

# KIC 006068502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006068502-01	OBS	No	2.818094	132.977072	22.1	6.269	9.7	7.8	2.47	6850	1.35	6173.51
006068502-02	OBS	No	2.817059	133.366749	0.6	8.268	9.3	0.1	2.47	6850	0.23	6176.53

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006068502-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006068502-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD

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

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

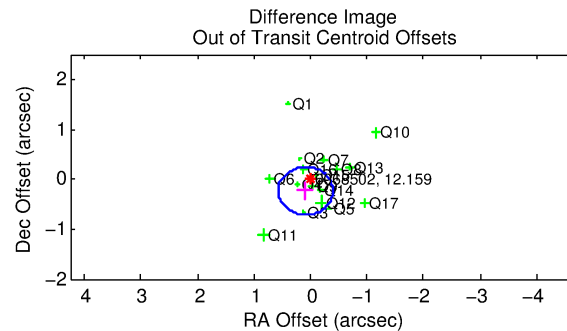
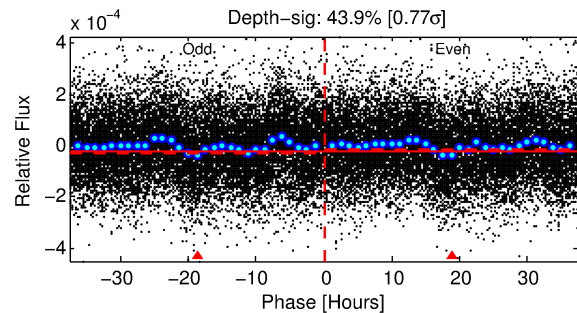
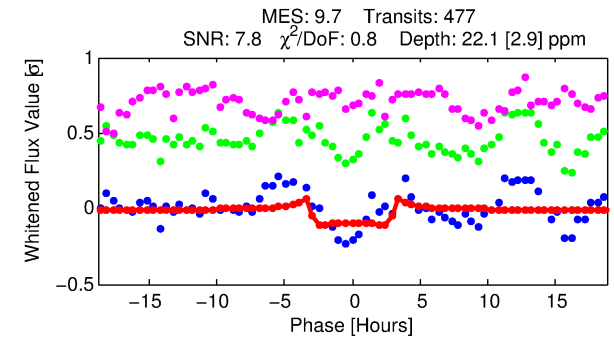
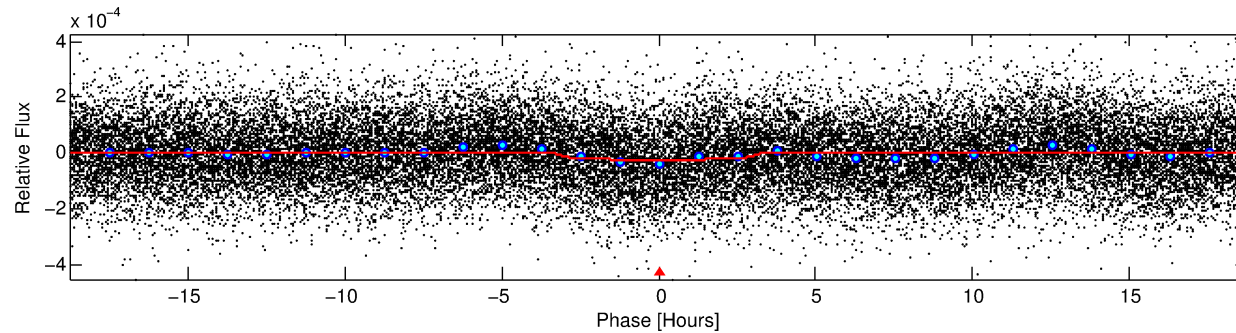
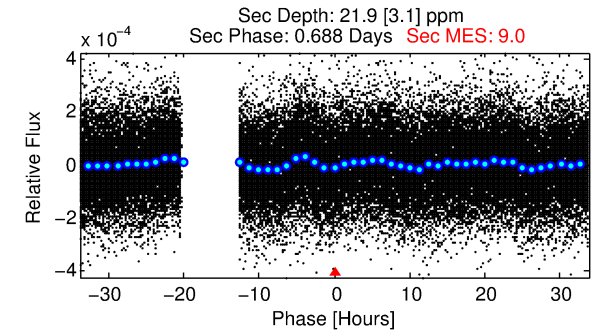
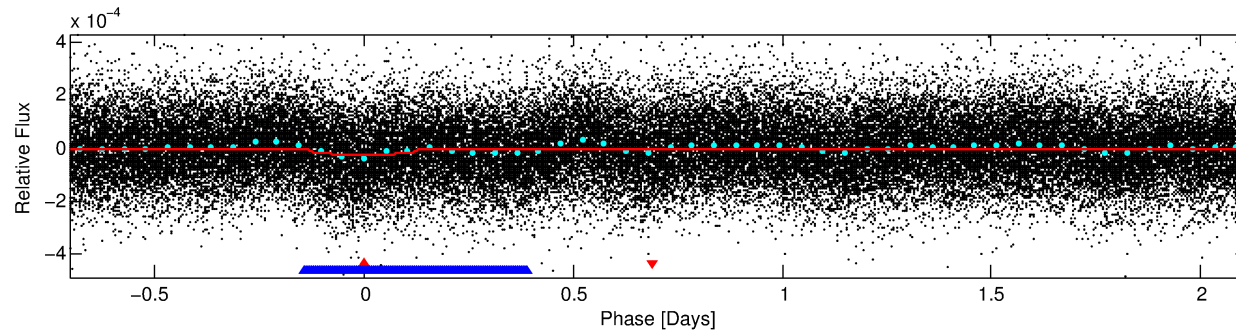
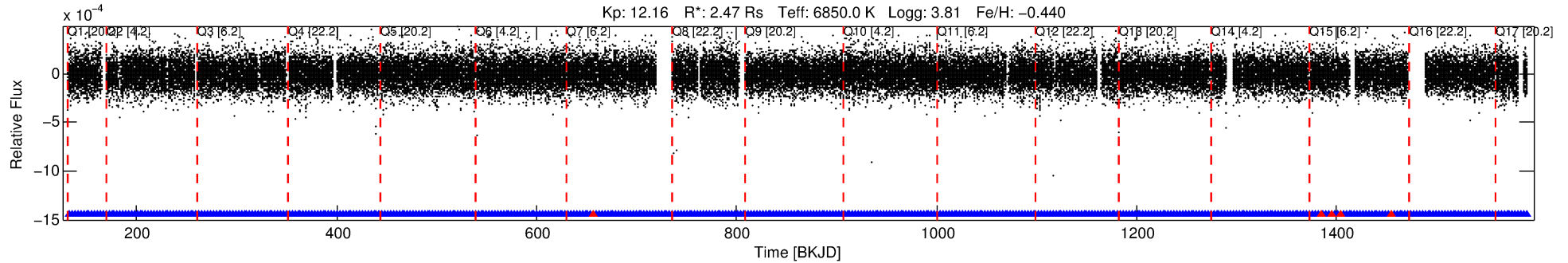
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006068502-01

No Significant Match Found

# DV One-Page Summary

KIC: 6068502 Candidate: 1 of 2 Period: 2.818 d



## DV Fit Results:

Period = 2.81809 [0.00002] d  
Epoch = 132.9771 [0.0047] BKJD  
Rp/R\* = 0.0050 [0.0010]  
a/R\* = 1.81 [1.46]  
b = 0.90 [0.25]  
Seff = 6173.51 [3139.34]  
Teq = 2260 [287] K  
Rp = 1.35 [0.54] Re  
a = 0.0442 [0.0140] AU  
Ag = 12.90 [8.44] [1.41σ]  
Teffp = 6623 [736] K [5.52σ]

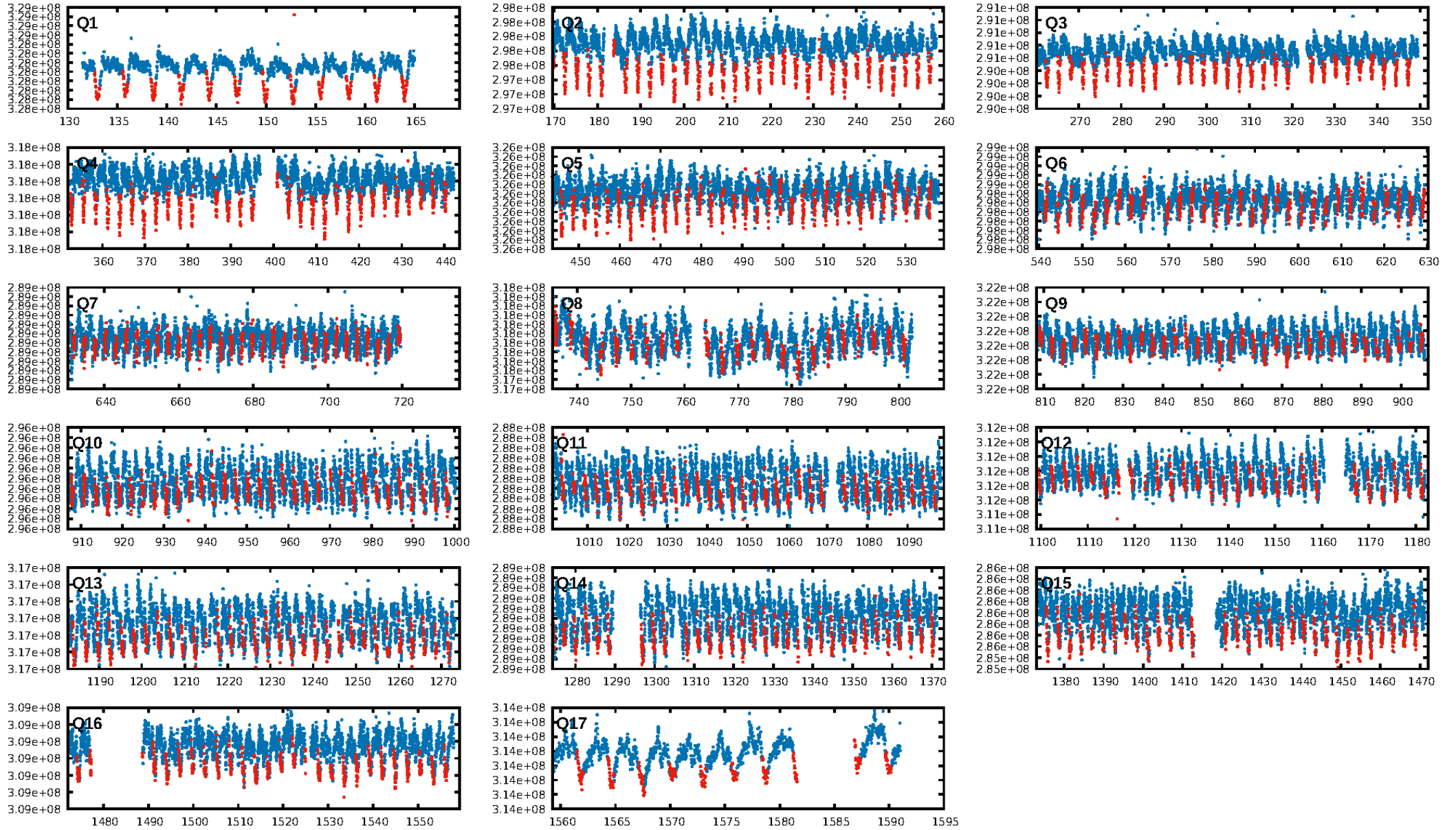
## DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.07e-15  
RollingBand-fgt: 0.99 [450/455]  
GhostDiagnostic-chr: 0.4639  
Centroid-sig: 0.0%  
Centroid-so: 2.890 arcsec [3.39σ]  
OotOffset-rm: 0.253 arcsec [1.57σ]  
KicOffset-rm: 0.104 arcsec [0.68σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

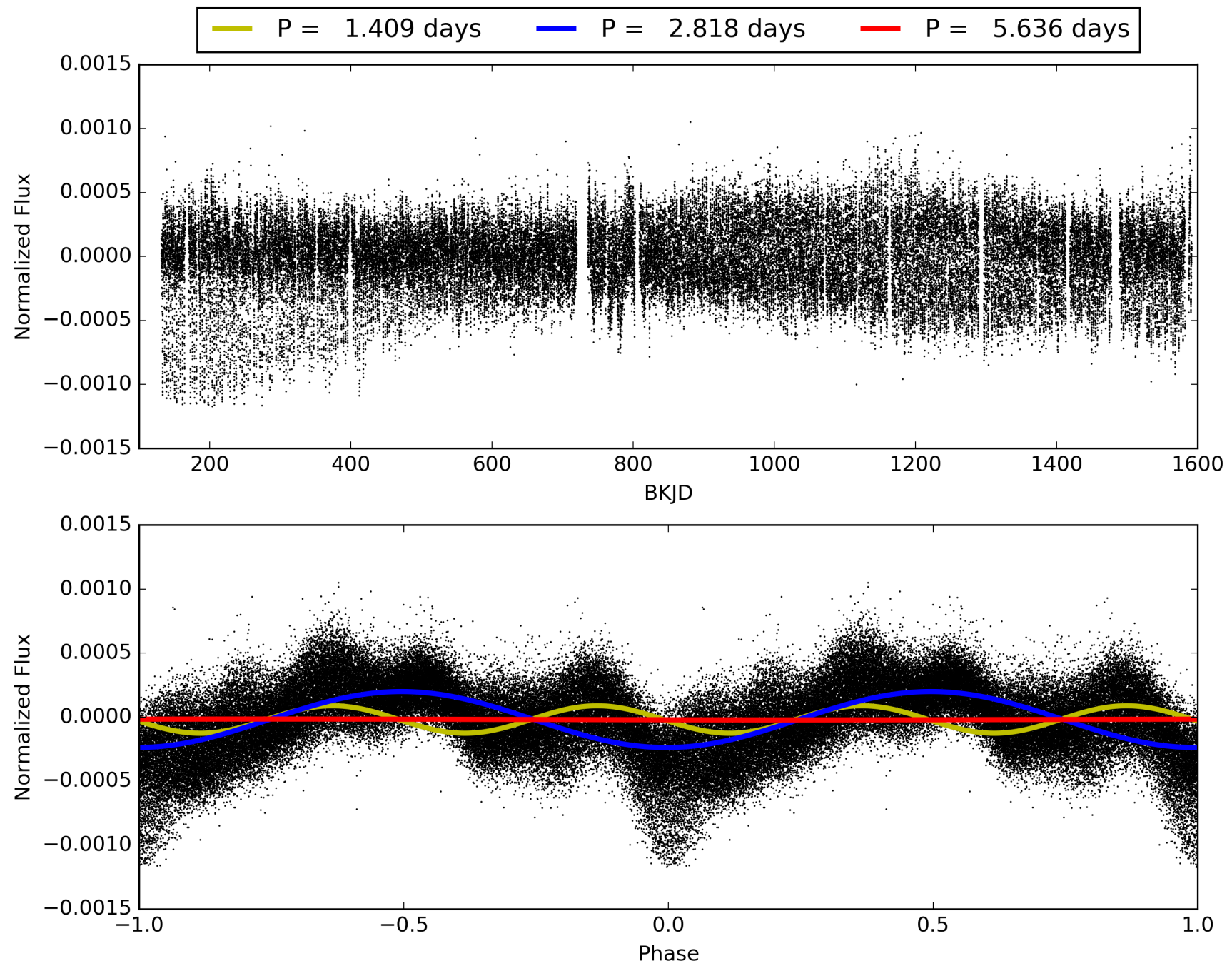
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:43:50 Z

