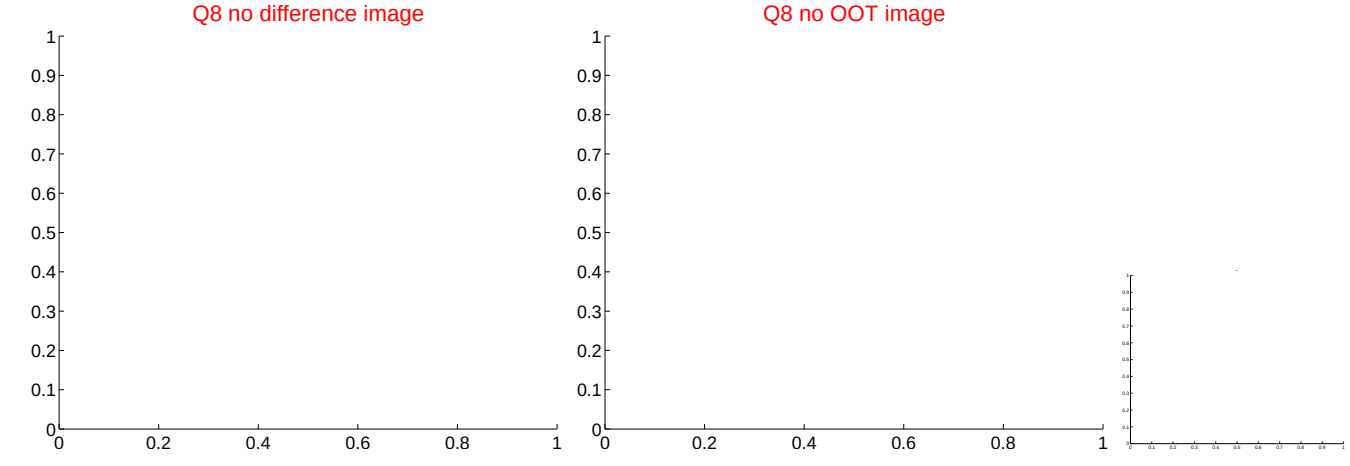


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

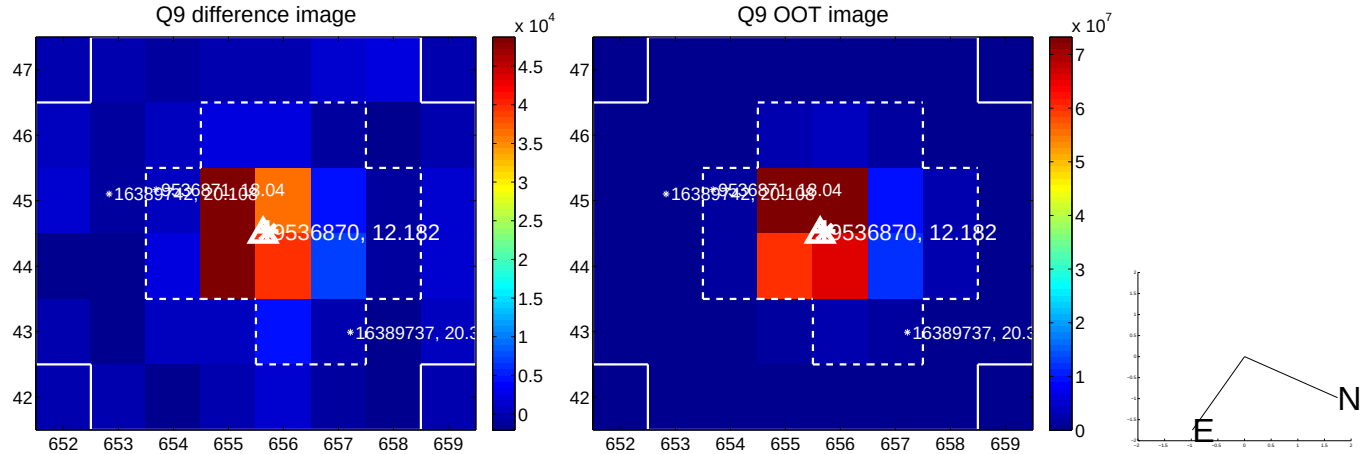


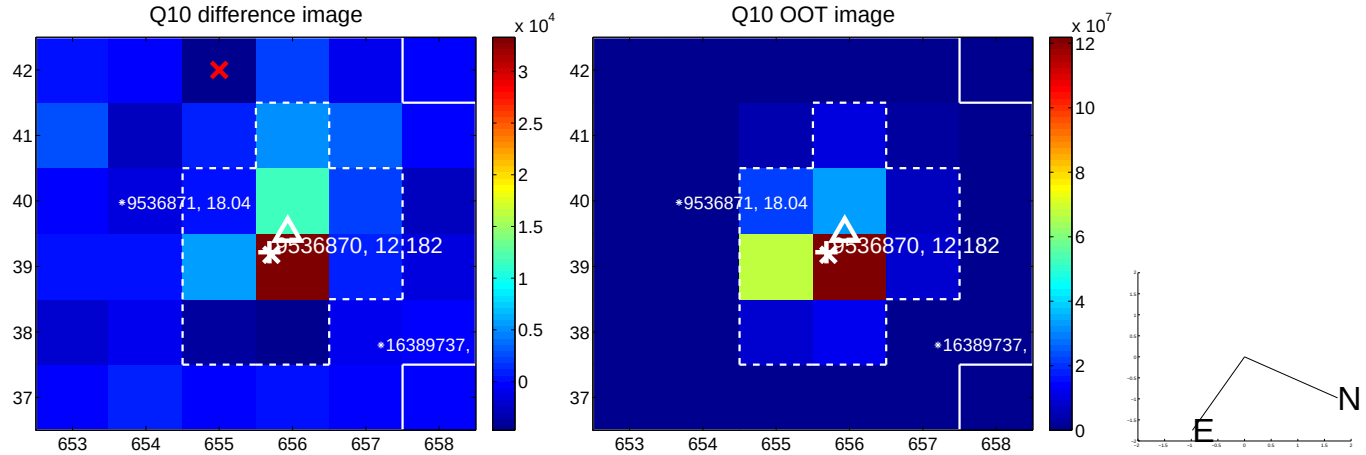


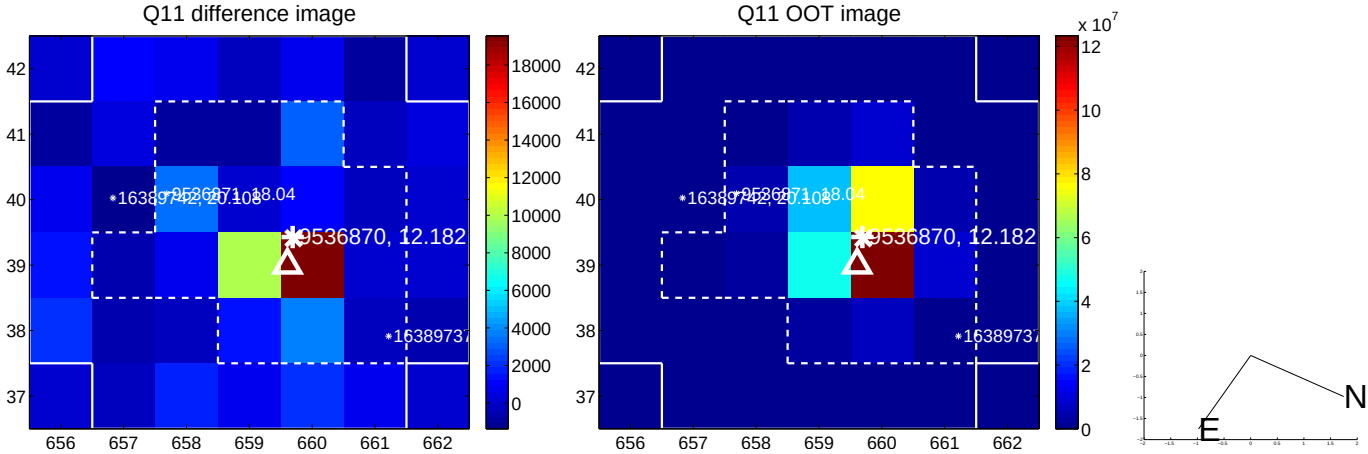


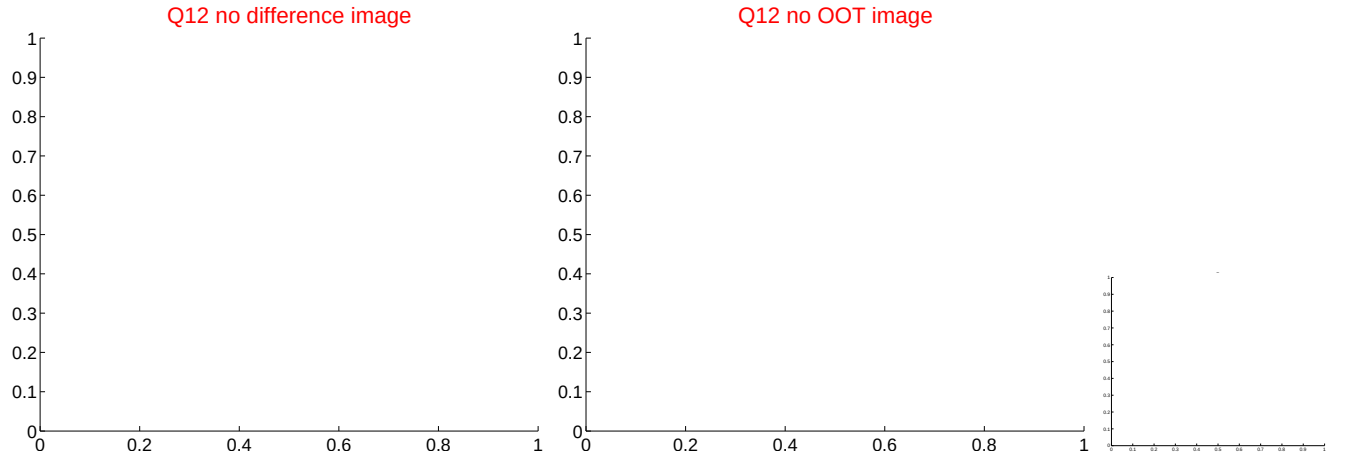


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

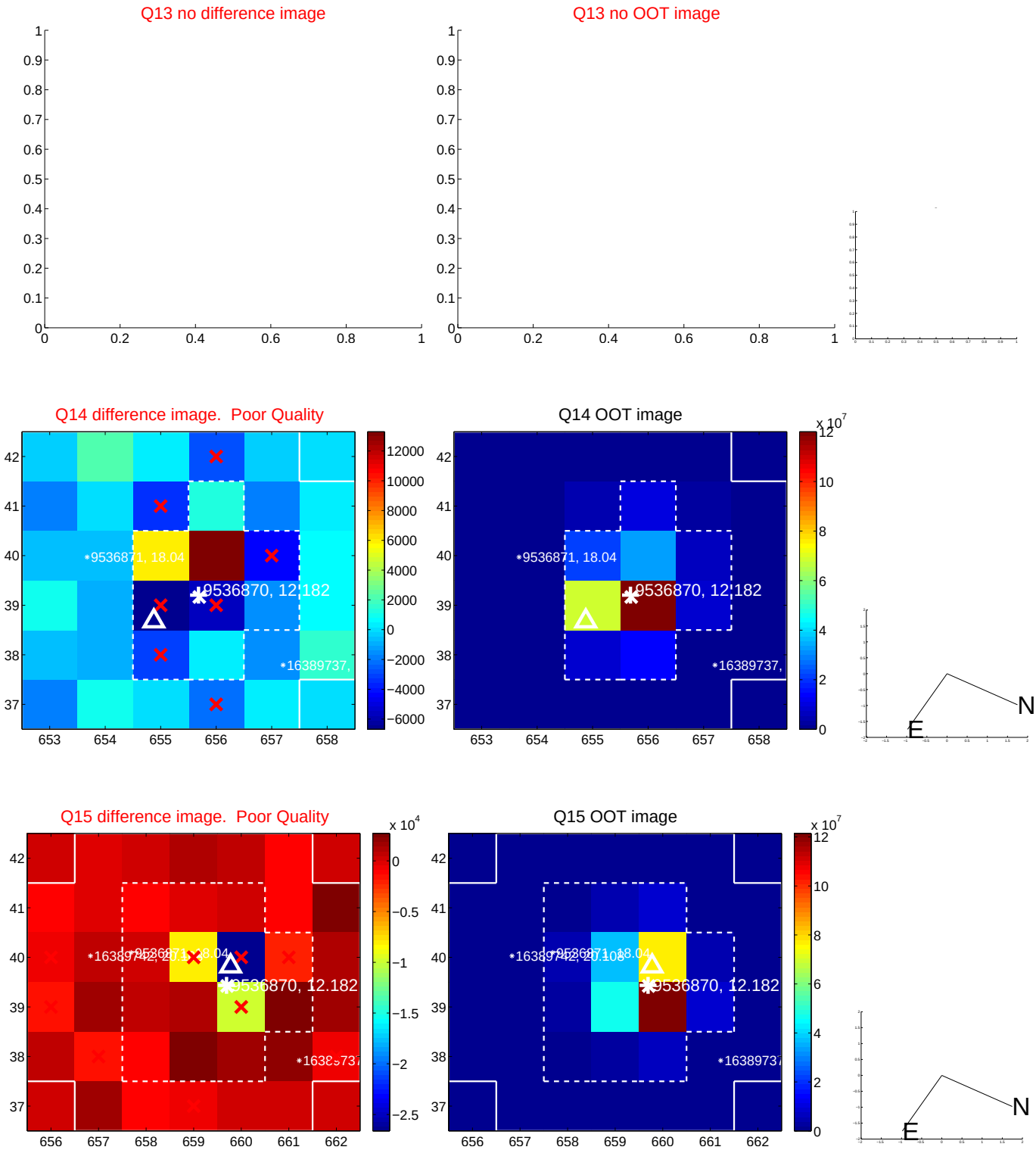




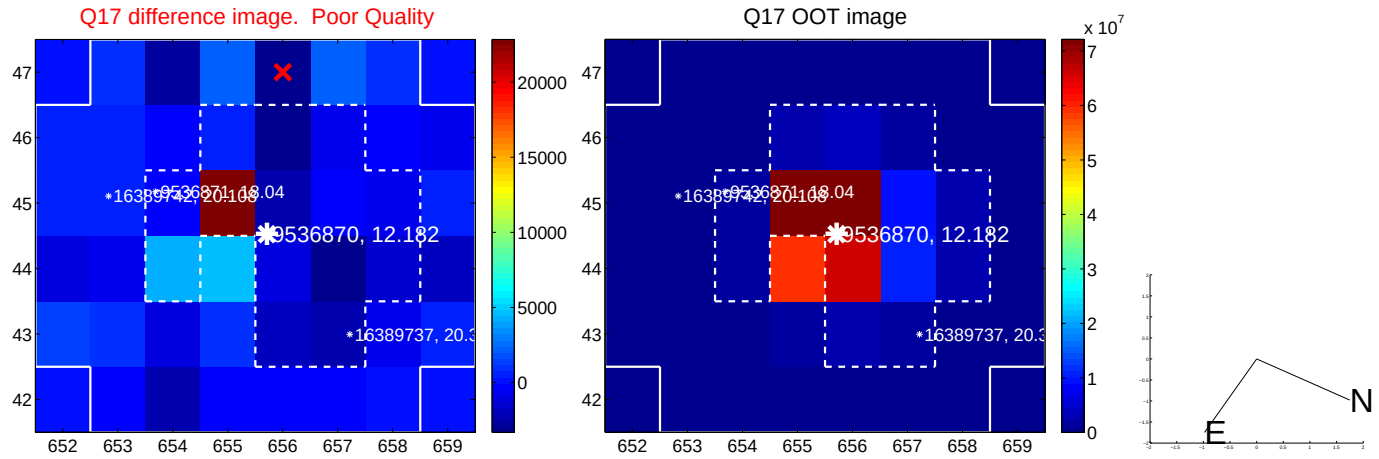


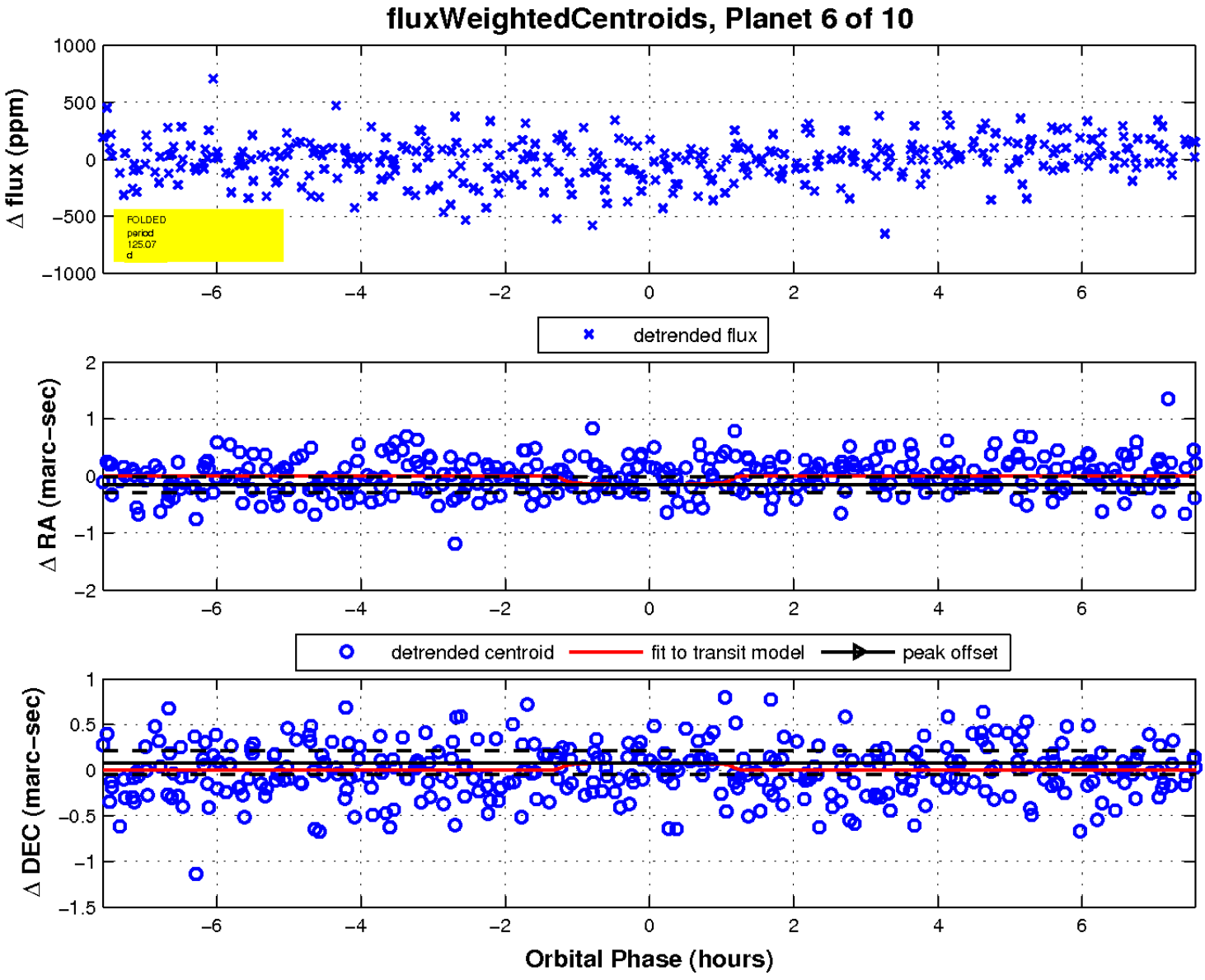


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

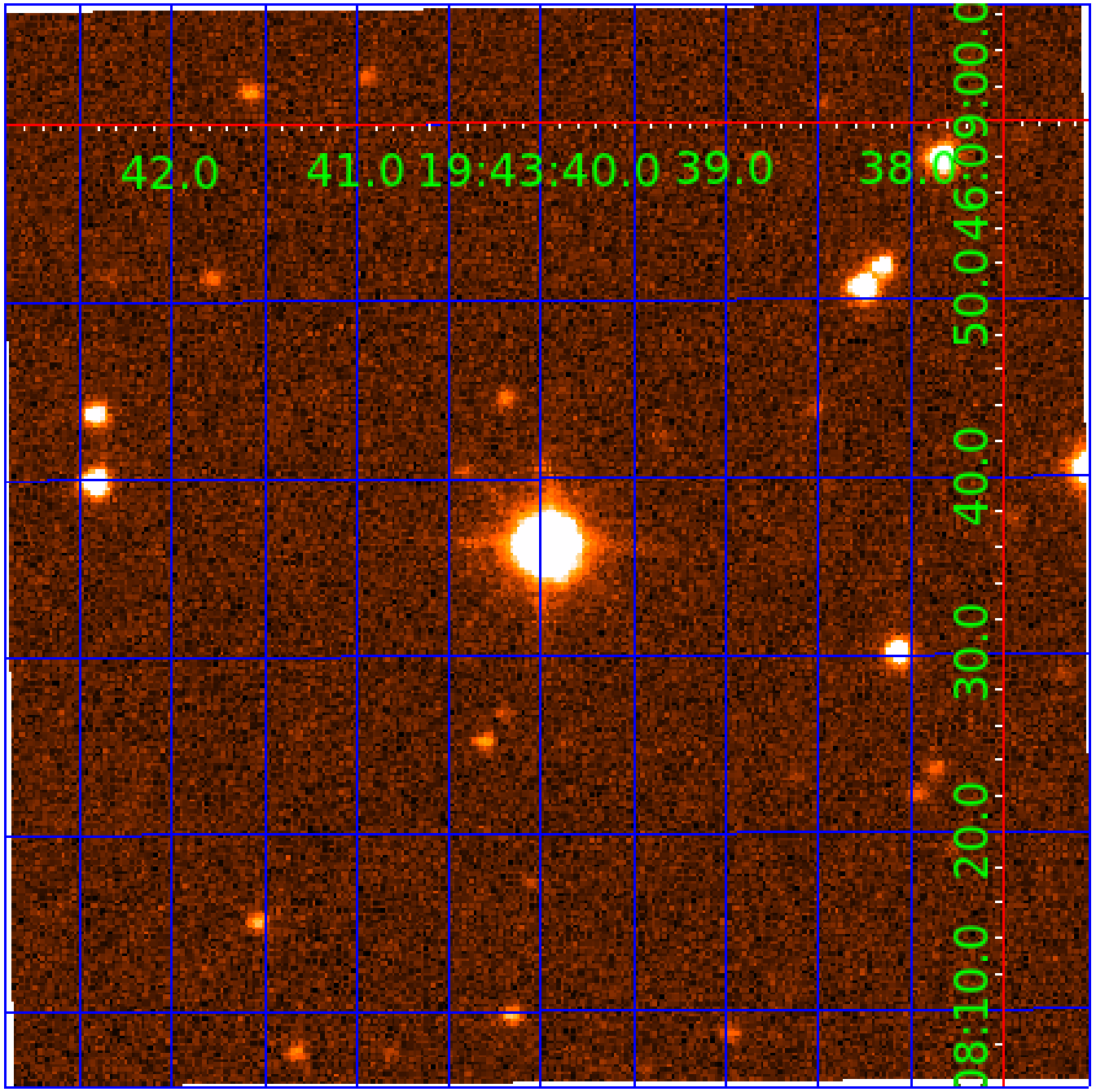


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

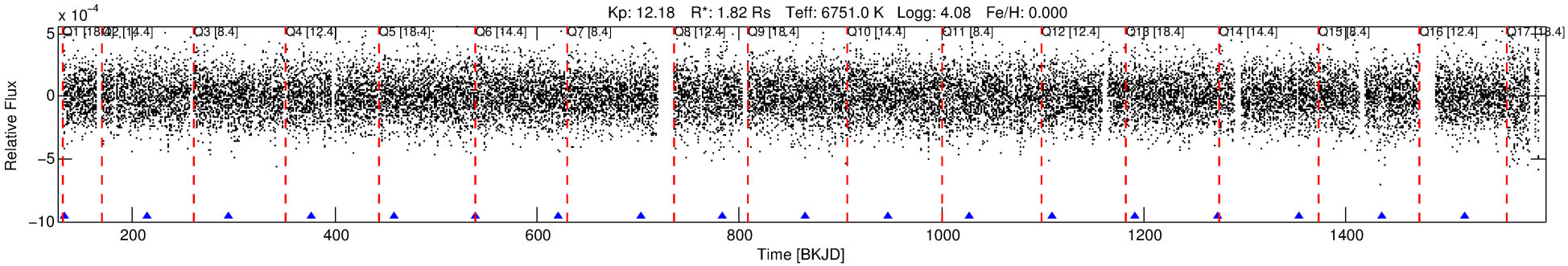
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

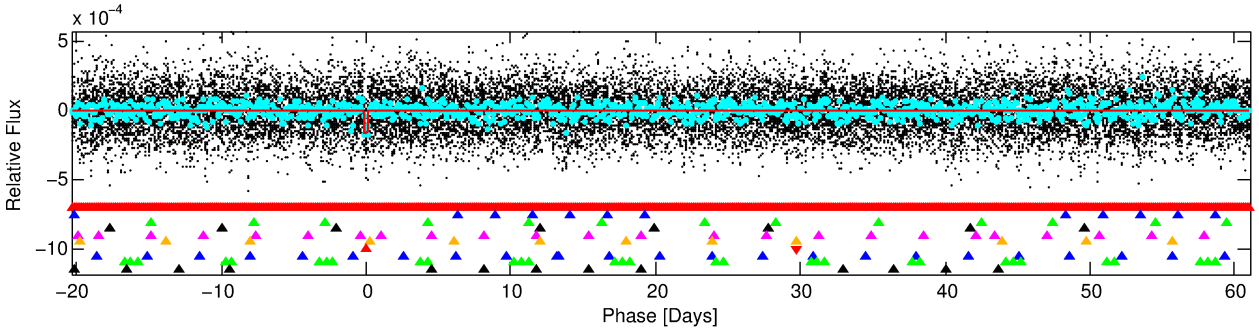
Ephemeris Match Information For 009536870-07

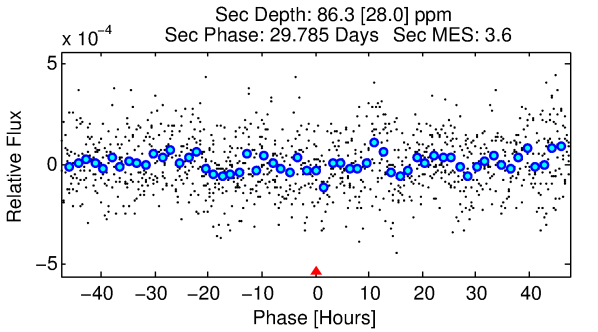
No Significant Match Found

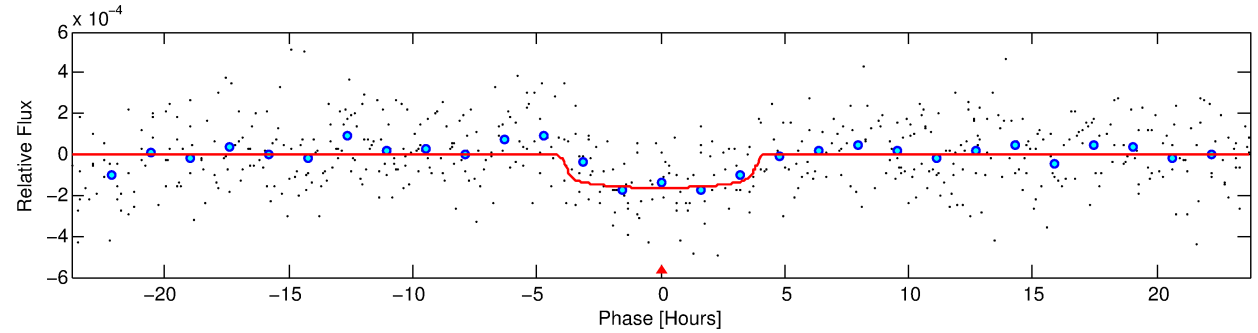
DV One-Page Summary

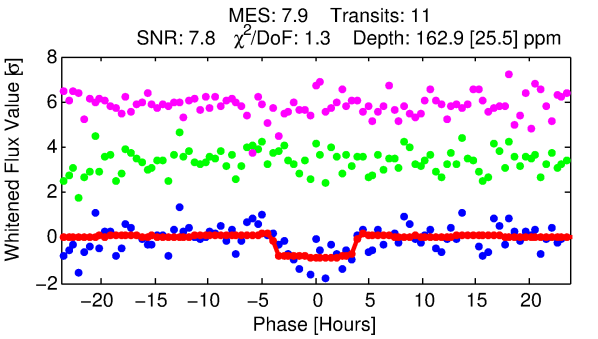
KIC: 9536870 Candidate: 7 of 10 Period: 81.409 d

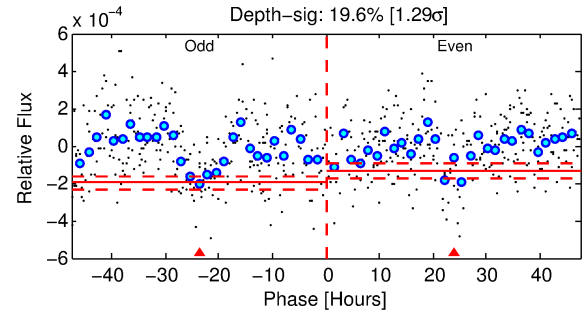


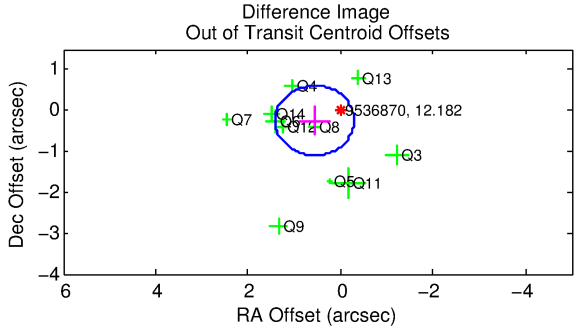












DV Fit Results:

Period = 81.40921 [0.00157] d
Epoch = 132.7289 [0.0152] BKJD
Rp/R* = 0.0126 [0.0059]
a/R* = 55.69 [145.29]
b = 0.72 [1.74]

Seff = 35.50 [9.11]
Teq = 622 [40] K
Rp = 2.50 [1.25] Re
a = 0.4158 [0.0672] AU

Ag = 1317.05 [1348.88] [0.98σ]
Teffp = 5797 [1442] K [3.59σ]

DV Diagnostic Results:

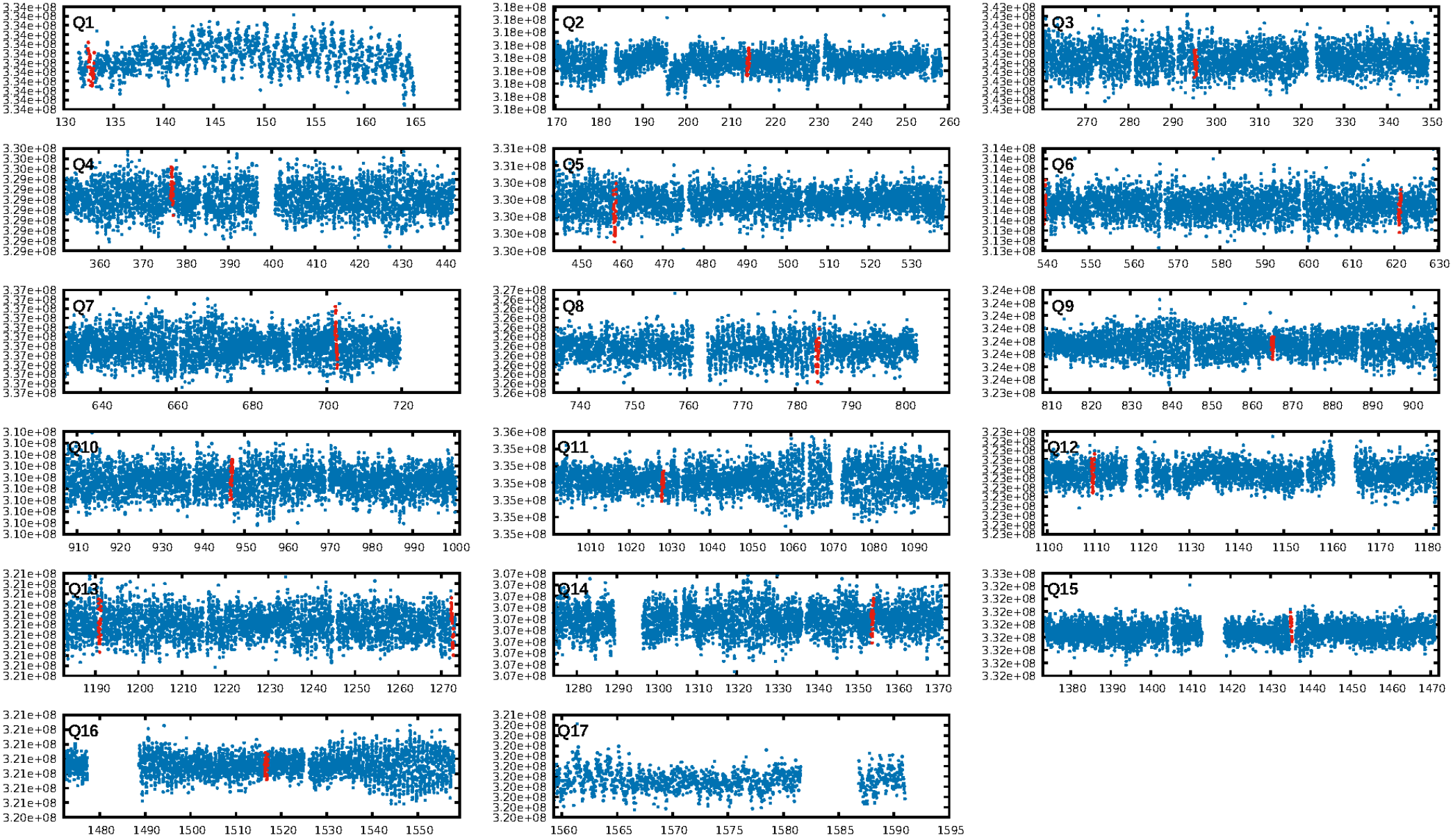
ShortPeriod−sig: 100.0% [54.37σ]
LongPeriod−sig: 100.0% [83.36σ]
ModelChiSquare2−sig: 7.0%
ModelChiSquareGof−sig: 100.0%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [11/11]
GhostDiagnostic−chr: −3.103

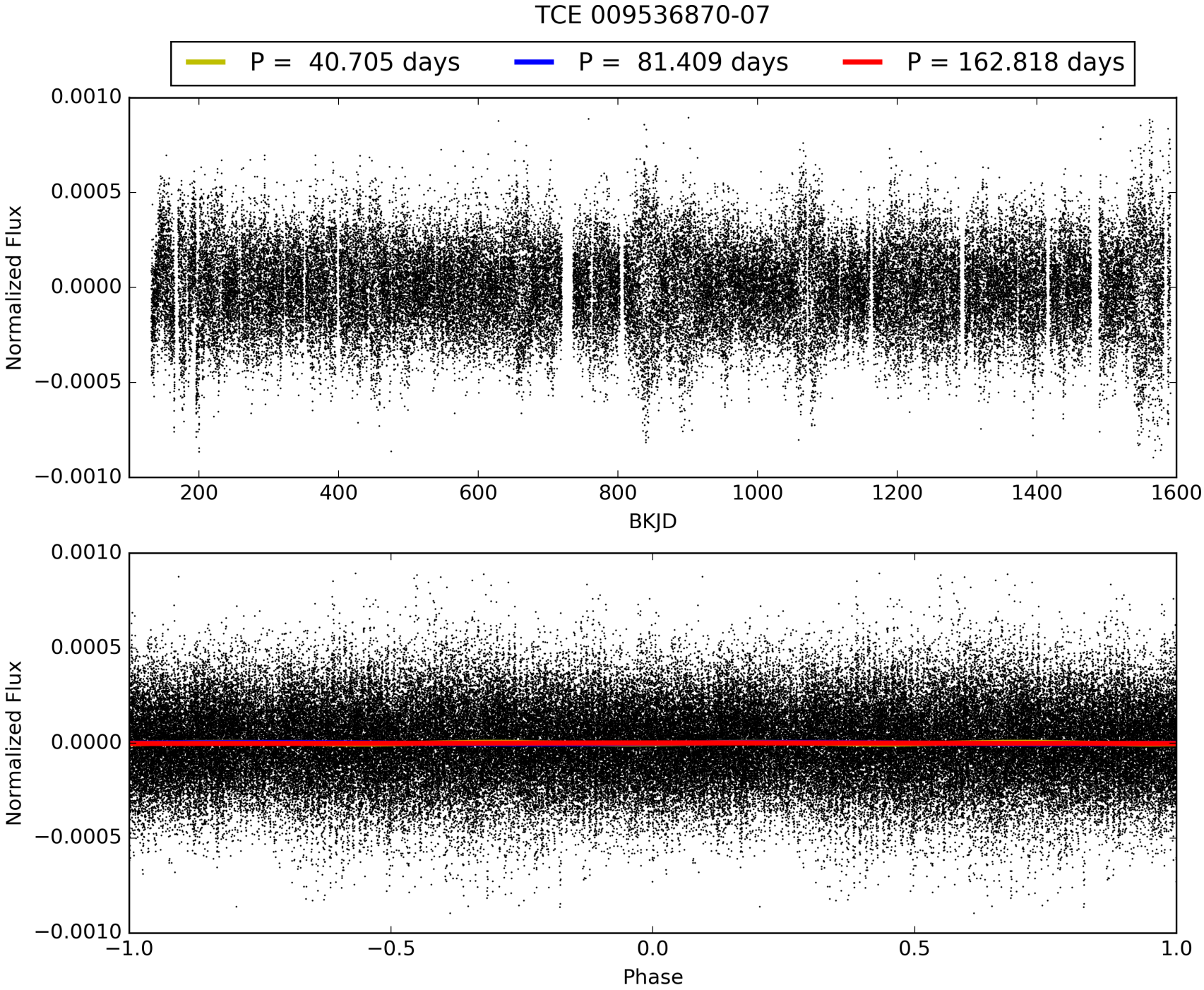
Centroid−sig: 18.2%
Centroid−so: 0.591 arcsec [1.52σ]
OotOffset−rm: 0.618 arcsec [2.18σ]
KicOffset−rm: 0.625 arcsec [2.27σ]
OotOffset−st: 2/3/3/3 [11]
KicOffset−st: 2/3/3/3 [11]
DiffImageQuality−fgm: 0.64 [7/11]
DiffImageOverlap−fno: 0.00 [0/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:38 Z

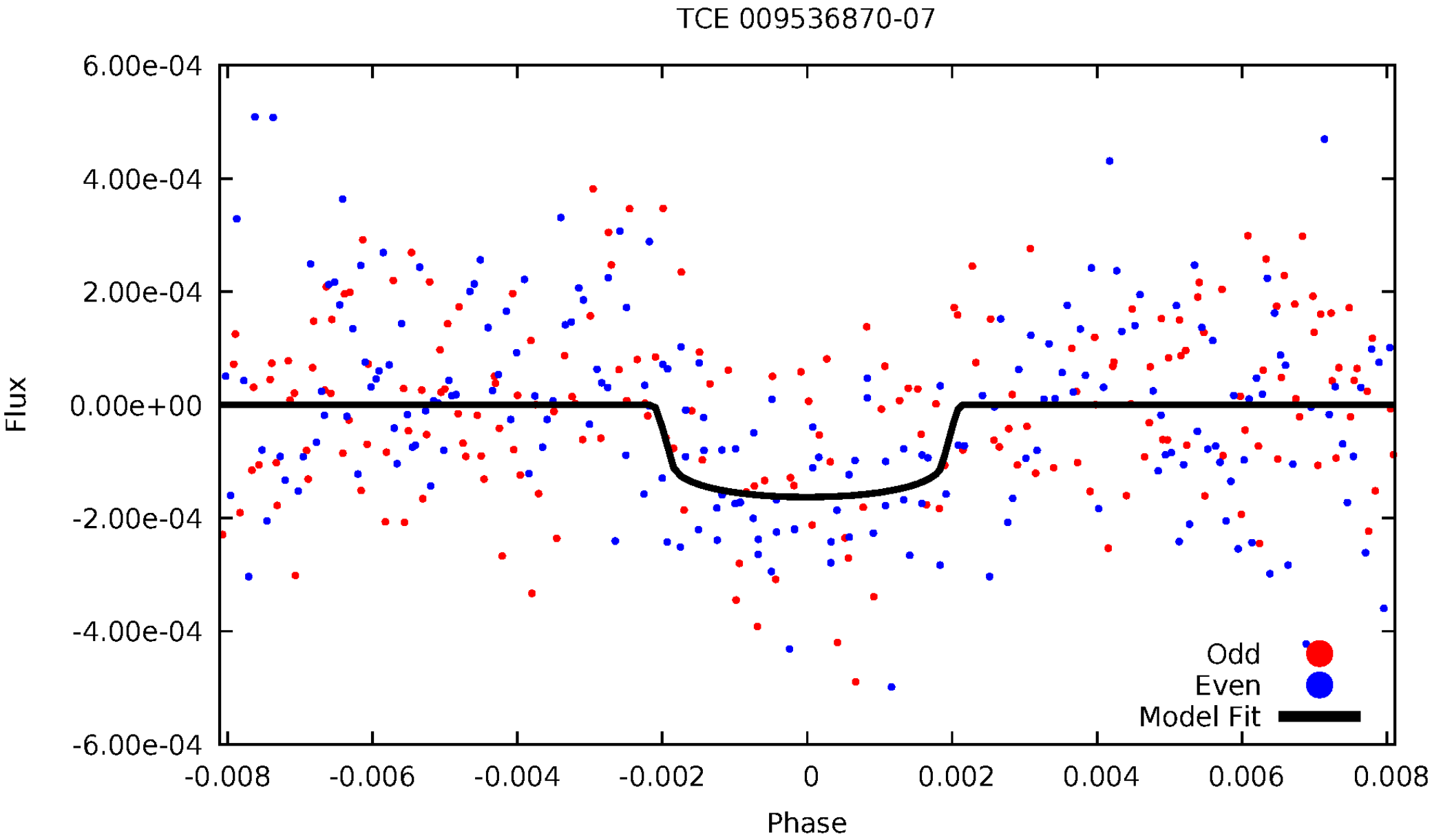
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

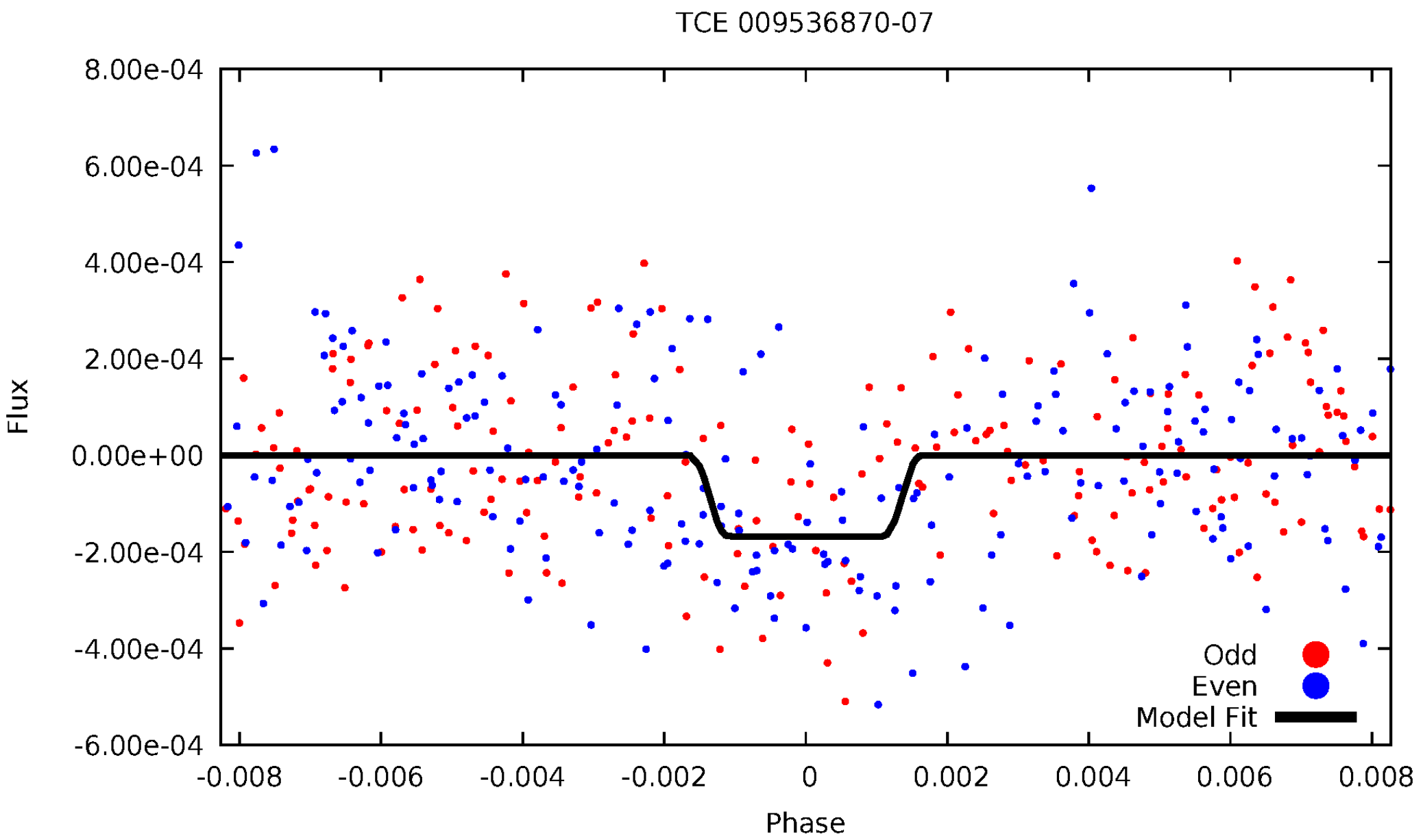
TCE 009536870-07, PDC Light Curves



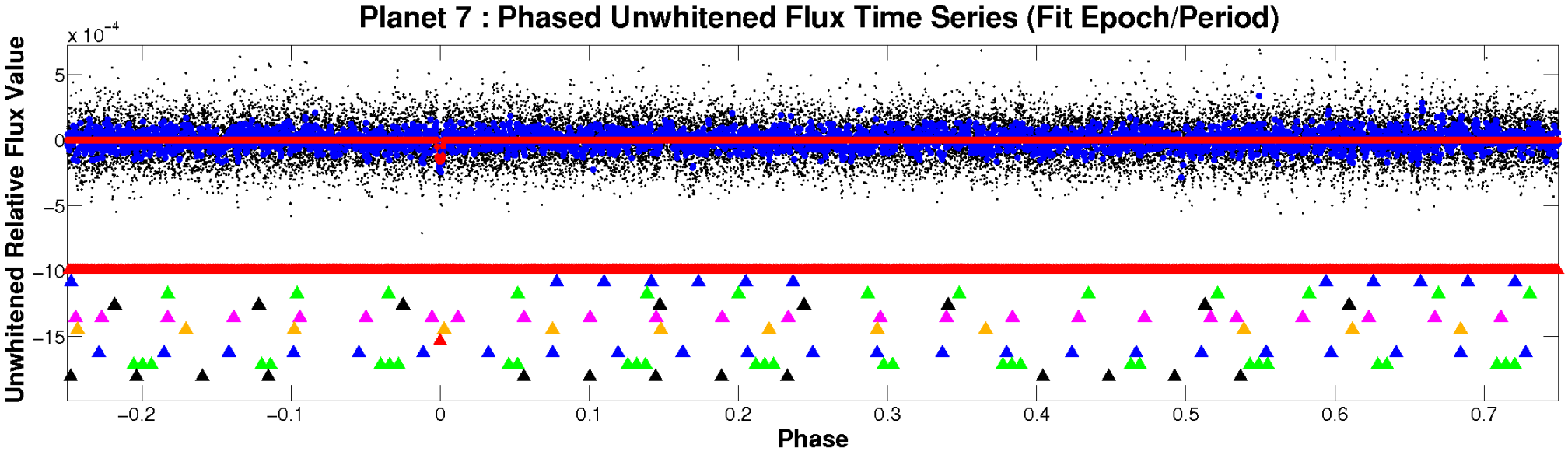

TCE 009536870-07
P = 40.705 days
P = 81.409 days
P = 162.818 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

