

# KIC 012406749

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012406749-01	OBS	1476.01	56.358464	165.964848	2580.7	6.458	39.8	40.2	0.82	5446	4.91	7.30

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012406749-01	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 012406749-01

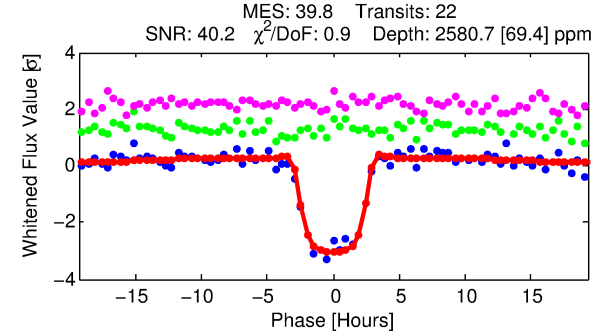
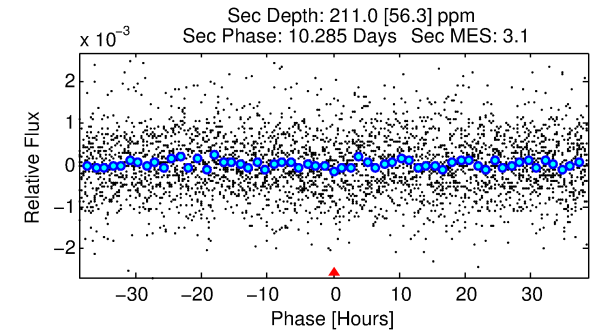
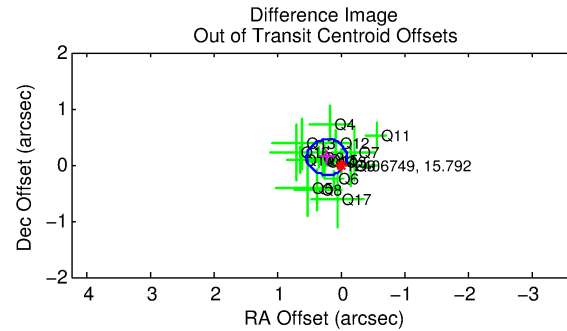
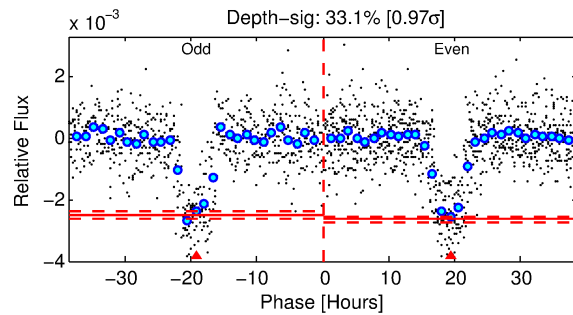
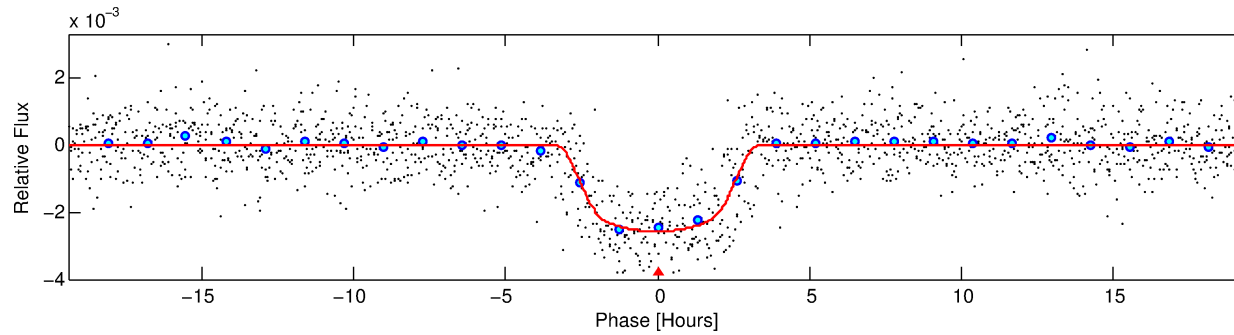
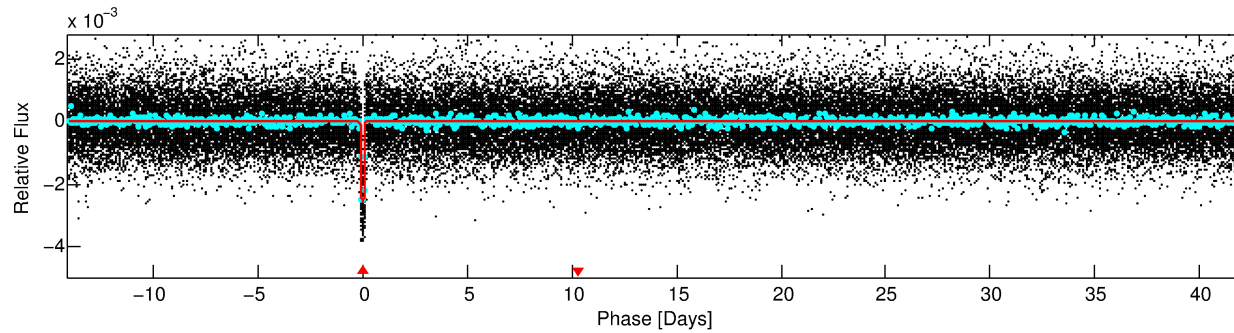
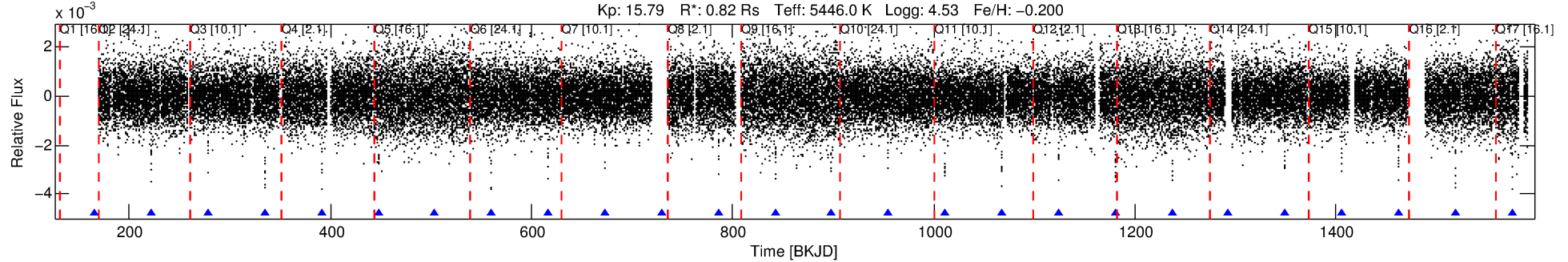
No Significant Match Found

# DV One-Page Summary

KIC: 12406749 Candidate: 1 of 1 Period: 56.358 d

KOI: K01476.01 Corr: 0.969

Kp: 15.79 R\*: 0.82 Rs Teff: 5446.0 K Logg: 4.53 Fe/H: -0.200



## DV Fit Results:

Period = 56.35846 [0.00023] d  
Epoch = 165.9648 [0.0035] BKJD  
Rp/R\* = 0.0548 [0.0016]  
a/R\* = 38.79 [3.53]  
b = 0.88 [0.02]  
Seff = 7.30 [1.90]  
Teq = 419 [27] K  
Rp = 4.91 [0.95] Re  
a = 0.2697 [0.0432] AU  
Ag = 350.31 [125.45] [2.78σ]  
Teffp = 2804 [209] K [11.32σ]

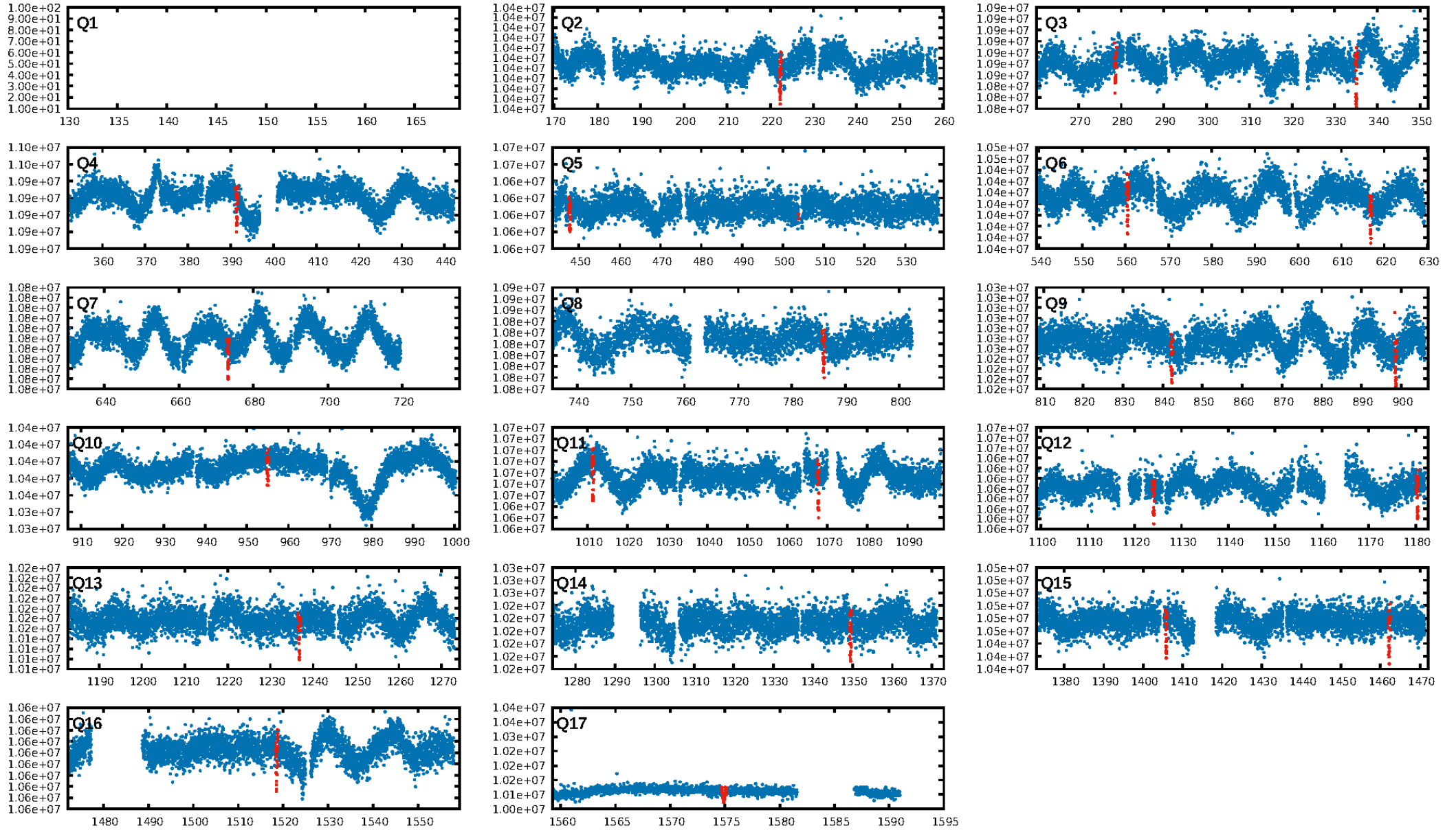
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 36.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.91e-293  
RollingBand-fgt: 1.00 [21/21]  
GhostDiagnostic-chr: 2.868  
Centroid-sig: 46.8%  
Centroid-so: 0.400 arcsec [1.31σ]  
OotOffset-rm: 0.268 arcsec [2.53σ]  
KicOffset-rm: 0.168 arcsec [1.61σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 1.00 [16/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 21:19:23 Z

