

# KIC 012735740

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012735740-01	OBS	3663.01	282.525596	363.071627	9749.8	10.830	471.1	443.9	0.91	5725	9.03	1.15

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012735740-01	OBS	PC	0.96	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.

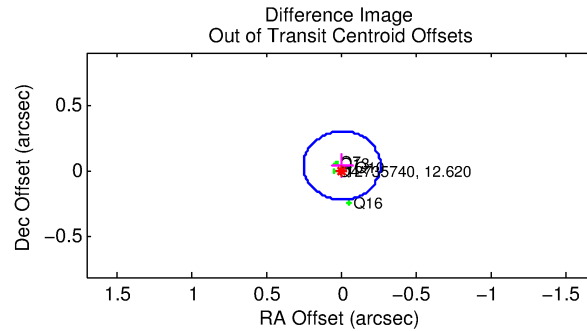
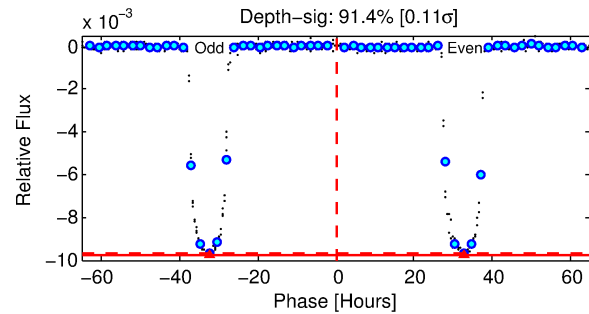
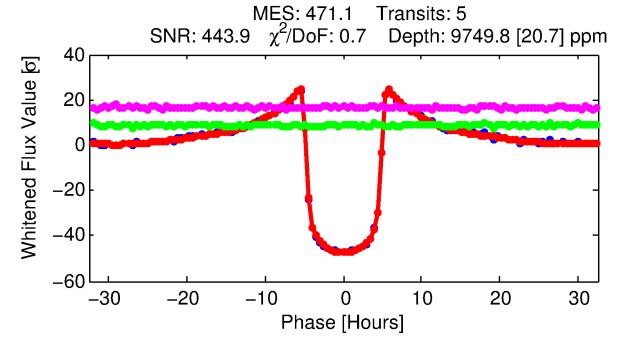
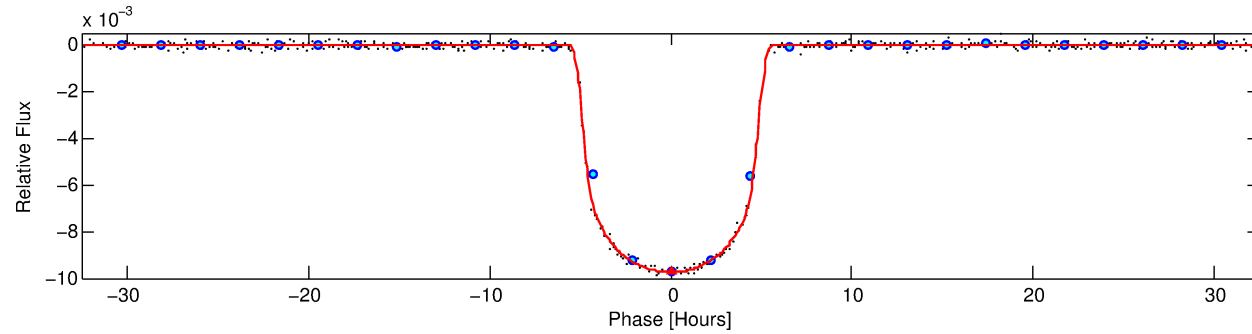
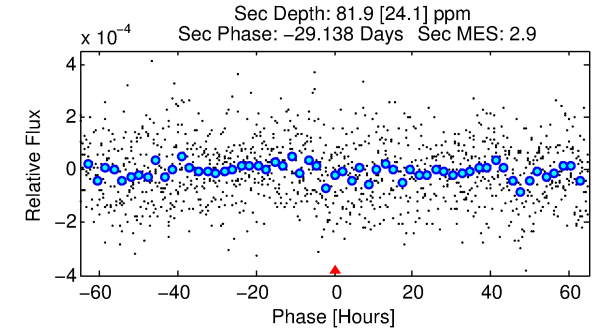
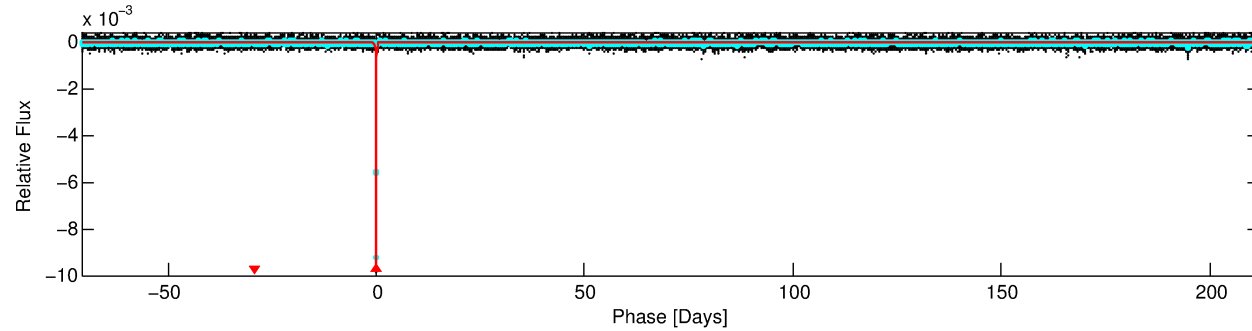
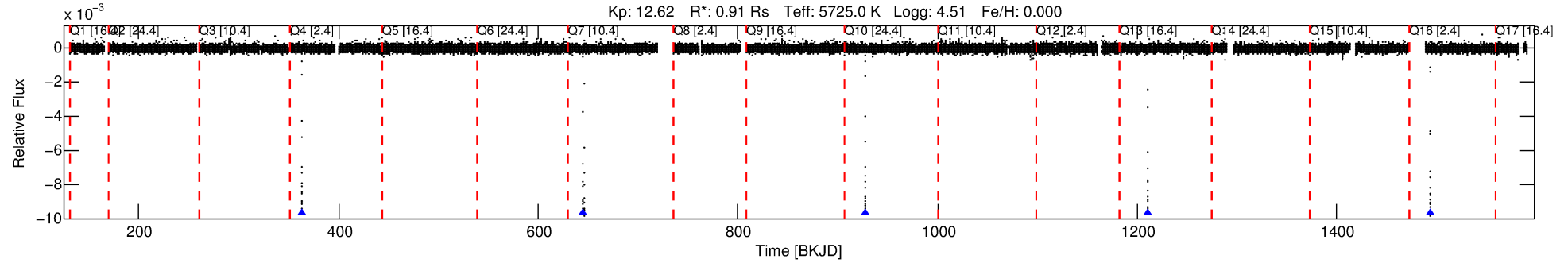
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012735740-01

No Significant Match Found

# DV One-Page Summary

KIC: 12735740 Candidate: 1 of 1 Period: 282.526 d  
KOI: K03663.01 Name: Kepler-86b Corr: 0.999



## DV Fit Results:

Period = 282.52560 [0.00010] d  
Epoch = 363.0716 [0.0003] BKJD  
Rp/R\* = 0.0906 [0.0003]  
a/R\* = 206.86 [2.19]  
b = 0.33 [0.03]  
Seff = 1.15 [0.25]  
Teff = 264 [14] K  
Rp = 9.03 [1.32] Re  
a = 0.8357 [0.1088] AU  
Ag = 386.04 [137.15] [2.81 $\sigma$ ]  
Teffp = 1809 [138] K [11.15 $\sigma$ ]

