

KIC 010577994

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})
010577994-01	OBS	0475.01	8.180880	135.795375	706.4	2.914	39.2	43.6	0.77	5081	2.41	62.32
010577994-02	OBS	0475.02	15.312977	141.167908	845.2	3.199	36.3	39.9	0.77	5081	2.51	27.02

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010577994-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010577994-02	OBS	PC	1.00	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.

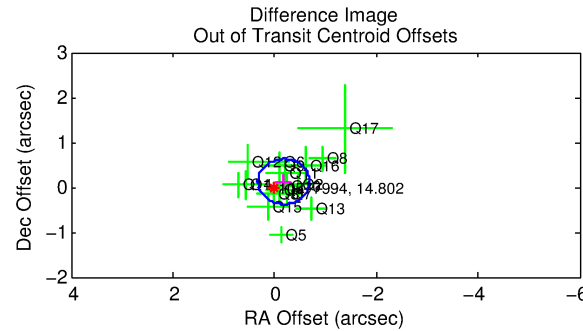
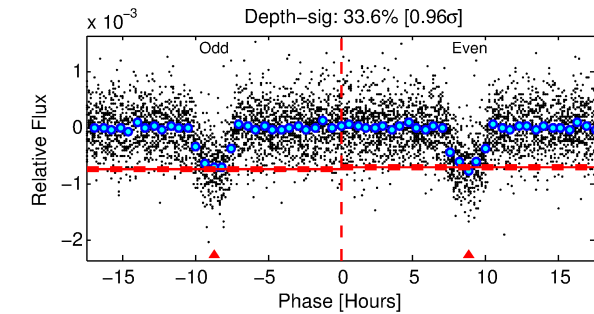
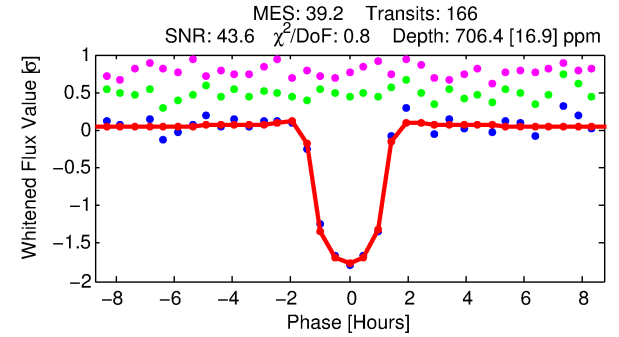
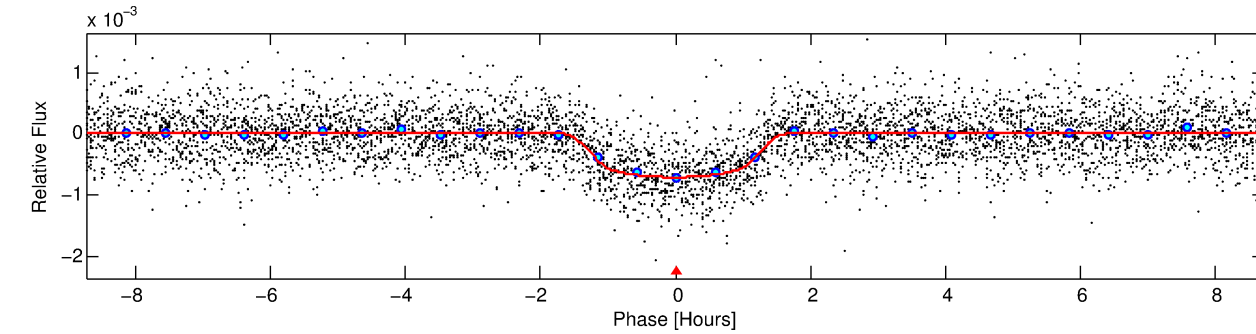
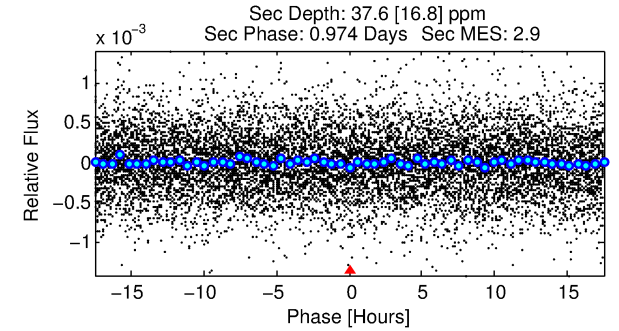
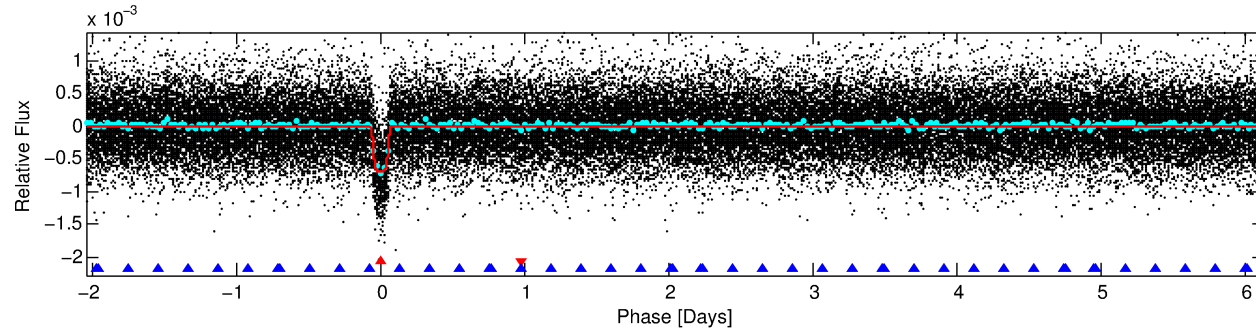
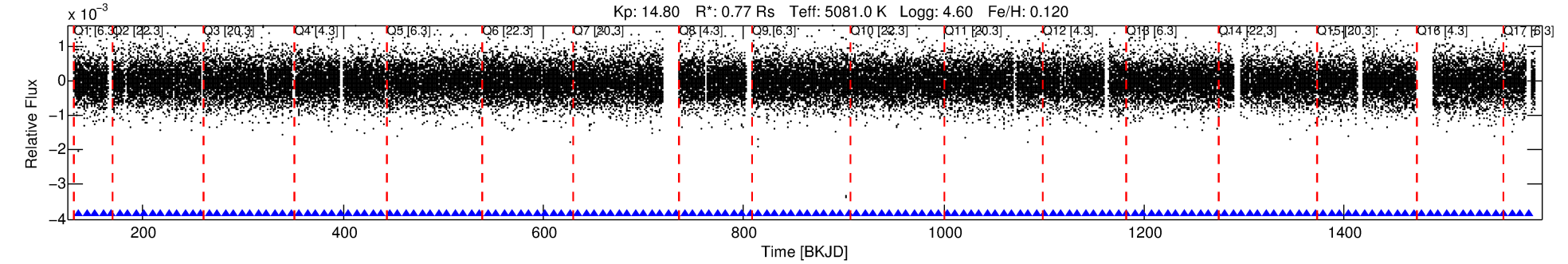
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010577994-01

No Significant Match Found

DV One-Page Summary

KIC: 10577994 Candidate: 1 of 2 Period: 8.181 d
KOI: K00475.01 Name: Kepler-165b Corr: 0.992



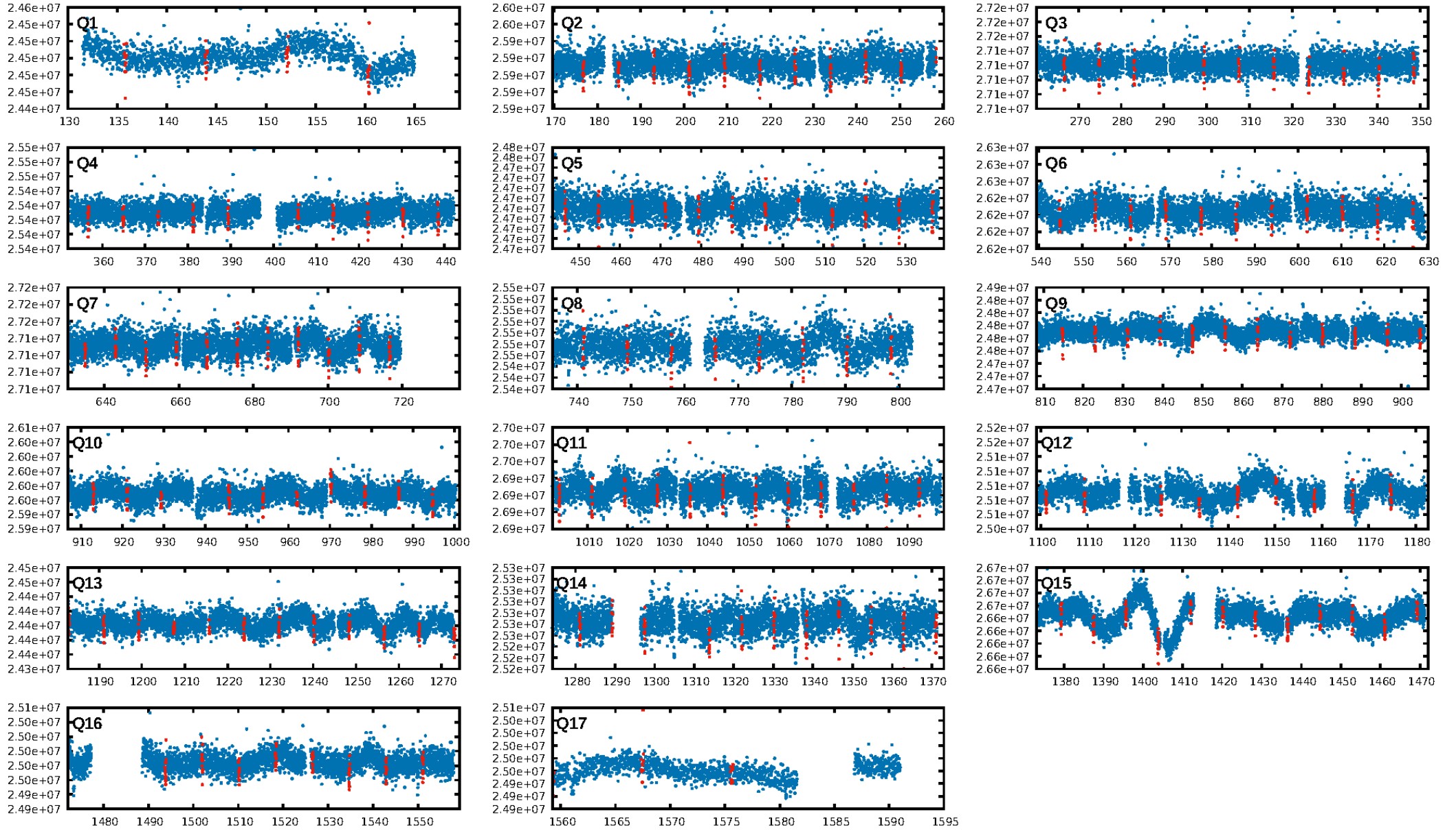
DV Fit Results:

Period = 8.18088 [0.00002] d
Epoch = 135.7954 [0.0014] BKJD
Rp/R* = 0.0287 [0.0035]
a/R* = 11.85 [5.37]
b = 0.87 [0.13]
Seff = 62.32 [8.30]
Teff = 716 [24] K
Rp = 2.41 [0.35] Re
a = 0.0754 [0.0056] AU
Ag = 20.19 [10.53] [1.82σ]
Teffp = 2348 [301] K [5.41σ]

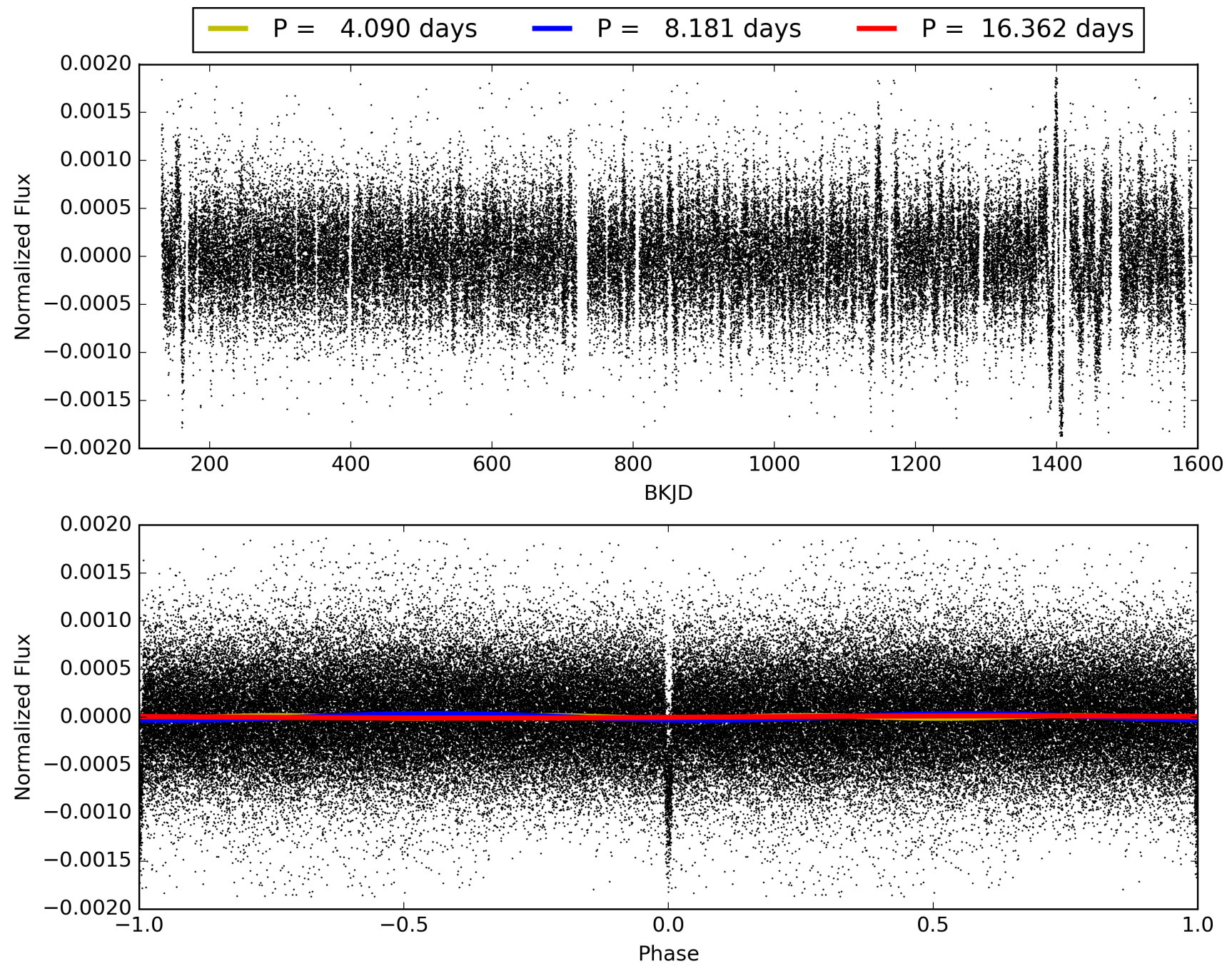
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [39.55σ]
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [159/159]
GhostDiagnostic-chr: 4.738
Centroid-sig: 3.1%
Centroid-so: 1.433 arcsec [4.54σ]
OotOffset-rm: 0.214 arcsec [1.28σ]
KicOffset-rm: 0.403 arcsec [2.93σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 010577994-01, PDC Light Curves

