

KIC 002581316

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})
002581316-01	OBS	3681.01	217.831834	238.819942	9195.7	21.325	326.3	490.8	1.17	6259	11.21	3.29
002581316-02	OBS	3681.02	10.514149	134.570690	78.0	3.827	19.8	20.4	1.17	6259	1.21	187.32

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002581316-01	OBS	PC	0.86	0	0	0	0	NO_COMMENT
002581316-02	OBS	PC	0.99	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.

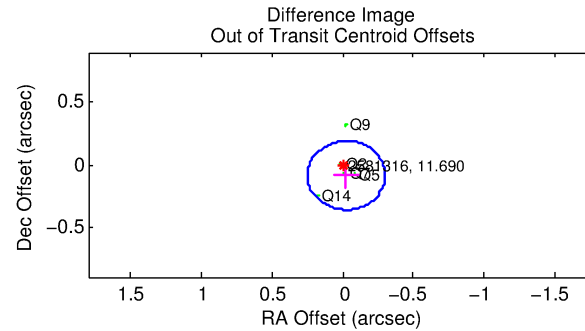
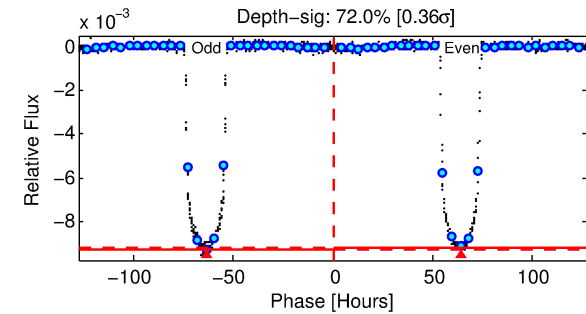
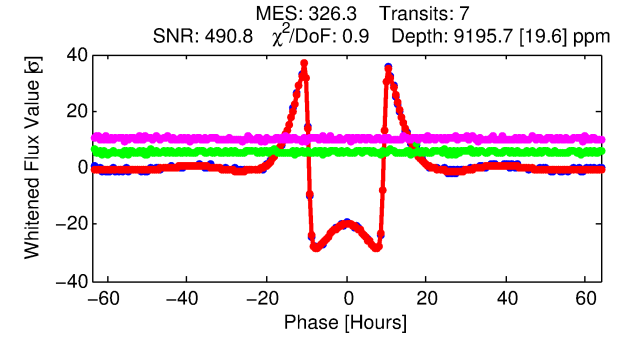
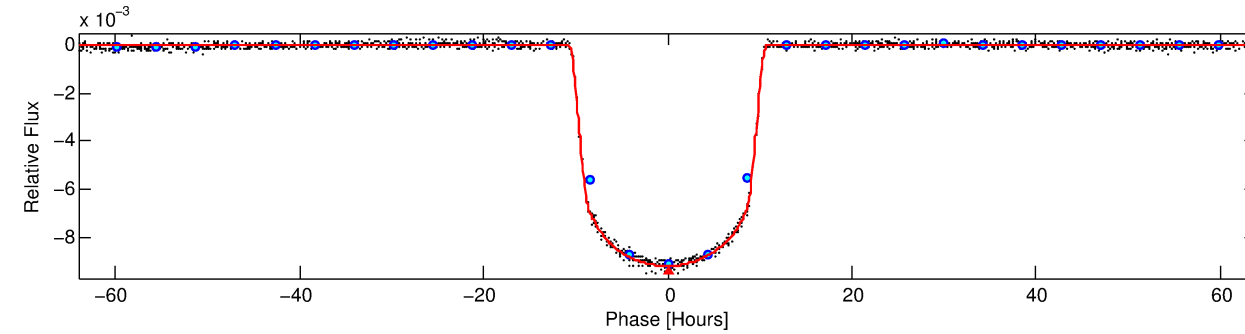
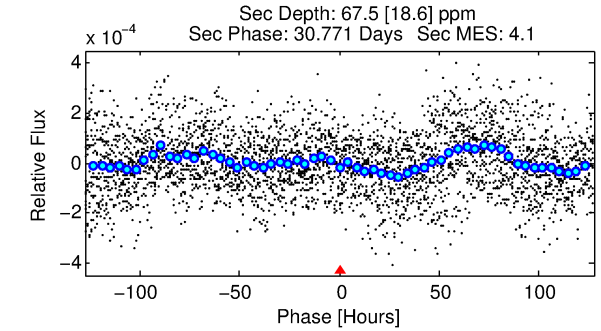
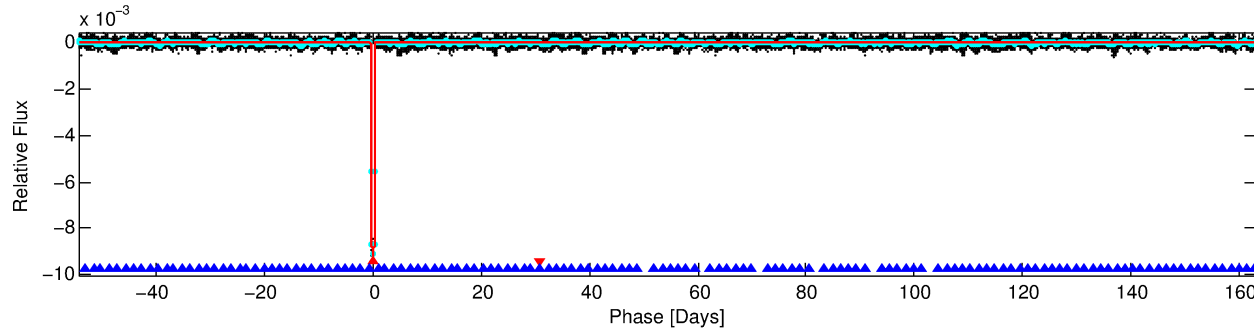
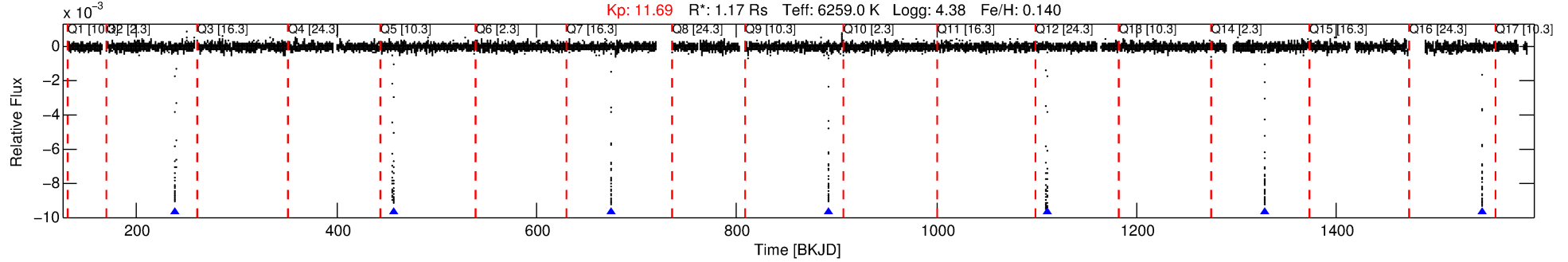
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002581316-01

No Significant Match Found

DV One-Page Summary

KIC: 2581316 Candidate: 1 of 2 Period: 217.832 d
KOI: K03681.01 Corr: 0.999



DV Fit Results:

Period = 217.83183 [0.00008] d
Epoch = 238.8199 [0.0003] BKJD
Rp/R* = 0.0880 [0.0001]
a/R* = 83.91 [0.41]
b = 0.17 [0.03]
Seff = 3.29 [0.81]
Teq = 343 [21] K
Rp = 11.21 [2.04] Re
a = 0.7542 [0.1176] AU
Ag = 168.13 [60.48] [2.76 σ]
Teffp = 1912 [138] K [11.21 σ]

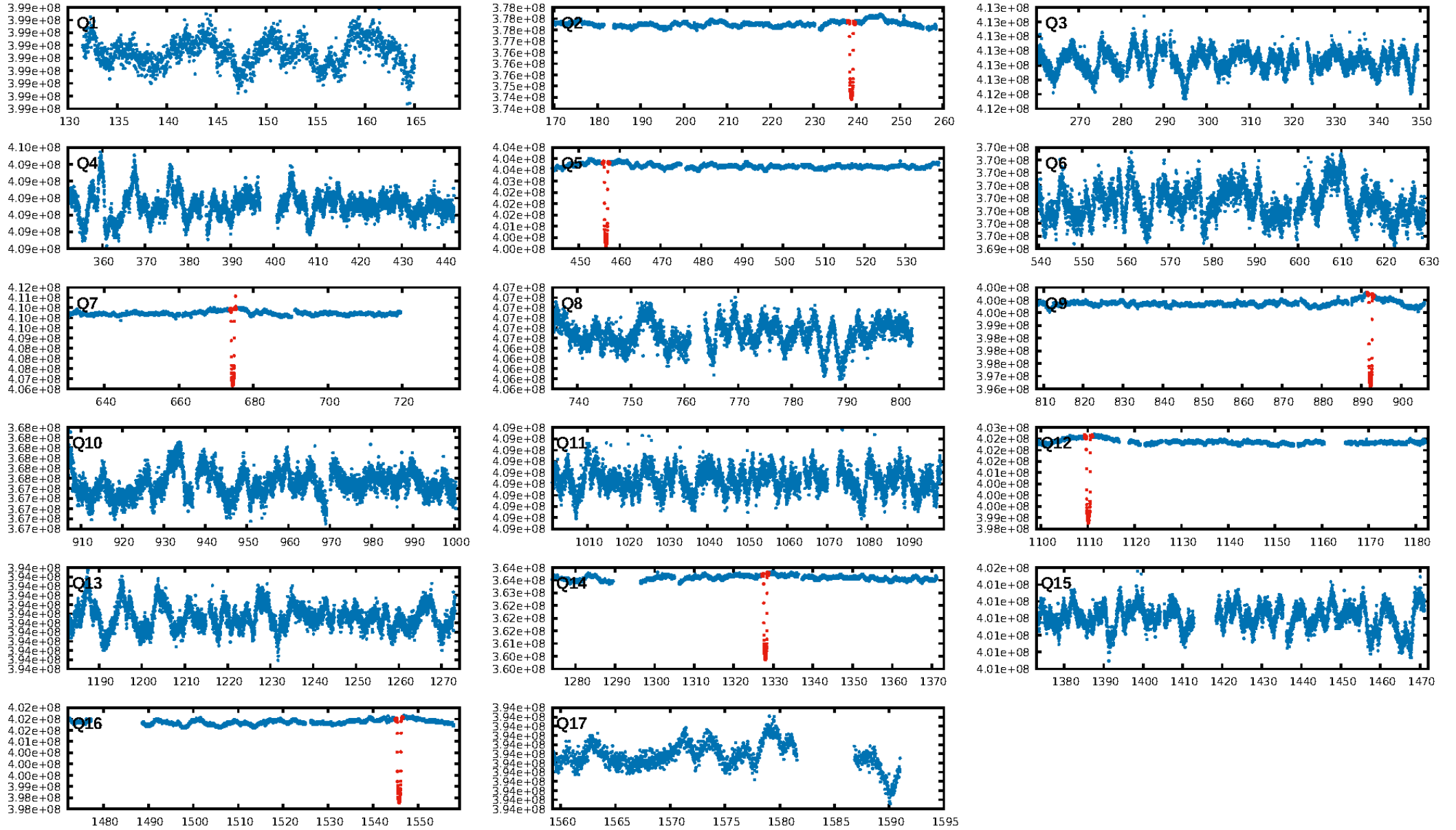
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [229.66 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 5.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [7/7]
GhostDiagnostic-chr: 3.504
Centroid-sig: 17.2%
Centroid-so: 0.087 arcsec [7.34 σ]
OotOffset-rm: 0.090 arcsec [0.98 σ]
KicOffset-rm: 0.142 arcsec [1.04 σ]
OotOffset-st: 2/1/0/2 [5]
KicOffset-st: 2/1/0/2 [5]
DiffImageQuality-fgm: 1.00 [5/5]
DiffImageOverlap-fno: 0.60 [3/5]

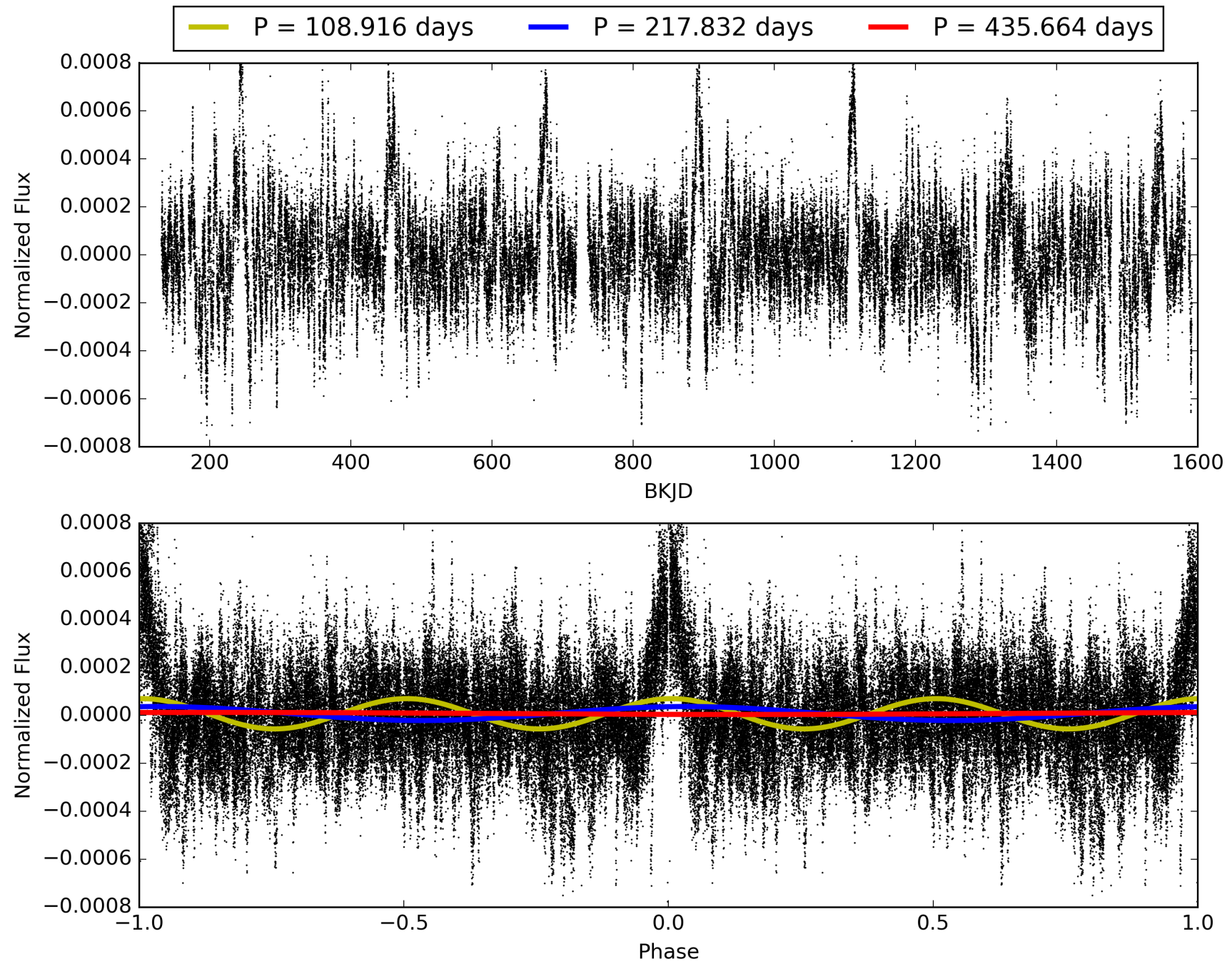
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:07:07 Z

