

KIC 009051650

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})
009051650-01	OBS	No	5.322248	135.125385	10.5	19.194	10.0	8.2	1.75	6649	0.67	1204.54
009051650-02	OBS	No	431.188983	495.623411	176.7	15.000	14.2	-1.0	1.75	6649	2.34	3.44
009051650-03	OBS	No	665.304291	173.732677	90.2	10.891	10.6	6.1	1.75	6649	1.88	1.93
009051650-04	OBS	No	5.321441	132.562771	12.9	34.912	9.5	11.0	1.75	6649	0.66	1204.78

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009051650-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009051650-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_NOFITS
009051650-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009051650-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

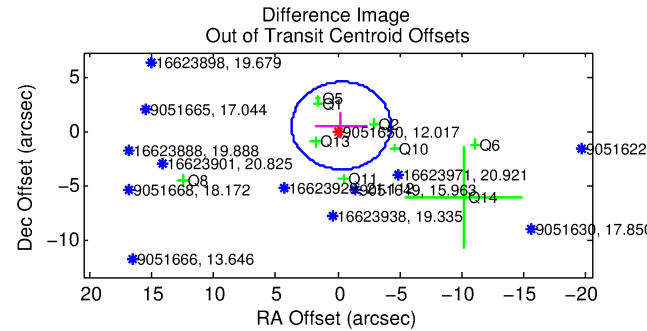
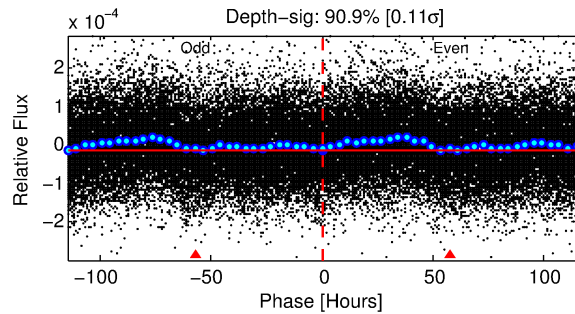
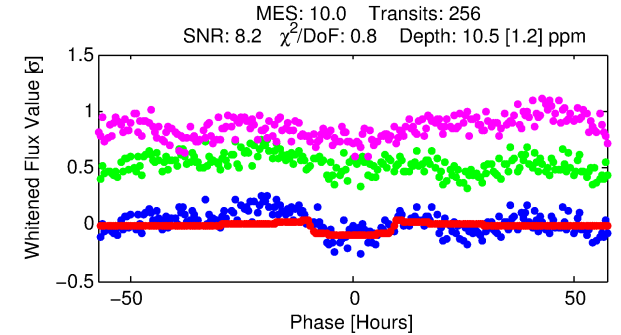
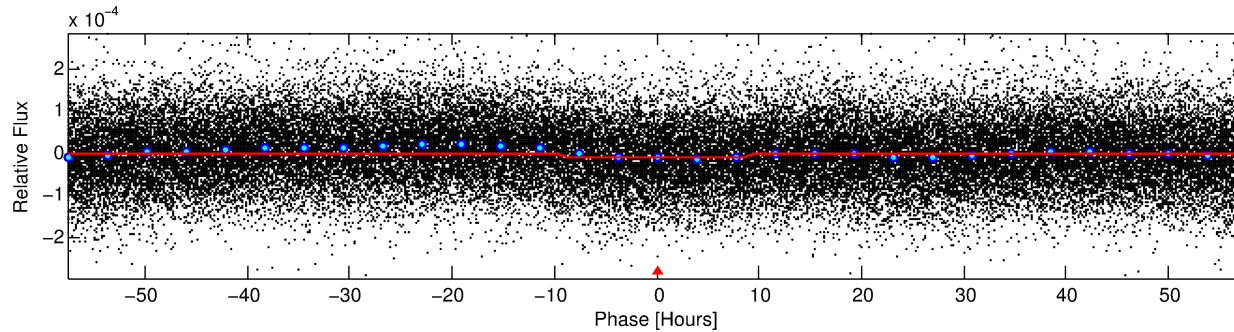
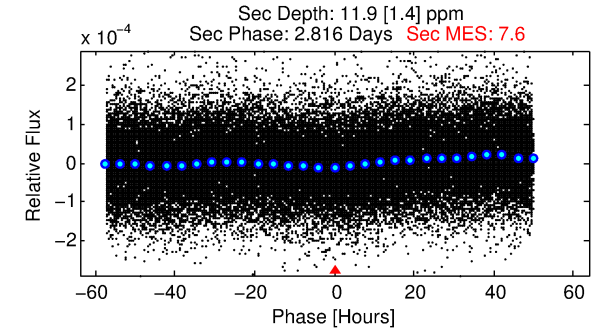
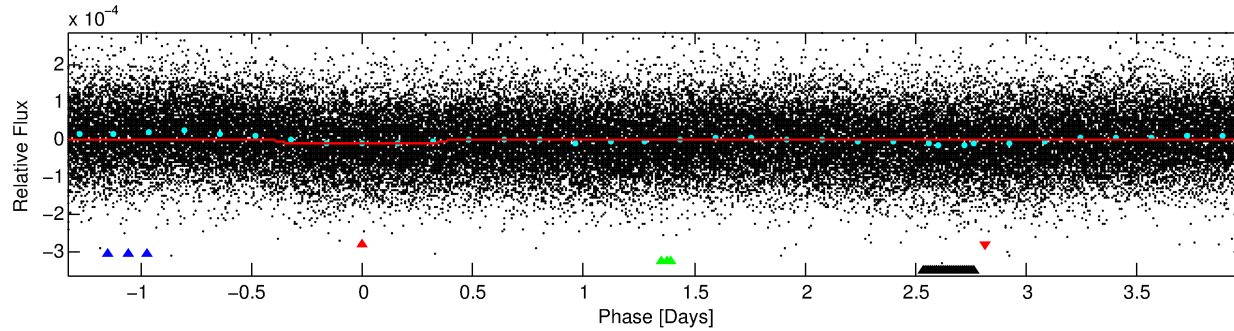
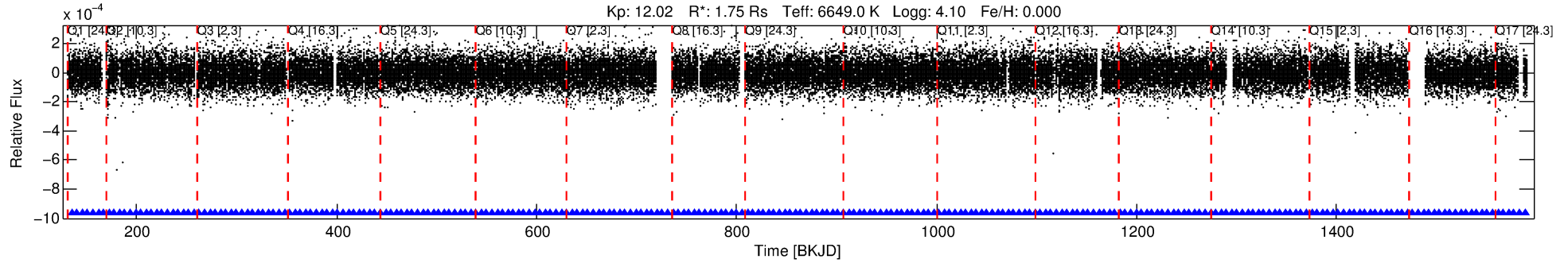
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009051650-01

No Significant Match Found

DV One-Page Summary

KIC: 9051650 Candidate: 1 of 4 Period: 5.322 d



DV Fit Results:

Period = 5.32225 [0.00013] d
Epoch = 135.1254 [0.0173] BKJD
Rp/R* = 0.0035 [0.0005]
a/R* = 1.27 [0.36]
b = 0.92 [0.12]
Seff = 1204.54 [404.29]
Teq = 1502 [126] K
Rp = 0.67 [0.19] Re
a = 0.0666 [0.0140] AU
Ag = 64.37 [27.88] [2.27σ]
Teffp = 6579 [542] K [9.13σ]

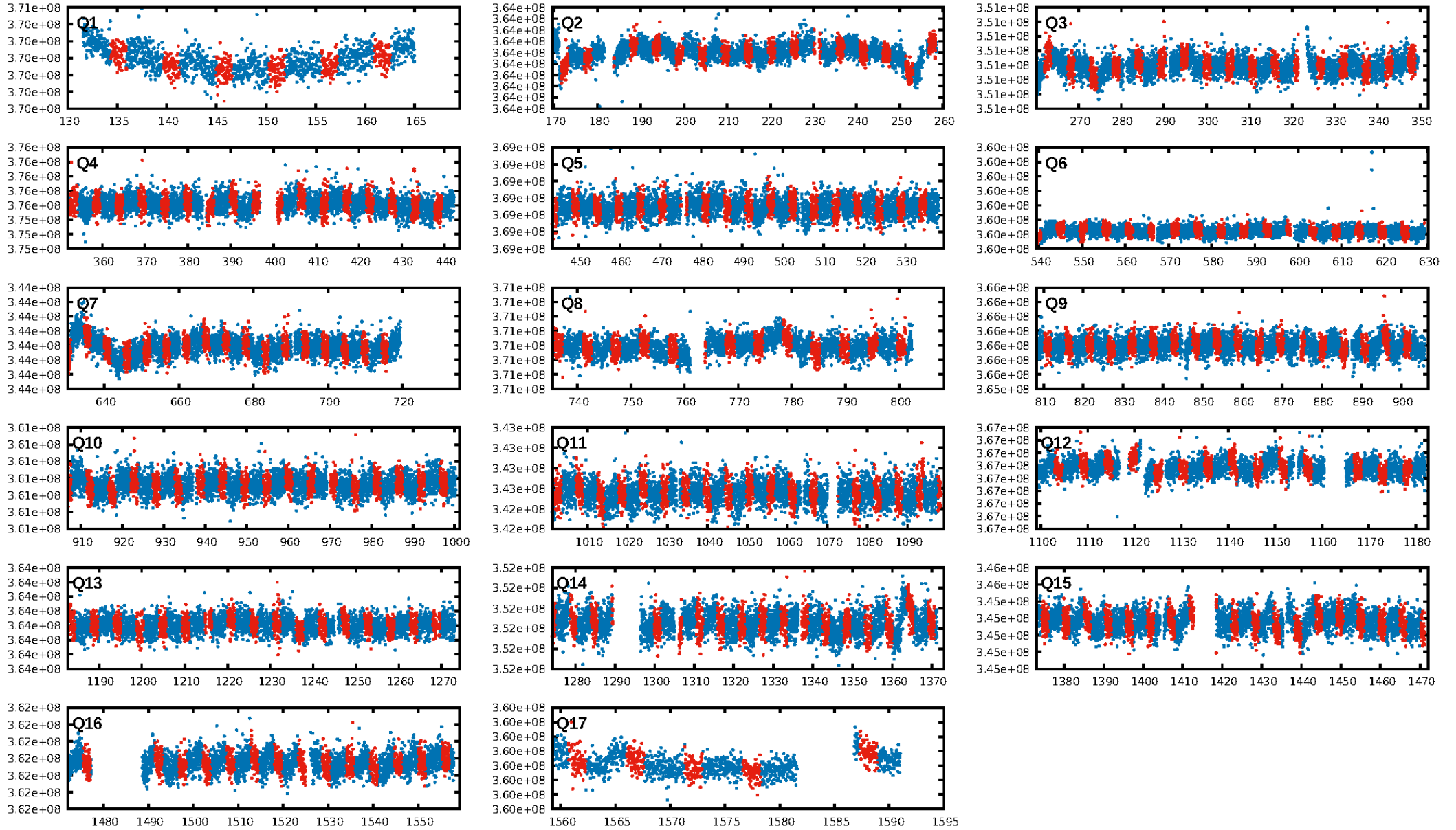
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [419.58σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [245/245]
GhostDiagnostic-chr: 7.379
Centroid-sig: N/A
Centroid-so: 2.088 arcsec [1.17σ]
OotOffset-rm: 0.628 arcsec [0.47σ]
KicOffset-rm: 0.652 arcsec [0.59σ]
OotOffset-st: 4/1/1/3 [9]
KicOffset-st: 4/1/1/3 [9]
DiffImageQuality-fgm: 0.33 [3/9]
DiffImageOverlap-fno: 1.00 [17/17]

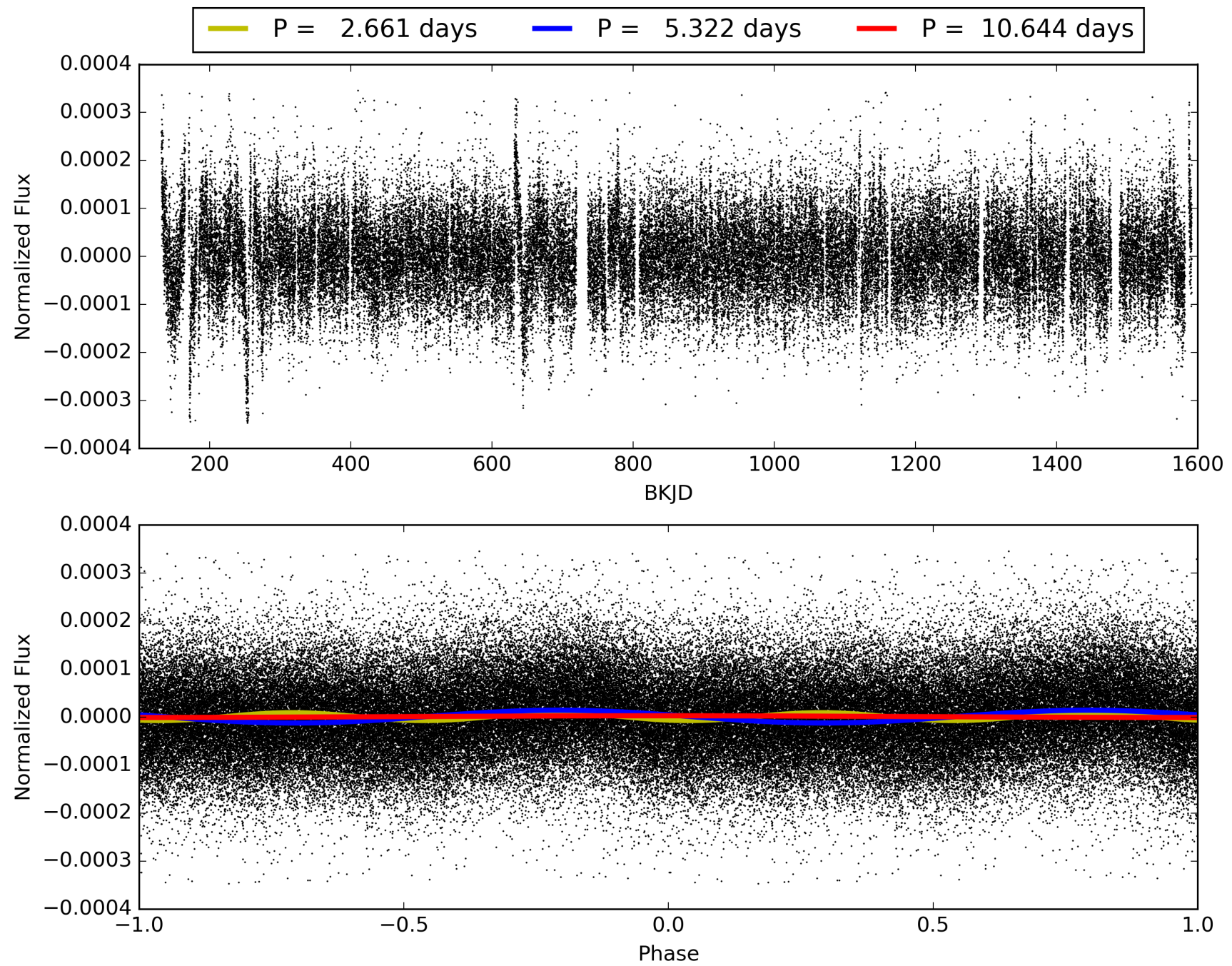
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:26:07 Z

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

TCE 009051650-01, PDC Light Curves

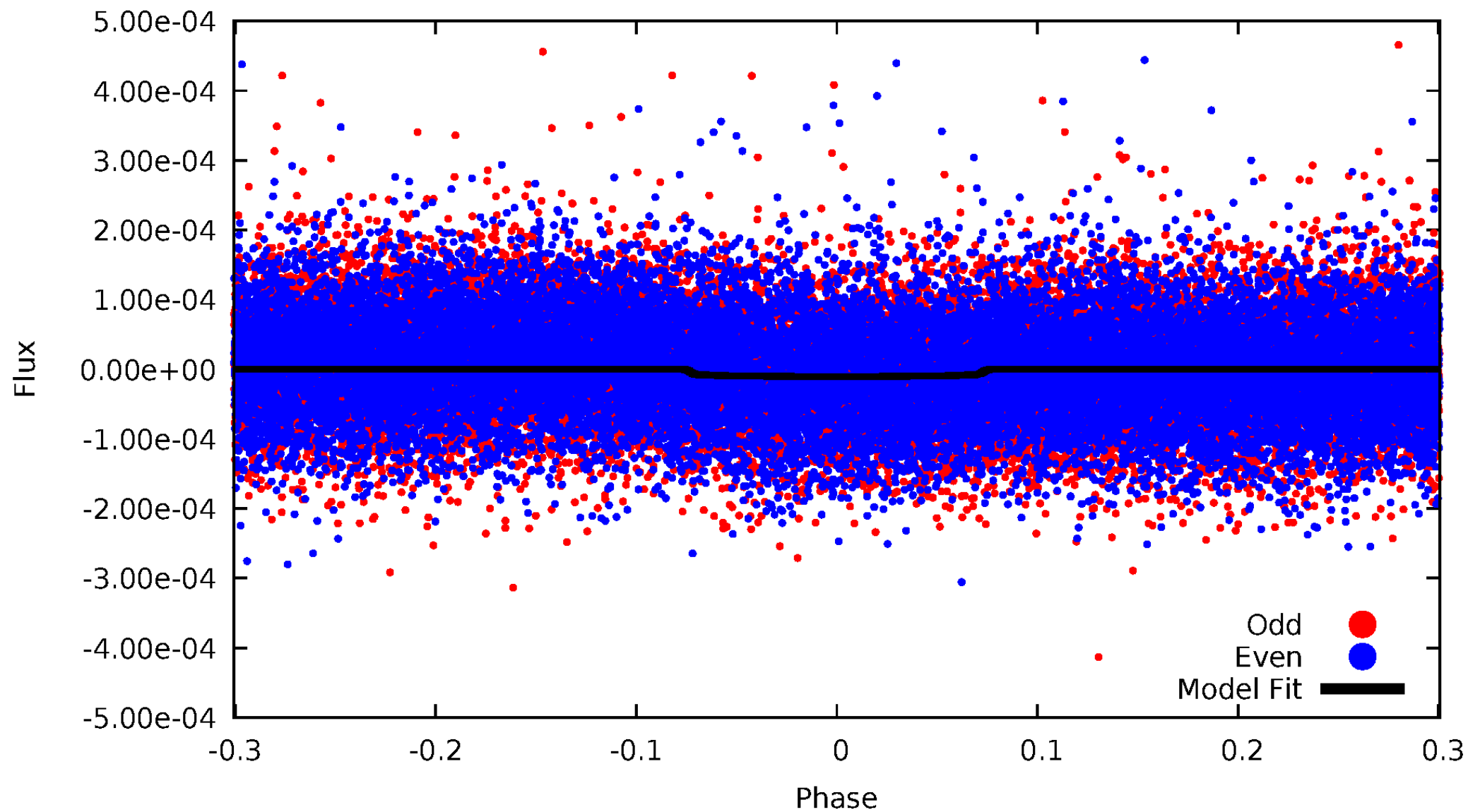


TCE 009051650-01



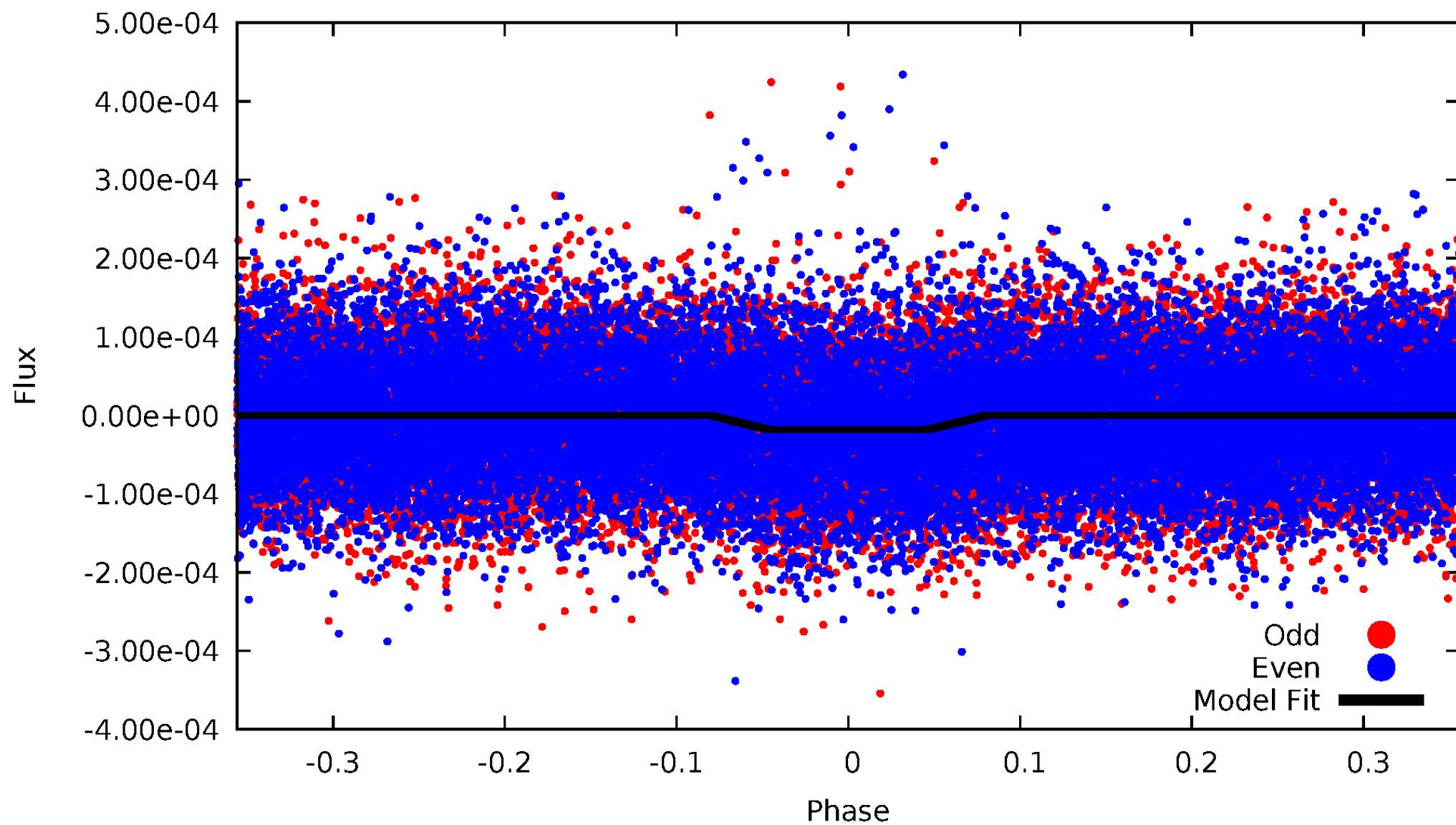
DV Odd/Even

TCE 009051650-01



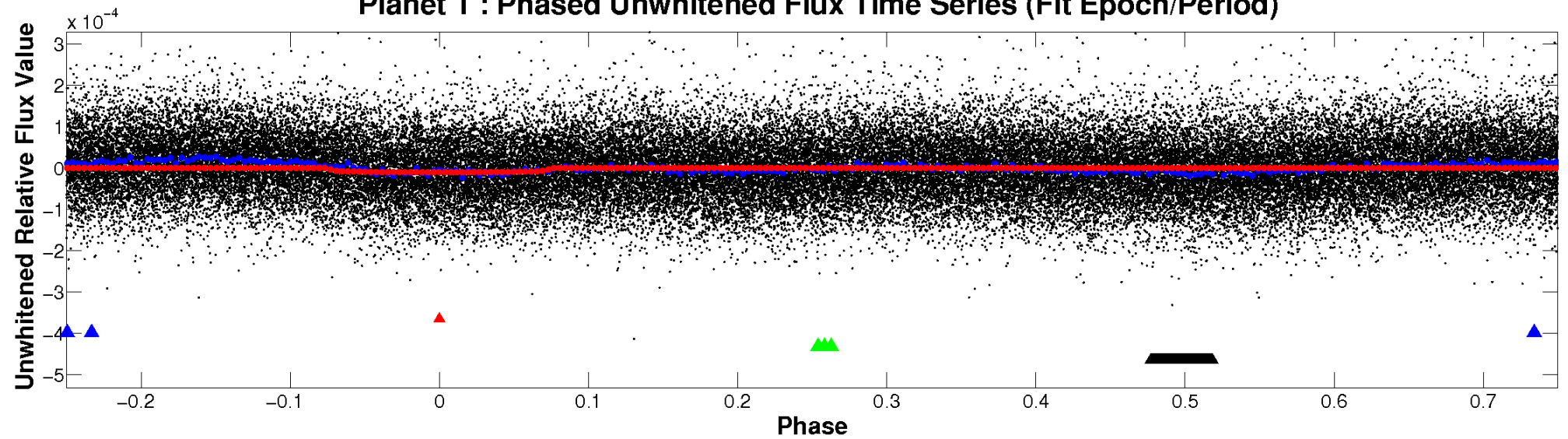
ALT Odd/Even

TCE 009051650-01

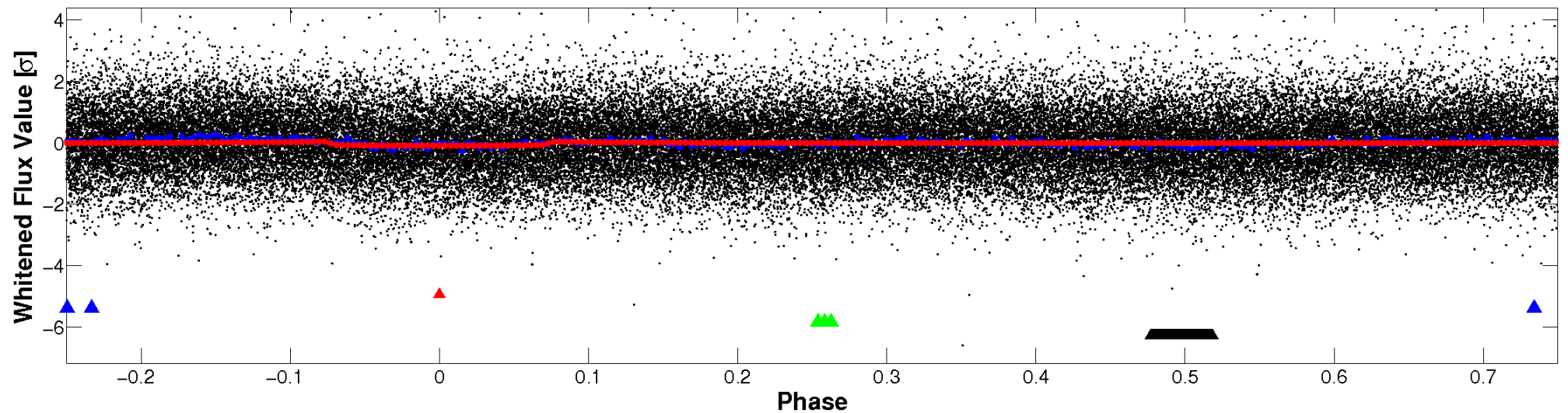


Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

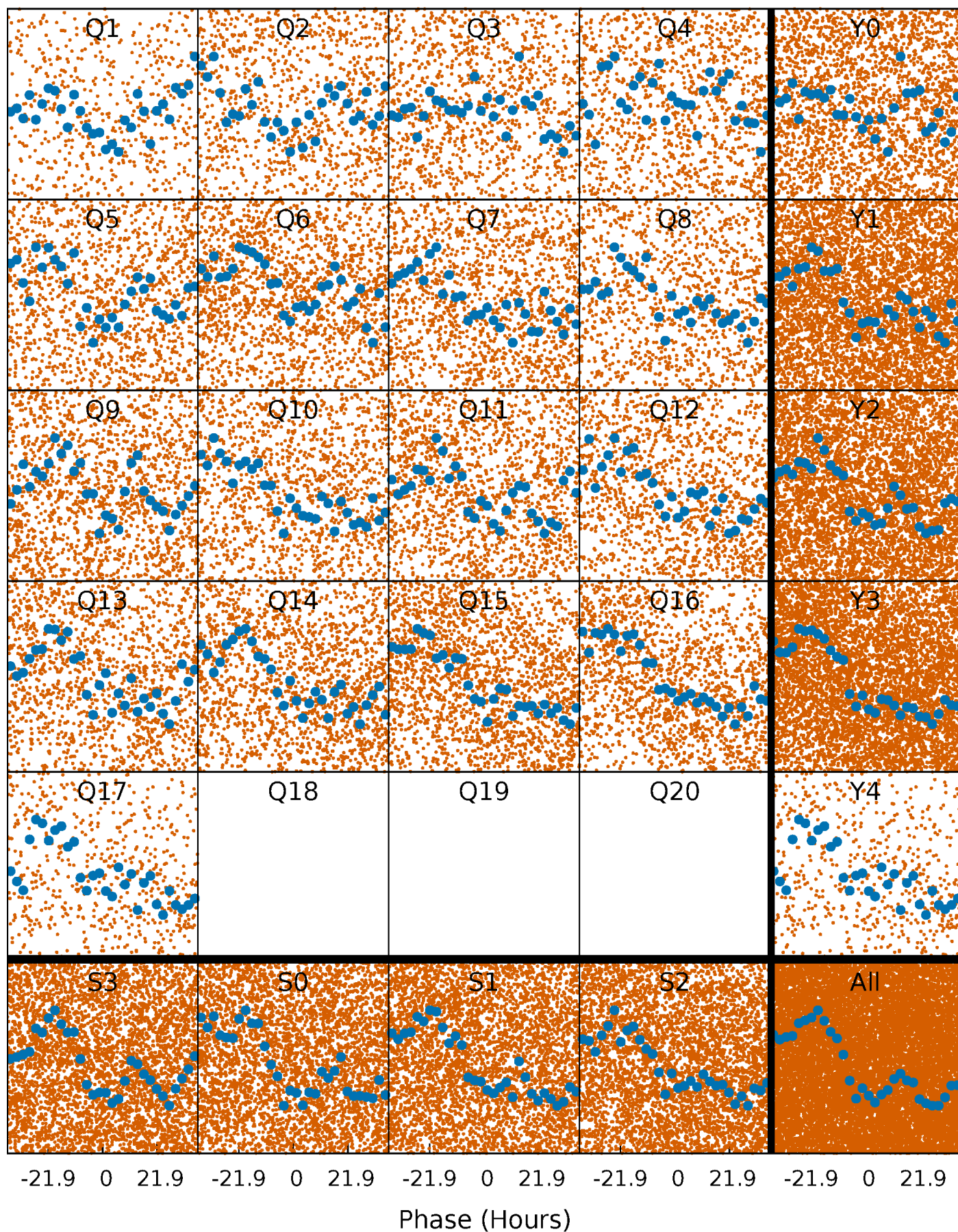


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



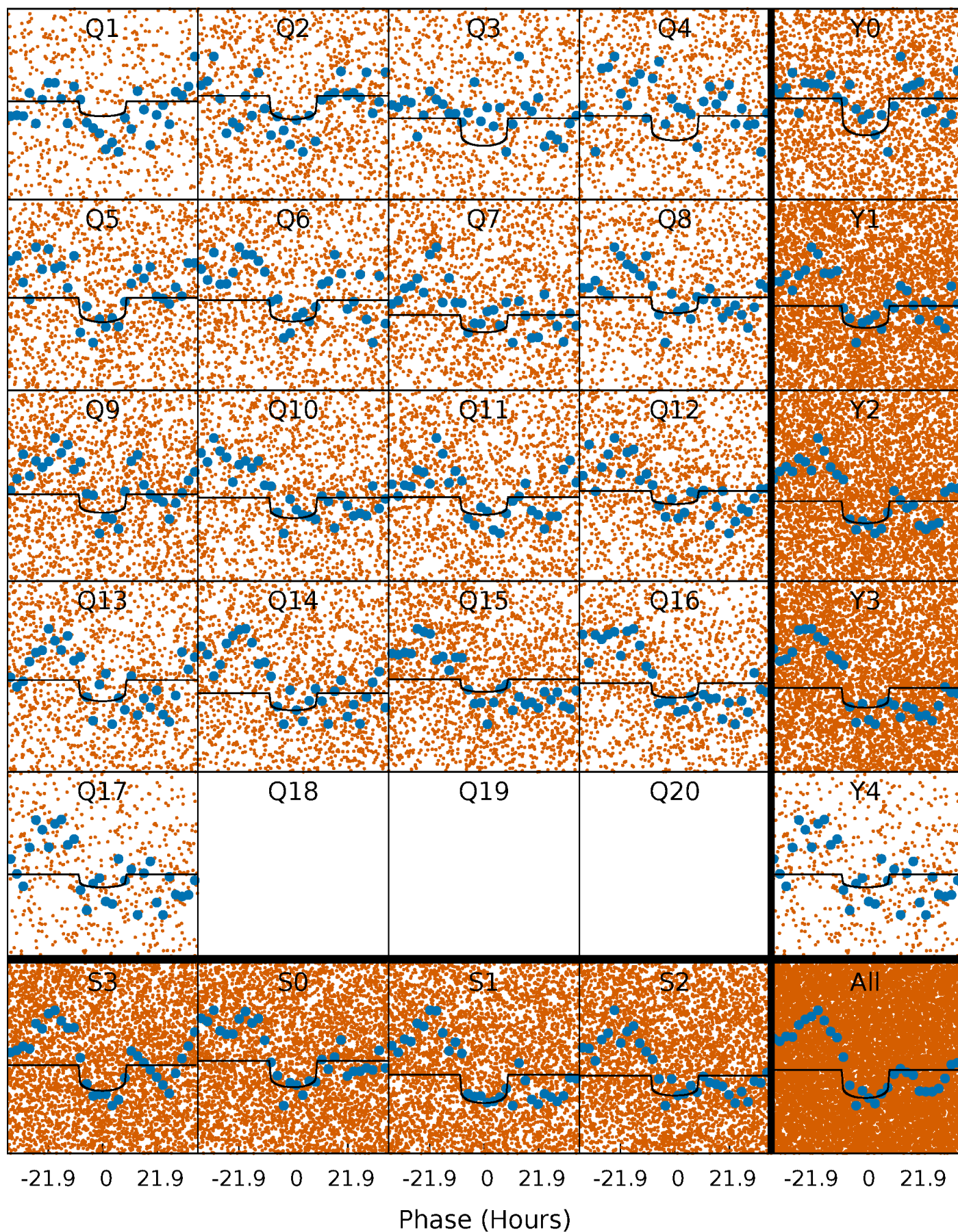
PDC Quarter-Phased Transit Curves

TCE 009051650-01 P= 5.322248 Days $T_0=135.125385$ (BKJD)



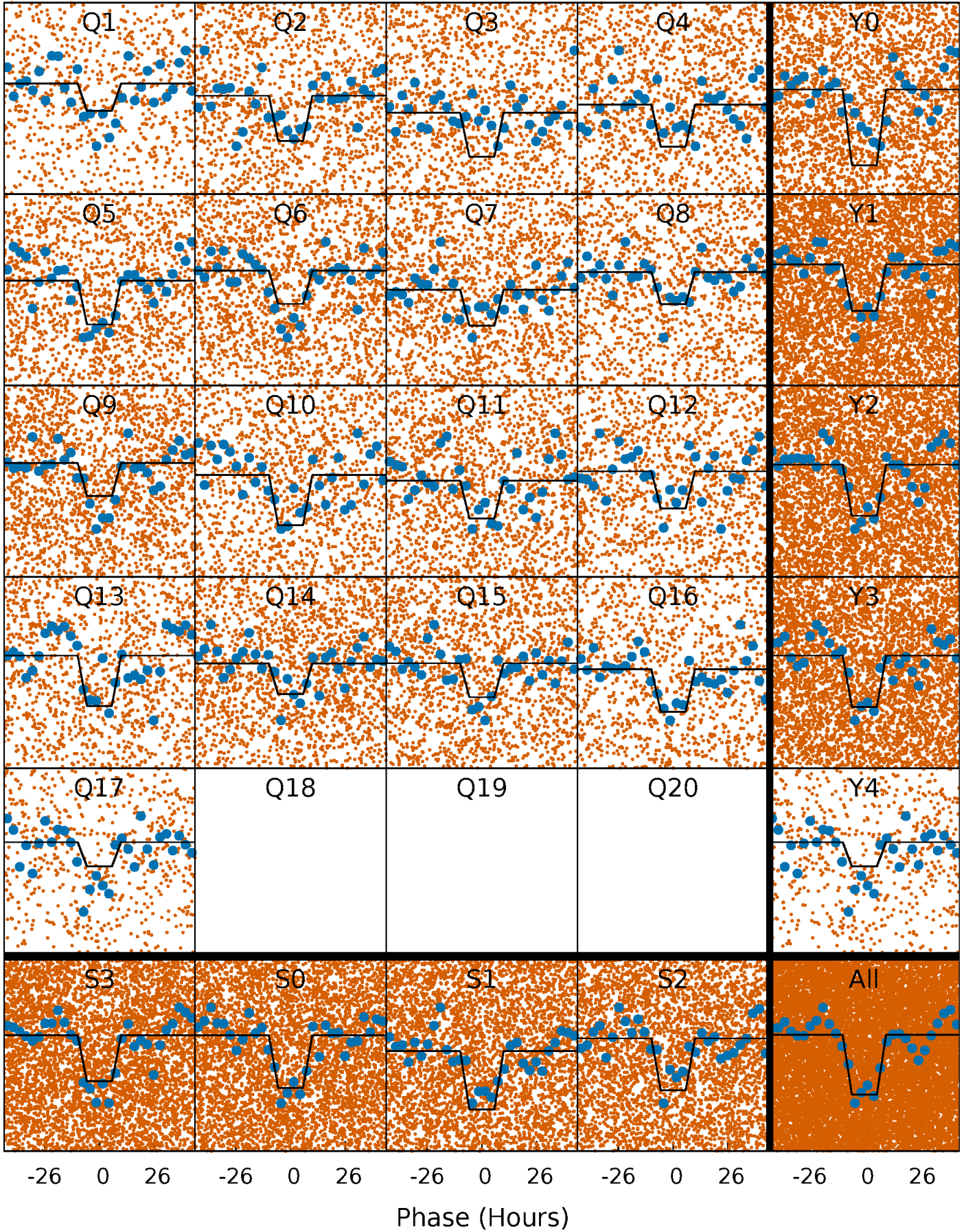
DV Quarter-Phased Transit Curves

TCE 009051650-01 P= 5.322248 Days $T_0=135.125385$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

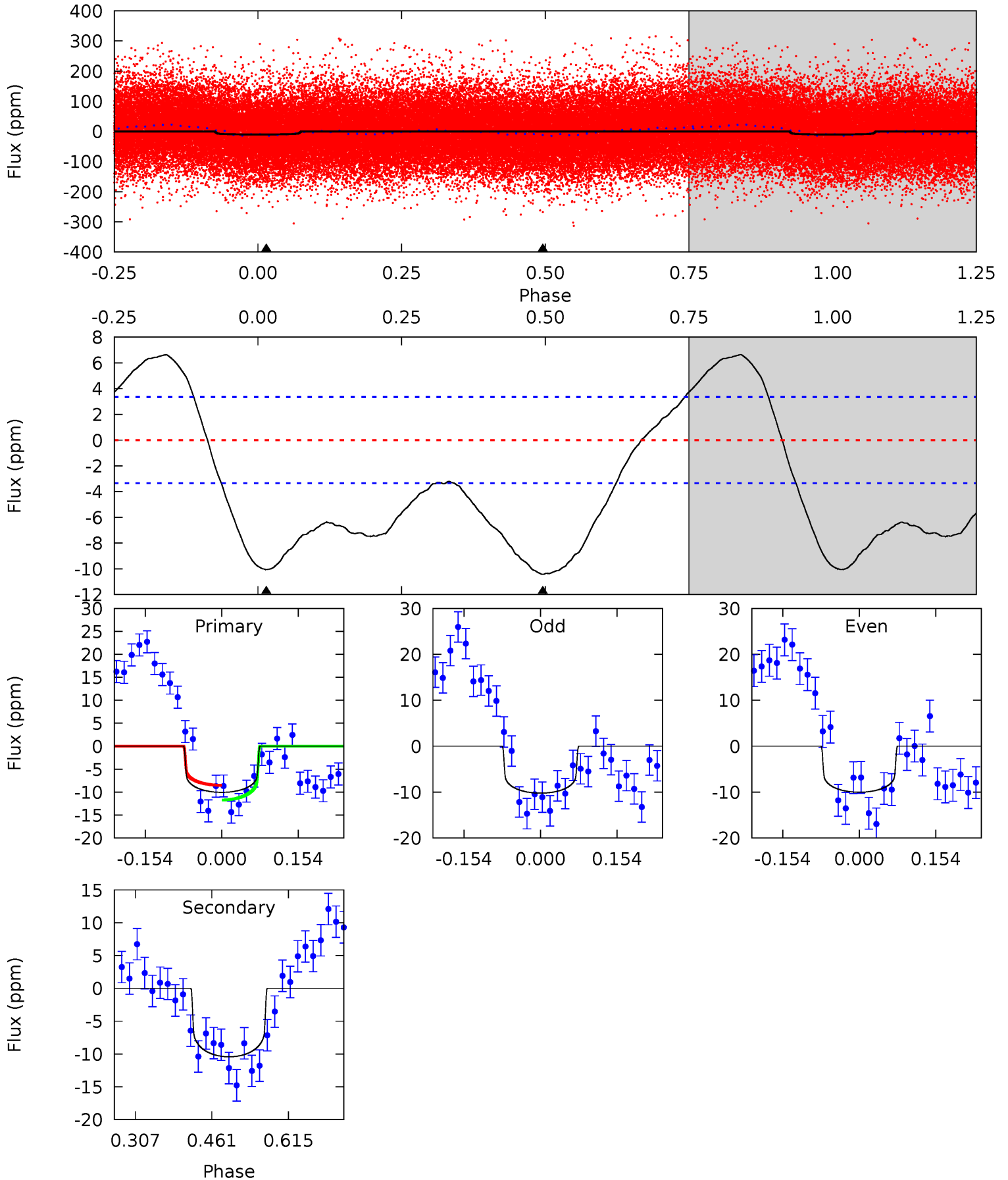
TCE 009051650-01 P= 5.322047 Days $T_0=135.146466$ (BKJD)



