

# KIC 009456281

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009456281-01	OBS	4207.01	0.701943	132.002504	200.8	0.761	12.8	19.4	0.54	4236	0.93	536.26

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009456281-01	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.

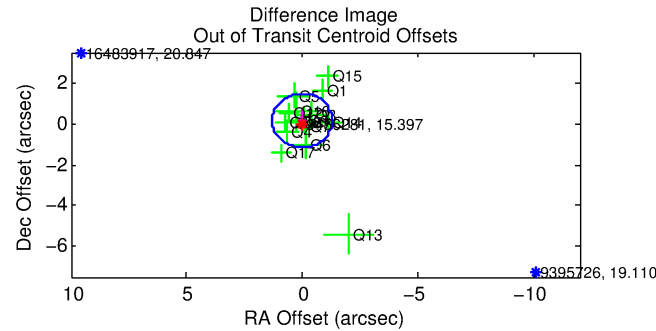
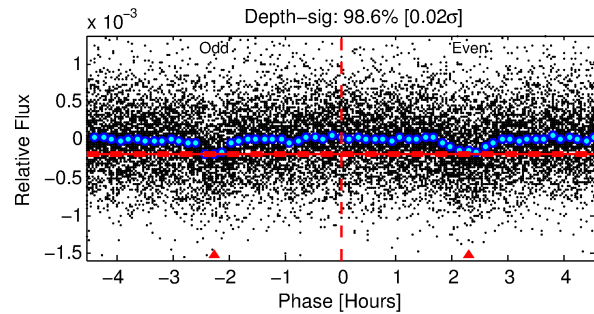
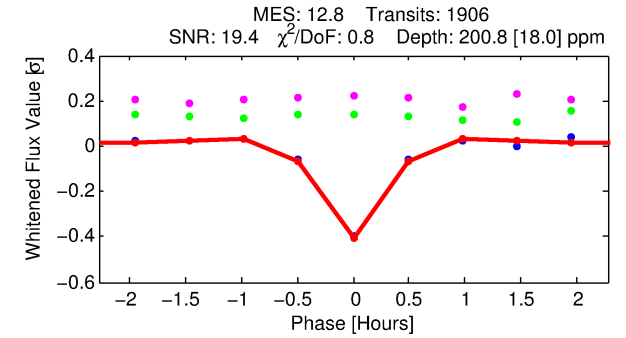
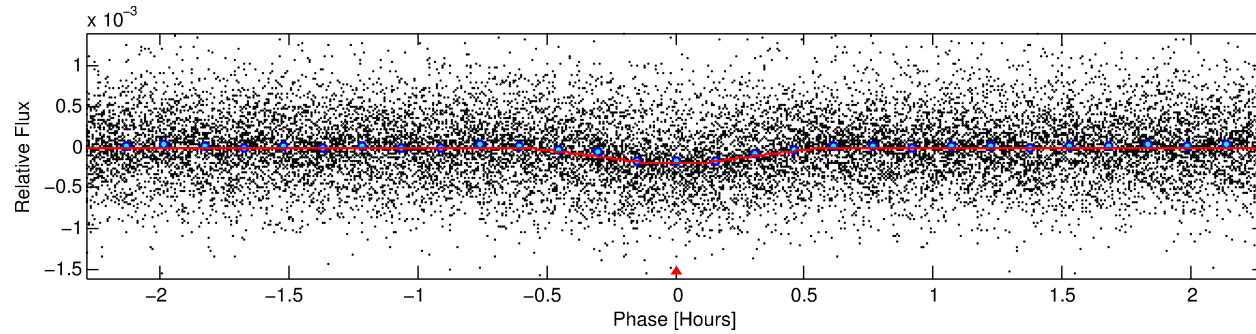
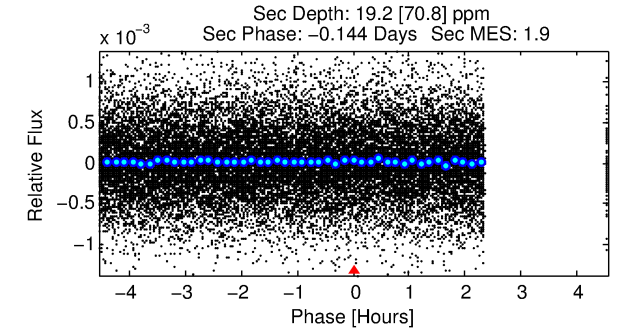
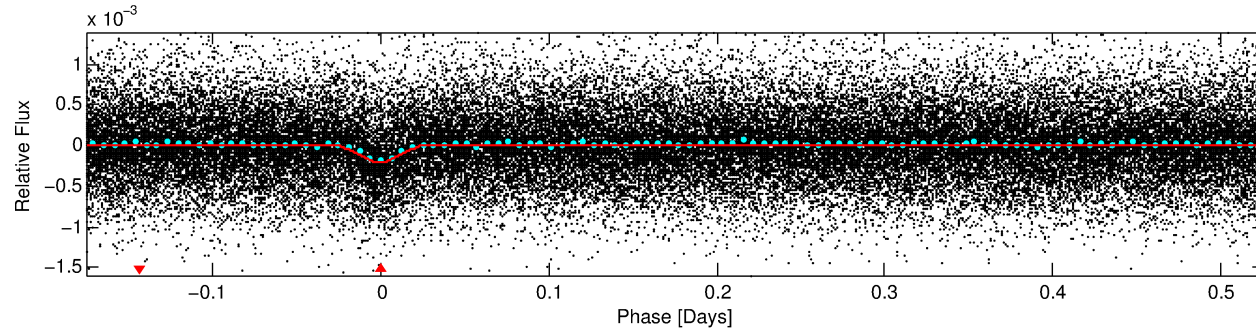
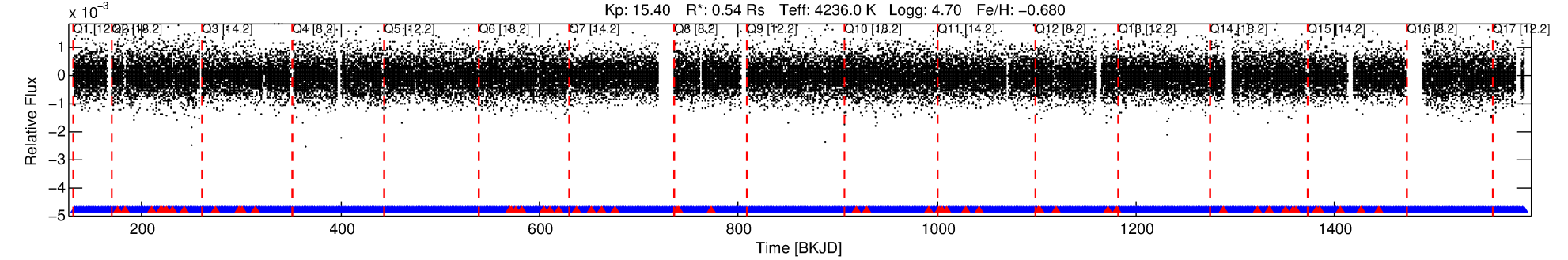
## Ephemeris Match Information For 009456281-01

No Significant Match Found

# DV One-Page Summary

KIC: 9456281 Candidate: 1 of 1 Period: 0.702 d

KOI: K04207.01 Corr: 0.948



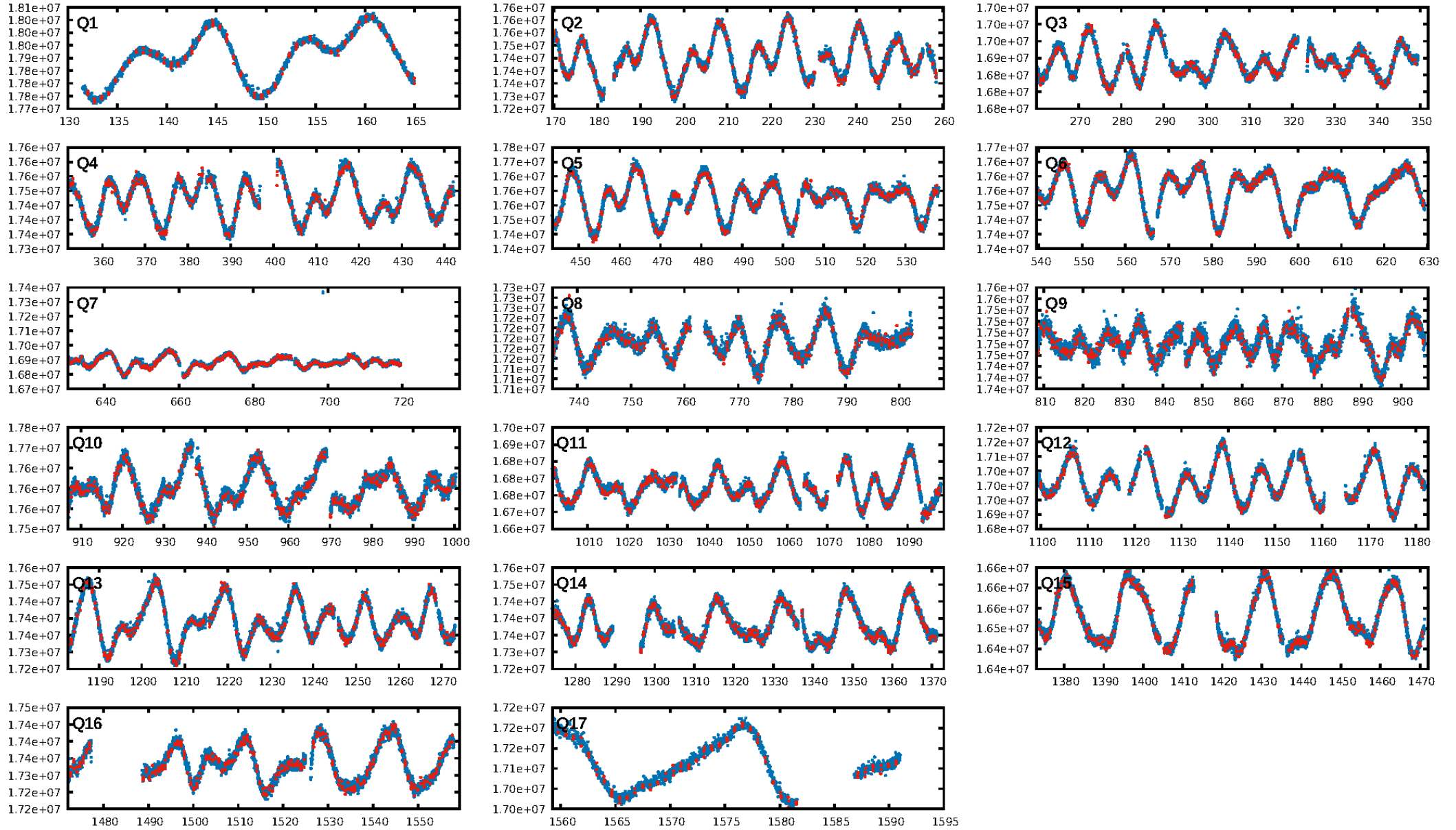
## DV Fit Results:

Period = 0.70194 [0.00001] d  
Epoch = 132.0025 [0.0007] BKJD  
Rp/R\* = 0.0158 [0.0055]  
a/R\* = 3.49 [5.09]  
b = 0.90 [0.36]  
Seff = 536.26 [96.43]  
Teff = 1227 [55] K  
Rp = 0.93 [0.34] Re  
a = 0.0125 [0.0011] AU  
Ag = 1.92 [7.20] [0.13σ]  
Teffp = 2232 [2097] K [0.48σ]