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

TCE 002581316-01, PDC Light Curves

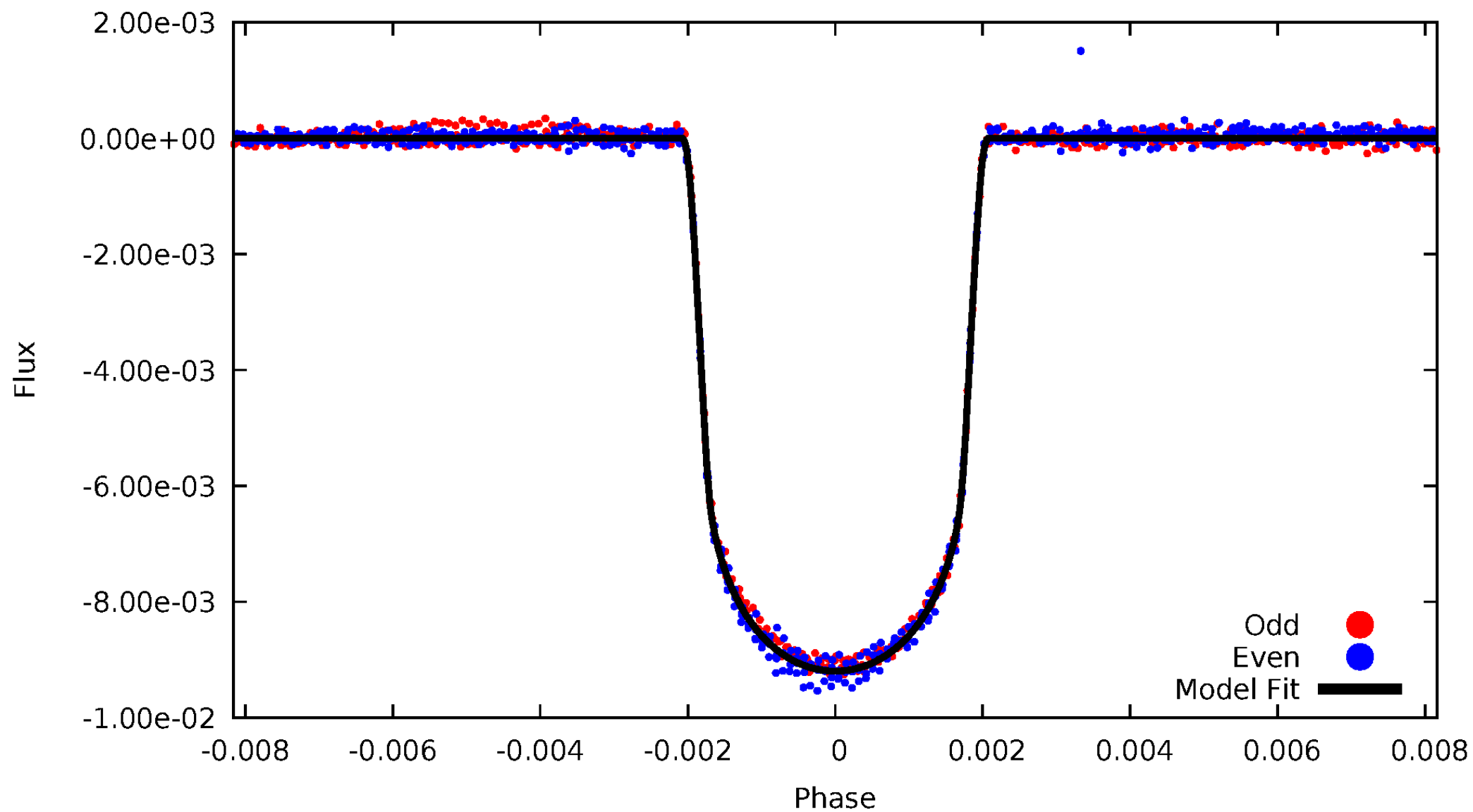


TCE 002581316-01



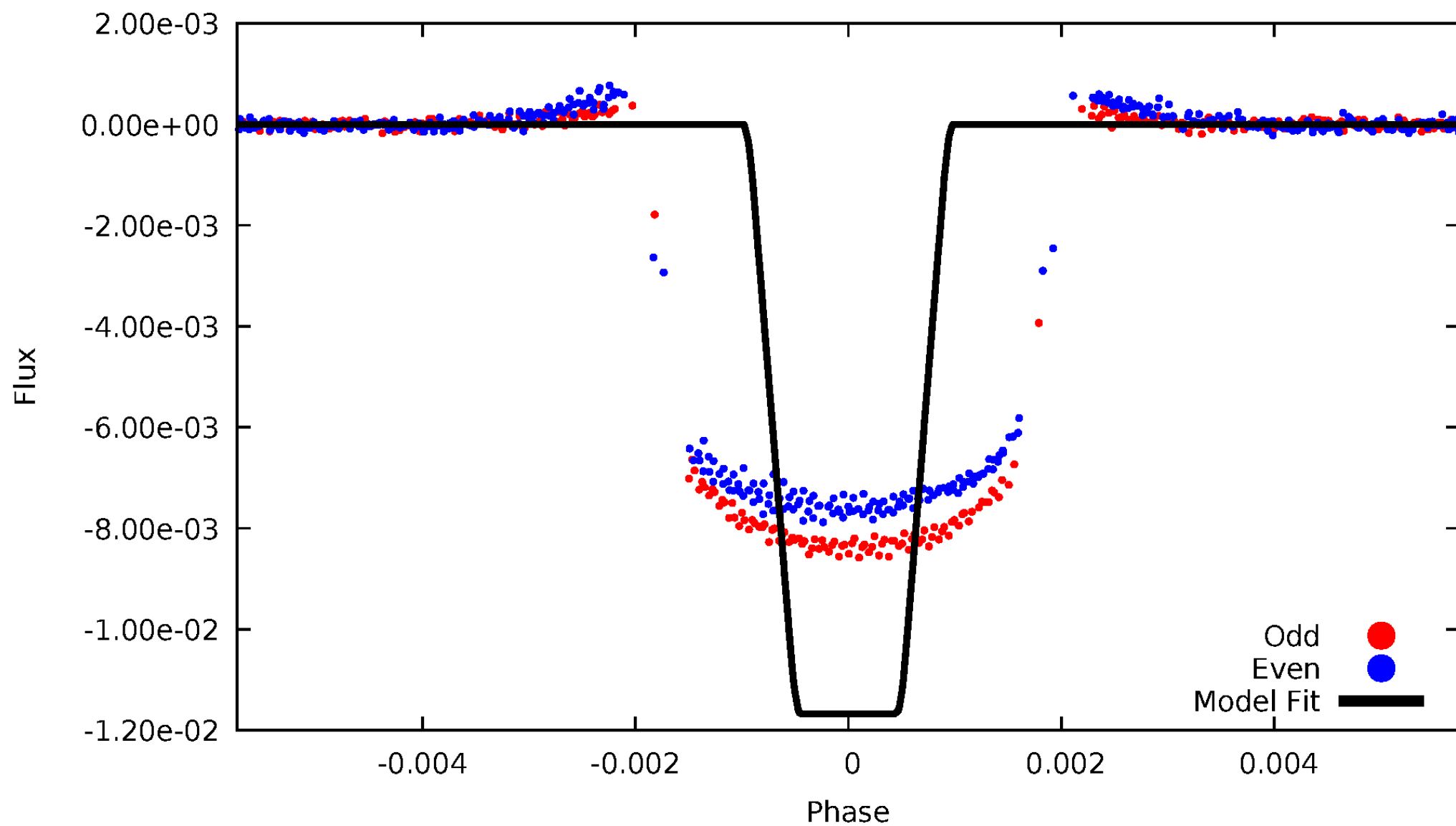
DV Odd/Even

TCE 002581316-01



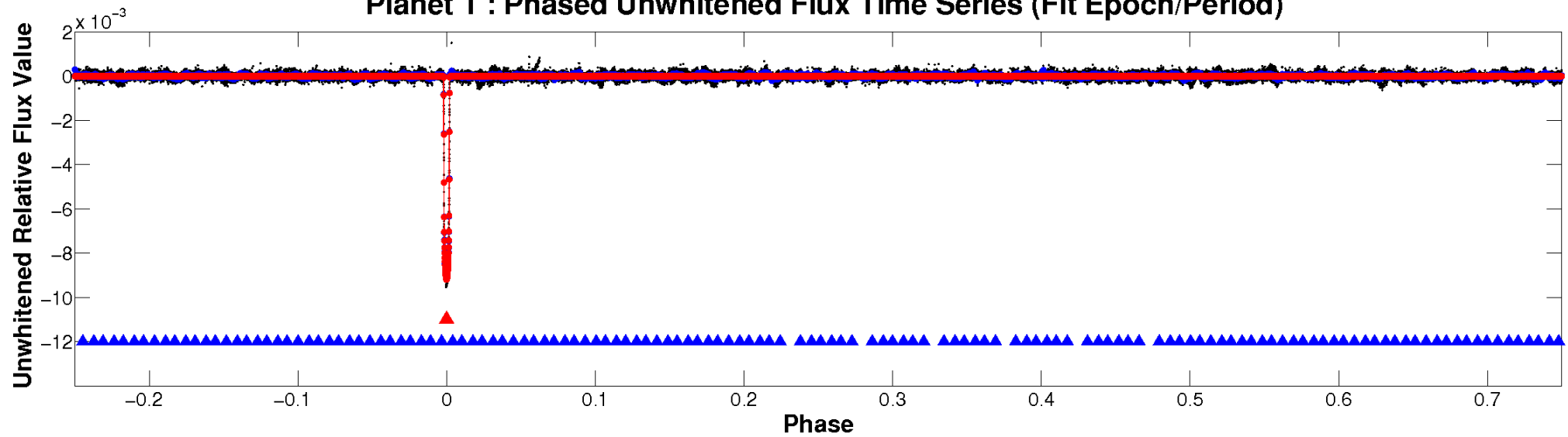
ALT Odd/Even

TCE 002581316-01

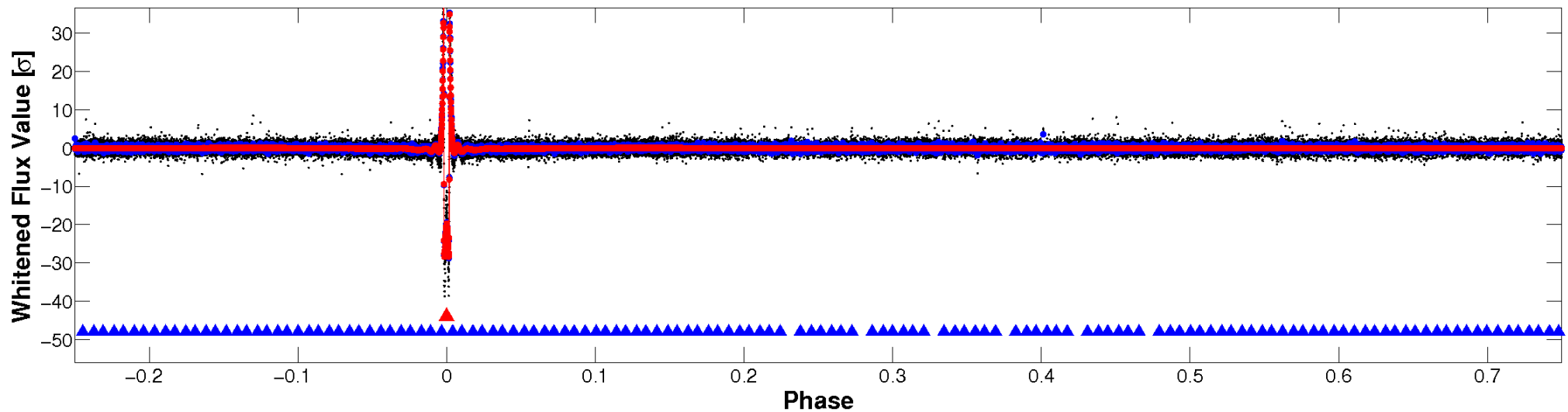


Non-Whitened Vs. Whitened Light Curve

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

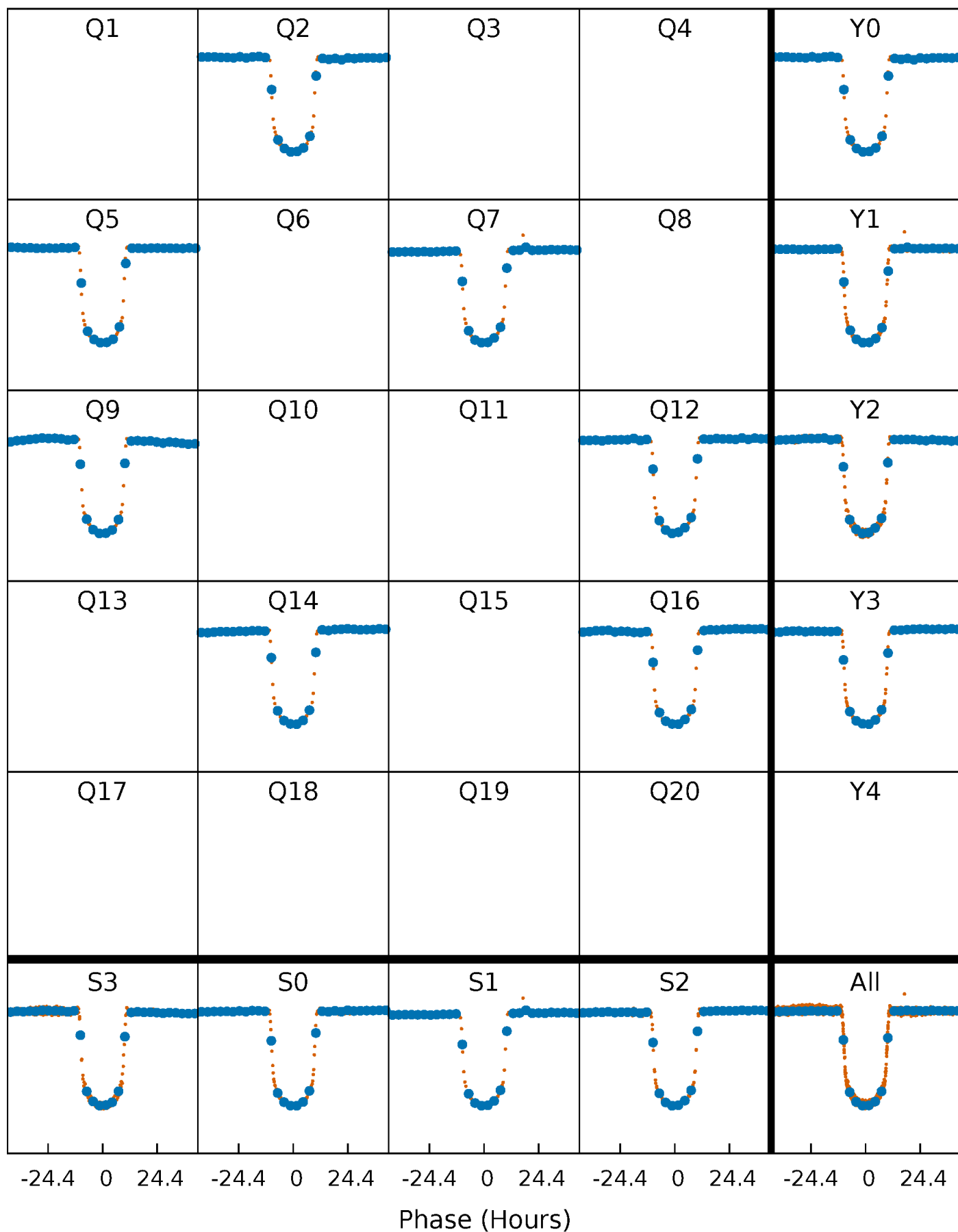


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



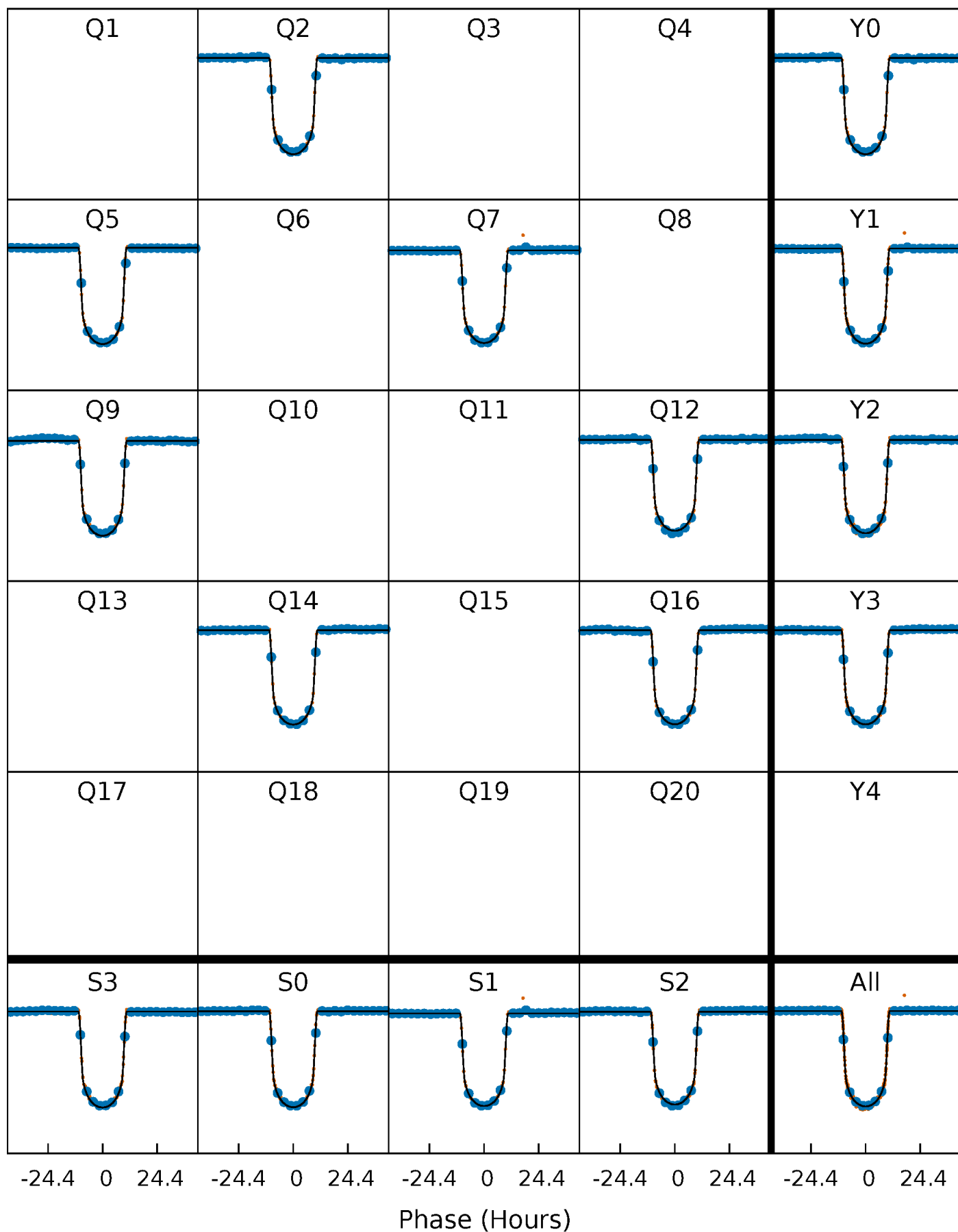
PDC Quarter-Phased Transit Curves

TCE 002581316-01 P=217.831834 Days $T_0=238.819942$ (BKJD)



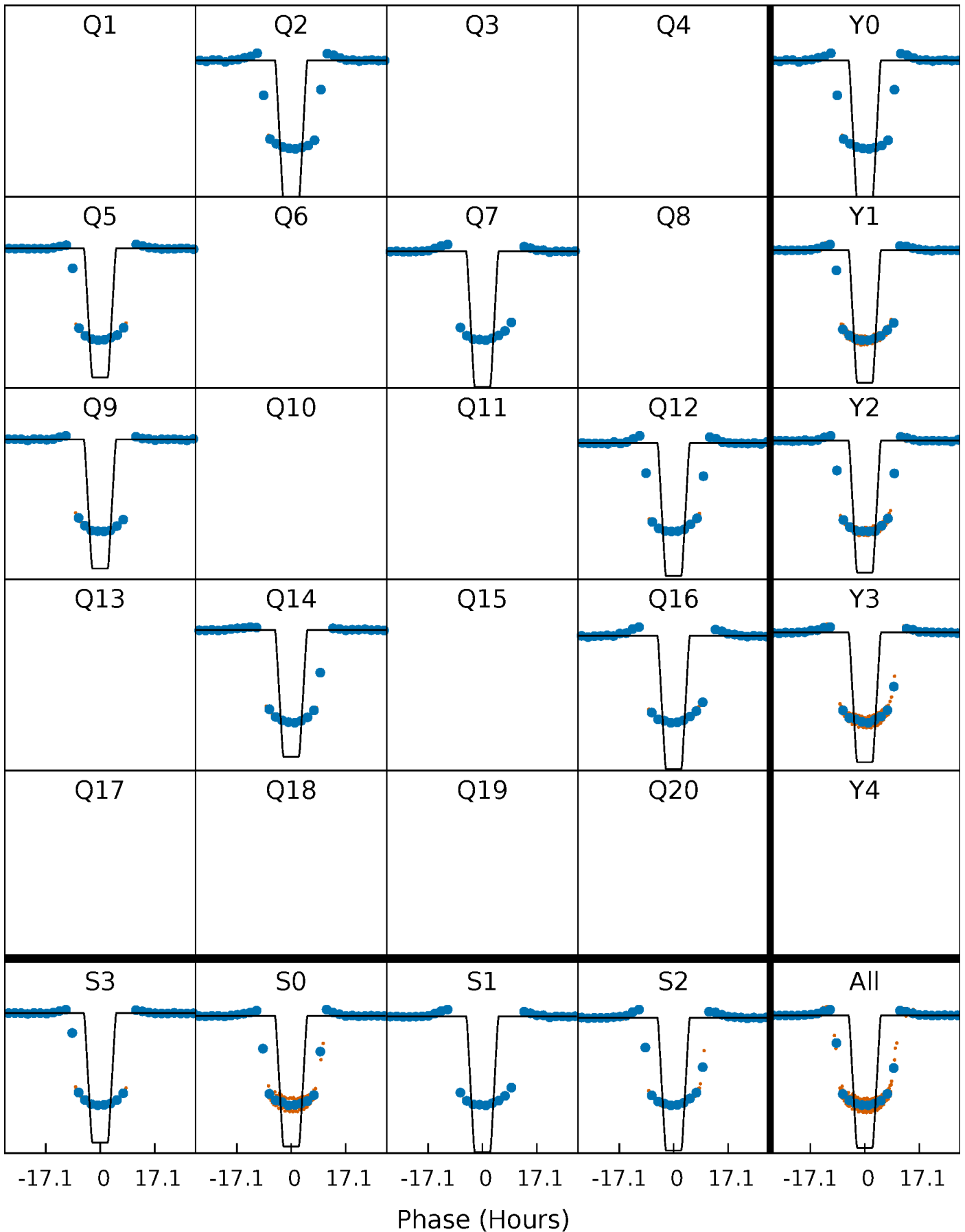
DV Quarter-Phased Transit Curves

TCE 002581316-01 P=217.831834 Days $T_0=238.819942$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

