

# KIC 004056616

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004056616-01	OBS	2013.01	2.414352	132.428402	189.0	1.305	33.1	39.0	0.72	4507	1.24	195.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004056616-01	OBS	PC	1.00	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.

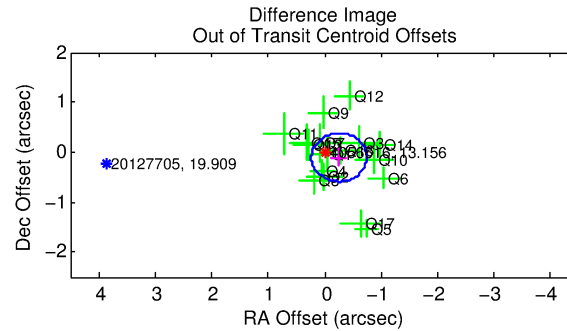
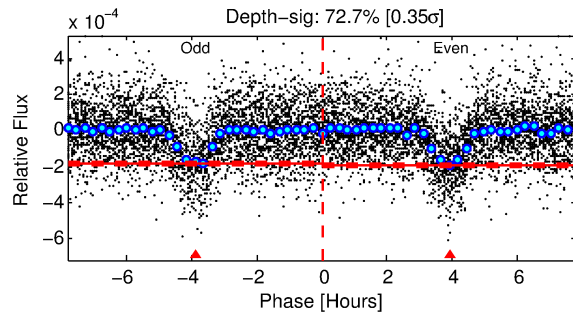
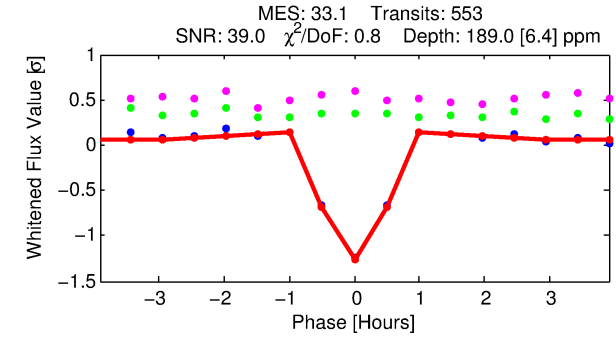
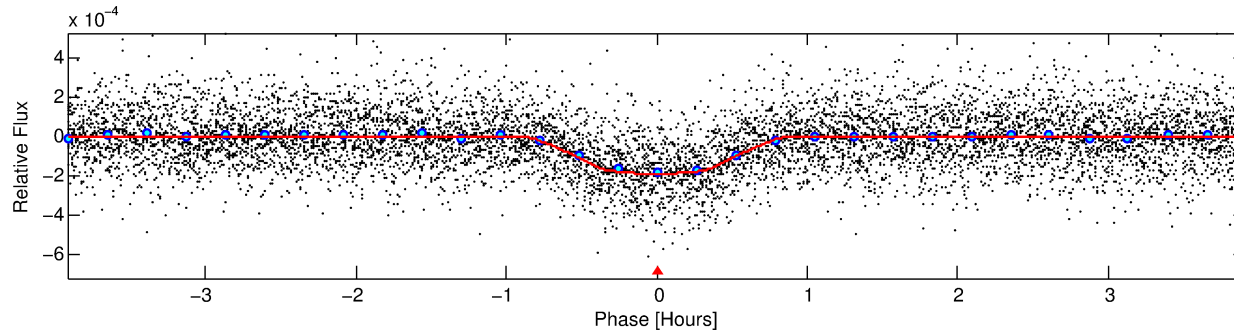
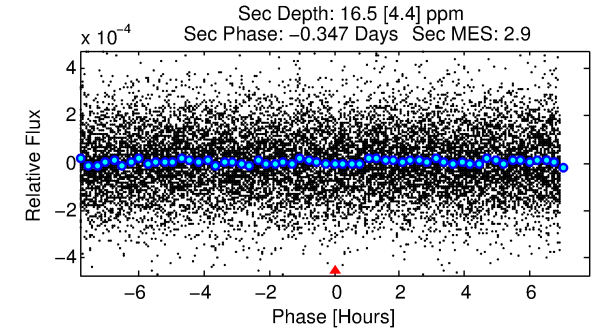
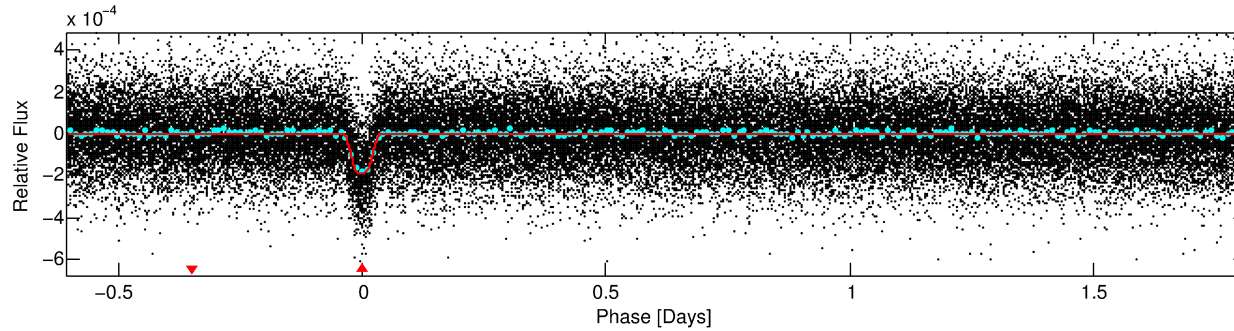
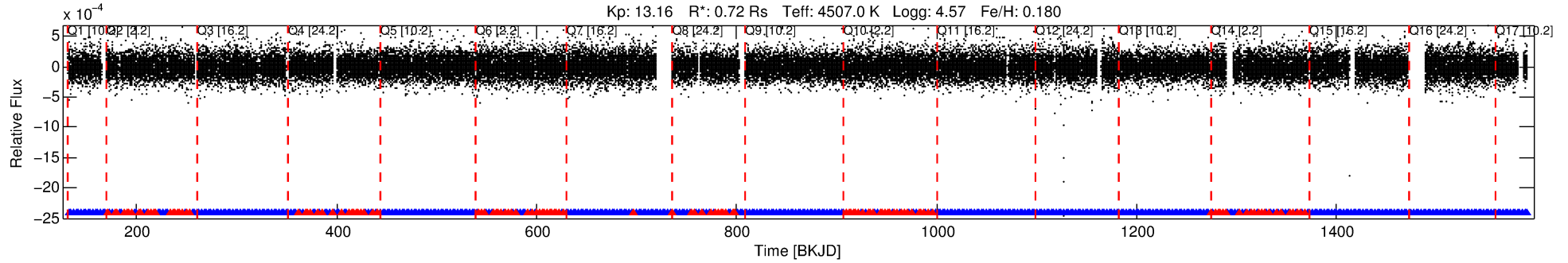
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004056616-01

No Significant Match Found

# DV One-Page Summary

KIC: 4056616 Candidate: 1 of 1 Period: 2.414 d  
KOI: K02013.01 Corr: 0.969



## DV Fit Results:

Period = 2.41435 [0.00000] d  
Epoch = 132.4284 [0.0005] BKJD  
Rp/R\* = 0.0157 [0.0041]  
a/R\* = 6.72 [6.22]  
b = 0.90 [0.21]  
Seff = 195.23 [19.94]  
Teq = 953 [24] K  
Rp = 1.24 [0.33] Re  
a = 0.0315 [0.0015] AU  
Ag = 5.87 [3.46] [1.41σ]  
Teffp = 2294 [338] K [3.96σ]

