

# KIC 009821916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009821916-01	OBS	No	333.240446	427.937451	127.3	14.143	9.3	8.3	0.85	5967	1.05	1.03

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009821916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

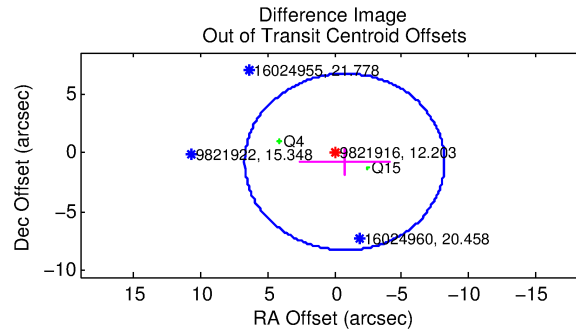
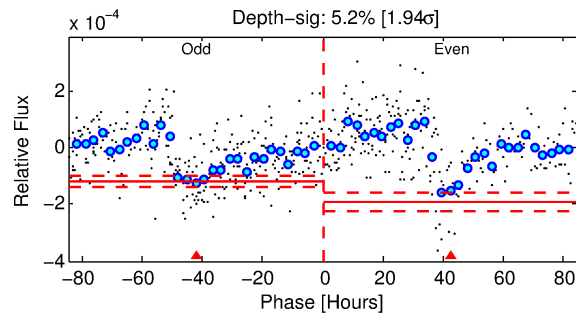
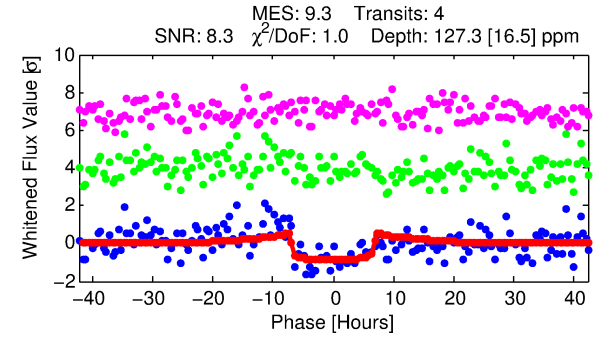
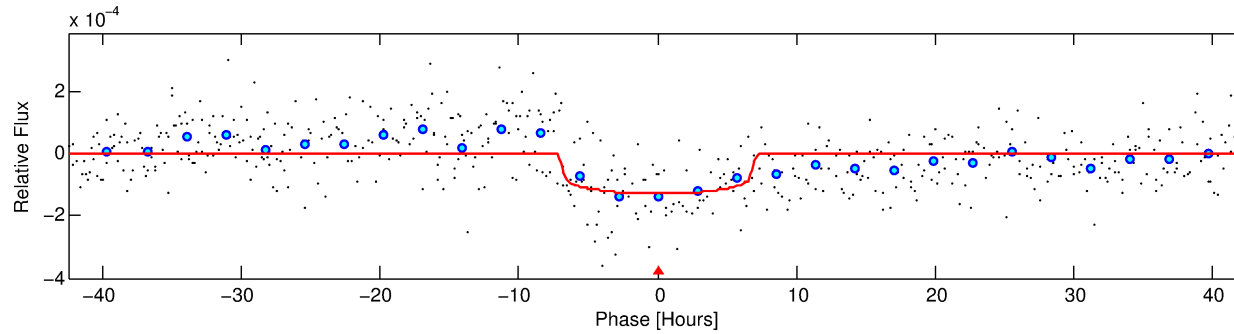
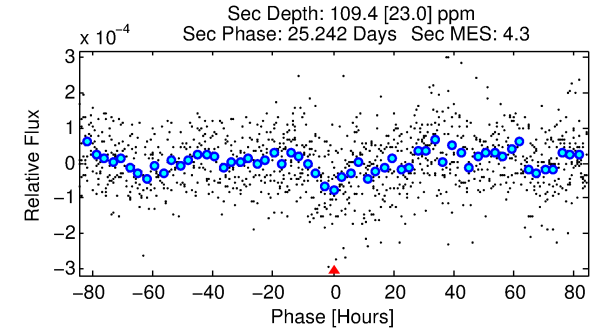
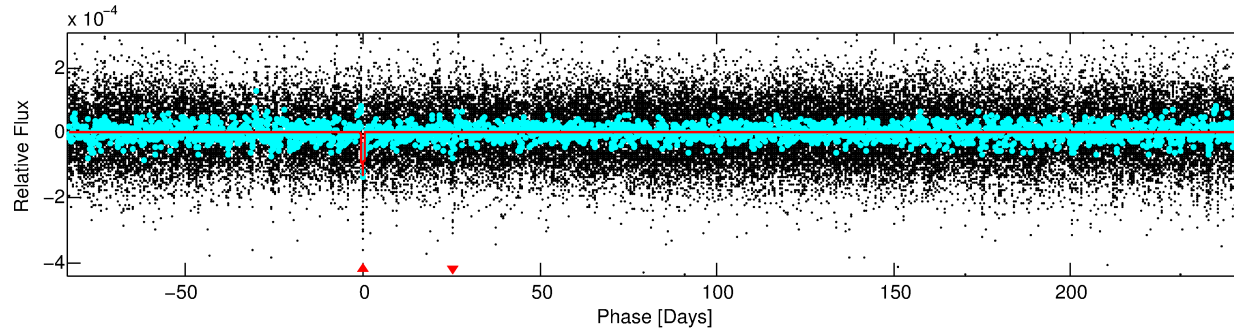
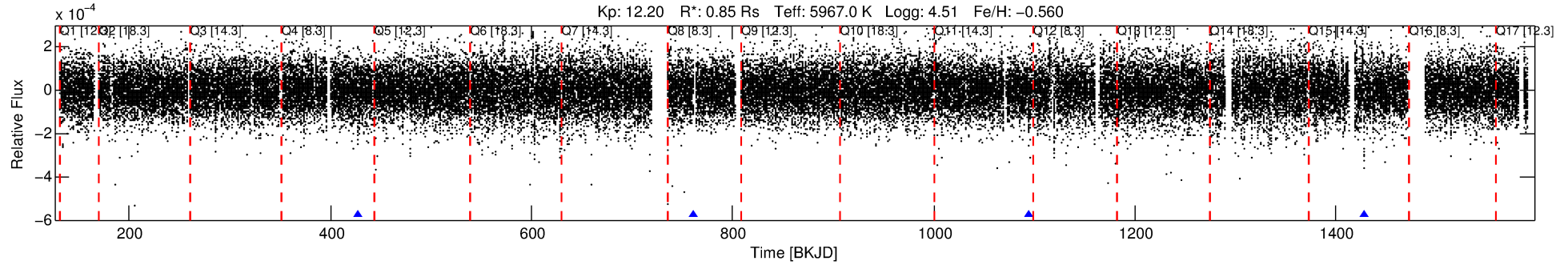
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009821916-01

No Significant Match Found

# DV One-Page Summary

KIC: 9821916 Candidate: 1 of 1 Period: 333.240 d



## DV Fit Results:

Period = 333.24045 [0.00671] d  
Epoch = 427.9375 [0.0142] BKJD  
Rp/R\* = 0.0113 [0.0043]  
a/R\* = 119.72 [228.56]  
b = 0.76 [1.06]  
Seff = 1.03 [0.27]  
Teq = 257 [17] K  
Rp = 1.05 [0.44] Re  
a = 0.8936 [0.1431] AU  
Ag = 43800.69 [35930.26] [1.22σ]  
Teffp = 5749 [1140] K [4.82σ]

