

# KIC 004681152

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004681152-01	OBS	6436.01	1.835927	132.077494	30196.7	5.863	6016.9	3627.8	0.98	5930	29.54	1201.17
004681152-02	OBS	No	0.917966	132.078702	2302.9	2.500	116.9	-1.0	0.98	5930	4.66	3026.76

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004681152-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
004681152-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS

**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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

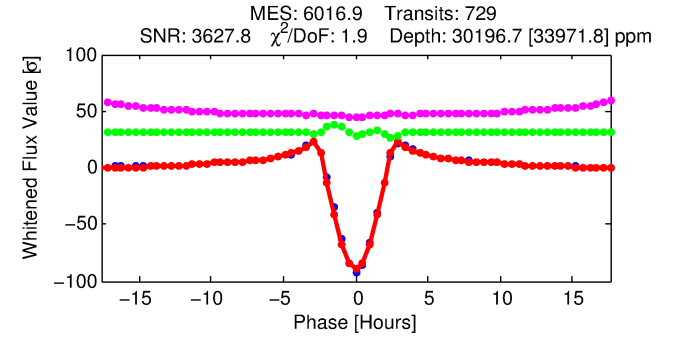
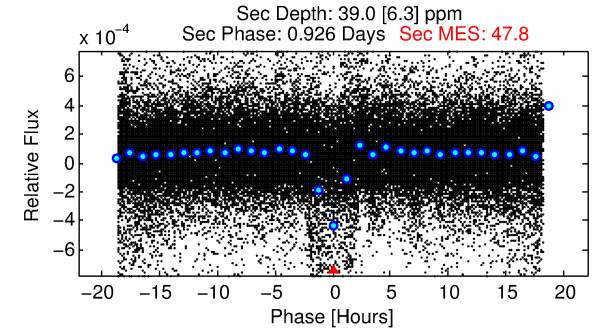
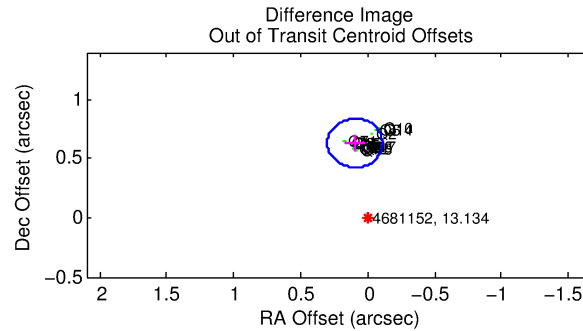
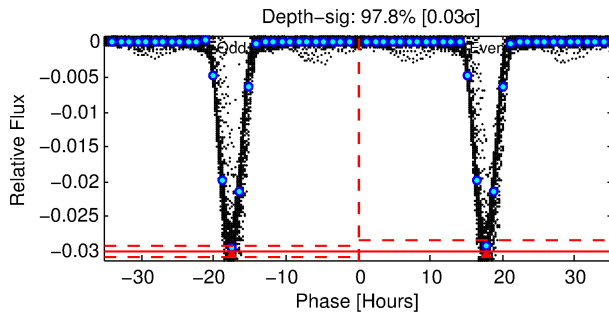
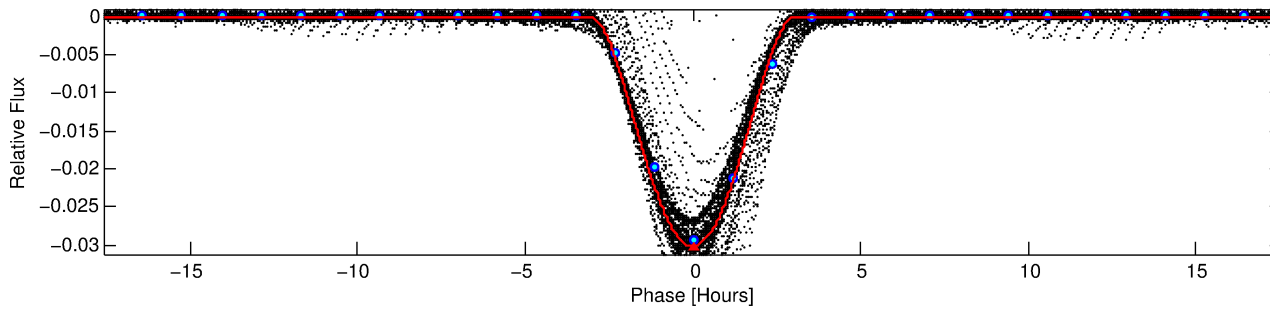
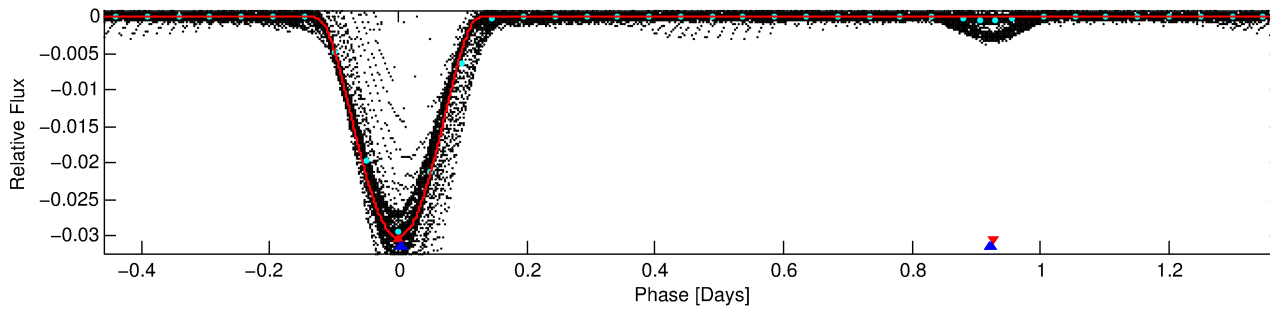
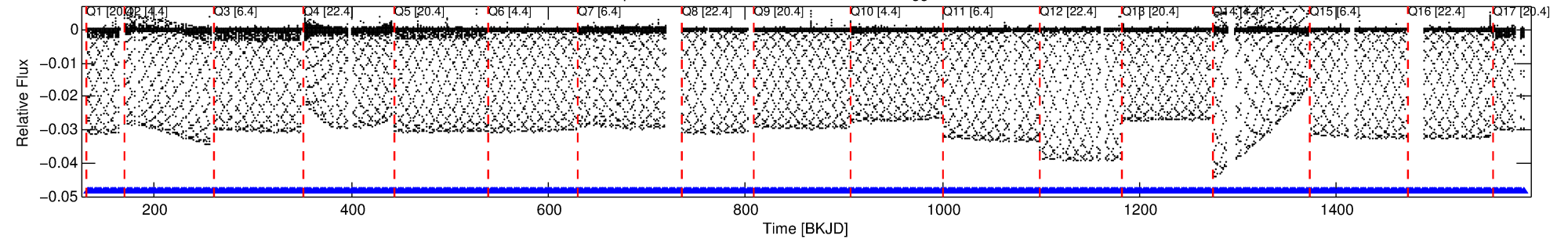
## Ephemeris Match Information For 004681152-01

No Significant Match Found

# DV One-Page Summary

KIC: 4681152 Candidate: 1 of 2 Period: 1.836 d  
KOI: K06436.01 Corr: 0.989

Kp: 13.13 R\*: 0.98 Rs Teff: 5930.0 K Logg: 4.47 Fe/H: -0.020



## DV Fit Results:

Period = 1.83593 [0.00000] d  
Epoch = 132.0775 [0.0000] BKJD  
Rp/R\* = 0.2773 [0.0038]  
a/R\* = 2.20 [0.00]  
b = 1.00 [0.20]  
Seff = 1201.17 [498.83]  
Teq = 1501 [156] K  
Rp = 29.54 [9.24] Re  
a = 0.0296 [0.0079] AU  
Ag = 0.02 [0.01] [-106.58σ]  
Teffp = 890 [48] K [-3.75σ]

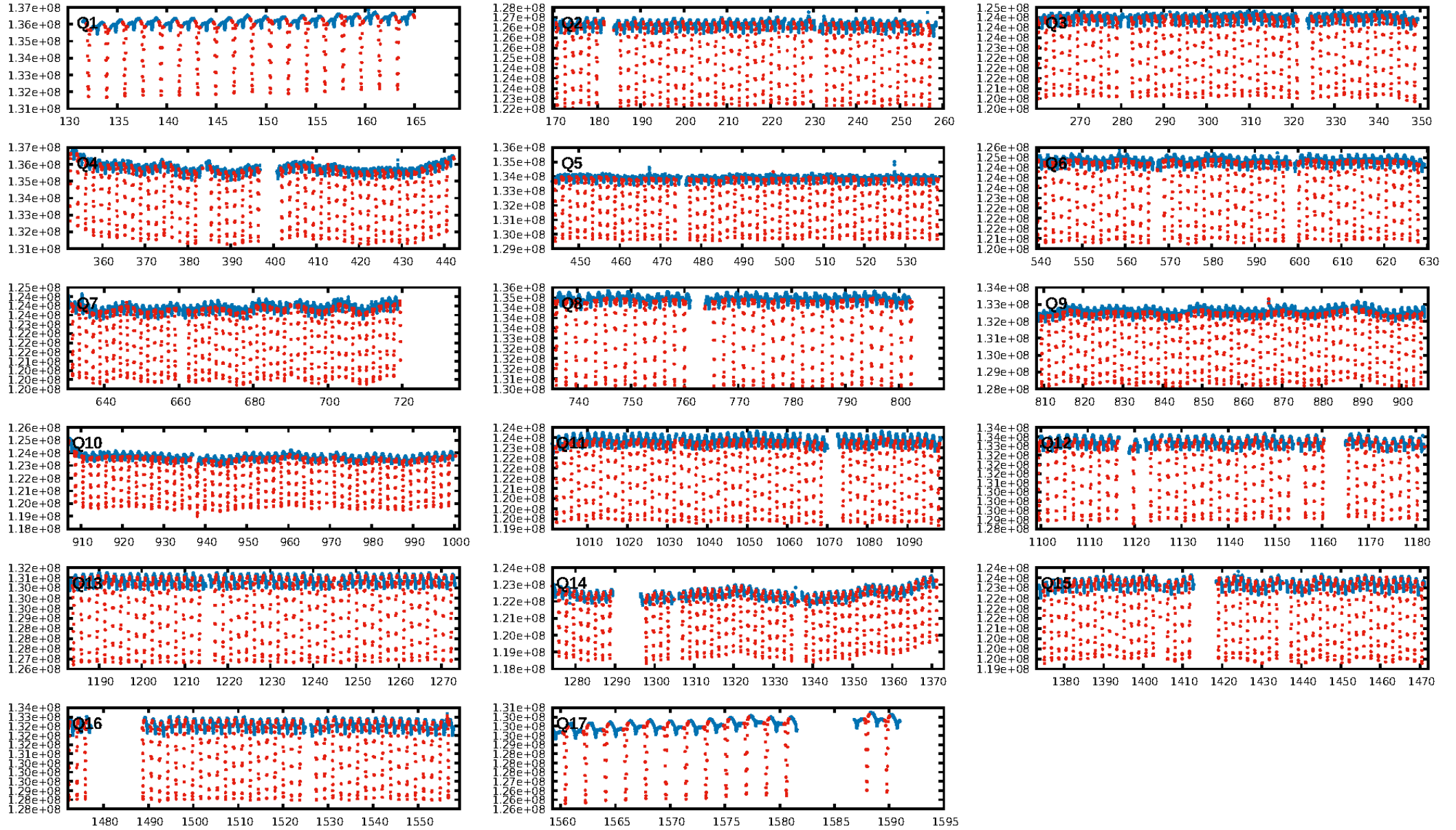
## DV Diagnostic Results:

ShortPeriod-sig: 99.9% [3.46σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [697/697]  
GhostDiagnostic-chr: 2.602  
Centroid-sig: 0.0%  
Centroid-so: 0.553 arcsec [244.51σ]  
OotOffset-rm: 0.639 arcsec [9.33σ]  
KicOffset-rm: 0.648 arcsec [9.63σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

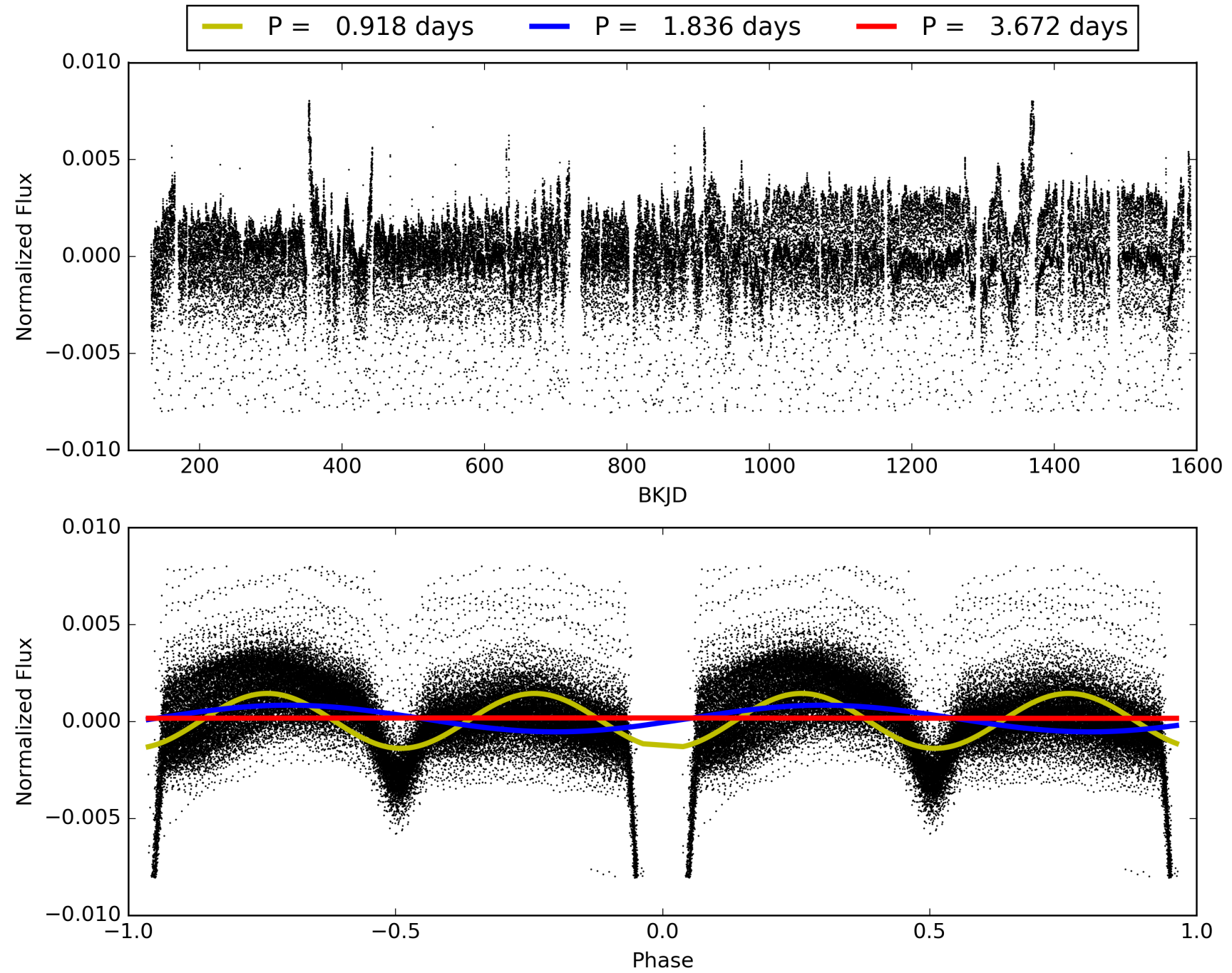
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:54:22 Z