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

# TCE 006068502-01, PDC Light Curves

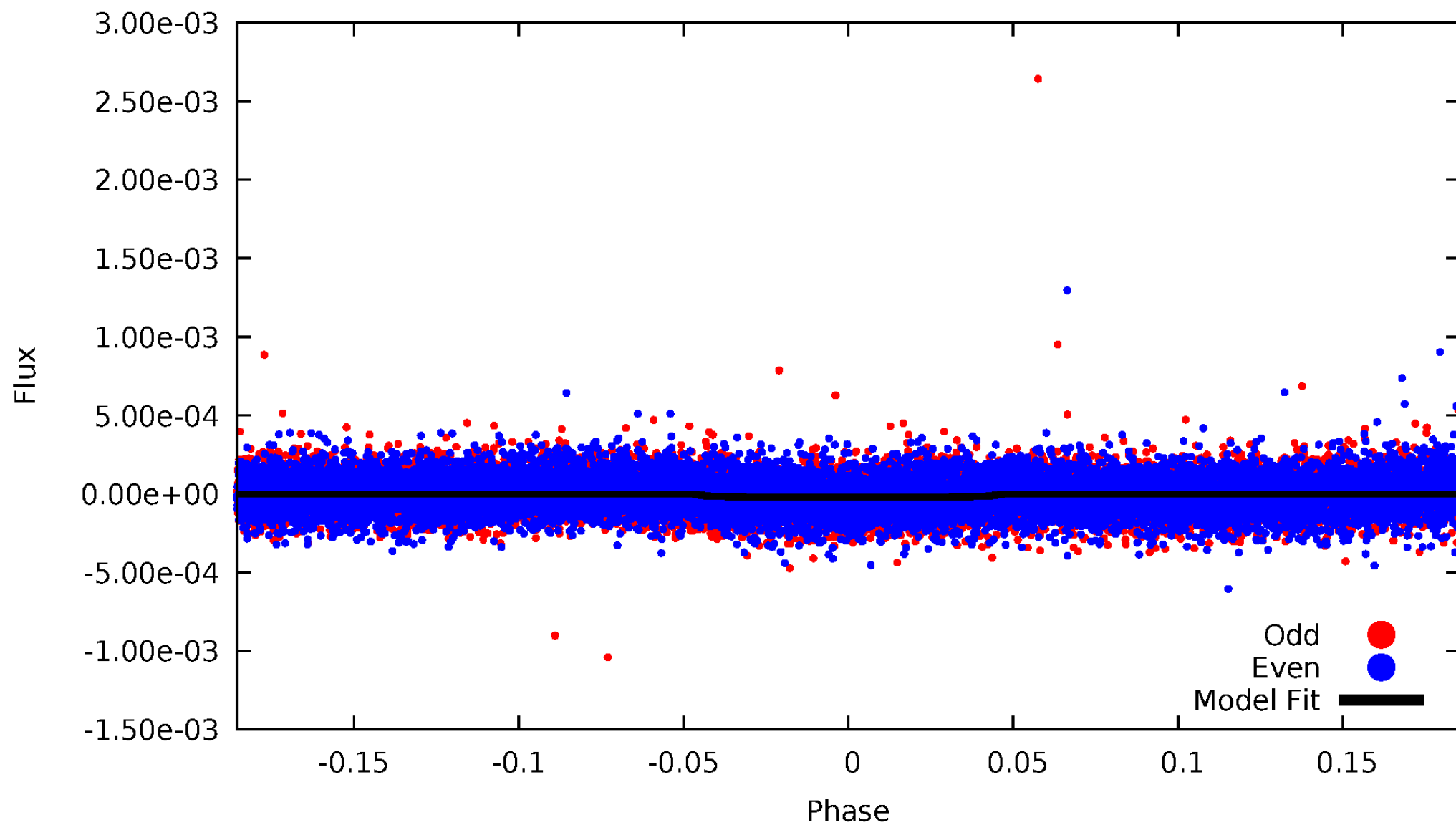


TCE 006068502-01



# DV Odd/Even

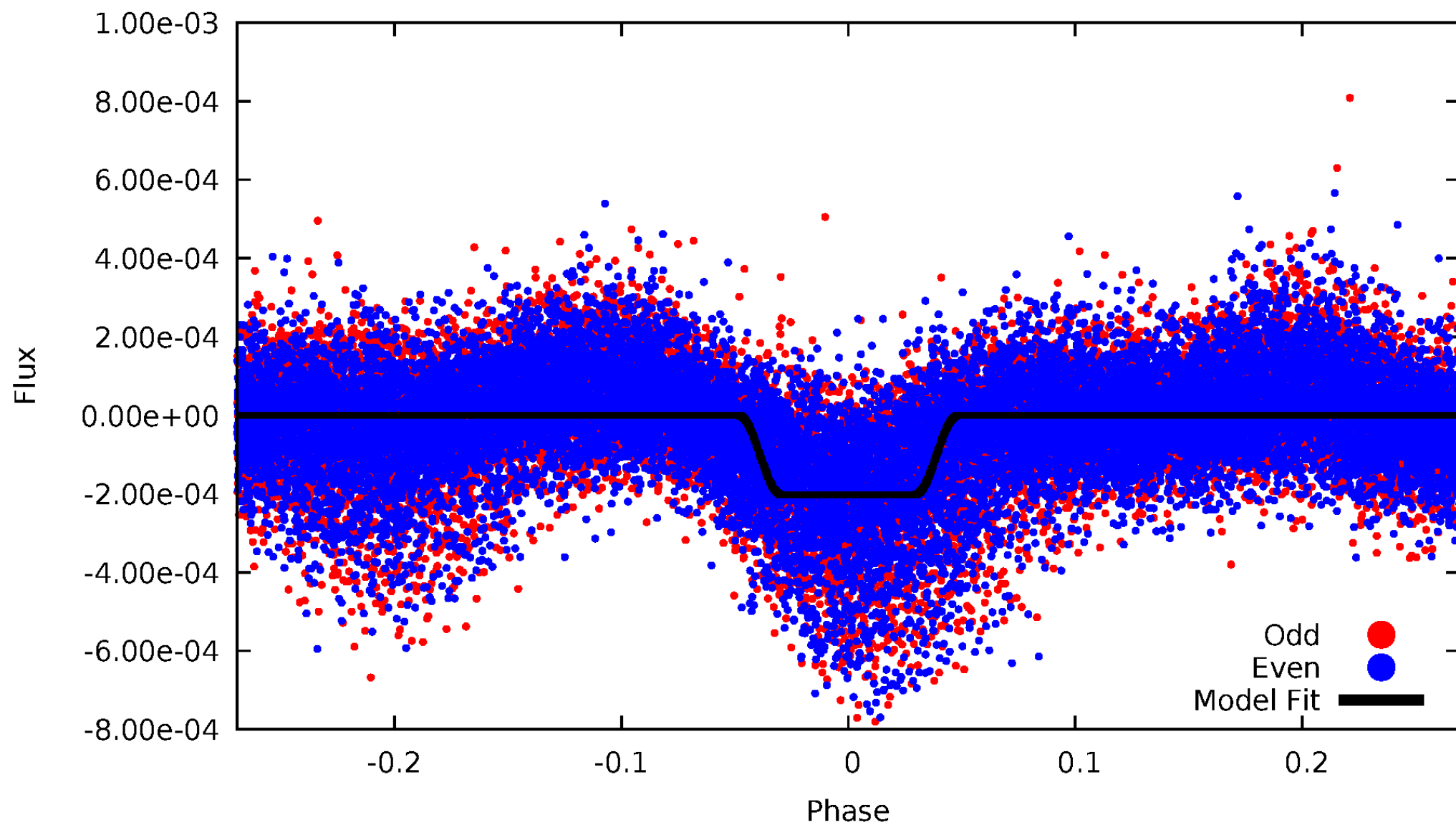
TCE 006068502-01





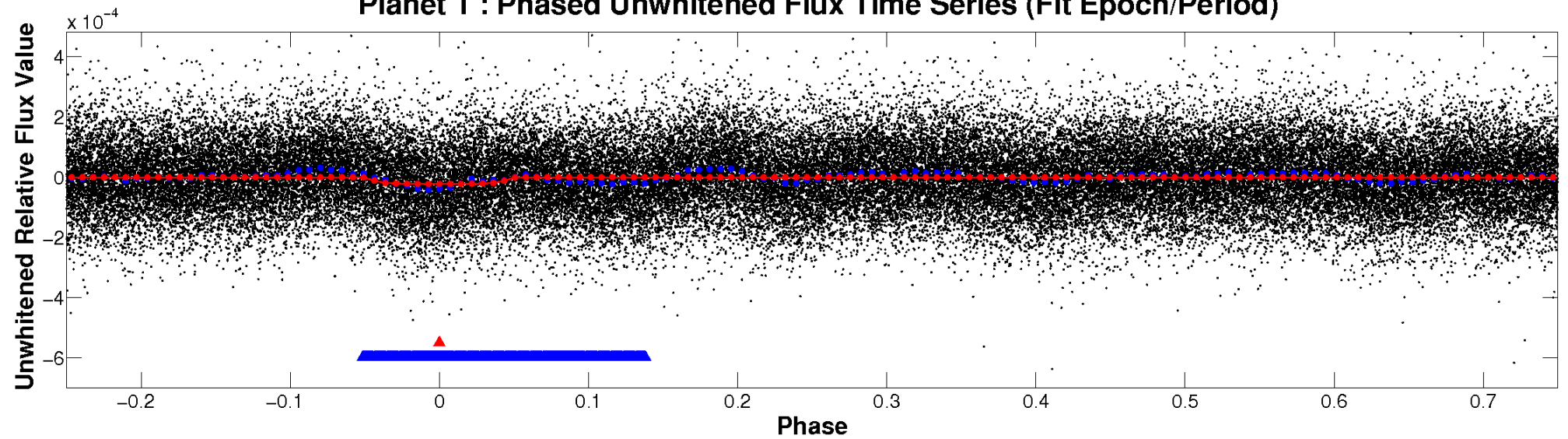
# ALT Odd/Even

TCE 006068502-01

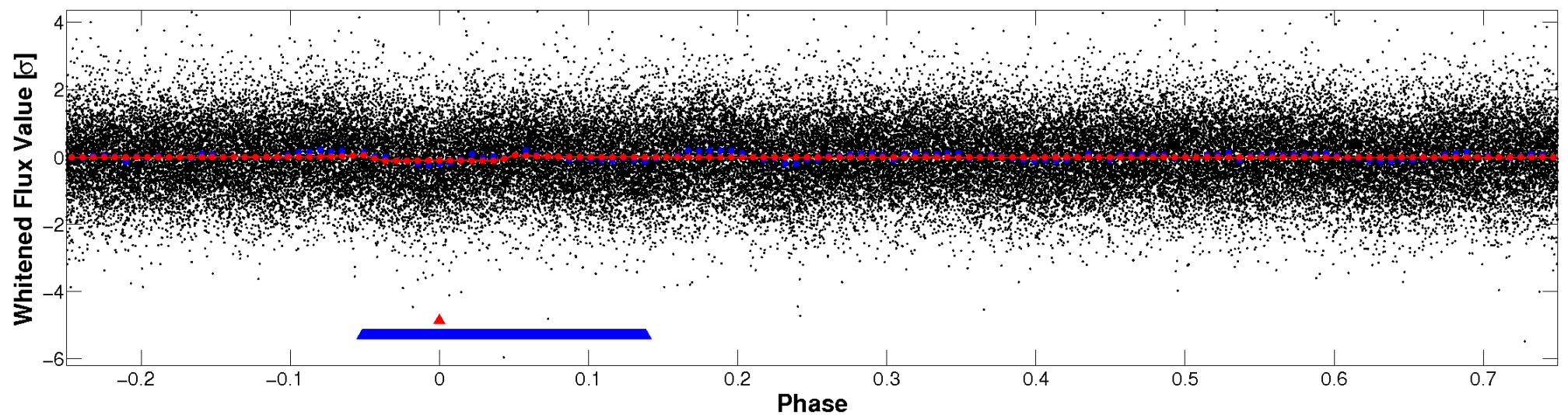


# Non-Whitened Vs. Whitened Light Curve

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

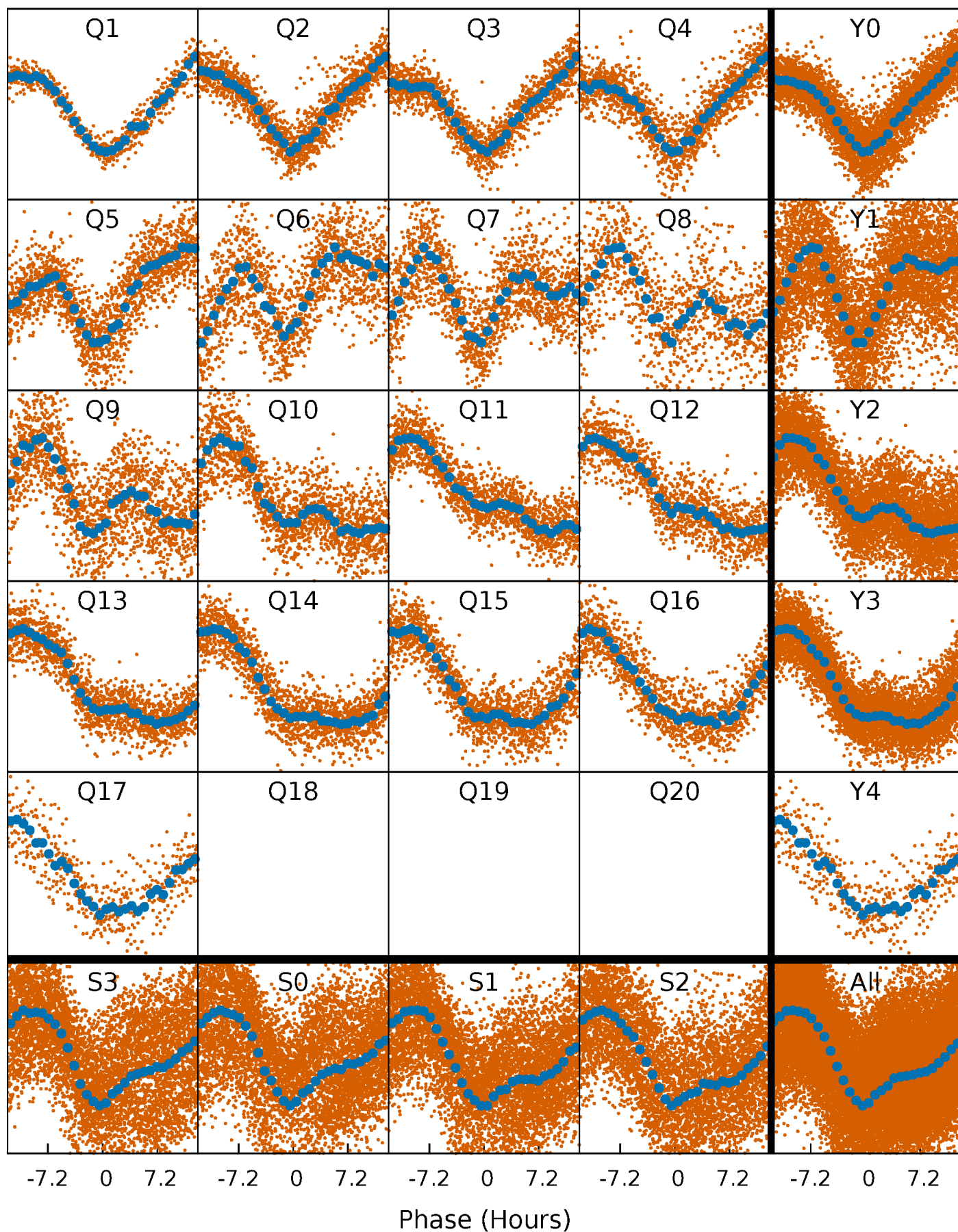


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

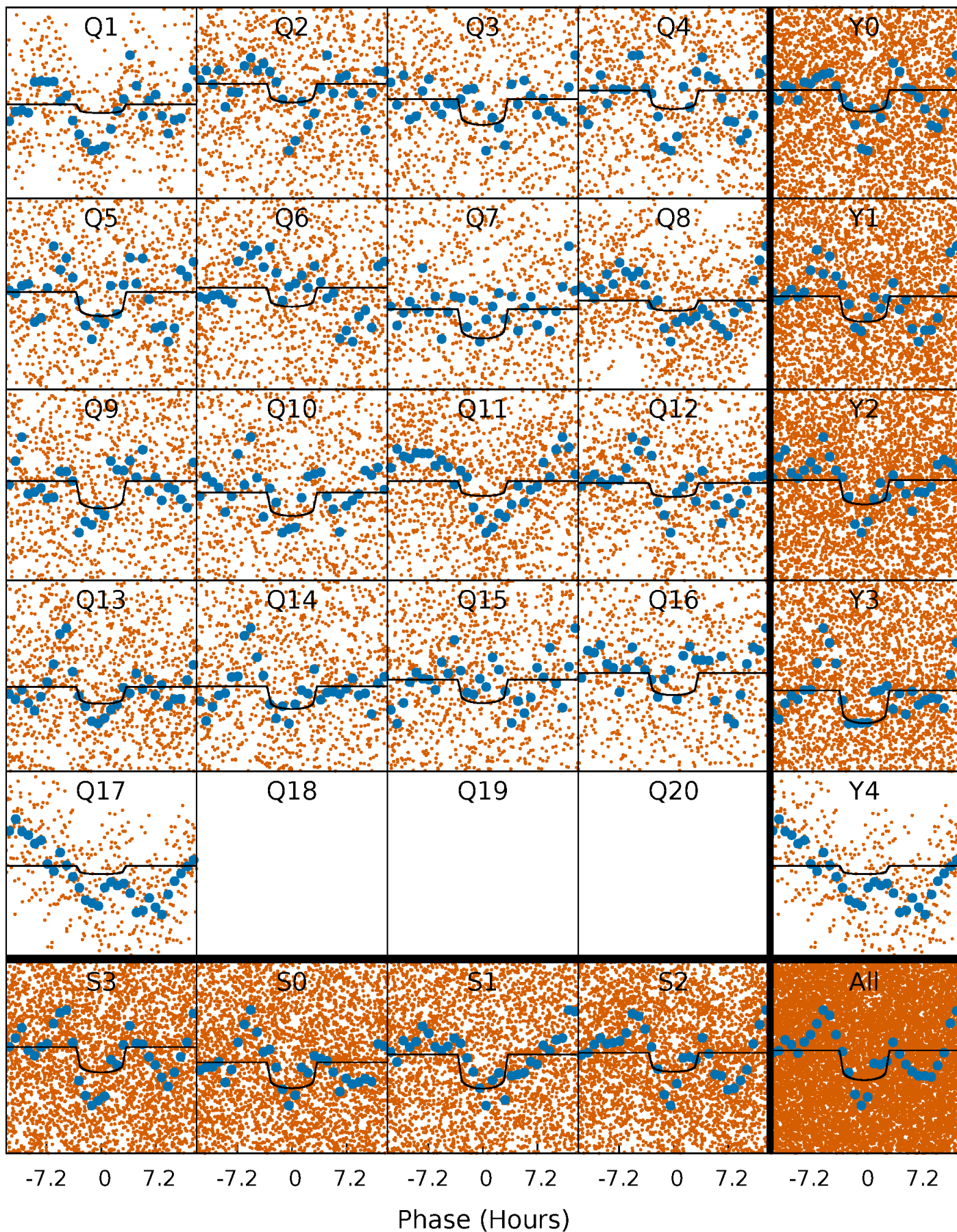
TCE 006068502-01 P= 2.818094 Days  $T_0=132.977072$  (BKJD)





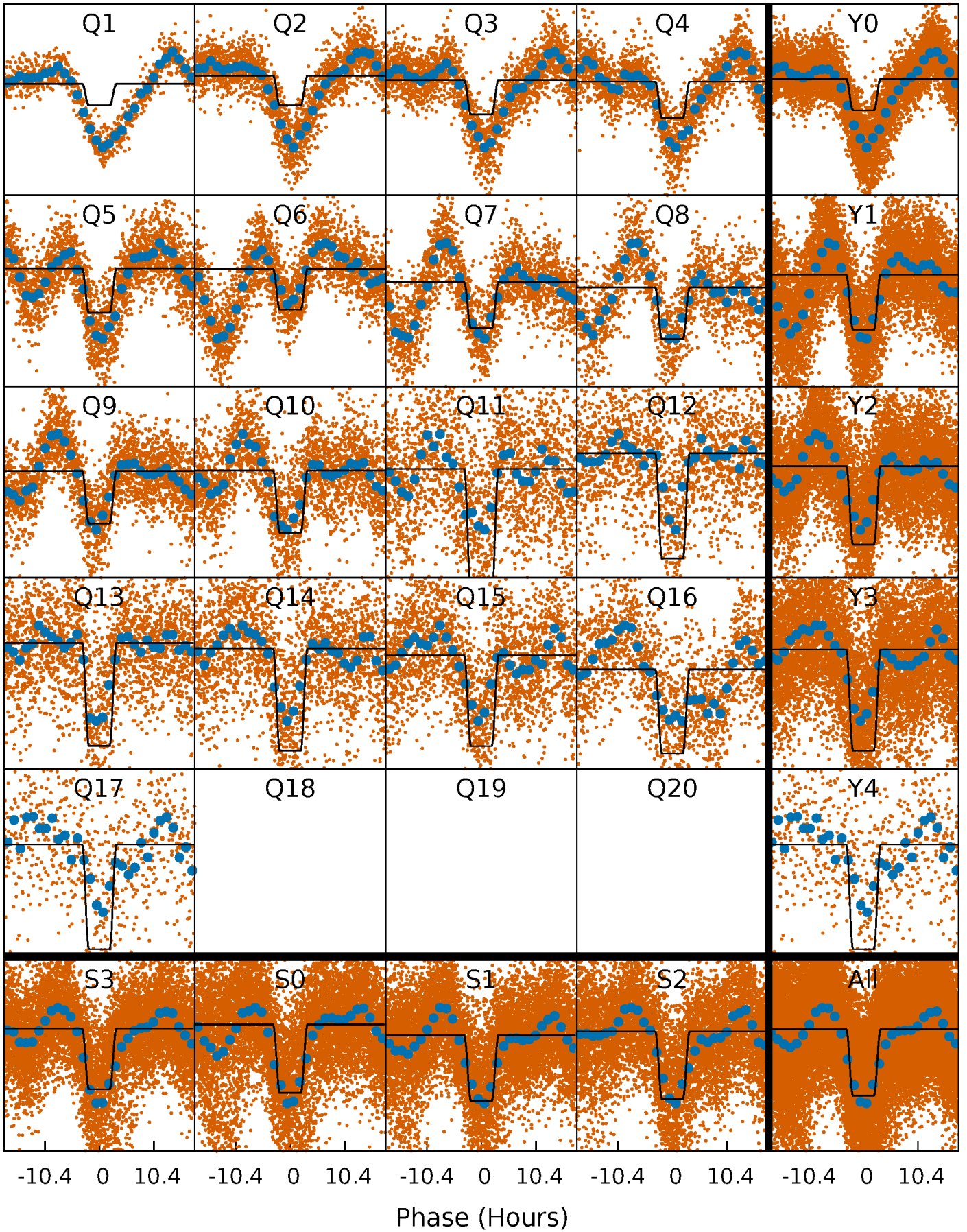
# DV Quarter-Phased Transit Curves

TCE 006068502-01 P= 2.818094 Days  $T_0=132.977072$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

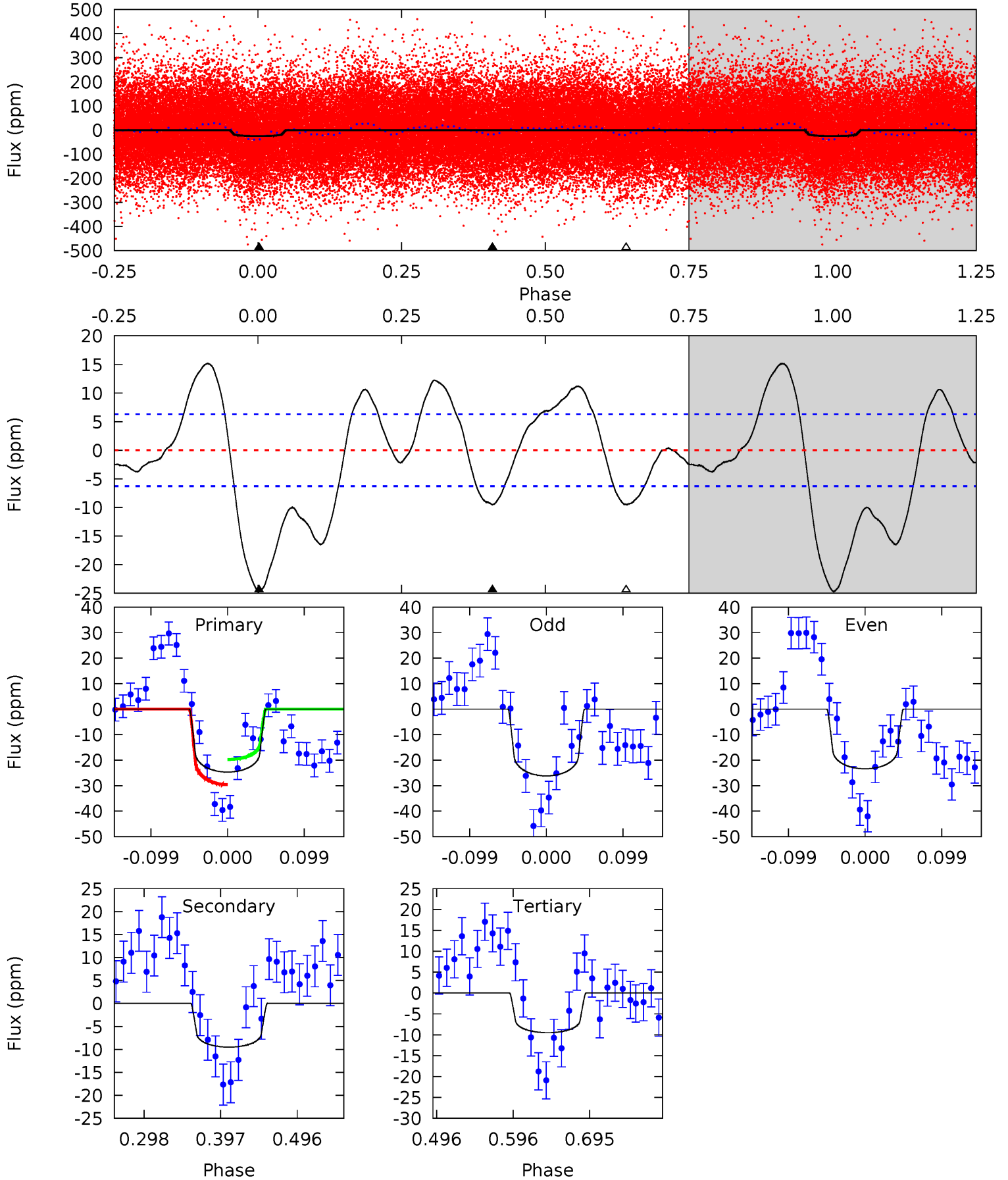
TCE 006068502-01 P= 2.818026 Days  $T_0=132.955276$  (BKJD)



# DV Model-Shift Uniqueness Test

006068502-01, P = 2.818094 Days, E = 130.158978 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
17.9	6.90	6.89	0	4.57	1.65	5.15	11.0	17.9	0.01	6.90	1.02	0.97	0.38	3.57

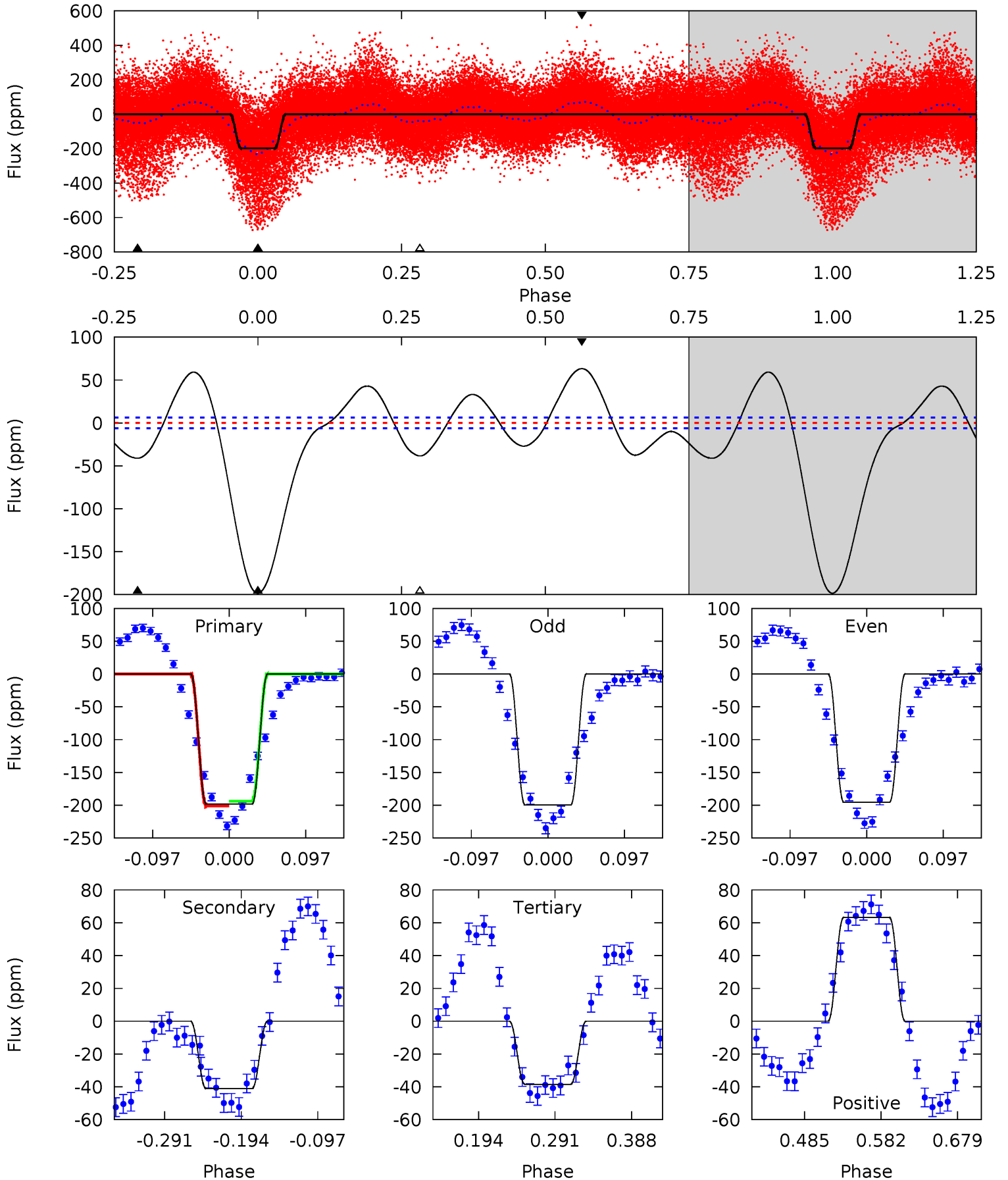




# Alt Model-Shift Uniqueness Test

006068502-01, P = 2.818026 Days, E = 130.137250 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
144.2	29.9	28.0	46.0	4.57	1.66	21.2	116.3	98.2	1.97	-16.1	1.49	1.17	0.24	2.50



