

# KIC 009812964

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009812964-01	OBS	No	421.529254	533.018349	1170.1	7.187	7.8	7.6	0.80	5035	3.14	0.36

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009812964-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE--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.

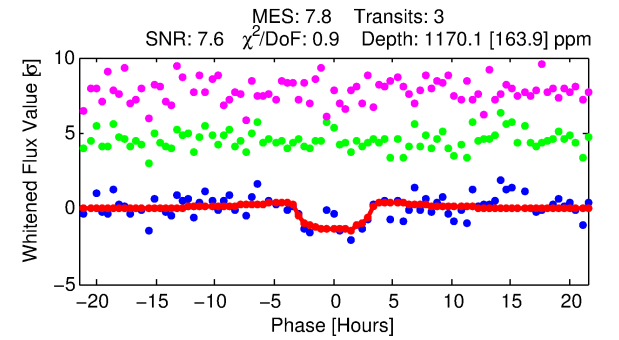
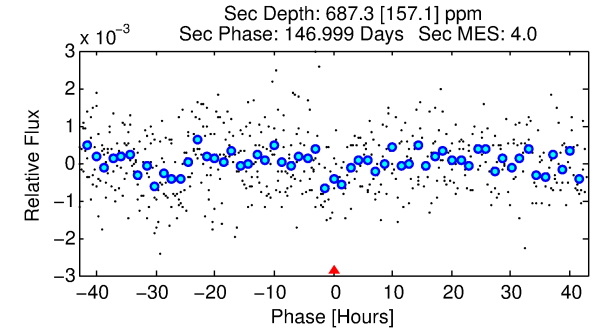
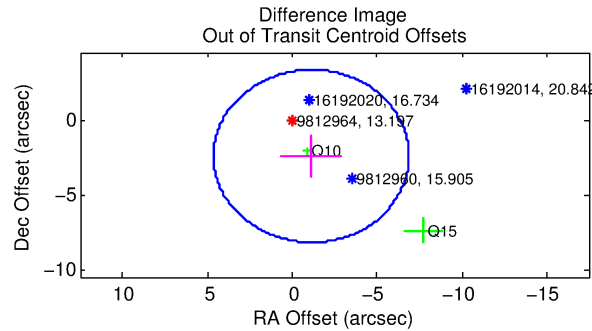
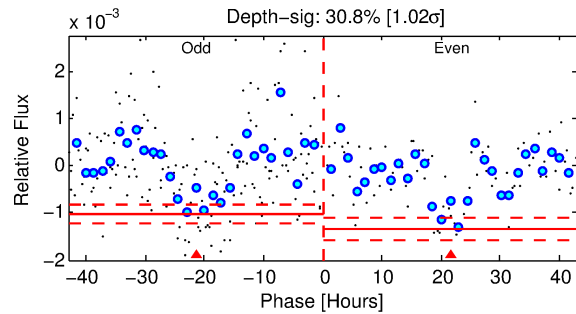
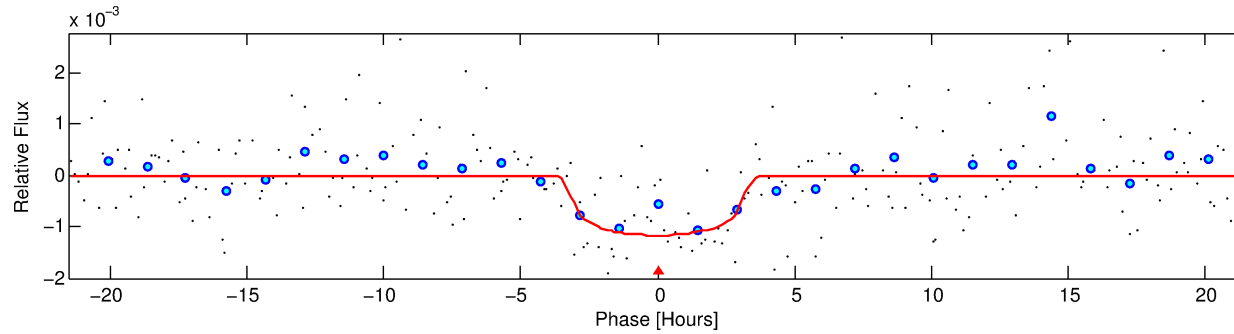
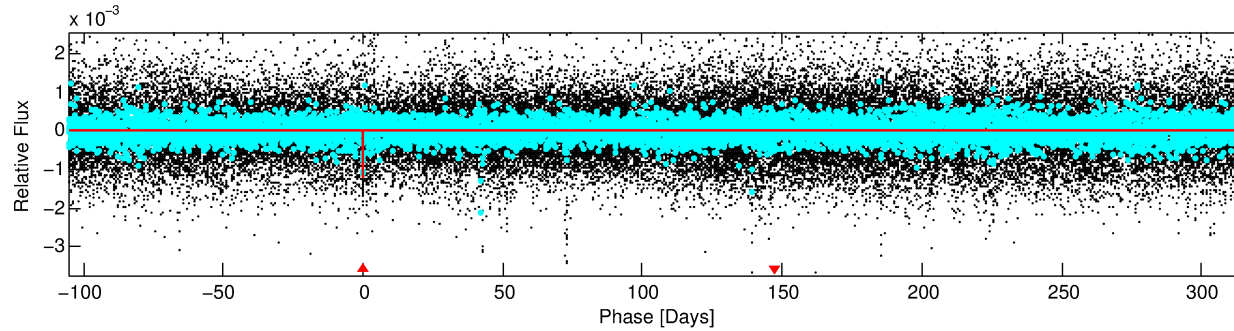
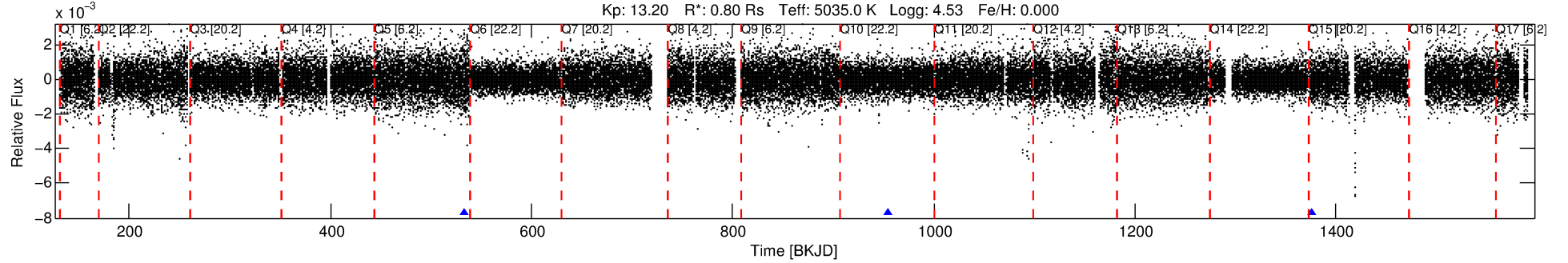
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009812964-01

No Significant Match Found

# DV One-Page Summary

KIC: 9812964 Candidate: 1 of 1 Period: 421.529 d



## DV Fit Results:

Period = 421.52925 [0.01349] d  
Epoch = 533.0183 [0.0195] BKJD  
Rp/R\* = 0.0362 [0.0118]  
a/R\* = 268.82 [306.38]  
b = 0.84 [0.40]  
Seff = 0.36 [0.07]  
Teq = 197 [9] K  
Rp = 3.14 [1.07] Re  
a = 1.0104 [0.0860] AU  
Ag = 39117.45 [27508.38] [1.42 $\sigma$ ]  
Teffp = 4284 [756] K [5.41 $\sigma$ ]

