

# KIC 004138008

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004138008-01	OBS	4742.01	112.303409	230.433602	512.0	5.852	12.9	12.0	0.59	4401	1.39	0.79

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004138008-01	OBS	PC	0.99	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.

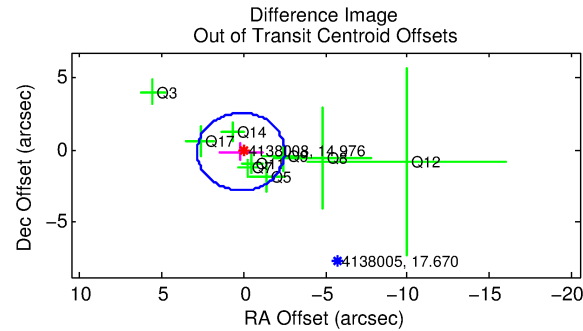
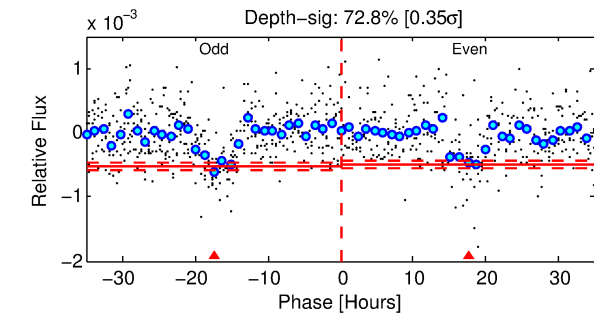
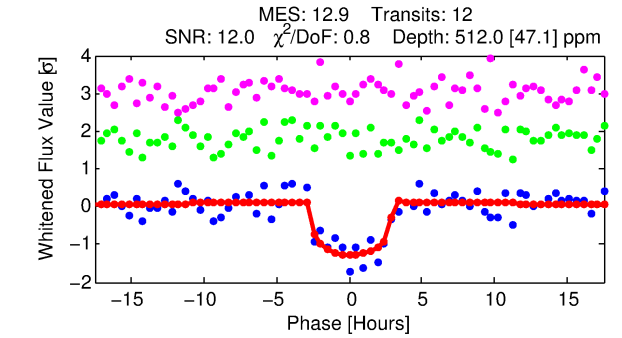
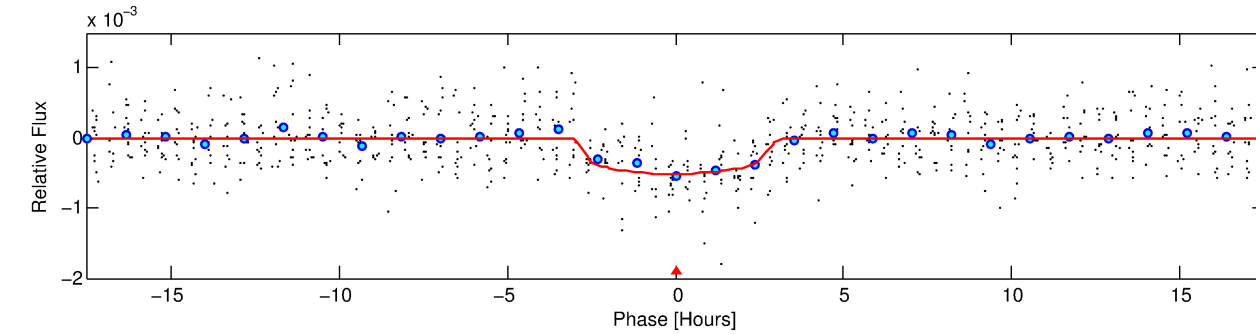
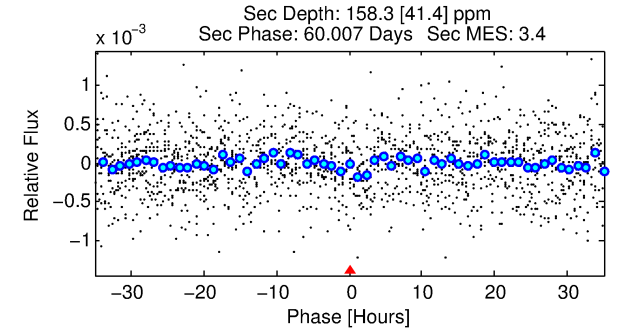
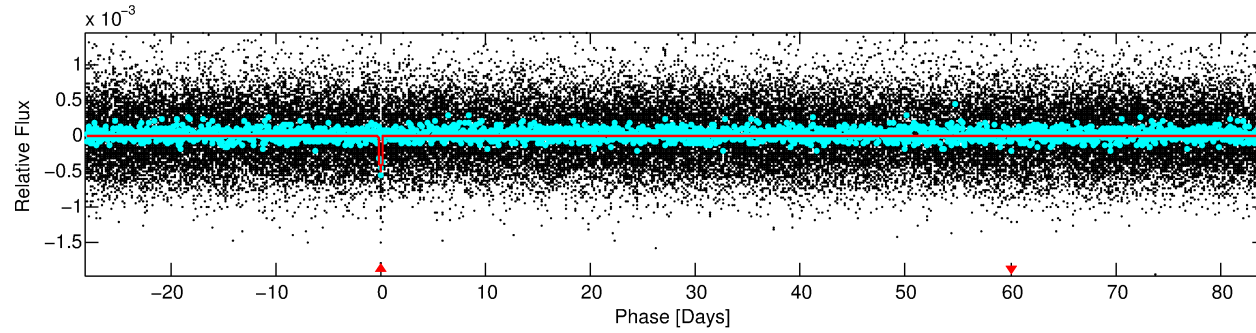
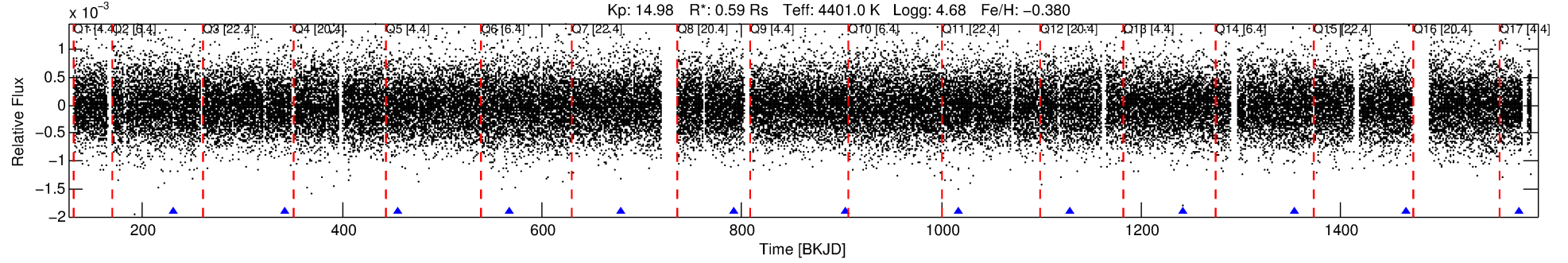
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004138008-01

No Significant Match Found

# DV One-Page Summary

KIC: 4138008 Candidate: 1 of 1 Period: 112.303 d  
KOI: K04742.01 Name: Kepler-442b Corr: 0.951



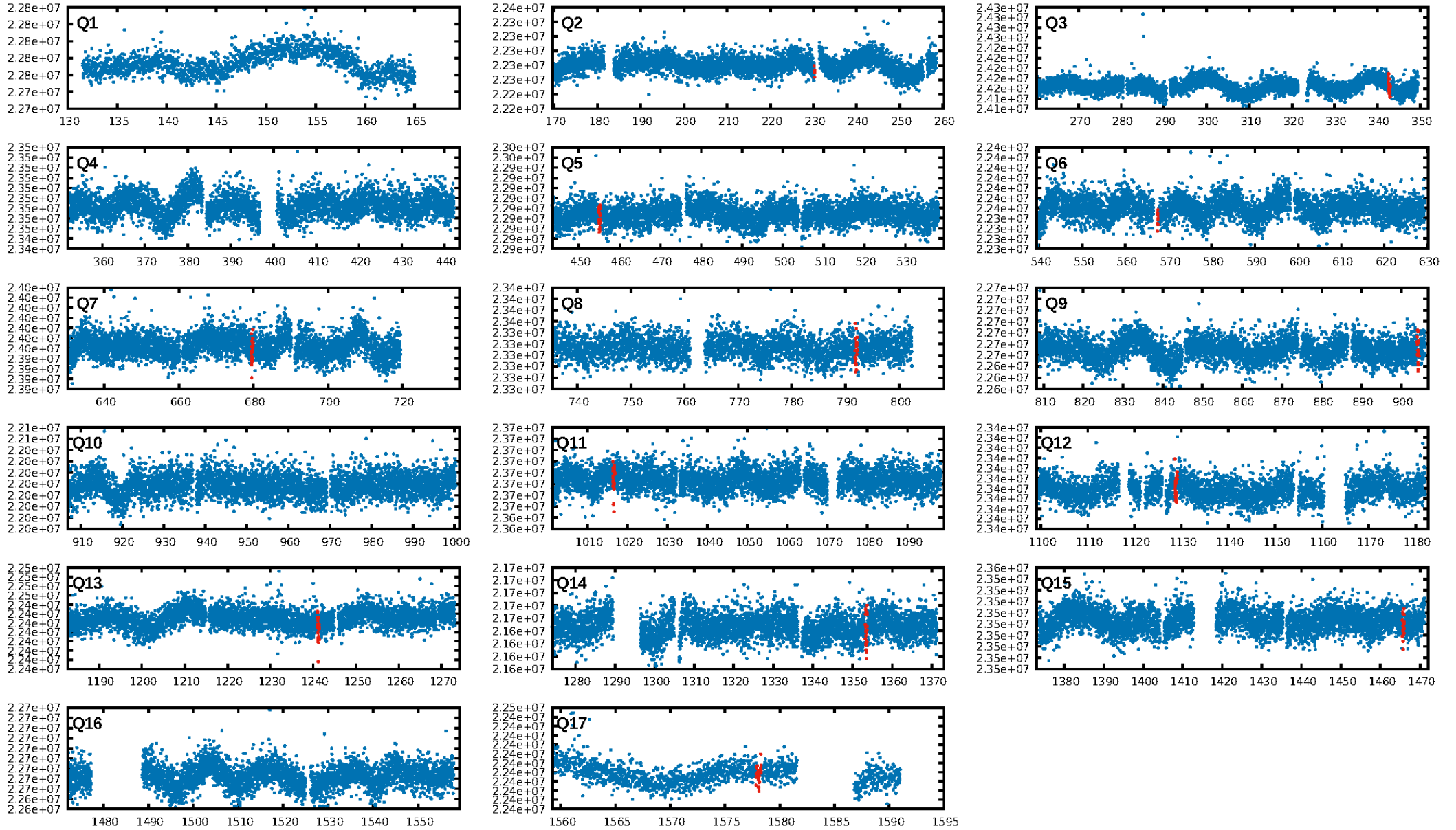
## DV Fit Results:

