

KIC 009071593

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})
009071593-01	OBS	2257.01	32.563410	163.461533	575.7	5.515	21.9	22.9	0.86	5225	2.22	13.66
009071593-02	OBS	2257.02	59.284128	148.733797	370.8	6.679	10.7	11.7	0.86	5225	1.88	6.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009071593-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009071593-02	OBS	PC	0.51	0	0	0	0	CENT_KIC_POS

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

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

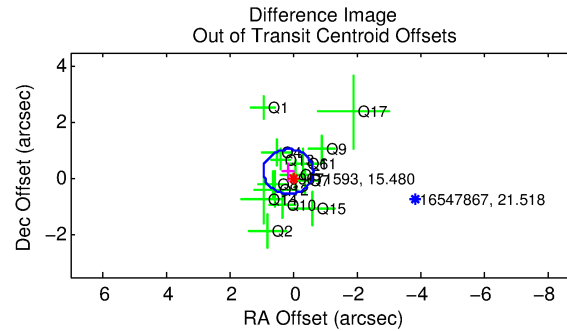
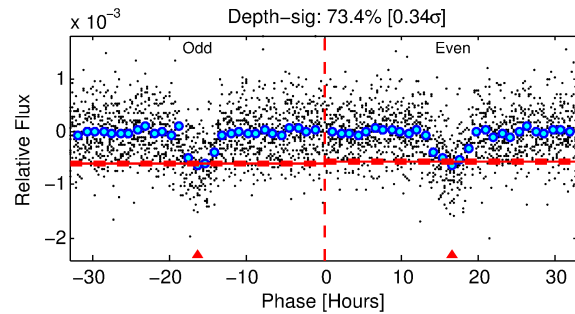
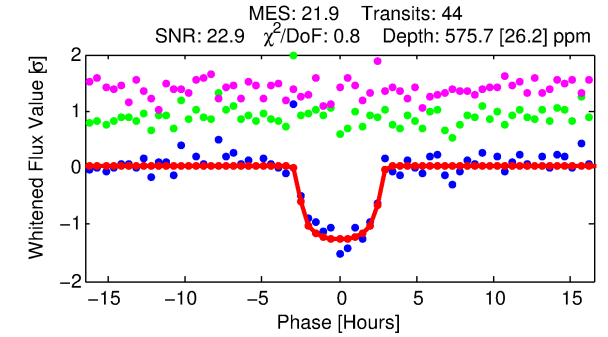
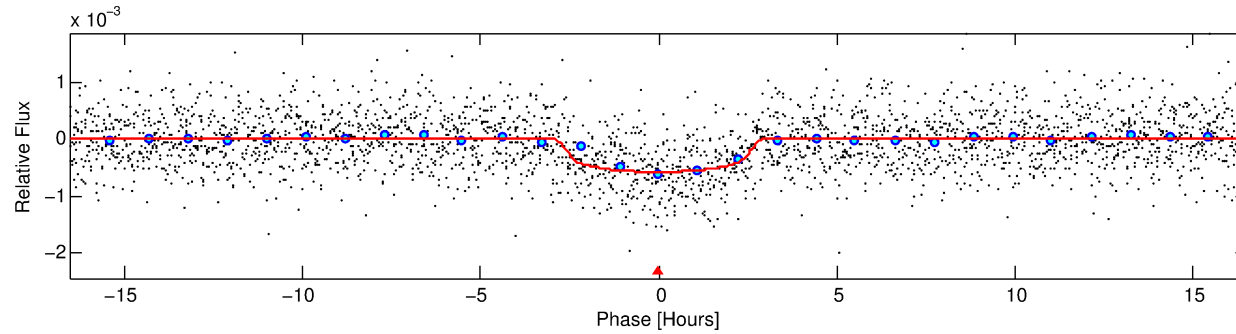
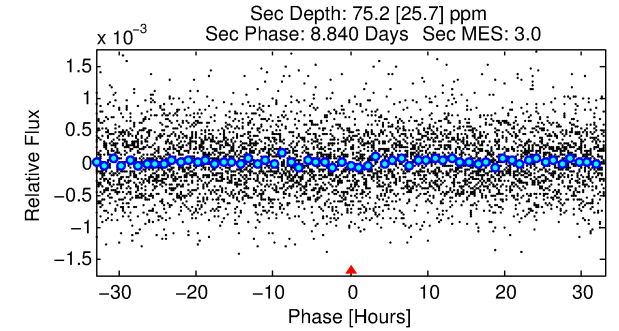
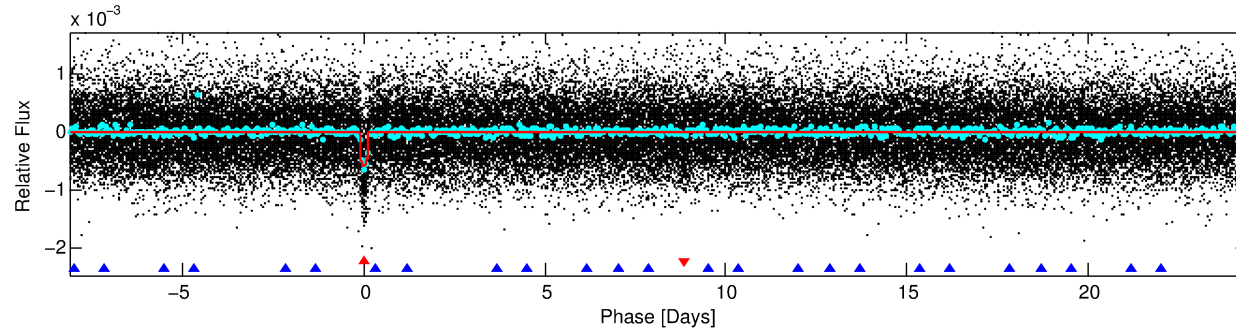
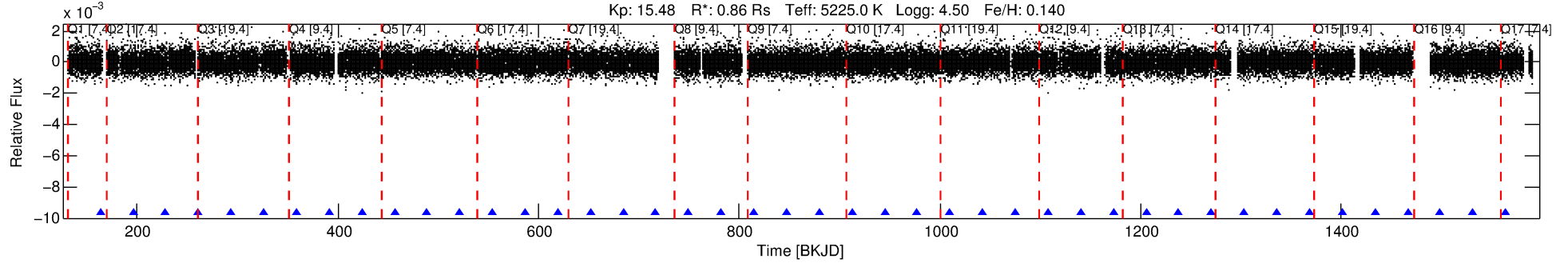
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009071593-01

No Significant Match Found

DV One-Page Summary

KIC: 9071593 Candidate: 1 of 2 Period: 32.563 d
KOI: K02257.01 Corr: 0.985



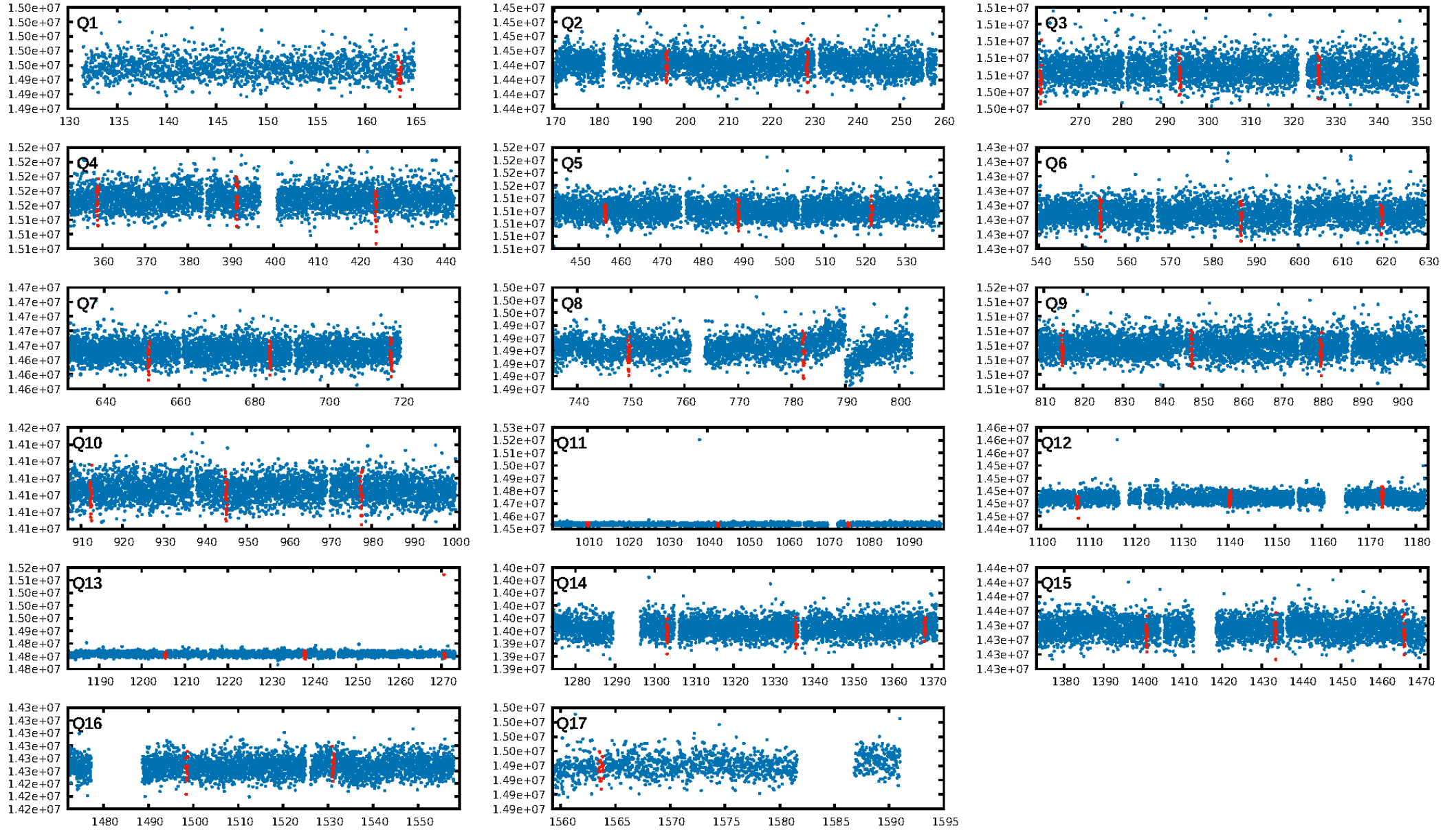
DV Fit Results:

Period = 32.56341 [0.00021] d
Epoch = 163.4615 [0.0053] BKJD
Rp/R* = 0.0237 [0.0102]
a/R* = 32.44 [51.20]
b = 0.73 [1.04]
Seff = 13.66 [1.58]
Teq = 490 [14] K
Rp = 2.22 [0.97] Re
a = 0.1899 [0.0122] AU
Ag = 301.66 [279.99] [1.07σ]
Teffp = 3159 [731] K [3.65σ]

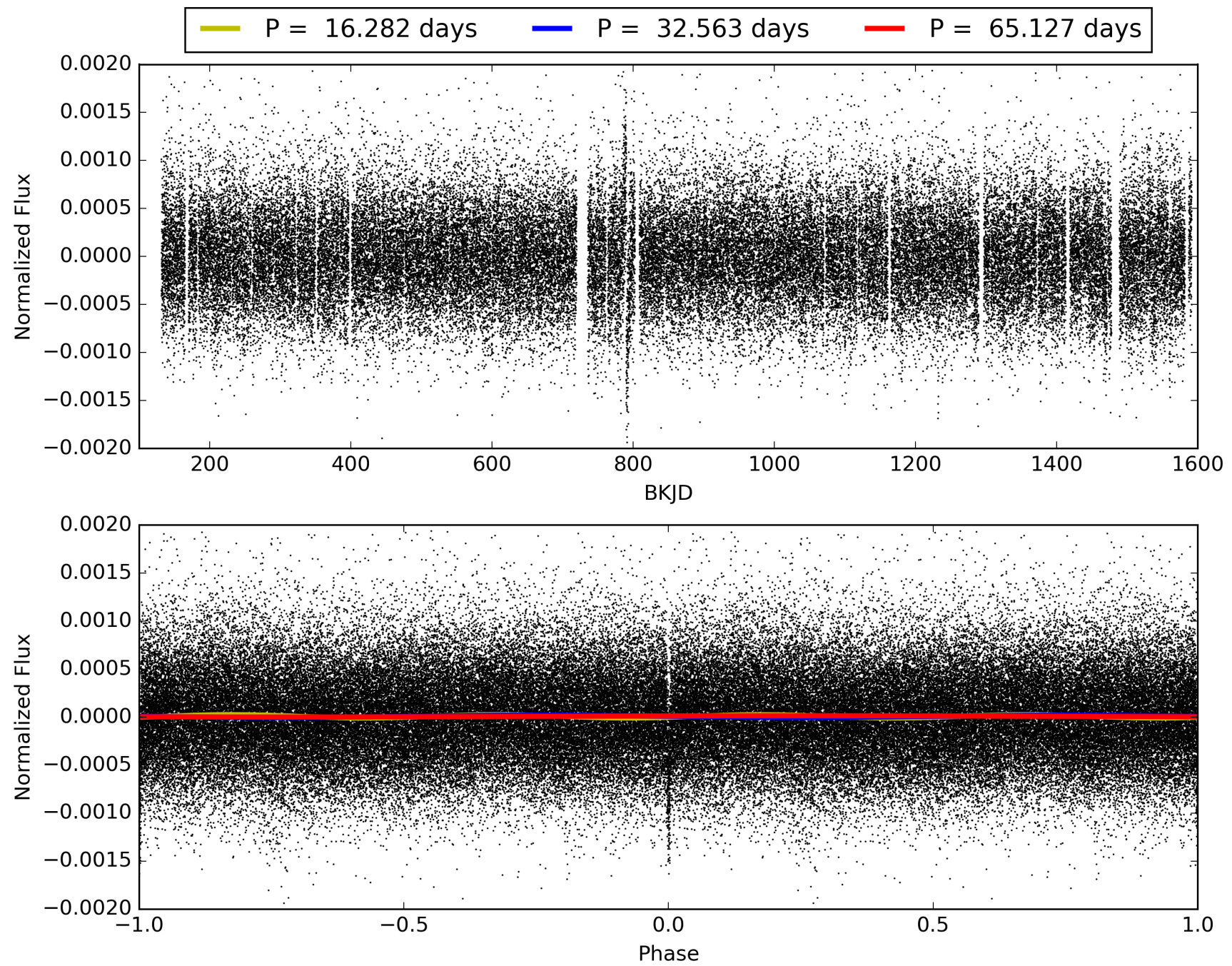
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [74.04σ]
ModelChiSquare2-sig: 51.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.06e-99
RollingBand-fgt: 1.00 [42/42]
GhostDiagnostic-chr: 2.965
Centroid-sig: 16.2%
Centroid-so: 0.761 arcsec [1.16σ]
OotOffset-rm: 0.288 arcsec [1.10σ]
KicOffset-rm: 0.084 arcsec [0.36σ]
OotOffset-st: 4/3/3/5 [15]
KicOffset-st: 4/3/3/5 [15]
DiffImageQuality-fgm: 0.93 [14/15]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009071593-01, PDC Light Curves

