

# KIC 005952403

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005952403-01	OBS	6139.01	0.905707	132.194355	1847.2	1.862	175.7	108.7	7.55	5037	44.09	0.00
005952403-02	OBS	No	0.905669	131.745369	79.7	1.500	53.6	-1.0	7.55	5037	6.58	59938.03

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005952403-01	OBS	FP	0.00	0	1	0	1	PLANET_IN_STAR—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_SATURATED—EPHEM_MATCH
005952403-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_SATURATED

**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 005952403-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
005952403-01	5952403	3947.01	5952366	1:1	34.5	0	-9	13.38	6.97	1.32	Direct-PRF	1	3.00	0.21

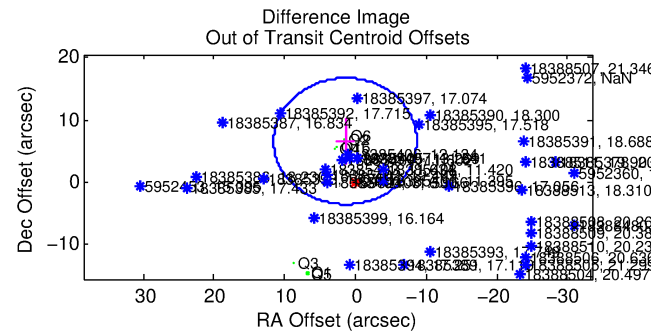
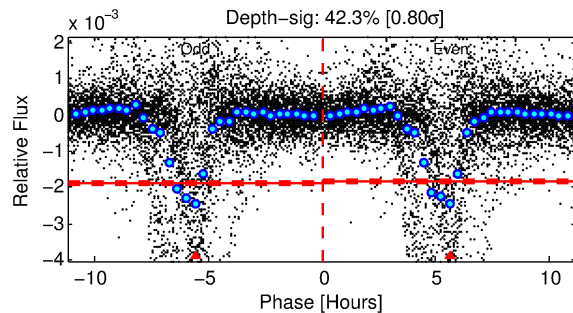
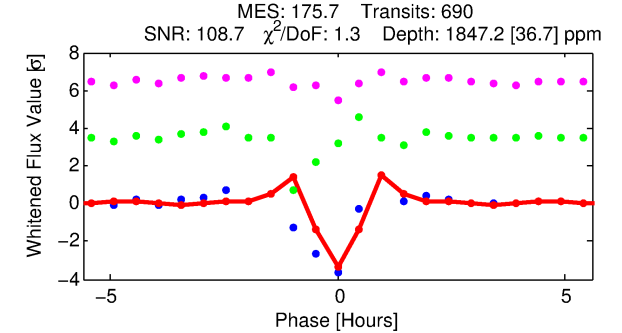
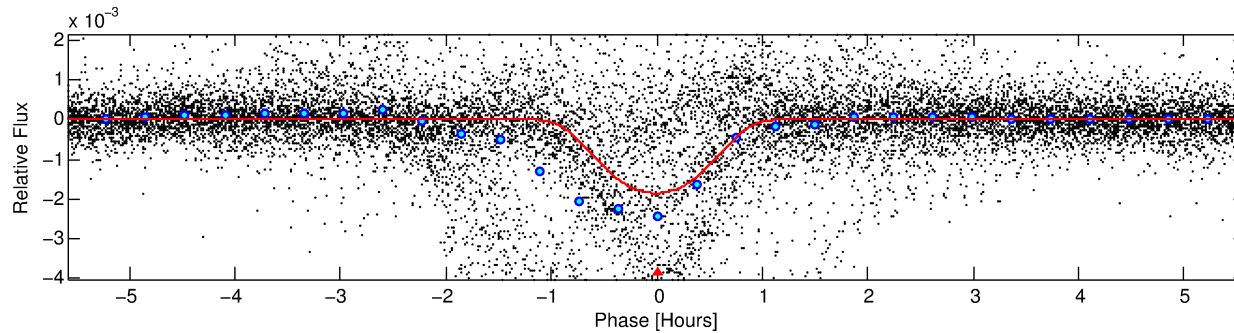
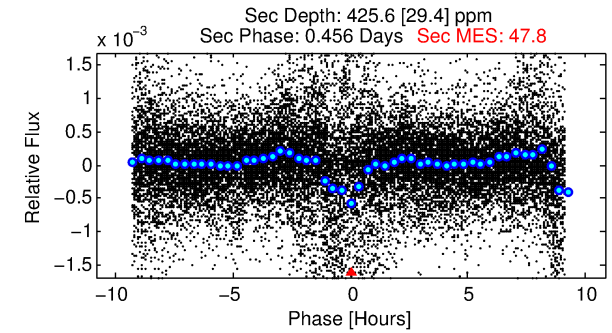
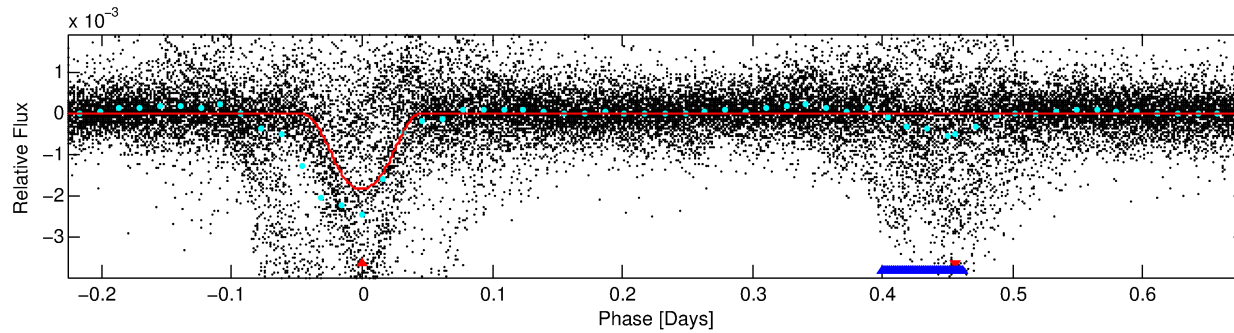
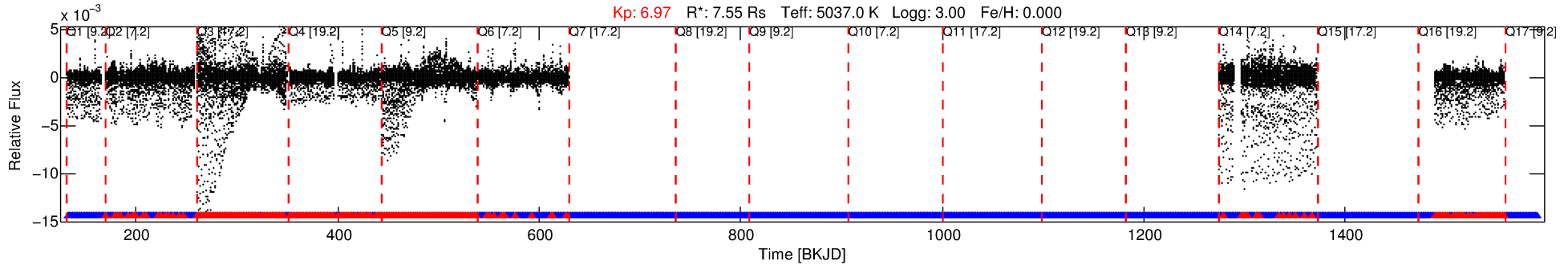
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 5952403 Candidate: 1 of 2 Period: 0.906 d

KOI: K06139.01 Corr: 0.758

Kp: 6.97 R\*: 7.55 Rs Teff: 5037.0 K Logg: 3.00 Fe/H: 0.000



## DV Fit Results:

Period = 0.90571 [0.00000] d  
Epoch = 132.1944 [0.0002] BKJD  
Rp/R\* = 0.0535 [0.0015]  
a/R\* = 1.95 [0.03]  
b = 0.95 [0.00]  
Seff = N/A  
Teq = N/A  
Rp = 44.09 [16.69] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

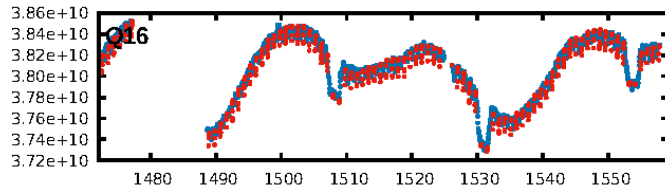
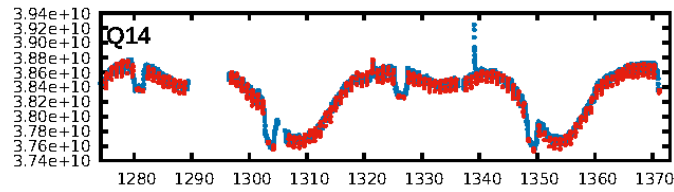
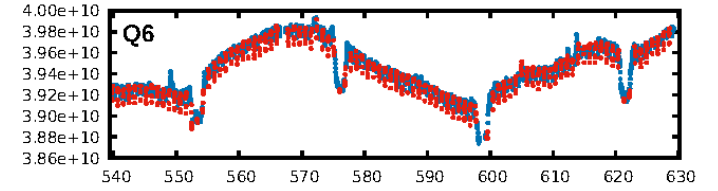
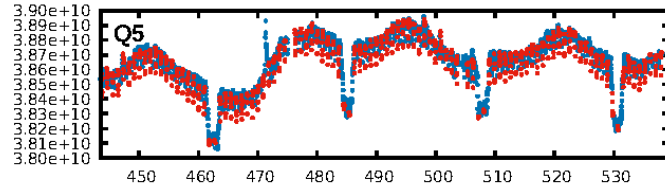
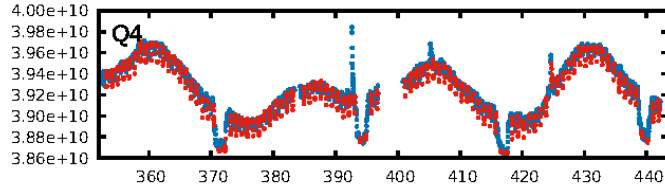
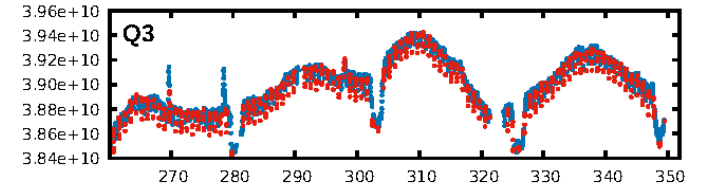
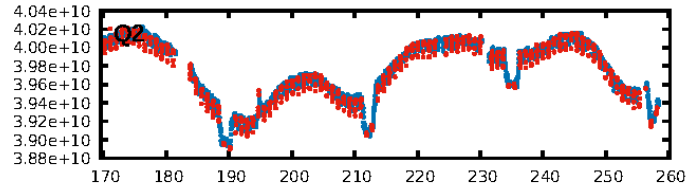
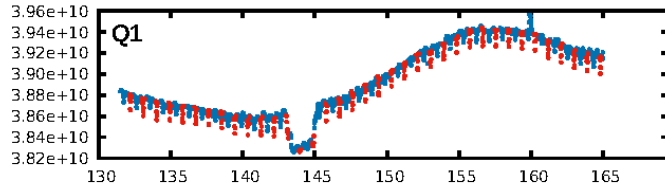
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.42 [276/653]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 8.689 arcsec [122.88σ]  
OotOffset-rm: 6.739 arcsec [2.00σ]  
KicOffset-rm: 14.504 arcsec [11.43σ]  
OotOffset-st: 3/1/2/2 [8]  
KicOffset-st: 3/1/2/2 [8]  
DiffImageQuality-figm: 0.00 [0/8]  
DiffImageOverlap-fno: 1.00 [8/8]

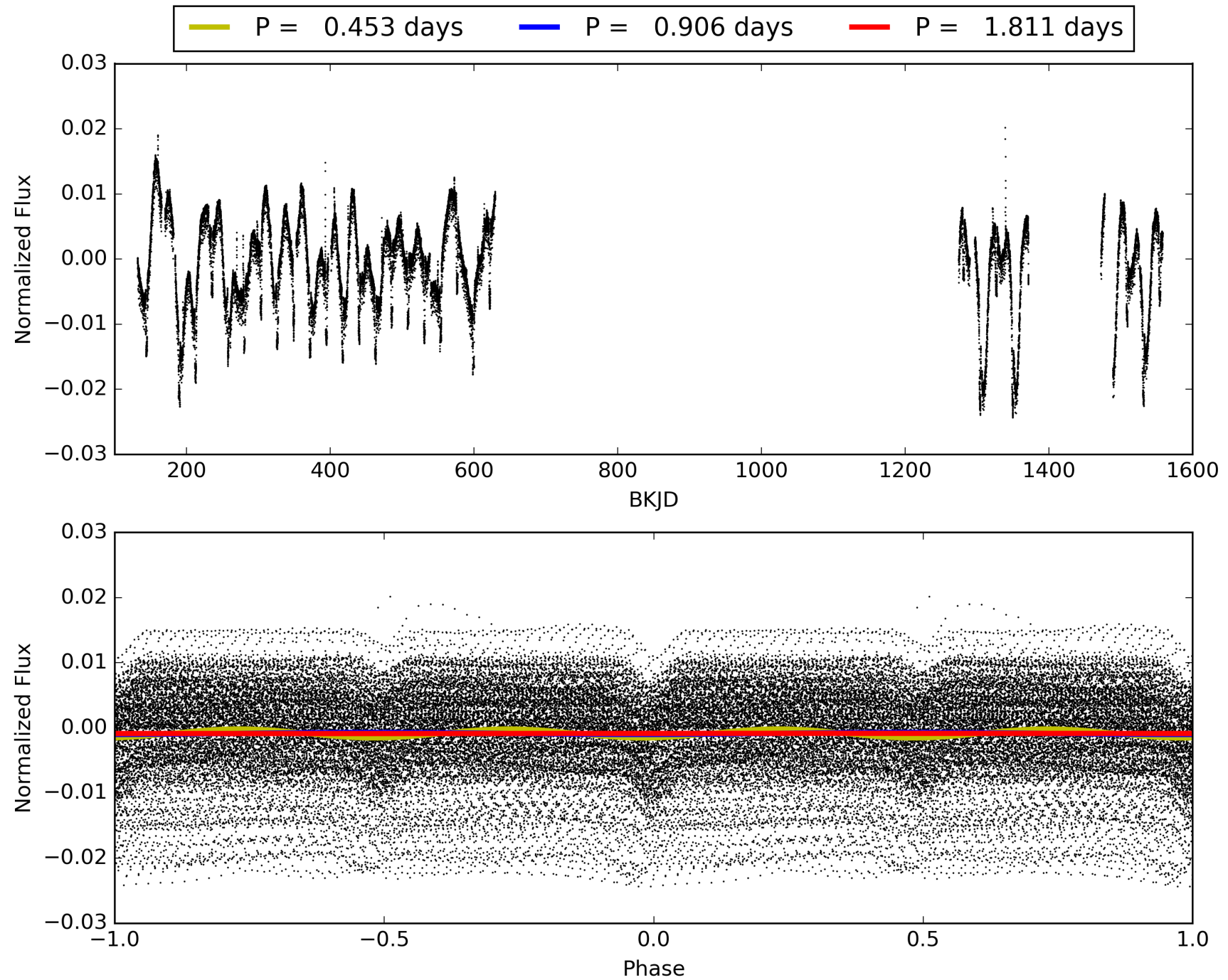
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 00:43:06 Z

