

KIC 012116489

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})
012116489-01	OBS	0547.01	25.302929	137.453536	2102.1	4.605	104.1	105.3	0.89	5121	4.23	19.43
012116489-02	OBS	0547.03	12.386045	132.818589	153.3	2.809	8.0	8.9	0.89	5121	1.33	50.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012116489-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
012116489-02	OBS	PC	0.88	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.

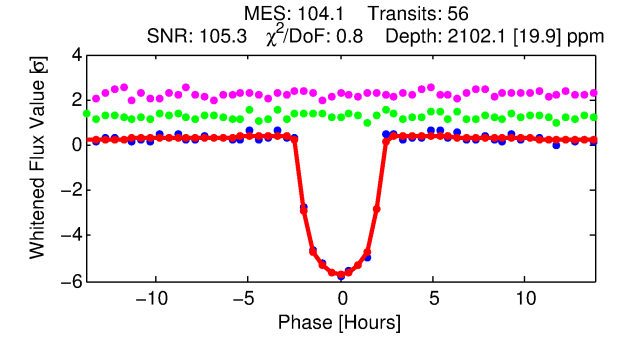
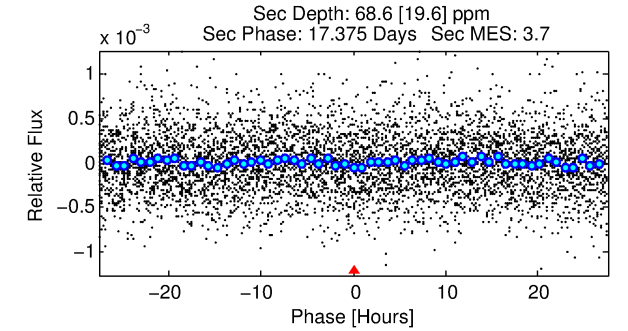
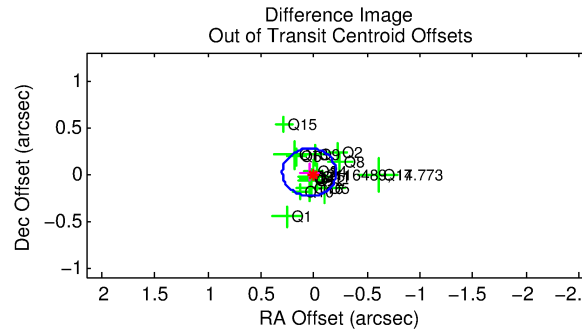
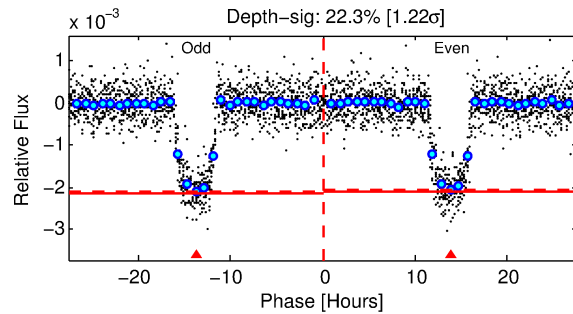
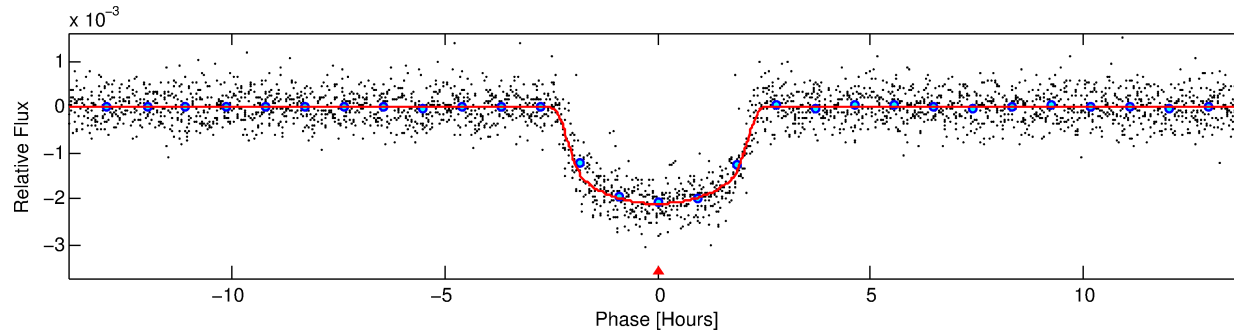
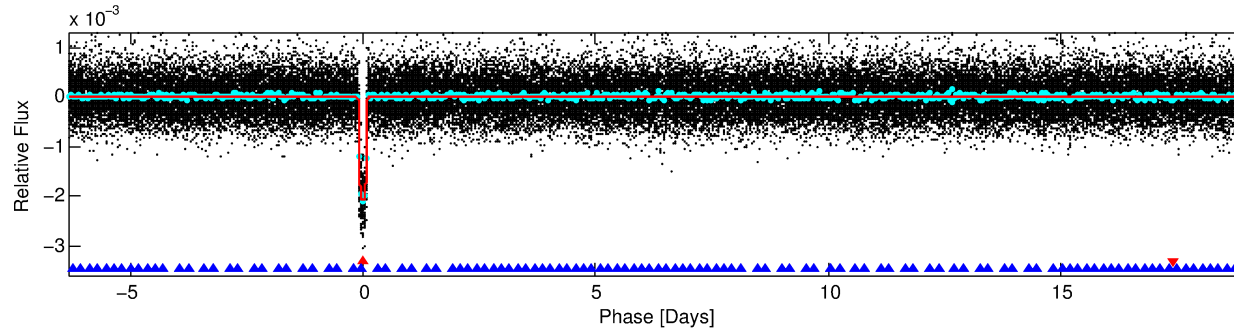
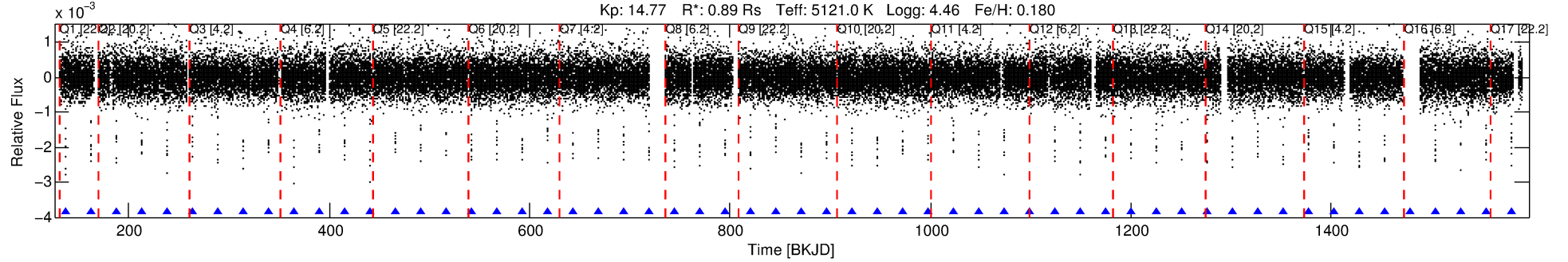
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012116489-01

No Significant Match Found

DV One-Page Summary

KIC: 12116489 Candidate: 1 of 2 Period: 25.303 d
KOI: K00547.01 Corr: 0.990



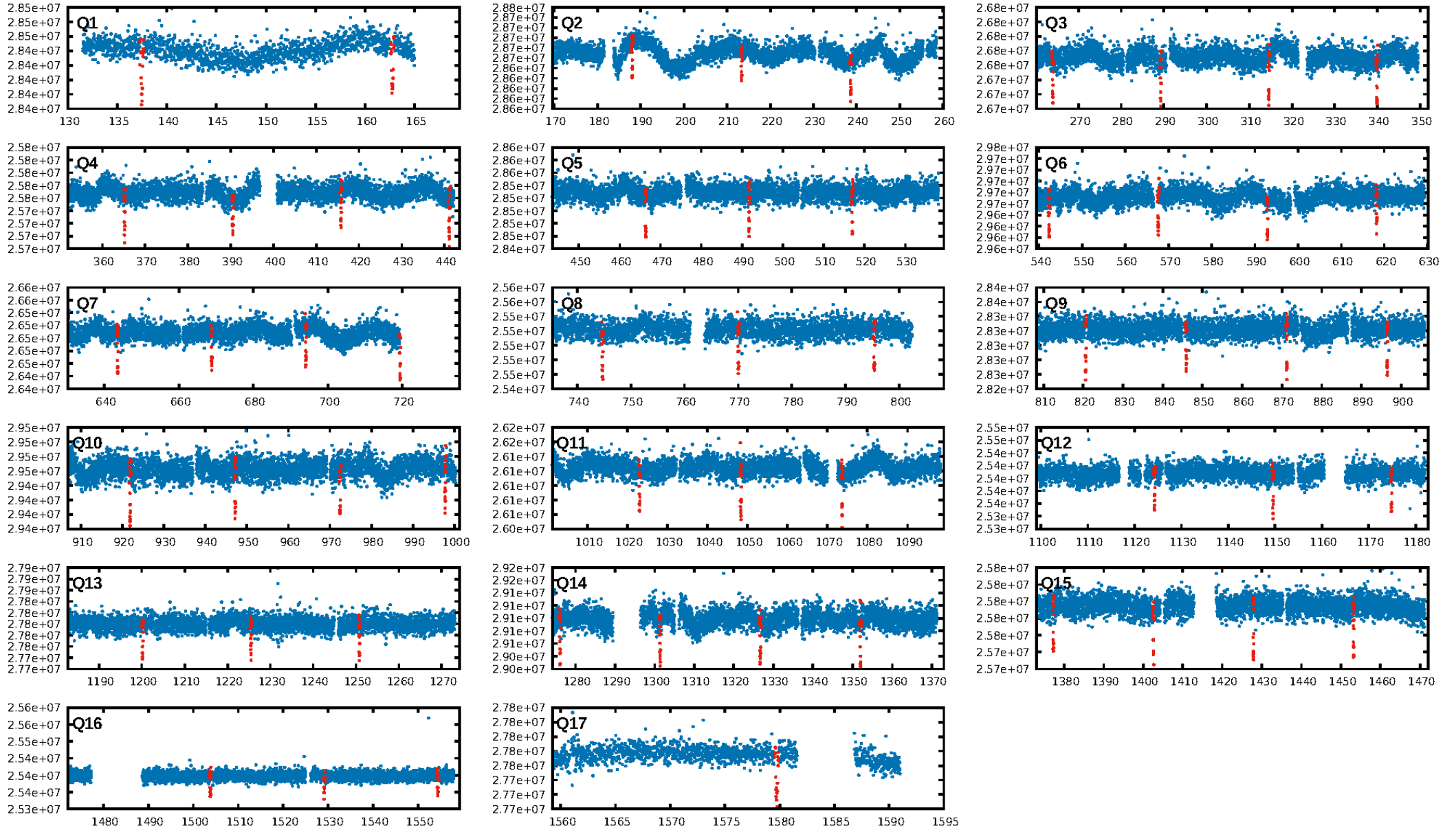
DV Fit Results:

Period = 25.30293 [0.00003] d
Epoch = 137.4535 [0.0009] BKJD
Rp/R* = 0.0436 [0.0035]
a/R* = 35.28 [9.83]
b = 0.62 [0.28]
Seff = 19.43 [3.24]
Teq = 535 [22] K
Rp = 4.23 [0.53] Re
a = 0.1582 [0.0149] AU
Ag = 52.78 [19.12] [2.71 σ]
Teffp = 2231 [187] K [9.02 σ]

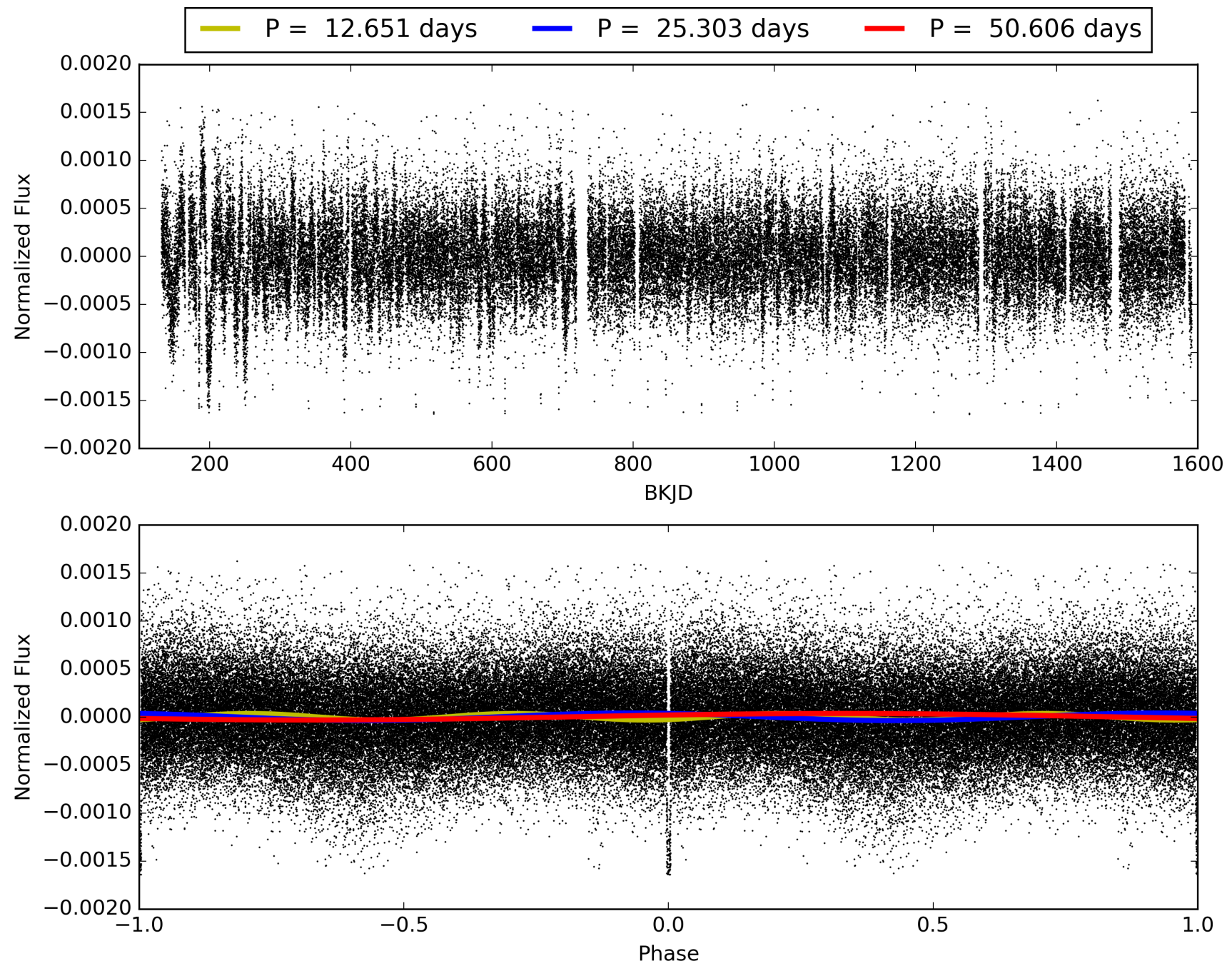
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [57.47 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 73.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [53/53]
GhostDiagnostic-chr: 3.696
Centroid-sig: 0.2%
Centroid-so: 0.140 arcsec [1.02 σ]
OotOffset-rm: 0.048 arcsec [0.57 σ]
KicOffset-rm: 0.100 arcsec [1.18 σ]
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 012116489-01, PDC Light Curves