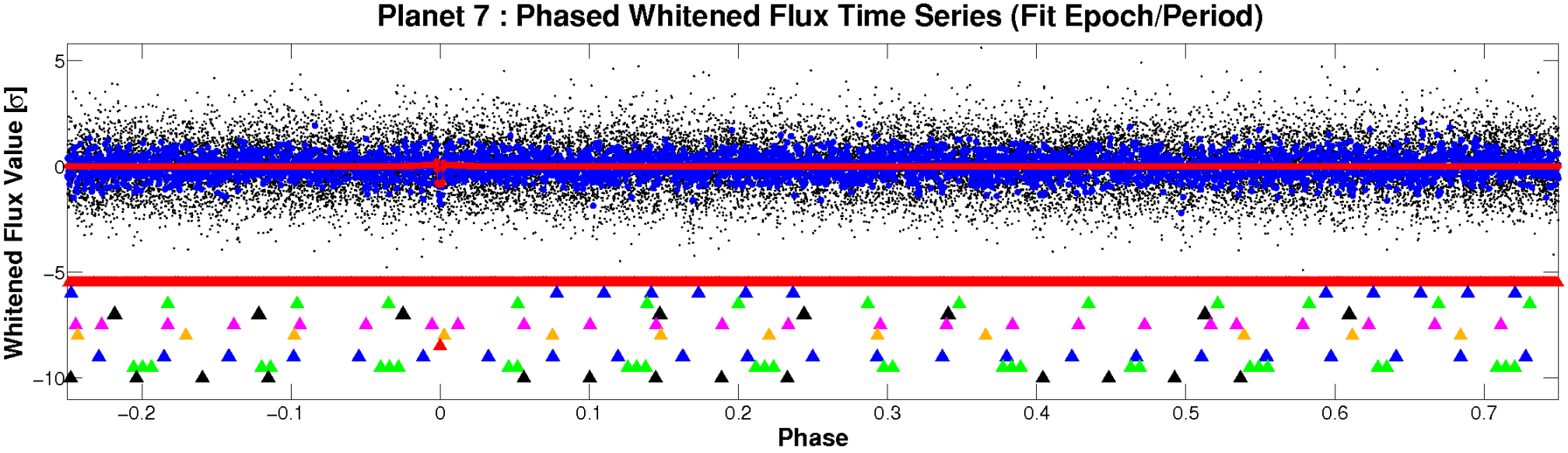
DV Odd/Even


TCE 009536870-07
6.00e-04
4.00e-04
2.00e-04
0.00e+00
-2.00e-04
-4.00e-04
-6.00e-04
Flux
-0.008
-0.006
-0.004
-0.002
0
0.002
0.004
0.006
0.008
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-07
8.00e-04
6.00e-04
4.00e-04
2.00e-04
0.00e+00
-2.00e-04
-4.00e-04
-6.00e-04
Flux
-0.008
-0.006
-0.004
-0.002
0
0.002
0.004
0.006
0.008
Phase
Odd
Even
Model Fit

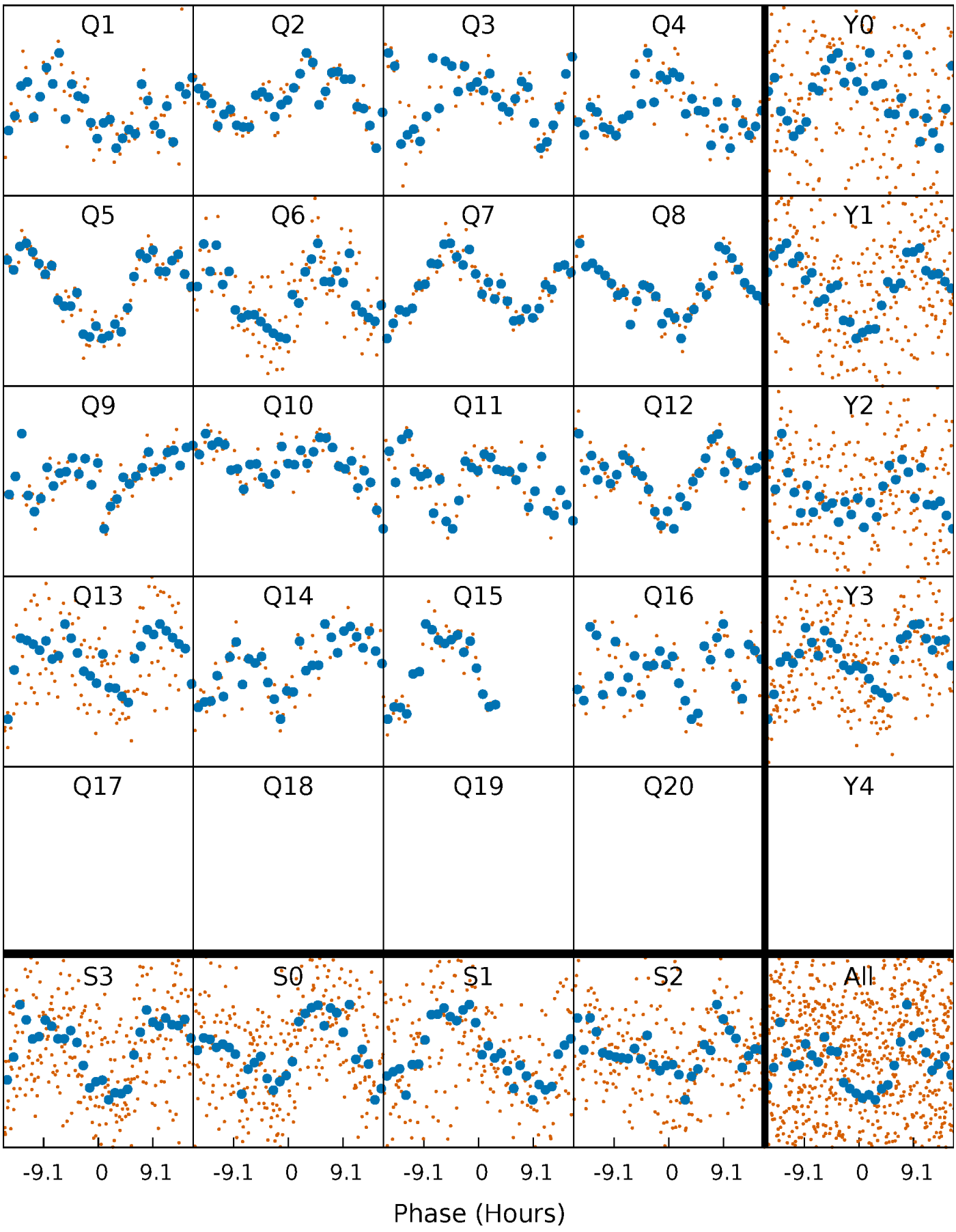
Non-Whitened Vs. Whitened Light Curve





PDC Quarter-Phased Transit Curves

TCE 009536870-07 P= 81.409206 Days T_0=132.728881 (BKJD)



DV Quarter-Phased Transit Curves

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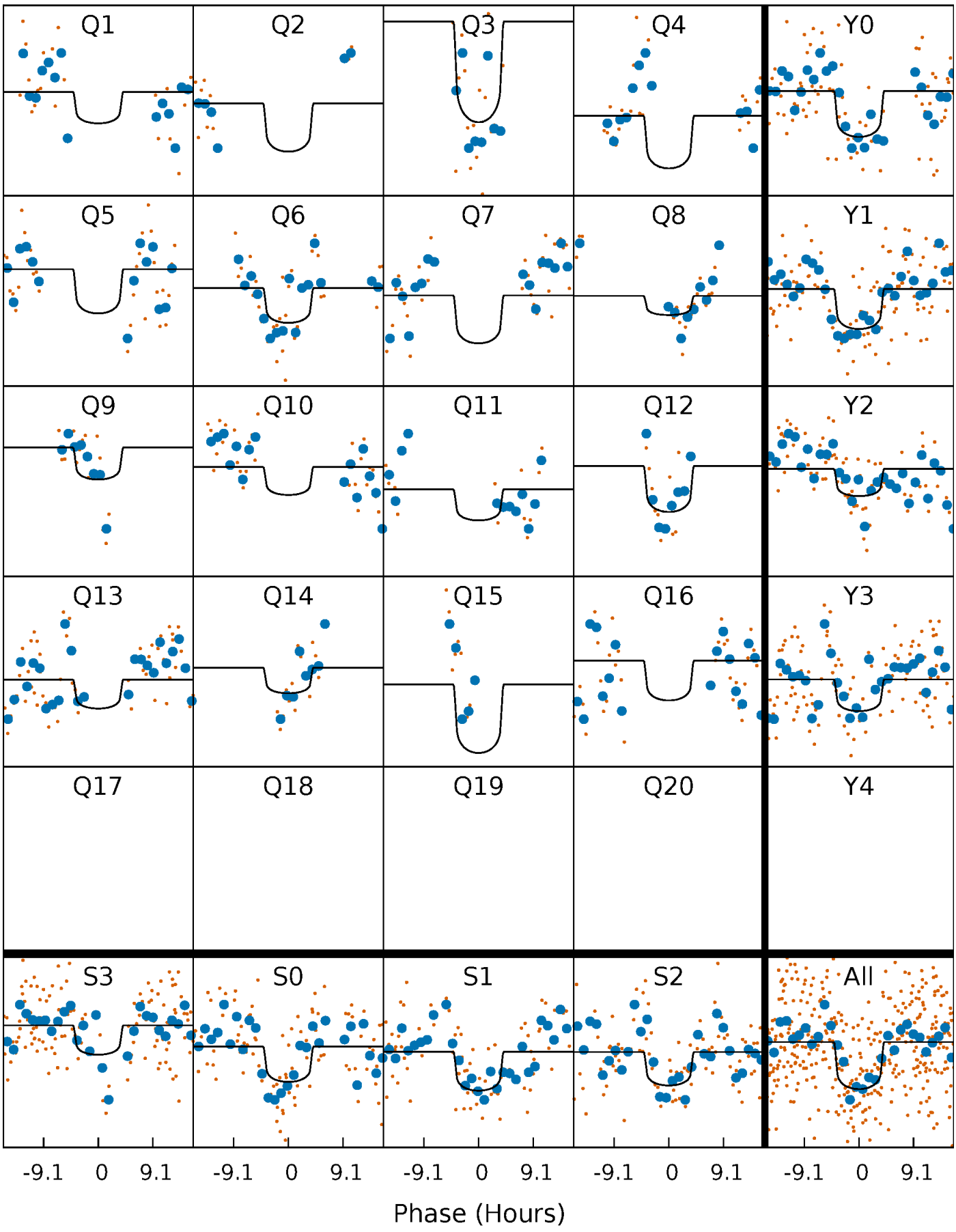
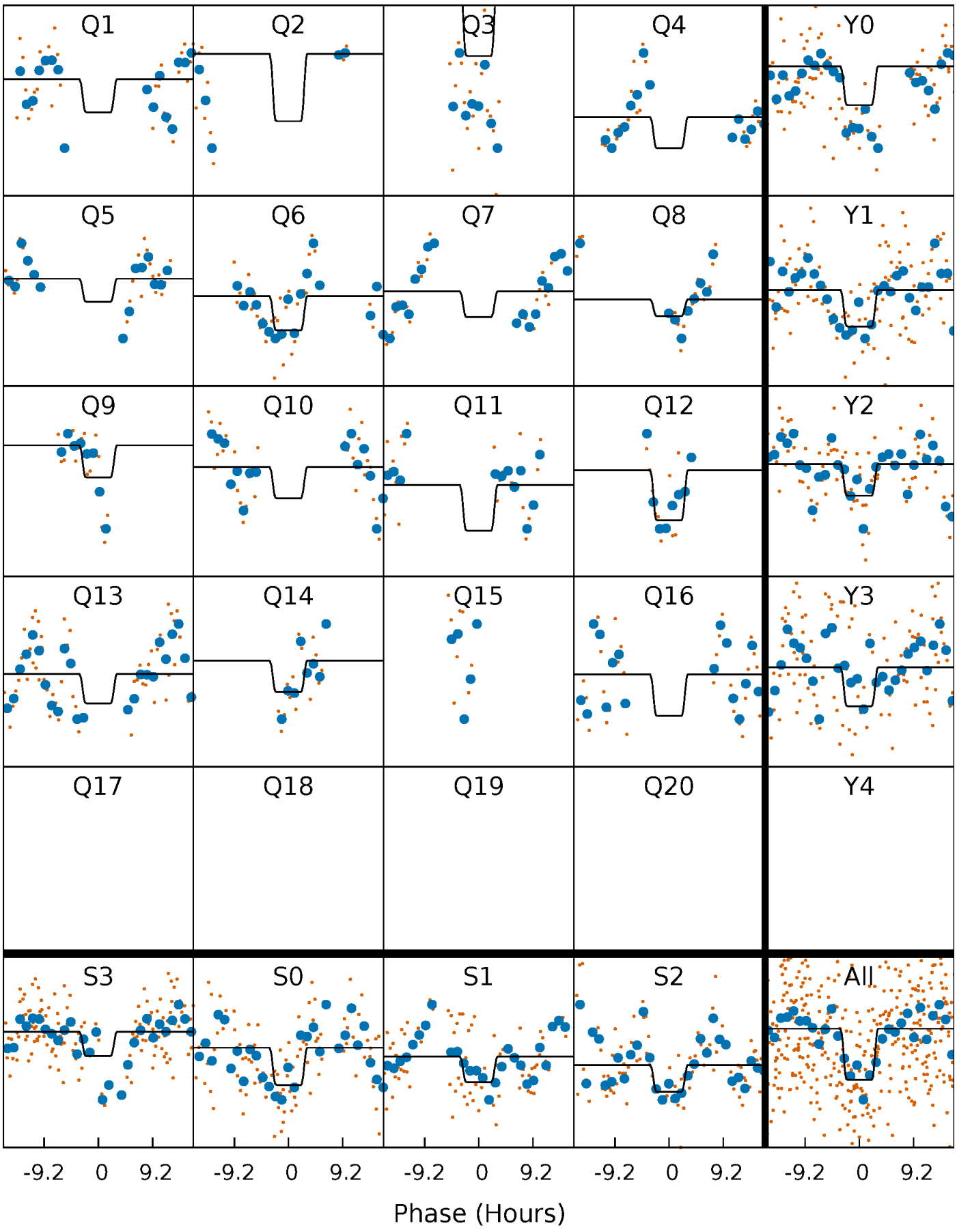


Alt. Detrend Quarter-Phased Transit Curves

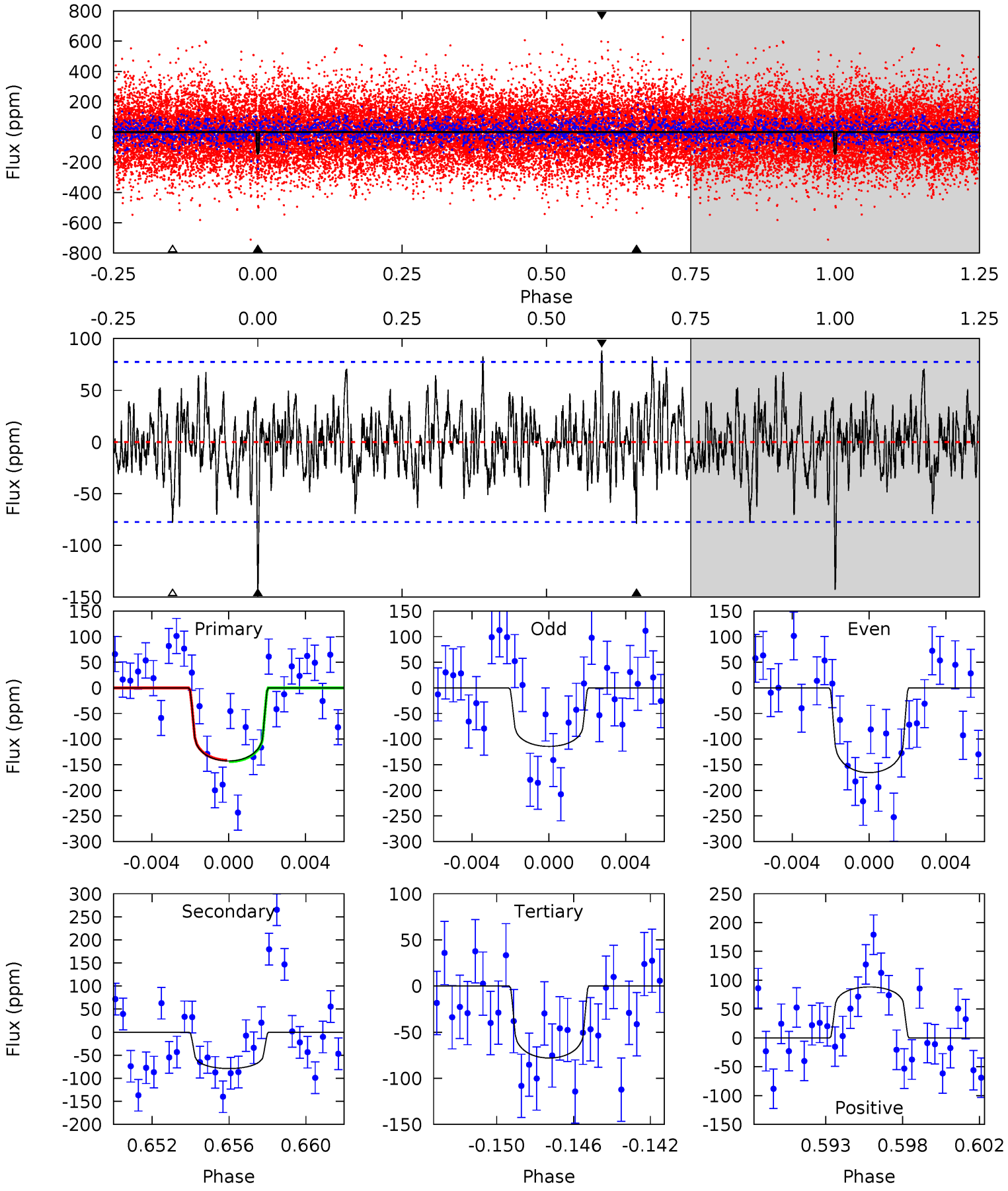
TCE 009536870-07 P= 81.406705 Days T_0=132.760278 (BKJD)



DV Model-Shift Uniqueness Test

009536870-07, P = 81.409206 Days, E = 51.319675 Days

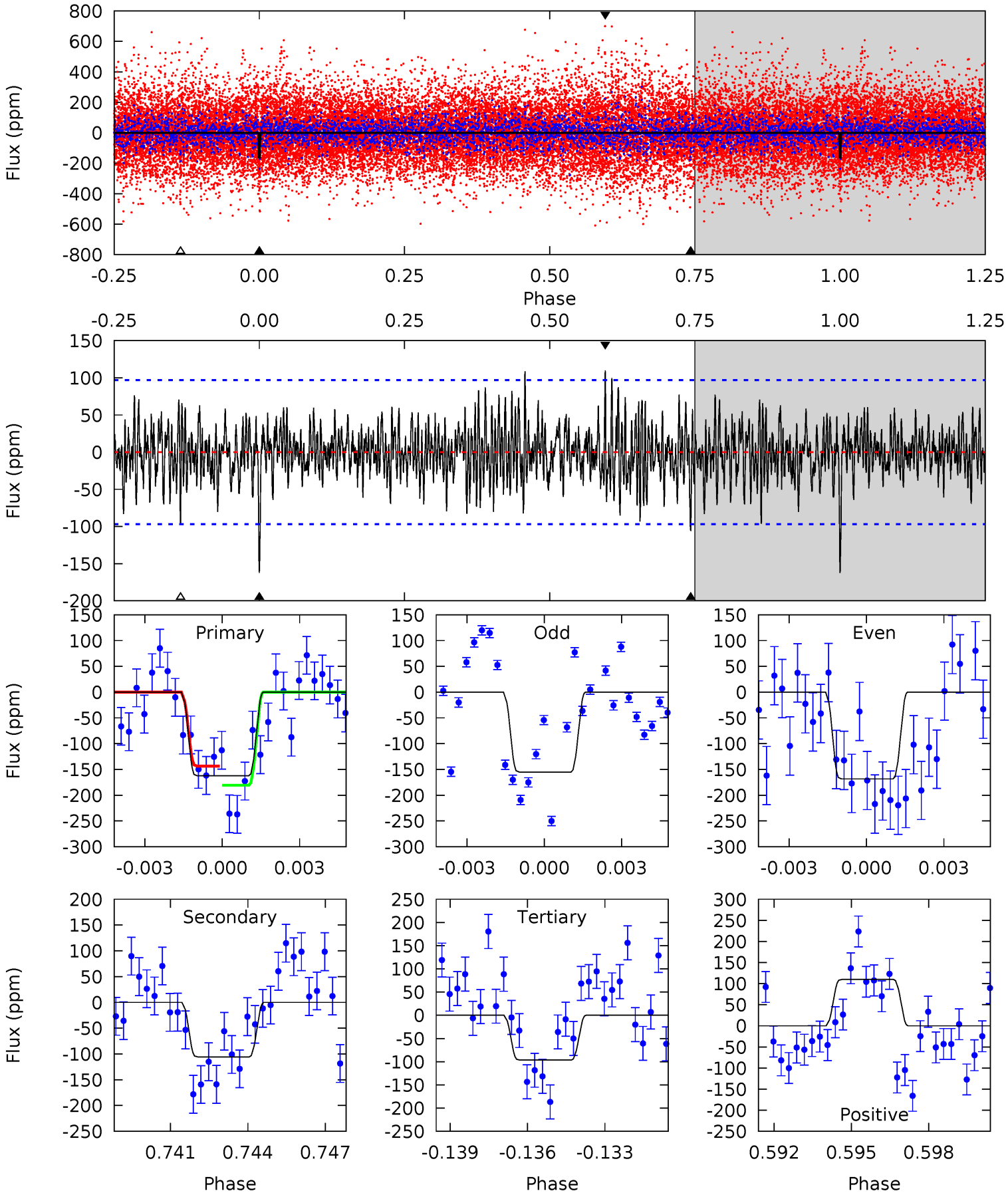
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.58	5.30	5.24	5.93	5.19	2.86	1.69	4.34	3.65	0.06	-0.63	1.71	0.74	0.38	0.09



Alt Model-Shift Uniqueness Test

009536870-07, P = 81.406705 Days, E = 51.353573 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.81	5.73	5.23	5.96	5.25	2.96	1.64	3.58	2.85	0.50	-0.23	0.36	0.66	0.40	1.00



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-07 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-79±15	$2.41^{+1.35}_{-1.18}$	864^{+42}_{-41}	5698^{+2464}_{-990}	1307^{+3630}_{-803}
Alt.	-106±18	$2.56^{+1.19}_{-1.10}$	867^{+42}_{-45}	5924^{+2305}_{-915}	1519^{+3254}_{-816}

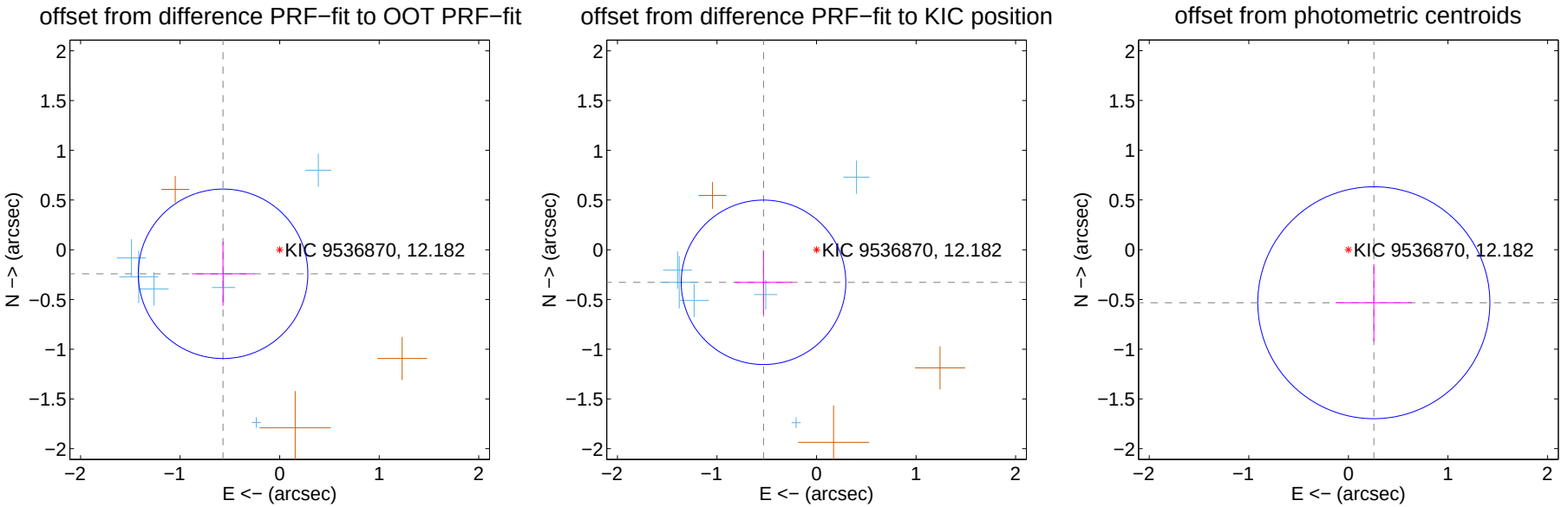
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

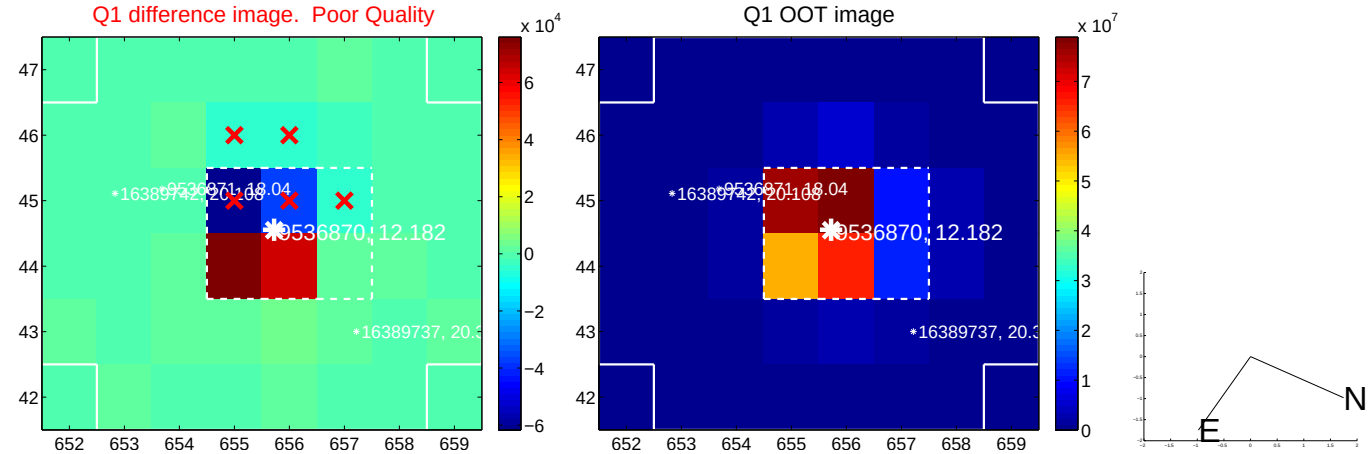
Supplemental centroid analysis for 009536870-07. Kepler magnitude: 12.18. Transit SNR 7.80
There are 7 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

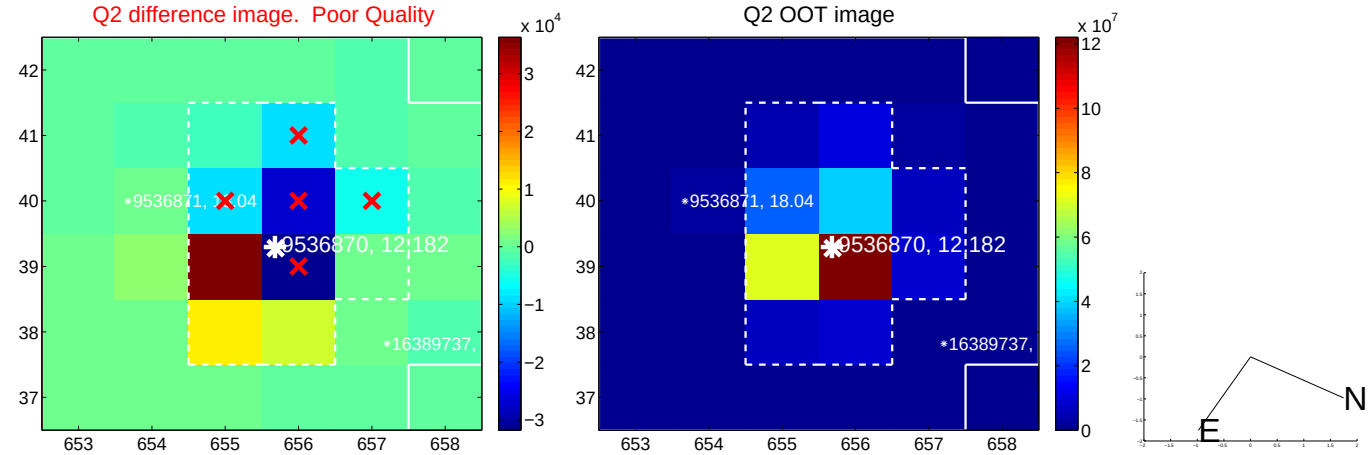
	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.618 ± 0.284	2.18	0.569 ± 0.312	-0.242 ± 0.321
PRF-fit source offset from KIC position	0.625 ± 0.276	2.27	0.533 ± 0.289	-0.327 ± 0.323
photometric centroid source offset	0.59 ± 0.39	1.52	-0.26 ± 0.38	-0.53 ± 0.39

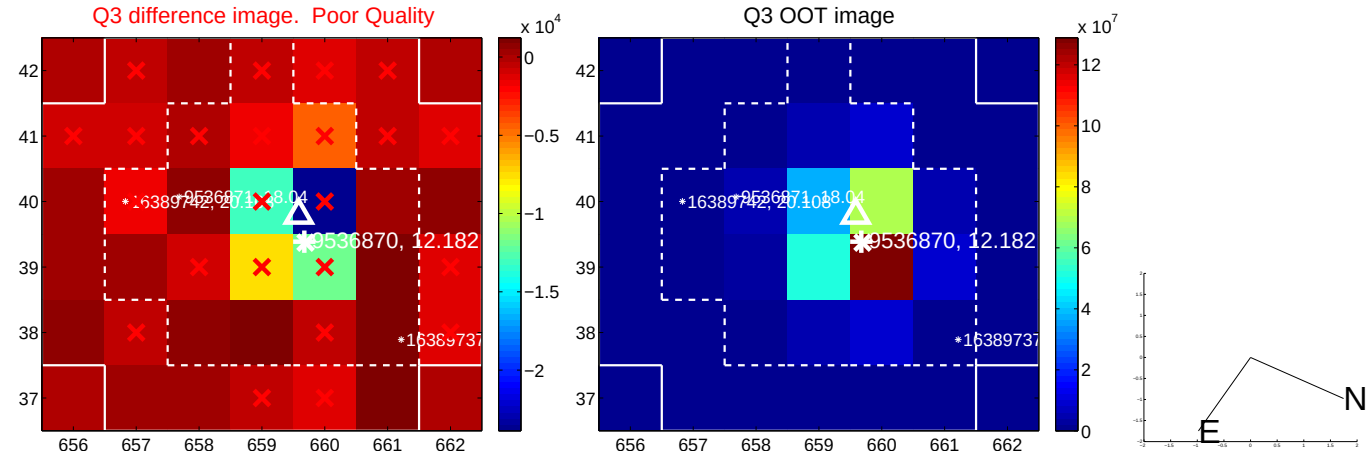


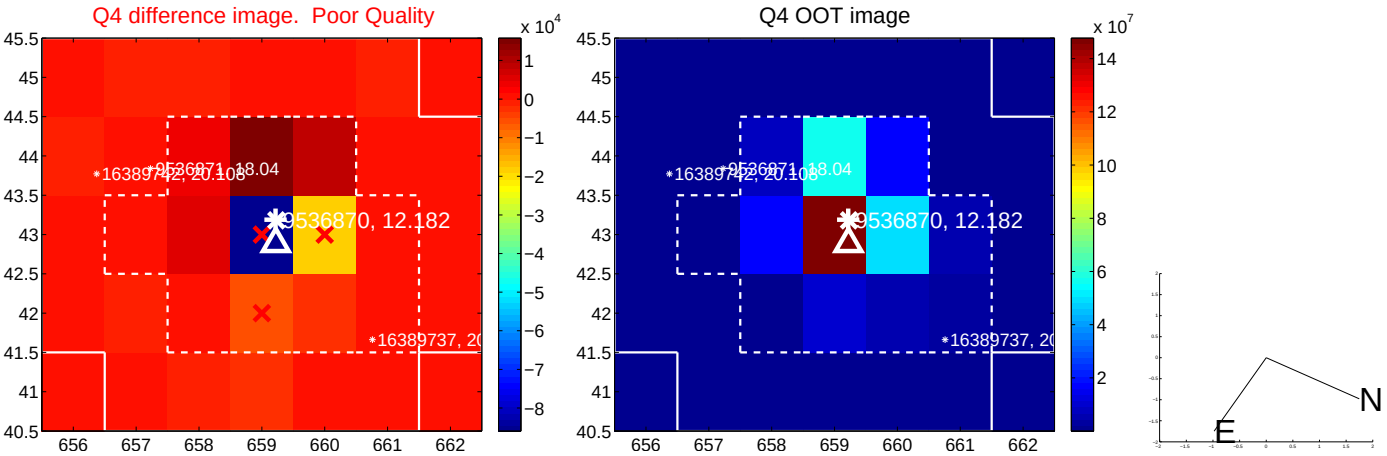
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.









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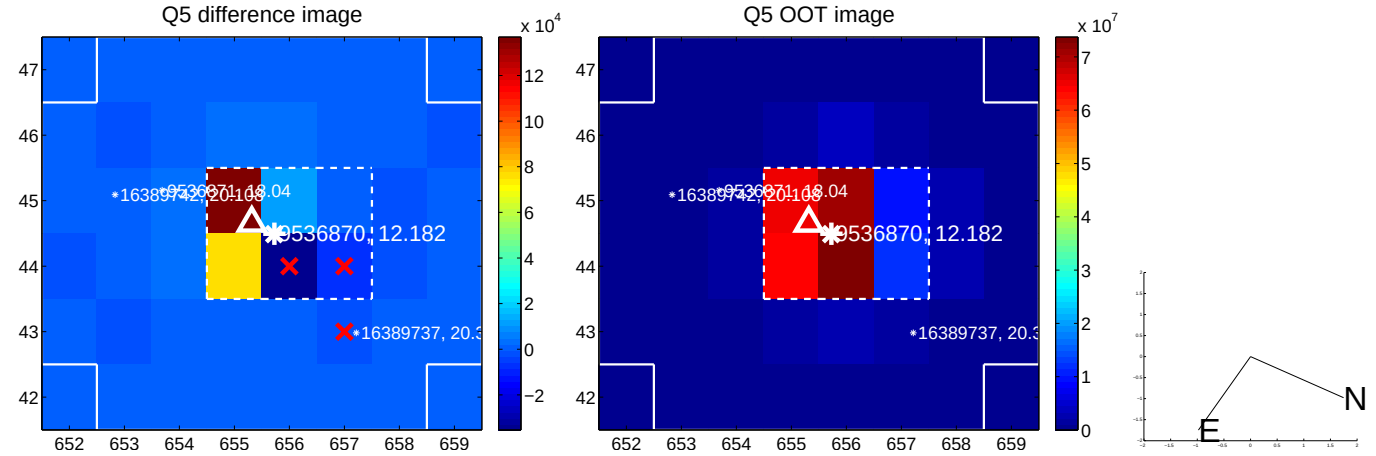

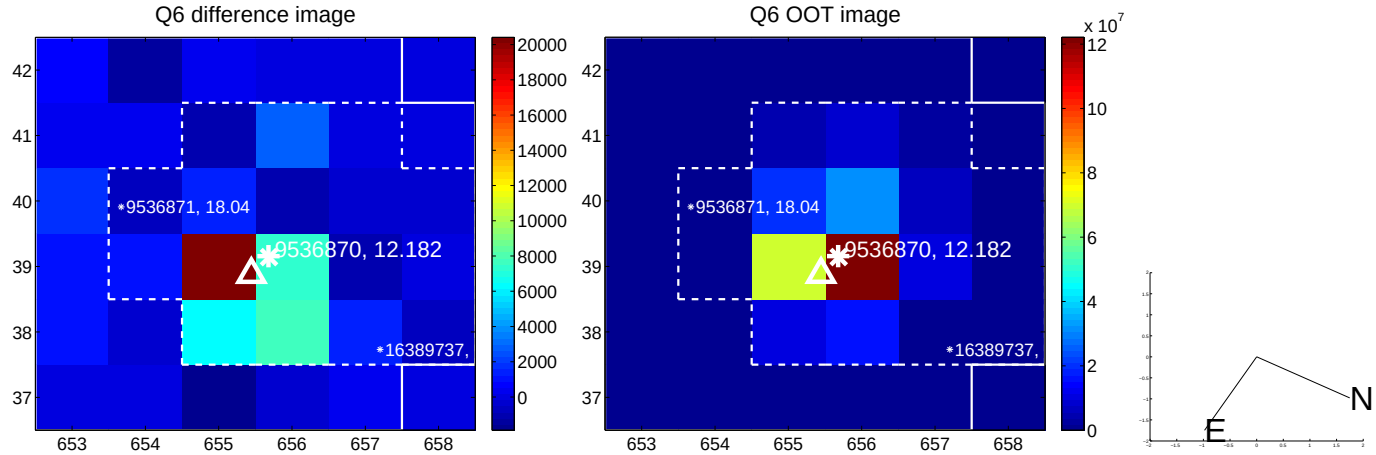

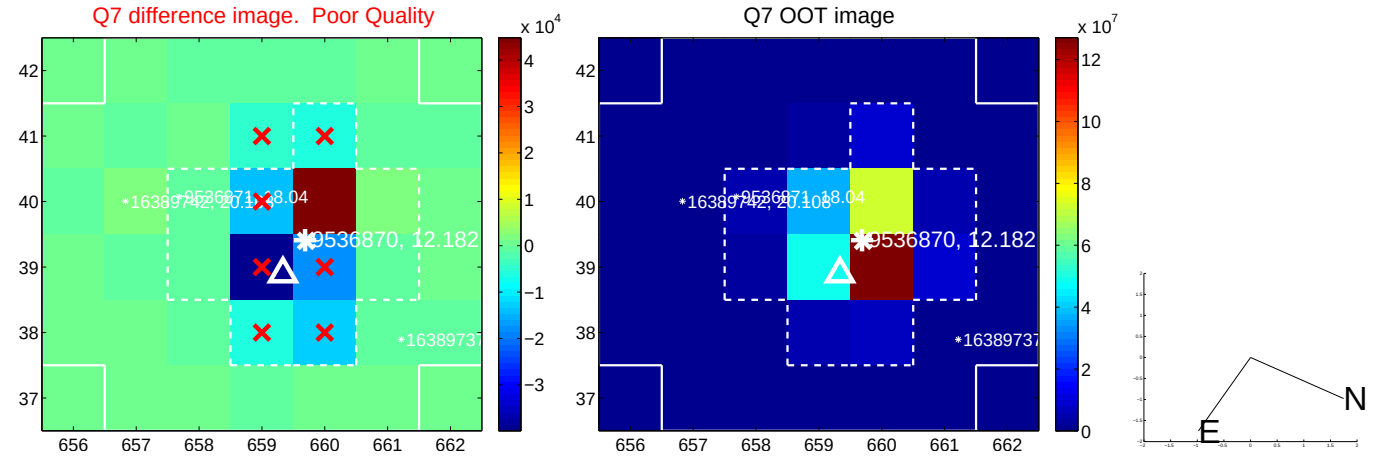

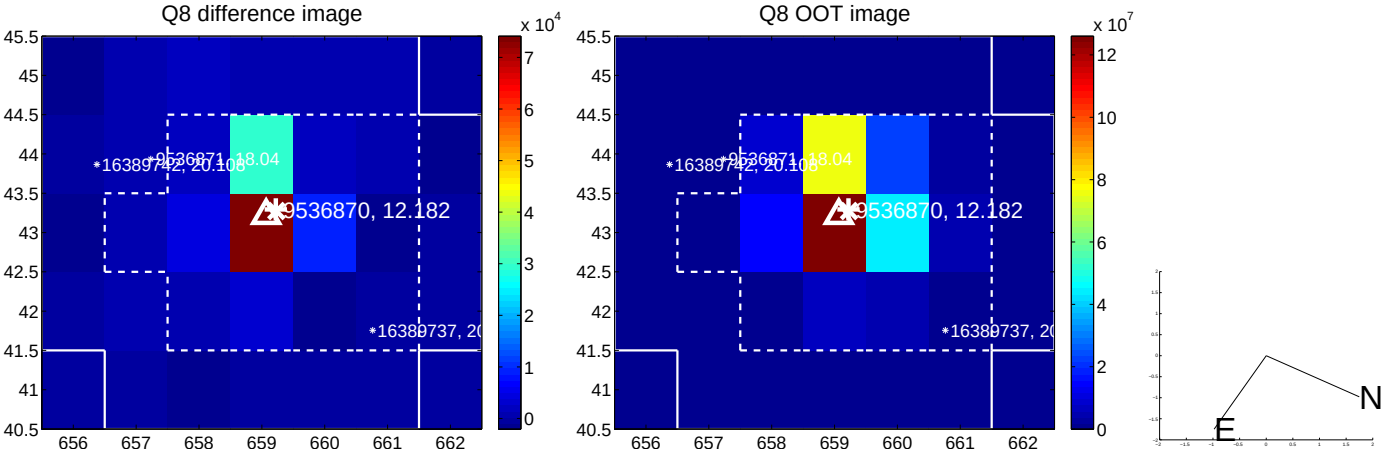

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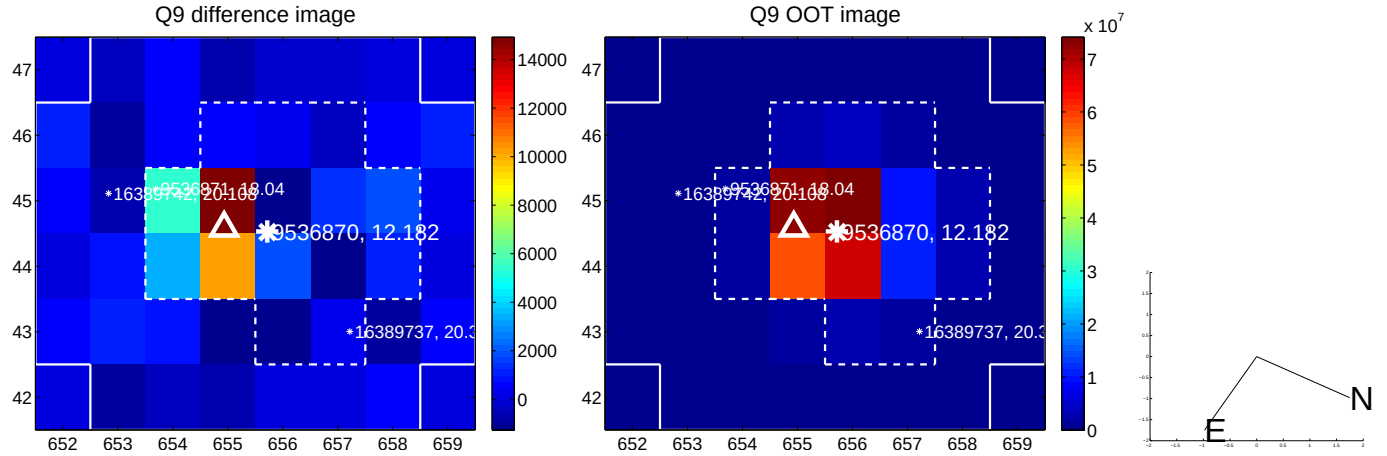

