

# KIC 009716391

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009716391-01	OBS	3025.01	13.182870	141.832519	495.5	3.691	12.3	12.4	0.83	5382	2.14	45.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009716391-01	OBS	PC	0.96	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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

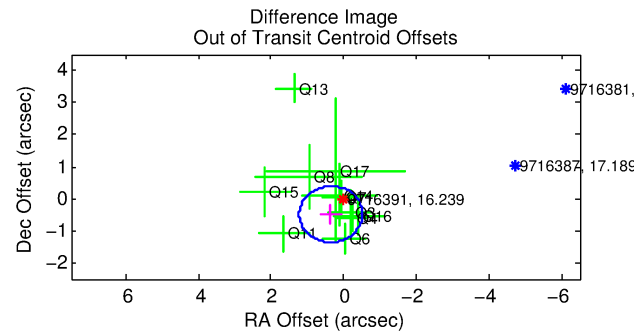
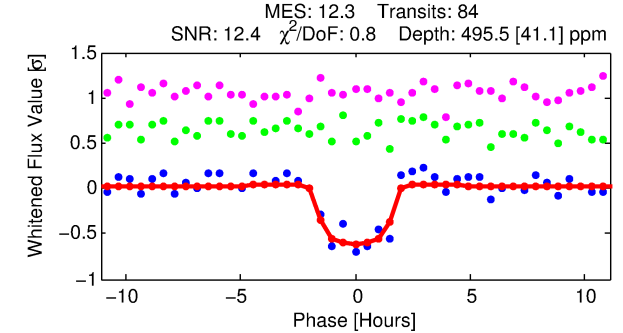
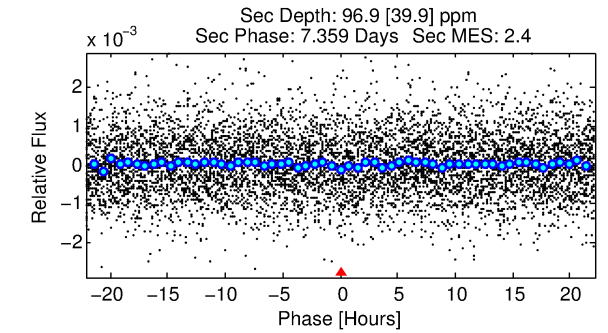
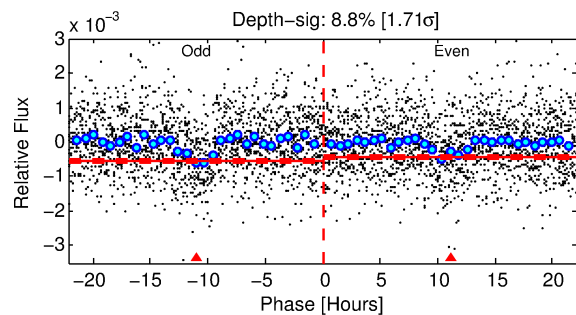
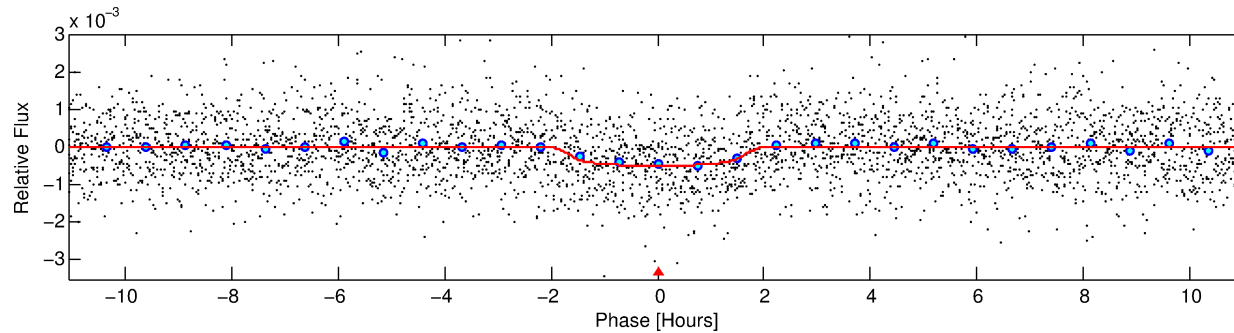
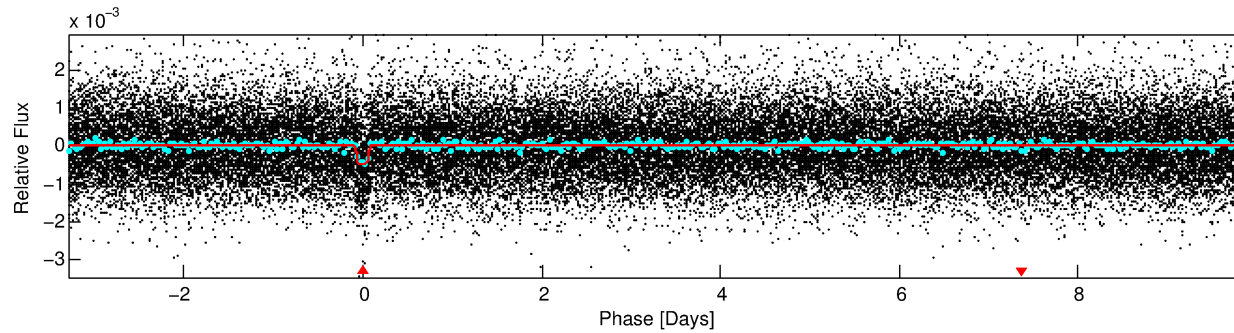
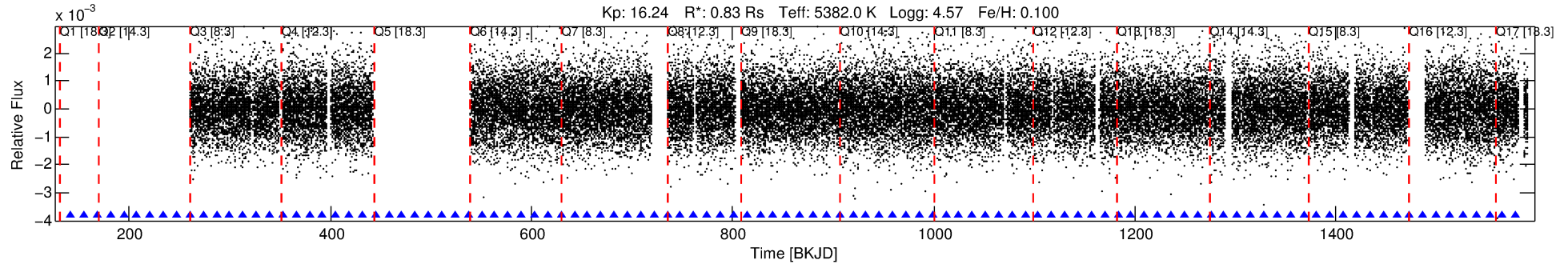
## Ephemeris Match Information For 009716391-01

No Significant Match Found

# DV One-Page Summary

KIC: 9716391 Candidate: 1 of 1 Period: 13.183 d

KOI: K03025.01 Corr: 0.979



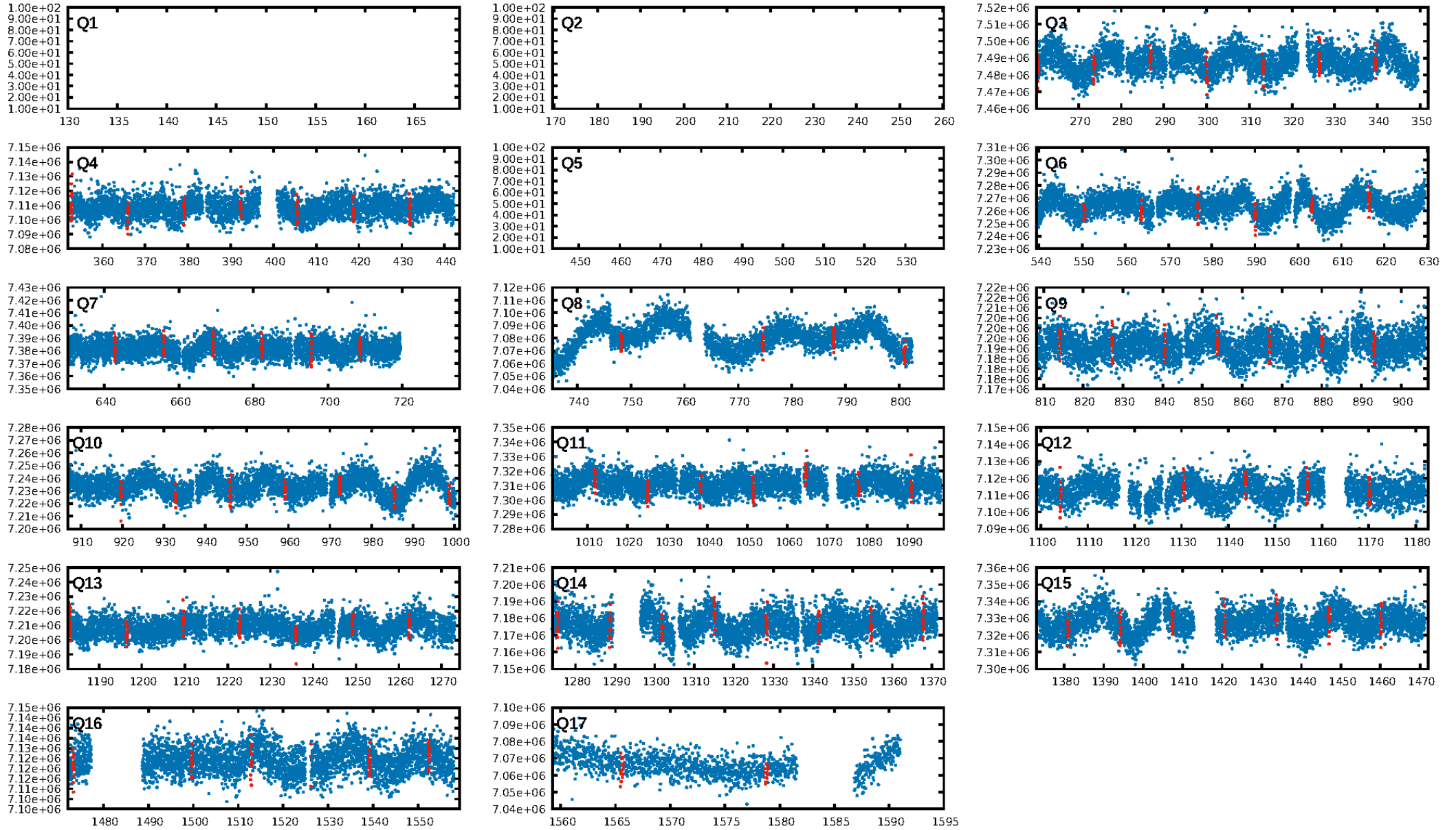
## DV Fit Results:

Period = 13.18287 [0.00012] d  
Epoch = 141.8325 [0.0076] BKJD  
Rp/R\* = 0.0237 [0.0106]  
a/R\* = 15.13 [27.40]  
b = 0.86 [0.56]  
Seff = 45.25 [12.75]  
Teq = 661 [47] K  
Rp = 2.14 [1.04] Re  
a = 0.1066 [0.0178] AU  
Ag = 132.24 [134.29] [0.98 $\sigma$ ]  
Teffp = 3468 [862] K [3.25 $\sigma$ ]

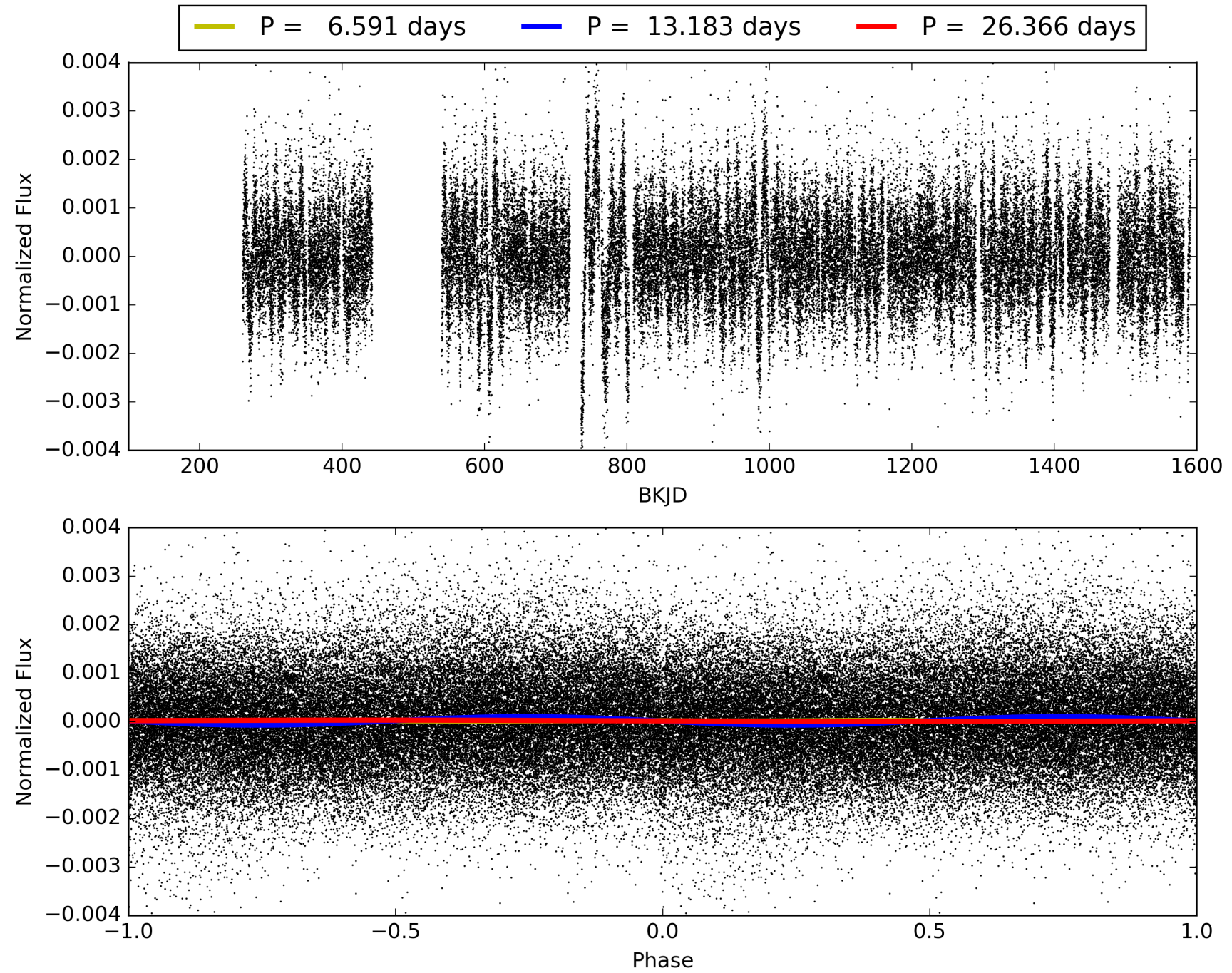
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.41e-35  
RollingBand-fgt: 1.00 [82/82]  
GhostDiagnostic-chr: 2.448  
Centroid-sig: 0.0%  
Centroid-so: 1.367 arcsec [1.81 $\sigma$ ]  
OotOffset-rm: 0.603 arcsec [2.08 $\sigma$ ]  
KicOffset-rm: 0.764 arcsec [2.07 $\sigma$ ]  
OotOffset-st: 2/4/3/2 [11]  
KicOffset-st: 2/4/3/2 [11]  
DiffImageQuality-fgm: 0.73 [8/11]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 009716391-01, PDC Light Curves