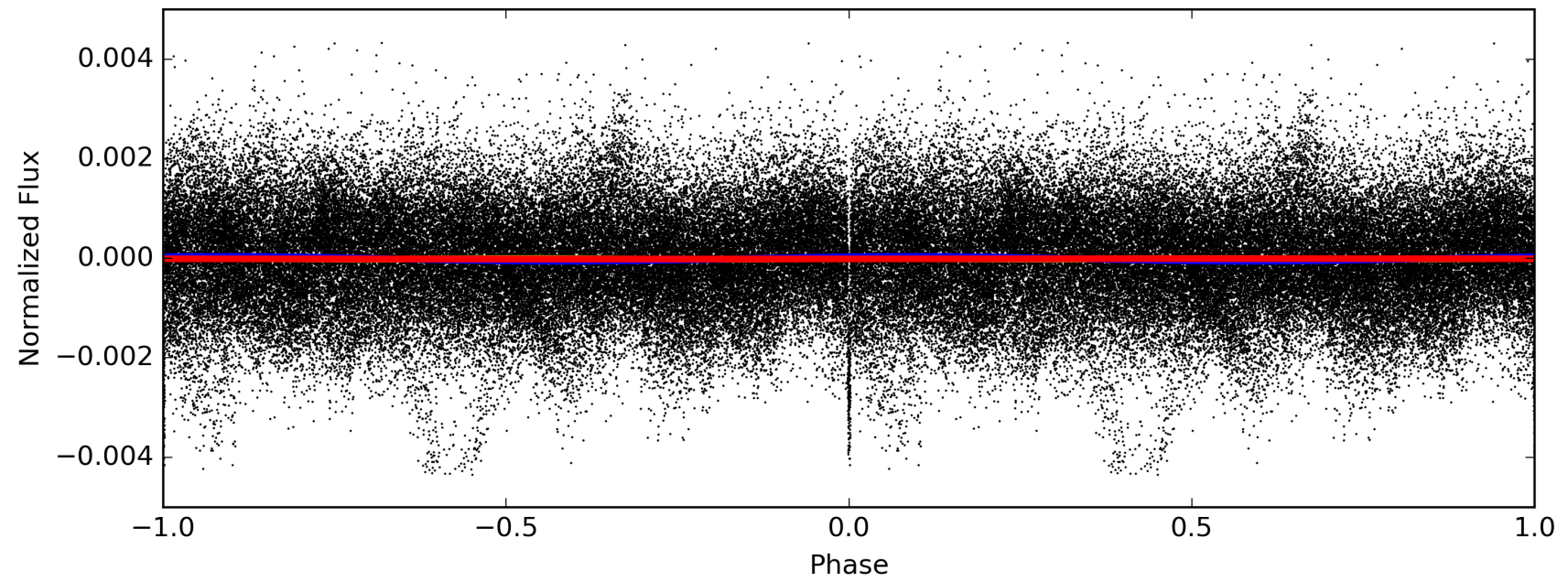
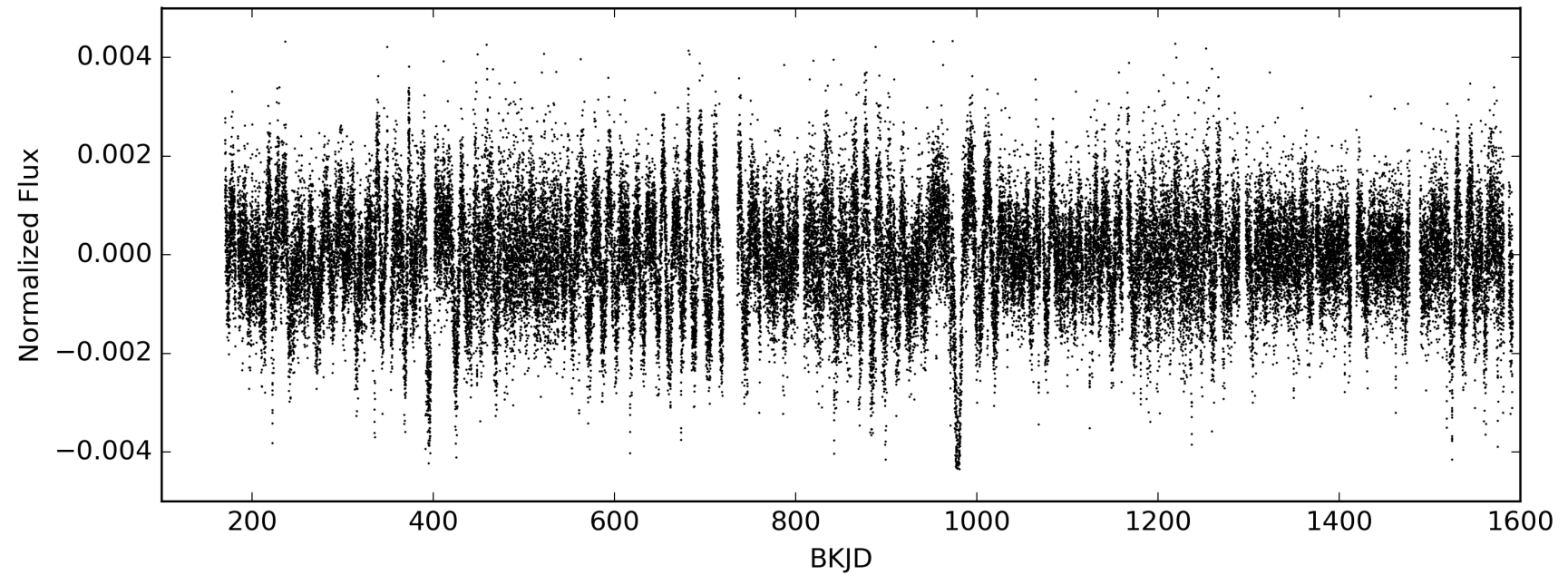
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 012406749-01, PDC Light Curves