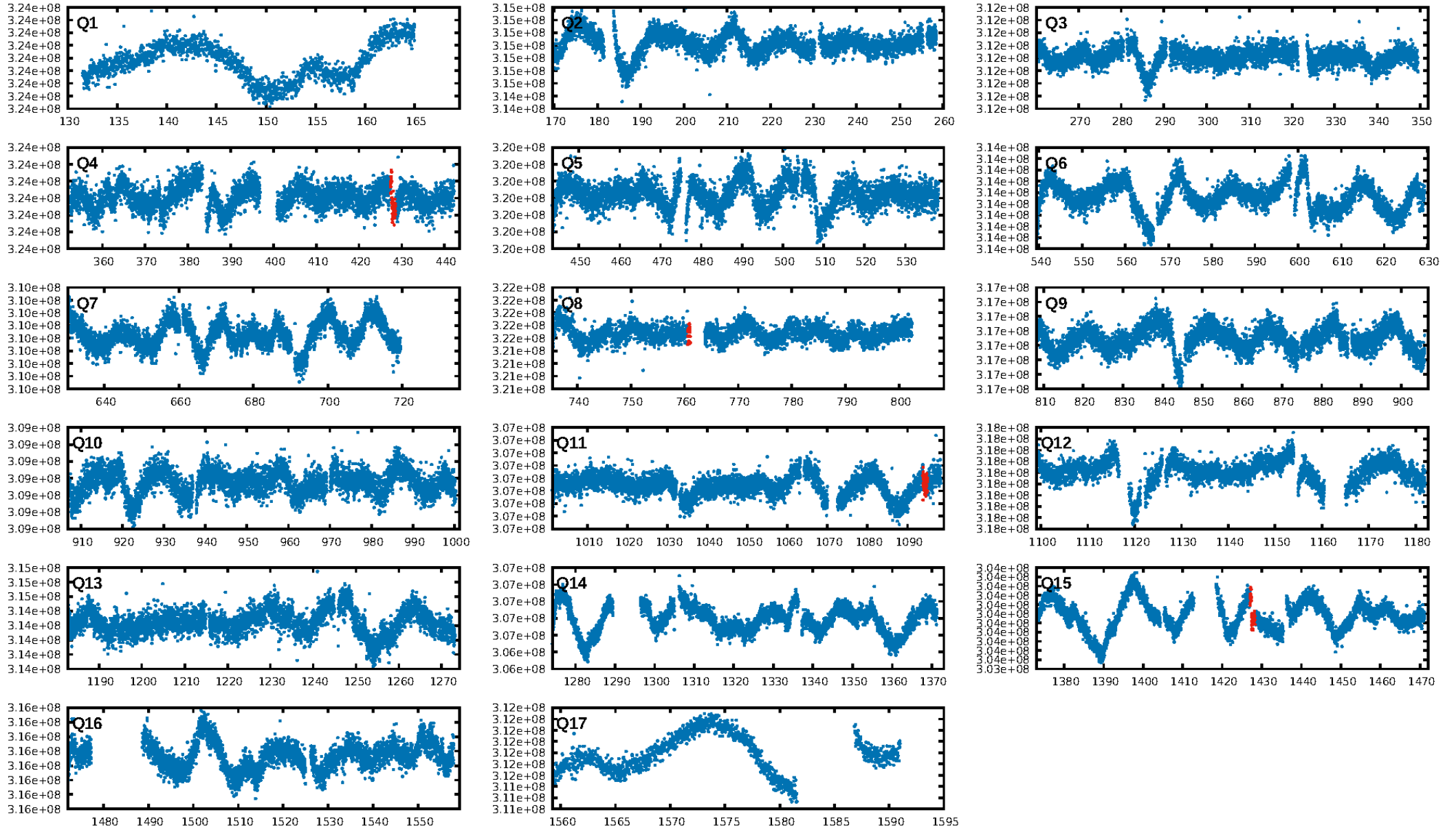
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.7%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 4.44e-11**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 2.885  
Centroid-sig: 23.0%  
Centroid-so: 0.496 arcsec [0.52σ]  
OotOffset-rm: 1.081 arcsec [0.43σ]  
KicOffset-rm: 1.498 arcsec [0.75σ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

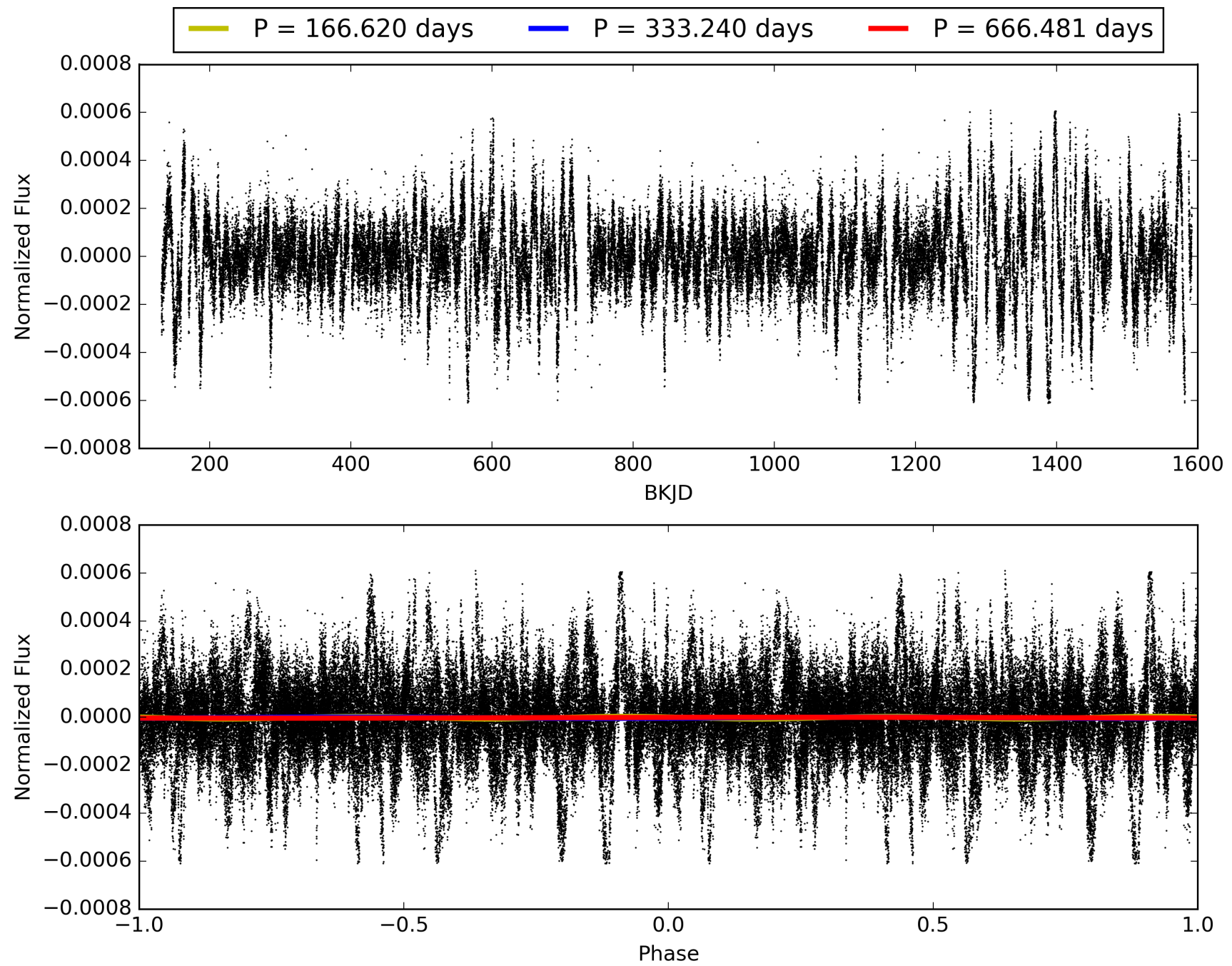
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 21:35:01 Z