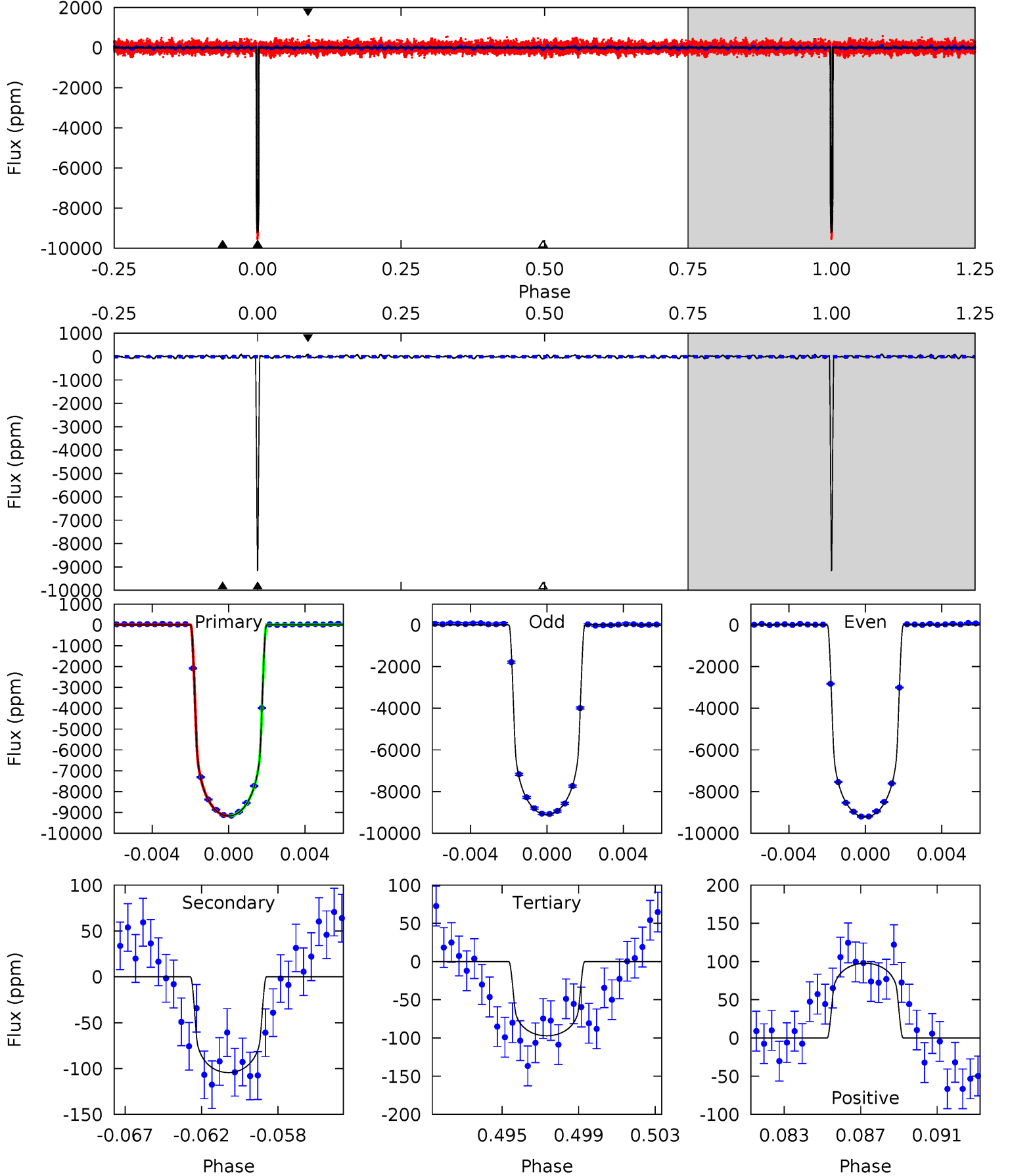
TCE 002581316-01 P=217.836267 Days $T_0=238.801027$ (BKJD)



DV Model-Shift Uniqueness Test

002581316-01, P = 217.831834 Days, E = 20.988108 Days

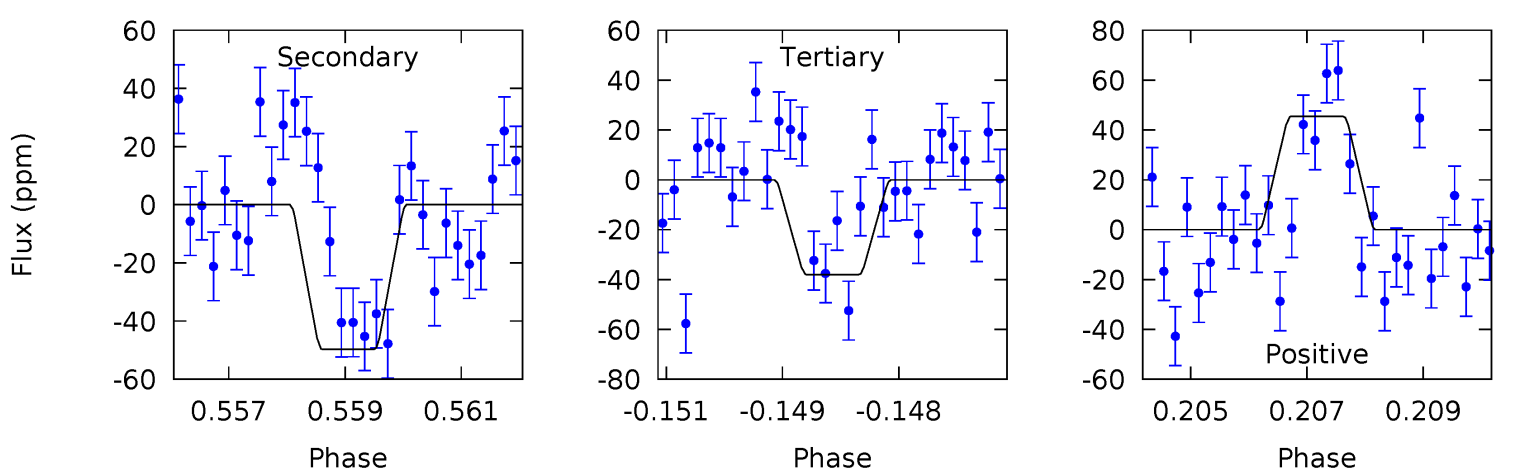
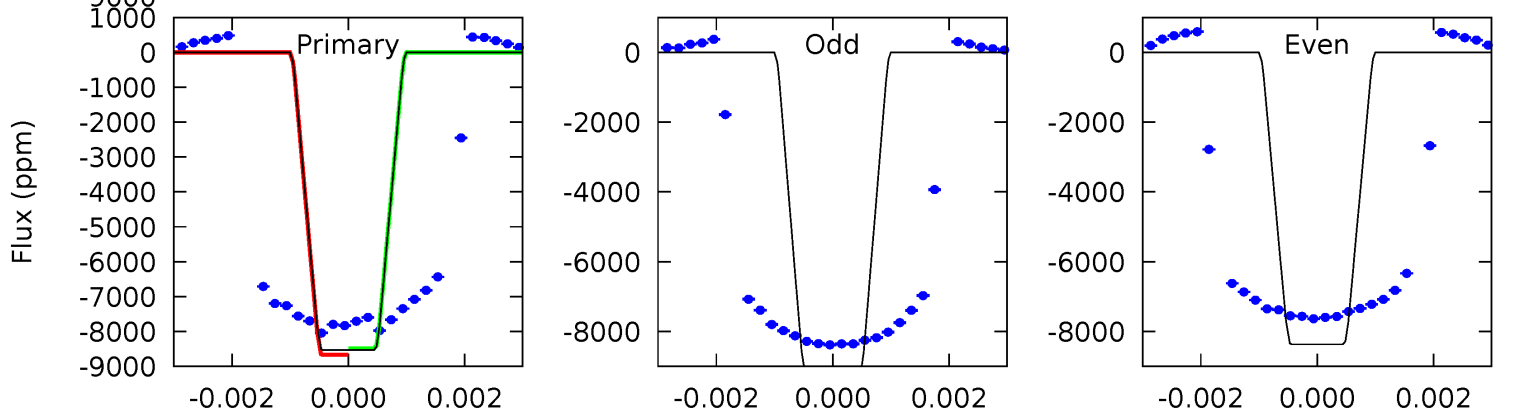
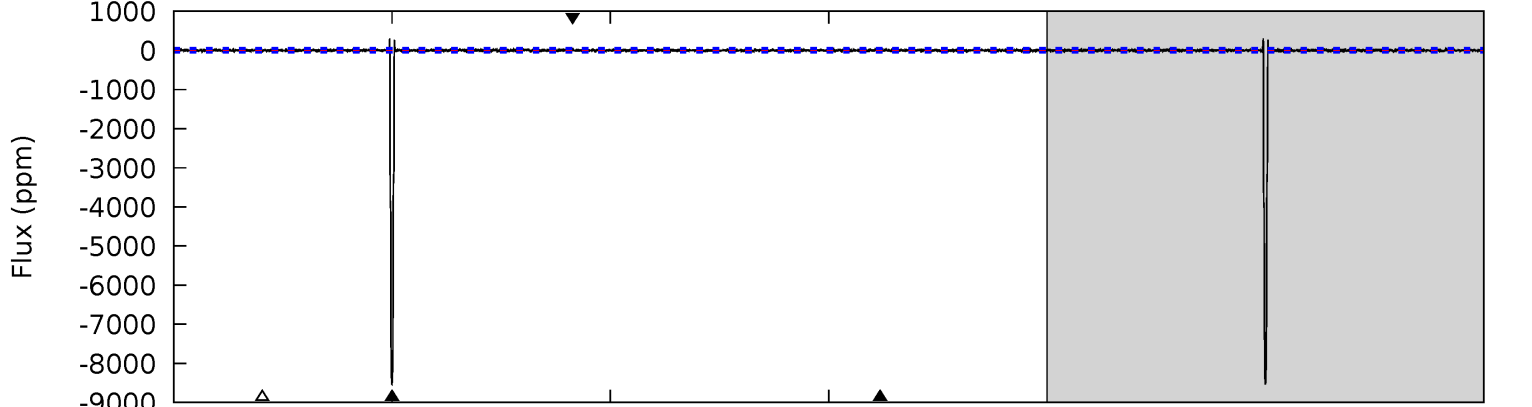
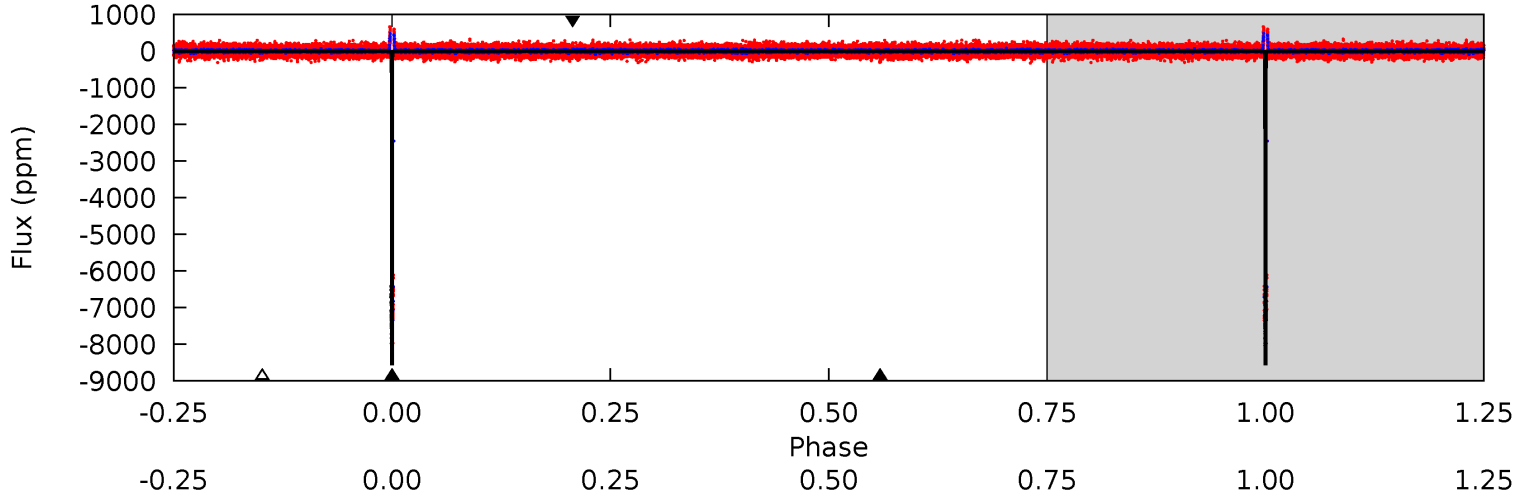
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1291	14.7	13.7	13.8	5.19	2.87	4.97	1278	1278	1.03	0.94	7.86	1.00	0.01	0.12



Alt Model-Shift Uniqueness Test

002581316-01, P = 217.836267 Days, E = 20.964760 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
942.4	5.49	4.20	5.02	5.33	3.10	6.17	938.2	937.4	1.29	0.47	72.0	1.04	0.03	9.59



Stellar Parameters For KIC 002581316

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6259^{+99}_{-136}	$4.385^{+0.034}_{-0.128}$	$0.140^{+0.150}_{-0.150}$	$1.167^{+0.212}_{-0.085}$	$1.210^{+0.084}_{-0.093}$	$1.072^{+0.172}_{-0.386}$
	+2%/-2%	+1%/-3%	+107%/-107%	+18%/-7%	+7%/-8%	+16%/-36%
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 002581316-01 / KOI 3681.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-104 ± 7	$11.49^{+1.08}_{-0.62}$	486^{+21}_{-15}	2855^{+36}_{-42}	246^{+29}_{-41}
Alt.	-50 ± 9	$14.02^{+1.35}_{-0.69}$	485^{+21}_{-14}	2464^{+58}_{-65}	77^{+17}_{-17}

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 $A_{obs} \gg 1.0$

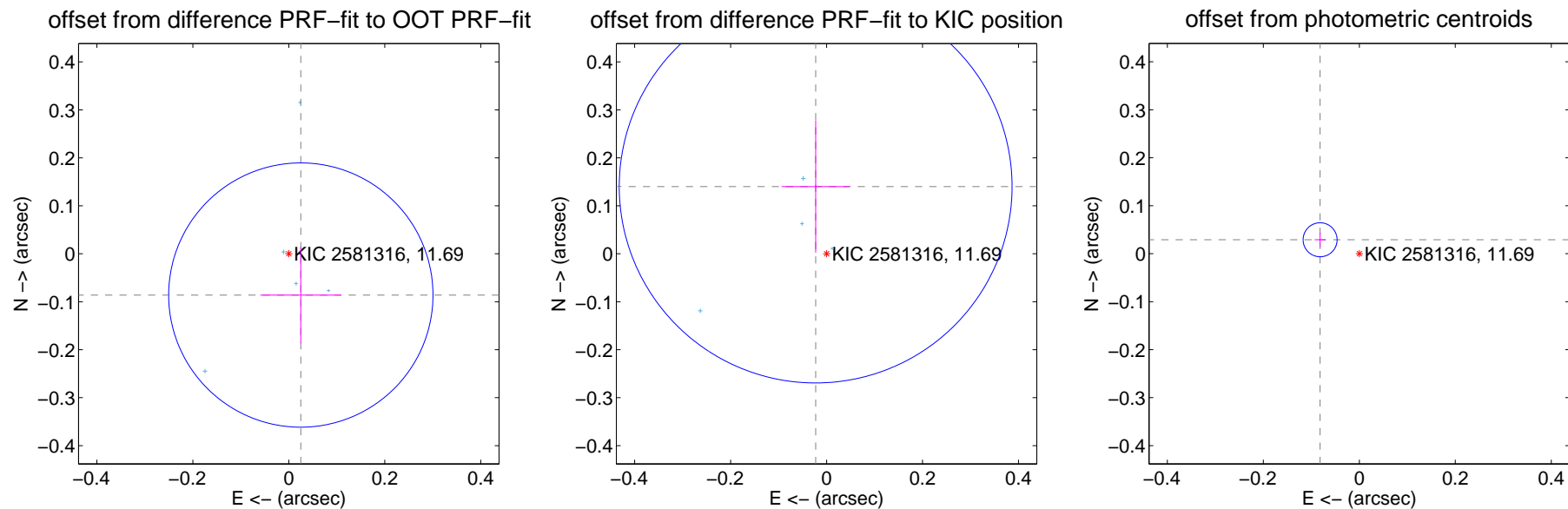
DV Centroid Data

Supplemental centroid analysis for 002581316-01. **Kepler magnitude: 11.69.** Transit SNR 490.83

There are 5 quarters with good PRF difference image offsets

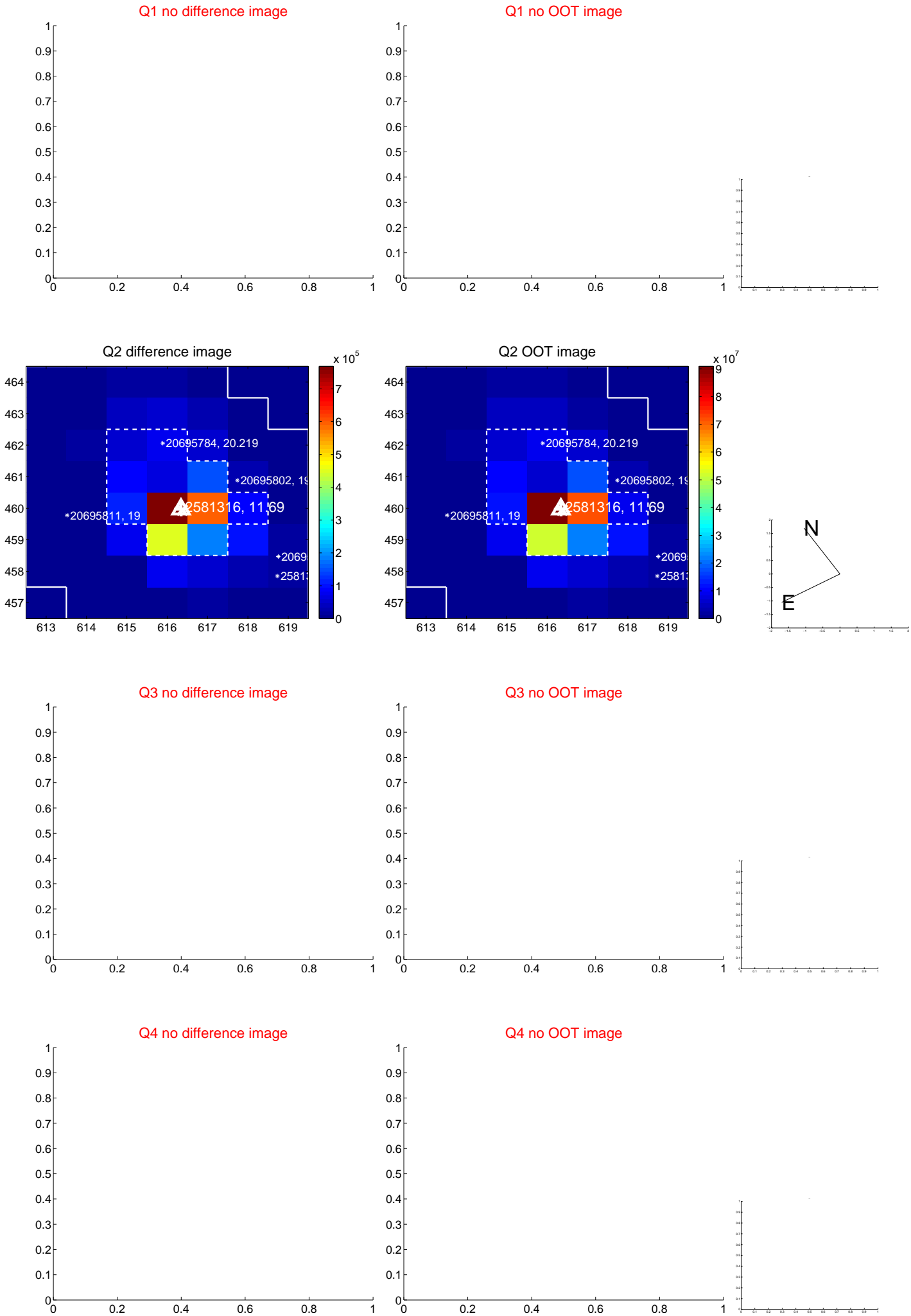
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.090 ± 0.092	0.98	-0.025 ± 0.084	-0.086 ± 0.100
PRF-fit source offset from KIC position	0.142 ± 0.136	1.04	0.023 ± 0.071	0.140 ± 0.138
photometric centroid source offset	0.09 ± 0.01	7.34	0.08 ± 0.01	0.03 ± 0.02

