

KIC 009002538

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})
009002538-01	OBS	3196.01	4.960606	135.318375	21.4	2.829	11.0	11.8	1.30	6117	0.71	620.18
009002538-02	OBS	3196.02	6.883047	134.161800	28.2	2.225	10.1	11.4	1.30	6117	0.81	400.74

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009002538-01	OBS	PC	0.92	0	0	0	0	NO_COMMENT
009002538-02	OBS	PC	0.98	0	0	0	0	NO_COMMENT

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

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

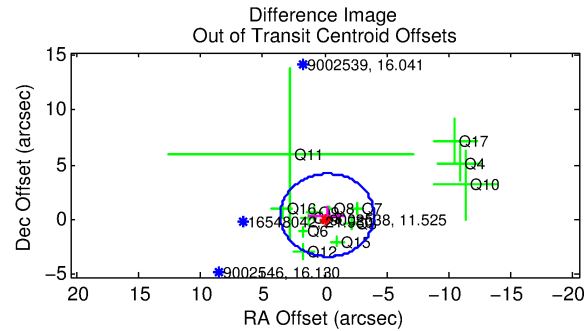
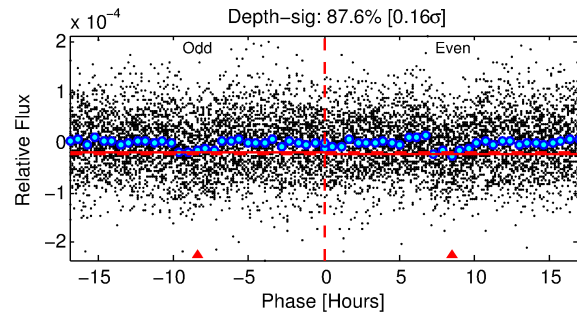
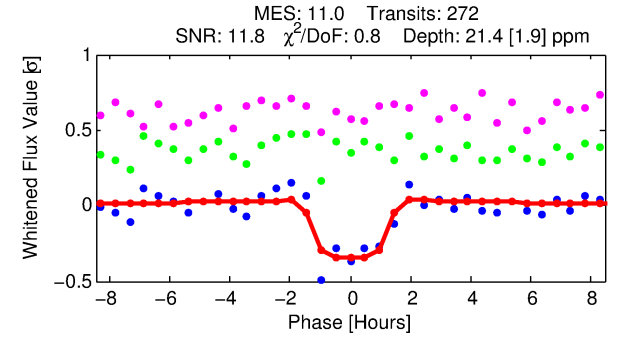
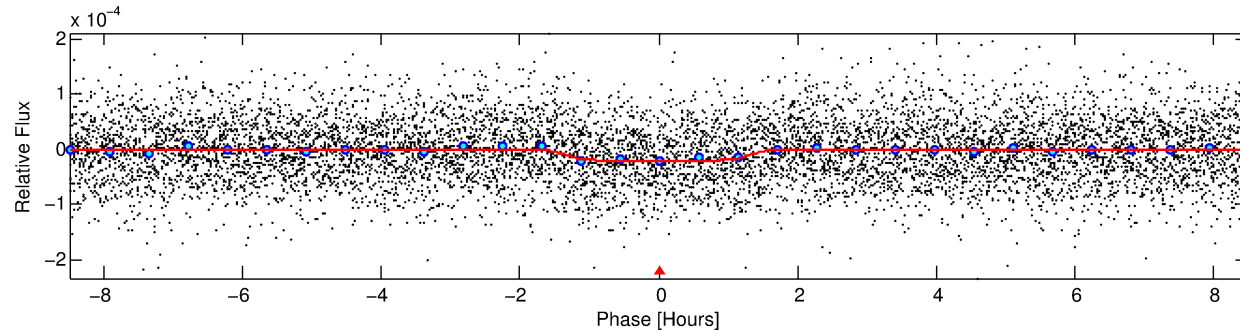
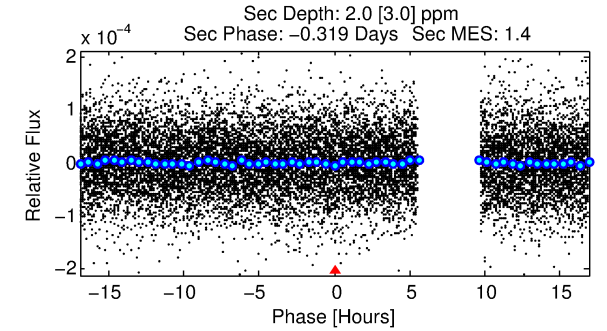
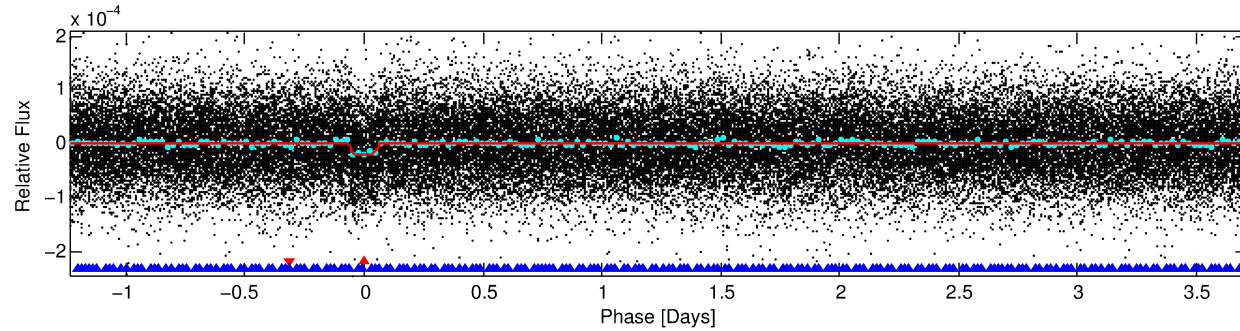
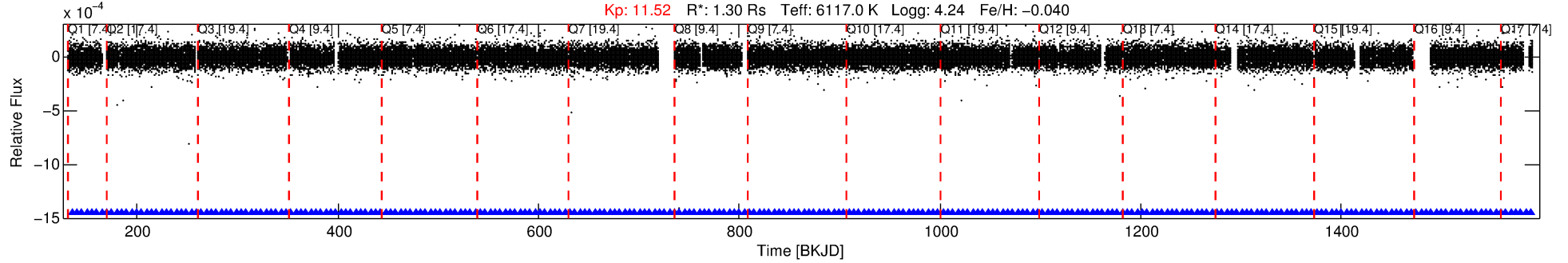
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009002538-01

No Significant Match Found

DV One-Page Summary

KIC: 9002538 Candidate: 1 of 2 Period: 4.961 d
KOI: K03196.01 Corr: 0.972



DV Fit Results:

Period = 4.96061 [0.00003] d
Epoch = 135.3184 [0.0040] BKJD
Rp/R* = 0.0050 [0.0014]
a/R* = 6.05 [8.63]
b = 0.90 [0.31]
Seff = 620.18 [158.00]
Teq = 1272 [81] K
Rp = 0.71 [0.23] Re
a = 0.0584 [0.0090] AU
Ag = 7.49 [12.22] [0.53σ]
Teffp = 3255 [1315] K [1.50σ]

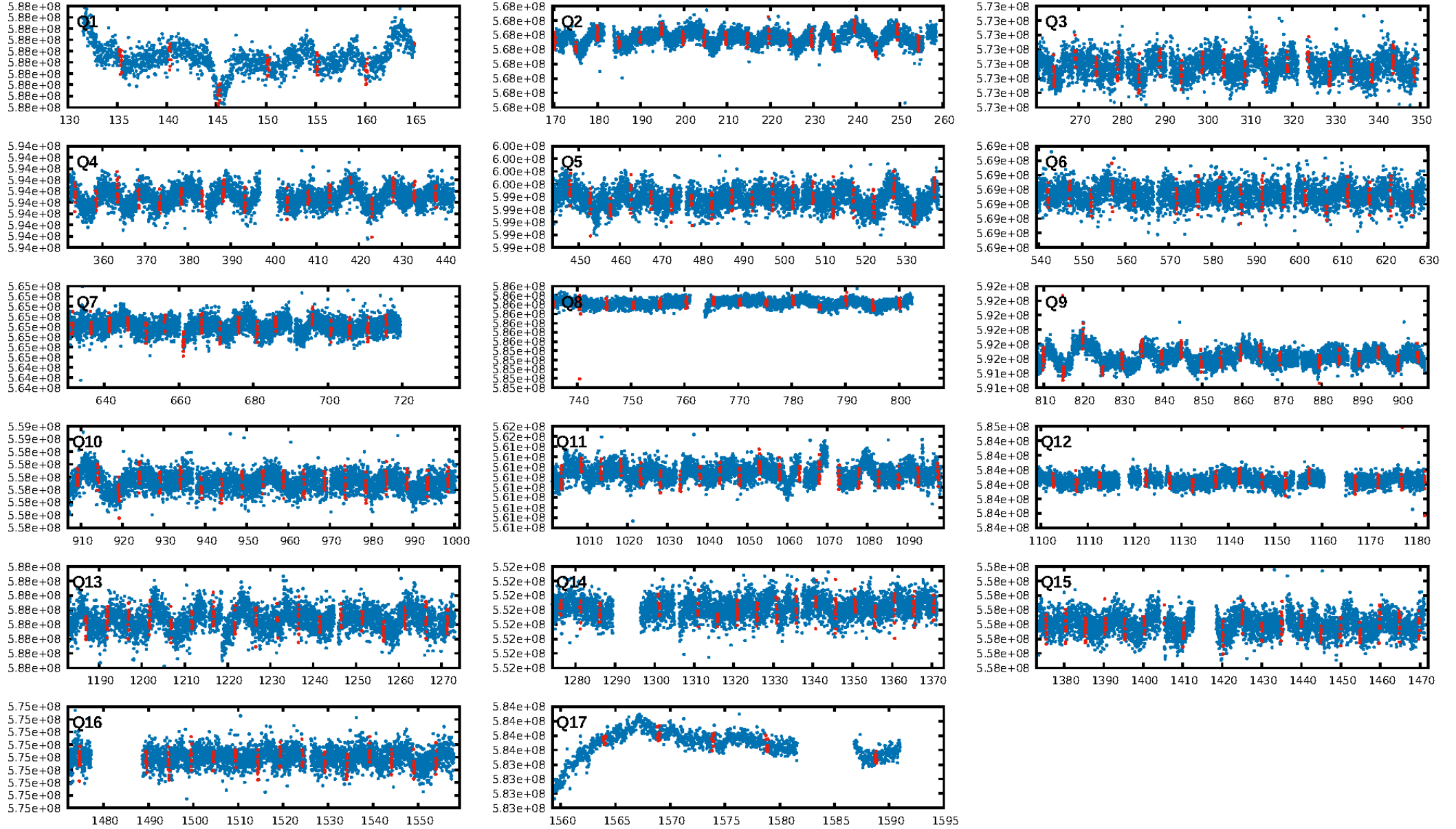
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [12.82σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGoF-sig: N/A
Bootstrap-pfa: 8.44e-27
RollingBand-fgt: 1.00 [261/261]
GhostDiagnostic-chr: 1.508
Centroid-sig: 3.9%
Centroid-so: 1.410 arcsec [1.53σ]
OotOffset-rm: 0.433 arcsec [0.34σ]
KicOffset-rm: 0.314 arcsec [0.23σ]
OotOffset-st: 2/4/4/3 [13]
KicOffset-st: 2/4/4/3 [13]
DiffImageQuality-fgm: 0.54 [7/13]
DiffImageOverlap-fno: 1.00 [17/17]

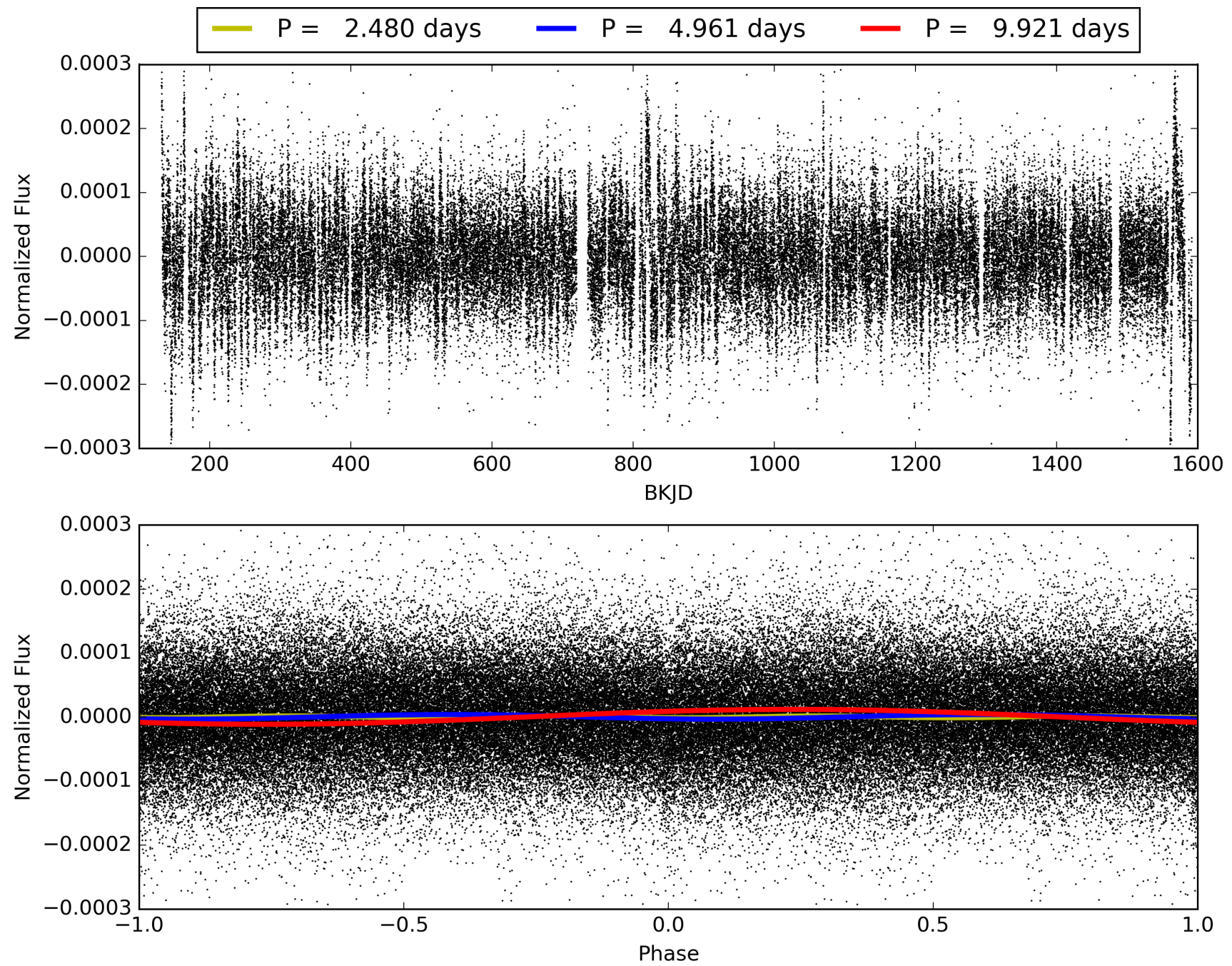
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:03:57 Z