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

# TCE 009821916-01, PDC Light Curves

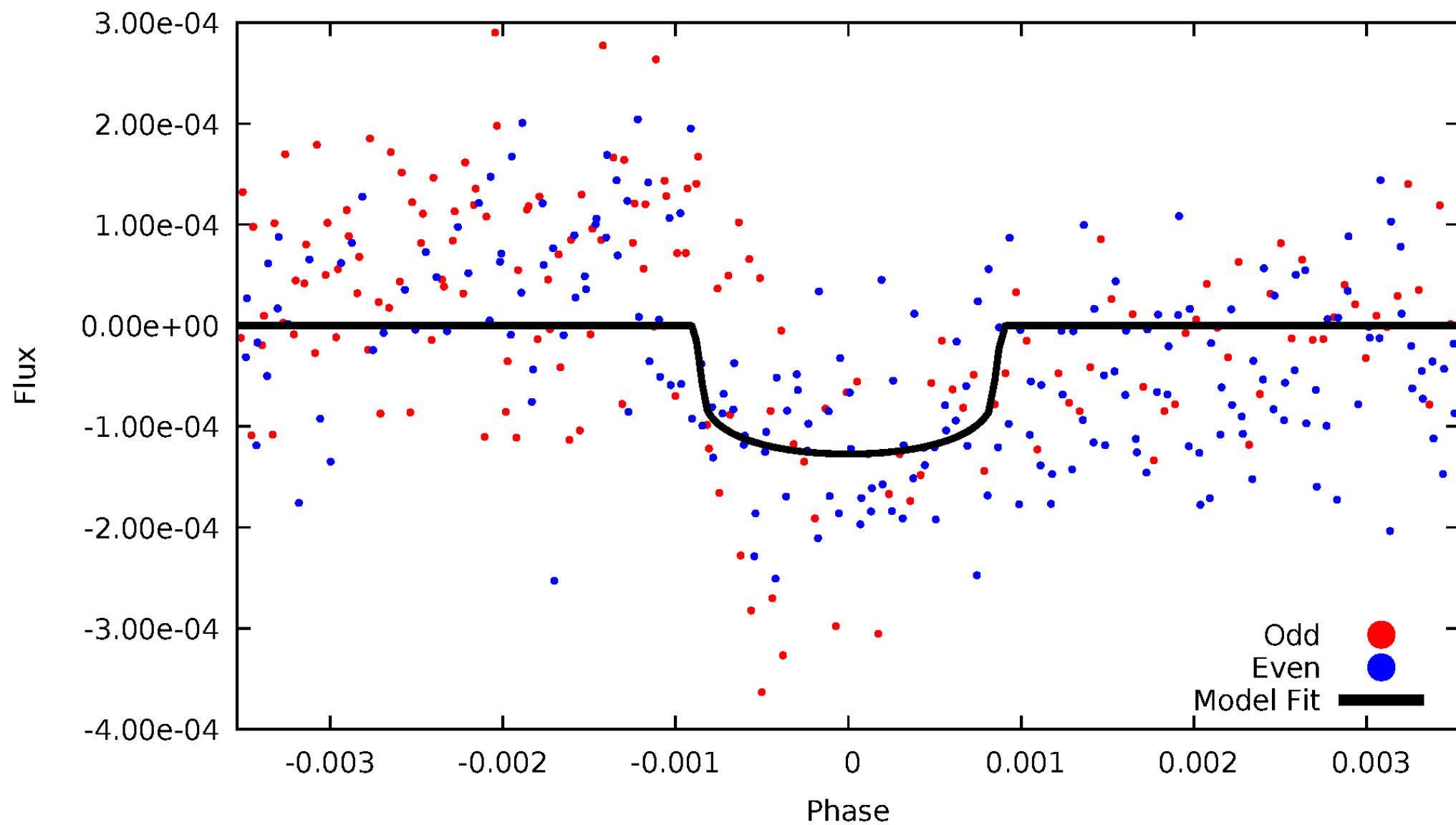


TCE 009821916-01



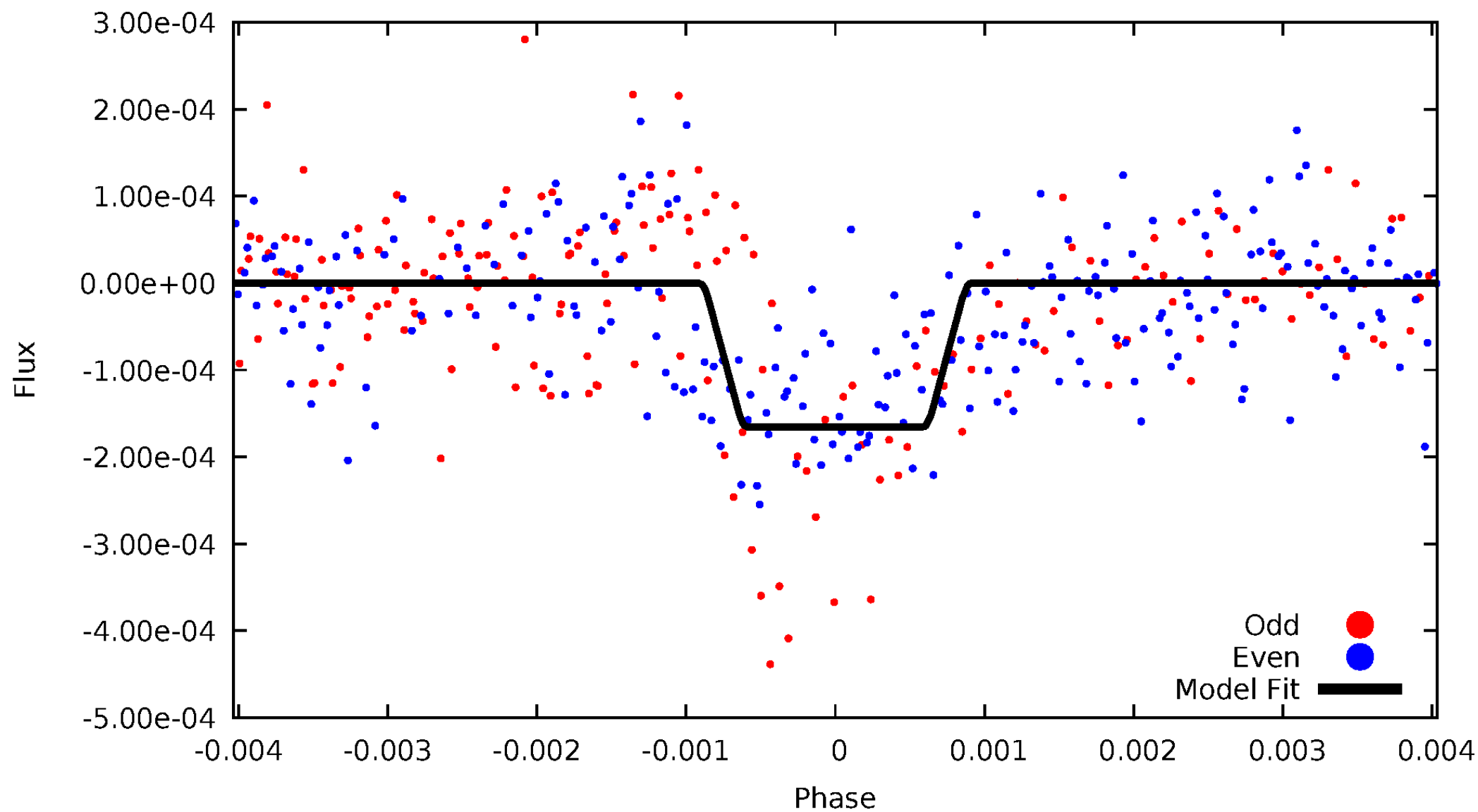
# DV Odd/Even

TCE 009821916-01



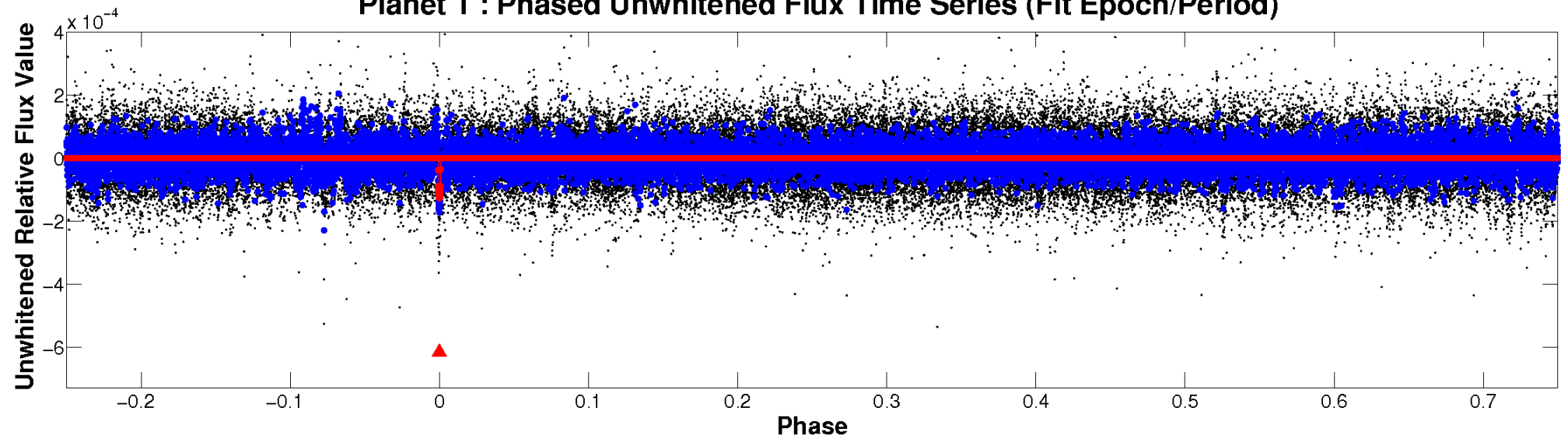