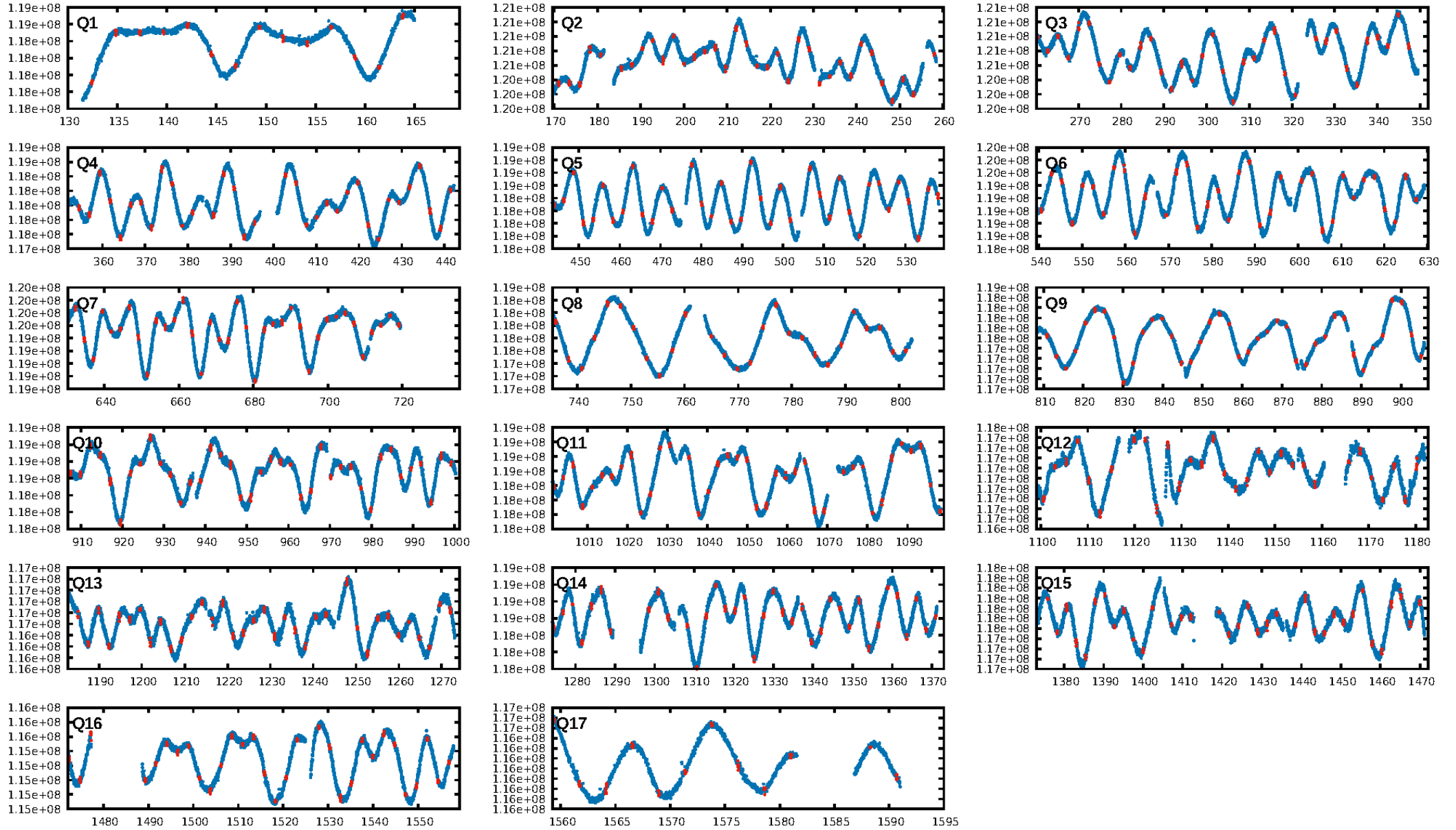
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.00e-220  
RollingBand-fgt: 0.77 [405/527]  
GhostDiagnostic-chr: 6.435  
Centroid-sig: 57.6%  
Centroid-so: 0.208 arcsec [0.67σ]  
OotOffset-rm: 0.271 arcsec [1.67σ]  
KicOffset-rm: 0.414 arcsec [2.44σ]  
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]

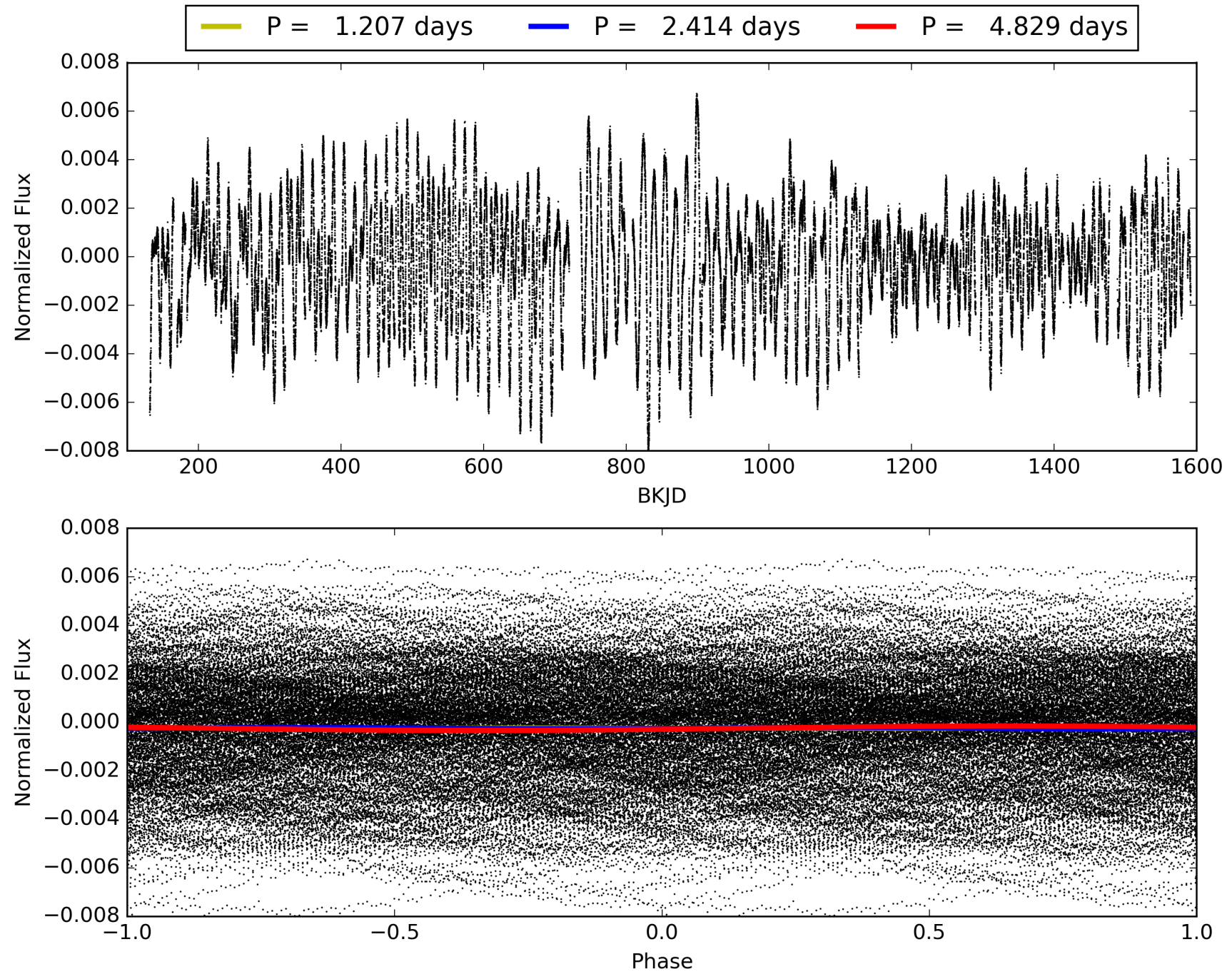
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:52:07 Z