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

# TCE 004681152-01, PDC Light Curves

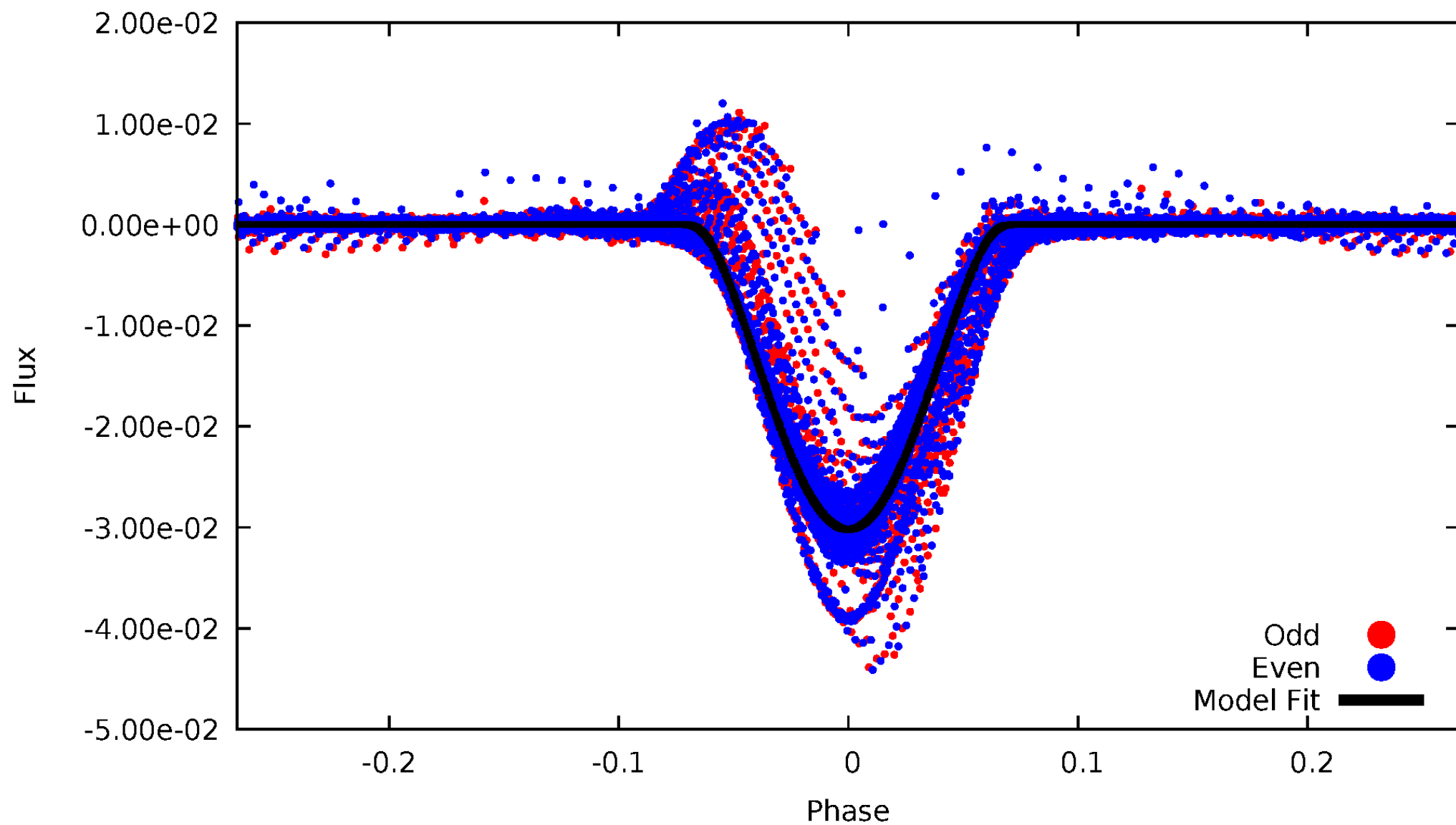


TCE 004681152-01



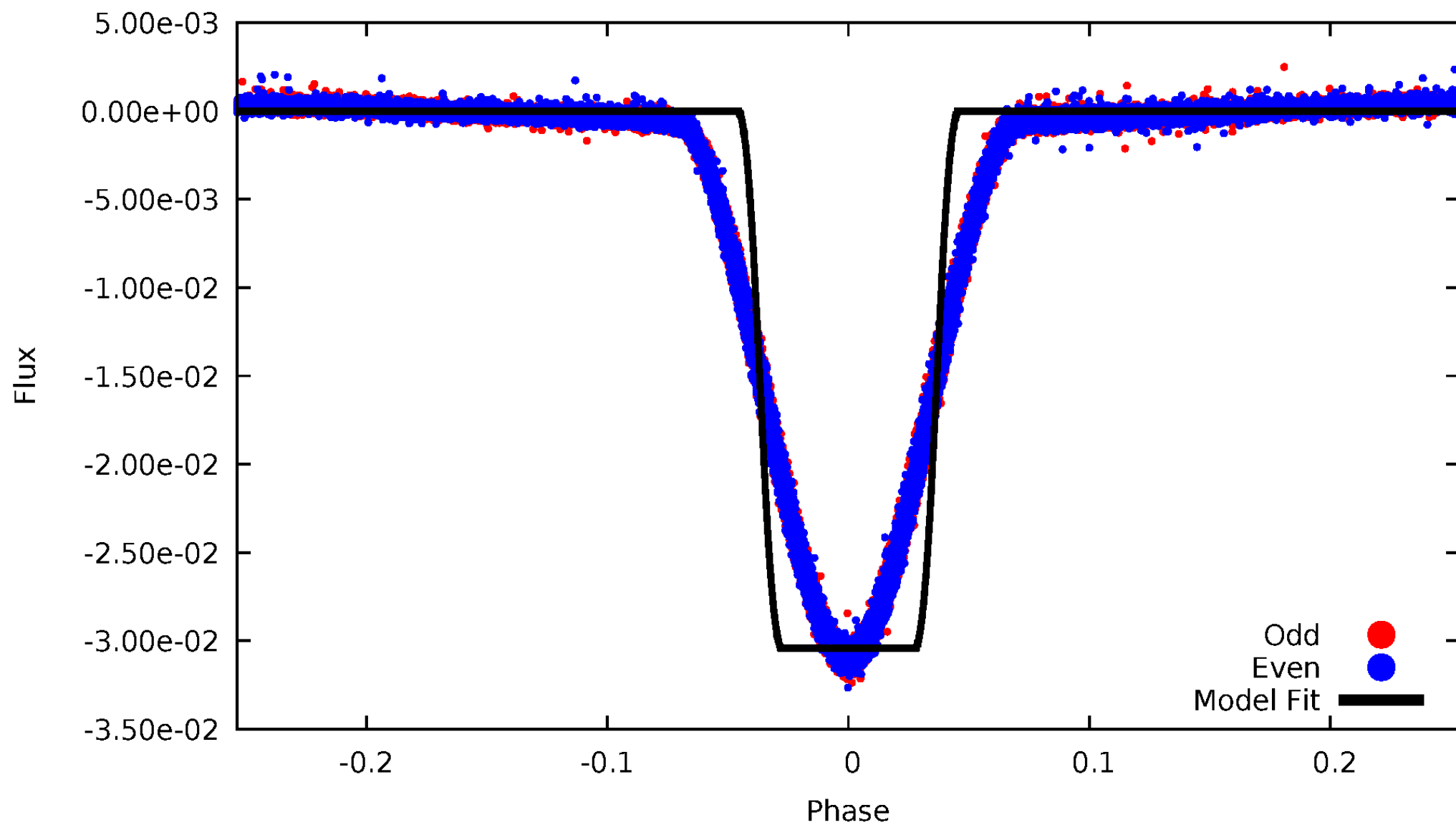
# DV Odd/Even

TCE 004681152-01



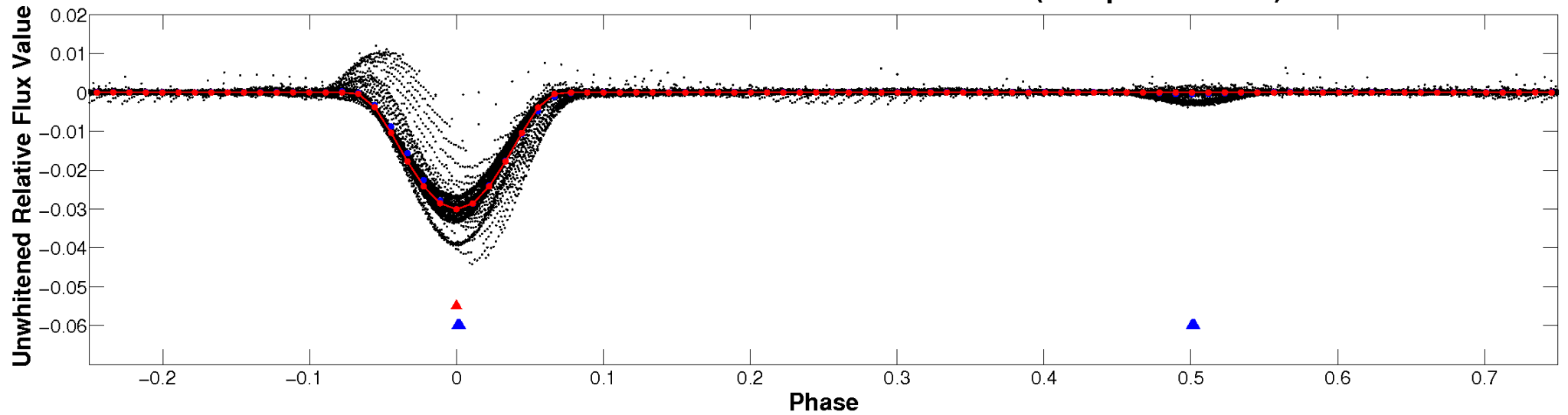
# ALT Odd/Even

TCE 004681152-01

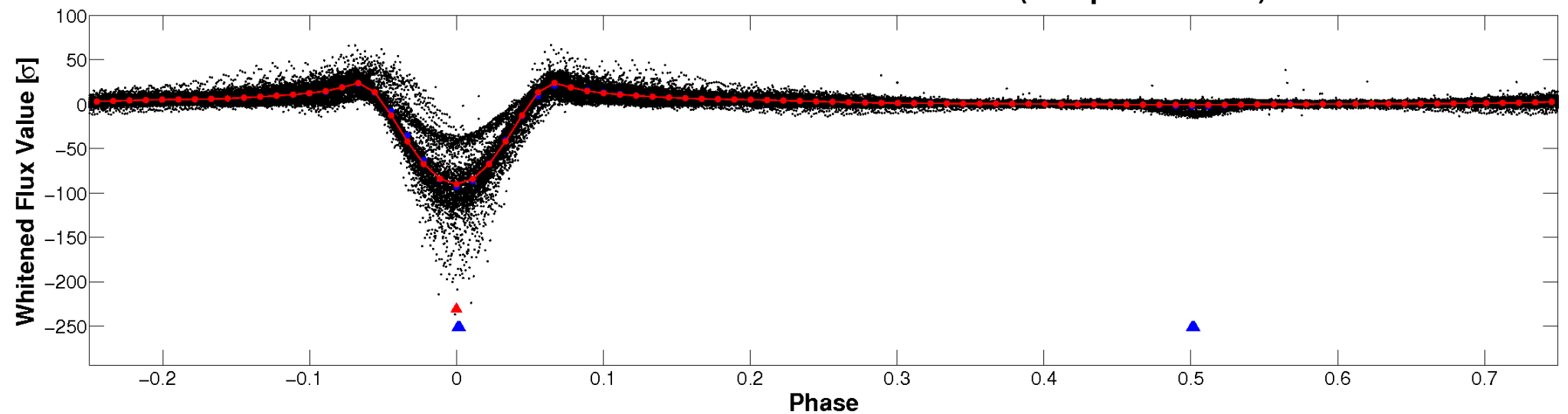


# Non-Whitened Vs. Whitened Light Curve

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



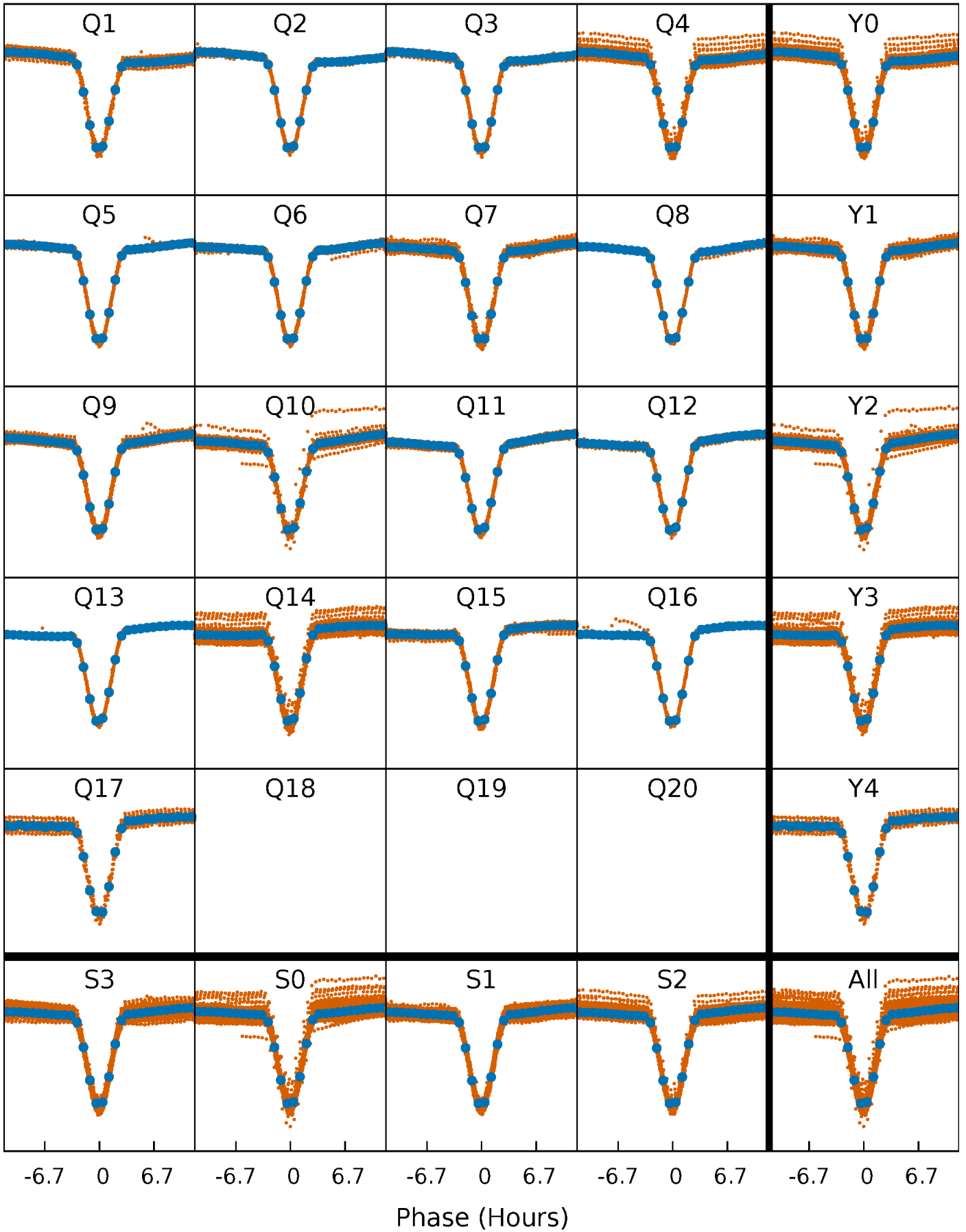
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

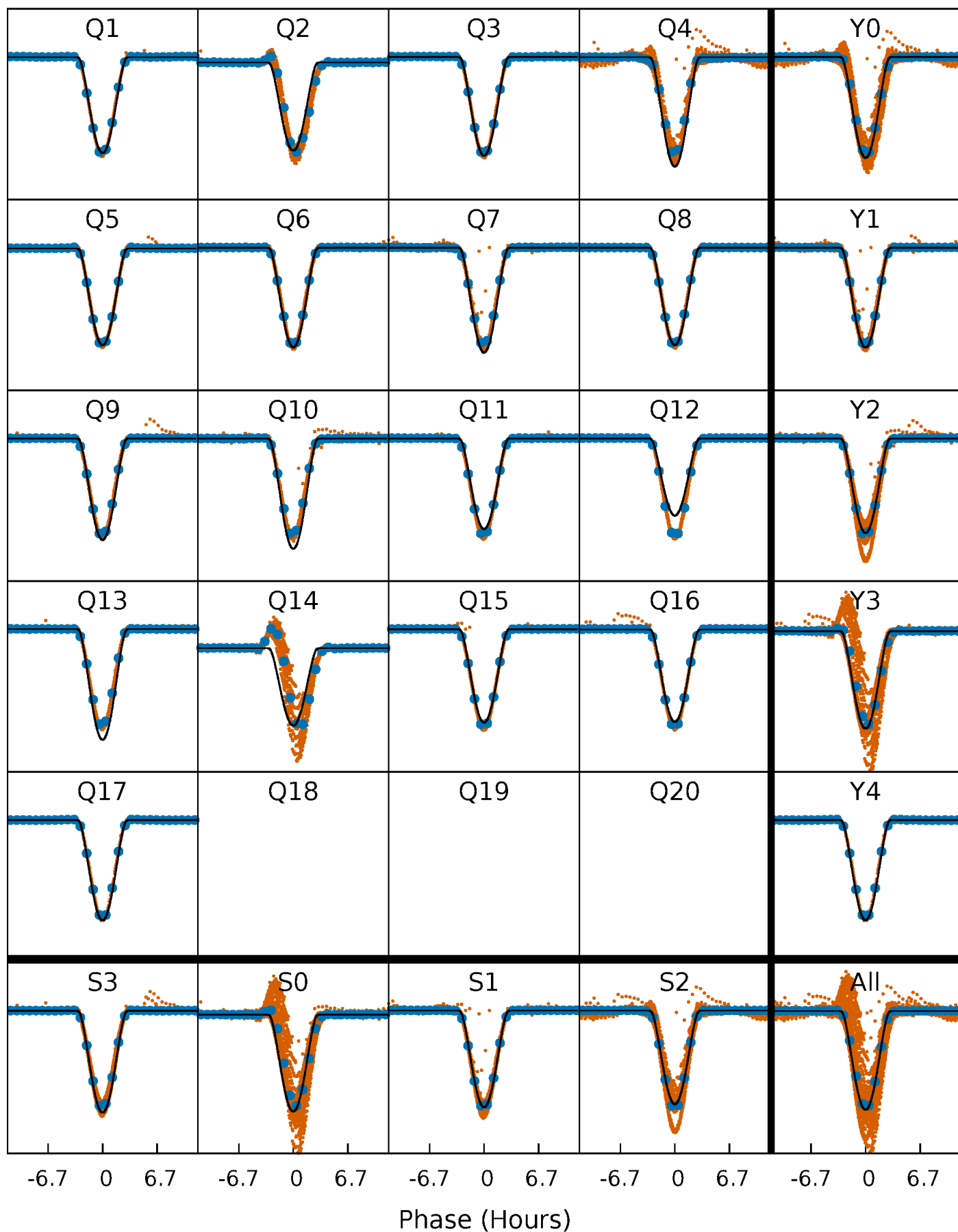
TCE 004681152-01 P= 1.835927 Days  $T_0=132.077494$  (BKJD)





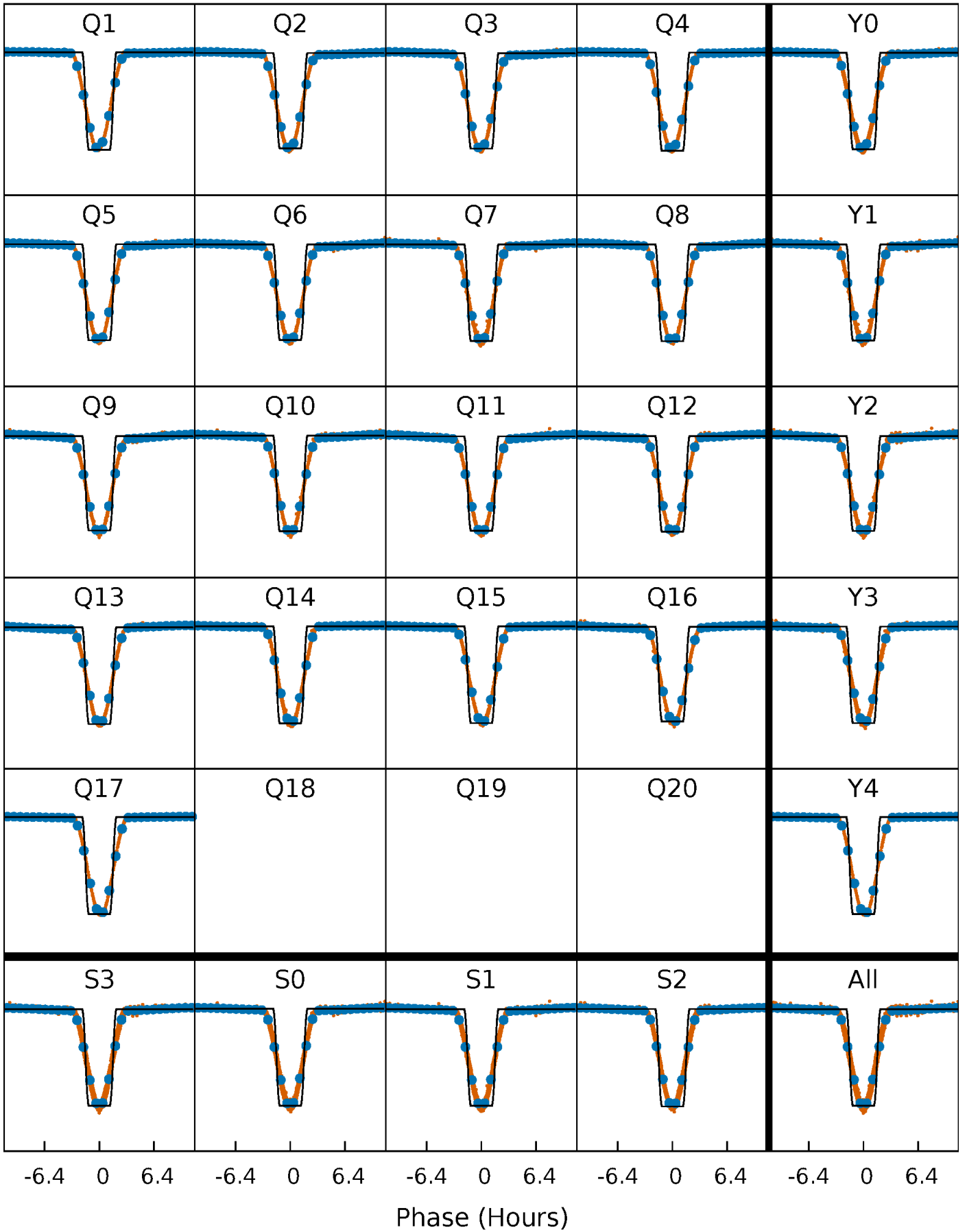
# DV Quarter-Phased Transit Curves

TCE 004681152-01 P= 1.835927 Days  $T_0=132.077494$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

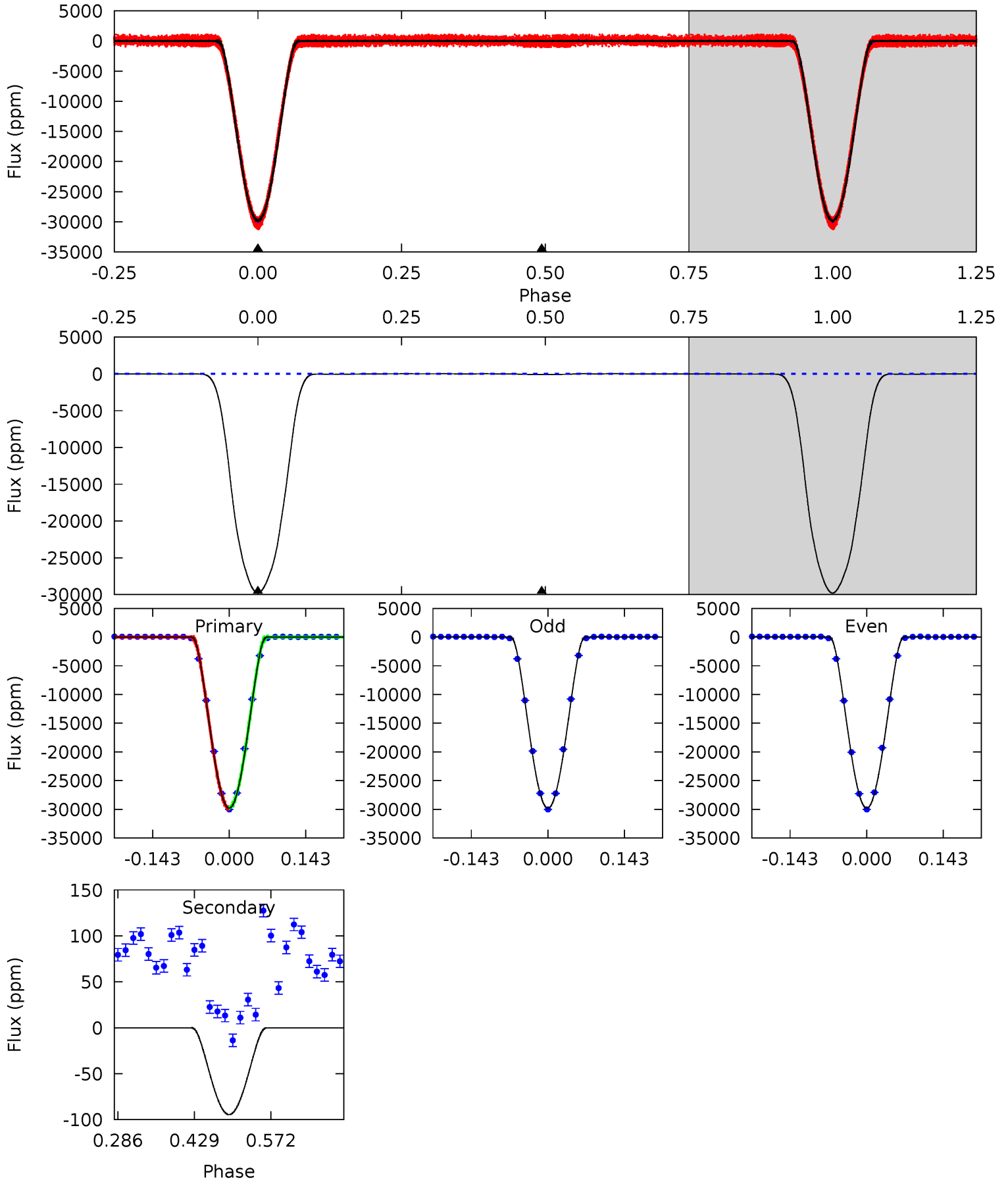
TCE 004681152-01 P= 1.835914 Days  $T_0=132.081626$  (BKJD)



