

# KIC 012216706

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012216706-01	OBS	3644.01	1.471042	132.279037	171742.2	4.031	4624.7	2036.9	2.91	8749	171.43	44047.64

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012216706-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—MOD_ODDEVEN_DV—DEEP_V_SHAPED—SEASONAL_DEPTH_DV

**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.

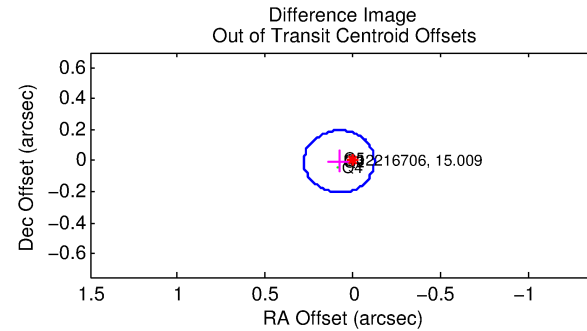
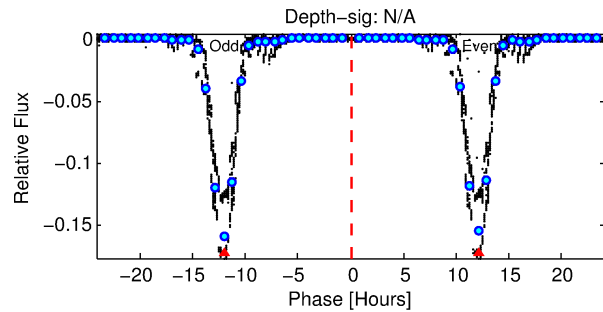
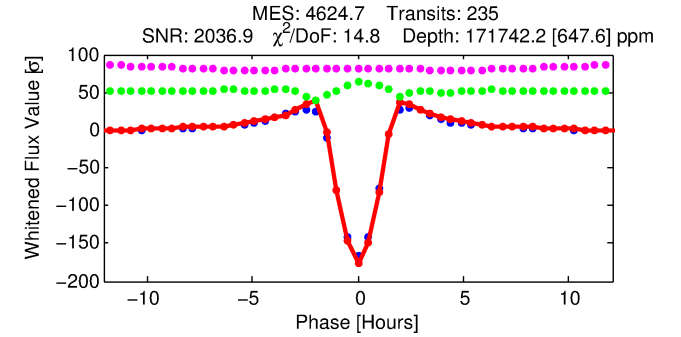
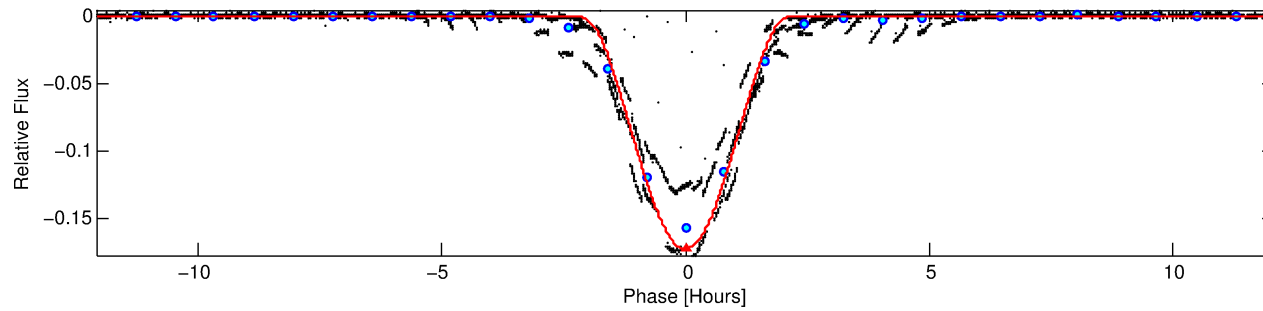
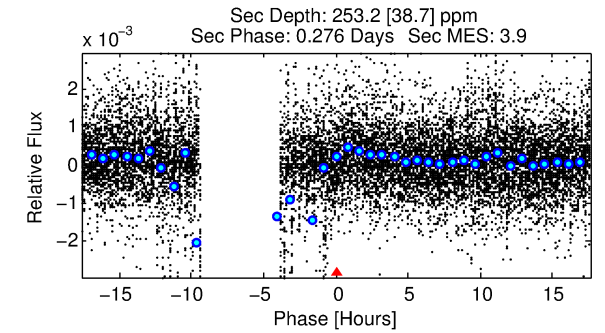
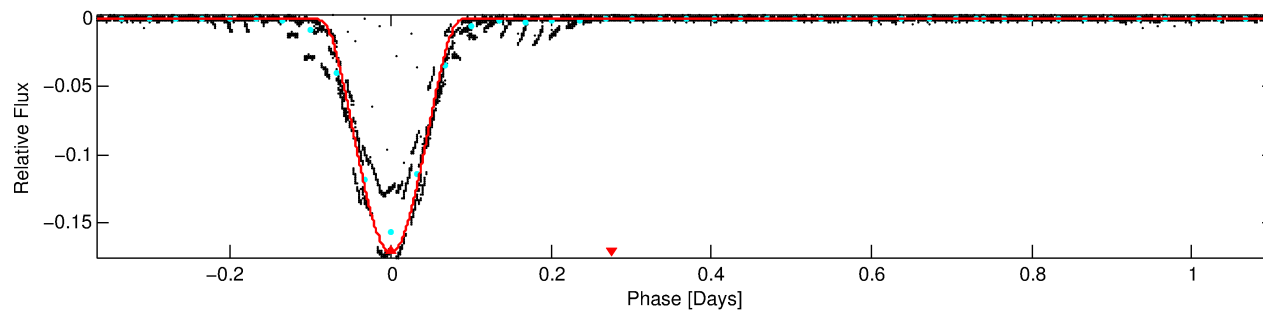
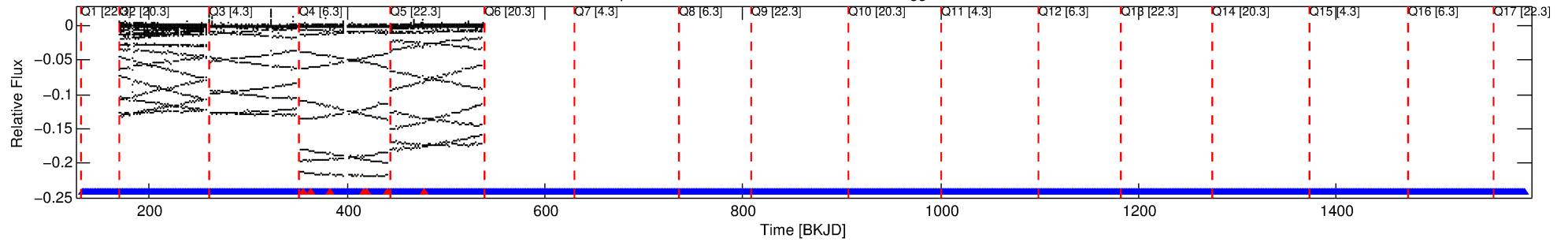
## Ephemeris Match Information For 012216706-01

No Significant Match Found

# DV One-Page Summary

KIC: 12216706 Candidate: 1 of 1 Period: 1.471 d  
KOI: K03644.01 Corr: 0.971

Kp: 15.01 R\*: 2.91 Rs Teff: 8749.0 K Logg: 3.81 Fe/H: -0.280



## DV Fit Results:

Period = 1.47104 [0.00000] d  
Epoch = 132.2790 [0.0001] BKJD  
Rp/R\* = 0.5397 [0.2342]  
a/R\* = 3.74 [0.23]  
b = 0.86 [0.34]  
Seff = 44047.63 [32792.09]  
Teff = 3694 [688] K  
Rp = 171.43 [109.79] Re  
a = 0.0318 [0.0144] AU  
Ag = 0.00 [0.01] [-182.33σ]  
Teffp = 1502 [337] K [-2.86σ]

