

# KIC 004828345

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004828345-01	OBS	No	360.897256	162.984255	2413.5	4.854	25.2	27.5	4.53	11617	38.79	148.51
004828345-02	OBS	No	0.504648	131.532385	0.5	1.125	8.1	0.3	4.53	11617	0.34	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004828345-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004828345-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

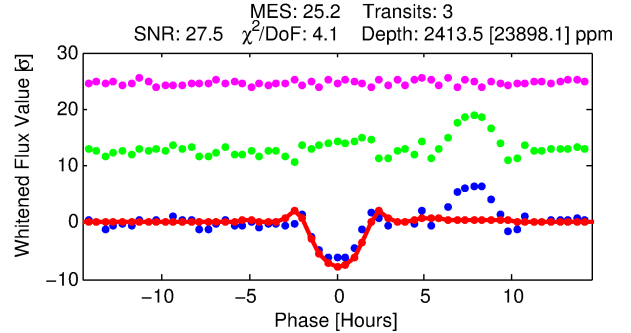
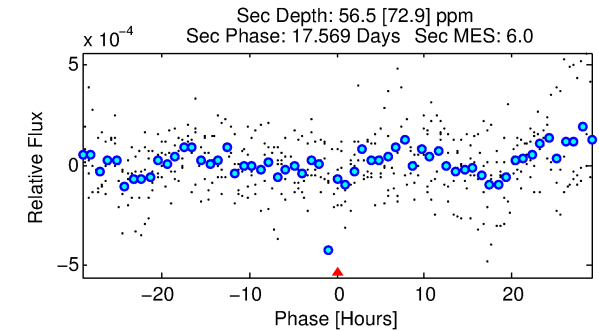
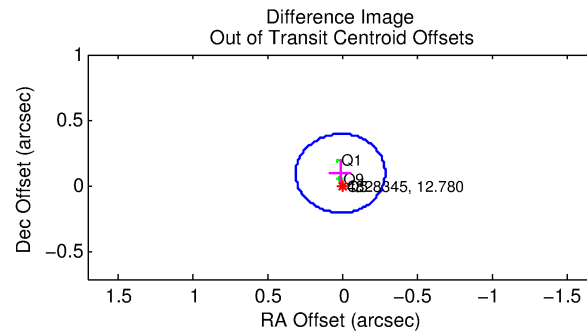
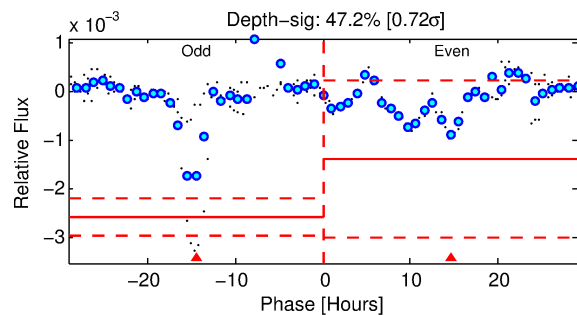
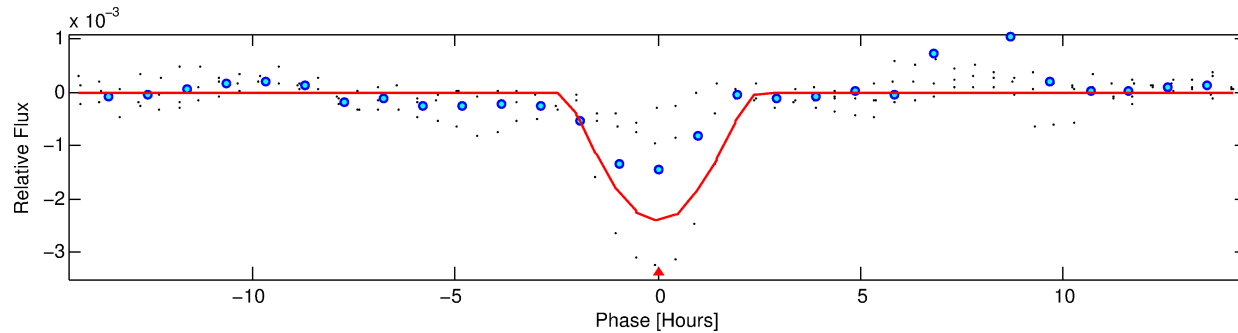
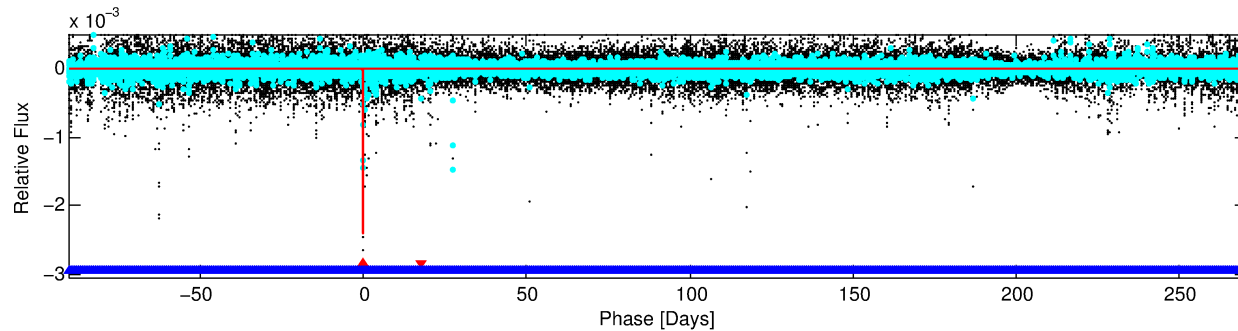
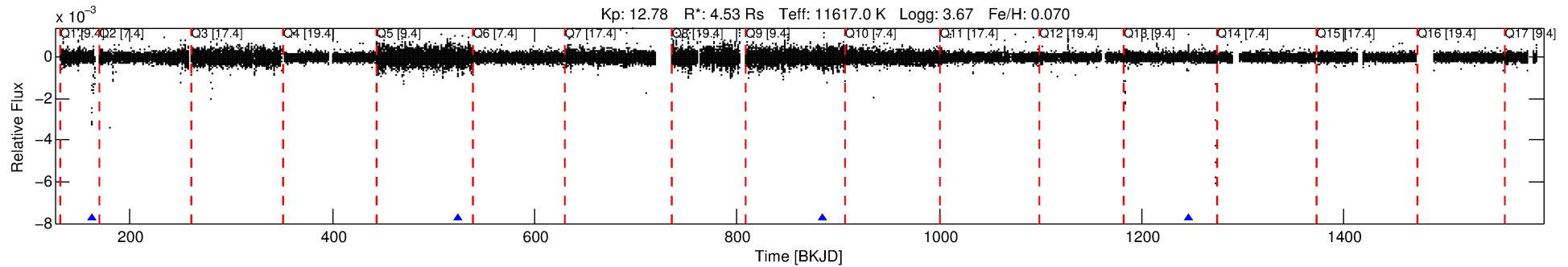
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004828345-01

No Significant Match Found

# DV One-Page Summary

KIC: 4828345 Candidate: 1 of 2 Period: 360.897 d



## DV Fit Results:

Period = 360.89726 [0.00494] d  
Epoch = 162.9843 [0.0055] BKJD  
Rp/R\* = 0.0784 [0.1186]  
a/R\* = 229.29 [82.23]  
b = 1.00 [0.38]  
Seff = 148.51 [149.64]  
Teq = 890 [224] K  
Rp = 38.79 [62.87] Re  
a = 1.5029 [0.8623] AU  
Ag = 46.69 [159.64] [0.29σ]  
Teff = 3597 [2979] K [0.91σ]

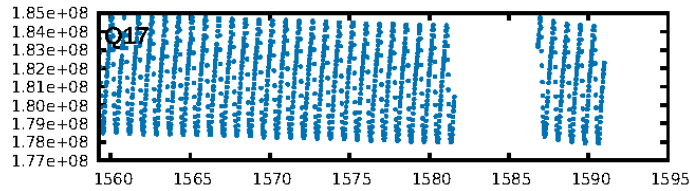
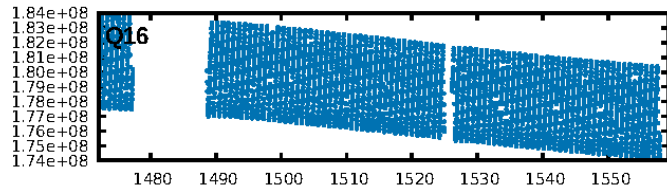
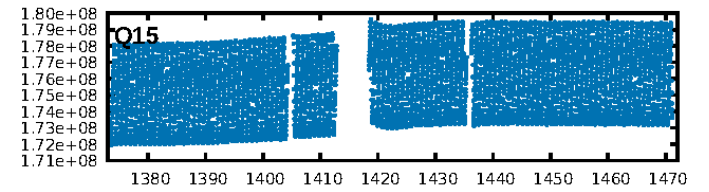
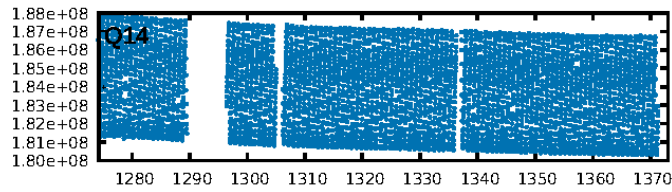
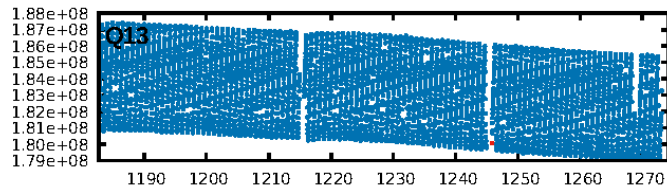
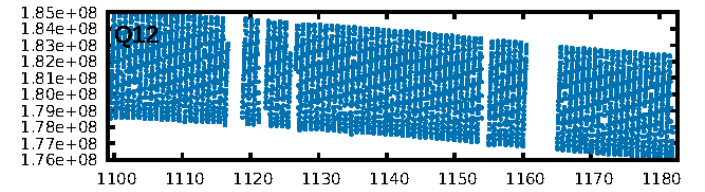
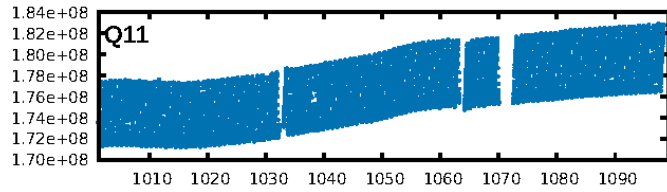
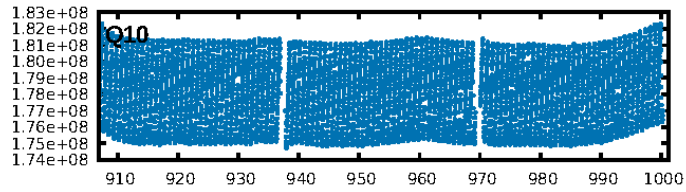
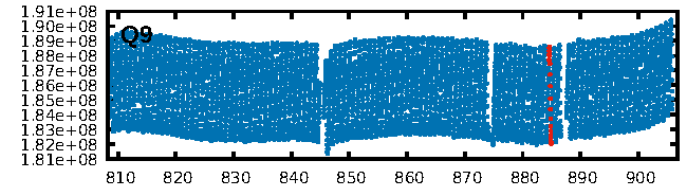
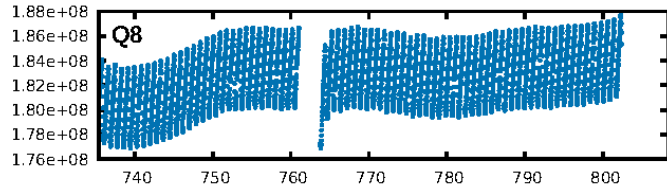
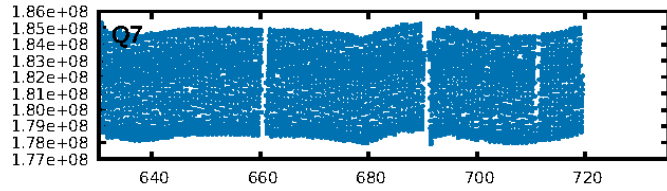
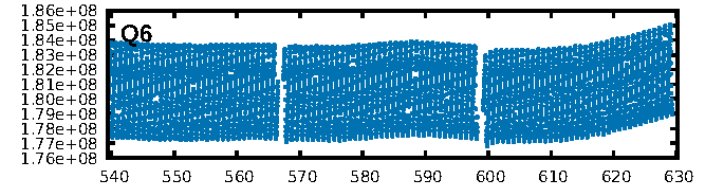
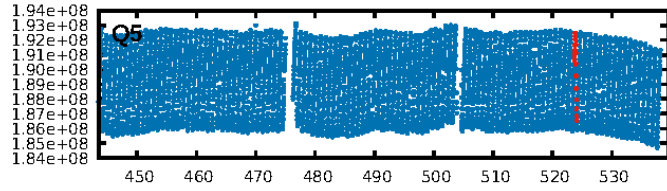
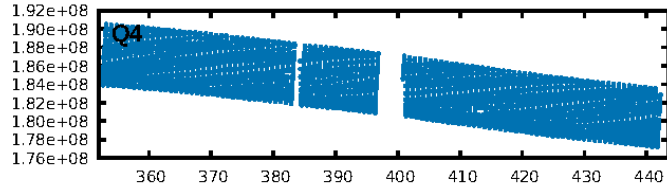
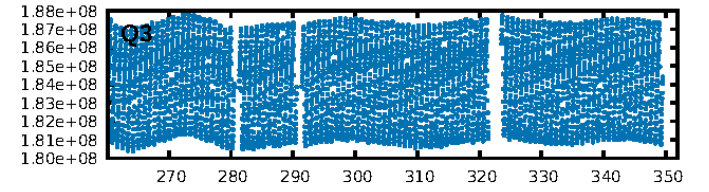
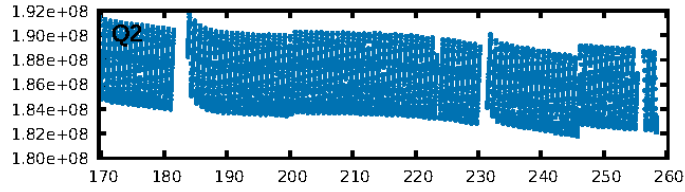
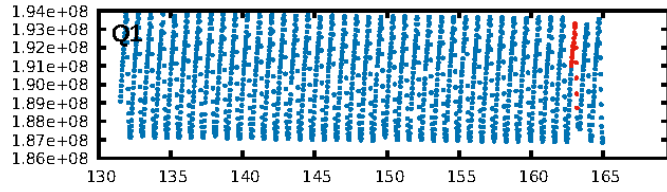
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1735.86σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGoF-sig: 0.0%  
Bootstrap-pfa: 4.09e-43  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 1.462  
Centroid-sig: 25.8%  
Centroid-so: 0.246 arcsec [1.33σ]  
OotOffset-rm: 0.100 arcsec [1.00σ]  
KicOffset-rm: 0.170 arcsec [1.92σ]  
OotOffset-st: 0/0/0/3 [3]  
KicOffset-st: 0/0/0/3 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 0.00 [0/3]

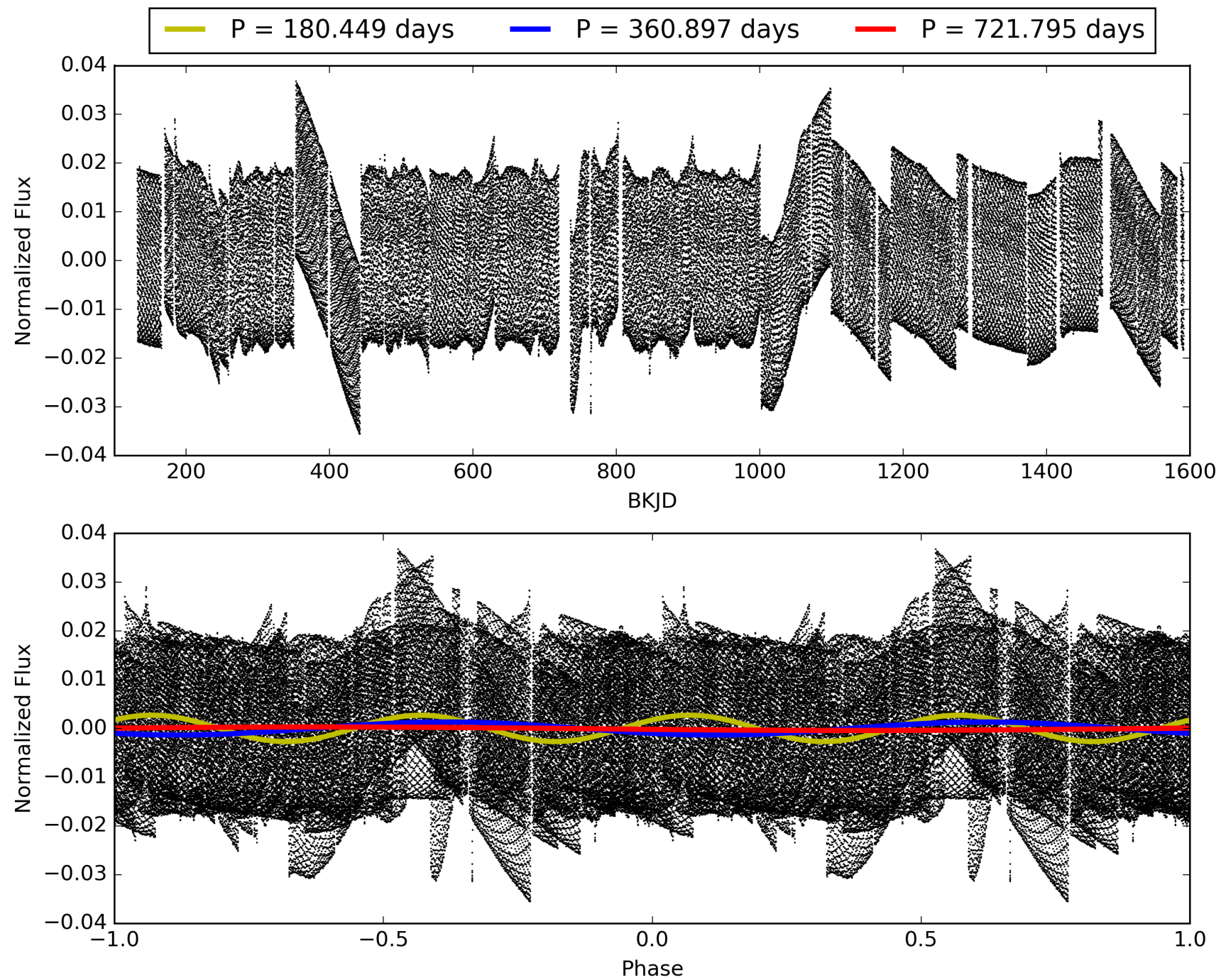
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004828345-01, PDC Light Curves

