

# KIC 011337372

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011337372-01	OBS	1650.01	6.531945	136.032080	753.6	3.465	32.7	35.6	0.98	5301	3.20	160.03
011337372-02	OBS	1650.02	100.827878	216.385700	1856.4	8.334	30.9	31.5	0.98	5301	4.37	4.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011337372-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011337372-02	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.

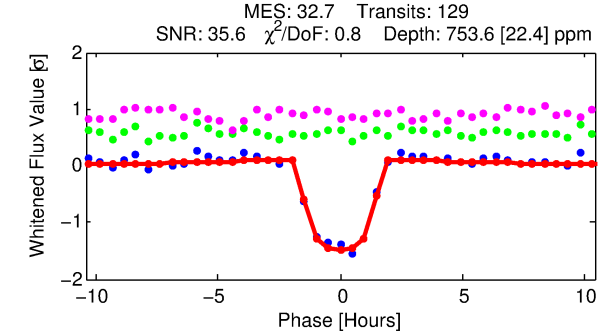
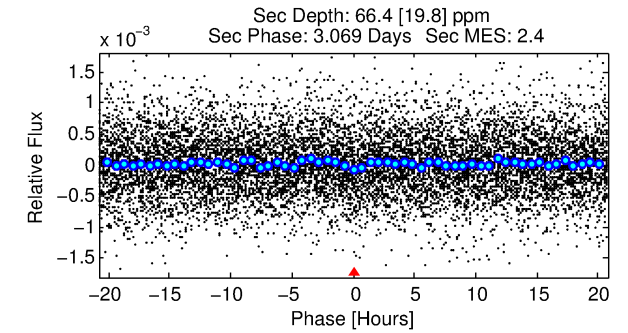
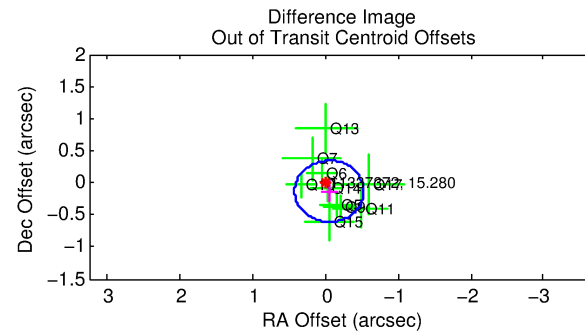
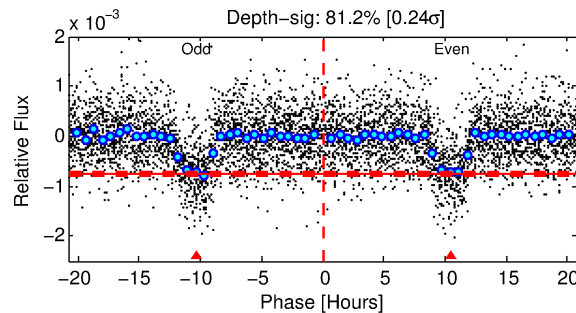
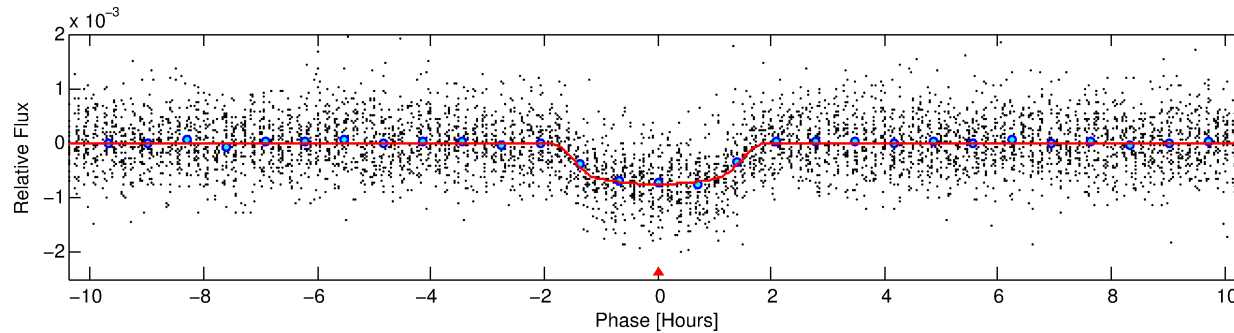
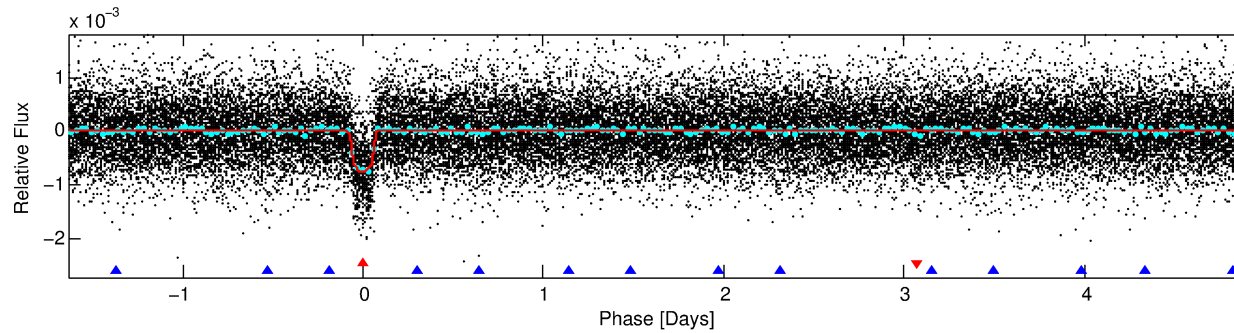
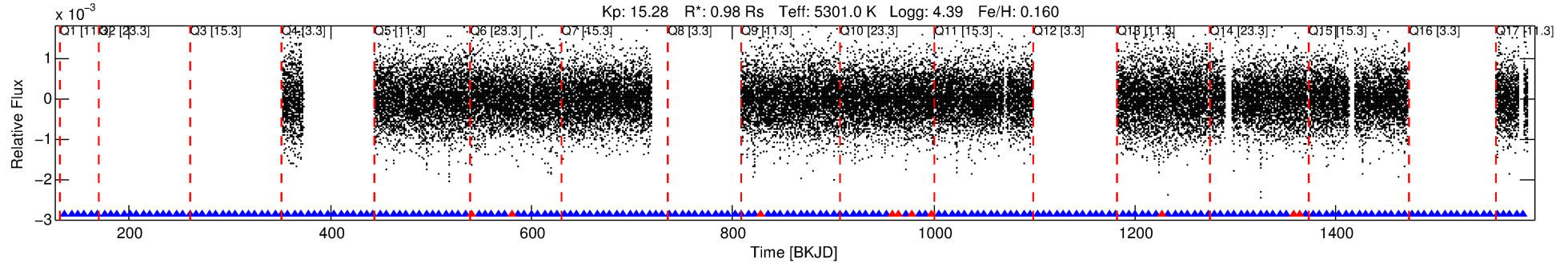
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011337372-01

No Significant Match Found

# DV One-Page Summary

KIC: 11337372 Candidate: 1 of 2 Period: 6.532 d  
KOI: K01650.01 Corr: 0.948



## DV Fit Results:

Period = 6.53194 [0.00002] d  
Epoch = 136.0321 [0.0024] BKJD  
Rp/R\* = 0.0300 [0.0026]  
a/R\* = 7.59 [2.58]  
b = 0.89 [0.08]  
Seff = 160.03 [36.34]  
Teq = 907 [51] K  
Rp = 3.20 [0.50] Re  
a = 0.0650 [0.0086] AU  
Ag = 15.03 [6.14] [2.29 $\sigma$ ]  
Teffp = 2761 [243] K [7.48 $\sigma$ ]

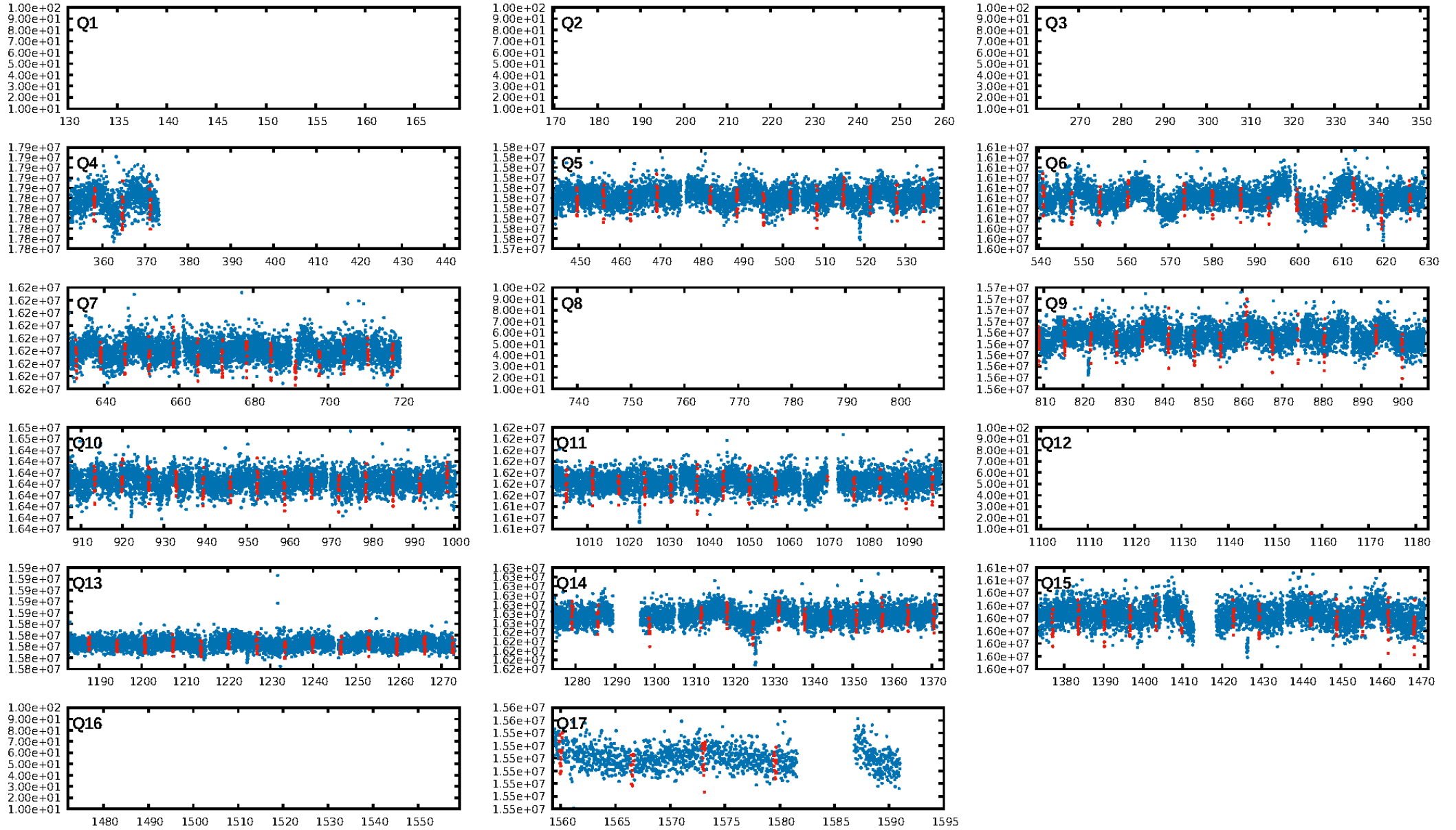
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [250.75 $\sigma$ ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 5.31e-232  
RollingBand-fgt: 0.92 [112/122]  
GhostDiagnostic-chr: 3.752  
Centroid-sig: 3.8%  
Centroid-so: 0.218 arcsec [0.57 $\sigma$ ]  
OotOffset-rm: 0.143 arcsec [0.90 $\sigma$ ]  
KicOffset-rm: 0.243 arcsec [1.75 $\sigma$ ]  
OotOffset-st: 3/3/0/4 [10]  
KicOffset-st: 3/3/0/4 [10]  
DiffImageQuality-fgm: 1.00 [10/10]  
DiffImageOverlap-fno: 1.00 [11/11]

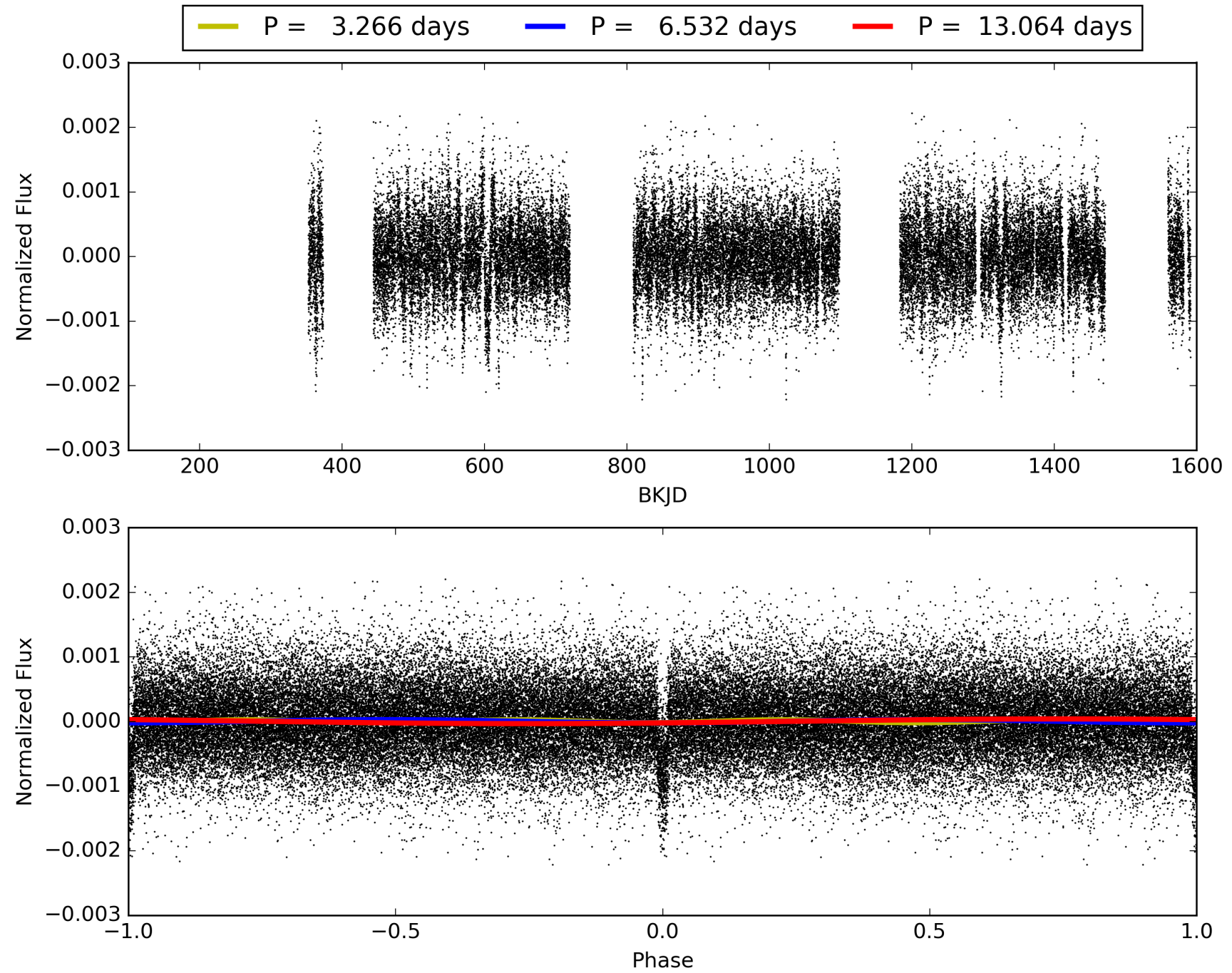
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 00:30:13 Z