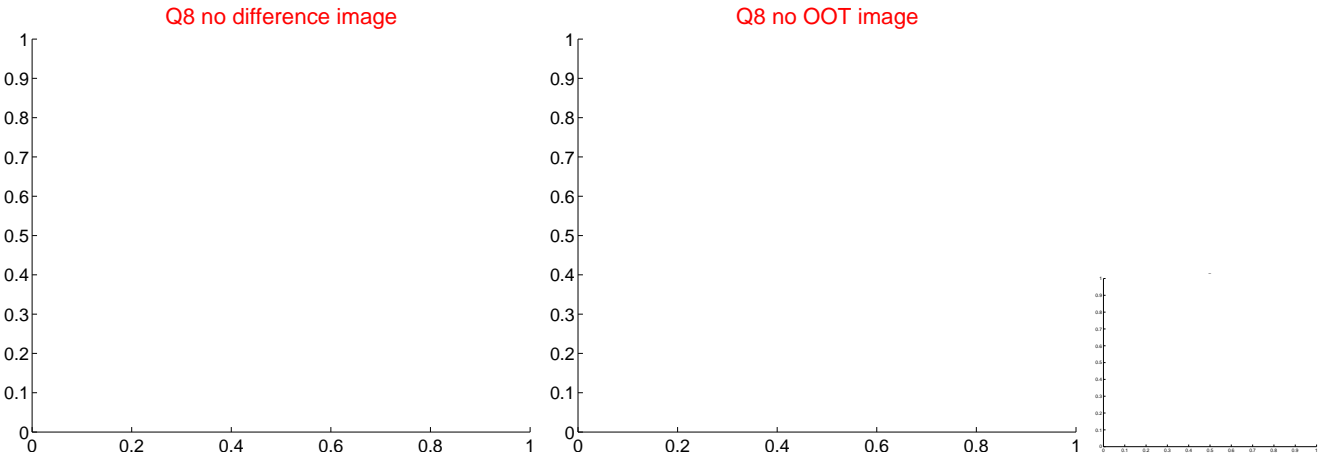
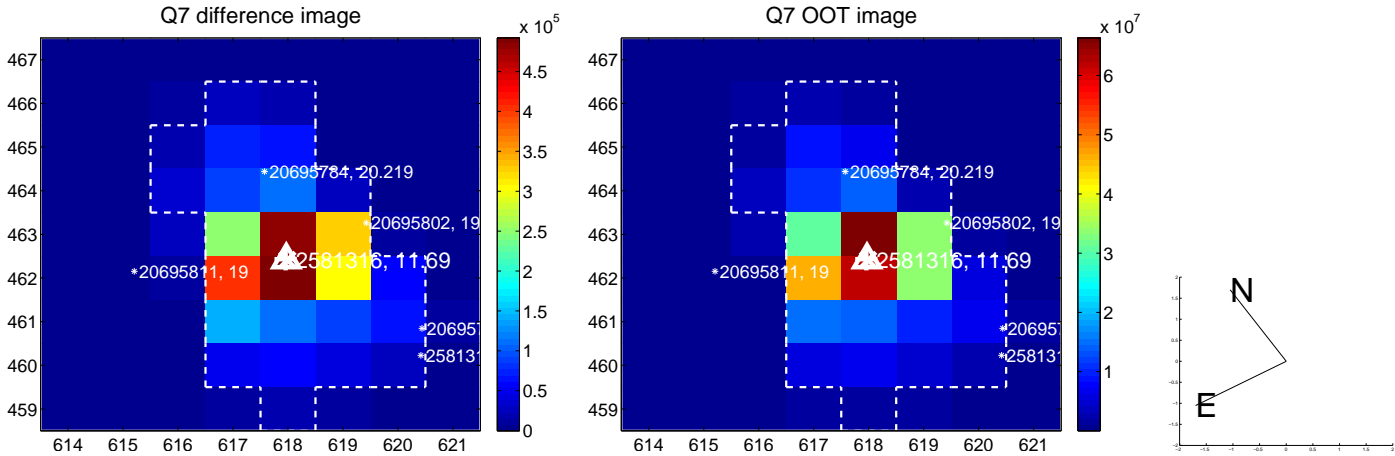
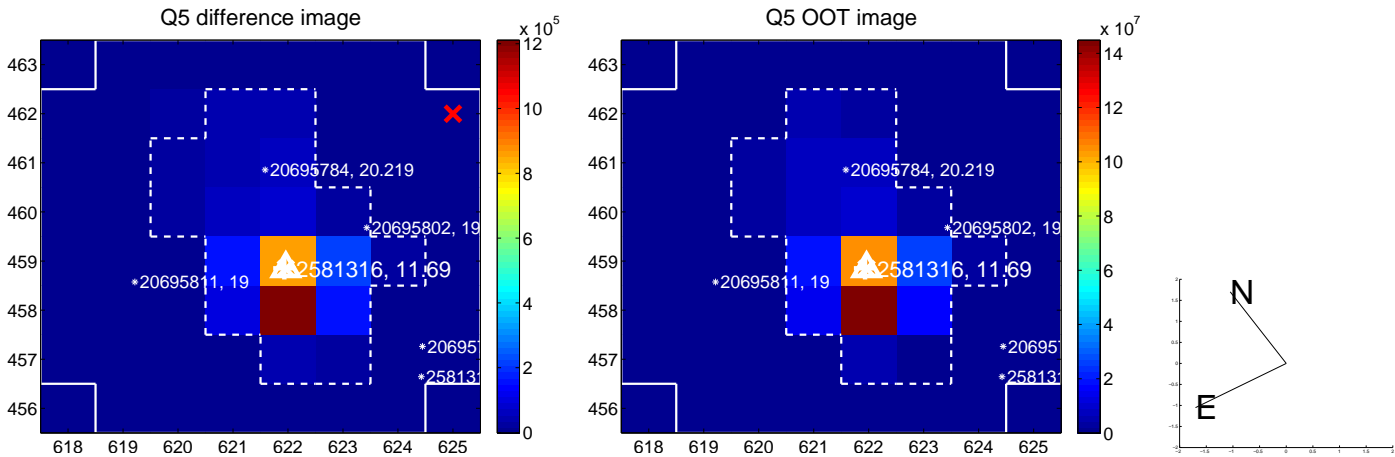


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

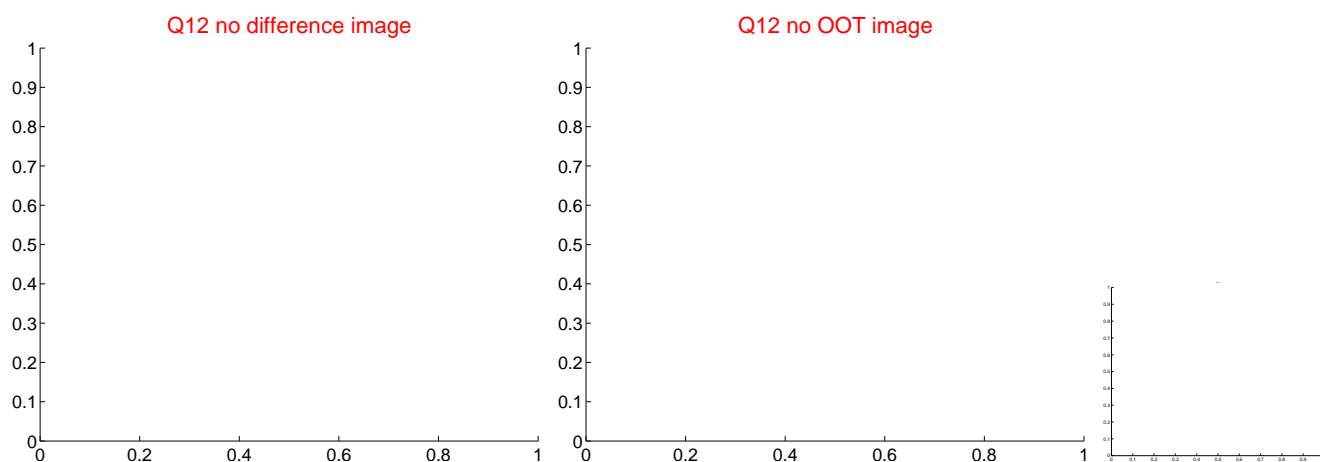
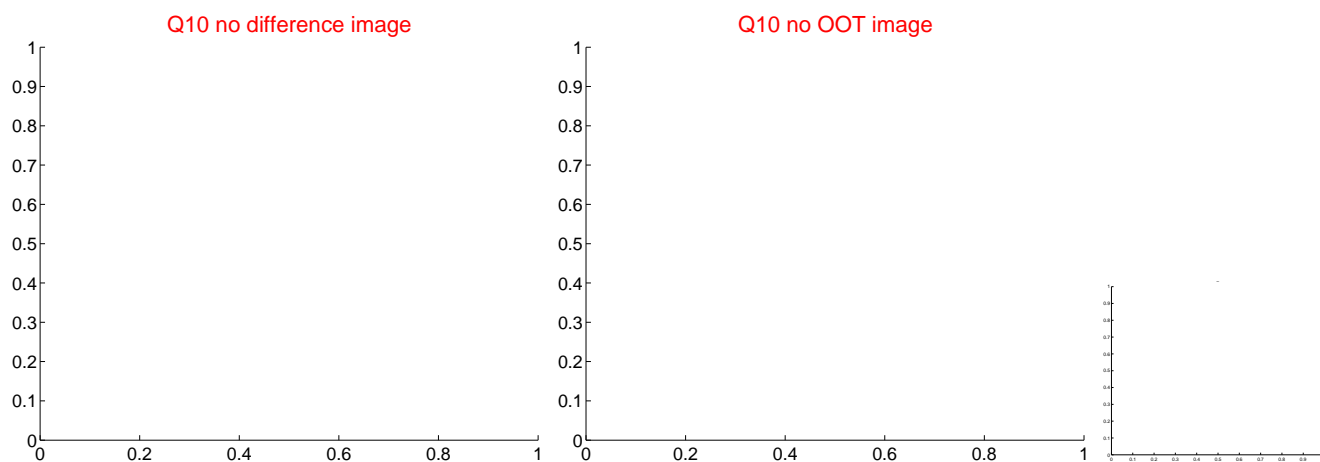
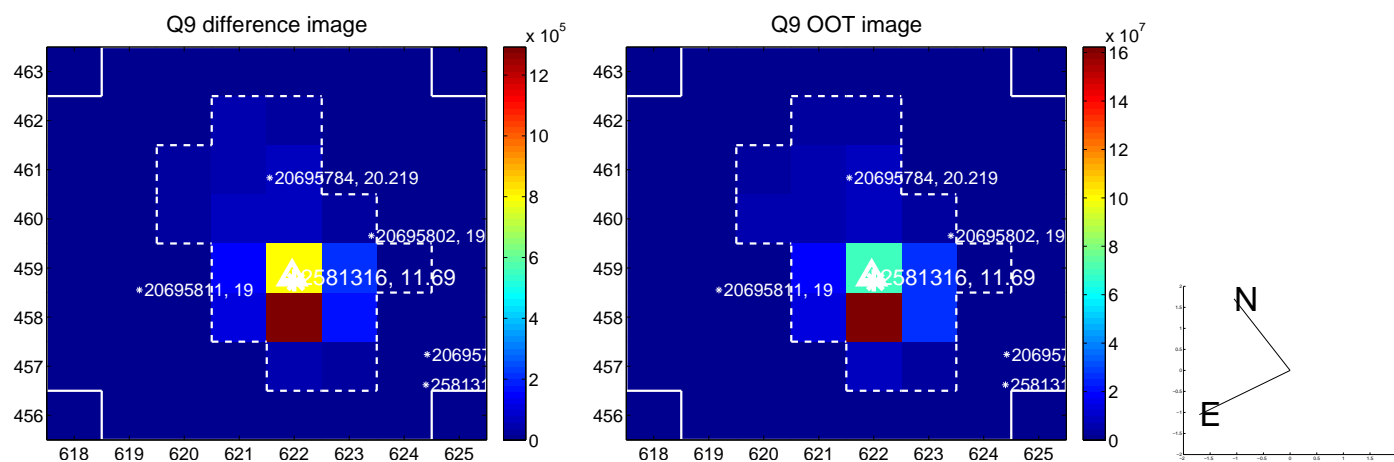
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.

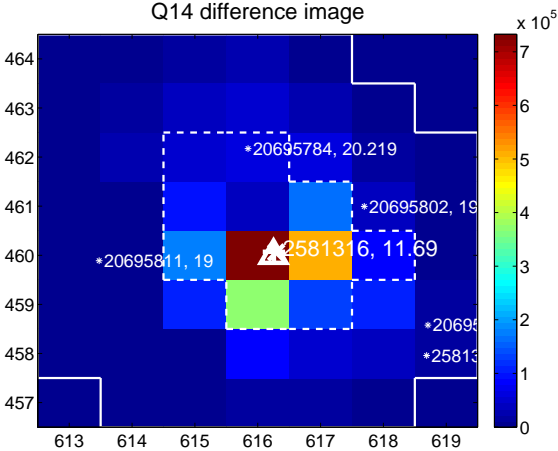
Q13 no difference image



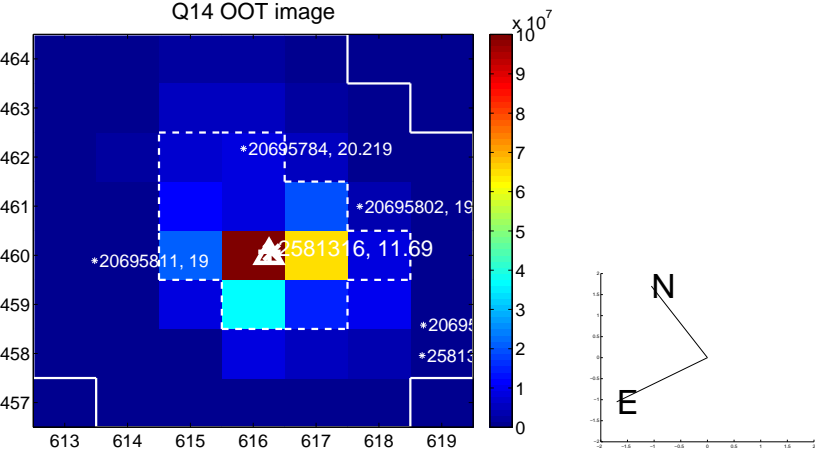
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



Q16 no difference image



Q16 no OOT image



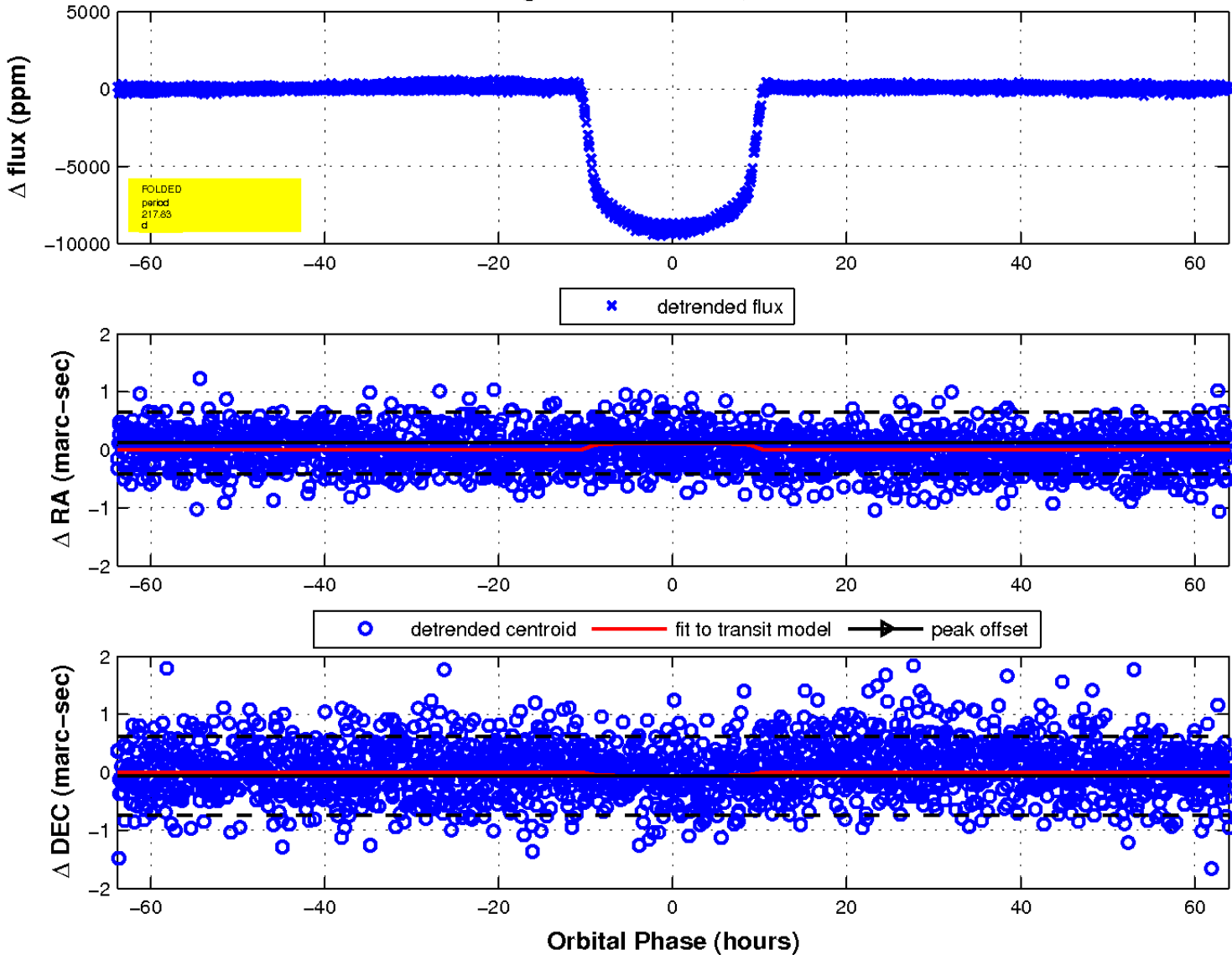
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q17 no difference image