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

TCE 009002538-01, PDC Light Curves

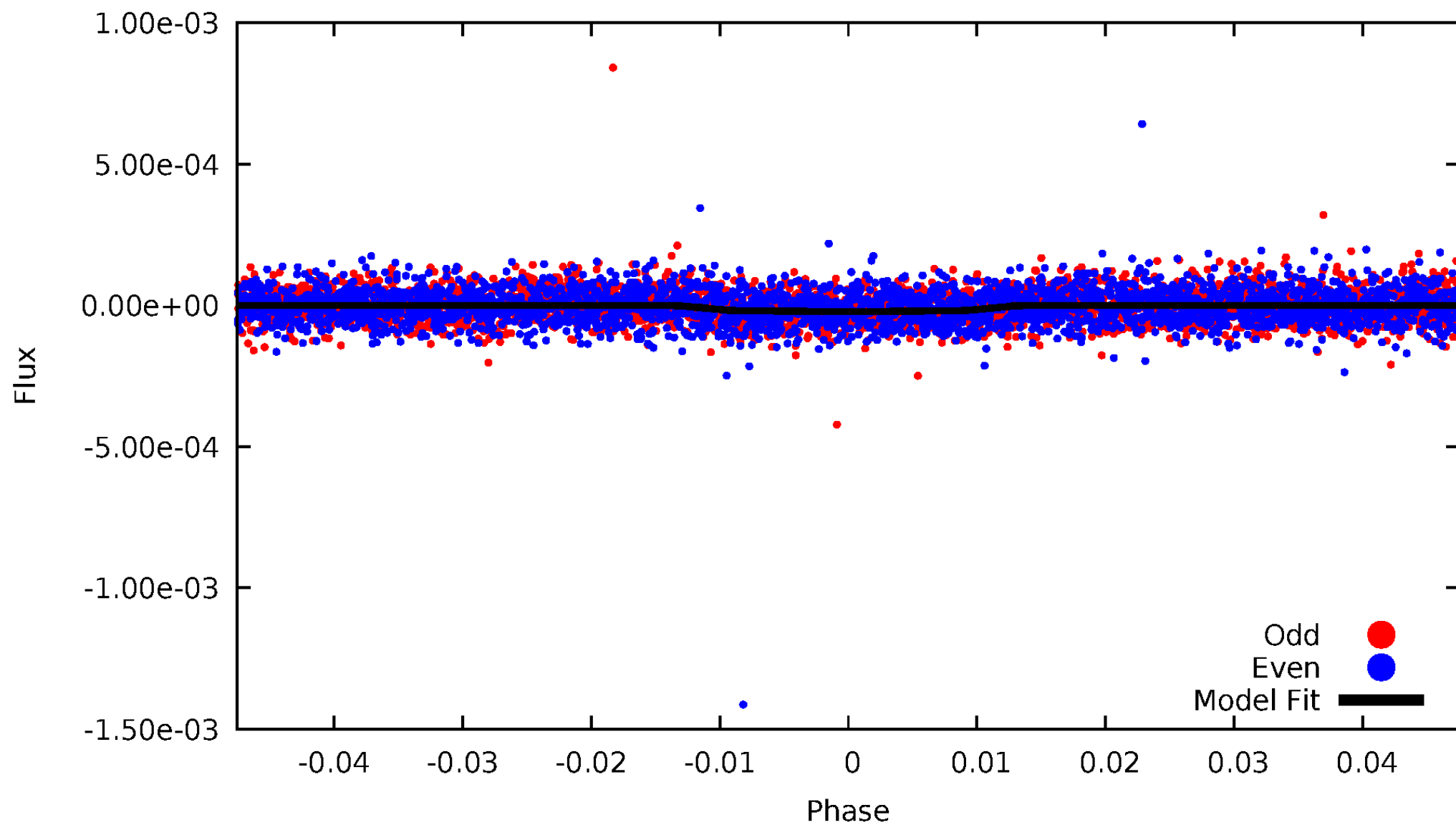


TCE 009002538-01



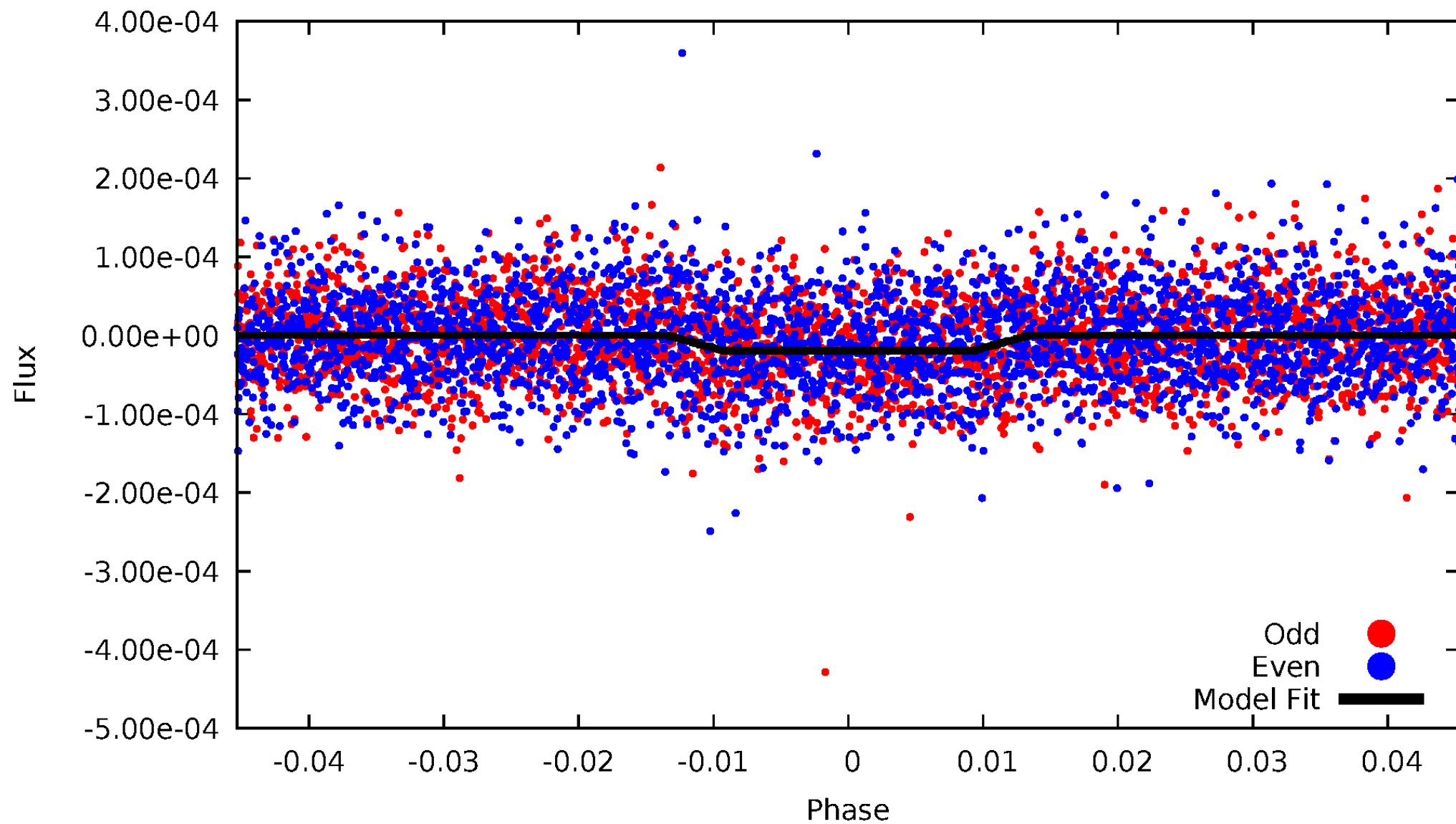
DV Odd/Even

TCE 009002538-01



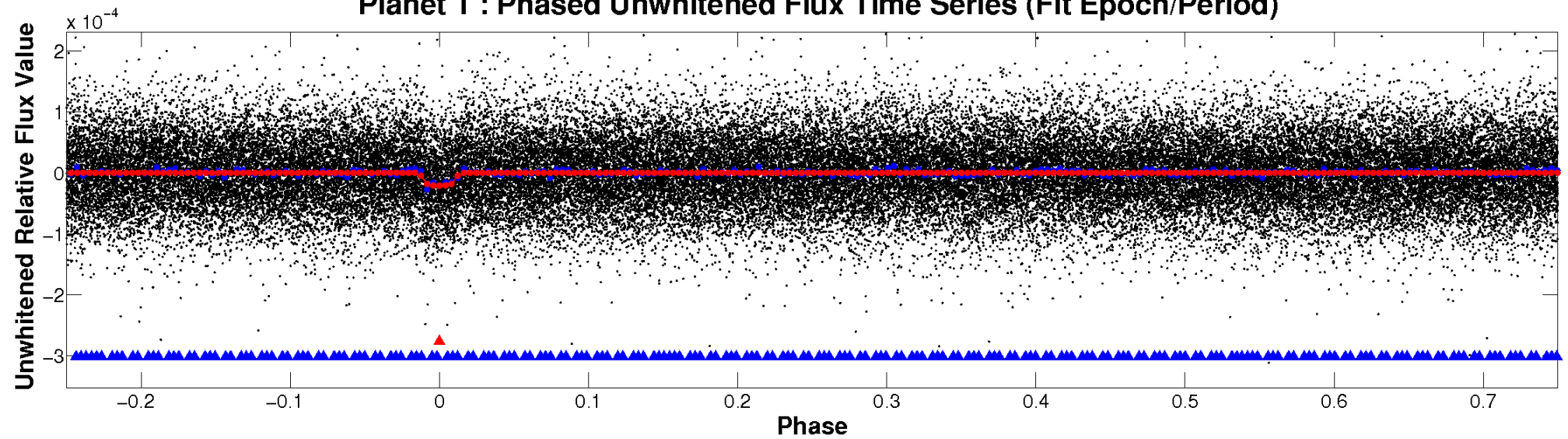
ALT Odd/Even

TCE 009002538-01

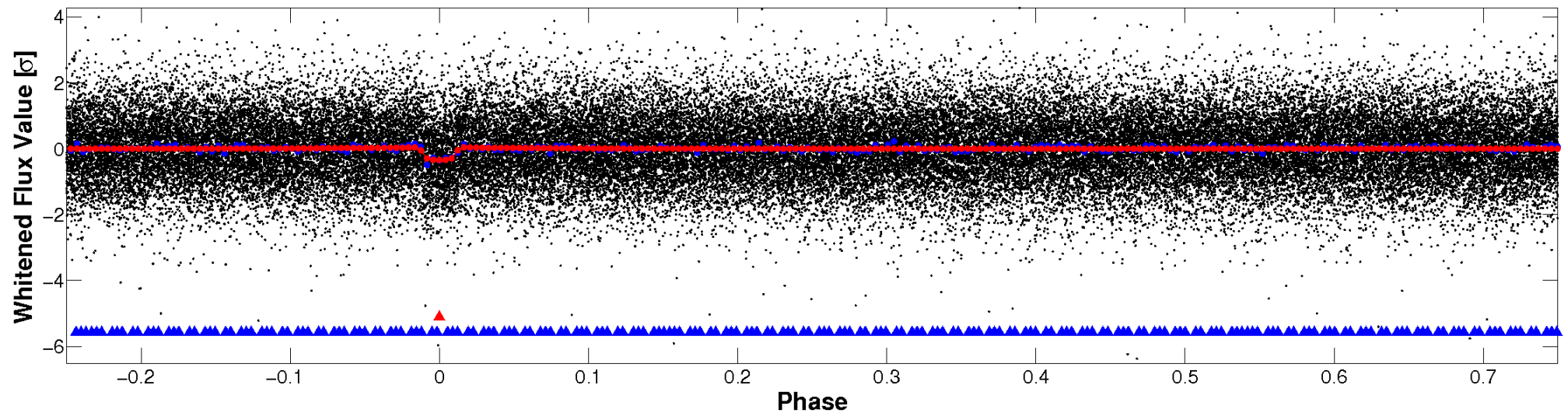


Non-Whitened Vs. Whitened Light Curve

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

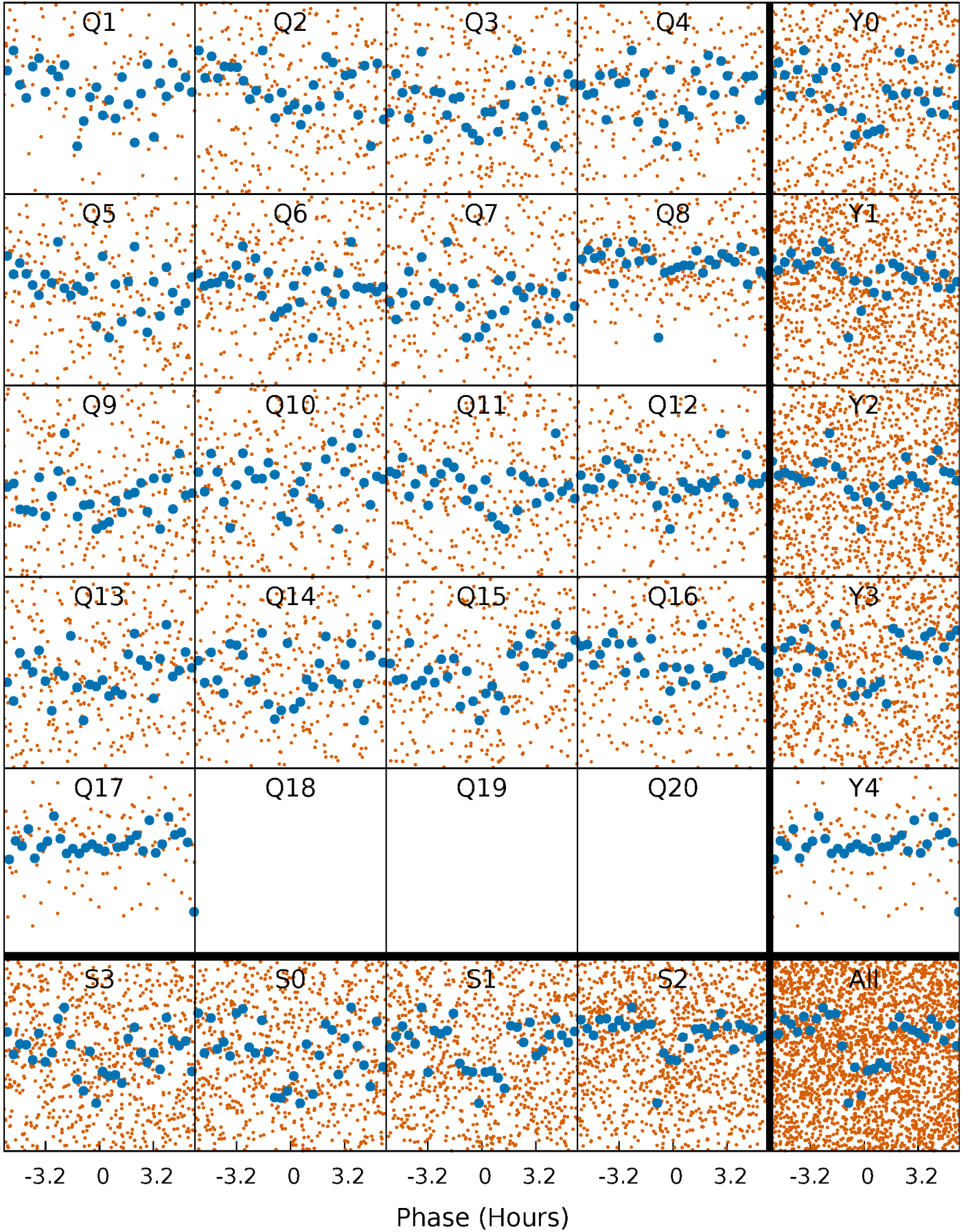


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



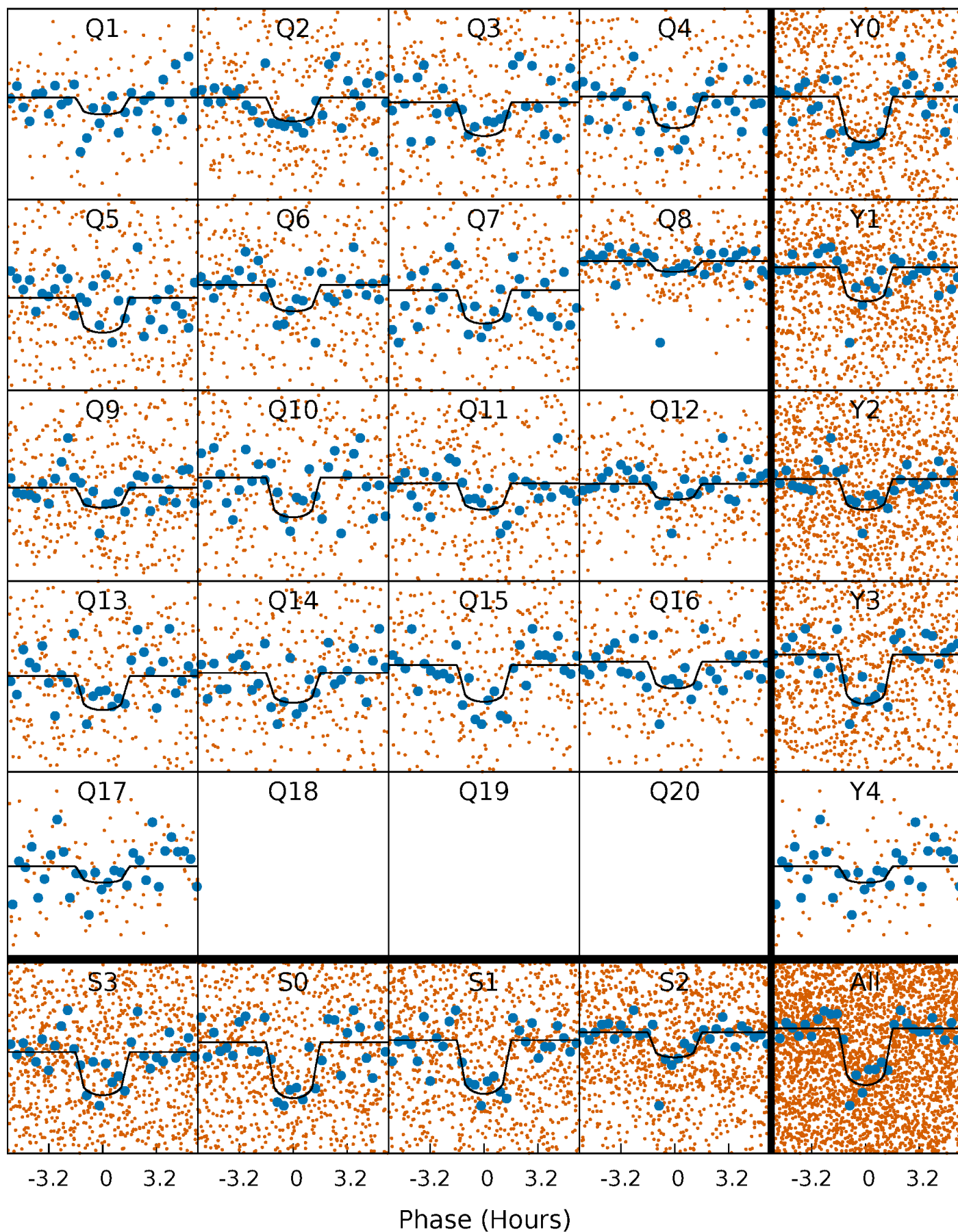
PDC Quarter-Phased Transit Curves

TCE 009002538-01 P= 4.960606 Days $T_0=135.318376$ (BKJD)



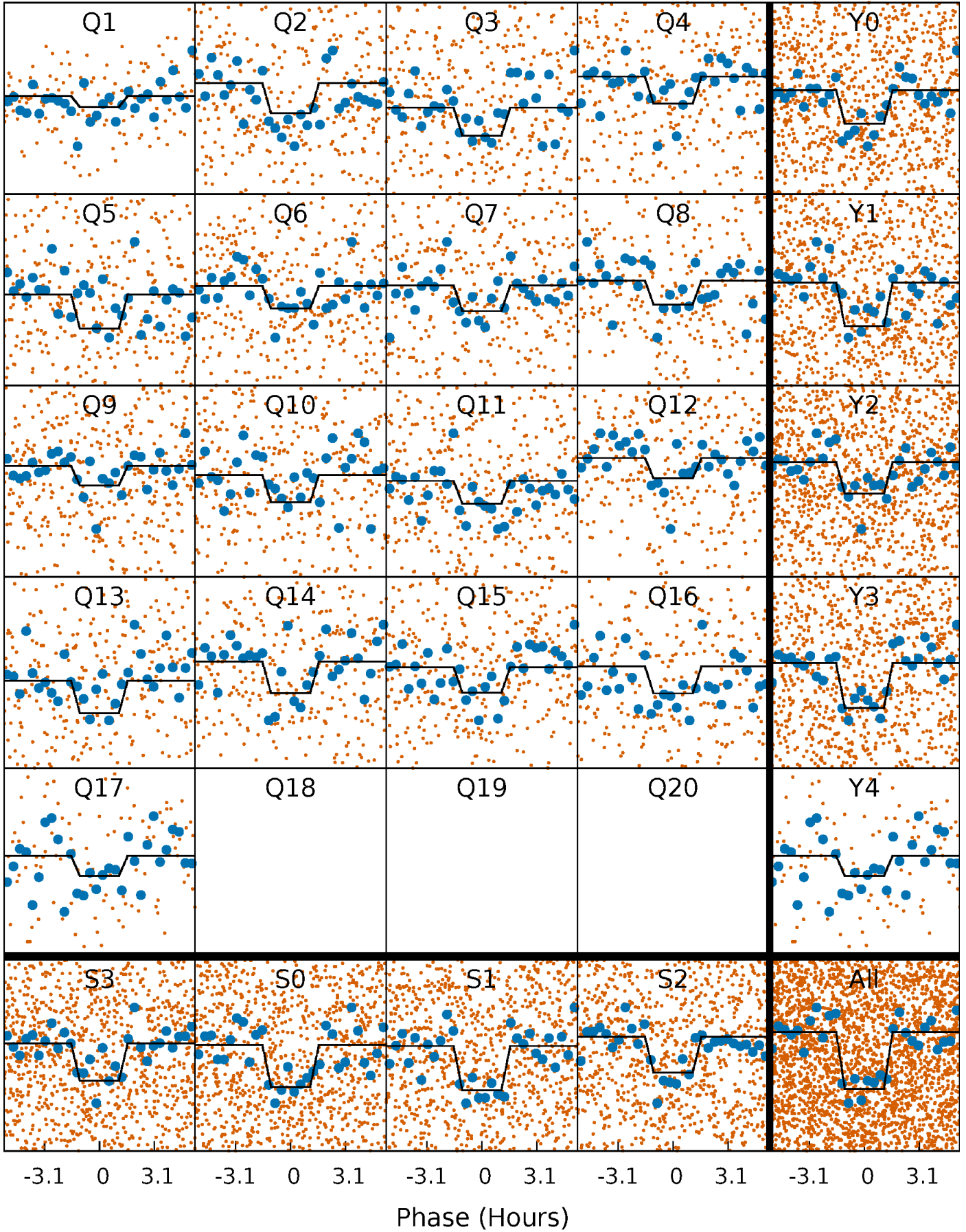
DV Quarter-Phased Transit Curves

TCE 009002538-01 P= 4.960606 Days $T_0=135.318376$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

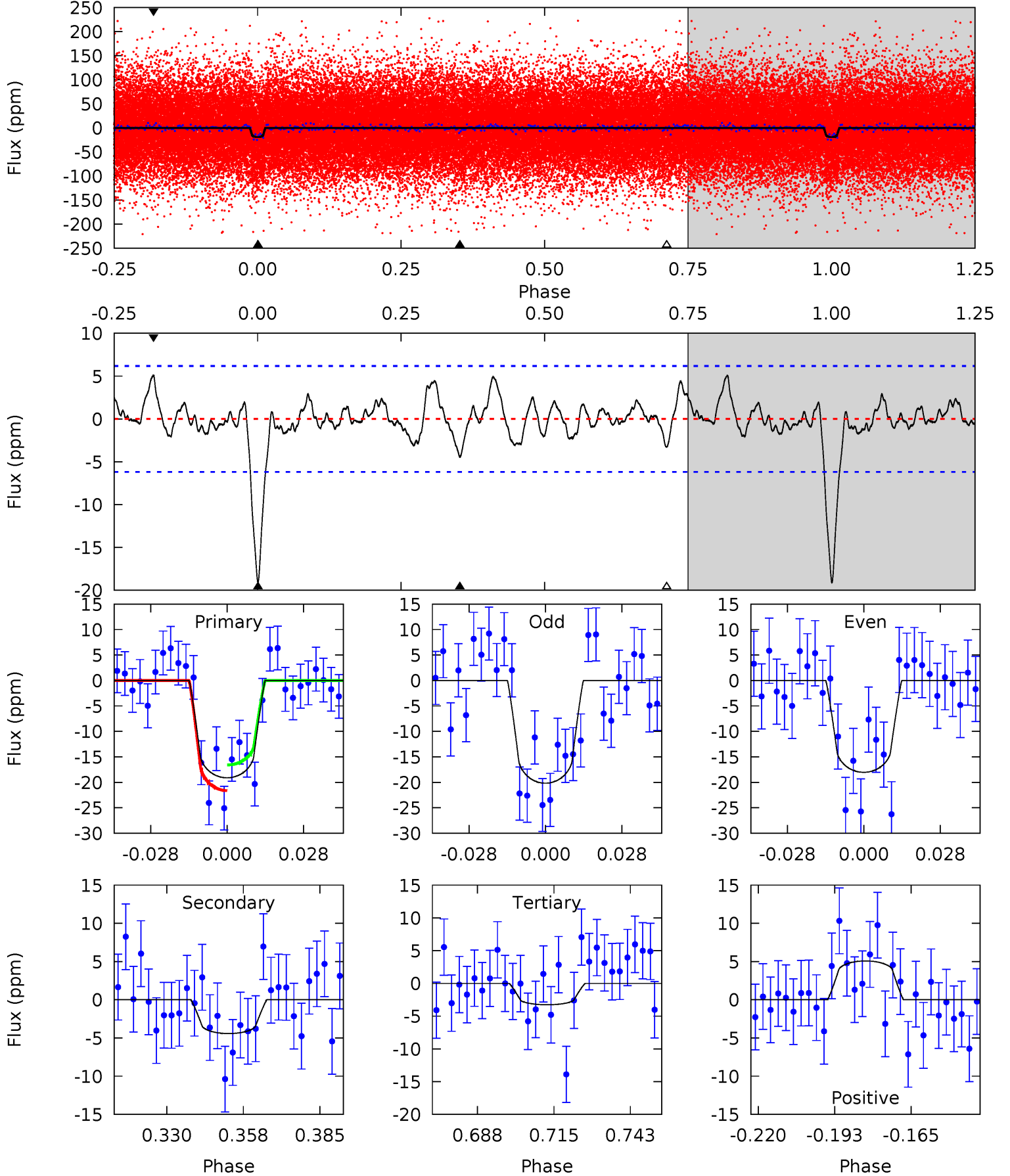
TCE 009002538-01 P= 4.960610 Days $T_0=135.321445$ (BKJD)