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

# TCE 011337372-01, PDC Light Curves

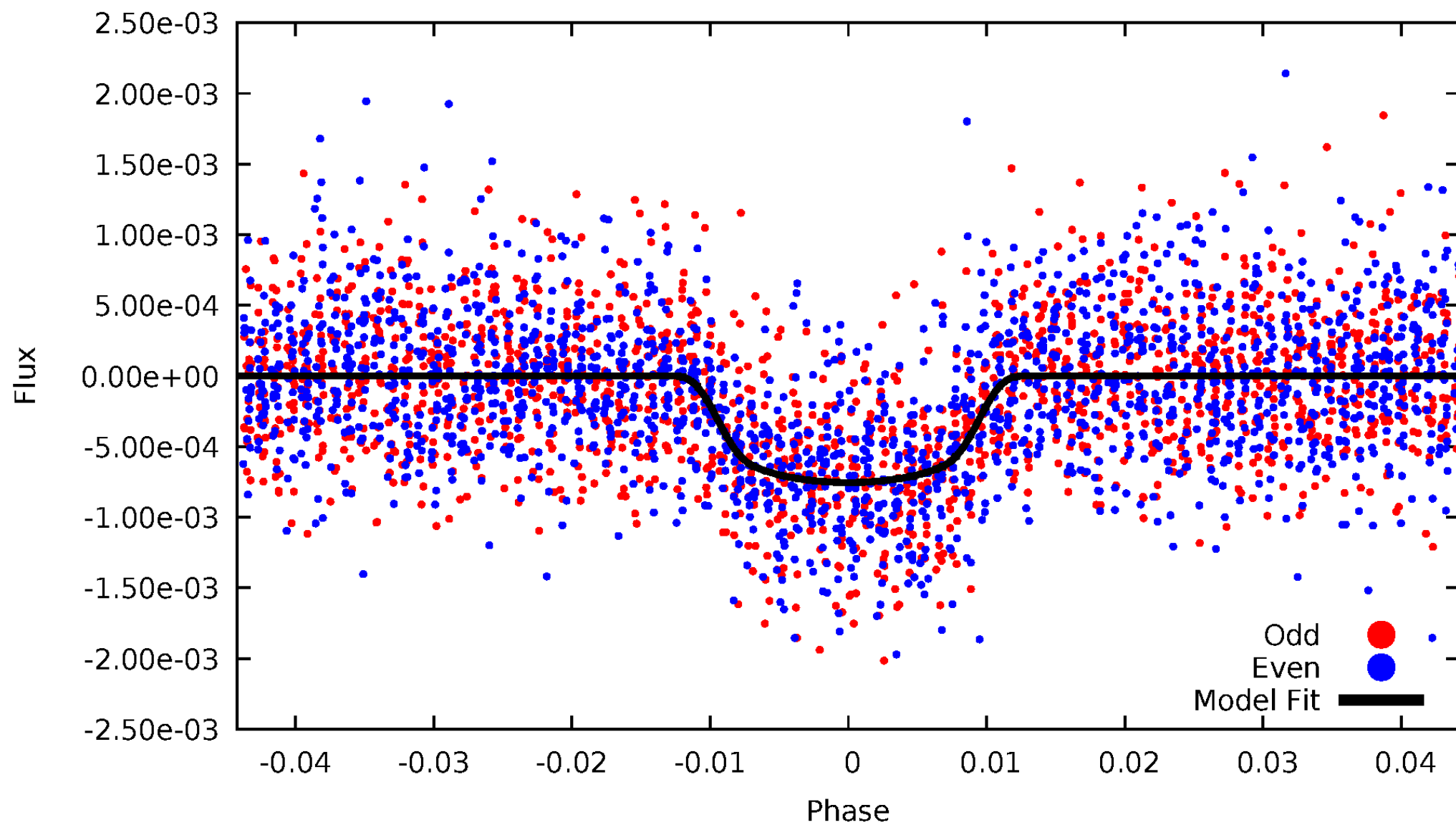


# TCE 011337372-01



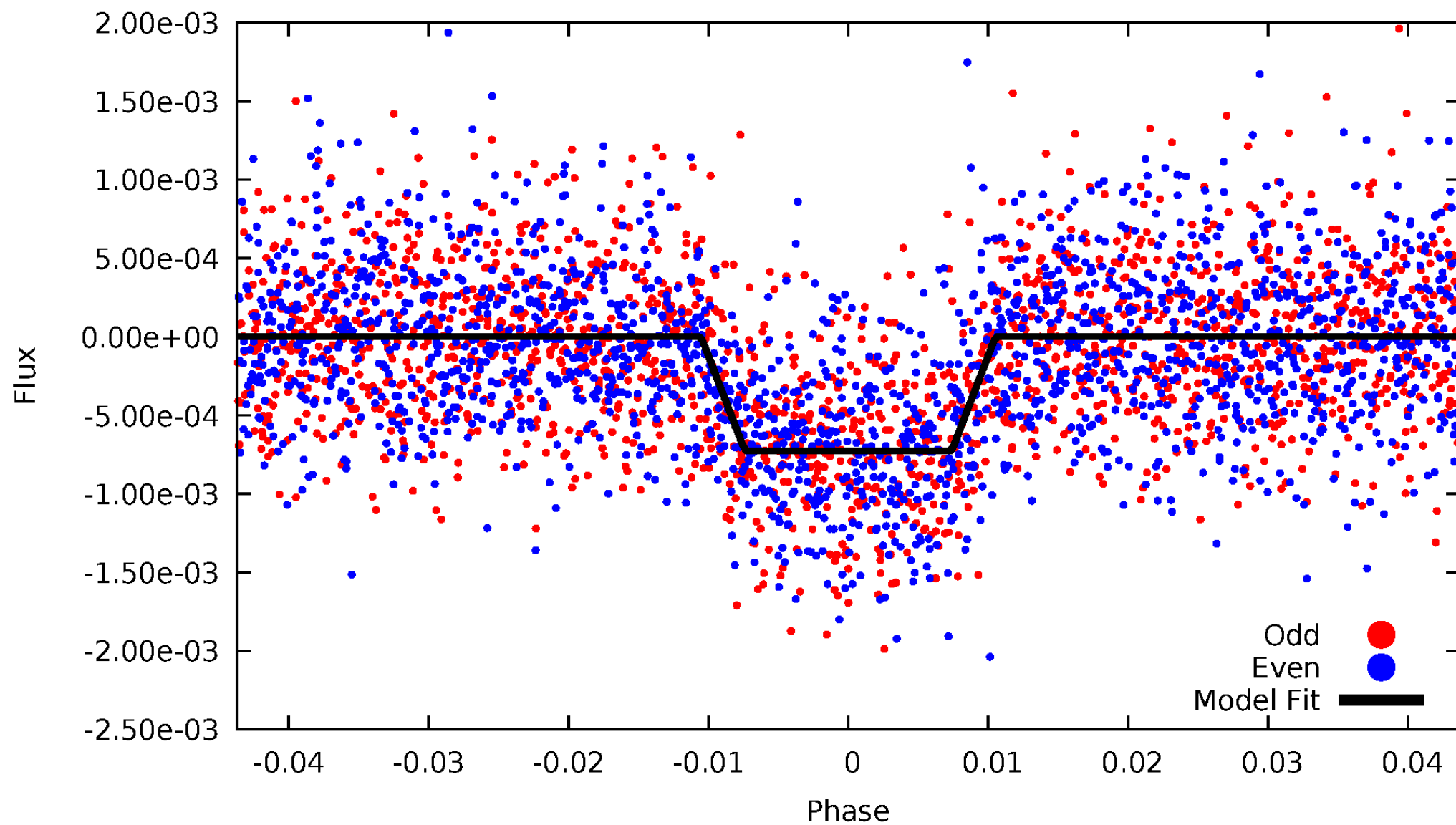
# DV Odd/Even

TCE 011337372-01



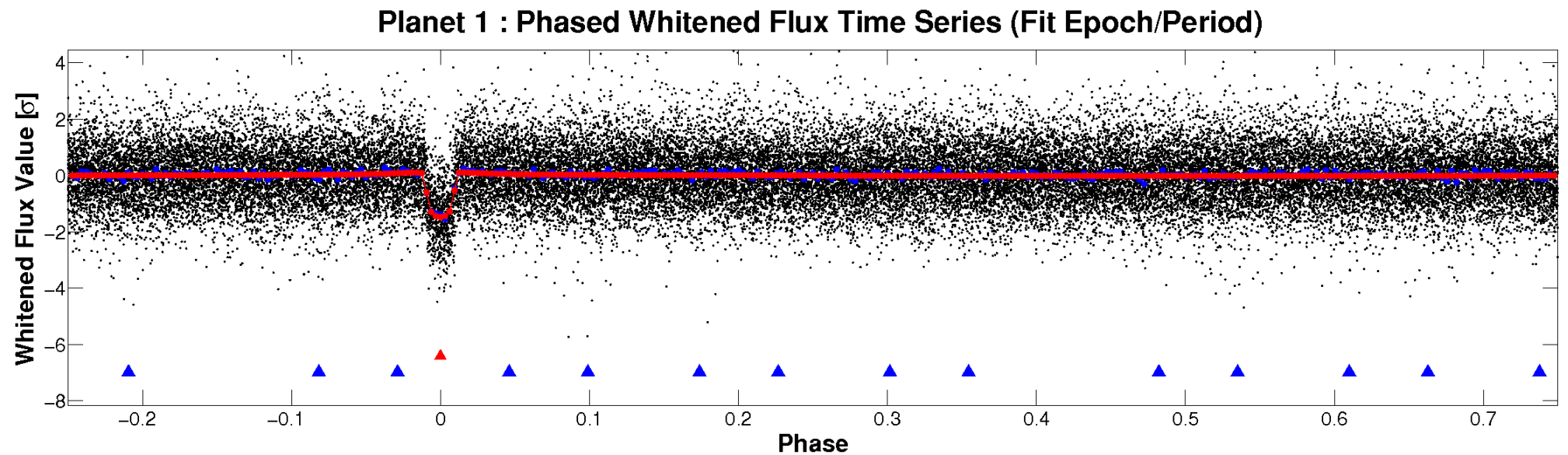
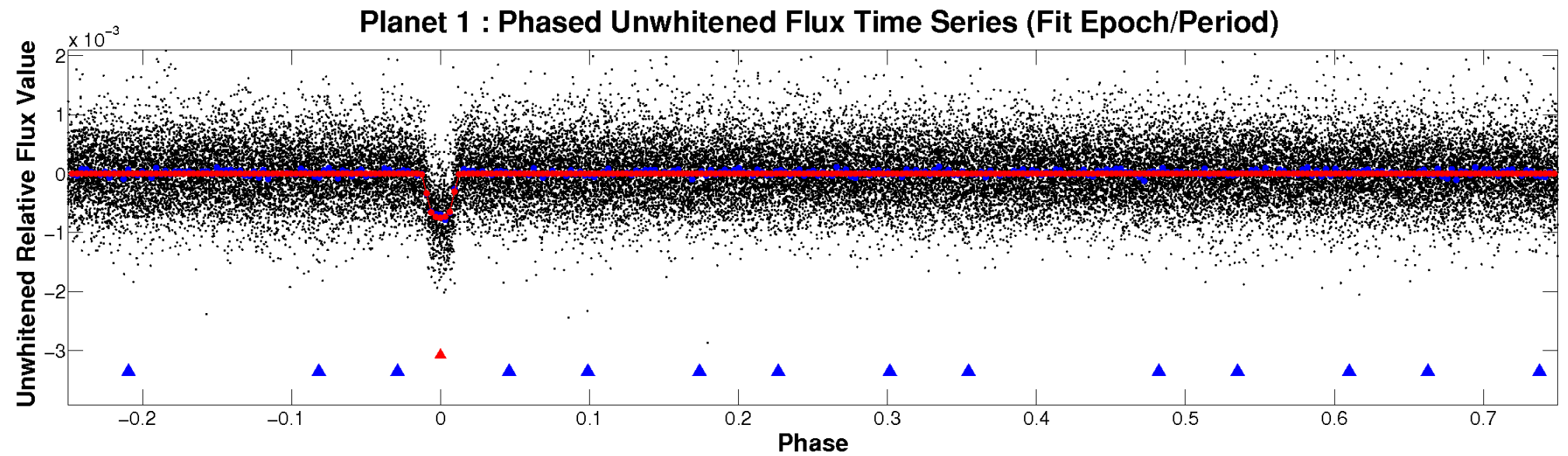
# ALT Odd/Even

TCE 011337372-01



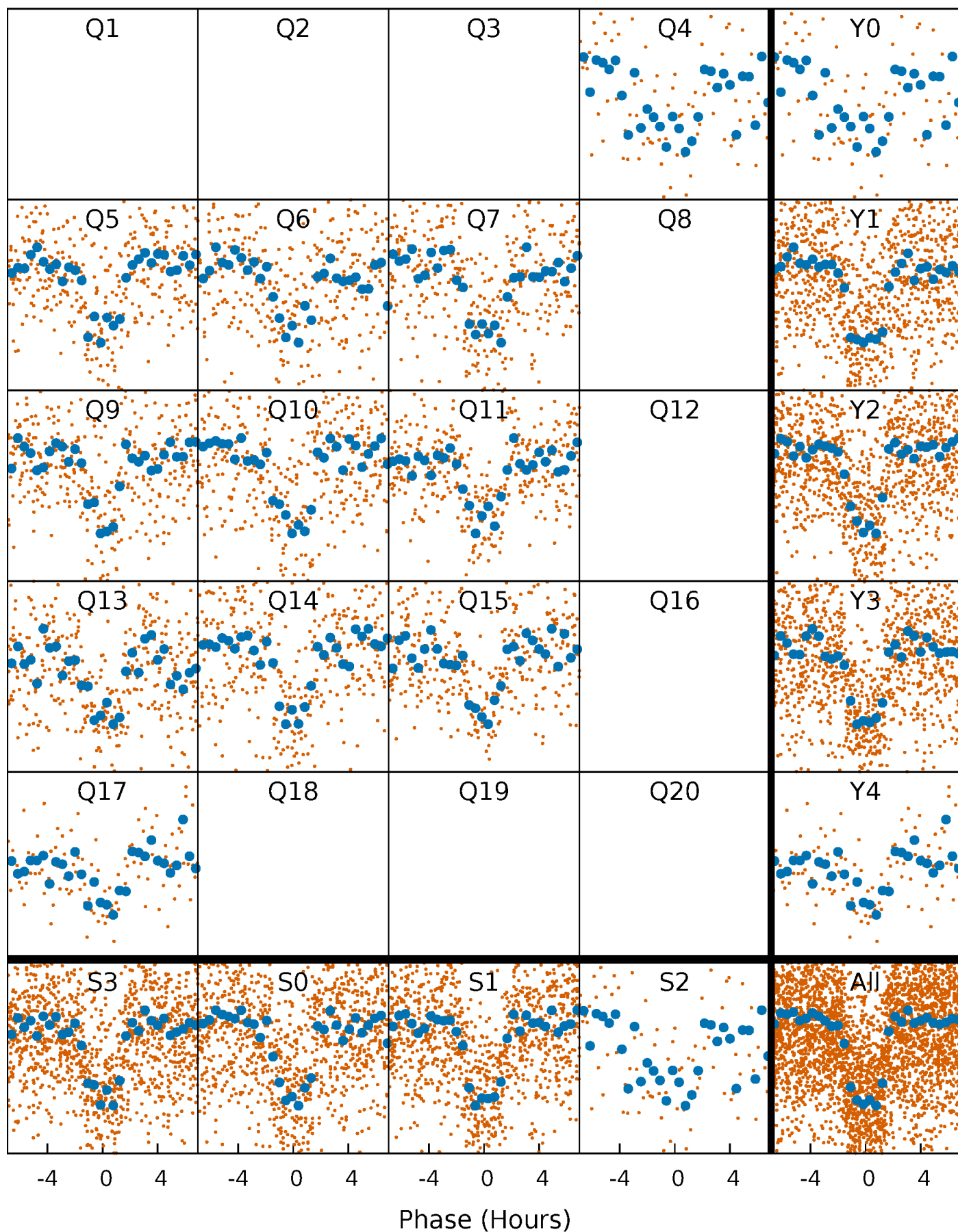


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

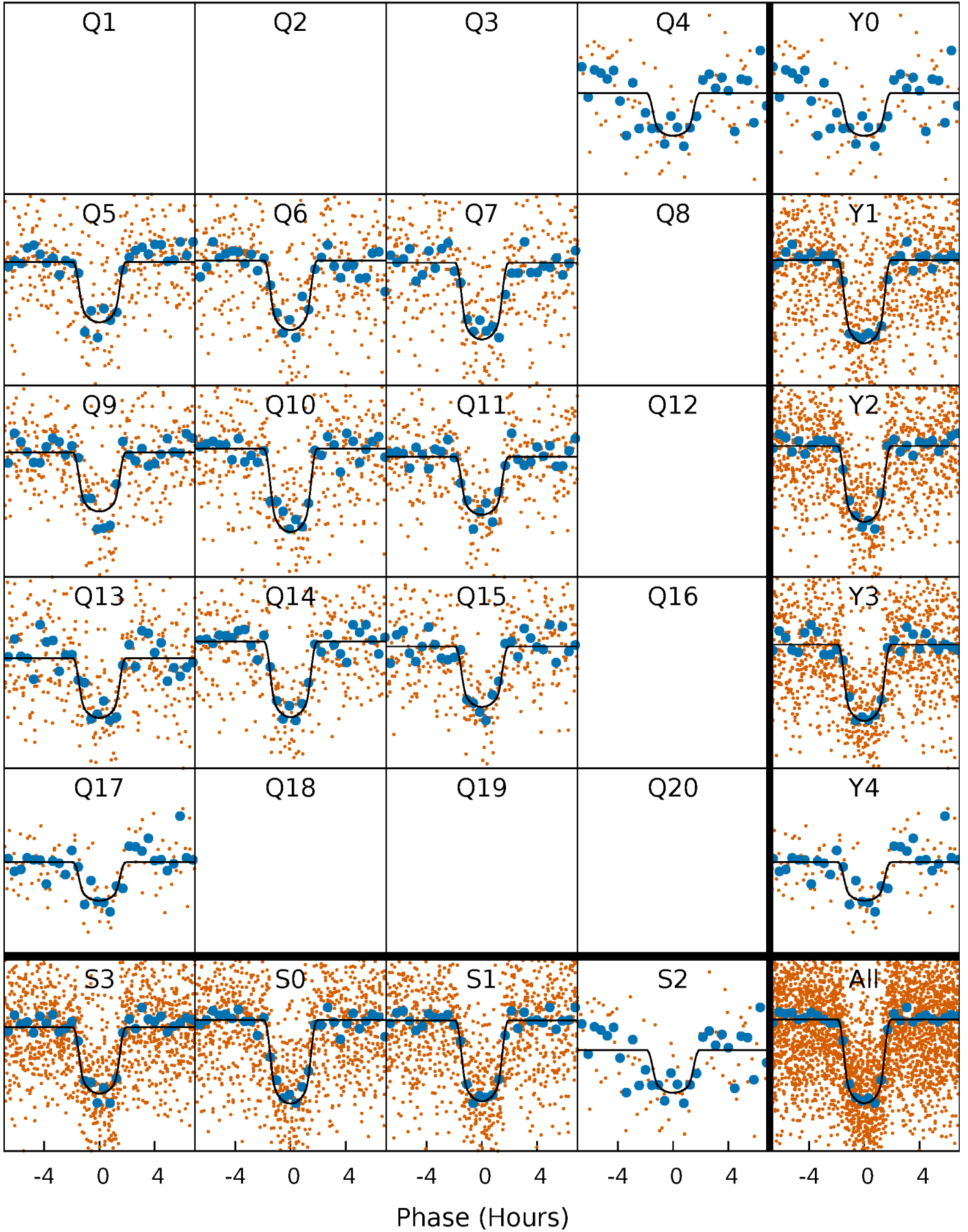
TCE 011337372-01 P= 6.531945 Days  $T_0=136.032081$  (BKJD)





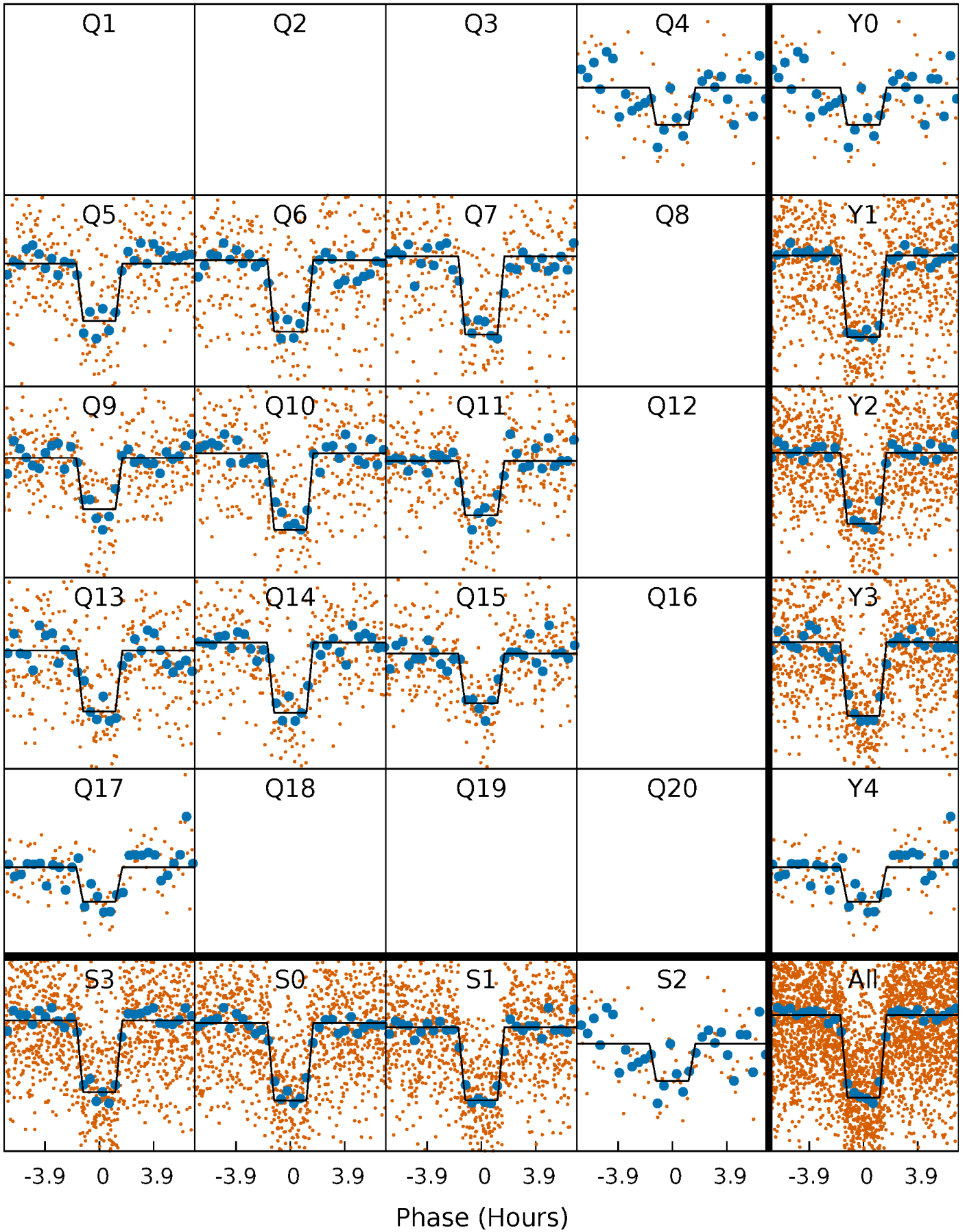
# DV Quarter-Phased Transit Curves

TCE 011337372-01 P= 6.531945 Days  $T_0=136.032081$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