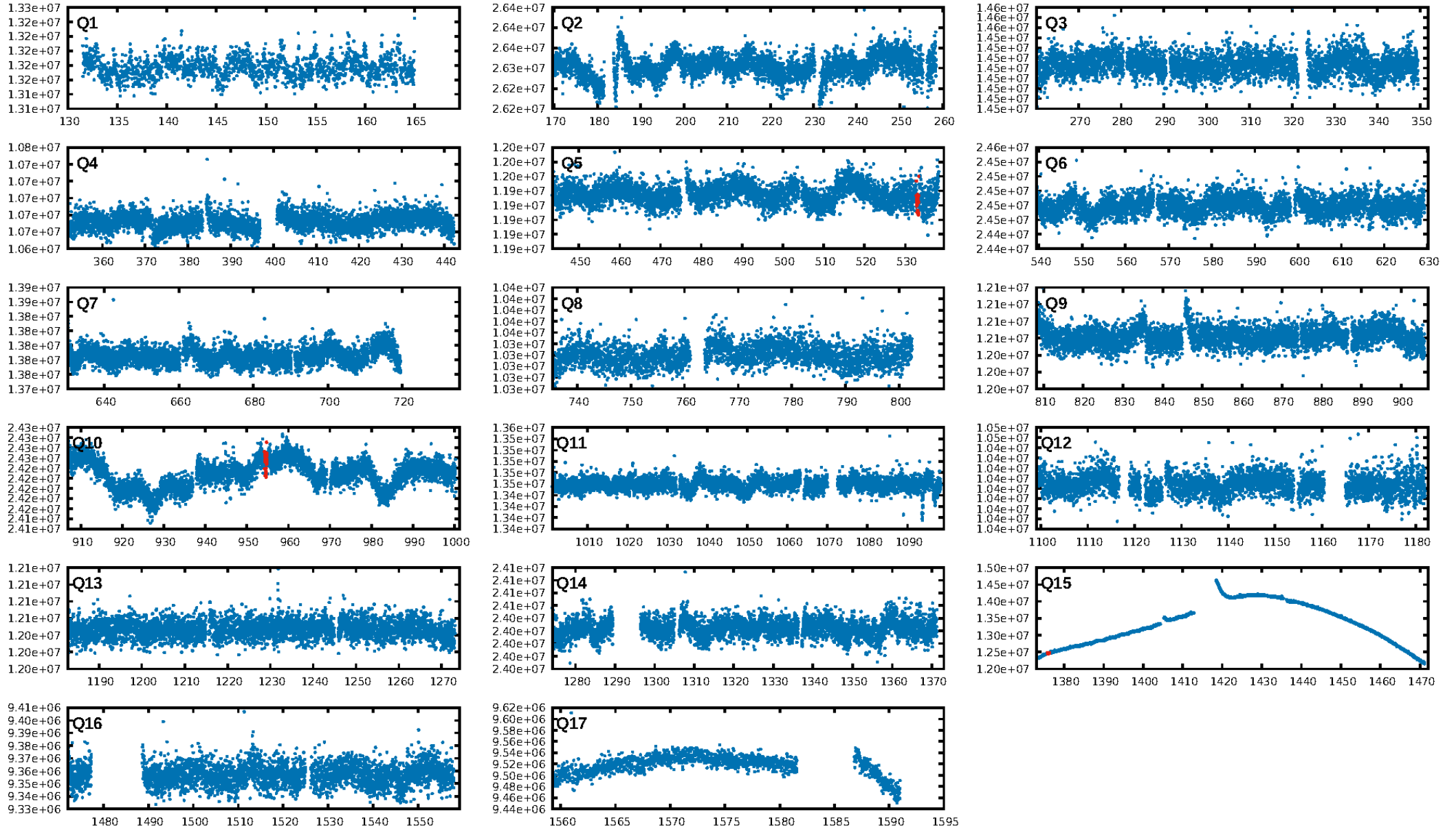
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 78.5%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 1.21e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.844  
Centroid-sig: 64.5%  
**Centroid-so: 4.536 arcsec [8.49 $\sigma$ ]**  
OotOffset-rm: 2.678 arcsec [1.39 $\sigma$ ]  
KicOffset-rm: 5.074 arcsec [1.62 $\sigma$ ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

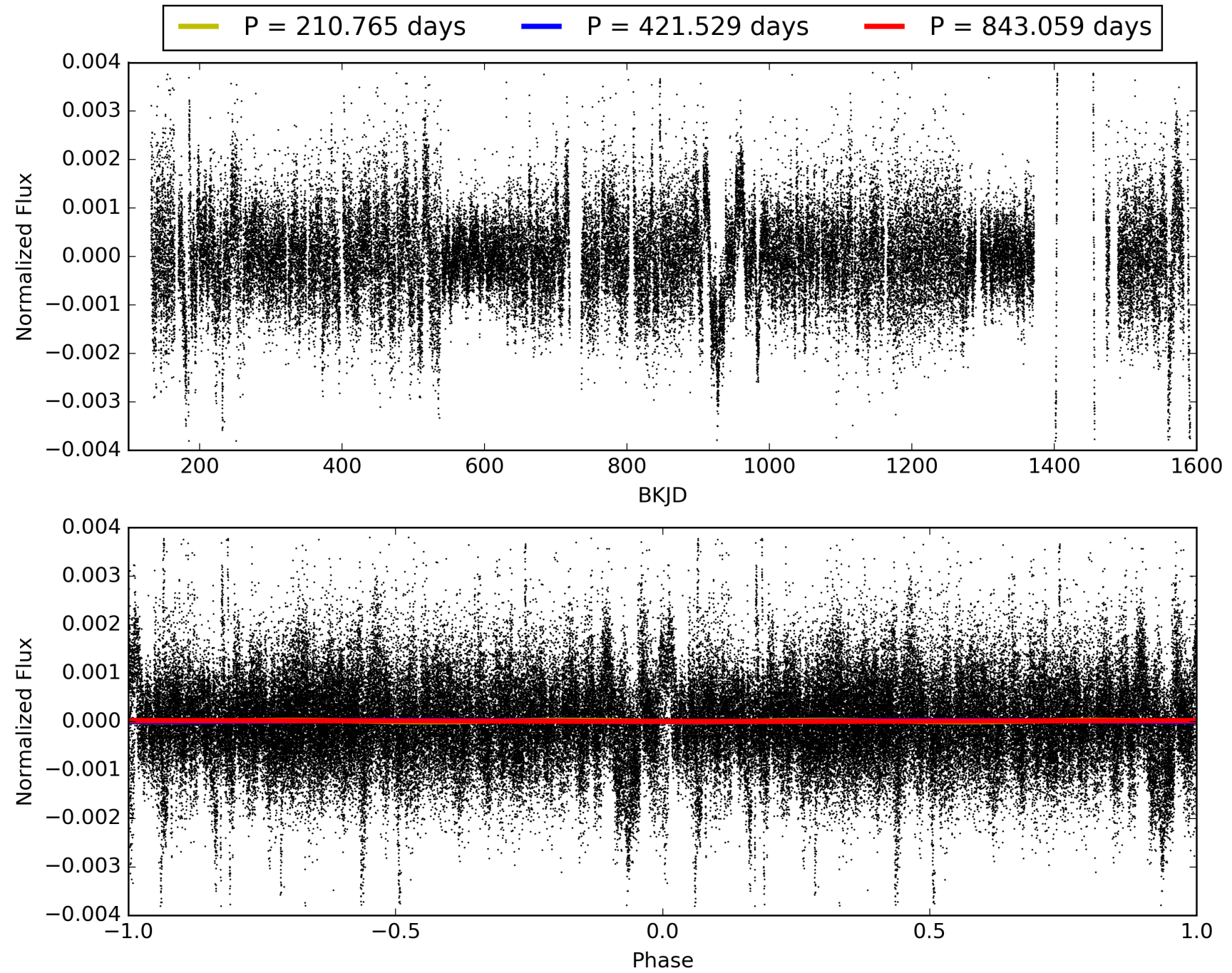
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 22:57:29 Z