DV Model-Shift Uniqueness Test

009002538-01, P = 4.960606 Days, E = 130.357770 Days

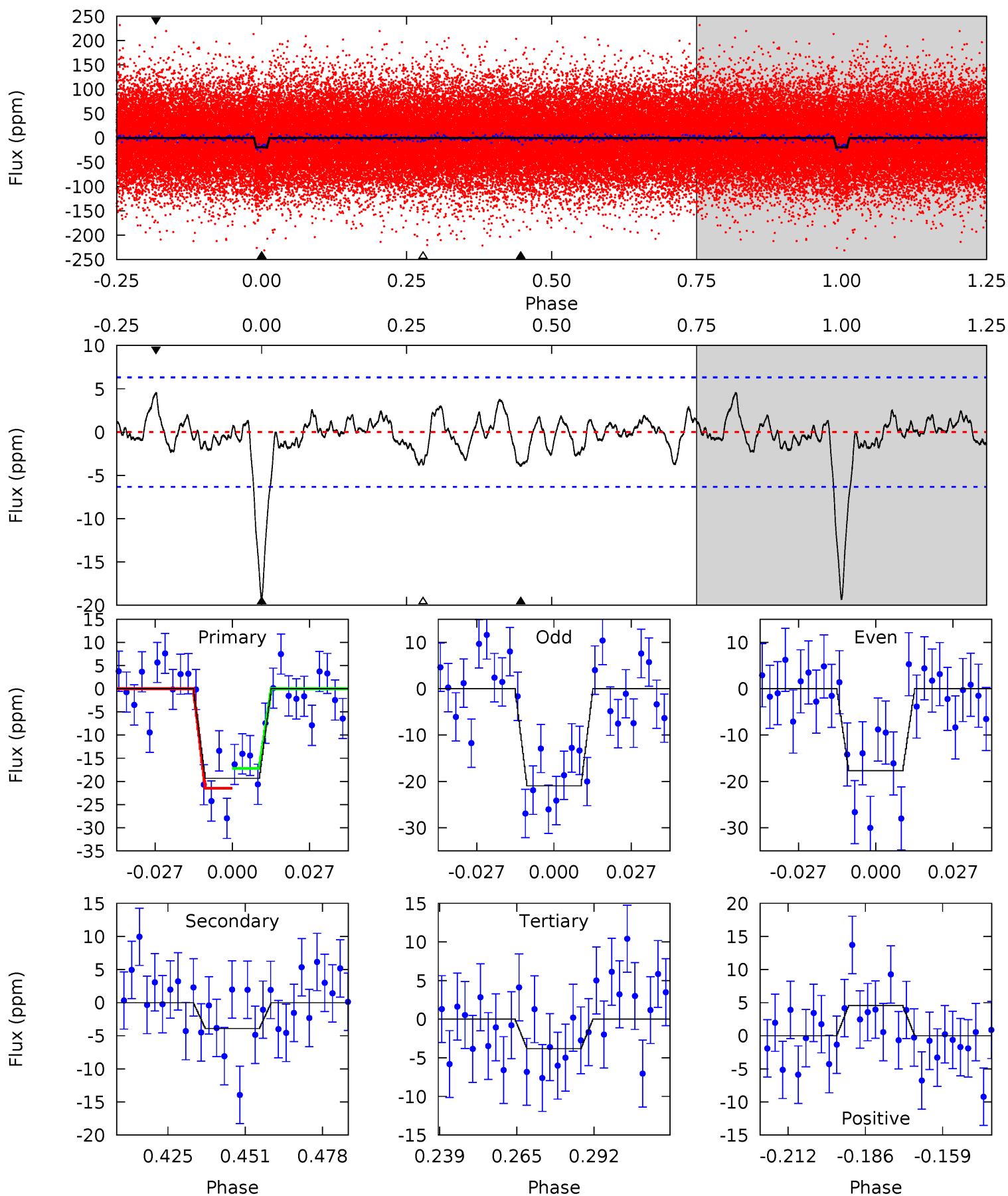
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.9	3.45	2.55	3.96	4.83	2.20	1.31	12.4	11.0	0.90	-0.51	0.84	1.08	0.21	1.96



Alt Model-Shift Uniqueness Test

009002538-01, P = 4.960610 Days, E = 130.360835 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.8	2.99	2.92	3.49	4.84	2.22	1.16	11.9	11.3	0.08	-0.49	1.26	0.99	0.19	1.65



Stellar Parameters For KIC 009002538

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6117^{+135}_{-135}	$4.244^{+0.137}_{-0.112}$	$-0.040^{+0.150}_{-0.150}$	$1.298^{+0.221}_{-0.199}$	$1.079^{+0.103}_{-0.075}$	$0.694^{+0.439}_{-0.229}$
	+2%/-2%	+3%/-3%	+375%/-375%	+17%/-15%	+10%/-7%	+63%/-33%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009002538-01 / KOI 3196.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-4 ± 1	$0.70^{+0.23}_{-0.19}$	1777^{+83}_{-89}	4209^{+562}_{-422}	17^{+14}_{-8}
Alt.	-4 ± 1	$0.61^{+0.21}_{-0.20}$	1774^{+91}_{-85}	4306^{+769}_{-498}	19^{+24}_{-10}

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 $A_{\text{obs}} \gg 1.0$

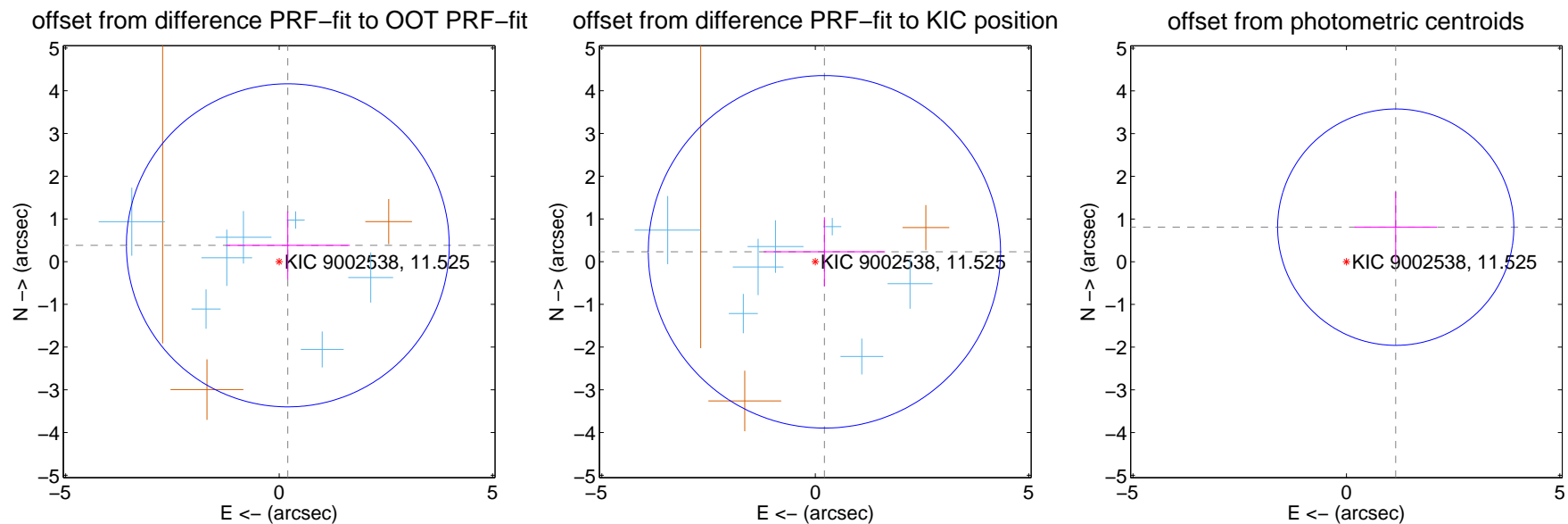
DV Centroid Data

Supplemental centroid analysis for 009002538-01. **Kepler magnitude: 11.53.** Transit SNR 11.80

There are 7 quarters with good PRF difference image offsets

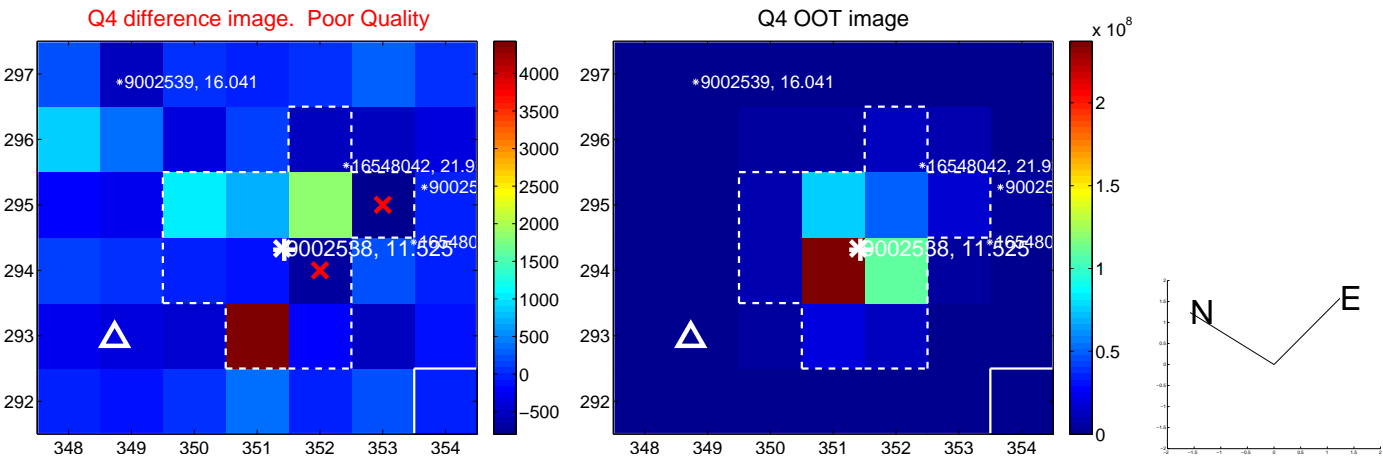
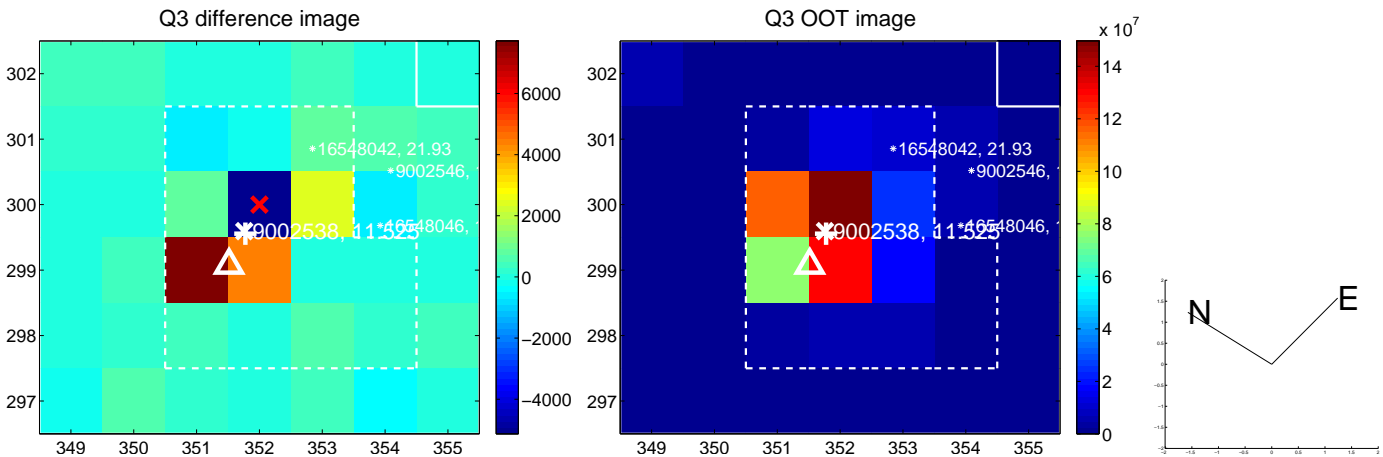
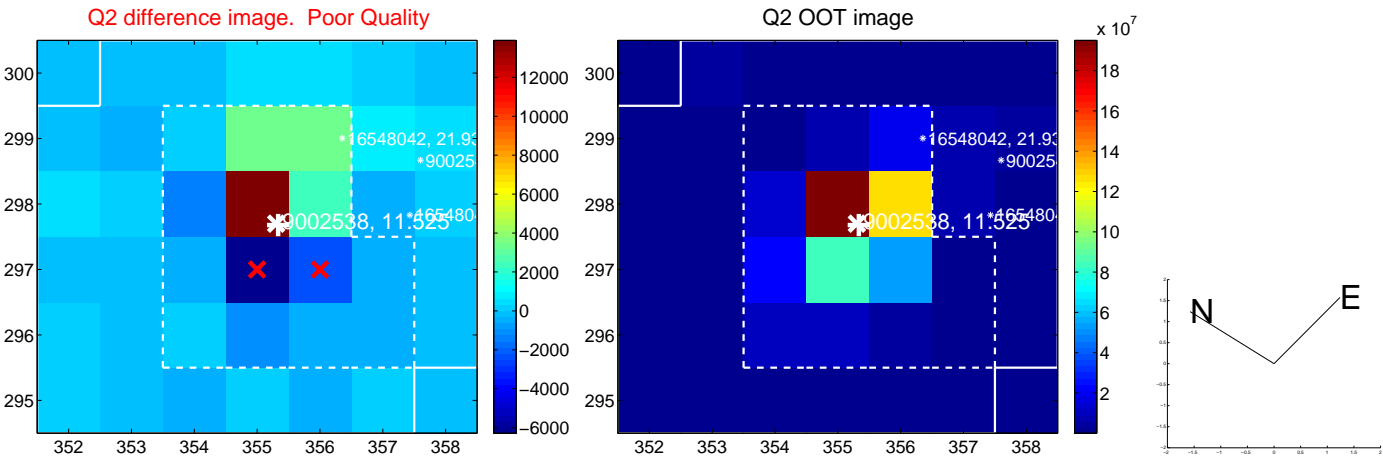
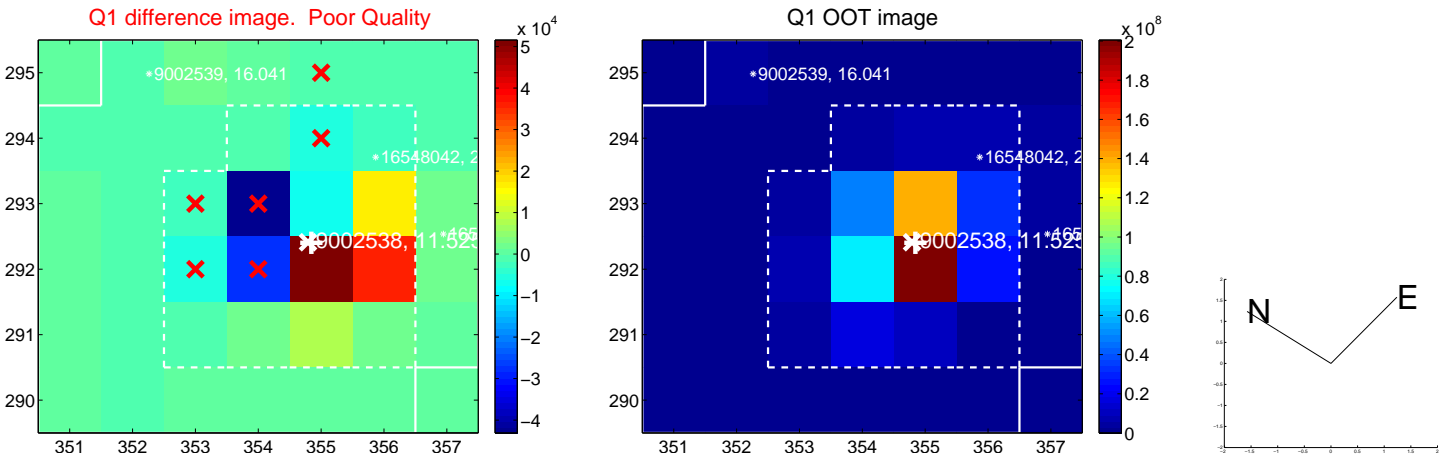
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.433 ± 1.260	0.34	-0.203 ± 1.450	0.382 ± 0.794
PRF-fit source offset from KIC position	0.314 ± 1.375	0.23	-0.215 ± 1.422	0.230 ± 0.810
photometric centroid source offset	1.41 ± 0.92	1.53	-1.16 ± 0.97	0.81 ± 0.83

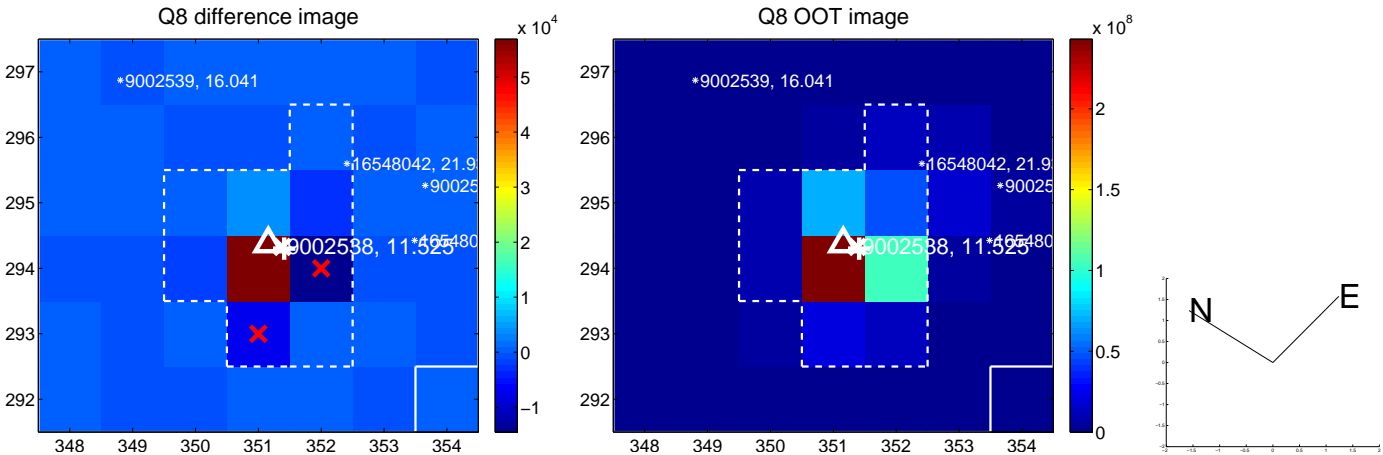
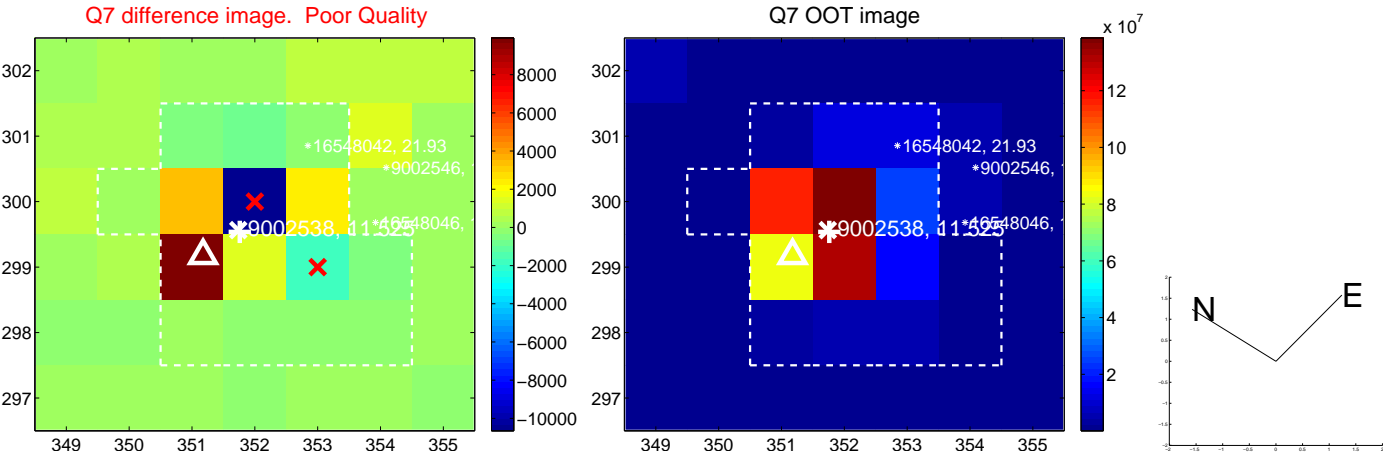
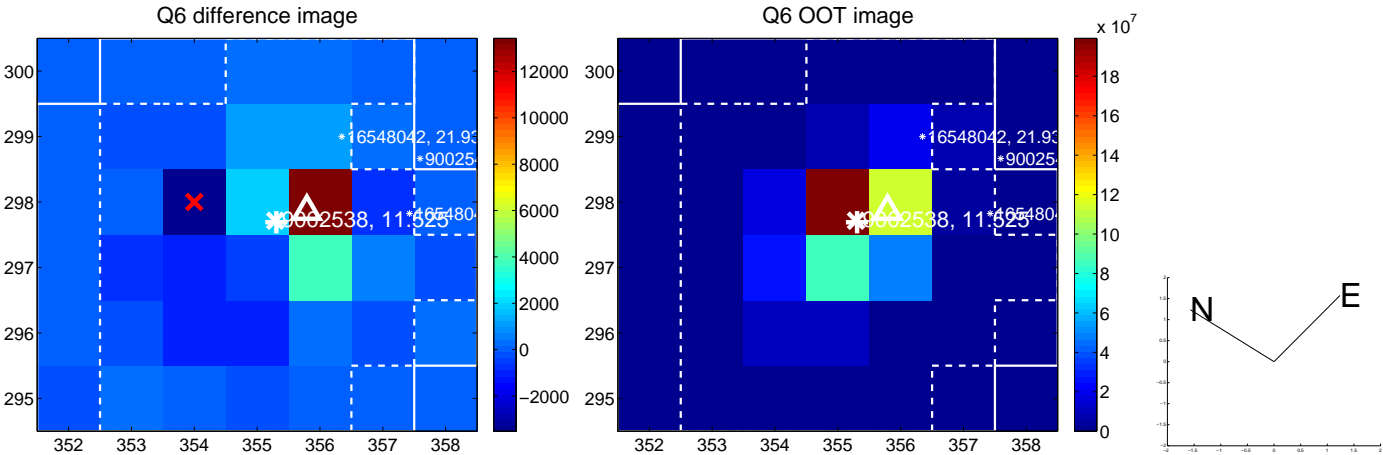
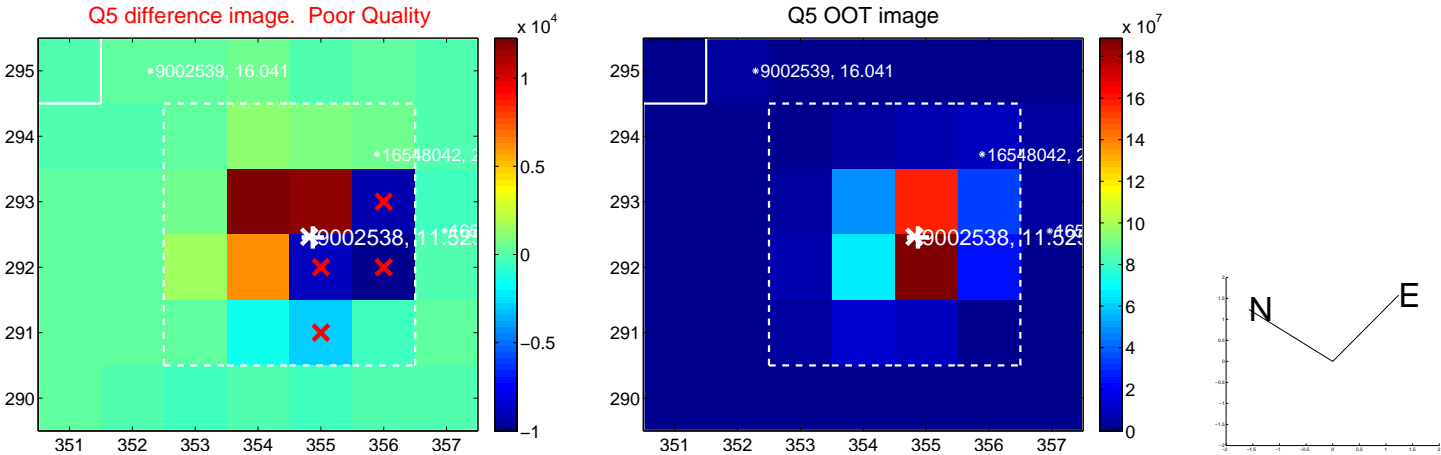