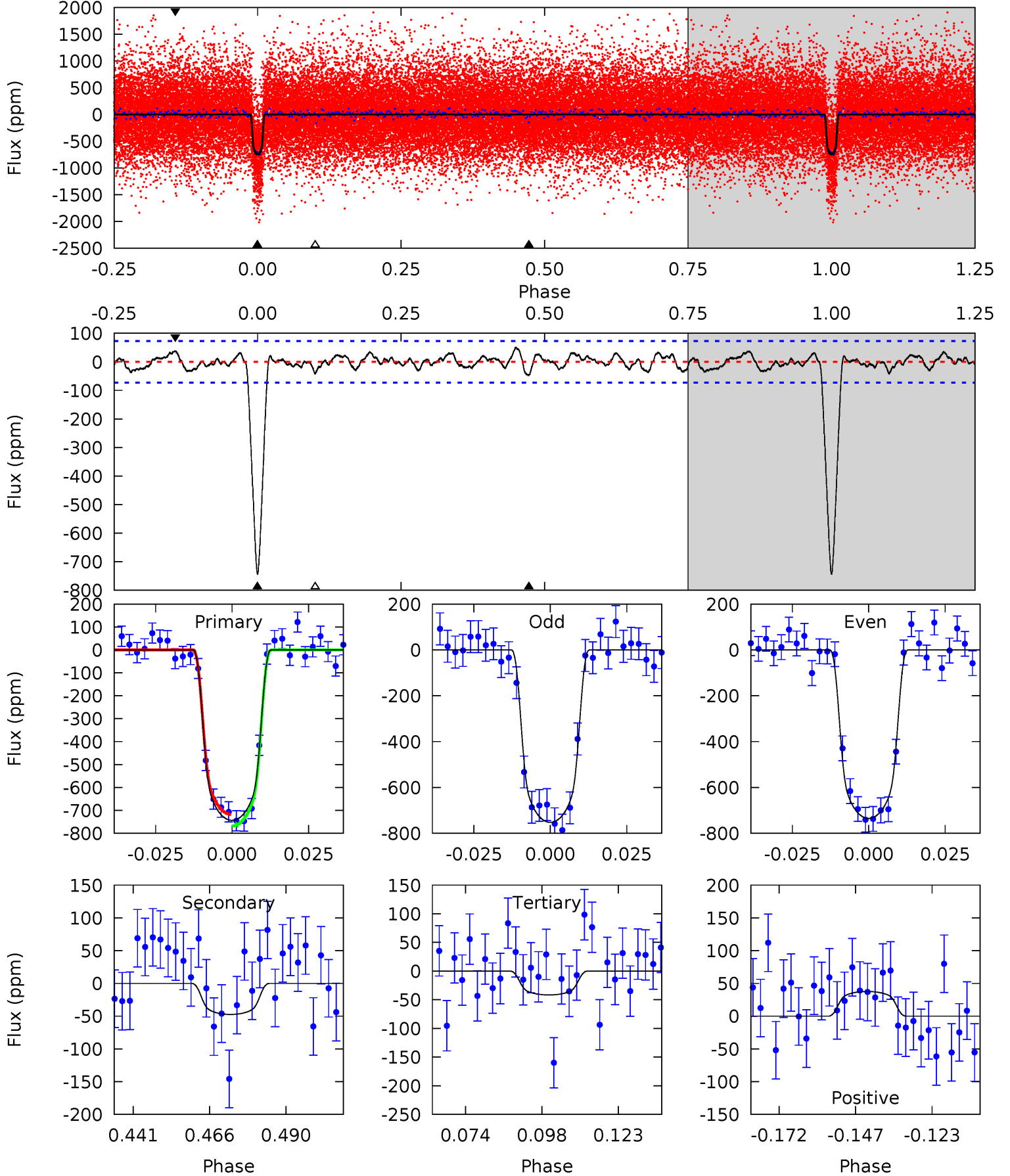
TCE 011337372-01 P= 6.531903 Days  $T_0=136.036974$  (BKJD)



# DV Model-Shift Uniqueness Test

011337372-01, P = 6.531945 Days, E = 136.032081 Days

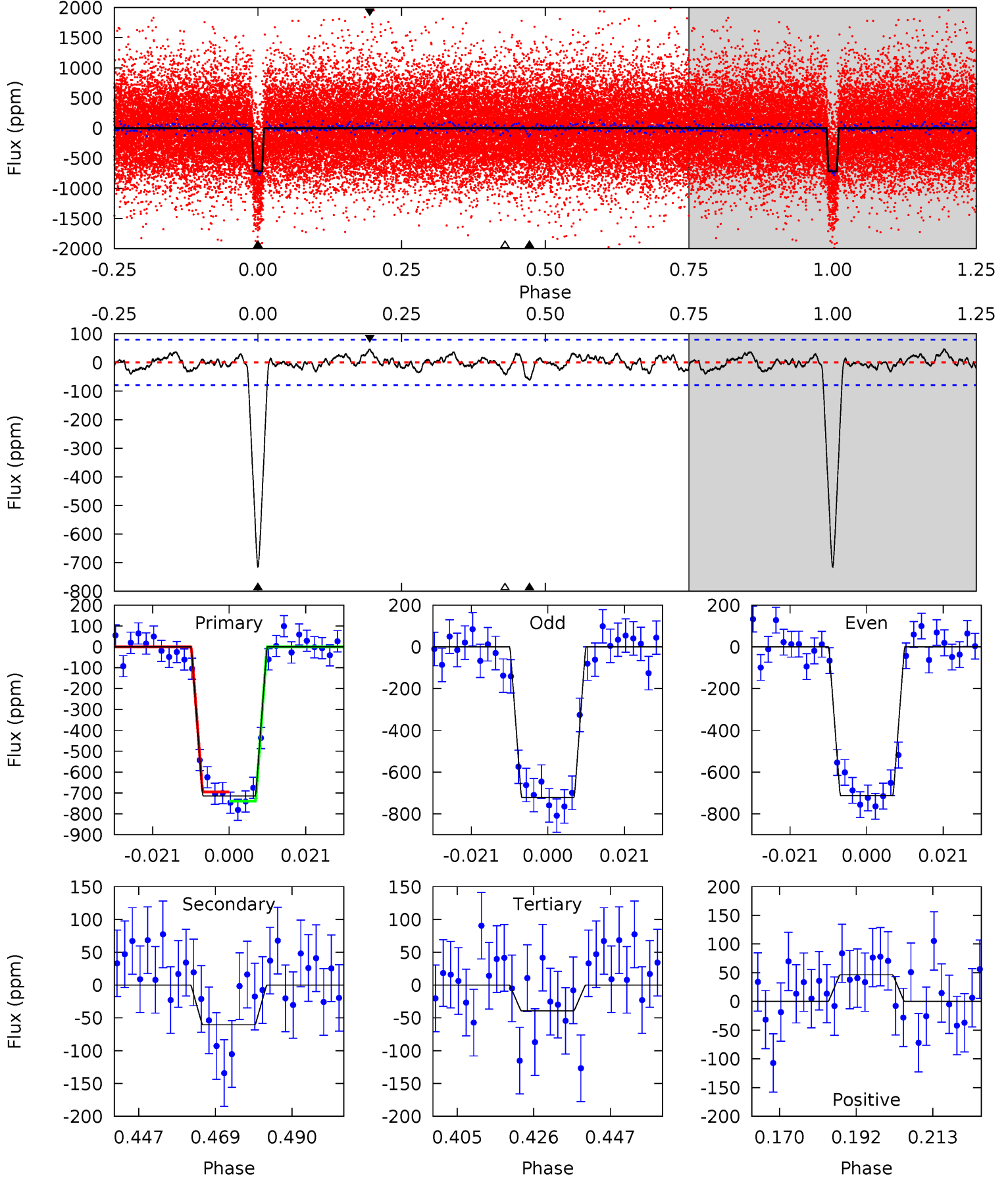
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
49.6	3.17	2.77	2.51	4.85	2.25	1.14	46.8	47.1	0.40	0.66	0.59	1.01	0.06	1.67



# Alt Model-Shift Uniqueness Test

011337372-01, P = 6.531903 Days, E = 136.036974 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
43.9	3.71	2.41	2.86	4.88	2.30	1.05	41.5	41.0	1.29	0.84	0.25	1.03	0.06	1.37



### Stellar Parameters For KIC 011337372

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5301^{+85}_{-74}$	$4.391^{+0.130}_{-0.070}$	$0.160^{+0.150}_{-0.150}$	$0.977^{+0.096}_{-0.128}$	$0.856^{+0.066}_{-0.033}$	$1.293^{+0.702}_{-0.269}$
	+2%/-1%	+3%/-2%	+94%/-94%	+10%/-13%	+8%/-4%	+54%/-21%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 011337372-01 / KOI 1650.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-47 \pm 15$	$3.16^{+0.36}_{-0.37}$	$1263^{+42}_{-53}$	$3137^{+165}_{-182}$	$11^{+5}_{-4}$
Alt.	$-60 \pm 16$	$2.84^{+0.35}_{-0.34}$	$1262^{+39}_{-54}$	$3348^{+173}_{-184}$	$17^{+7}_{-6}$

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



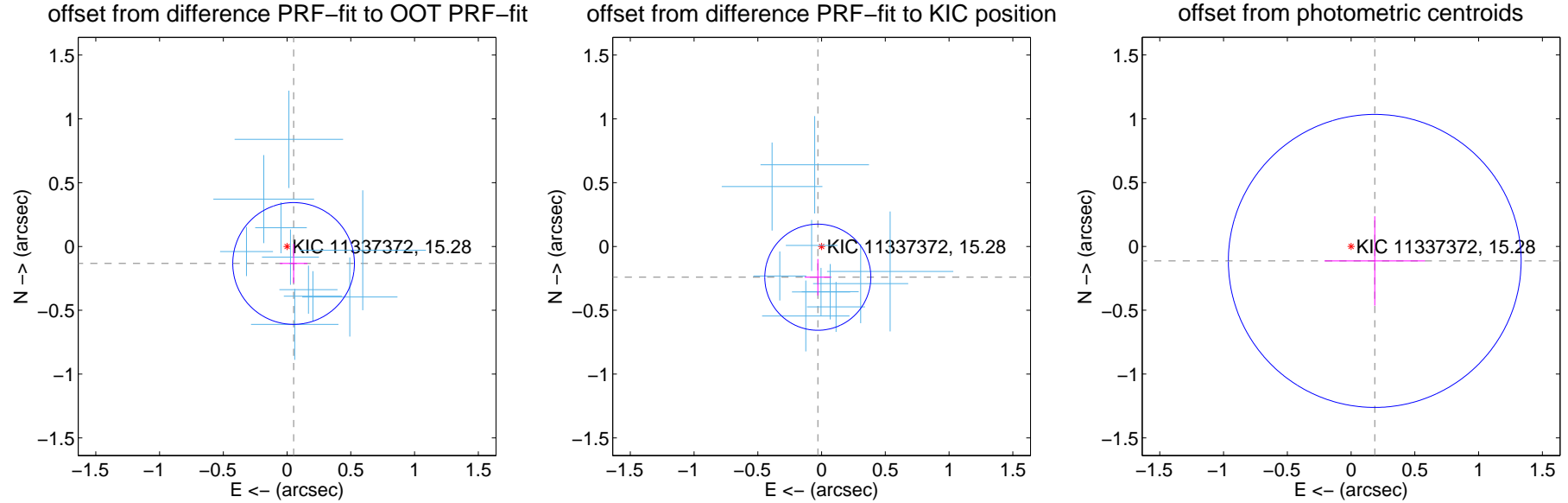
## DV Centroid Data

Supplemental centroid analysis for 011337372-01. Kepler magnitude: 15.28. Transit SNR 35.59

There are 10 quarters with good PRF difference image offsets

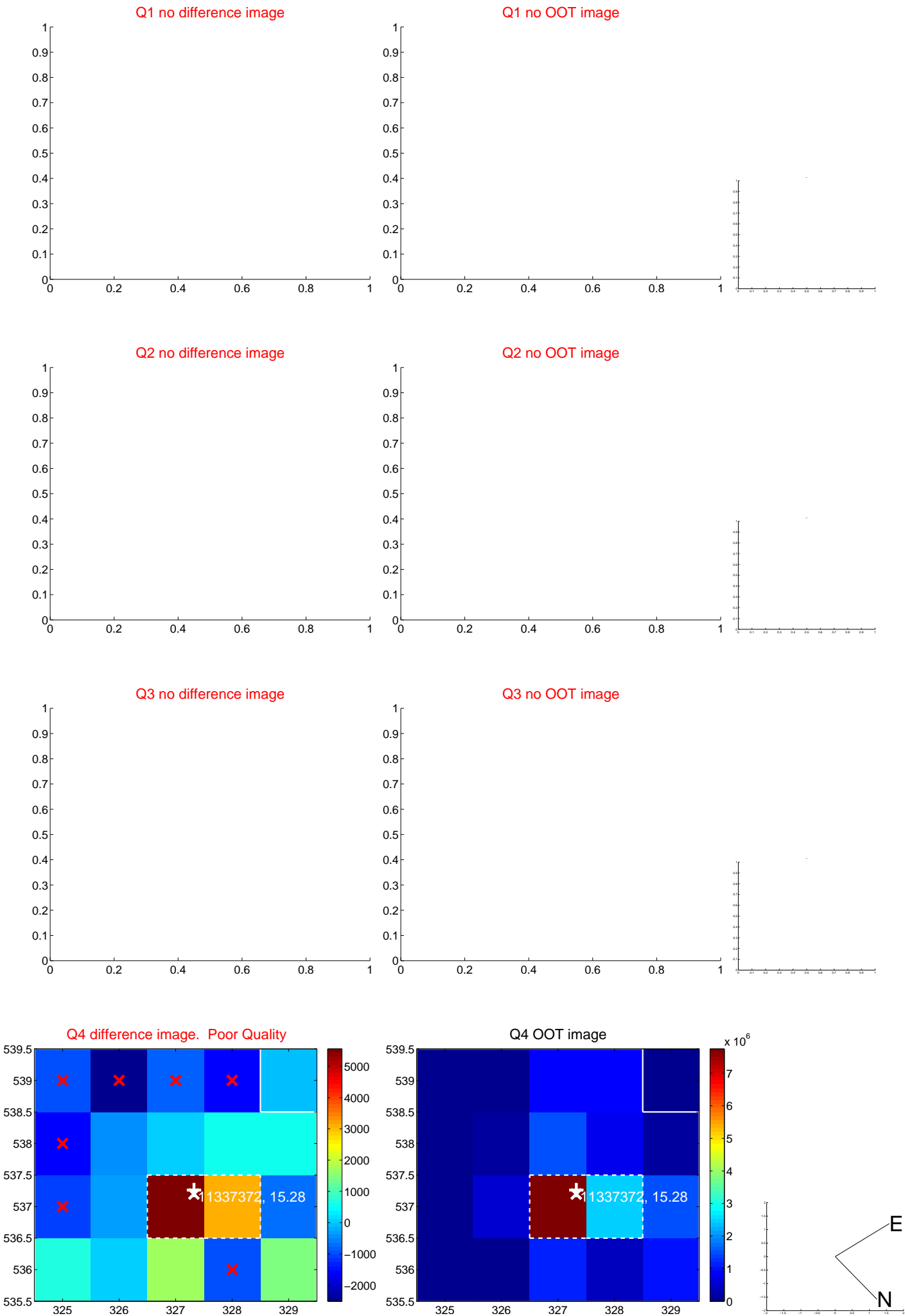
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.143 \pm 0.159$	0.90	$-0.051 \pm 0.108$	$-0.133 \pm 0.153$
PRF-fit source offset from KIC position	$0.243 \pm 0.139$	1.75	$0.029 \pm 0.103$	$-0.241 \pm 0.143$
photometric centroid source offset	$0.22 \pm 0.38$	0.57	$-0.19 \pm 0.39$	$-0.11 \pm 0.35$

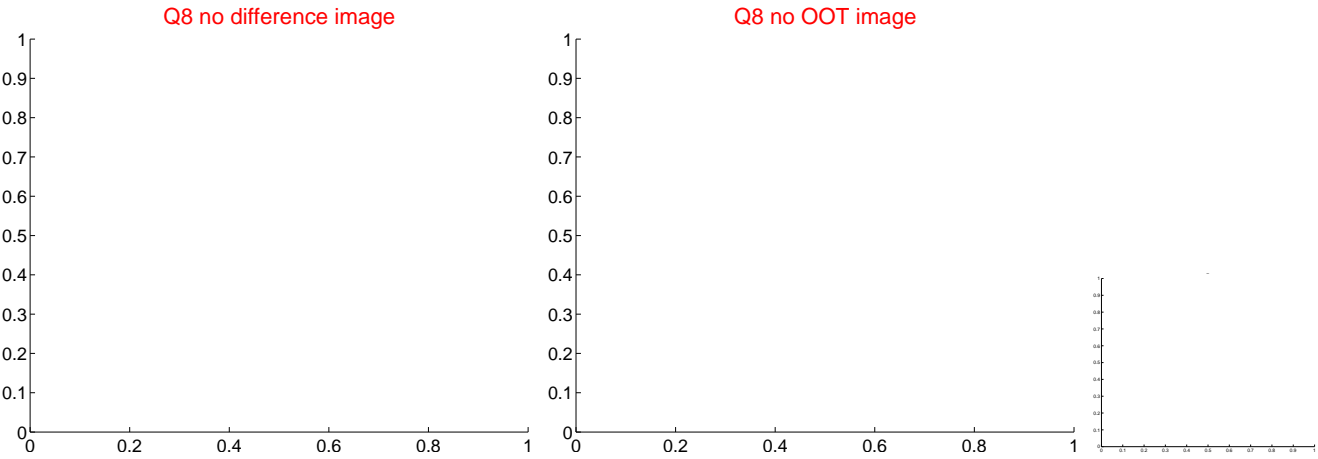
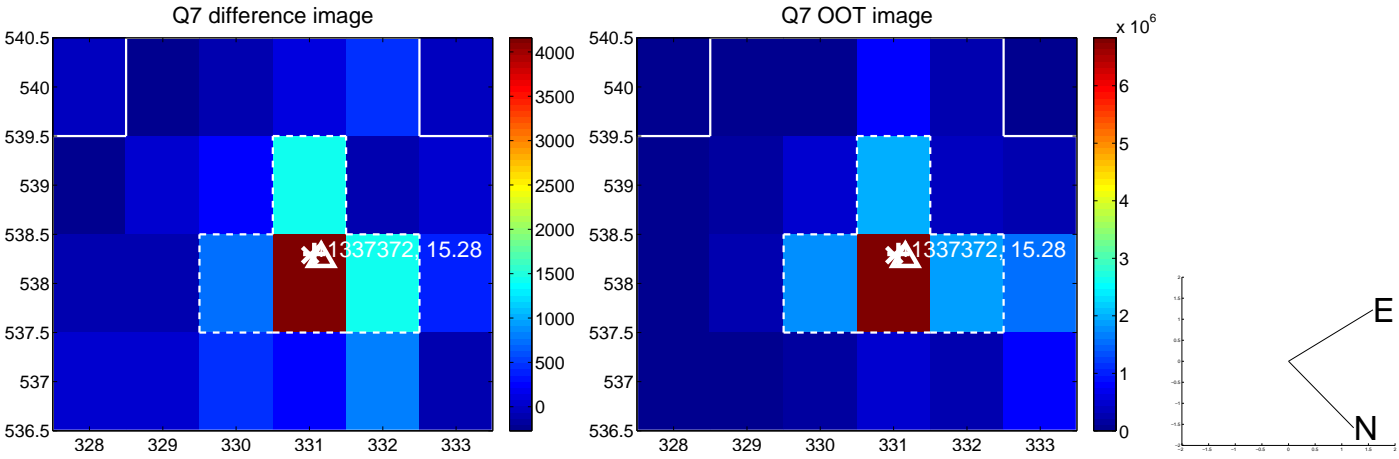
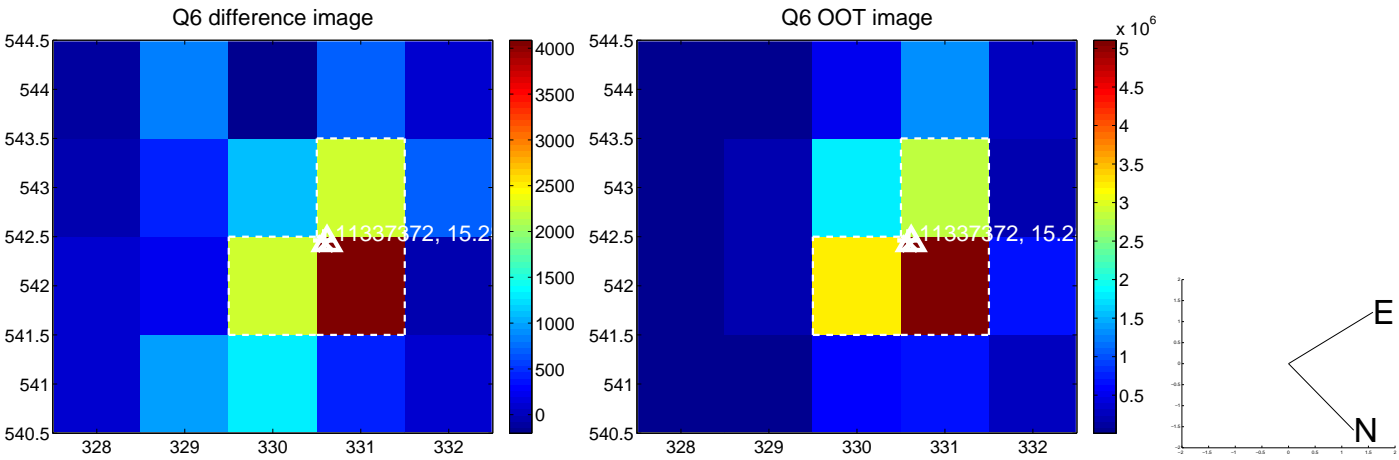
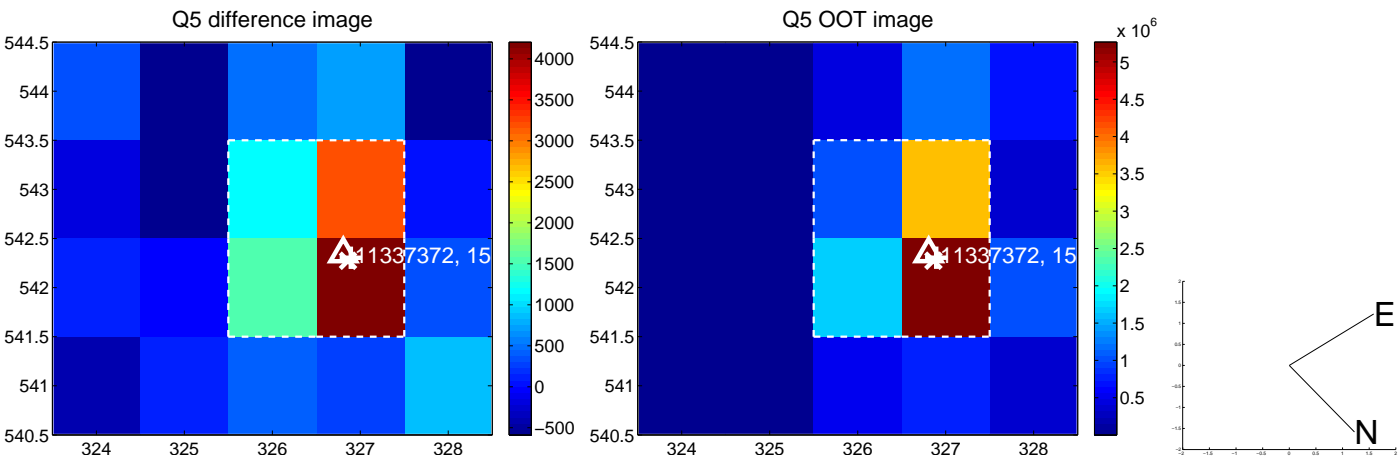


