

# KIC 010355809

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010355809-01	OBS	No	526.988093	227.367712	1174.8	2.126	16.3	6.5	0.52	4064	1.86	0.06
010355809-02	OBS	No	289.904624	185.935033	1434.7	5.049	16.0	7.2	0.52	4064	2.35	0.14
010355809-04	OBS	No	297.941469	138.549550	1169.6	5.551	15.1	5.6	0.52	4064	1.84	0.13
010355809-05	OBS	No	415.344228	407.285097	2218.6	3.520	13.9	10.2	0.52	4064	2.46	0.09
010355809-06	OBS	No	460.511846	358.267837	1587.0	3.600	14.2	7.9	0.52	4064	2.06	0.07
010355809-07	OBS	No	301.674269	279.061731	295.1	10.500	12.9	-1.0	0.52	4064	0.89	0.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010355809-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010355809-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010355809-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010355809-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
010355809-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010355809-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

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

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

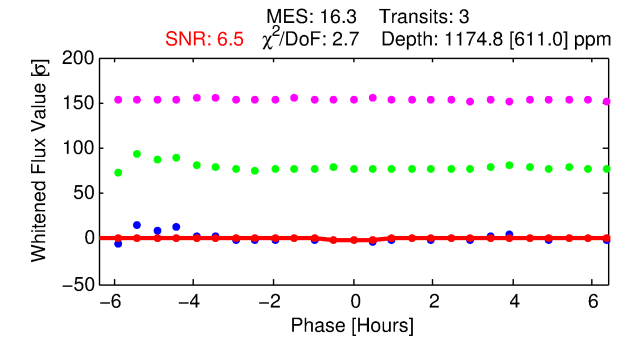
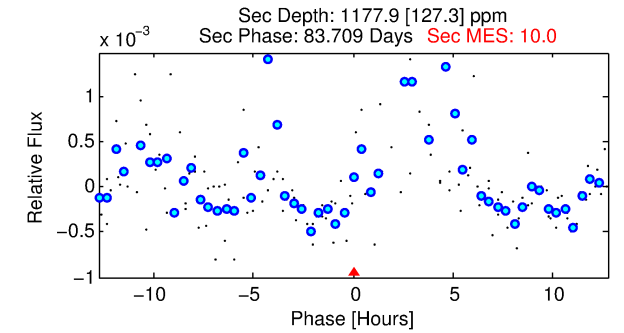
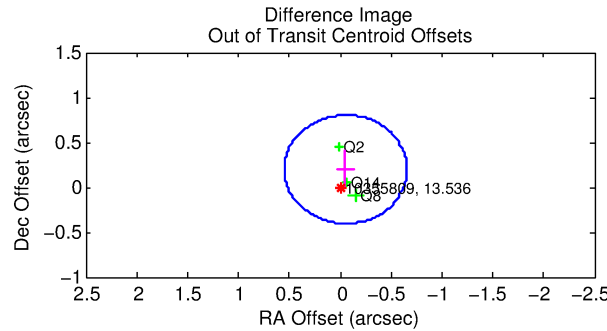
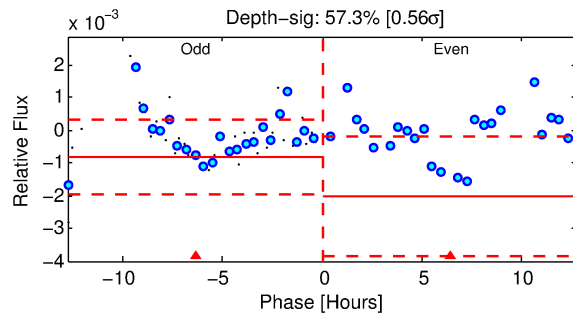
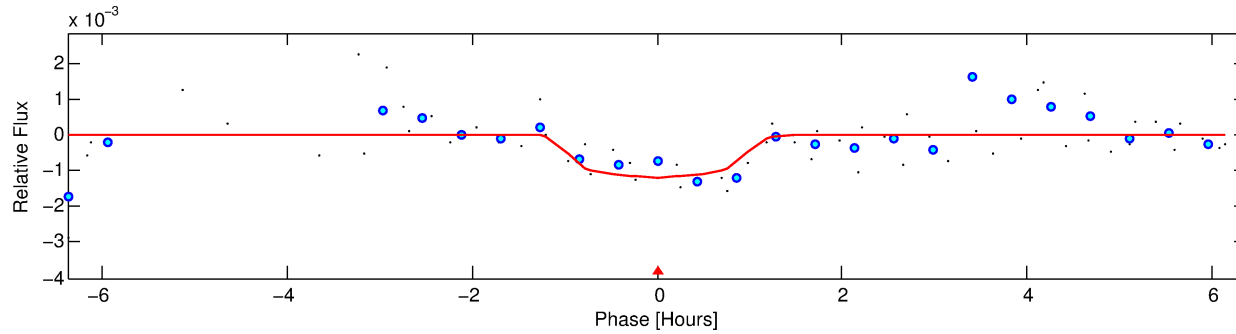
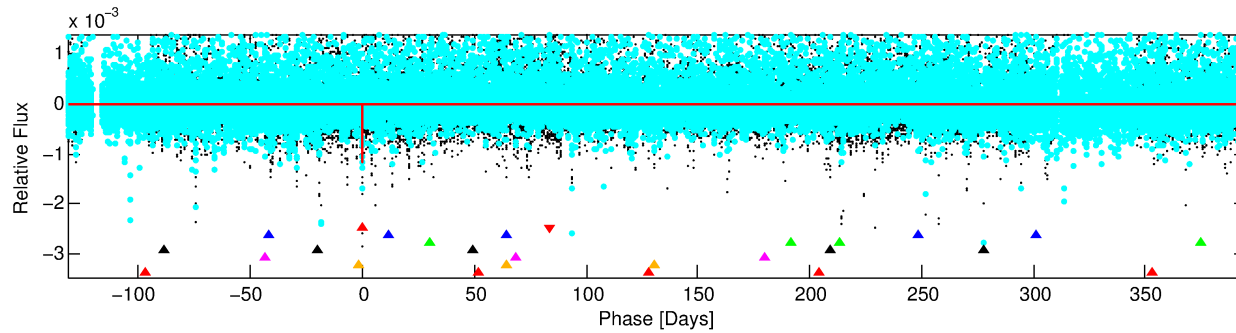
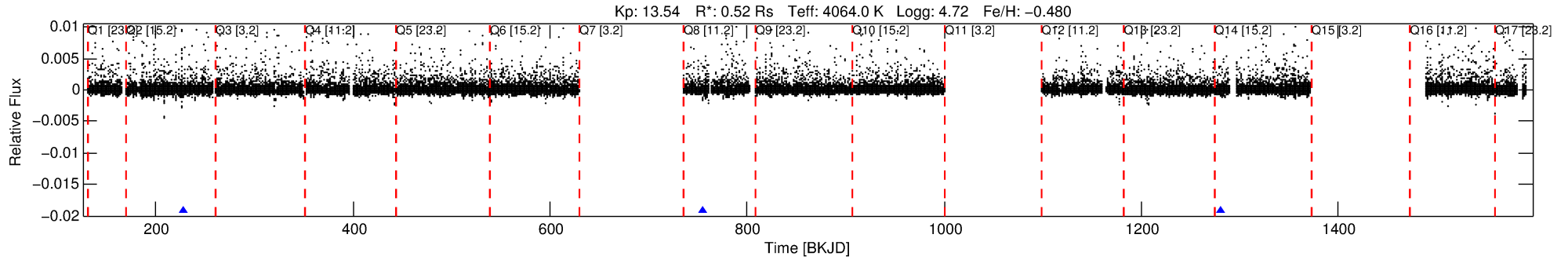
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010355809-01