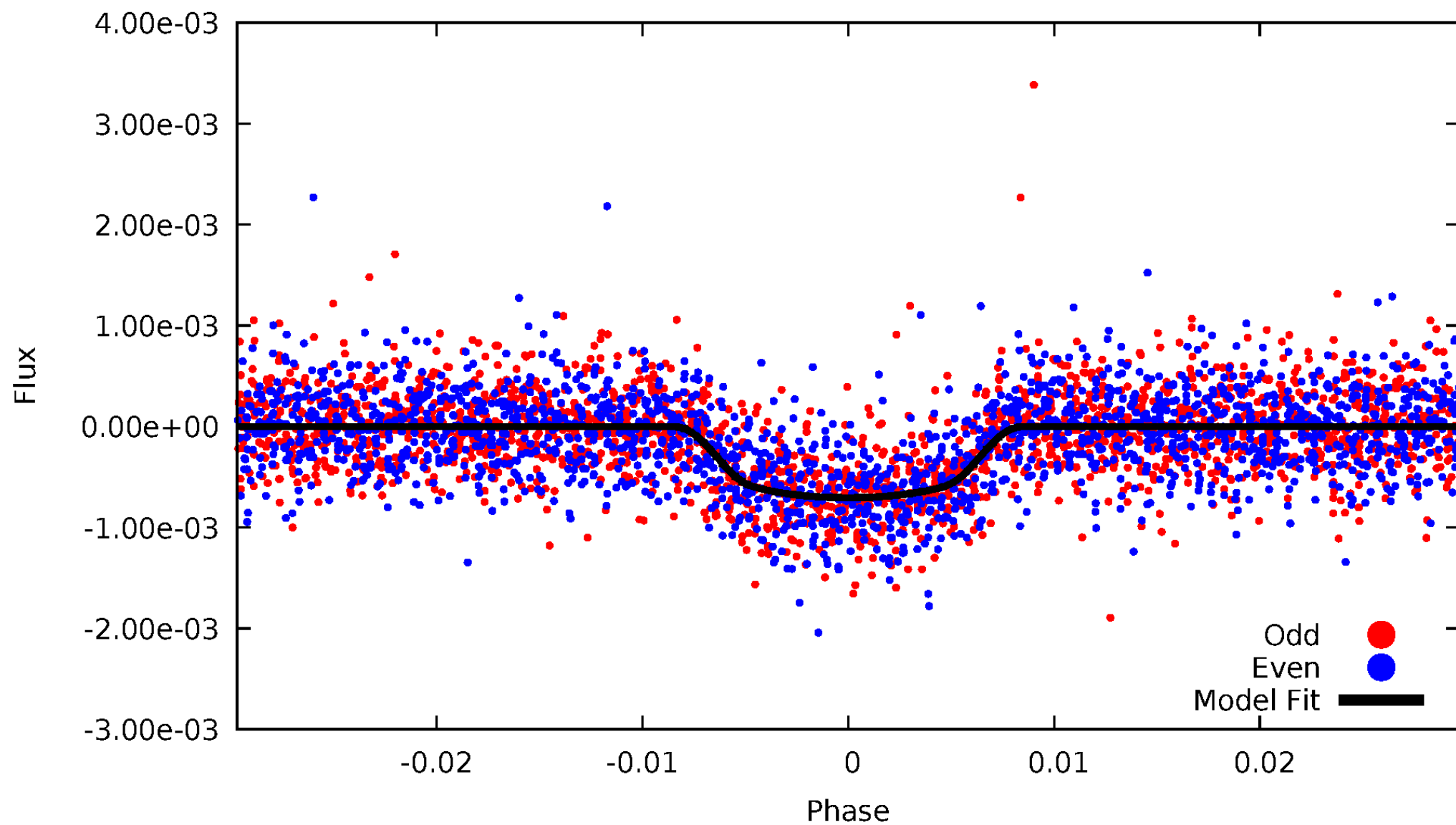


TCE 010577994-01



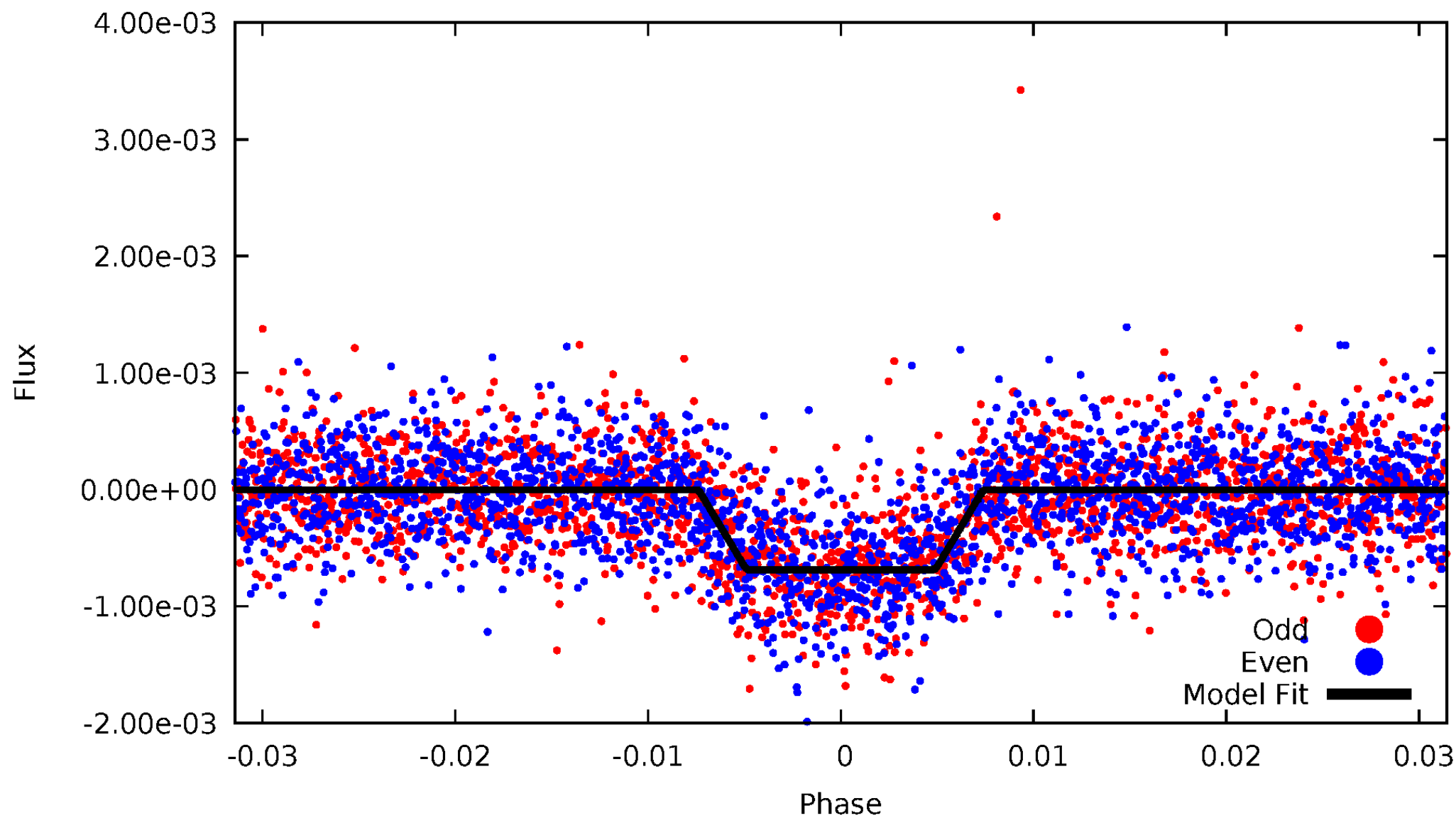
DV Odd/Even

TCE 010577994-01



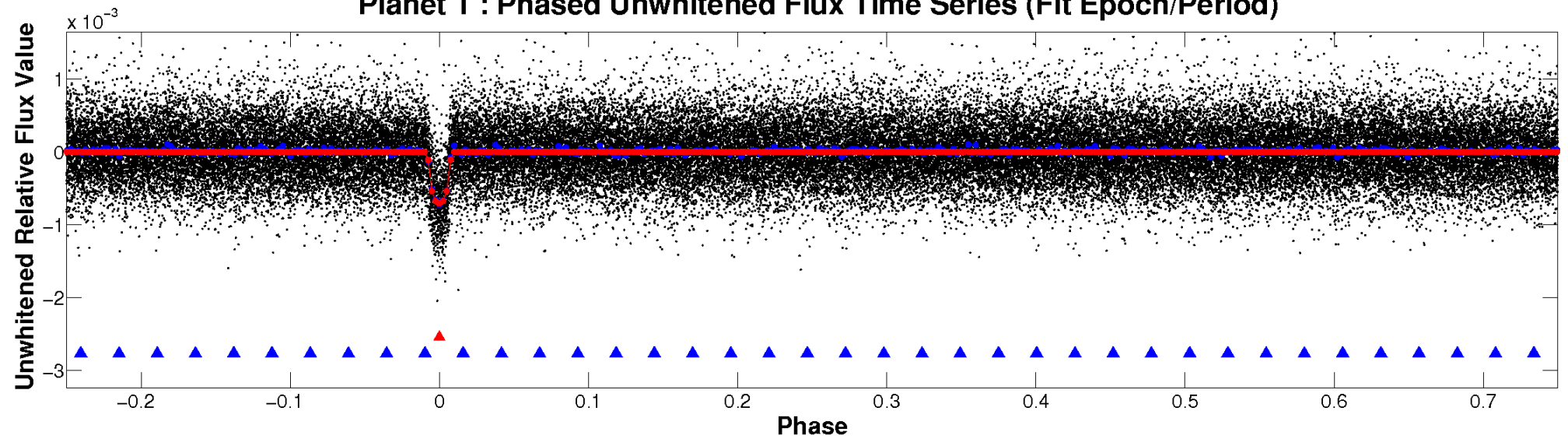
ALT Odd/Even

TCE 010577994-01

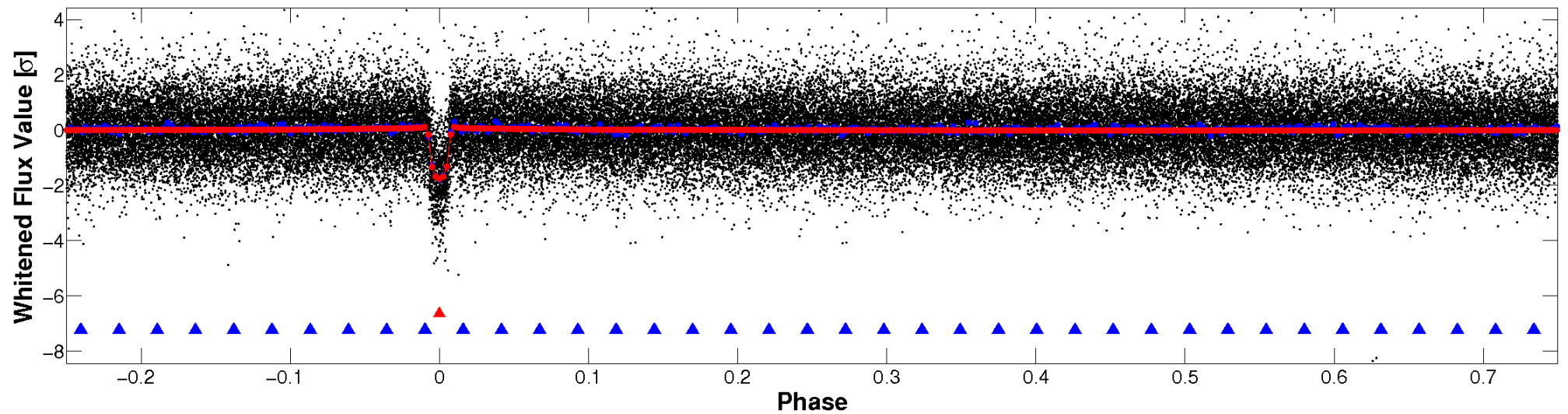


Non-Whitened Vs. Whitened Light Curve

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

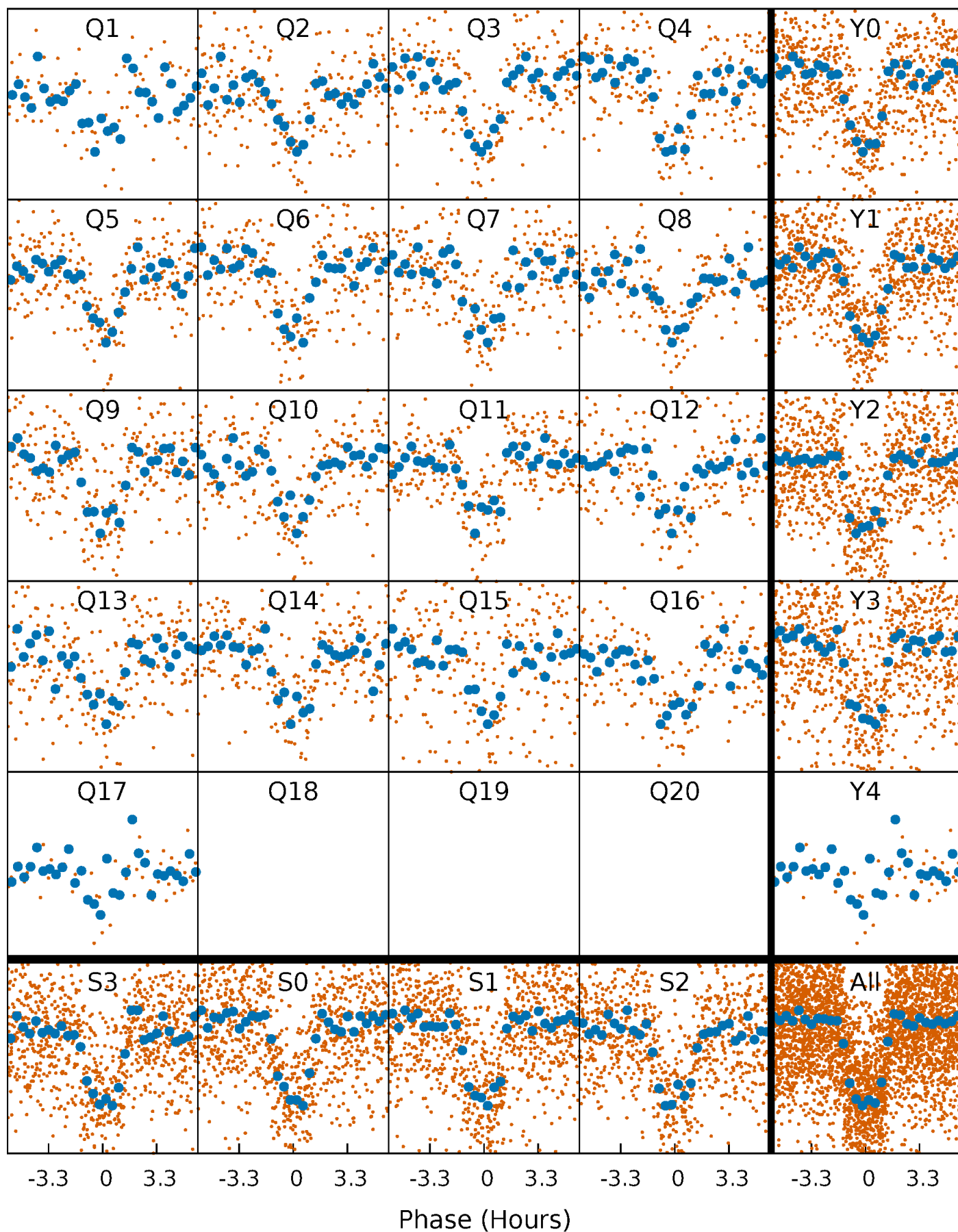


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



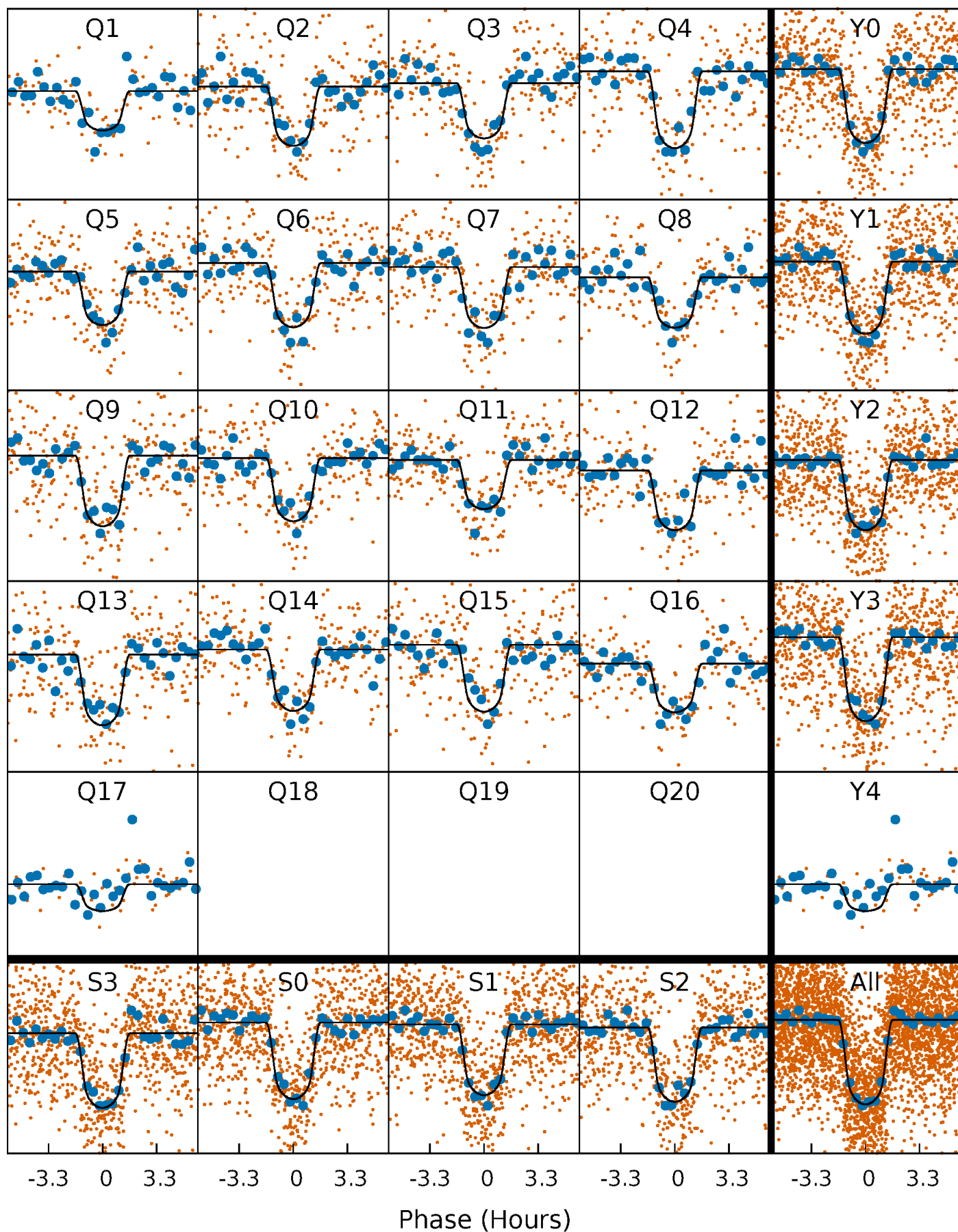
PDC Quarter-Phased Transit Curves

TCE 010577994-01 P= 8.180880 Days $T_0=135.795375$ (BKJD)



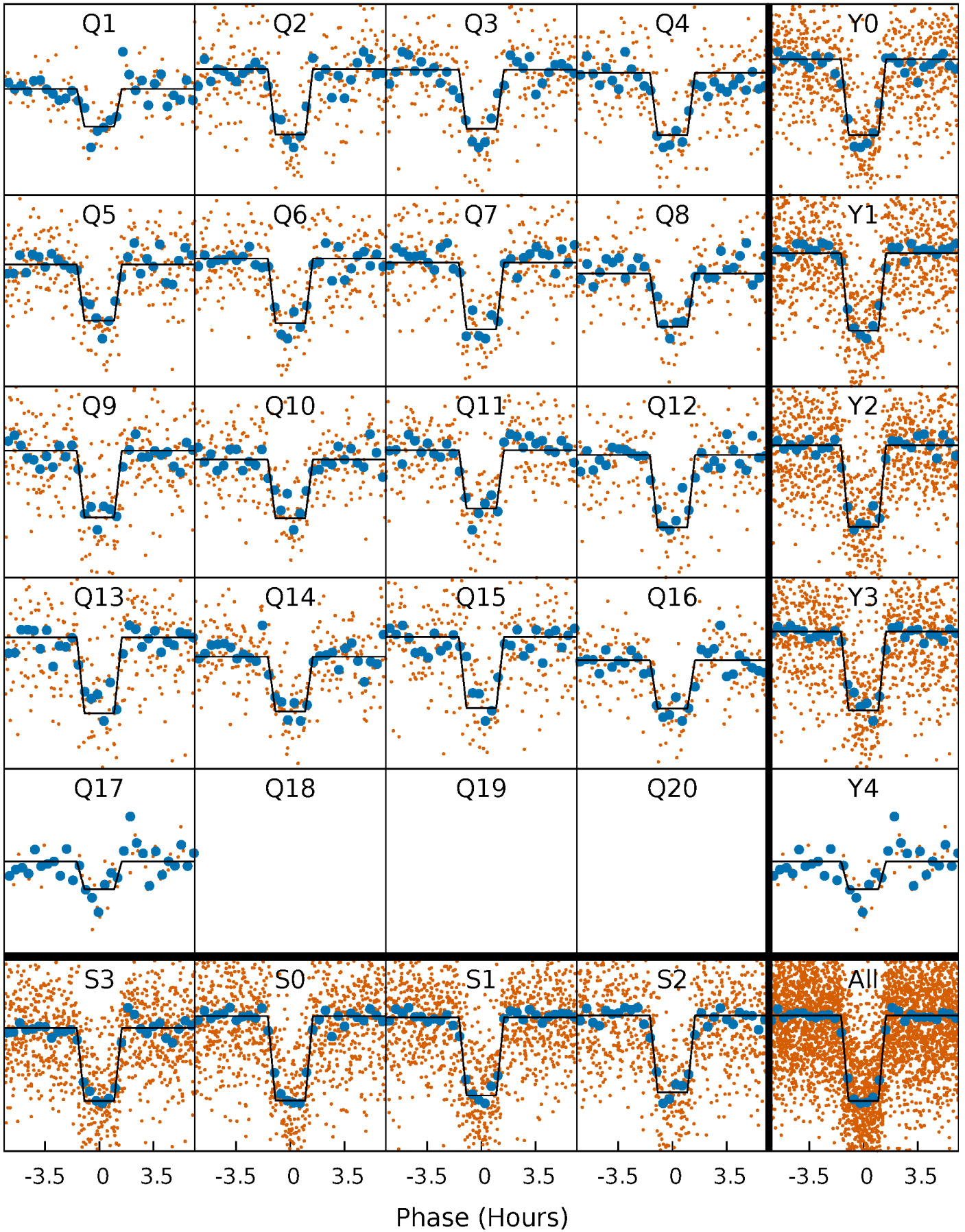
DV Quarter-Phased Transit Curves

TCE 010577994-01 P= 8.180880 Days $T_0=135.795375$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

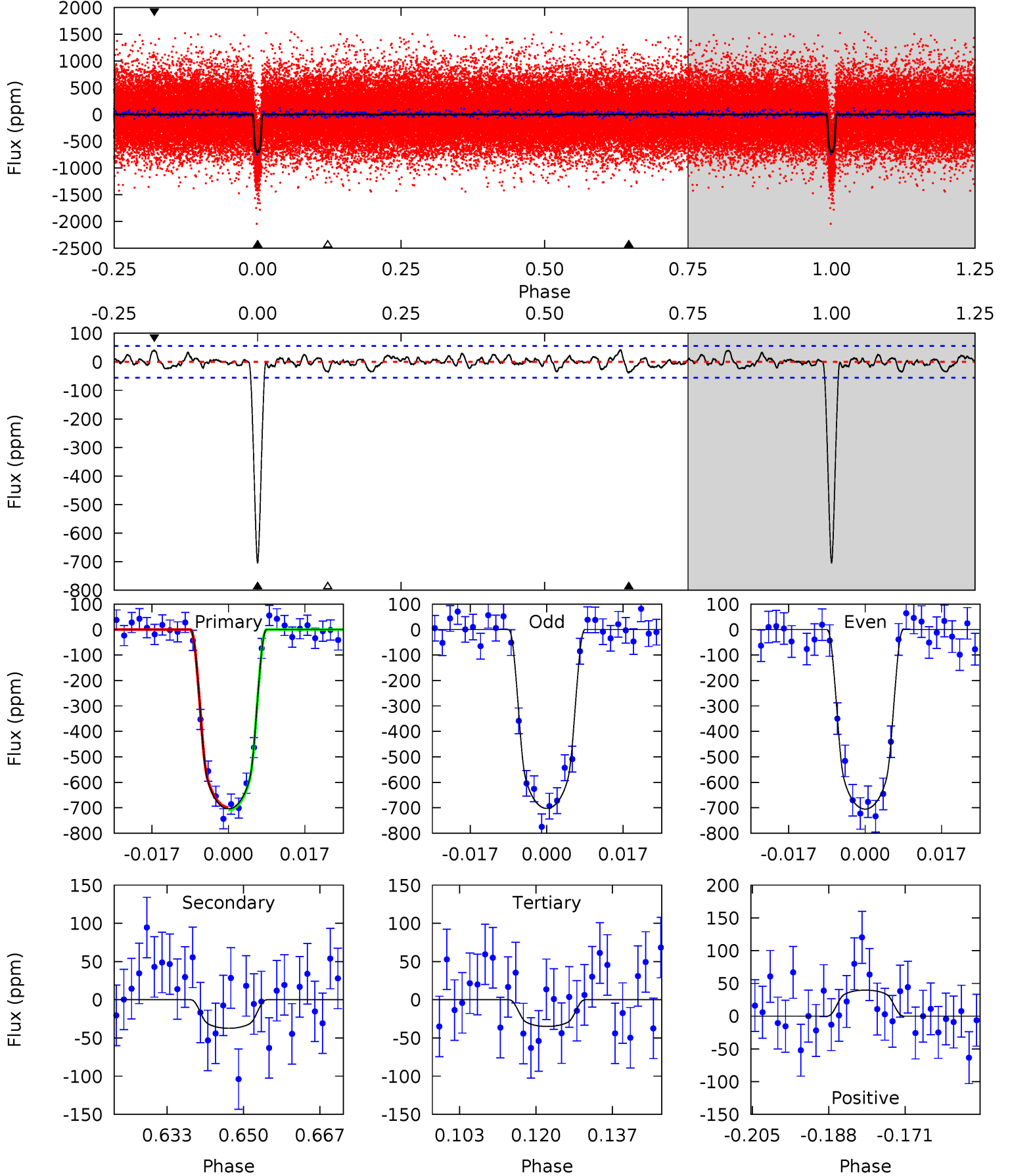
TCE 010577994-01 P= 8.180852 Days $T_0=135.797784$ (BKJD)



DV Model-Shift Uniqueness Test

010577994-01, P = 8.180880 Days, E = 127.614495 Days

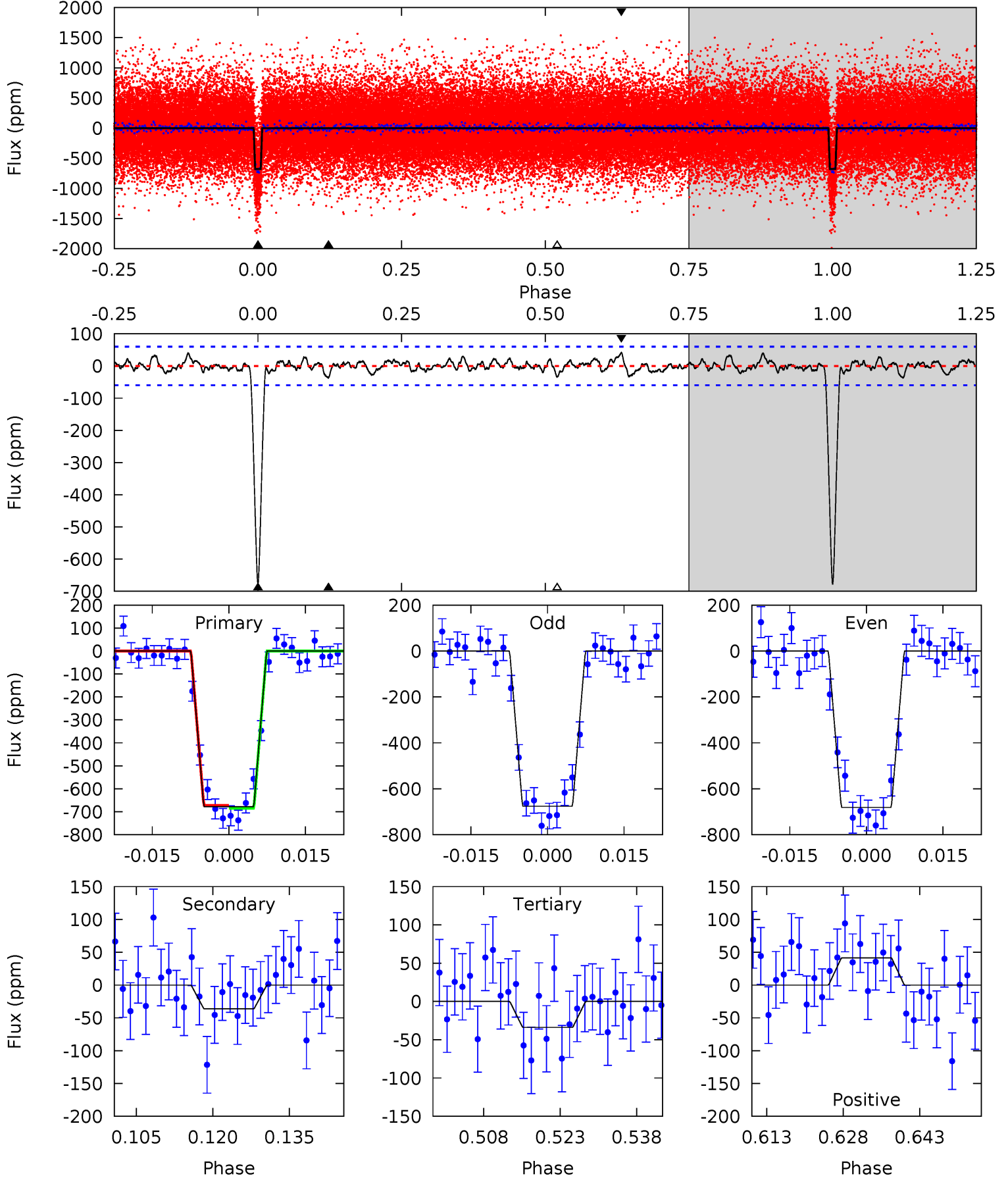
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
62.2	3.30	3.09	3.51	4.92	2.38	1.16	59.1	58.6	0.21	-0.22	0.11	0.96	0.06	0.43



