

KIC 009456920

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})
009456920-01	OBS	No	150.956546	279.927189	1105.5	3.417	14.3	7.4	0.66	4074	2.10	0.46
009456920-02	OBS	No	375.297460	246.520728	1383.0	4.079	12.1	6.1	0.66	4074	2.78	0.14
009456920-03	OBS	No	524.224071	494.560506	1187.8	3.523	16.7	5.7	0.66	4074	2.36	0.09
009456920-04	OBS	No	532.149397	524.662488	1298.9	3.519	15.0	6.7	0.66	4074	2.59	0.09
009456920-05	OBS	No	677.236290	224.184000	440.3	4.500	12.7	-1.0	0.66	4074	1.32	0.06

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009456920-01	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009456920-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
009456920-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

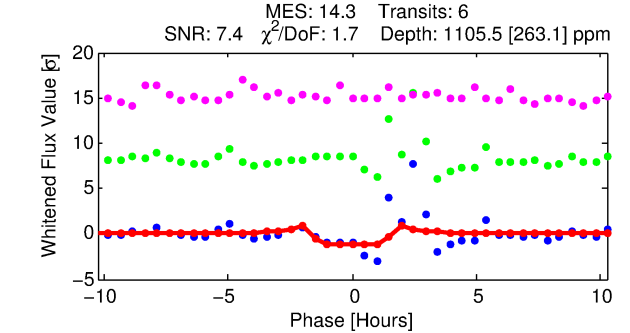
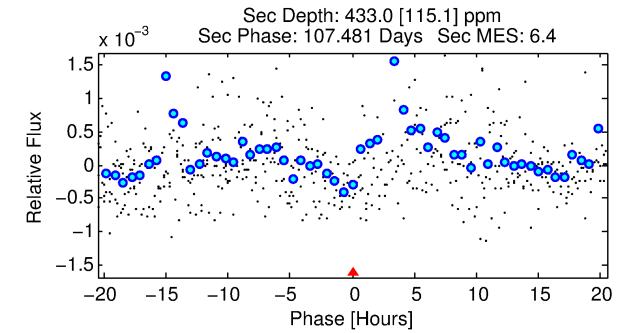
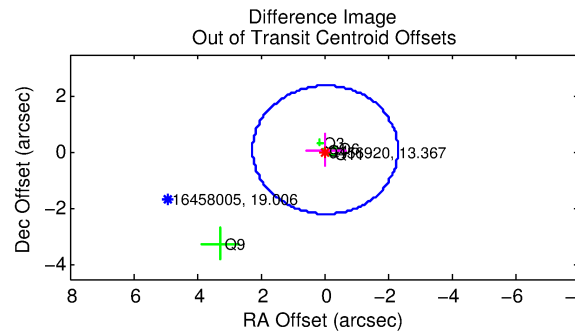
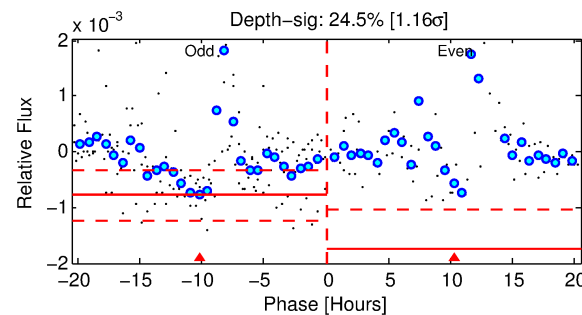
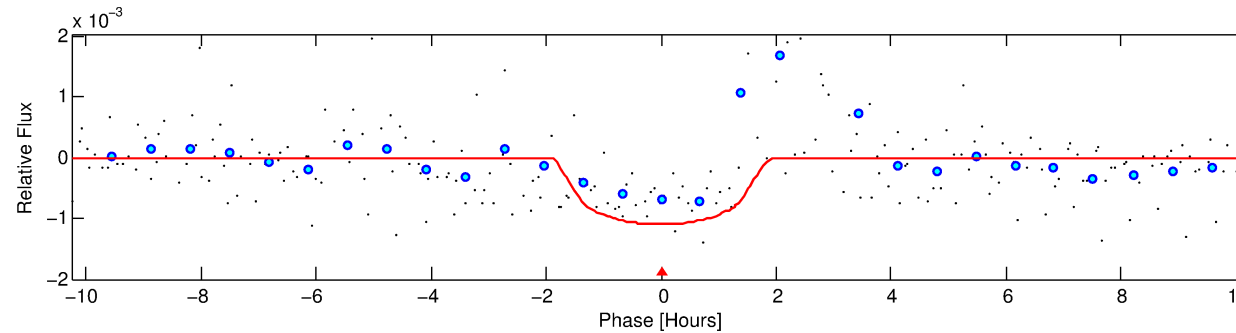
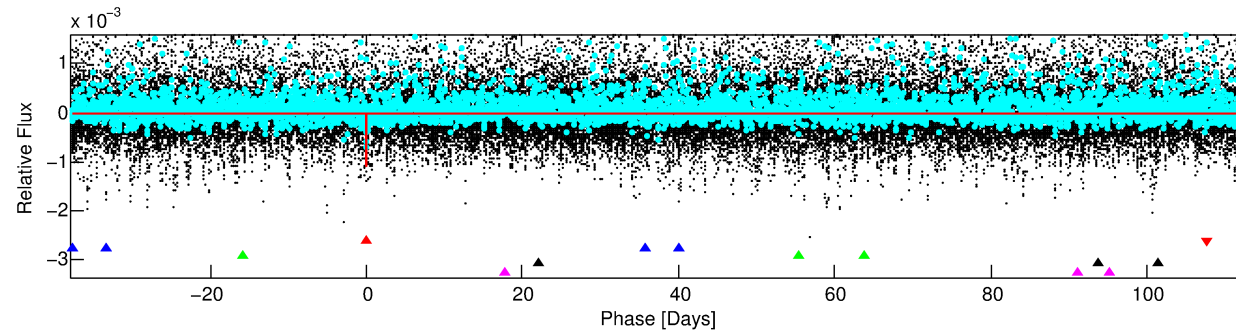
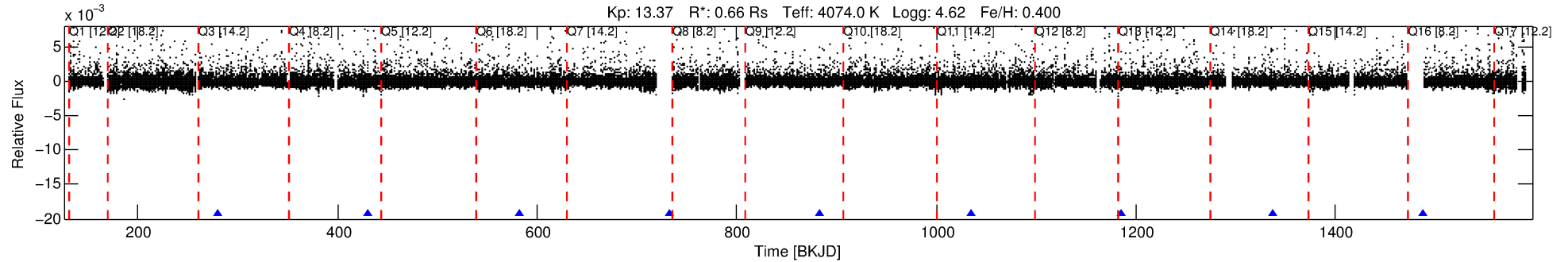
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009456920-01

No Significant Match Found

DV One-Page Summary

KIC: 9456920 Candidate: 1 of 5 Period: 150.957 d



DV Fit Results:

Period = 150.95655 [0.00277] d
Epoch = 279.9272 [0.0102] BKJD
Rp/R* = 0.0290 [0.0277]
a/R* = 347.32 [917.25]
b = 0.00 [50229.29]
Seff = 0.46 [0.10]
Teq = 210 [11] K
Rp = 2.10 [2.02] Re
a = 0.4834 [0.0415] AU
Ag = 12660.69 [24502.63] [0.52 σ]
Teffp = 3452 [1674] K [1.94 σ]

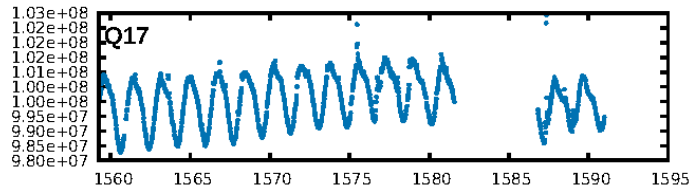
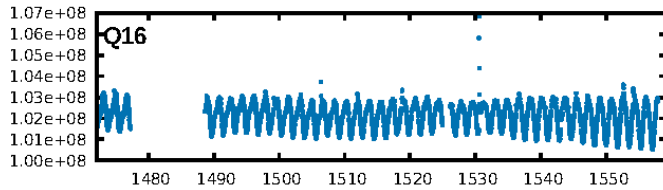
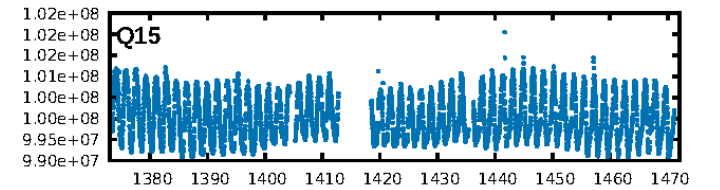
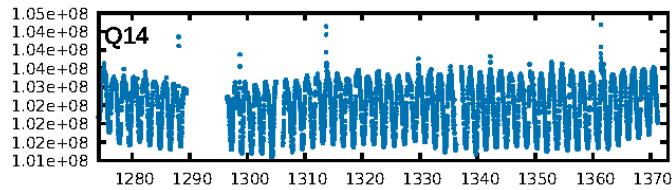
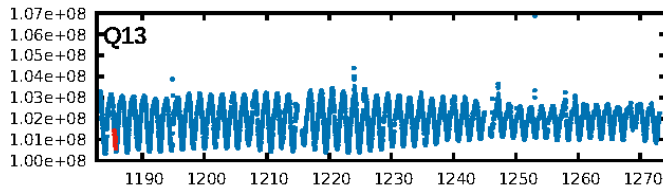
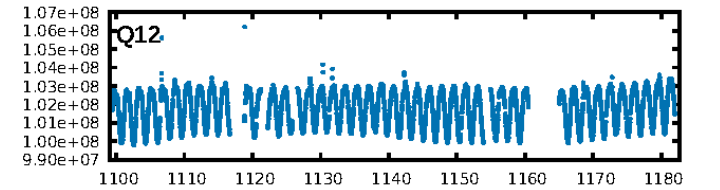
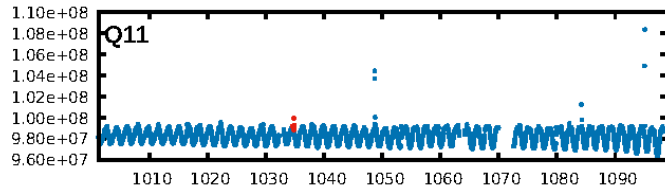
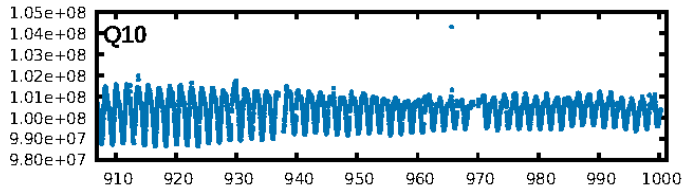
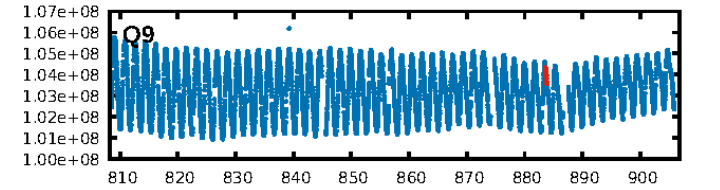
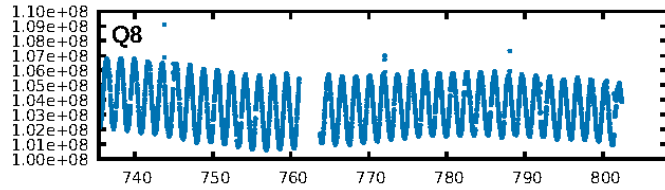
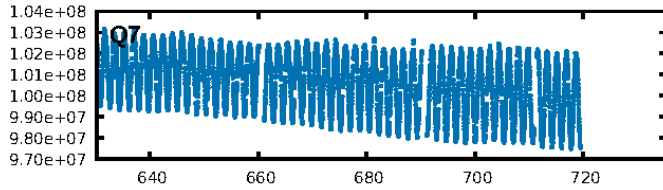
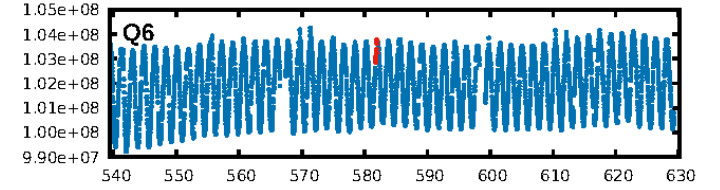
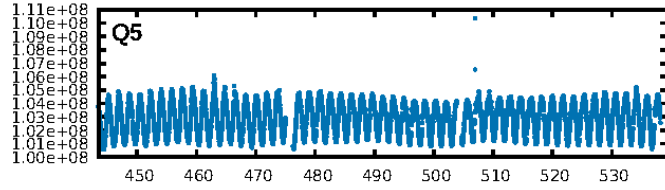
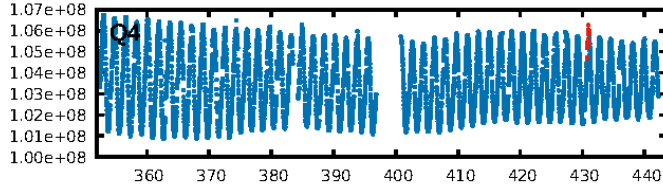
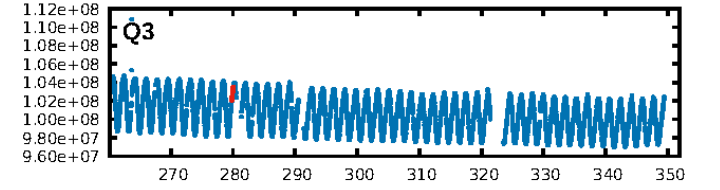
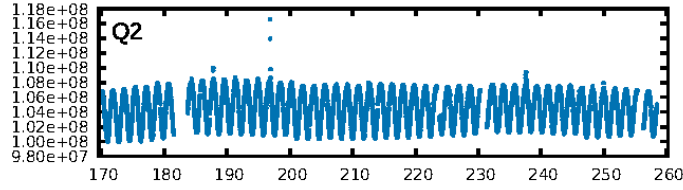
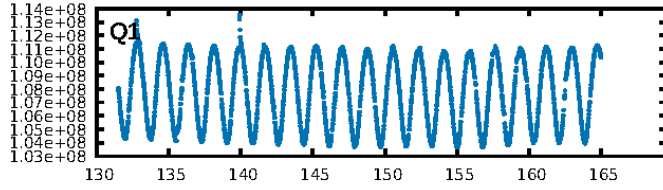
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1011.93 σ]
ModelChiSquare2-sig: 0.7%
ModelChiSquareGof-sig: 34.6%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 1.513
Centroid-sig: 35.5%
Centroid-so: 0.727 arcsec [2.26 σ]
OotOffset-rm: 0.104 arcsec [0.14 σ]
OotOffset-st: 1/2/1/1 [5]
KicOffset-rm: 0.772 arcsec [1.35 σ]
KicOffset-st: 1/2/1/1 [5]
DiffImageQuality-fgm: 0.00 [0/5]
DiffImageOverlap-fno: 1.00 [5/5]

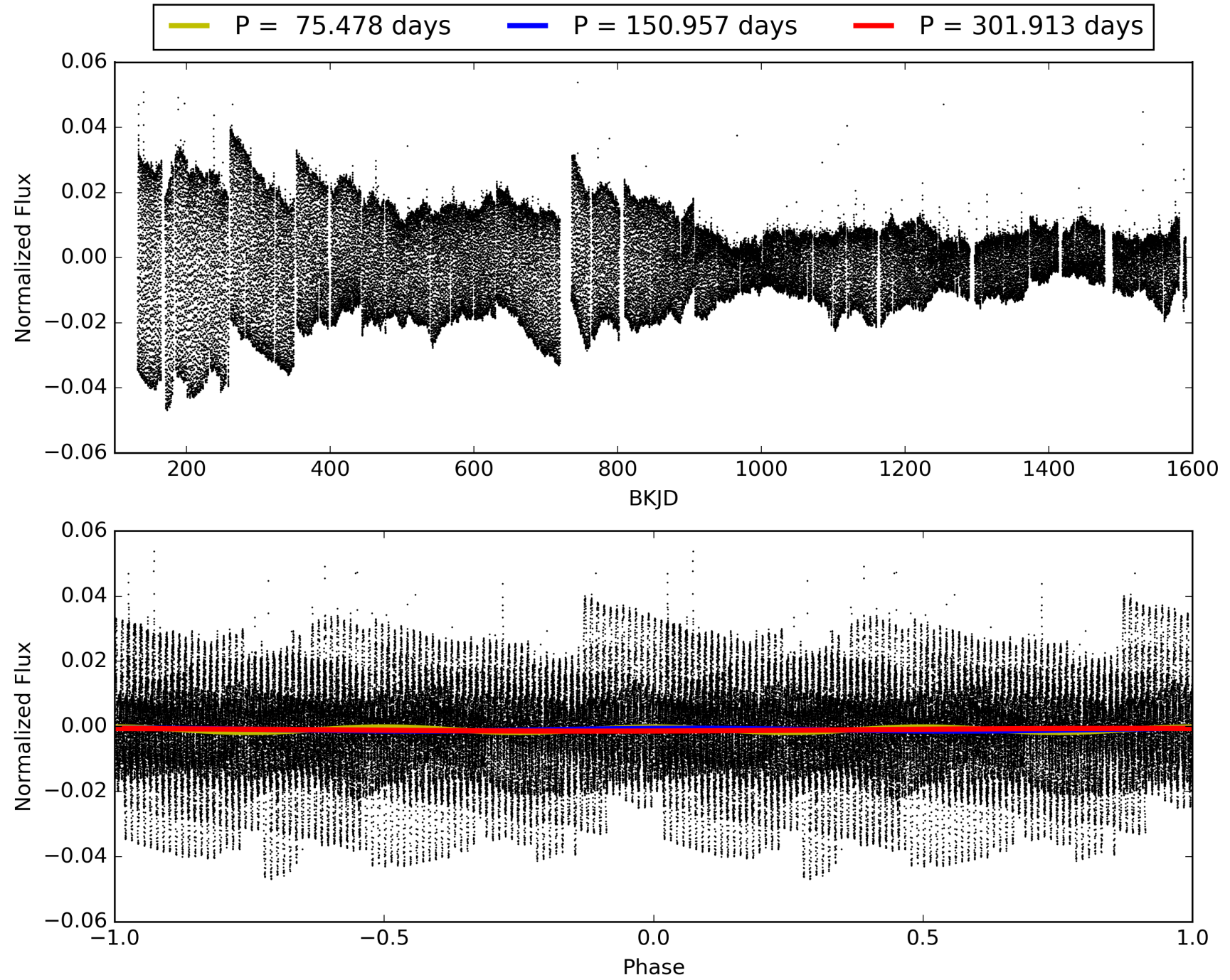
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009456920-01, PDC Light Curves

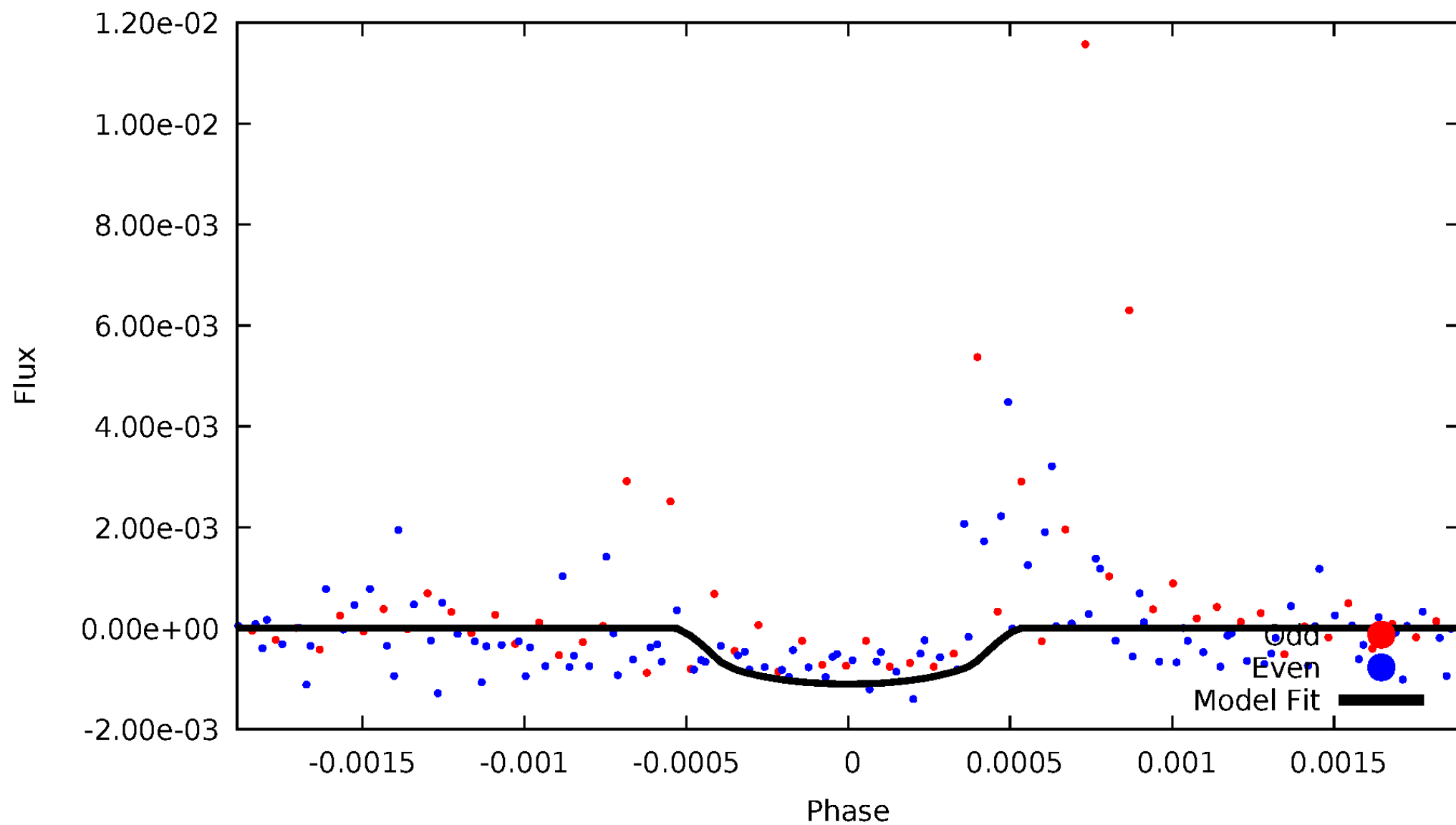


TCE 009456920-01



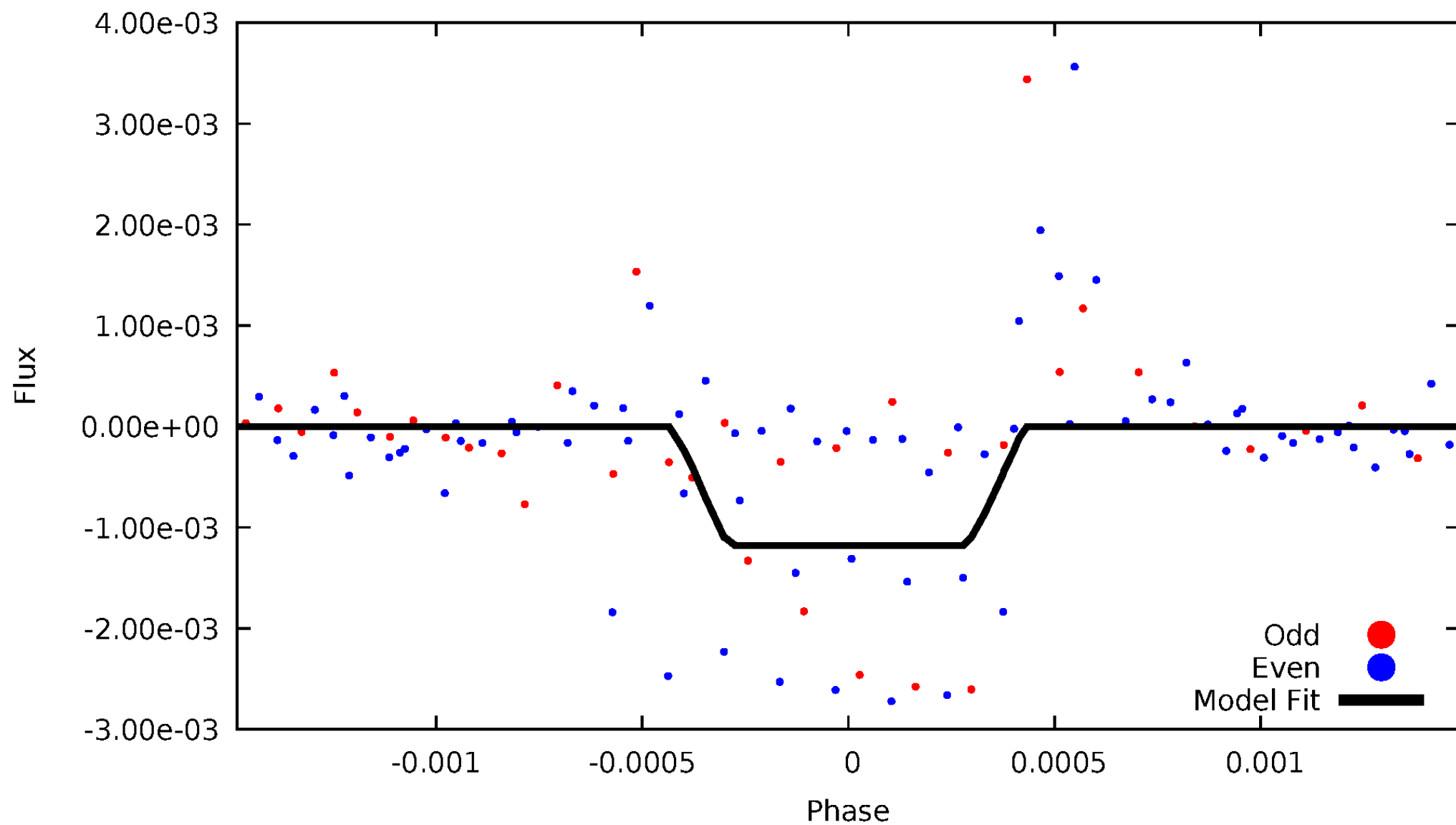
DV Odd/Even

TCE 009456920-01



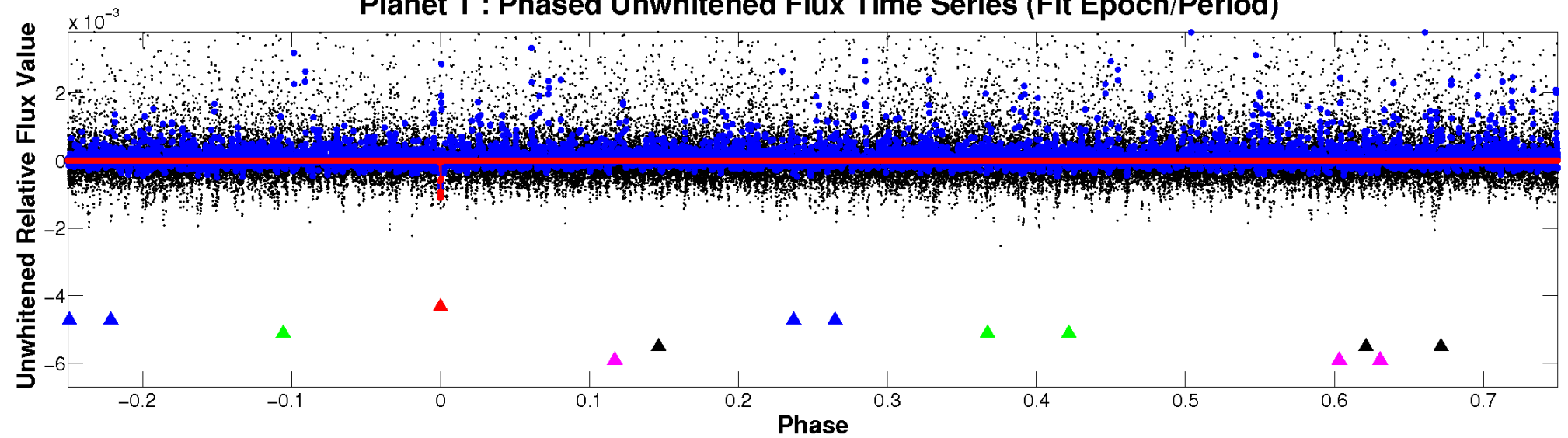
ALT Odd/Even

TCE 009456920-01

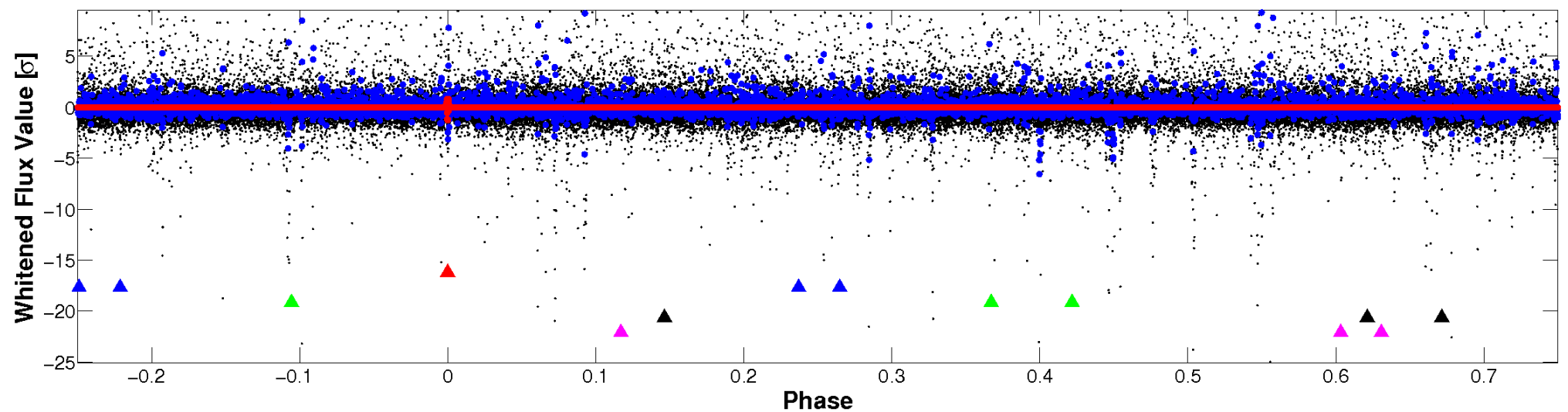


Non-Whitened Vs. Whitened Light Curve

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

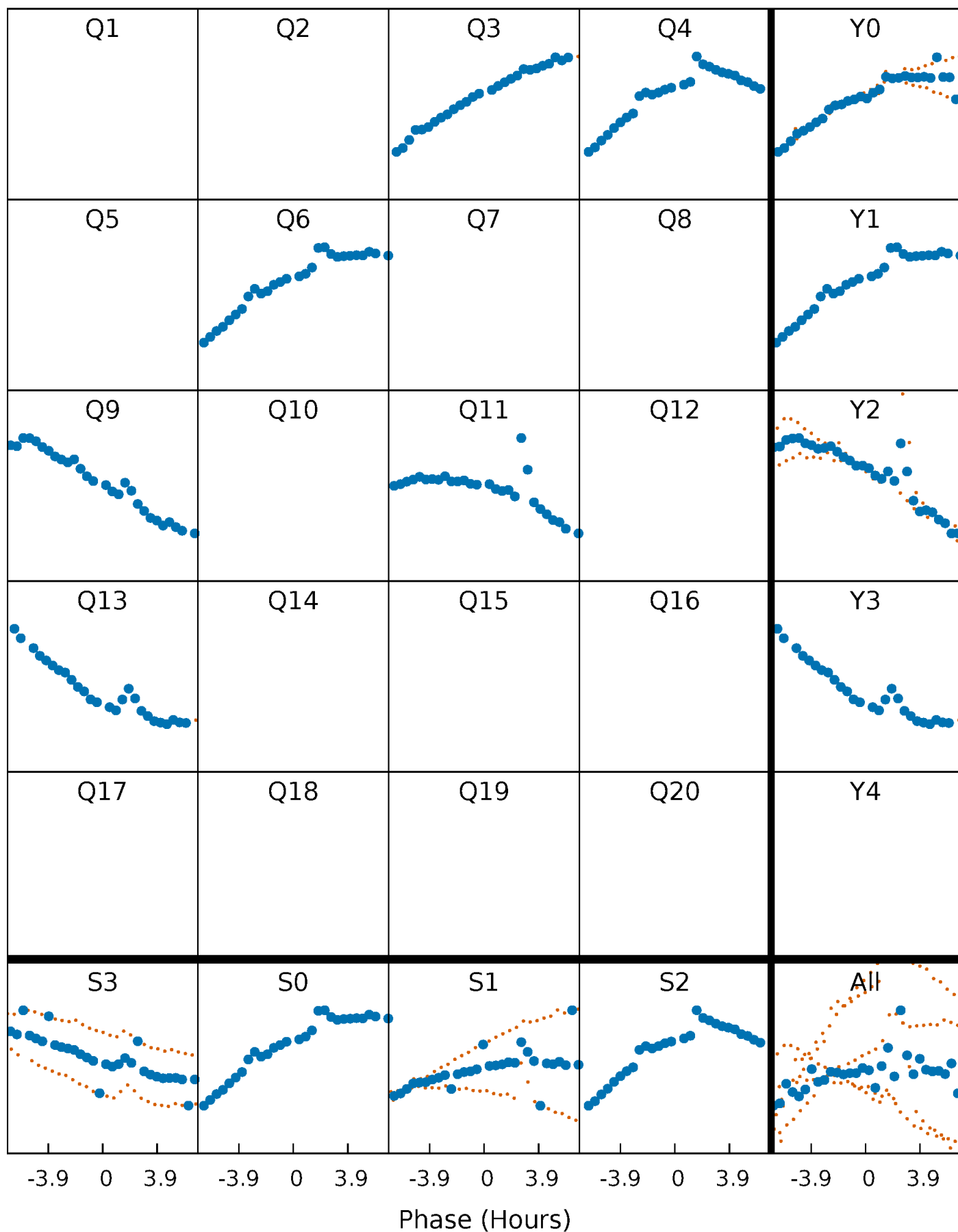


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



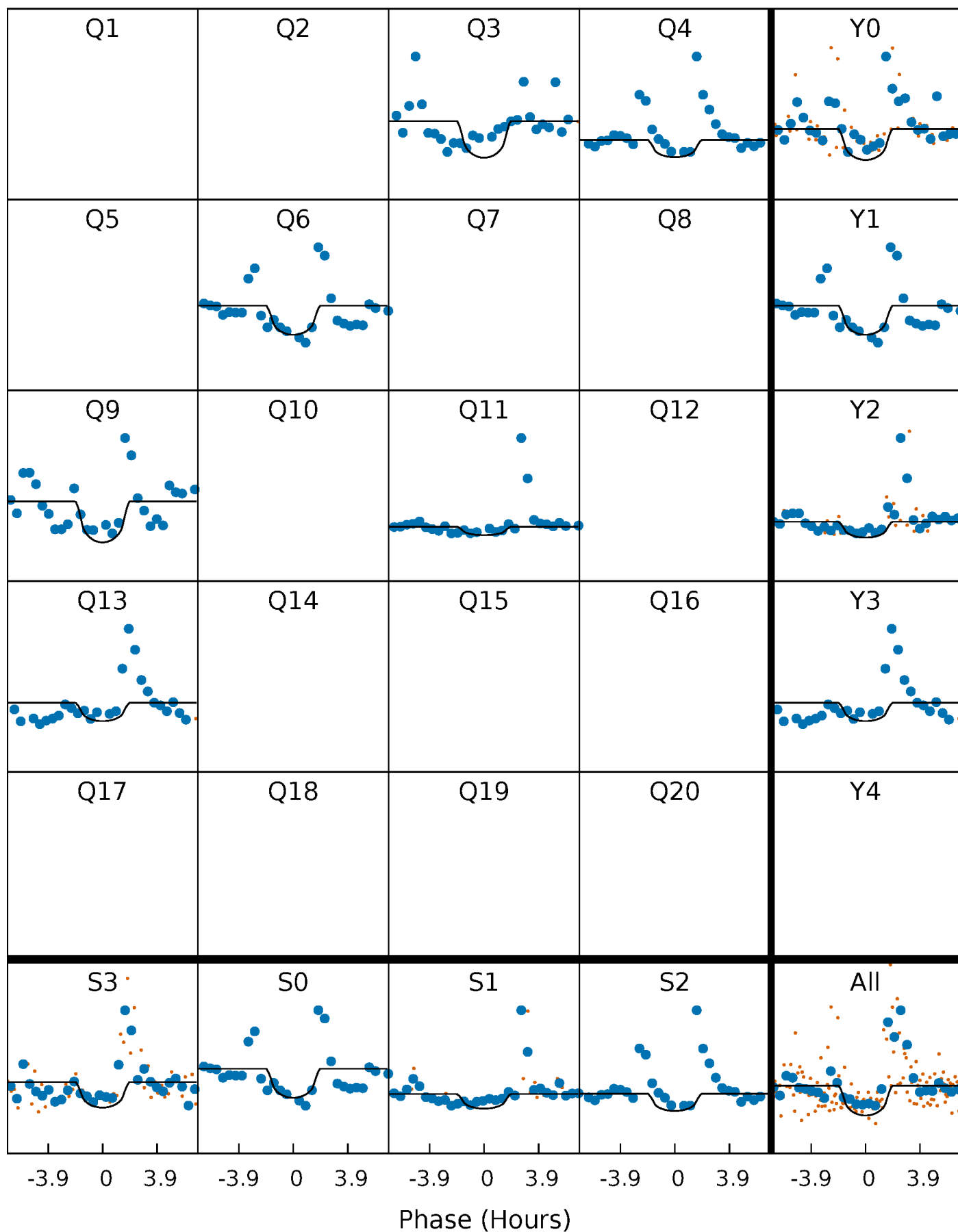
PDC Quarter-Phased Transit Curves

TCE 009456920-01 P=150.956546 Days $T_0=279.927189$ (BKJD)



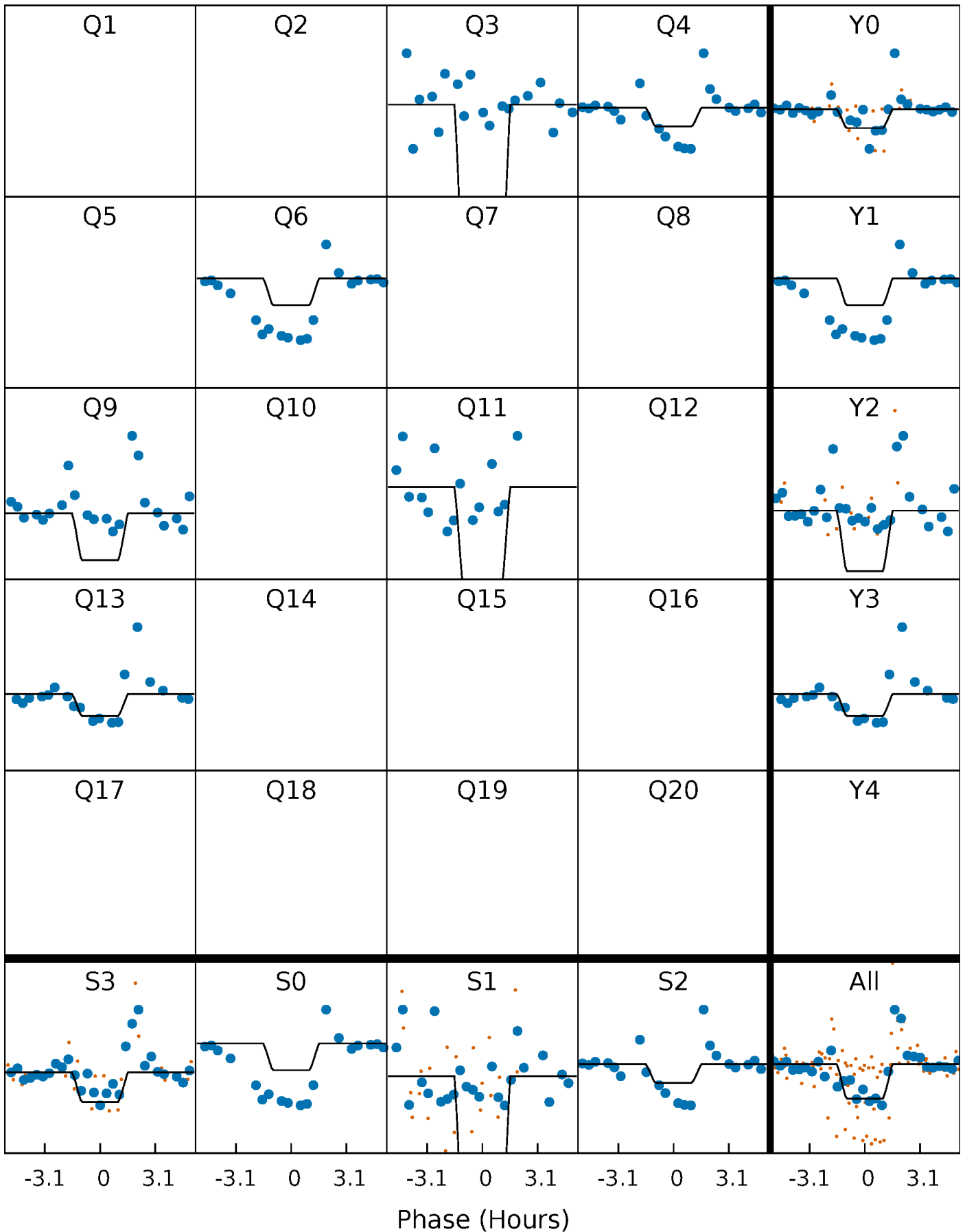
DV Quarter-Phased Transit Curves

TCE 009456920-01 P=150.956546 Days $T_0=279.927189$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

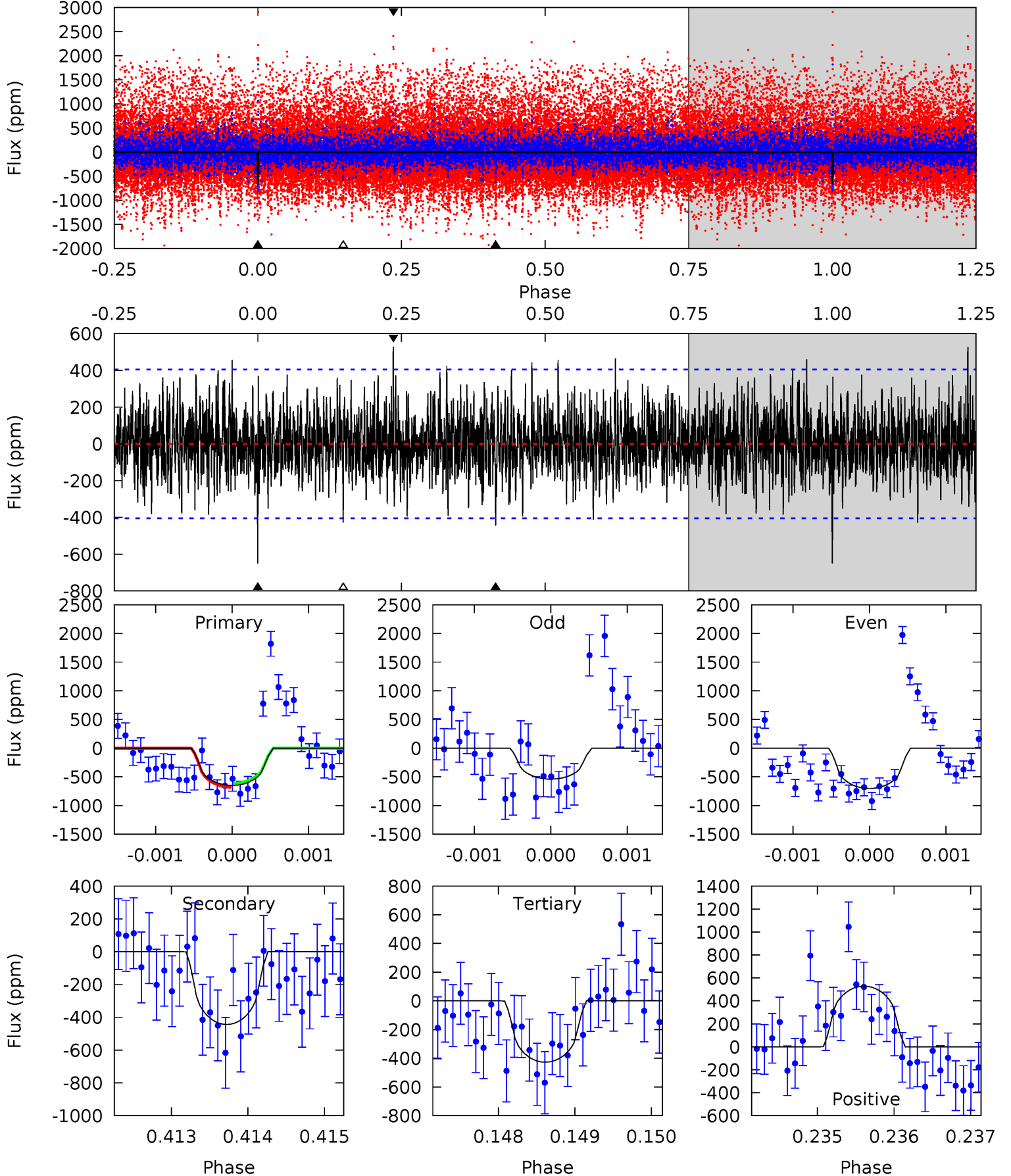
TCE 009456920-01 P=150.955914 Days $T_0=279.922549$ (BKJD)