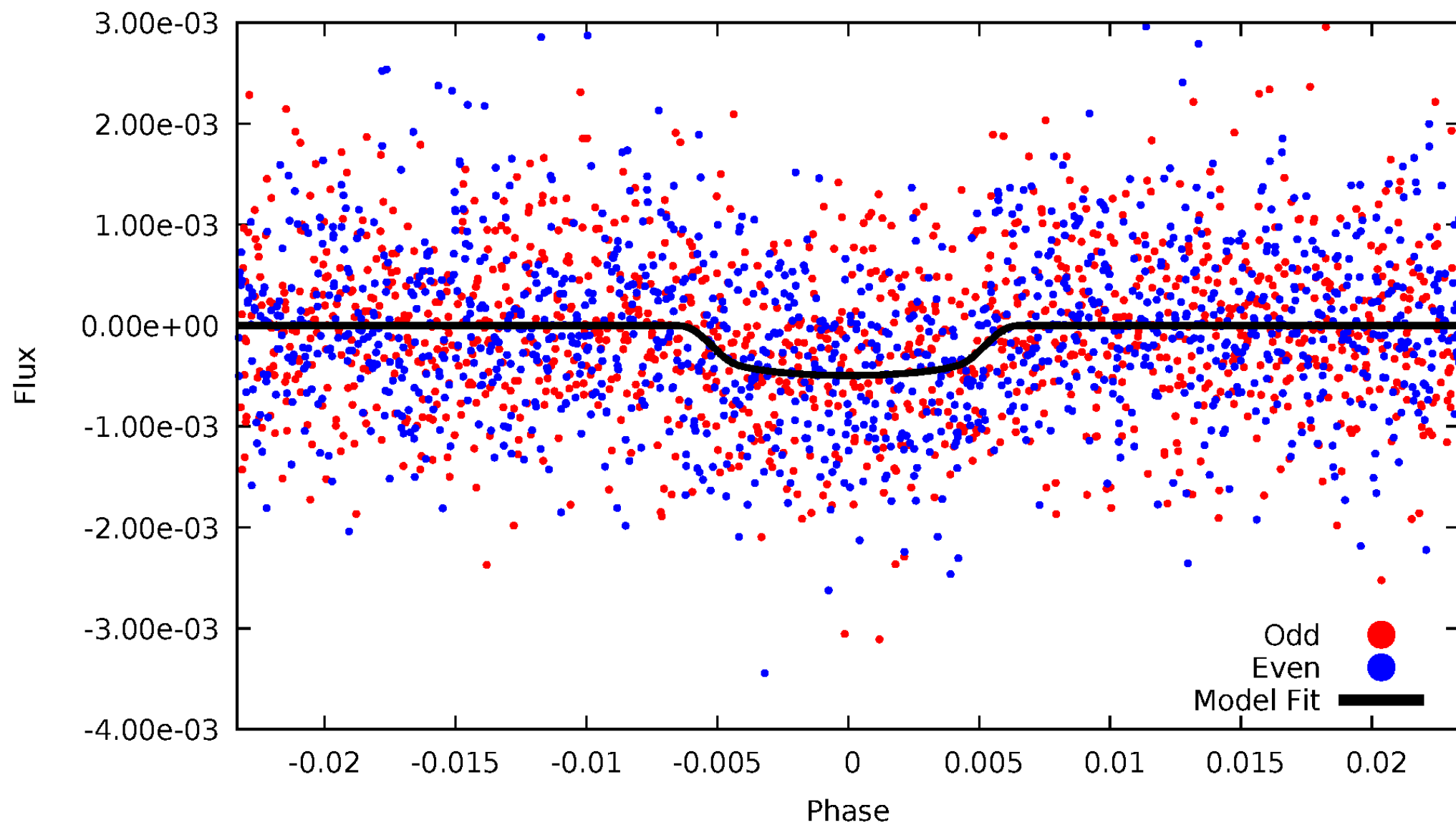
# TCE 009716391-01





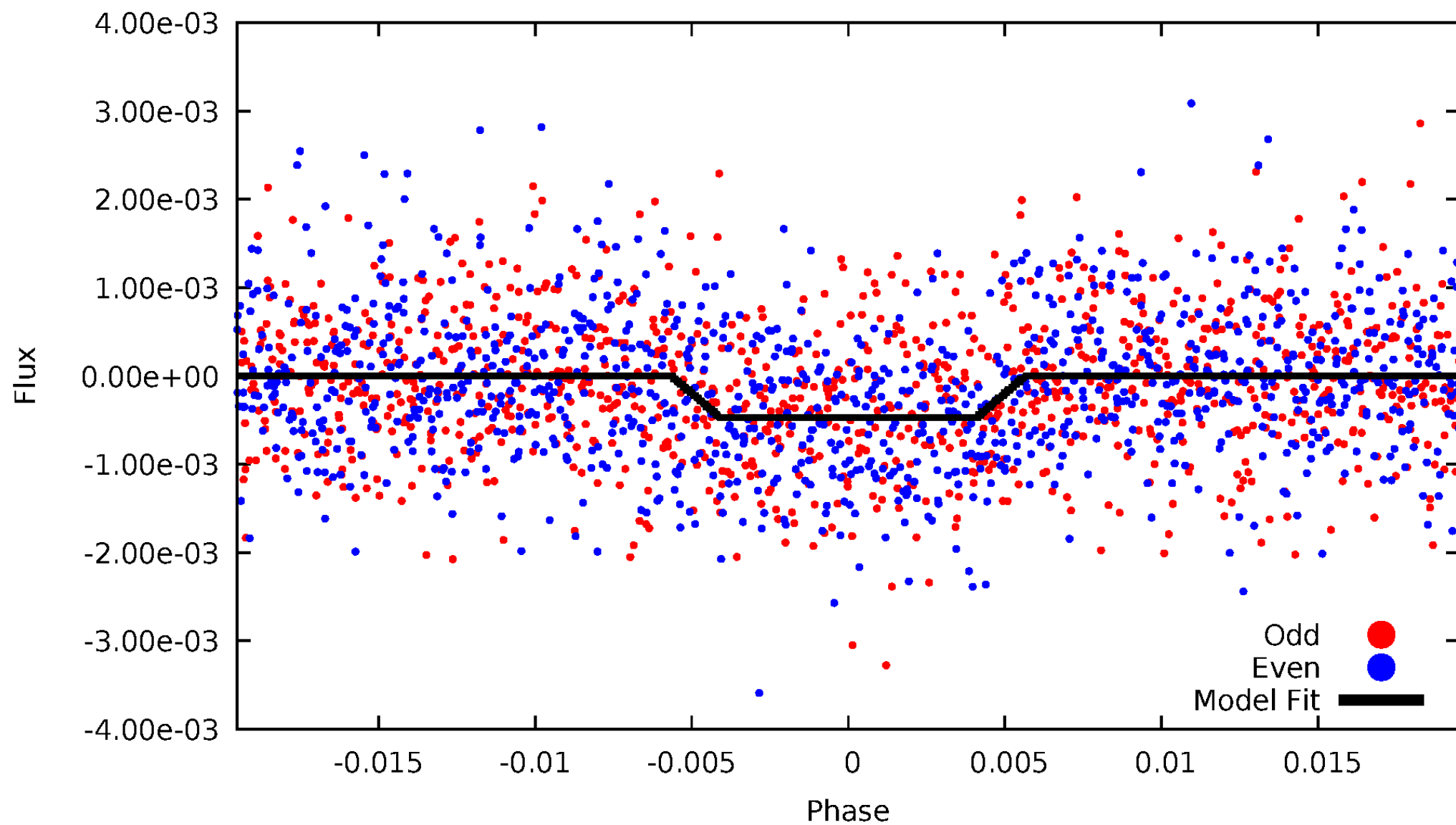
# DV Odd/Even

TCE 009716391-01



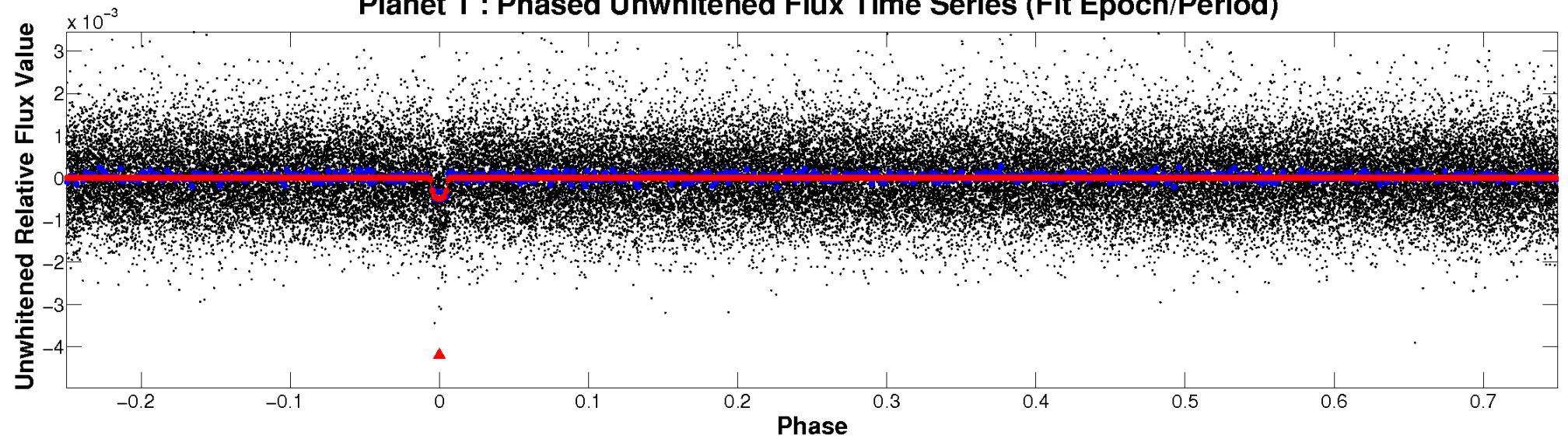
# ALT Odd/Even

TCE 009716391-01

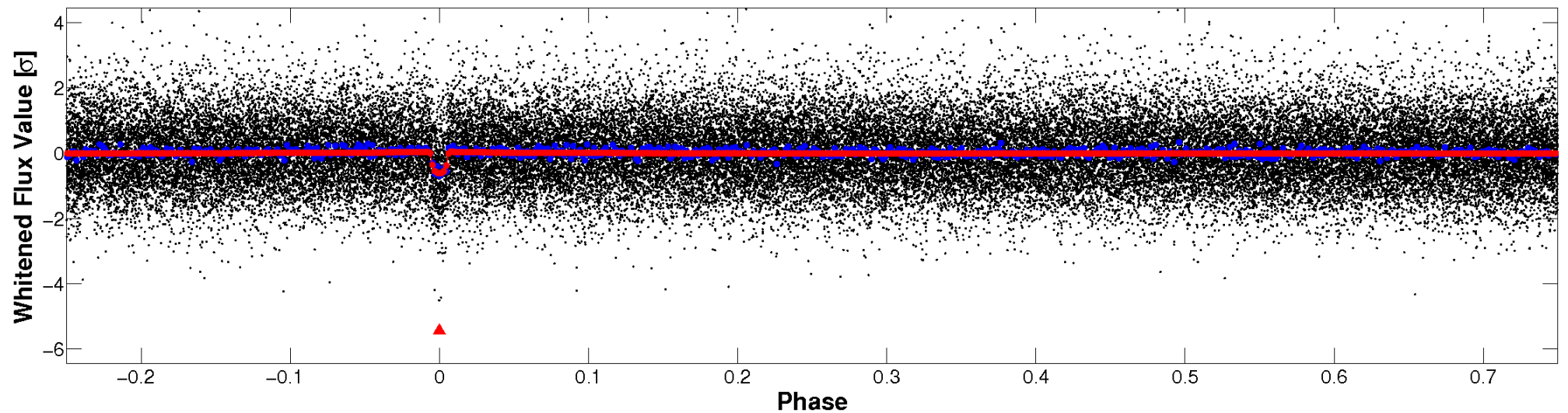


# Non-Whitened Vs. Whitened Light Curve

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