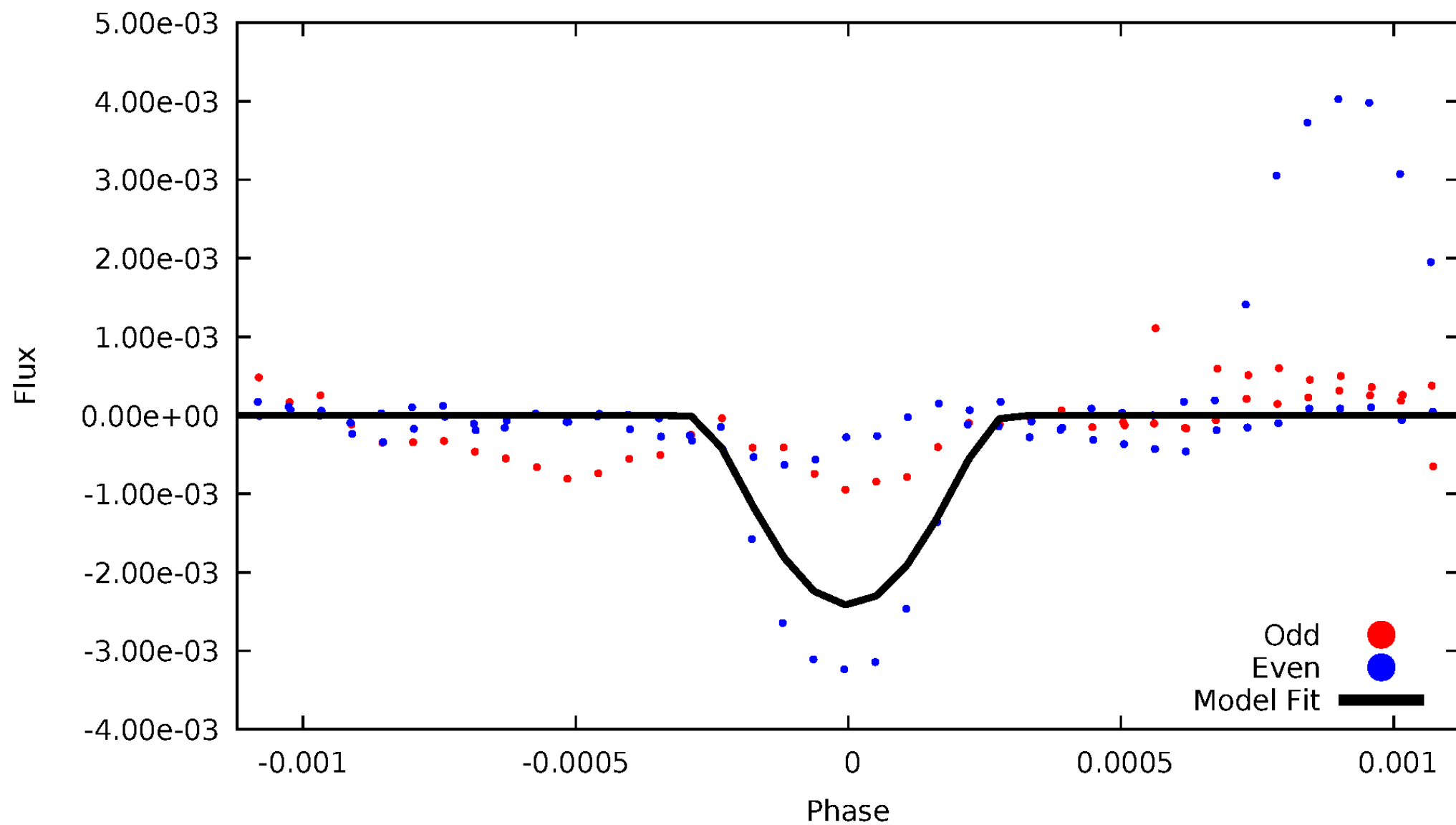


TCE 004828345-01



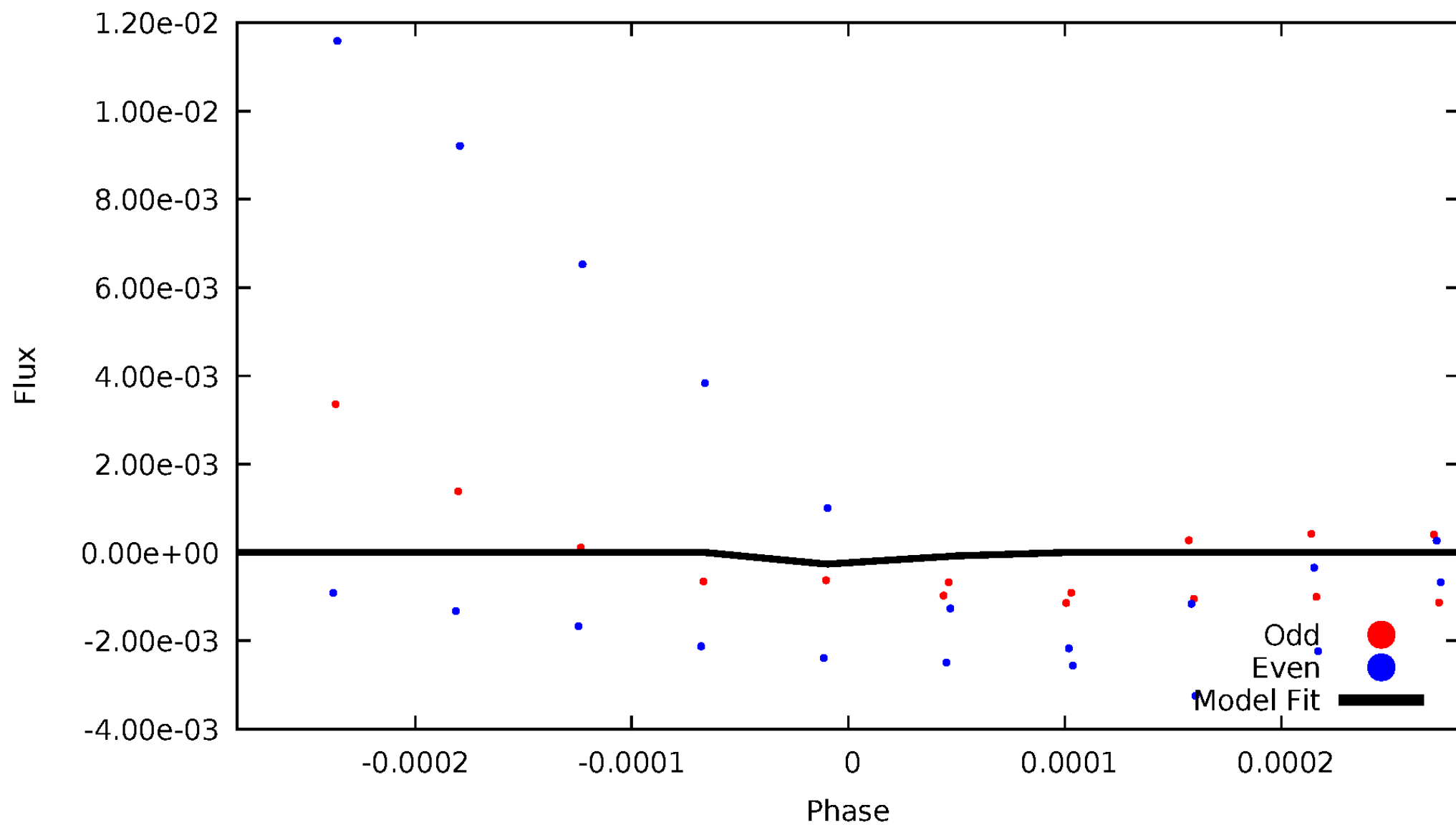
# DV Odd/Even

TCE 004828345-01



# ALT Odd/Even

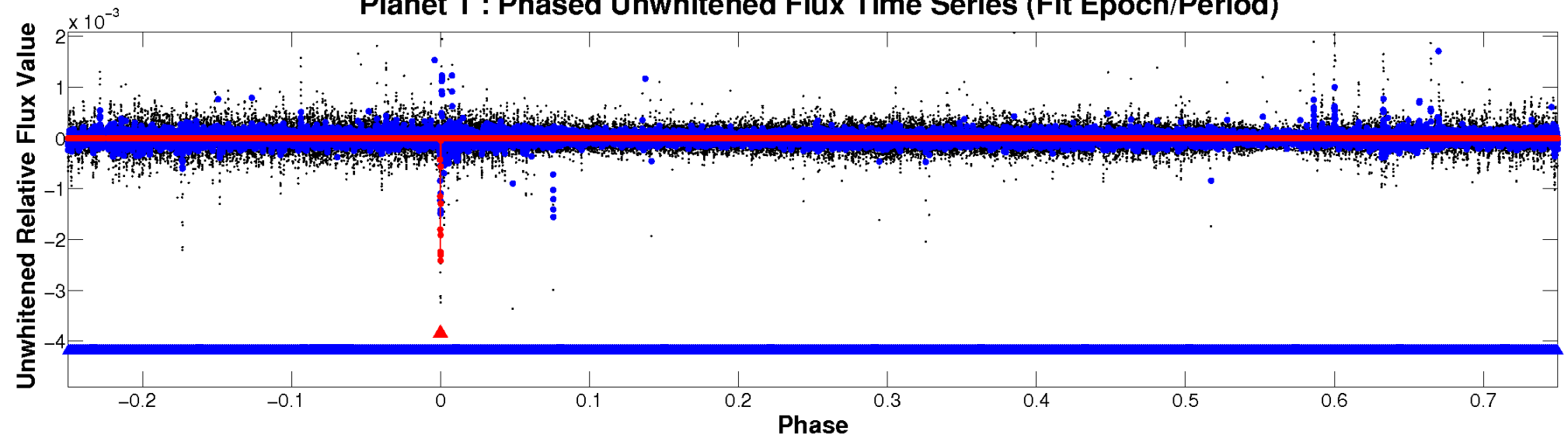
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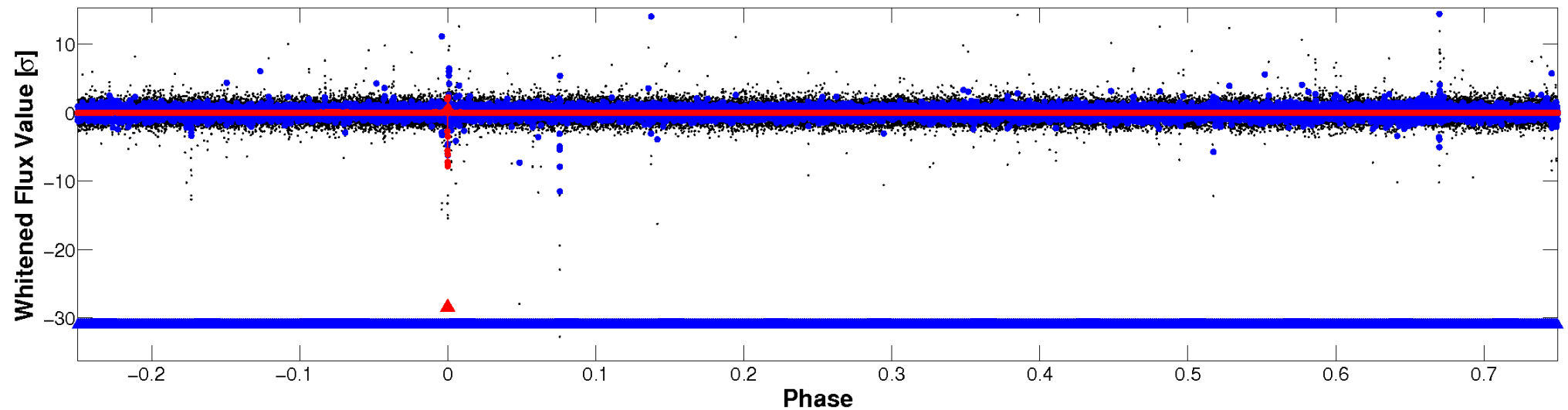


# Non-Whitened Vs. Whitened Light Curve

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

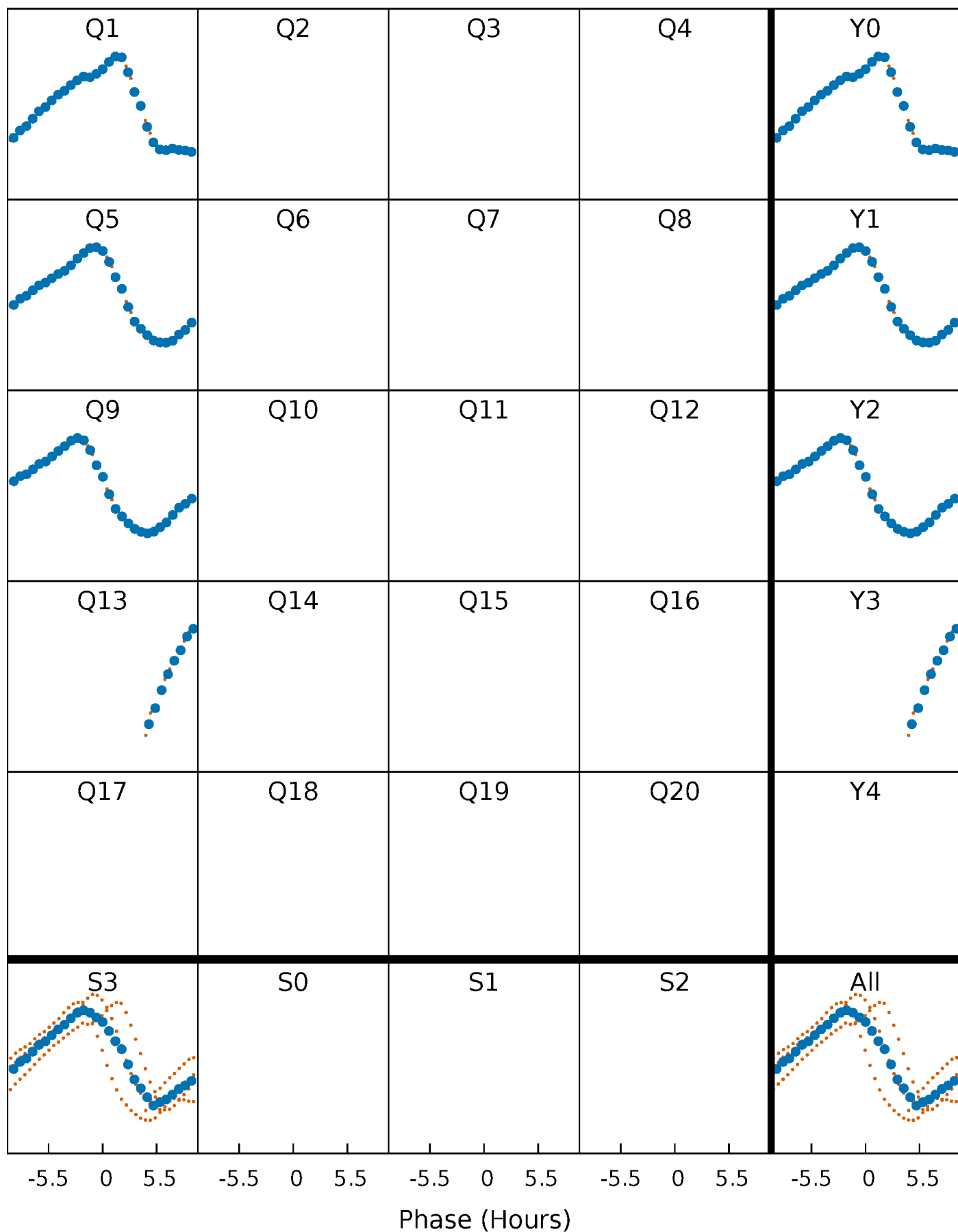


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

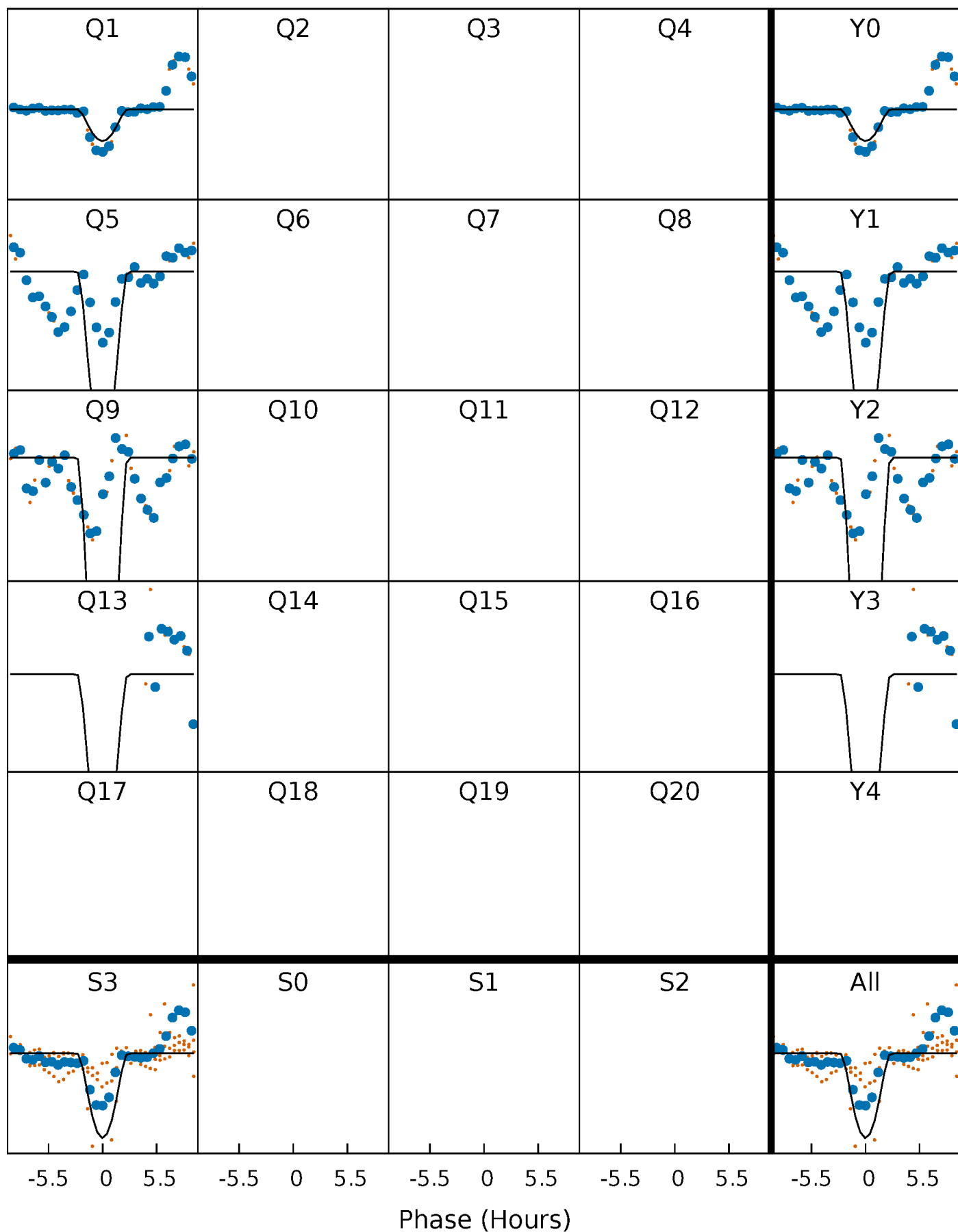
TCE 004828345-01 P=360.897256 Days  $T_0=162.984255$  (BKJD)