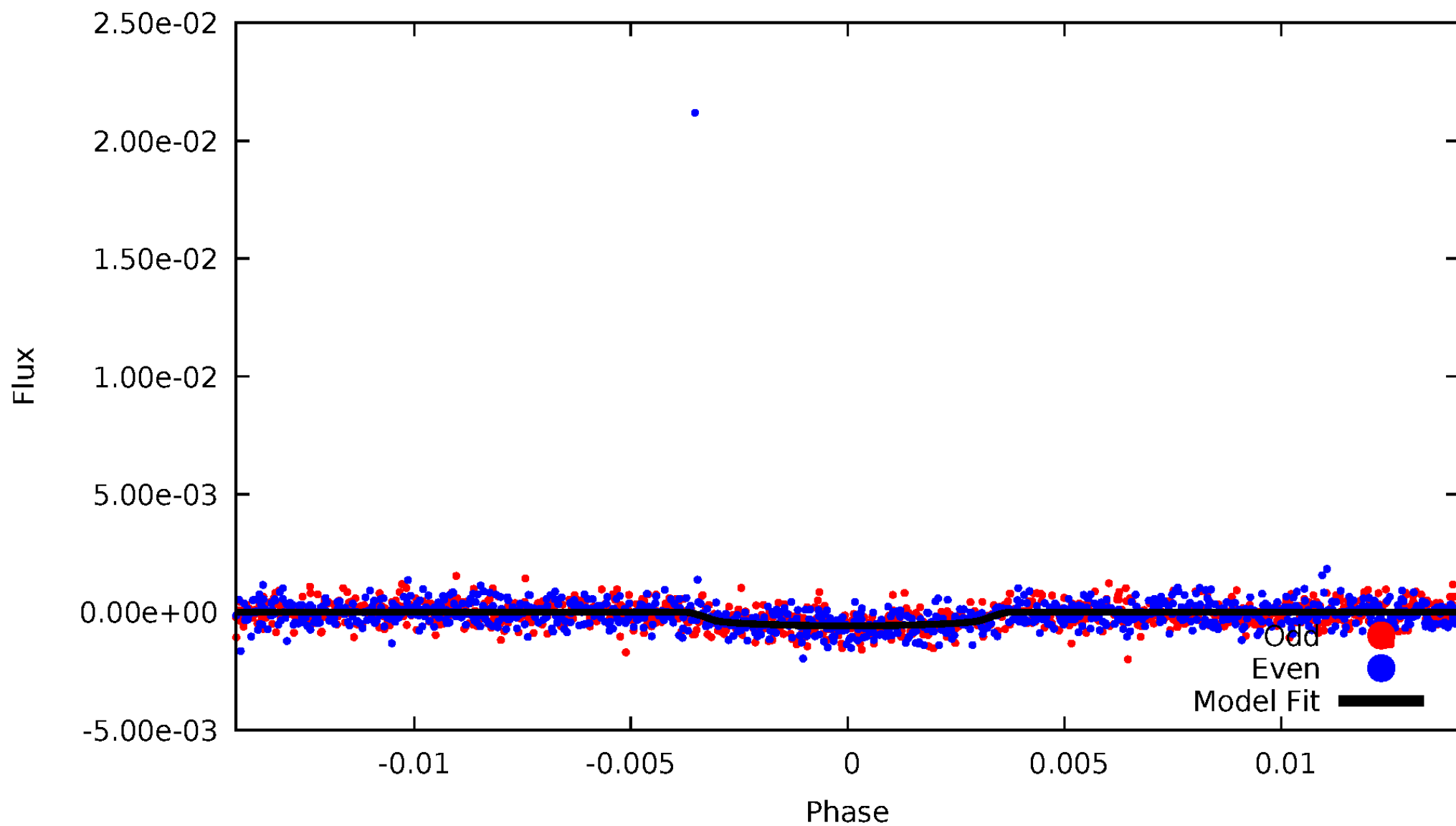


TCE 009071593-01



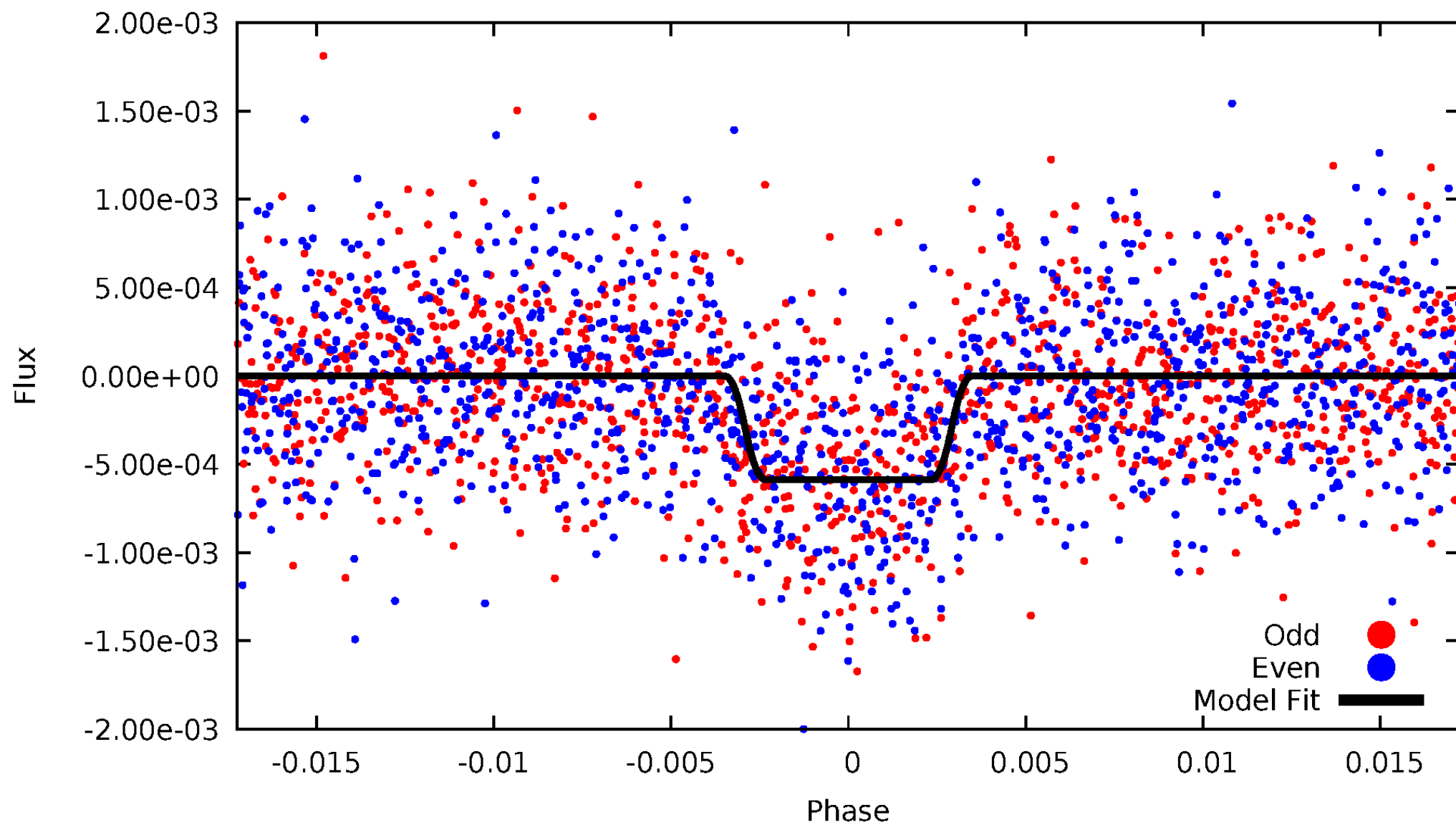
DV Odd/Even

TCE 009071593-01



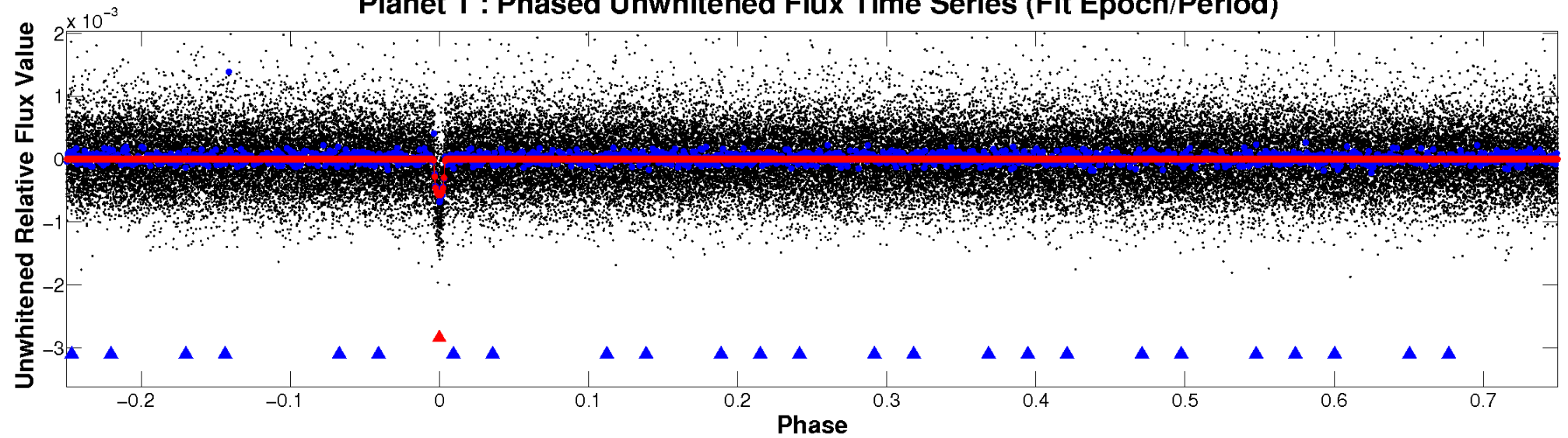
ALT Odd/Even

TCE 009071593-01

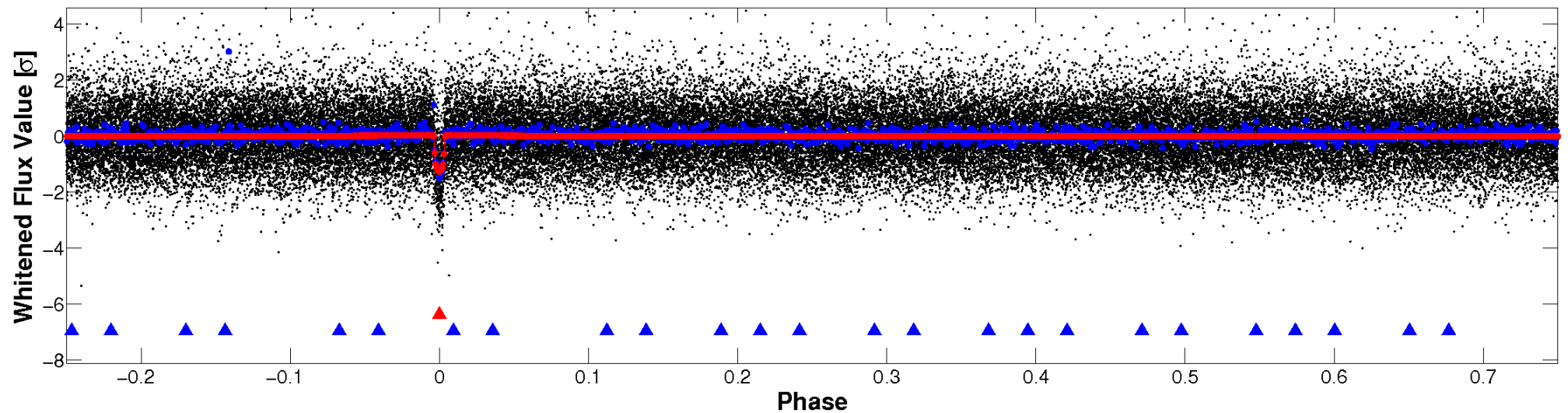


Non-Whitened Vs. Whitened Light Curve

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

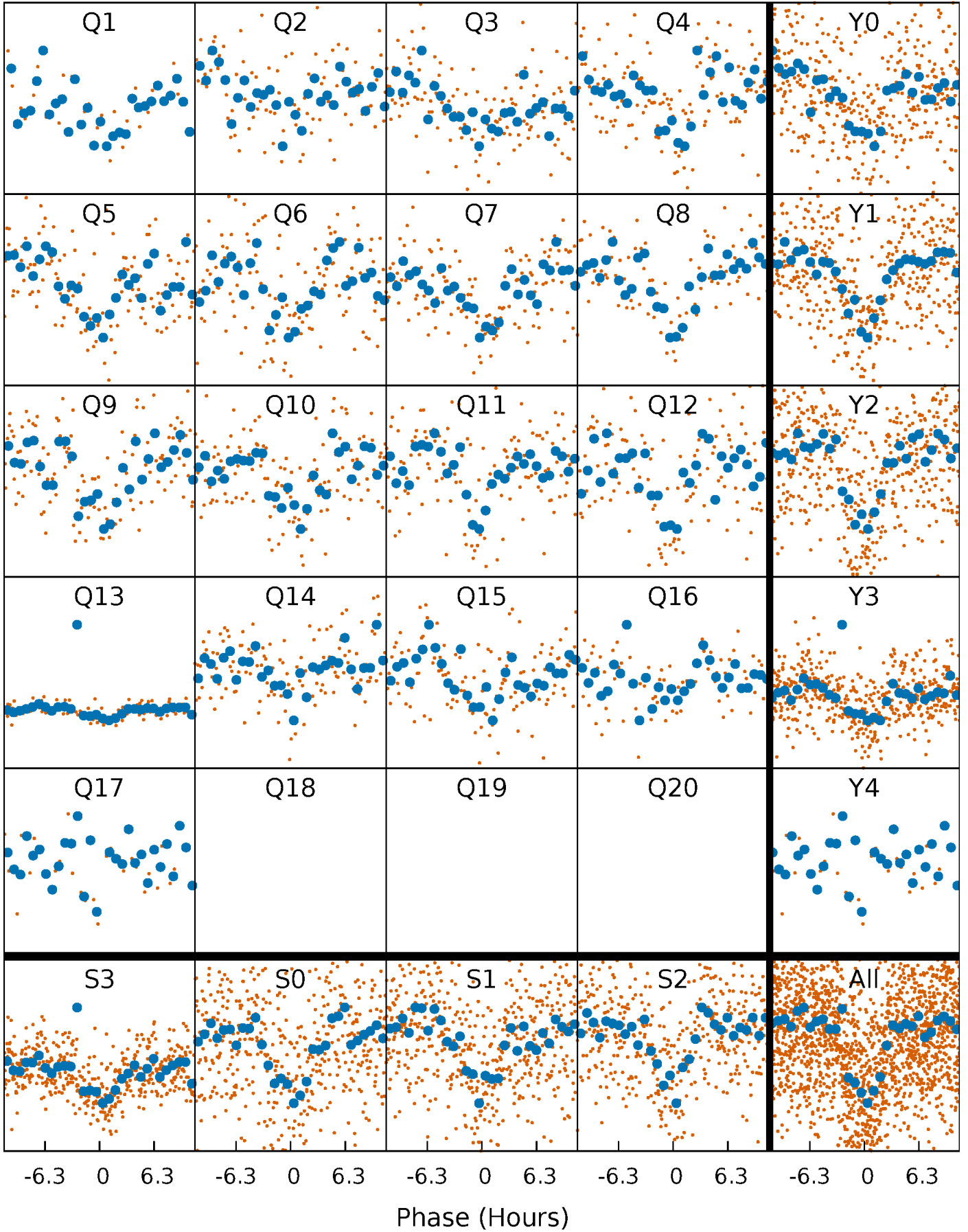


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



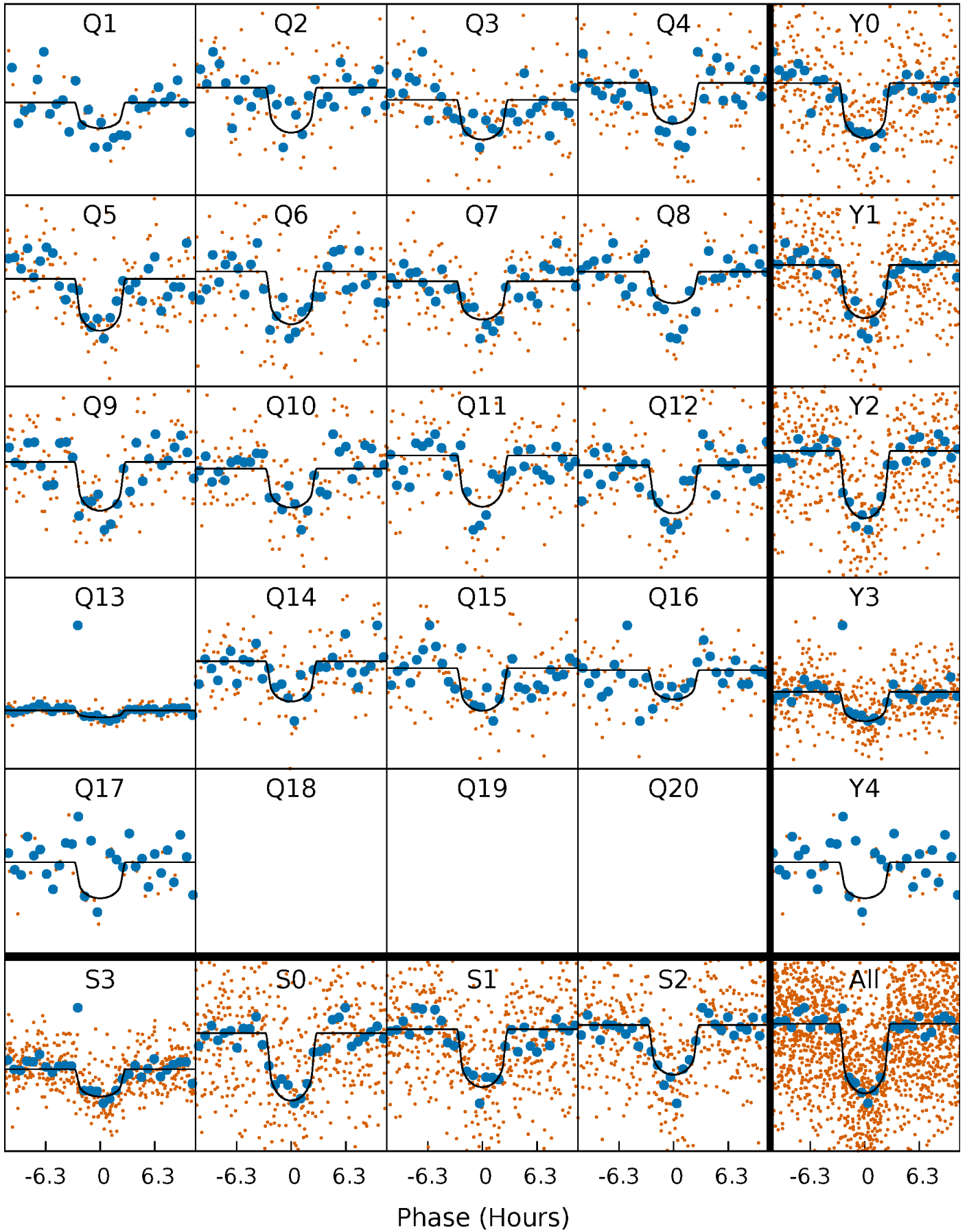
PDC Quarter-Phased Transit Curves

TCE 009071593-01 P= 32.563410 Days $T_0=163.461533$ (BKJD)



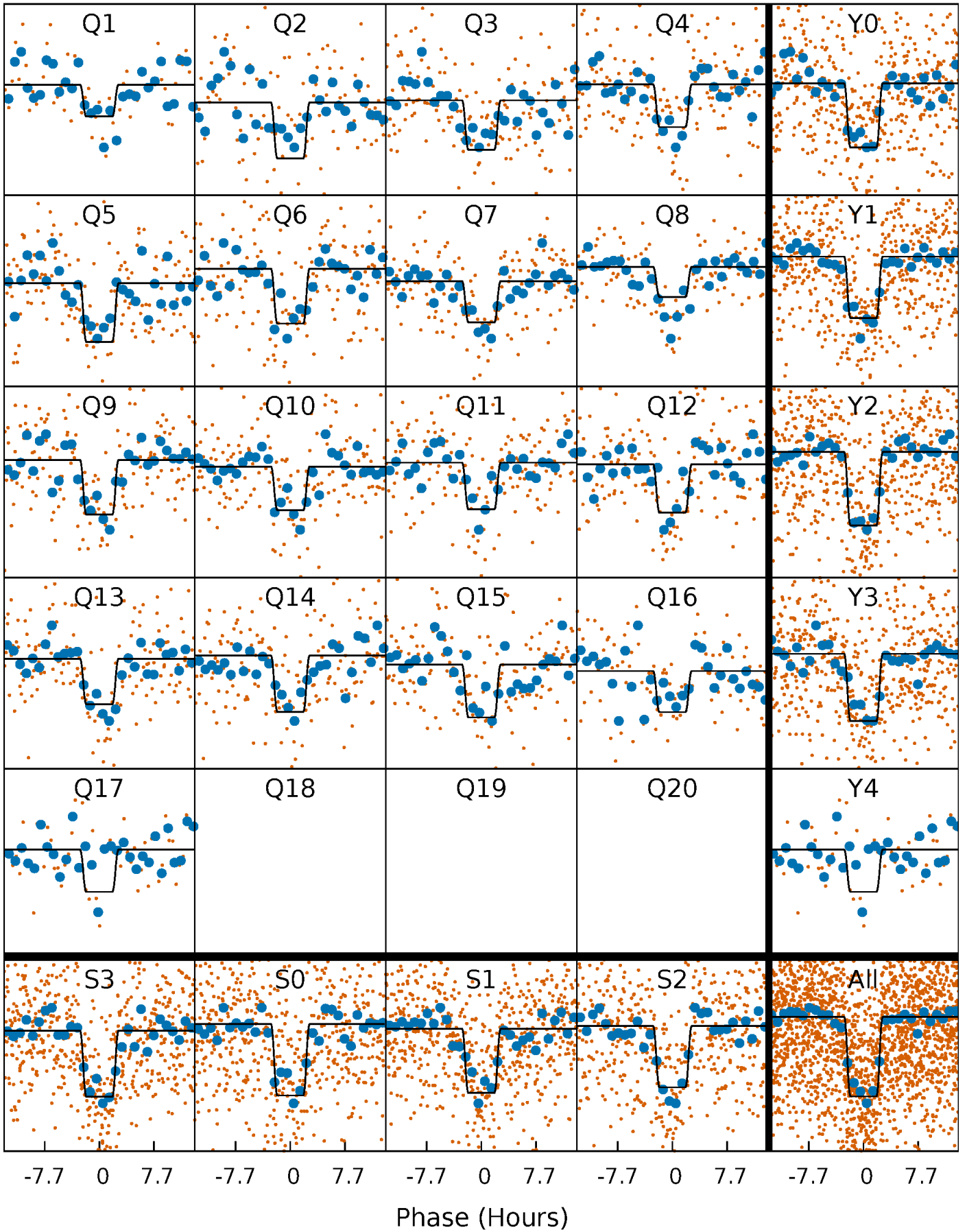
DV Quarter-Phased Transit Curves

TCE 009071593-01 P= 32.563410 Days $T_0=163.461533$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

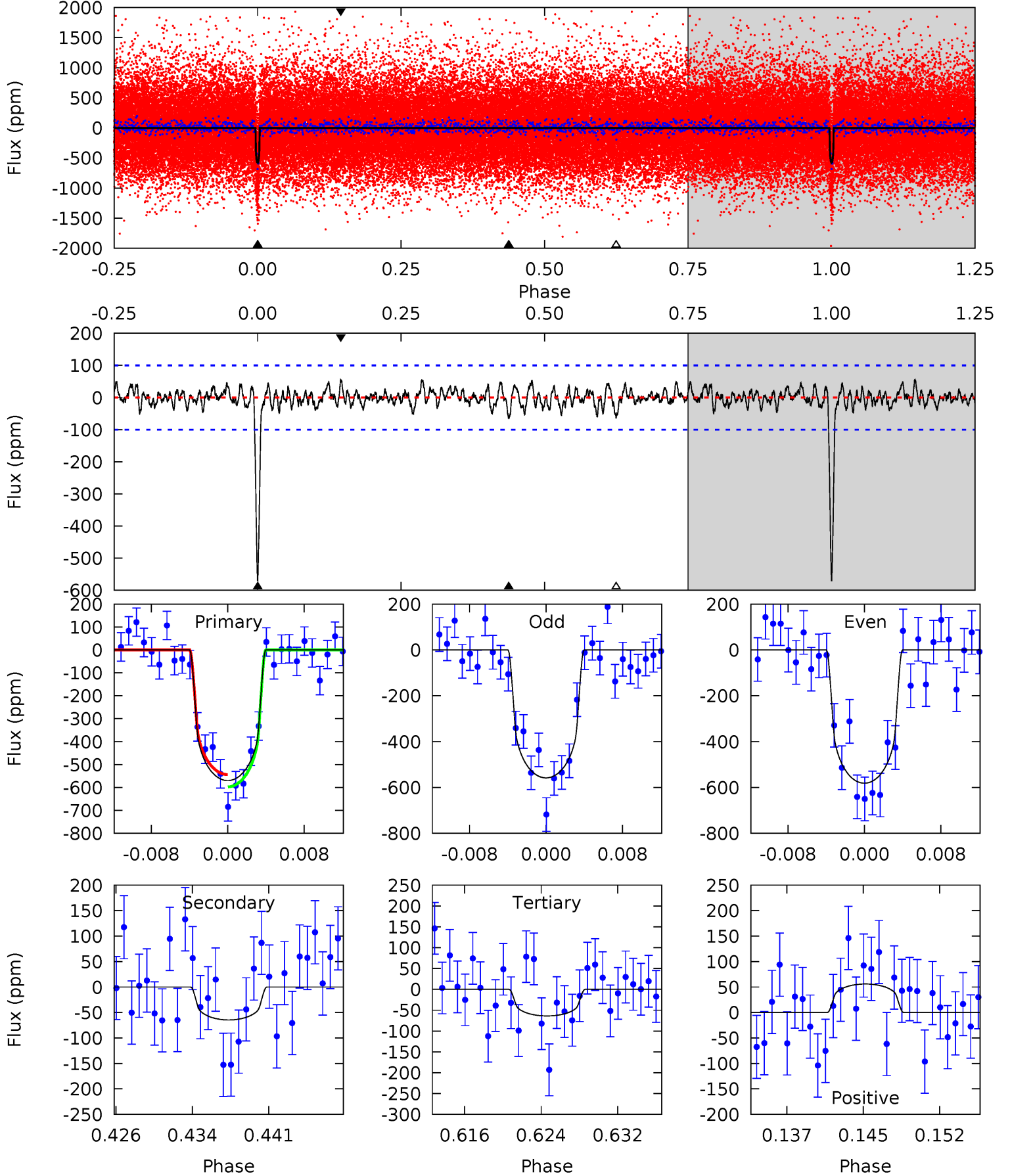
TCE 009071593-01 P= 32.562927 Days $T_0=163.473051$ (BKJD)



DV Model-Shift Uniqueness Test

009071593-01, P = 32.563410 Days, E = 130.898123 Days

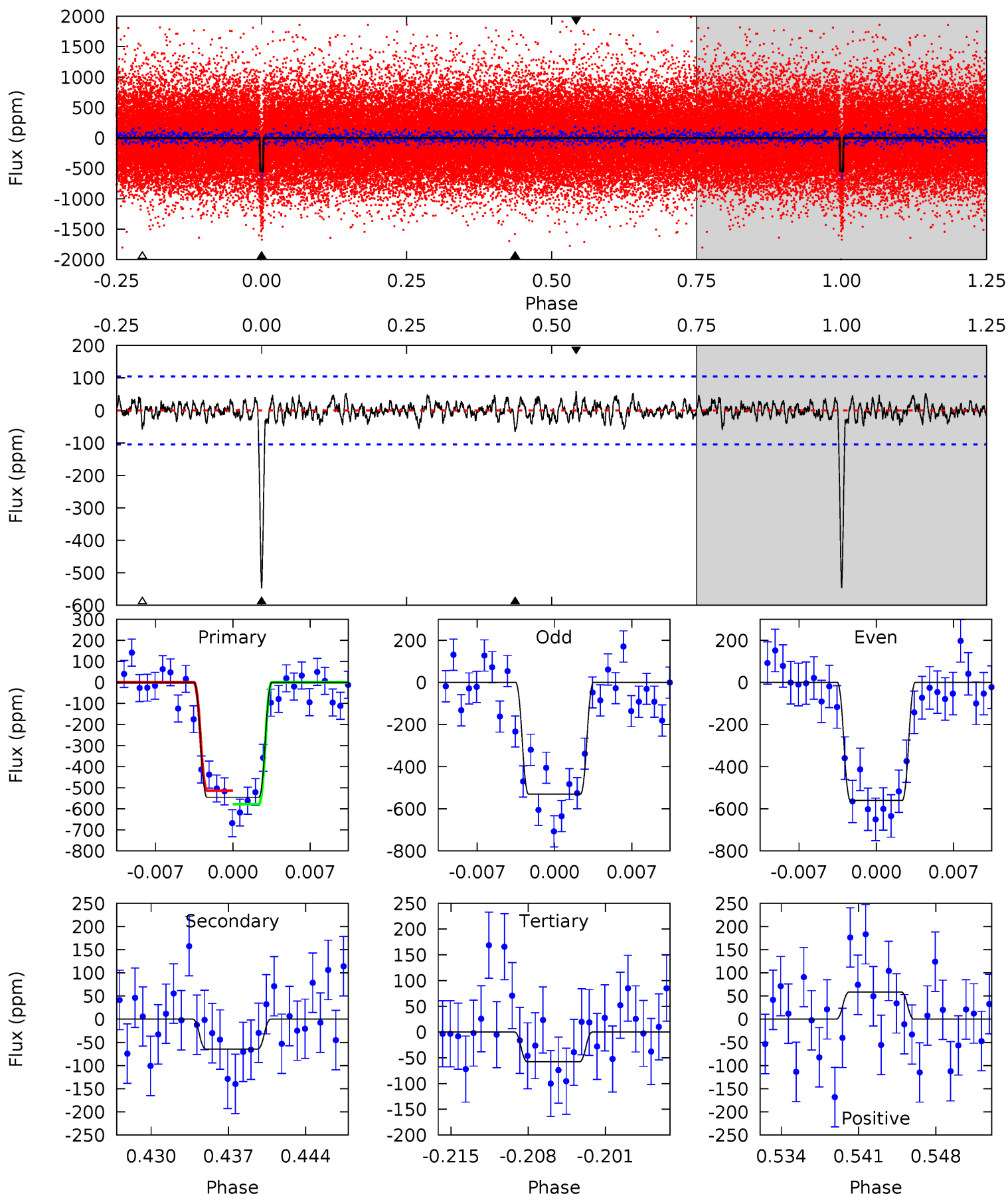
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.9	3.28	3.24	2.84	5.08	2.67	1.07	25.7	26.1	0.04	0.44	0.59	1.02	0.09	1.37