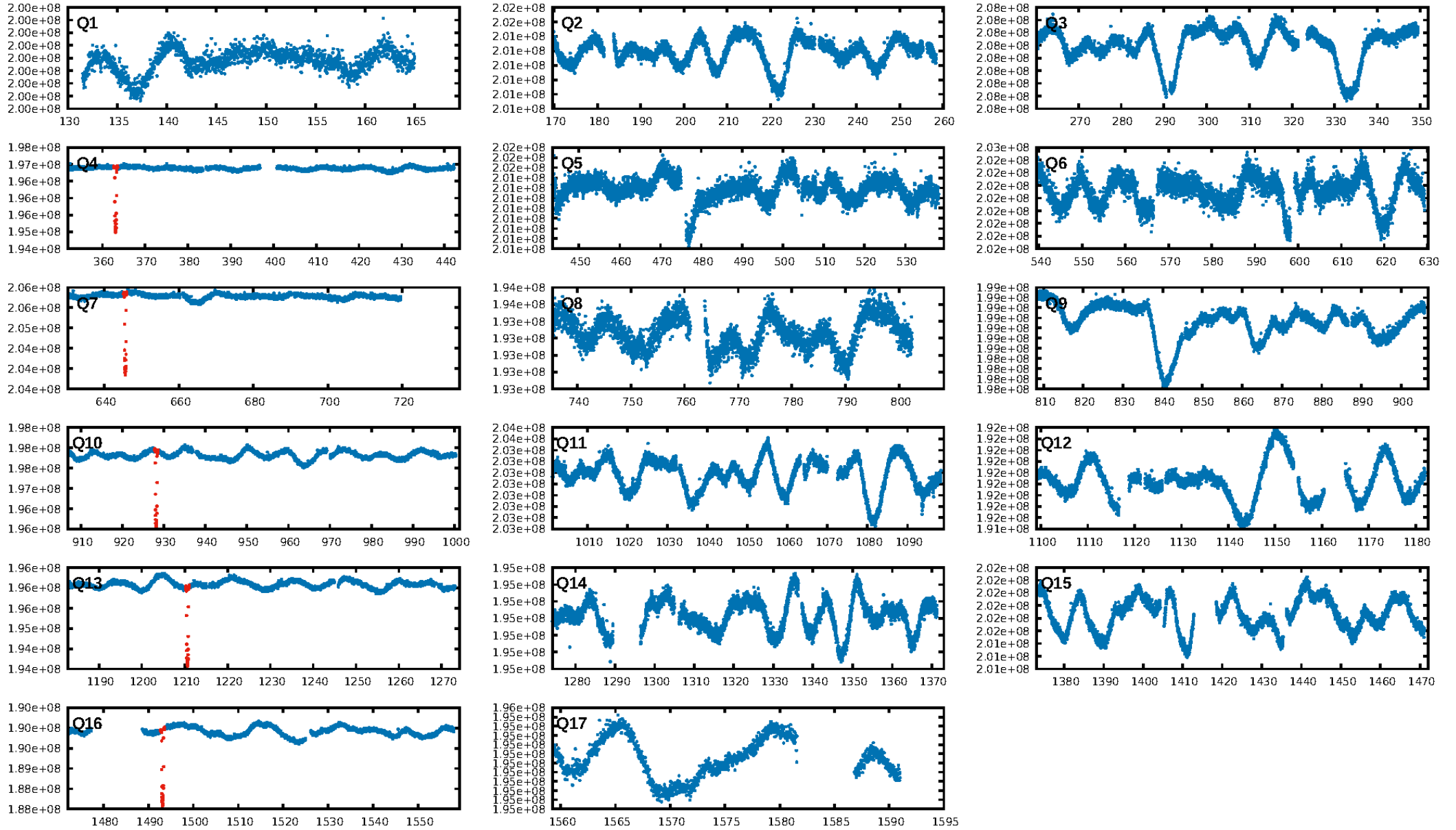
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 25.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 4.702  
Centroid-sig: 18.9%  
Centroid-so: 0.404 arcsec [14.08 $\sigma$ ]  
OotOffset-rm: 0.044 arcsec [0.51 $\sigma$ ]  
KicOffset-rm: 0.315 arcsec [2.61 $\sigma$ ]  
OotOffset-st: 1/1/2/1 [5]  
KicOffset-st: 1/1/2/1 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 1.00 [5/5]

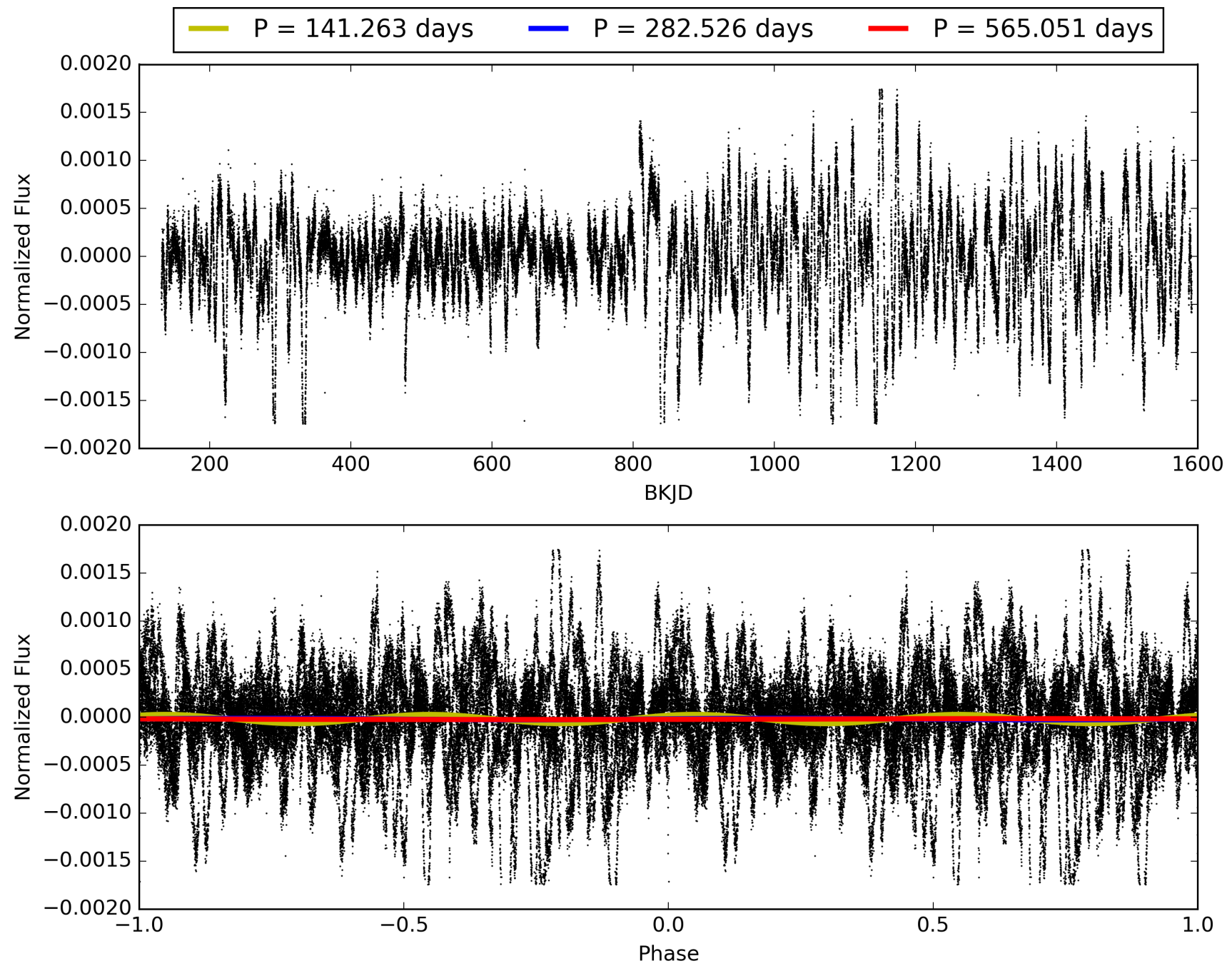
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 19:41:05 Z