# DV Model-Shift Uniqueness Test

004681152-01, P = 1.835927 Days, E = 130.241567 Days

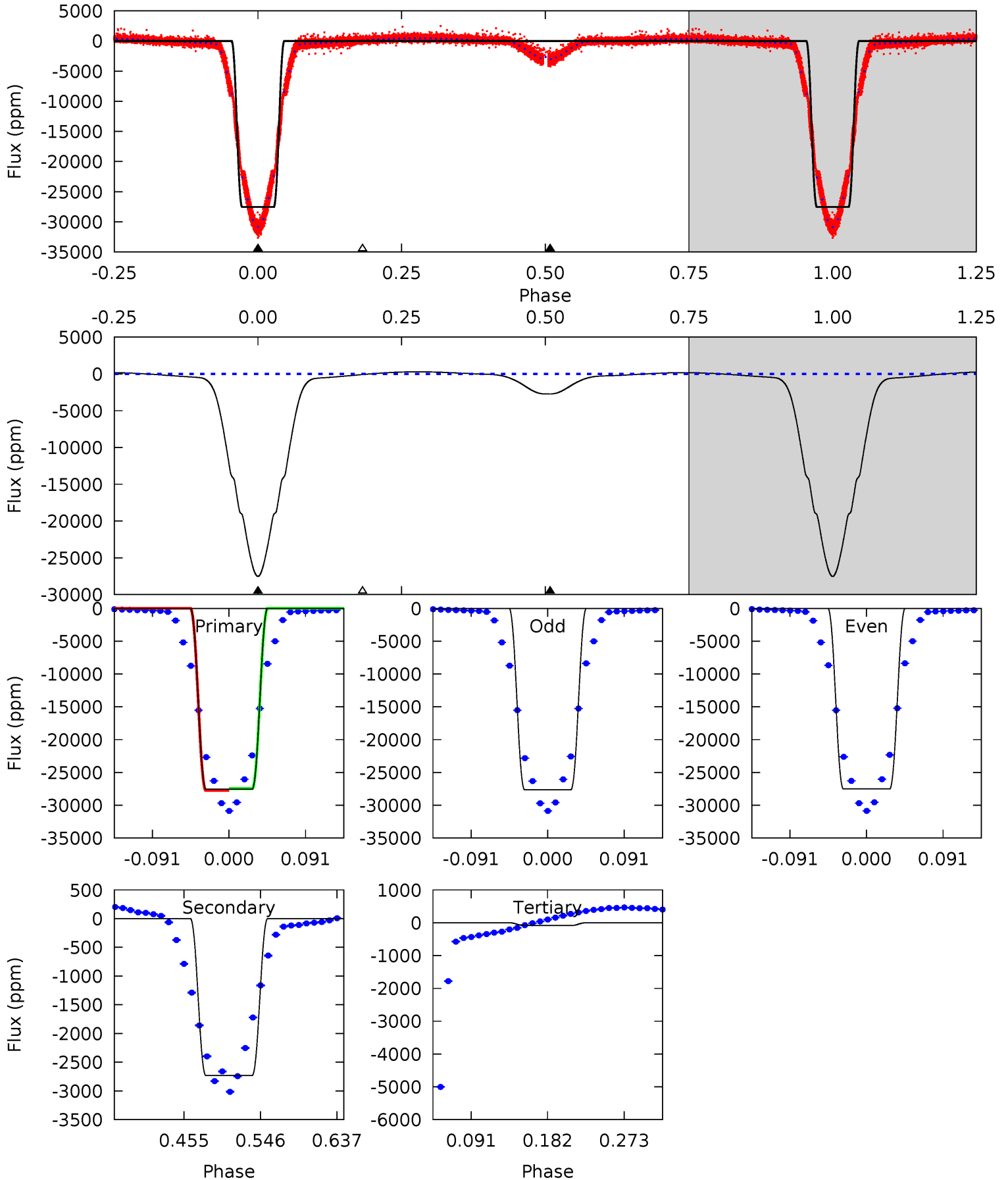
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9120	29.0	0	0	4.49	1.46	5.68	9120	9120	29.0	29.0	1.76	0.99	0.00	23.8



# Alt Model-Shift Uniqueness Test

004681152-01, P = 1.835914 Days, E = 130.245712 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5249	520.8	16.3	0	4.58	1.69	47.1	5232	5249	504.5	520.8	10.1	1.00	0.01	28.2



### Stellar Parameters For KIC 004681152

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5930^{+184}_{-205}$	$4.472^{+0.067}_{-0.216}$	$-0.020^{+0.250}_{-0.300}$	$0.976^{+0.305}_{-0.109}$	$1.029^{+0.138}_{-0.138}$	$1.559^{+0.454}_{-0.837}$
	+3%/-3%	+1%/-5%	+1250%/-1500%	+31%/-11%	+13%/-13%	+29%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 004681152-01 / KOI 6436.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-95 \pm 3$	$29.62^{+5.22}_{-2.21}$	$2130^{+155}_{-113}$	$-2515^{+73}_{-108}$	$0.050^{+0.008}_{-0.012}$
Alt.	$-2732 \pm 5$	$18.79^{+3.36}_{-1.54}$	$2129^{+159}_{-102}$	$3616^{+83}_{-88}$	$3.650^{+0.628}_{-0.901}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

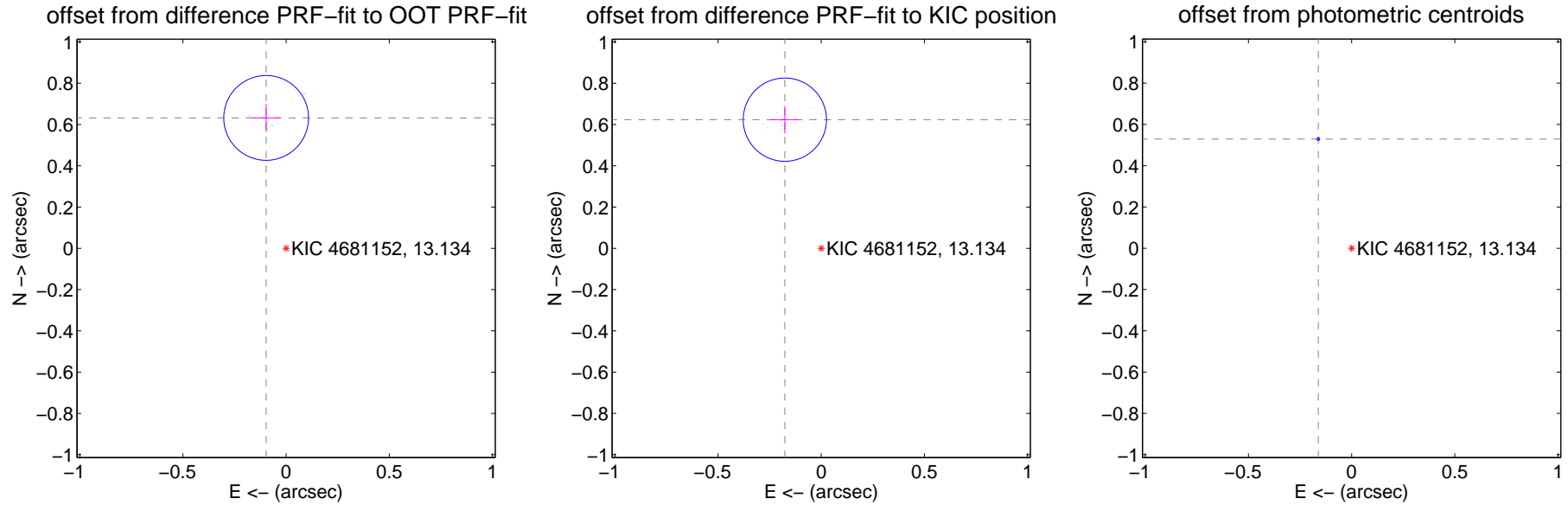
## DV Centroid Data

Supplemental centroid analysis for 004681152-01. Kepler magnitude: 13.13. Transit SNR 3627.84

There are 17 quarters with good PRF difference image offsets

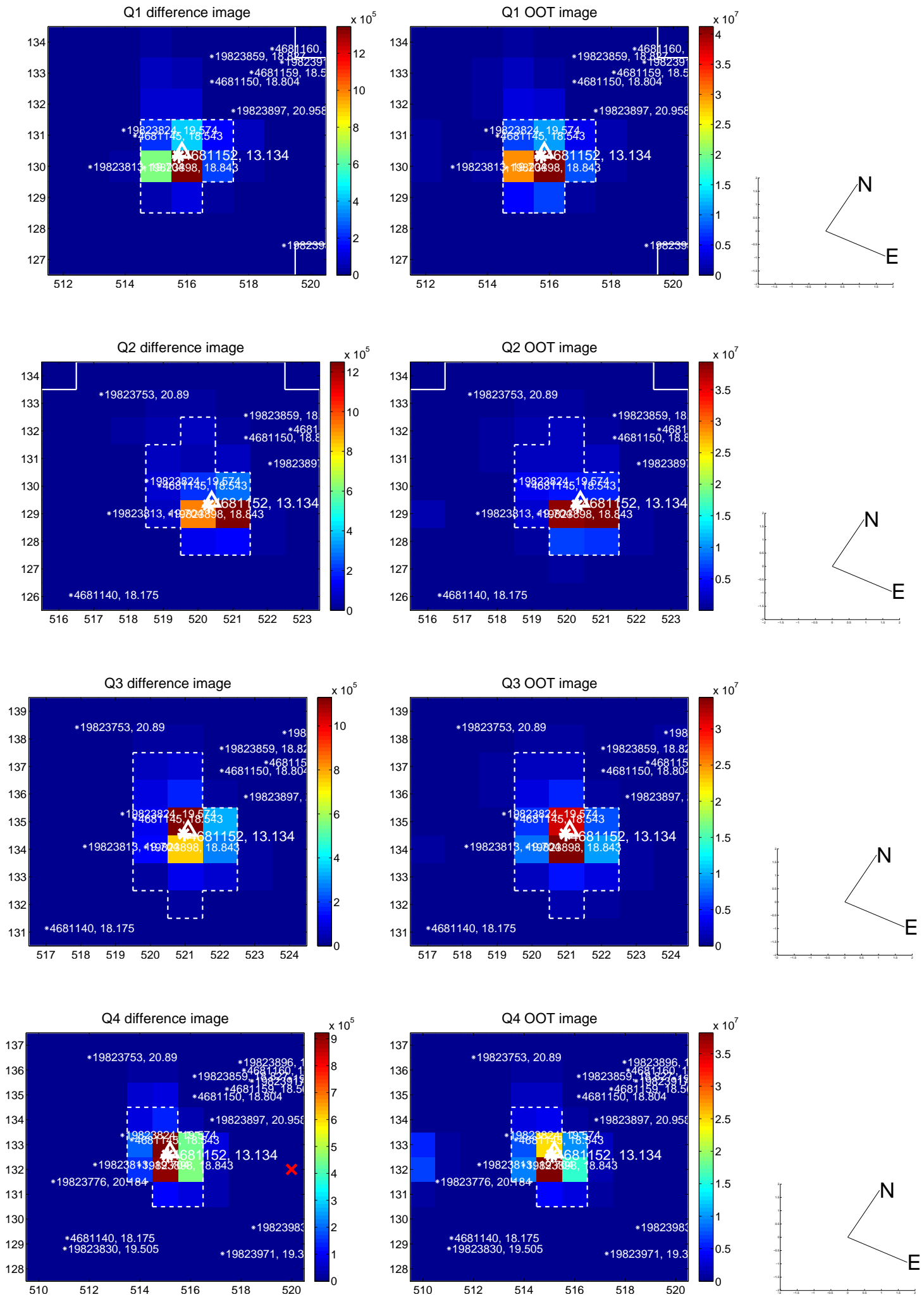
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>0.639 <math>\pm</math> 0.068</b>	<b>9.33</b>	0.097 $\pm$ 0.069	0.632 $\pm$ 0.068
PRF-fit source offset from KIC position	<b>0.648 <math>\pm</math> 0.067</b>	<b>9.63</b>	0.176 $\pm$ 0.070	0.623 $\pm$ 0.067
photometric centroid source offset	<b>0.55 <math>\pm</math> 0.00</b>	<b>244.51</b>	0.16 $\pm$ 0.00	0.53 $\pm$ 0.00



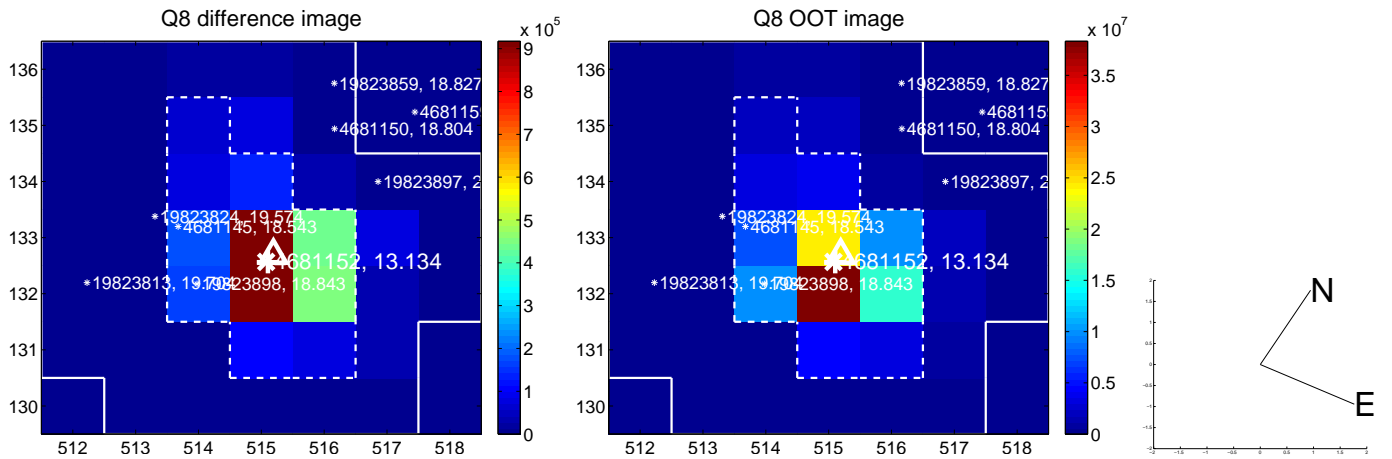
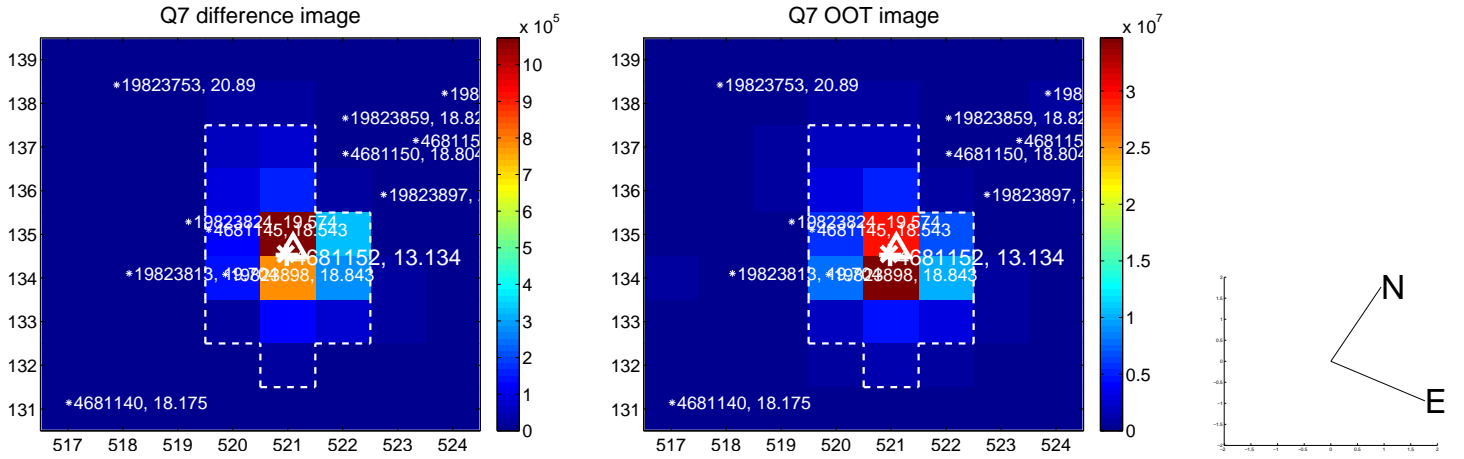
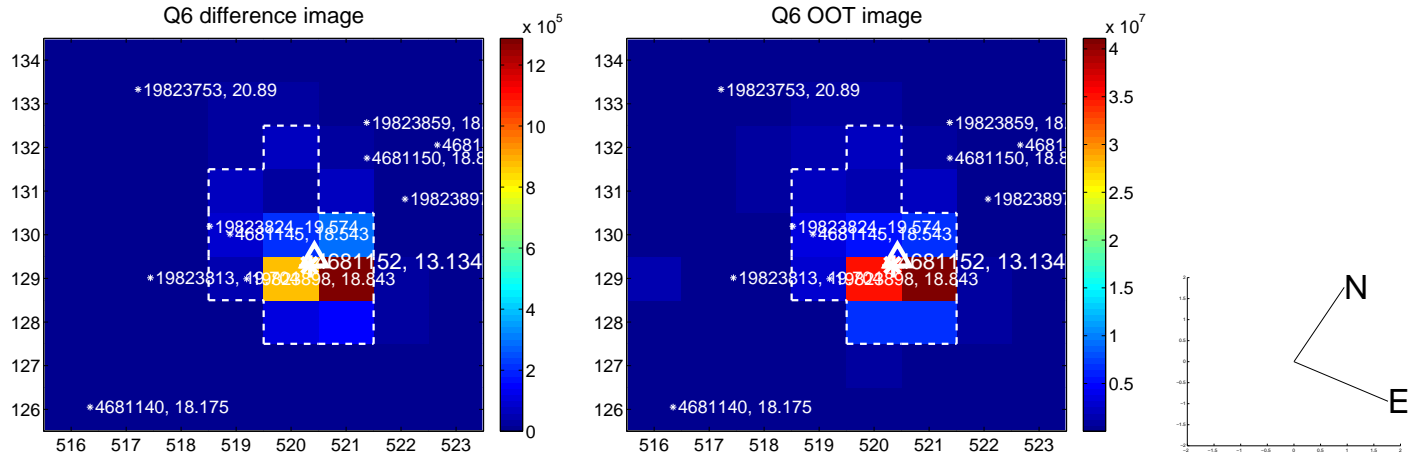
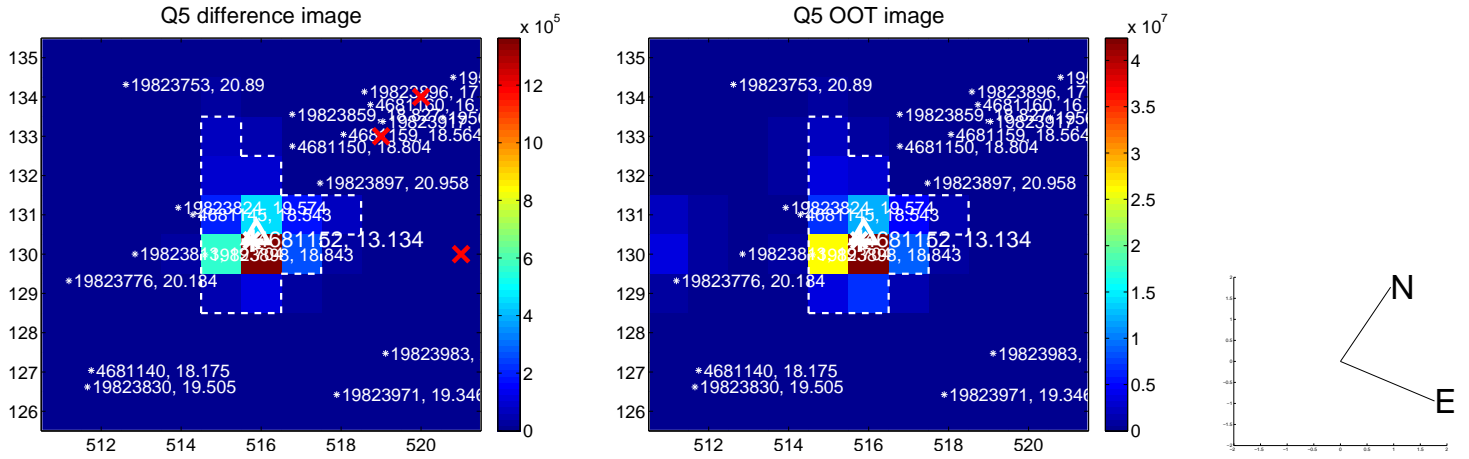
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