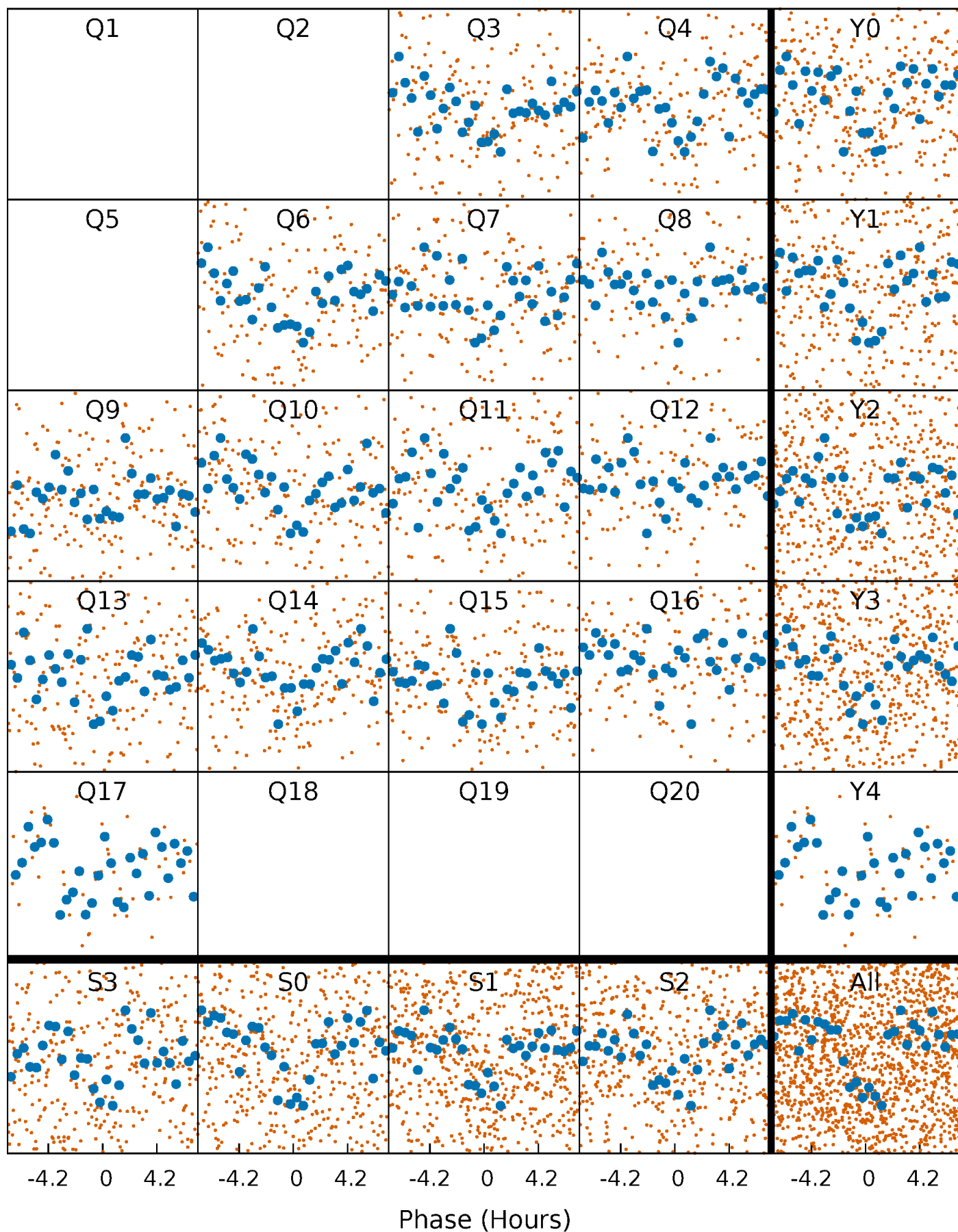


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

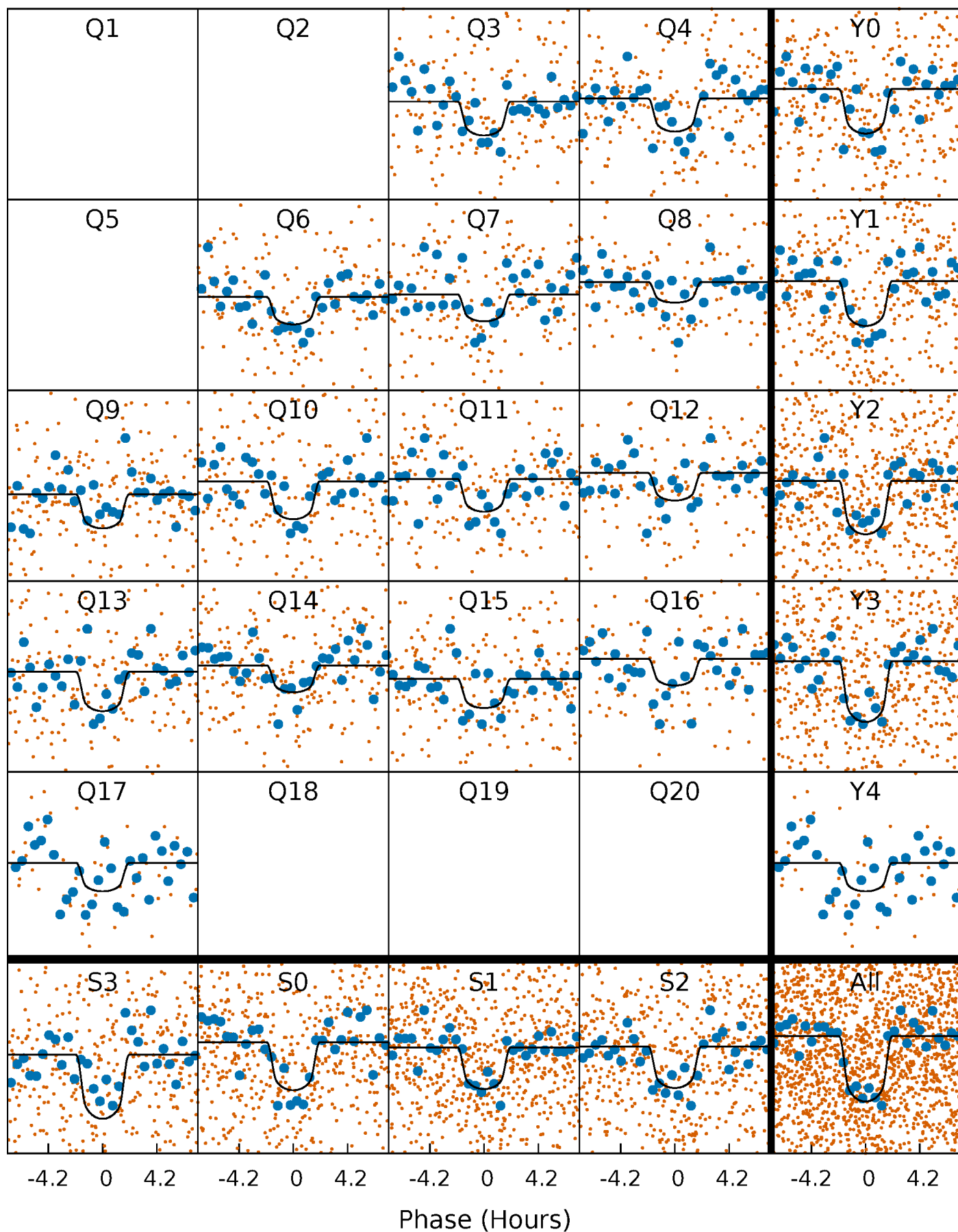
TCE 009716391-01 P= 13.182870 Days  $T_0=141.832519$  (BKJD)





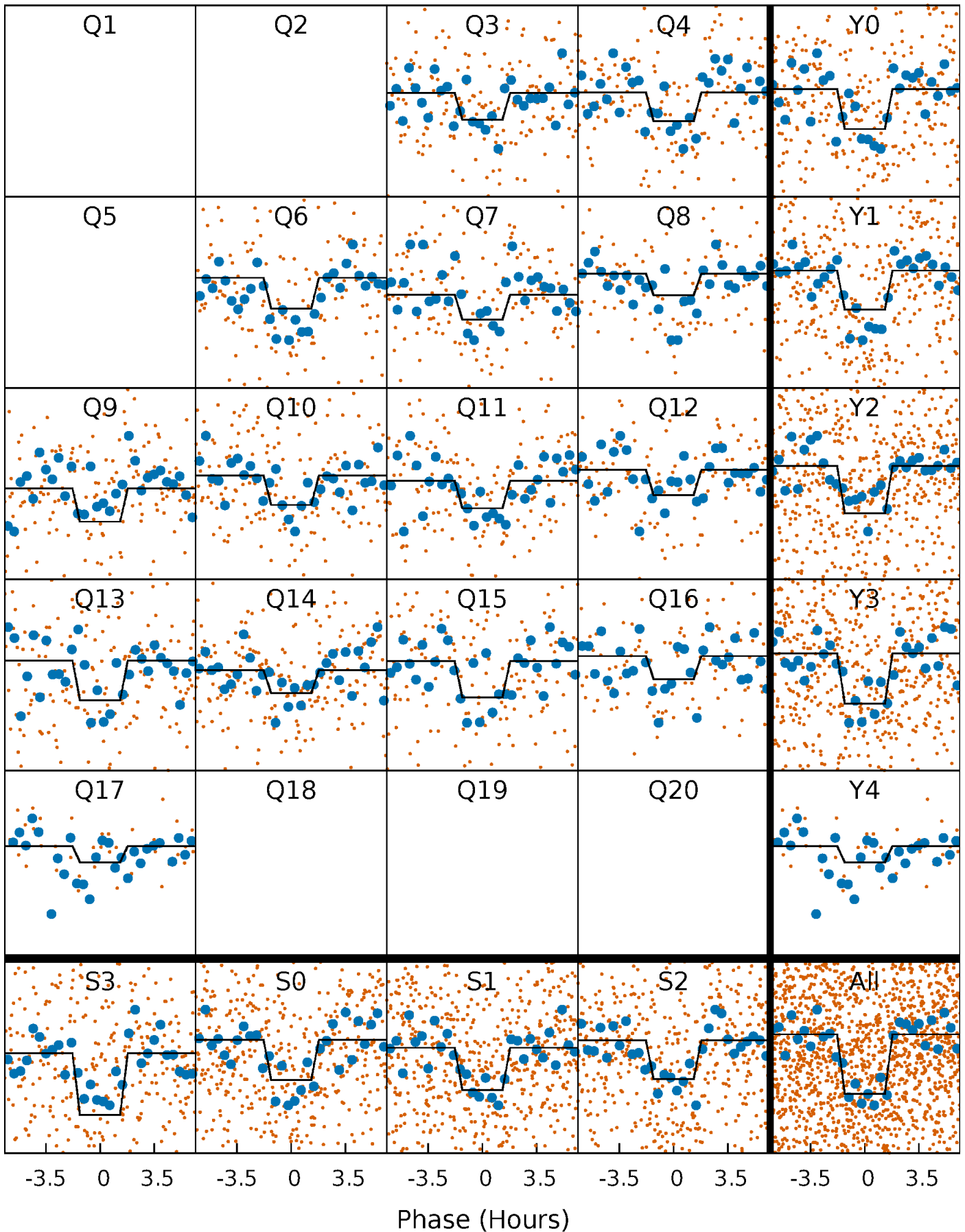
# DV Quarter-Phased Transit Curves

TCE 009716391-01 P= 13.182870 Days  $T_0=141.832519$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