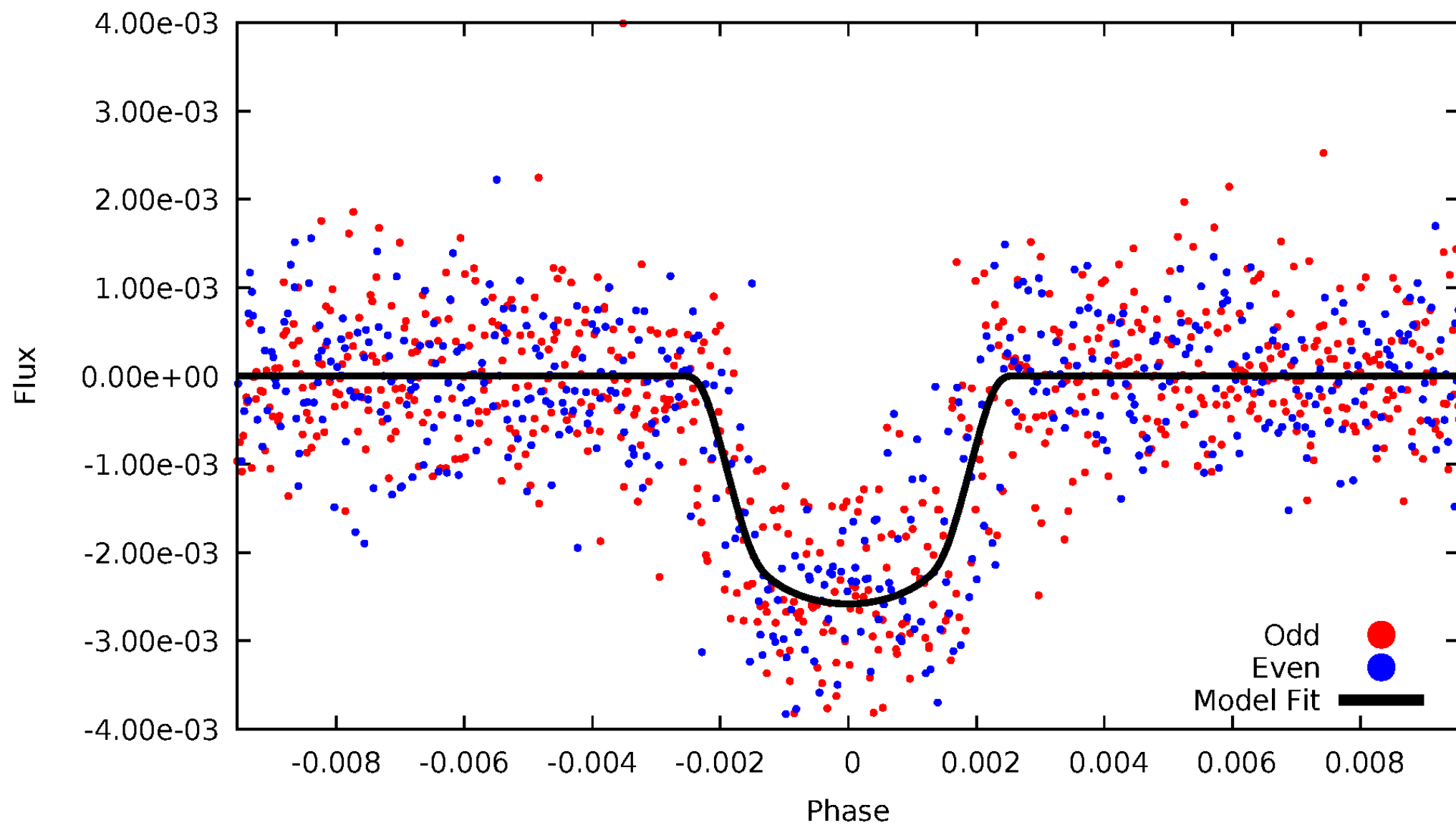
TCE 012406749-01

— P = 28.179 days    — P = 56.358 days    — P = 112.717 days



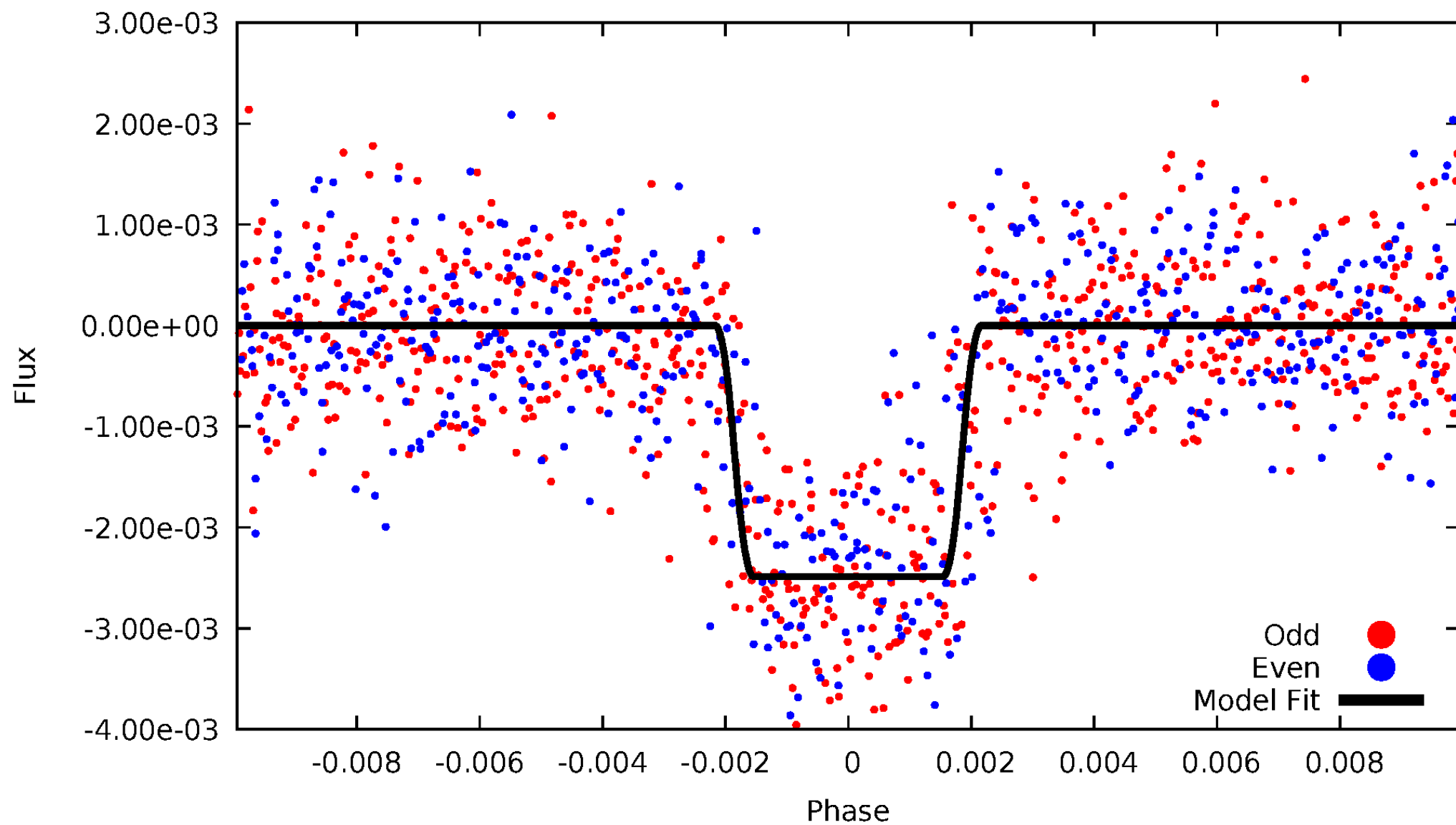
# DV Odd/Even

TCE 012406749-01



# ALT Odd/Even

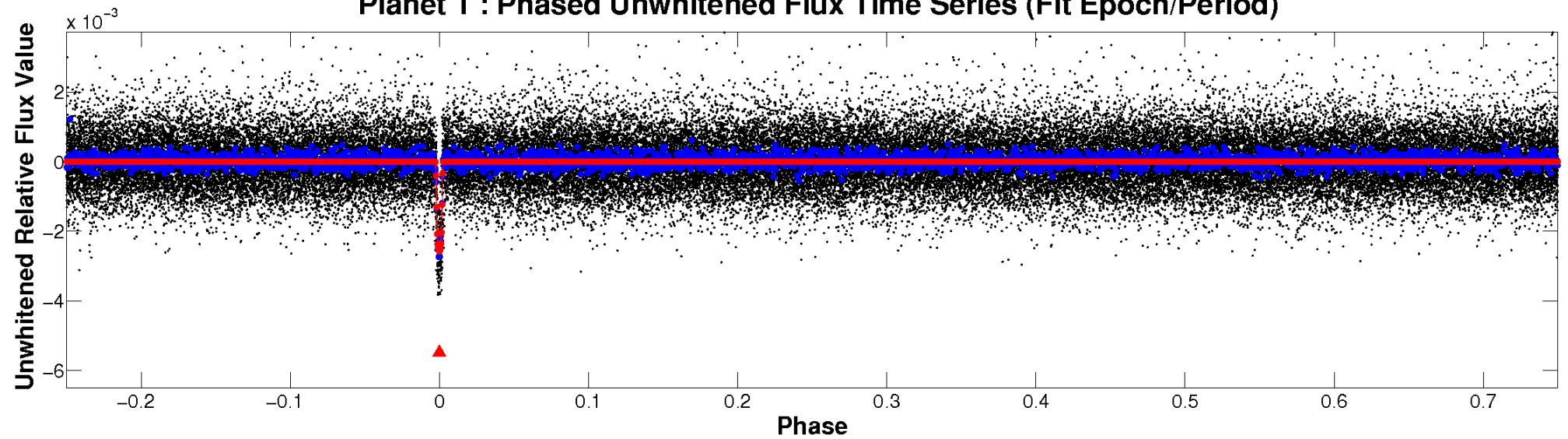
TCE 012406749-01



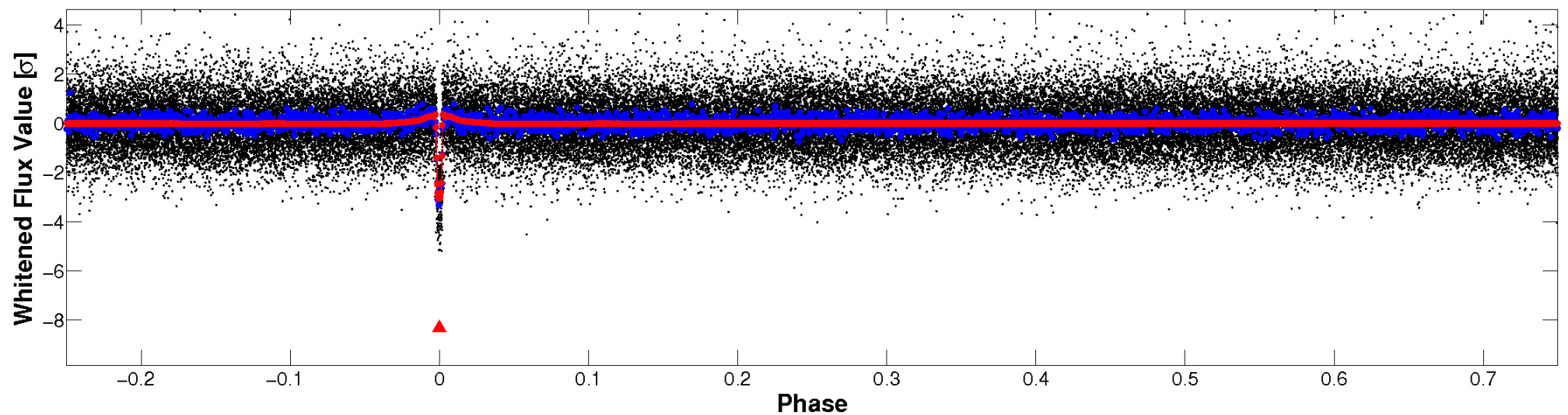


# Non-Whitened Vs. Whitened Light Curve

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

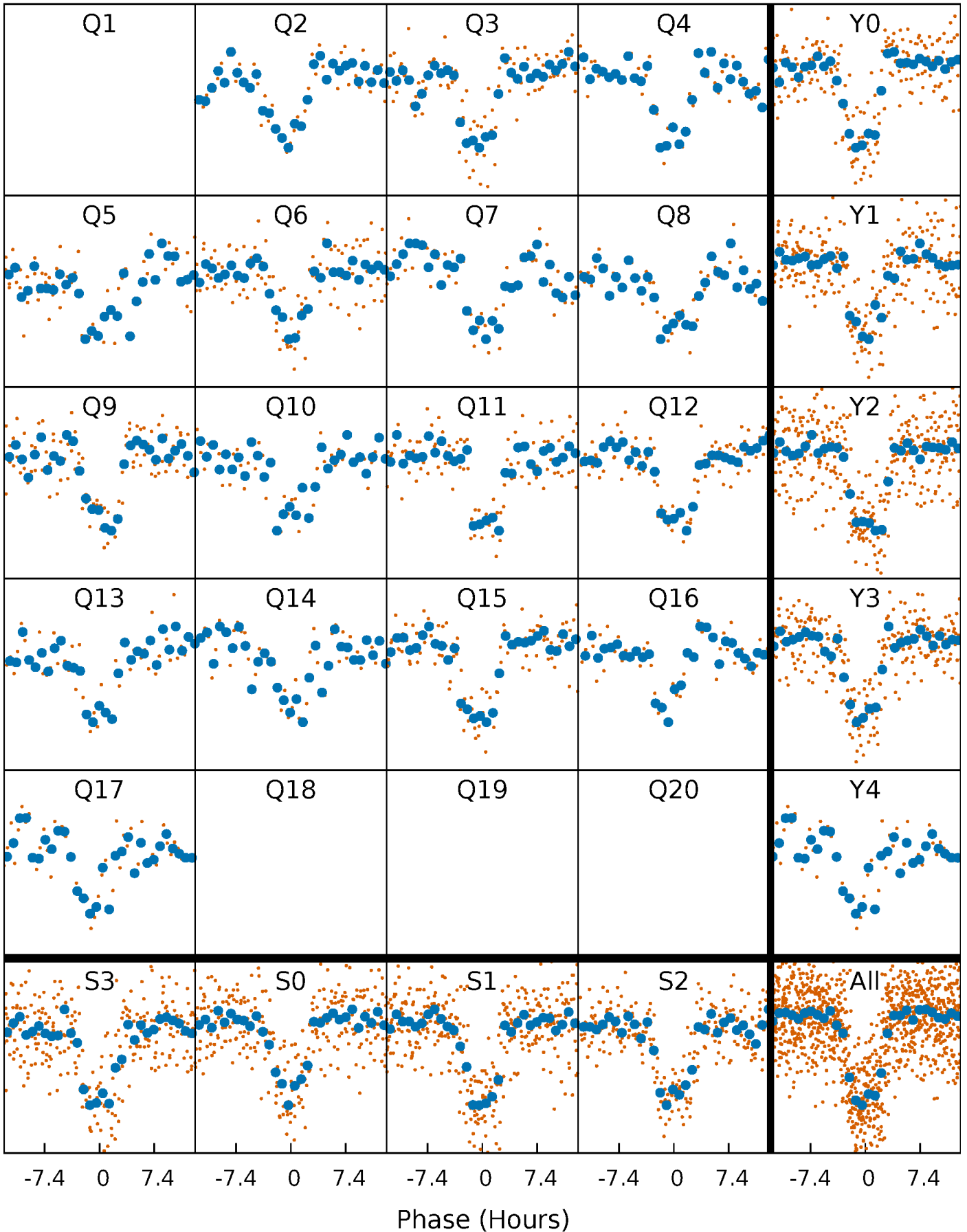