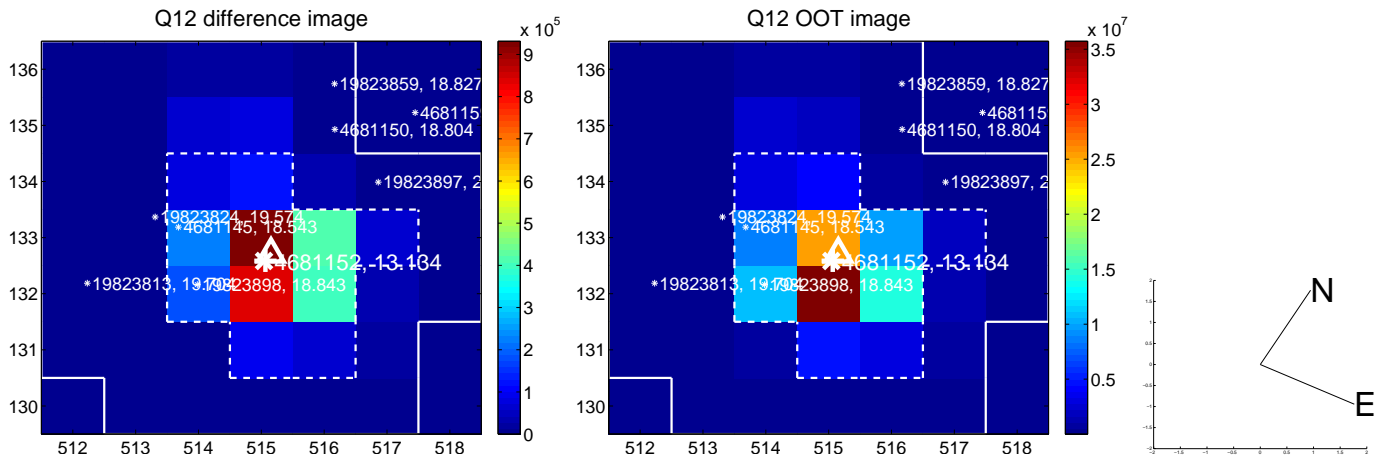
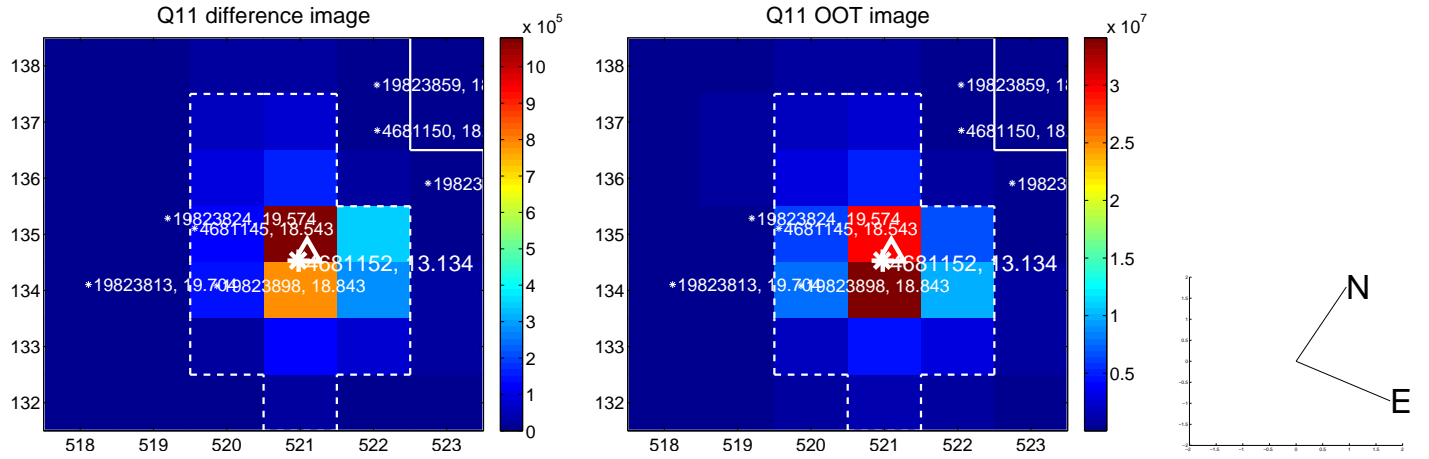
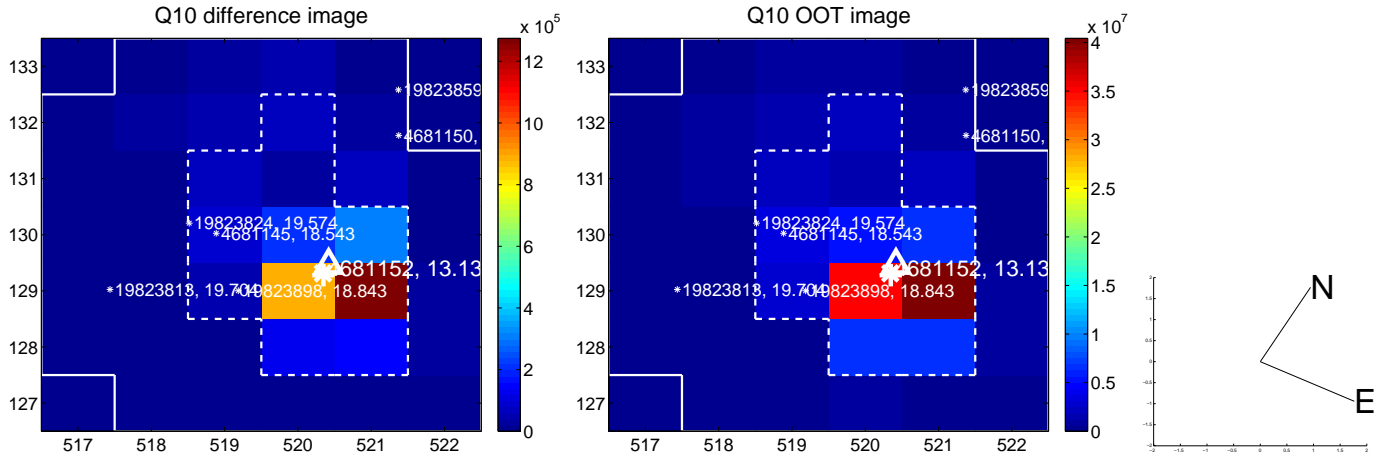
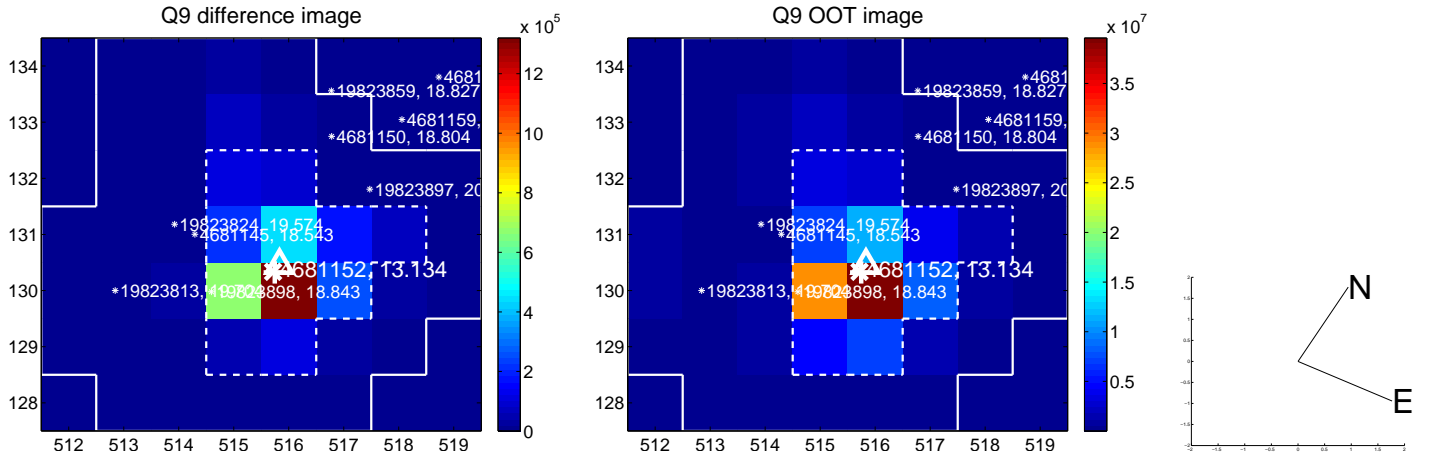




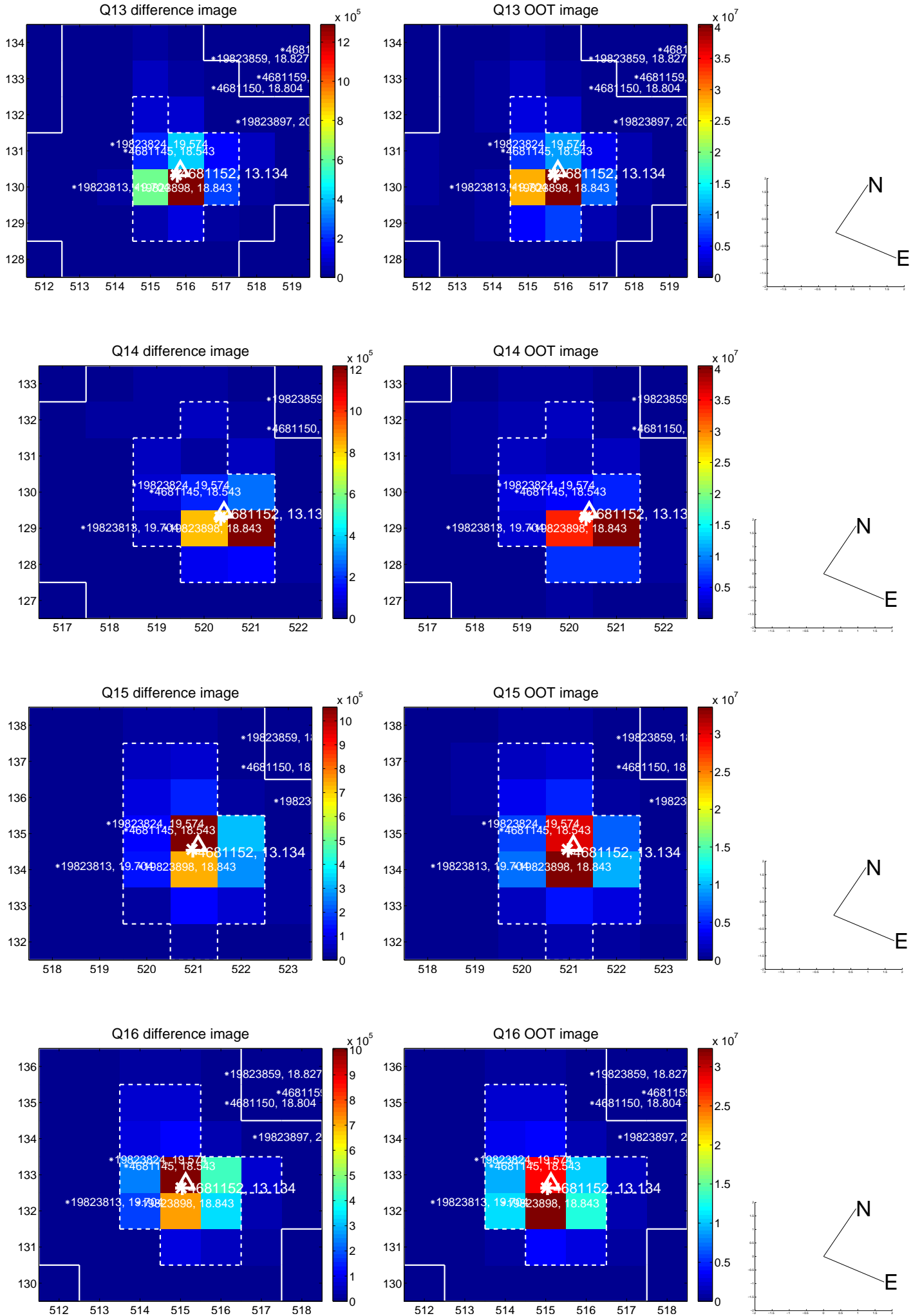
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



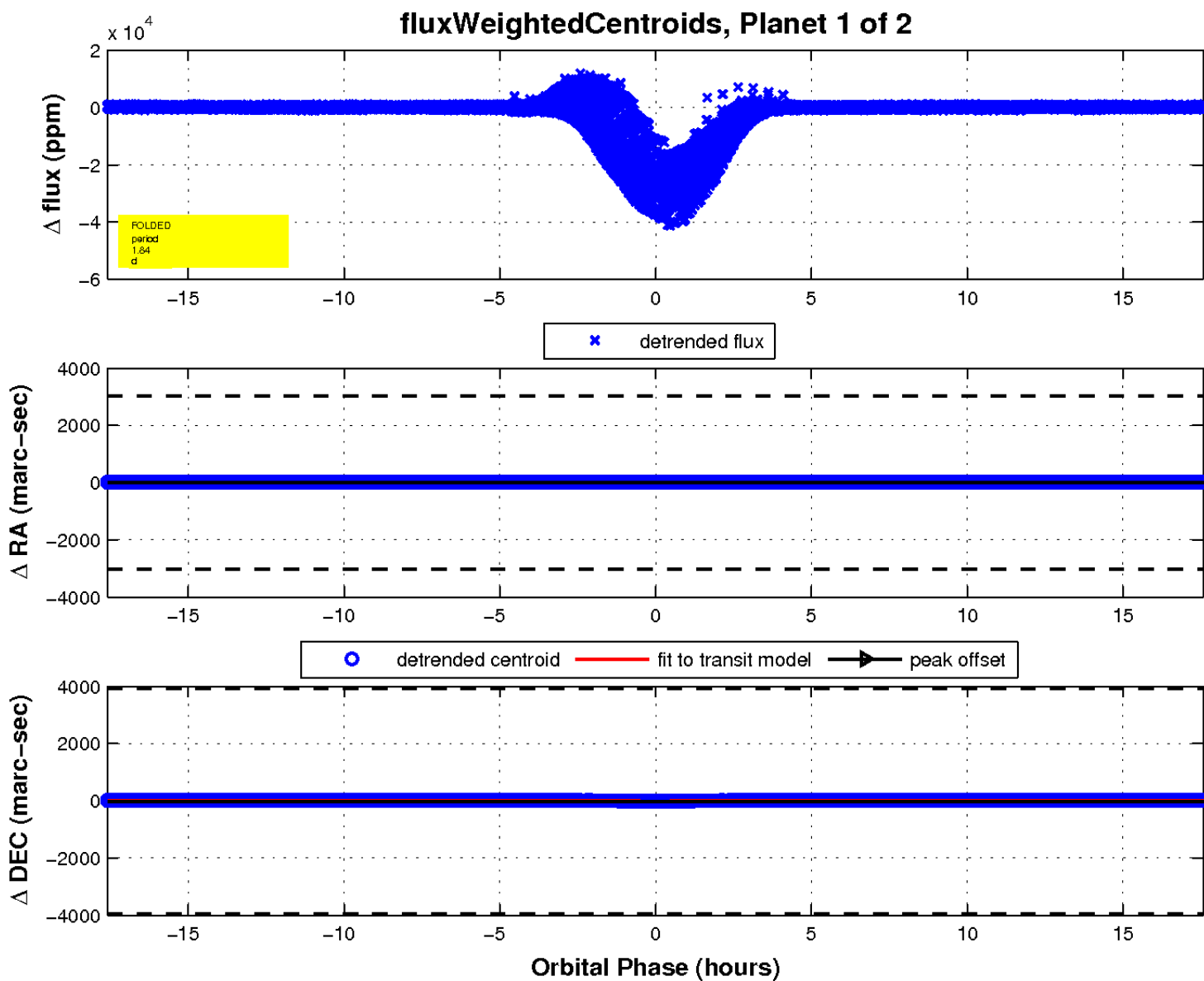
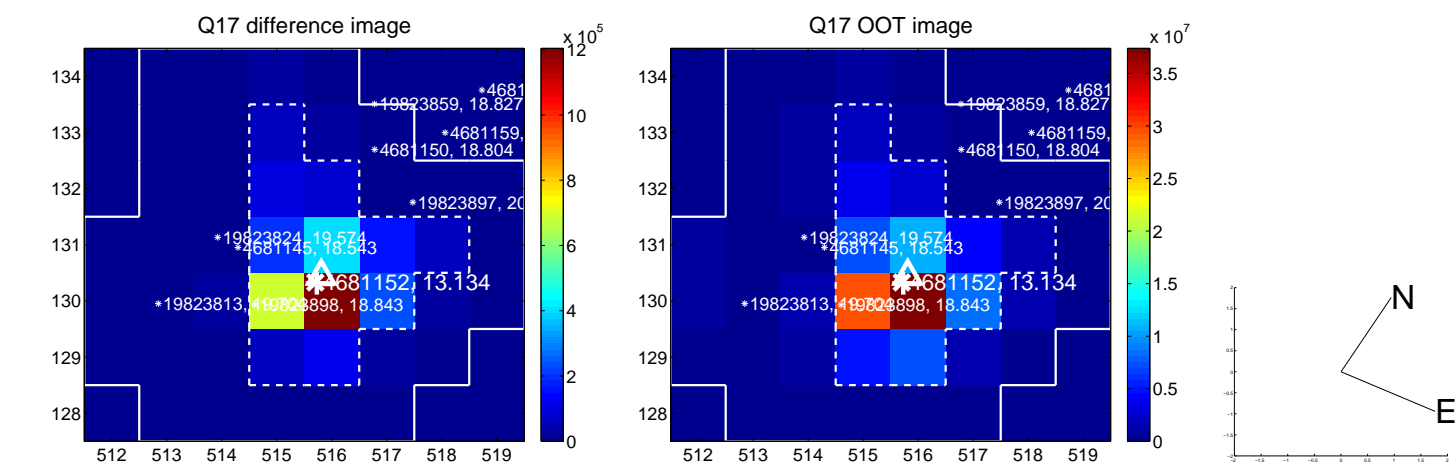
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