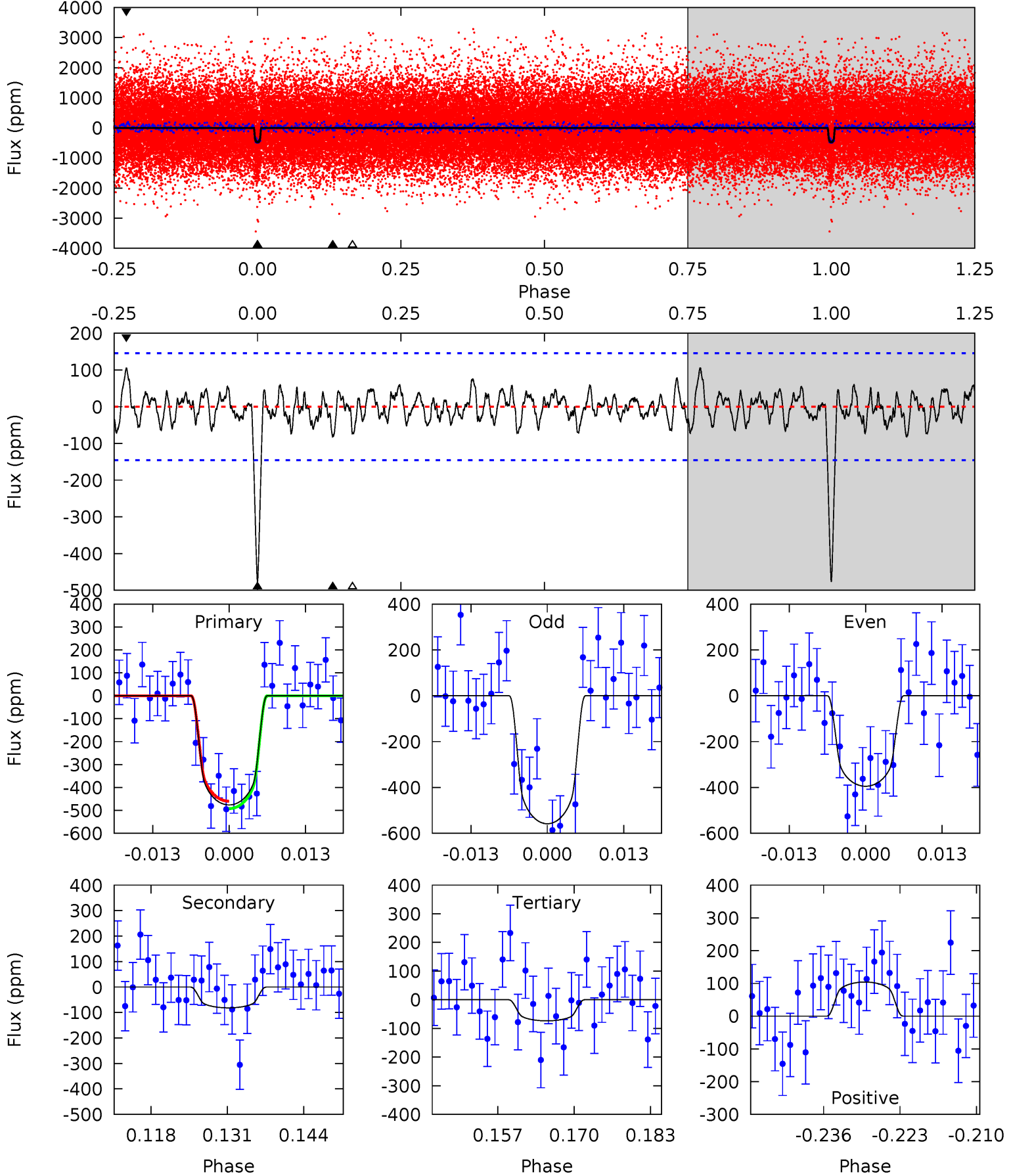
TCE 009716391-01 P= 13.182734 Days  $T_0=141.840185$  (BKJD)



# DV Model-Shift Uniqueness Test

009716391-01,  $P = 13.182870$  Days,  $E = 141.832519$  Days

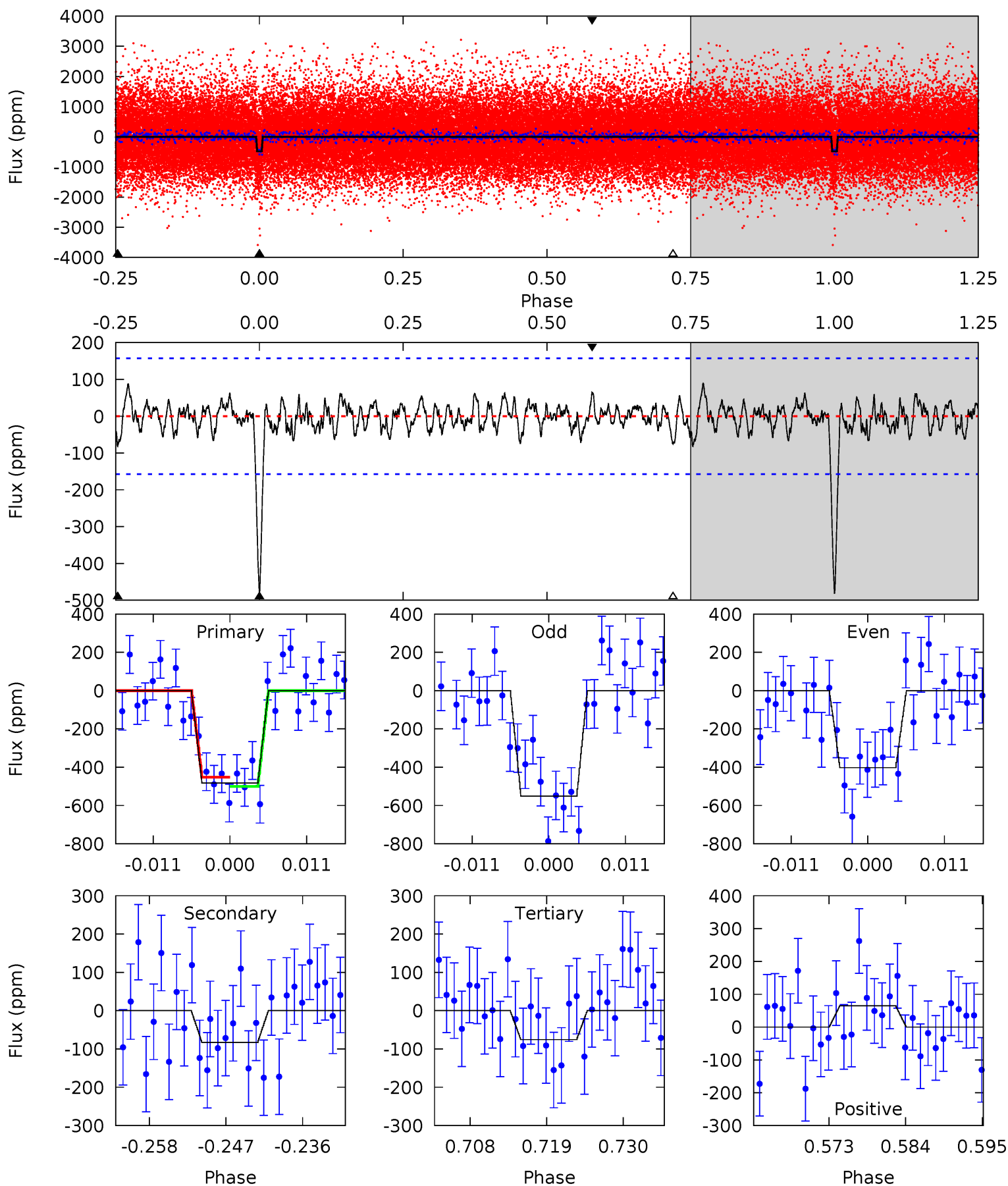
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.3	2.79	2.51	3.55	4.97	2.48	1.07	13.8	12.7	0.28	-0.77	2.80	0.94	0.18	0.55



# Alt Model-Shift Uniqueness Test

009716391-01,  $P = 13.182734$  Days,  $E = 141.840185$  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
15.3	2.63	2.40	2.07	5.00	2.54	0.92	12.9	13.3	0.23	0.56	2.36	0.99	0.16	0.76



### Stellar Parameters For KIC 009716391

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5382^{+167}_{-185}$	$4.571^{+0.025}_{-0.136}$	$0.100^{+0.250}_{-0.300}$	$0.827^{+0.161}_{-0.069}$	$0.928^{+0.064}_{-0.100}$	$2.310^{+0.407}_{-0.892}$
	+3%/-3%	+1%/-3%	+250%/-300%	+19%/-8%	+7%/-11%	+18%/-39%
Source	KIC0	KIC0	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 009716391-01 / KOI 3025.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-82 \pm 29$	$2.25^{+0.98}_{-1.04}$	$942^{+50}_{-40}$	$3691^{+885}_{-500}$	$97^{+244}_{-57}$
Alt.	$-83 \pm 31$	$2.01^{+1.04}_{-0.91}$	$943^{+48}_{-39}$	$3827^{+987}_{-537}$	$124^{+292}_{-76}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = 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

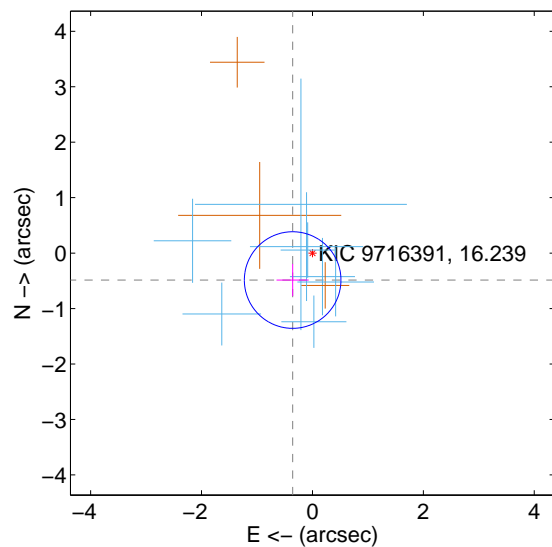
Supplemental centroid analysis for 009716391-01. Kepler magnitude: 16.24. Transit SNR 12.42

There are 8 quarters with good PRF difference image offsets

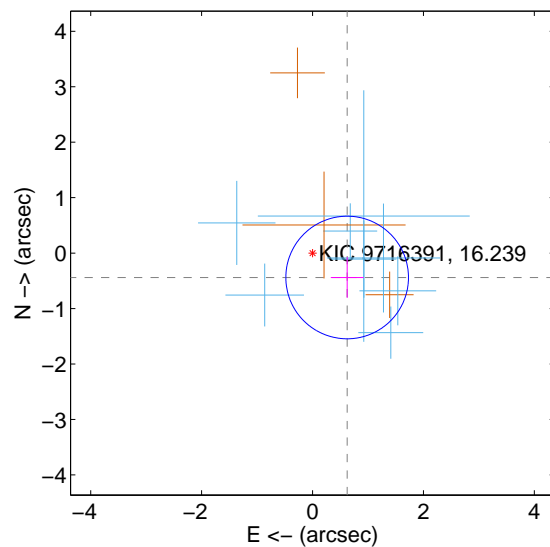
The direct PRF centroid is offset from the target star catalog position by about 1.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.603 \pm 0.290$	2.08	$0.357 \pm 0.291$	$-0.486 \pm 0.290$
PRF-fit source offset from KIC position	$0.764 \pm 0.369$	2.07	$-0.625 \pm 0.295$	$-0.440 \pm 0.367$
photometric centroid source offset	$1.37 \pm 0.76$	1.81	$-0.24 \pm 0.76$	$-1.35 \pm 0.76$