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

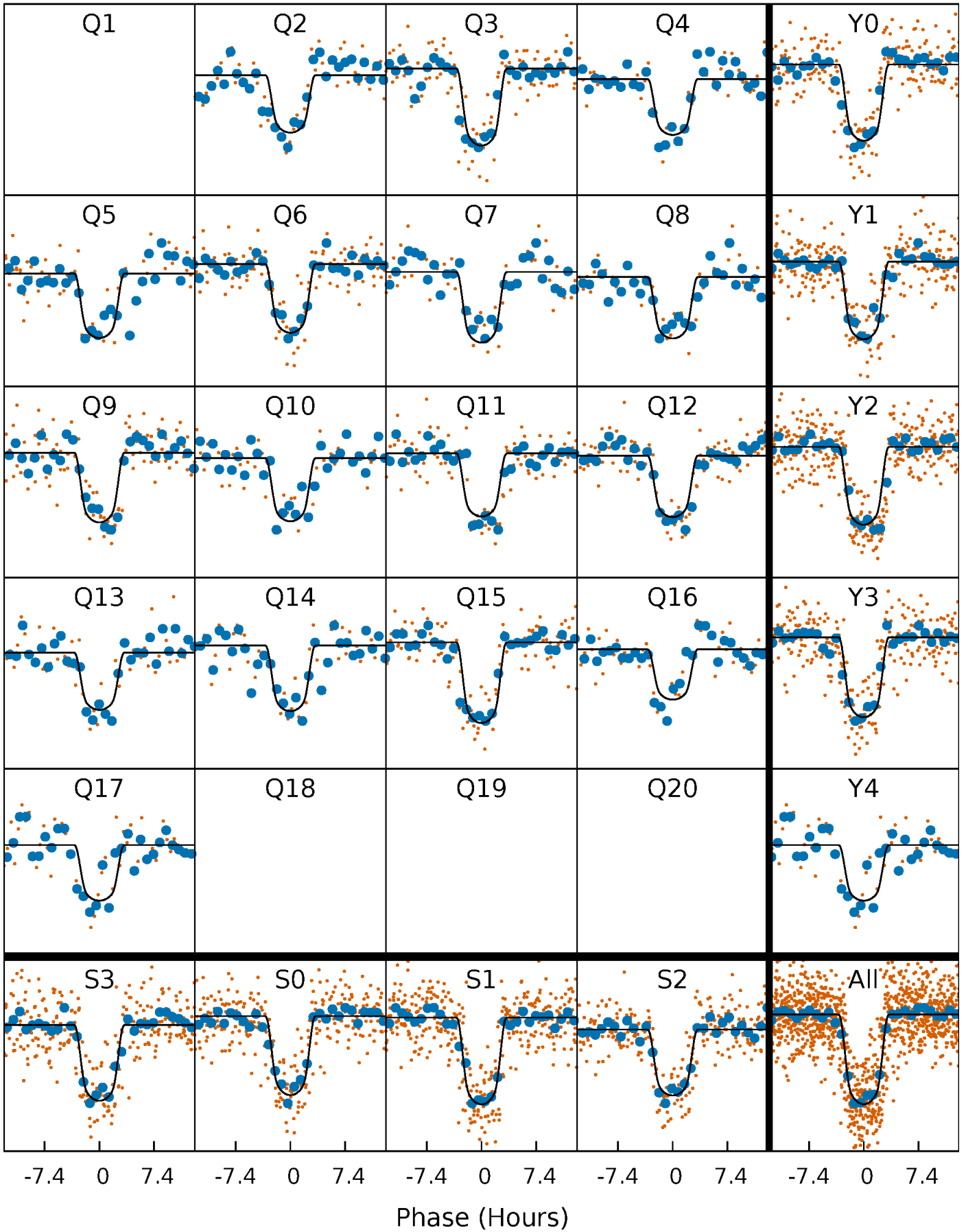
TCE 012406749-01 P= 56.358464 Days  $T_0=165.964847$  (BKJD)





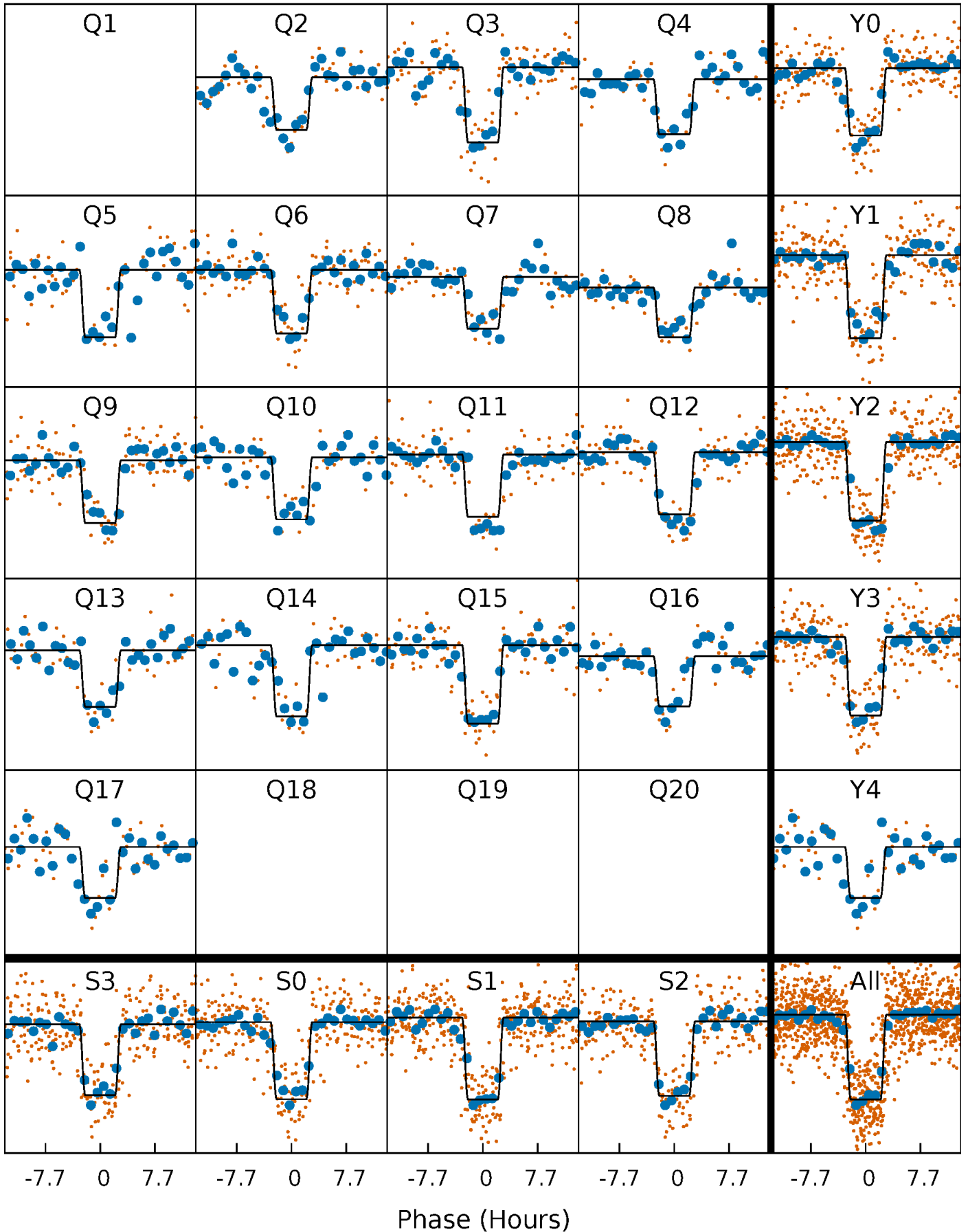
# DV Quarter-Phased Transit Curves

TCE 012406749-01 P= 56.358464 Days  $T_0=165.964847$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

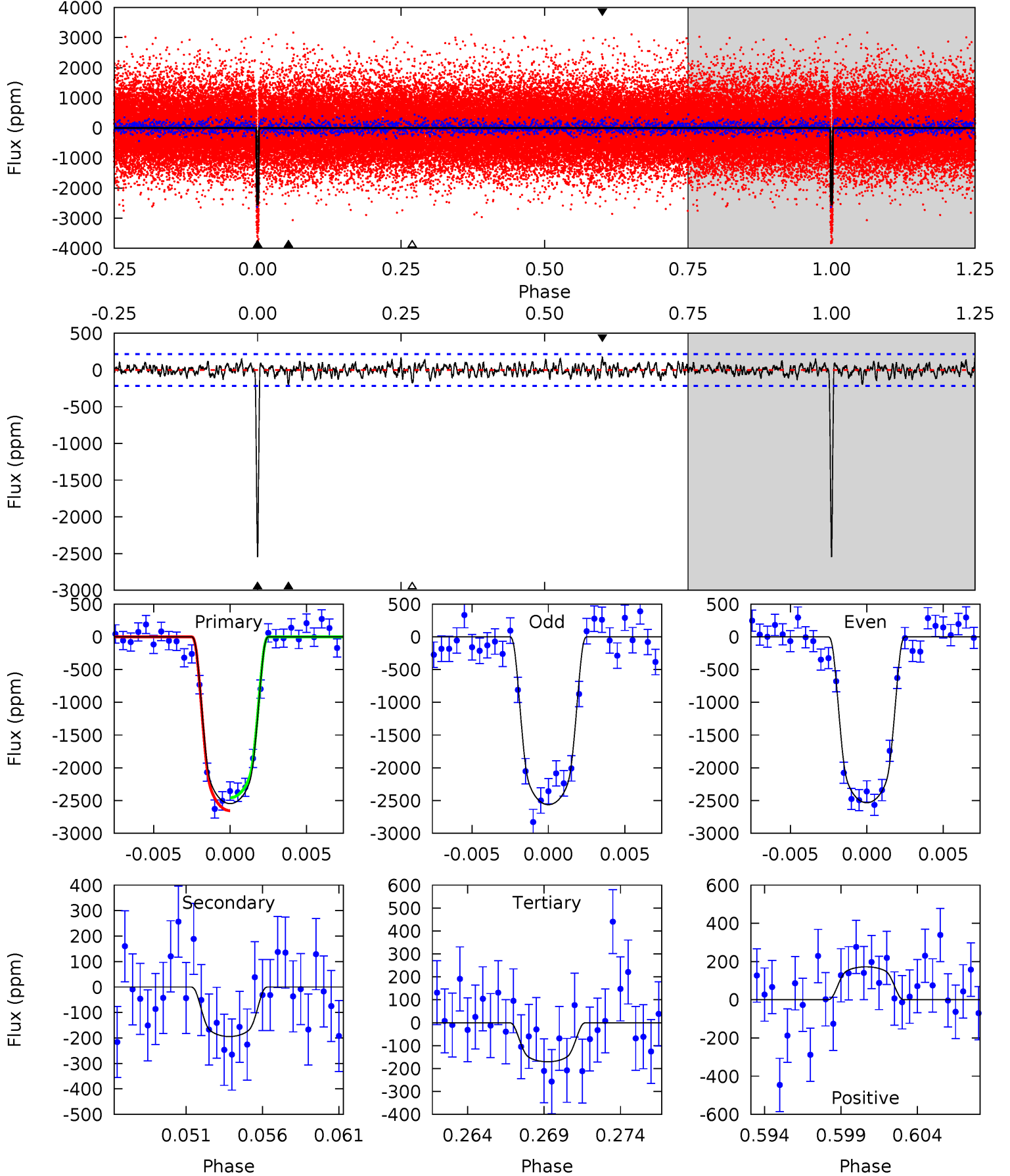
TCE 012406749-01 P= 56.358563 Days  $T_0=165.962631$  (BKJD)