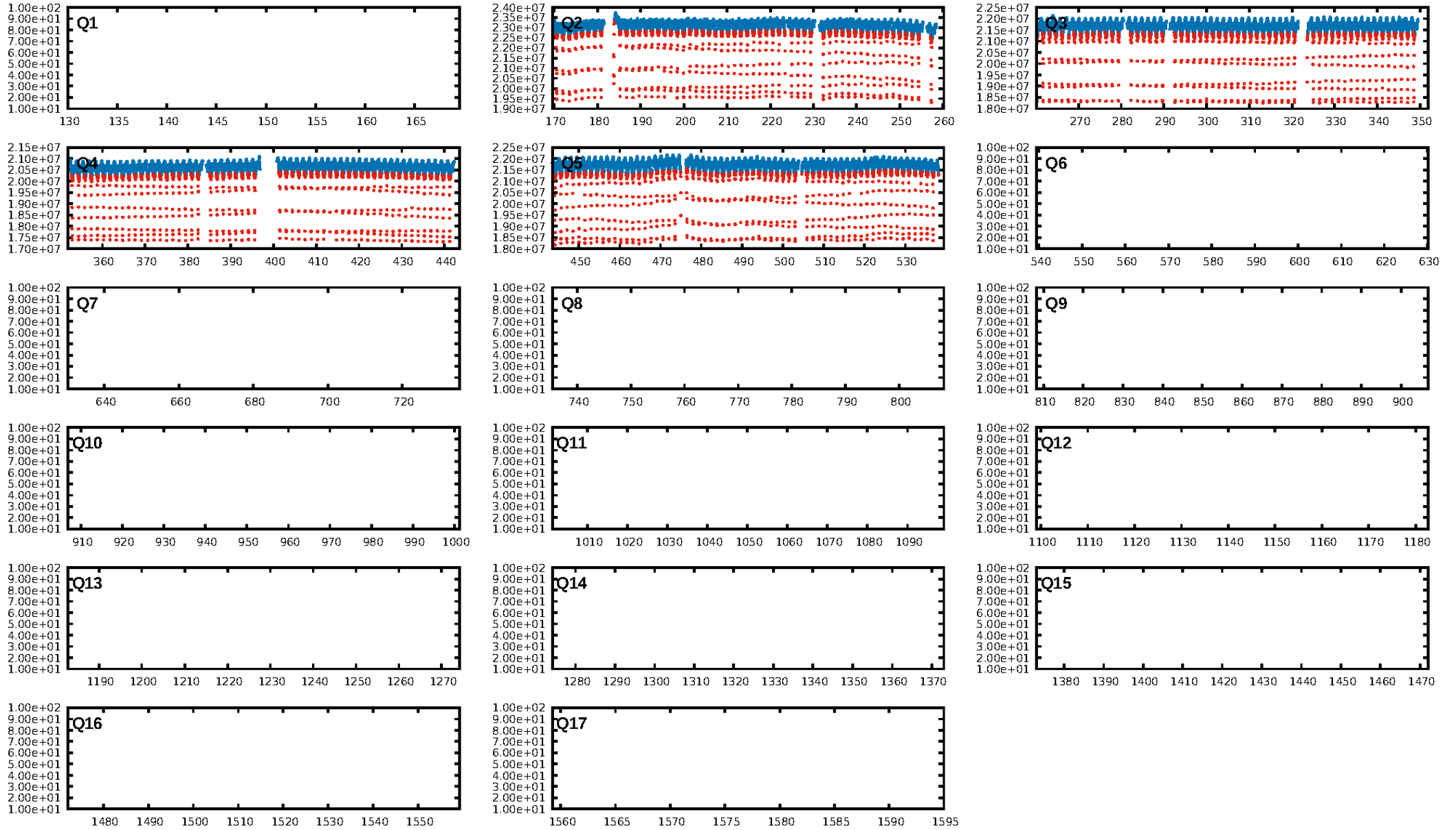
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.97 [228/235]  
GhostDiagnostic-chr: 1.731  
Centroid-sig: 0.0%  
Centroid-so: 0.448 arcsec [221.21σ]  
OotOffset-rm: 0.079 arcsec [1.18σ]  
KicOffset-rm: 0.111 arcsec [1.62σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

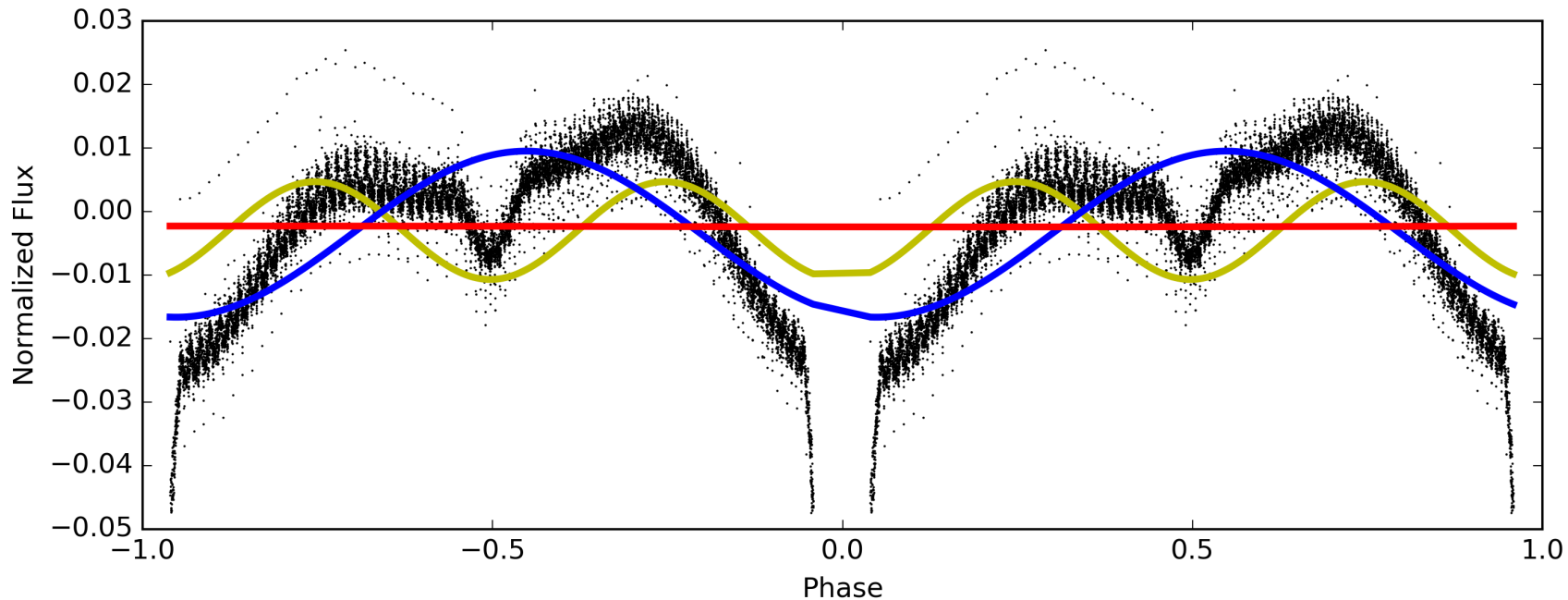
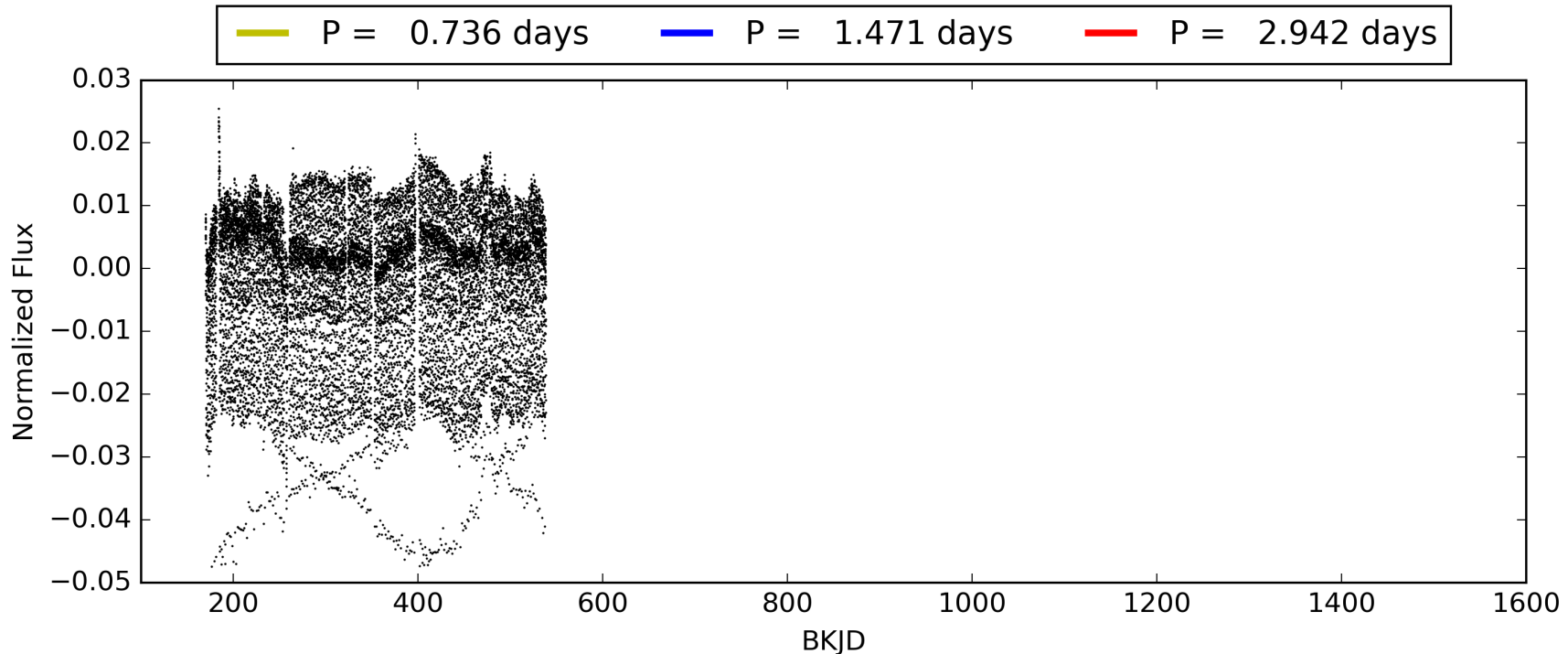
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:25:14 Z