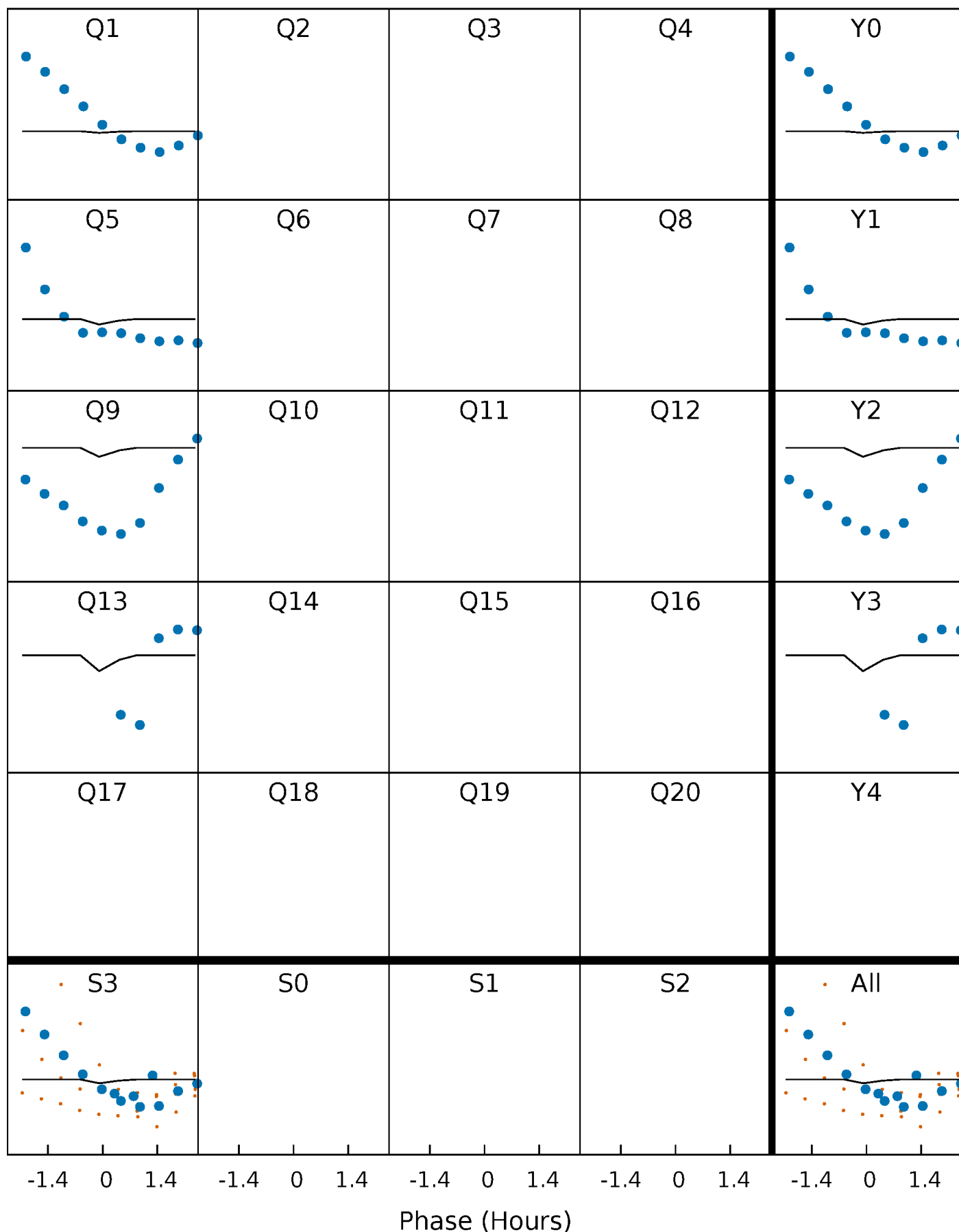
# DV Quarter-Phased Transit Curves

TCE 004828345-01     $P=360.897256$  Days     $T_0=162.984255$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

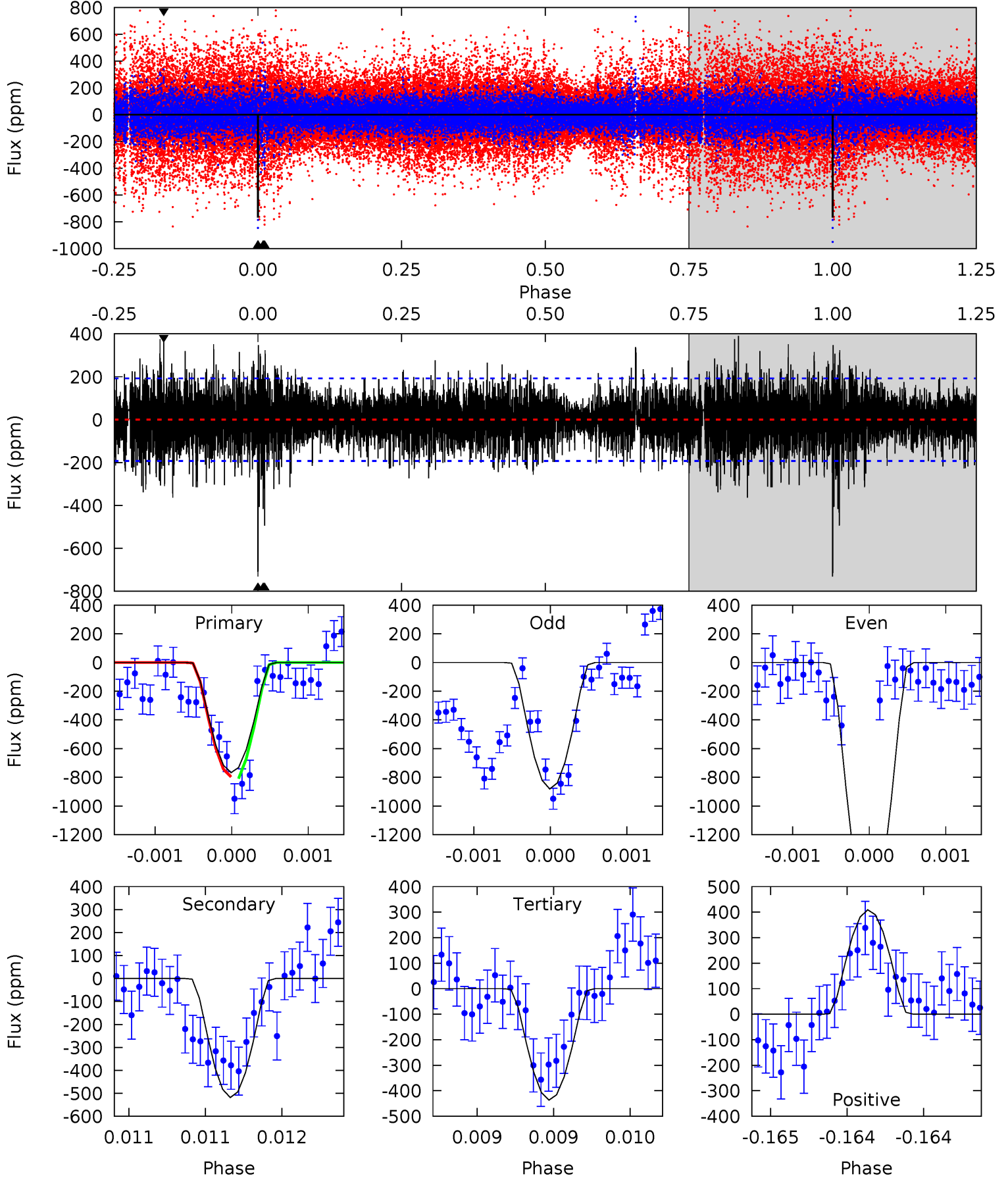
TCE 004828345-01 P=360.898186 Days  $T_0=163.168972$  (BKJD)



# DV Model-Shift Uniqueness Test

004828345-01, P = 360.897256 Days, E = 162.984255 Days

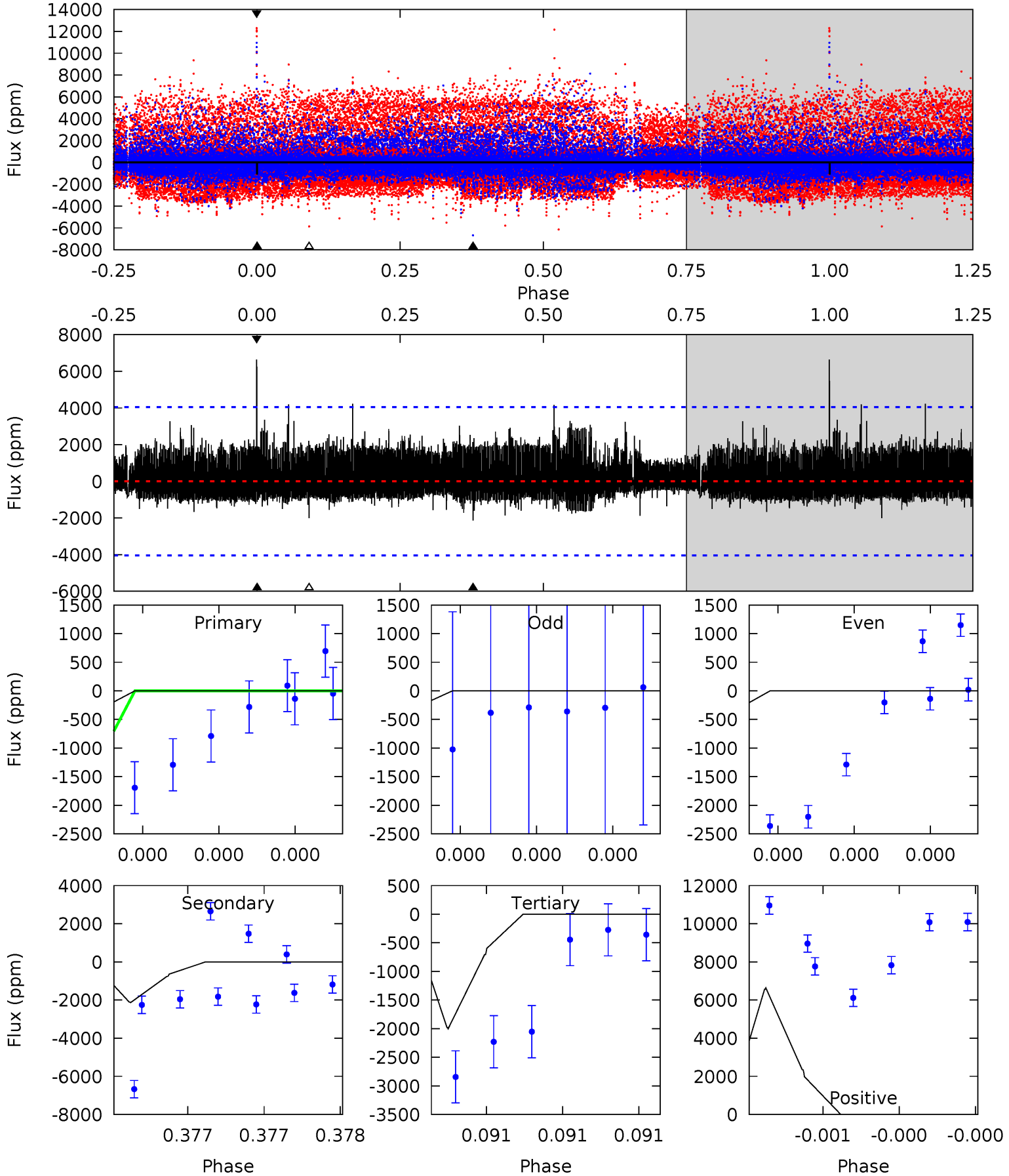
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.1	14.2	12.0	11.2	5.55	3.45	2.42	9.10	9.85	2.24	2.99	13.0	1.76	0.35	0



# Alt Model-Shift Uniqueness Test

004828345-01, P = 360.898186 Days, E = 163.168972 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
1.61	3.08	2.88	9.57	5.83	3.86	0.92	-1.28	-7.96	0.19	-6.49	0.15	1.35	0.76	0.54



### Stellar Parameters For KIC 004828345

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$11617^{+744}_{-1116}$	$3.666^{+0.552}_{-0.097}$	$0.070^{+0.150}_{-0.600}$	$4.534^{+0.464}_{-2.631}$	$3.472^{+0.058}_{-1.111}$	$0.052^{+0.395}_{-0.011}$
	+6%/-10%	+15%/-3%	+214%/-857%	+10%/-58%	+2%/-32%	+753%/-20%
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 004828345-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-493 \pm 35$	$50.40^{+50.61}_{-33.76}$	$1191^{+142}_{-178}$	$4582^{+3260}_{-1007}$	$225^{+1852}_{-166}$
Alt.	$-2134 \pm 694$	$38.83^{+44.01}_{-26.46}$	$1200^{+123}_{-186}$	$6988^{+8663}_{-1934}$	$1638^{+13531}_{-1296}$

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

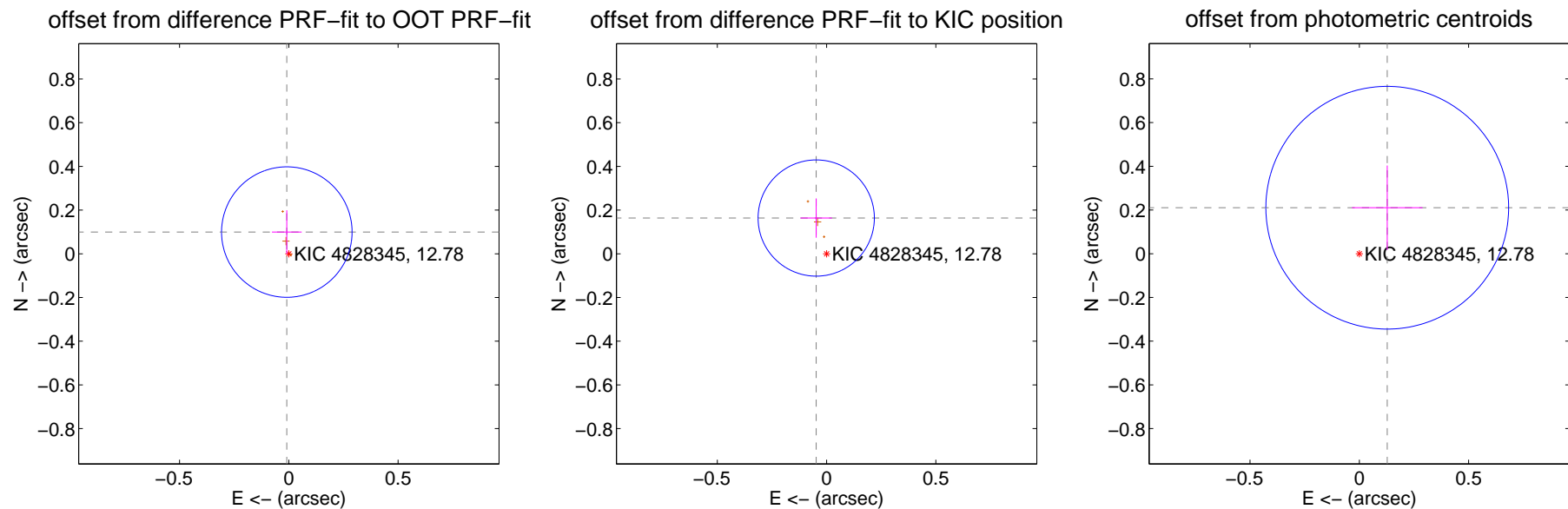
## DV Centroid Data

Supplemental centroid analysis for 004828345-01. Kepler magnitude: 12.78. Transit SNR 27.51

There are 0 quarters with good PRF difference image offsets

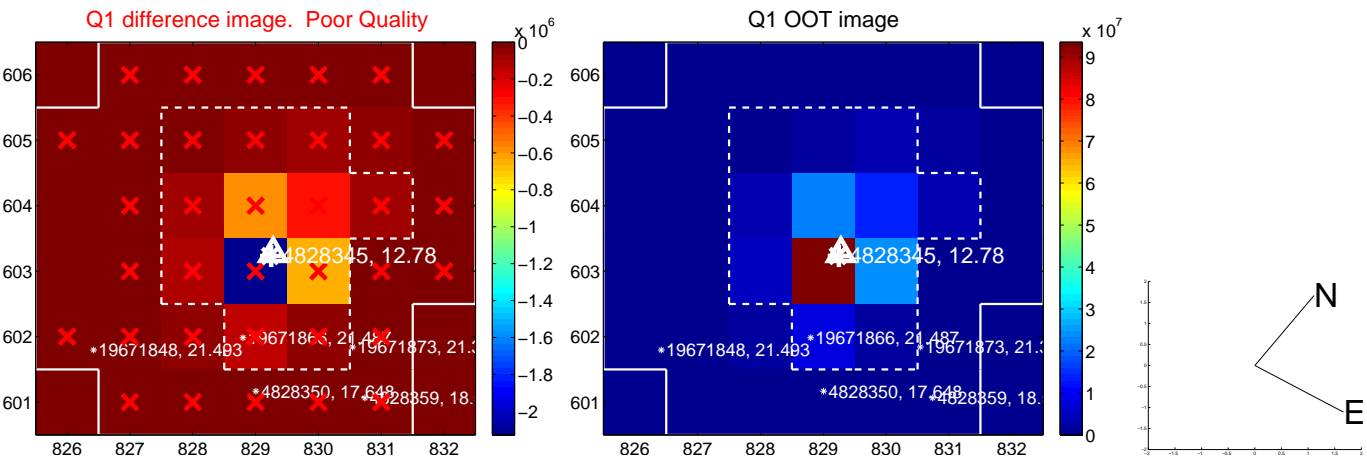
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.100 \pm 0.100$	1.00	$0.009 \pm 0.068$	$0.099 \pm 0.100$
PRF-fit source offset from KIC position	$0.170 \pm 0.089$	1.92	$0.047 \pm 0.072$	$0.164 \pm 0.090$
photometric centroid source offset	$0.25 \pm 0.19$	1.33	$-0.13 \pm 0.16$	$0.21 \pm 0.19$