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

# TCE 012735740-01, PDC Light Curves

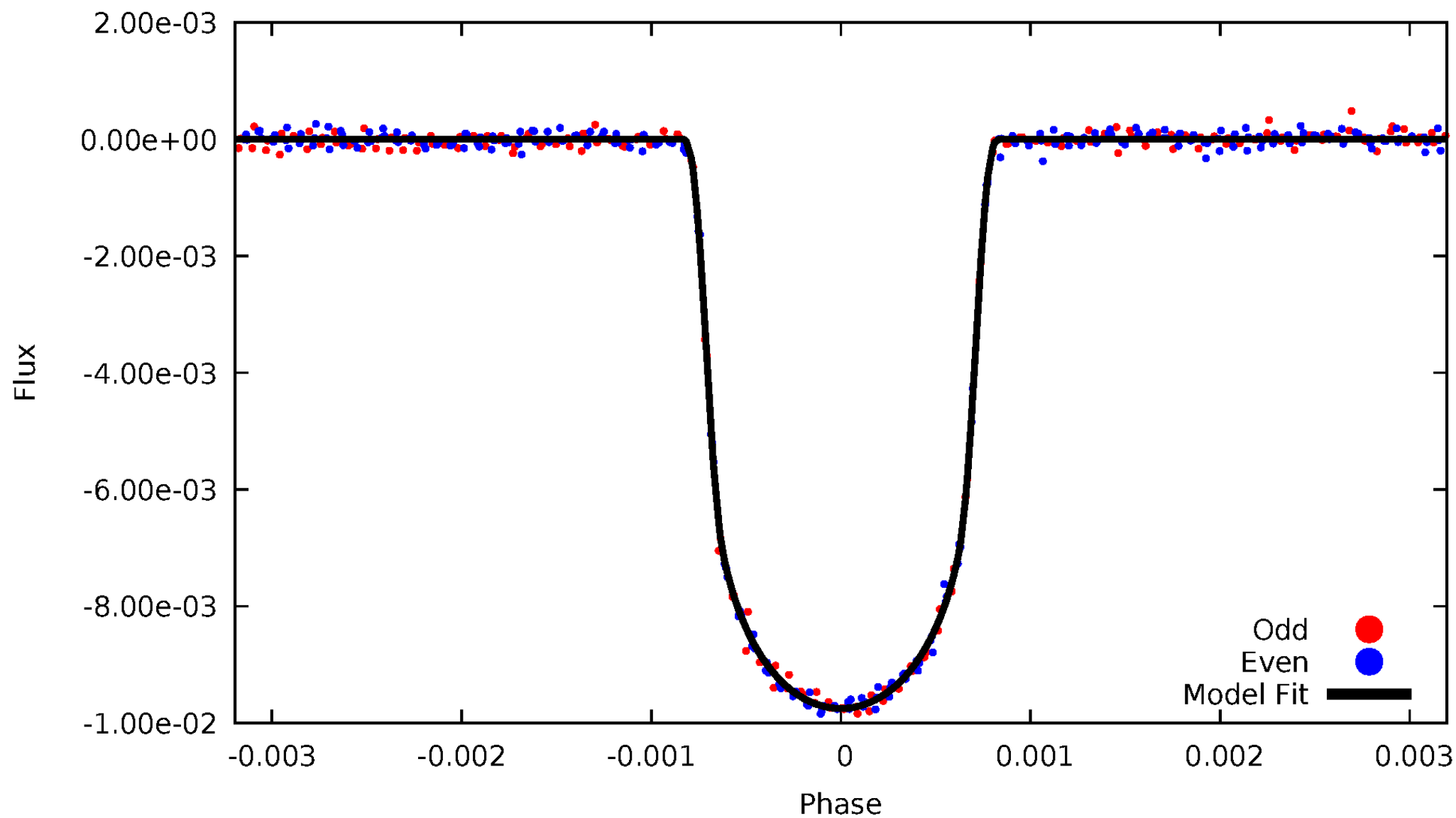


TCE 012735740-01



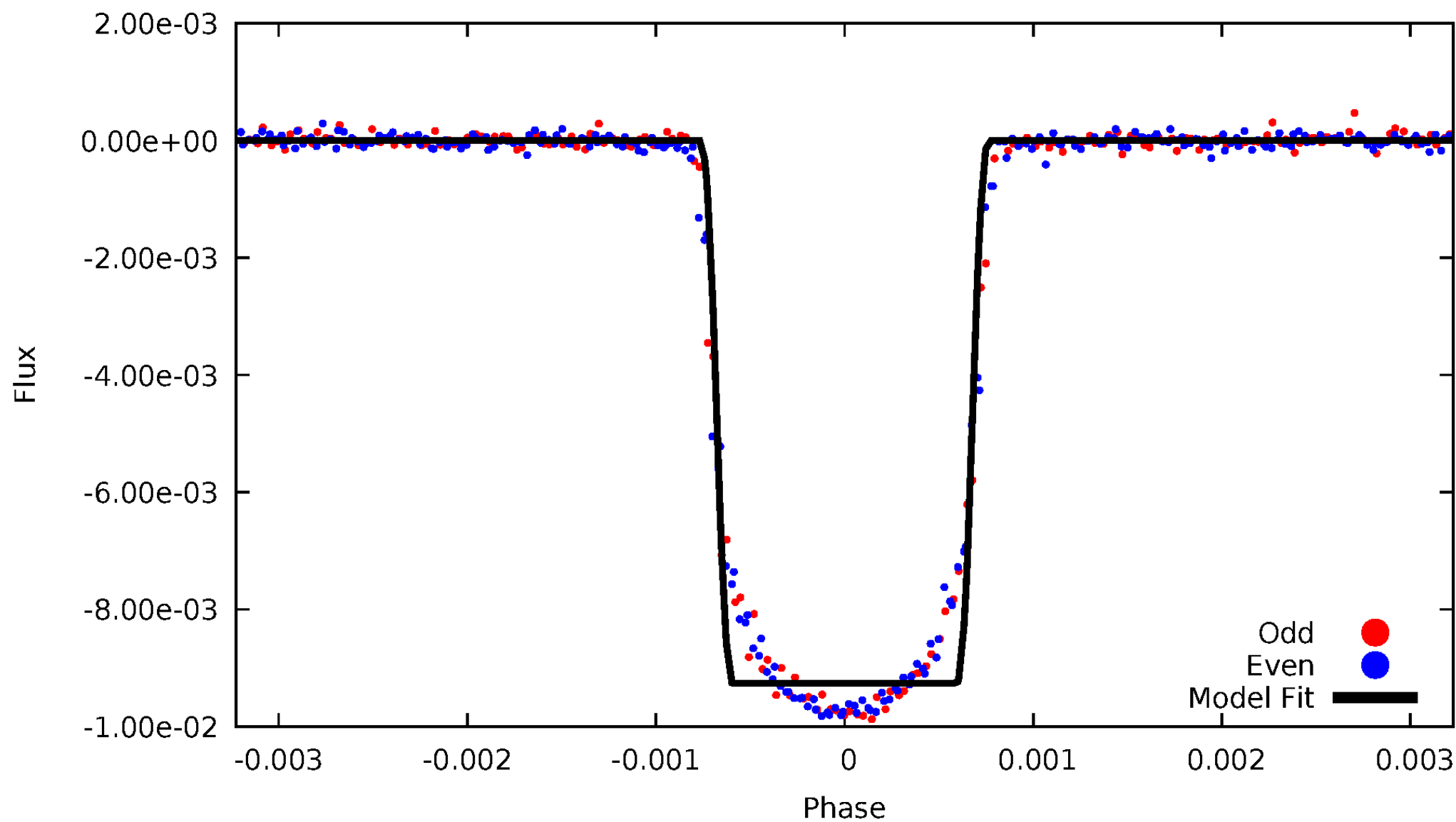
# DV Odd/Even

TCE 012735740-01

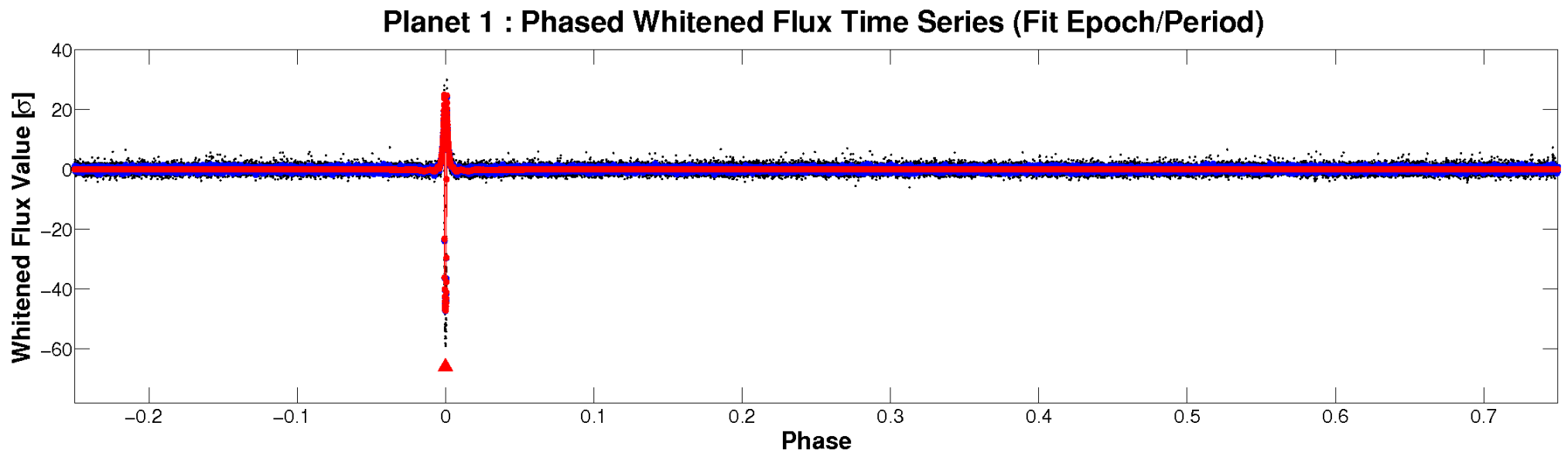
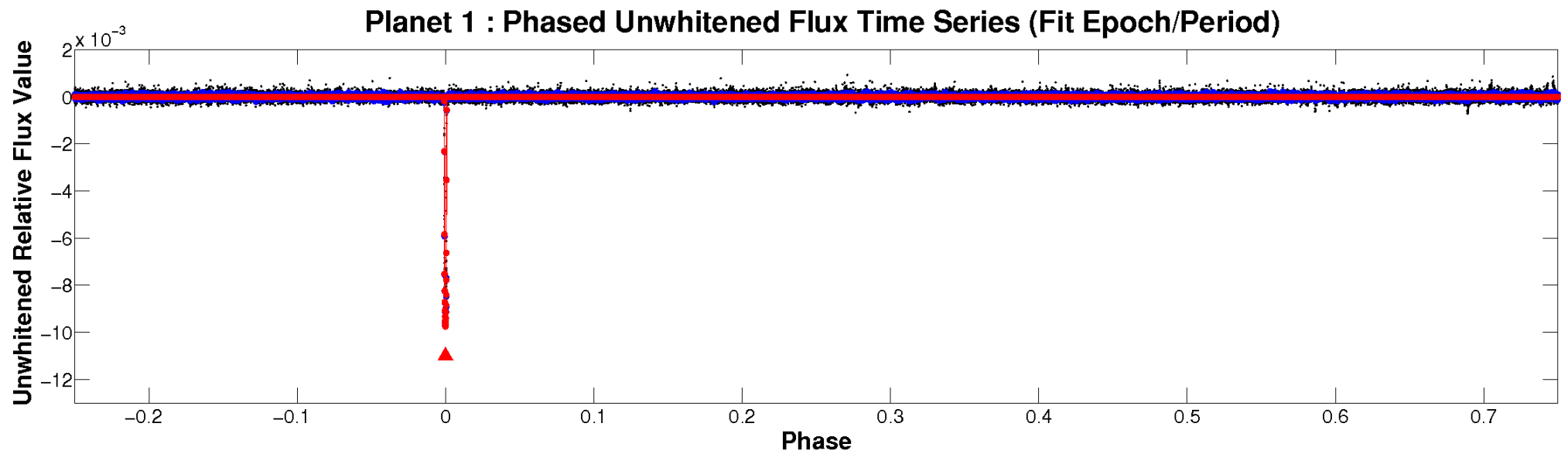


