

KIC 006146418

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})
006146418-01	OBS	6021.01	22.446164	149.161015	1212.4	8.179	183.6	137.9	1.78	6070	11.77	151.09
006146418-02	OBS	No	22.446129	153.933102	865.0	11.946	134.9	117.2	1.78	6070	10.04	151.10

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006146418-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST
006146418-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST

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.

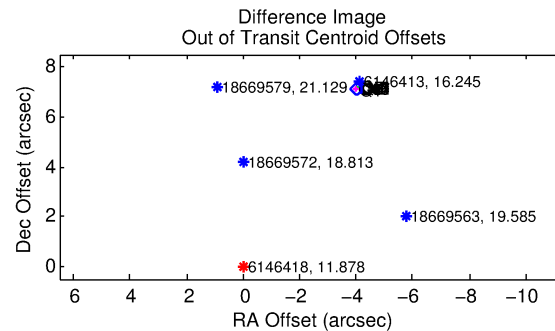
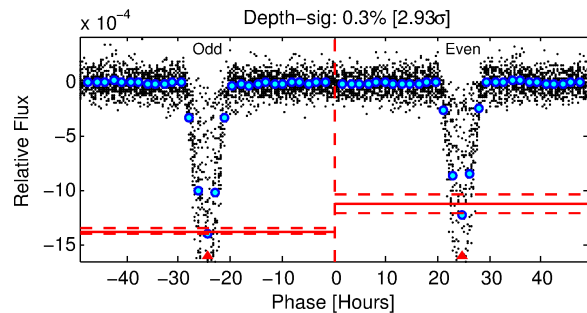
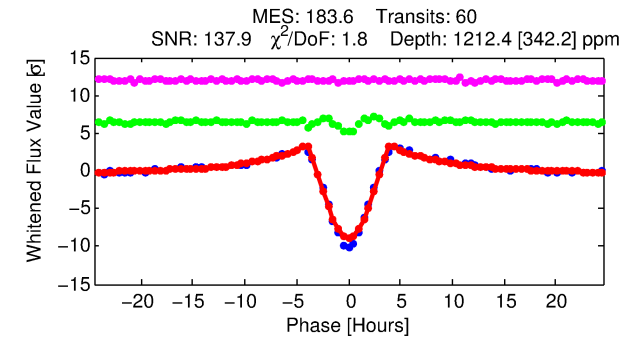
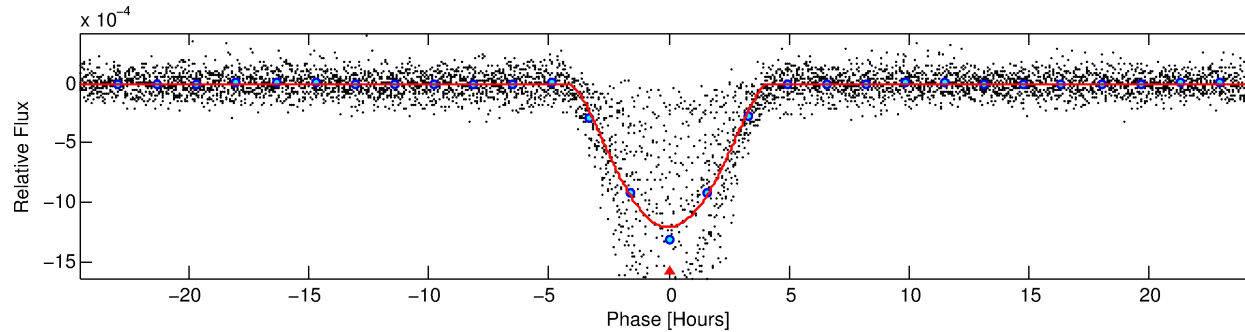
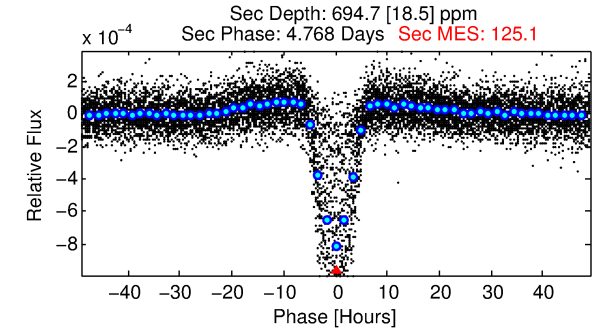
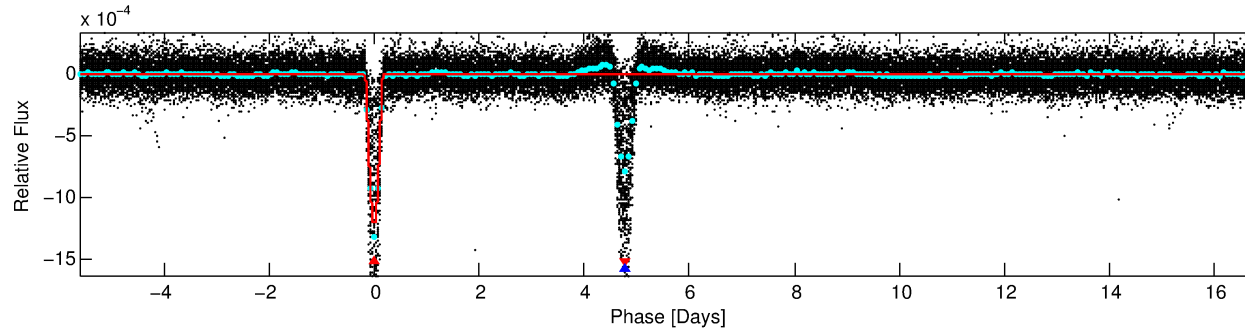
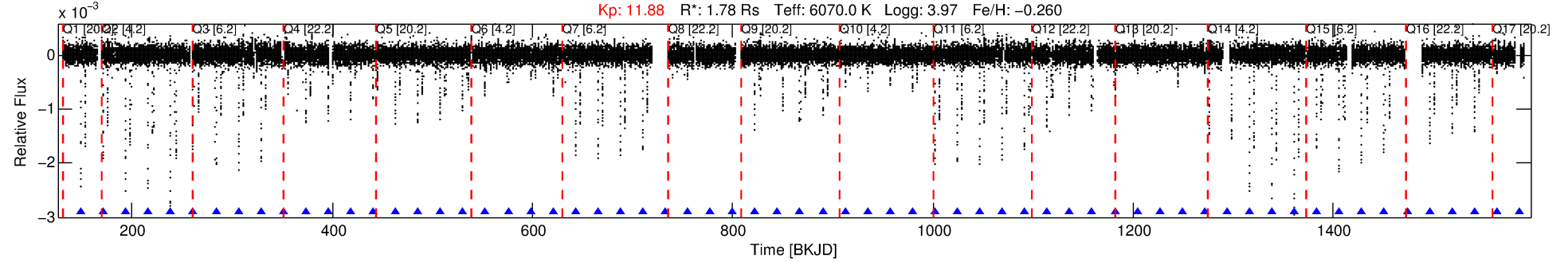
Ephemeris Match Information For 006146418-01

No Significant Match Found

DV One-Page Summary

KIC: 6146418 Candidate: 1 of 2 Period: 22.446 d
KOI: K06021.01 Corr: 0.996

Kp: 11.88 R*: 1.78 Rs Teff: 6070.0 K Logg: 3.97 Fe/H: -0.260



DV Fit Results:

Period = 22.44616 [0.00003] d
Epoch = 149.1610 [0.0012] BKJD
Rp/R* = 0.0607 [0.0130]
a/R* = 7.48 [0.36]
b = 1.00 [0.01]
Seff = 151.10 [72.94]
Teq = 894 [108] K
Rp = 11.77 [4.53] Re
a = 0.1594 [0.0477] AU
Ag = 70.17 [44.61] [1.55σ]
Teff = 4001 [441] K [6.84σ]

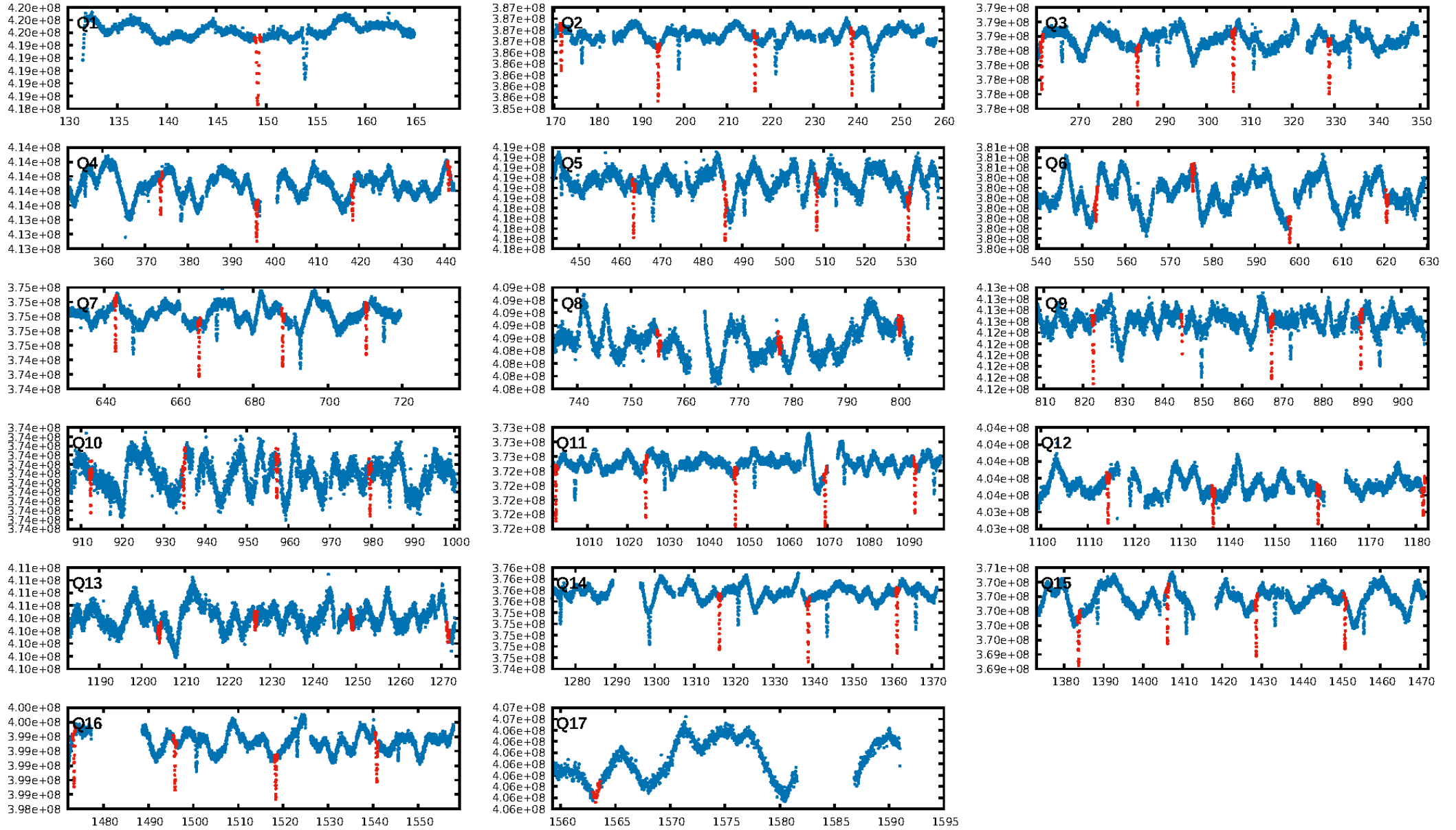
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [58/58]
GhostDiagnostic-chr: -0.1692
Centroid-sig: 0.0%
Centroid-so: 23.971 arcsec [496.32σ]
OotOffset-rm: 8.165 arcsec [121.07σ]
KicOffset-rm: 8.297 arcsec [120.86σ]
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]

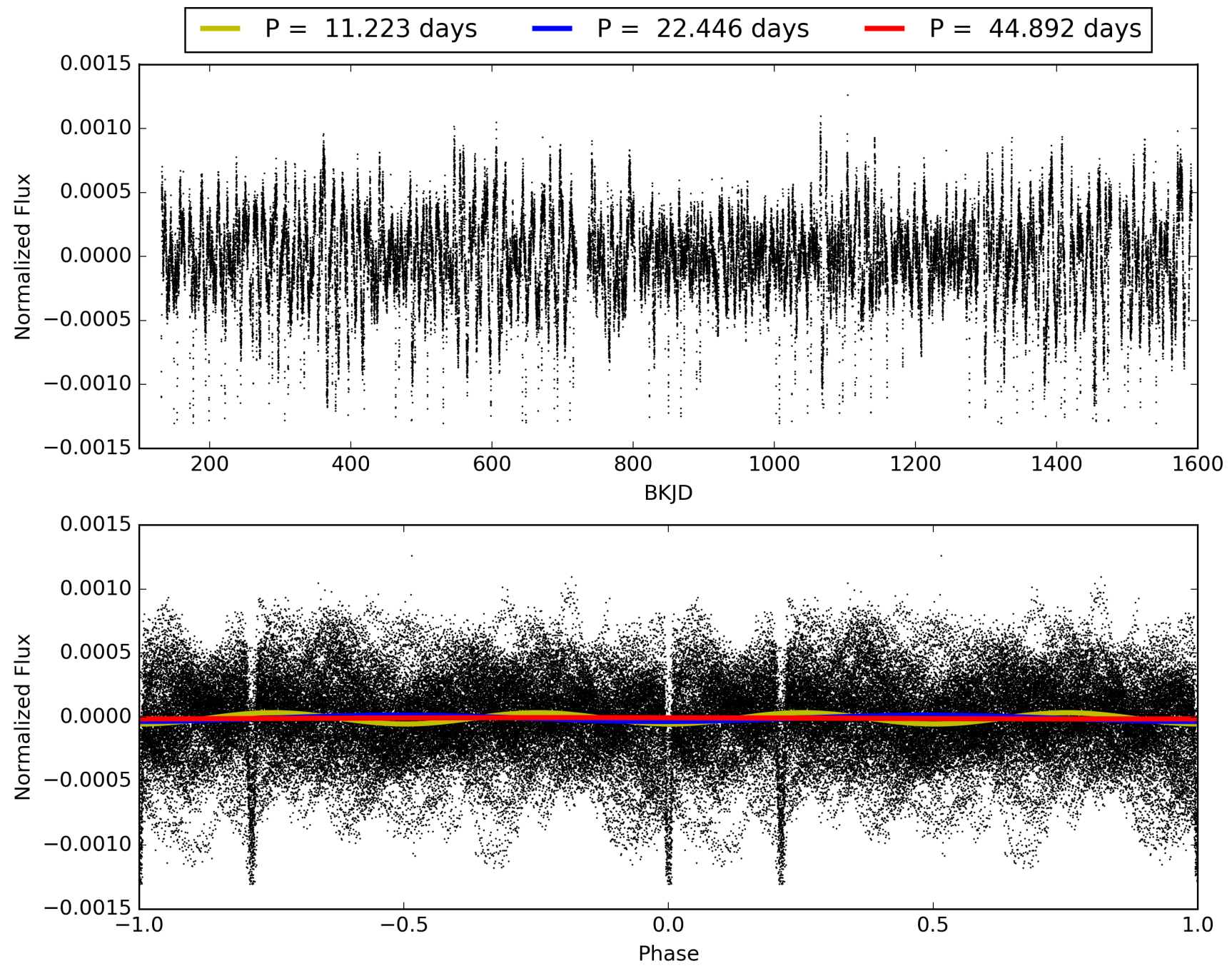
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:37:01 Z