DV Model-Shift Uniqueness Test

009051650-01, P = 5.322248 Days, E = 129.803137 Days

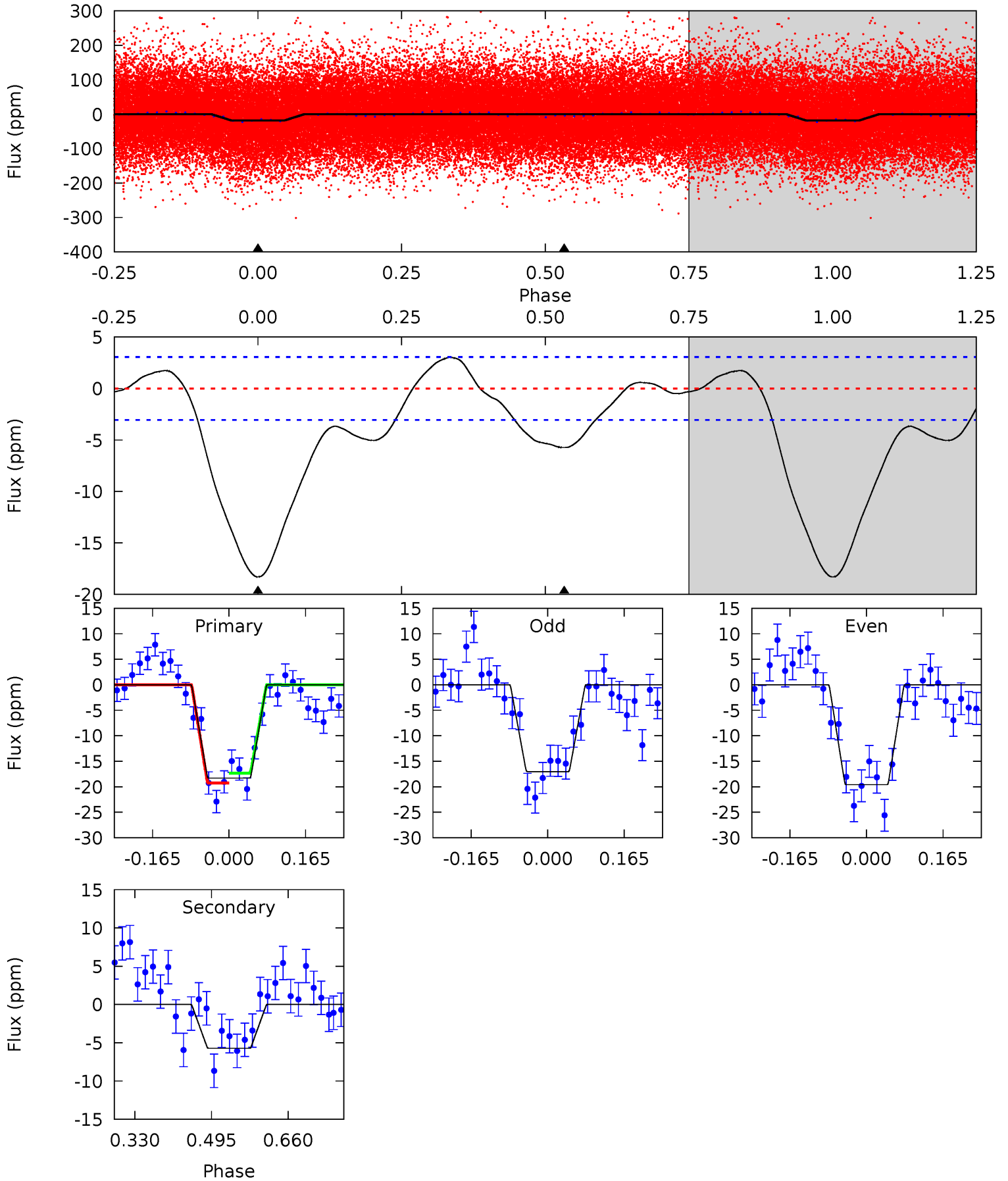
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	13.9	0	0	4.47	1.43	6.68	13.4	13.4	13.9	13.9	0.14	1.12	0.39	2.14



Alt Model-Shift Uniqueness Test

009051650-01, P = 5.322047 Days, E = 129.824419 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.6	8.34	0	0	4.46	1.39	3.75	26.6	26.6	8.34	8.34	1.87	1.04	0.14	1.41



Stellar Parameters For KIC 009051650

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6649^{+149}_{-215}	$4.097^{+0.171}_{-0.140}$	$0.000^{+0.250}_{-0.300}$	$1.748^{+0.353}_{-0.431}$	$1.396^{+0.163}_{-0.245}$	$0.368^{+0.367}_{-0.135}$
	+2%/-3%	+4%/-3%	+inf%/-inf%	+20%/-25%	+12%/-18%	+100%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009051650-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-10 ± 1	$0.67^{+0.13}_{-0.13}$	2093^{+133}_{-131}	6354^{+565}_{-456}	58^{+28}_{-18}
Alt.	-6 ± 1	$0.80^{+0.16}_{-0.13}$	2092^{+122}_{-140}	5020^{+317}_{-283}	22^{+9}_{-6}

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 $A_{obs} \gg 1.0$

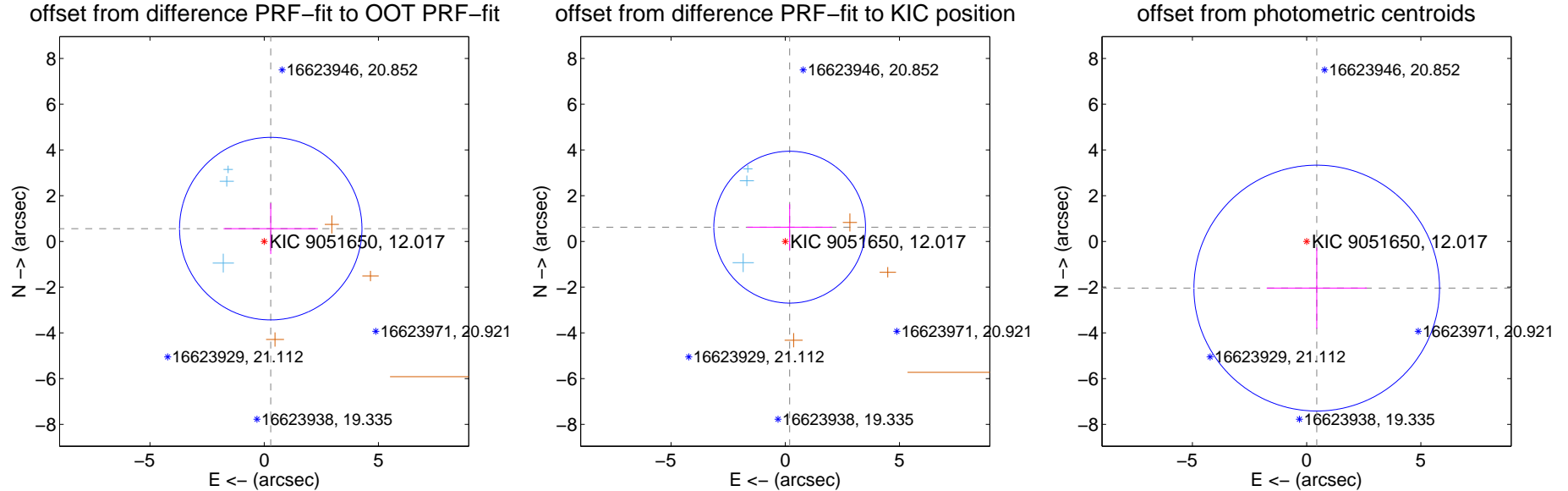
DV Centroid Data

Supplemental centroid analysis for 009051650-01. Kepler magnitude: 12.02. Transit SNR 8.22

There are 3 quarters with good PRF difference image offsets

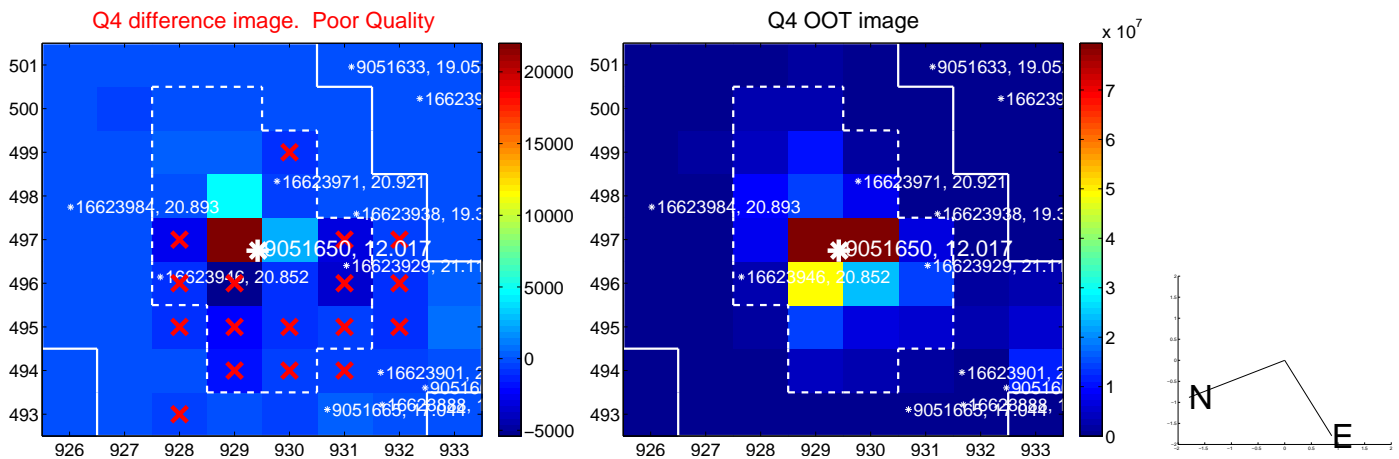
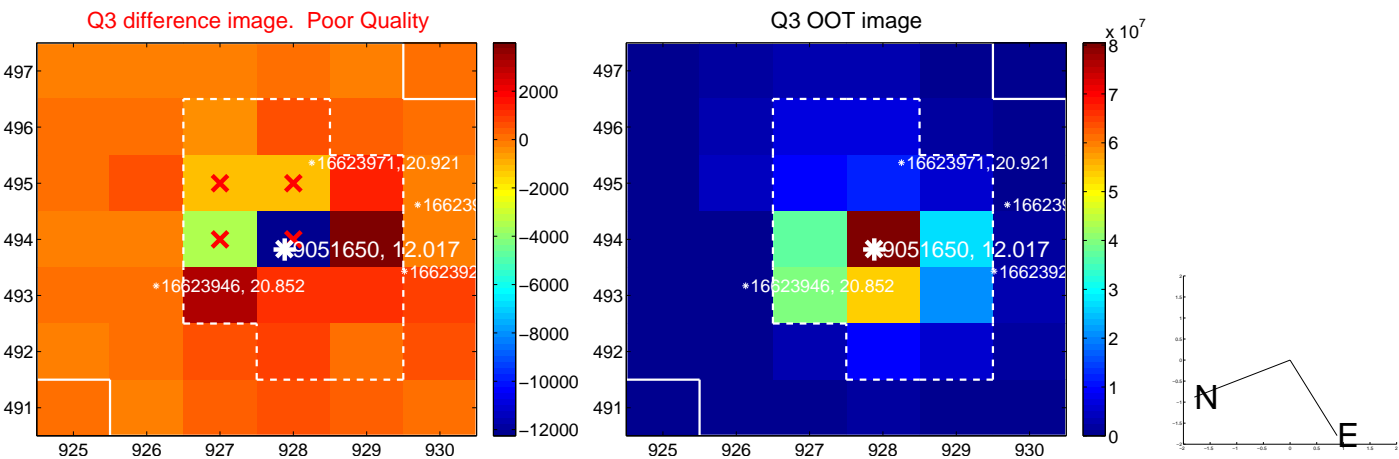
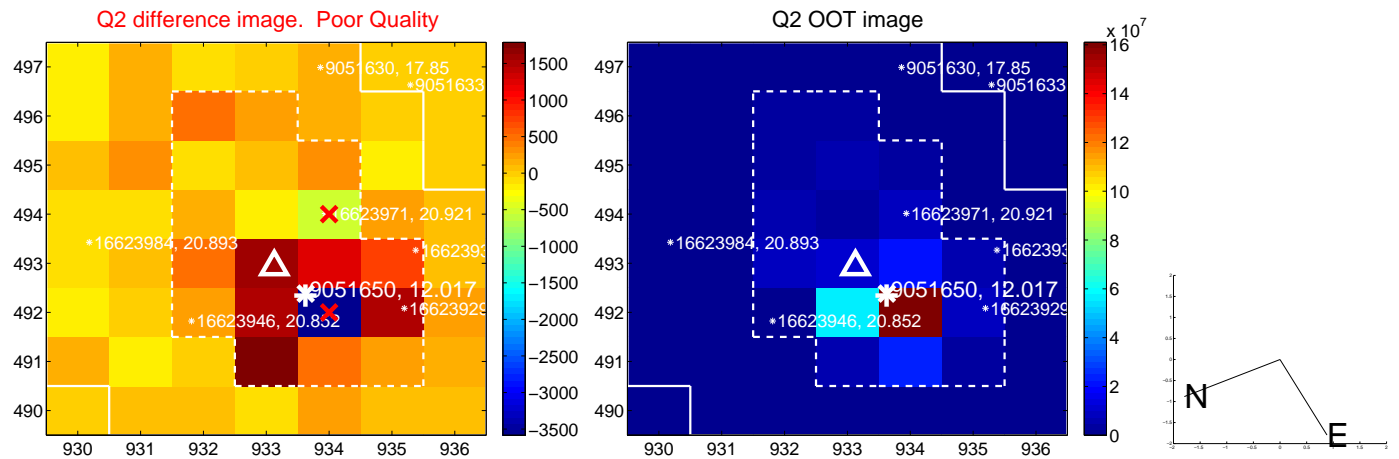
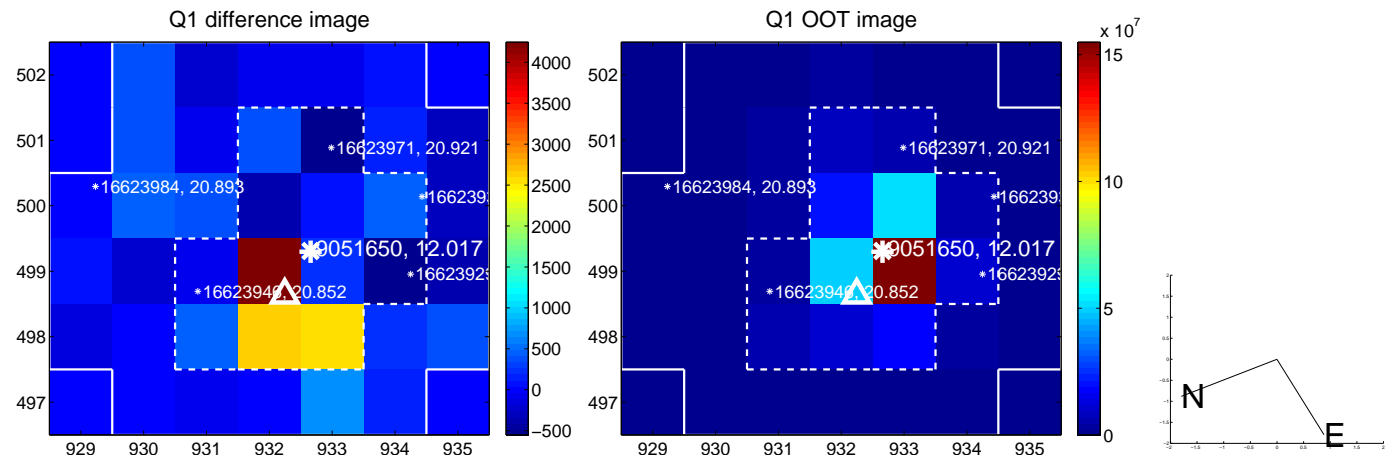
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.628 ± 1.330	0.47	-0.286 ± 2.064	0.559 ± 1.113
PRF-fit source offset from KIC position	0.652 ± 1.107	0.59	-0.193 ± 1.865	0.623 ± 1.003
photometric centroid source offset	2.09 ± 1.79	1.17	-0.44 ± 2.19	-2.04 ± 1.77

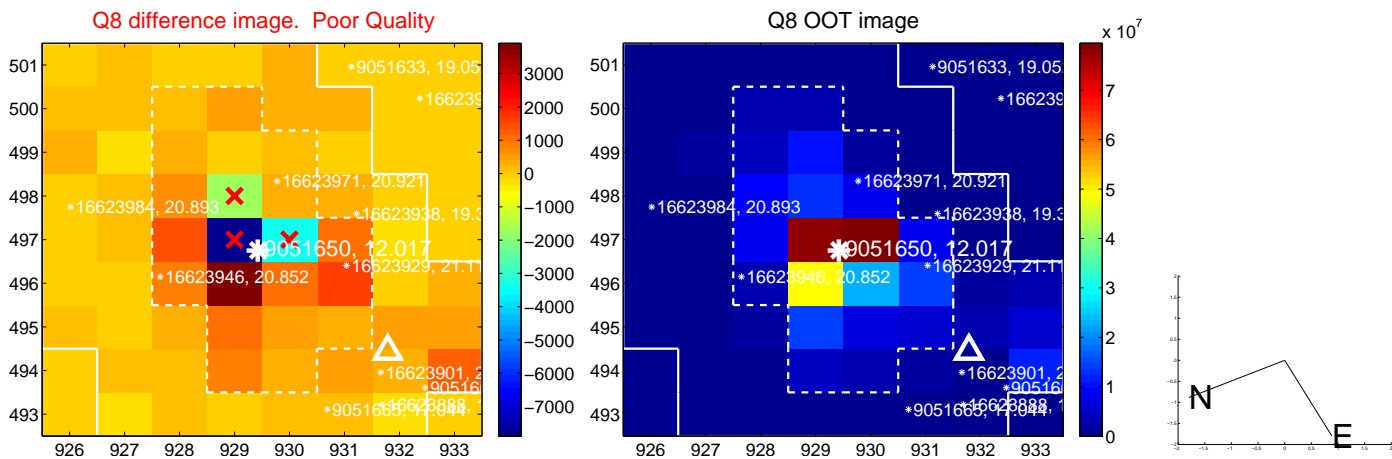
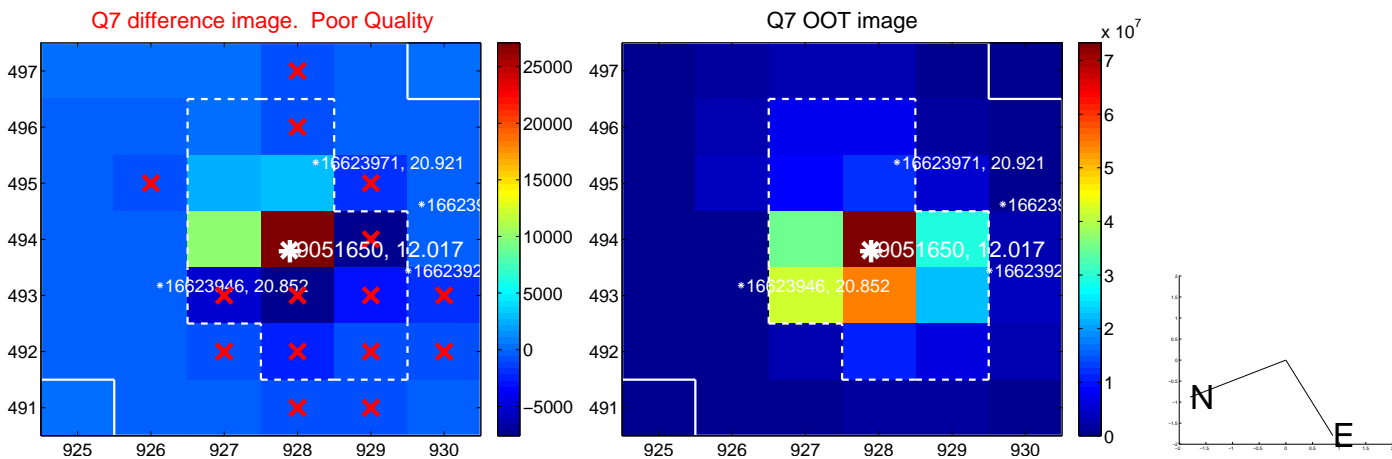
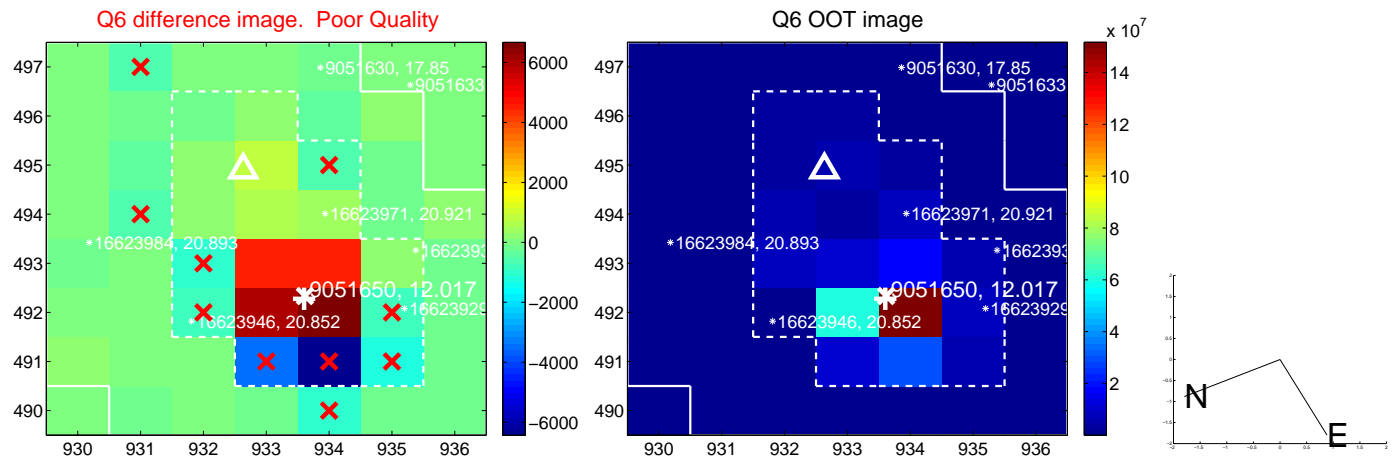
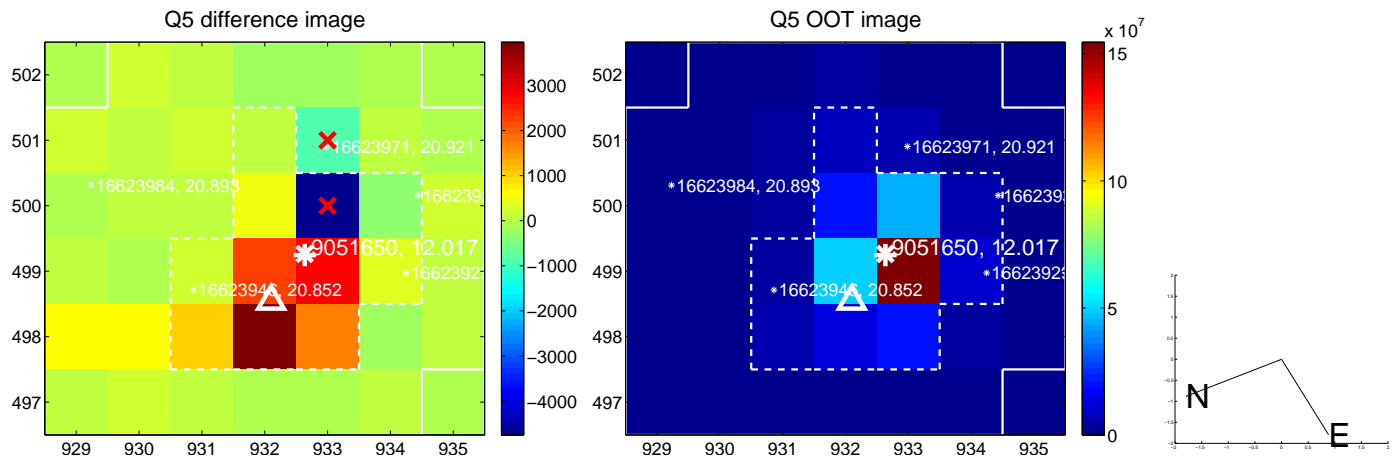


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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.

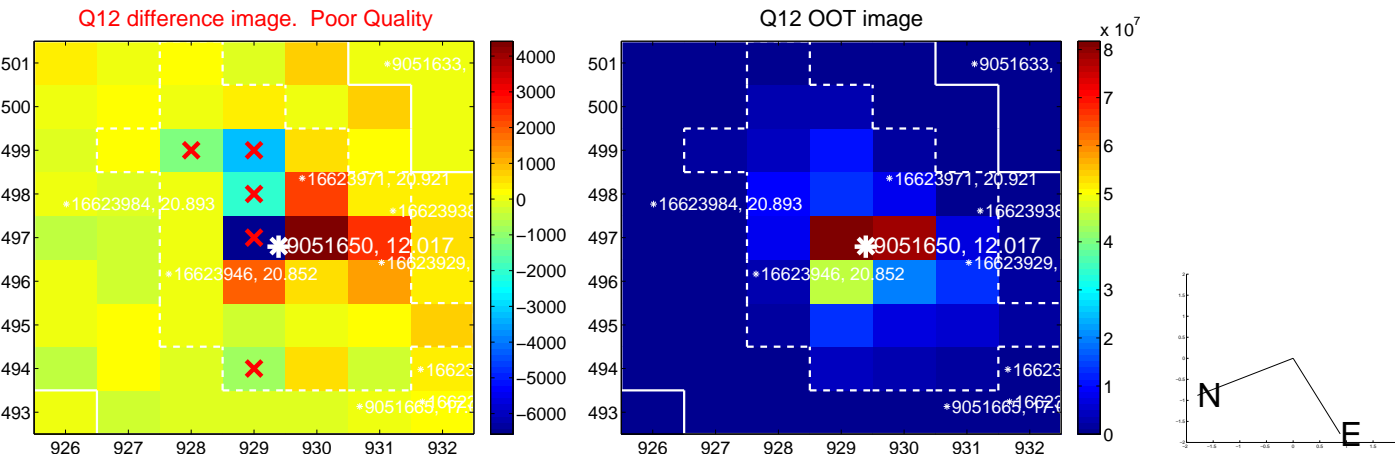
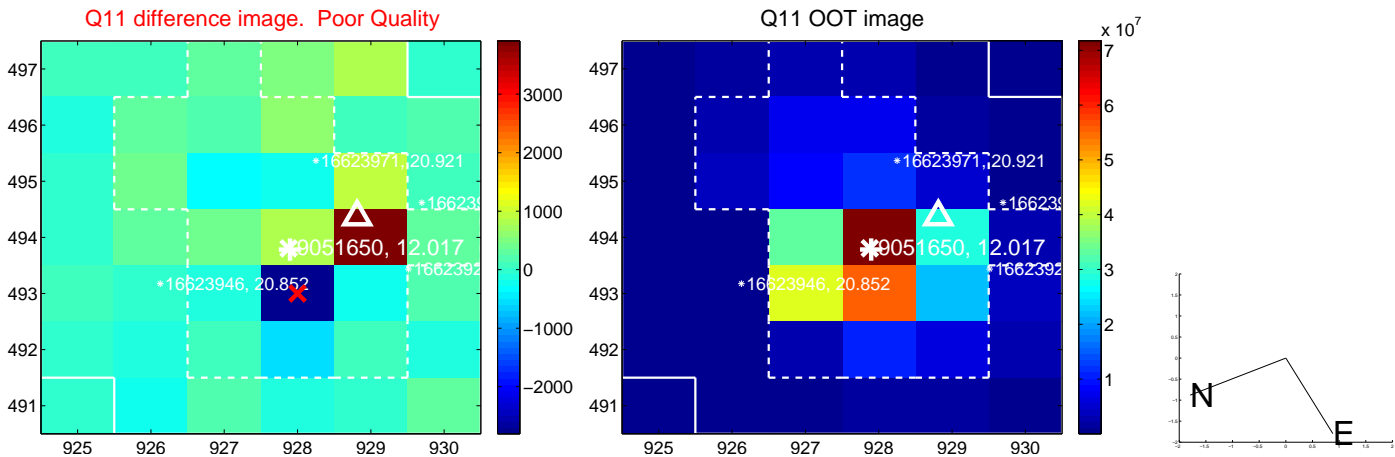
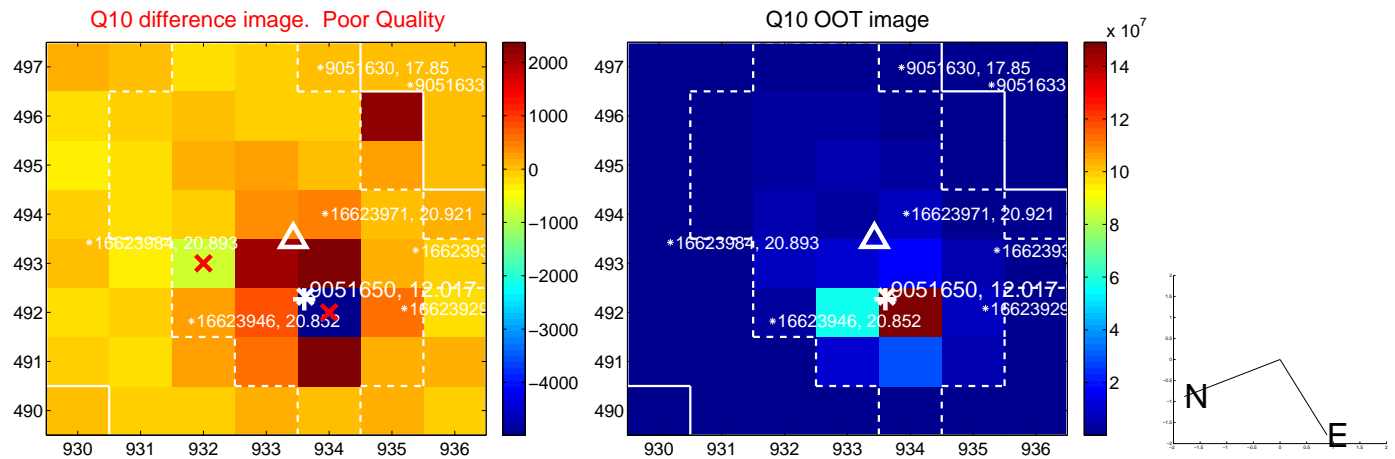
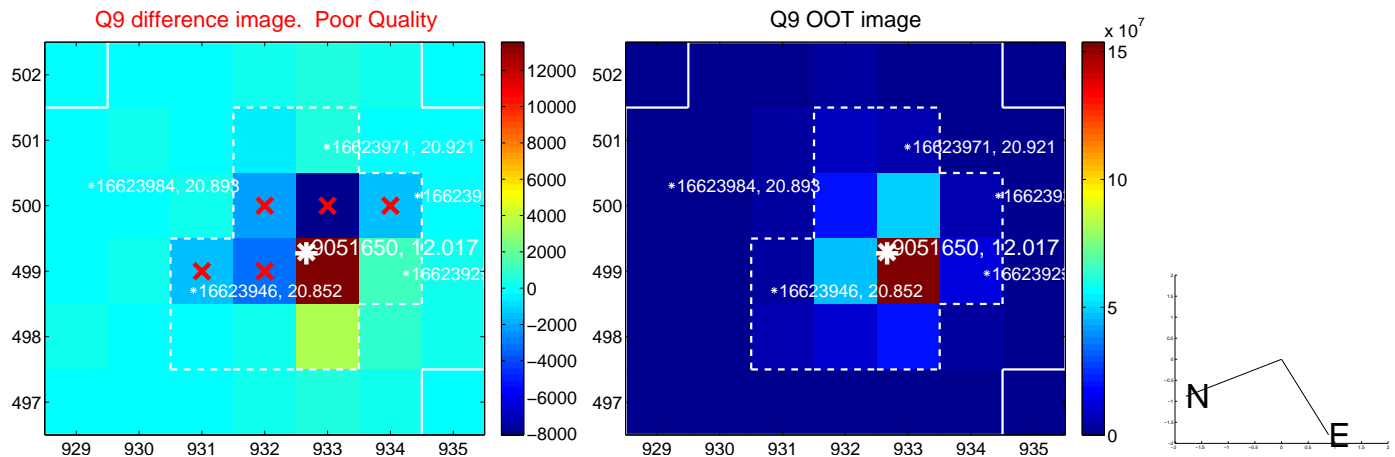
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



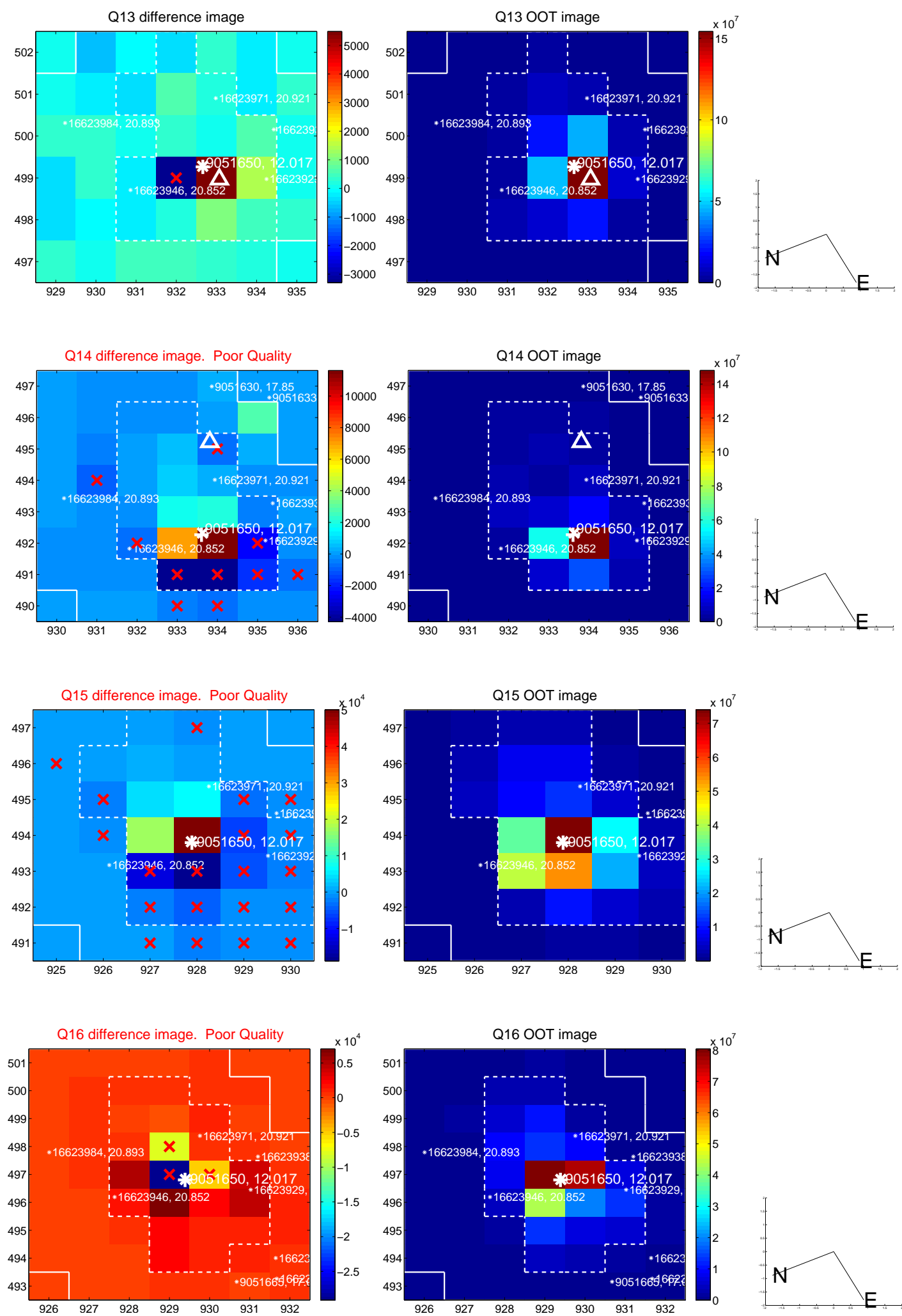
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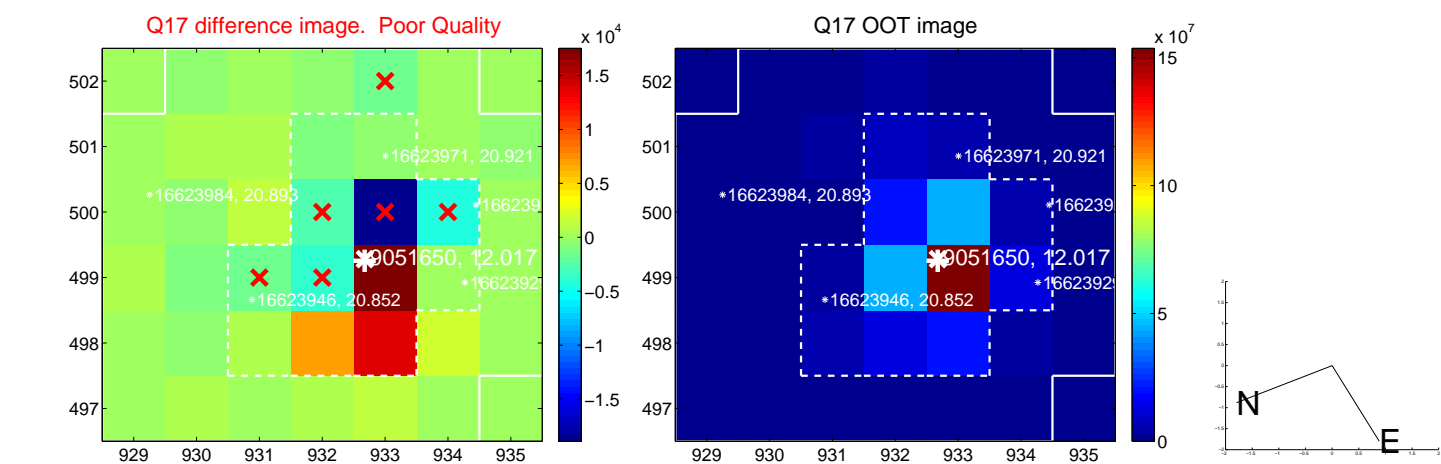
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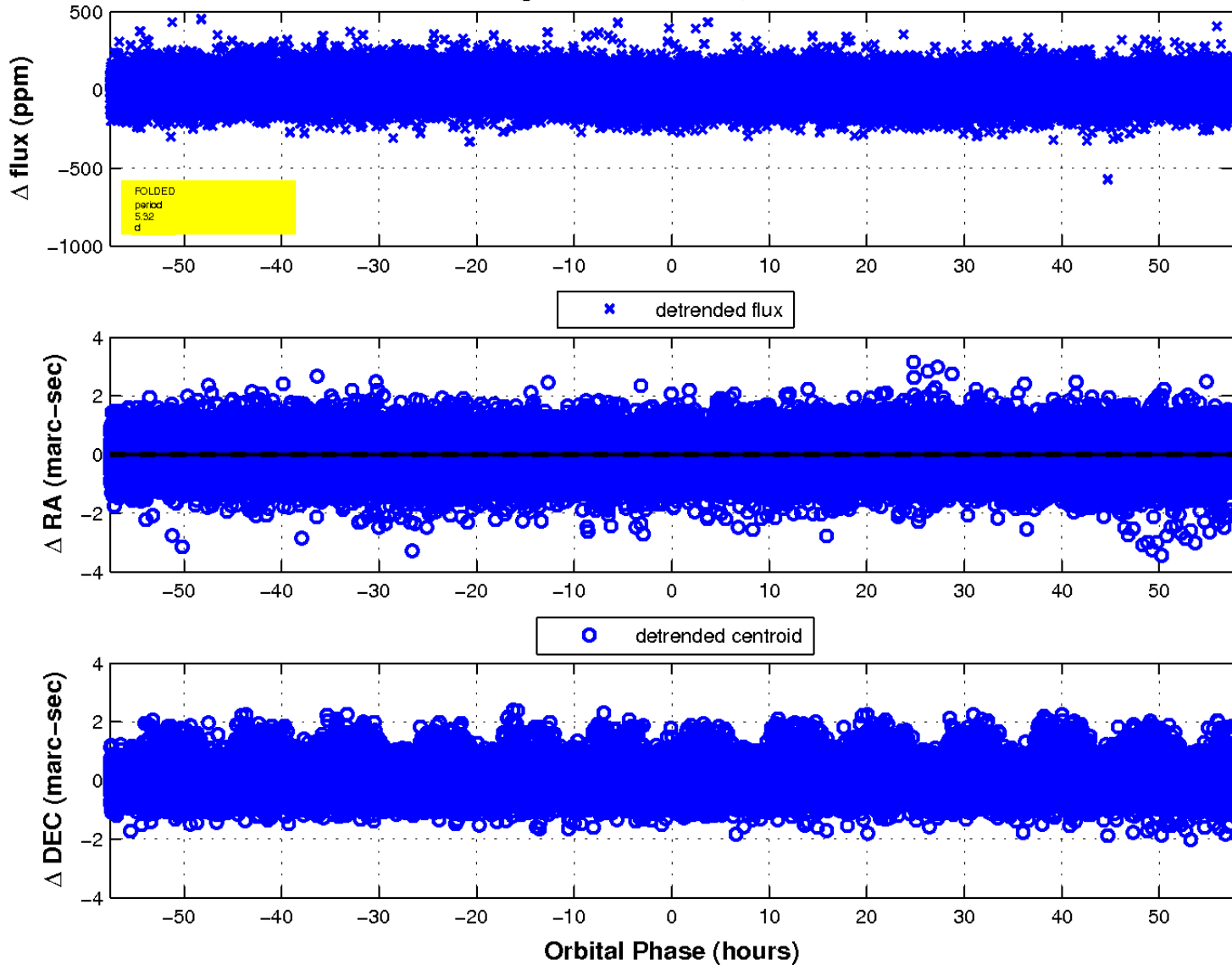
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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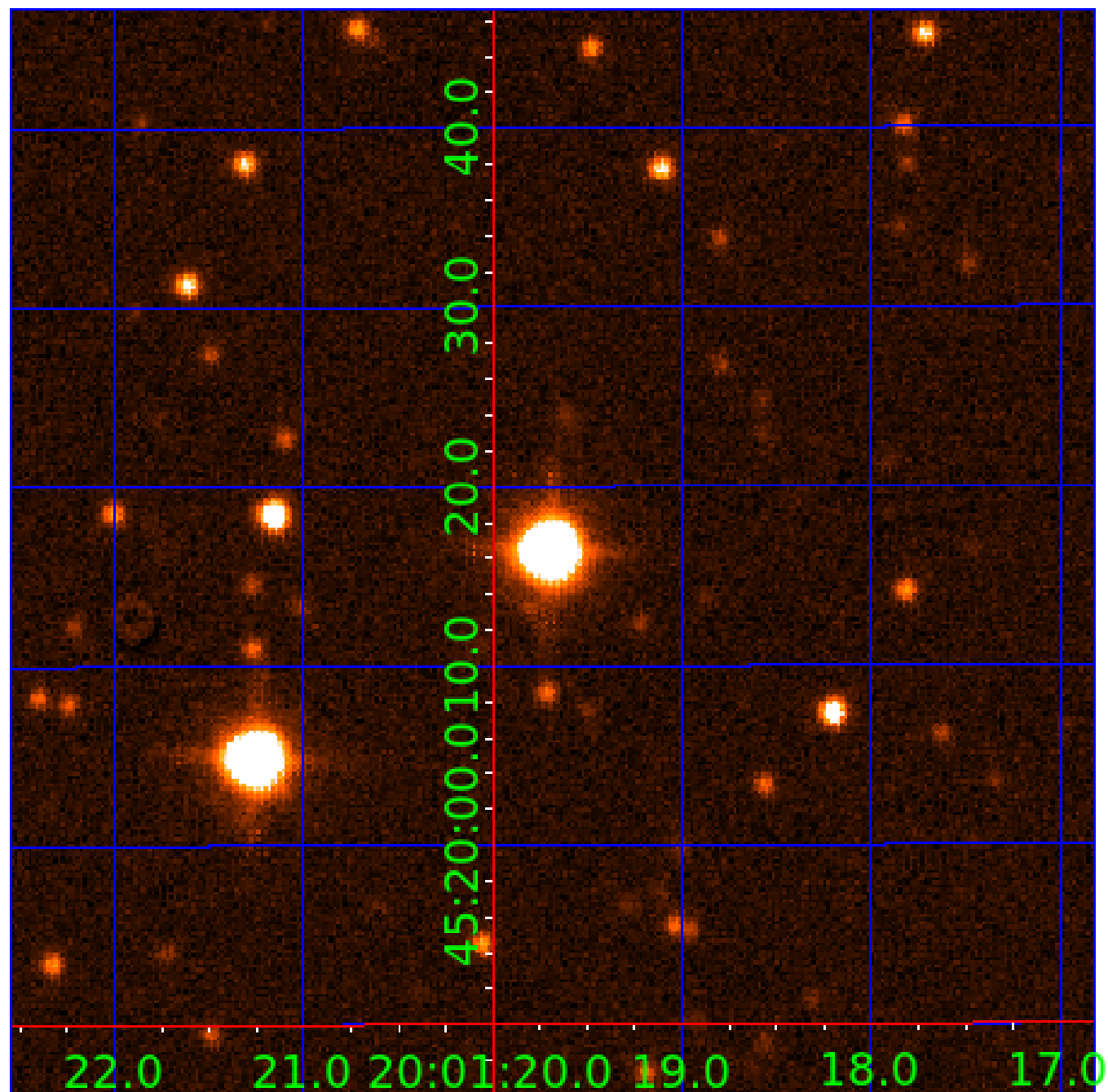