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

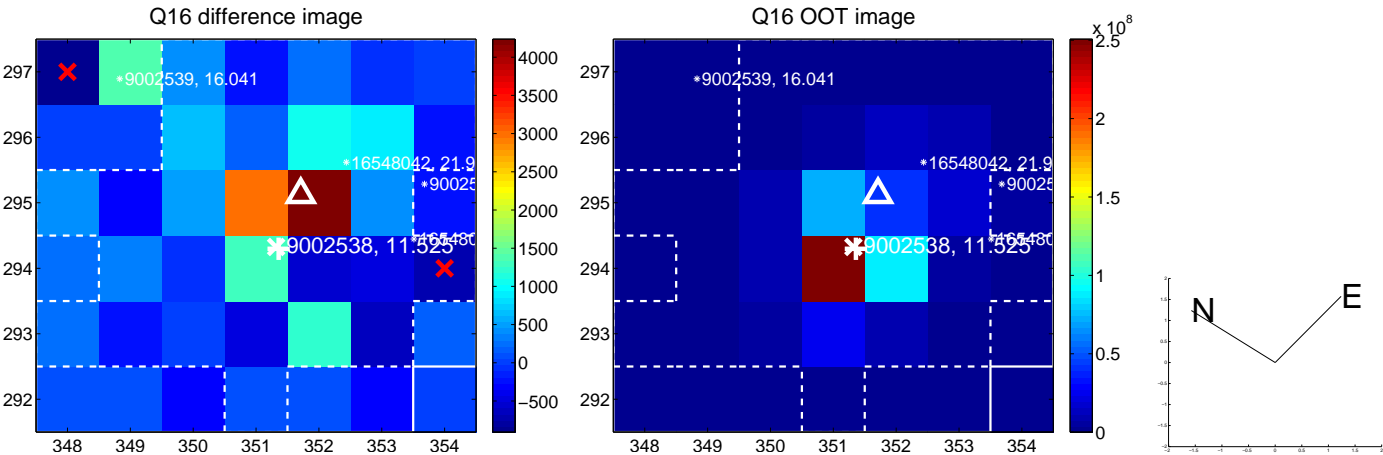
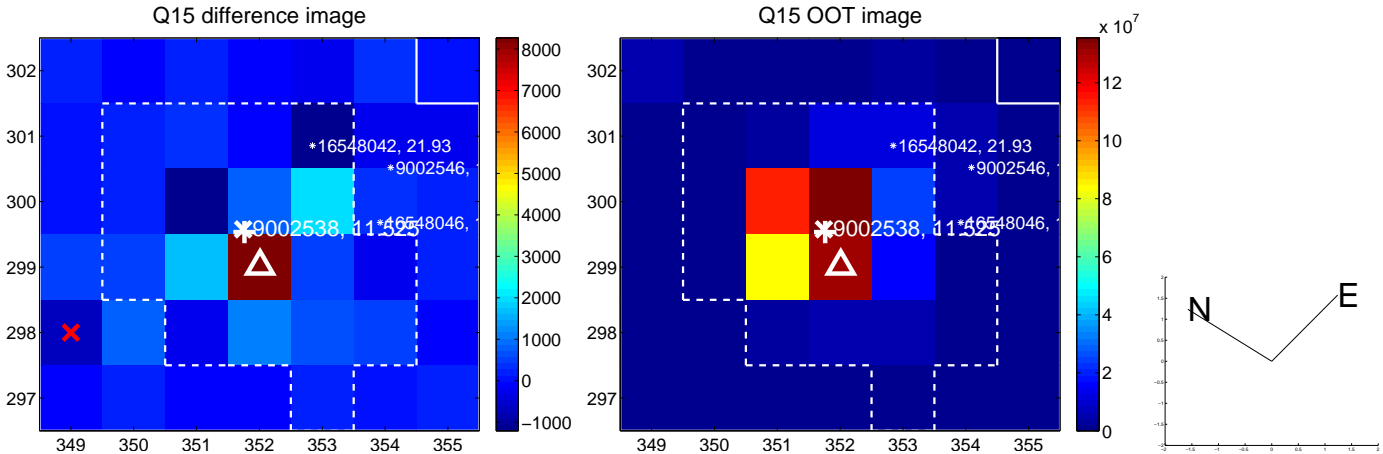
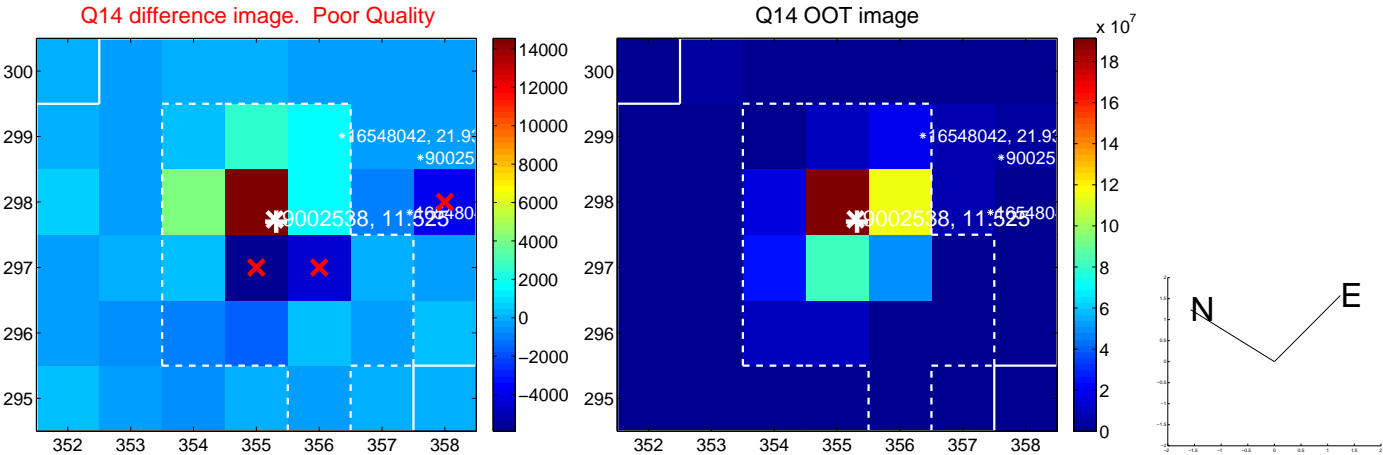
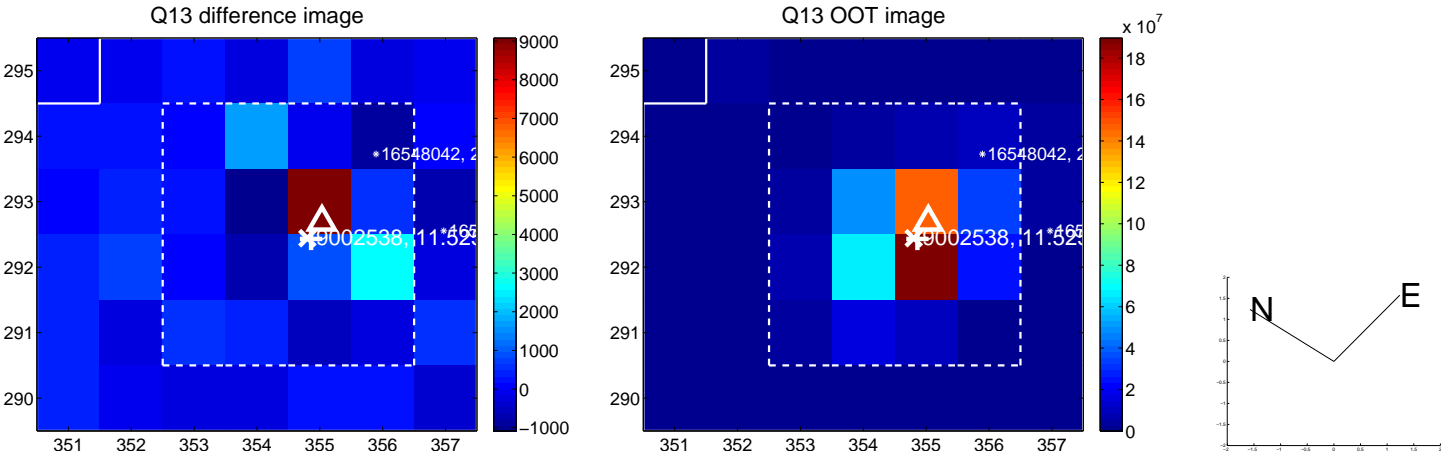
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



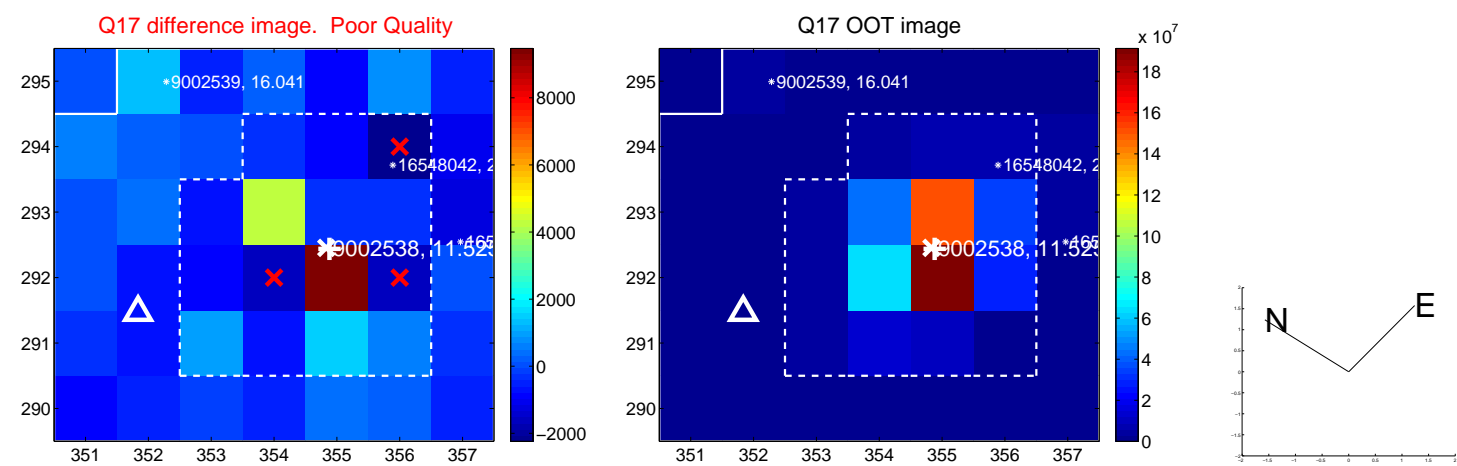
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



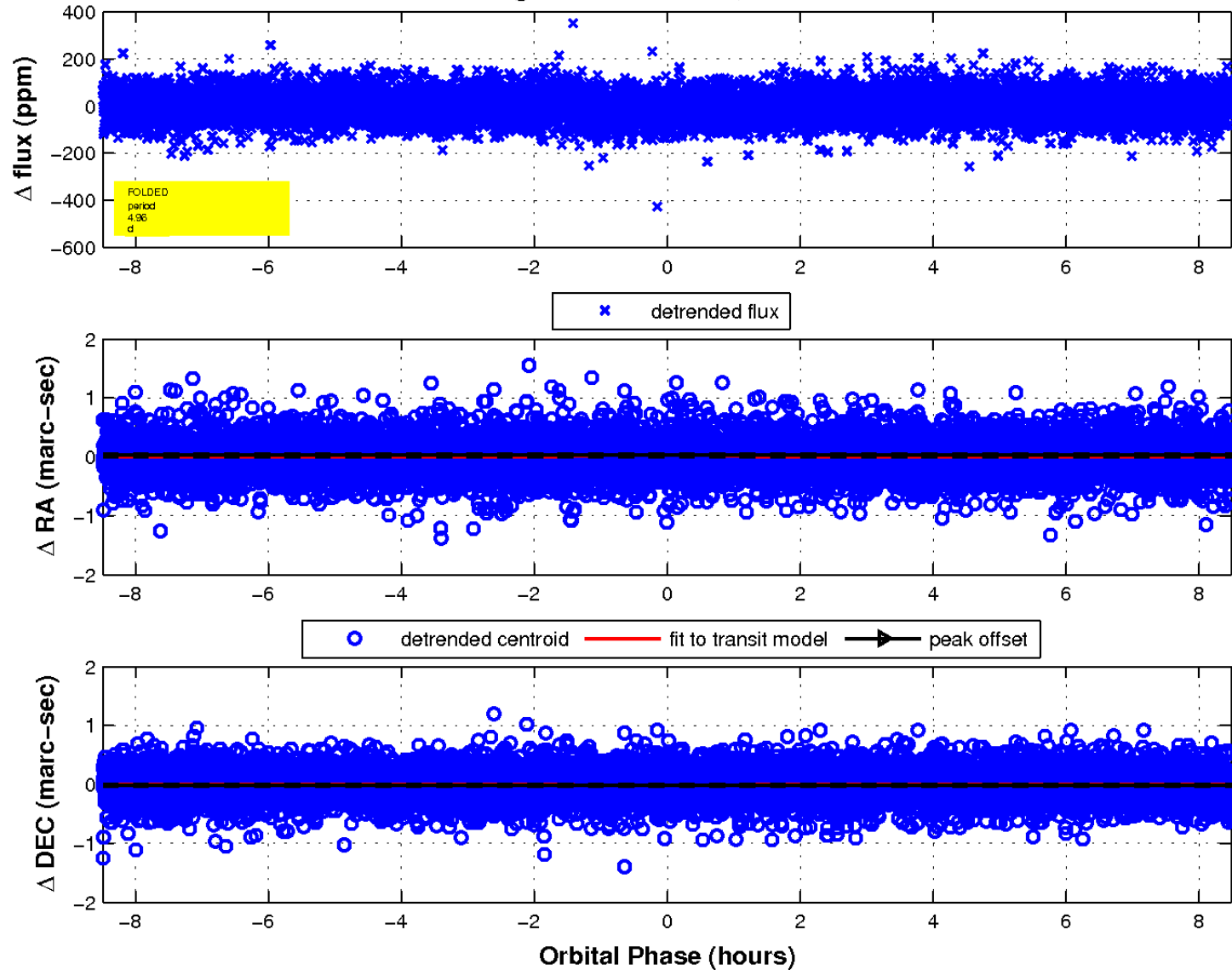
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

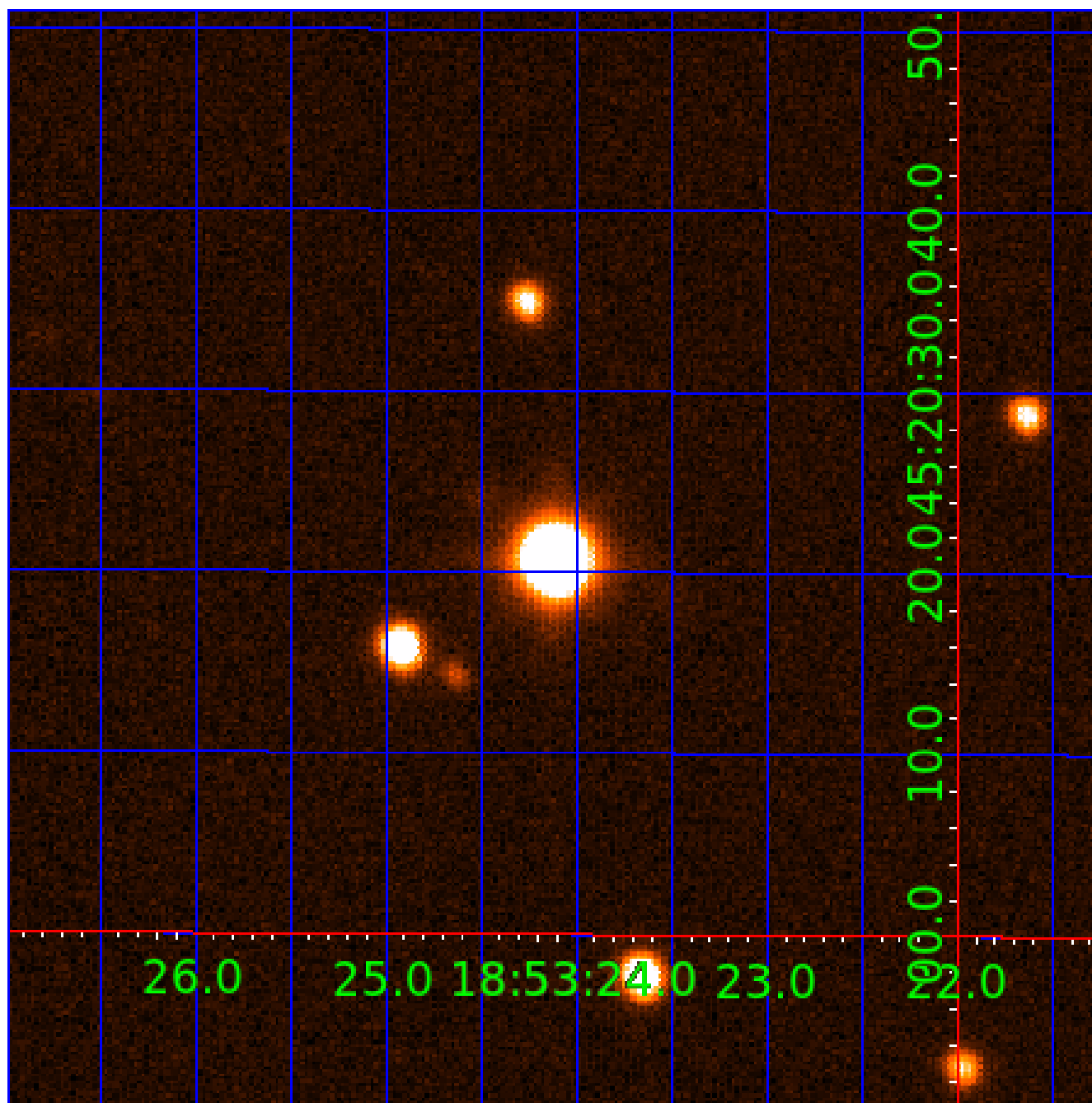


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009002538

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})
009002538-01	OBS	3196.01	4.960606	135.318375	21.4	2.829	11.0	11.8	1.30	6117	0.71	620.18
009002538-02	OBS	3196.02	6.883047	134.161800	28.2	2.225	10.1	11.4	1.30	6117	0.81	400.74

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009002538-01	OBS	PC	0.92	0	0	0	0	NO_COMMENT
009002538-02	OBS	PC	0.98	0	0	0	0	NO_COMMENT