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

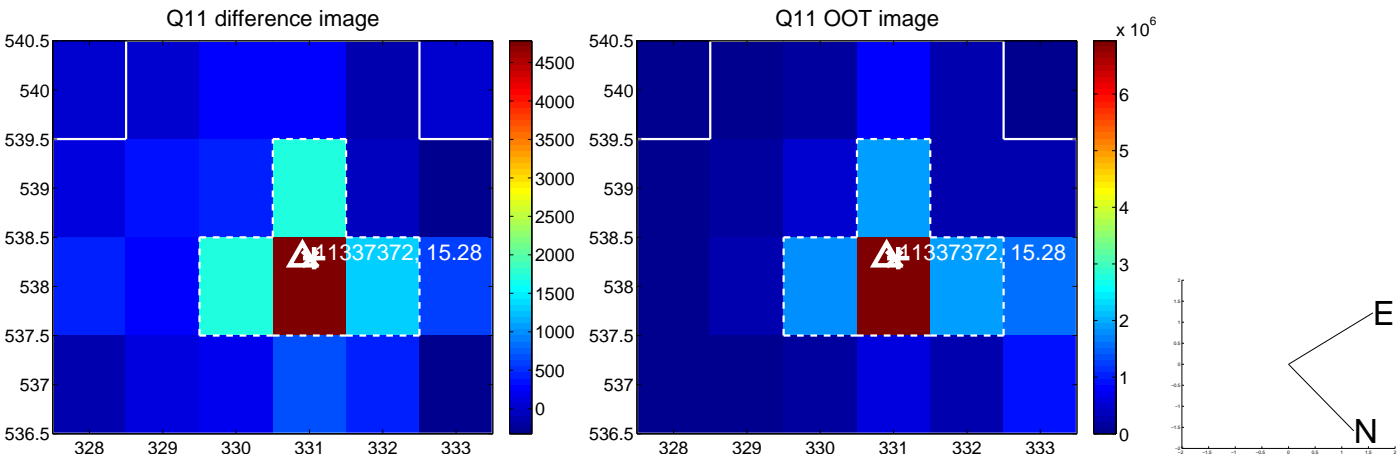
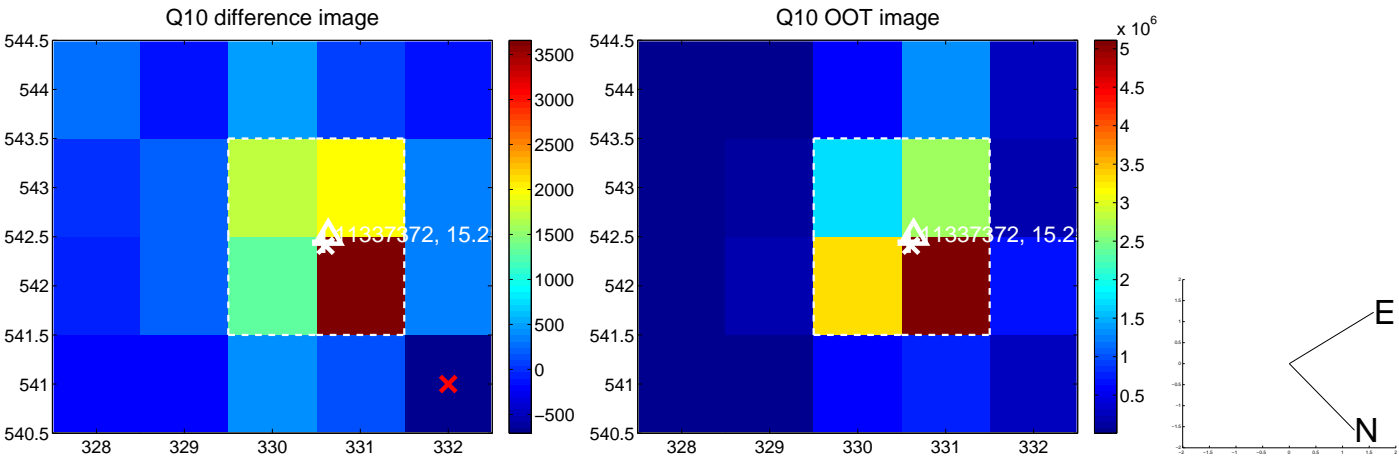
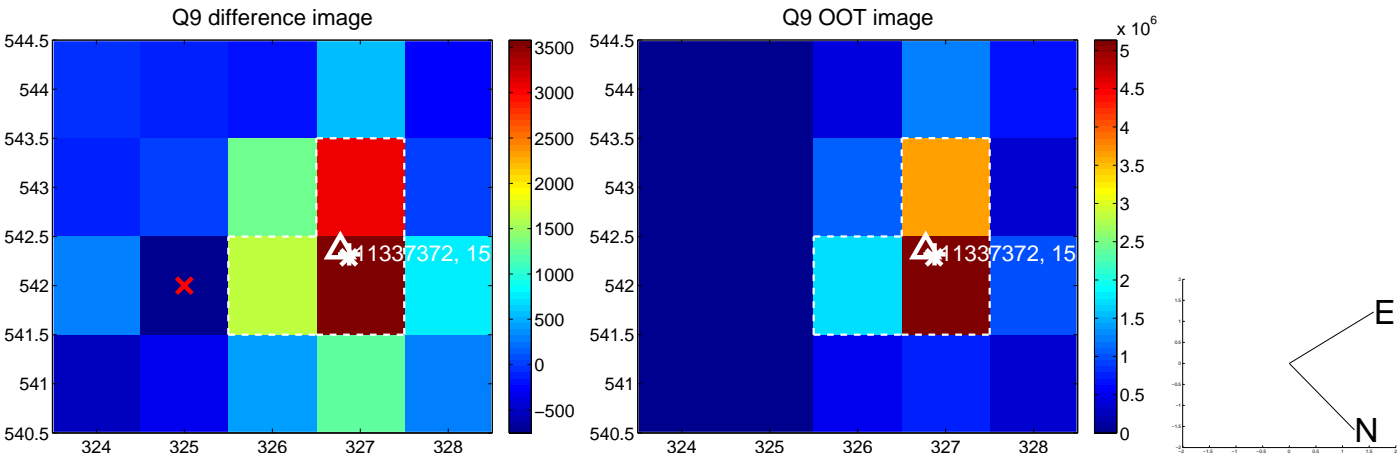
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



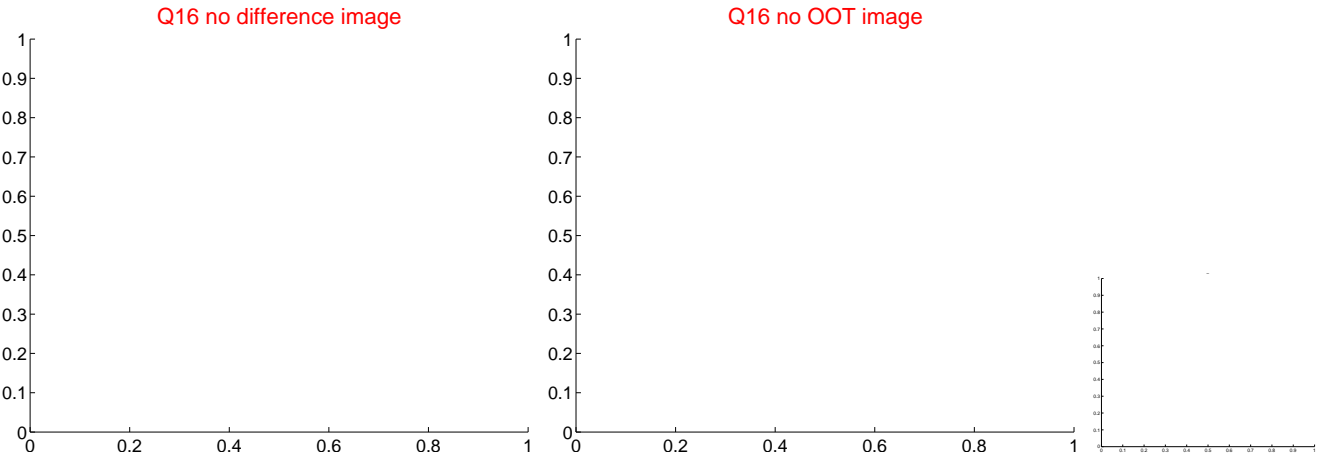
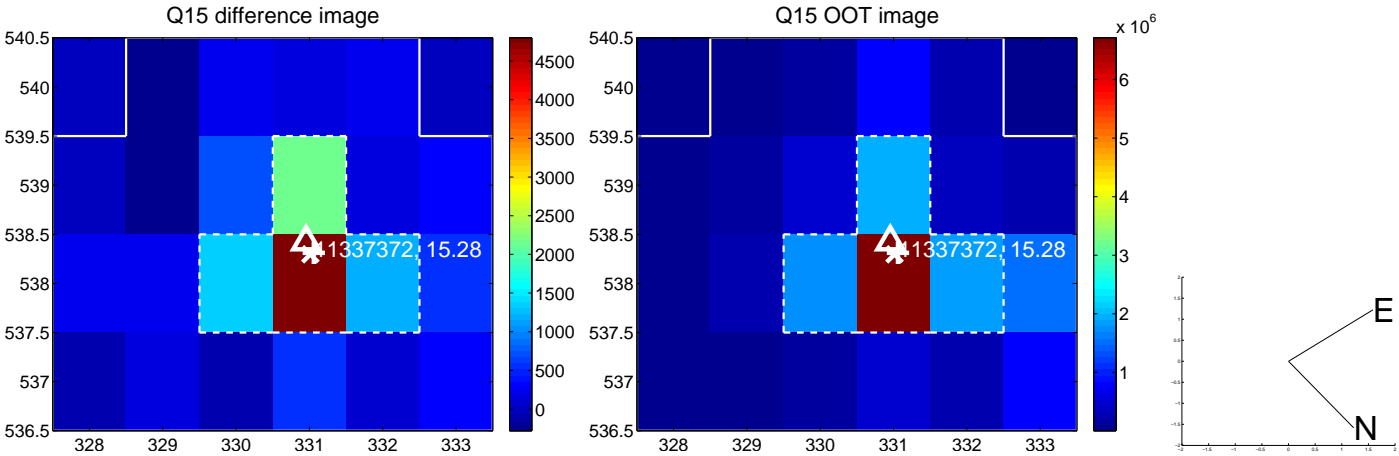
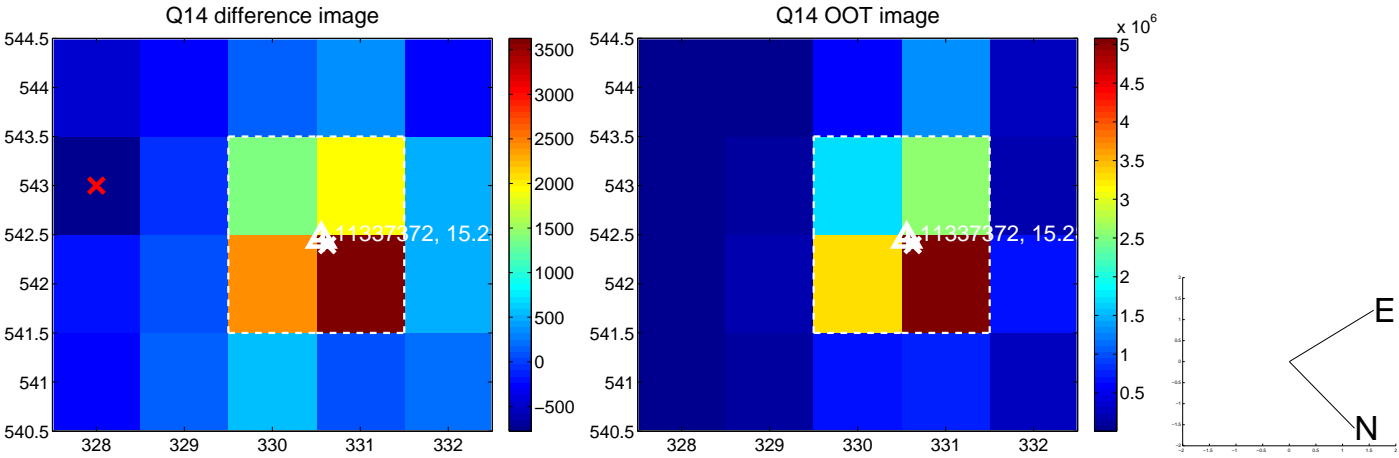
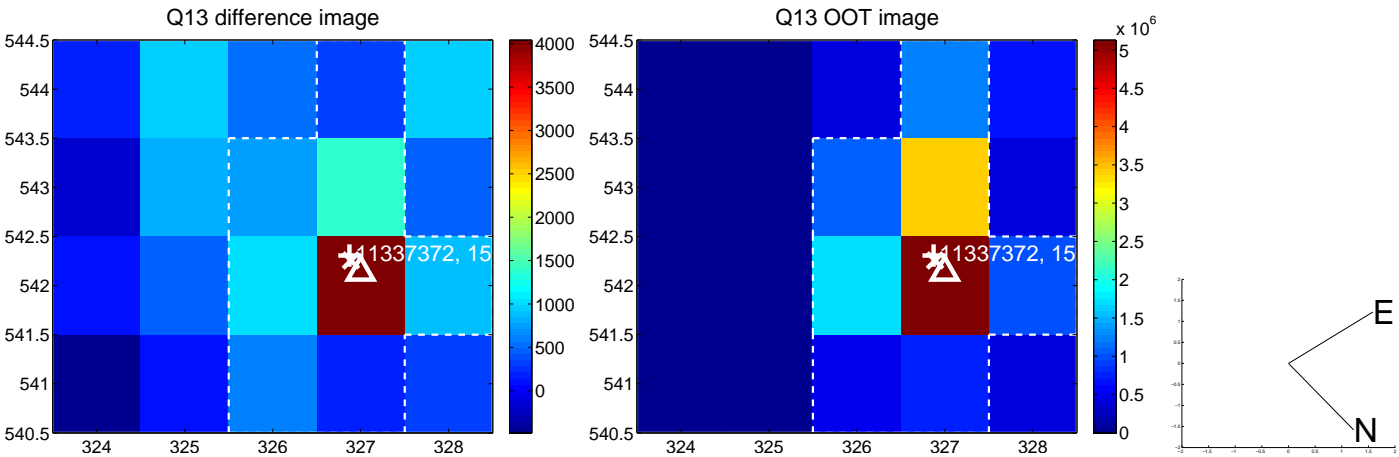
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