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

# TCE 005952403-01, PDC Light Curves

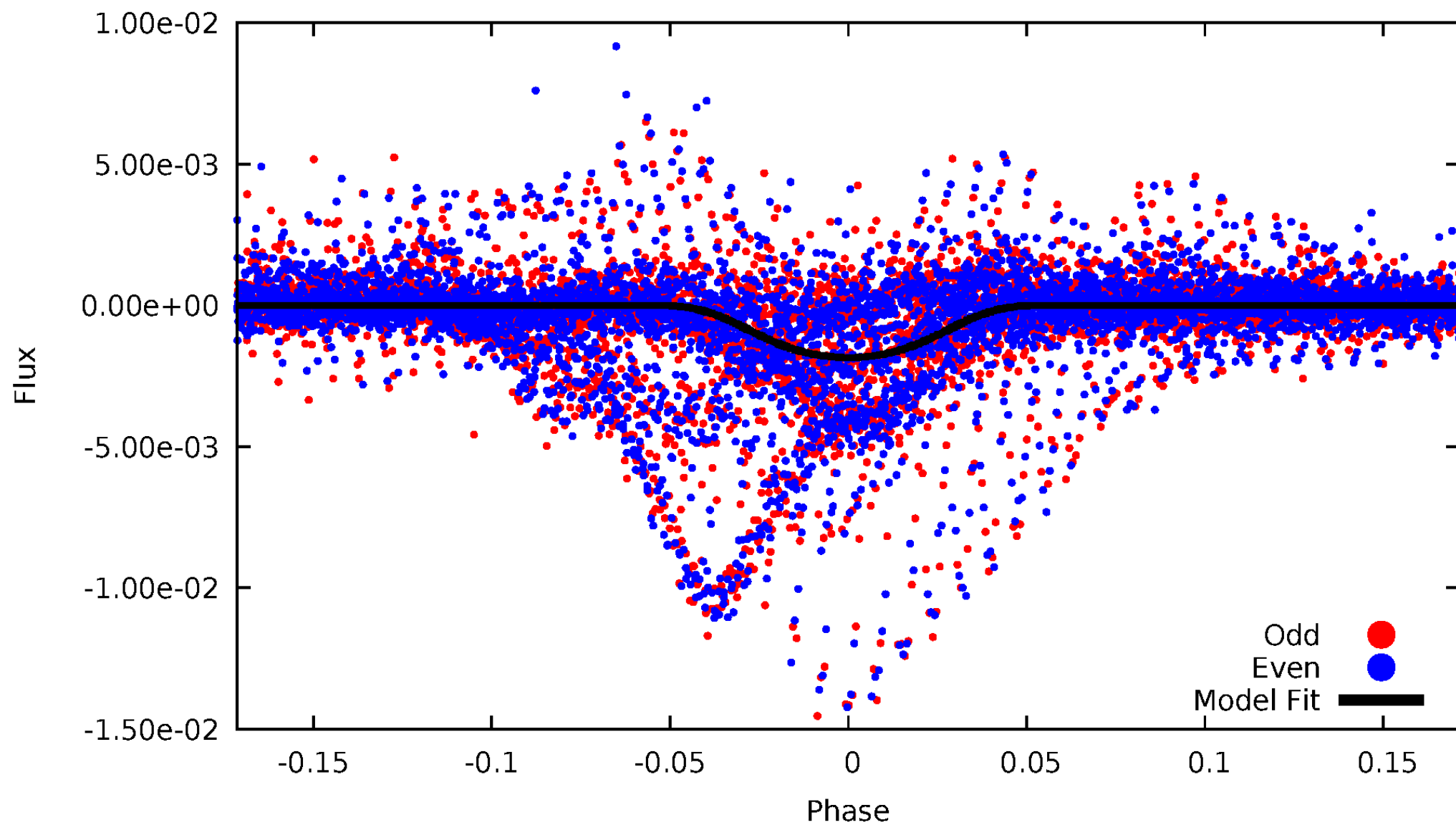


TCE 005952403-01



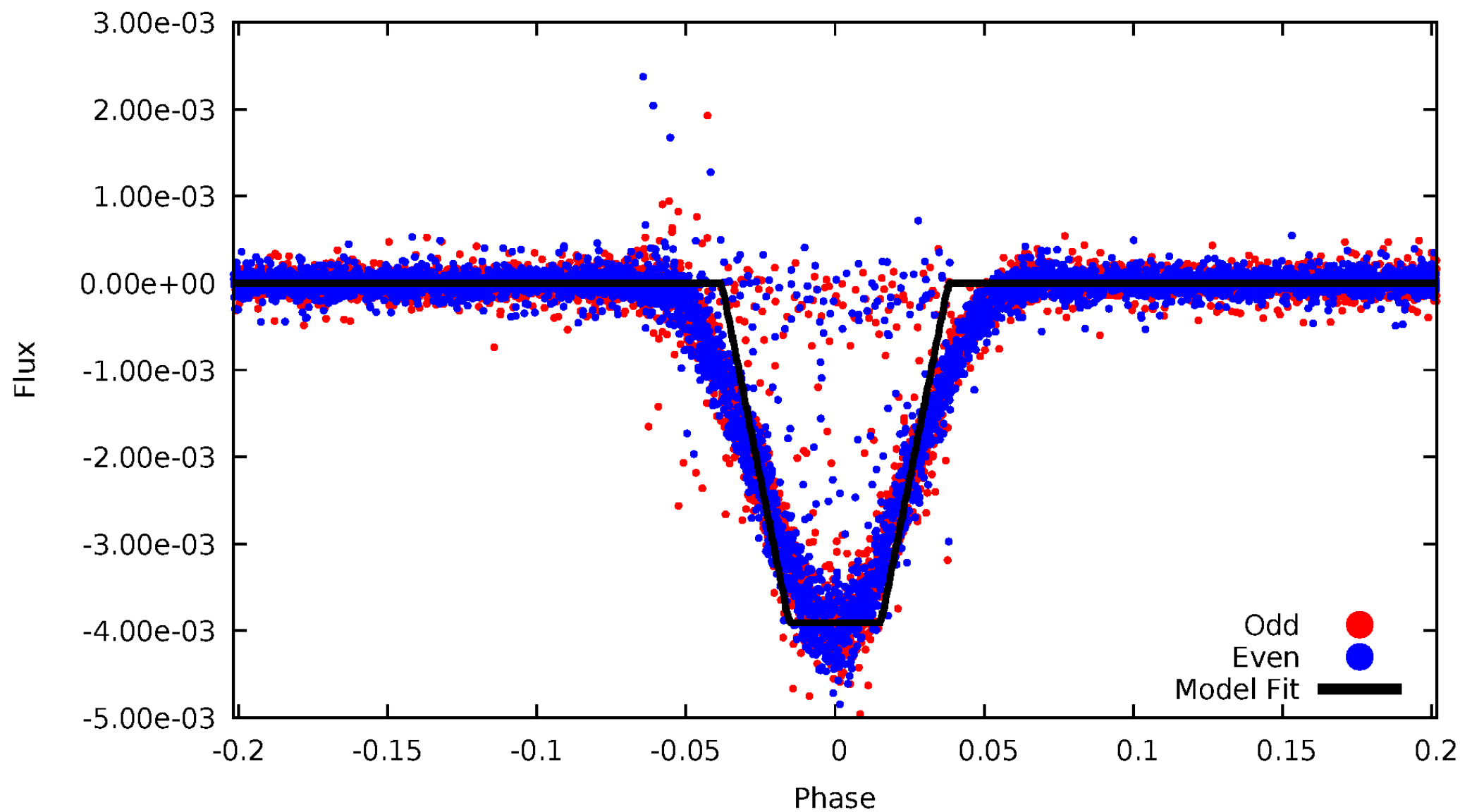
# DV Odd/Even

TCE 005952403-01



# ALT Odd/Even

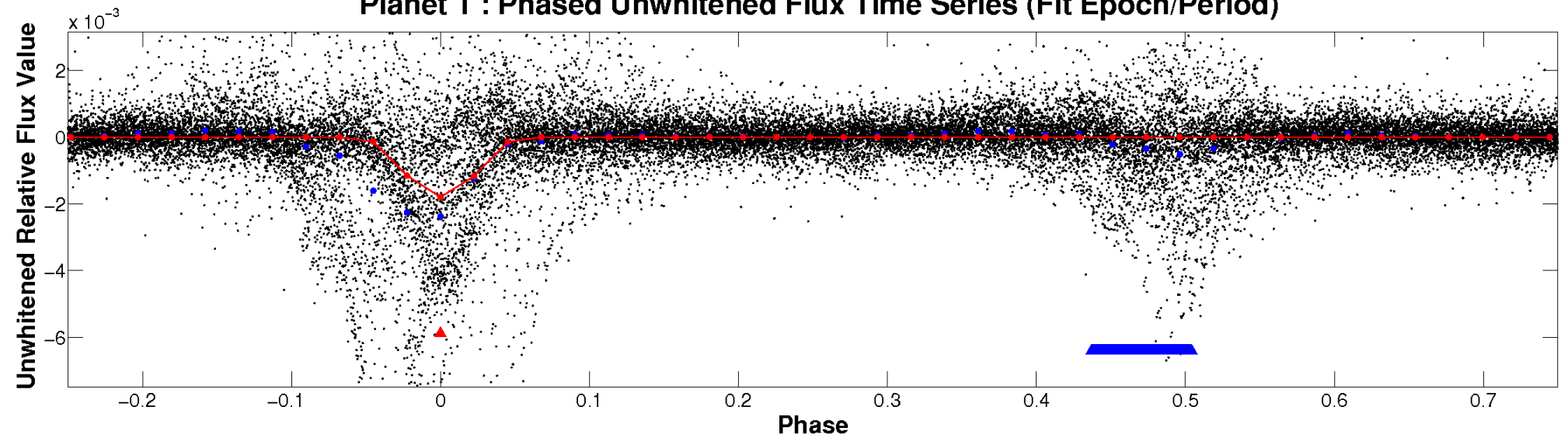
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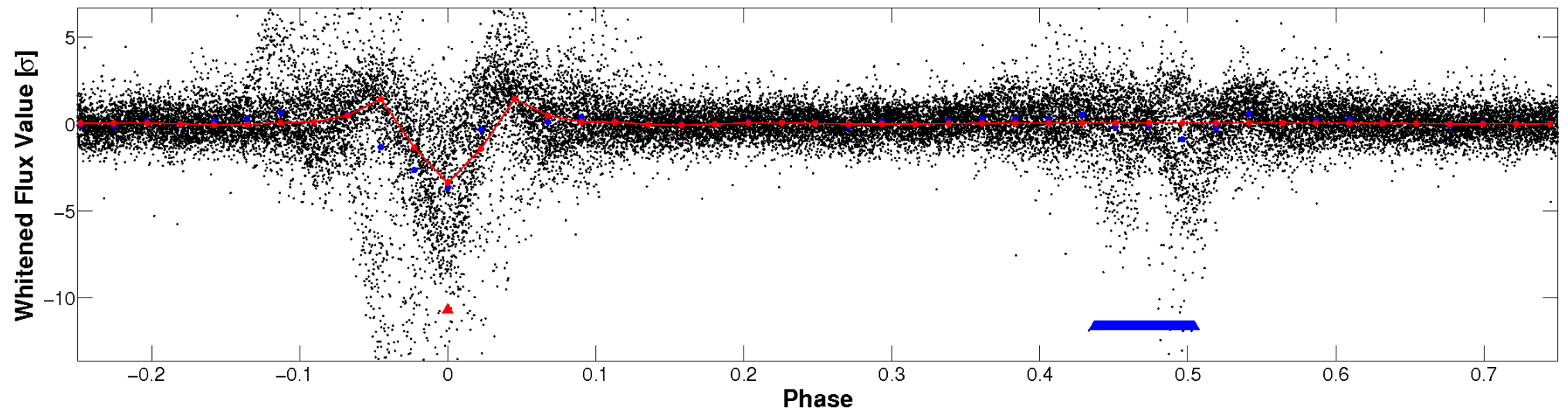


# Non-Whitened Vs. Whitened Light Curve

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

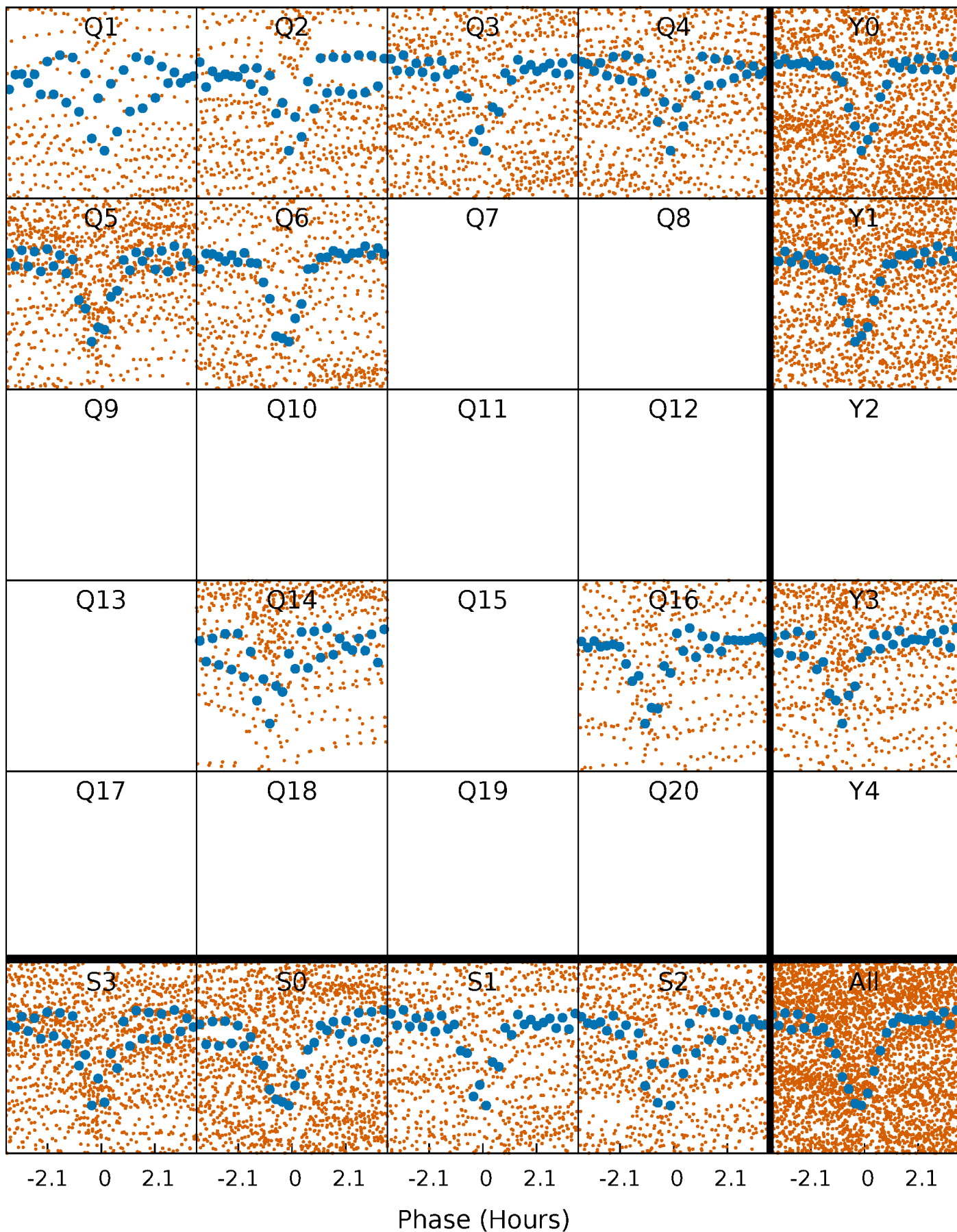


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

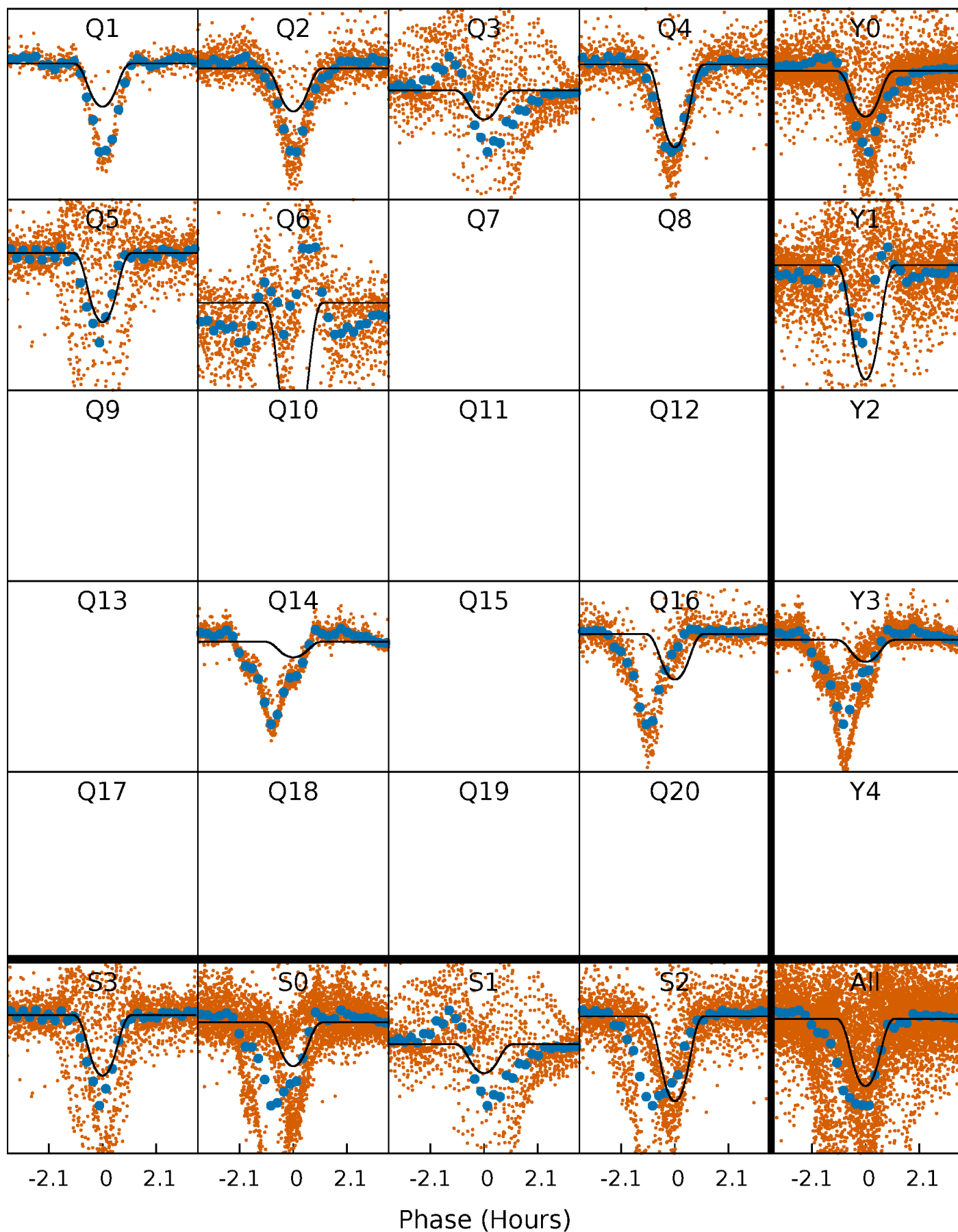
TCE 005952403-01 P= 0.905707 Days  $T_0=132.194355$  (BKJD)





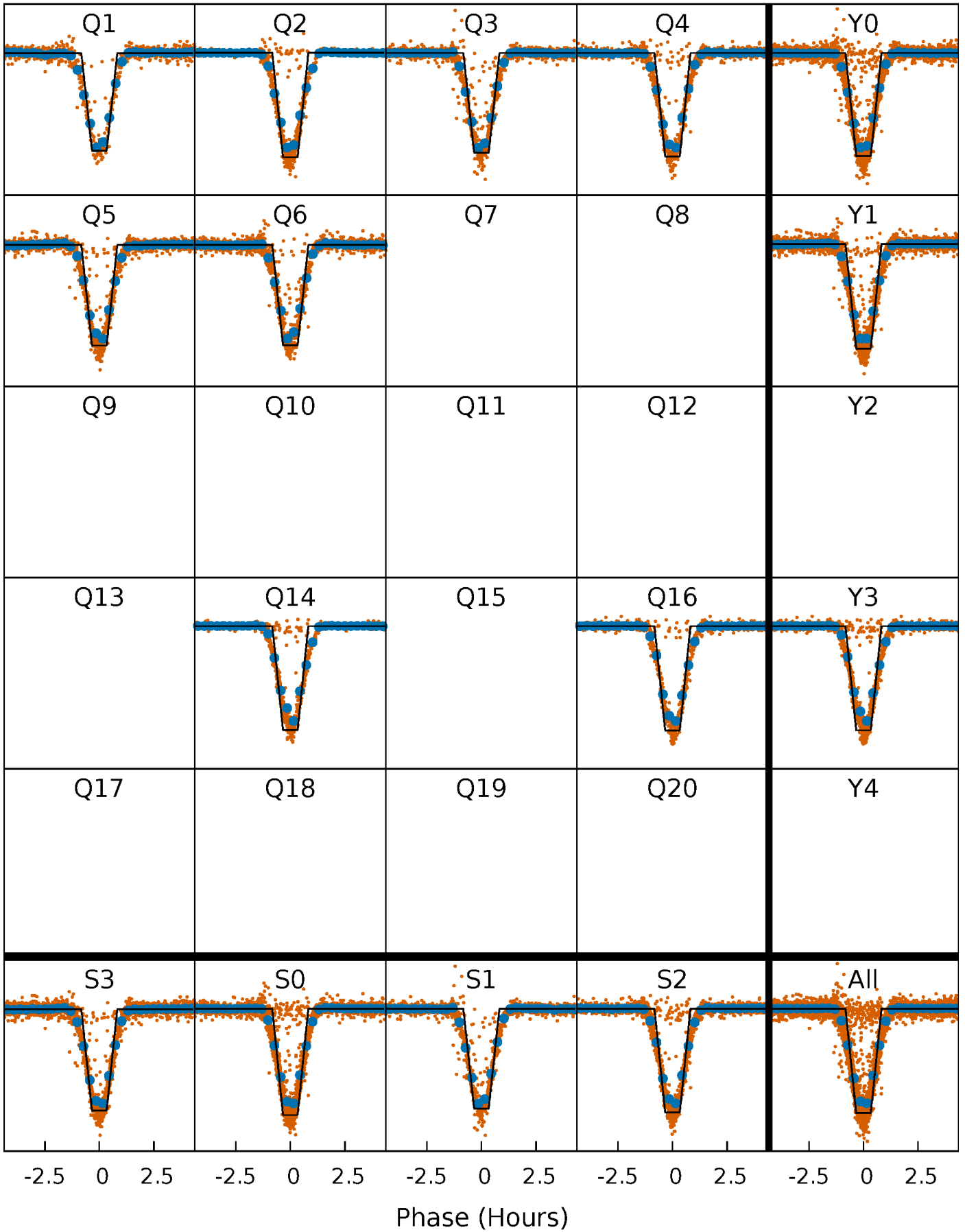
# DV Quarter-Phased Transit Curves

TCE 005952403-01   P= 0.905707 Days    $T_0=132.194355$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