### Stellar Parameters For KIC 006068502

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6850^{+183}_{-204}$	$3.813^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.473^{+0.460}_{-0.854}$	$1.453^{+0.205}_{-0.308}$	$0.135^{+0.264}_{-0.040}$
	+3%/-3%	+7%/-2%	+68%/-57%	+19%/-35%	+14%/-21%	+195%/-30%
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 006068502-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-10 \pm 1$	$1.27^{+0.36}_{-0.30}$	$3109^{+181}_{-262}$	$5298^{+719}_{-457}$	$6.170^{+4.580}_{-2.369}$
Alt.	$-41 \pm 1$	$3.69^{+0.58}_{-0.66}$	$3091^{+188}_{-246}$	$4628^{+188}_{-171}$	$3.297^{+1.352}_{-0.778}$

$T_{\text{max}}$  = 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

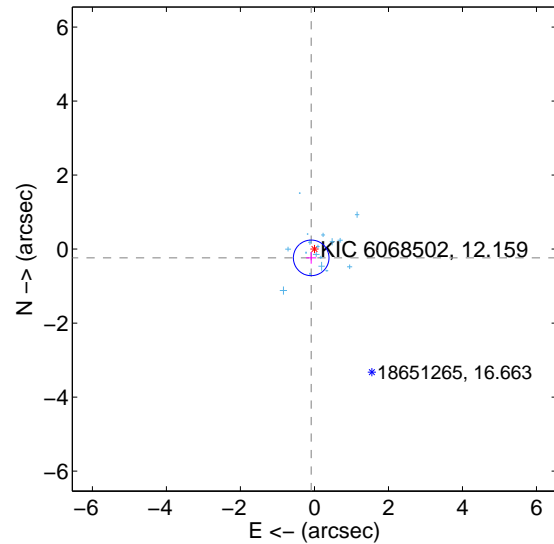
Supplemental centroid analysis for 006068502-01. Kepler magnitude: 12.16. Transit SNR 7.79

There are 17 quarters with good PRF difference image offsets

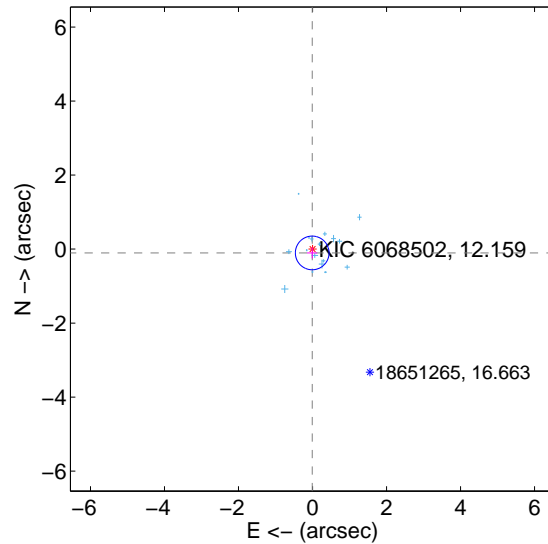
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.253 \pm 0.160$	1.57	$0.088 \pm 0.137$	$-0.237 \pm 0.159$
PRF-fit source offset from KIC position	$0.104 \pm 0.152$	0.68	$0.009 \pm 0.138$	$-0.103 \pm 0.150$
photometric centroid source offset	$2.89 \pm 0.85$	3.39	$-2.88 \pm 0.85$	$0.21 \pm 0.77$

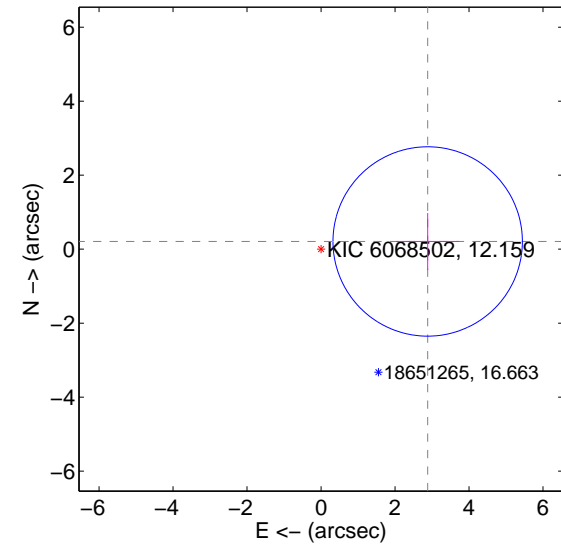
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

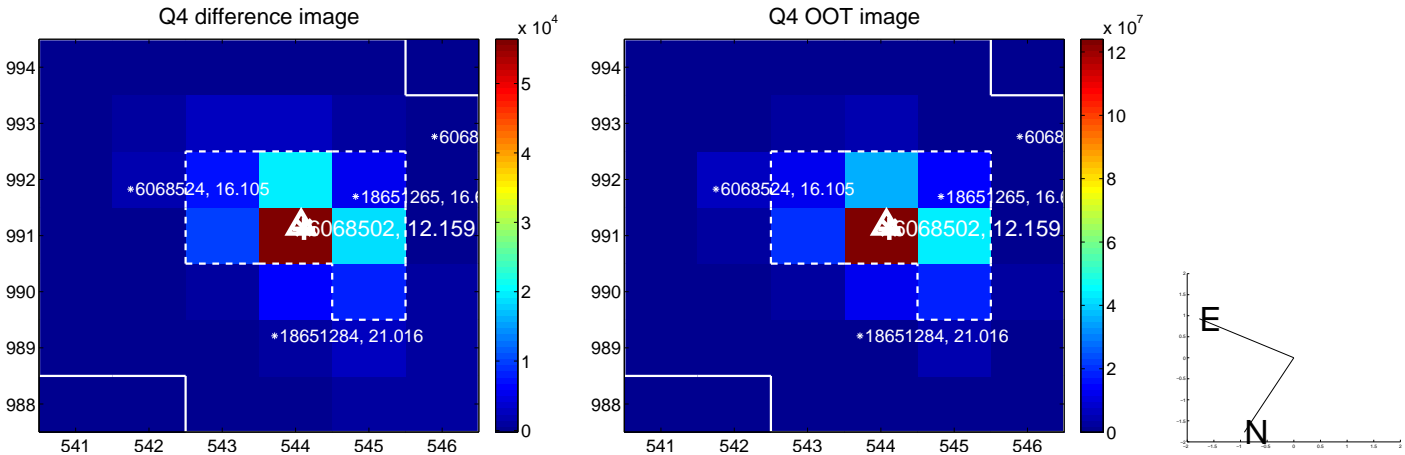
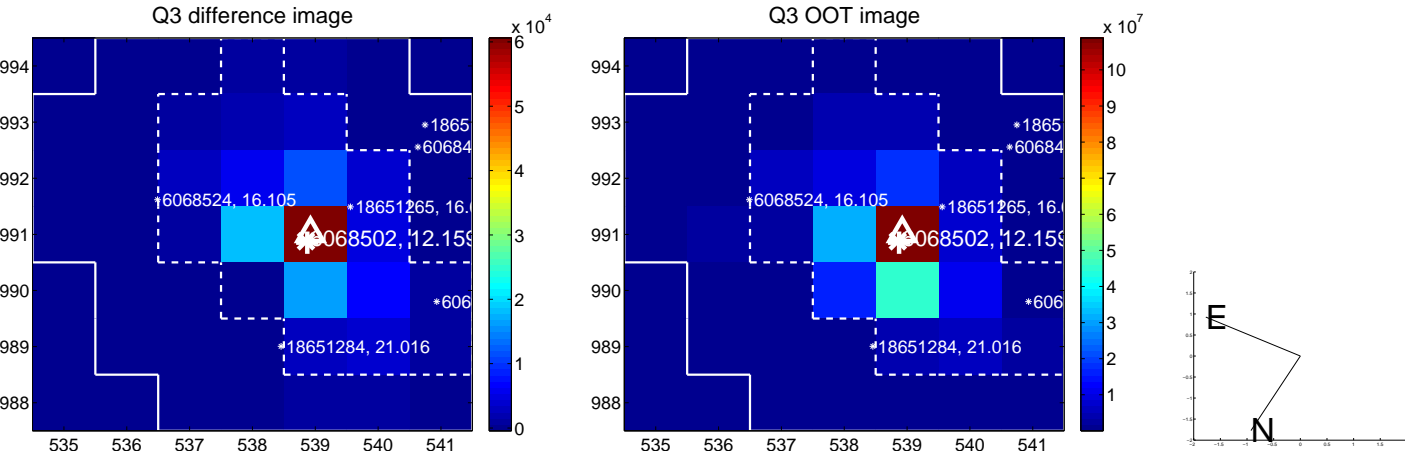
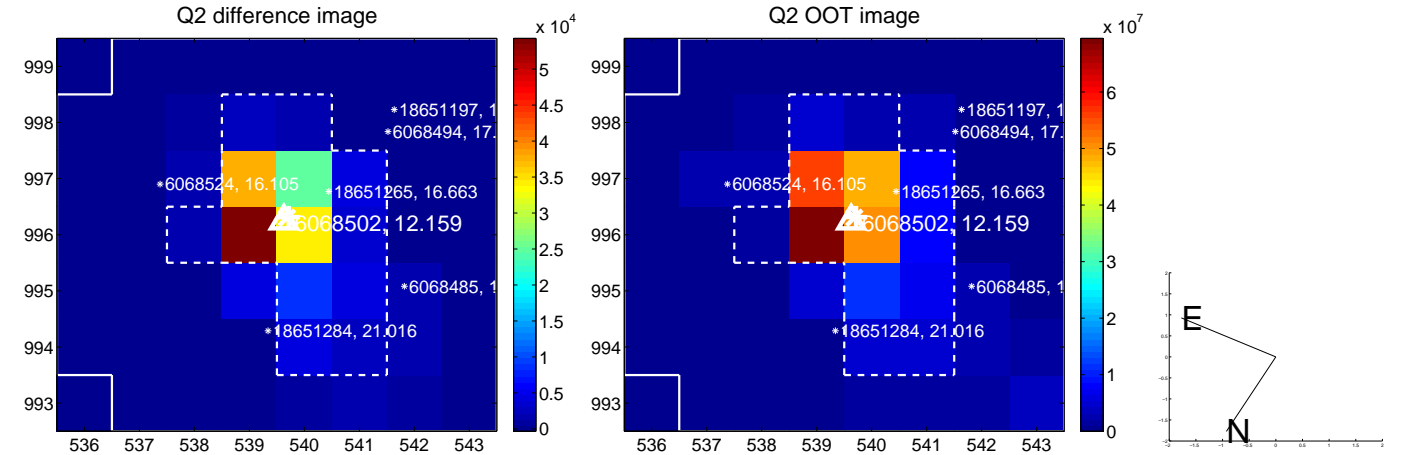
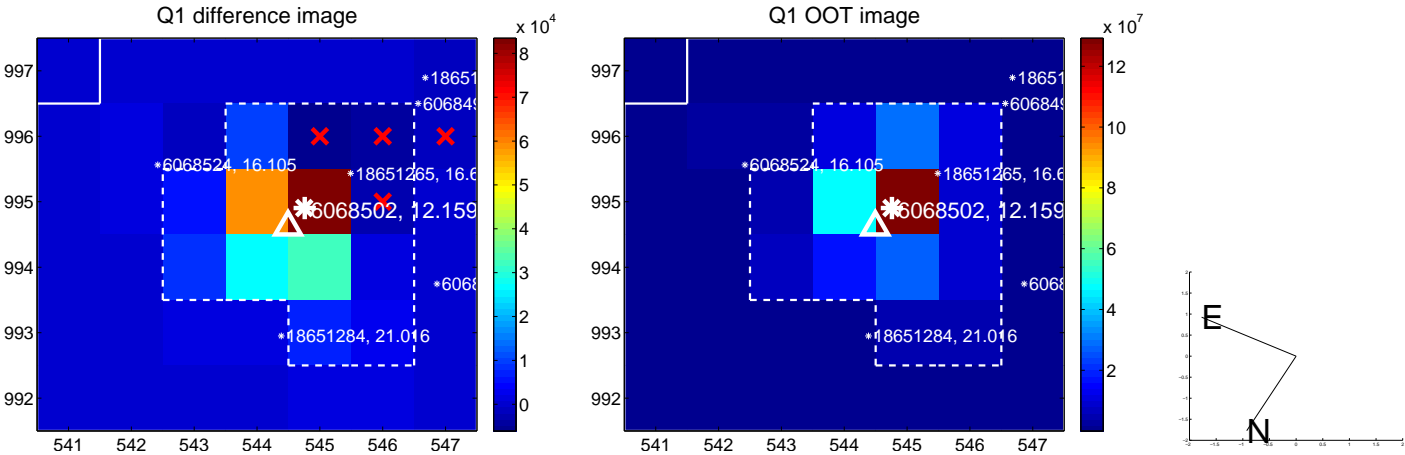


offset from photometric centroids

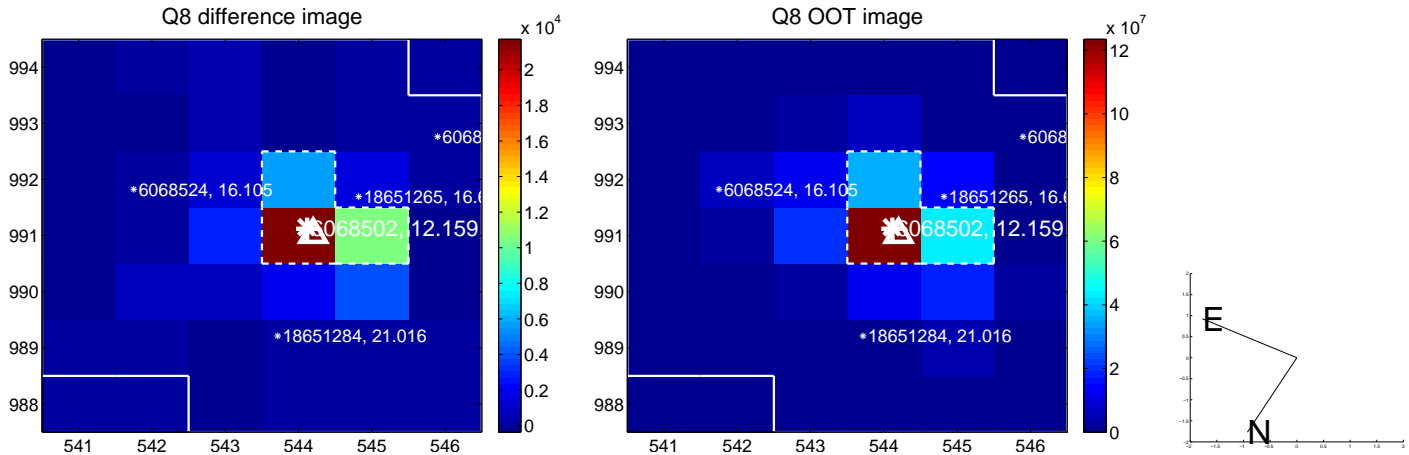
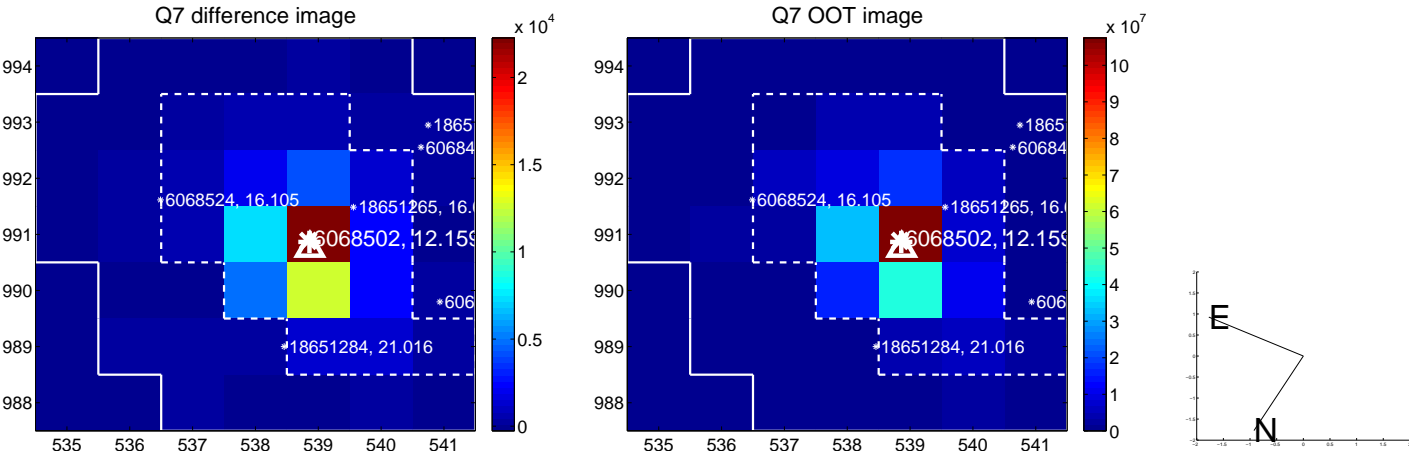
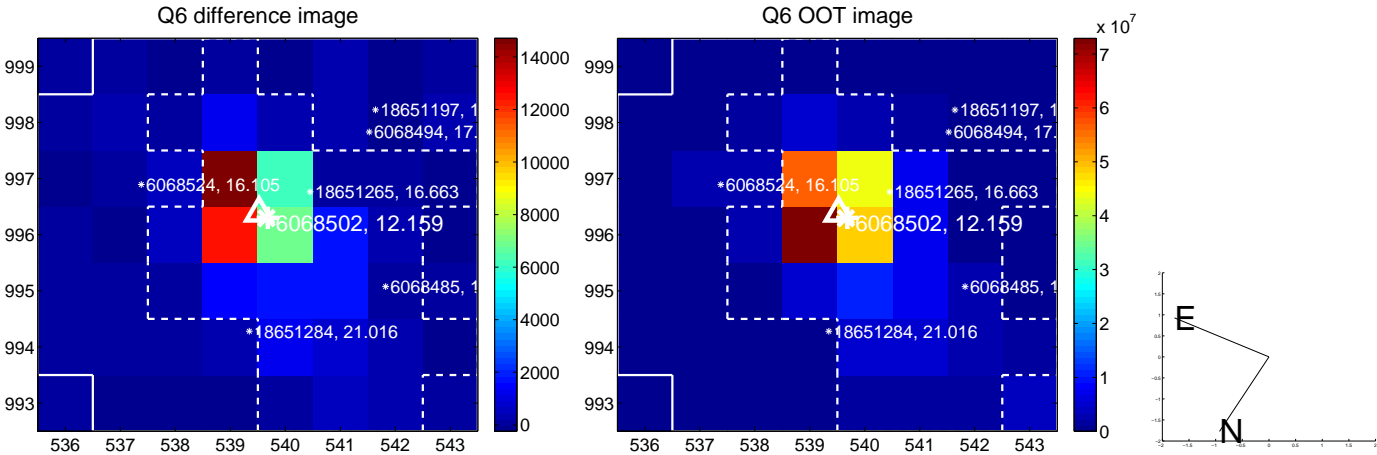
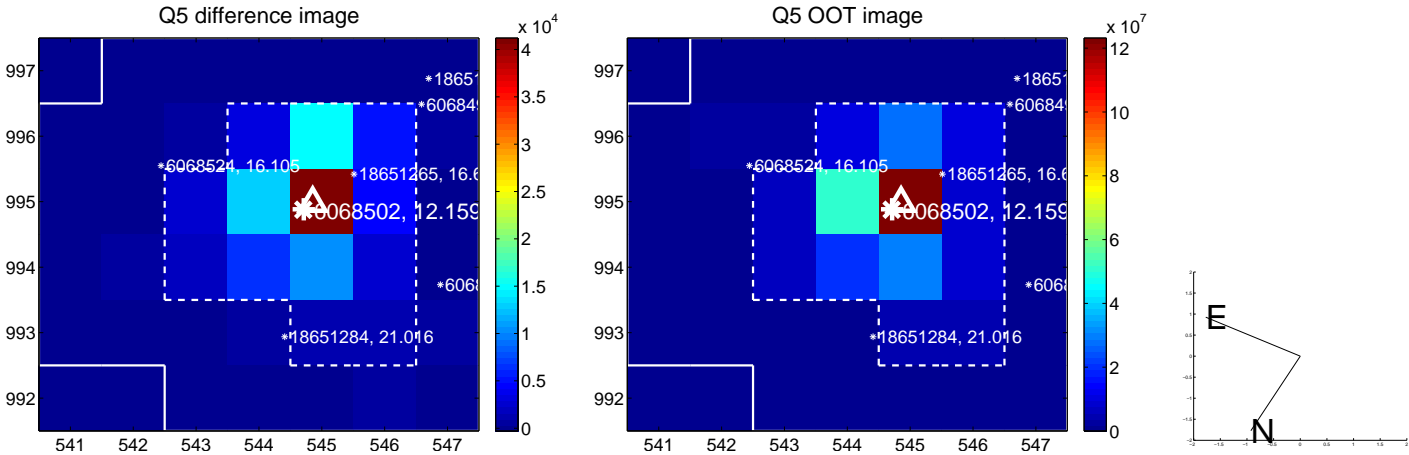