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

TCE 006146418-01, PDC Light Curves

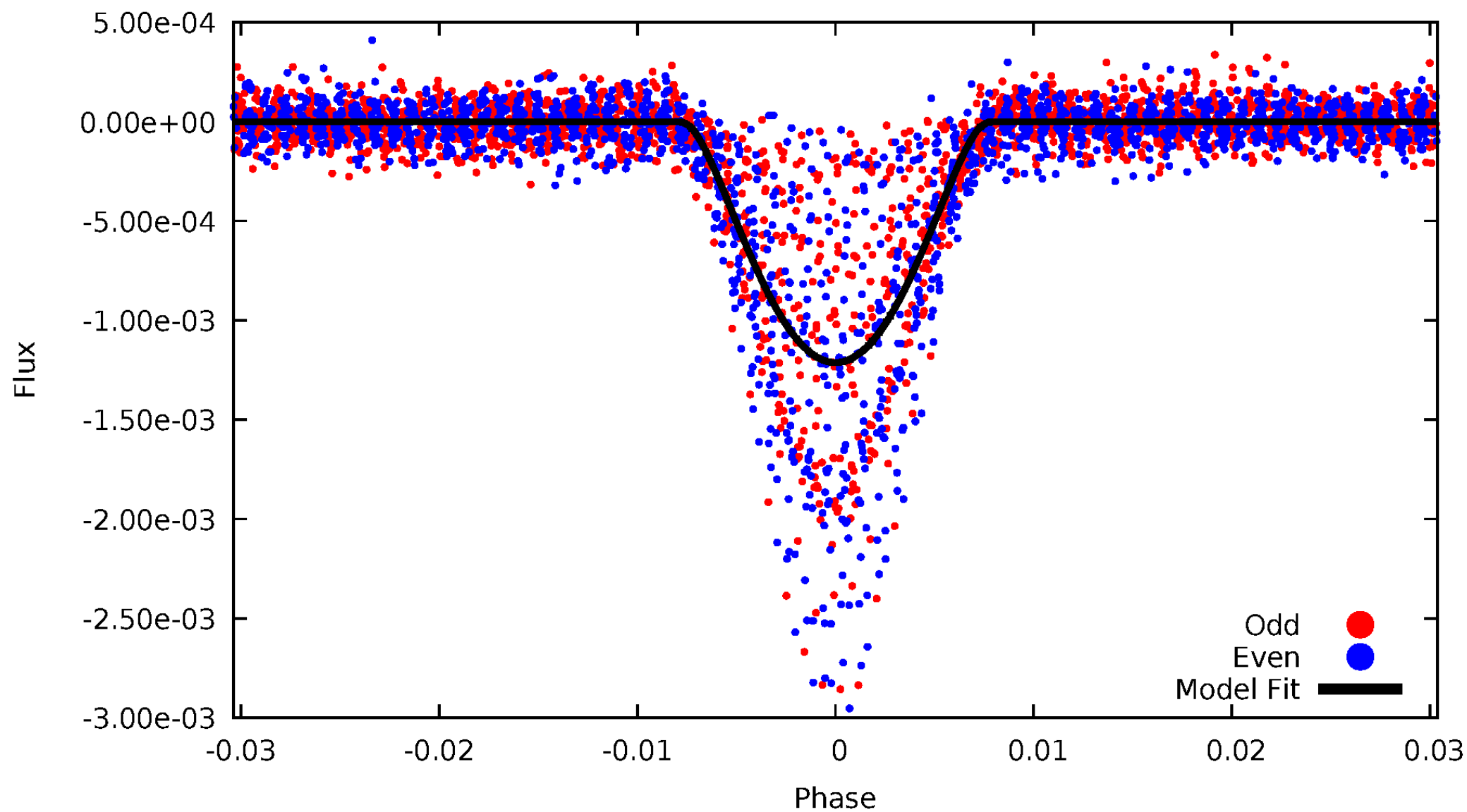


TCE 006146418-01



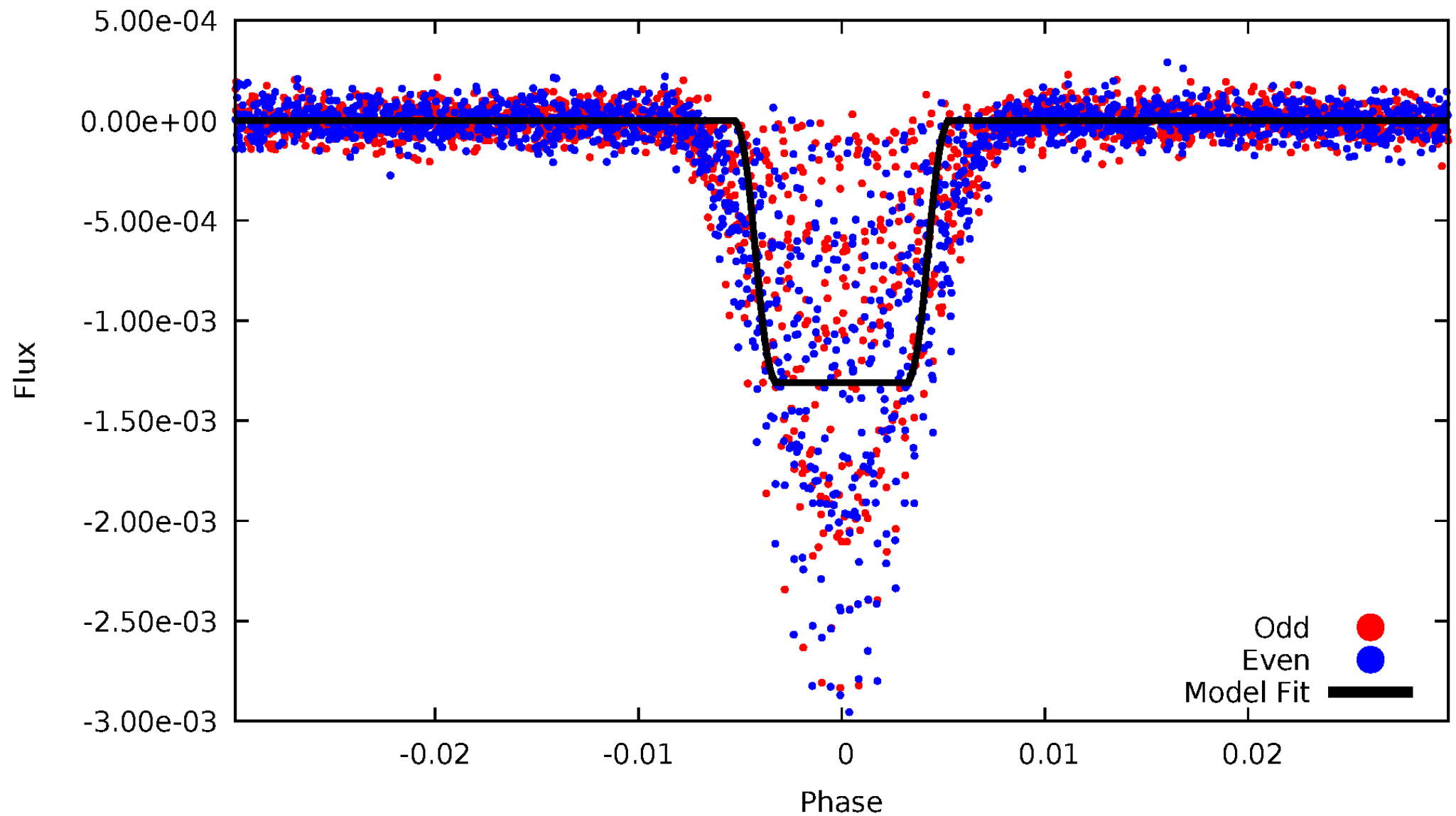
DV Odd/Even

TCE 006146418-01



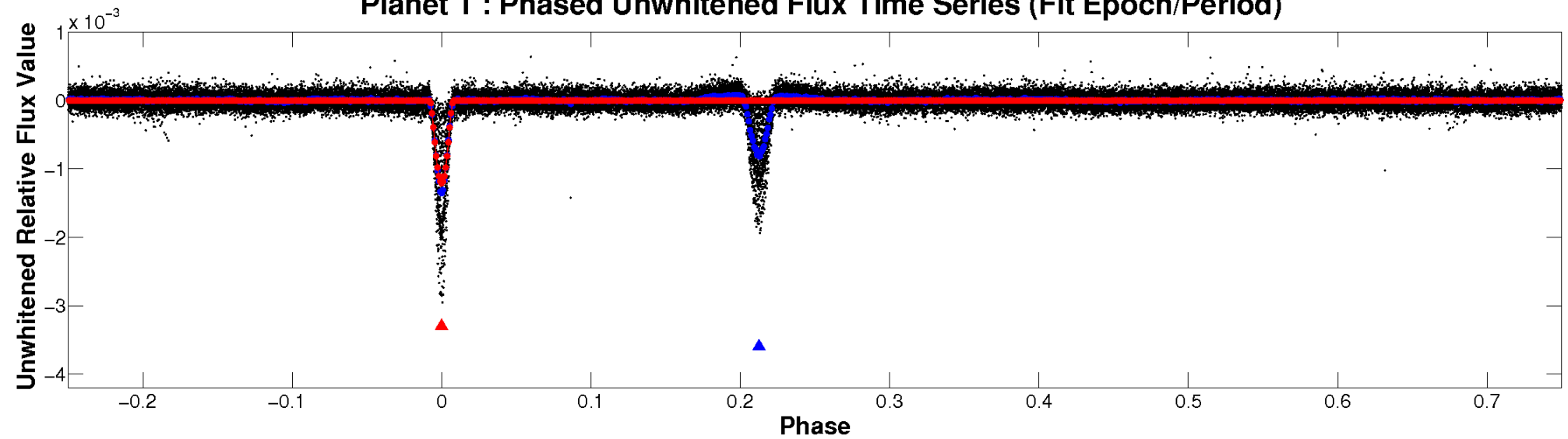
ALT Odd/Even

TCE 006146418-01

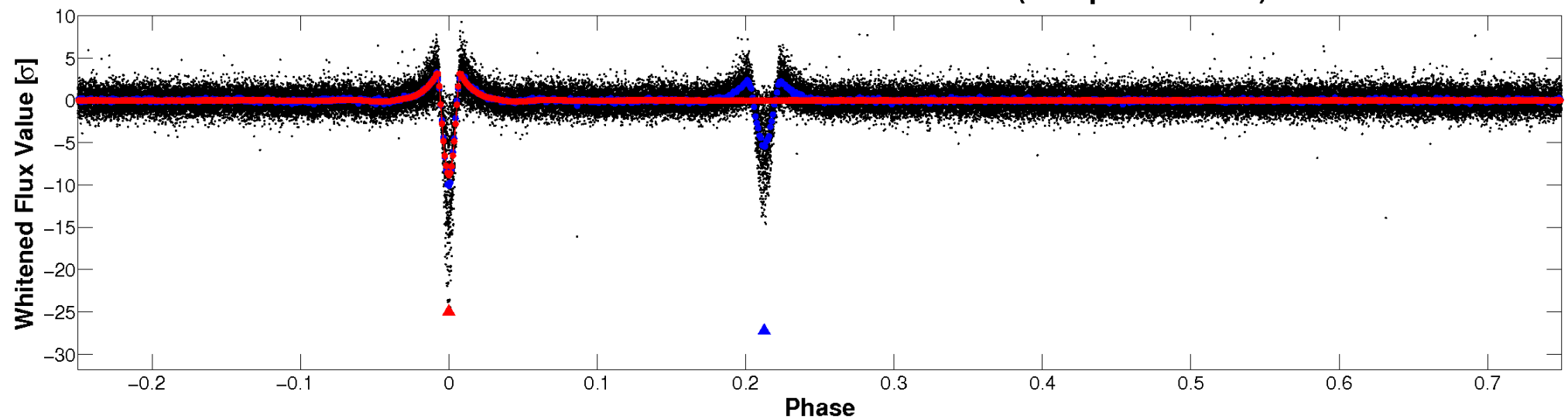


Non-Whitened Vs. Whitened Light Curve

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

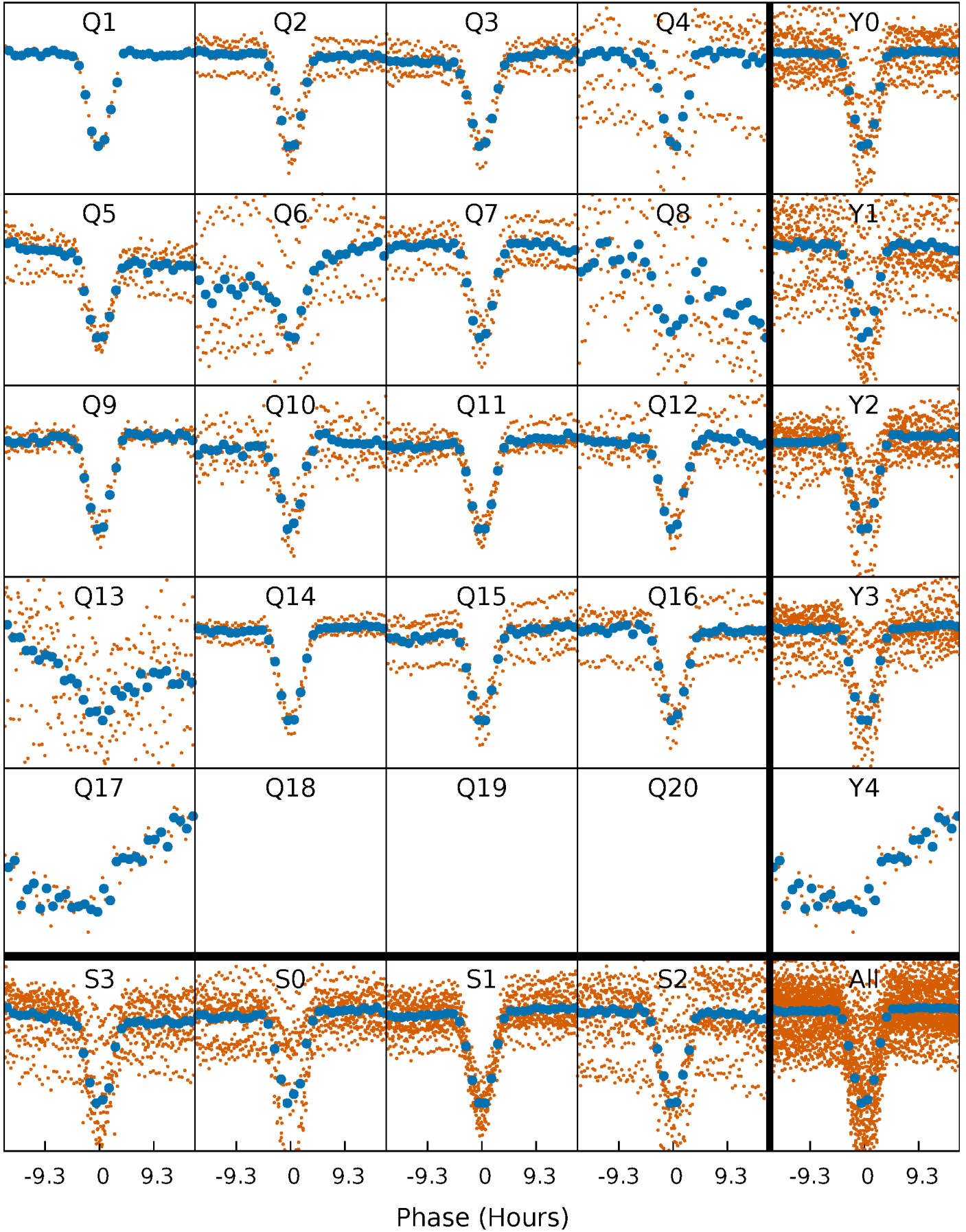


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



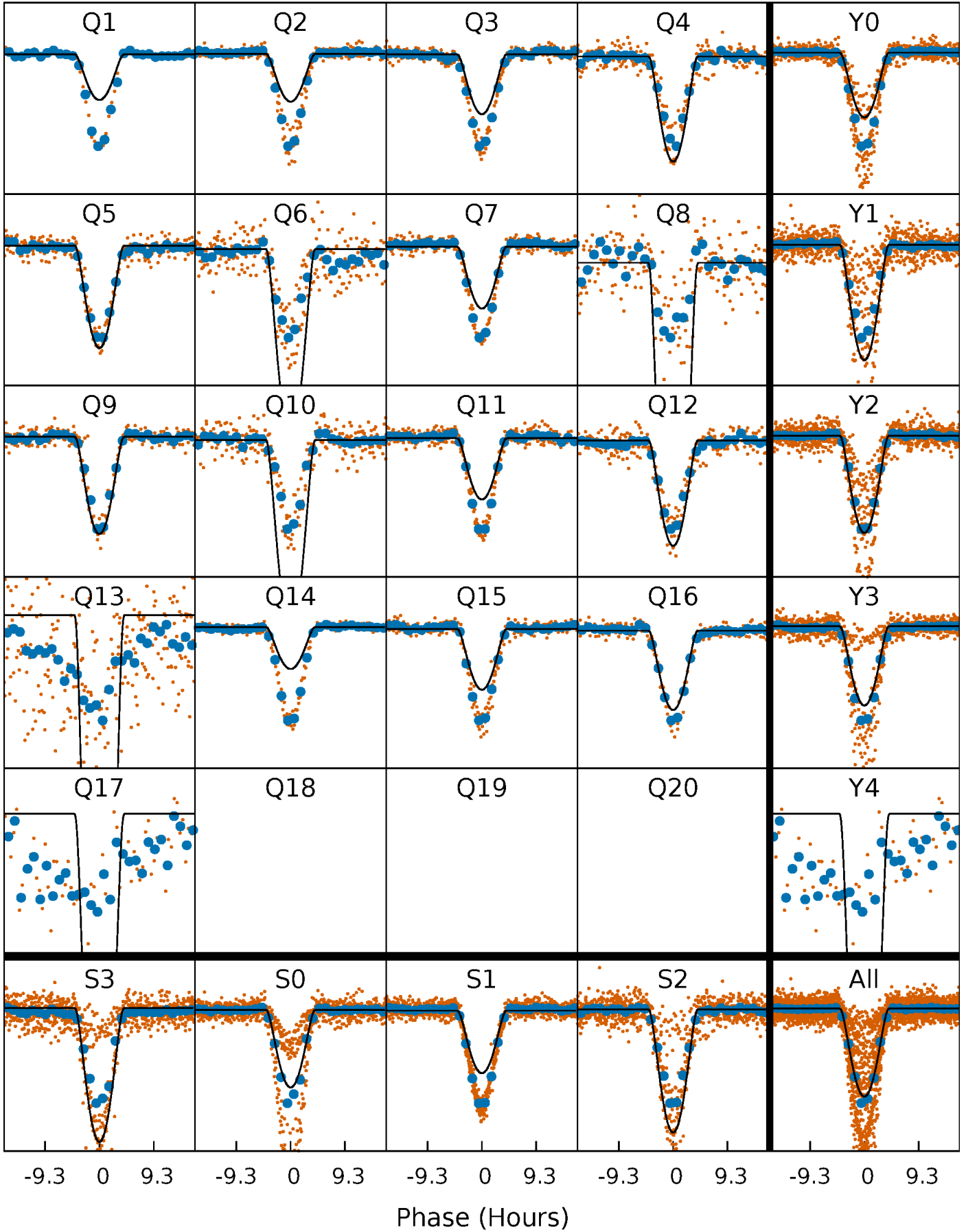
PDC Quarter-Phased Transit Curves

TCE 006146418-01 P= 22.446164 Days $T_0=149.161015$ (BKJD)