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

# TCE 009812964-01, PDC Light Curves

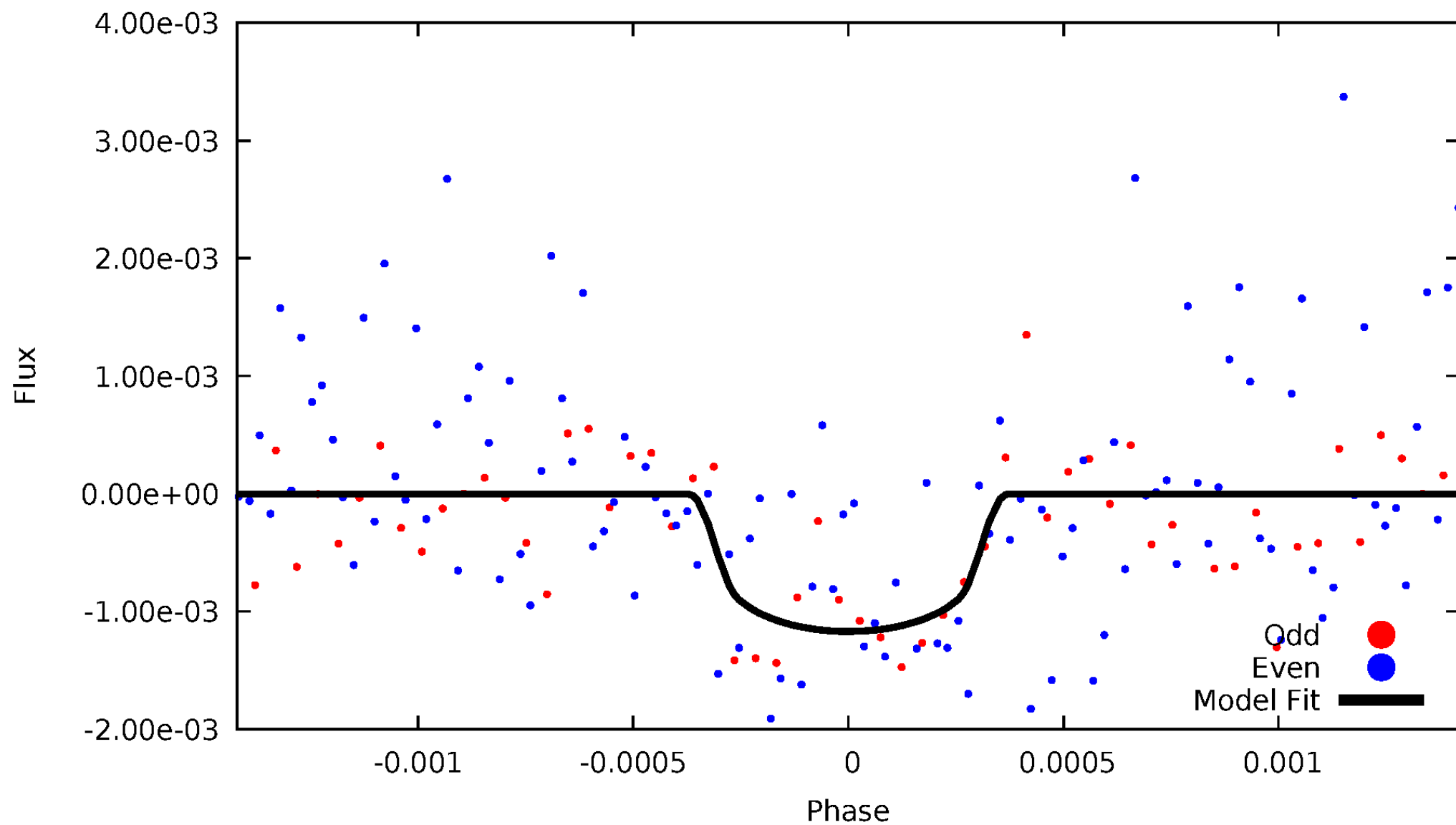


TCE 009812964-01



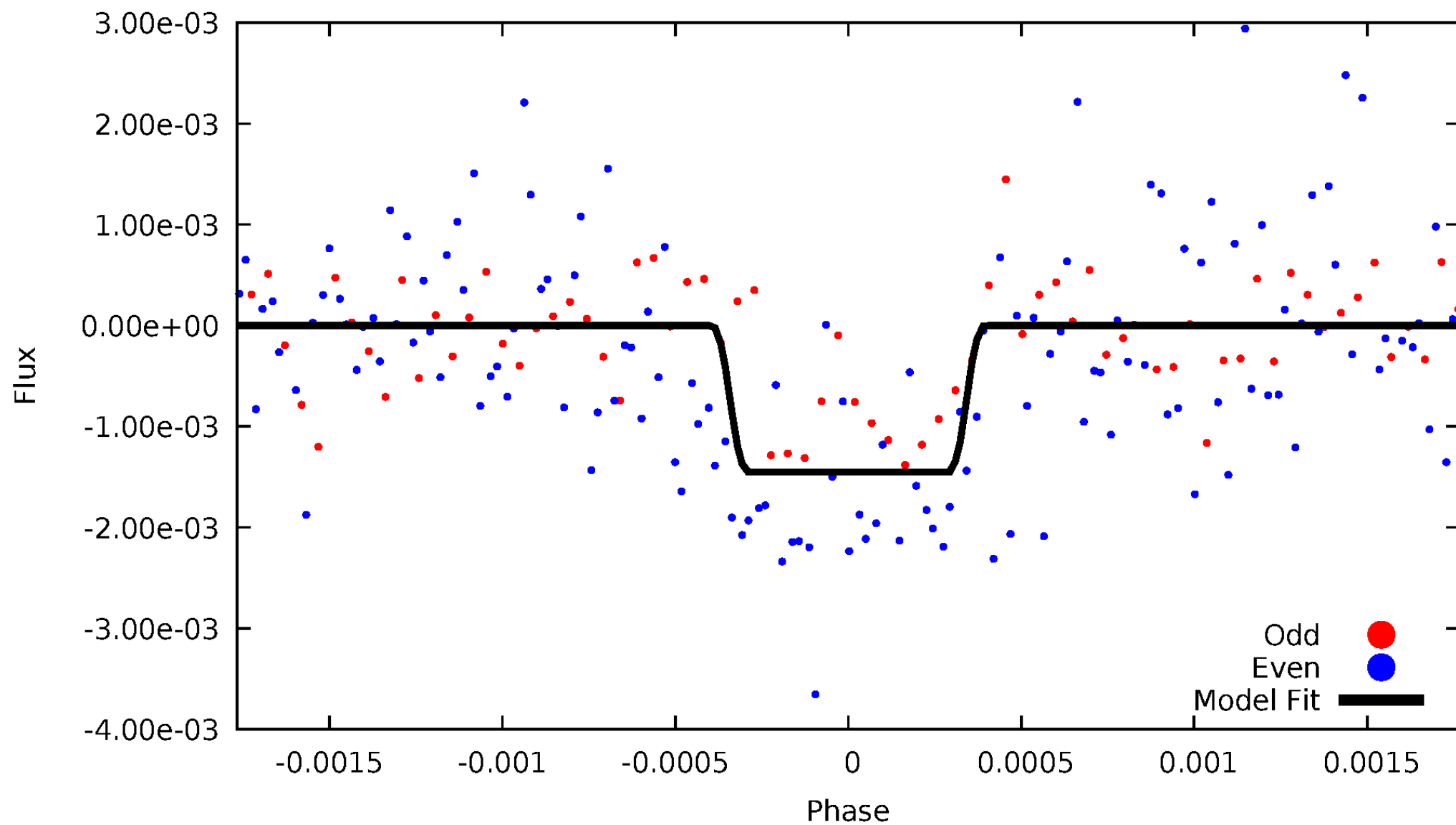
# DV Odd/Even

TCE 009812964-01



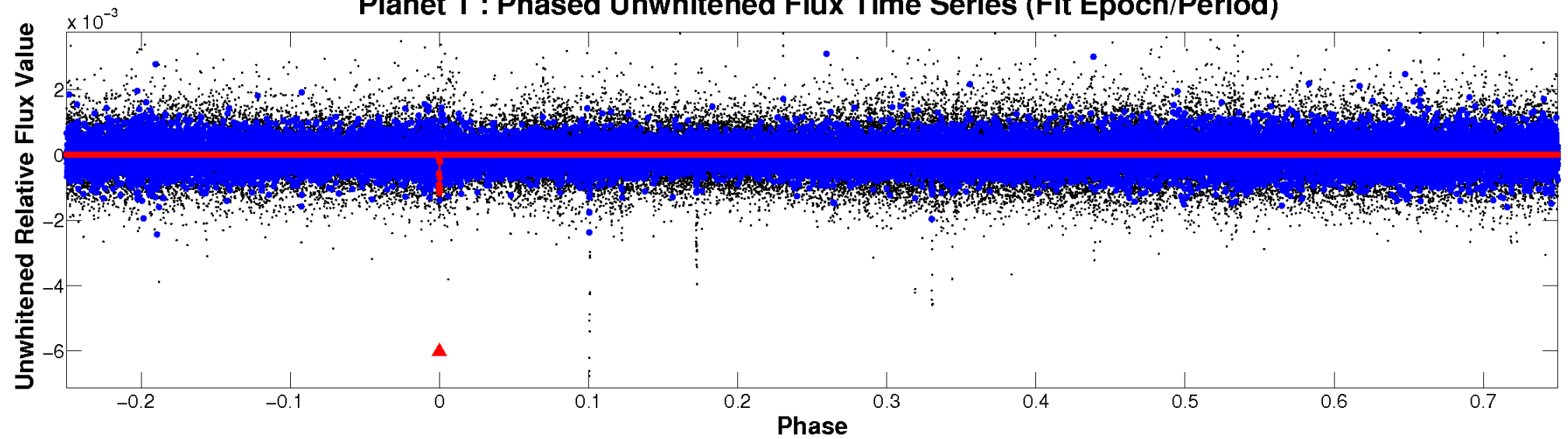