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

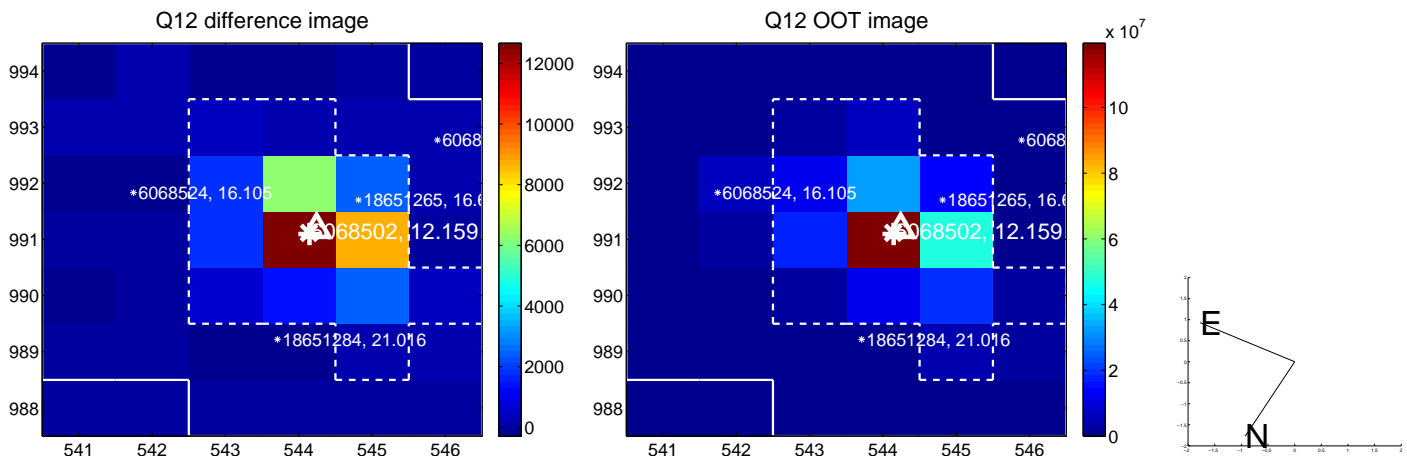
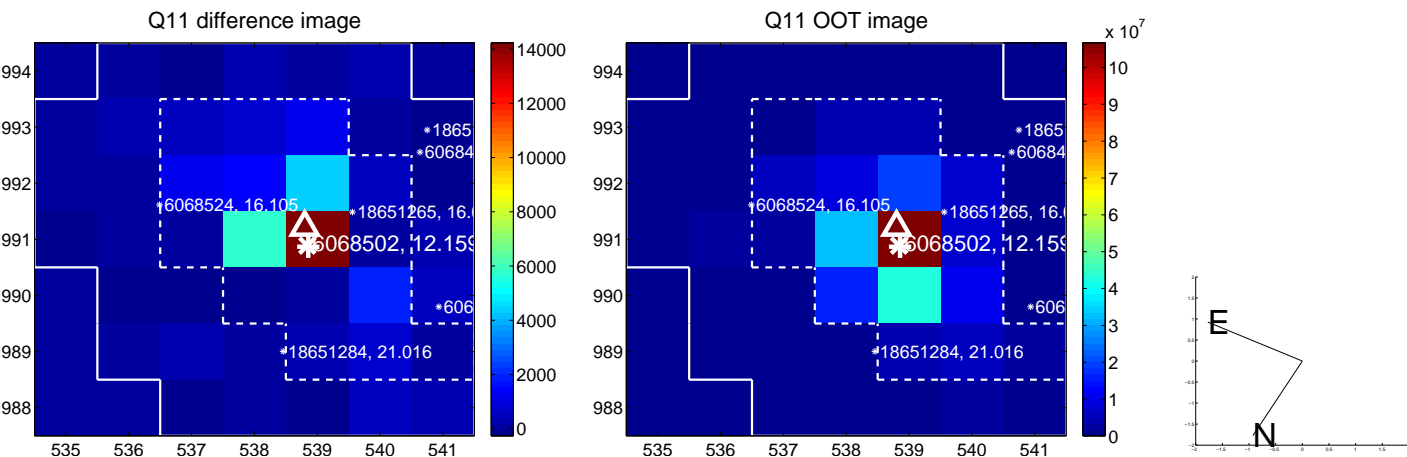
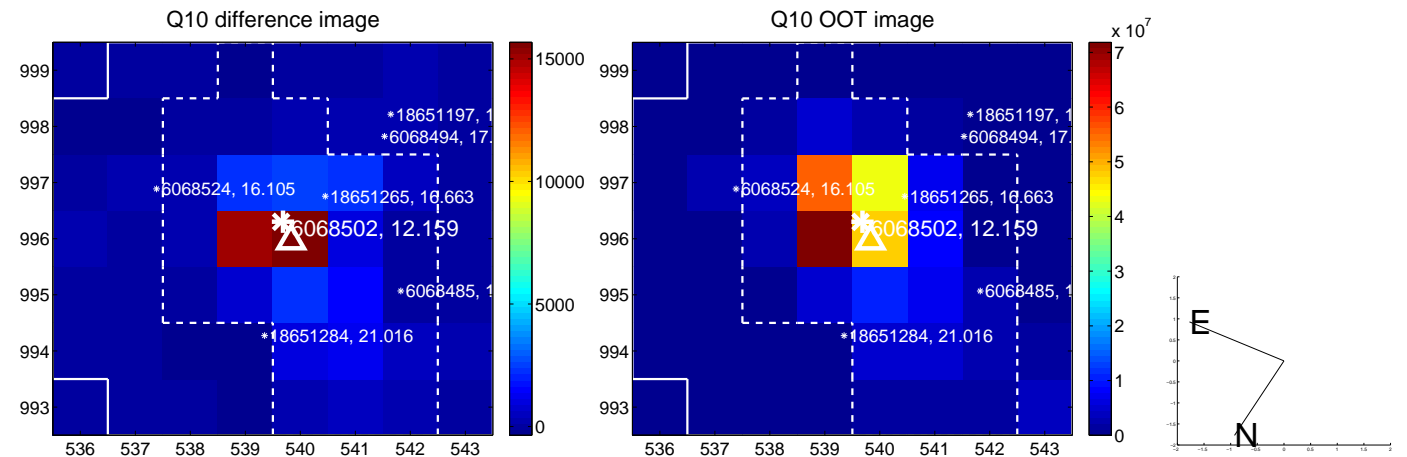
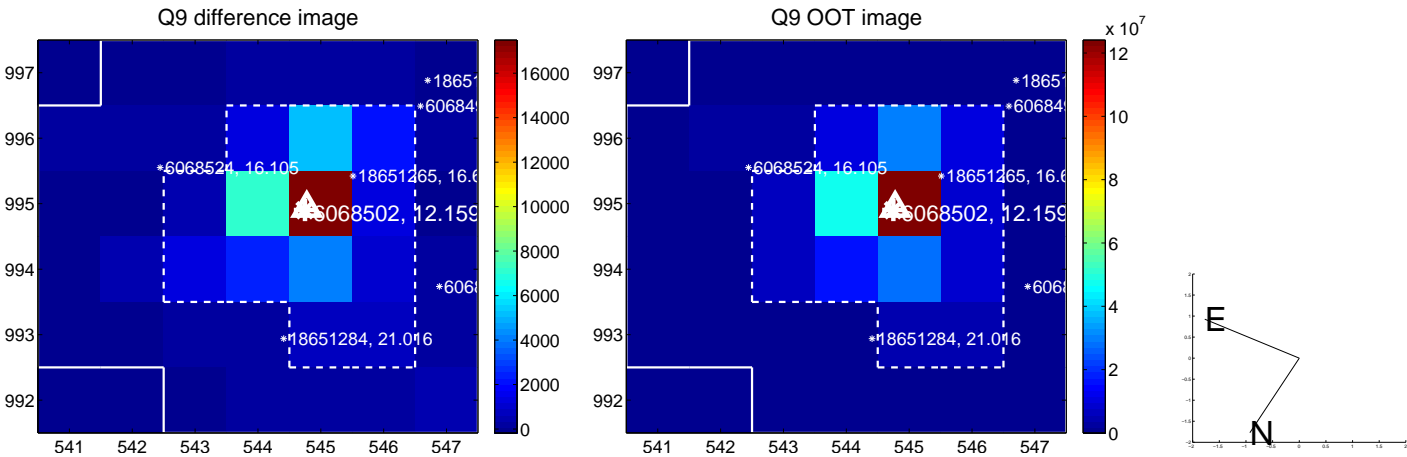
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



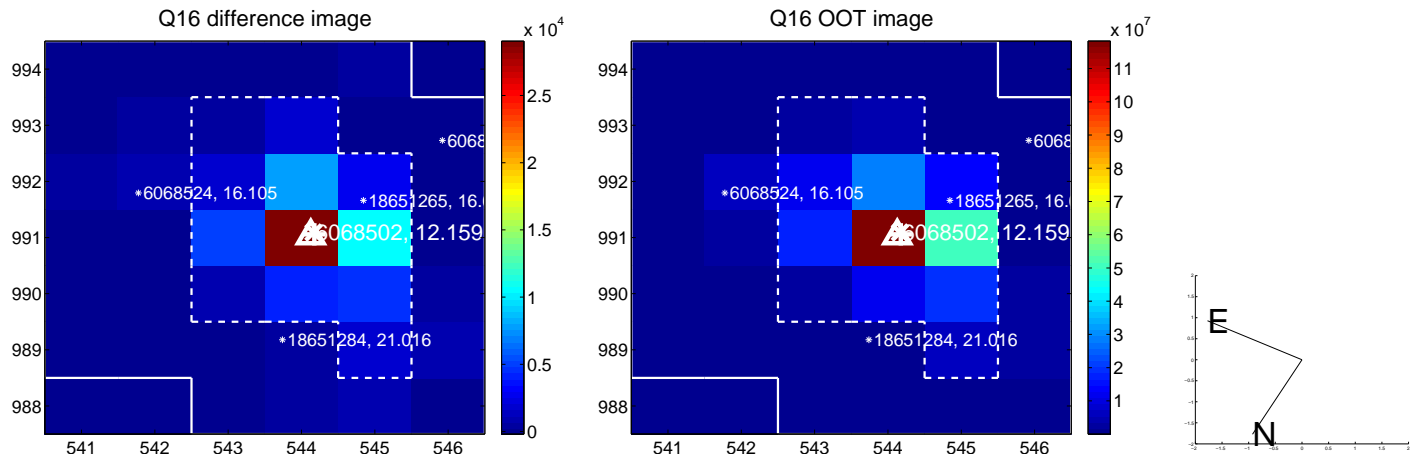
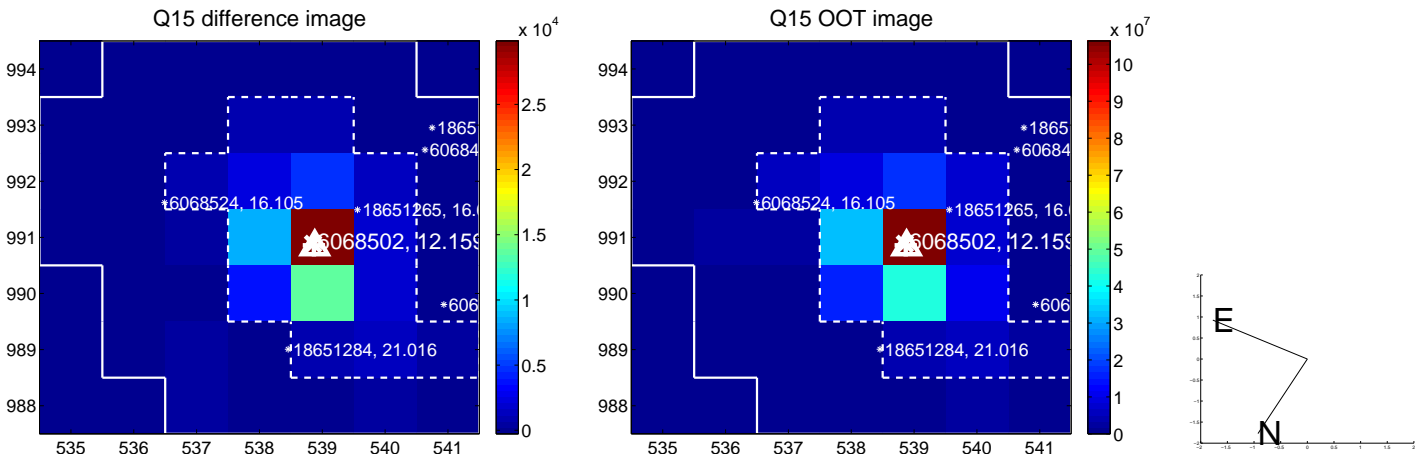
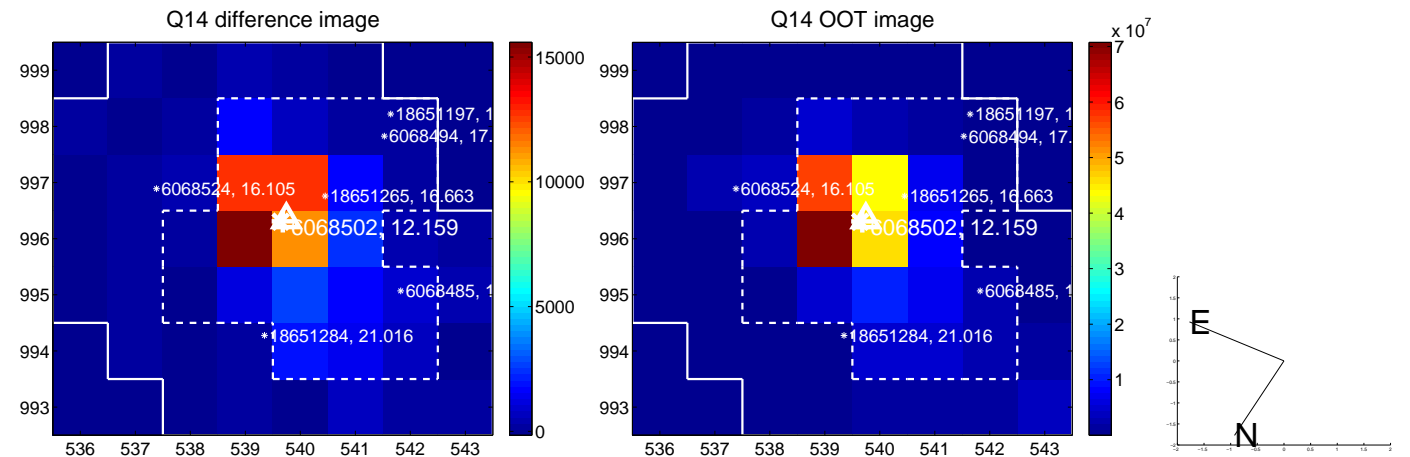
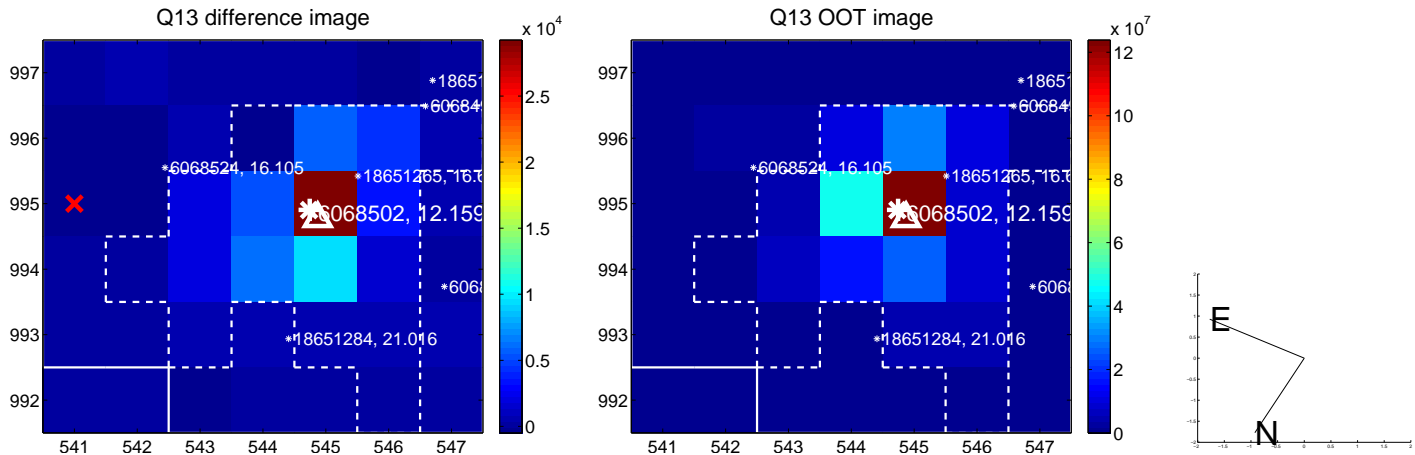
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