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 009051650

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})
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009051650-03	OBS	No	665.304291	173.732677	90.2	10.891	10.6	6.1	1.75	6649	1.88	1.93
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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009051650-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_NOFITS
009051650-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009051650-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

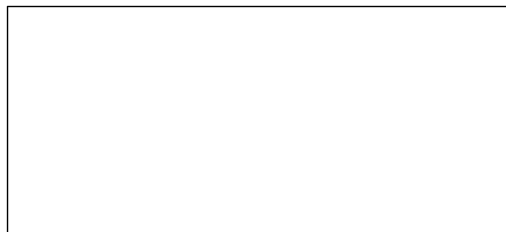
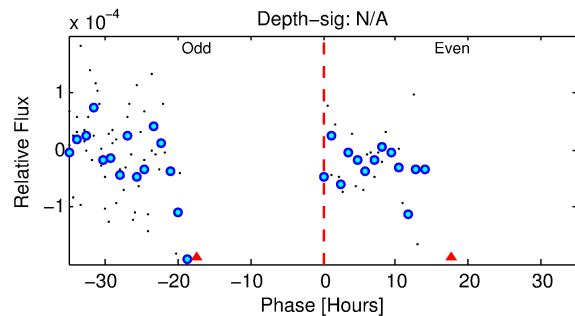
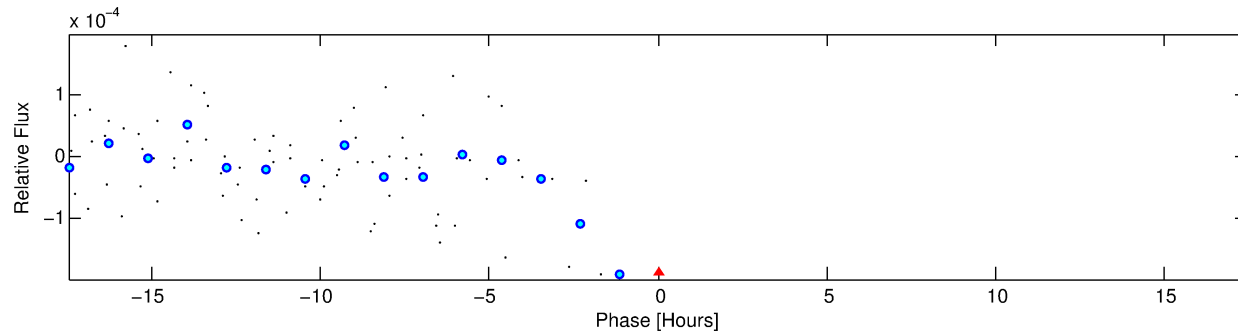
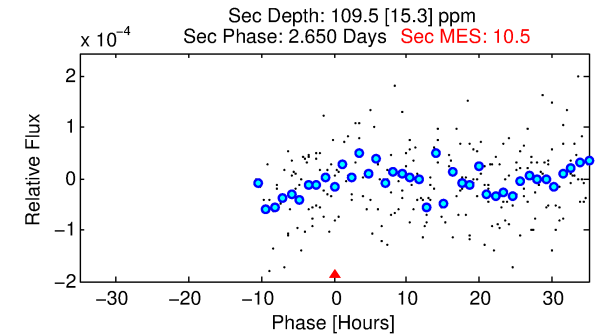
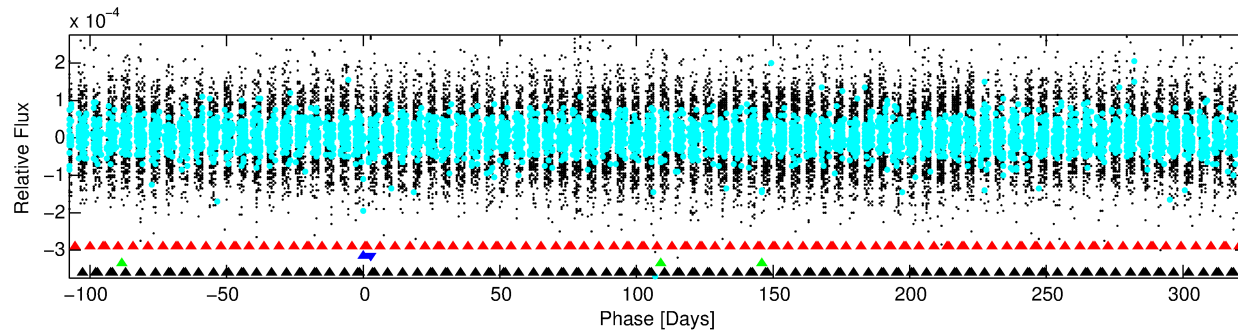
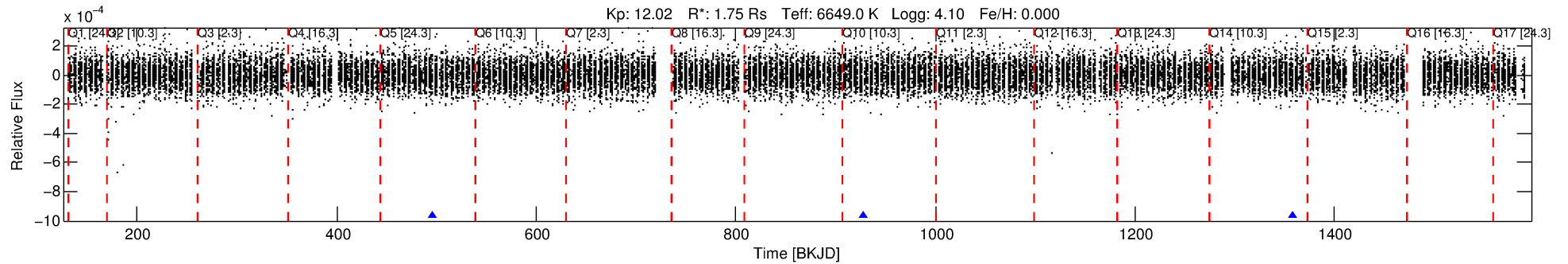
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009051650-02

No Significant Match Found

DV One-Page Summary

KIC: 9051650 Candidate: 2 of 4 Period: 431.189 d



TPS TCE Results:

Period = 431.18898 d
Epoch = 495.6234 BKJD

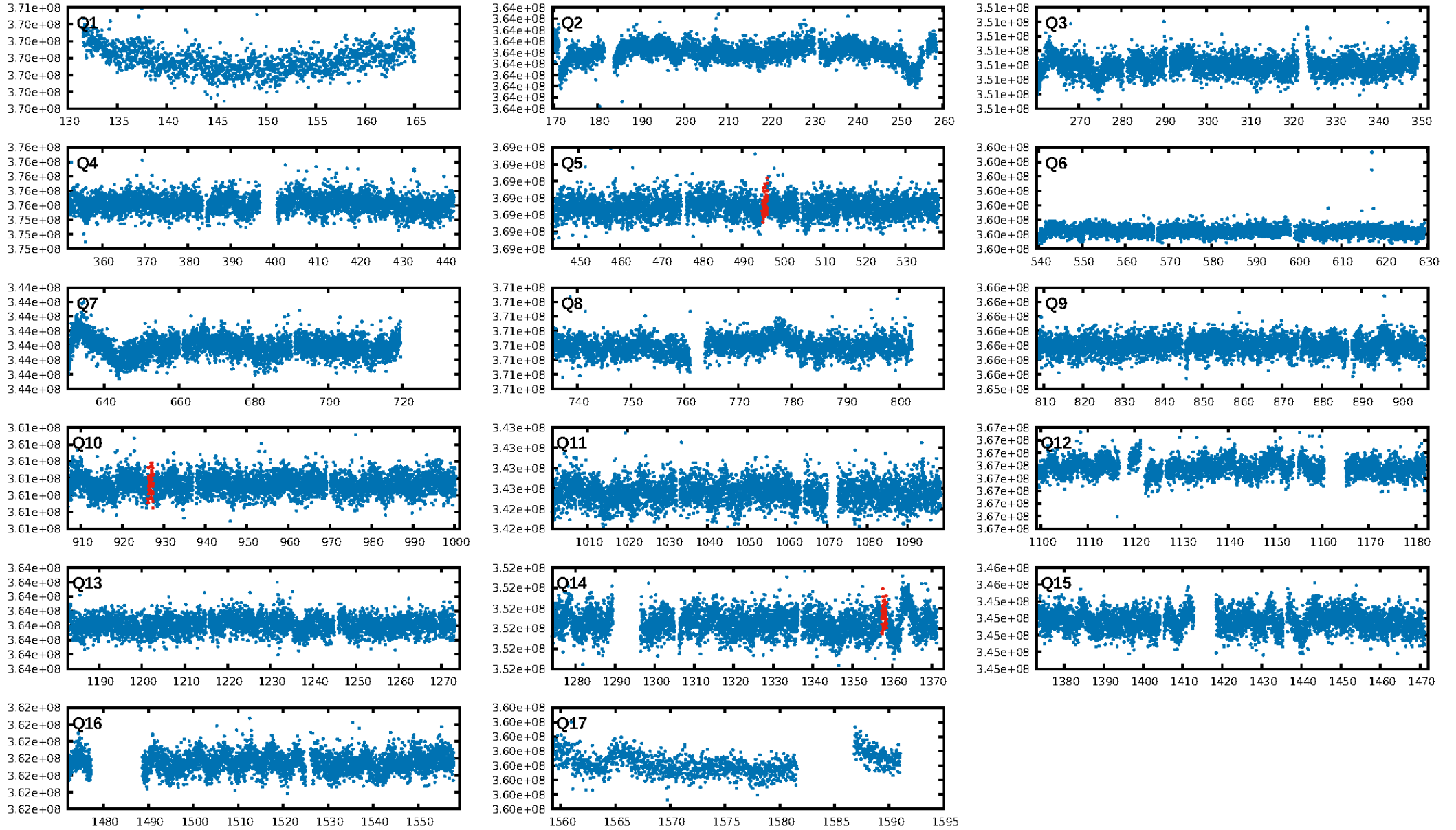
DV fit results are unavailable

DV Diagnostic Results:

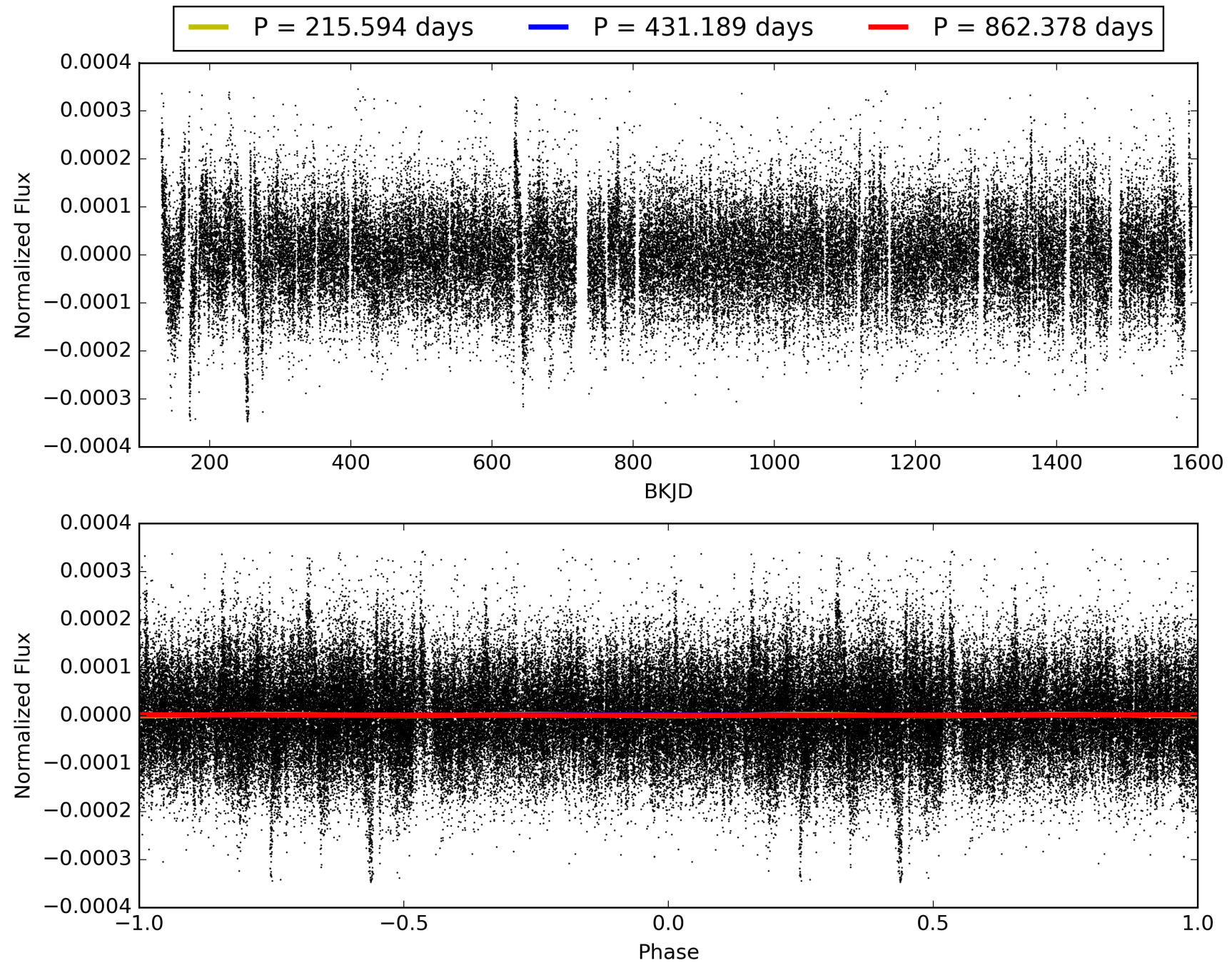
ShortPeriod-sig: 100.0% [419.58σ]
LongPeriod-sig: 100.0% [303.11σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1/1]
GhostDiagnostic-chr: 0.439

Centroid-sig: N/A
Centroid-so: 4.580 arcsec [0.47σ]
OotOffset-rm: N/A
KicOffset-rm: N/A
OotOffset-st: 0/0/0/0 [0]
KicOffset-st: 0/0/0/0 [0]
DiffImageQuality-fgm: N/A
DiffImageOverlap-fno: 1.00 [3/3]

TCE 009051650-02, PDC Light Curves

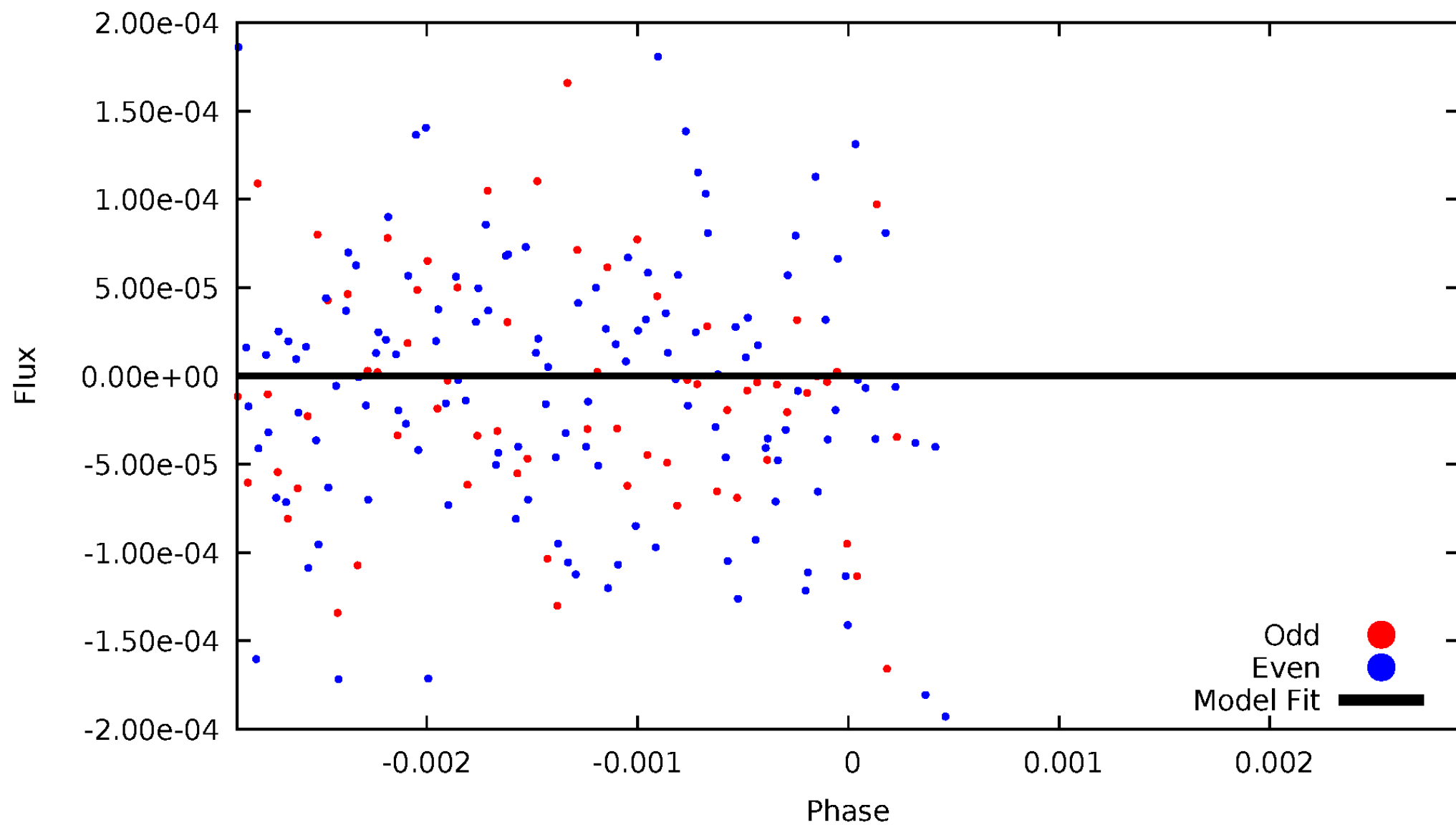


TCE 009051650-02



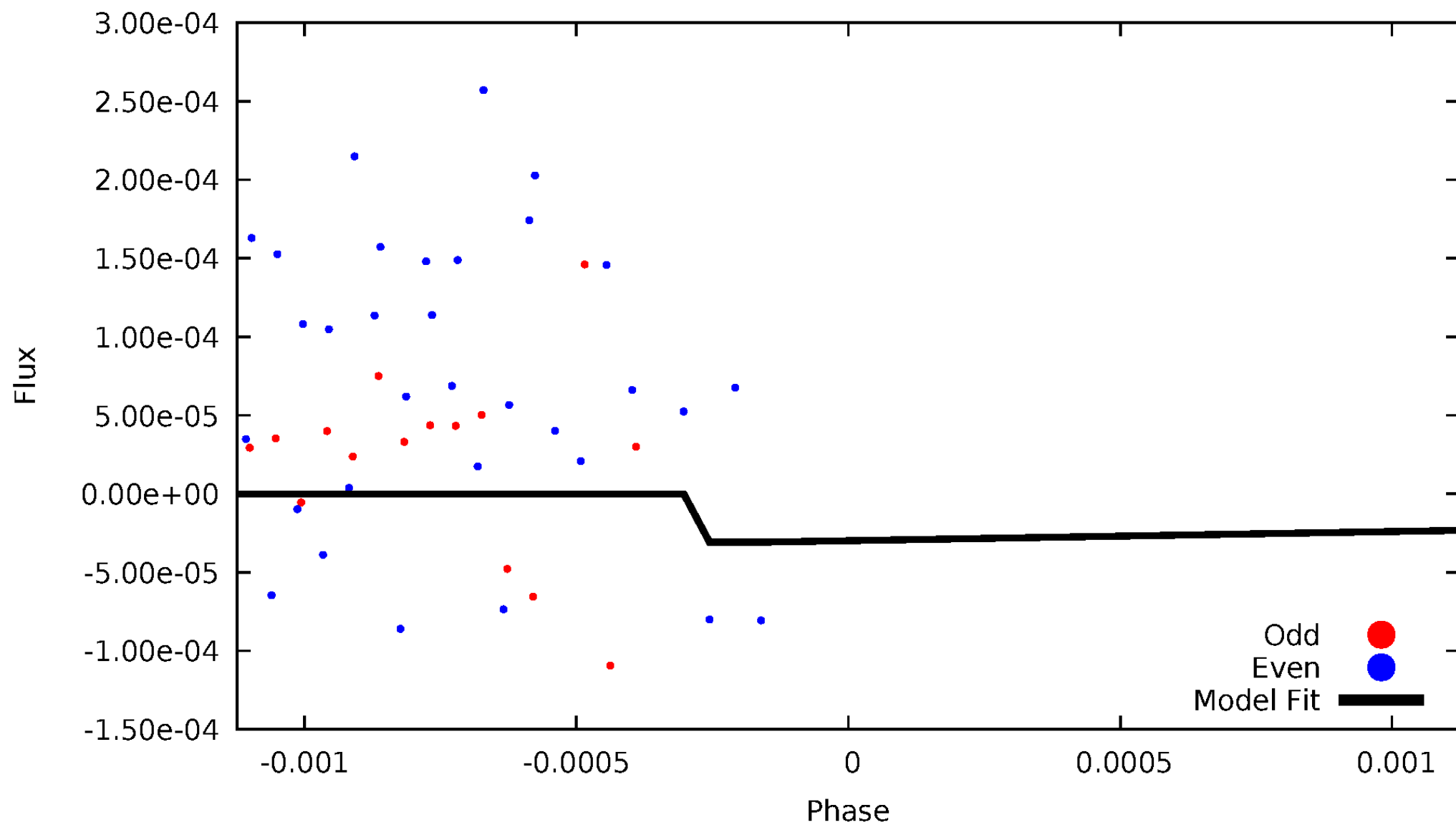
DV Odd/Even

TCE 009051650-02



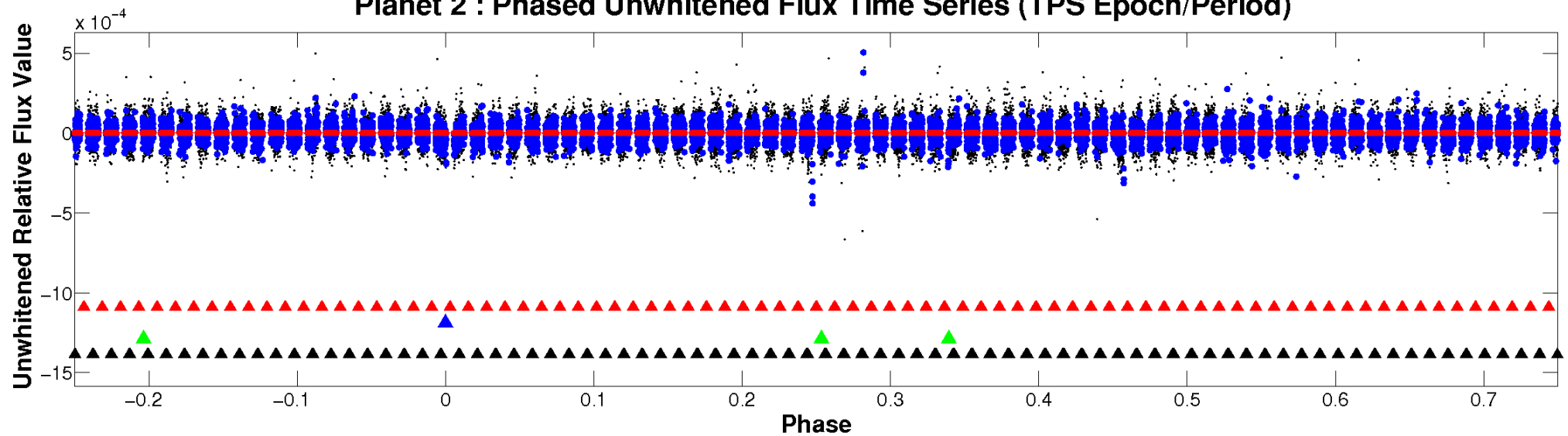
ALT Odd/Even

TCE 009051650-02

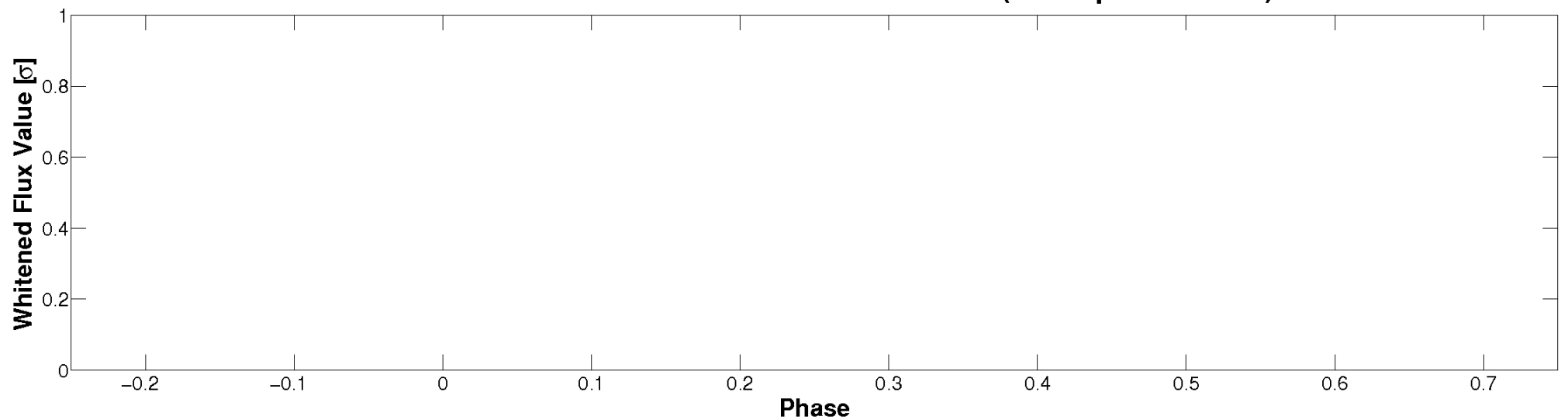


Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

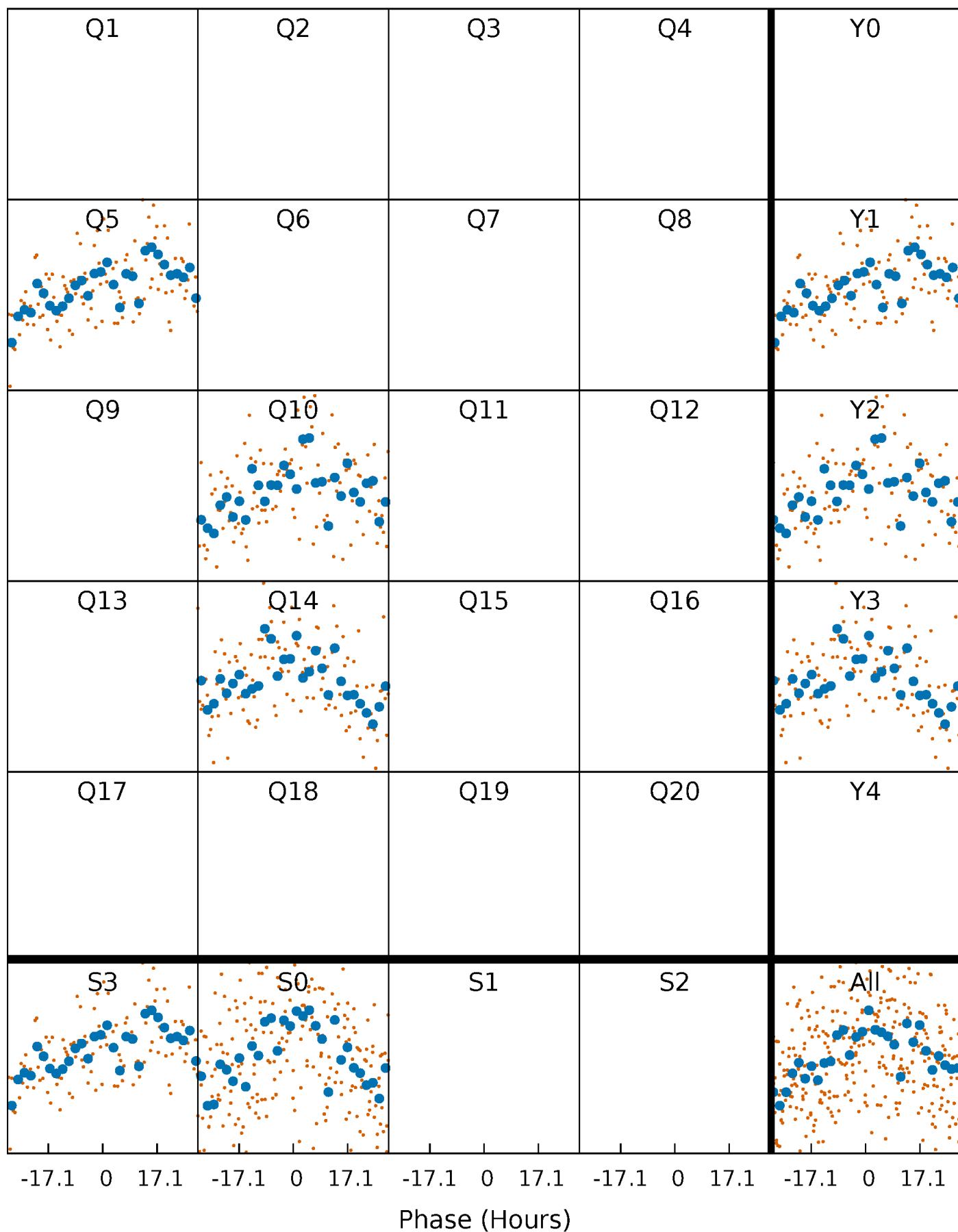


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



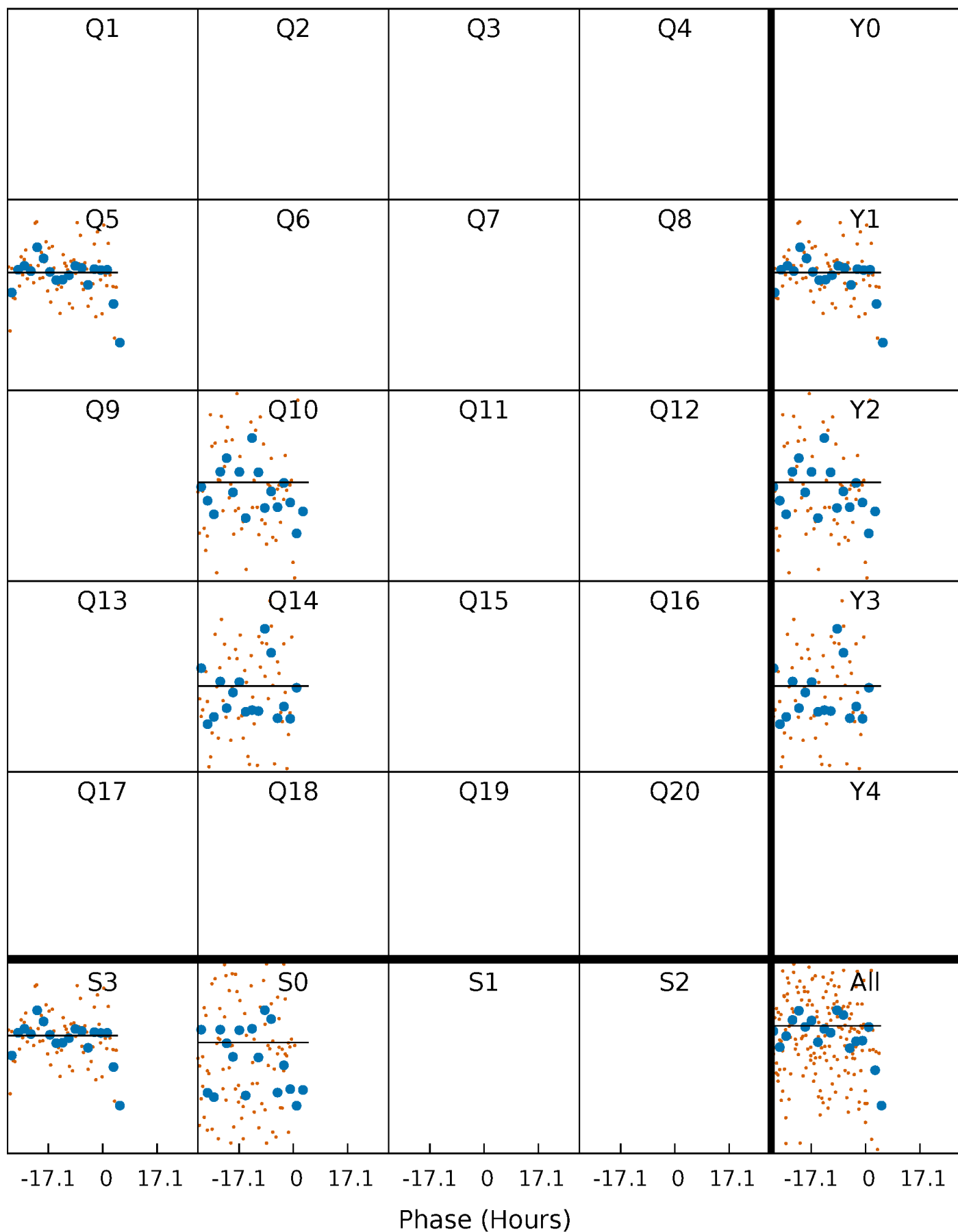
PDC Quarter-Phased Transit Curves

TCE 009051650-02 $P=431.188983$ Days $T_0=495.623411$ (BKJD)



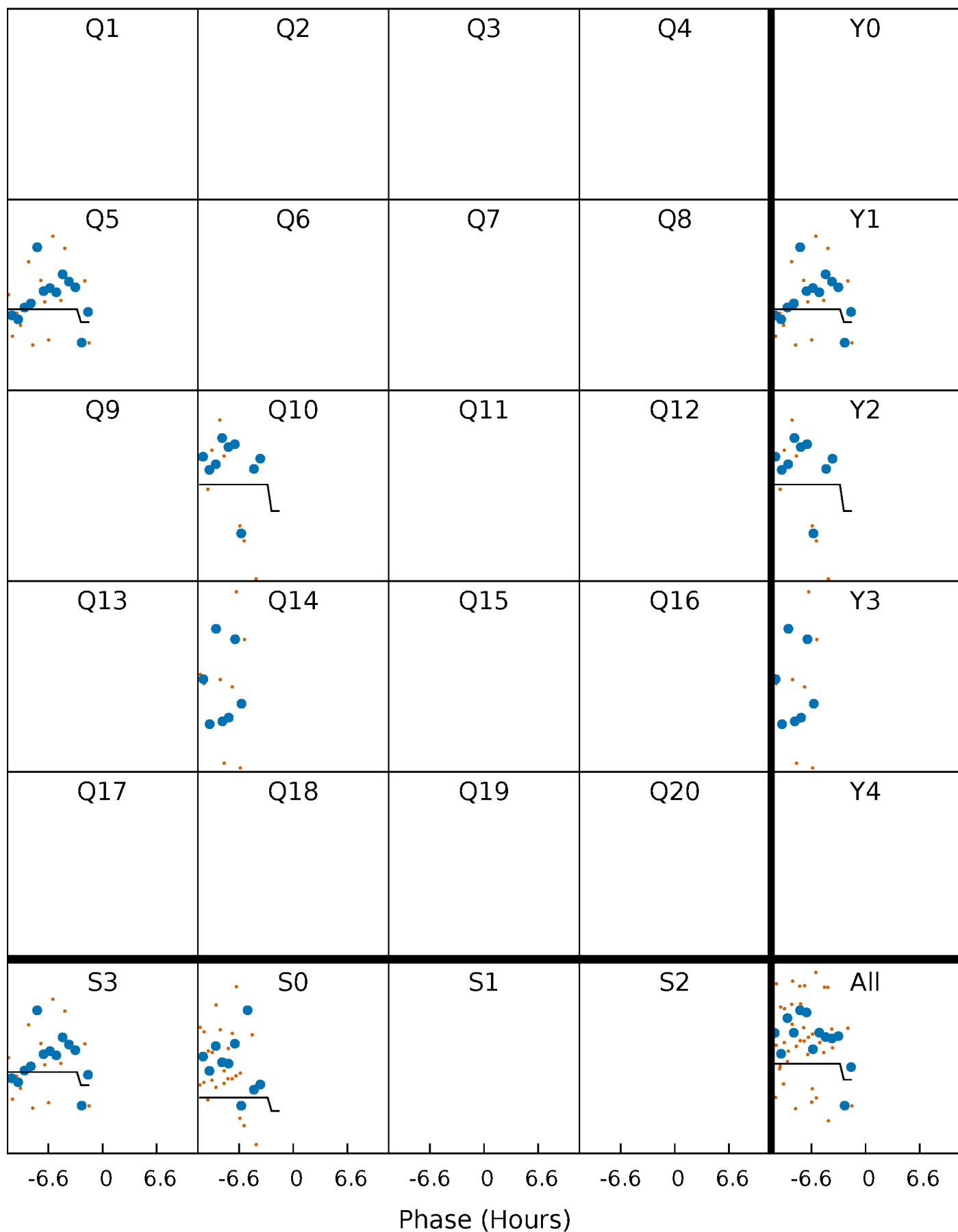
DV Quarter-Phased Transit Curves

TCE 009051650-02 P=431.188983 Days $T_0=495.623411$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