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

# TCE 004056616-01, PDC Light Curves

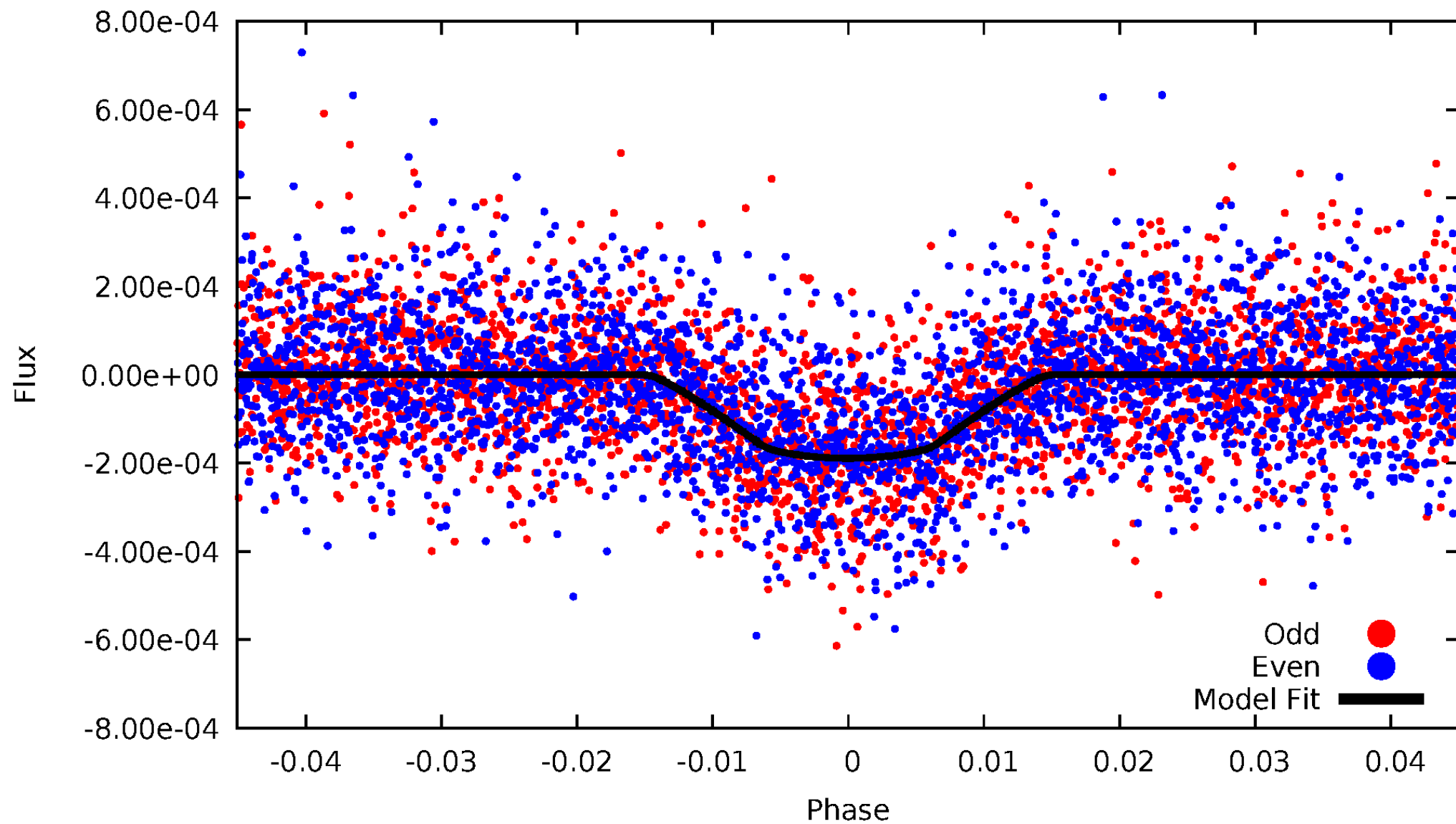


TCE 004056616-01



# DV Odd/Even

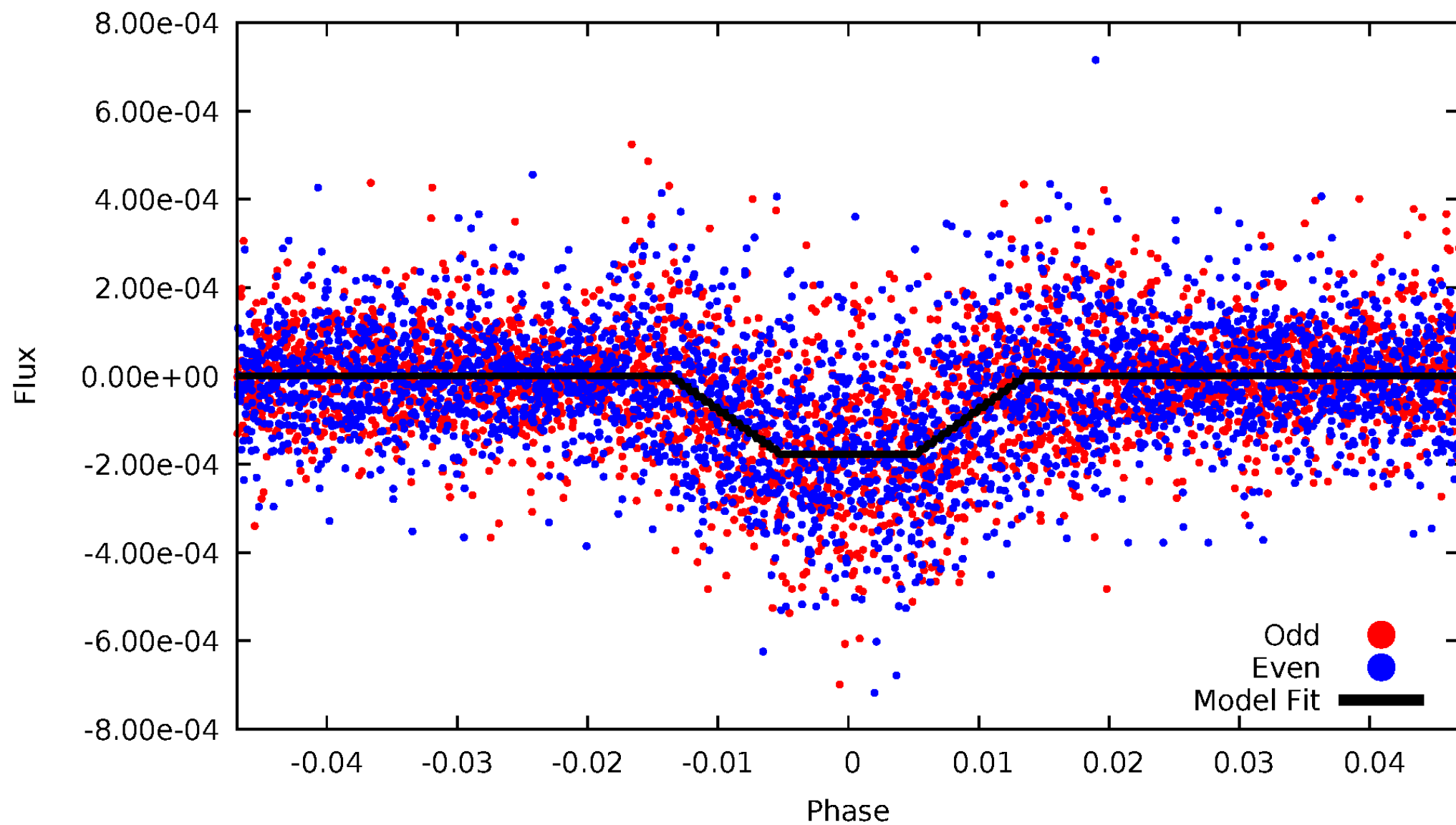
TCE 004056616-01





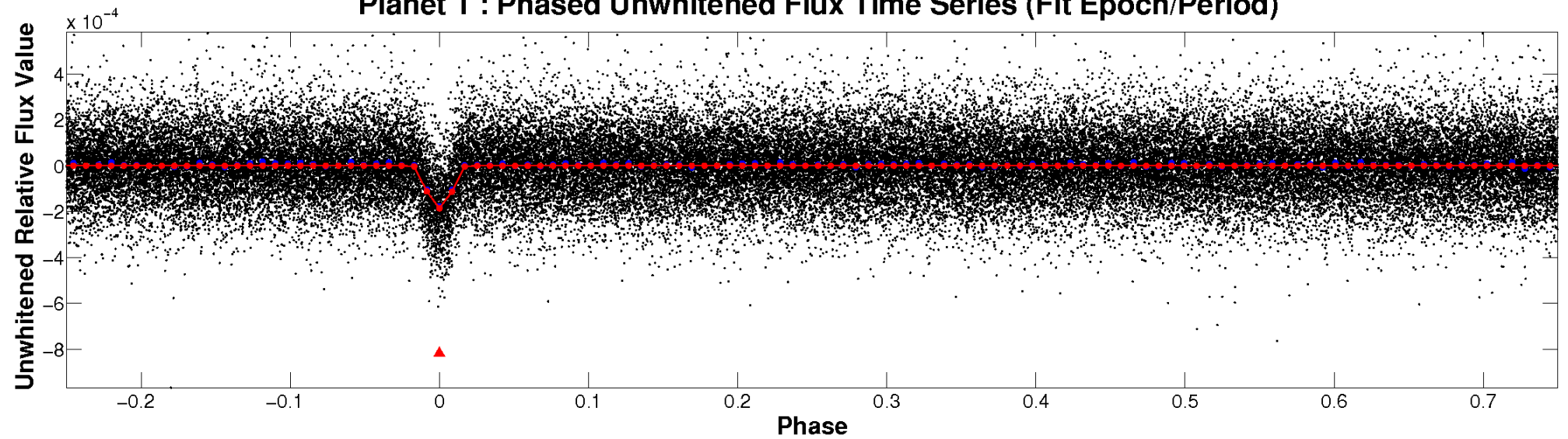
# ALT Odd/Even

TCE 004056616-01