# ALT Odd/Even

TCE 012735740-01

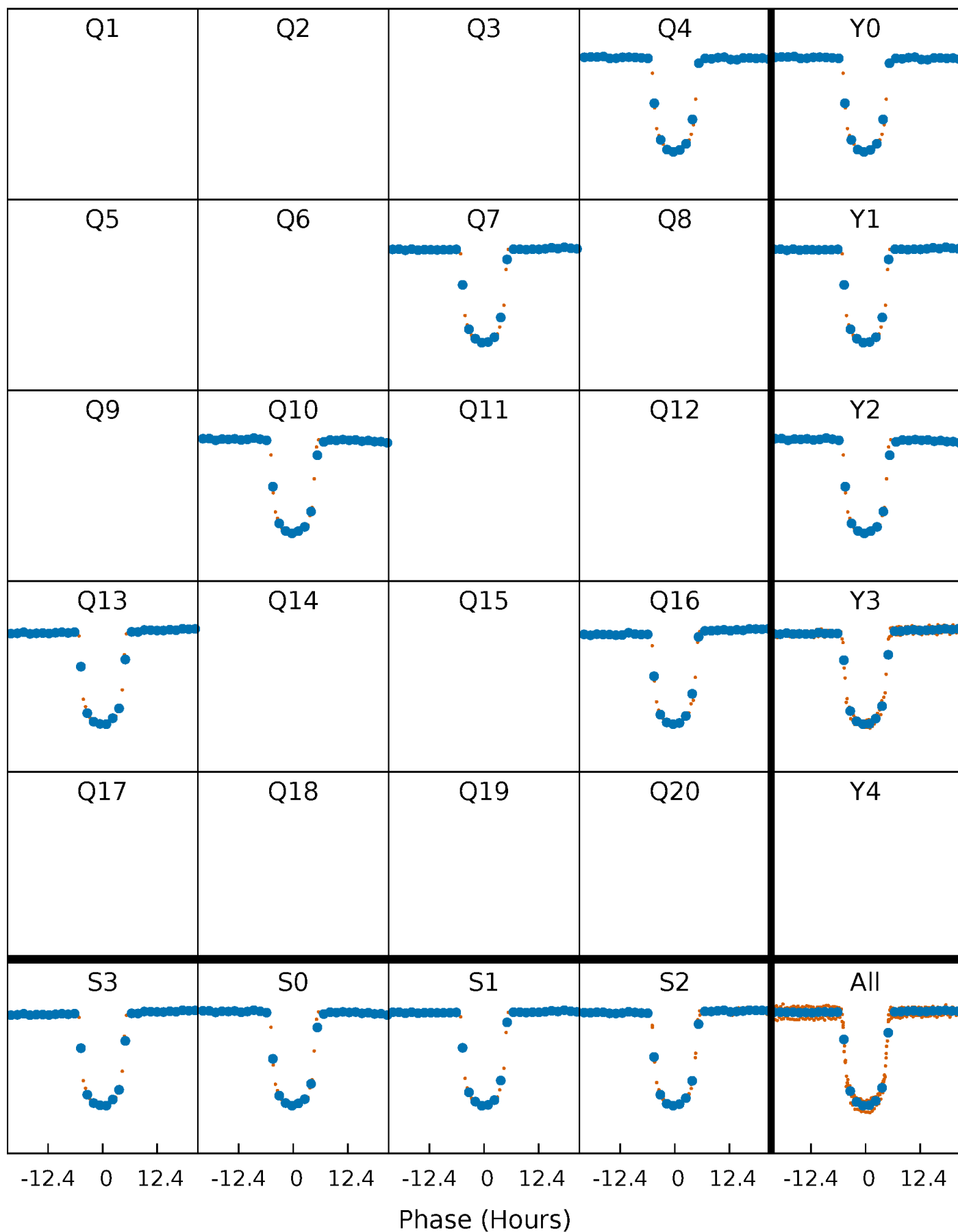


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

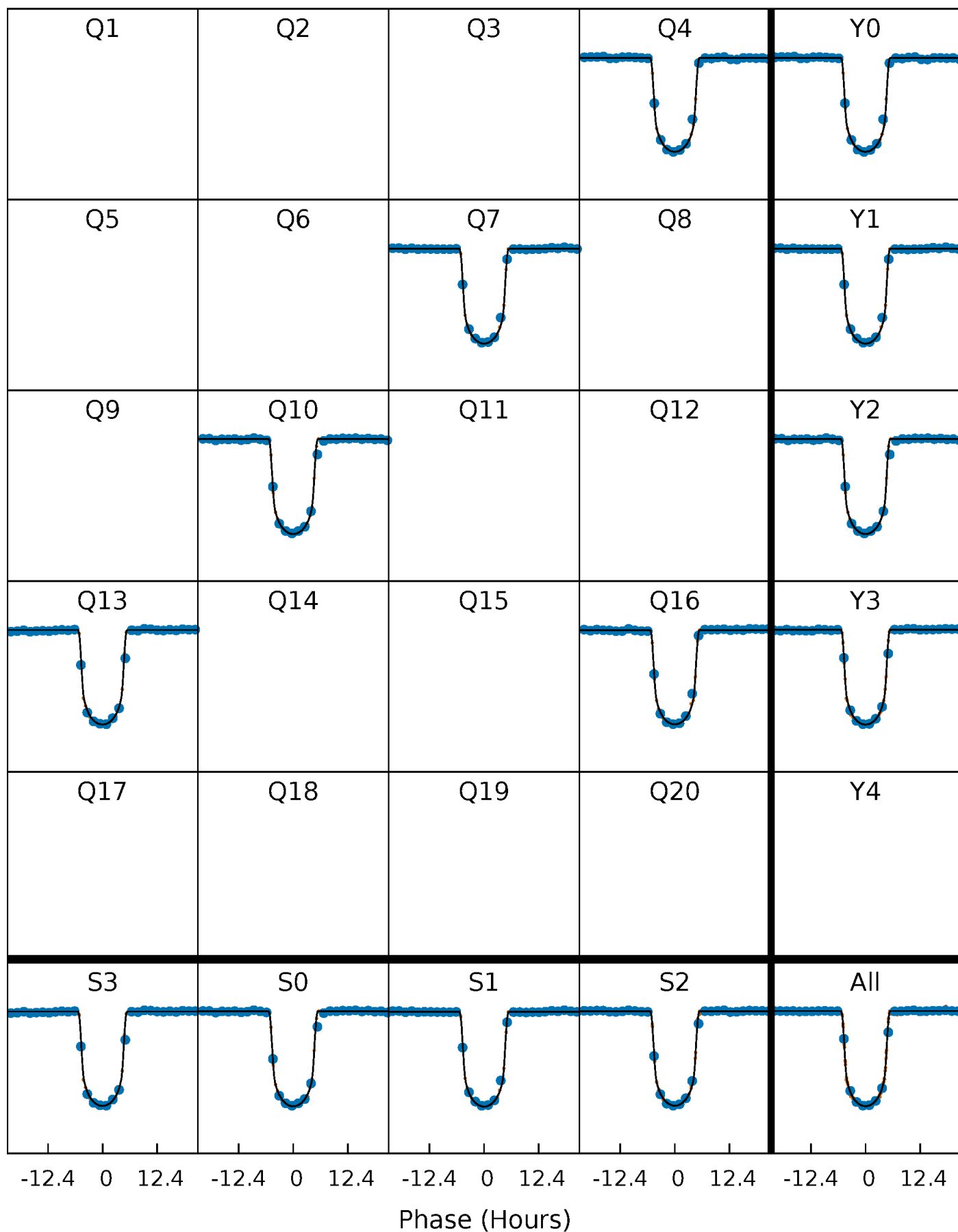
TCE 012735740-01 P=282.525596 Days  $T_0=363.071626$  (BKJD)