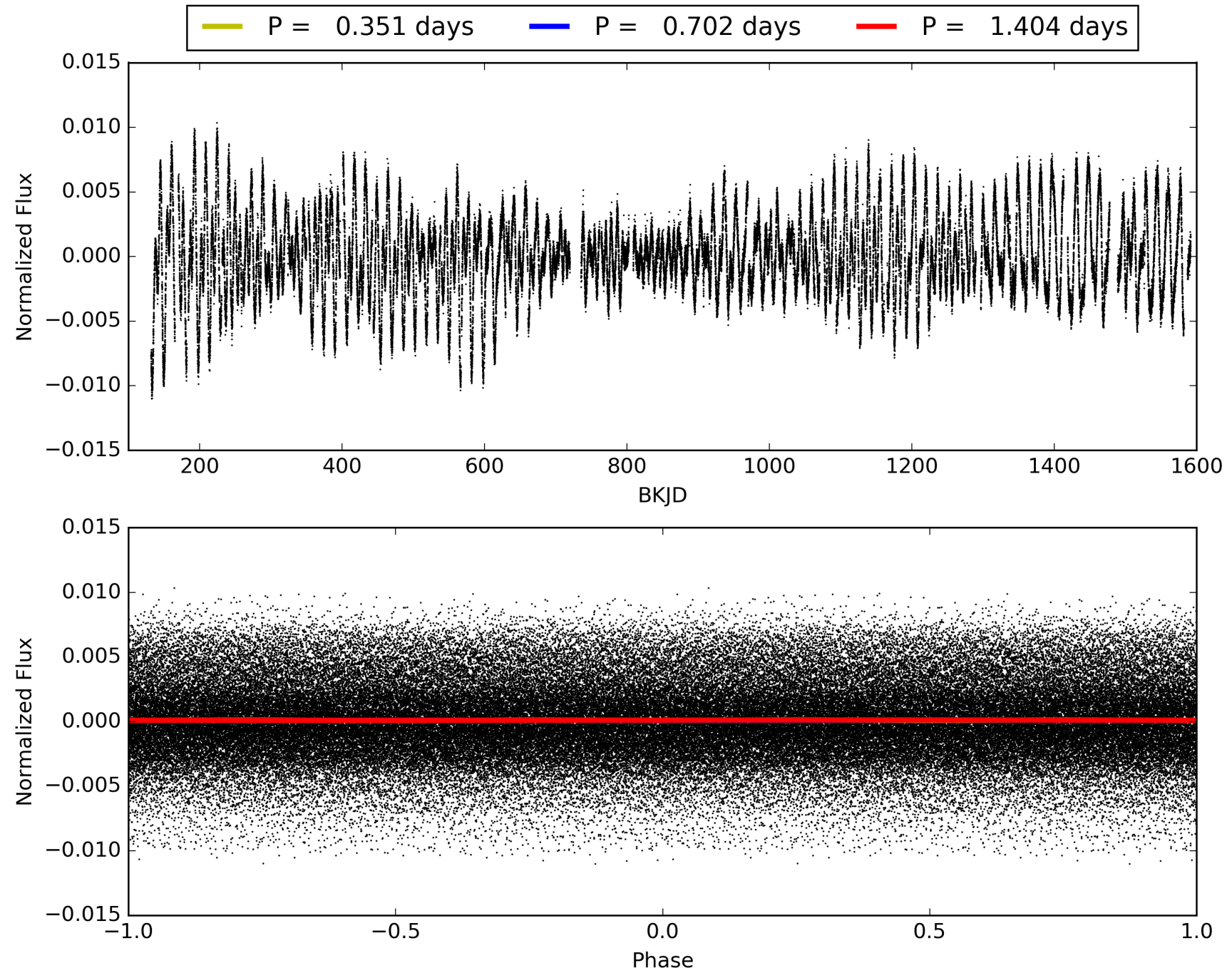
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 9.54e-35  
RollingBand-fgt: 0.97 [1767/1820]  
GhostDiagnostic-chr: 58.85  
Centroid-sig: 0.0%  
Centroid-so: 1.342 arcsec [2.06σ]  
OotOffset-rm: 0.162 arcsec [0.37σ]  
KicOffset-rm: 0.050 arcsec [0.23σ]  
OotOffset-st: 2/4/4/5 [15]  
KicOffset-st: 2/4/4/5 [15]  
DiffImageQuality-fgm: 0.87 [13/15]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009456281-01, PDC Light Curves