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

# TCE 012216706-01, PDC Light Curves

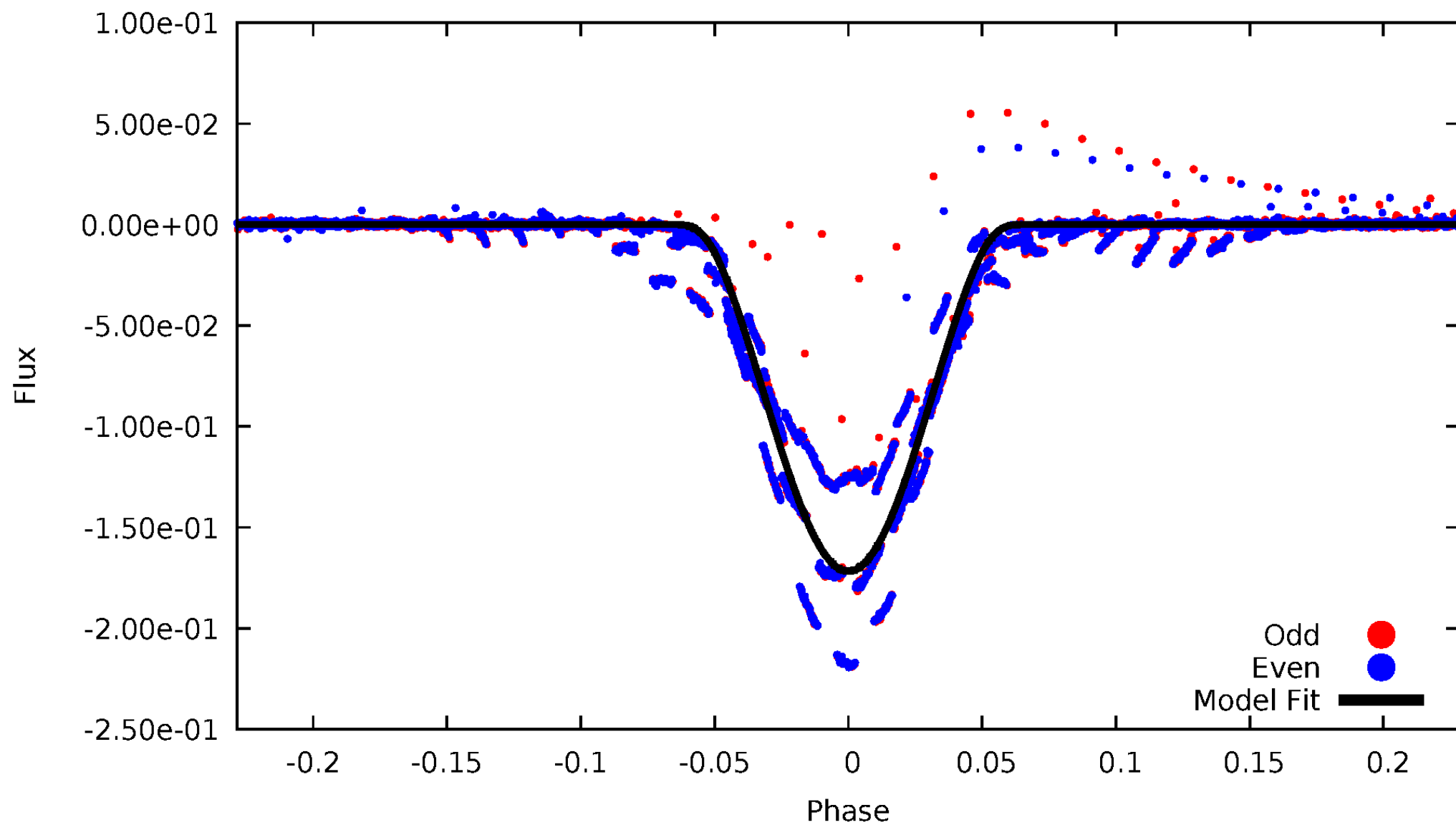


TCE 012216706-01



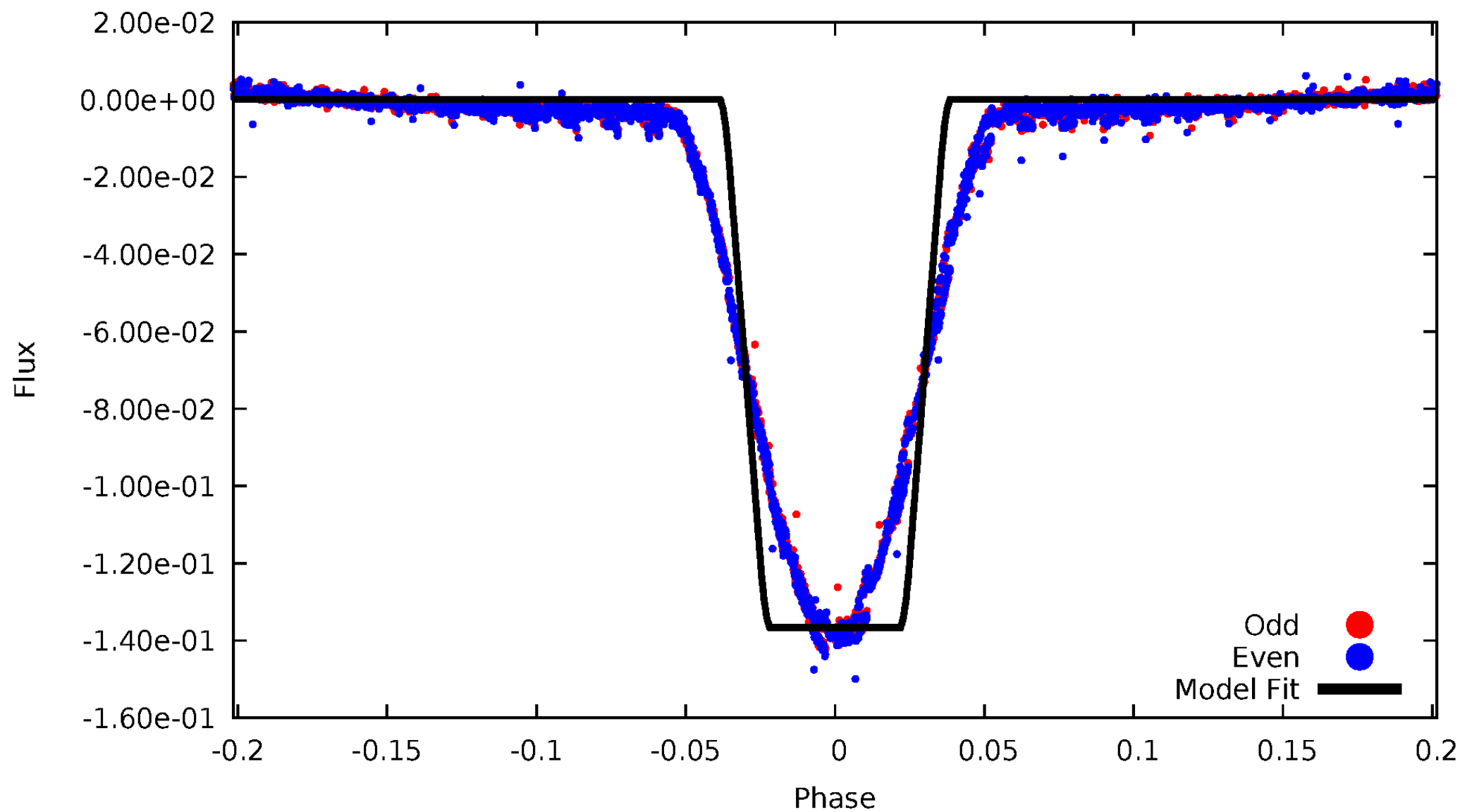
# DV Odd/Even

TCE 012216706-01



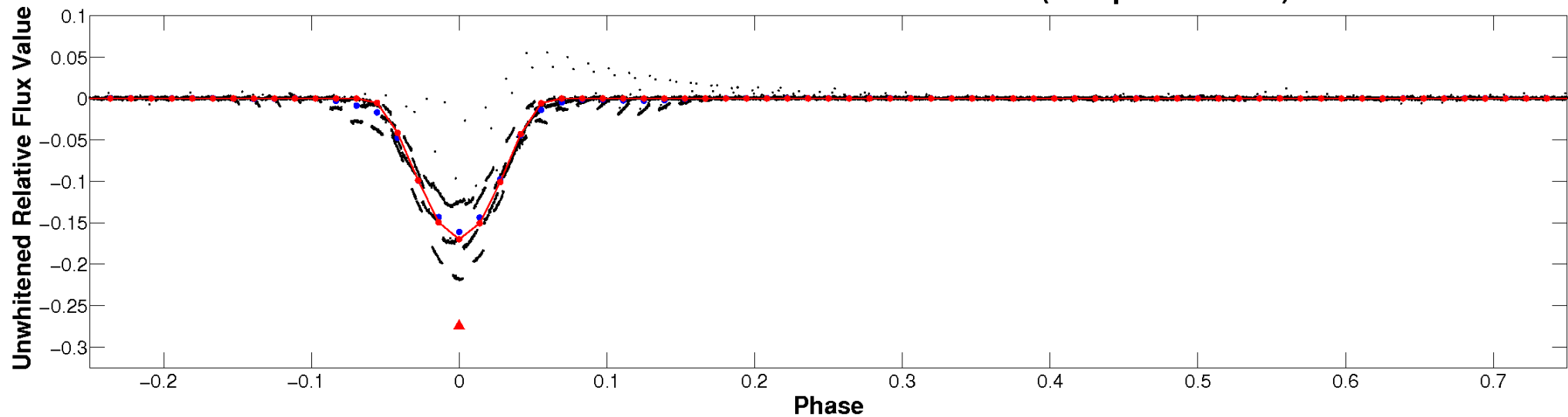