# ALT Odd/Even

TCE 009812964-01

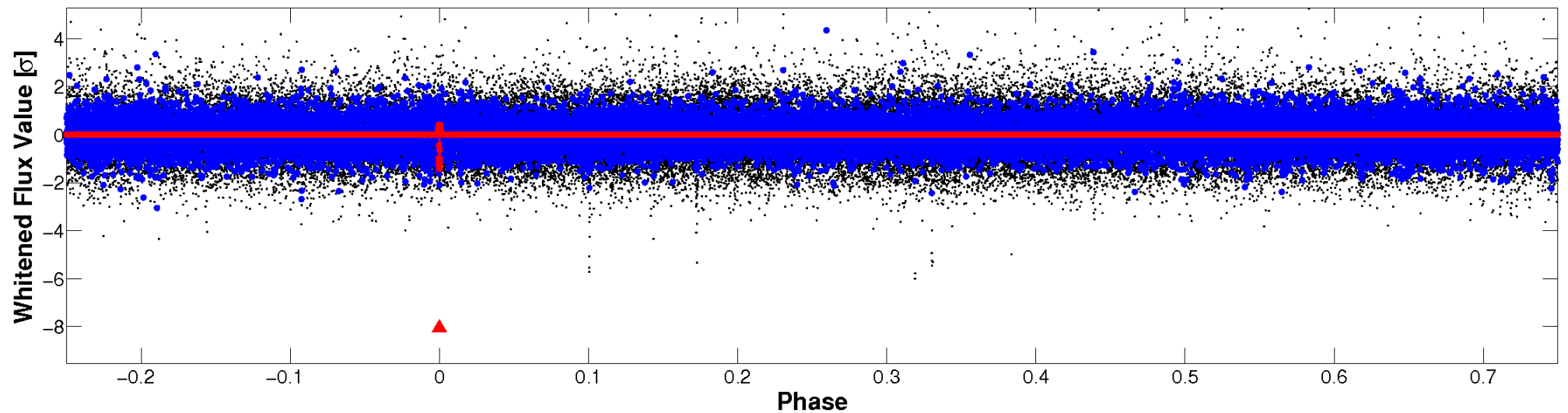


# Non-Whitened Vs. Whitened Light Curve

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



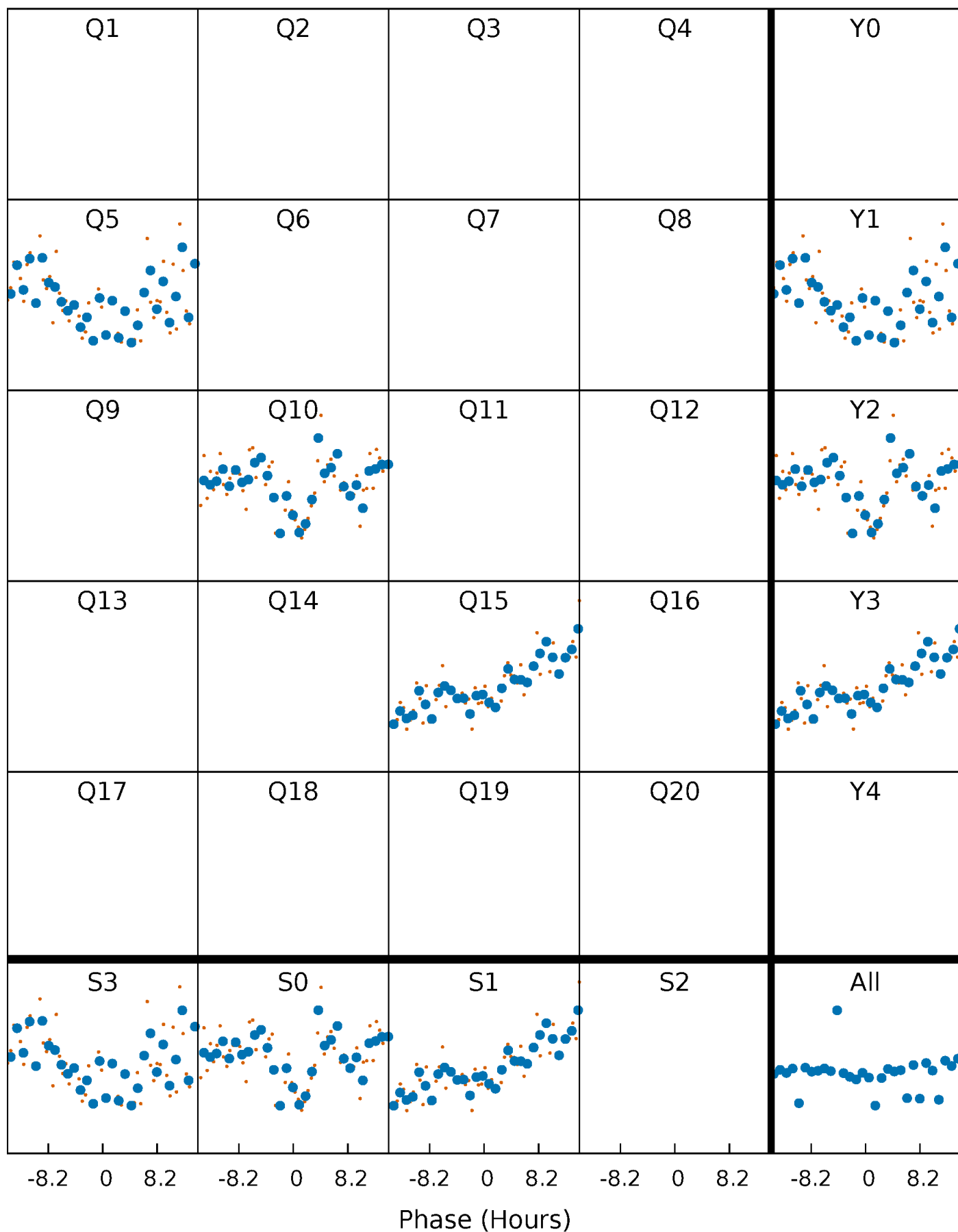
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