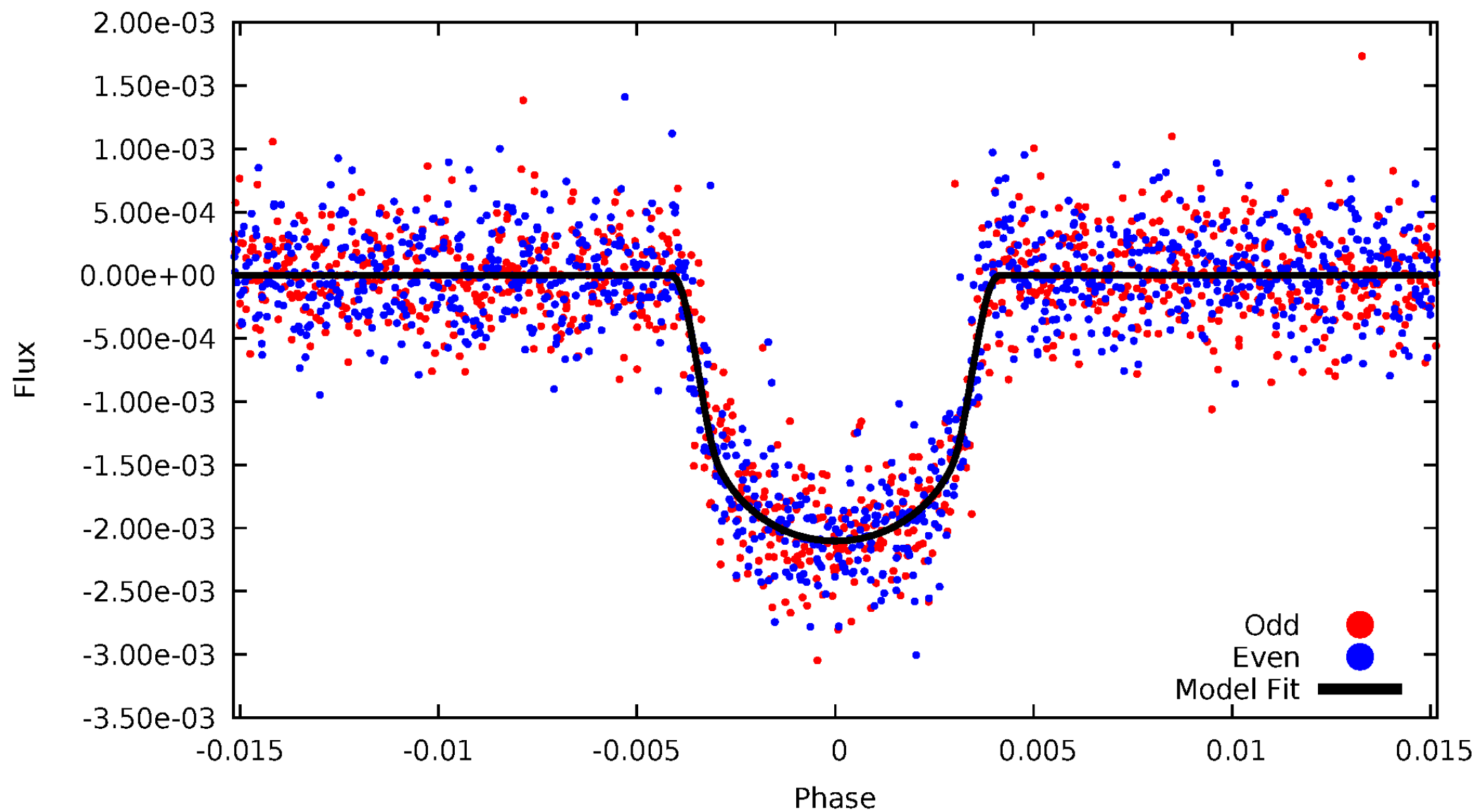


TCE 012116489-01



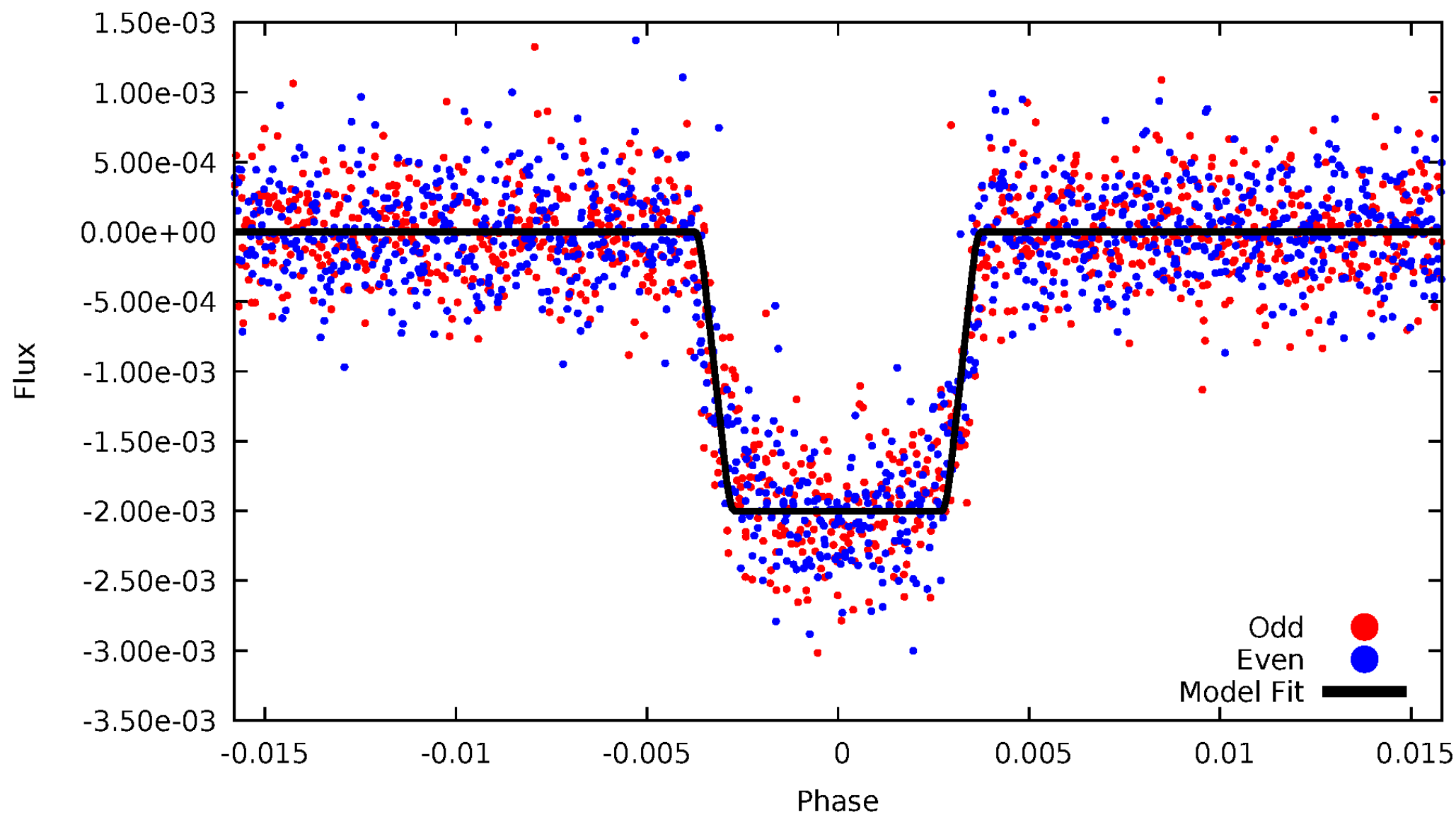
DV Odd/Even

TCE 012116489-01



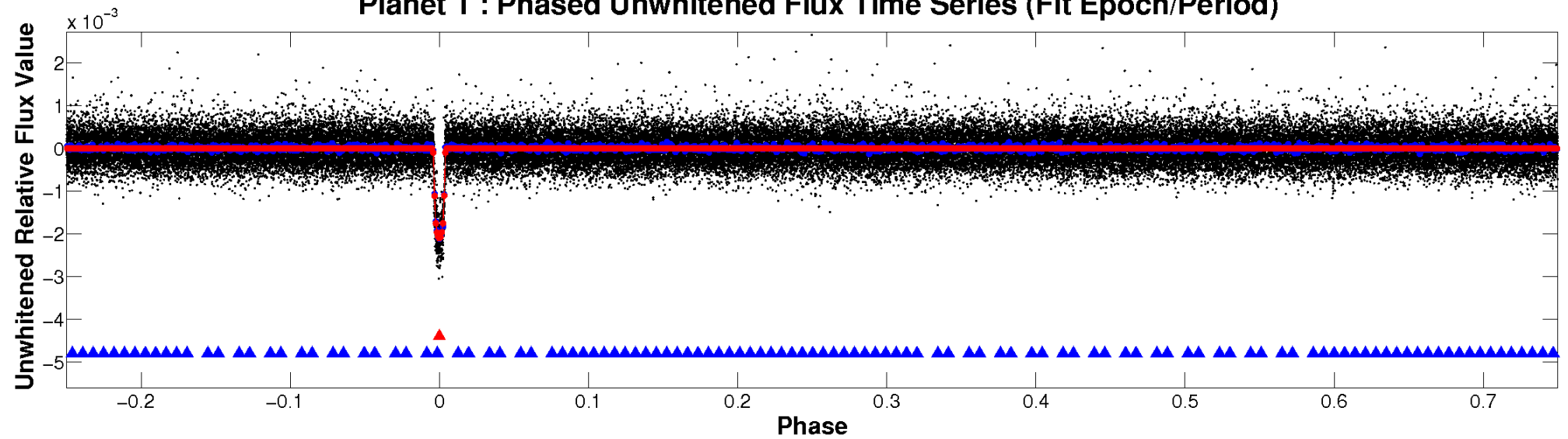
ALT Odd/Even

TCE 012116489-01

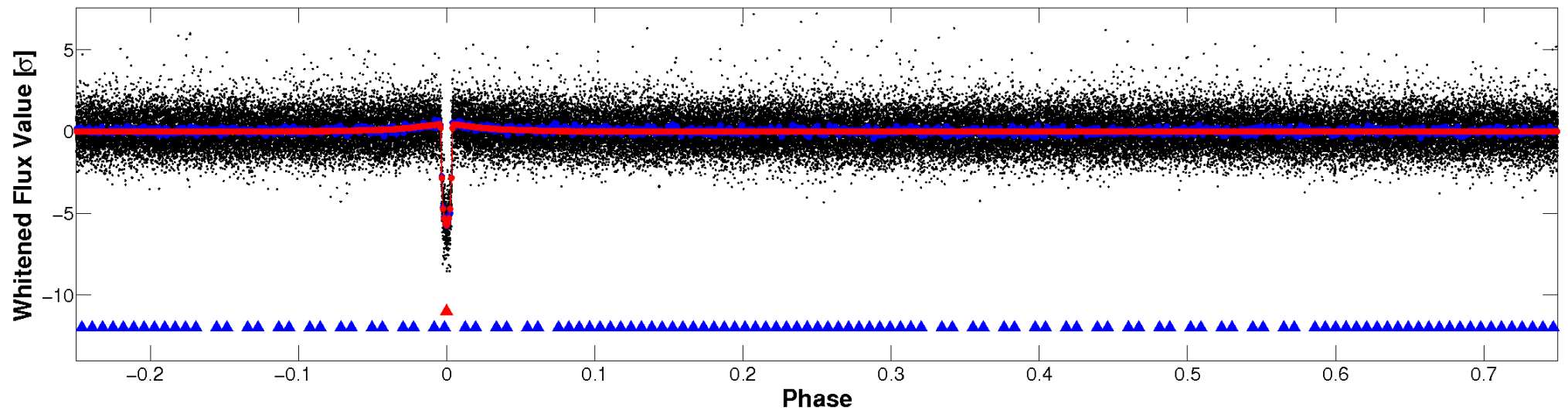


Non-Whitened Vs. Whitened Light Curve

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

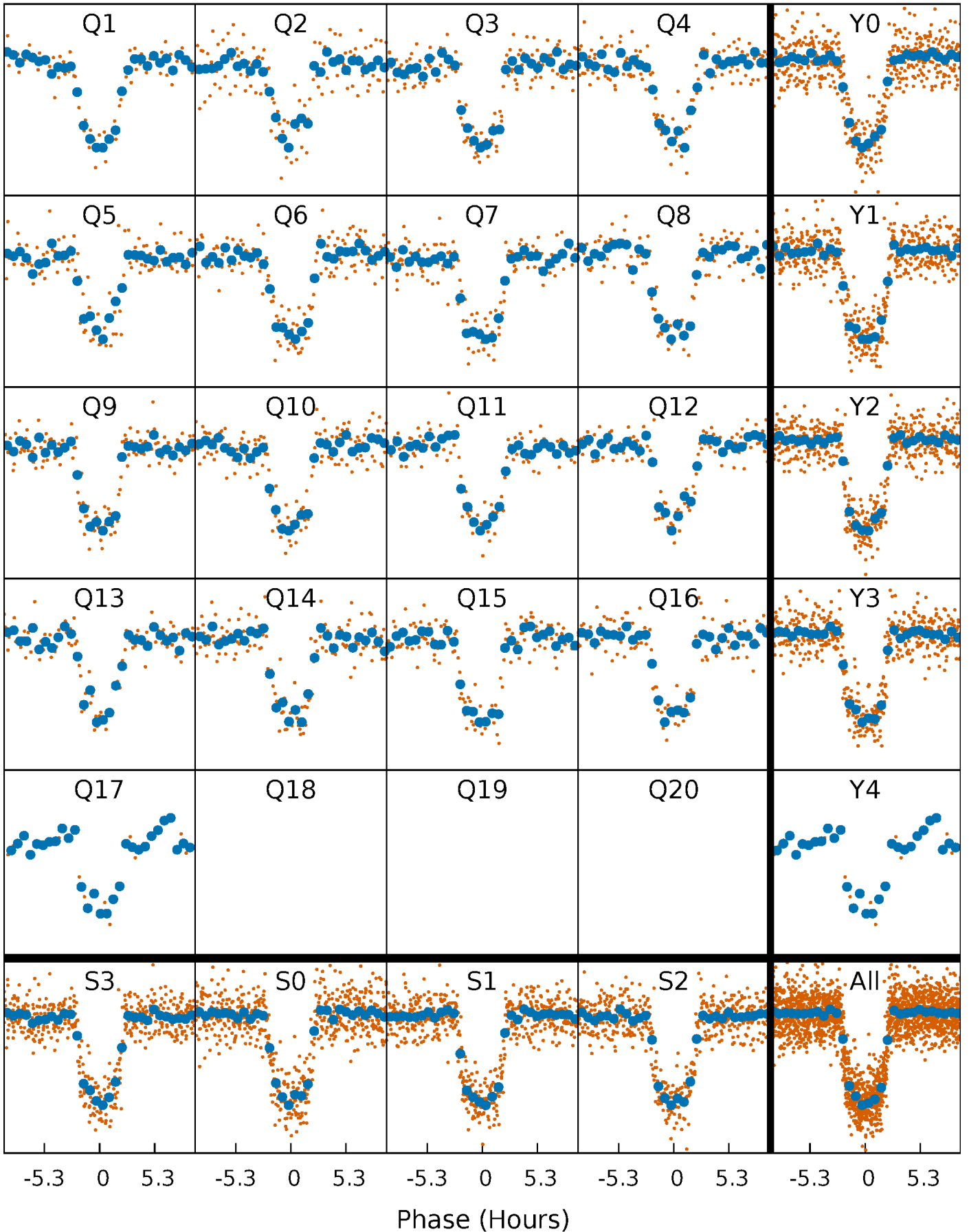


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



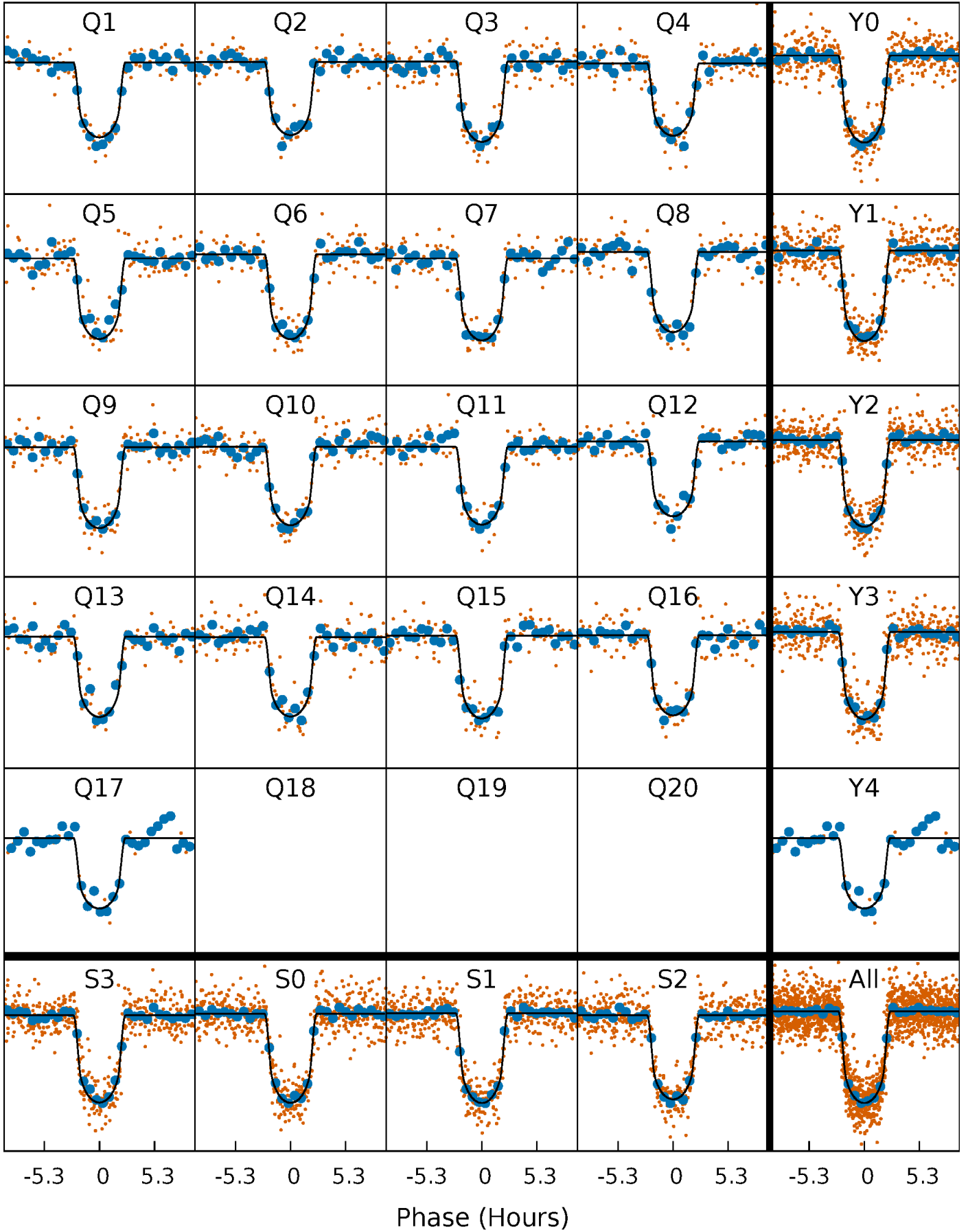
PDC Quarter-Phased Transit Curves

TCE 012116489-01 P= 25.302929 Days $T_0=137.453535$ (BKJD)



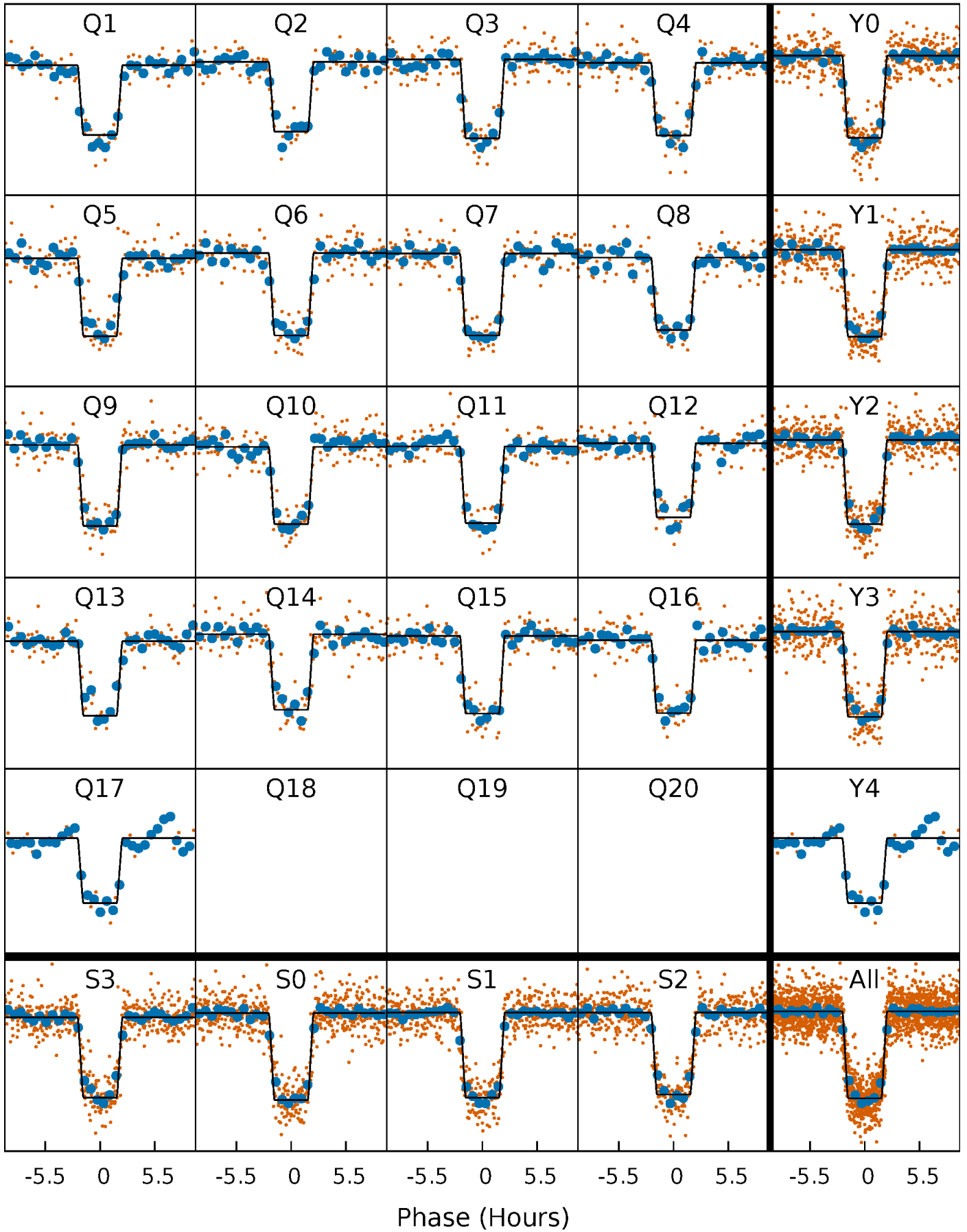
DV Quarter-Phased Transit Curves

TCE 012116489-01 P= 25.302929 Days $T_0=137.453535$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