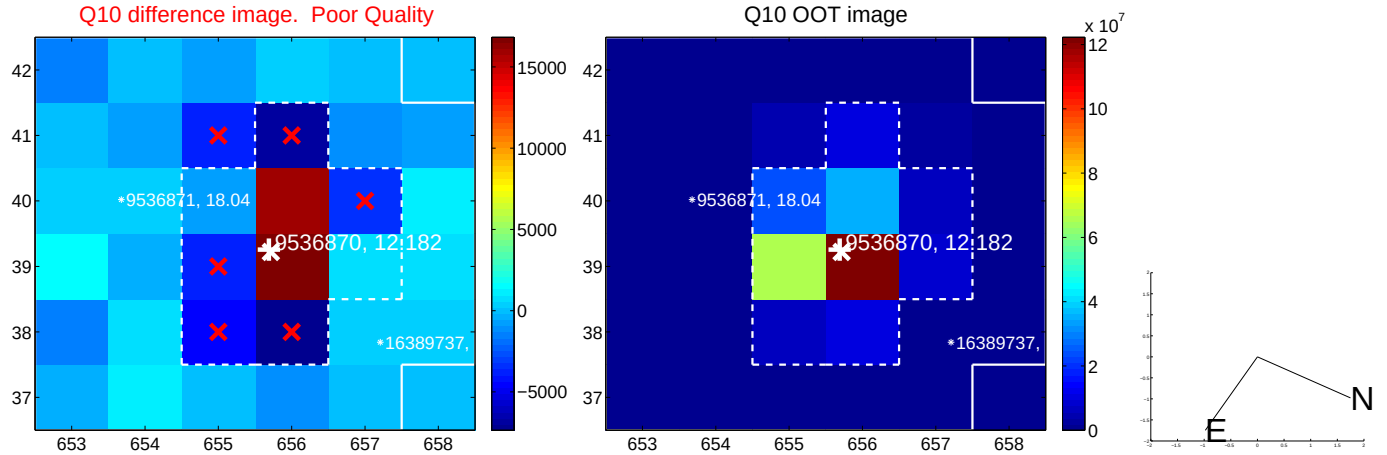

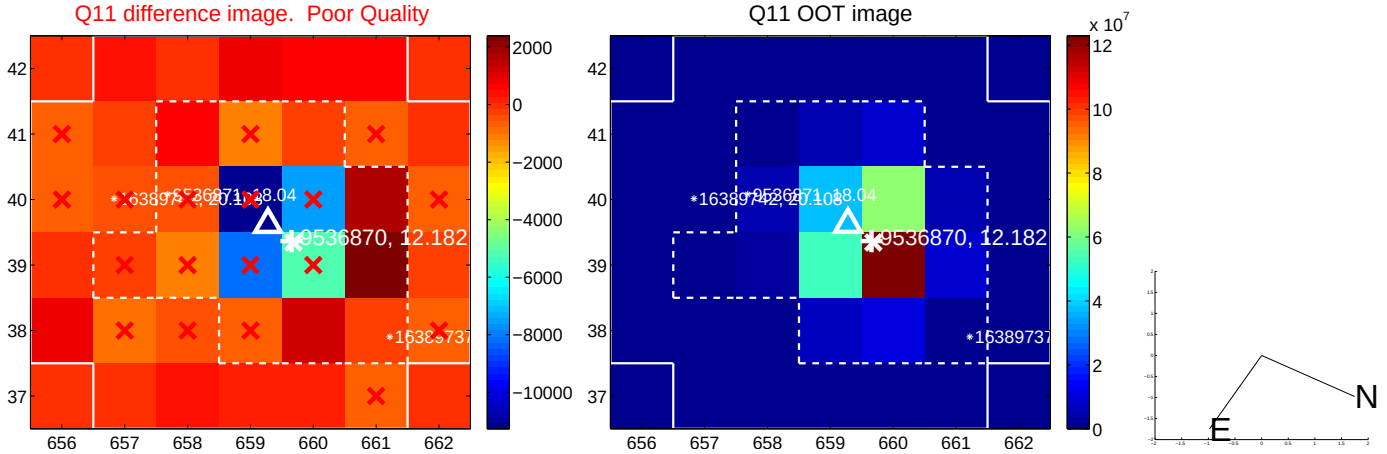

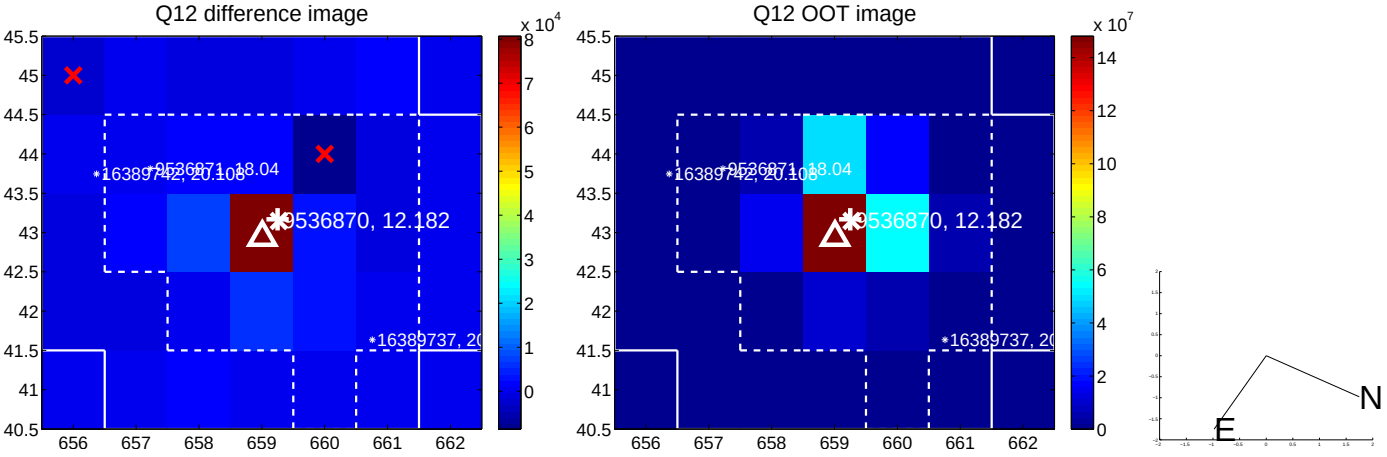

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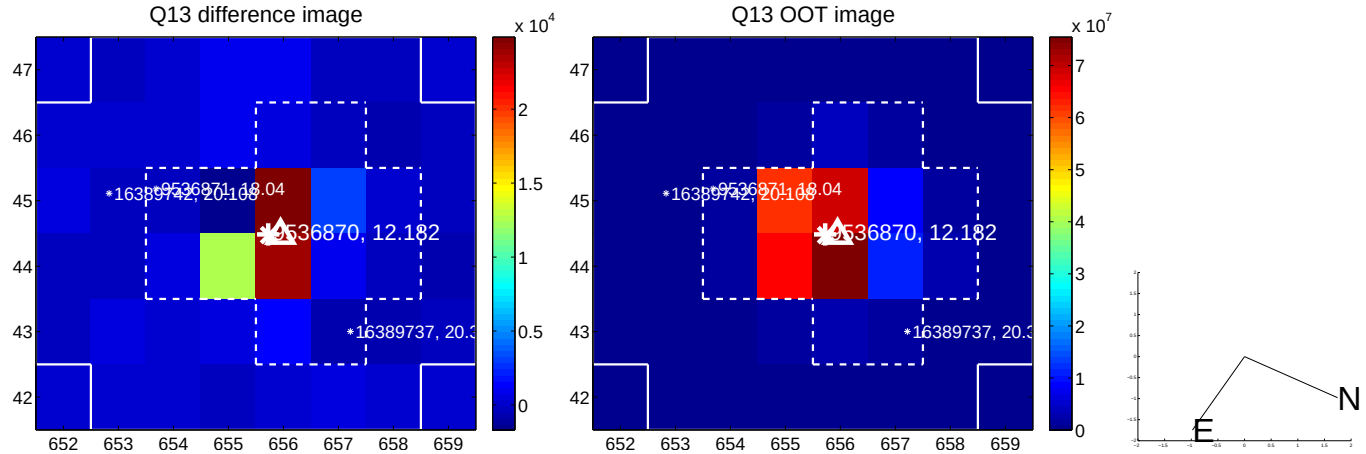
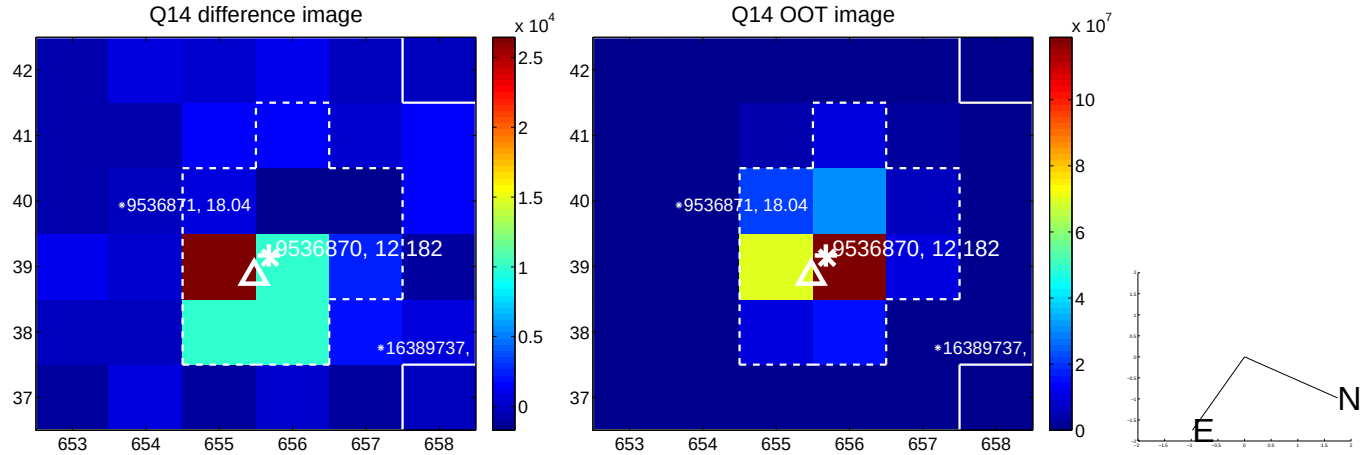
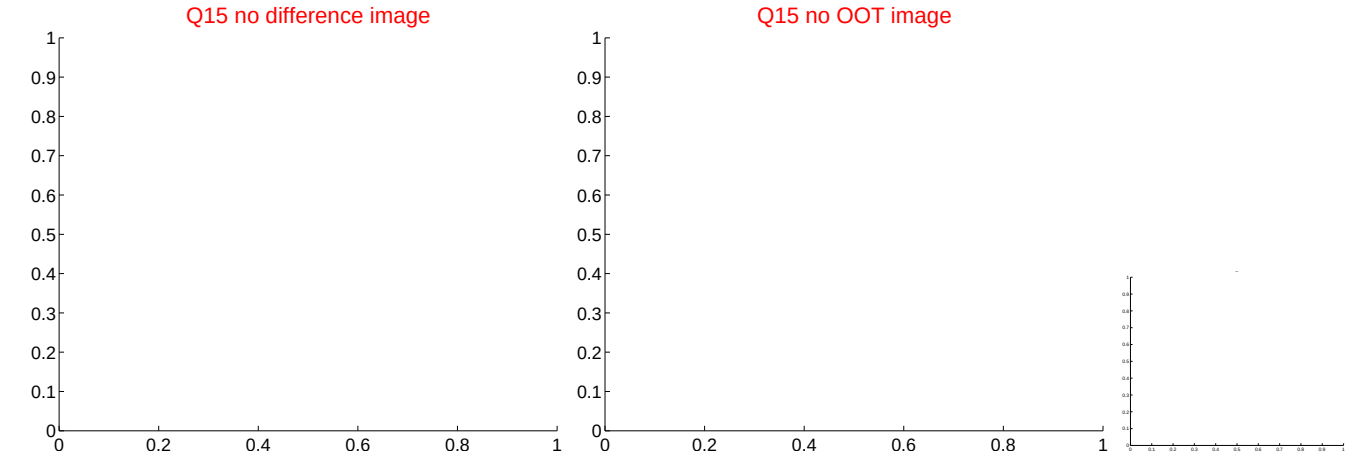
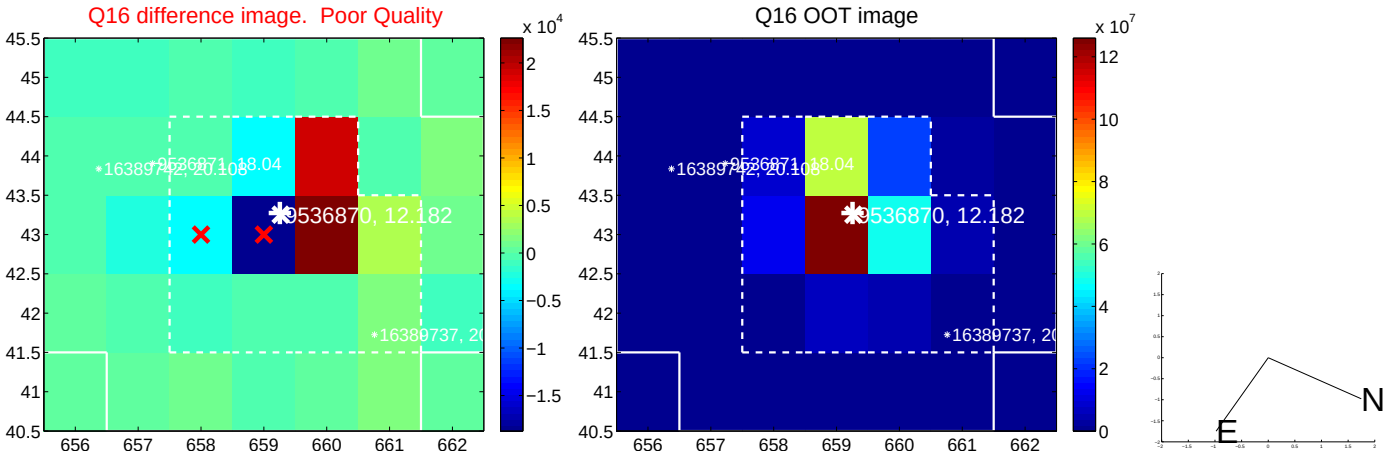
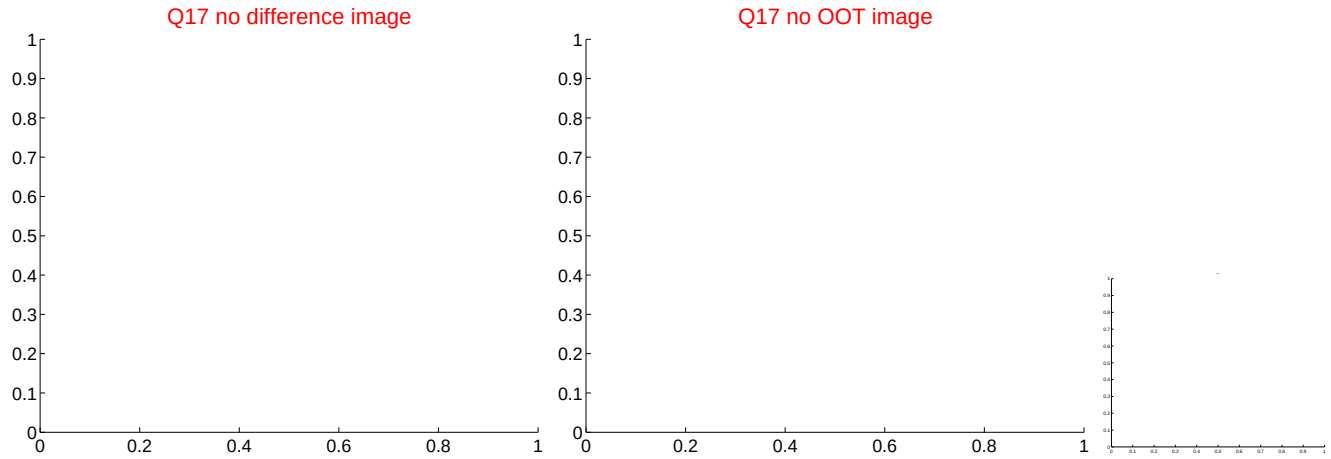


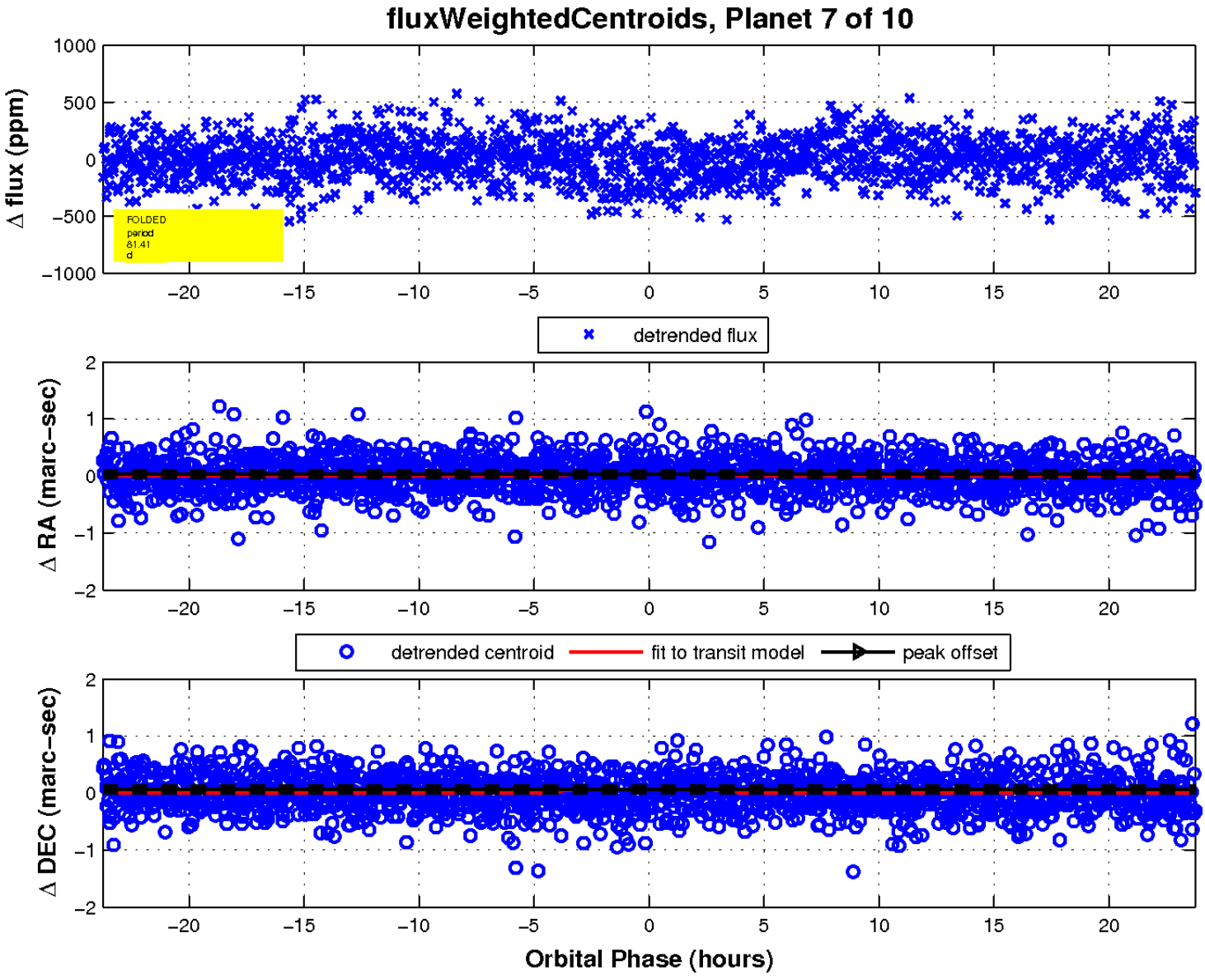




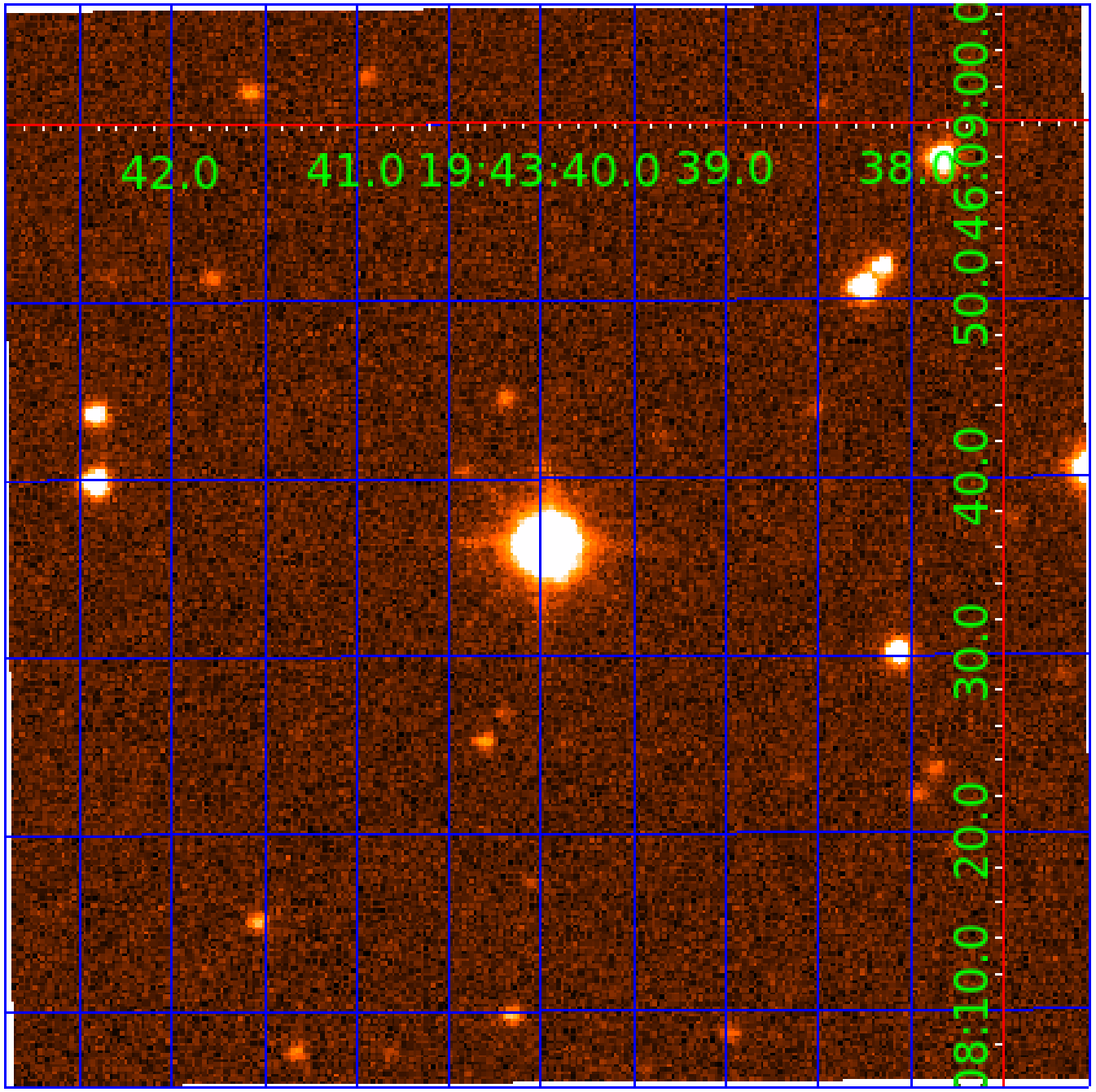


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

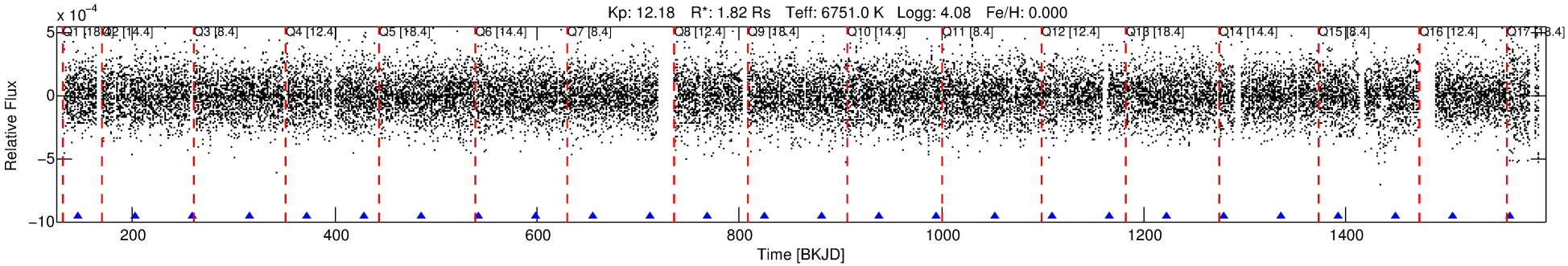
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

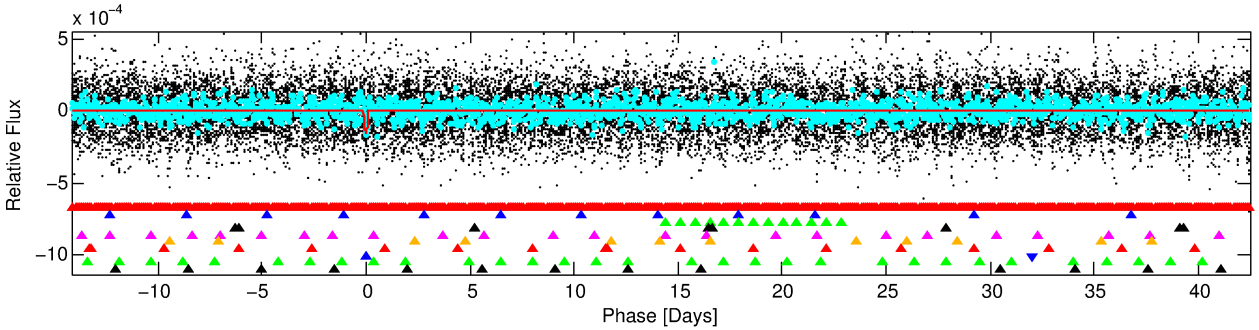
Ephemeris Match Information For 009536870-08

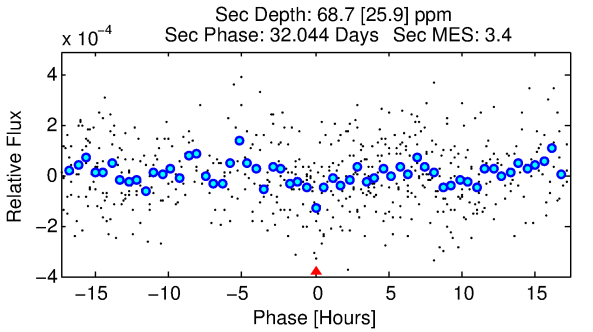
No Significant Match Found

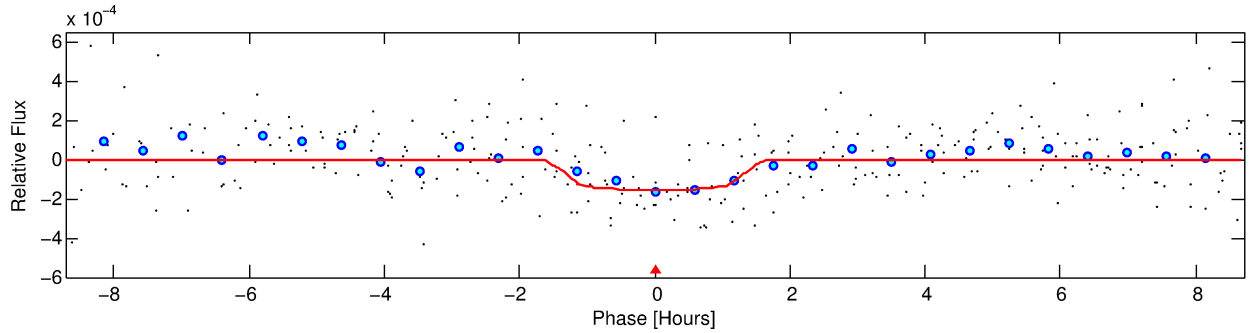
DV One-Page Summary

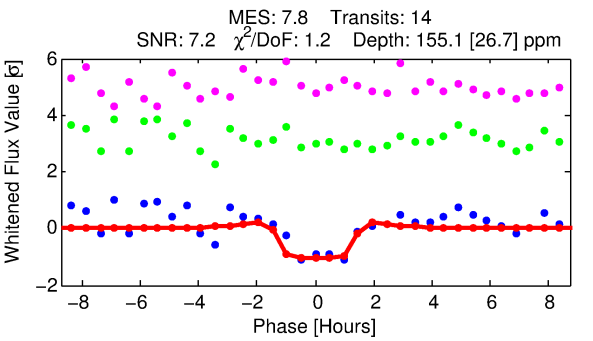
KIC: 9536870 Candidate: 8 of 10 Period: 56.630 d

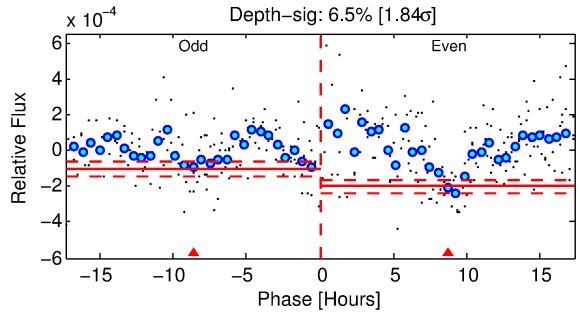


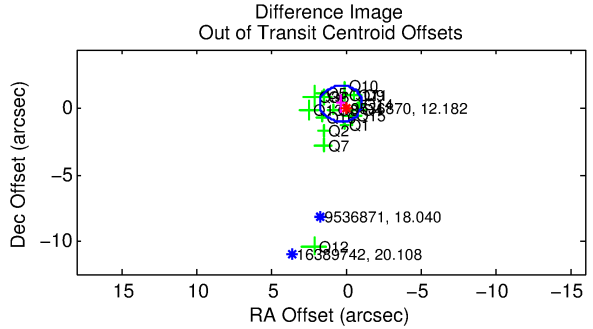












DV Fit Results:

Period = 56.63041 [0.00113] d
Epoch = 145.9990 [0.0193] BKJD
Rp/R* = 0.0132 [0.0104]
a/R* = 72.93 [338.47]
b = 0.89 [1.13]

Seff = 57.59 [14.78]
Teq = 702 [45] K
Rp = 2.61 [2.12] Re
a = 0.3264 [0.0527] AU

Ag = 590.65 [971.29] [0.61σ]
Teffp = 5354 [2177] K [2.14σ]

DV Diagnostic Results:

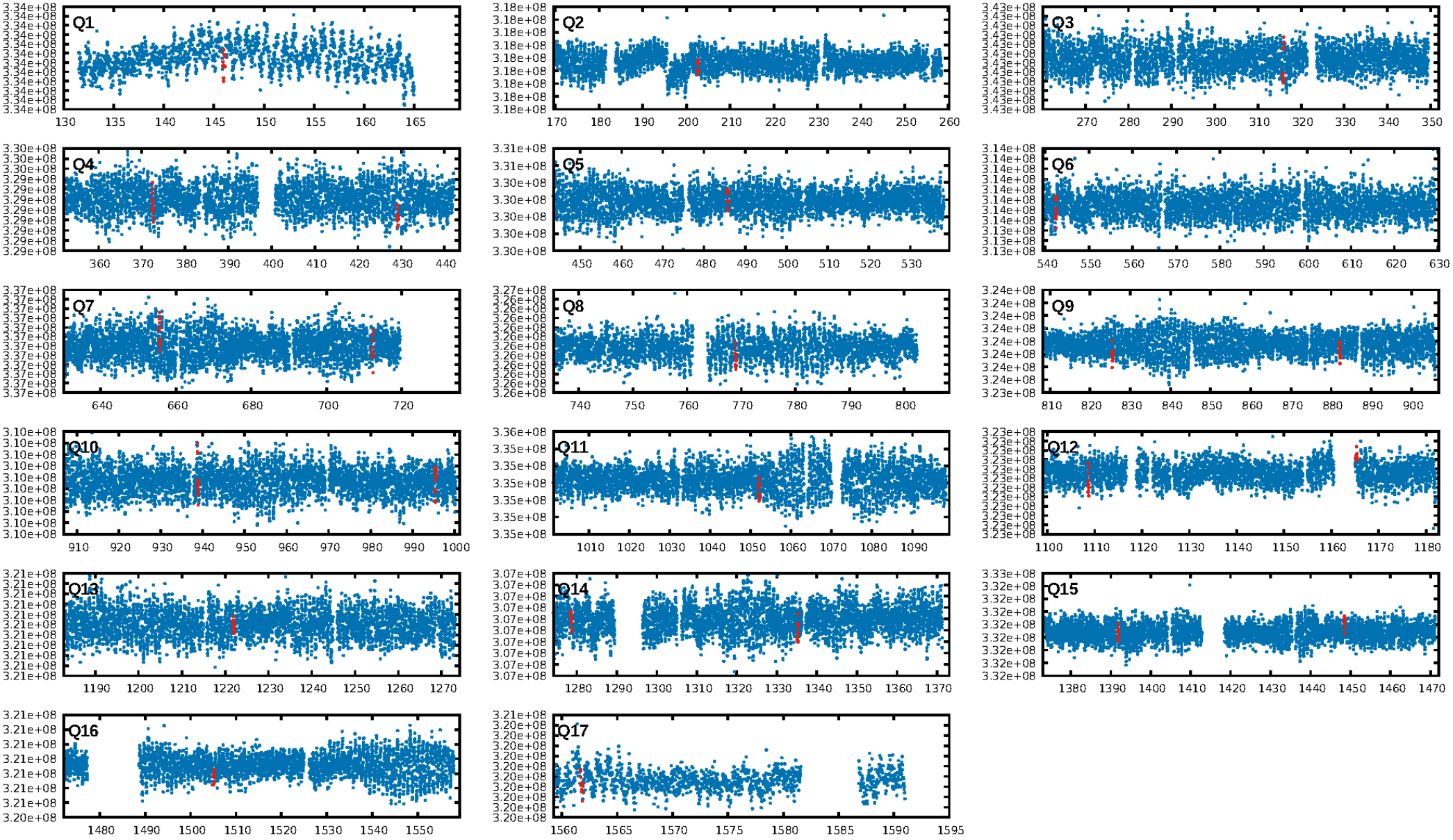
ShortPeriod−sig: 100.0% [65.19σ]
LongPeriod−sig: 100.0% [29.00σ]
ModelChiSquare2−sig: 1.8%
ModelChiSquareGof−sig: 99.6%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [14/14]
GhostDiagnostic−chr: 1.617

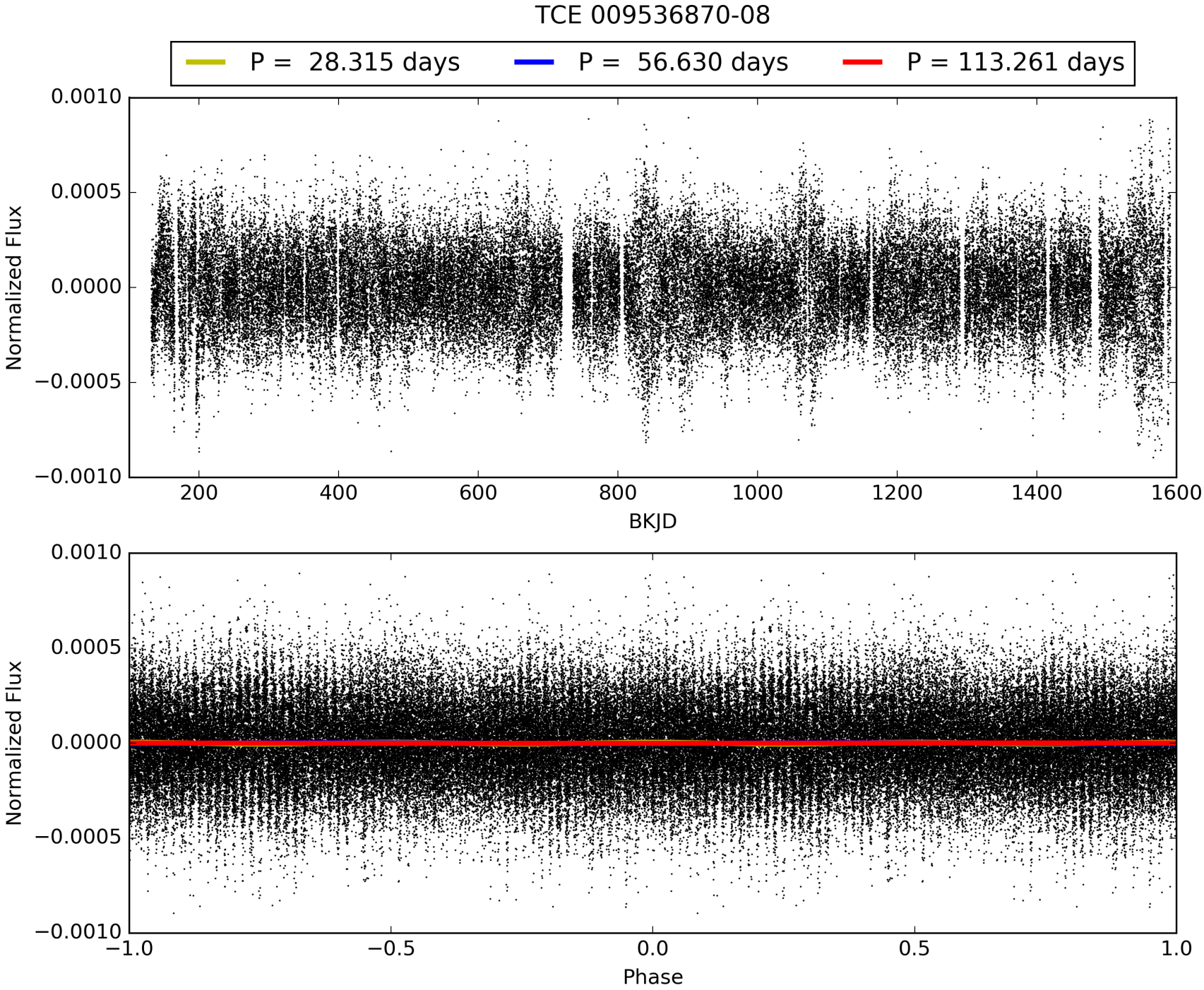
Centroid−sig: 40.1%
Centroid−so: 0.566 arcsec [1.00σ]
OotOffset−rm: 0.507 arcsec [1.10σ]
KicOffset−rm: 0.442 arcsec [0.92σ]
OotOffset−st: 4/4/4/5 [17]
KicOffset−st: 4/4/4/5 [17]
DiffImageQuality−fgm: 0.82 [14/17]
DiffImageOverlap−fno: 0.18 [3/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:43 Z

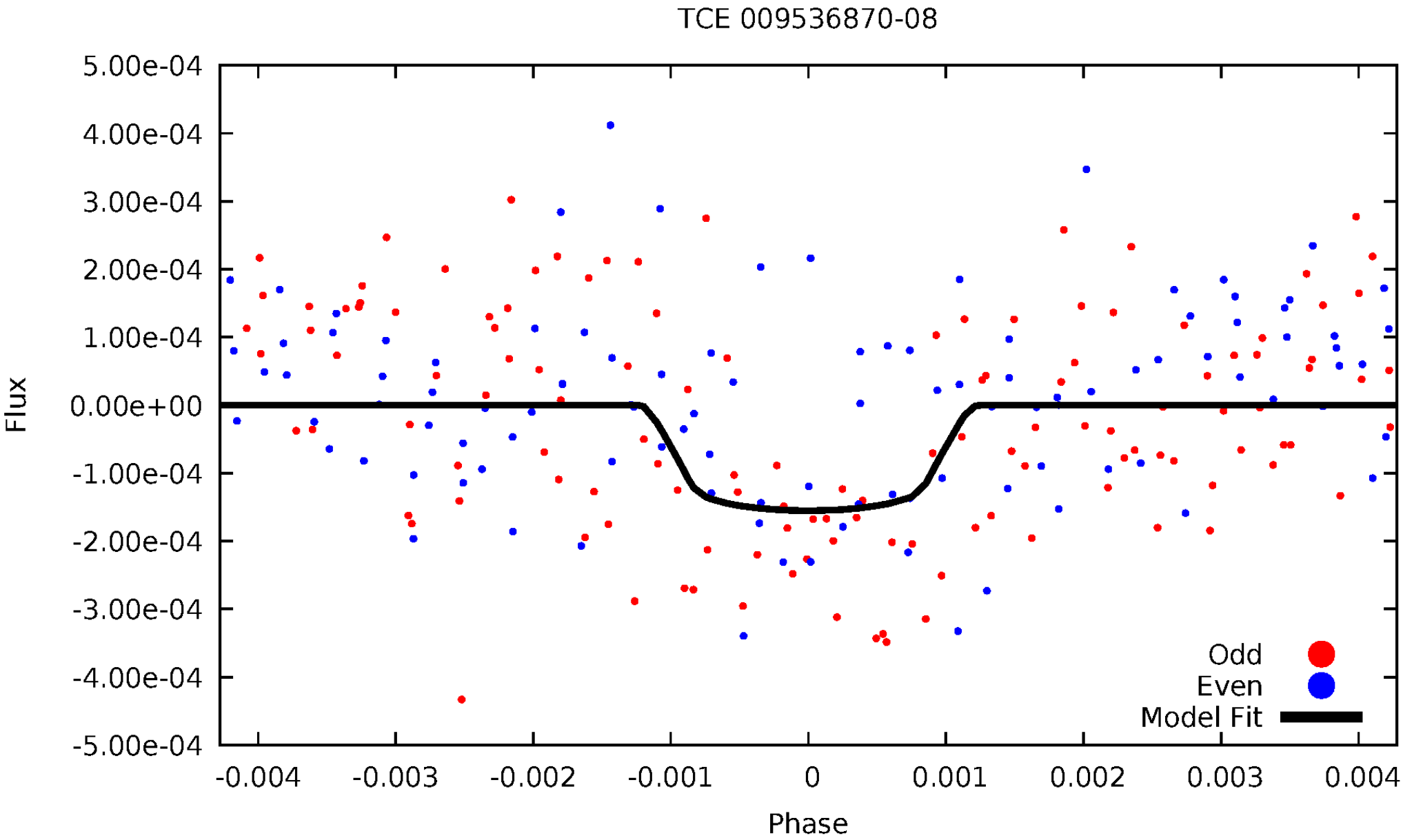
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

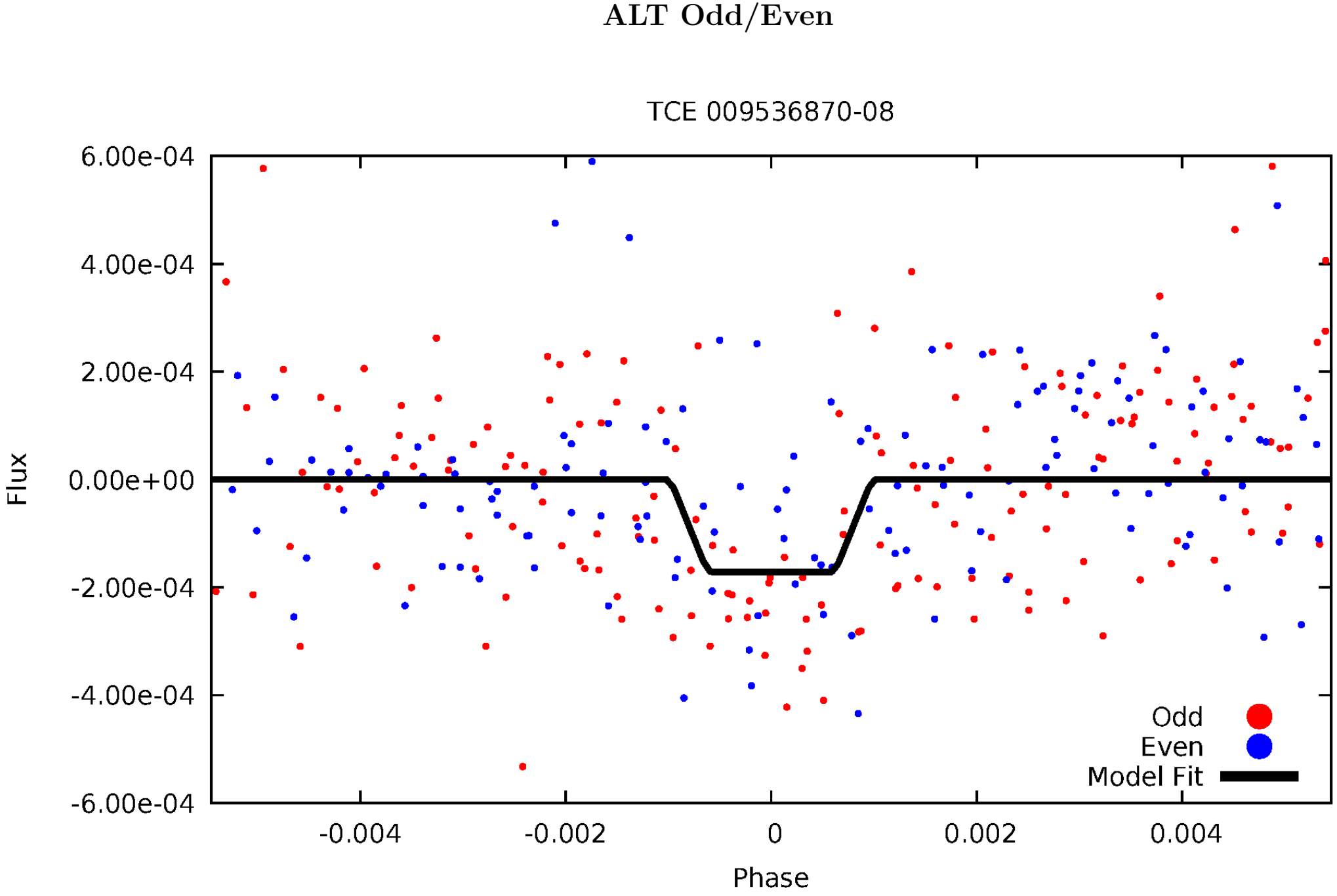
TCE 009536870-08, PDC Light Curves



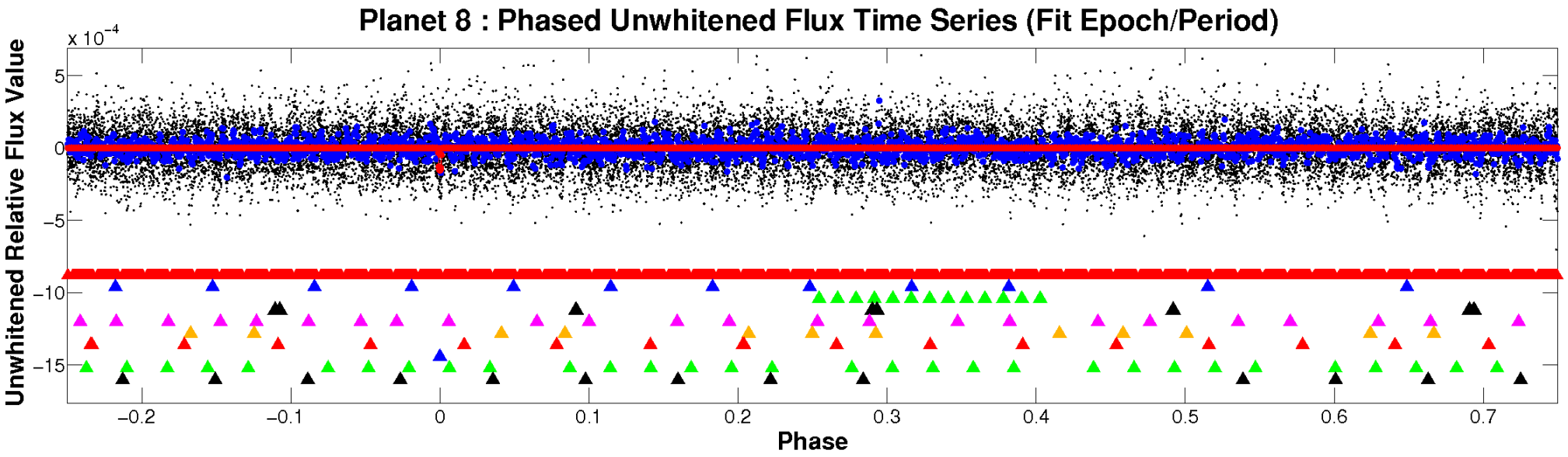

TCE 009536870-08
P = 28.315 days
P = 56.630 days
P = 113.261 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

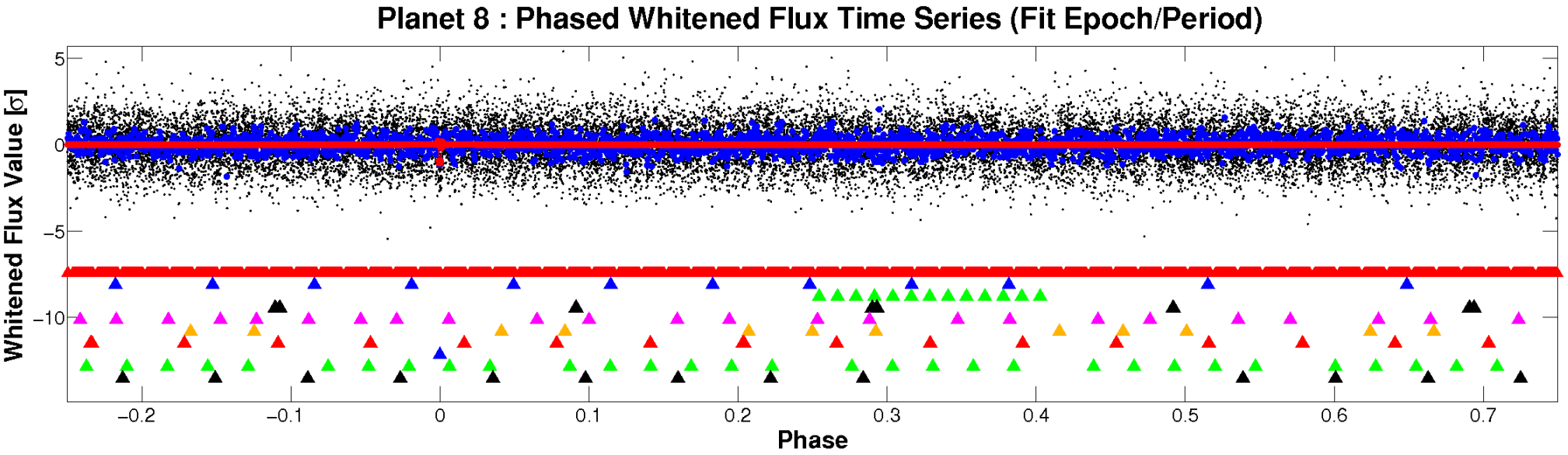
DV Odd/Even


TCE 009536870-08
5.00e-04
4.00e-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
Flux
-0.004
-0.003
-0.002
-0.001
0
0.001
0.002
0.003
0.004
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-08
6.00e-04
4.00e-04
2.00e-04
0.00e+00
-2.00e-04
-4.00e-04
-6.00e-04
Flux
-0.004
-0.002
0
0.002
0.004
Phase
Odd
Even
Model Fit