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 009002538-02

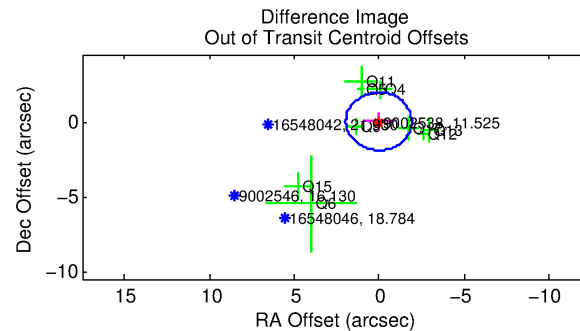
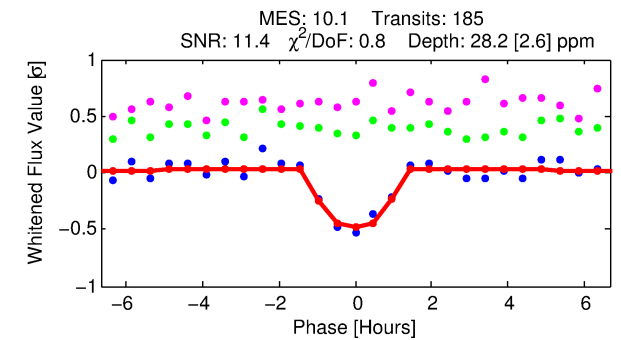
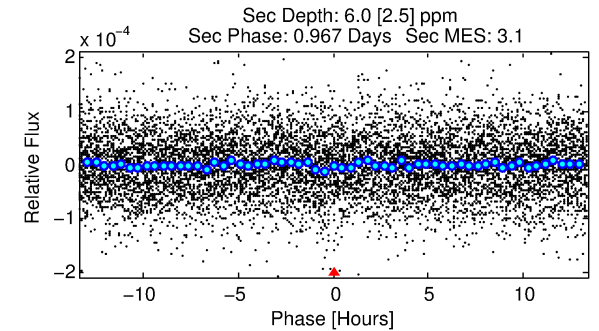
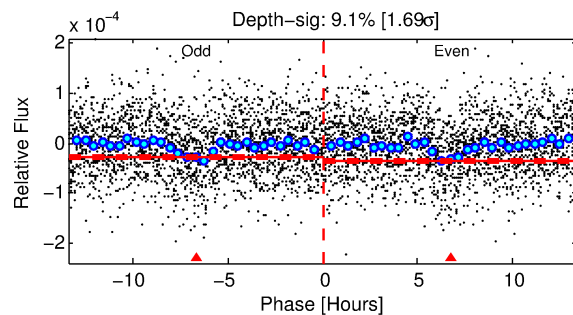
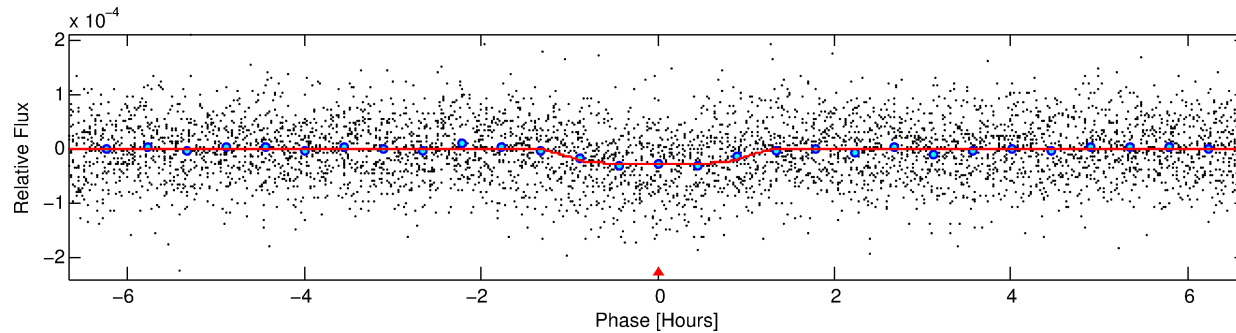
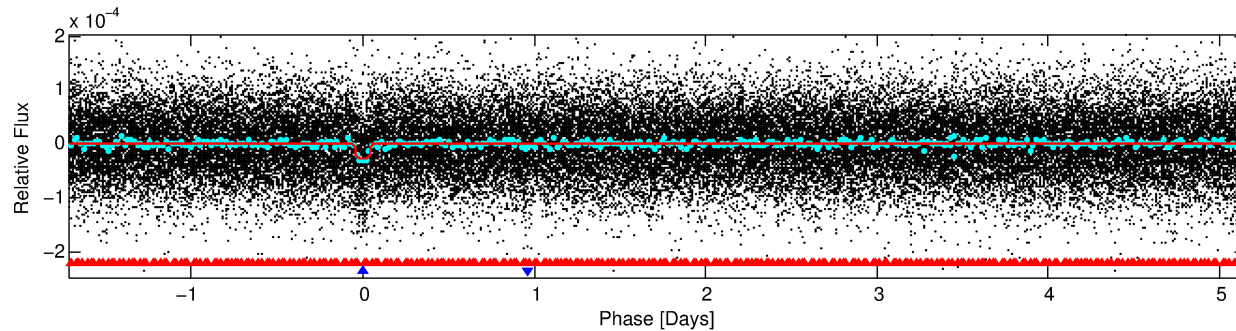
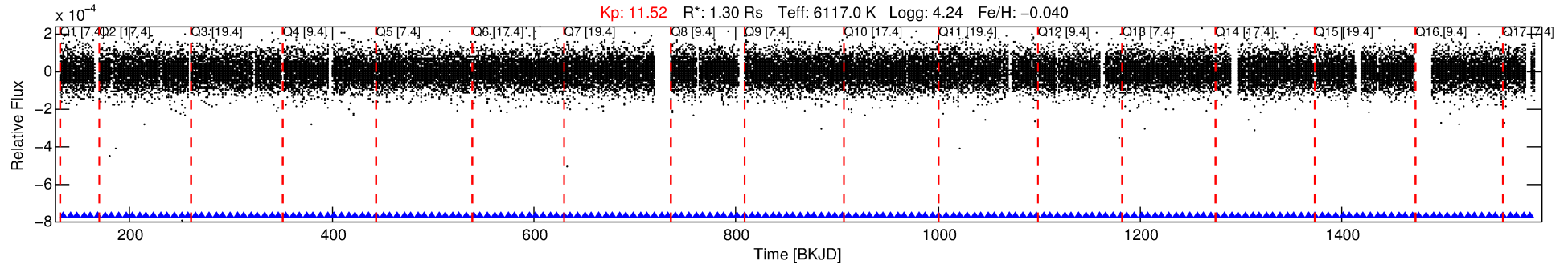
No Significant Match Found

DV One-Page Summary

KIC: 9002538 Candidate: 2 of 2 Period: 6.883 d

KOI: K03196.02 Corr: 0.893

Kp: 11.52 R*: 1.30 Rs Teff: 6117.0 K Logg: 4.24 Fe/H: -0.040



DV Fit Results:

Period = 6.88305 [0.00004] d
Epoch = 134.1618 [0.0039] BKJD
Rp/R* = 0.0057 [0.0019]
a/R* = 10.60 [18.76]
b = 0.90 [0.38]
Seff = 400.73 [102.09]
Teq = 1141 [73] K
Rp = 0.81 [0.31] Re
a = 0.0726 [0.0112] AU
Ag = 26.37 [21.88] [1.16σ]
Teffp = 3997 [799] K [3.56σ]

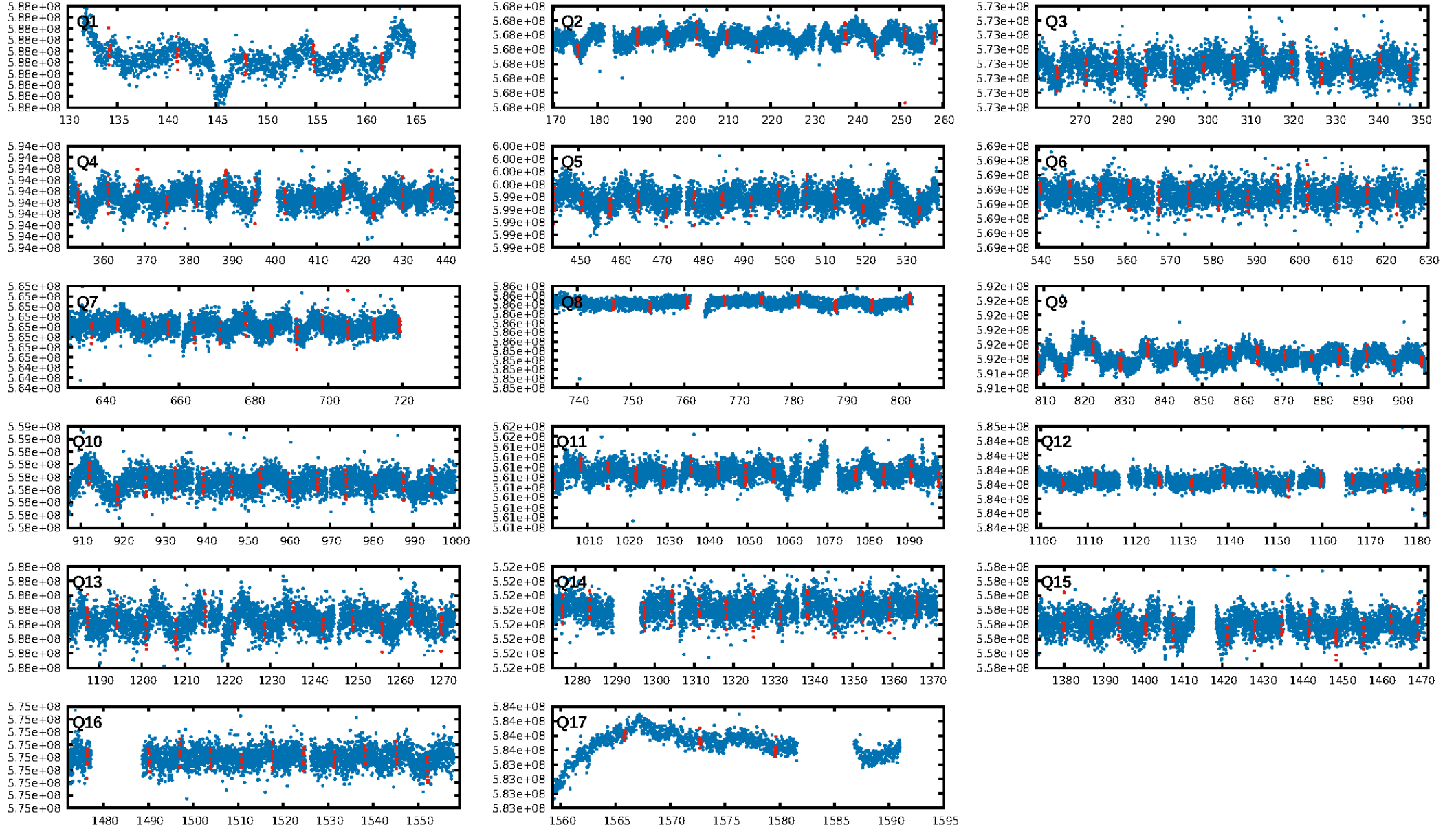
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [12.82σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.36e-23
RollingBand-fgt: 1.00 [177/177]
GhostDiagnostic-chr: -4.172
Centroid-sig: 78.3%
Centroid-so: 0.445 arcsec [0.50σ]
OotOffset-rm: 0.032 arcsec [0.05σ]
KicOffset-rm: 0.143 arcsec [0.13σ]
OotOffset-st: 1/2/2/4 [9]
KicOffset-st: 1/2/2/4 [9]
DiffImageQuality-fgm: 0.67 [6/9]
DiffImageOverlap-fno: 1.00 [17/17]

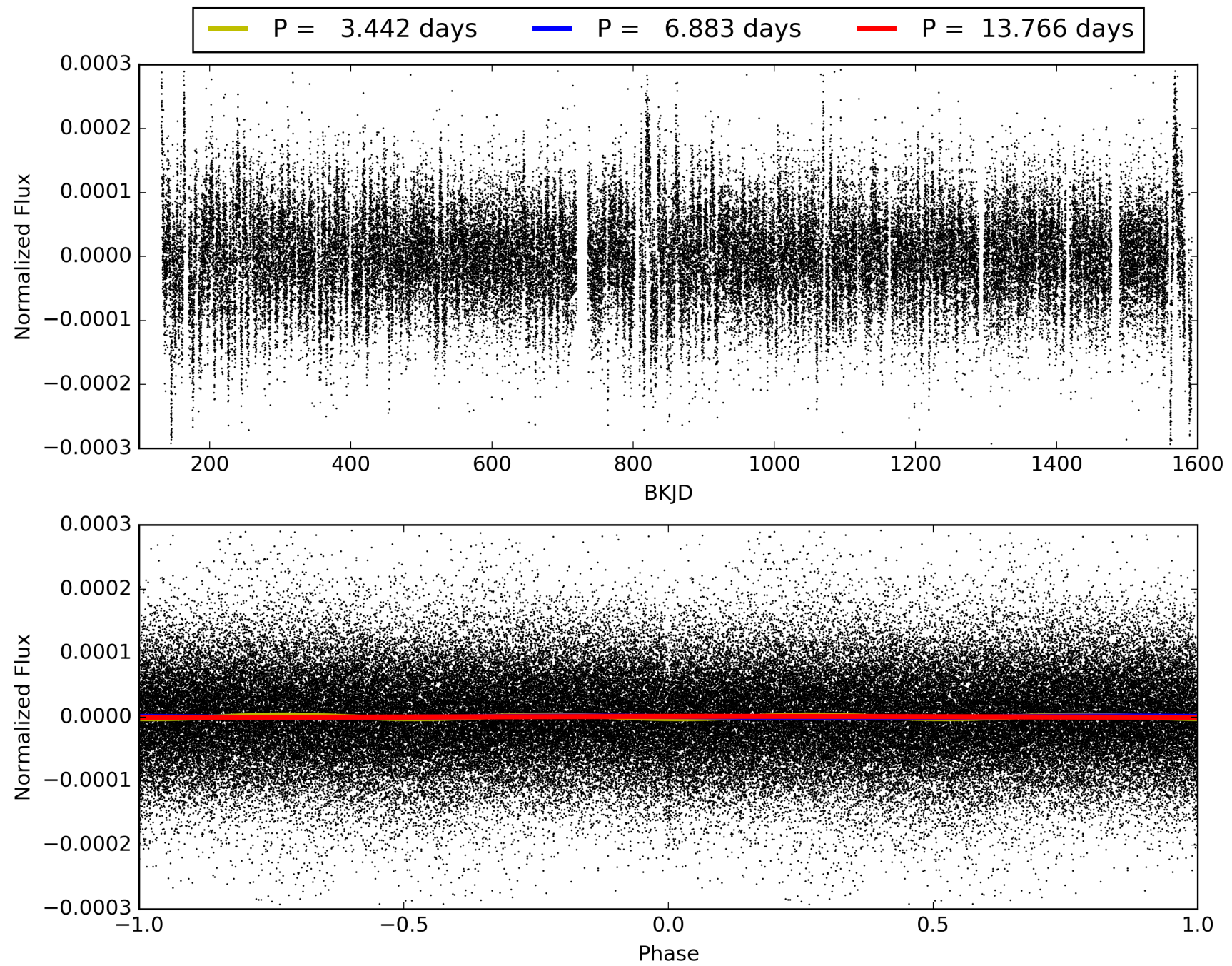
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:04:04 Z

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TCE 009002538-02, PDC Light Curves