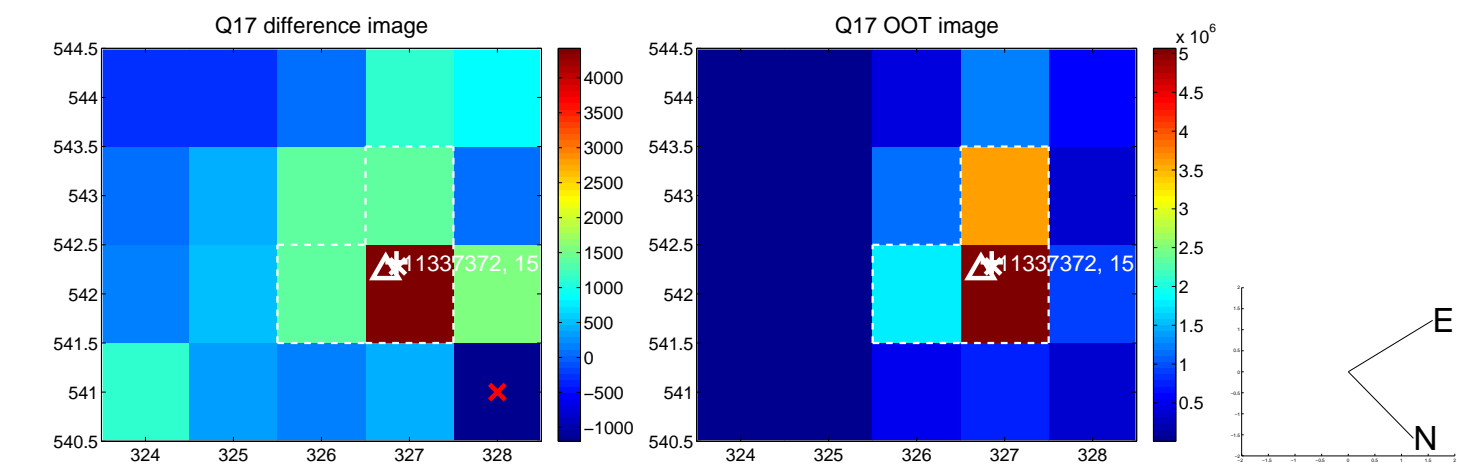


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

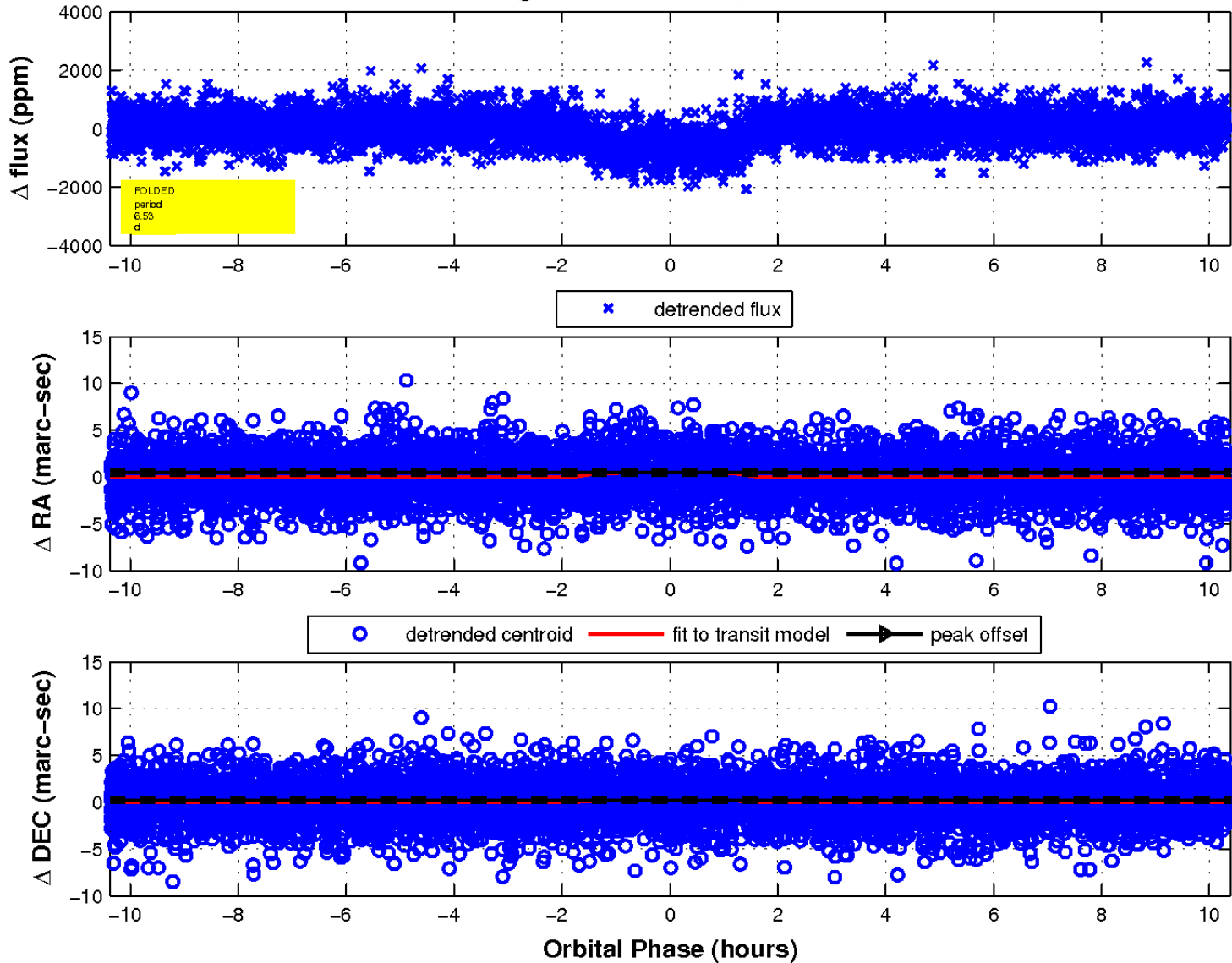




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

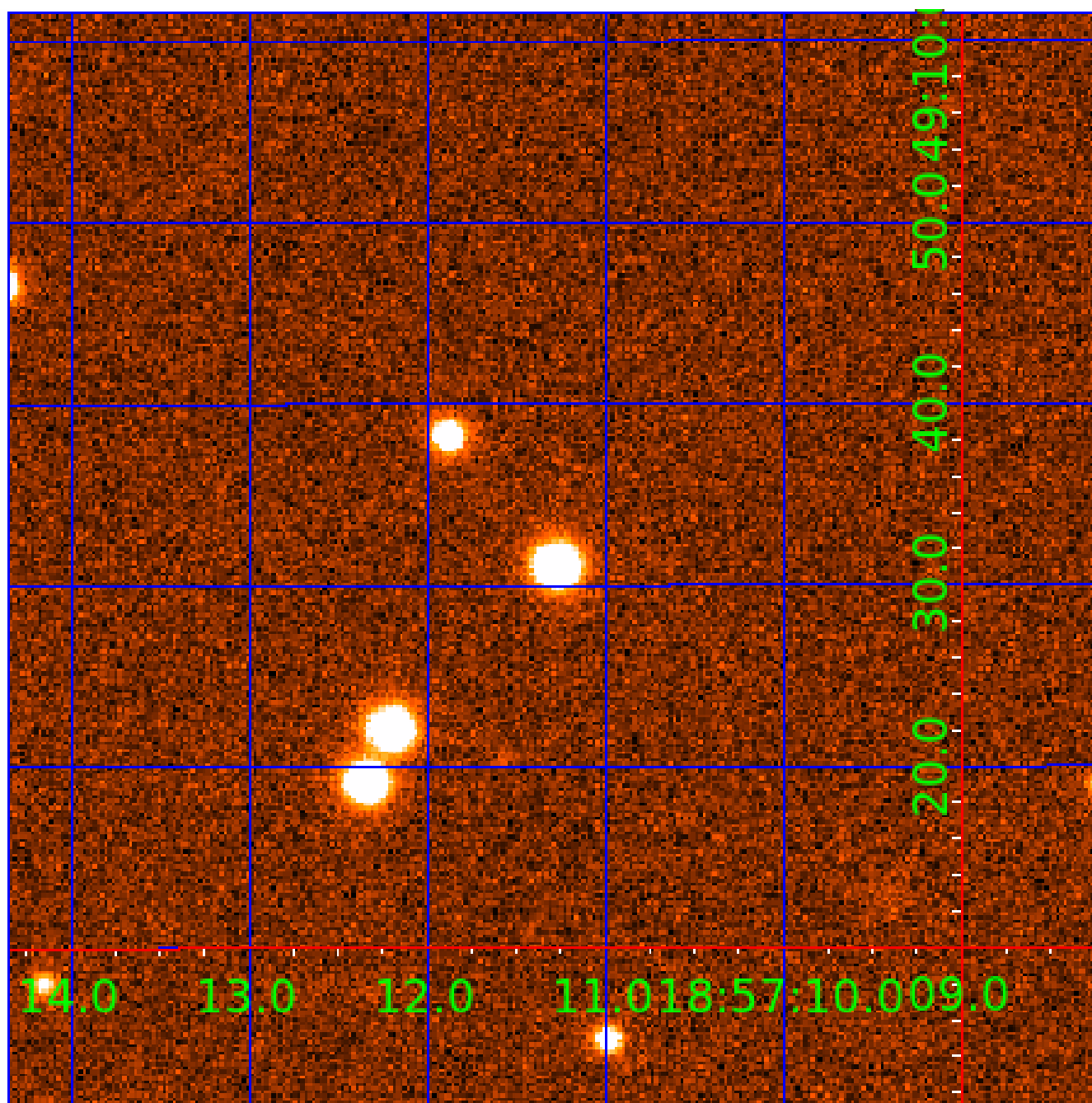


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 011337372

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011337372-01	OBS	1650.01	6.531945	136.032080	753.6	3.465	32.7	35.6	0.98	5301	3.20	160.03
011337372-02	OBS	1650.02	100.827878	216.385700	1856.4	8.334	30.9	31.5	0.98	5301	4.37	4.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011337372-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011337372-02	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 011337372-02

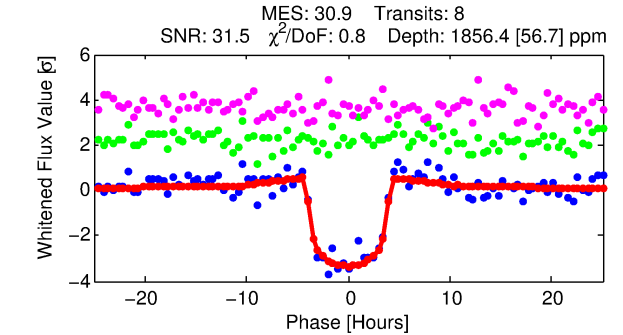
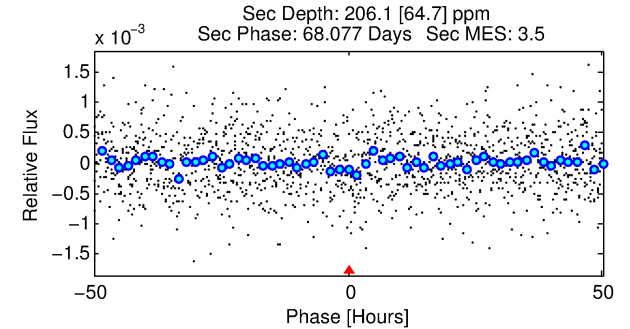
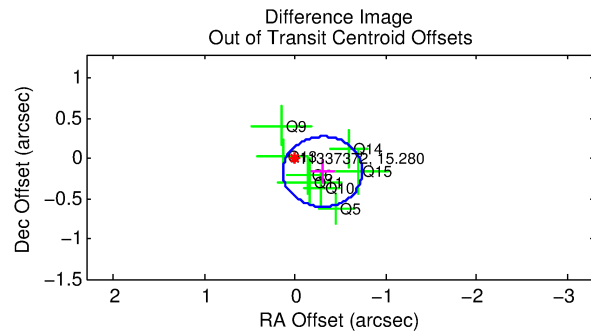
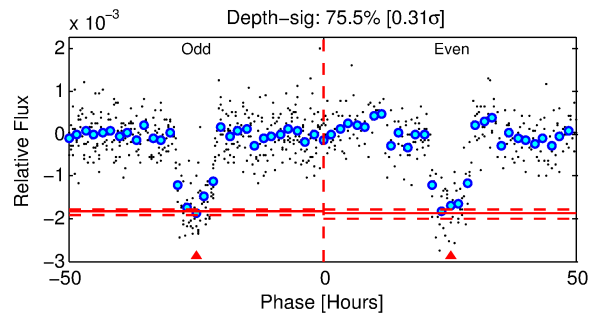
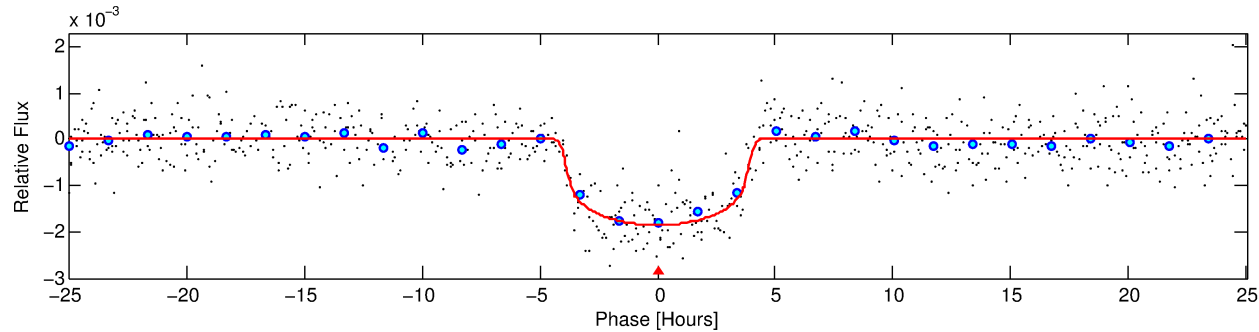
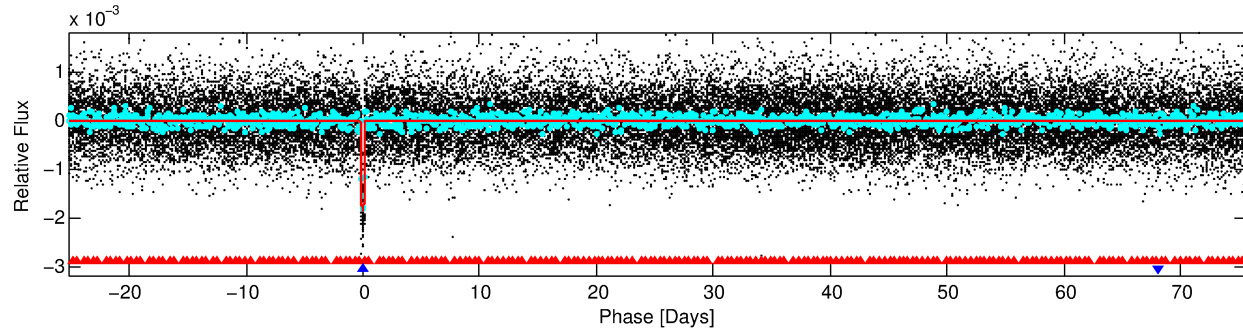
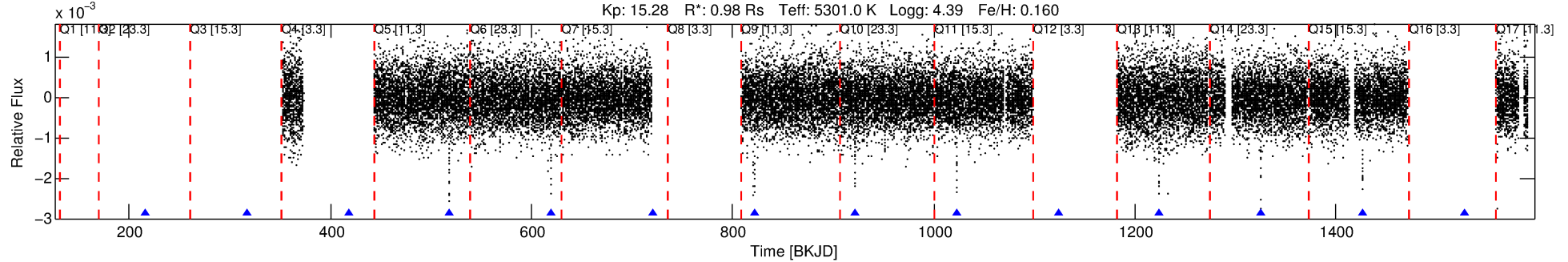
No Significant Match Found

# DV One-Page Summary

KIC: 11337372 Candidate: 2 of 2 Period: 100.828 d

KOI: K01650.02 Corr: 0.994

Kp: 15.28 R\*: 0.98 Rs Teff: 5301.0 K Logg: 4.39 Fe/H: 0.160



## DV Fit Results:

Period = 100.82788 [0.00074] d  
Epoch = 216.3857 [0.0065] BKJD  
Rp/R\* = 0.0410 [0.0061]  
a/R\* = 77.78 [42.35]  
b = 0.61 [0.56]  
Seff = 4.16 [0.95]  
Teq = 364 [21] K  
Rp = 4.37 [0.87] Re  
a = 0.4027 [0.0534] AU  
Ag = 963.06 [467.94] [2.06σ]  
Teffp = 3137 [344] K [8.04σ]

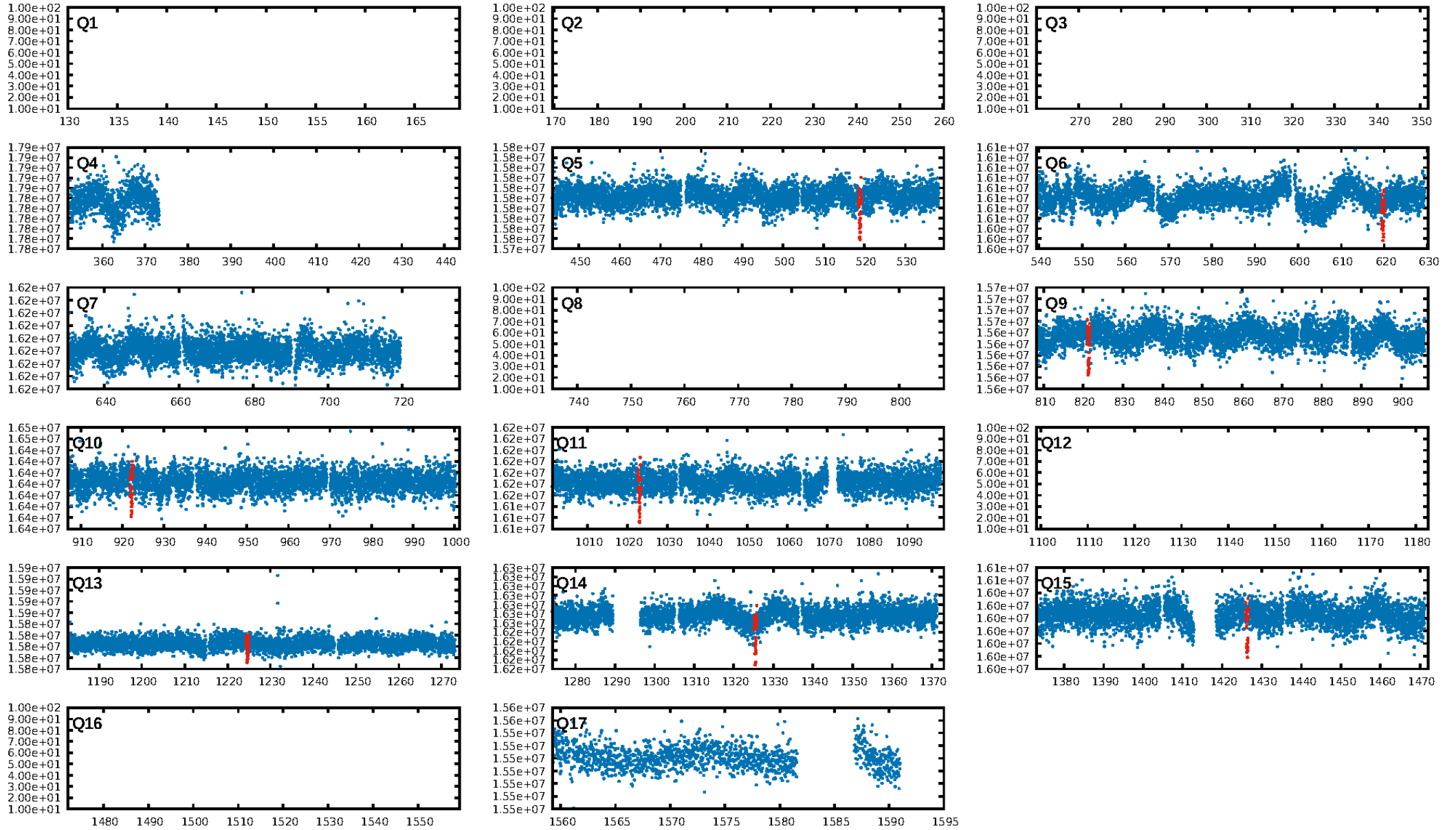
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [250.75σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 56.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.44e-204  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 4.667  
Centroid-sig: 0.2%  
Centroid-so: 0.748 arcsec [1.98σ]  
OotOffset-rm: 0.342 arcsec [2.34σ]  
KicOffset-rm: 0.354 arcsec [2.42σ]  
OotOffset-st: 3/2/0/3 [8]  
KicOffset-st: 3/2/0/3 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 0.62 [5/8]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 00:30:19 Z