Alt Model-Shift Uniqueness Test

010577994-01, P = 8.180852 Days, E = 127.616932 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
56.1	3.01	2.81	3.44	4.95	2.43	1.06	53.3	52.6	0.20	-0.43	0.21	0.99	0.06	0.57



Stellar Parameters For KIC 010577994

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5081^{+71}_{-81}	$4.596^{+0.012}_{-0.068}$	$0.120^{+0.150}_{-0.150}$	$0.770^{+0.061}_{-0.028}$	$0.864^{+0.026}_{-0.057}$	$2.663^{+0.165}_{-0.570}$
	+1%/-2%	+0%/-1%	+125%/-125%	+8%/-4%	+3%/-7%	+6%/-21%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 010577994-01 / KOI 0475.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-37 ± 11	$2.46^{+0.30}_{-0.30}$	1011^{+22}_{-20}	2969^{+172}_{-174}	19^{+8}_{-7}
Alt.	-36 ± 12	$2.26^{+0.30}_{-0.32}$	1010^{+23}_{-19}	3041^{+196}_{-195}	22^{+11}_{-9}

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 $A_{obs} \gg 1.0$

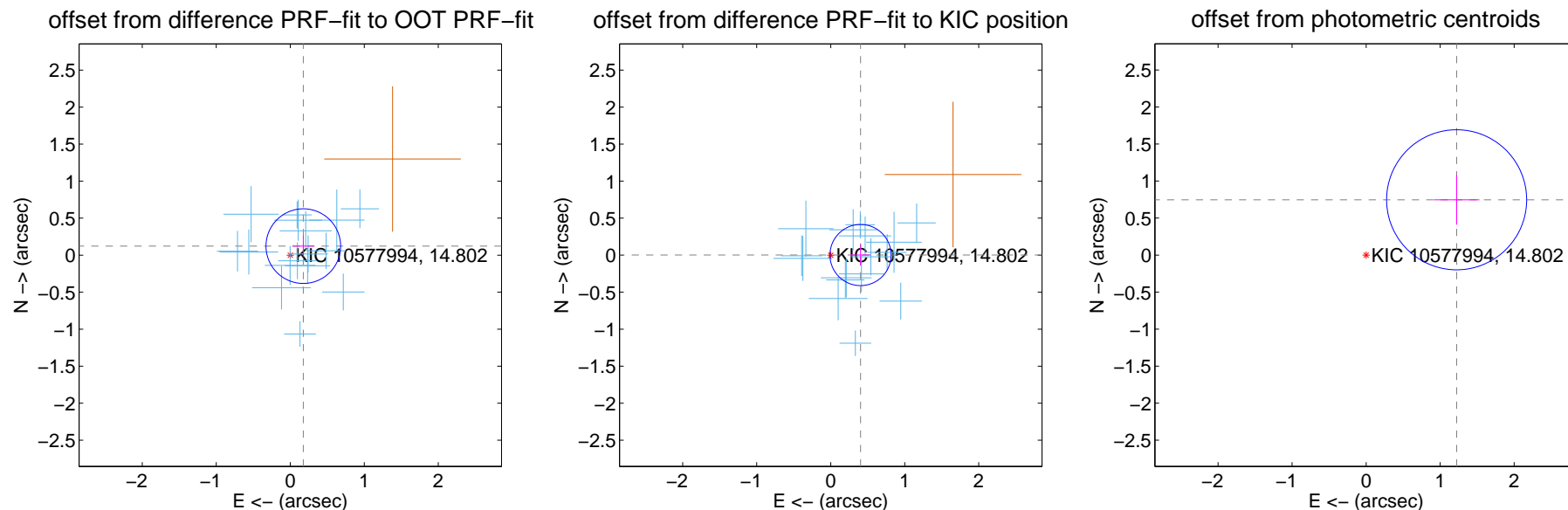
DV Centroid Data

Supplemental centroid analysis for 010577994-01. Kepler magnitude: 14.80. Transit SNR 43.59

There are 16 quarters with good PRF difference image offsets

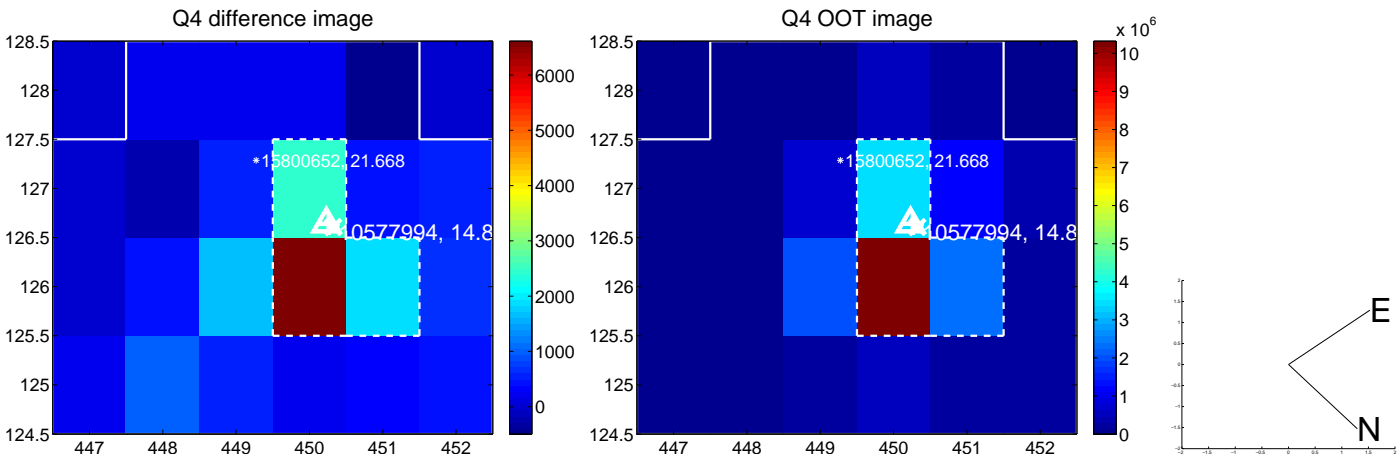
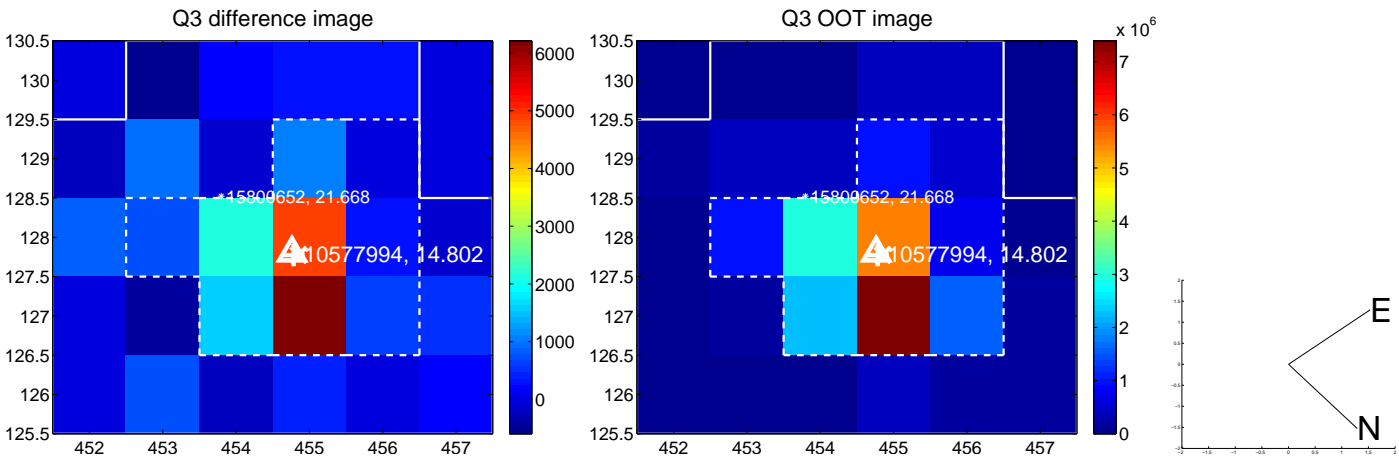
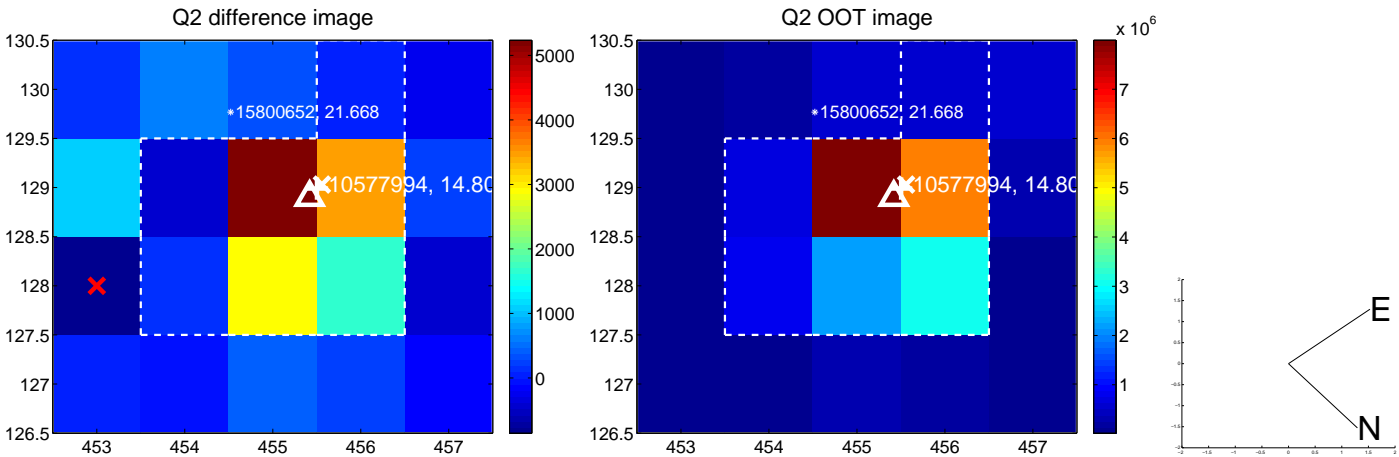
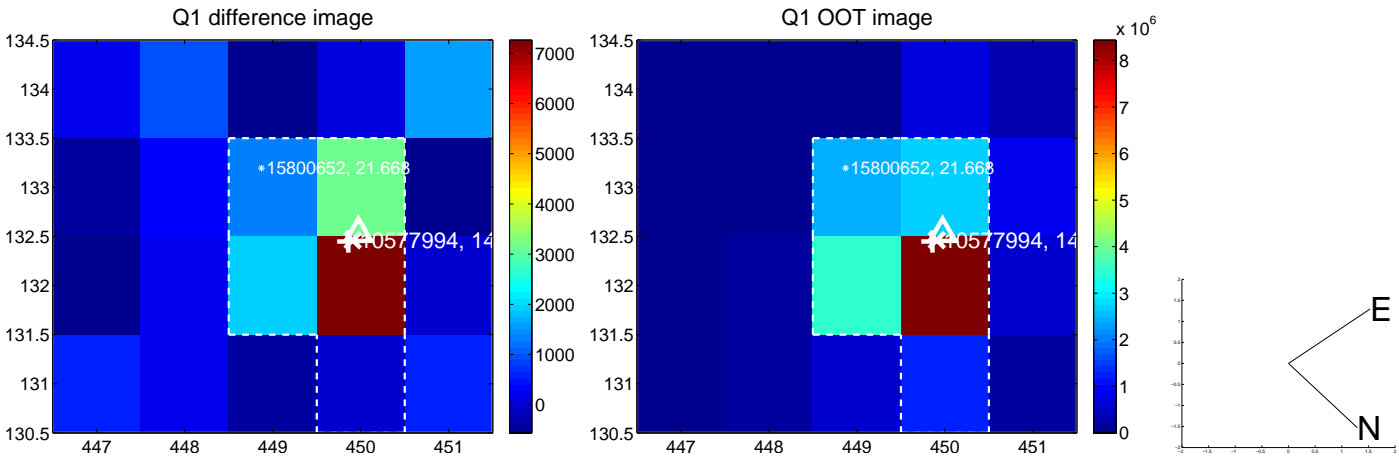
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.214 ± 0.168	1.28	-0.176 ± 0.149	0.122 ± 0.140
PRF-fit source offset from KIC position	0.403 ± 0.138	2.93	-0.403 ± 0.138	0.002 ± 0.142
photometric centroid source offset	1.43 ± 0.32	4.54	-1.22 ± 0.31	0.75 ± 0.34

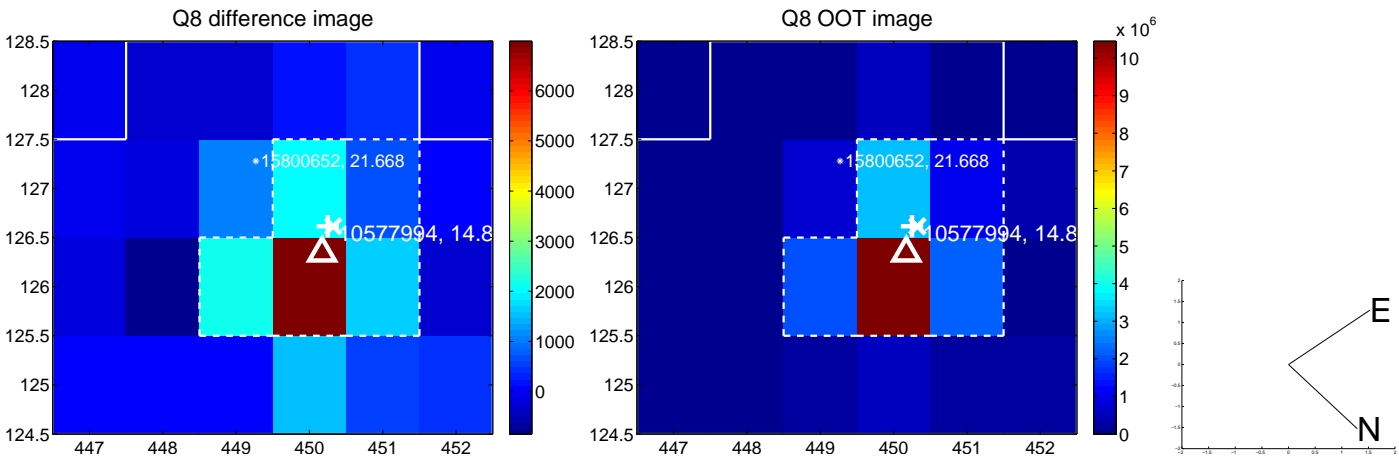
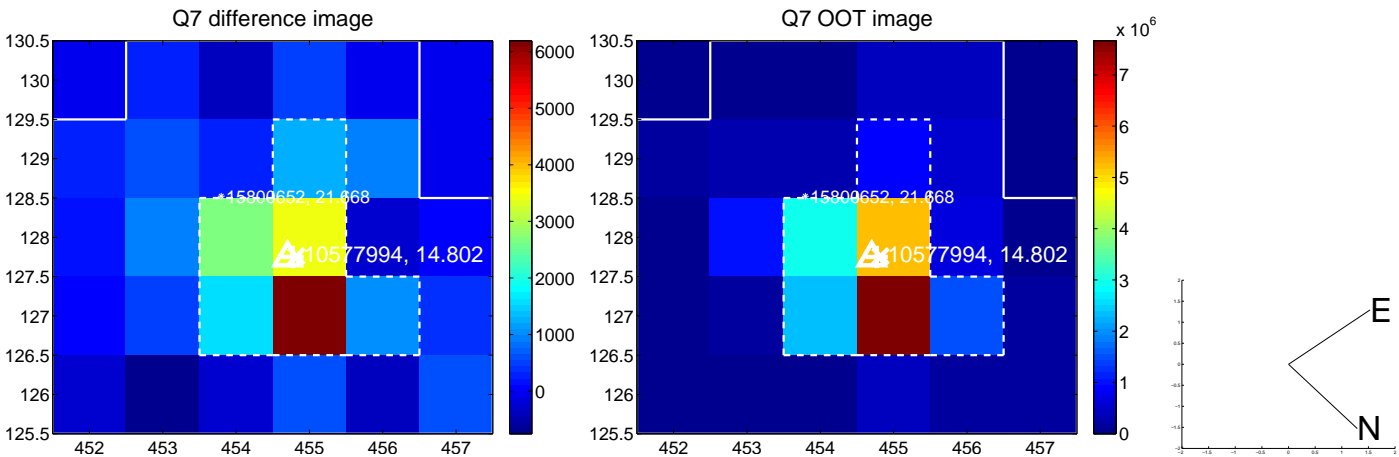
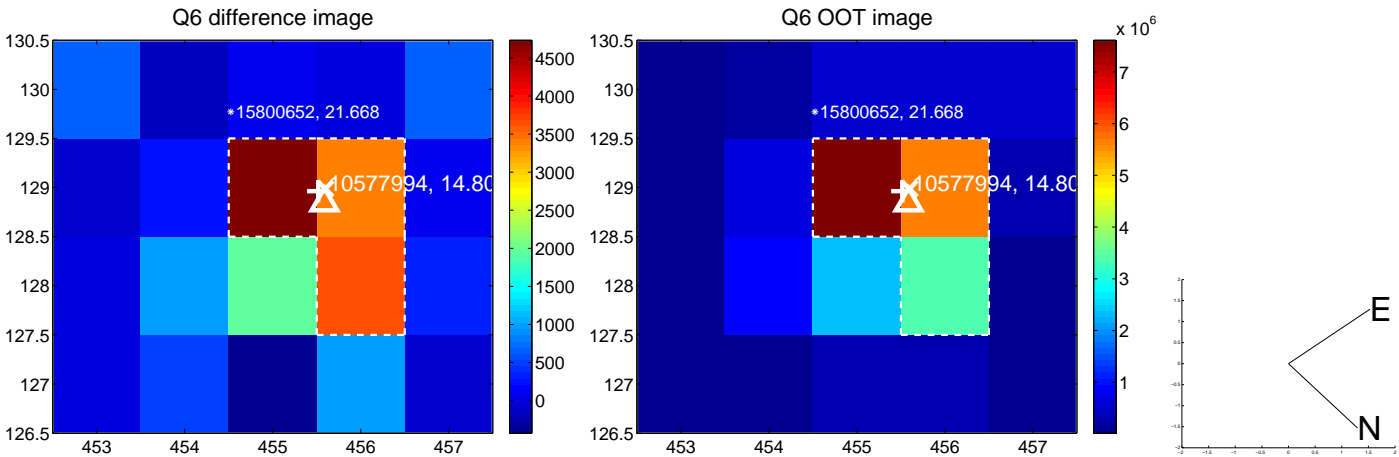
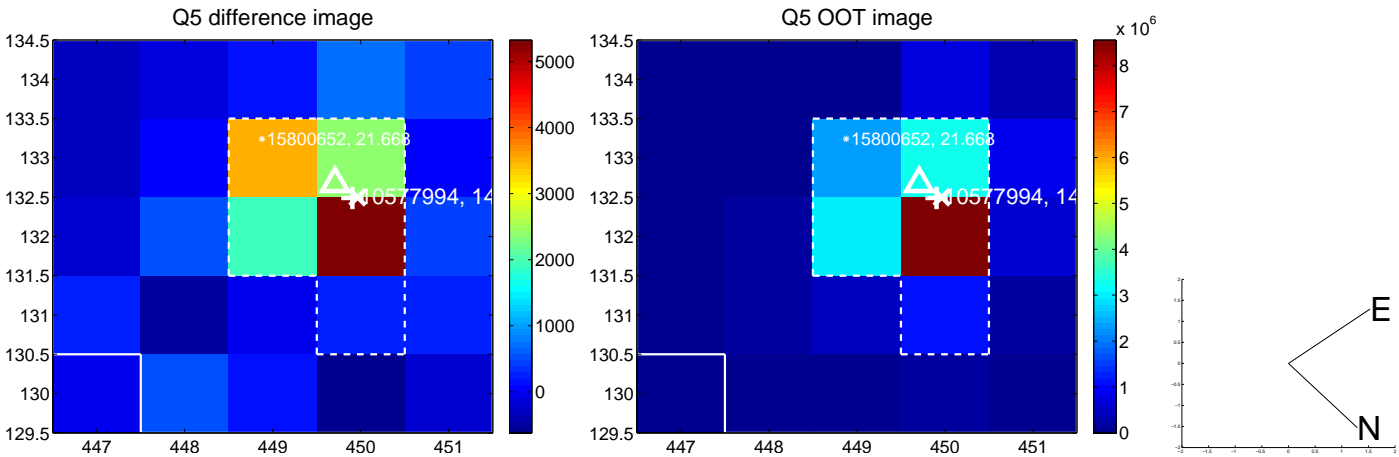