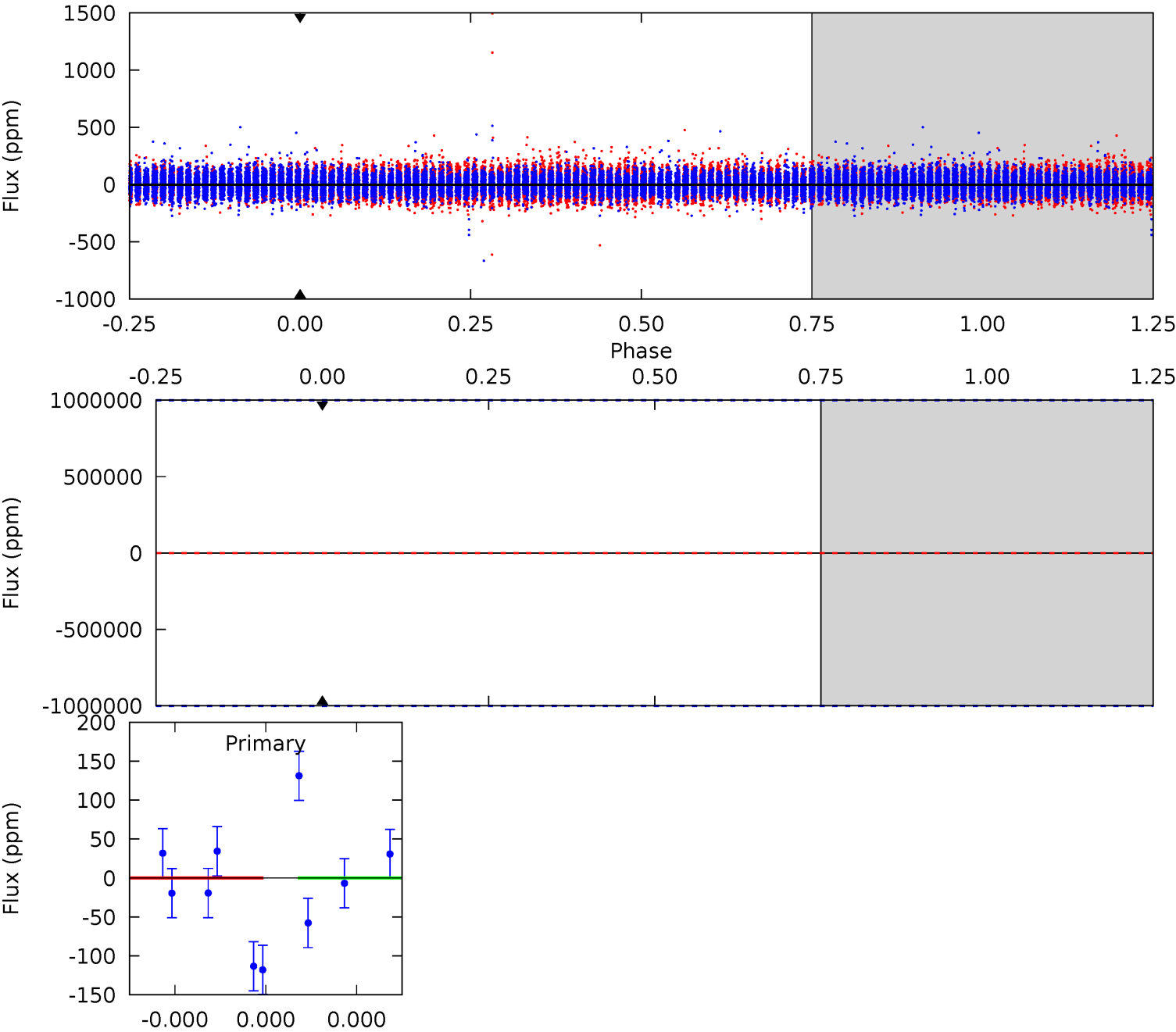
TCE 009051650-02 P=431.188983 Days $T_0=495.891270$ (BKJD)



DV Model-Shift Uniqueness Test

009051650-02, P = 431.188983 Days, E = 64.434428 Days

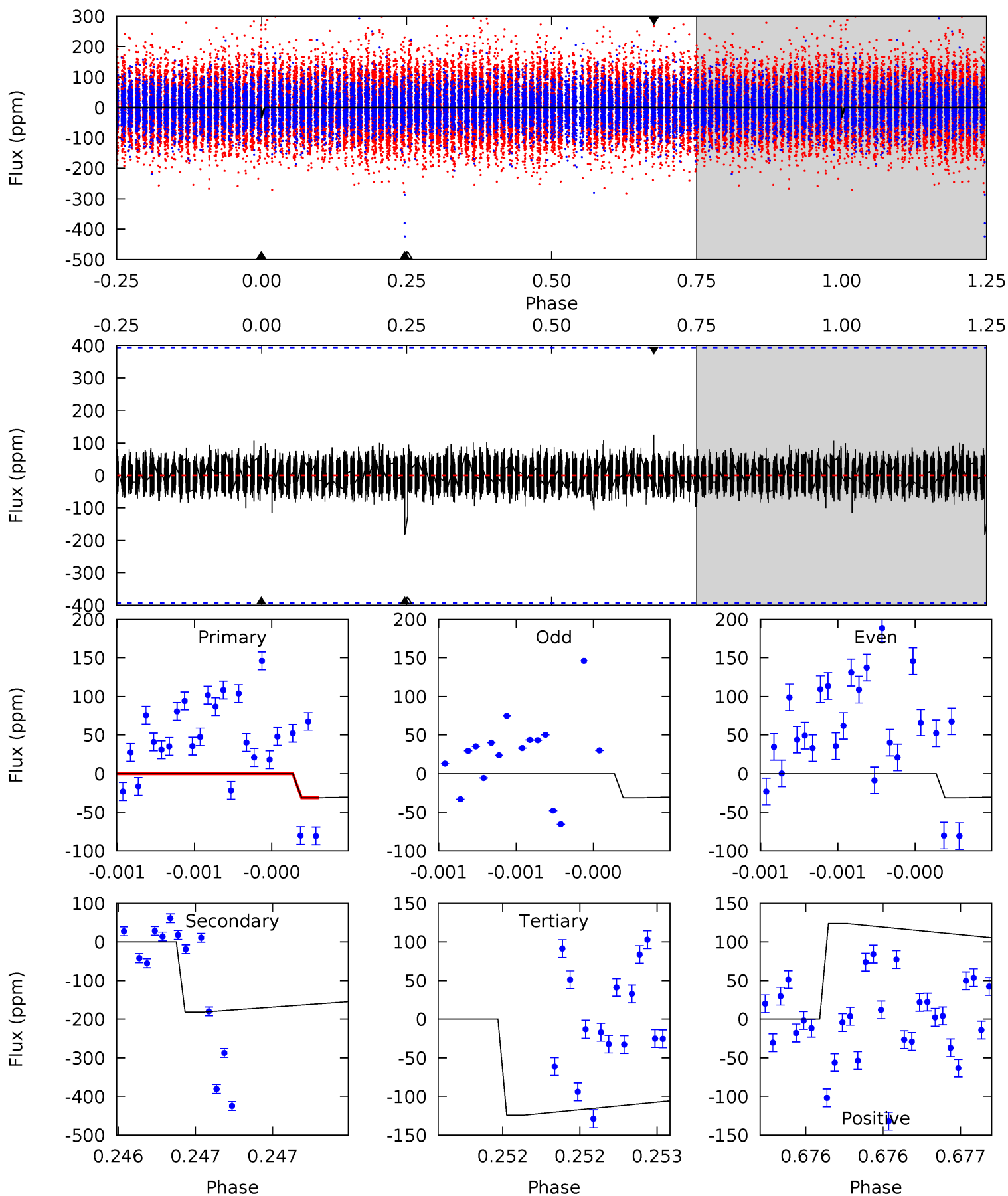
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009051650-02, $P = 431.188983$ Days, $E = 64.702287$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.44	2.59	1.77	1.76	5.61	3.53	0.36	-1.32	-1.32	0.82	0.83	0	0	0.41	0



Stellar Parameters For KIC 009051650

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6649^{+149}_{-215}	$4.097^{+0.171}_{-0.140}$	$0.000^{+0.250}_{-0.300}$	$1.748^{+0.353}_{-0.431}$	$1.396^{+0.163}_{-0.245}$	$0.368^{+0.367}_{-0.135}$
	+2%/-3%	+4%/-3%	+inf%/-inf%	+20%/-25%	+12%/-18%	+100%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009051650-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$13.32^{+15.25}_{-8.94}$	484^{+28}_{-32}	4100^{+28221}_{-30802}	$2451^{+845301}_{-692301}$
Alt.	-182 ± 70	$13.18^{+14.58}_{-9.73}$	485^{+28}_{-30}	3358^{+2147}_{-645}	803^{+10833}_{-631}

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 $A_{obs} \gg 1.0$

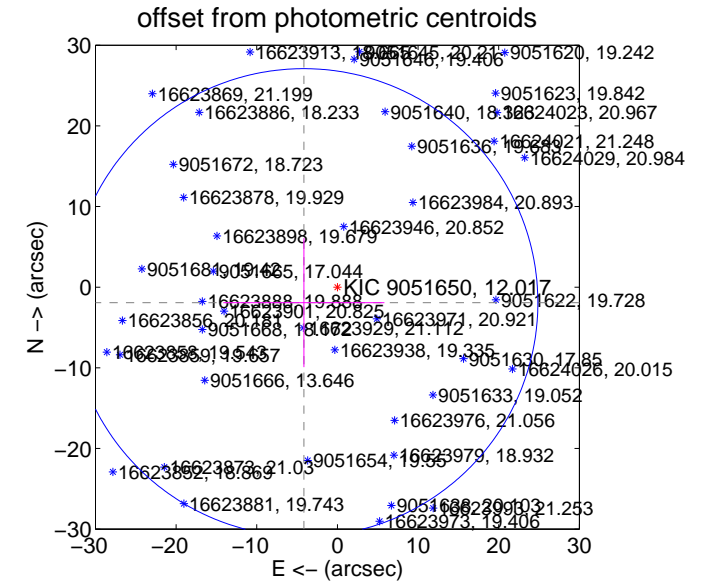
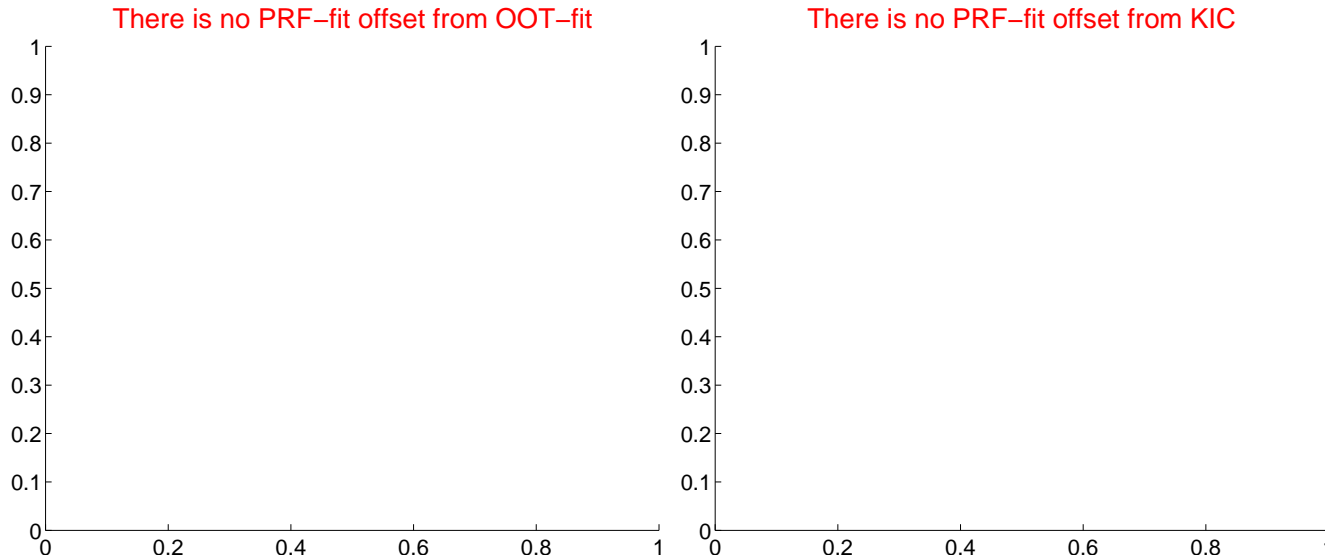
DV Centroid Data

Supplemental centroid analysis for 009051650-02. Kepler magnitude: 12.02. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

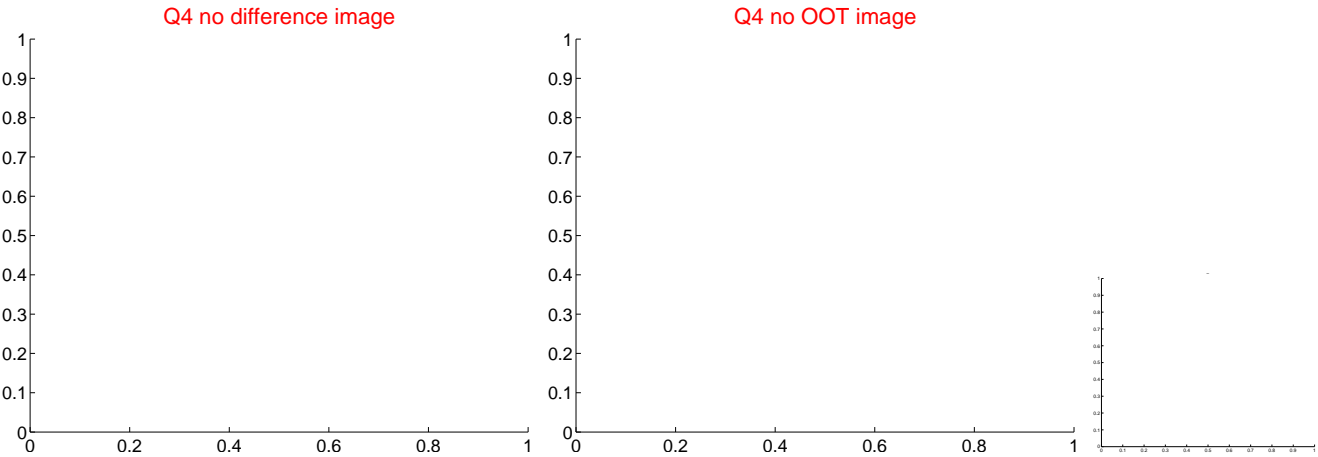
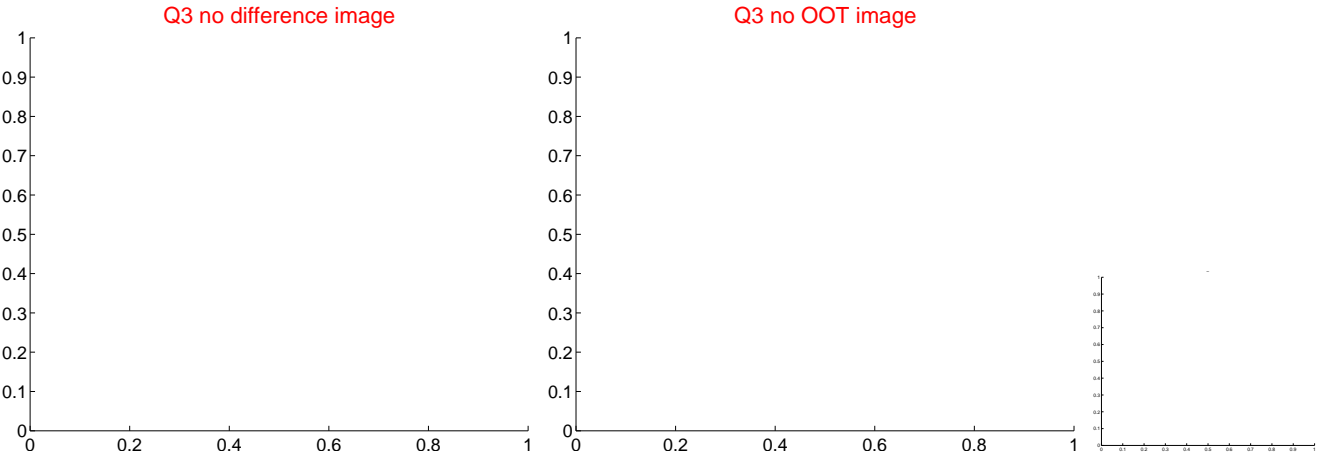
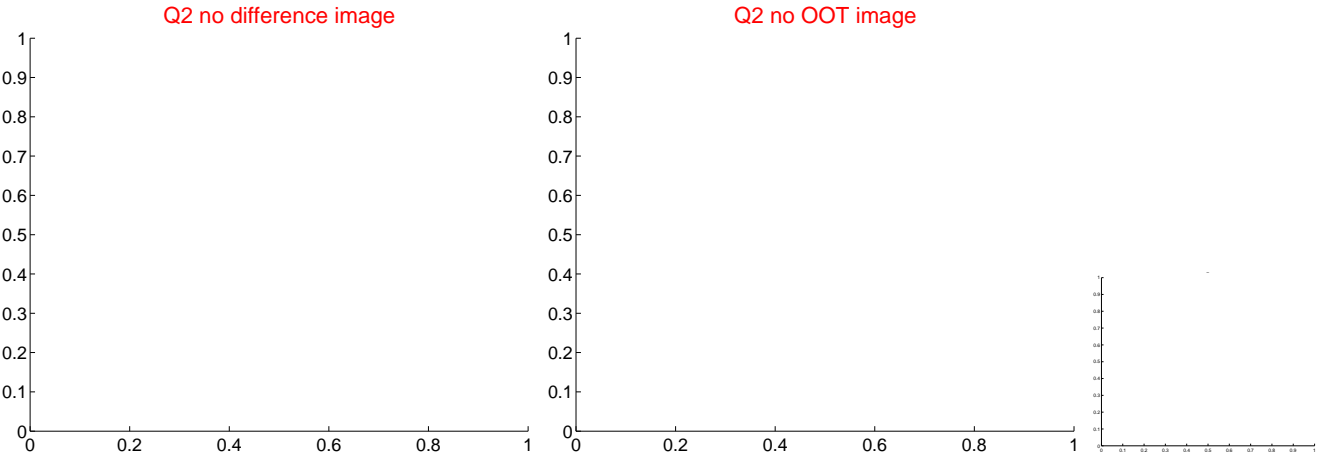
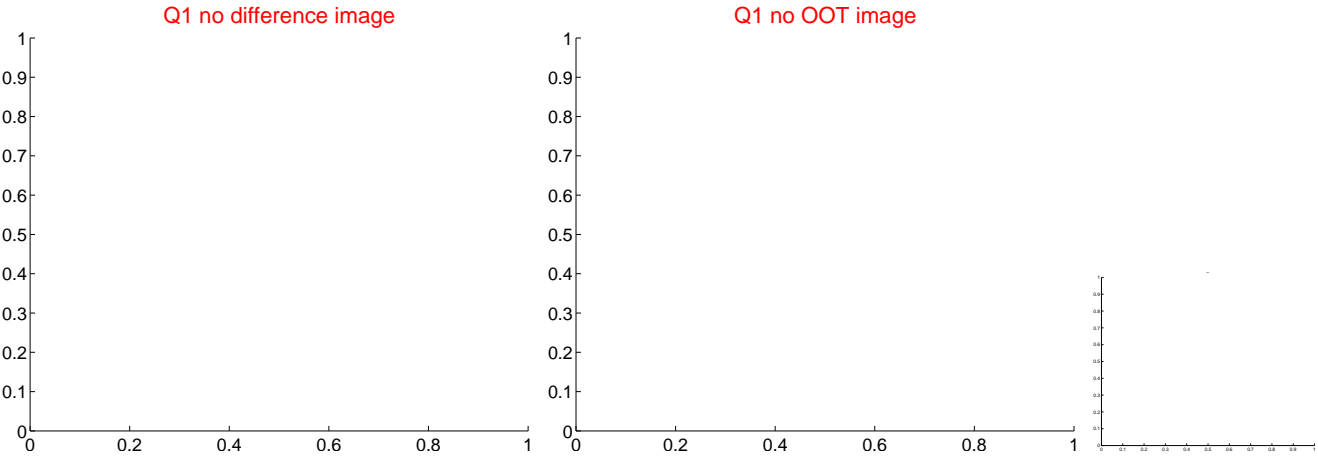
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	4.58 ± 9.67	0.47	4.16 ± 9.99	-1.92 ± 8.00

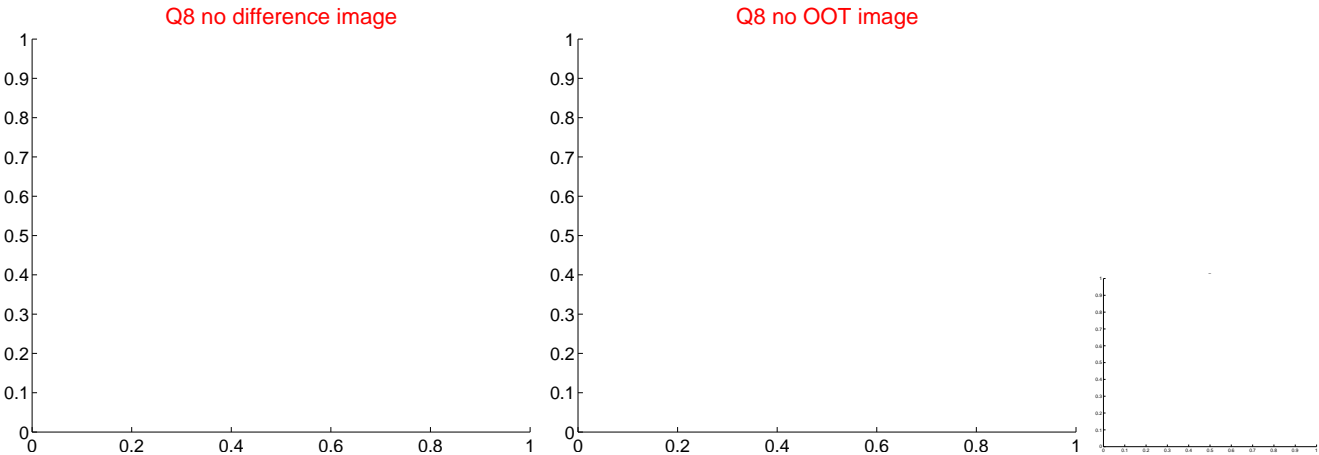
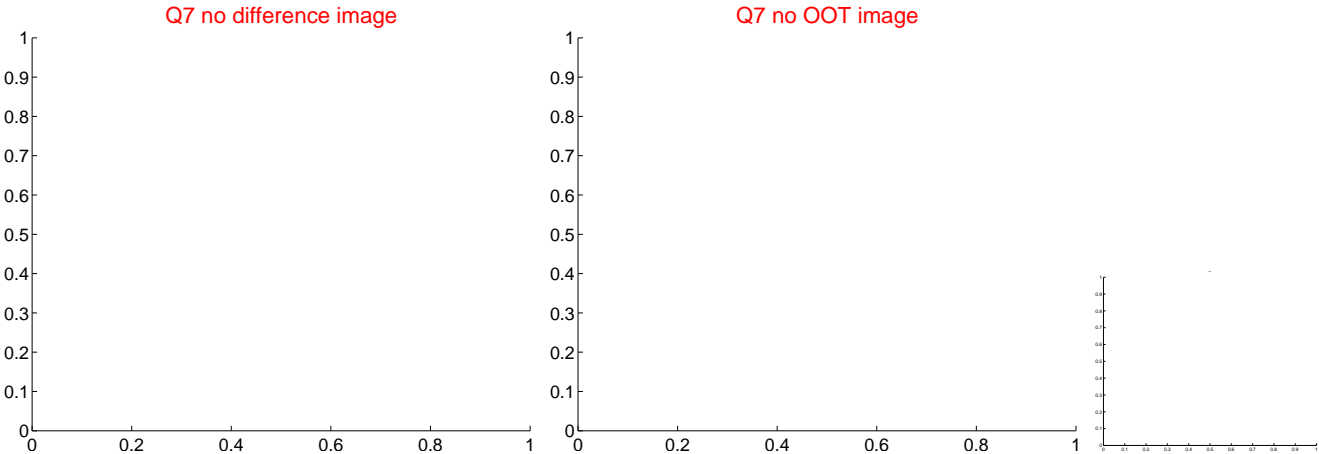
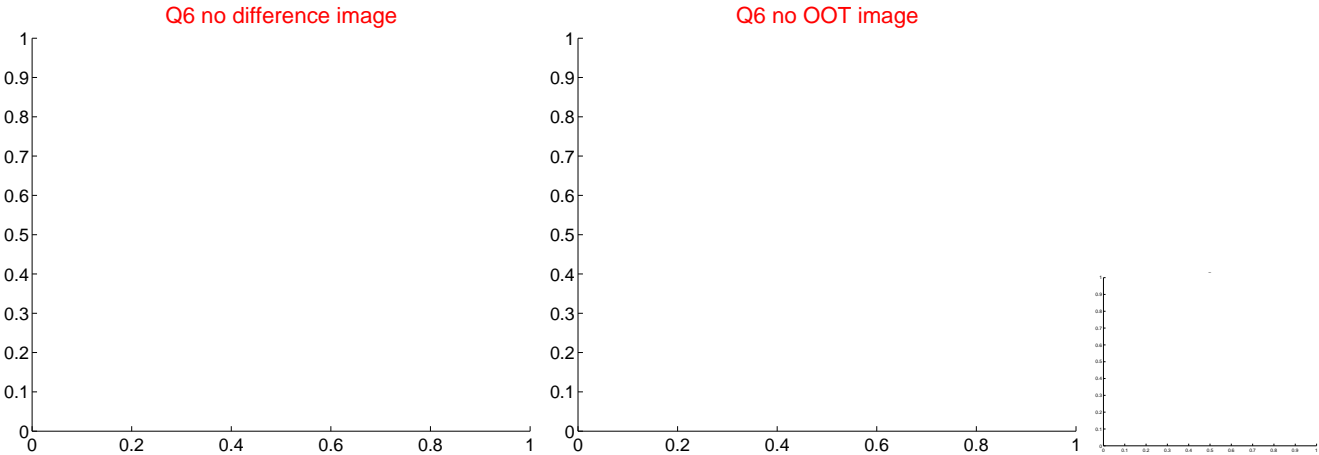
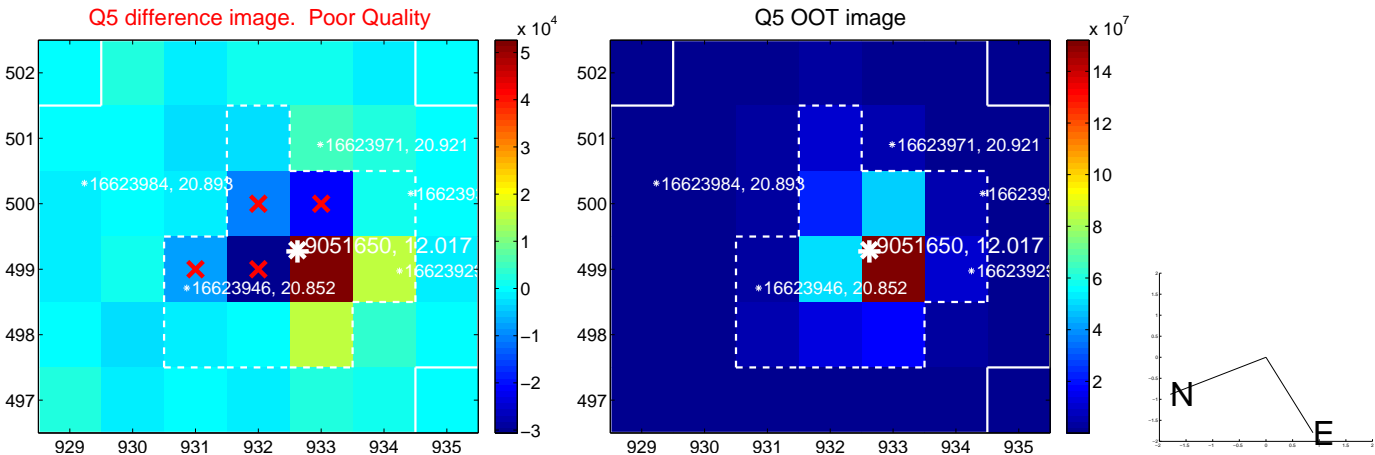


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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.

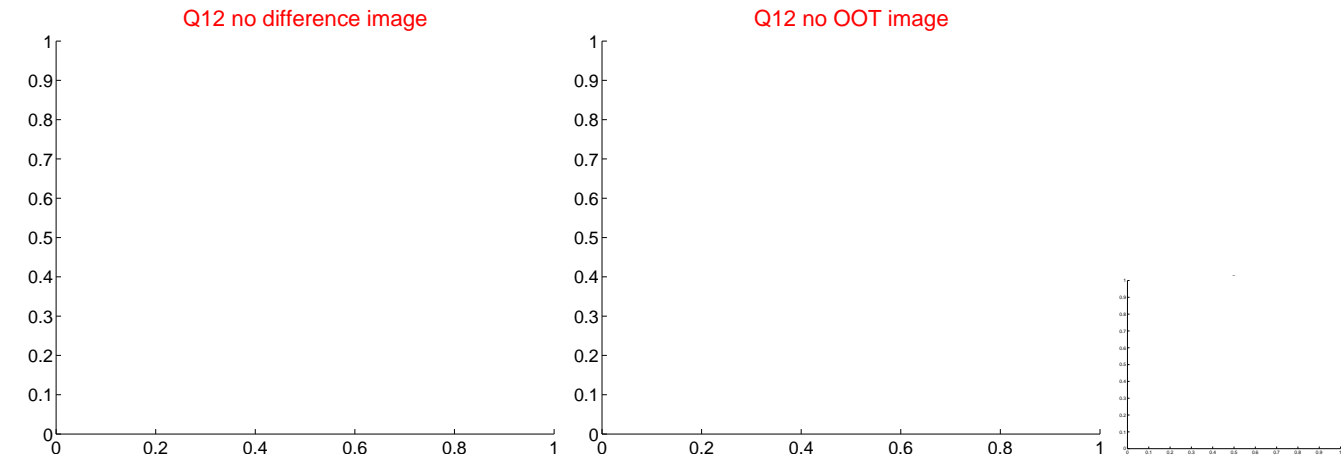
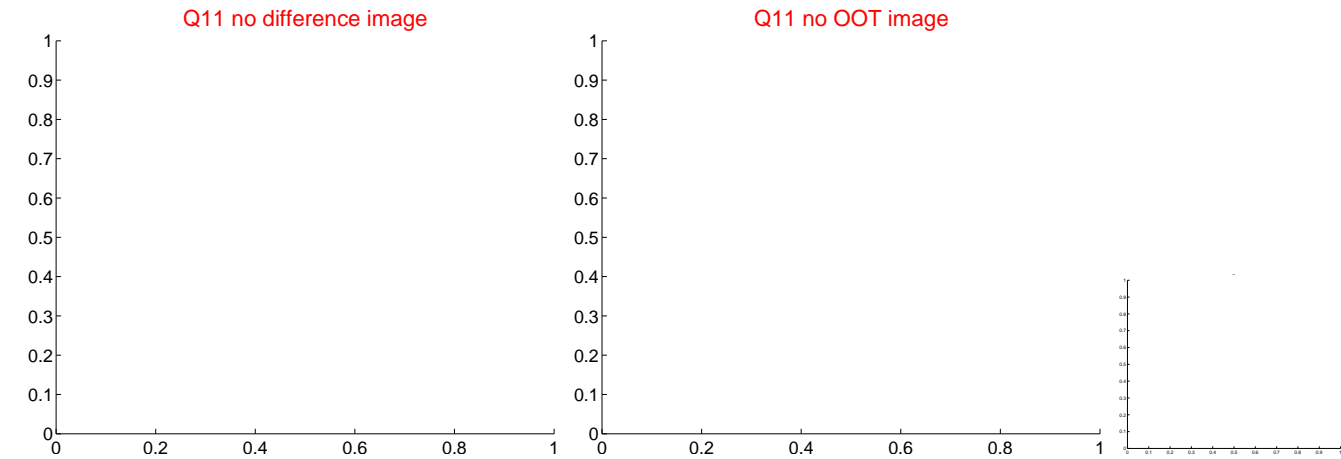
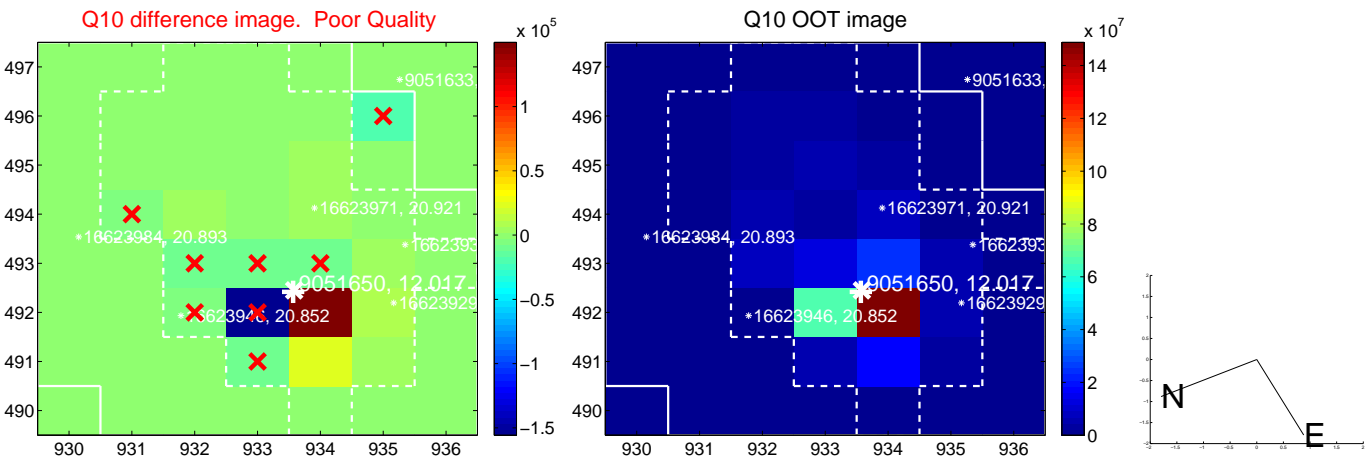
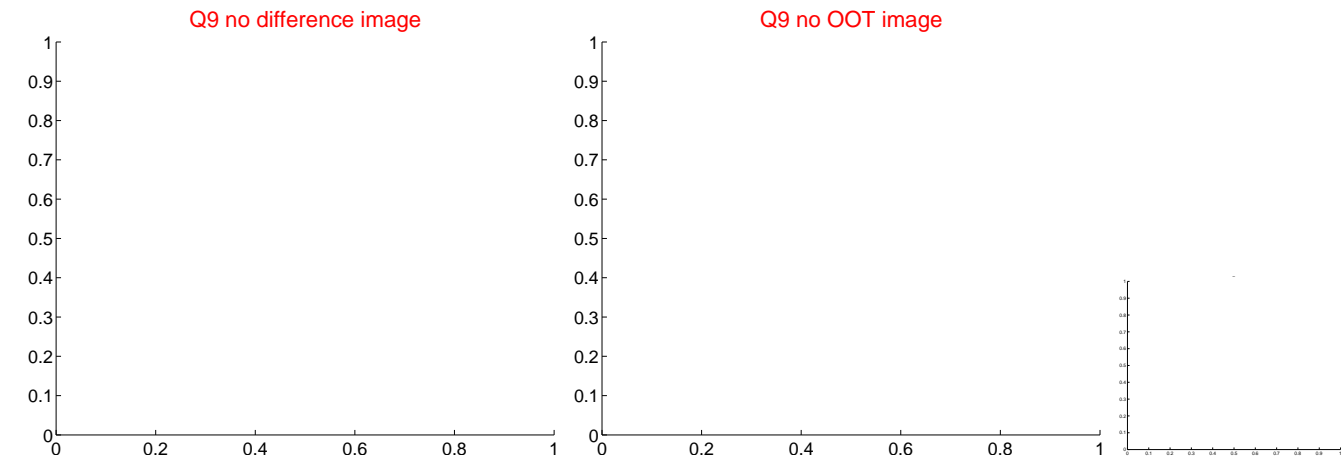
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



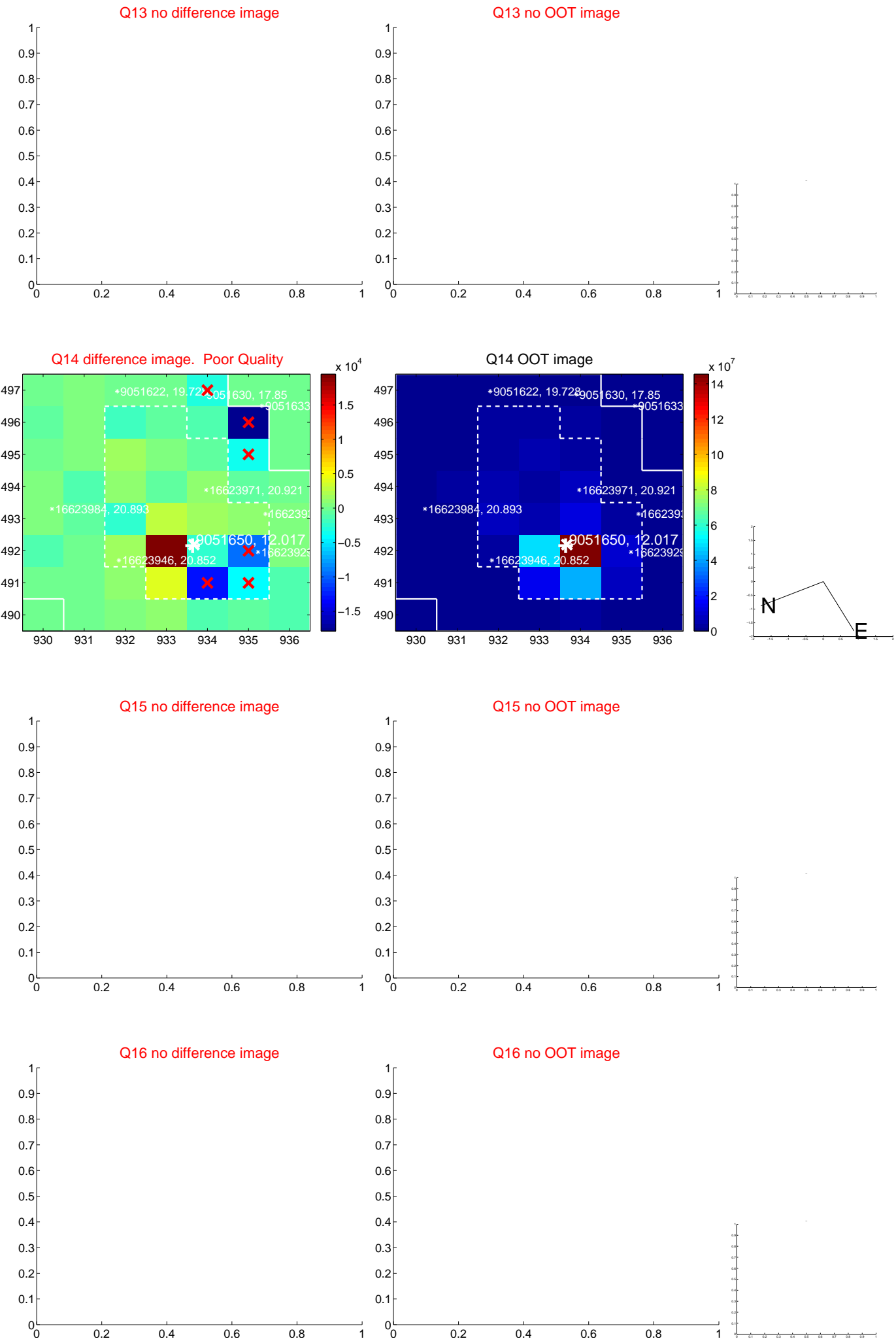
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