No Significant Match Found

# DV One-Page Summary

KIC: 10355809 Candidate: 1 of 7 Period: 526.988 d



## DV Fit Results:

Period = 526.98809 [0.01245] d  
Epoch = 227.3677 [0.0152] BKJD  
Rp/R\* = 0.0327 [0.1086]  
a/R\* = 1605.32 [23336.52]  
b = 0.59 [16.20]  
Seff = 0.06 [0.01]  
Teq = 128 [7] K  
Rp = 1.86 [6.19] Re  
a = 1.0320 [0.1188] AU  
Ag = 198693.23 [1319247.01] [0.15 $\sigma$ ]  
Teff = 4162 [6909] K [0.58 $\sigma$ ]

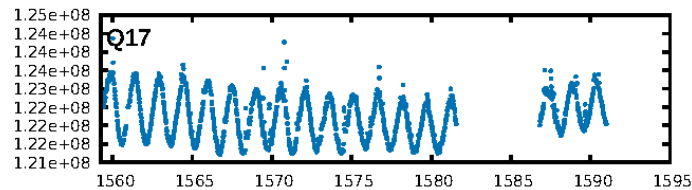
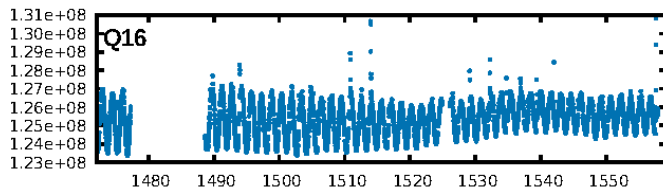
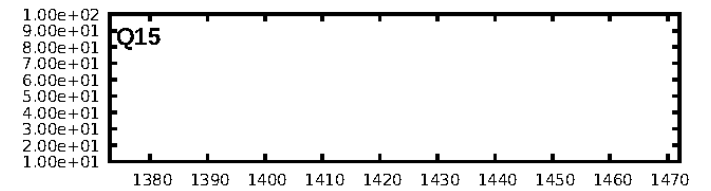
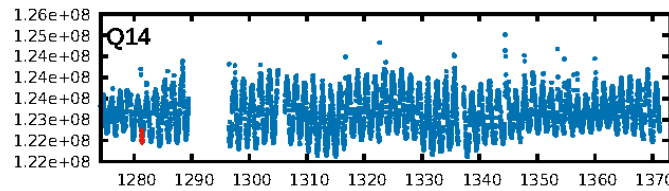
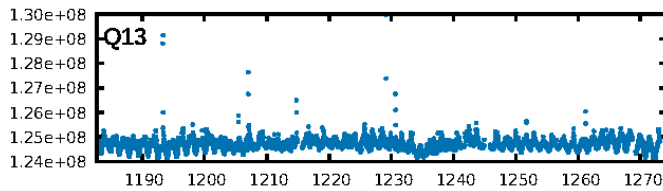
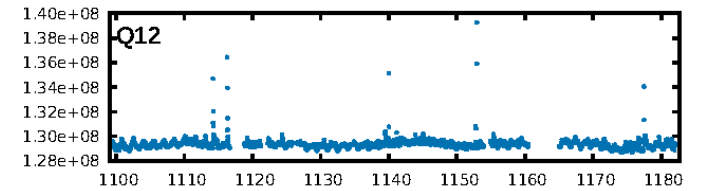
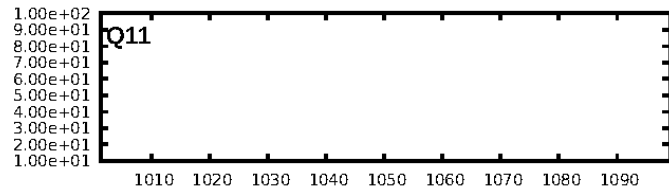
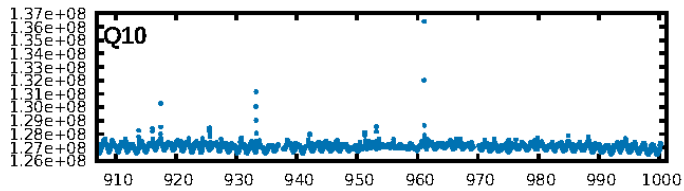
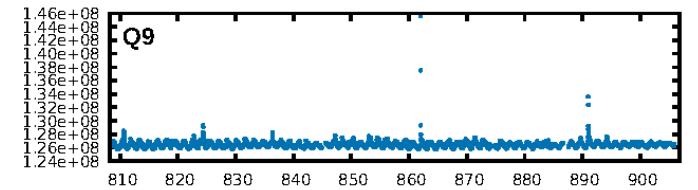