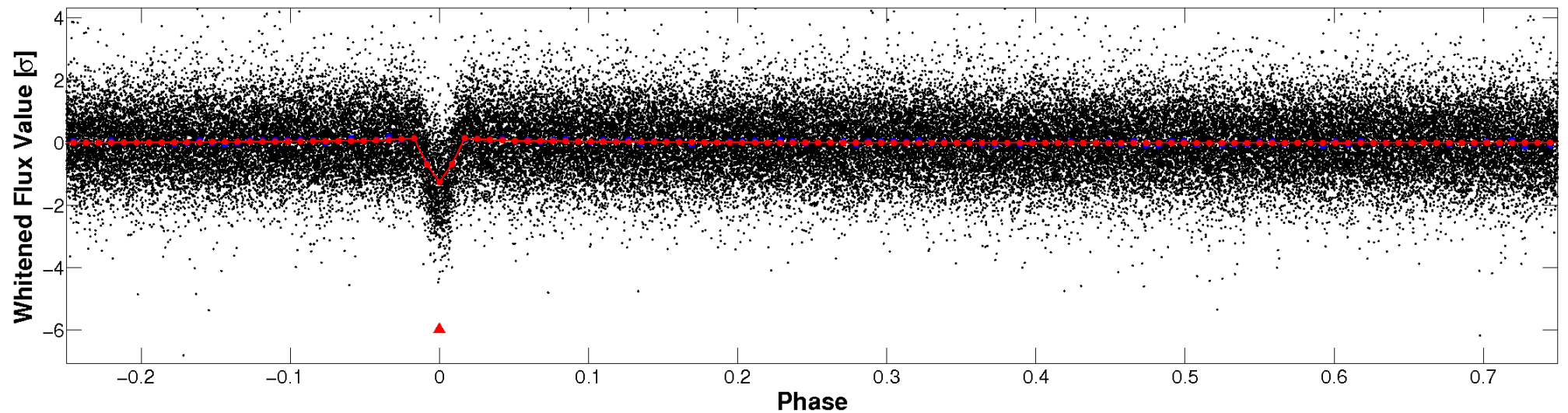


# Non-Whitened Vs. Whitened Light Curve

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

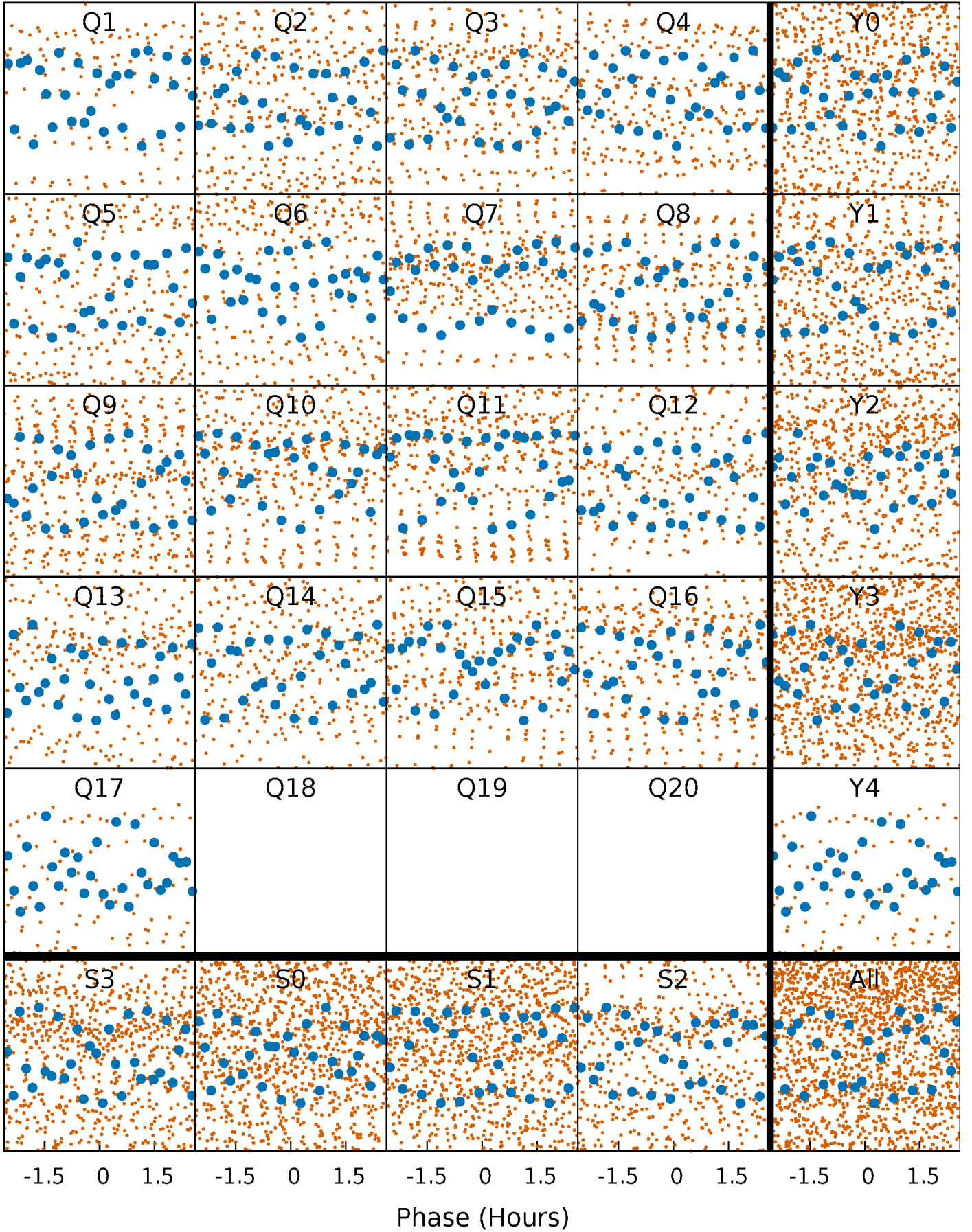


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

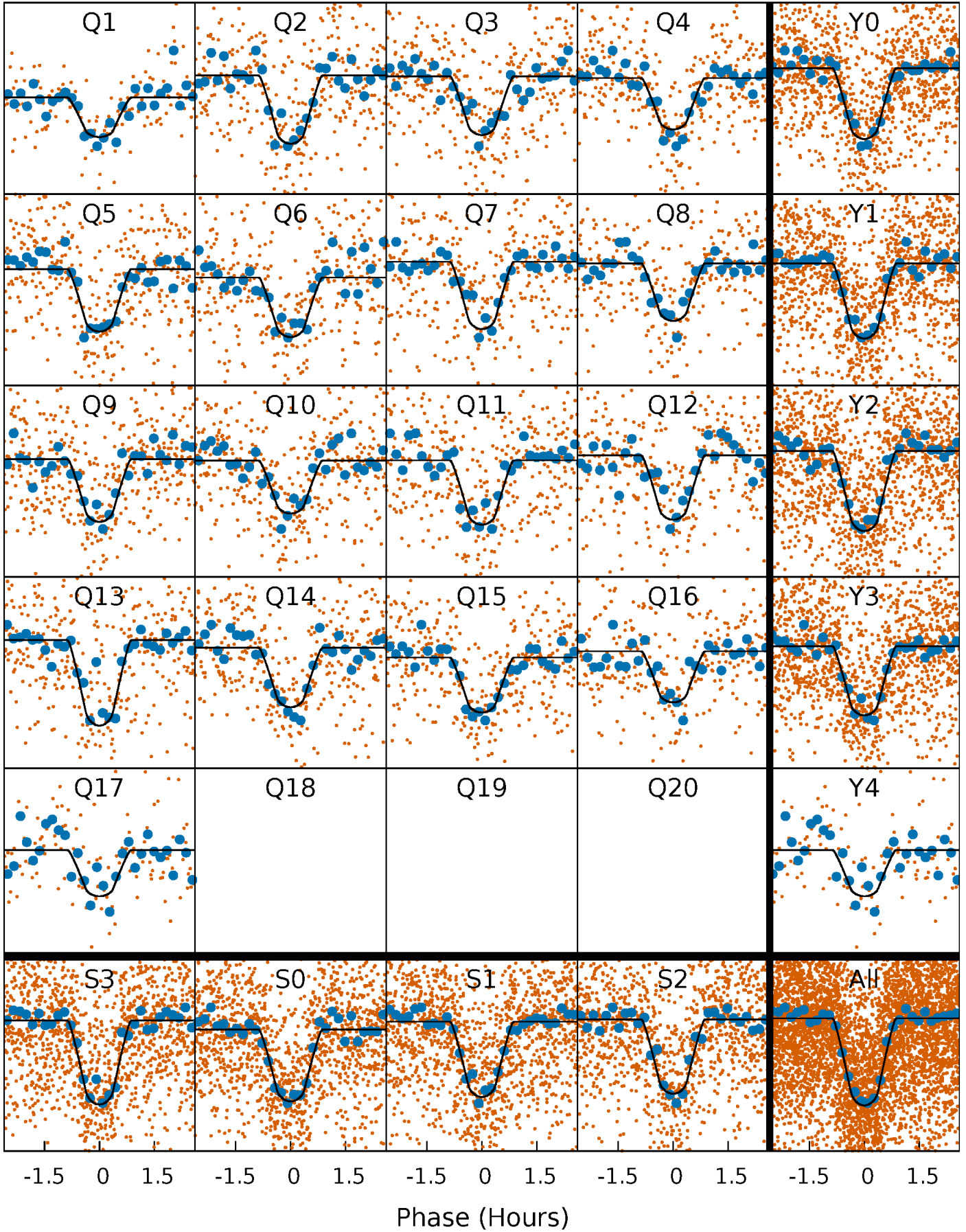
TCE 004056616-01   P= 2.414352 Days    $T_0=132.428402$  (BKJD)