# ALT Odd/Even

TCE 012216706-01

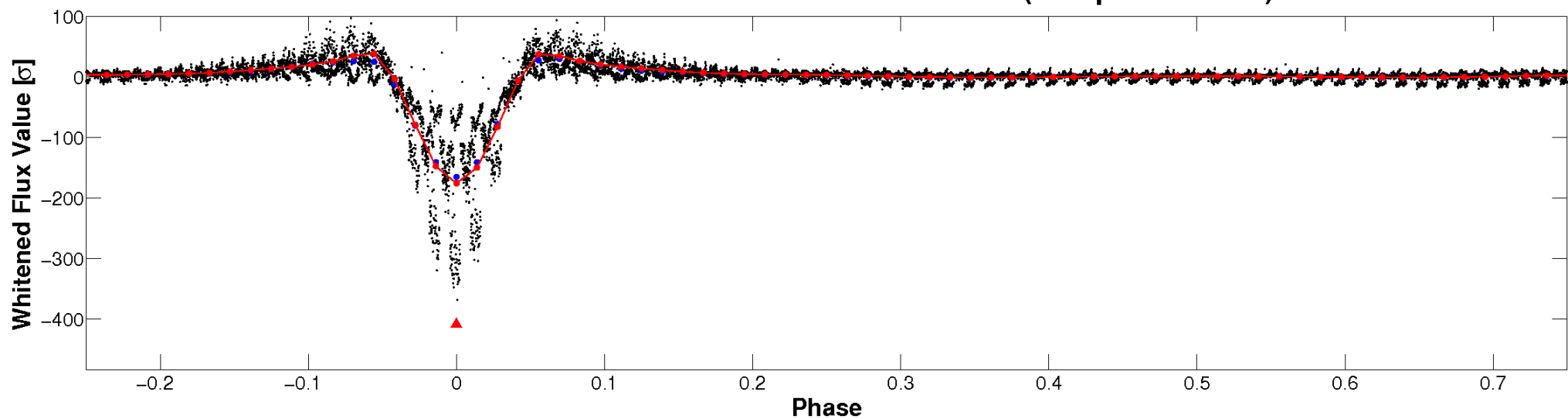


# Non-Whitened Vs. Whitened Light Curve

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

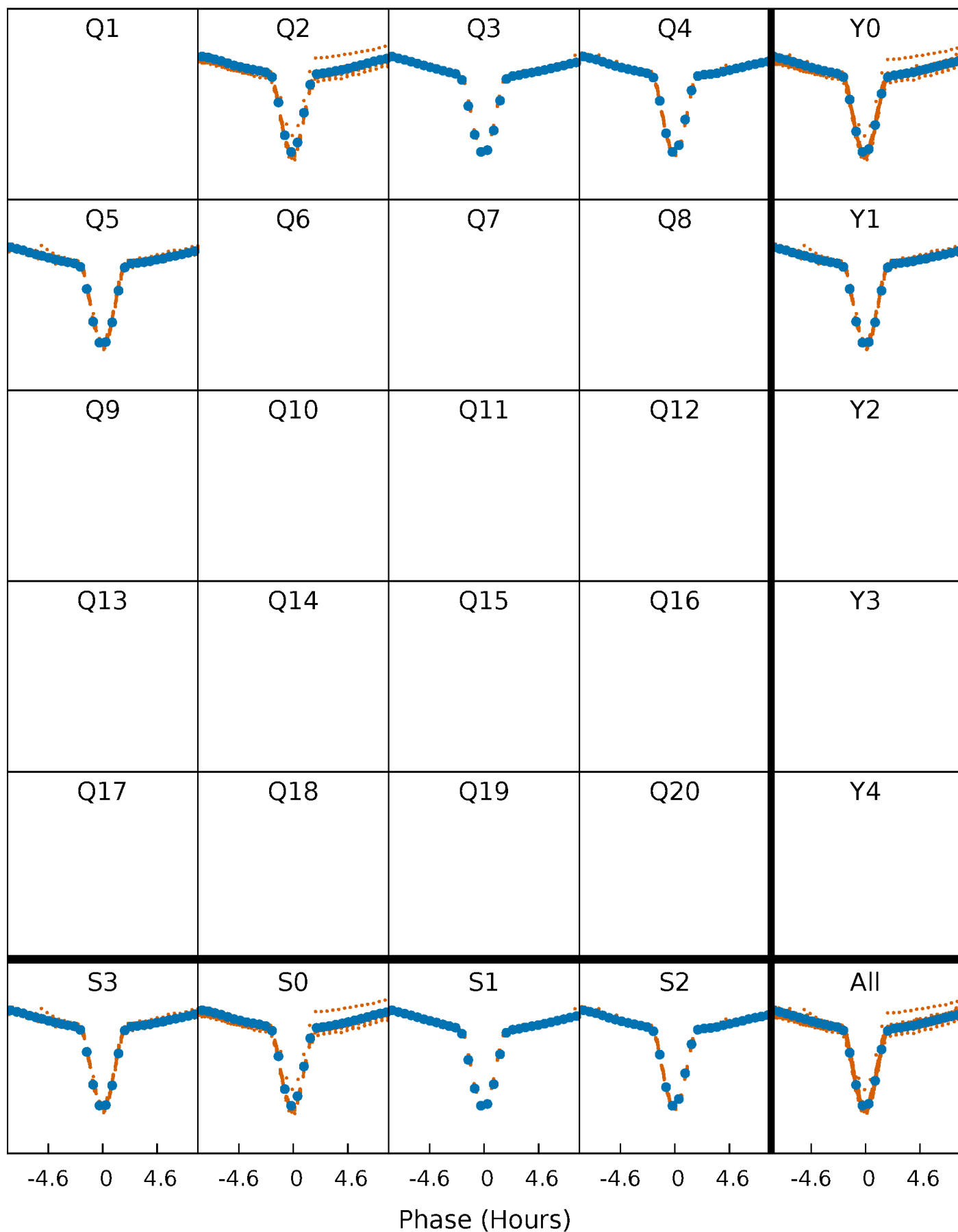


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