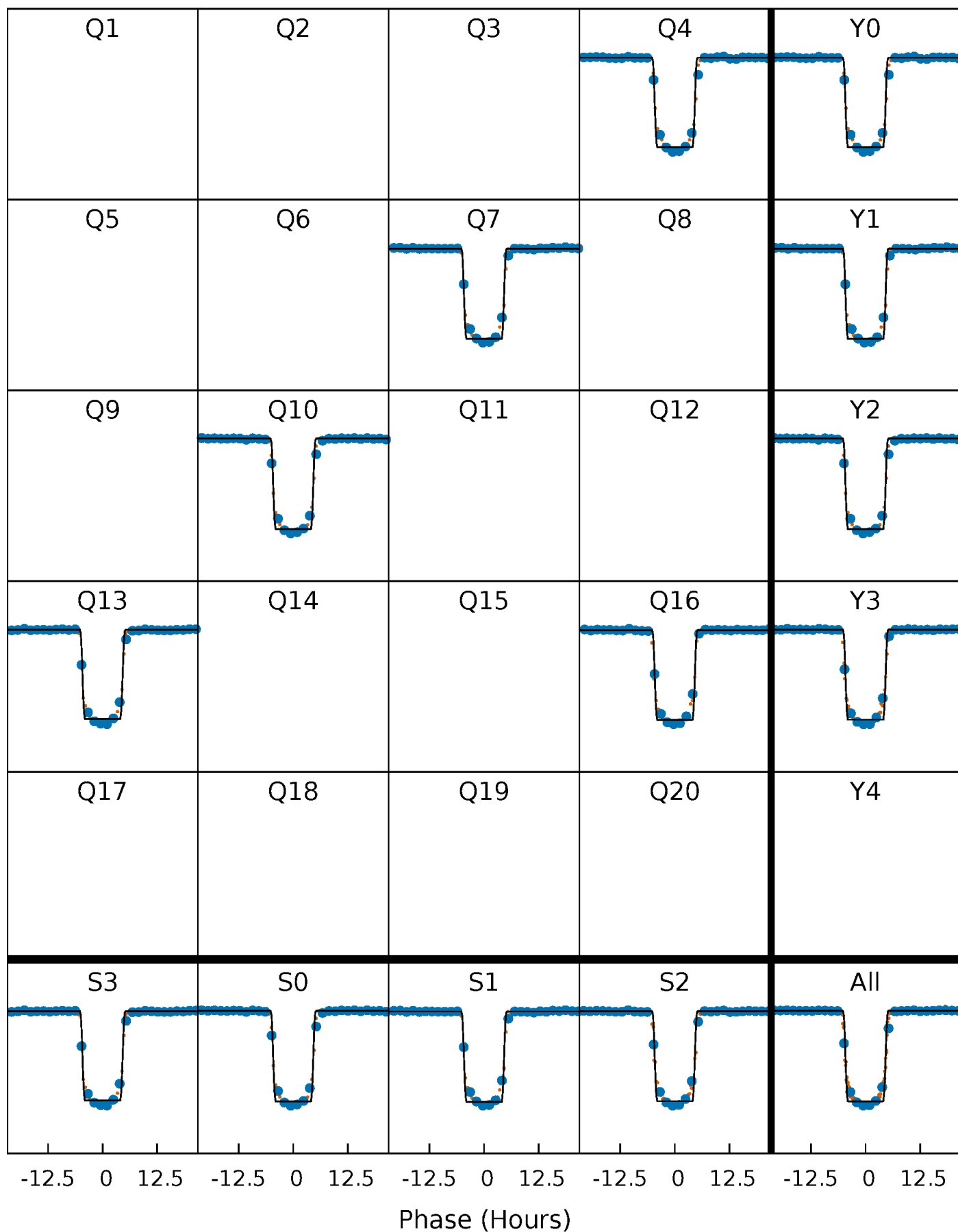
# DV Quarter-Phased Transit Curves

TCE 012735740-01 P=282.525596 Days  $T_0=363.071626$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

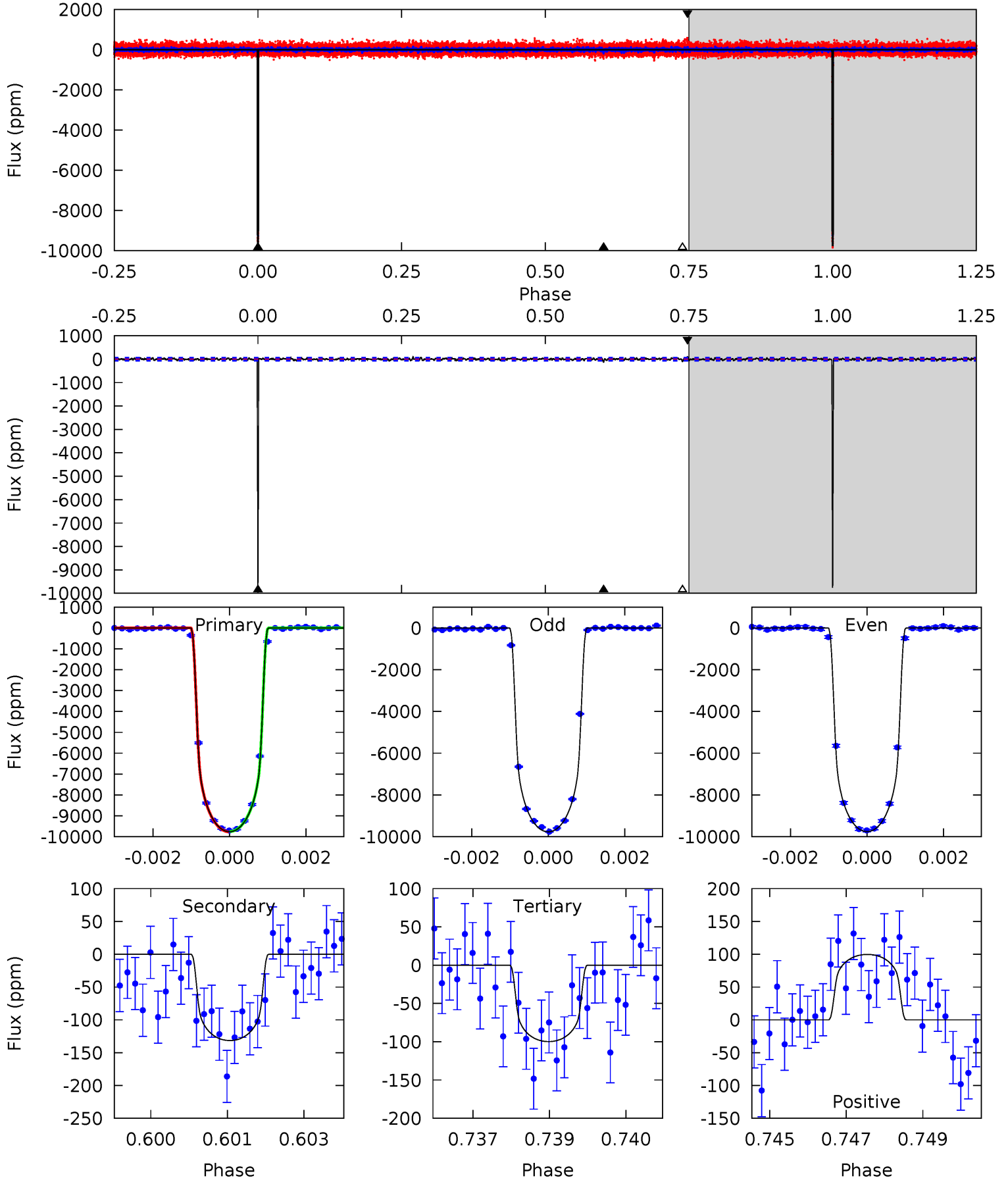
TCE 012735740-01 P=282.528023 Days  $T_0=363.066373$  (BKJD)