# DV Model-Shift Uniqueness Test

012406749-01, P = 56.358464 Days, E = 165.964847 Days

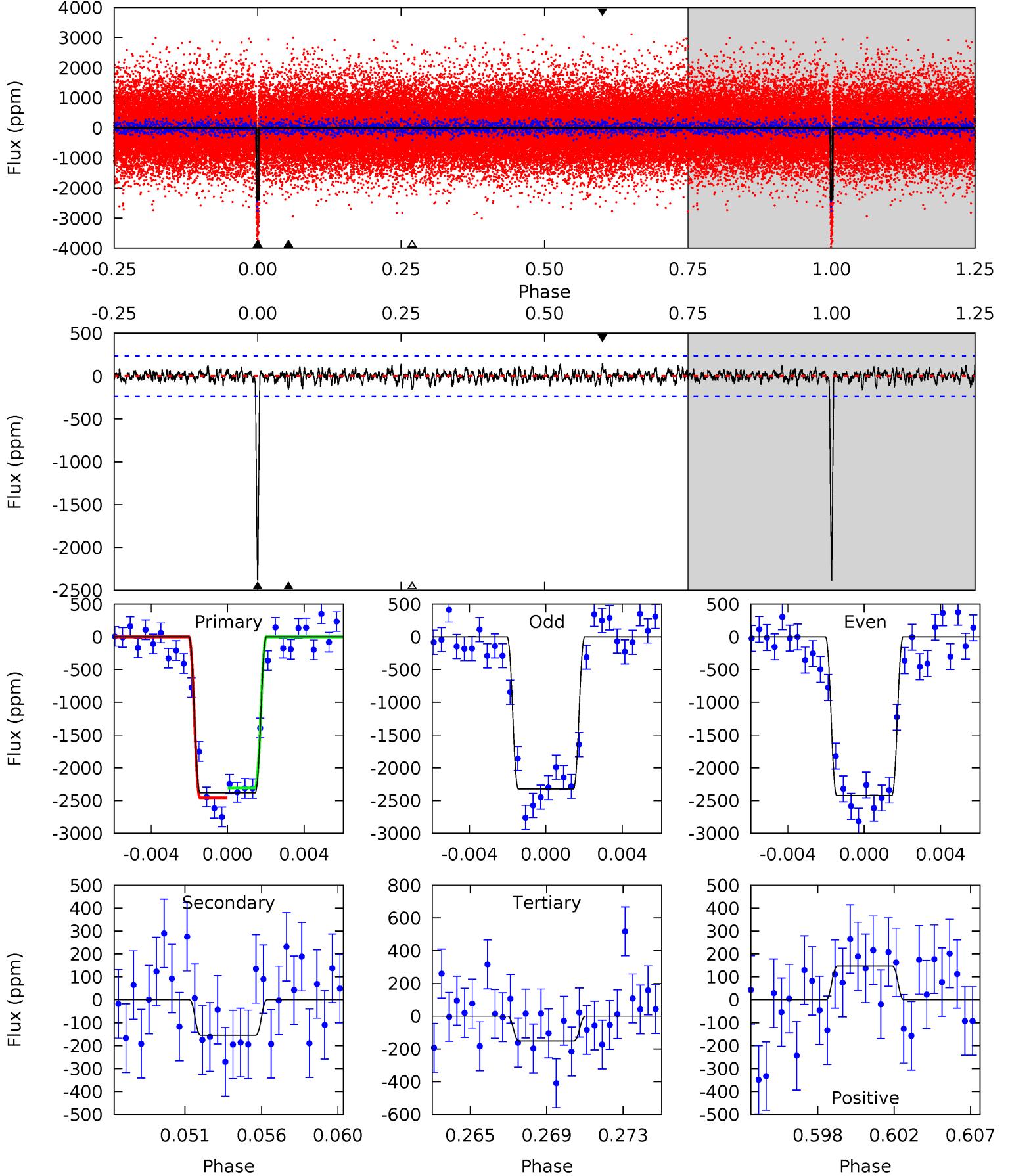
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
60.6	4.63	4.06	4.10	5.15	2.80	1.28	56.5	56.5	0.57	0.52	0.35	1.01	0.06	2.34



# Alt Model-Shift Uniqueness Test

012406749-01,  $P = 56.358563$  Days,  $E = 165.962631$  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
52.6	3.42	3.33	3.25	5.19	2.86	1.01	49.3	49.4	0.09	0.17	1.09	1.03	0.06	1.66



### Stellar Parameters For KIC 012406749

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5446^{+162}_{-162}$	$4.525^{+0.072}_{-0.126}$	$-0.200^{+0.300}_{-0.300}$	$0.821^{+0.157}_{-0.085}$	$0.824^{+0.096}_{-0.080}$	$2.093^{+0.581}_{-0.769}$
	+3%/-3%	+2%/-3%	+150%/-150%	+19%/-10%	+12%/-10%	+28%/-37%
Source	PHO1	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 012406749-01 / KOI 1476.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-194 \pm 42$	$4.98^{+0.52}_{-0.40}$	$591^{+29}_{-25}$	$3290^{+129}_{-140}$	$307^{+94}_{-79}$
Alt.	$-155 \pm 45$	$4.53^{+0.47}_{-0.36}$	$590^{+32}_{-27}$	$3276^{+152}_{-176}$	$303^{+107}_{-101}$

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

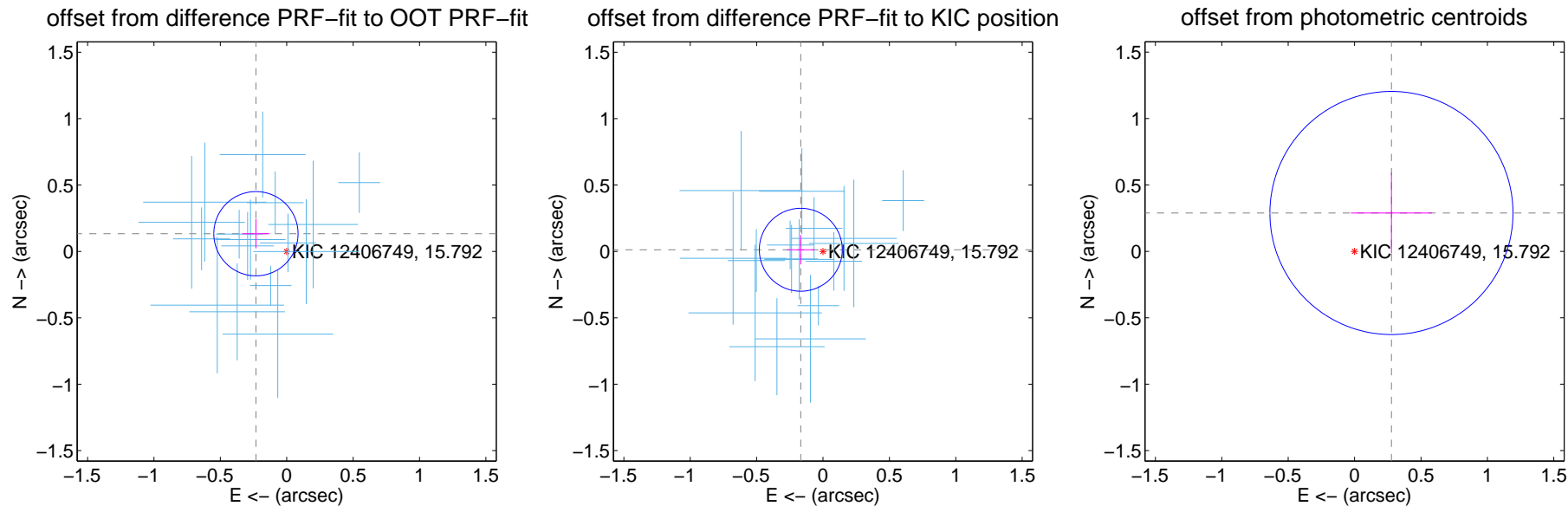
## DV Centroid Data

Supplemental centroid analysis for 012406749-01. Kepler magnitude: 15.79. Transit SNR 40.21

There are 16 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

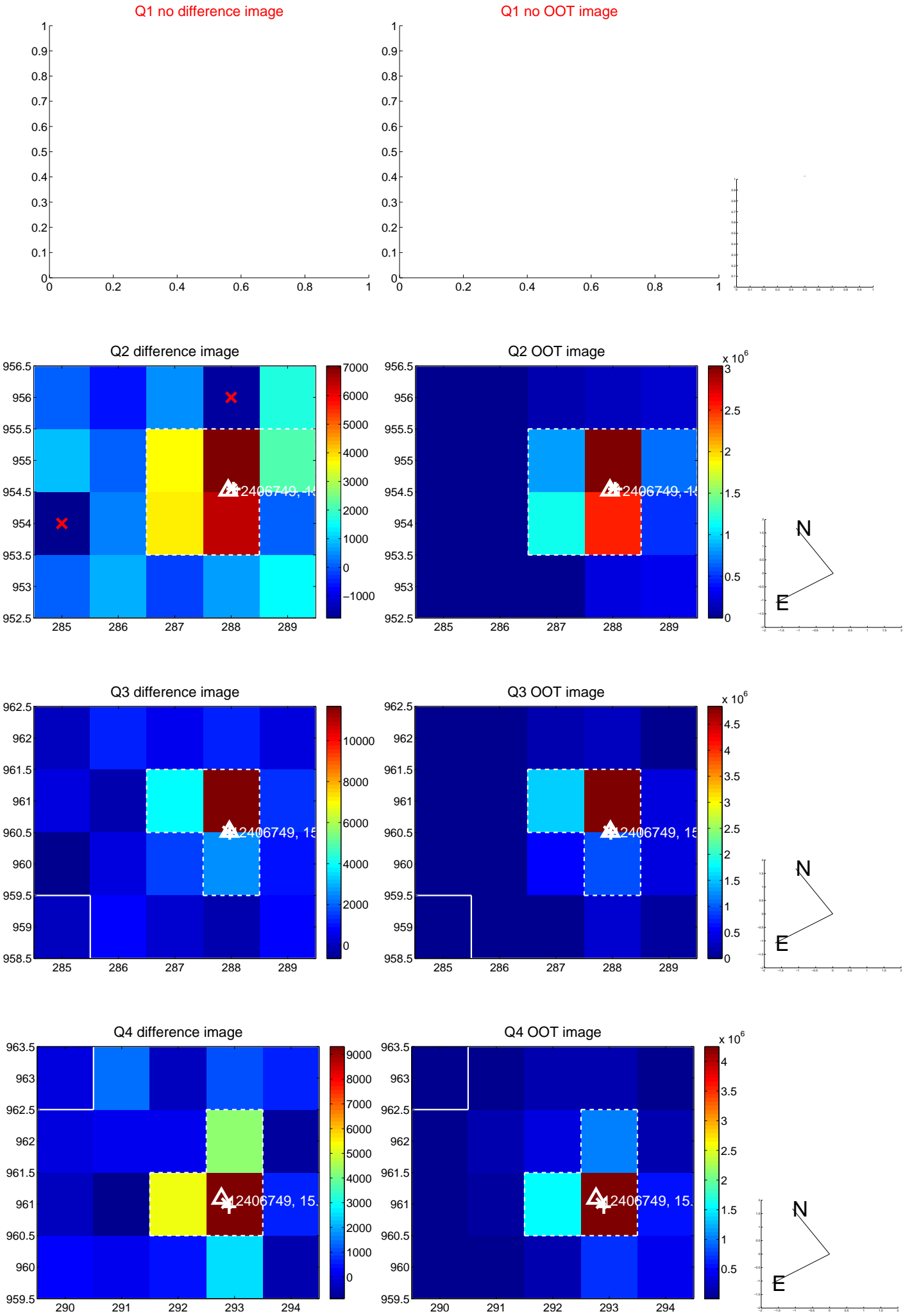
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.268 \pm 0.106$	2.53	$0.232 \pm 0.104$	$0.133 \pm 0.111$
PRF-fit source offset from KIC position	$0.168 \pm 0.104$	1.61	$0.167 \pm 0.104$	$0.013 \pm 0.111$
photometric centroid source offset	$0.40 \pm 0.31$	1.31	$-0.28 \pm 0.31$	$0.29 \pm 0.30$