DV Model-Shift Uniqueness Test

009456920-01, P = 150.956546 Days, E = 128.970643 Days

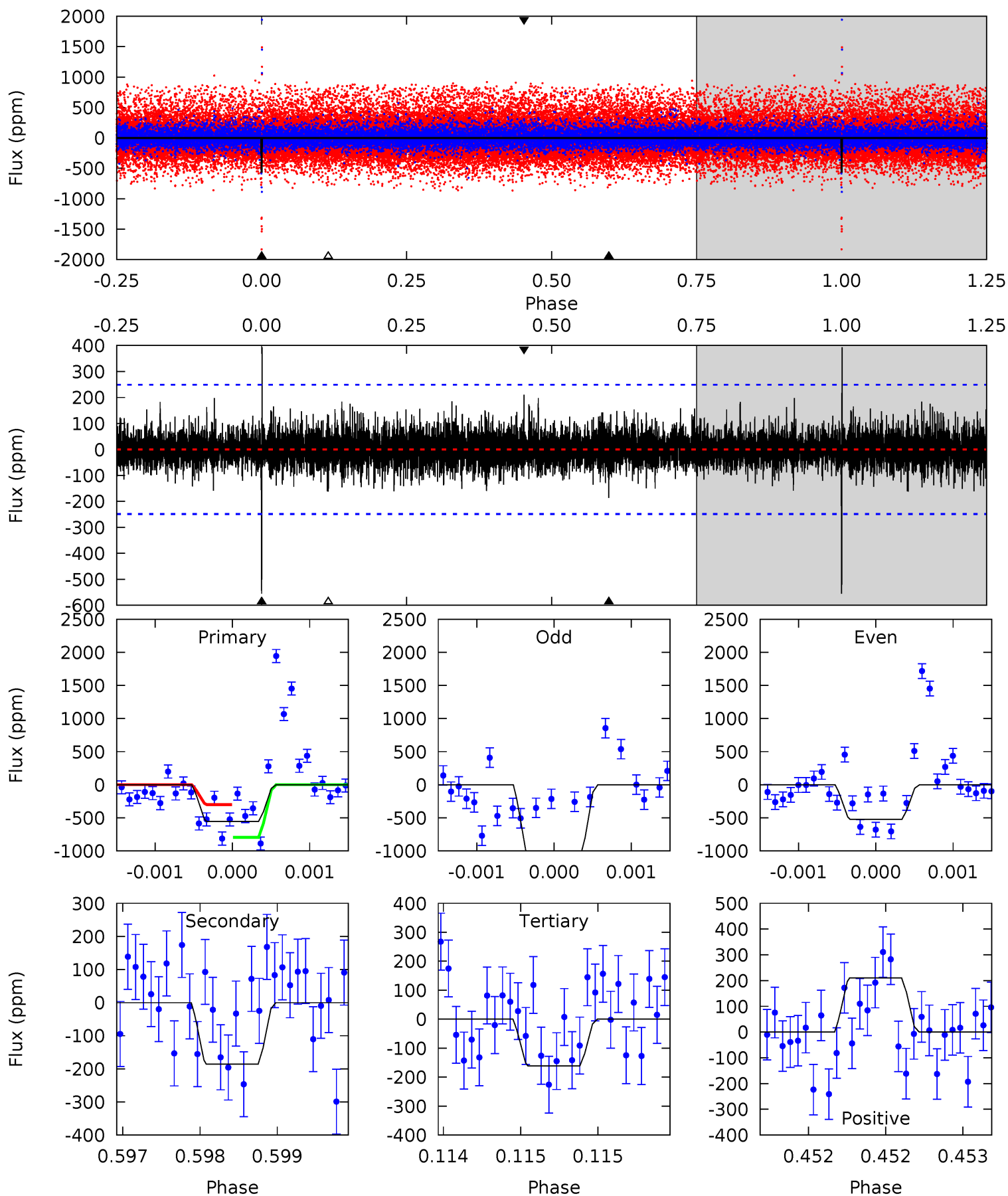
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.75	5.98	5.76	7.11	5.45	3.29	1.79	2.99	1.64	0.22	-1.13	1.00	0.84	0.45	0.49



Alt Model-Shift Uniqueness Test

009456920-01, P = 150.955914 Days, E = 128.966635 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	4.10	3.56	4.64	5.49	3.34	1.02	8.70	7.62	0.54	-0.54	6.38	1.48	0.41	5.00



Stellar Parameters For KIC 009456920

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4074^{+146}_{-178}	$4.615^{+0.064}_{-0.016}$	$0.400^{+0.050}_{-0.300}$	$0.663^{+0.026}_{-0.070}$	$0.660^{+0.038}_{-0.062}$	$3.196^{+0.867}_{-0.198}$
	+4%/-4%	+1%/-0%	+12%/-75%	+4%/-11%	+6%/-9%	+27%/-6%
Source	PHO1	KIC0	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 009456920-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-444 ± 74	$2.37^{+1.81}_{-1.37}$	292^{+11}_{-14}	3469^{+1272}_{-536}	9751^{+44568}_{-6550}
Alt.	-186 ± 45	$2.72^{+1.87}_{-1.67}$	292^{+12}_{-14}	2960^{+970}_{-419}	3337^{+18685}_{-2299}

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

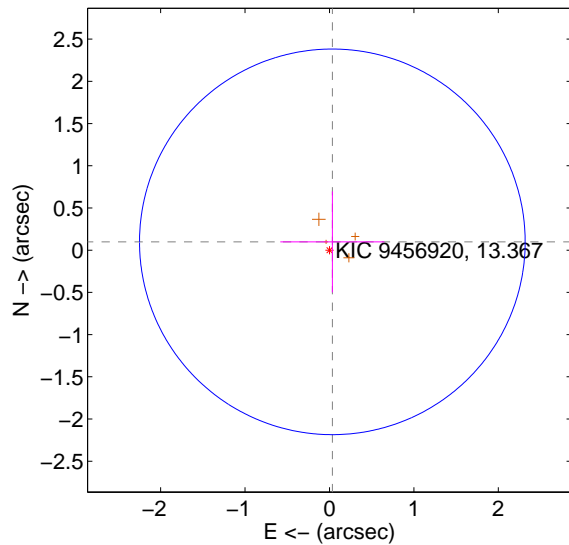
Supplemental centroid analysis for 009456920-01. Kepler magnitude: 13.37. Transit SNR 7.36

There are 0 quarters with good PRF difference image offsets

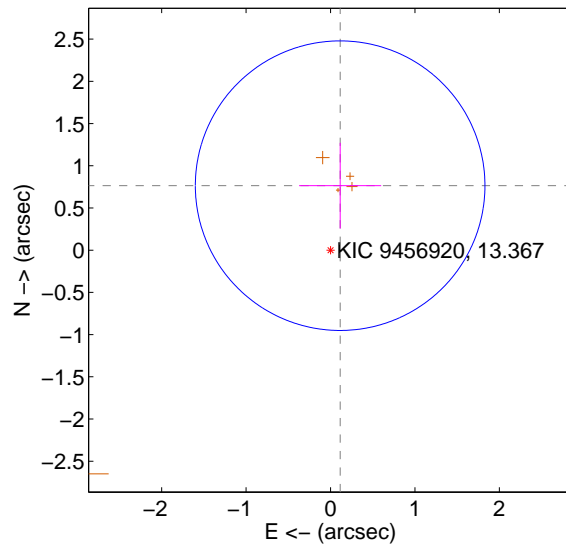
The direct PRF centroid is offset from the target star catalog position by about 0.84 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.104 ± 0.761	0.14	-0.034 ± 0.616	0.099 ± 0.598
PRF-fit source offset from KIC position	0.772 ± 0.572	1.35	-0.114 ± 0.487	0.764 ± 0.508
photometric centroid source offset	0.73 ± 0.32	2.26	0.39 ± 0.35	0.61 ± 0.31

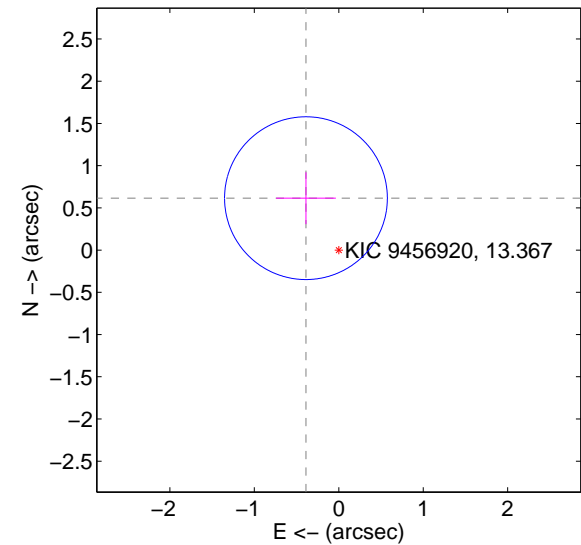
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

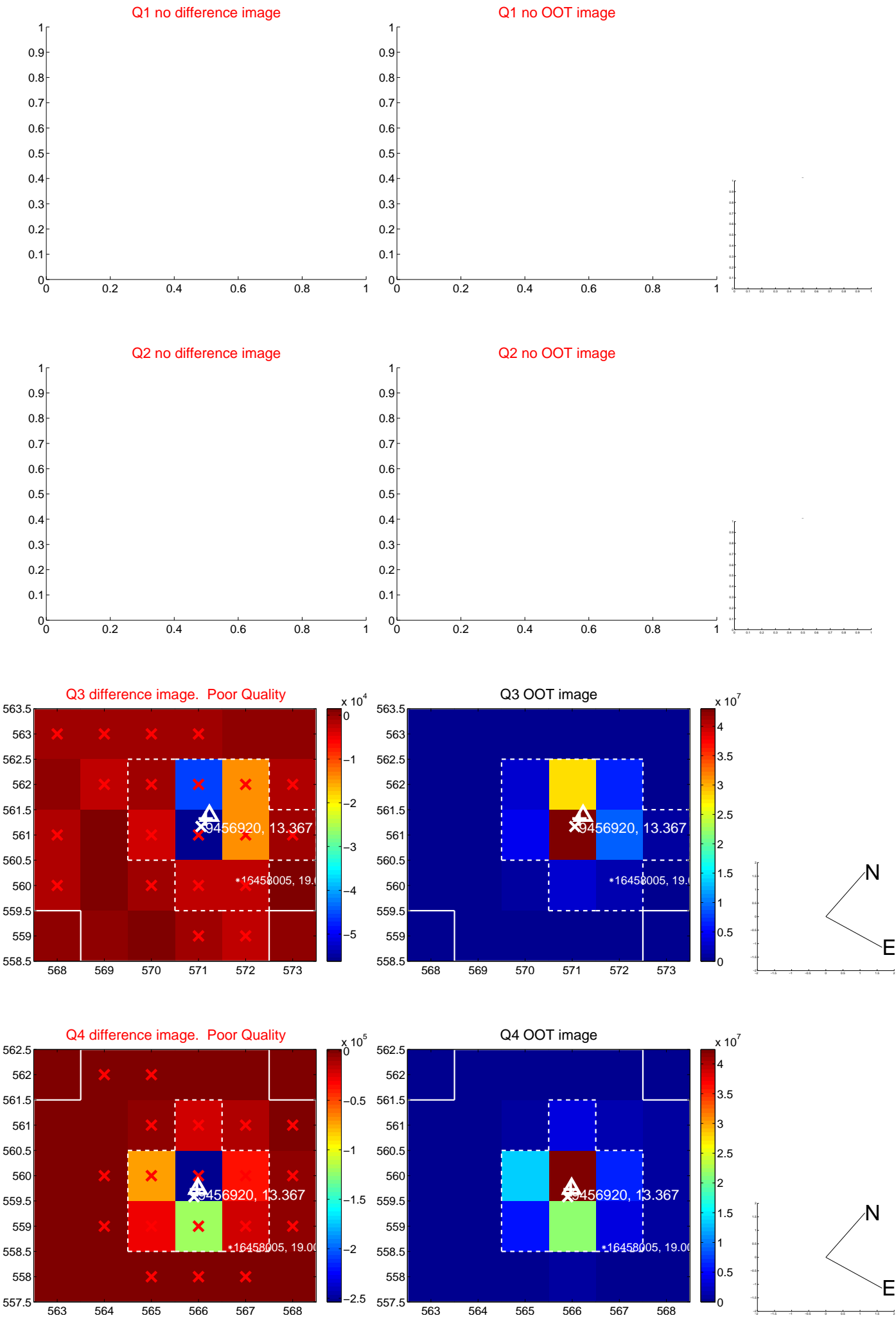


offset from photometric centroids

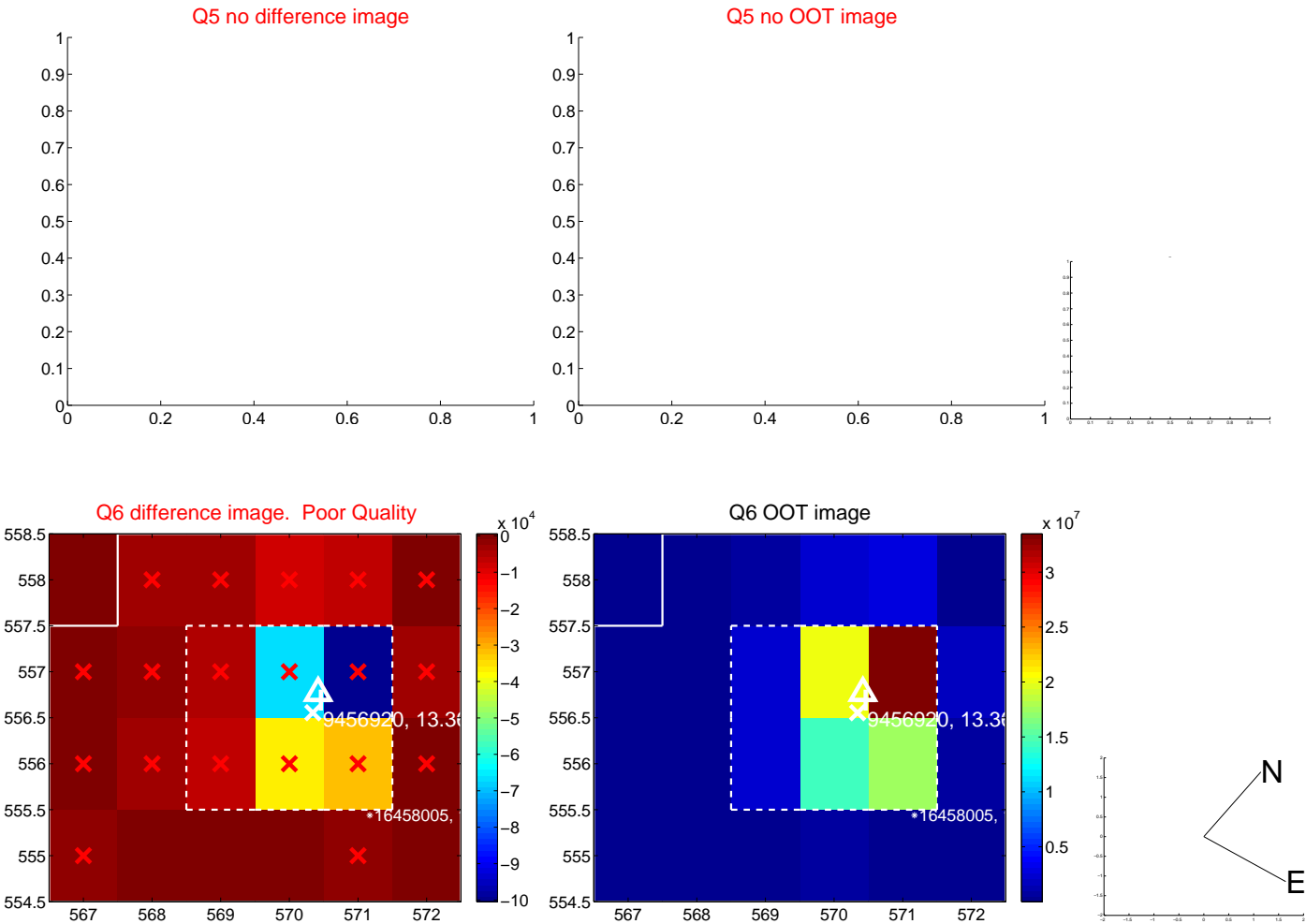


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

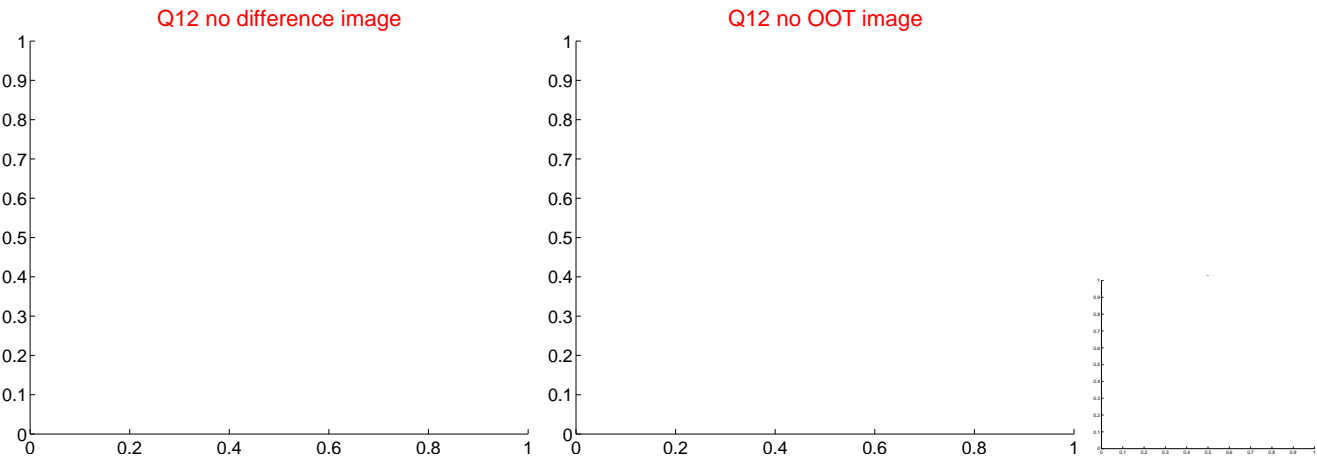
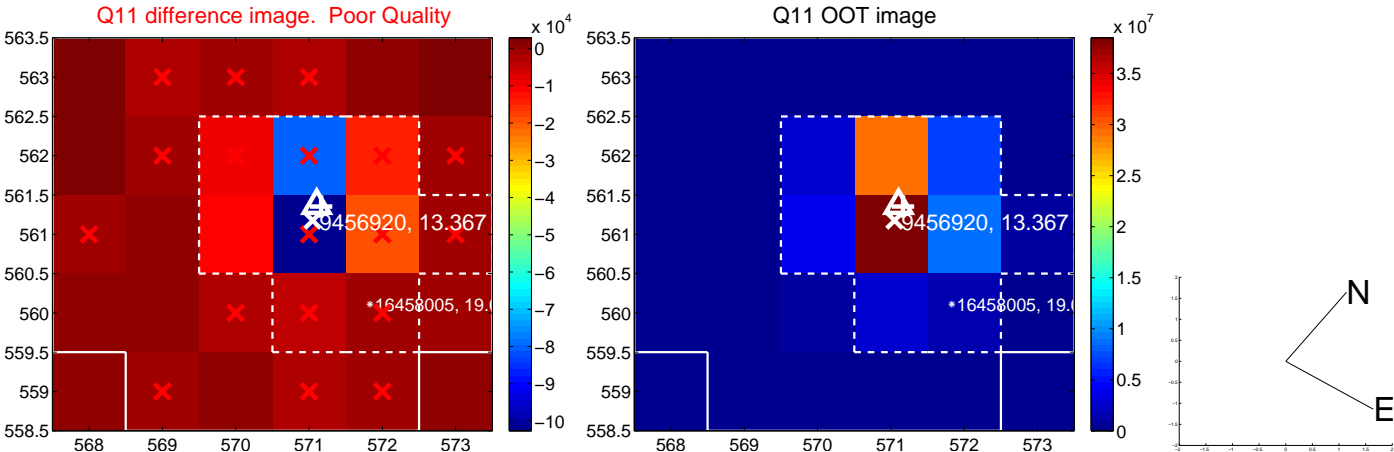
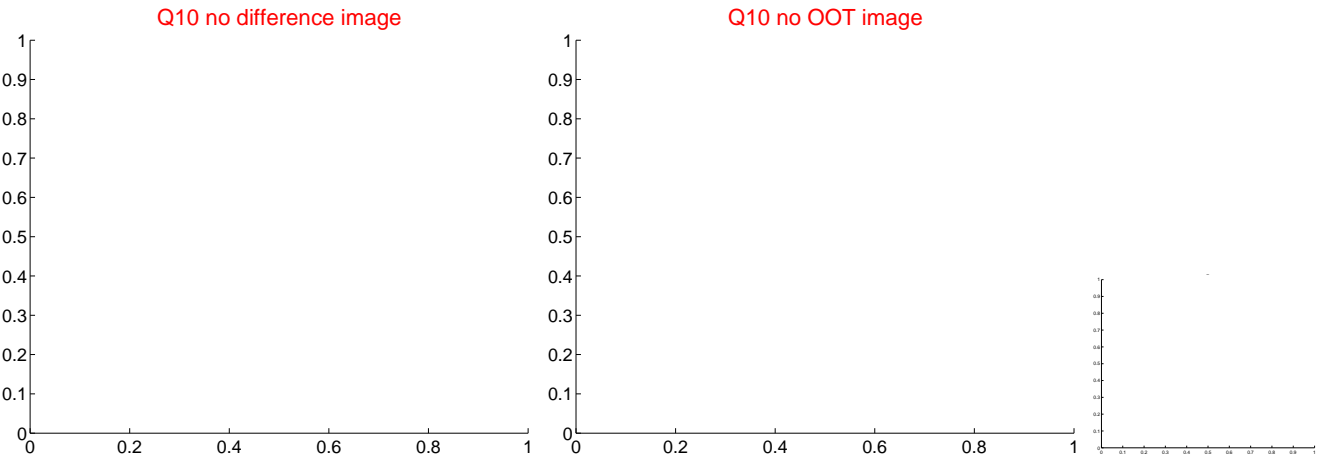
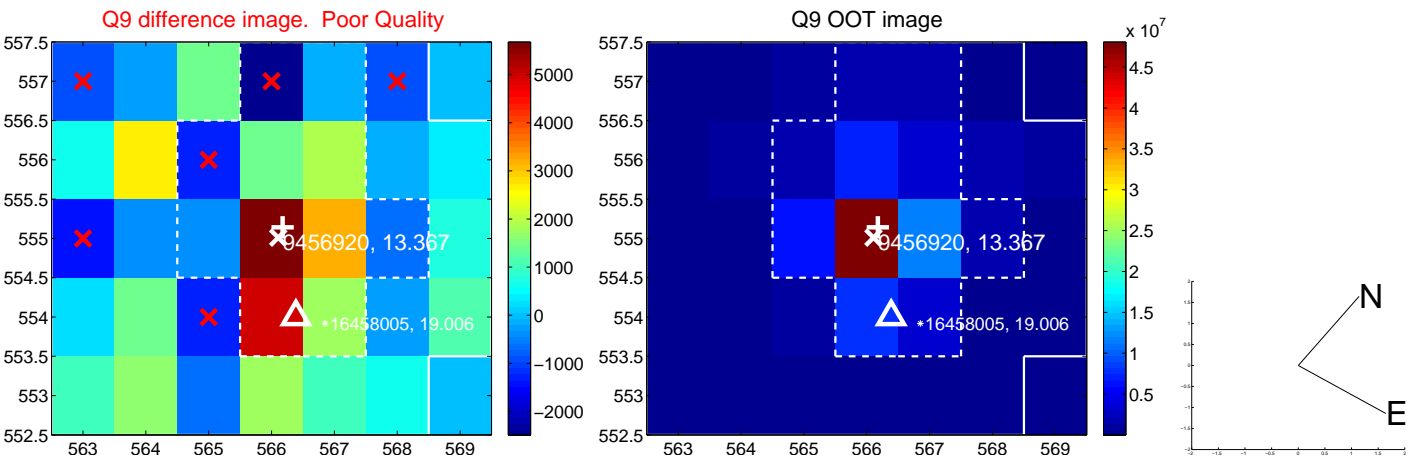
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



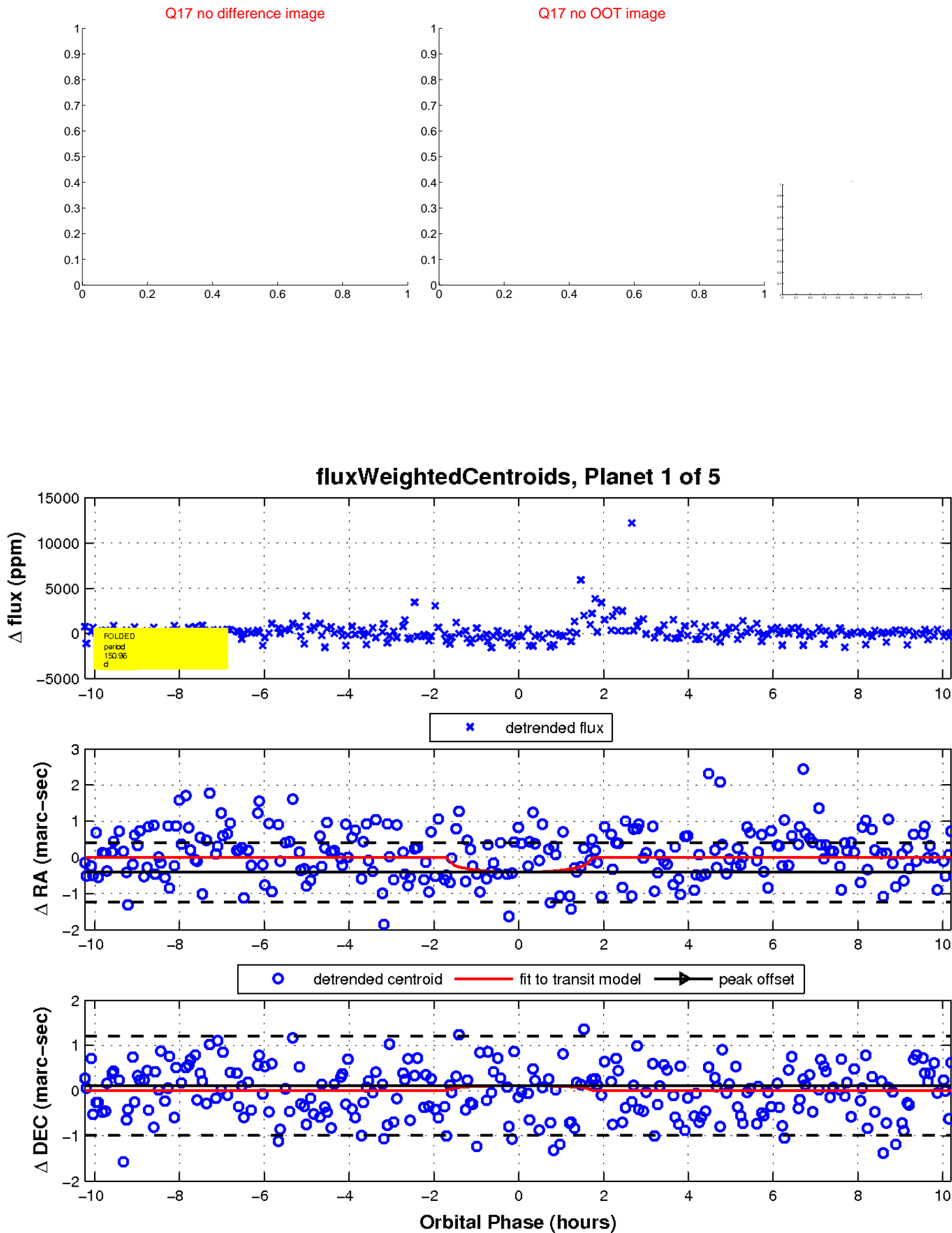
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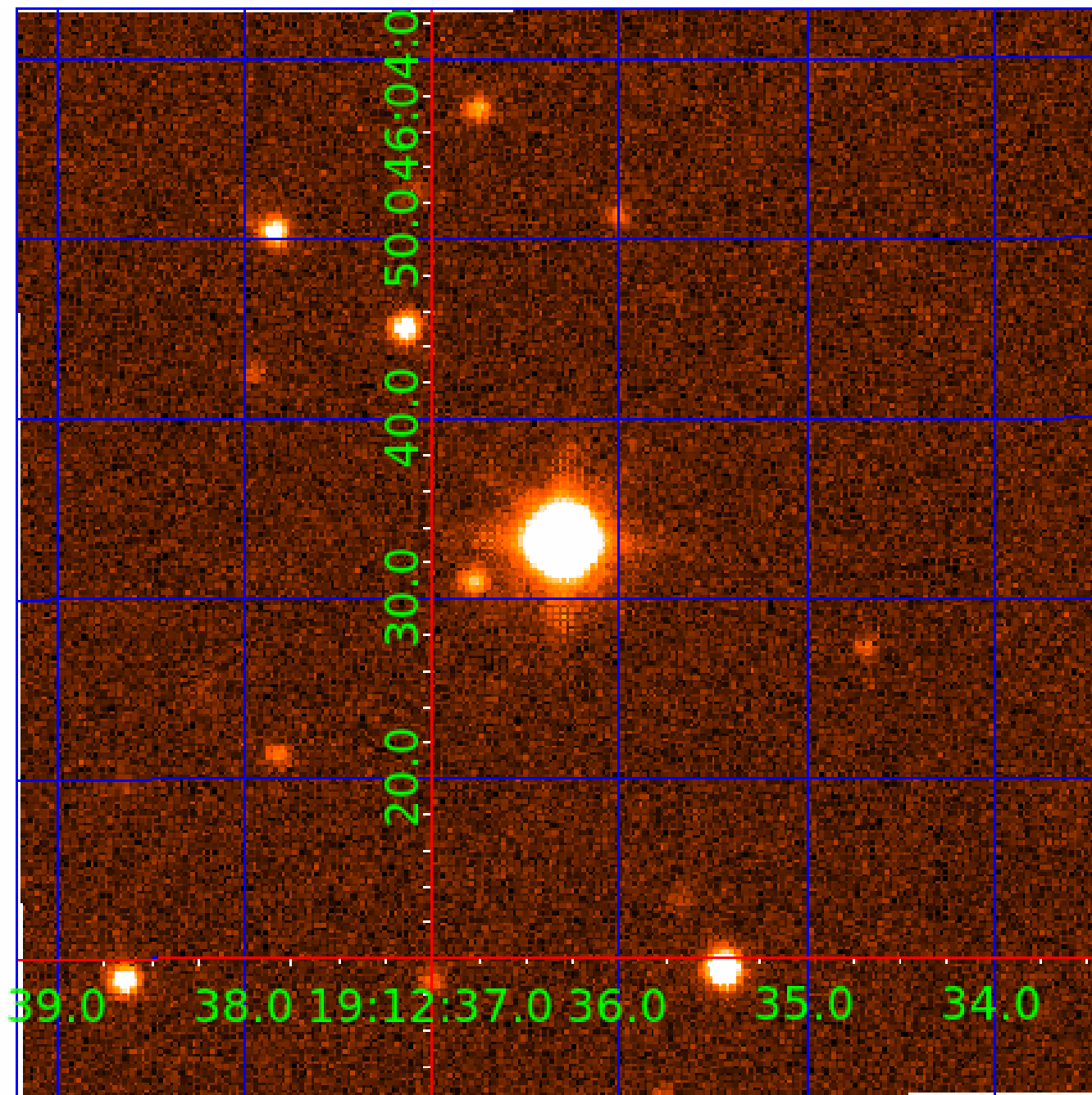


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UKIRT Image

Declination



KIC 009456920

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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009456920-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
009456920-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

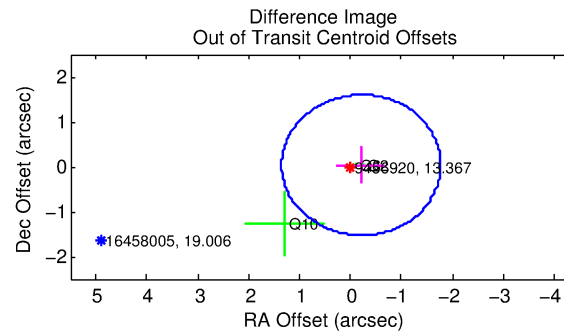
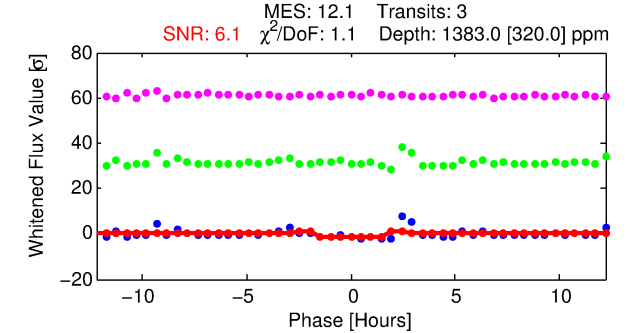
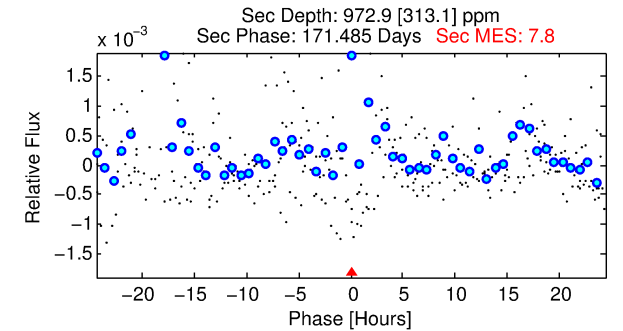
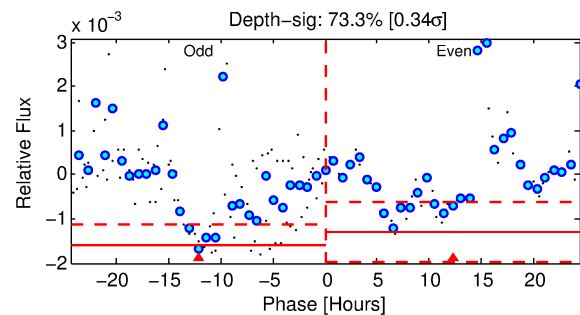
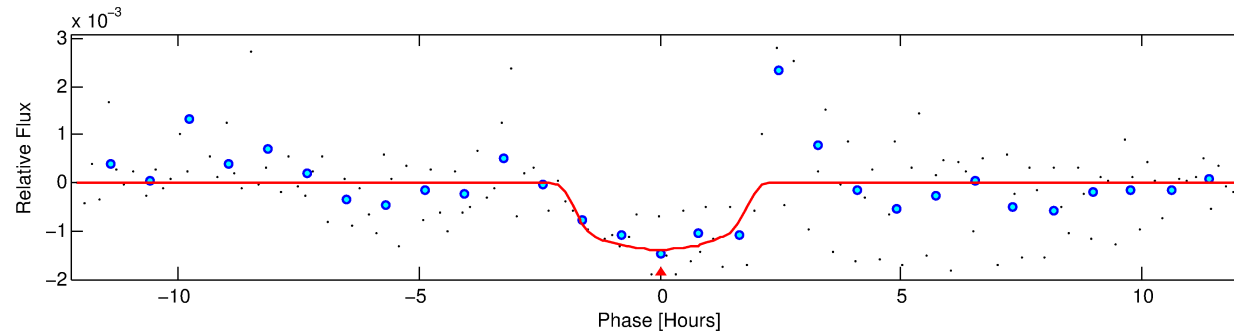
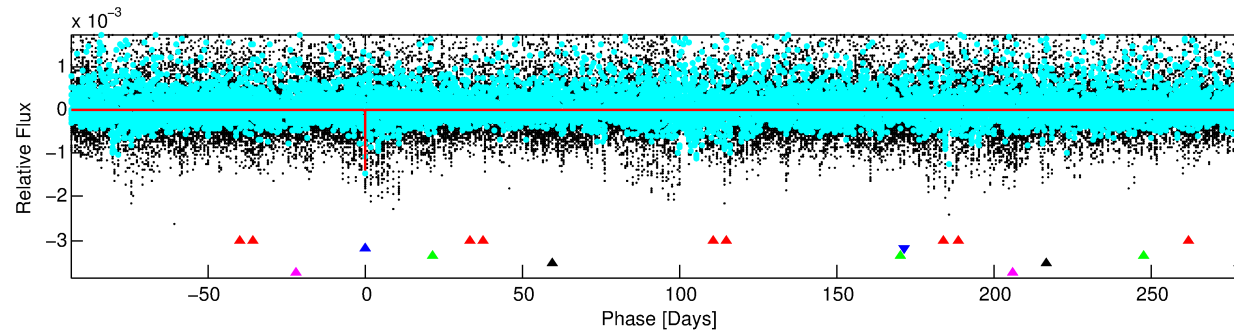
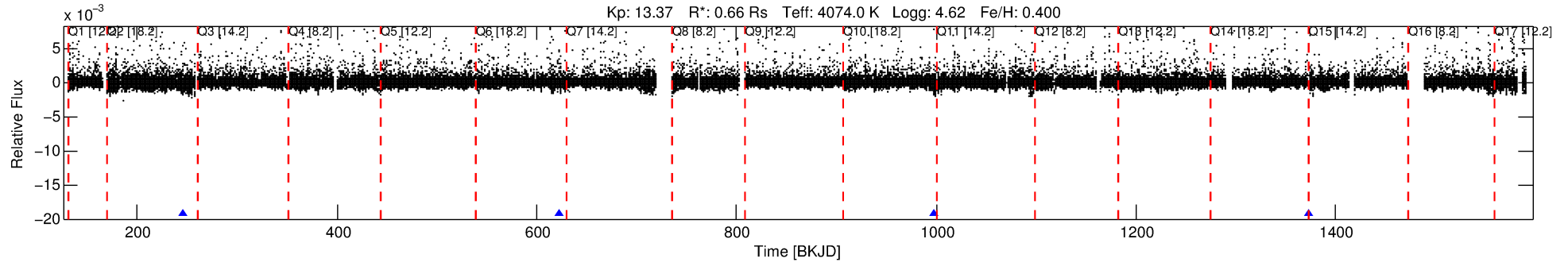
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009456920-02

No Significant Match Found

DV One-Page Summary

KIC: 9456920 Candidate: 2 of 5 Period: 375.297 d



DV Fit Results:

Period = 375.29746 [0.00673] d
Epoch = 246.5207 [0.0089] BKJD
Rp/R* = 0.0385 [0.0211]
a/R* = 465.96 [766.18]
b = 0.80 [0.76]
Seff = 0.14 [0.03]
Teq = 155 [8] K
Rp = 2.78 [1.55] Re
a = 0.8871 [0.0761] AU
Ag = 54373.96 [62484.31] [0.87σ]
Teffp = 3668 [1060] K [3.31σ]

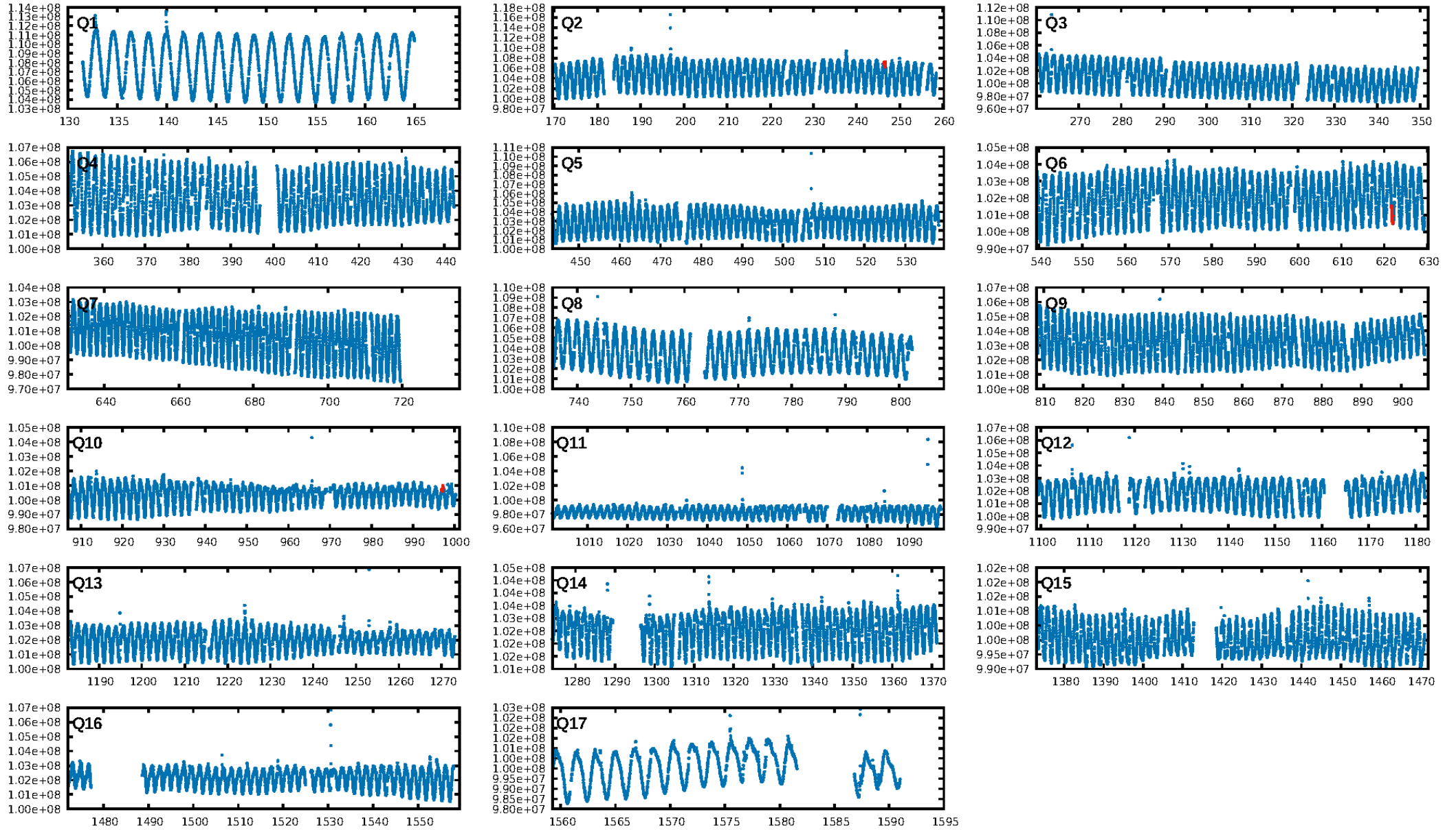
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1011.93σ]
LongPeriod-sig: 100.0% [663.18σ]
ModelChiSquare2-sig: 45.3%
ModelChiSquareGof-sig: 99.5%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -2.231
Centroid-sig: 30.3%
Centroid-so: 0.962 arcsec [2.65σ]
OotOffset-rm: 0.215 arcsec [0.41σ]
OotOffset-st: 3/0/0/0 [3]
KicOffset-rm: 0.699 arcsec [1.20σ]
KicOffset-st: 3/0/0/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

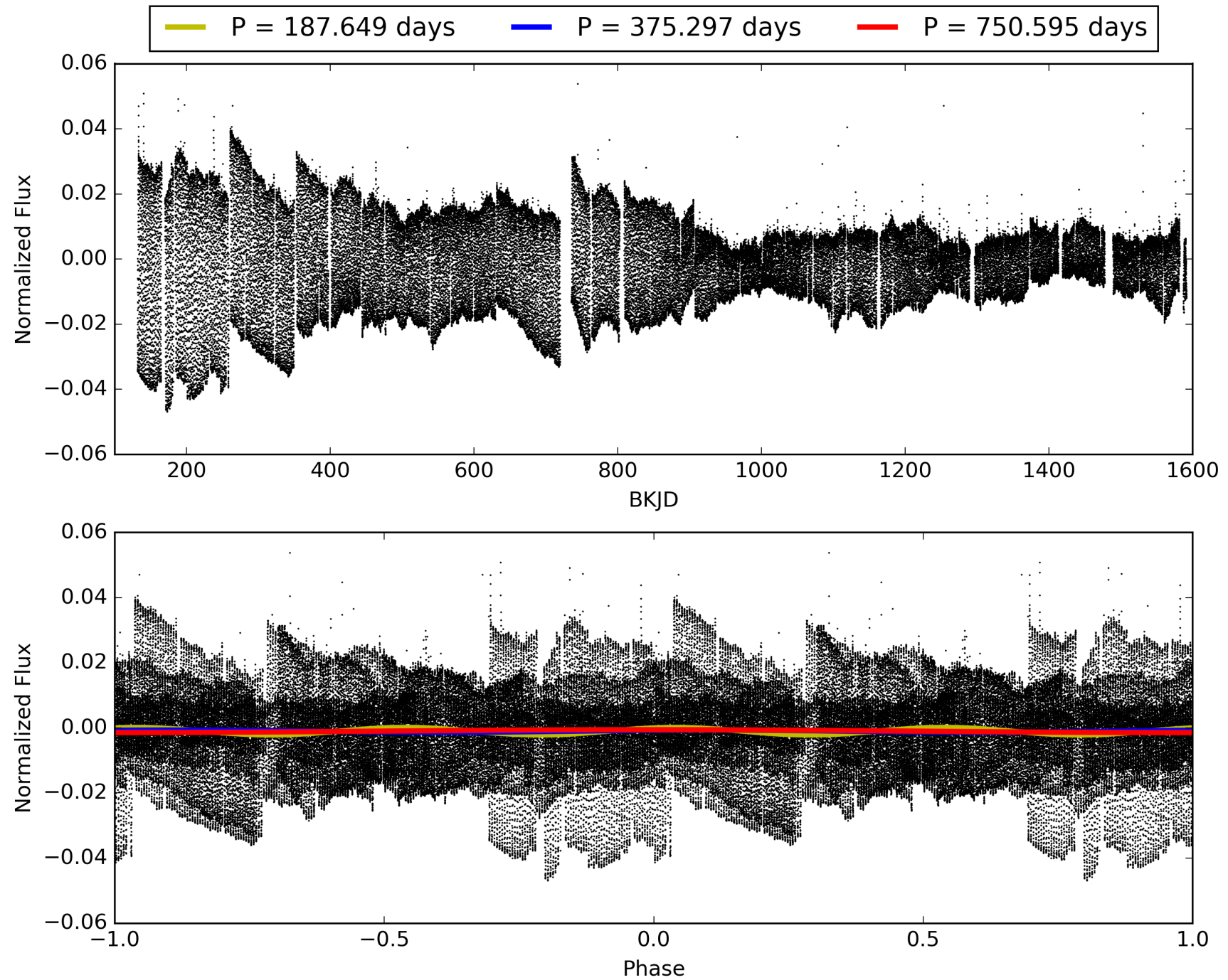
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:14:26 Z