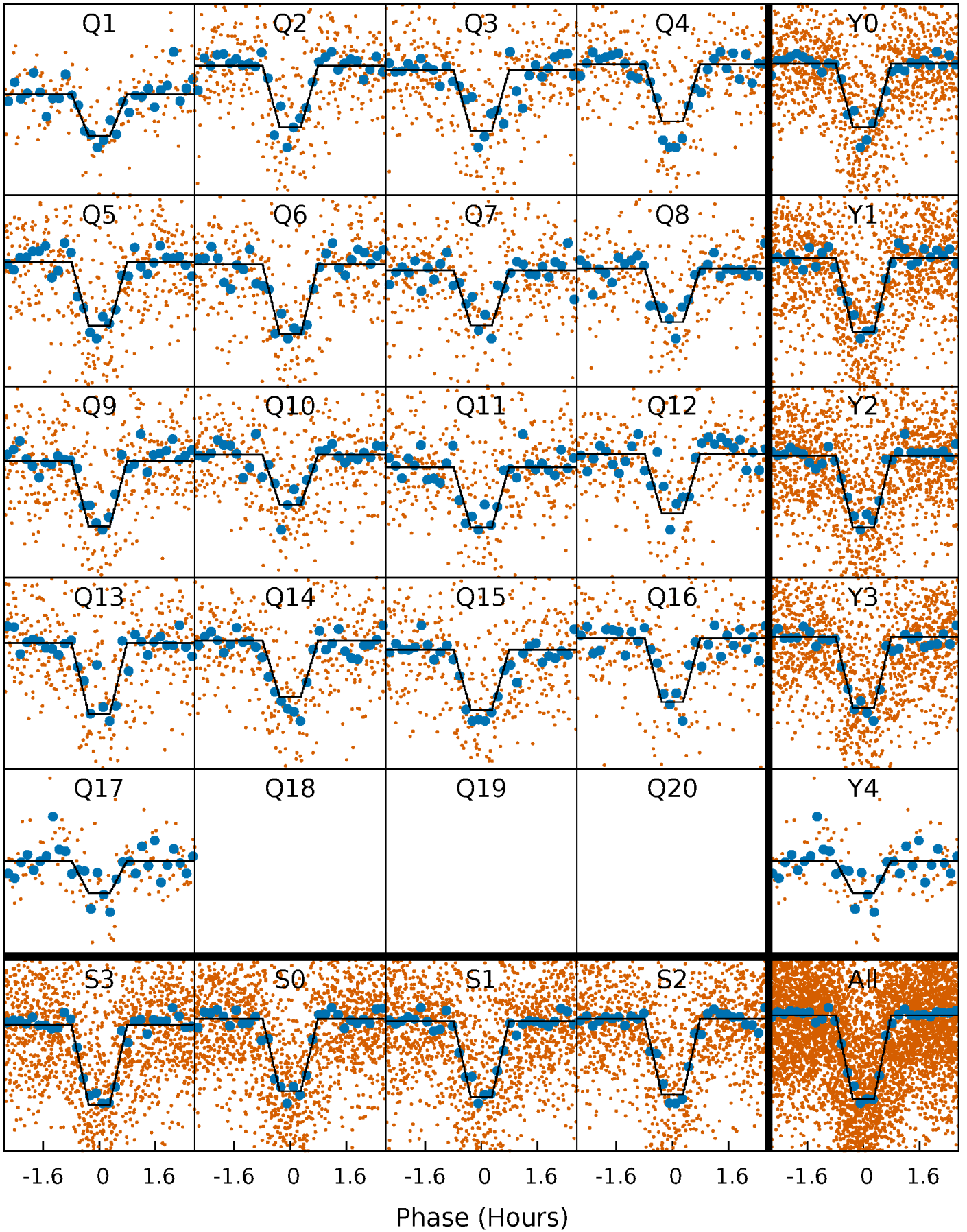
# DV Quarter-Phased Transit Curves

TCE 004056616-01 P= 2.414352 Days  $T_0=132.428402$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

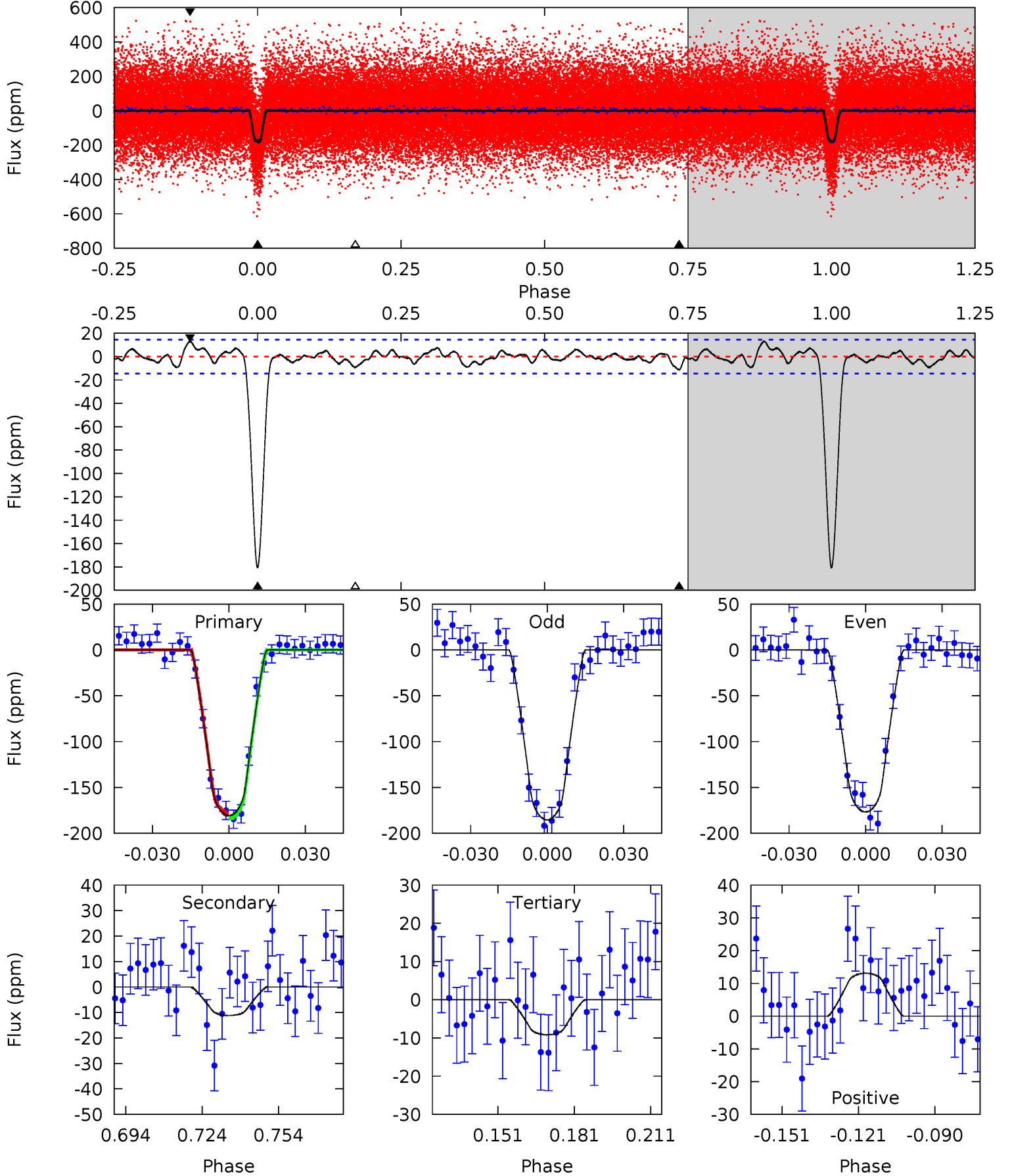
TCE 004056616-01 P= 2.414351 Days  $T_0=132.428176$  (BKJD)



# DV Model-Shift Uniqueness Test

004056616-01, P = 2.414352 Days, E = 130.014050 Days

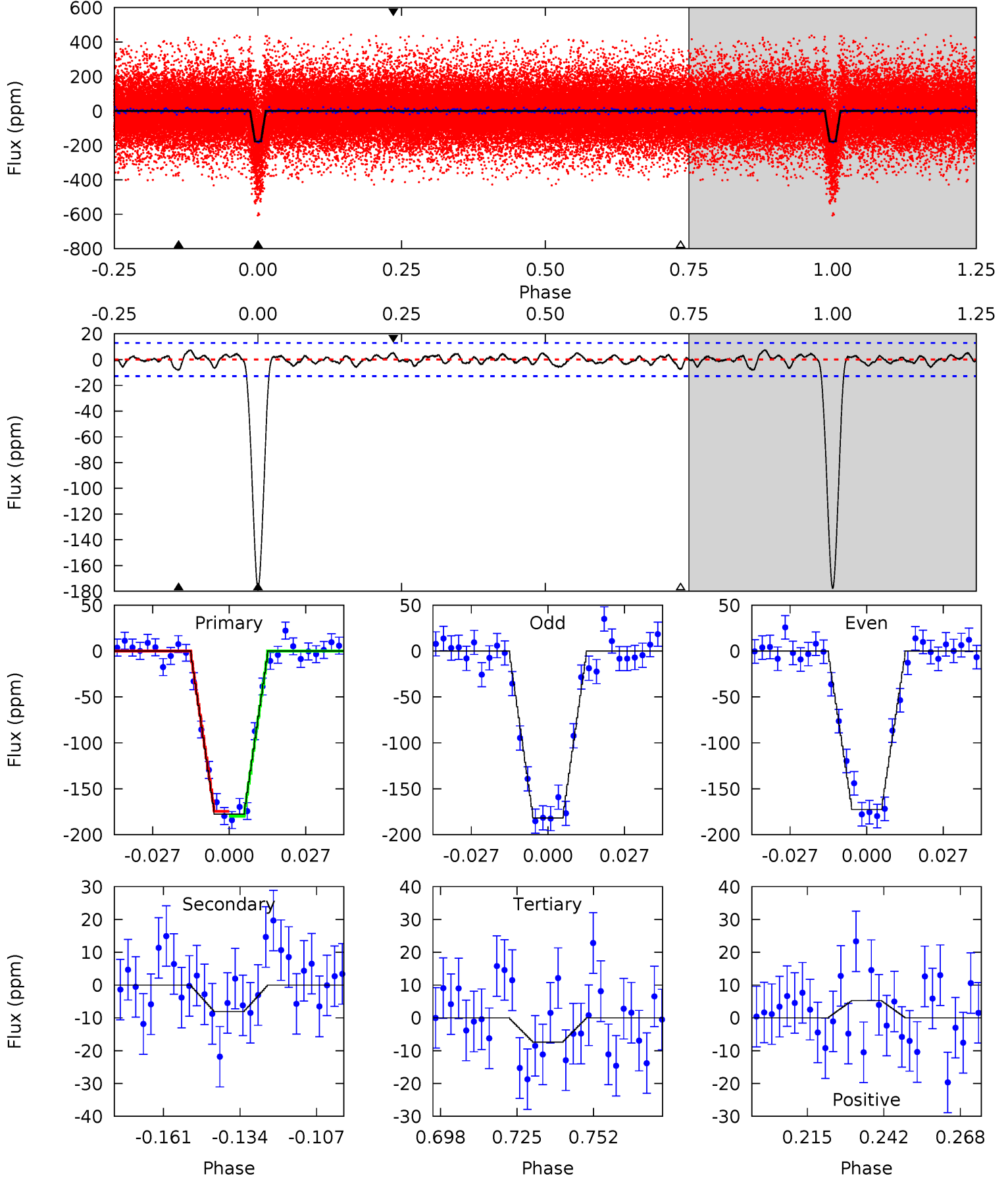
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
60.0	3.71	3.04	4.35	4.81	2.17	1.34	56.9	55.6	0.67	-0.63	1.43	1.00	0.07	0.72