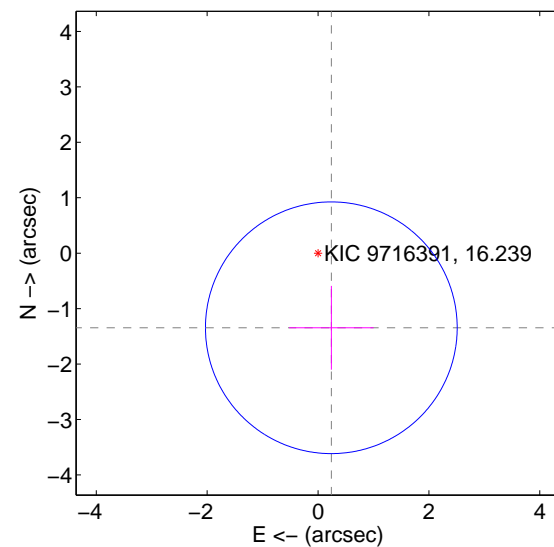
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

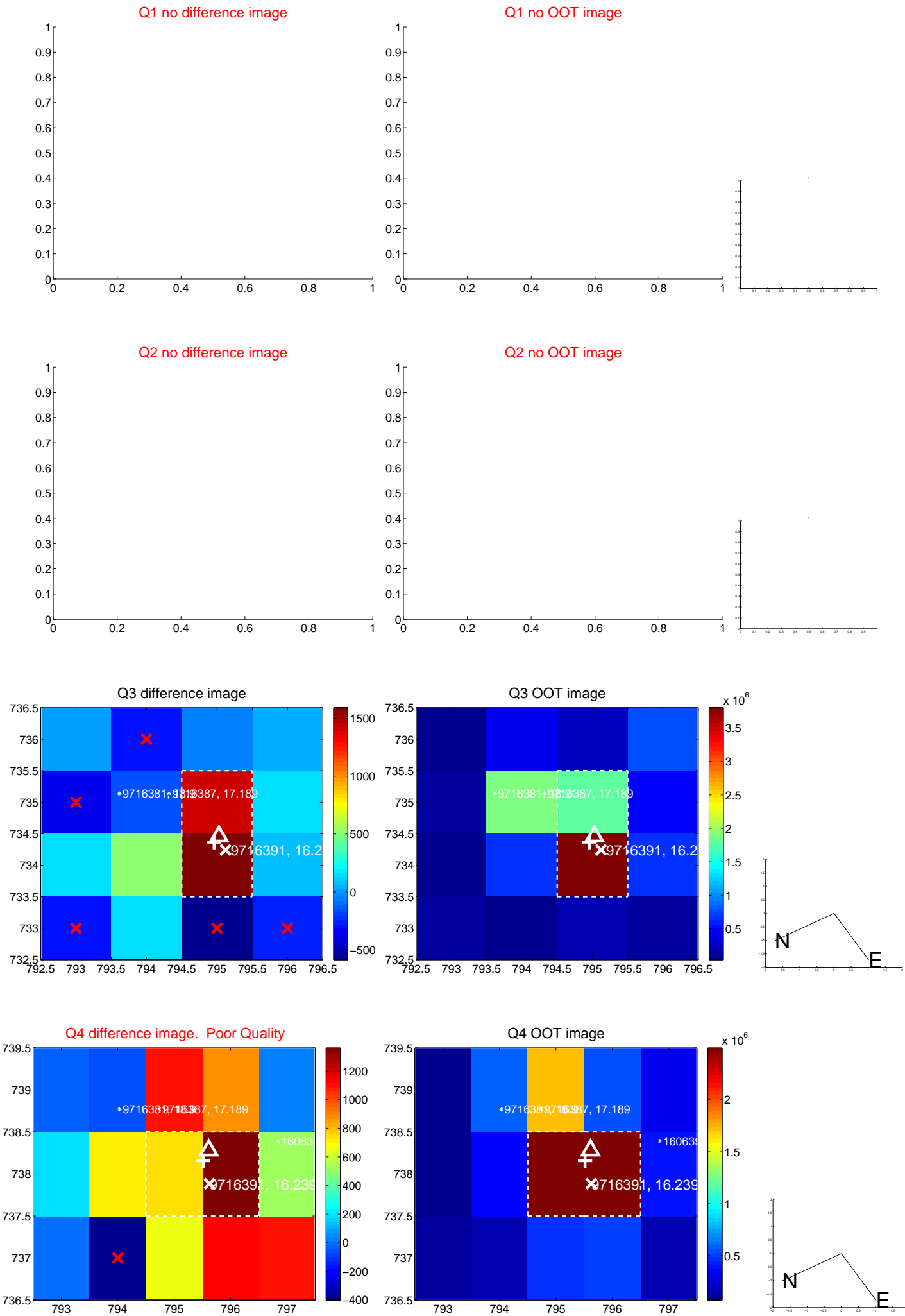


offset from photometric centroids

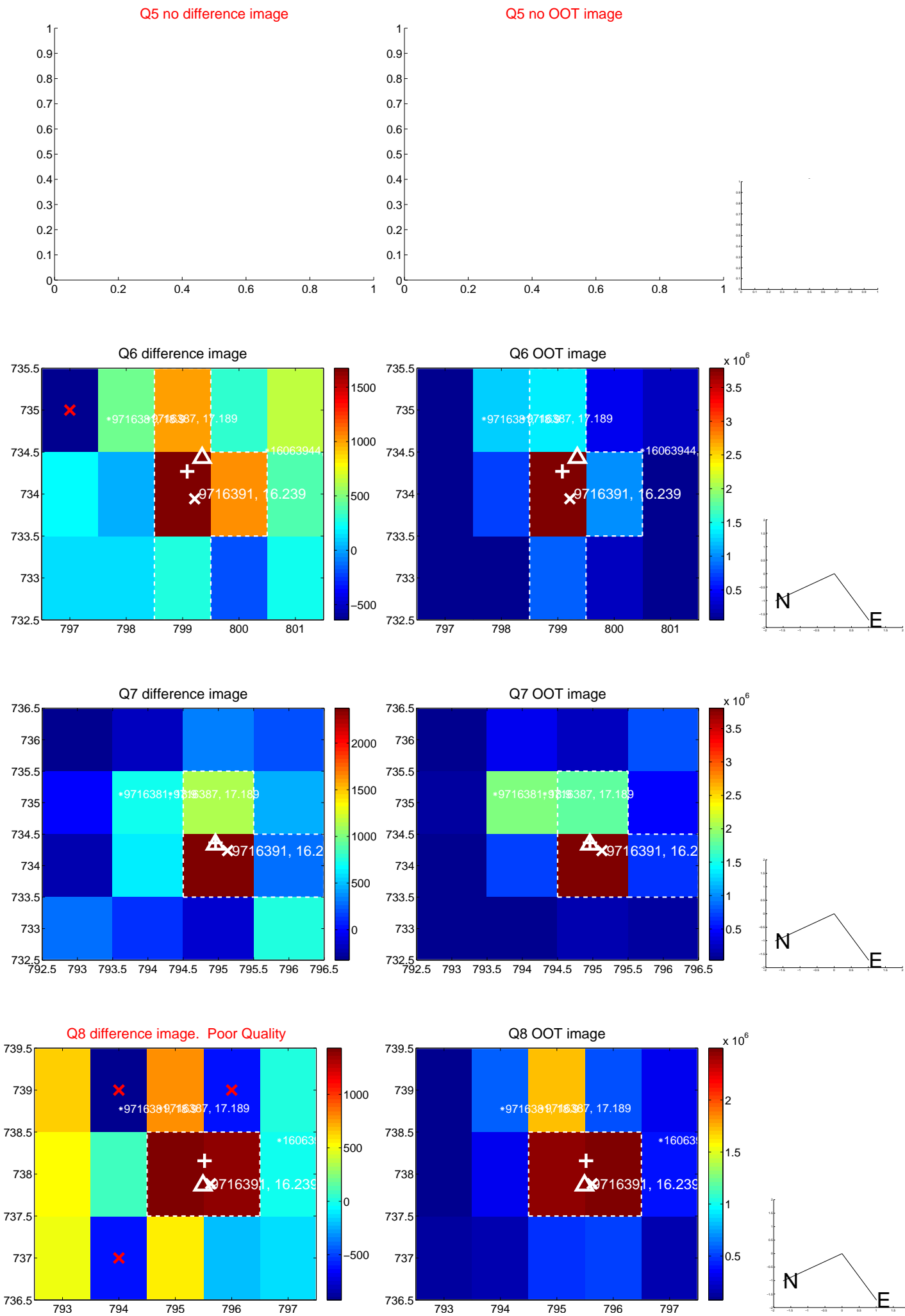


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