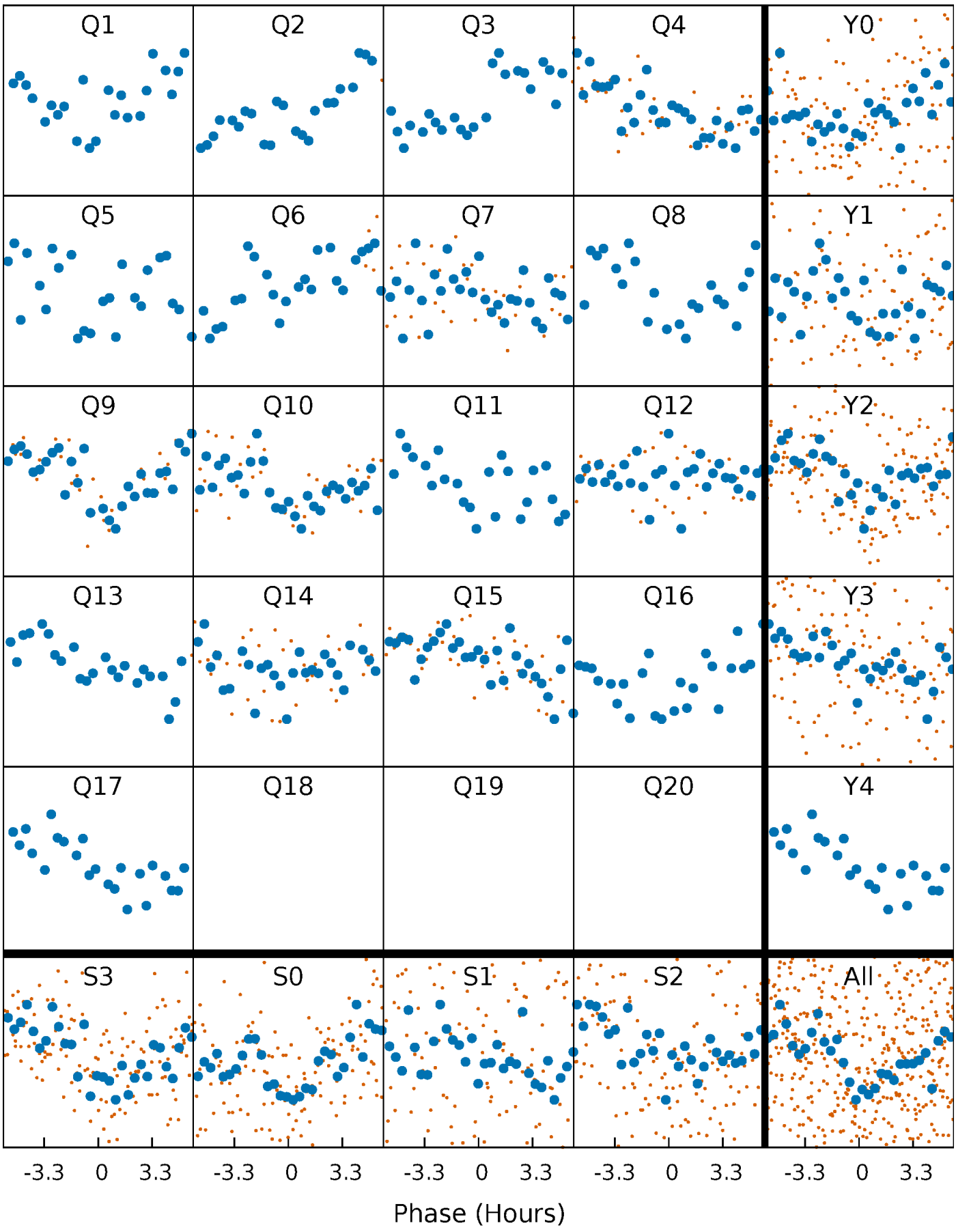
Non-Whitened Vs. Whitened Light Curve





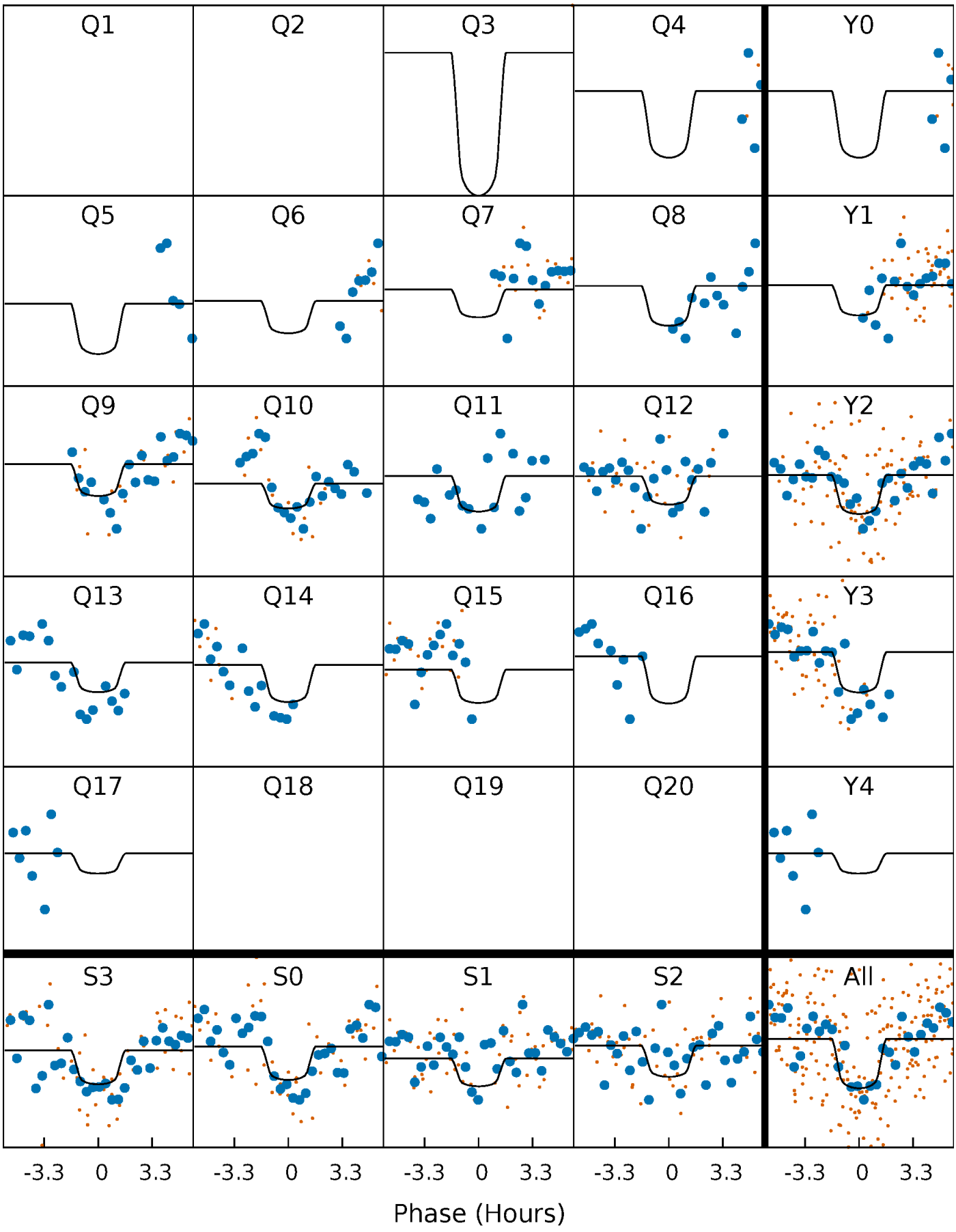
PDC Quarter-Phased Transit Curves

TCE 009536870-08 P= 56.630415 Days T_0=145.998989 (BKJD)



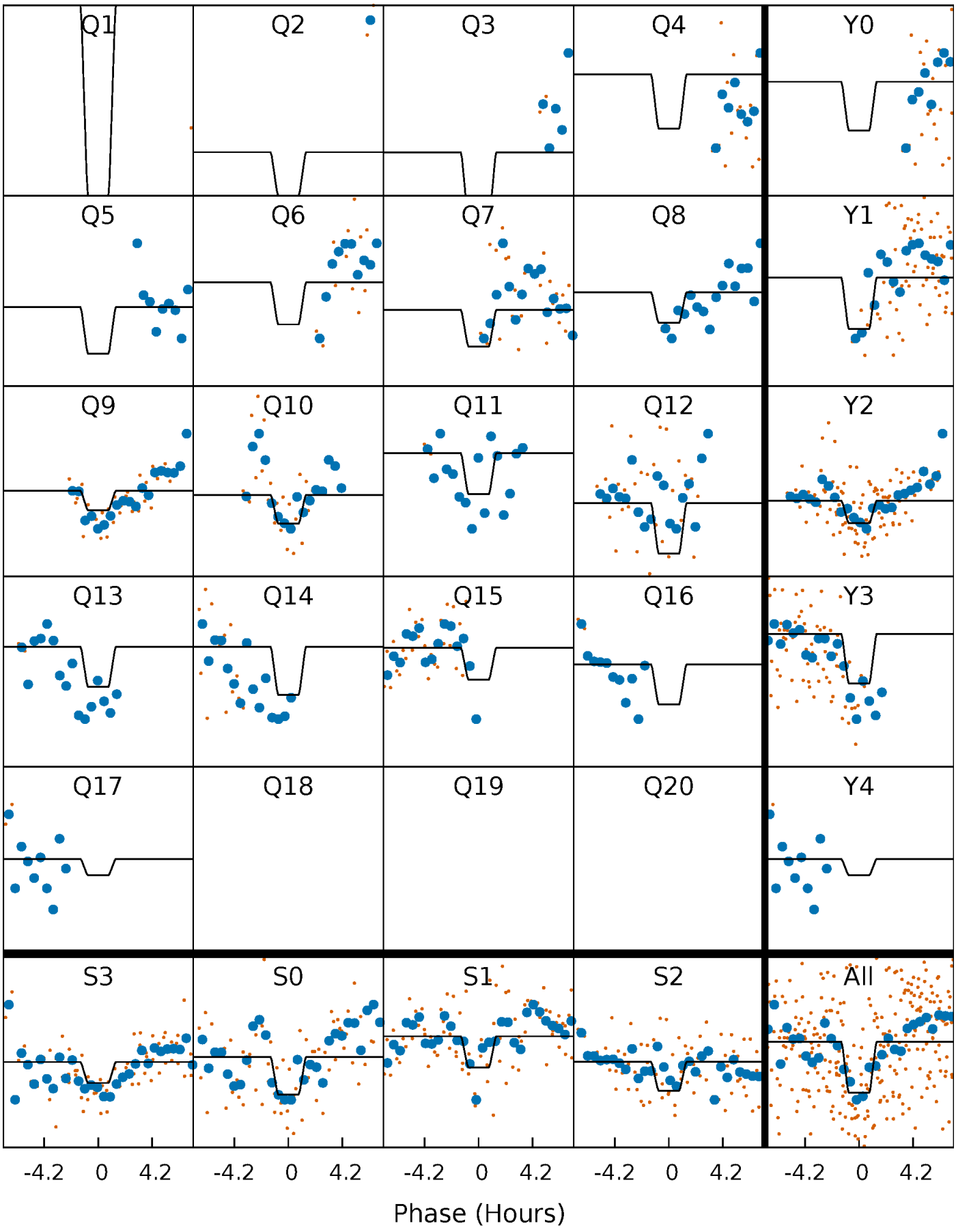
DV Quarter-Phased Transit Curves

TCE 009536870-08 P= 56.630415 Days T_0=145.998989 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

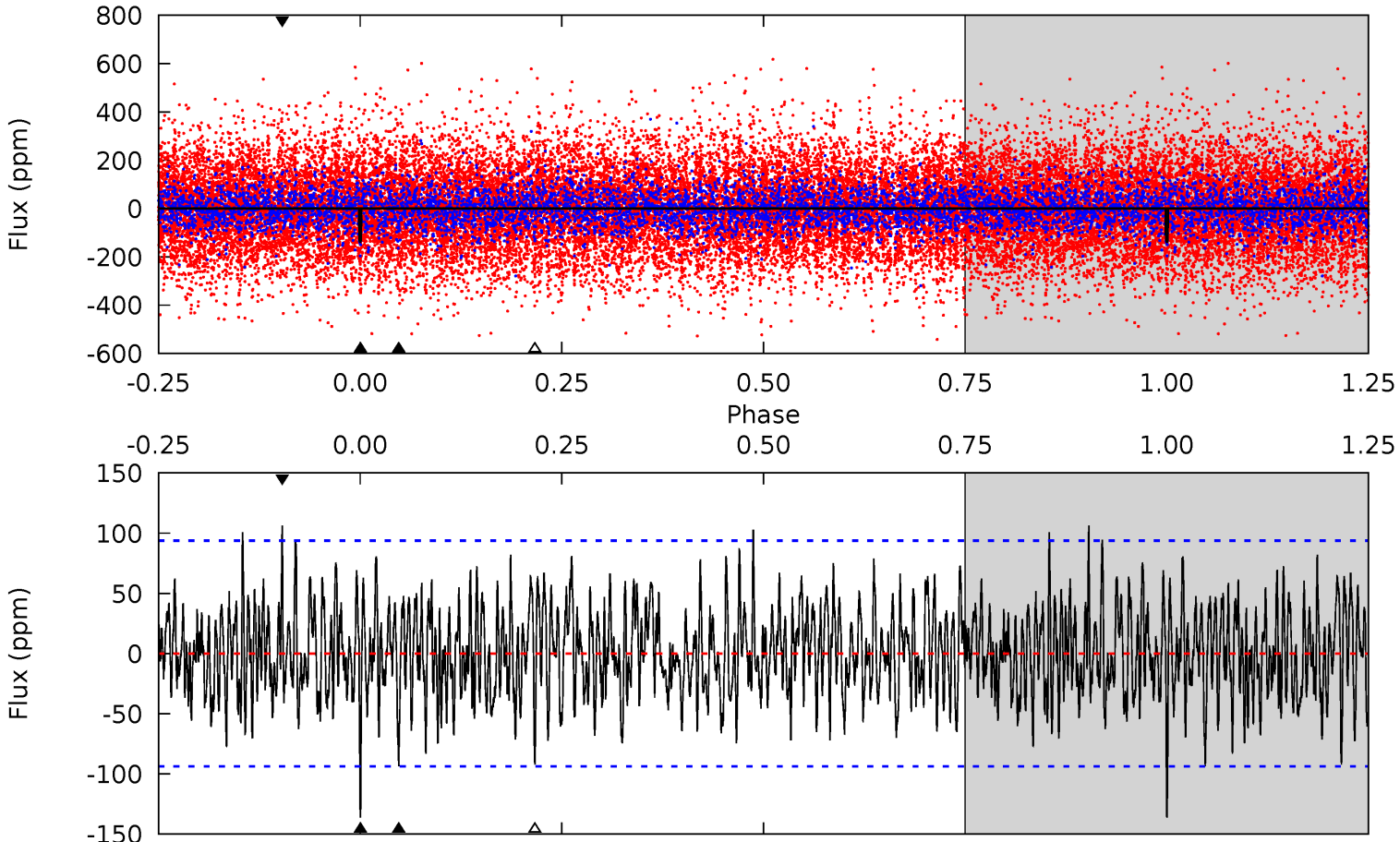
TCE 009536870-08 P= 56.628313 Days T_0=146.045614 (BKJD)

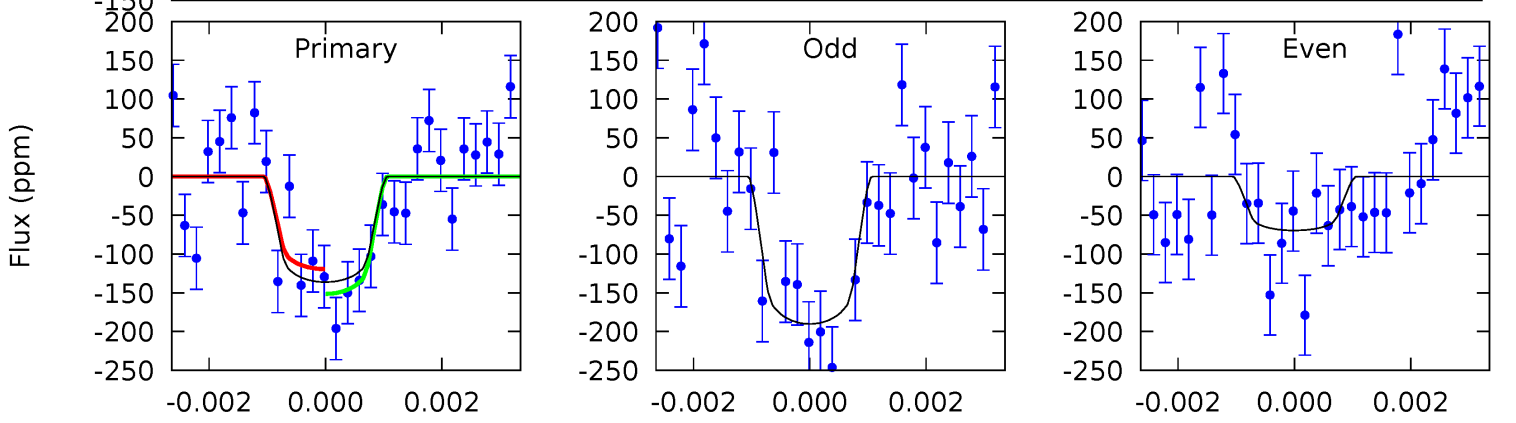


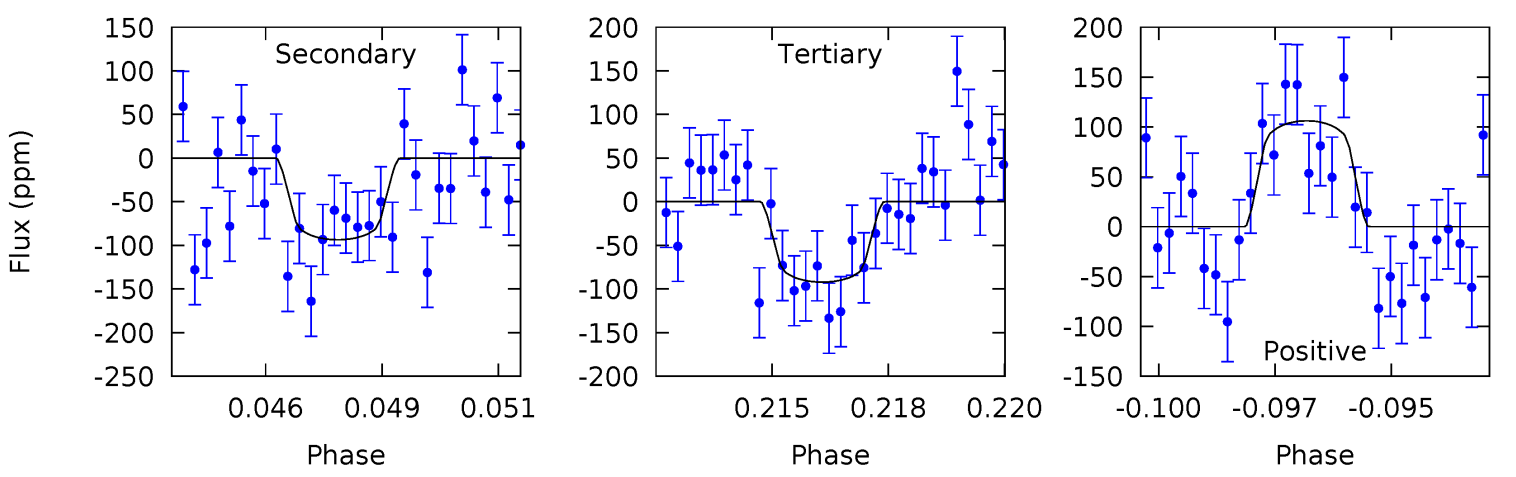
DV Model-Shift Uniqueness Test

009536870-08, P = 56.630415 Days, E = 89.368574 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.69	5.29	5.21	6.00	5.30	3.05	1.87	2.49	1.69	0.08	-0.71	3.41	0.54	0.44	0.90



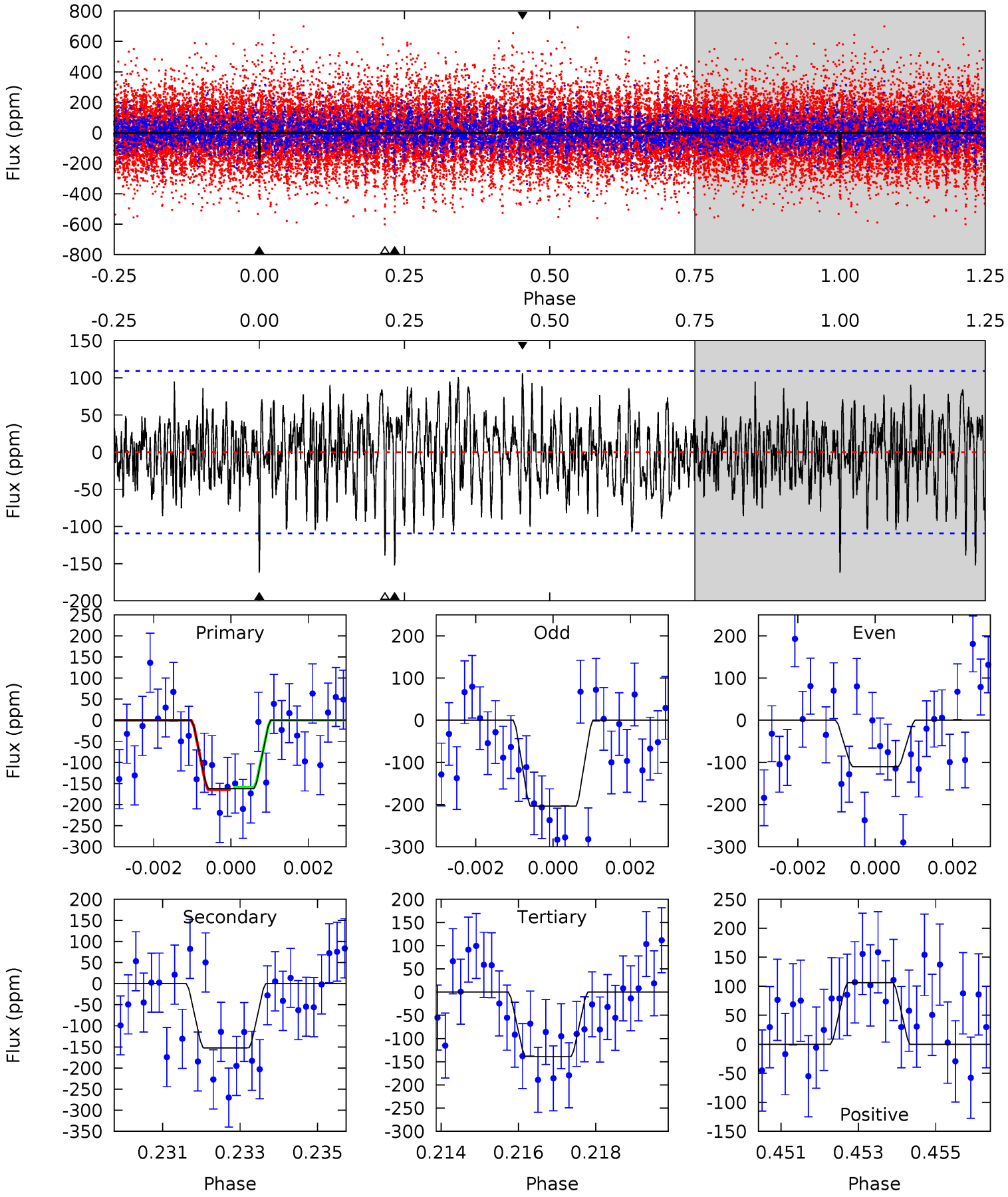




Alt Model-Shift Uniqueness Test

009536870-08, P = 56.628313 Days, E = 89.417301 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.91	7.42	6.78	5.18	5.33	3.09	1.88	1.14	2.73	0.65	2.24	2.29	0.70	0.40	0.13



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-08 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-94±18	$2.90^{+1.82}_{-1.82}$	979^{+46}_{-48}	5470^{+4183}_{-1064}	656^{+4112}_{-422}
Alt.	-152±20	$2.95^{+1.87}_{-1.73}$	980^{+43}_{-50}	6108^{+4381}_{-1261}	1038^{+5098}_{-672}

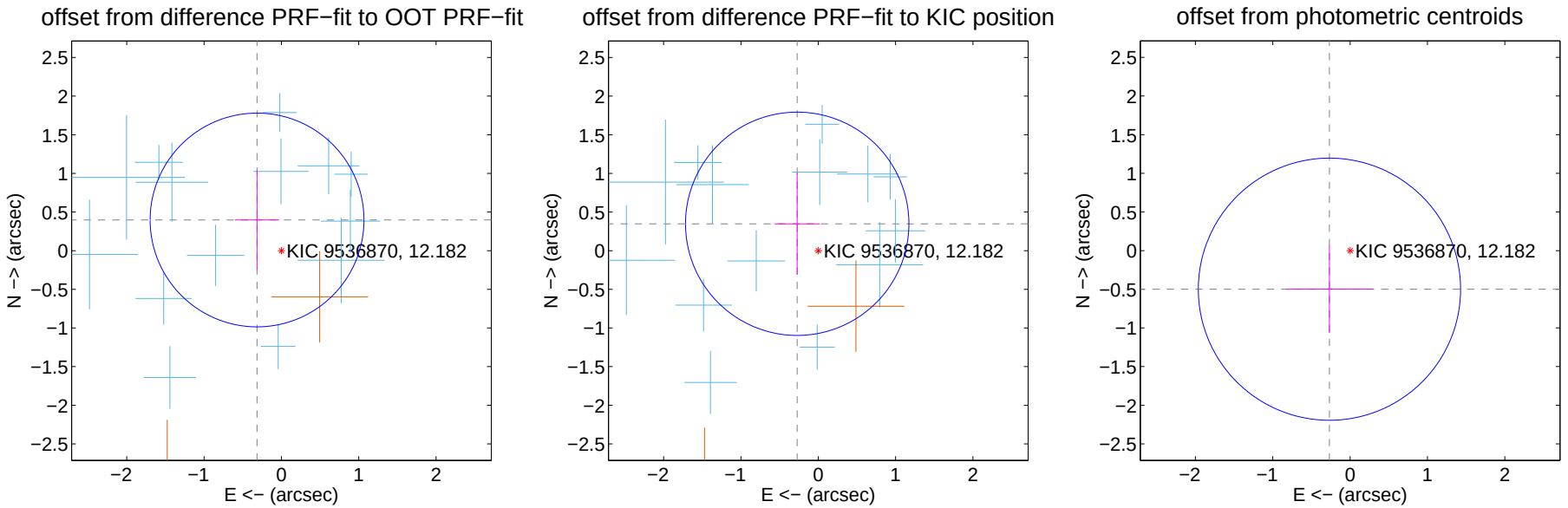
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

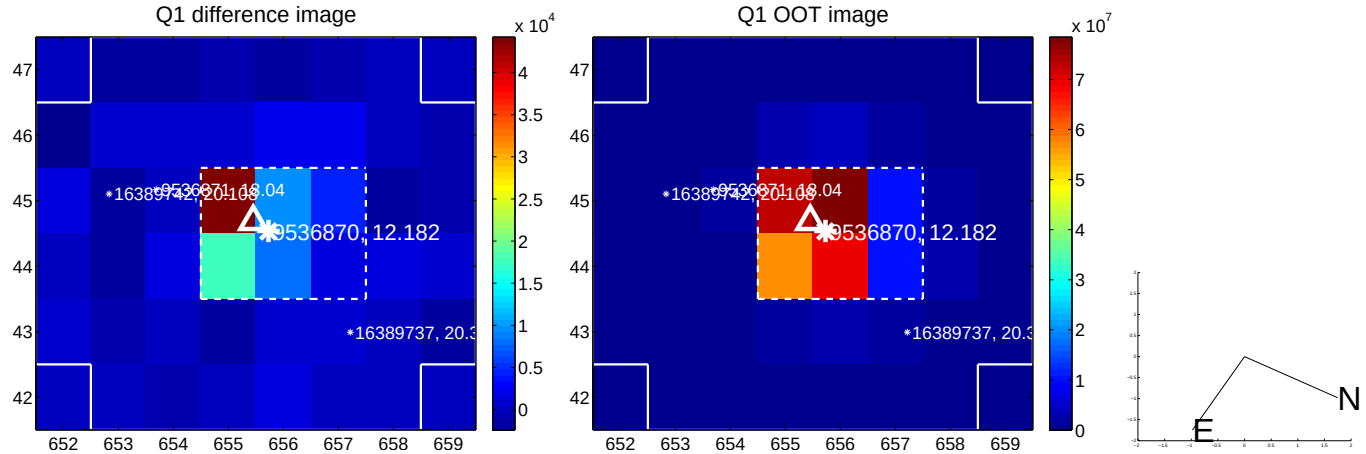
Supplemental centroid analysis for 009536870-08. Kepler magnitude: 12.18. Transit SNR 7.18
There are 14 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

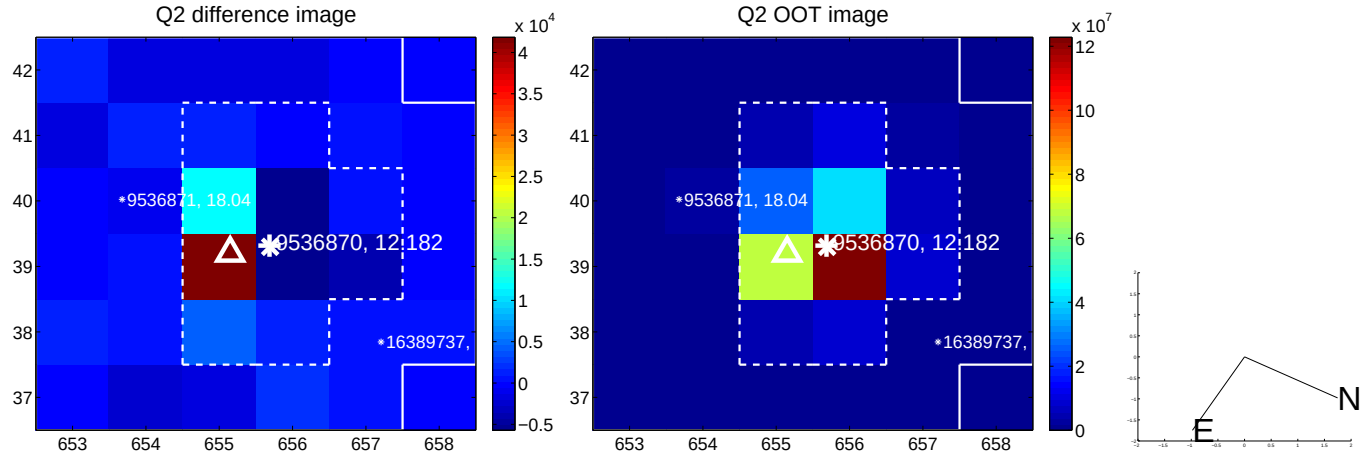
	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.507 $\pm$ 0.461	1.10	0.315 $\pm$ 0.286	0.397 $\pm$ 0.643
PRF-fit source offset from KIC position	0.442 $\pm$ 0.482	0.92	0.272 $\pm$ 0.293	0.348 $\pm$ 0.658
photometric centroid source offset	0.57 $\pm$ 0.57	1.00	0.27 $\pm$ 0.56	-0.50 $\pm$ 0.57

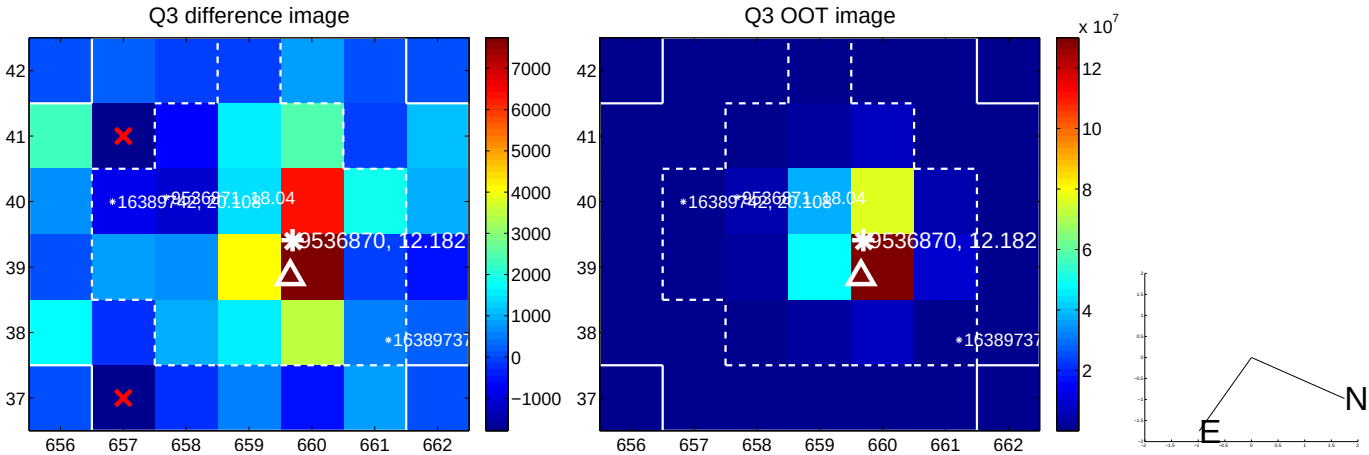


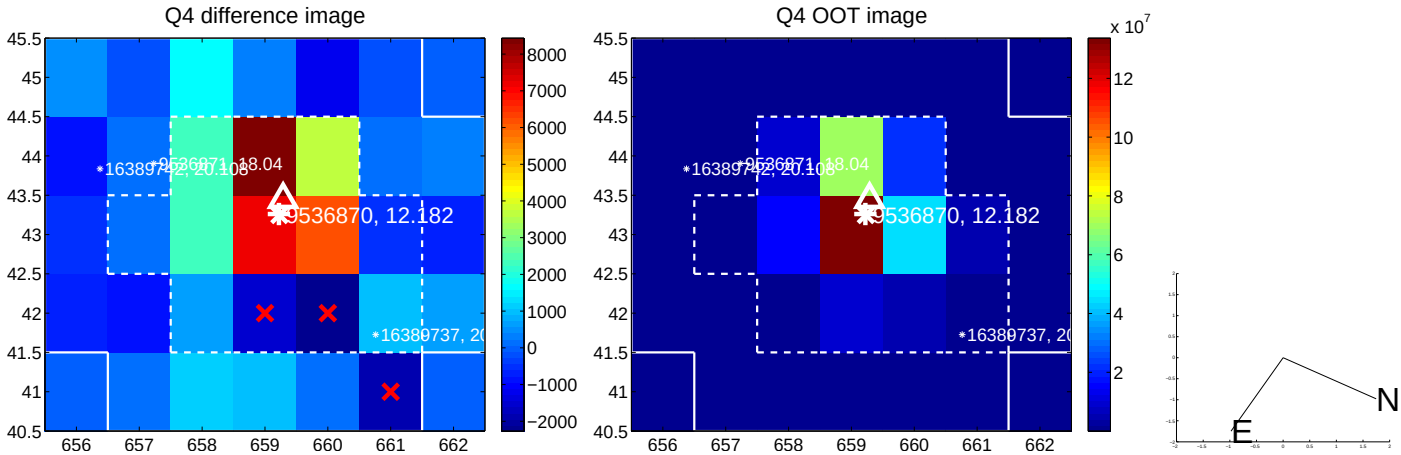
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.









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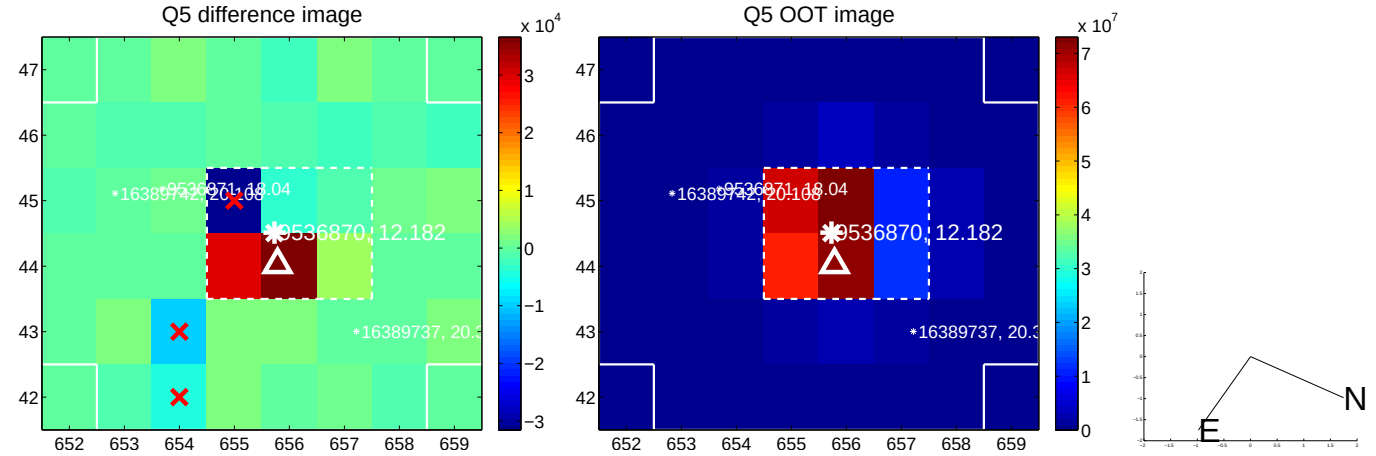
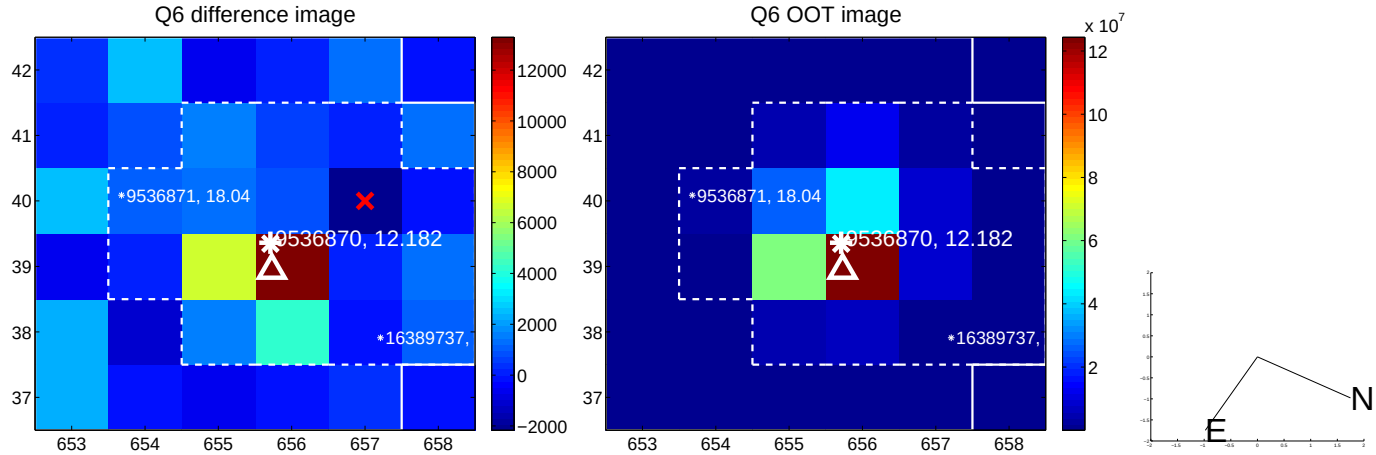
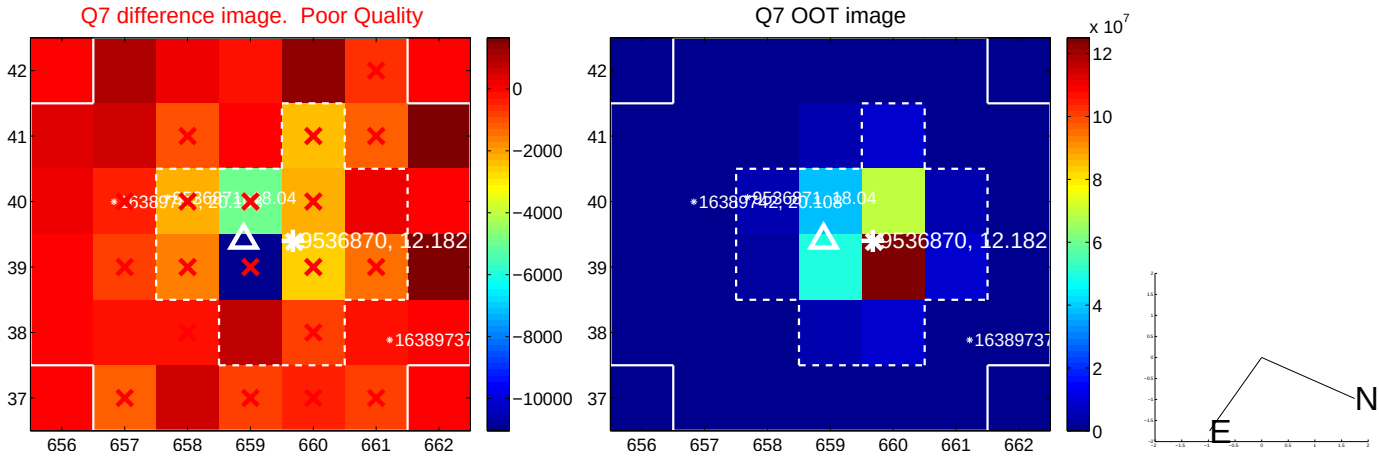
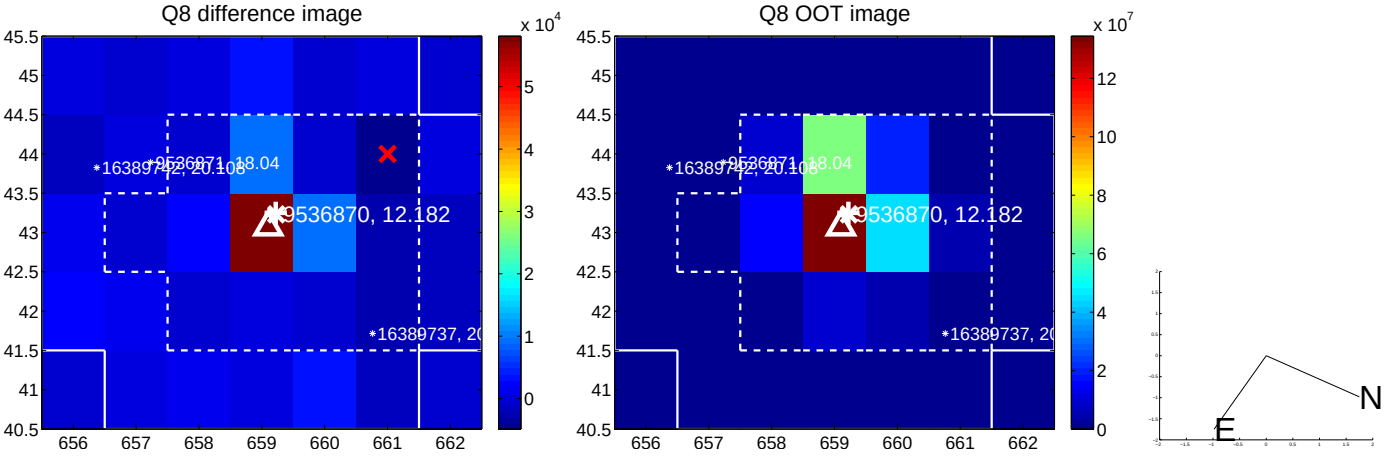
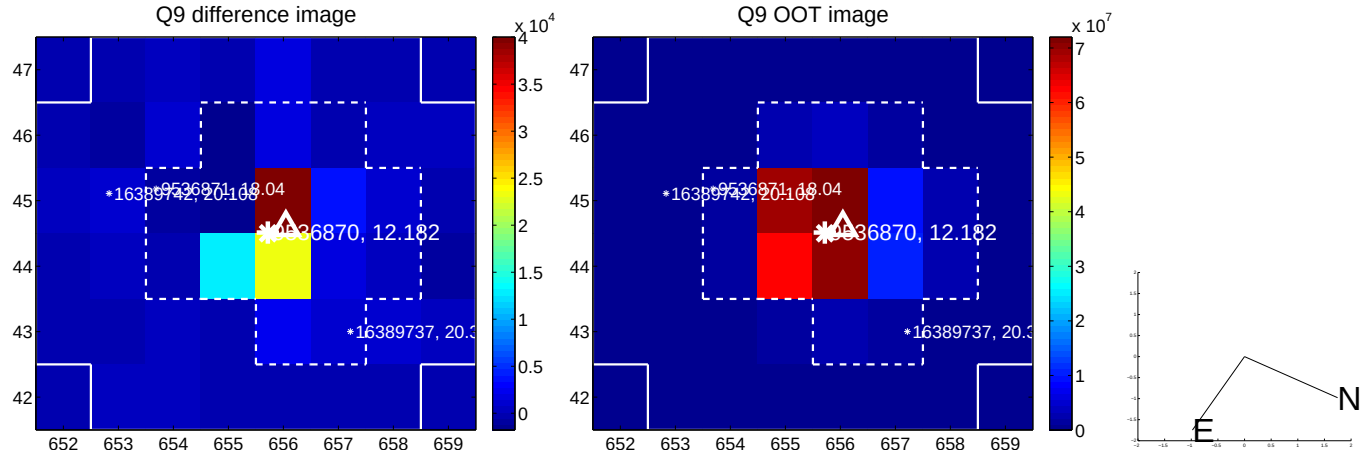