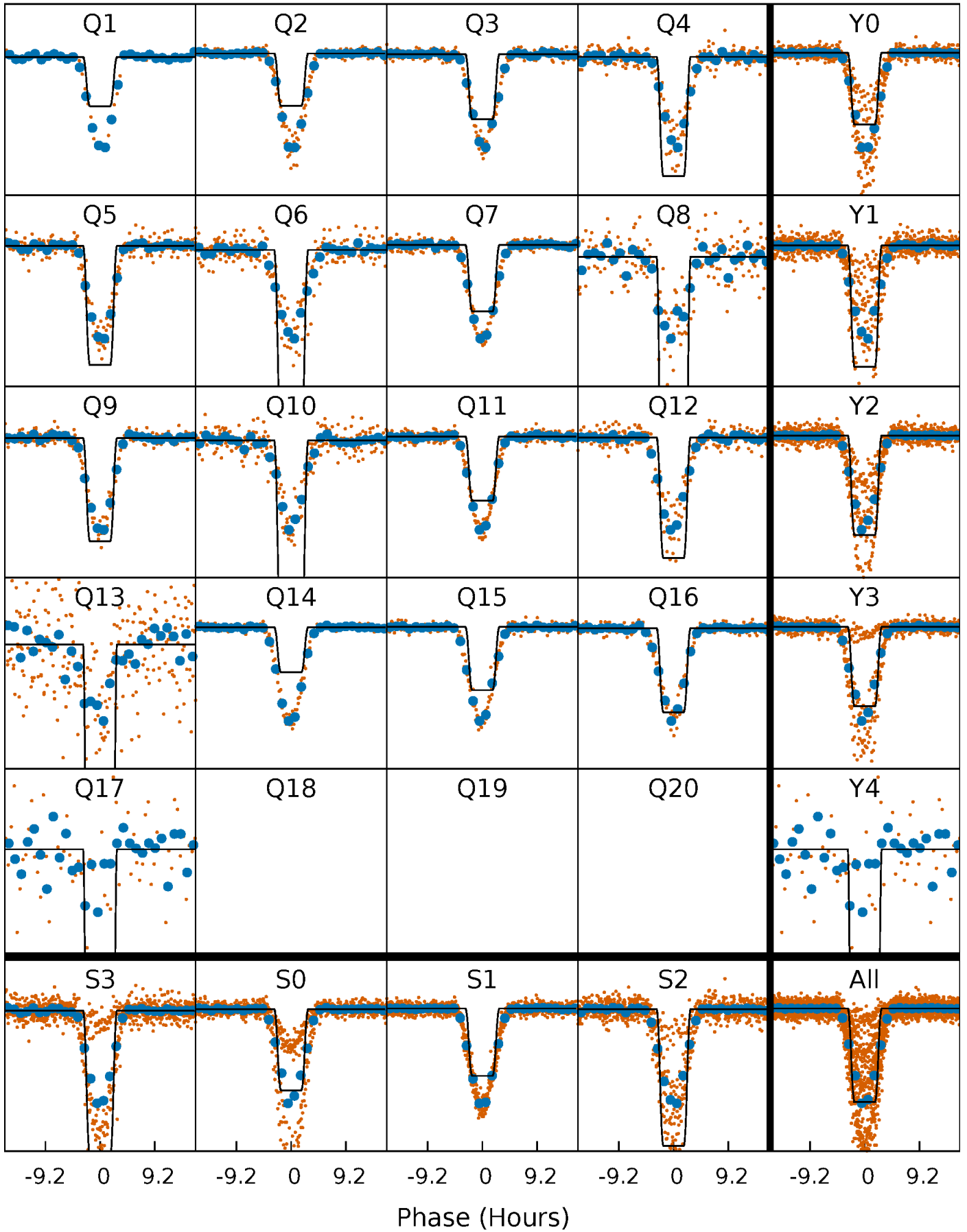
DV Quarter-Phased Transit Curves

TCE 006146418-01 P= 22.446164 Days $T_0=149.161015$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

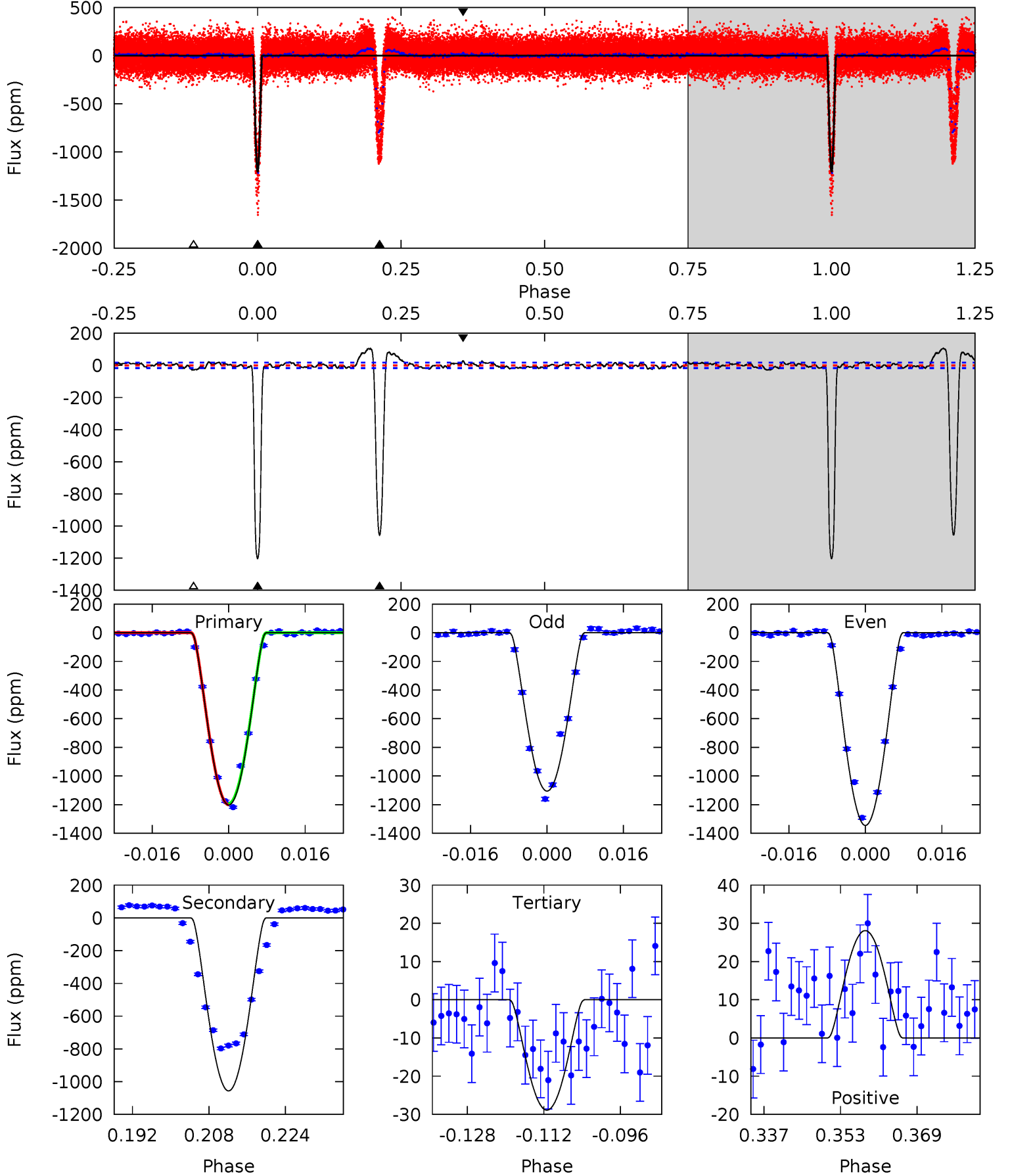
TCE 006146418-01 P= 22.446519 Days $T_0=149.149443$ (BKJD)



DV Model-Shift Uniqueness Test

006146418-01, P = 22.446164 Days, E = 126.714851 Days

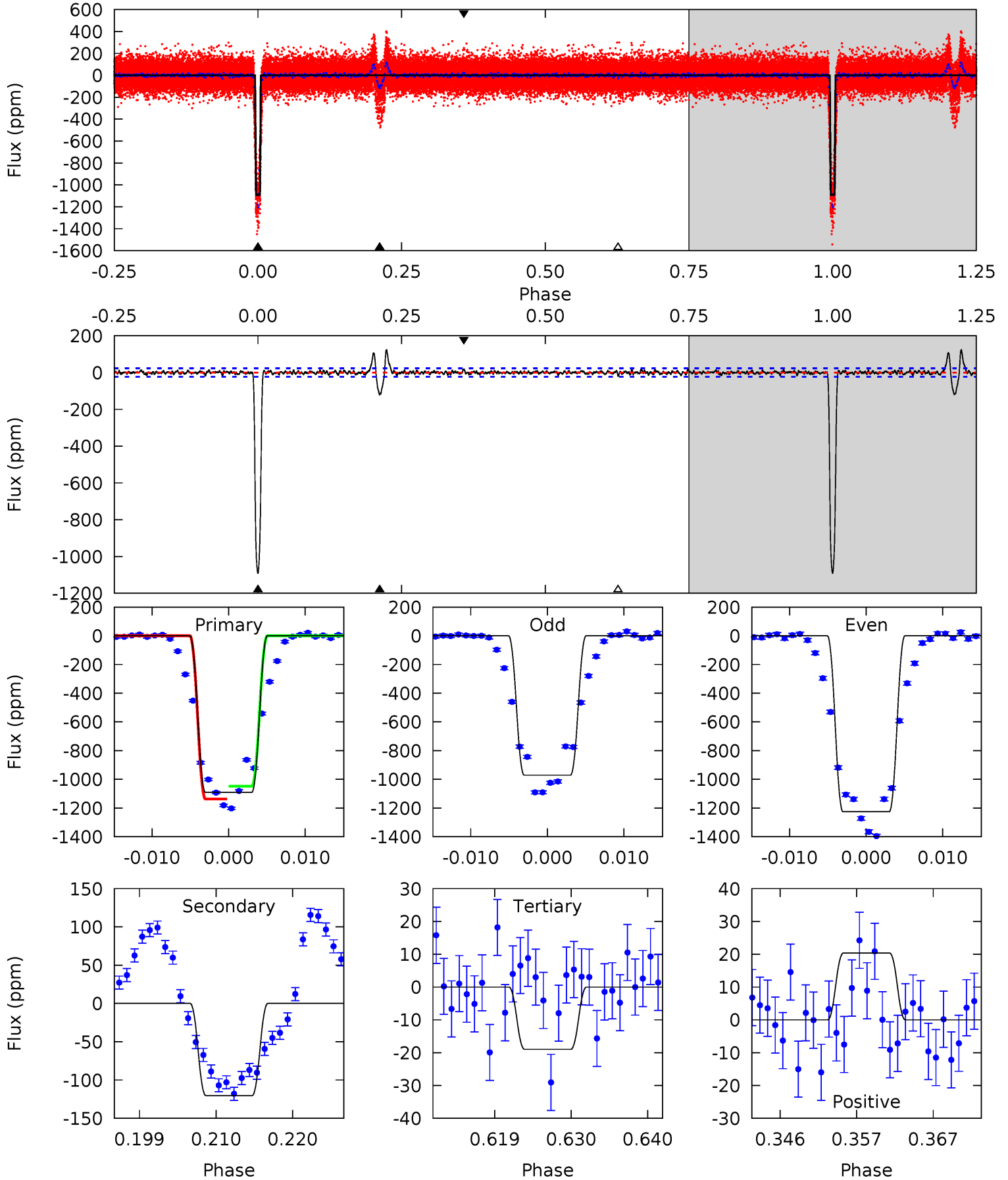
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
351.9	309.1	8.45	8.22	4.93	2.41	5.51	343.5	343.7	300.7	300.9	35.4	1.04	0.08	0



Alt Model-Shift Uniqueness Test

006146418-01, P = 22.446519 Days, E = 126.702924 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
241.4	26.6	4.20	4.51	5.02	2.56	2.47	237.2	236.9	22.4	22.1	28.0	1.05	0.10	0



Stellar Parameters For KIC 006146418

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6070^{+165}_{-165}	$3.969^{+0.273}_{-0.117}$	$-0.260^{+0.300}_{-0.250}$	$1.777^{+0.332}_{-0.569}$	$1.074^{+0.190}_{-0.173}$	$0.270^{+0.483}_{-0.097}$
	+3%/-3%	+7%/-3%	+115%/-96%	+19%/-32%	+18%/-16%	+179%/-36%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 006146418-01 / KOI 6021.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1056 ± 3	$11.26^{+3.15}_{-2.86}$	1235^{+80}_{-106}	4595^{+505}_{-343}	118^{+92}_{-47}
Alt.	-120 ± 5	$6.95^{+2.68}_{-2.52}$	1236^{+78}_{-106}	3712^{+588}_{-341}	36^{+50}_{-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 $A_{obs} \gg 1.0$

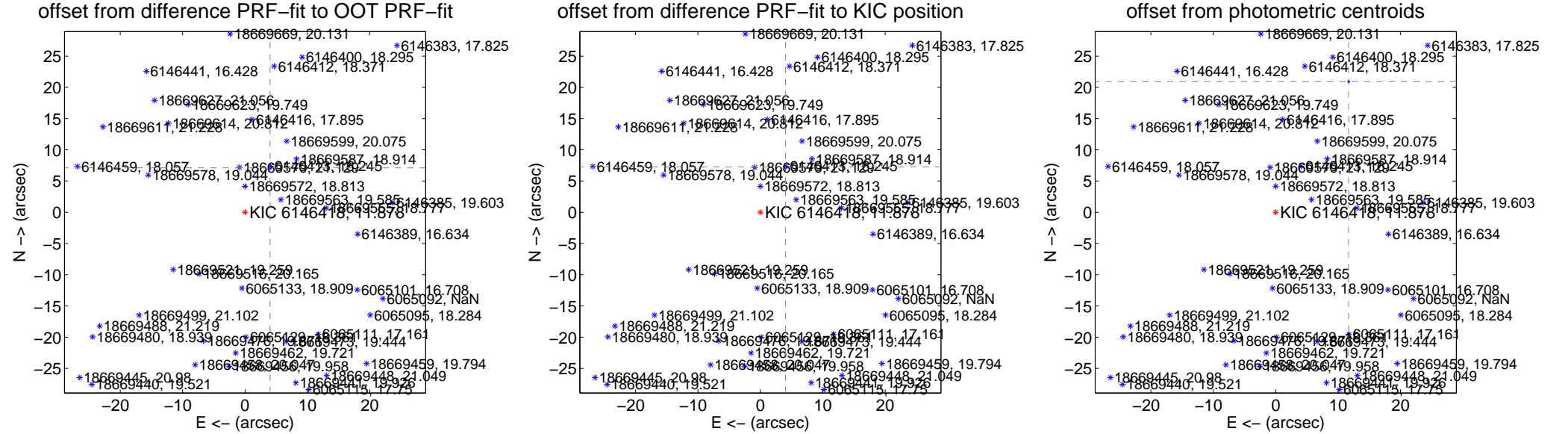
DV Centroid Data

Supplemental centroid analysis for 006146418-01. **Kepler magnitude: 11.88.** Transit SNR 137.89

There are 17 quarters with good PRF difference image offsets

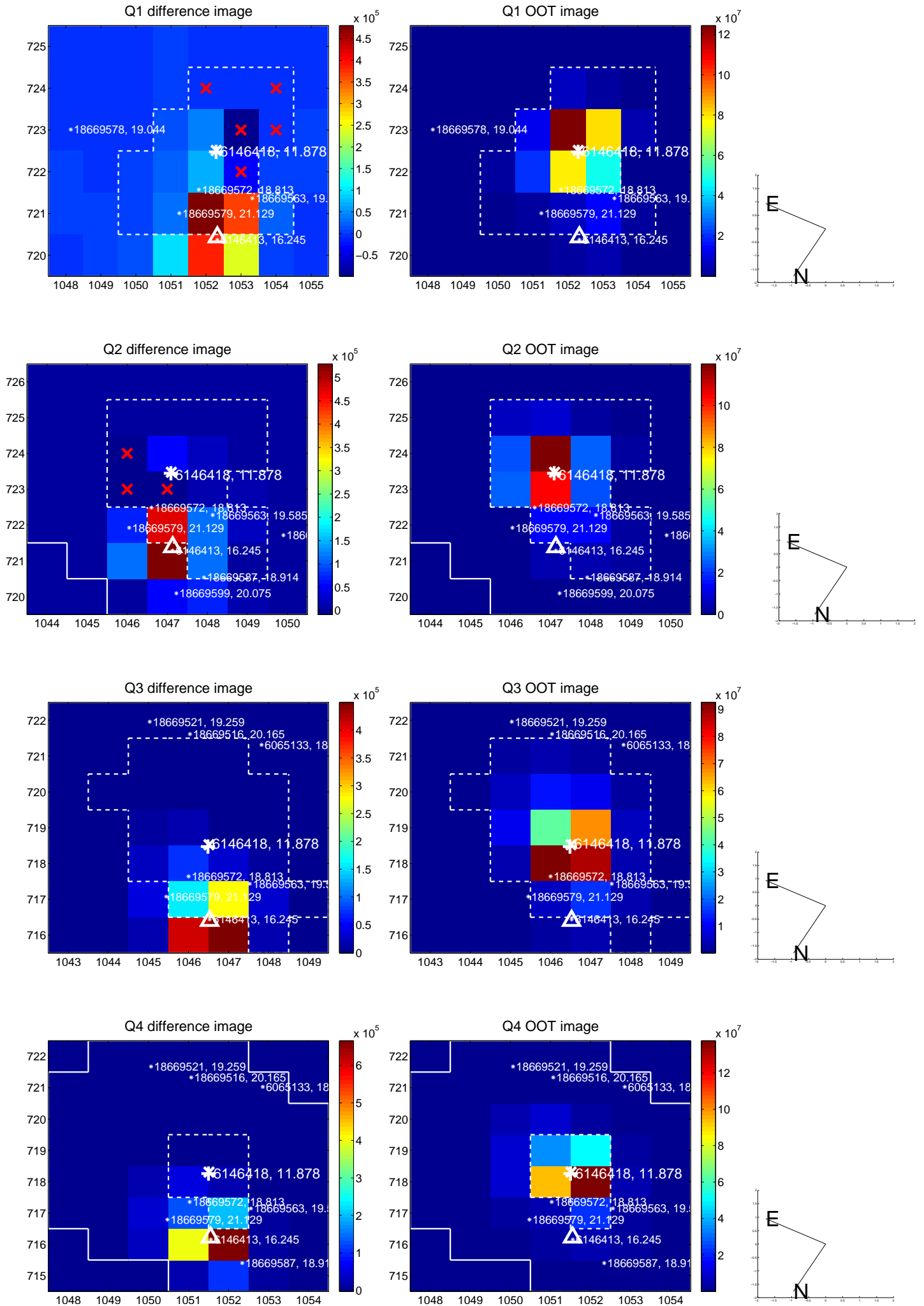
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	8.165 \pm 0.067	121.07	-4.011 \pm 0.067	7.112 \pm 0.067
PRF-fit source offset from KIC position	8.297 \pm 0.069	120.86	-4.037 \pm 0.067	7.249 \pm 0.069
photometric centroid source offset	23.97 \pm 0.05	496.32	-11.69 \pm 0.05	20.92 \pm 0.05