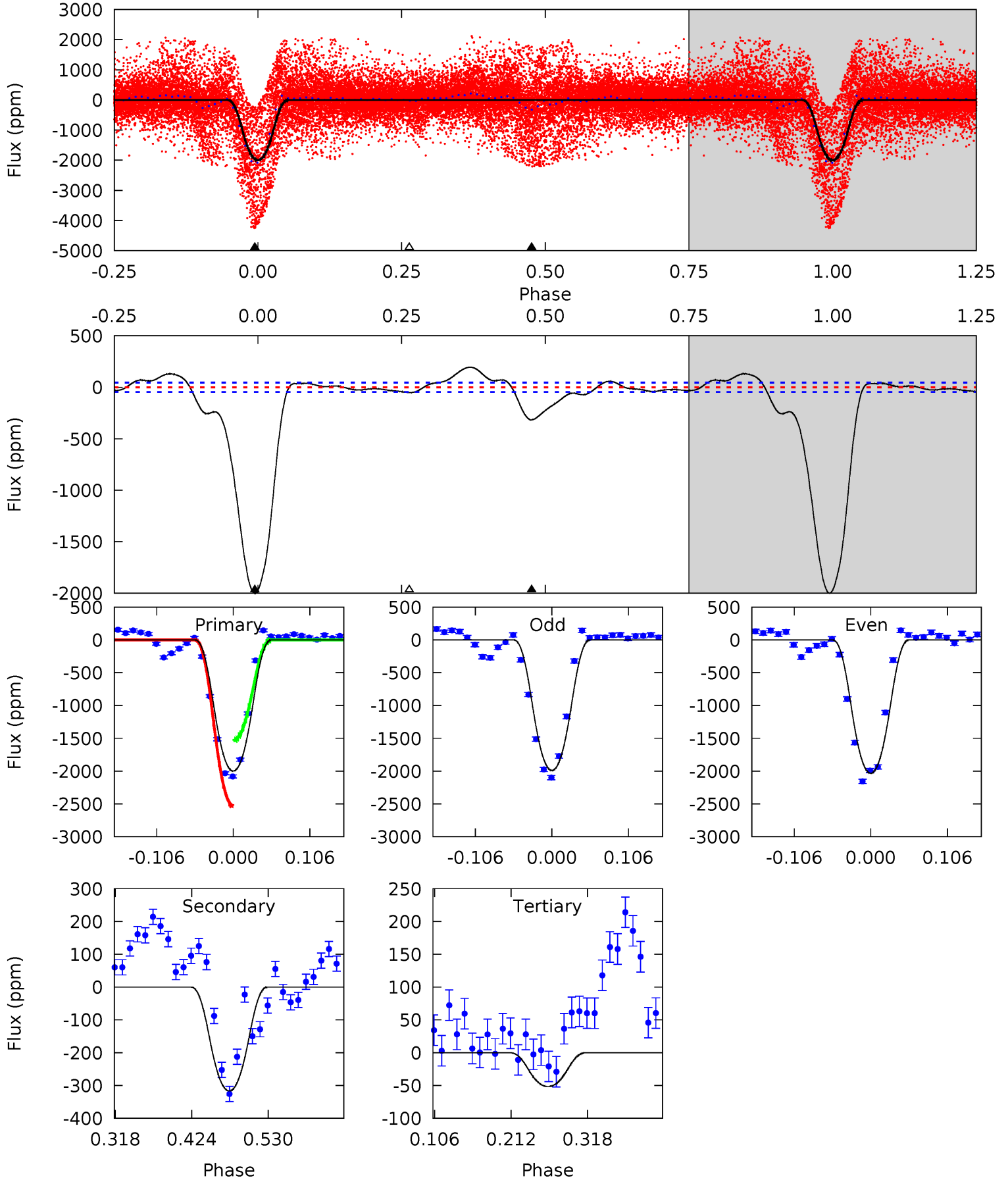
TCE 005952403-01 P= 0.905677 Days  $T_0=132.198612$  (BKJD)



# DV Model-Shift Uniqueness Test

005952403-01, P = 0.905707 Days, E = 131.288648 Days

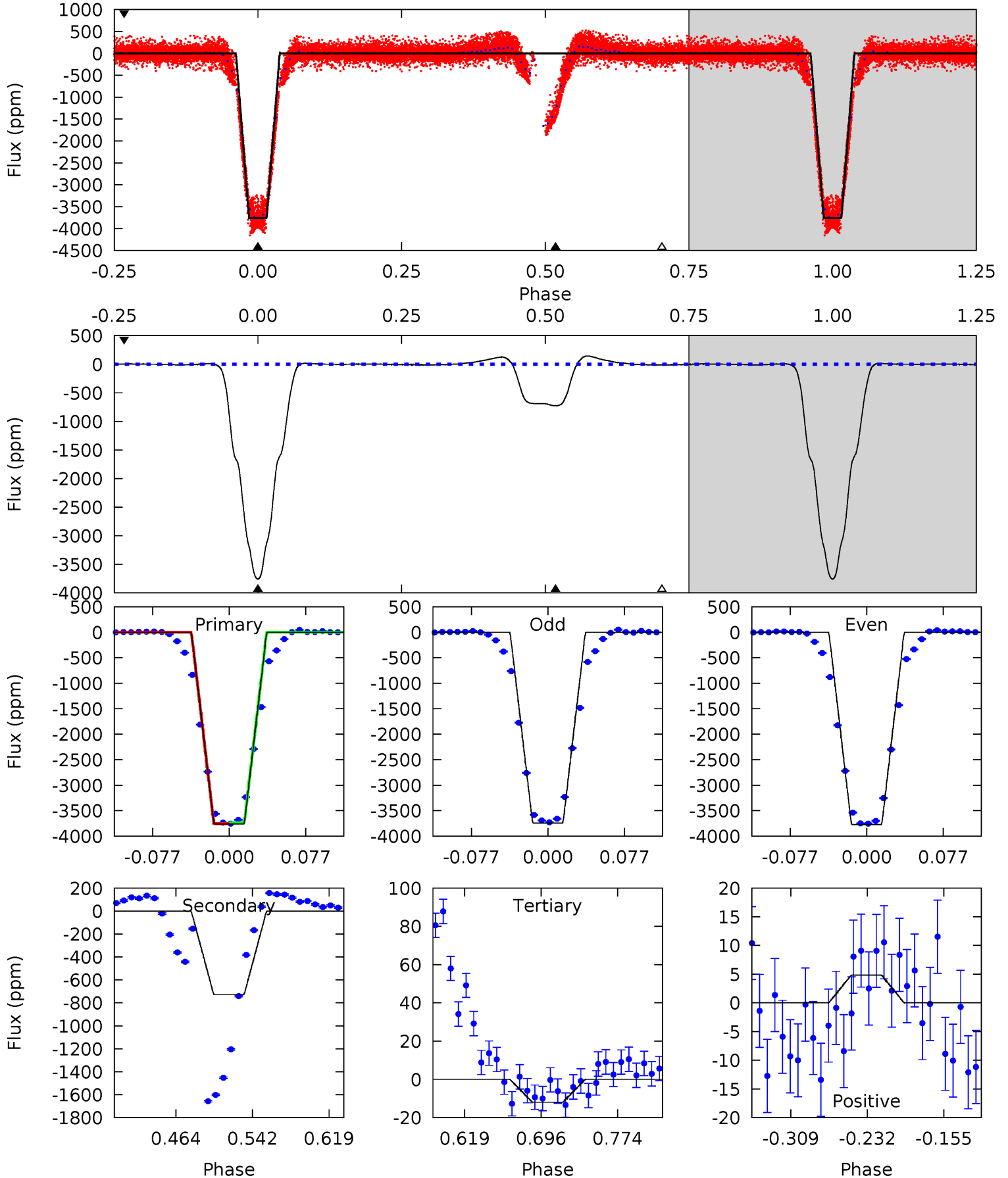
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
199.3	31.6	5.15	0	4.55	1.62	5.73	194.1	199.3	26.4	31.6	2.21	1.22	0.09	48.5



# Alt Model-Shift Uniqueness Test

005952403-01, P = 0.905677 Days, E = 131.292935 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
1321	255.8	4.21	1.69	4.62	1.77	10.2	1317	1319	251.6	254.2	5.23	0.94	0.04	0



### Stellar Parameters For KIC 005952403

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5037^{+50}_{-130}$	$3.002^{+0.201}_{-0.108}$	$0.000^{+0.100}_{-0.200}$	$7.553^{+2.138}_{-2.851}$	$2.091^{+0.573}_{-0.860}$	$0.007^{+0.010}_{-0.002}$
	+1%/-3%	+7%/-4%	+inf%/-inf%	+28%/-38%	+27%/-41%	+147%/-32%
Source	SPE13	SPE13	SPE13	DSEP		

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

### Secondary Eclipse Parameters for KIC 005952403-01 / KOI 6139.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-317 \pm 10$	$44.12^{+6.54}_{-8.76}$	$5490^{+317}_{-416}$	$-4418^{+308}_{-242}$	$0.051^{+0.018}_{-0.010}$
Alt.	$-728 \pm 3$	$51.02^{+8.15}_{-9.42}$	$5466^{+316}_{-400}$	$-4275^{+340}_{-254}$	$0.086^{+0.032}_{-0.017}$

$T_{\text{max}}$  = 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

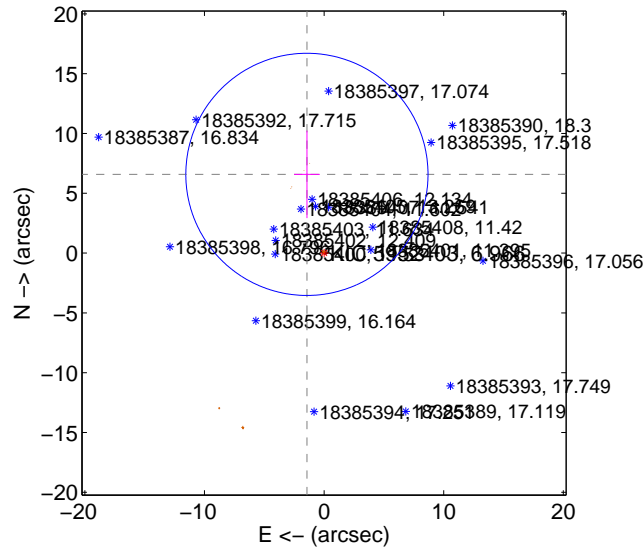
Supplemental centroid analysis for 005952403-01. **Kepler magnitude: 6.97.** Transit SNR 108.73

There are 0 quarters with good PRF difference image offsets

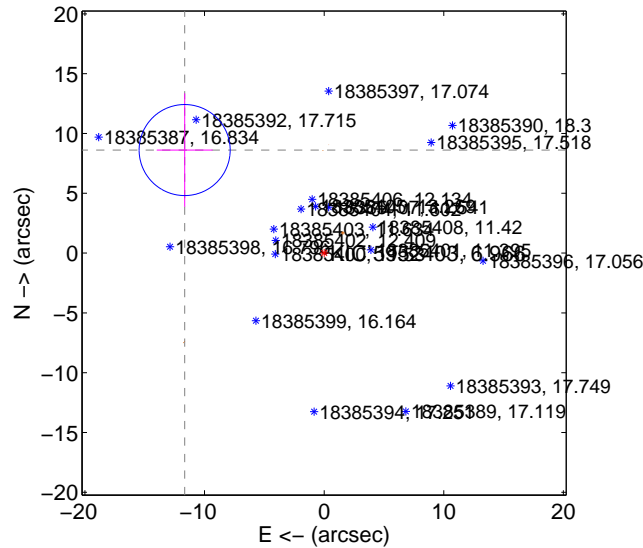
The OOT PRF centroid is offset from the target star catalog position by about 15.87 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.739 \pm 3.376$	2.00	$1.436 \pm 1.078$	$6.584 \pm 3.659$
PRF-fit source offset from KIC position	$14.504 \pm 1.269$	11.43	$11.666 \pm 2.331$	$8.618 \pm 4.739$
photometric centroid source offset	$8.69 \pm 0.07$	122.88	$4.87 \pm 0.05$	$-7.20 \pm 0.08$

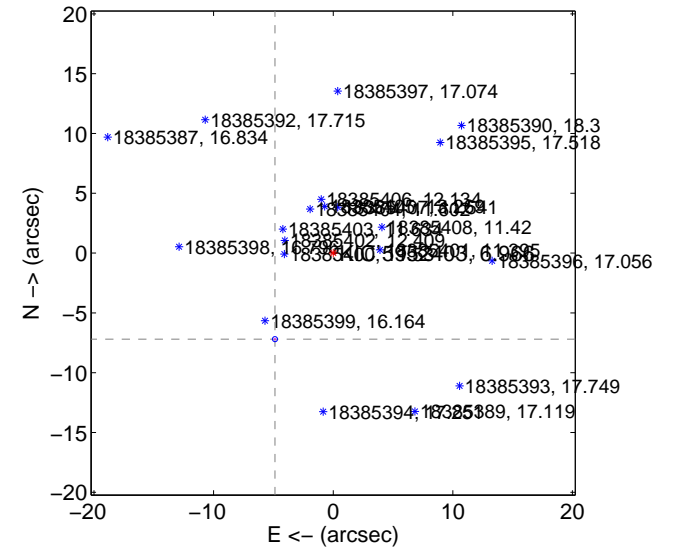
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