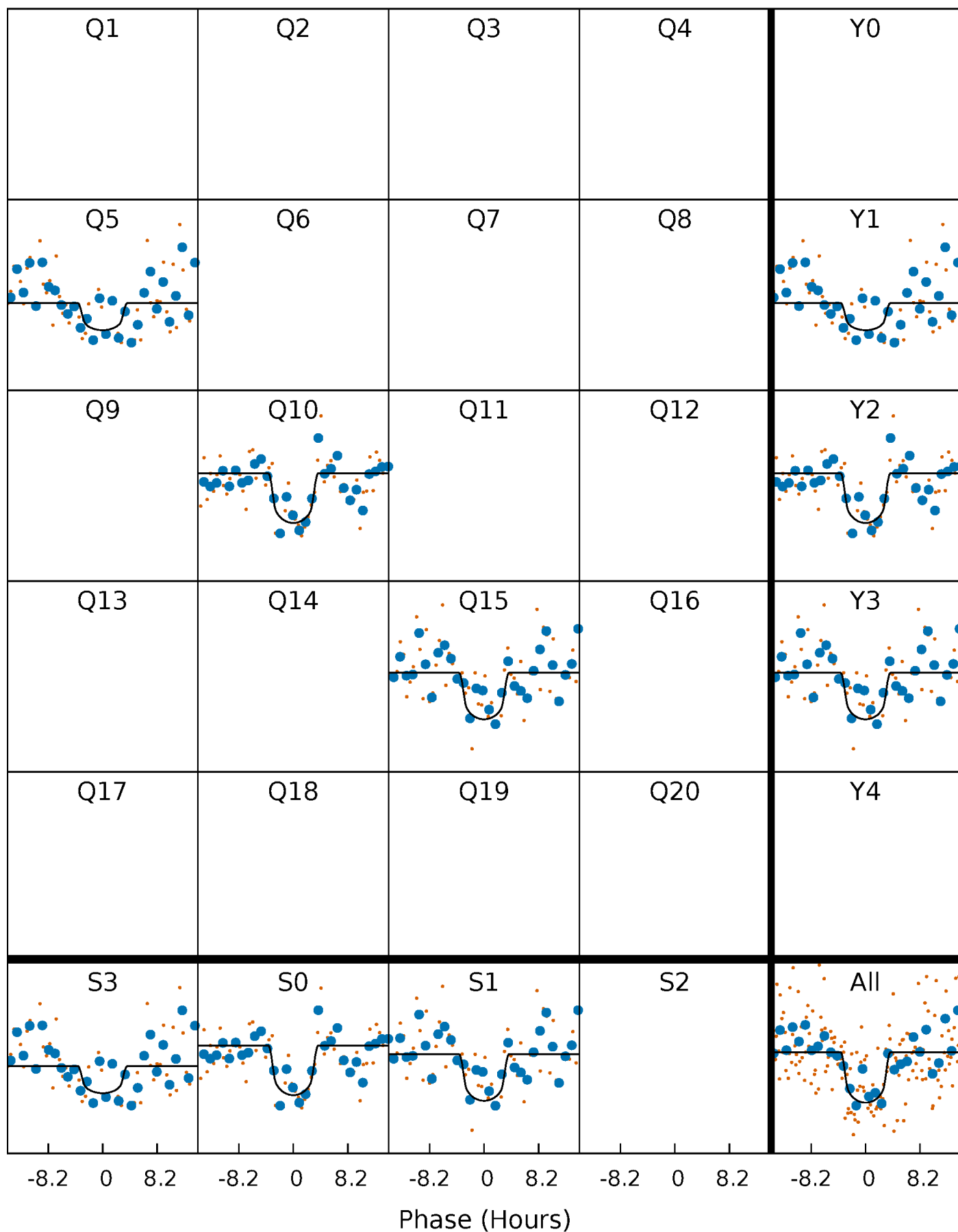
TCE 009812964-01 P=421.529254 Days  $T_0=533.018349$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 009812964-01 P=421.529254 Days  $T_0=533.018349$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

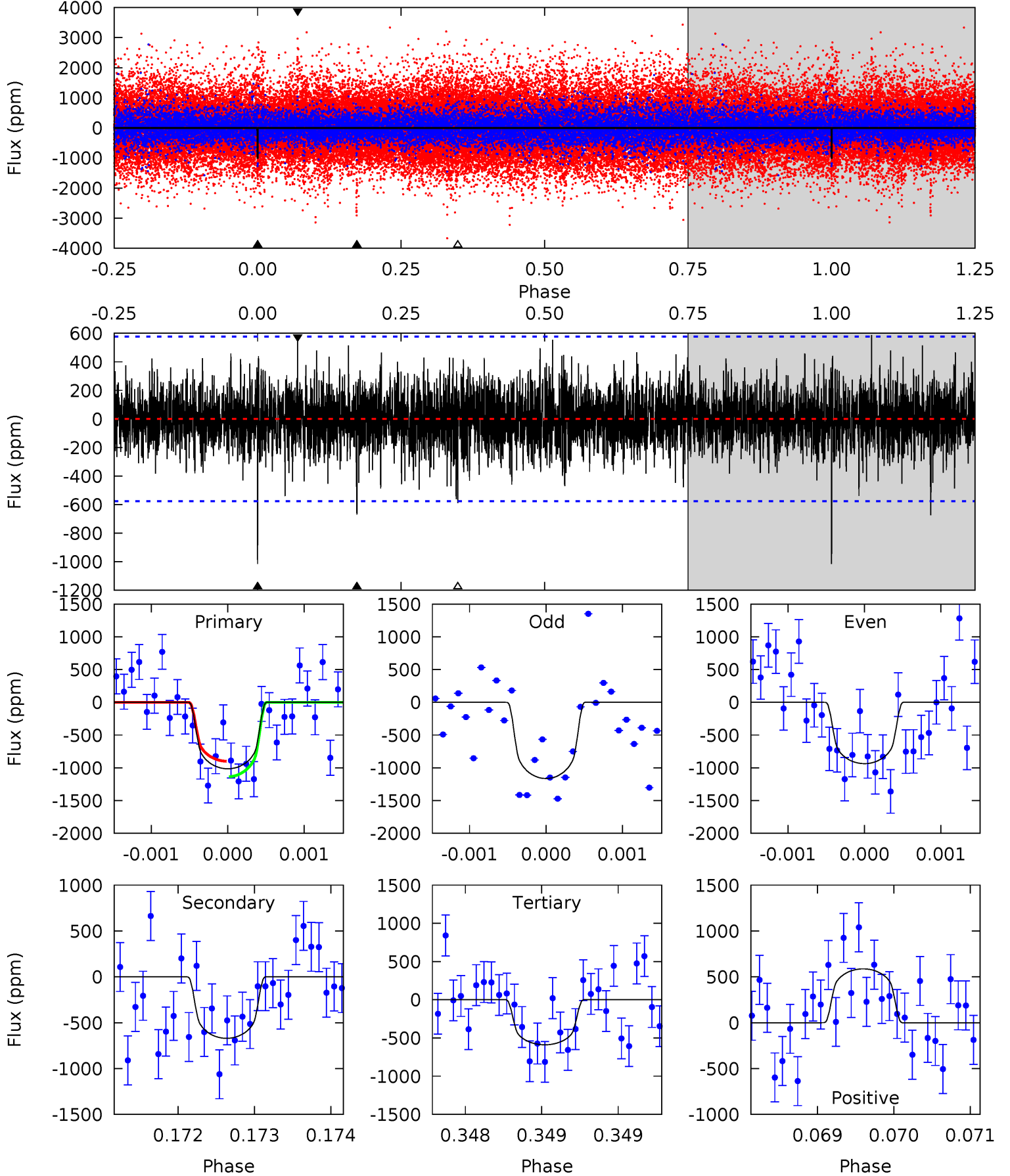
TCE 009812964-01 P=421.510287 Days  $T_0=533.020101$  (BKJD)