Period = 112.30341 [0.00125] d  
Epoch = 230.4336 [0.0095] BKJD  
Rp/R\* = 0.0214 [0.0185]  
a/R\* = 120.56 [354.35]  
b = 0.61 [3.13]  
Seff = 0.79 [0.07]  
Teff = 241 [5] K  
Rp = 1.39 [1.20] Re  
a = 0.3872 [0.0153] AU  
Ag = 6736.51 [11735.97] [0.57 $\sigma$ ]  
Teffp = 3371 [1469] K [2.13 $\sigma$ ]

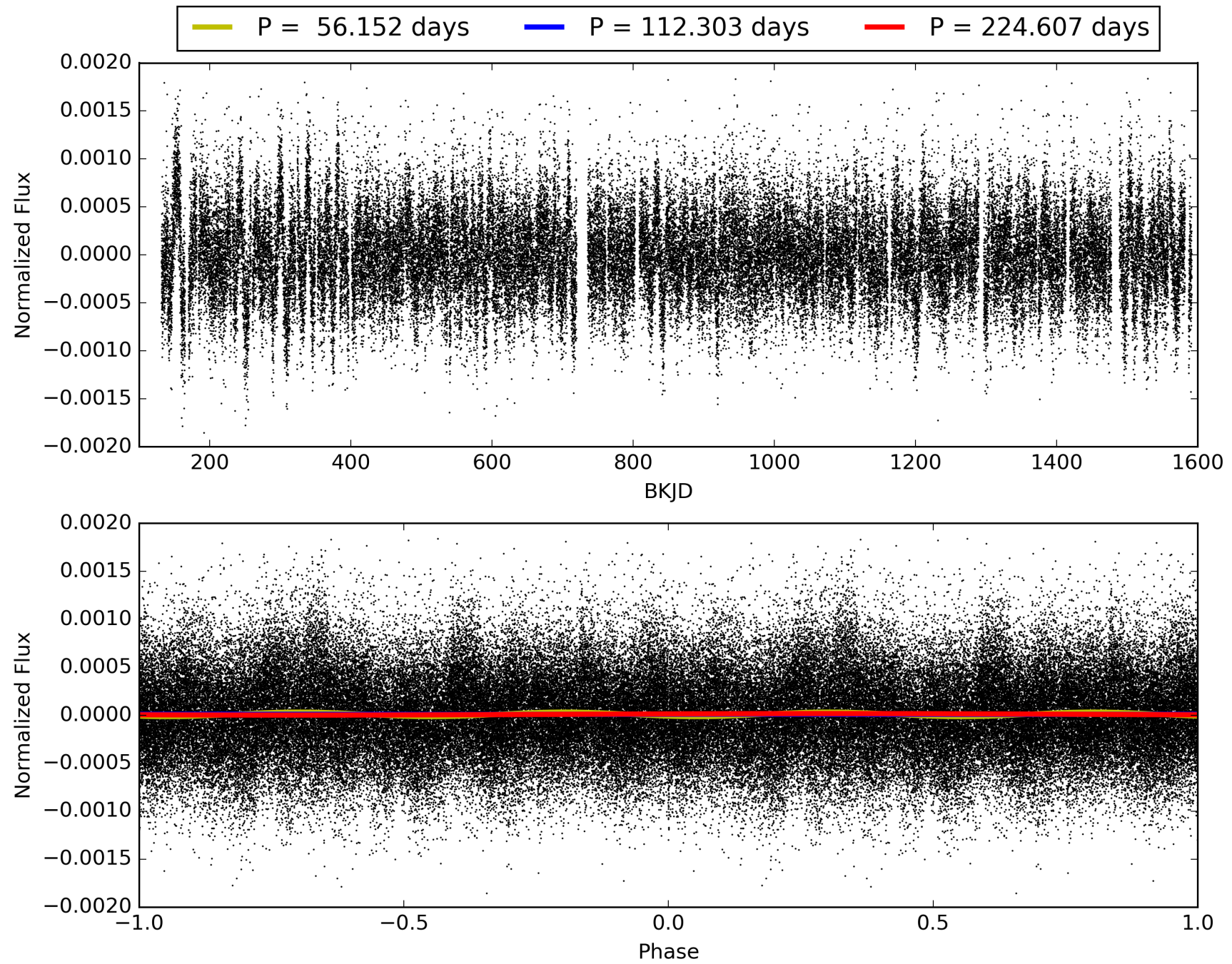
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 96.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.15e-40  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: 125.6  
Centroid-sig: 30.8%  
Centroid-so: 0.734 arcsec [0.65 $\sigma$ ]  
OotOffset-rm: 0.187 arcsec [0.21 $\sigma$ ]  
KicOffset-rm: 0.498 arcsec [0.59 $\sigma$ ]  
OotOffset-st: 1/3/2/3 [9]  
KicOffset-st: 1/3/2/3 [9]  
DiffImageQuality-fgm: 0.56 [5/9]  
DiffImageOverlap-fno: 1.00 [10/10]