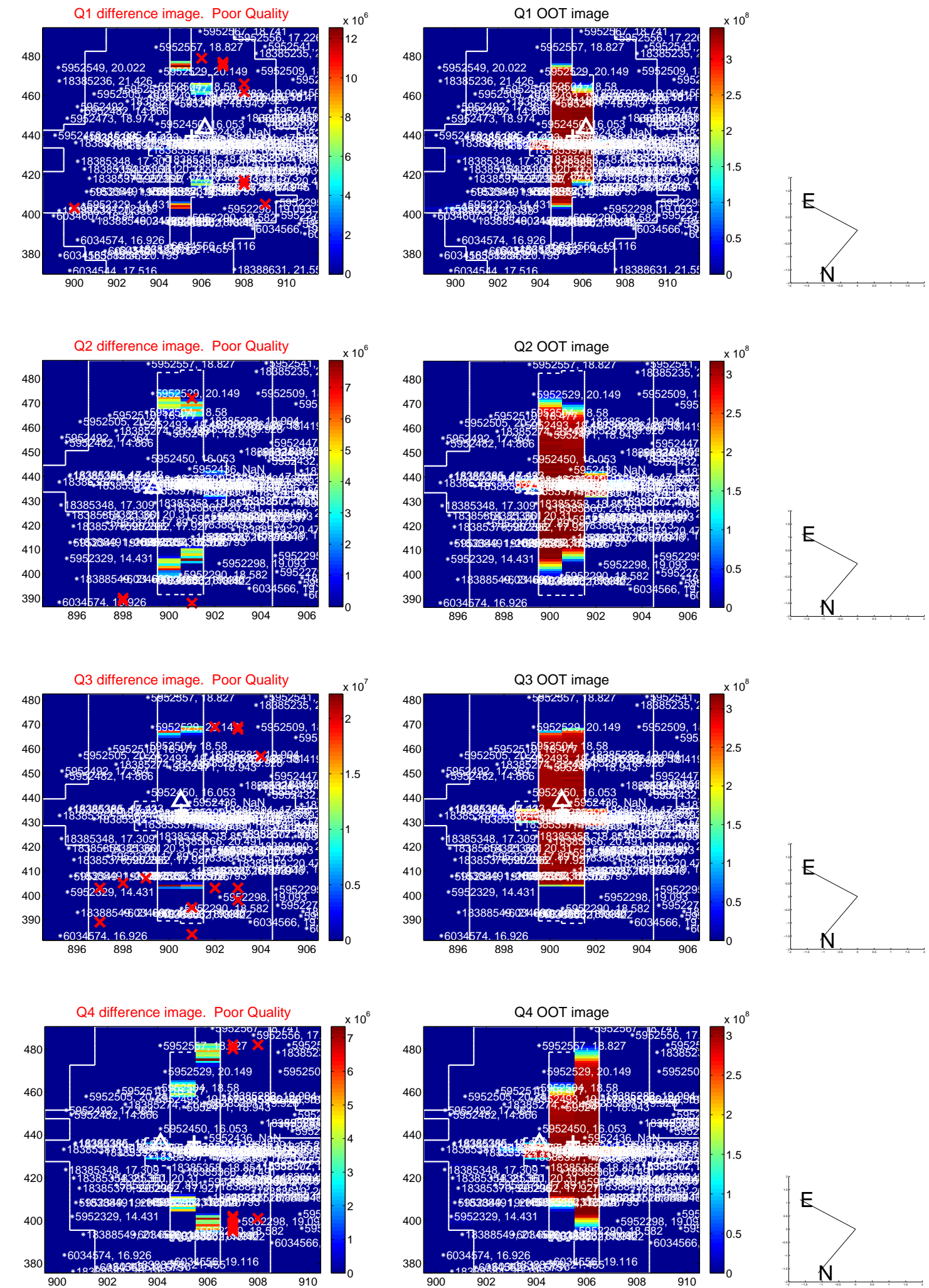


offset from photometric centroids

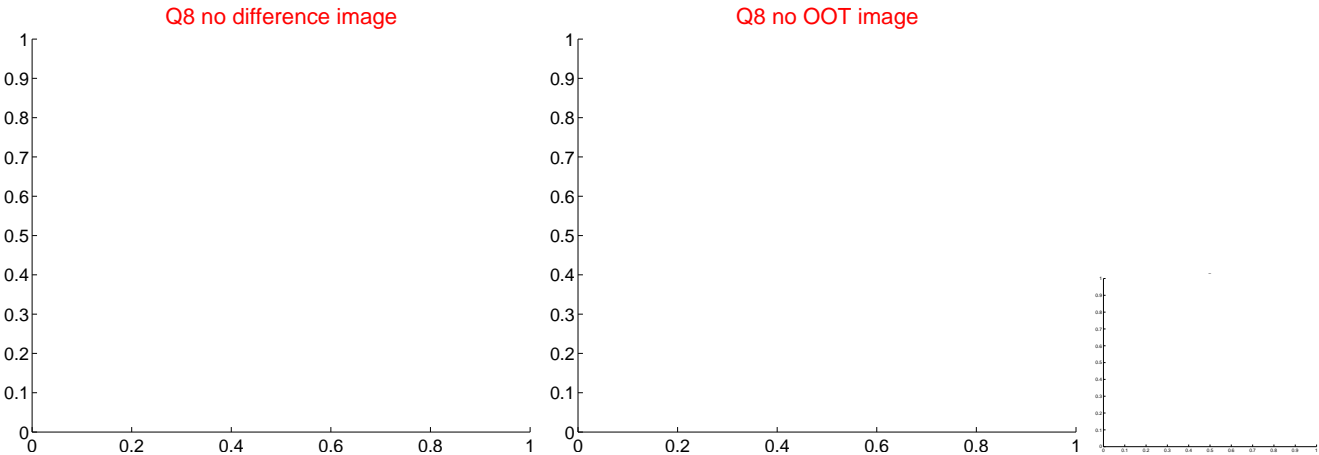
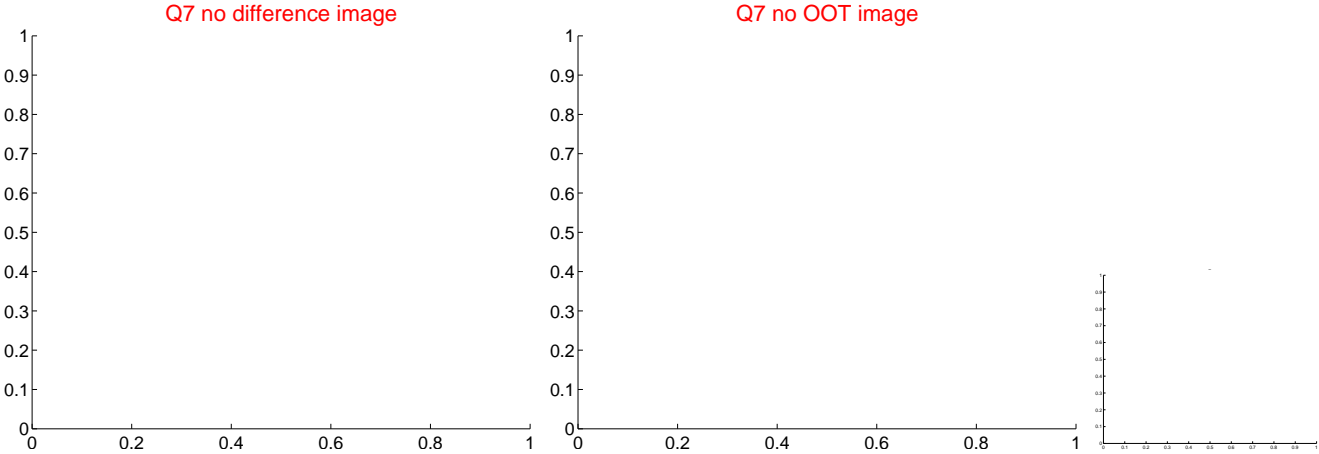
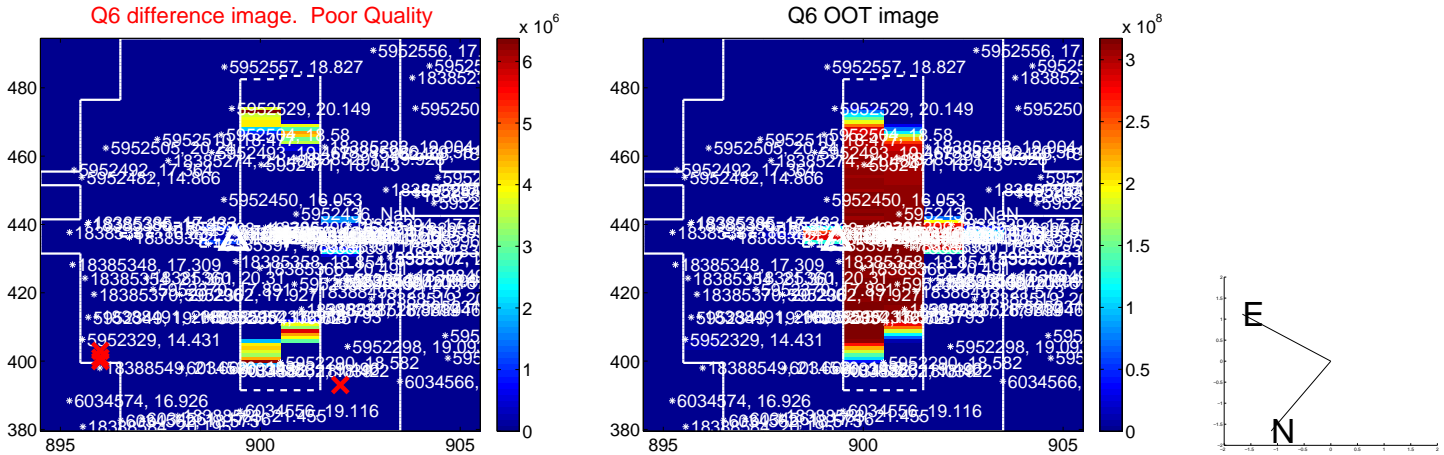
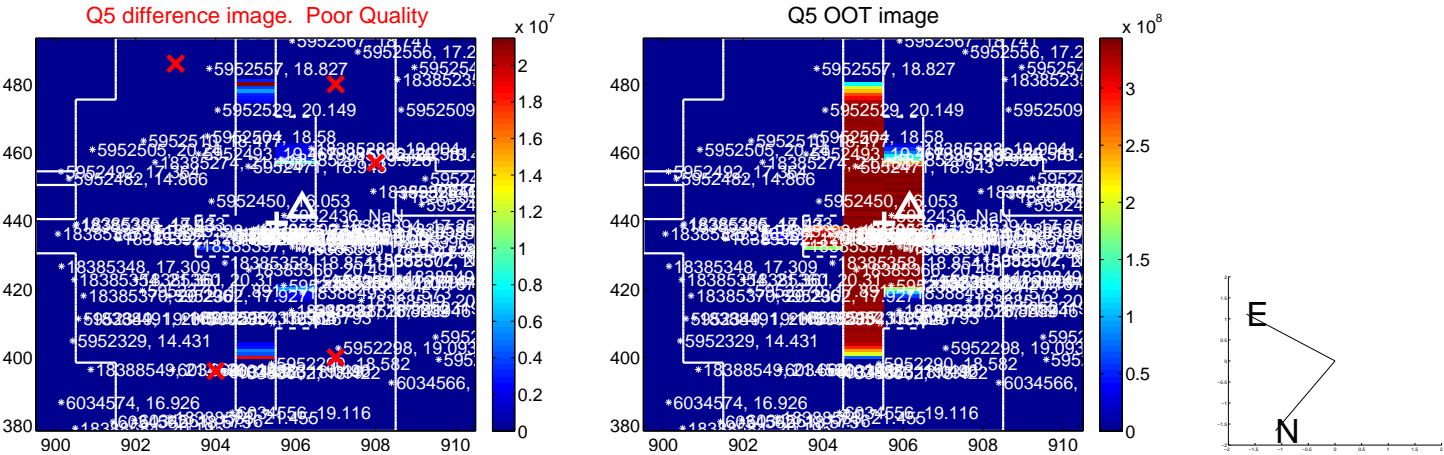