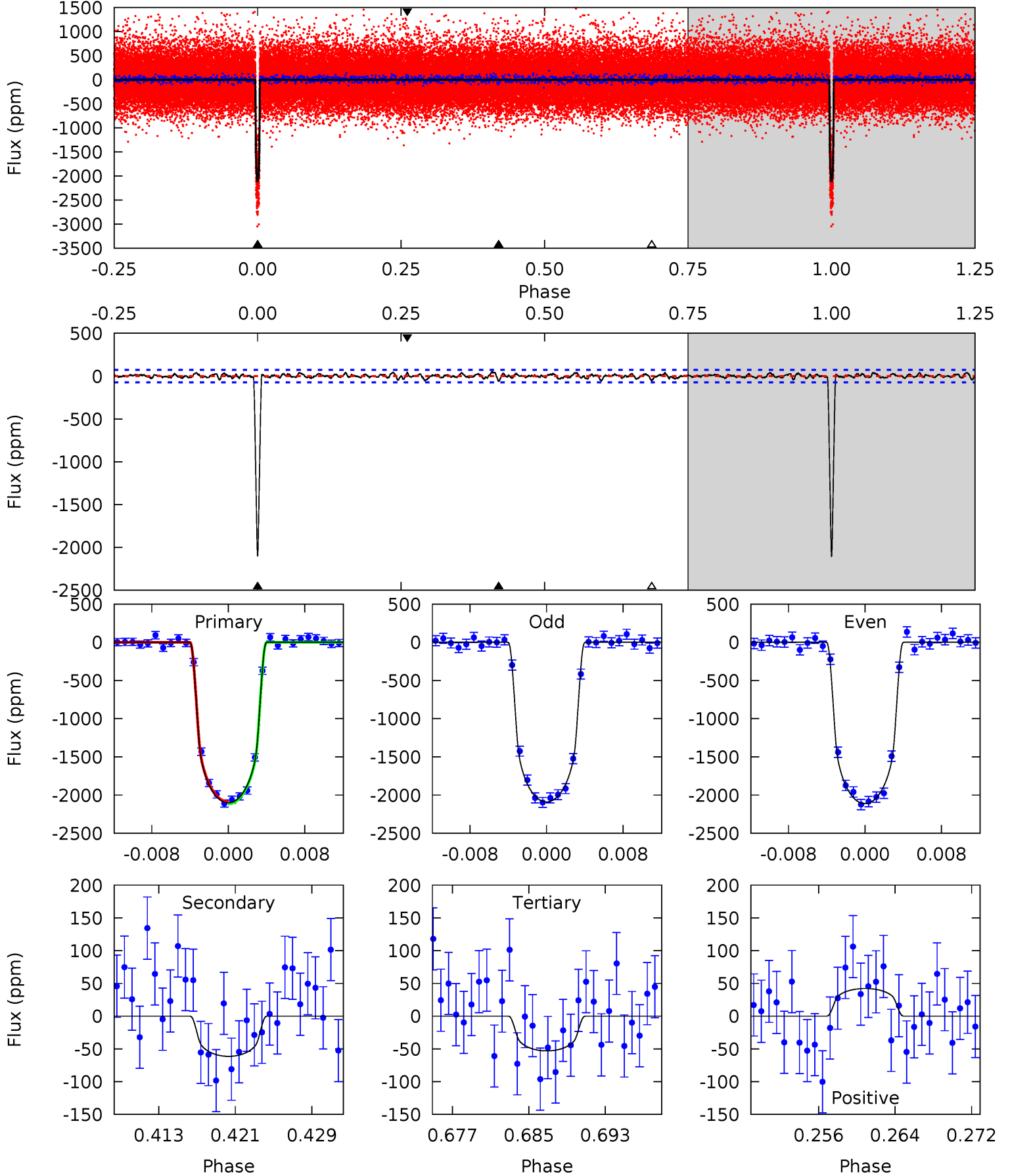
TCE 012116489-01 P= 25.302842 Days $T_0=137.456419$ (BKJD)



DV Model-Shift Uniqueness Test

012116489-01, P = 25.302929 Days, E = 112.150606 Days

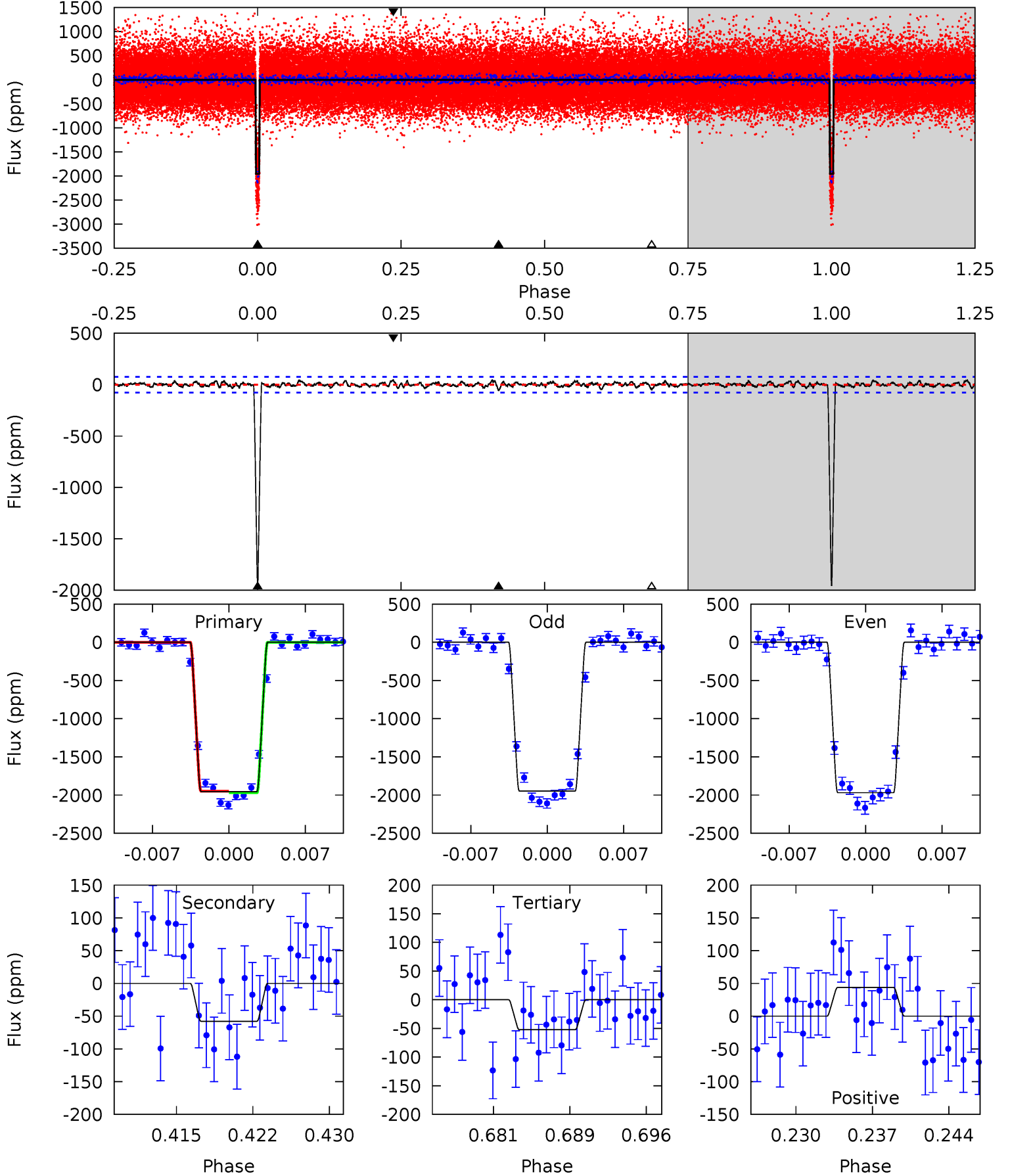
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
147.7	4.32	3.73	2.97	5.06	2.64	1.17	144.0	144.7	0.59	1.35	0.76	1.00	0.02	0.92



Alt Model-Shift Uniqueness Test

012116489-01, $P = 25.302842$ Days, $E = 112.153577$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
130.6	3.86	3.48	2.92	5.08	2.68	1.02	127.1	127.7	0.38	0.94	0.69	0.99	0.02	0.70



Stellar Parameters For KIC 012116489

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5121^{+84}_{-76}	$4.457^{+0.091}_{-0.039}$	$0.180^{+0.150}_{-0.150}$	$0.888^{+0.049}_{-0.084}$	$0.822^{+0.053}_{-0.029}$	$1.656^{+0.573}_{-0.244}$
	+2%/-1%	+2%/-1%	+83%/-83%	+6%/-9%	+6%/-4%	+35%/-15%
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 012116489-01 / KOI 0547.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-61 ± 14	$4.21^{+0.37}_{-0.40}$	743^{+19}_{-21}	2852^{+118}_{-116}	47^{+17}_{-12}
Alt.	-58 ± 15	$4.29^{+0.38}_{-0.39}$	743^{+18}_{-21}	2820^{+113}_{-126}	44^{+15}_{-12}

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

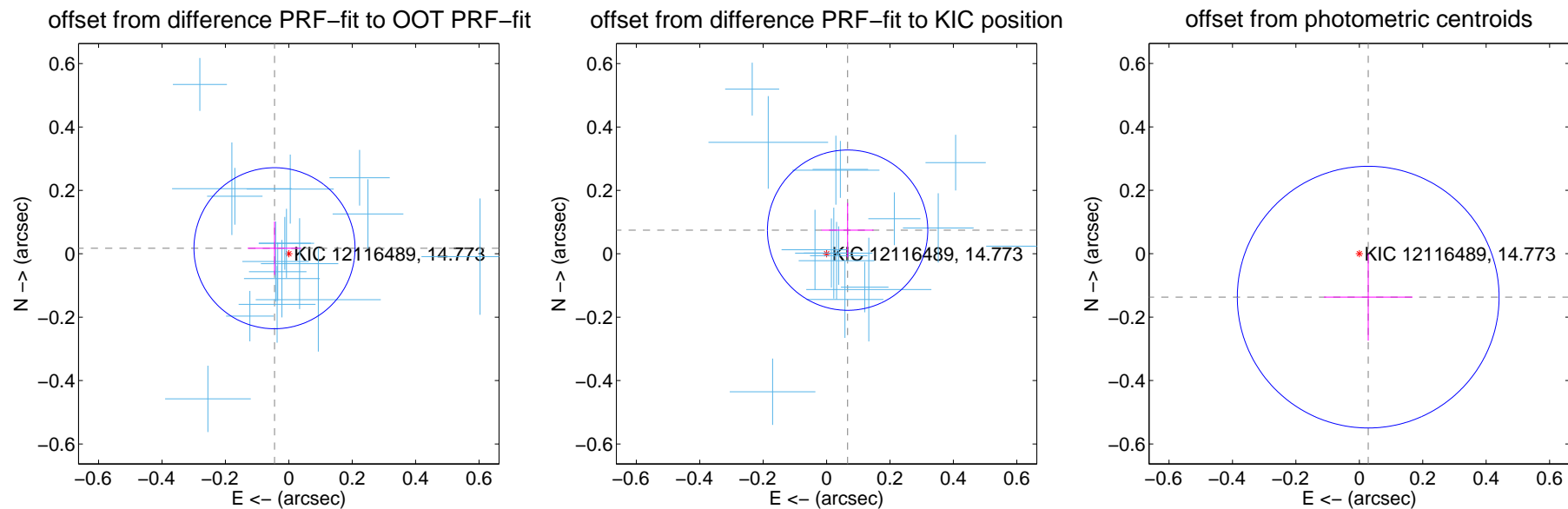
DV Centroid Data

Supplemental centroid analysis for 012116489-01. Kepler magnitude: 14.77. Transit SNR 105.31

There are 17 quarters with good PRF difference image offsets

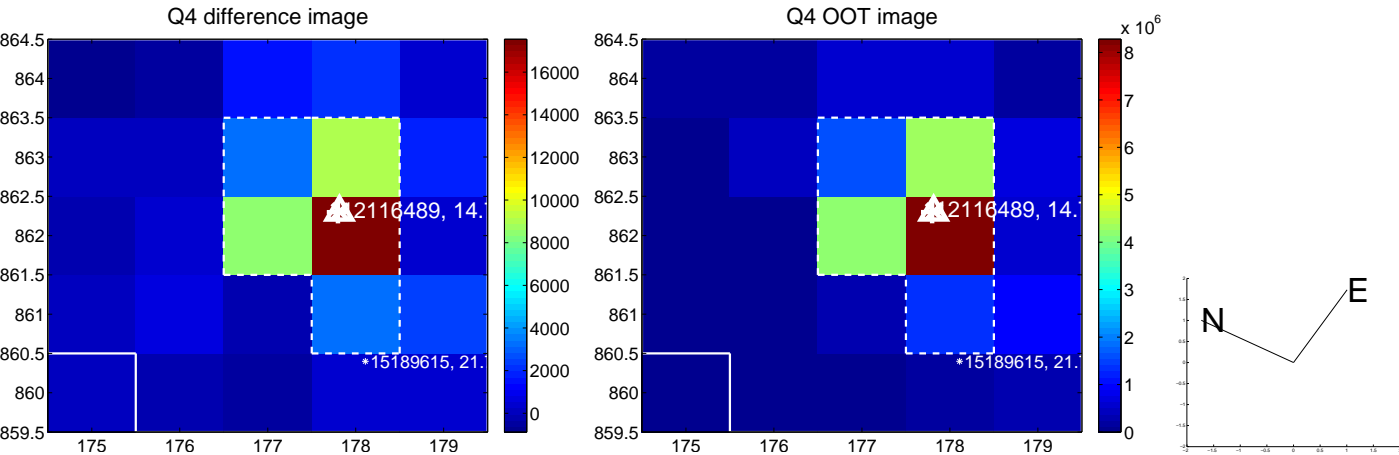
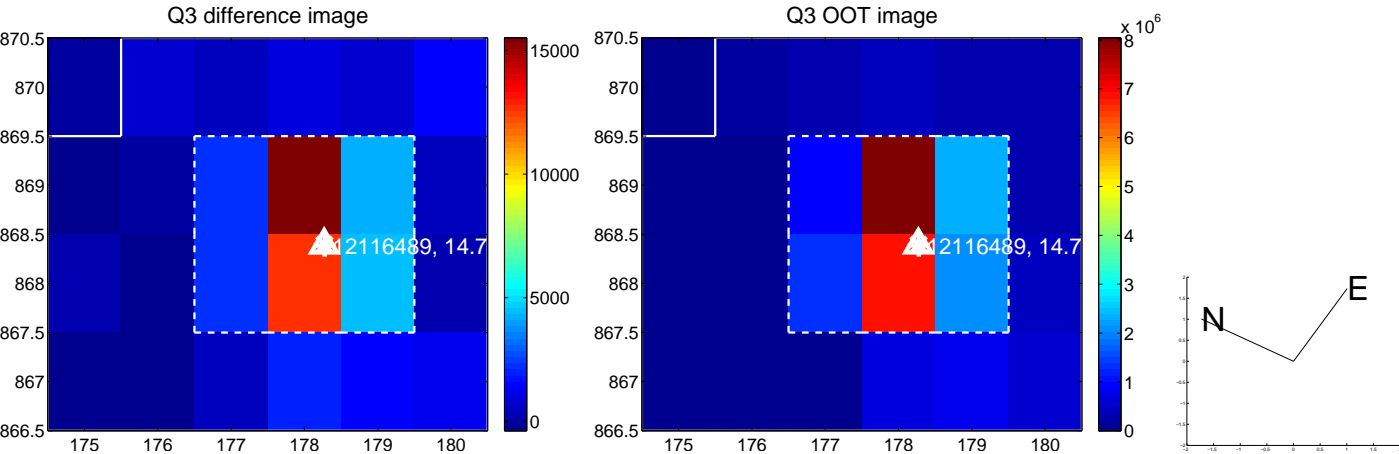
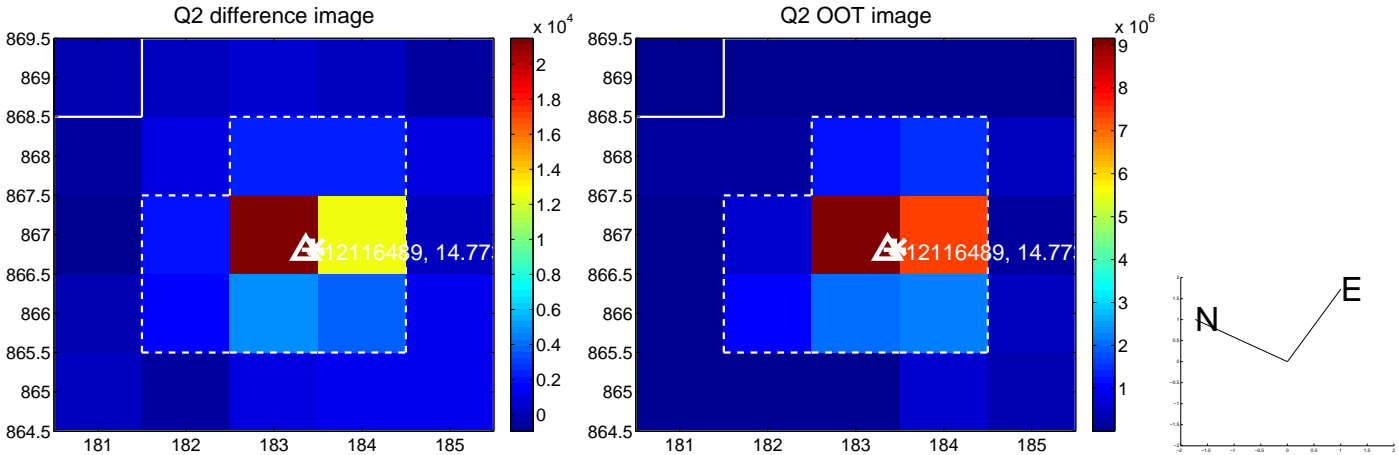
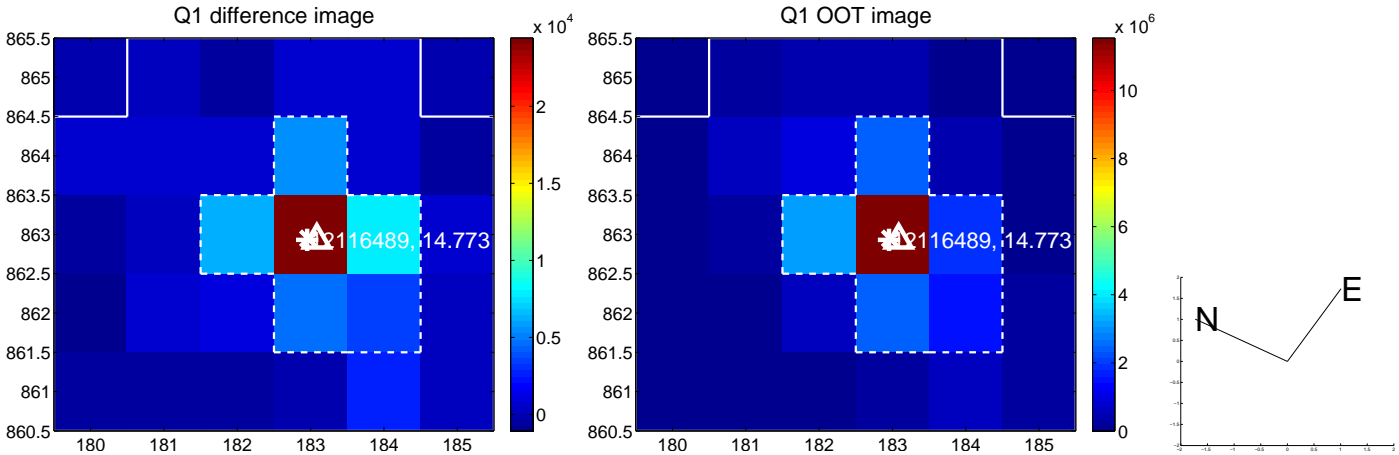
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.048 ± 0.085	0.57	0.045 ± 0.085	0.018 ± 0.084
PRF-fit source offset from KIC position	0.100 ± 0.084	1.18	-0.066 ± 0.082	0.075 ± 0.086
photometric centroid source offset	0.14 ± 0.14	1.02	-0.03 ± 0.14	-0.14 ± 0.14