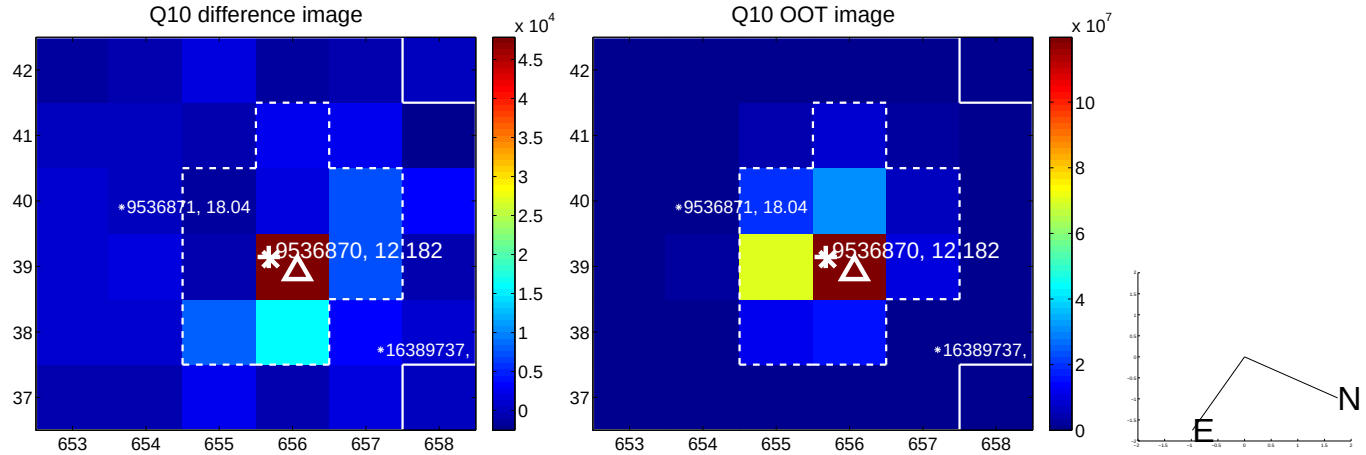


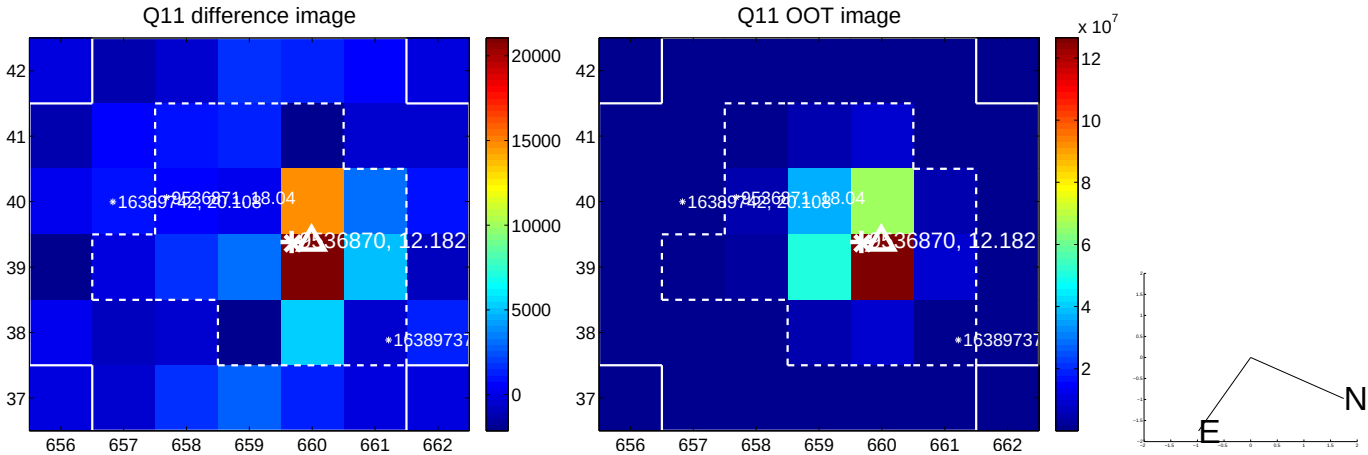


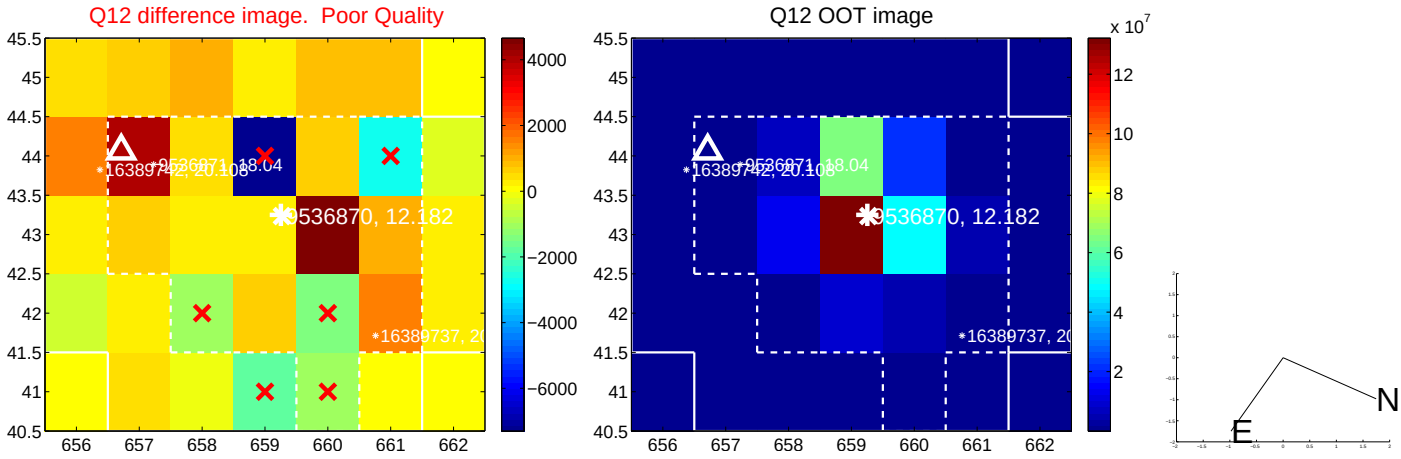


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

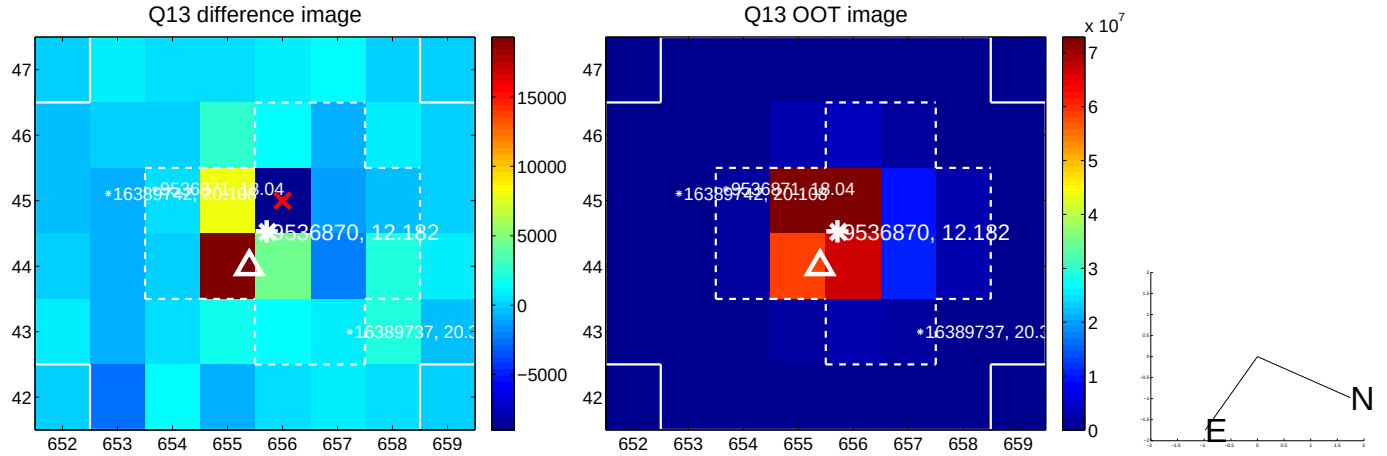


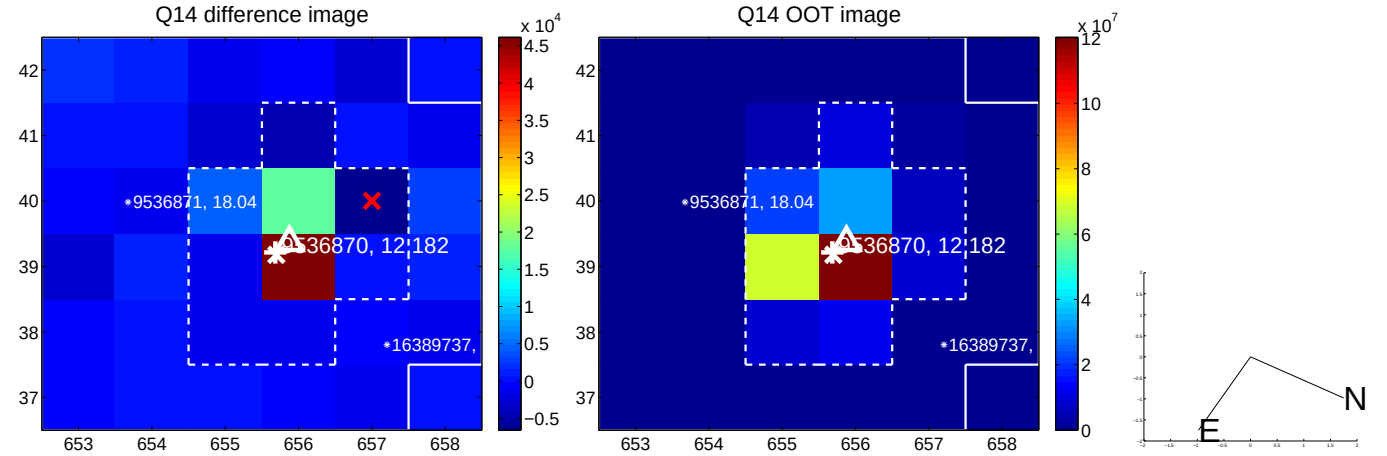


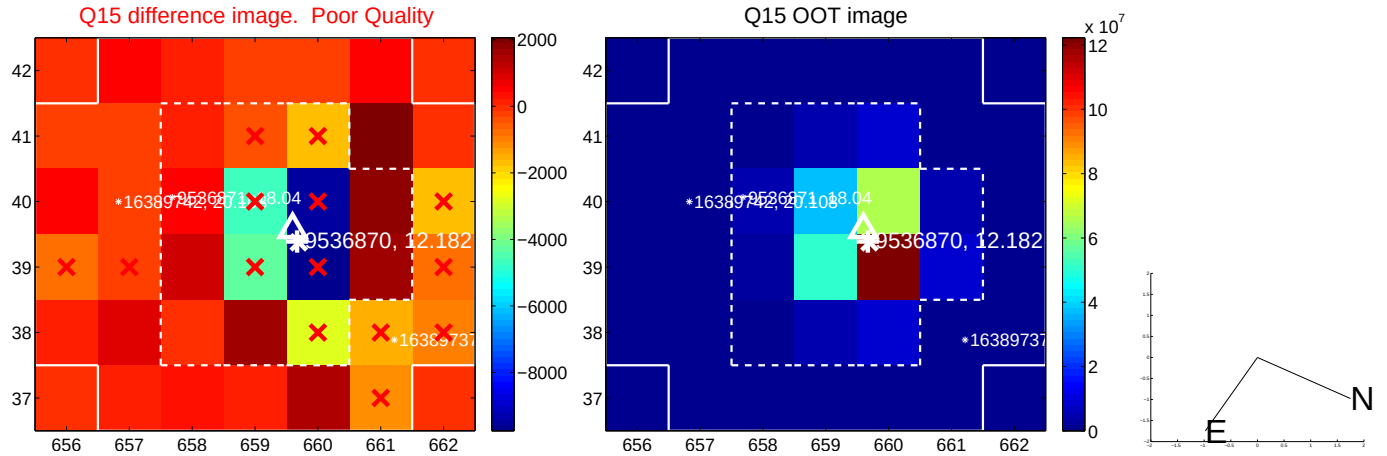


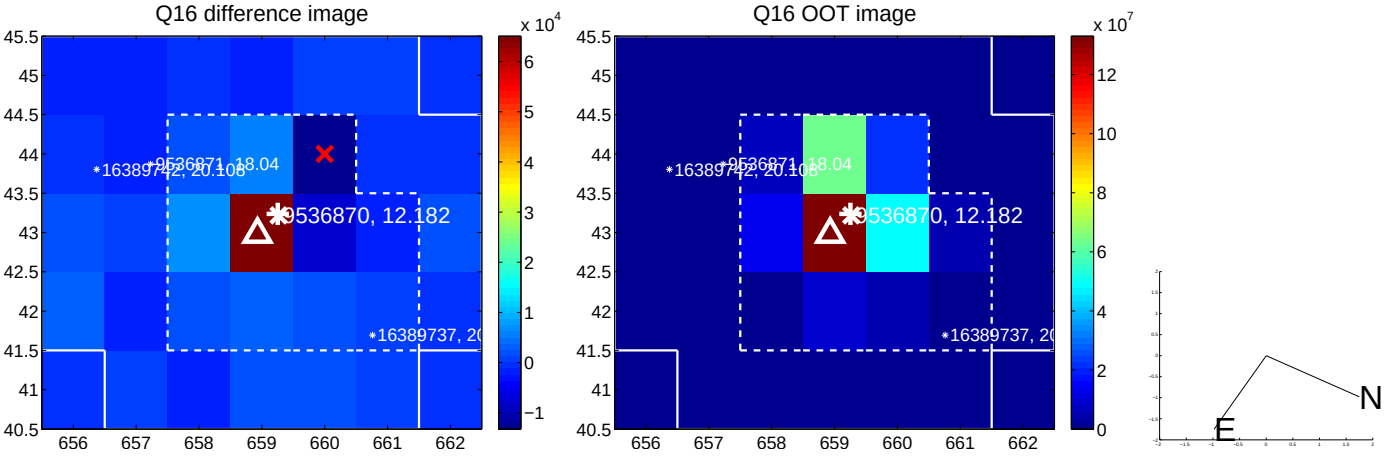


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

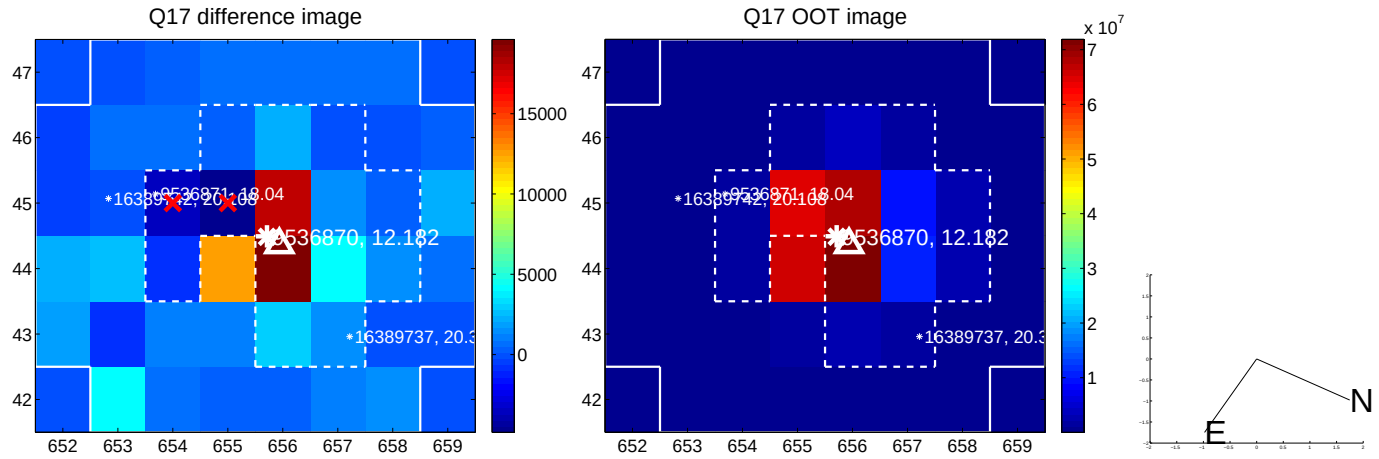


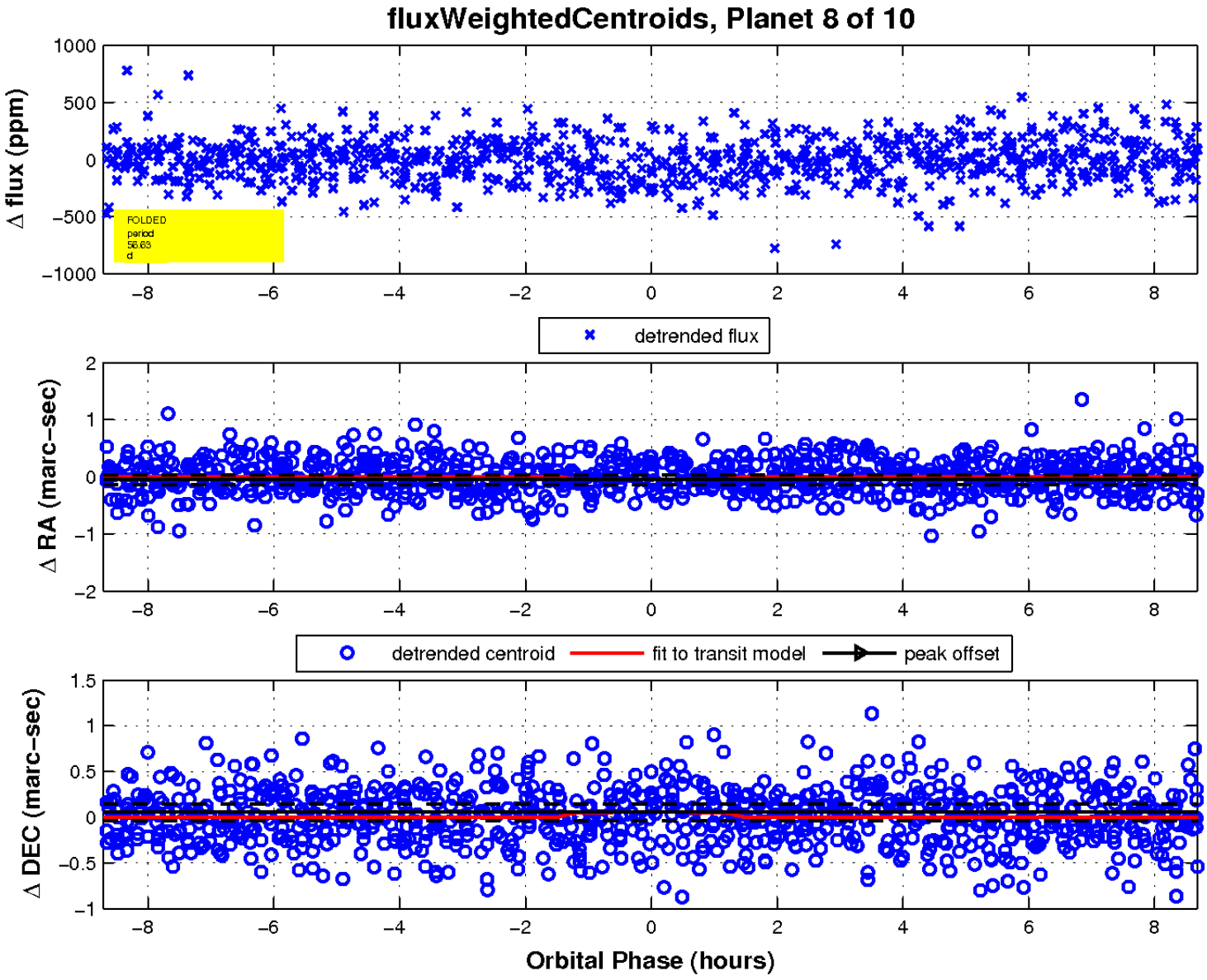




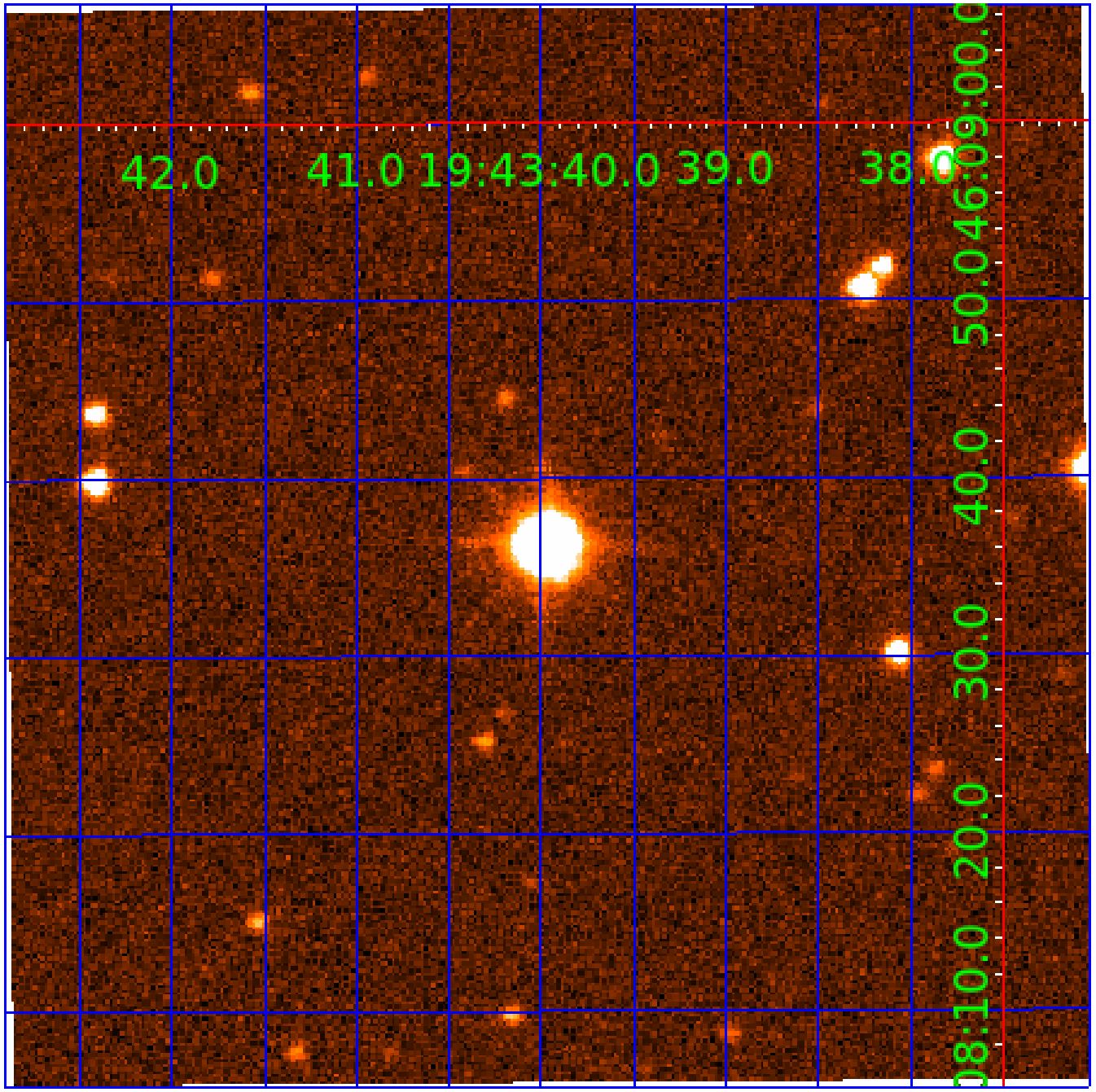


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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46:
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40.0
30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

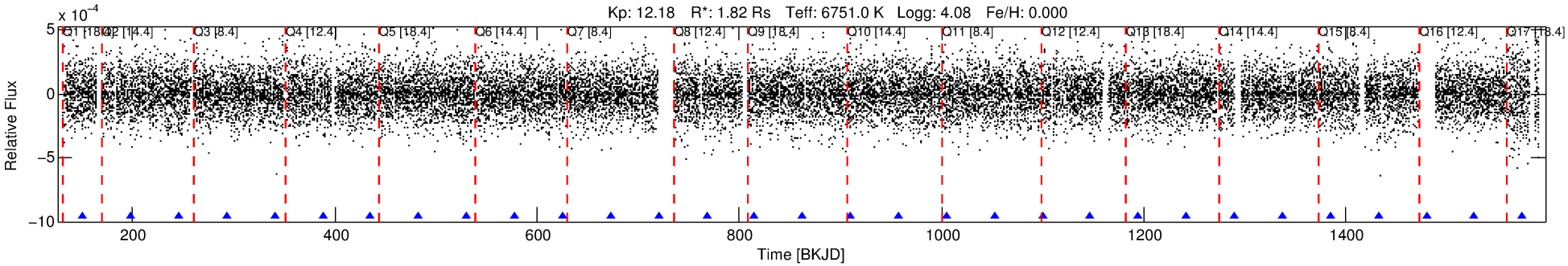
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

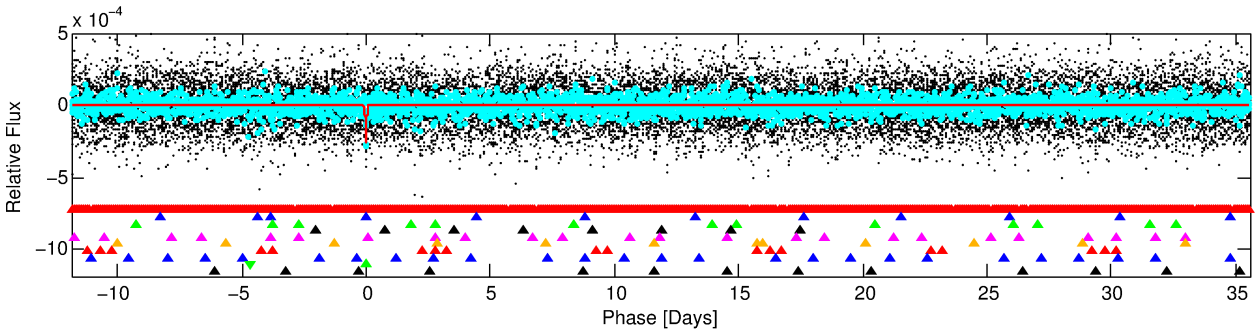
Ephemeris Match Information For 009536870-09

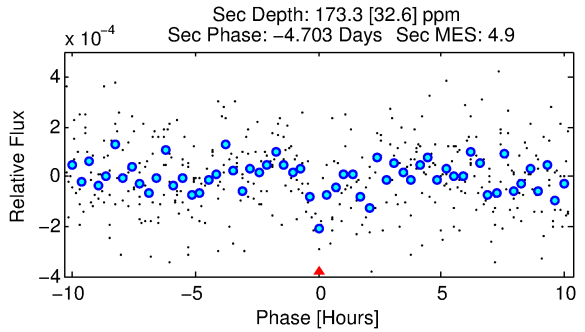
No Significant Match Found

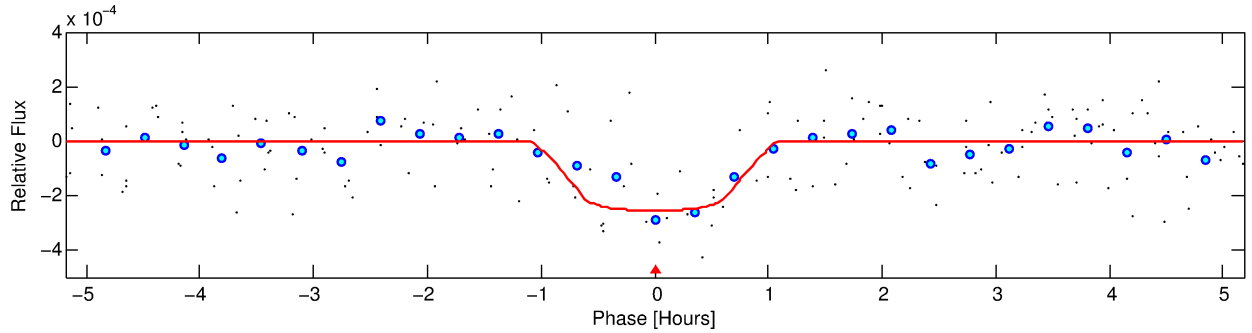
DV One-Page Summary

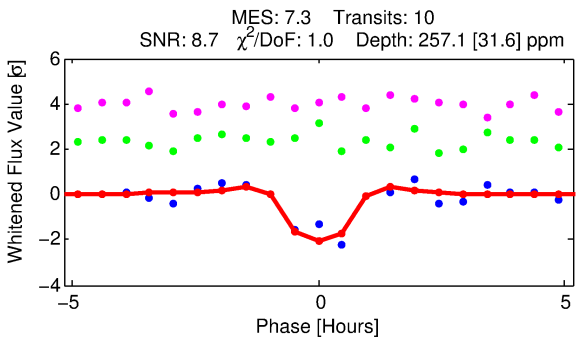
KIC: 9536870 Candidate: 9 of 10 Period: 47.448 d

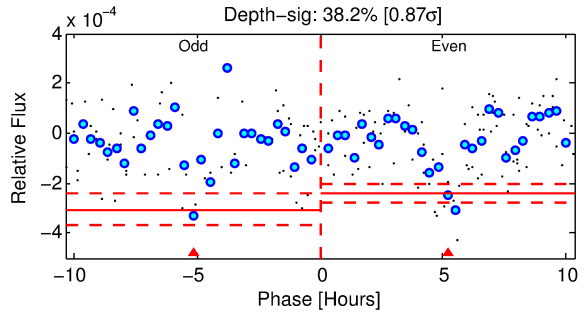


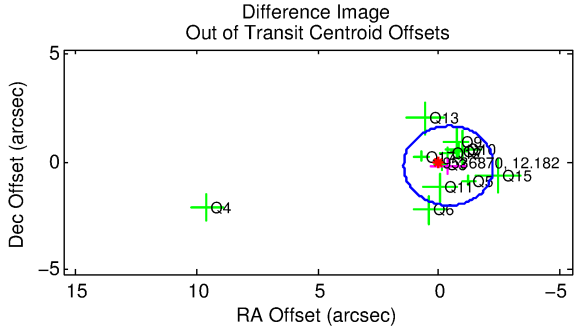












DV Fit Results:

Period = 47.44816 [0.00037] d
Epoch = 150.9332 [0.0047] BKJD
Rp/R* = 0.0158 [0.0131]
a/R* = 153.87 [725.22]
b = 0.70 [3.42]

Seff = 72.92 [18.71]
Teq = 745 [48] K
Rp = 3.13 [2.66] Re
a = 0.2901 [0.0469] AU

Ag = 820.40 [1388.80] [0.59σ]
Teffp = 6166 [2582] K [2.10σ]

DV Diagnostic Results:

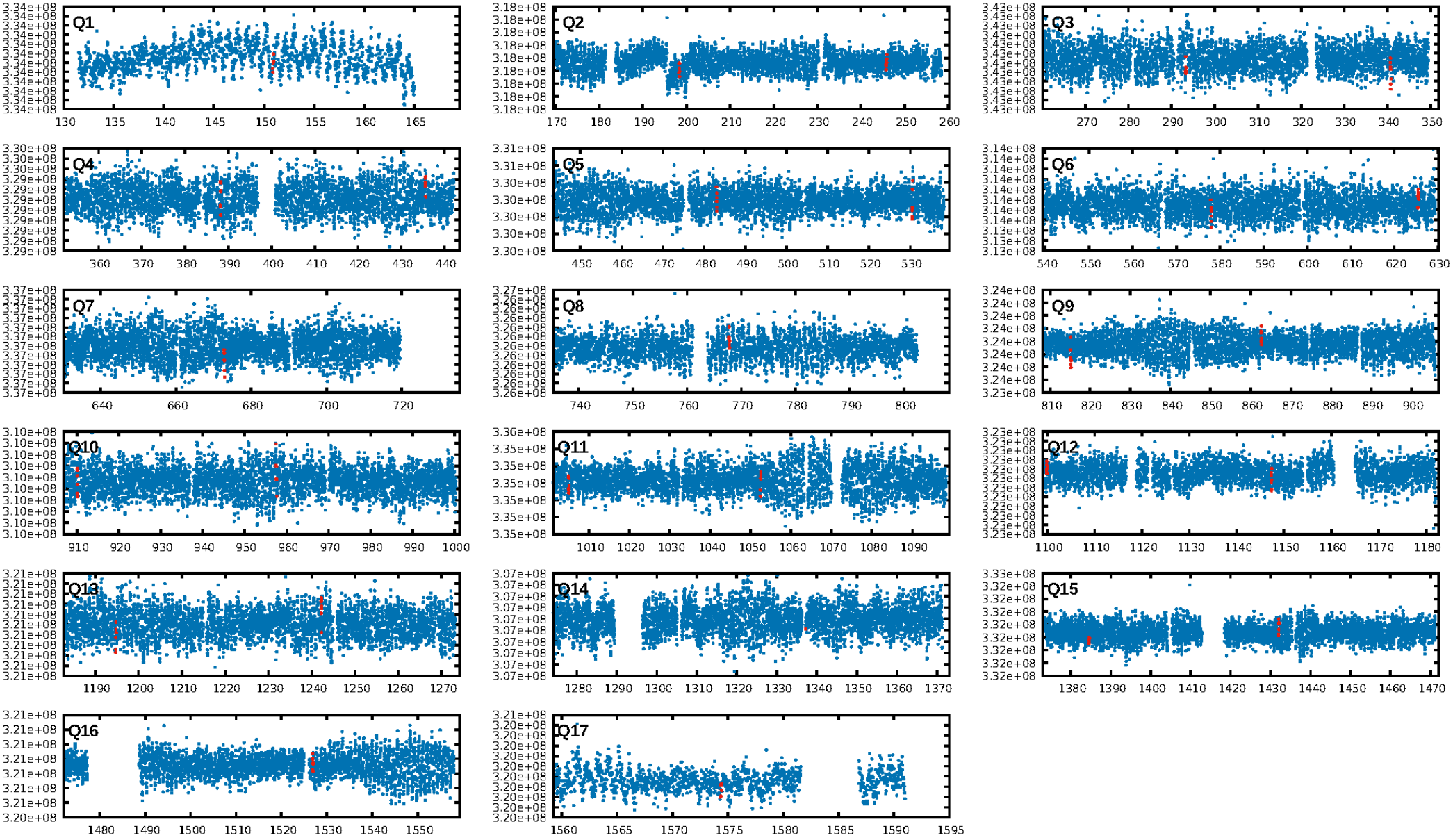
ShortPeriod−sig: 100.0% [228.66σ]
LongPeriod−sig: 100.0% [65.19σ]
ModelChiSquare2−sig: 70.8%
ModelChiSquareGof−sig: 99.2%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [10/10]
GhostDiagnostic−chr: 8.306

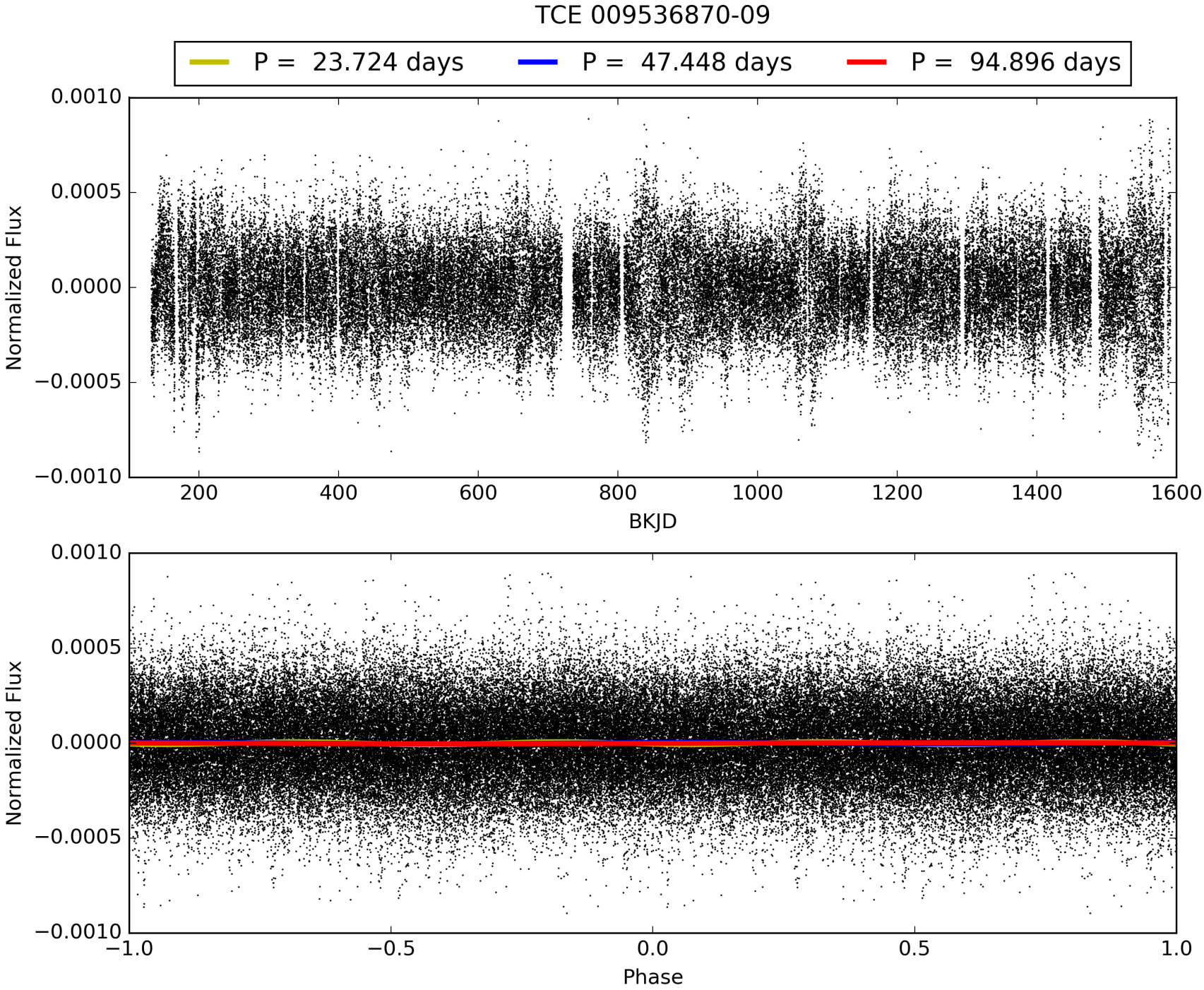
Centroid−sig: 84.0%
Centroid−so: 0.090 arcsec [0.23σ]
OotOffset−rm: 0.444 arcsec [0.72σ]
KicOffset−rm: 0.496 arcsec [0.78σ]
OotOffset−st: 2/4/2/4 [12]
KicOffset−st: 2/4/2/4 [12]
DiffImageQuality−fgm: 0.75 [9/12]
DiffImageOverlap−fno: 0.40 [6/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:48 Z

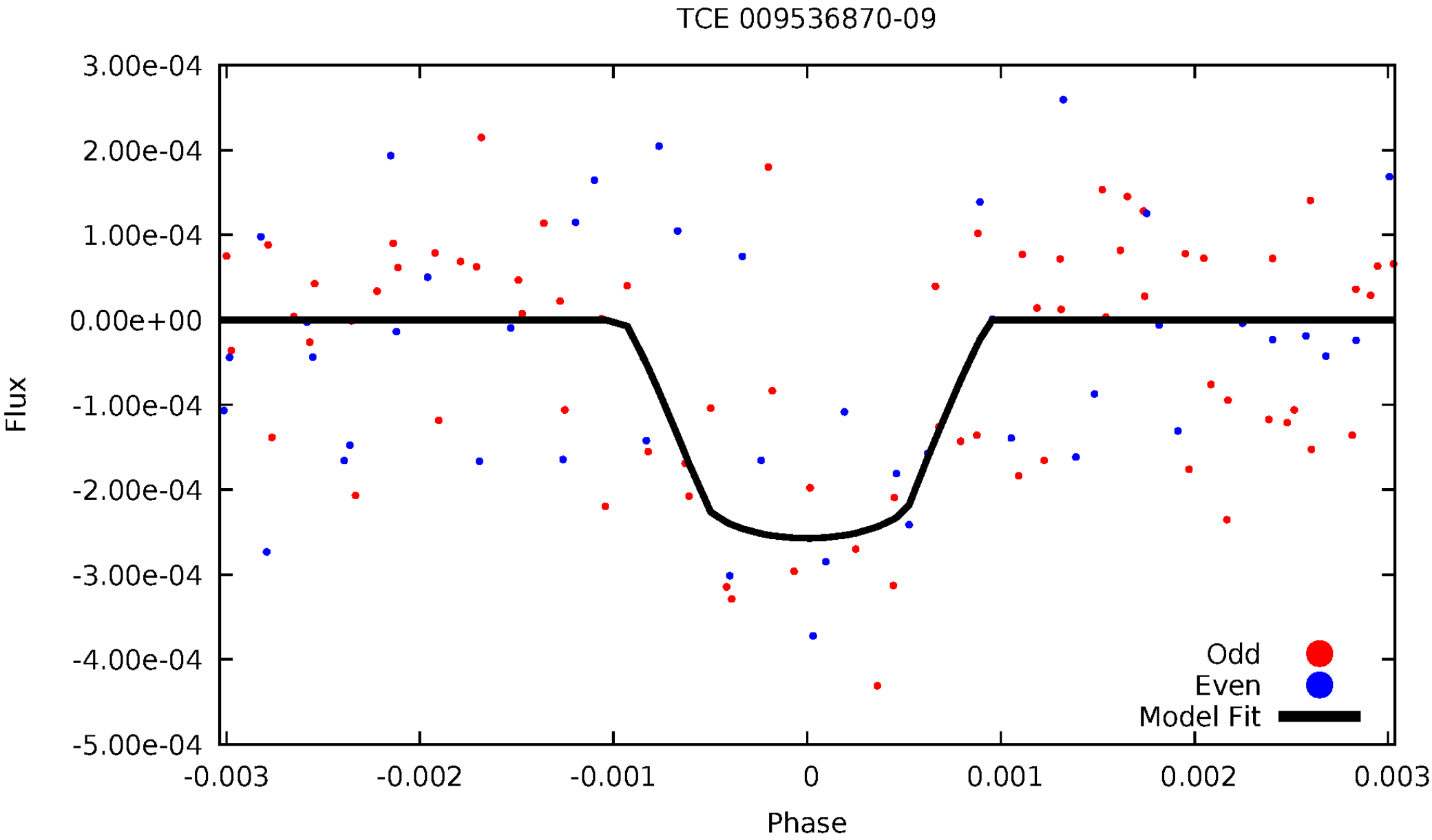
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

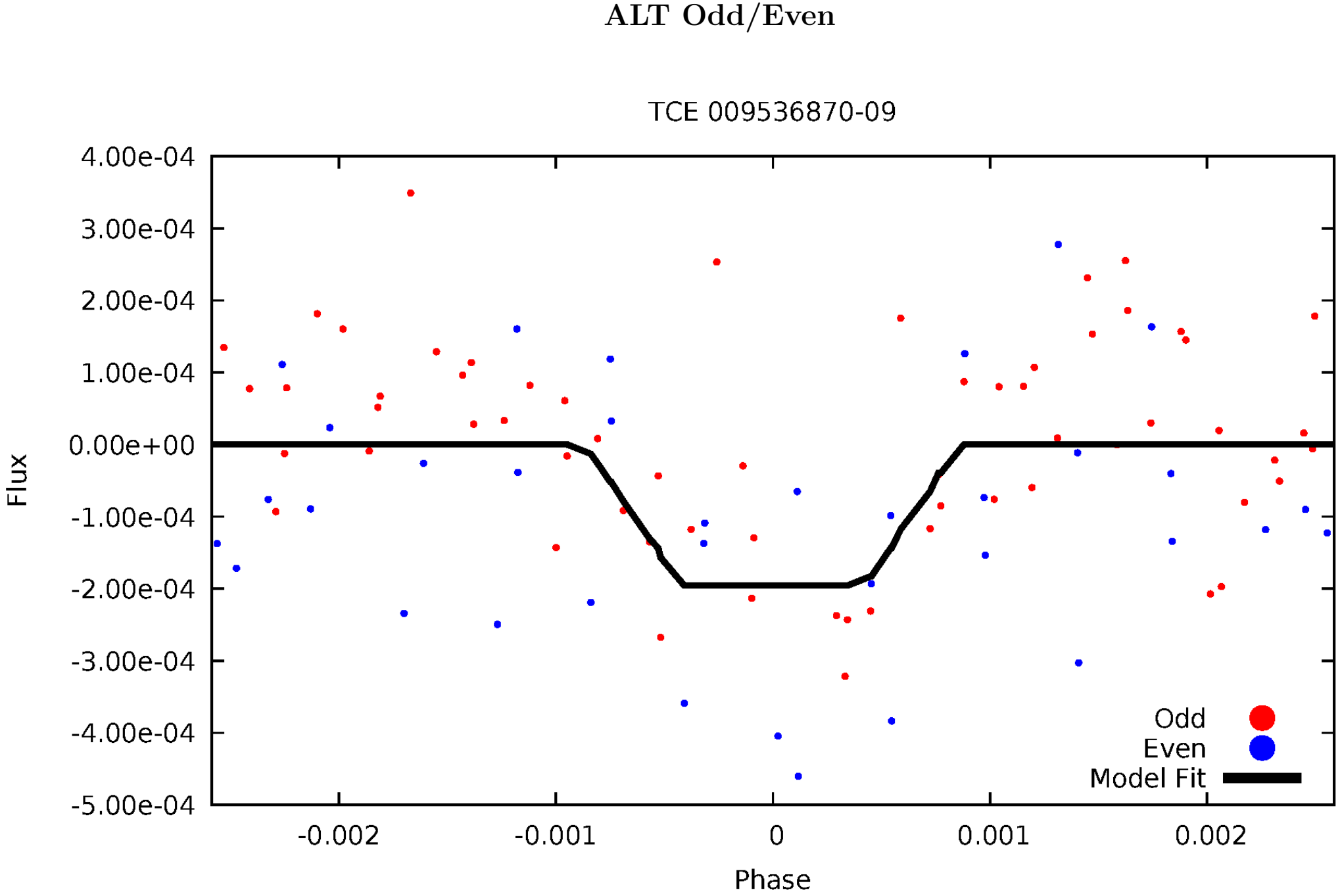
TCE 009536870-09, PDC Light Curves



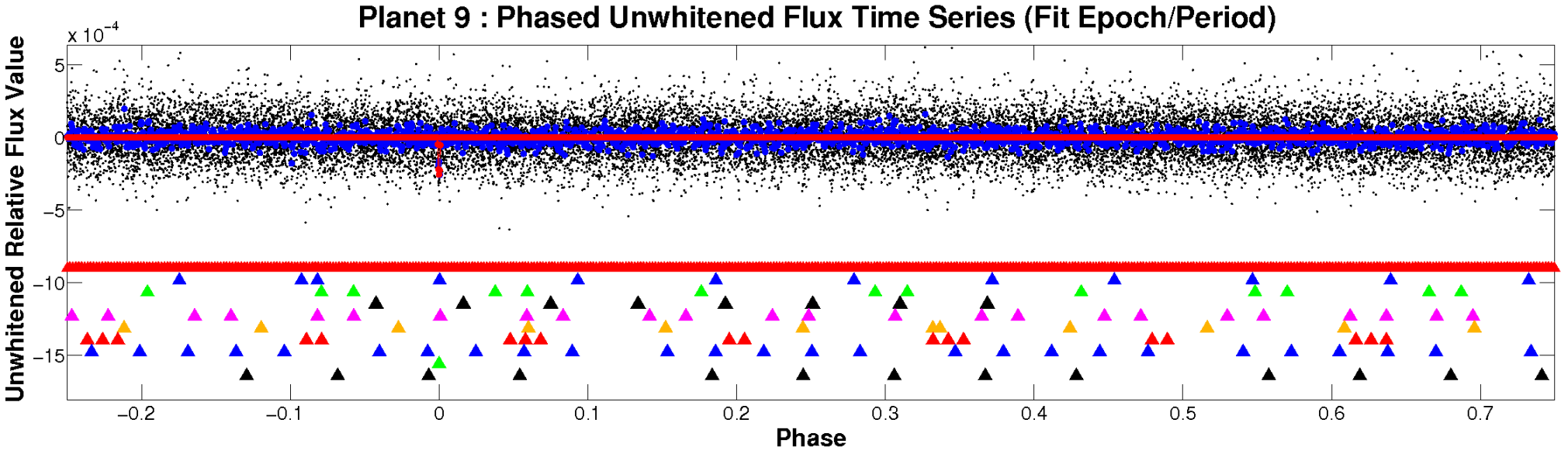

TCE 009536870-09
P = 23.724 days
P = 47.448 days
P = 94.896 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

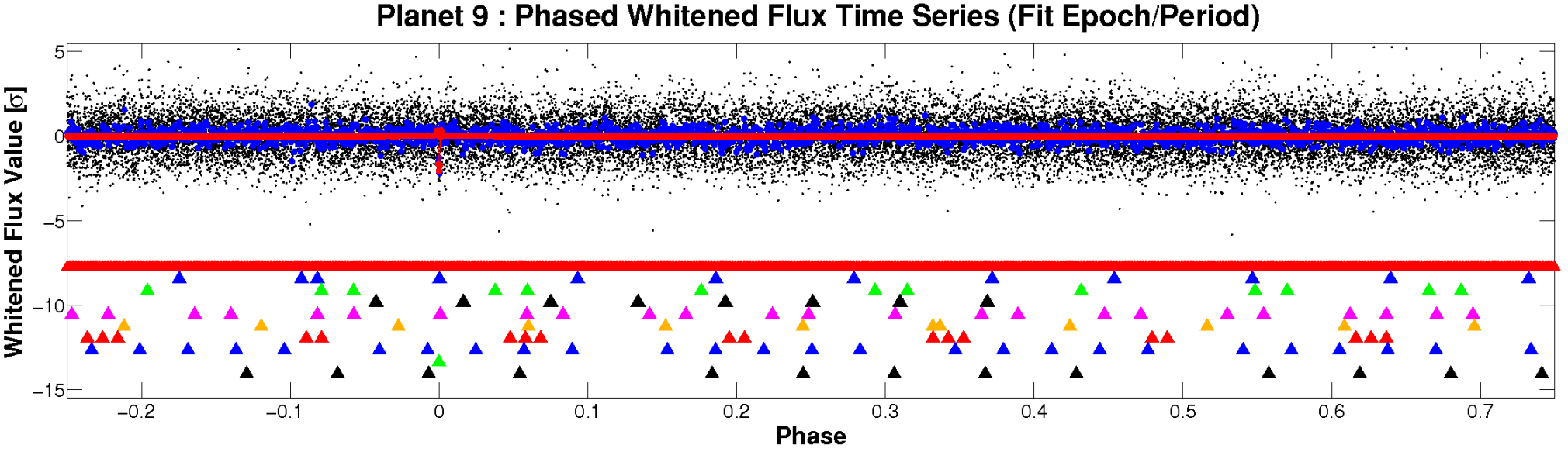
DV Odd/Even


TCE 009536870-09
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
Flux
-0.003
-0.002
-0.001
0
0.001
0.002
0.003
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-09
4.00e-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
Flux
-0.002
-0.001
0
0.001
0.002
Phase
Odd
Even
Model Fit