Q17 no OOT image

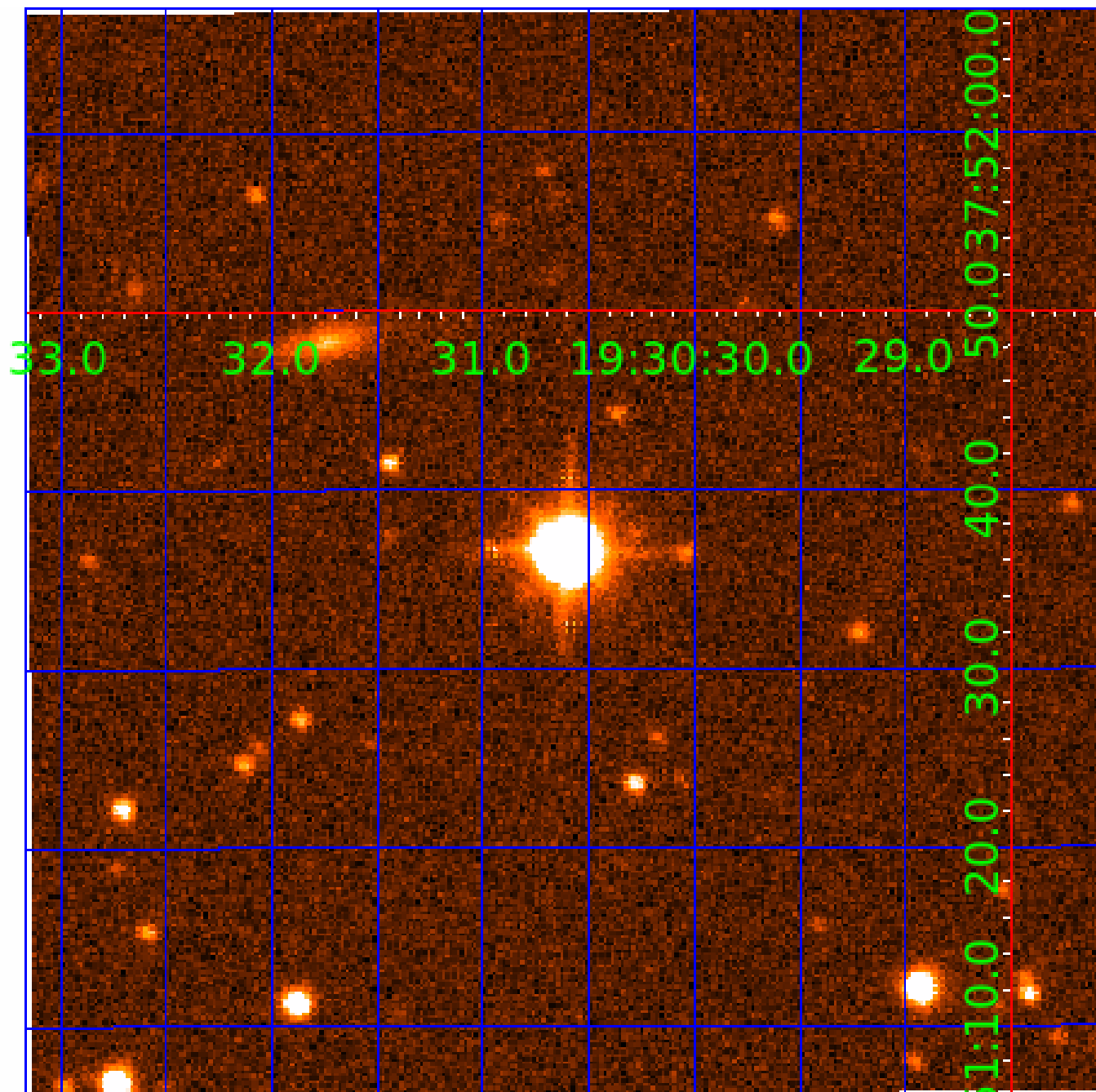


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 002581316

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})
002581316-01	OBS	3681.01	217.831834	238.819942	9195.7	21.325	326.3	490.8	1.17	6259	11.21	3.29
002581316-02	OBS	3681.02	10.514149	134.570690	78.0	3.827	19.8	20.4	1.17	6259	1.21	187.32

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002581316-01	OBS	PC	0.86	0	0	0	0	NO_COMMENT
002581316-02	OBS	PC	0.99	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 002581316-02

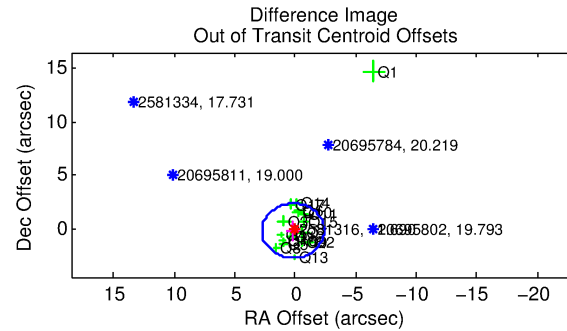
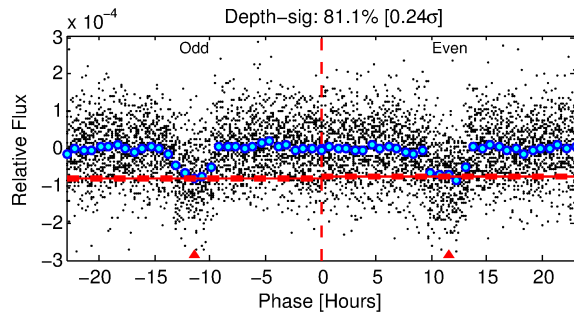
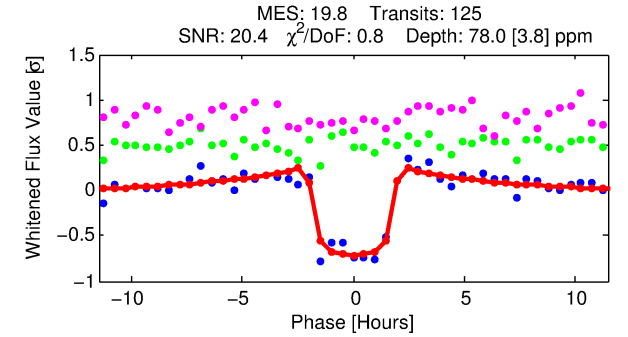
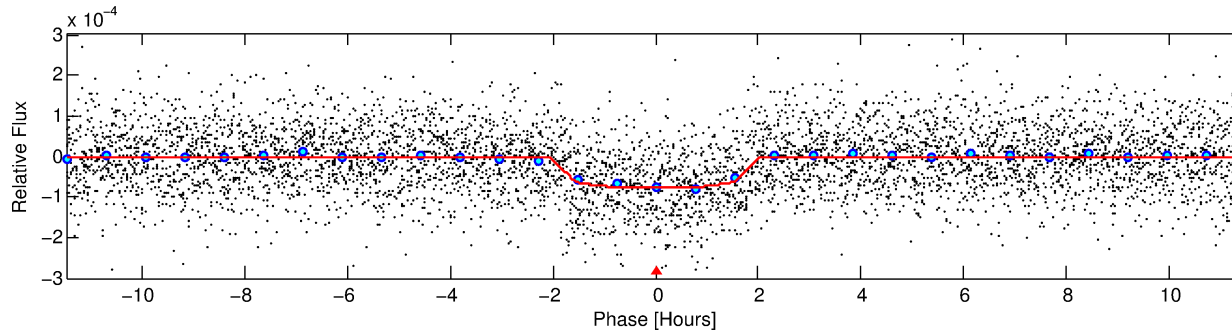
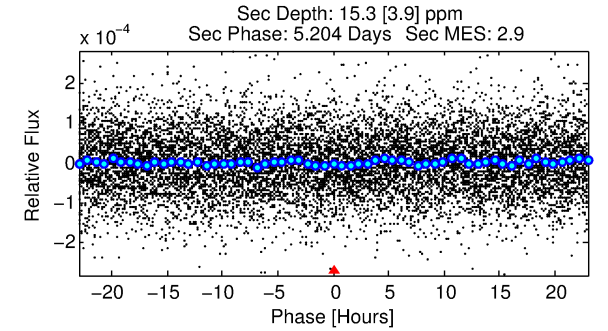
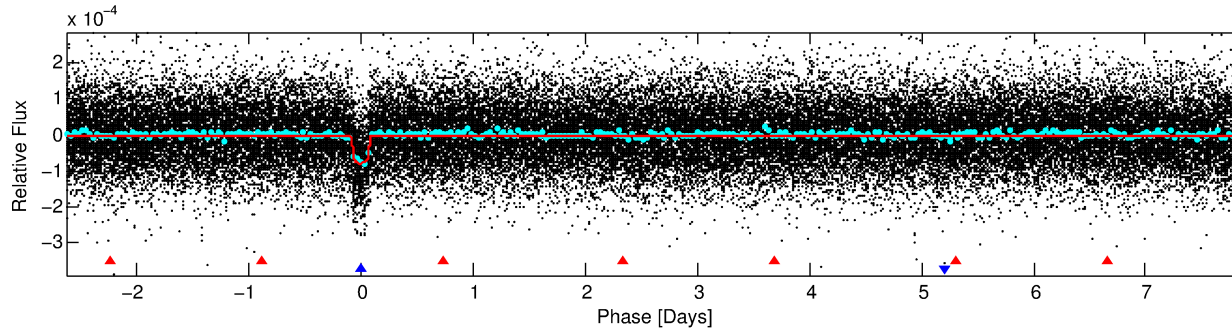
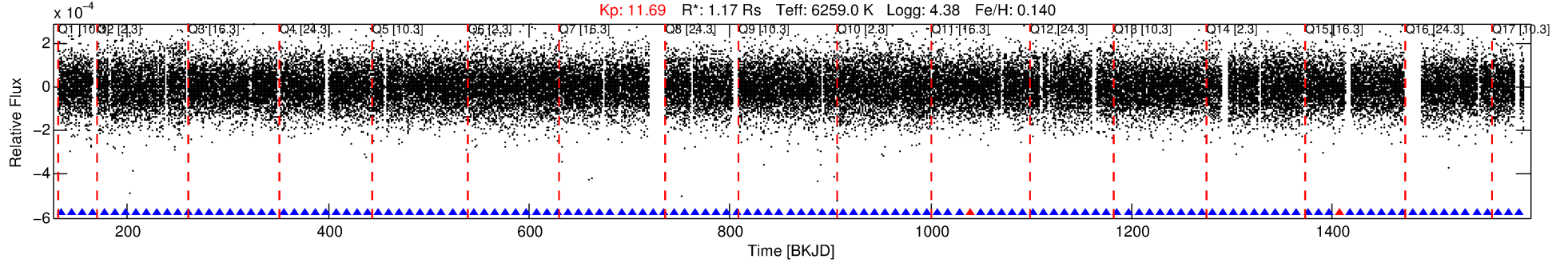
No Significant Match Found

DV One-Page Summary

KIC: 2581316 Candidate: 2 of 2 Period: 10.514 d

KOI: K03681.02 Corr: 0.976

Kp: 11.69 R*: 1.17 Rs Teff: 6259.0 K Logg: 4.38 Fe/H: 0.140



DV Fit Results:

Period = 10.51415 [0.00004] d
Epoch = 134.5707 [0.0029] BKJD
Rp/R* = 0.0095 [0.0017]
a/R* = 9.69 [9.13]
b = 0.90 [0.21]
Seff = 187.33 [46.20]
Teq = 943 [58] K
Rp = 1.21 [0.31] Re
a = 0.1000 [0.0156] AU
Ag = 57.39 [28.68] [1.97σ]
Teff = 4014 [453] K [6.72σ]

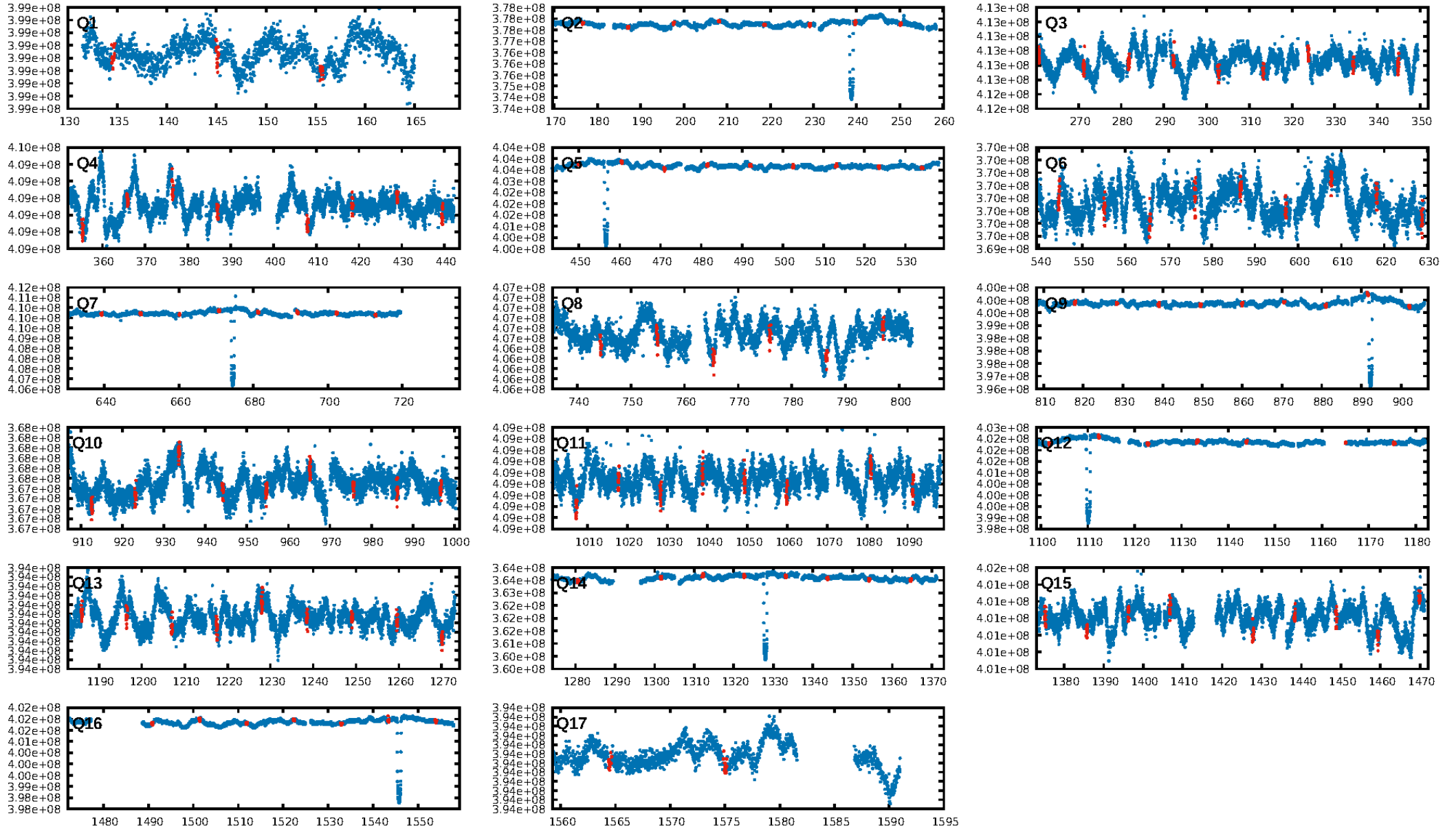
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [229.66σ]
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.46e-84
RollingBand-fgt: 0.98 [118/120]
GhostDiagnostic-chr: 3.262
Centroid-sig: 0.0%
Centroid-so: 1.411 arcsec [2.45σ]
OotOffset-rm: 0.261 arcsec [0.31σ]
KicOffset-rm: 0.298 arcsec [0.47σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.76 [13/17]
DiffImageOverlap-fno: 1.00 [17/17]

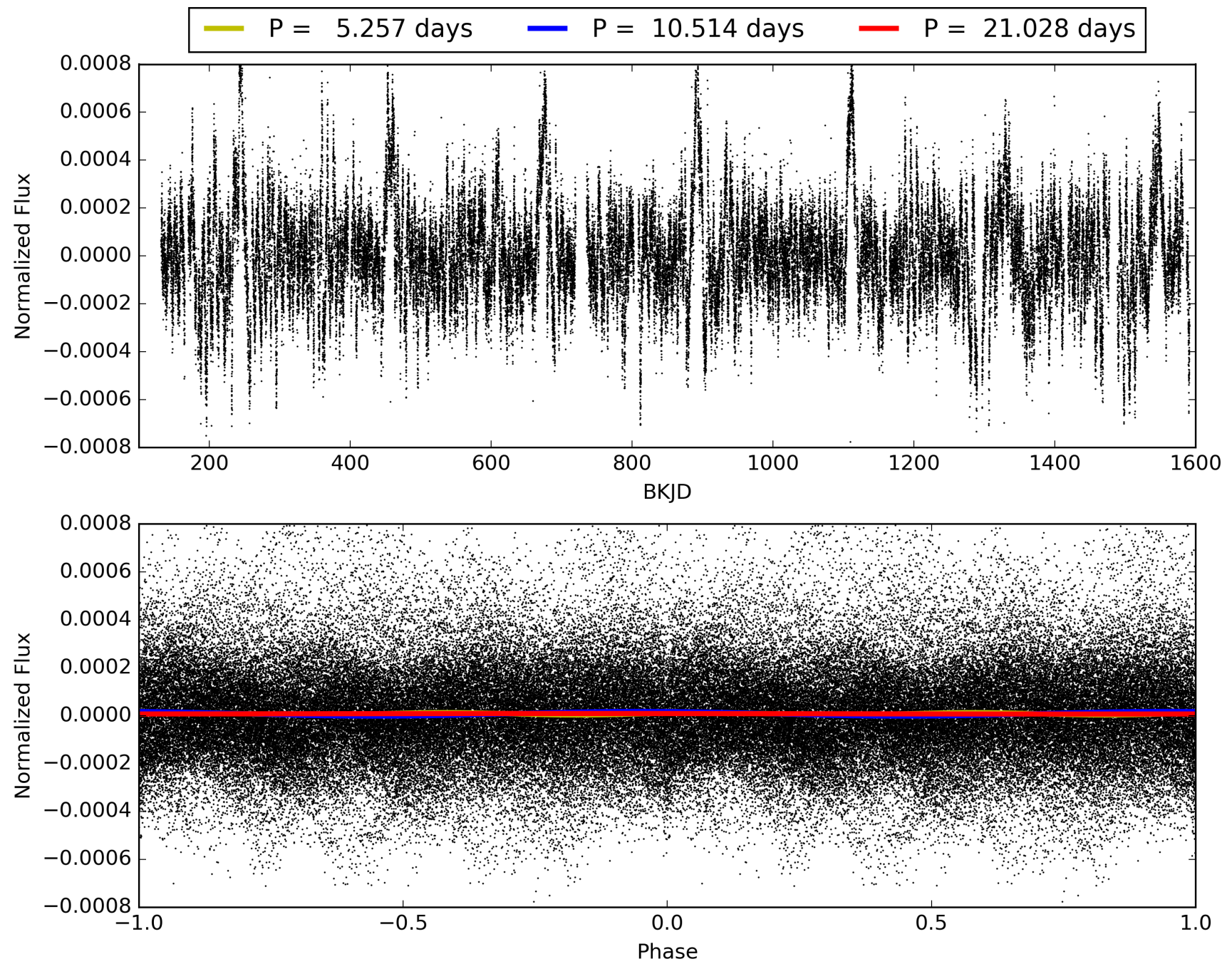
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:07:12 Z