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

TCE 009456920-02, PDC Light Curves

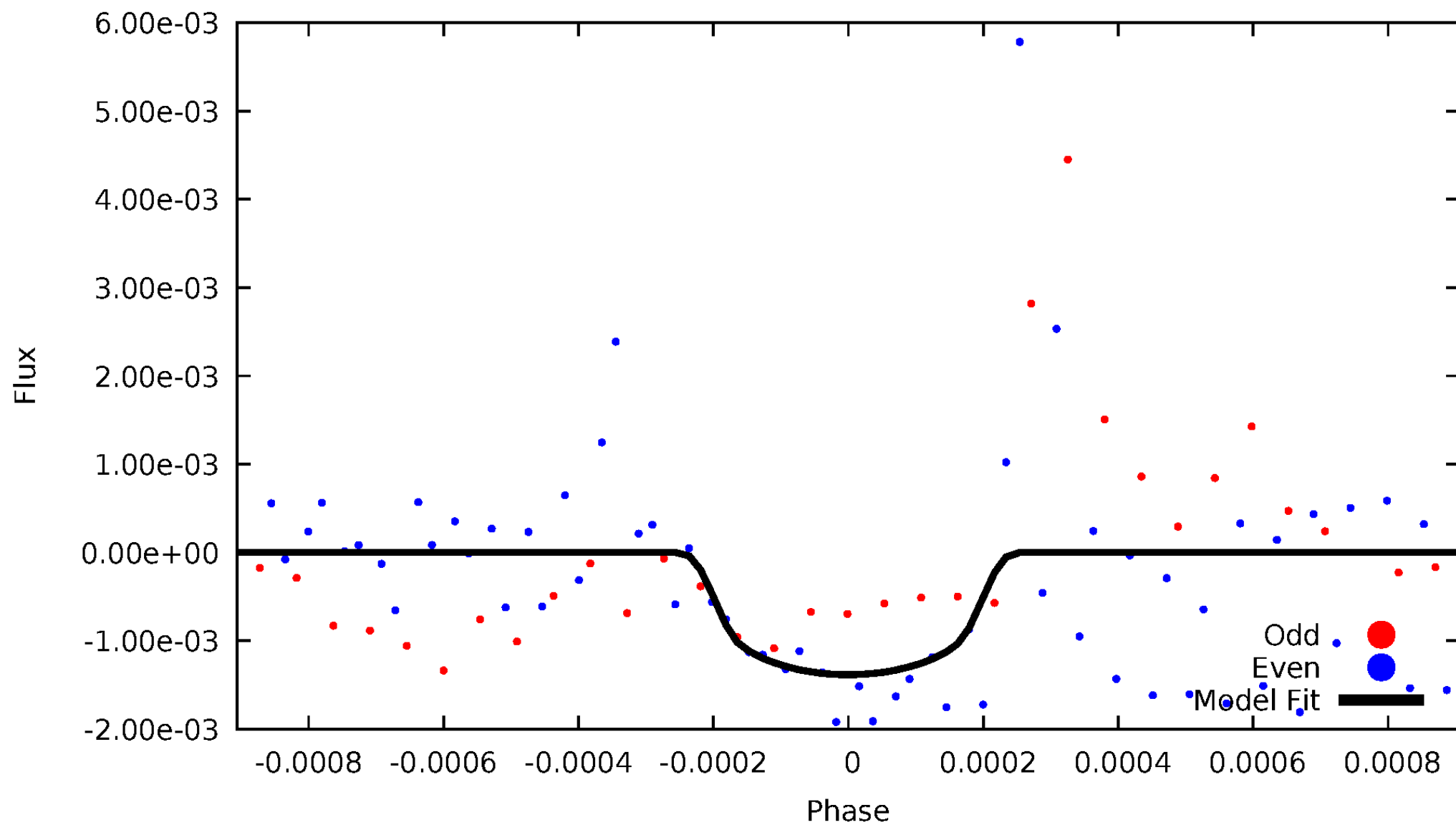


TCE 009456920-02



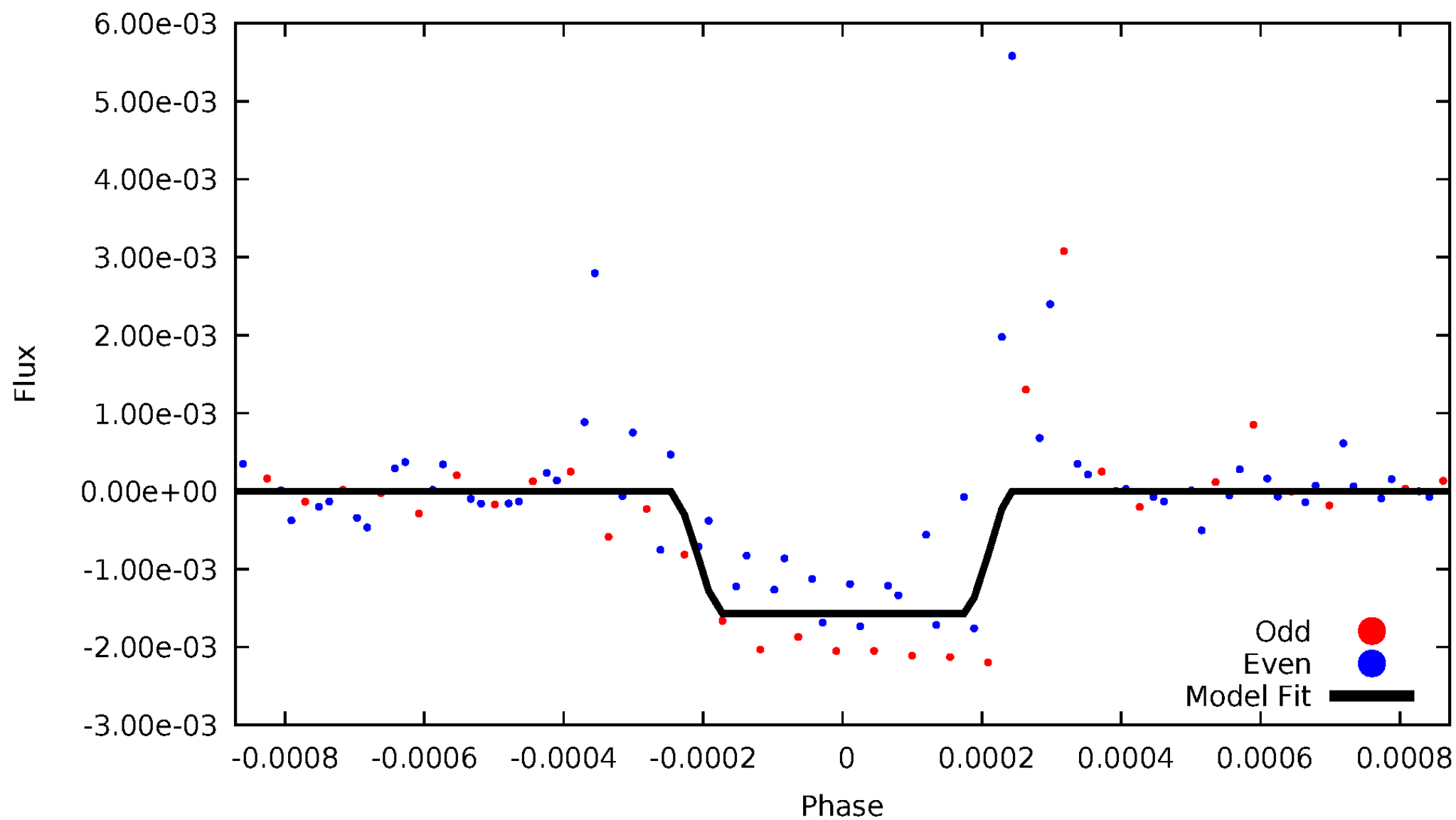
DV Odd/Even

TCE 009456920-02



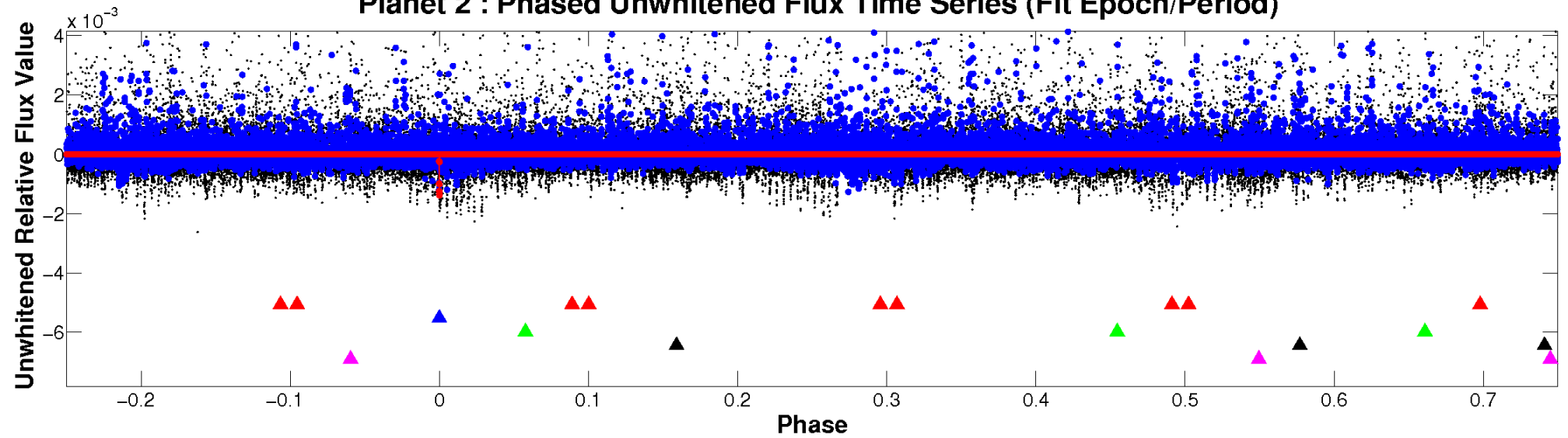
ALT Odd/Even

TCE 009456920-02

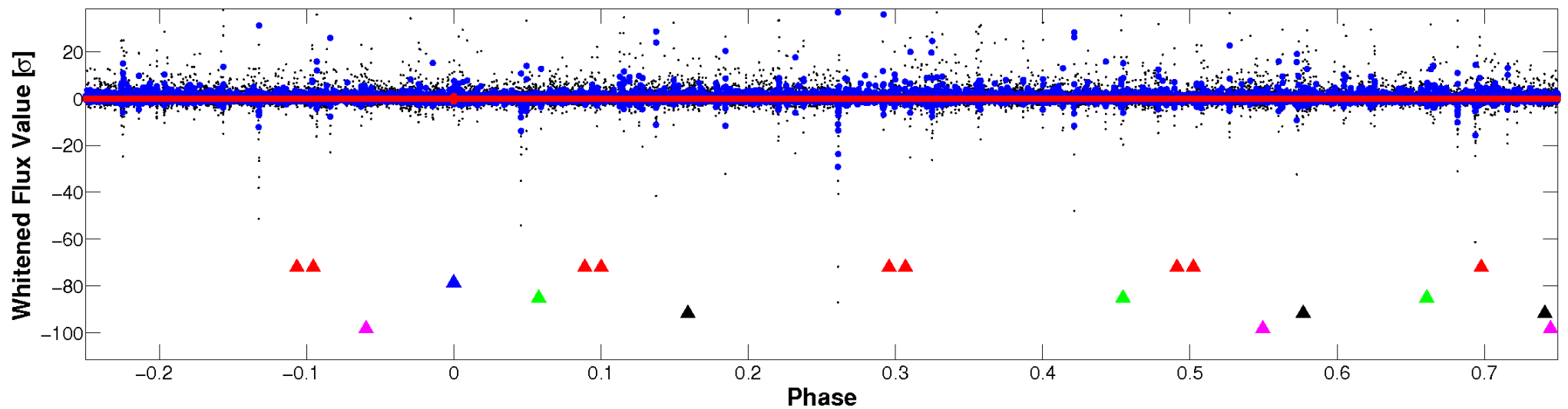


Non-Whitened Vs. Whitened Light Curve

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

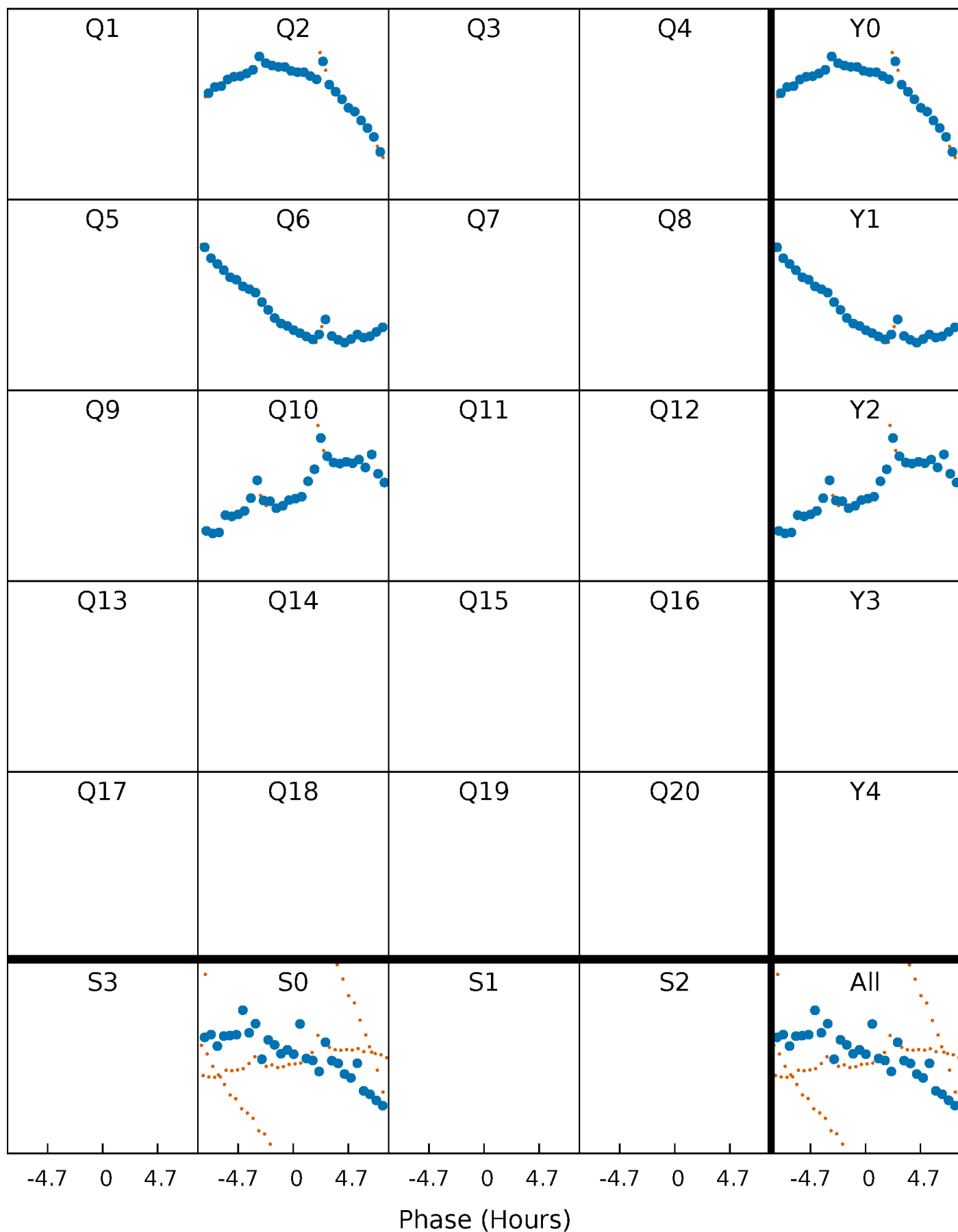


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



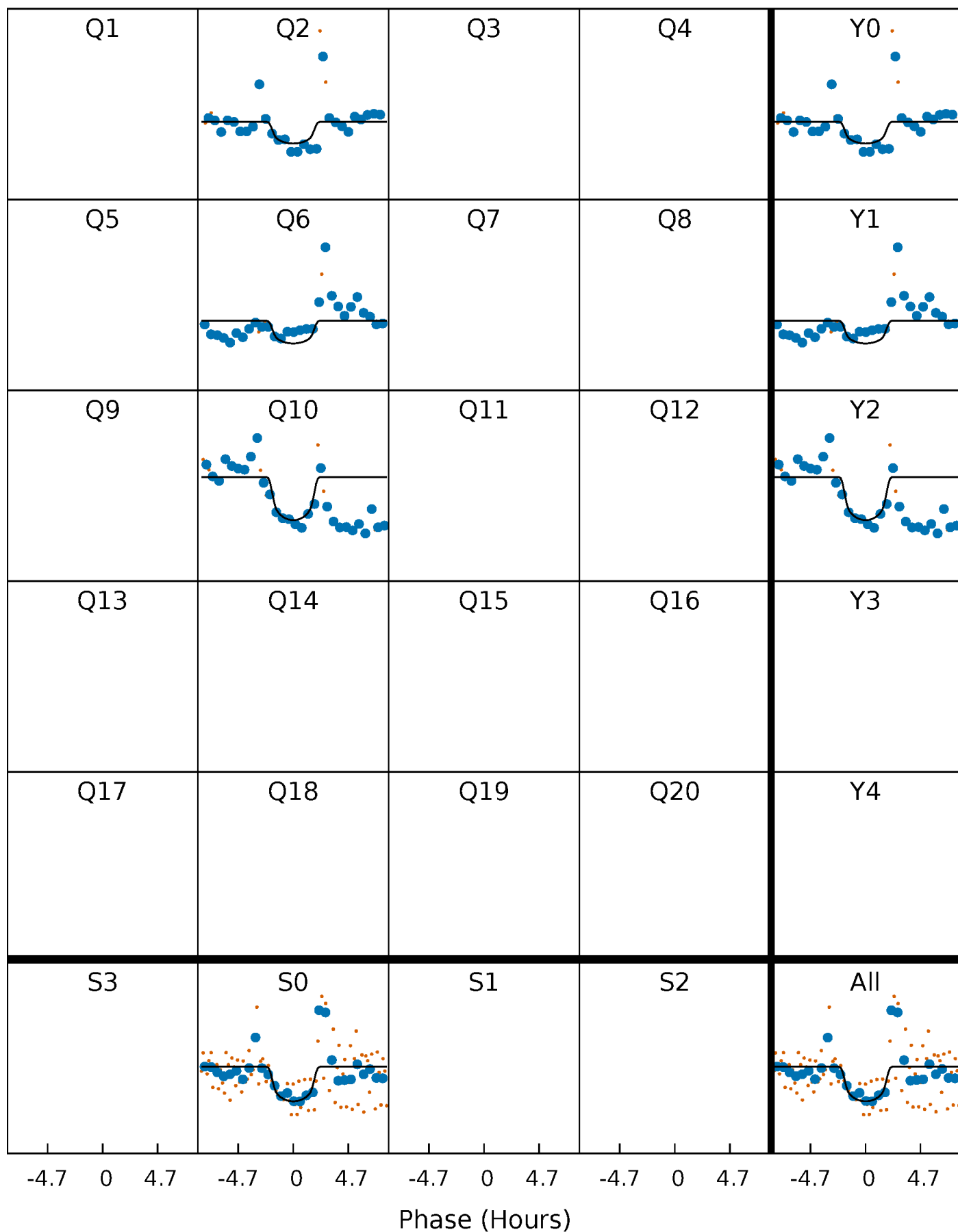
PDC Quarter-Phased Transit Curves

TCE 009456920-02 P=375.297460 Days $T_0=246.520728$ (BKJD)



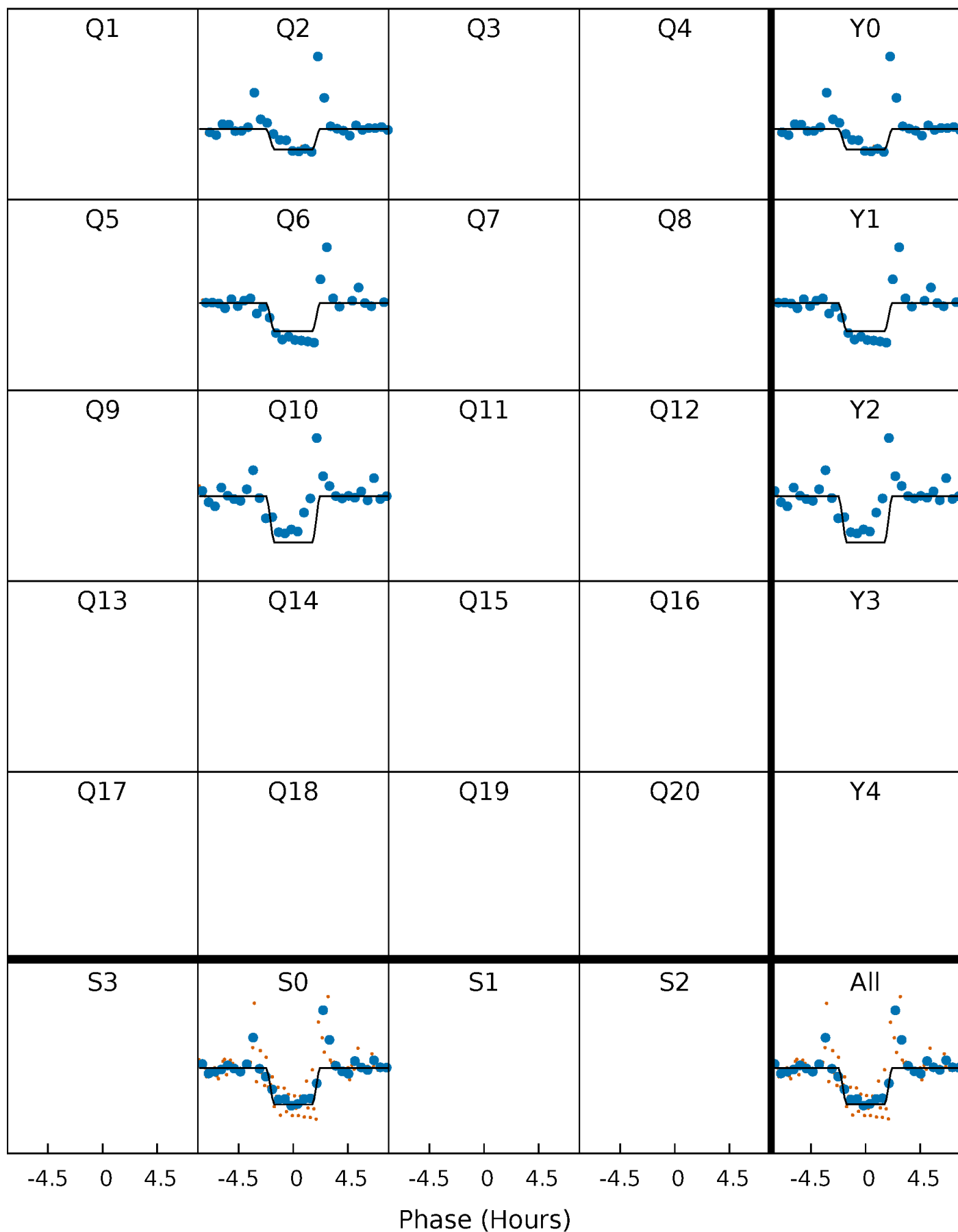
DV Quarter-Phased Transit Curves

TCE 009456920-02 $P=375.297460$ Days $T_0=246.520728$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

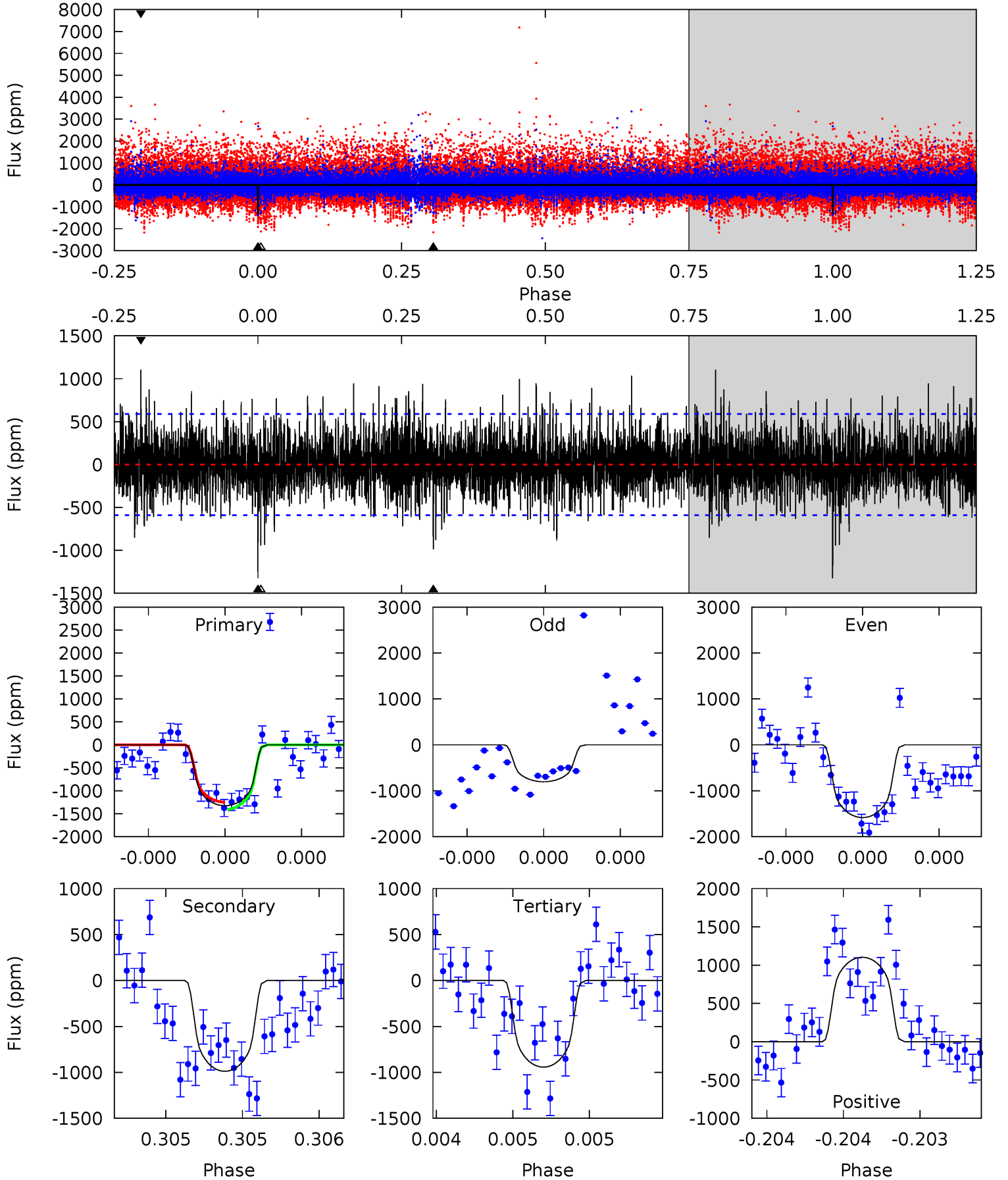
TCE 009456920-02 P=375.296385 Days $T_0=246.524761$ (BKJD)



DV Model-Shift Uniqueness Test

009456920-02, $P = 375.297460$ Days, $E = 246.520728$ Days

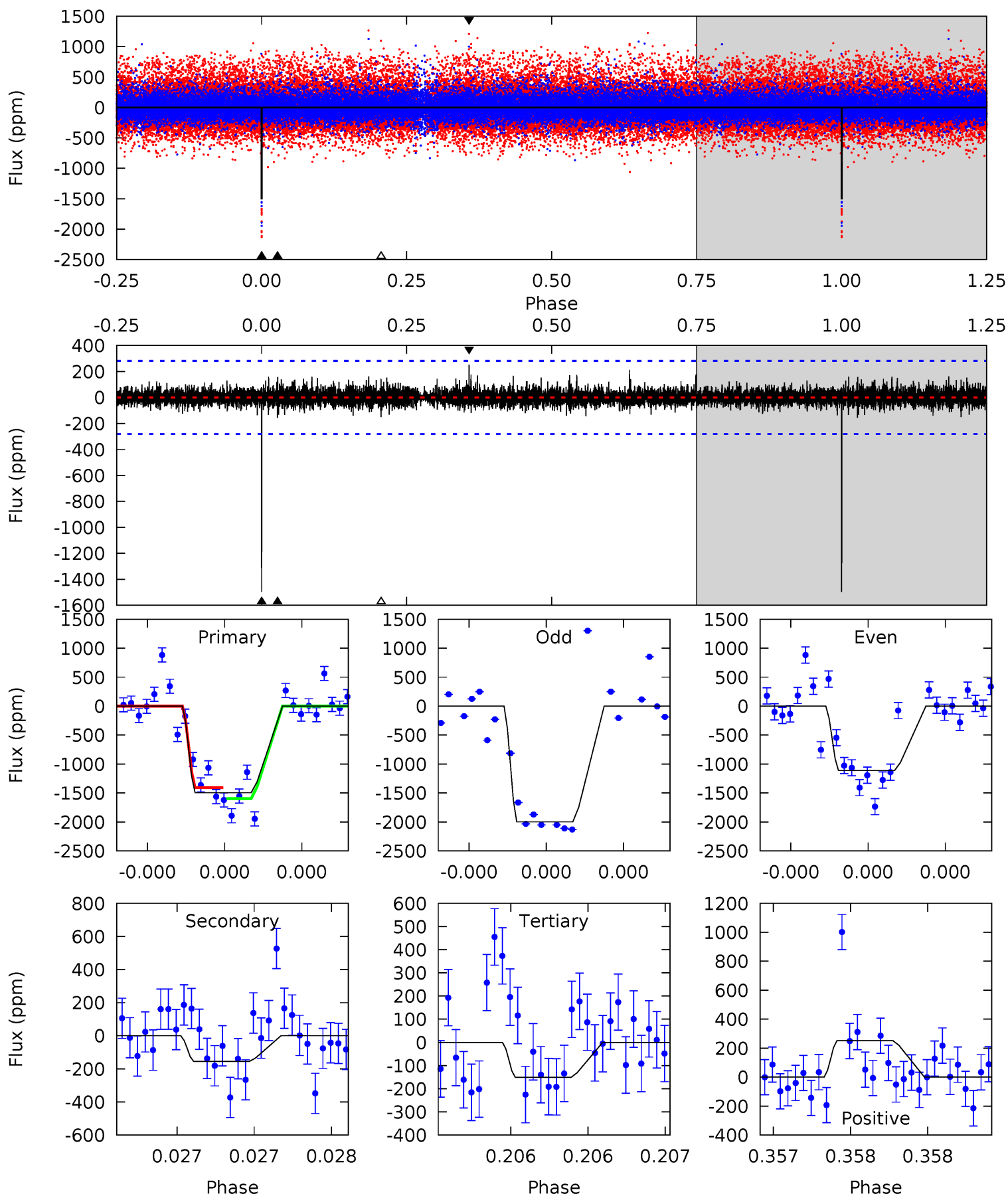
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	9.36	8.93	10.5	5.58	3.49	2.26	3.61	2.09	0.43	-1.09	3.03	0.91	0.45	0.75



Alt Model-Shift Uniqueness Test

009456920-02, P = 375.296385 Days, E = 246.524761 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.7	3.07	2.99	5.00	5.59	3.51	0.73	26.8	24.8	0.08	-1.93	8.26	1.08	0.14	1.90



Stellar Parameters For KIC 009456920

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4074^{+146}_{-178}	$4.615^{+0.064}_{-0.016}$	$0.400^{+0.050}_{-0.300}$	$0.663^{+0.026}_{-0.070}$	$0.660^{+0.038}_{-0.062}$	$3.196^{+0.867}_{-0.198}$
	+4%/-4%	+1%/-0%	+12%/-75%	+4%/-11%	+6%/-9%	+27%/-6%
Source	PHO1	KIC0	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 009456920-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-989 ± 106	$2.76^{+1.36}_{-1.42}$	215^{+9}_{-10}	3774^{+1190}_{-478}	$55617^{+172392}_{-31279}$
Alt.	-154 ± 50	$2.86^{+1.39}_{-1.38}$	215^{+8}_{-10}	2826^{+590}_{-326}	8222^{+21711}_{-4976}

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

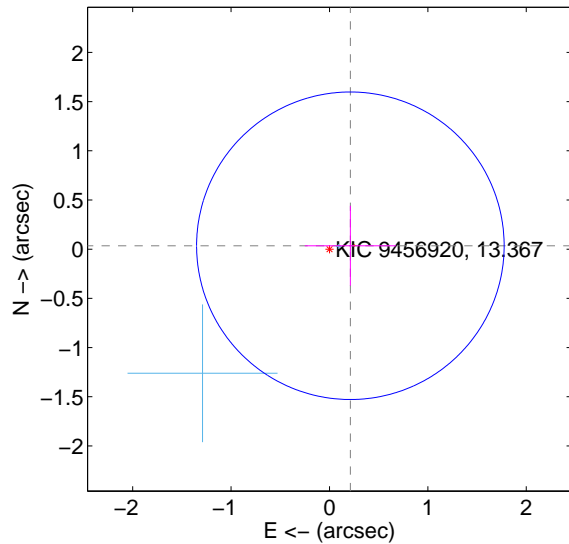
Supplemental centroid analysis for 009456920-02. Kepler magnitude: 13.37. Transit SNR 6.09

There are 2 quarters with good PRF difference image offsets

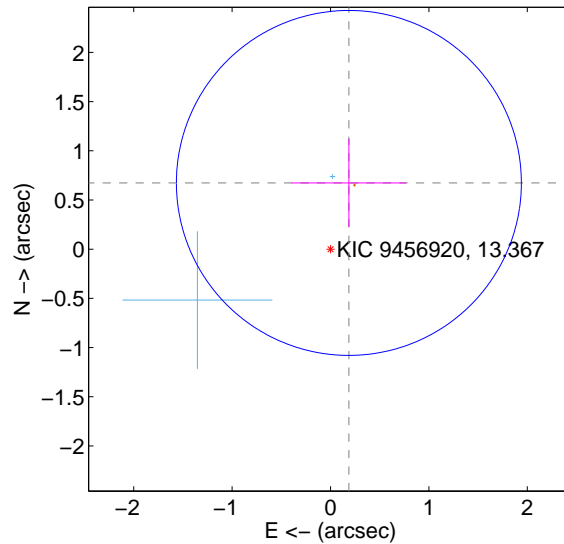
The direct PRF centroid is offset from the target star catalog position by about 0.75 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.215 ± 0.521	0.41	-0.212 ± 0.463	0.035 ± 0.406
PRF-fit source offset from KIC position	0.699 ± 0.584	1.20	-0.187 ± 0.584	0.673 ± 0.448
photometric centroid source offset	0.96 ± 0.36	2.65	0.18 ± 0.37	0.94 ± 0.36

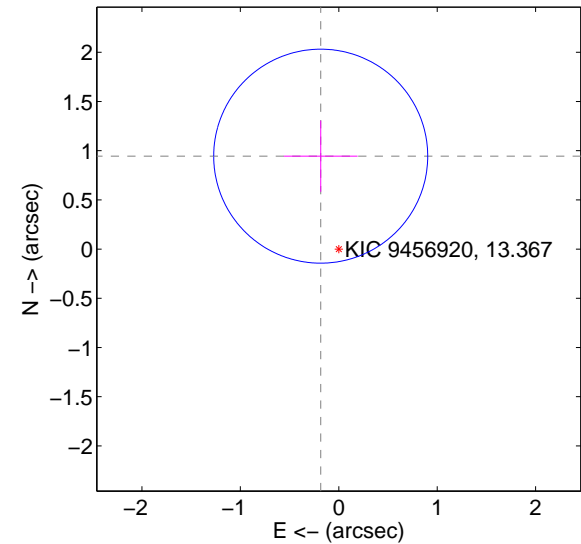
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

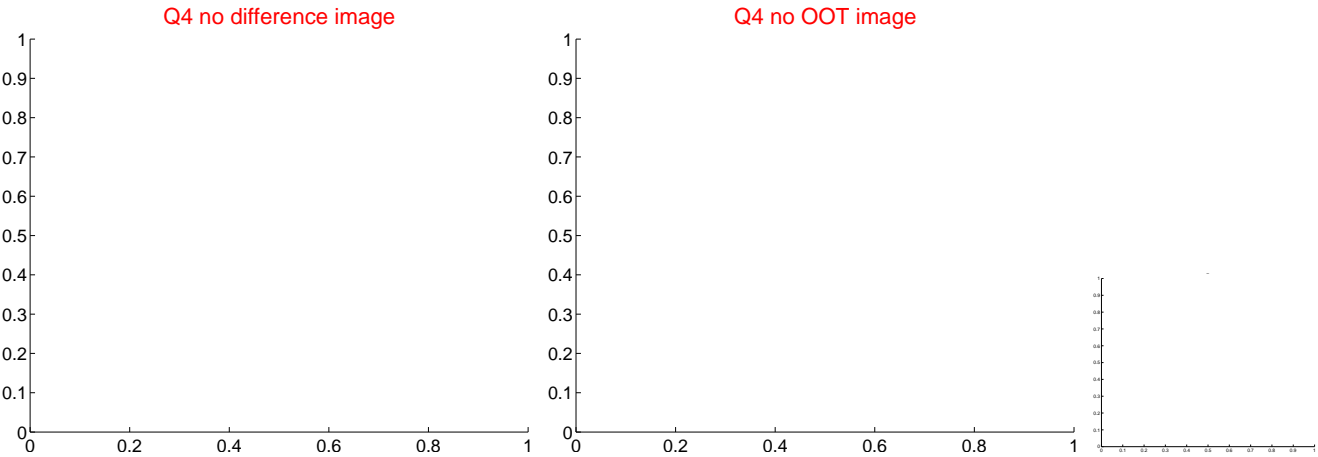
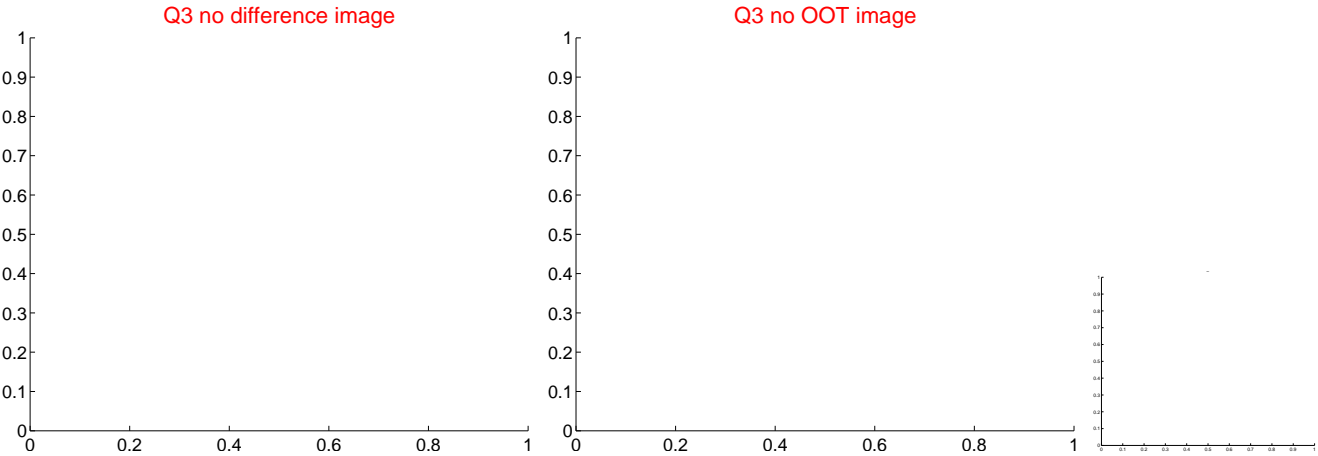
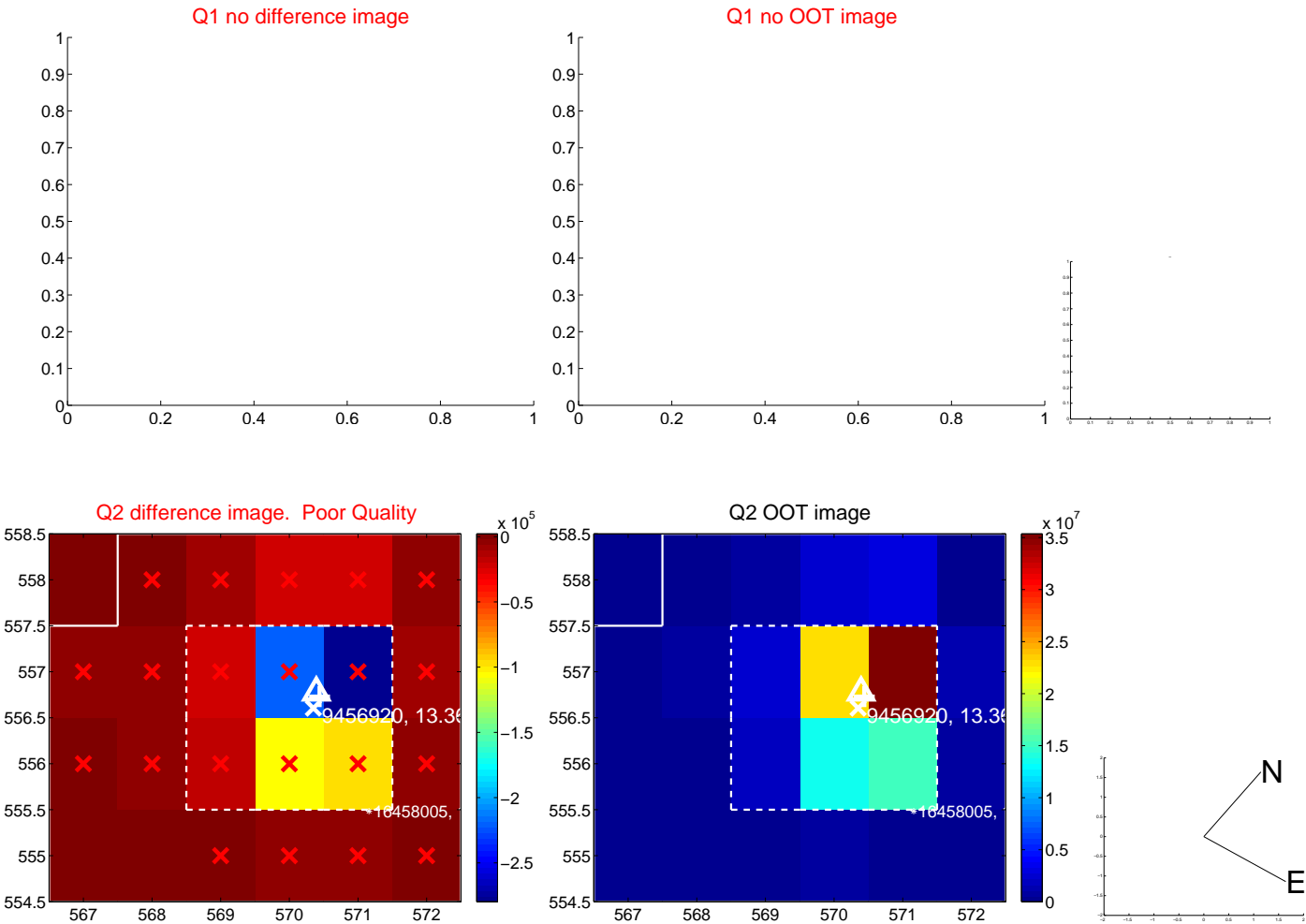


offset from photometric centroids

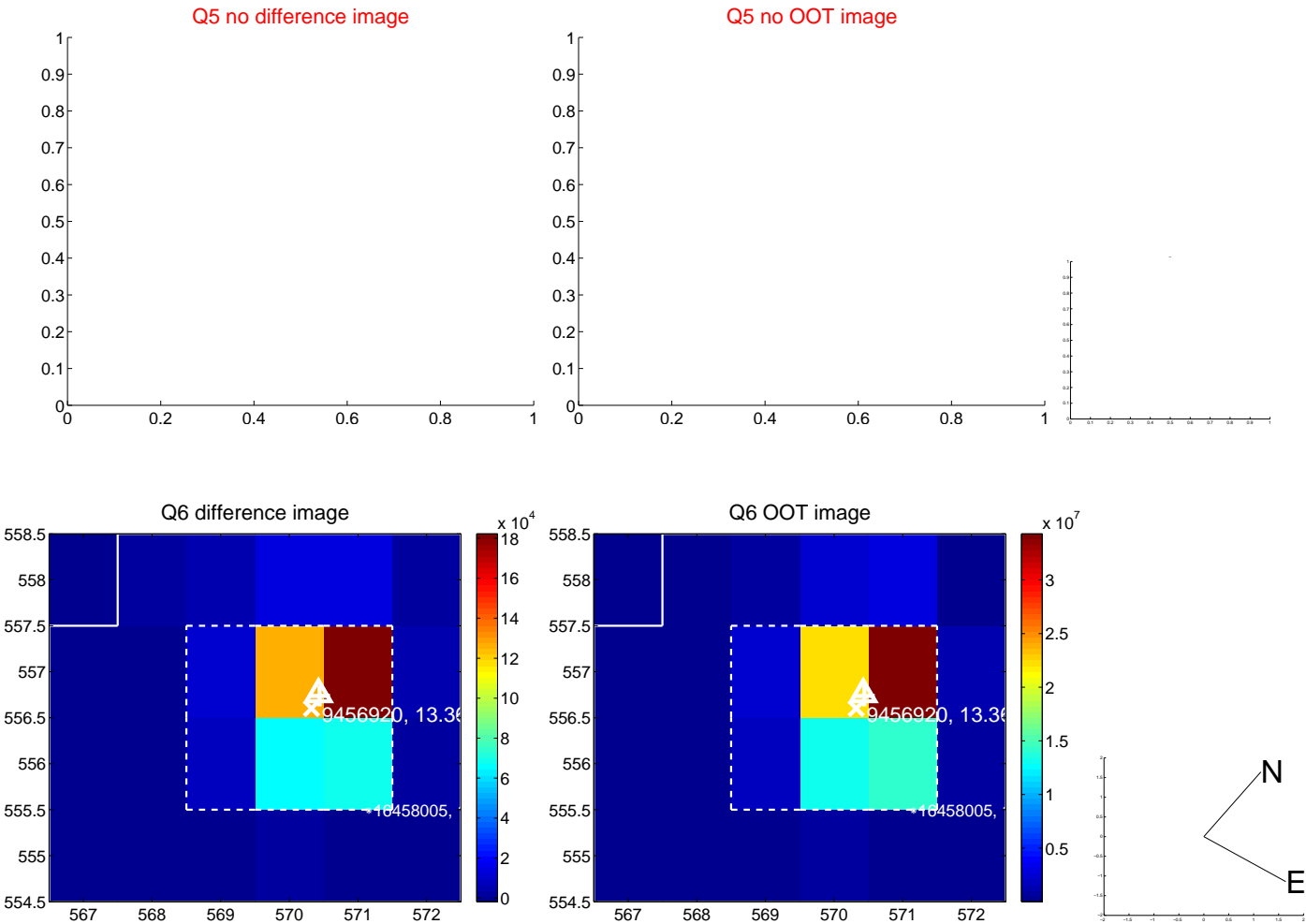


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

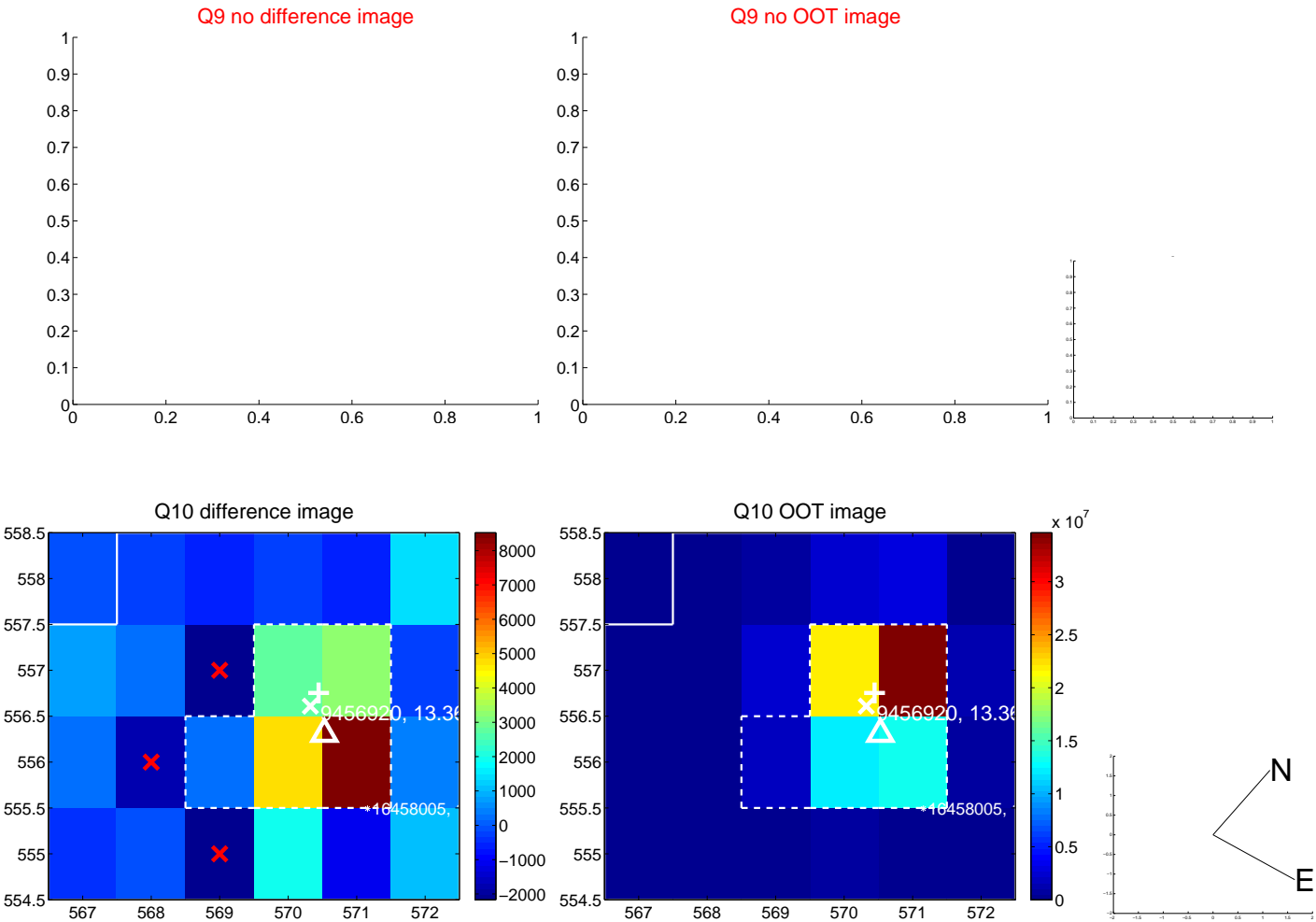
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