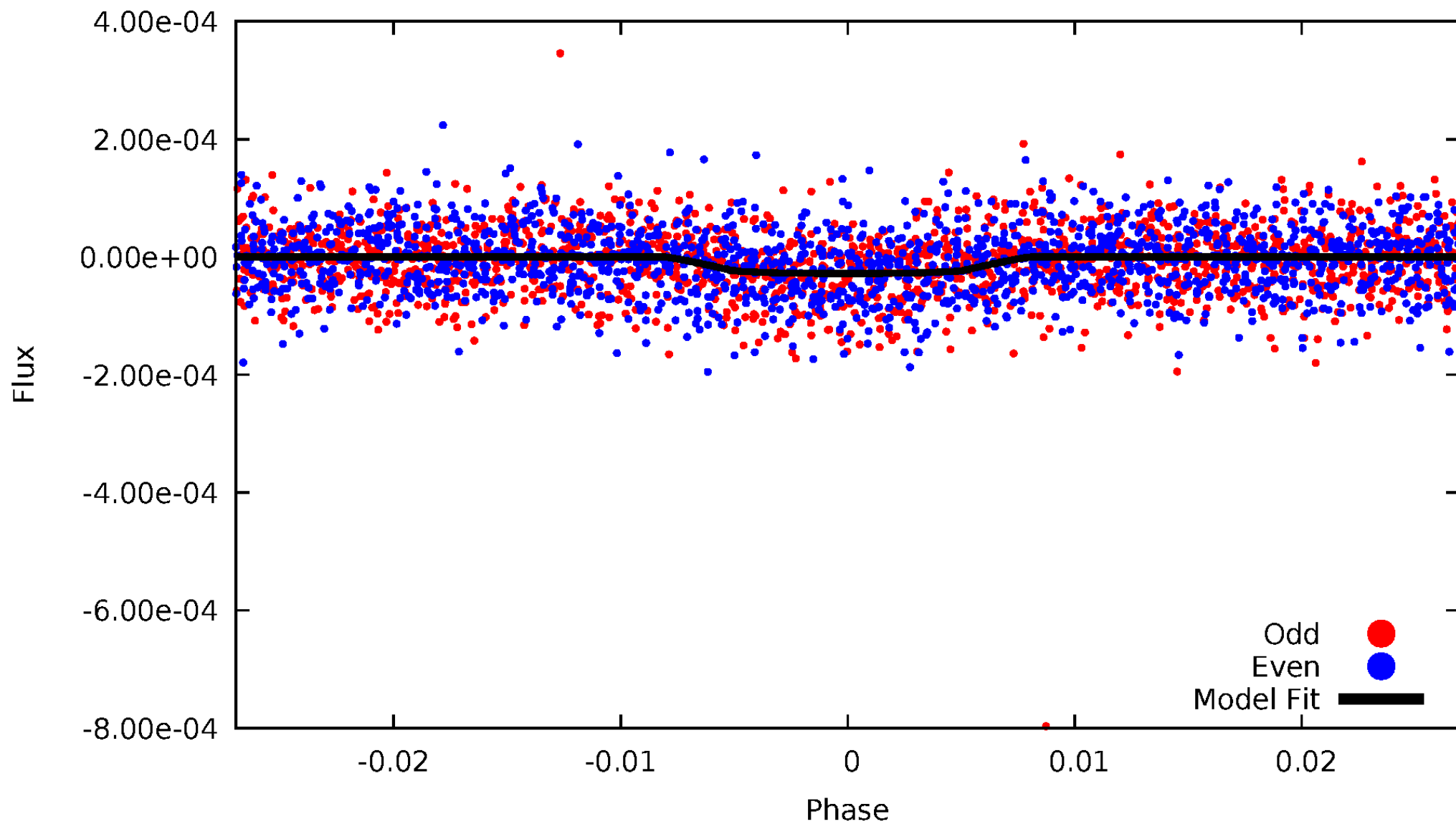


TCE 009002538-02



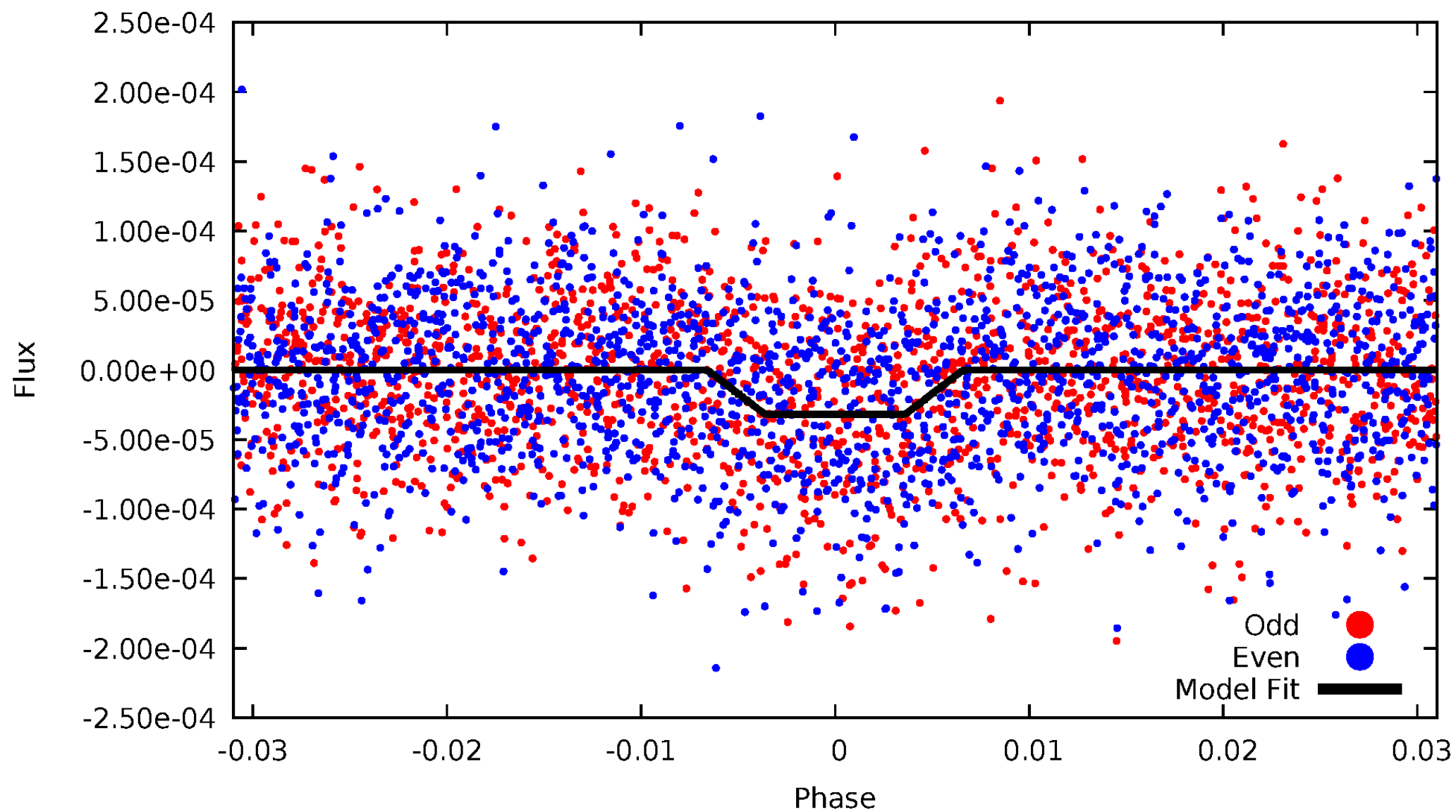
DV Odd/Even

TCE 009002538-02



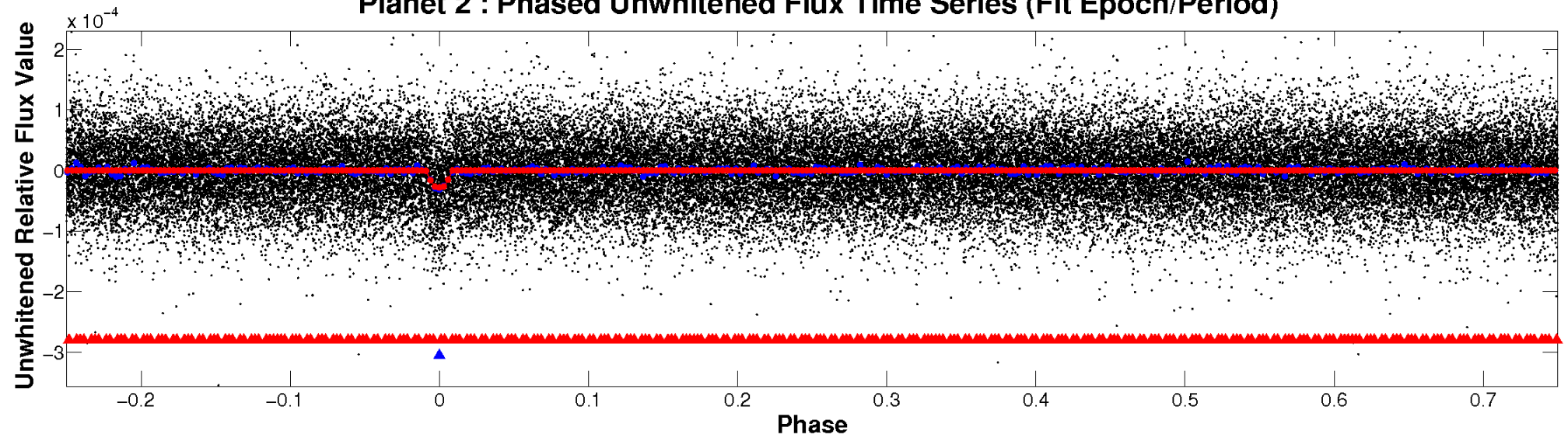
ALT Odd/Even

TCE 009002538-02

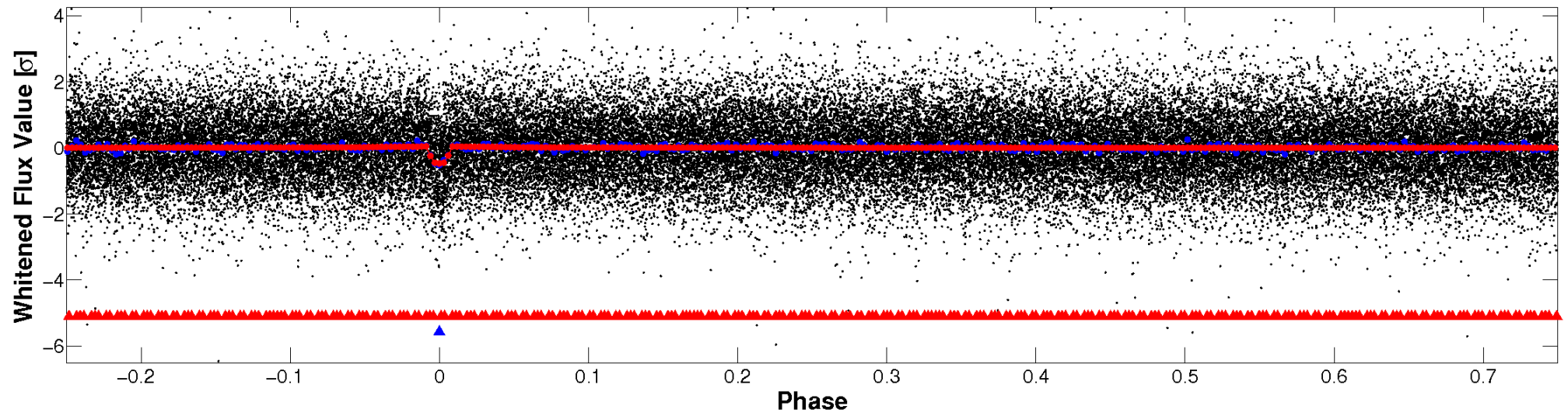


Non-Whitened Vs. Whitened Light Curve

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

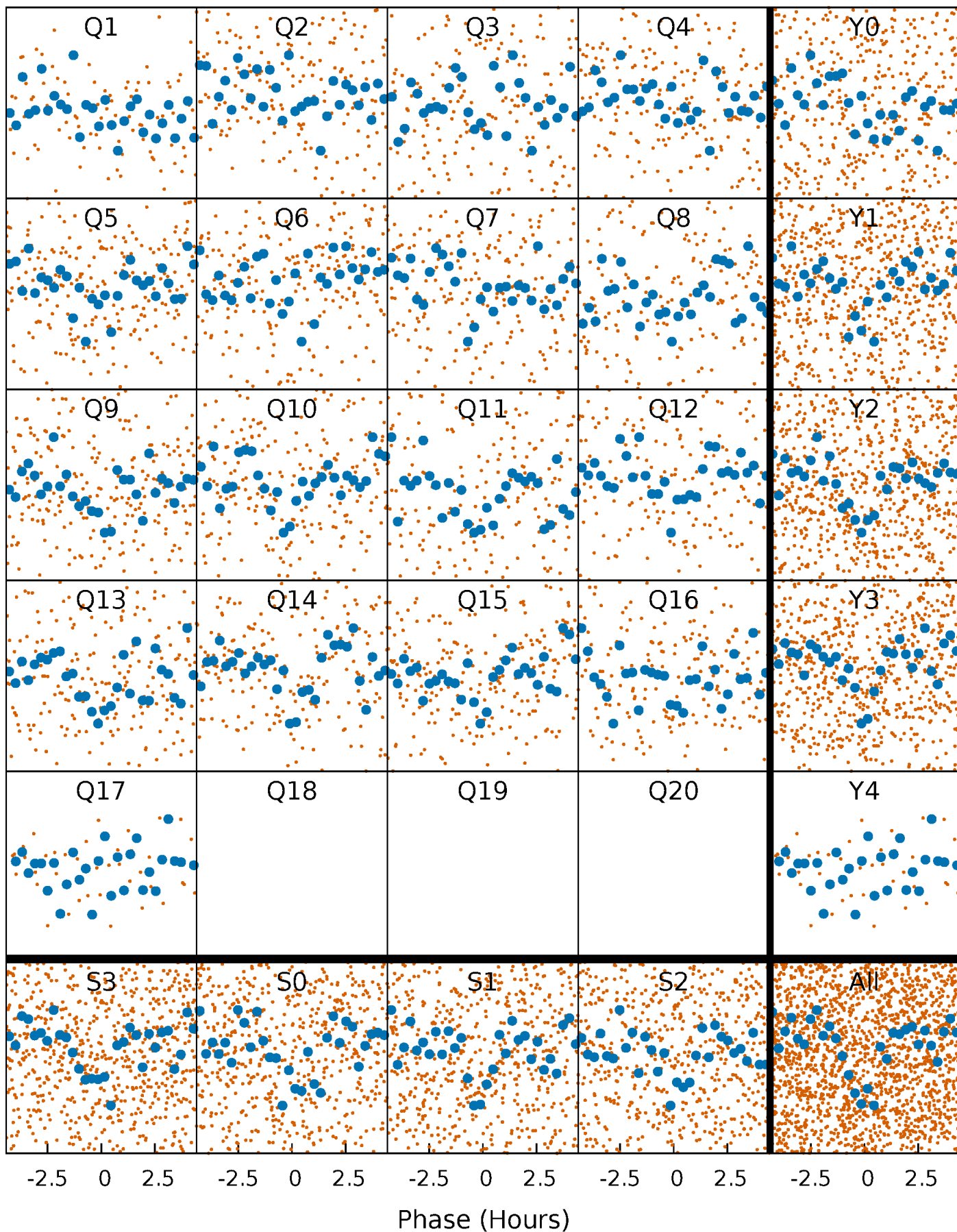


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



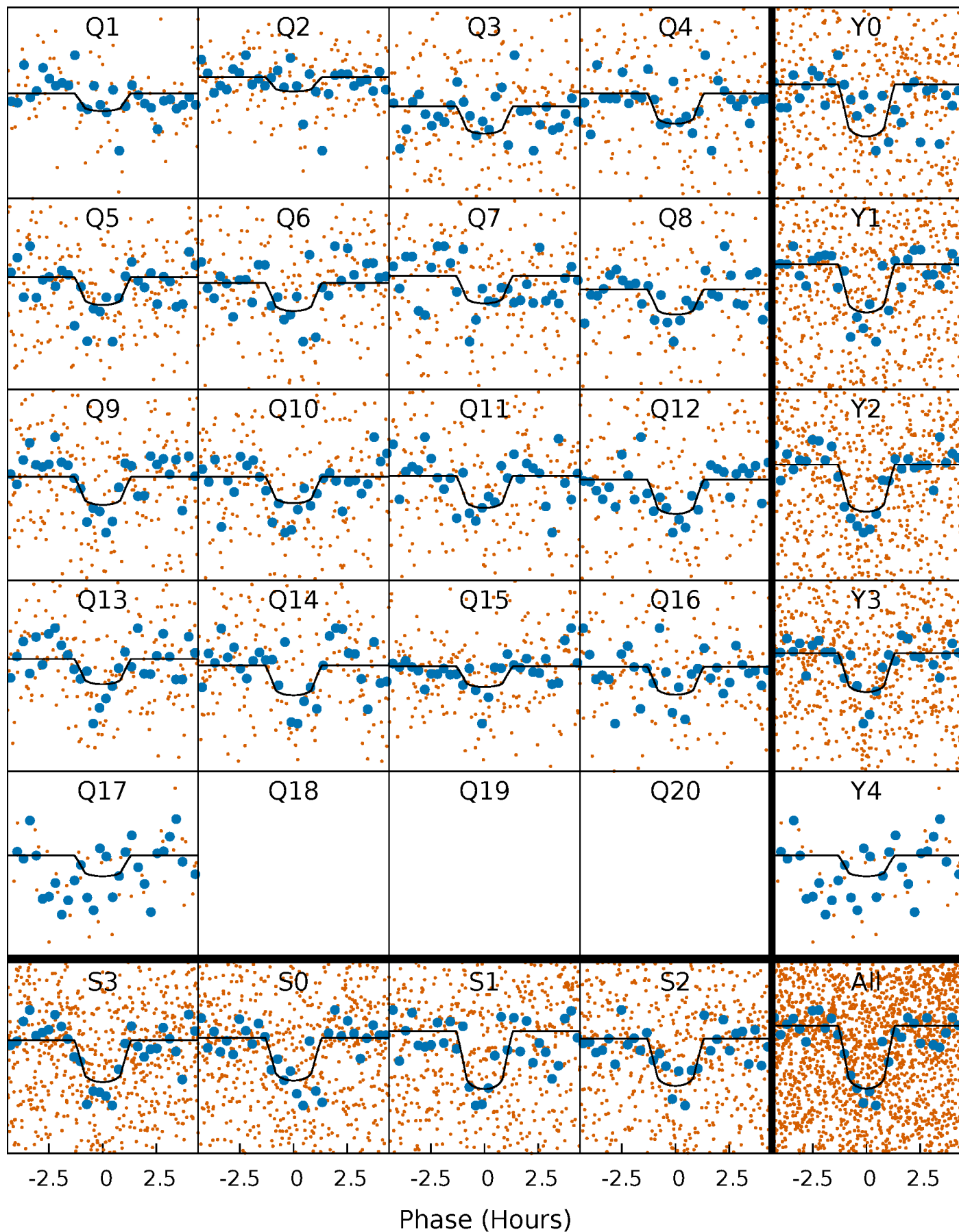
PDC Quarter-Phased Transit Curves

TCE 009002538-02 P= 6.883047 Days $T_0=134.161800$ (BKJD)



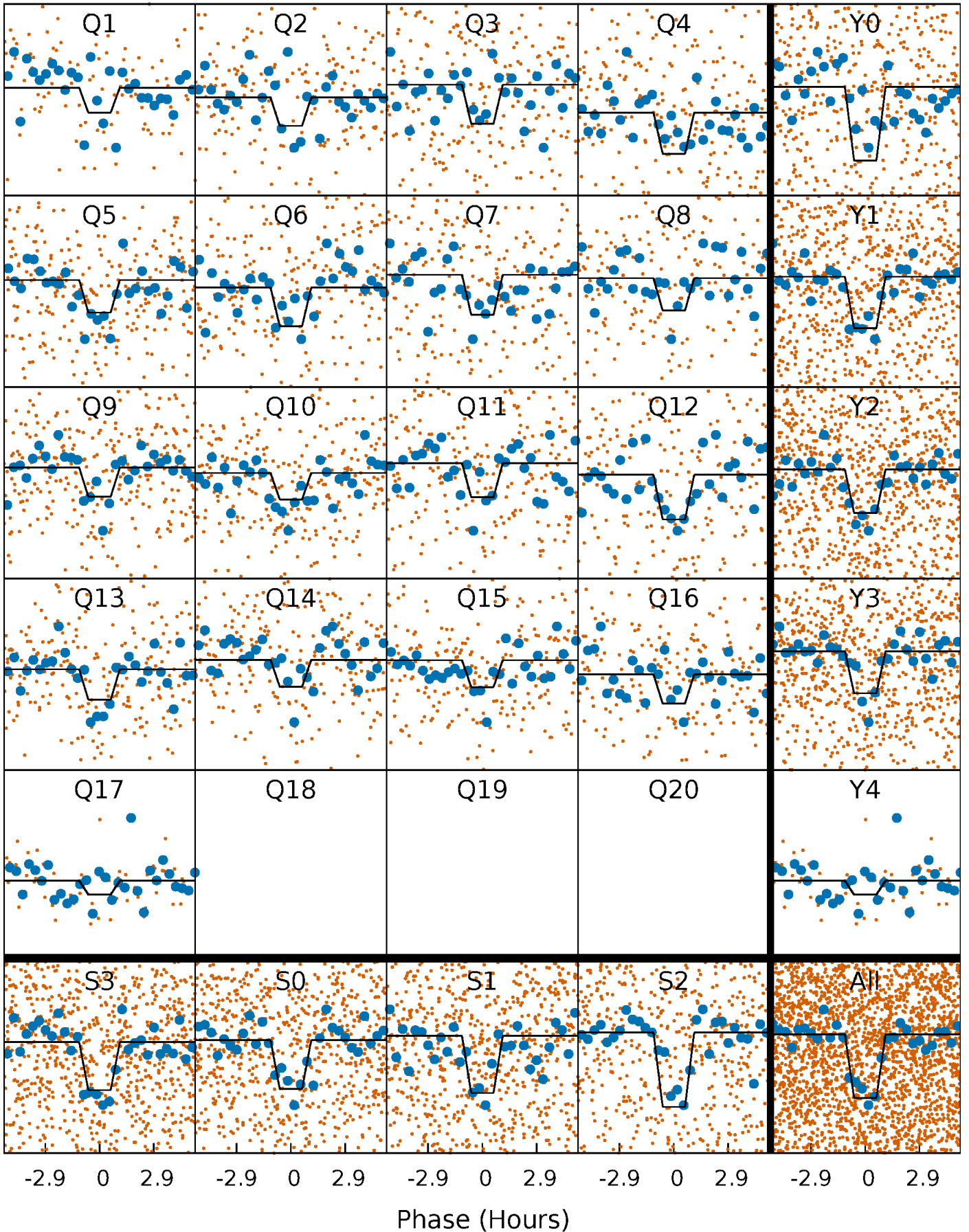
DV Quarter-Phased Transit Curves

TCE 009002538-02 P= 6.883047 Days $T_0=134.161800$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

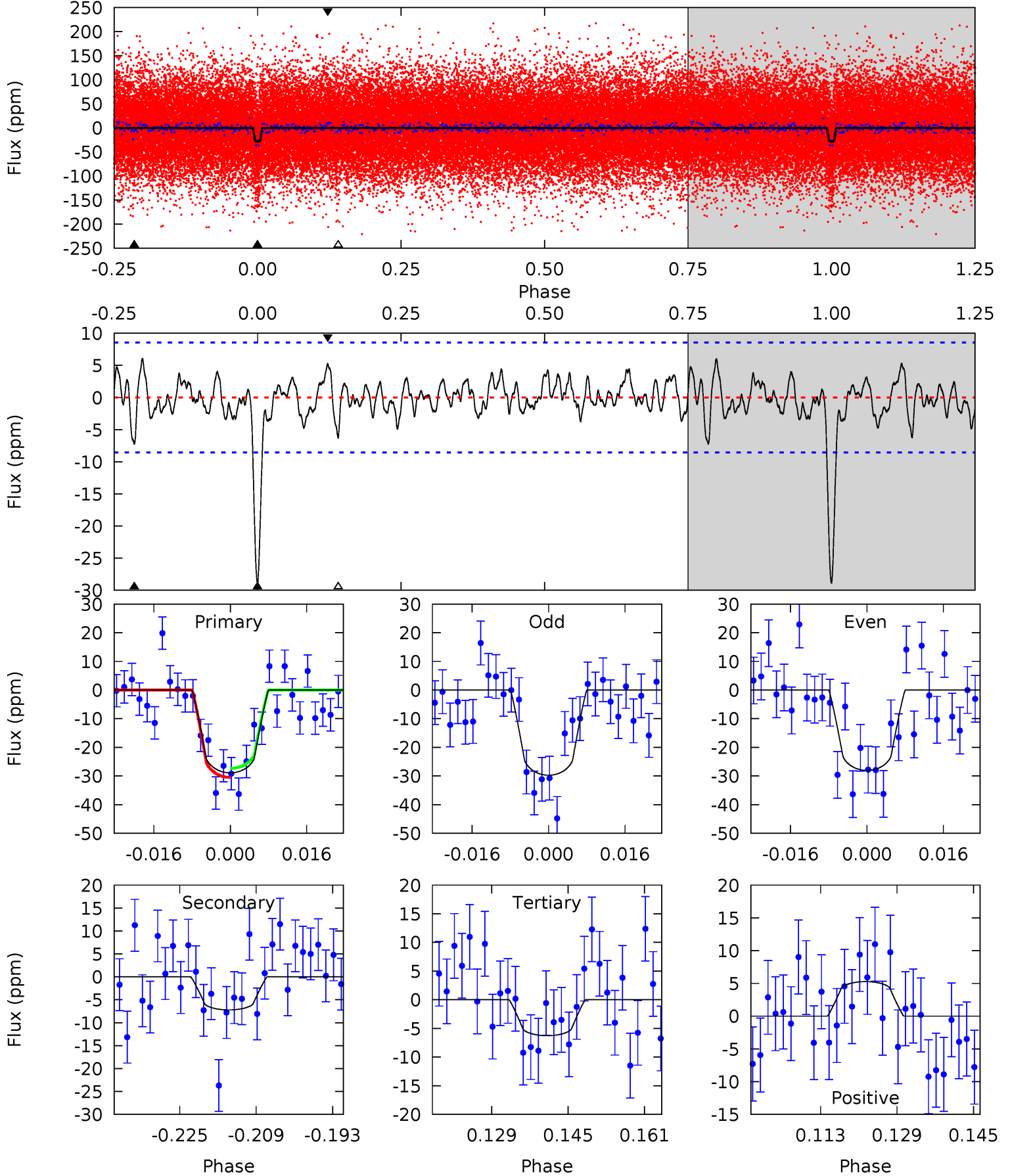
TCE 009002538-02 P= 6.883012 Days $T_0=134.162984$ (BKJD)



DV Model-Shift Uniqueness Test

009002538-02, P = 6.883047 Days, E = 127.278753 Days

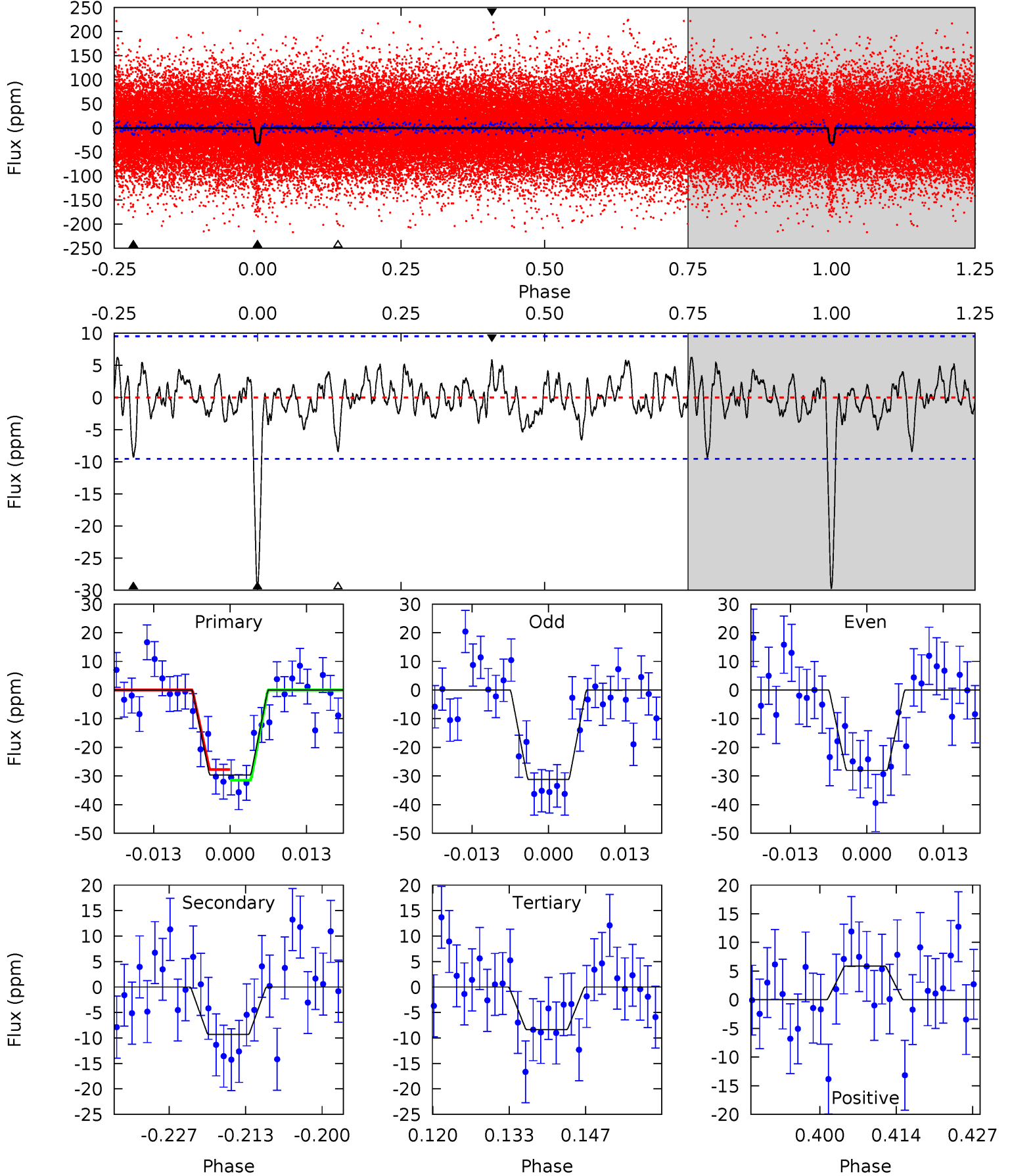
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.7	4.16	3.61	3.04	4.93	2.41	1.19	13.1	13.6	0.55	1.12	0.48	0.98	0.17	0.91