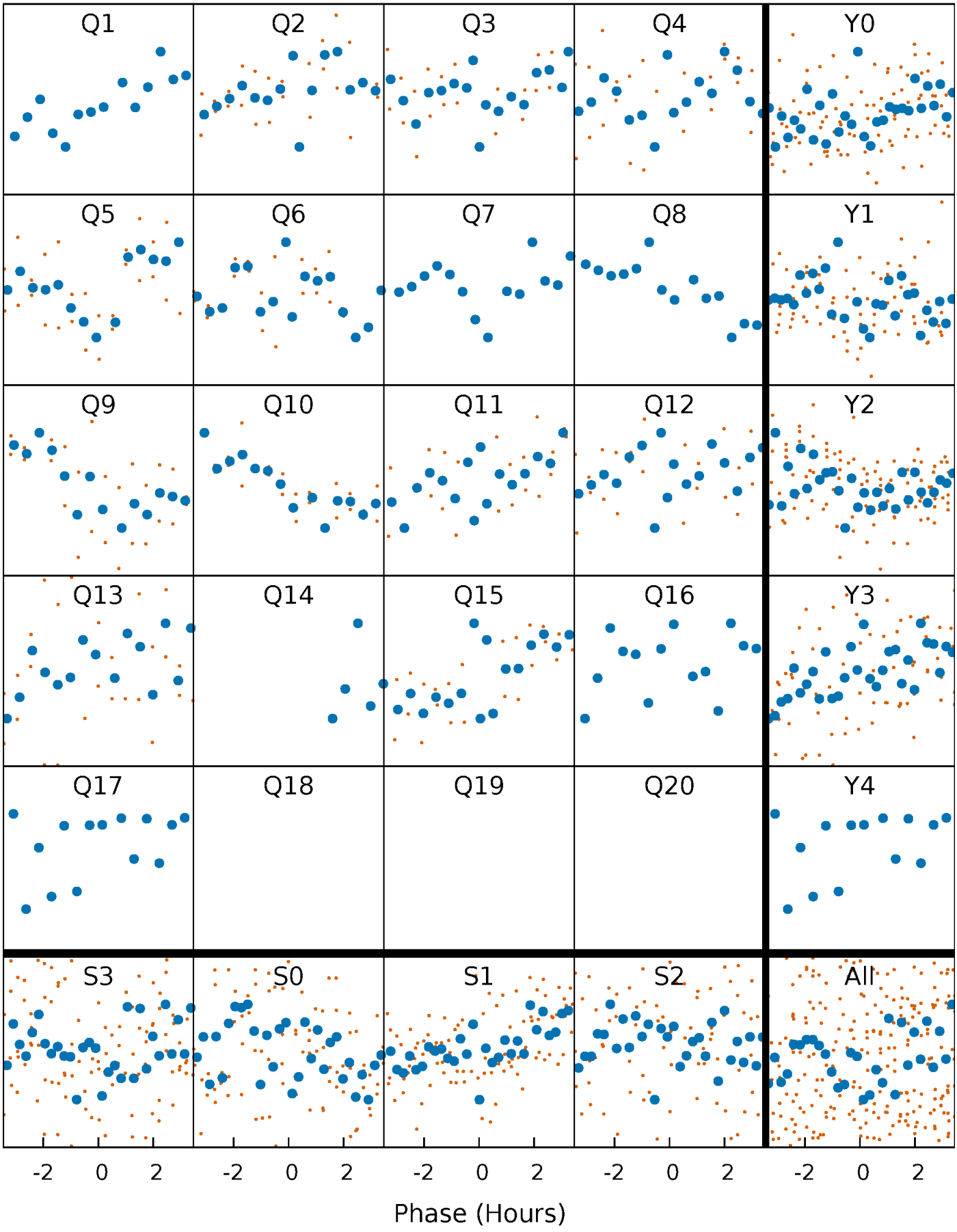
Non-Whitened Vs. Whitened Light Curve





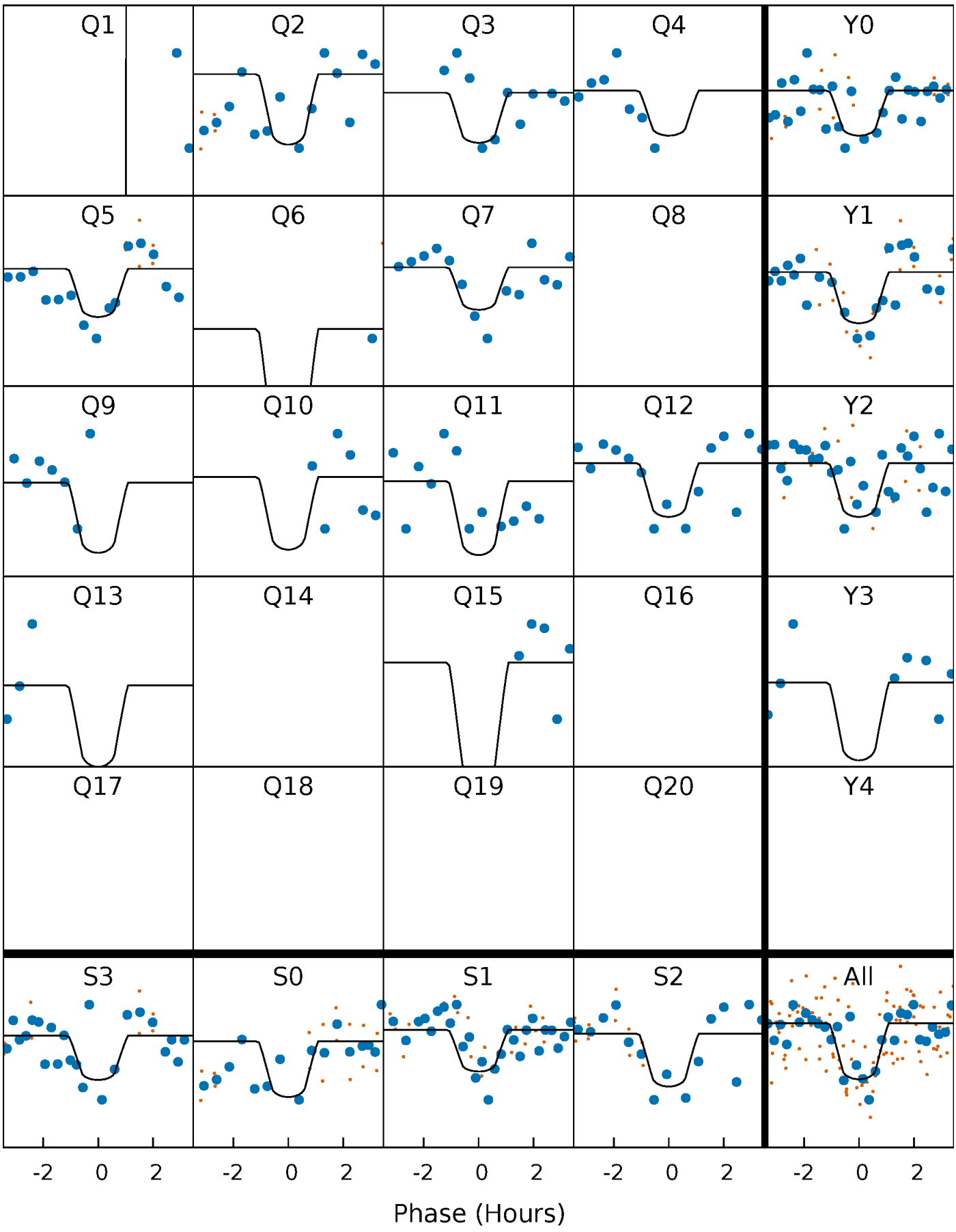
PDC Quarter-Phased Transit Curves

TCE 009536870-09 P= 47.448162 Days T_0=150.933155 (BKJD)



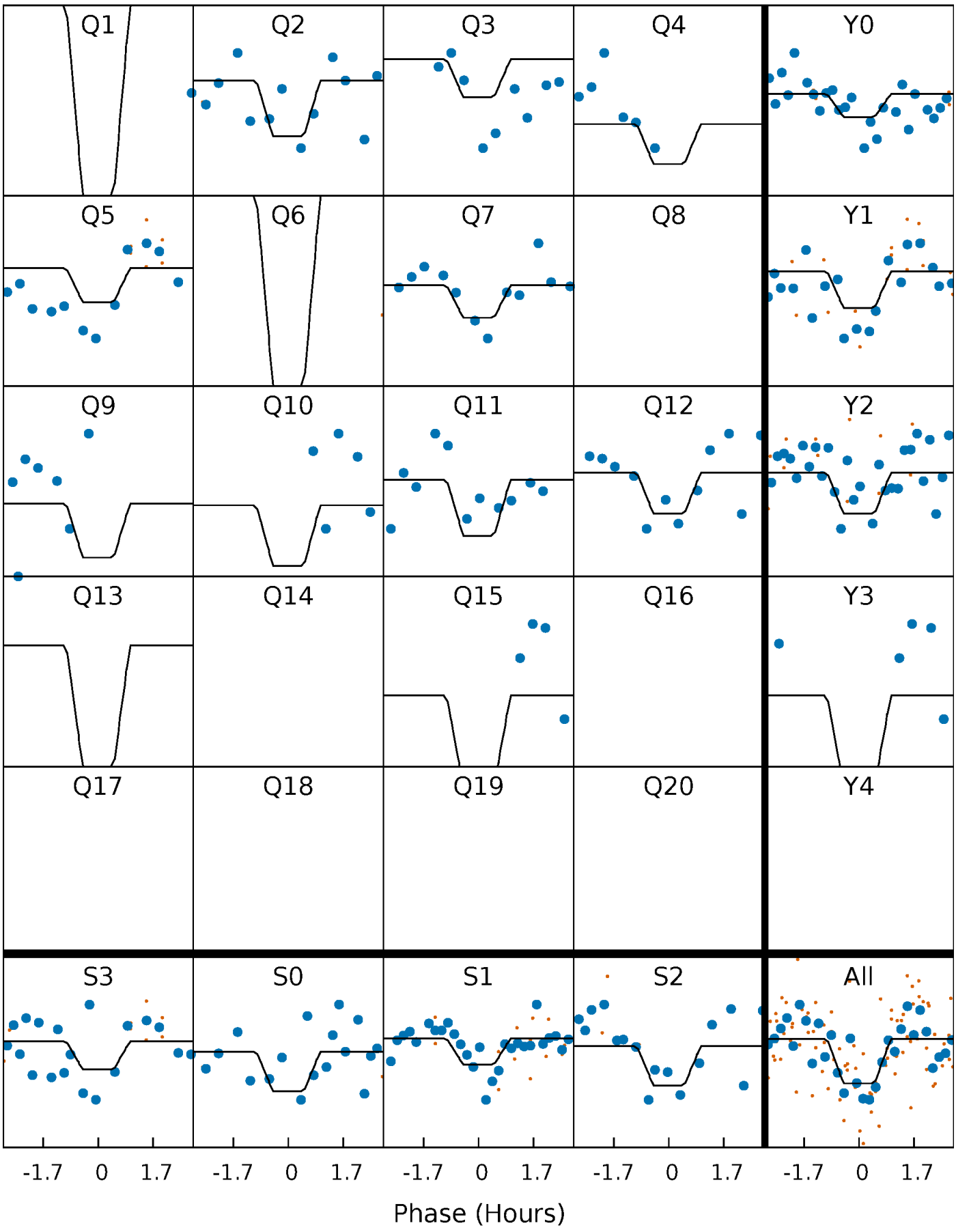
DV Quarter-Phased Transit Curves

TCE 009536870-09 P= 47.448162 Days T_0=150.933155 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

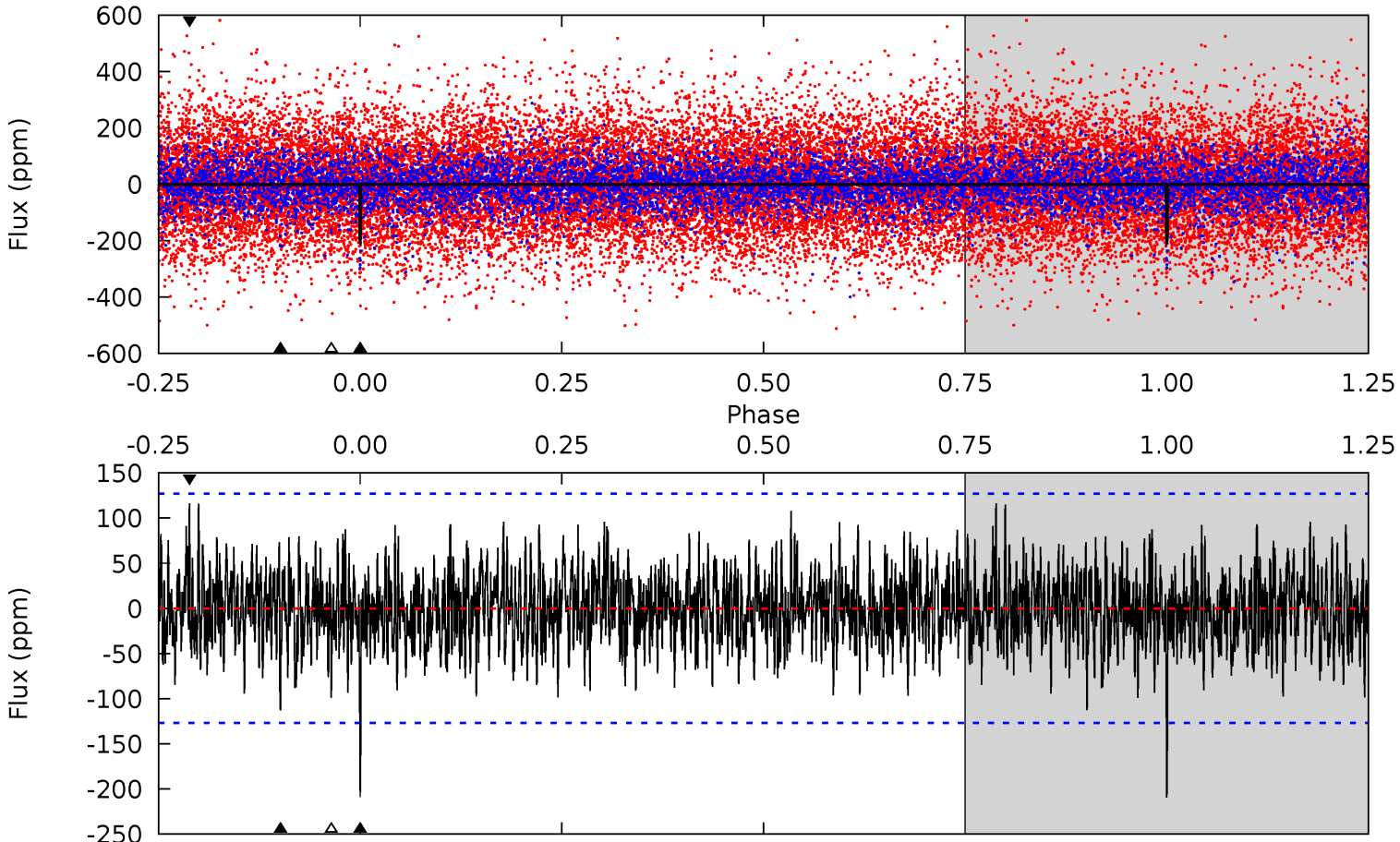
TCE 009536870-09 P= 47.448505 Days T_0=150.930774 (BKJD)

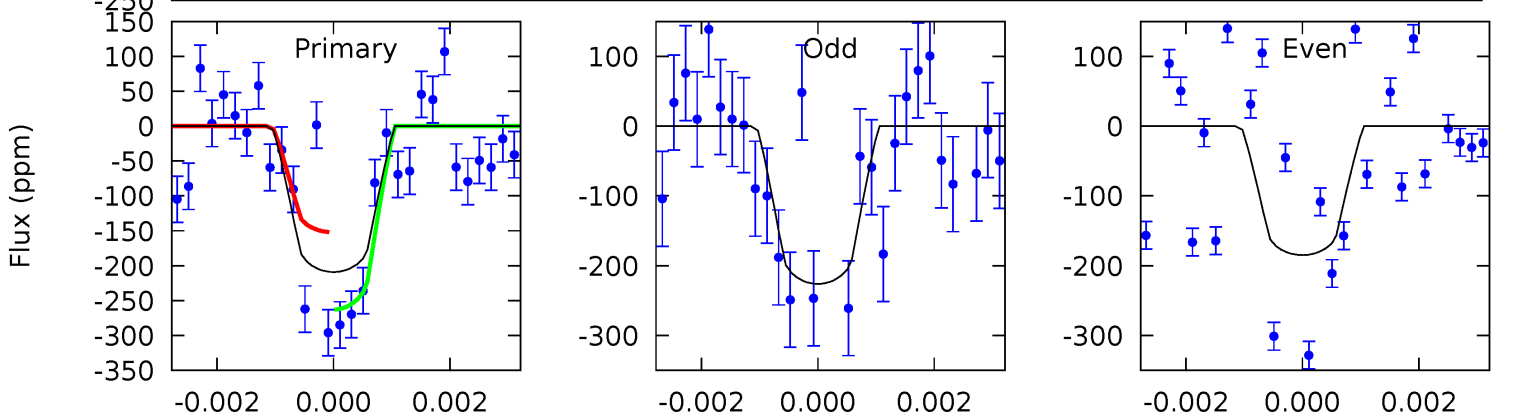


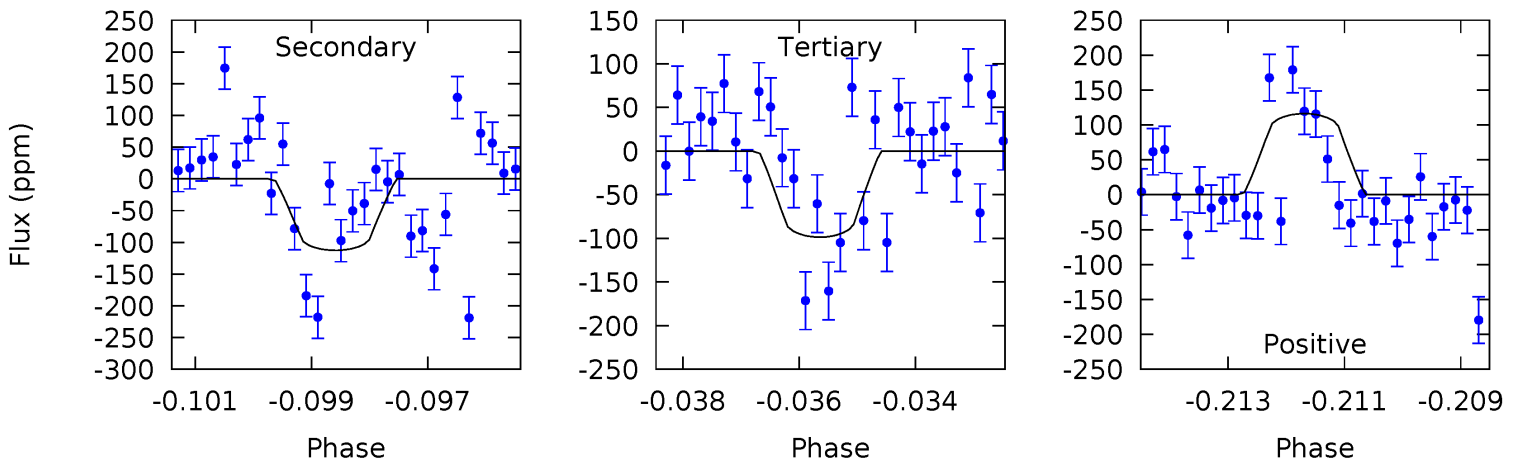
DV Model-Shift Uniqueness Test

009536870-09, P = 47.448162 Days, E = 103.484993 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.80	4.74	4.15	4.89	5.35	3.12	1.47	4.65	3.91	0.59	-0.15	0.85	0.98	0.36	2.33



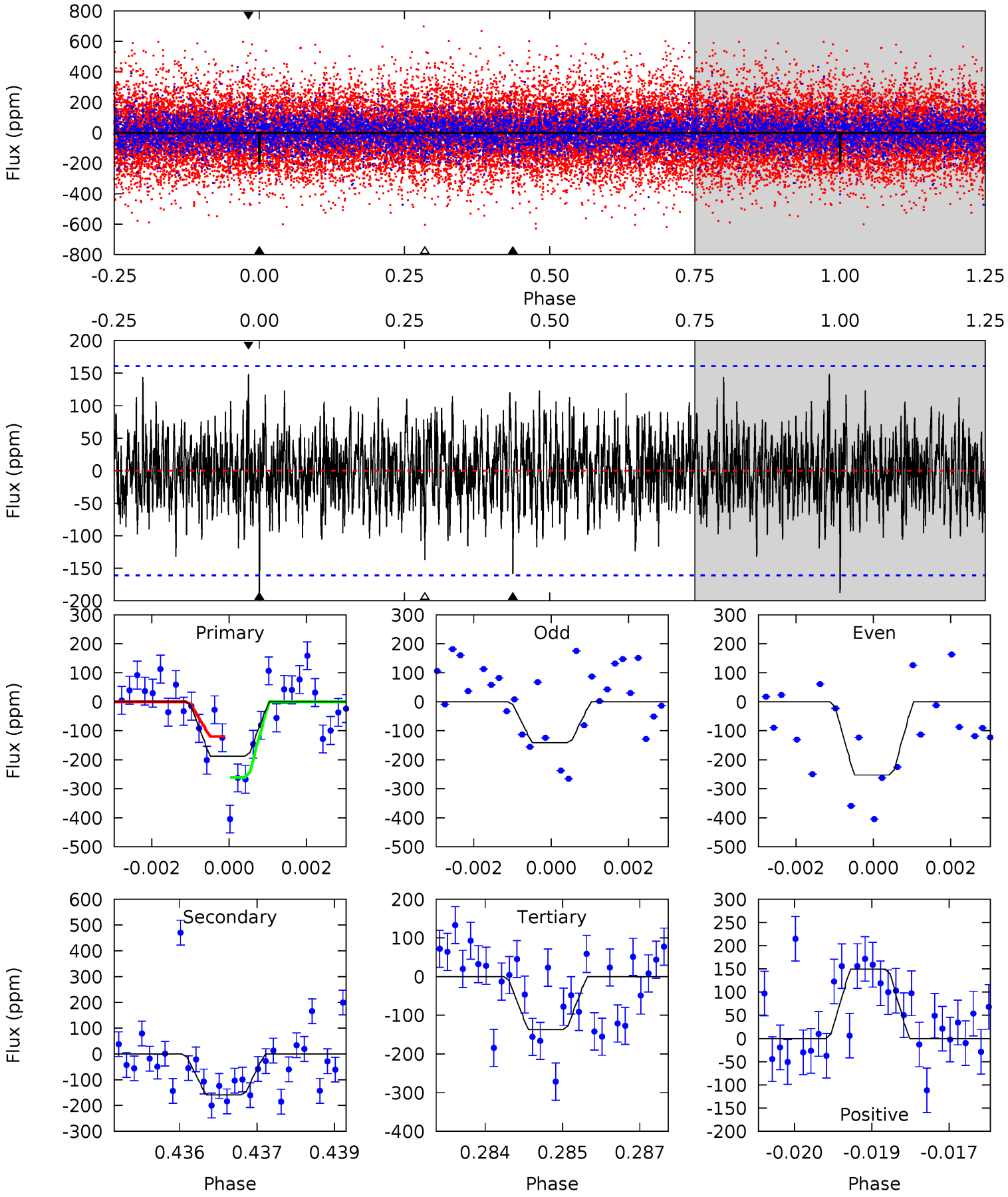




Alt Model-Shift Uniqueness Test

009536870-09, P = 47.448505 Days, E = 103.482269 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.26	5.29	4.56	4.98	5.36	3.14	1.43	1.70	1.29	0.72	0.31	1.80	0.85	0.44	2.35



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-09 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-113±24	$3.27^{+2.84}_{-1.98}$	1039^{+47}_{-54}	5353^{+3408}_{-1180}	476^{+2590}_{-345}
Alt.	-159±30	$3.22^{+2.49}_{-1.93}$	1037^{+47}_{-49}	5901^{+4314}_{-1298}	724^{+3646}_{-501}

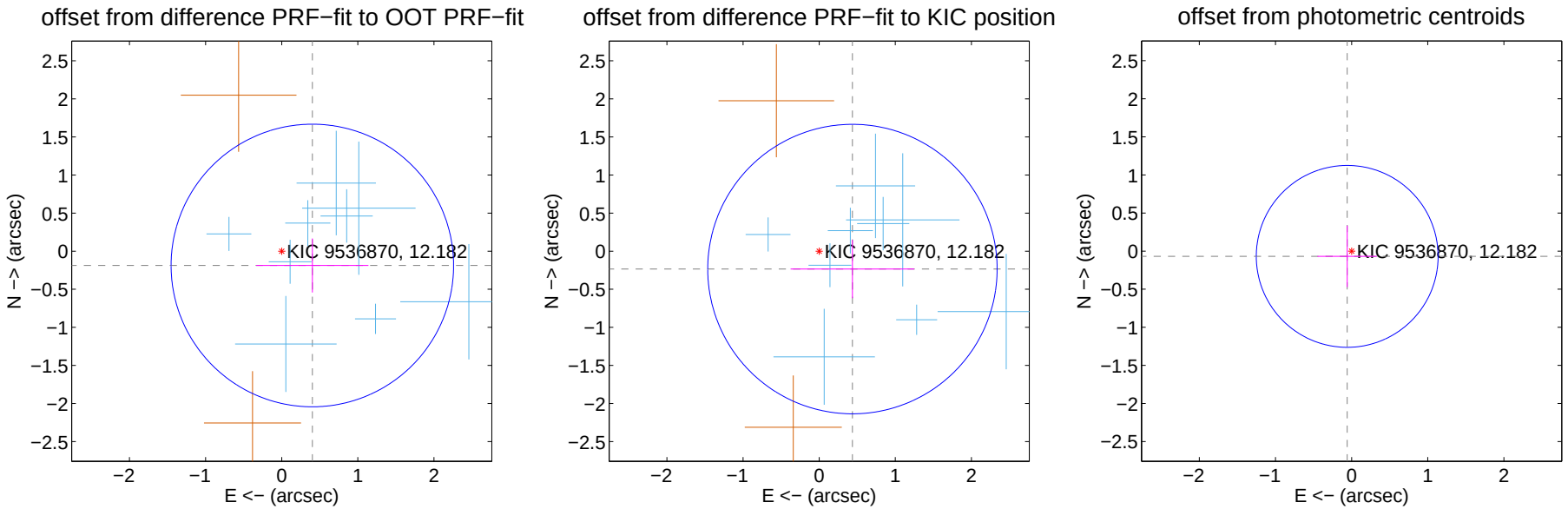
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

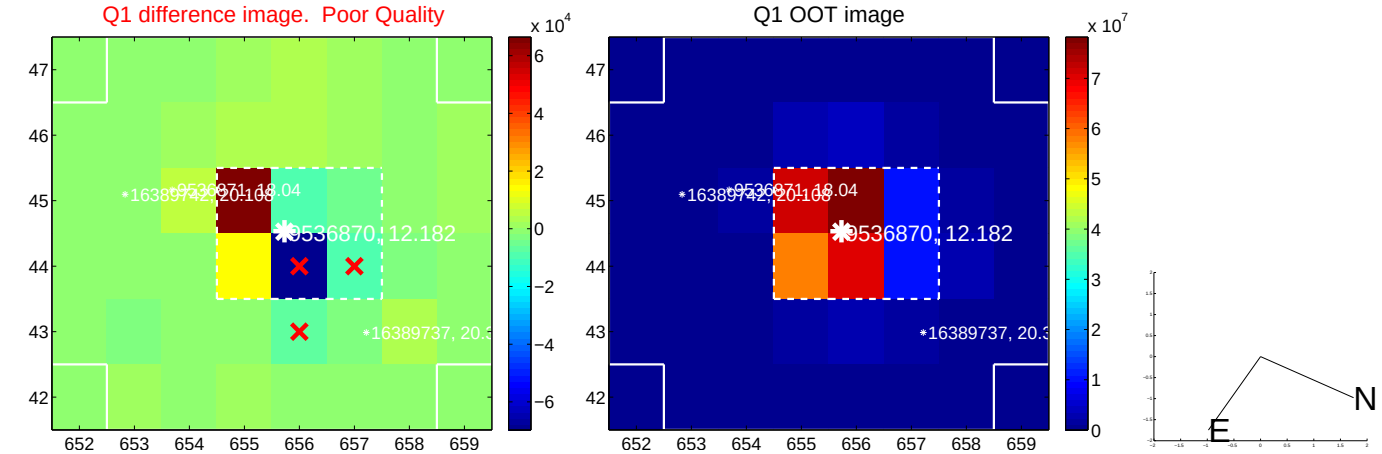
Supplemental centroid analysis for 009536870-09. Kepler magnitude: 12.18. Transit SNR 8.72
There are 9 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

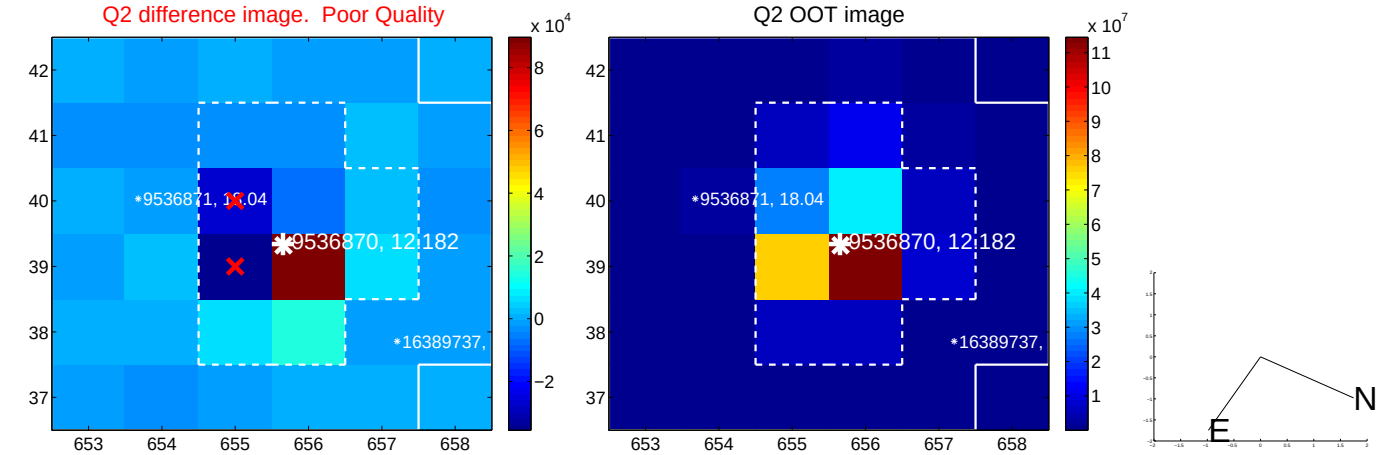
	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.444 ± 0.618	0.72	-0.402 ± 0.737	-0.188 ± 0.355
PRF-fit source offset from KIC position	0.496 ± 0.633	0.78	-0.437 ± 0.813	-0.235 ± 0.382
photometric centroid source offset	0.09 ± 0.40	0.23	0.06 ± 0.39	-0.07 ± 0.40

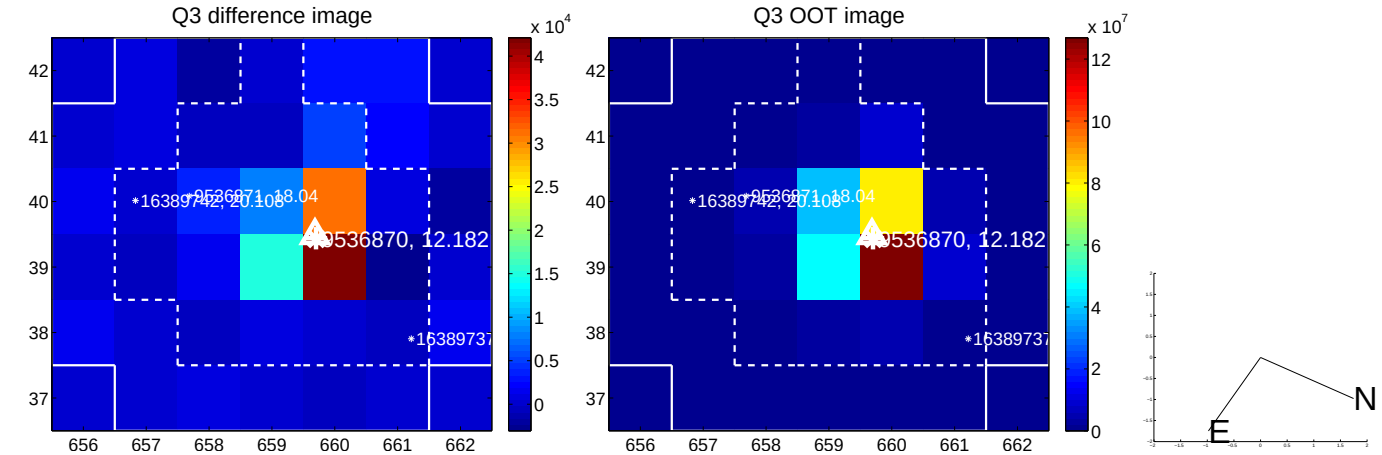


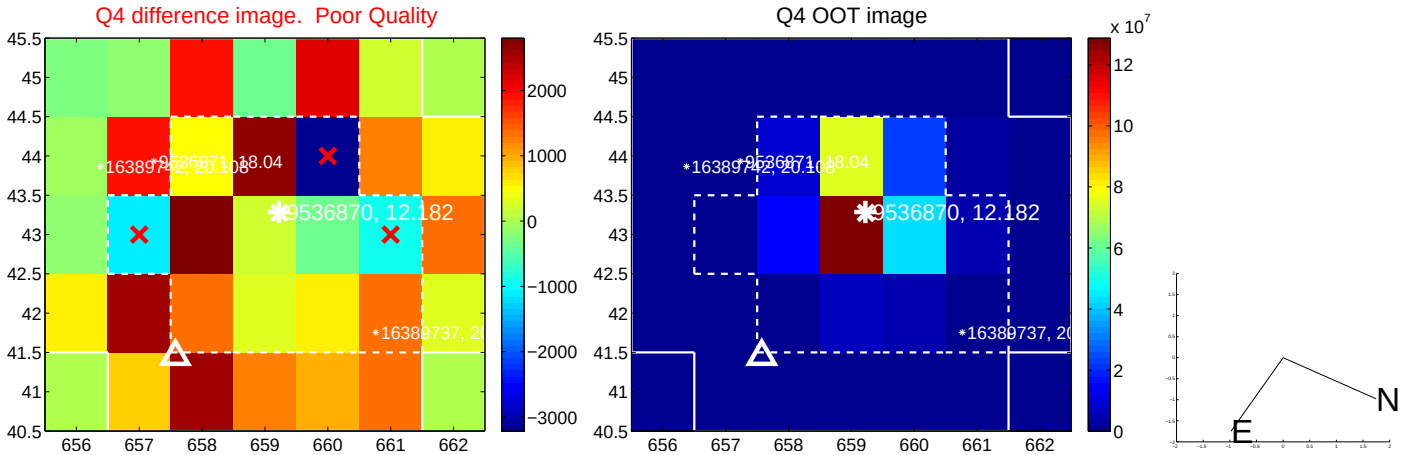
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

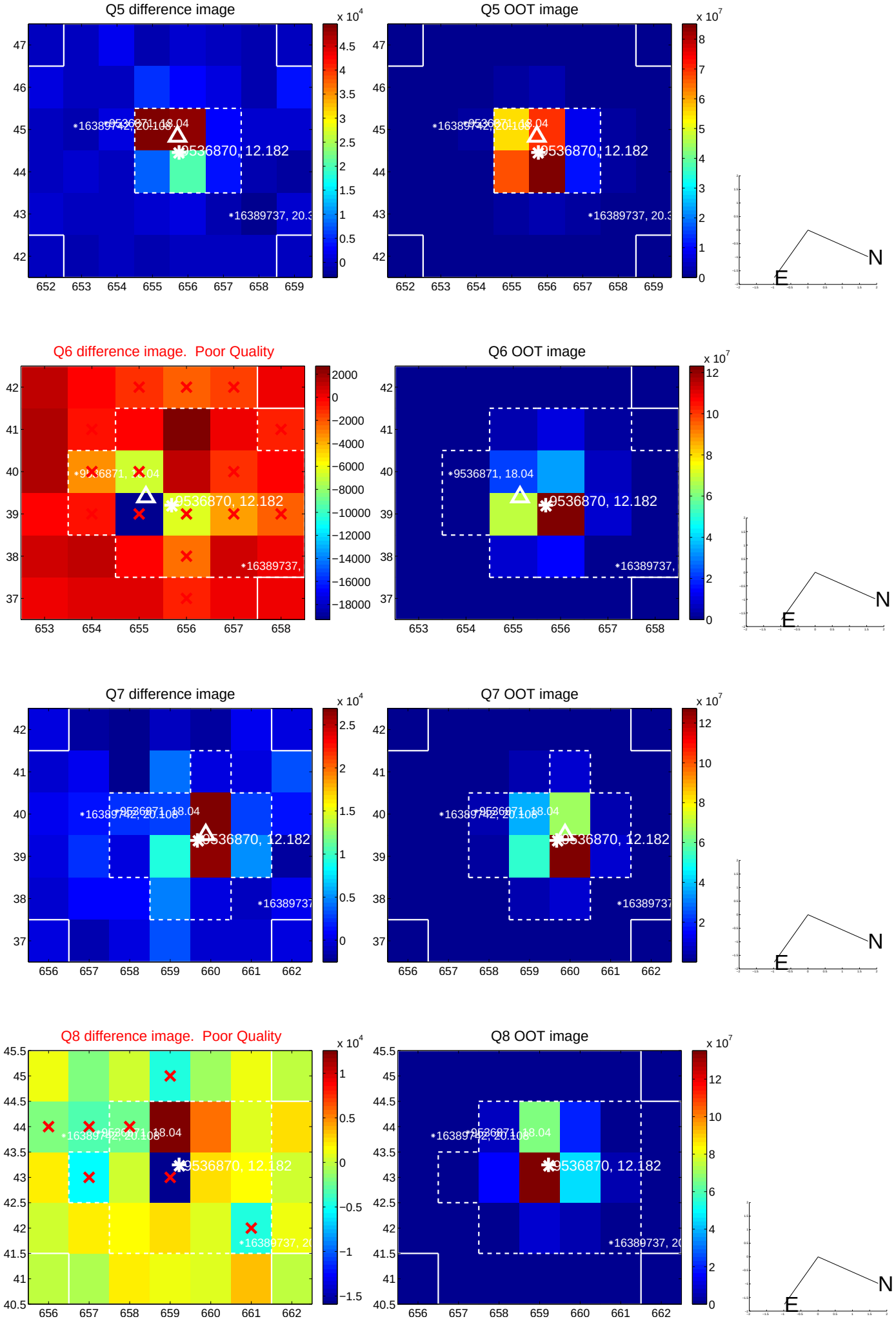




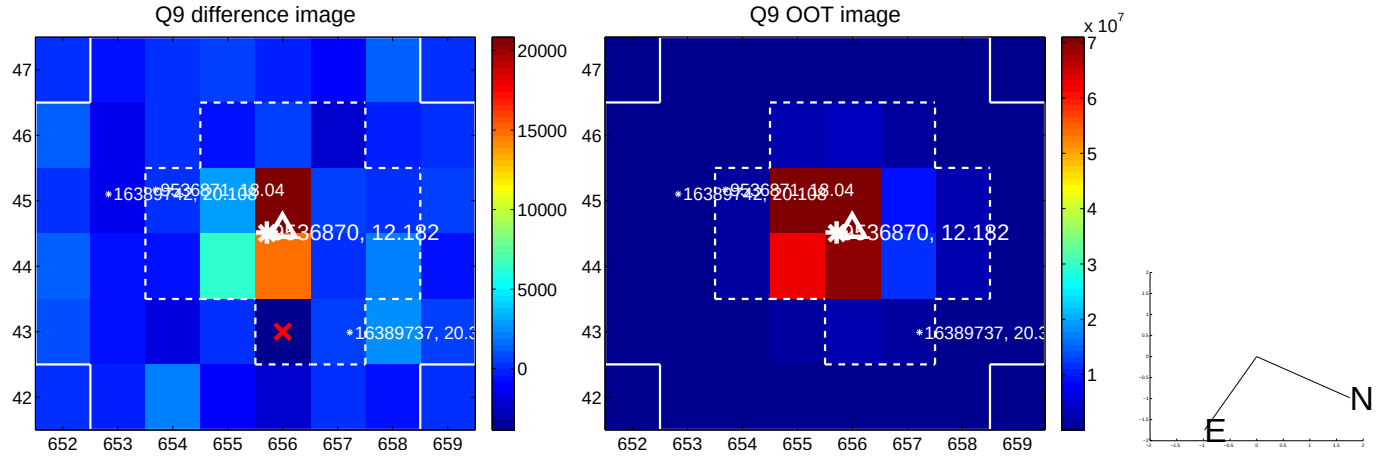


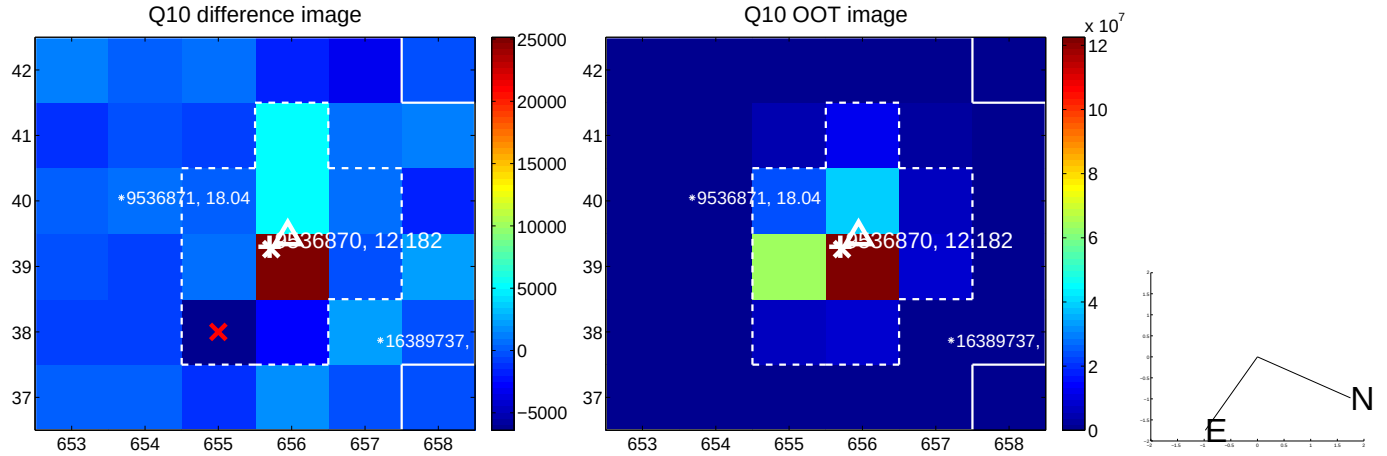


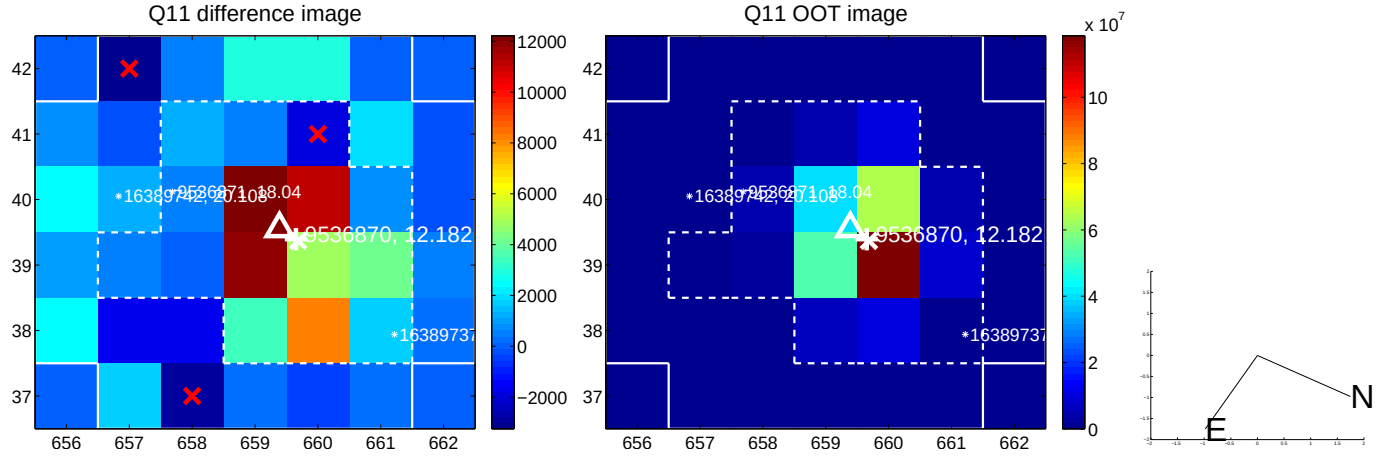
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