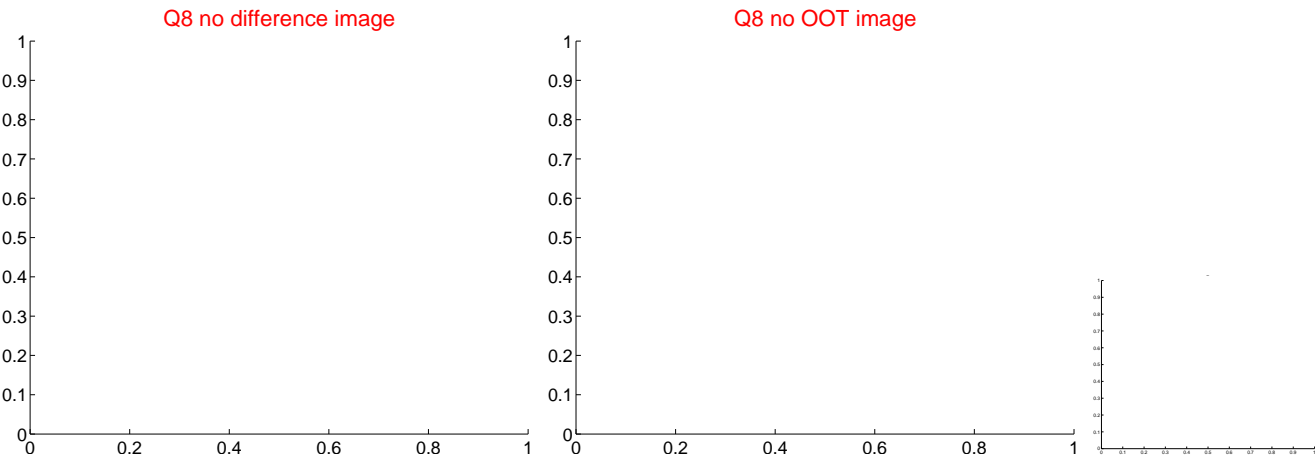
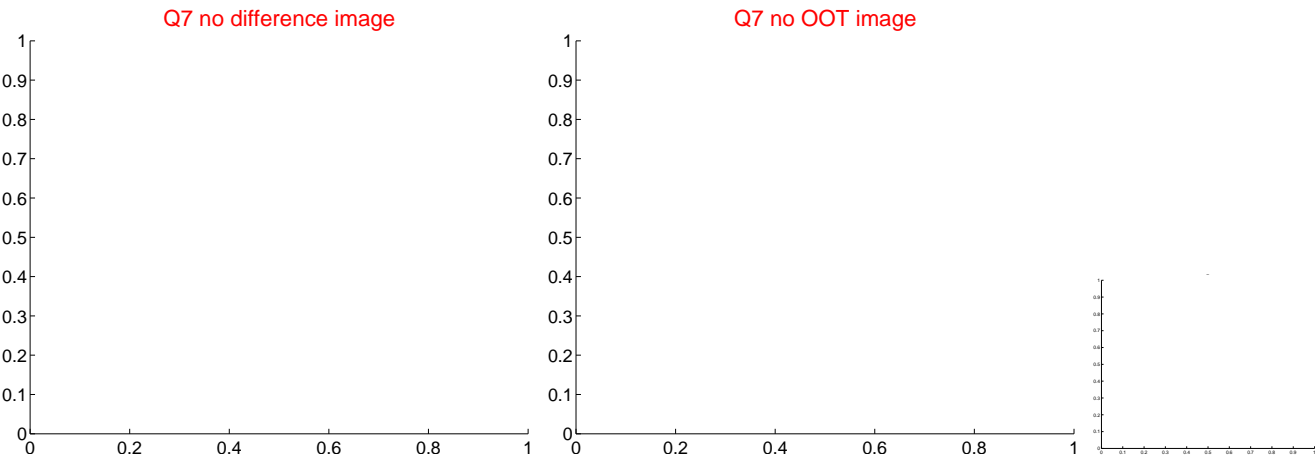
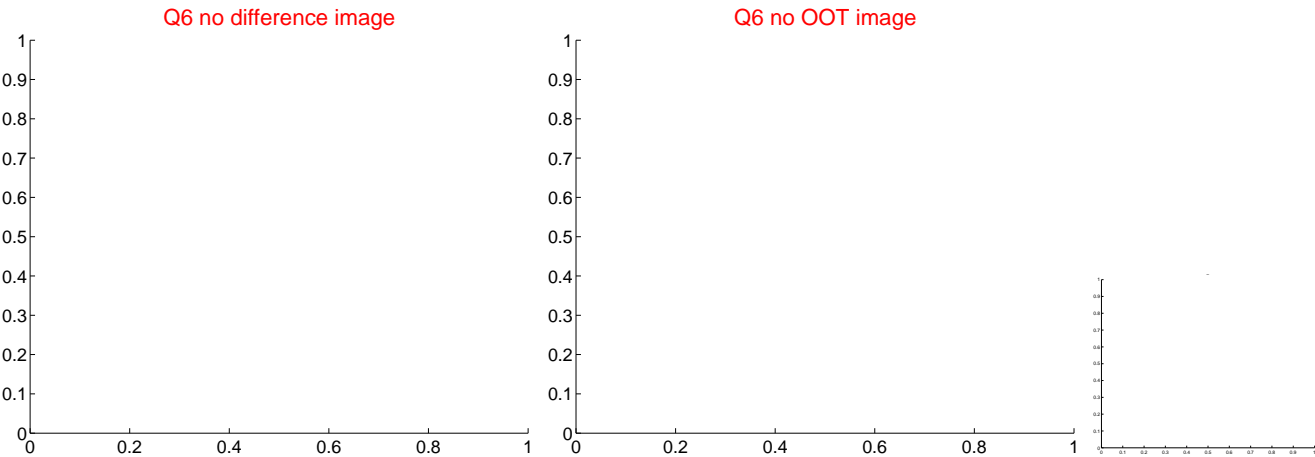
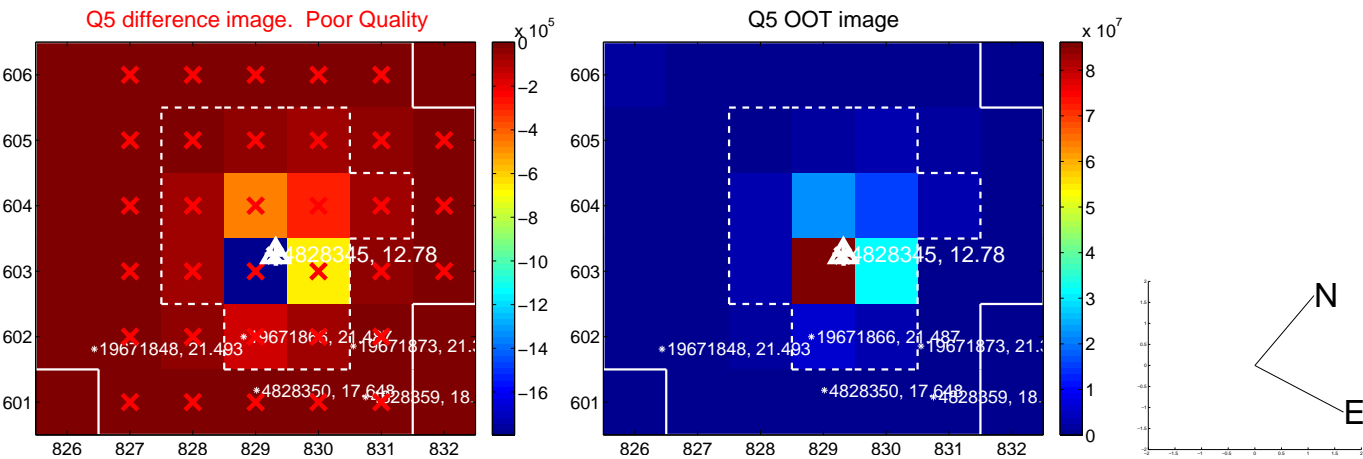
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

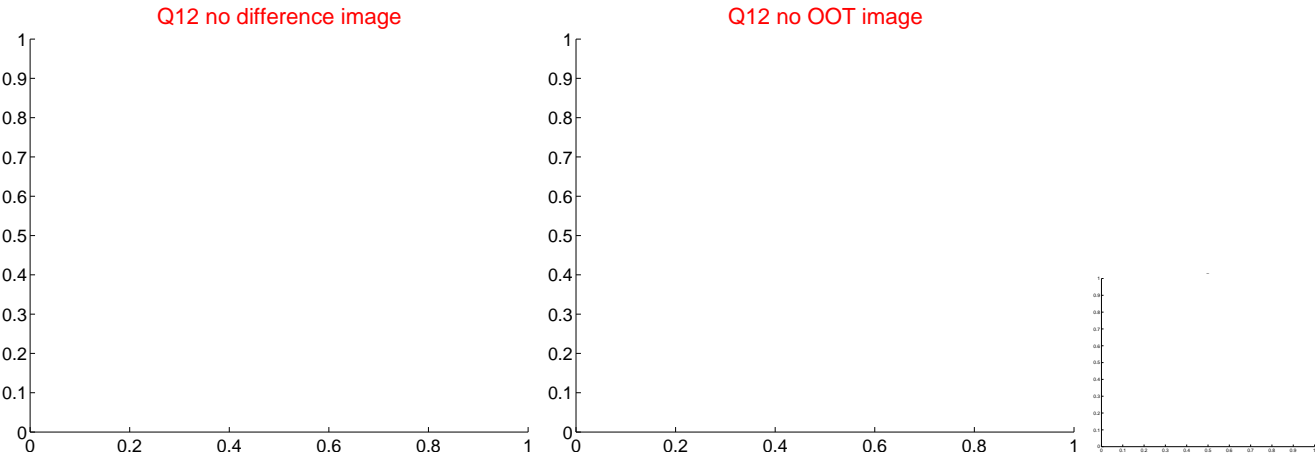
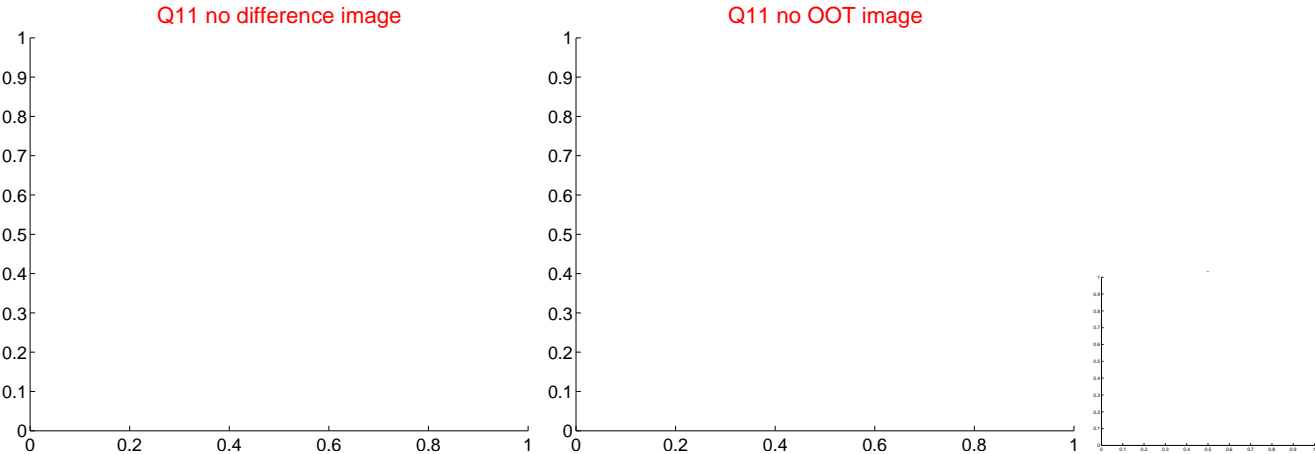
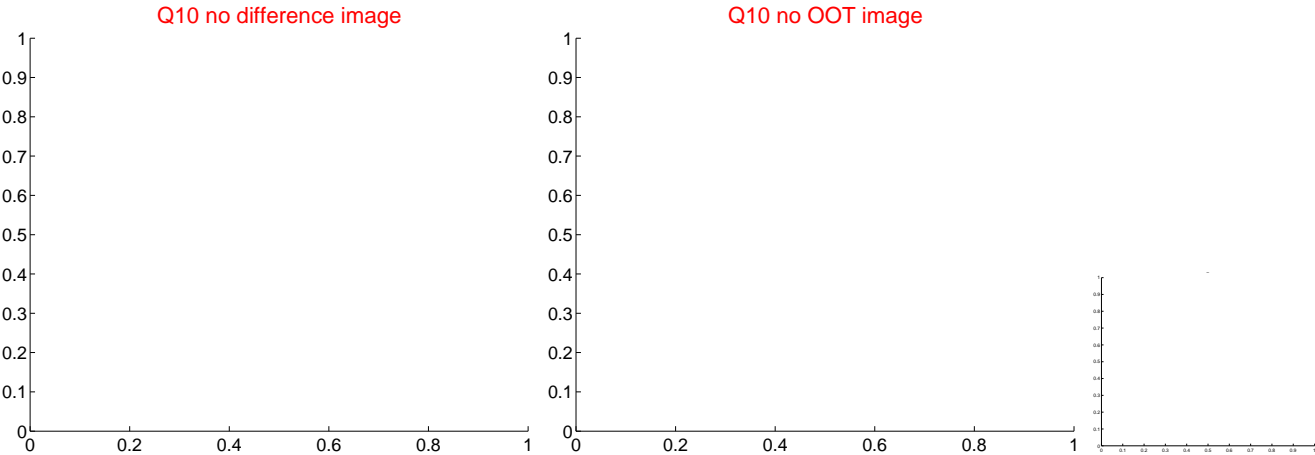
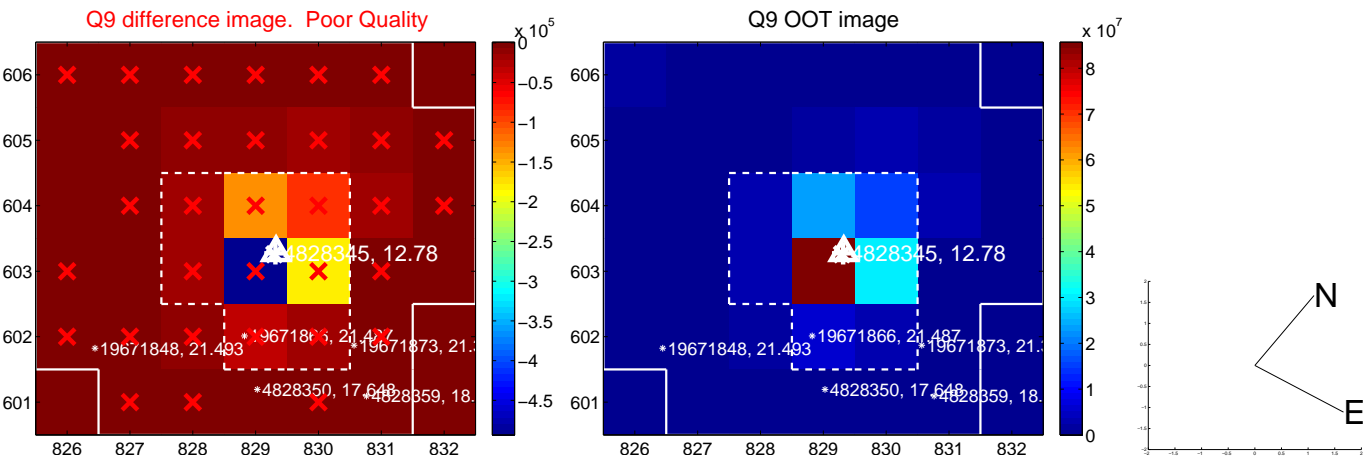




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



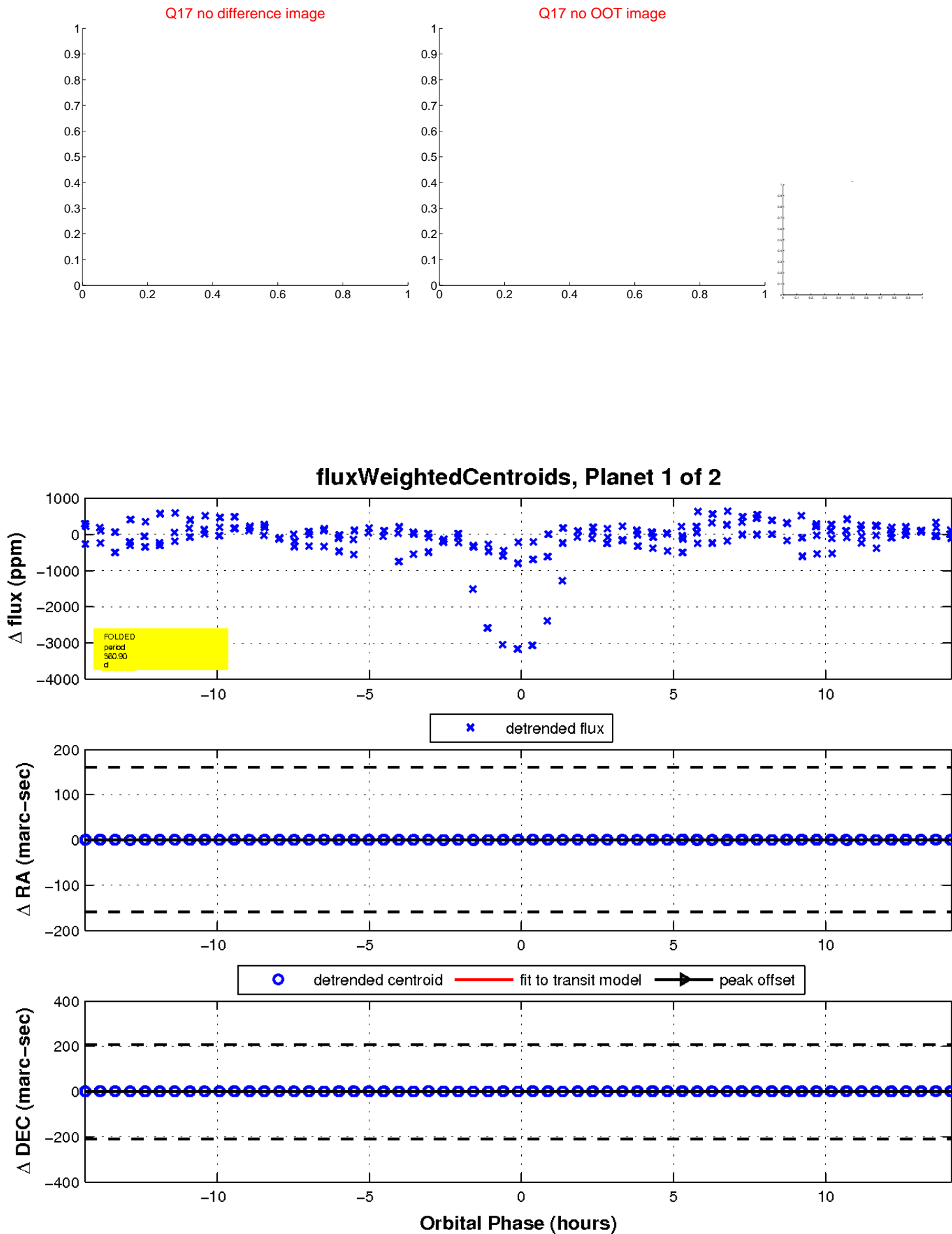
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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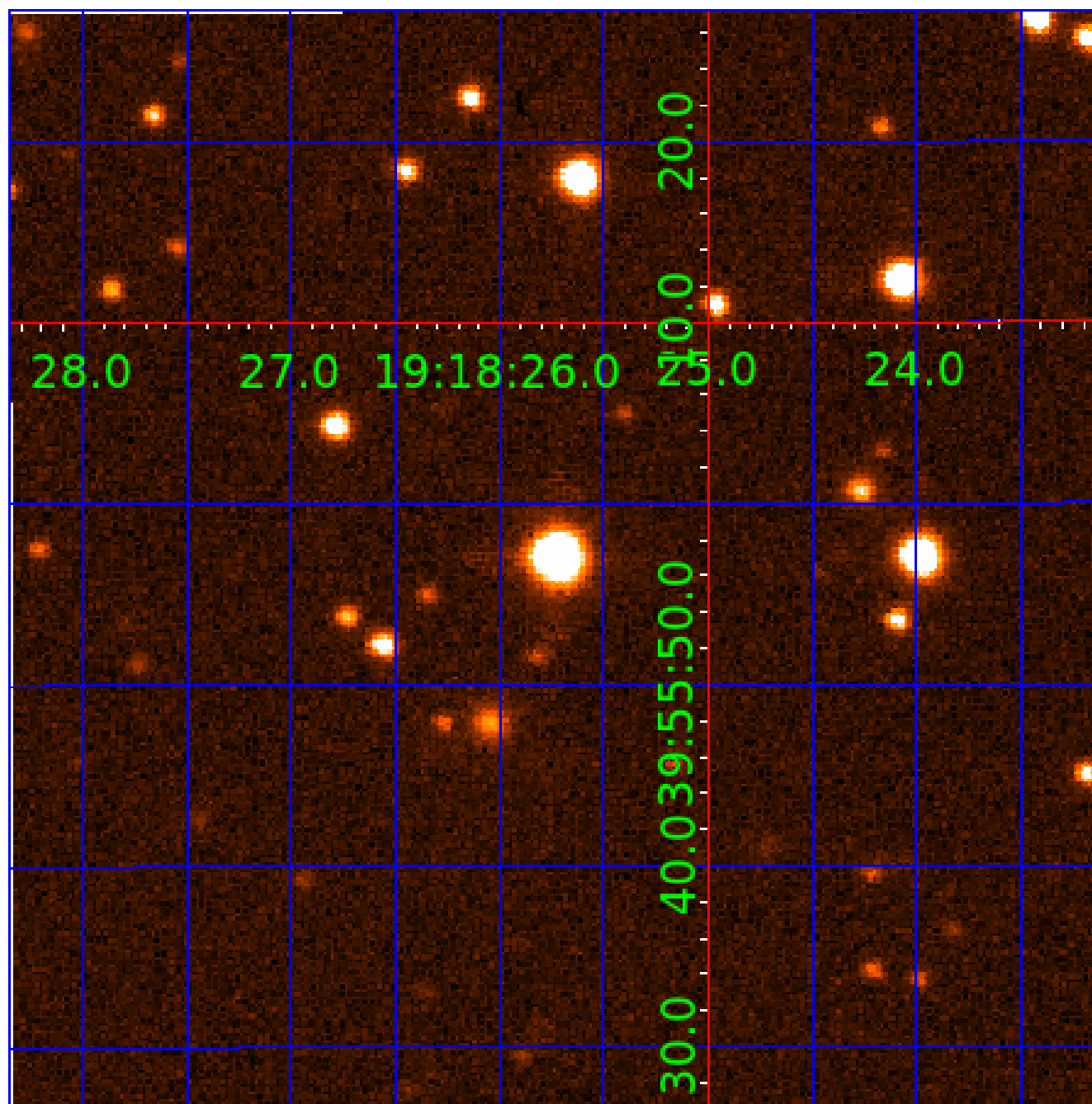