Alt Model-Shift Uniqueness Test

009002538-02, P = 6.883012 Days, E = 127.279972 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.4	4.85	4.36	3.05	4.97	2.47	1.28	11.1	12.4	0.49	1.80	0.83	0.95	0.17	0.98



Stellar Parameters For KIC 009002538

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6117^{+135}_{-135}	$4.244^{+0.137}_{-0.112}$	$-0.040^{+0.150}_{-0.150}$	$1.298^{+0.221}_{-0.199}$	$1.079^{+0.103}_{-0.075}$	$0.694^{+0.439}_{-0.229}$
	+2%/-2%	+3%/-3%	+375%/-375%	+17%/-15%	+10%/-7%	+63%/-33%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009002538-02 / KOI 3196.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-7 ± 2	$0.81^{+0.28}_{-0.29}$	1589^{+86}_{-76}	4399^{+872}_{-486}	33^{+48}_{-16}
Alt.	-9 ± 2	$0.79^{+0.29}_{-0.29}$	1592^{+79}_{-75}	4616^{+1080}_{-506}	41^{+69}_{-19}

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 $A_{obs} \gg 1.0$

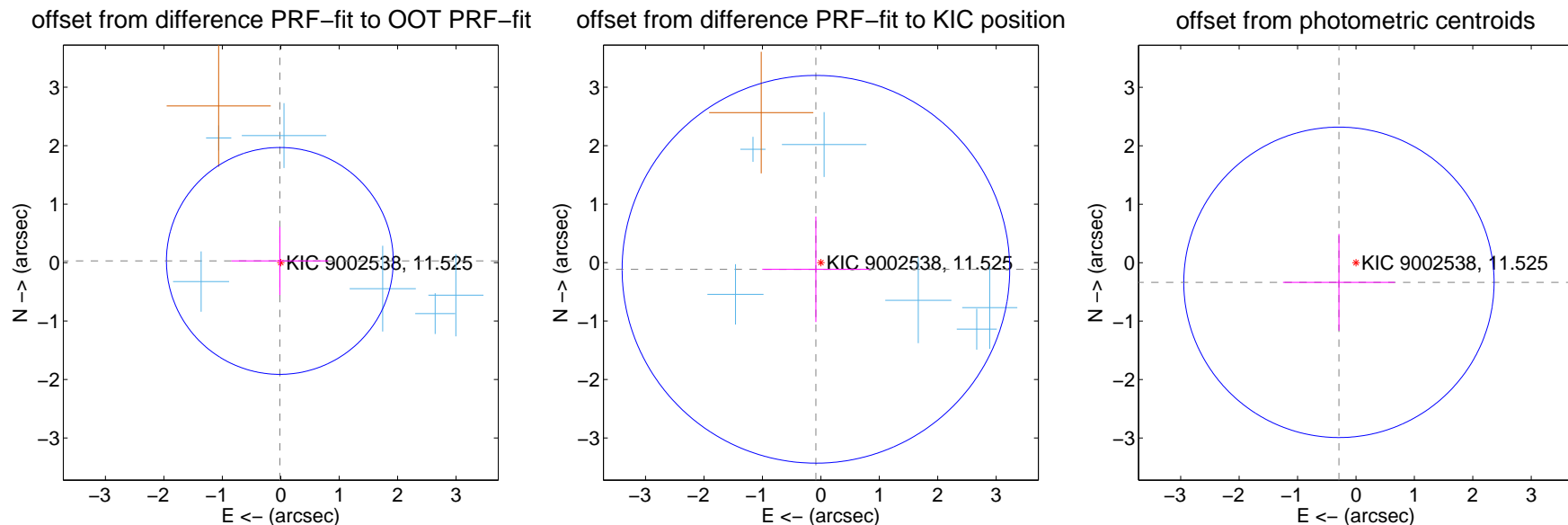
DV Centroid Data

Supplemental centroid analysis for 009002538-02. **Kepler magnitude: 11.53.** Transit SNR 11.42

There are 6 quarters with good PRF difference image offsets

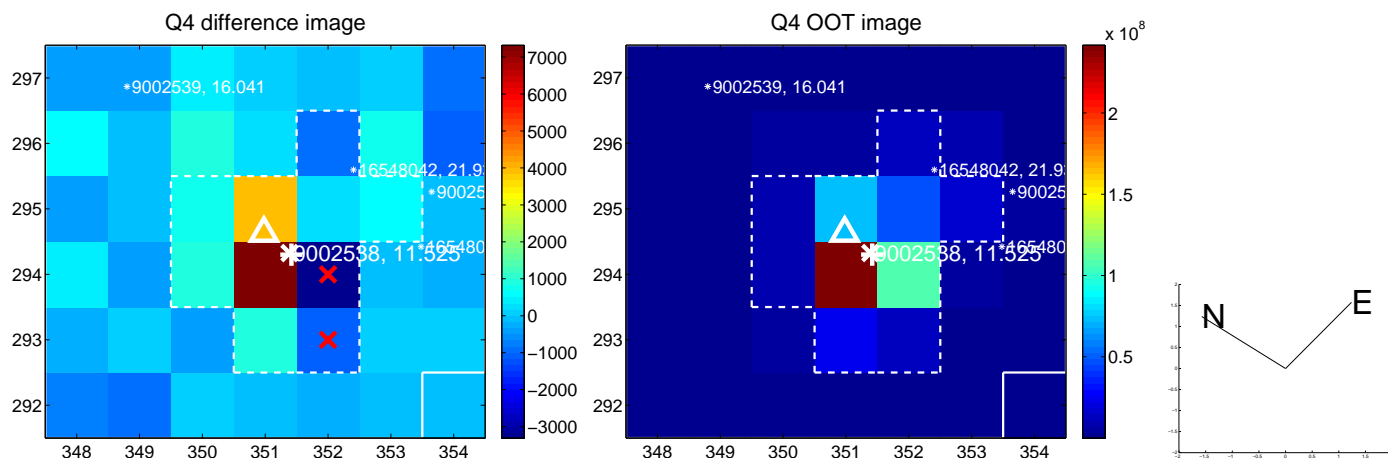
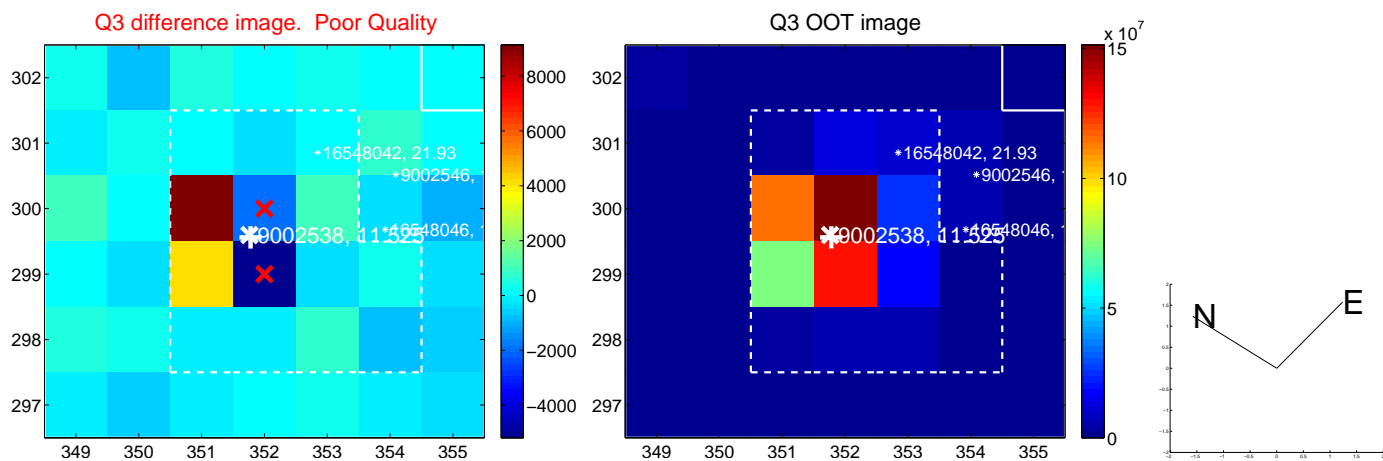
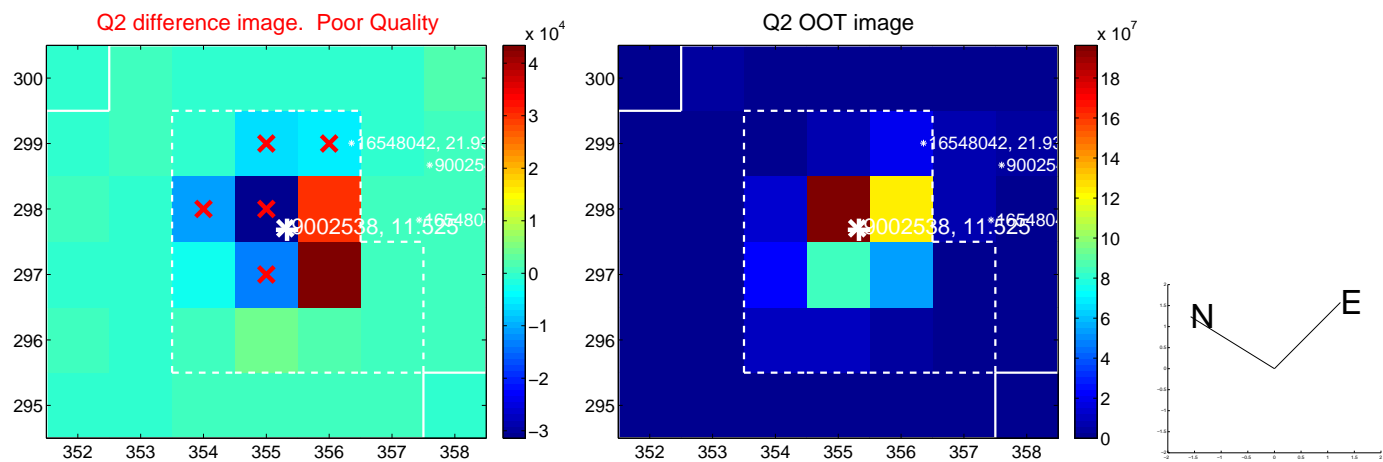
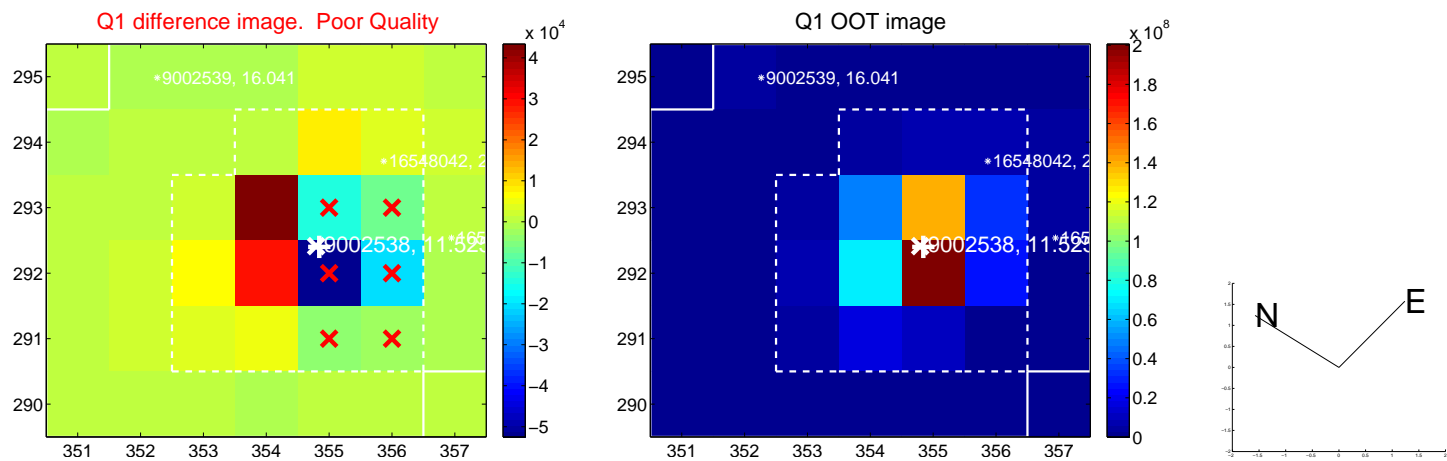
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.032 ± 0.647	0.05	0.016 ± 0.827	0.028 ± 0.582
PRF-fit source offset from KIC position	0.143 ± 1.105	0.13	0.085 ± 0.919	-0.115 ± 0.902
photometric centroid source offset	0.45 ± 0.89	0.50	0.29 ± 0.96	-0.34 ± 0.83

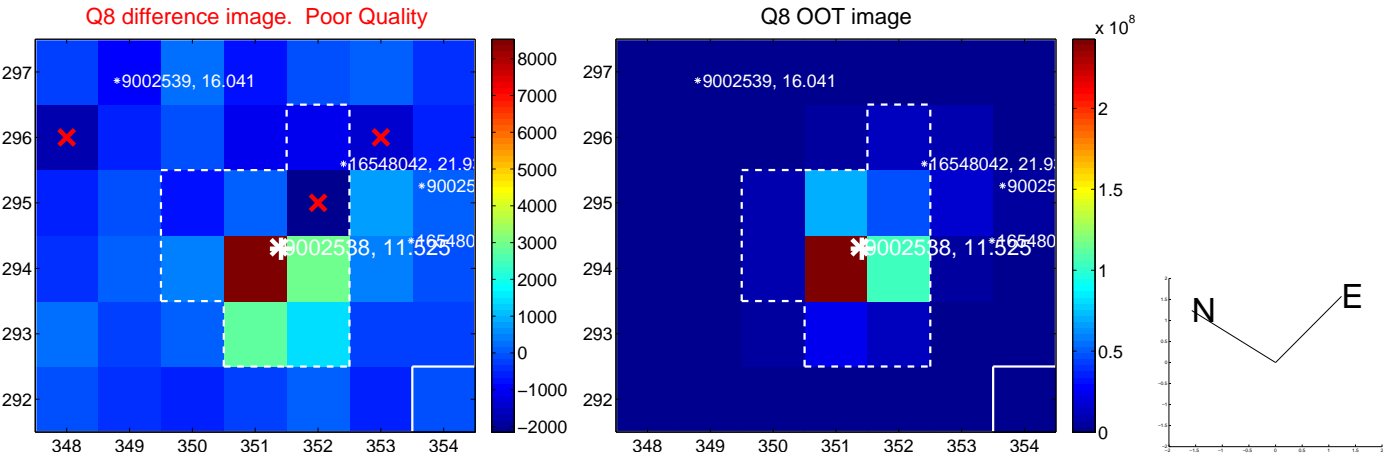
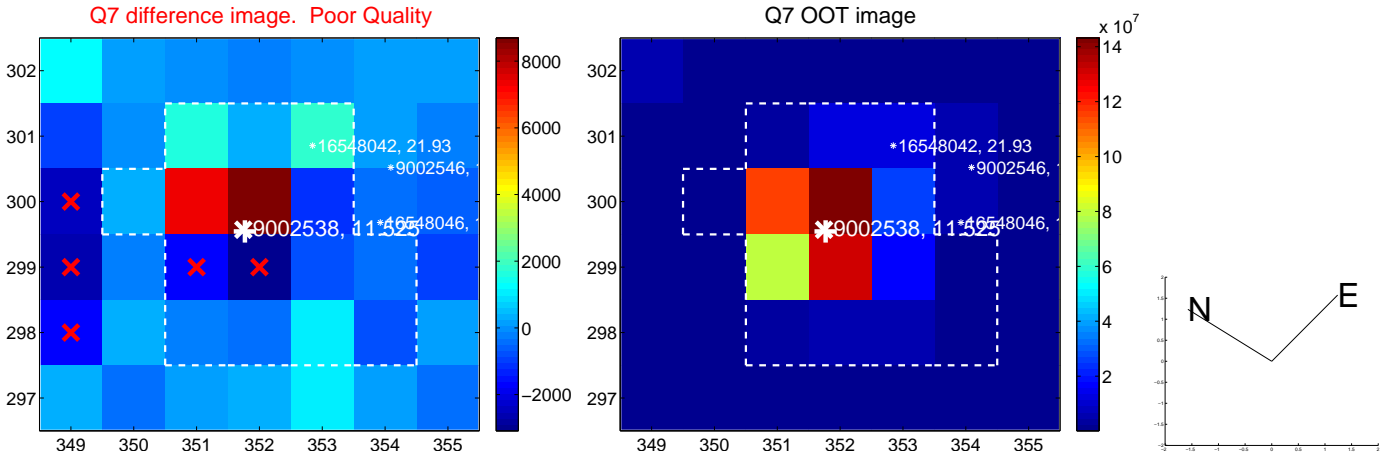
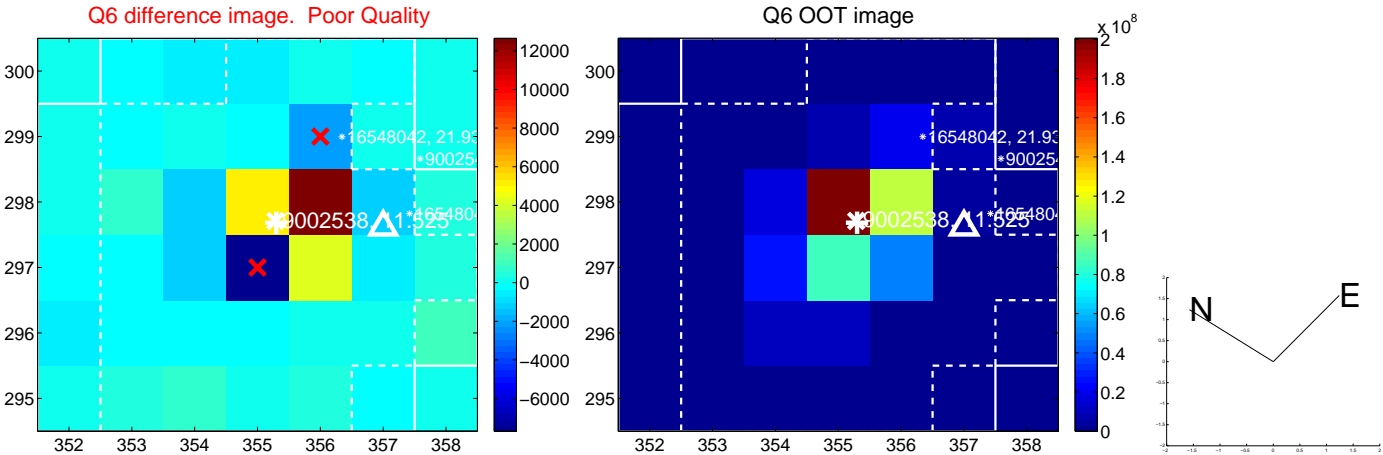
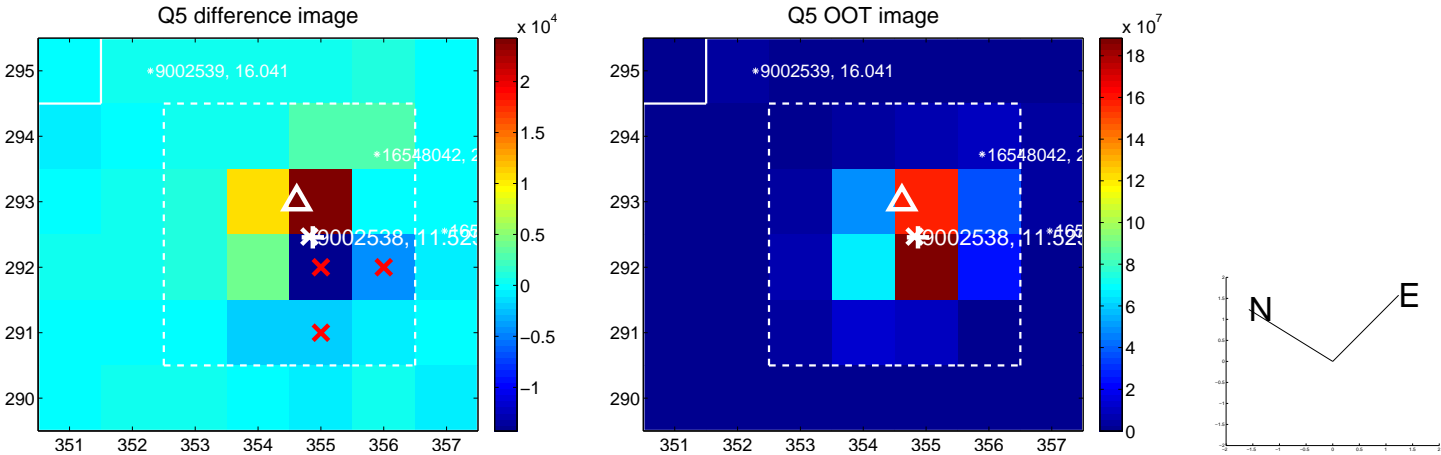