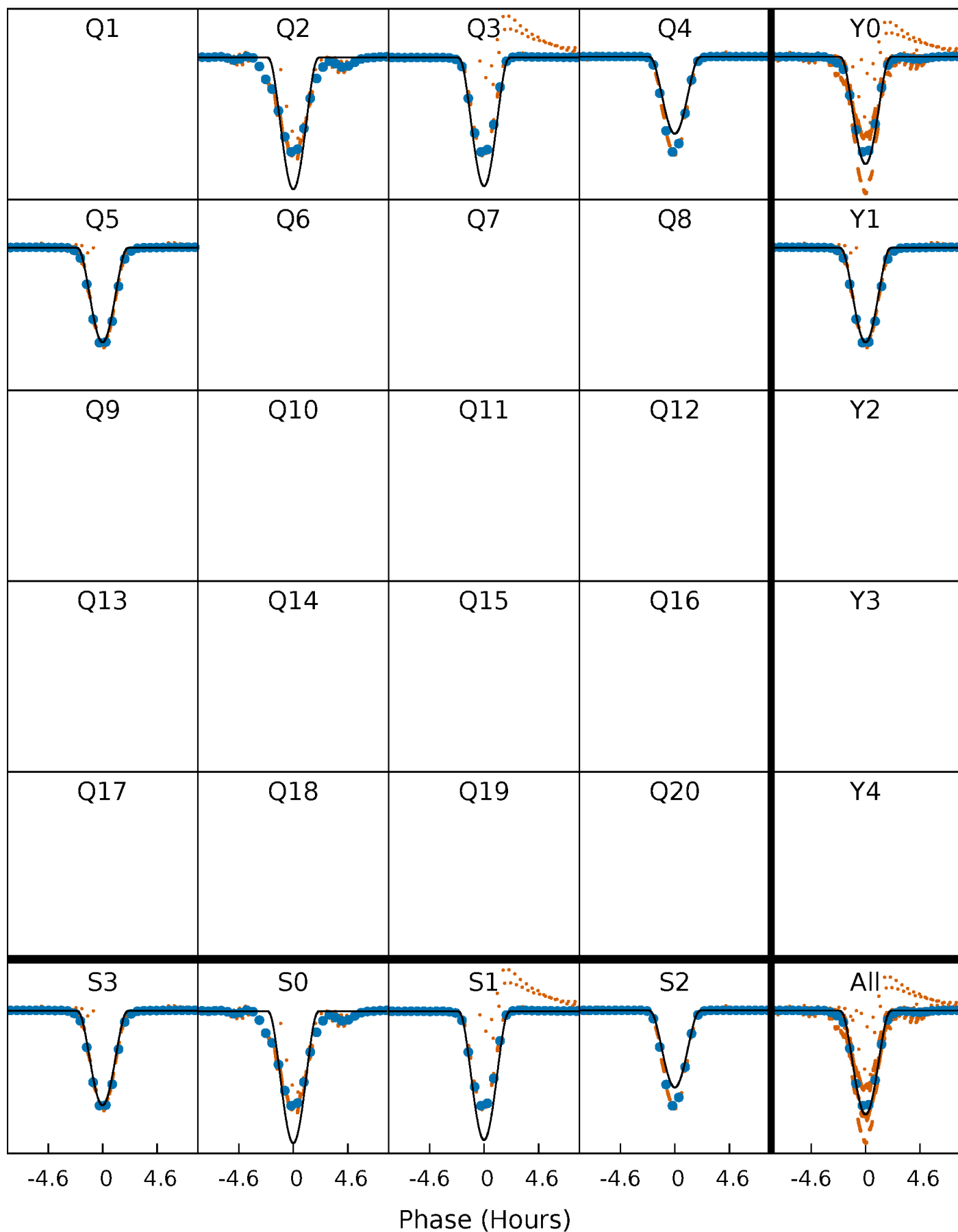
TCE 012216706-01 P= 1.471042 Days  $T_0=132.279037$  (BKJD)





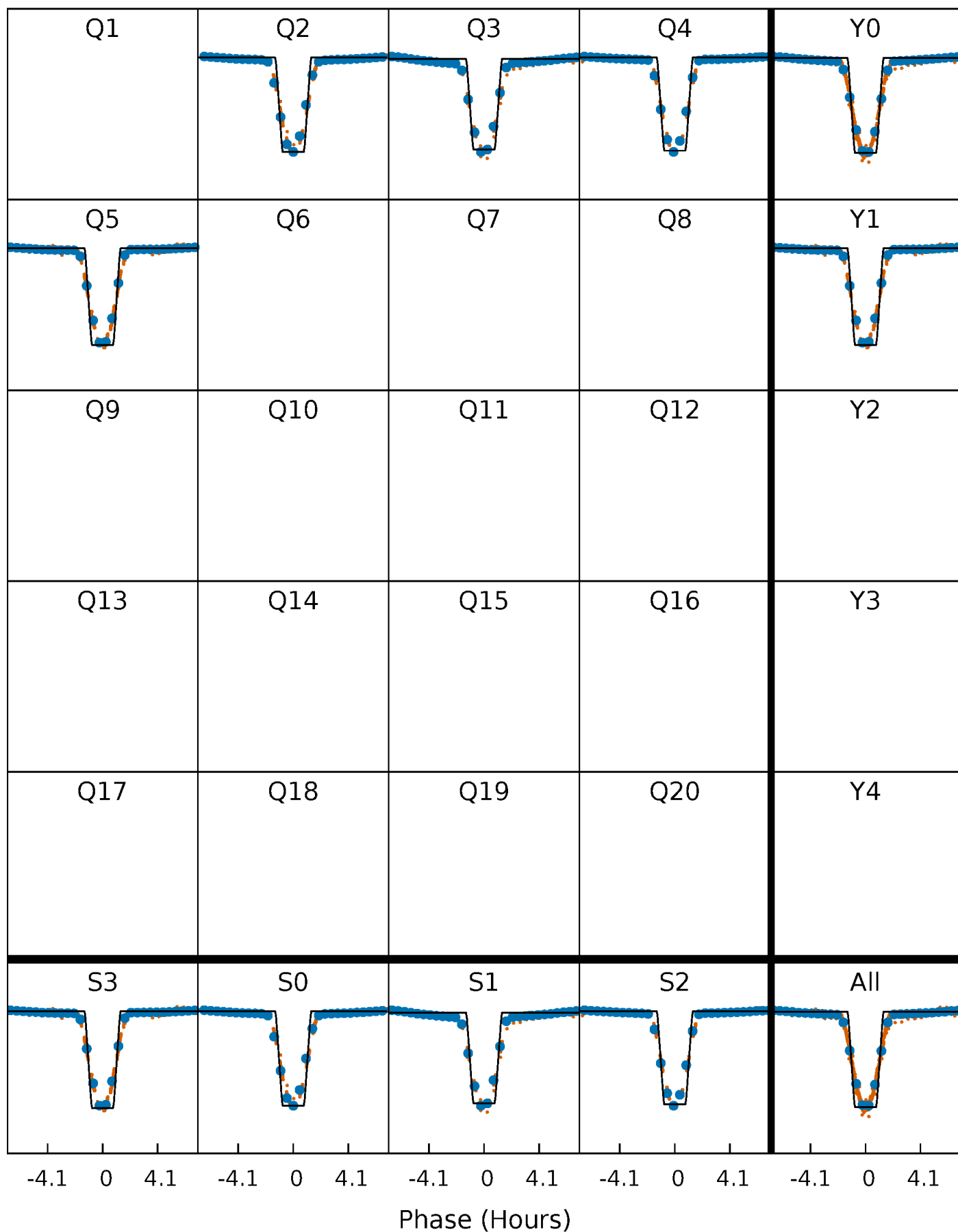
# DV Quarter-Phased Transit Curves

TCE 012216706-01 P= 1.471042 Days  $T_0=132.279037$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