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004828345

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004828345-01	OBS	No	360.897256	162.984255	2413.5	4.854	25.2	27.5	4.53	11617	38.79	148.51
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004828345-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004828345-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

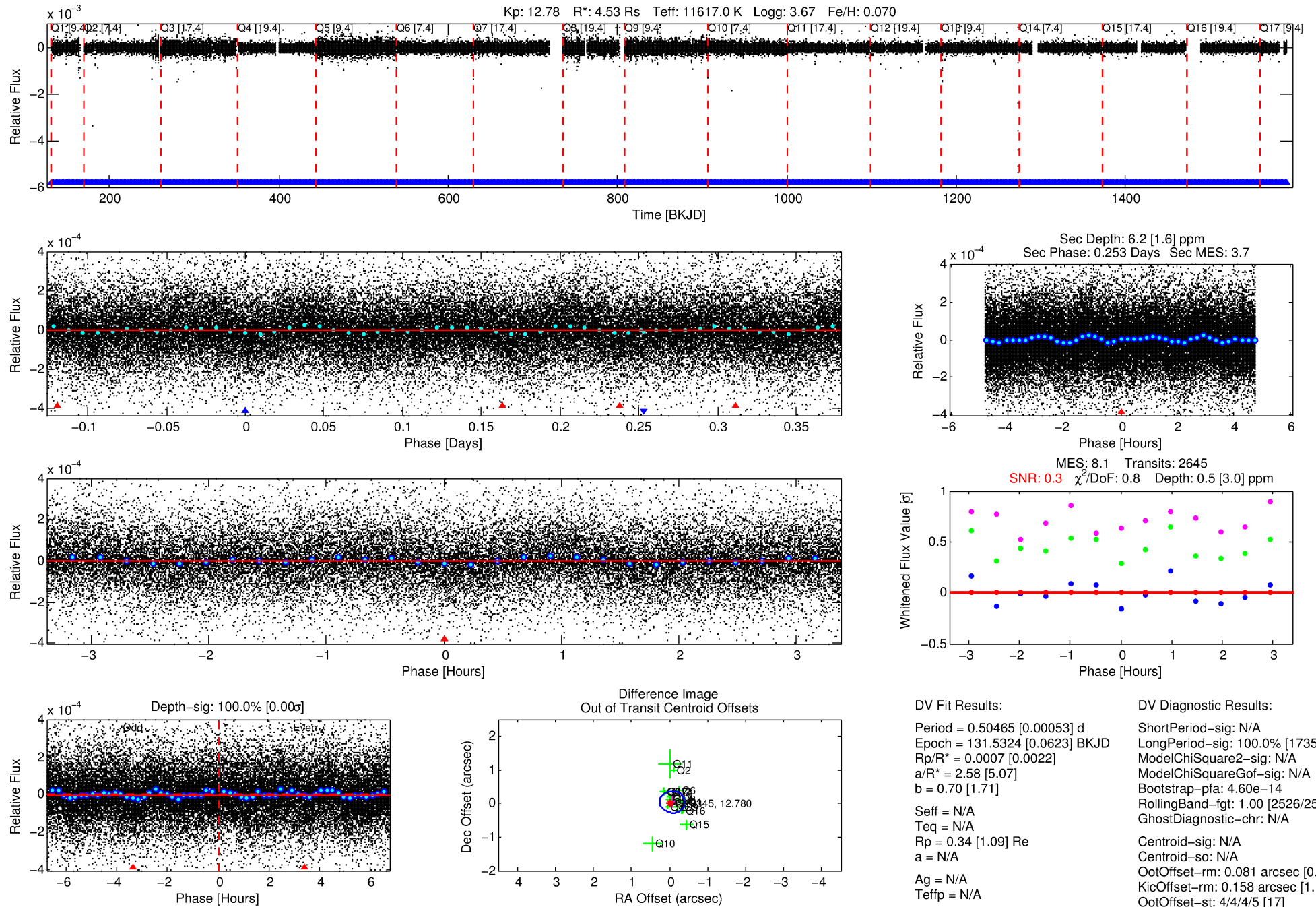
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004828345-02

No Significant Match Found

# DV One-Page Summary

KIC: 4828345 Candidate: 2 of 2 Period: 0.505 d



## DV Fit Results:

Period = 0.50465 [0.00053] d  
Epoch = 131.5324 [0.0623] BKJD  
Rp/R\* = 0.0007 [0.0022]  
a/R\* = 2.58 [5.07]  
b = 0.70 [1.71]  
Seff = N/A  
Teq = N/A  
Rp = 0.34 [1.09] Re  
a = N/A  
Ag = N/A  
Teff = N/A

## DV Diagnostic Results:

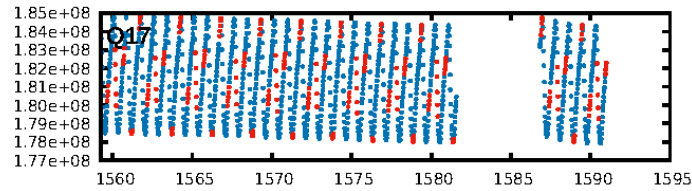
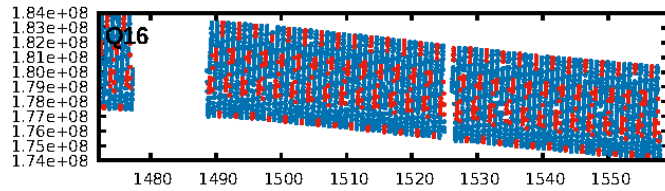
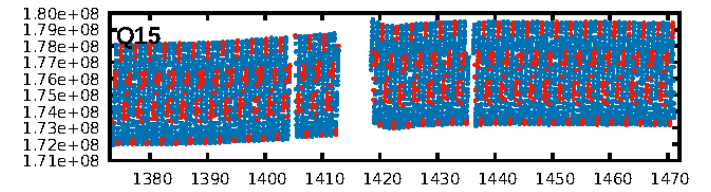
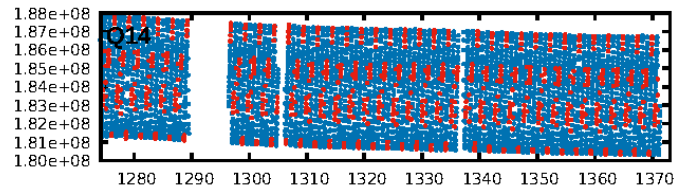
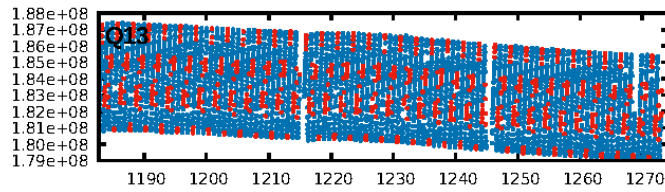
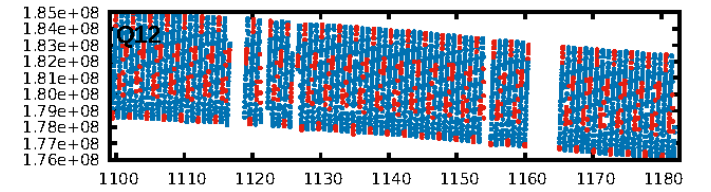
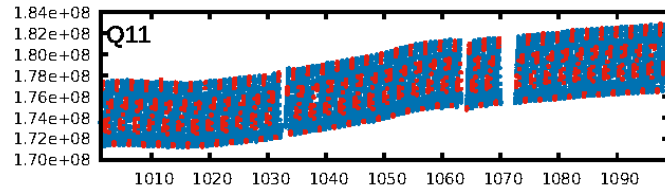
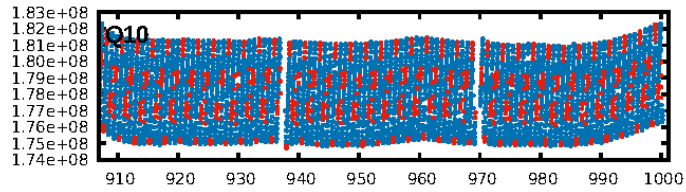
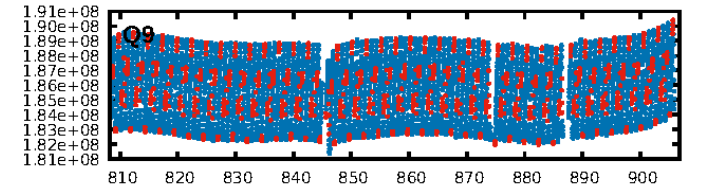
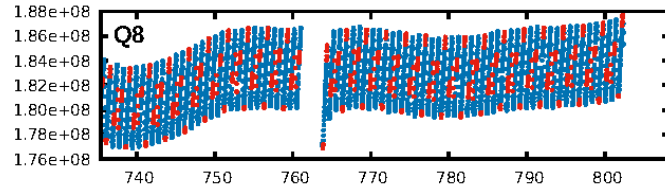
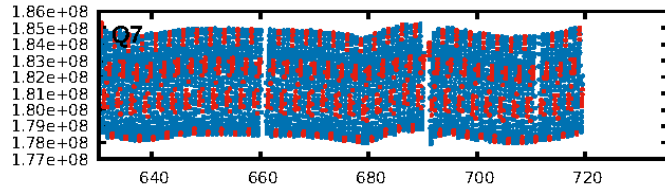
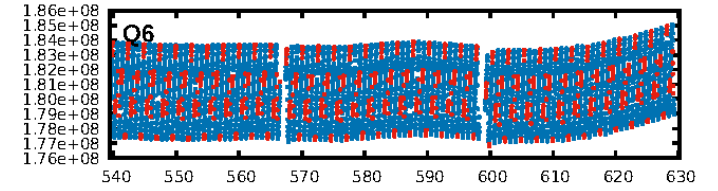
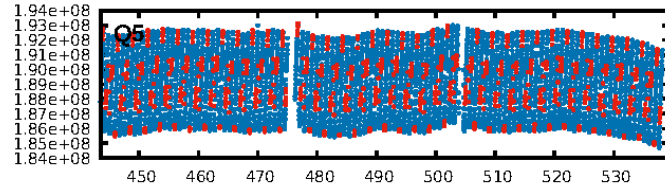
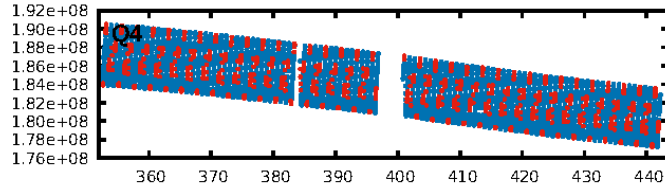
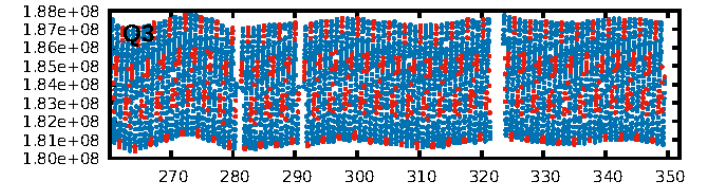
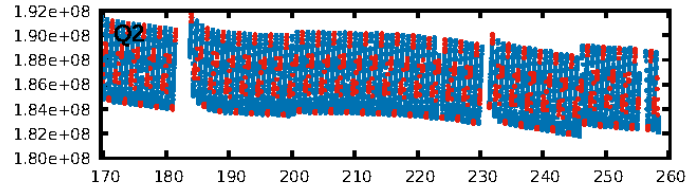
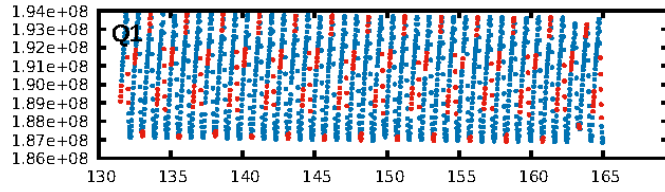
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1735.86σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.60e-14  
RollingBand-fgt: 1.00 [2526/2526]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.081 arcsec [0.76σ]  
KicOffset-rm: 0.158 arcsec [1.10σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 09:10:38 Z

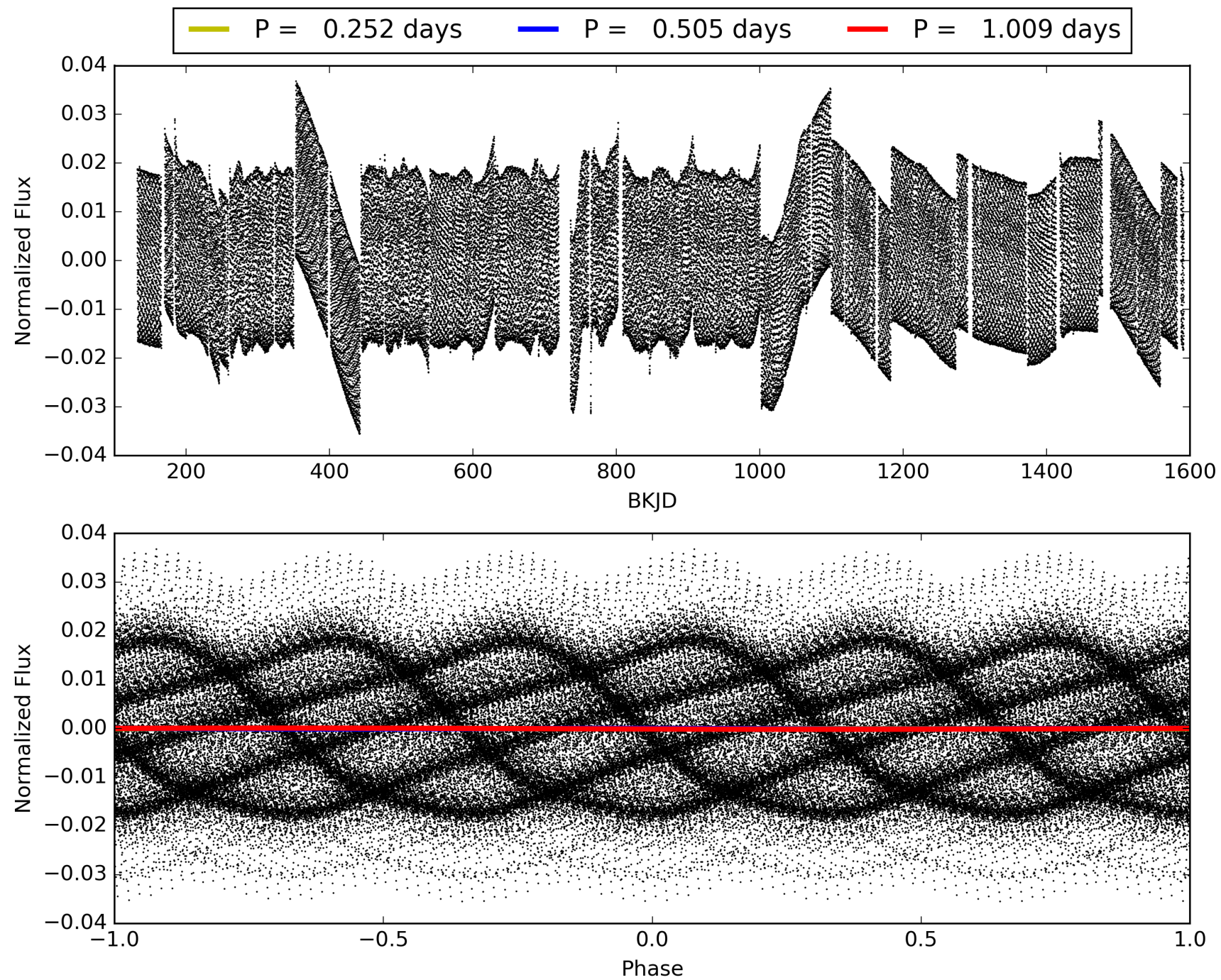
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004828345-02, PDC Light Curves