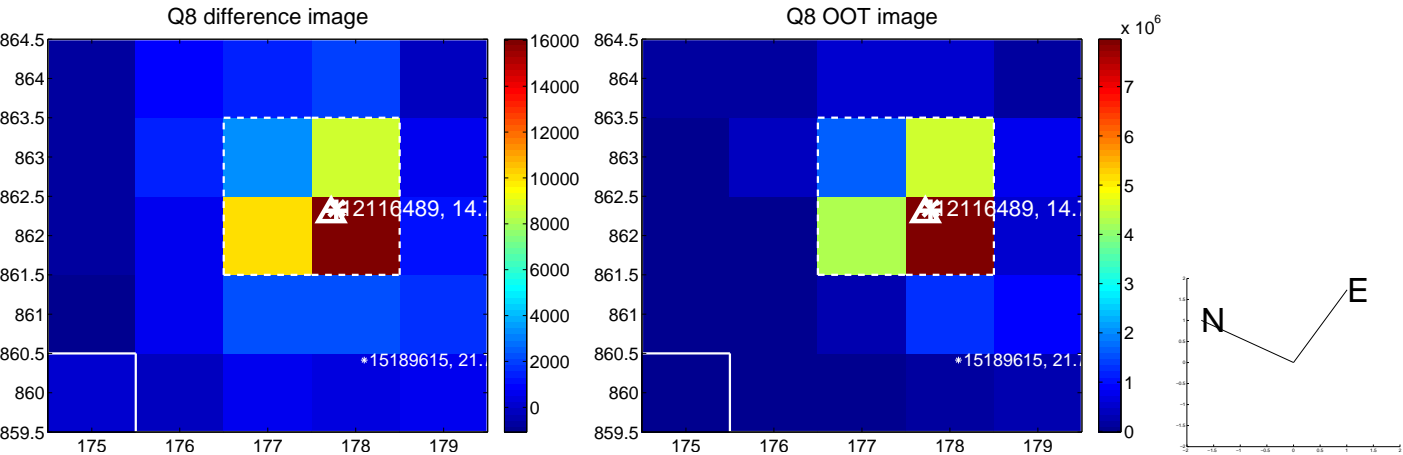
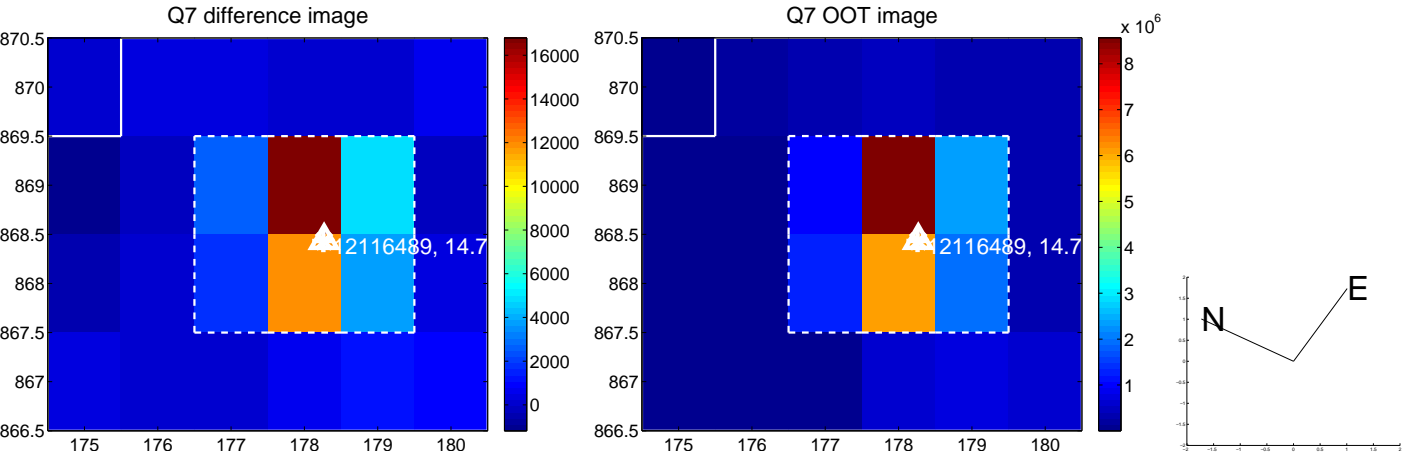
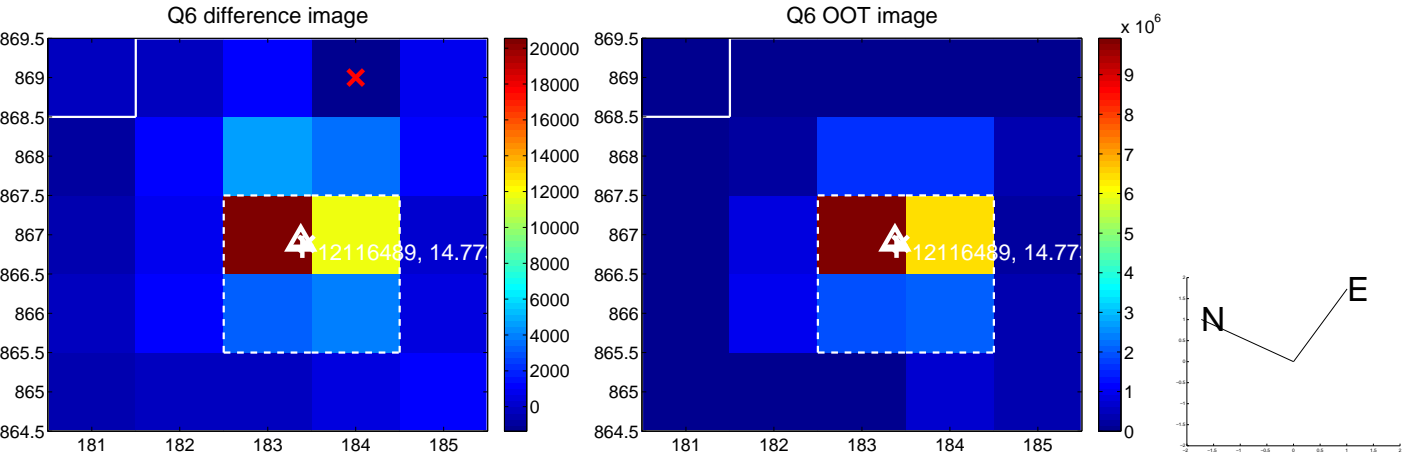
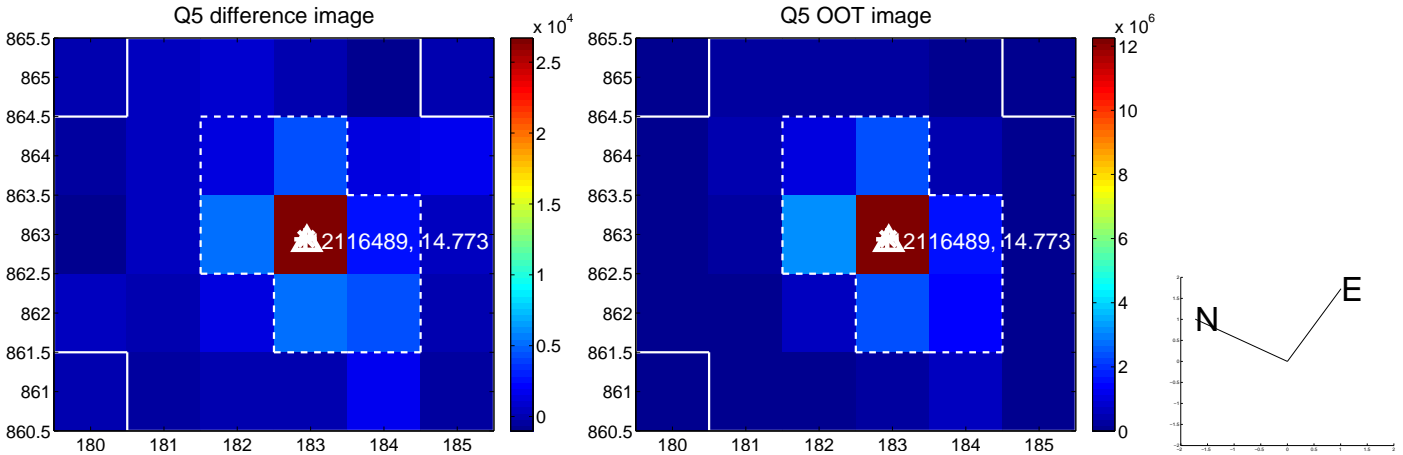


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

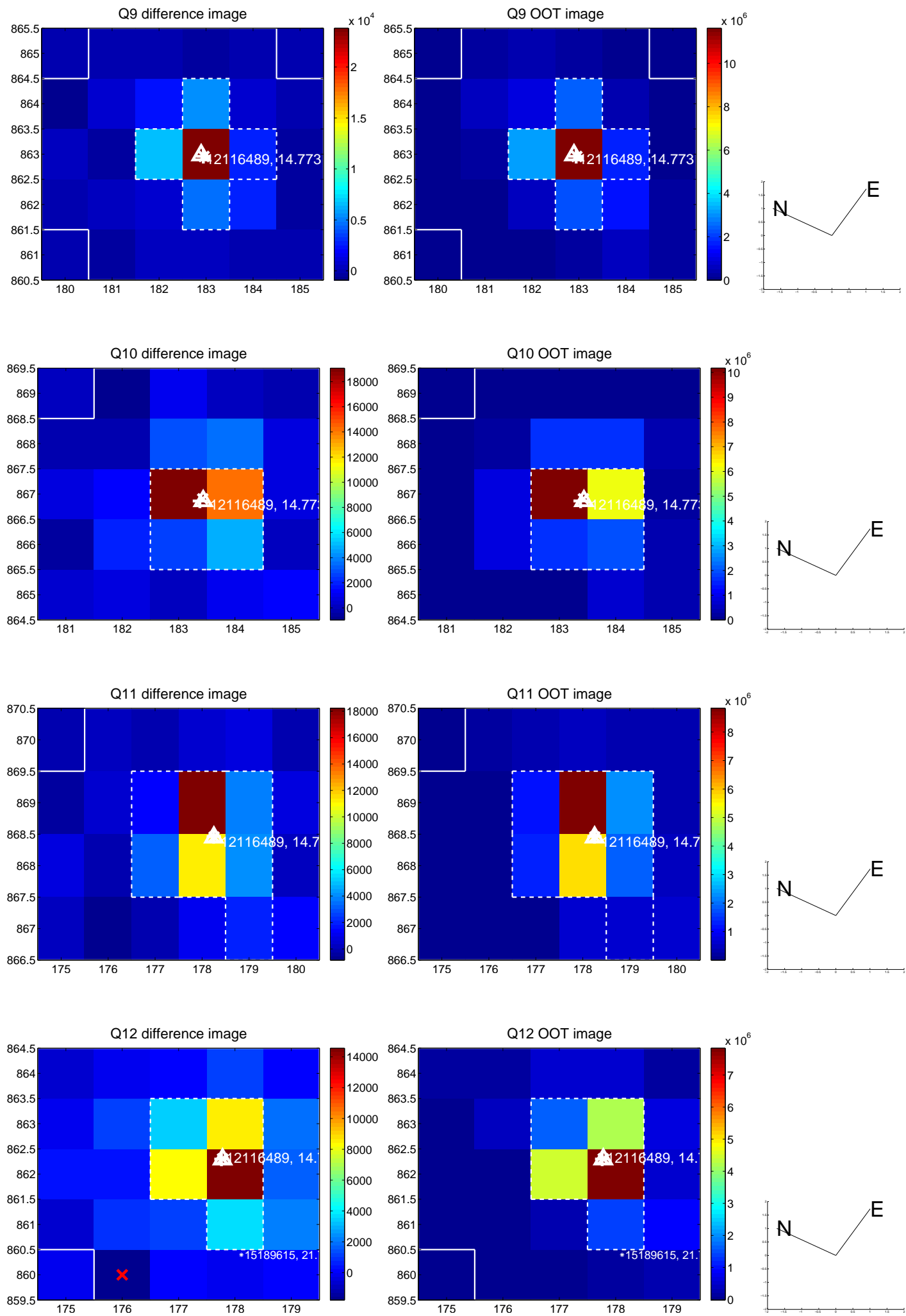
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



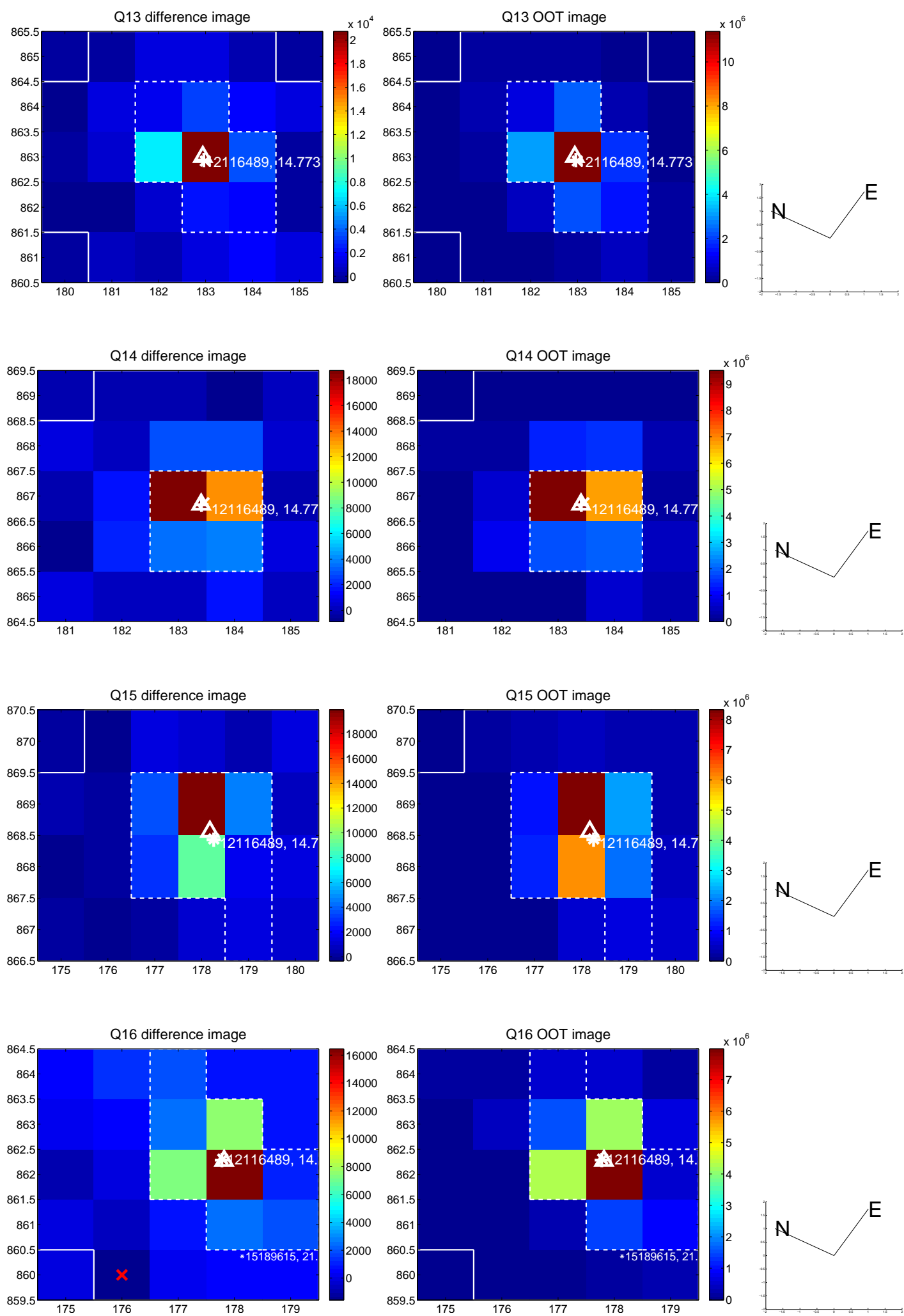
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