# ALT Odd/Even

TCE 009821916-01

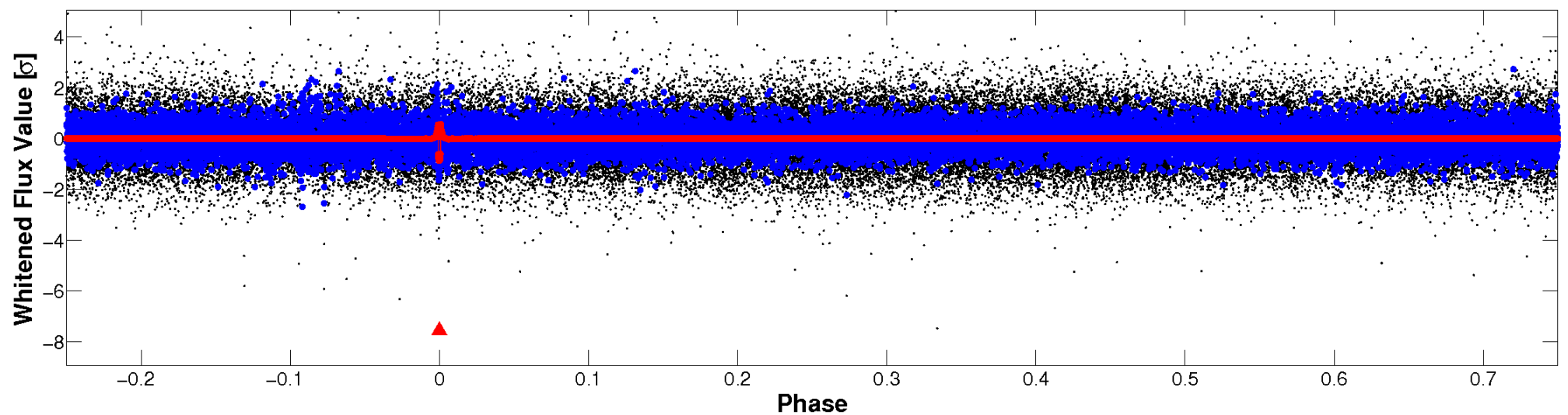


# Non-Whitened Vs. Whitened Light Curve

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

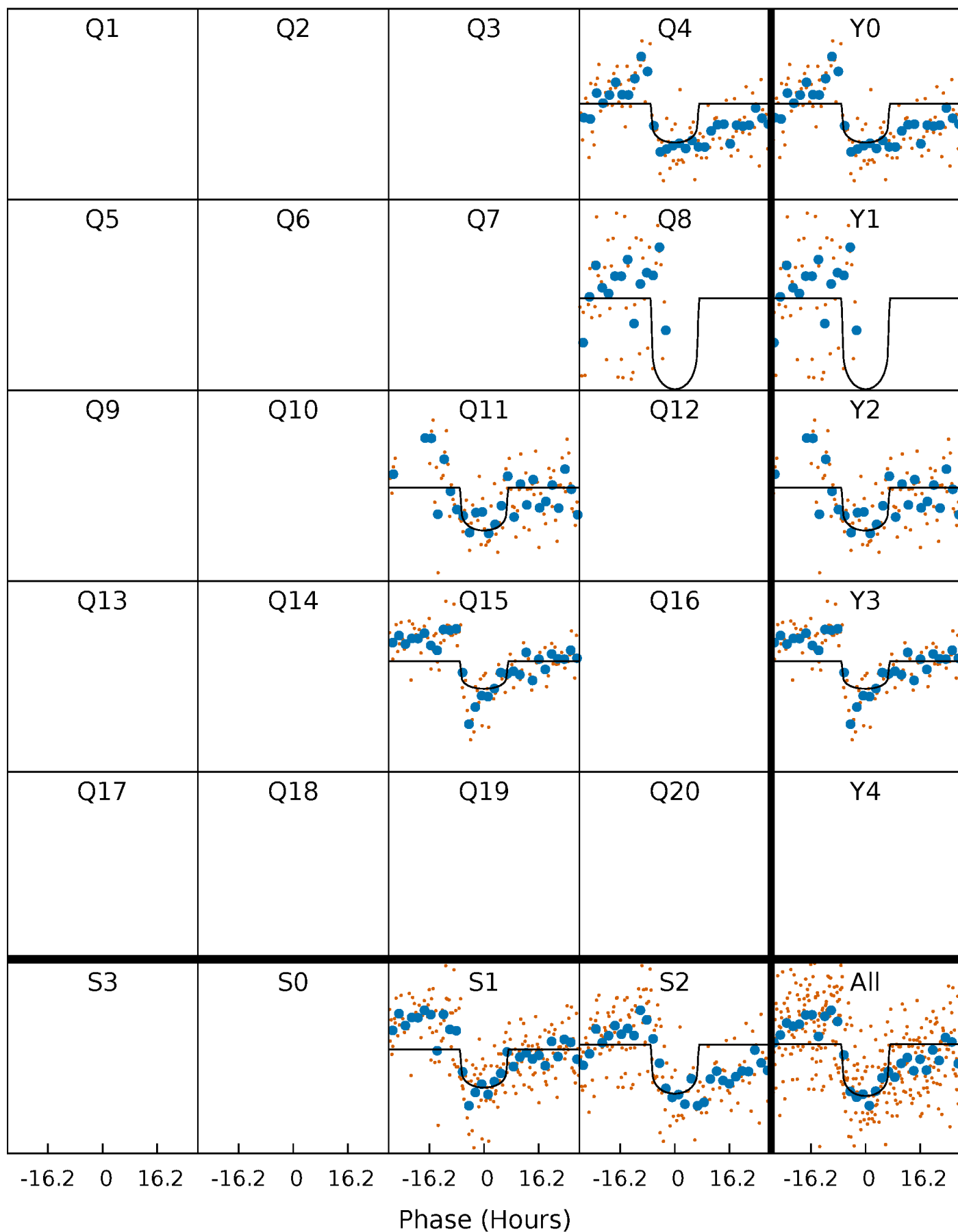
TCE 009821916-01 P=333.240446 Days  $T_0=427.937451$  (BKJD)