# DV Model-Shift Uniqueness Test

009812964-01, P = 421.529254 Days, E = 111.489095 Days

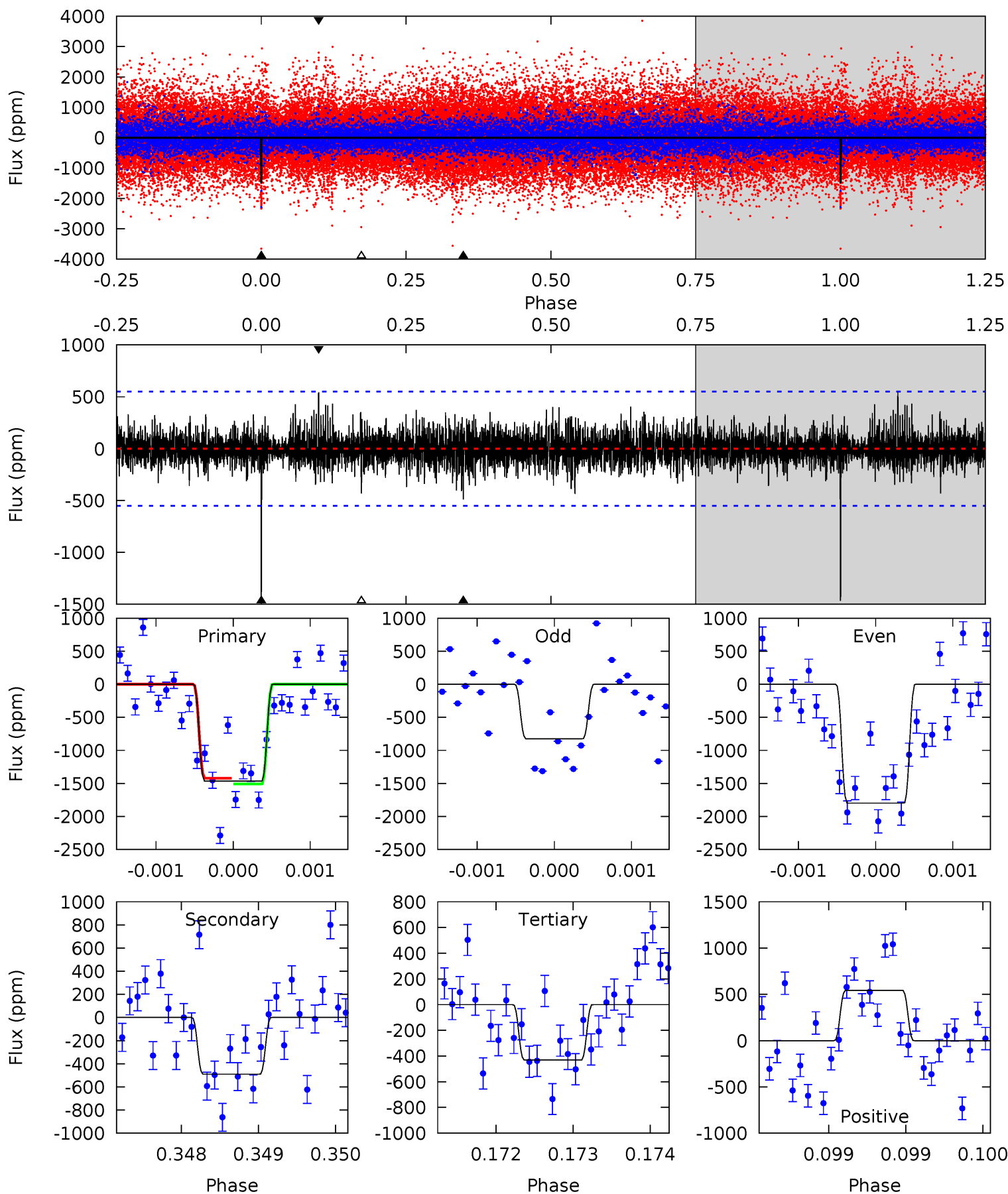
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.69	6.40	5.62	5.60	5.51	3.38	1.42	4.06	4.09	0.78	0.80	1.02	1.02	0.37	1.12



# Alt Model-Shift Uniqueness Test

009812964-01, P = 421.510287 Days, E = 111.509814 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
14.6	4.89	4.30	5.42	5.50	3.36	1.13	10.3	9.20	0.59	-0.53	4.63	0.98	0.27	0.44



### Stellar Parameters For KIC 009812964

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5035^{+176}_{-176}$	$4.526^{+0.071}_{-0.065}$	$0.000^{+0.250}_{-0.300}$	$0.795^{+0.078}_{-0.078}$	$0.774^{+0.093}_{-0.064}$	$2.170^{+0.697}_{-0.442}$
	+3%/-3%	+2%/-1%	+inf%/-inf%	+10%/-10%	+12%/-8%	+32%/-20%
Source	PHO54	PHO54	PHO54	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009812964-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-670 \pm 105$	$3.10^{+1.04}_{-1.10}$	$274^{+12}_{-11}$	$4392^{+889}_{-456}$	$38227^{+56026}_{-16911}$
Alt.	$-490 \pm 100$	$3.33^{+1.07}_{-0.97}$	$275^{+12}_{-12}$	$4058^{+594}_{-406}$	$24460^{+25967}_{-11112}$