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

TCE 002581316-02, PDC Light Curves

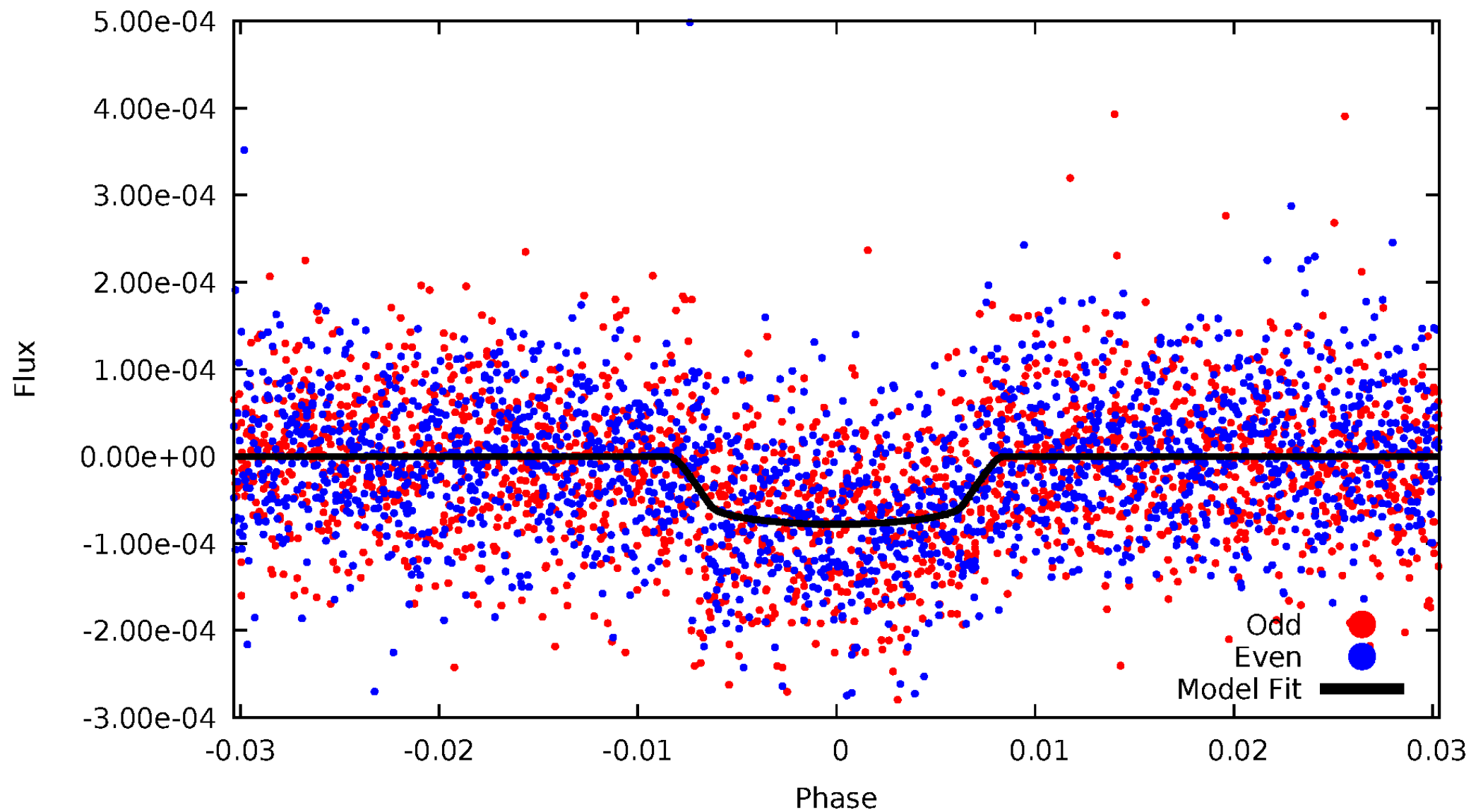


TCE 002581316-02



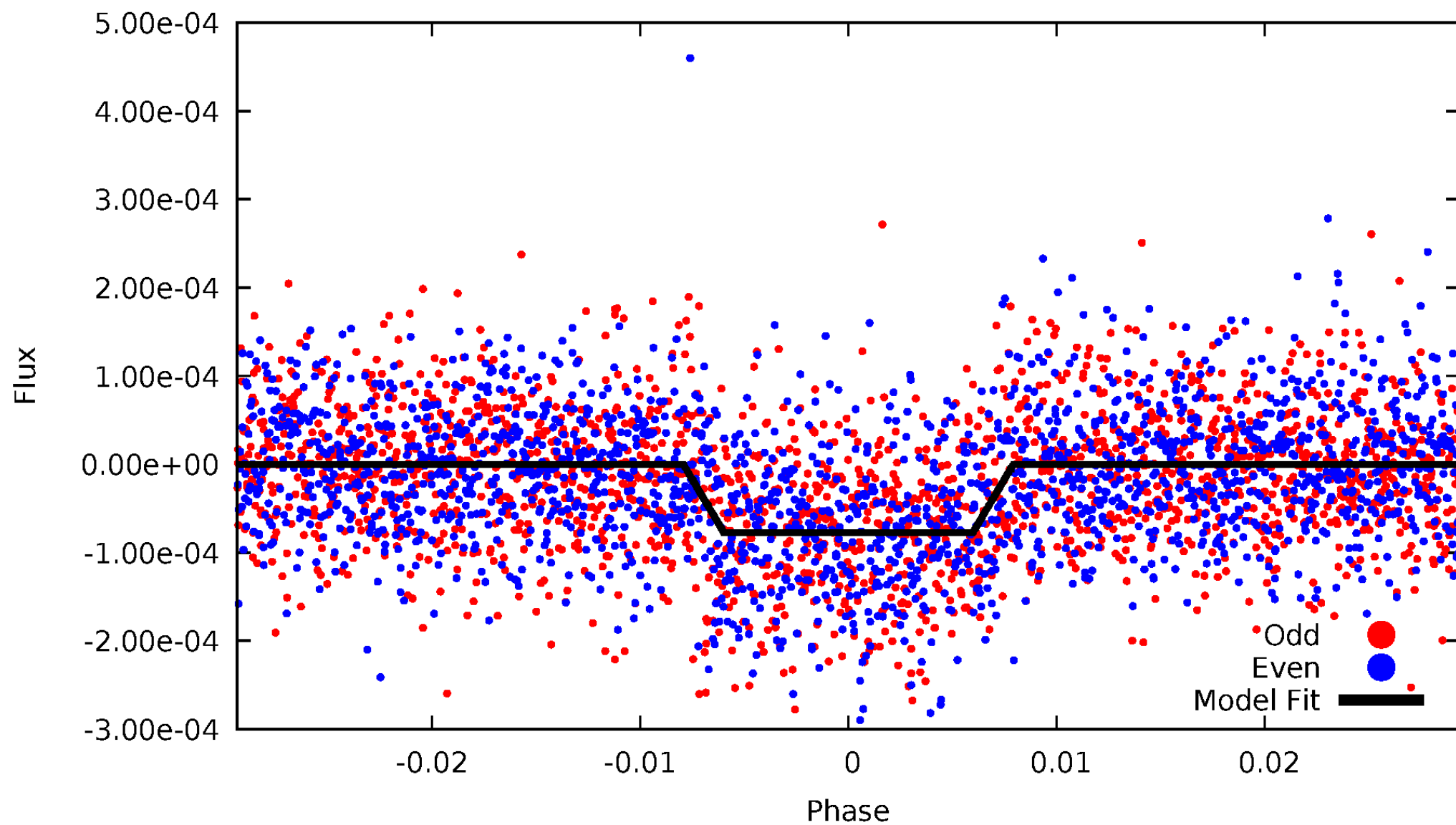
DV Odd/Even

TCE 002581316-02



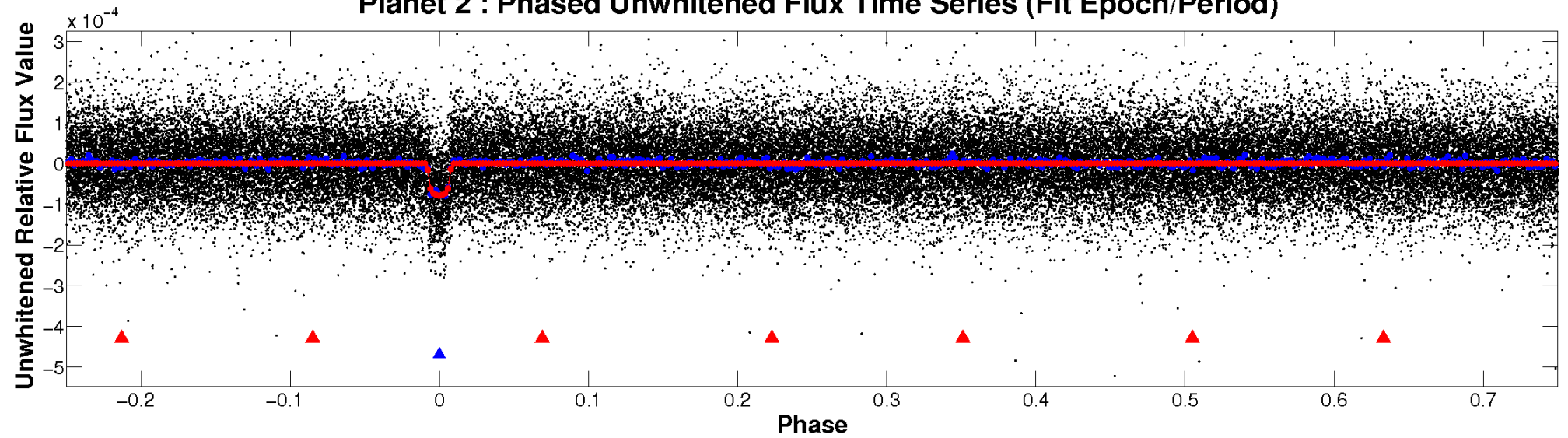
ALT Odd/Even

TCE 002581316-02

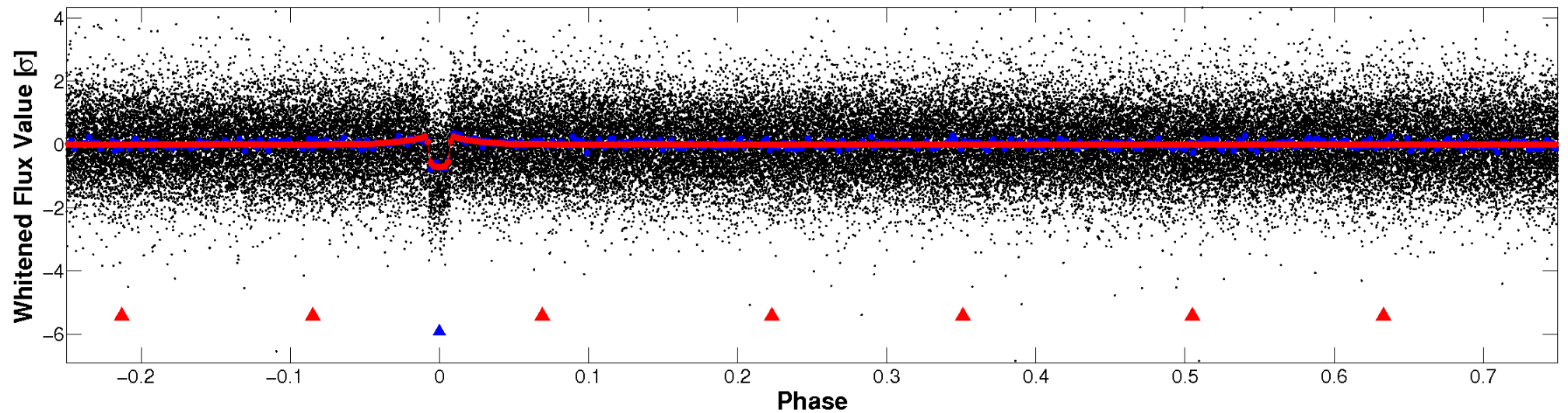


Non-Whitened Vs. Whitened Light Curve

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

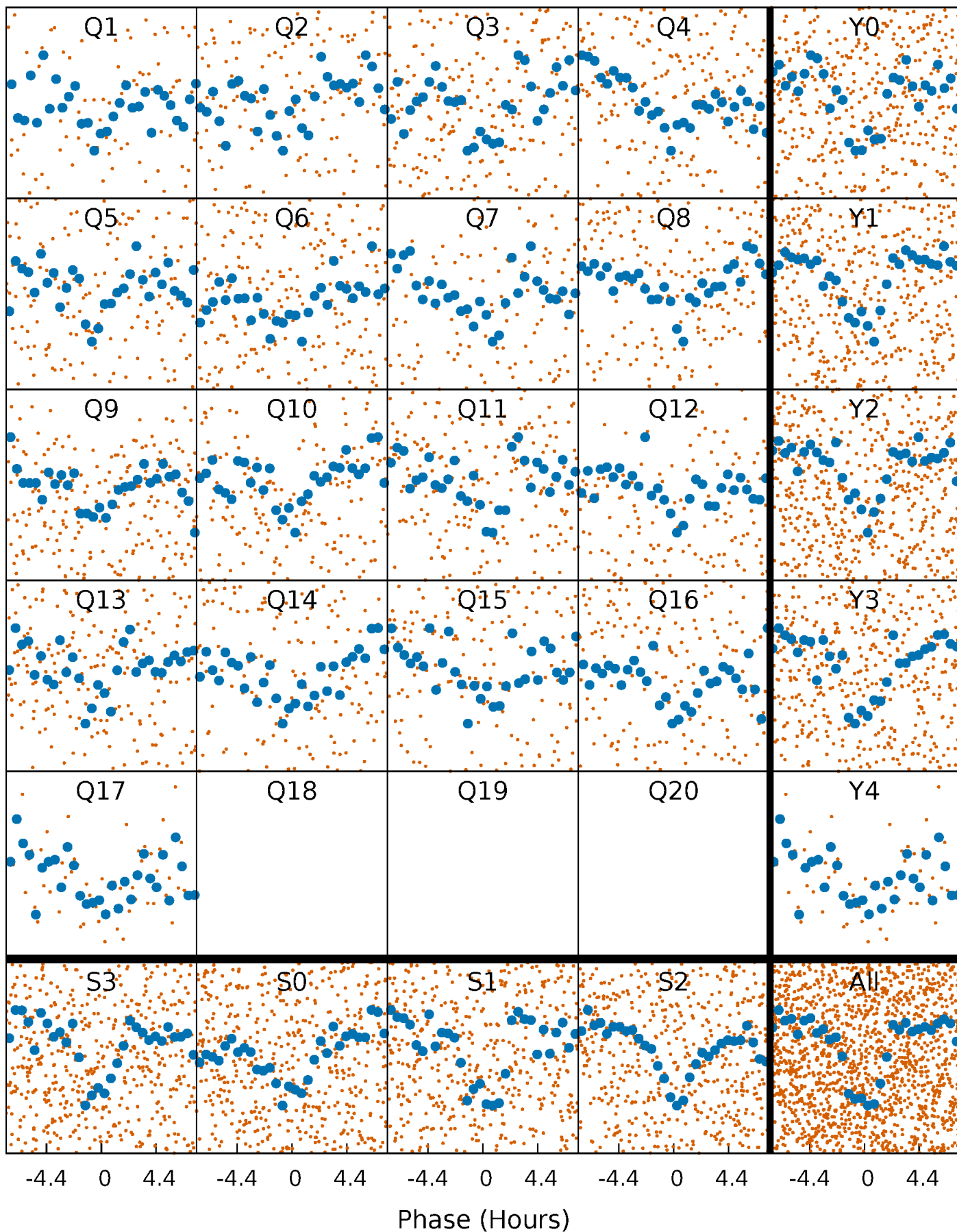


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



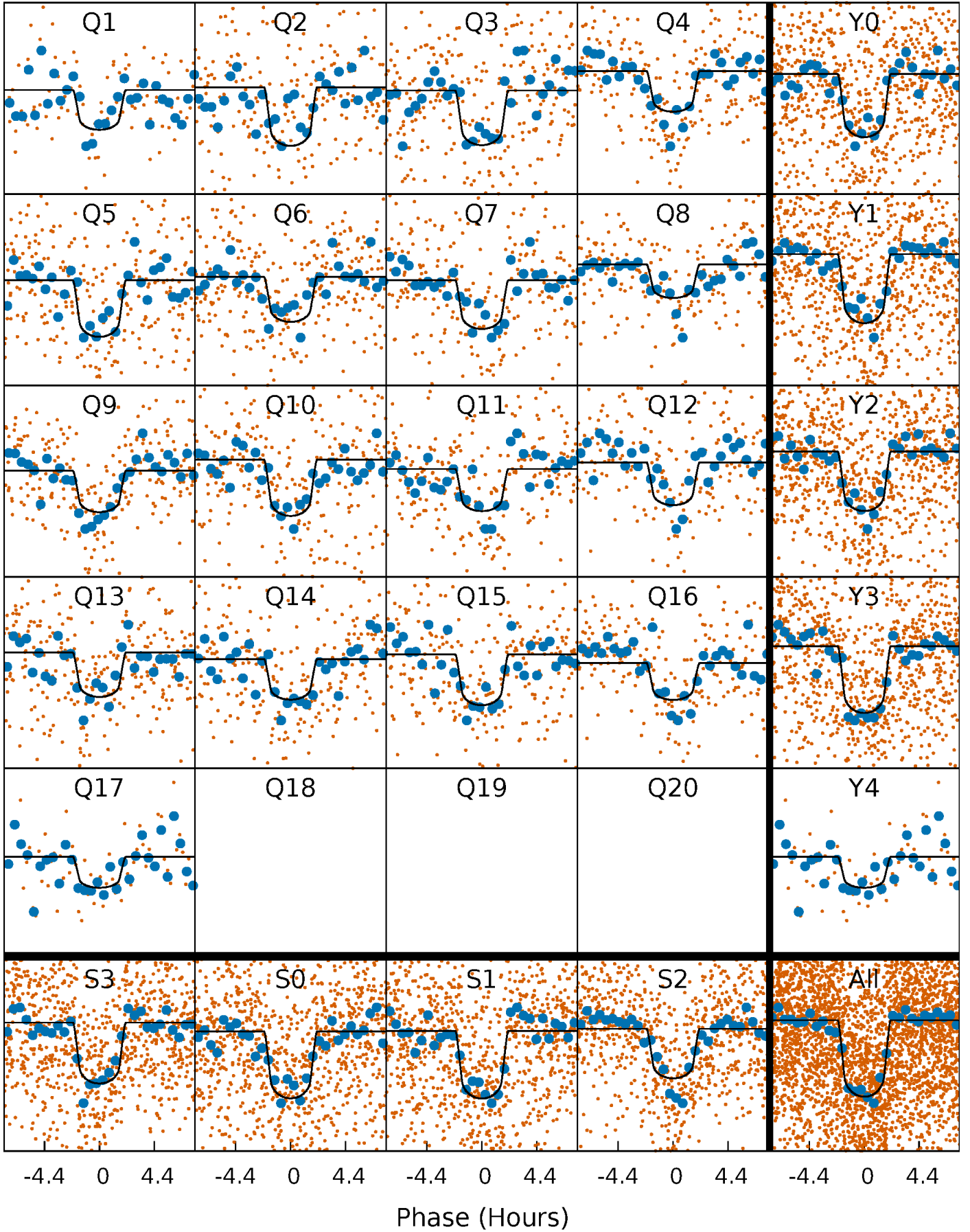
PDC Quarter-Phased Transit Curves

TCE 002581316-02 P= 10.514149 Days $T_0=134.570690$ (BKJD)



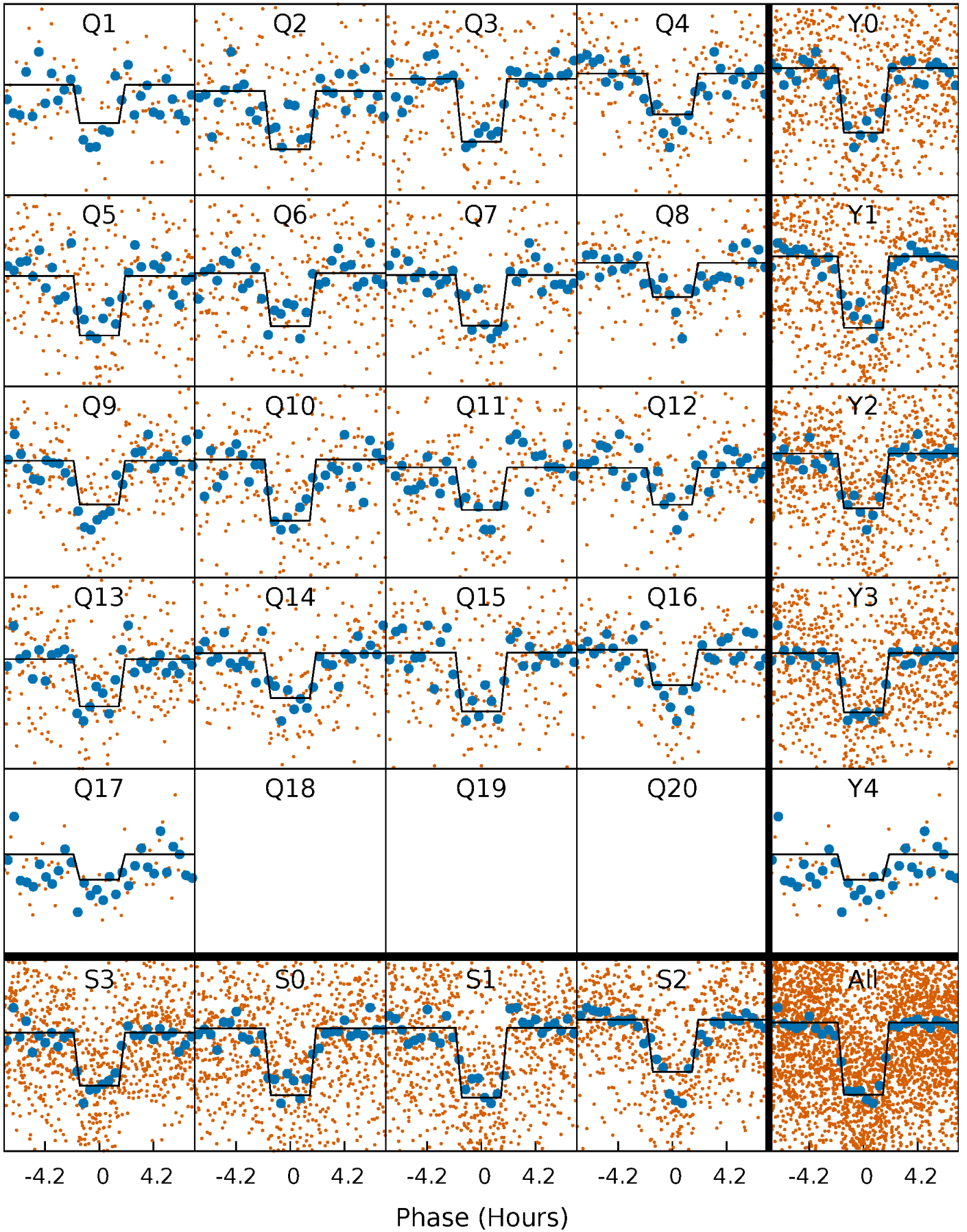
DV Quarter-Phased Transit Curves

TCE 002581316-02 P= 10.514149 Days $T_0=134.570690$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