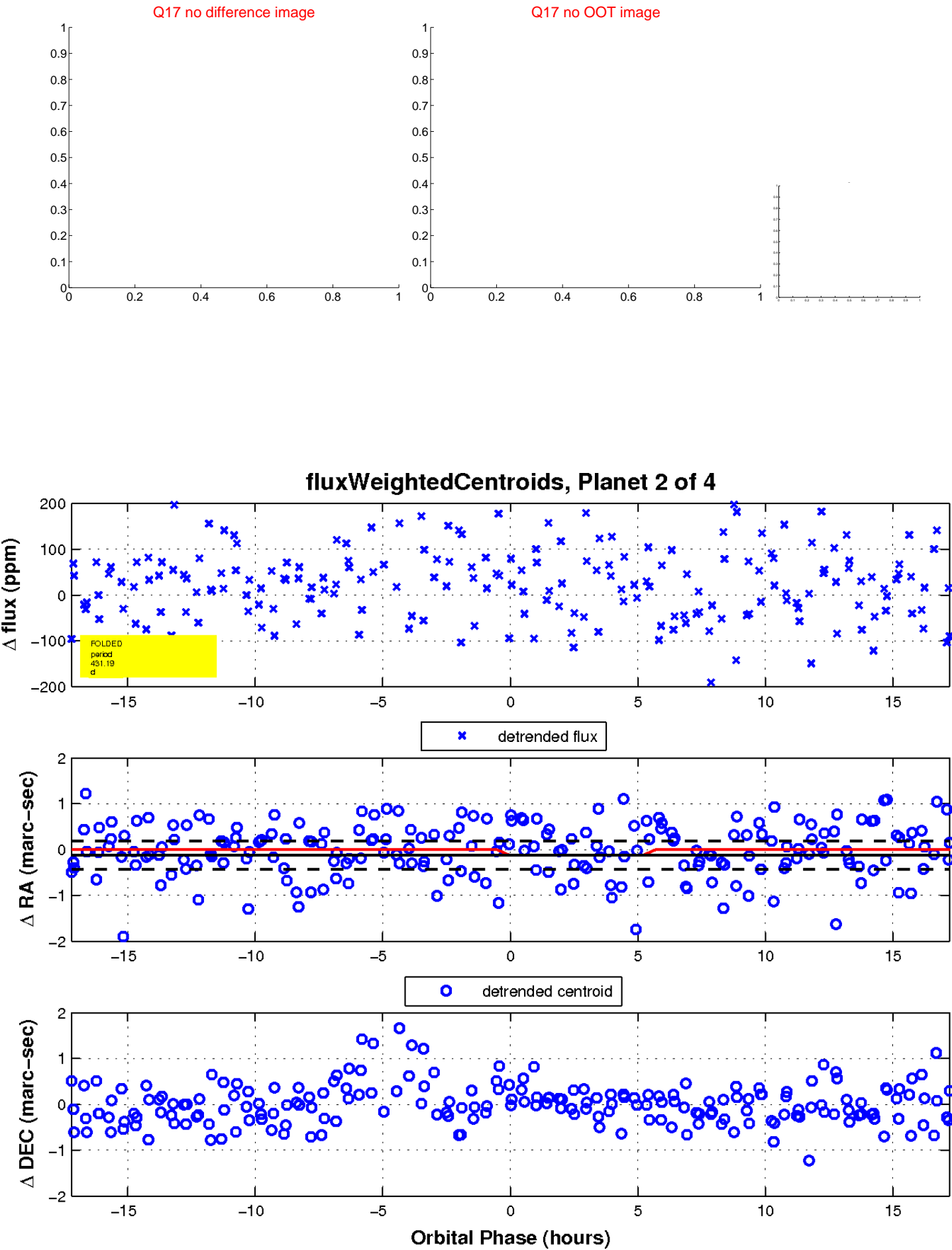
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

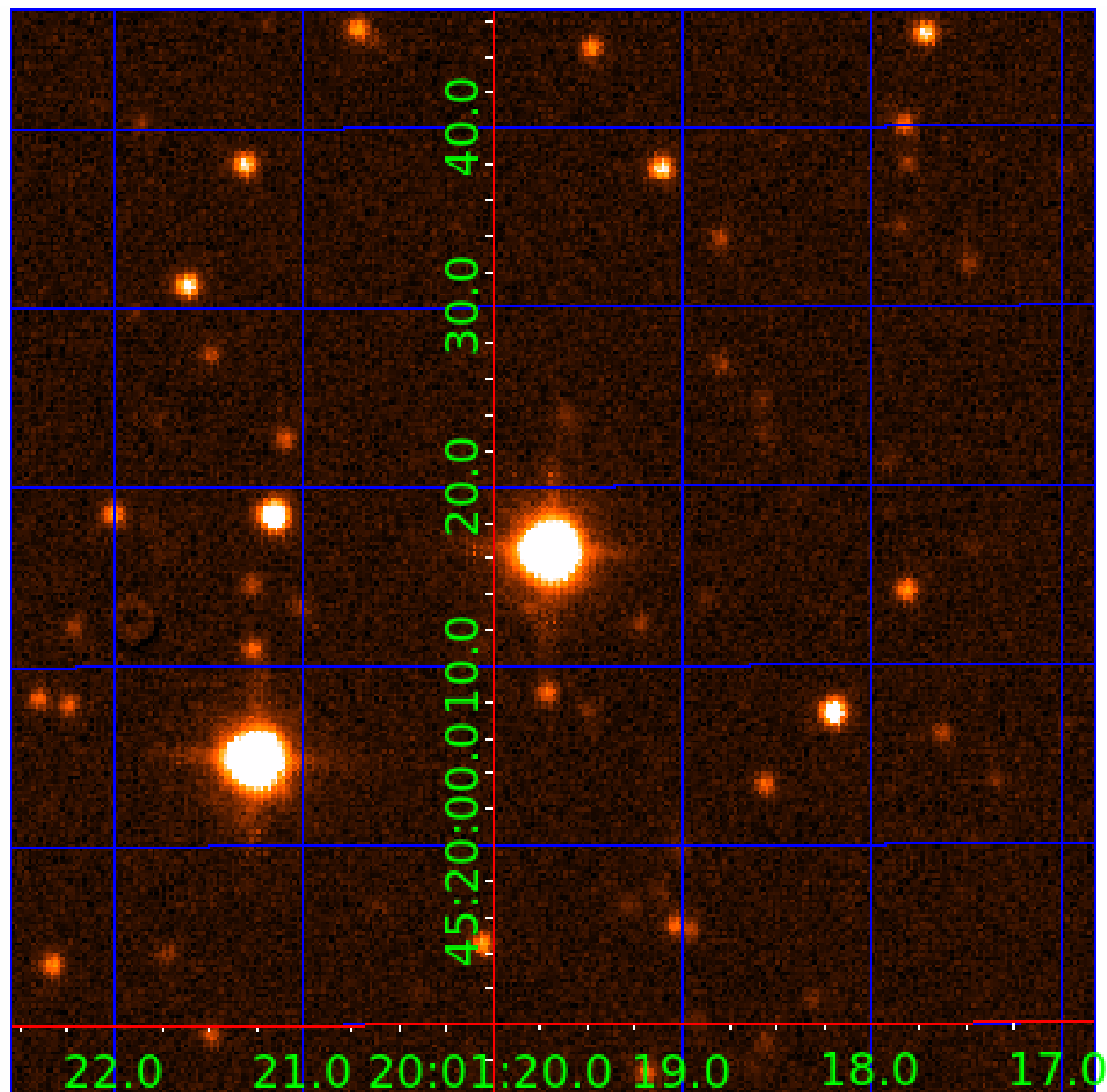


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009051650

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})
009051650-01	OBS	No	5.322248	135.125385	10.5	19.194	10.0	8.2	1.75	6649	0.67	1204.54
009051650-02	OBS	No	431.188983	495.623411	176.7	15.000	14.2	-1.0	1.75	6649	2.34	3.44
009051650-03	OBS	No	665.304291	173.732677	90.2	10.891	10.6	6.1	1.75	6649	1.88	1.93
009051650-04	OBS	No	5.321441	132.562771	12.9	34.912	9.5	11.0	1.75	6649	0.66	1204.78

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009051650-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009051650-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009051650-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009051650-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

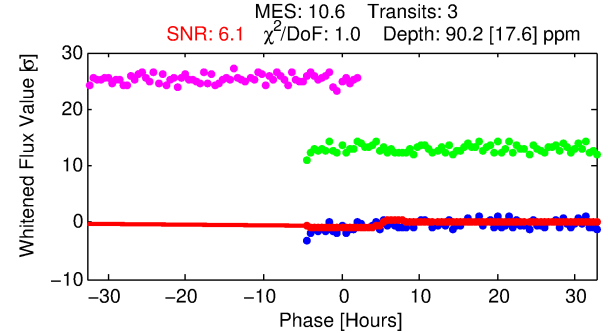
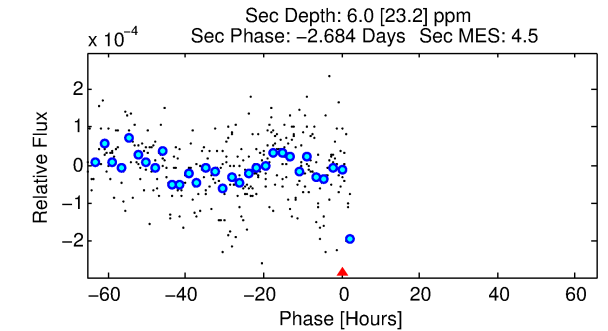
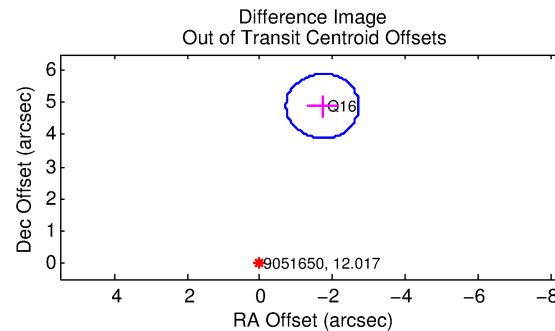
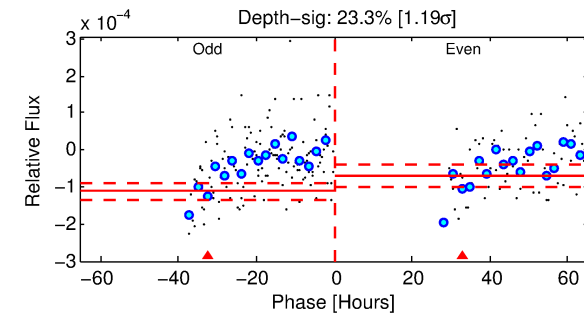
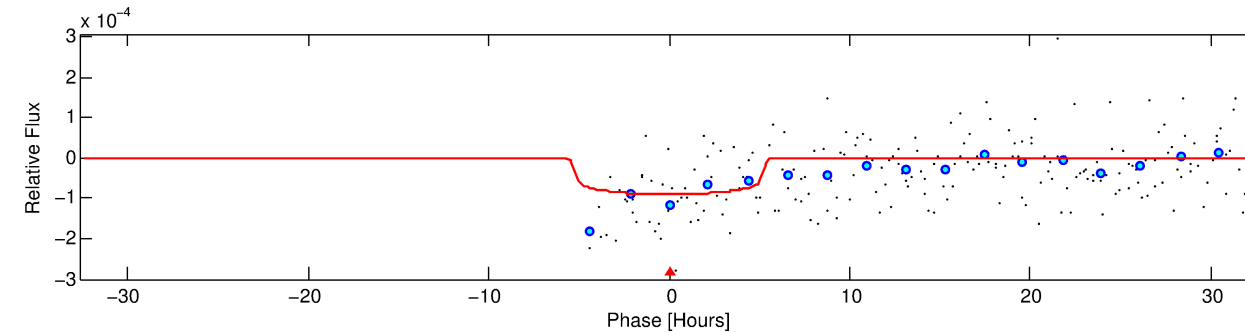
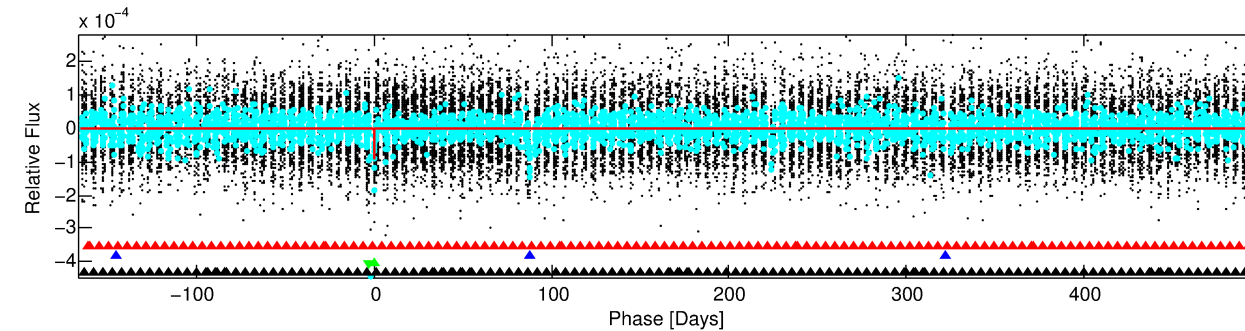
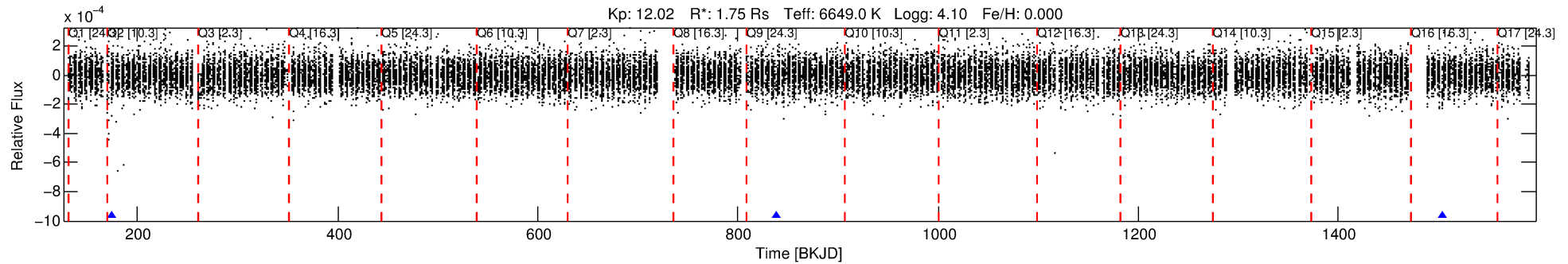
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009051650-03

No Significant Match Found

DV One-Page Summary

KIC: 9051650 Candidate: 3 of 4 Period: 665.304 d



DV Fit Results:

Period = 665.30429 [0.02017] d
Epoch = 173.7327 [0.0957] BKJD
Rp/R* = 0.0098 [0.0057]
a/R* = 251.98 [868.50]
b = 0.85 [1.02]
Seff = 1.93 [0.65]
Teq = 300 [25] K
Rp = 1.88 [1.19] Re
a = 1.6662 [0.3505] AU
Ag = 2606.00 [10535.52] [0.25 σ]
Teffp = 3319 [3346] K [0.90 σ]

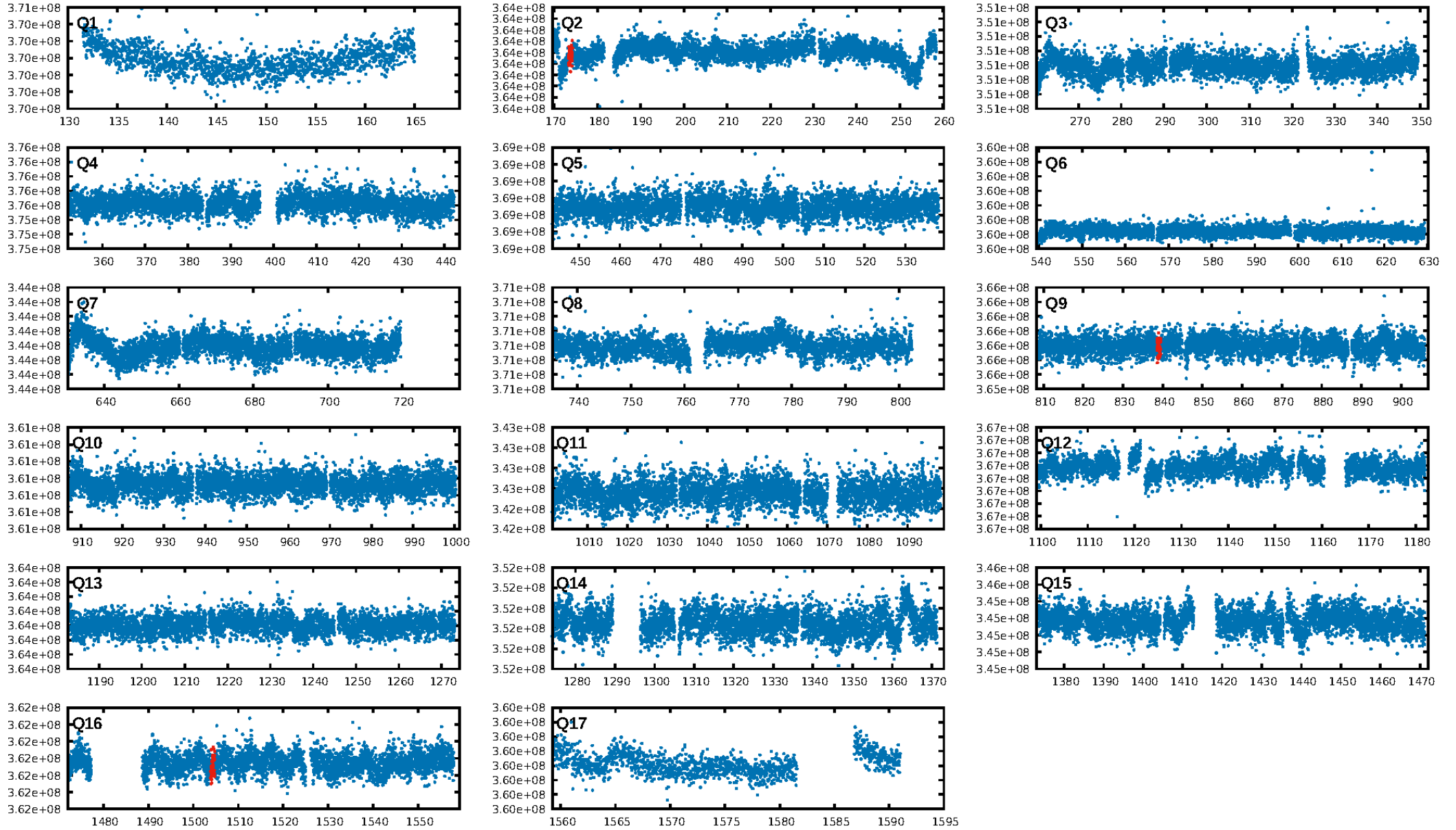
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [303.11 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 38.3%
ModelChiSquareGof-sig: 99.8%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.6813
Centroid-sig: N/A
Centroid-so: 2.896 arcsec [1.16 σ]
OotOffset-rm: 5.186 arcsec [15.50 σ]
KicOffset-rm: 5.234 arcsec [15.66 σ]
OotOffset-st: 0/0/1/0 [1]
KicOffset-st: 0/0/1/0 [1]
DiffImageQuality-fgm: 0.00 [0/1]
DiffImageOverlap-fno: 0.00 [0/3]

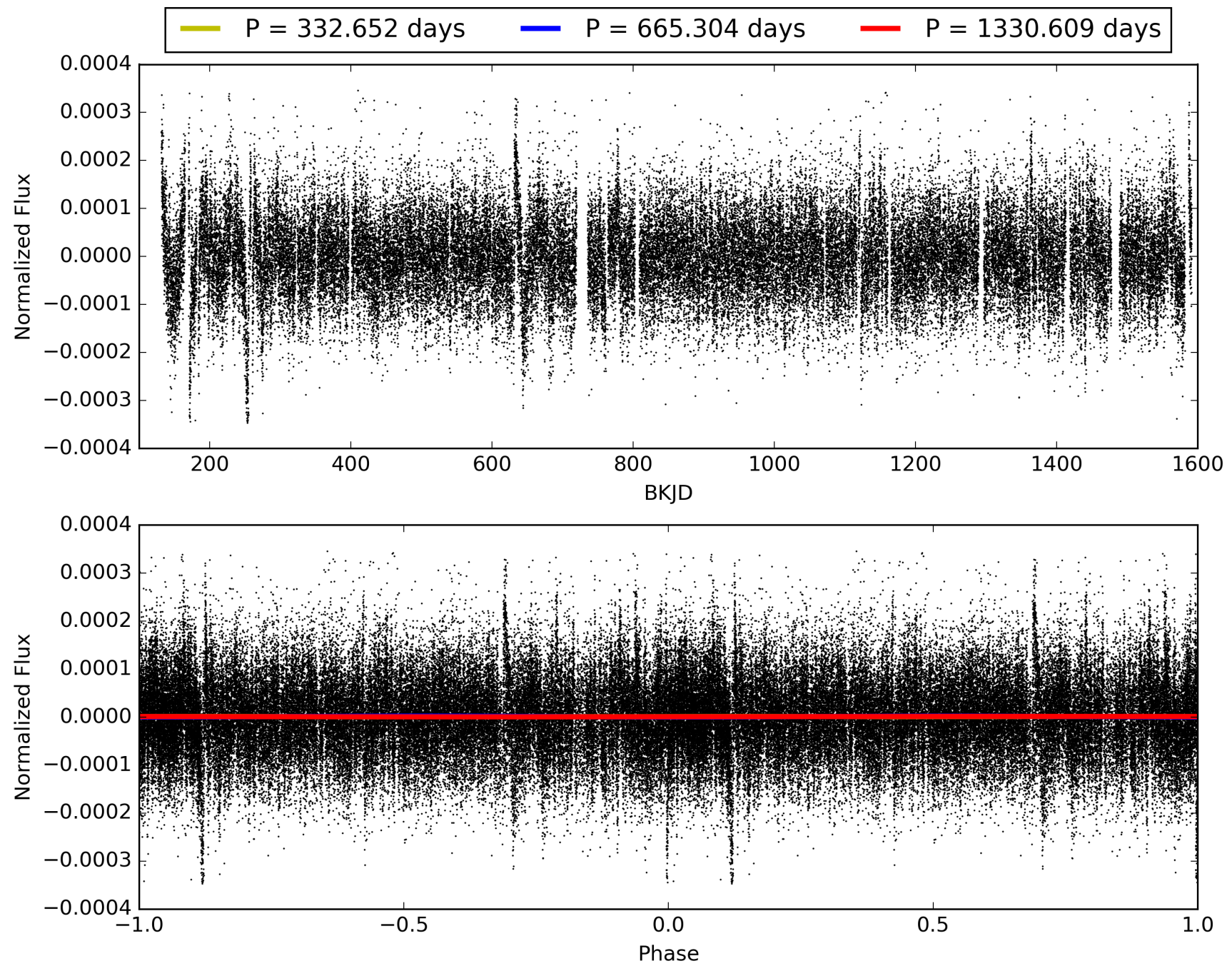
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:26:35 Z

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

TCE 009051650-03, PDC Light Curves

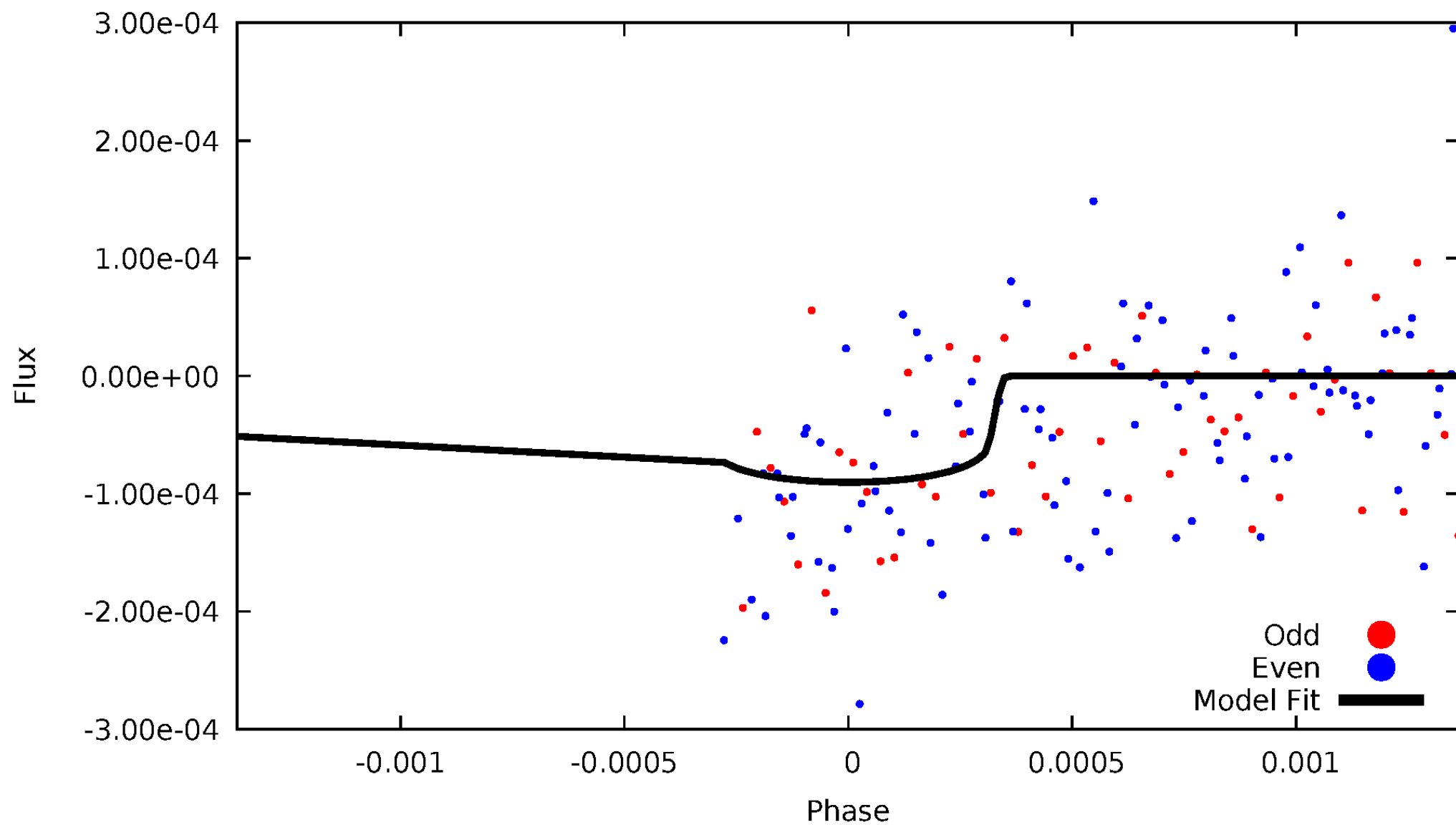


TCE 009051650-03



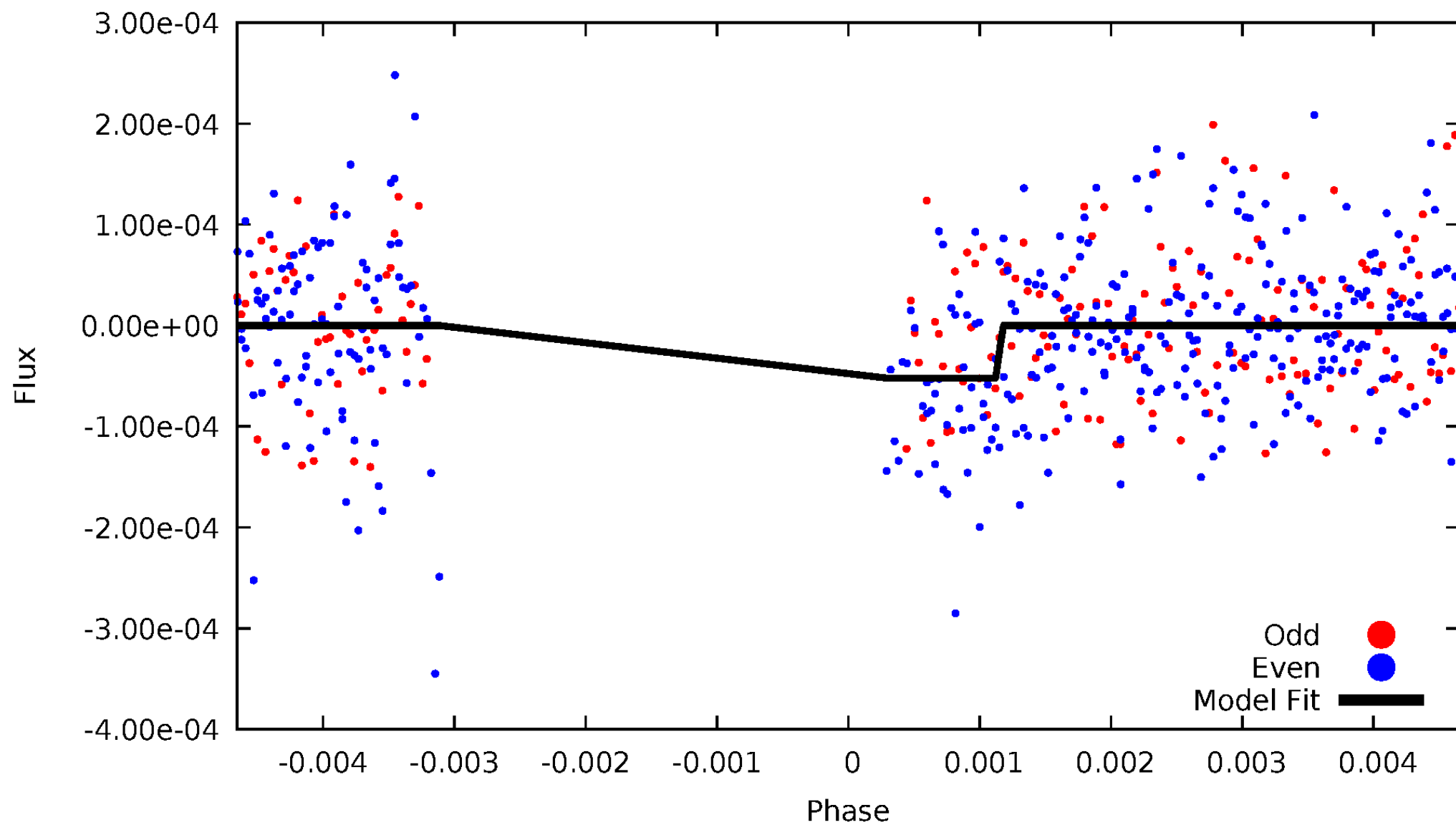
DV Odd/Even

TCE 009051650-03



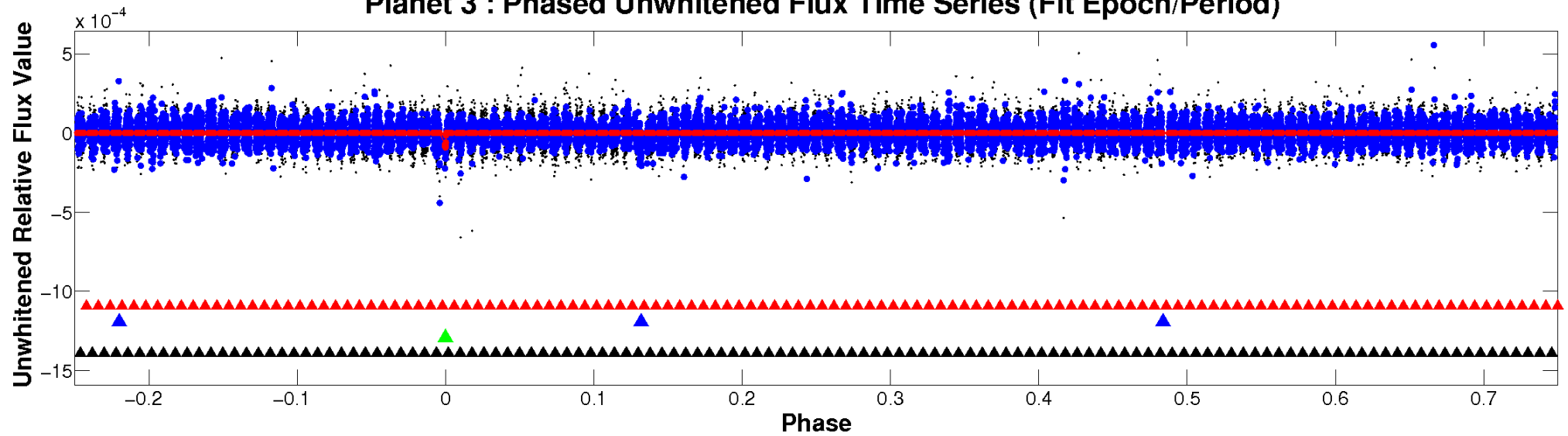
ALT Odd/Even

TCE 009051650-03

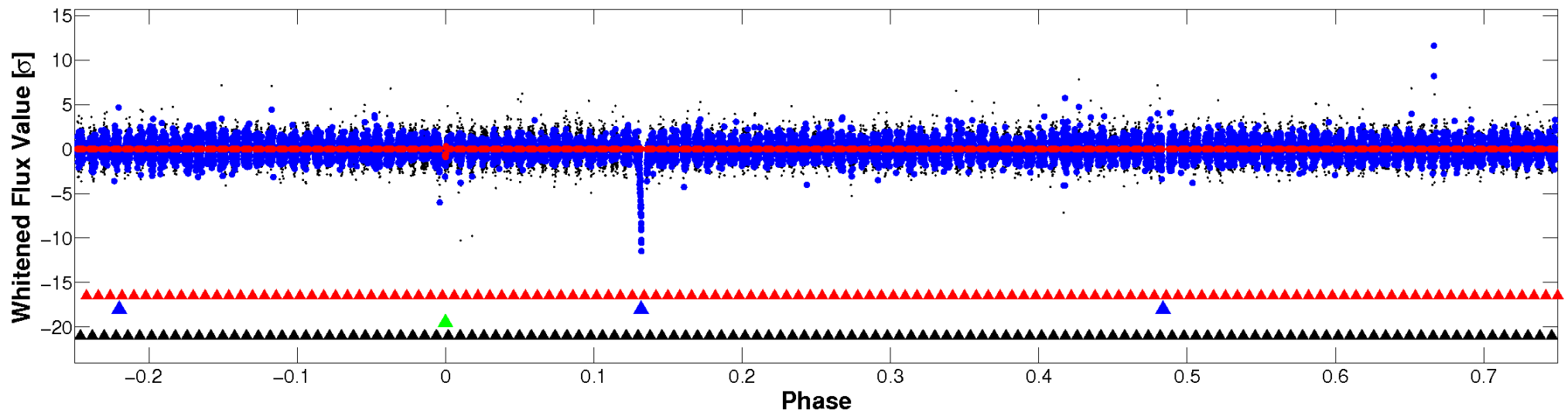


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

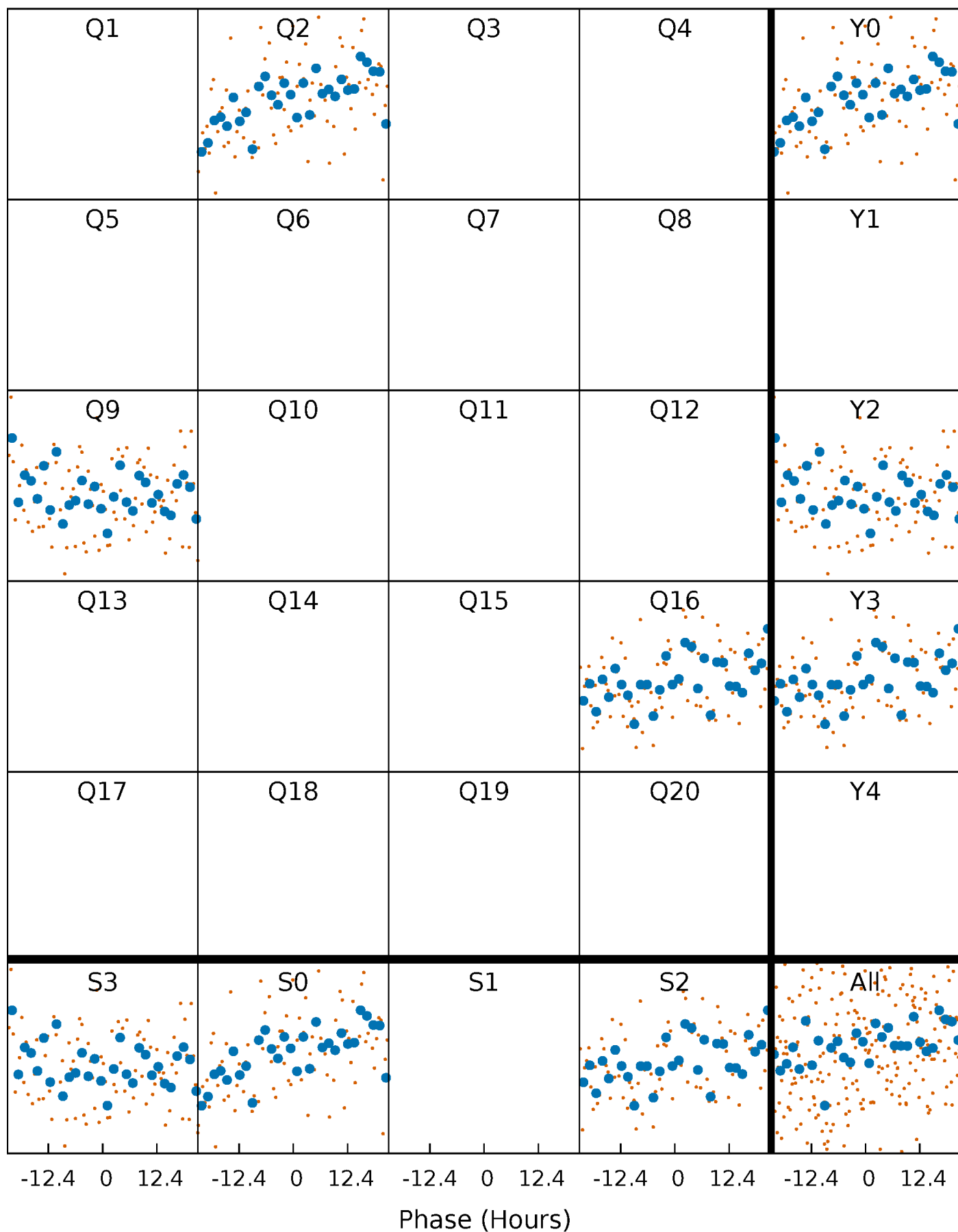


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 009051650-03 P=665.304291 Days $T_0=173.732677$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 009051650-03 P=665.304291 Days $T_0=173.732677$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

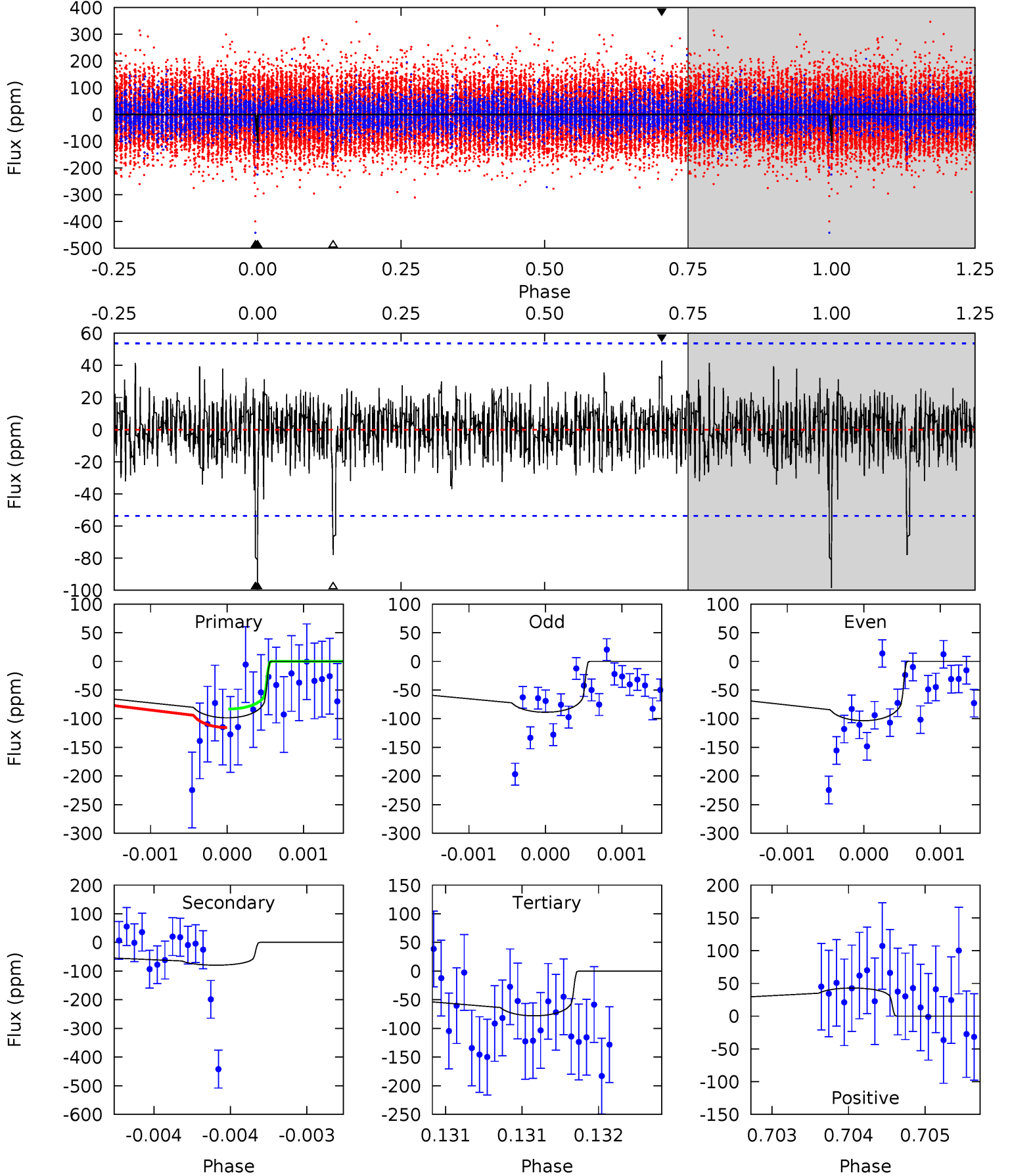
TCE 009051650-03 P=665.378014 Days $T_0=173.207031$ (BKJD)