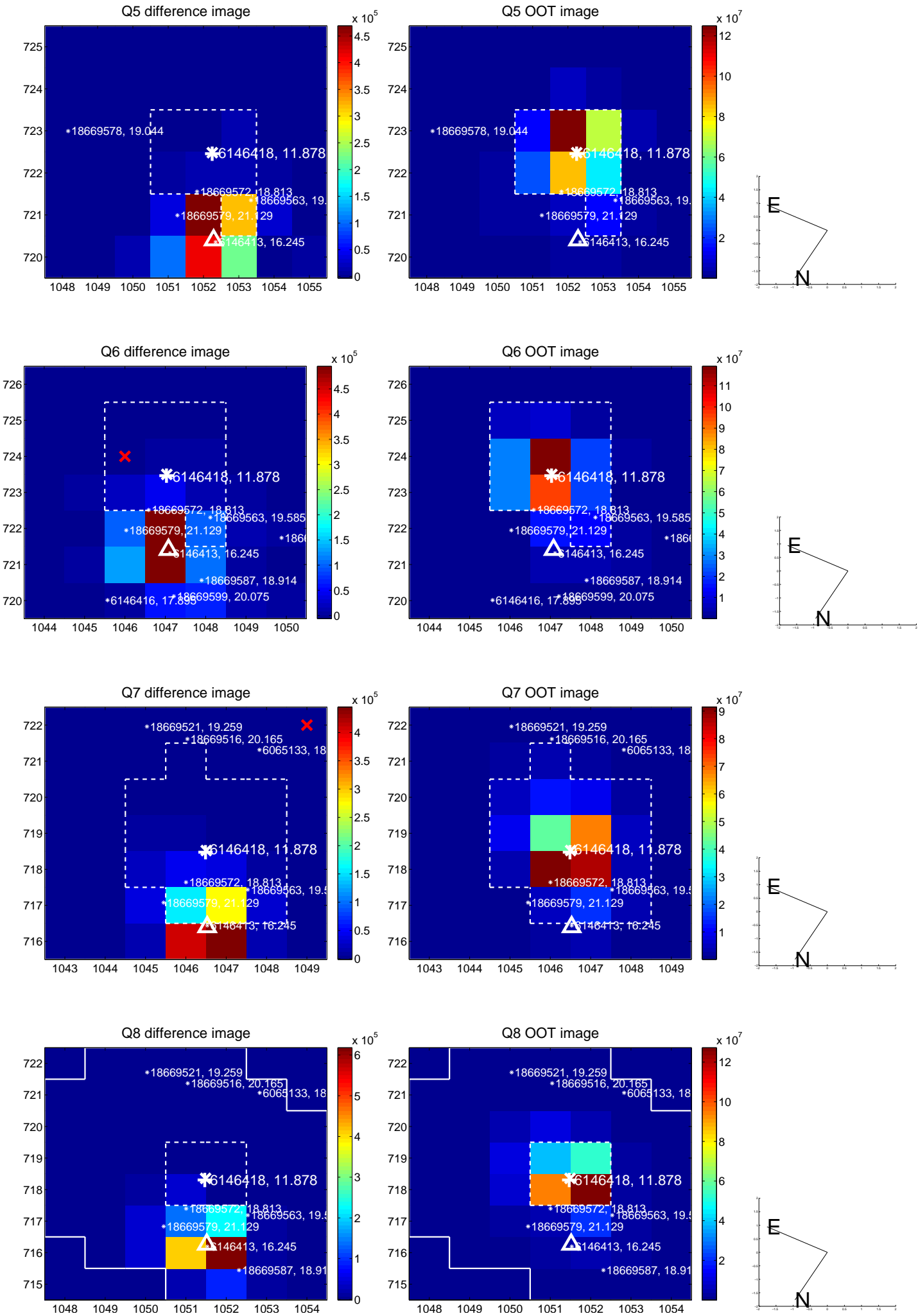


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

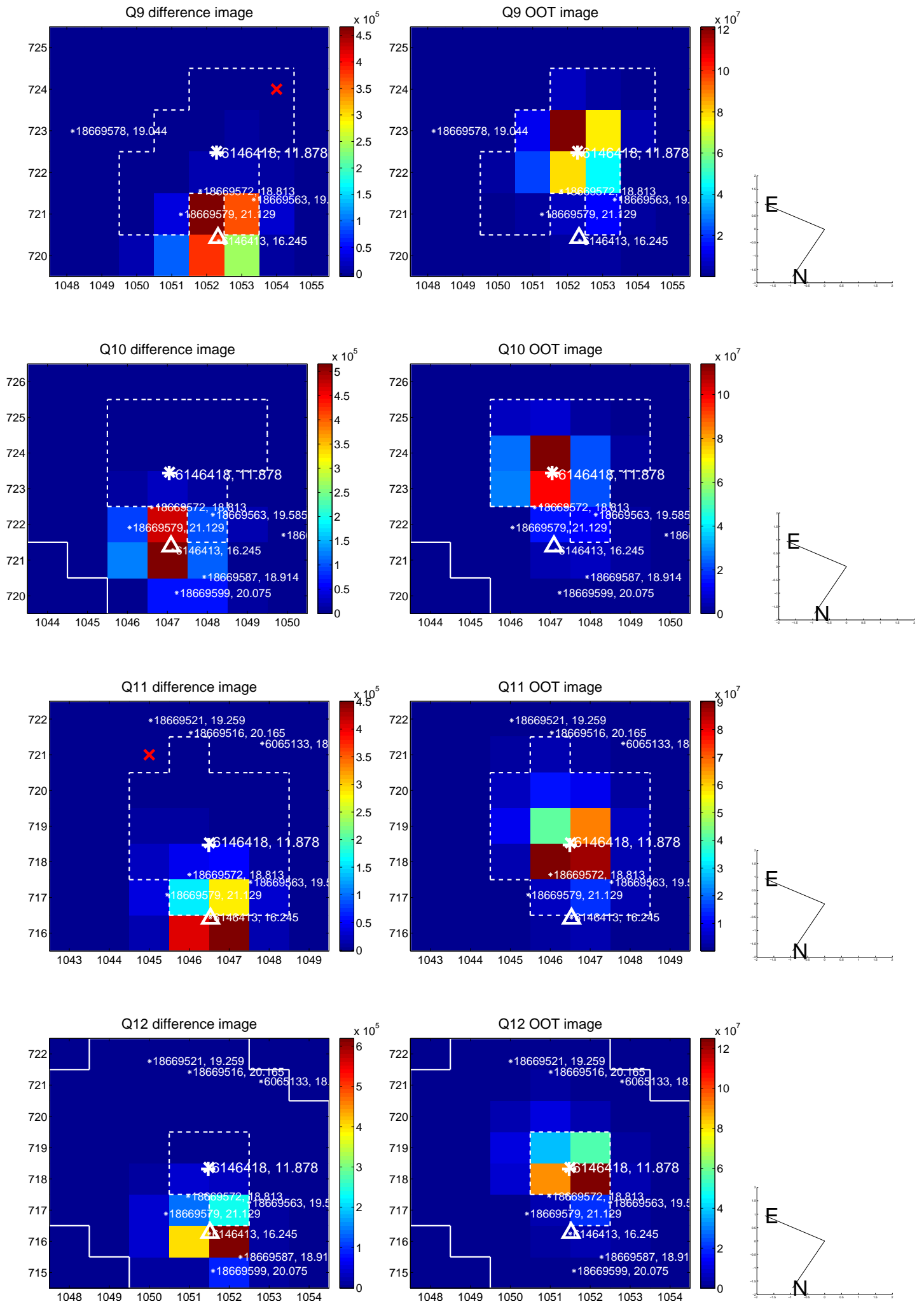
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



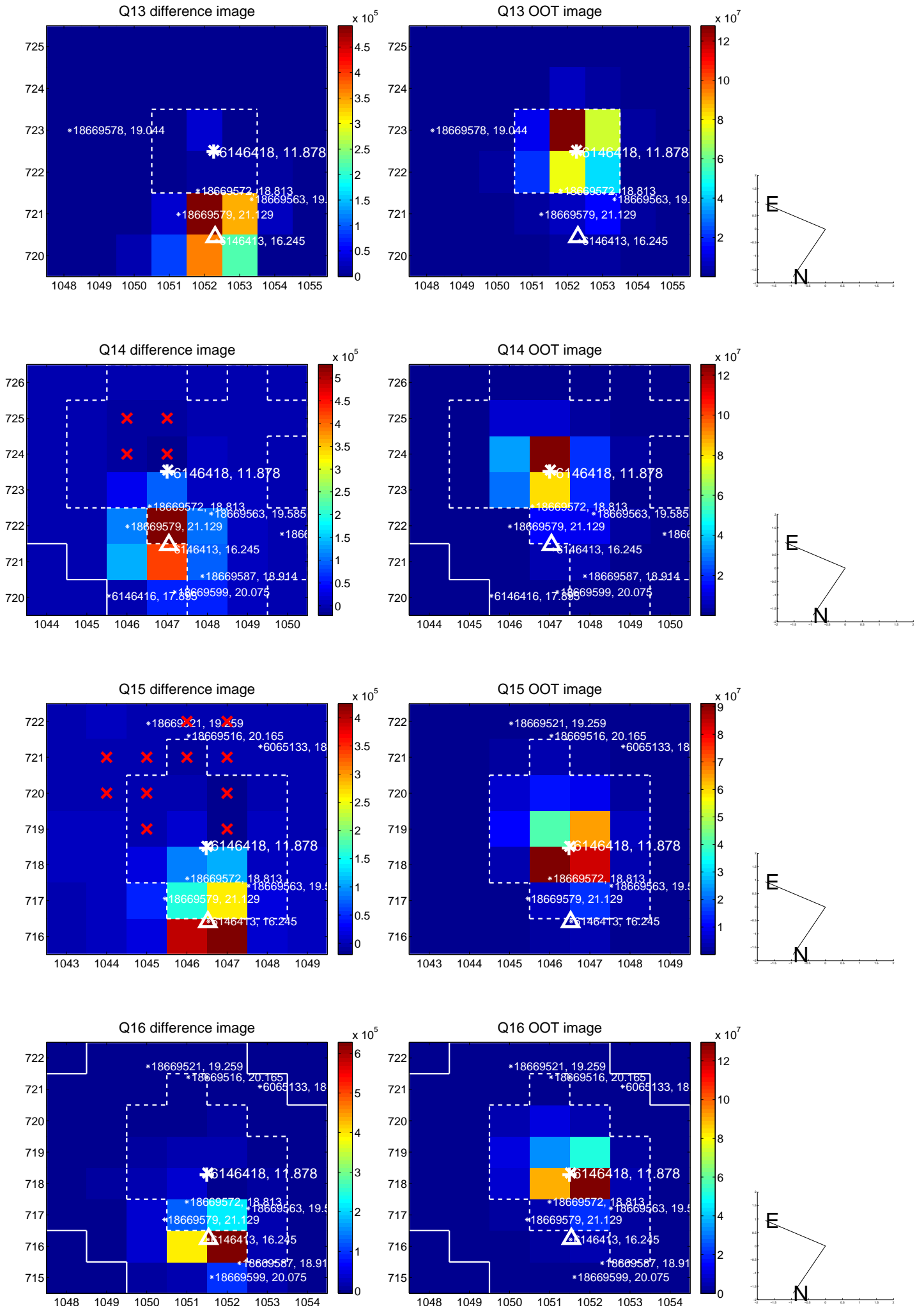
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



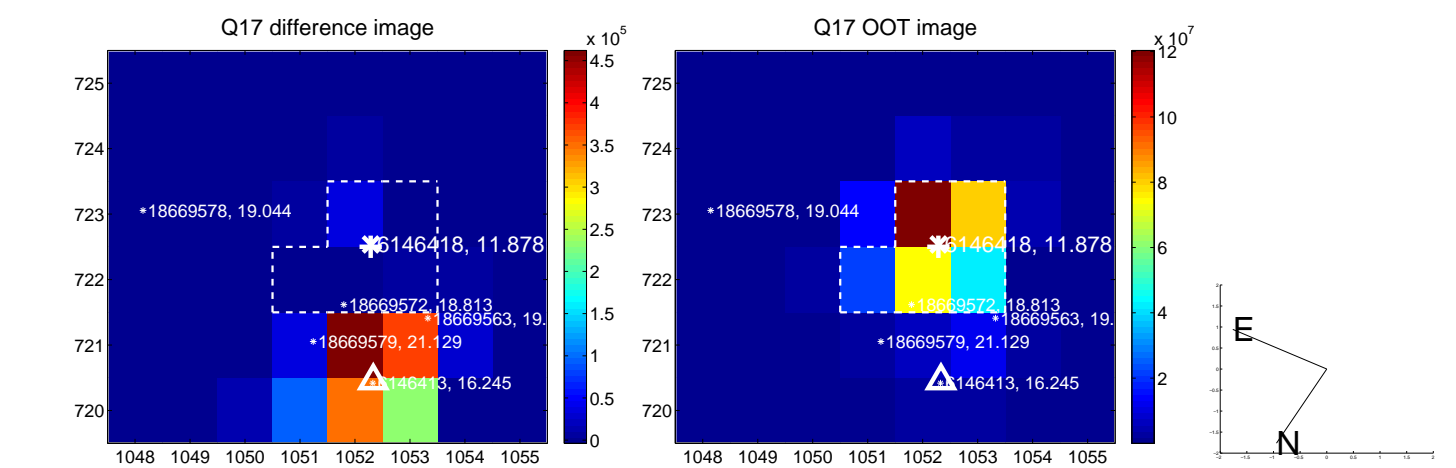
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



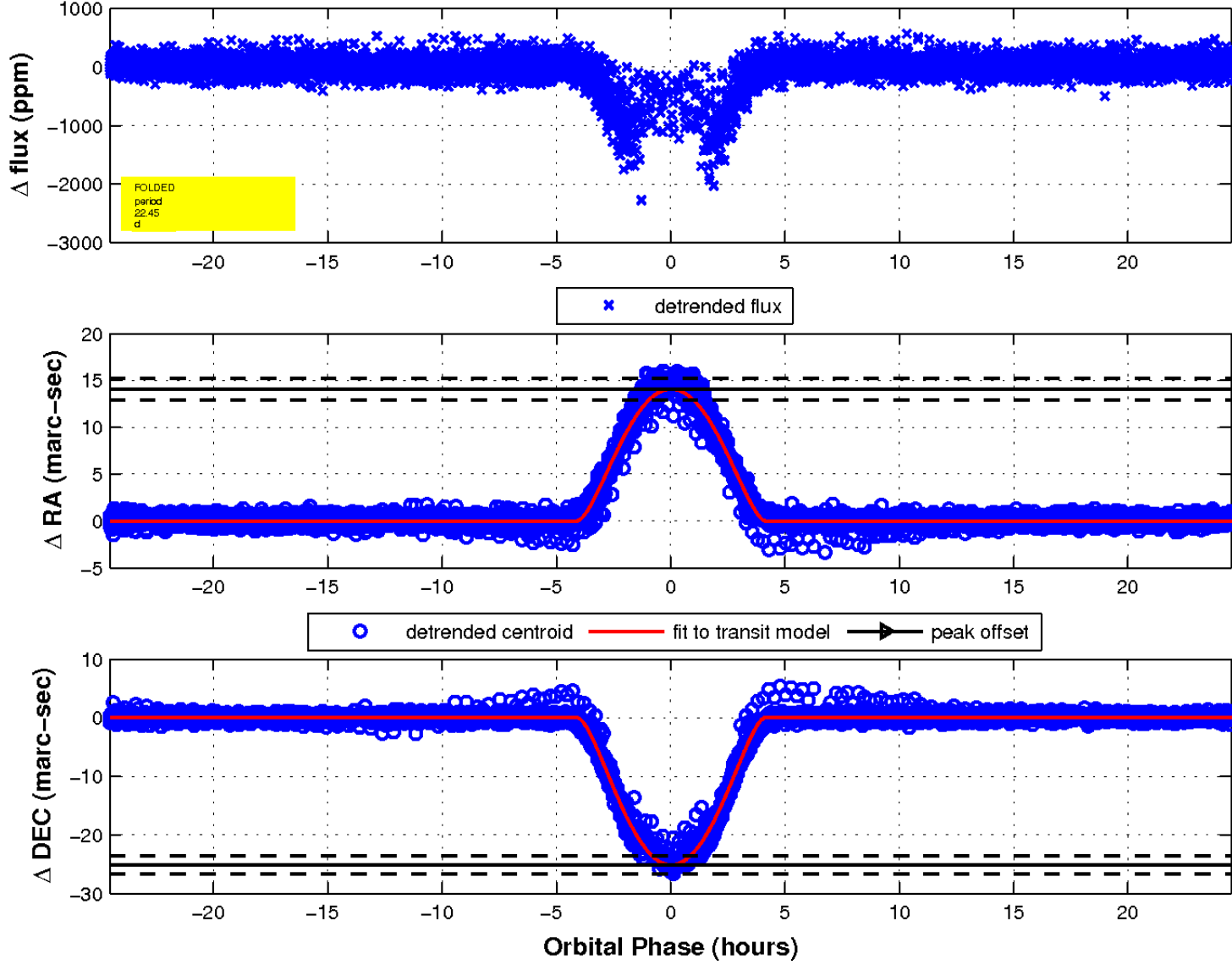
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



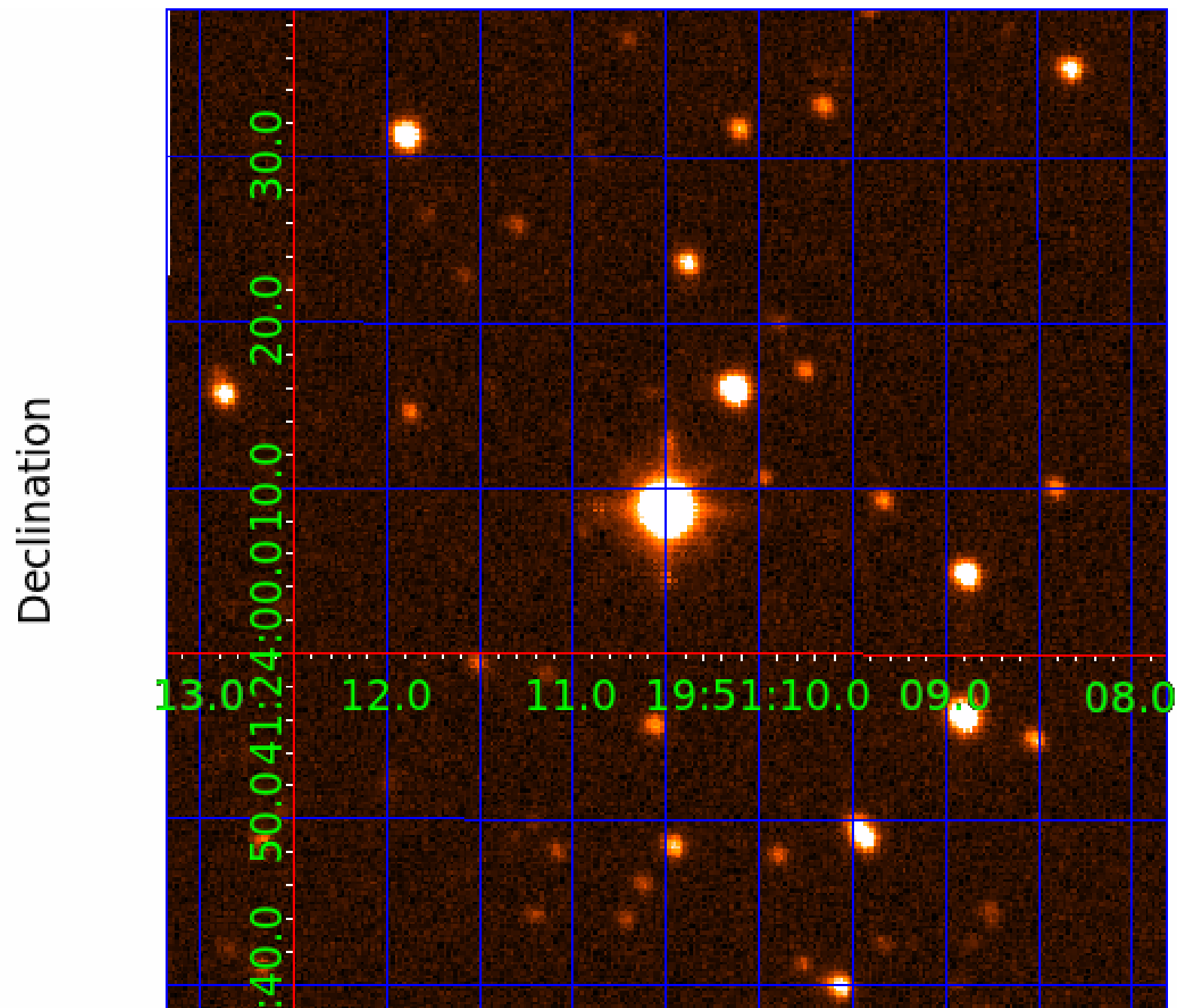
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 006146418

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})
006146418-01	OBS	6021.01	22.446164	149.161015	1212.4	8.179	183.6	137.9	1.78	6070	11.77	151.09
006146418-02	OBS	No	22.446129	153.933102	865.0	11.946	134.9	117.2	1.78	6070	10.04	151.10

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006146418-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST
006146418-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST

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.