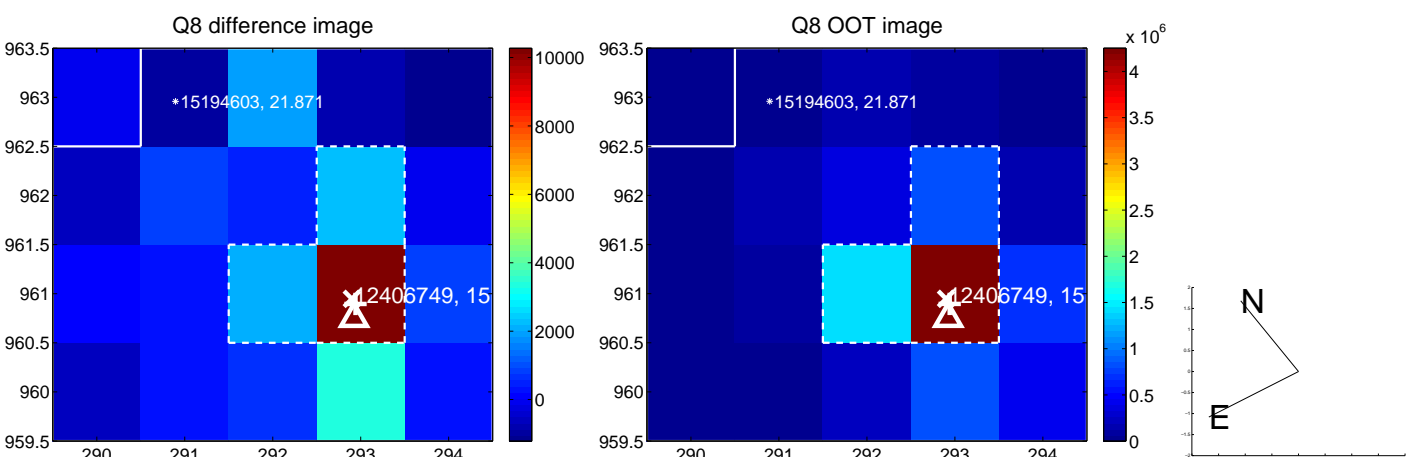
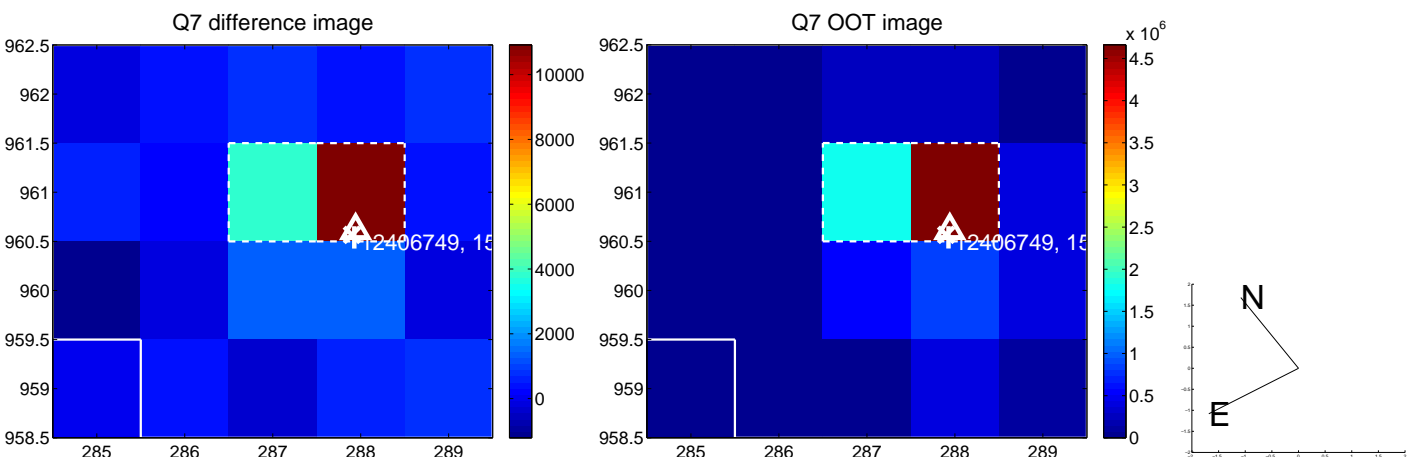
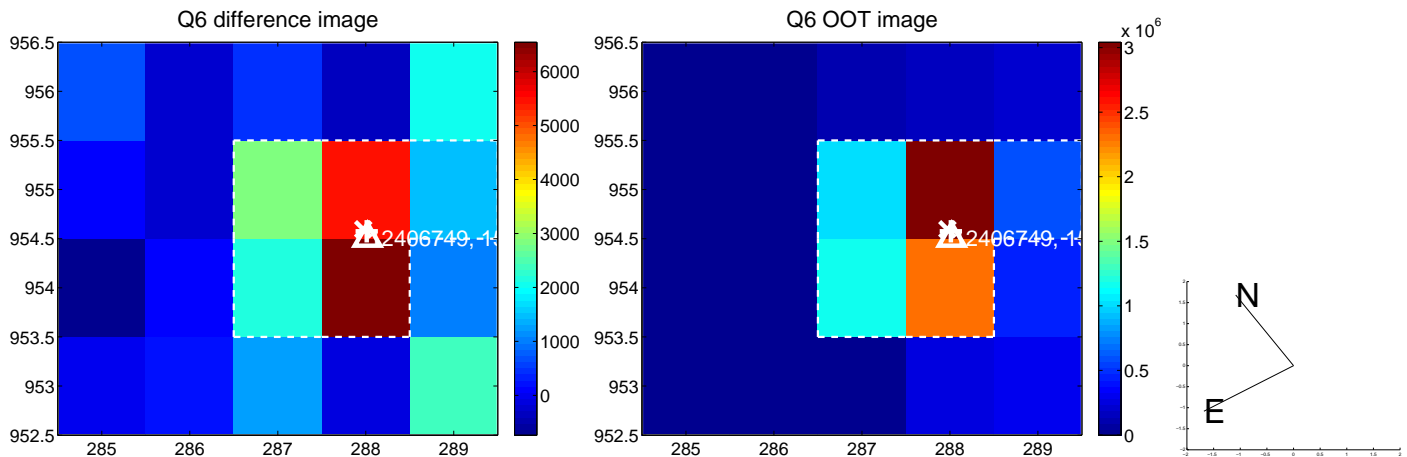
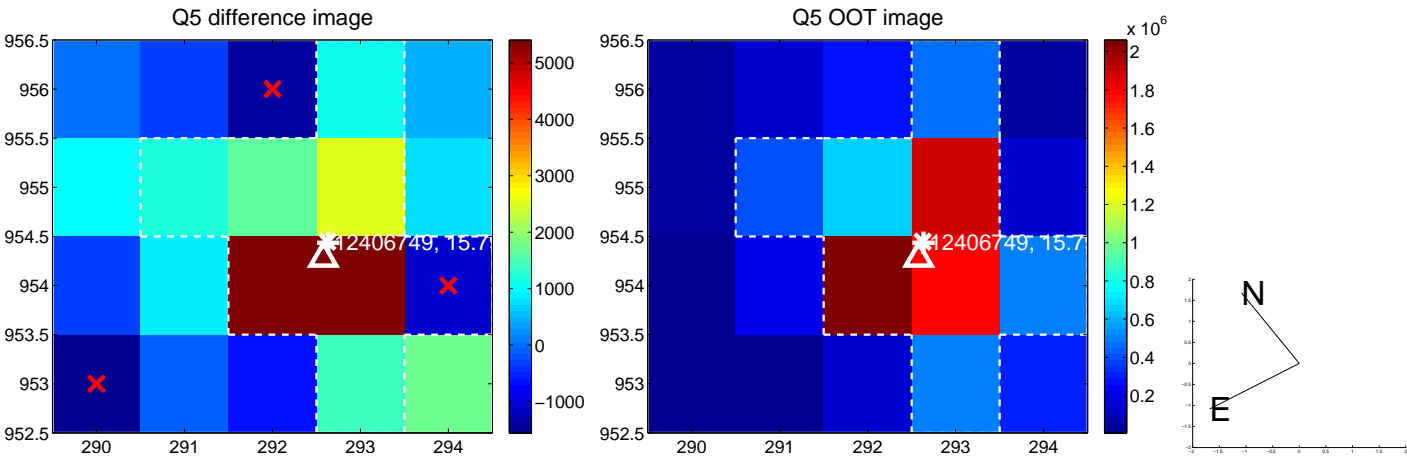
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