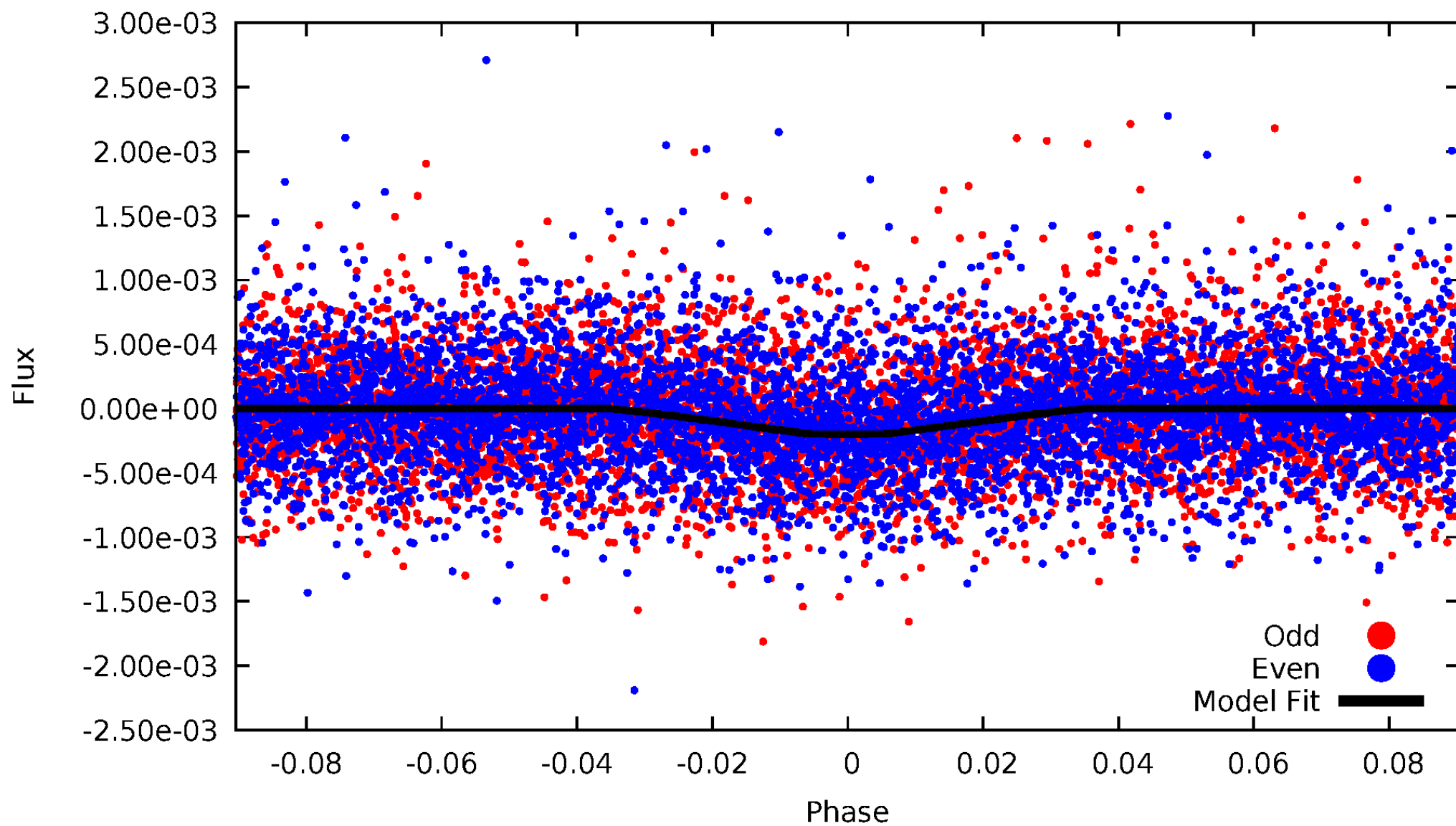


TCE 009456281-01



# DV Odd/Even

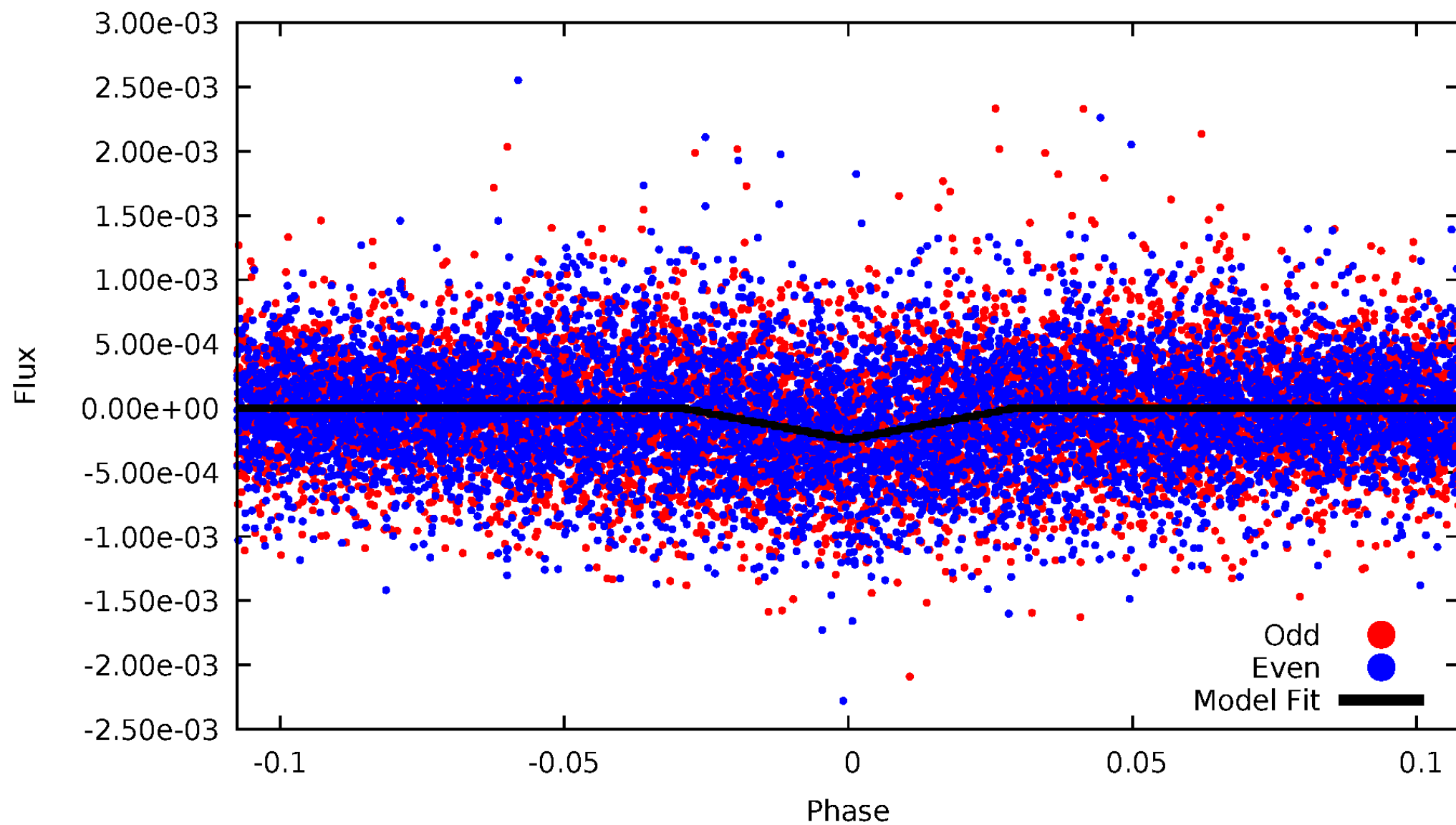
TCE 009456281-01





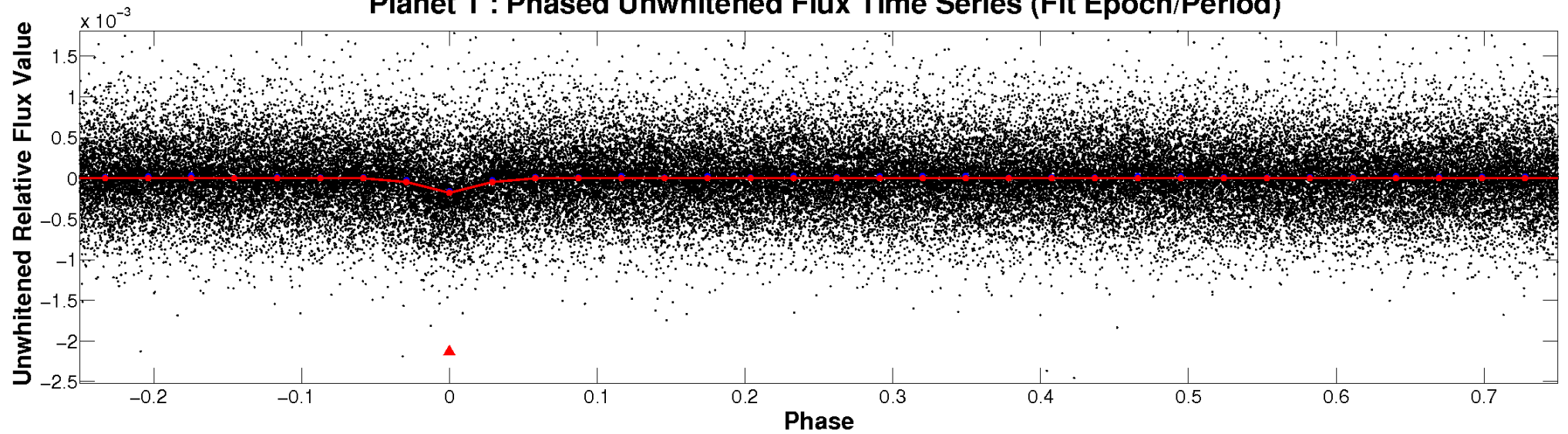
# ALT Odd/Even

TCE 009456281-01

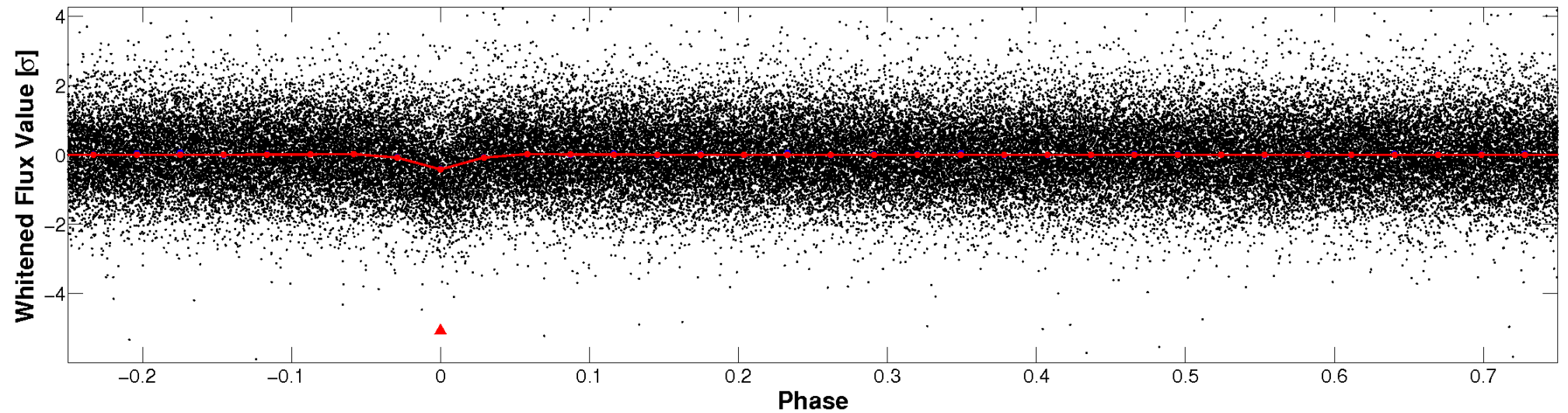


# Non-Whitened Vs. Whitened Light Curve

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

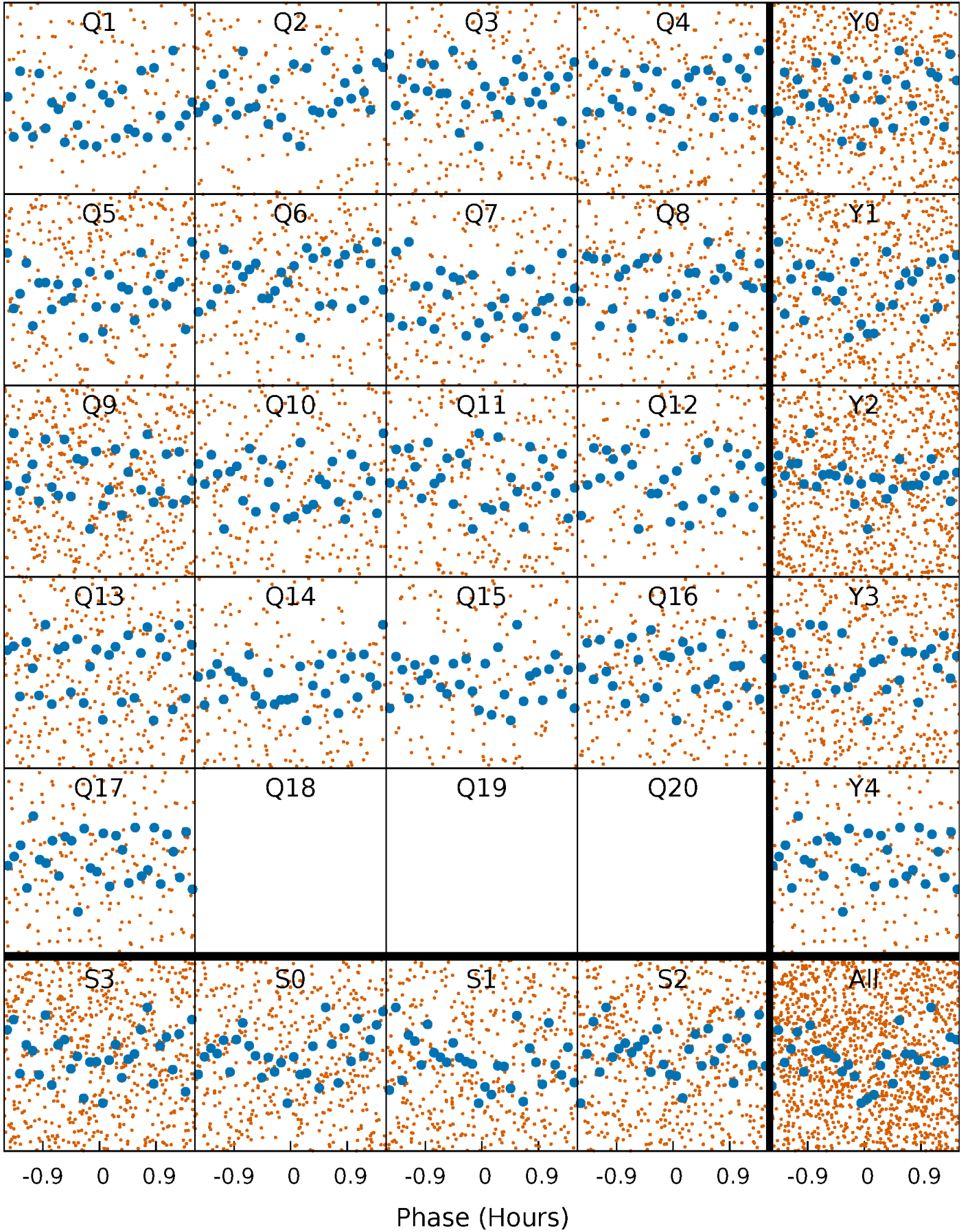


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

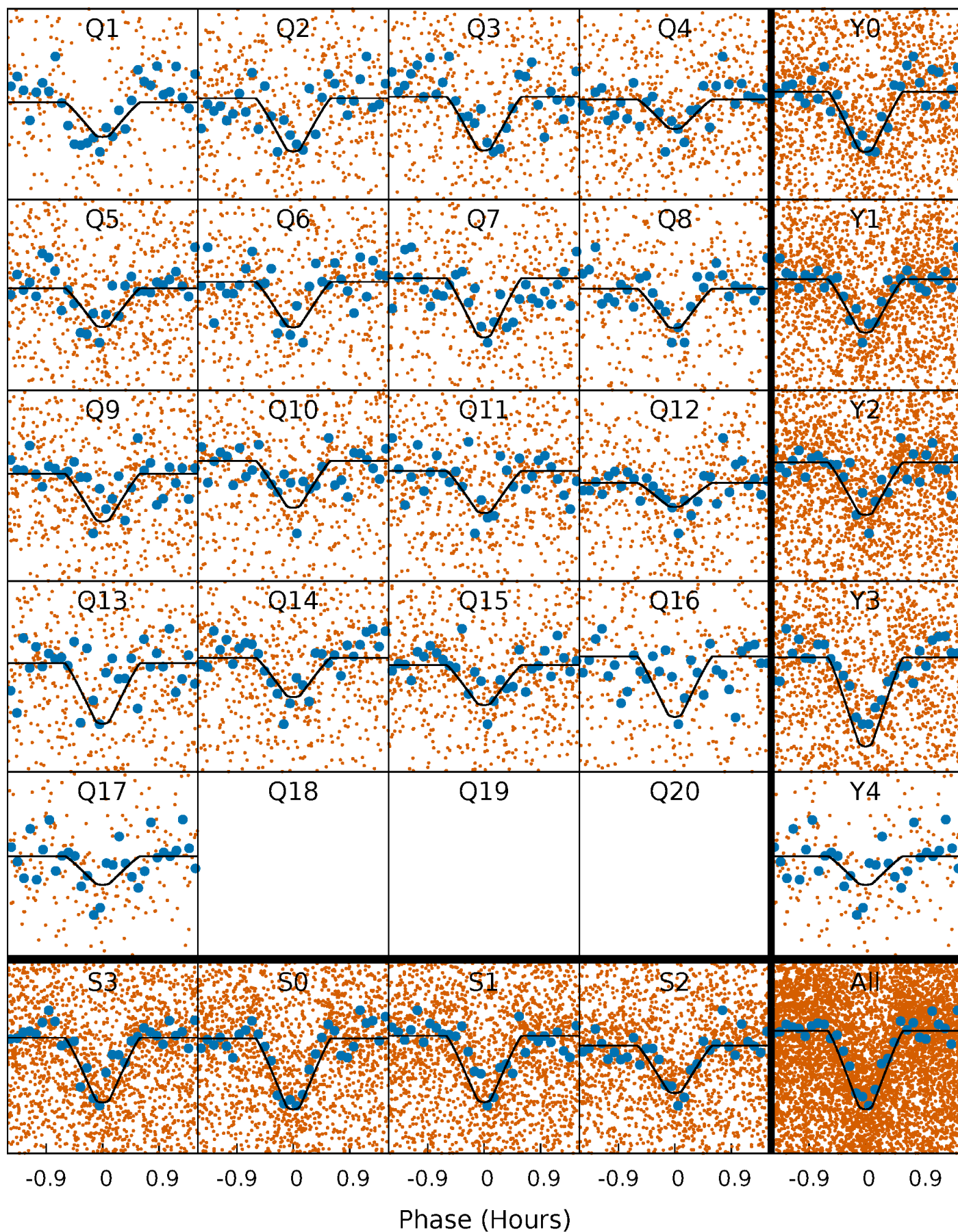
TCE 009456281-01   P= 0.701943 Days    $T_0=132.002504$  (BKJD)