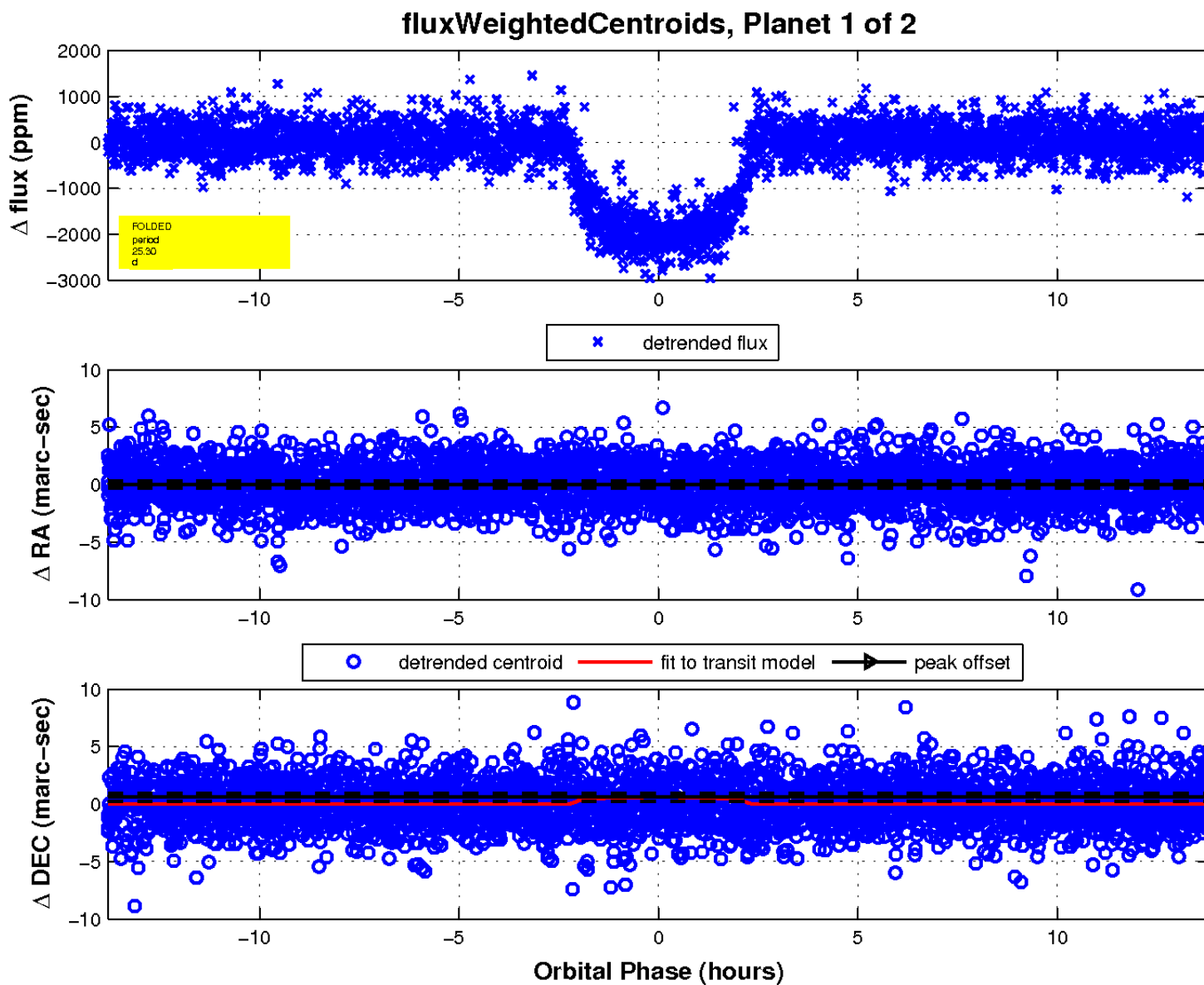
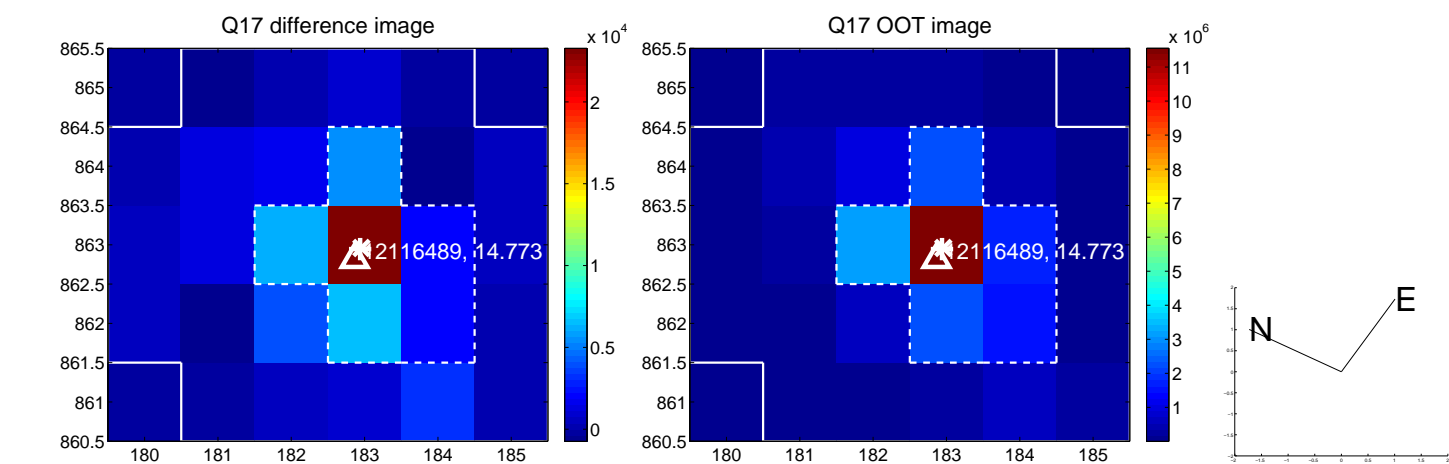
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

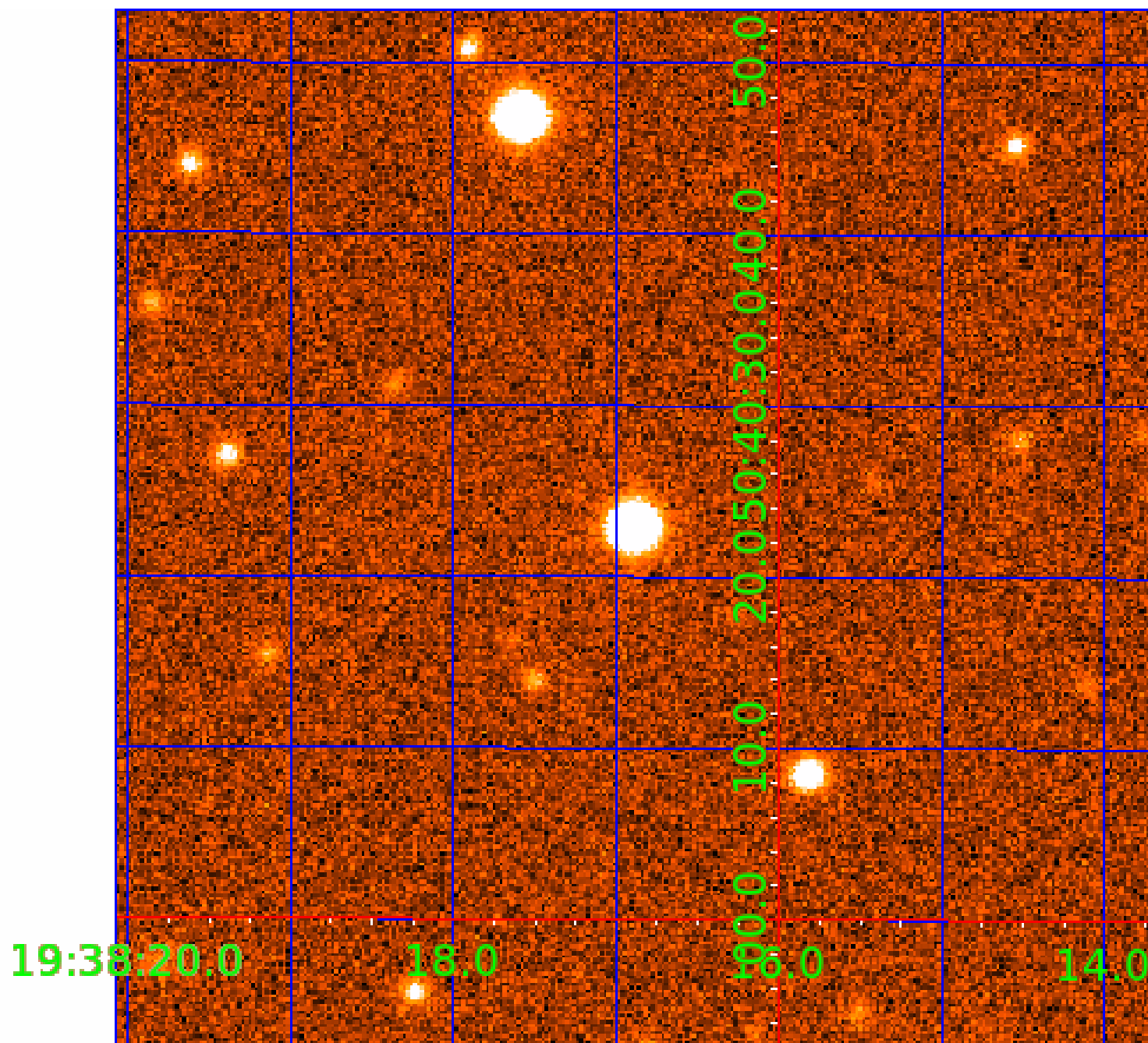


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012116489

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})
012116489-01	OBS	0547.01	25.302929	137.453536	2102.1	4.605	104.1	105.3	0.89	5121	4.23	19.43
012116489-02	OBS	0547.03	12.386045	132.818589	153.3	2.809	8.0	8.9	0.89	5121	1.33	50.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012116489-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
012116489-02	OBS	PC	0.88	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 012116489-02

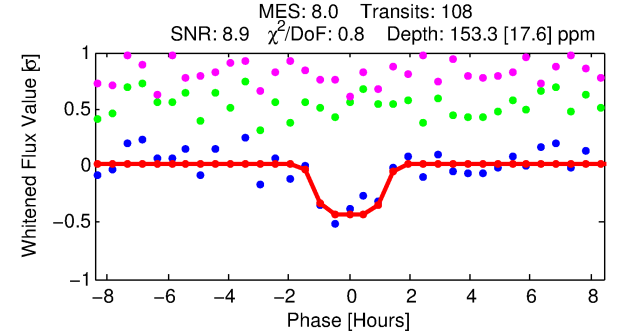
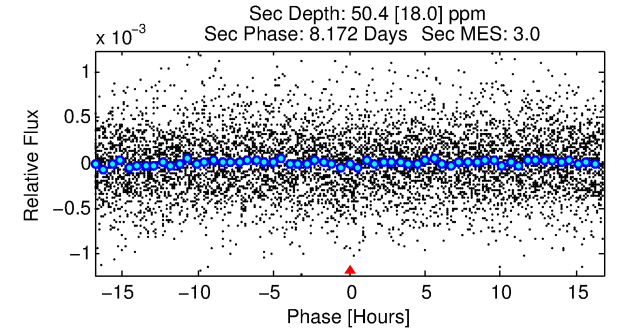
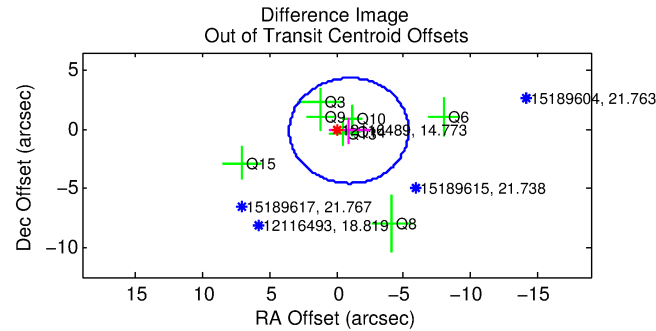
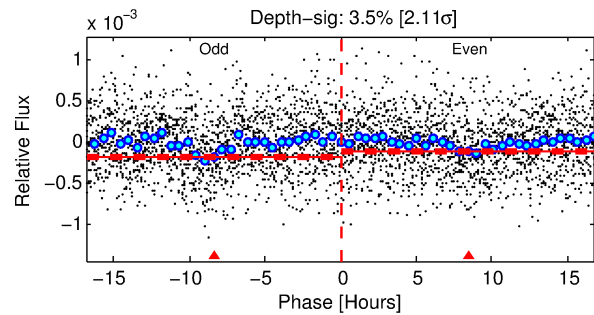
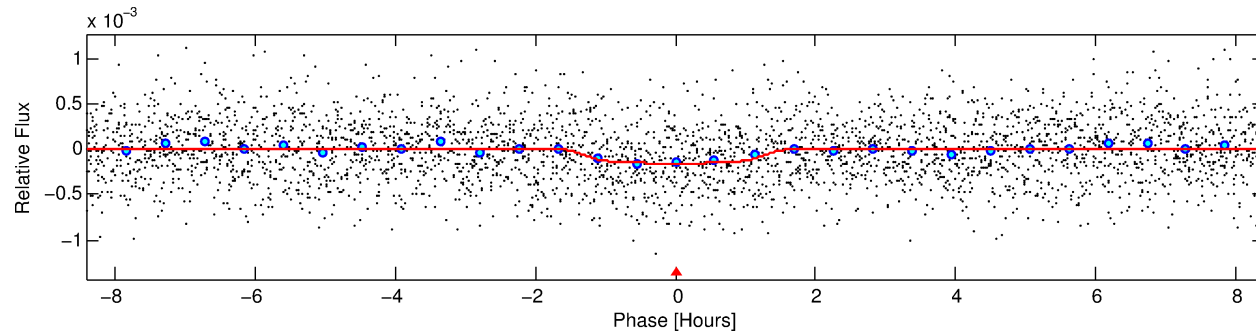
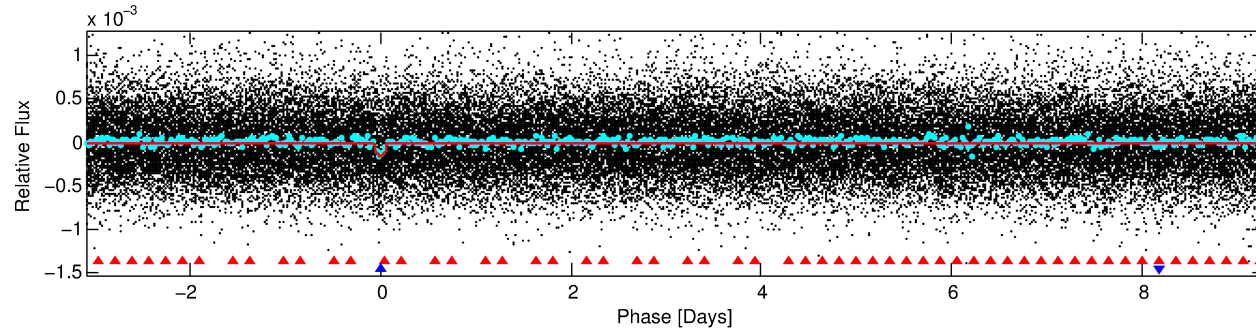
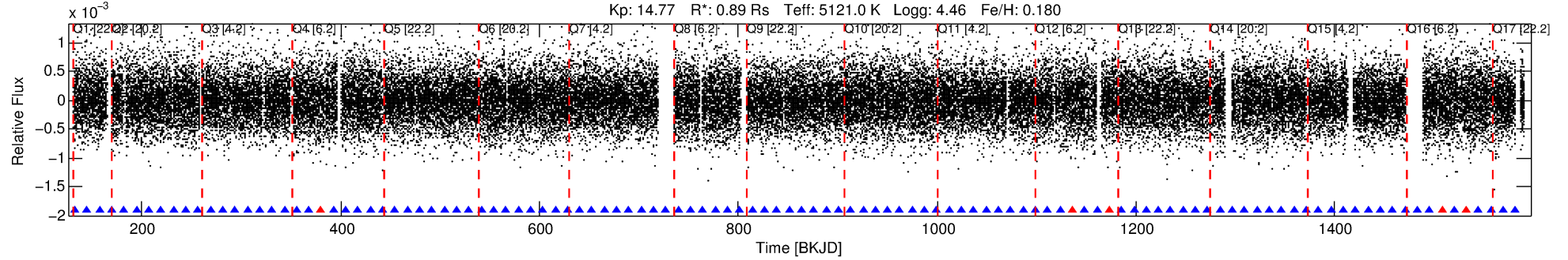
No Significant Match Found

DV One-Page Summary

KIC: 12116489 Candidate: 2 of 2 Period: 12.386 d

KOI: K00547 Corr: No Ephemeris Match

Kp: 14.77 R*: 0.89 Rs Teff: 5121.0 K Logg: 4.46 Fe/H: 0.180



DV Fit Results:

Period = 12.38605 [0.00011] d
Epoch = 132.8186 [0.0076] BKJD
Rp/R* = 0.0137 [0.0122]
a/R* = 16.20 [57.96]
b = 0.89 [0.84]
Seff = 50.35 [8.39]
Teq = 679 [28] K
Rp = 1.33 [1.19] Re
a = 0.0982 [0.0092] AU
Ag = 152.08 [276.72] [0.55σ]
Teffp = 3688 [1673] K [1.80σ]

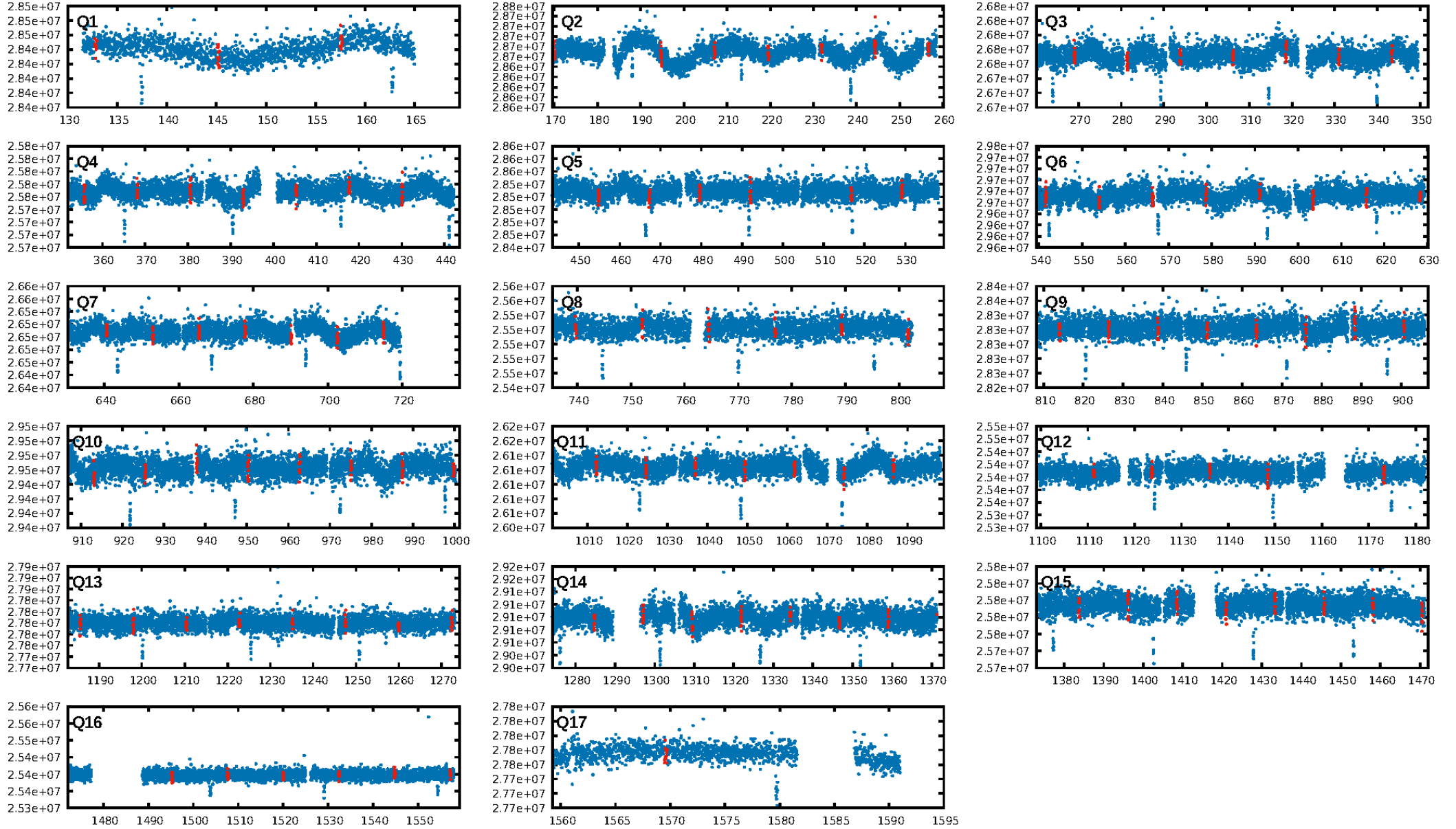
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [57.47σ]
ModelChiSquare2-sig: 98.4%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.32e-15
RollingBand-fgt: 0.95 [99/104]
GhostDiagnostic-chr: 6.936
Centroid-sig: 0.1%
Centroid-so: 3.330 arcsec [1.97σ]
OotOffset-rm: 0.948 arcsec [0.64σ]
KicOffset-rm: 1.103 arcsec [0.84σ]
OotOffset-st: 3/2/1/2 [8]
KicOffset-st: 3/2/1/2 [8]
DiffImageQuality-fgm: 0.38 [3/8]
DiffImageOverlap-fno: 1.00 [17/17]