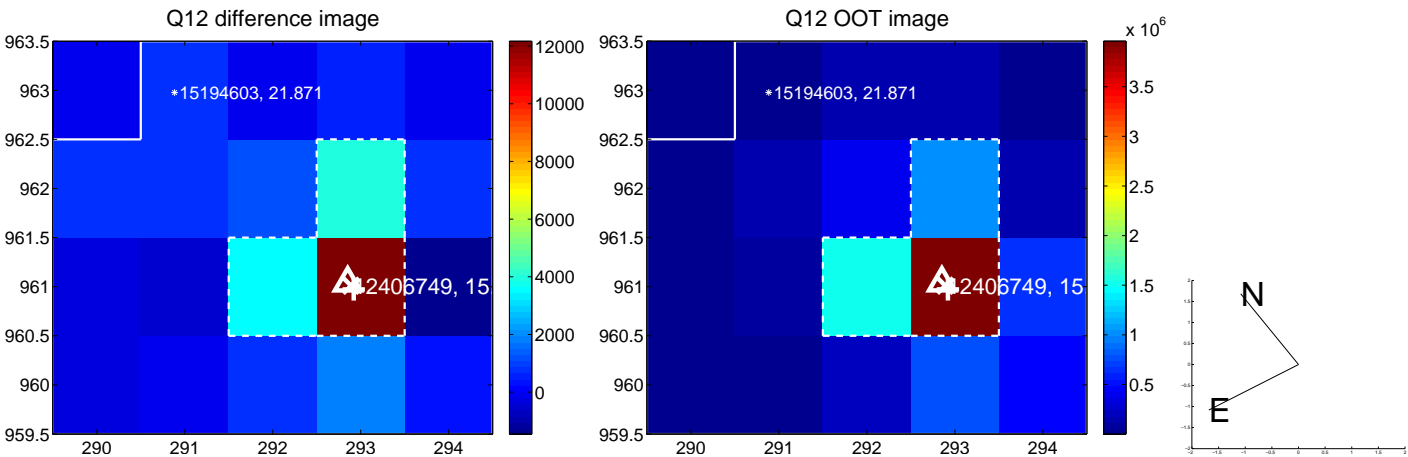
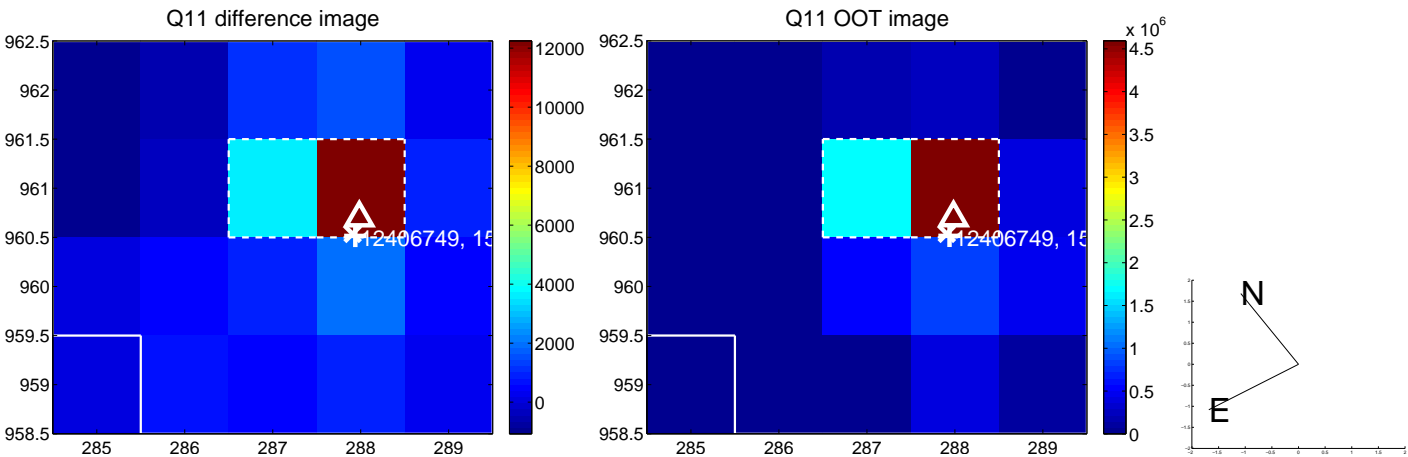
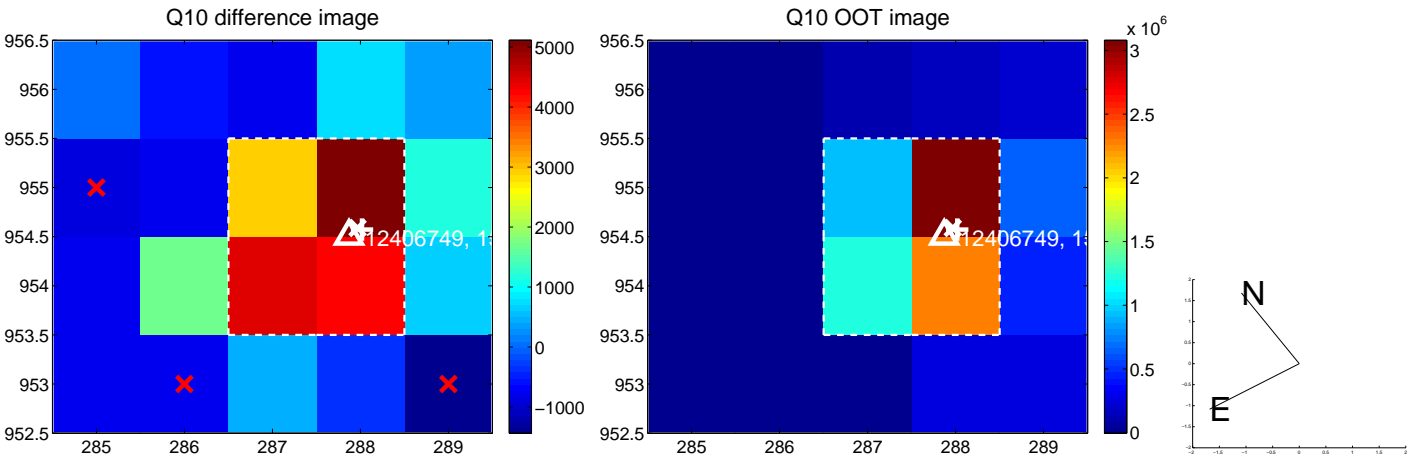
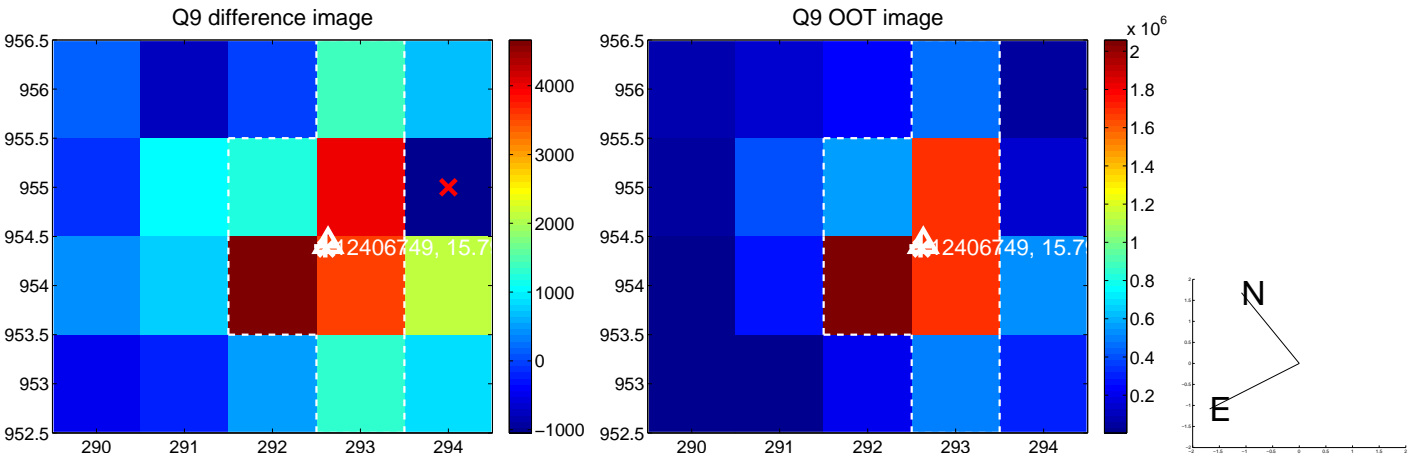
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