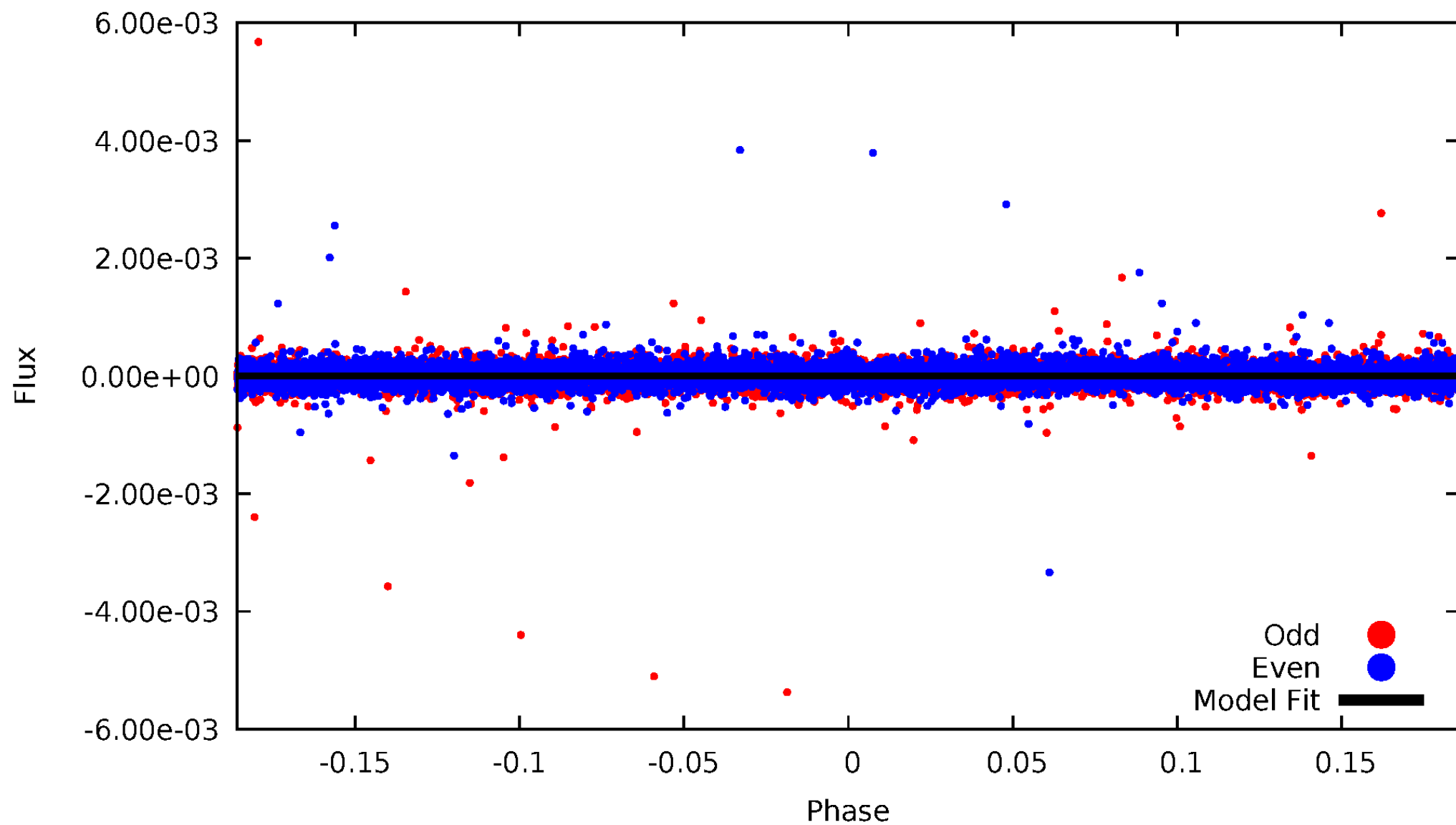


TCE 004828345-02



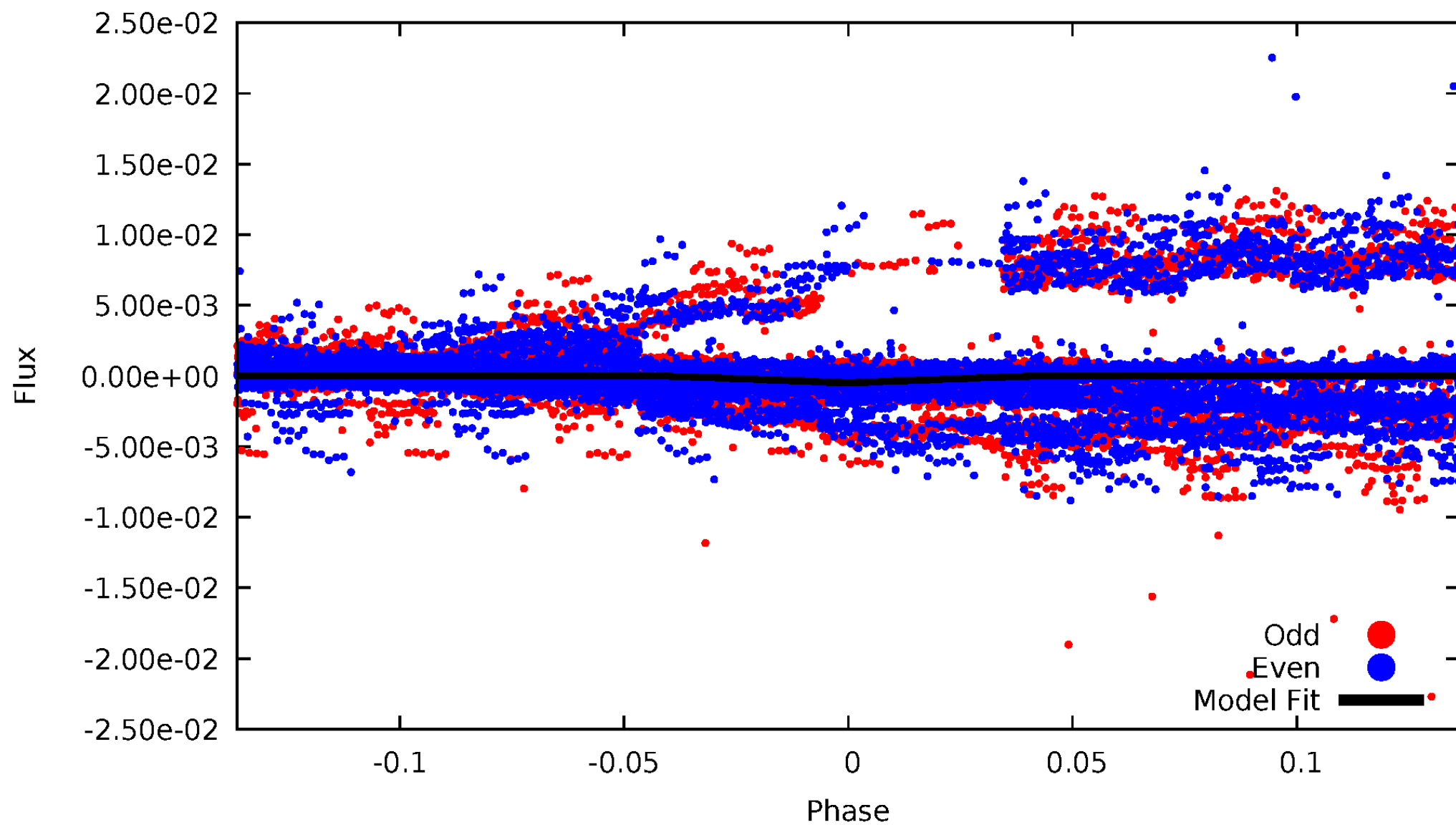
# DV Odd/Even

TCE 004828345-02



# ALT Odd/Even

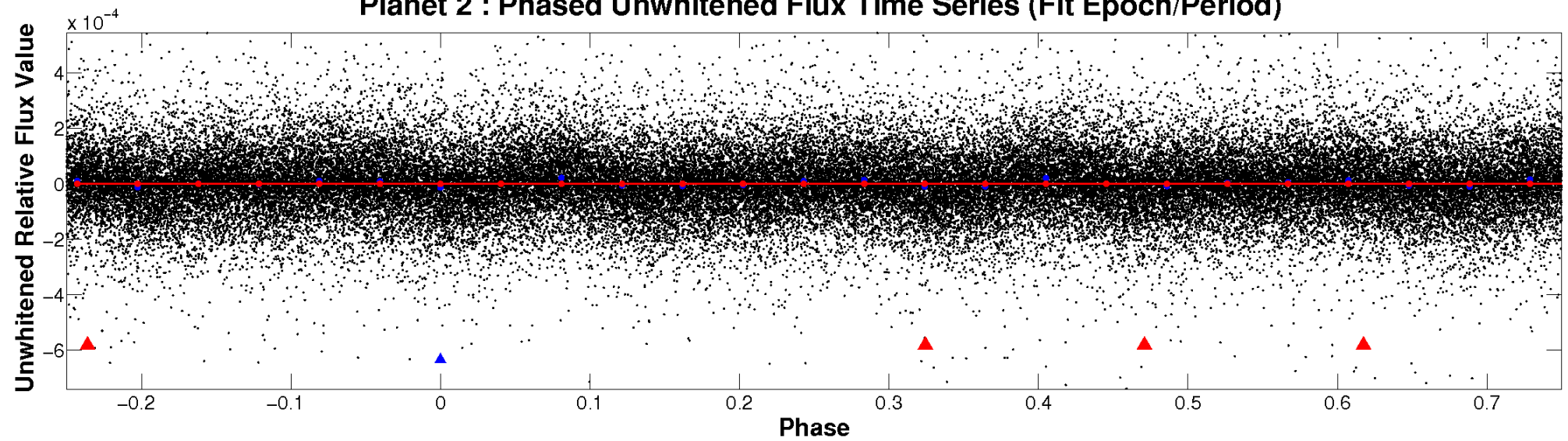
TCE 004828345-02



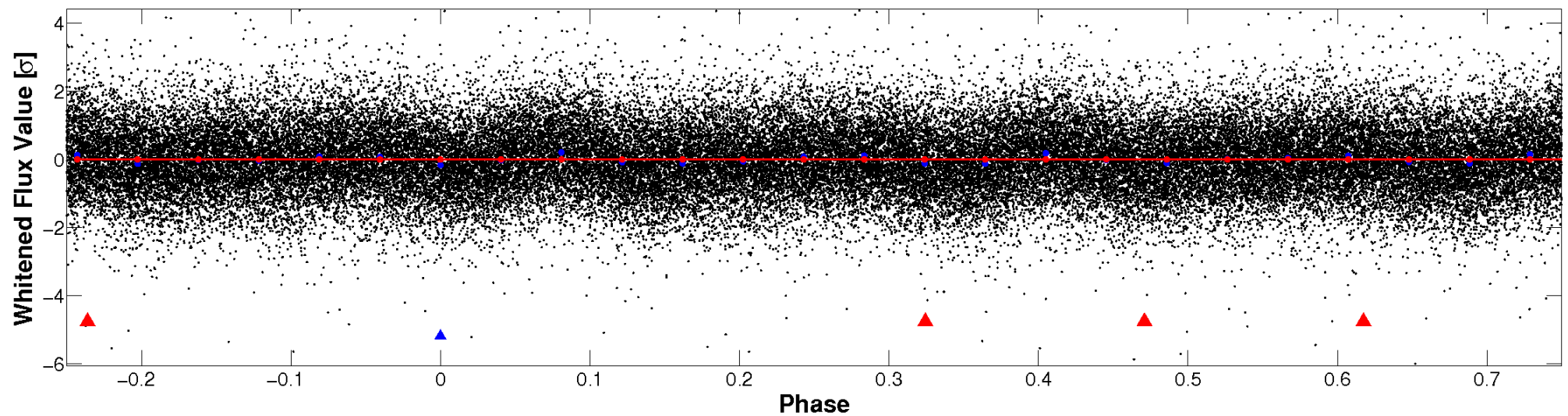


# Non-Whitened Vs. Whitened Light Curve

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

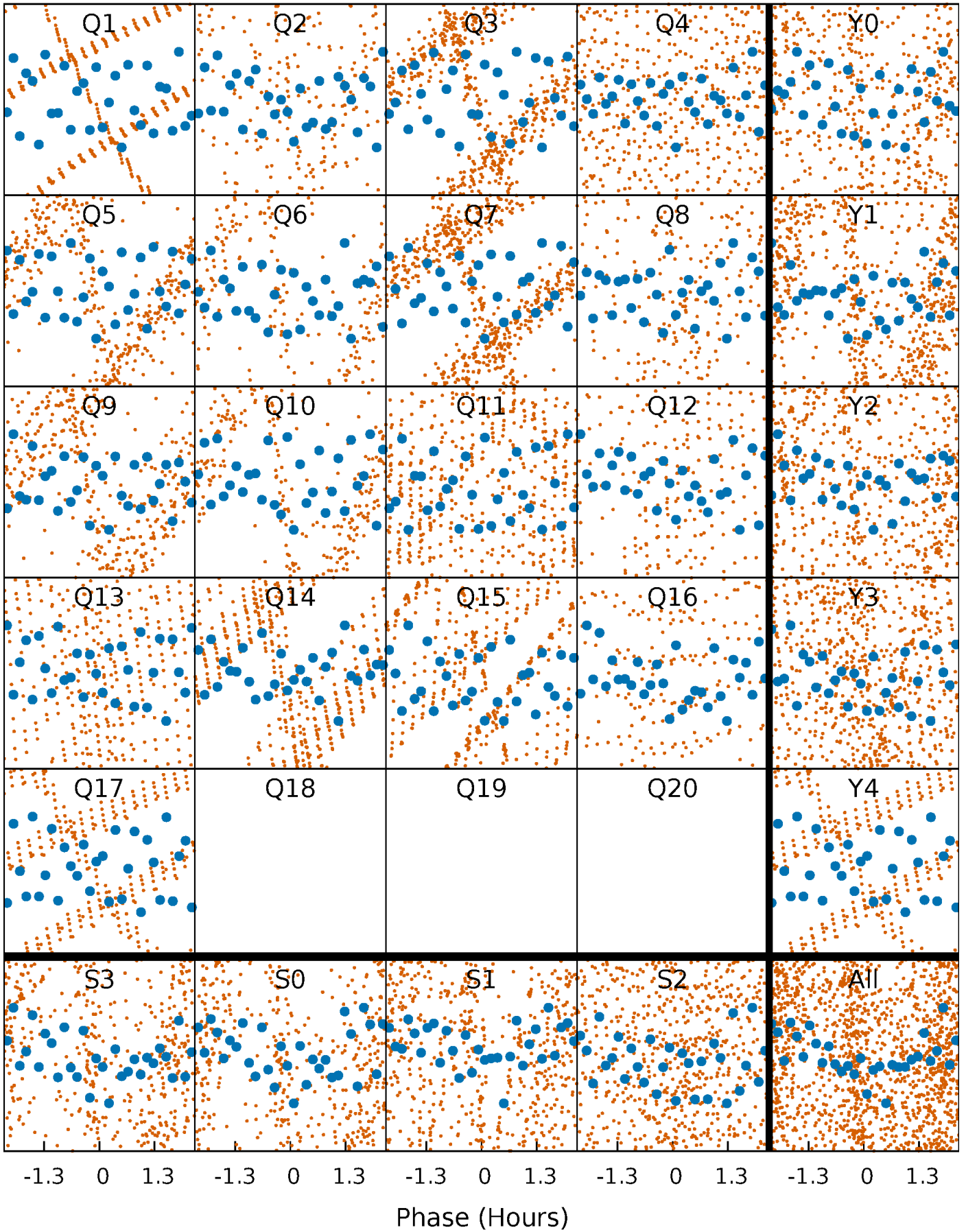


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



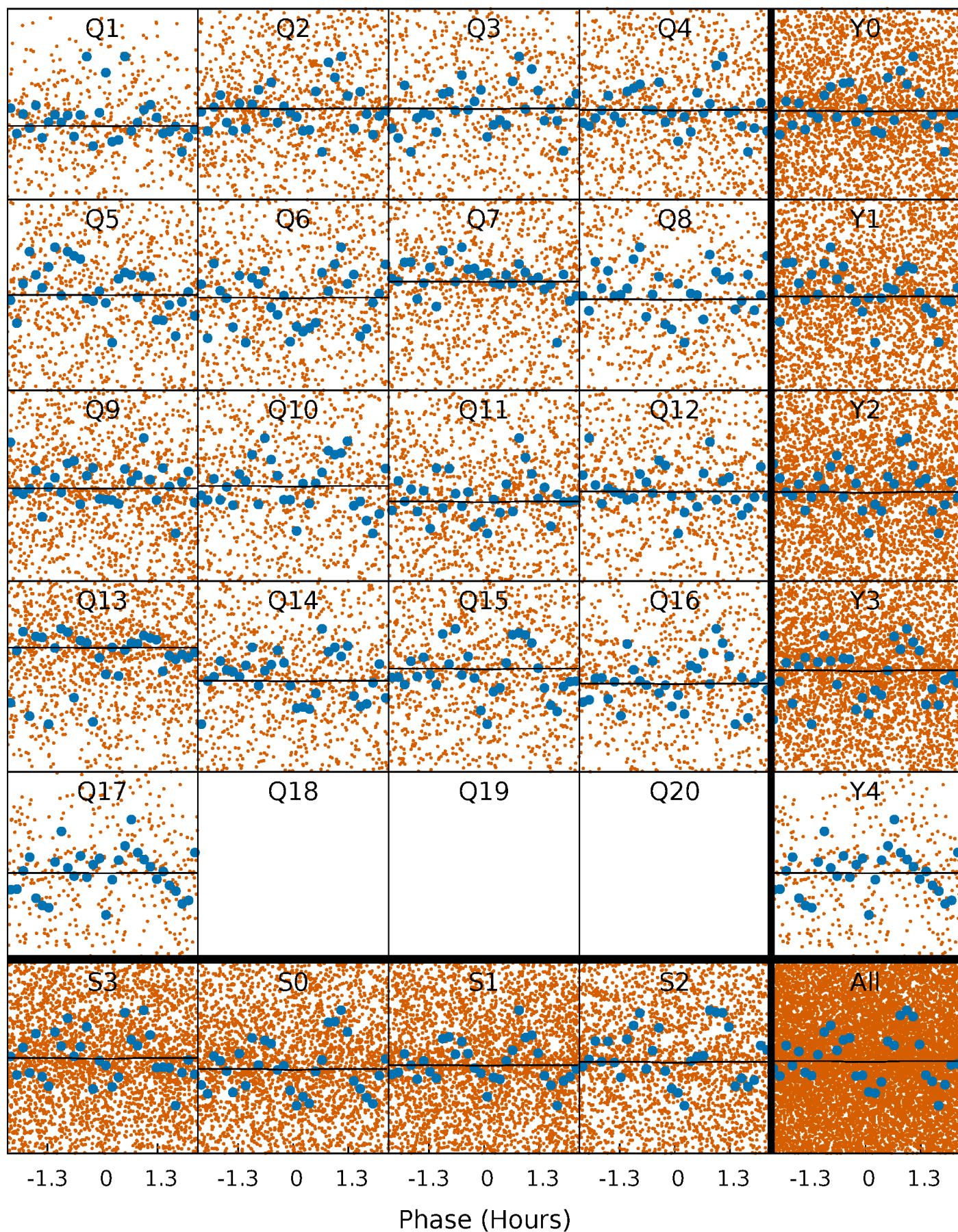
# PDC Quarter-Phased Transit Curves

TCE 004828345-02   P= 0.504648 Days    $T_0=131.532385$  (BKJD)