# Alt Model-Shift Uniqueness Test

004056616-01, P = 2.414351 Days, E = 130.013825 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
66.9	3.05	2.79	1.97	4.83	2.21	0.96	64.1	64.9	0.26	1.07	1.74	0.97	0.04	1.02



### Stellar Parameters For KIC 004056616

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4507^{+80}_{-80}$	$4.573^{+0.043}_{-0.013}$	$0.180^{+0.150}_{-0.150}$	$0.724^{+0.020}_{-0.035}$	$0.715^{+0.040}_{-0.025}$	$2.653^{+0.414}_{-0.160}$
	+2%/-2%	+1%/-0%	+83%/-83%	+3%/-5%	+6%/-3%	+16%/-6%
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 004056616-01 / KOI 2013.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-11 \pm 3$	$1.23^{+0.35}_{-0.32}$	$1323^{+28}_{-24}$	$2724^{+283}_{-212}$	$4.005^{+3.948}_{-1.732}$
Alt.	$-8 \pm 3$	$1.06^{+0.33}_{-0.34}$	$1324^{+28}_{-28}$	$2705^{+345}_{-238}$	$3.822^{+4.903}_{-1.817}$

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



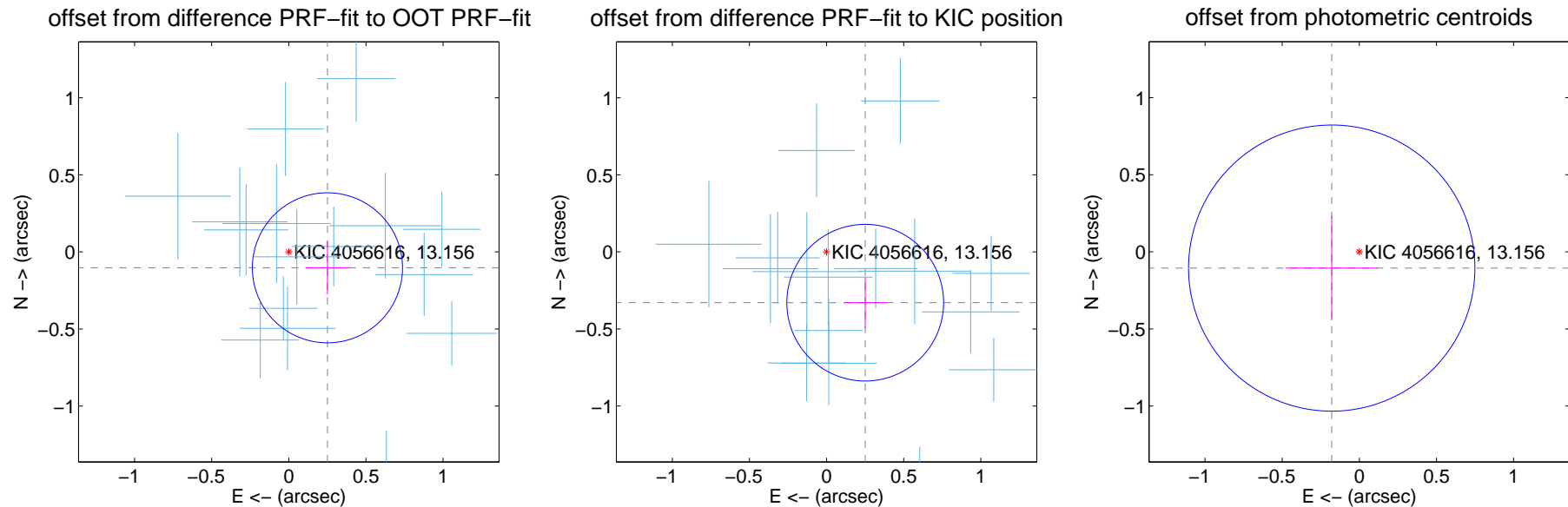
## DV Centroid Data

Supplemental centroid analysis for 004056616-01. Kepler magnitude: 13.16. Transit SNR 39.04

There are 17 quarters with good PRF difference image offsets

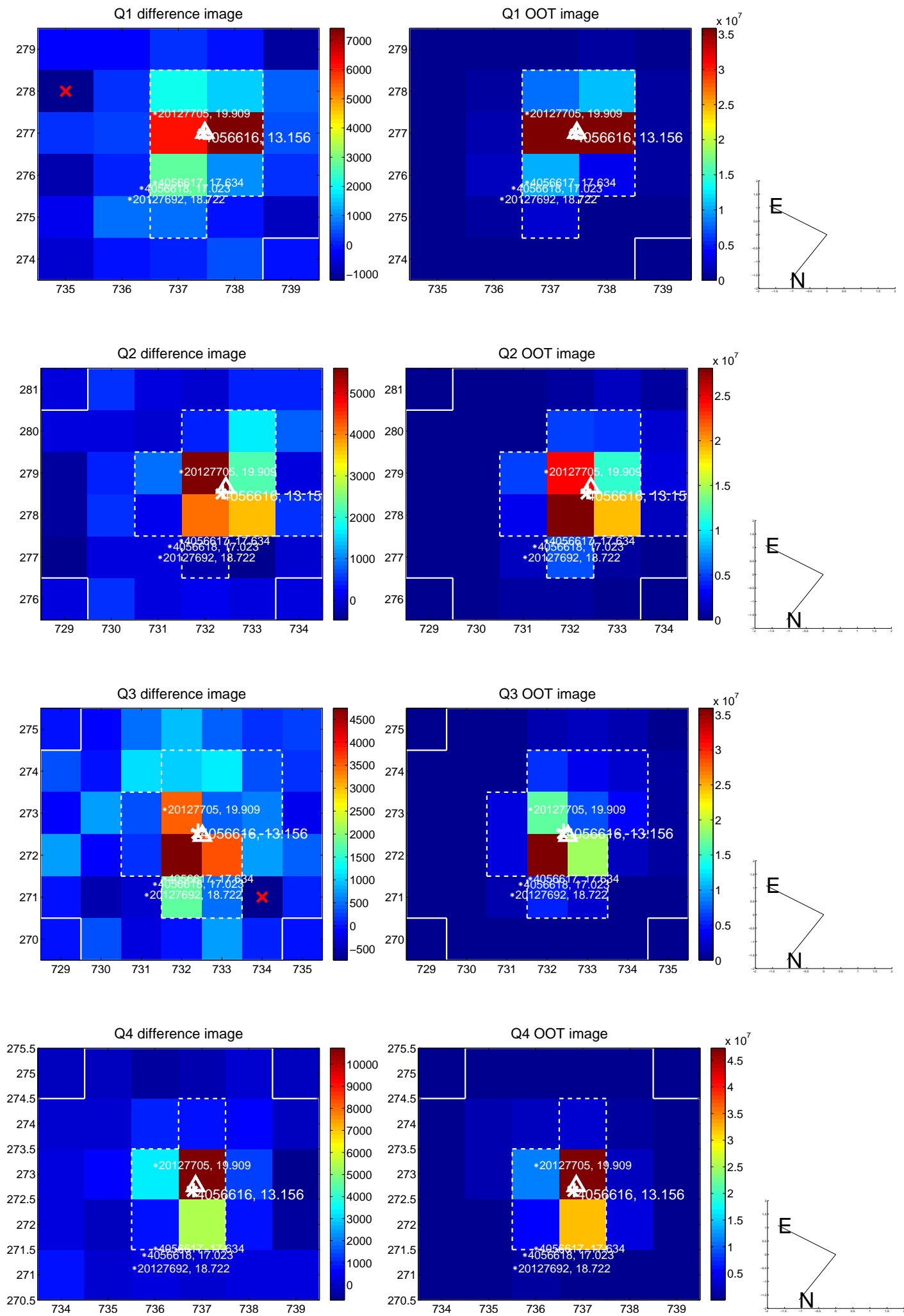
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.271 \pm 0.162$	1.67	$-0.250 \pm 0.142$	$-0.103 \pm 0.172$
PRF-fit source offset from KIC position	$0.414 \pm 0.169$	2.44	$-0.250 \pm 0.139$	$-0.329 \pm 0.164$
photometric centroid source offset	$0.21 \pm 0.31$	0.67	$0.18 \pm 0.30$	$-0.11 \pm 0.34$