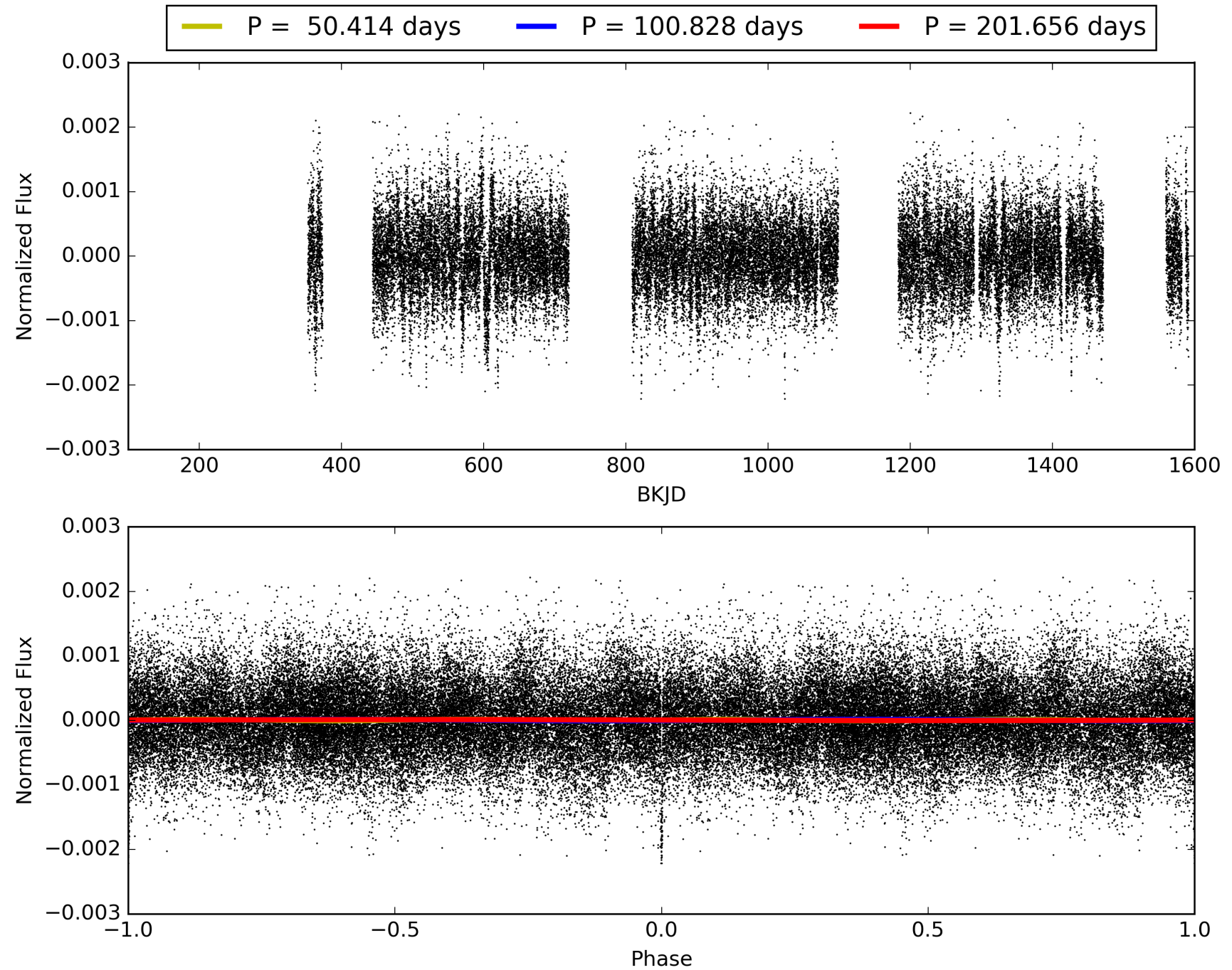
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011337372-02, PDC Light Curves