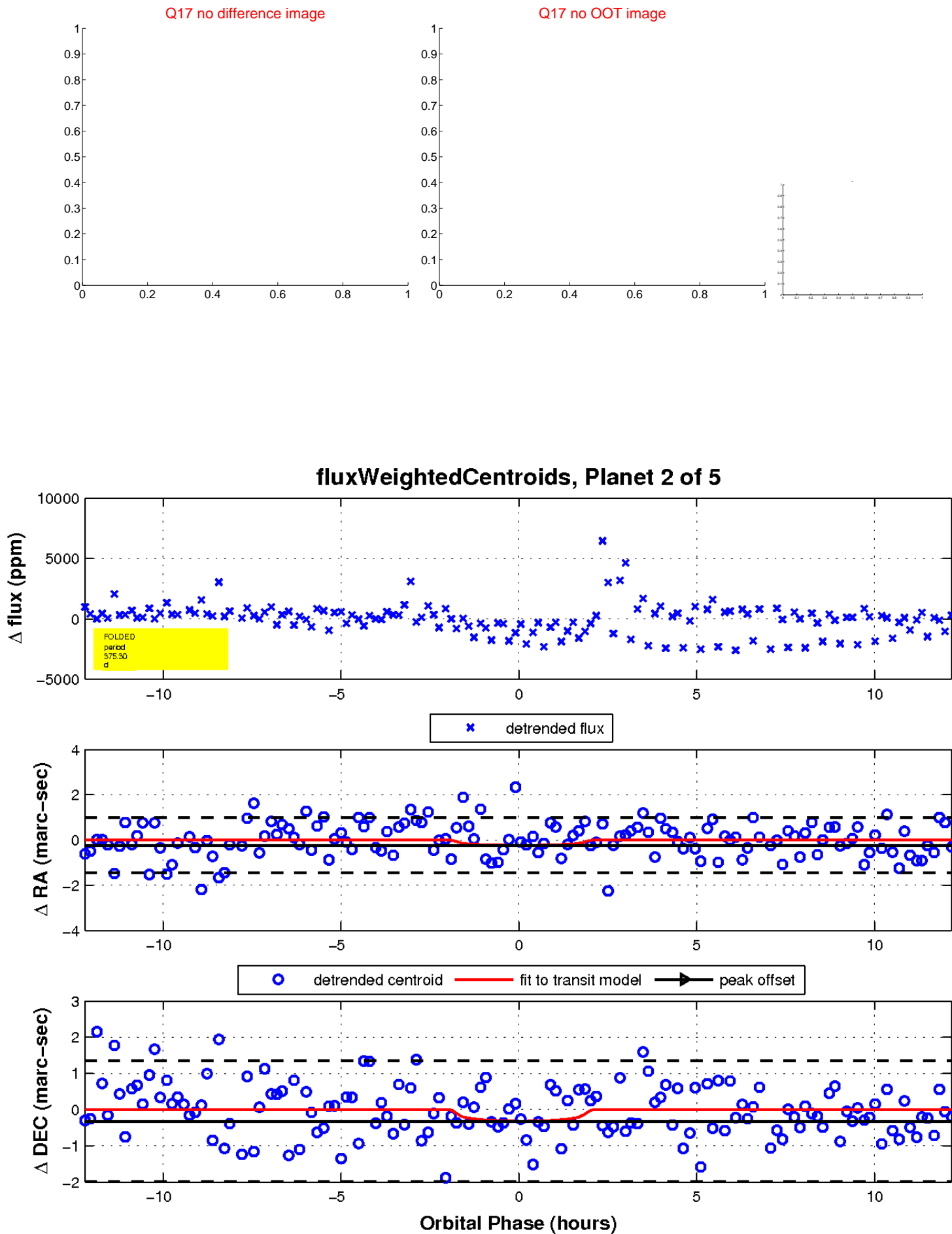
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

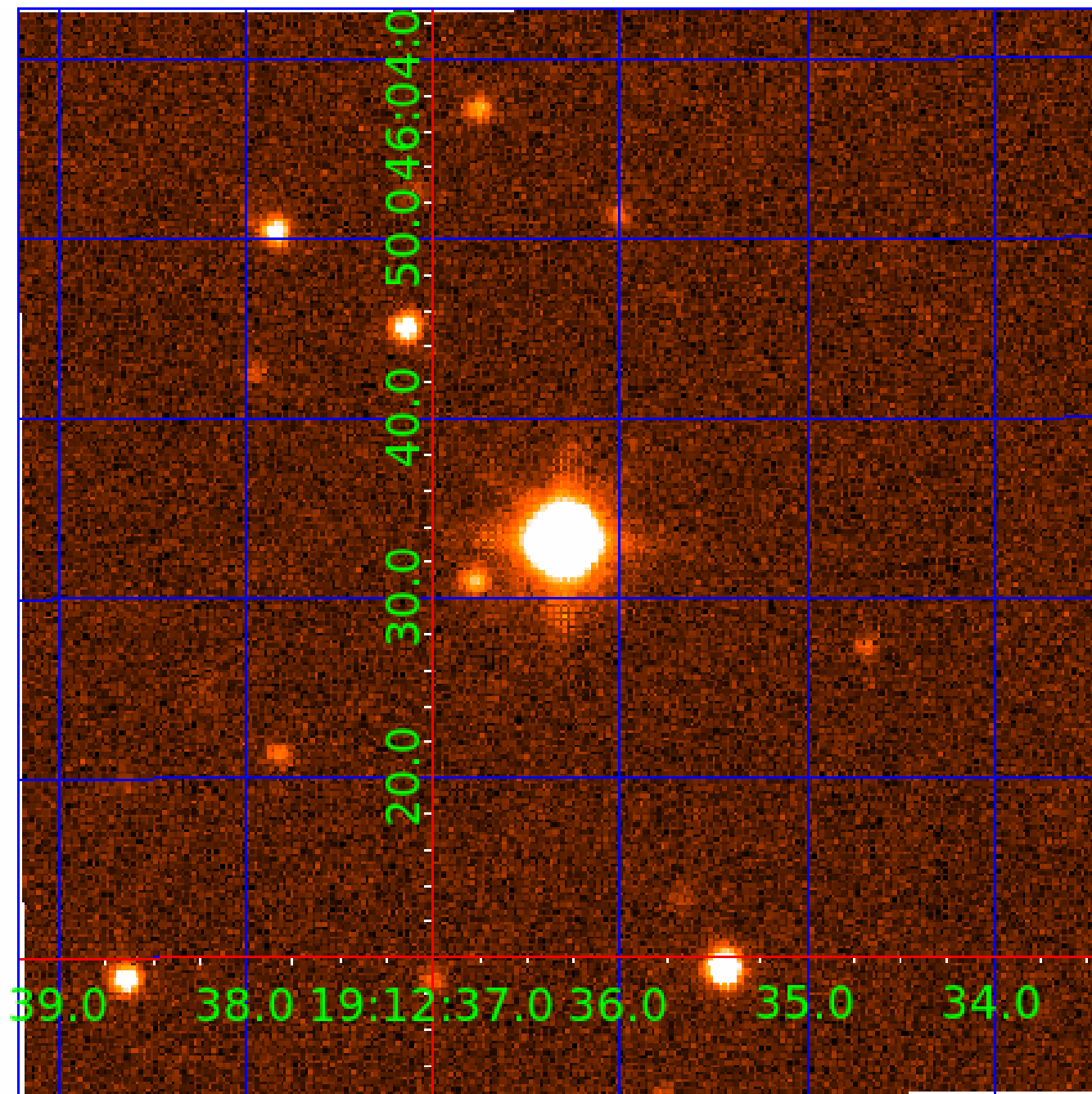


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009456920

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})
009456920-01	OBS	No	150.956546	279.927189	1105.5	3.417	14.3	7.4	0.66	4074	2.10	0.46
009456920-02	OBS	No	375.297460	246.520728	1383.0	4.079	12.1	6.1	0.66	4074	2.78	0.14
009456920-03	OBS	No	524.224071	494.560506	1187.8	3.523	16.7	5.7	0.66	4074	2.36	0.09
009456920-04	OBS	No	532.149397	524.662488	1298.9	3.519	15.0	6.7	0.66	4074	2.59	0.09
009456920-05	OBS	No	677.236290	224.184000	440.3	4.500	12.7	-1.0	0.66	4074	1.32	0.06

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009456920-01	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009456920-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
009456920-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

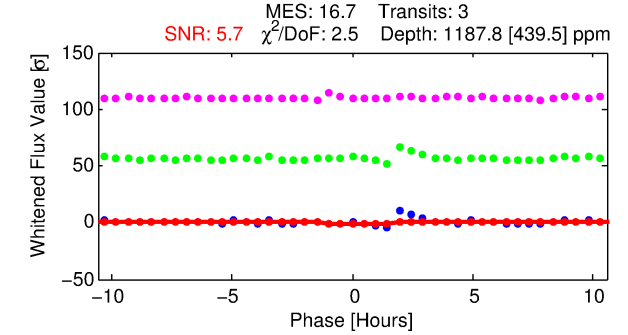
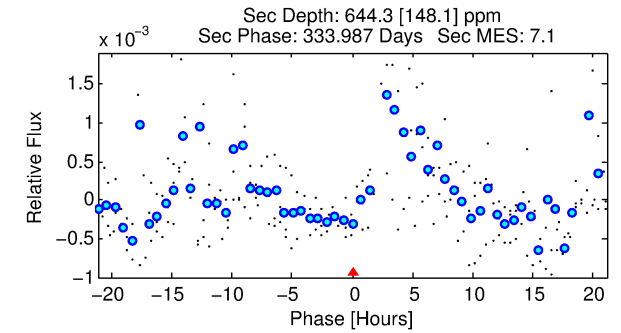
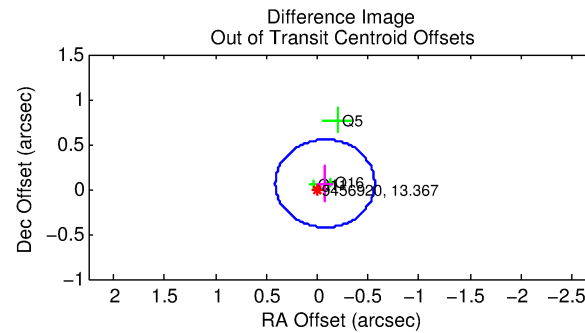
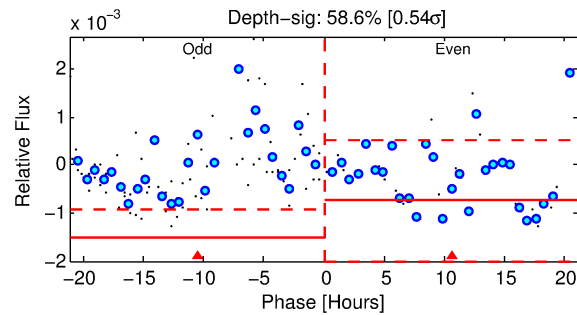
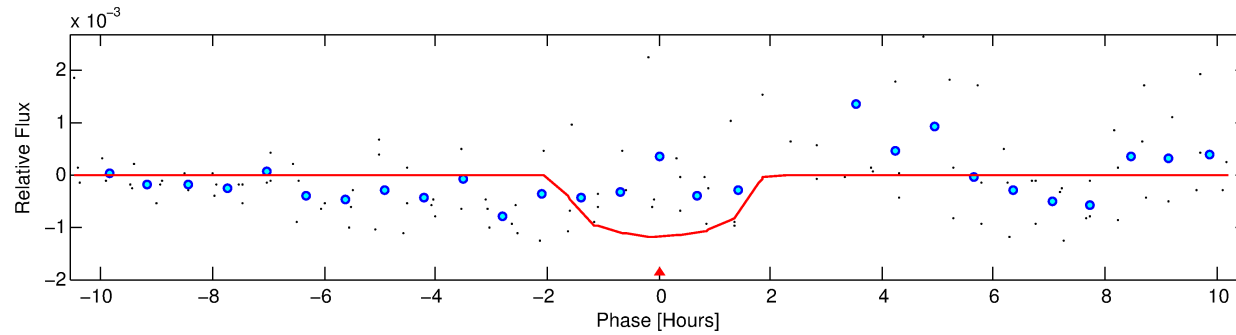
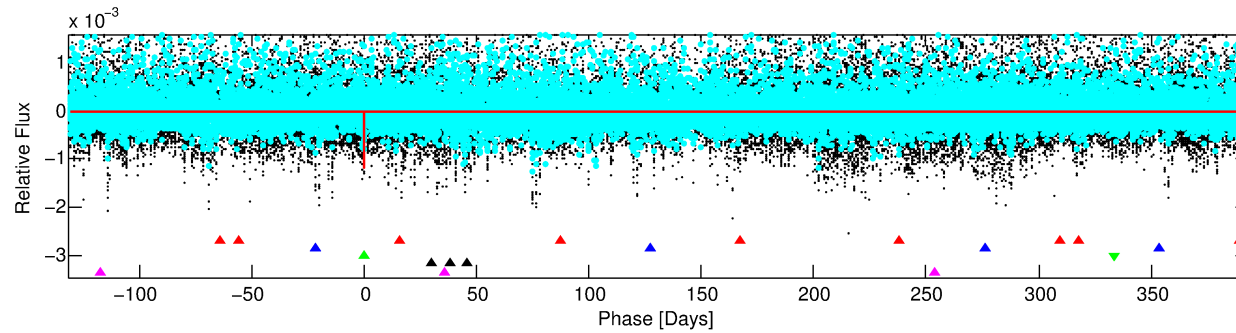
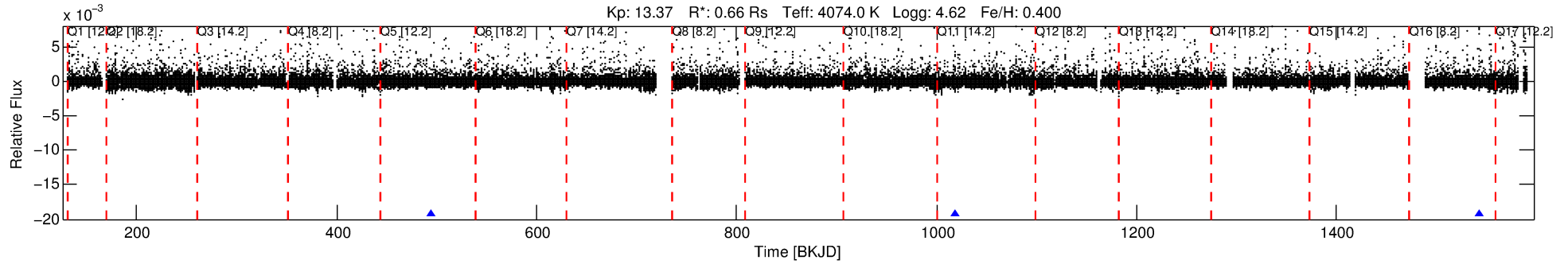
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009456920-03

No Significant Match Found

DV One-Page Summary

KIC: 9456920 Candidate: 3 of 5 Period: 524.224 d



DV Fit Results:

Period = 524.22407 [0.00877] d
Epoch = 494.5605 [0.0112] BKJD
Rp/R* = 0.0326 [0.0668]
a/R* = 944.16 [5710.01]
b = 0.61 [6.35]
Seff = 0.09 [0.02]
Teq = 139 [7] K
Rp = 2.36 [4.84] Re
a = 1.1085 [0.0951] AU
Ag = 78058.08 [319870.46] [0.24 σ]
Teffp = 3592 [3682] K [0.94 σ]

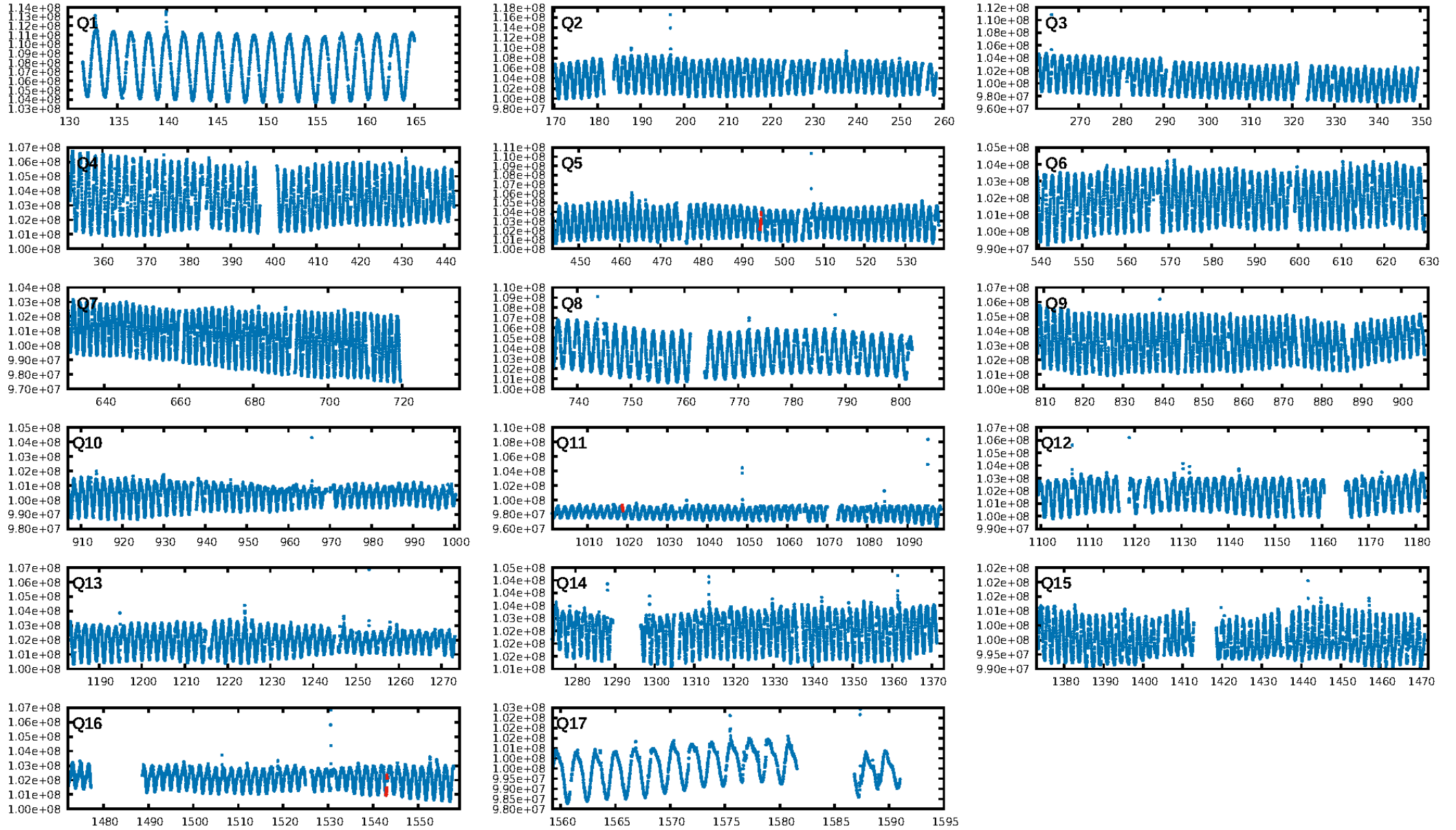
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [663.18 σ]
LongPeriod-sig: 100.0% [38.20 σ]
ModelChiSquare2-sig: 4.6%
ModelChiSquareGof-sig: 0.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -1.245
Centroid-sig: 43.8%
Centroid-so: 0.552 arcsec [1.30 σ]
OotOffset-rm: 0.098 arcsec [0.60 σ]
KicOffset-rm: 0.885 arcsec [5.77 σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

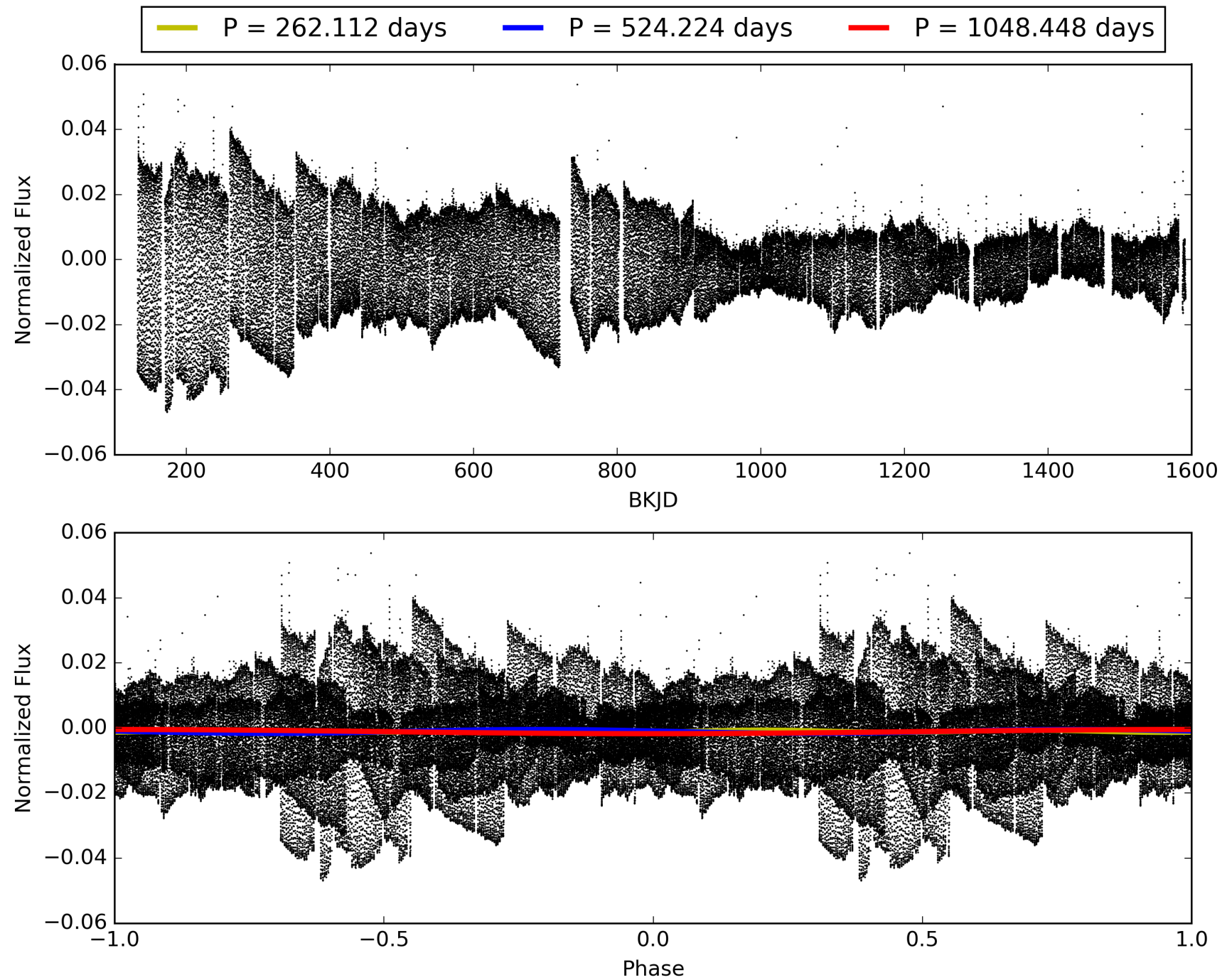
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:14:47 Z

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

TCE 009456920-03, PDC Light Curves

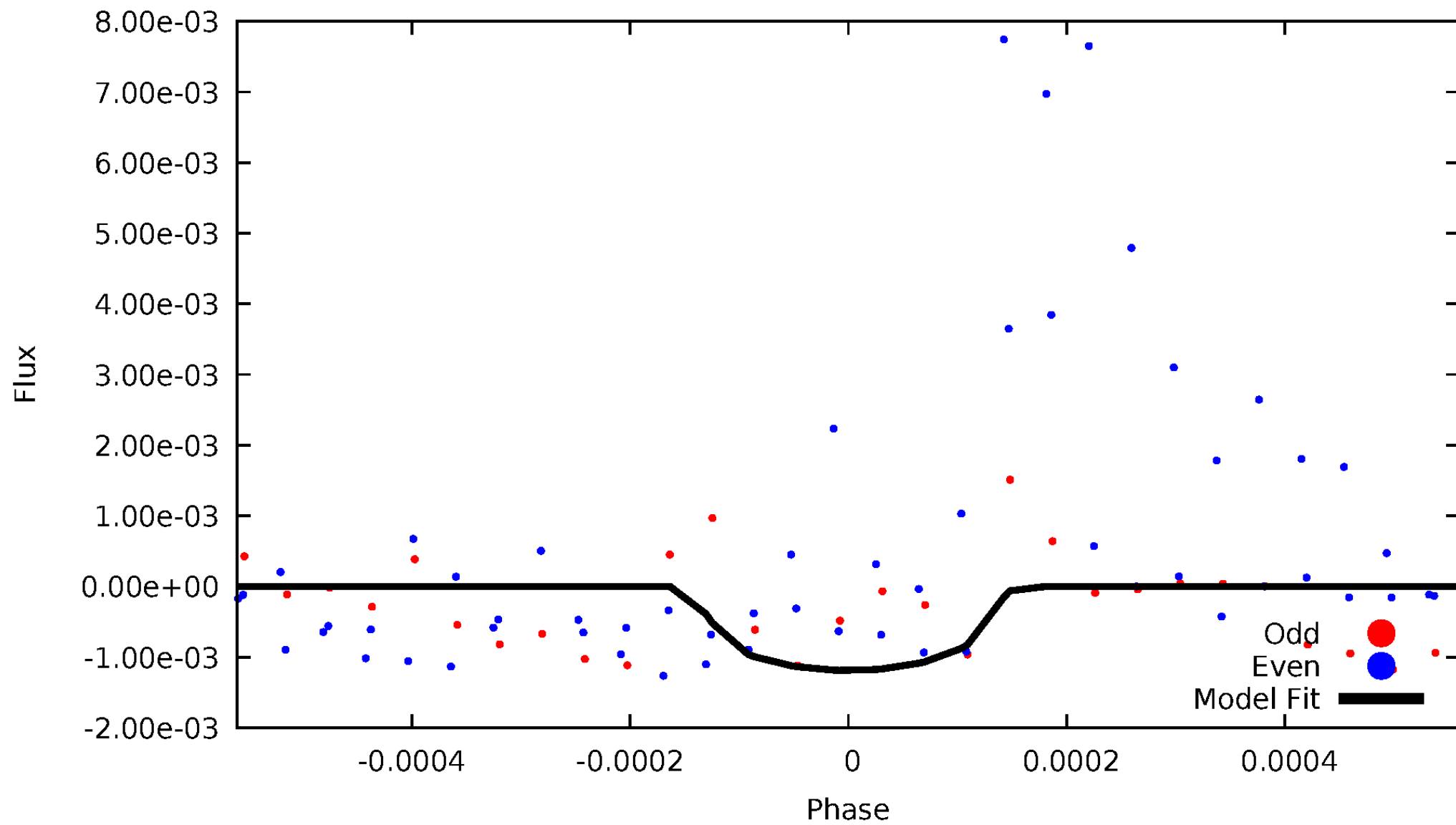


TCE 009456920-03



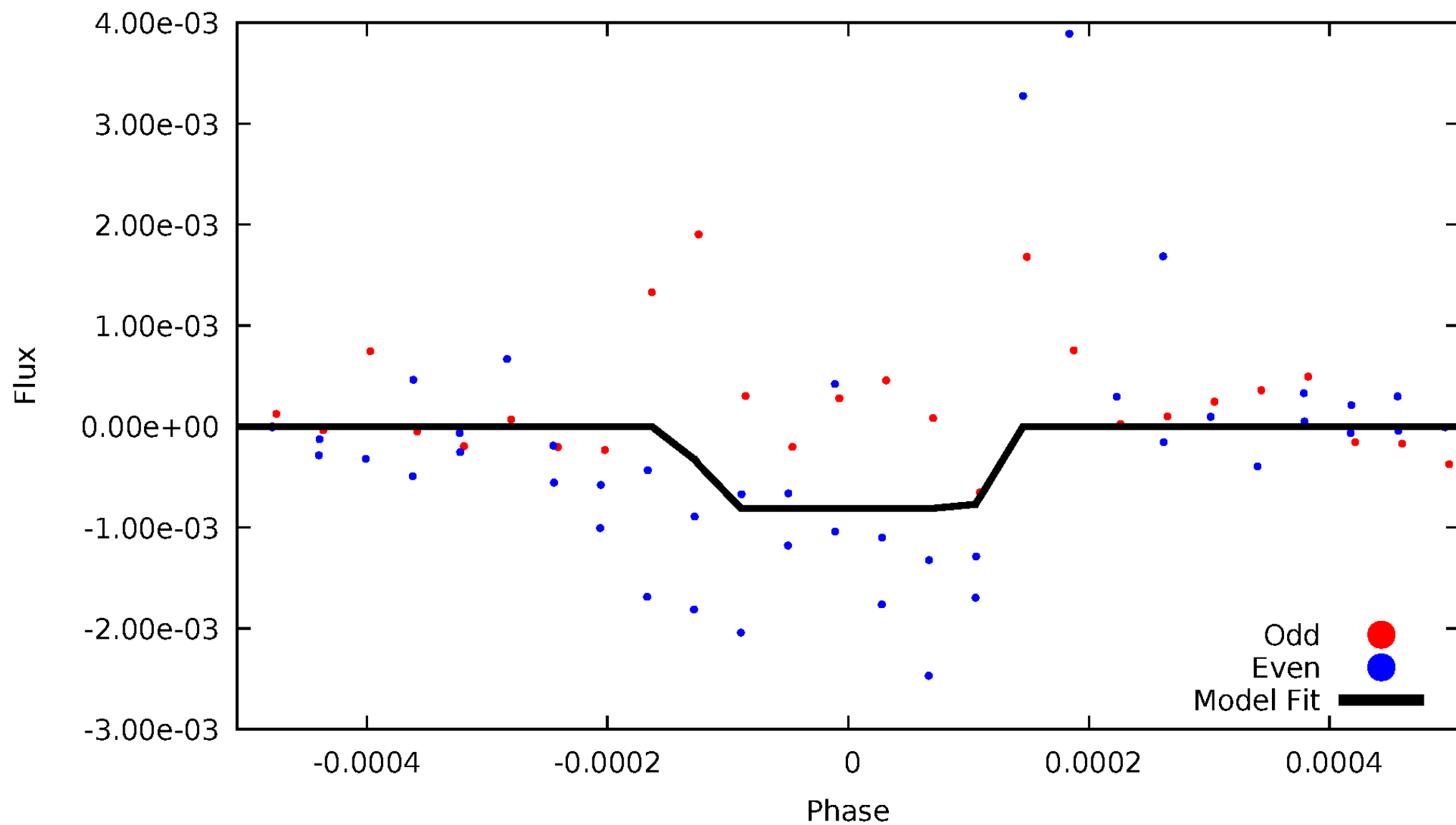
DV Odd/Even

TCE 009456920-03



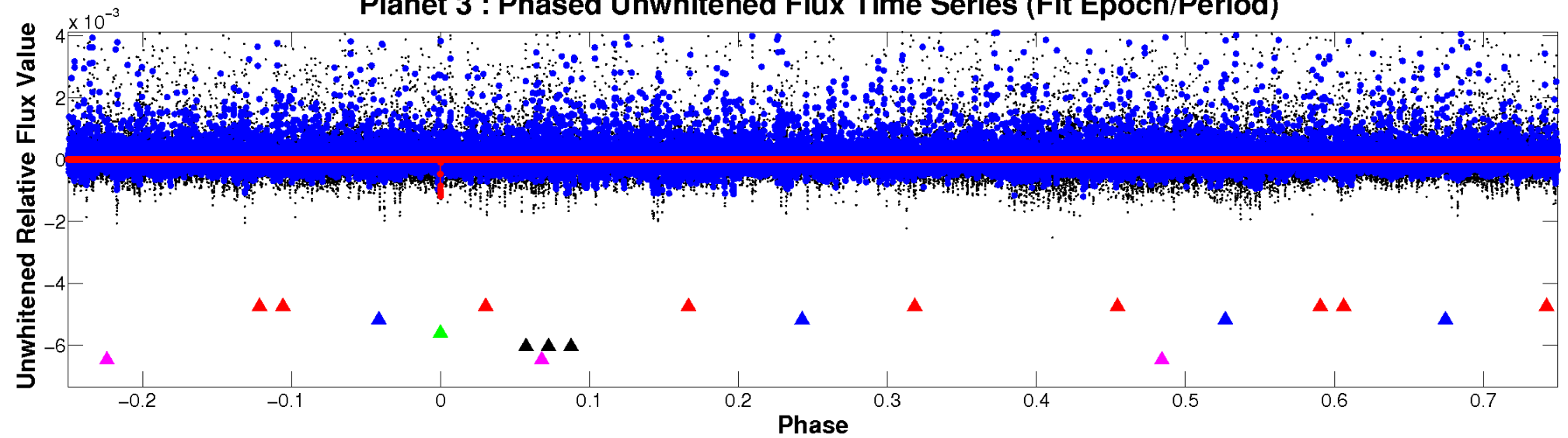
ALT Odd/Even

TCE 009456920-03

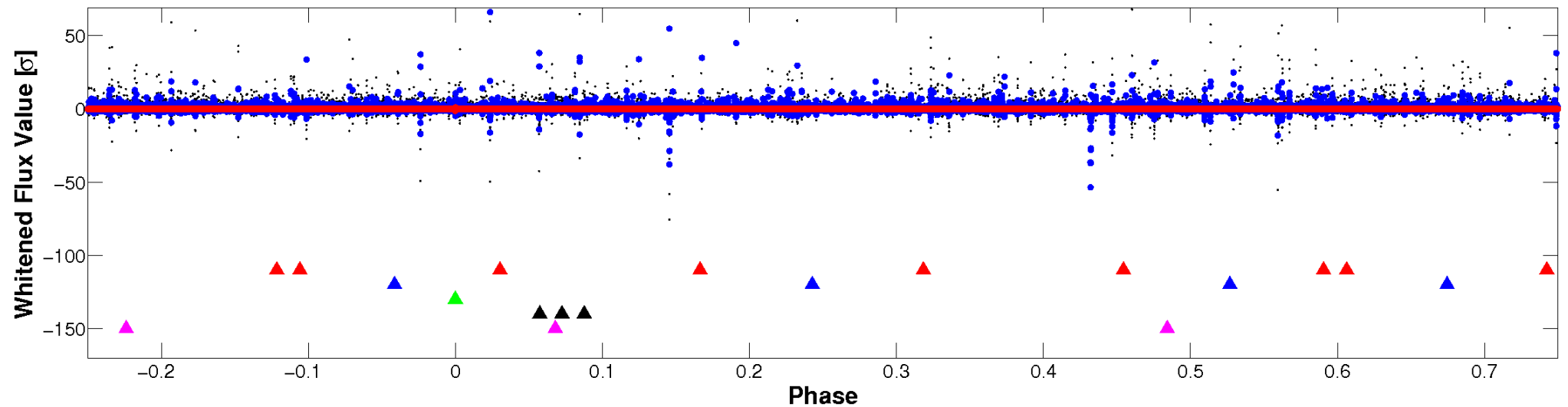


Non-Whitened Vs. Whitened Light Curve

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

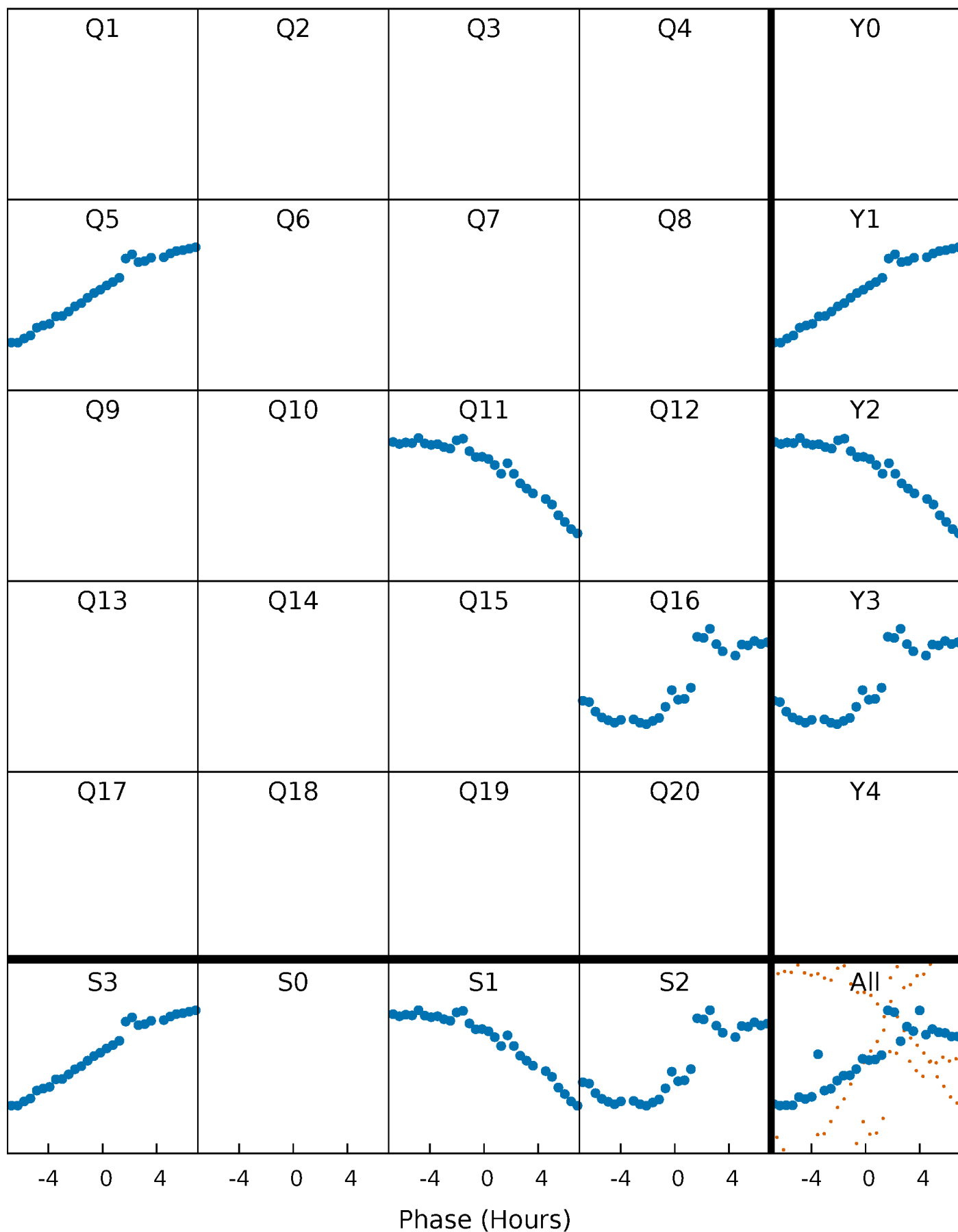


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



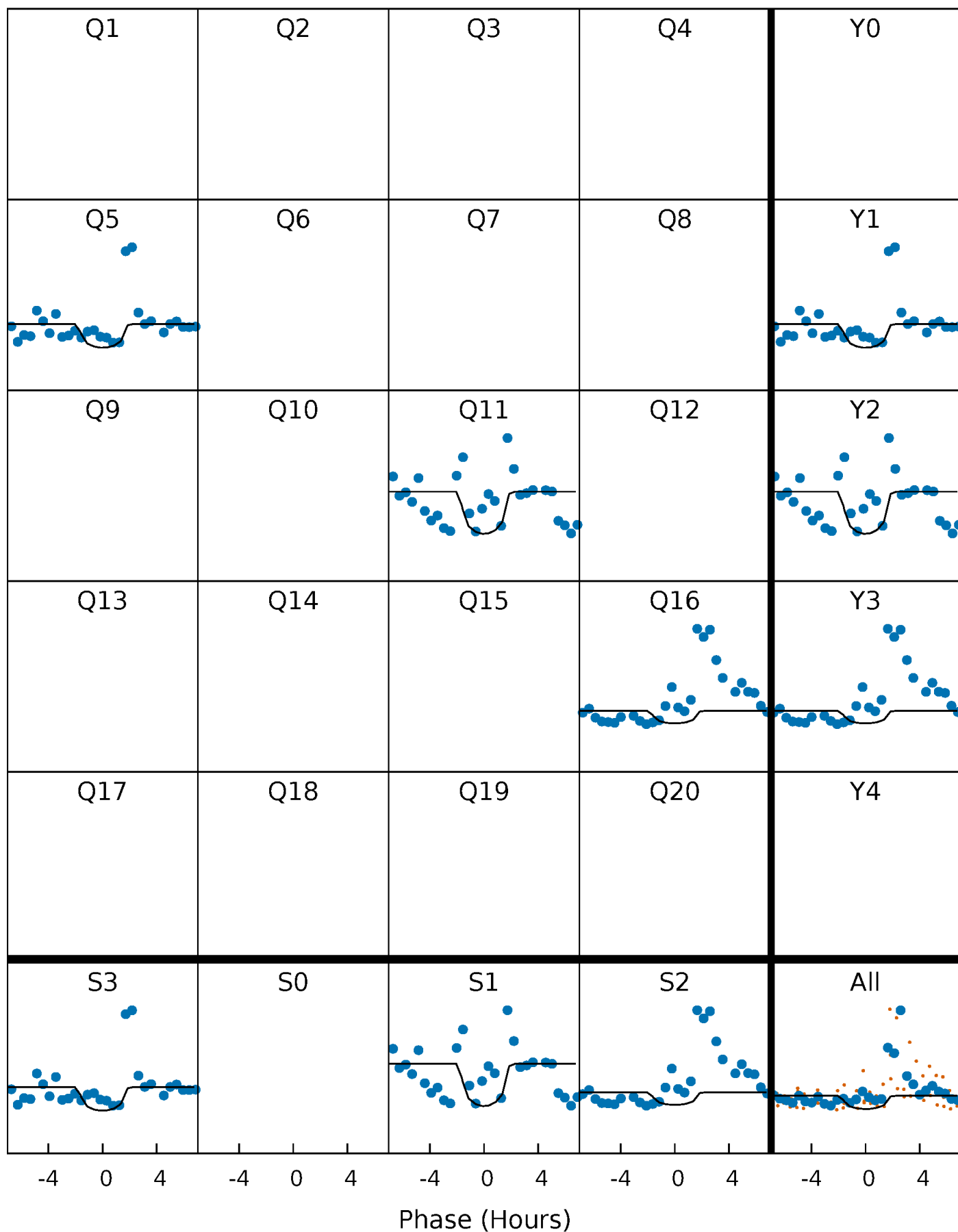
PDC Quarter-Phased Transit Curves

TCE 009456920-03 $P=524.224071$ Days $T_0=494.560506$ (BKJD)