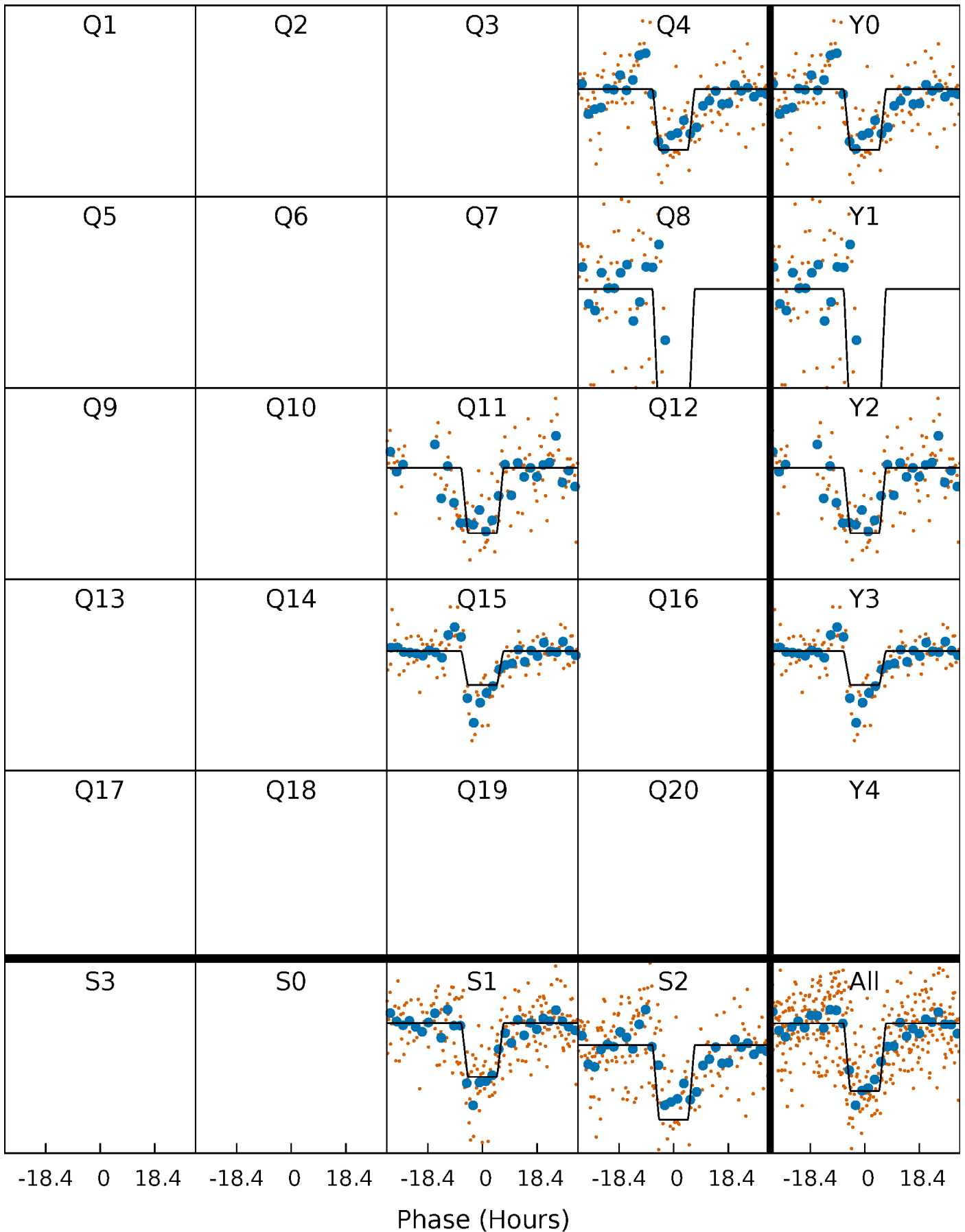
# DV Quarter-Phased Transit Curves

TCE 009821916-01 P=333.240446 Days  $T_0=427.937451$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