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

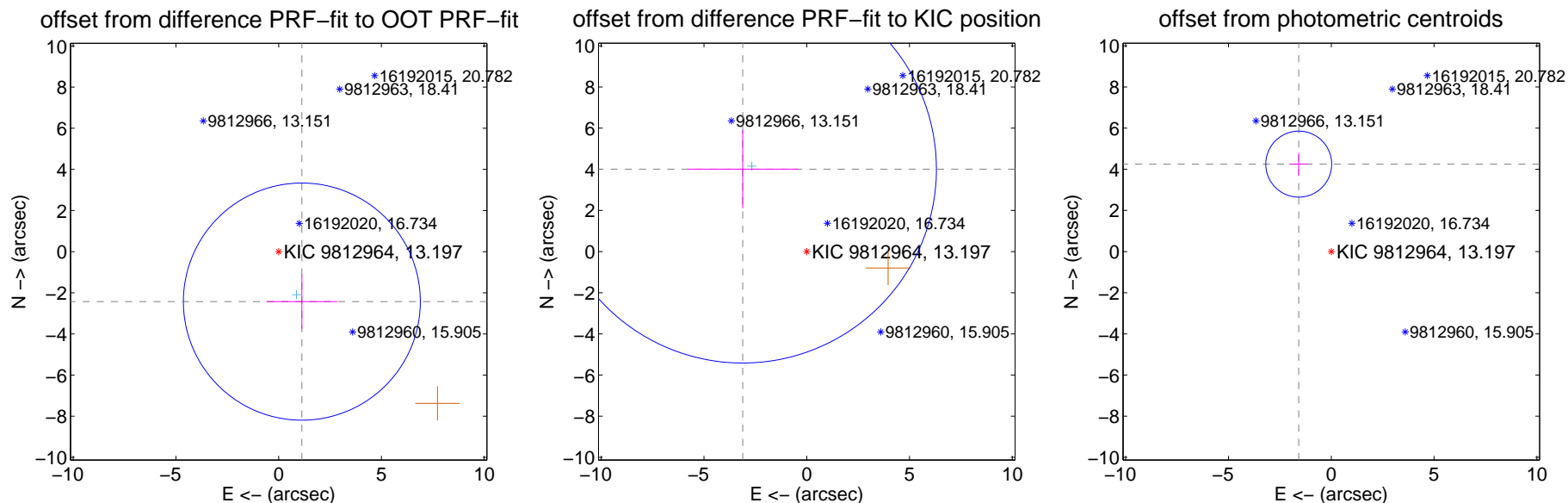
## DV Centroid Data

Supplemental centroid analysis for 009812964-01. Kepler magnitude: 13.20. Transit SNR 7.56

There are 2 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 7.58 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.678 \pm 1.921$	1.39	$-1.128 \pm 1.717$	$-2.429 \pm 1.322$
PRF-fit source offset from KIC position	$5.074 \pm 3.140$	1.62	$3.115 \pm 2.681$	$4.005 \pm 1.898$
photometric centroid source offset	$4.54 \pm 0.53$	8.49	$1.58 \pm 0.46$	$4.25 \pm 0.54$



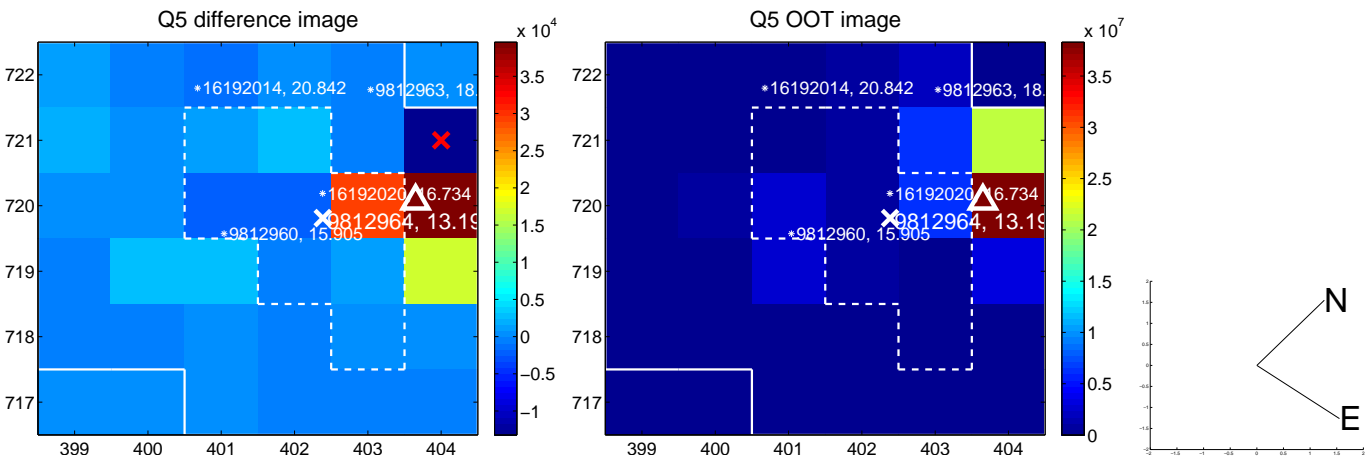
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