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

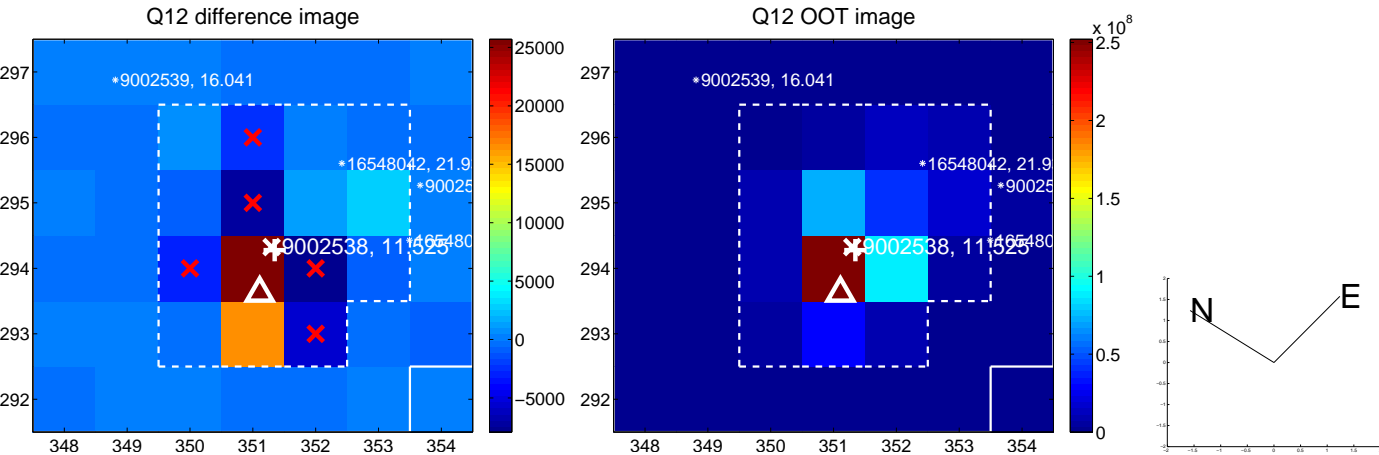
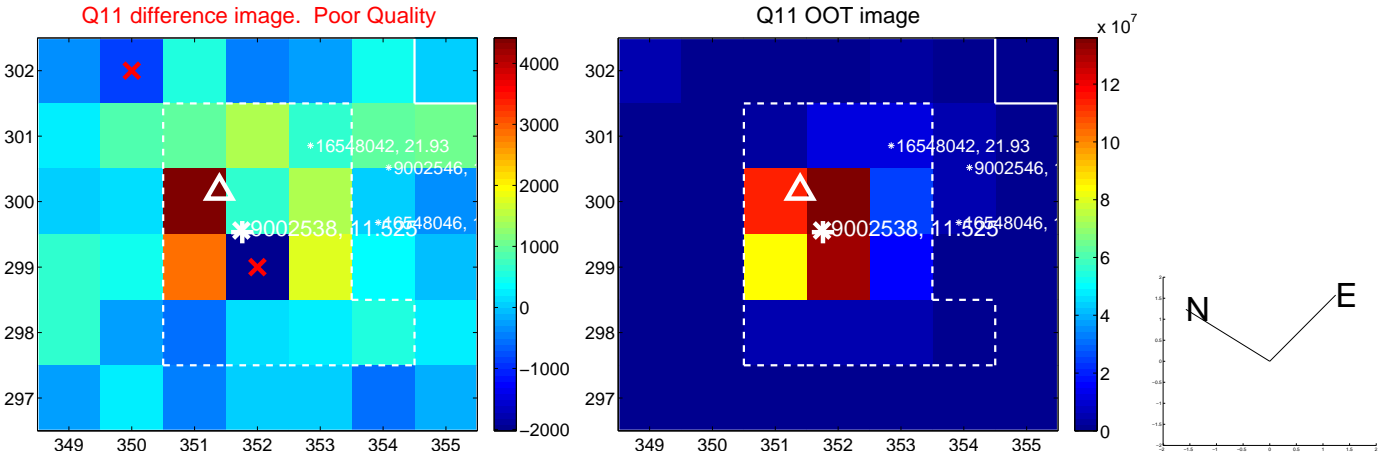
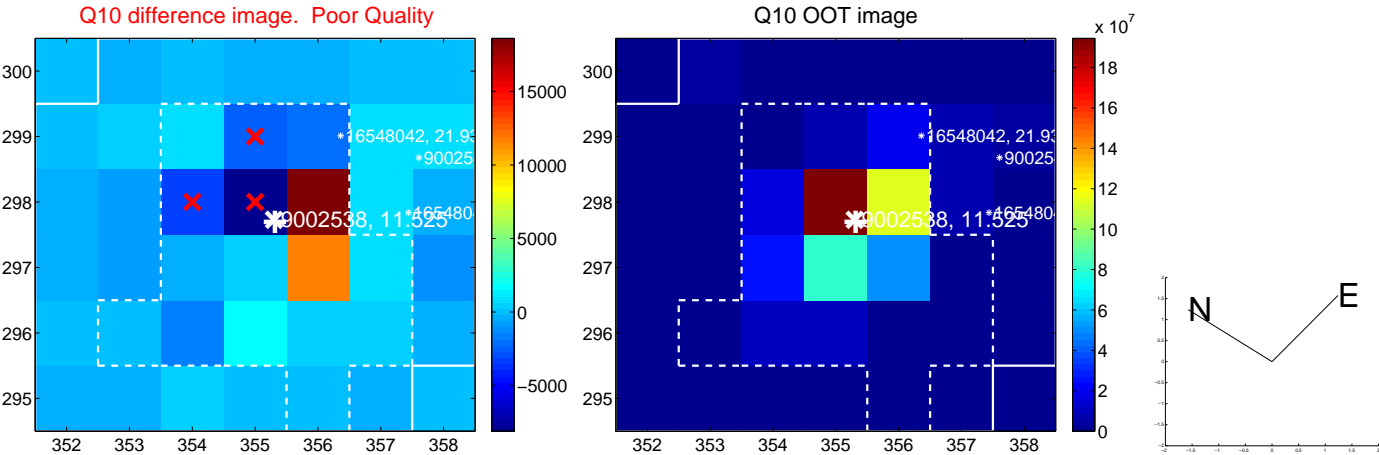
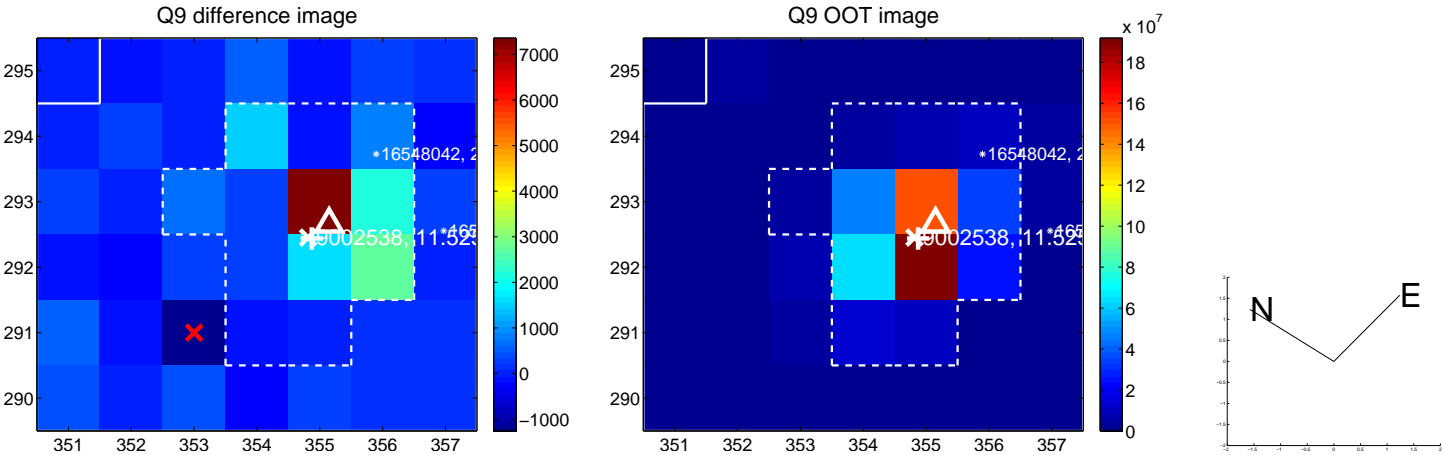
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



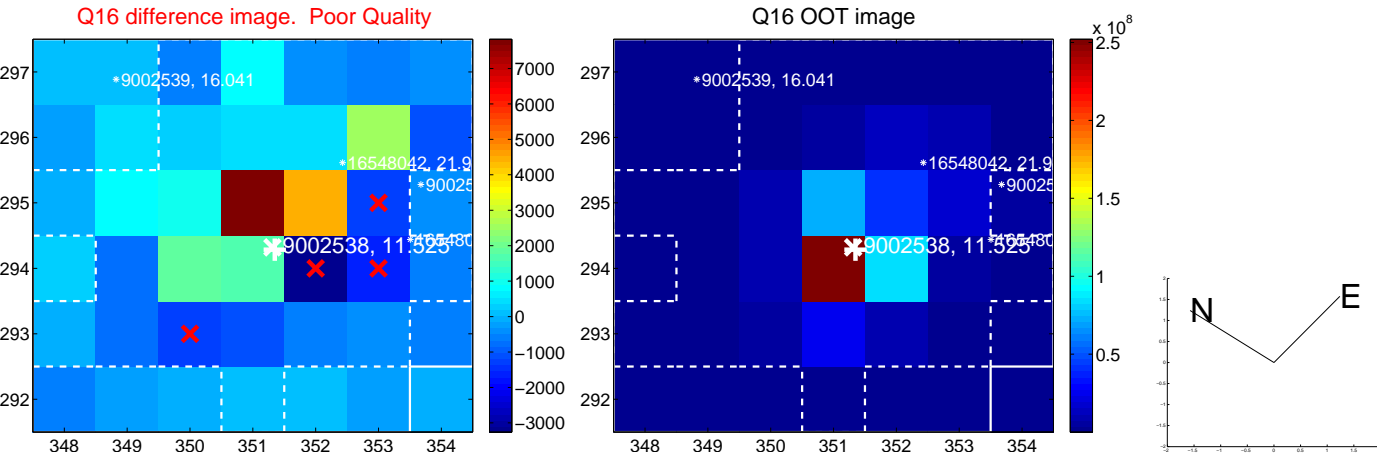
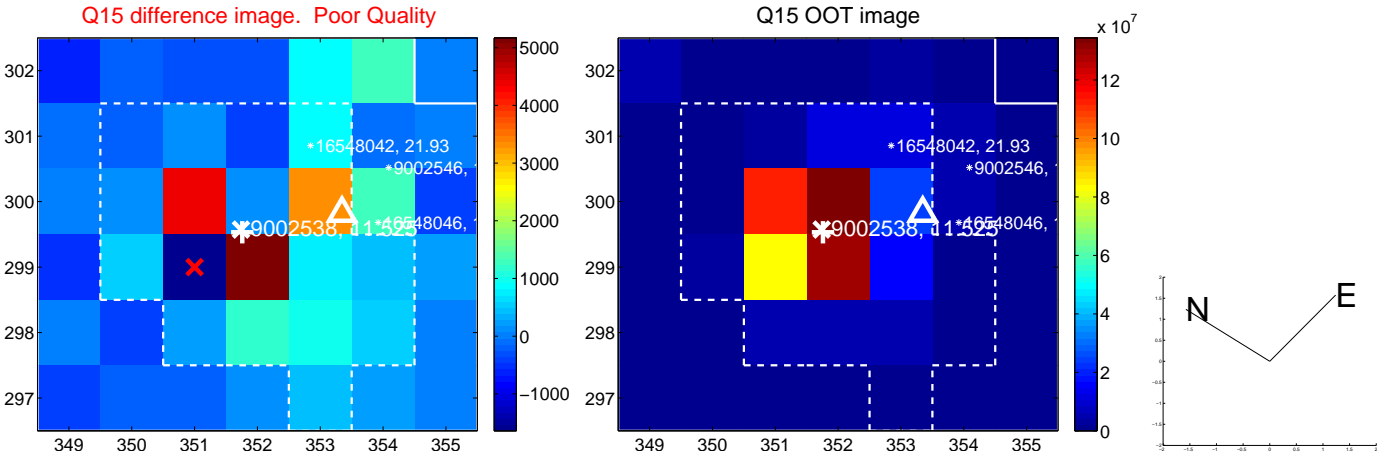
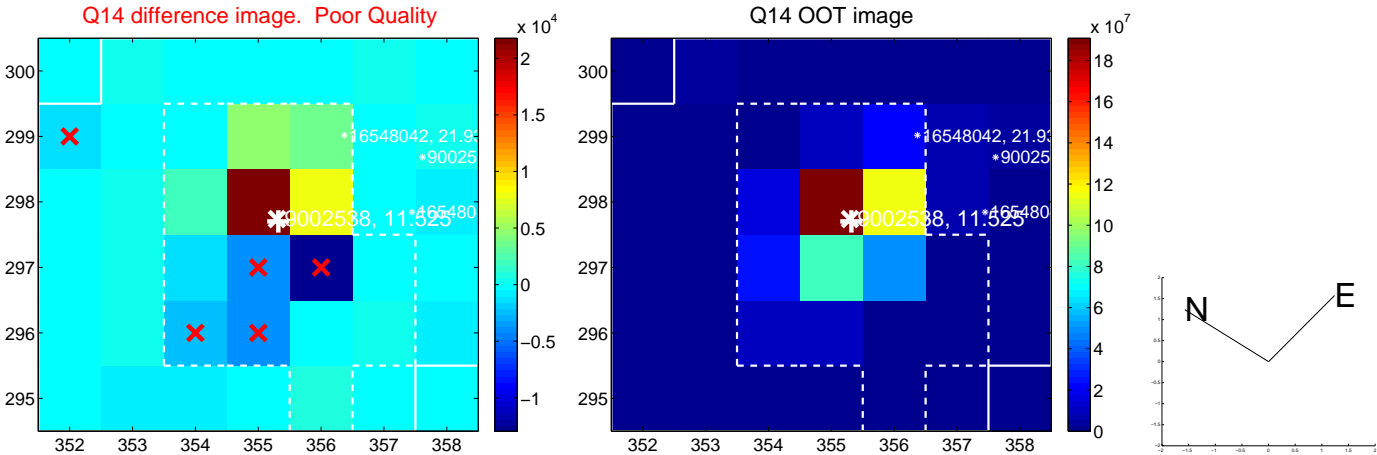
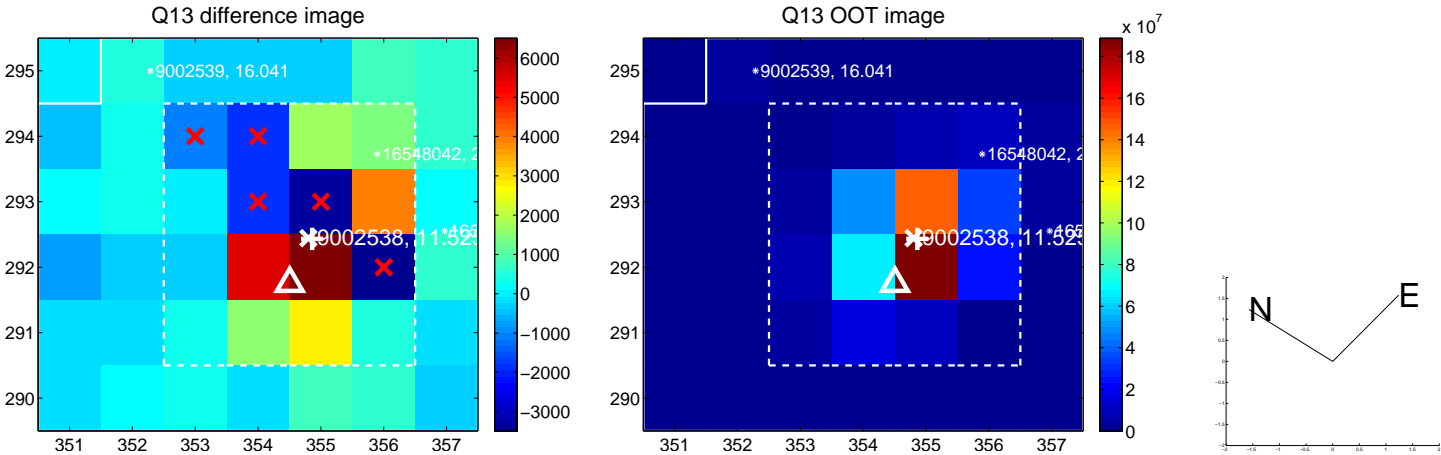
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



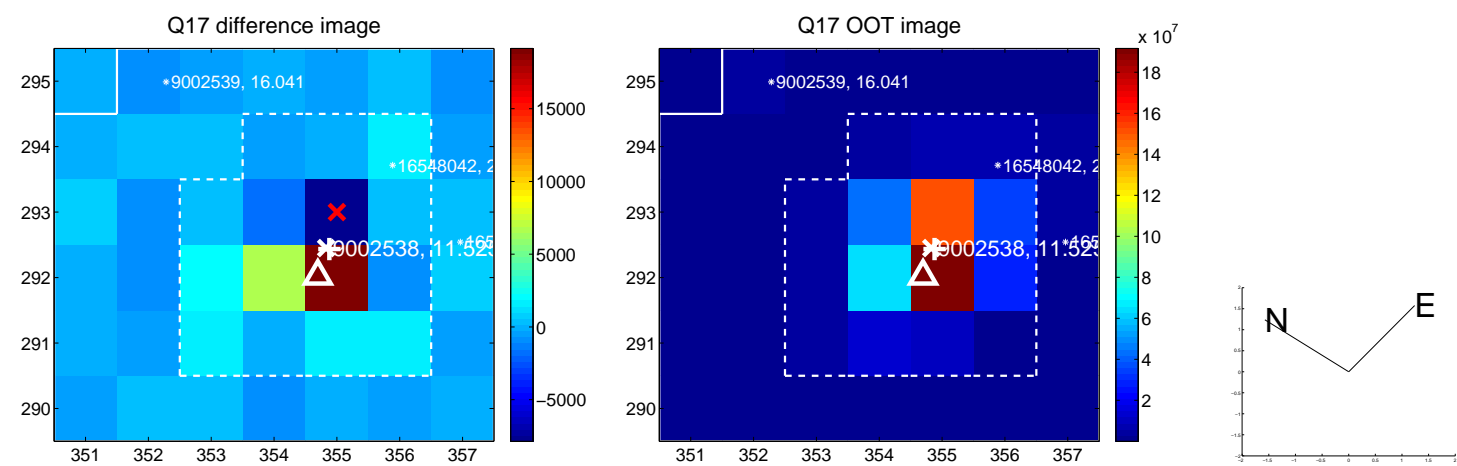
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



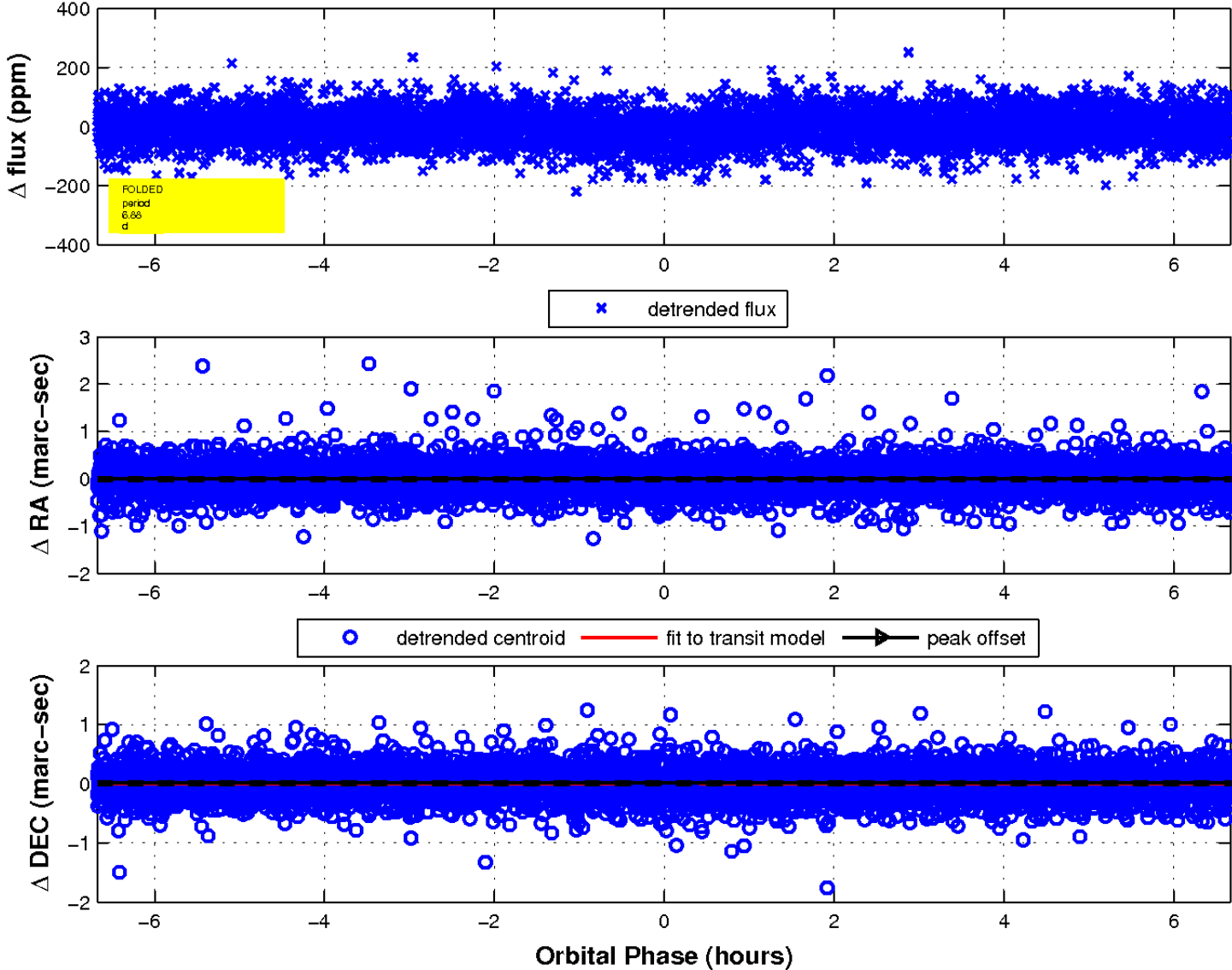
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