# TCE 004138008-01, PDC Light Curves

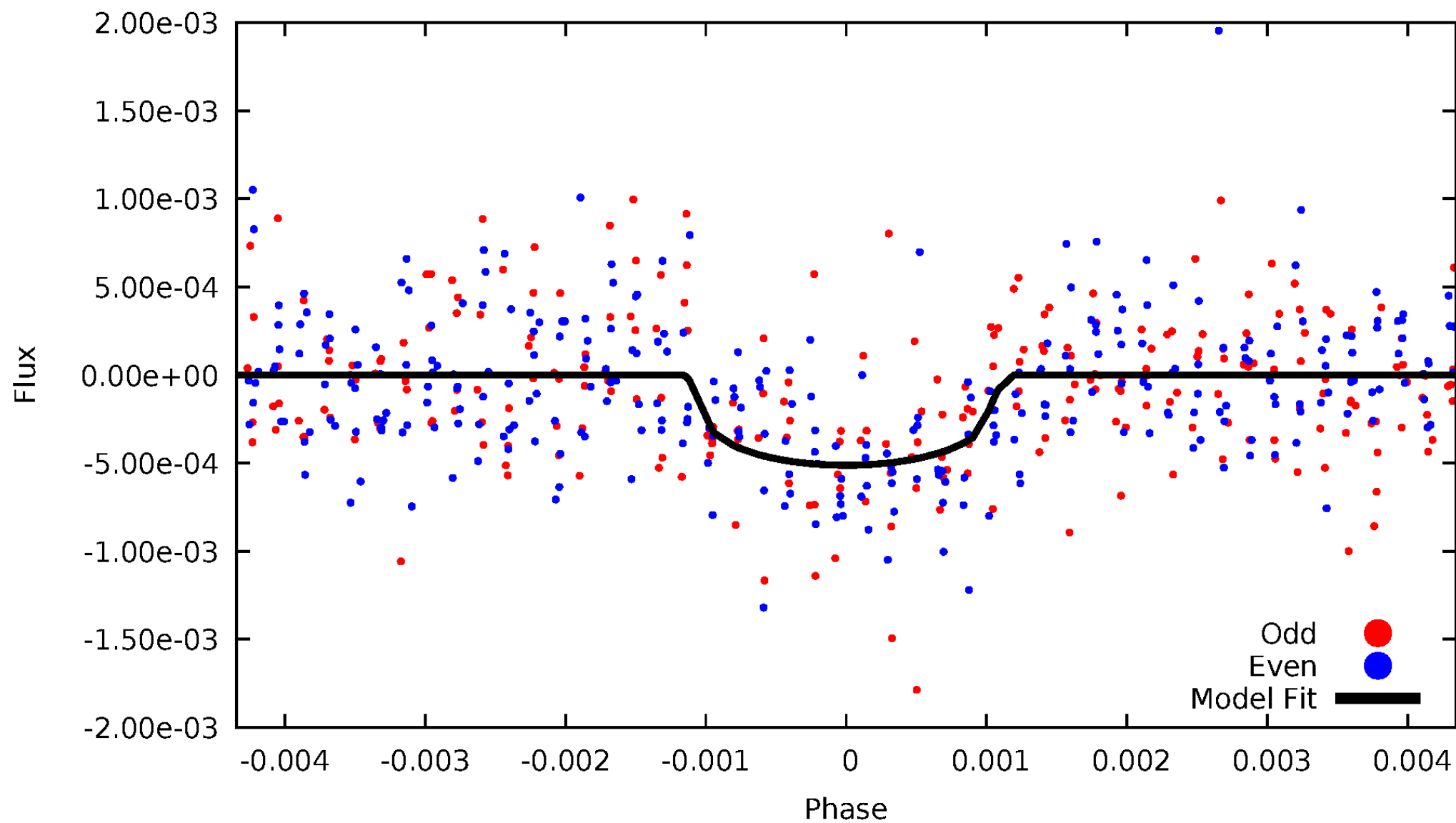


# TCE 004138008-01



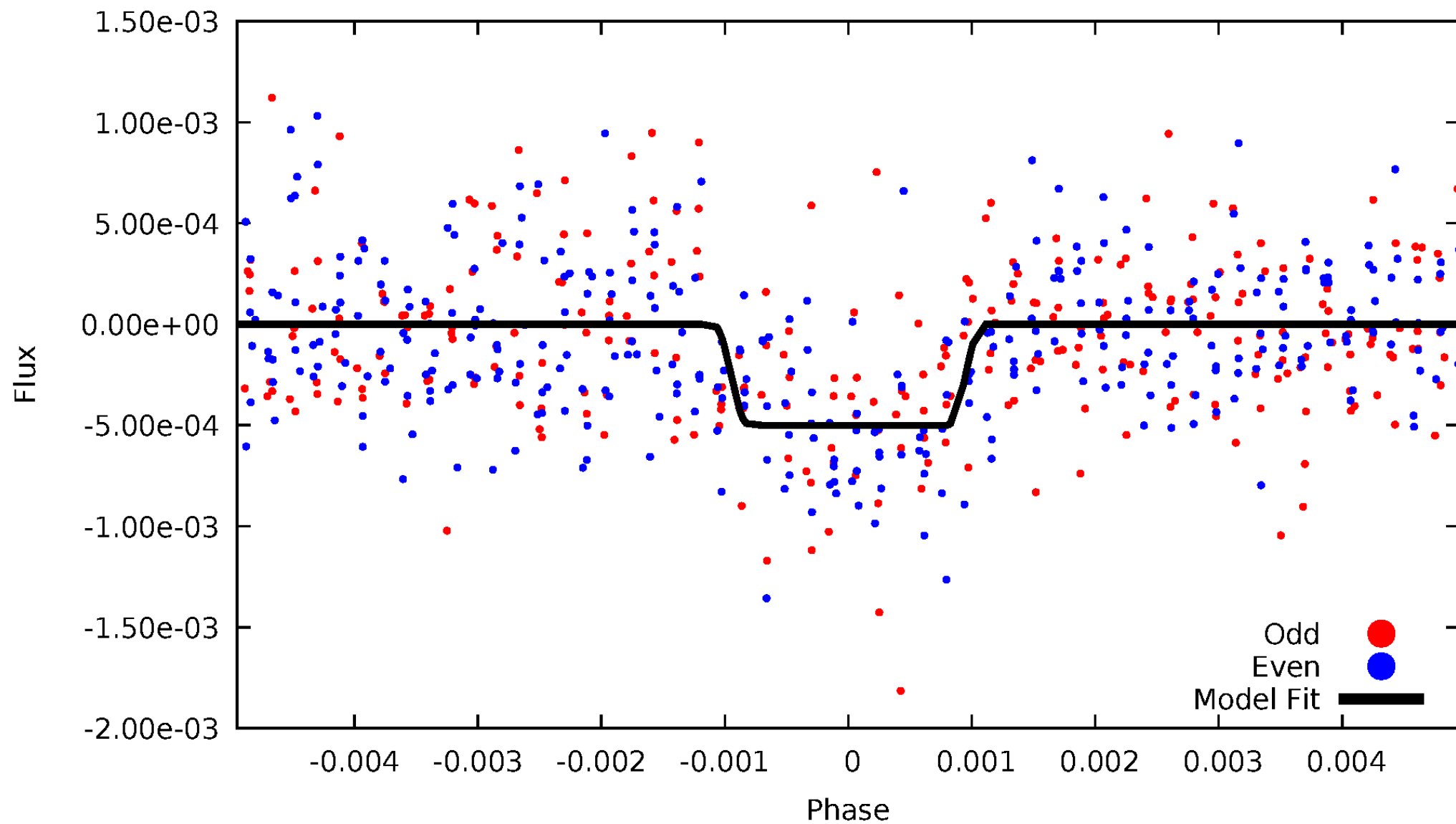
# DV Odd/Even

TCE 004138008-01



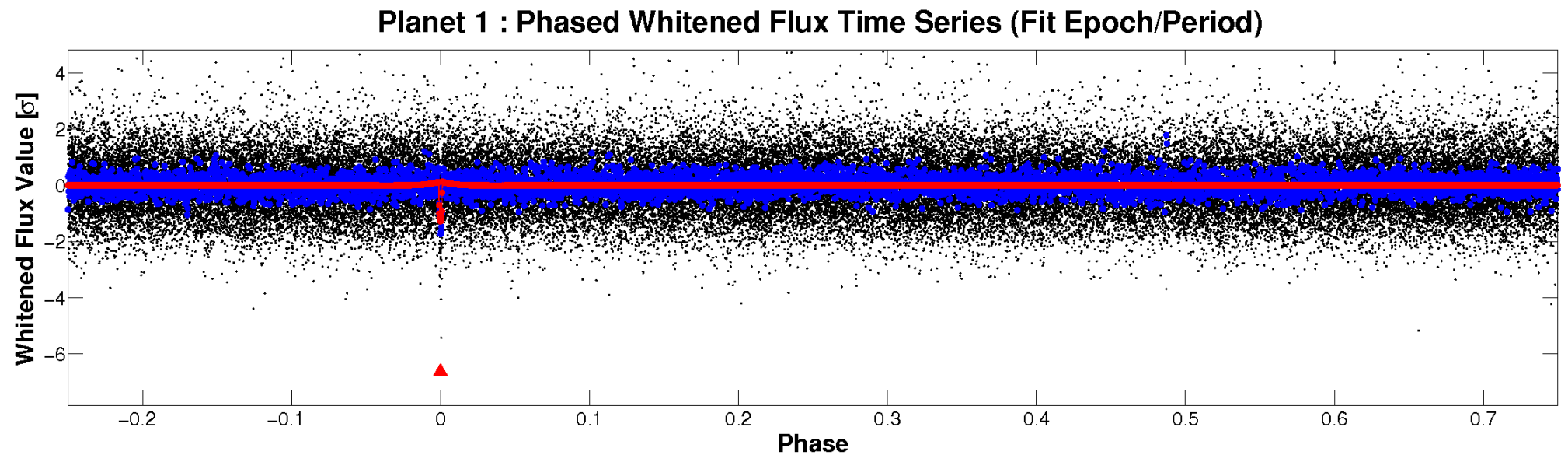
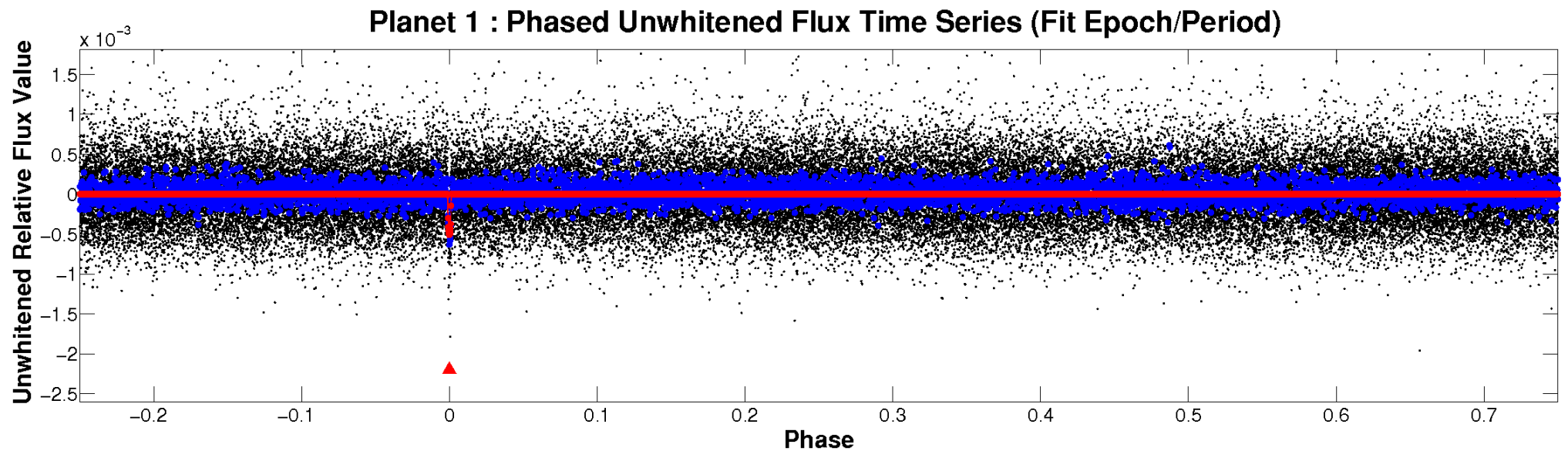
# ALT Odd/Even