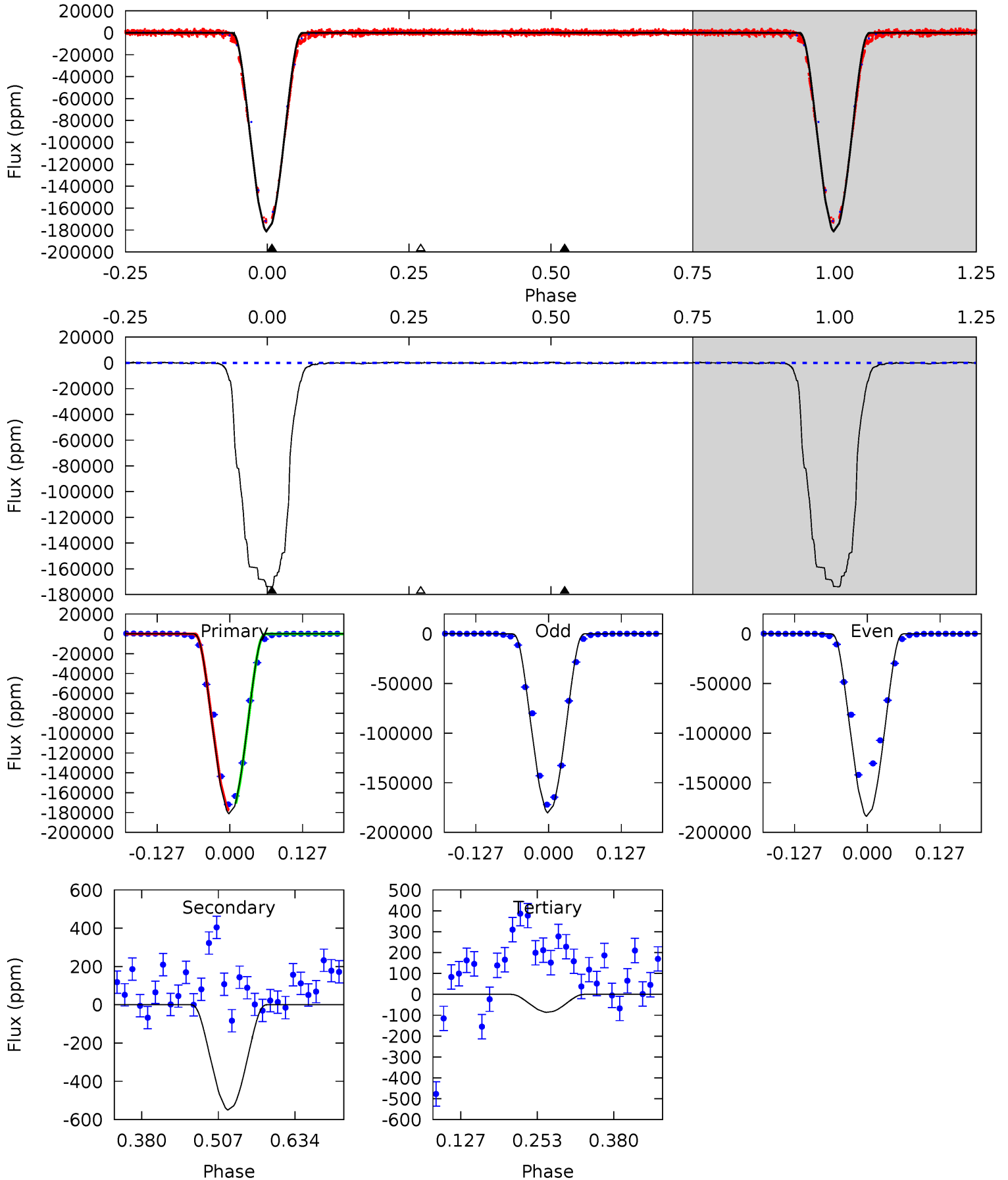
TCE 012216706-01 P= 1.471069 Days  $T_0=132.273184$  (BKJD)



# DV Model-Shift Uniqueness Test

012216706-01, P = 1.471042 Days, E = 132.279037 Days

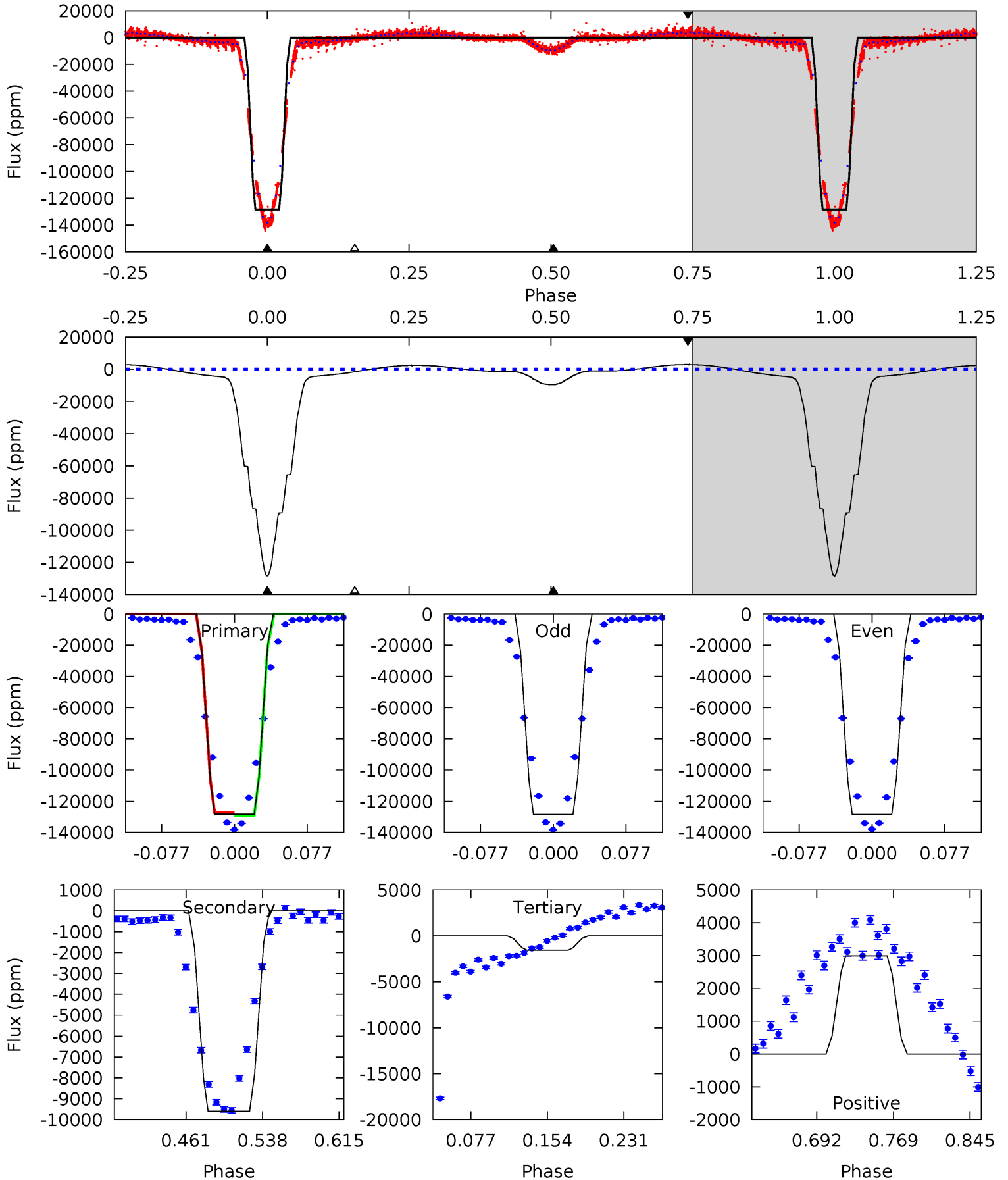
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4931	15.0	2.34	0	4.51	1.53	6.20	4929	4931	12.6	15.0	48.7	0.94	0.00	0