Alt Model-Shift Uniqueness Test

009071593-01, P = 32.562927 Days, E = 130.910124 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	3.14	2.82	2.86	5.10	2.70	0.94	23.8	23.8	0.32	0.28	0.72	0.97	0.10	1.57



Stellar Parameters For KIC 009071593

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5225^{+83}_{-73}	$4.505^{+0.054}_{-0.054}$	$0.140^{+0.150}_{-0.150}$	$0.859^{+0.063}_{-0.051}$	$0.861^{+0.050}_{-0.041}$	$1.911^{+0.369}_{-0.341}$
	+2%/-1%	+1%/-1%	+107%/-107%	+7%/-6%	+6%/-5%	+19%/-18%
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 009071593-01 / KOI 2257.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-65 ± 20	$2.21^{+0.97}_{-0.96}$	685^{+17}_{-15}	3480^{+822}_{-426}	252^{+610}_{-145}
Alt.	-64 ± 20	$2.23^{+1.03}_{-0.88}$	686^{+16}_{-16}	3489^{+662}_{-415}	259^{+430}_{-152}

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 $A_{obs} \gg 1.0$

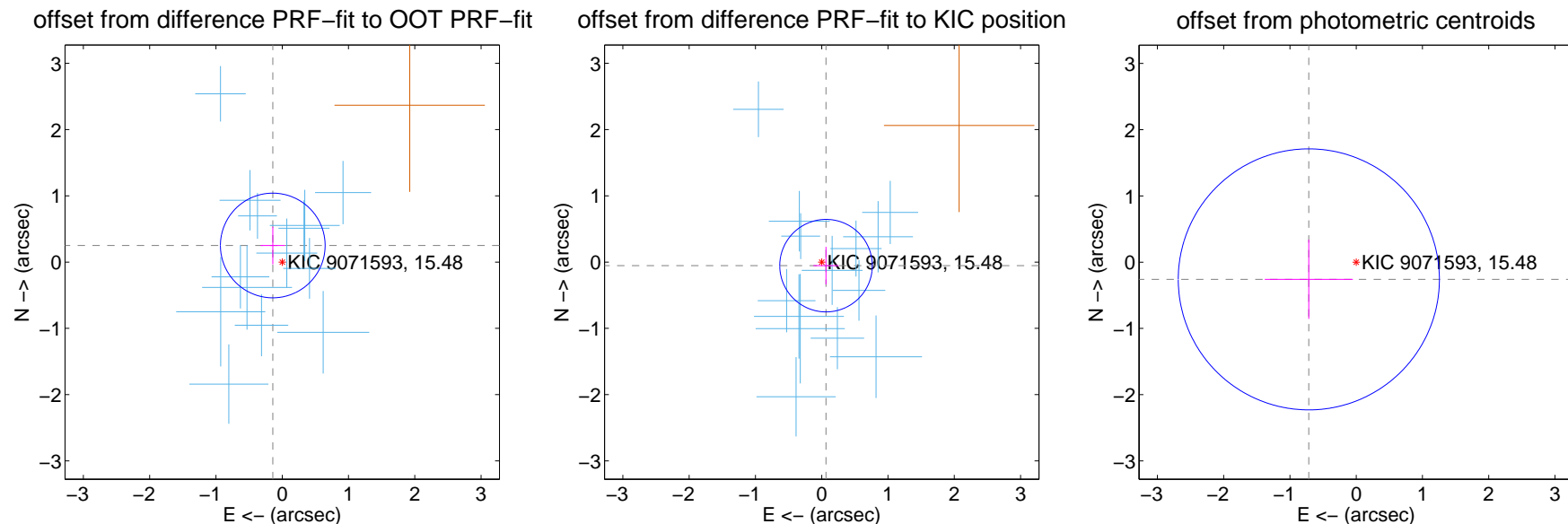
DV Centroid Data

Supplemental centroid analysis for 009071593-01. Kepler magnitude: 15.48. Transit SNR 22.92

There are 14 quarters with good PRF difference image offsets

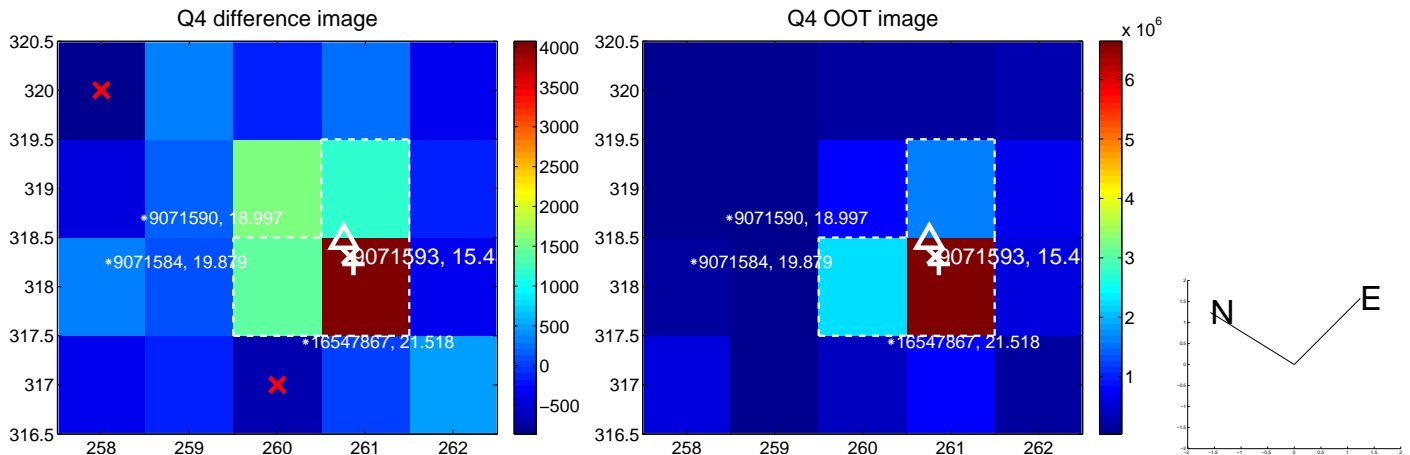
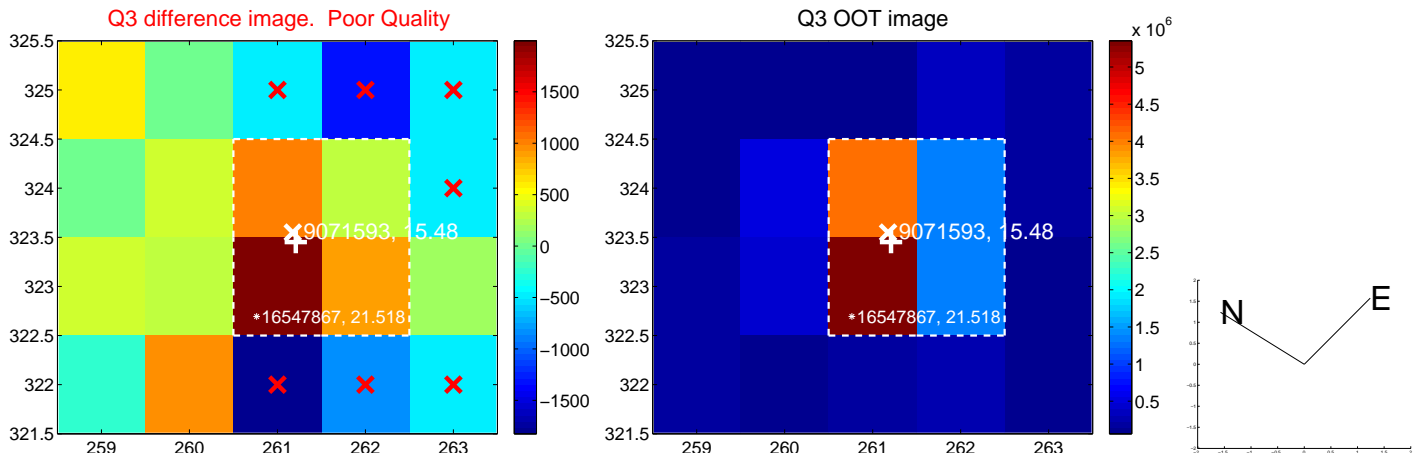
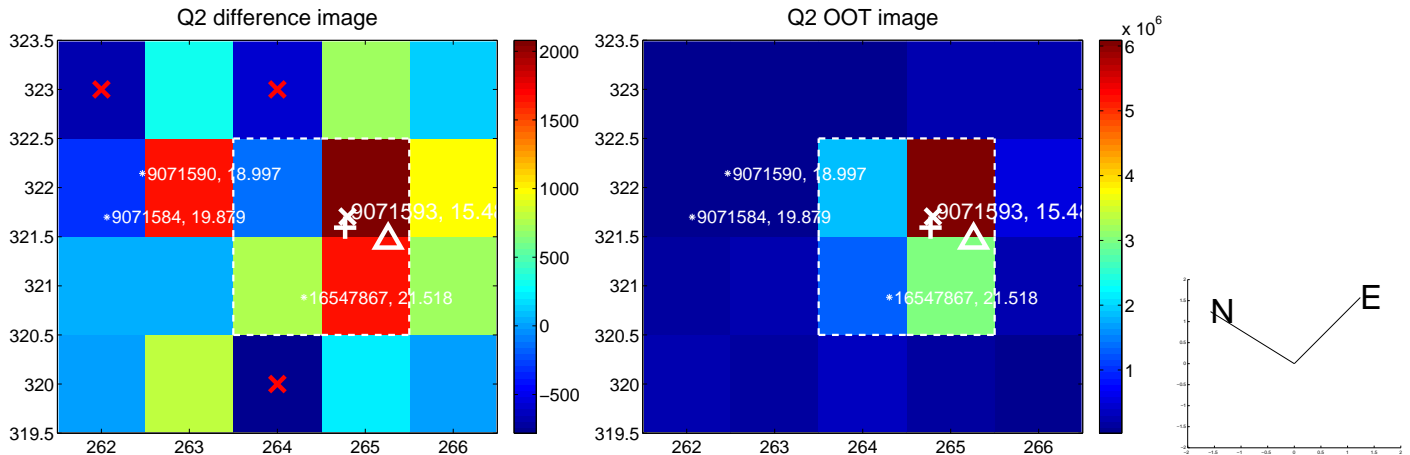
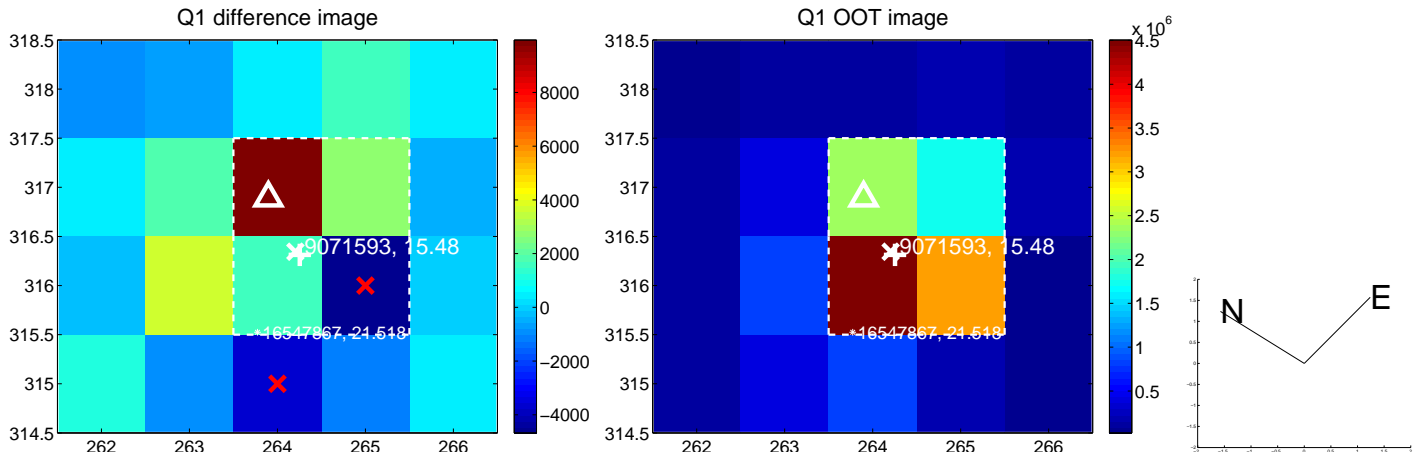
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.288 ± 0.263	1.10	0.143 ± 0.184	0.251 ± 0.284
PRF-fit source offset from KIC position	0.084 ± 0.233	0.36	-0.065 ± 0.190	-0.054 ± 0.284
photometric centroid source offset	0.76 ± 0.66	1.16	0.72 ± 0.66	-0.26 ± 0.60

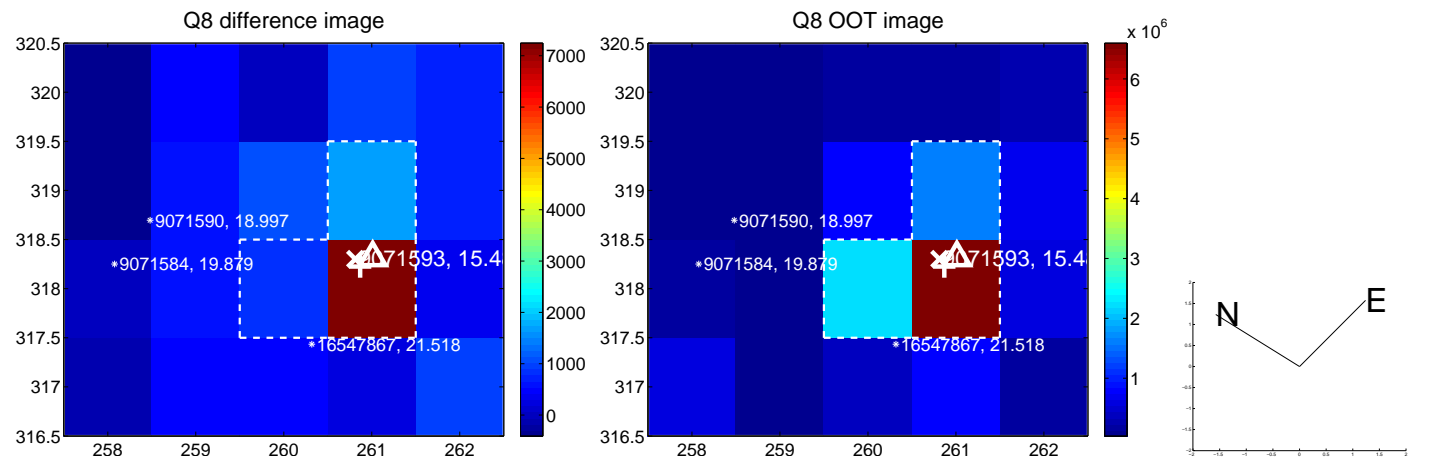
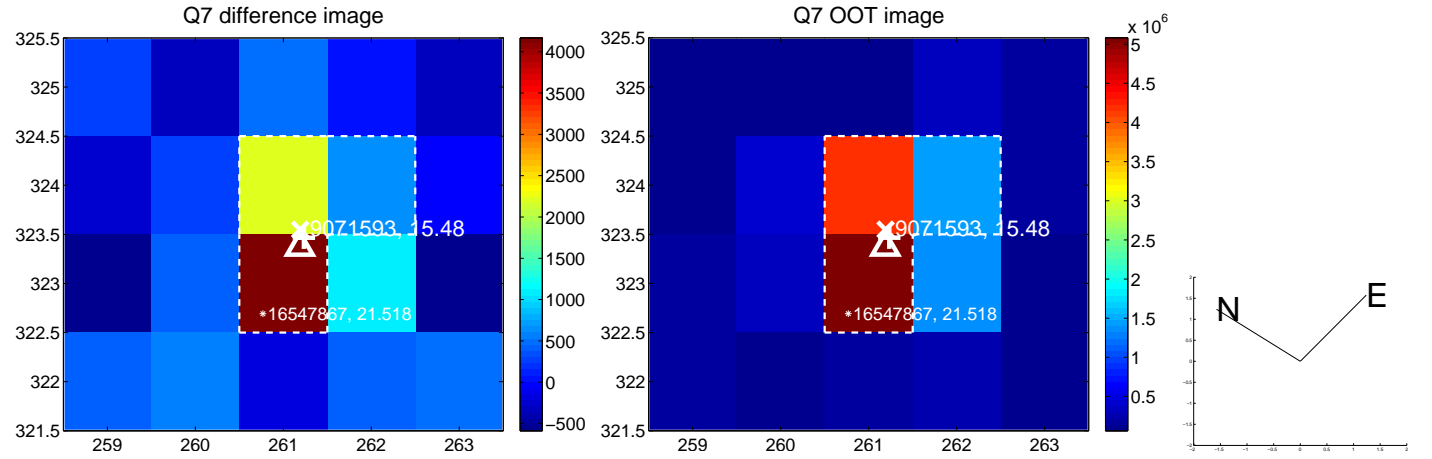
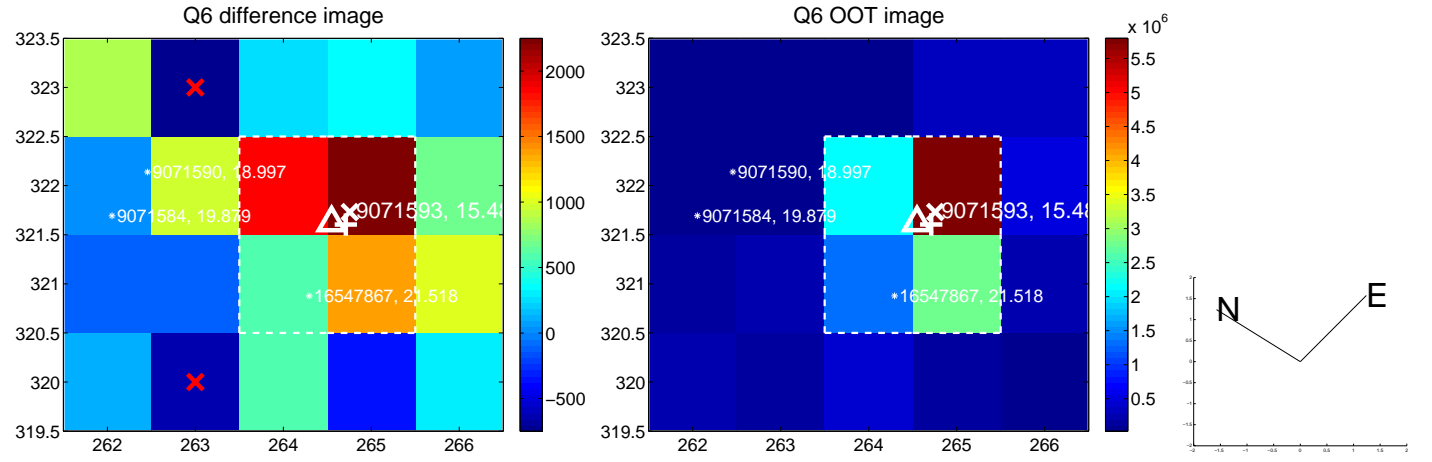
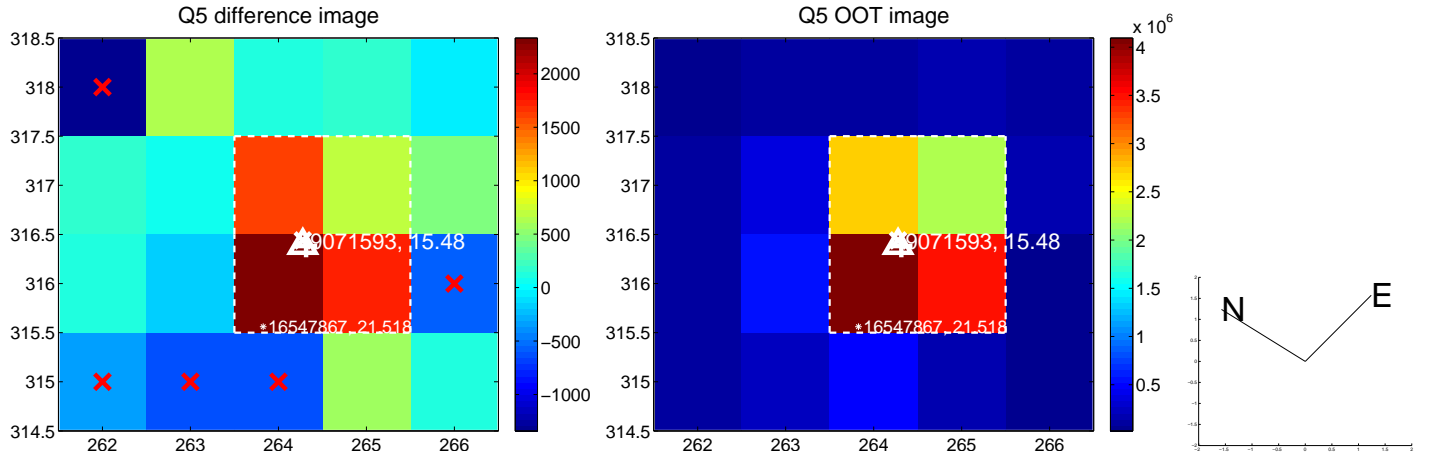