TCE 004138008-01



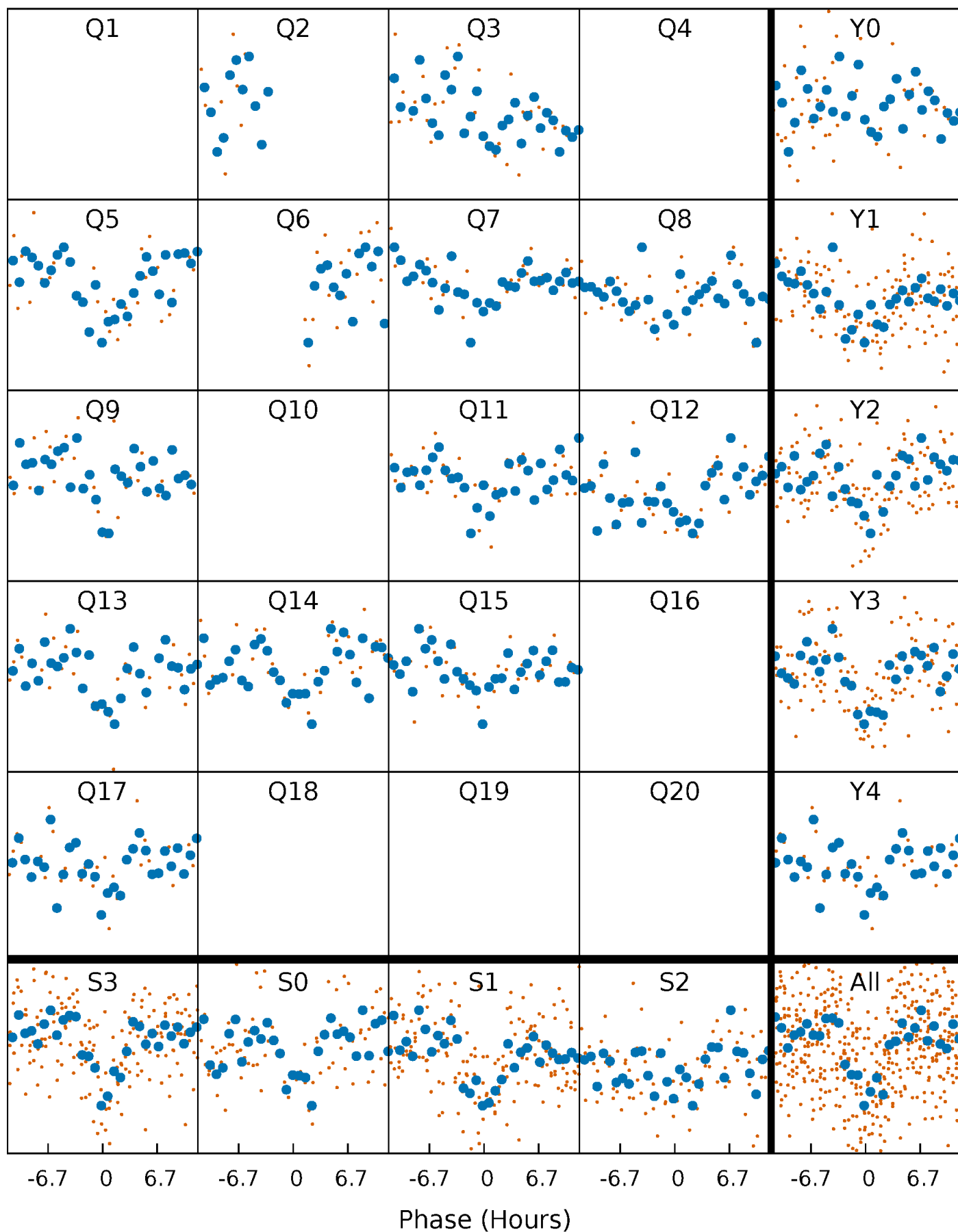


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

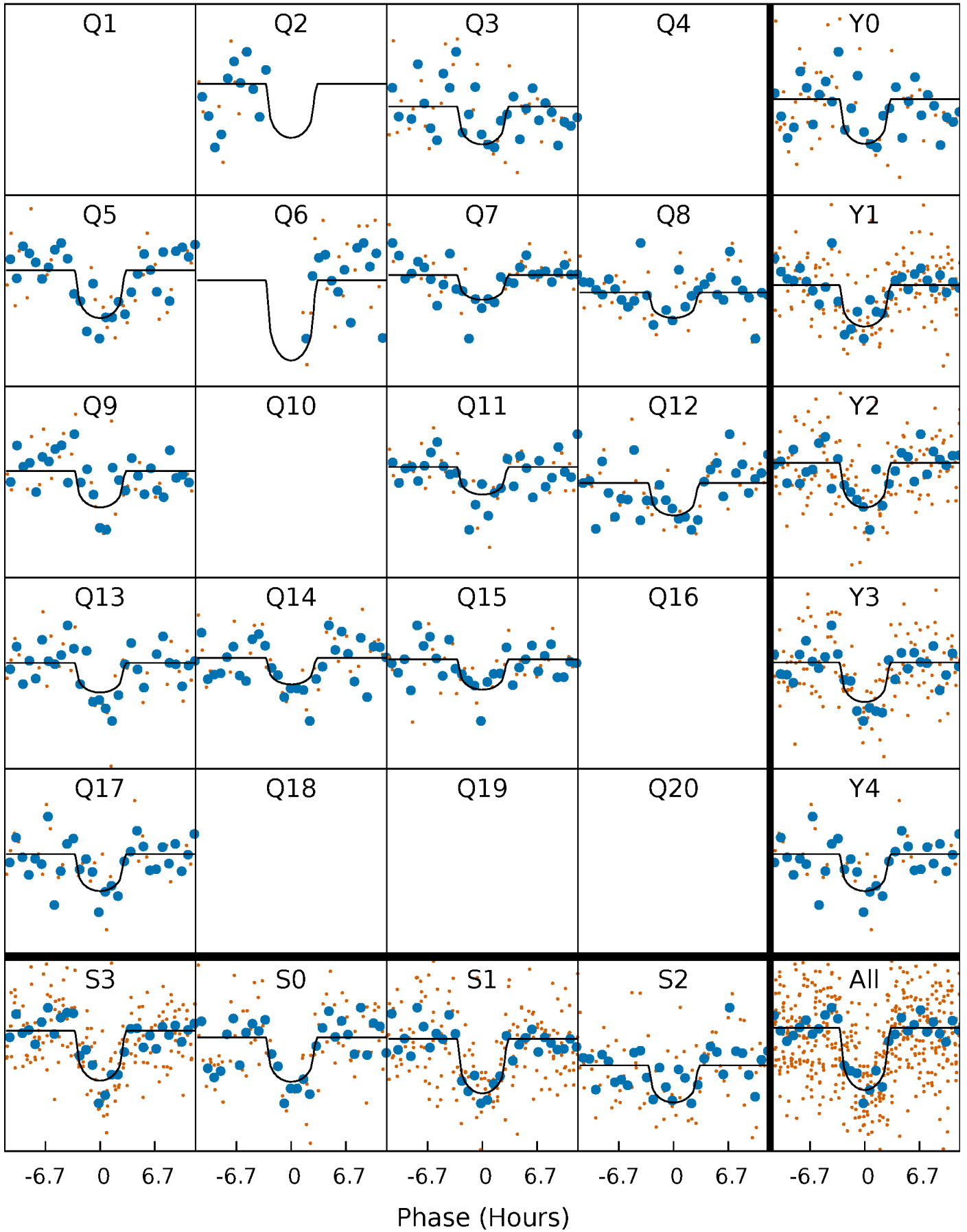
TCE 004138008-01 P=112.303409 Days  $T_0=230.433602$  (BKJD)





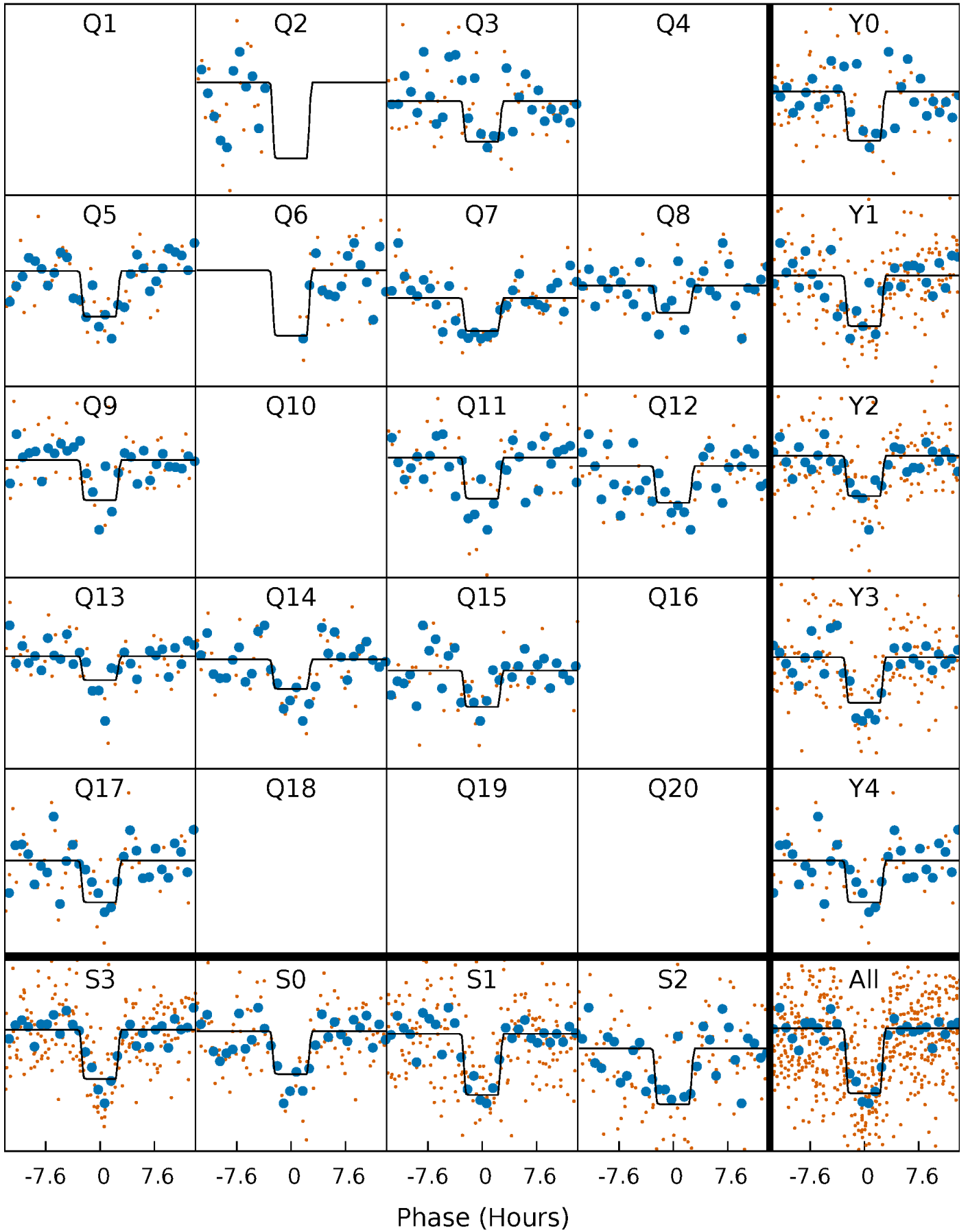
# DV Quarter-Phased Transit Curves

TCE 004138008-01 P=112.303409 Days  $T_0=230.433602$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