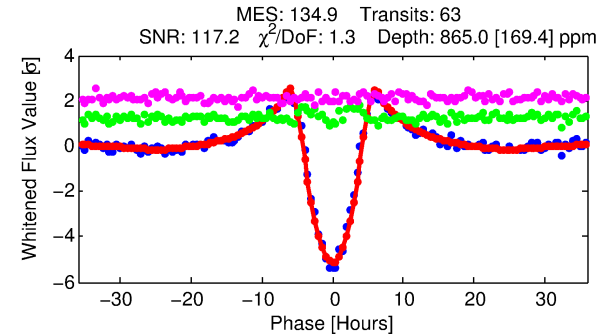
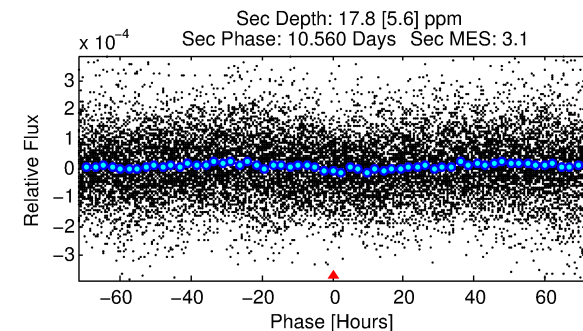
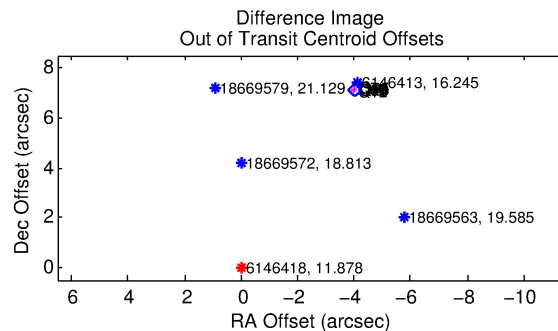
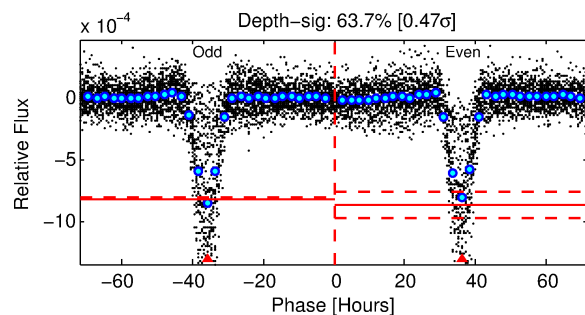
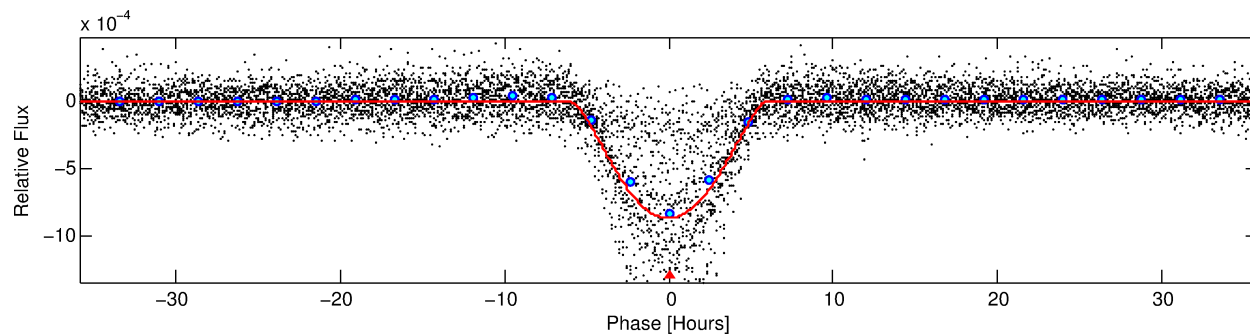
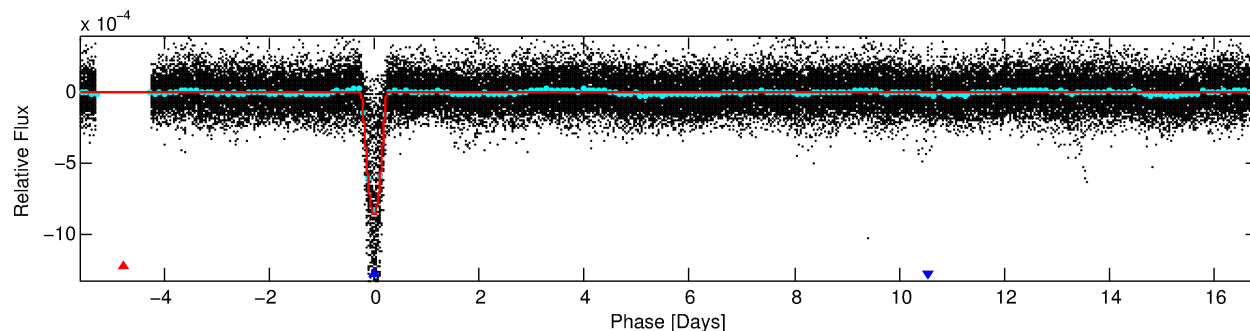
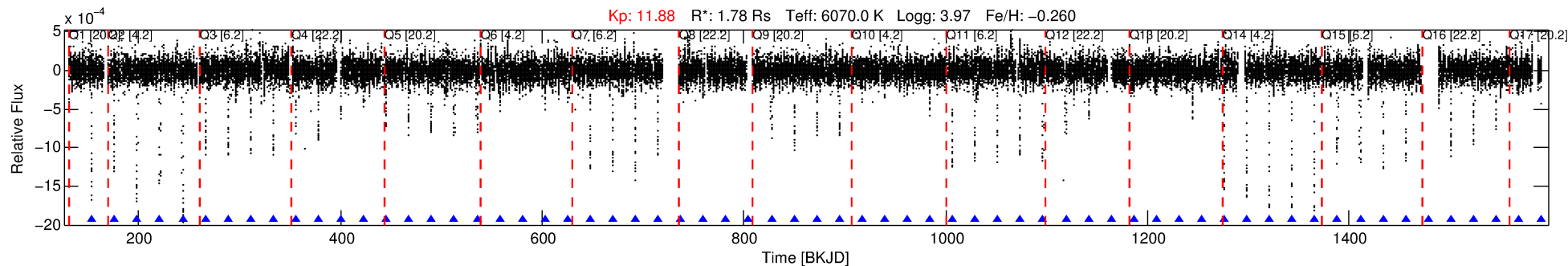
Ephemeris Match Information For 006146418-02

No Significant Match Found

DV One-Page Summary

KIC: 6146418 Candidate: 2 of 2 Period: 22.446 d
KOI: K06021 Corr: No Ephemeris Match

Kp: 11.88 R*: 1.78 Rs Teff: 6070.0 K Logg: 3.97 Fe/H: -0.260



DV Fit Results:

Period = 22.44613 [0.00005] d
Epoch = 153.9331 [0.0019] BKJD
Rp/R* = 0.0518 [0.0107]
a/R* = 4.79 [0.23]
b = 1.00 [0.01]
Seff = 151.10 [72.94]
Teq = 894 [108] K
Rp = 10.04 [3.83] Re
a = 0.1594 [0.0477] AU
Ag = 2.47 [1.73] [0.85σ]
Teff = 1732 [230] K [3.29σ]

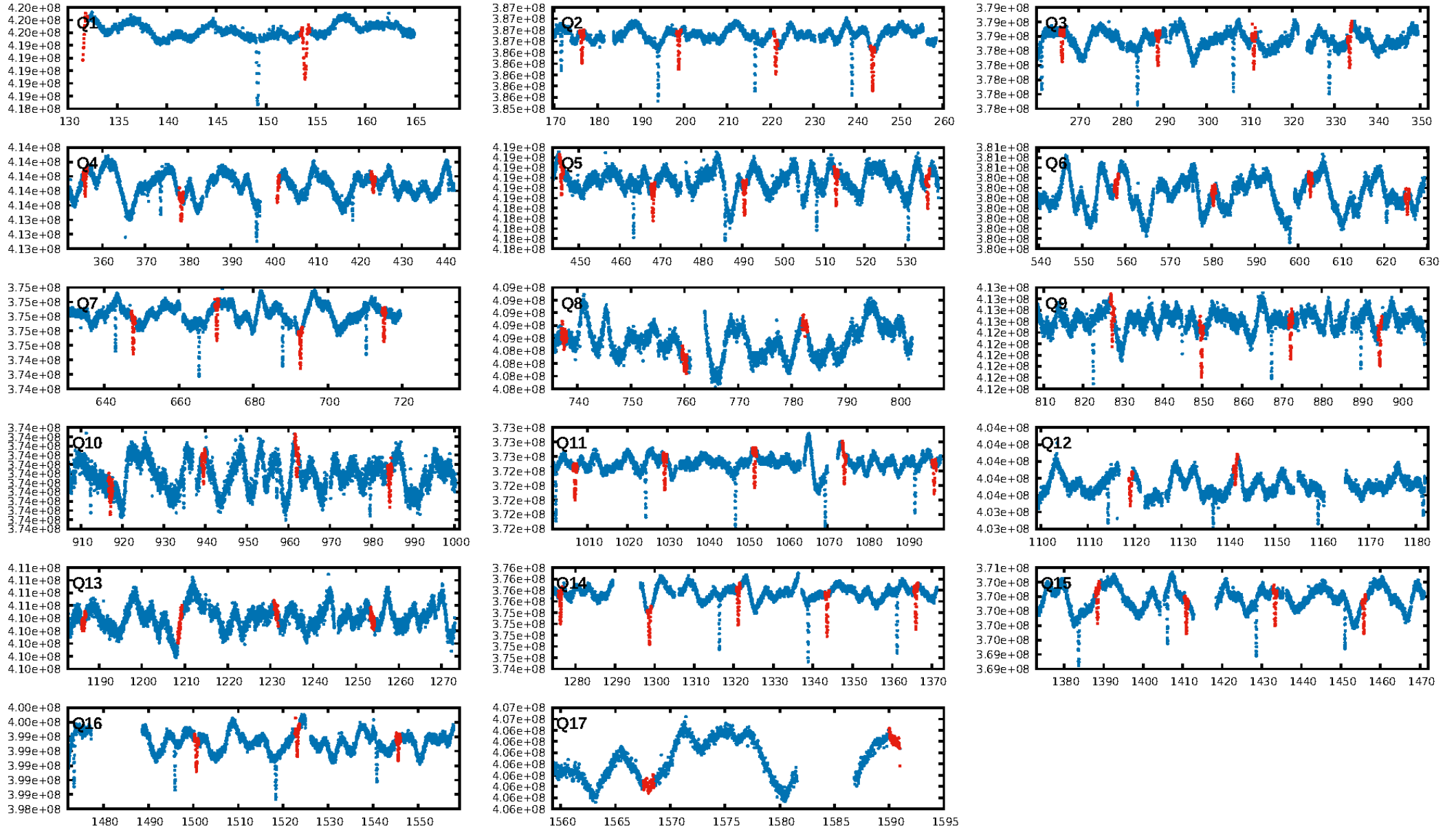
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 0.1%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [59/59]
GhostDiagnostic-chr: -0.1286
Centroid-sig: 0.0%
Centroid-so: 21.759 arcsec [346.78σ]
OotOffset-rm: 8.167 arcsec [121.46σ]
KicOffset-rm: 8.300 arcsec [121.49σ]
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]

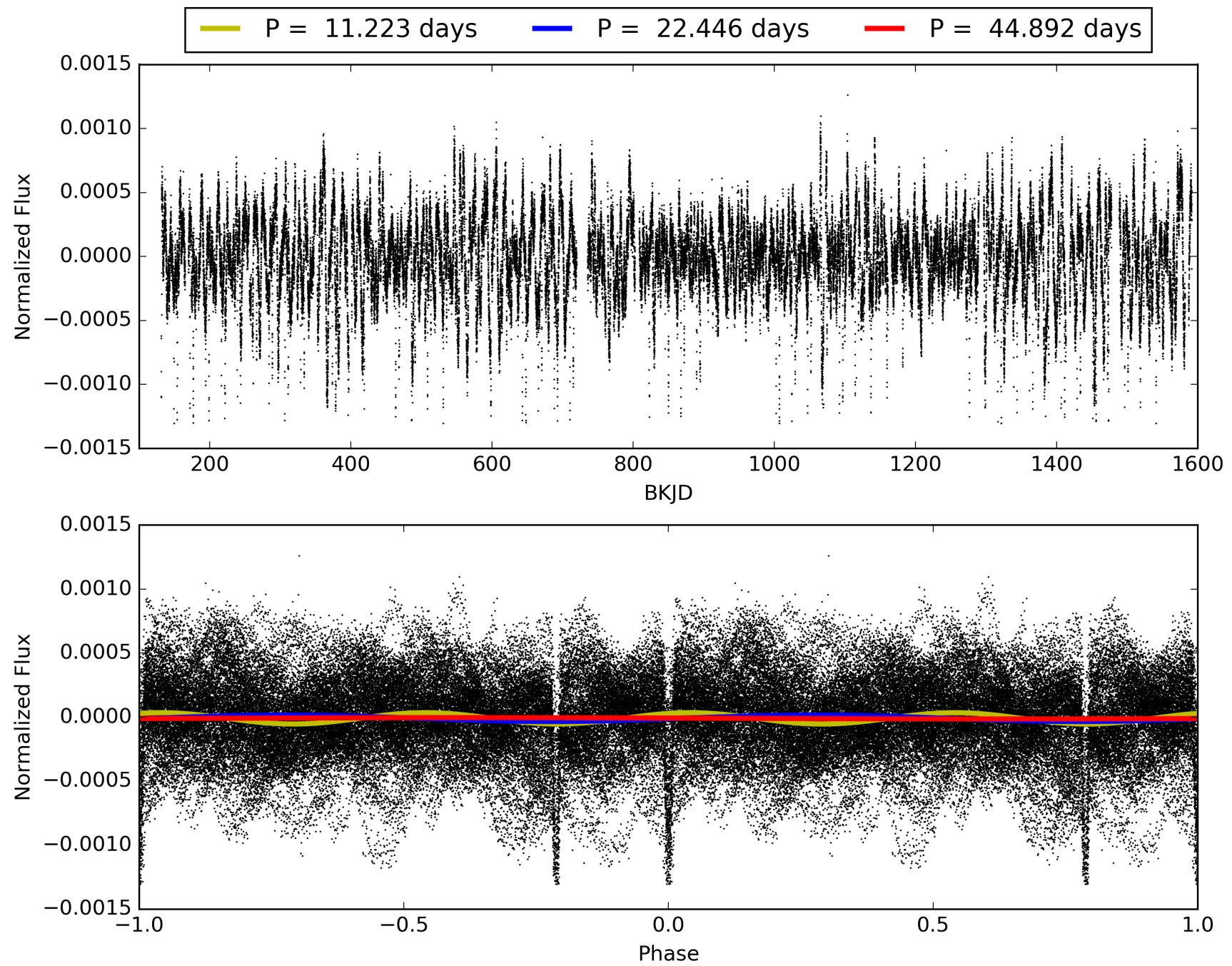
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:37:08 Z