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

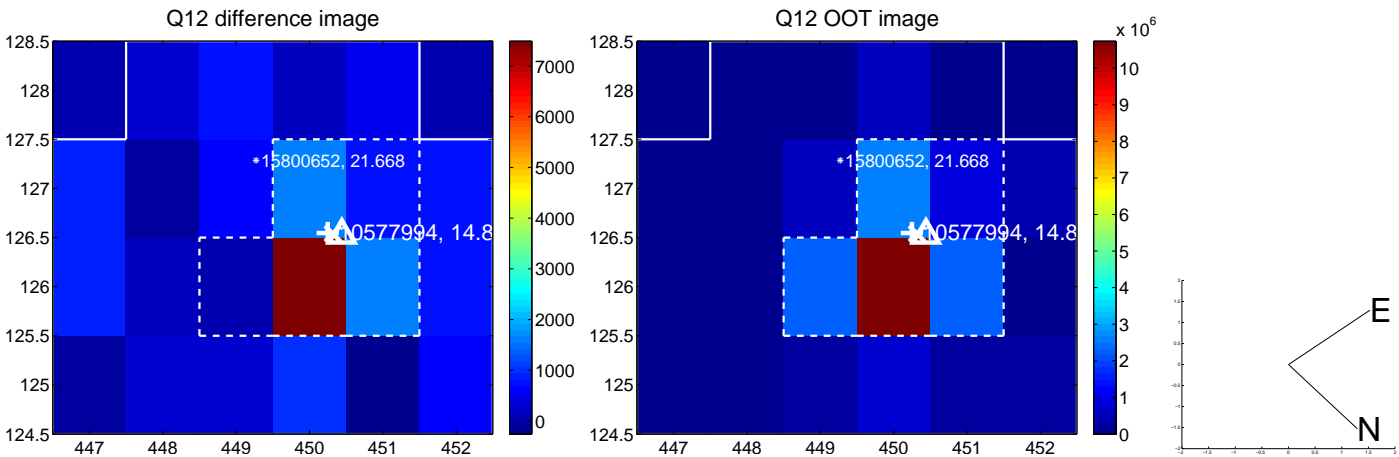
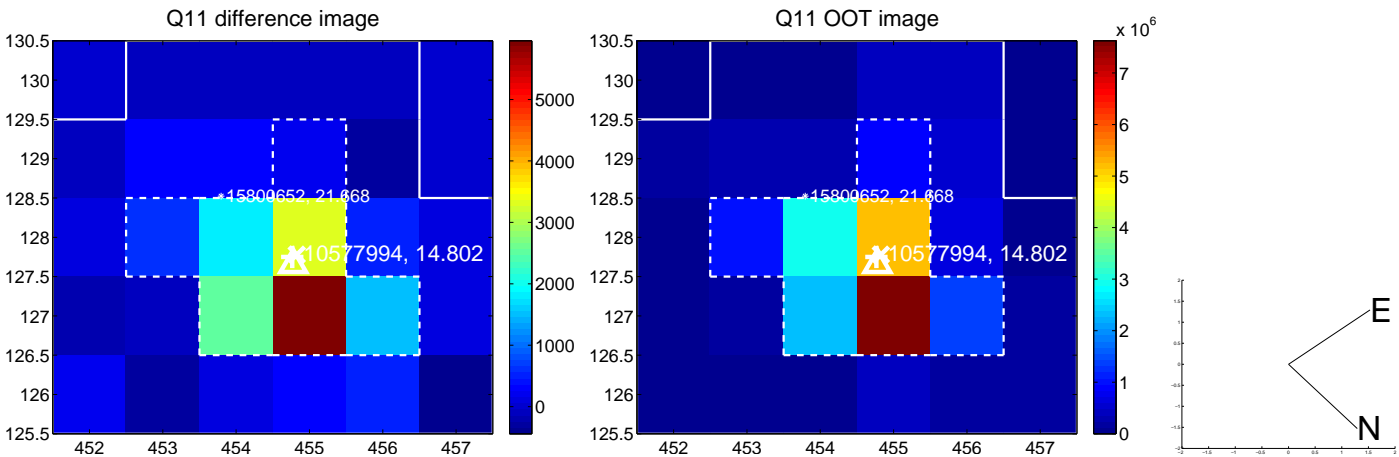
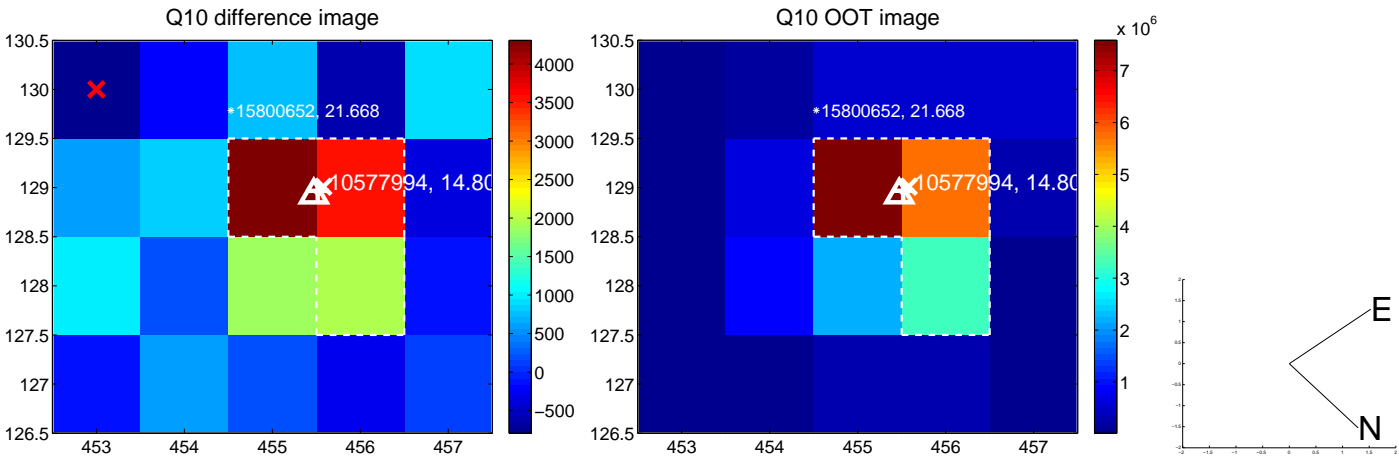
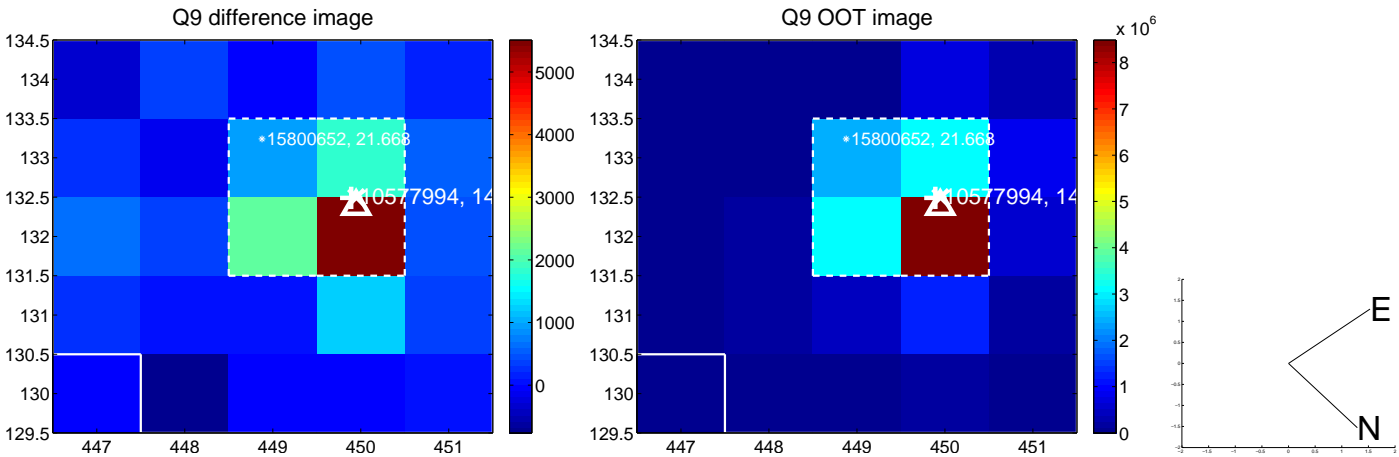
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



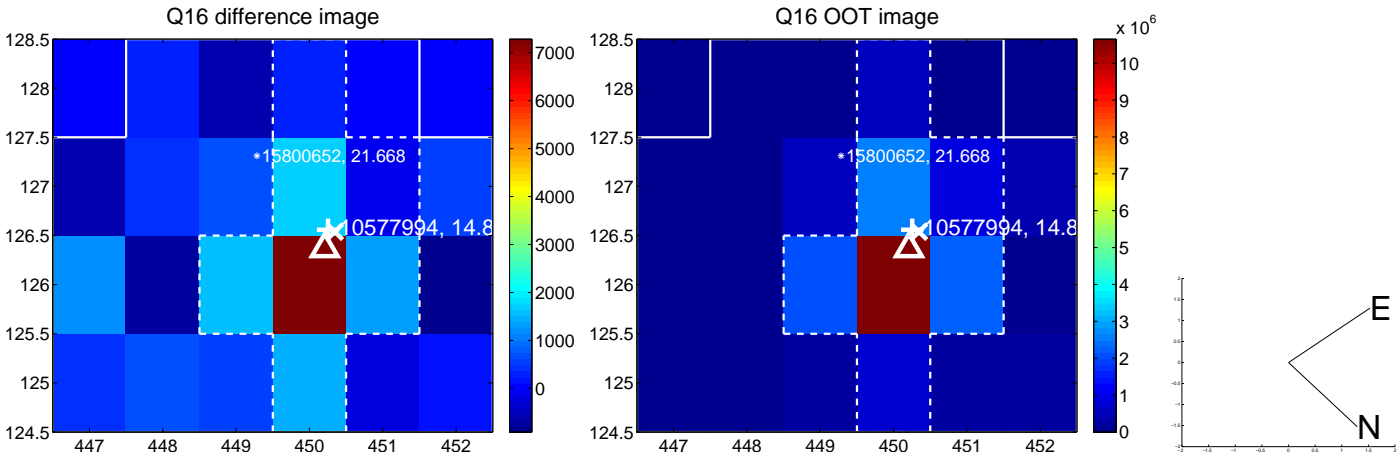
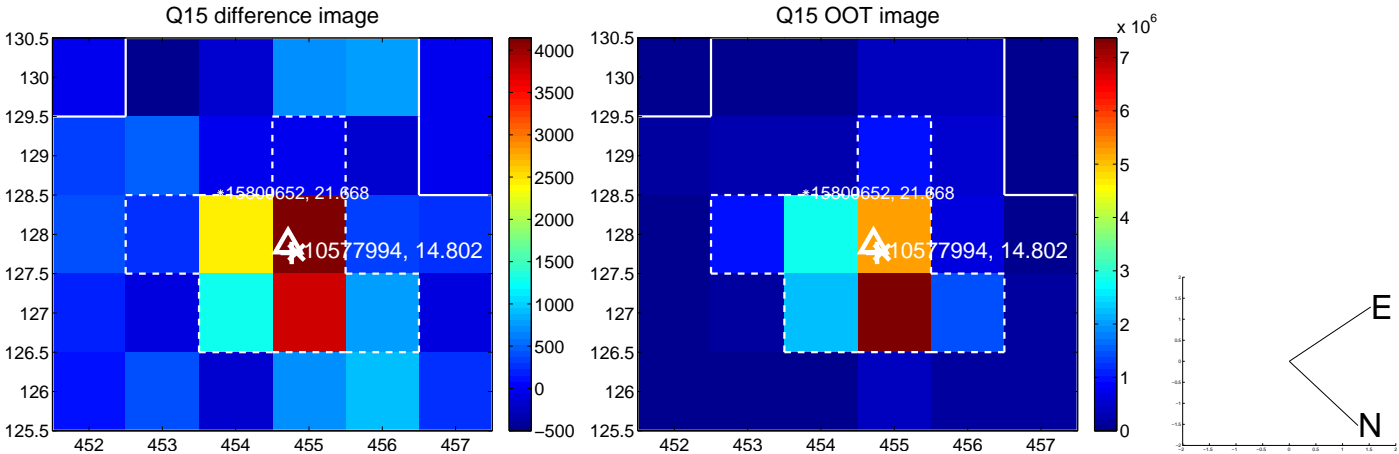
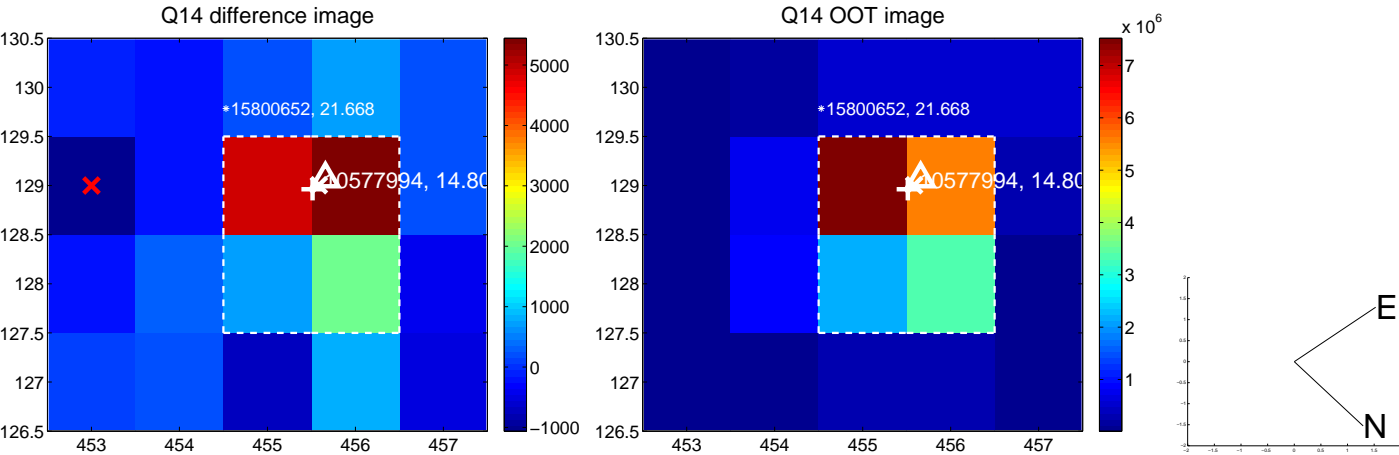
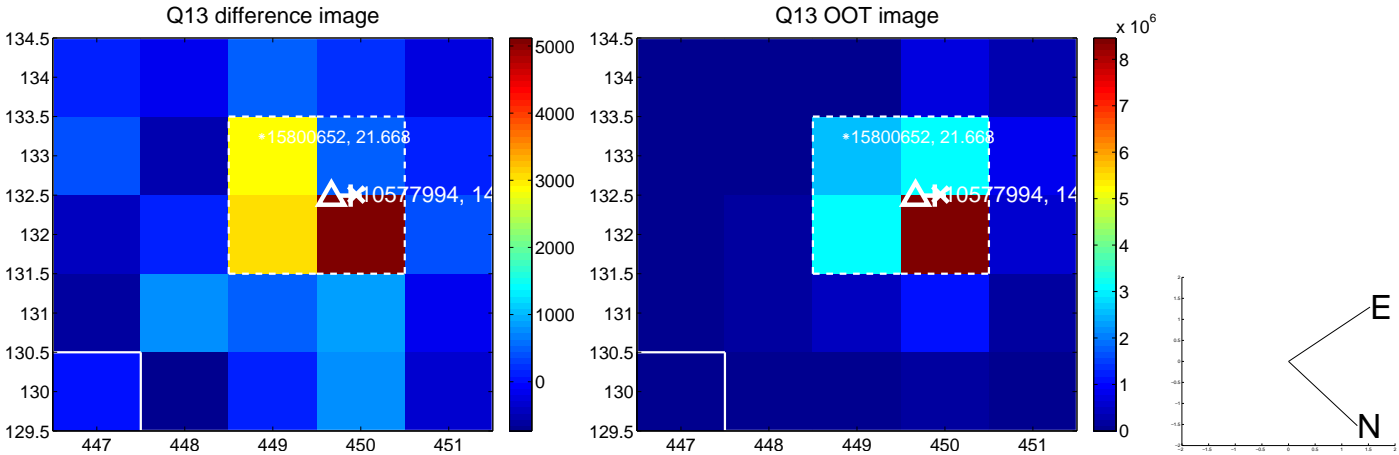
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



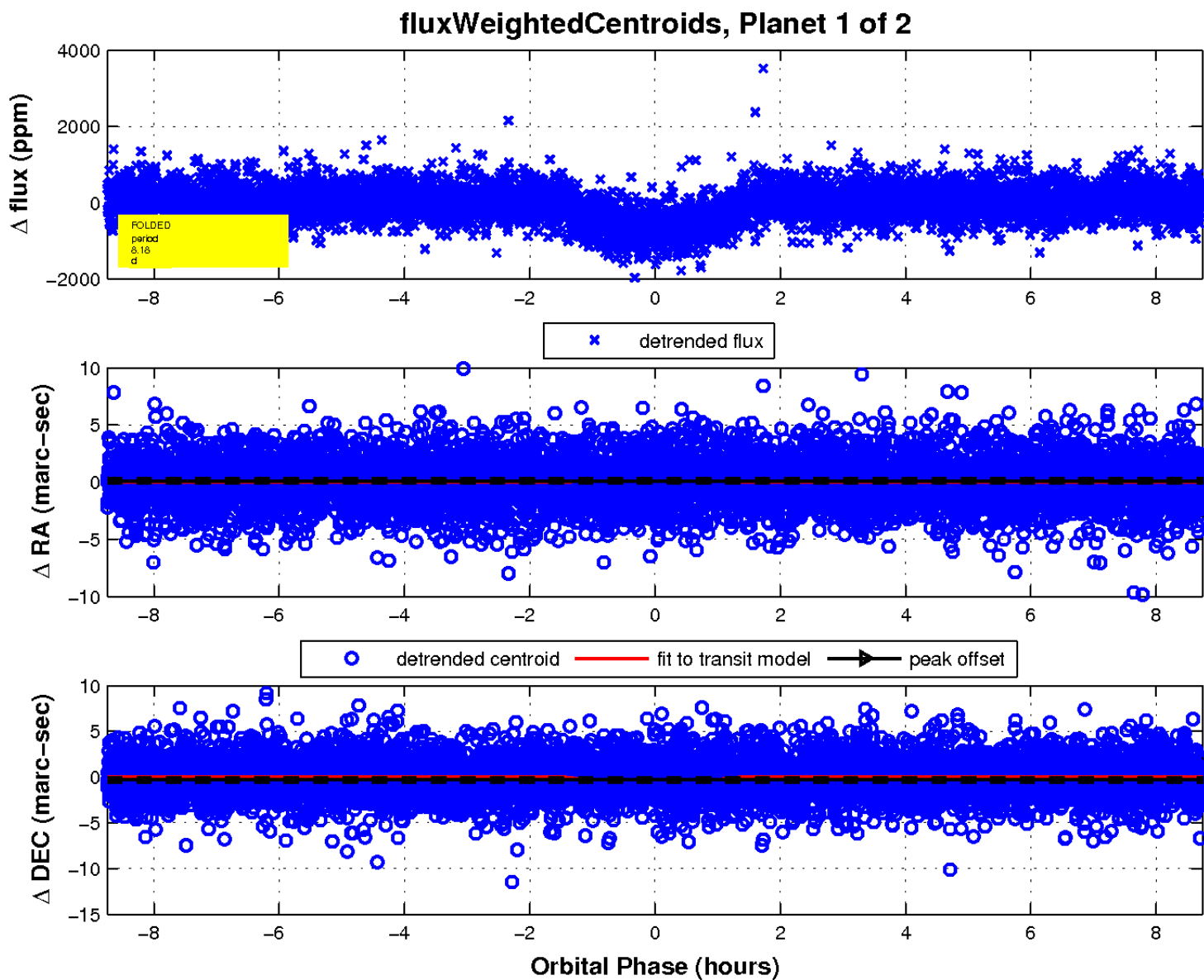
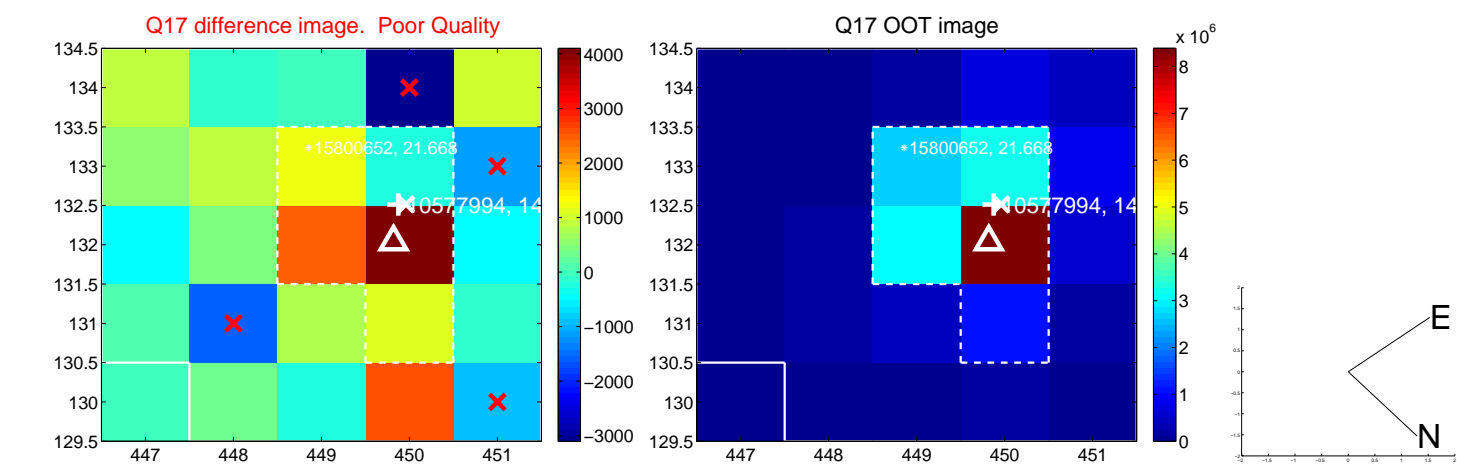
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