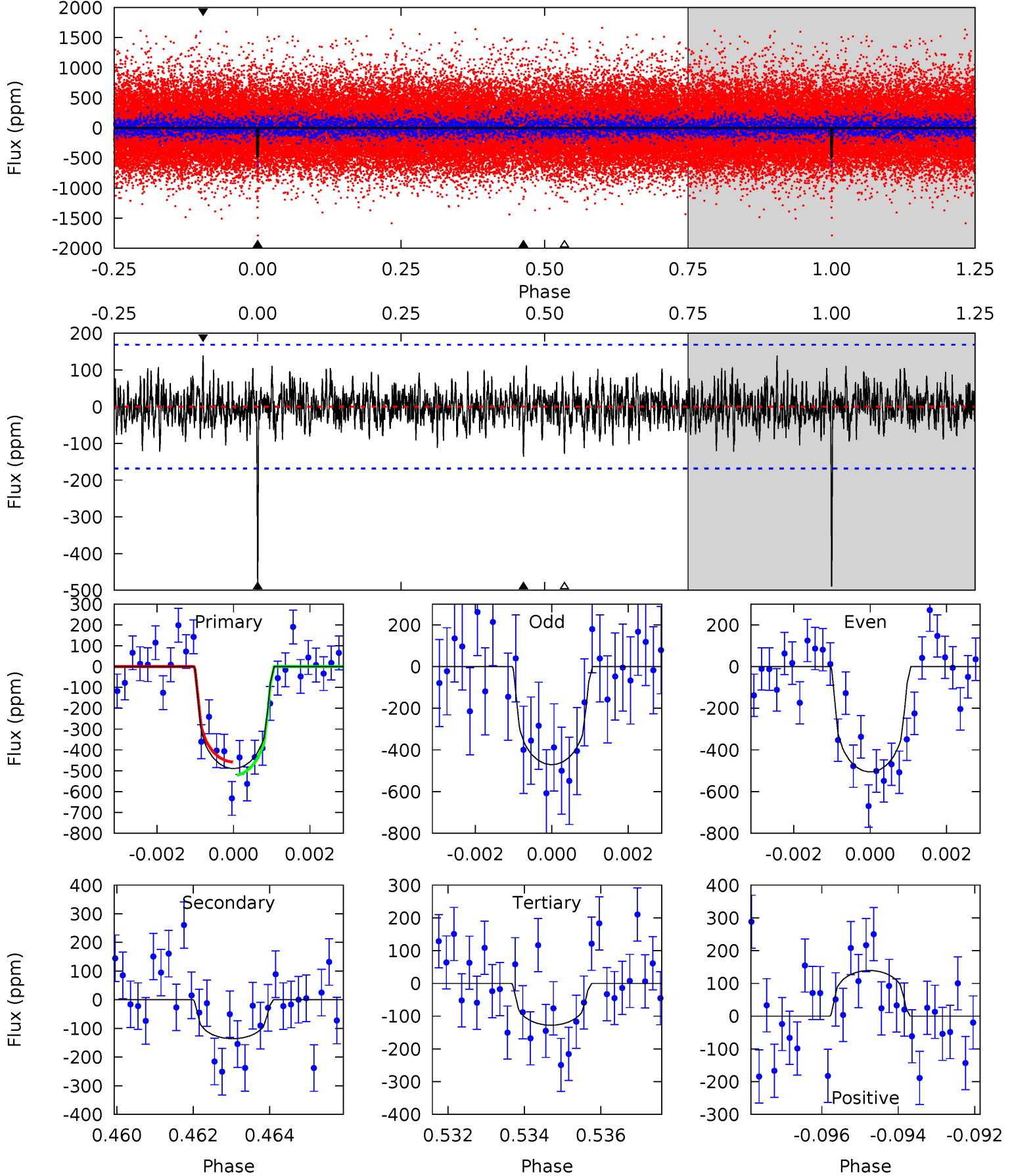
TCE 004138008-01 P=112.303486 Days  $T_0=230.441642$  (BKJD)



# DV Model-Shift Uniqueness Test

004138008-01, P = 112.303409 Days, E = 118.130193 Days

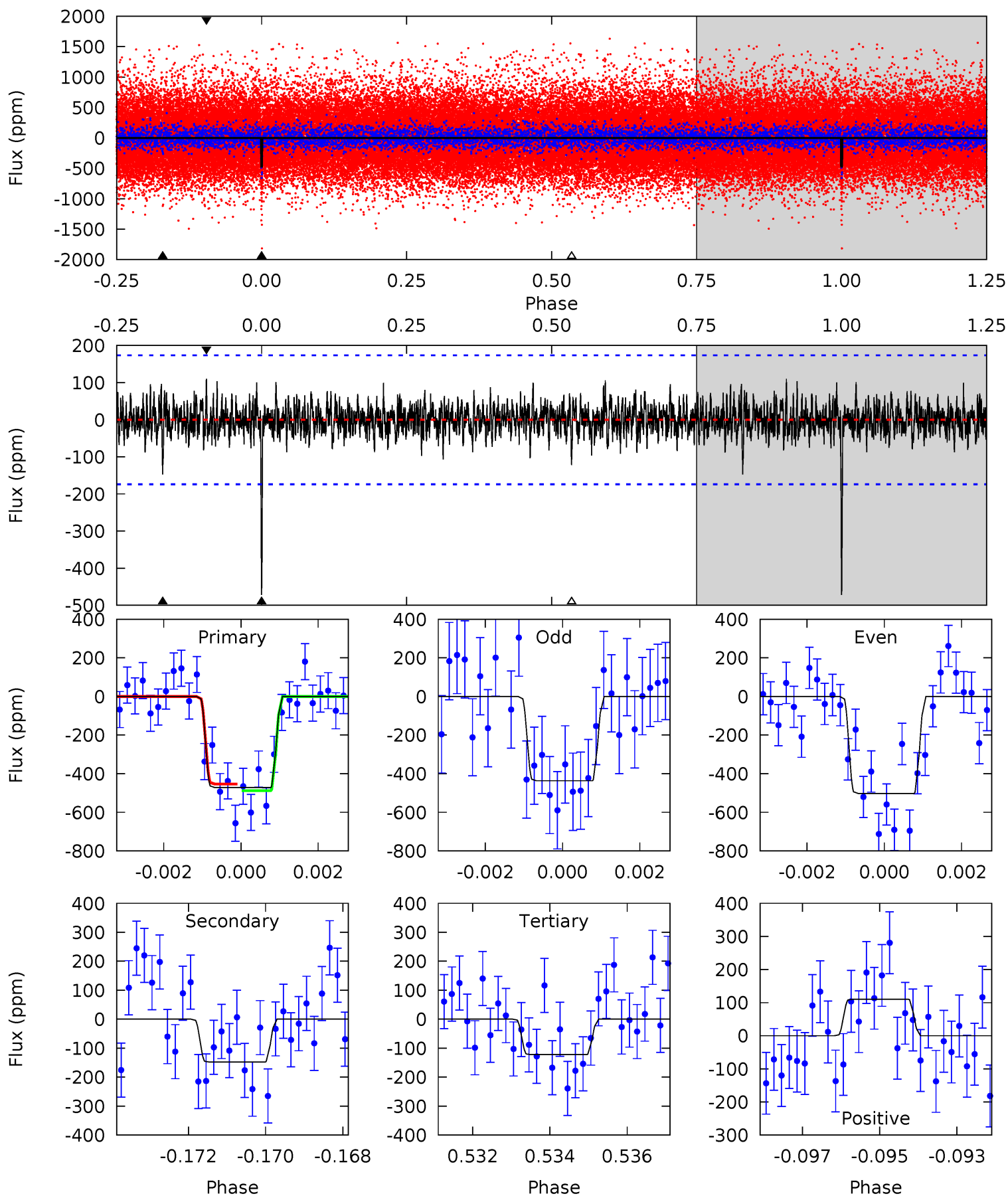
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.4	4.28	4.02	4.39	5.31	3.06	1.16	11.4	11.0	0.25	-0.11	0.55	1.04	0.22	1.00



# Alt Model-Shift Uniqueness Test

004138008-01, P = 112.303486 Days, E = 118.138156 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
14.4	4.52	3.74	3.37	5.32	3.08	0.97	10.7	11.1	0.78	1.15	1.00	1.01	0.19	0.52



### Stellar Parameters For KIC 004138008

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4401^{+78}_{-78}$	$4.677^{+0.017}_{-0.027}$	$-0.380^{+0.150}_{-0.150}$	$0.595^{+0.030}_{-0.024}$	$0.613^{+0.030}_{-0.030}$	$4.094^{+0.354}_{-0.428}$
	+2%/-2%	+0%/-1%	+39%/-39%	+5%/-4%	+5%/-5%	+9%/-10%
Source	SPE85	SPE85	SPE85	DSEP		

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

### Secondary Eclipse Parameters for KIC 004138008-01 / KOI 4742.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-136 \pm 32$	$1.58^{+1.29}_{-0.91}$	$337^{+6}_{-7}$	$3428^{+1176}_{-566}$	$4397^{+20071}_{-3076}$
Alt.	$-148 \pm 33$	$1.64^{+1.07}_{-0.96}$	$337^{+7}_{-7}$	$3412^{+1277}_{-468}$	$4397^{+21685}_{-2772}$