DV Model-Shift Uniqueness Test

009051650-03, P = 665.304291 Days, E = 173.732677 Days

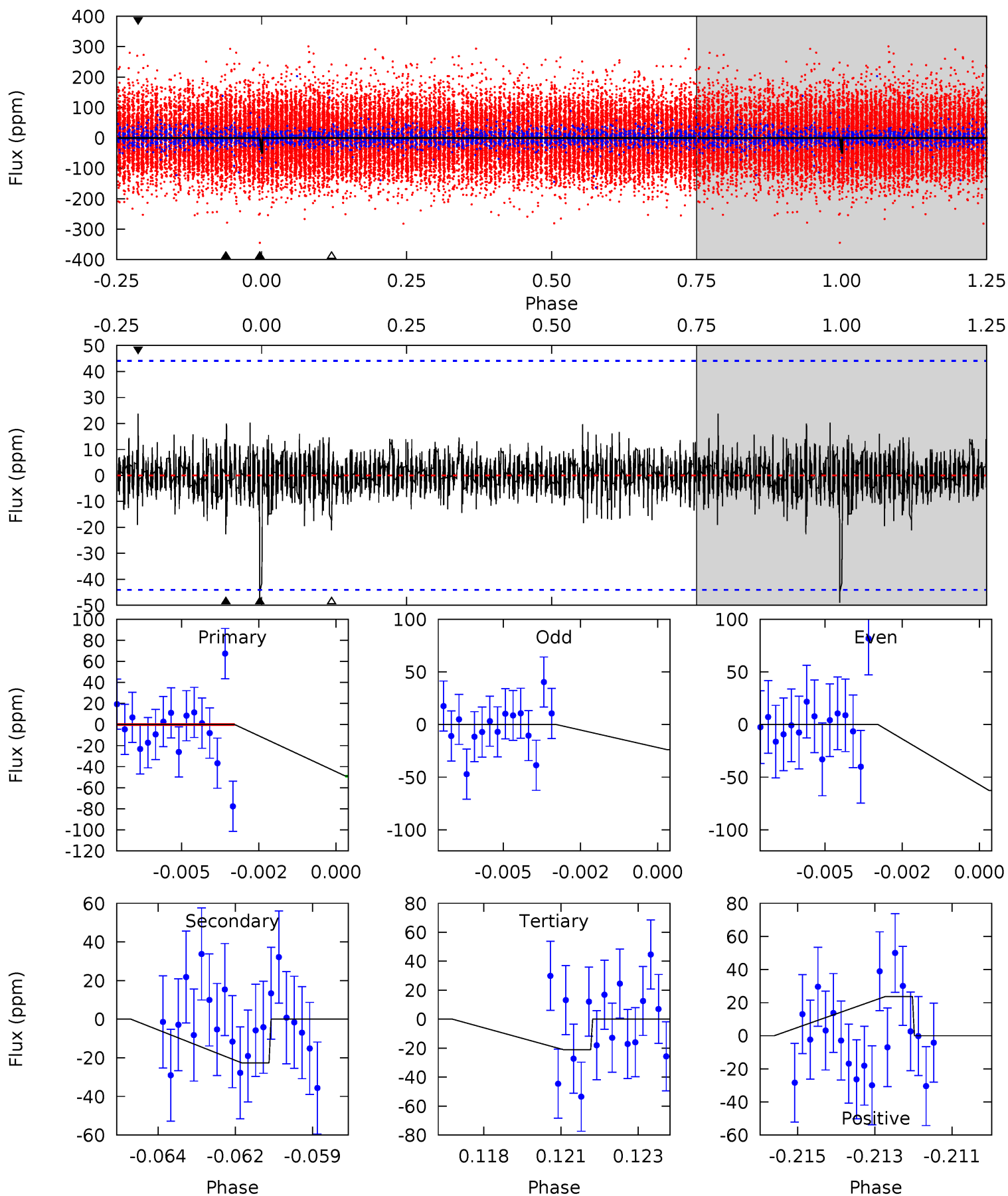
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	8.19	8.04	4.42	5.53	3.42	1.20	2.12	5.74	0.15	3.77	0.72	0.98	0.30	1.65



Alt Model-Shift Uniqueness Test

009051650-03, P = 665.378014 Days, E = 173.207031 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.89	2.73	2.53	2.85	5.30	3.04	0.64	3.36	3.04	0.19	-0.13	2.22	1.18	0.33	0



Stellar Parameters For KIC 009051650

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6649^{+149}_{-215}	$4.097^{+0.171}_{-0.140}$	$0.000^{+0.250}_{-0.300}$	$1.748^{+0.353}_{-0.431}$	$1.396^{+0.163}_{-0.245}$	$0.368^{+0.367}_{-0.135}$
	+2%/-3%	+4%/-3%	+inf%/-inf%	+20%/-25%	+12%/-18%	+100%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009051650-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-79 ± 10	$1.93^{+1.19}_{-1.01}$	419^{+28}_{-26}	6100^{+3564}_{-1117}	$32774^{+108662}_{-20464}$
Alt.	-23 ± 8	$1.43^{+1.08}_{-0.83}$	420^{+25}_{-27}	5198^{+3061}_{-1065}	15639^{+74070}_{-10986}

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 $A_{obs} \gg 1.0$

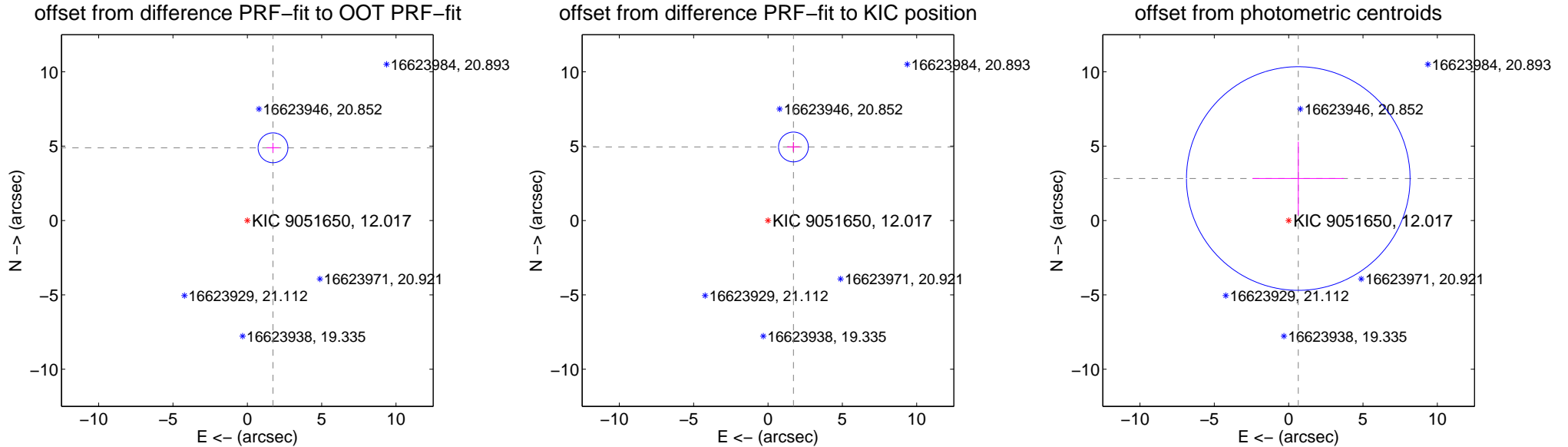
DV Centroid Data

Supplemental centroid analysis for 009051650-03. Kepler magnitude: 12.02. Transit SNR 6.12

There are 0 quarters with good PRF difference image offsets

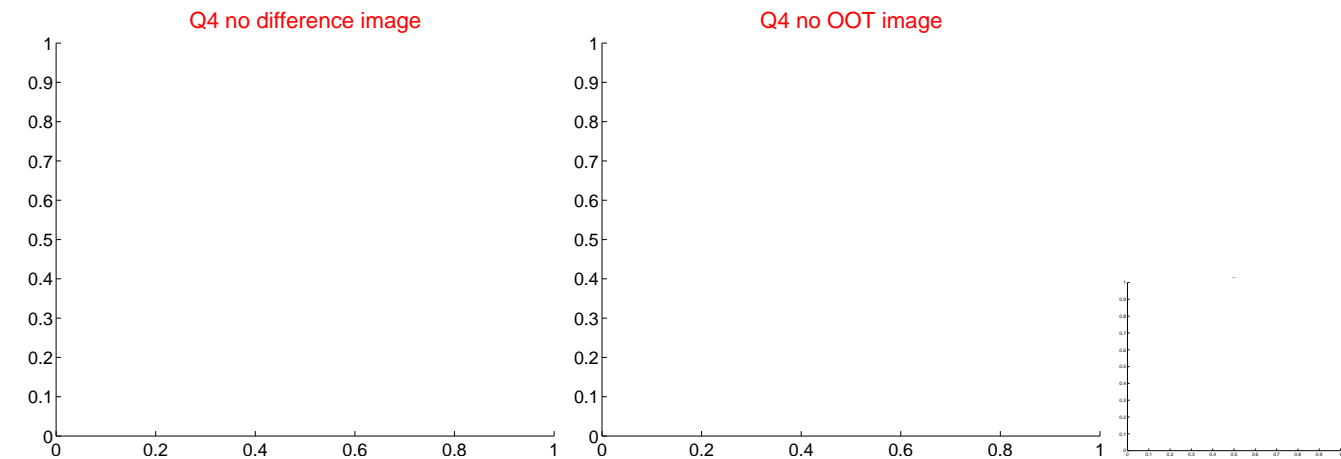
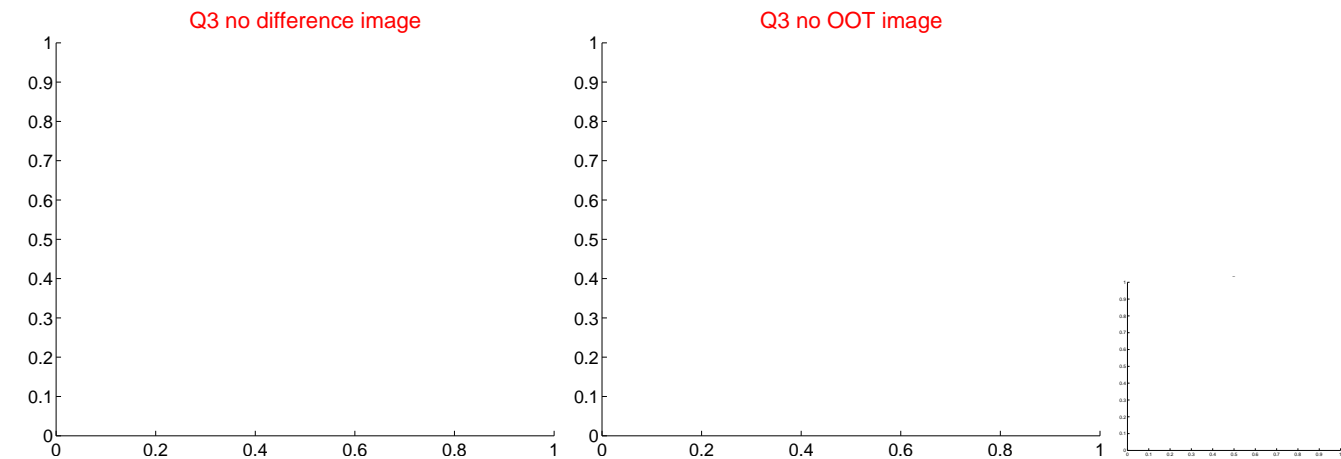
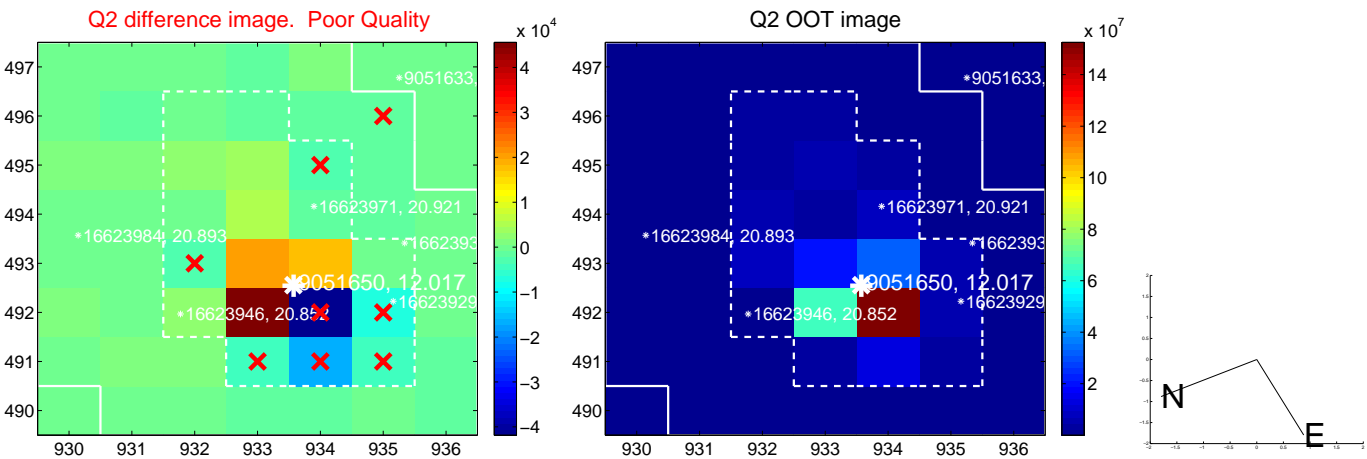
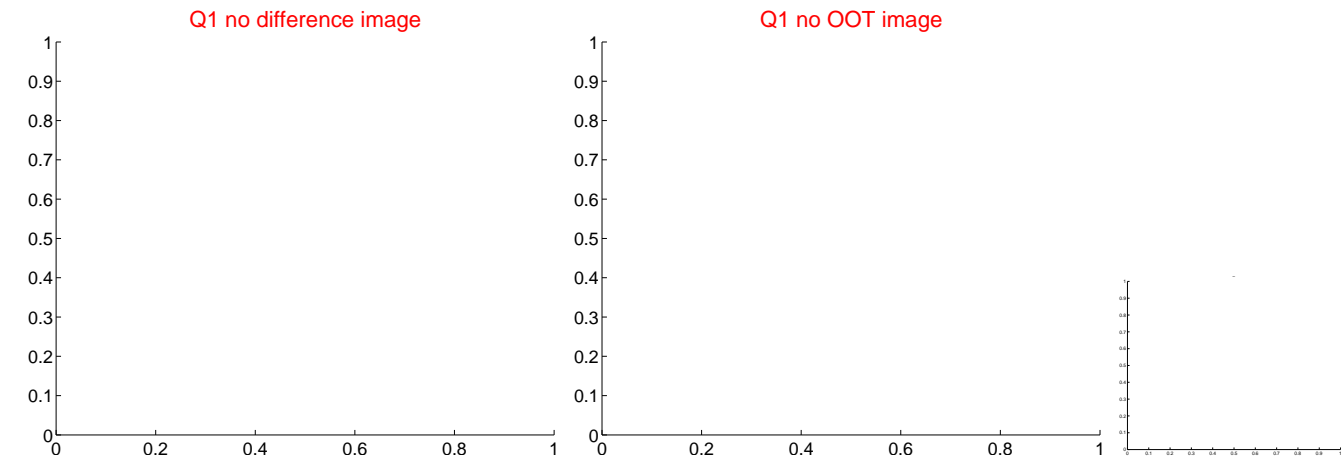
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.186 ± 0.335	15.50	-1.726 ± 0.427	4.891 ± 0.321
PRF-fit source offset from KIC position	5.234 ± 0.334	15.66	-1.712 ± 0.427	4.946 ± 0.321
photometric centroid source offset	2.90 ± 2.51	1.16	-0.65 ± 3.09	2.82 ± 2.47

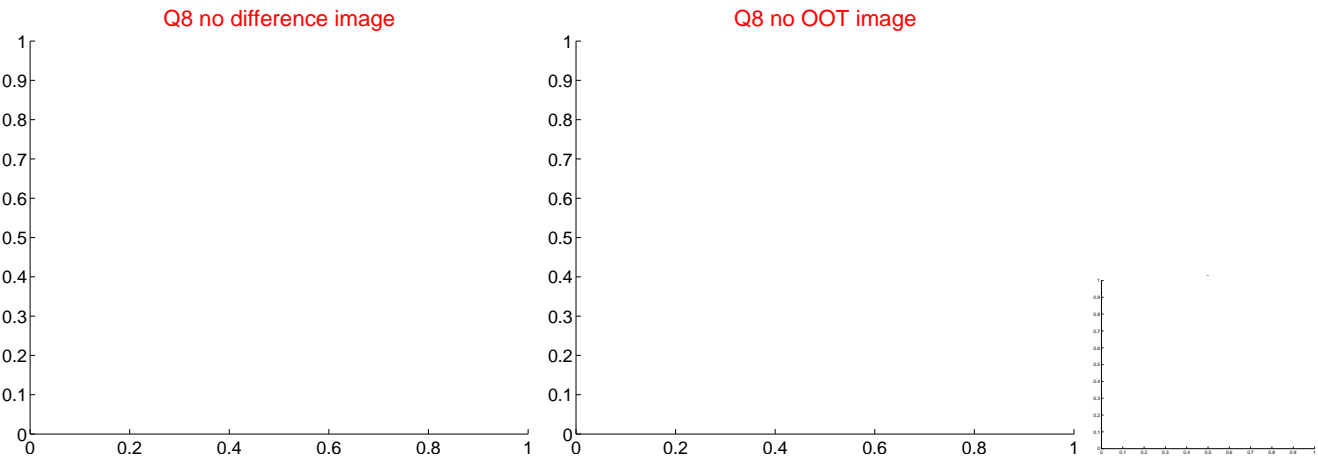
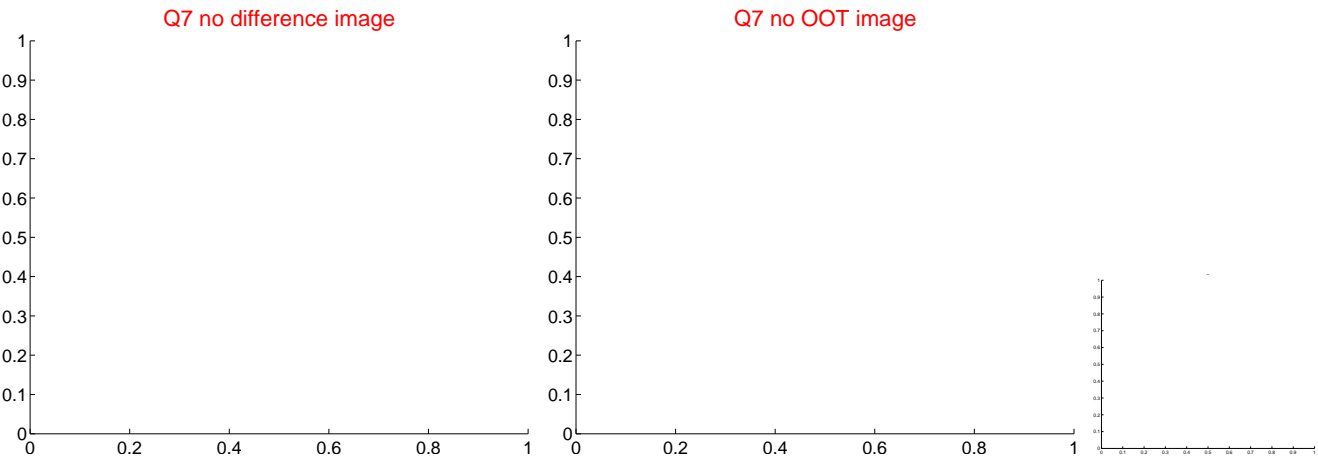
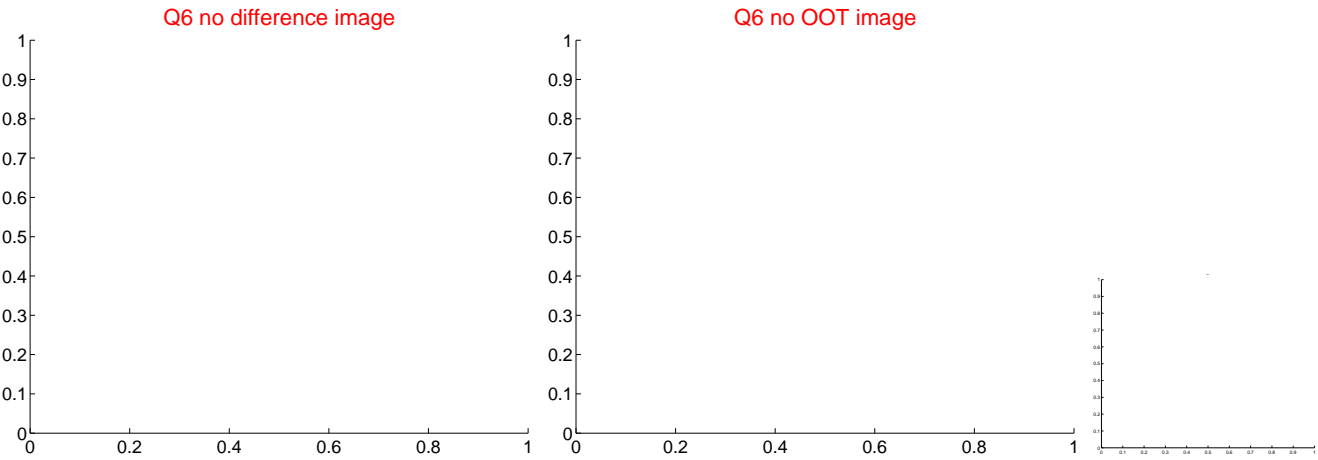
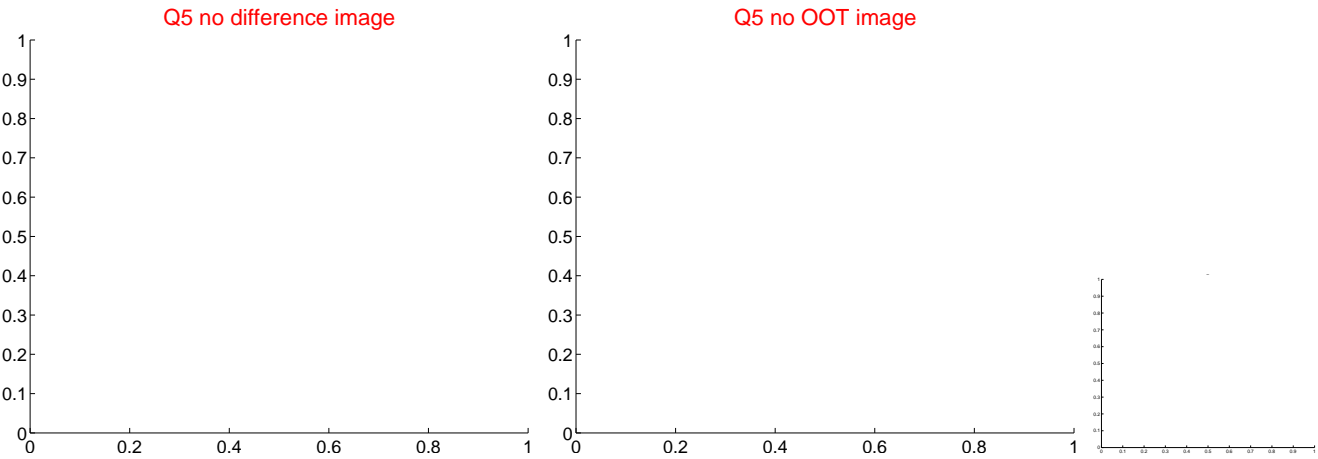


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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.

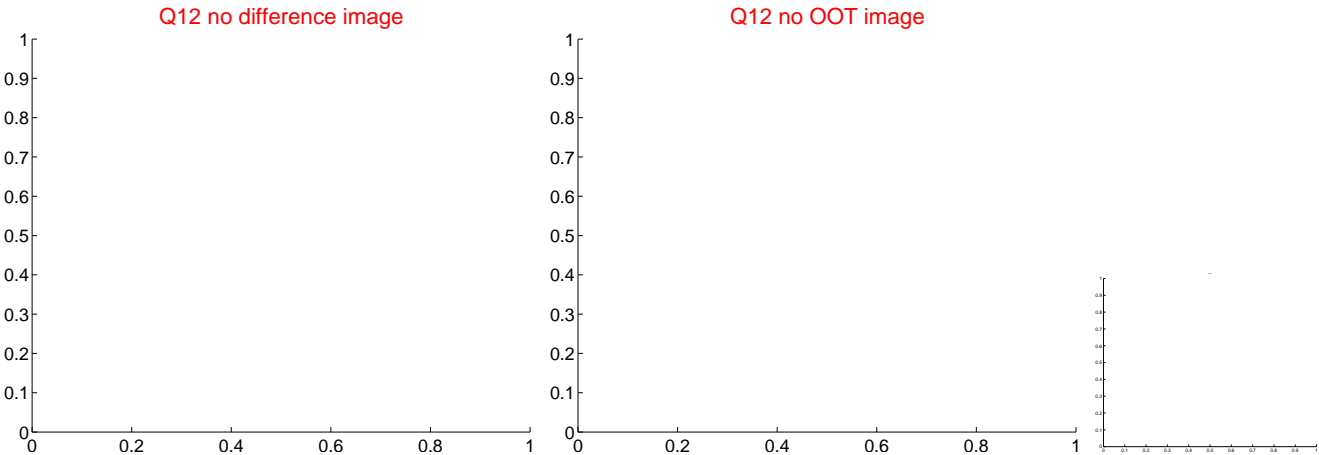
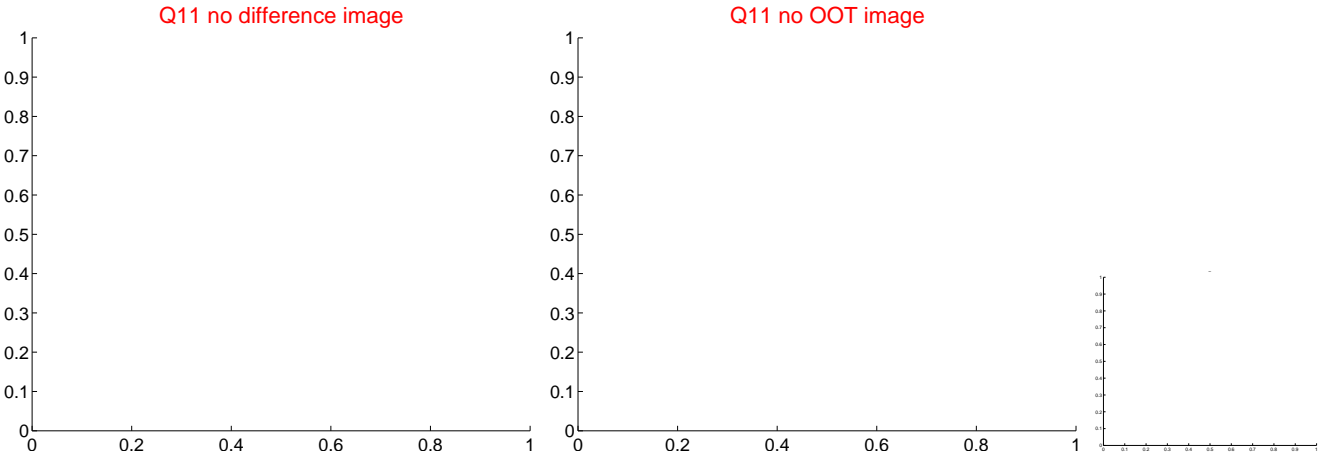
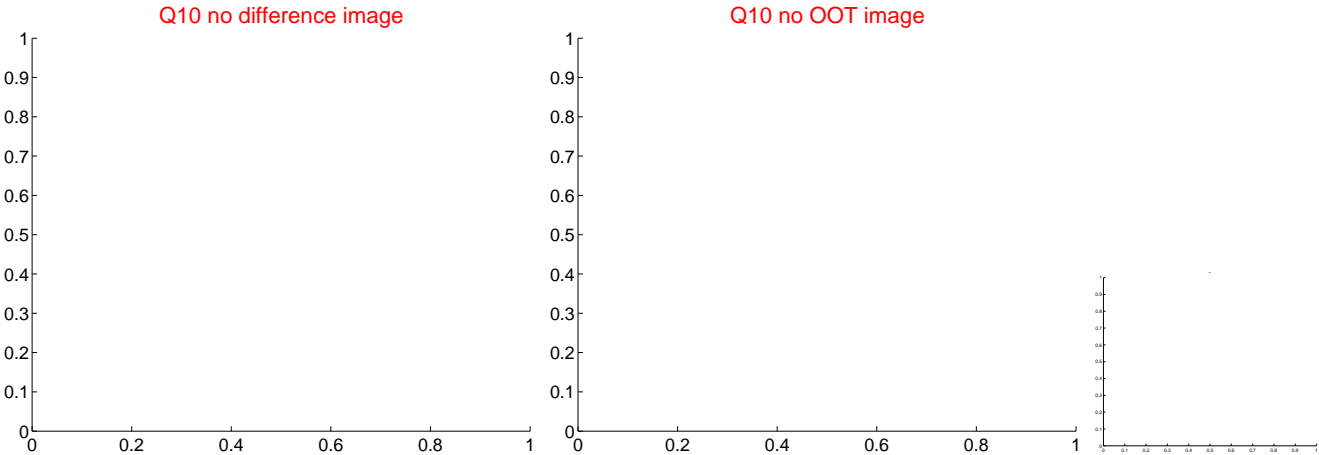
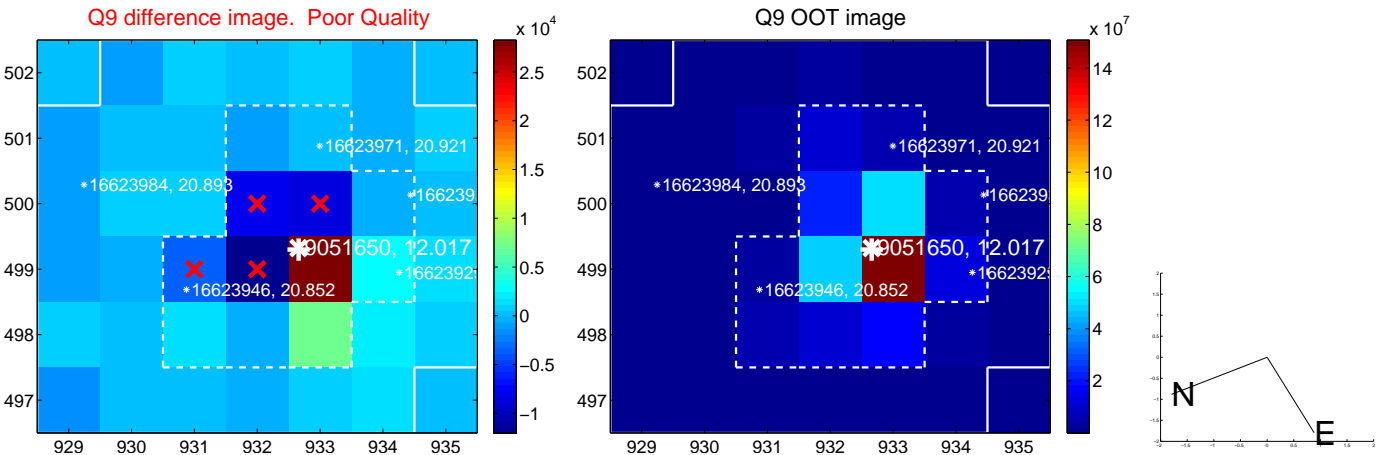
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



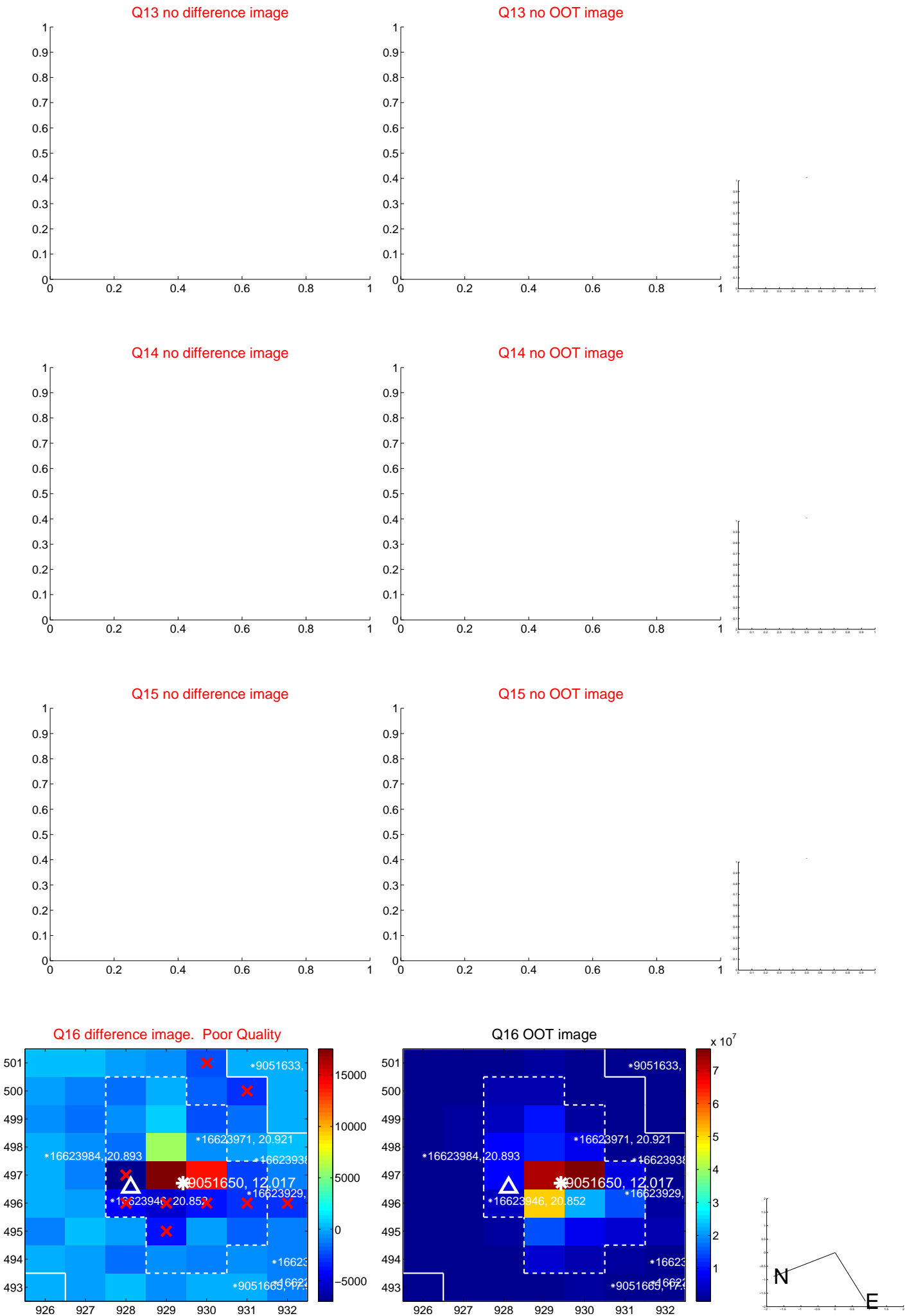
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



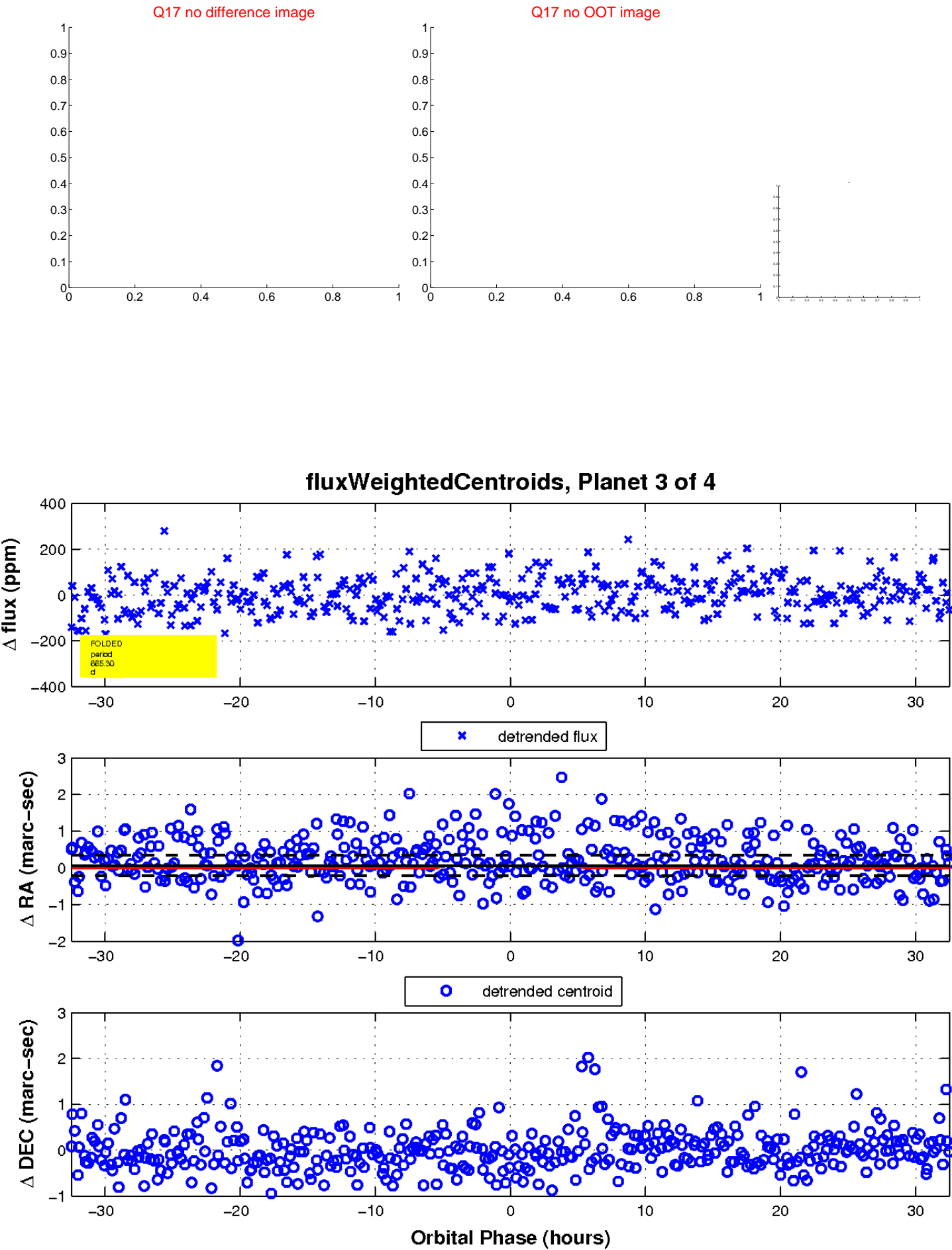
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