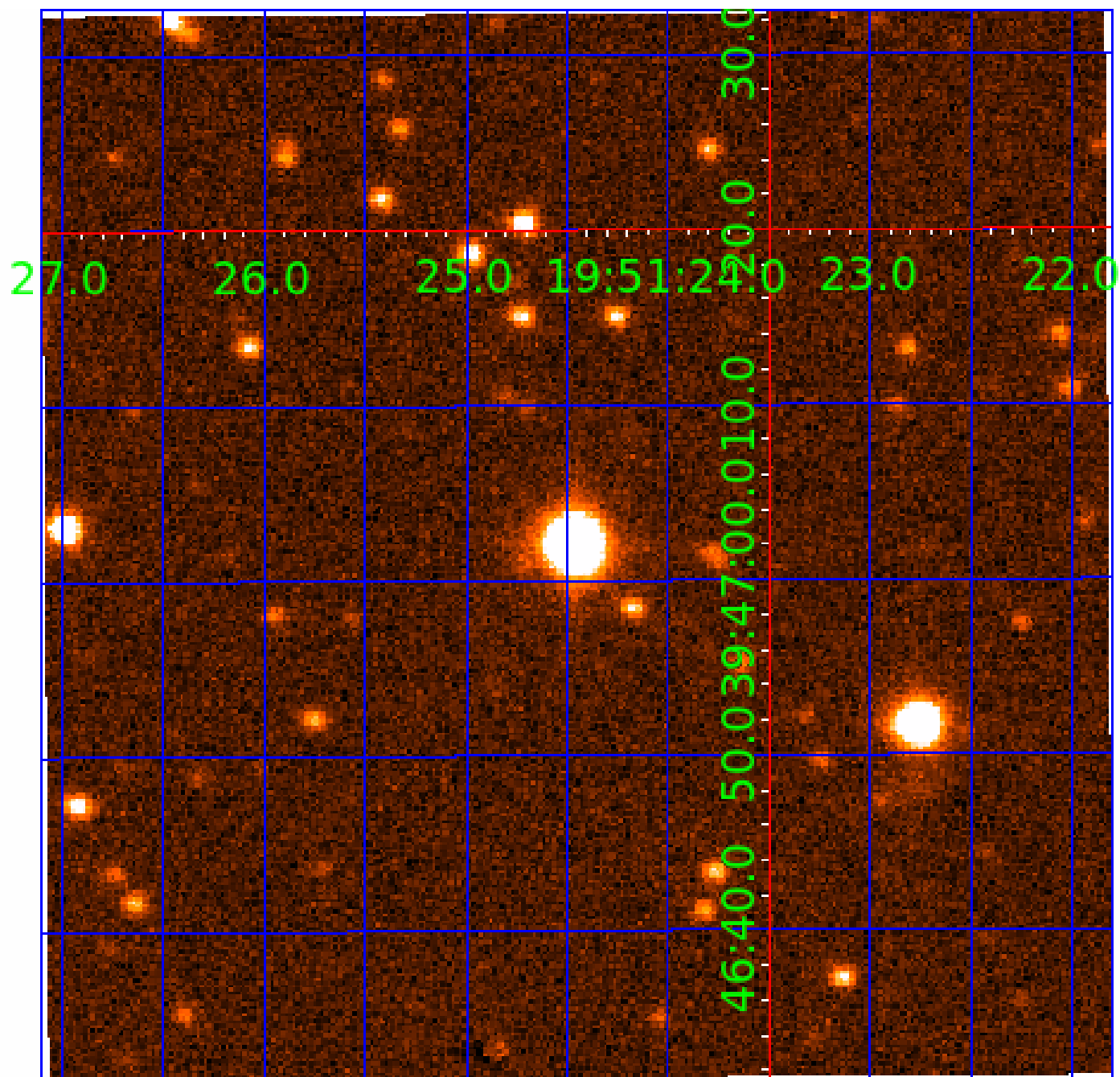


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004681152

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004681152-01	OBS	6436.01	1.835927	132.077494	30196.7	5.863	6016.9	3627.8	0.98	5930	29.54	1201.17
004681152-02	OBS	No	0.917966	132.078702	2302.9	2.500	116.9	-1.0	0.98	5930	4.66	3026.76

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004681152-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
004681152-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS

**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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

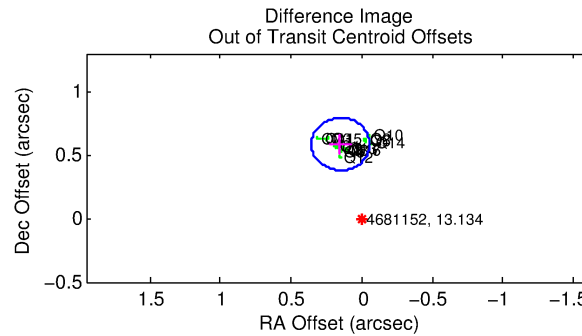
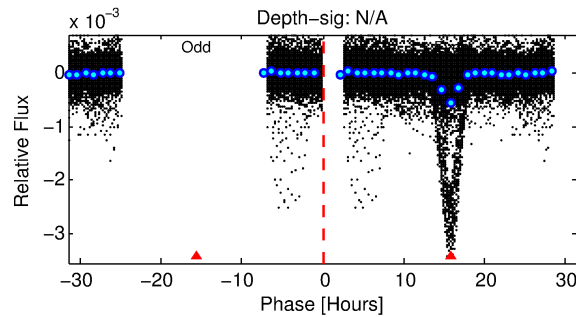
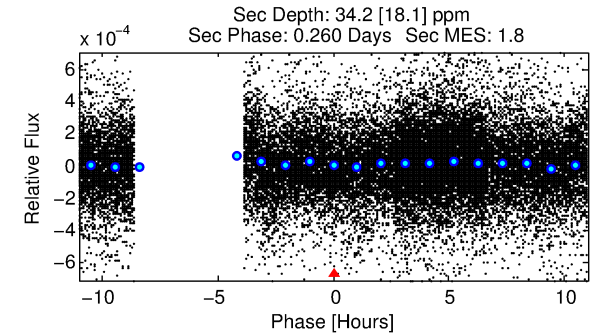
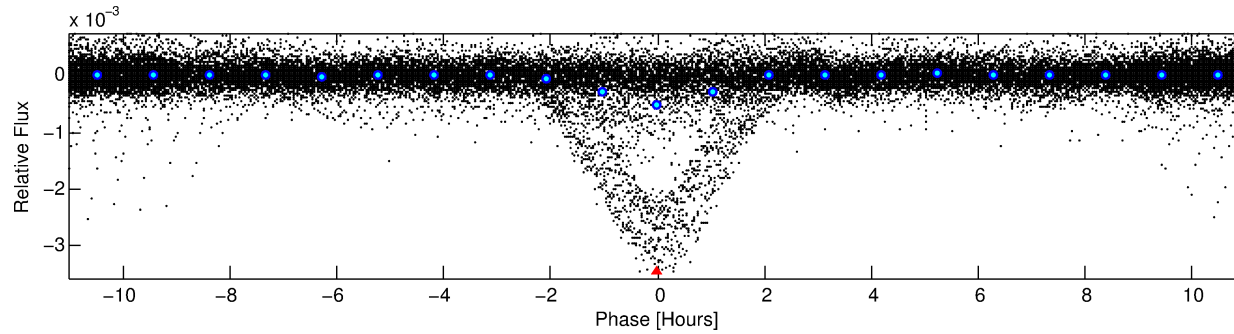
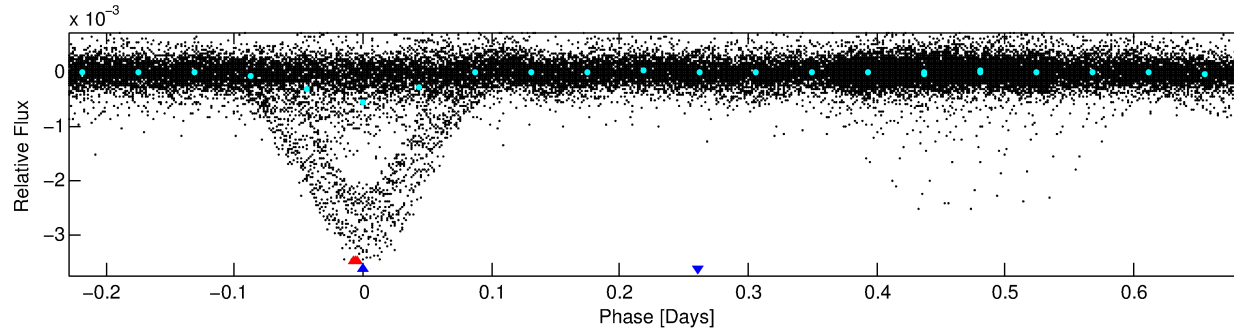
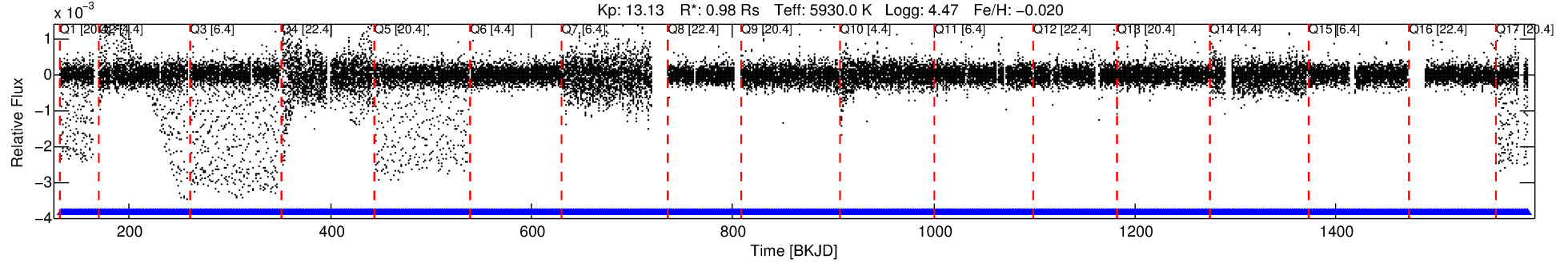
## Ephemeris Match Information For 004681152-02

No Significant Match Found

# DV One-Page Summary

KIC: 4681152 Candidate: 2 of 2 Period: 0.918 d  
KOI: K06436 Corr: No Ephemeris Match

Kp: 13.13 R\*: 0.98 Rs Teff: 5930.0 K Logg: 4.47 Fe/H: -0.020



## TPS TCE Results:

Period = 0.91797 d  
Epoch = 132.0787 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

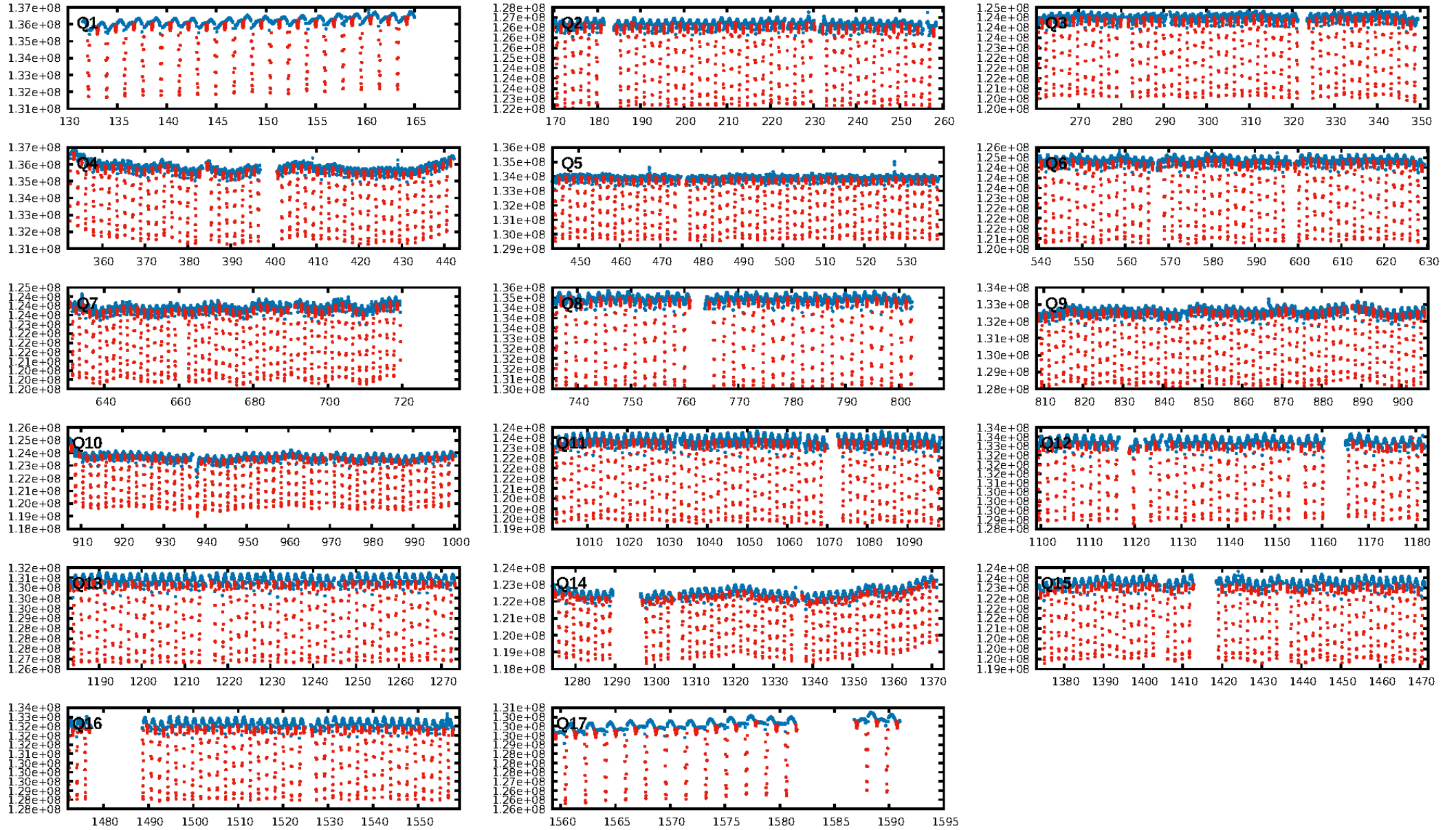
ShortPeriod-sig: N/A  
LongPeriod-sig: 99.9% [3.46σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [703/703]  
GhostDiagnostic-chr: 0.8298  
Centroid-sig: 0.0%  
Centroid-so: 0.234 arcsec [16.79σ]  
OotOffset-rm: 0.605 arcsec [8.81σ]  
KicOffset-rm: 0.615 arcsec [8.95σ]  
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 16:54:32 Z

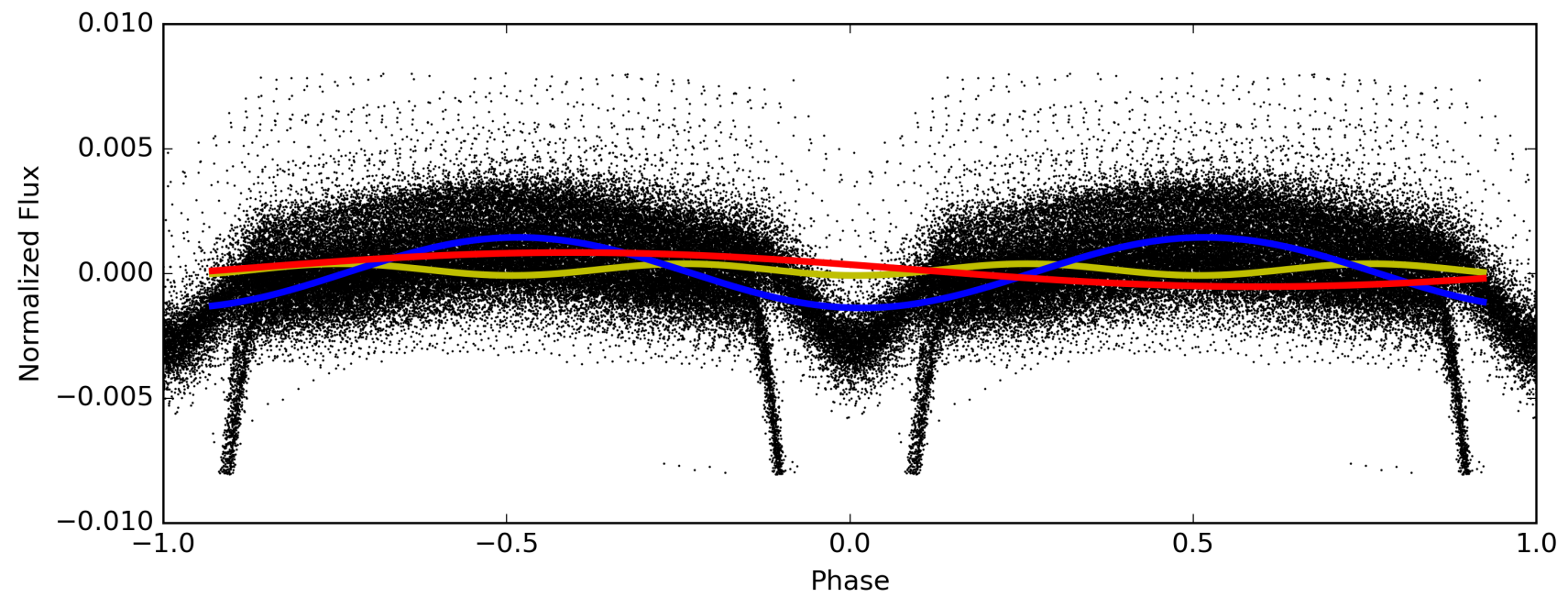
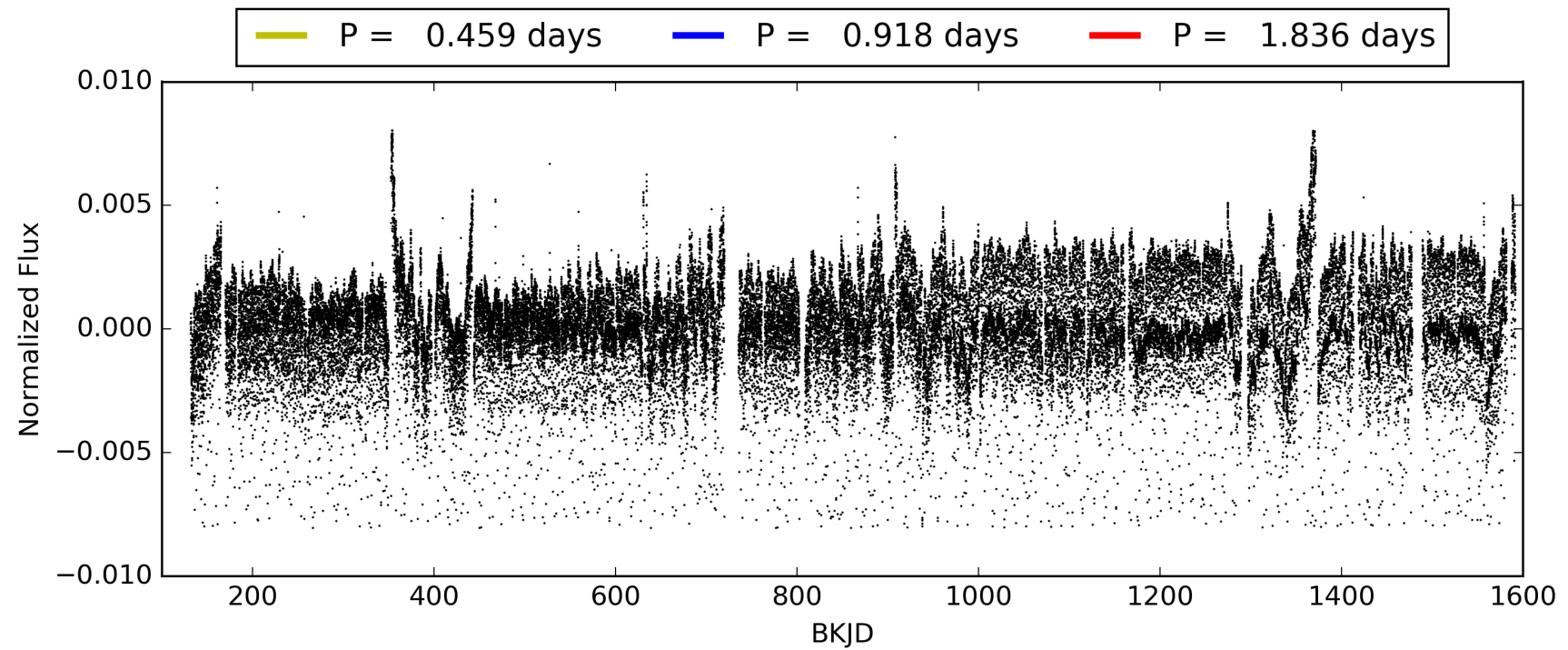
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004681152-02, PDC Light Curves