# DV Model-Shift Uniqueness Test

012735740-01, P = 282.525596 Days, E = 80.546030 Days

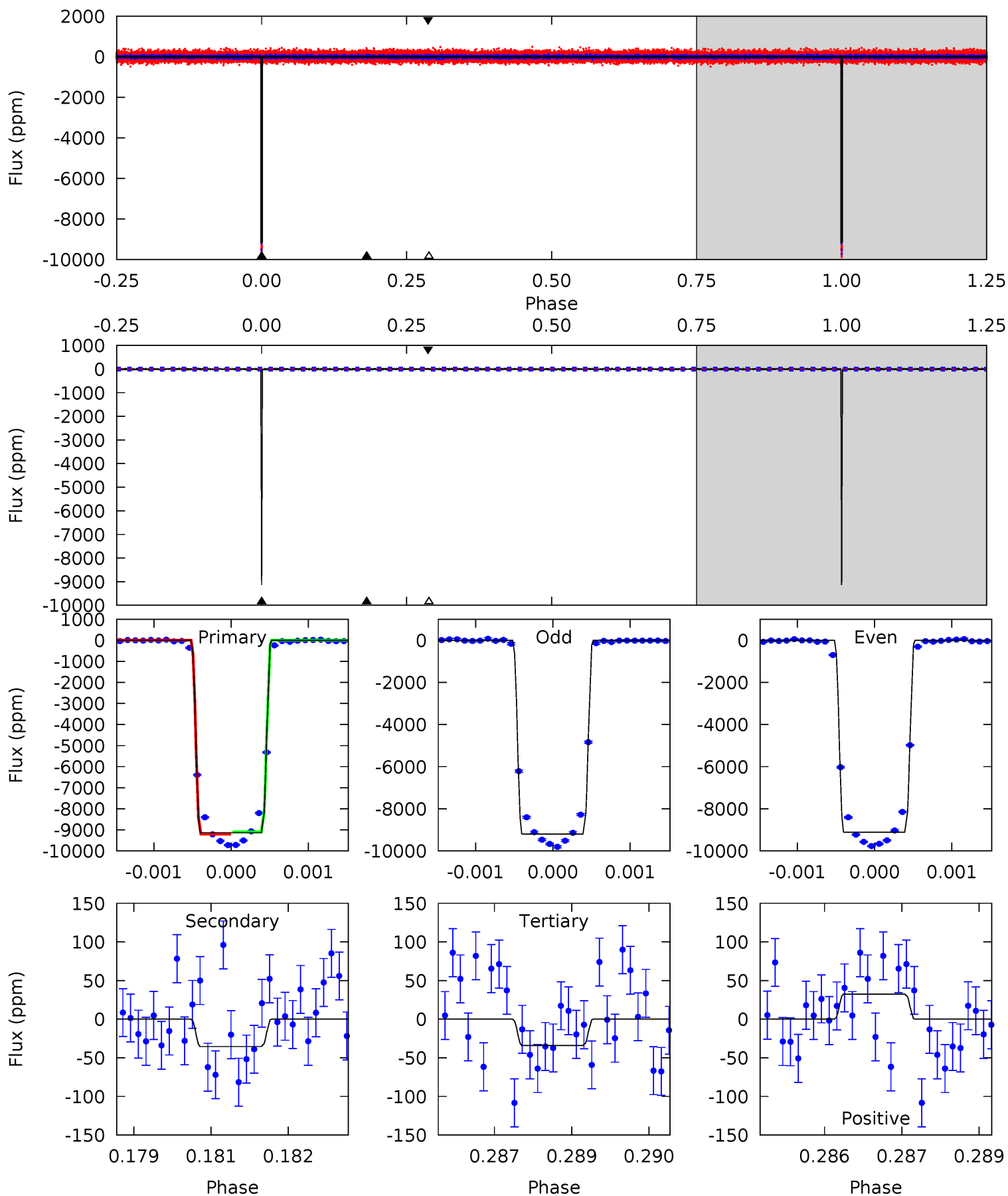
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
857.7	11.6	8.77	8.76	5.36	3.15	2.16	849.0	849.0	2.79	2.80	0.39	1.00	0.01	0.76



# Alt Model-Shift Uniqueness Test

012735740-01, P = 282.528023 Days, E = 80.538350 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
833.1	3.23	3.10	2.97	5.38	3.18	0.68	830.0	830.1	0.13	0.26	3.55	1.00	0.00	4.94



### Stellar Parameters For KIC 012735740

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5725^{+102}_{-113}$	$4.506^{+0.038}_{-0.113}$	$0.000^{+0.150}_{-0.150}$	$0.913^{+0.133}_{-0.048}$	$0.974^{+0.054}_{-0.074}$	$1.806^{+0.257}_{-0.594}$
	+2%/-2%	+1%/-3%	+inf%/-inf%	+15%/-5%	+6%/-8%	+14%/-33%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 012735740-01 / KOI 3663.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-132 \pm 11$	$9.05^{+0.80}_{-0.34}$	$372^{+13}_{-11}$	$2785^{+41}_{-45}$	$596^{+78}_{-87}$
Alt.	$-35 \pm 11$	$9.62^{+0.82}_{-0.33}$	$372^{+14}_{-11}$	$2330^{+84}_{-99}$	$141^{+46}_{-48}$

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

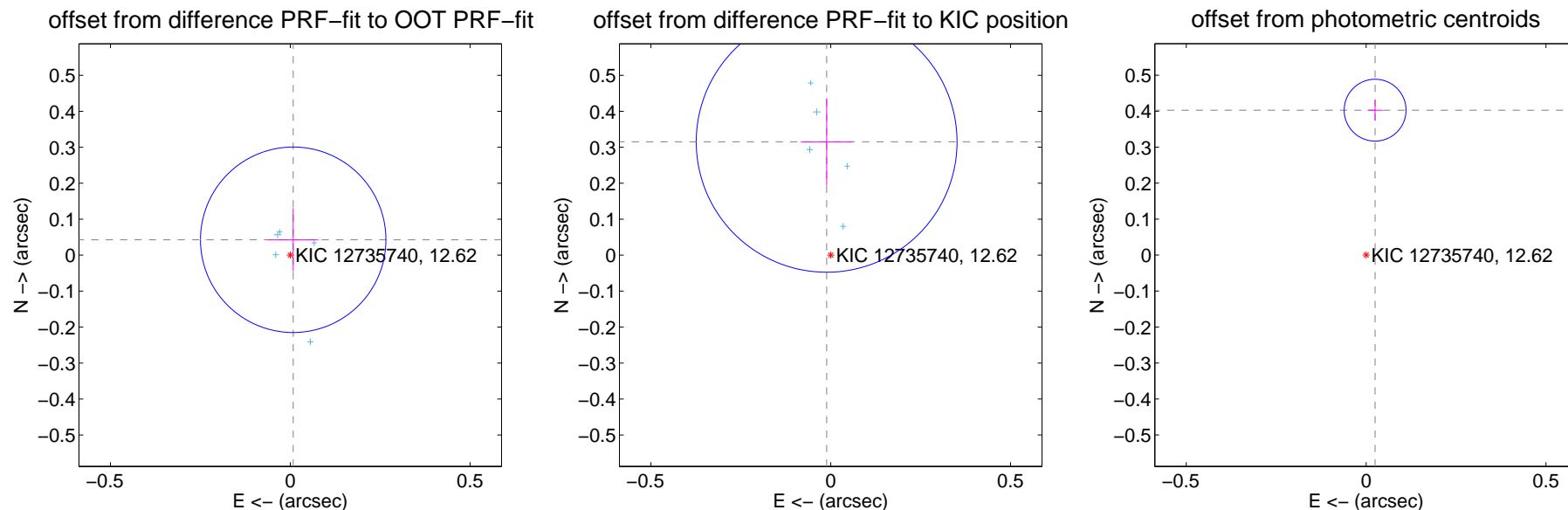
## DV Centroid Data

Supplemental centroid analysis for 012735740-01. Kepler magnitude: 12.62. Transit SNR 443.88