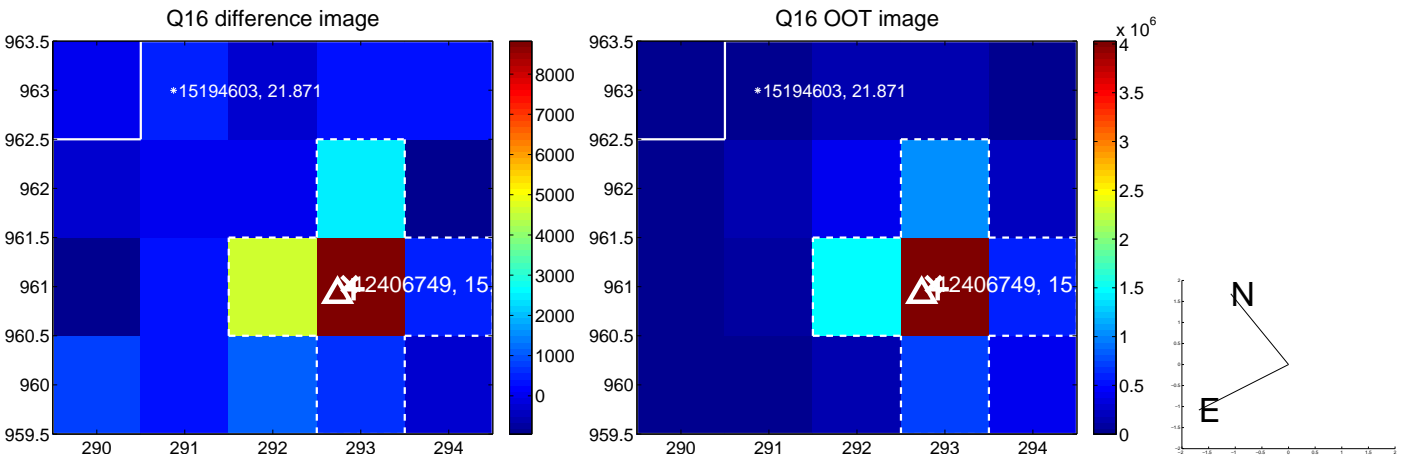
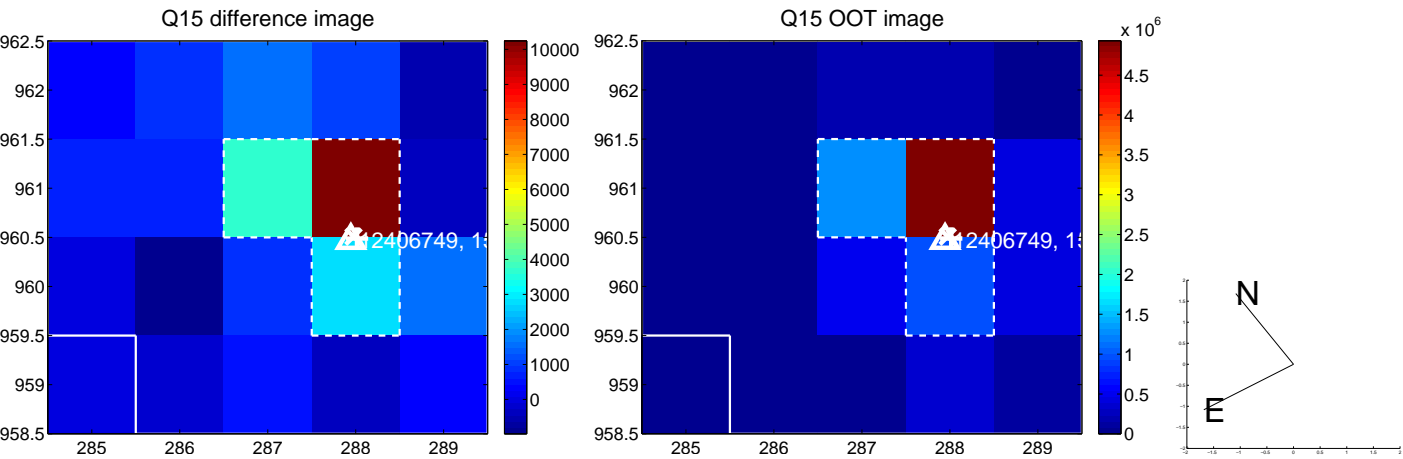
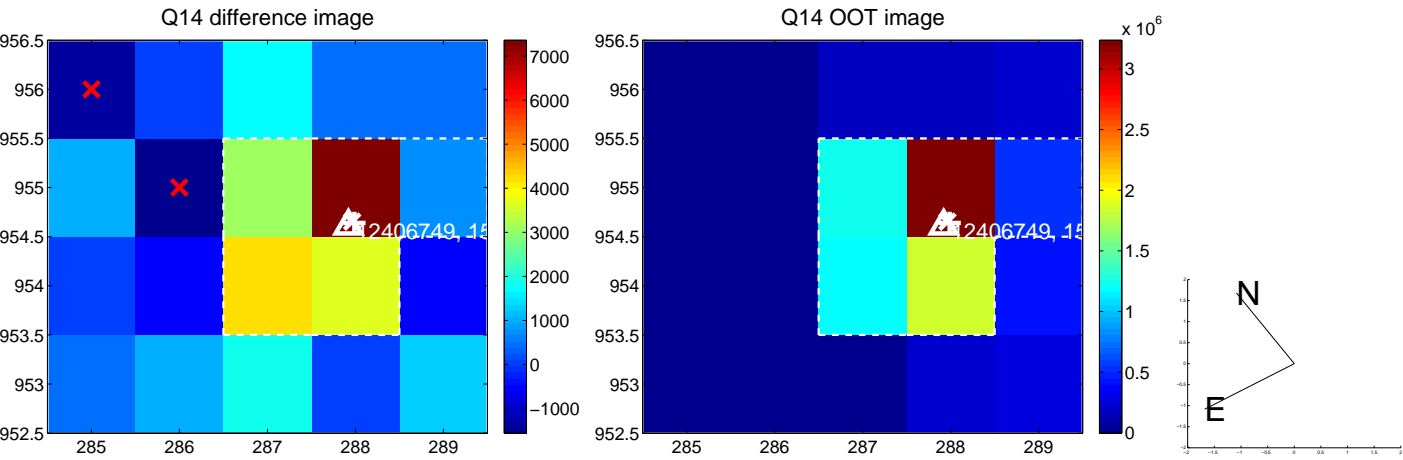
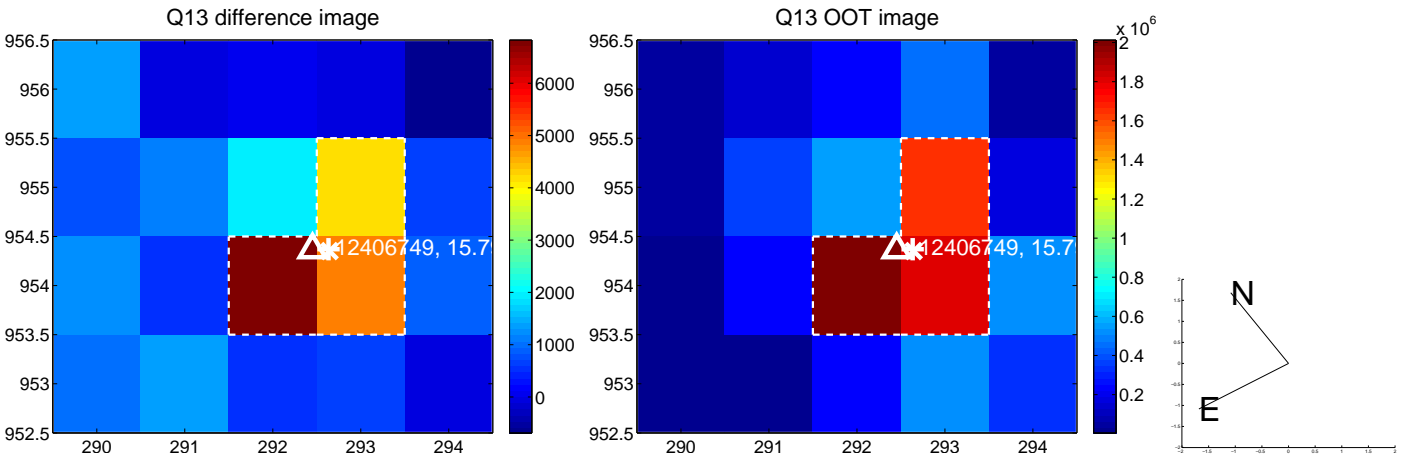
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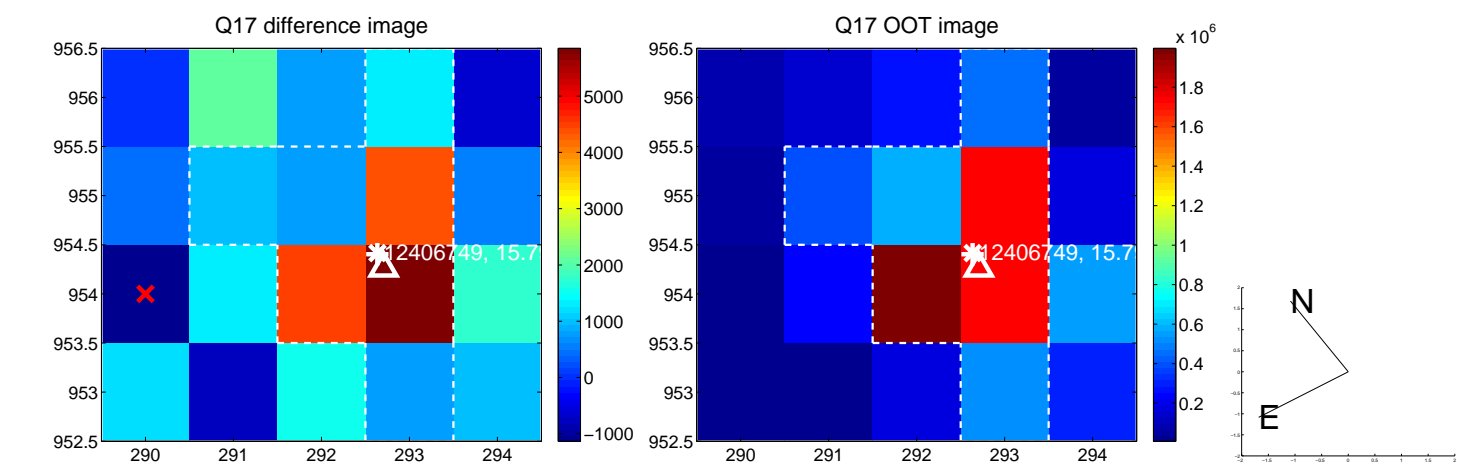
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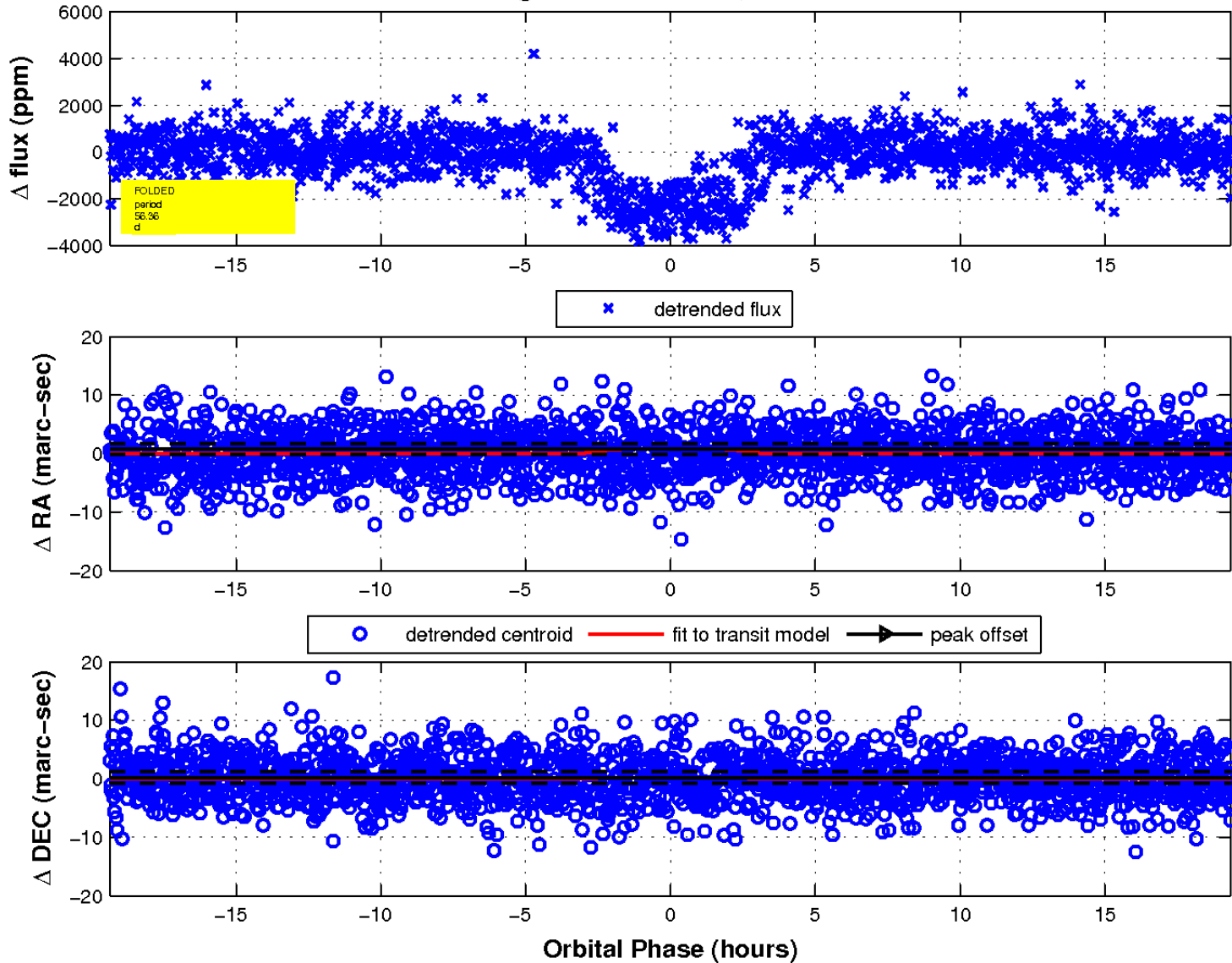
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



# UKIRT Image

Declination