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

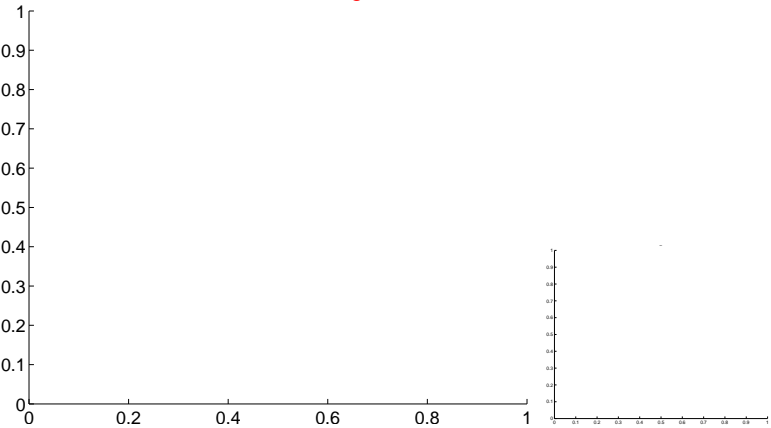


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q13 no difference image

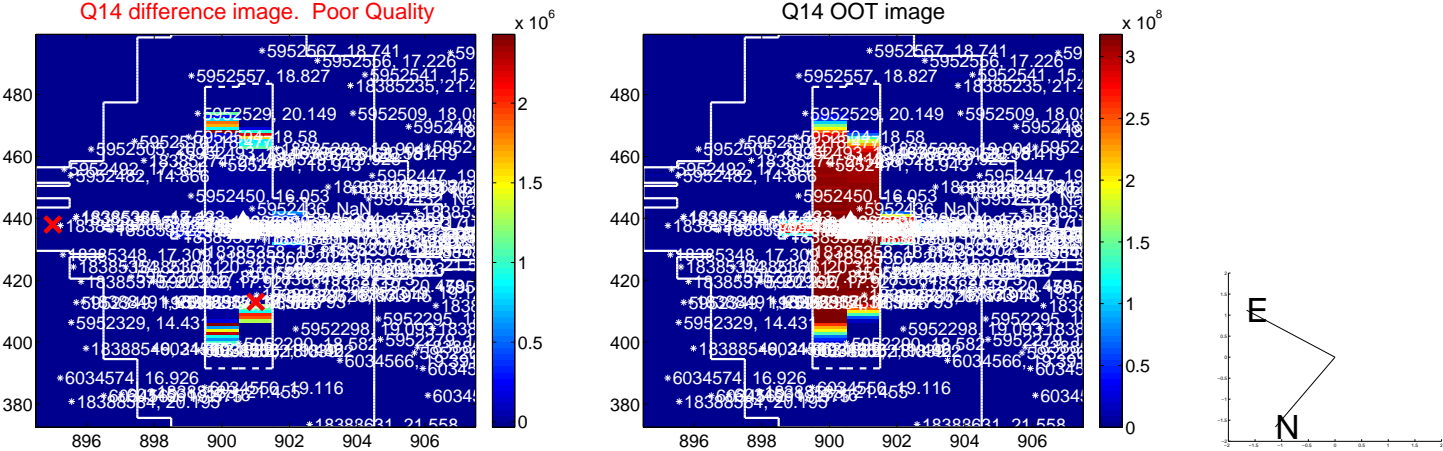


Q13 no OOT image

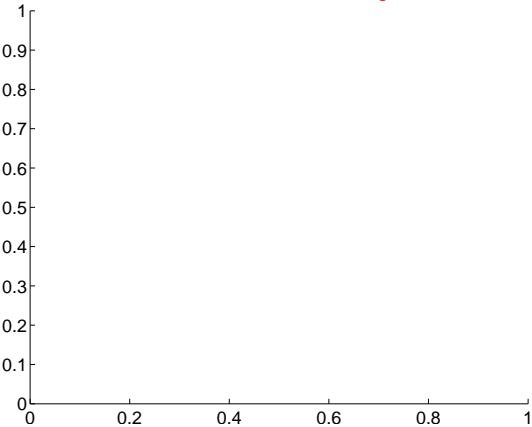


Q14 difference image. Poor Quality

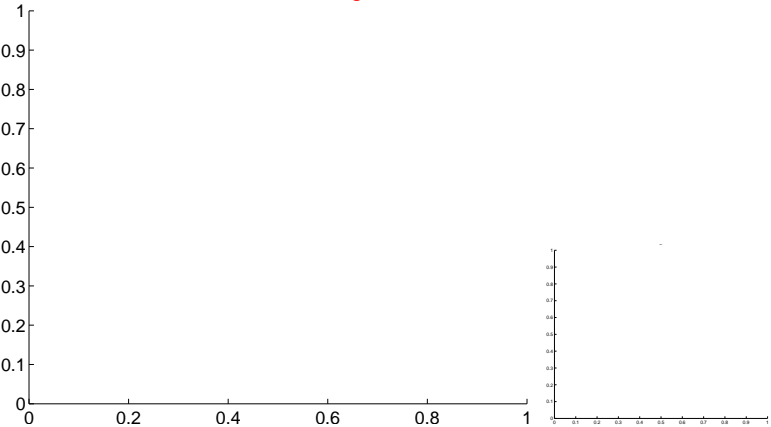
Q14 OOT image



Q15 no difference image

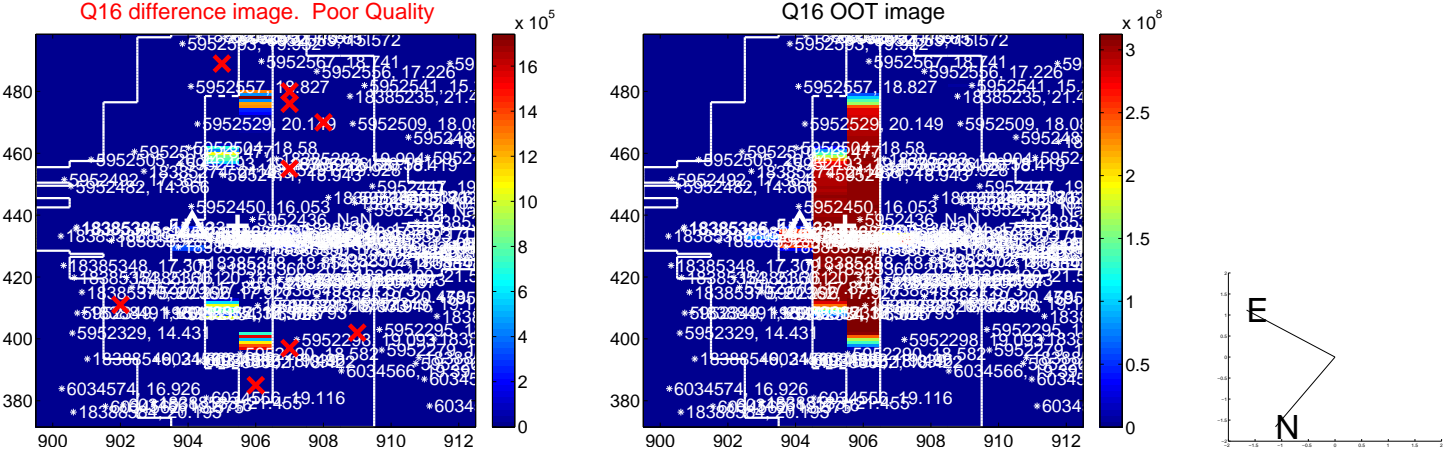


Q15 no OOT image



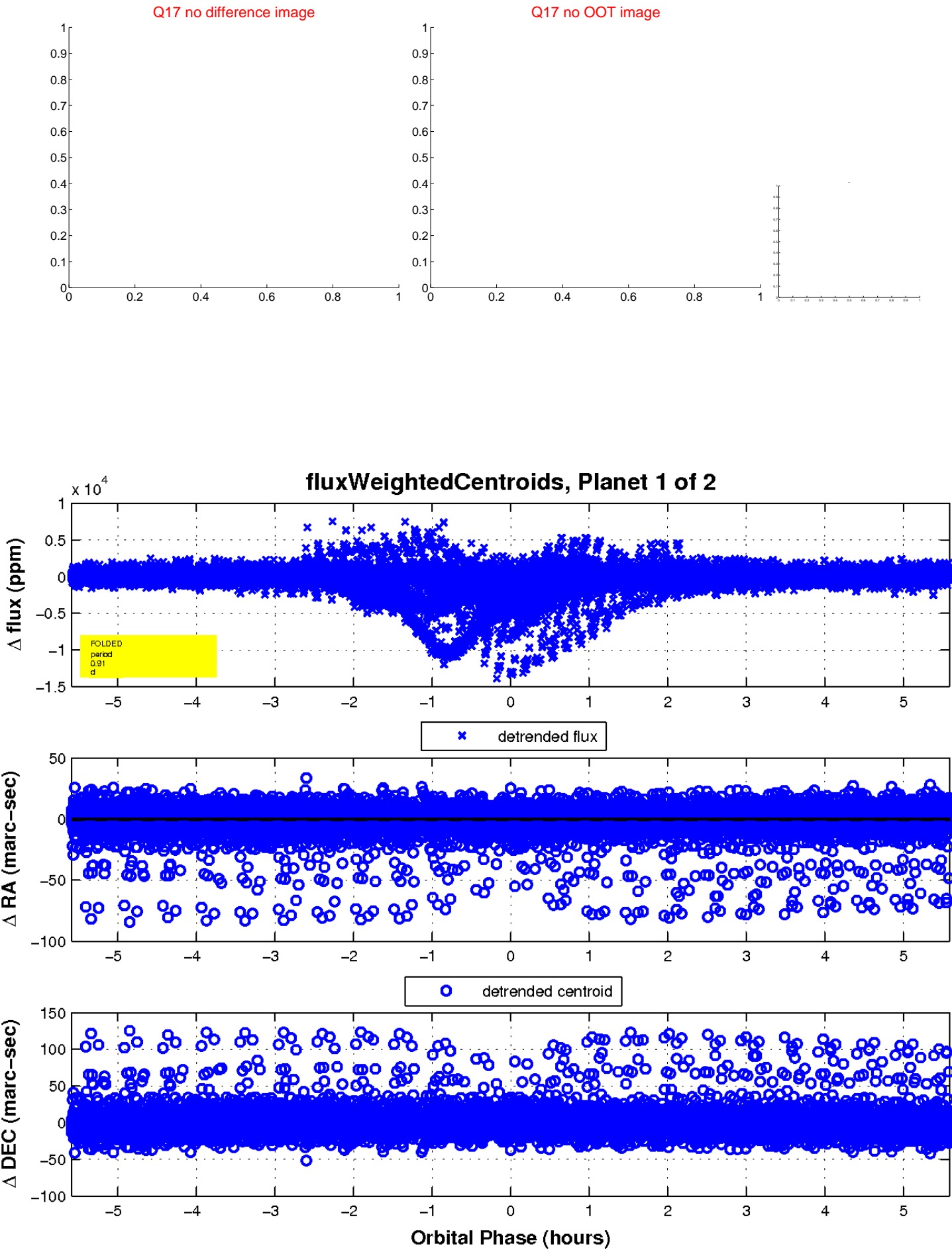
Q16 difference image. Poor Quality

Q16 OOT image



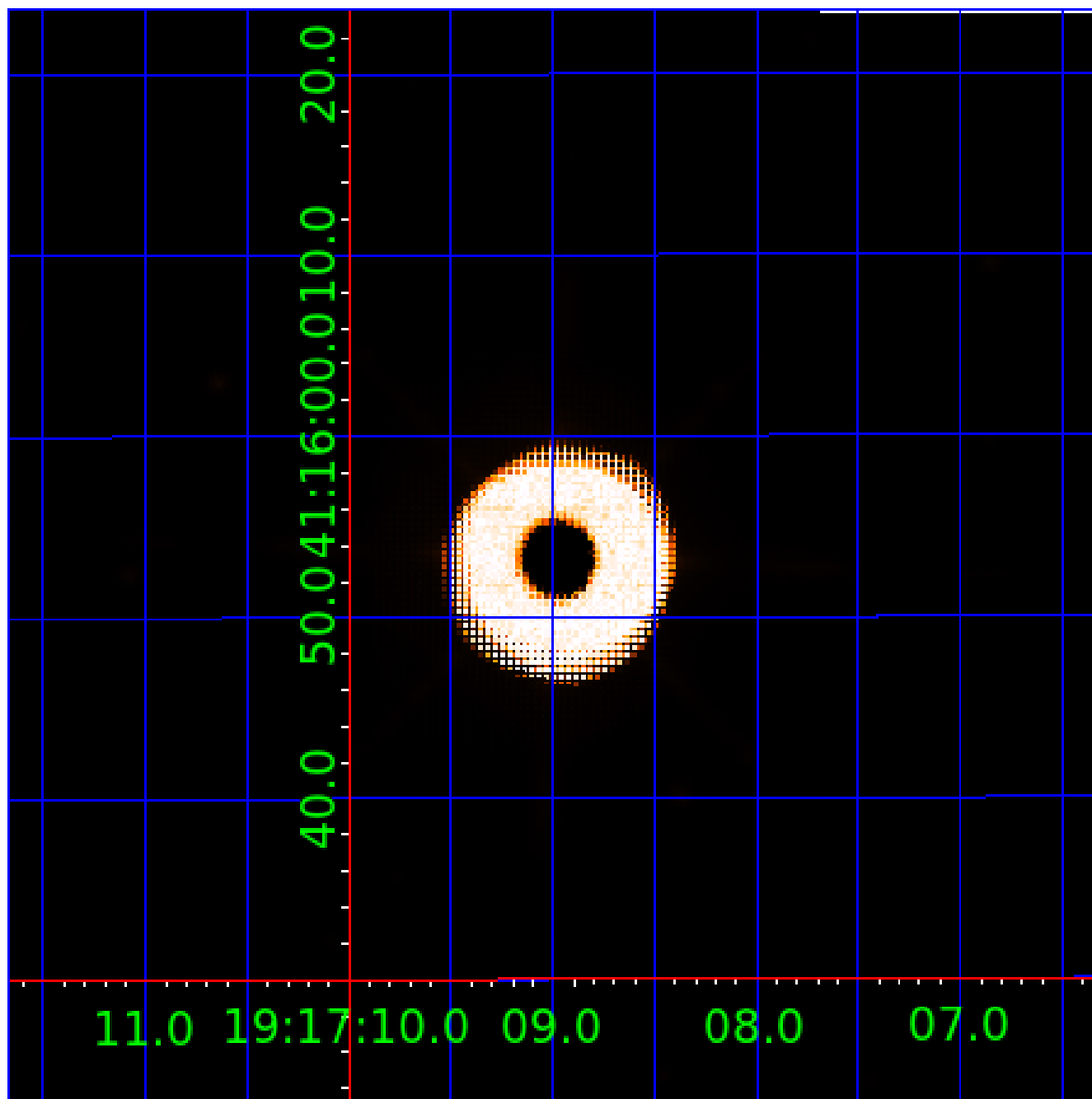


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005952403

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005952403-01	OBS	6139.01	0.905707	132.194355	1847.2	1.862	175.7	108.7	7.55	5037	44.09	0.00
005952403-02	OBS	No	0.905669	131.745369	79.7	1.500	53.6	-1.0	7.55	5037	6.58	59938.03

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005952403-01	OBS	FP	0.00	0	1	0	1	PLANET_IN_STAR—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_SATURATED—EPHEM_MATCH
005952403-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_SATURATED

**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.

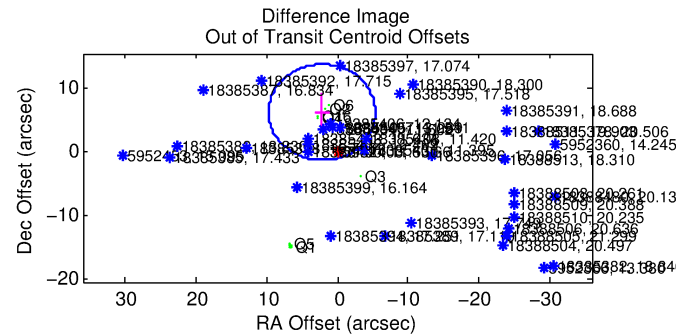
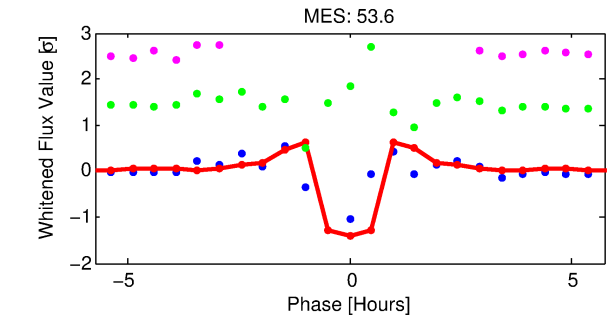
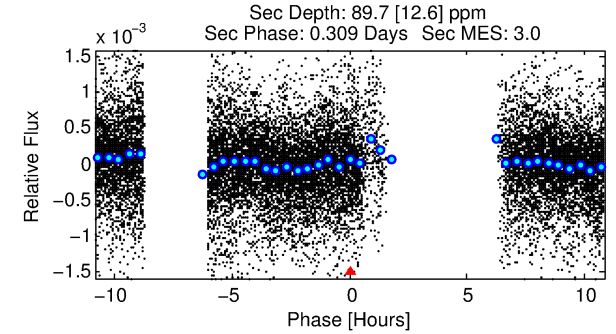
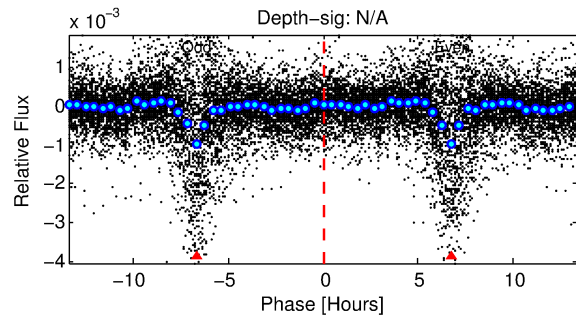
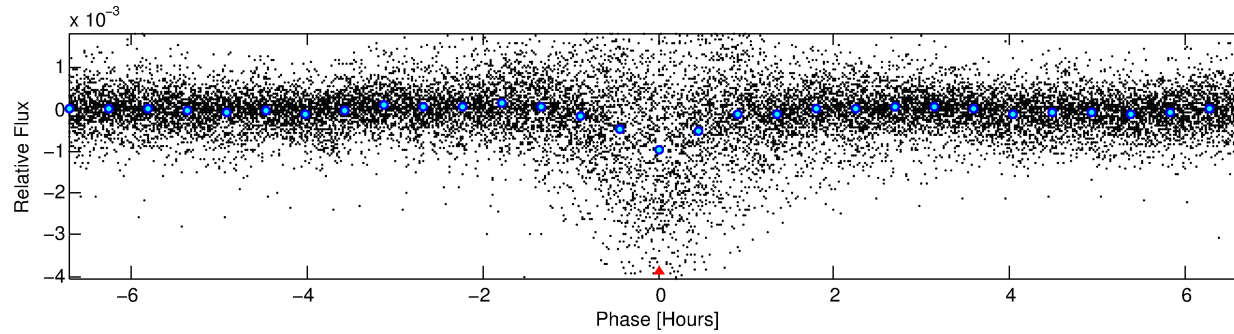
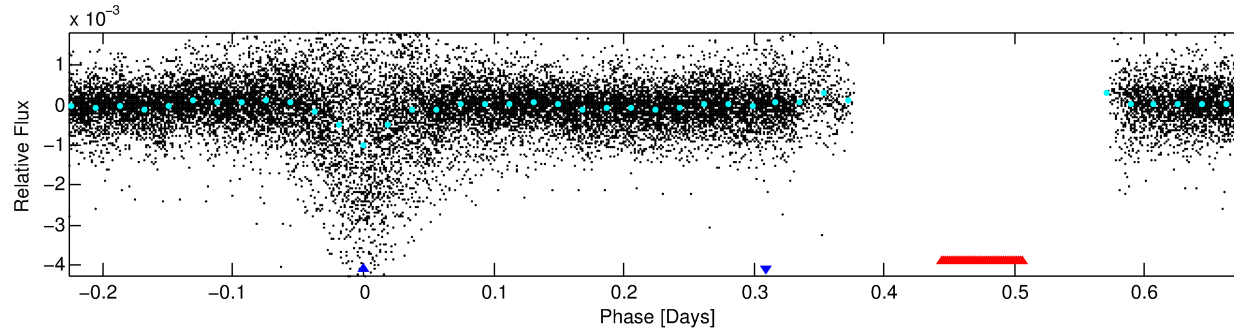
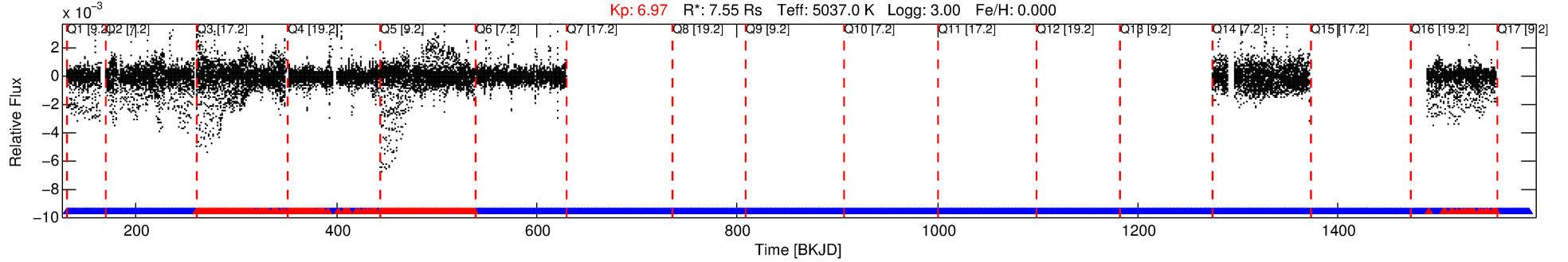
## Ephemeris Match Information For 005952403-02

No Significant Match Found

# DV One-Page Summary

KIC: 5952403 Candidate: 2 of 2 Period: 0.906 d  
KOI: K06139 Corr: No Ephemeris Match

Kp: 6.97 R\*: 7.55 Rs Teff: 5037.0 K Logg: 3.00 Fe/H: 0.000



TPS TCE Results:

Period = 0.90567 d  
Epoch = 131.7454 BKJD

DV fit results are unavailable

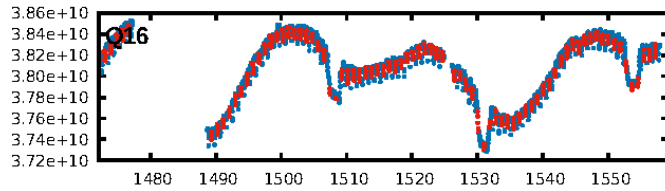
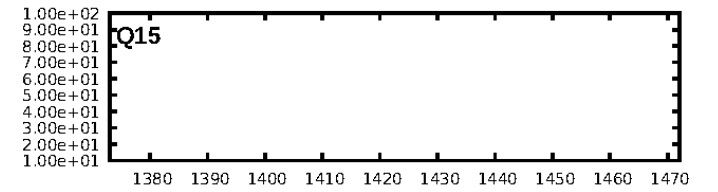
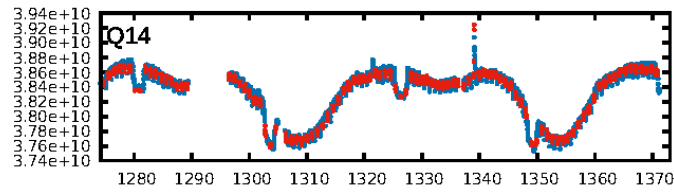
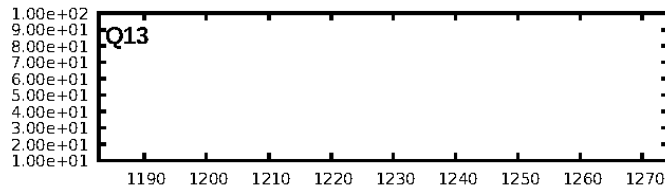
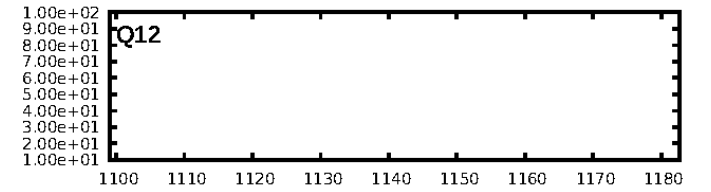
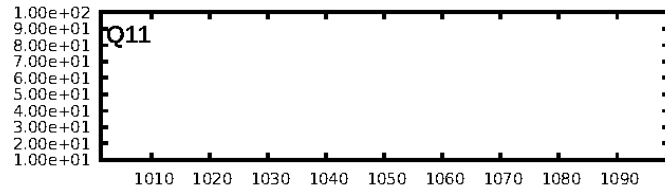
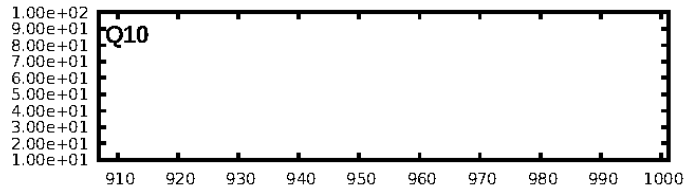
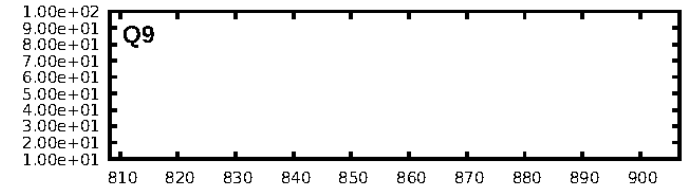
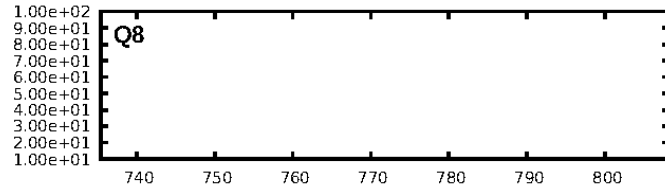
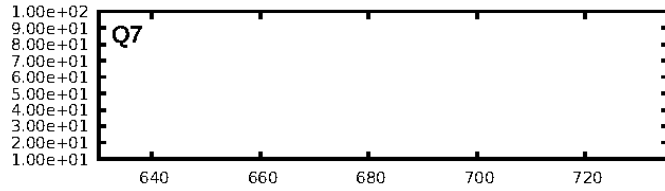
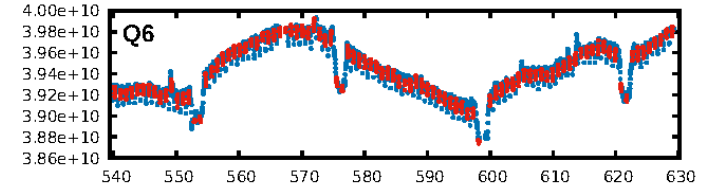
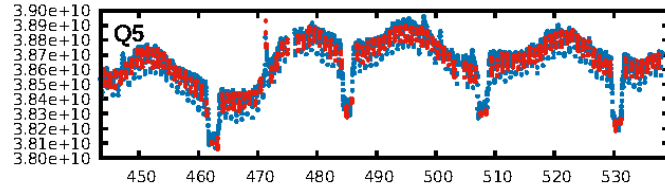
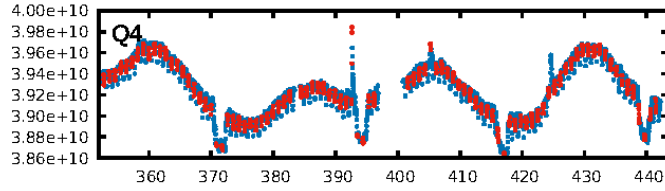
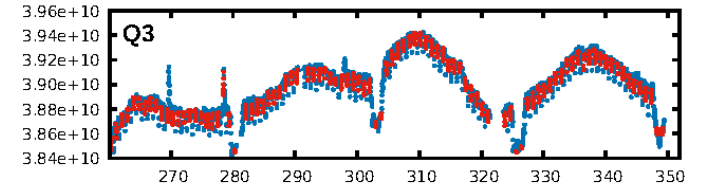
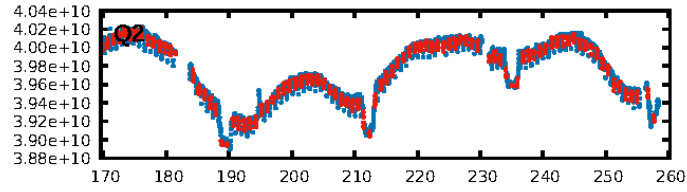
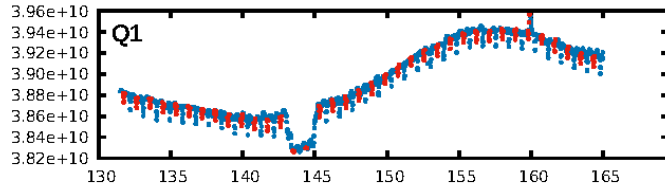
DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.62 [404/656]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 8.552 arcsec [159.06σ]  
OotOffset-rm: 6.617 arcsec [2.63σ]  
KicOffset-rm: 8.997 arcsec [1.69σ]  
OotOffset-st: 3/1/2/2 [8]  
KicOffset-st: 3/1/2/2 [8]  
DiffImageQuality-fgm: 0.00 [0/8]  
DiffImageOverlap-fno: 1.00 [8/8]

Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 00:43:13 Z

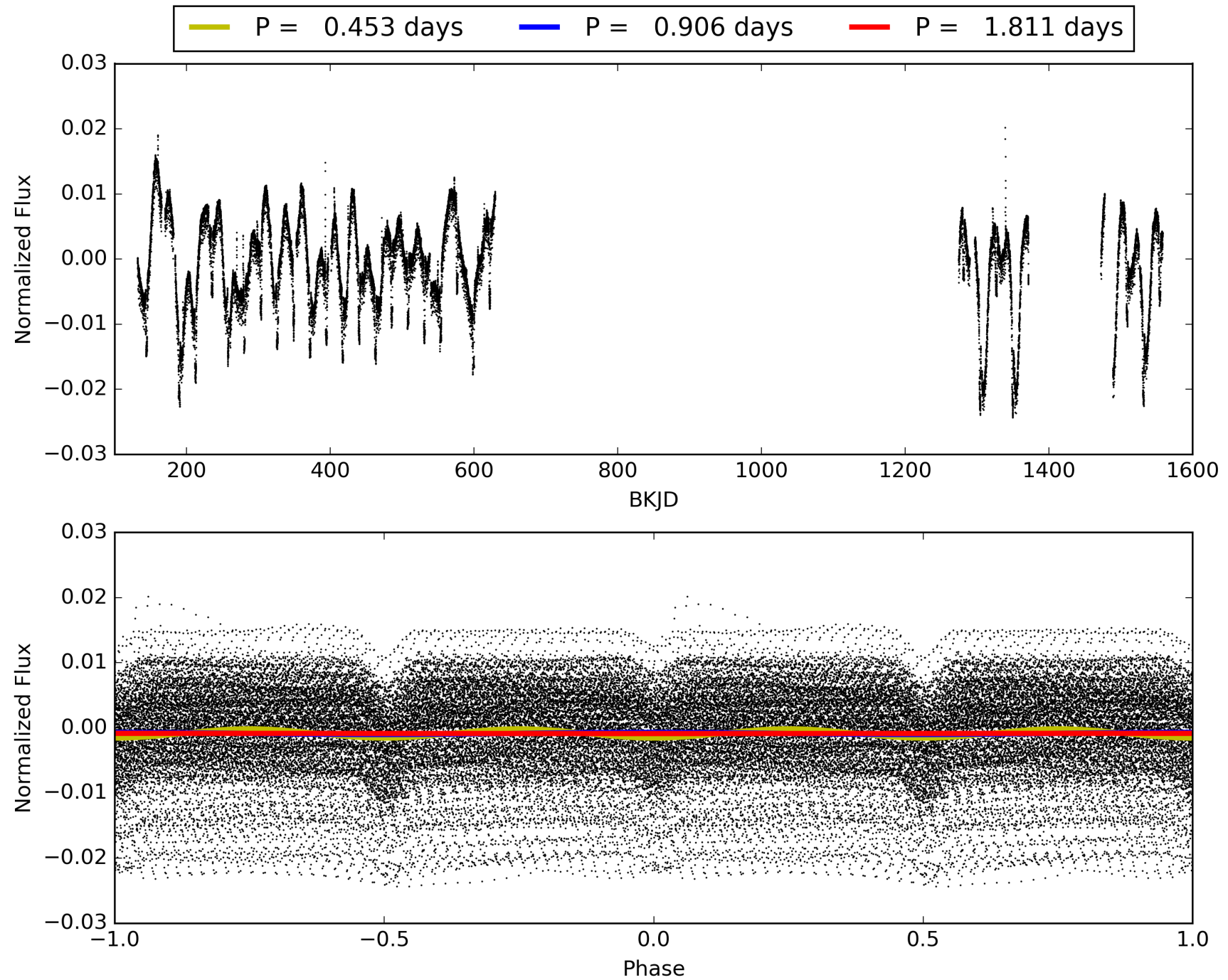
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005952403-02, PDC Light Curves