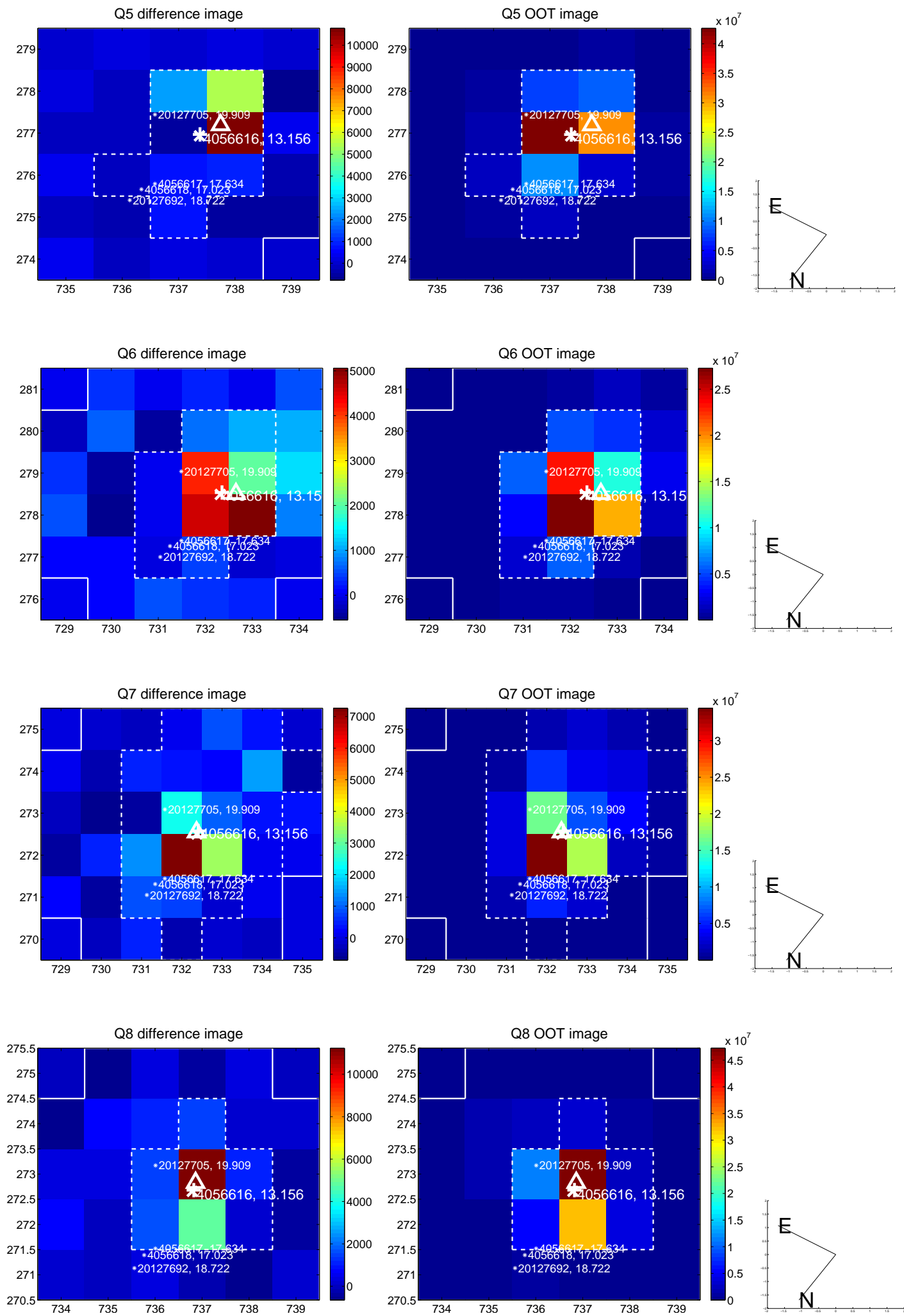


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

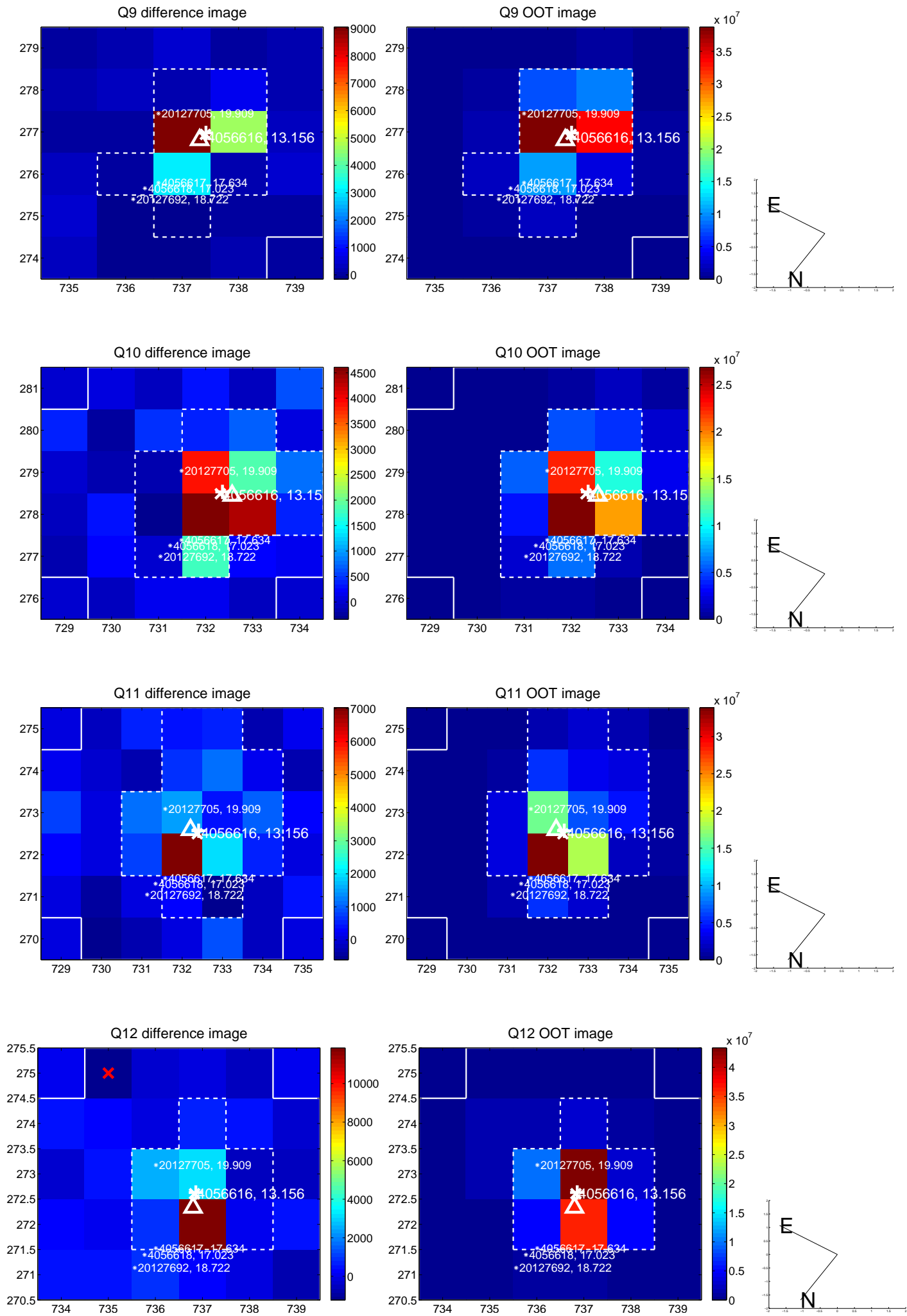
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