There are 5 quarters with good PRF difference image offsets

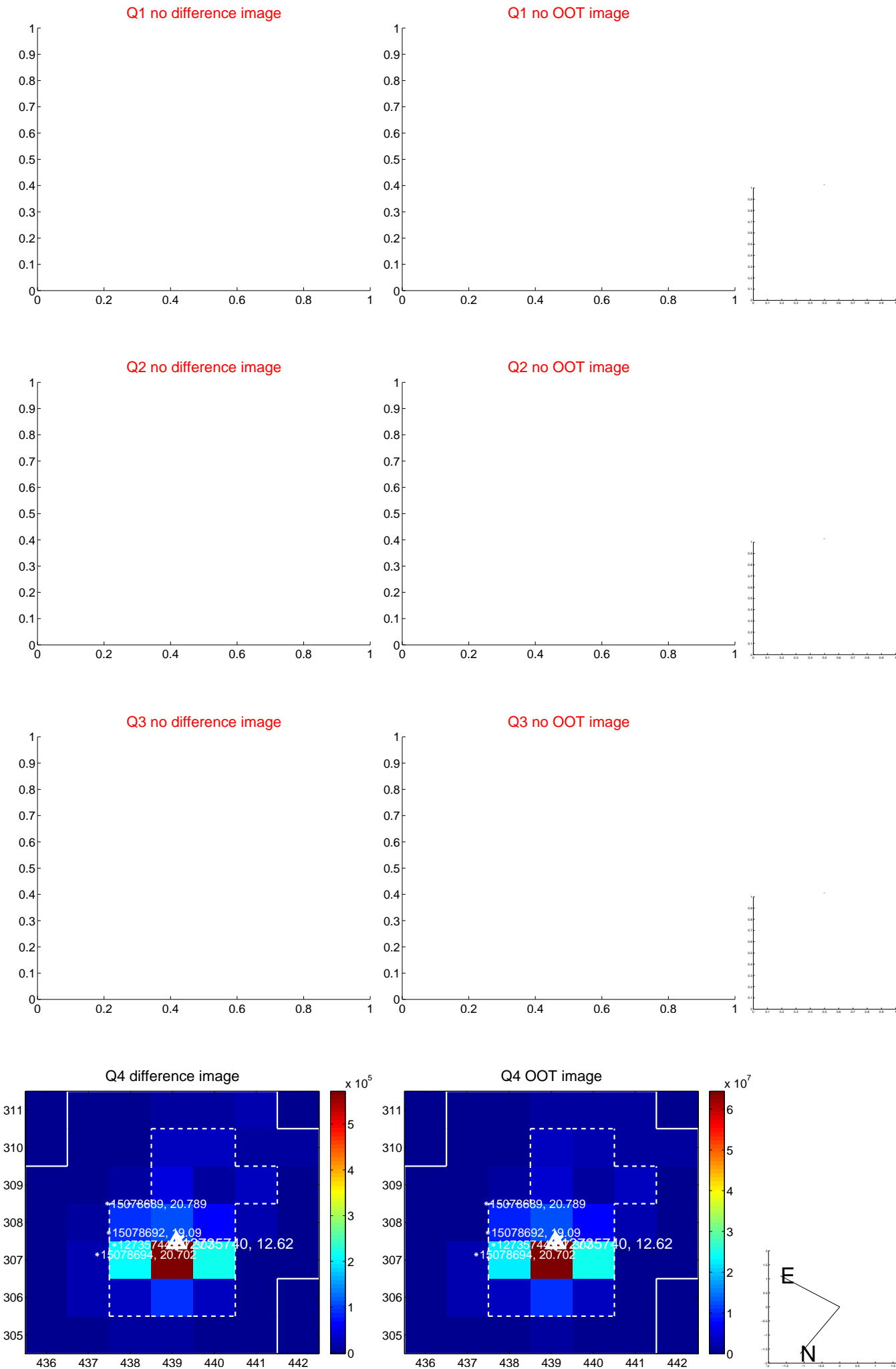
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.044 \pm 0.086$	0.51	$-0.008 \pm 0.070$	$0.043 \pm 0.088$
PRF-fit source offset from KIC position	$0.315 \pm 0.121$	2.61	$0.011 \pm 0.072$	$0.315 \pm 0.121$
photometric centroid source offset	$0.40 \pm 0.03$	14.08	$-0.02 \pm 0.02$	$0.40 \pm 0.03$



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.

Q5 no difference image



Q5 no OOT image



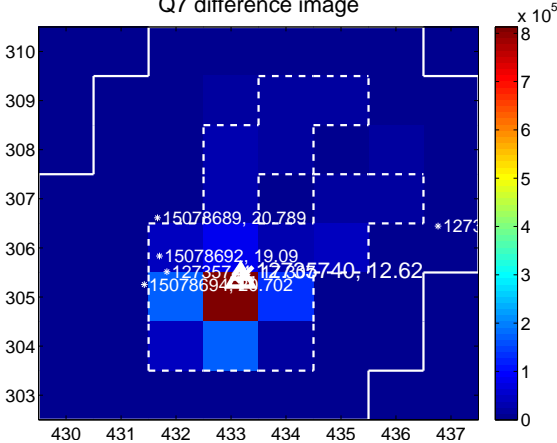
Q6 no difference image



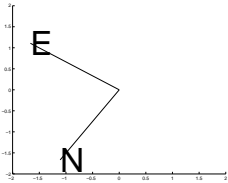
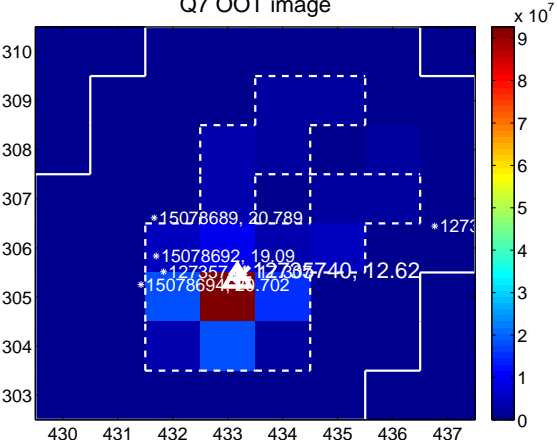
Q6 no OOT image