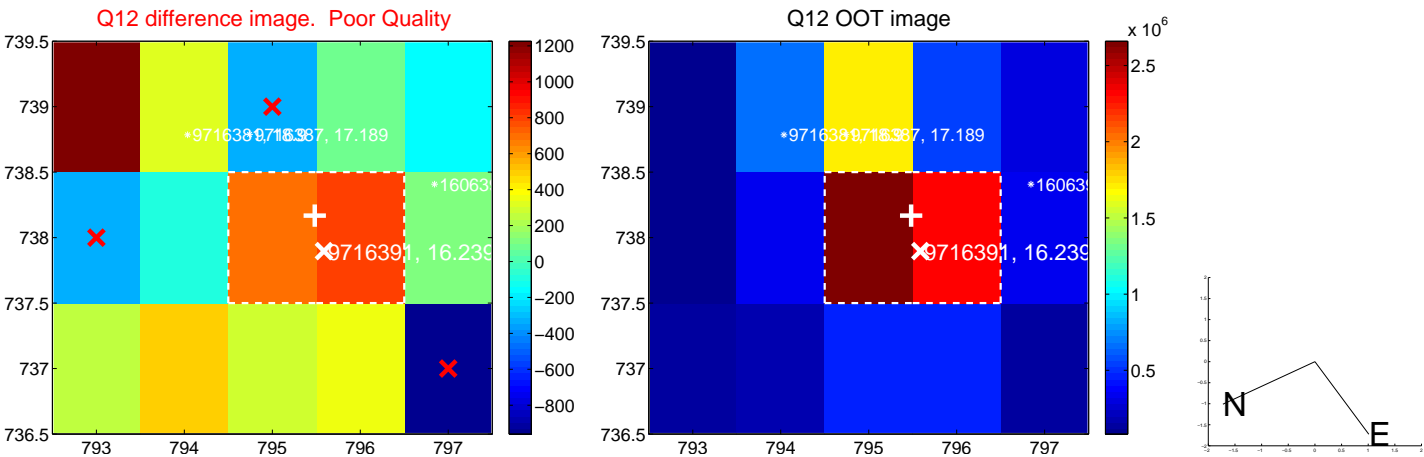
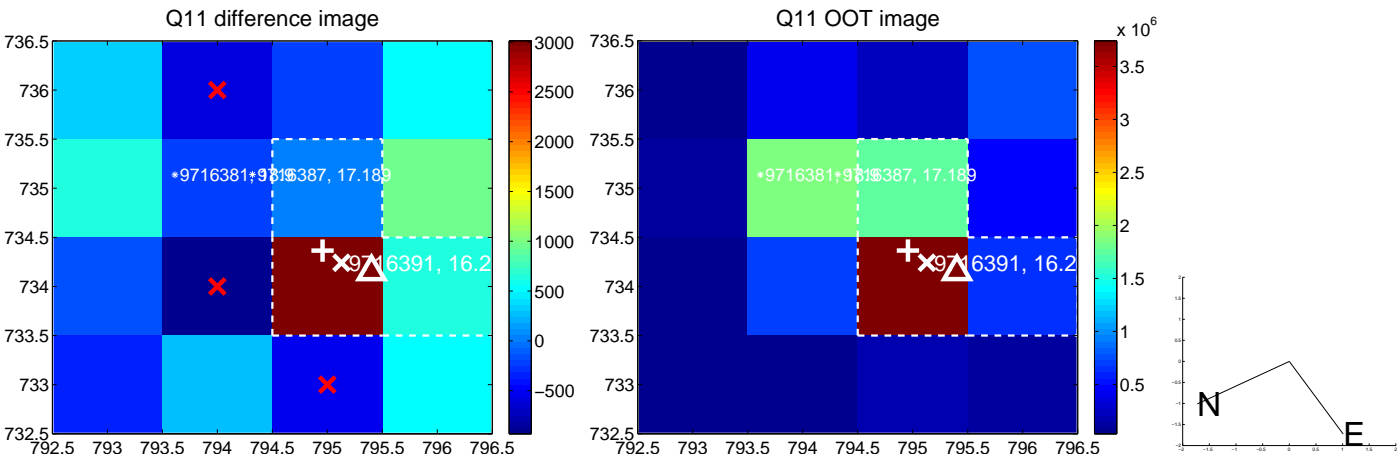
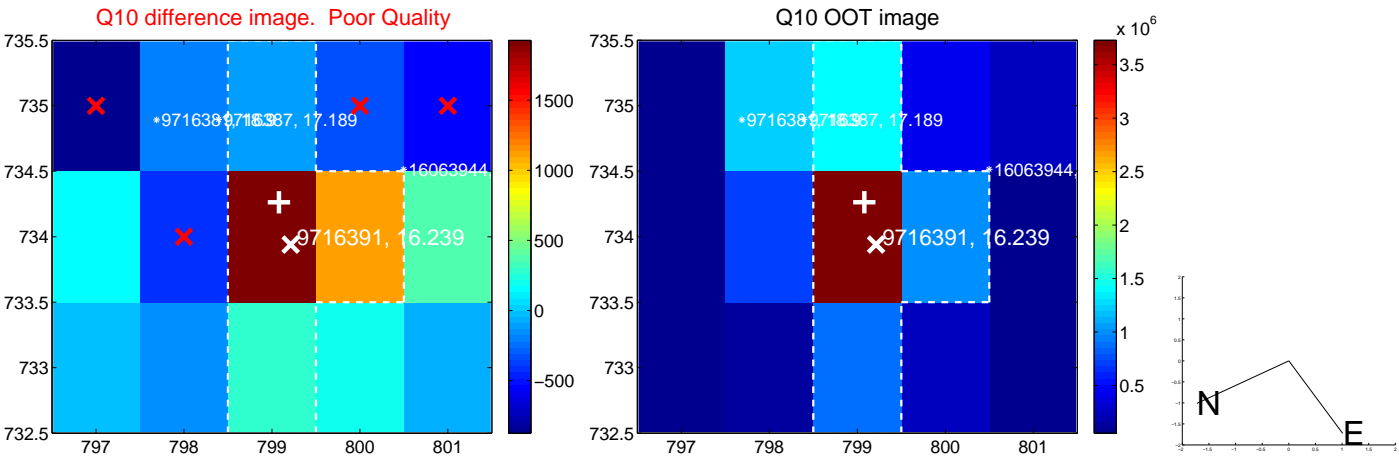
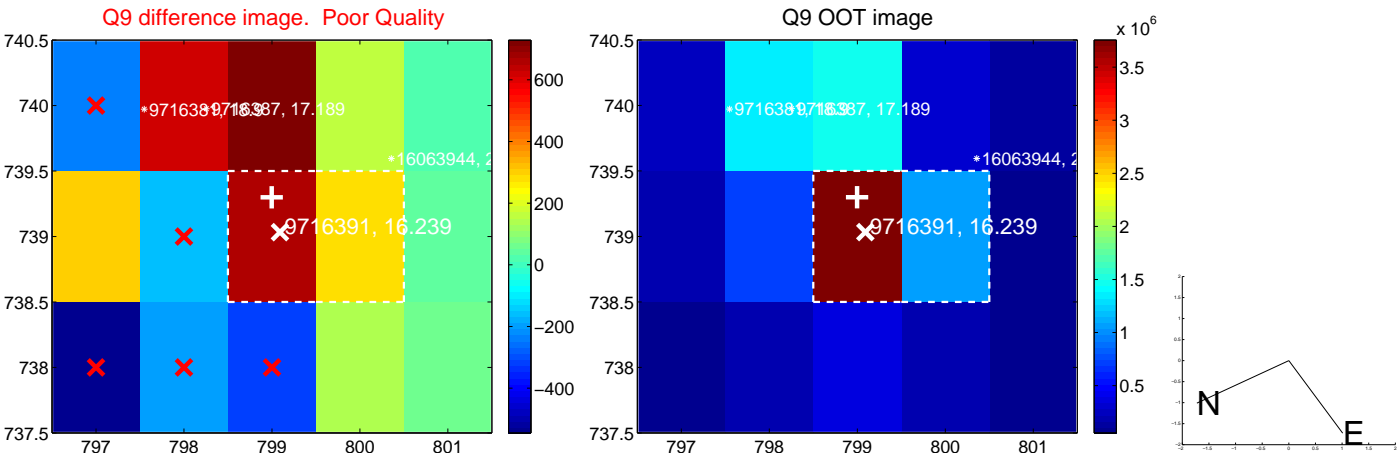
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