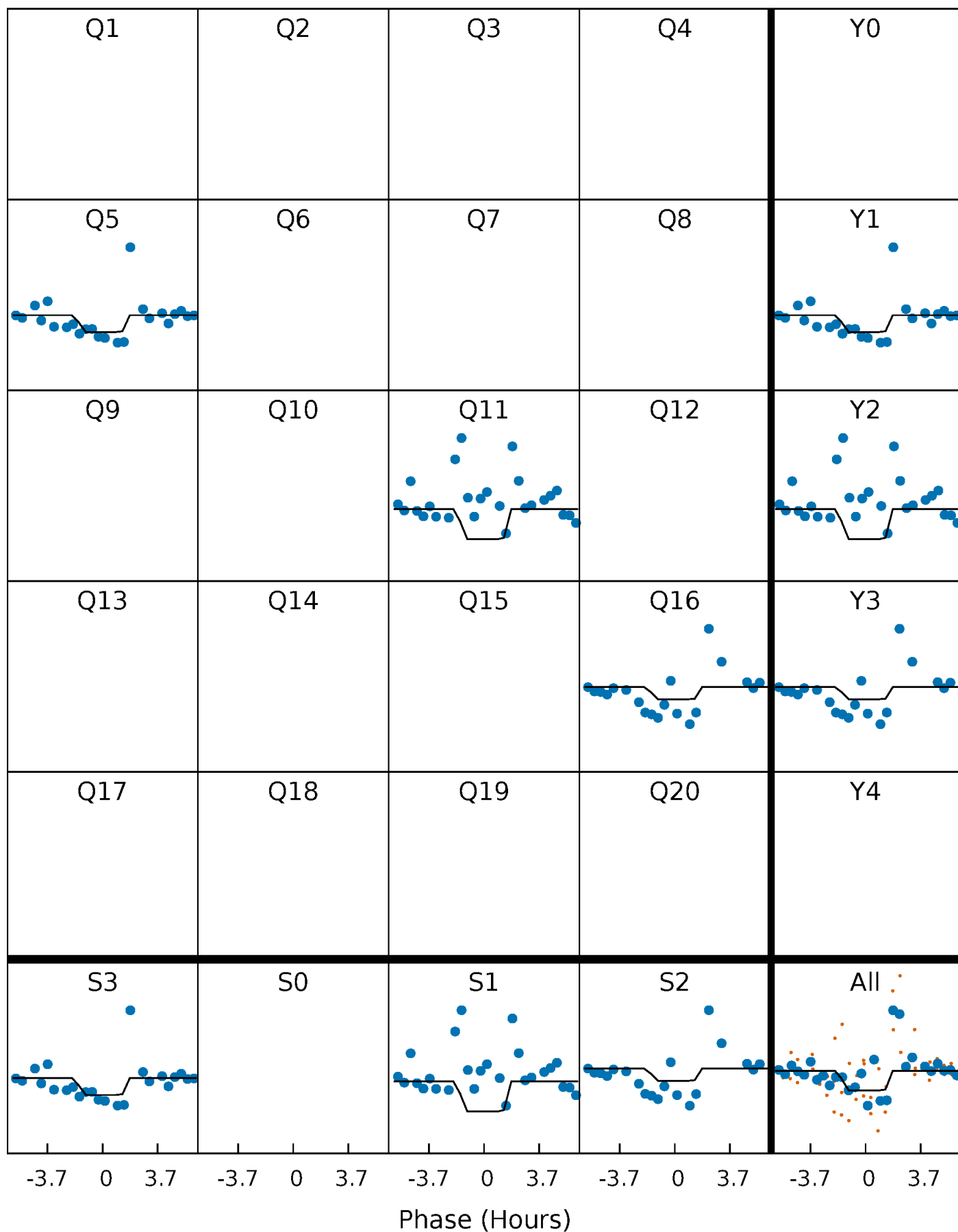
DV Quarter-Phased Transit Curves

TCE 009456920-03 $P=524.224071$ Days $T_0=494.560506$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

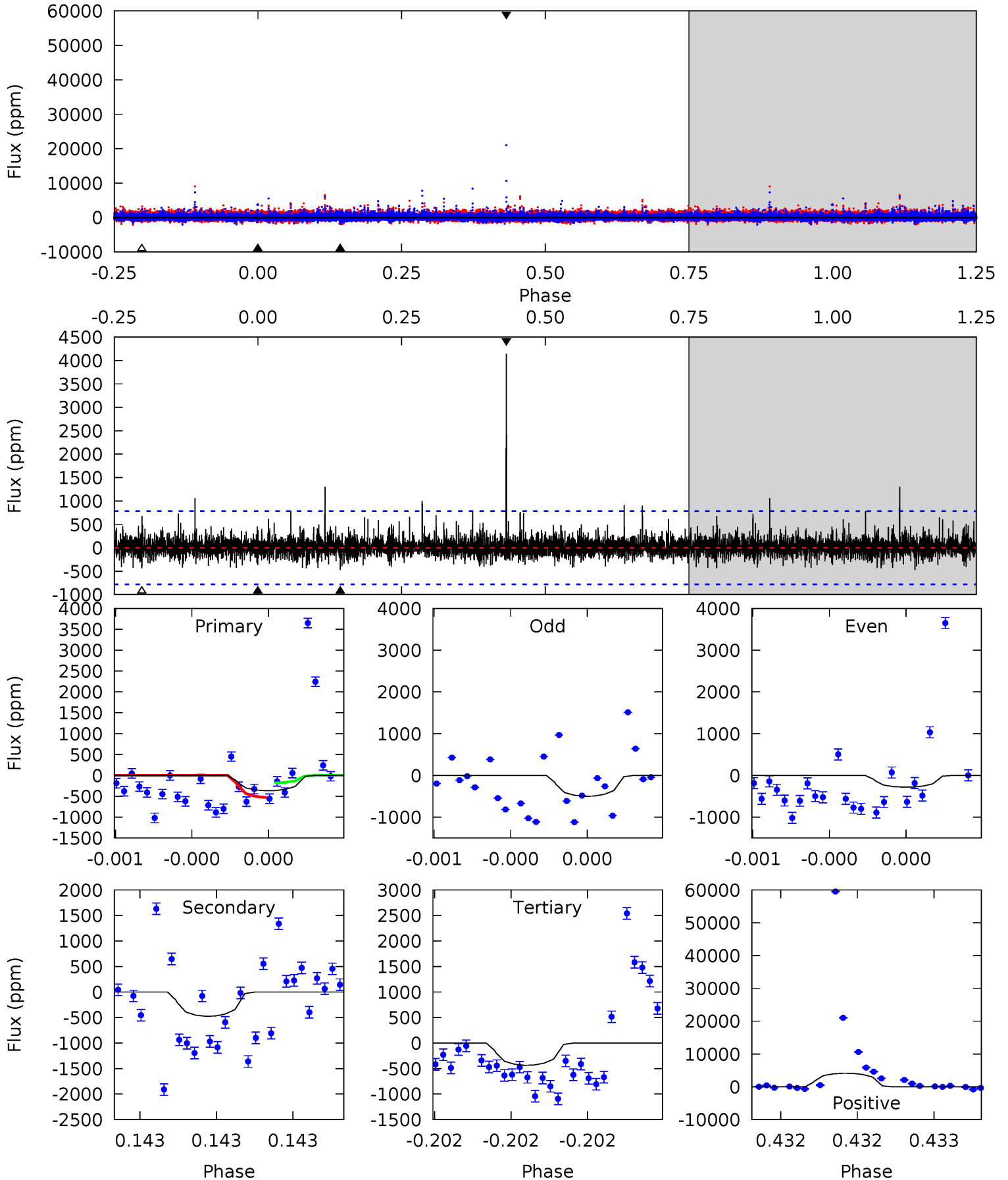
TCE 009456920-03 P=524.222982 Days $T_0=494.561516$ (BKJD)



DV Model-Shift Uniqueness Test

009456920-03, P = 524.224071 Days, E = 494.560506 Days

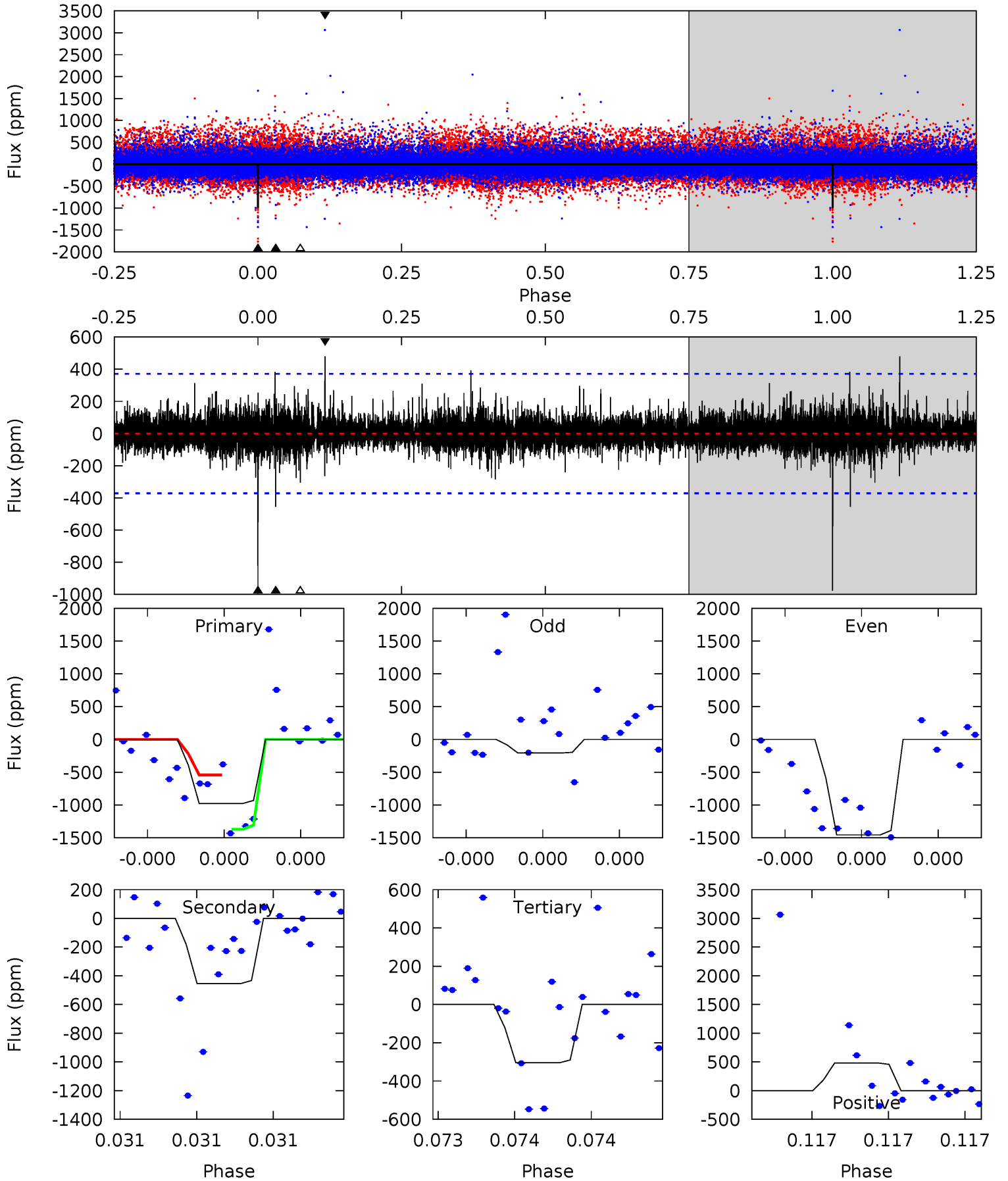
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.66	3.44	3.15	29.9	5.66	3.61	1.08	-0.49	-27.3	0.30	-26.5	0.56	0.31	0.90	1.25



Alt Model-Shift Uniqueness Test

009456920-03, P = 524.222982 Days, E = 494.561516 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.9	6.95	4.66	7.34	5.68	3.64	0.88	10.3	7.59	2.30	-0.39	10.3	0.76	0.33	6.10



Stellar Parameters For KIC 009456920

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4074^{+146}_{-178}	$4.615^{+0.064}_{-0.016}$	$0.400^{+0.050}_{-0.300}$	$0.663^{+0.026}_{-0.070}$	$0.660^{+0.038}_{-0.062}$	$3.196^{+0.867}_{-0.198}$
	+4%/-4%	+1%/-0%	+12%/-75%	+4%/-11%	+6%/-9%	+27%/-6%
Source	PHO1	KIC0	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 009456920-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-476 ± 138	$4.03^{+3.86}_{-2.73}$	193^{+8}_{-9}	2983^{+1367}_{-497}	$18727^{+173590}_{-14015}$
Alt.	-455 ± 65	$4.21^{+3.84}_{-2.78}$	192^{+8}_{-9}	2949^{+1198}_{-460}	$17348^{+133604}_{-12666}$

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 $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

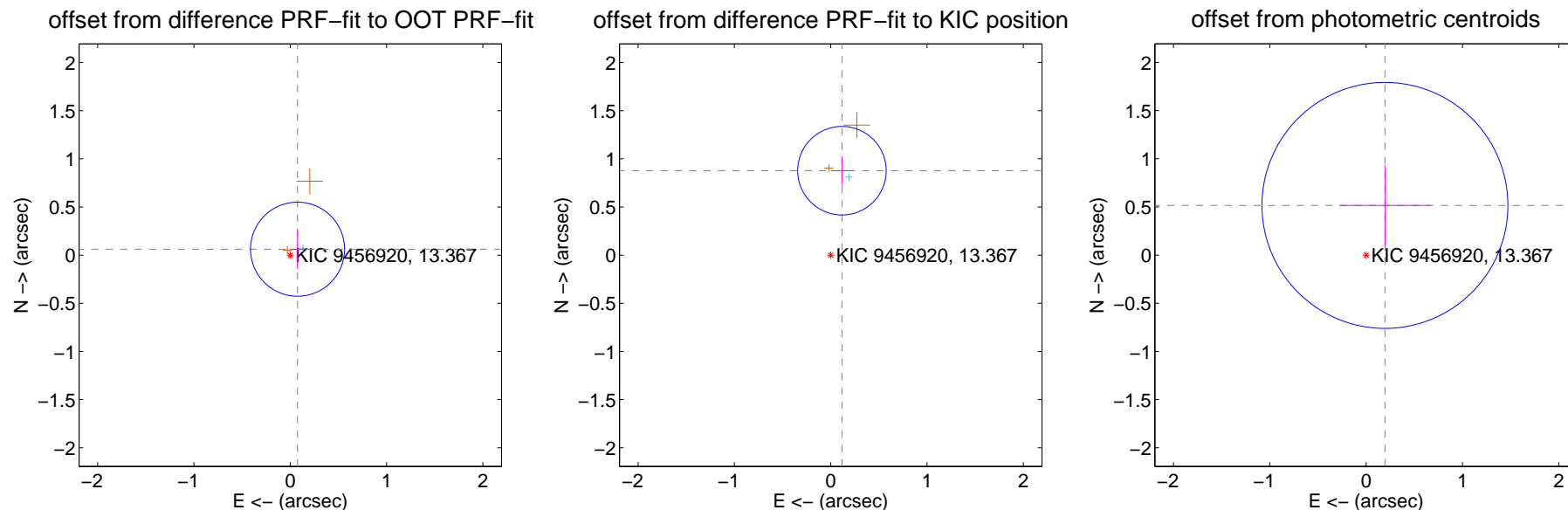
DV Centroid Data

Supplemental centroid analysis for 009456920-03. Kepler magnitude: 13.37. Transit SNR 5.69

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.74 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.098 ± 0.163	0.60	-0.076 ± 0.077	0.062 ± 0.206
PRF-fit source offset from KIC position	0.885 ± 0.153	5.77	-0.117 ± 0.114	0.877 ± 0.147
photometric centroid source offset	0.55 ± 0.43	1.30	-0.20 ± 0.47	0.52 ± 0.42

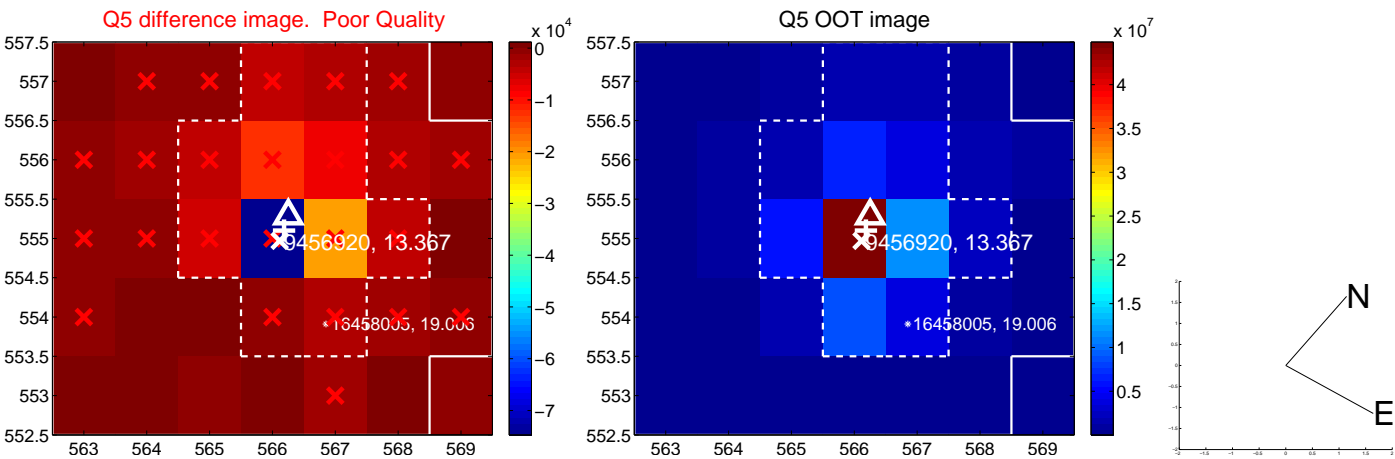


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

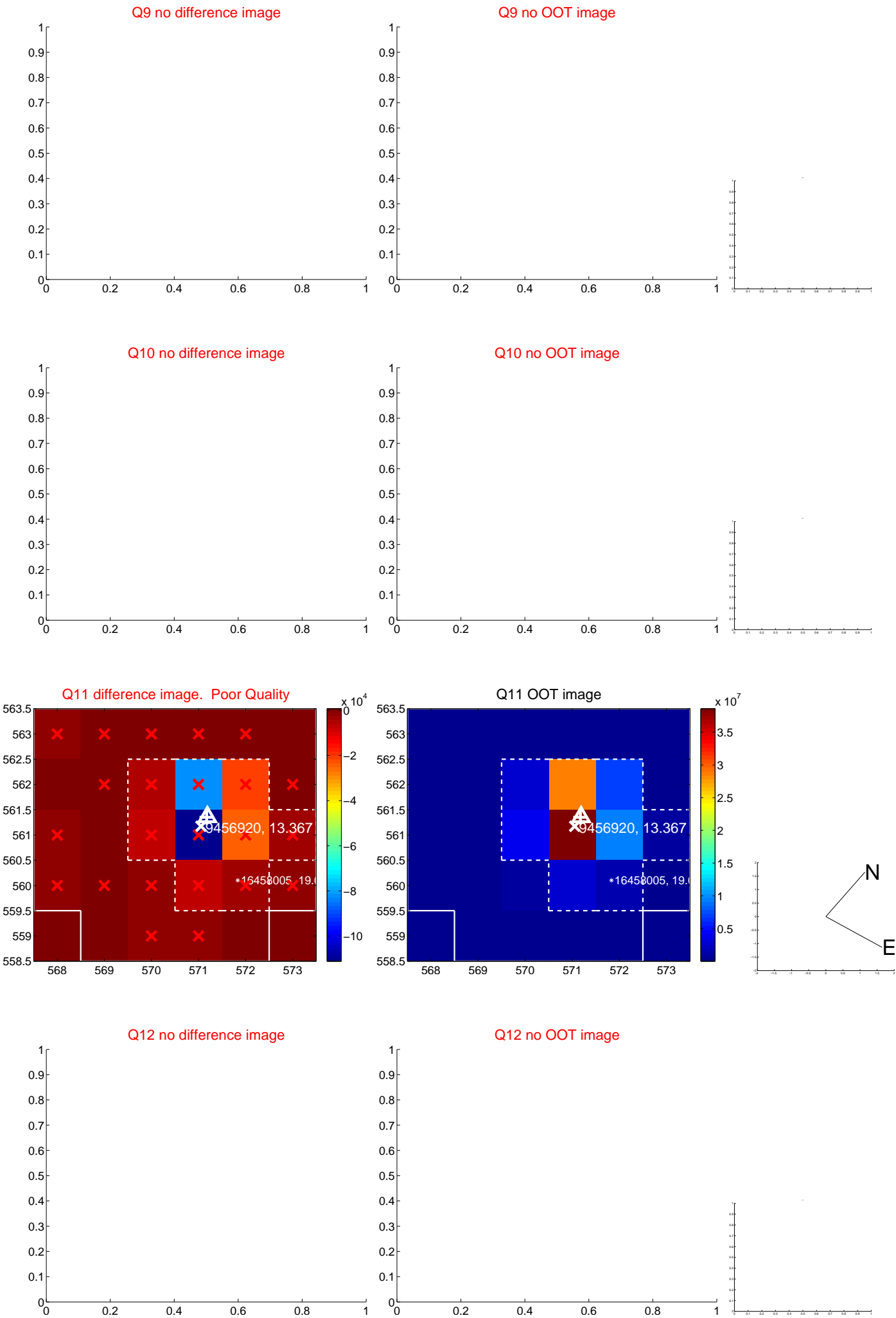
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



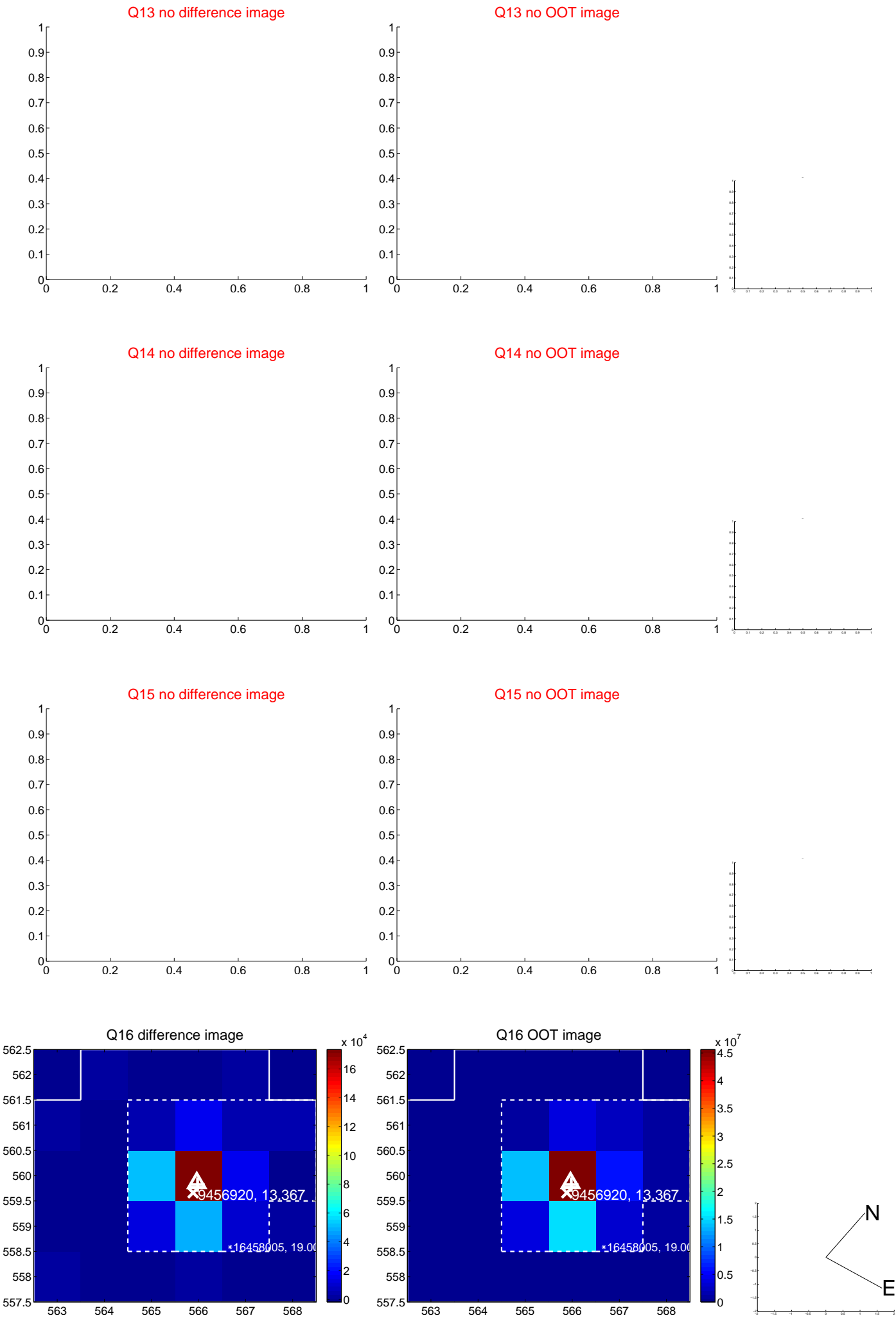
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



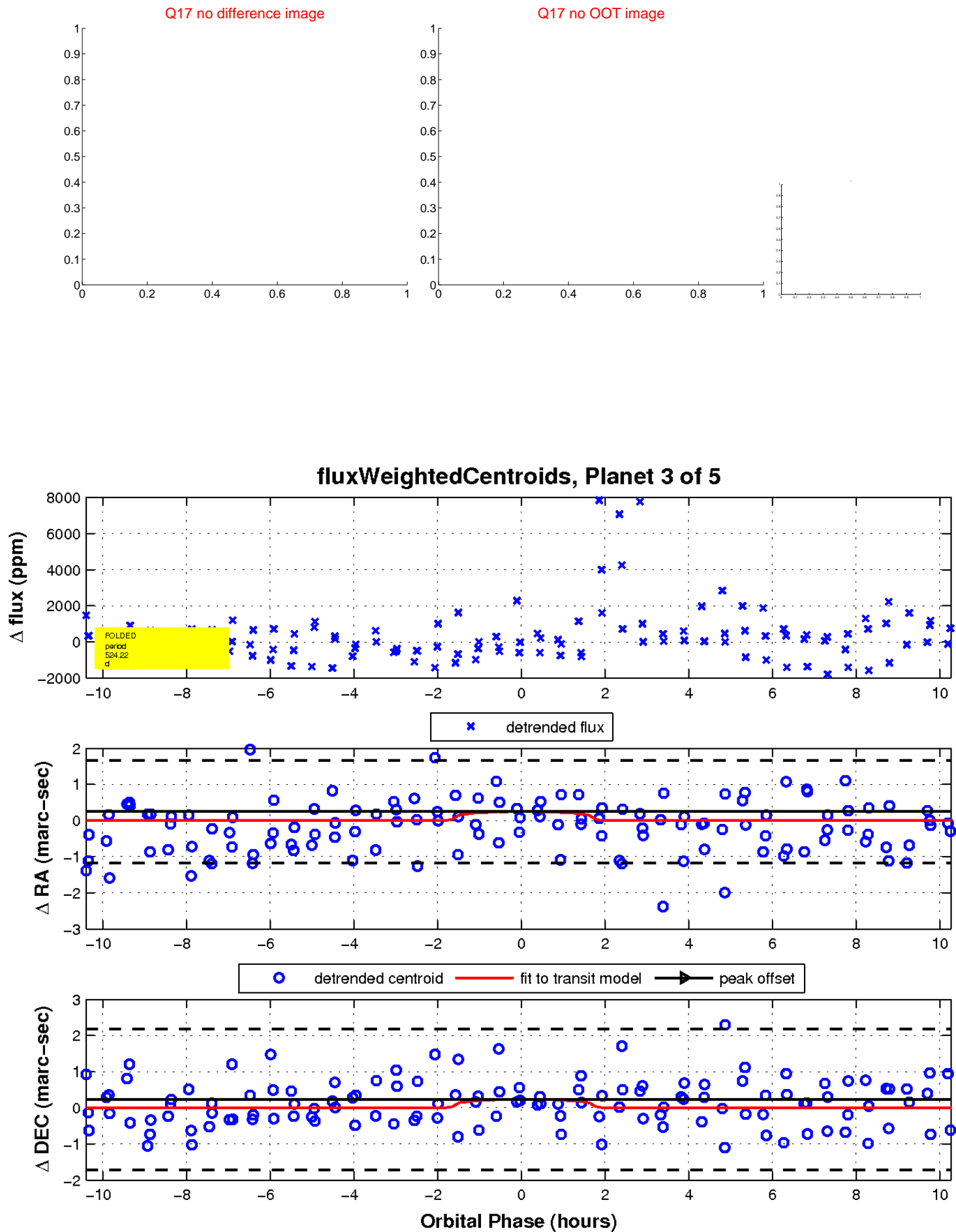
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

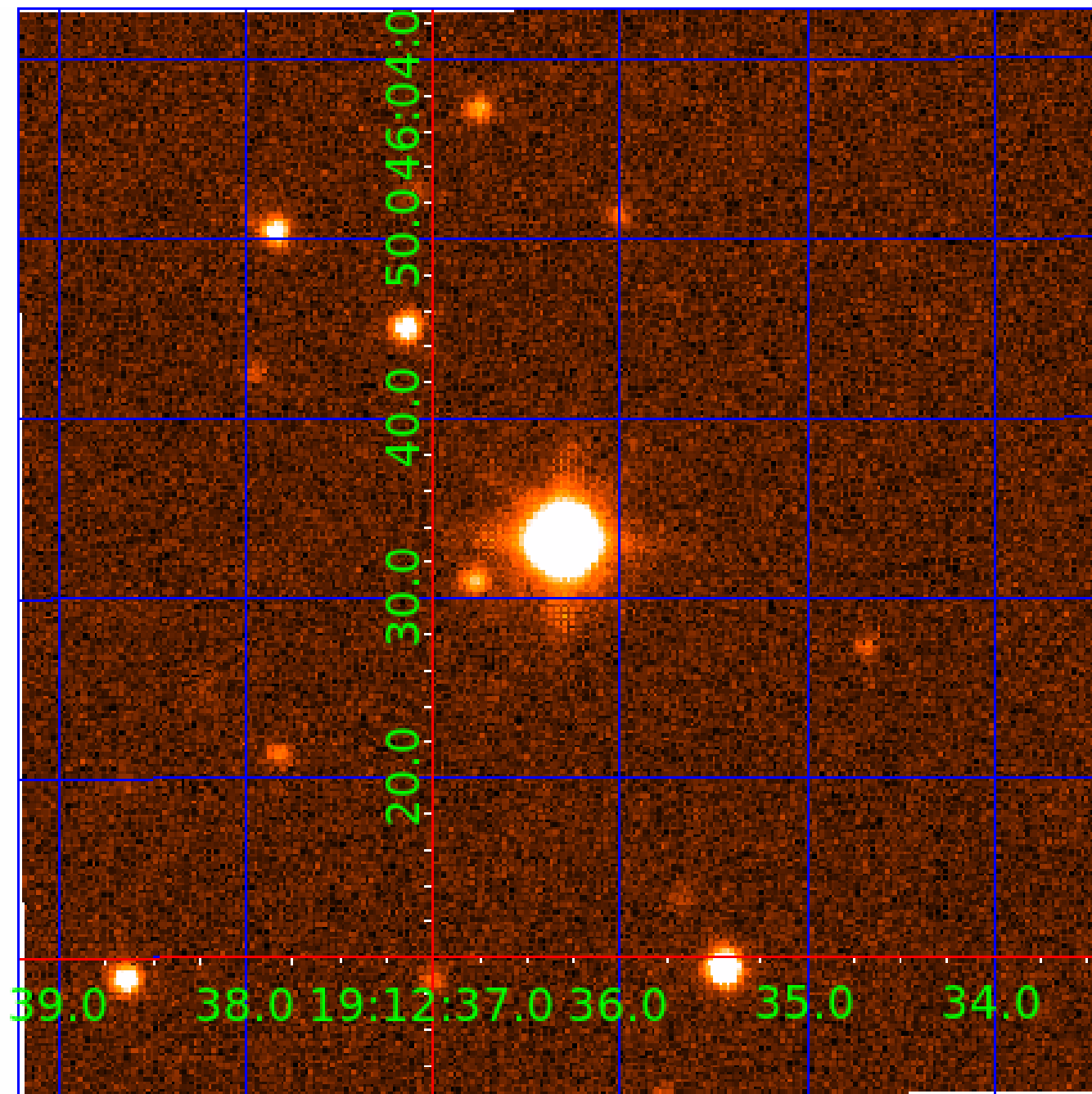


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009456920

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})
009456920-01	OBS	No	150.956546	279.927189	1105.5	3.417	14.3	7.4	0.66	4074	2.10	0.46
009456920-02	OBS	No	375.297460	246.520728	1383.0	4.079	12.1	6.1	0.66	4074	2.78	0.14
009456920-03	OBS	No	524.224071	494.560506	1187.8	3.523	16.7	5.7	0.66	4074	2.36	0.09
009456920-04	OBS	No	532.149397	524.662488	1298.9	3.519	15.0	6.7	0.66	4074	2.59	0.09
009456920-05	OBS	No	677.236290	224.184000	440.3	4.500	12.7	-1.0	0.66	4074	1.32	0.06

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009456920-01	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009456920-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
009456920-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

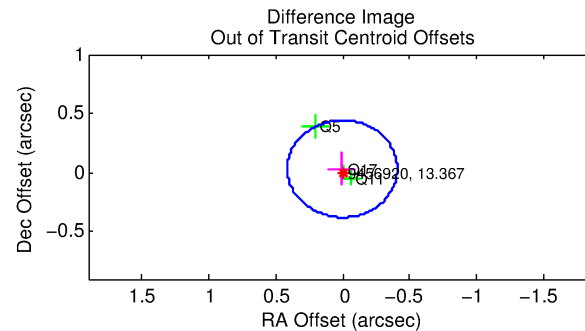
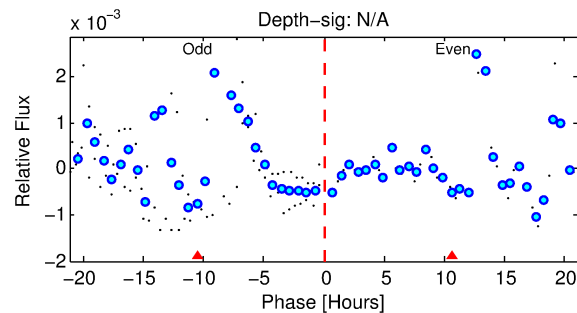
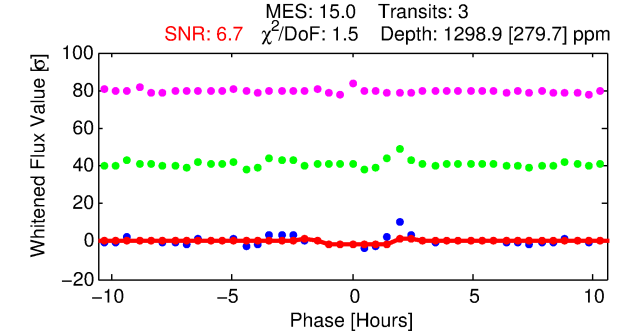
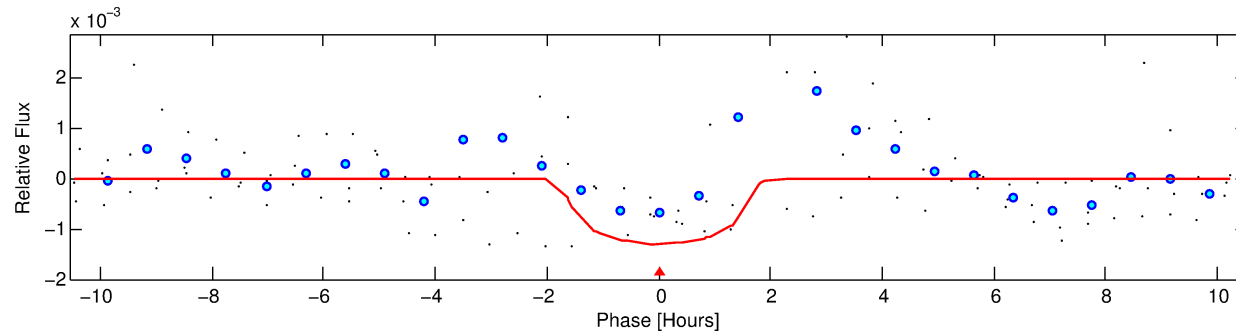
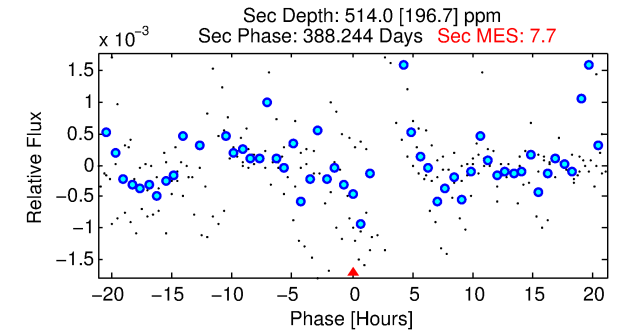
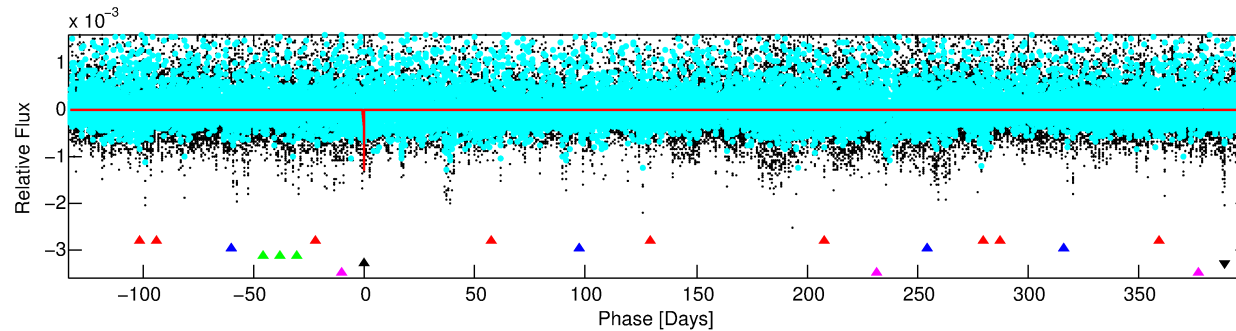
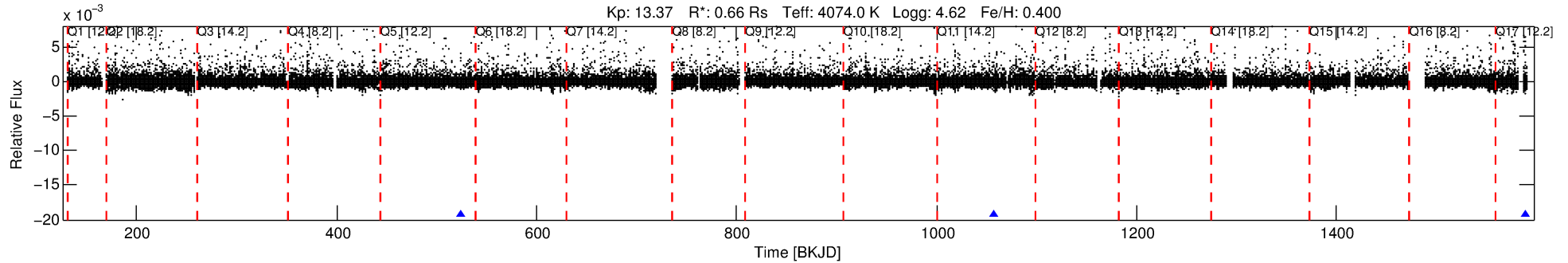
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009456920-04

No Significant Match Found

DV One-Page Summary

KIC: 9456920 Candidate: 4 of 5 Period: 532.149 d



DV Fit Results:

Period = 532.14940 [0.00592] d
Epoch = 524.6625 [0.0101] BKJD
Rp/R* = 0.0358 [0.0327]
a/R* = 852.49 [2341.02]
b = 0.73 [1.84]
Seff = 0.09 [0.02]
Teq = 138 [7] K
Rp = 2.59 [2.38] Re
a = 1.1196 [0.0961] AU
Ag = 52980.98 [99256.60] [0.53] σ
Teffp = 3244 [1523] K [2.04] σ

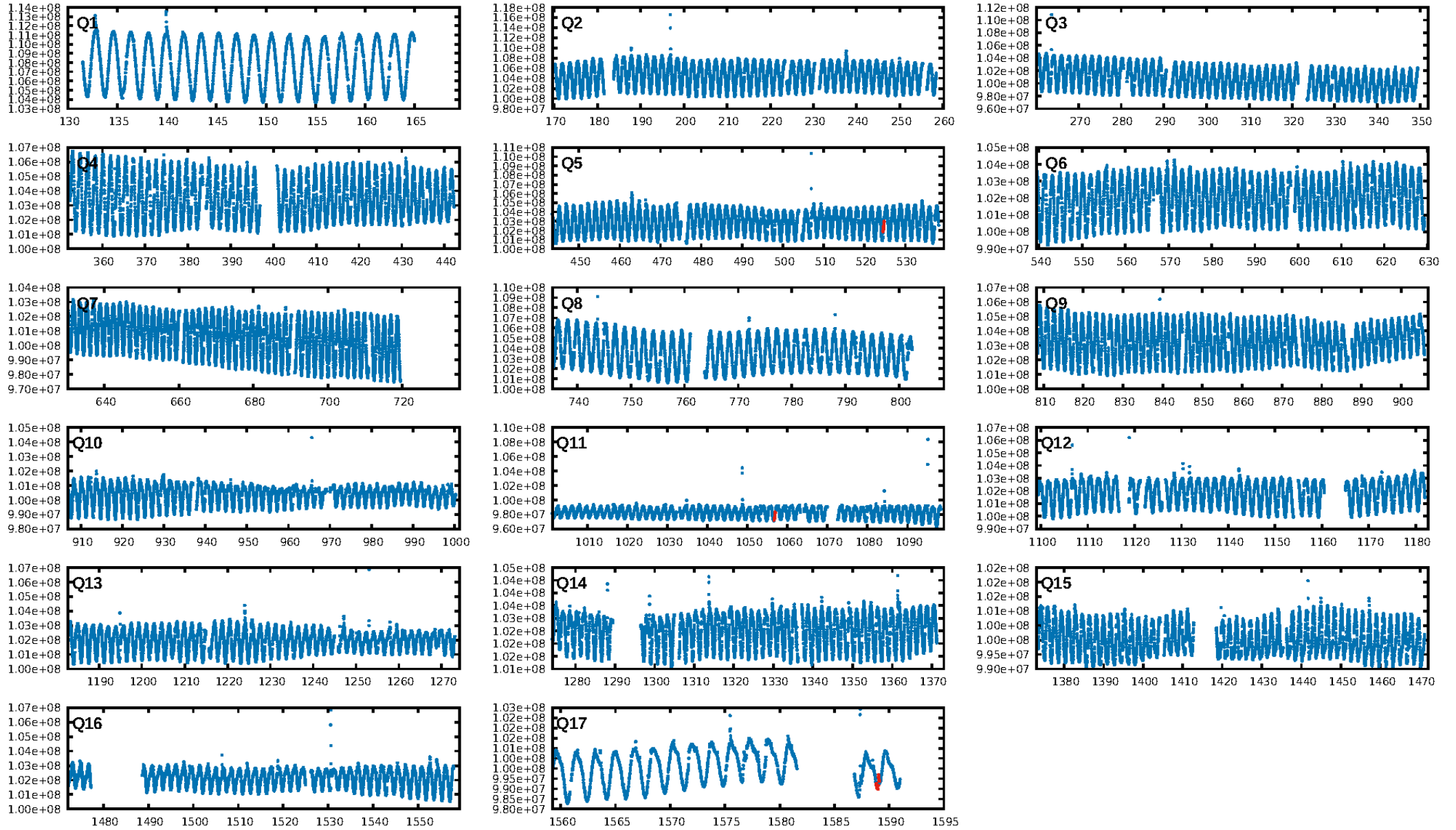
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [38.20] σ
LongPeriod-sig: 100.0% [609.53] σ
ModelChiSquare2-sig: 45.9%
ModelChiSquareGof-sig: 94.4%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 1.918
Centroid-sig: 37.8%
Centroid-so: 0.460 arcsec [1.14] σ
OotOffset-rm: 0.031 arcsec [0.23] σ
OotOffset-st: 0/1/0/2 [3]
KicOffset-rm: 0.784 arcsec [8.06] σ
KicOffset-st: 0/1/0/2 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