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

TCE 006146418-02, PDC Light Curves

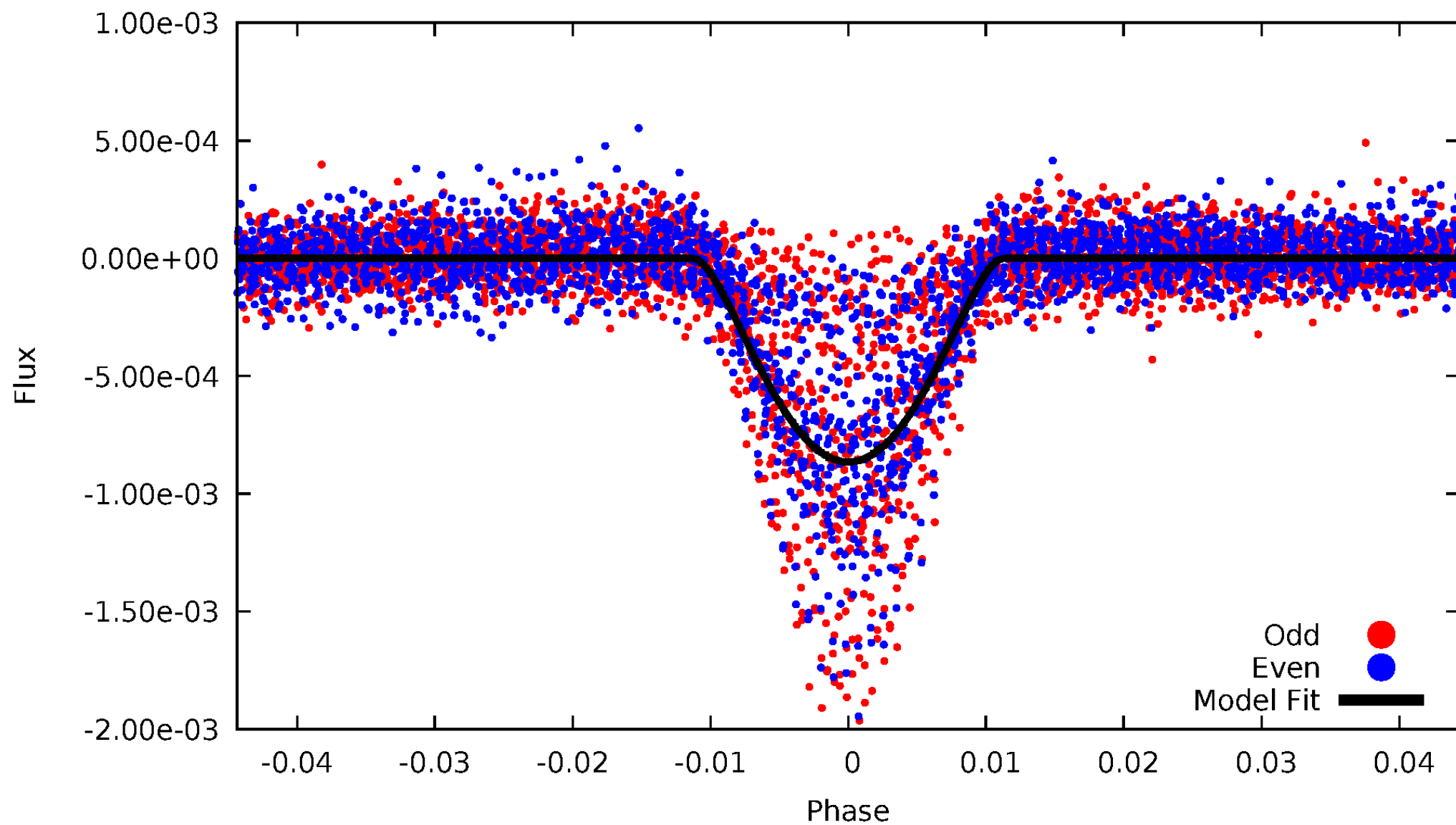


TCE 006146418-02



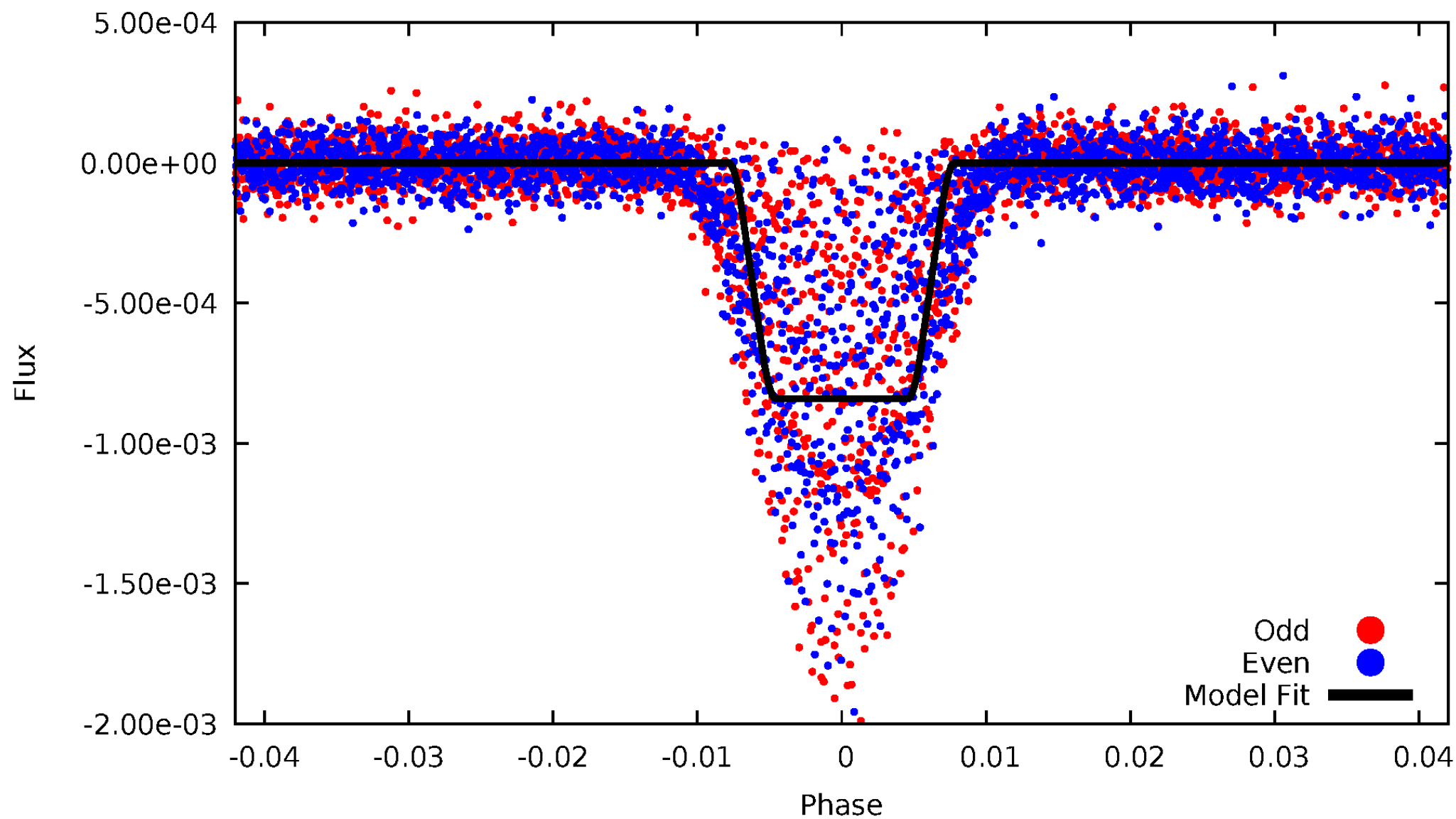
DV Odd/Even

TCE 006146418-02



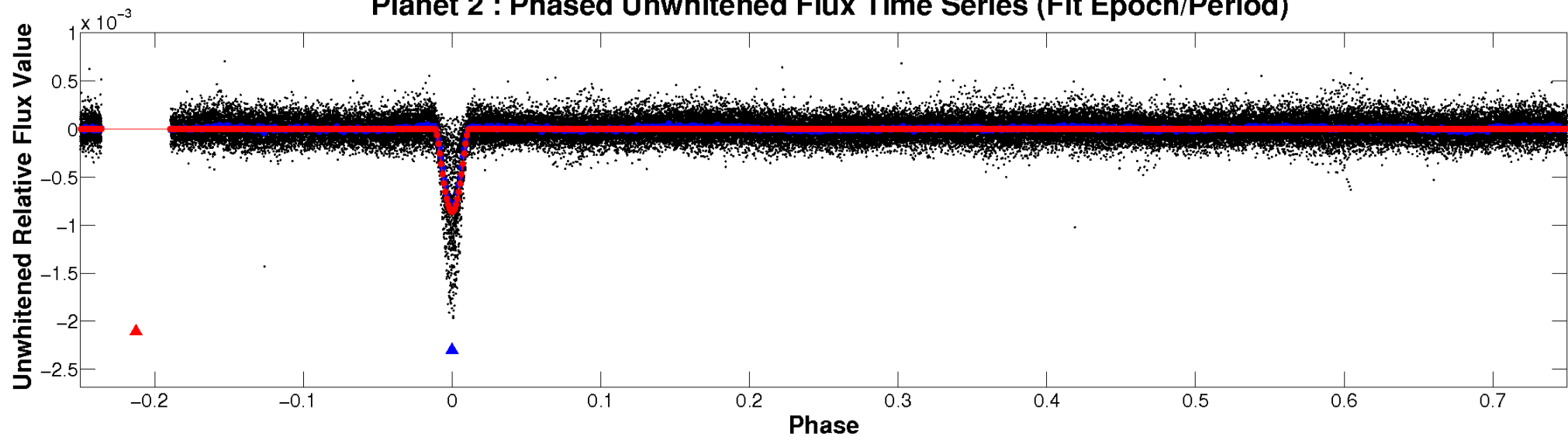
ALT Odd/Even

TCE 006146418-02

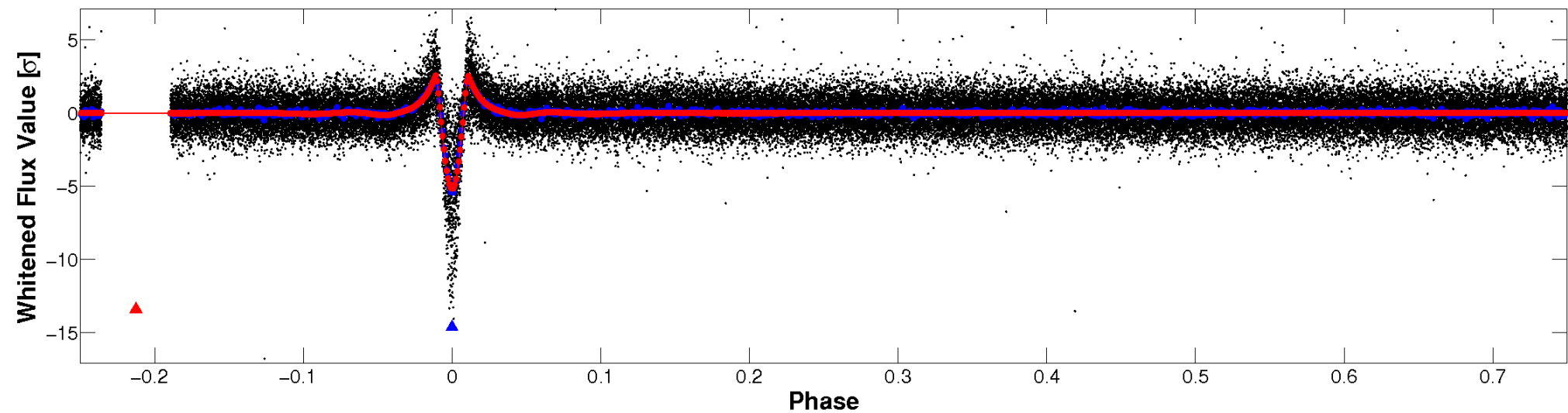


Non-Whitened Vs. Whitened Light Curve

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

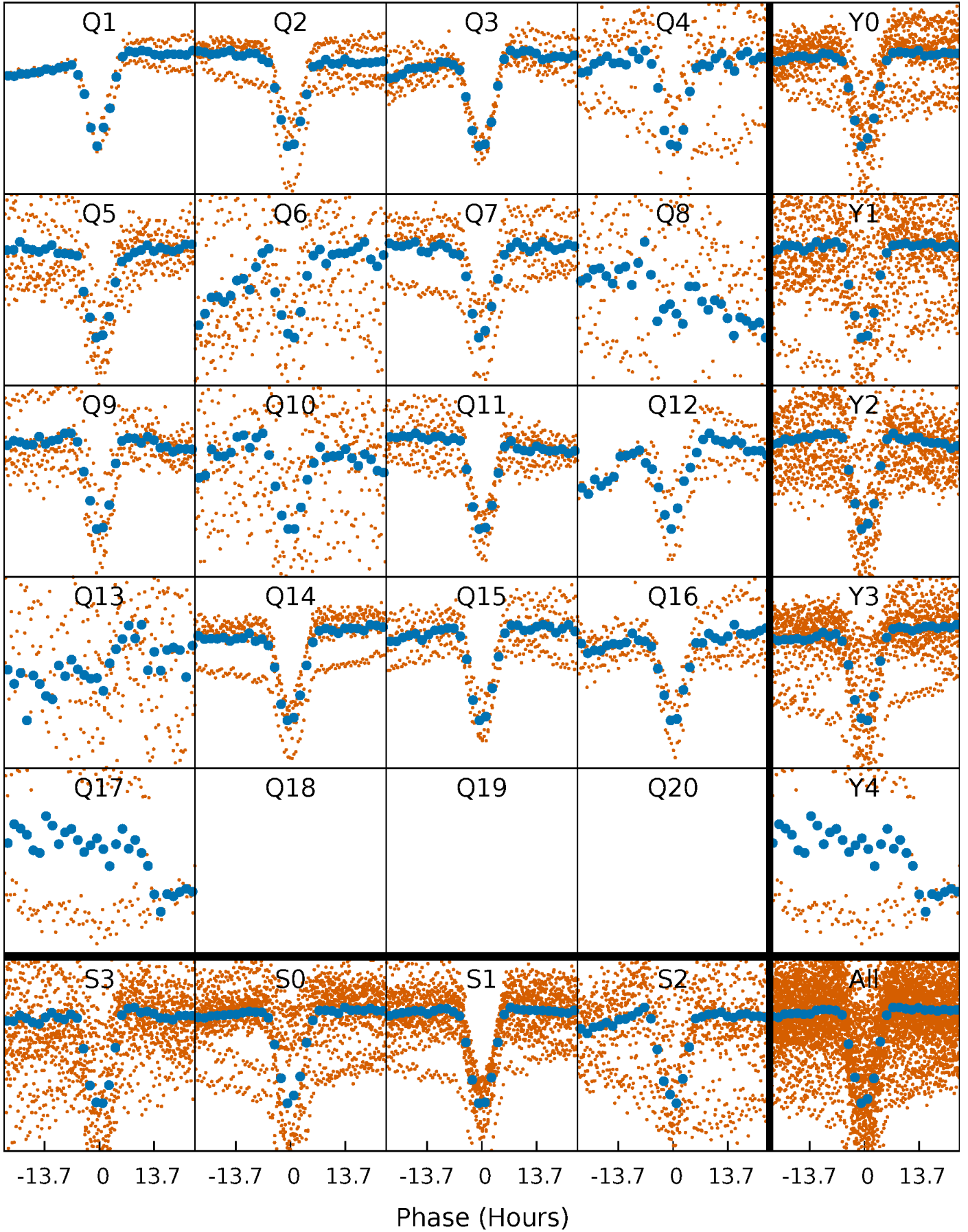


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



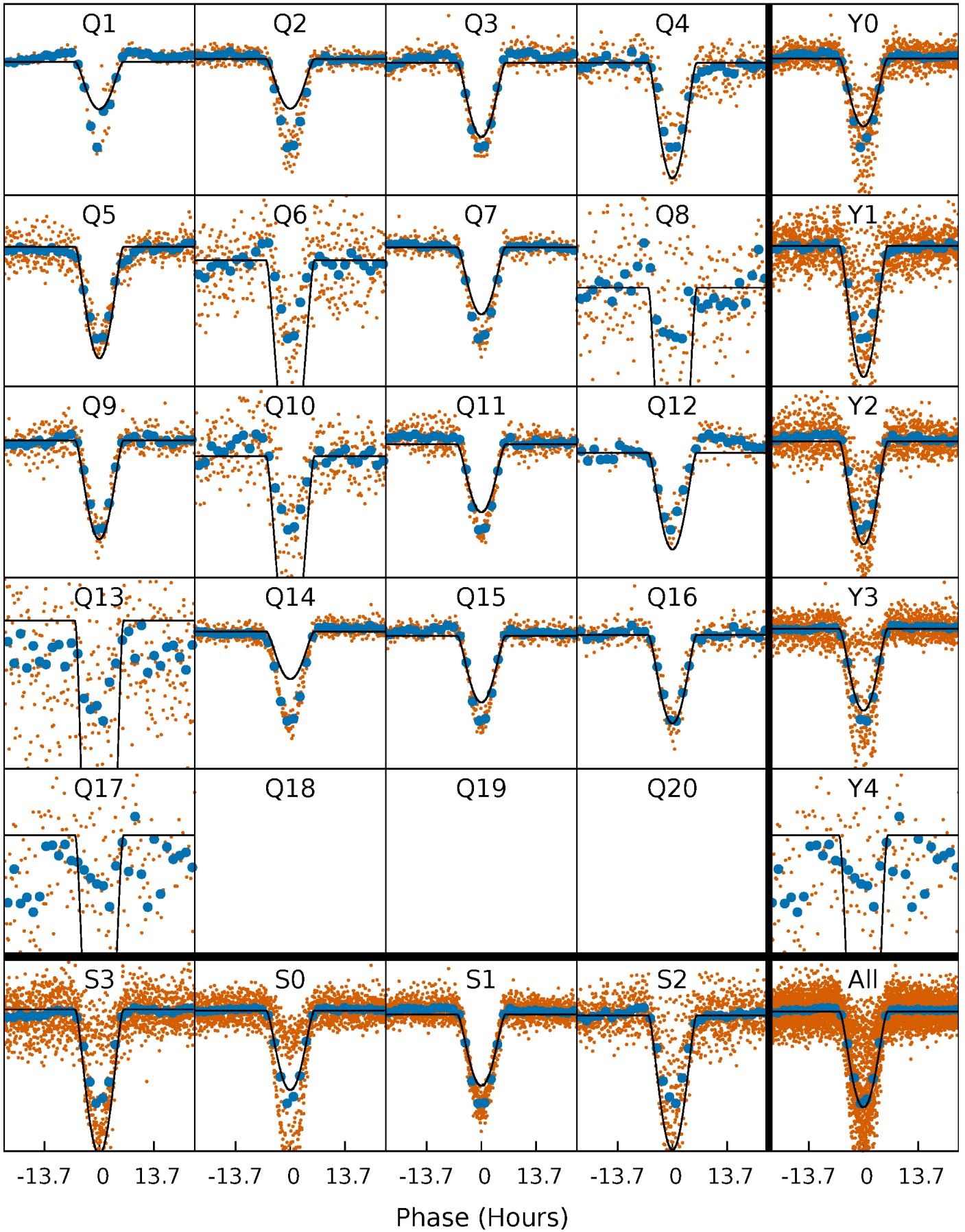
PDC Quarter-Phased Transit Curves

TCE 006146418-02 P= 22.446129 Days $T_0=153.933102$ (BKJD)