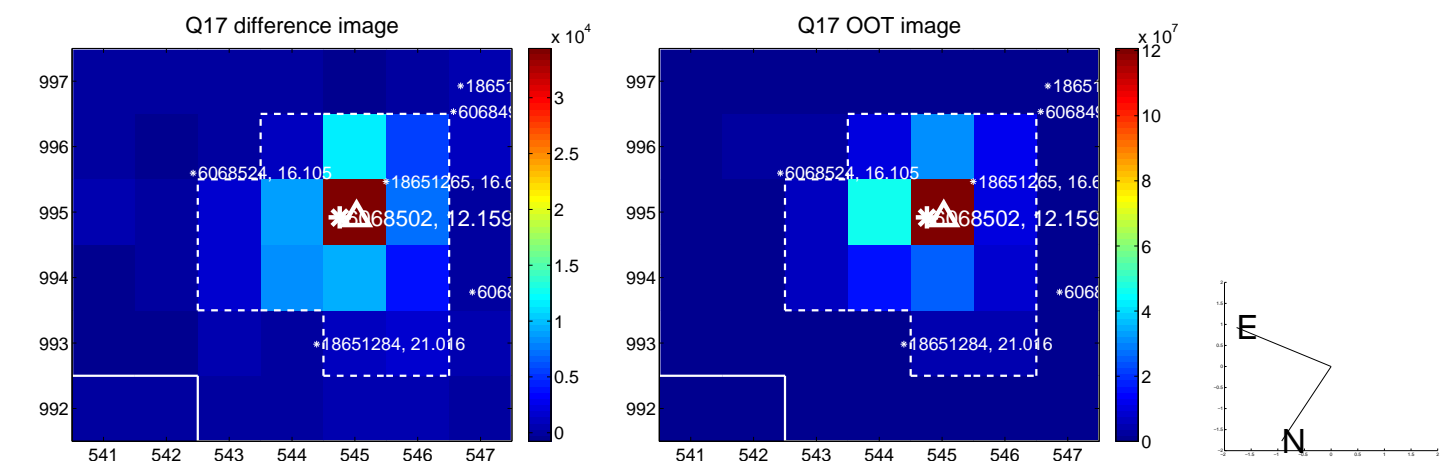


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

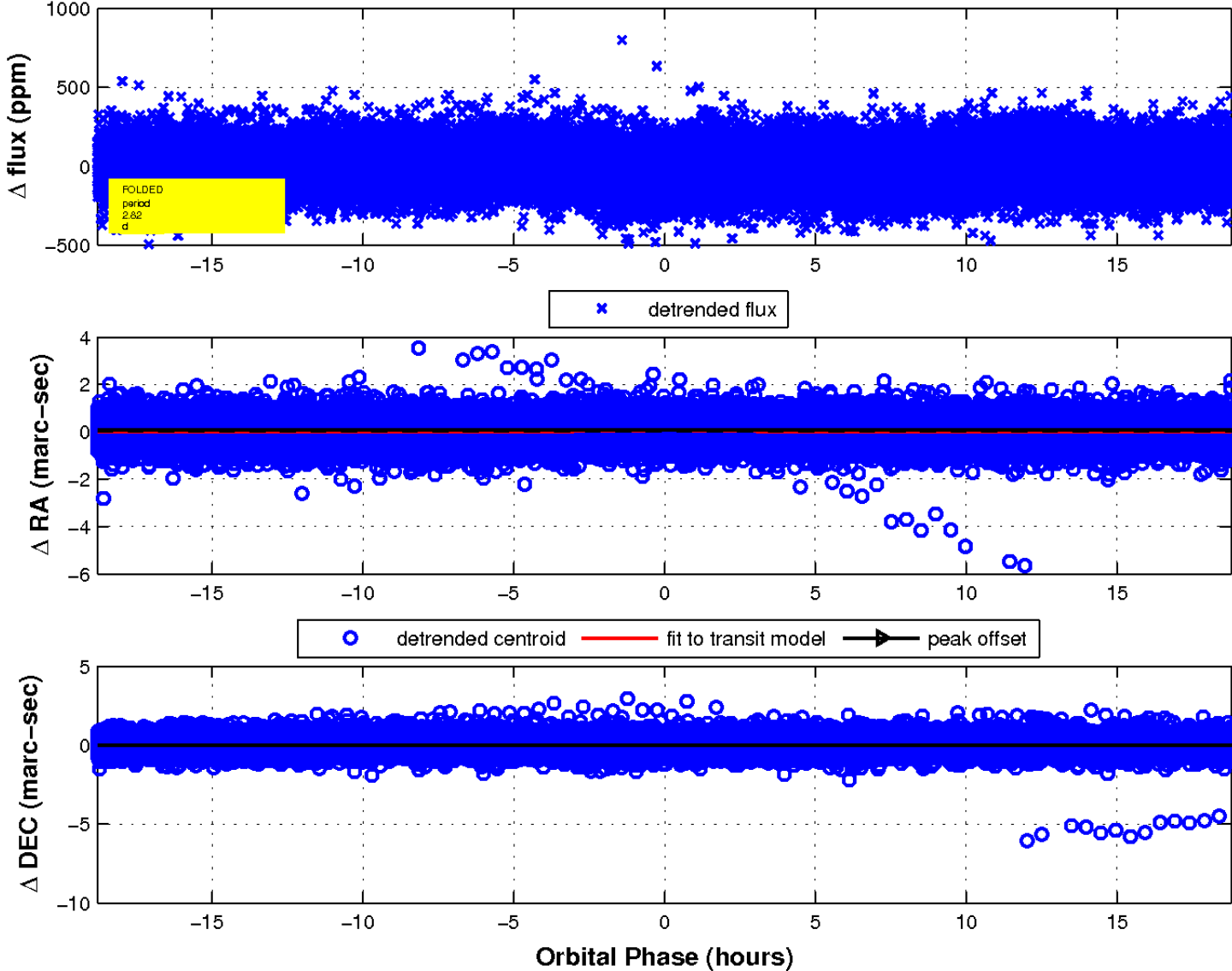




white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

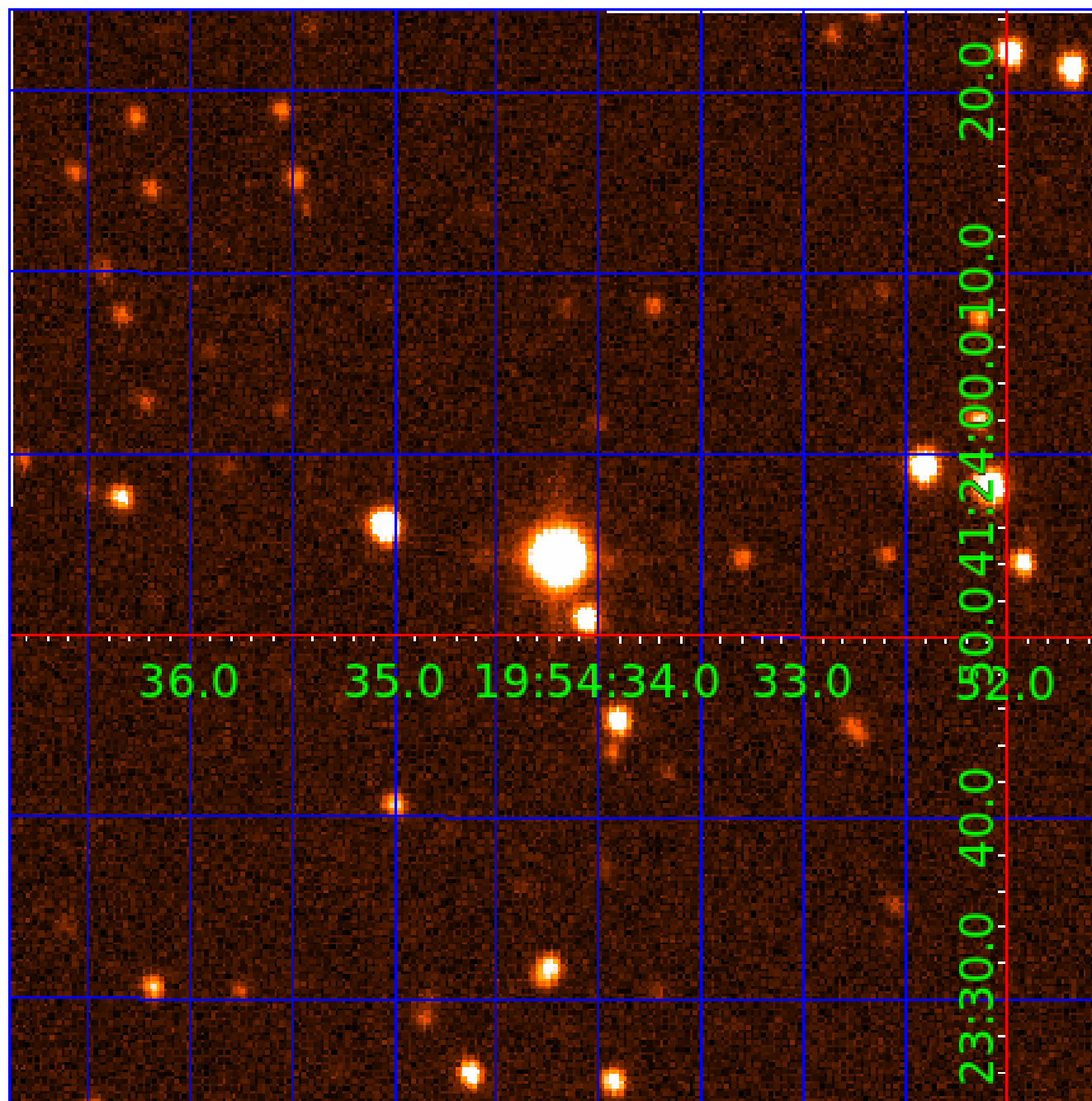


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 006068502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006068502-01	OBS	No	2.818094	132.977072	22.1	6.269	9.7	7.8	2.47	6850	1.35	6173.51
006068502-02	OBS	No	2.817059	133.366749	0.6	8.268	9.3	0.1	2.47	6850	0.23	6176.53

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006068502-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006068502-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD

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

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

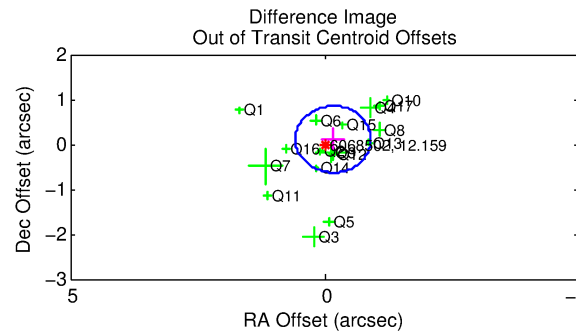
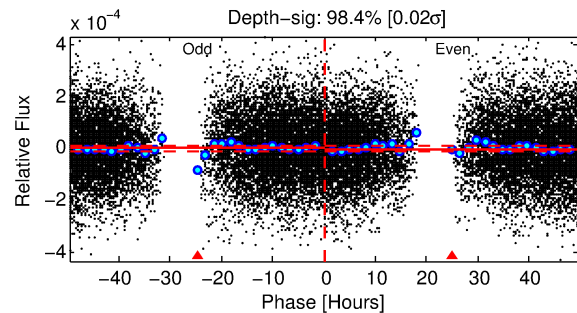
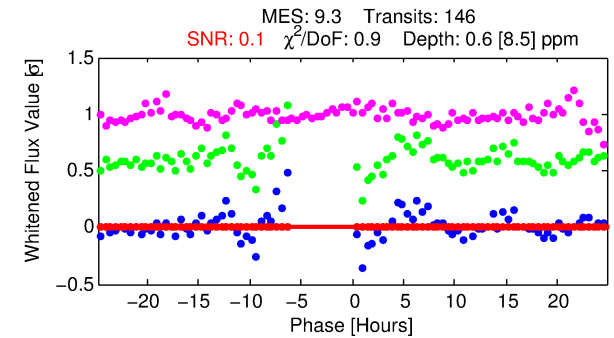
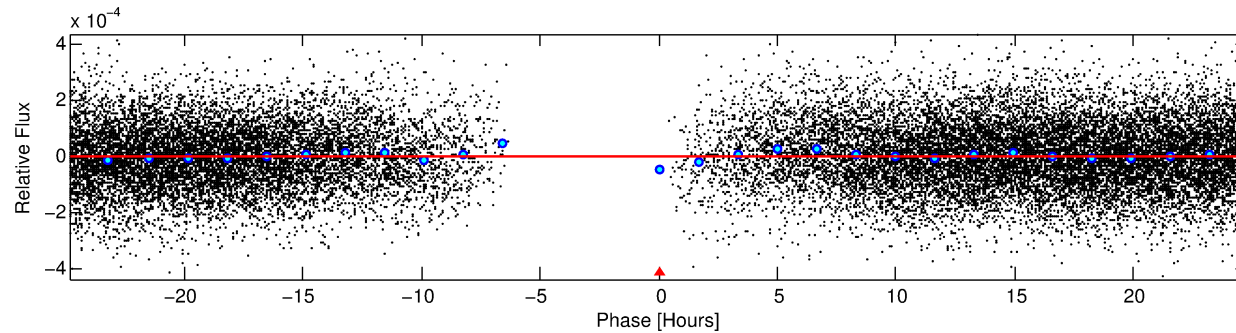
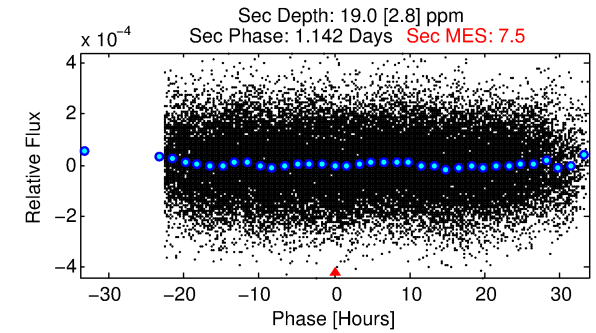
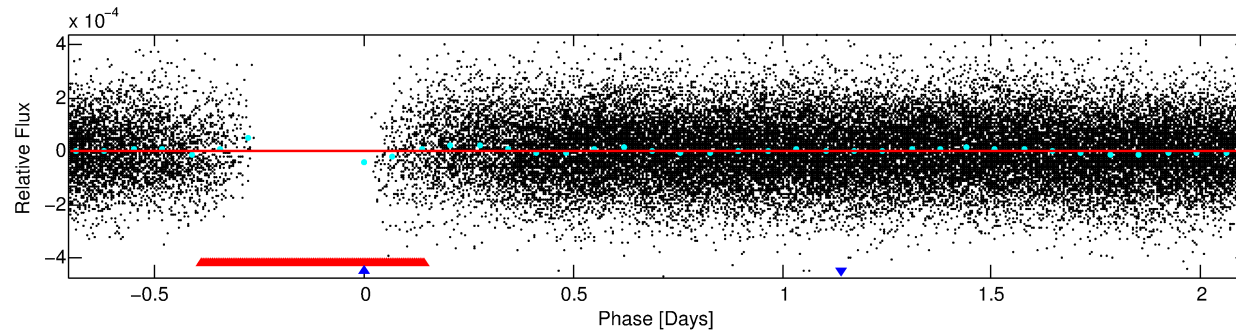
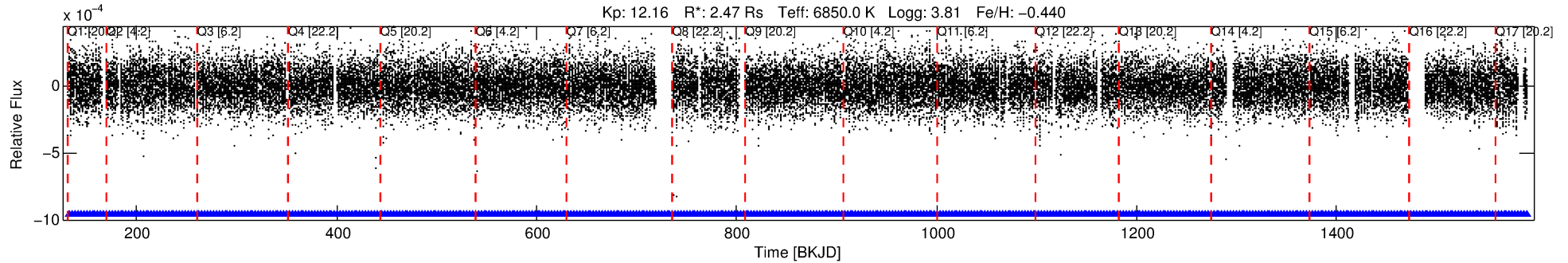
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006068502-02

No Significant Match Found

# DV One-Page Summary

KIC: 6068502 Candidate: 2 of 2 Period: 2.817 d



## DV Fit Results:

Period = 2.81706 [0.00645] d  
Epoch = 133.3667 [1.0240] BKJD  
Rp/R\* = 0.0009 [0.0059]  
a/R\* = 1.45 [8.19]  
b = 0.91 [2.09]  
Seff = 6176.53 [3140.93]  
Teq = 2261 [287] K  
Rp = 0.23 [1.60] Re  
a = 0.0442 [0.0140] AU  
Ag = 376.67 [5175.66] [0.07σ]  
Teffp = 15397 [52860] K [0.25σ]

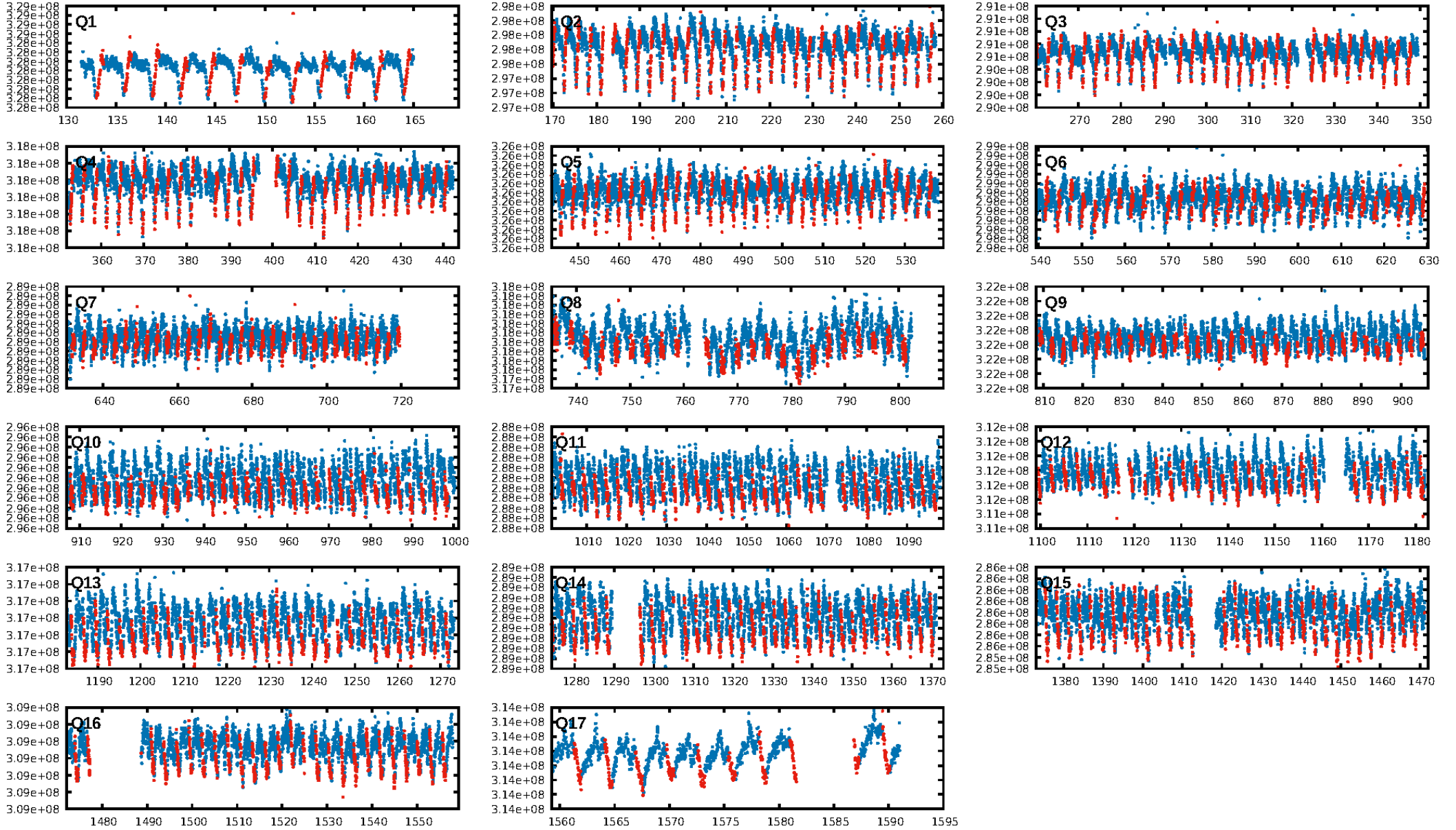
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.2% [0.00σ]  
ModelChiSquare2-sig: 87.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.03e-14  
RollingBand-fgt: 1.00 [134/134]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.196 arcsec [0.80σ]  
KicOffset-rm: 0.245 arcsec [1.10σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.59 [10/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:44:00 Z

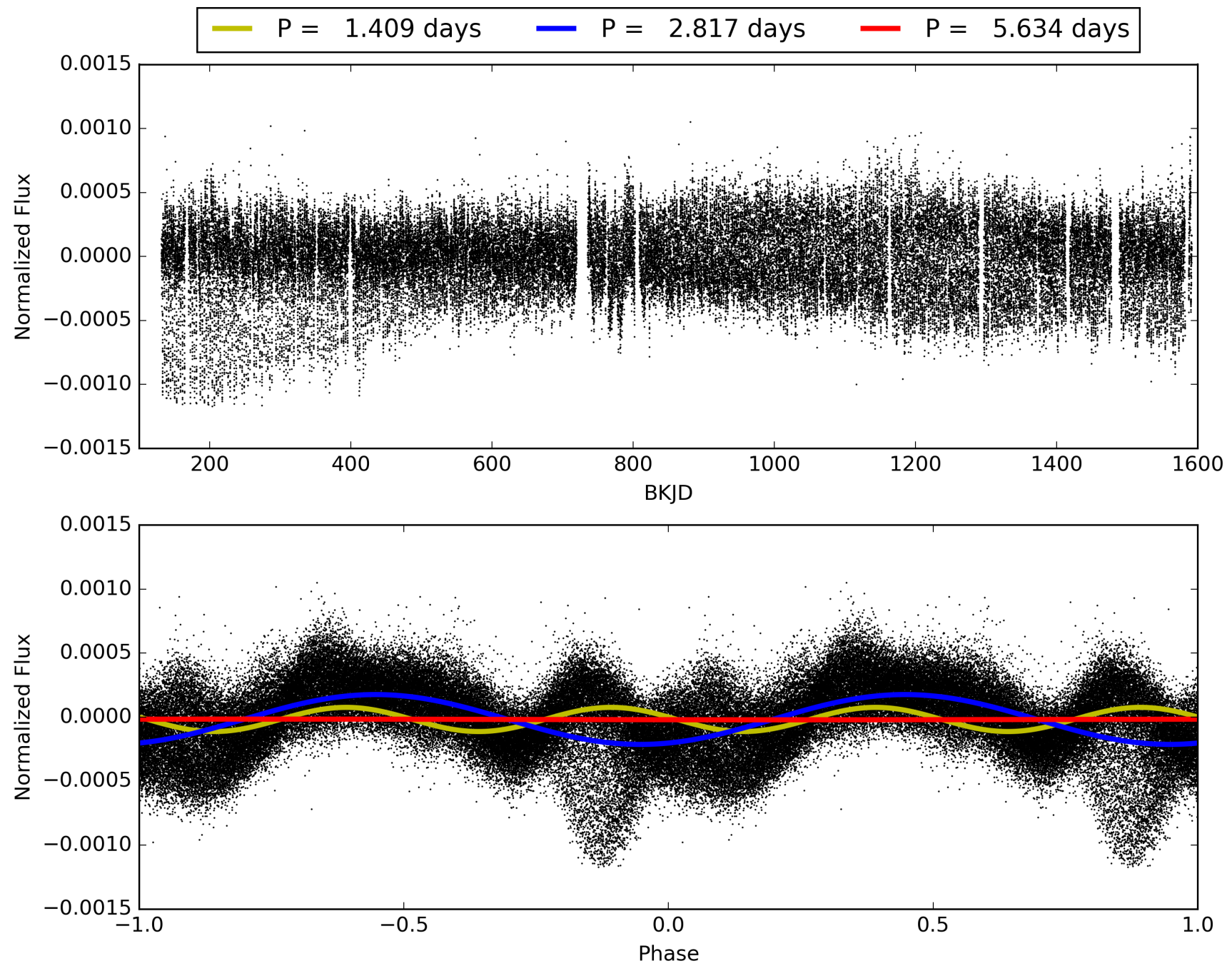
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006068502-02, PDC Light Curves