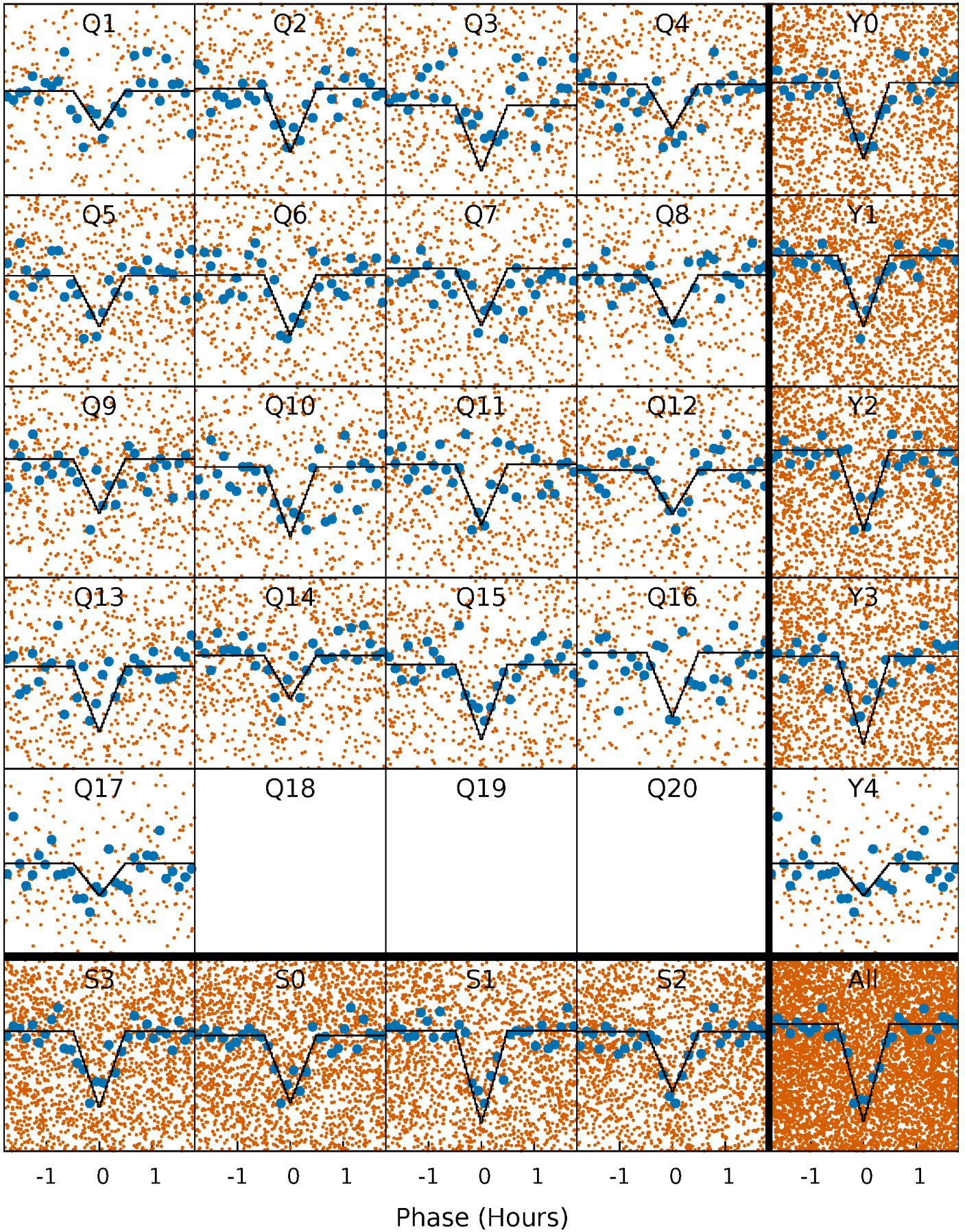
# DV Quarter-Phased Transit Curves

TCE 009456281-01 P= 0.701943 Days  $T_0=132.002504$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

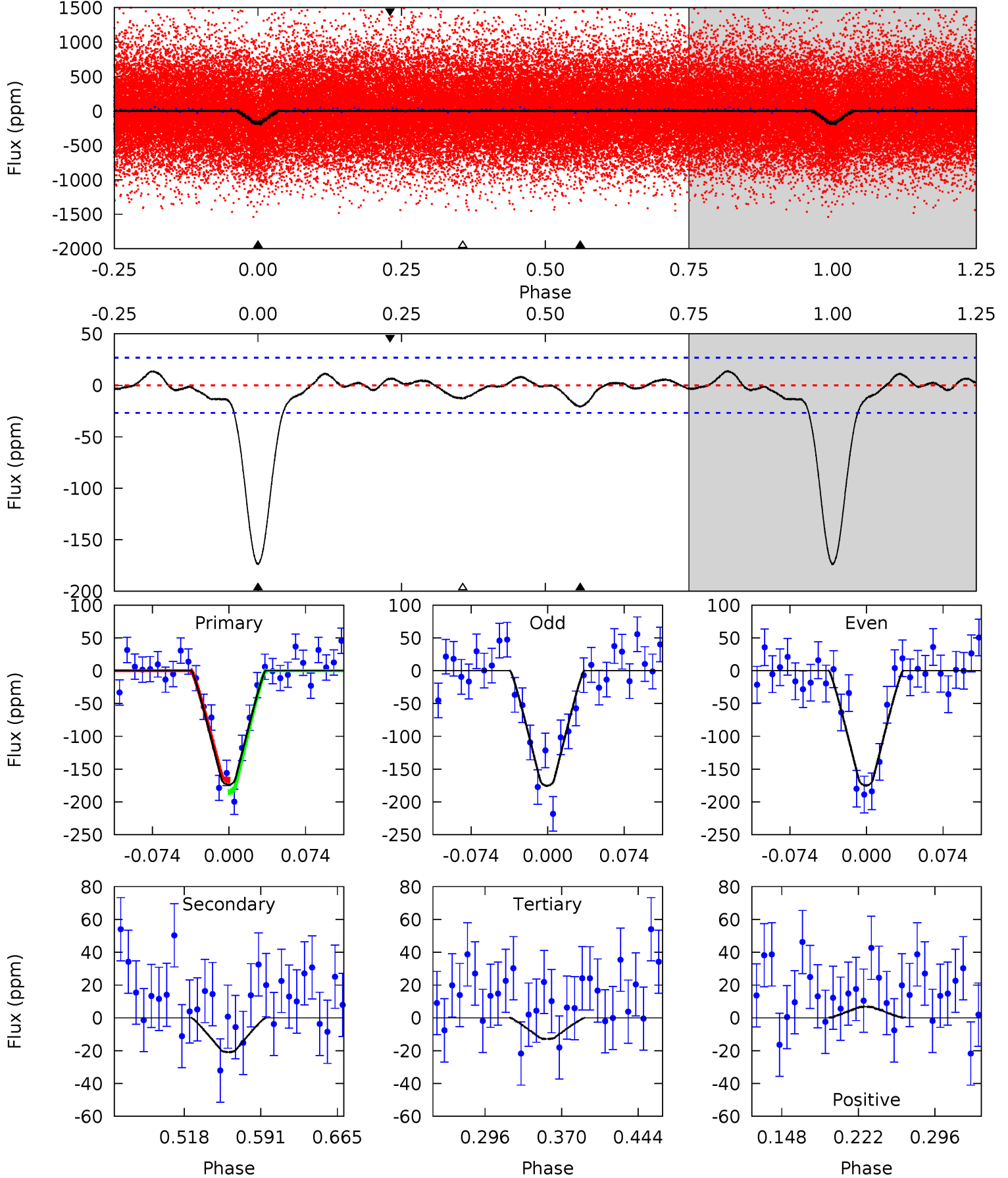
TCE 009456281-01 P= 0.701945 Days  $T_0=132.000296$  (BKJD)



# DV Model-Shift Uniqueness Test

009456281-01, P = 0.701943 Days, E = 131.300561 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
29.9	3.60	2.22	1.17	4.63	1.79	0.99	27.7	28.8	1.38	2.43	0.04	0.89	0.07	1.61