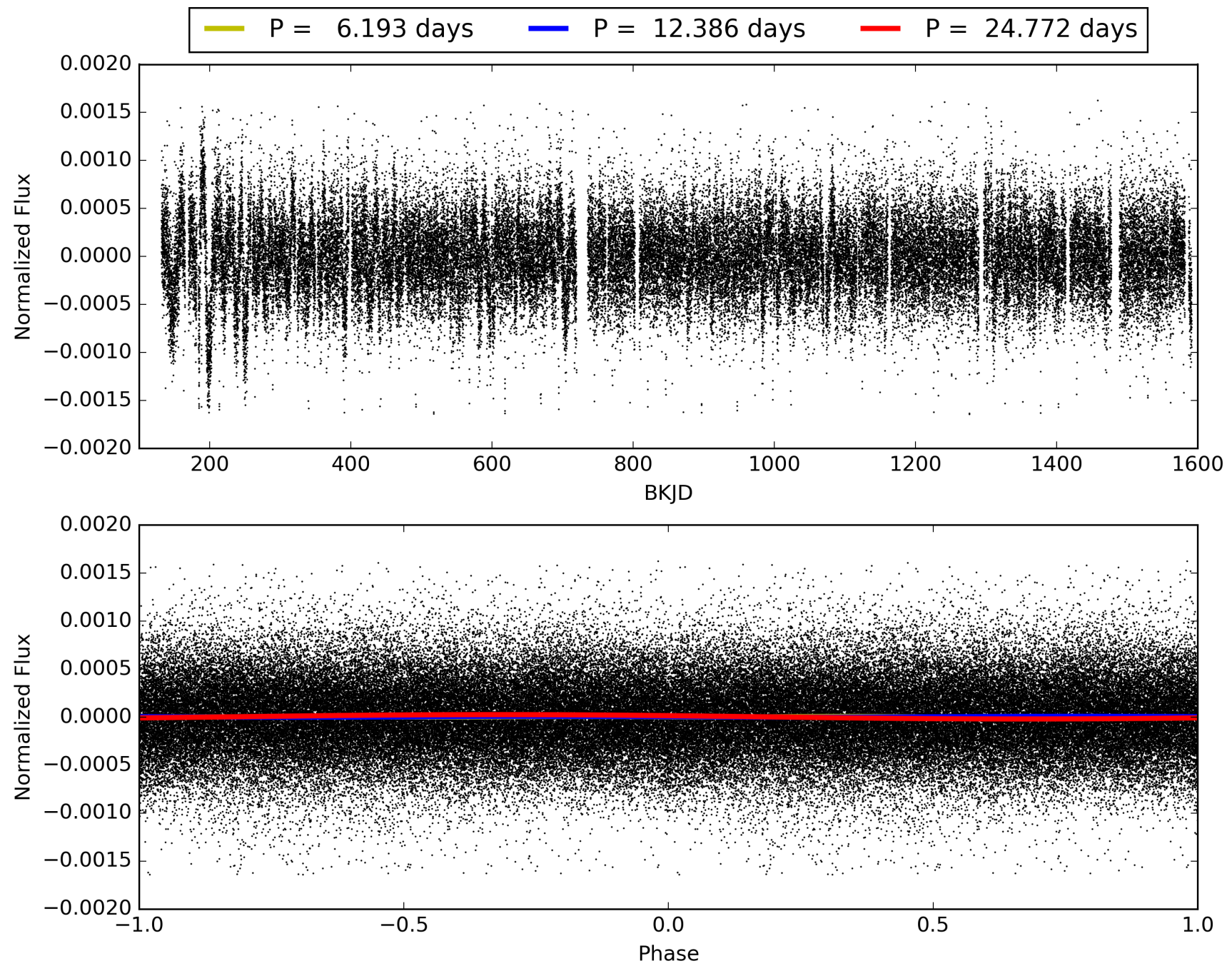
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 01:10:44 Z