# Alt Model-Shift Uniqueness Test

012216706-01, P = 1.471069 Days, E = 132.273184 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
1565	117.1	18.9	36.5	4.62	1.77	26.3	1546	1528	98.2	80.6	0.12	1.00	0.02	11.3



### Stellar Parameters For KIC 012216706

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8749^{+241}_{-379}$	$3.806^{+0.425}_{-0.100}$	$-0.280^{+0.350}_{-0.400}$	$2.911^{+0.588}_{-1.371}$	$1.979^{+0.350}_{-0.428}$	$0.113^{+0.398}_{-0.038}$
	+3%/-4%	+11%/-3%	+125%/-143%	+20%/-47%	+18%/-22%	+352%/-34%
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 012216706-01 / KOI 3644.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-528 \pm 35$	$155.82^{+81.28}_{-70.24}$	$5012^{+384}_{-582}$	$-4133^{+419}_{-247}$	$0.012^{+0.027}_{-0.007}$
Alt.	$-9597 \pm 82$	$115.58^{+72.87}_{-63.28}$	$5020^{+352}_{-567}$	$3444^{+2348}_{-7157}$	$0.410^{+1.513}_{-0.255}$

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

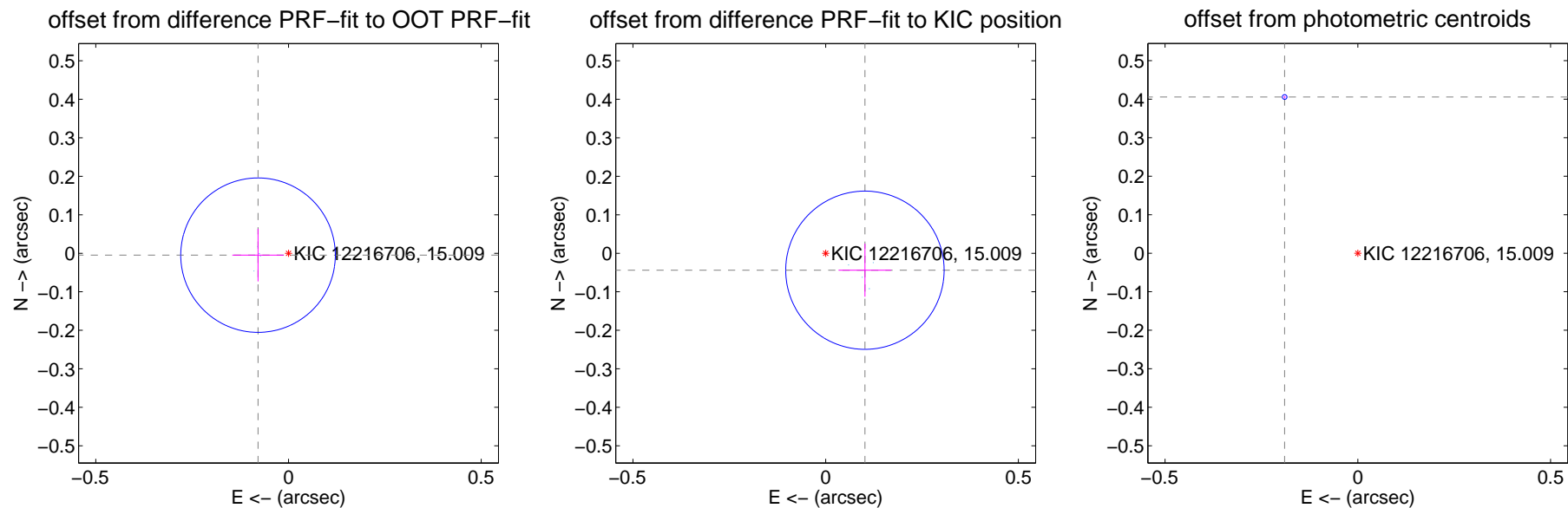
## DV Centroid Data

Supplemental centroid analysis for 012216706-01. Kepler magnitude: 15.01. Transit SNR 2036.91

There are 4 quarters with good PRF difference image offsets

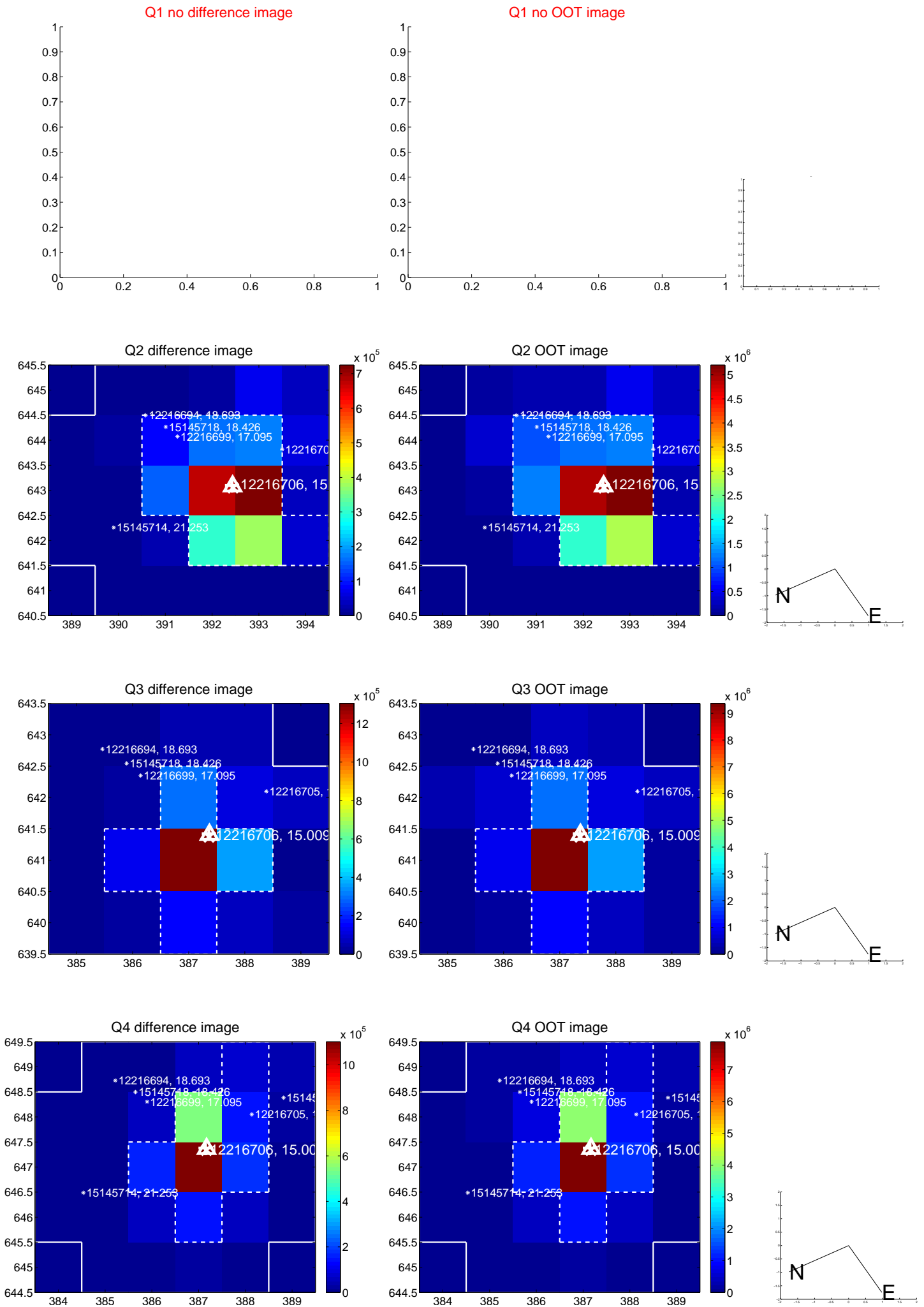
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.079 \pm 0.067$	1.18	$0.079 \pm 0.067$	$-0.005 \pm 0.068$
PRF-fit source offset from KIC position	$0.111 \pm 0.069$	1.62	$-0.102 \pm 0.068$	$-0.044 \pm 0.069$
photometric centroid source offset	$0.45 \pm 0.00$	221.21	$0.19 \pm 0.00$	$0.41 \pm 0.00$