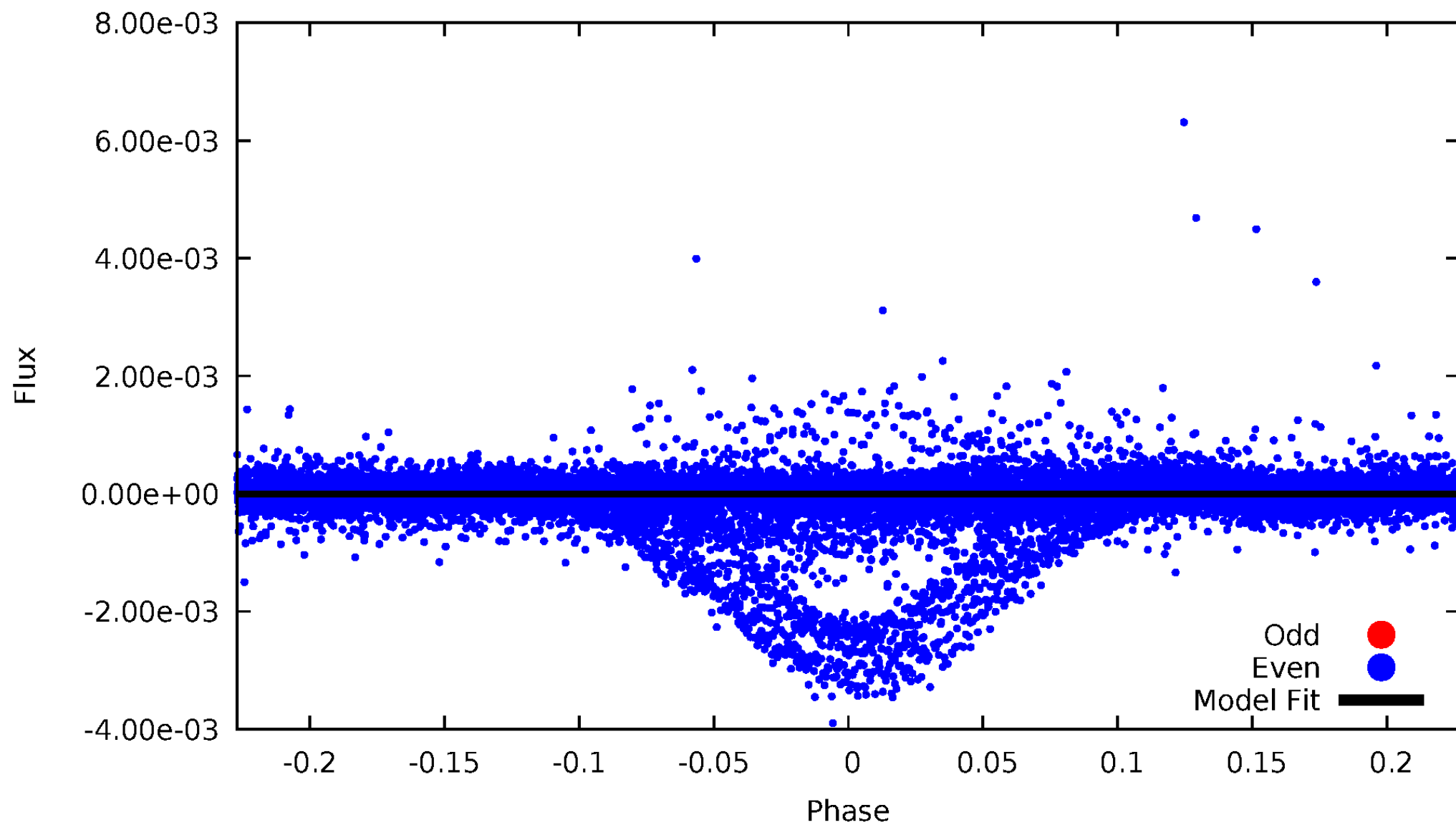


TCE 004681152-02



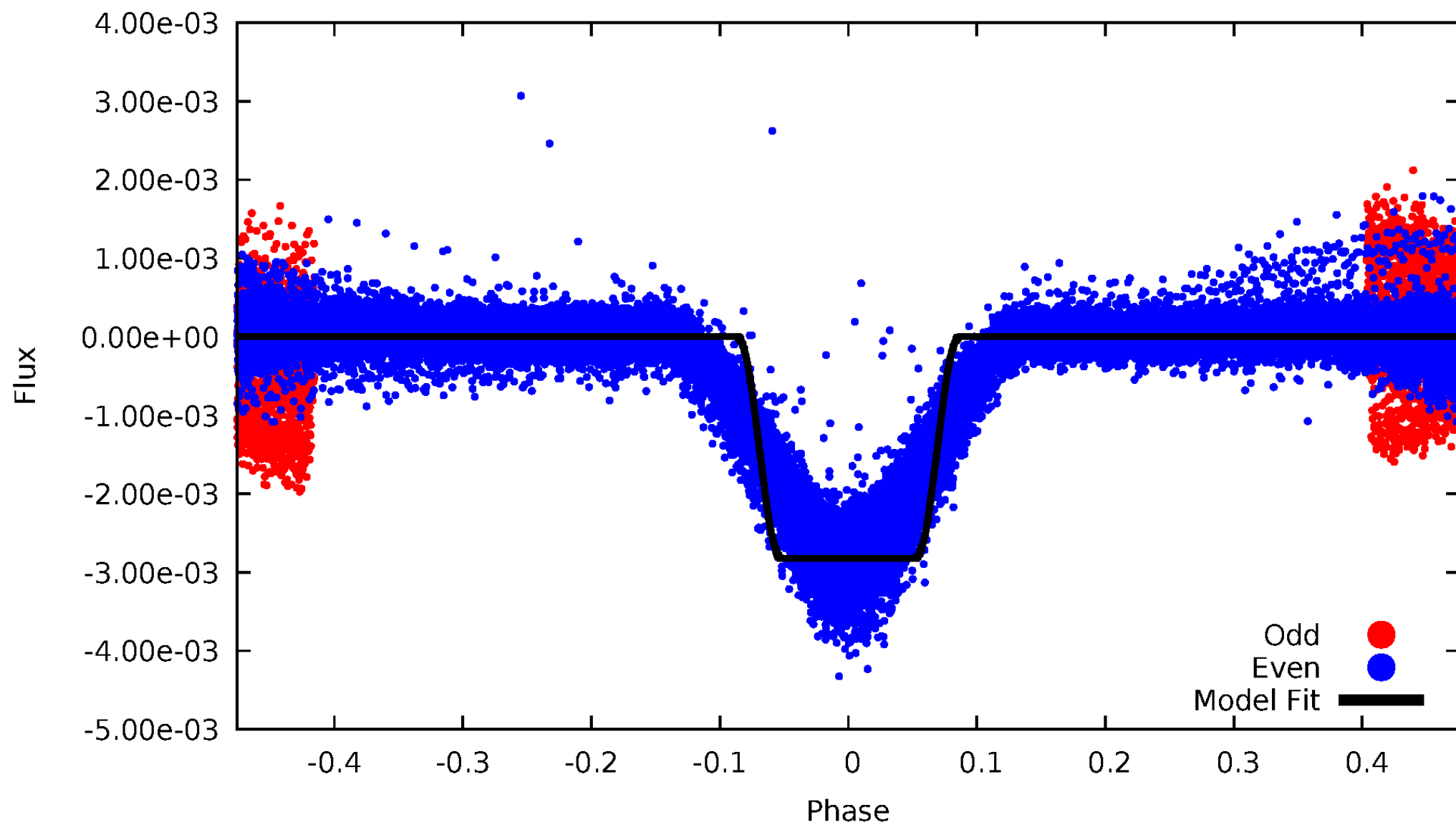
# DV Odd/Even

TCE 004681152-02



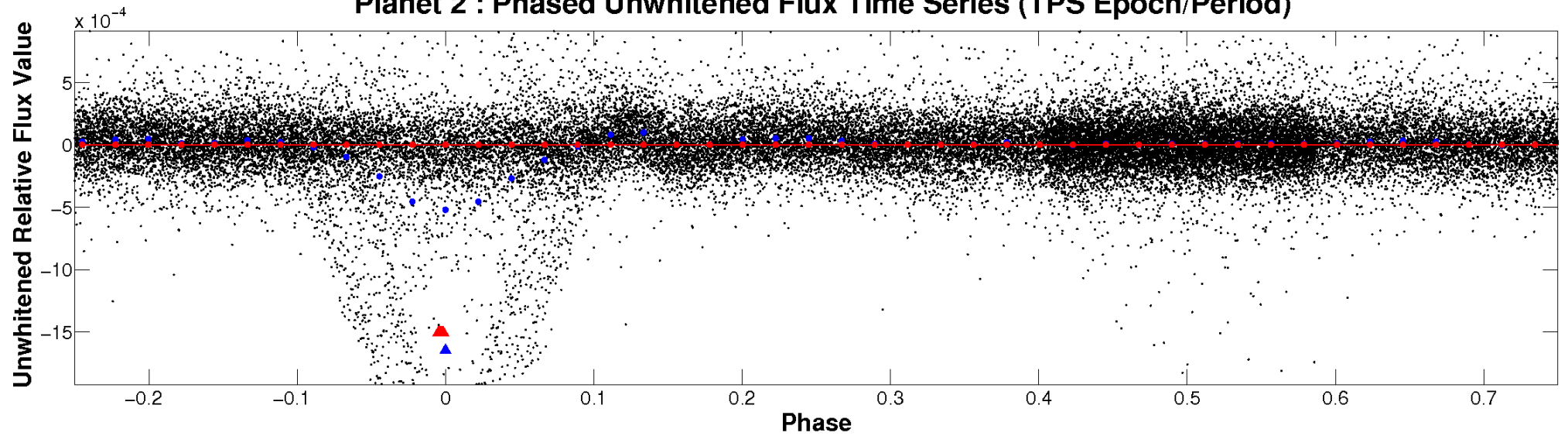
# ALT Odd/Even

TCE 004681152-02

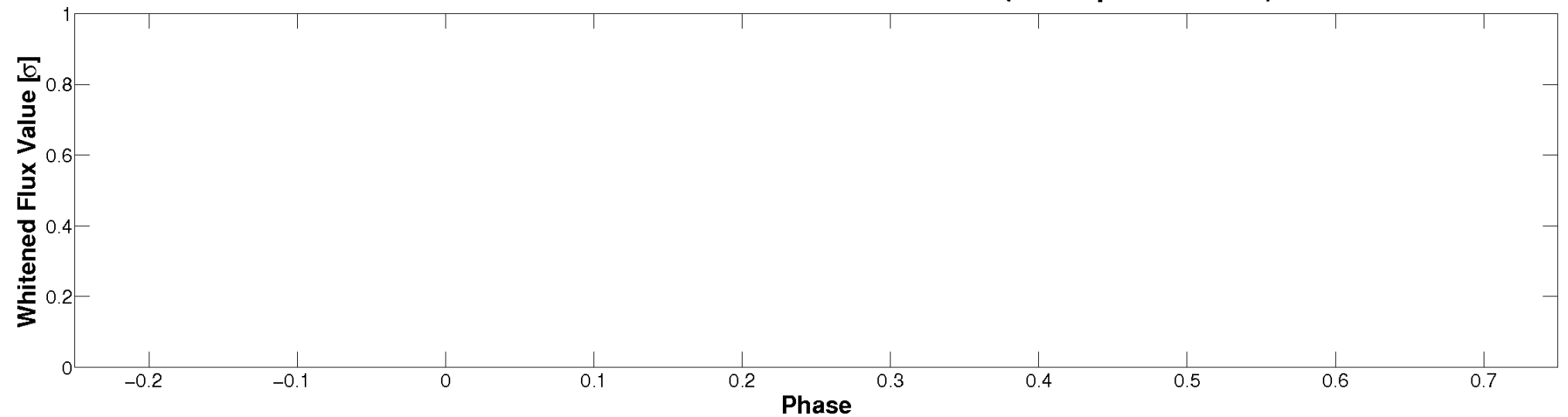


# Non-Whitened Vs. Whitened Light Curve

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

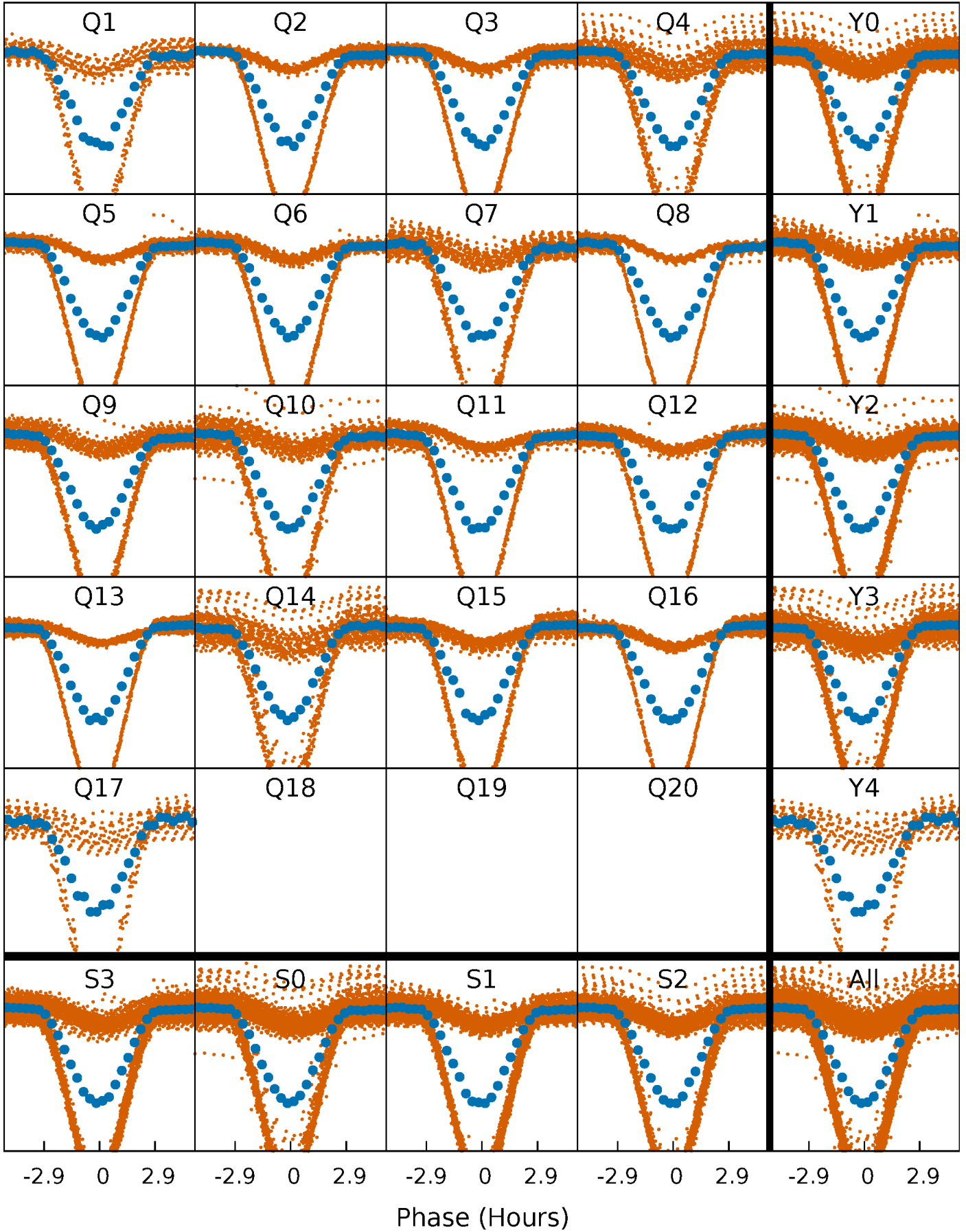


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

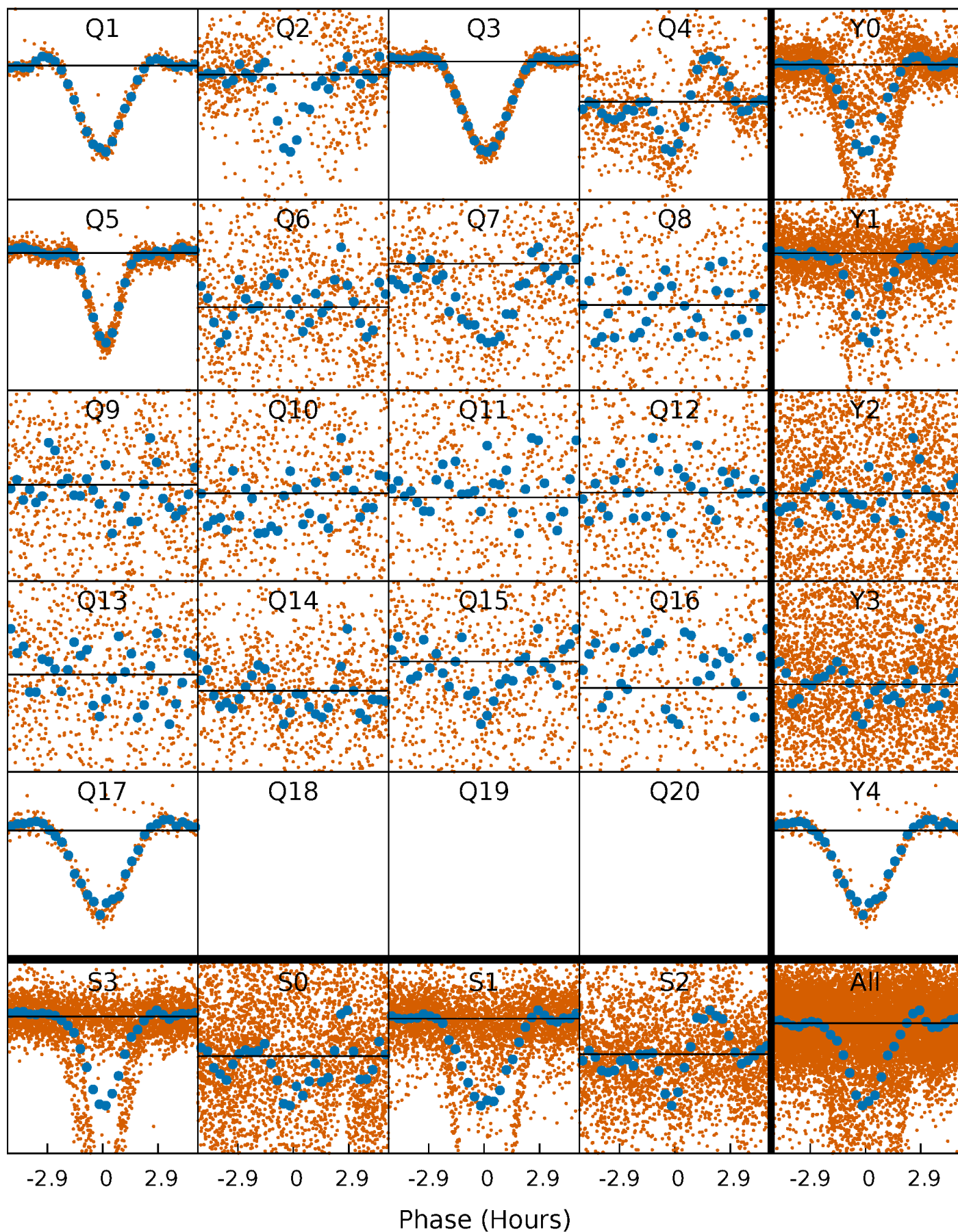
TCE 004681152-02 P= 0.917966 Days  $T_0=132.078702$  (BKJD)