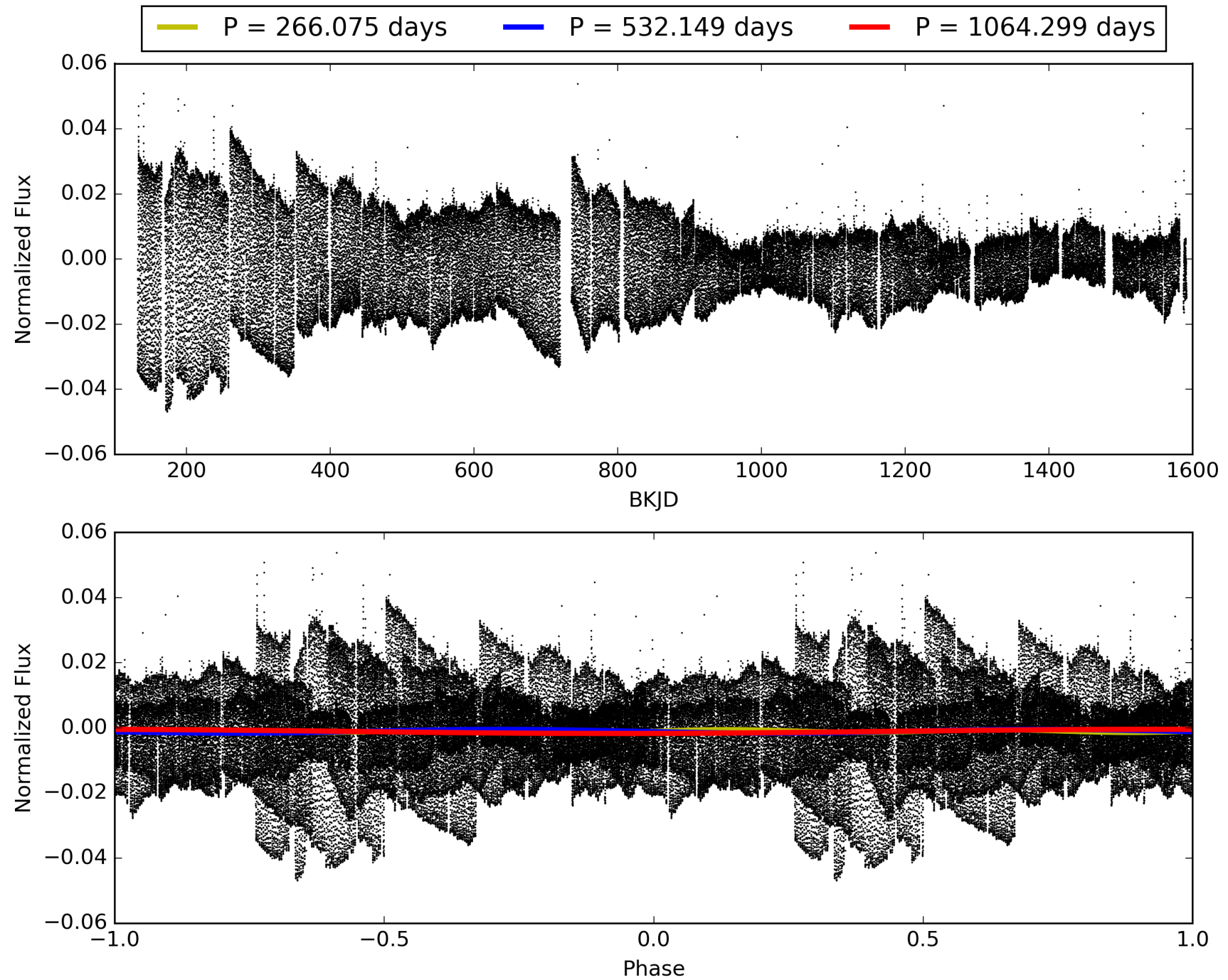
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:15:08 Z

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

TCE 009456920-04, PDC Light Curves

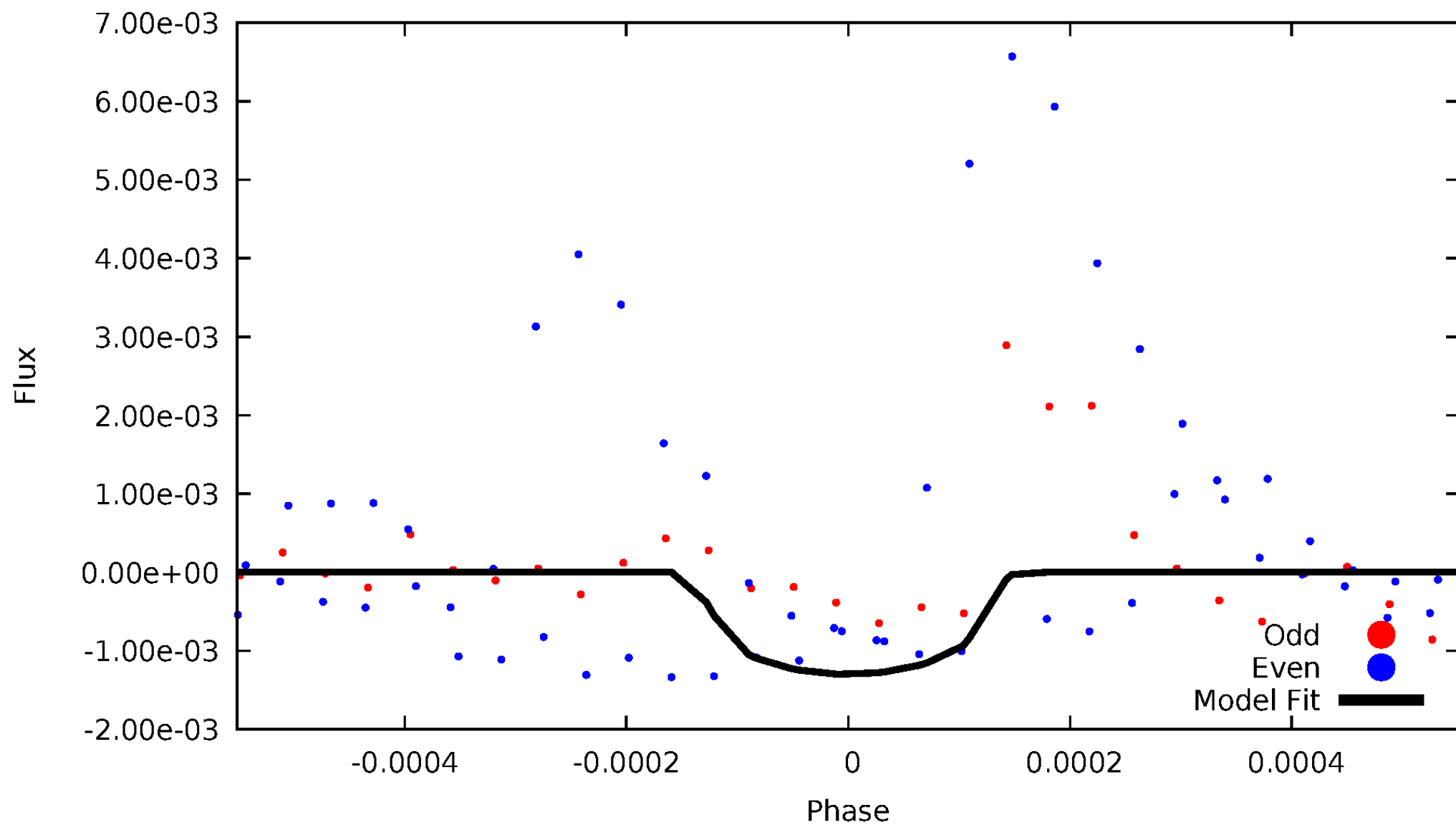


TCE 009456920-04



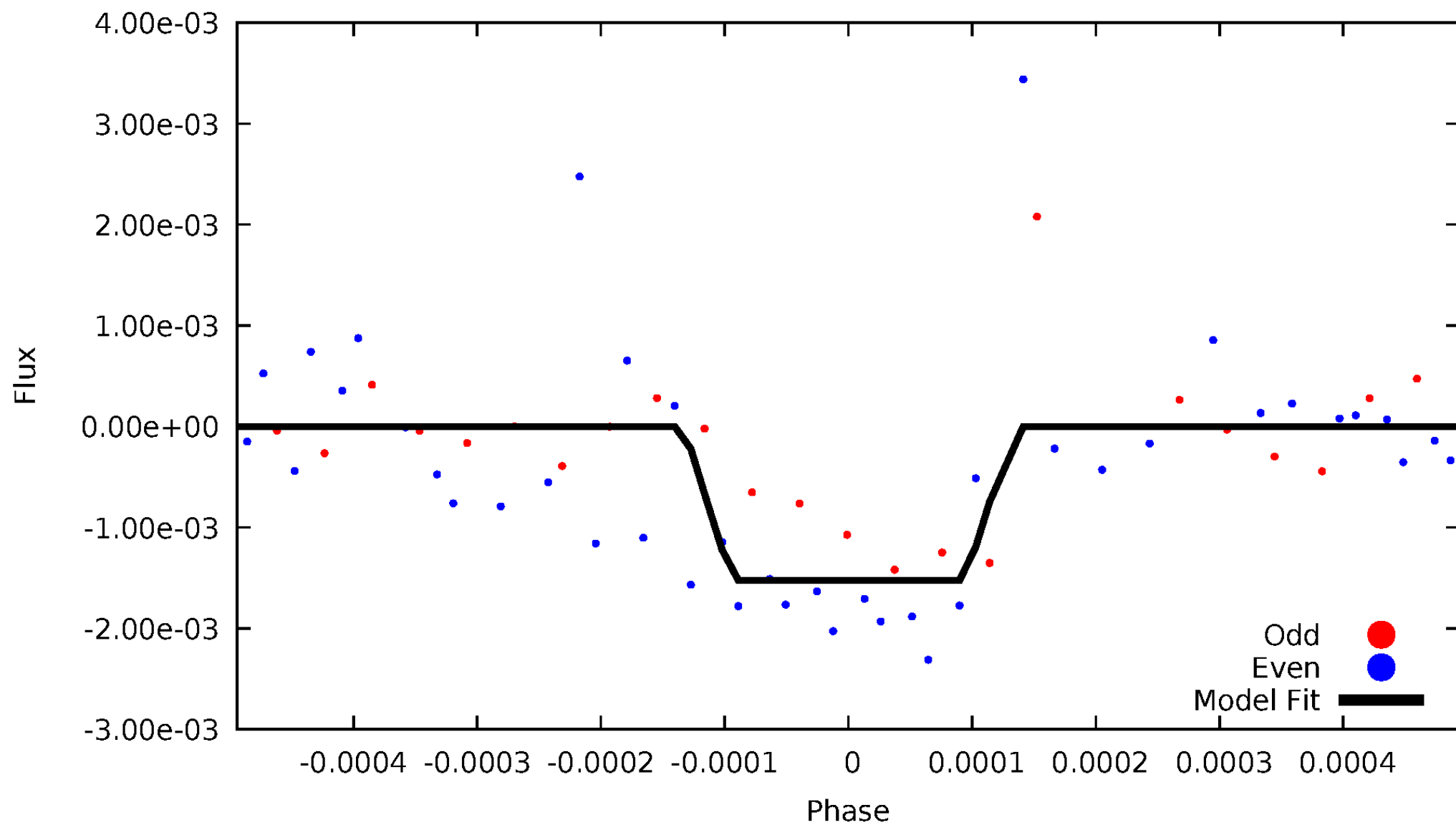
DV Odd/Even

TCE 009456920-04



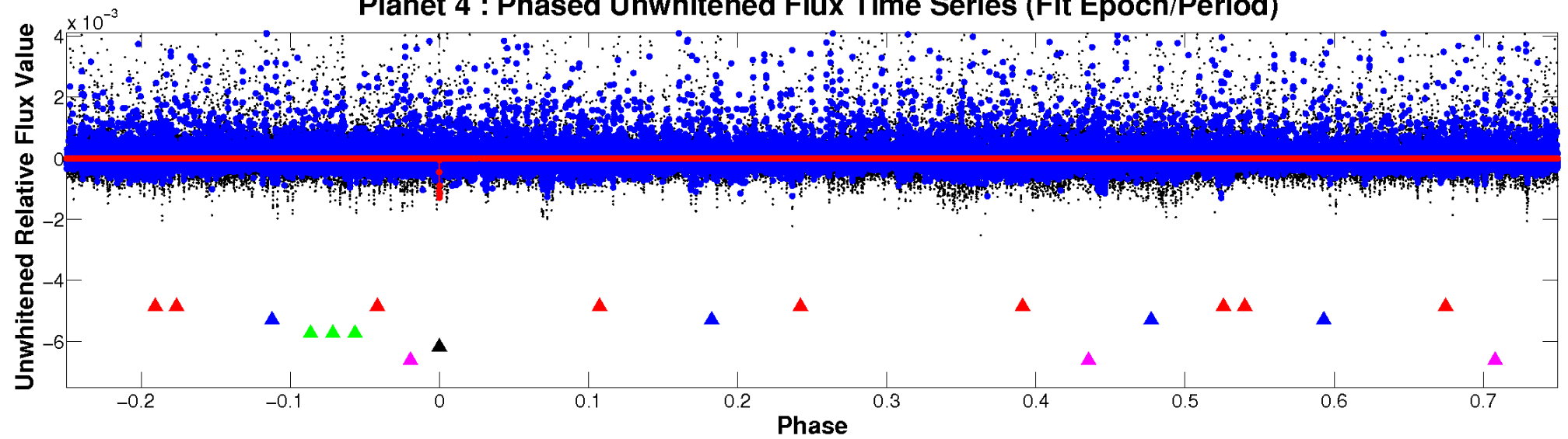
ALT Odd/Even

TCE 009456920-04

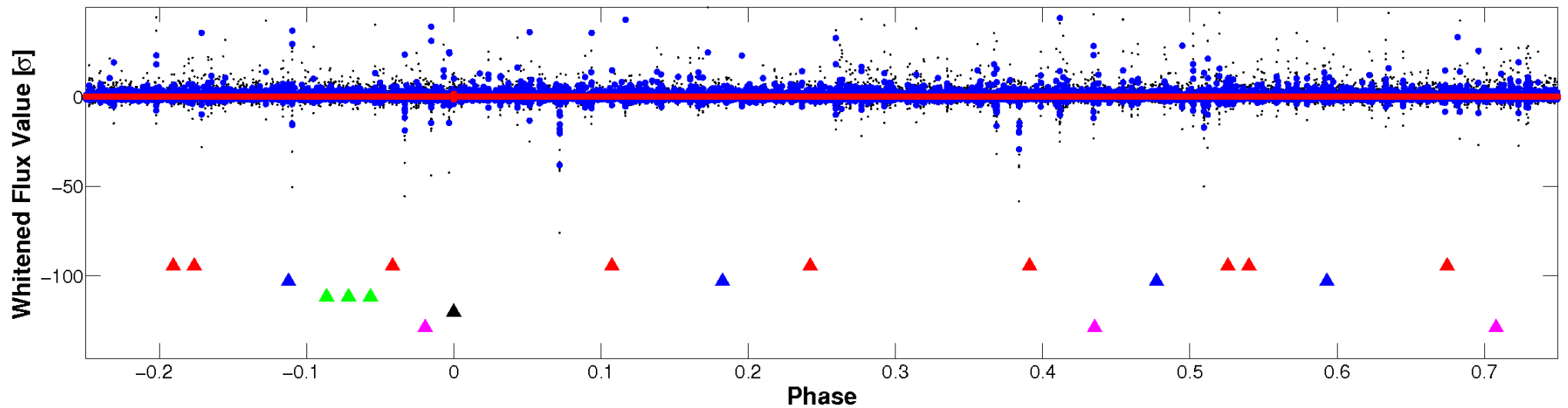


Non-Whitened Vs. Whitened Light Curve

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

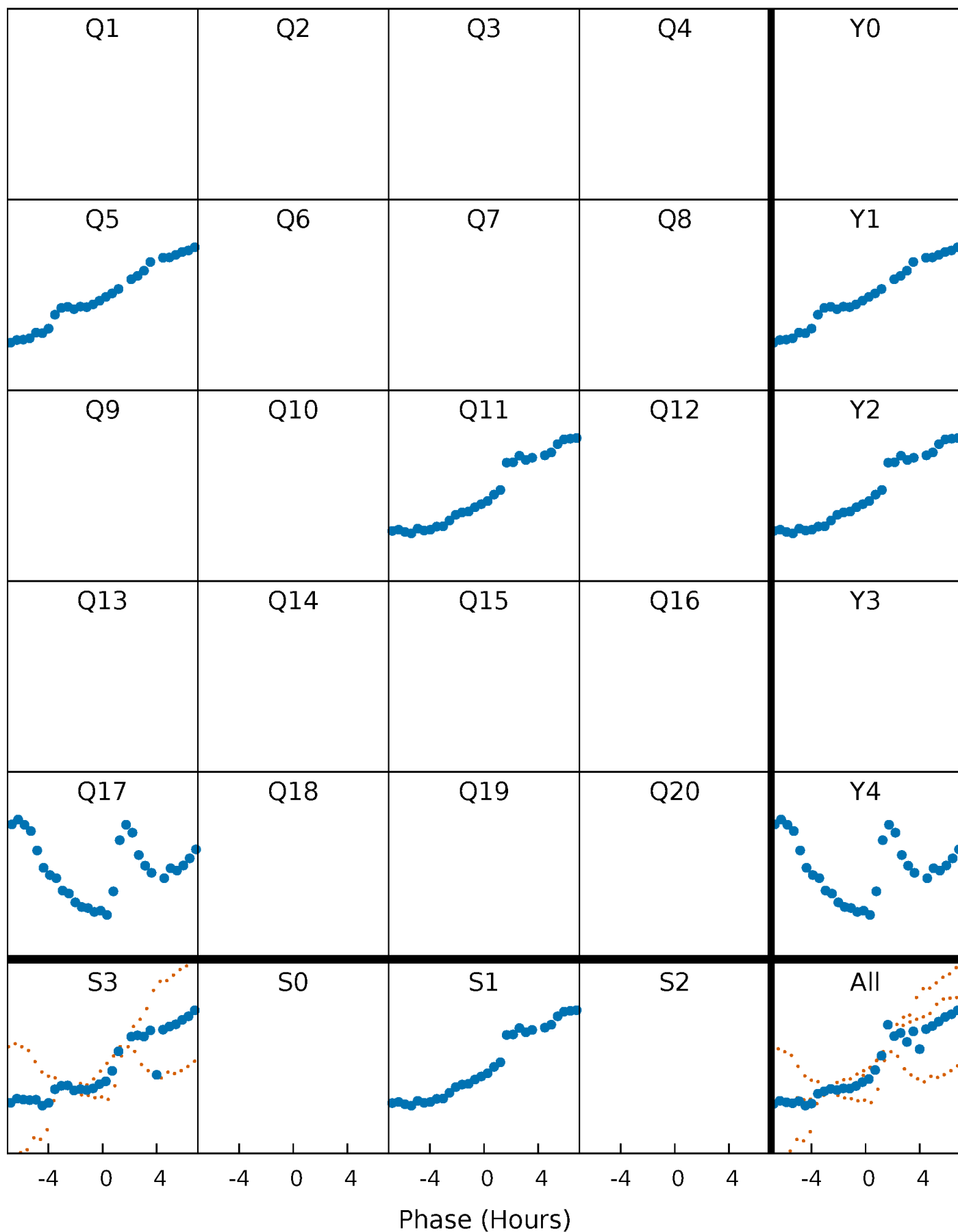


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



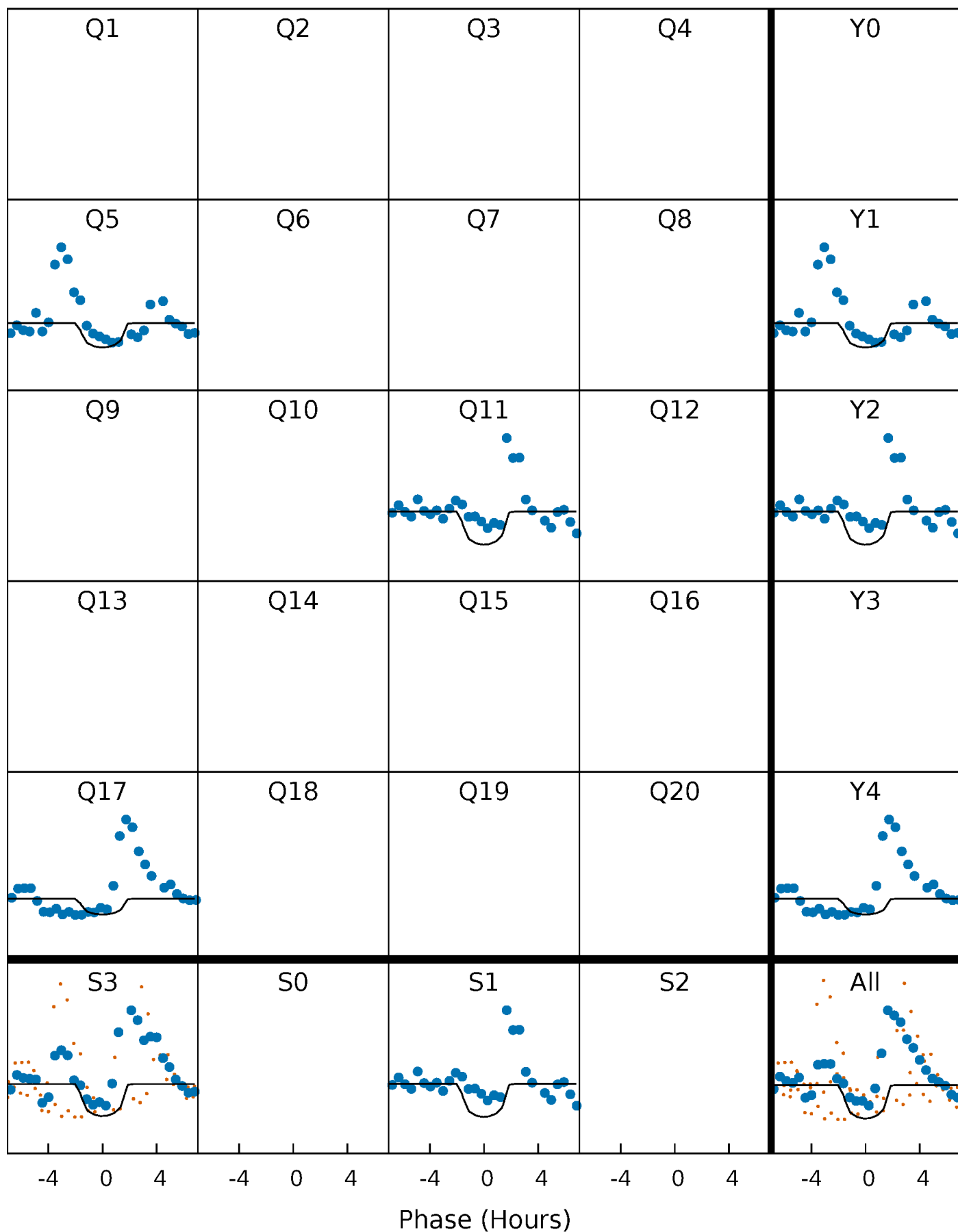
PDC Quarter-Phased Transit Curves

TCE 009456920-04 $P=532.149397$ Days $T_0=524.662488$ (BKJD)



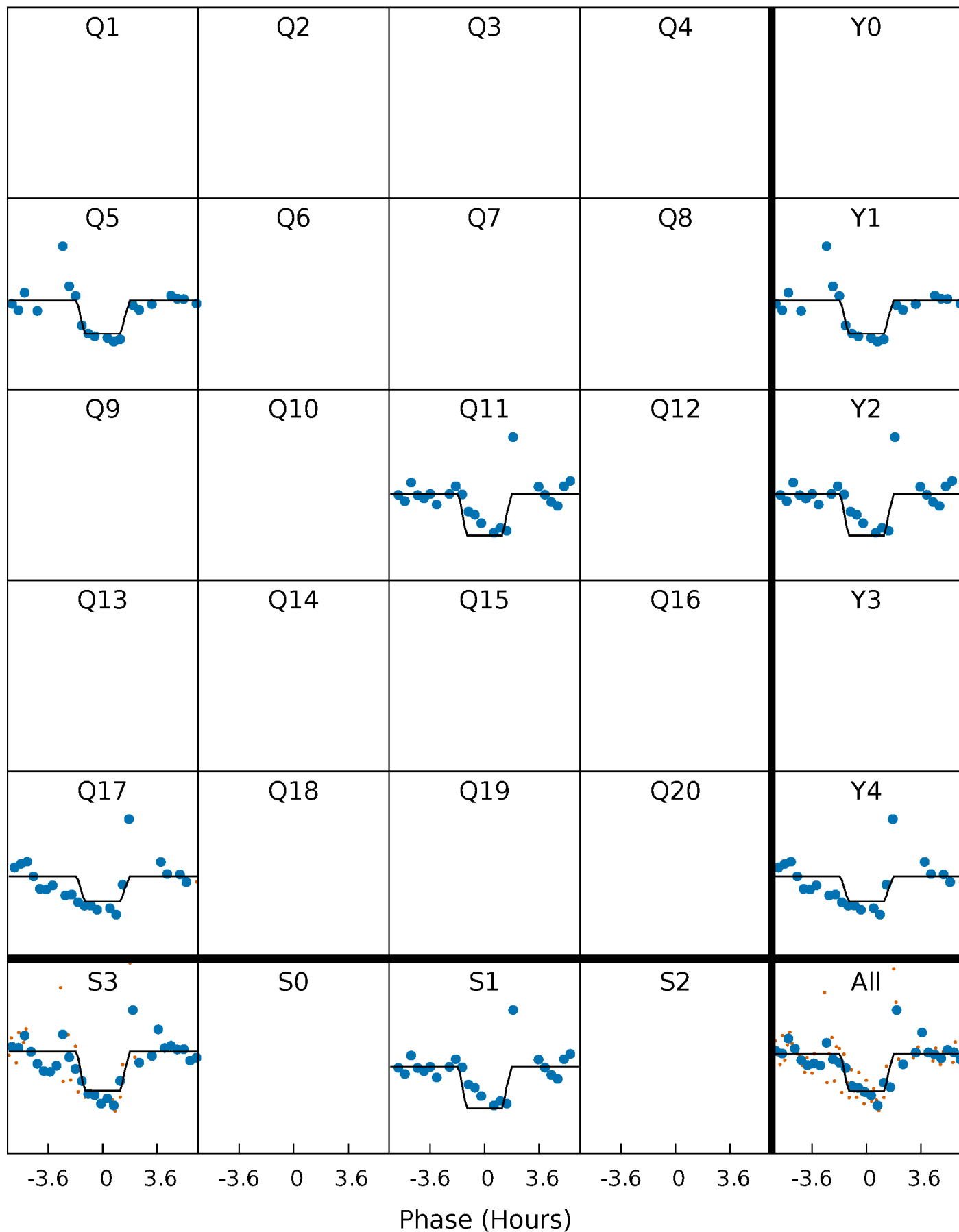
DV Quarter-Phased Transit Curves

TCE 009456920-04 $P=532.149397$ Days $T_0=524.662488$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

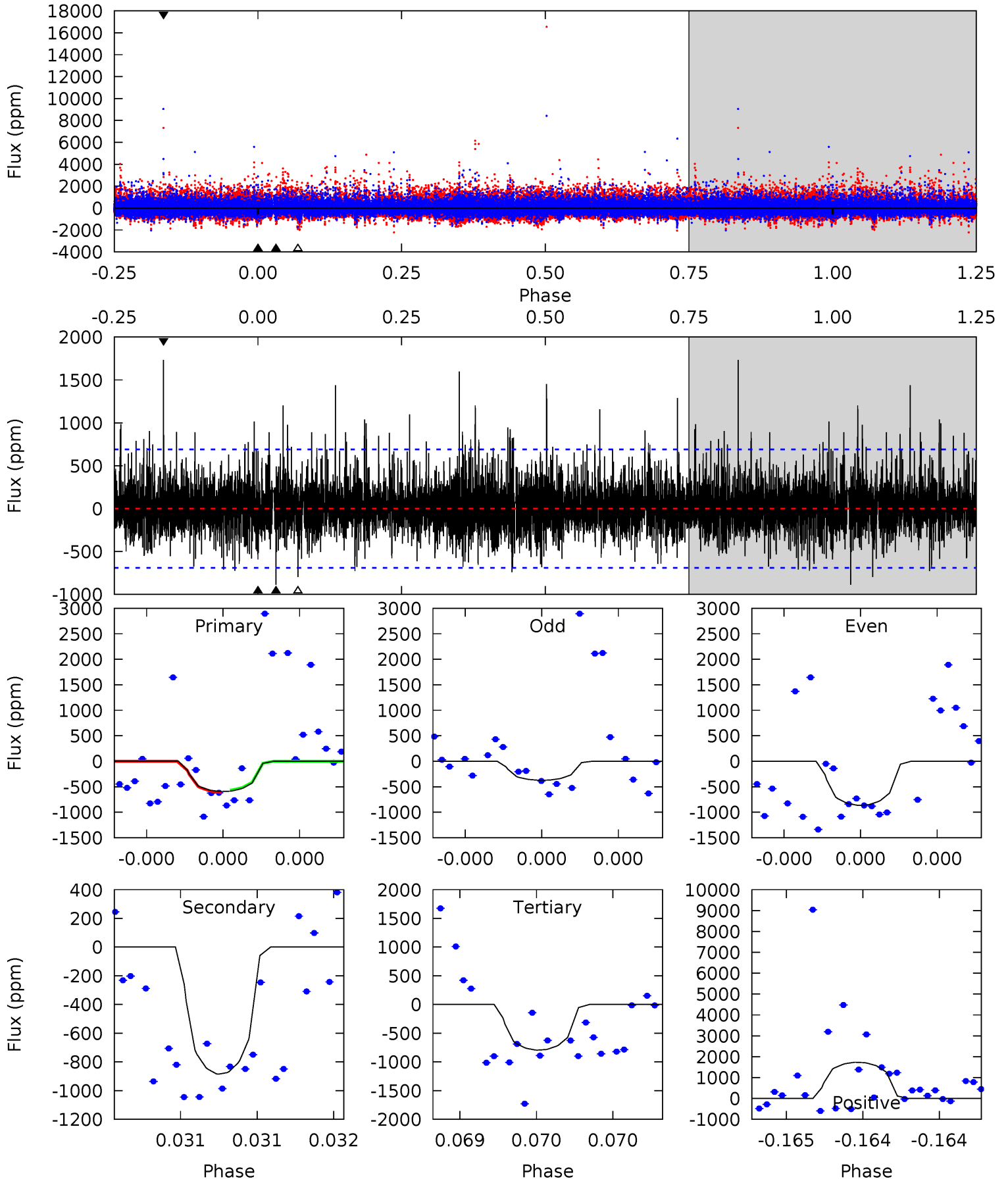
TCE 009456920-04 $P=532.137581$ Days $T_0=524.669023$ (BKJD)



DV Model-Shift Uniqueness Test

009456920-04, P = 532.149397 Days, E = 524.662488 Days

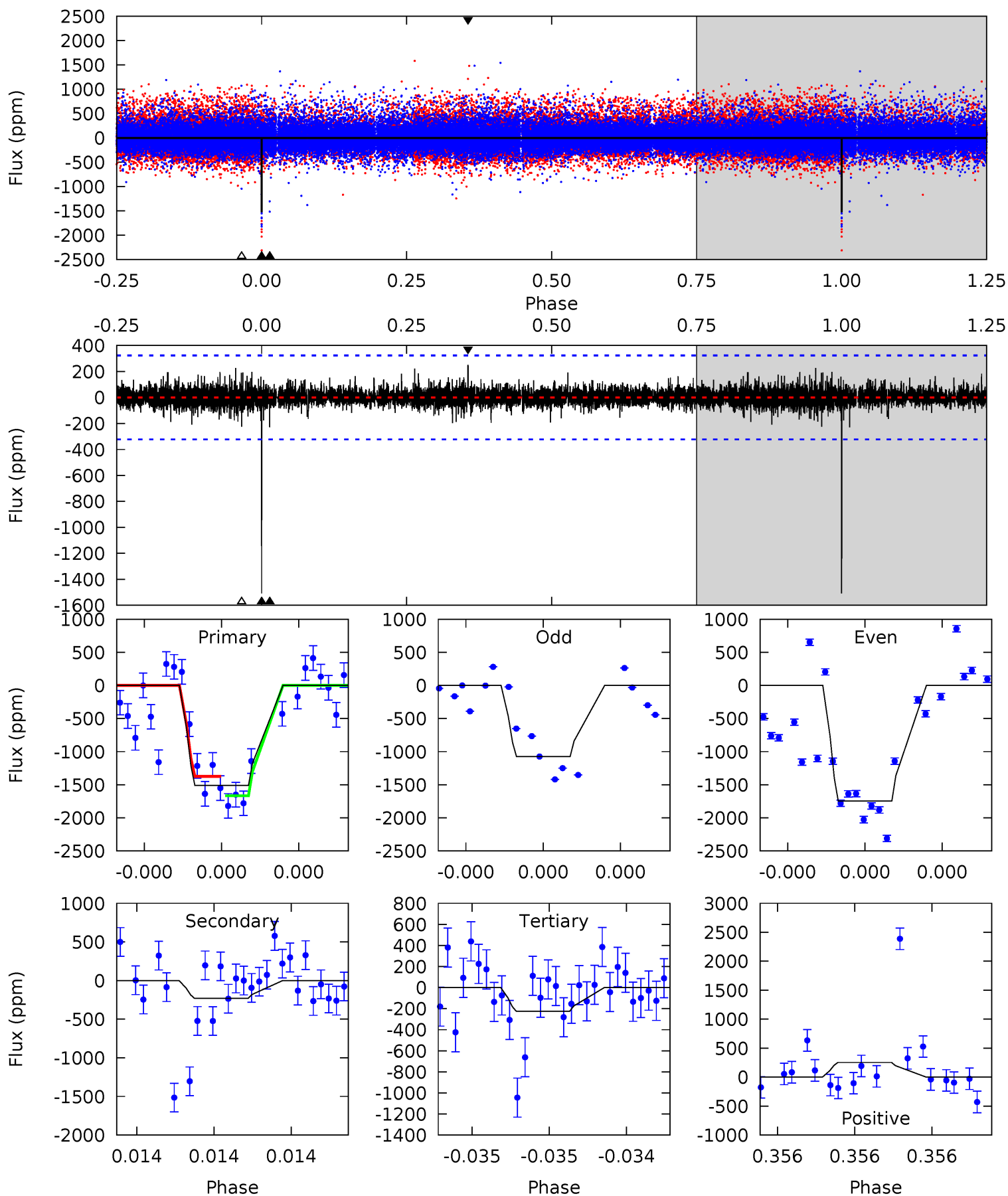
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.87	7.27	6.53	14.2	5.68	3.64	1.85	-1.66	-9.37	0.74	-6.97	1.28	0.92	0.66	0.17



Alt Model-Shift Uniqueness Test

009456920-04, P = 532.137581 Days, E = 524.669023 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	4.05	3.94	4.45	5.69	3.65	0.72	22.6	22.1	0.11	-0.39	5.29	0.92	0.14	2.57



Stellar Parameters For KIC 009456920

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4074^{+146}_{-178}	$4.615^{+0.064}_{-0.016}$	$0.400^{+0.050}_{-0.300}$	$0.663^{+0.026}_{-0.070}$	$0.660^{+0.038}_{-0.062}$	$3.196^{+0.867}_{-0.198}$
	+4%/-4%	+1%/-0%	+12%/-75%	+4%/-11%	+6%/-9%	+27%/-6%
Source	PHO1	KIC0	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 009456920-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-885 ± 122	$2.99^{+2.32}_{-1.93}$	191^{+8}_{-9}	3591^{+1732}_{-568}	$65952^{+478233}_{-43971}$
Alt.	-230 ± 57	$3.16^{+2.15}_{-1.79}$	191^{+8}_{-10}	2898^{+875}_{-386}	15929^{+73173}_{-10506}

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 $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

DV Centroid Data

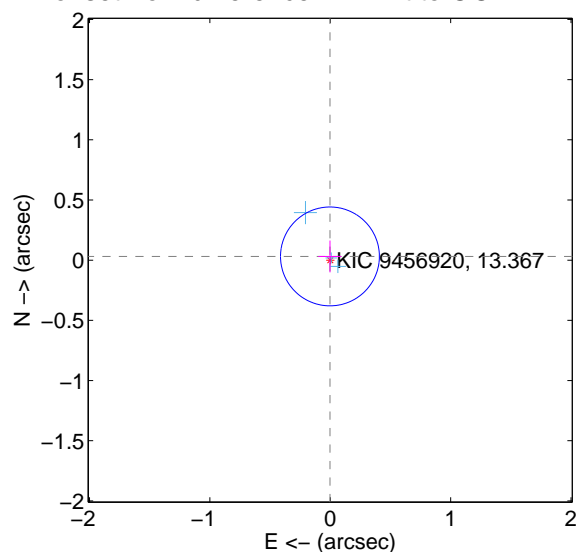
Supplemental centroid analysis for 009456920-04. Kepler magnitude: 13.37. Transit SNR 6.74

There are 3 quarters with good PRF difference image offsets

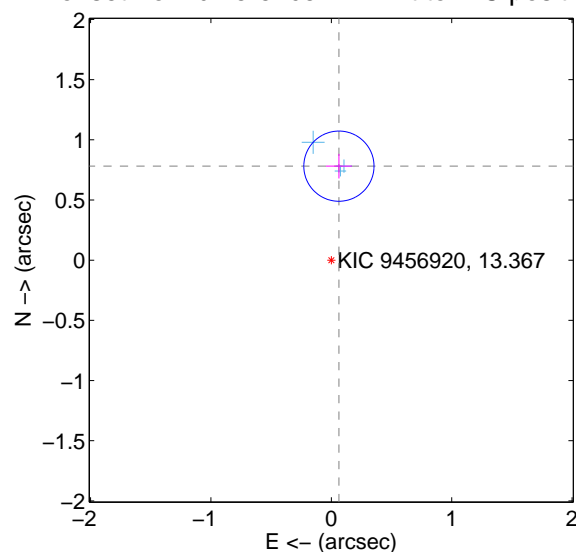
The direct PRF centroid is offset from the target star catalog position by about 0.72 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.031 ± 0.137	0.23	0.003 ± 0.096	0.031 ± 0.132
PRF-fit source offset from KIC position	0.784 ± 0.097	8.06	-0.063 ± 0.108	0.781 ± 0.102
photometric centroid source offset	0.46 ± 0.40	1.14	0.16 ± 0.44	0.43 ± 0.40

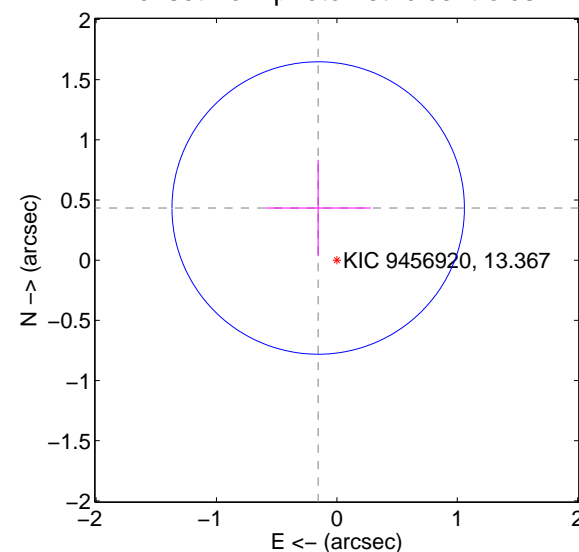
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

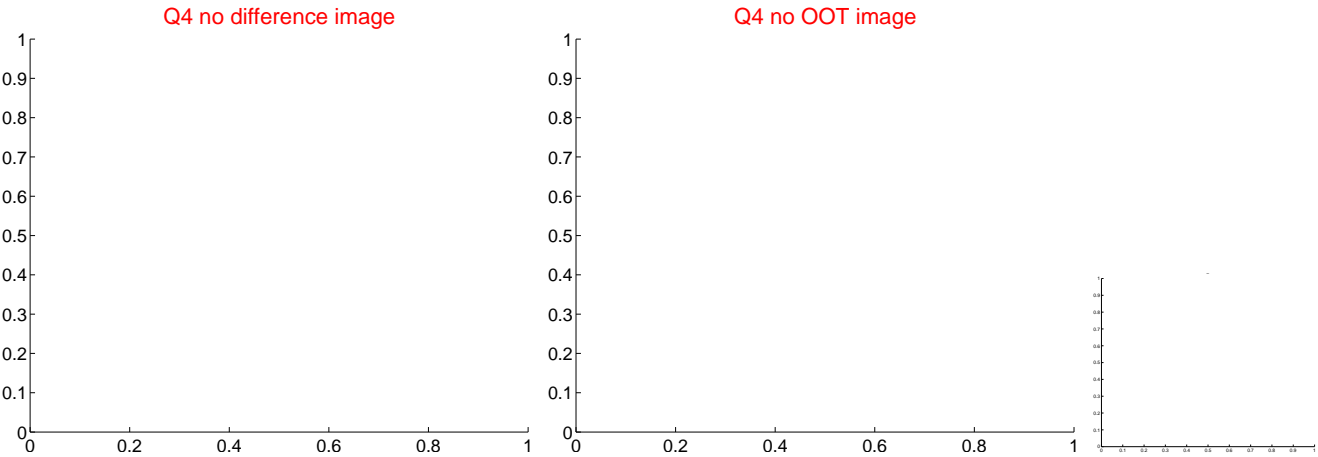
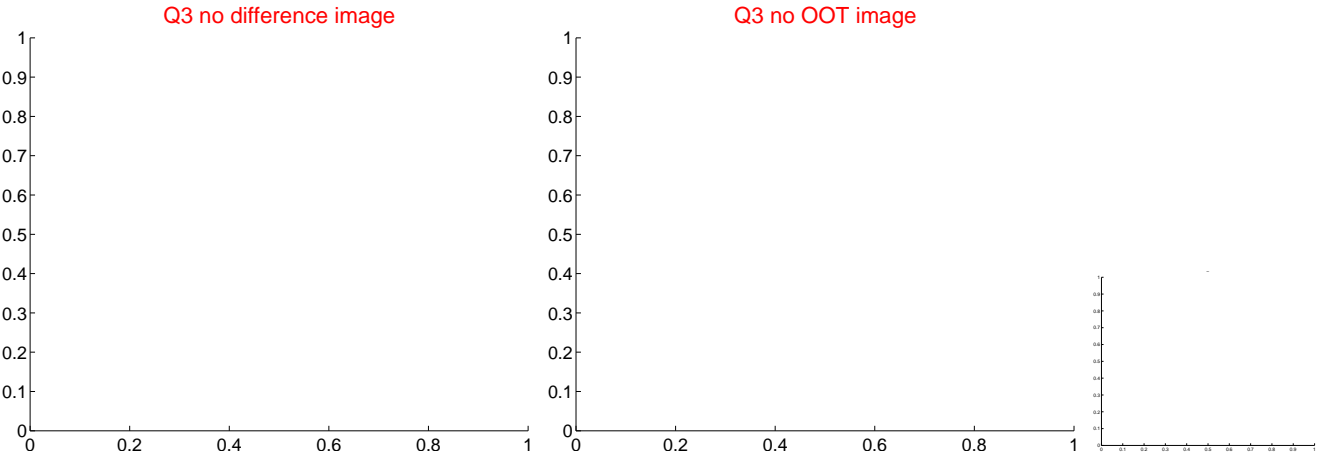
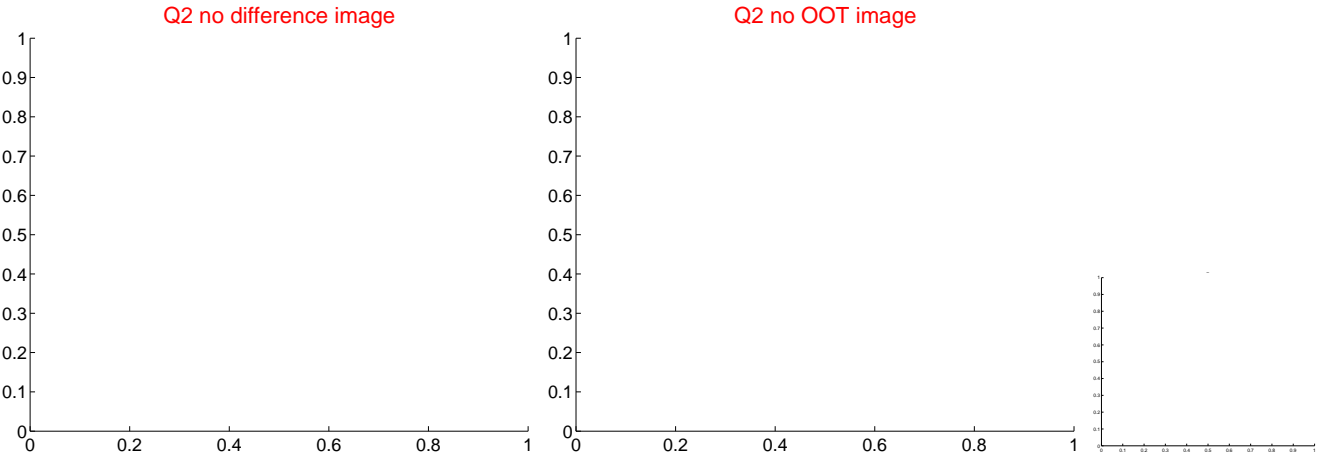
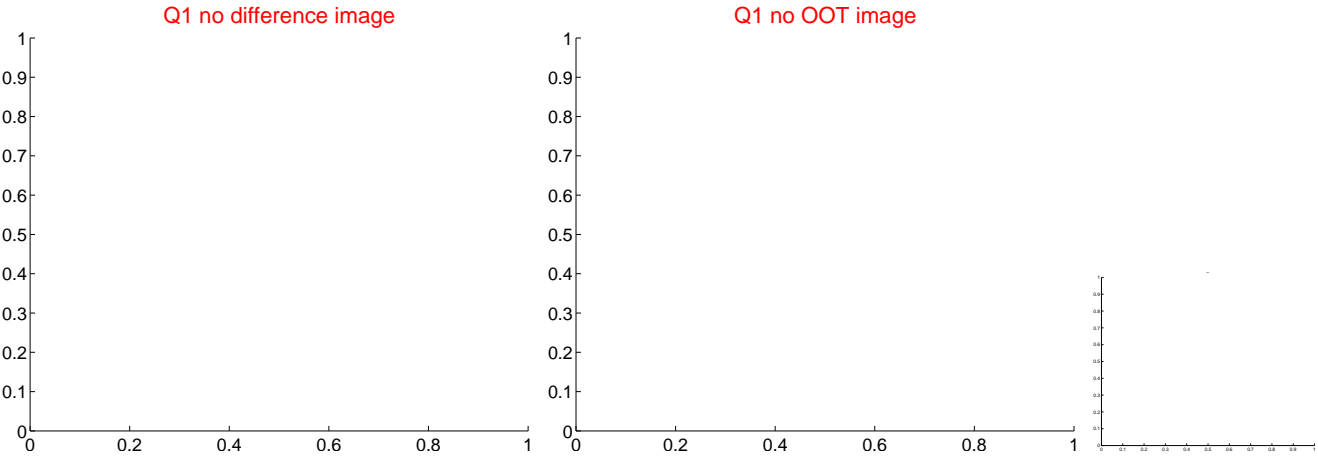