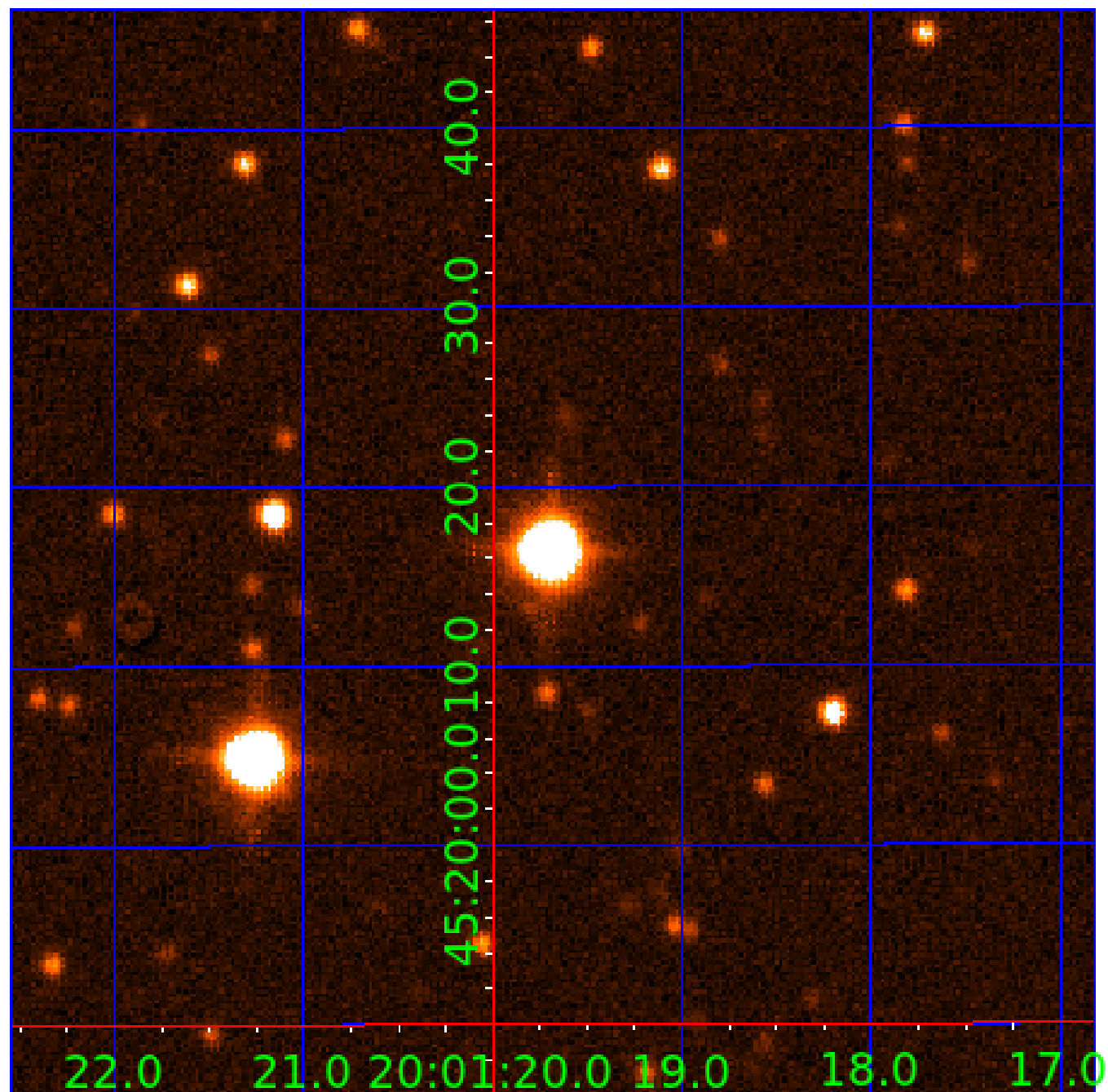


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009051650

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})
009051650-01	OBS	No	5.322248	135.125385	10.5	19.194	10.0	8.2	1.75	6649	0.67	1204.54
009051650-02	OBS	No	431.188983	495.623411	176.7	15.000	14.2	-1.0	1.75	6649	2.34	3.44
009051650-03	OBS	No	665.304291	173.732677	90.2	10.891	10.6	6.1	1.75	6649	1.88	1.93
009051650-04	OBS	No	5.321441	132.562771	12.9	34.912	9.5	11.0	1.75	6649	0.66	1204.78

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009051650-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009051650-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_NOFITS
009051650-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009051650-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

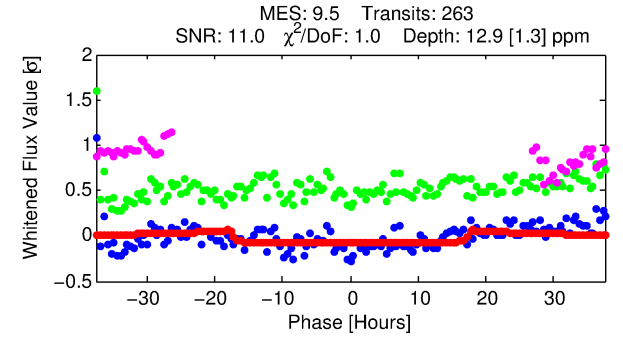
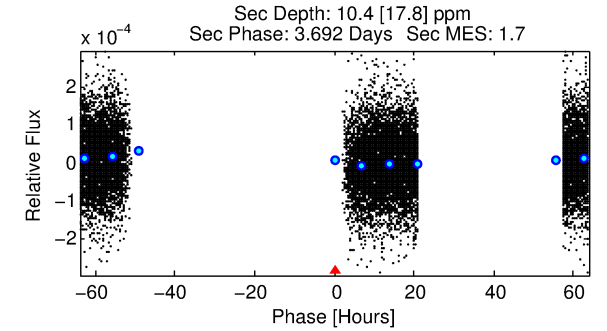
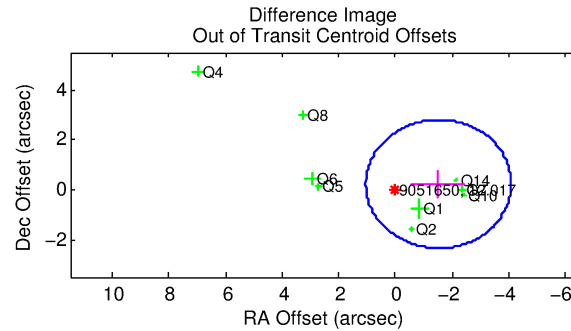
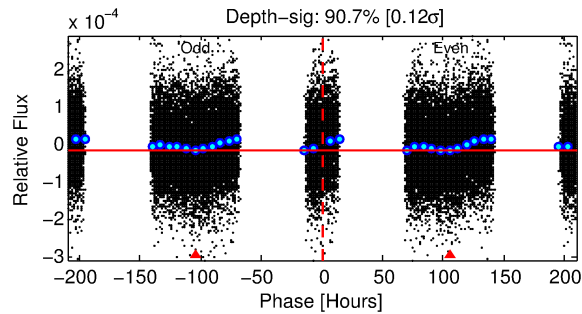
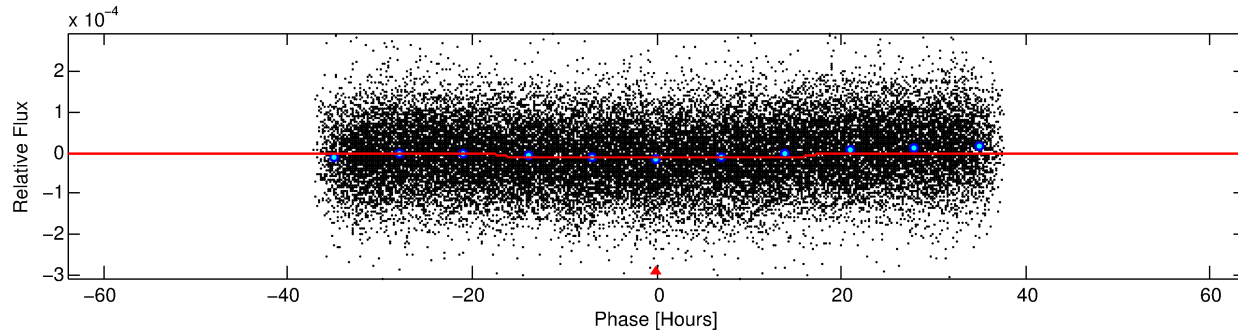
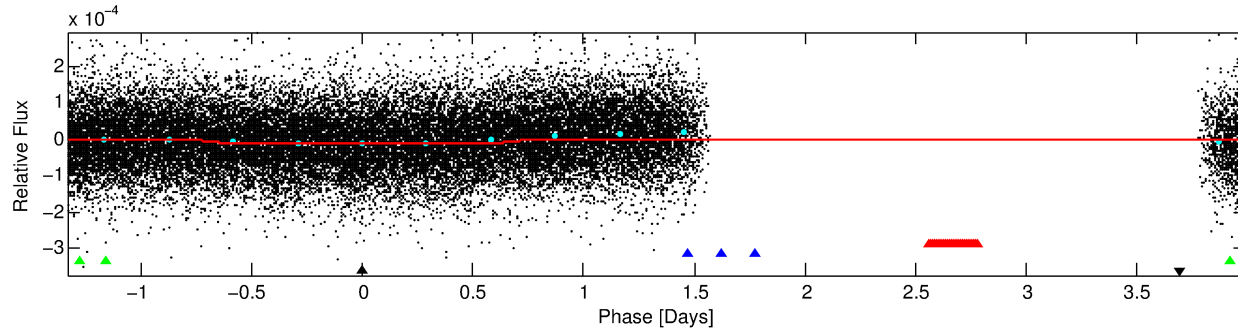
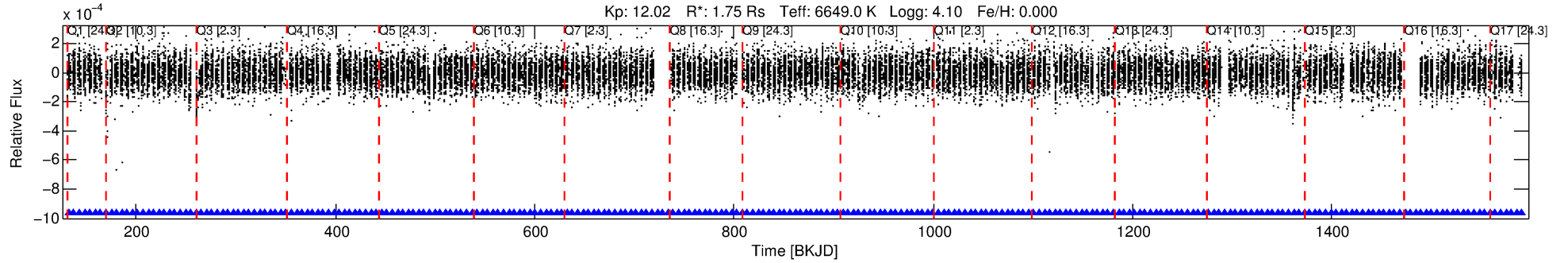
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009051650-04

No Significant Match Found

DV One-Page Summary

KIC: 9051650 Candidate: 4 of 4 Period: 5.321 d



DV Fit Results:

Period = 5.32144 [0.00011] d
Epoch = 132.5628 [0.0152] BKJD
Rp/R* = 0.0034 [0.0011]
a/R* = 1.22 [0.69]
b = 0.59 [1.90]
Seff = 1204.78 [404.37]
Teq = 1502 [126] K
Rp = 0.66 [0.26] Re
a = 0.0666 [0.0140] AU
Ag = 58.99 [108.96] [0.53 σ]
Teffp = 6437 [2938] K [1.68 σ]

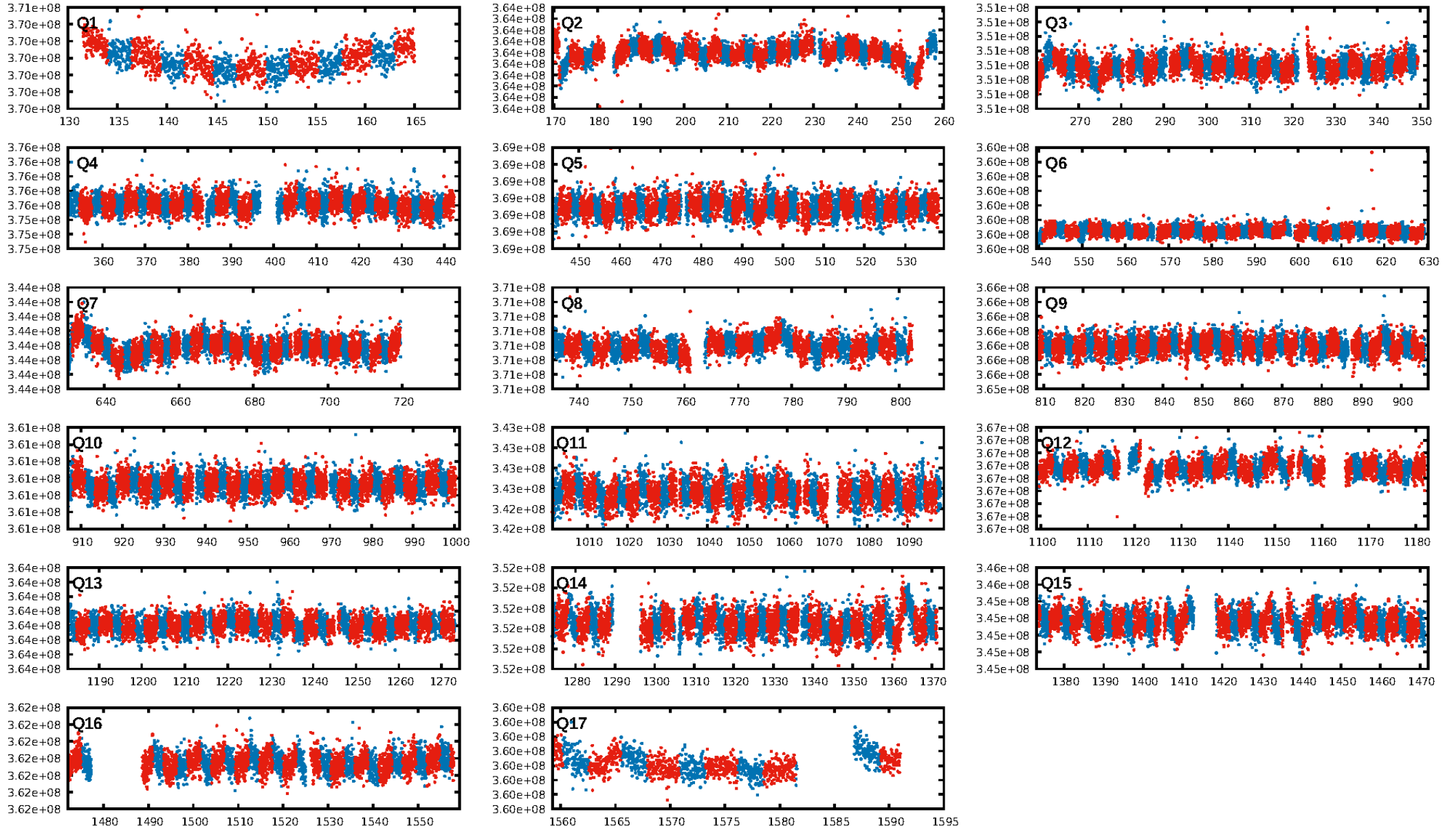
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [250/250]
GhostDiagnostic-chr: 0.948
Centroid-sig: N/A
Centroid-so: 1.800 arcsec [1.36 σ]
OotOffset-rm: 1.545 arcsec [1.80 σ]
KicOffset-rm: 1.473 arcsec [1.94 σ]
OotOffset-st: 4/1/2/2 [9]
KicOffset-st: 4/1/2/2 [9]
DiffImageQuality-fgm: 0.44 [4/9]
DiffImageOverlap-fno: 0.00 [0/17]

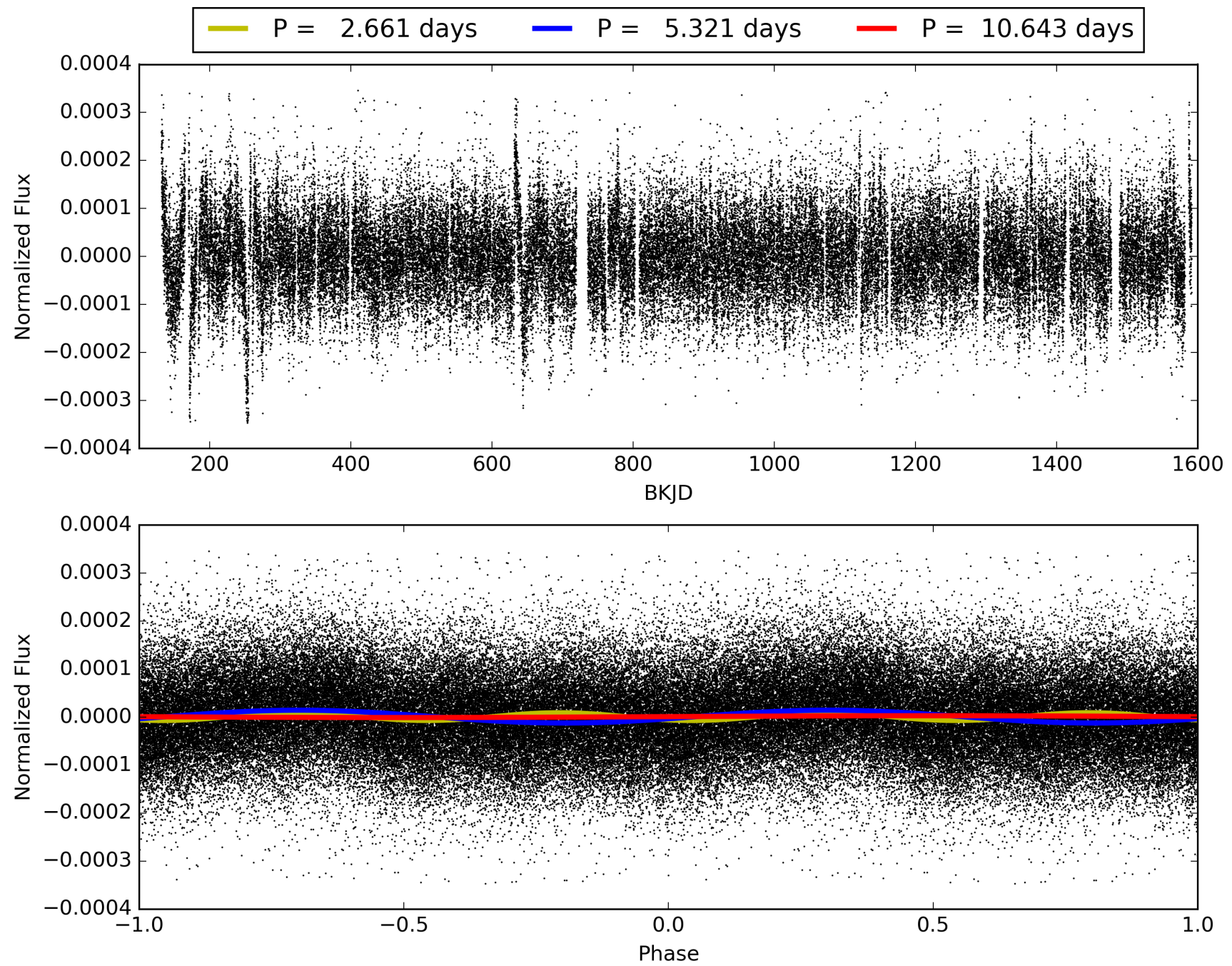
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:26:50 Z

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

TCE 009051650-04, PDC Light Curves

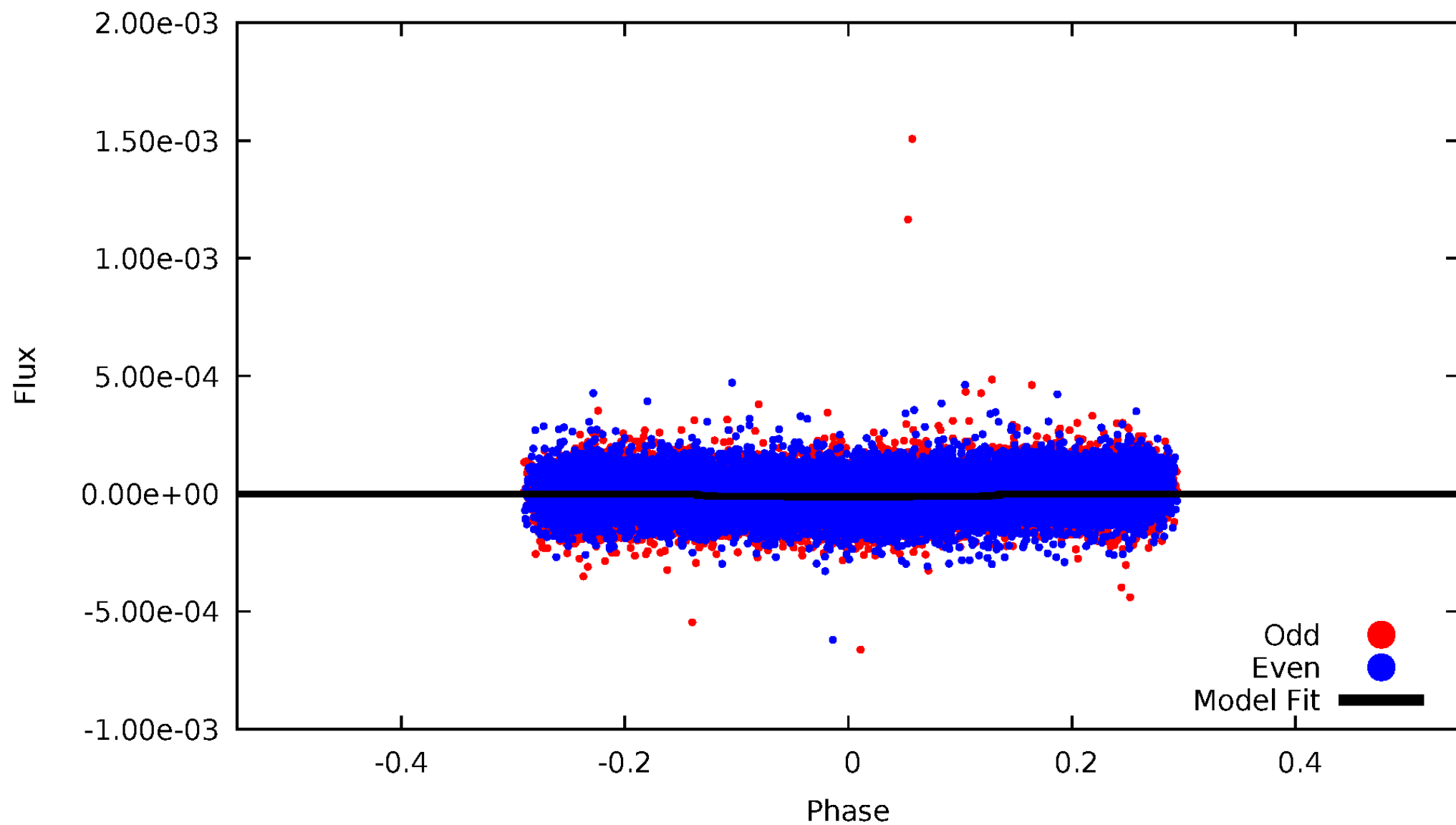


TCE 009051650-04



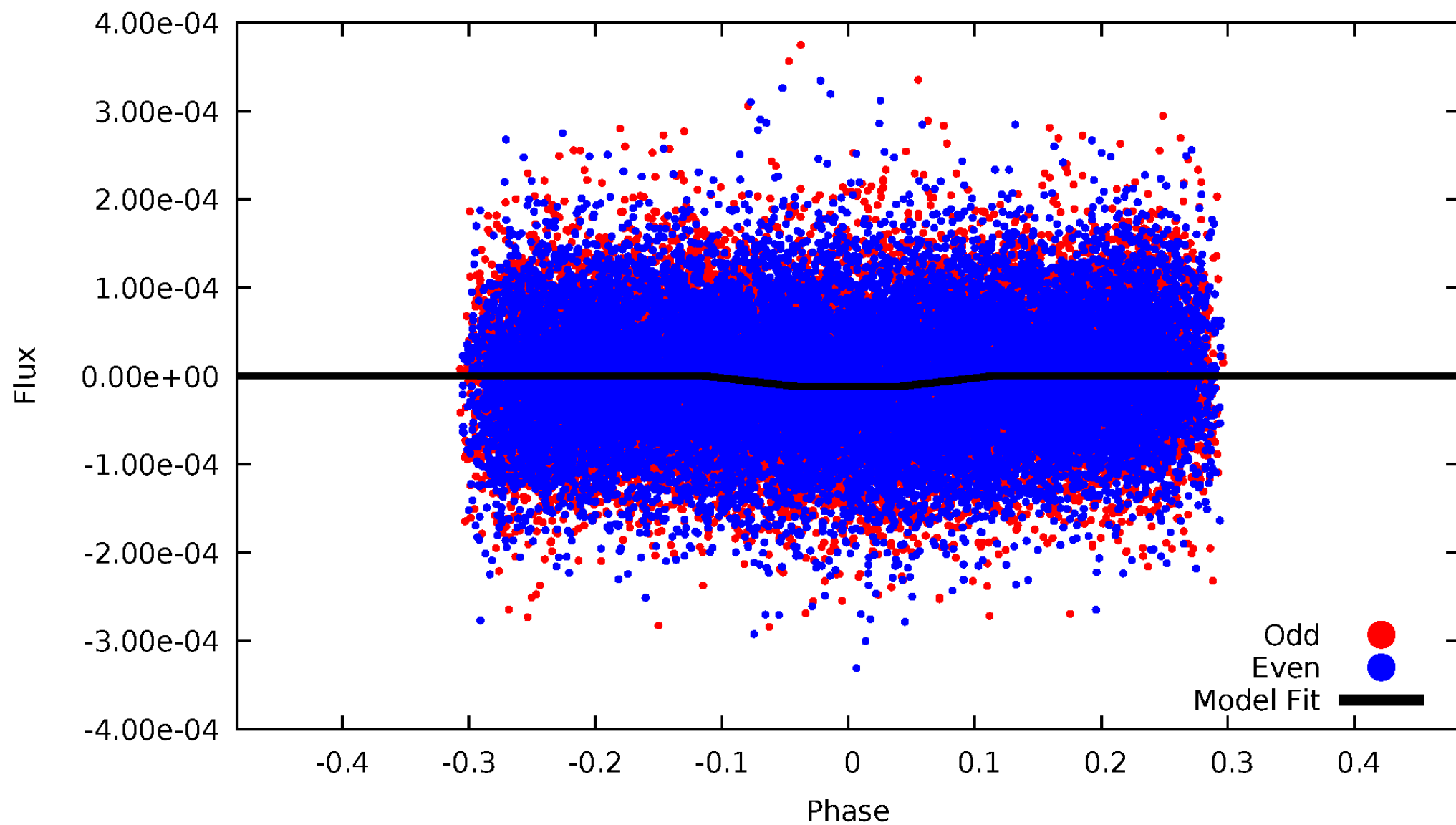
DV Odd/Even

TCE 009051650-04



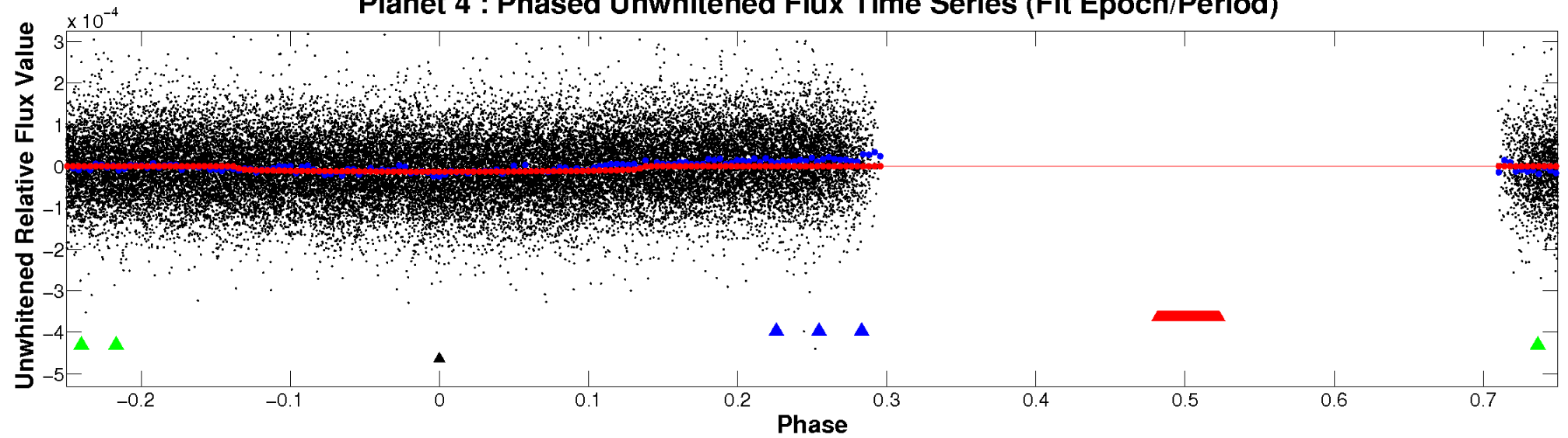
ALT Odd/Even

TCE 009051650-04

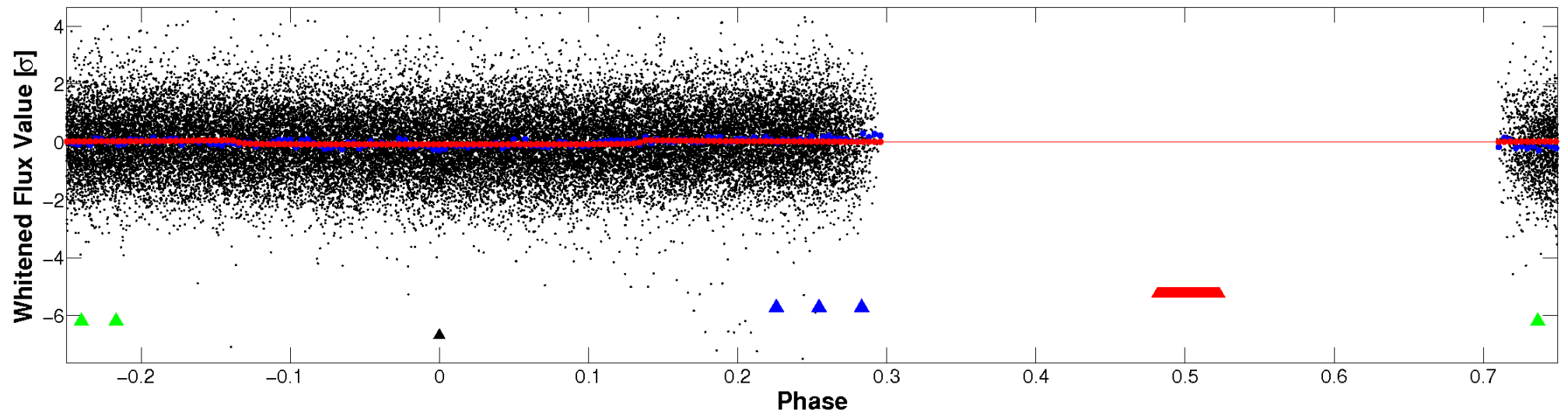


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

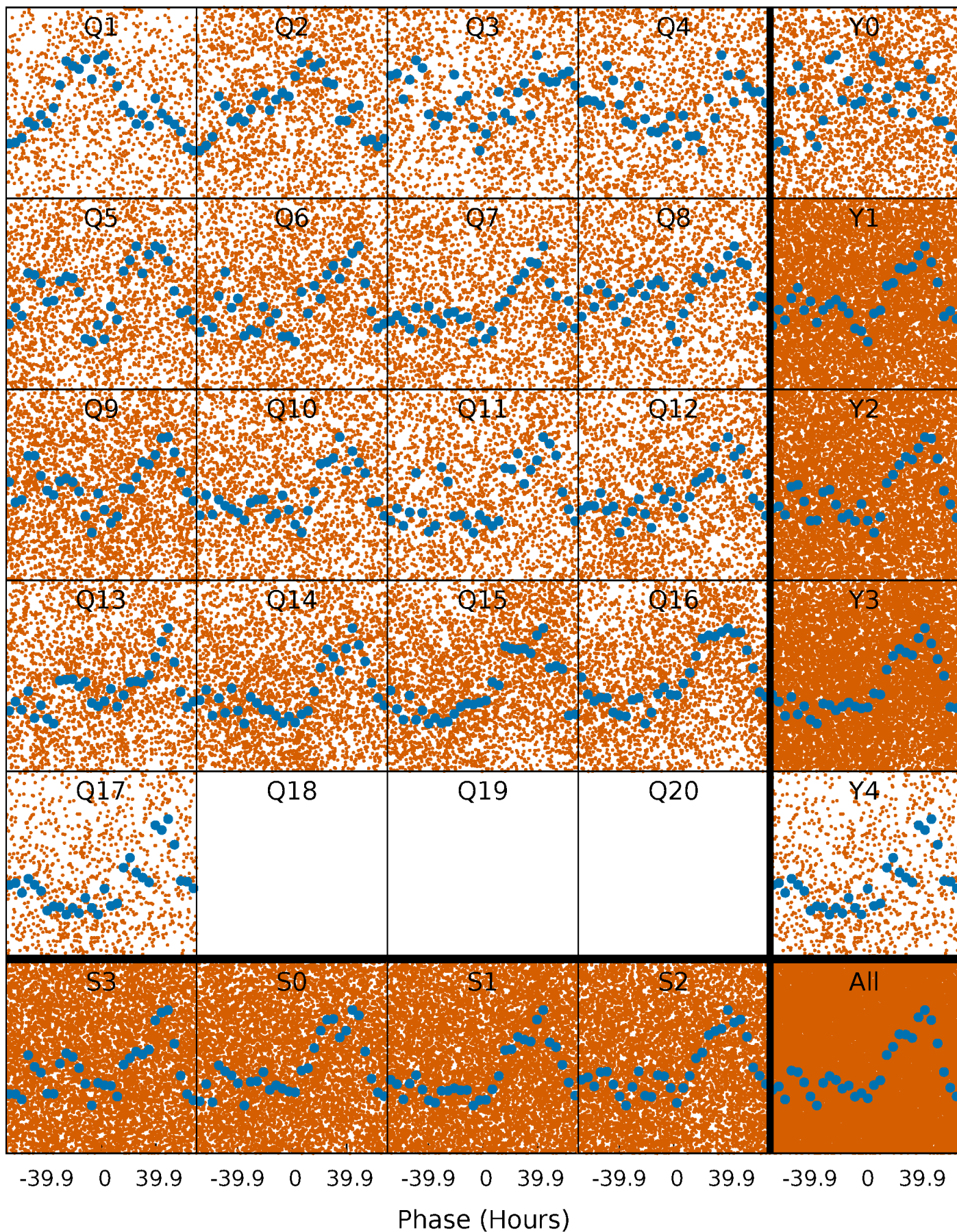


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



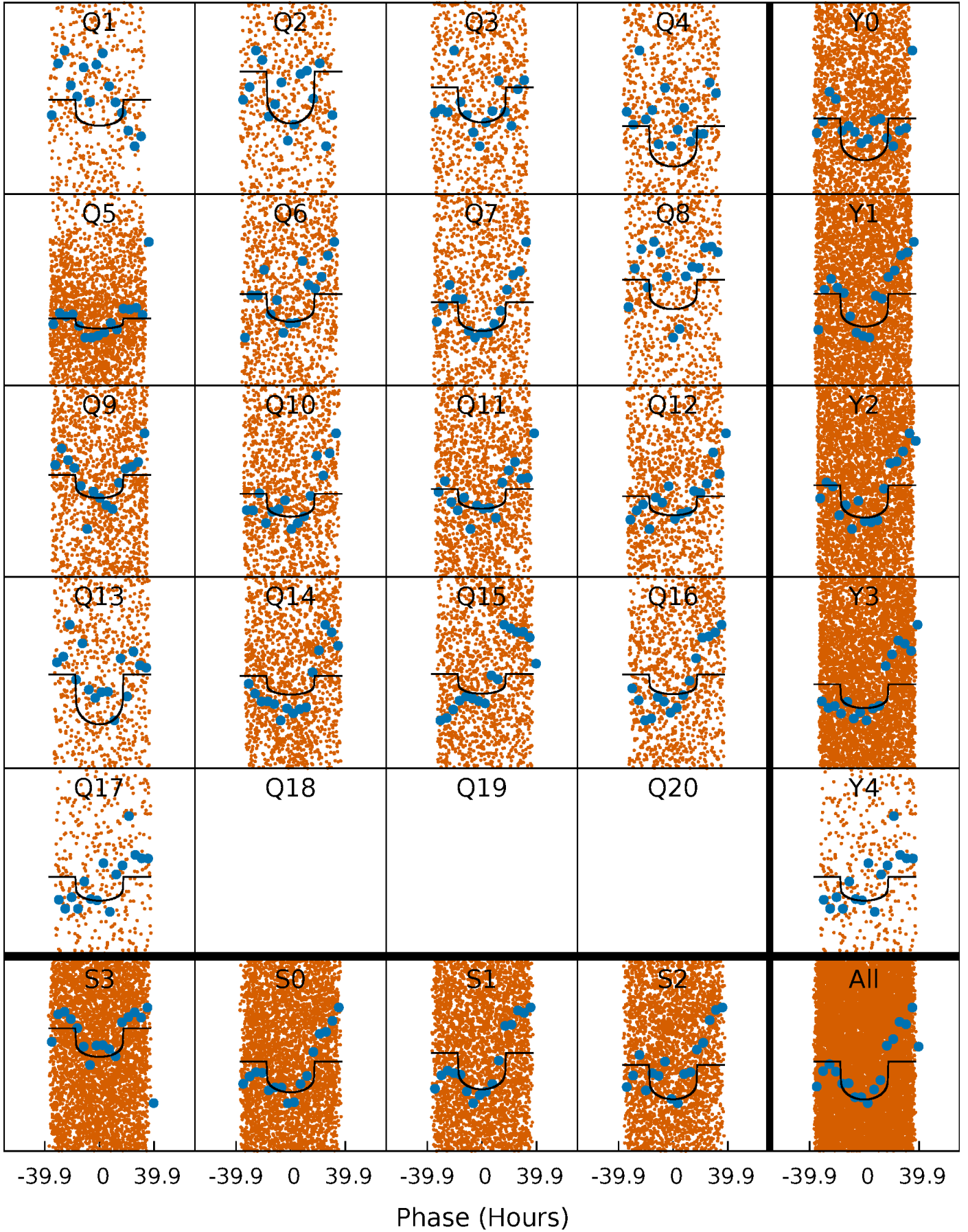
PDC Quarter-Phased Transit Curves

TCE 009051650-04 P= 5.321441 Days $T_0=132.562771$ (BKJD)



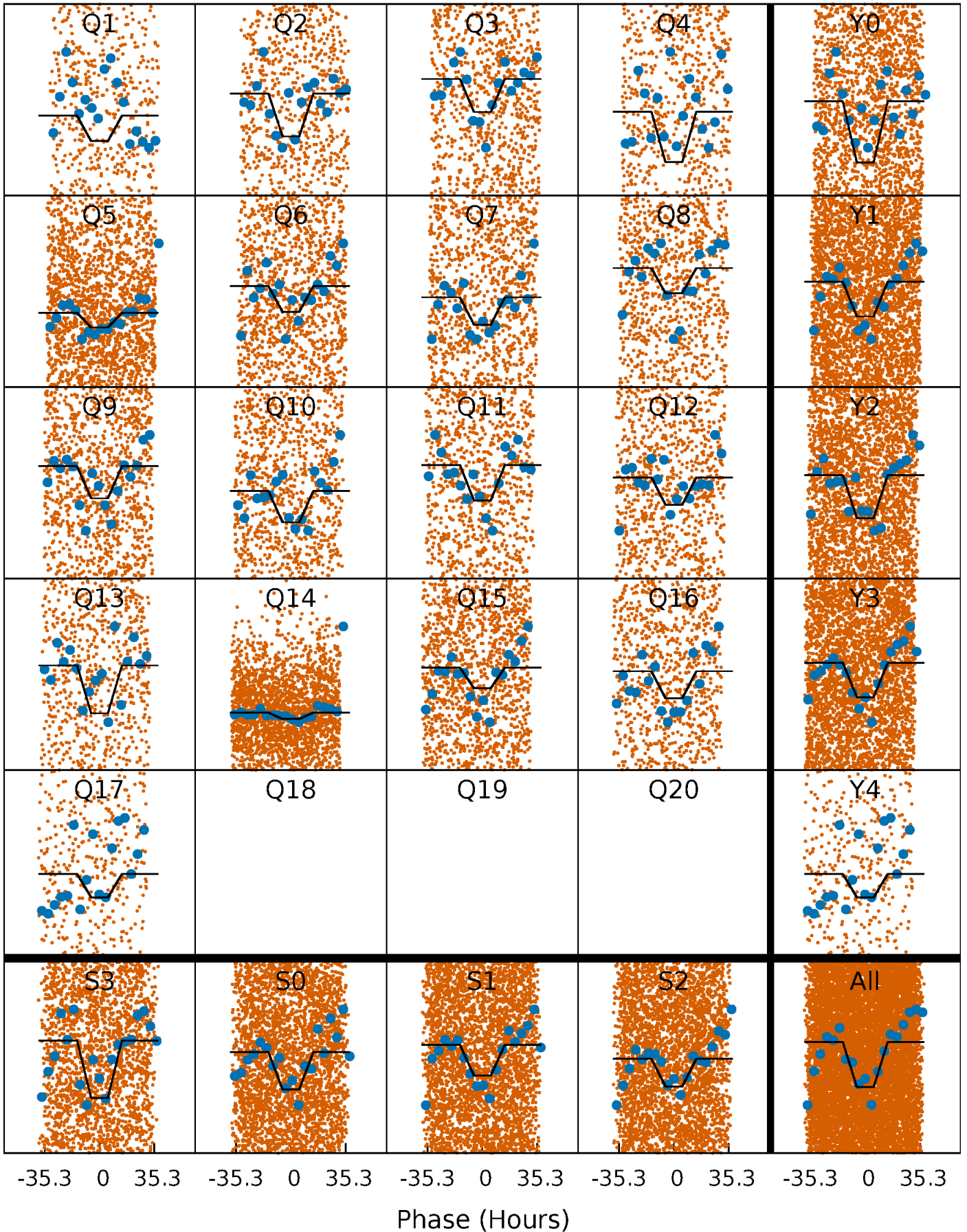
DV Quarter-Phased Transit Curves

TCE 009051650-04 P= 5.321441 Days $T_0=132.562771$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