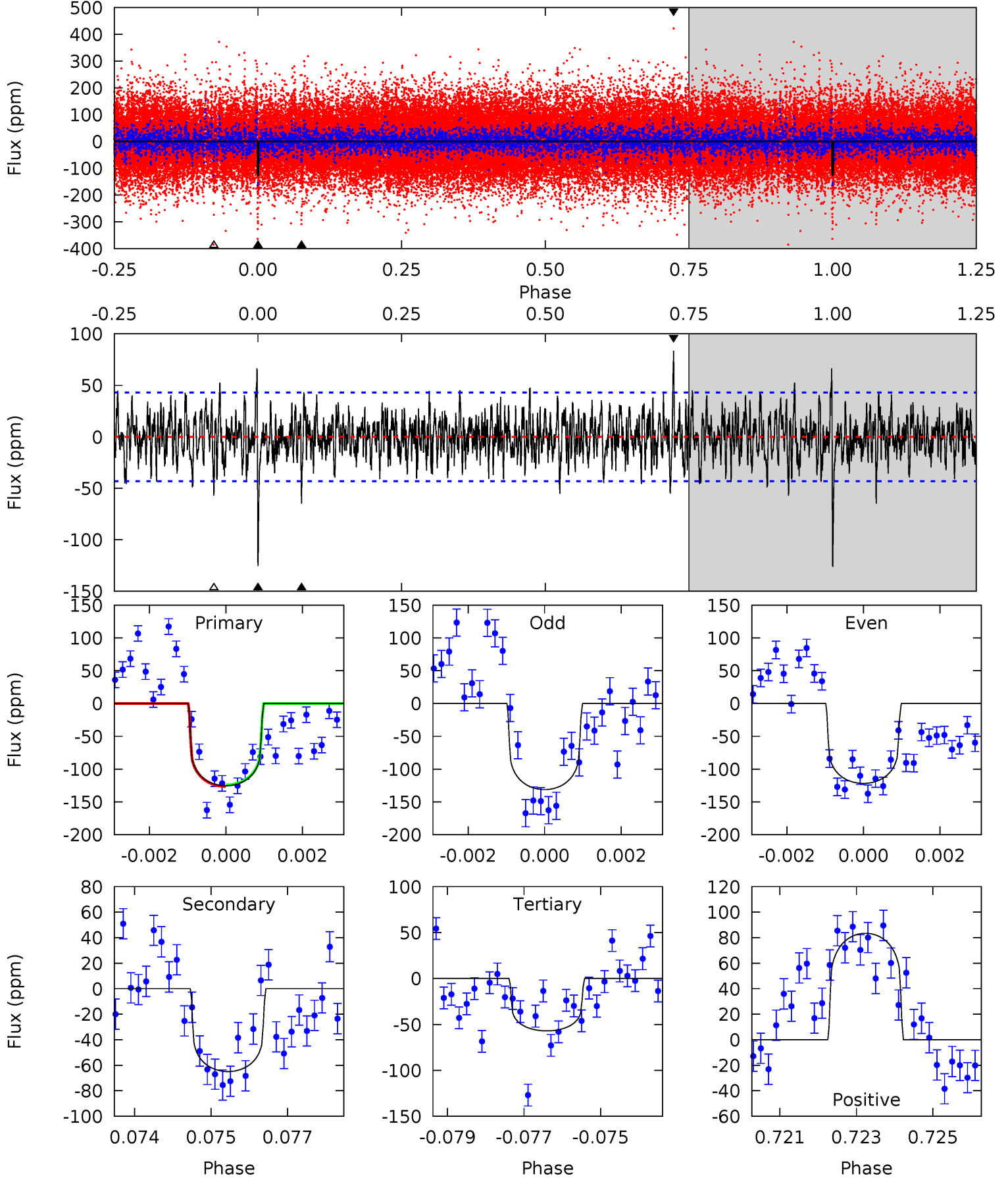
TCE 009821916-01 P=333.223685 Days  $T_0=427.966340$  (BKJD)



# DV Model-Shift Uniqueness Test

009821916-01, P = 333.240446 Days, E = 94.697005 Days

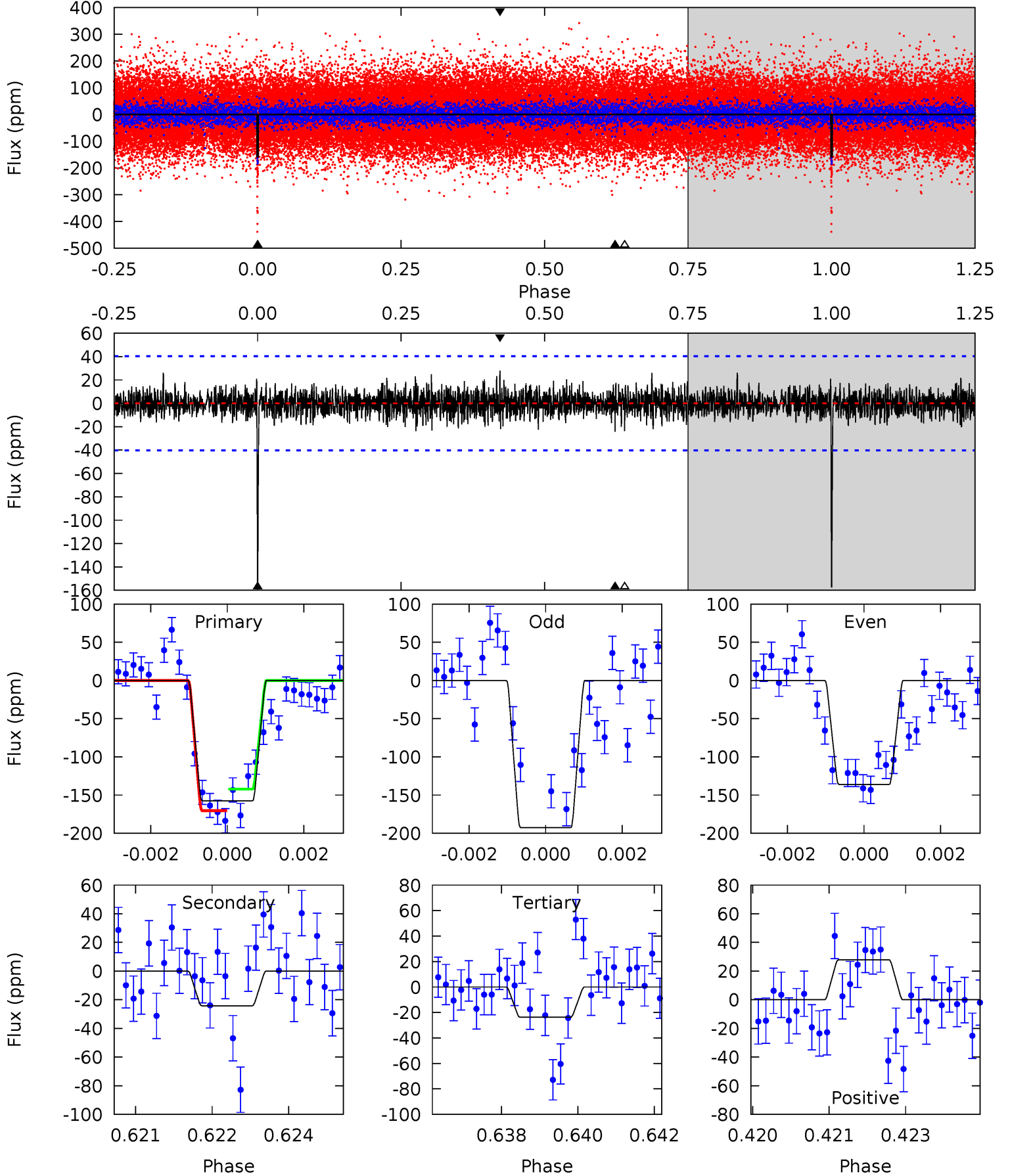
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.6	8.06	7.08	10.4	5.34	3.11	2.10	8.49	5.22	0.98	-2.29	0.57	0.80	0.40	0.14



# Alt Model-Shift Uniqueness Test

009821916-01,  $P = 333.223685$  Days,  $E = 94.742655$  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
20.9	3.21	3.15	3.69	5.35	3.12	0.94	17.7	17.2	0.06	-0.48	3.67	0.92	0.15	1.87



### Stellar Parameters For KIC 009821916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5967^{+149}_{-164}$	$4.510^{+0.070}_{-0.130}$	$-0.560^{+0.300}_{-0.300}$	$0.852^{+0.160}_{-0.086}$	$0.856^{+0.090}_{-0.081}$	$1.952^{+0.553}_{-0.724}$
	+2%/-3%	+2%/-3%	+54%/-54%	+19%/-10%	+11%/-9%	+28%/-37%
Source	PHO1	FLK73	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 009821916-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-65 \pm 8$	$1.07^{+0.42}_{-0.41}$	$362^{+18}_{-15}$	$5127^{+1374}_{-671}$	$24640^{+42156}_{-12129}$
Alt.	$-24 \pm 8$	$1.22^{+0.39}_{-0.42}$	$361^{+17}_{-14}$	$3996^{+693}_{-448}$	$7086^{+9479}_{-3447}$