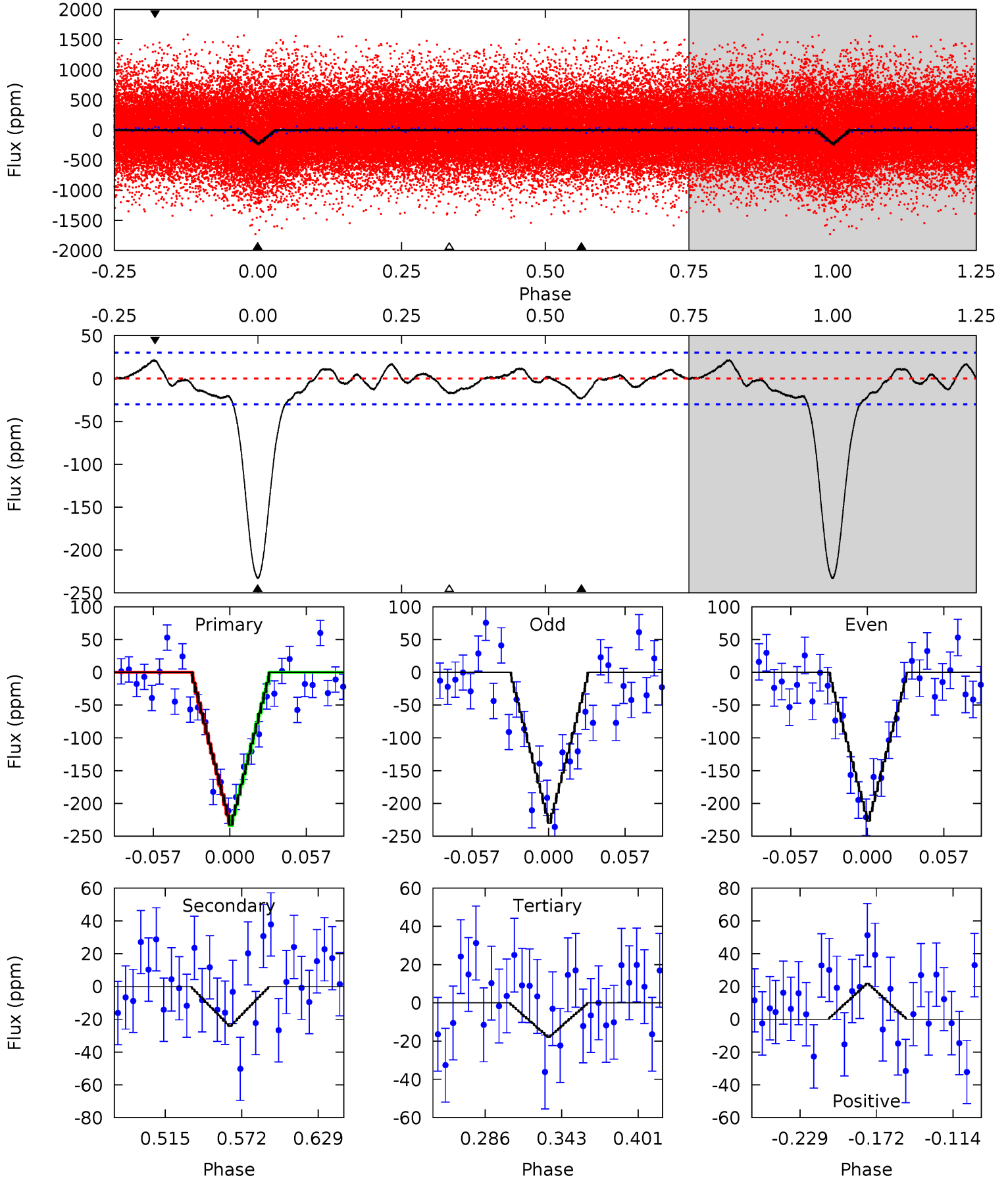




# Alt Model-Shift Uniqueness Test

009456281-01, P = 0.701945 Days, E = 131.298351 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
36.3	3.78	2.79	3.40	4.68	1.90	1.45	33.5	32.9	0.99	0.38	0.24	0.93	0.09	0.68



### Stellar Parameters For KIC 009456281

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4236^{+115}_{-140}$	$4.698^{+0.063}_{-0.032}$	$-0.680^{+0.300}_{-0.300}$	$0.539^{+0.044}_{-0.060}$	$0.528^{+0.051}_{-0.041}$	$4.760^{+1.466}_{-0.640}$
	+3%/-3%	+1%/-1%	+44%/-44%	+8%/-11%	+10%/-8%	+31%/-13%
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 009456281-01 / KOI 4207.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-21 \pm 6$	$0.92^{+0.35}_{-0.32}$	$1702^{+59}_{-66}$	$2800^{+435}_{-319}$	$2.124^{+3.158}_{-1.073}$
Alt.	$-24 \pm 6$	$0.91^{+0.32}_{-0.34}$	$1701^{+57}_{-58}$	$2863^{+459}_{-291}$	$2.518^{+3.766}_{-1.303}$

$T_{max}$  = 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

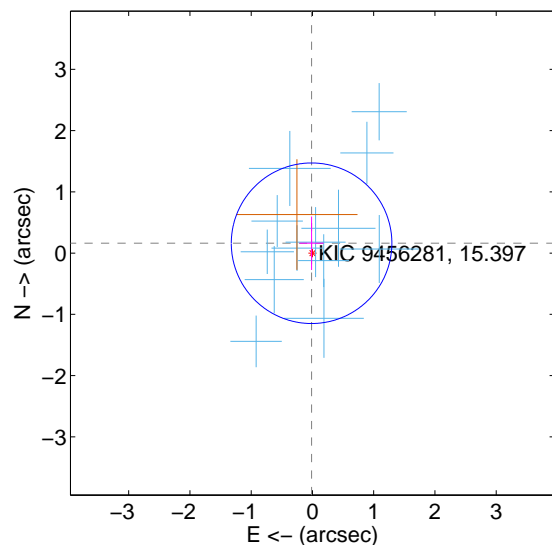
Supplemental centroid analysis for 009456281-01. Kepler magnitude: 15.40. Transit SNR 19.39

There are 13 quarters with good PRF difference image offsets

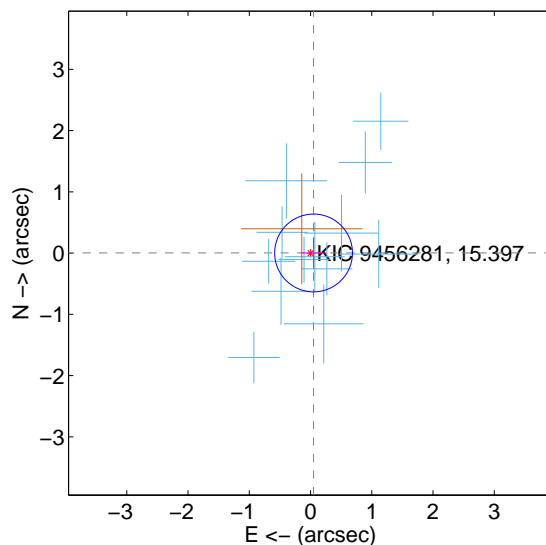
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.162 \pm 0.437$	0.37	$0.014 \pm 0.197$	$0.161 \pm 0.437$
PRF-fit source offset from KIC position	$0.050 \pm 0.212$	0.23	$-0.050 \pm 0.212$	$0.002 \pm 0.256$
photometric centroid source offset	$1.34 \pm 0.65$	2.06	$-0.04 \pm 0.71$	$1.34 \pm 0.65$

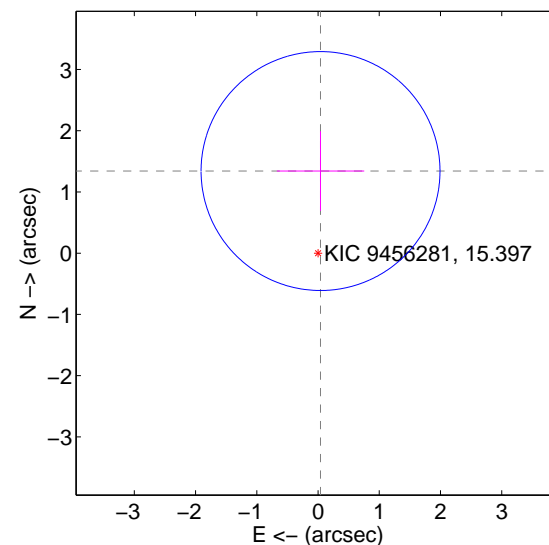
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

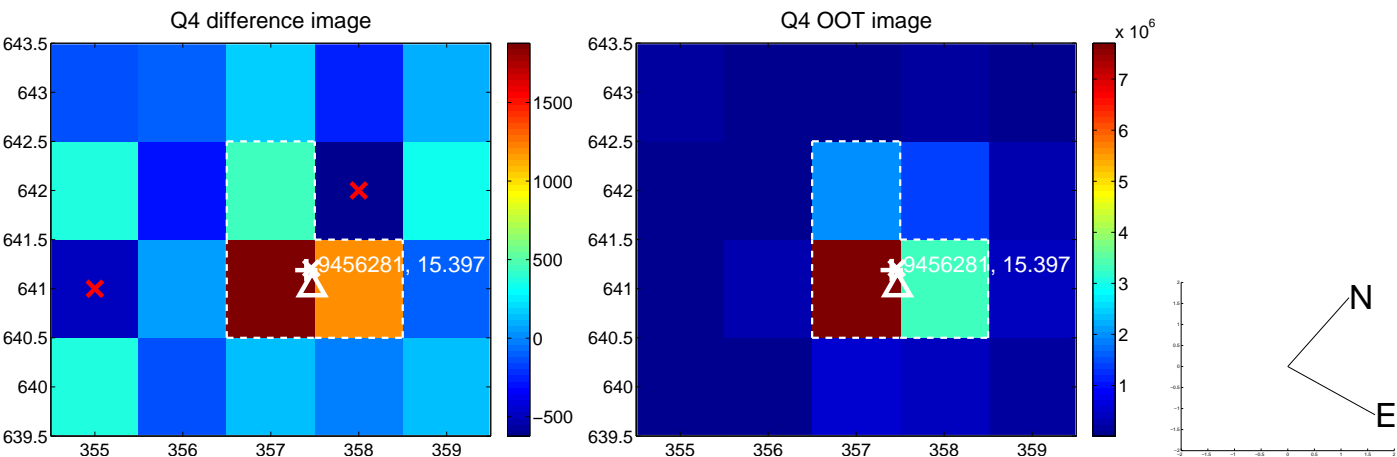
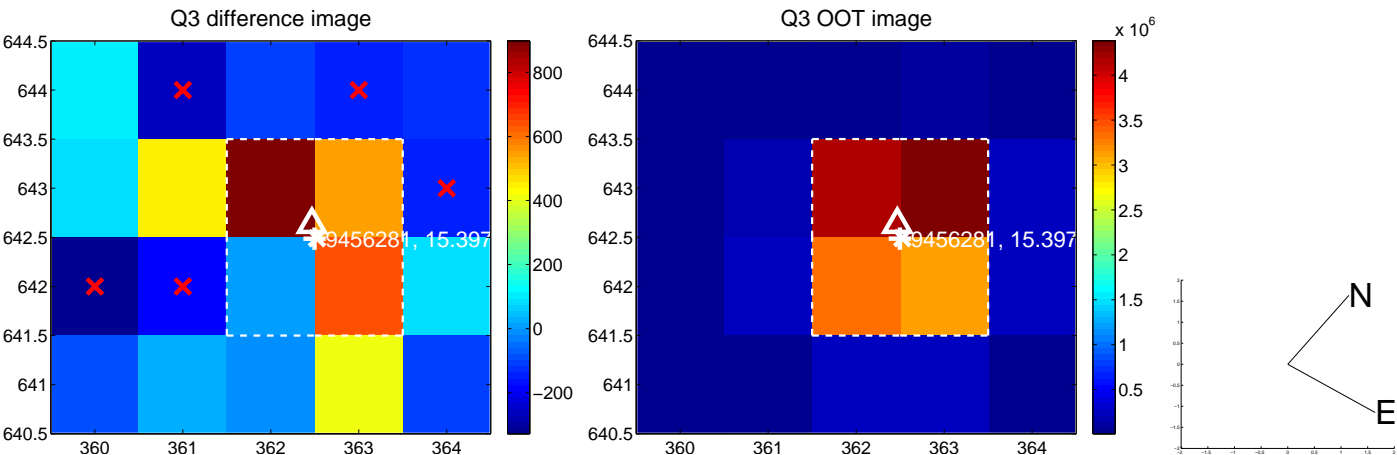
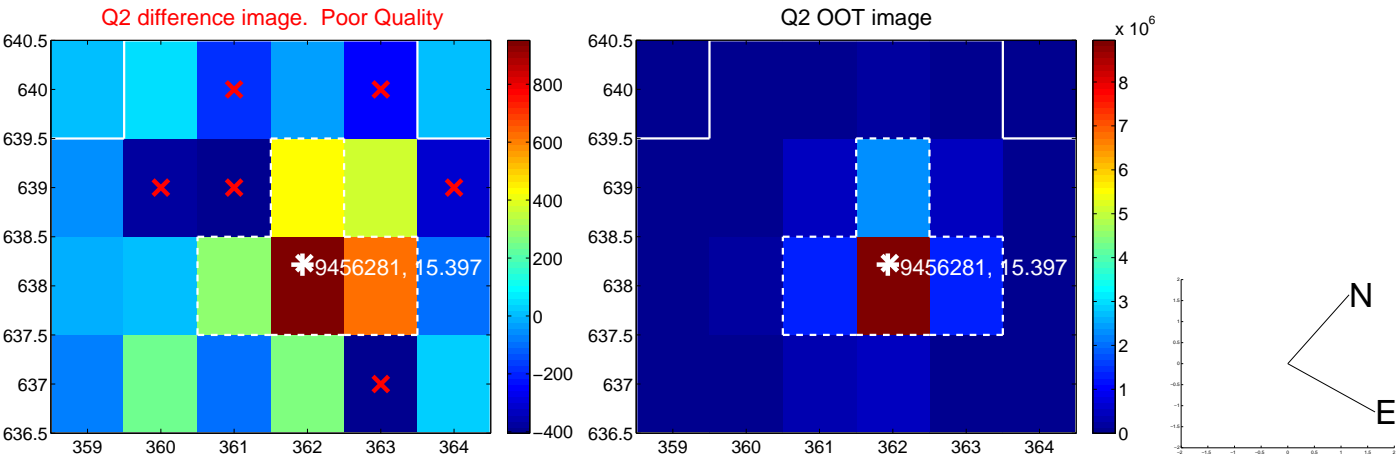
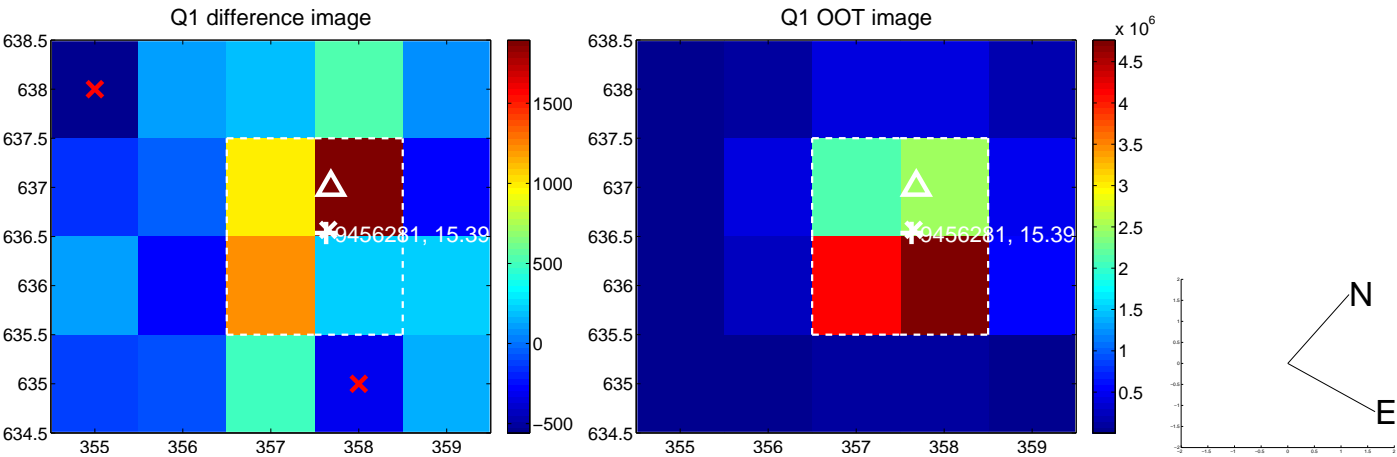