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

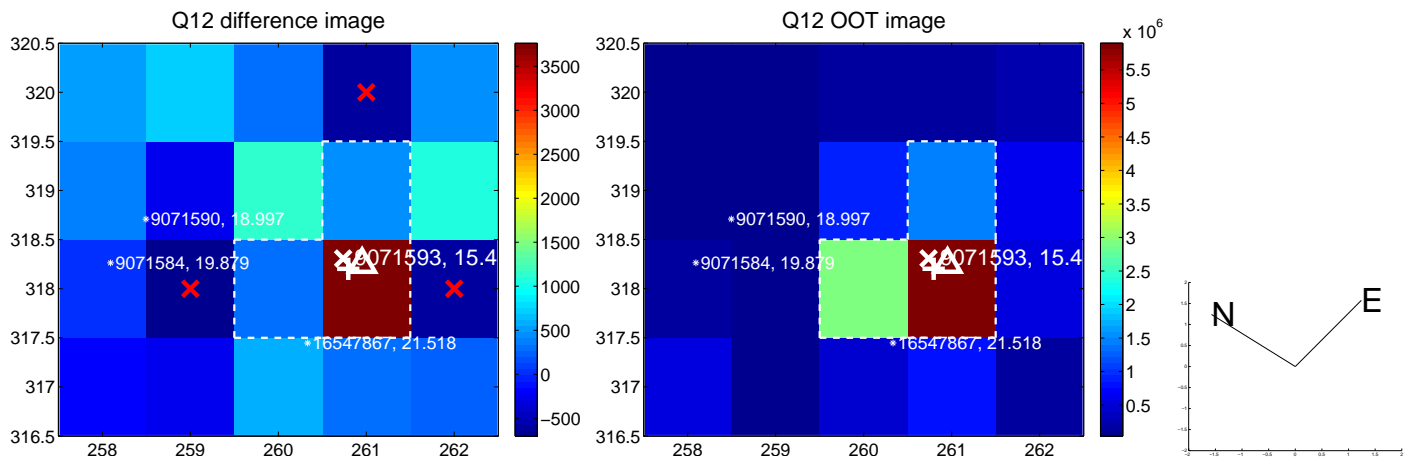
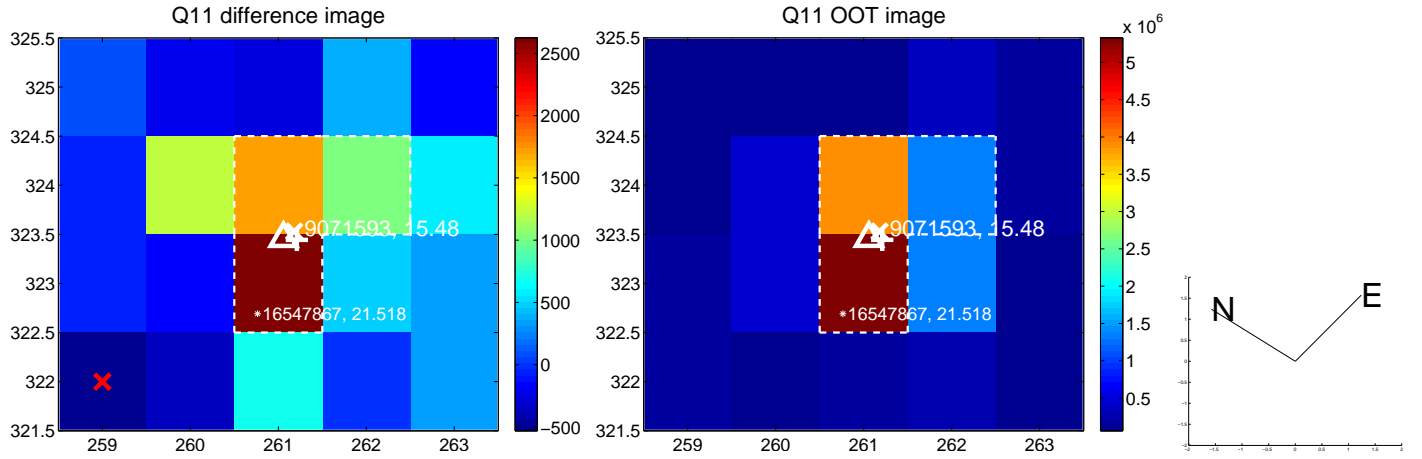
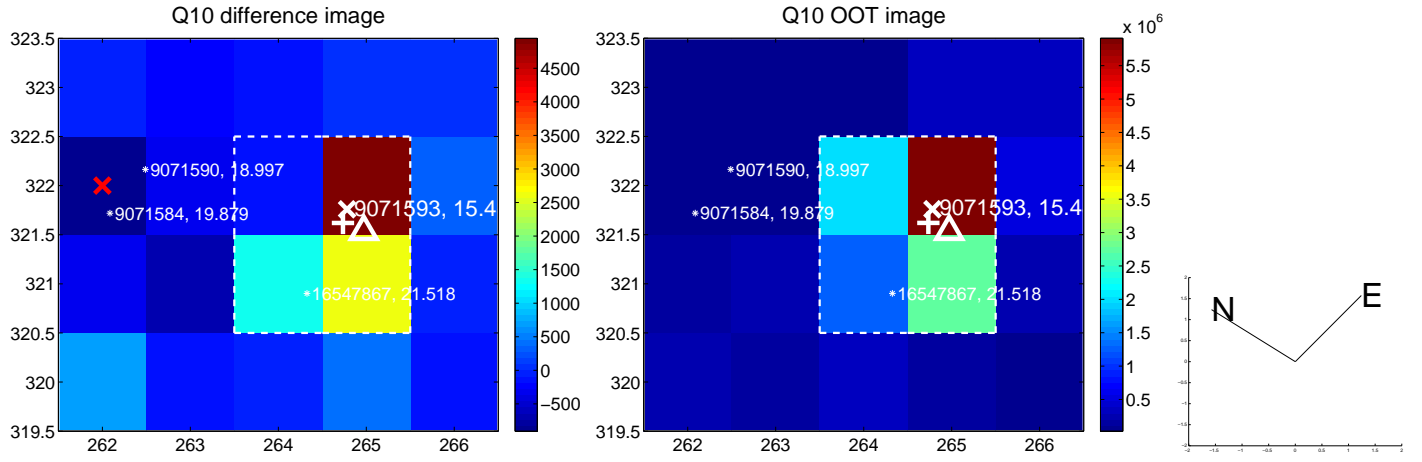
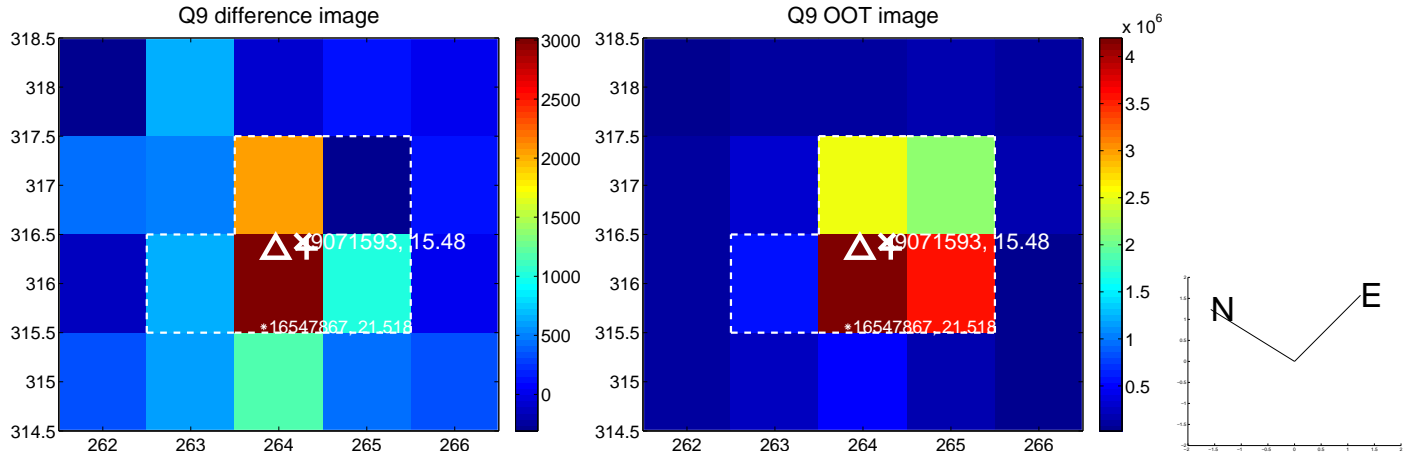
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



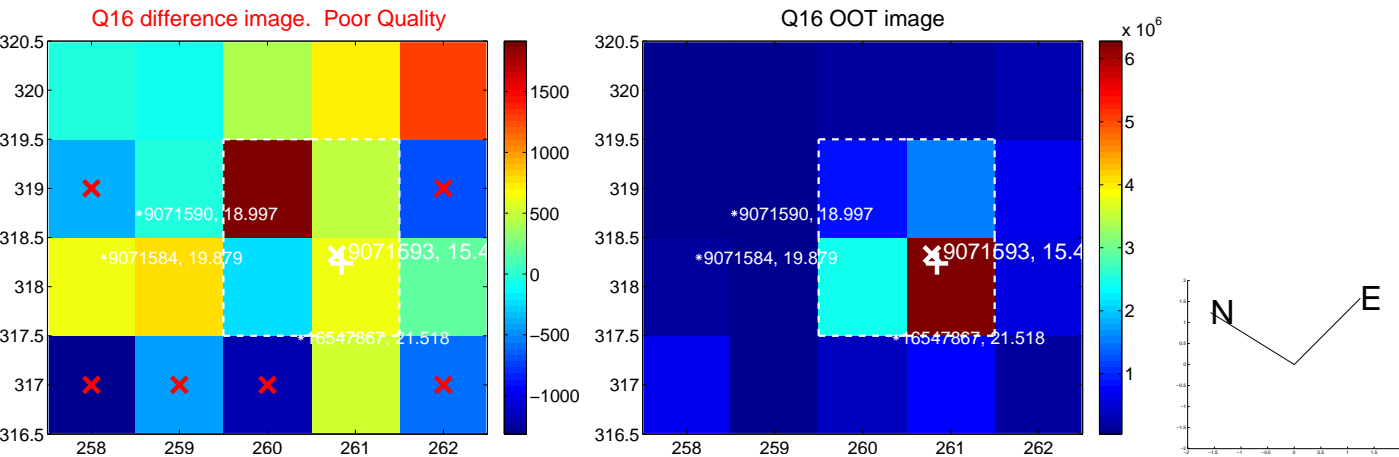
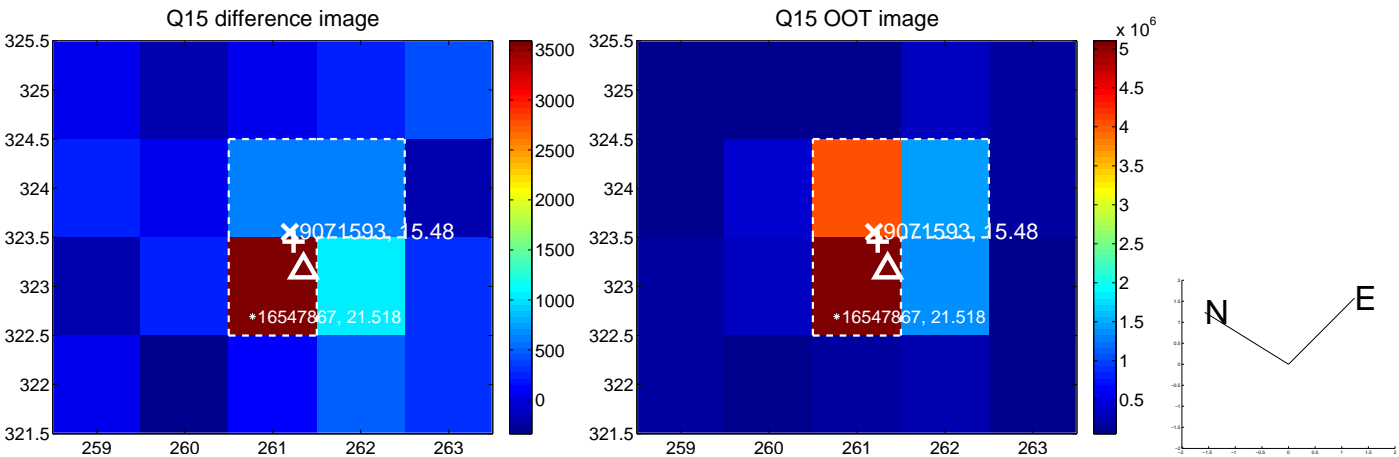
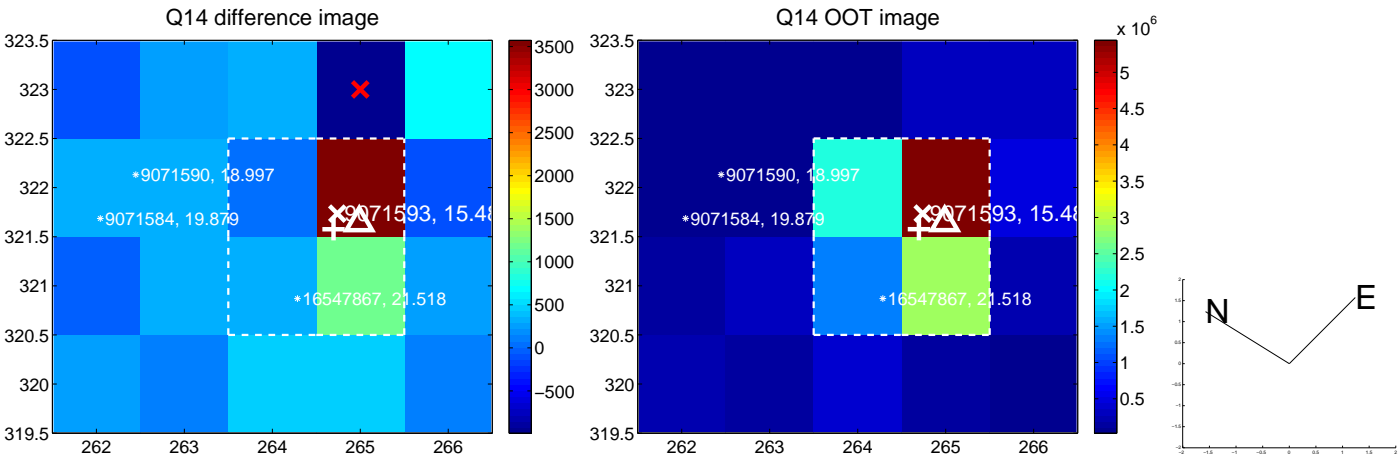
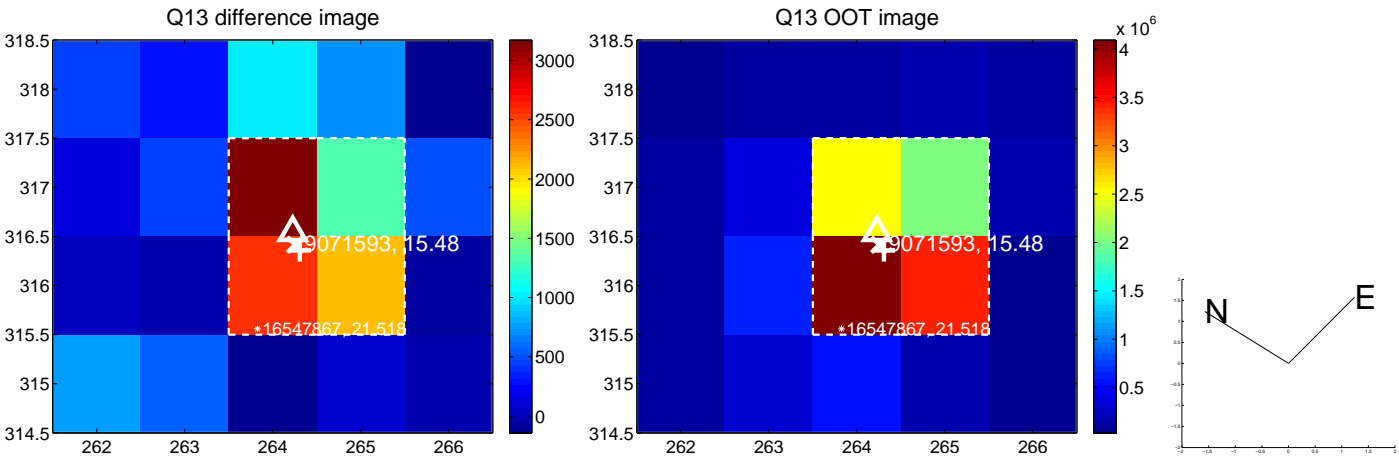
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



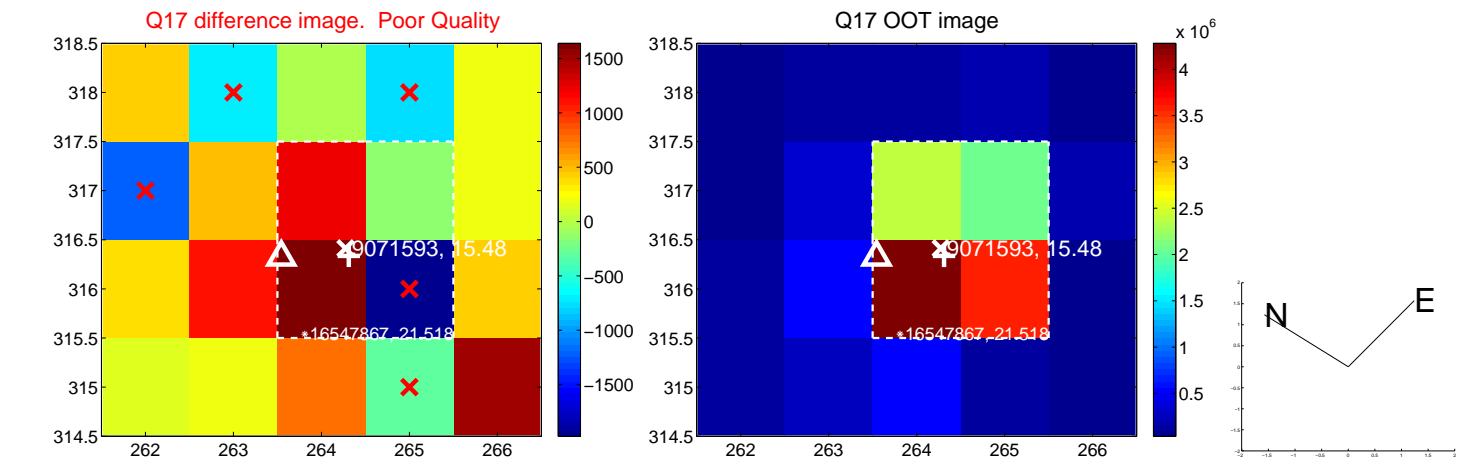
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



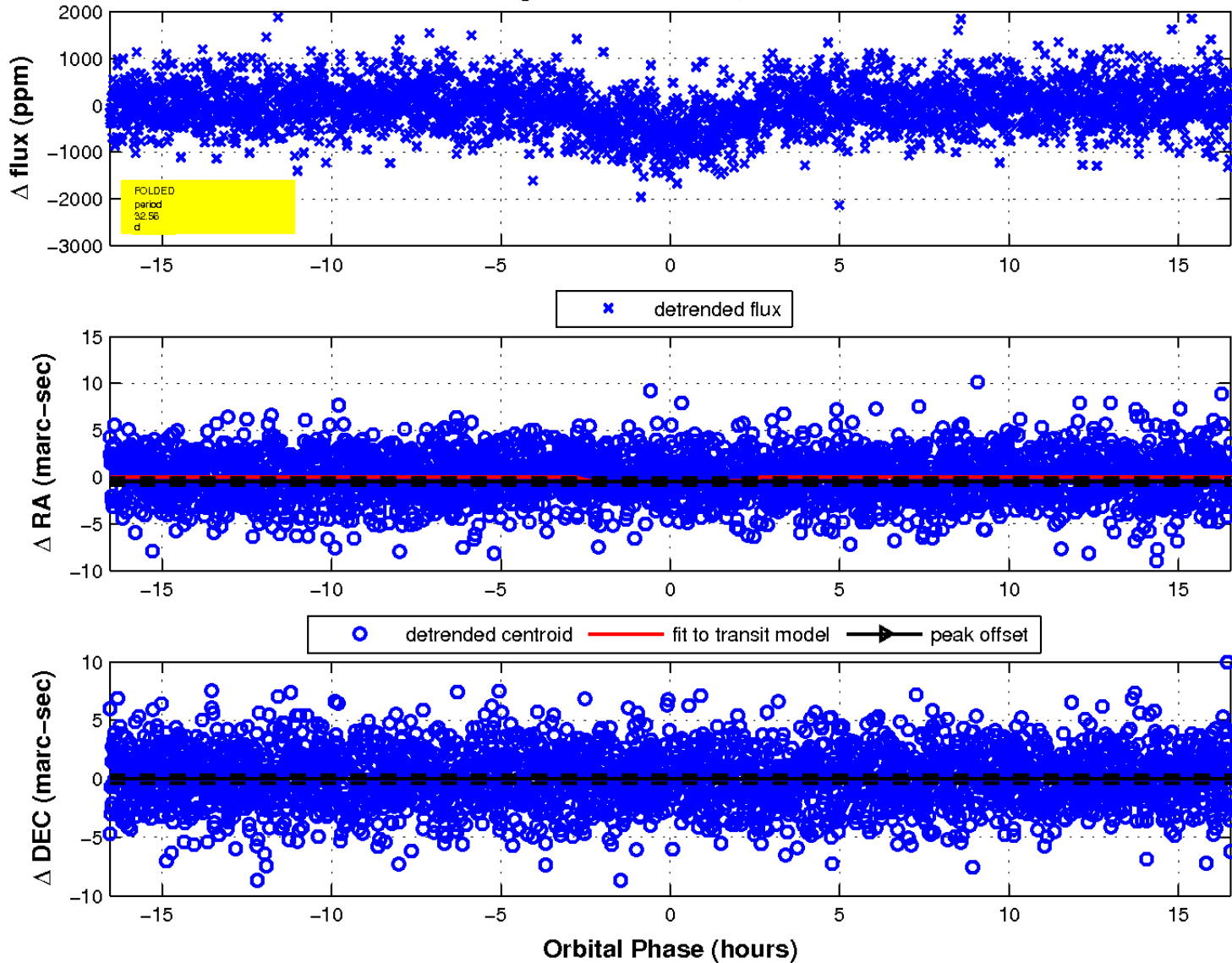
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