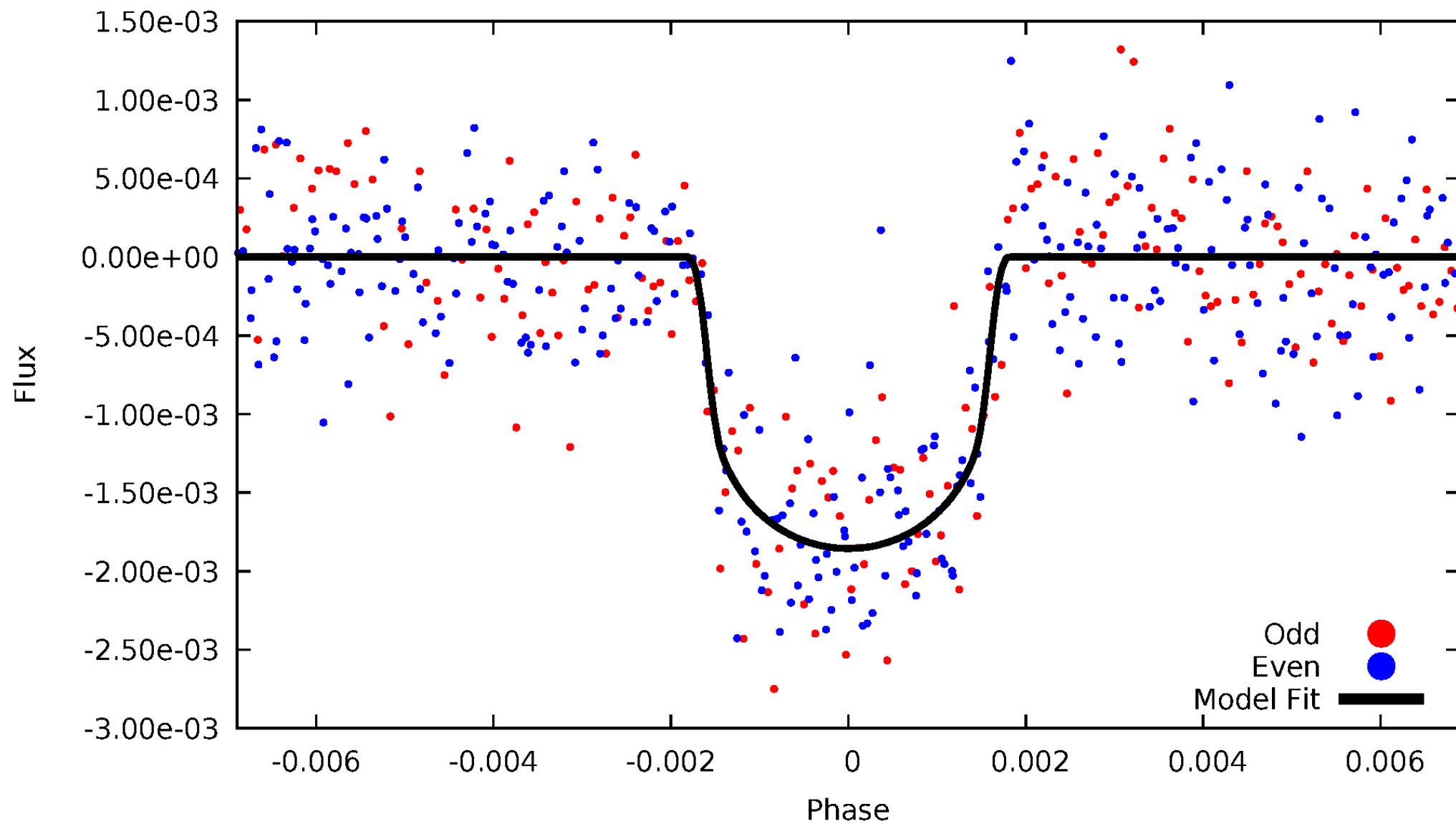


# TCE 011337372-02



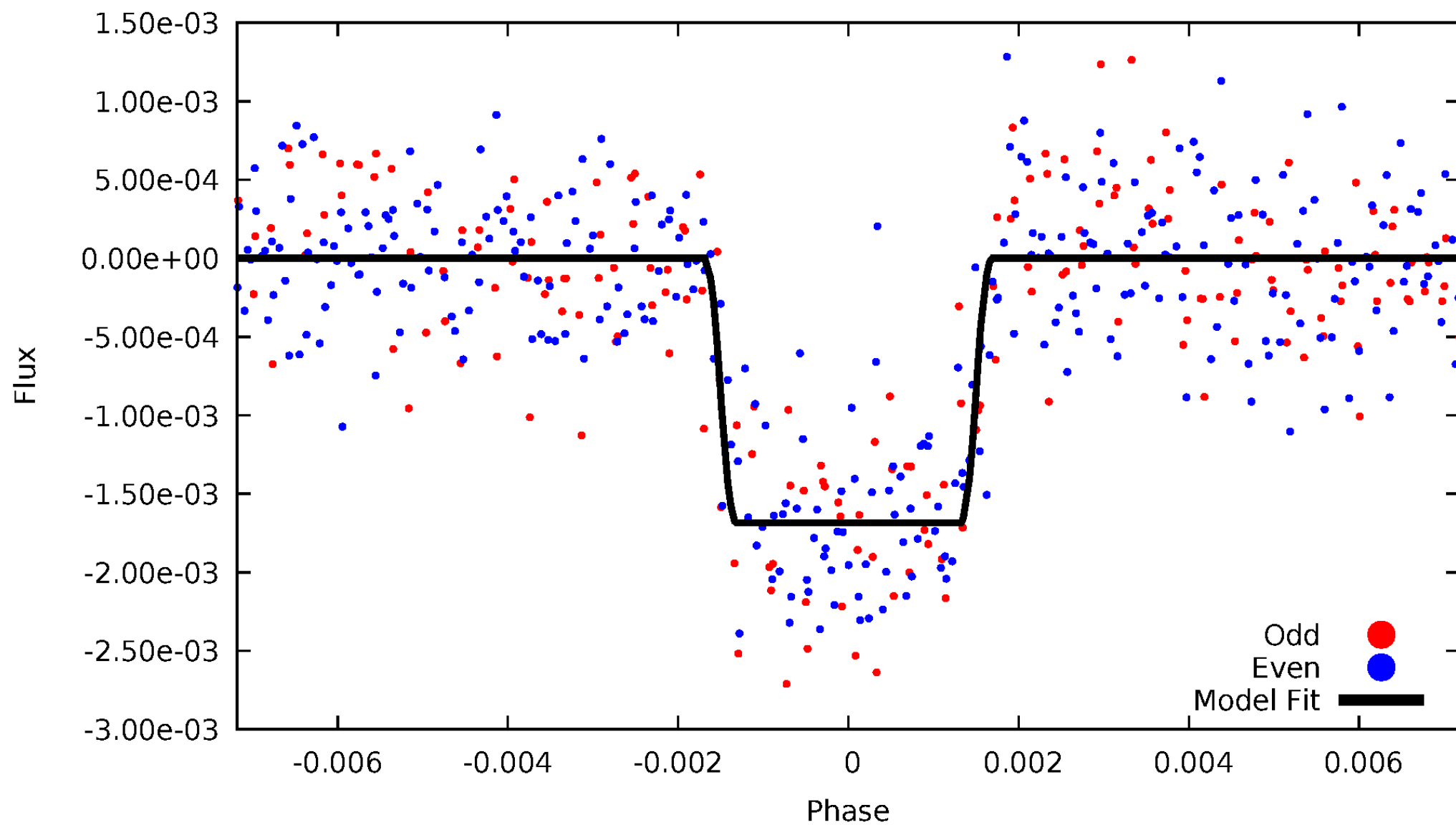
# DV Odd/Even

TCE 011337372-02



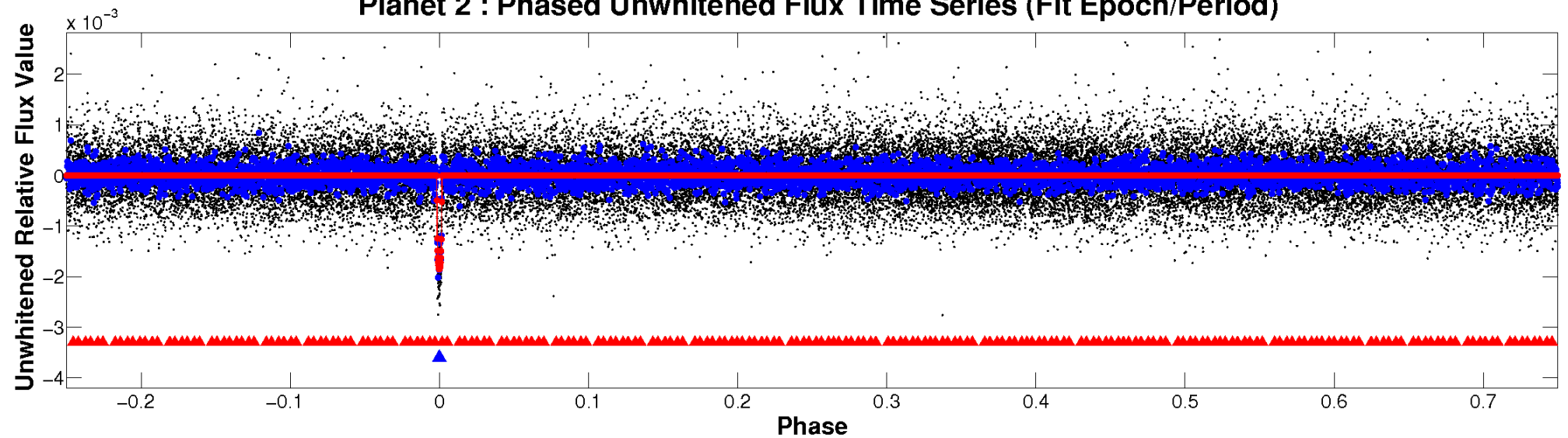
# ALT Odd/Even

TCE 011337372-02

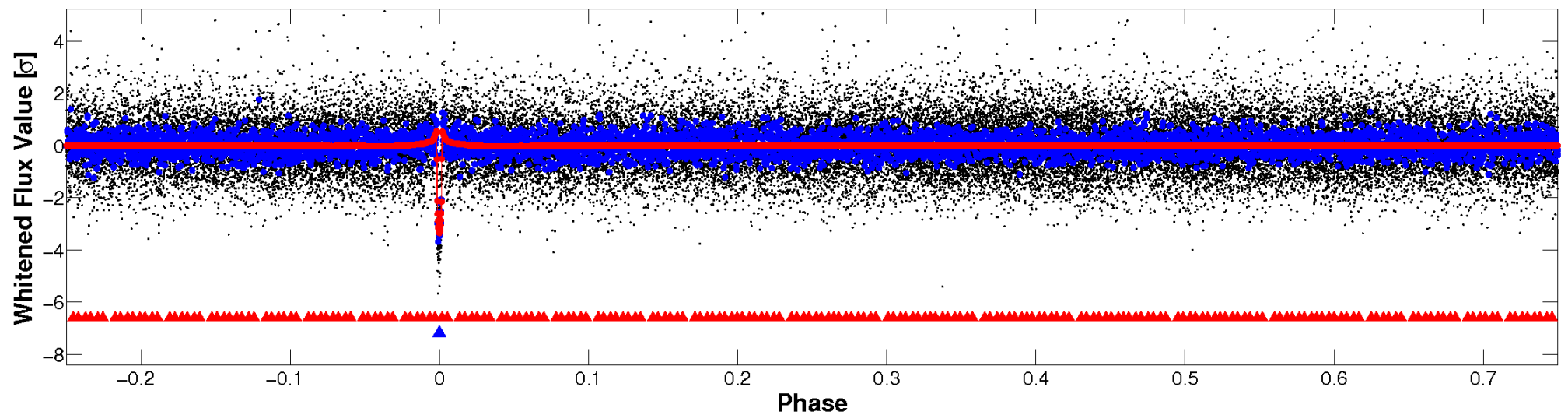


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

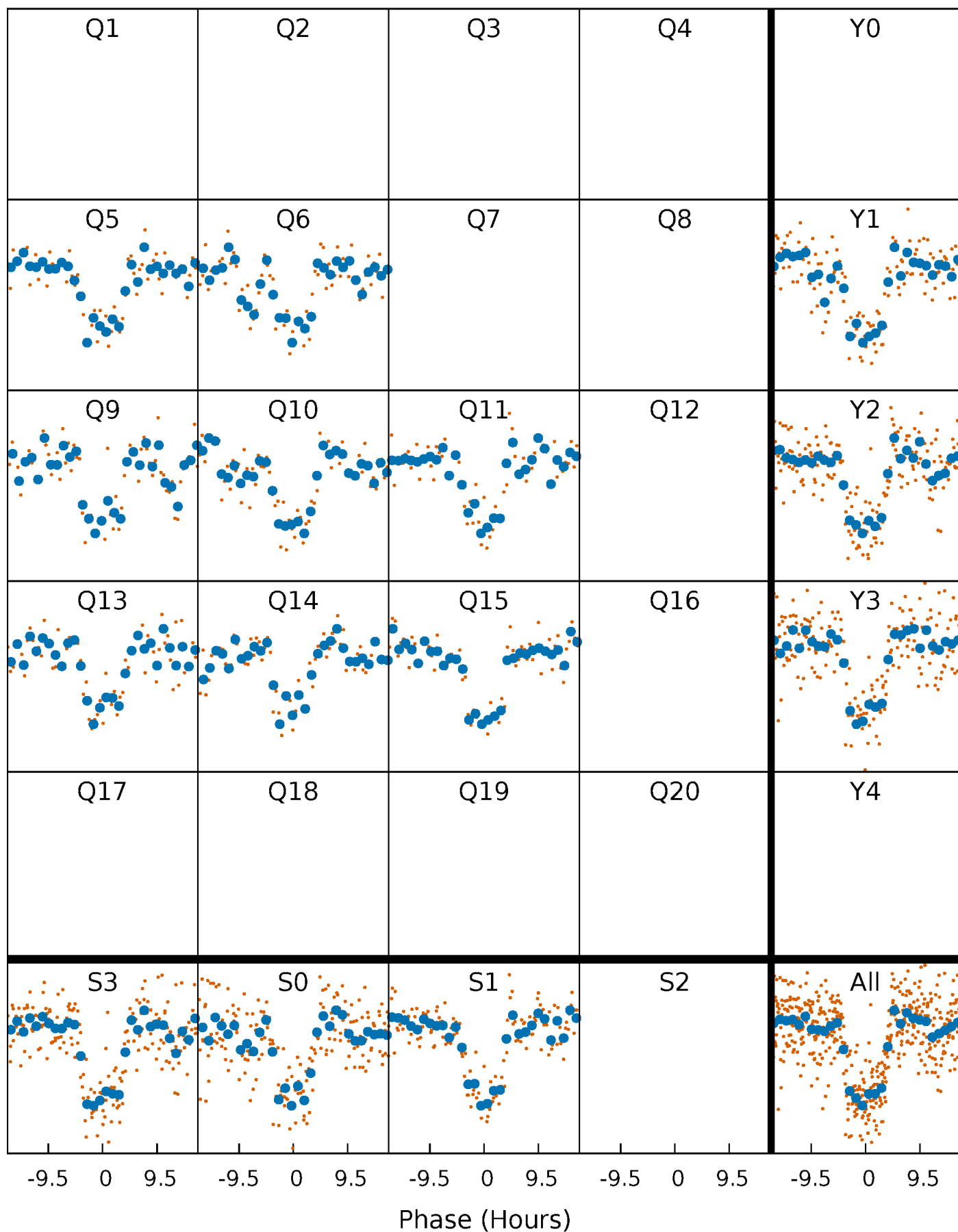


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

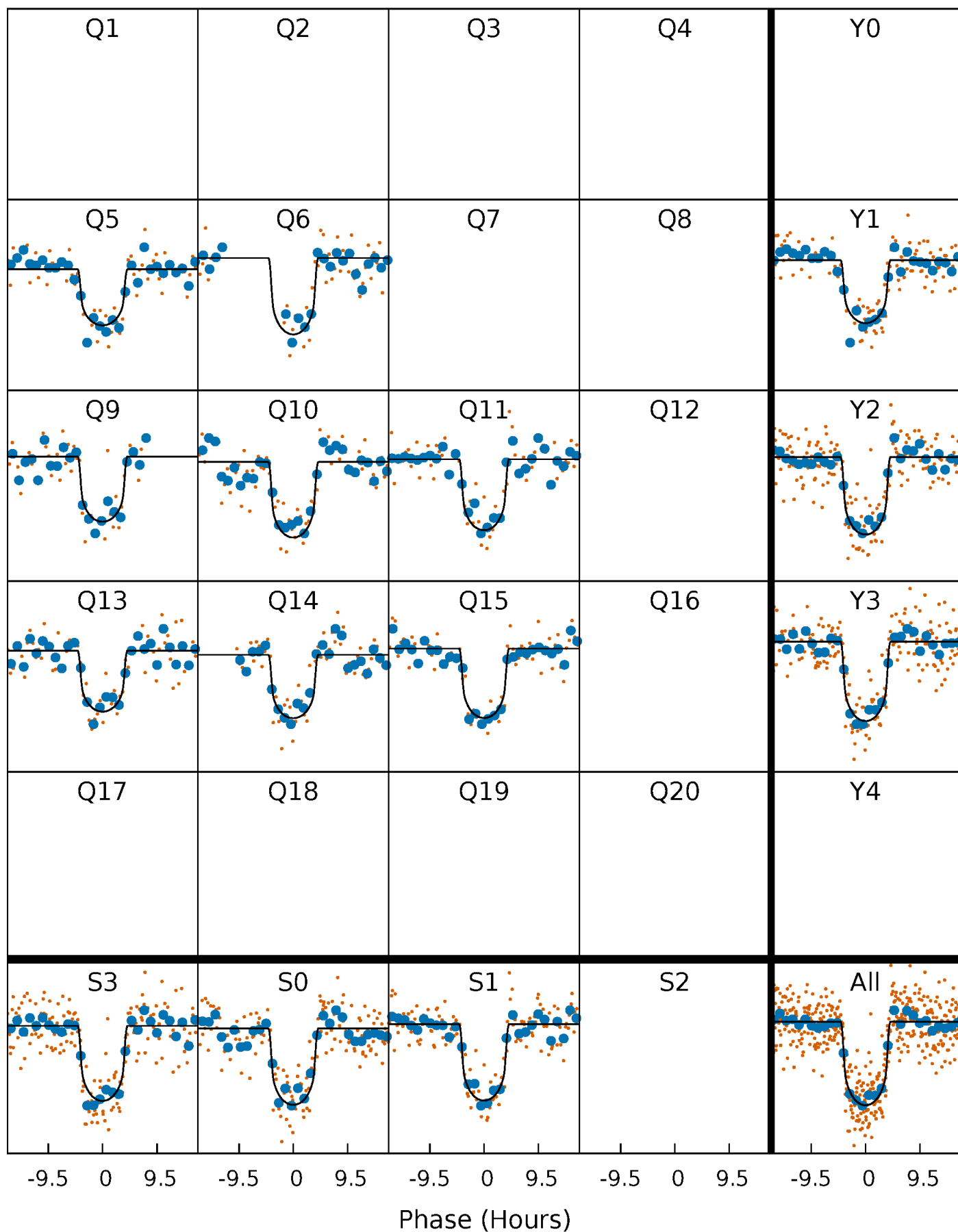
TCE 011337372-02     $P=100.827878$  Days     $T_0=216.385700$  (BKJD)





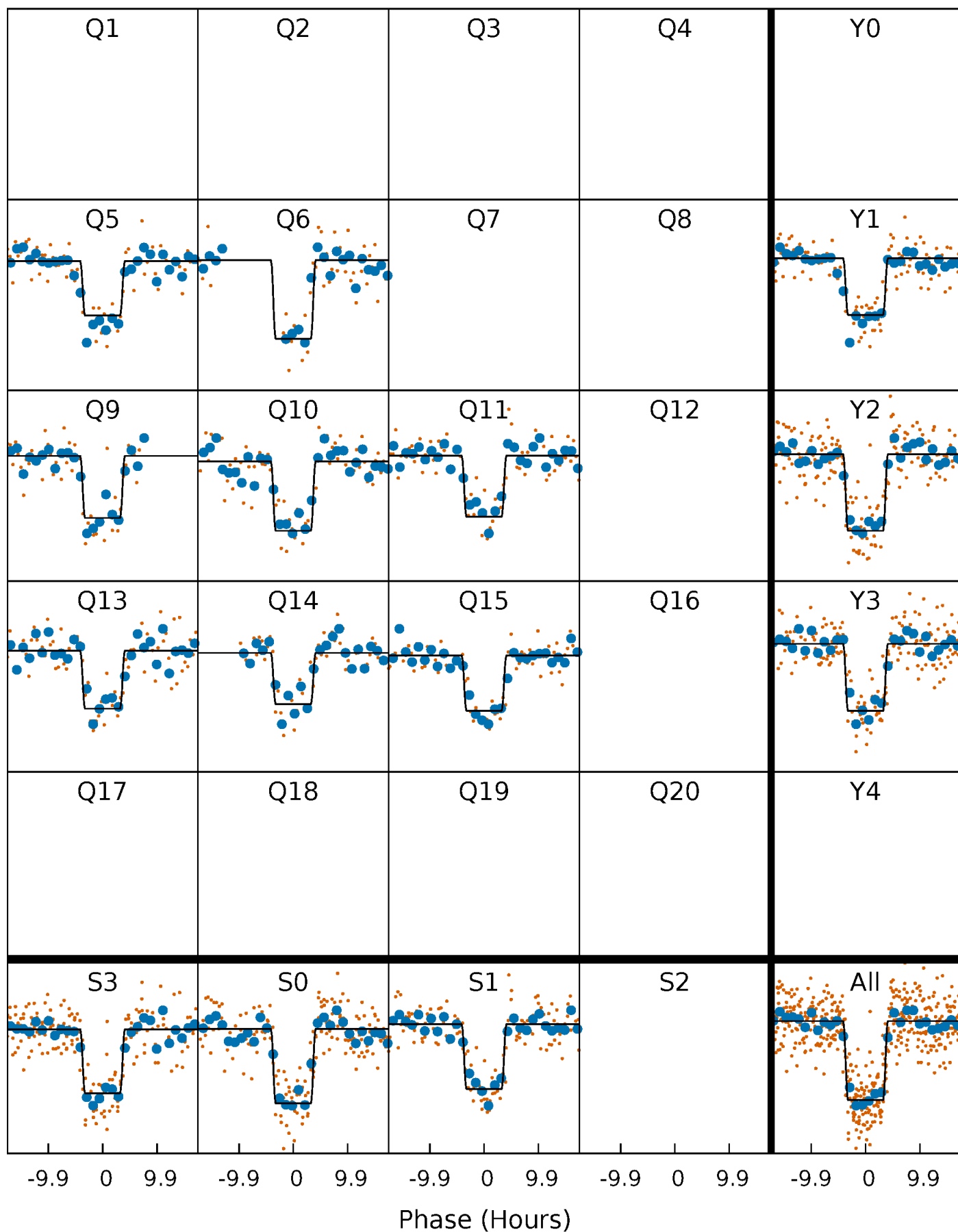
# DV Quarter-Phased Transit Curves

TCE 011337372-02     $P=100.827878$  Days     $T_0=216.385700$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

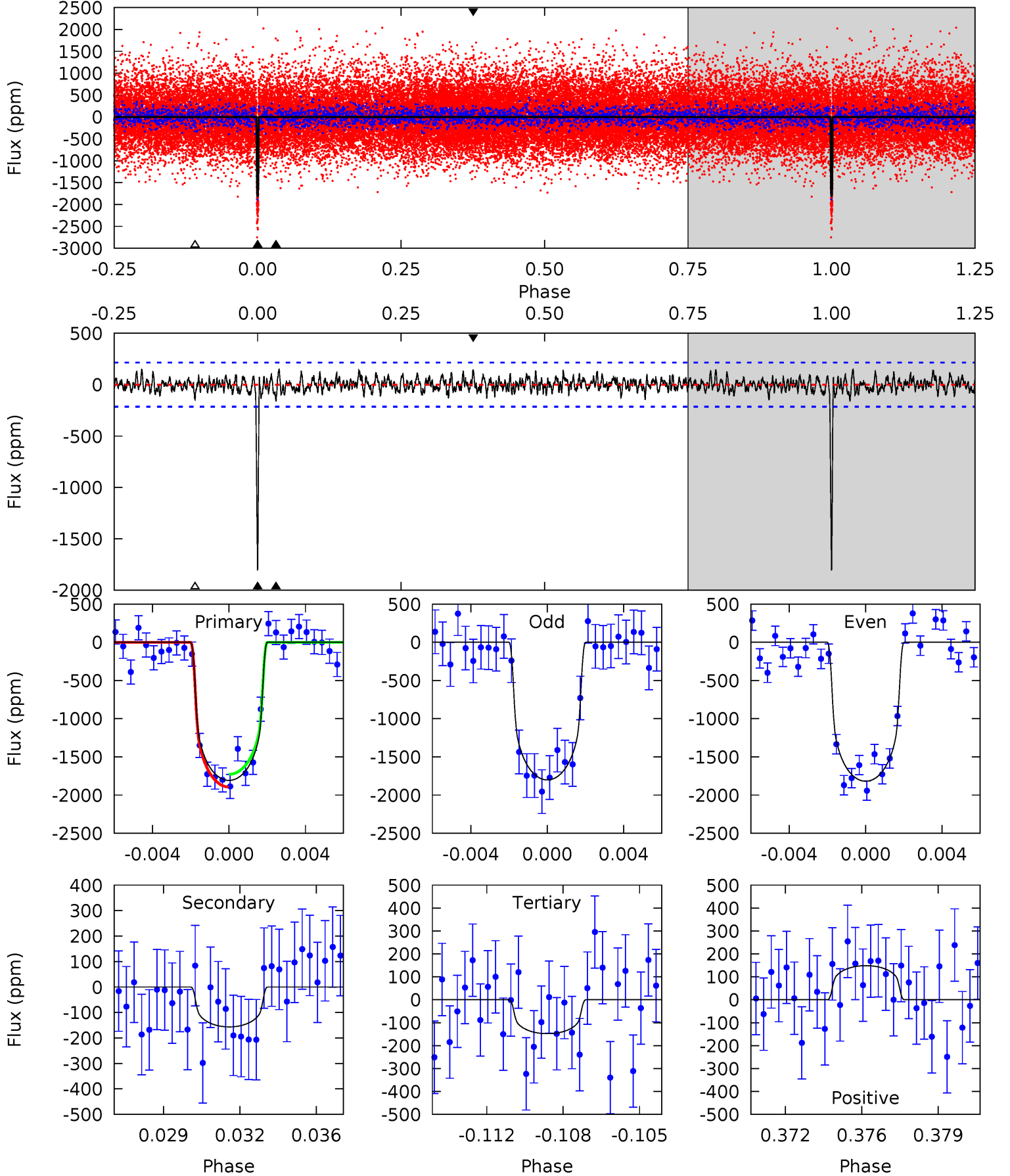
TCE 011337372-02 P=100.825138 Days  $T_0=216.404779$  (BKJD)



# DV Model-Shift Uniqueness Test

011337372-02,  $P = 100.827878$  Days,  $E = 216.385700$  Days

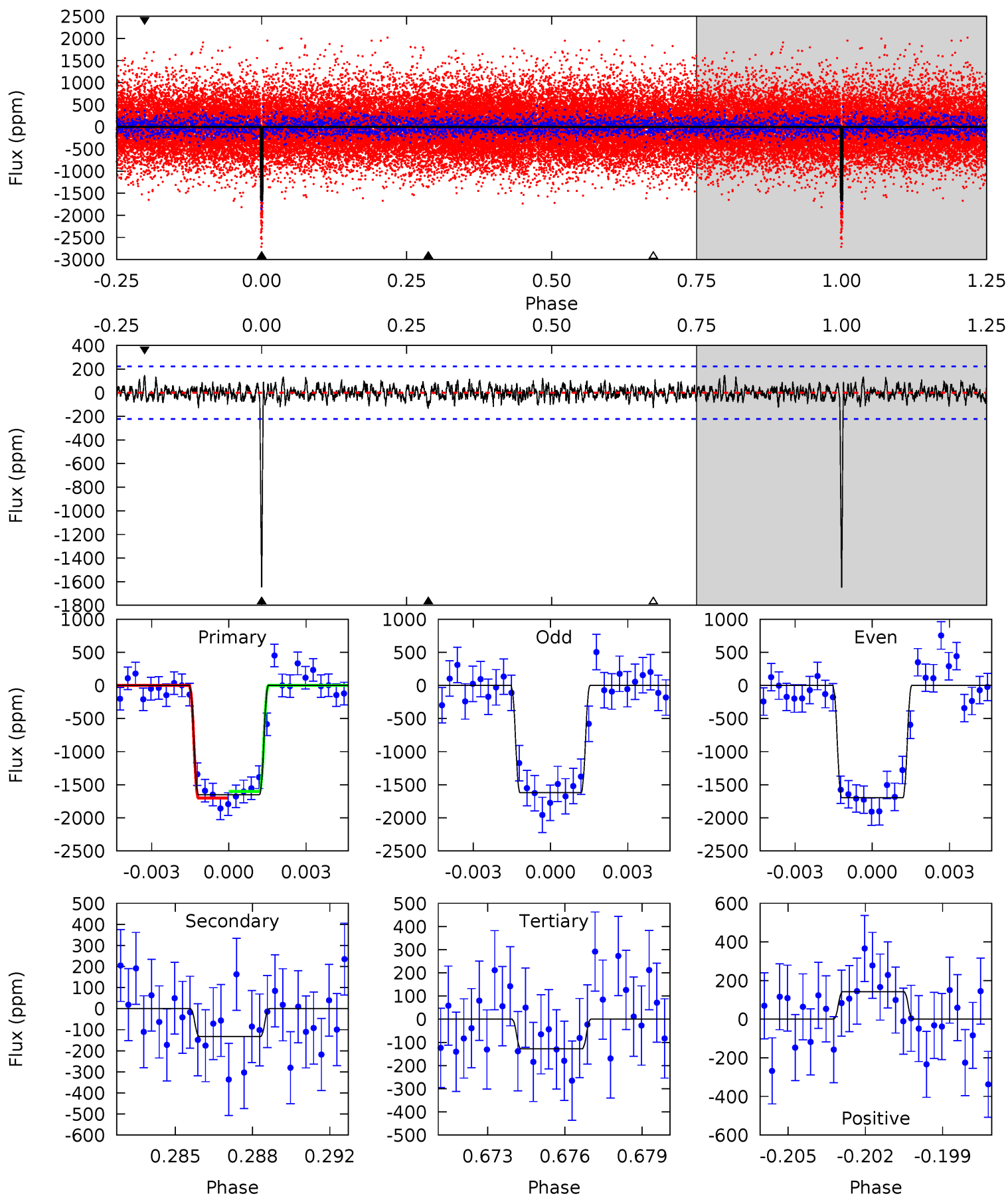
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
44.1	3.82	3.61	3.63	5.22	2.91	1.21	40.5	40.5	0.21	0.19	0.20	1.02	0.08	2.03



# Alt Model-Shift Uniqueness Test

011337372-02, P = 100.825138 Days, E = 216.404779 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
38.8	3.11	3.01	3.36	5.23	2.94	0.98	35.8	35.4	0.09	-0.25	0.86	1.03	0.08	1.17



### Stellar Parameters For KIC 011337372

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5301^{+85}_{-74}$	$4.391^{+0.130}_{-0.070}$	$0.160^{+0.150}_{-0.150}$	$0.977^{+0.096}_{-0.128}$	$0.856^{+0.066}_{-0.033}$	$1.293^{+0.702}_{-0.269}$
	+2%/-1%	+3%/-2%	+94%/-94%	+10%/-13%	+8%/-4%	+54%/-21%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 011337372-02 / KOI 1650.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-157 \pm 41$	$4.31^{+0.72}_{-0.70}$	$506^{+18}_{-20}$	$3422^{+213}_{-212}$	$760^{+399}_{-270}$
Alt.	$-132 \pm 43$	$4.33^{+0.72}_{-0.68}$	$506^{+16}_{-19}$	$3317^{+243}_{-212}$	$620^{+365}_{-223}$

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

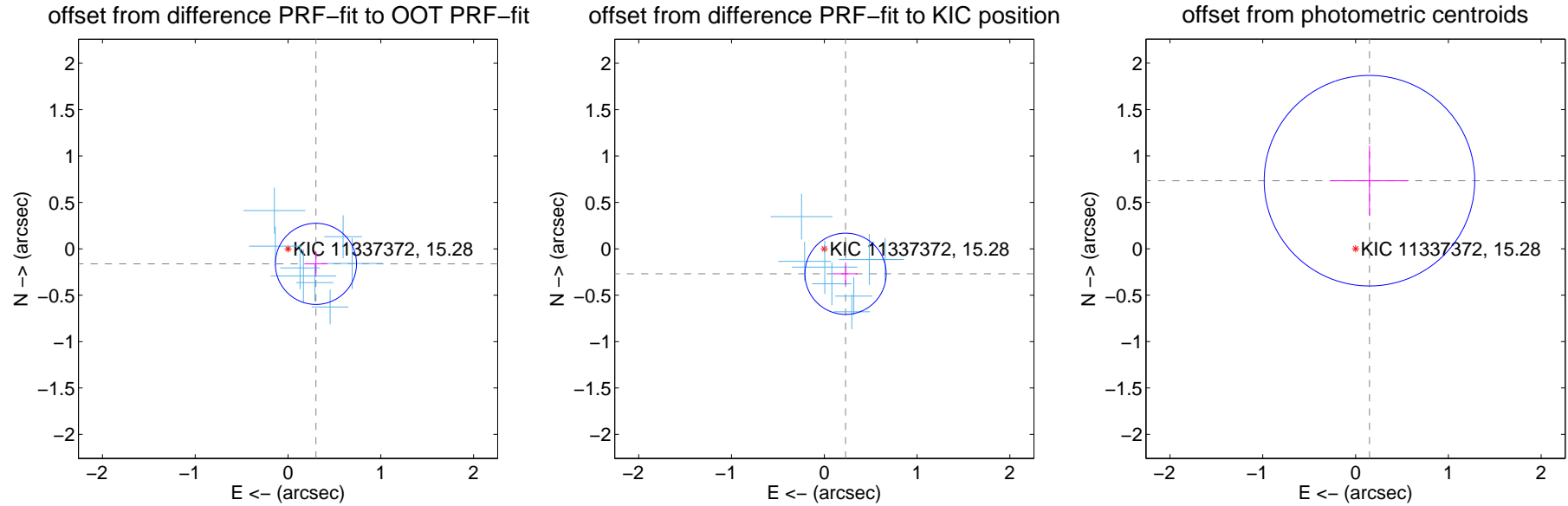
## DV Centroid Data

Supplemental centroid analysis for 011337372-02. Kepler magnitude: 15.28. Transit SNR 31.54

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.342 \pm 0.146$	2.34	$-0.301 \pm 0.124$	$-0.162 \pm 0.137$
PRF-fit source offset from KIC position	$0.354 \pm 0.146$	2.42	$-0.229 \pm 0.130$	$-0.269 \pm 0.121$
photometric centroid source offset	$0.75 \pm 0.38$	1.98	$-0.15 \pm 0.42$	$0.73 \pm 0.38$