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

TCE 012116489-02, PDC Light Curves

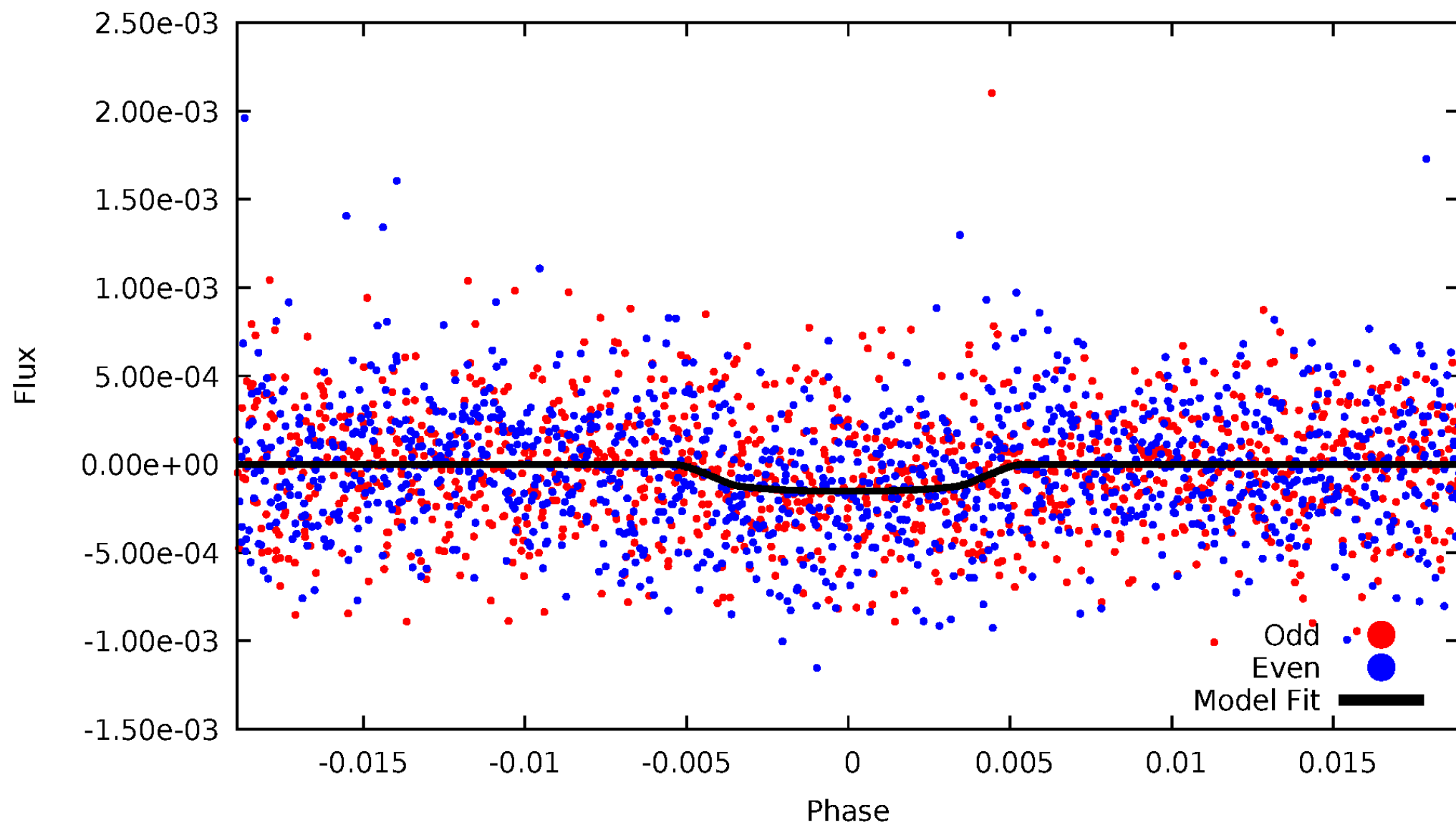


TCE 012116489-02



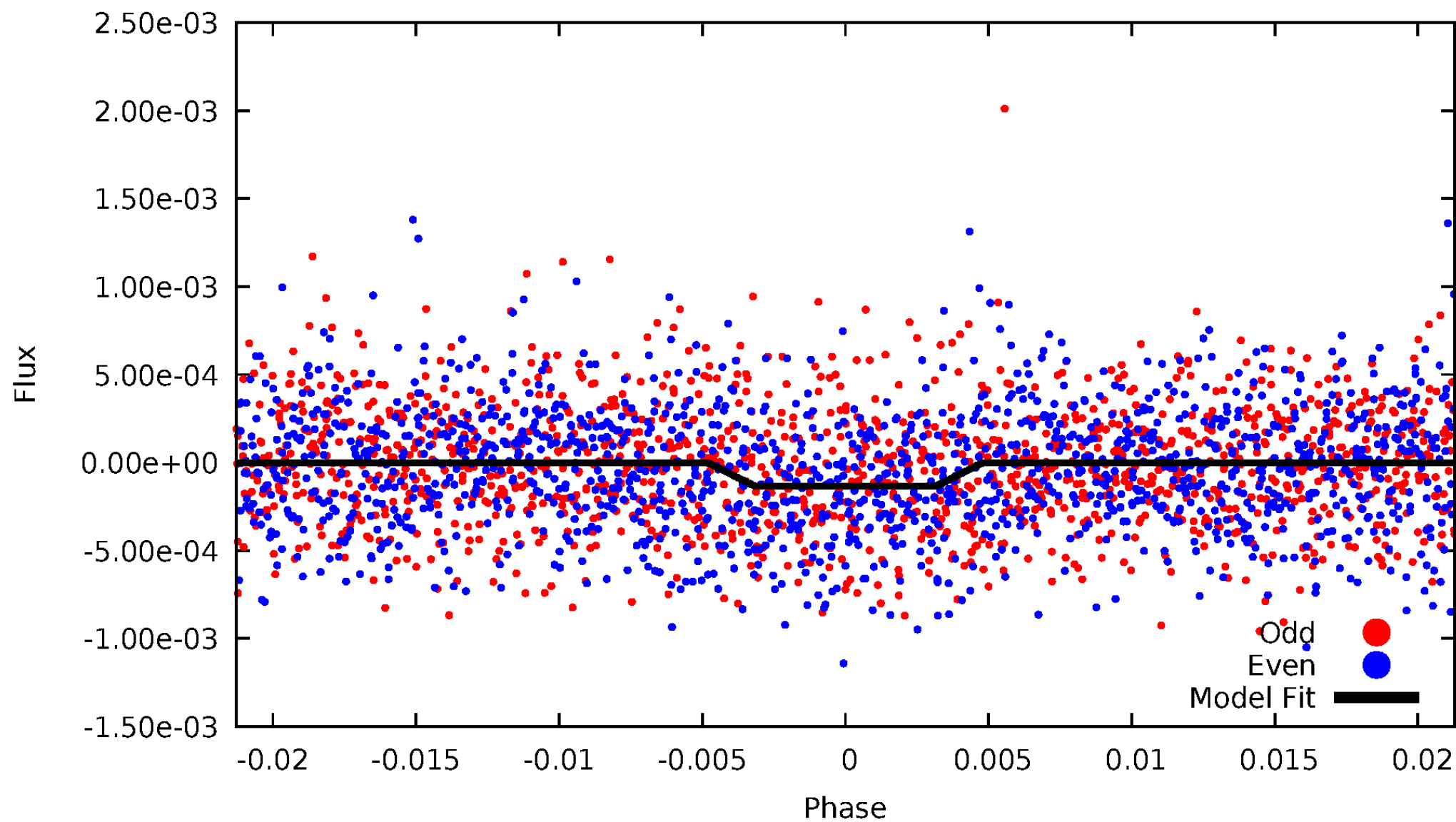
DV Odd/Even

TCE 012116489-02



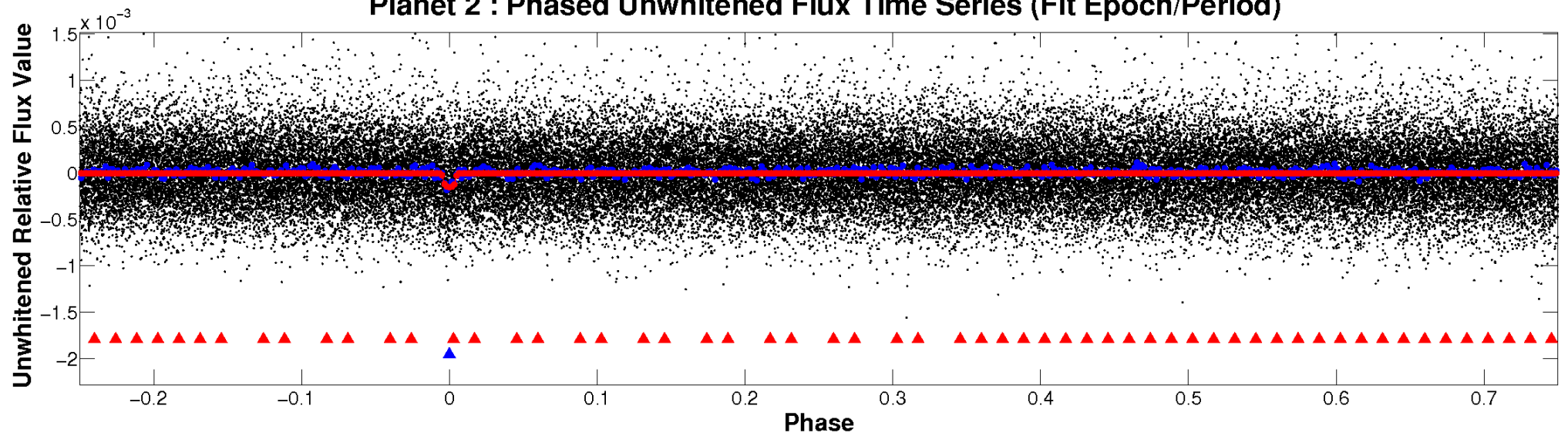
ALT Odd/Even

TCE 012116489-02

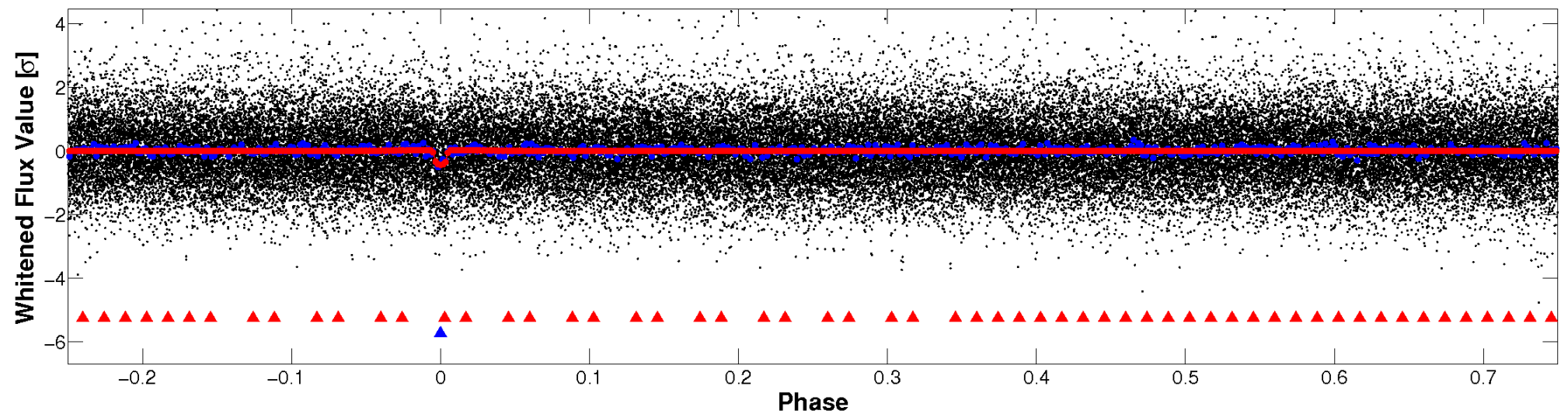


Non-Whitened Vs. Whitened Light Curve

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

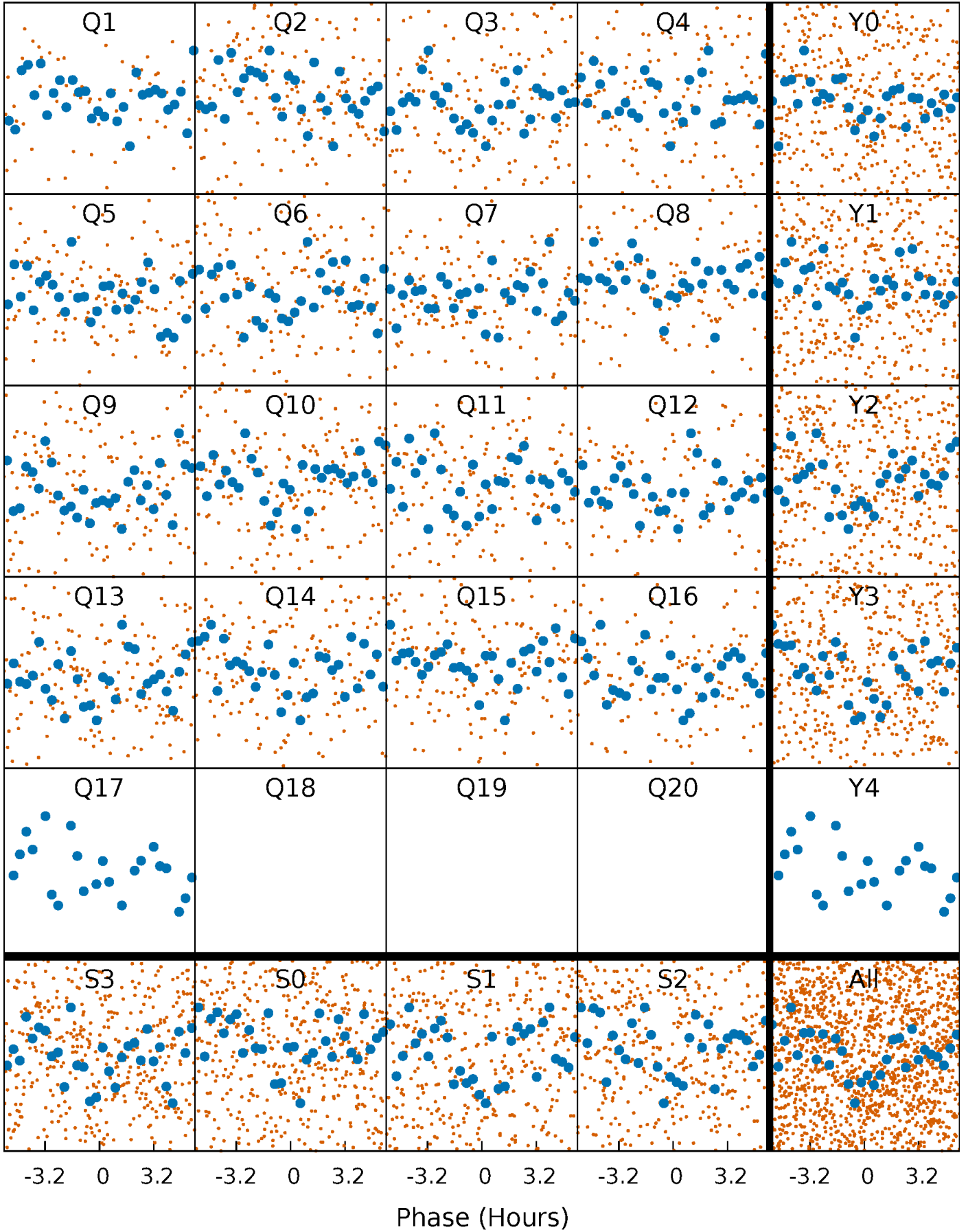


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



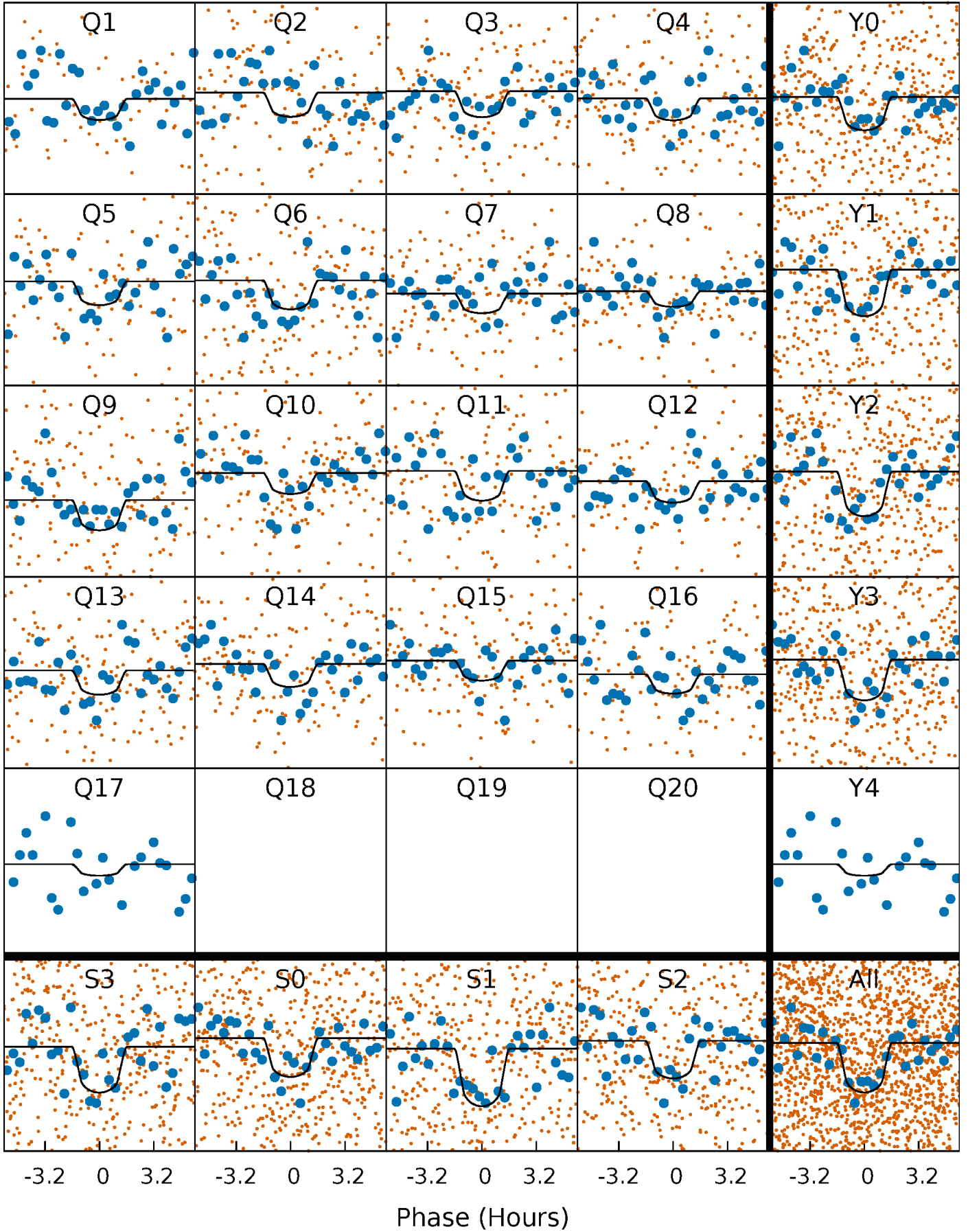
PDC Quarter-Phased Transit Curves

TCE 012116489-02 P= 12.386045 Days $T_0=132.818589$ (BKJD)



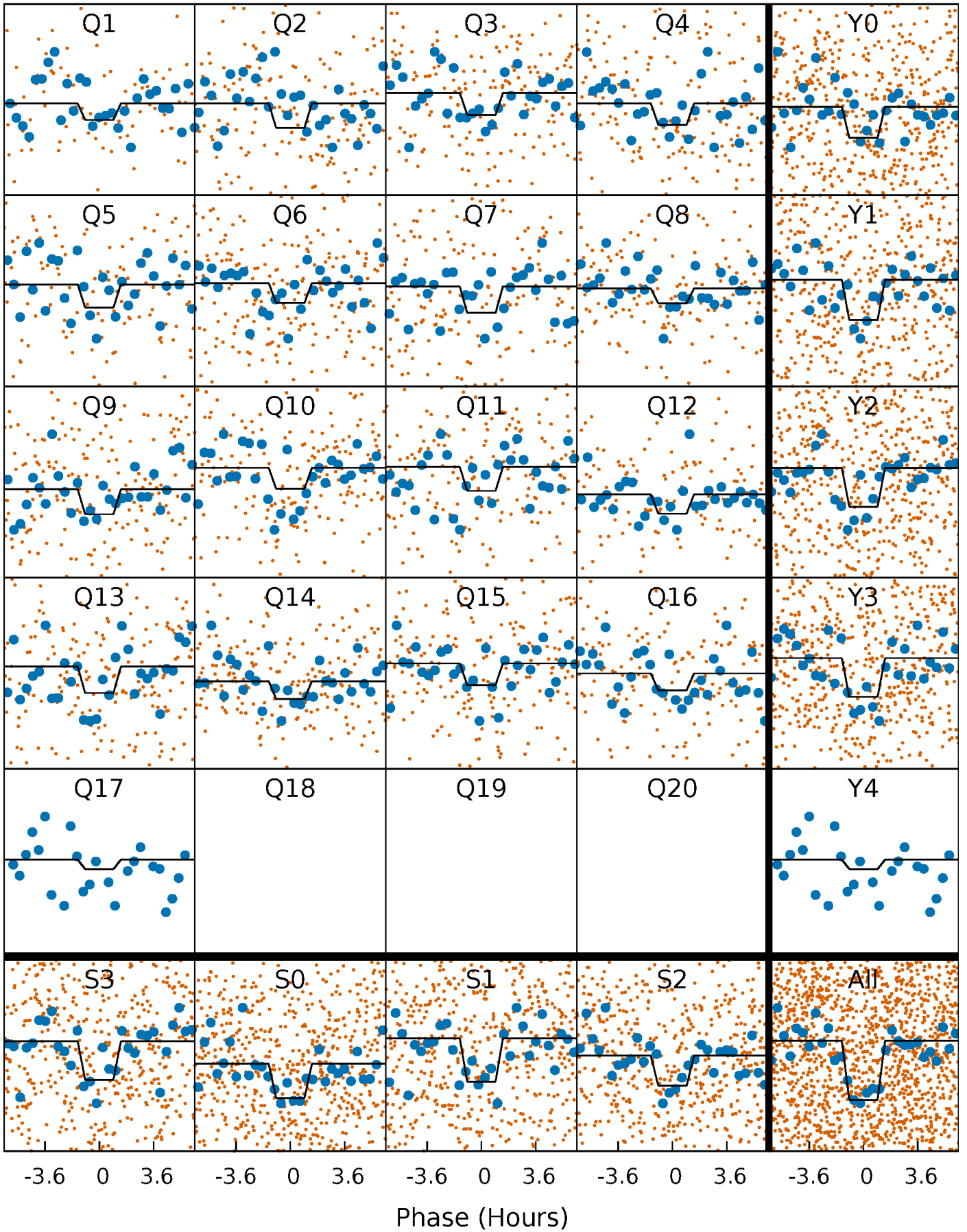
DV Quarter-Phased Transit Curves

TCE 012116489-02 P= 12.386045 Days $T_0=132.818589$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

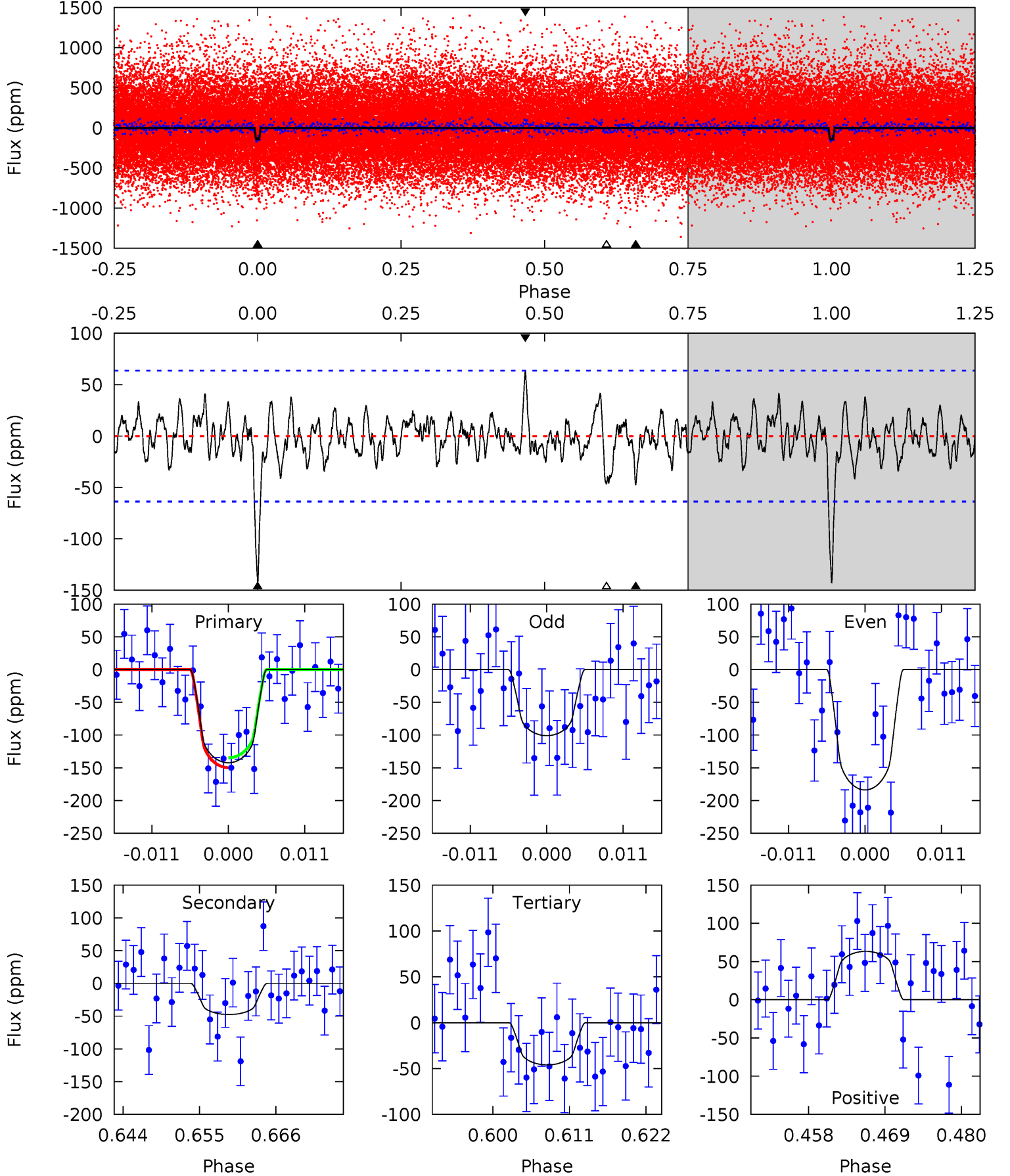
TCE 012116489-02 P= 12.386248 Days $T_0=132.802908$ (BKJD)



DV Model-Shift Uniqueness Test

012116489-02, P = 12.386045 Days, E = 120.432544 Days

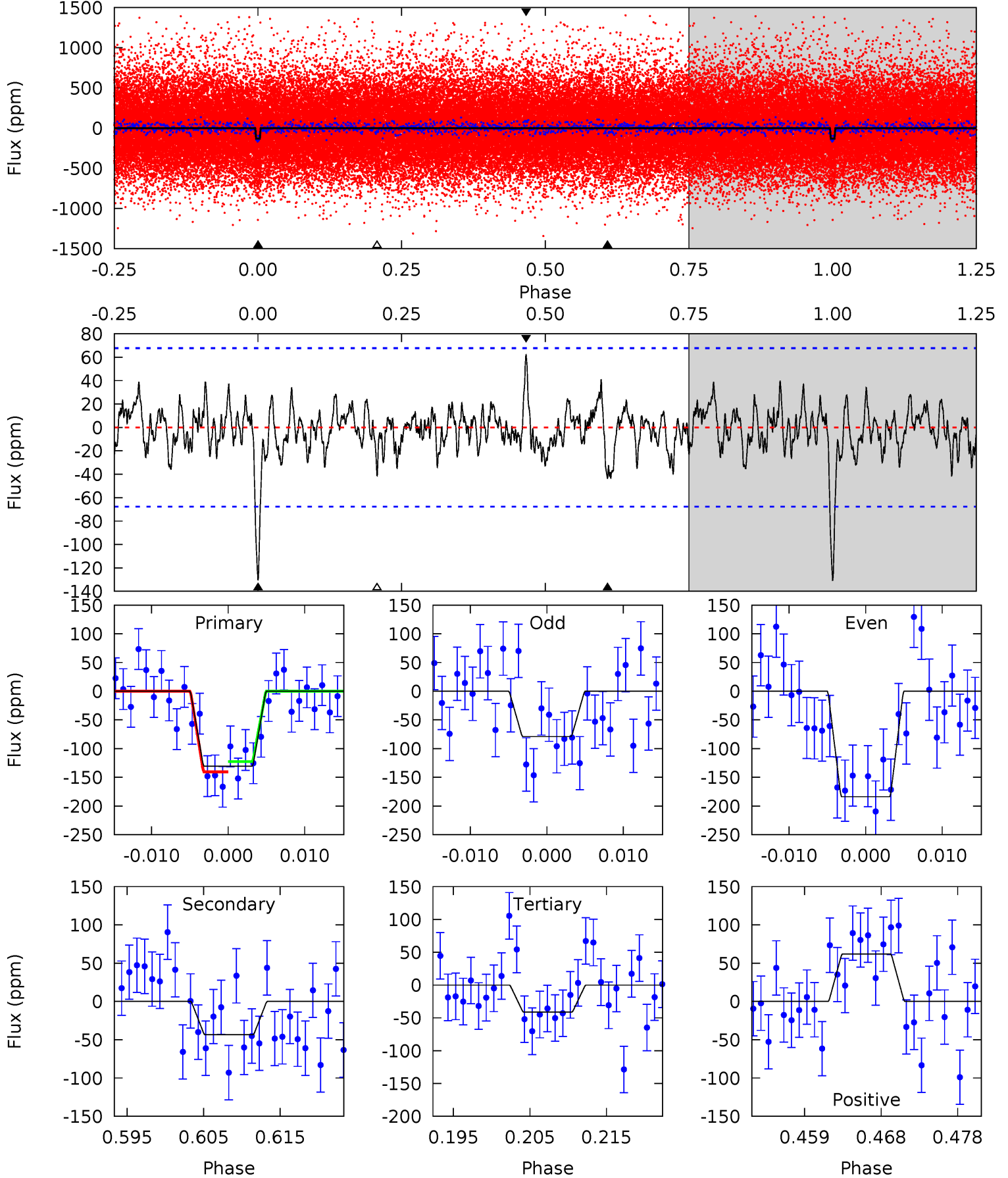
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	3.74	3.62	4.98	5.01	2.55	1.26	7.57	6.21	0.12	-1.24	3.26	1.04	0.31	0.59



Alt Model-Shift Uniqueness Test

012116489-02, P = 12.386248 Days, E = 120.416660 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.71	3.23	3.06	4.61	5.03	2.58	1.11	6.64	5.10	0.17	-1.38	3.89	1.04	0.32	0.67



Stellar Parameters For KIC 012116489

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5121^{+84}_{-76}	$4.457^{+0.091}_{-0.039}$	$0.180^{+0.150}_{-0.150}$	$0.888^{+0.049}_{-0.084}$	$0.822^{+0.053}_{-0.029}$	$1.656^{+0.573}_{-0.244}$
	+2%/-1%	+2%/-1%	+83%/-83%	+6%/-9%	+6%/-4%	+35%/-15%
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 012116489-02 / KOI 0547.03

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-48 ± 13	$1.50^{+1.06}_{-0.92}$	944^{+23}_{-25}	3711^{+1678}_{-563}	109^{+621}_{-72}
Alt.	-43 ± 13	$1.36^{+1.16}_{-0.86}$	944^{+25}_{-26}	3787^{+1861}_{-688}	117^{+817}_{-83}

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

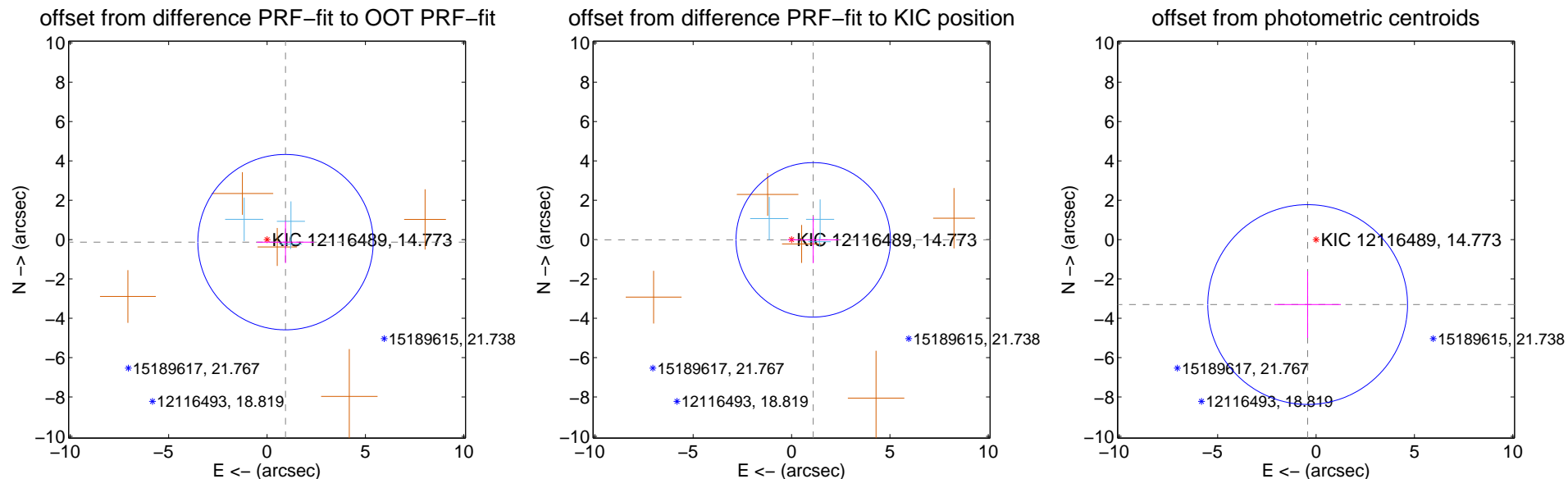
DV Centroid Data

Supplemental centroid analysis for 012116489-02. Kepler magnitude: 14.77. Transit SNR 8.93