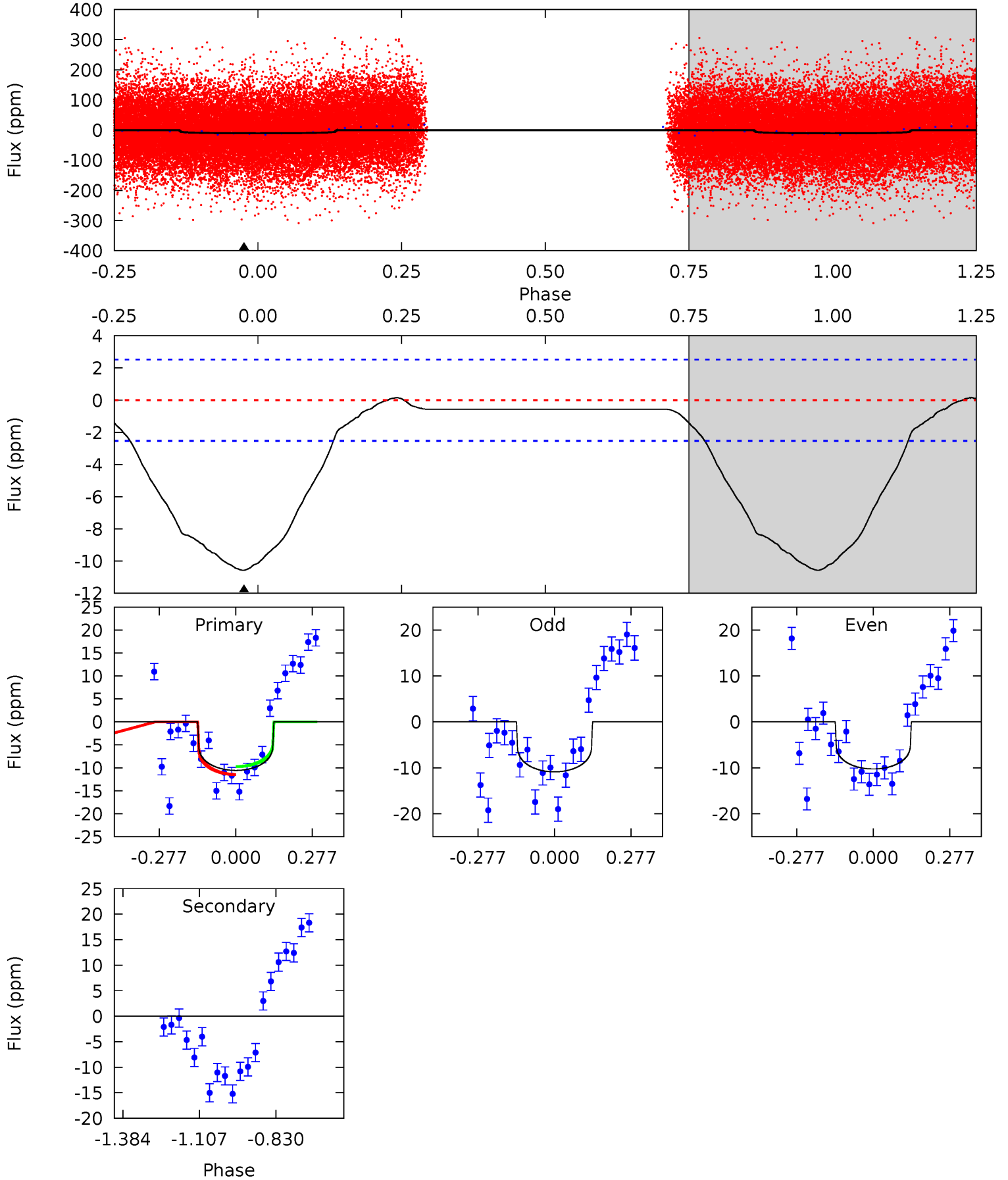
TCE 009051650-04 P= 5.323411 Days $T_0=132.335102$ (BKJD)



DV Model-Shift Uniqueness Test

009051650-04, P = 5.321441 Days, E = 127.241330 Days

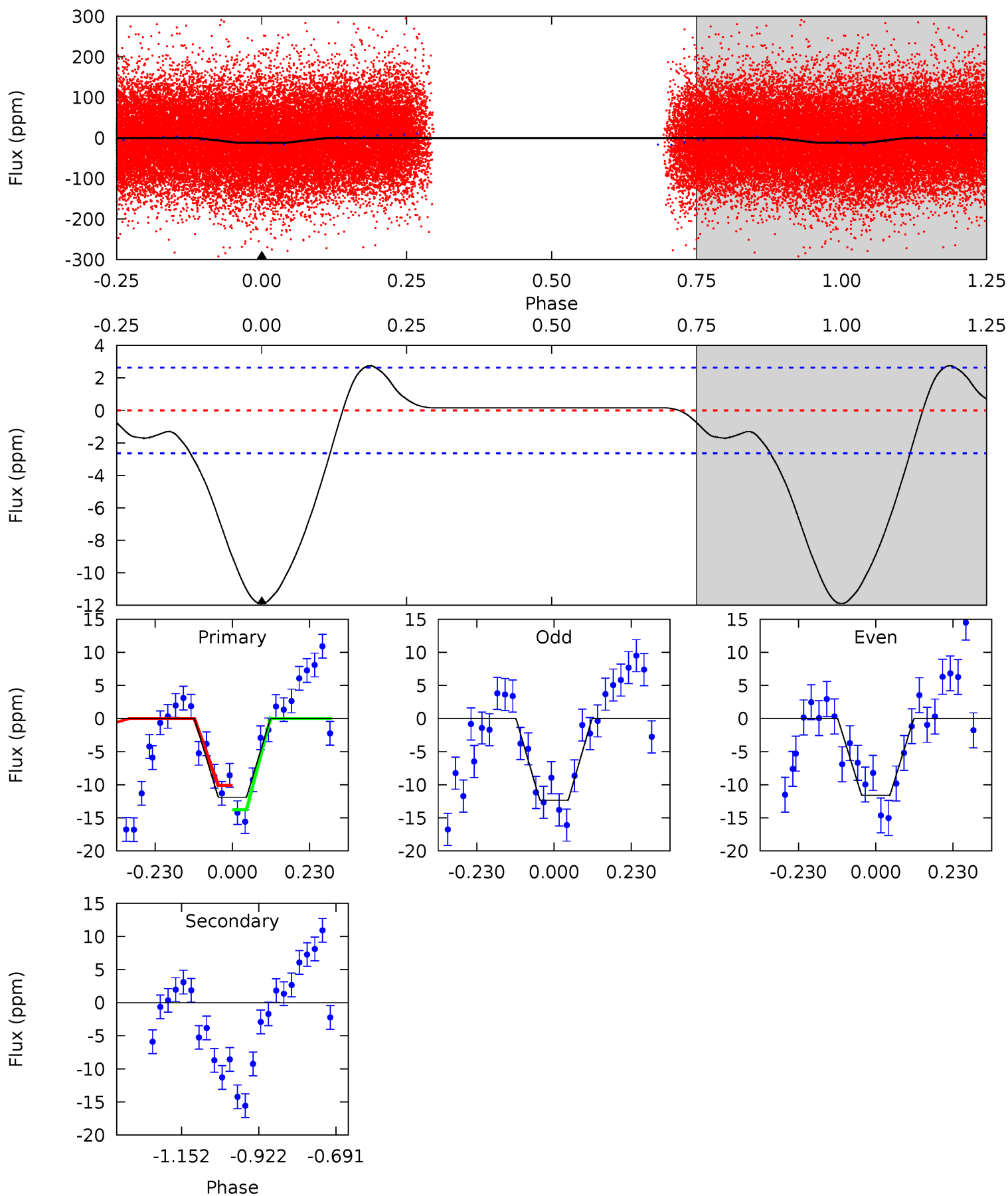
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.2	0	0	0	4.35	1.09	0.46	18.2	18.2	0	0	0.55	1.34	0.01	1.48



Alt Model-Shift Uniqueness Test

009051650-04, P = 5.323411 Days, E = 127.011691 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.8	0	0	0	4.39	1.20	1.28	19.8	19.8	0	0	0.63	0.93	0.19	2.97



Stellar Parameters For KIC 009051650

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6649^{+149}_{-215}	$4.097^{+0.171}_{-0.140}$	$0.000^{+0.250}_{-0.300}$	$1.748^{+0.353}_{-0.431}$	$1.396^{+0.163}_{-0.245}$	$0.368^{+0.367}_{-0.135}$
	+2%/-3%	+4%/-3%	+inf%/-inf%	+20%/-25%	+12%/-18%	+100%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009051650-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1	$0.64^{+0.24}_{-0.20}$	2088^{+129}_{-133}	-2558^{+6163}_{-1156}	$-0.019^{+3.899}_{-4.008}$
Alt.	0 ± 1	$0.63^{+0.24}_{-0.21}$	2098^{+131}_{-139}	-2679^{+6327}_{-1083}	$-0.105^{+4.174}_{-3.982}$

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 $A_{obs} \gg 1.0$

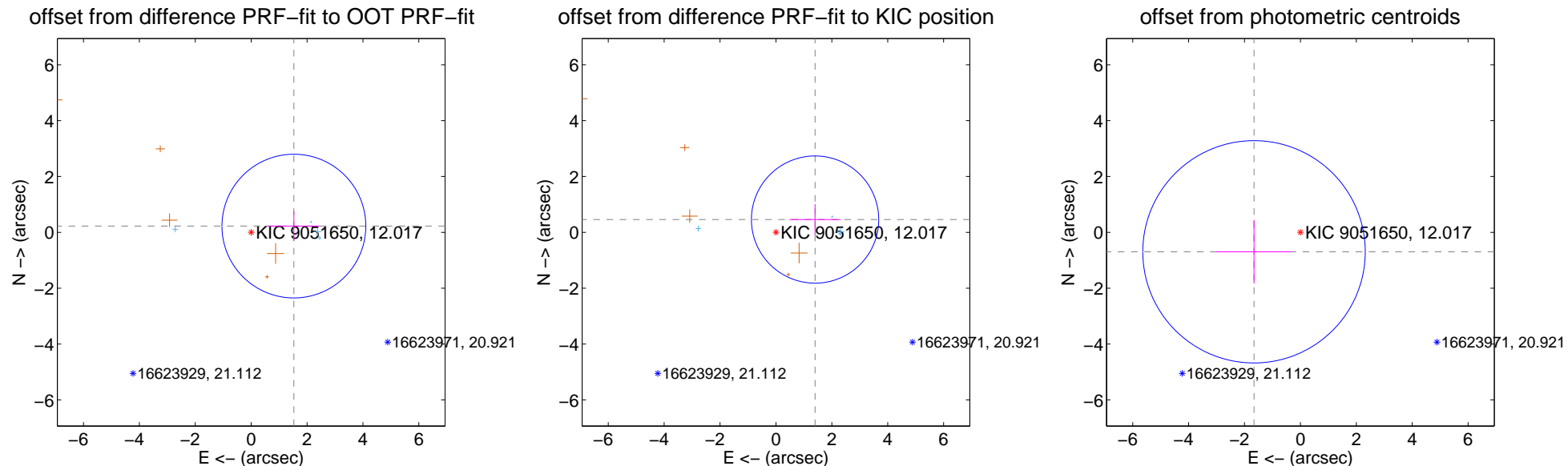
DV Centroid Data

Supplemental centroid analysis for 009051650-04. Kepler magnitude: 12.02. Transit SNR 11.03

There are 4 quarters with good PRF difference image offsets

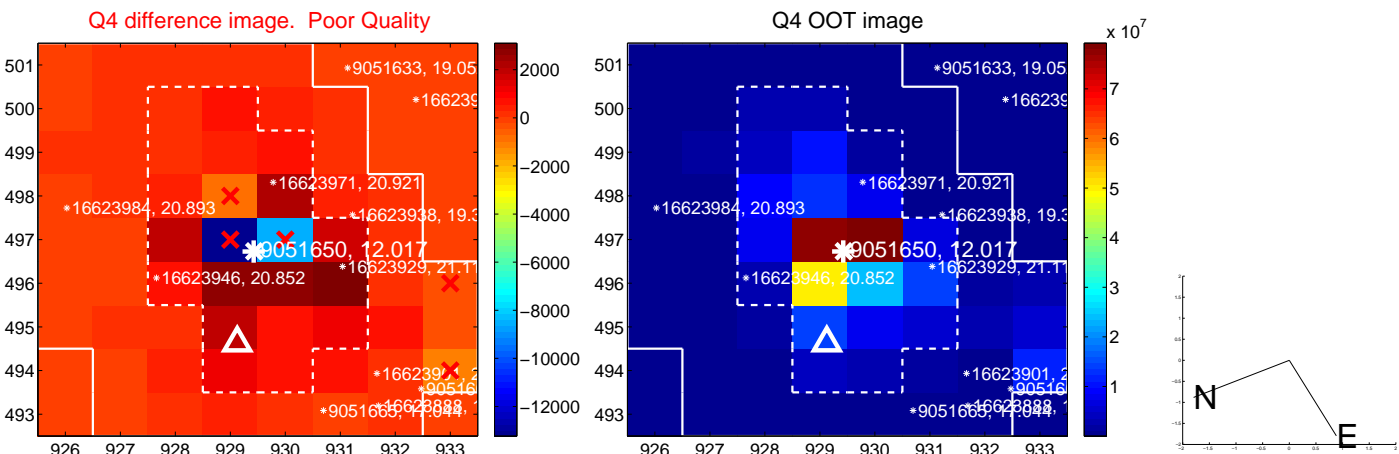
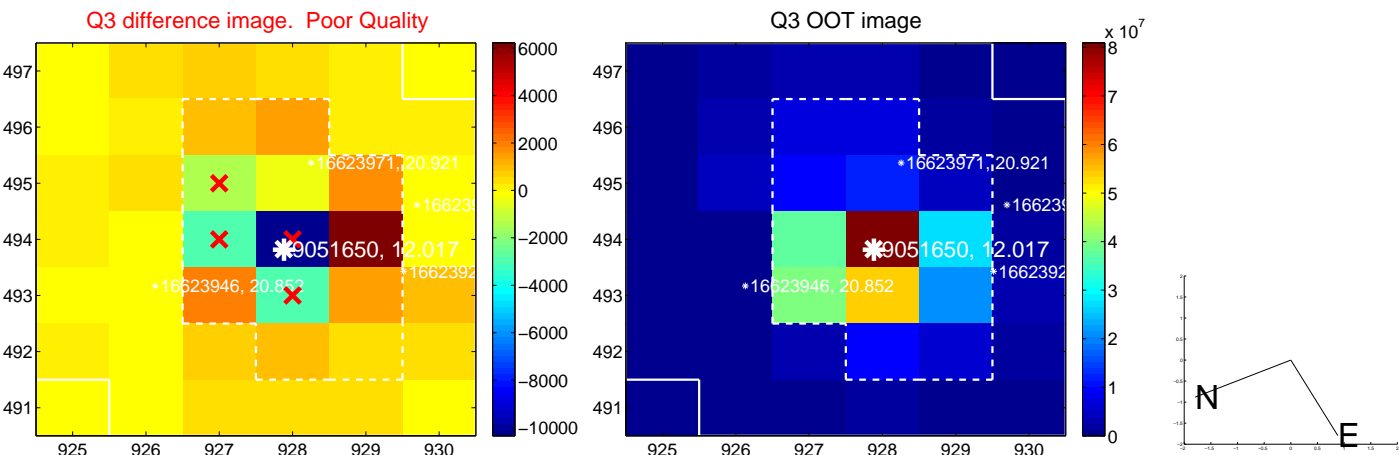
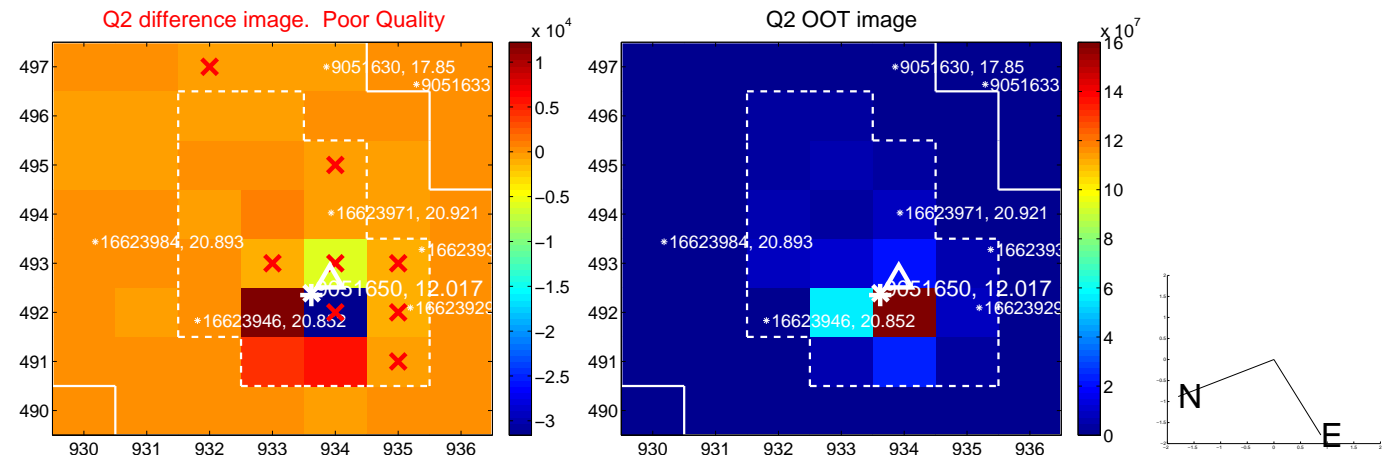
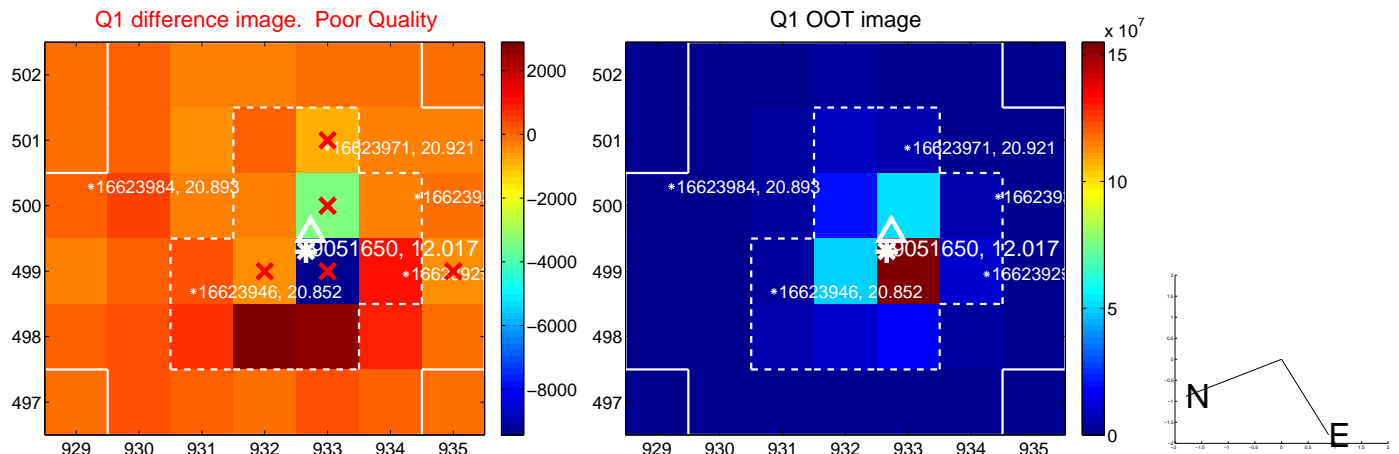
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.545 ± 0.858	1.80	-1.528 ± 0.919	0.224 ± 0.528
PRF-fit source offset from KIC position	1.473 ± 0.759	1.94	-1.400 ± 0.917	0.457 ± 0.555
photometric centroid source offset	1.80 ± 1.33	1.36	1.66 ± 1.36	-0.70 ± 1.14

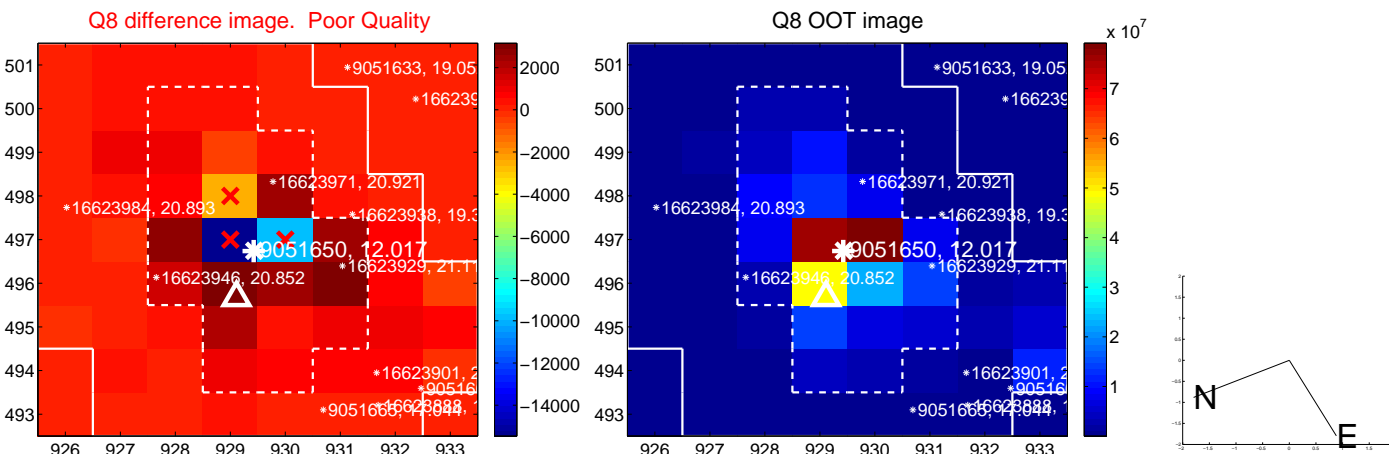
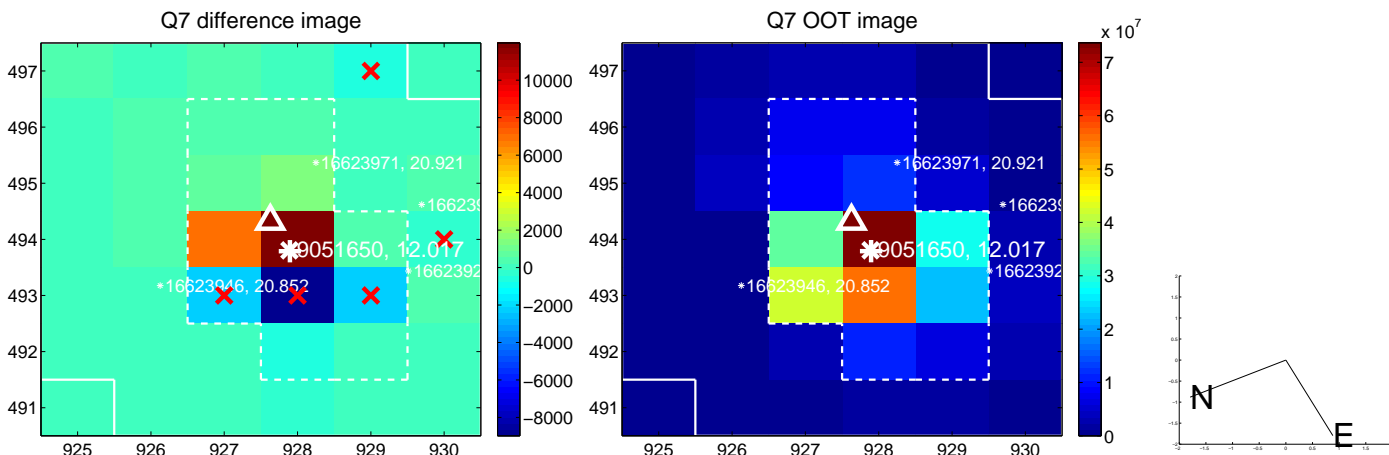
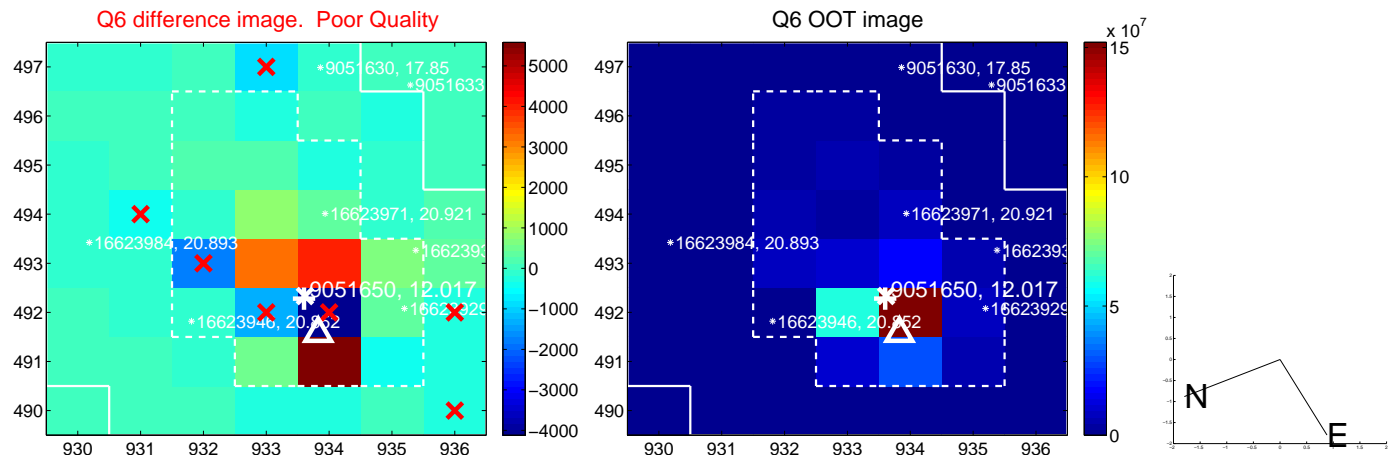
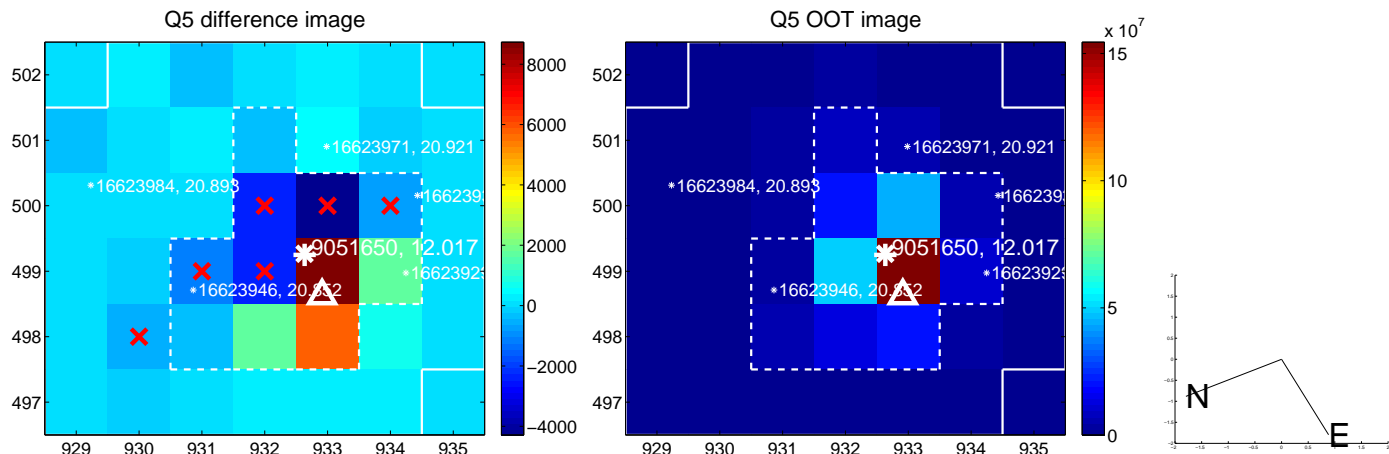


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

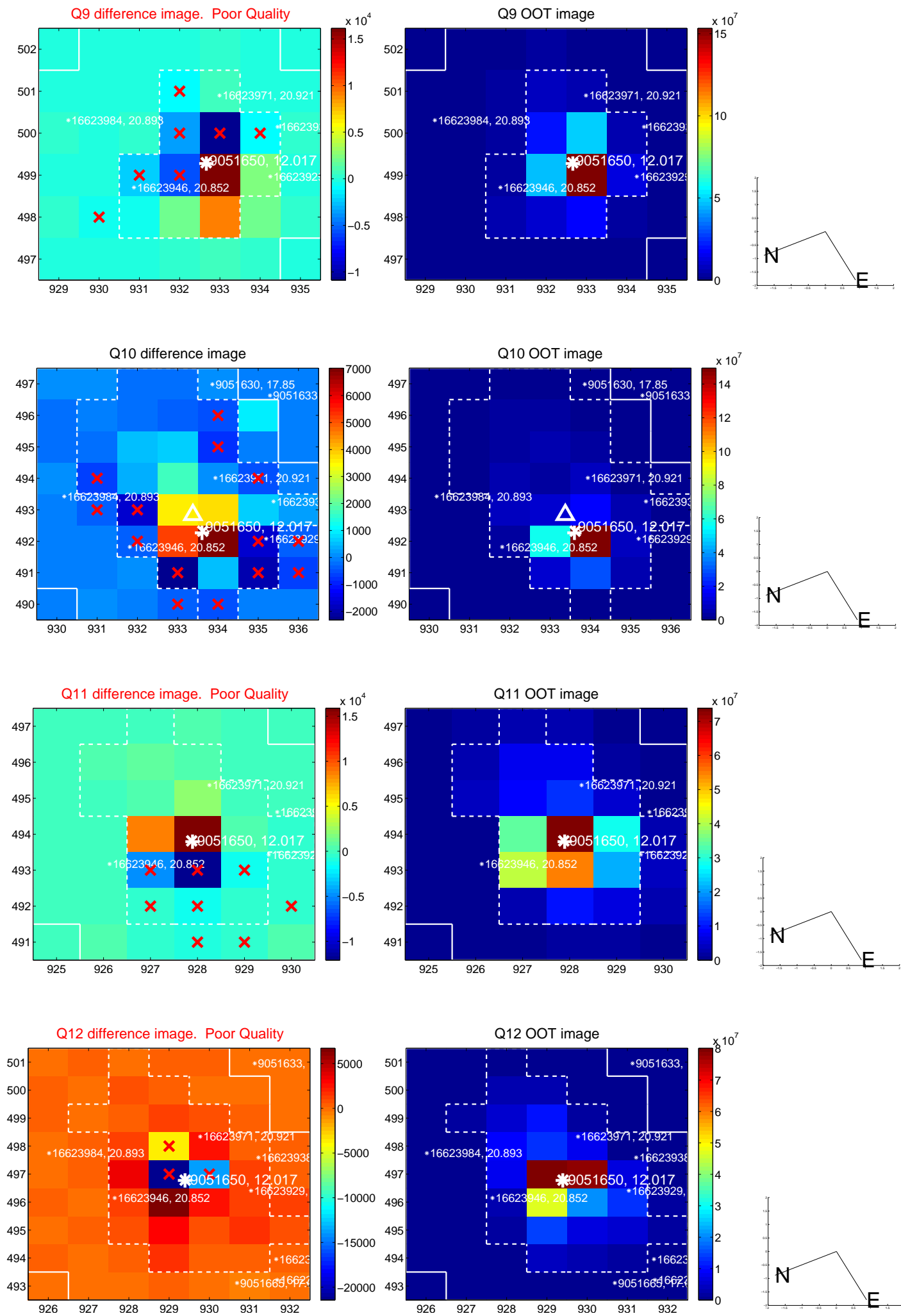
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



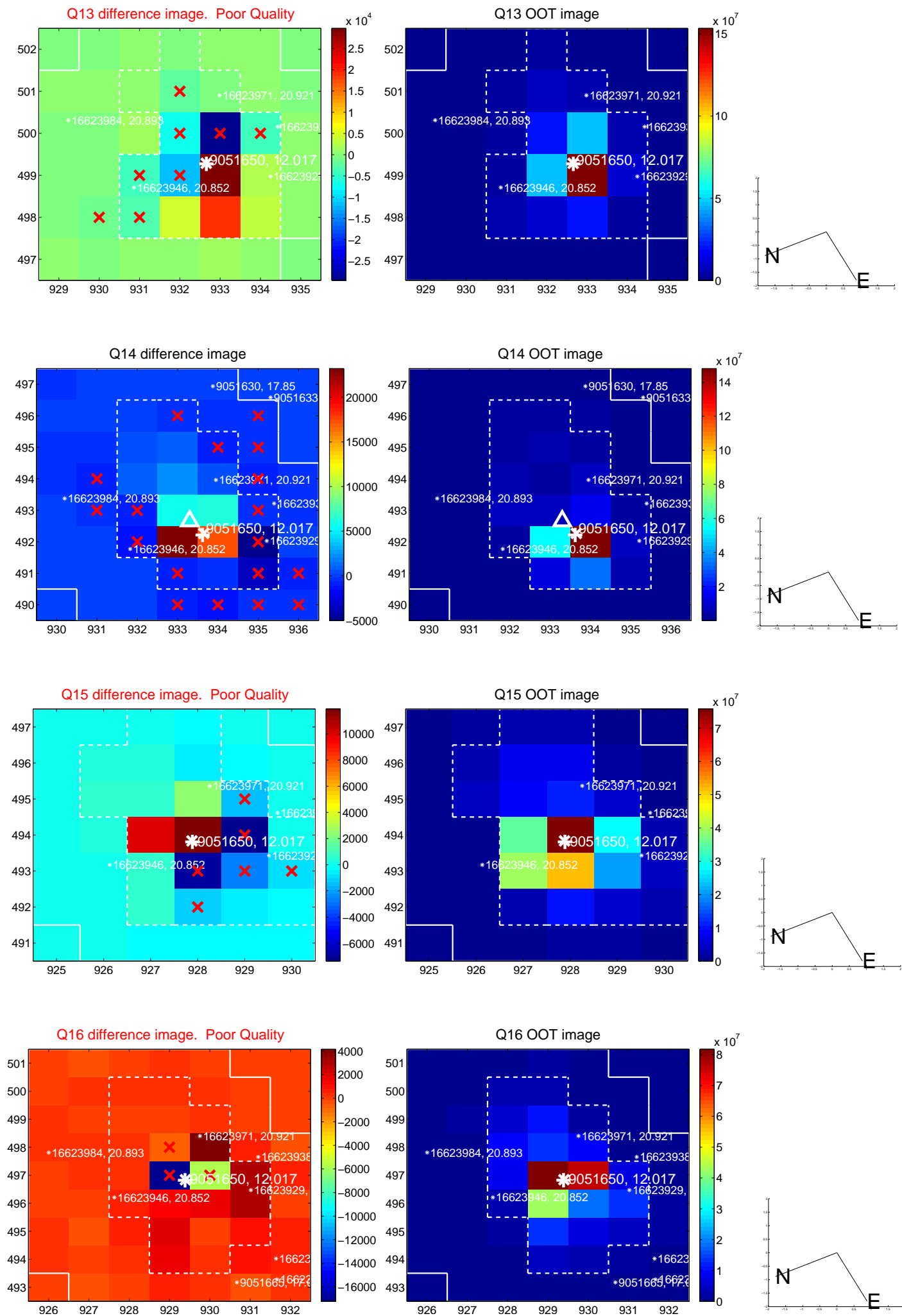
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



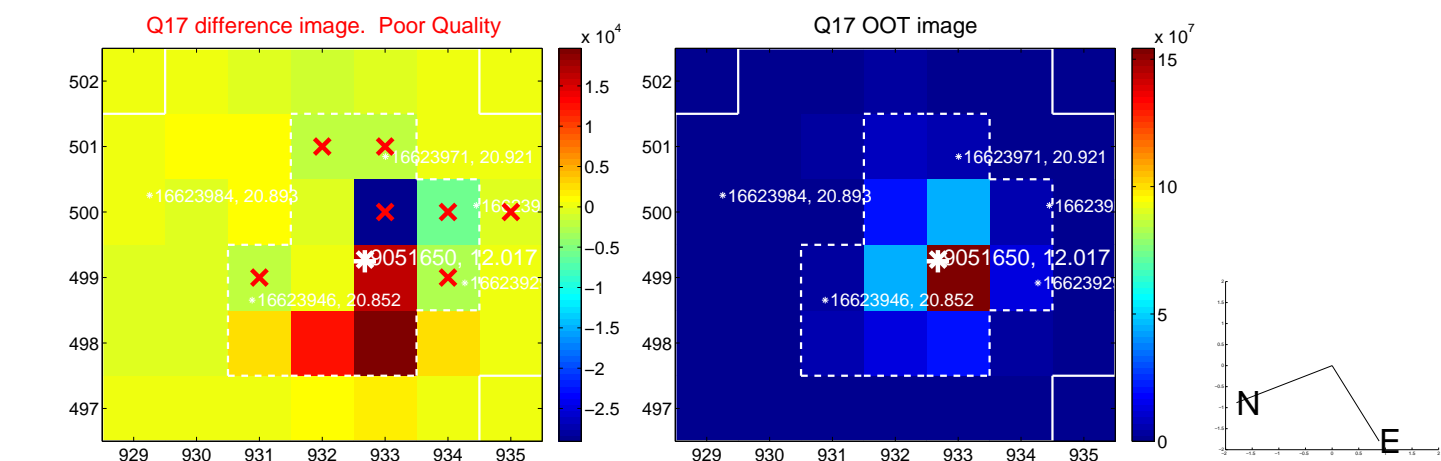
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



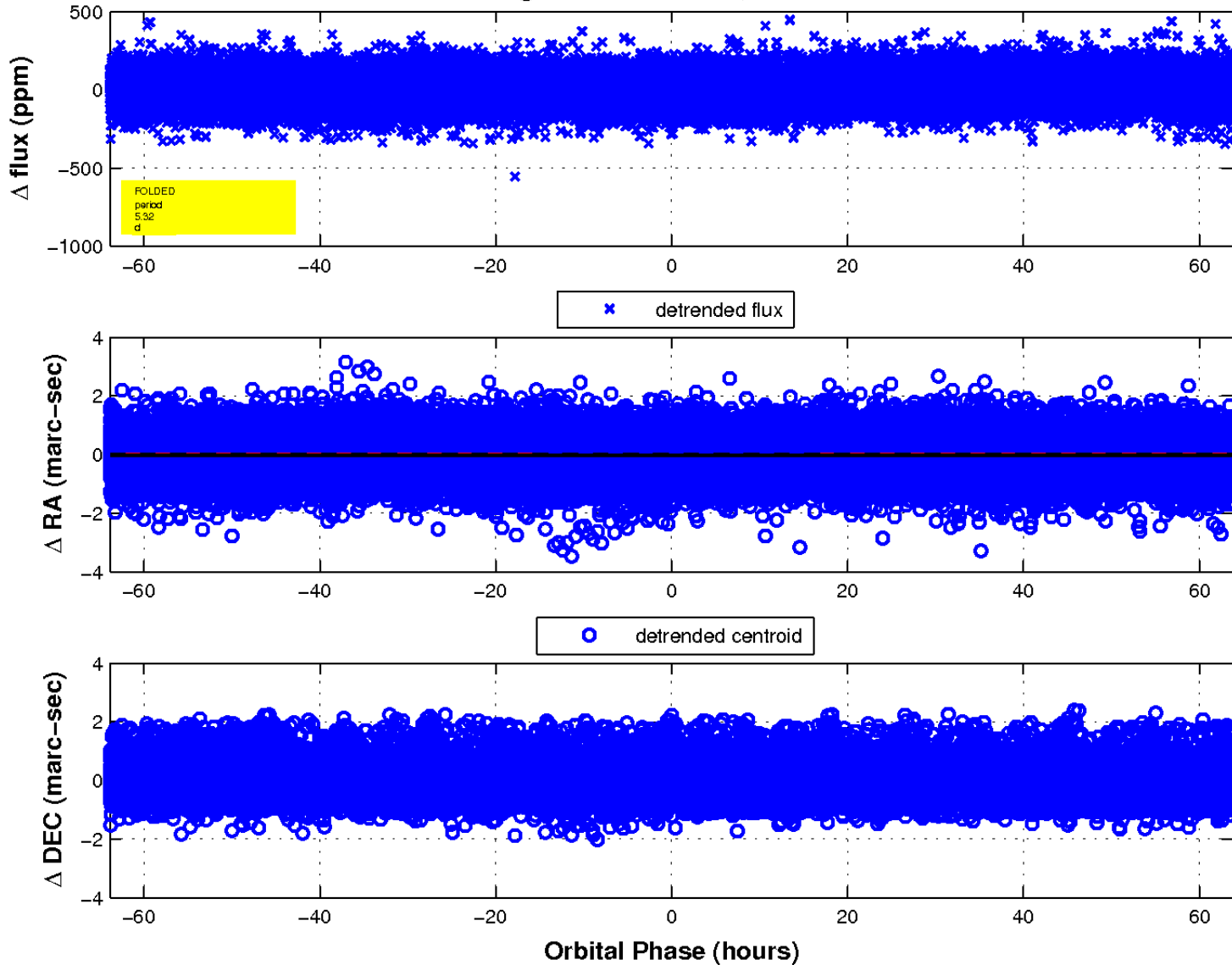
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