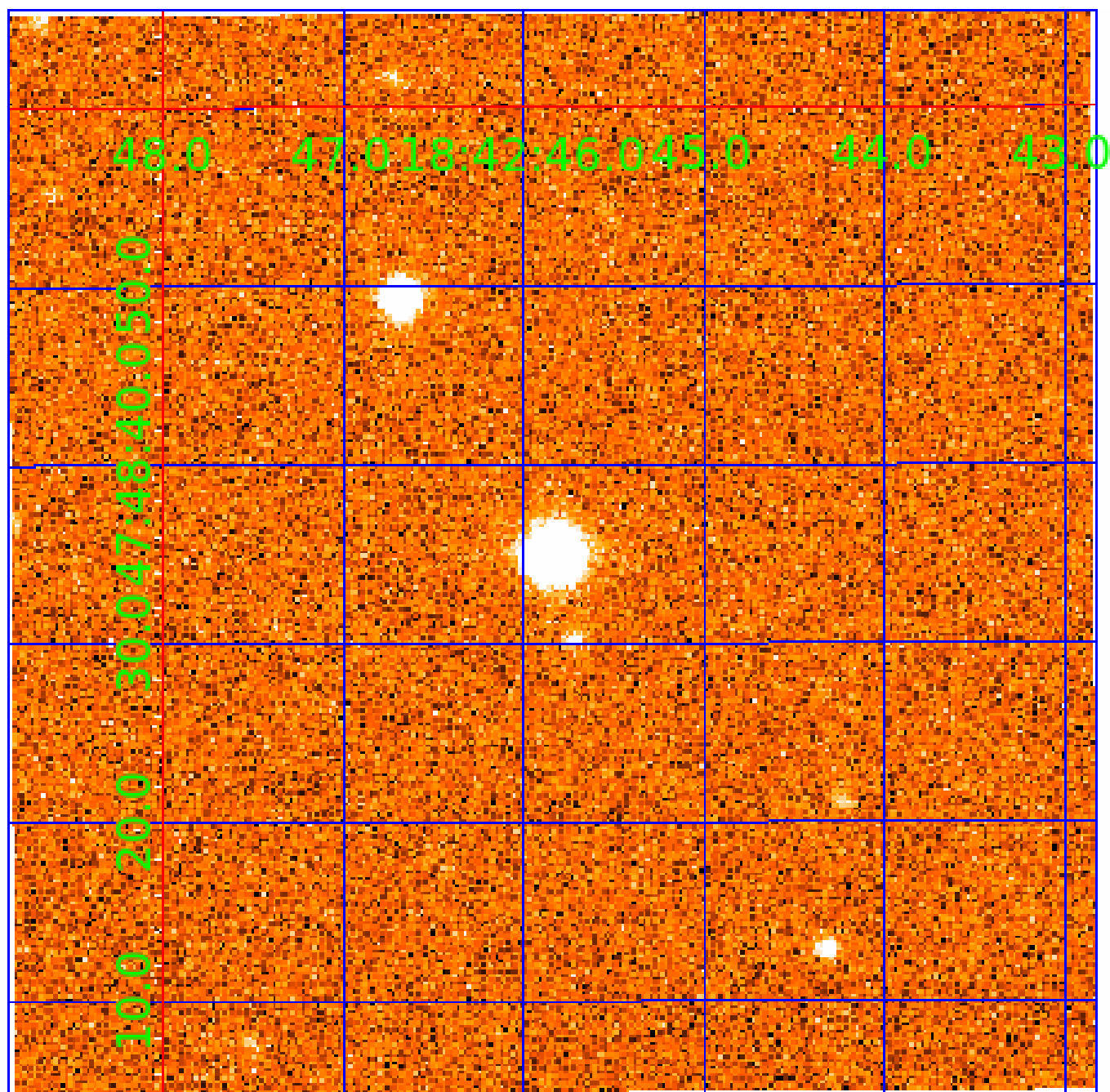


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010577994

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})
010577994-01	OBS	0475.01	8.180880	135.795375	706.4	2.914	39.2	43.6	0.77	5081	2.41	62.32
010577994-02	OBS	0475.02	15.312977	141.167908	845.2	3.199	36.3	39.9	0.77	5081	2.51	27.02

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010577994-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010577994-02	OBS	PC	1.00	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.

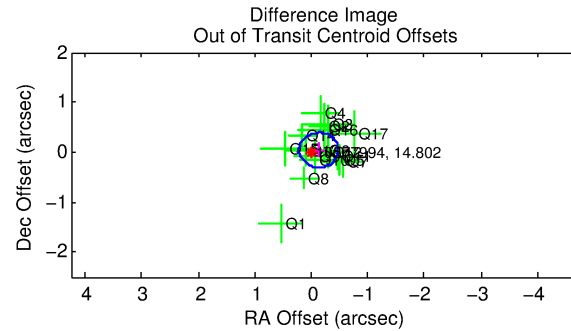
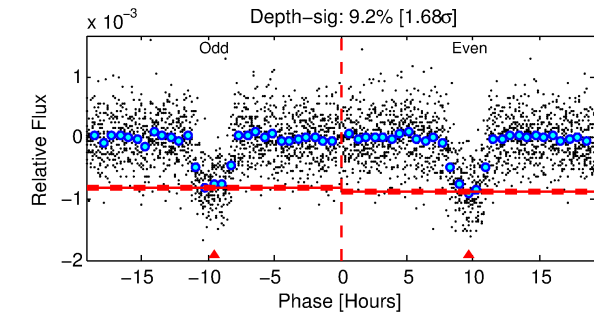
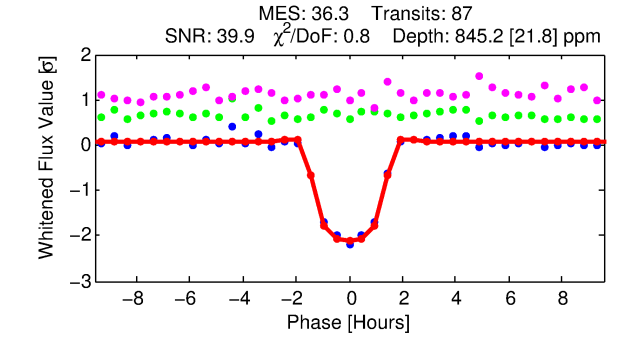
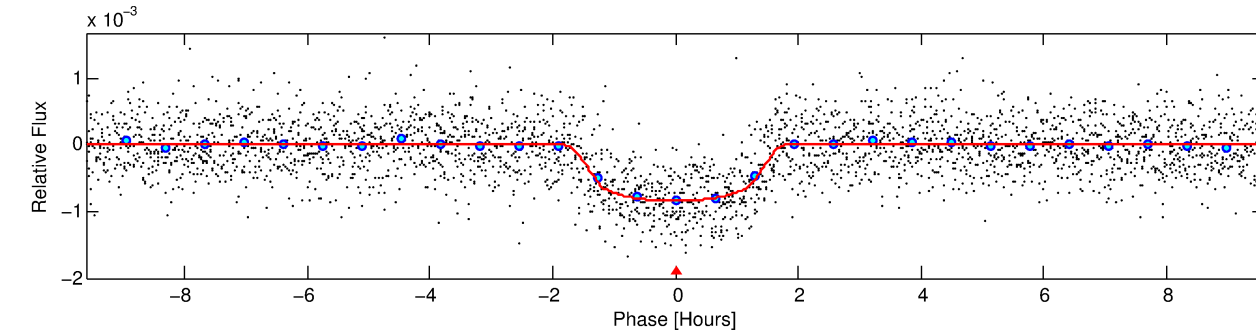
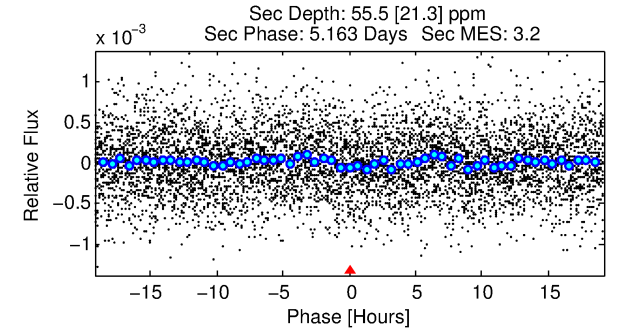
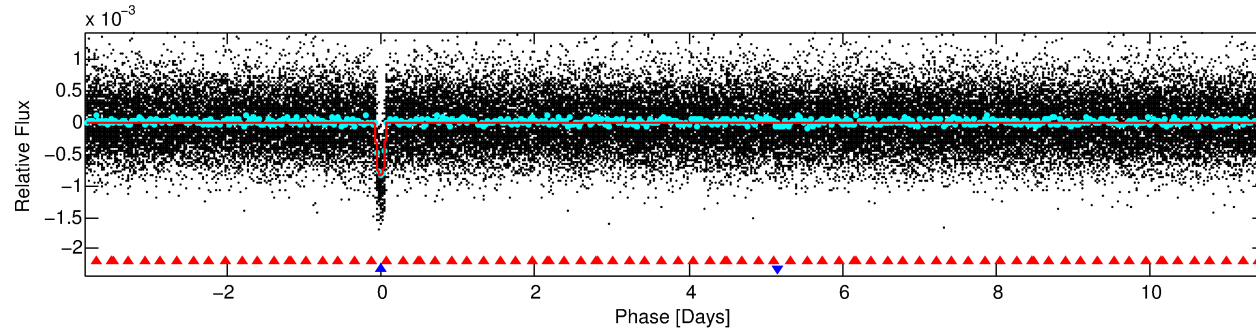
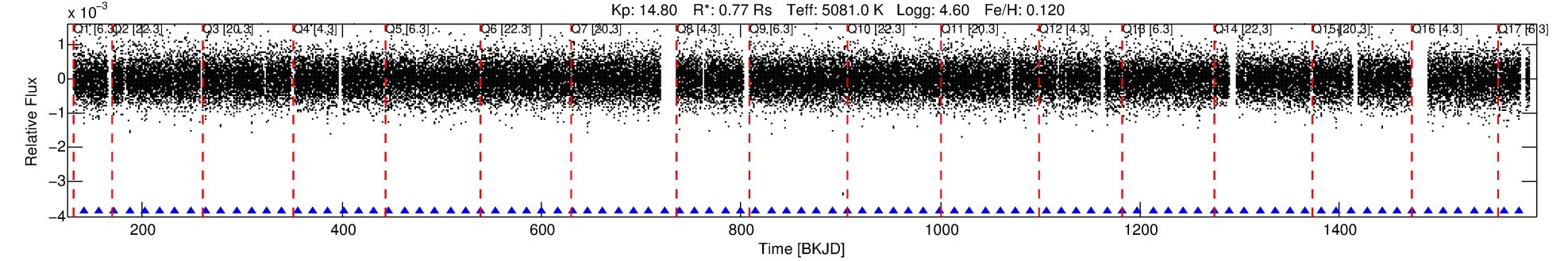
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010577994-02

No Significant Match Found

DV One-Page Summary

KIC: 10577994 Candidate: 2 of 2 Period: 15.313 d
KOI: K00475.02 Name: Kepler-165c Corr: 0.976



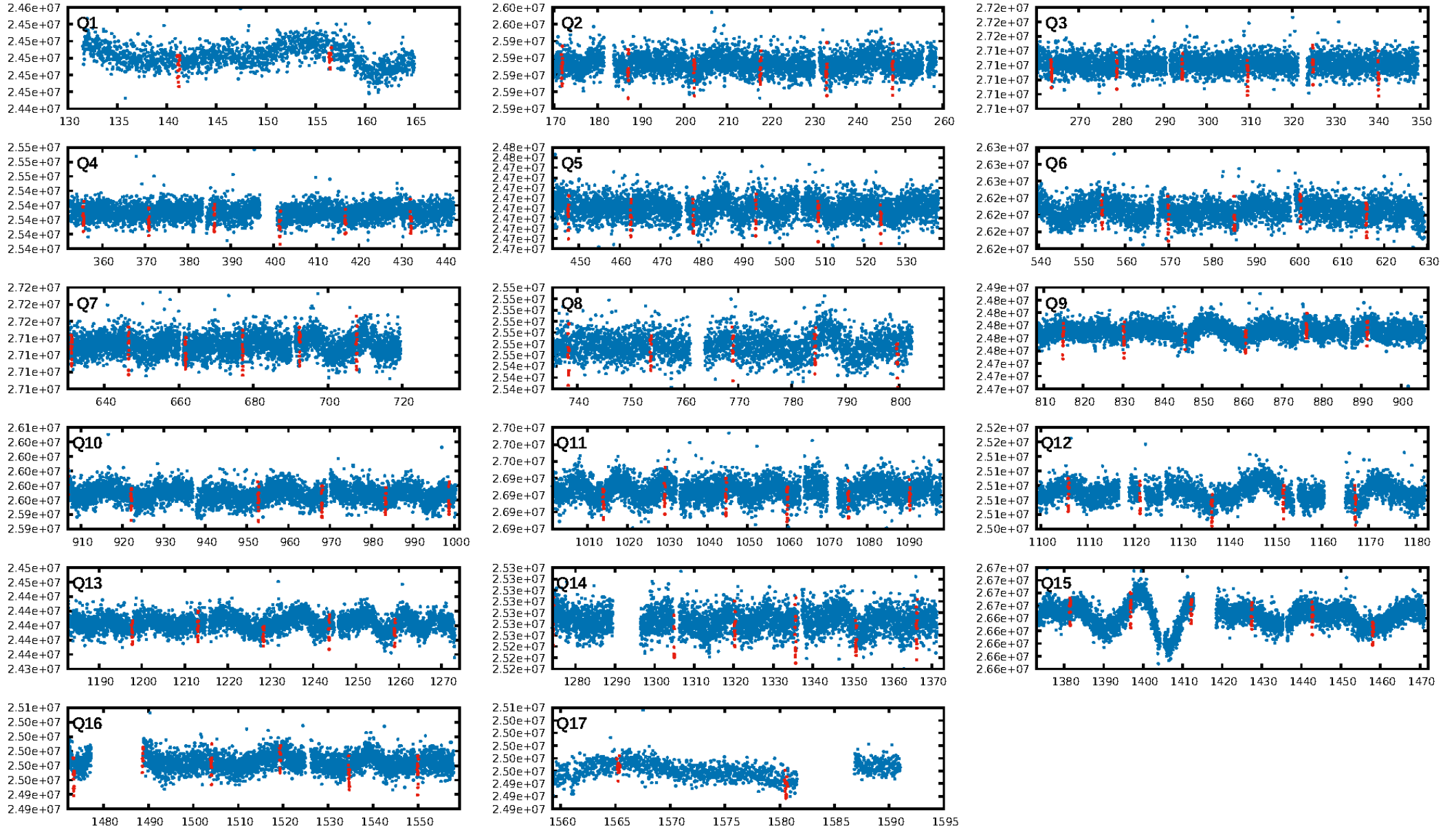
DV Fit Results:

Period = 15.31298 [0.00004] d
Epoch = 141.1679 [0.0018] BKJD
Rp/R* = 0.0298 [0.0065]
a/R* = 23.74 [18.52]
b = 0.80 [0.36]
Seff = 27.02 [3.60]
Teq = 581 [19] K
Rp = 2.51 [0.58] Re
a = 0.1145 [0.0085] AU
Ag = 63.60 [37.57] [1.67σ]
Teffp = 2538 [370] K [5.29σ]

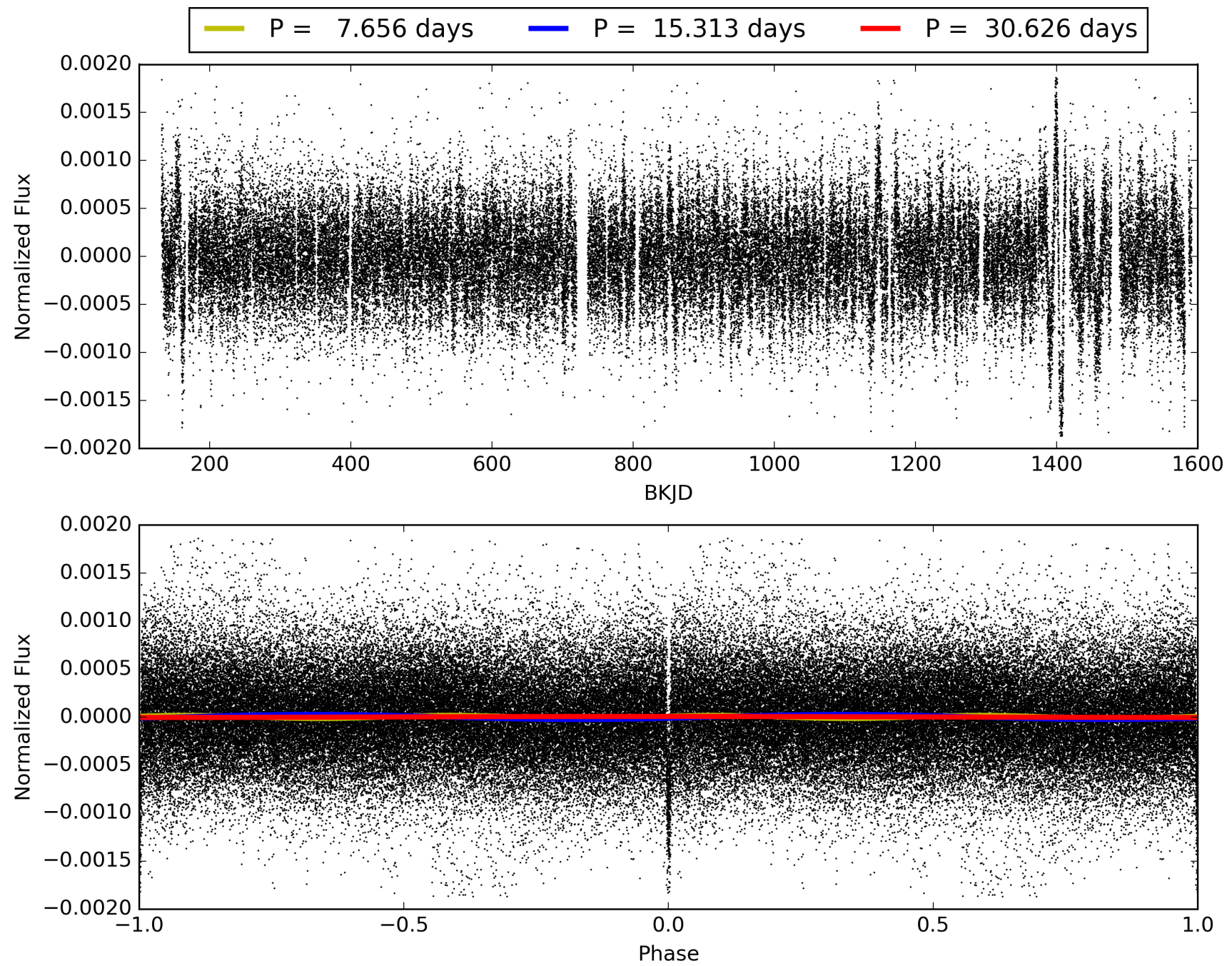
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [39.55σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 93.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.80e-280
RollingBand-fgt: 1.00 [83/83]
GhostDiagnostic-chr: 9.563
Centroid-sig: 0.0%
Centroid-so: 0.730 arcsec [1.99σ]
OotOffset-rm: 0.135 arcsec [1.16σ]
KicOffset-rm: 0.373 arcsec [3.49σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 010577994-02, PDC Light Curves