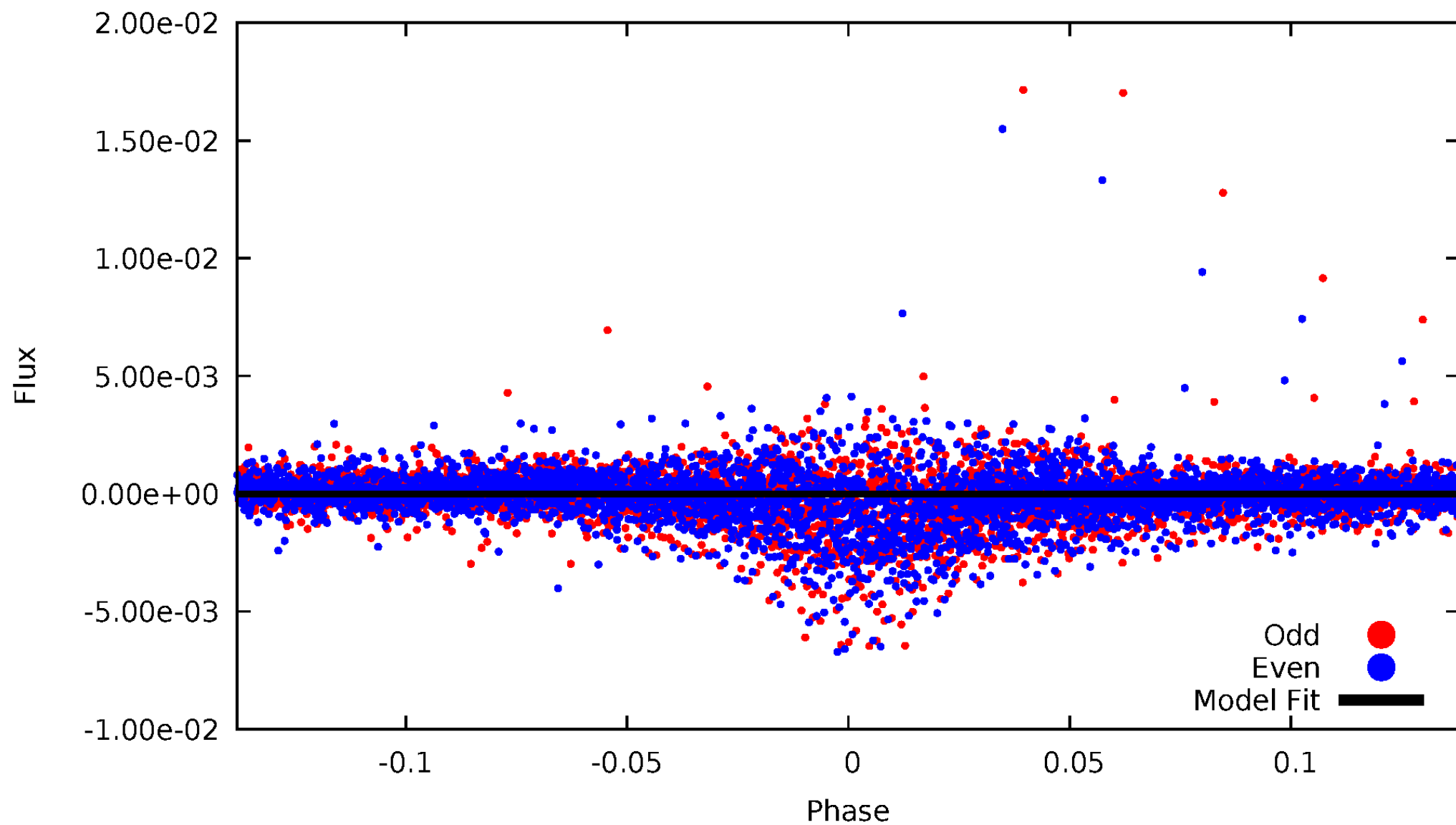


# TCE 005952403-02



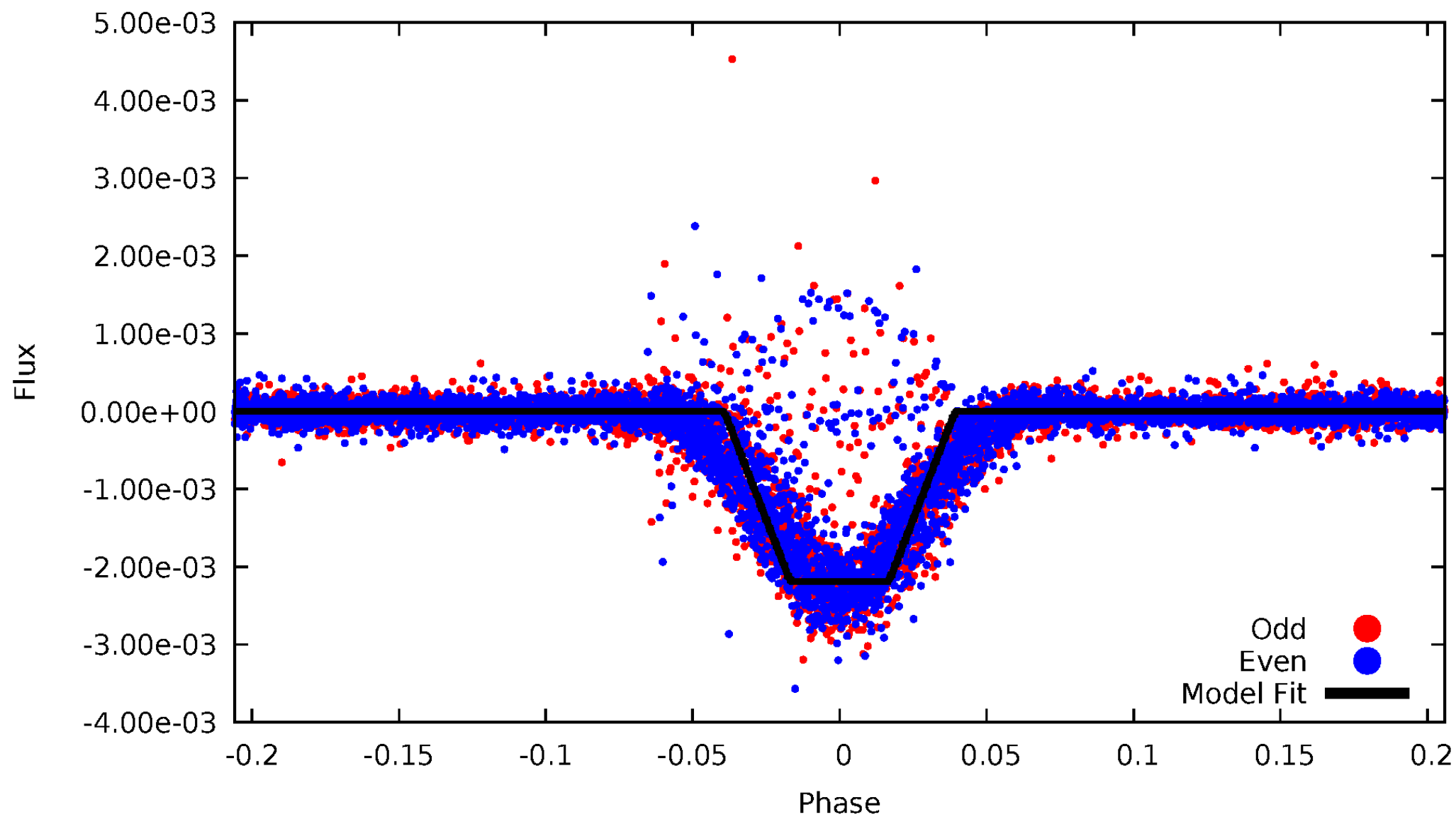
# DV Odd/Even

TCE 005952403-02



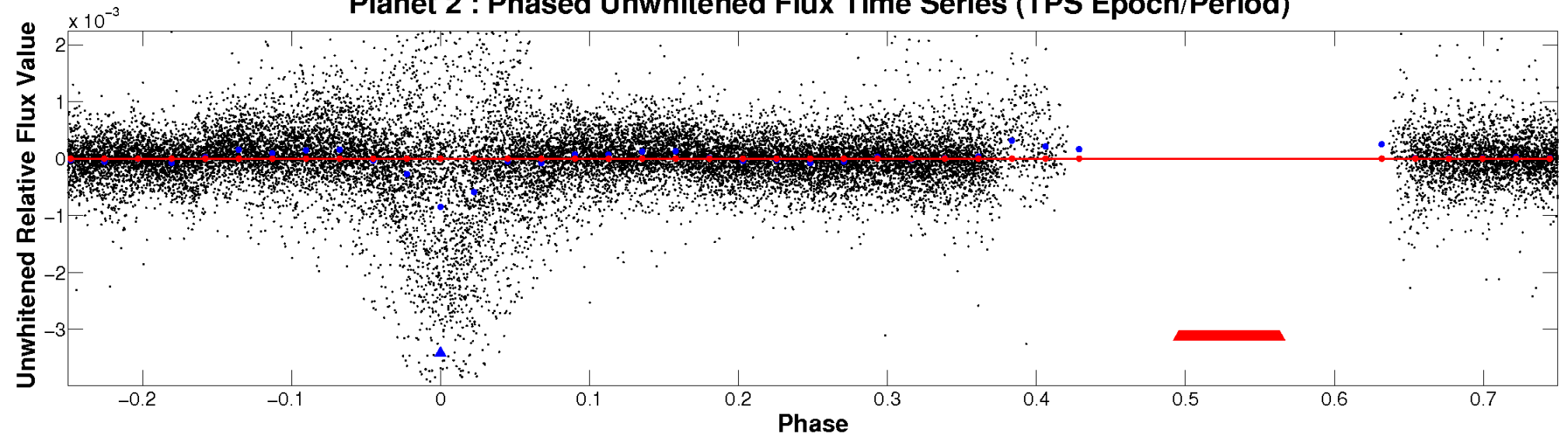
# ALT Odd/Even

TCE 005952403-02

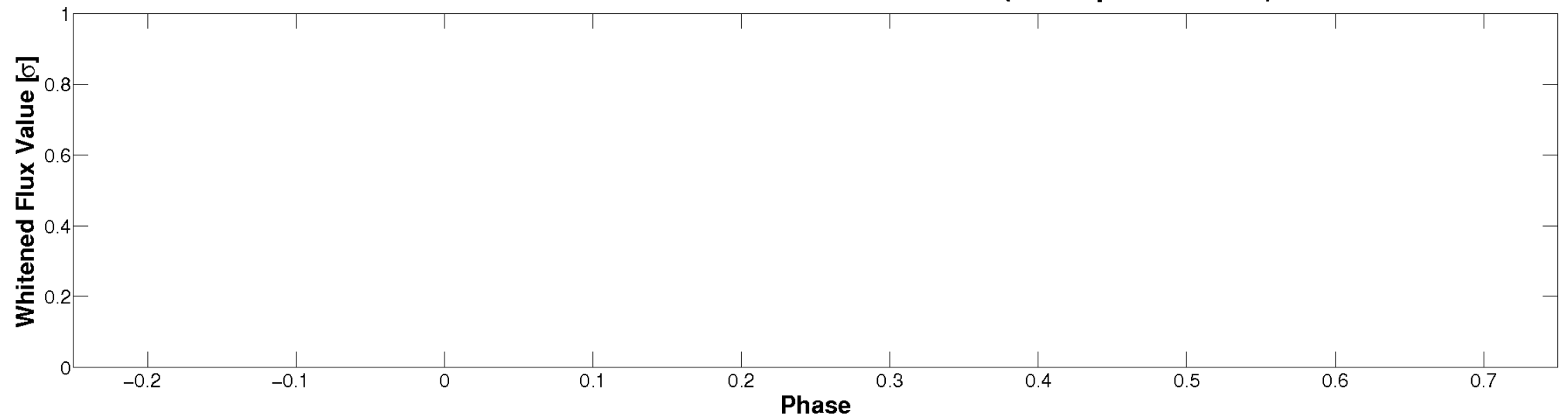


# Non-Whitened Vs. Whitened Light Curve

**Planet 2 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

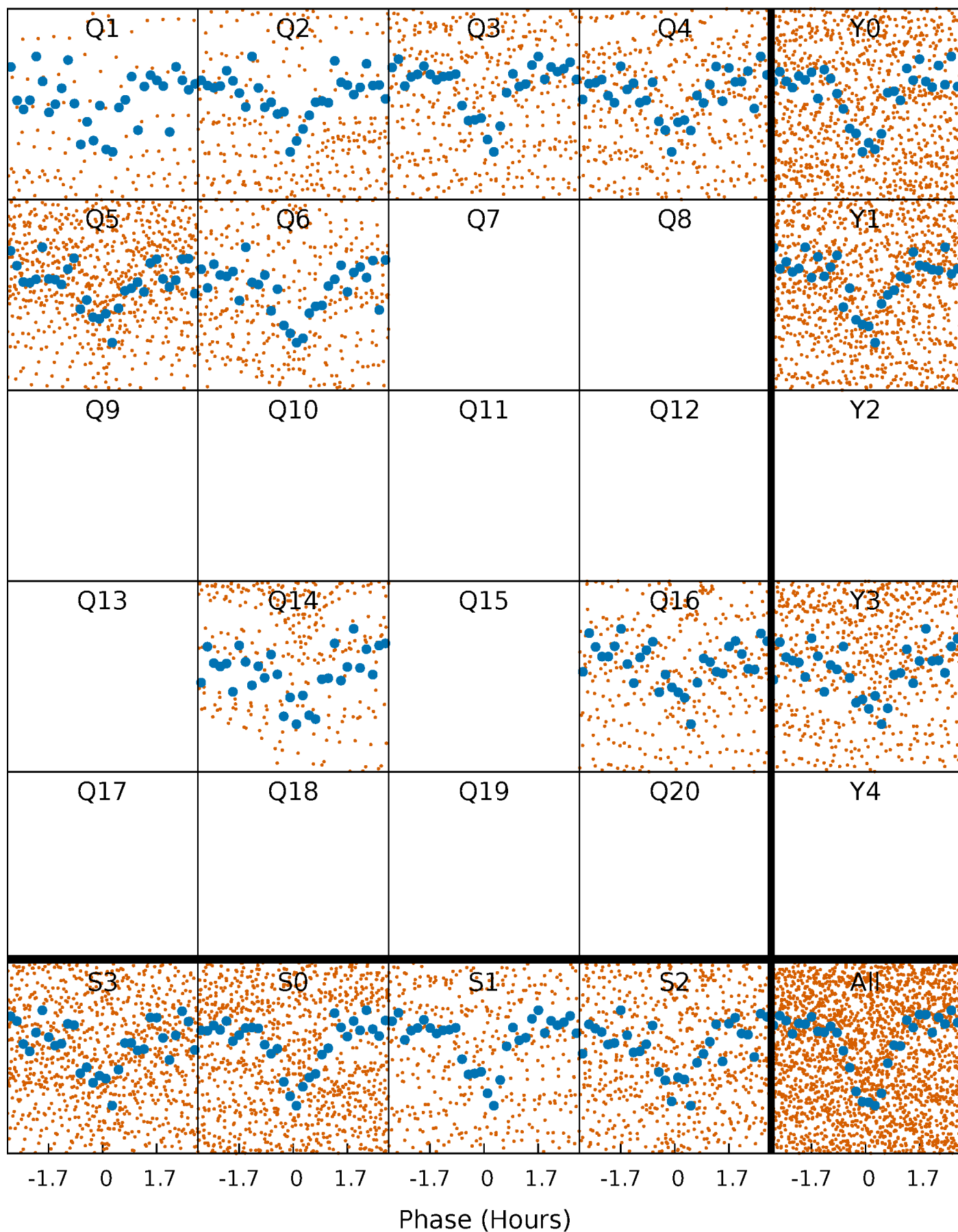


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

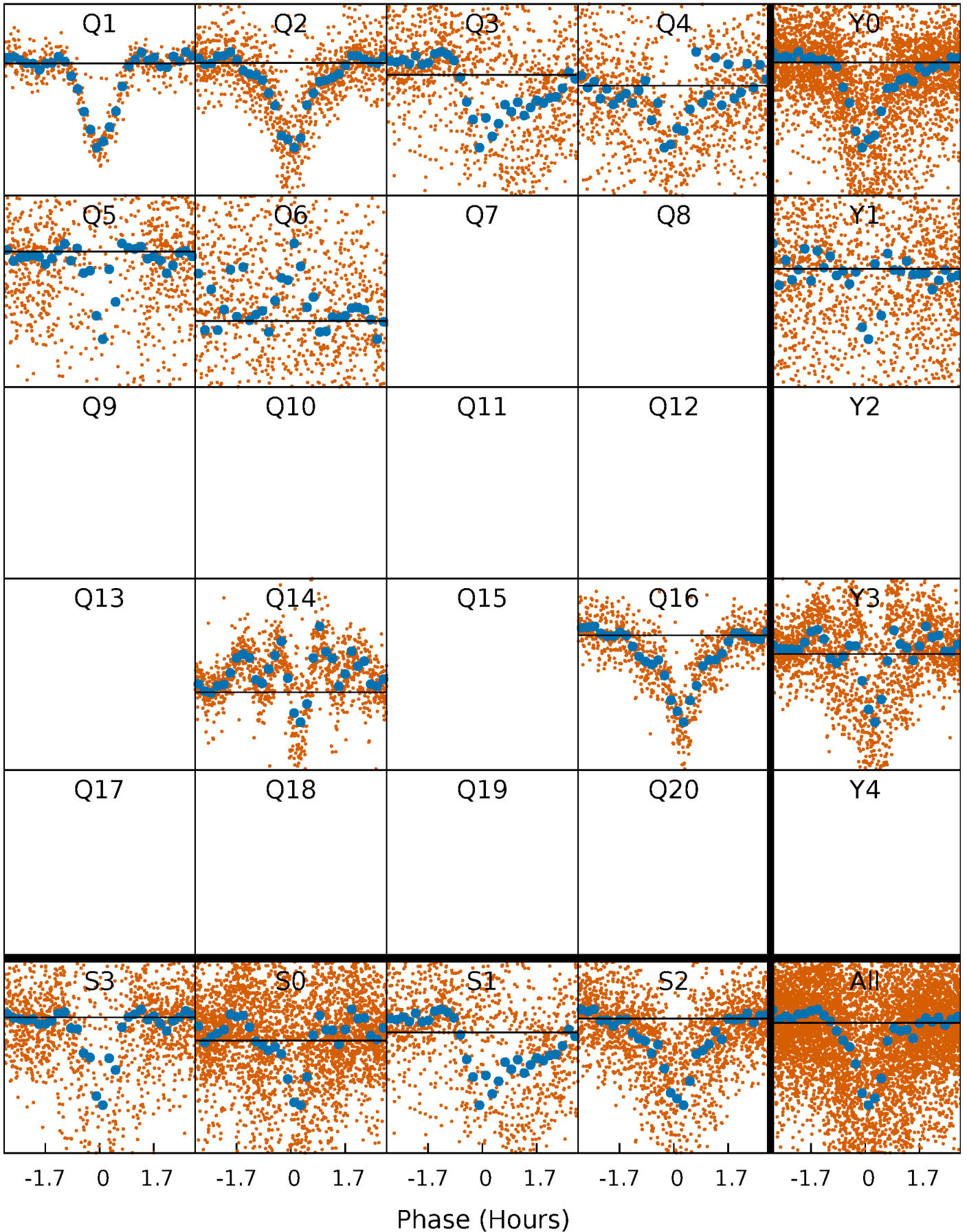
TCE 005952403-02 P= 0.905669 Days  $T_0=131.745369$  (BKJD)





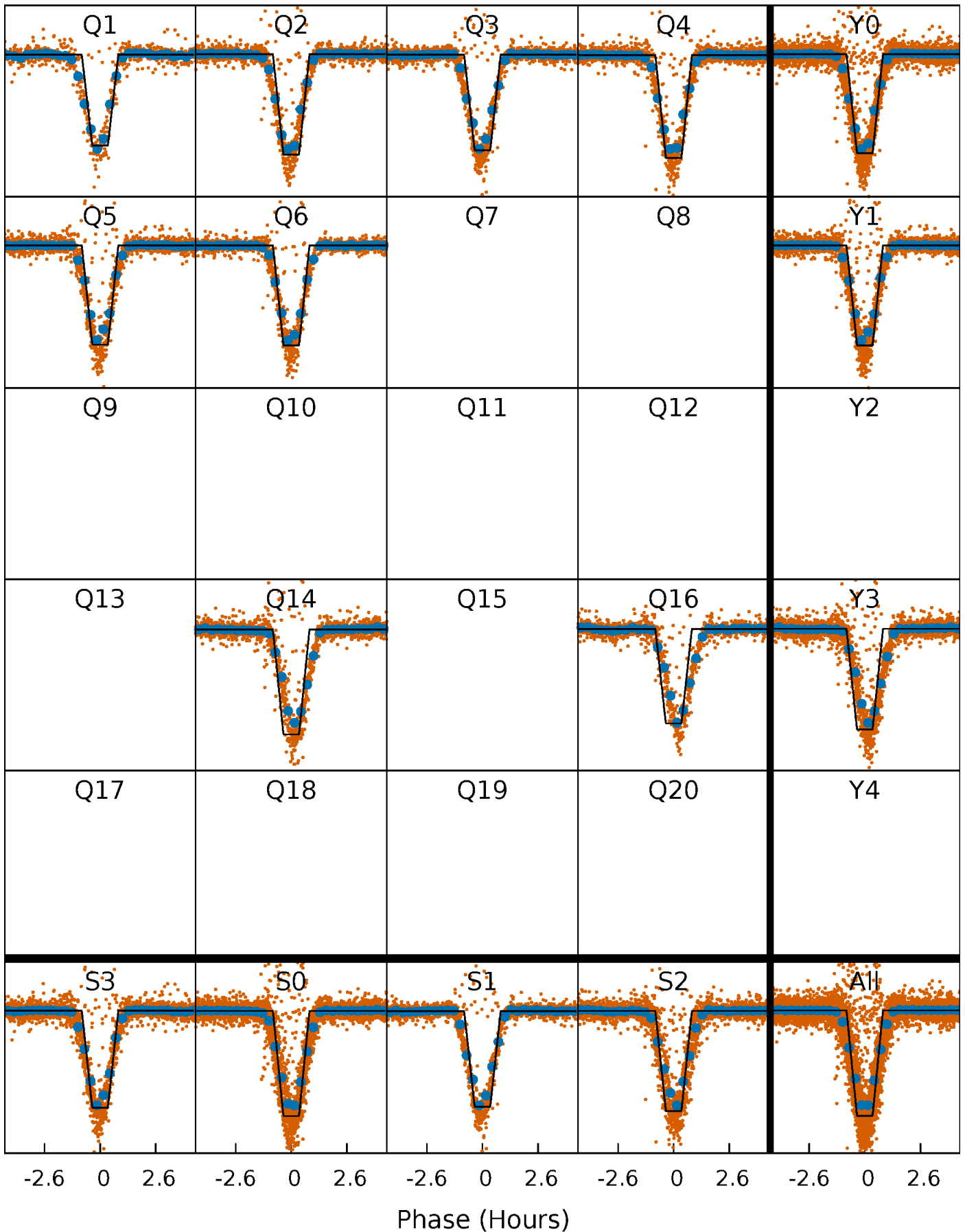
# DV Quarter-Phased Transit Curves

TCE 005952403-02   P= 0.905669 Days    $T_0=131.745369$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

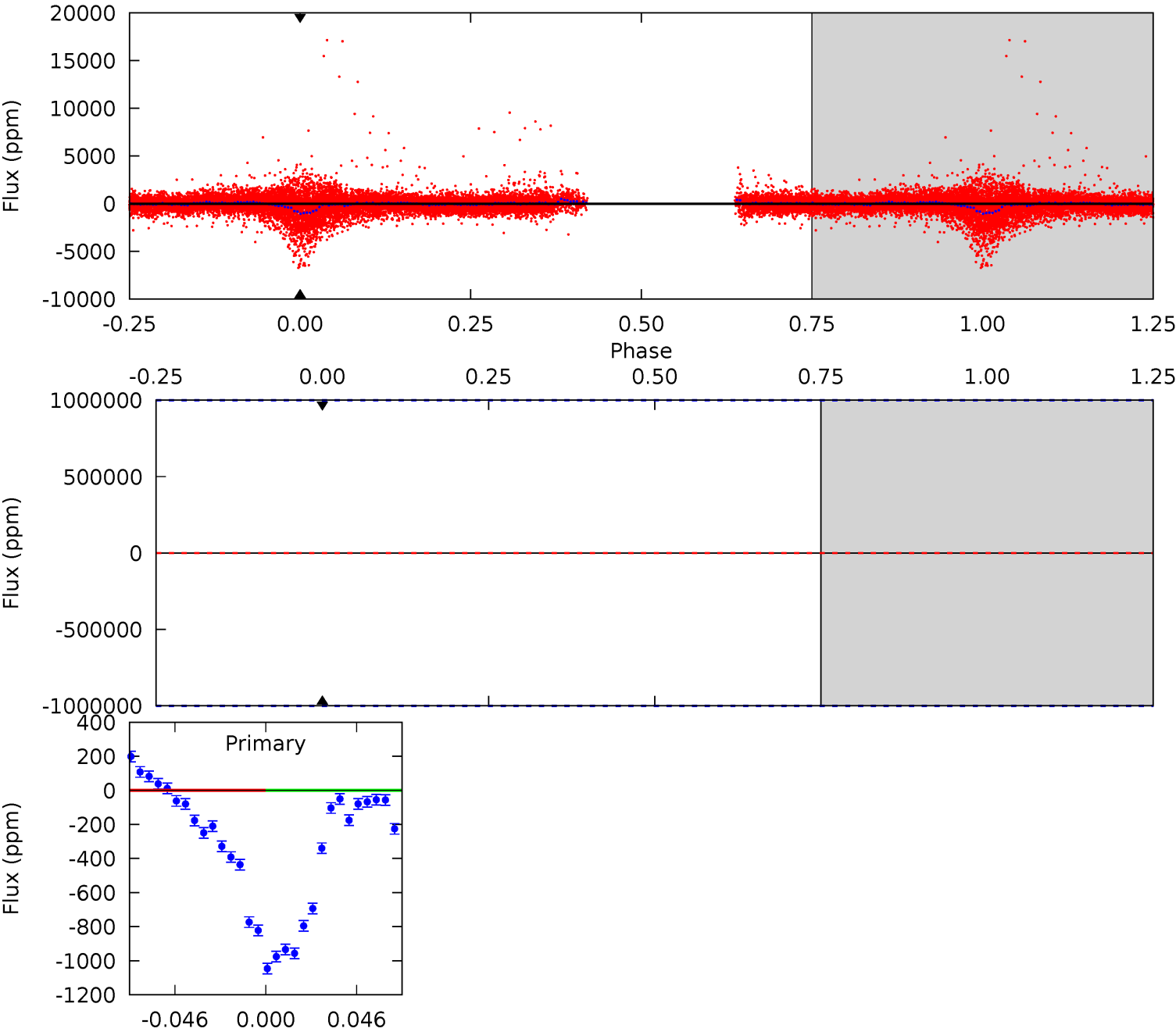
TCE 005952403-02   P= 0.905669 Days    $T_0=131.749737$  (BKJD)



DV Model-Shift Uniqueness Test

005952403-02, P = 0.905669 Days, E = 130.839700 Days

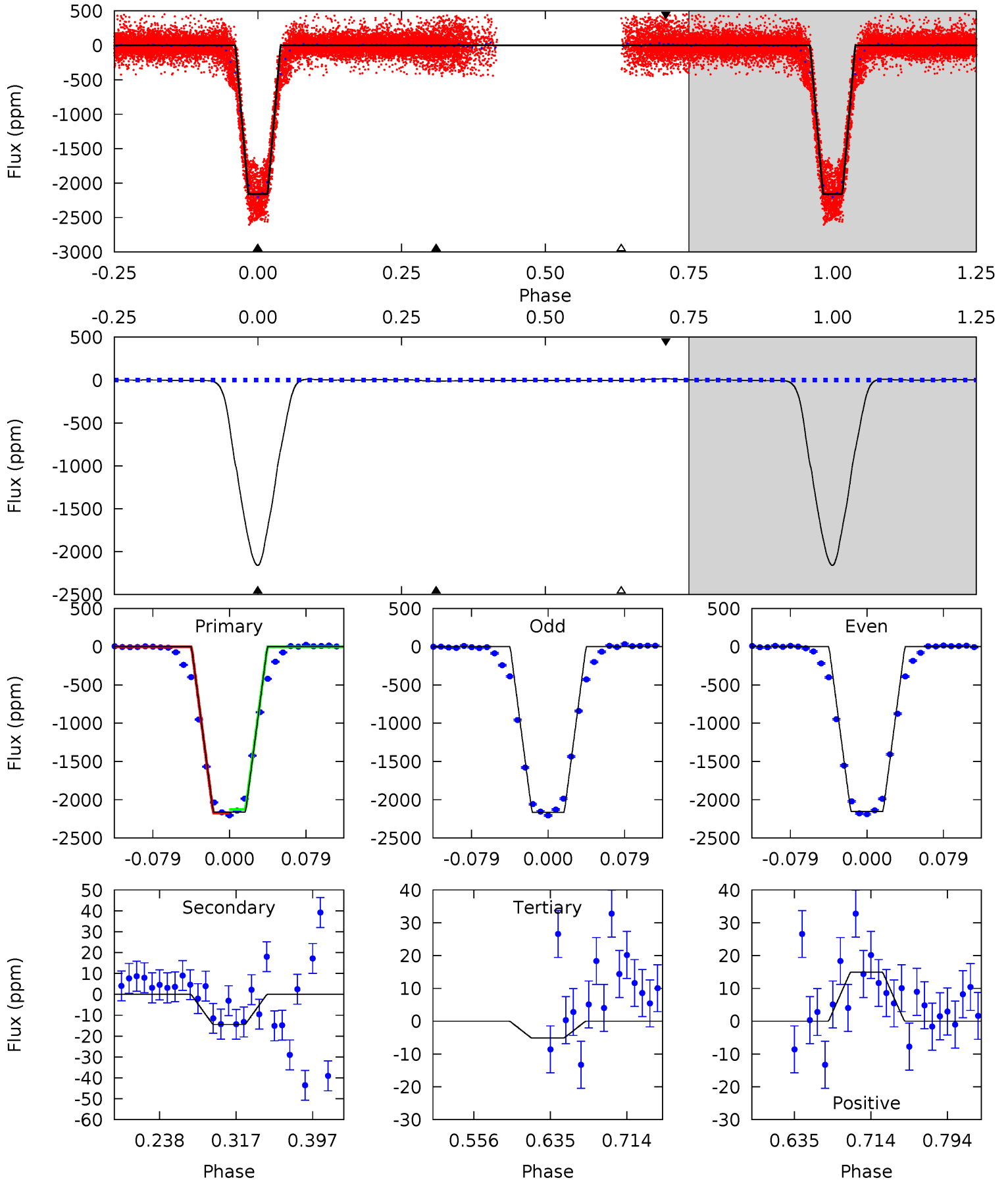
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

005952403-02, P = 0.905669 Days, E = 130.844068 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
763.8	5.10	1.83	5.28	4.61	1.75	1.87	762.0	758.5	3.27	-0.18	1.92	0.92	0.01	7.97



### Stellar Parameters For KIC 005952403

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5037^{+50}_{-130}$	$3.002^{+0.201}_{-0.108}$	$0.000^{+0.100}_{-0.200}$	$7.553^{+2.138}_{-2.851}$	$2.091^{+0.573}_{-0.860}$	$0.007^{+0.010}_{-0.002}$
	+1%/-3%	+7%/-4%	+inf%/-inf%	+28%/-38%	+27%/-41%	+147%/-32%
Source	SPE13	SPE13	SPE13	DSEP		

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

### Secondary Eclipse Parameters for KIC 005952403-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$58.23^{+60.83}_{-40.47}$	$5493^{+313}_{-402}$	$-3924^{+20573}_{-10290}$	$0.164^{+20.276}_{-14.234}$
Alt.	$-14 \pm 3$	$68.36^{+65.50}_{-47.04}$	$5475^{+305}_{-409}$	$-4552^{+300}_{-221}$	$0.001^{+0.009}_{-0.001}$

$T_{max}$  = 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

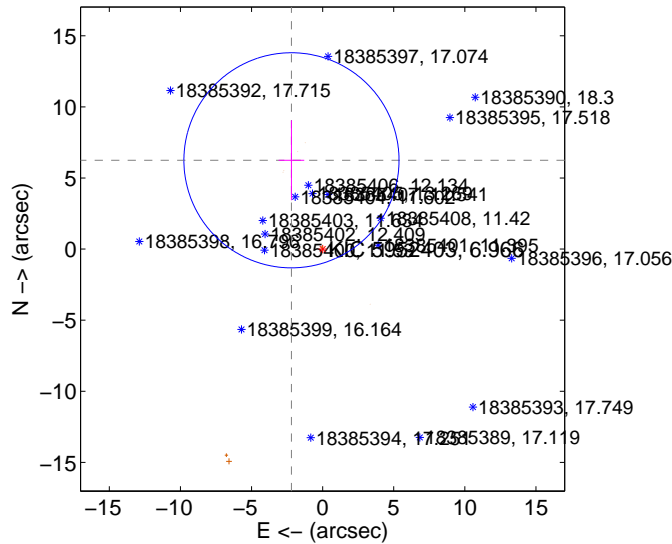
Supplemental centroid analysis for 005952403-02. **Kepler magnitude: 6.97.** Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