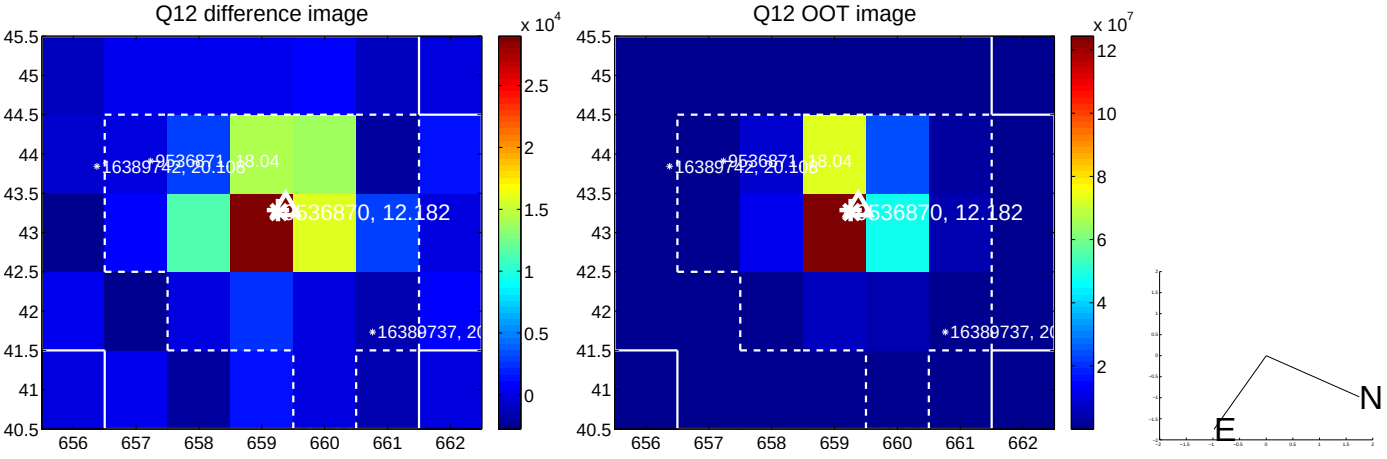


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

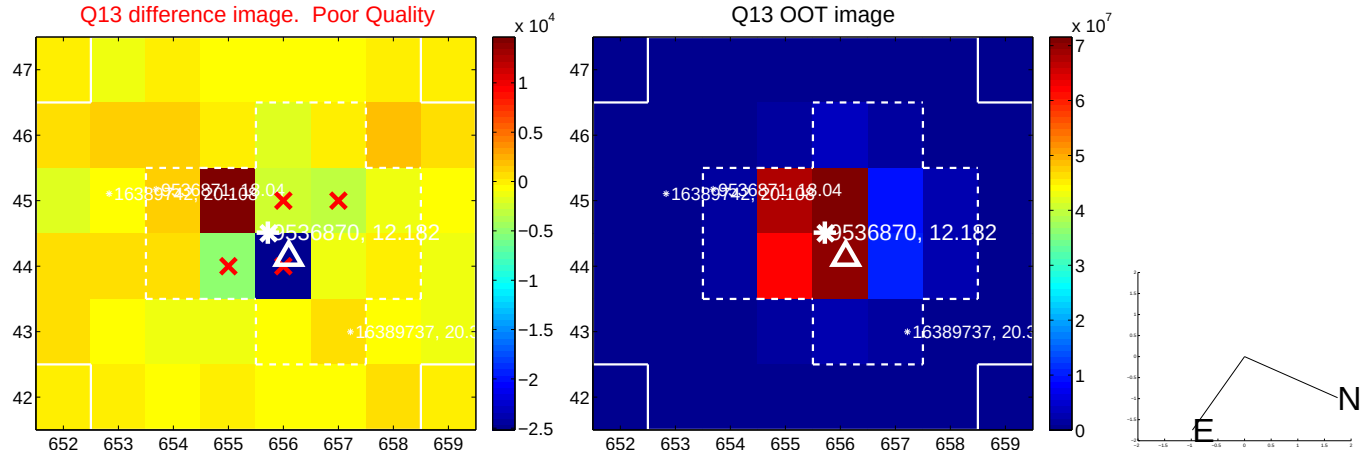


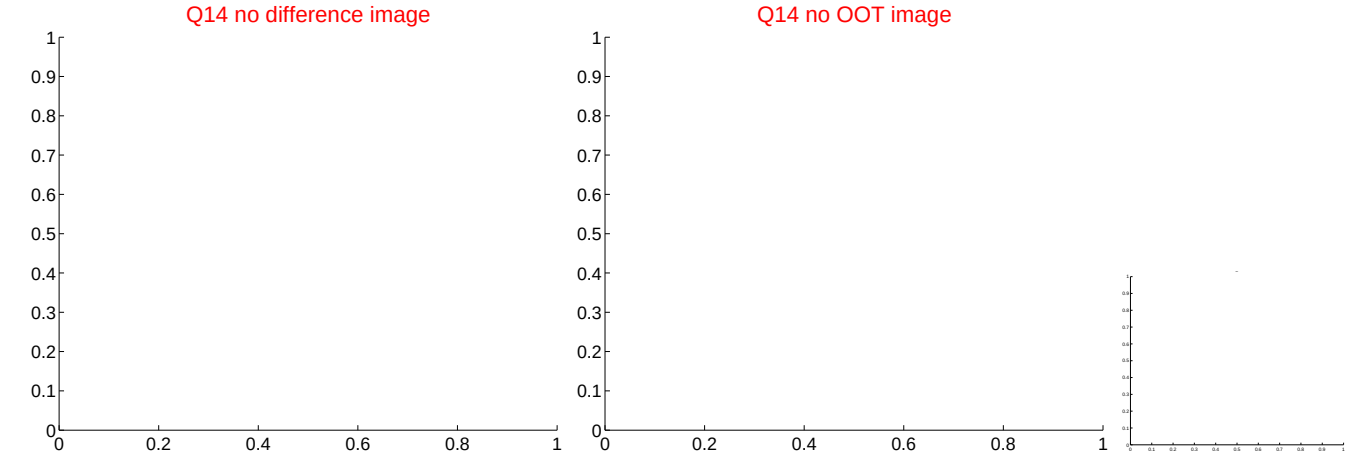


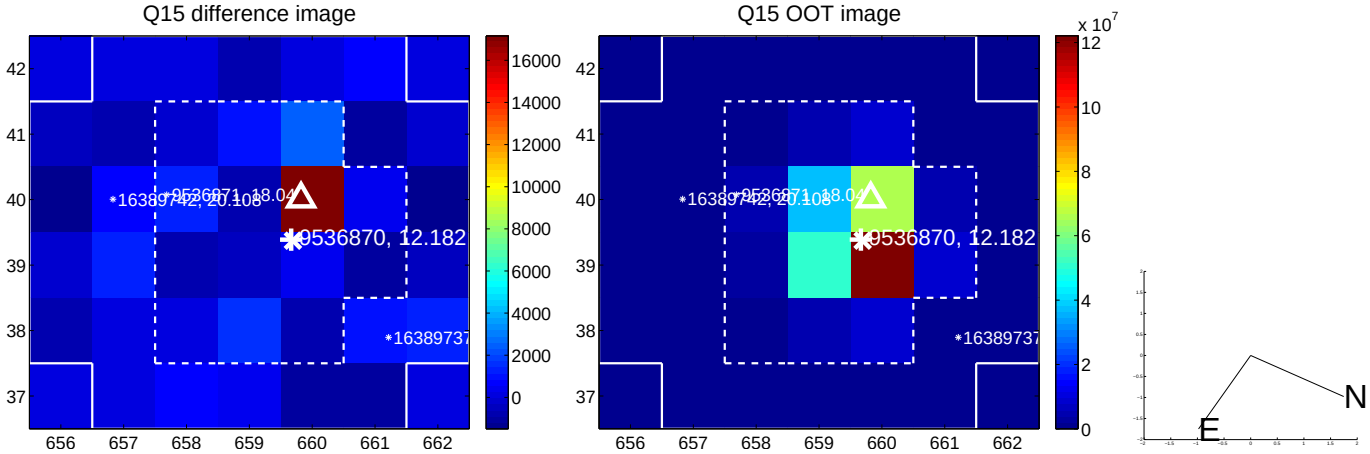


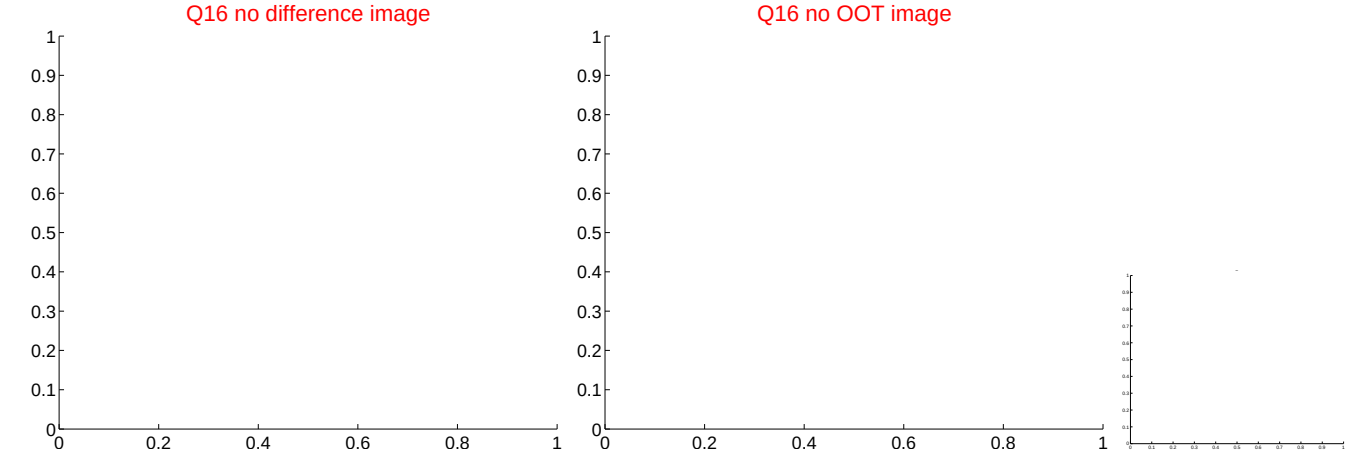


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

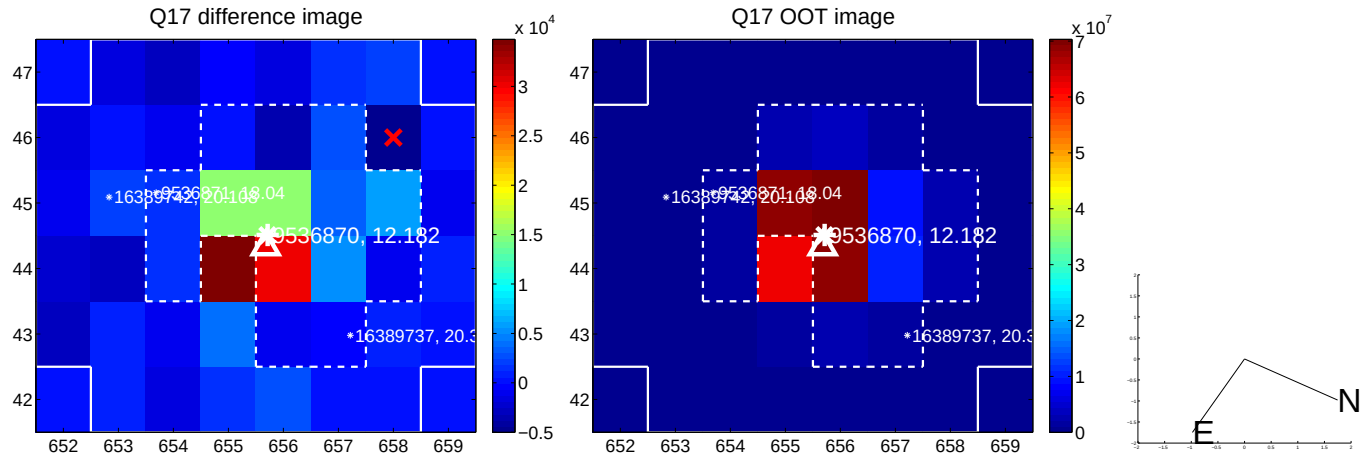


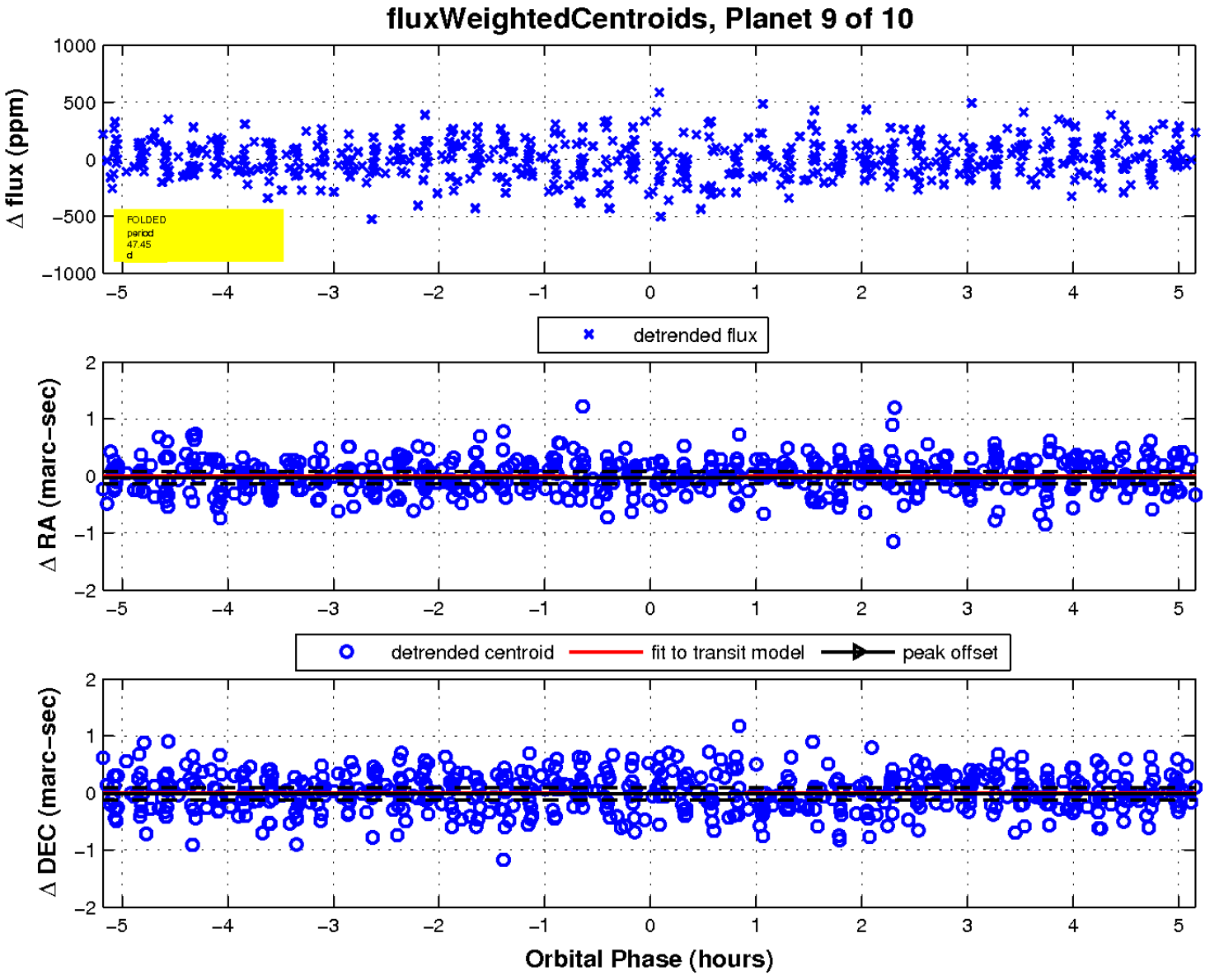




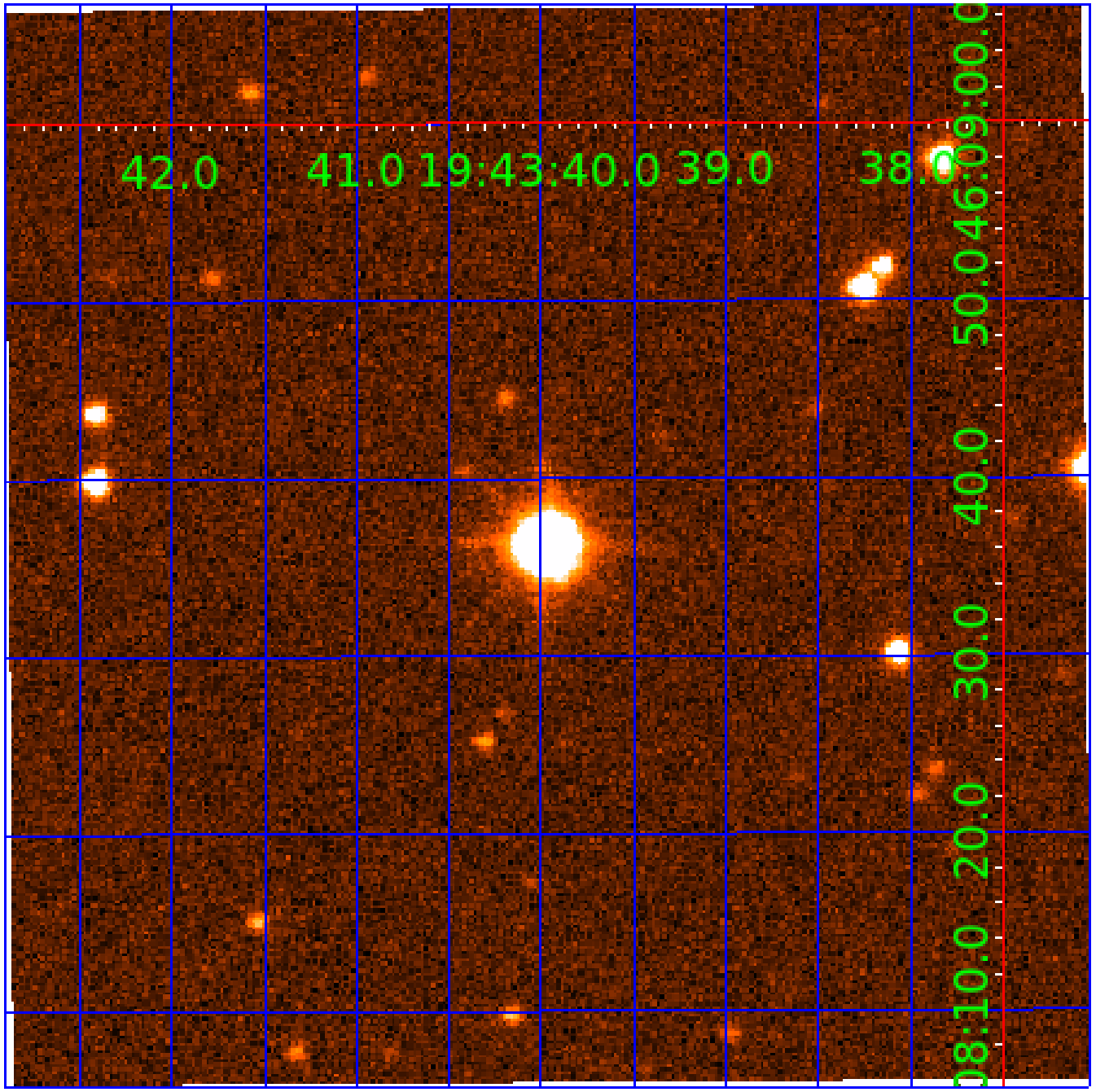


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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38.0
09:00.0
46:
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40.0
30.0
20.0
8:10.0
Declination

KIC 009536870

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_\star$ ($R_\odot$)	$T_\star$ (K)	R_p ($R_\oplus$)	S_p ($S_\oplus$)
009536870-01	OBS	No	0.943322	131.879292	19.3	4.565	9.2	8.2	1.82	6751	0.85	13538.30
009536870-02	OBS	No	120.823506	193.993213	342.7	3.749	8.4	8.3	1.82	6751	6.53	20.97
009536870-03	OBS	No	112.561159	225.436123	261.1	3.397	7.9	8.8	1.82	6751	3.40	23.05
009536870-04	OBS	No	192.578125	196.372269	218.0	6.592	8.1	7.2	1.82	6751	3.00	11.26
009536870-05	OBS	No	61.958544	133.702332	251.7	3.317	9.9	8.2	1.82	6751	3.07	51.09
009536870-06	OBS	No	125.069727	214.361056	260.8	2.529	7.9	8.0	1.82	6751	3.31	20.02
009536870-07	OBS	No	81.409206	132.728881	162.9	7.920	7.9	7.8	1.82	6751	2.50	35.50
009536870-08	OBS	No	56.630415	145.998989	155.1	2.906	7.8	7.2	1.82	6751	2.61	57.59
009536870-09	OBS	No	47.448162	150.933155	257.1	1.728	7.3	8.7	1.82	6751	3.13	72.92
009536870-10	OBS	No	109.744498	218.708111	294.2	1.955	7.5	8.4	1.82	6751	3.60	23.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009536870-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009536870-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009536870-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009536870-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT
009536870-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009536870-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009536870-09	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009536870-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

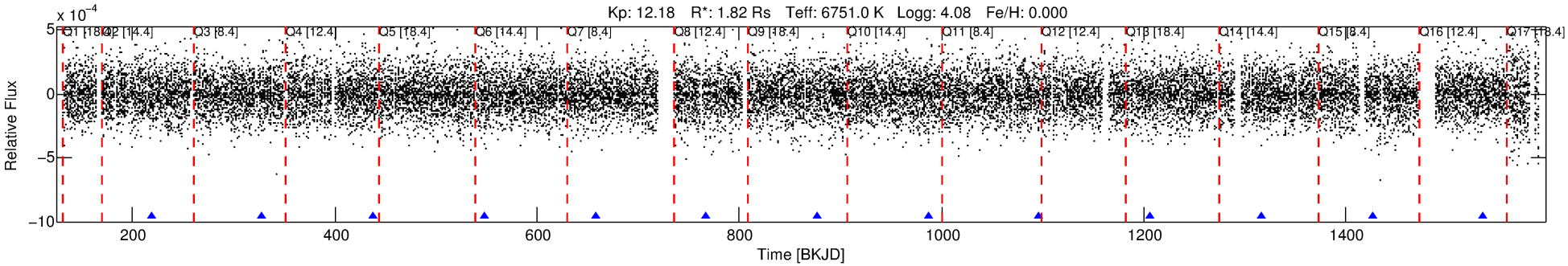
Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

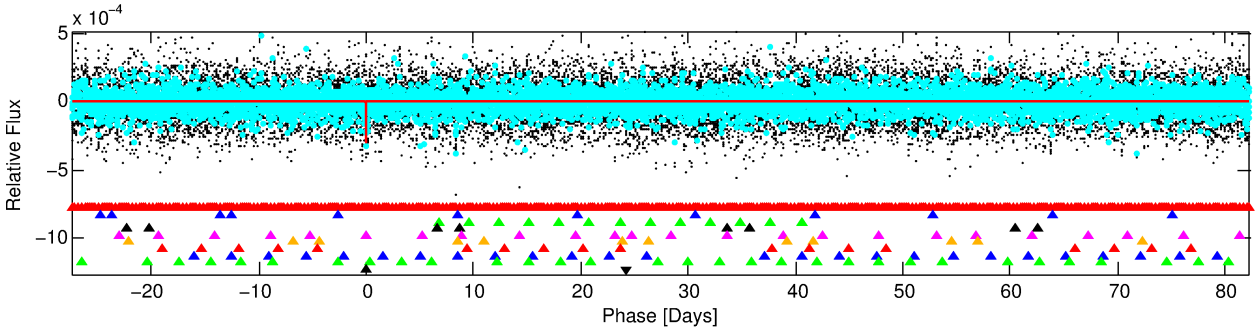
Ephemeris Match Information For 009536870-10

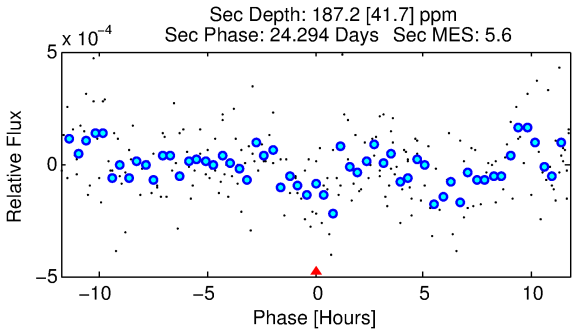
No Significant Match Found

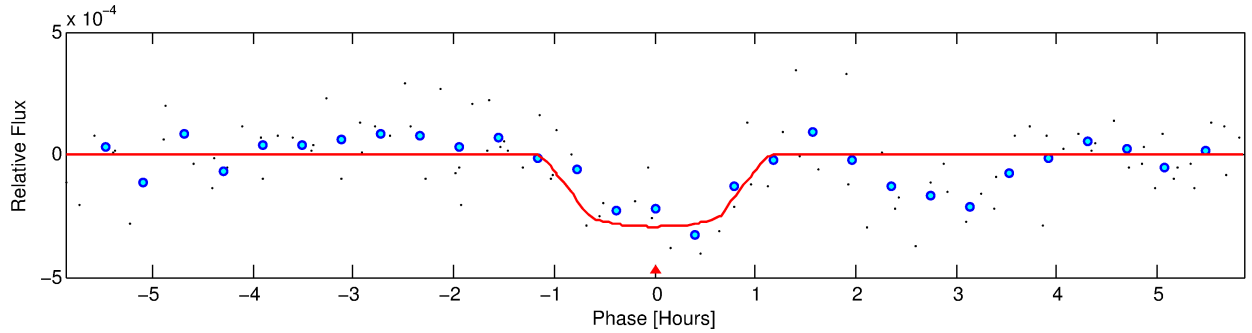
DV One-Page Summary

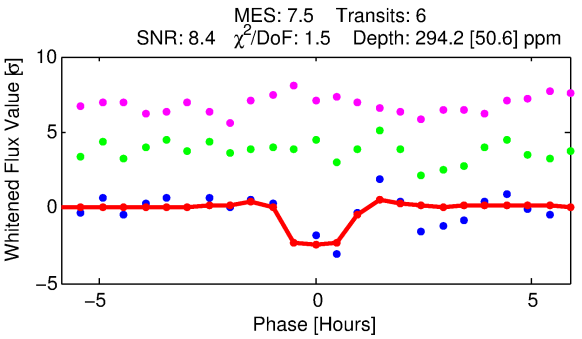
KIC: 9536870 Candidate: 10 of 10 Period: 109.744 d

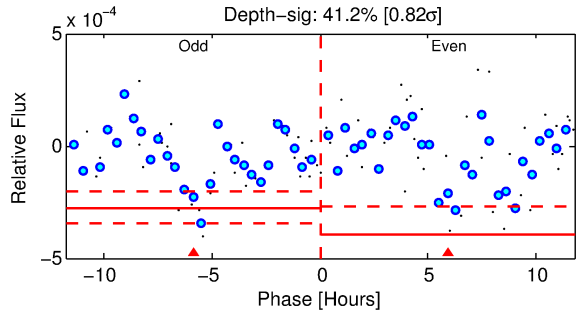


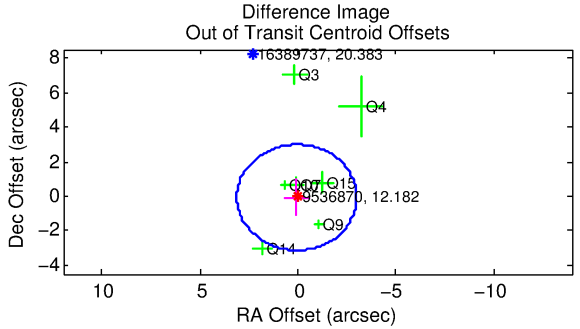












DV Fit Results:

Period = 109.74450 [0.00100] d
Epoch = 218.7081 [0.0059] BKJD
Rp/R* = 0.0182 [0.0118]
a/R* = 214.79 [796.85]
b = 0.89 [0.91]

Seff = 23.84 [6.12]
Teq = 563 [36] K
Rp = 3.60 [2.43] Re
a = 0.5074 [0.0820] AU

Ag = 2046.06 [2747.90] [0.74σ]
Teffp = 5859 [1935] K [2.74σ]

DV Diagnostic Results:

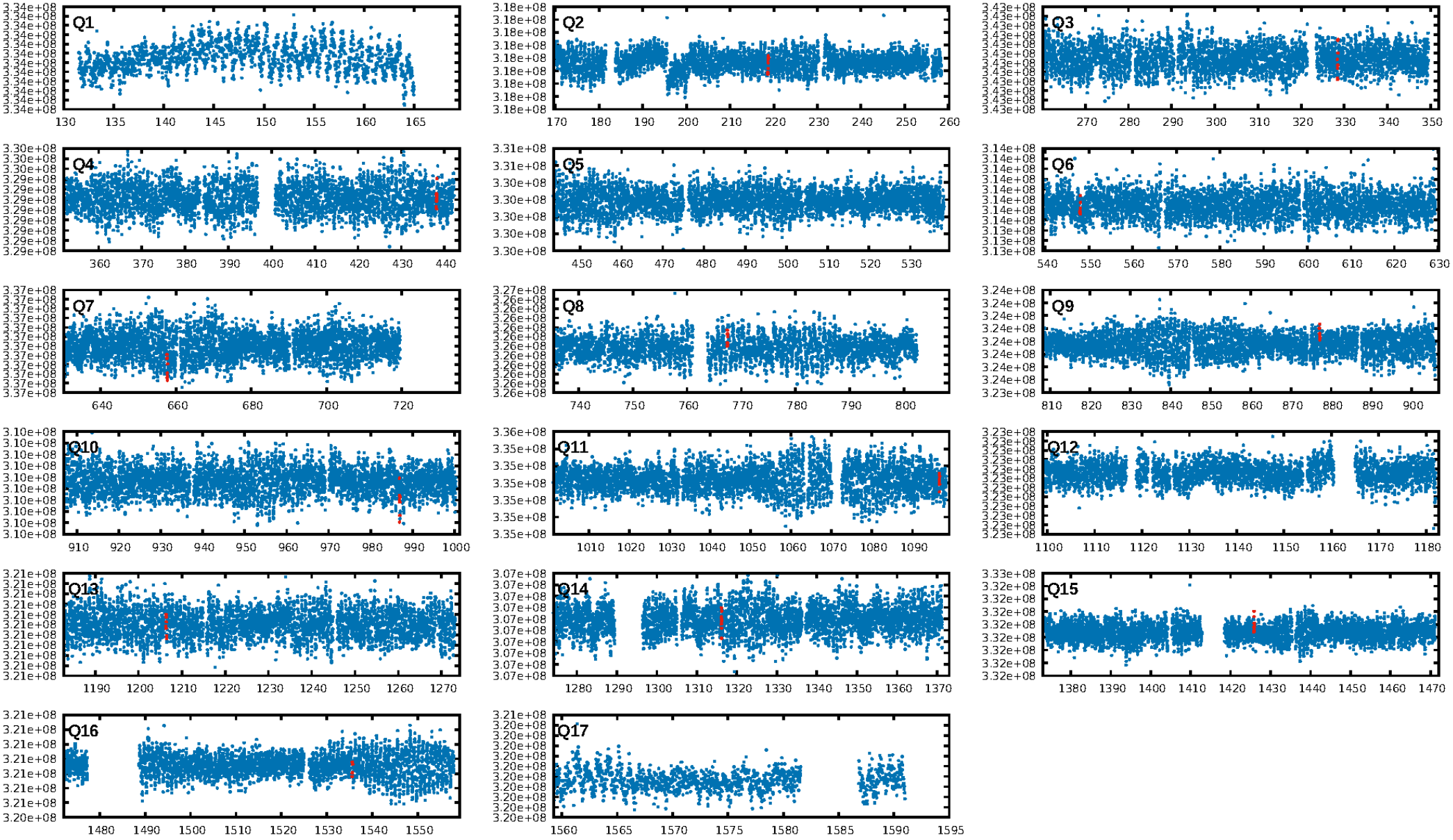
ShortPeriod−sig: 100.0% [83.36σ]
LongPeriod−sig: 100.0% [17.25σ]
ModelChiSquare2−sig: 94.2%
ModelChiSquareGof−sig: 99.2%
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [6/6]
GhostDiagnostic−chr: 1.686

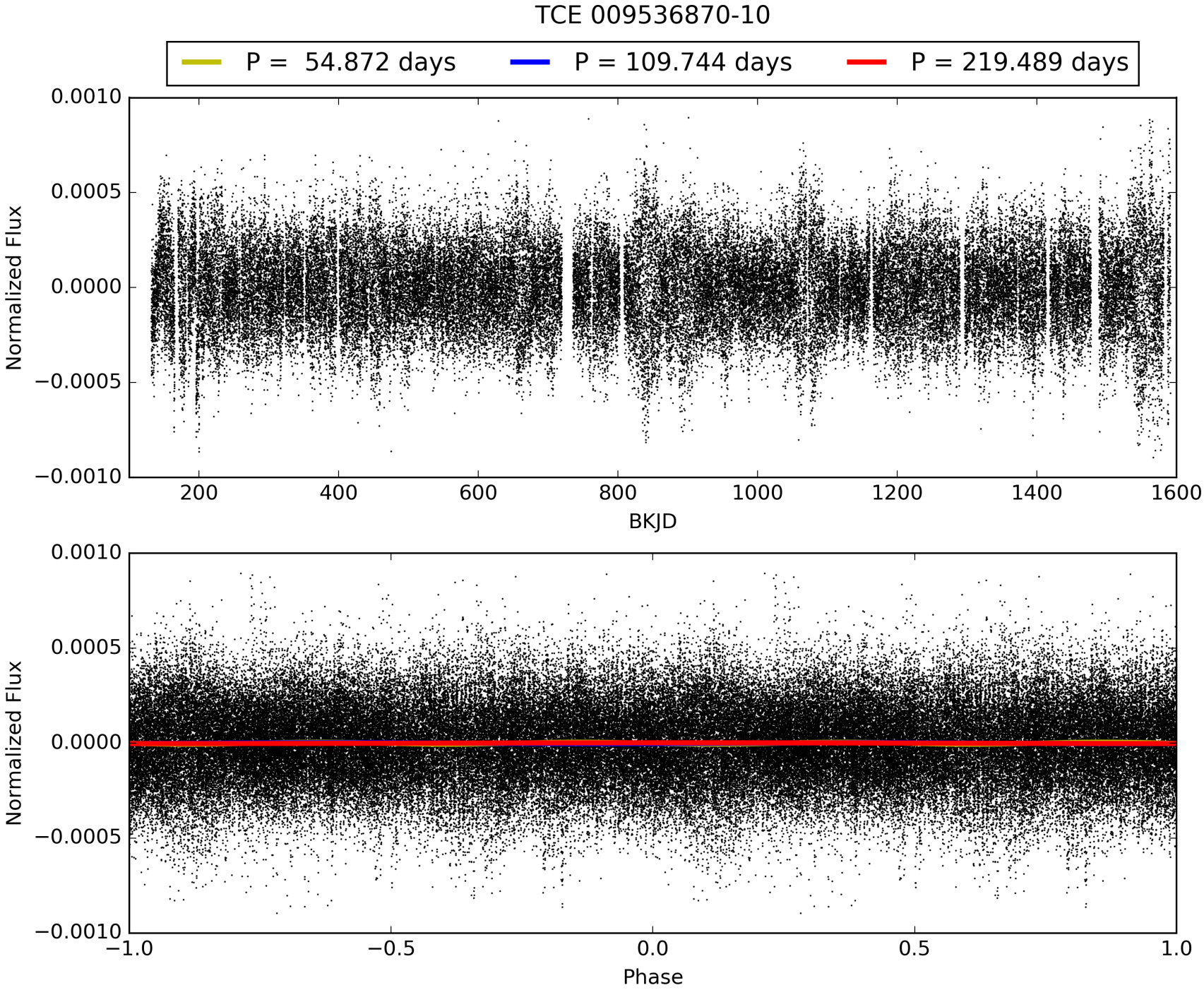
Centroid−sig: 86.2%
Centroid−so: 0.009 arcsec [0.02σ]
OotOffset−rm: 0.100 arcsec [0.10σ]
KicOffset−rm: 0.199 arcsec [0.15σ]
OotOffset−st: 2/3/1/1 [7]
KicOffset−st: 2/3/1/1 [7]
DiffImageQuality−fgm: 0.43 [3/7]
DiffImageOverlap−fno: 0.33 [4/12]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 03−Feb−2016 05:22:55 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009536870-10, PDC Light Curves

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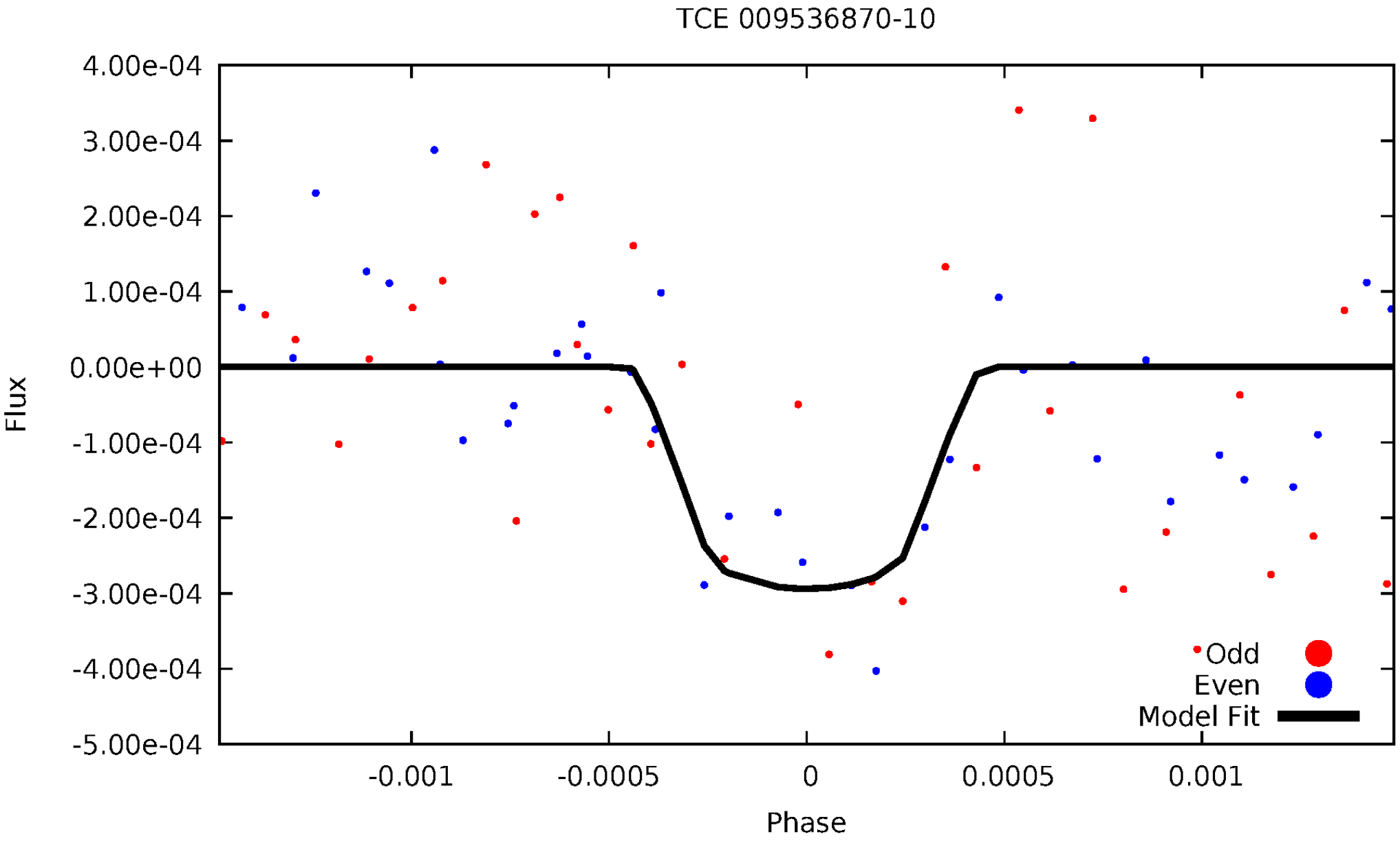
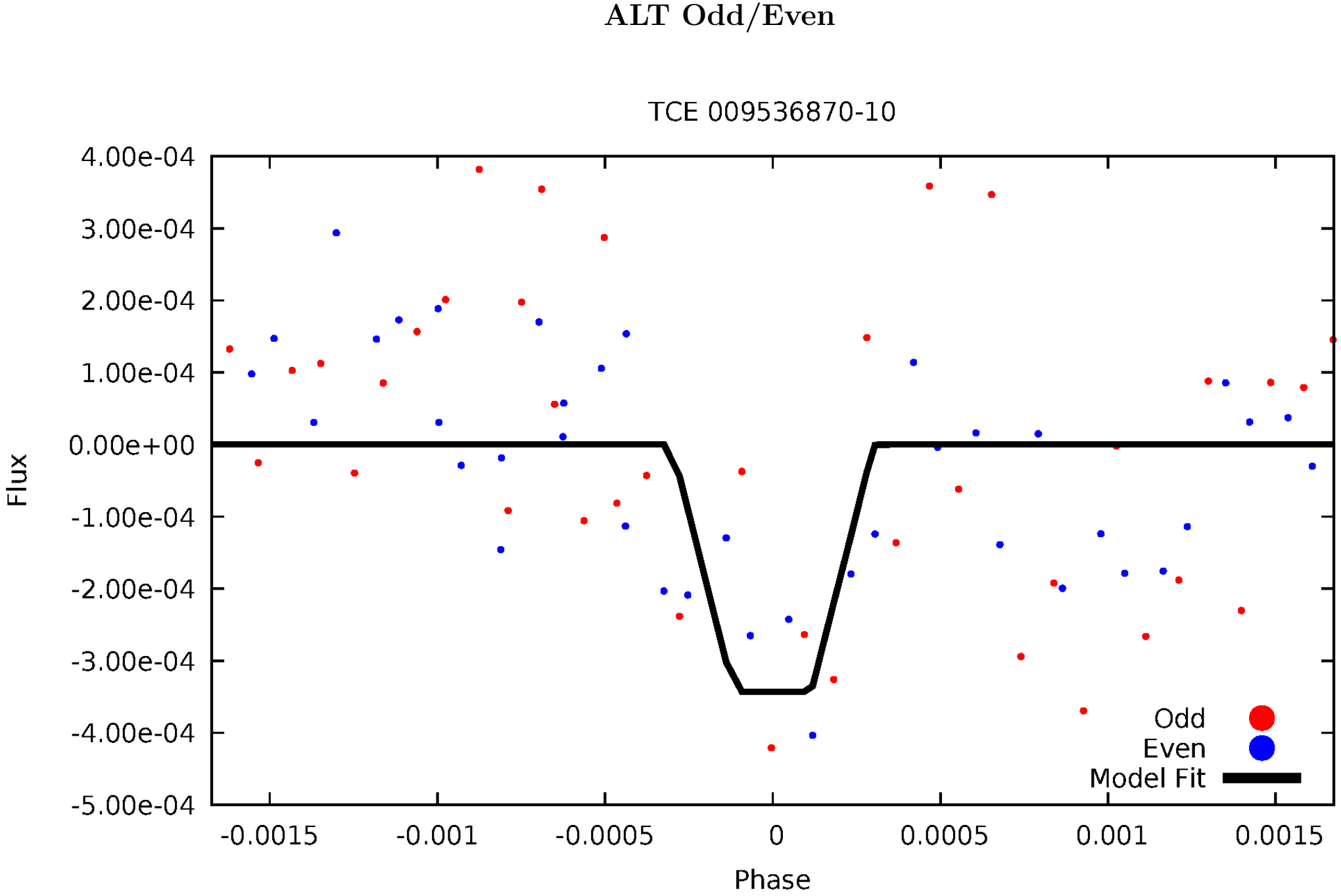
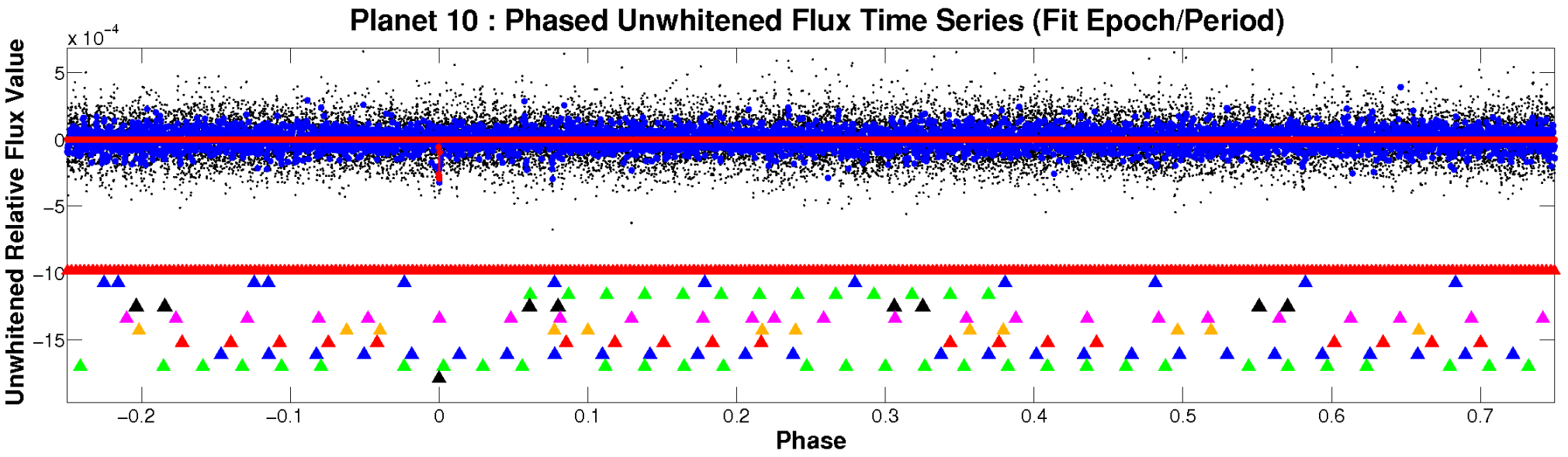
P = 54.872 days
P = 109.744 days
P = 219.489 days
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
200
400
600
800
1000
1200
1400
1600
BKJD
Normalized Flux
0.0010
0.0005
0.0000
−0.0005
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Phase

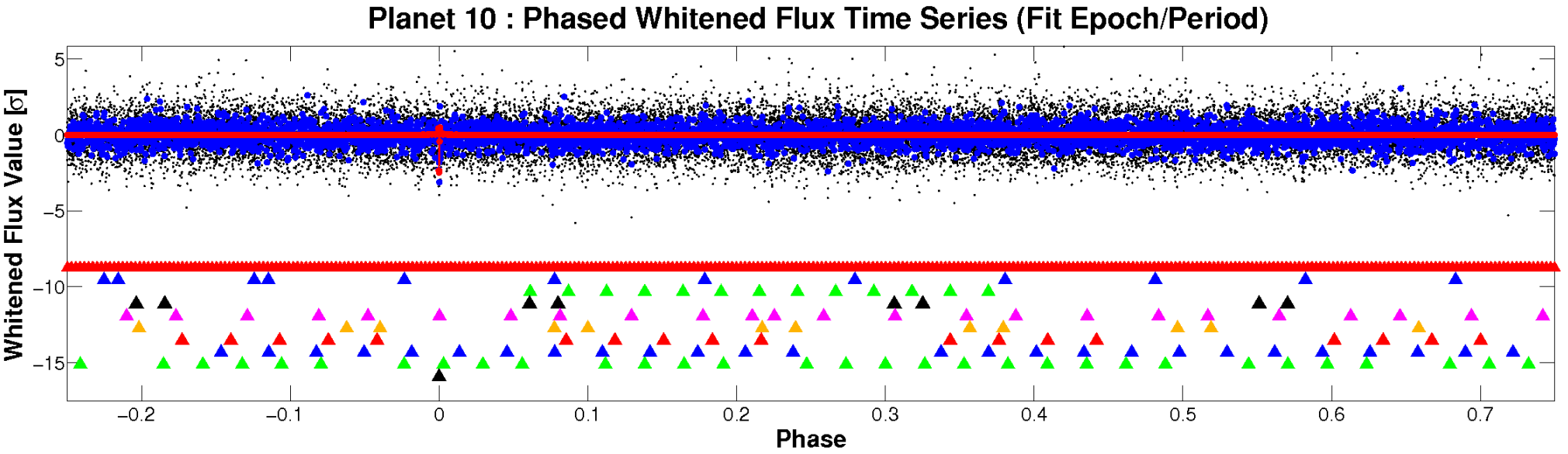
DV Odd/Even


TCE 009536870-10
4.00e-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
Flux
-0.001
-0.0005
0
0.0005
0.001
Phase
Odd
Even
Model Fit


ALT Odd/Even
TCE 009536870-10
4.00e-04
3.00e-04
2.00e-04
1.00e-04
0.00e+00
-1.00e-04
-2.00e-04
-3.00e-04
-4.00e-04
-5.00e-04
Flux
-0.0015
-0.001
-0.0005
0
0.0005
0.001
0.0015
Phase
Odd
Even
Model Fit

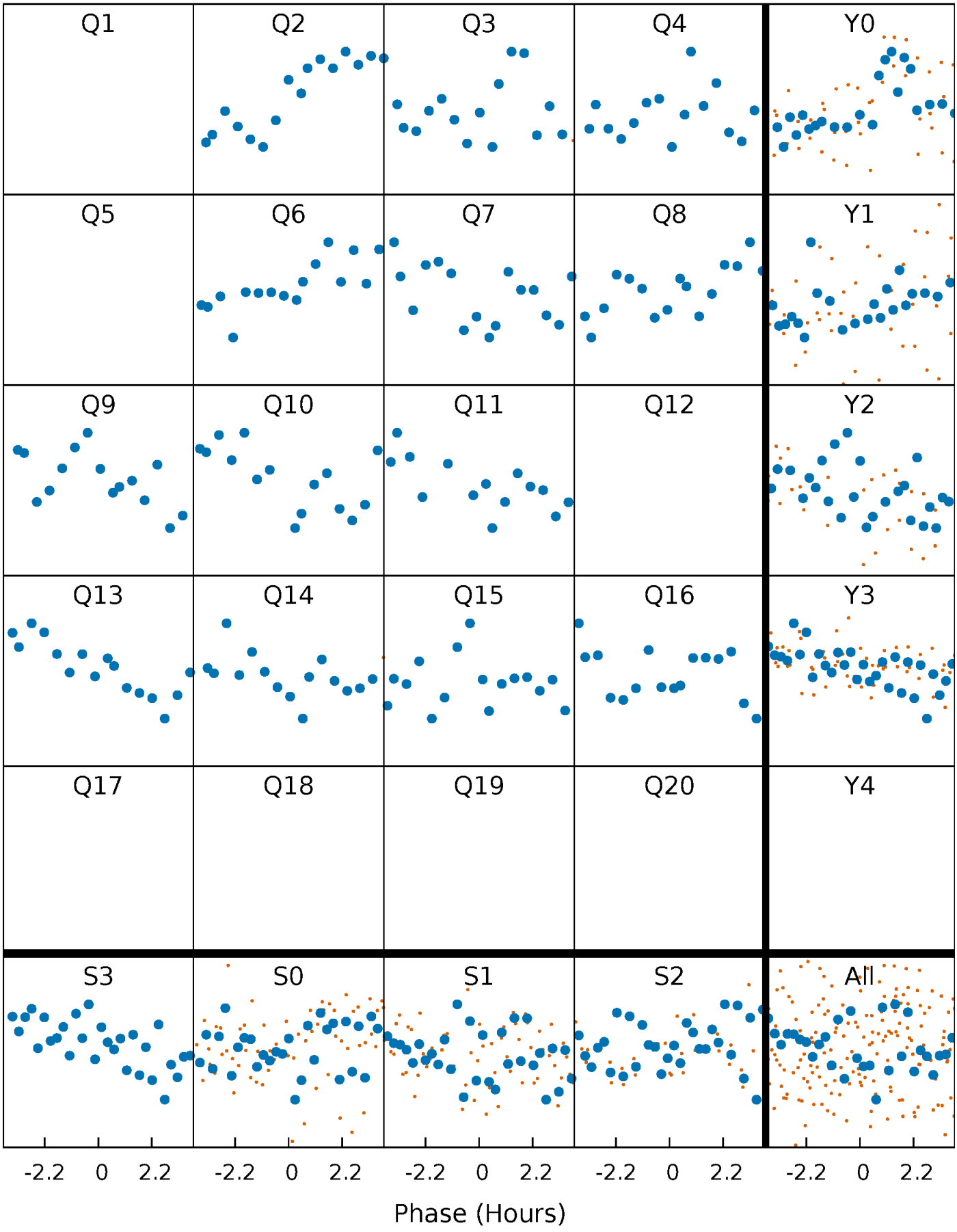
Non-Whitened Vs. Whitened Light Curve





PDC Quarter-Phased Transit Curves

TCE 009536870-10 P=109.744498 Days T_0=218.708111 (BKJD)



DV Quarter-Phased Transit Curves

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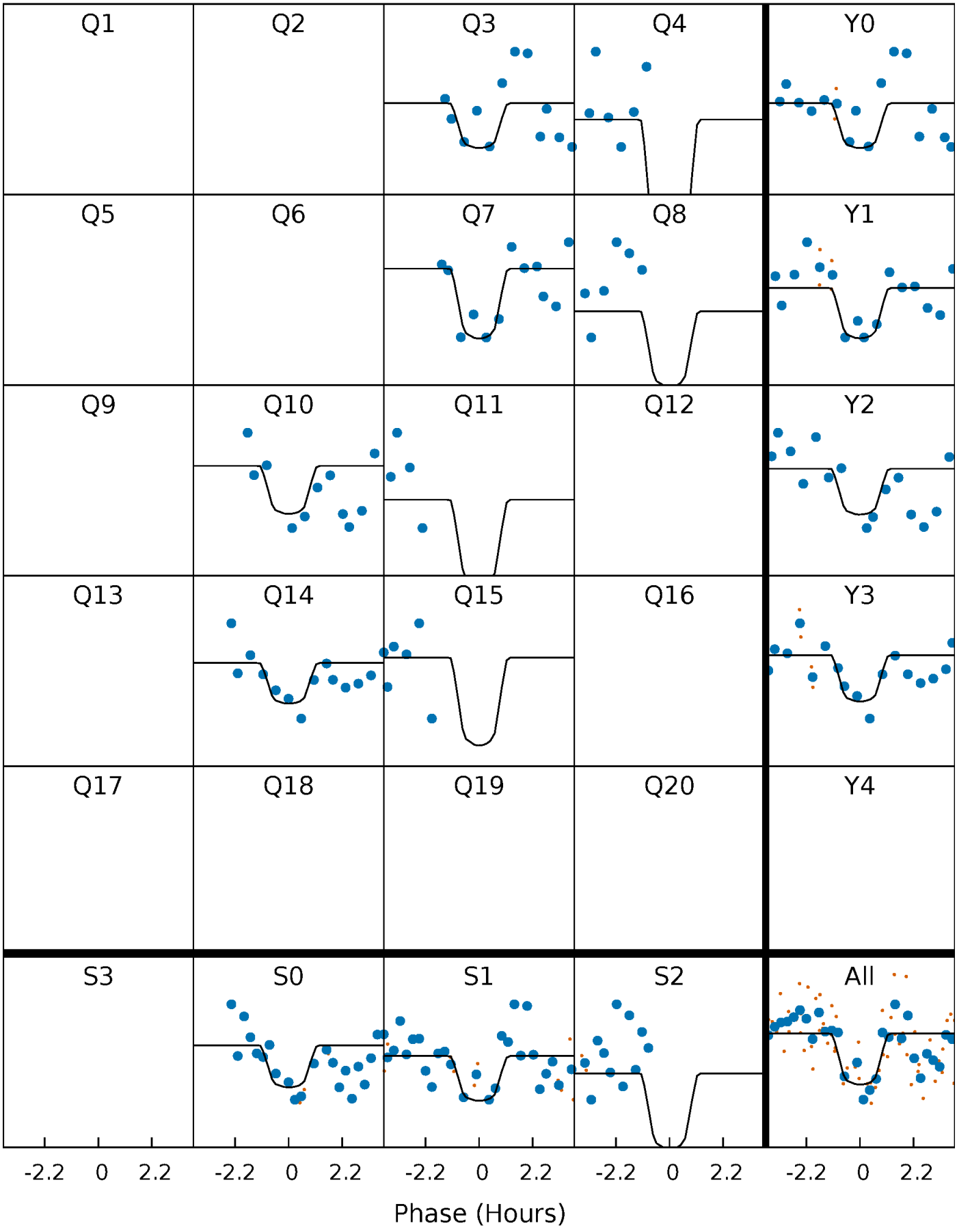