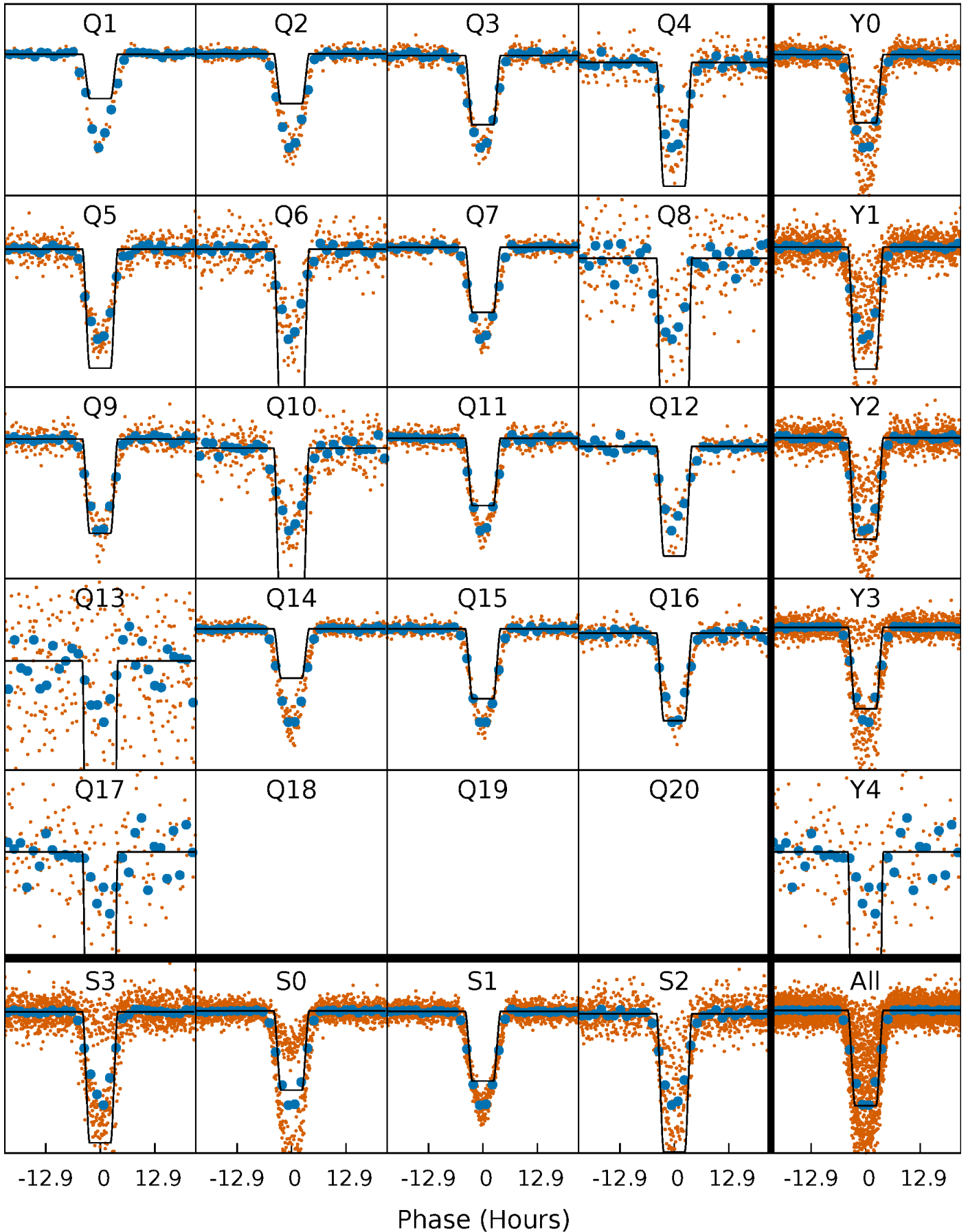
DV Quarter-Phased Transit Curves

TCE 006146418-02 P= 22.446129 Days $T_0=153.933102$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

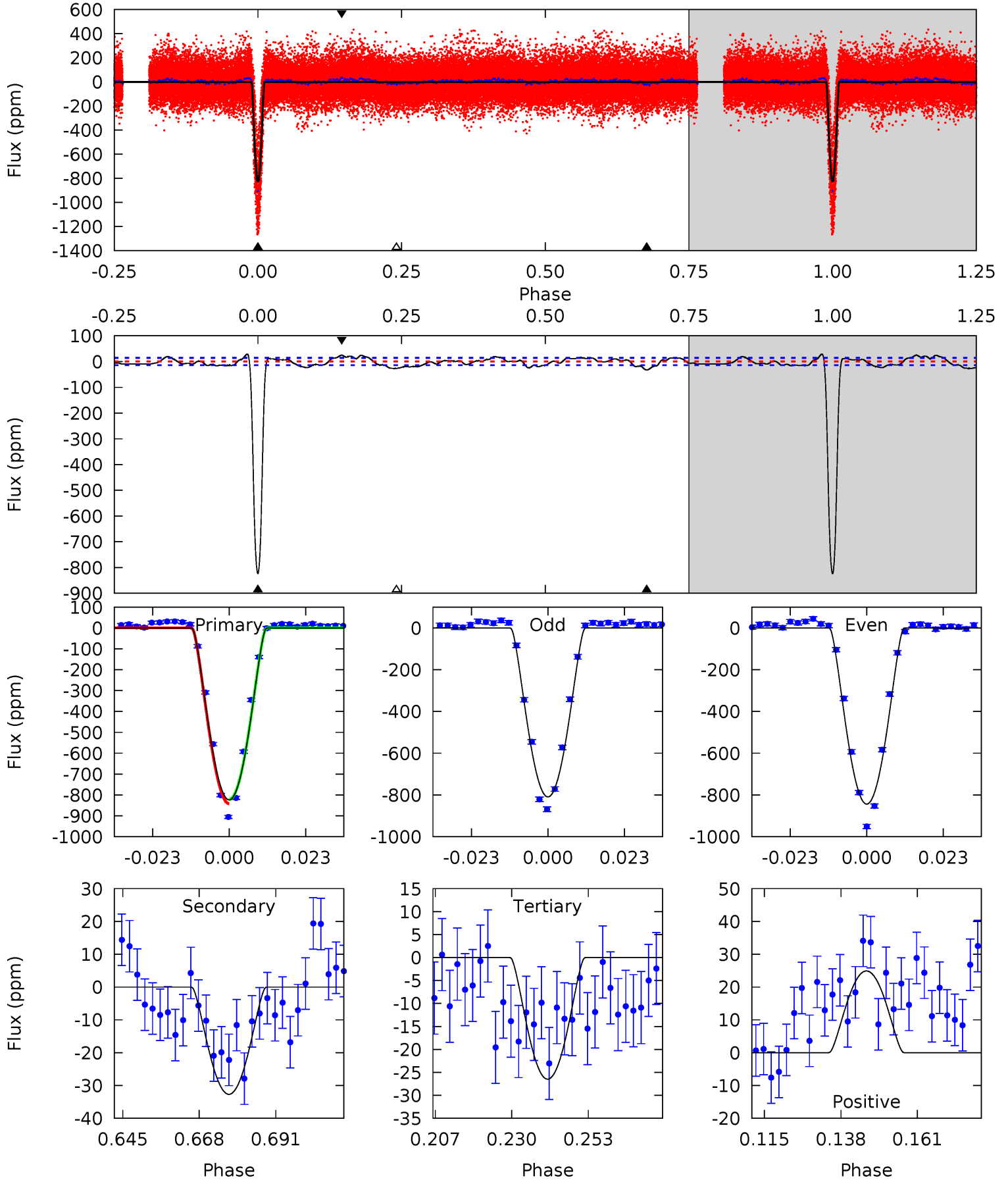
TCE 006146418-02 P= 22.446019 Days $T_0=153.936313$ (BKJD)



DV Model-Shift Uniqueness Test

006146418-02, P = 22.446129 Days, E = 131.486973 Days

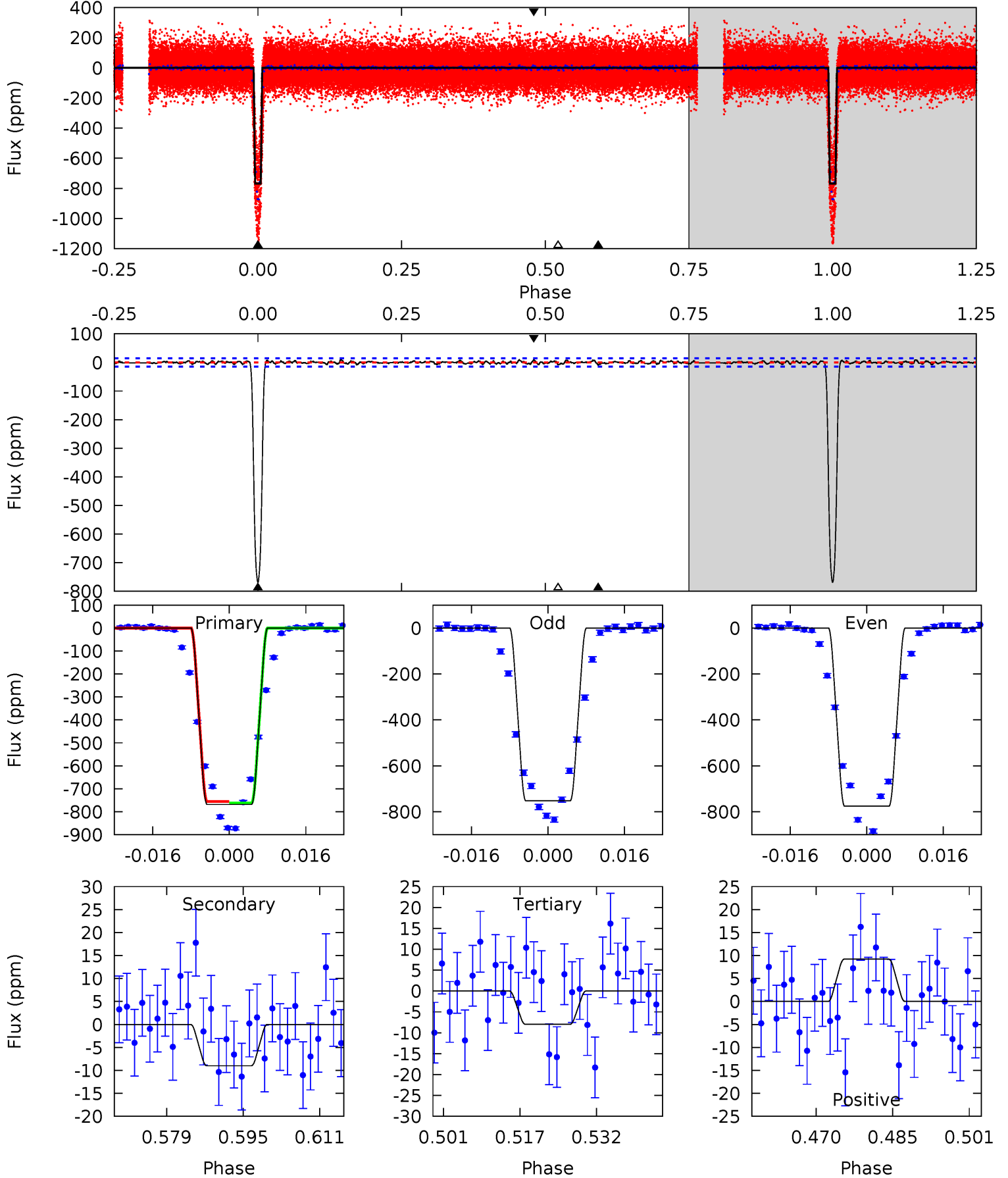
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
284.1	11.3	9.13	8.59	4.86	2.27	4.29	275.0	275.5	2.14	2.69	5.92	1.00	0.03	3.45



Alt Model-Shift Uniqueness Test

006146418-02, P = 22.446019 Days, E = 131.490294 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
255.5	3.00	2.66	3.07	4.94	2.42	1.03	252.9	252.5	0.34	-0.07	3.91	1.08	0.01	0



Stellar Parameters For KIC 006146418

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6070^{+165}_{-165}	$3.969^{+0.273}_{-0.117}$	$-0.260^{+0.300}_{-0.250}$	$1.777^{+0.332}_{-0.569}$	$1.074^{+0.190}_{-0.173}$	$0.270^{+0.483}_{-0.097}$
	+3%/-3%	+7%/-3%	+115%/-96%	+19%/-32%	+18%/-16%	+179%/-36%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 006146418-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-33 ± 3	$9.73^{+2.54}_{-2.27}$	1236^{+77}_{-98}	2746^{+185}_{-145}	$4.922^{+3.514}_{-1.848}$
Alt.	-9 ± 3	$5.34^{+2.26}_{-2.20}$	1232^{+78}_{-100}	2690^{+419}_{-248}	$4.285^{+7.879}_{-2.316}$

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

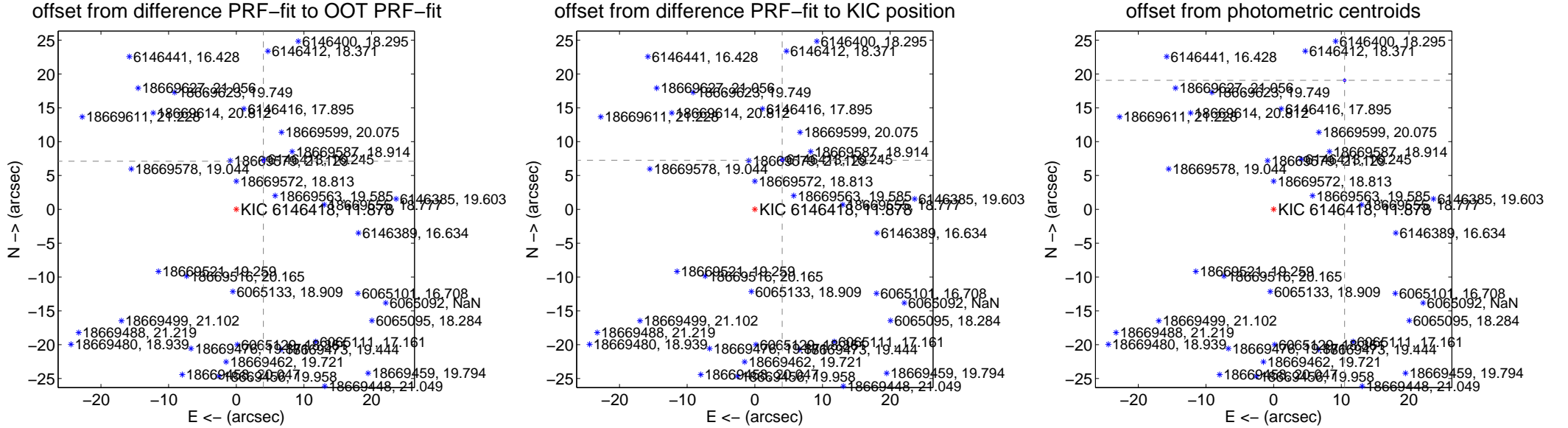
DV Centroid Data

Supplemental centroid analysis for 006146418-02. **Kepler magnitude: 11.88.** Transit SNR 117.20

There are 17 quarters with good PRF difference image offsets

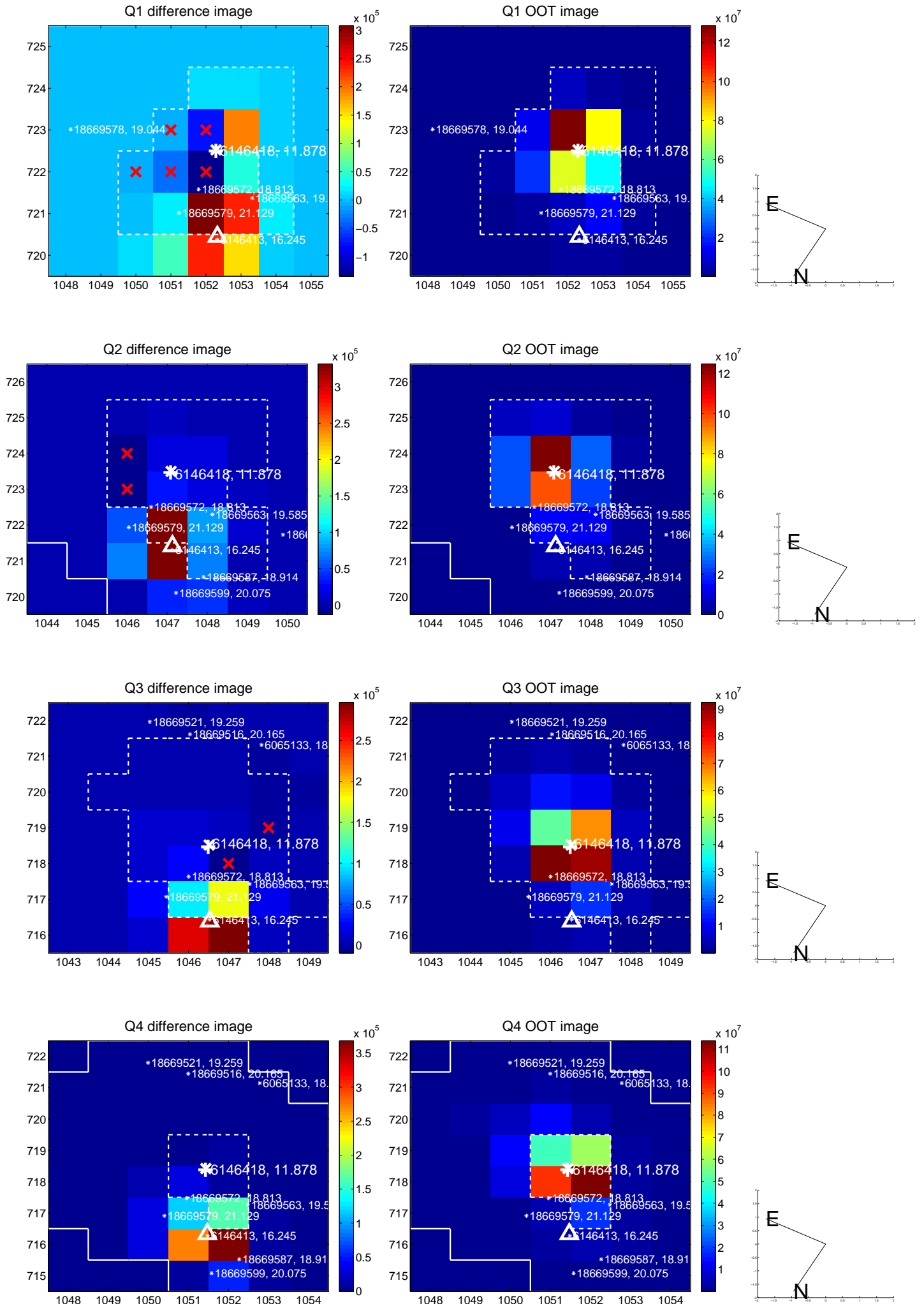
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	8.167 \pm 0.067	121.46	-4.013 \pm 0.067	7.113 \pm 0.067
PRF-fit source offset from KIC position	8.300 \pm 0.068	121.49	-4.042 \pm 0.067	7.250 \pm 0.069
photometric centroid source offset	21.76 \pm 0.06	346.78	-10.49 \pm 0.06	19.06 \pm 0.06