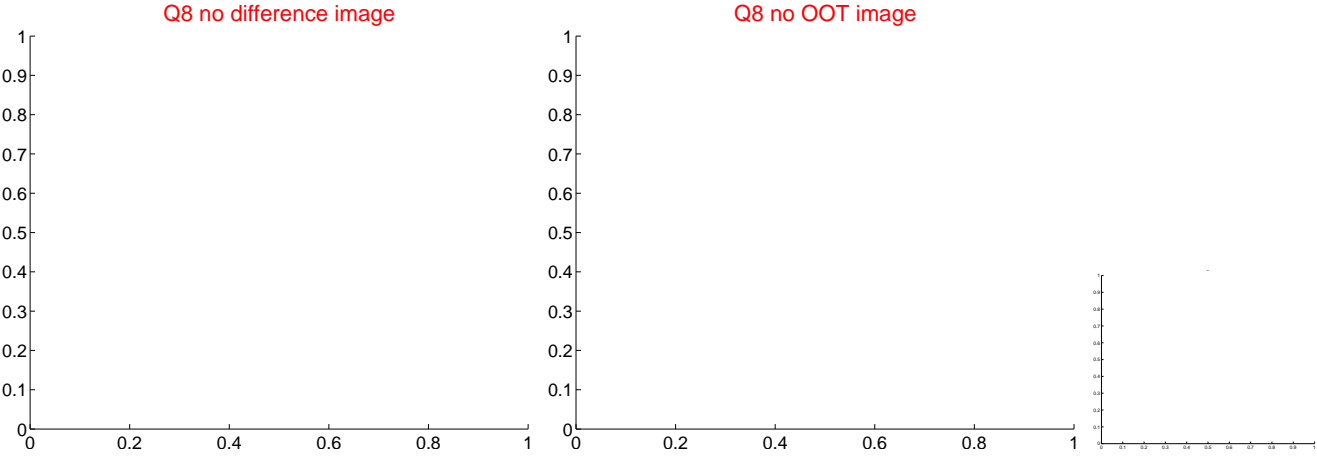
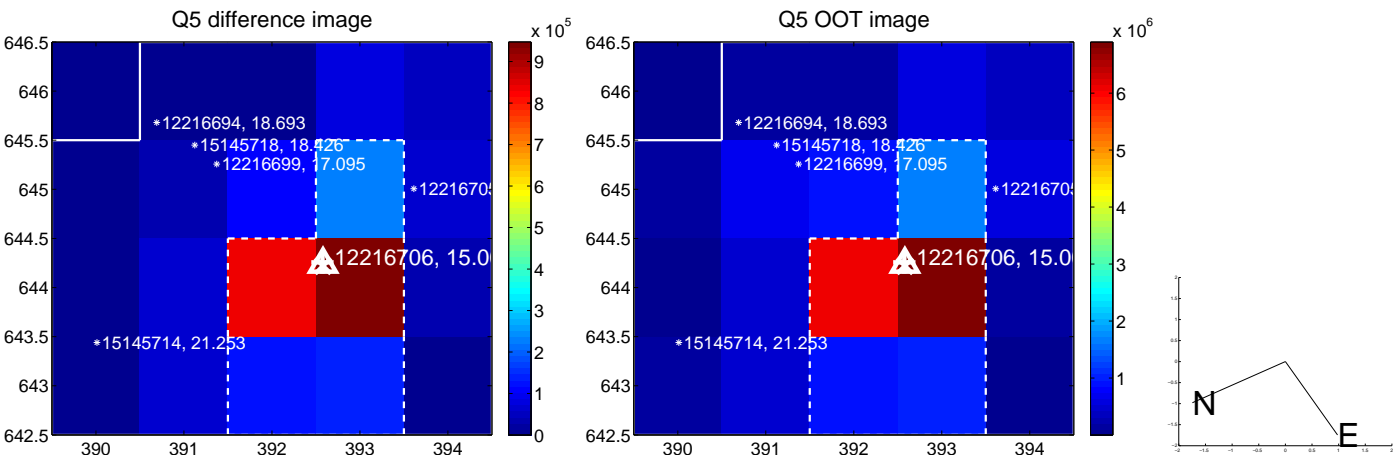


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





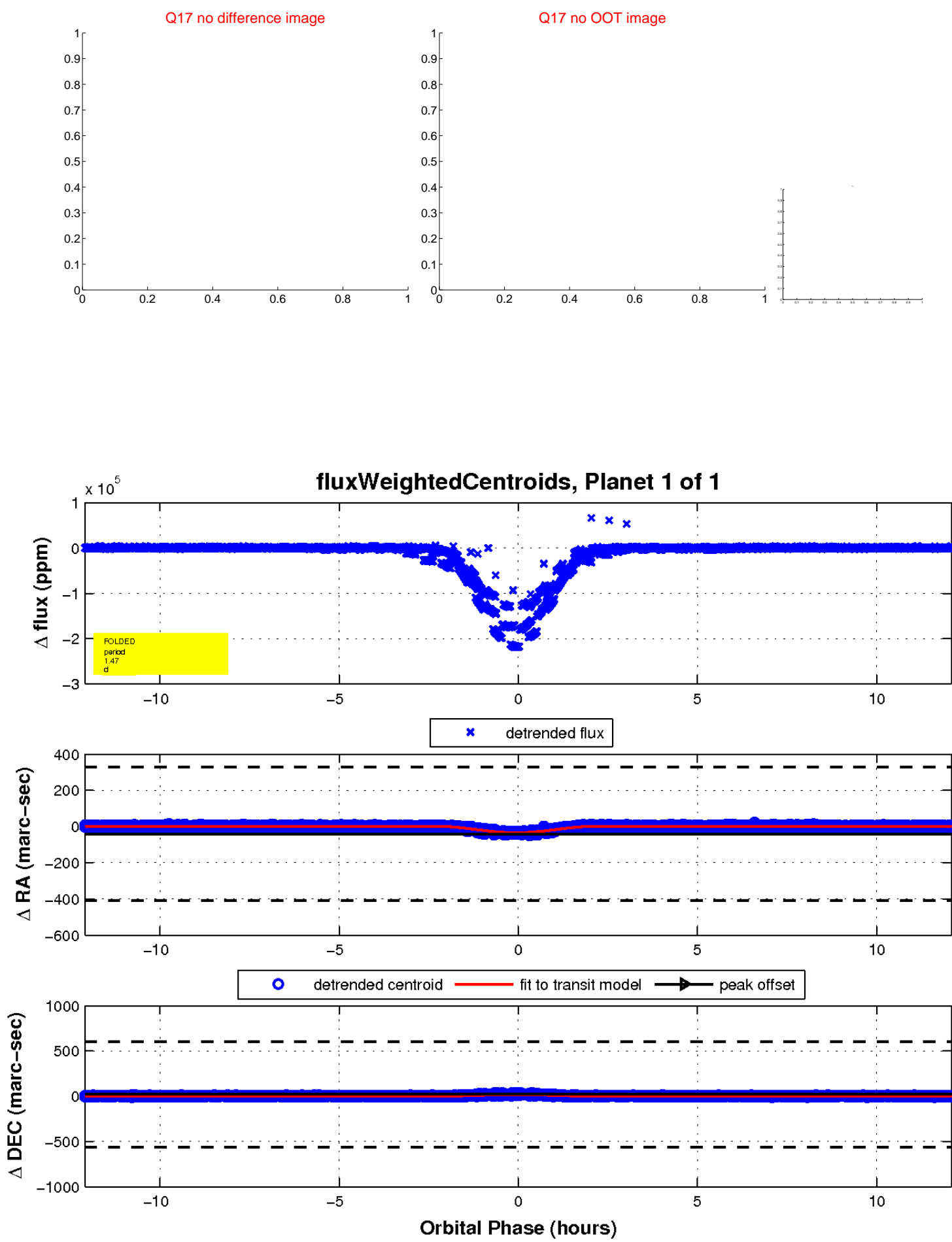
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