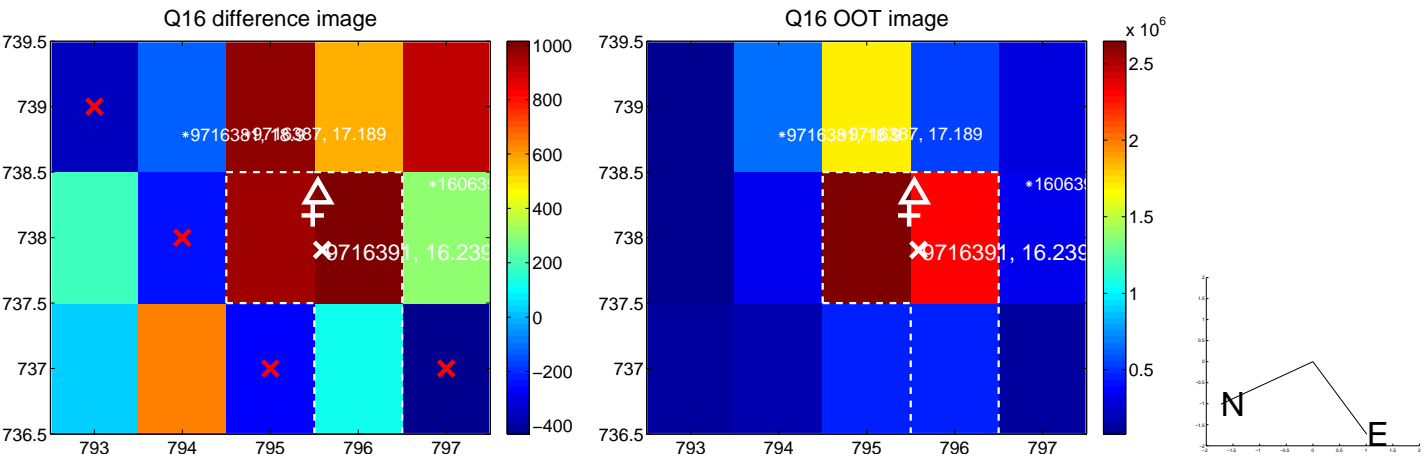
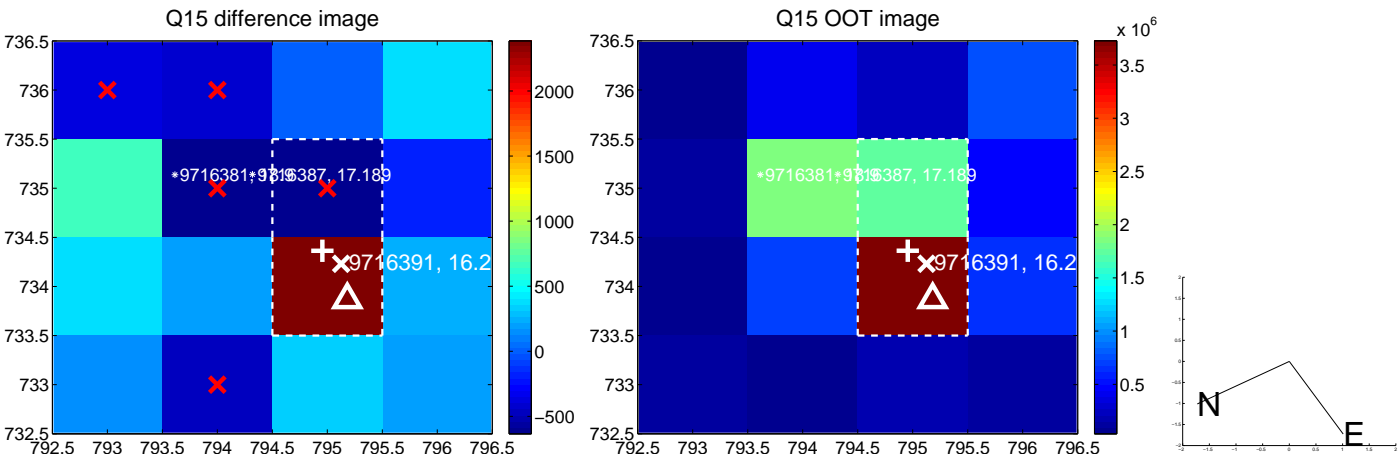
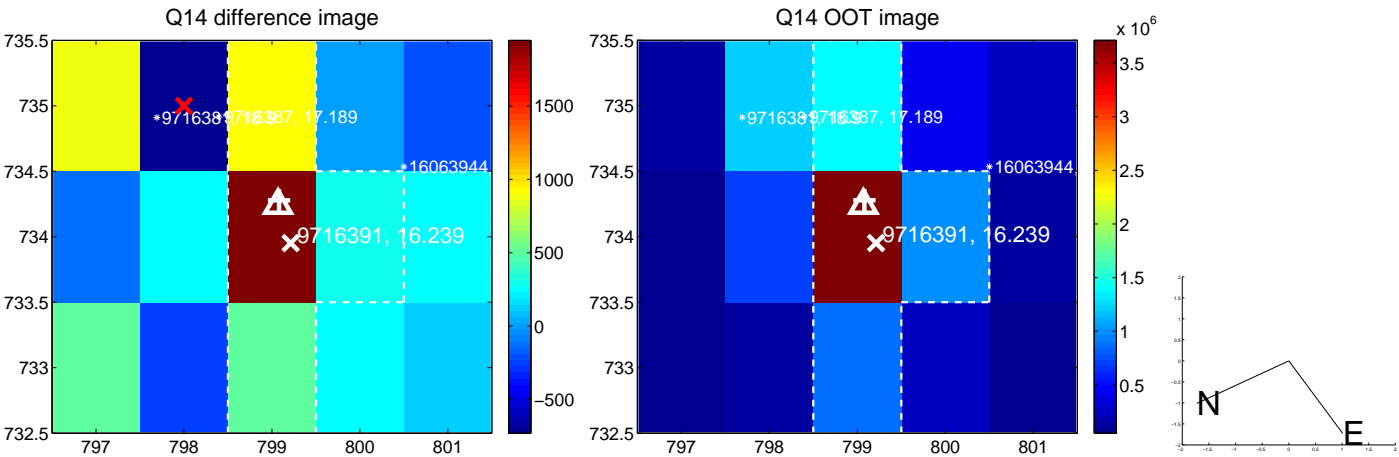
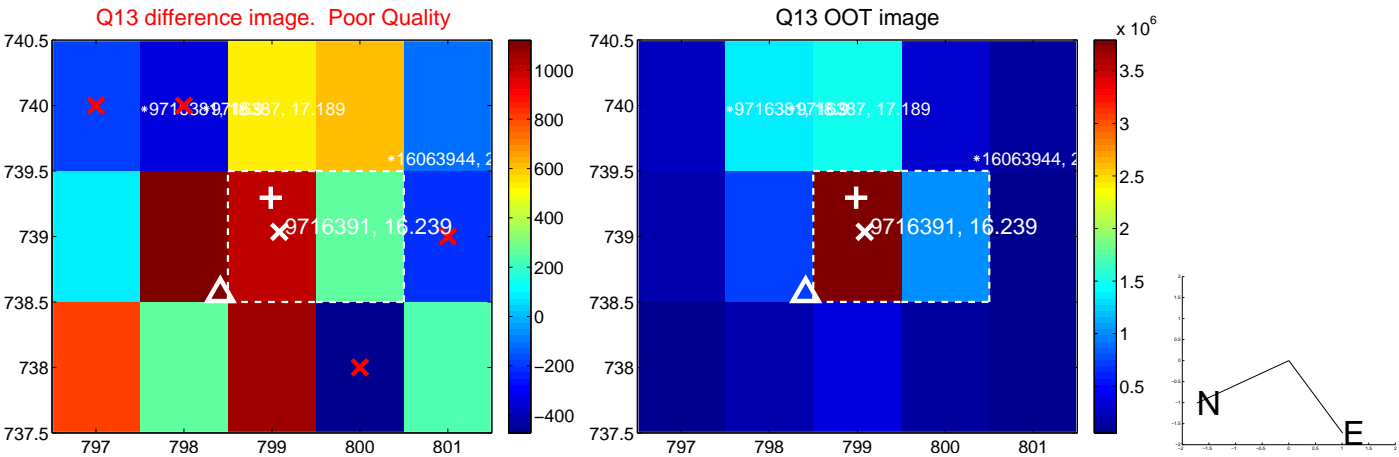
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

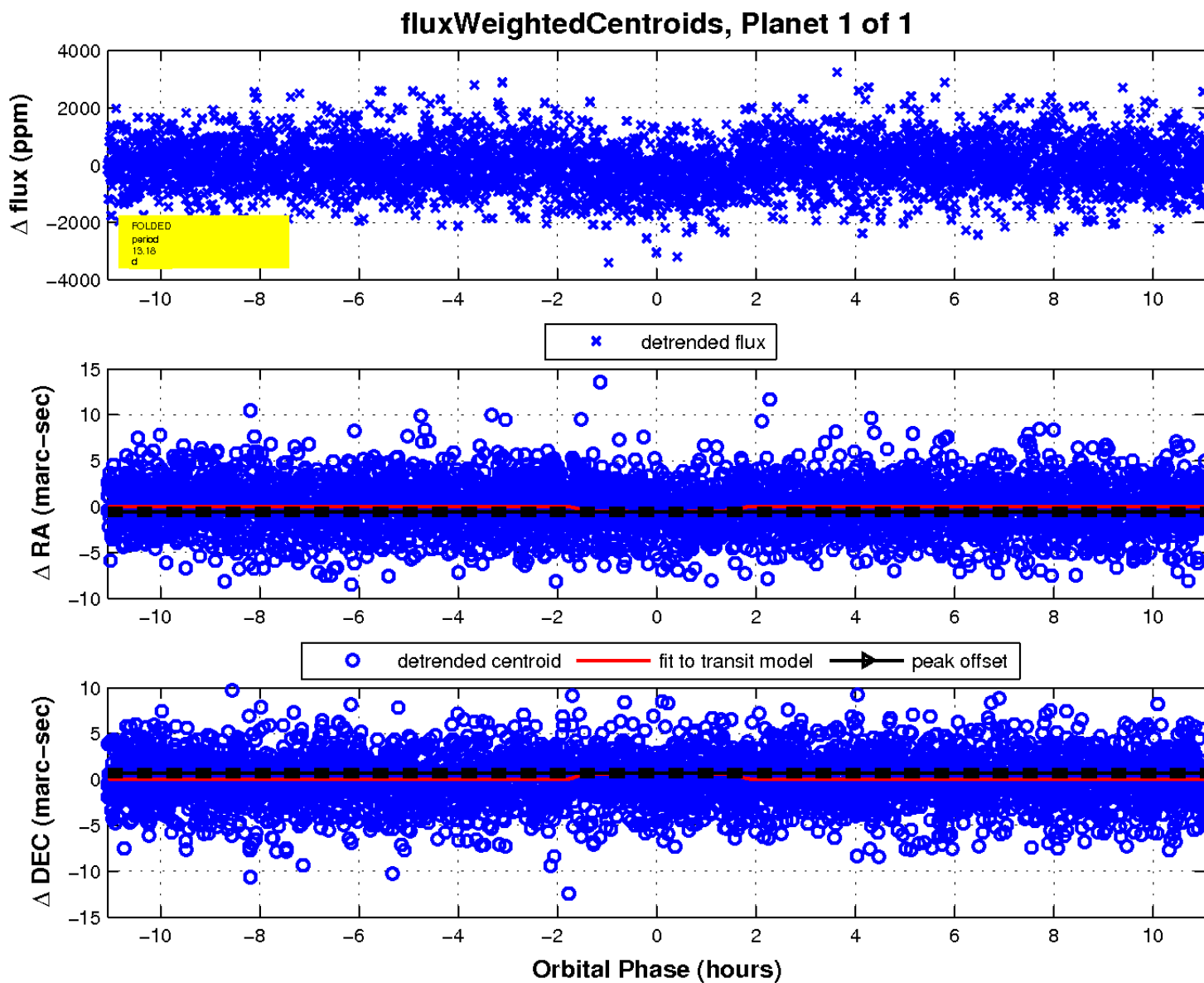
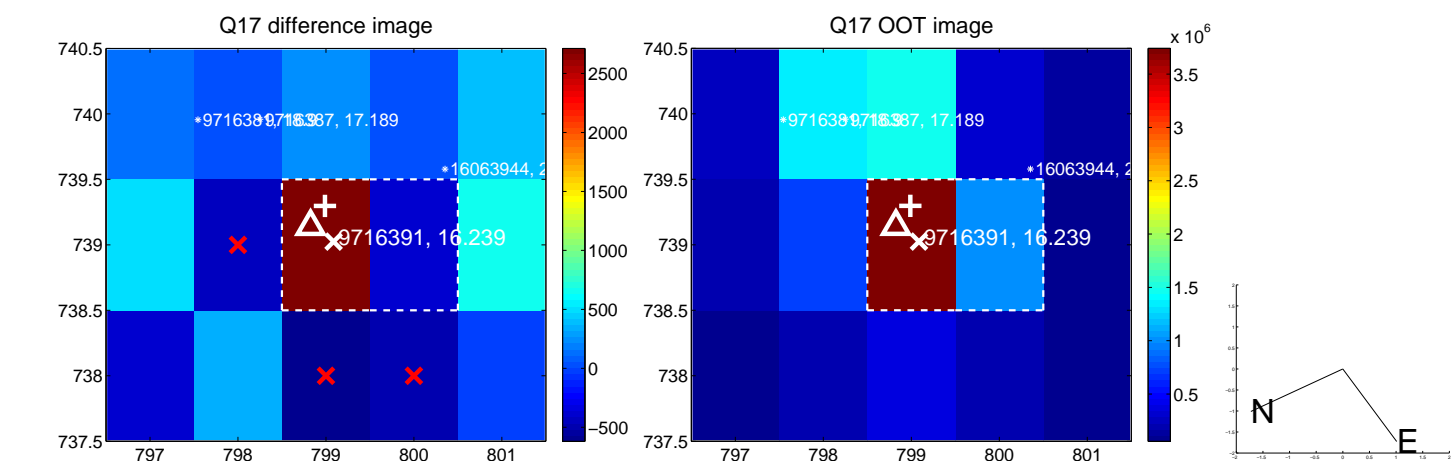


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