Q7 difference image



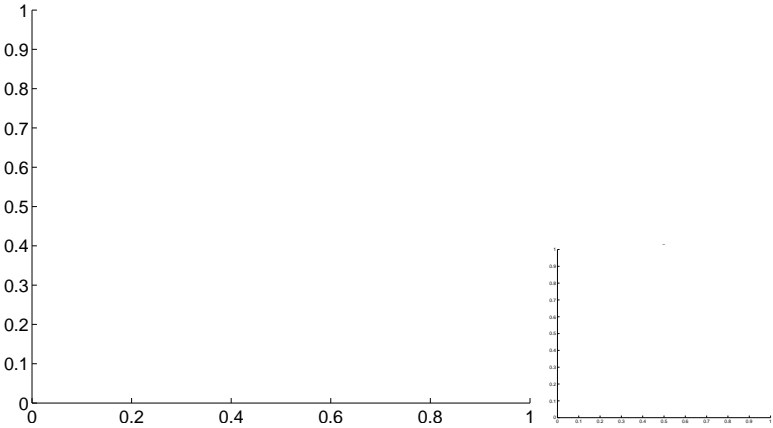
Q7 OOT image



Q8 no difference image

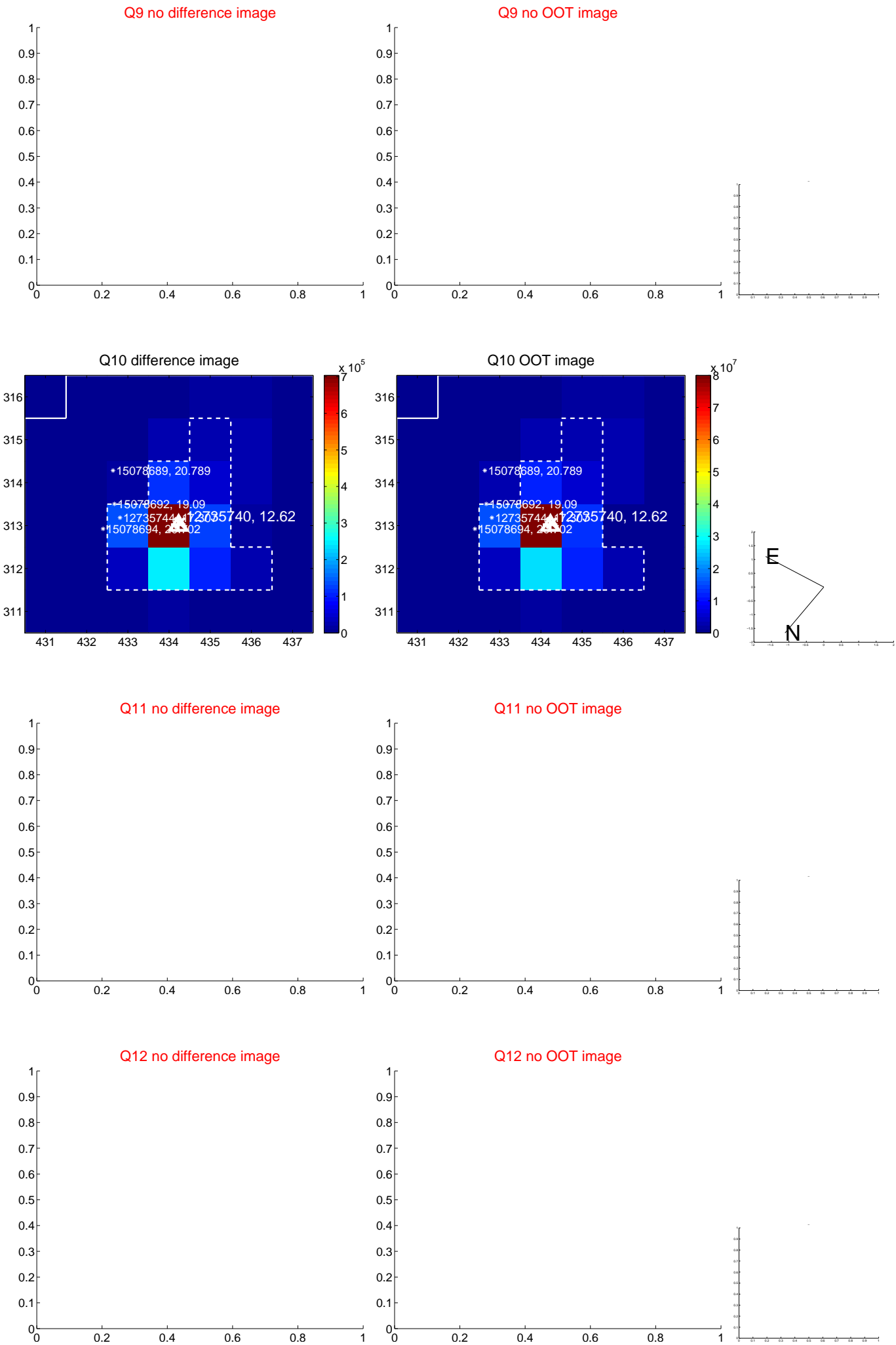


Q8 no OOT image

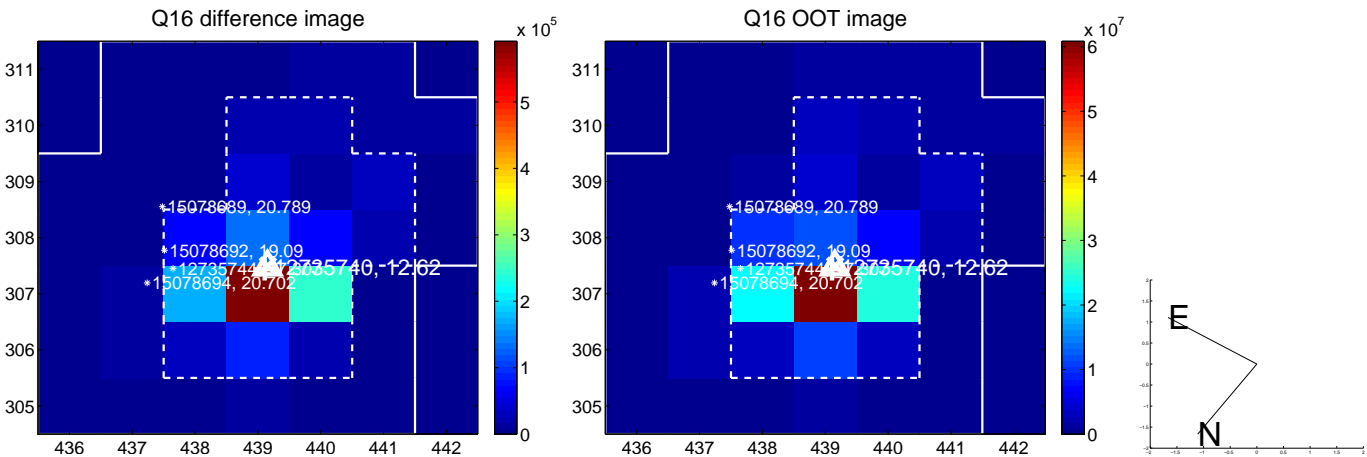
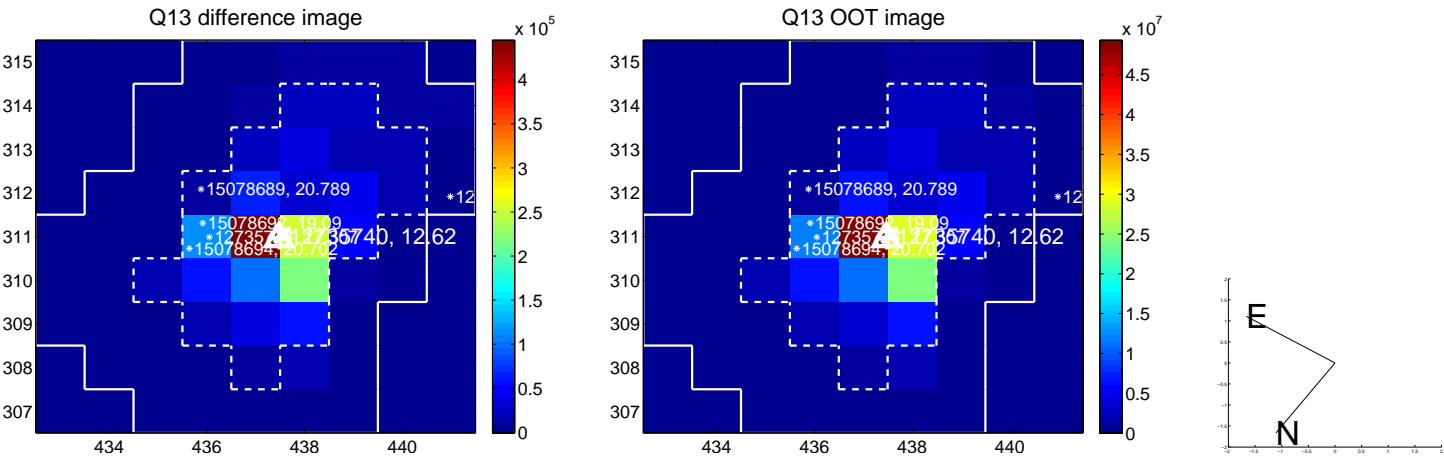




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



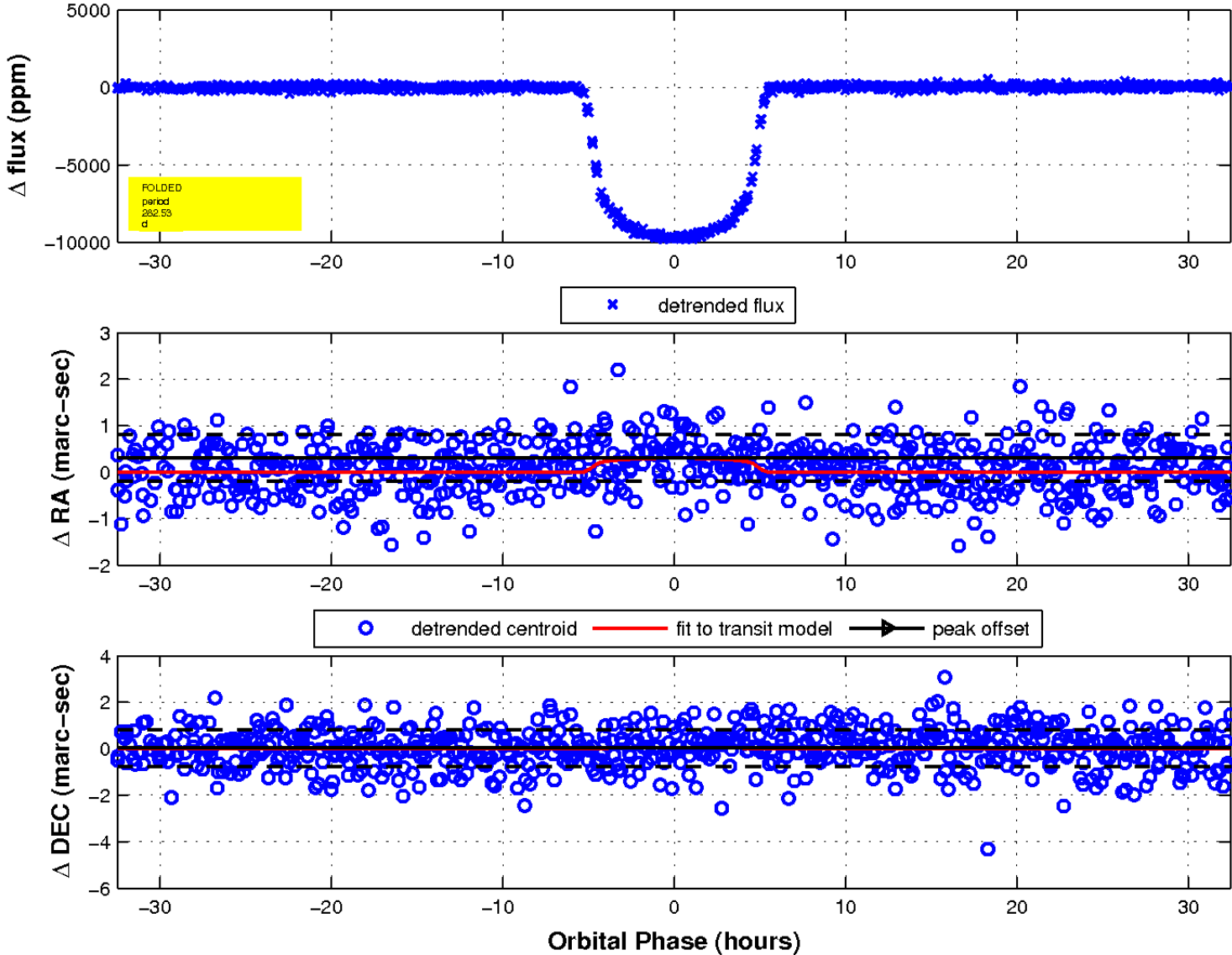
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q17 no difference image

Q17 no OOT image



fluxWeightedCentroids, Planet 1 of 1



# UKIRT Image

Declination