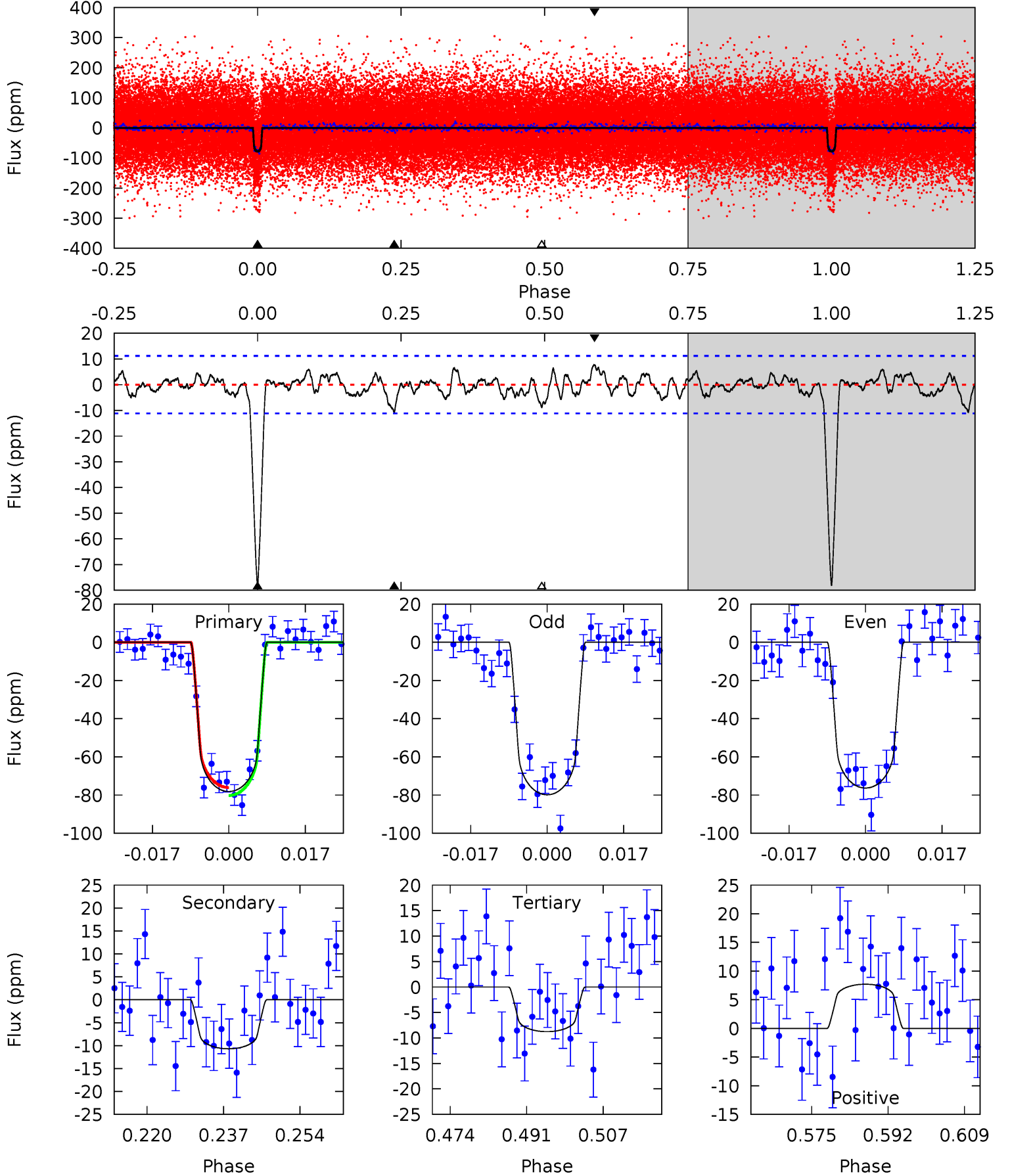
TCE 002581316-02 P= 10.514180 Days $T_0=134.568823$ (BKJD)



DV Model-Shift Uniqueness Test

002581316-02, $P = 10.514149$ Days, $E = 124.056541$ Days

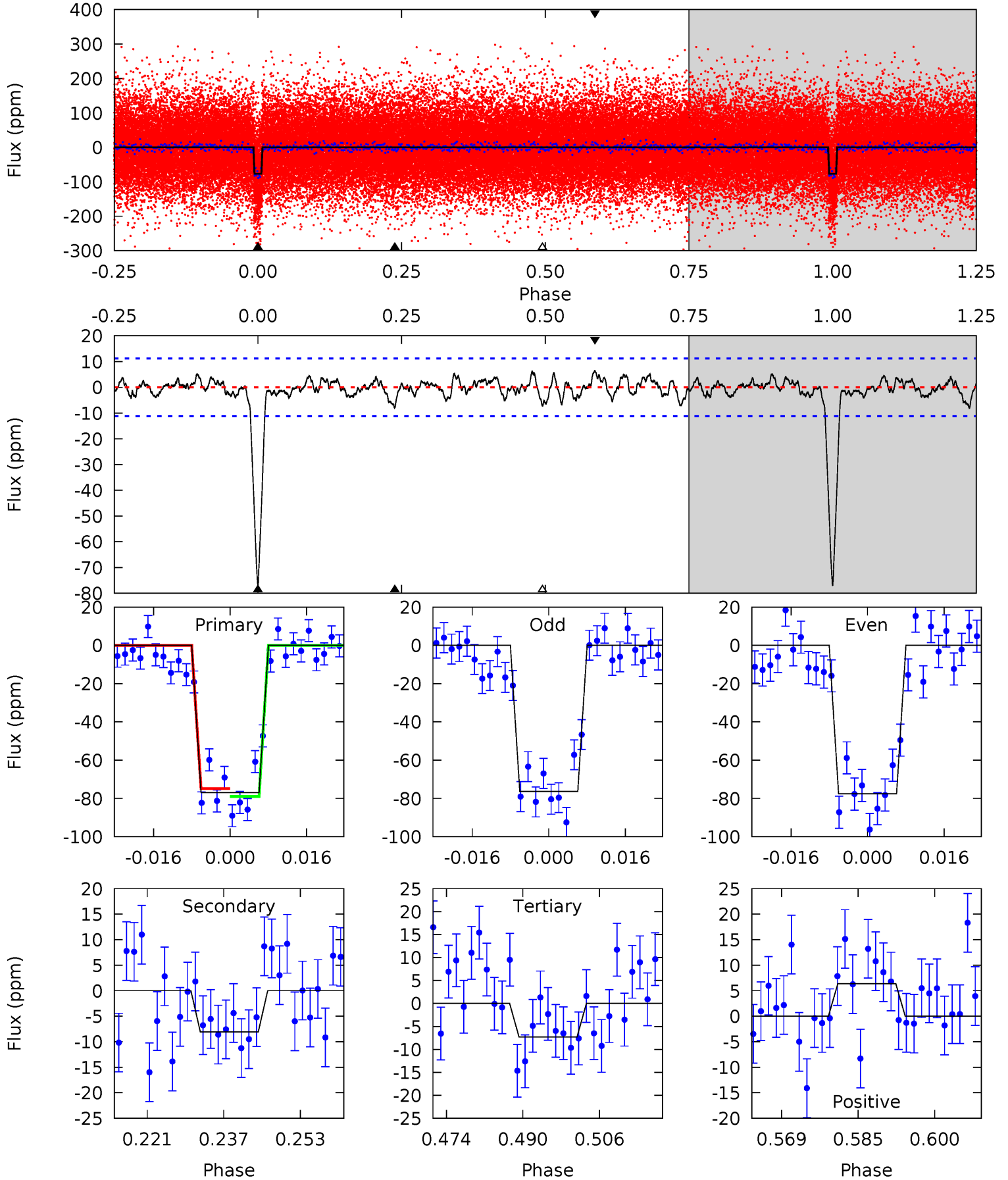
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
34.4	4.71	3.86	3.40	4.92	2.39	1.28	30.6	31.0	0.86	1.32	0.78	0.93	0.09	0.91



Alt Model-Shift Uniqueness Test

002581316-02, $P = 10.514180$ Days, $E = 124.054643$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.9	3.55	3.22	2.81	4.94	2.41	1.13	30.7	31.1	0.33	0.74	0.26	1.00	0.08	0.92



Stellar Parameters For KIC 002581316

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6259^{+99}_{-136}	$4.385^{+0.034}_{-0.128}$	$0.140^{+0.150}_{-0.150}$	$1.167^{+0.212}_{-0.085}$	$1.210^{+0.084}_{-0.093}$	$1.072^{+0.172}_{-0.386}$
	+2%/-2%	+1%/-3%	+107%/-107%	+18%/-7%	+7%/-8%	+16%/-36%
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 002581316-02 / KOI 3681.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-11±2	$1.26^{+0.25}_{-0.24}$	1335^{+54}_{-41}	3978^{+311}_{-266}	37^{+20}_{-13}
Alt.	-8±2	$1.15^{+0.25}_{-0.25}$	1334^{+54}_{-41}	3897^{+391}_{-313}	33^{+23}_{-13}

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

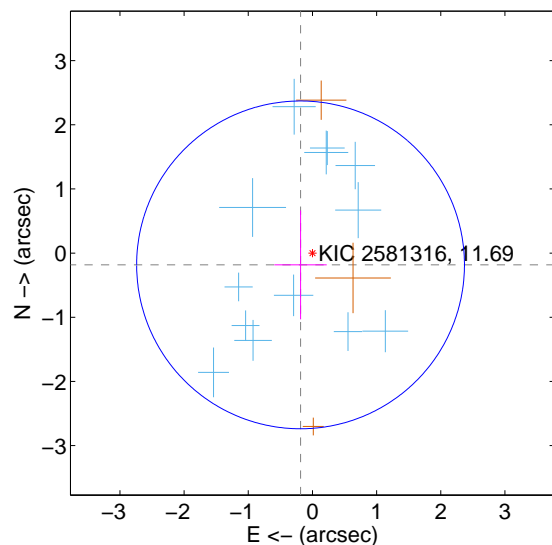
Supplemental centroid analysis for 002581316-02. **Kepler magnitude: 11.69.** Transit SNR 20.37

There are 13 quarters with good PRF difference image offsets

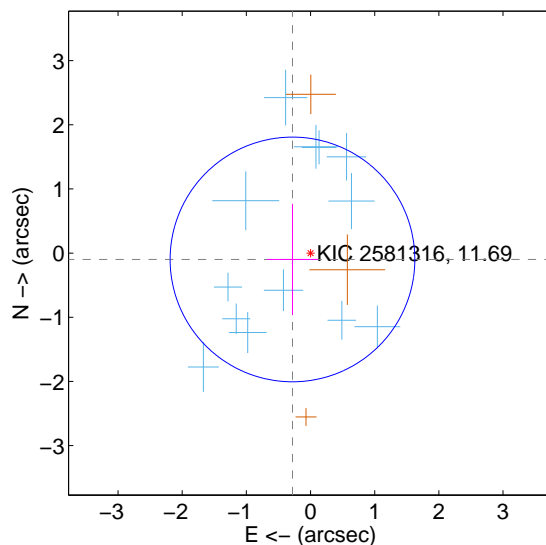
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.261 ± 0.851	0.31	0.185 ± 0.408	-0.184 ± 0.848
PRF-fit source offset from KIC position	0.298 ± 0.635	0.47	0.281 ± 0.397	-0.099 ± 0.868
photometric centroid source offset	1.41 ± 0.58	2.45	-0.35 ± 0.46	1.37 ± 0.58

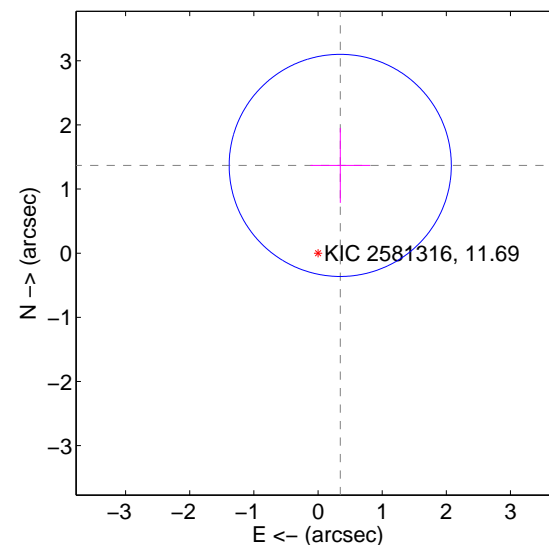
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