offset from photometric centroids

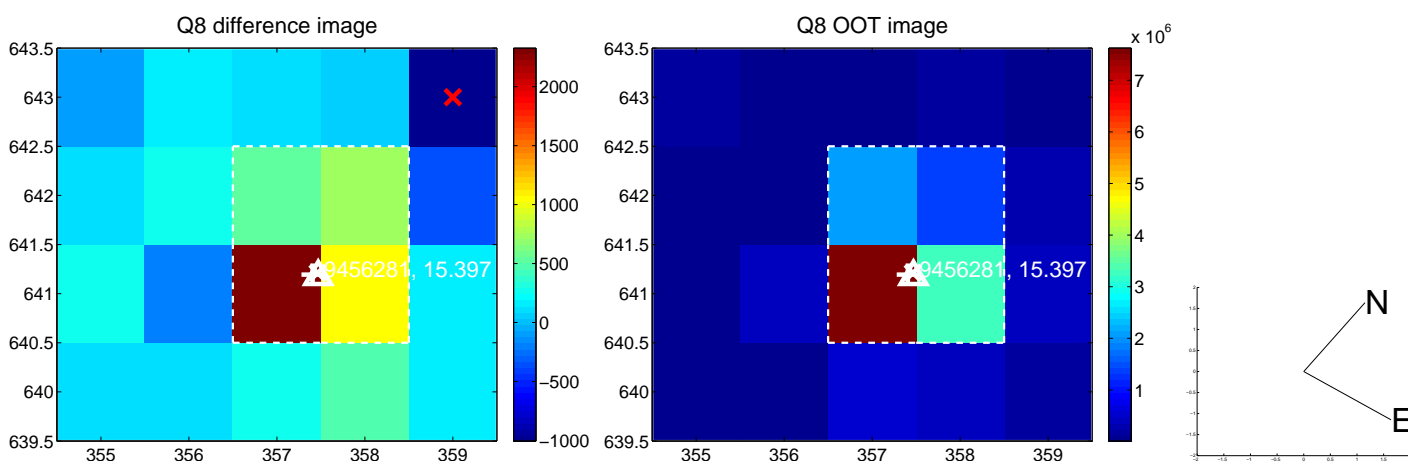
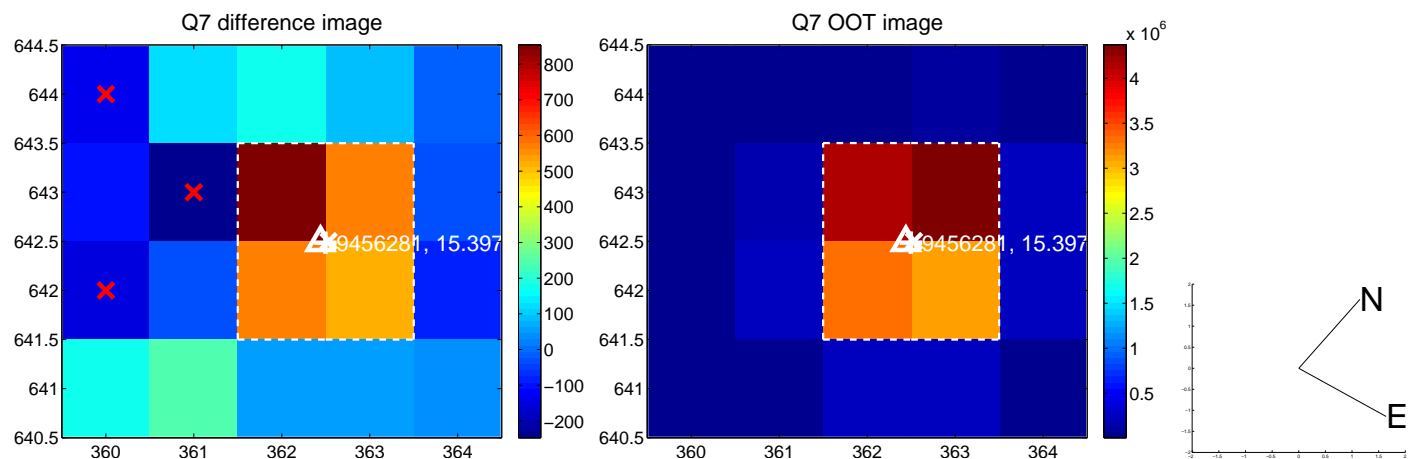
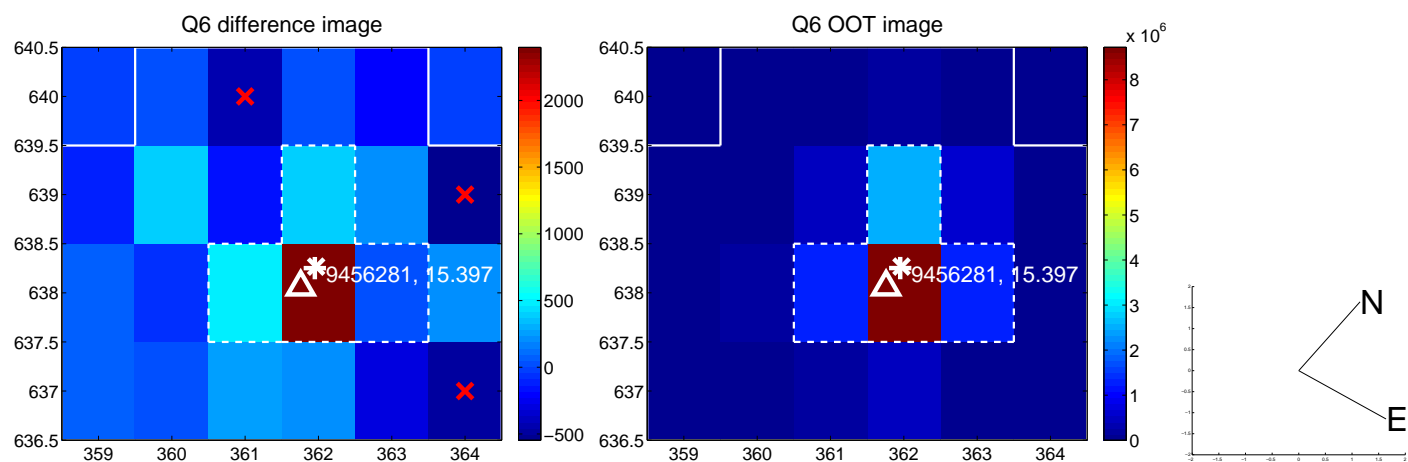
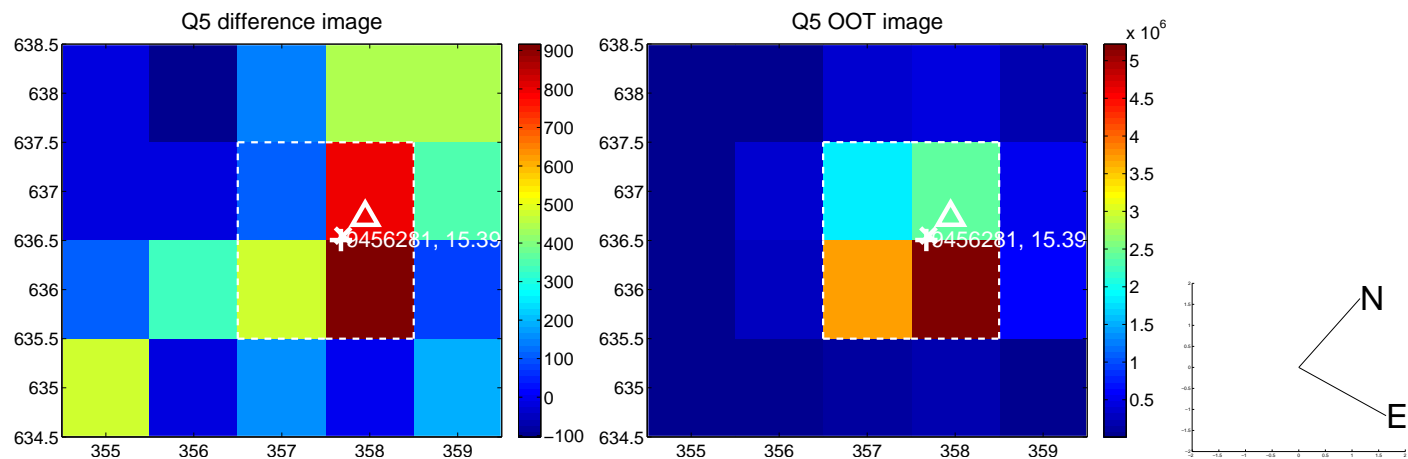