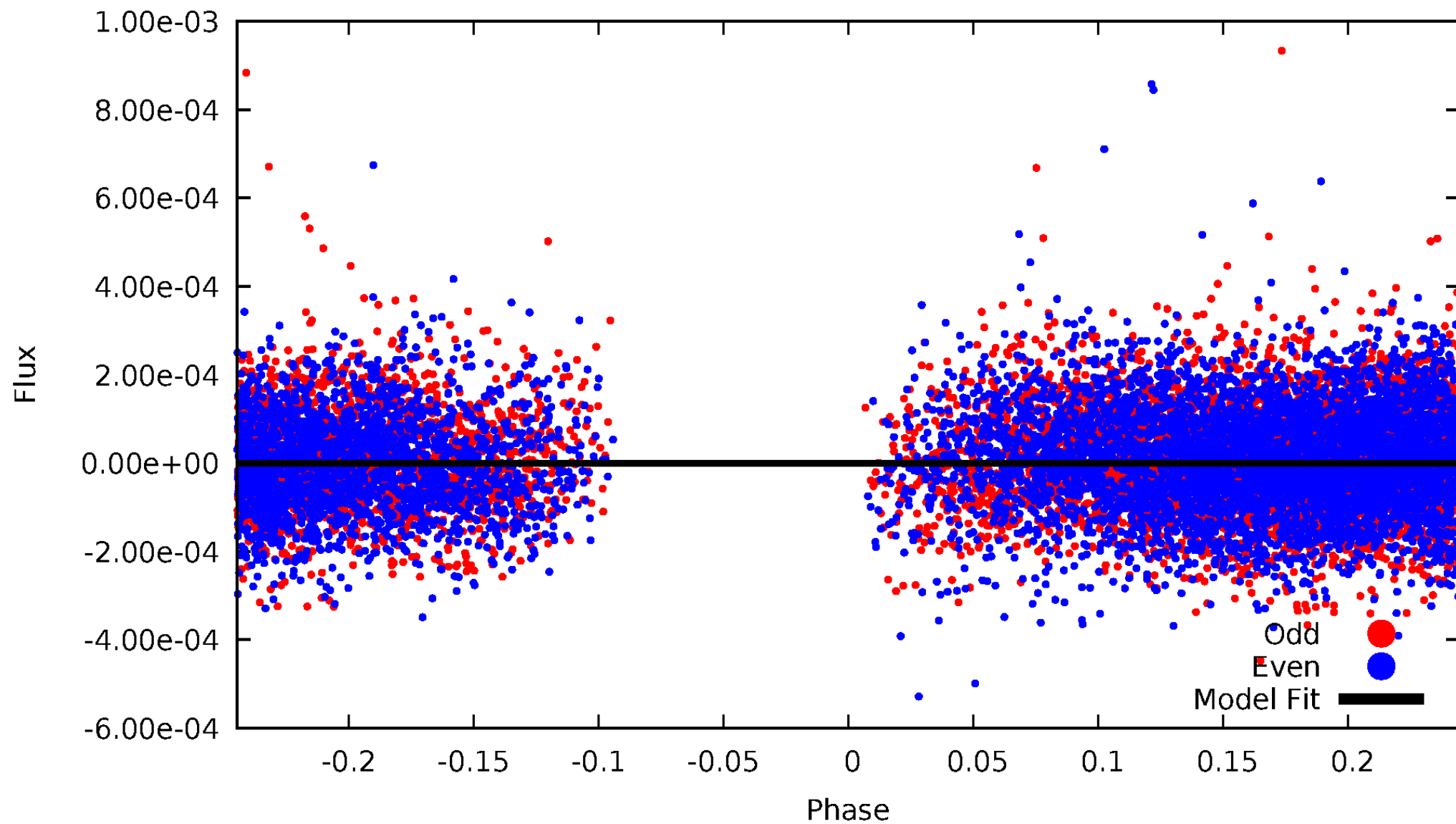


TCE 006068502-02



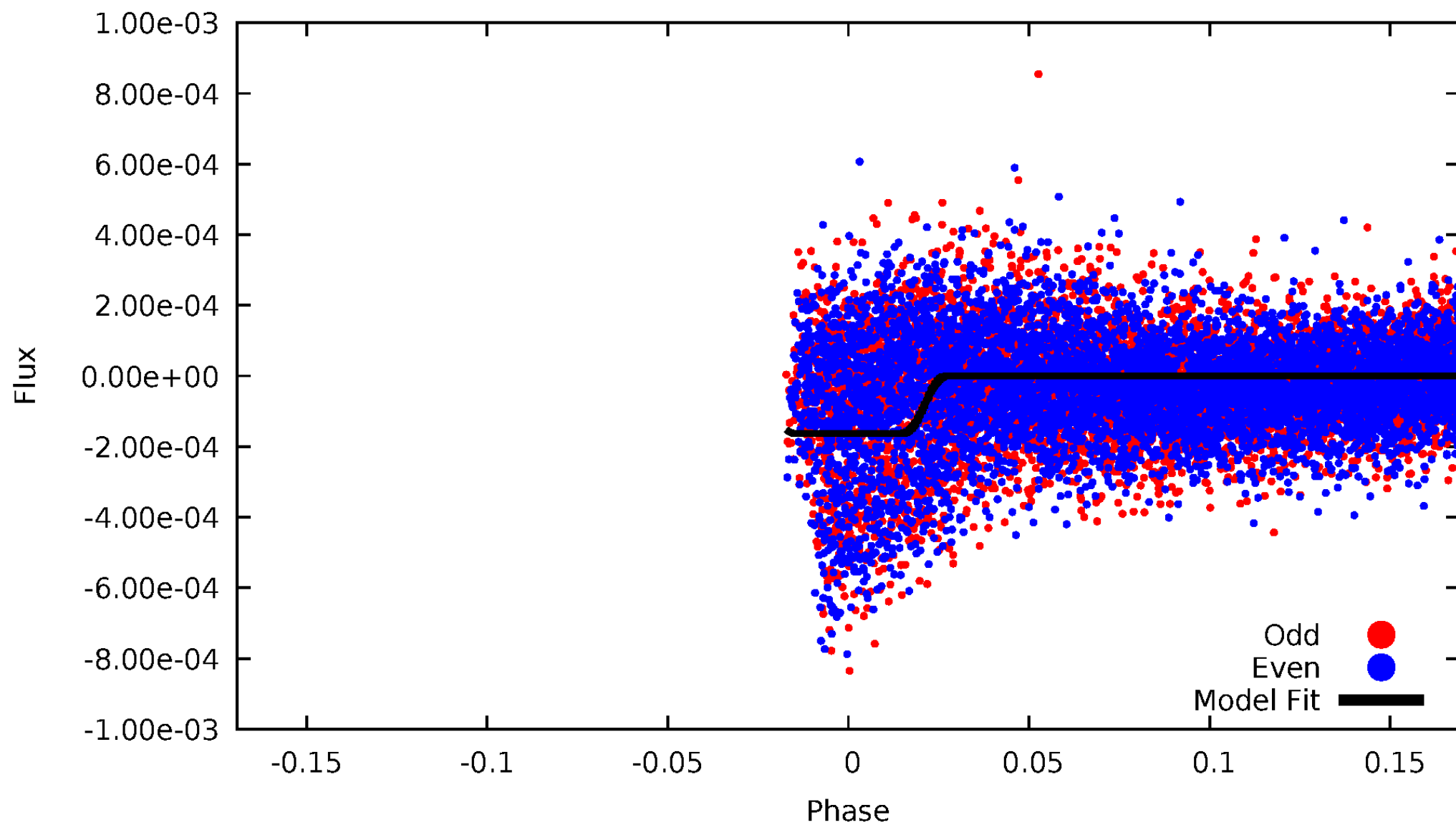
# DV Odd/Even

TCE 006068502-02



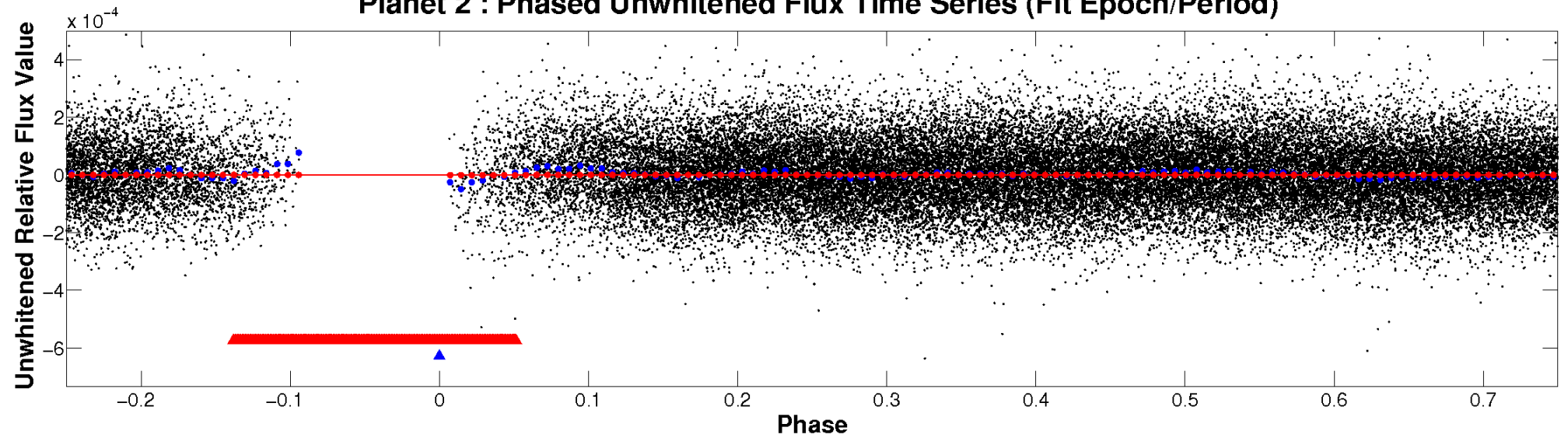
# ALT Odd/Even

TCE 006068502-02

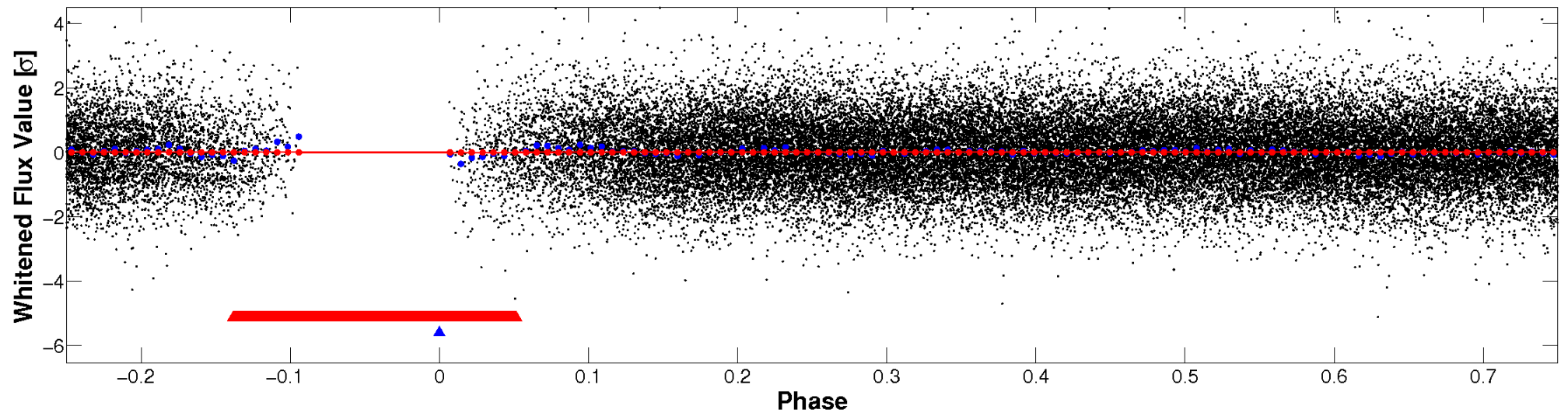


# Non-Whitened Vs. Whitened Light Curve

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

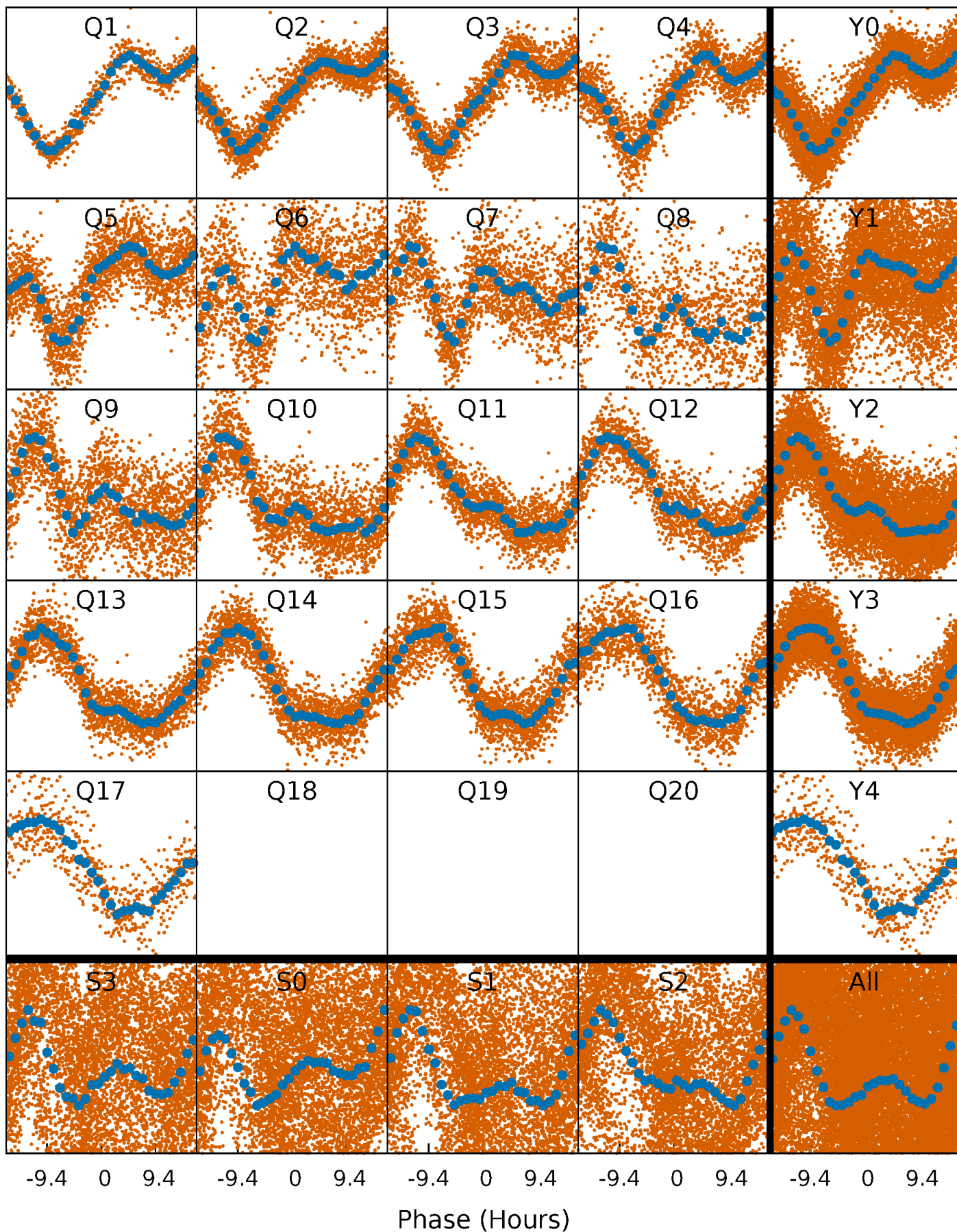


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

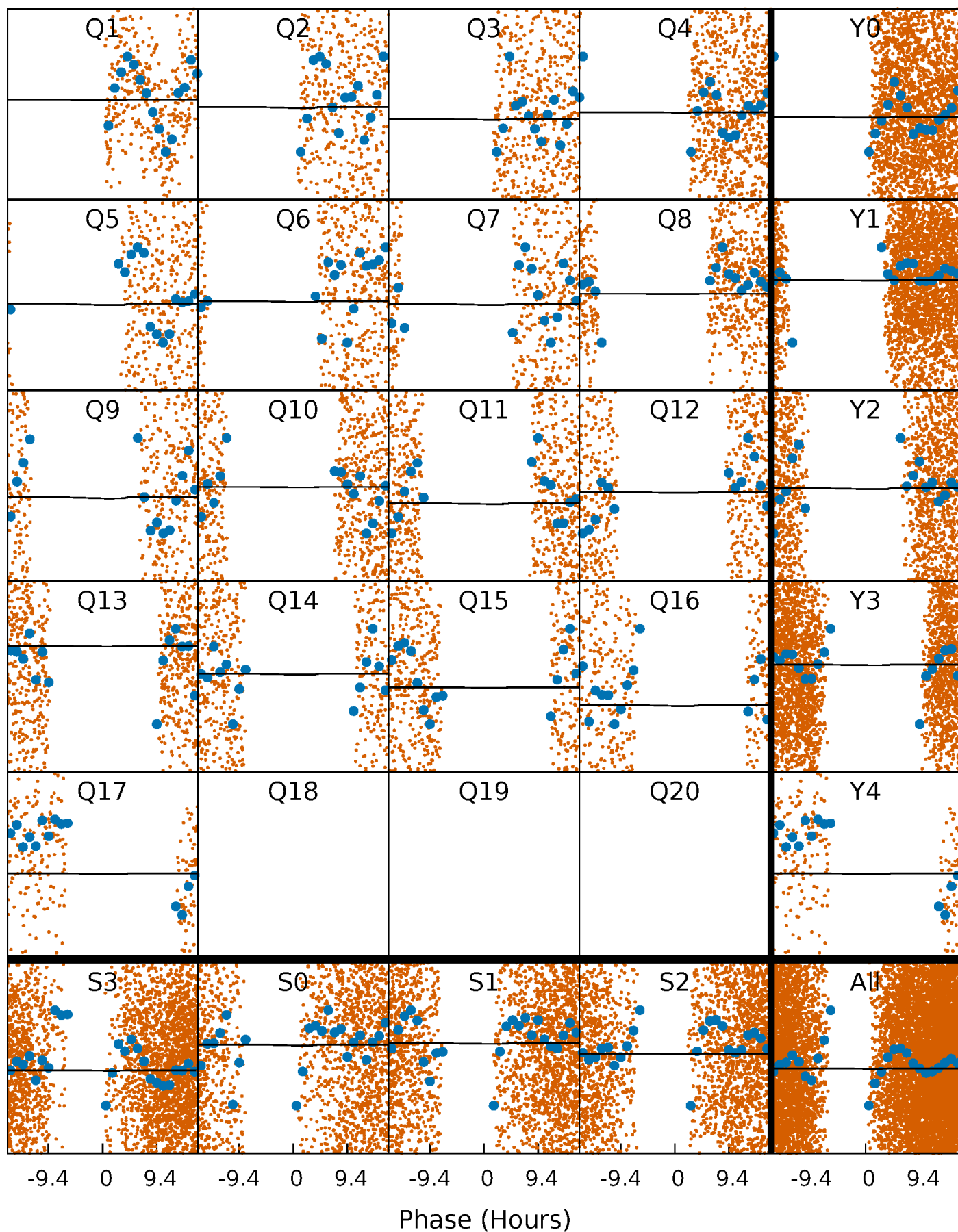
TCE 006068502-02   P= 2.817059 Days    $T_0=133.366749$  (BKJD)





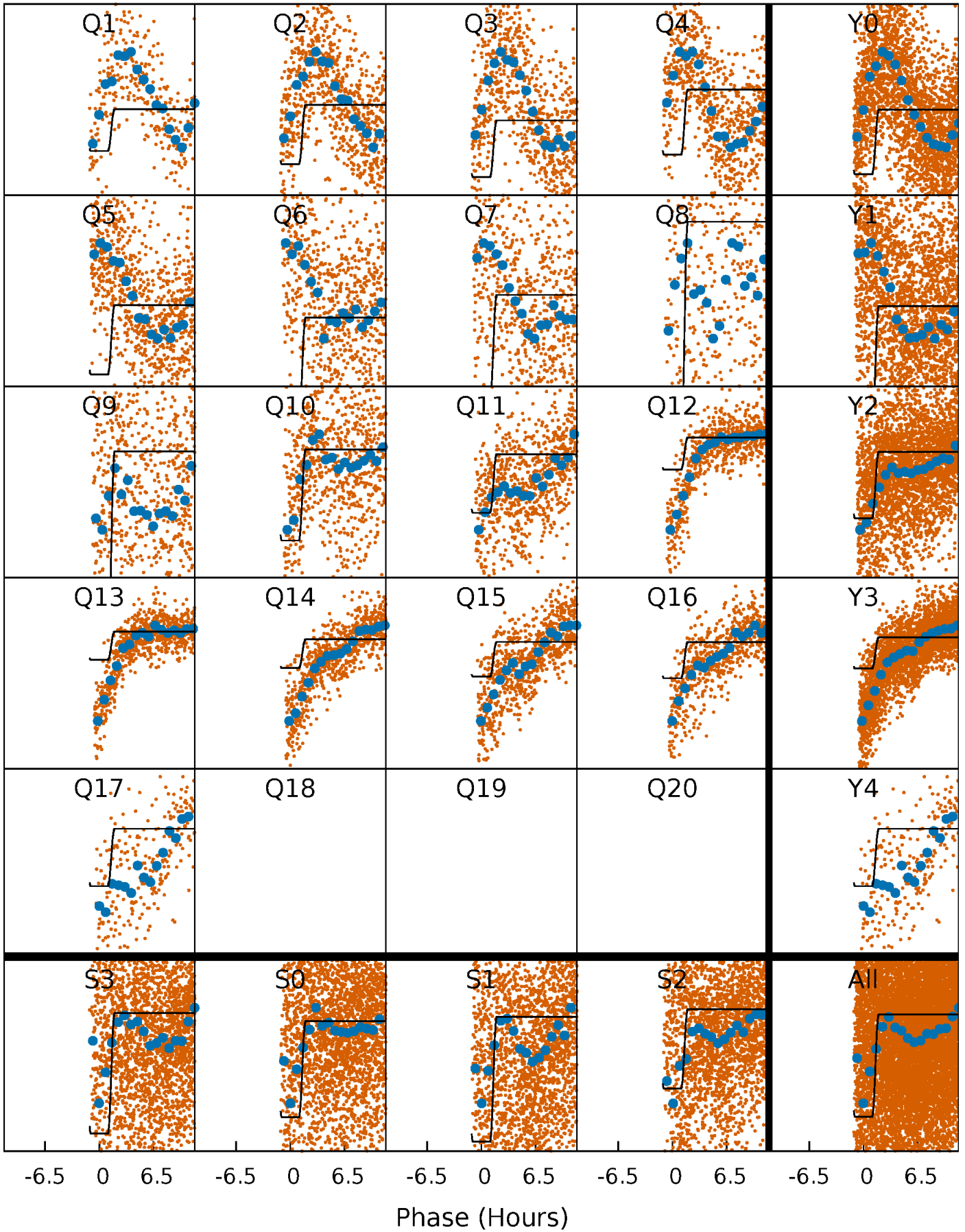
# DV Quarter-Phased Transit Curves

TCE 006068502-02   P= 2.817059 Days    $T_0=133.366749$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

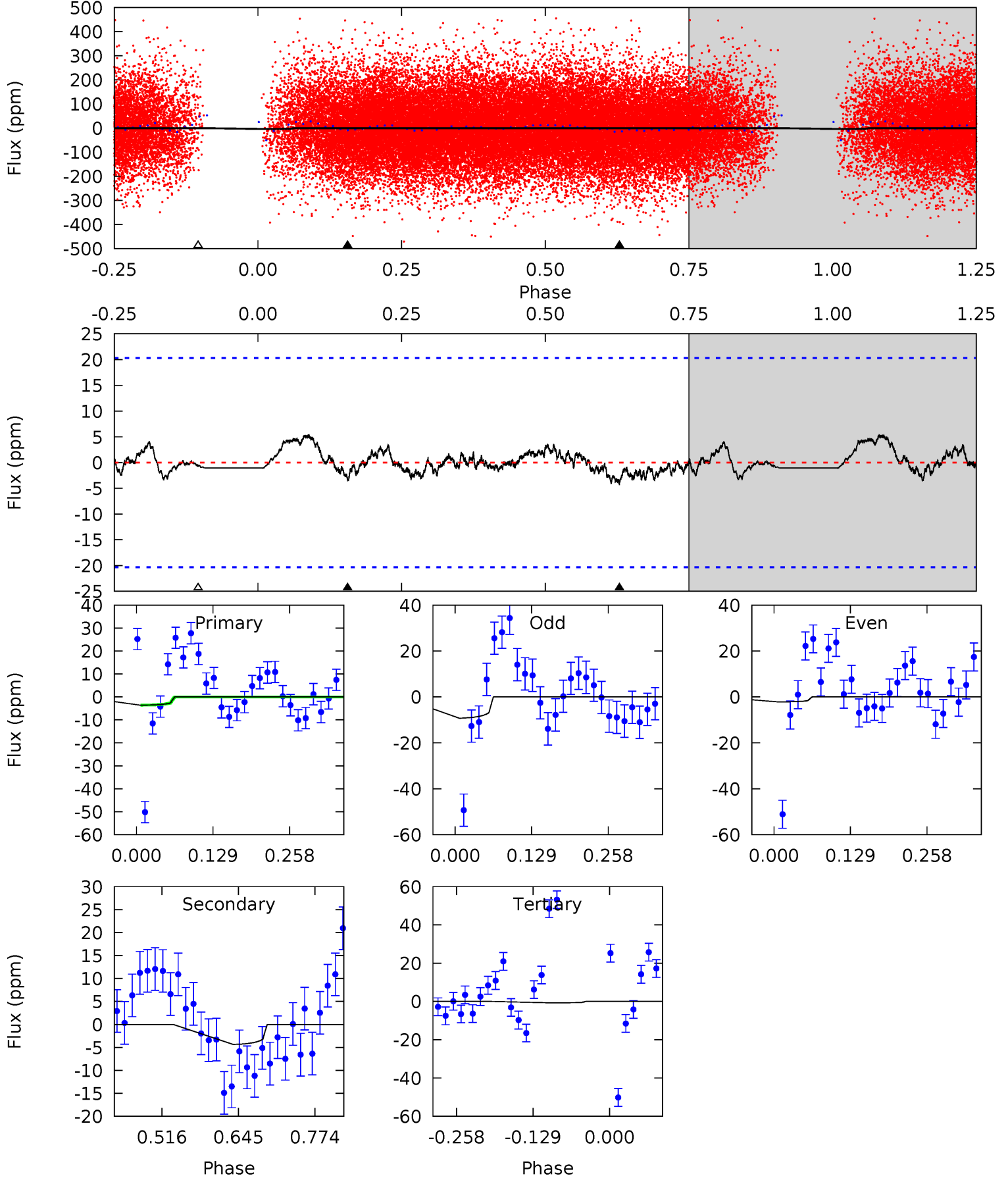
TCE 006068502-02     $P = 2.818026$  Days     $T_0 = 133.429548$  (BKJD)