# DV Quarter-Phased Transit Curves

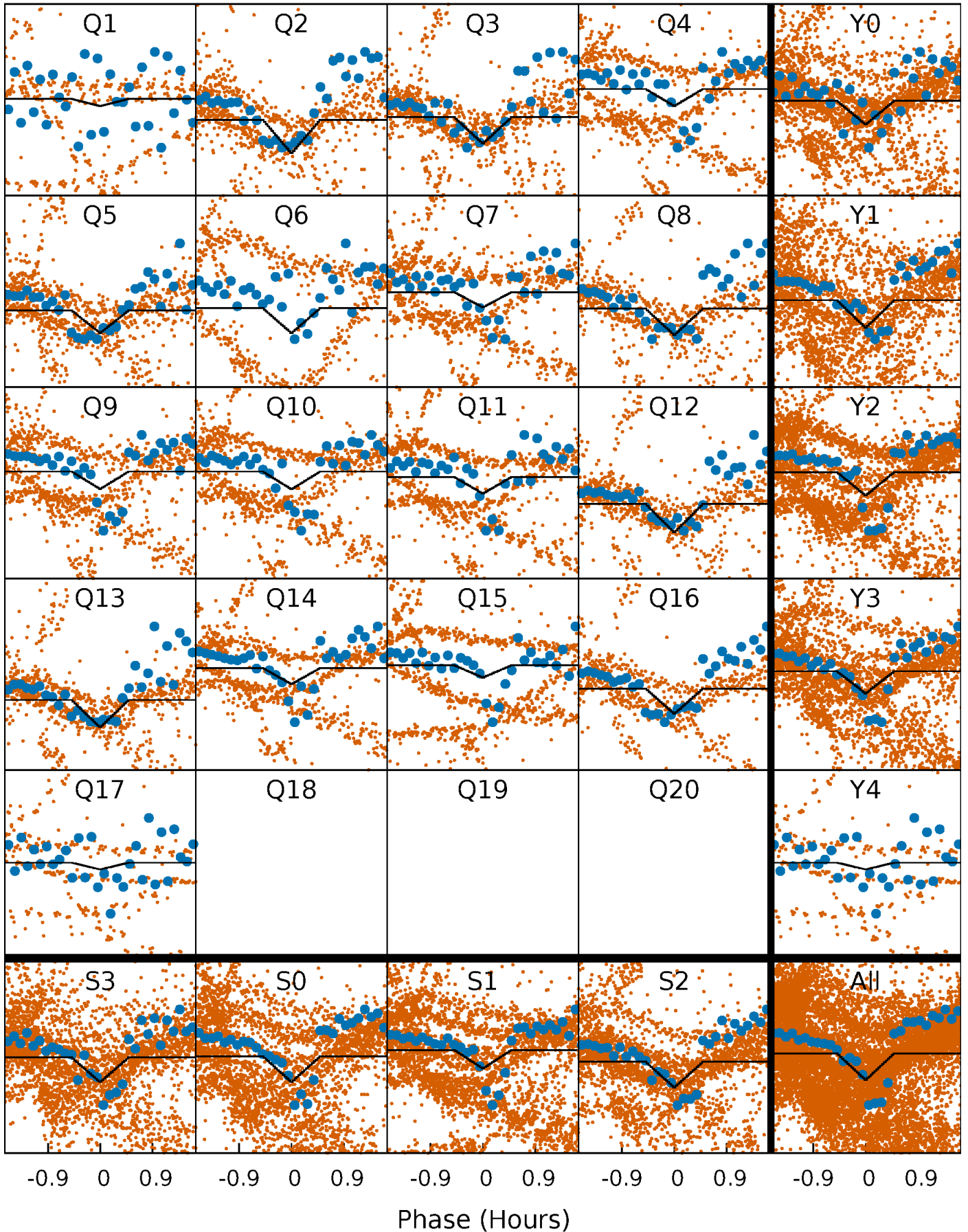
TCE 004828345-02   P= 0.504648 Days    $T_0=131.532385$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

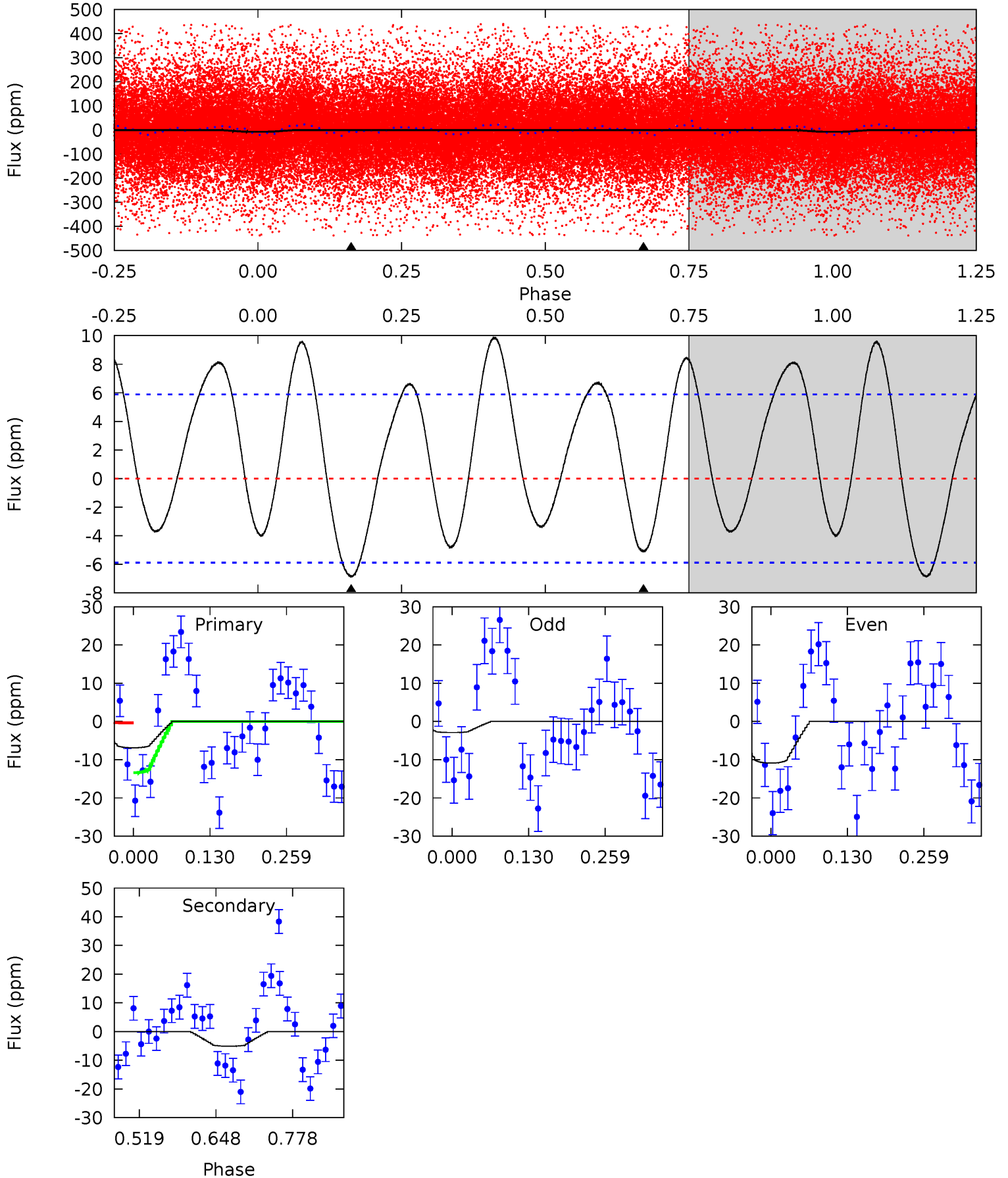
TCE 004828345-02 P= 0.504645 Days  $T_0=131.550639$  (BKJD)



# DV Model-Shift Uniqueness Test

004828345-02, P = 0.504648 Days, E = 131.027737 Days

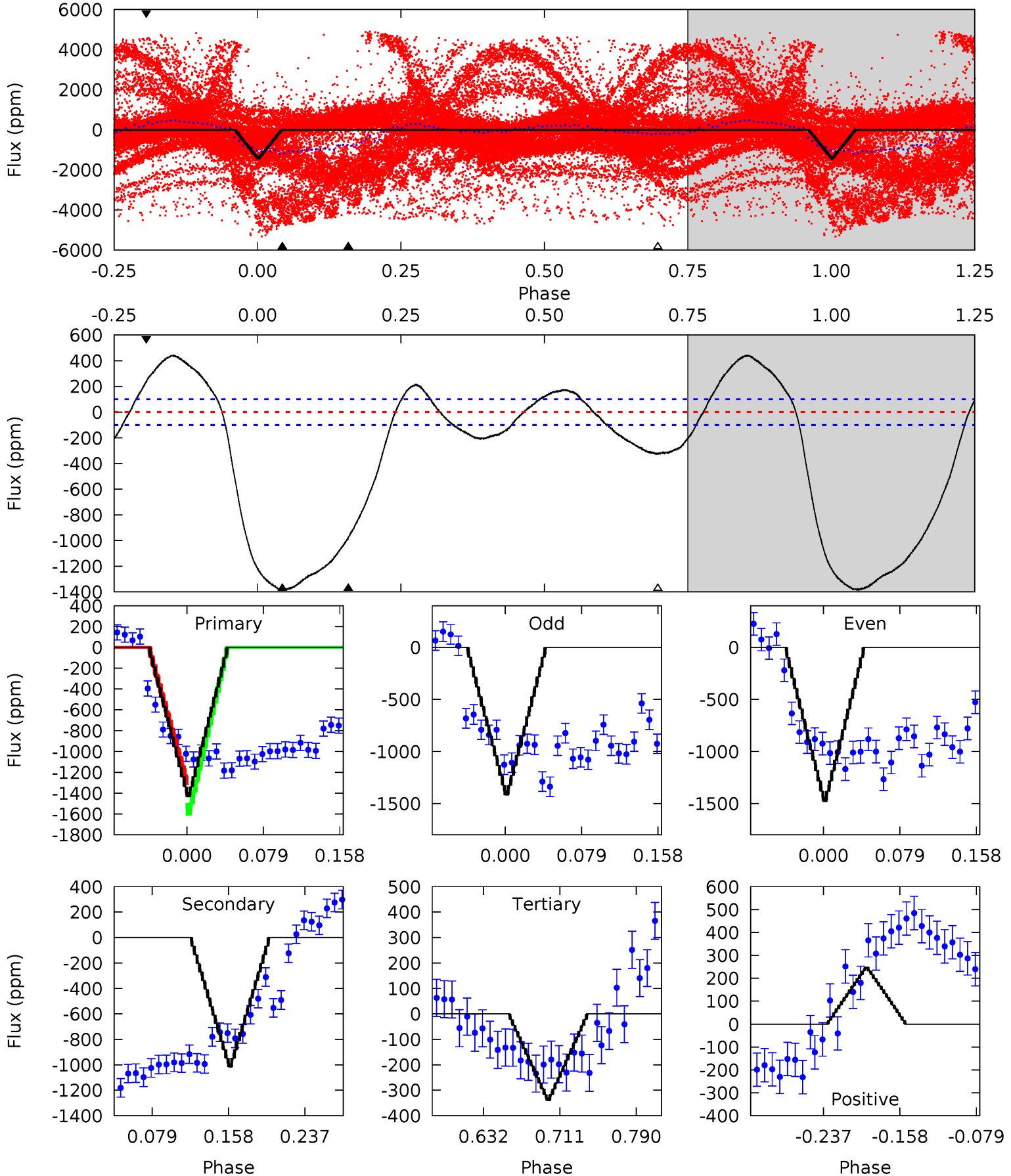
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.27	3.91	0	0	4.51	1.52	3.41	5.27	5.27	3.91	3.91	3.11	0.64	0.59	5.08



# Alt Model-Shift Uniqueness Test

004828345-02, P = 0.504645 Days, E = 131.045994 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
63.0	44.7	14.9	10.9	4.61	1.76	9.90	48.1	52.1	29.7	33.7	1.34	1.31	0.24	4.65



### Stellar Parameters For KIC 004828345

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$11617^{+744}_{-1116}$	$3.666^{+0.552}_{-0.097}$	$0.070^{+0.150}_{-0.600}$	$4.534^{+0.464}_{-2.631}$	$3.472^{+0.058}_{-1.111}$	$0.052^{+0.395}_{-0.011}$
	+6%/-10%	+15%/-3%	+214%/-857%	+10%/-58%	+2%/-32%	+753%/-20%
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 004828345-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-5 \pm 1$	$0.74^{+0.80}_{-0.50}$	$10552^{+1208}_{-1541}$	$13121^{+40014}_{-7675}$	$1.752^{+13.477}_{-1.362}$
Alt.	$-980 \pm 22$	$10.05^{+1.76}_{-2.88}$	$10583^{+1181}_{-1661}$	$14591^{+2640}_{-2142}$	$1.856^{+1.497}_{-0.527}$

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

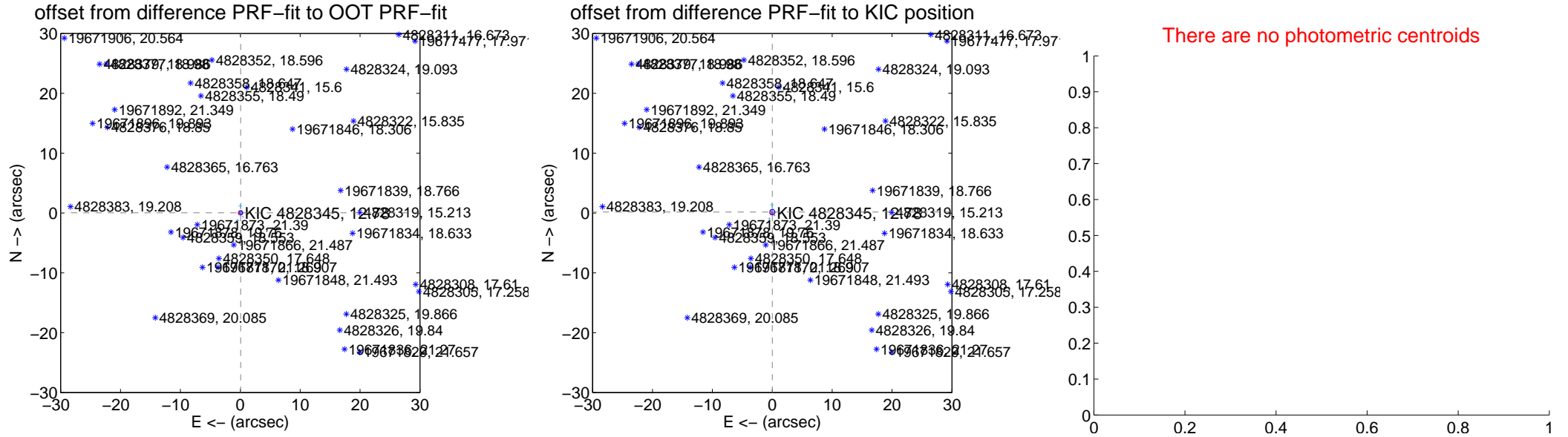
## DV Centroid Data

Supplemental centroid analysis for 004828345-02. Kepler magnitude: 12.78. Transit SNR 0.27

There are 17 quarters with good PRF difference image offsets

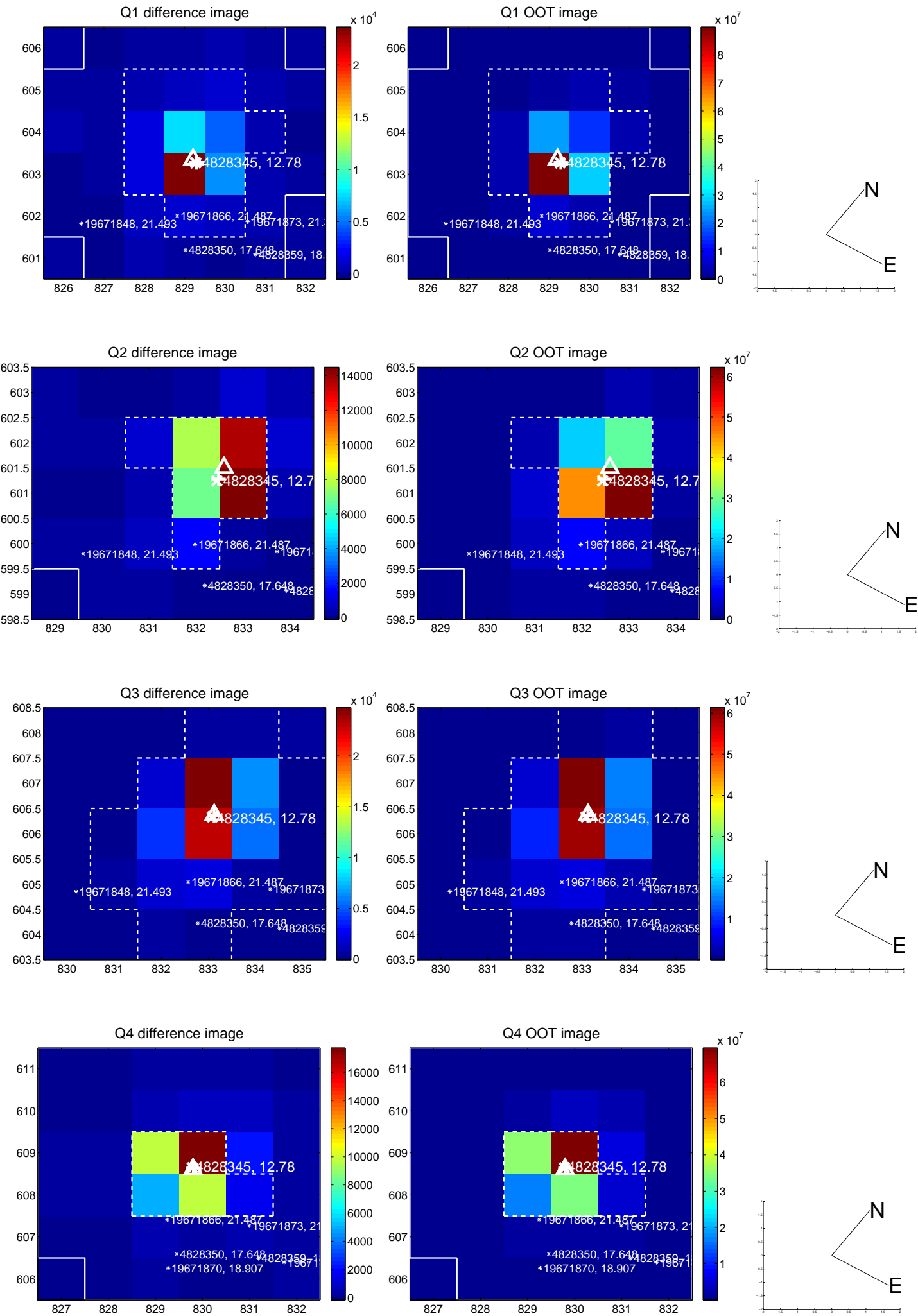
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.081 \pm 0.107$	0.76	$-0.070 \pm 0.086$	$0.041 \pm 0.148$
PRF-fit source offset from KIC position	$0.158 \pm 0.143$	1.10	$-0.012 \pm 0.084$	$0.157 \pm 0.144$
photometric centroid source offset	—	—	—	—