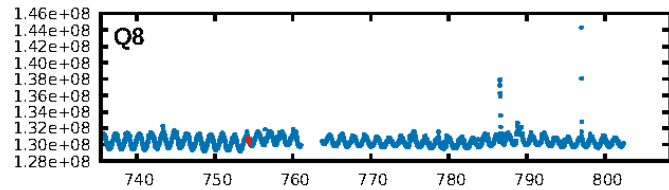
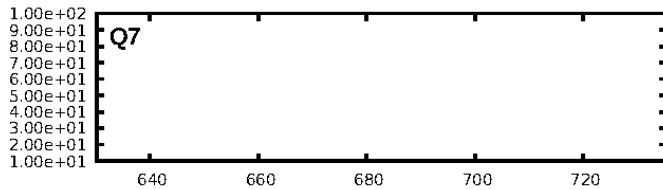
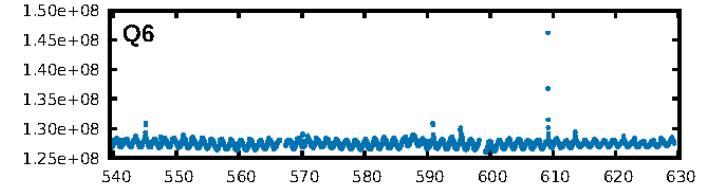
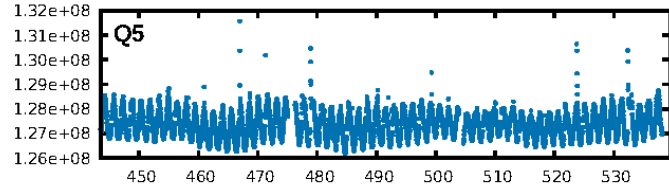
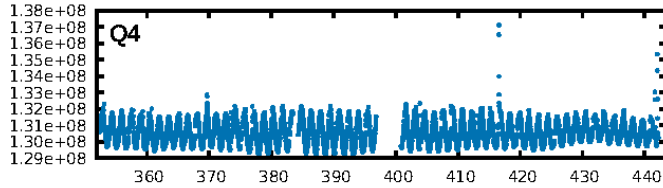
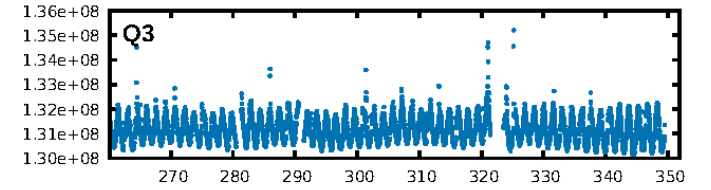
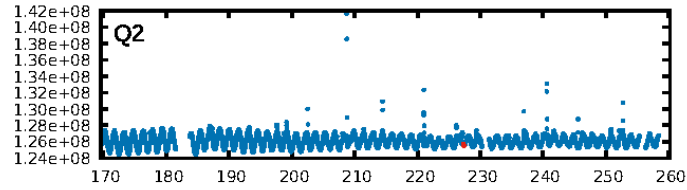
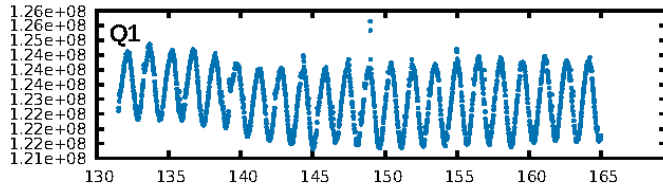
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [381.61 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 4.0%  
ModelChiSquareGof-sig: 58.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.04439  
Centroid-sig: N/A  
Centroid-so: 0.346 arcsec [0.68 $\sigma$ ]  
OotOffset-rm: 0.204 arcsec [1.02 $\sigma$ ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-rm: 0.026 arcsec [0.16 $\sigma$ ]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