There are 3 quarters with good PRF difference image offsets

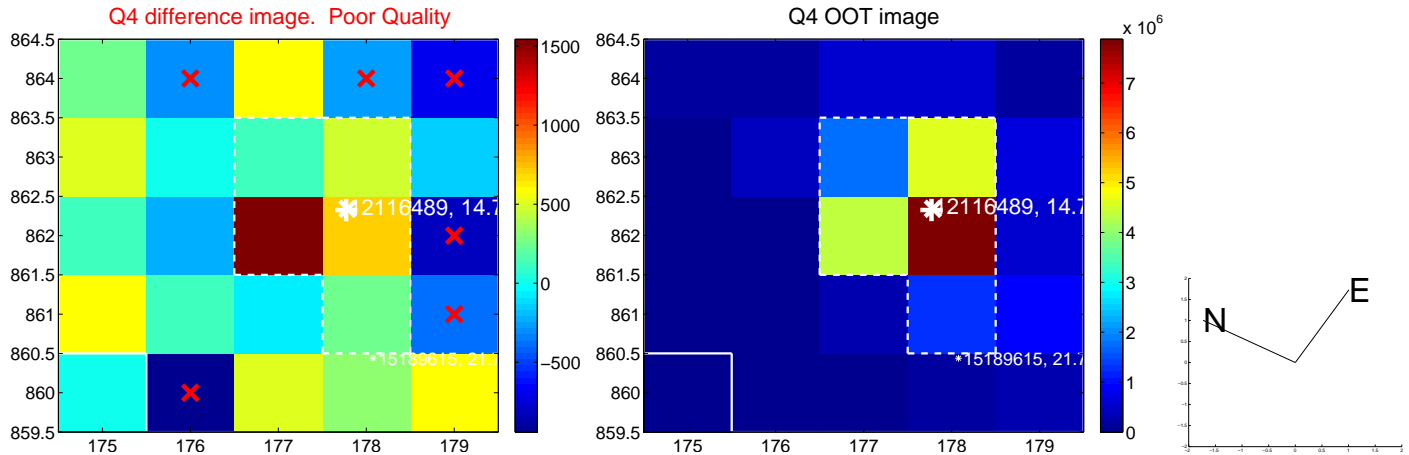
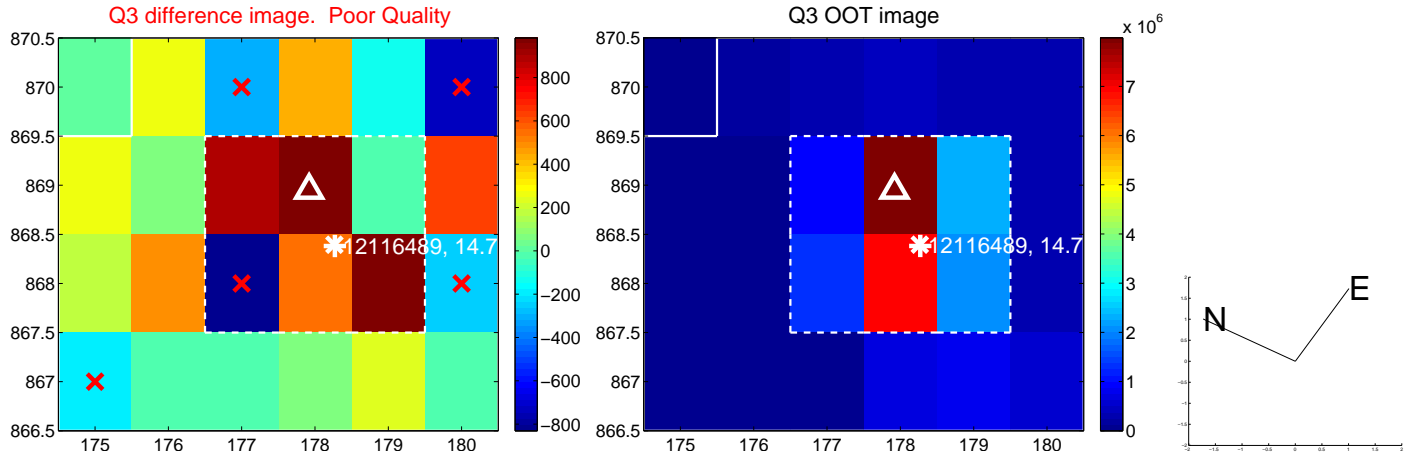
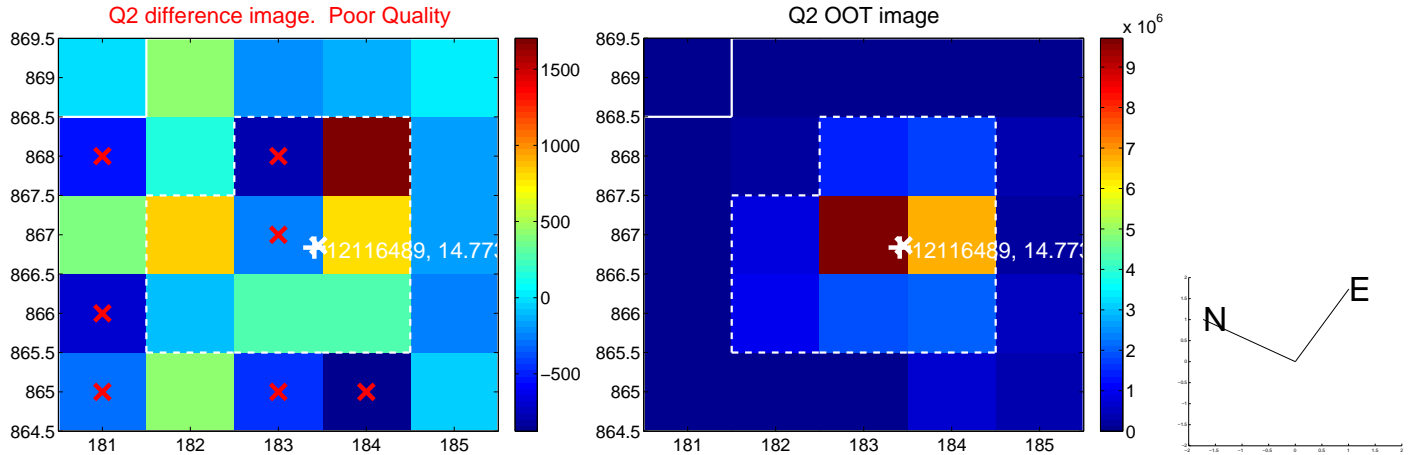
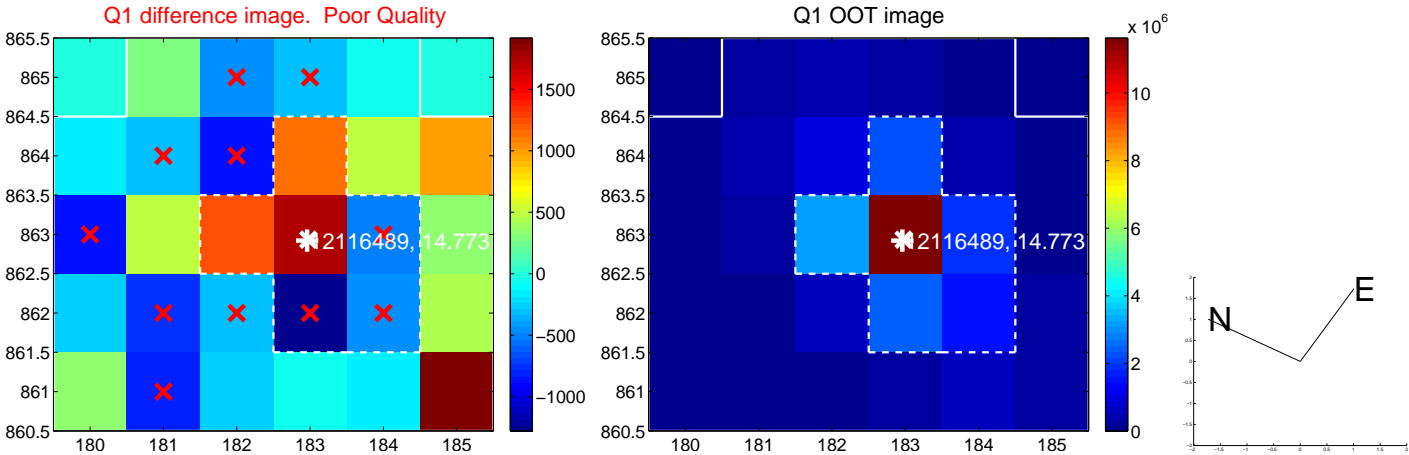
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.948 ± 1.486	0.64	-0.939 ± 1.458	-0.130 ± 1.064
PRF-fit source offset from KIC position	1.103 ± 1.309	0.84	-1.102 ± 1.307	-0.014 ± 1.189
photometric centroid source offset	3.33 ± 1.69	1.97	0.43 ± 1.69	-3.30 ± 1.69

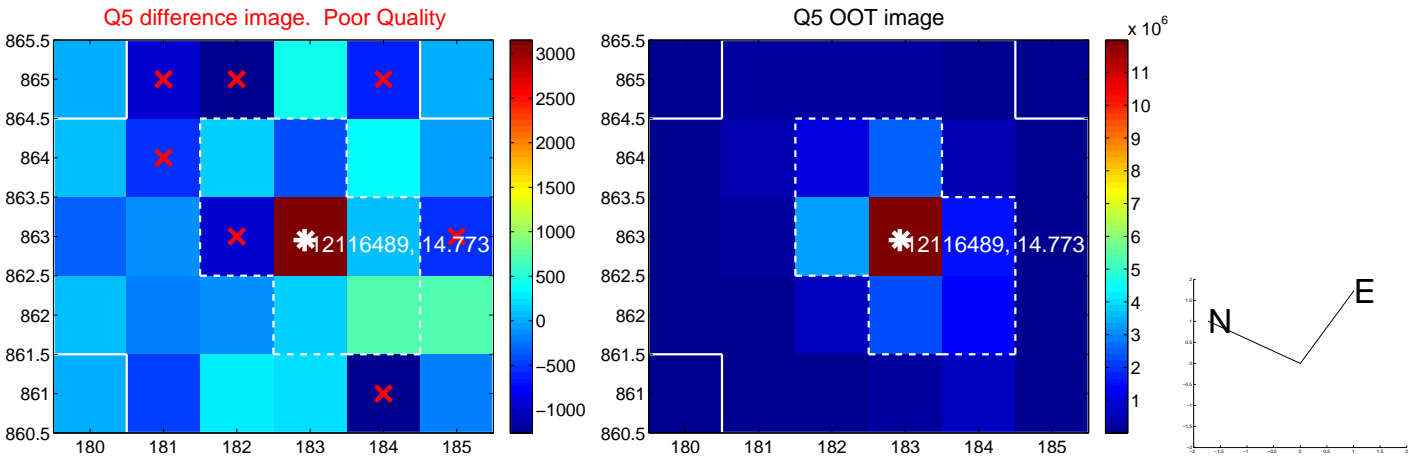


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

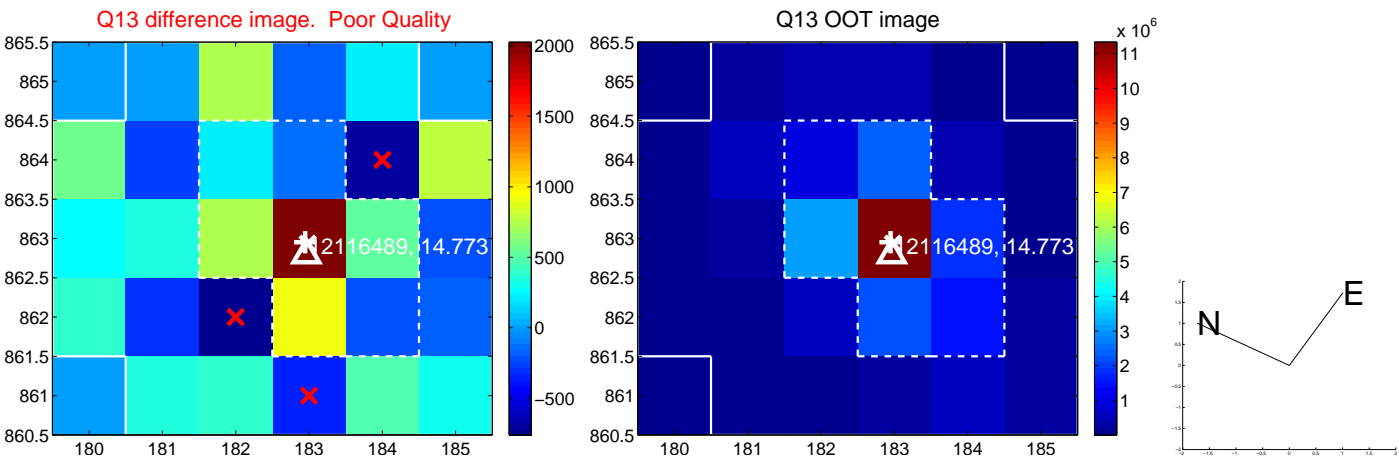
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



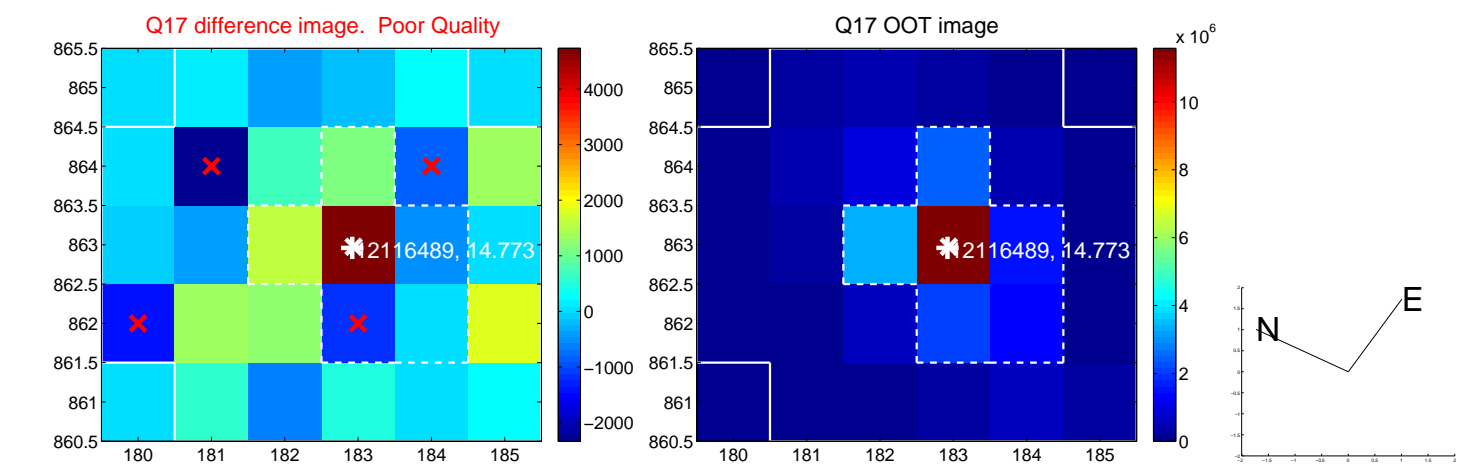
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



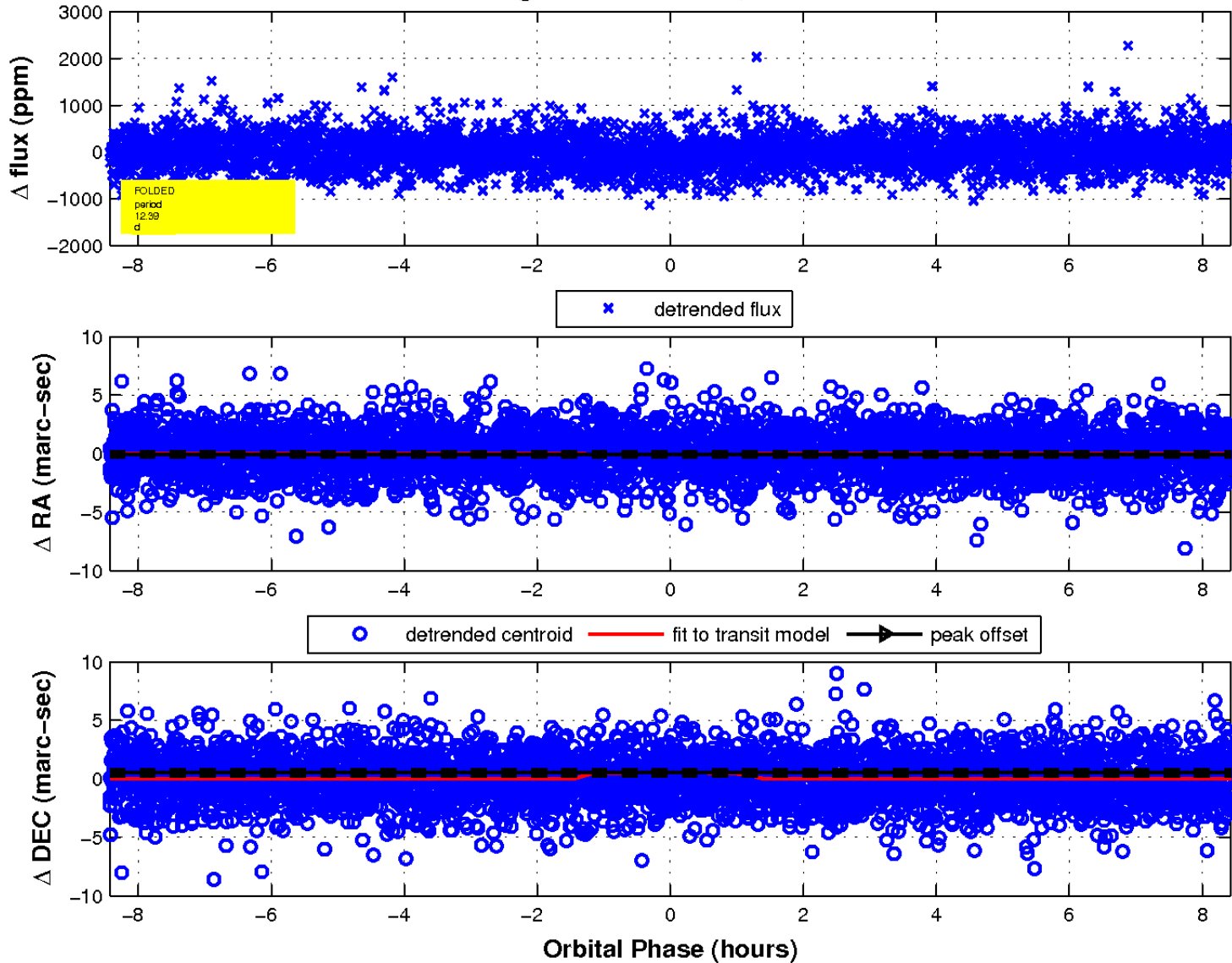
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