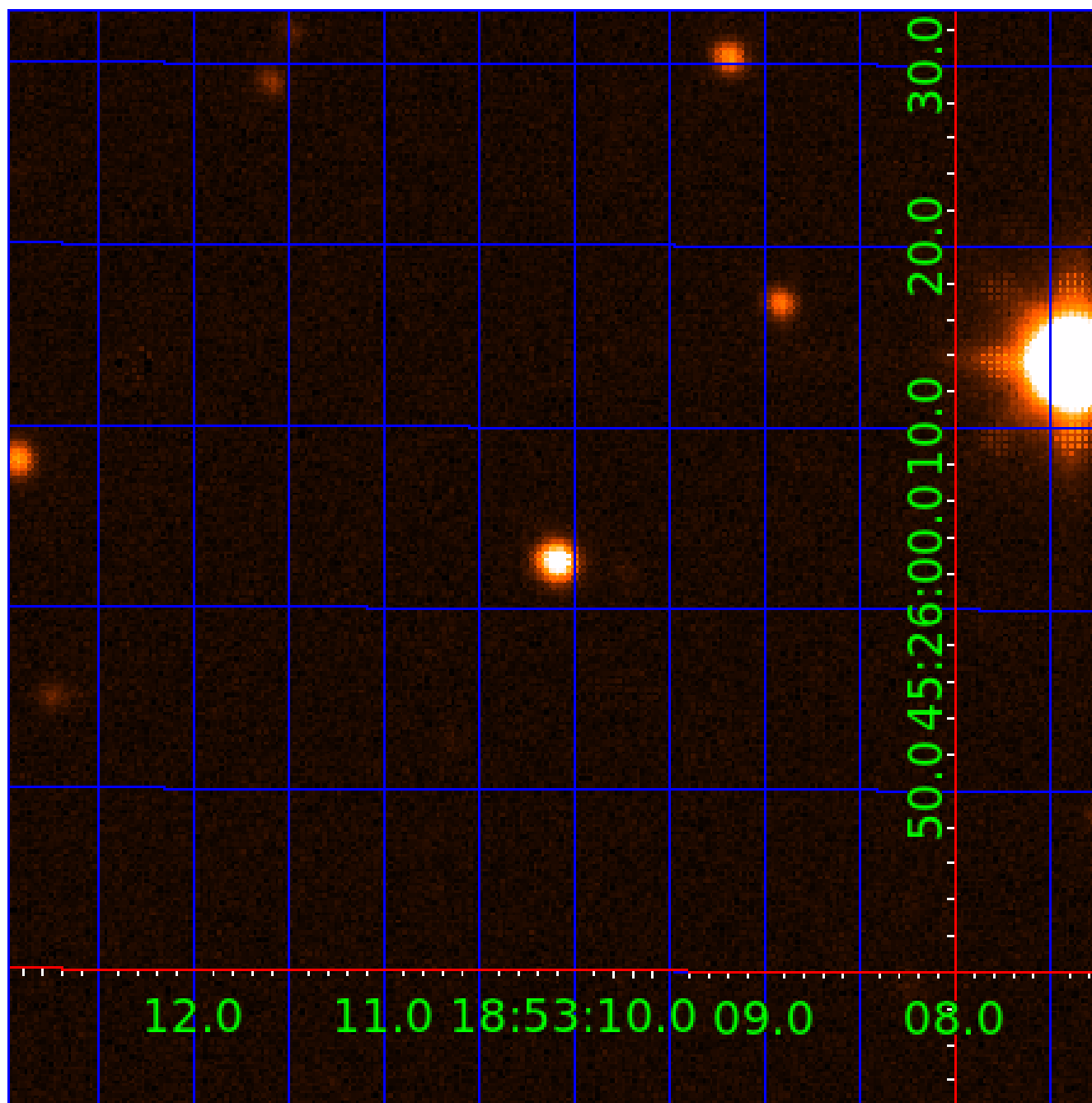


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009071593

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})
009071593-01	OBS	2257.01	32.563410	163.461533	575.7	5.515	21.9	22.9	0.86	5225	2.22	13.66
009071593-02	OBS	2257.02	59.284128	148.733797	370.8	6.679	10.7	11.7	0.86	5225	1.88	6.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009071593-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009071593-02	OBS	PC	0.51	0	0	0	0	CENT_KIC_POS

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

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

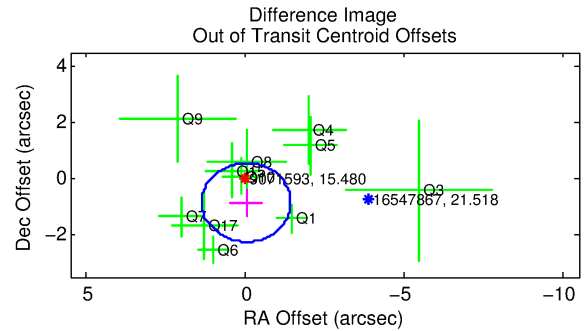
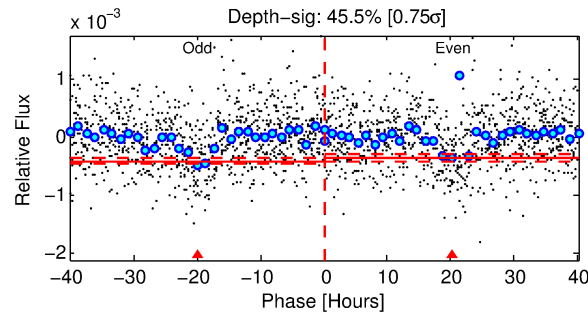
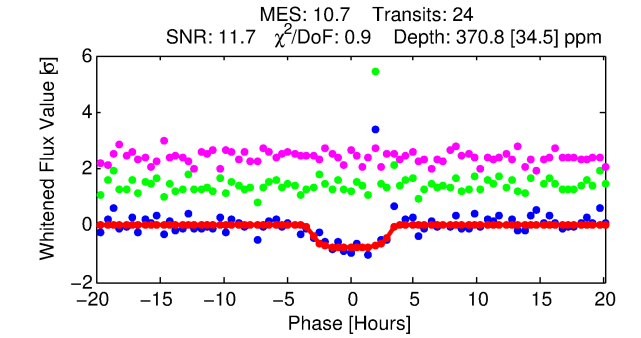
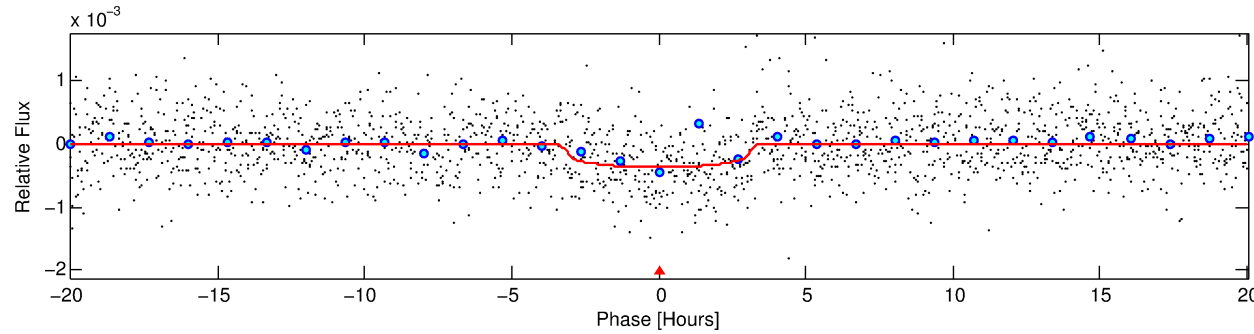
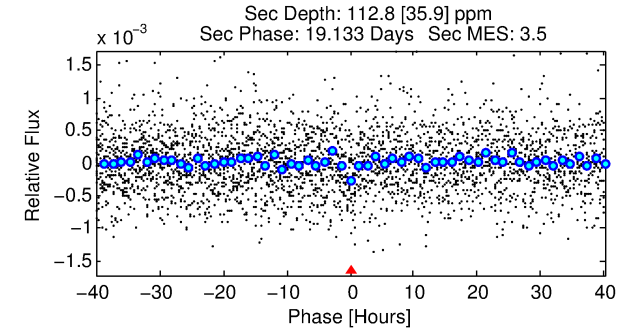
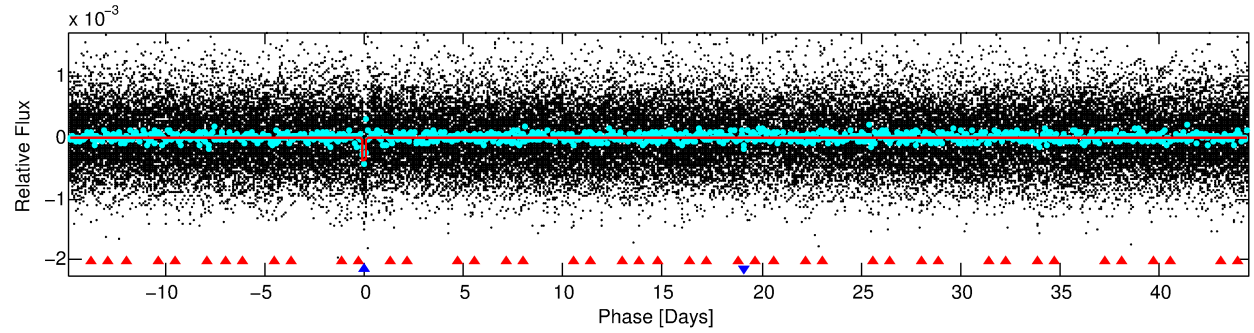
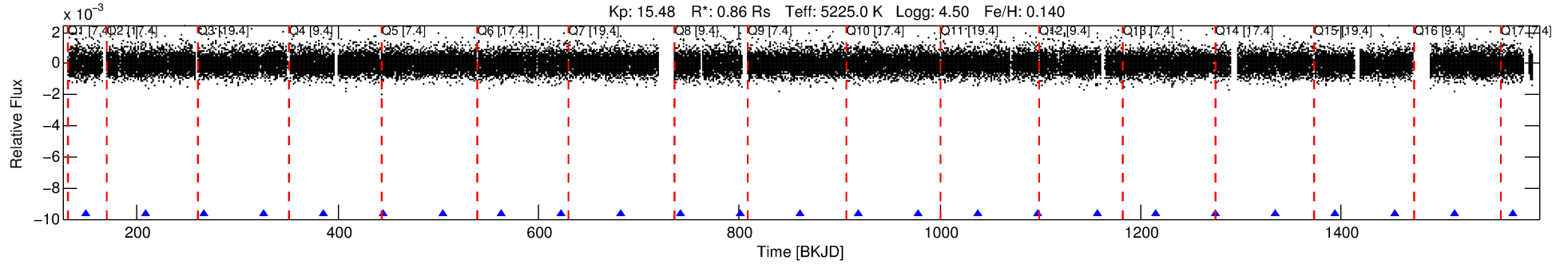
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009071593-02

No Significant Match Found

DV One-Page Summary

KIC: 9071593 Candidate: 2 of 2 Period: 59.284 d
KOI: K02257.02 Corr: 0.892



DV Fit Results:

Period = 59.28413 [0.00087] d
Epoch = 148.7338 [0.0128] BKJD
Rp/R* = 0.0200 [0.0090]
a/R* = 40.61 [70.84]
b = 0.83 [0.68]
Seff = 6.15 [0.71]
Teff = 402 [12] K
Rp = 1.88 [0.86] Re
a = 0.2831 [0.0181] AU
Ag = 1410.31 [1356.55] [1.04σ]
Teffp = 3804 [912] K [3.73σ]

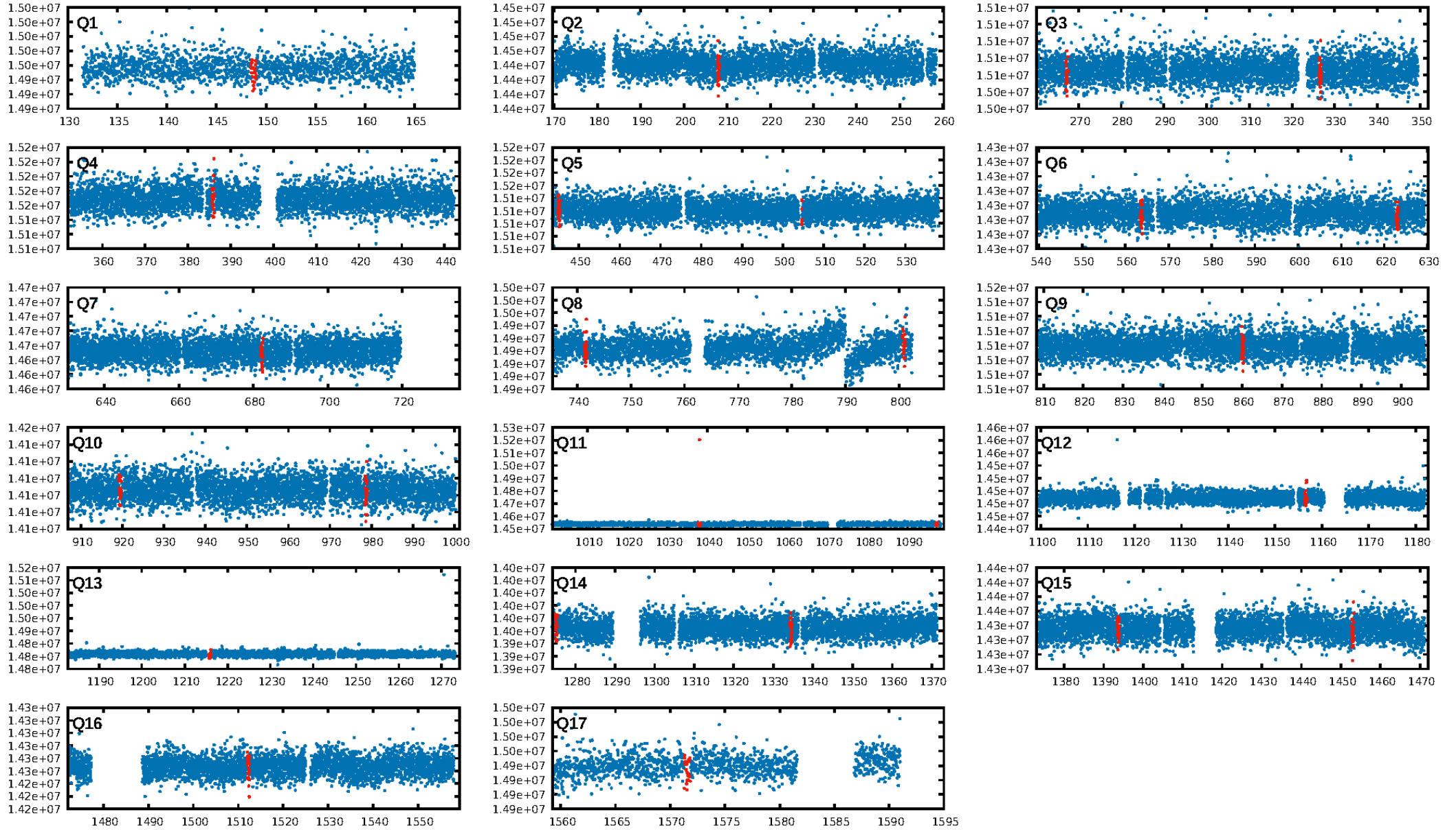
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [74.04σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 97.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.87e-24
RollingBand-fgt: 1.00 [22/22]
GhostDiagnostic-chr: 4.045
Centroid-sig: 0.2%
Centroid-so: 2.707 arcsec [2.36σ]
OotOffset-rm: 0.850 arcsec [1.82σ]
KicOffset-rm: 1.158 arcsec [2.50σ]
OotOffset-st: 2/3/2/4 [11]
KicOffset-st: 2/3/2/4 [11]
DiffImageQuality-fgm: 0.55 [6/11]
DiffImageOverlap-fno: 0.93 [14/15]

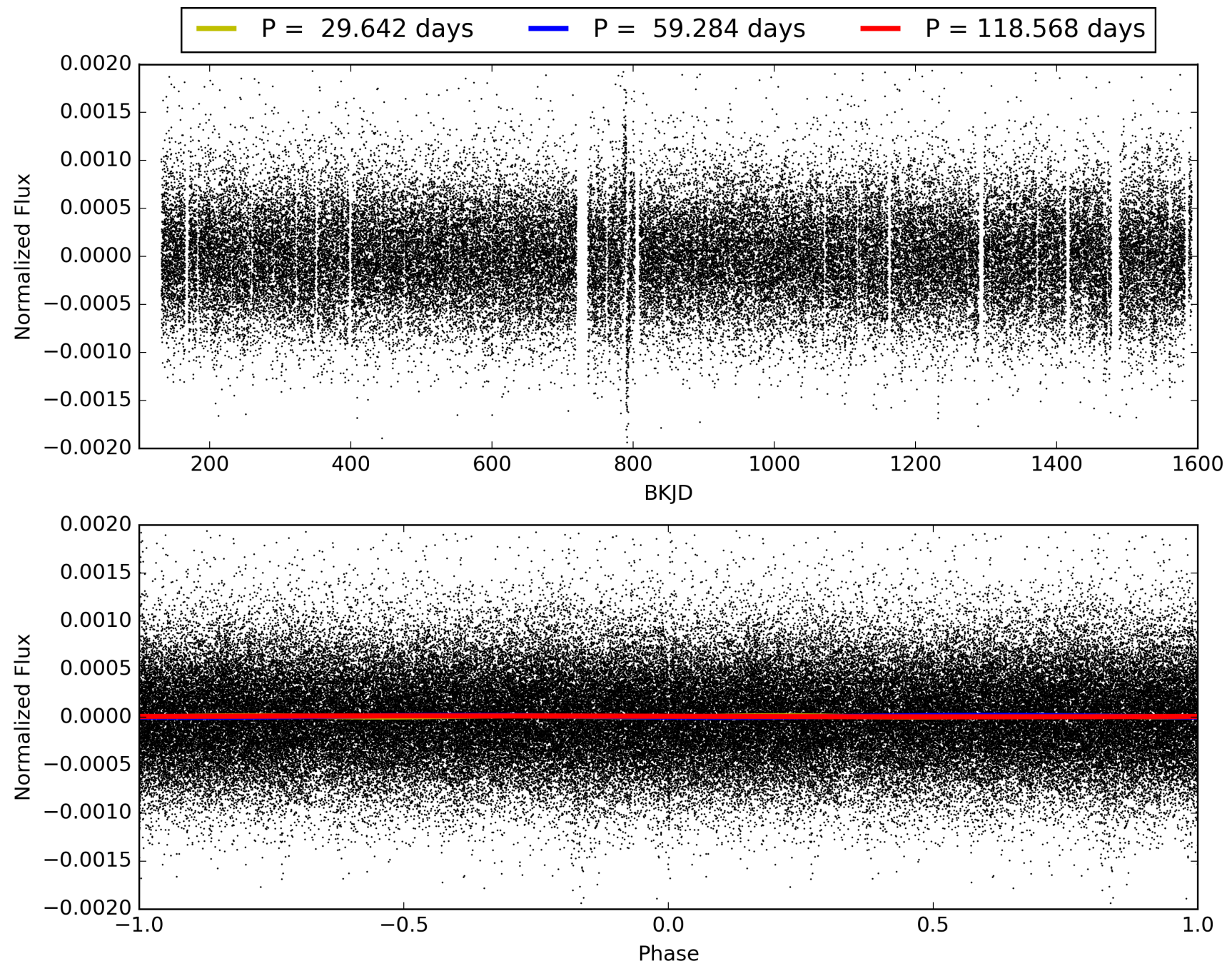
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:45:11 Z