# DV Model-Shift Uniqueness Test

006068502-02, P = 2.817059 Days, E = 130.549690 Days

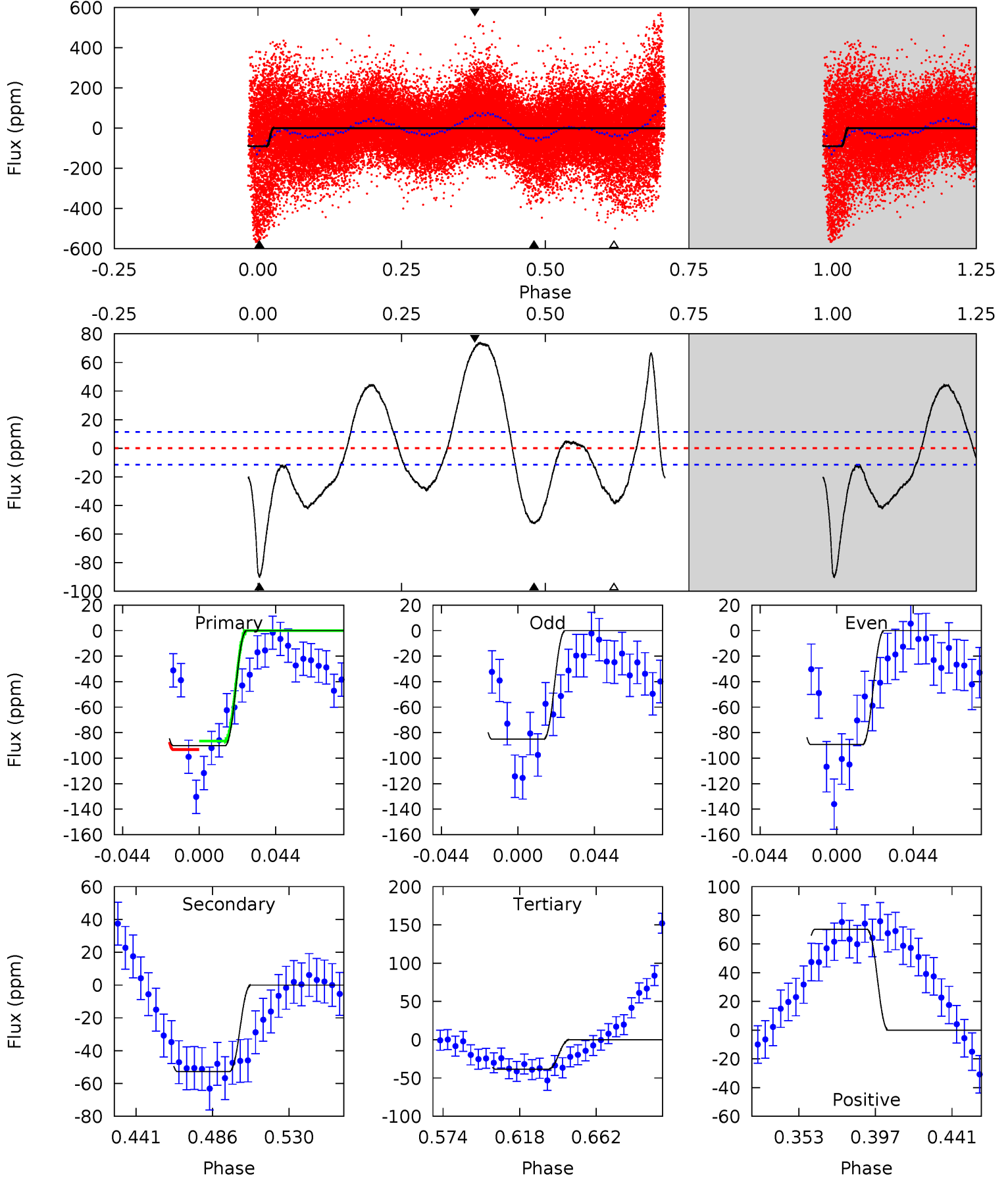
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.80	0.97	0.16	0	4.51	1.52	0.29	0.64	0.80	0.81	0.97	0.79	-1.13	0.55	0



# Alt Model-Shift Uniqueness Test

006068502-02, P = 2.818026 Days, E = 130.611522 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
37.2	21.8	15.9	29.0	4.73	2.01	13.9	21.3	8.19	5.86	-7.25	0.85	1.73	0.45	0



### Stellar Parameters For KIC 006068502

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6850^{+183}_{-204}$	$3.813^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.473^{+0.460}_{-0.854}$	$1.453^{+0.205}_{-0.308}$	$0.135^{+0.264}_{-0.040}$
	+3%/-3%	+7%/-2%	+68%/-57%	+19%/-35%	+14%/-21%	+195%/-30%
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 006068502-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-4 \pm 5$	$1.13^{+1.07}_{-0.80}$	$3098^{+188}_{-263}$	$4520^{+3955}_{-7487}$	$2.965^{+33.609}_{-2.923}$
Alt.	$-53 \pm 2$	$3.20^{+1.84}_{-1.35}$	$3079^{+195}_{-225}$	$5124^{+1583}_{-852}$	$5.396^{+10.860}_{-3.137}$

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



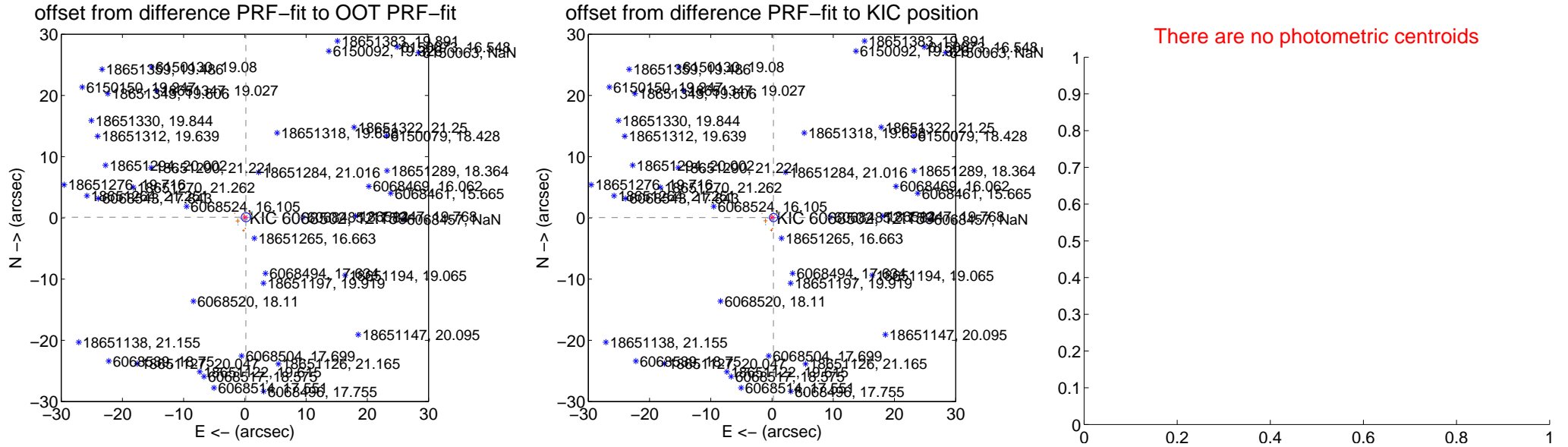
## DV Centroid Data

Supplemental centroid analysis for 006068502-02. Kepler magnitude: 12.16. Transit SNR 0.07

There are 10 quarters with good PRF difference image offsets

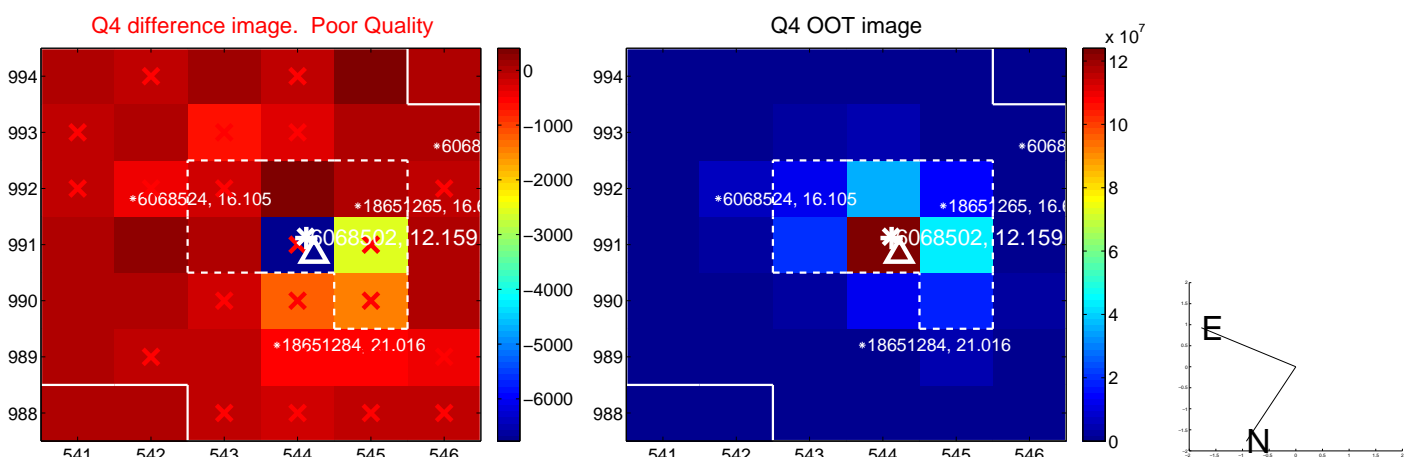
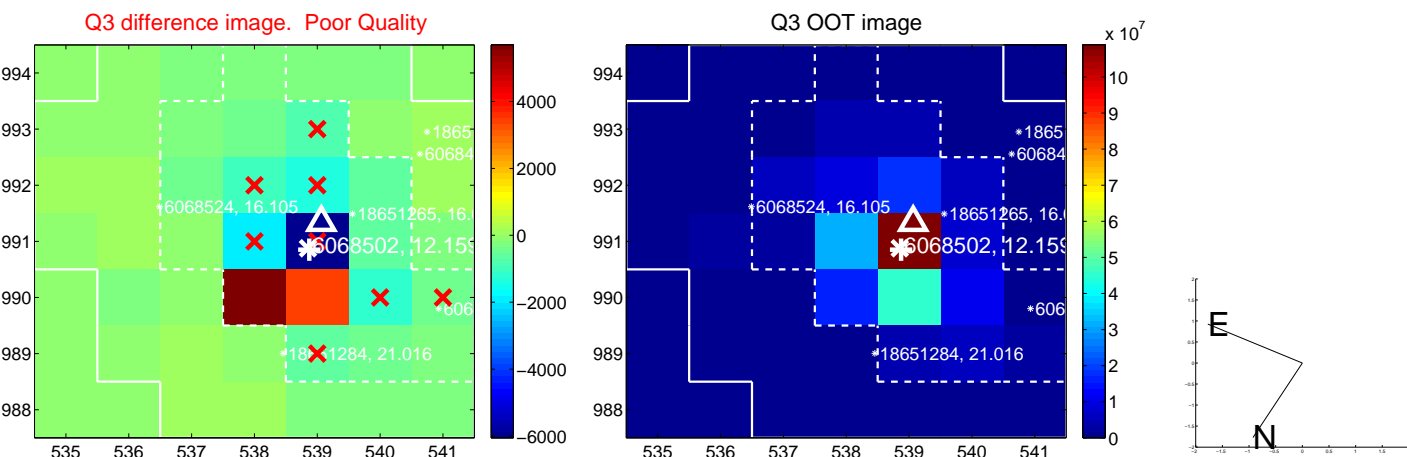
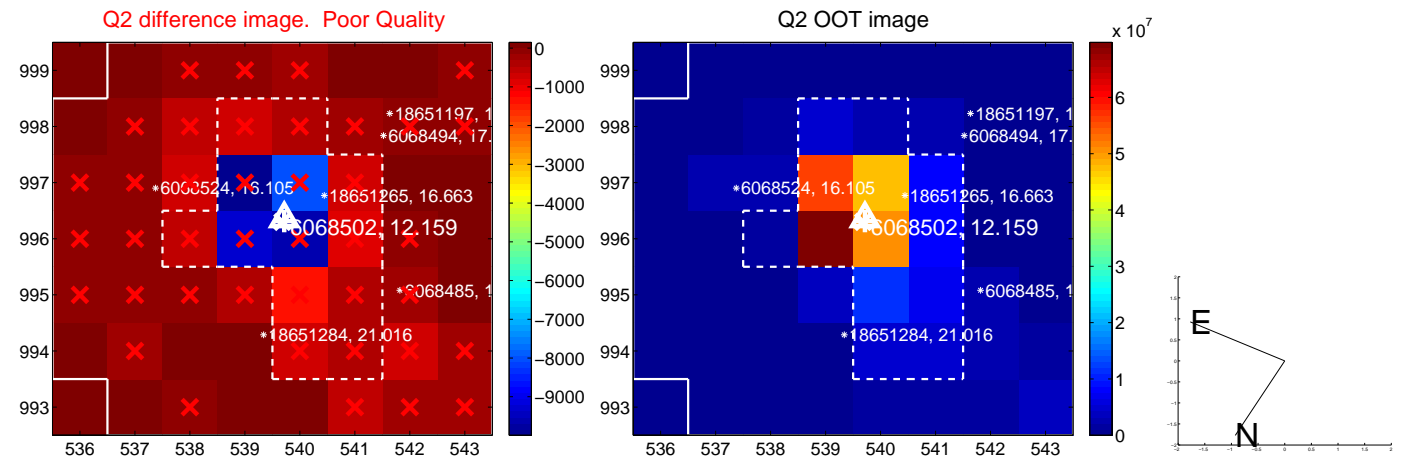
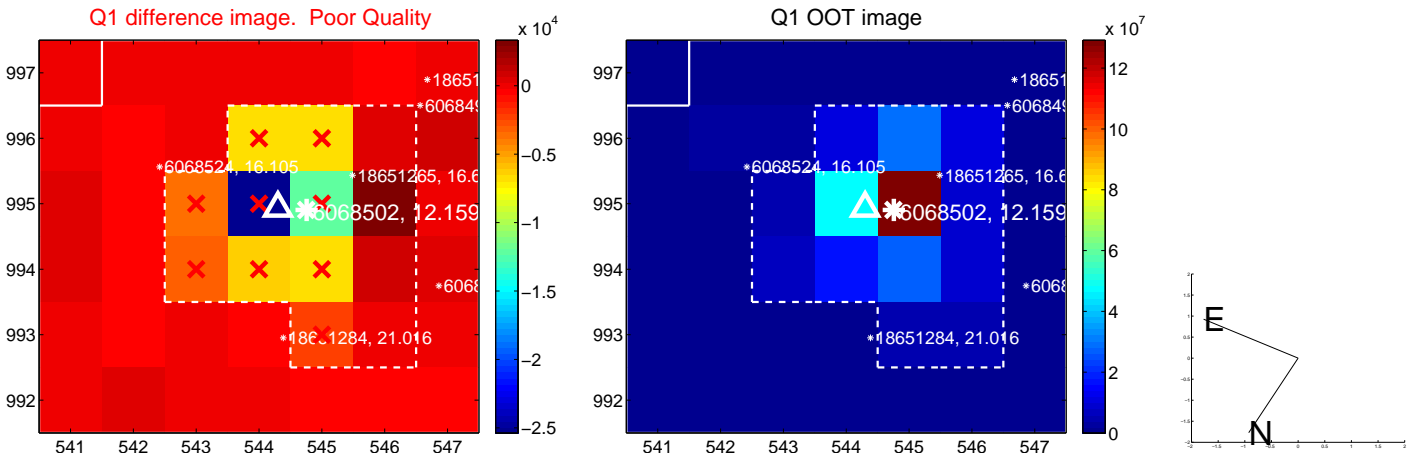
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.196 \pm 0.247$	0.80	$-0.164 \pm 0.215$	$0.109 \pm 0.225$
PRF-fit source offset from KIC position	$0.245 \pm 0.223$	1.10	$-0.240 \pm 0.212$	$0.052 \pm 0.206$
photometric centroid source offset	—	—	—	—

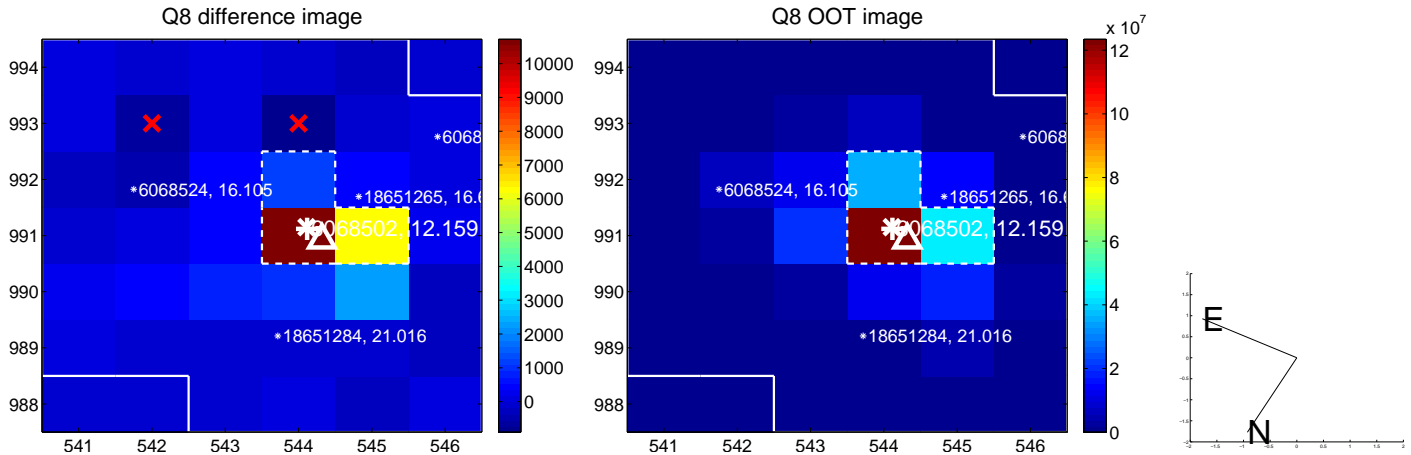
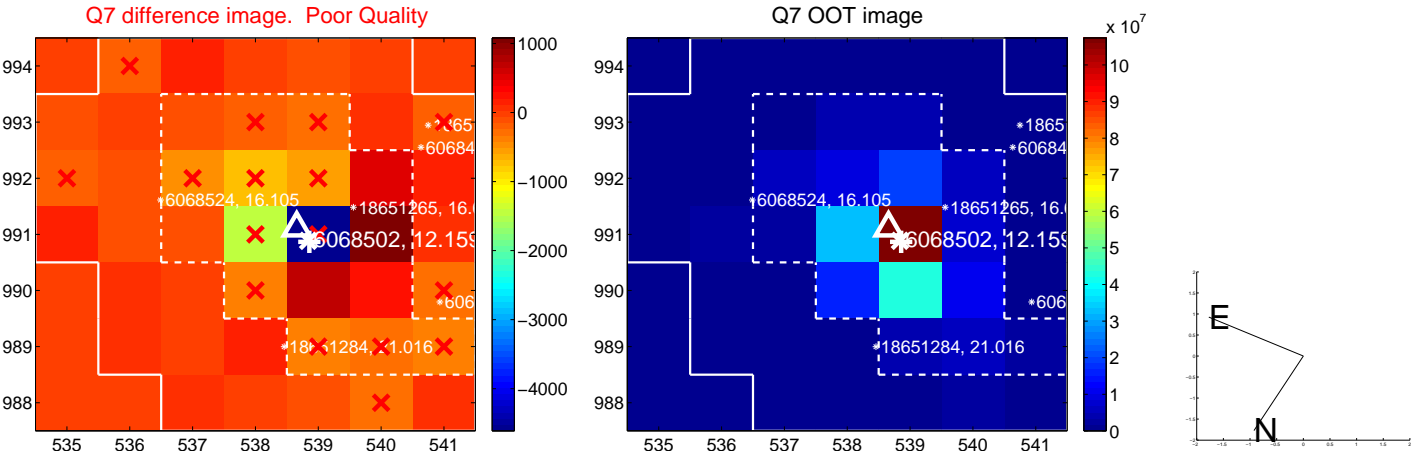
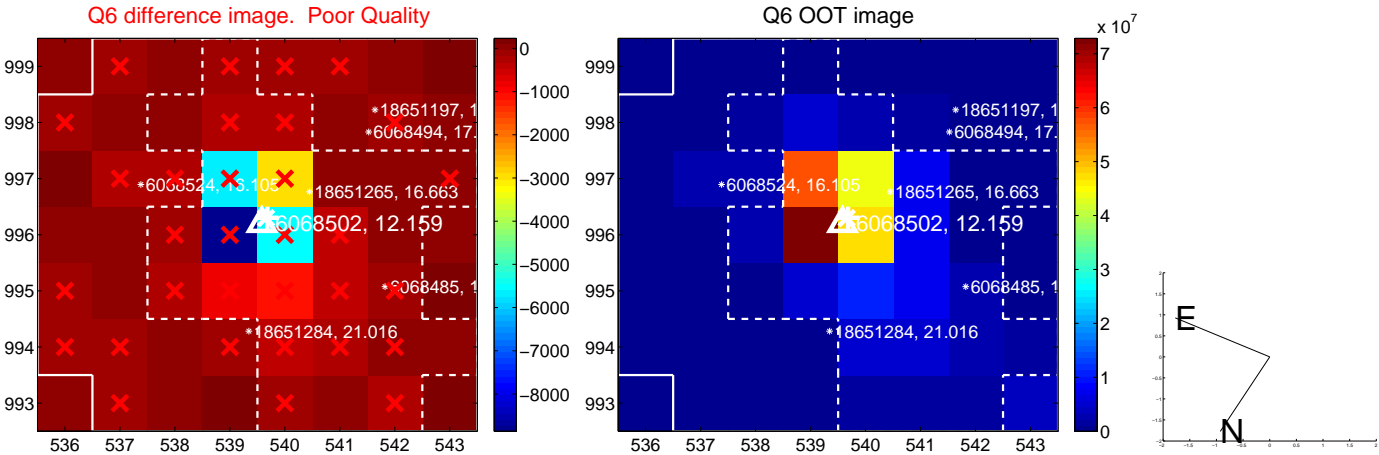
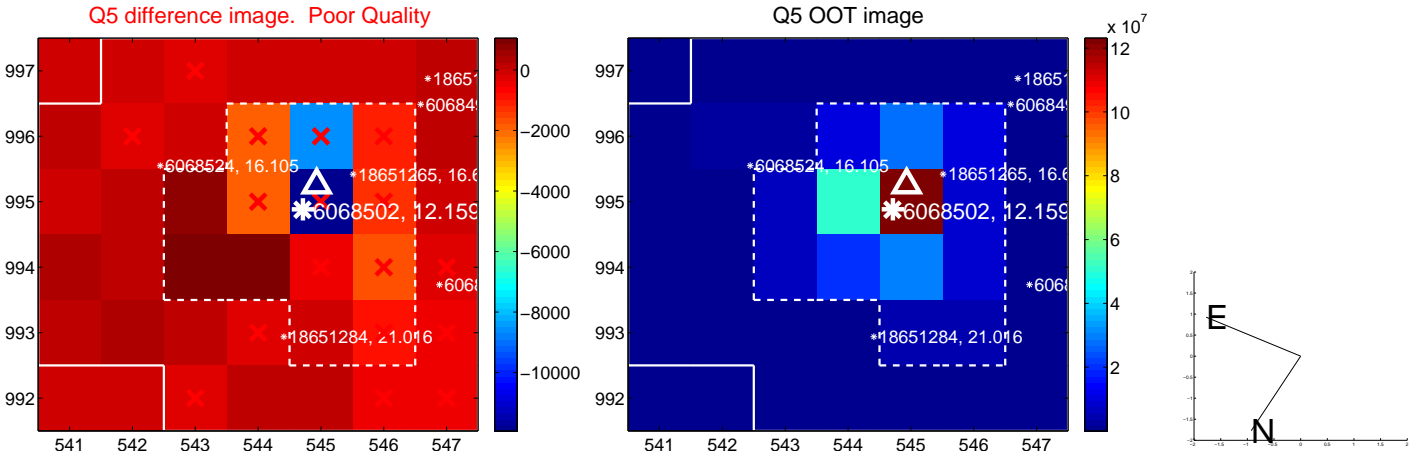