offset from photometric centroids

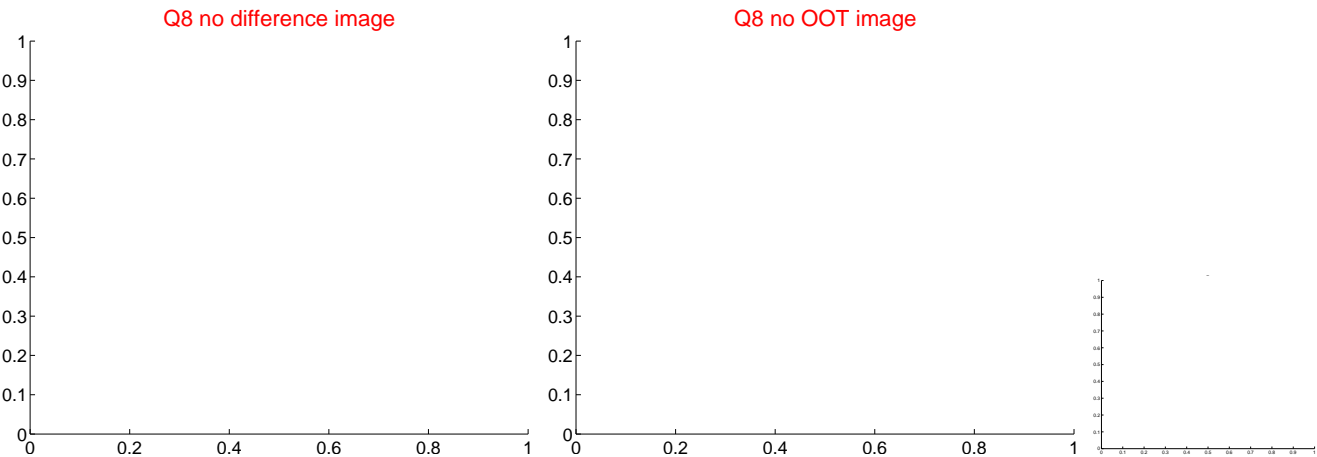
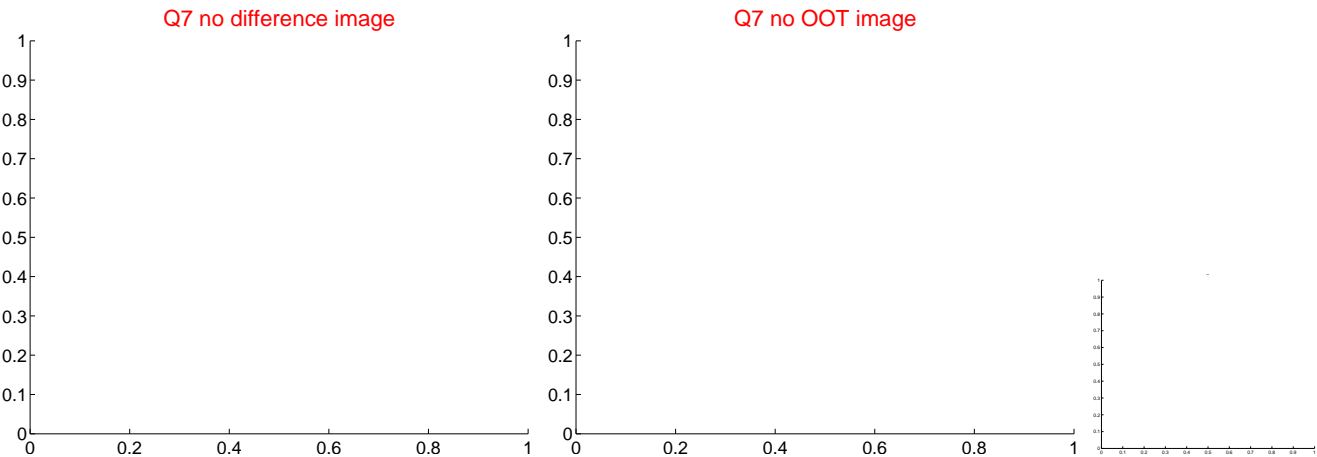
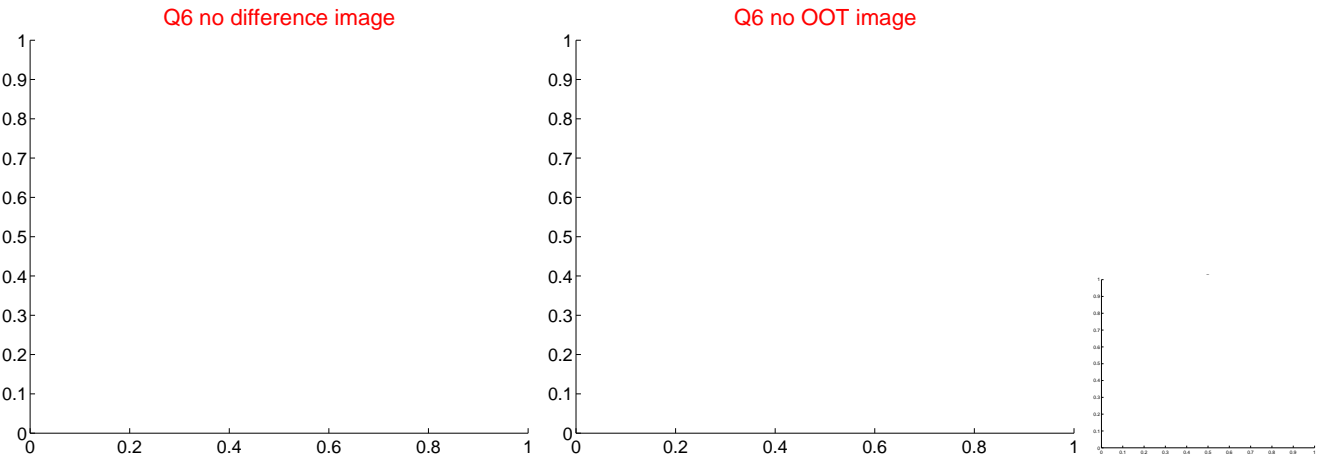
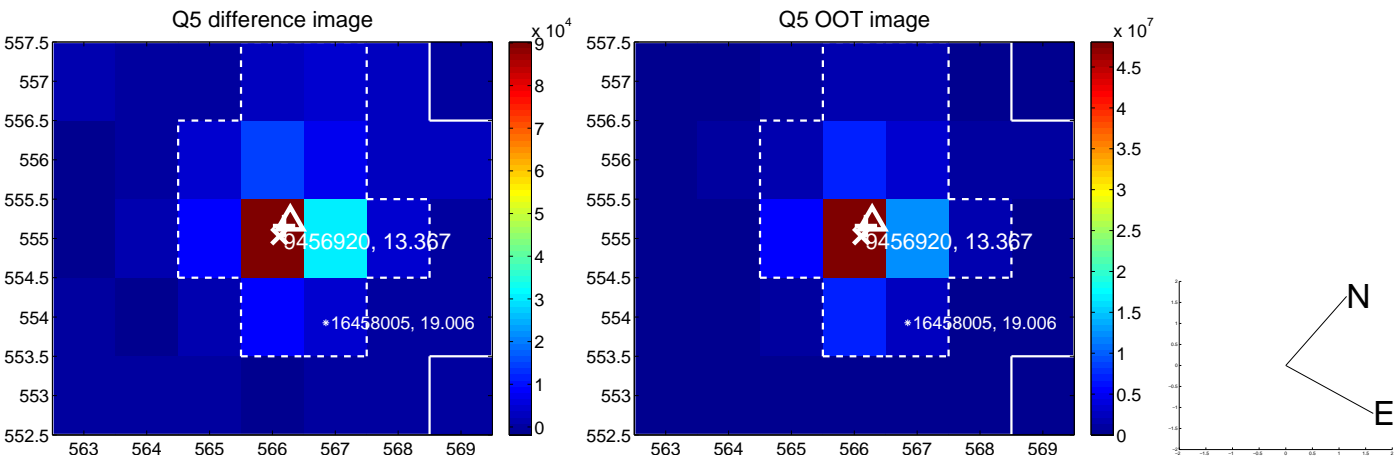


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

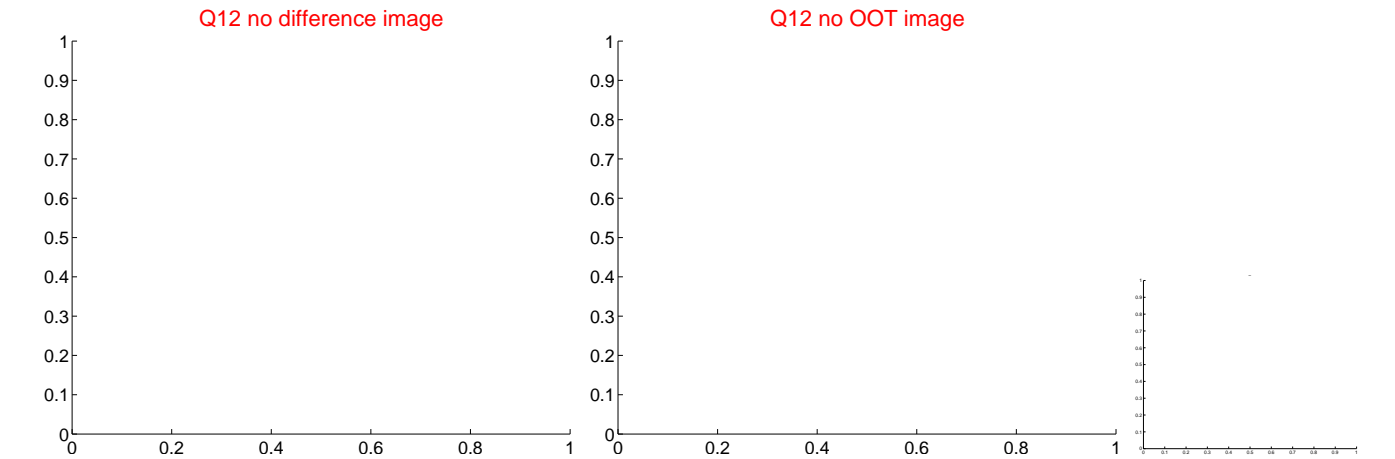
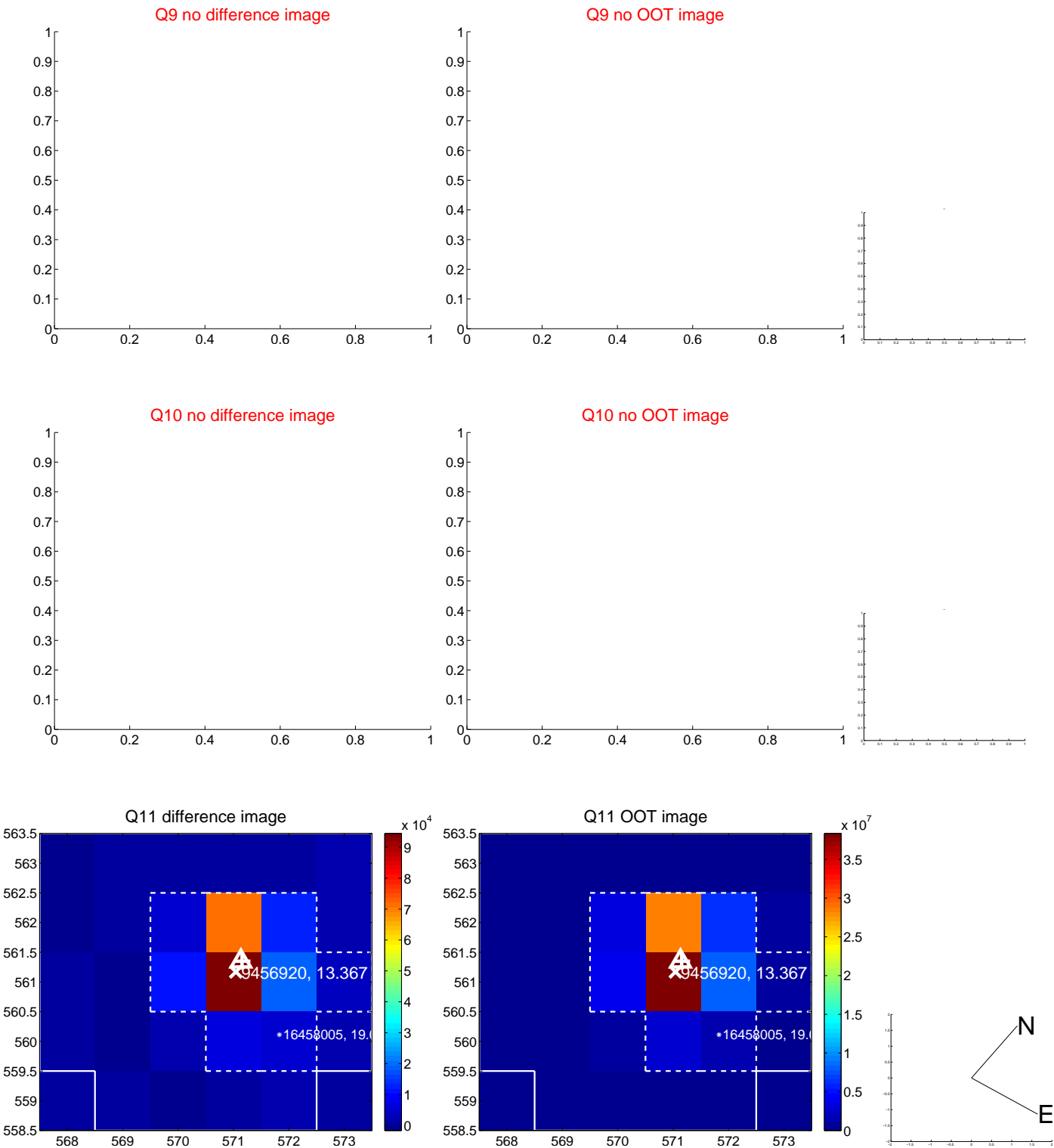
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



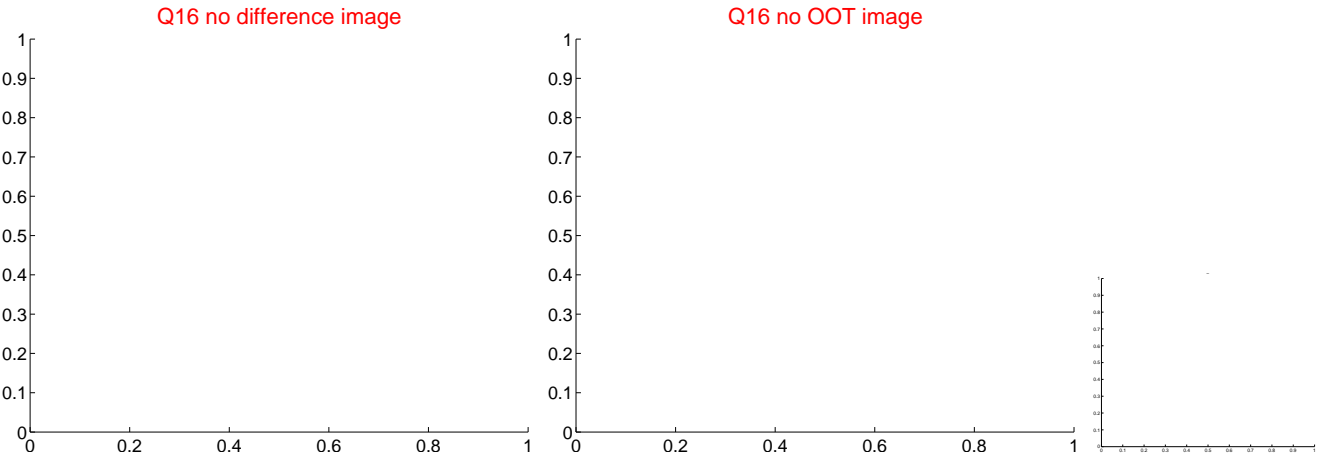
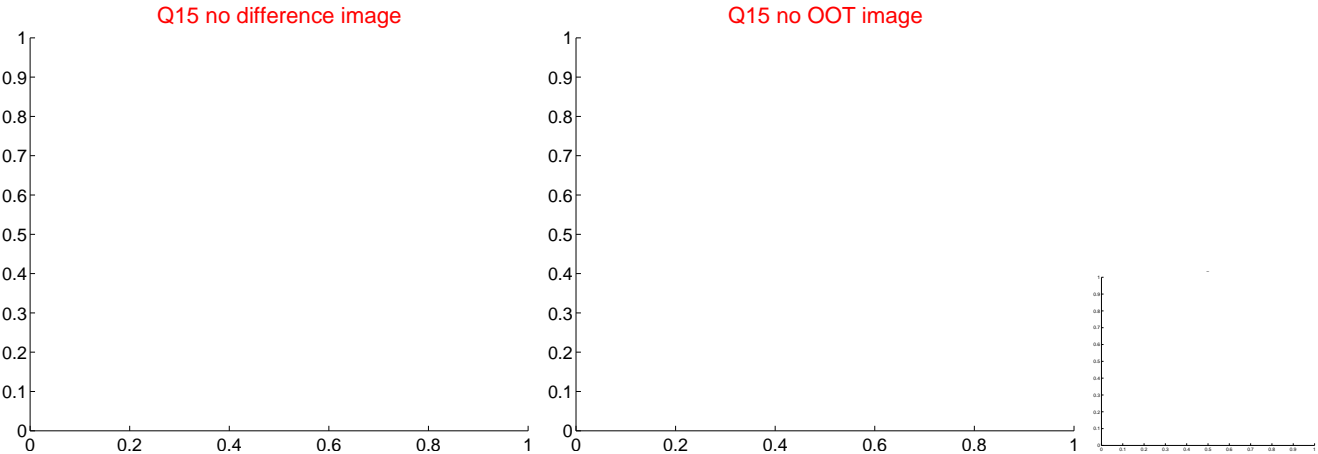
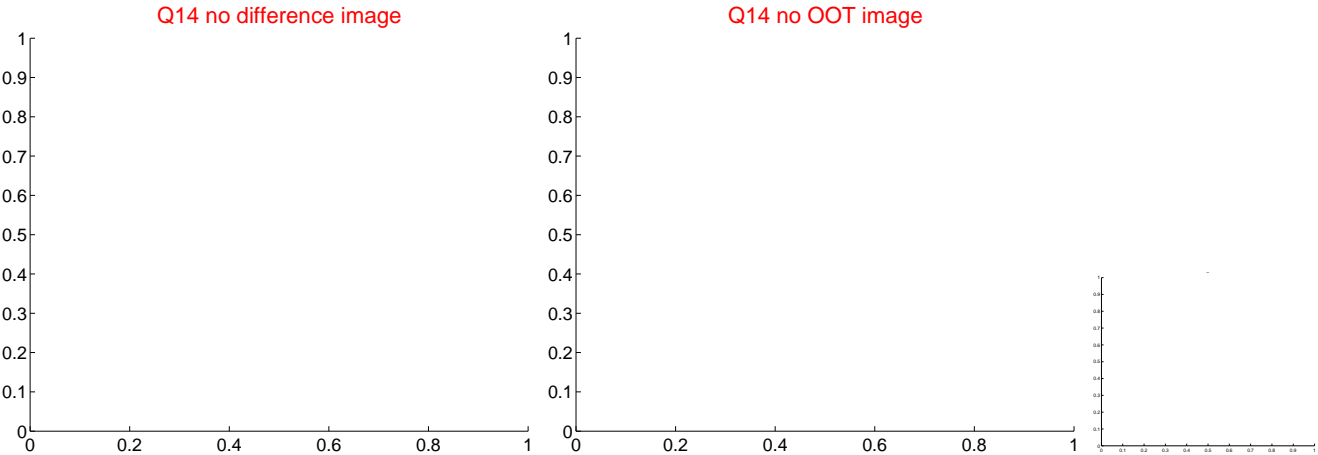
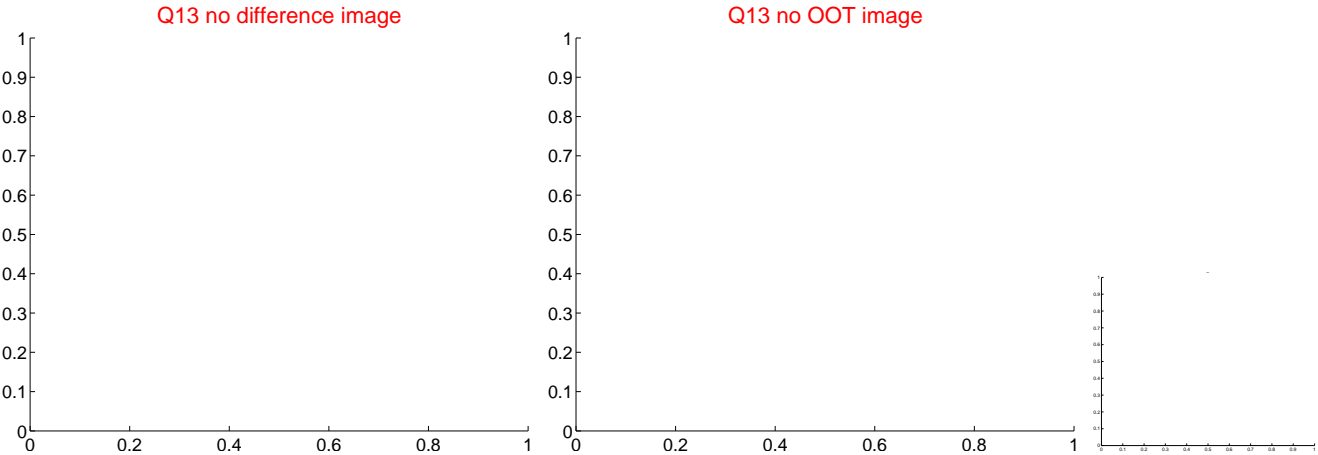
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

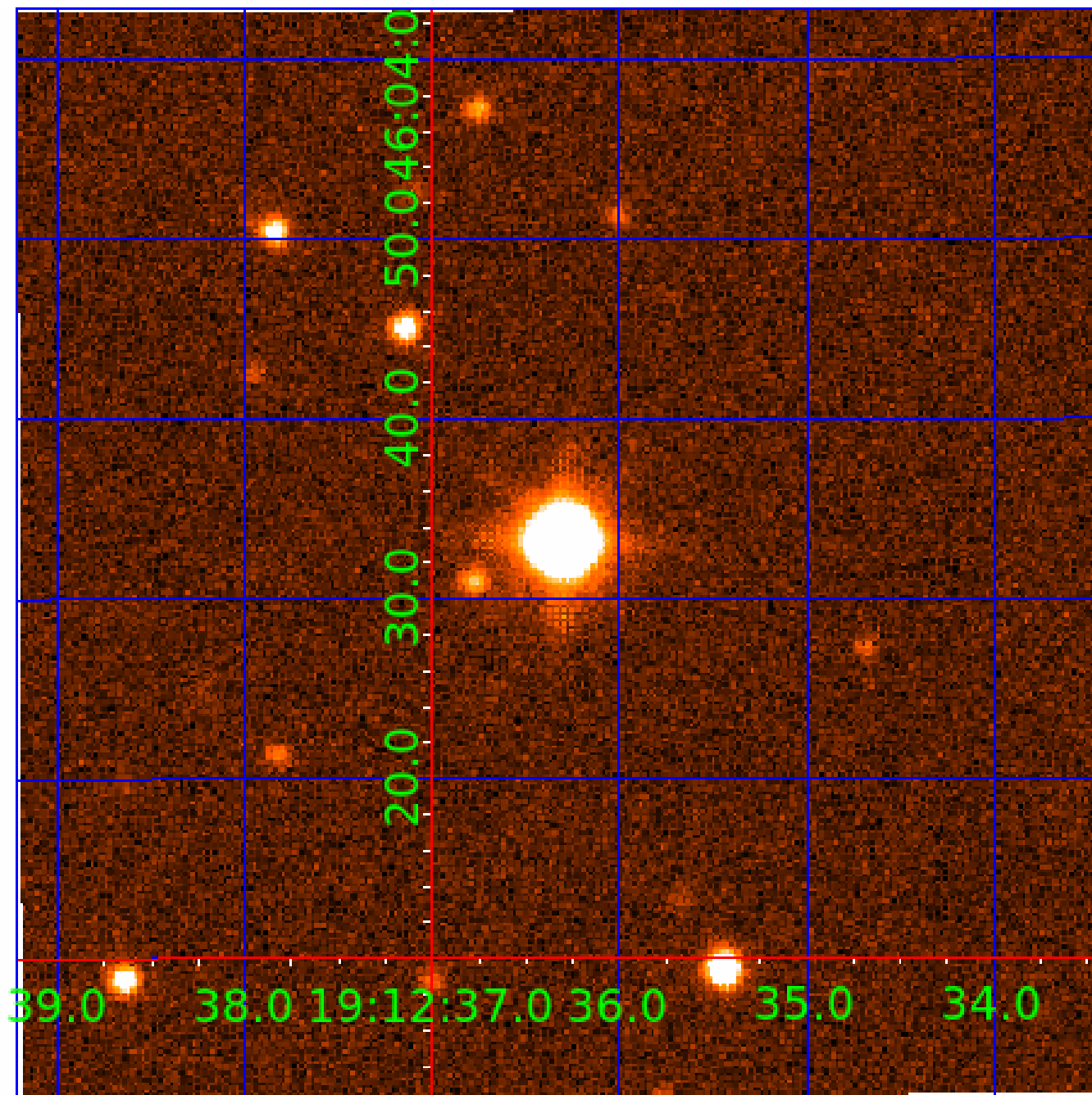


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009456920

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})
009456920-01	OBS	No	150.956546	279.927189	1105.5	3.417	14.3	7.4	0.66	4074	2.10	0.46
009456920-02	OBS	No	375.297460	246.520728	1383.0	4.079	12.1	6.1	0.66	4074	2.78	0.14
009456920-03	OBS	No	524.224071	494.560506	1187.8	3.523	16.7	5.7	0.66	4074	2.36	0.09
009456920-04	OBS	No	532.149397	524.662488	1298.9	3.519	15.0	6.7	0.66	4074	2.59	0.09
009456920-05	OBS	No	677.236290	224.184000	440.3	4.500	12.7	-1.0	0.66	4074	1.32	0.06

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009456920-01	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009456920-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009456920-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
009456920-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

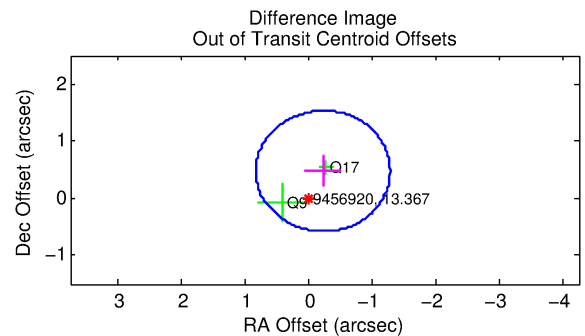
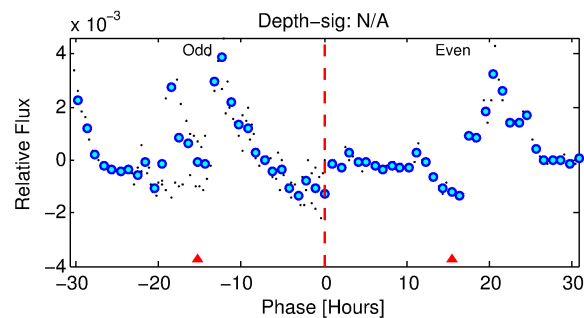
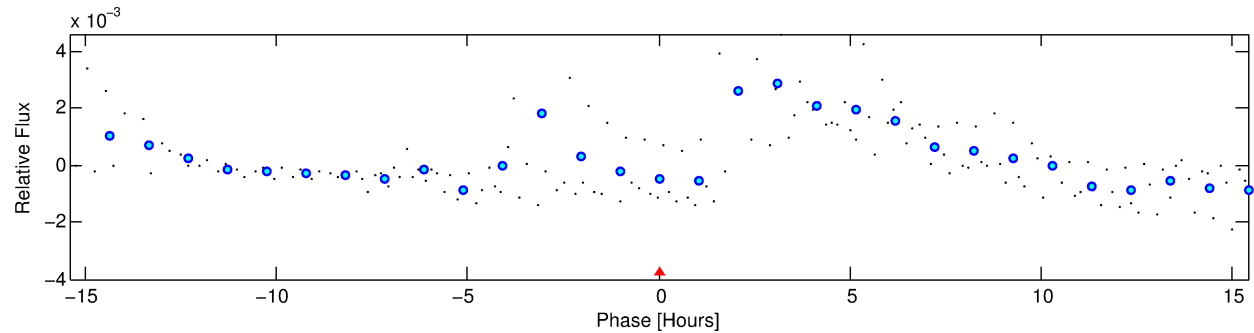
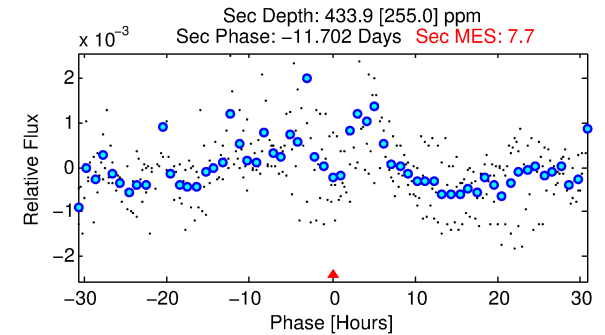
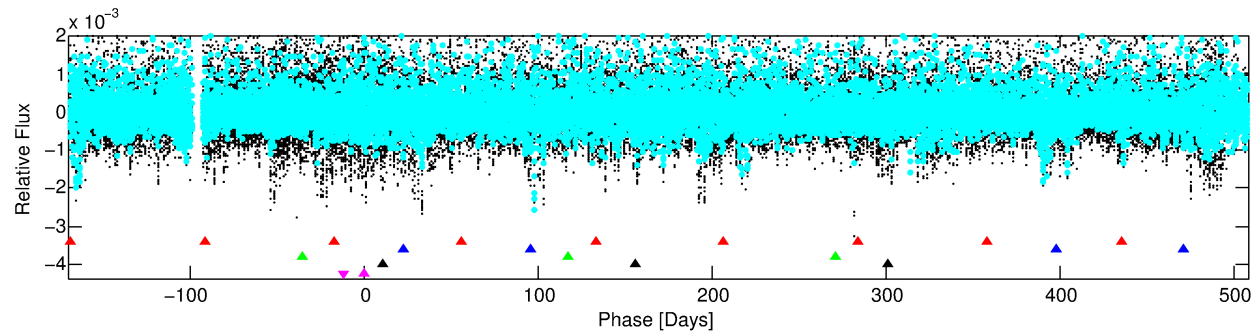
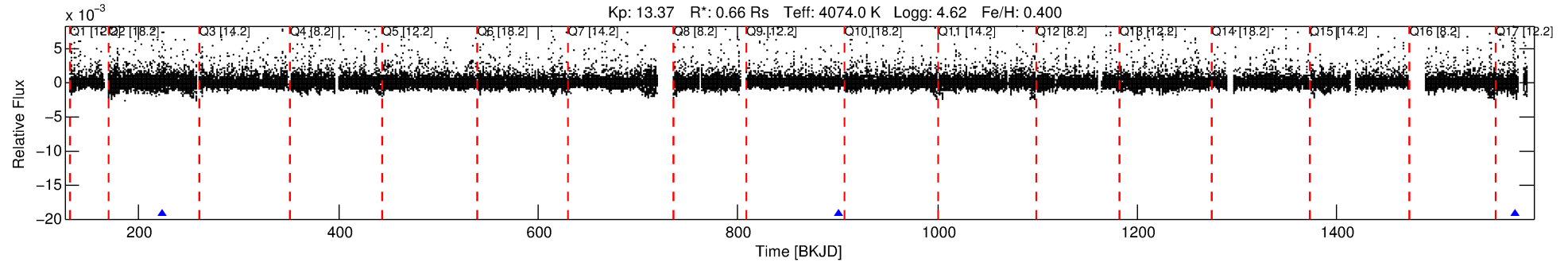
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009456920-05

No Significant Match Found

DV One-Page Summary

KIC: 9456920 Candidate: 5 of 5 Period: 677.236 d



TPS TCE Results:

Period = 677.23629 d
Epoch = 224.1840 BKJD

DV fit results are unavailable

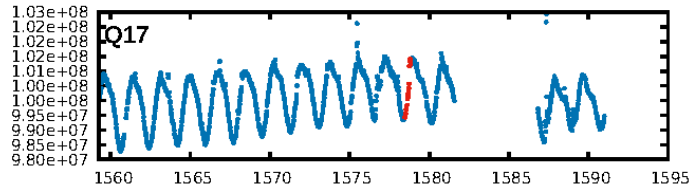
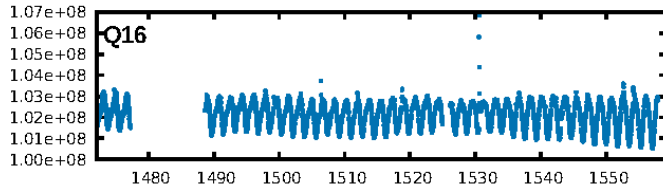
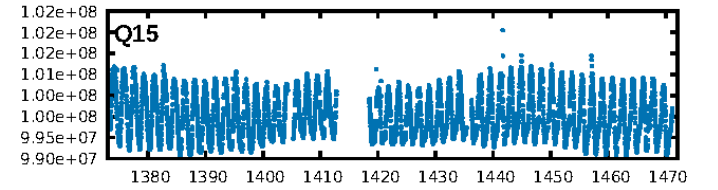
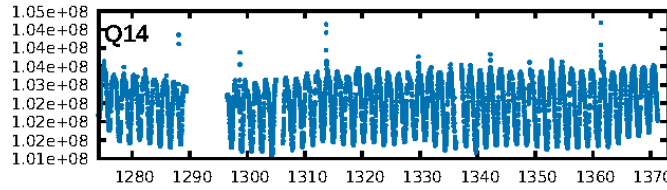
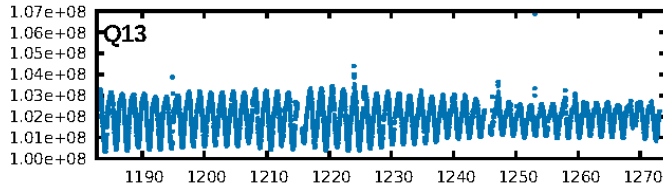
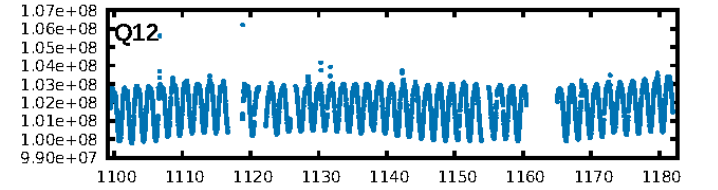
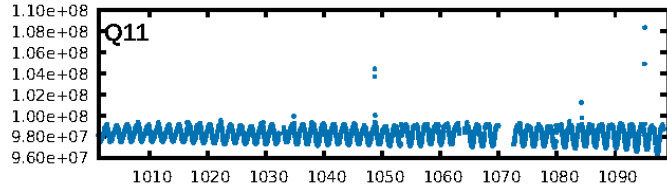
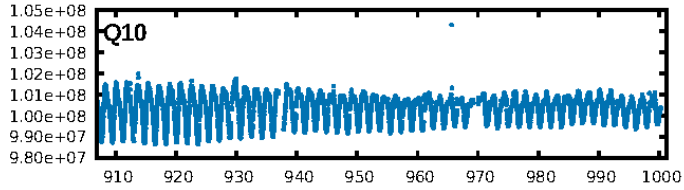
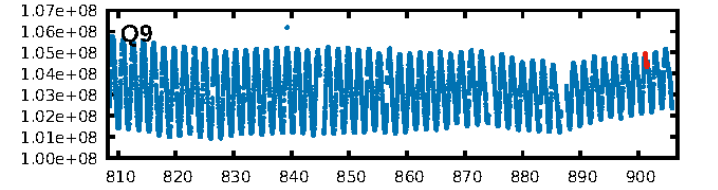
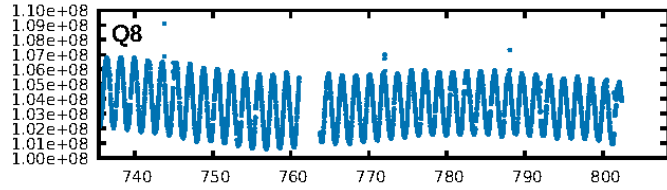
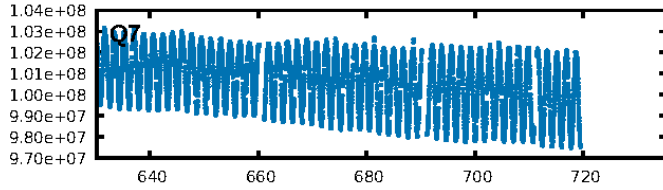
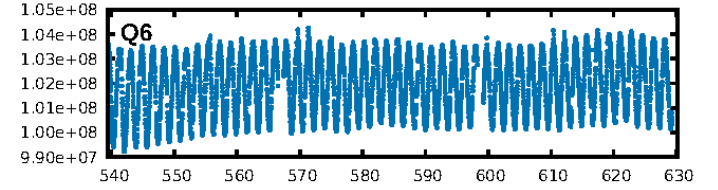
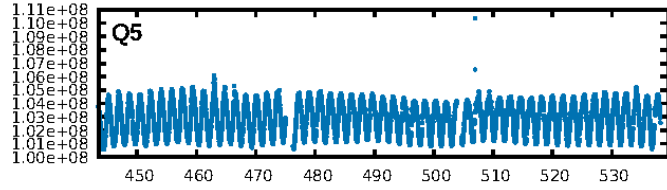
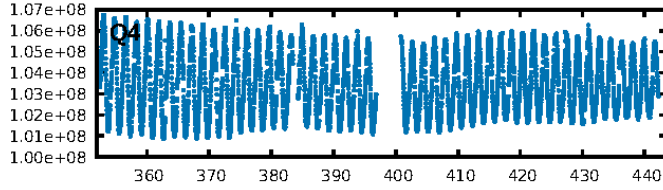
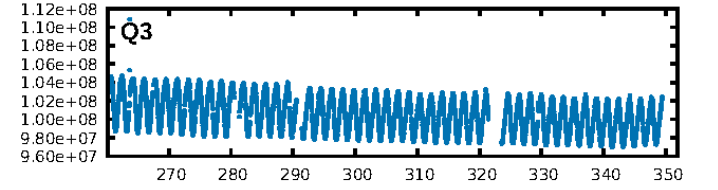
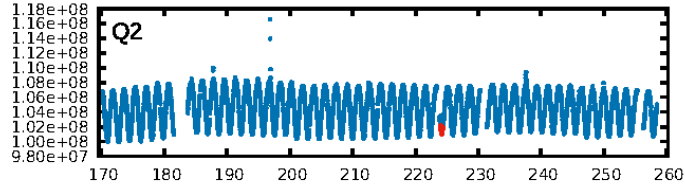
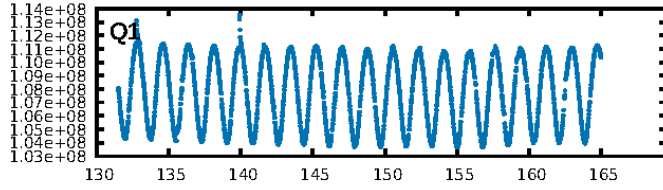
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [609.53σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.3125
Centroid-sig: 54.6%
Centroid-so: 0.575 arcsec [1.96σ]
OotOffset-rm: 0.527 arcsec [1.49σ]
KicOffset-rm: 1.220 arcsec [4.70σ]
OotOffset-st: 0/0/0/2 [2]
KicOffset-st: 0/0/0/2 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [2/2]

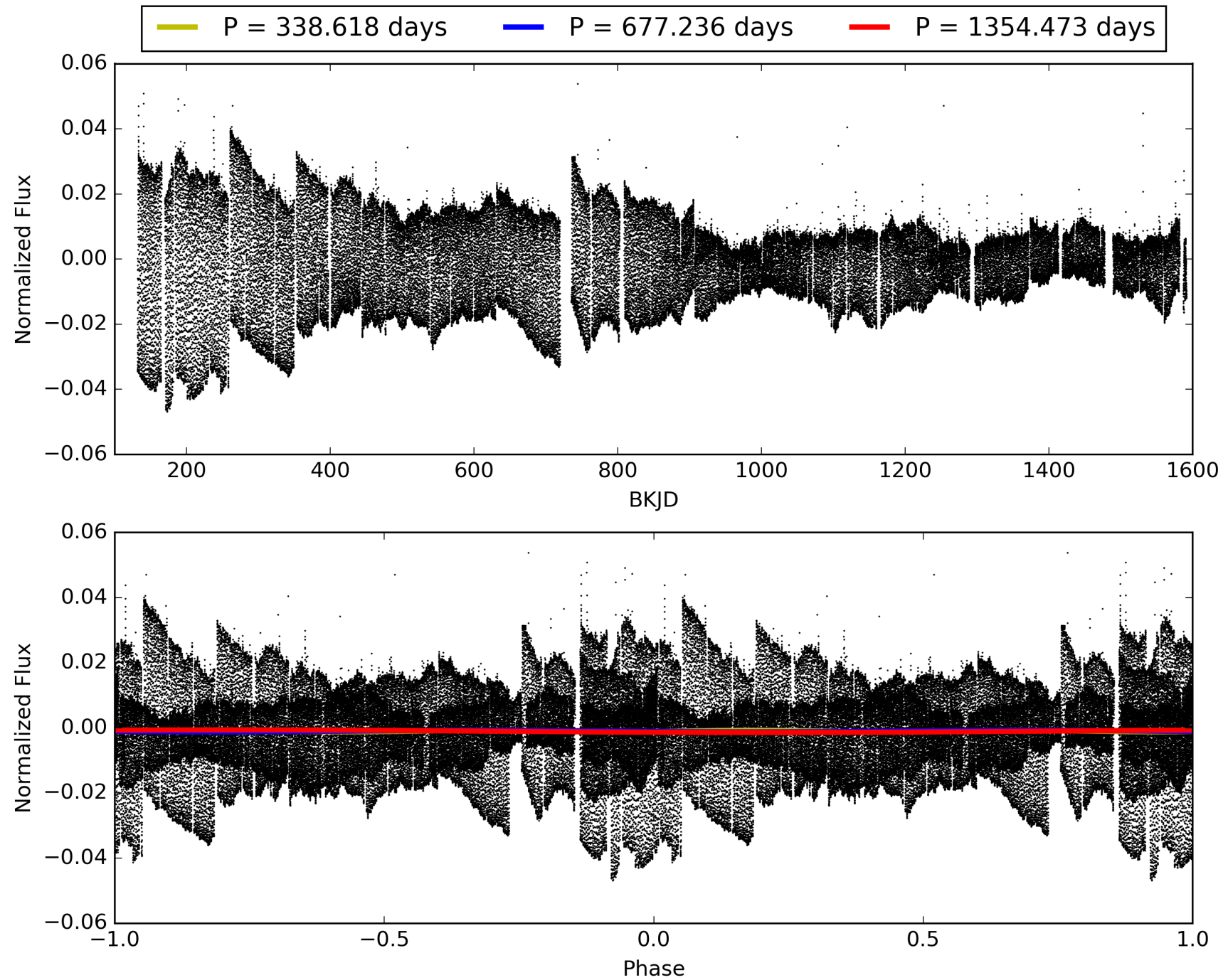
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:15:27 Z