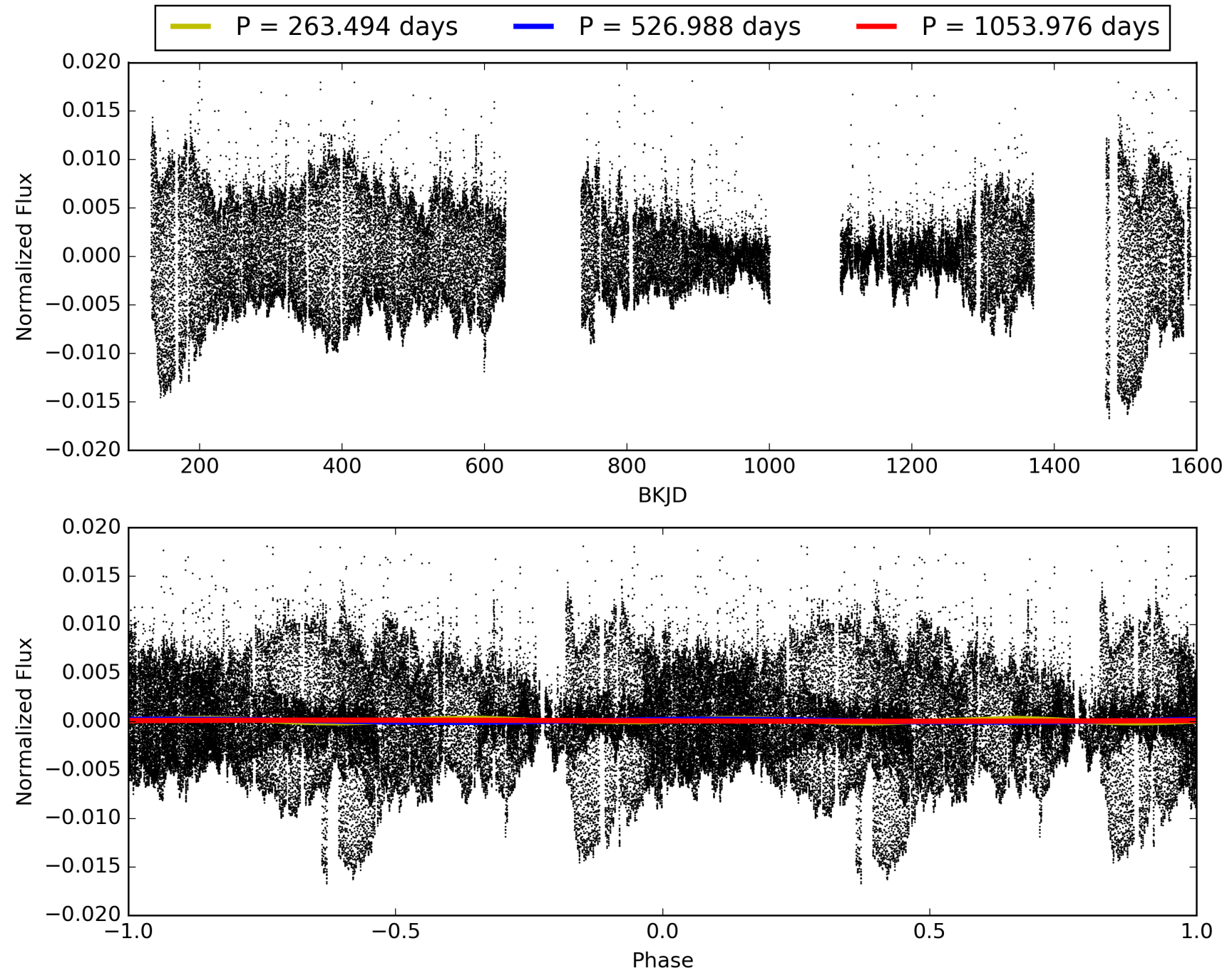
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010355809-01, PDC Light Curves