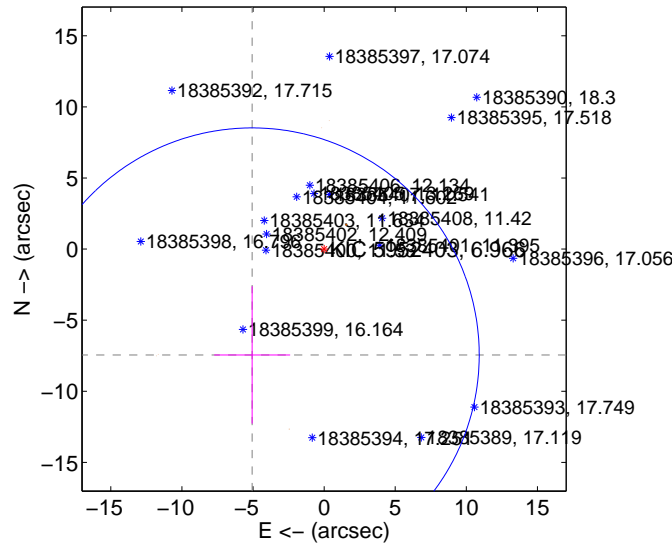
The OOT PRF centroid is offset from the target star catalog position by about 15.87 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.617 \pm 2.520$	2.63	$2.192 \pm 0.897$	$6.243 \pm 2.812$
PRF-fit source offset from KIC position	$8.997 \pm 5.320$	1.69	$5.058 \pm 2.671$	$-7.441 \pm 4.829$
photometric centroid source offset	<b><math>8.55 \pm 0.05</math></b>	<b>159.06</b>	$4.72 \pm 0.04$	$-7.13 \pm 0.06$

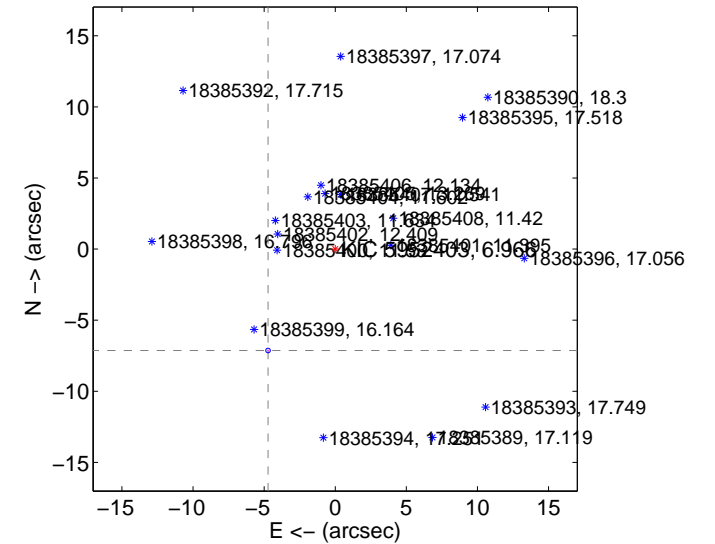
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



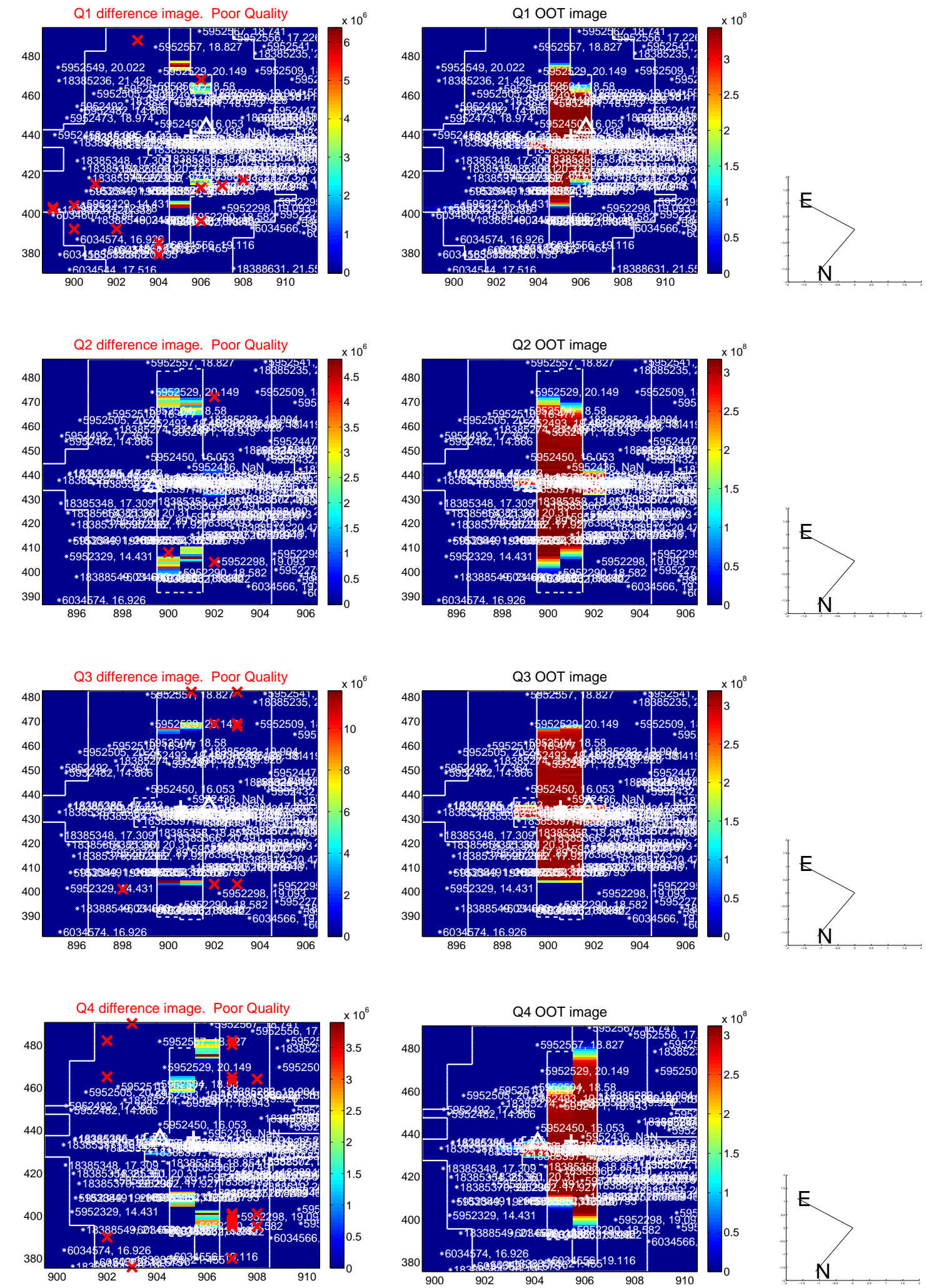
offset from photometric centroids



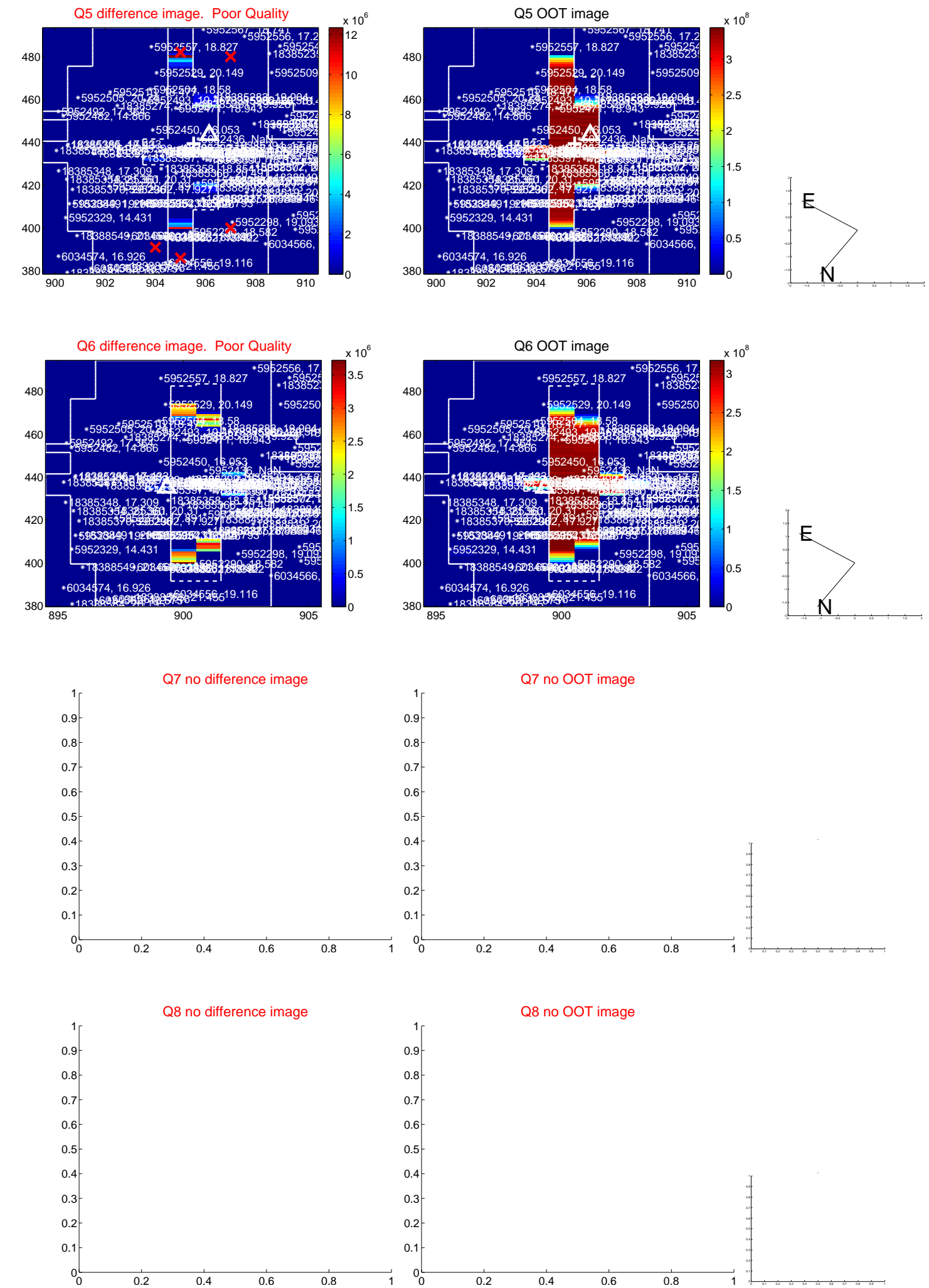
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



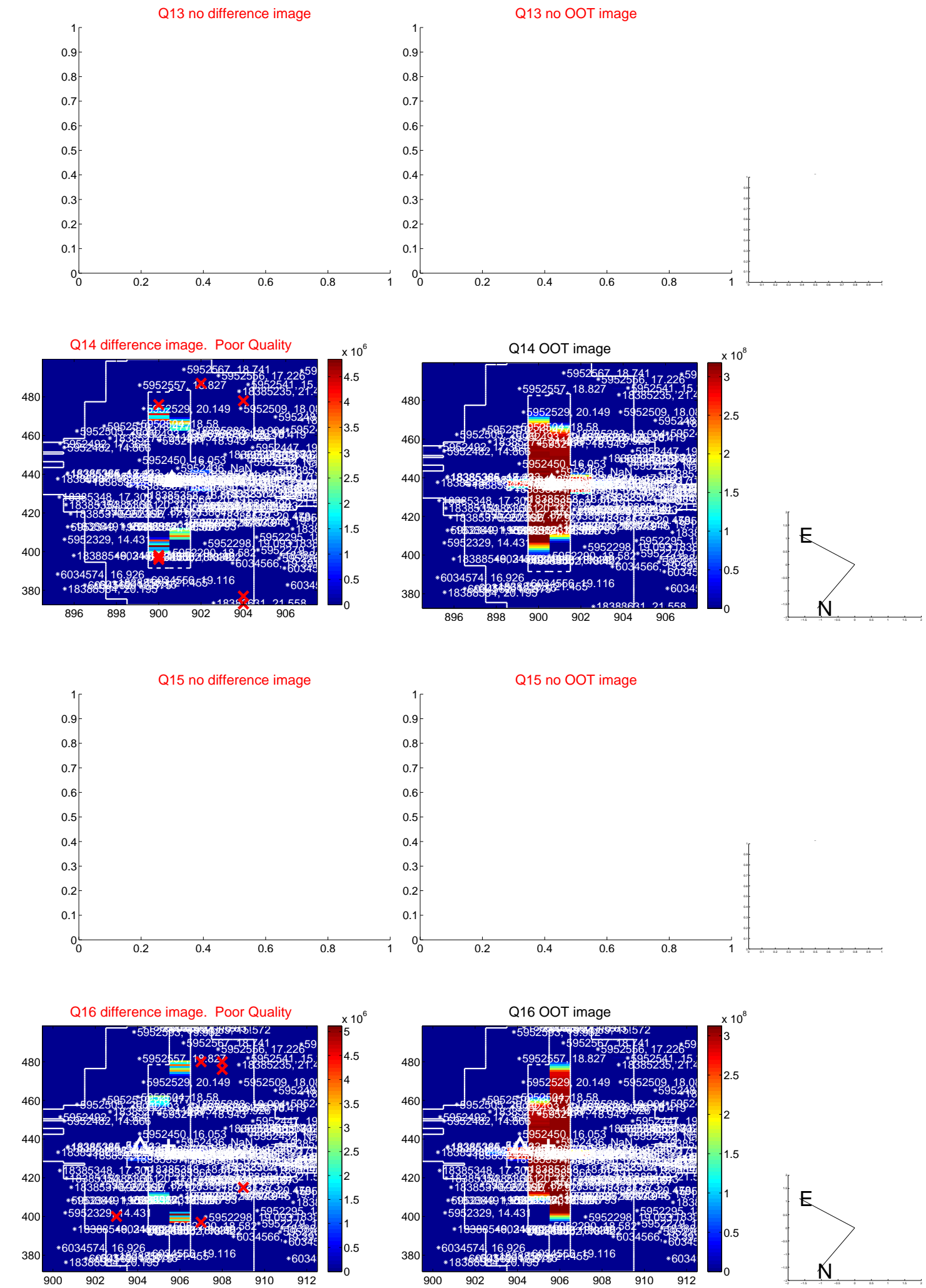
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



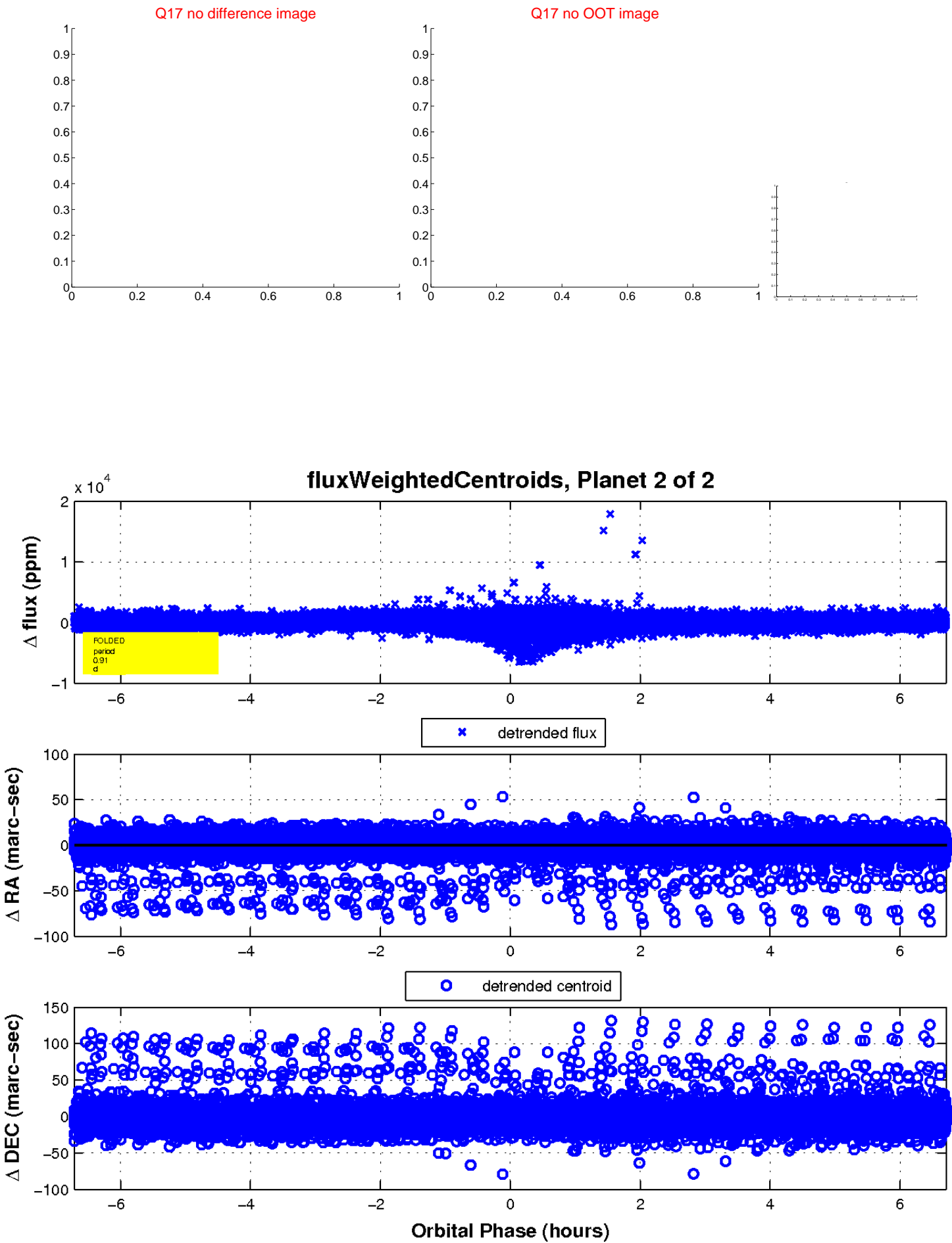
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



# UKIRT Image

Declination