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

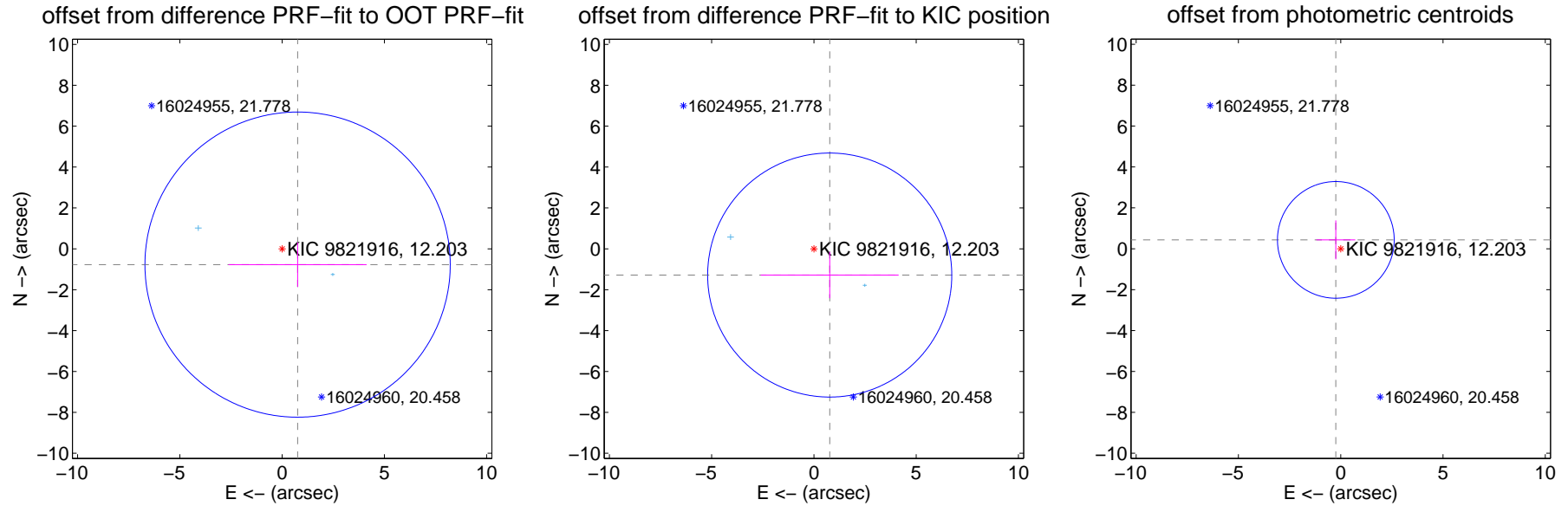
## DV Centroid Data

Supplemental centroid analysis for 009821916-01. Kepler magnitude: 12.20. Transit SNR 8.34

There are 2 quarters with good PRF difference image offsets

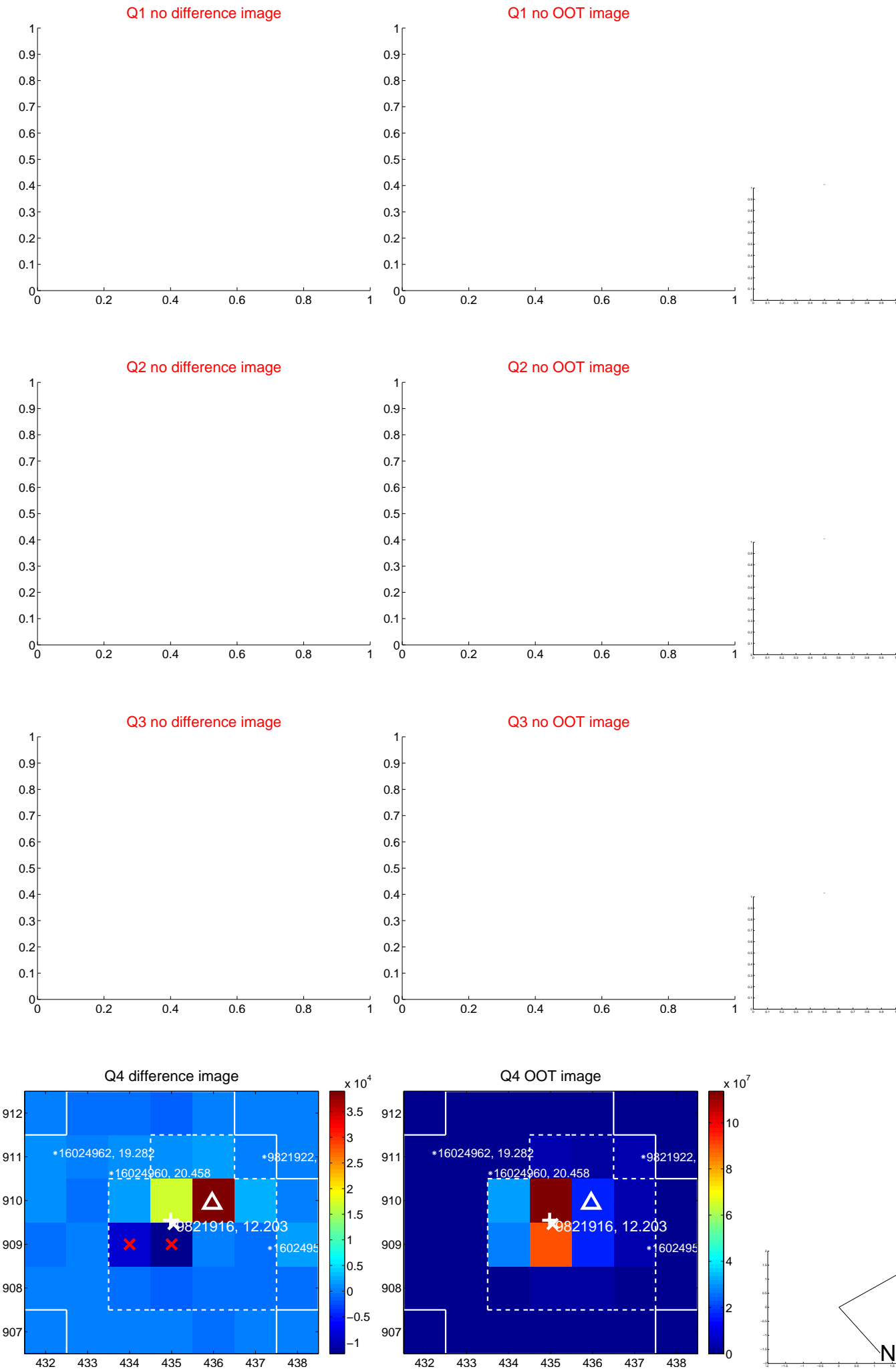
The direct PRF centroid is offset from the target star catalog position by about 0.53 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.081 \pm 2.488$	0.43	$-0.757 \pm 3.376$	$-0.772 \pm 1.087$
PRF-fit source offset from KIC position	$1.498 \pm 1.990$	0.75	$-0.772 \pm 3.371$	$-1.284 \pm 1.130$
photometric centroid source offset	$0.50 \pm 0.95$	0.52	$0.24 \pm 0.95$	$0.43 \pm 0.95$



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.