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

TCE 009456920-05, PDC Light Curves

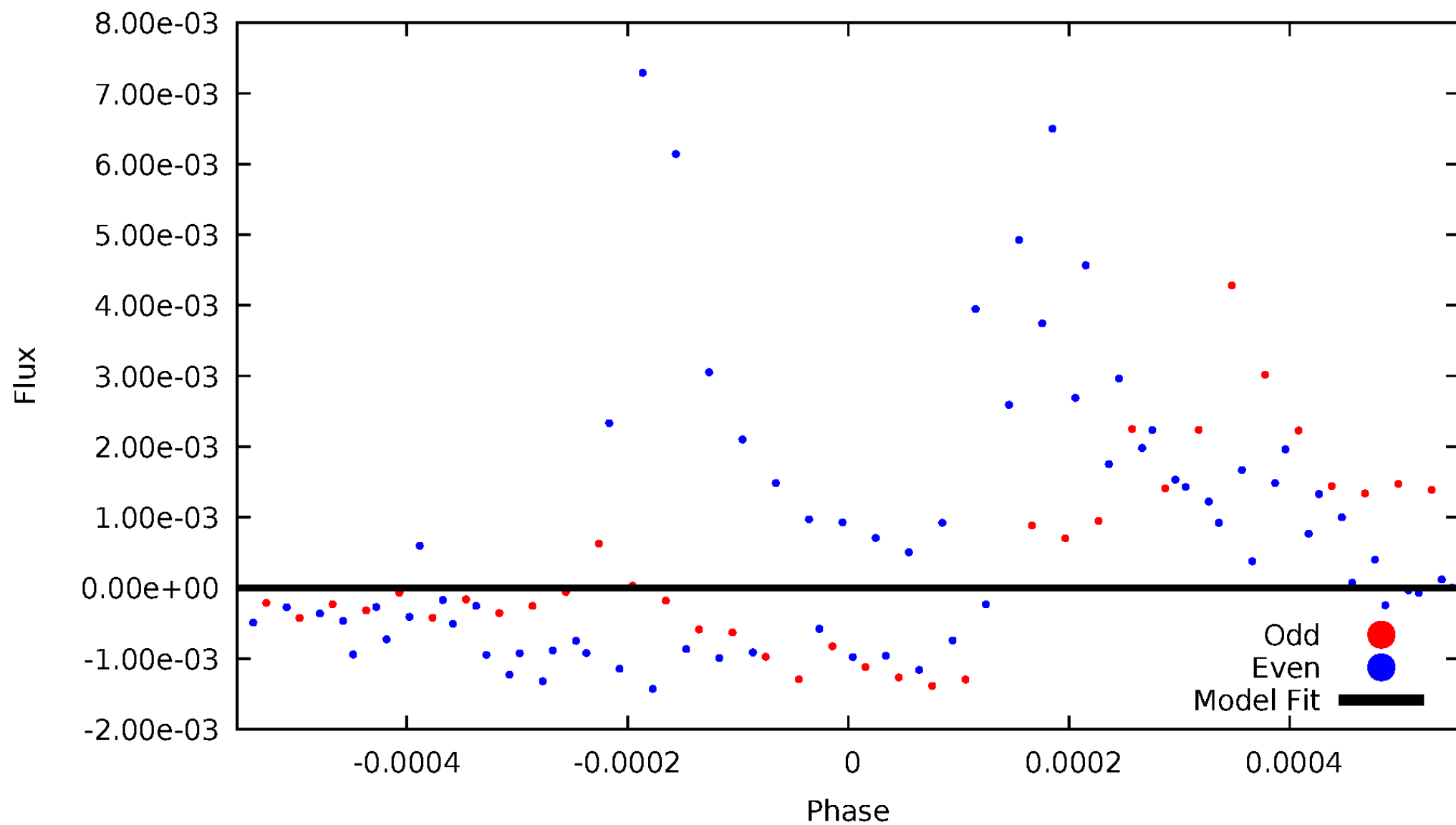


TCE 009456920-05



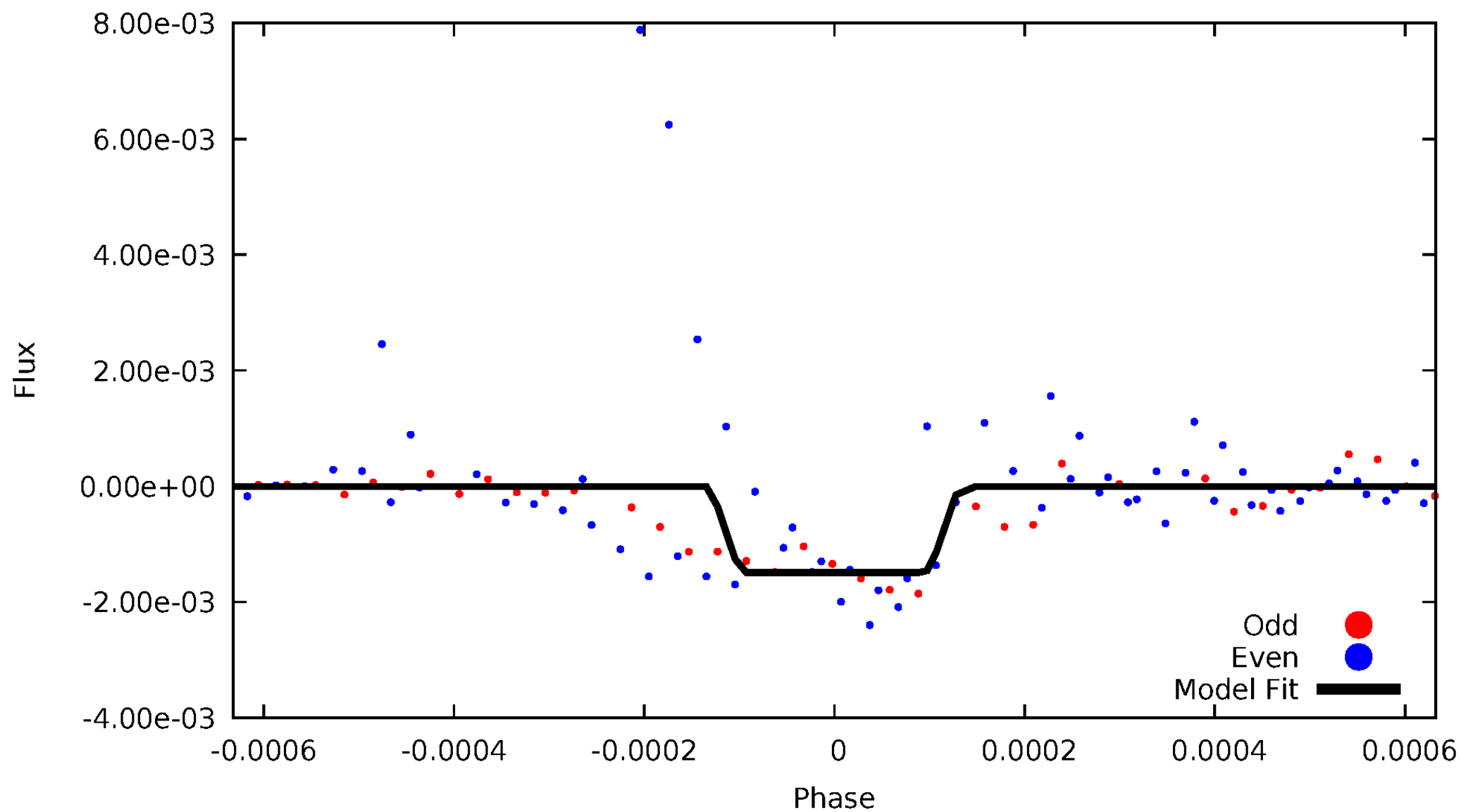
DV Odd/Even

TCE 009456920-05



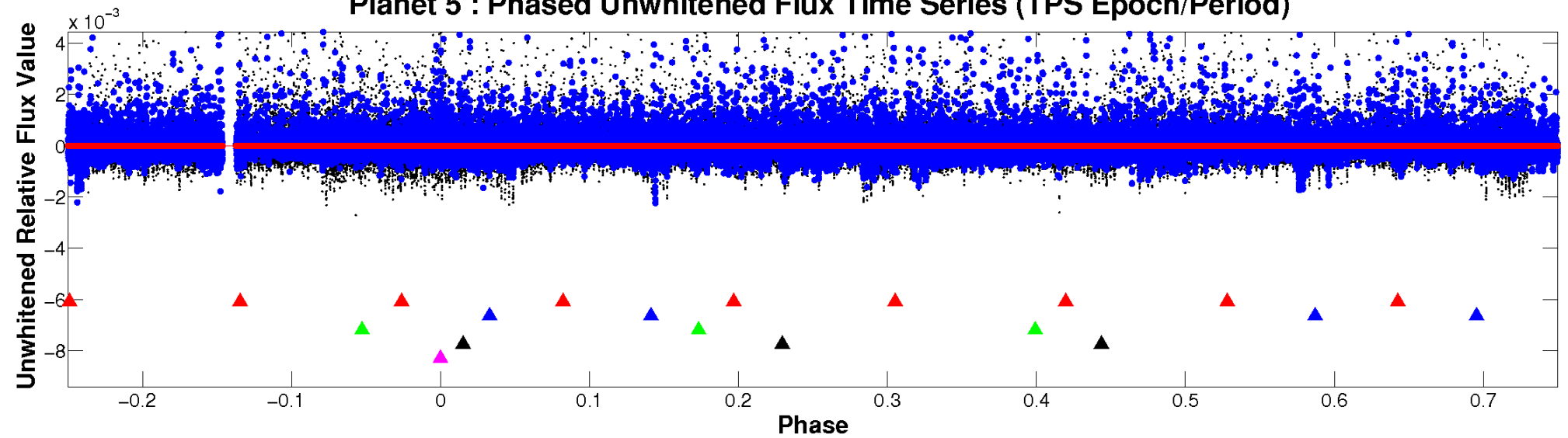
ALT Odd/Even

TCE 009456920-05

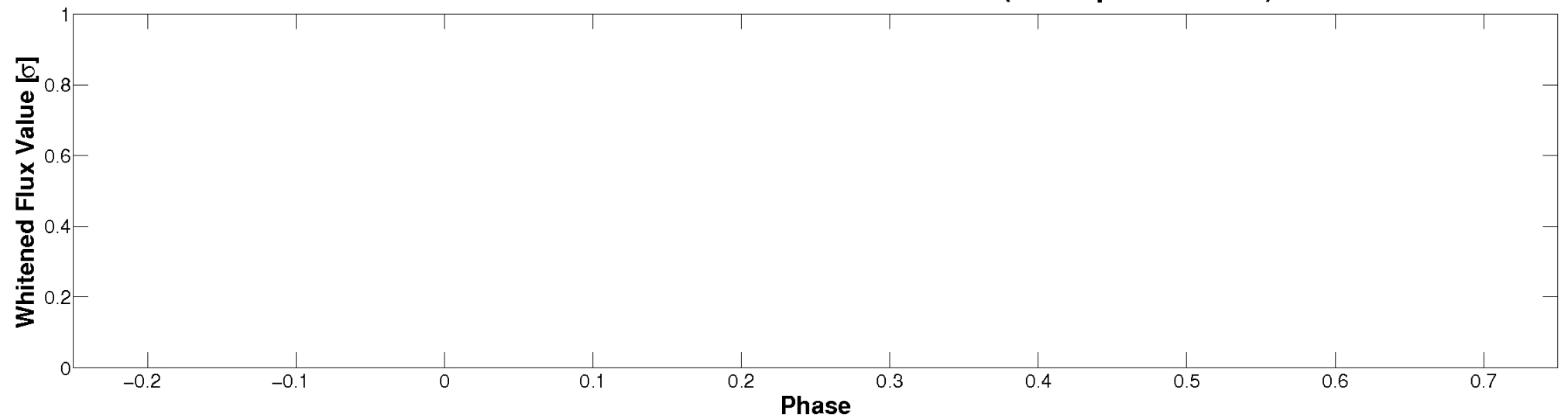


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

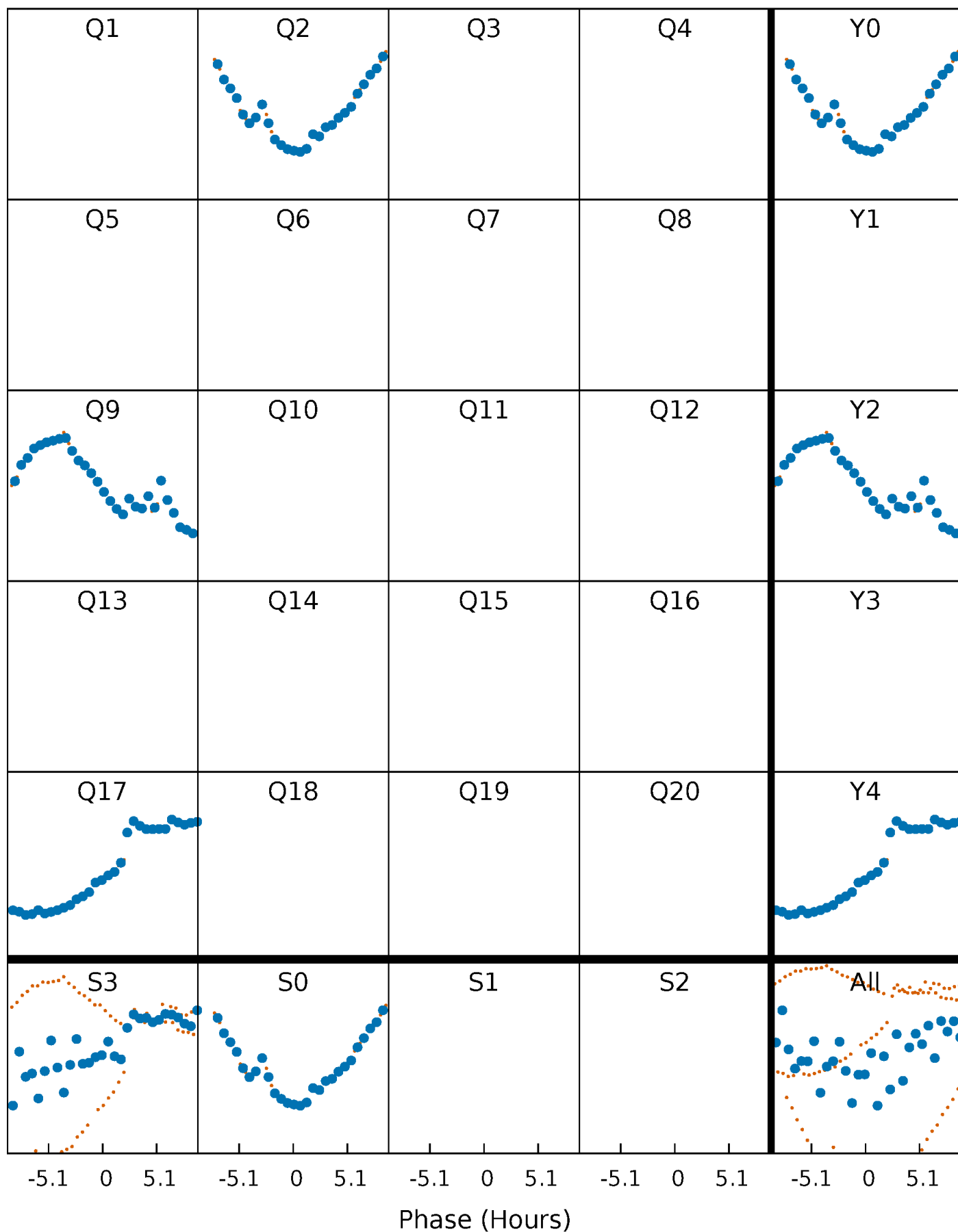


Planet 5 : Phased Whitened Flux Time Series (TPS Epoch/Period)



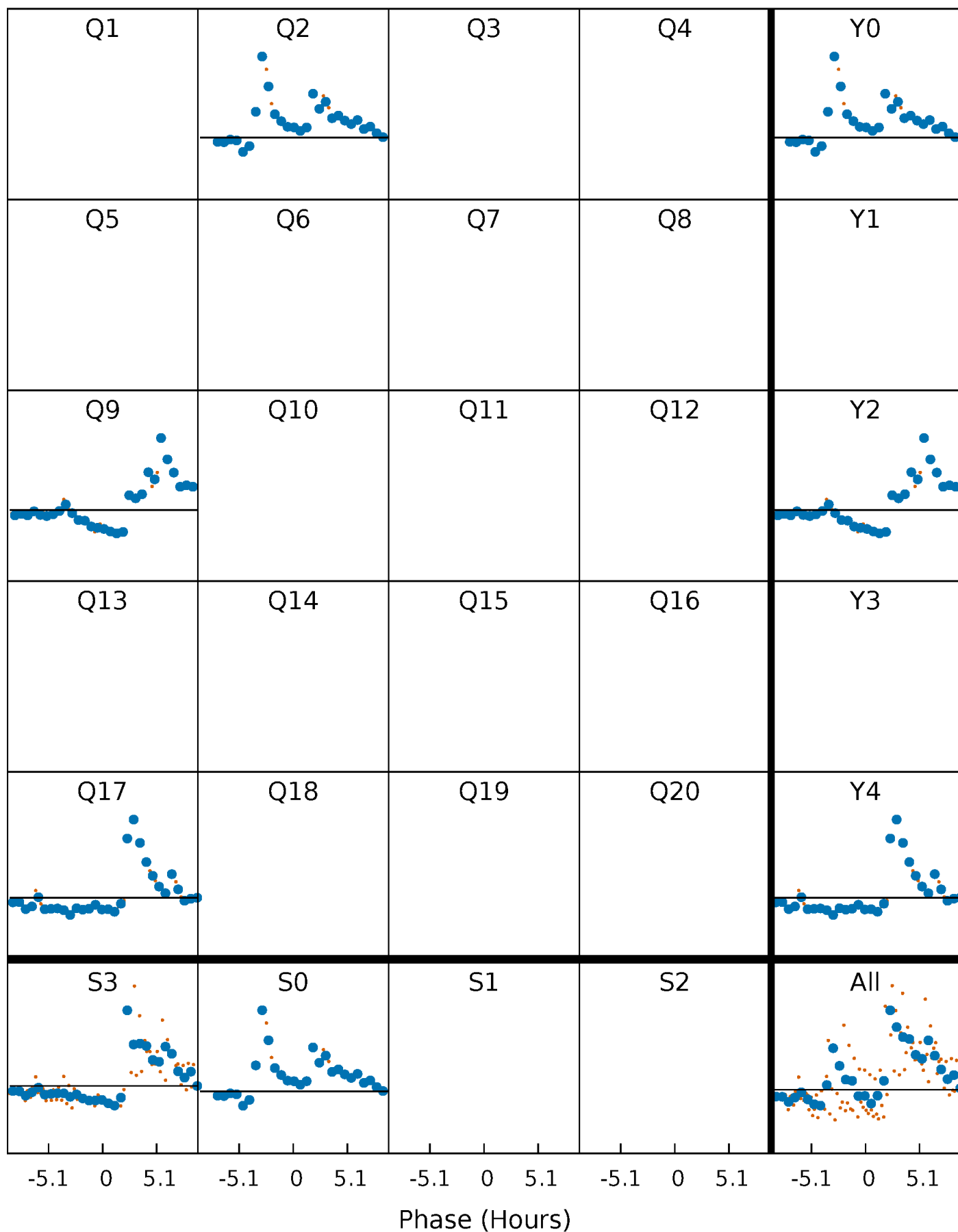
PDC Quarter-Phased Transit Curves

TCE 009456920-05 $P=677.236290$ Days $T_0=224.184000$ (BKJD)



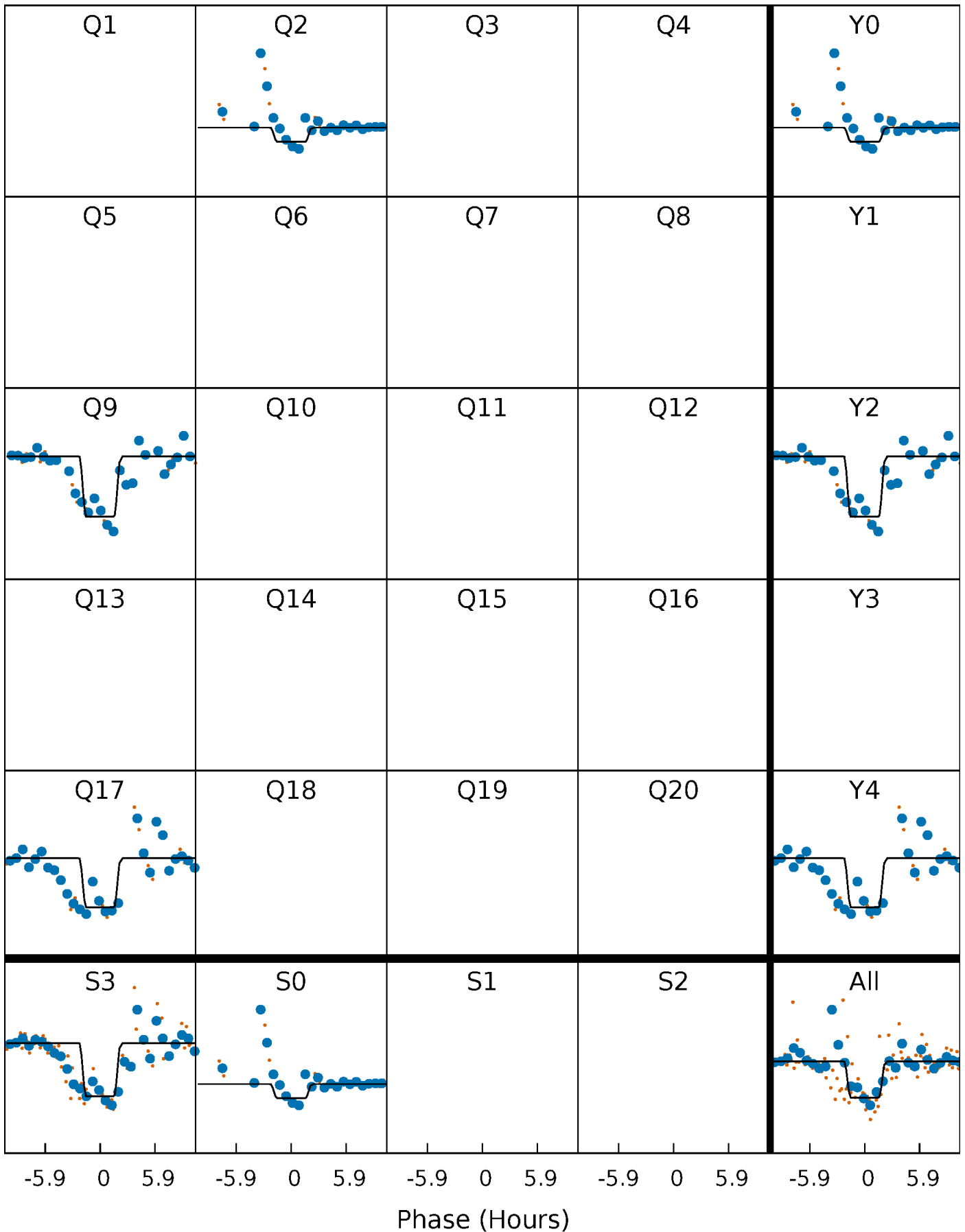
DV Quarter-Phased Transit Curves

TCE 009456920-05 $P=677.236290$ Days $T_0=224.184000$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

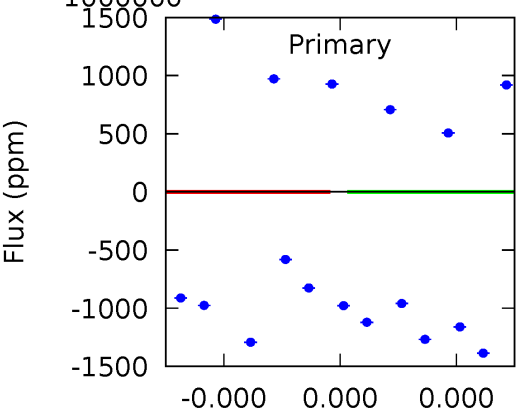
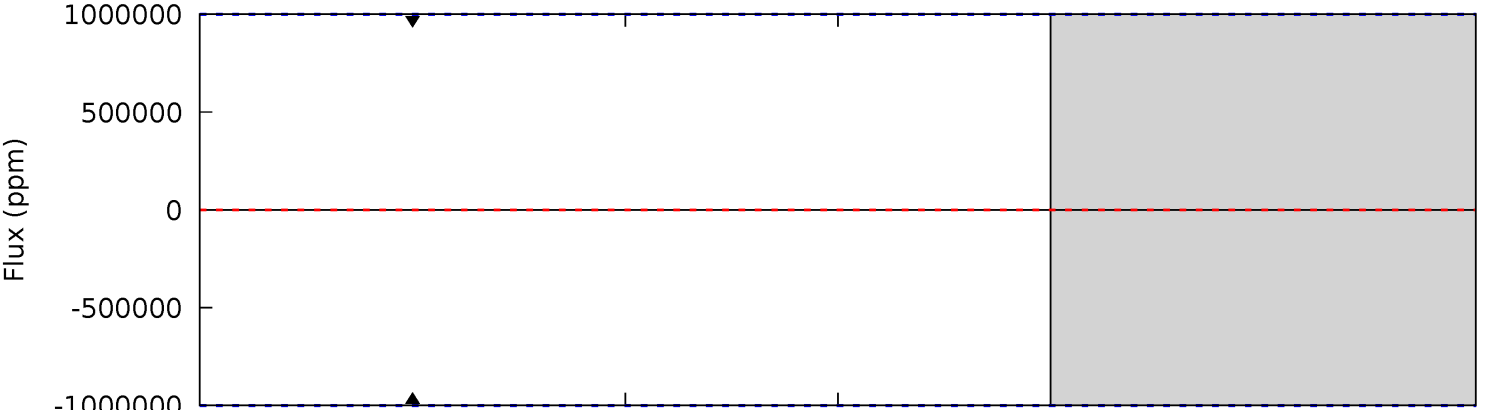
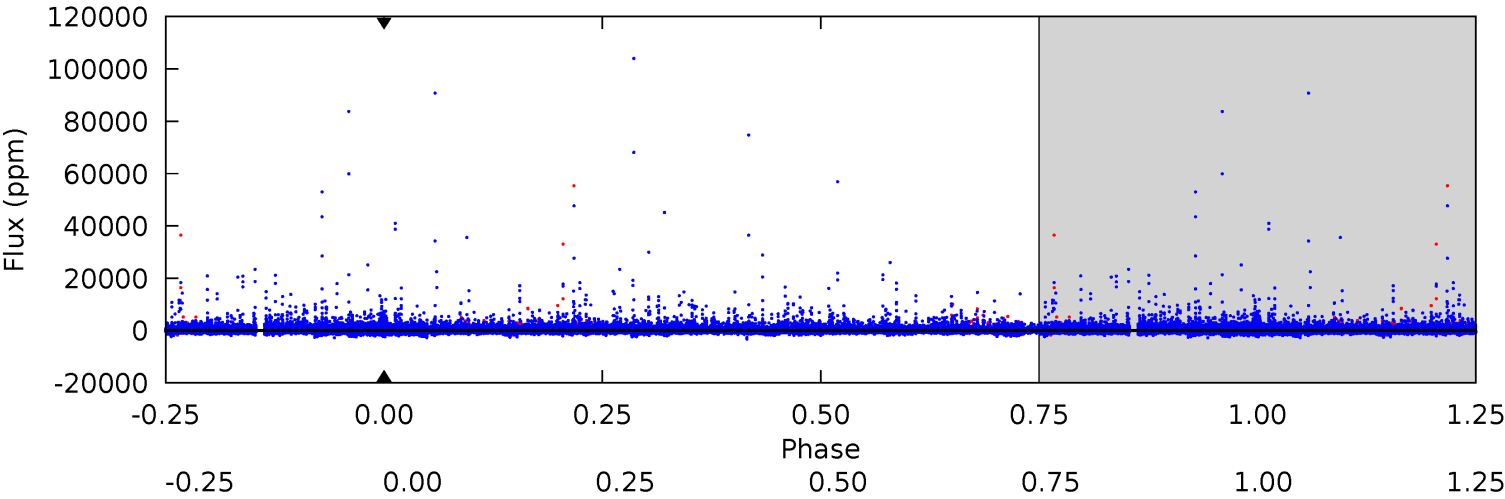
TCE 009456920-05 $P=677.236290$ Days $T_0=224.196086$ (BKJD)



DV Model-Shift Uniqueness Test

009456920-05, P = 677.236290 Days, E = 224.184000 Days

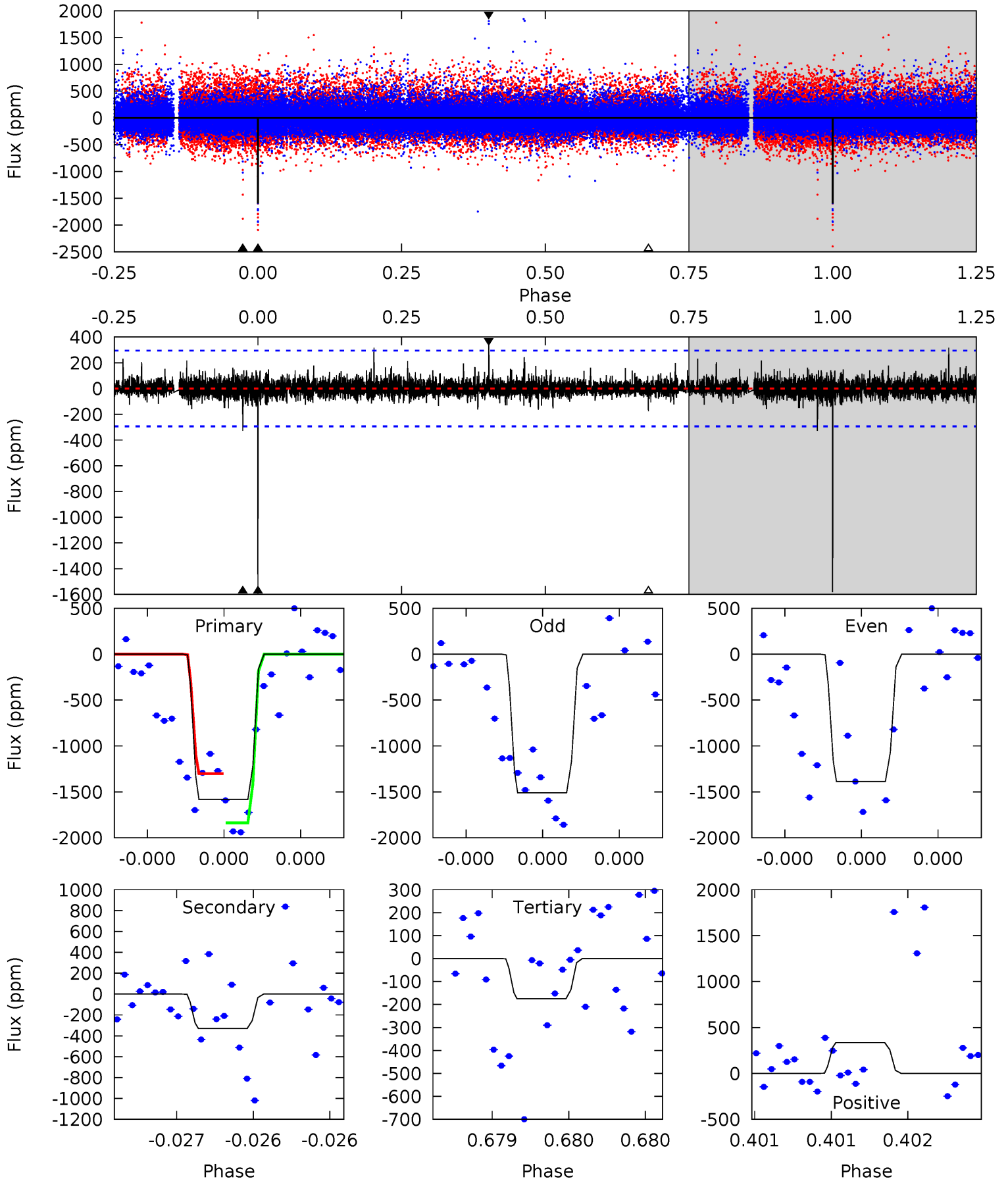
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009456920-05, P = 677.236290 Days, E = 224.196086 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.5	6.35	3.38	6.46	5.67	3.63	0.73	27.1	24.0	2.97	-0.11	1.07	0.91	0.17	5.19



Stellar Parameters For KIC 009456920

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4074^{+146}_{-178}	$4.615^{+0.064}_{-0.016}$	$0.400^{+0.050}_{-0.300}$	$0.663^{+0.026}_{-0.070}$	$0.660^{+0.038}_{-0.062}$	$3.196^{+0.867}_{-0.198}$
	+4%/-4%	+1%/-0%	+12%/-75%	+4%/-11%	+6%/-9%	+27%/-6%
Source	PHO1	KIC0	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 009456920-05 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0 ± 1000000	$5.63^{+5.51}_{-4.06}$	176^{+7}_{-8}	3743^{+5394}_{-12941}	$134428^{+4919631}_{-5792147}$
Alt.	-329 ± 52	$5.78^{+6.05}_{-3.82}$	177^{+7}_{-8}	2592^{+923}_{-406}	9518^{+73114}_{-7250}

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 $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

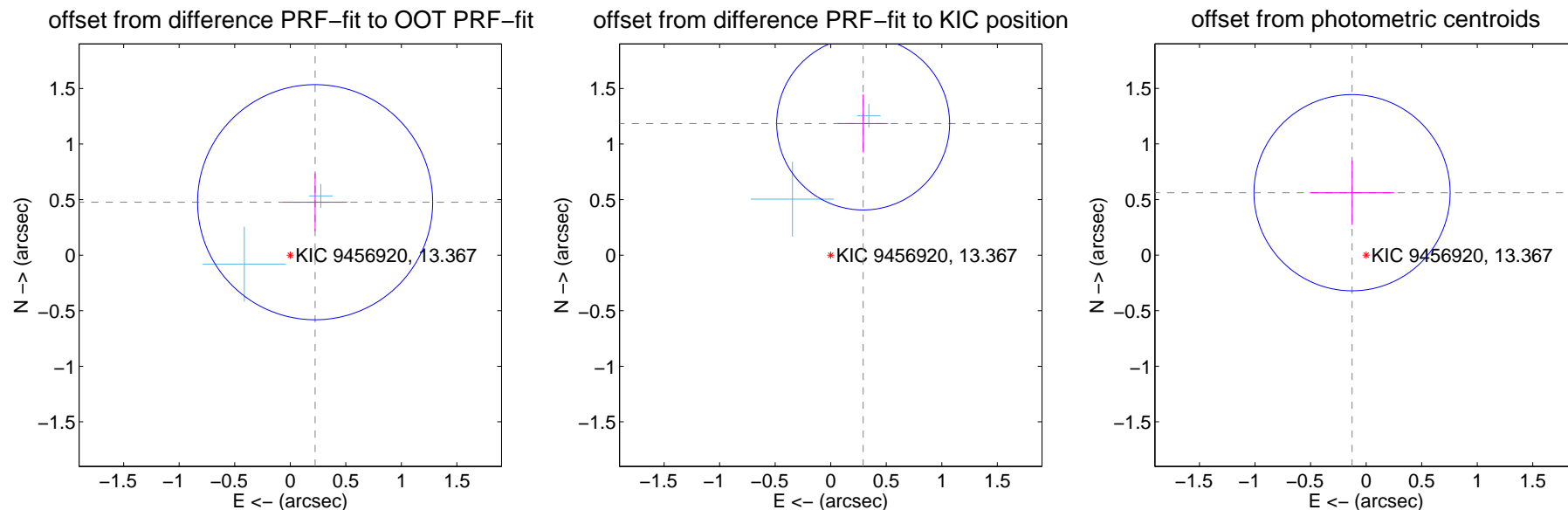
DV Centroid Data

Supplemental centroid analysis for 009456920-05. Kepler magnitude: 13.37. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.72 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.527 ± 0.353	1.49	-0.224 ± 0.289	0.477 ± 0.259
PRF-fit source offset from KIC position	1.220 ± 0.259	4.70	-0.292 ± 0.221	1.185 ± 0.262
photometric centroid source offset	0.58 ± 0.29	1.96	0.13 ± 0.38	0.56 ± 0.29



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.

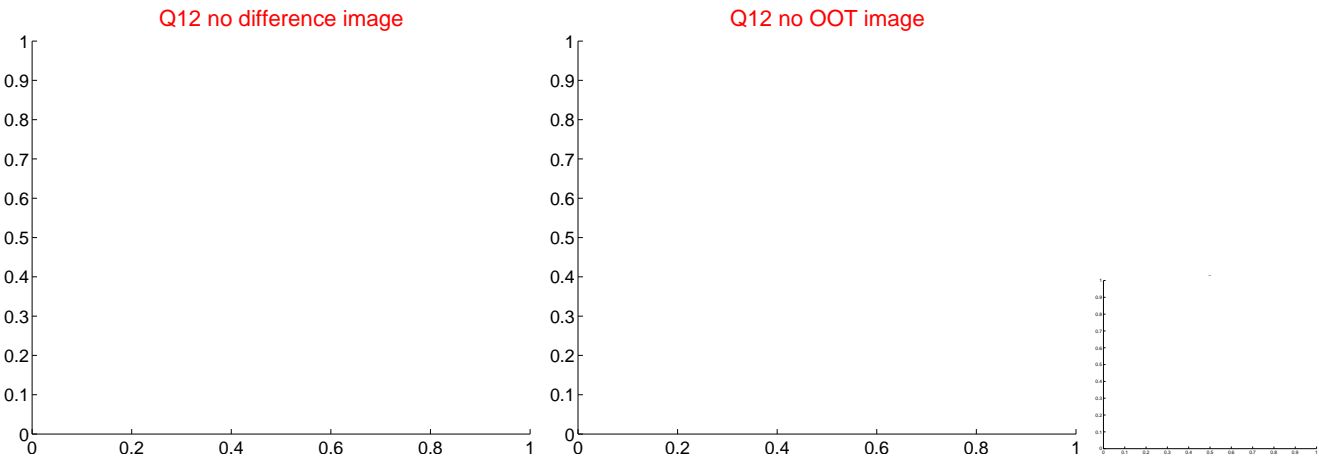
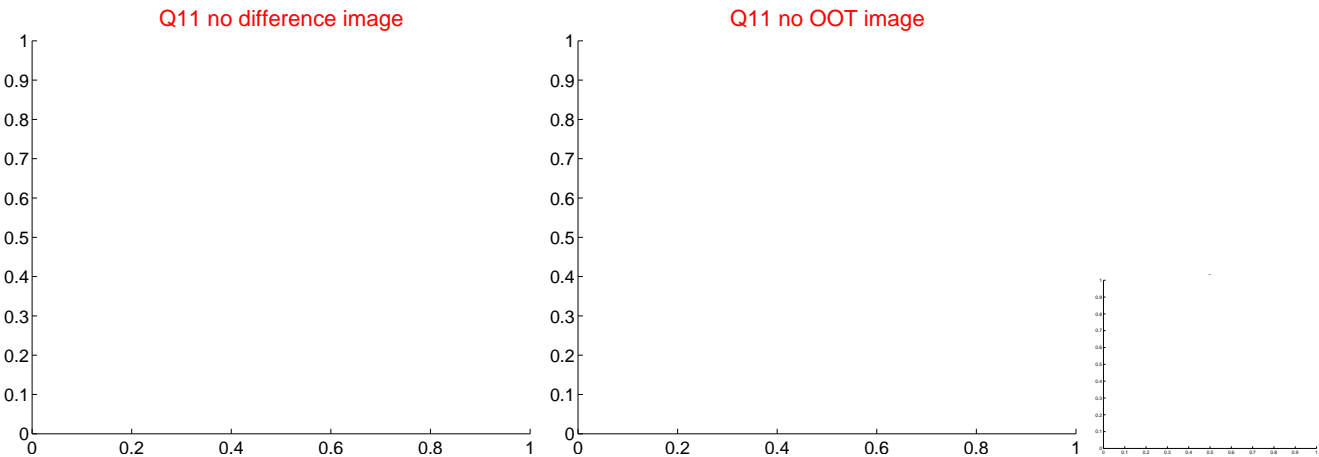
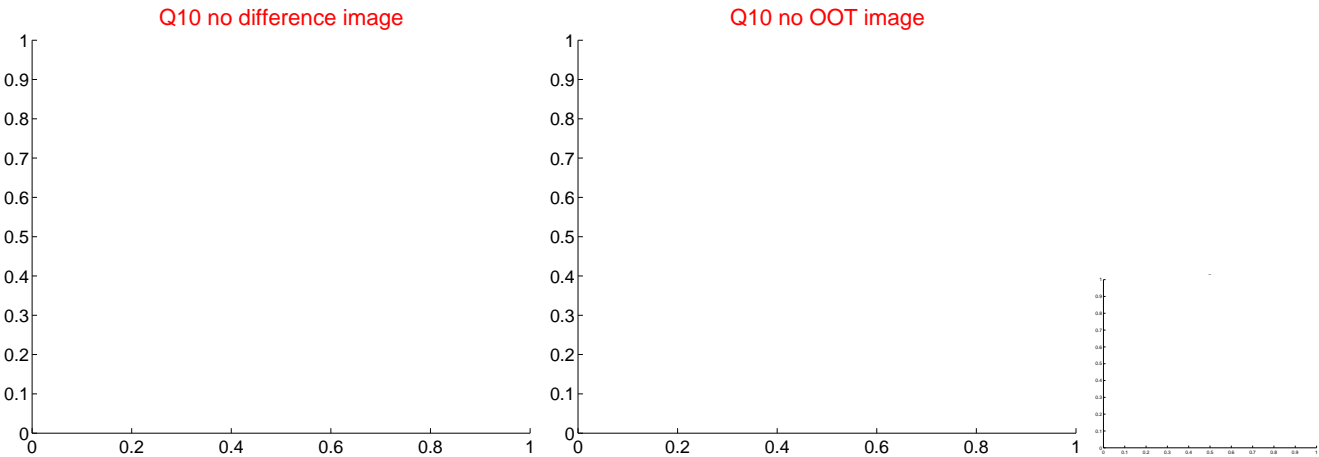
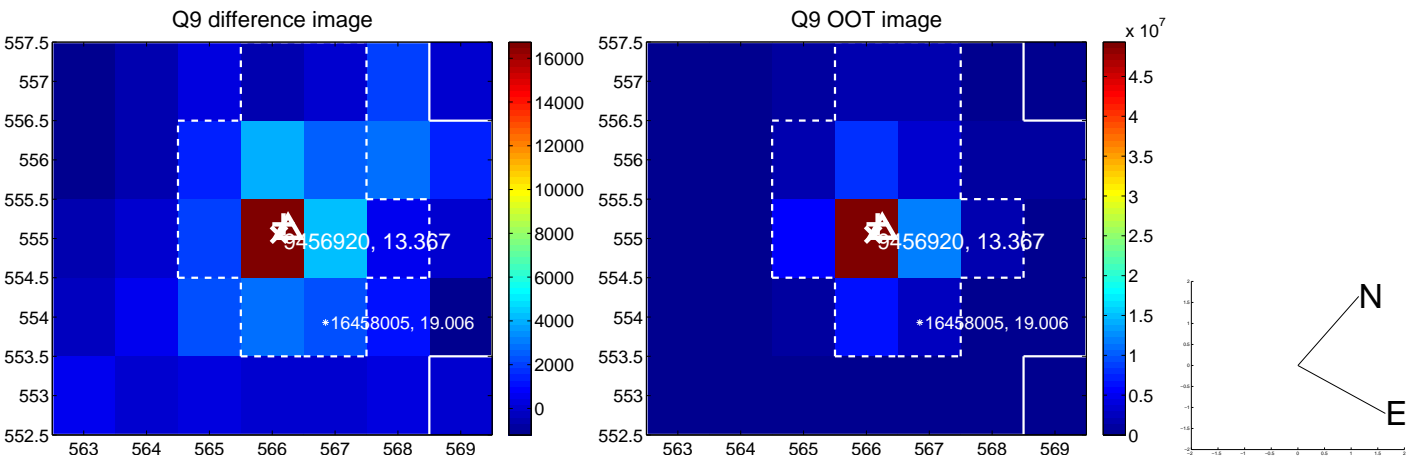
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



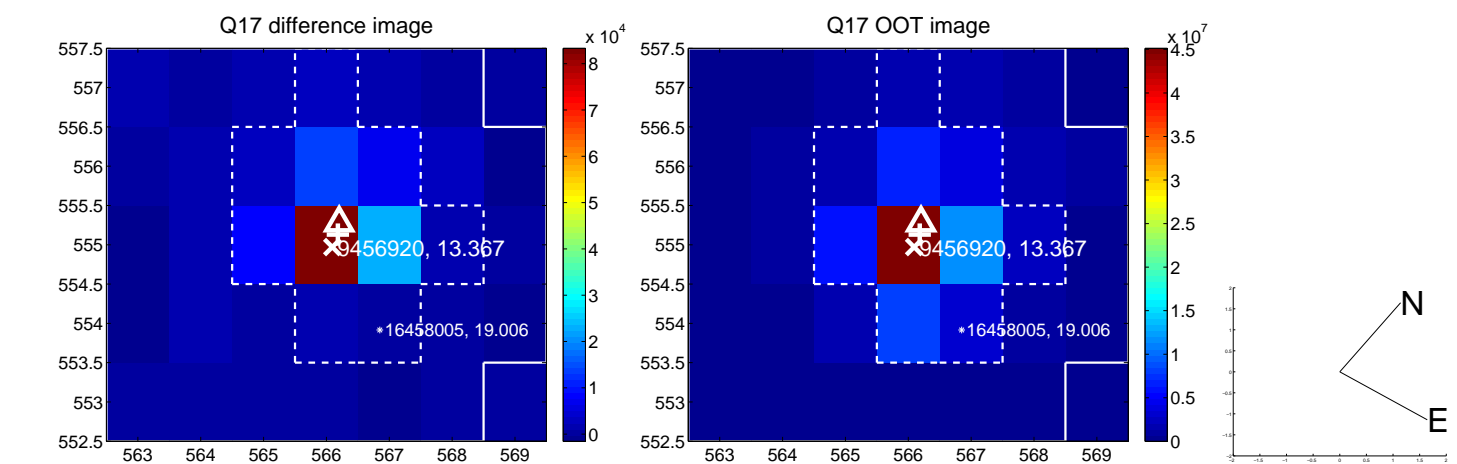
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



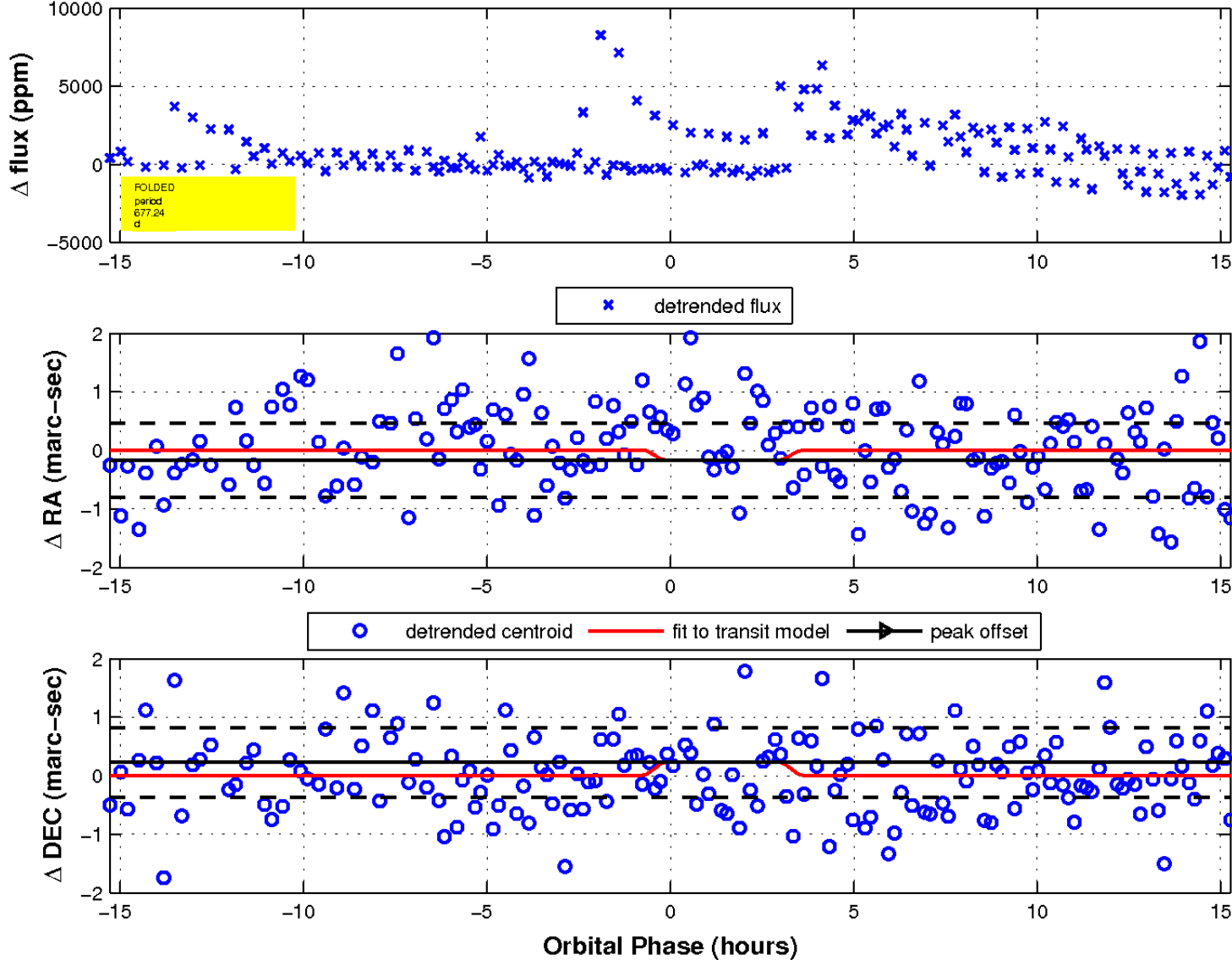
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 5 of 5



UKIRT Image

Declination