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

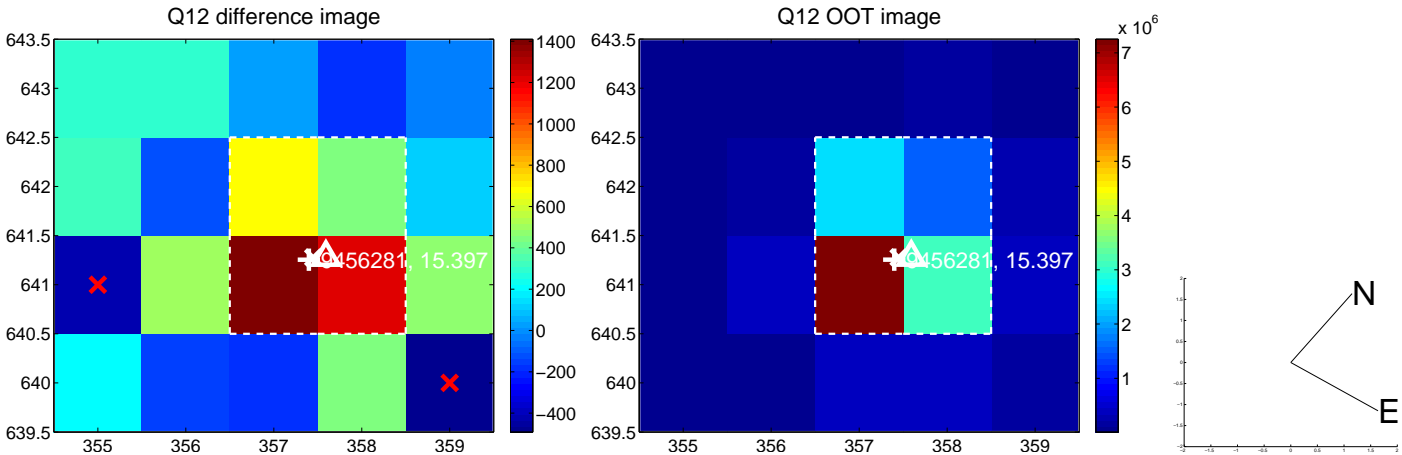
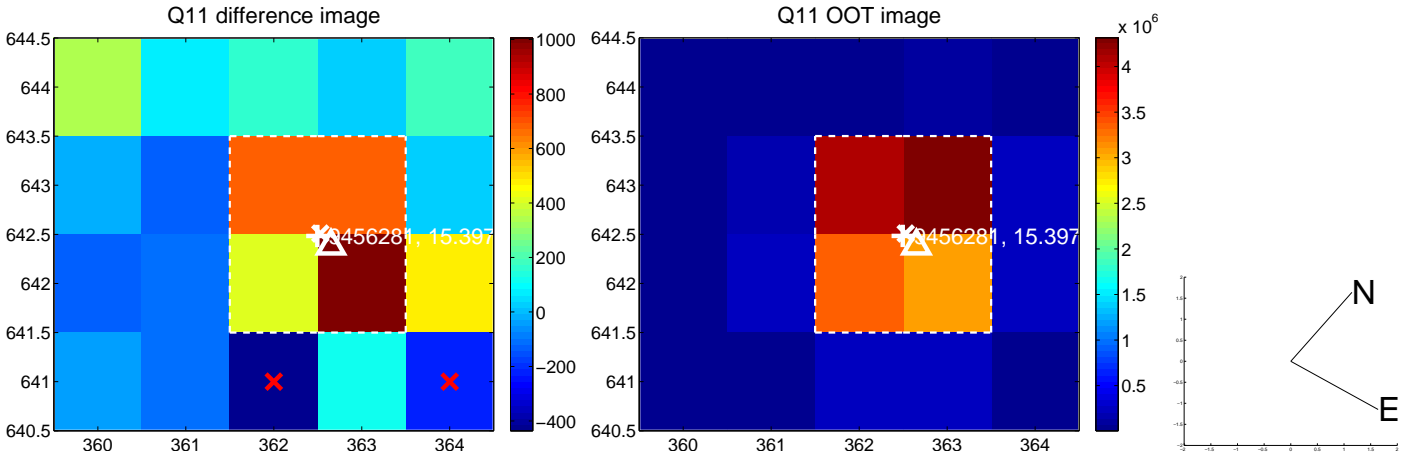
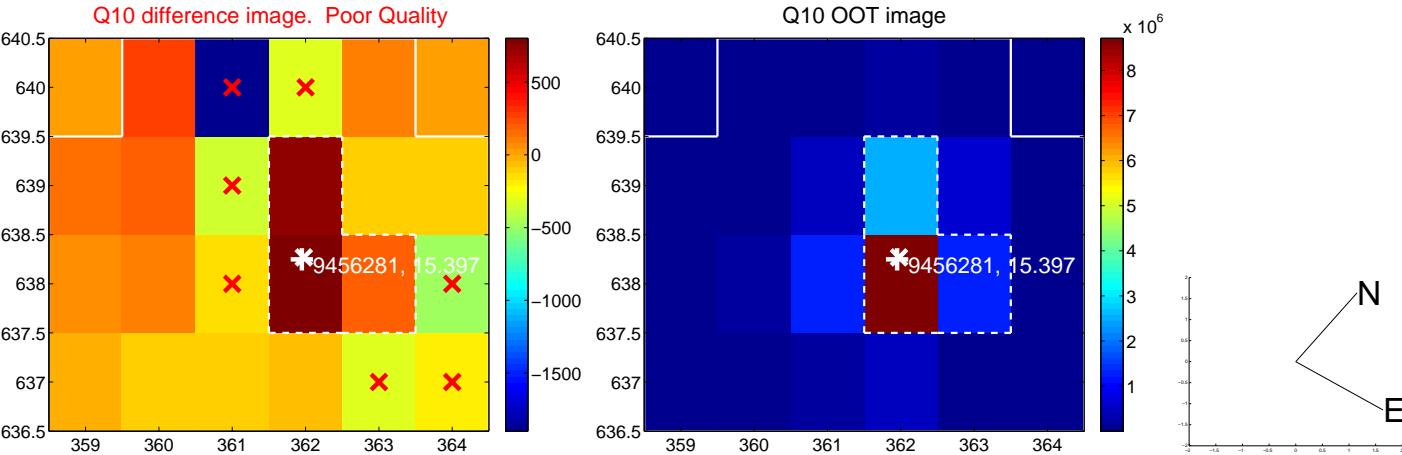
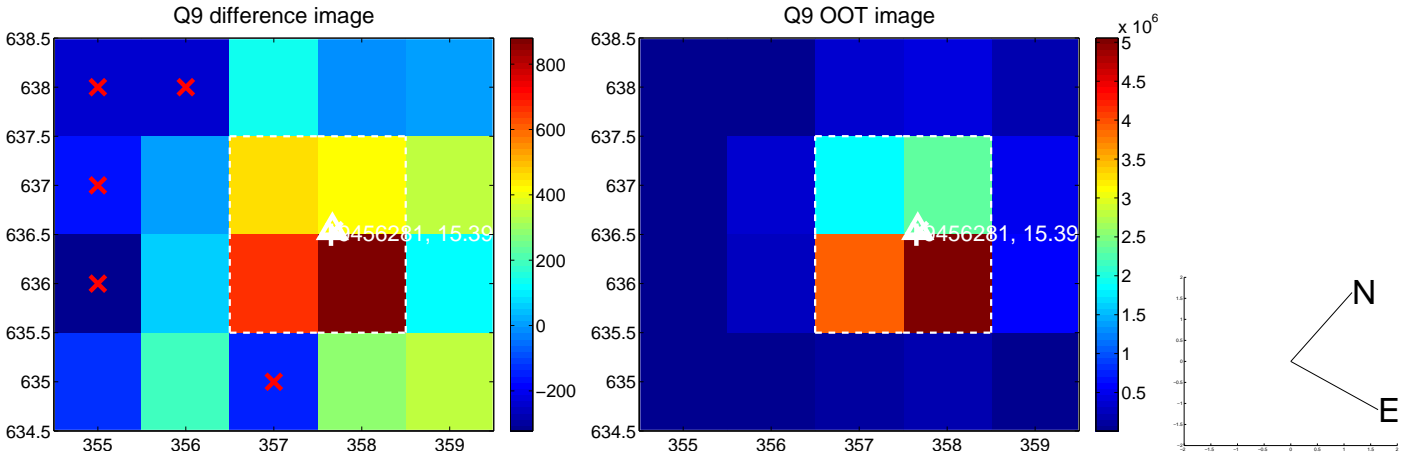
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