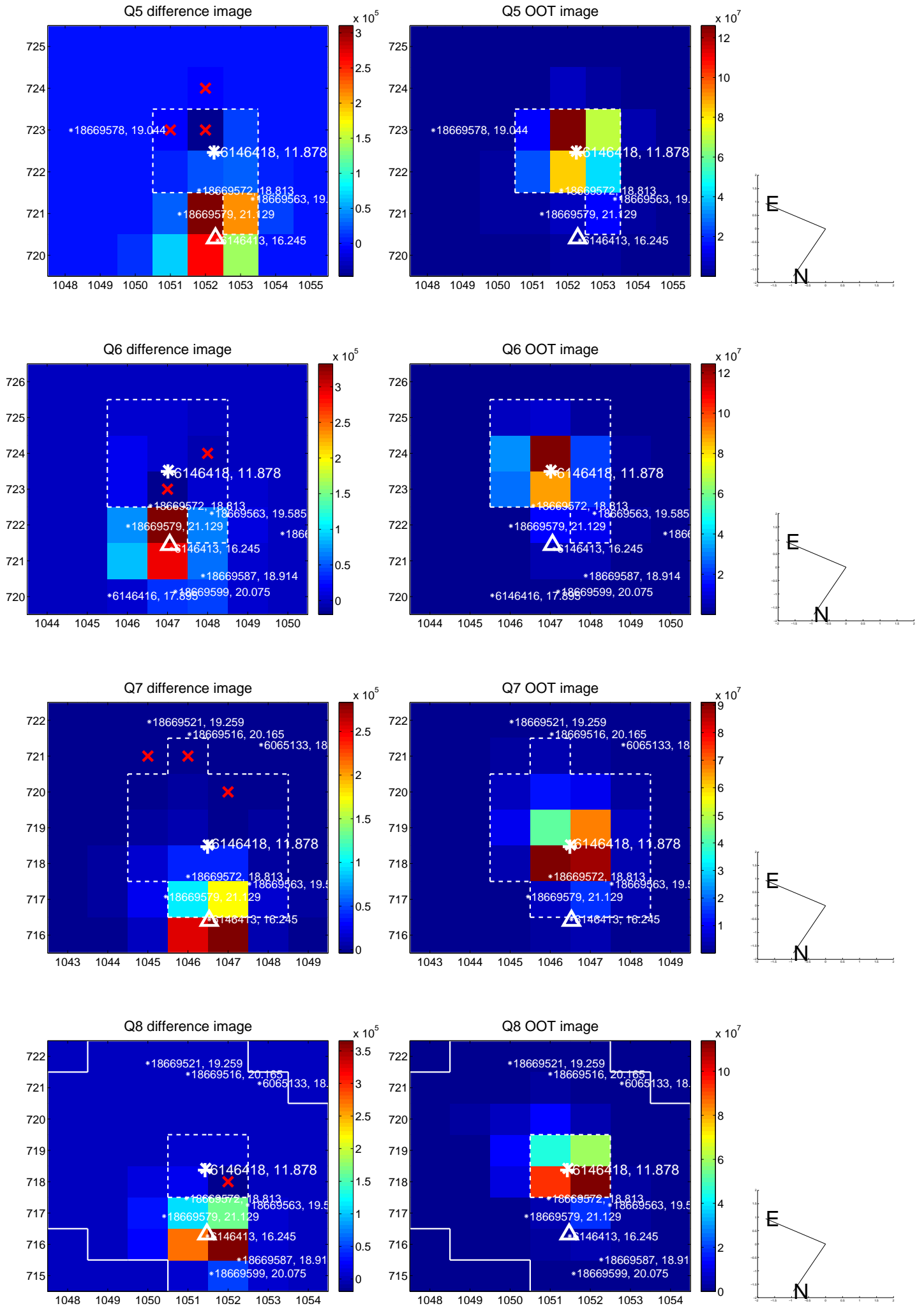


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

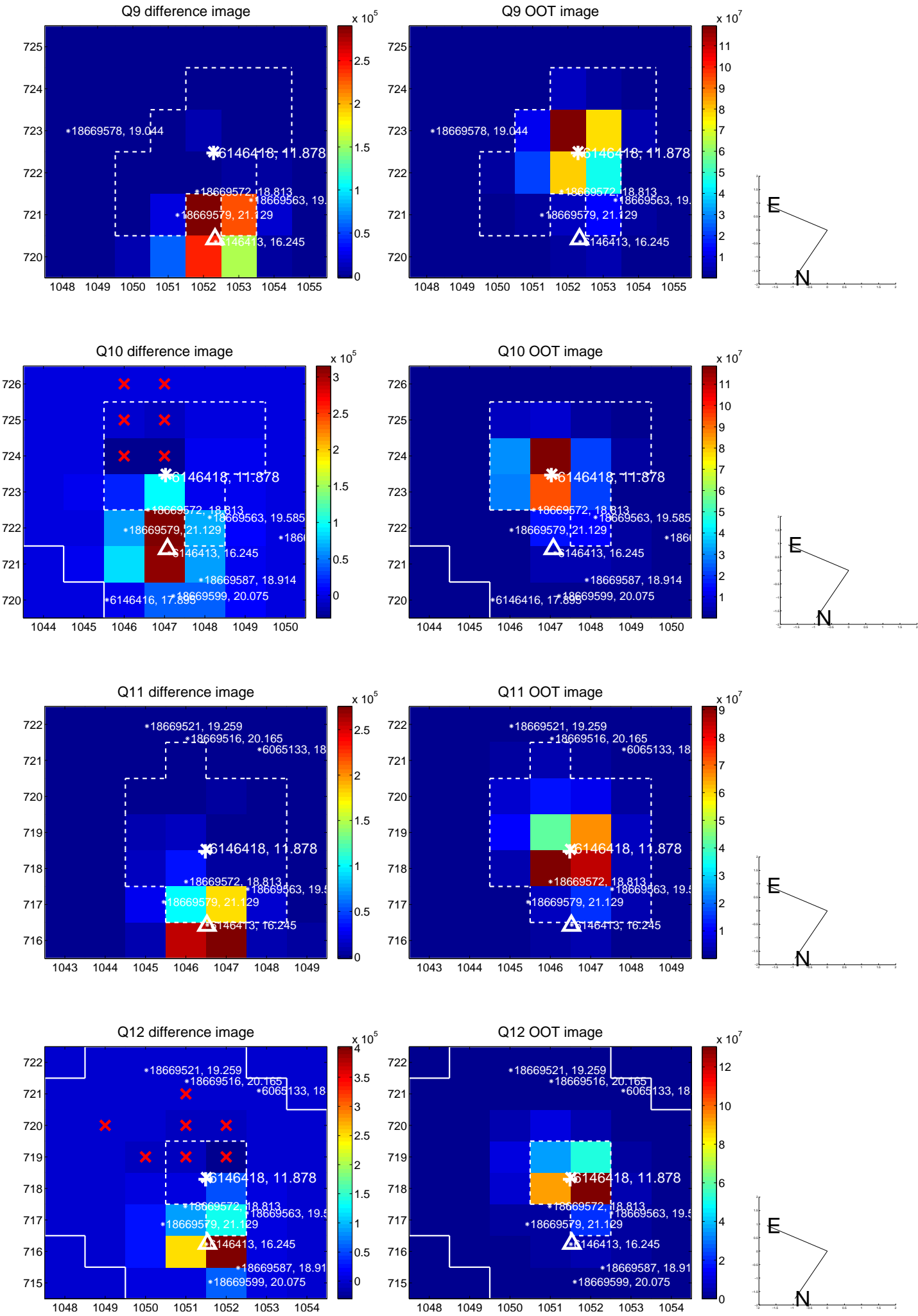
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



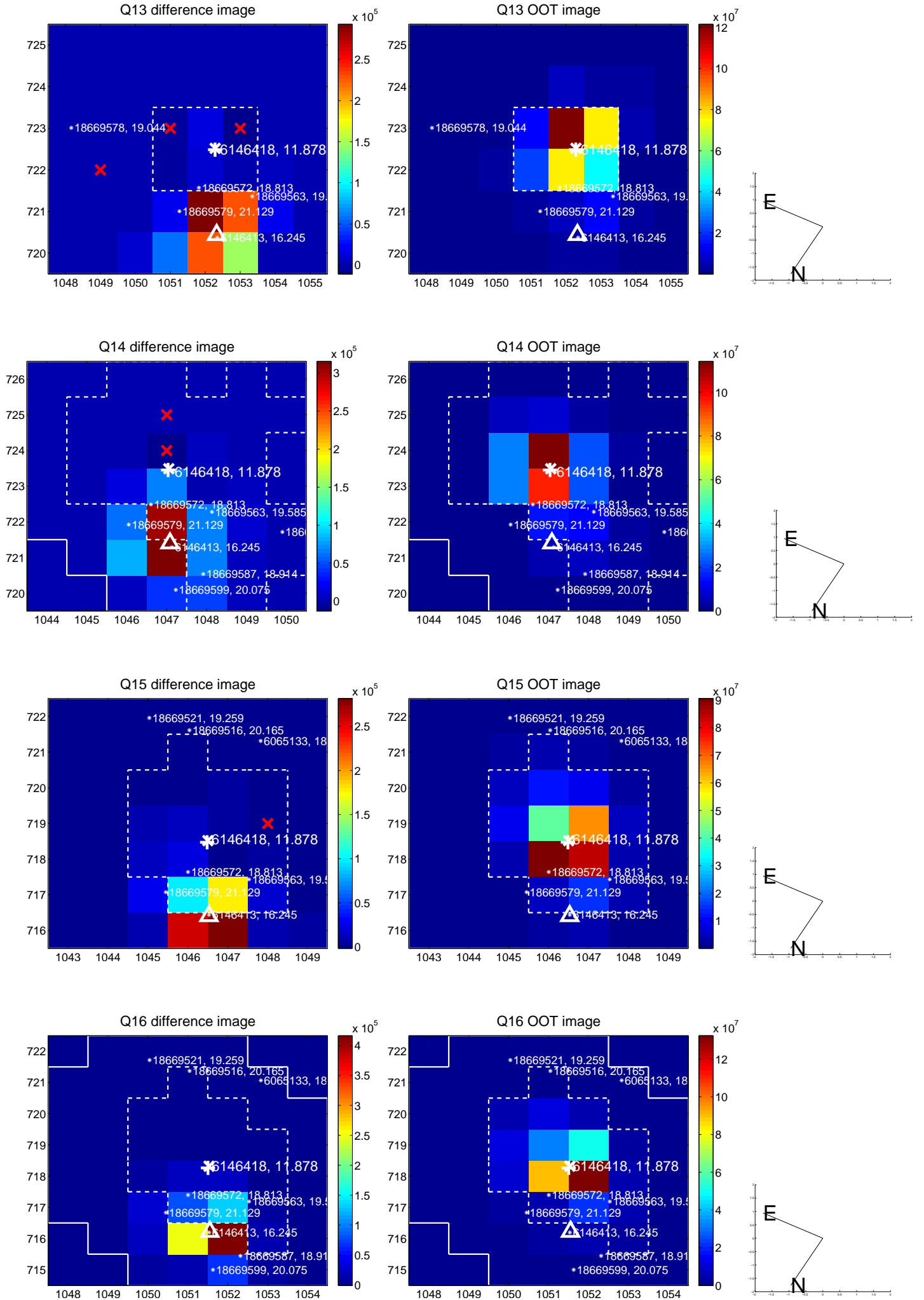
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



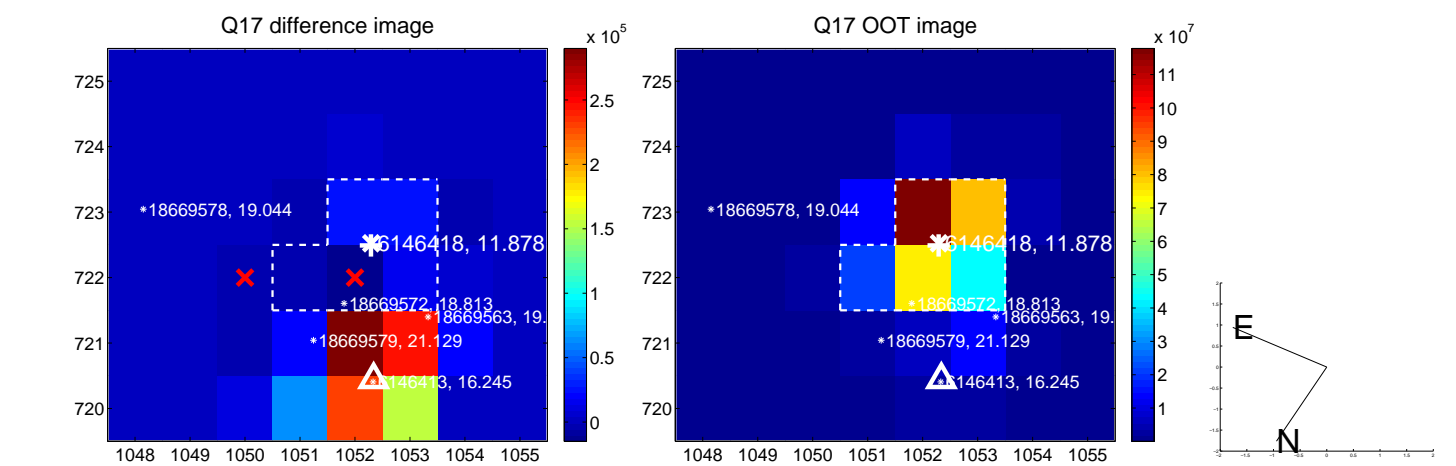
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



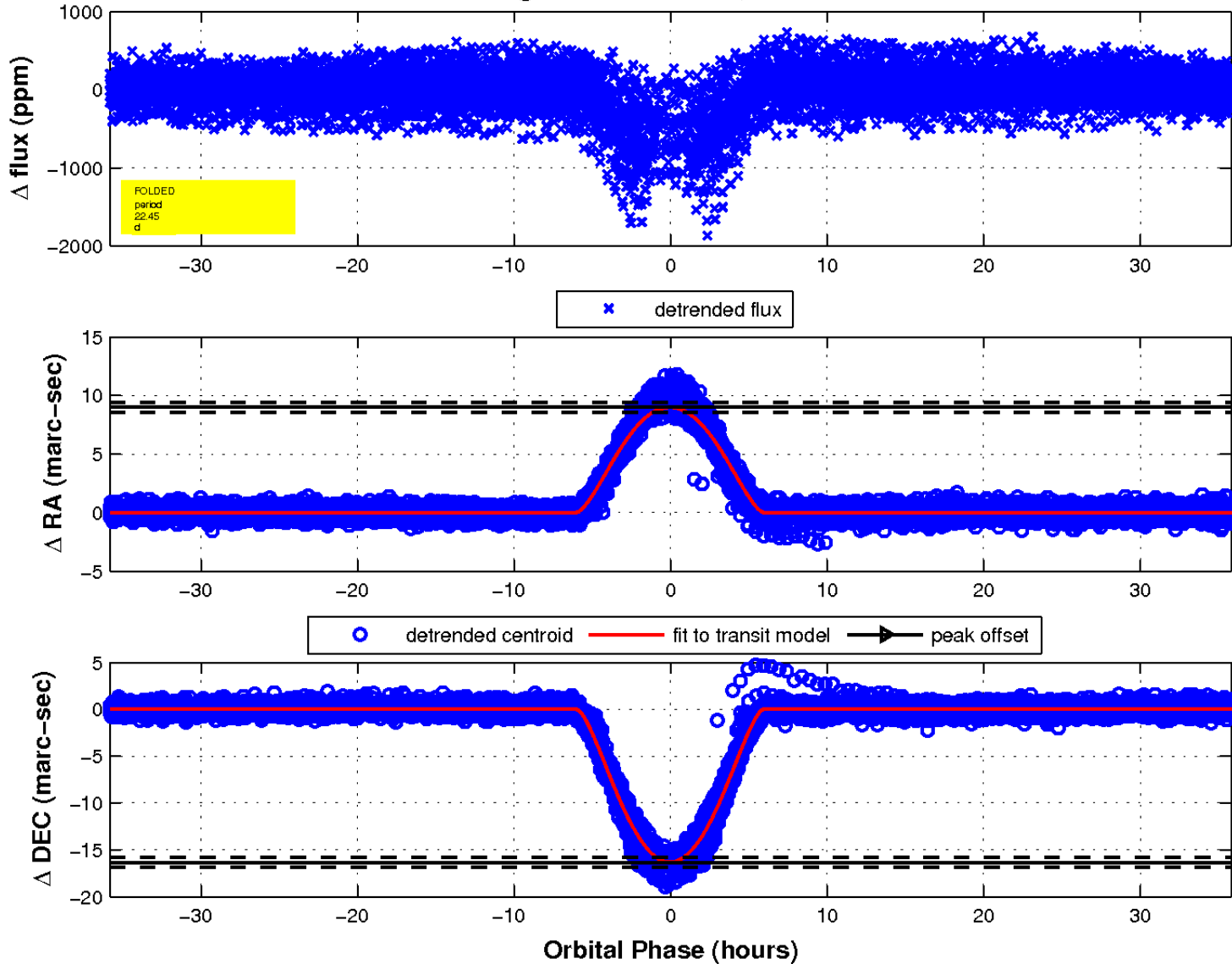
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