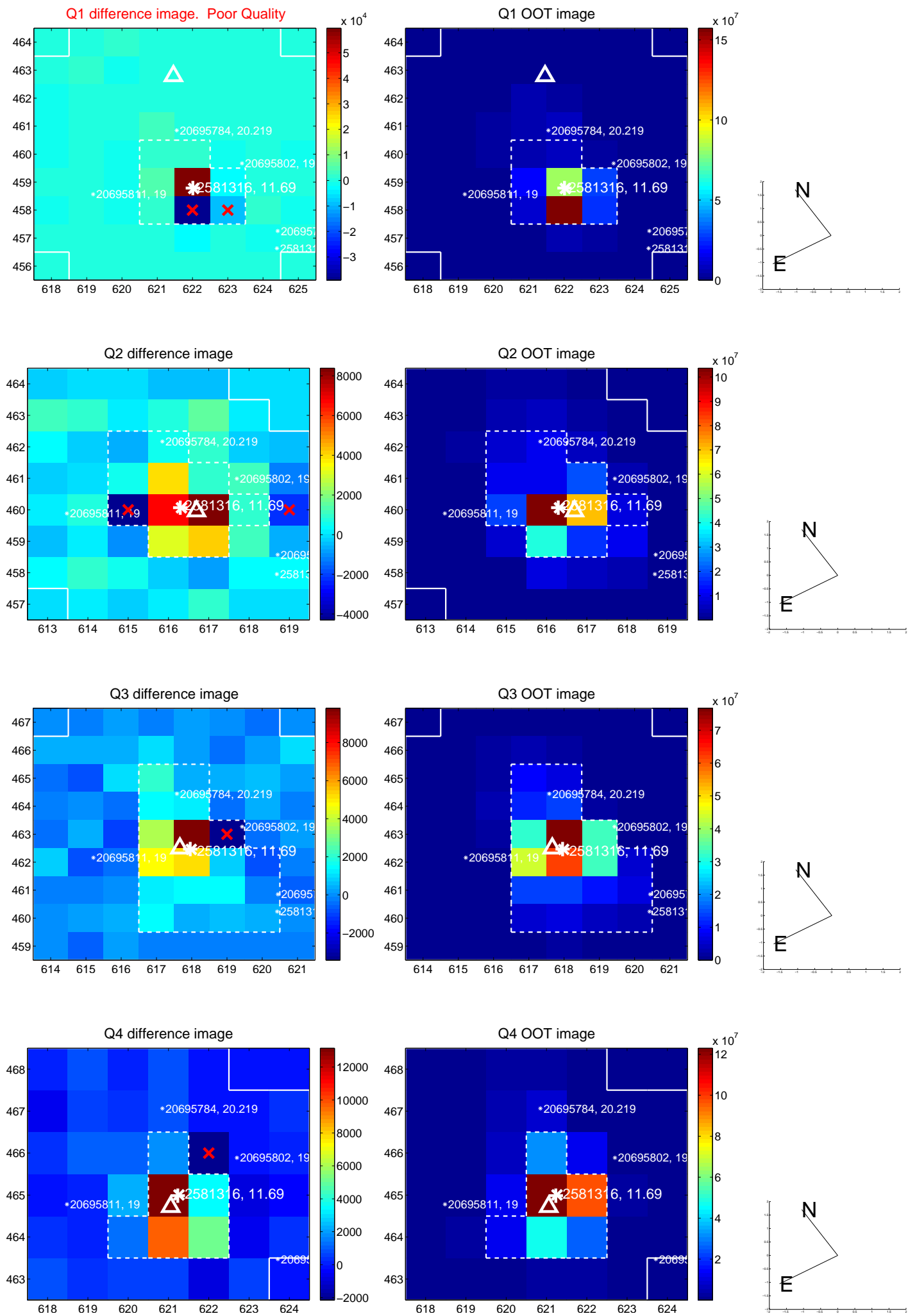


offset from photometric centroids

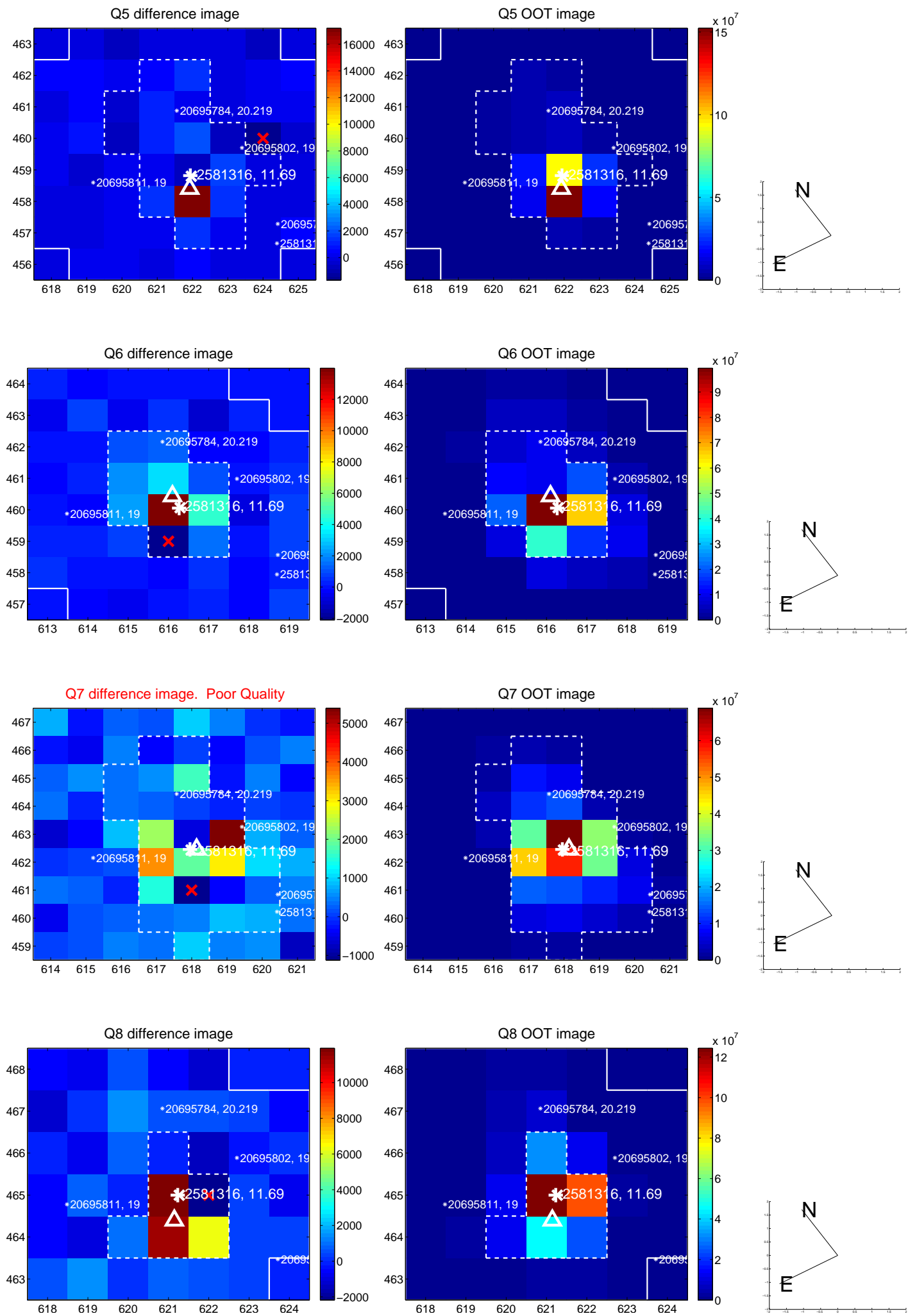


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

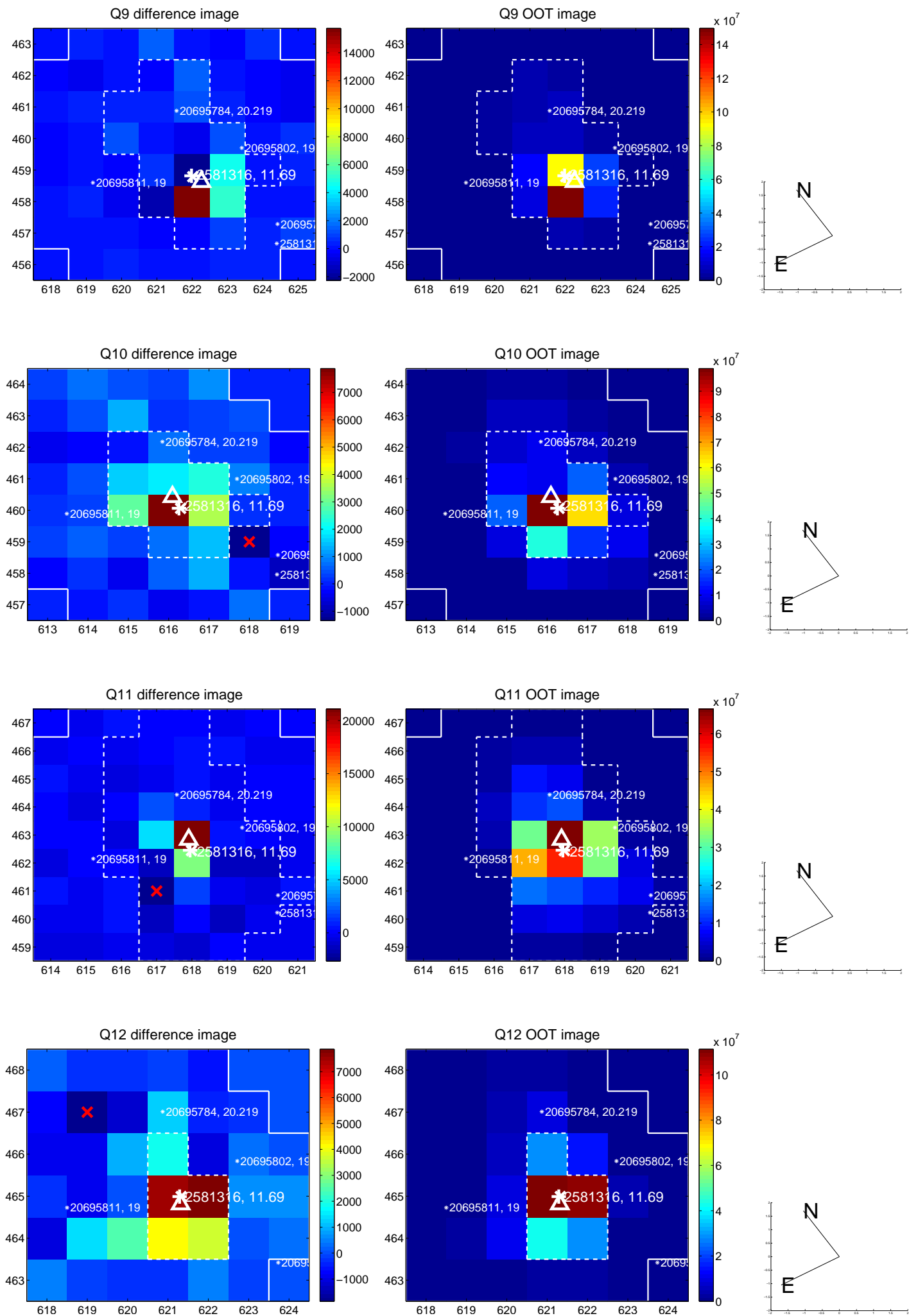
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



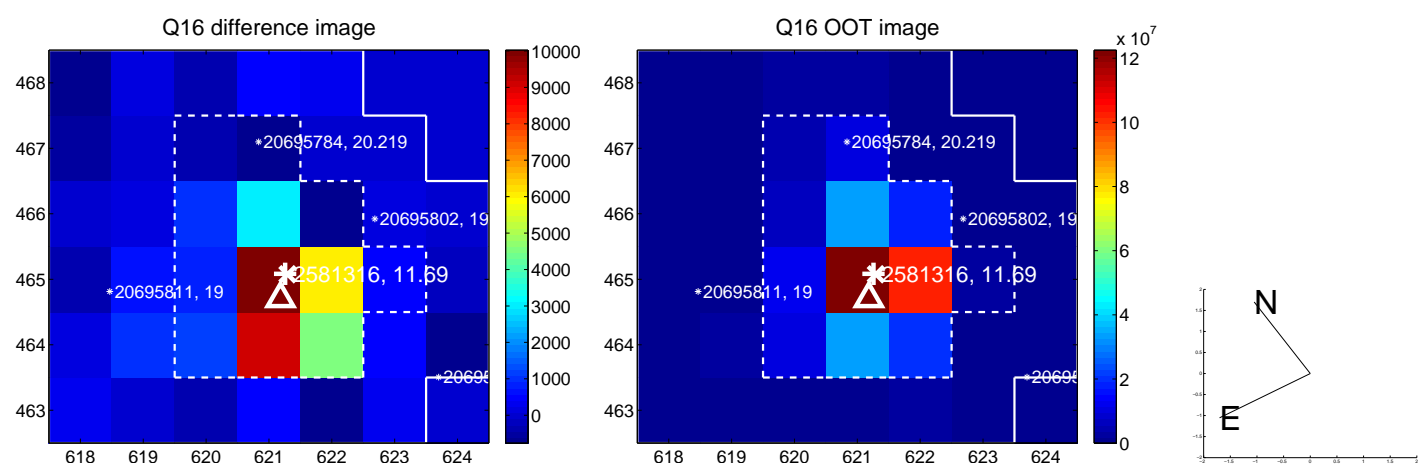
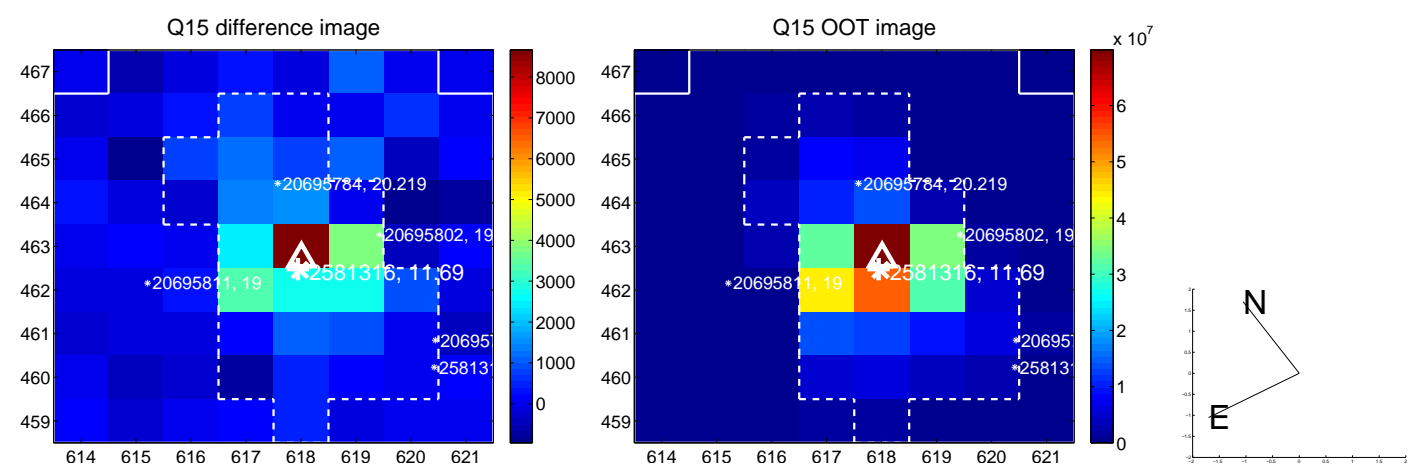
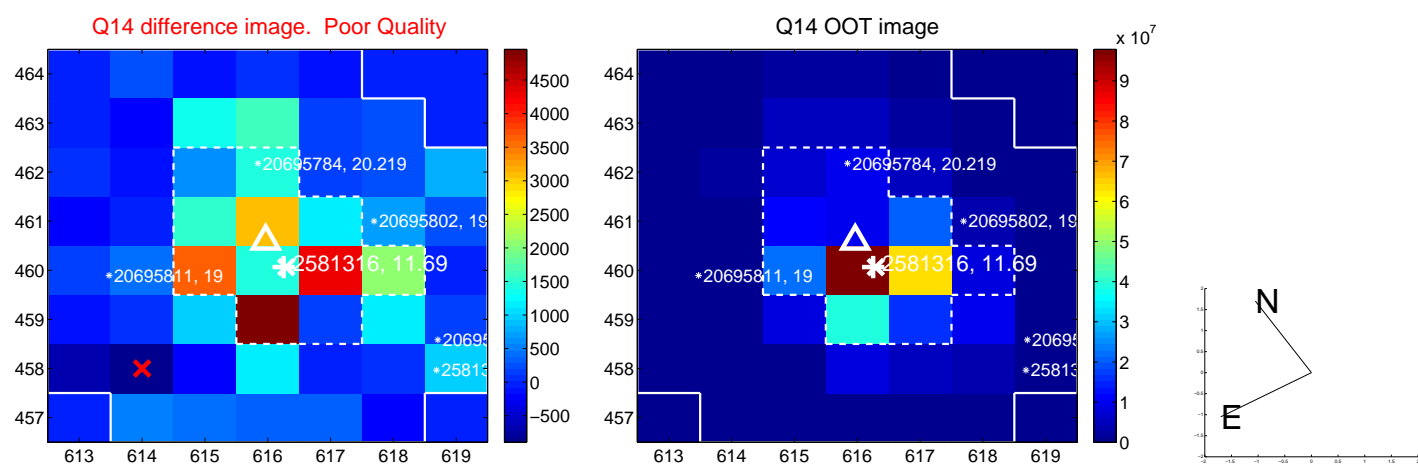
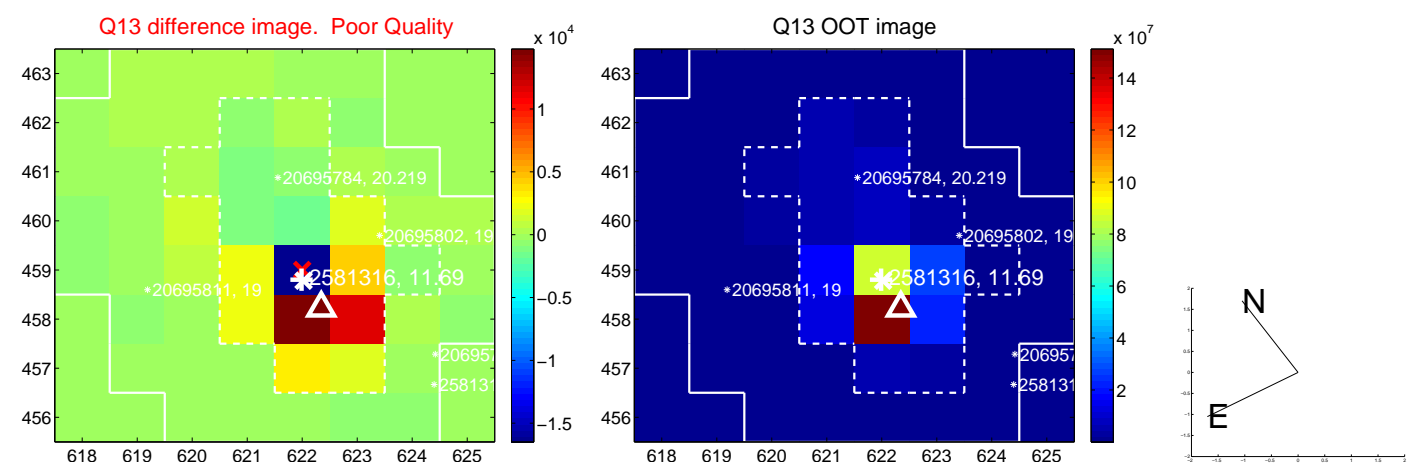
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



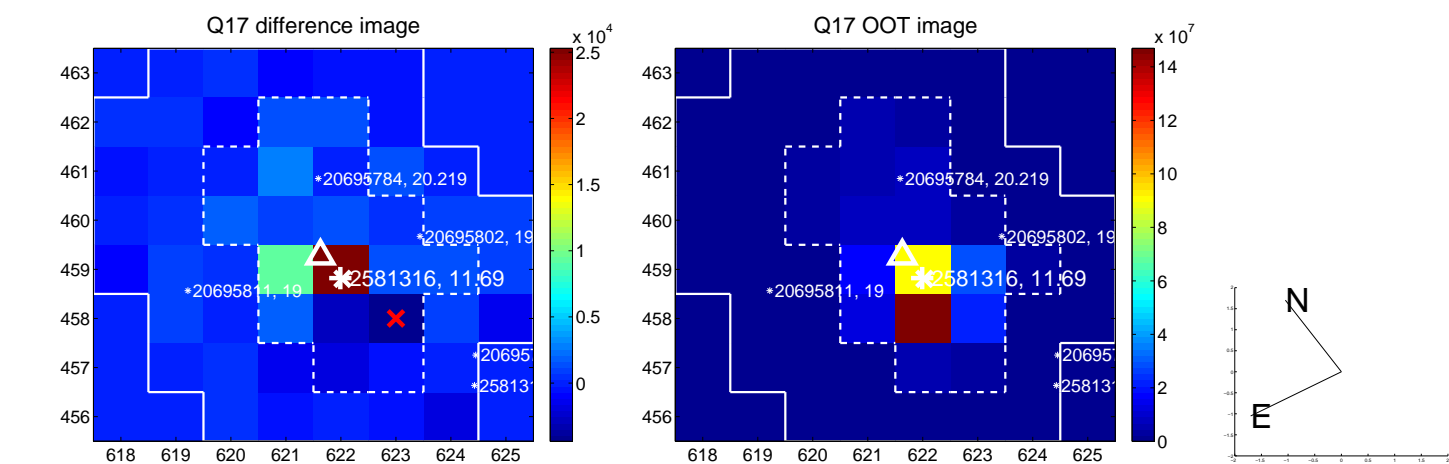
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



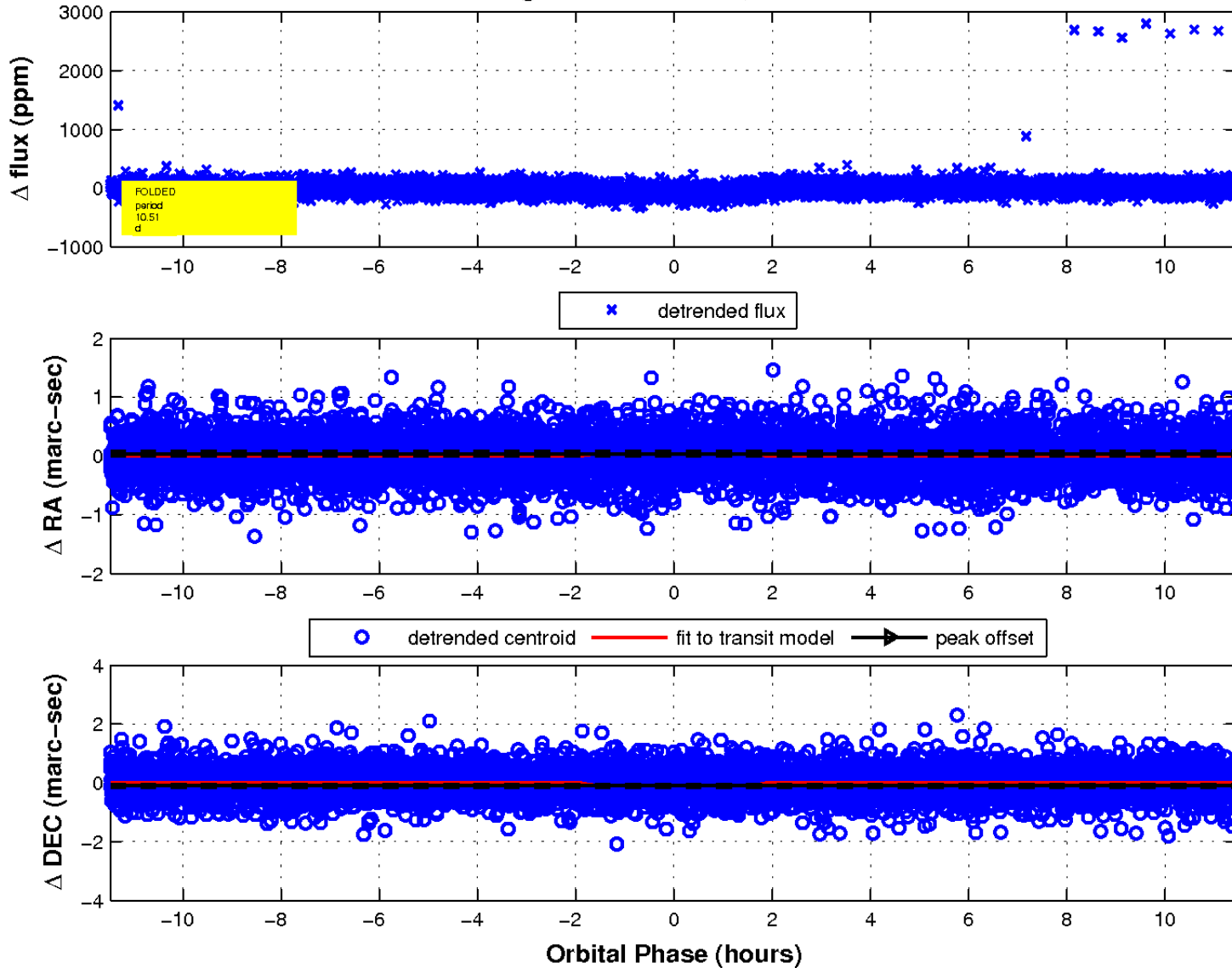
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