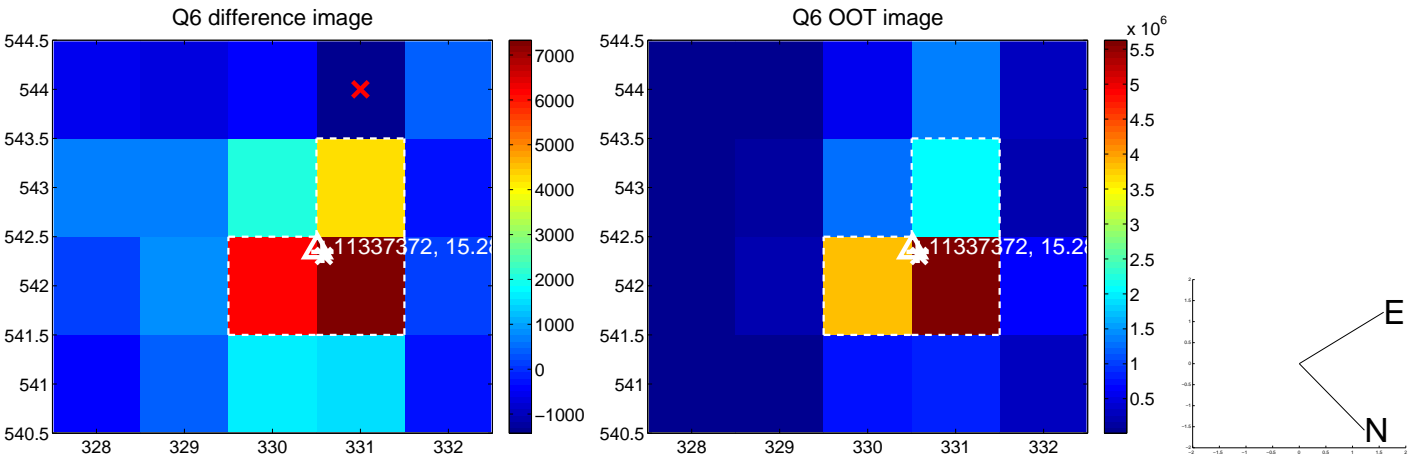
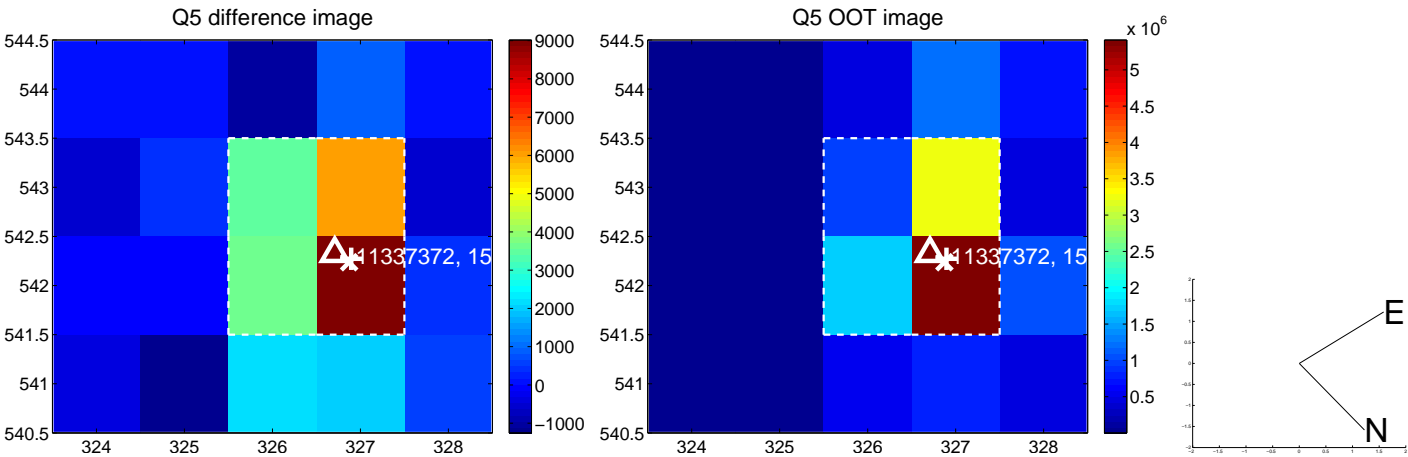
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

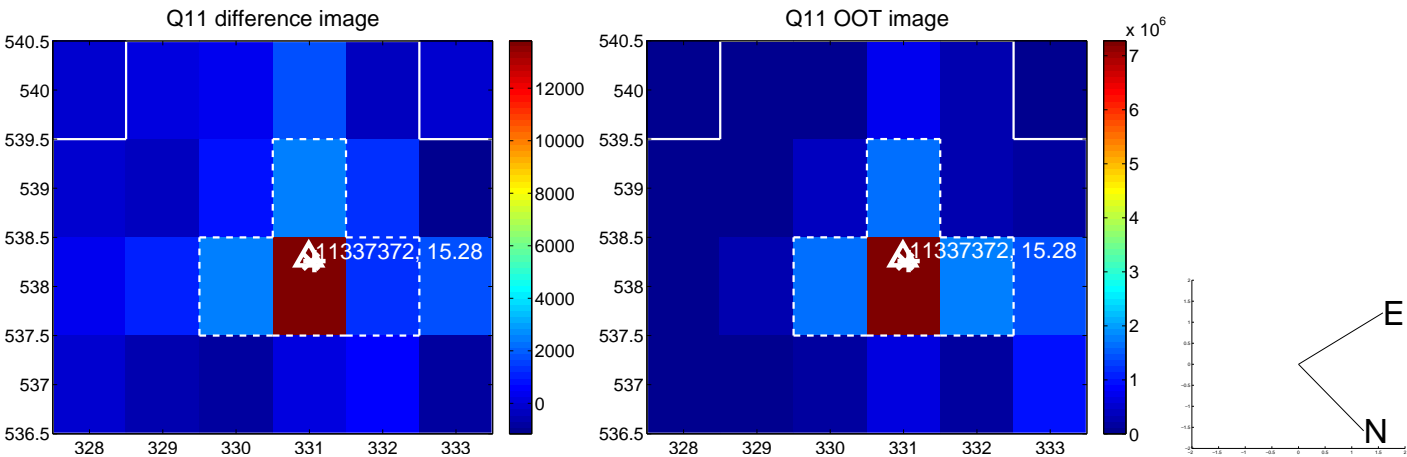
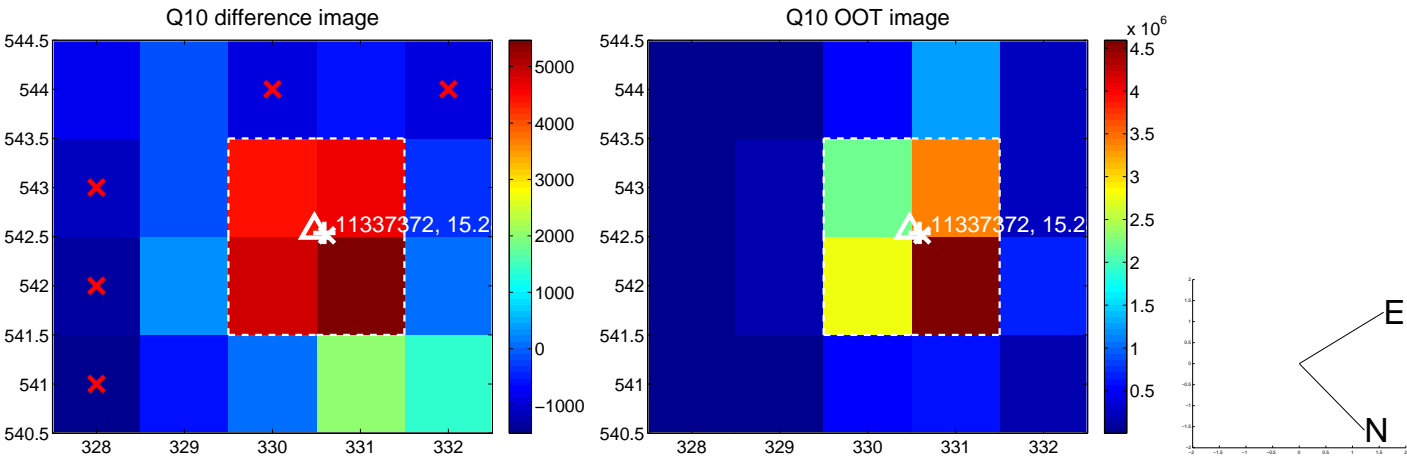
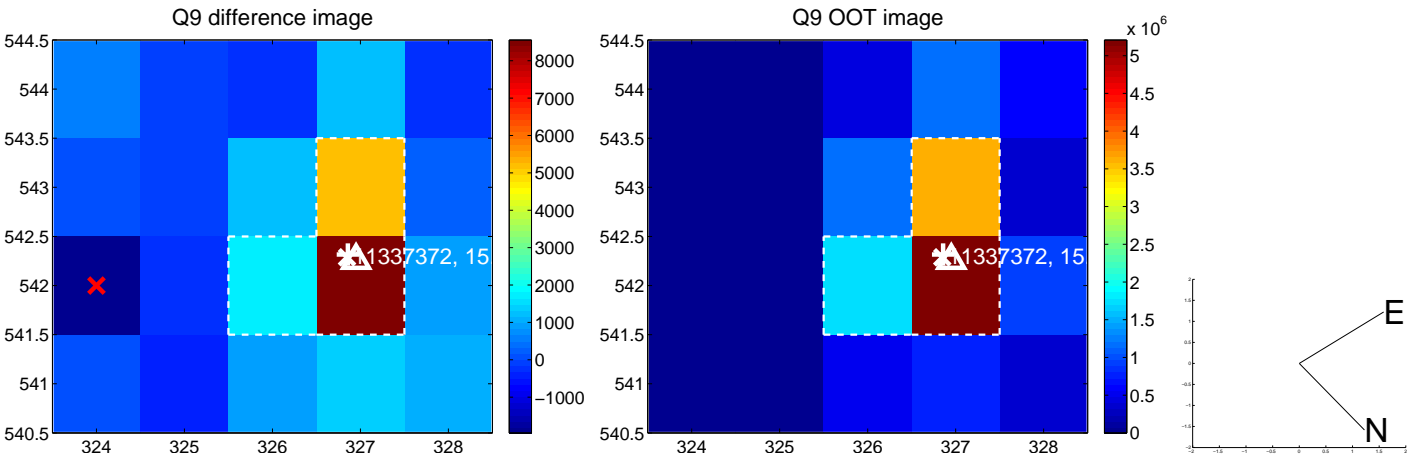




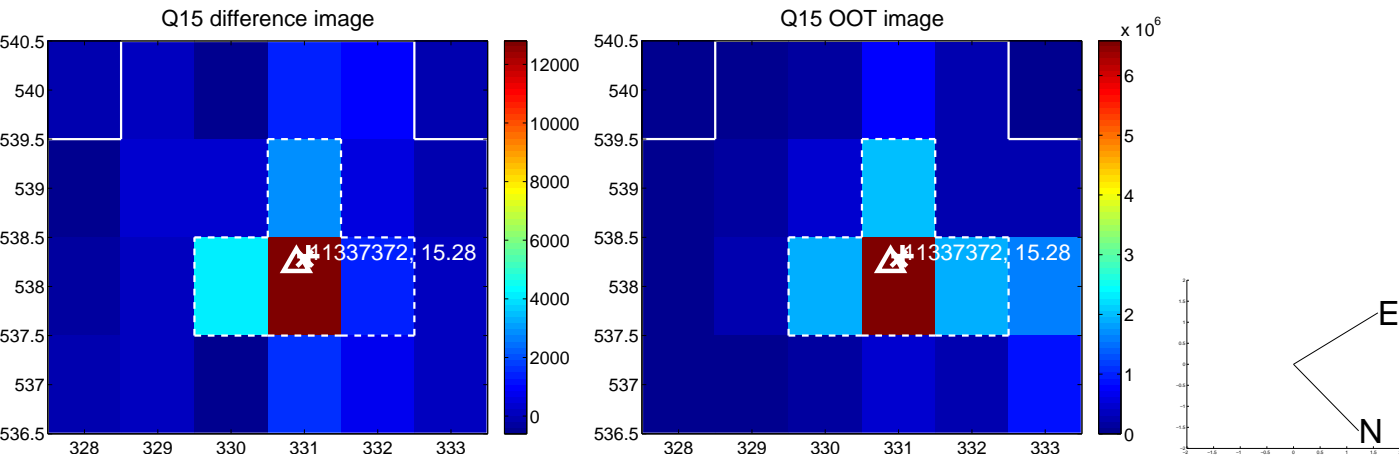
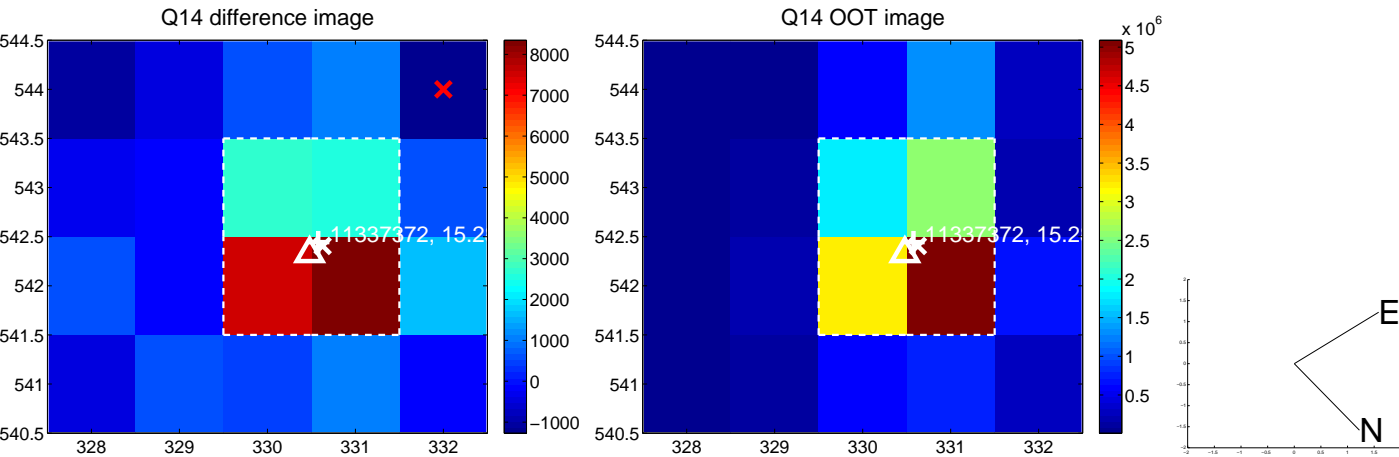
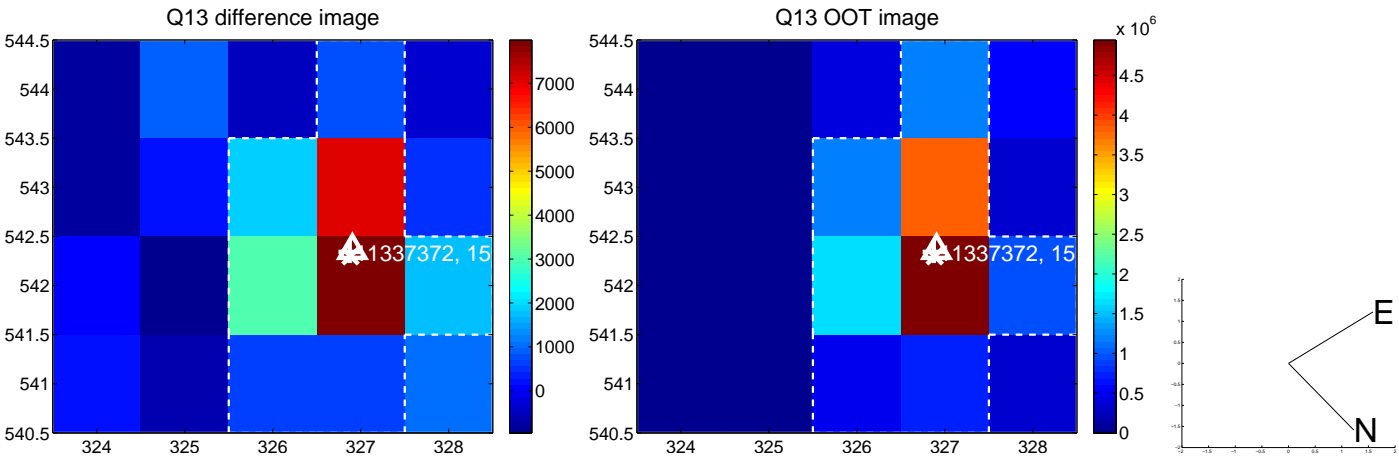
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



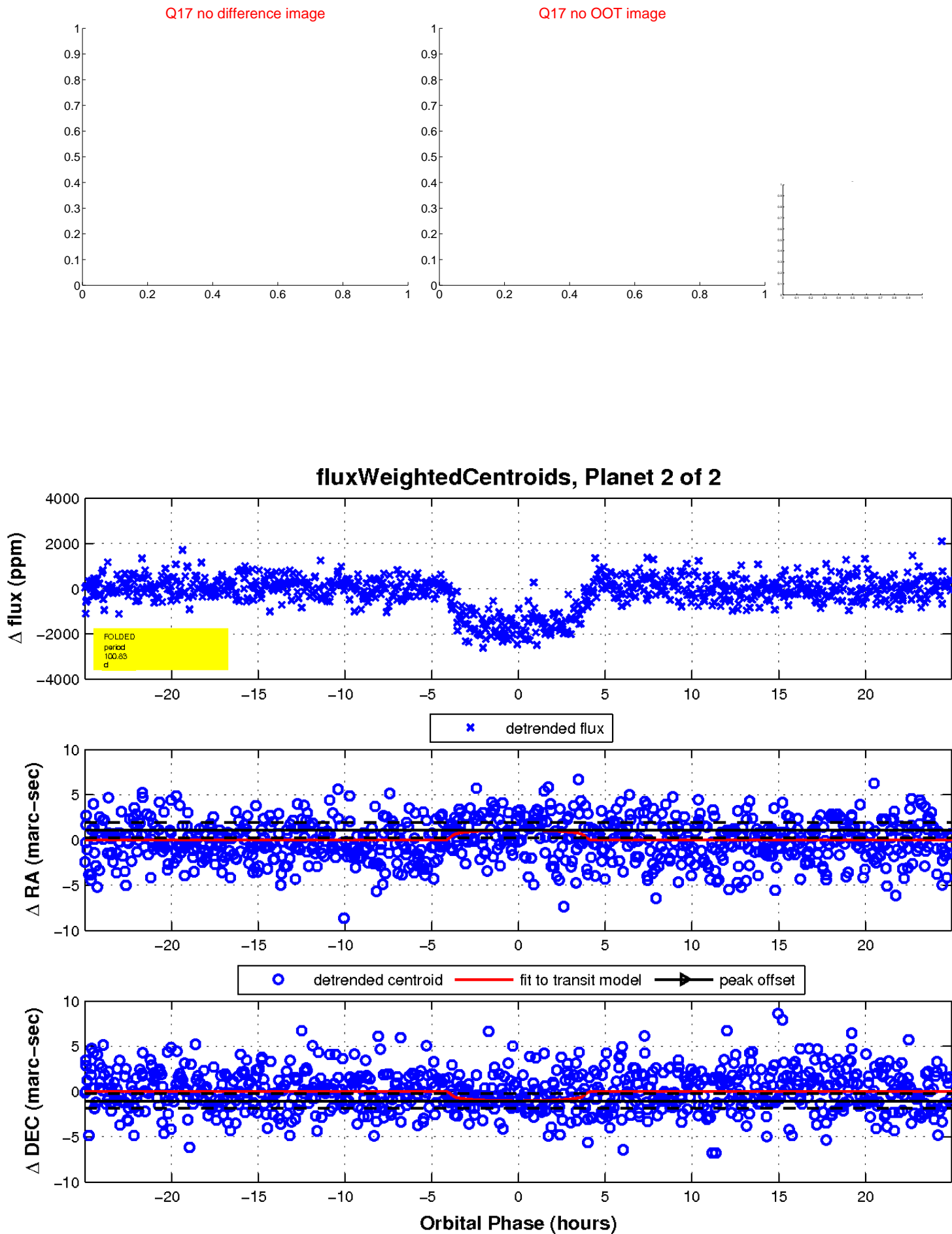
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