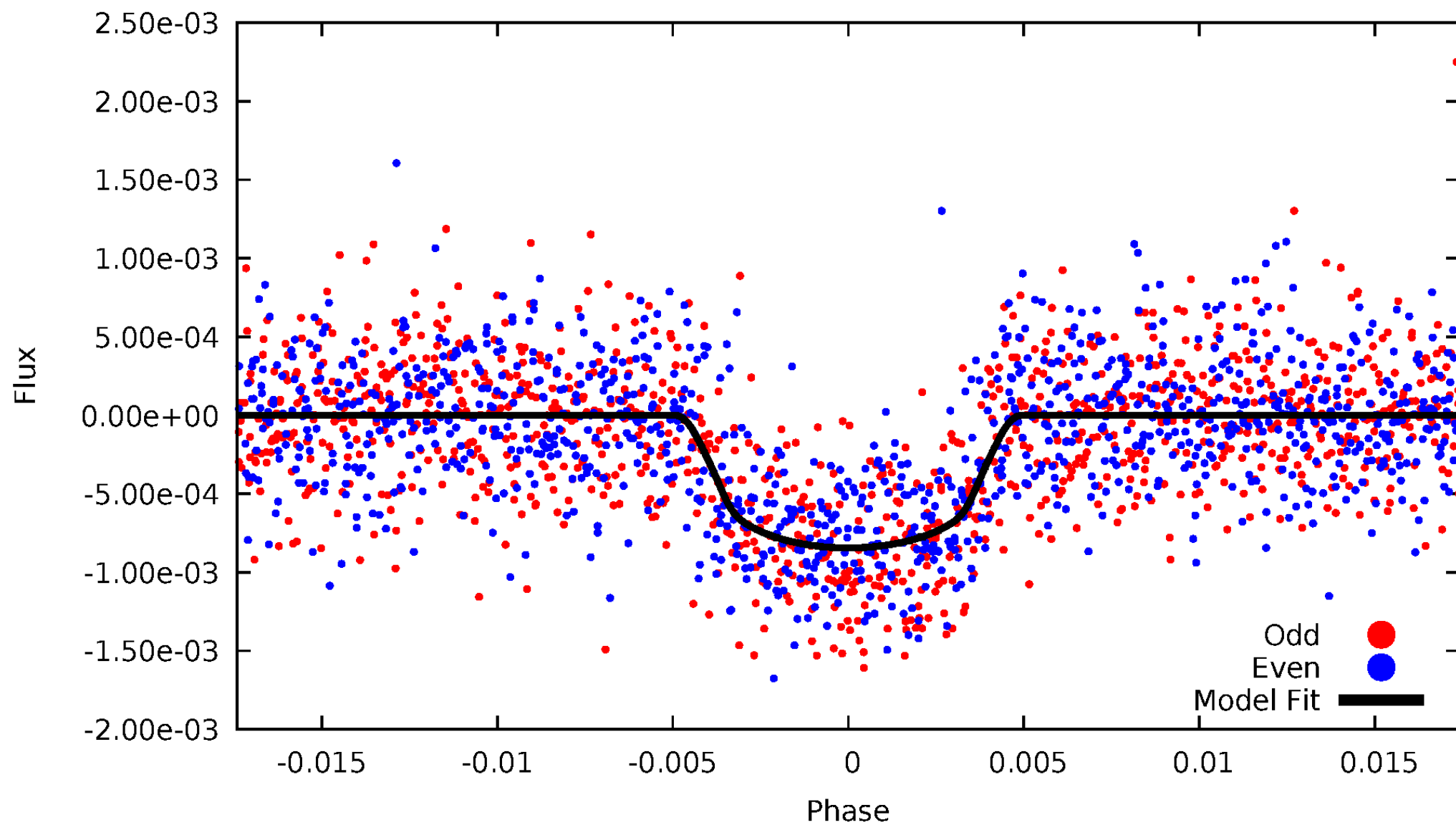


TCE 010577994-02



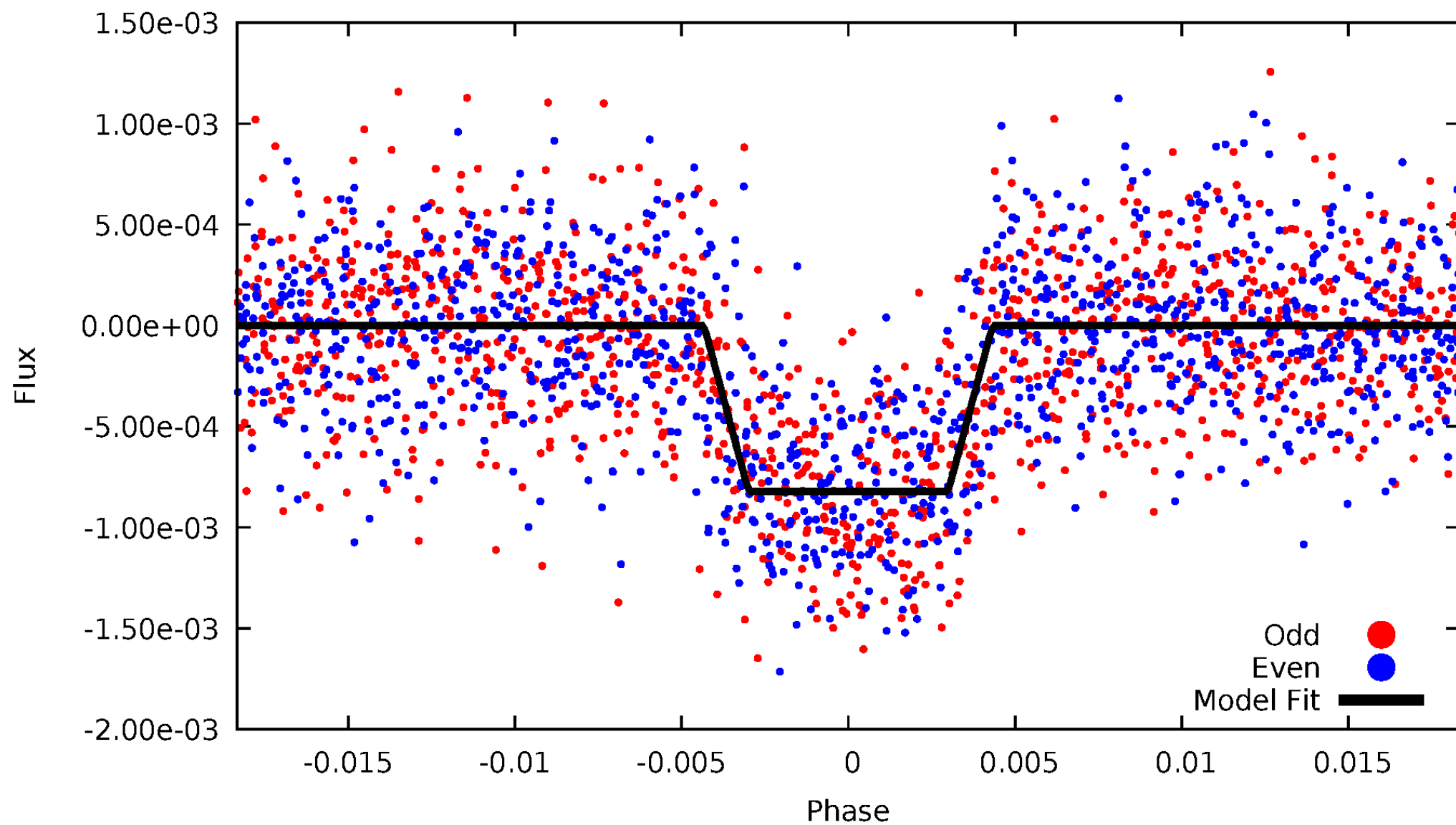
DV Odd/Even

TCE 010577994-02



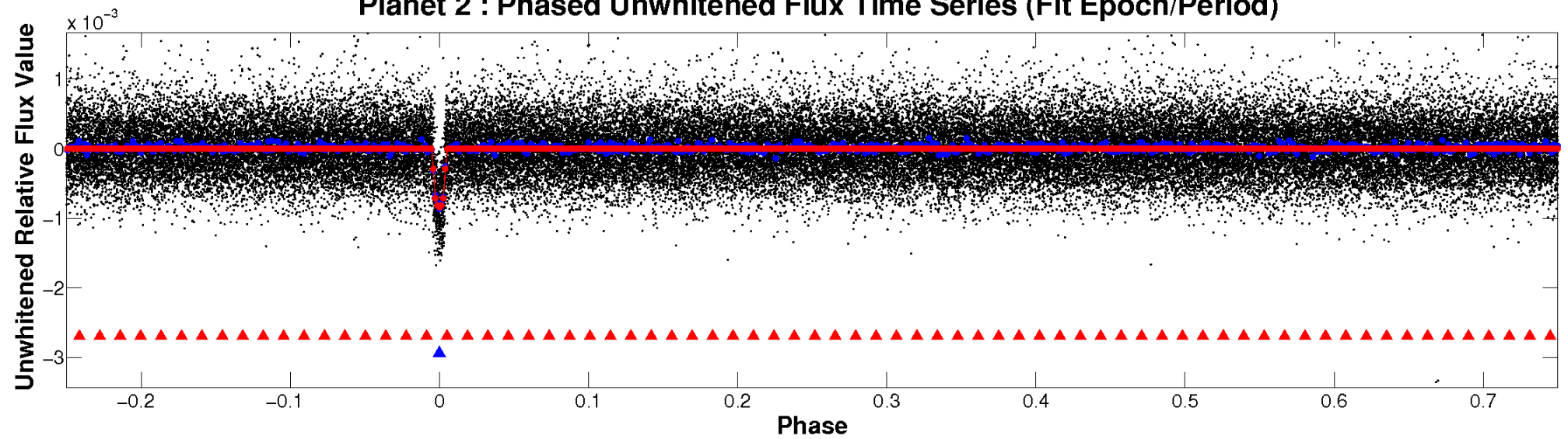
ALT Odd/Even

TCE 010577994-02

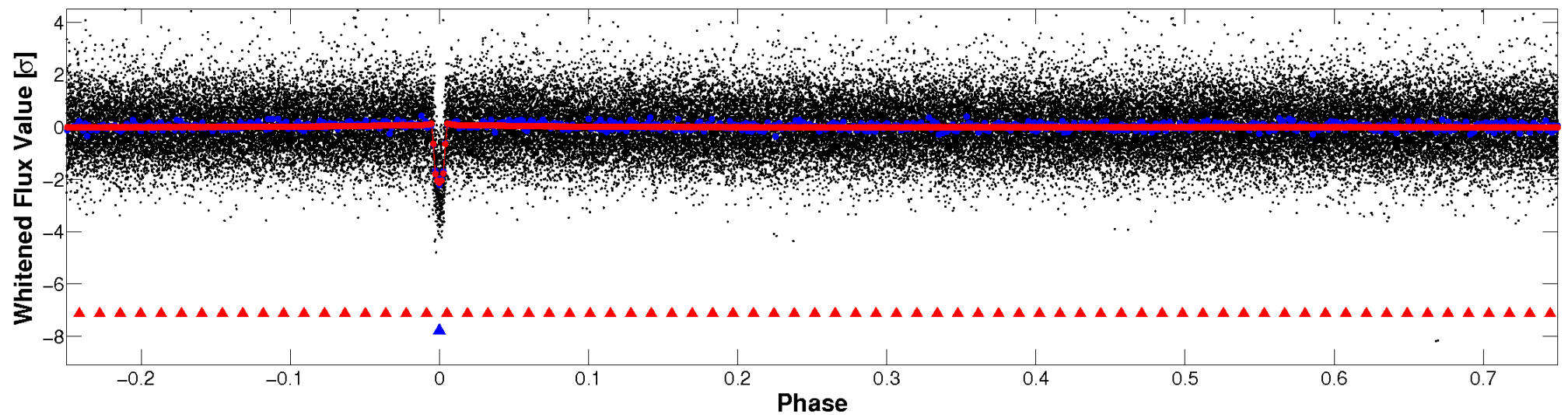


Non-Whitened Vs. Whitened Light Curve

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

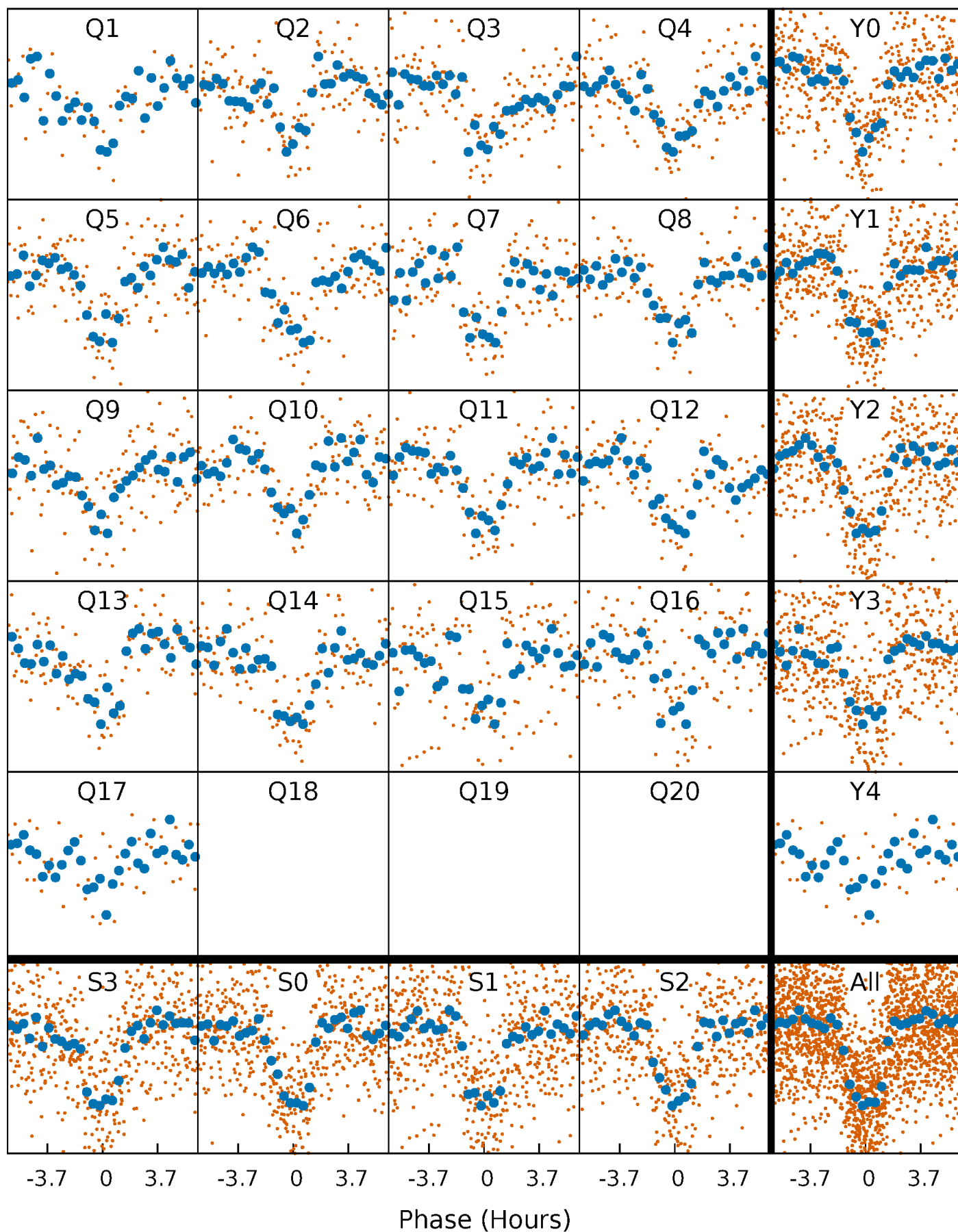


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



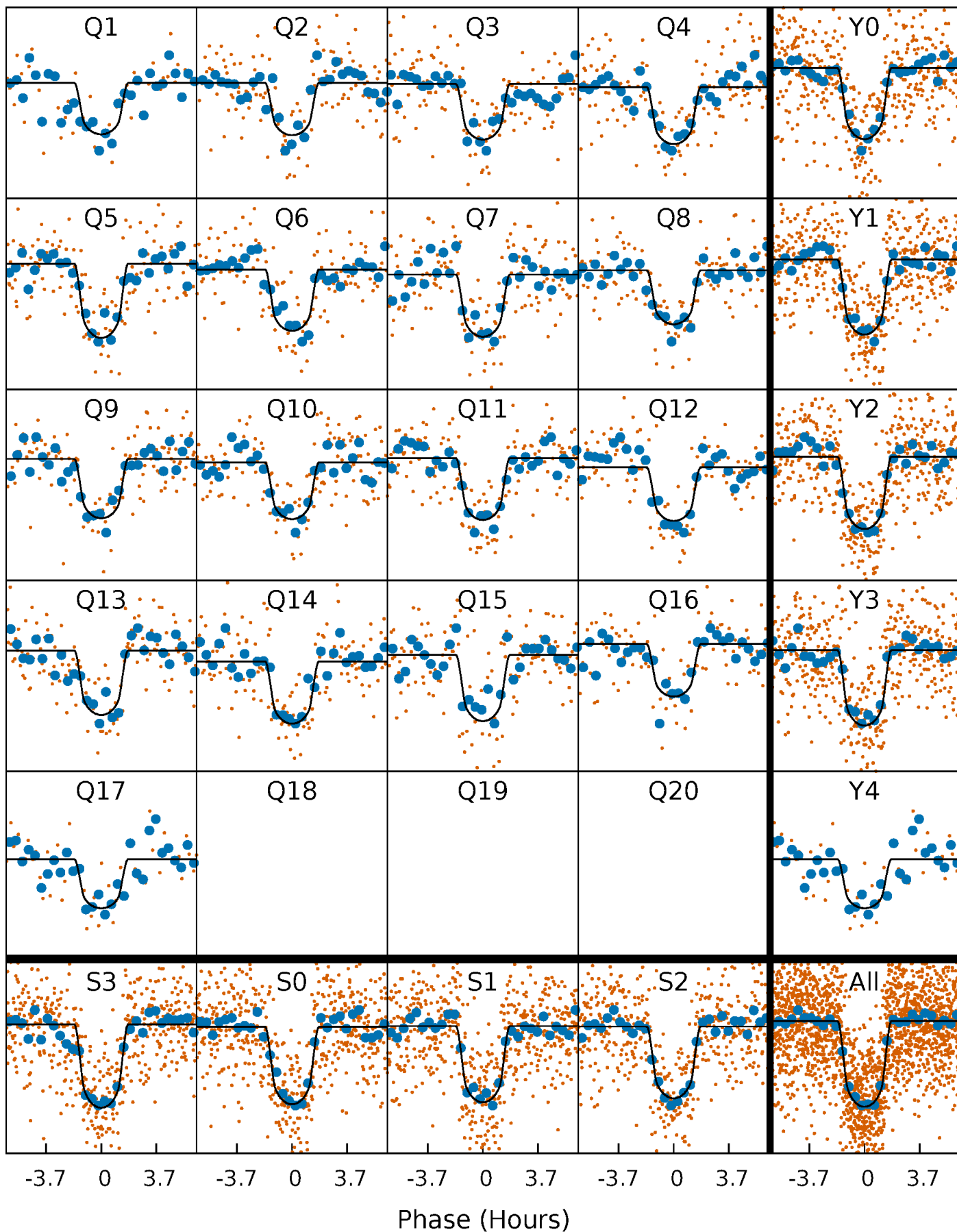
PDC Quarter-Phased Transit Curves

TCE 010577994-02 P= 15.312977 Days $T_0=141.167908$ (BKJD)



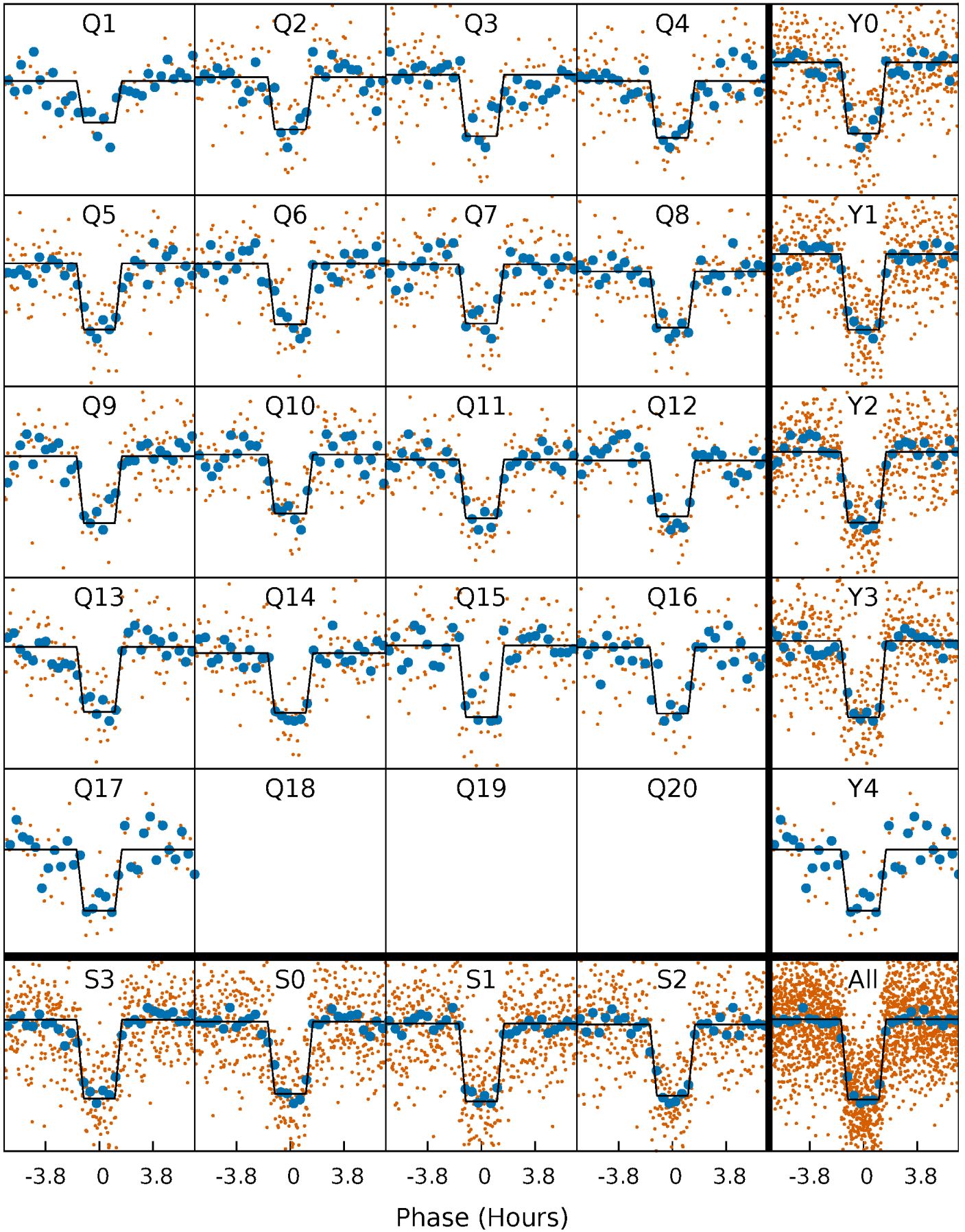
DV Quarter-Phased Transit Curves

TCE 010577994-02 P= 15.312977 Days $T_0=141.167908$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