# DV Quarter-Phased Transit Curves

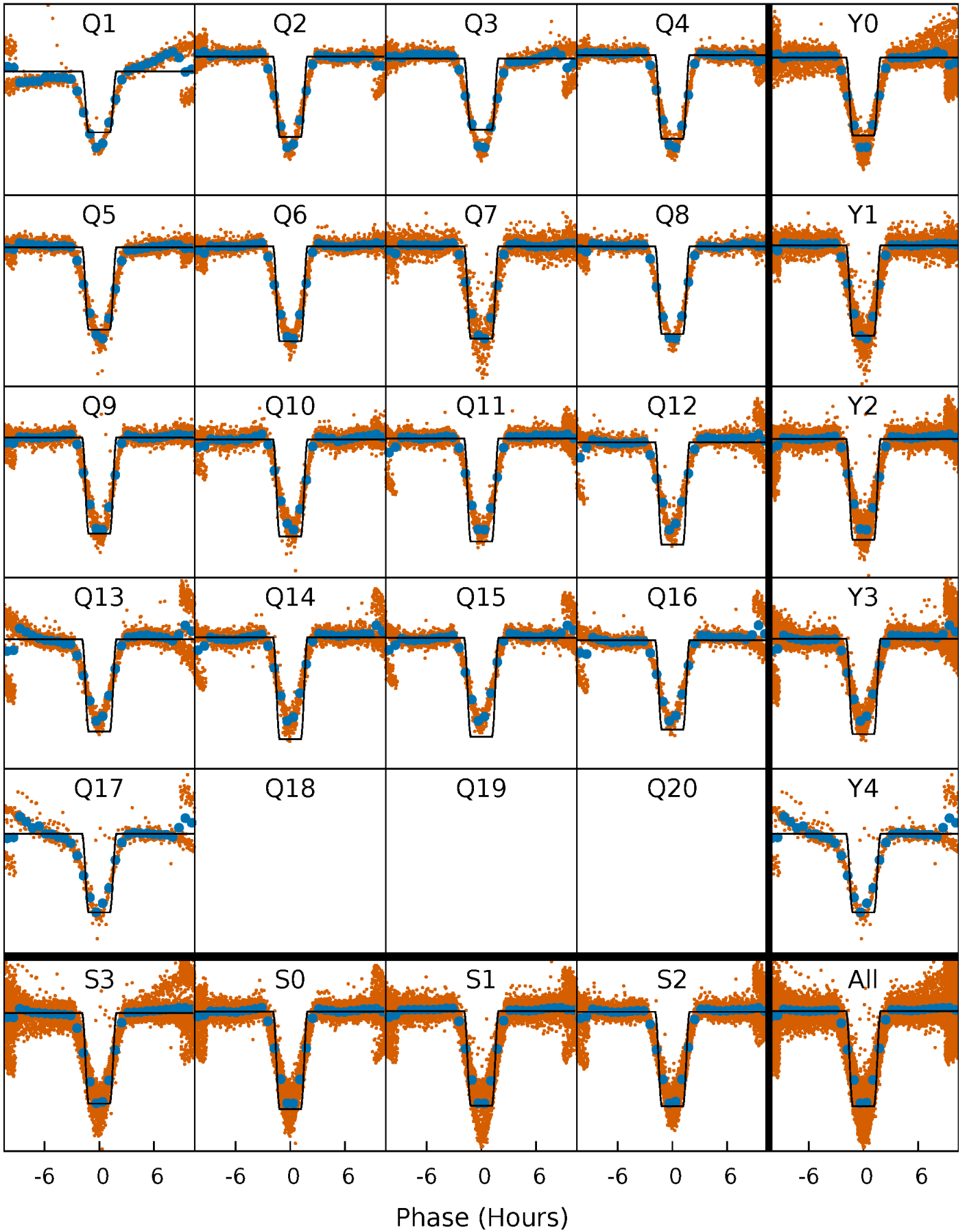
TCE 004681152-02     $P = 0.917966$  Days     $T_0 = 132.078702$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

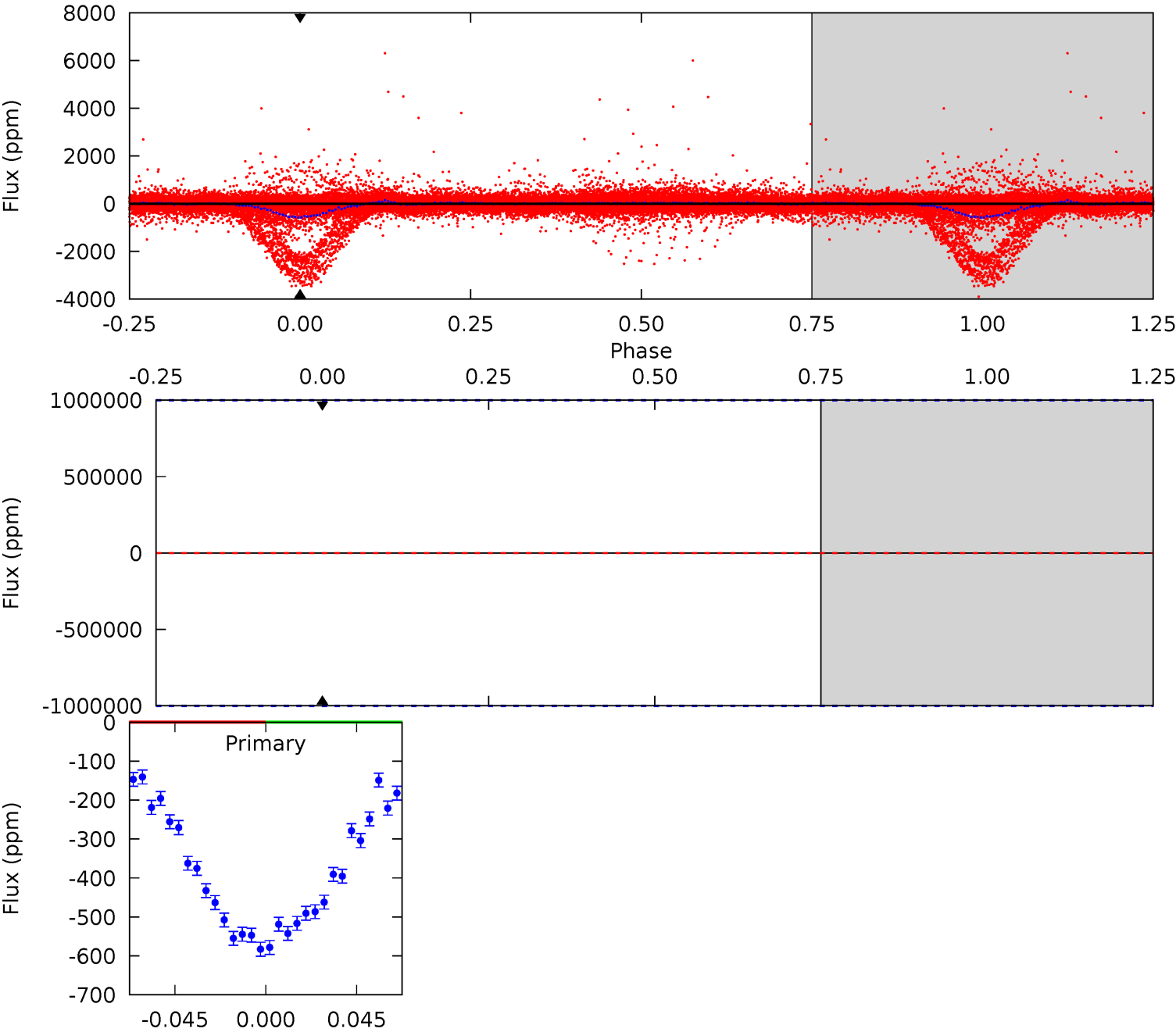
TCE 004681152-02   P= 0.917966 Days    $T_0=132.081288$  (BKJD)



DV Model-Shift Uniqueness Test

004681152-02, P = 0.917966 Days, E = 131.160736 Days

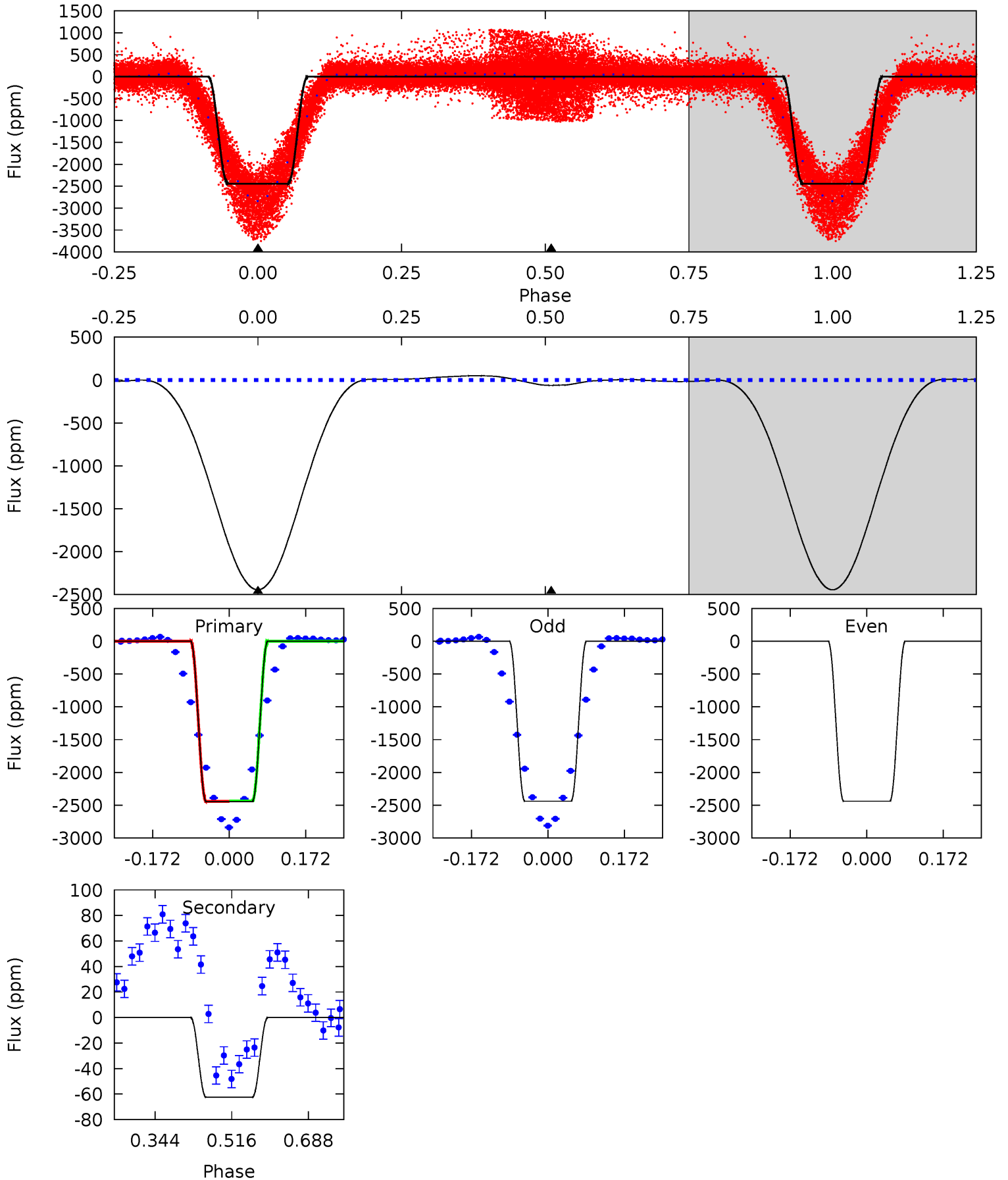
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

004681152-02, P = 0.917966 Days, E = 131.163322 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1049	26.8	0	0	4.45	1.37	7.56	1049	1049	26.8	26.8	0	1.02	0.02	1.50



### Stellar Parameters For KIC 004681152

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5930^{+184}_{-205}$	$4.472^{+0.067}_{-0.216}$	$-0.020^{+0.250}_{-0.300}$	$0.976^{+0.305}_{-0.109}$	$1.029^{+0.138}_{-0.138}$	$1.559^{+0.454}_{-0.837}$
	+3%/-3%	+1%/-5%	+1250%/-1500%	+31%/-11%	+13%/-13%	+29%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 004681152-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$10.11^{+9.53}_{-6.41}$	$2704^{+212}_{-152}$	$4731^{+13264}_{-20487}$	$5.381^{+324.033}_{-257.016}$
Alt.	$-62 \pm 2$	$9.81^{+9.29}_{-6.86}$	$2692^{+208}_{-152}$	$-2694^{+6221}_{-207}$	$0.124^{+1.229}_{-0.092}$

$T_{max}$  = 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

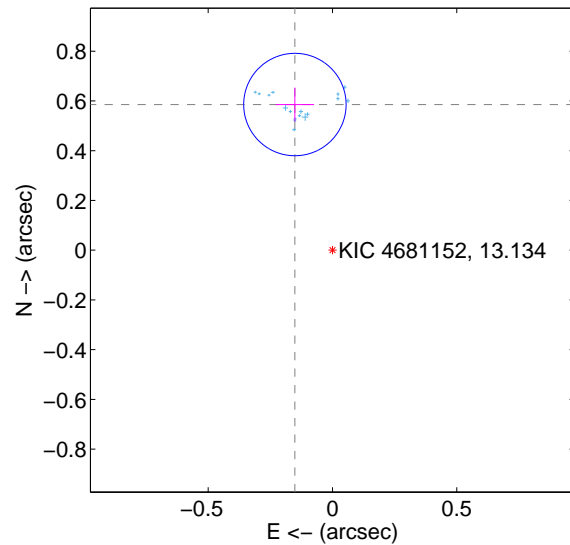
Supplemental centroid analysis for 004681152-02. Kepler magnitude: 13.13. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

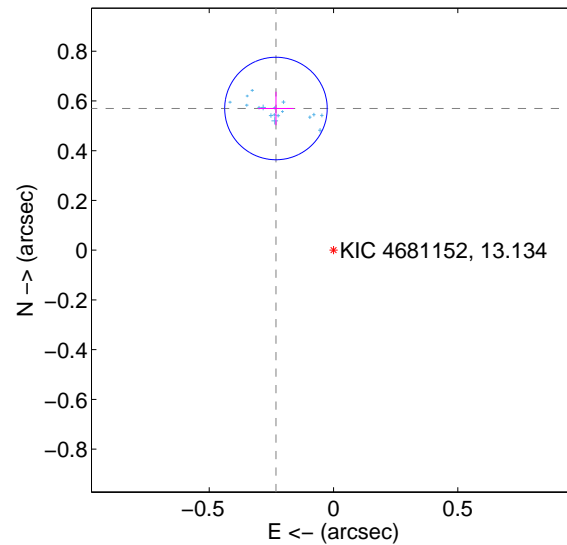
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.605 \pm 0.069$	8.81	$0.151 \pm 0.077$	$0.586 \pm 0.068$
PRF-fit source offset from KIC position	$0.615 \pm 0.069$	8.95	$0.231 \pm 0.071$	$0.570 \pm 0.067$
photometric centroid source offset	$0.23 \pm 0.01$	16.79	$0.16 \pm 0.01$	$0.17 \pm 0.01$

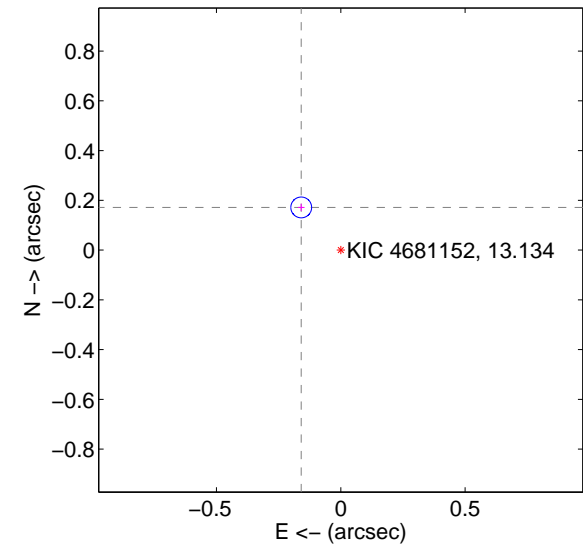
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