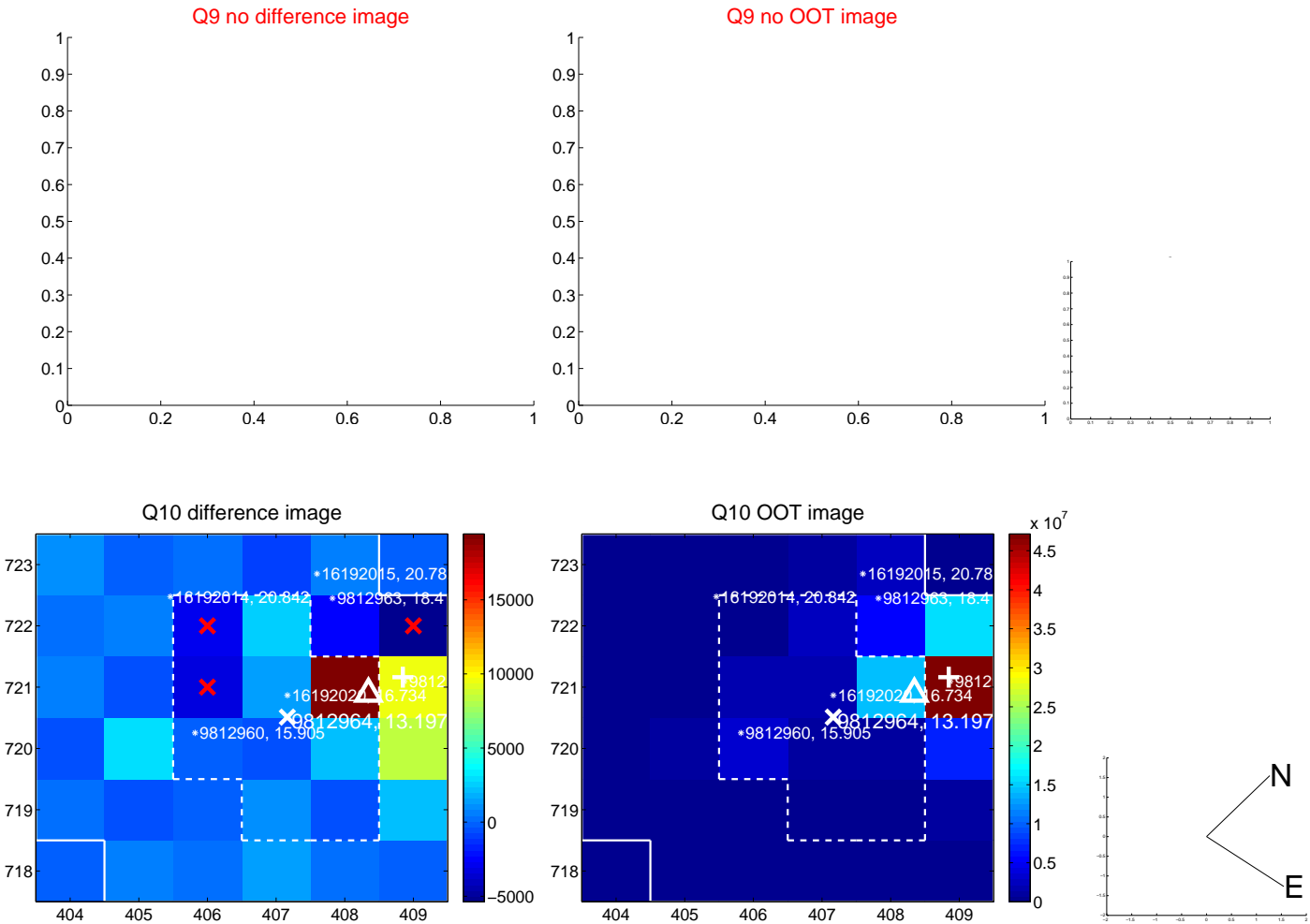




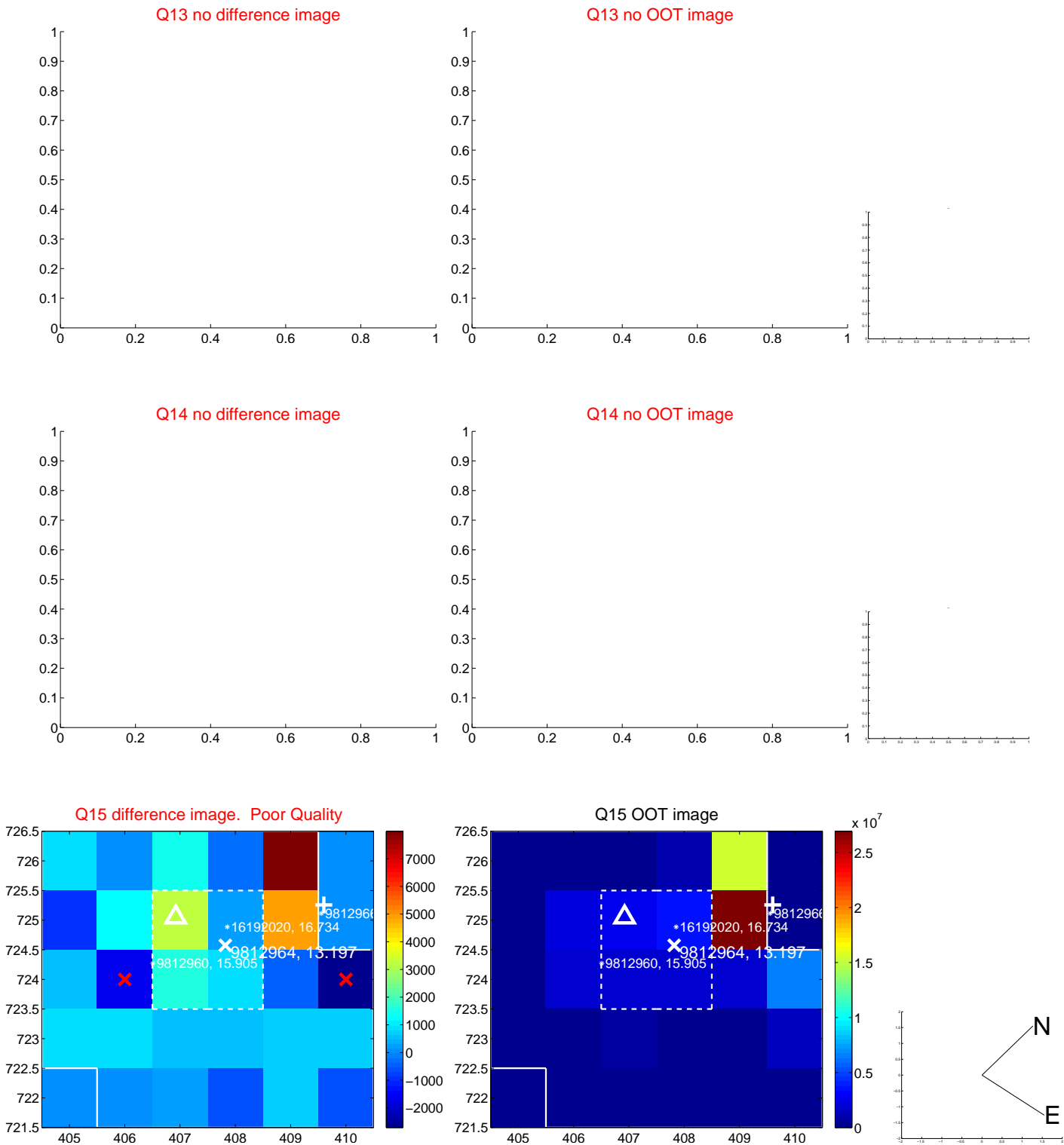
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



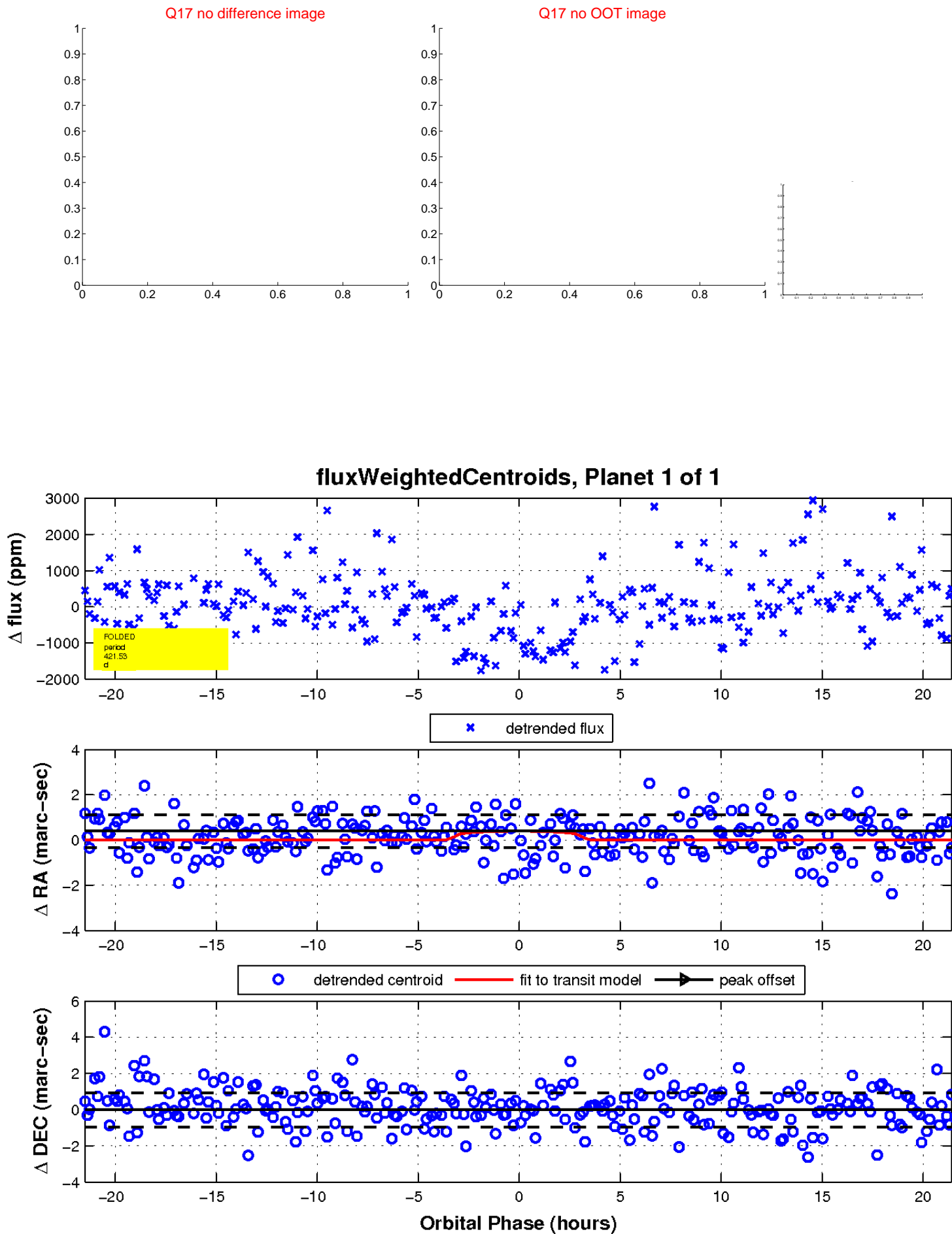
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



# UKIRT Image

Declination