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

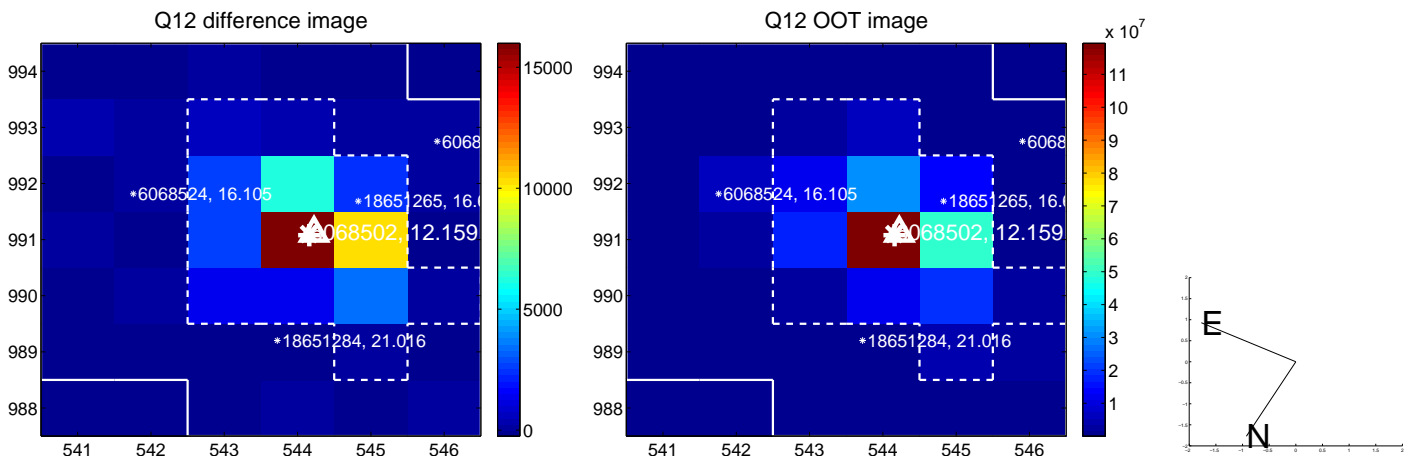
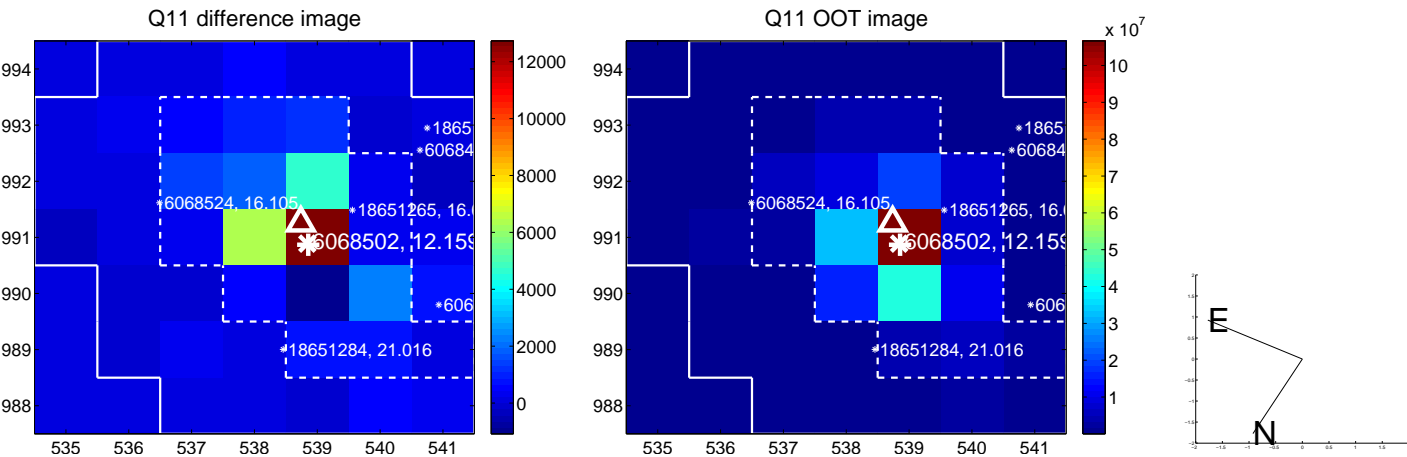
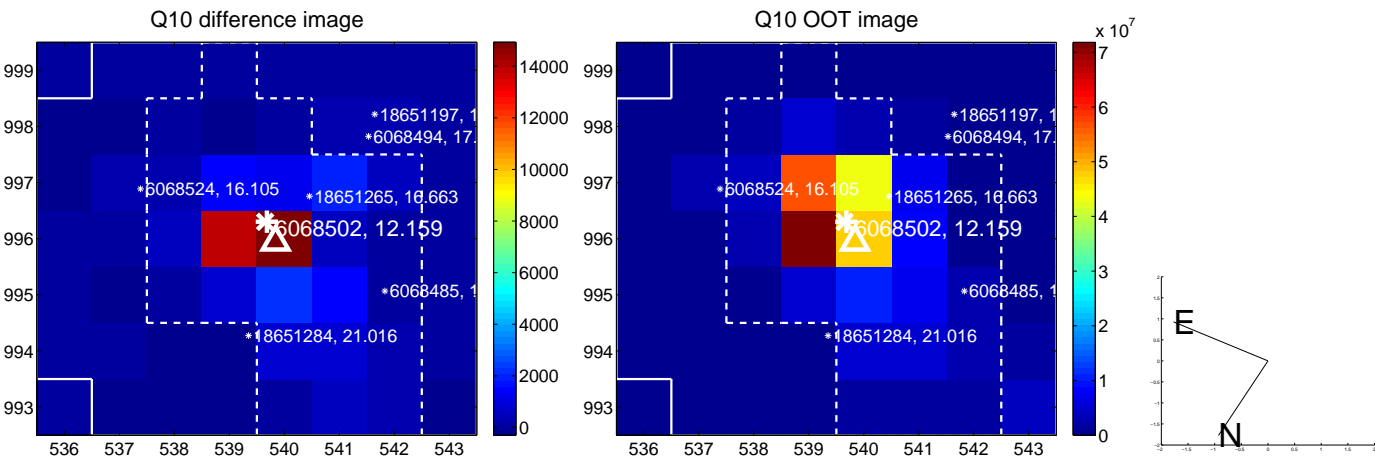
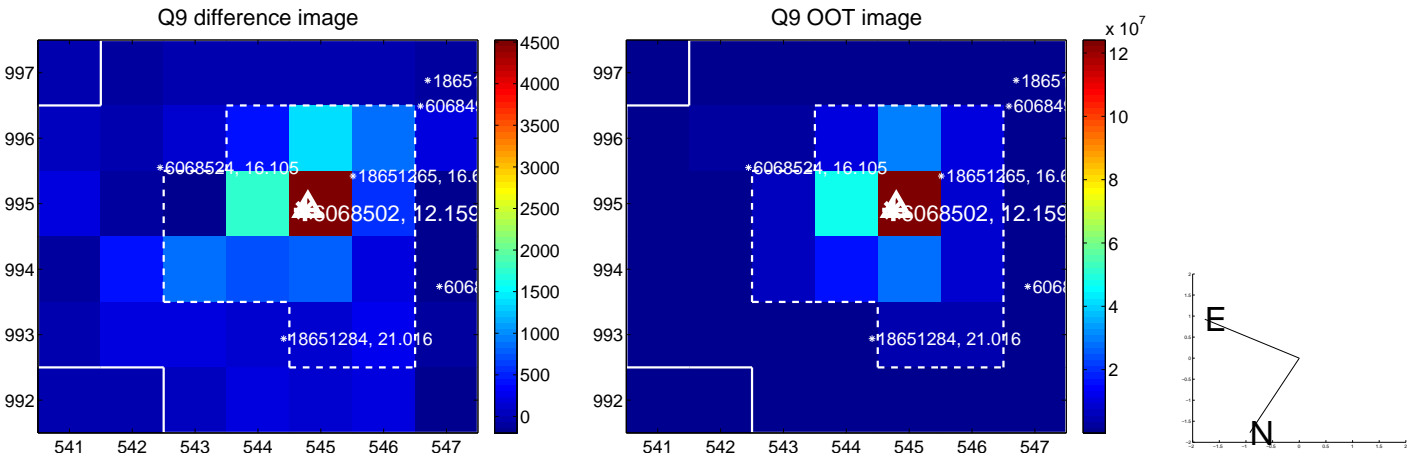
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



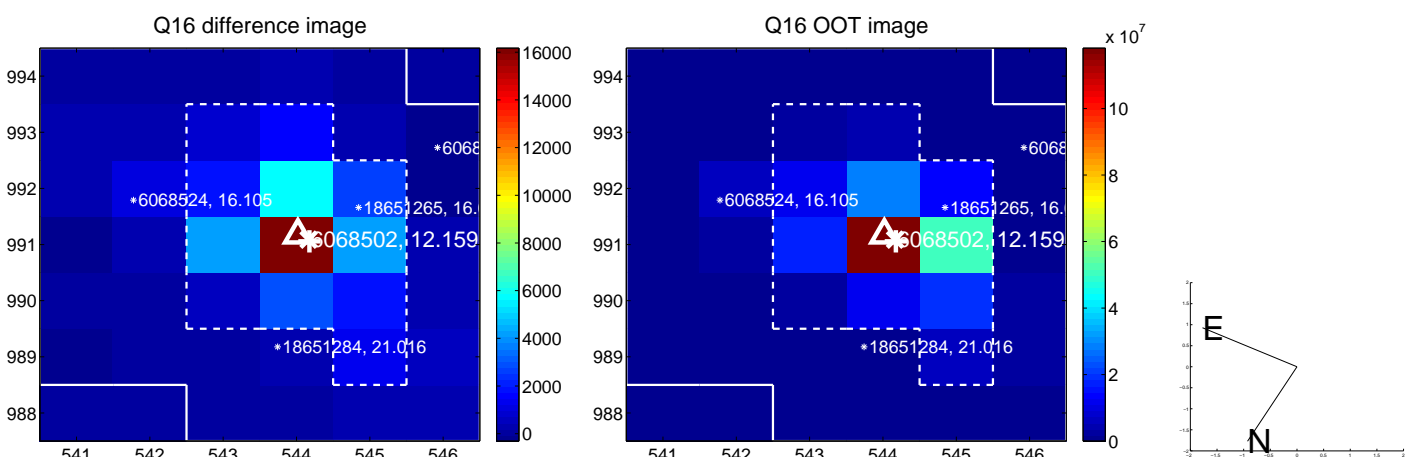
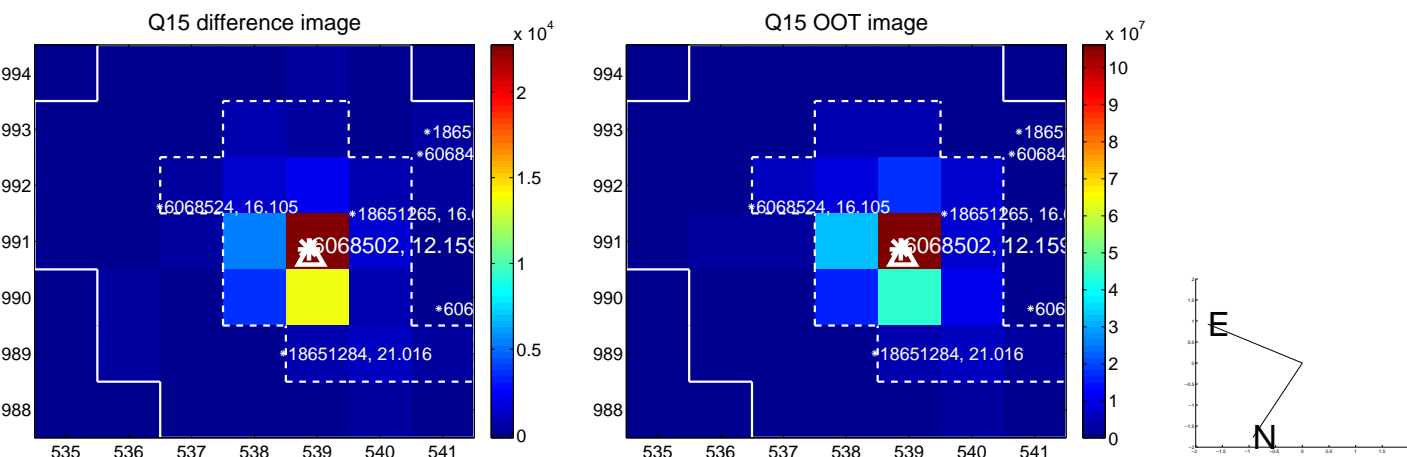
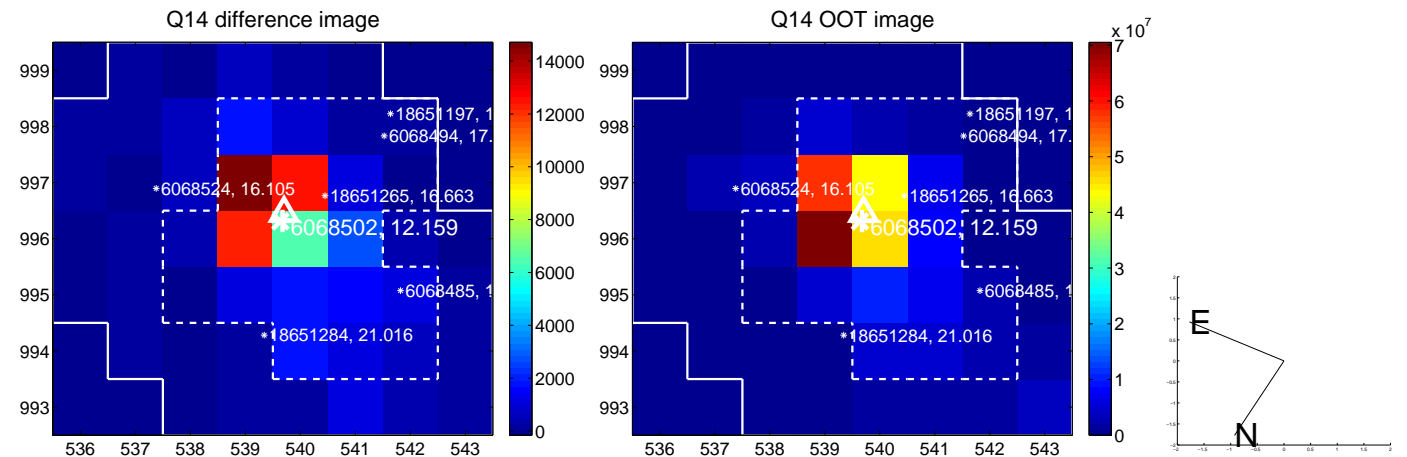
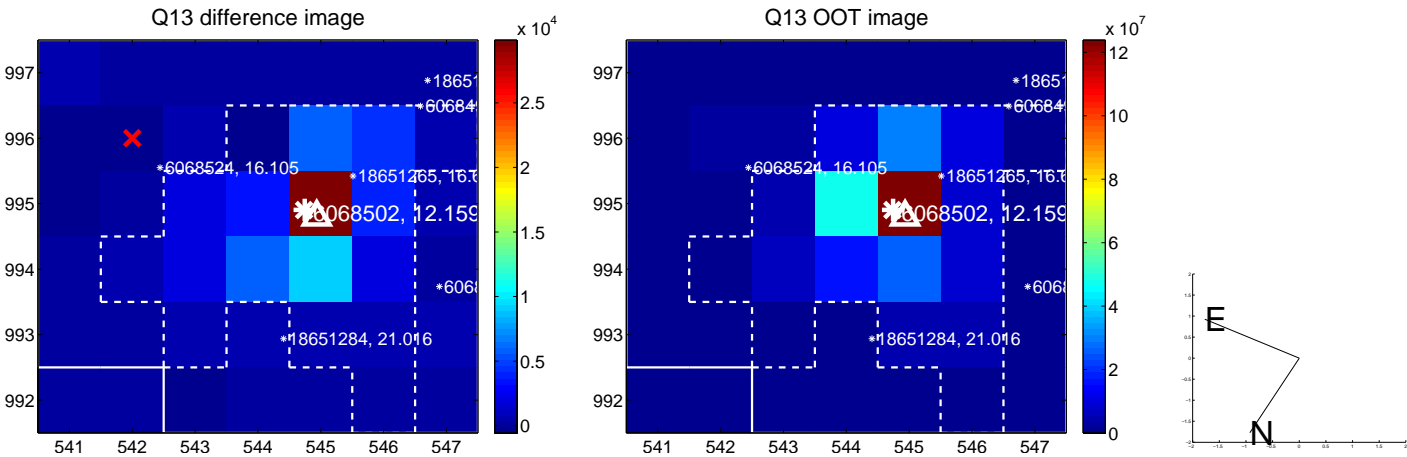
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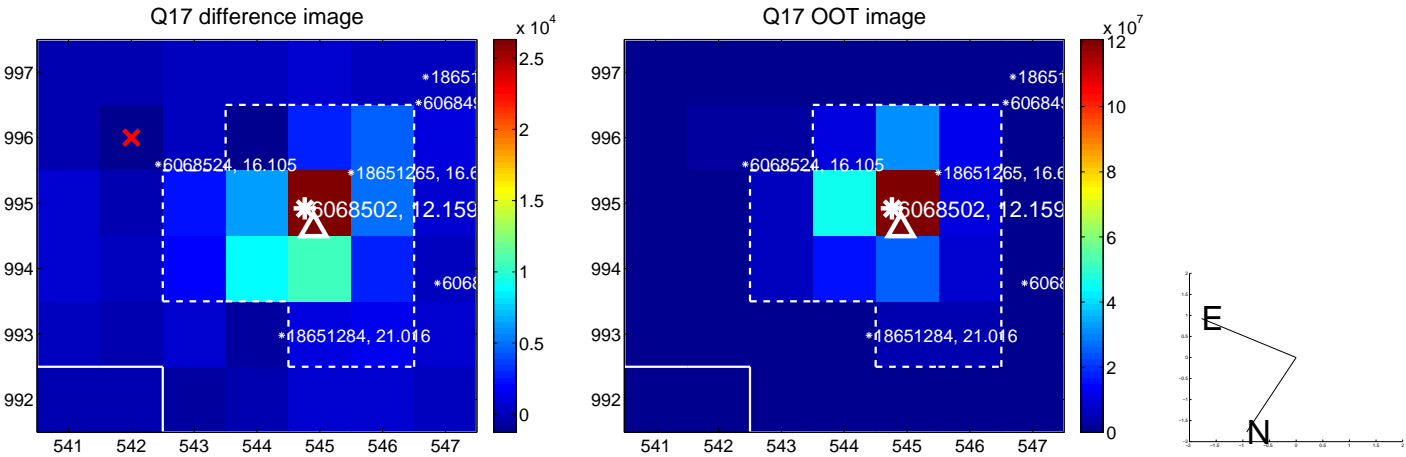


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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