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

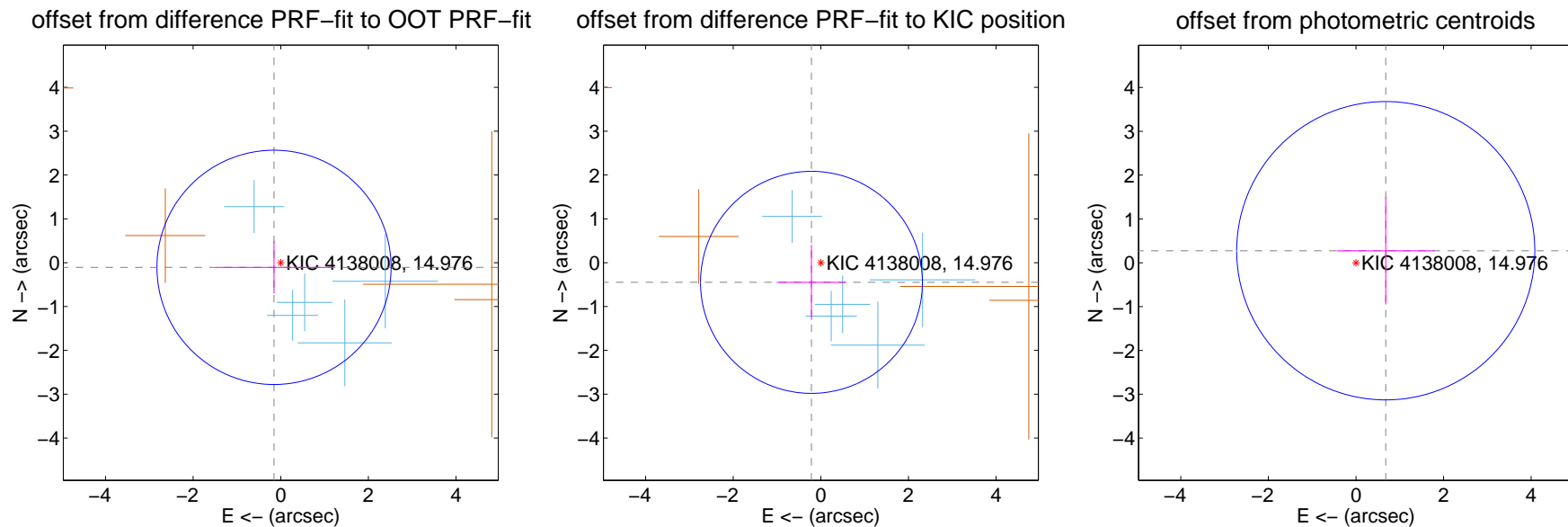
## DV Centroid Data

Supplemental centroid analysis for 004138008-01. Kepler magnitude: 14.98. Transit SNR 12.00

There are 5 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

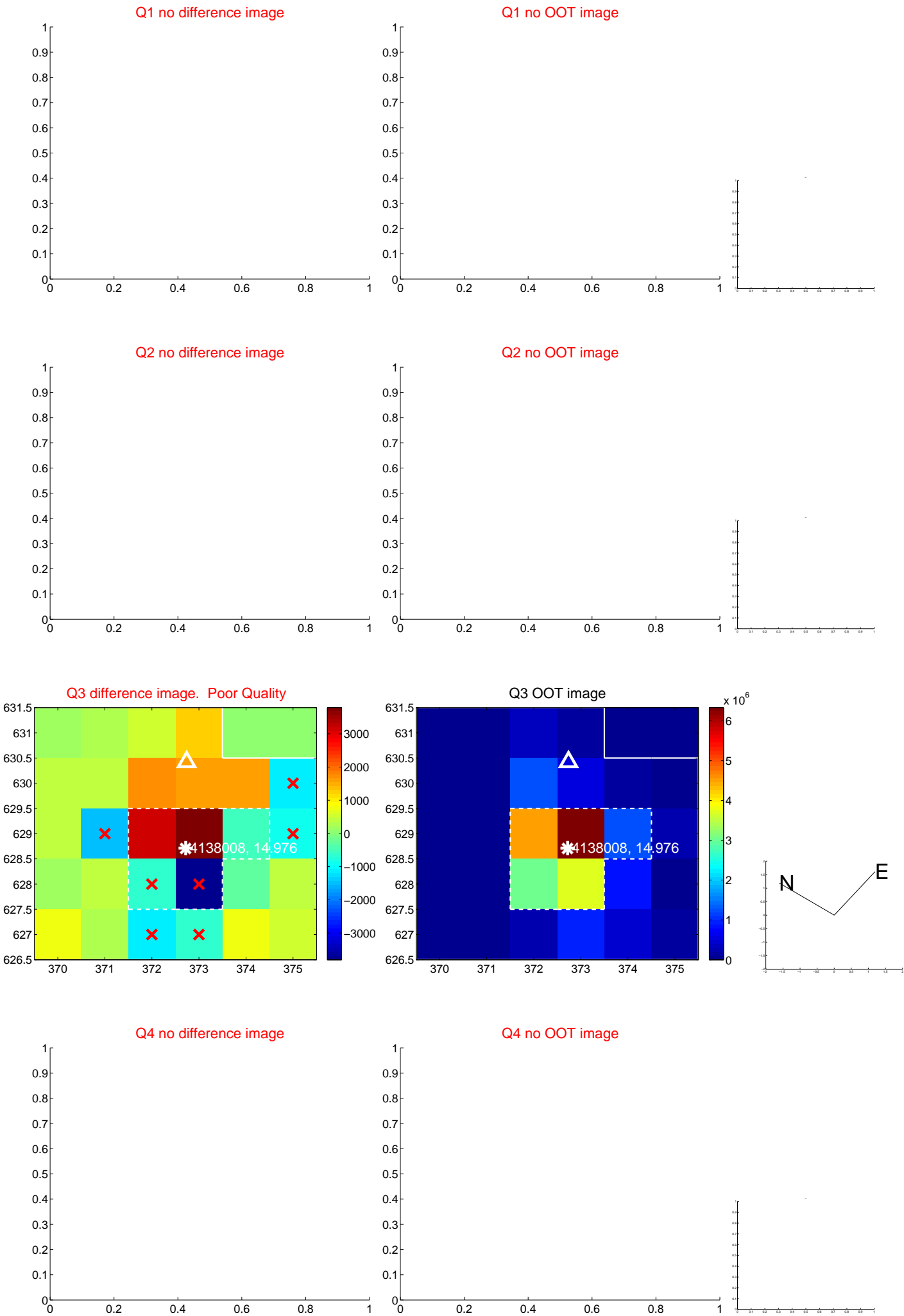
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.187 \pm 0.891$	0.21	$0.154 \pm 1.327$	$-0.106 \pm 0.599$
PRF-fit source offset from KIC position	$0.498 \pm 0.844$	0.59	$0.215 \pm 0.790$	$-0.449 \pm 0.856$
photometric centroid source offset	$0.73 \pm 1.13$	0.65	$-0.68 \pm 1.12$	$0.27 \pm 1.23$