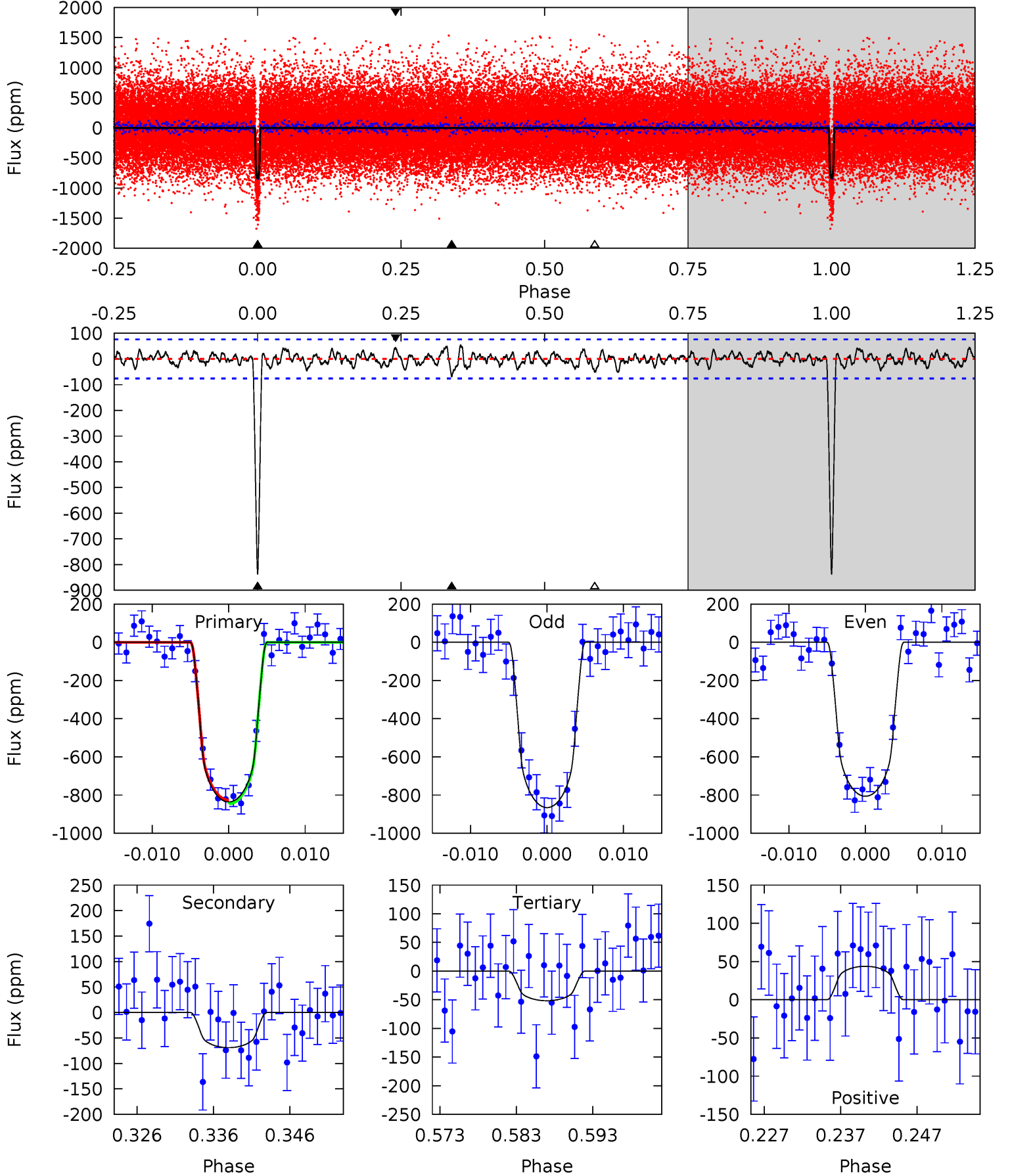
TCE 010577994-02 P= 15.312956 Days $T_0=141.168676$ (BKJD)



DV Model-Shift Uniqueness Test

010577994-02, $P = 15.312977$ Days, $E = 125.854931$ Days

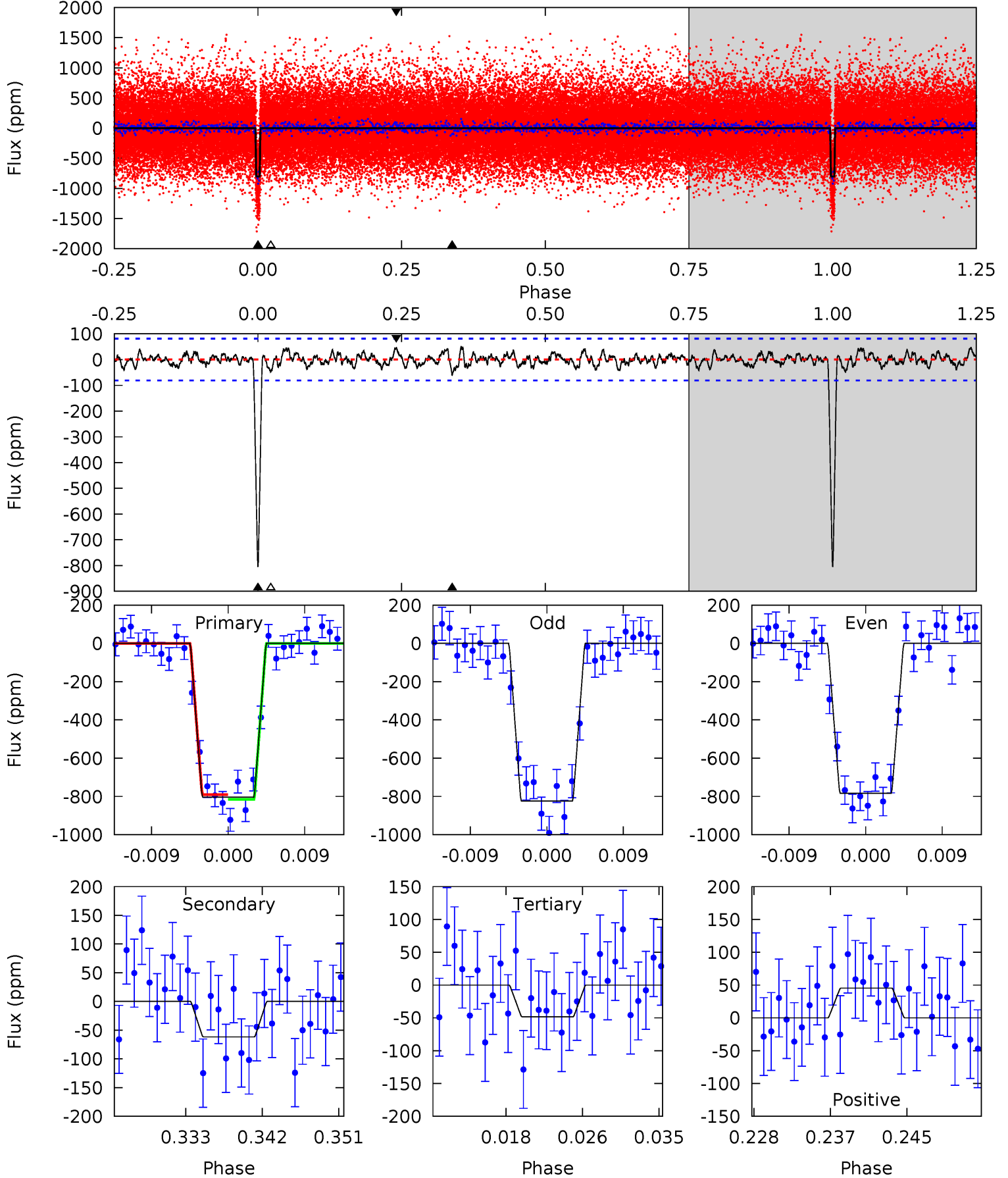
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
55.3	4.56	3.42	2.90	5.03	2.58	1.22	51.9	52.4	1.14	1.67	1.97	1.01	0.06	0.63



Alt Model-Shift Uniqueness Test

010577994-02, $P = 15.312956$ Days, $E = 125.855720$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
50.0	3.85	3.01	2.83	5.05	2.62	1.10	47.0	47.2	0.83	1.02	1.26	1.01	0.06	0.79



Stellar Parameters For KIC 010577994

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5081^{+71}_{-81}	$4.596^{+0.012}_{-0.068}$	$0.120^{+0.150}_{-0.150}$	$0.770^{+0.061}_{-0.028}$	$0.864^{+0.026}_{-0.057}$	$2.663^{+0.165}_{-0.570}$
	+1%/-2%	+0%/-1%	+125%/-125%	+8%/-4%	+3%/-7%	+6%/-21%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 010577994-02 / KOI 0475.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-69 ± 15	$2.56^{+0.58}_{-0.55}$	821^{+20}_{-16}	3218^{+279}_{-198}	75^{+49}_{-28}
Alt.	-62 ± 16	$2.41^{+0.59}_{-0.54}$	820^{+19}_{-15}	3221^{+291}_{-243}	75^{+58}_{-31}

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

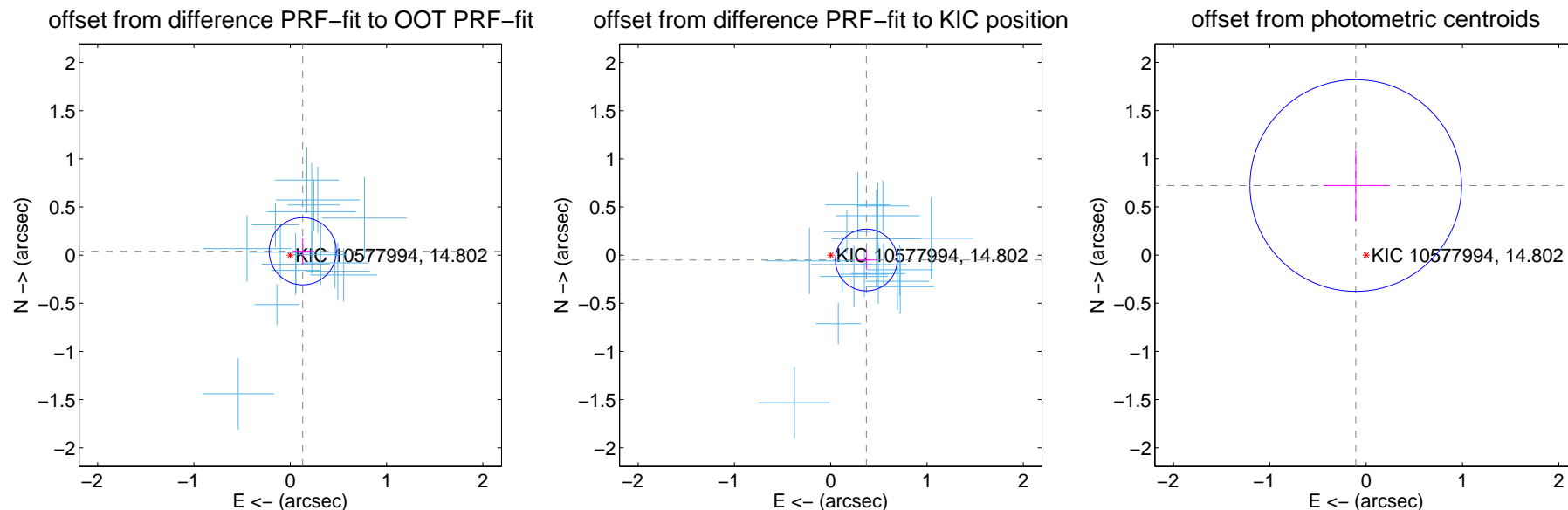
DV Centroid Data

Supplemental centroid analysis for 010577994-02. Kepler magnitude: 14.80. Transit SNR 39.87

There are 17 quarters with good PRF difference image offsets

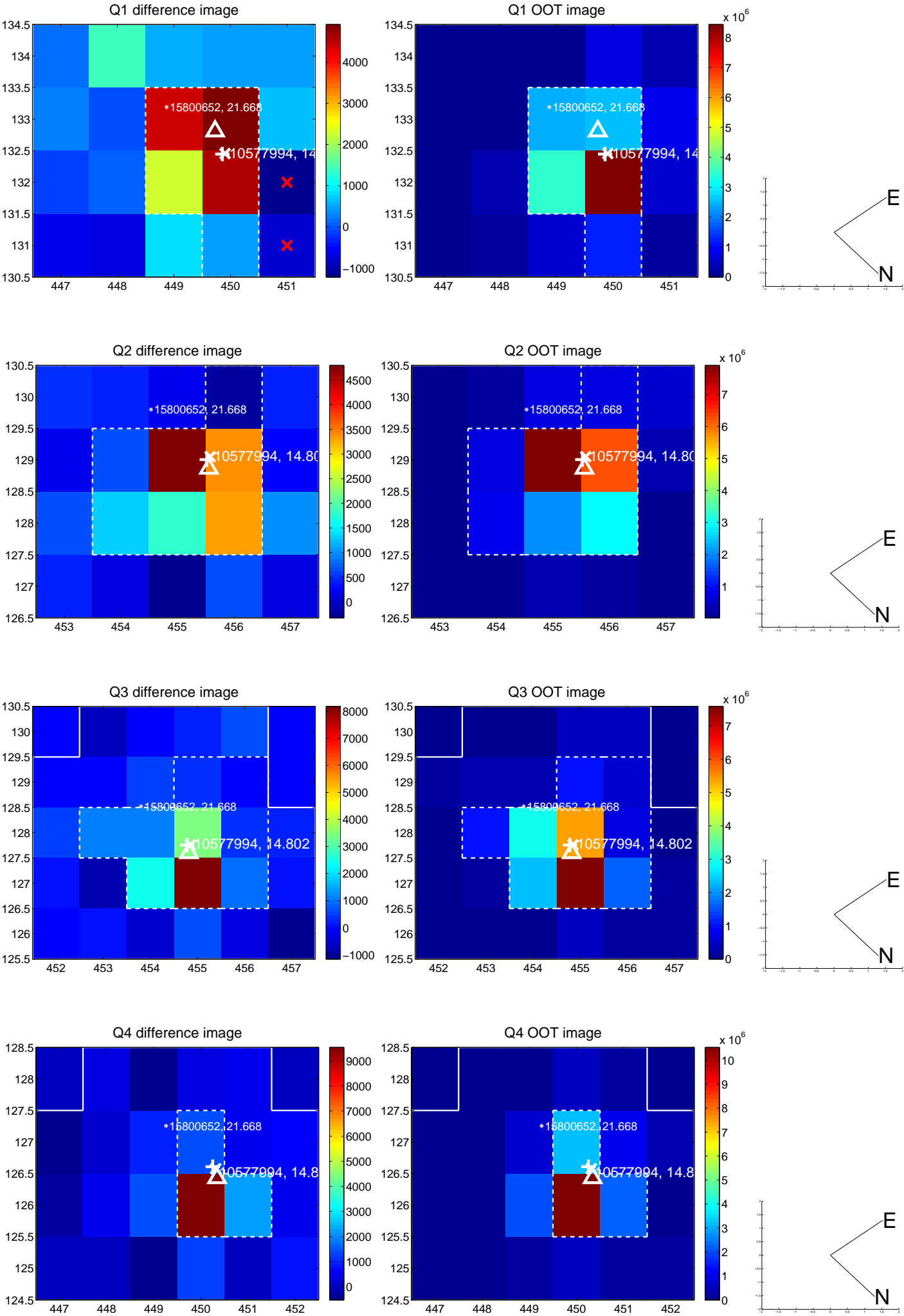
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.135 ± 0.116	1.16	-0.129 ± 0.103	0.040 ± 0.134
PRF-fit source offset from KIC position	0.373 ± 0.107	3.49	-0.370 ± 0.107	-0.050 ± 0.102
photometric centroid source offset	0.73 ± 0.37	1.99	0.11 ± 0.34	0.72 ± 0.37

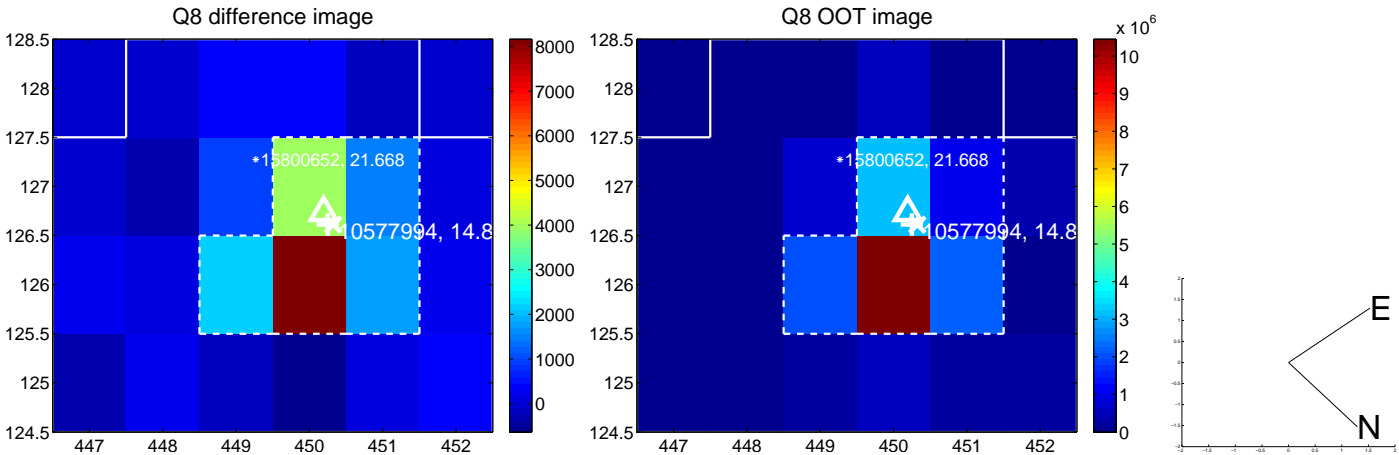
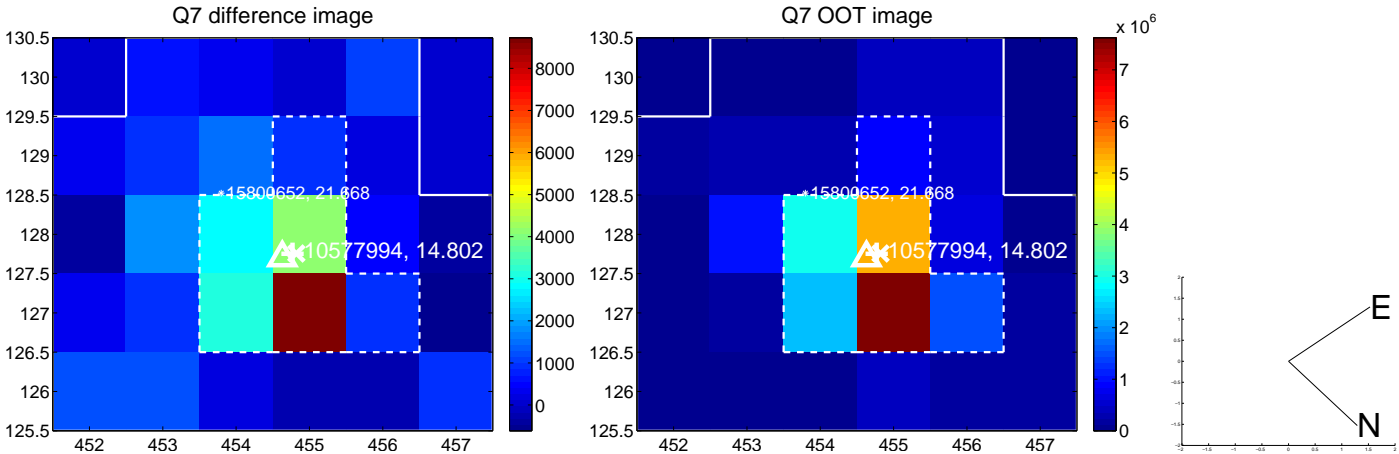
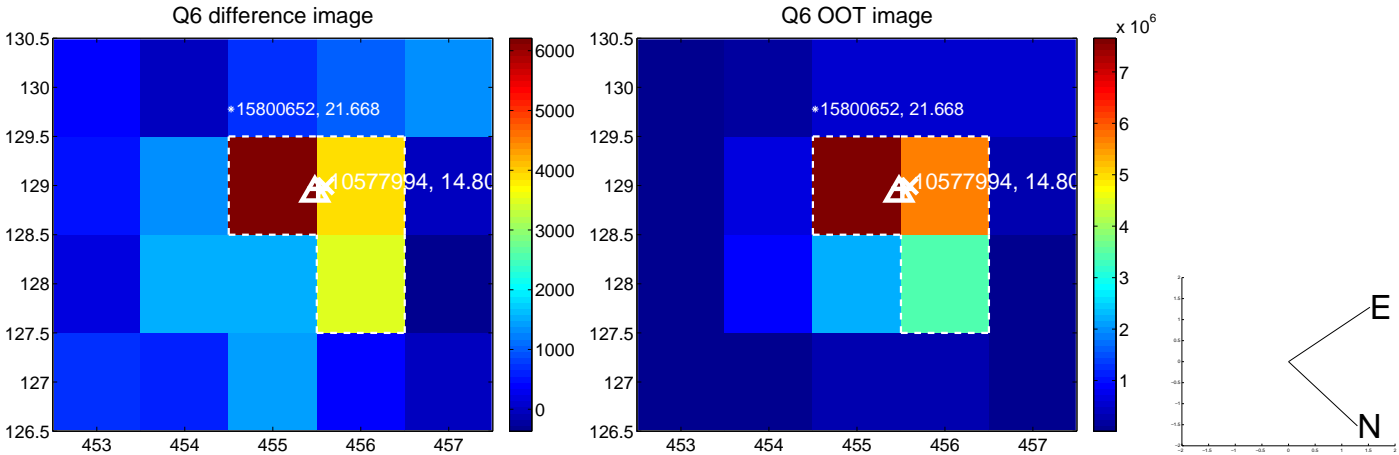
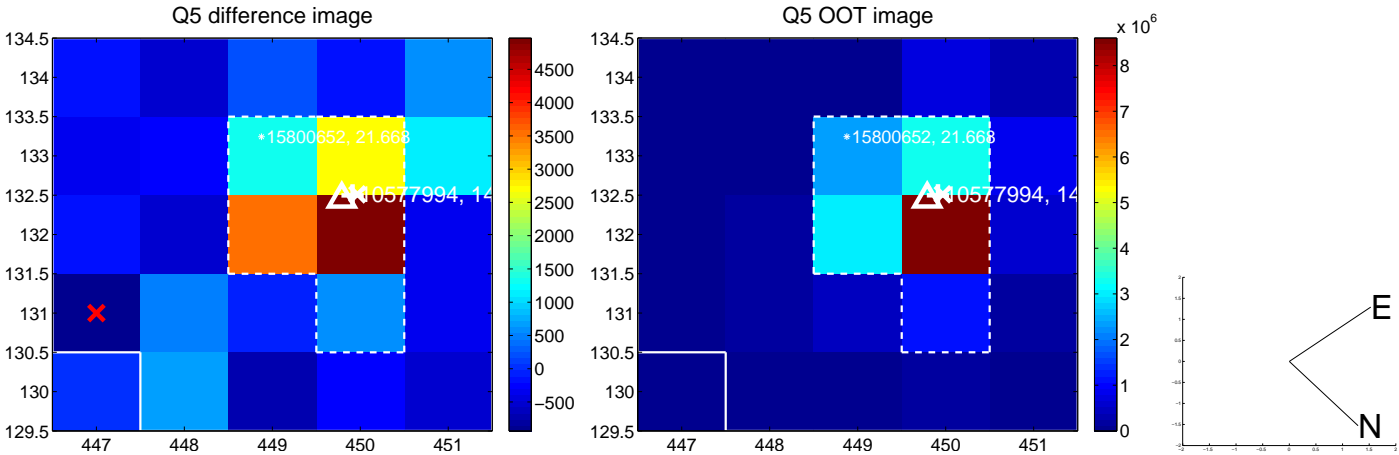