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

TCE 009071593-02, PDC Light Curves

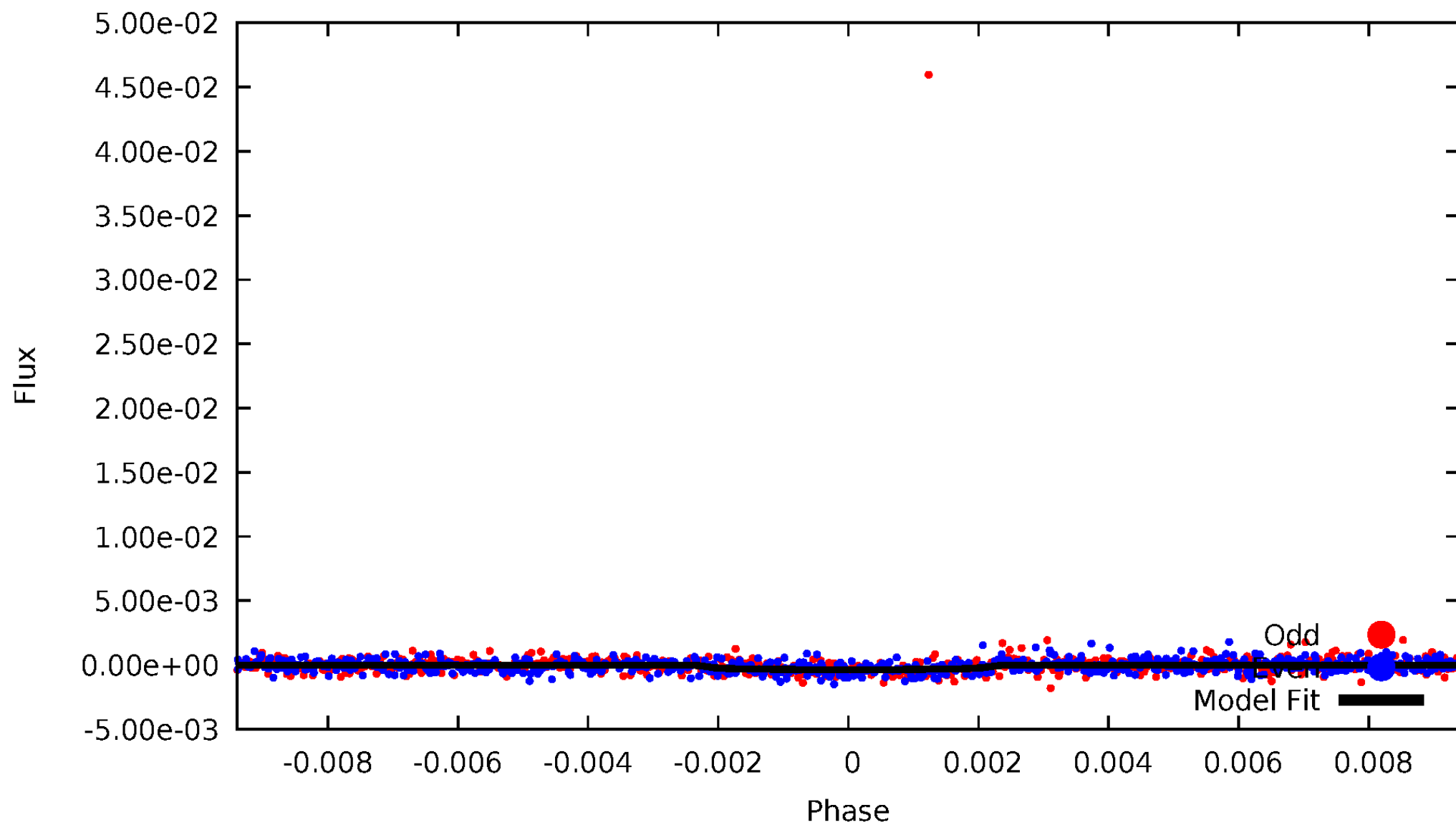


TCE 009071593-02



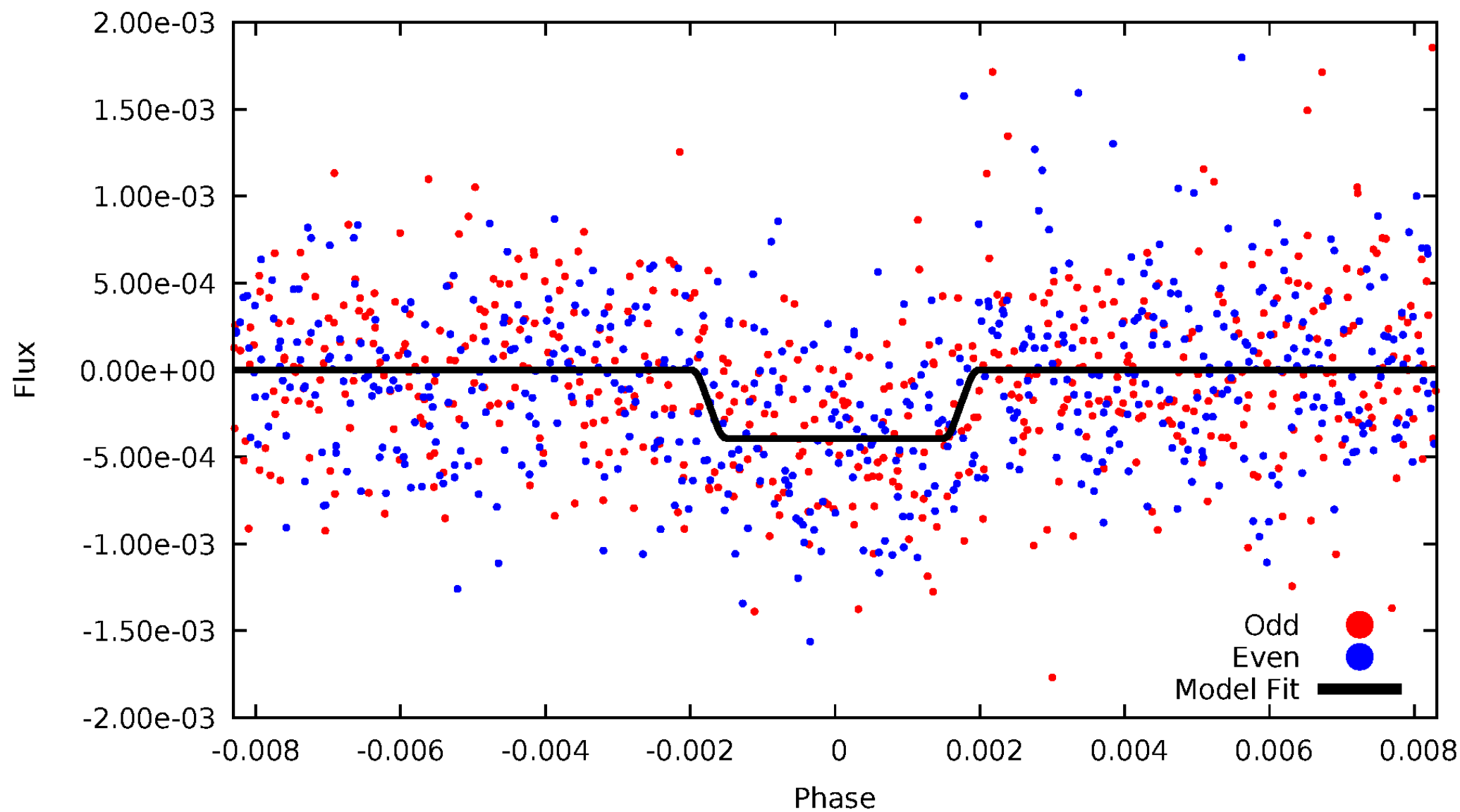
DV Odd/Even

TCE 009071593-02



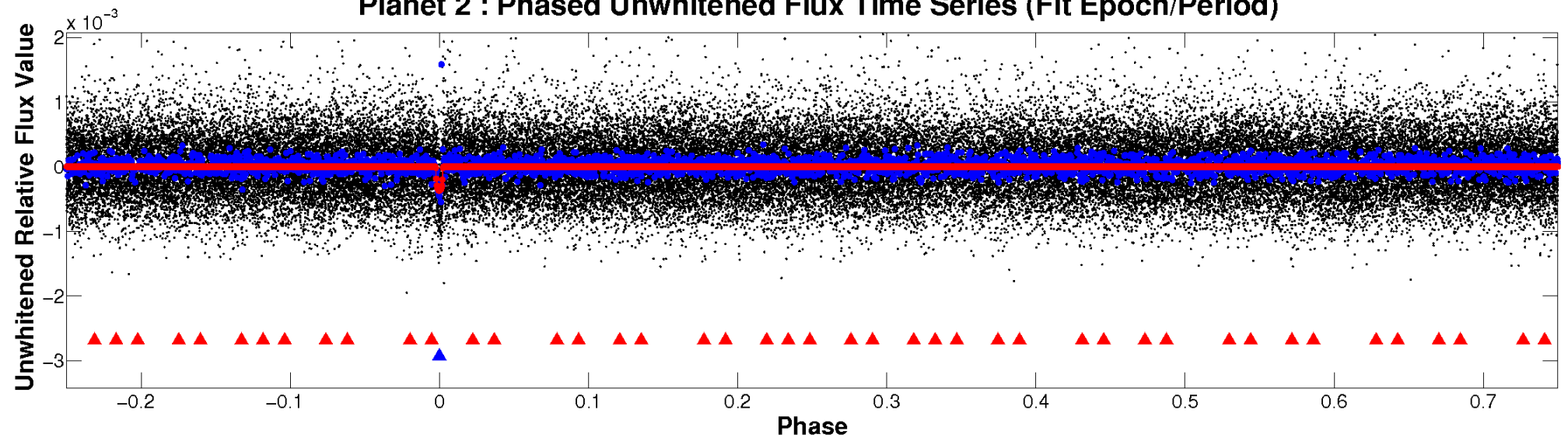
ALT Odd/Even

TCE 009071593-02

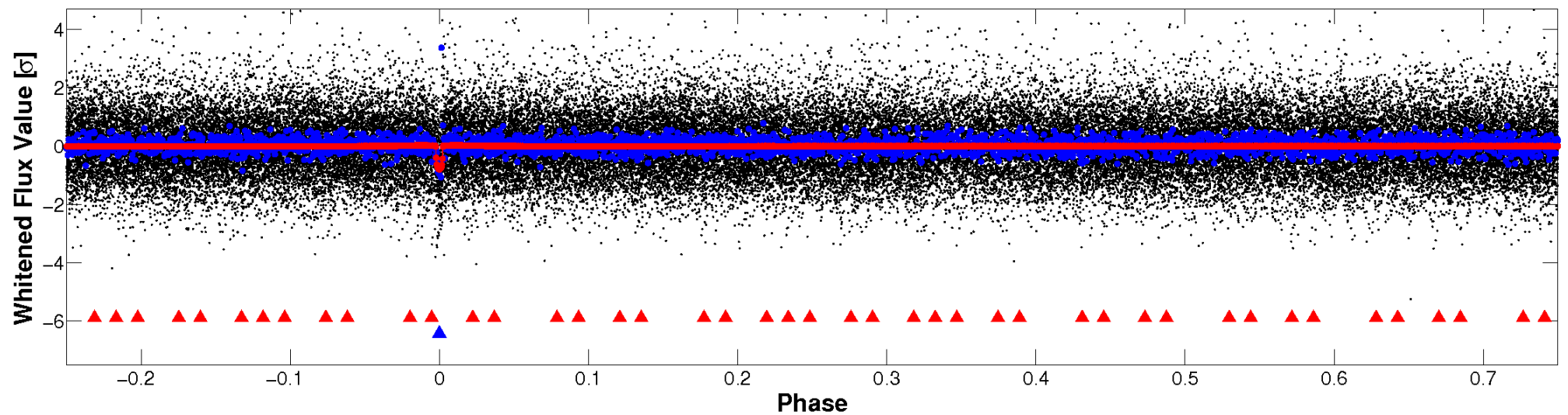


Non-Whitened Vs. Whitened Light Curve

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

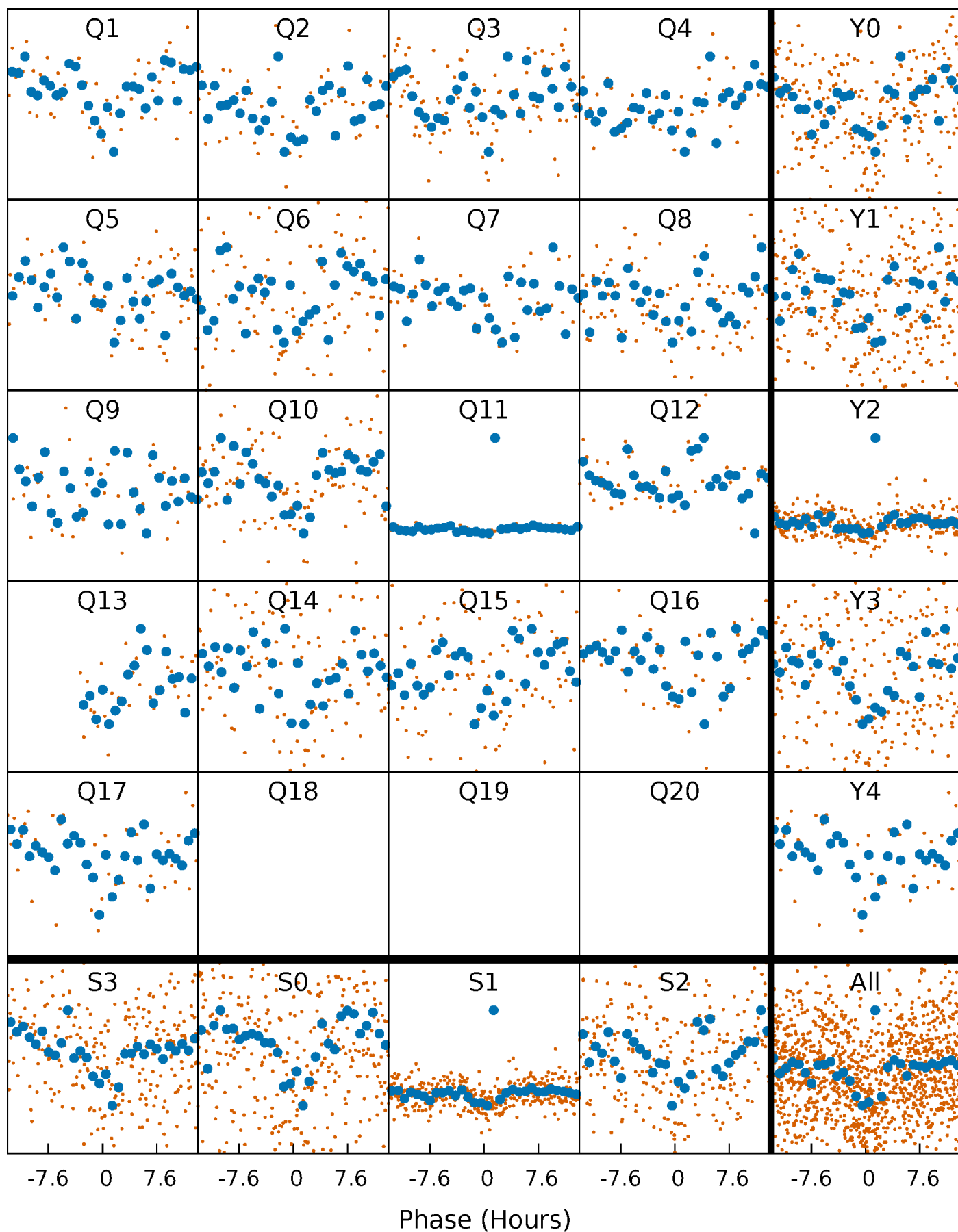


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



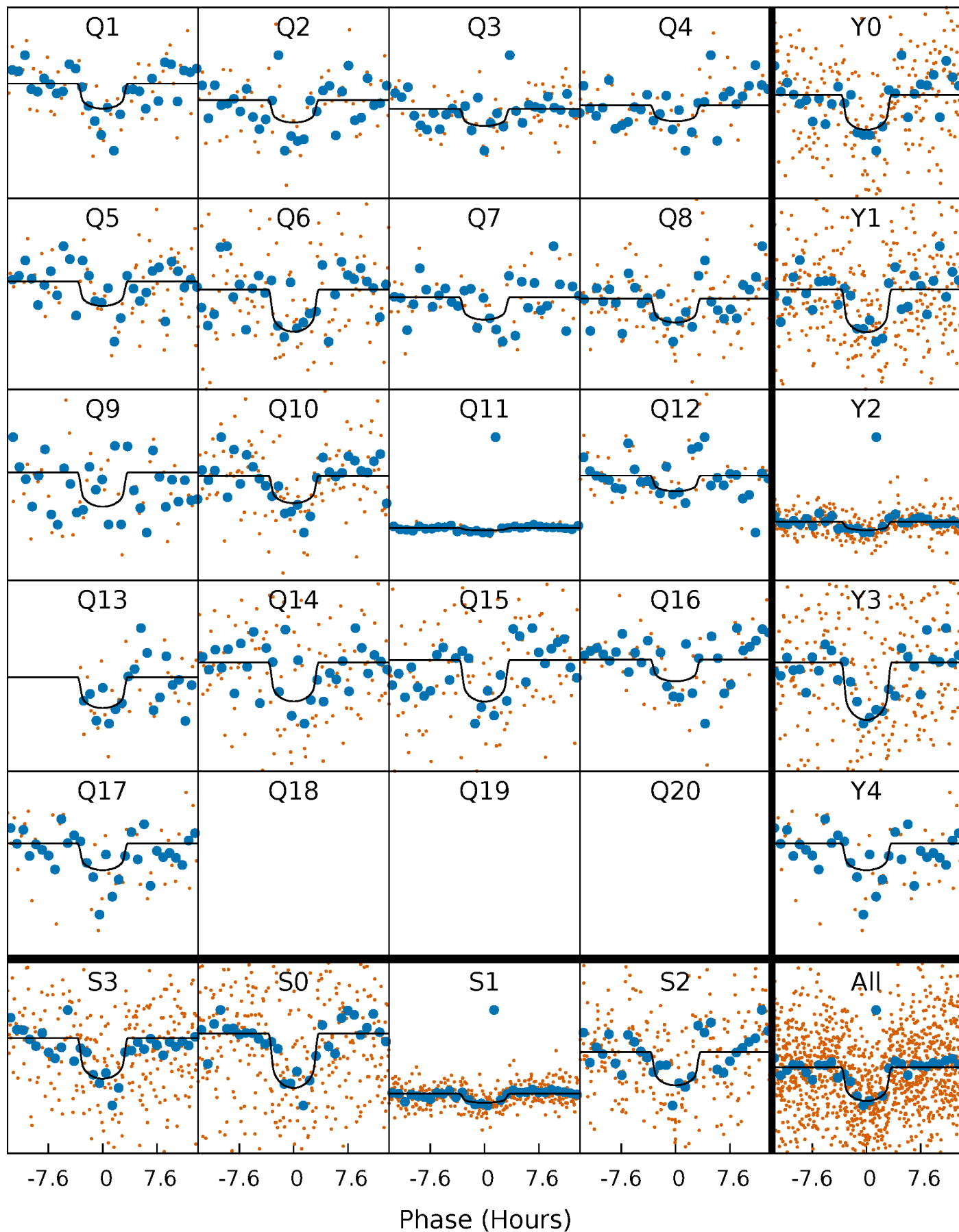
PDC Quarter-Phased Transit Curves

TCE 009071593-02 P= 59.284128 Days $T_0=148.733797$ (BKJD)



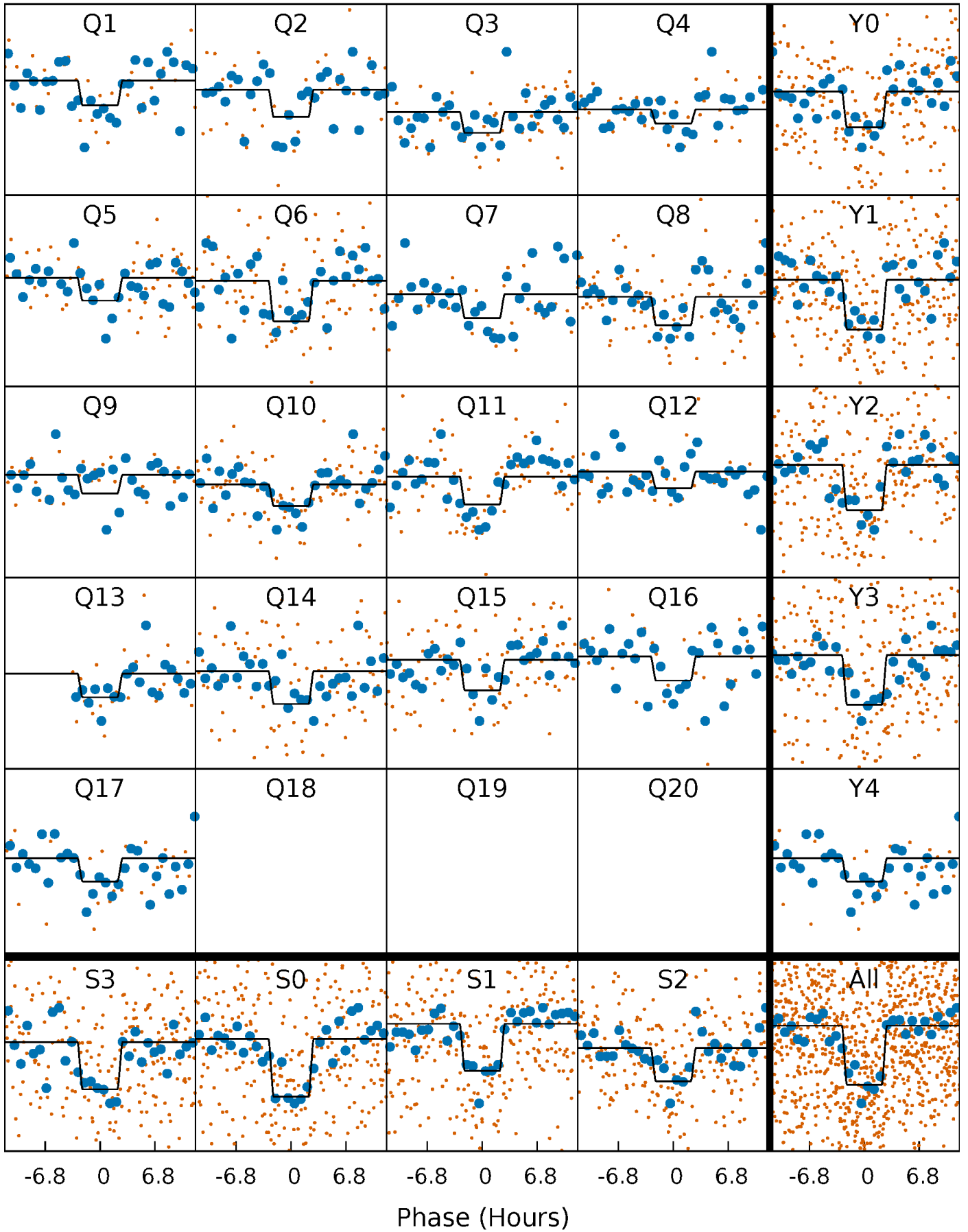
DV Quarter-Phased Transit Curves

TCE 009071593-02 P= 59.284128 Days $T_0=148.733797$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