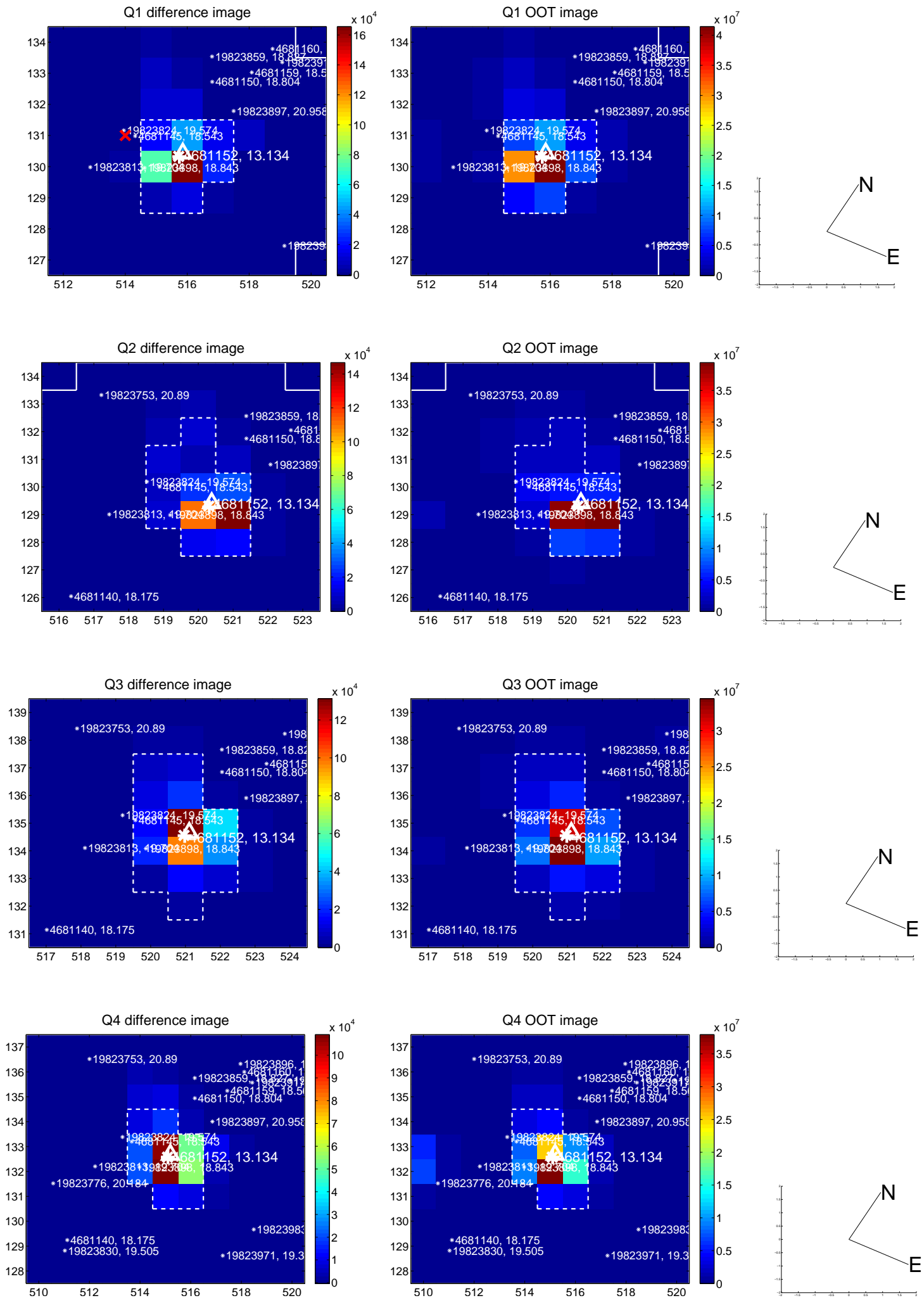


offset from photometric centroids

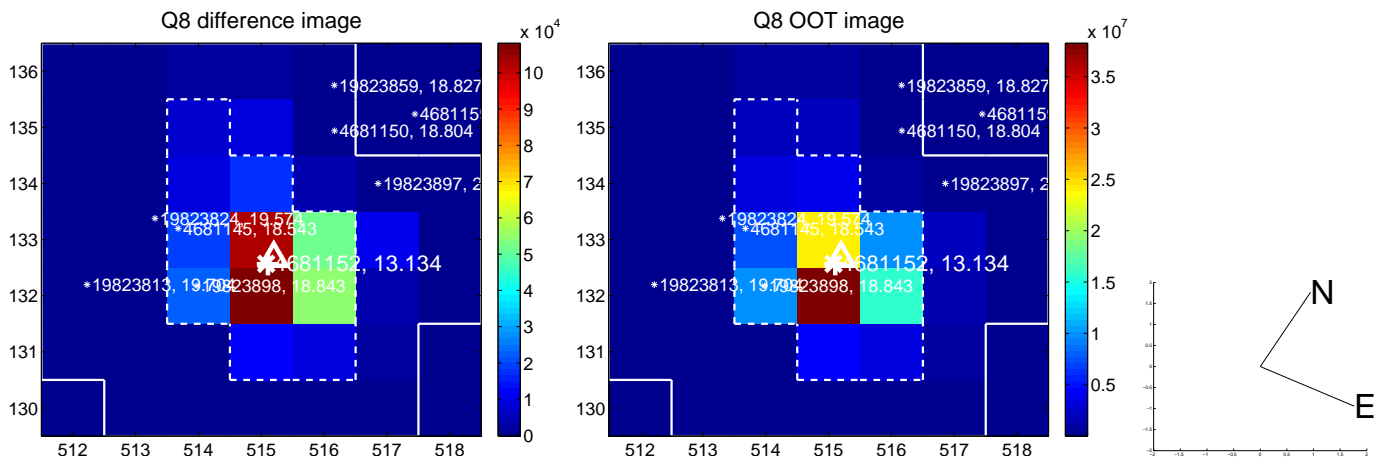
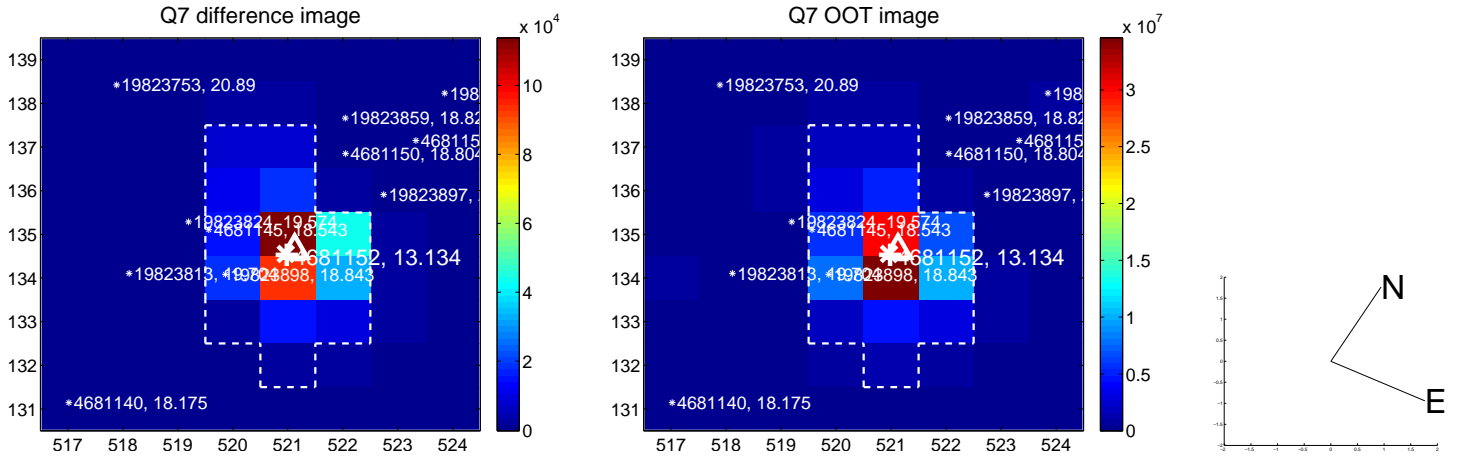
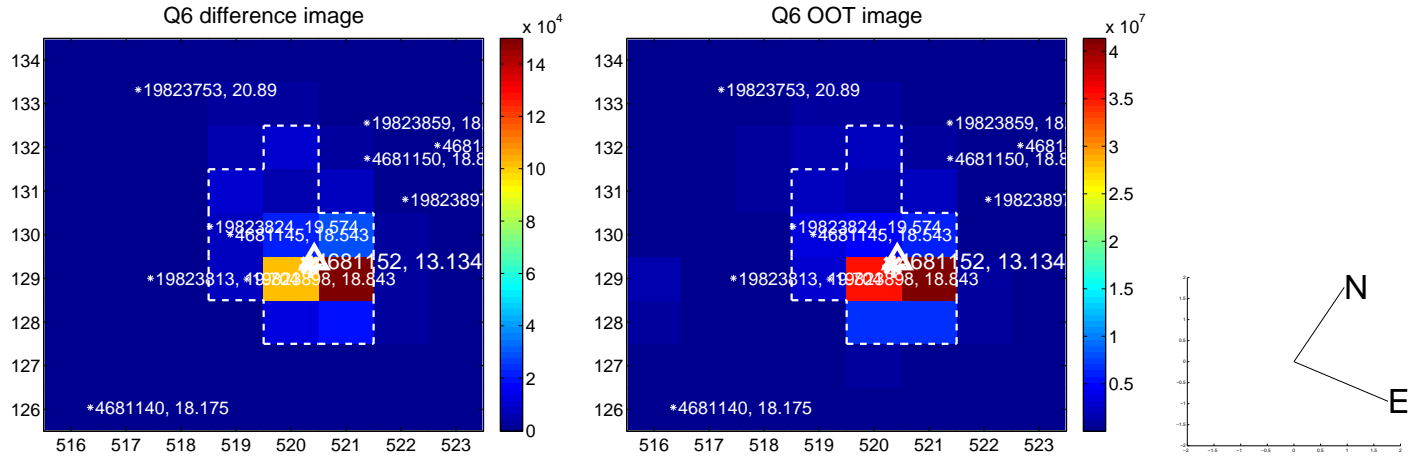
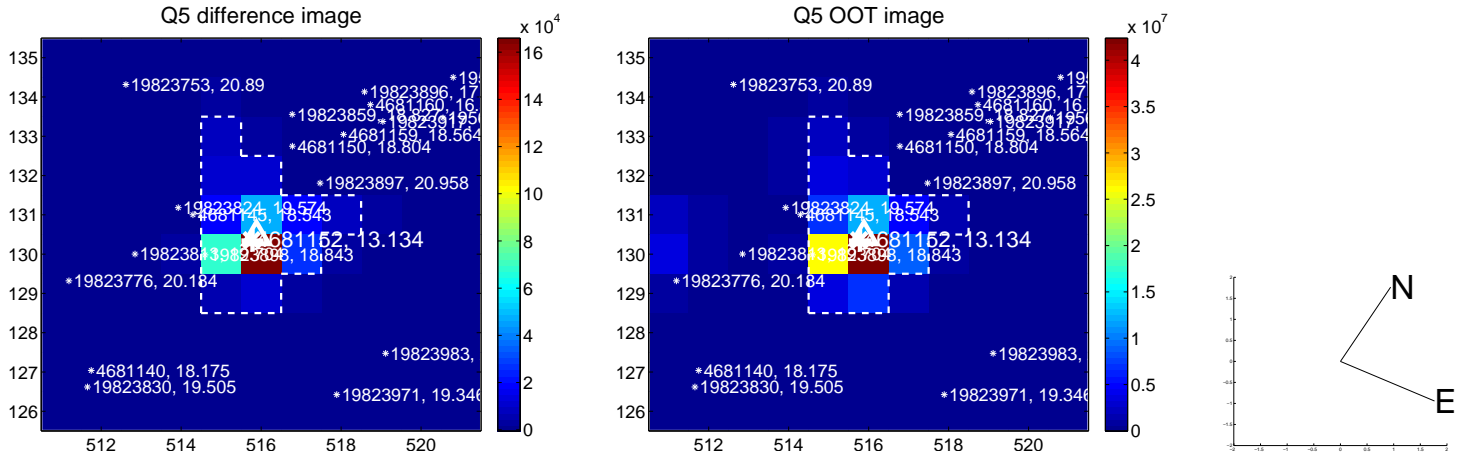


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

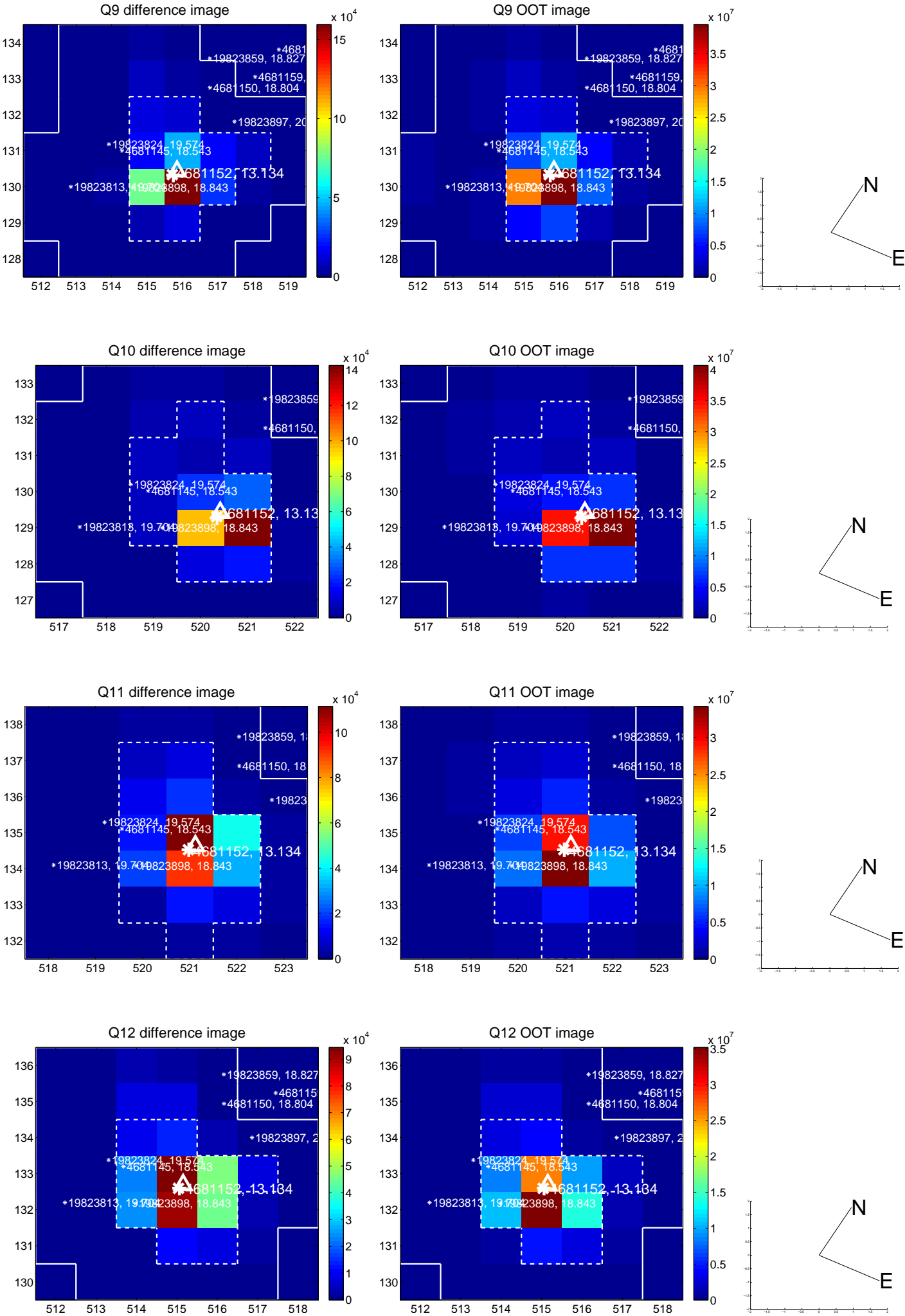


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

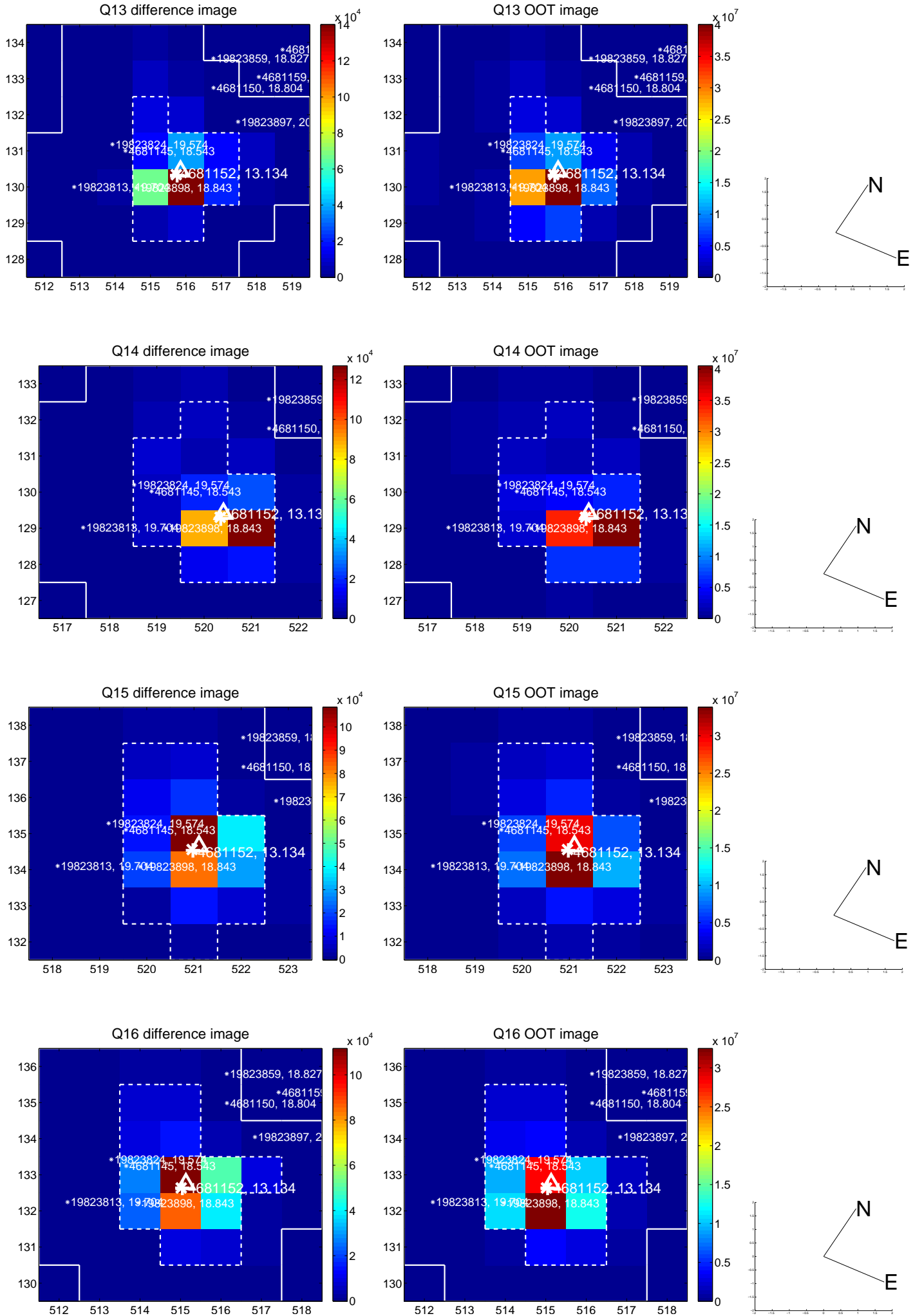




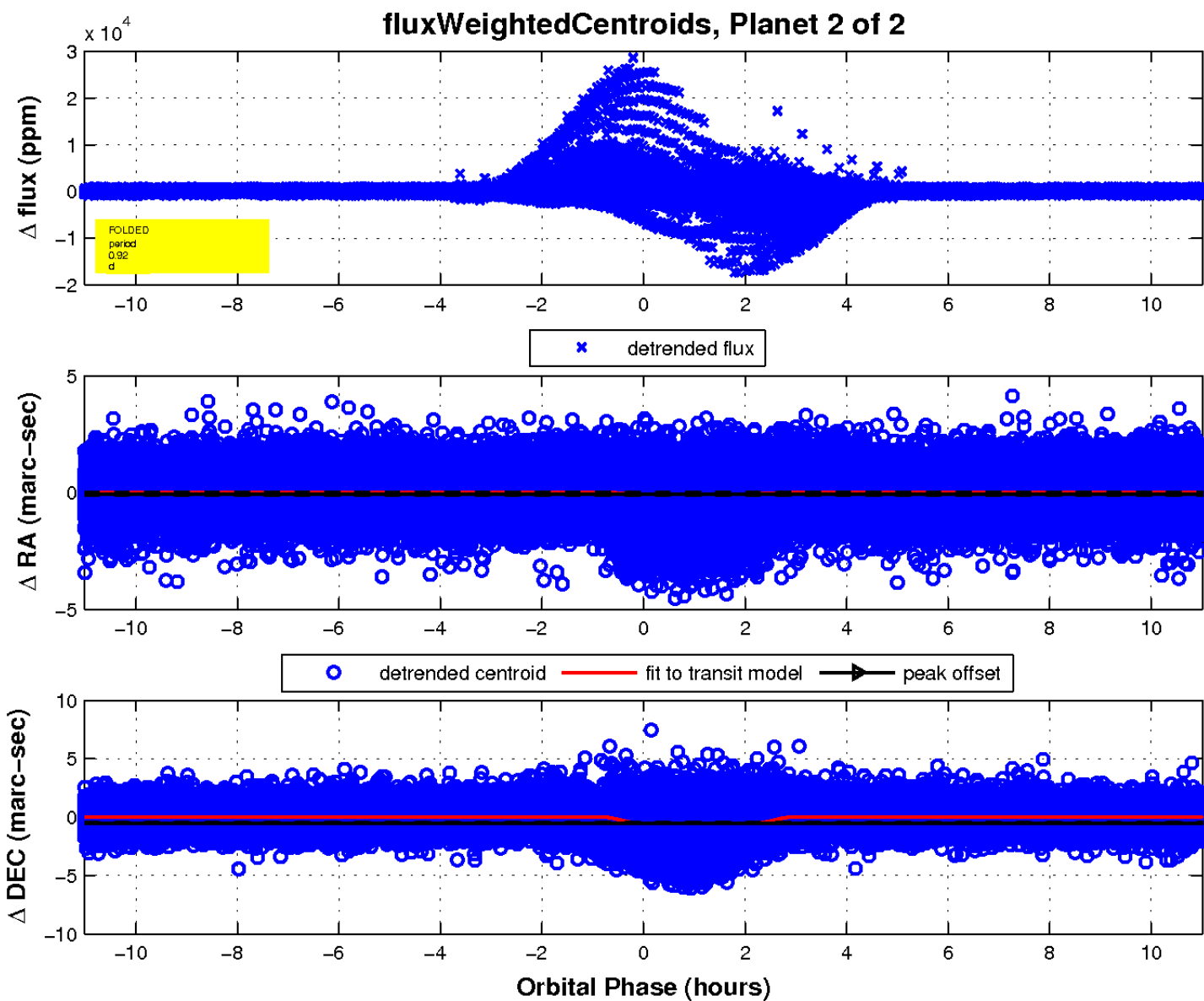
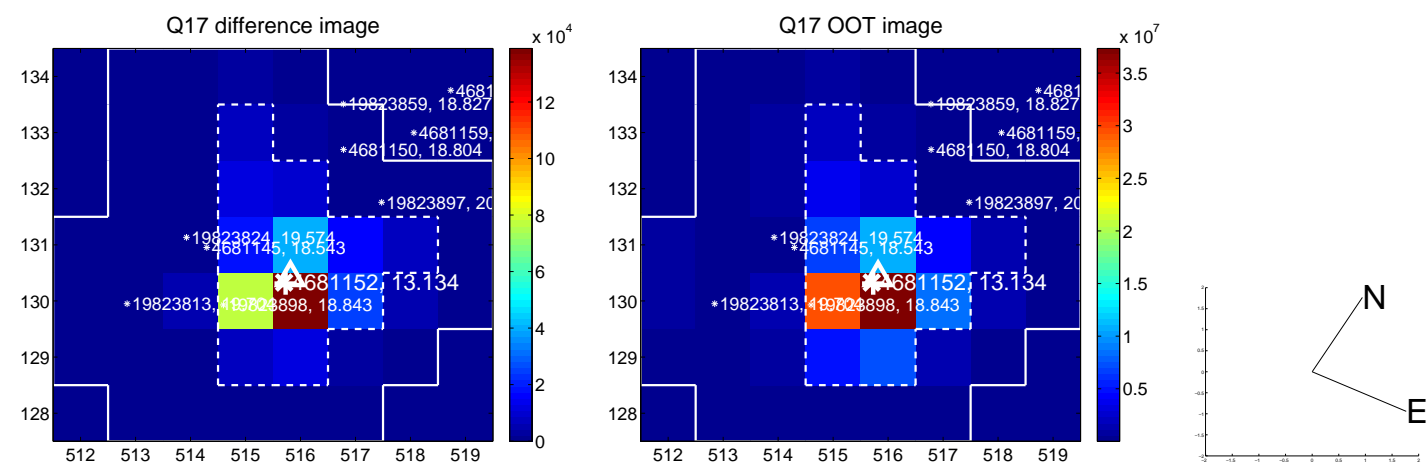
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