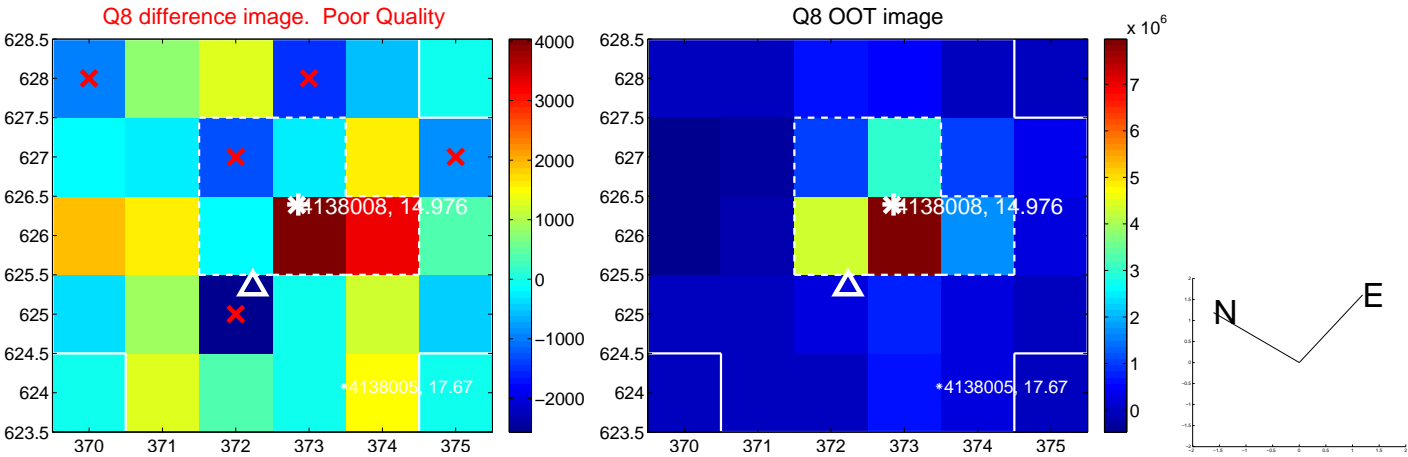
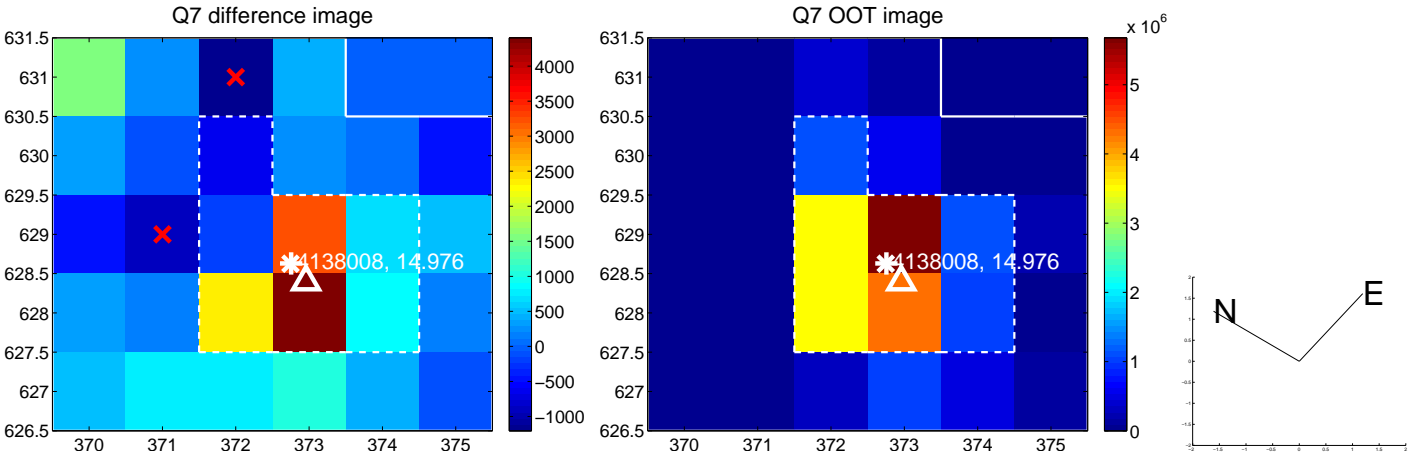
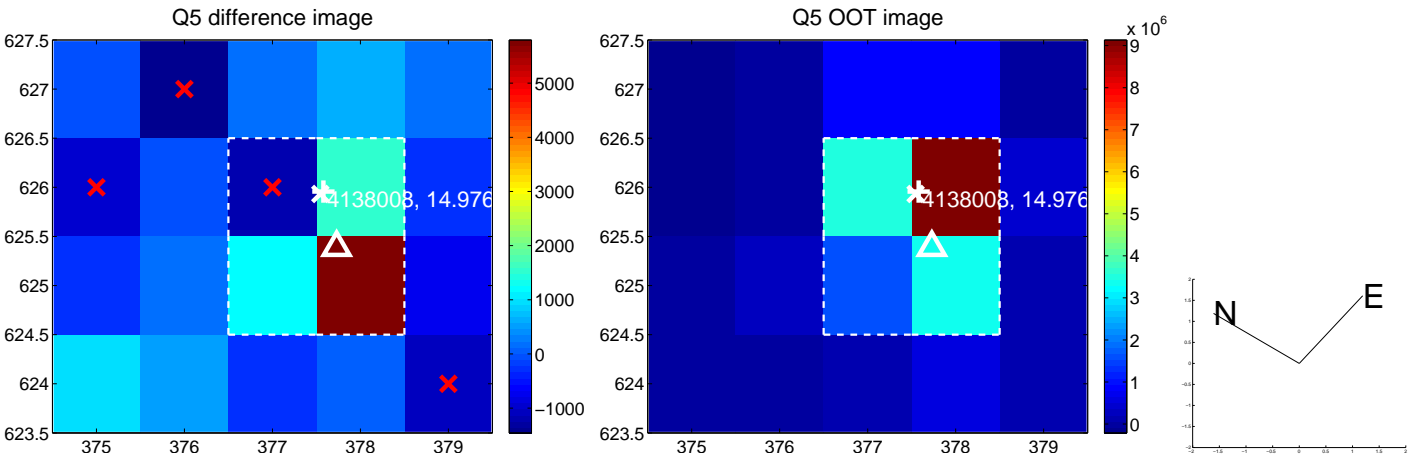
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



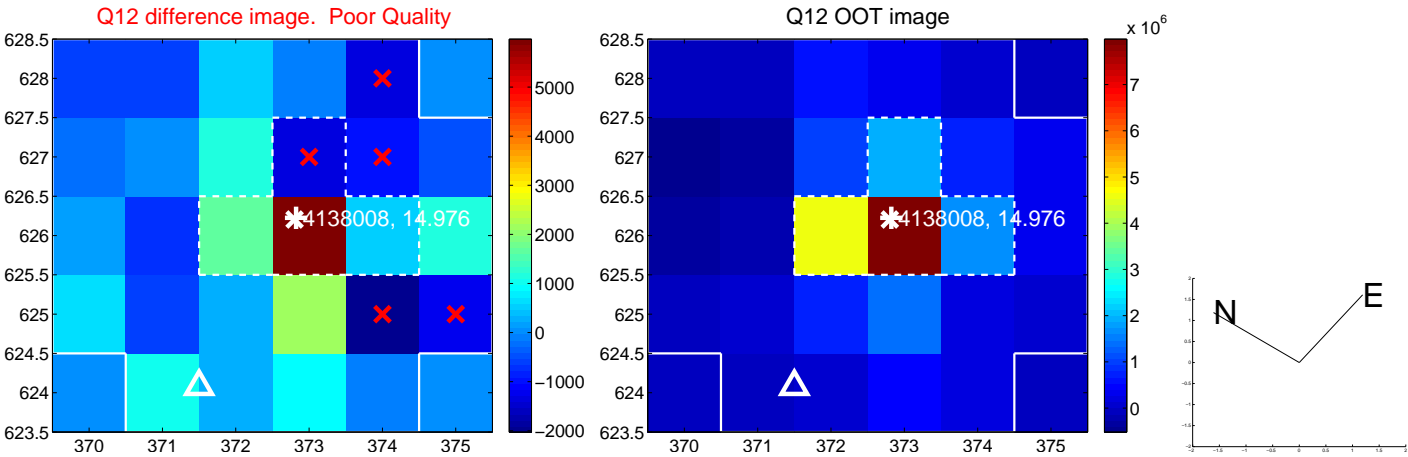
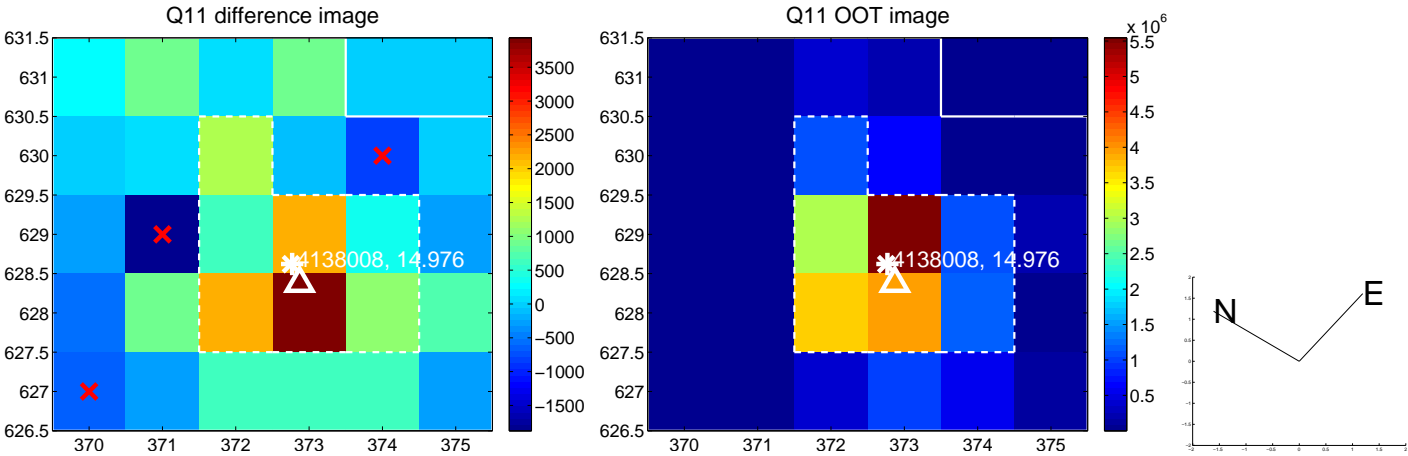
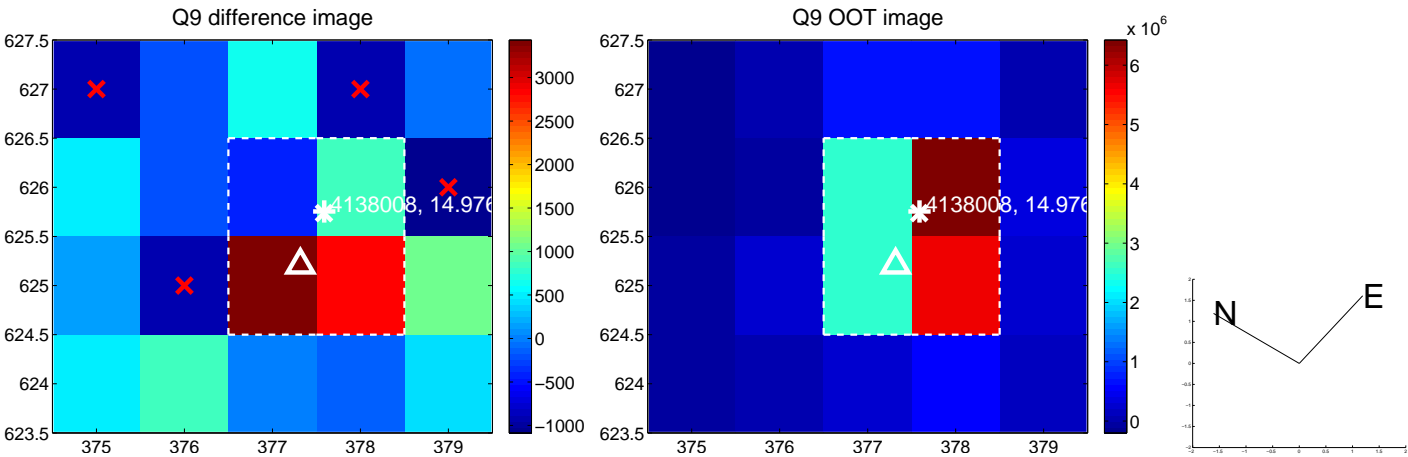
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