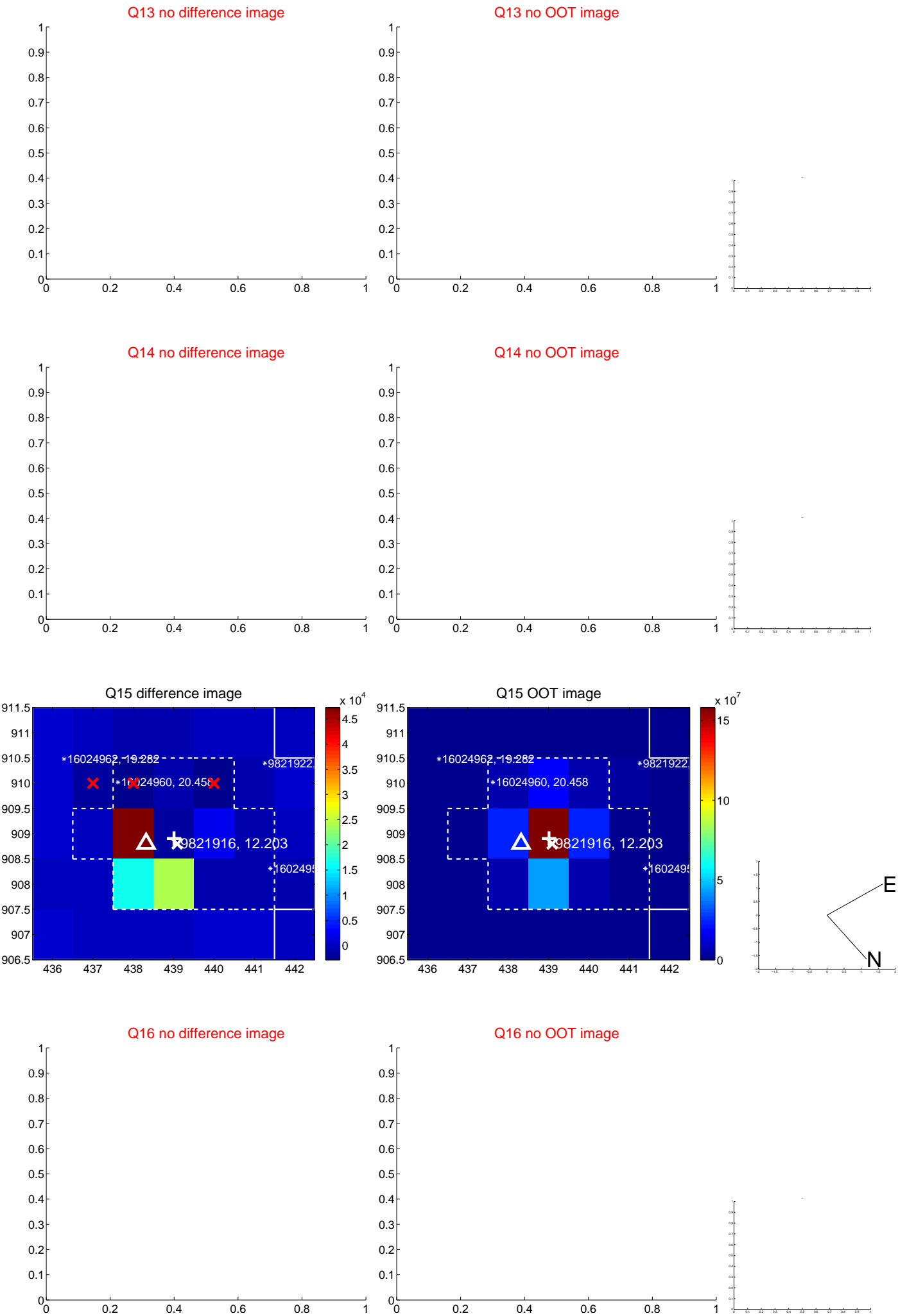
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



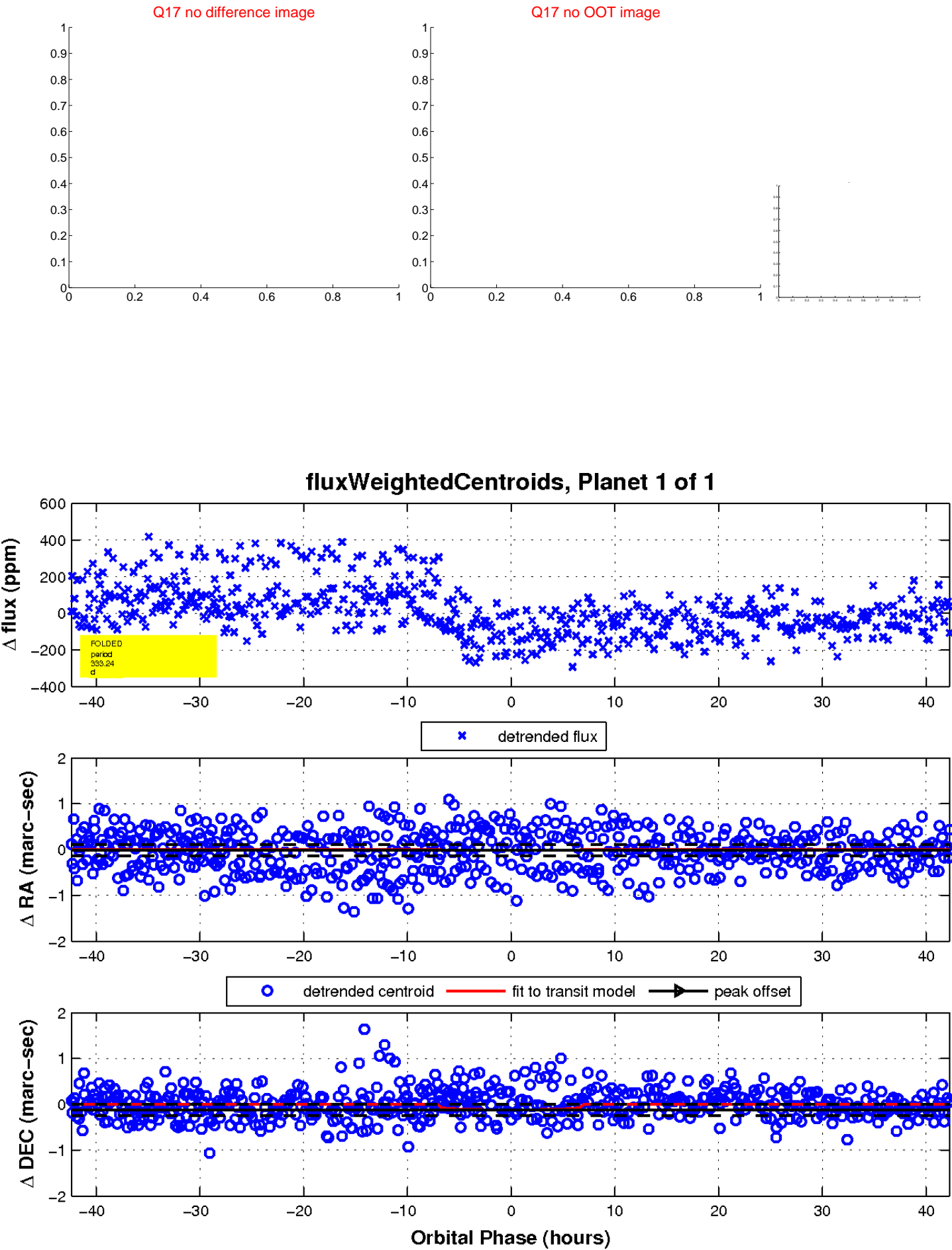
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