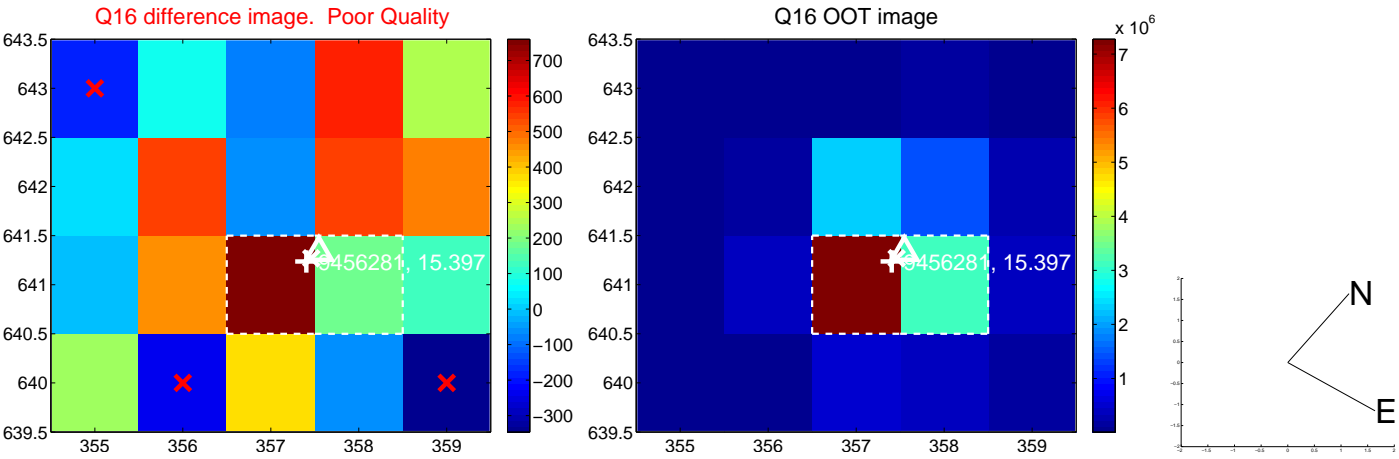
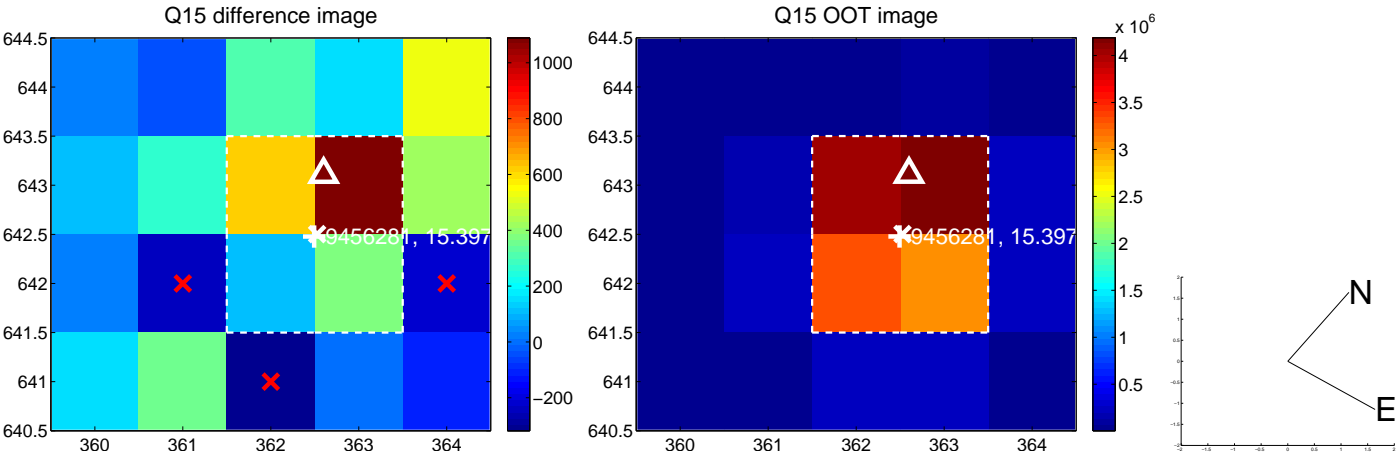
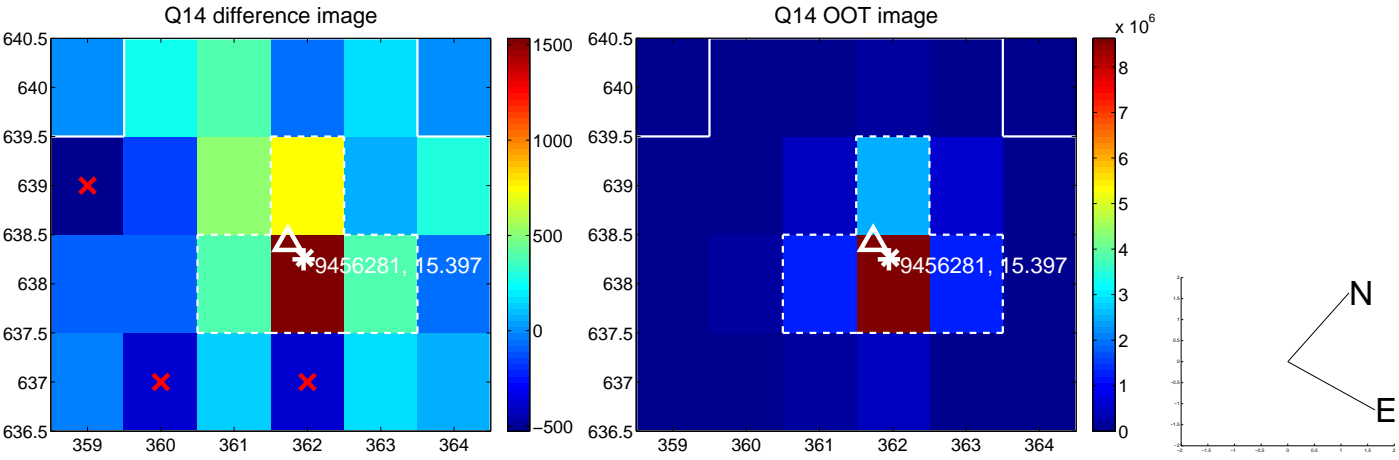
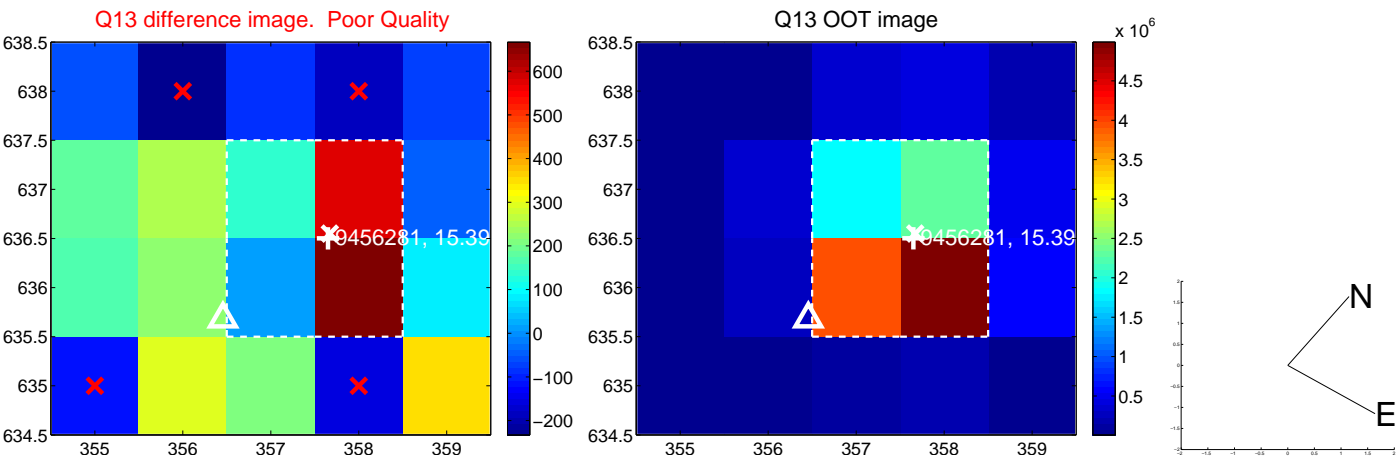
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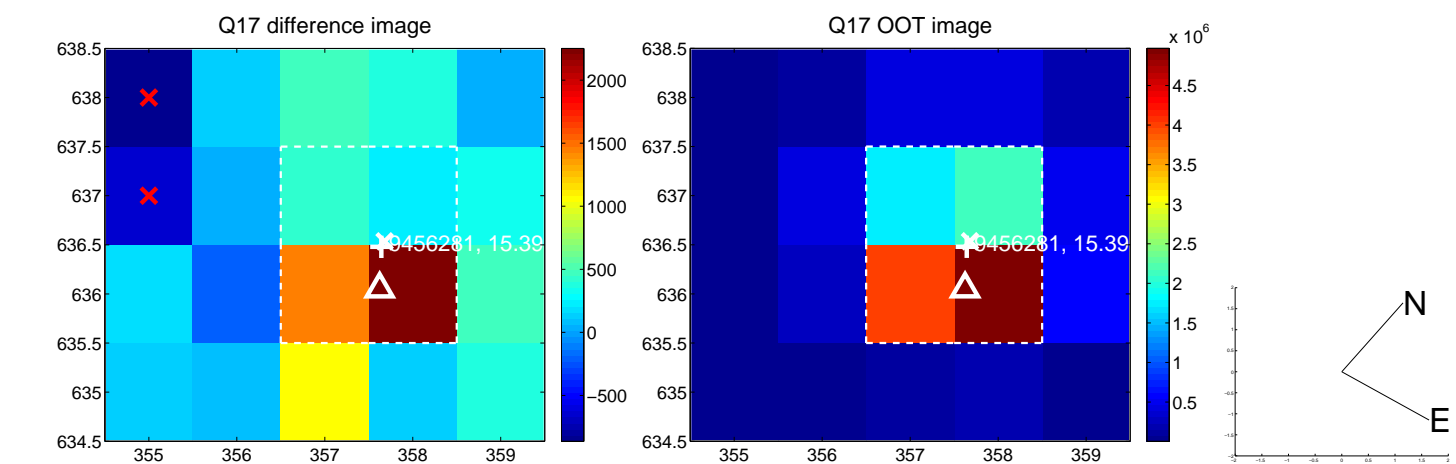


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

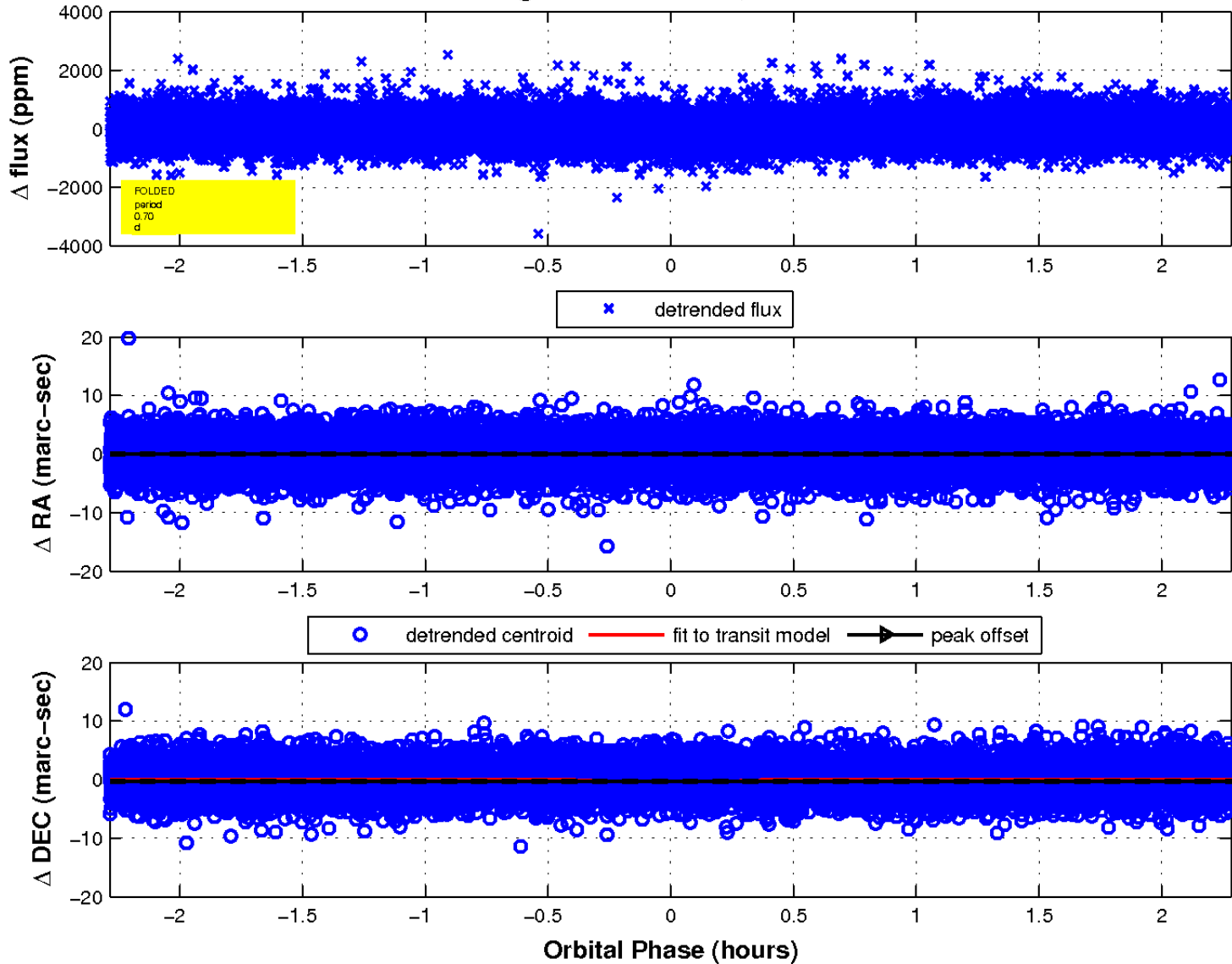




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