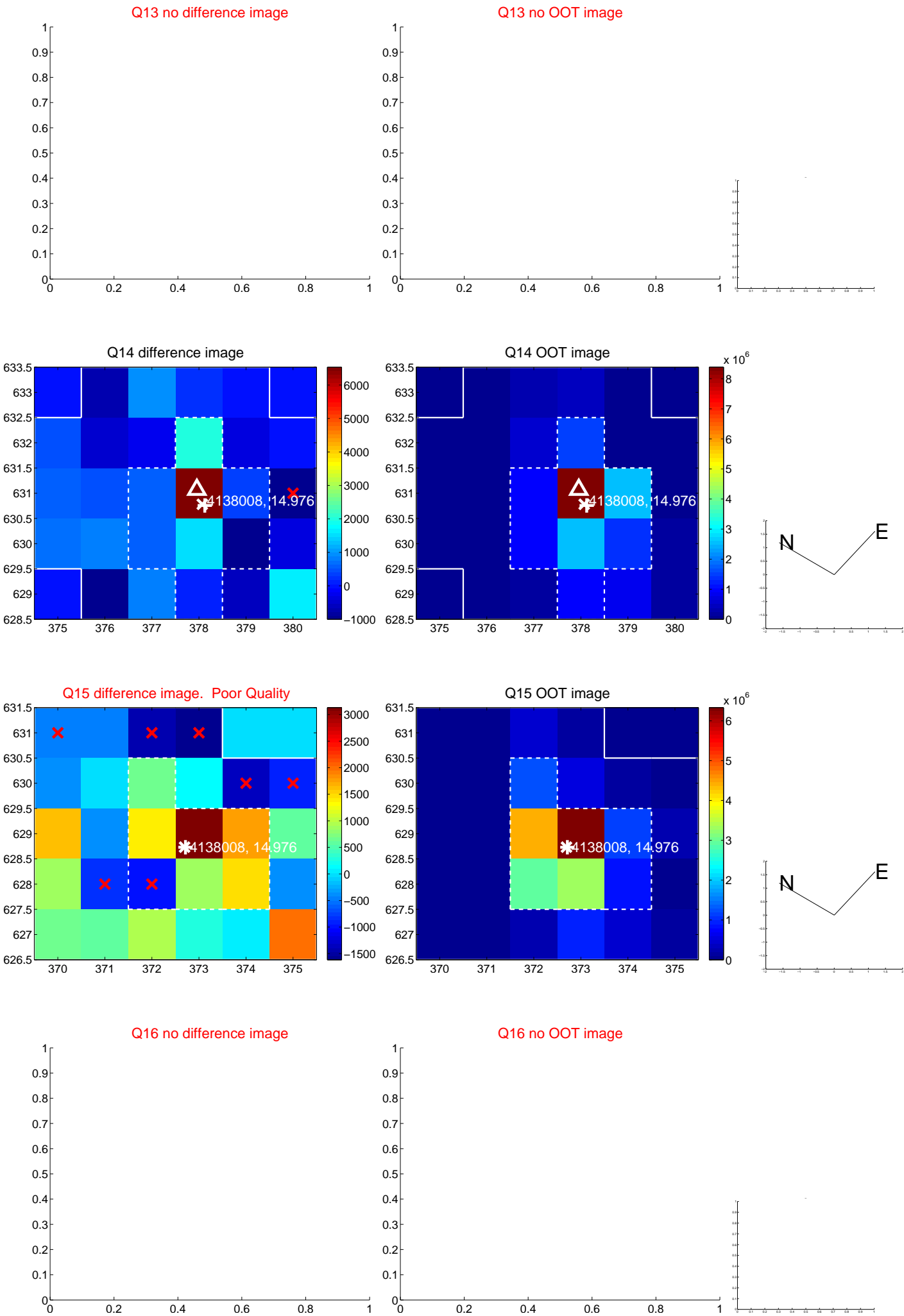
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



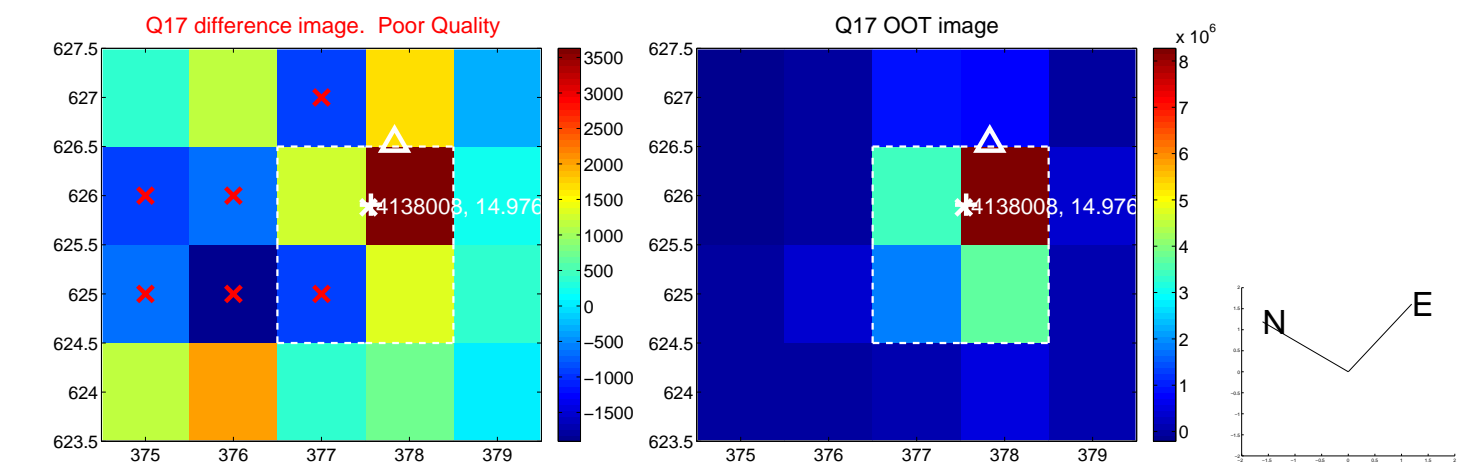
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



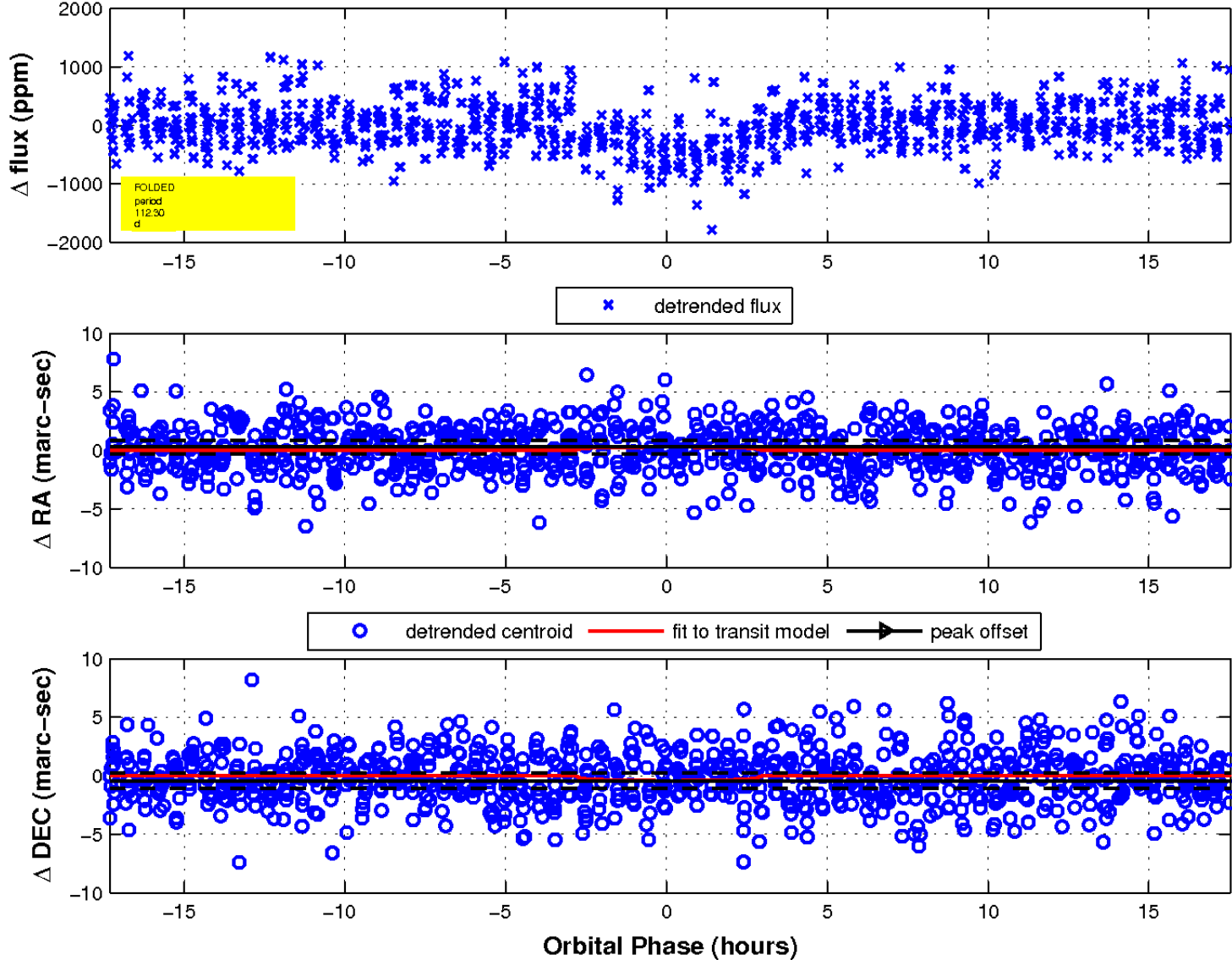
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