Alt. Detrend Quarter-Phased Transit Curves

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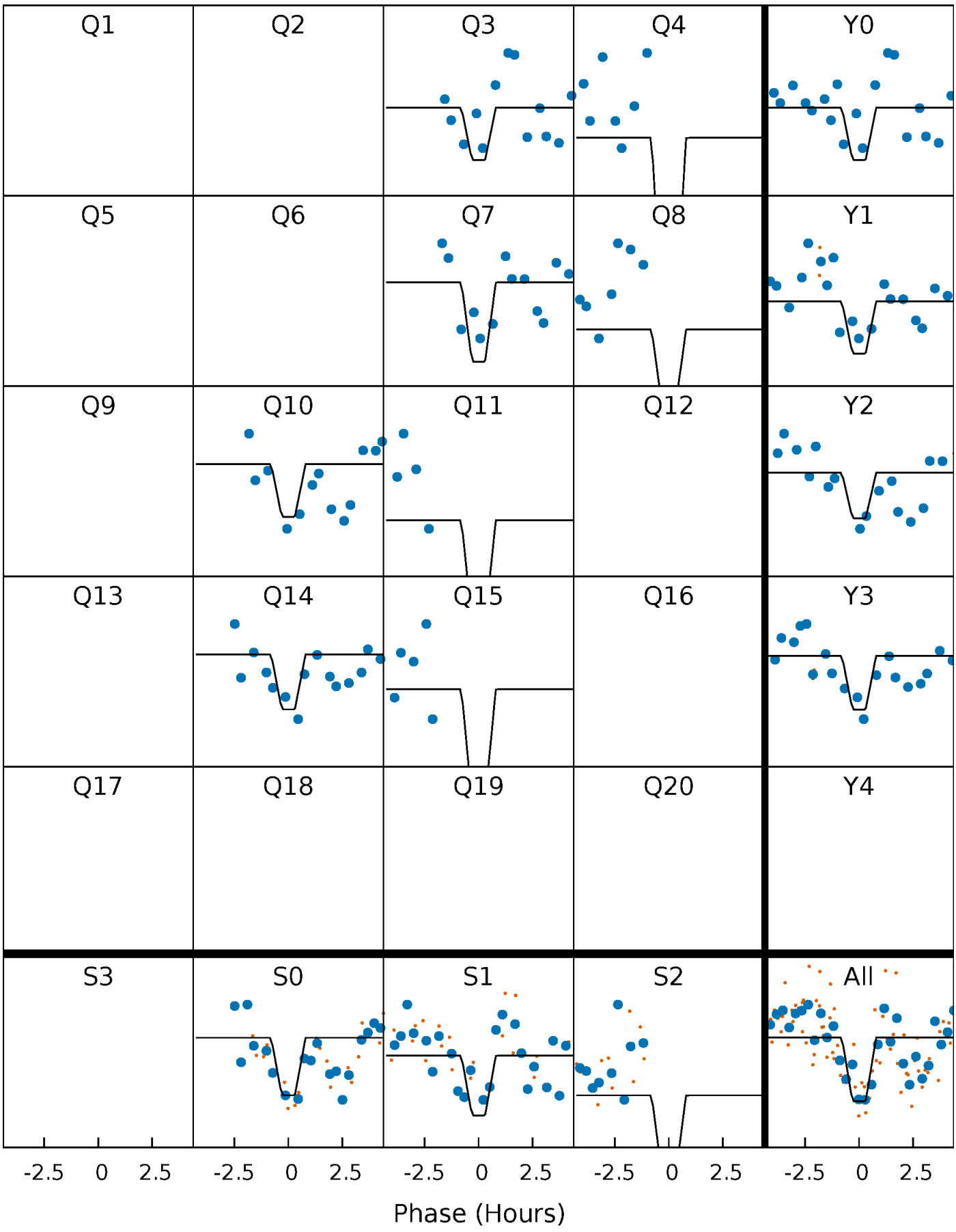
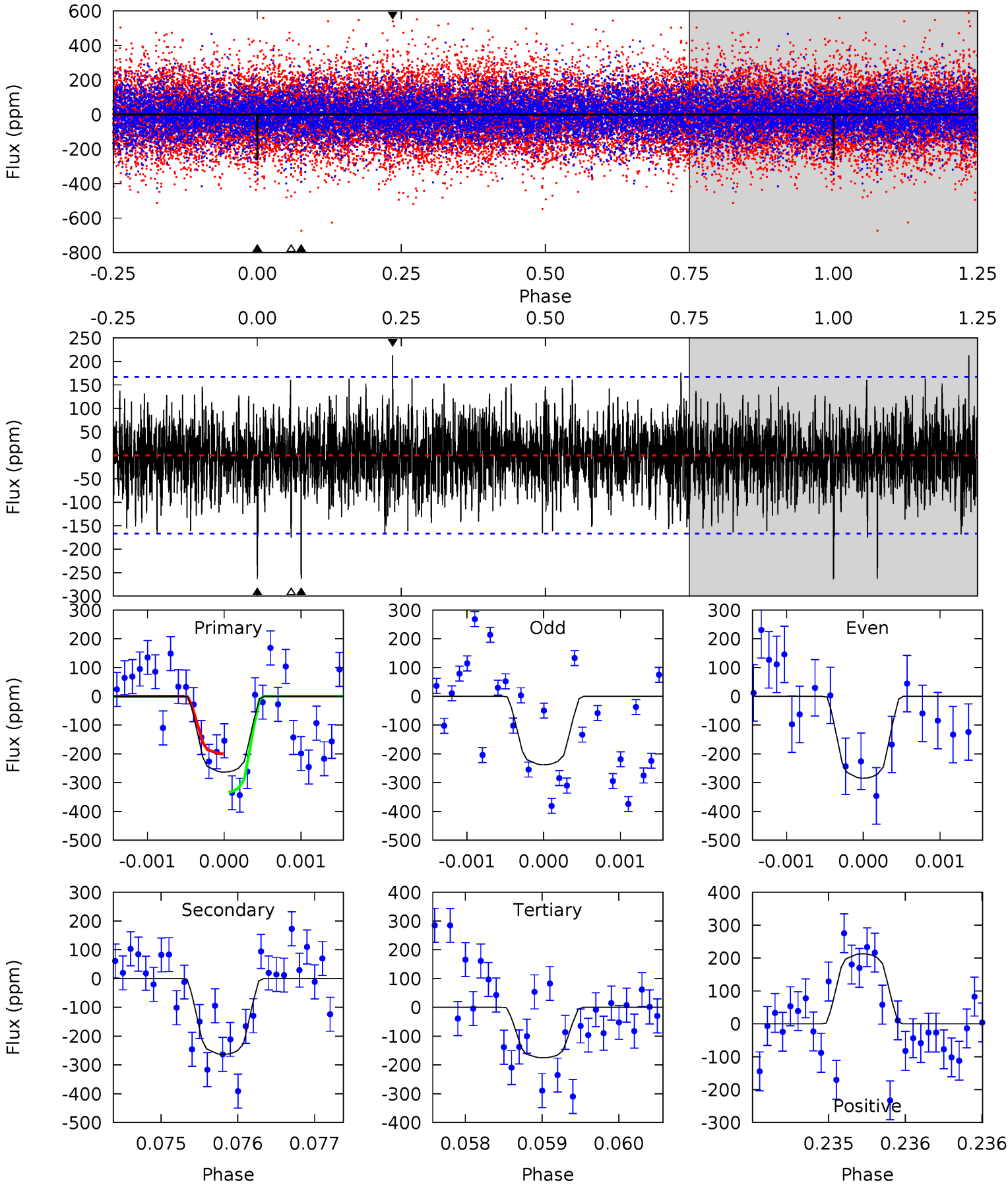


DV Model-Shift Uniqueness Test

009536870-10, P = 109.744498 Days, E = 108.963613 Days

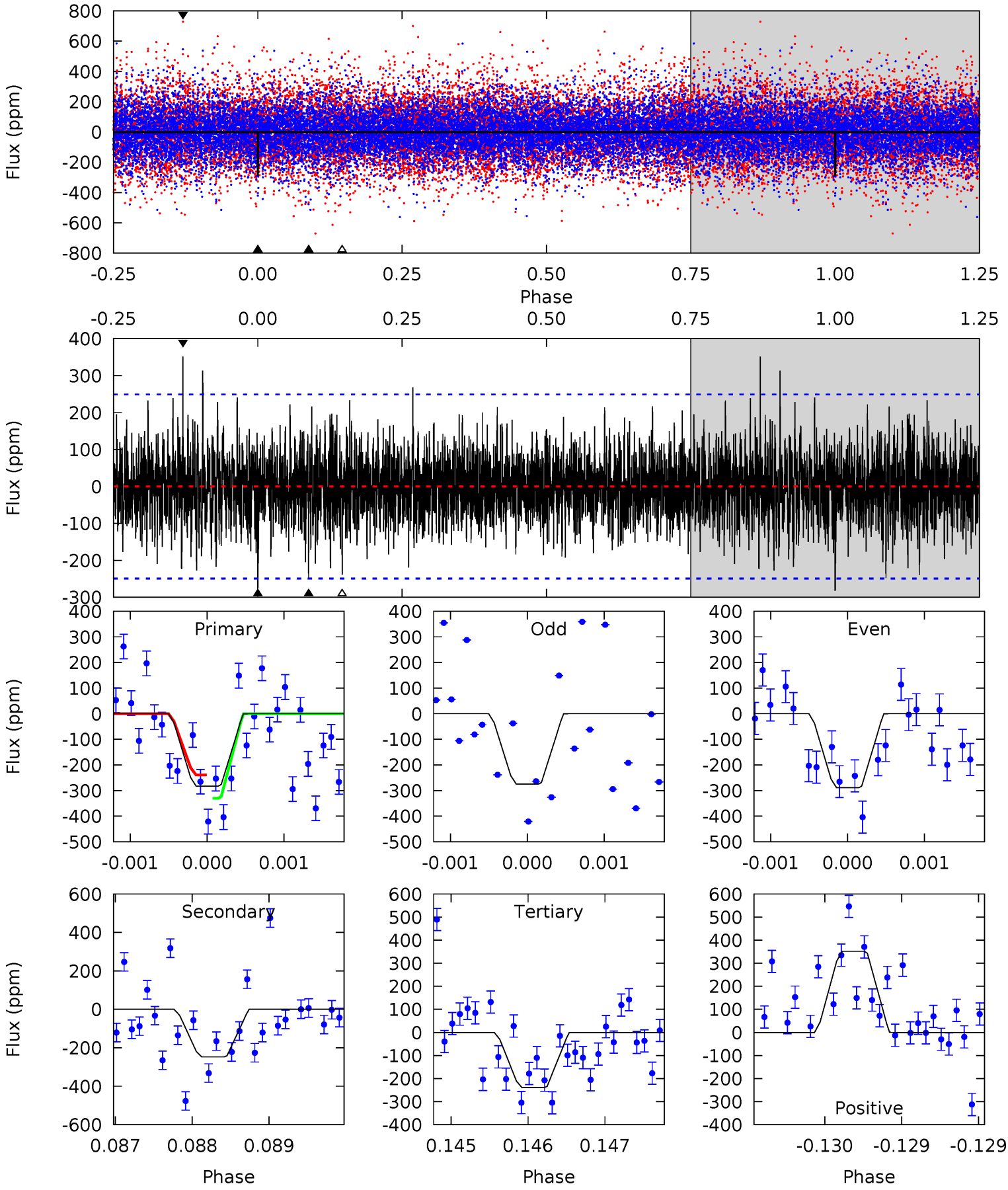
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.62	8.62	5.72	6.97	5.46	3.31	1.68	2.90	1.65	2.90	1.65	0.76	0.93	0.45	2.19



Alt Model-Shift Uniqueness Test

009536870-10, P = 109.744330 Days, E = 108.971678 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.27	5.50	5.31	7.79	5.53	3.41	1.53	0.95	-1.53	0.18	-2.30	0.16	1.02	0.55	1.00



Stellar Parameters For KIC 009536870

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6751^{+60}_{-101}	$4.080^{+0.143}_{-0.117}$	$0.000^{+0.150}_{-0.150}$	$1.816^{+0.323}_{-0.323}$	$1.446^{+0.115}_{-0.126}$	$0.340^{+0.240}_{-0.121}$
	+1%/-1%	+4%/-3%	+inf%/-inf%	+18%/-18%	+8%/-9%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009536870-10 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-263±31	$3.69^{+2.34}_{-2.03}$	784^{+37}_{-38}	6183^{+3822}_{-1180}	2727^{+10773}_{-1701}
Alt.	-248±45	$3.81^{+2.19}_{-2.03}$	784^{+39}_{-38}	6069^{+3471}_{-1177}	2414^{+8478}_{-1479}

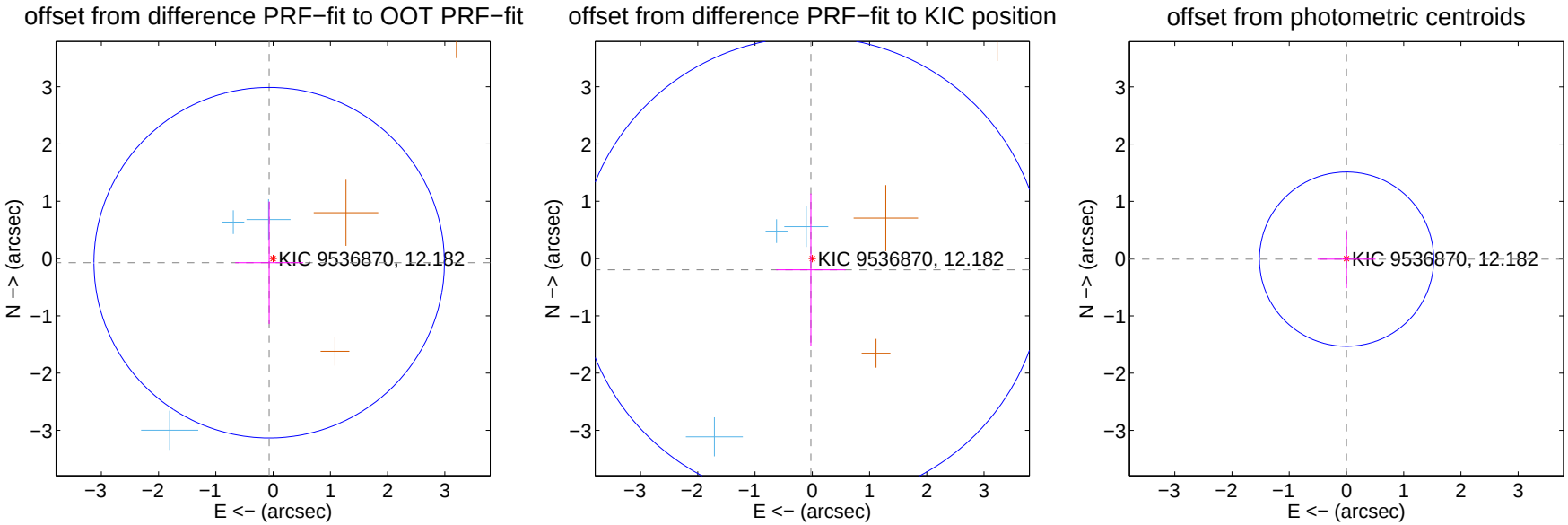
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

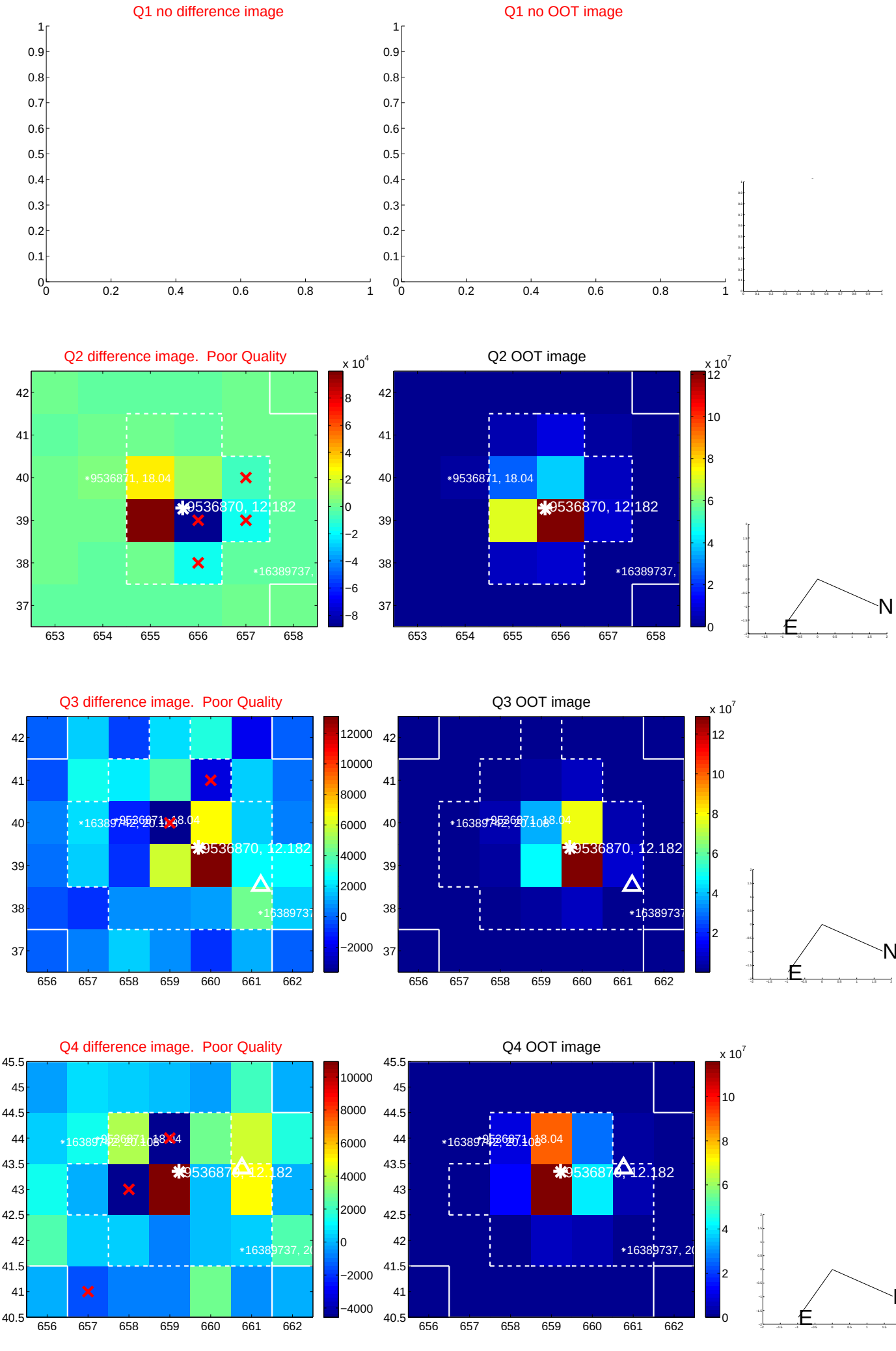
Supplemental centroid analysis for 009536870-10. Kepler magnitude: 12.18. Transit SNR 8.36
There are 3 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.100 ± 1.020	0.10	0.068 ± 0.593	-0.073 ± 1.069
PRF-fit source offset from KIC position	0.199 ± 1.356	0.15	0.024 ± 0.606	-0.197 ± 1.332
photometric centroid source offset	0.01 ± 0.51	0.02	-0.00 ± 0.51	-0.01 ± 0.51



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs $> 15,000,000$ are from the UKIRT catalog.

white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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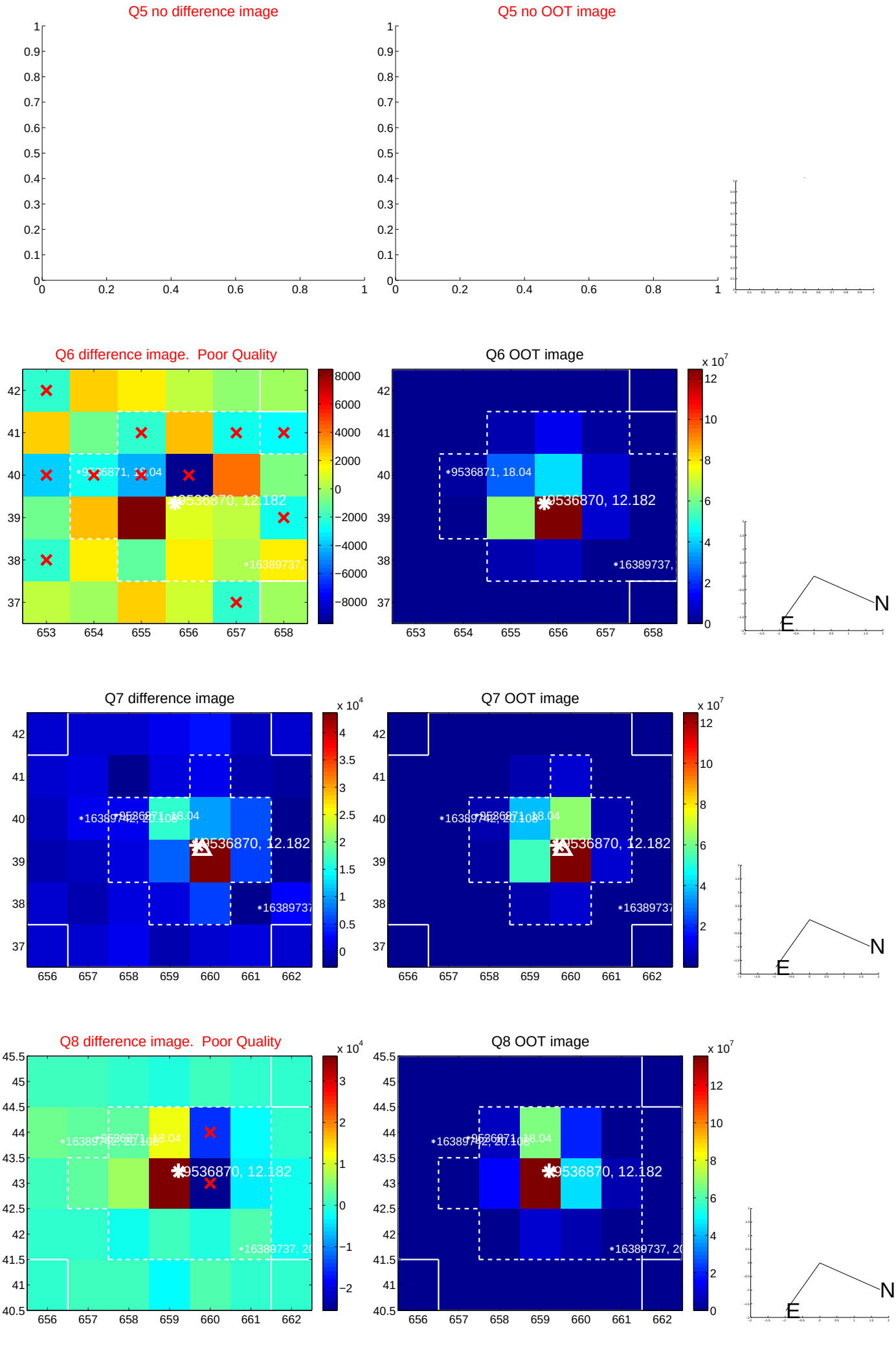

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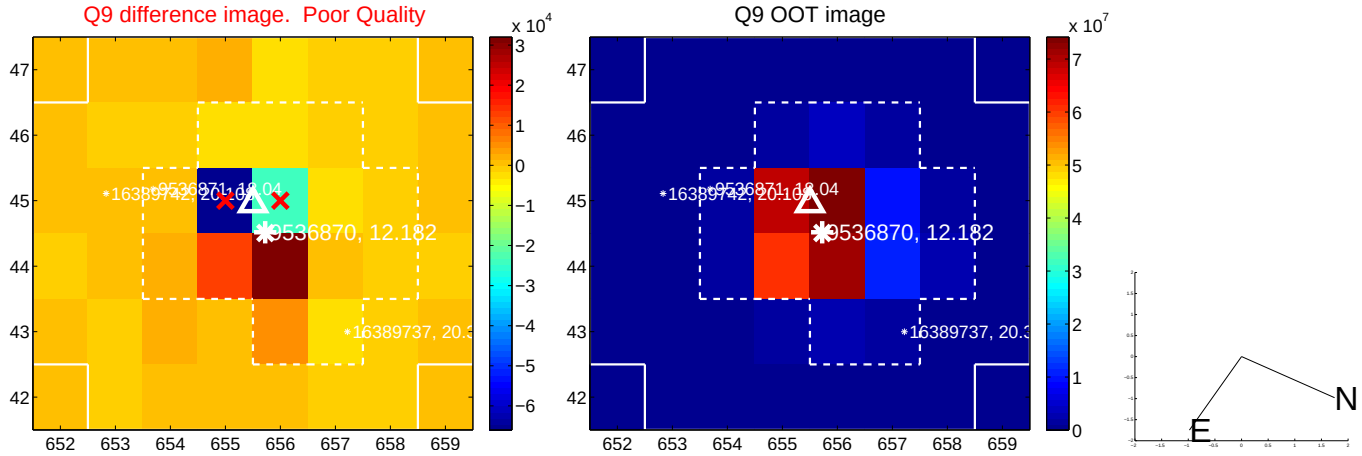
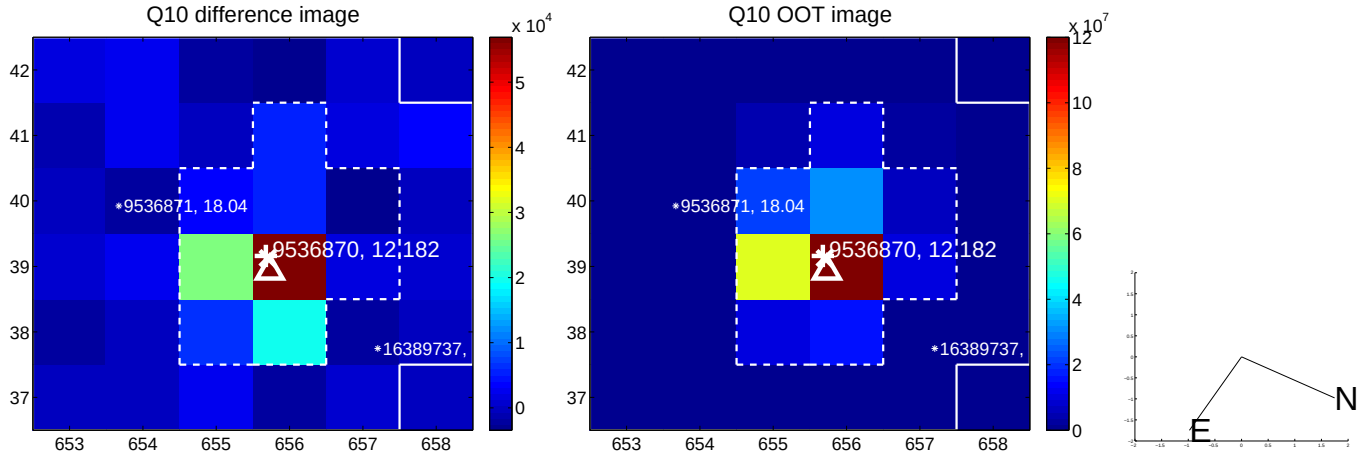
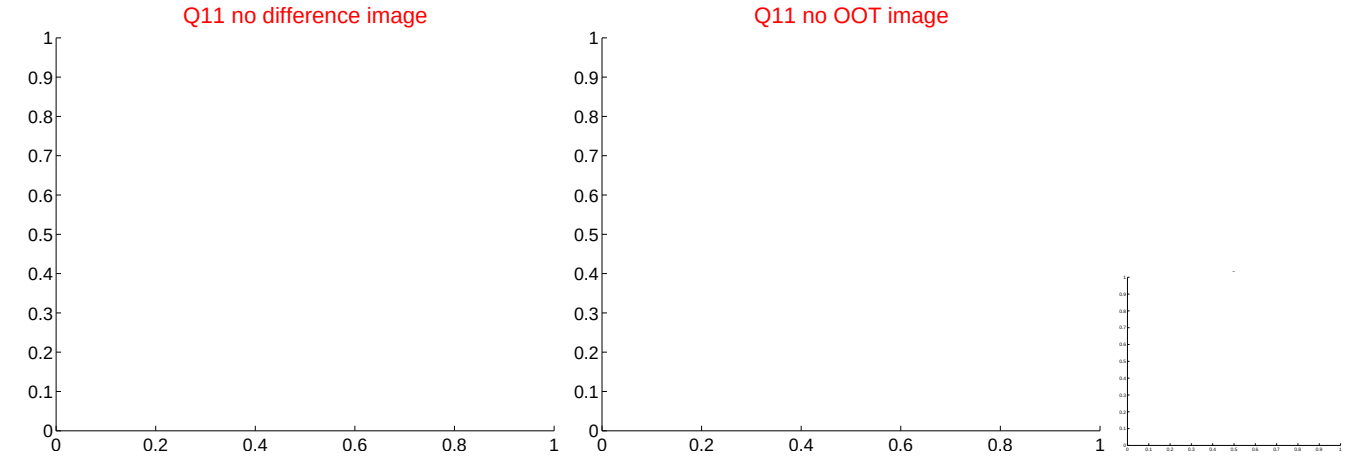
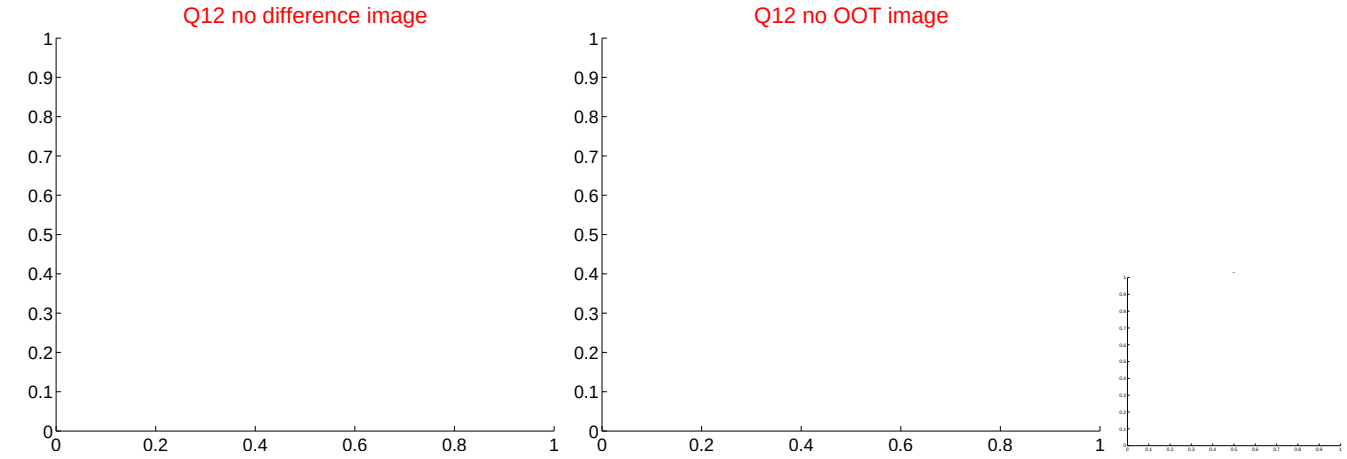
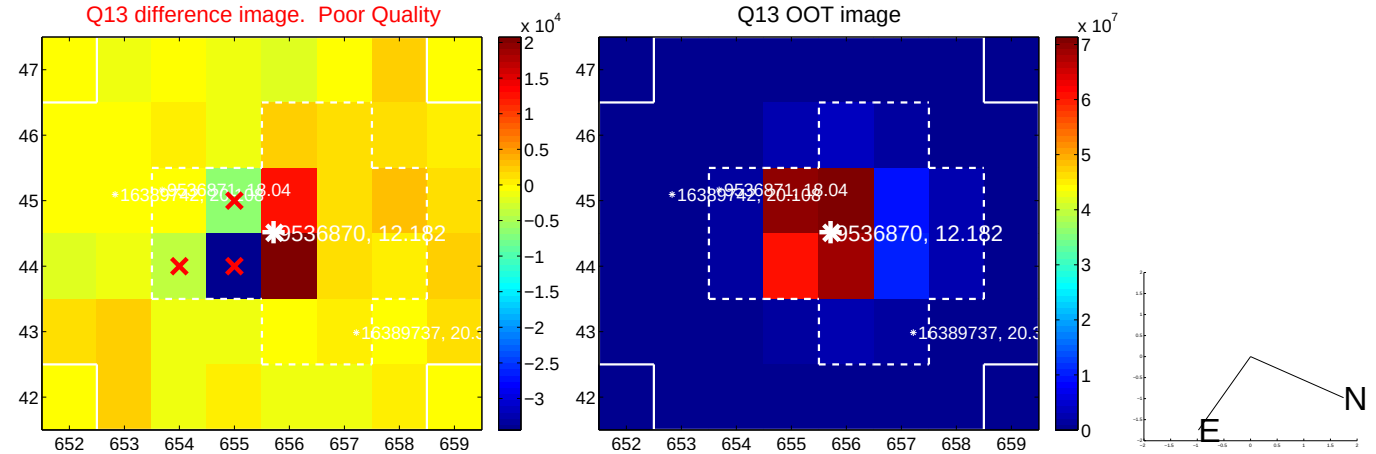


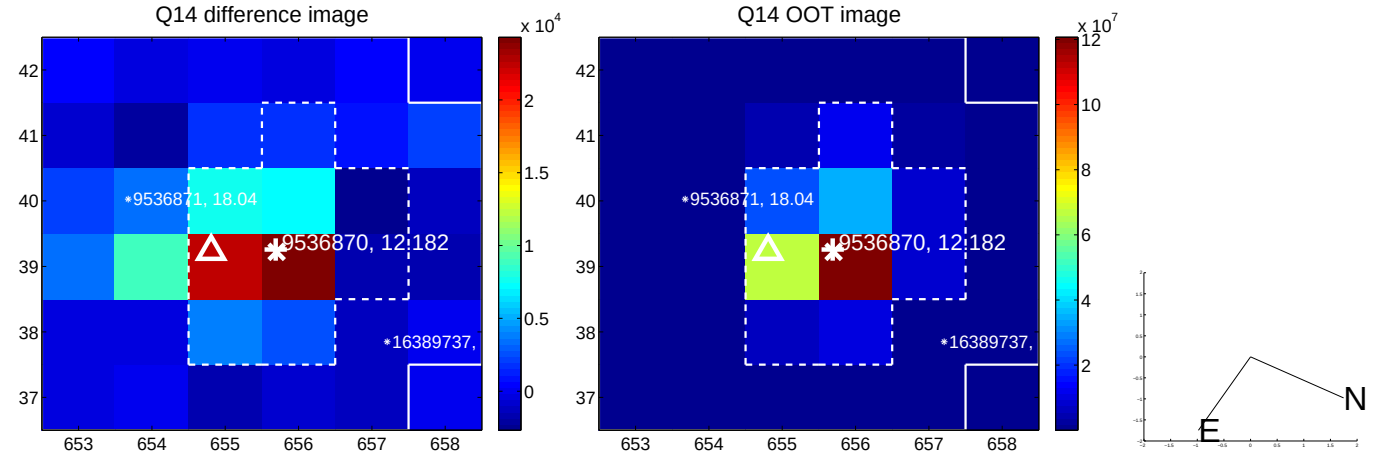


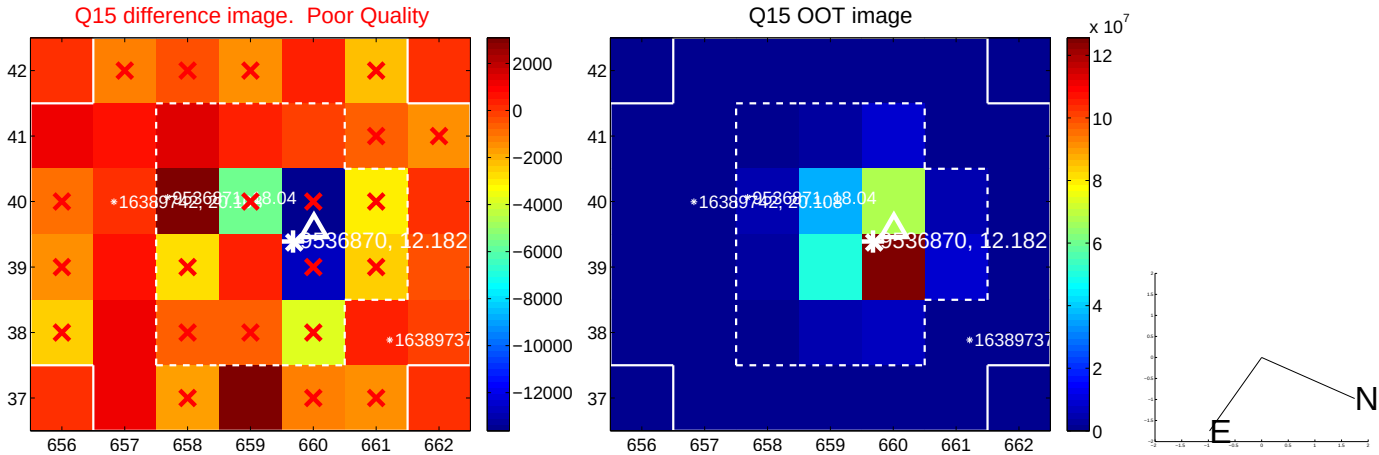


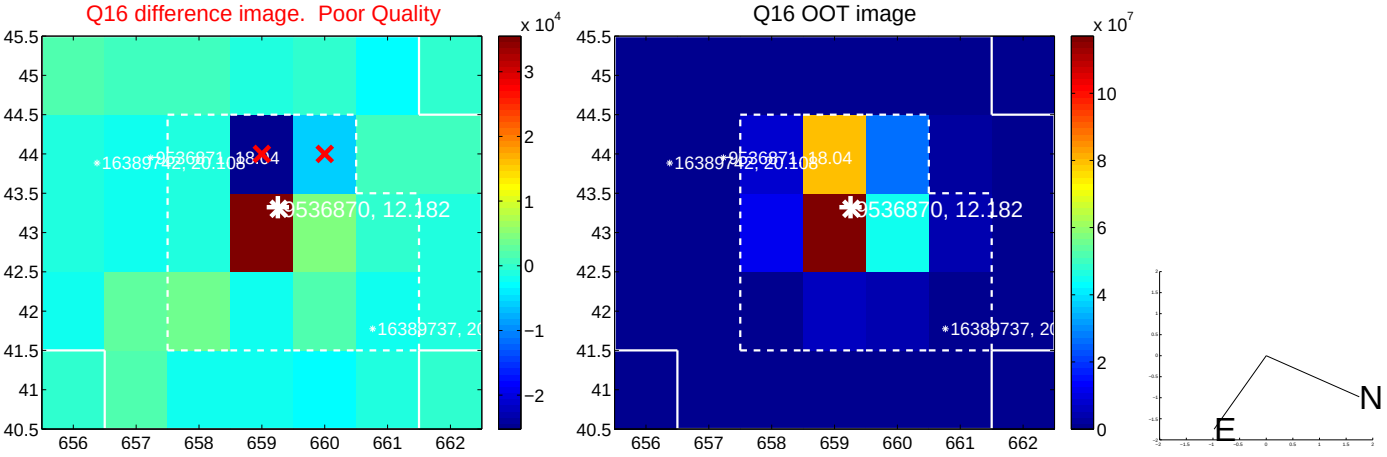


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

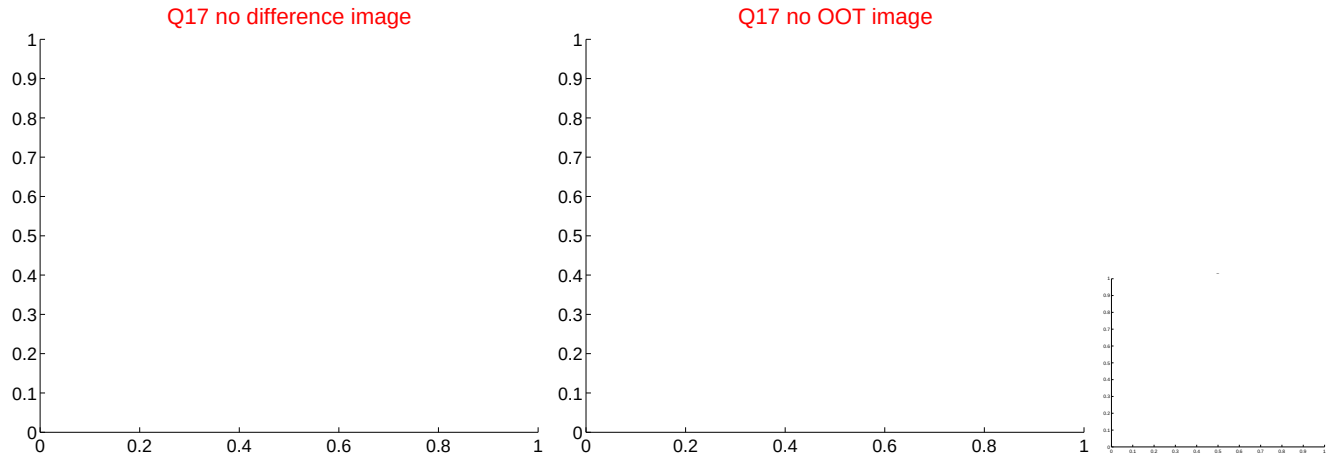


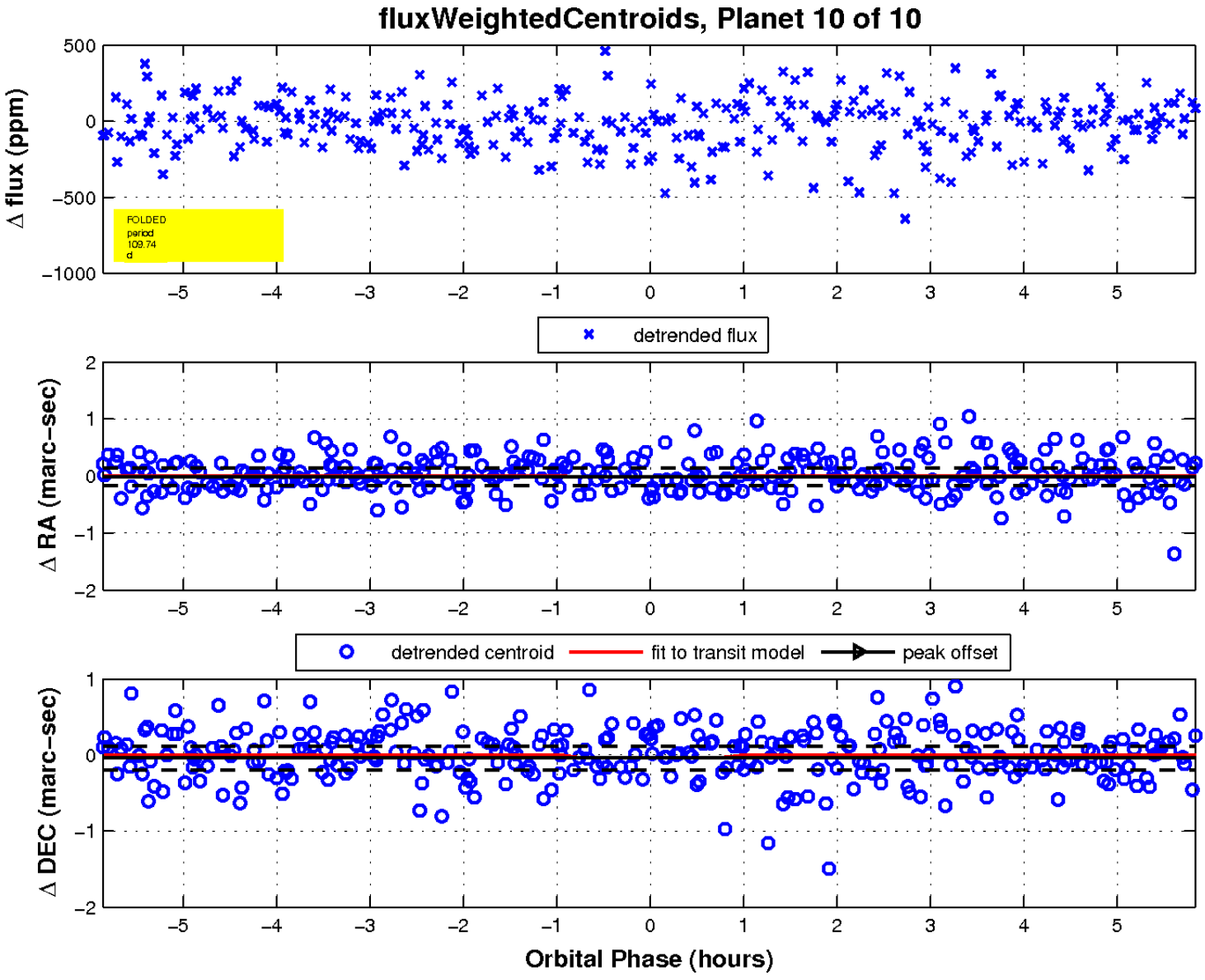




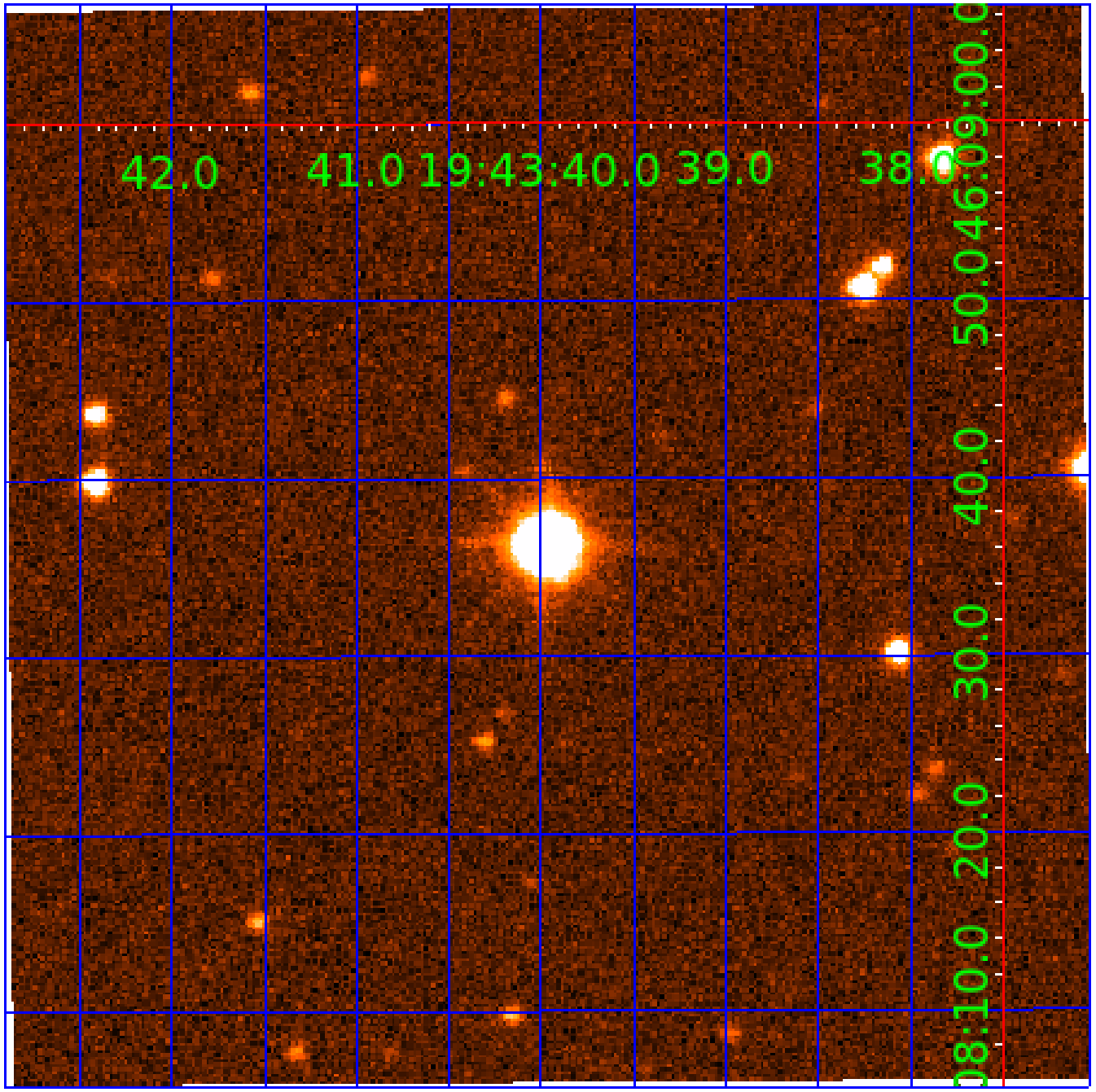


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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Declination