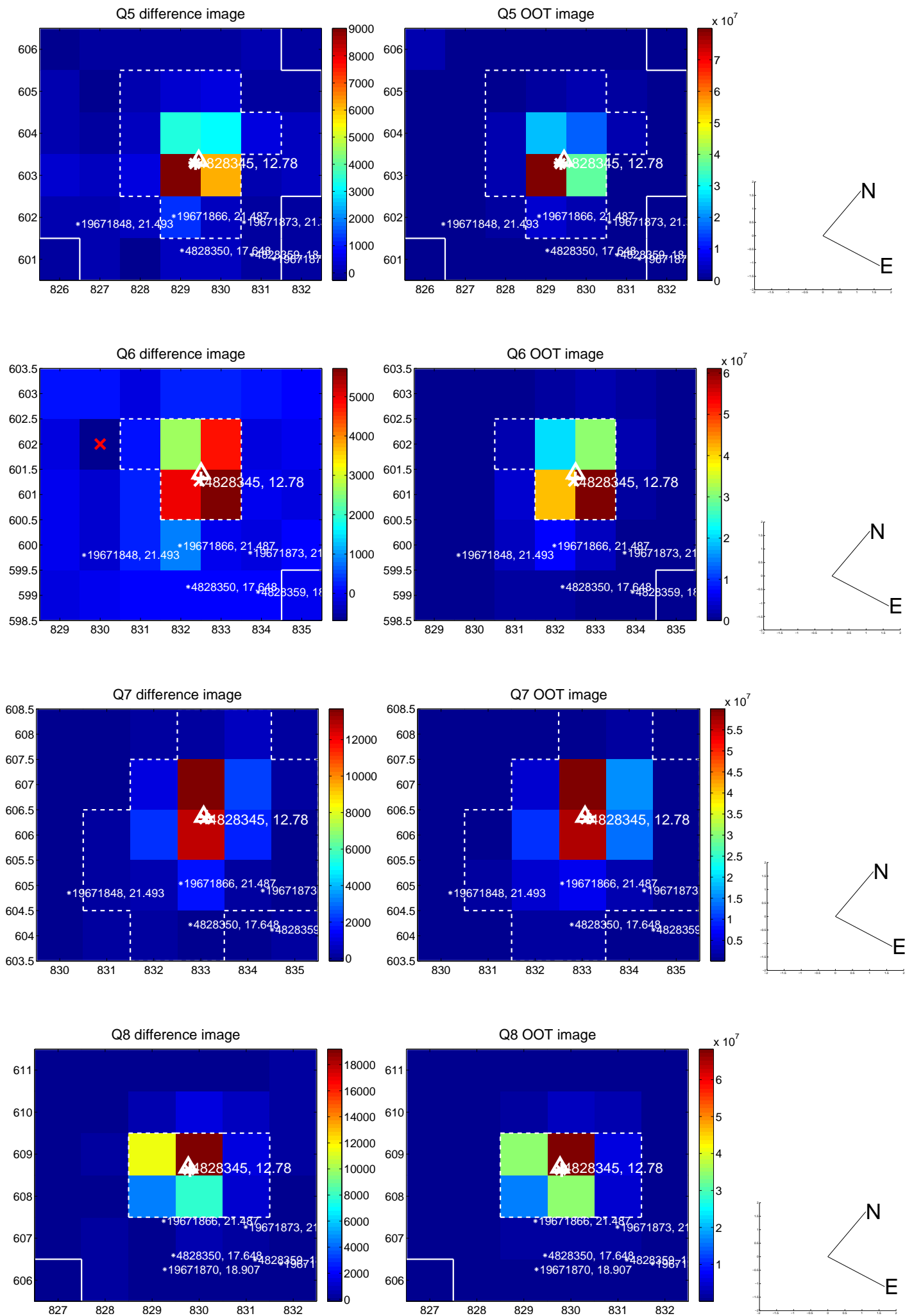


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

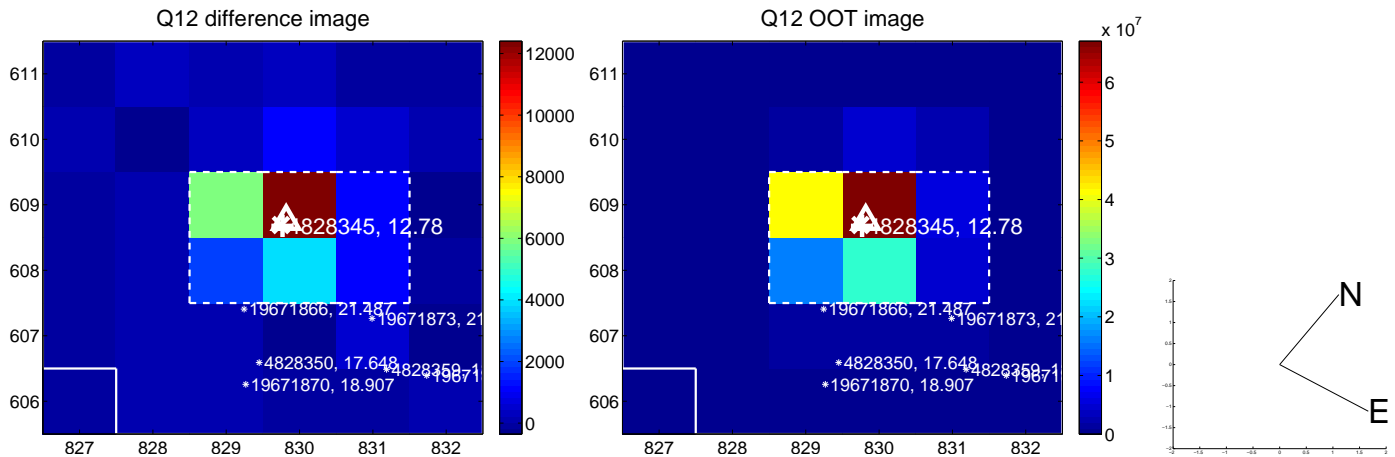
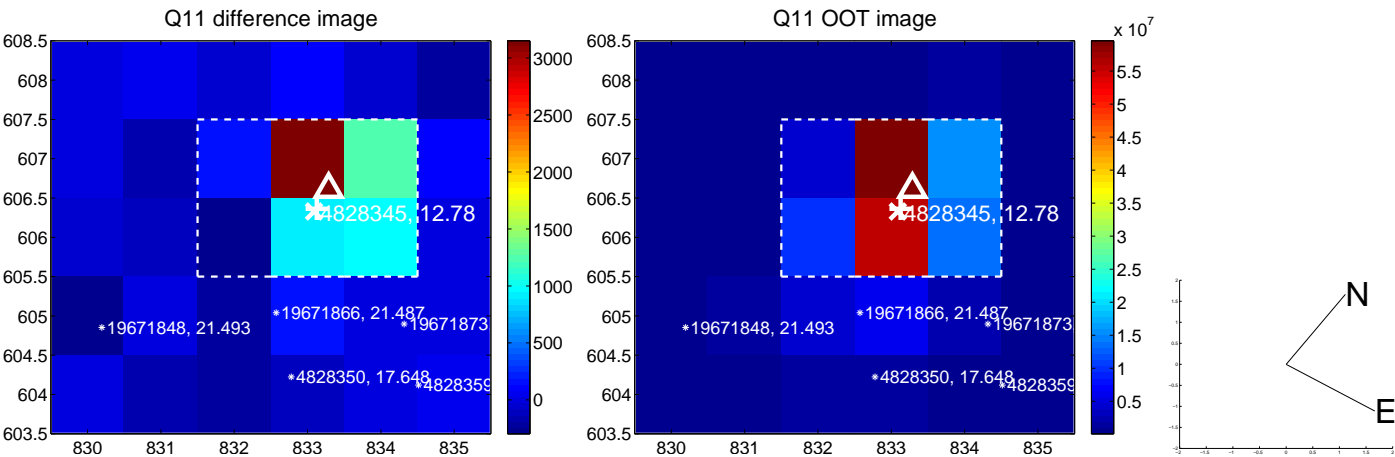
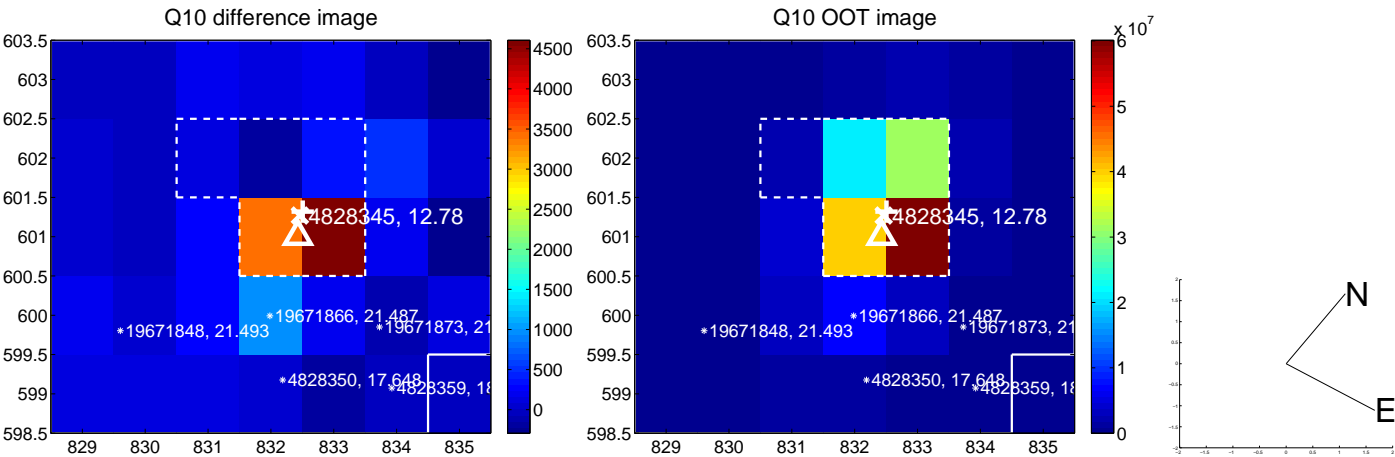
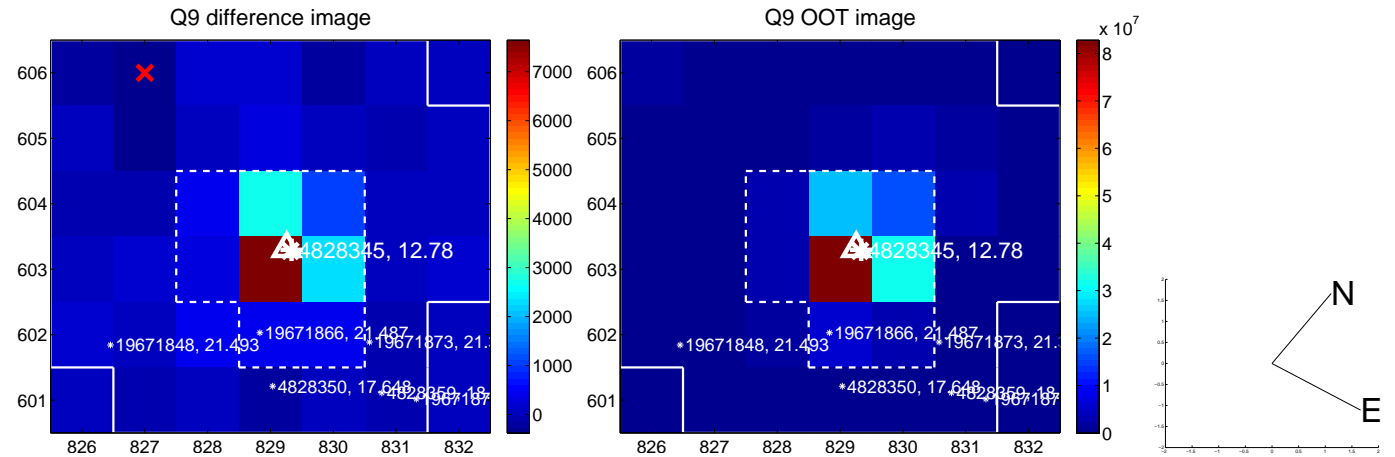


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

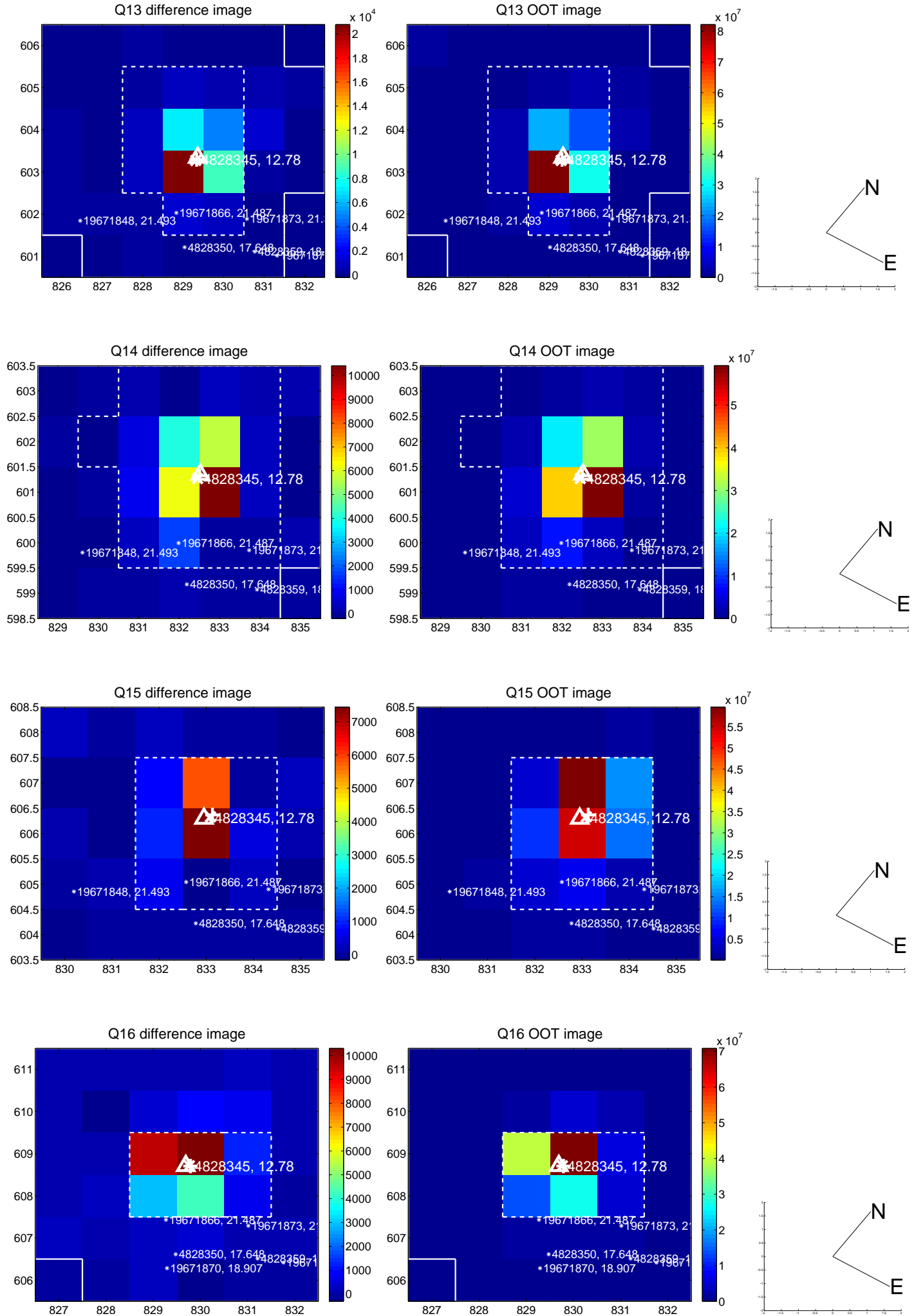




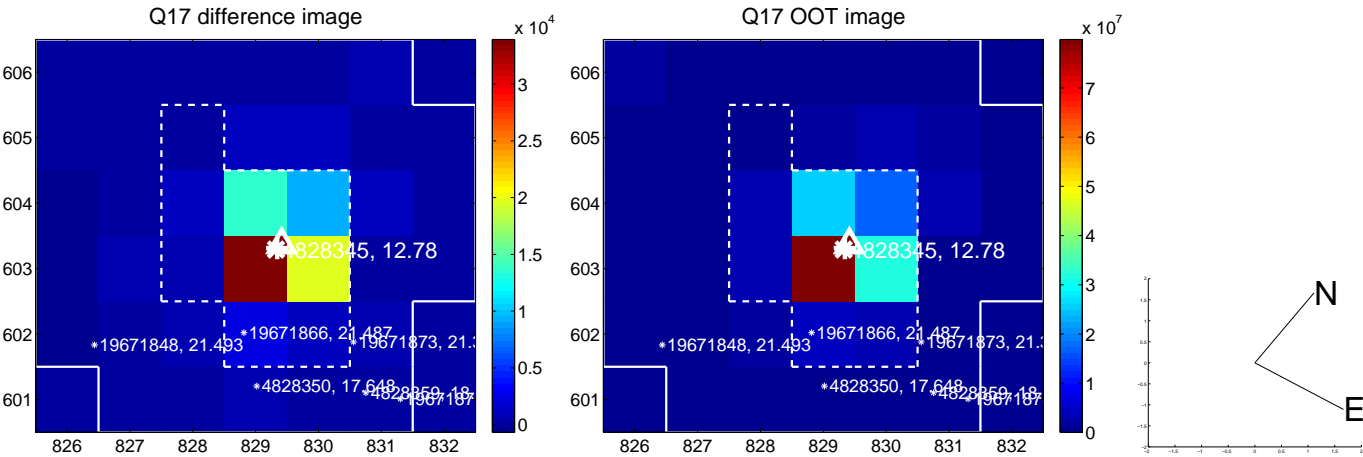
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



folded centroid time series figure for this object.

UKIRT Image

Declination