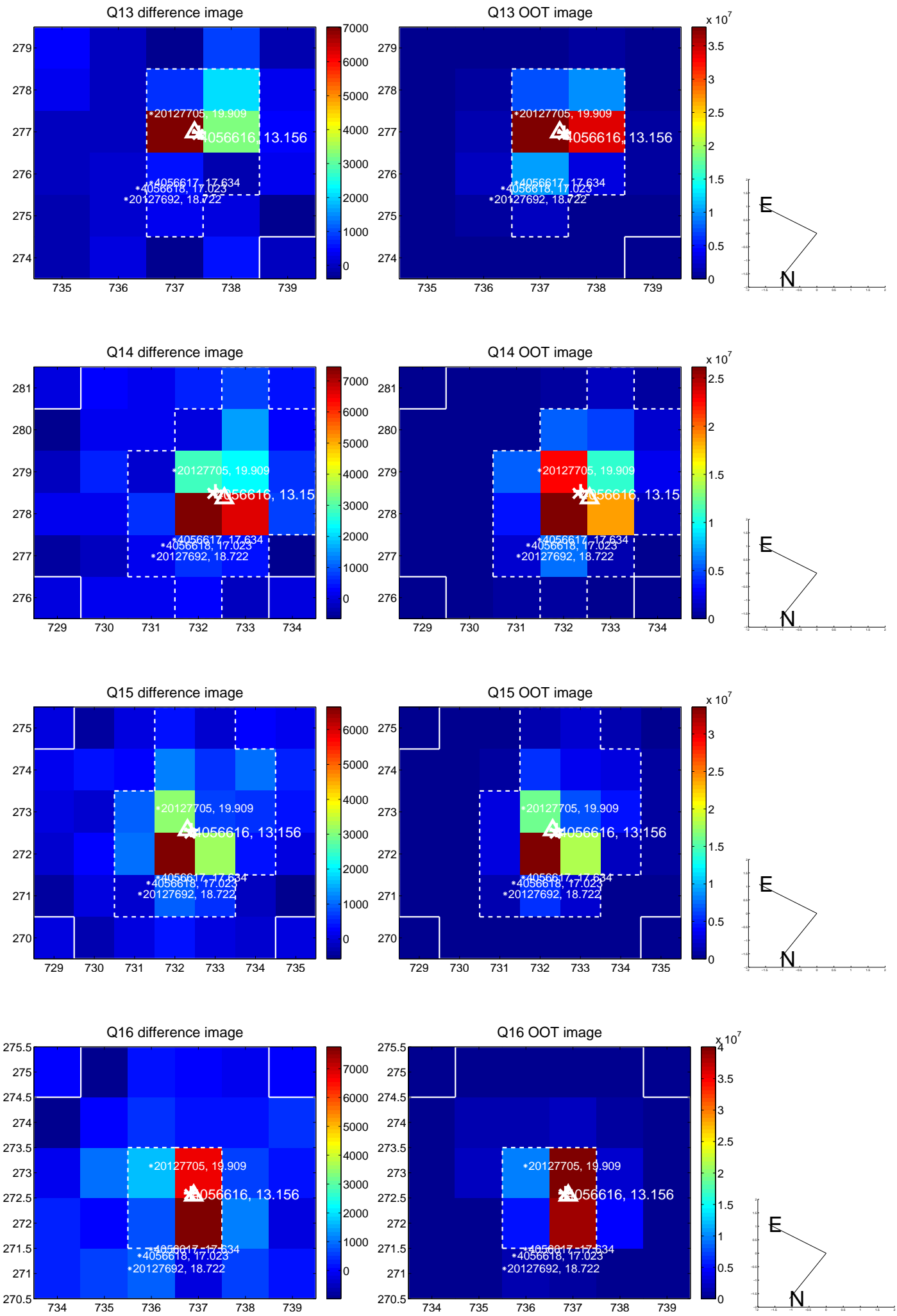
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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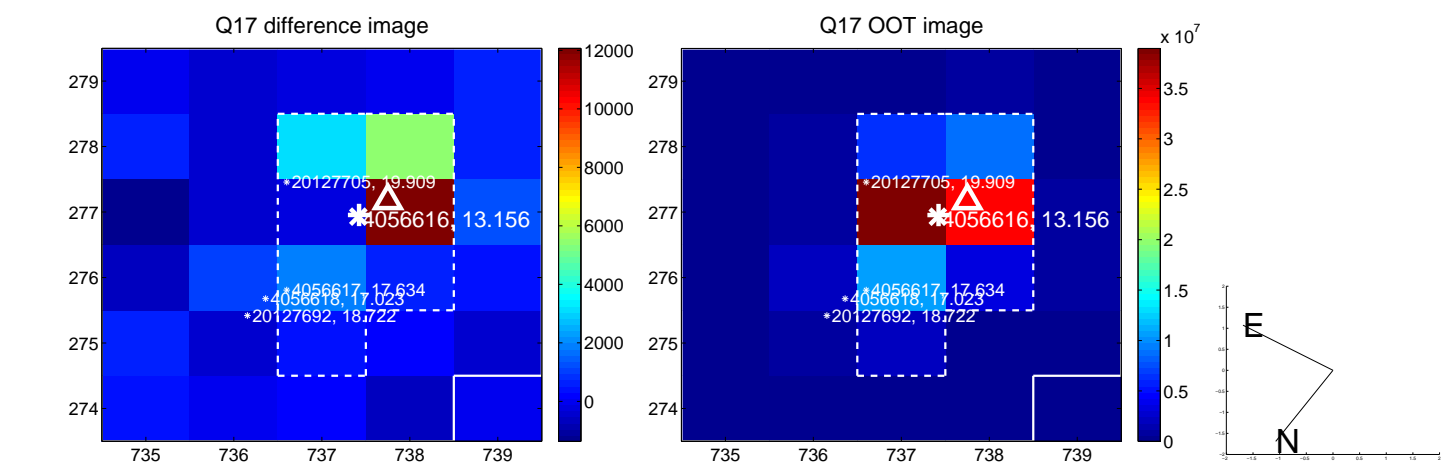


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

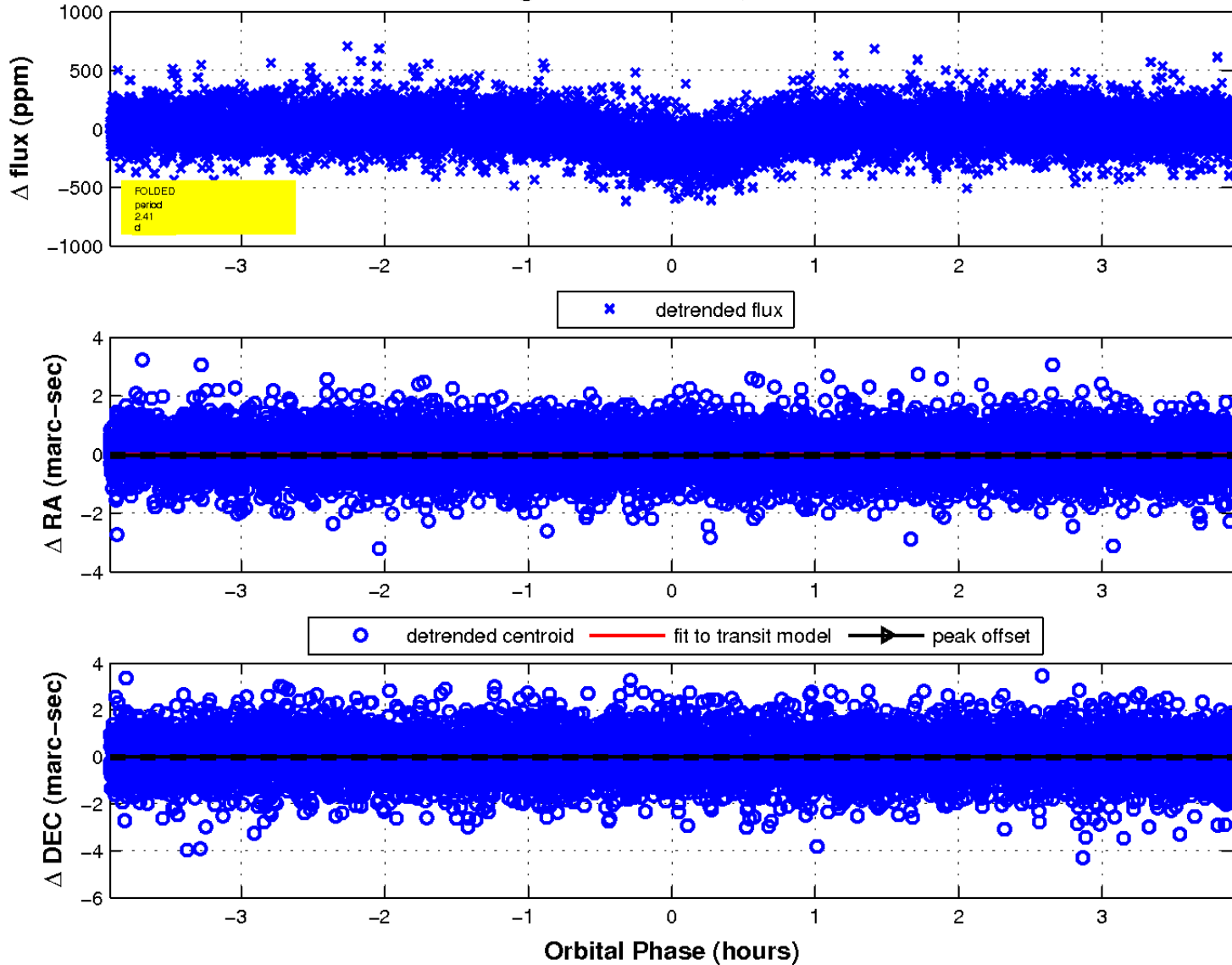




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