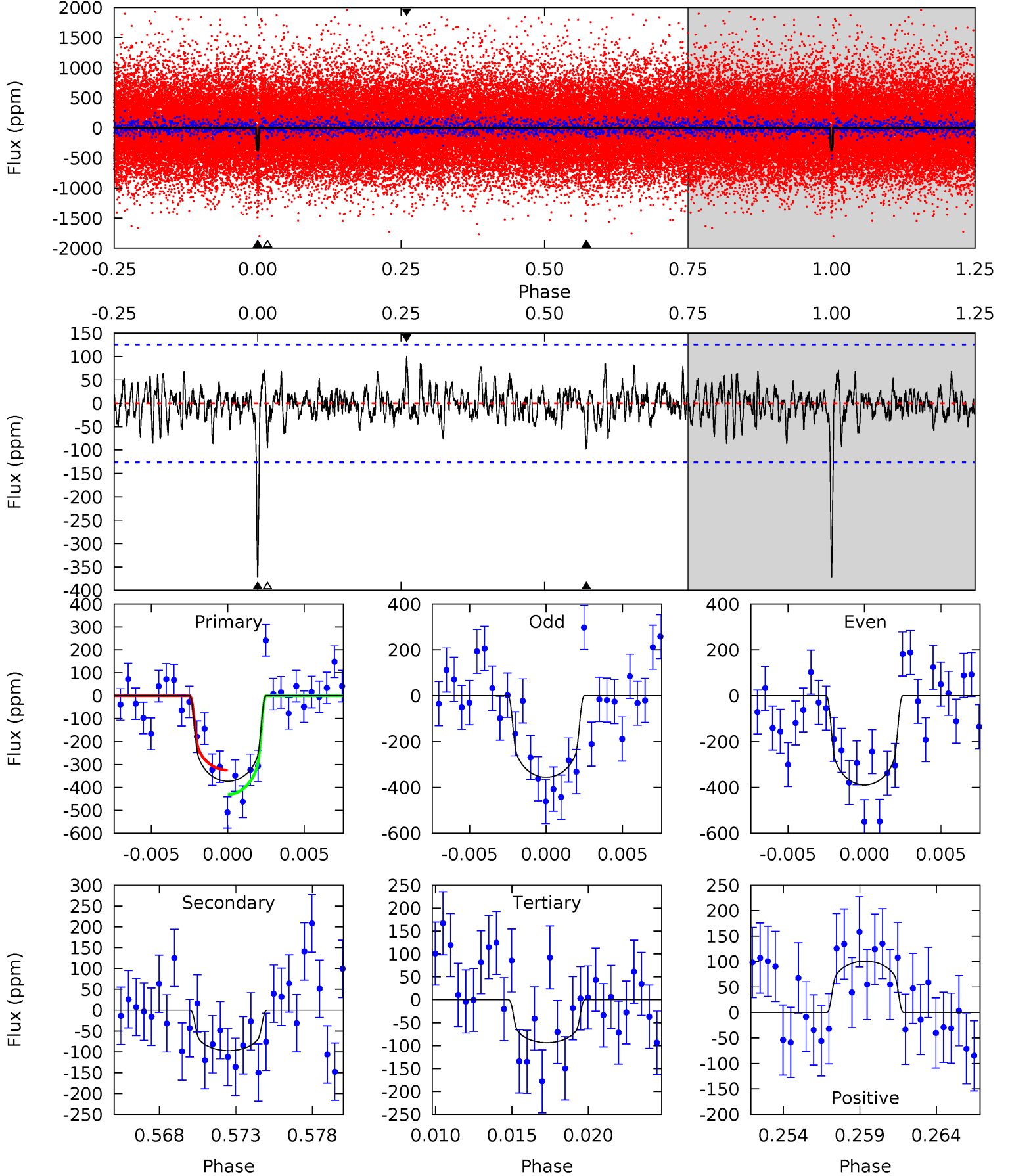
TCE 009071593-02 P= 59.283301 Days $T_0=148.759211$ (BKJD)



DV Model-Shift Uniqueness Test

009071593-02, P = 59.284128 Days, E = 89.449669 Days

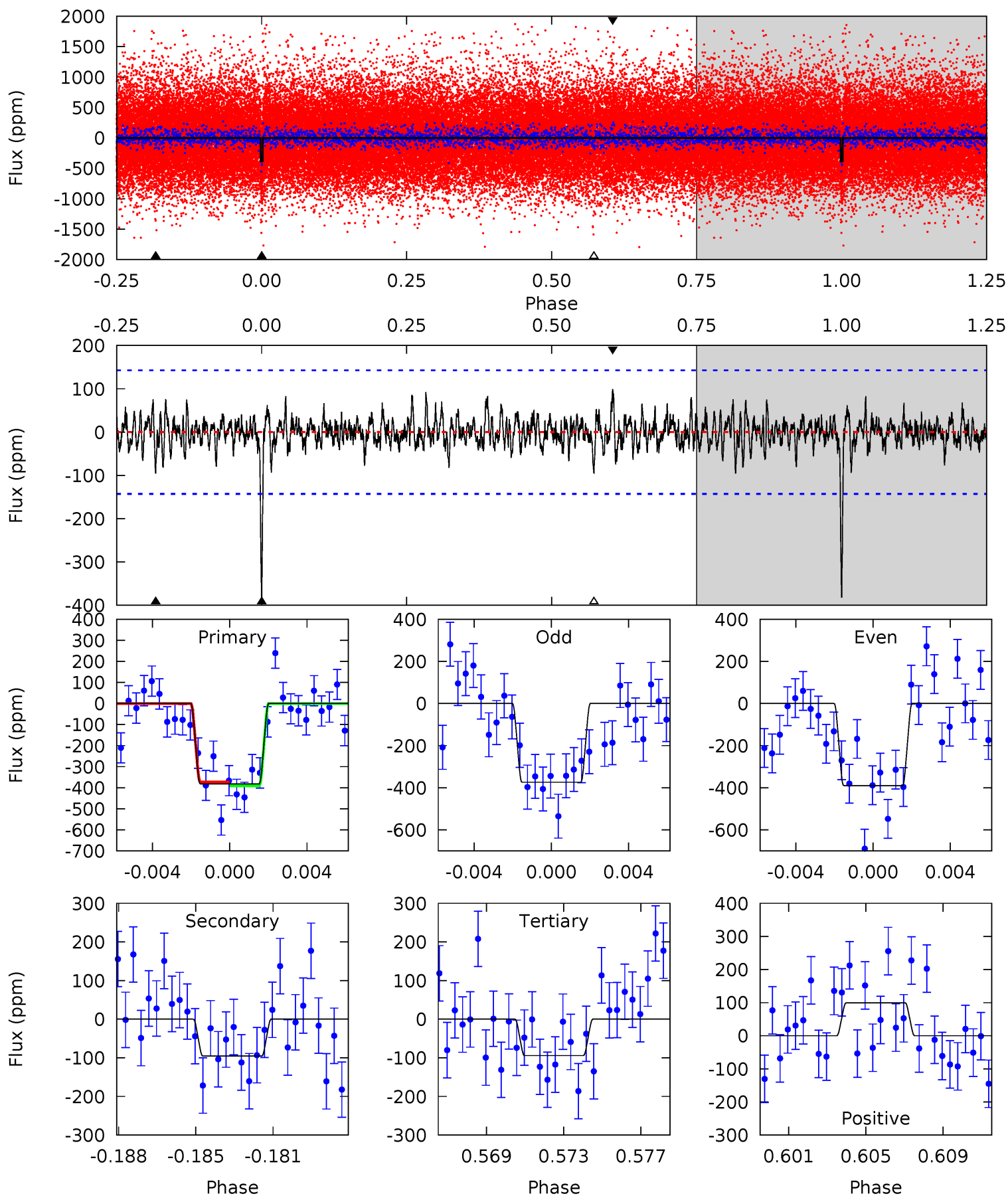
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.2	3.97	3.82	4.12	5.16	2.81	1.13	11.4	11.1	0.14	-0.15	0.70	0.54	0.21	2.17



Alt Model-Shift Uniqueness Test

009071593-02, P = 59.283301 Days, E = 89.475910 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.9	3.48	3.43	3.63	5.20	2.88	1.00	10.5	10.3	0.05	-0.15	0.30	0.95	0.21	0.33



Stellar Parameters For KIC 009071593

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5225^{+83}_{-73}	$4.505^{+0.054}_{-0.054}$	$0.140^{+0.150}_{-0.150}$	$0.859^{+0.063}_{-0.051}$	$0.861^{+0.050}_{-0.041}$	$1.911^{+0.369}_{-0.341}$
	+2%/-1%	+1%/-1%	+107%/-107%	+7%/-6%	+6%/-5%	+19%/-18%
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 009071593-02 / KOI 2257.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-97 ± 24	$1.98^{+0.85}_{-0.86}$	561^{+14}_{-13}	3882^{+997}_{-472}	1101^{+2319}_{-603}
Alt.	-96 ± 27	$1.90^{+0.83}_{-0.80}$	560^{+15}_{-13}	3915^{+950}_{-496}	1129^{+2440}_{-633}

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 $A_{obs} \gg 1.0$

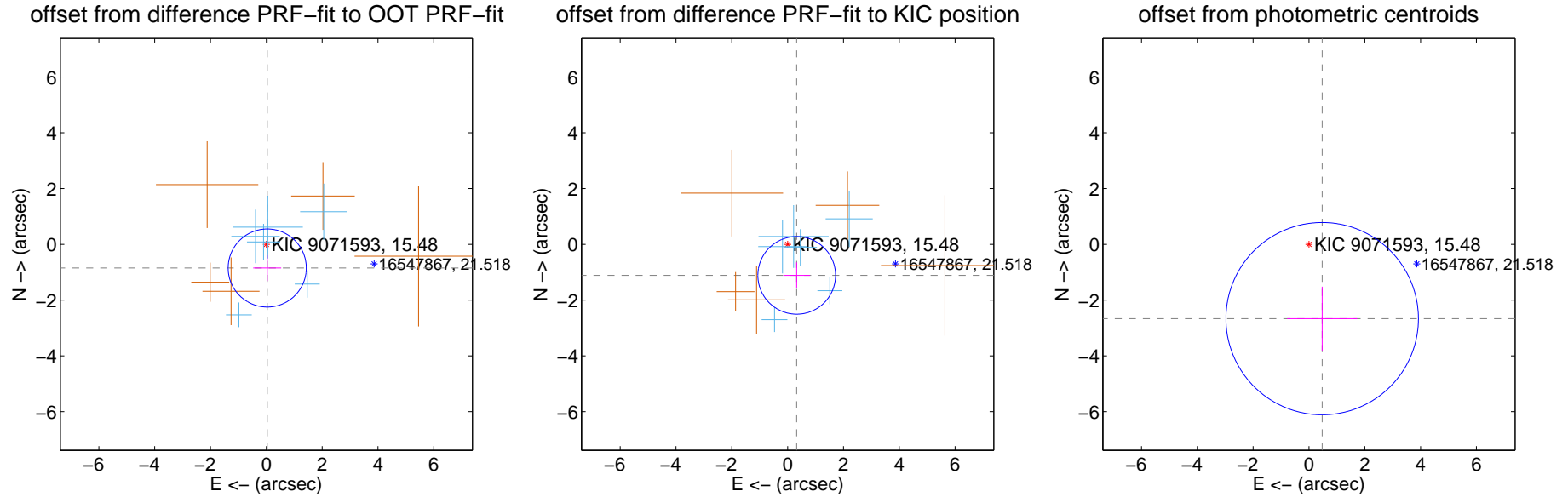
DV Centroid Data

Supplemental centroid analysis for 009071593-02. Kepler magnitude: 15.48. Transit SNR 11.68

There are 6 quarters with good PRF difference image offsets

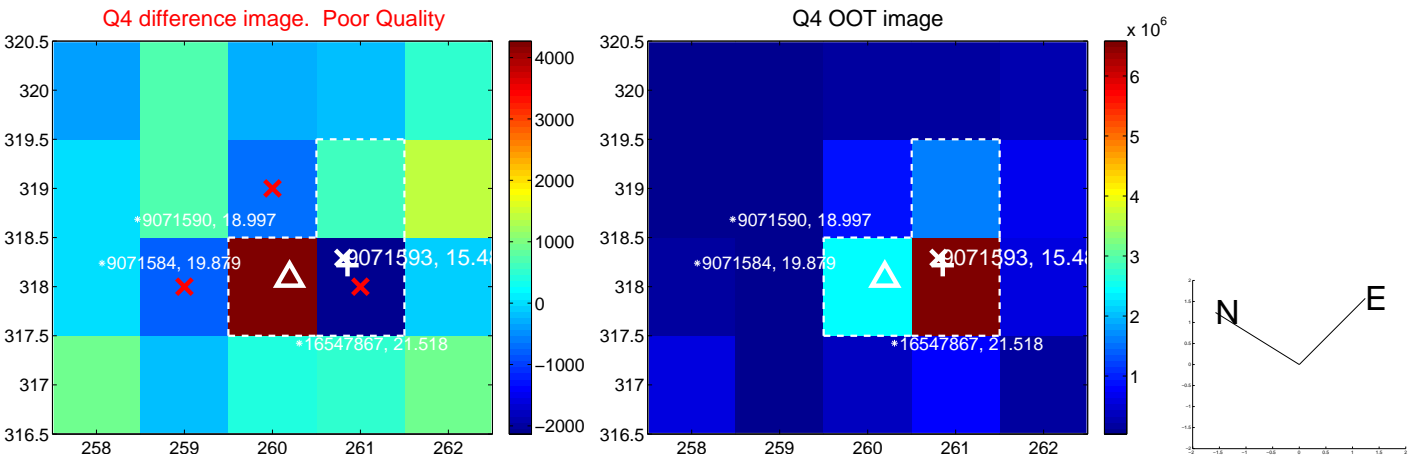
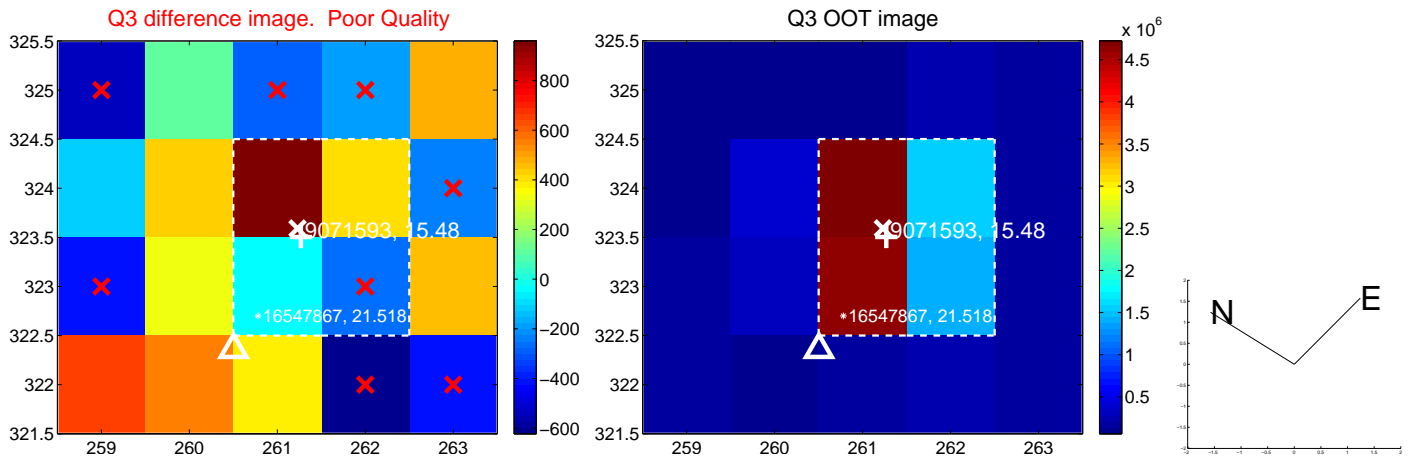
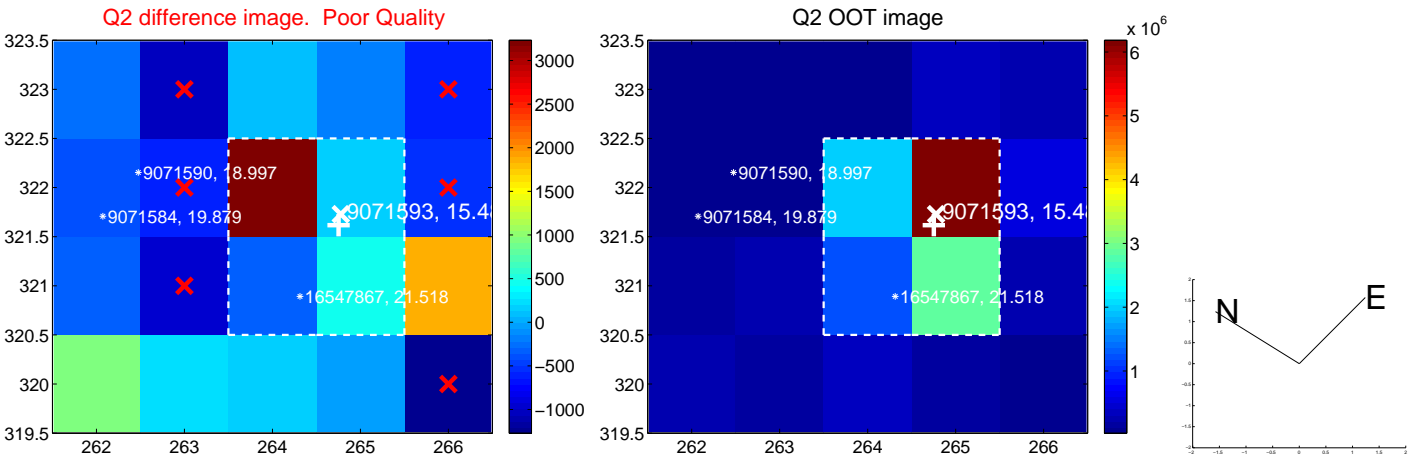
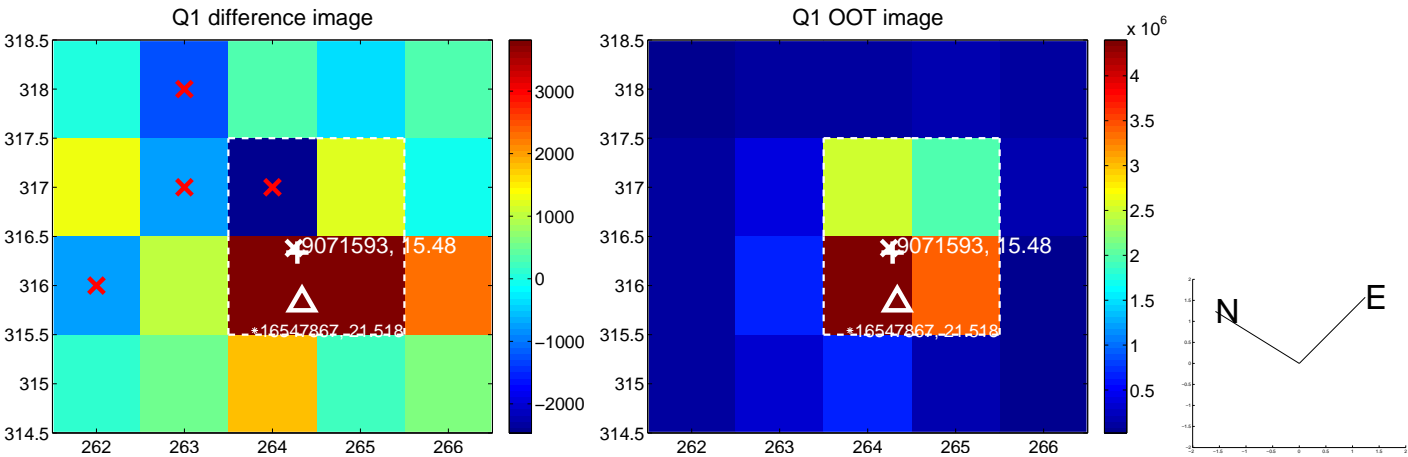
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.850 ± 0.467	1.82	-0.033 ± 0.501	-0.849 ± 0.467
PRF-fit source offset from KIC position	1.158 ± 0.464	2.50	-0.325 ± 0.476	-1.112 ± 0.463
photometric centroid source offset	2.71 ± 1.15	2.36	-0.47 ± 1.25	-2.66 ± 1.15