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

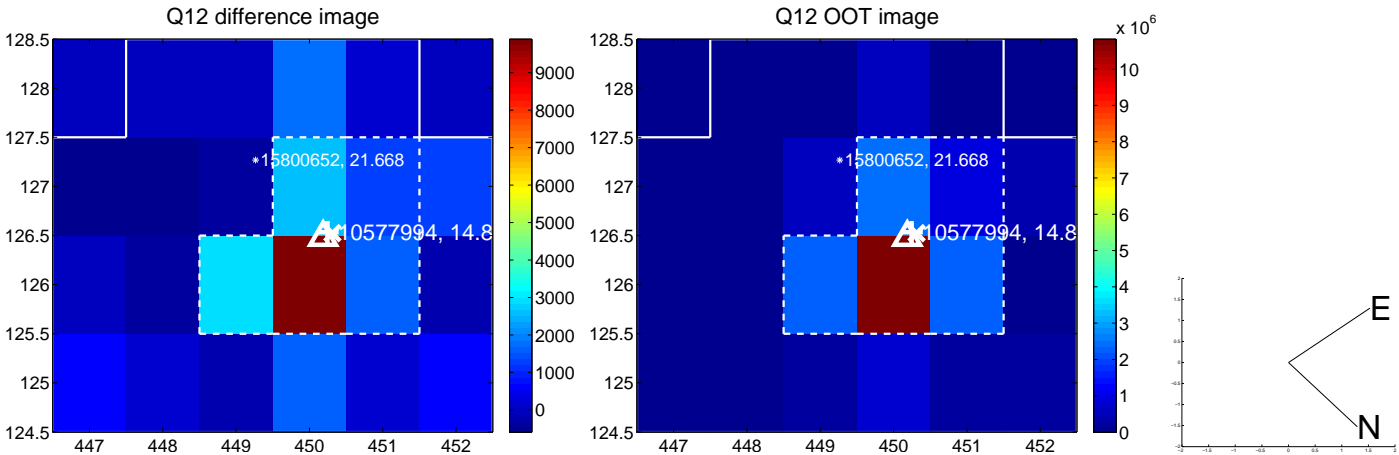
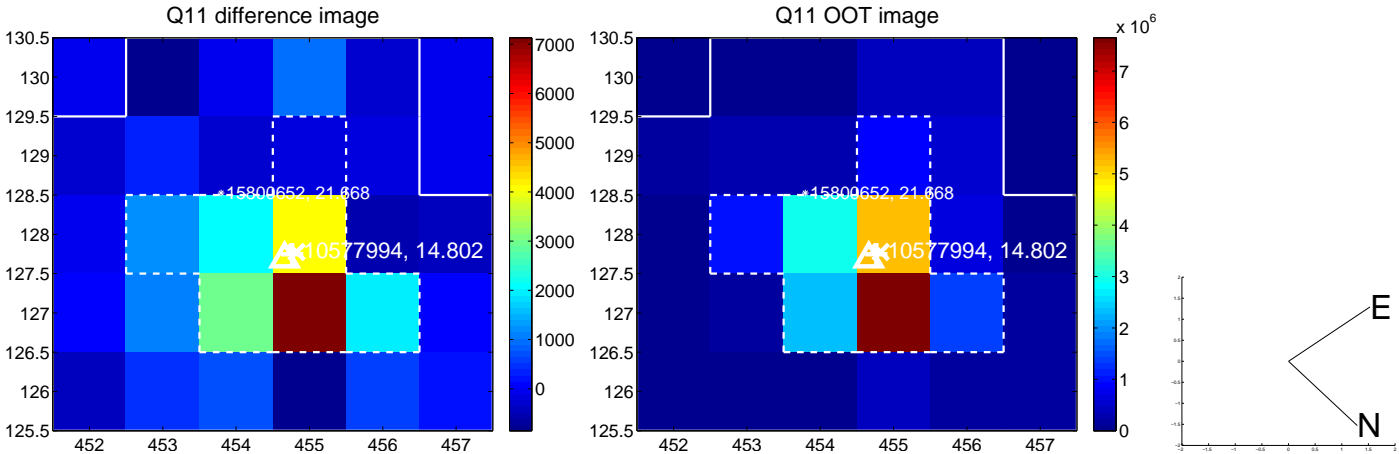
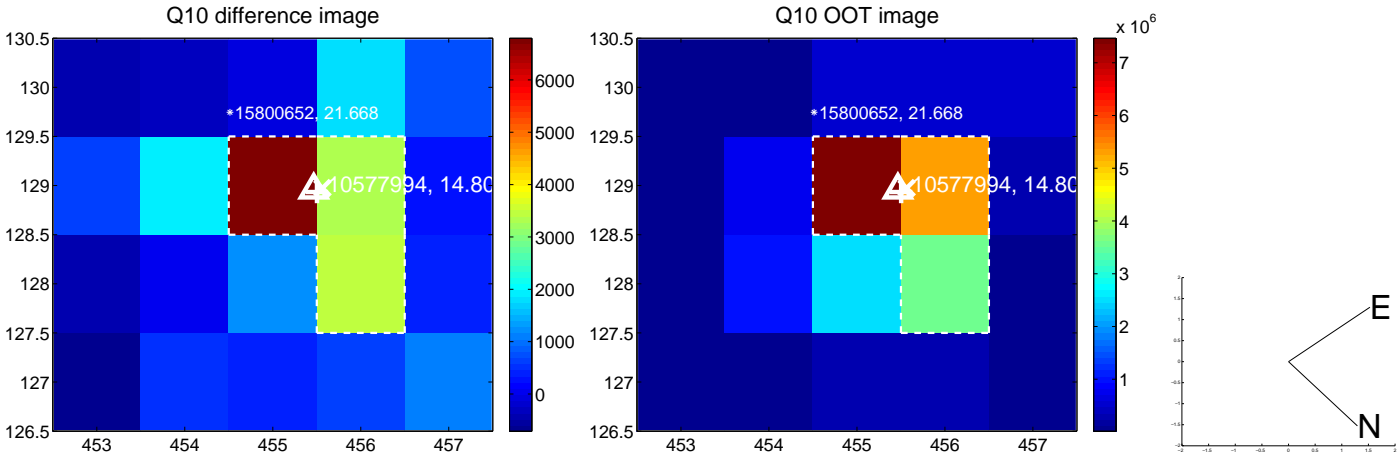
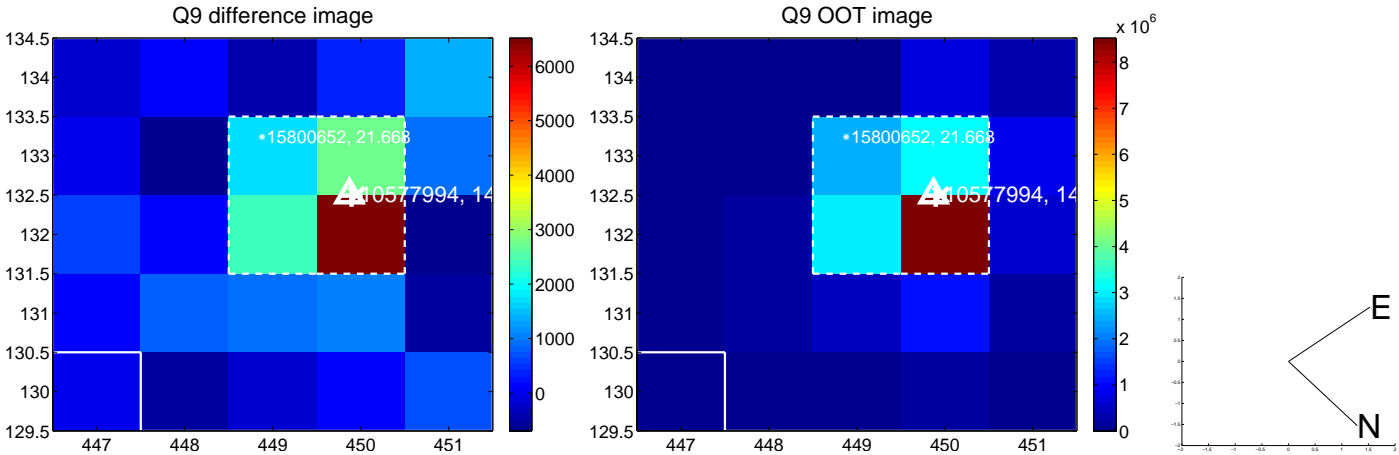
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



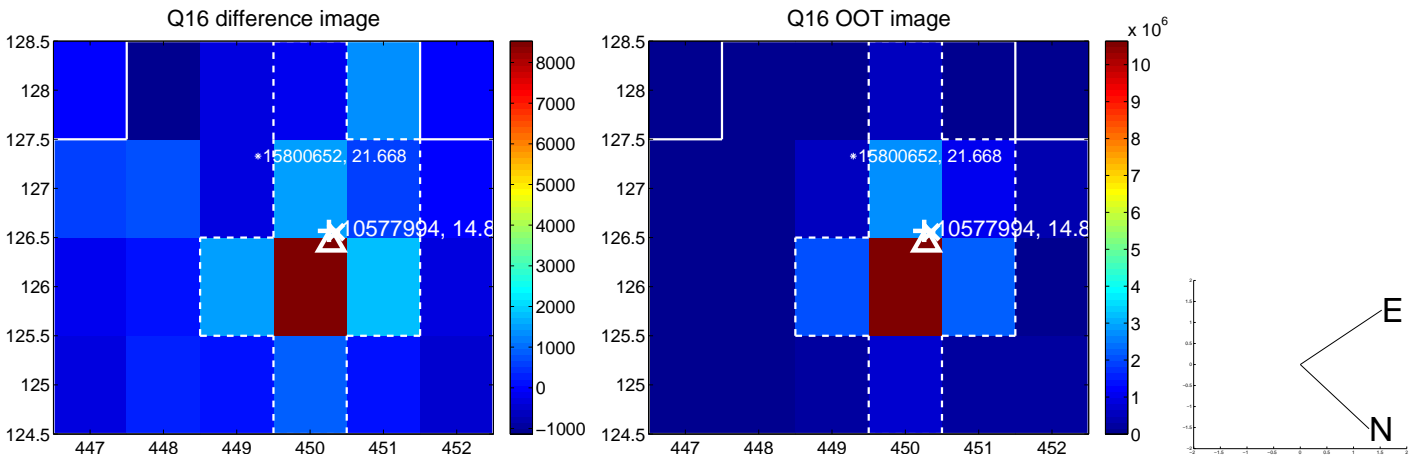
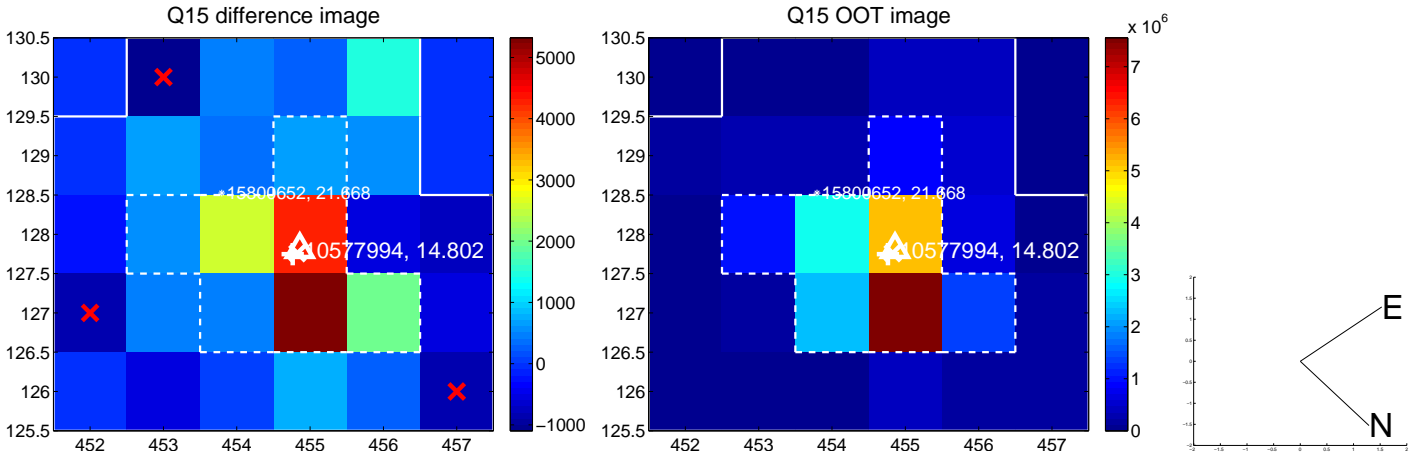
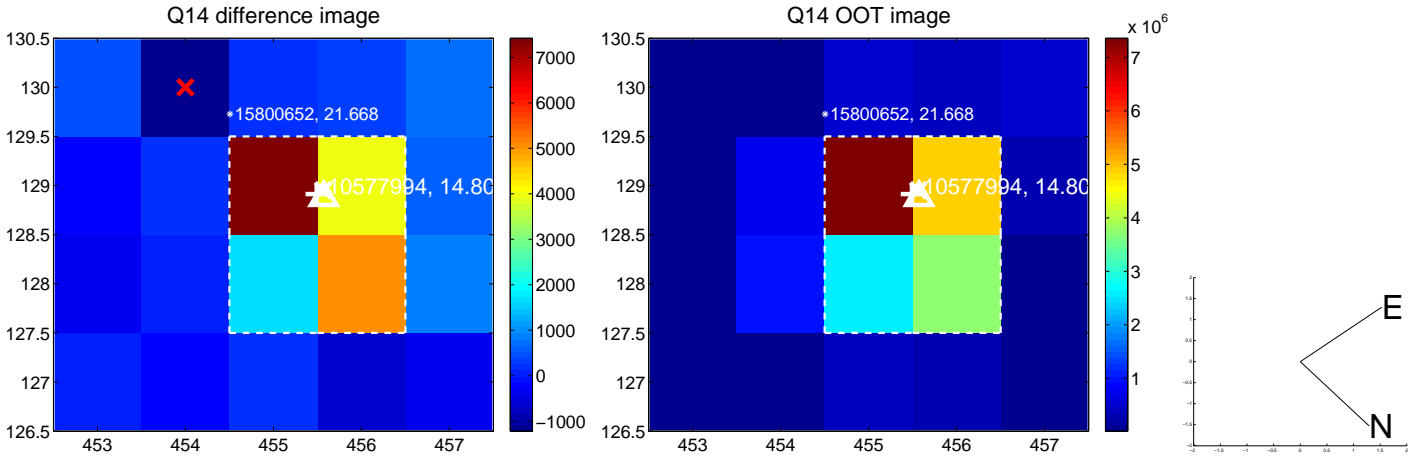
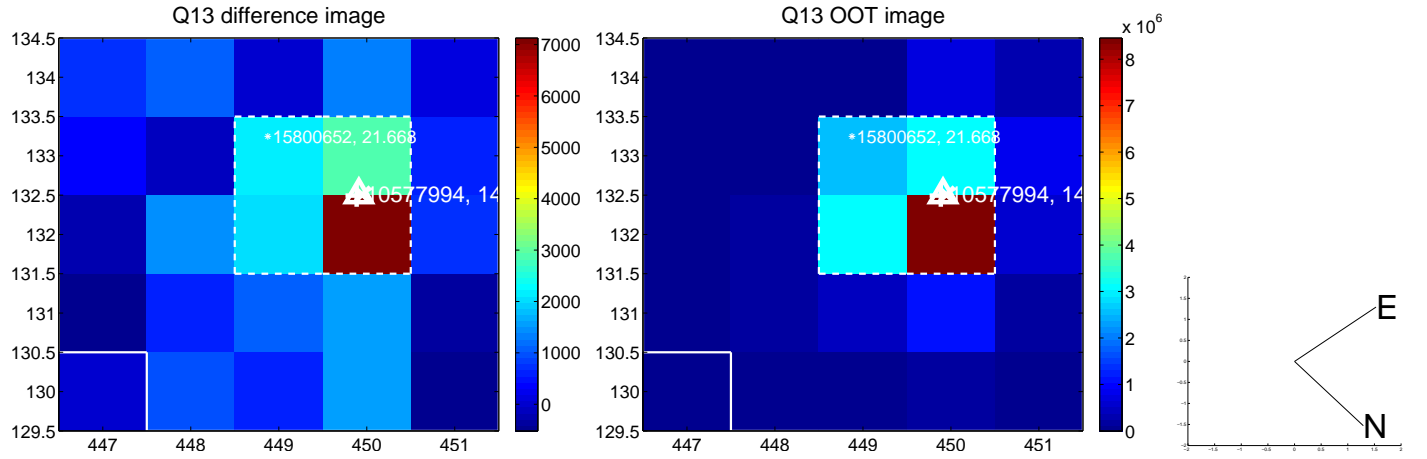
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



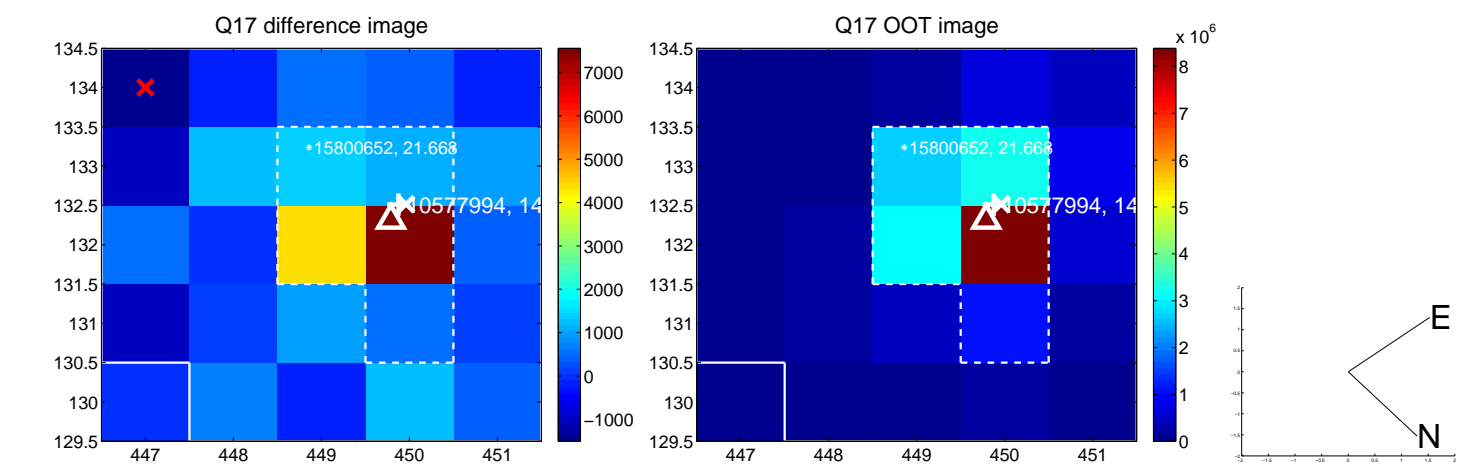
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



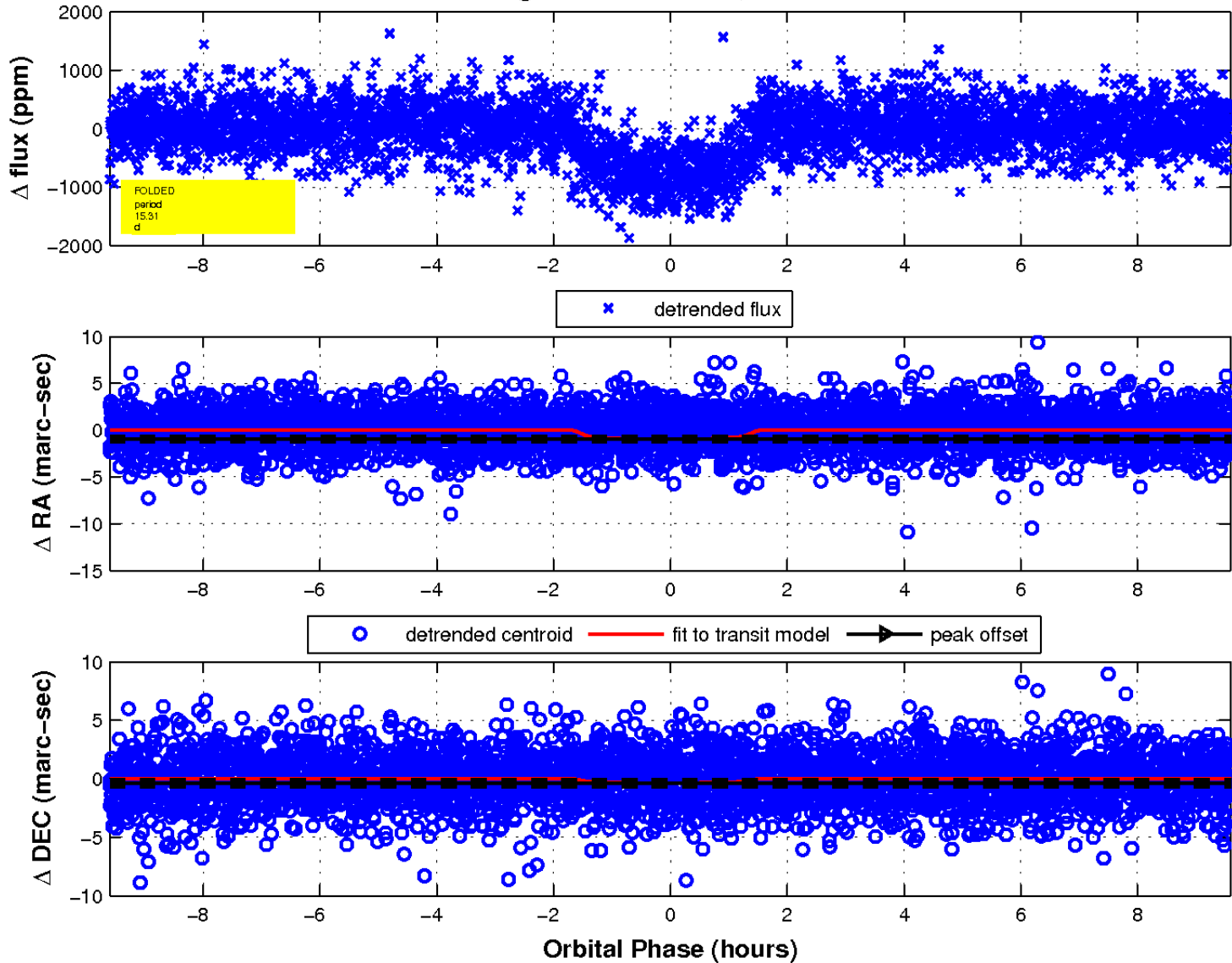
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