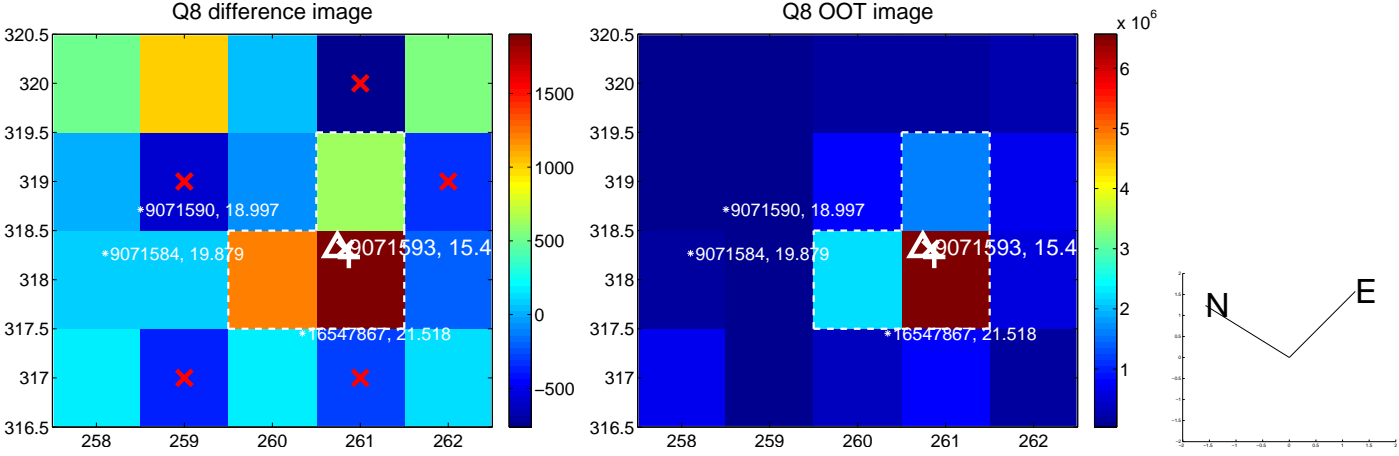
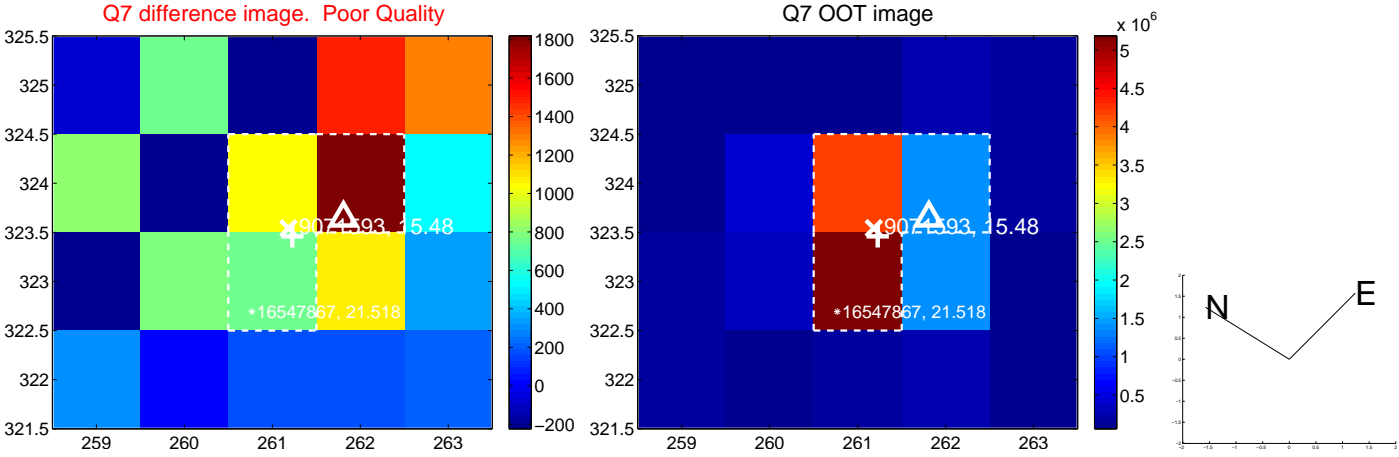
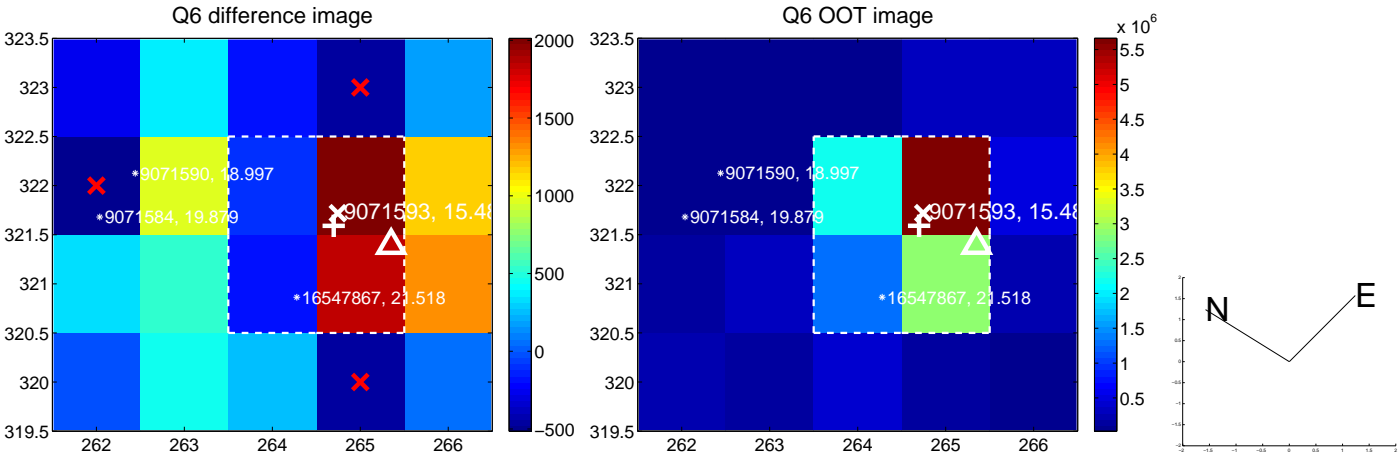
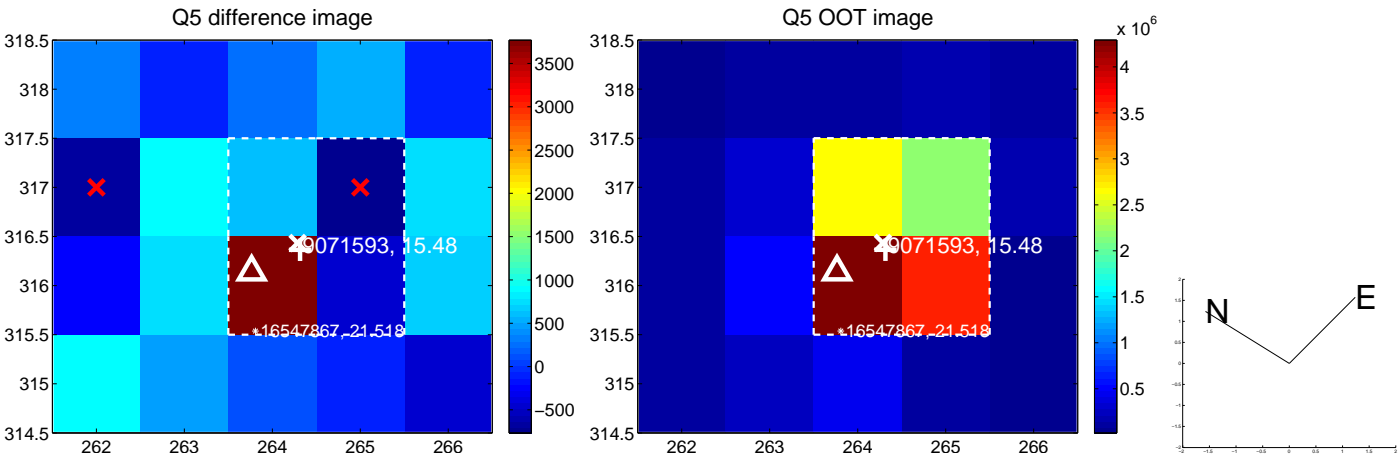


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

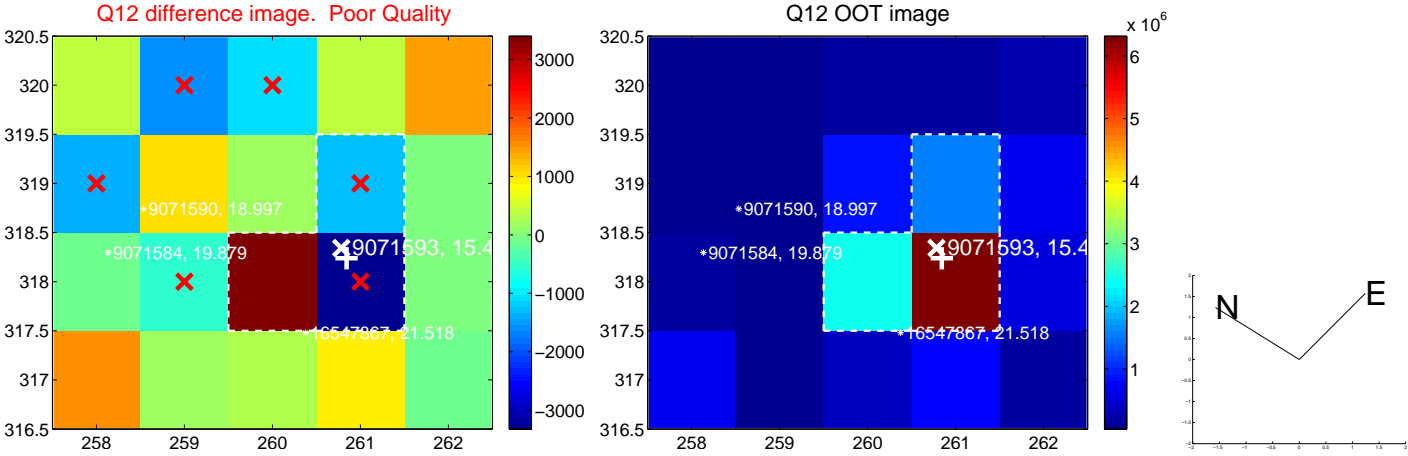
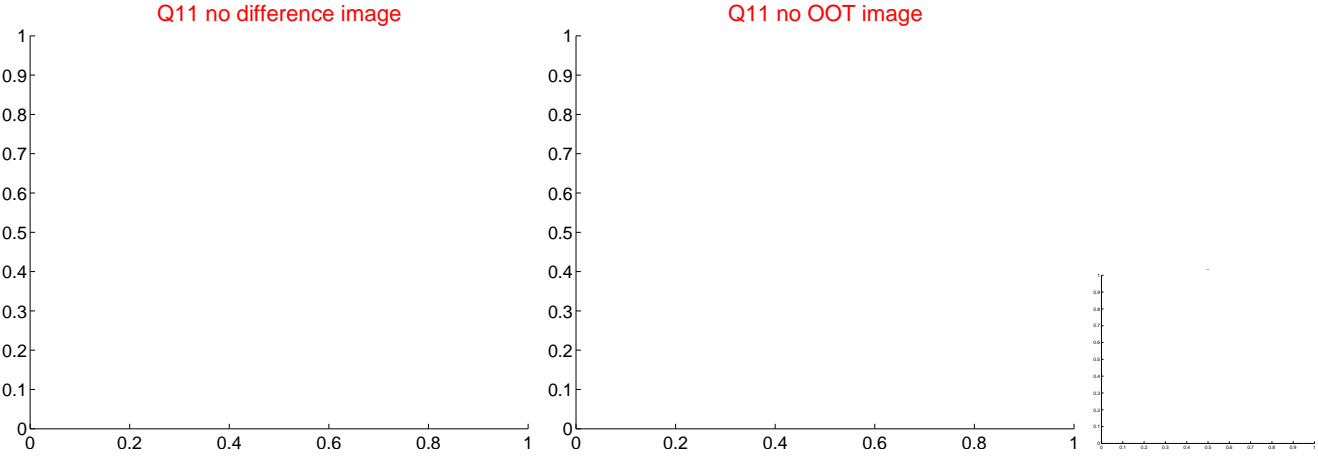
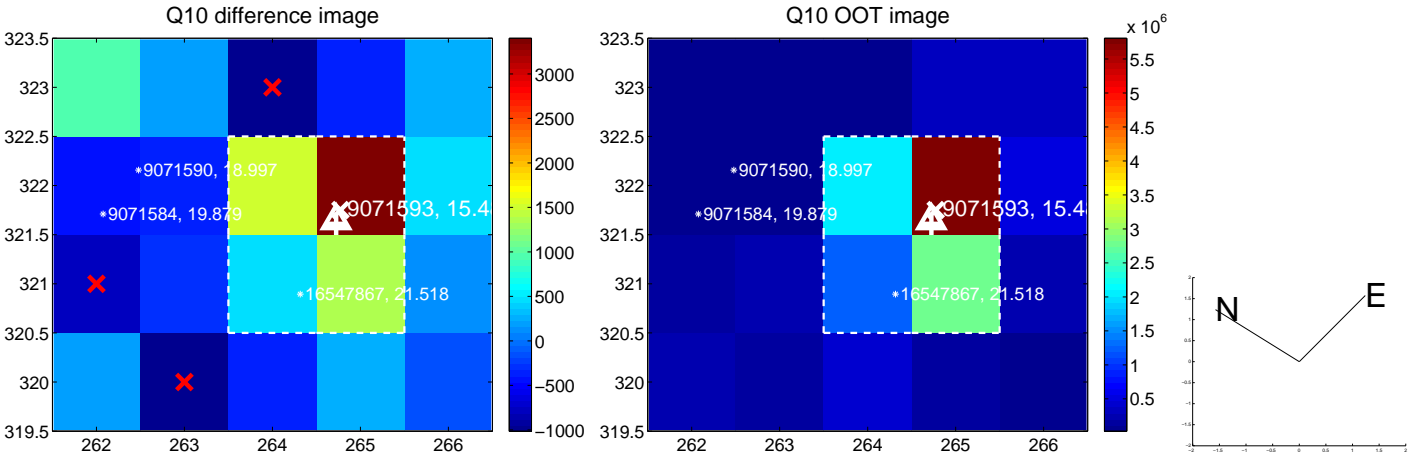
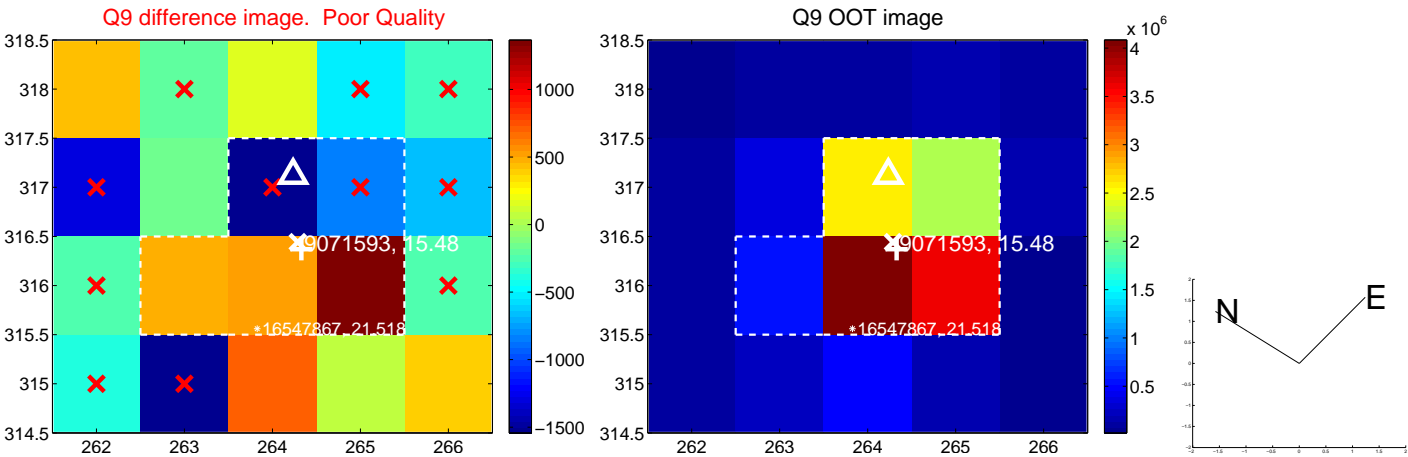
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



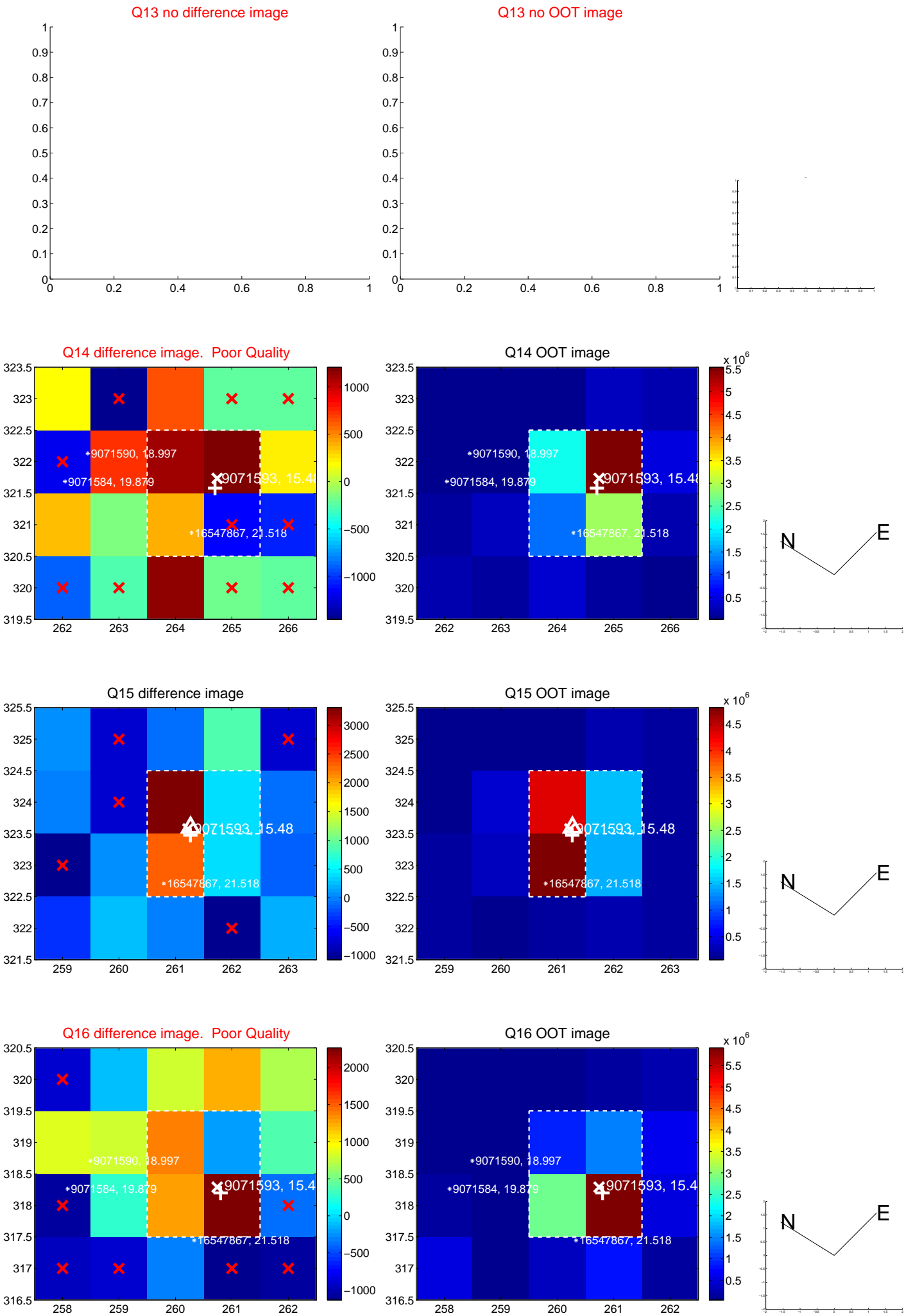
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



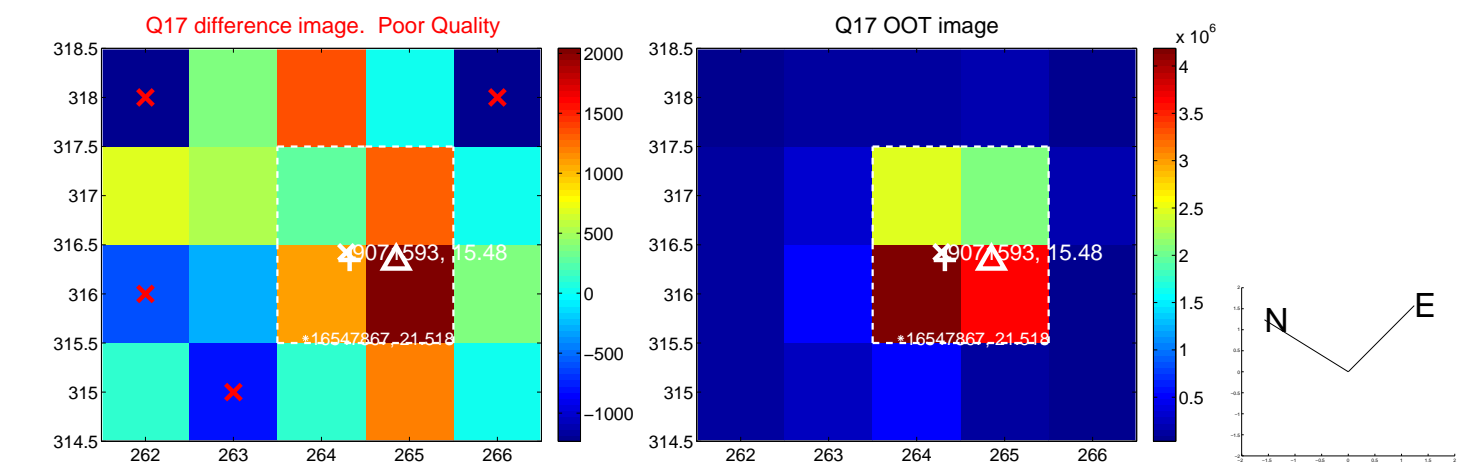
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



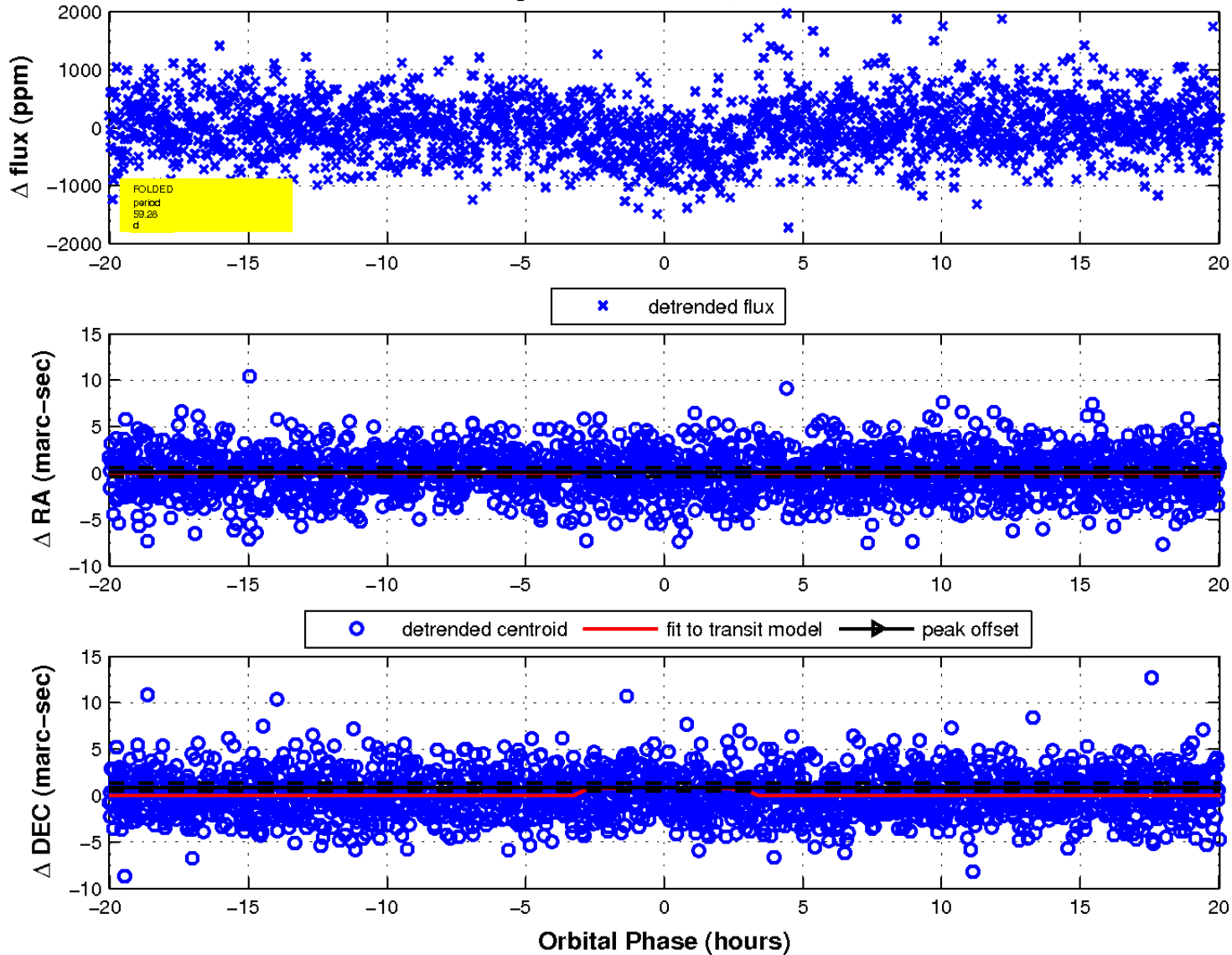
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