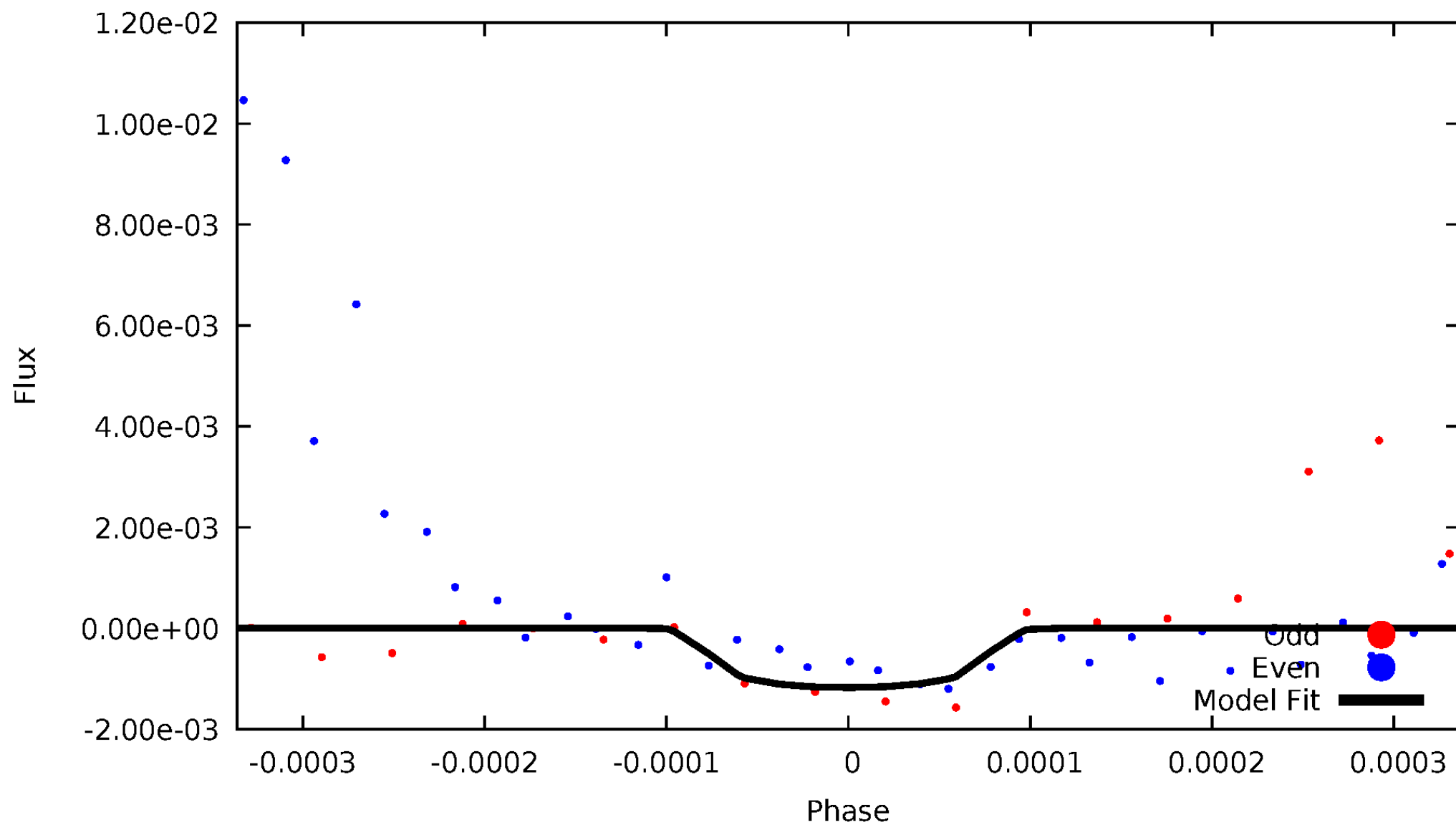
TCE 010355809-01





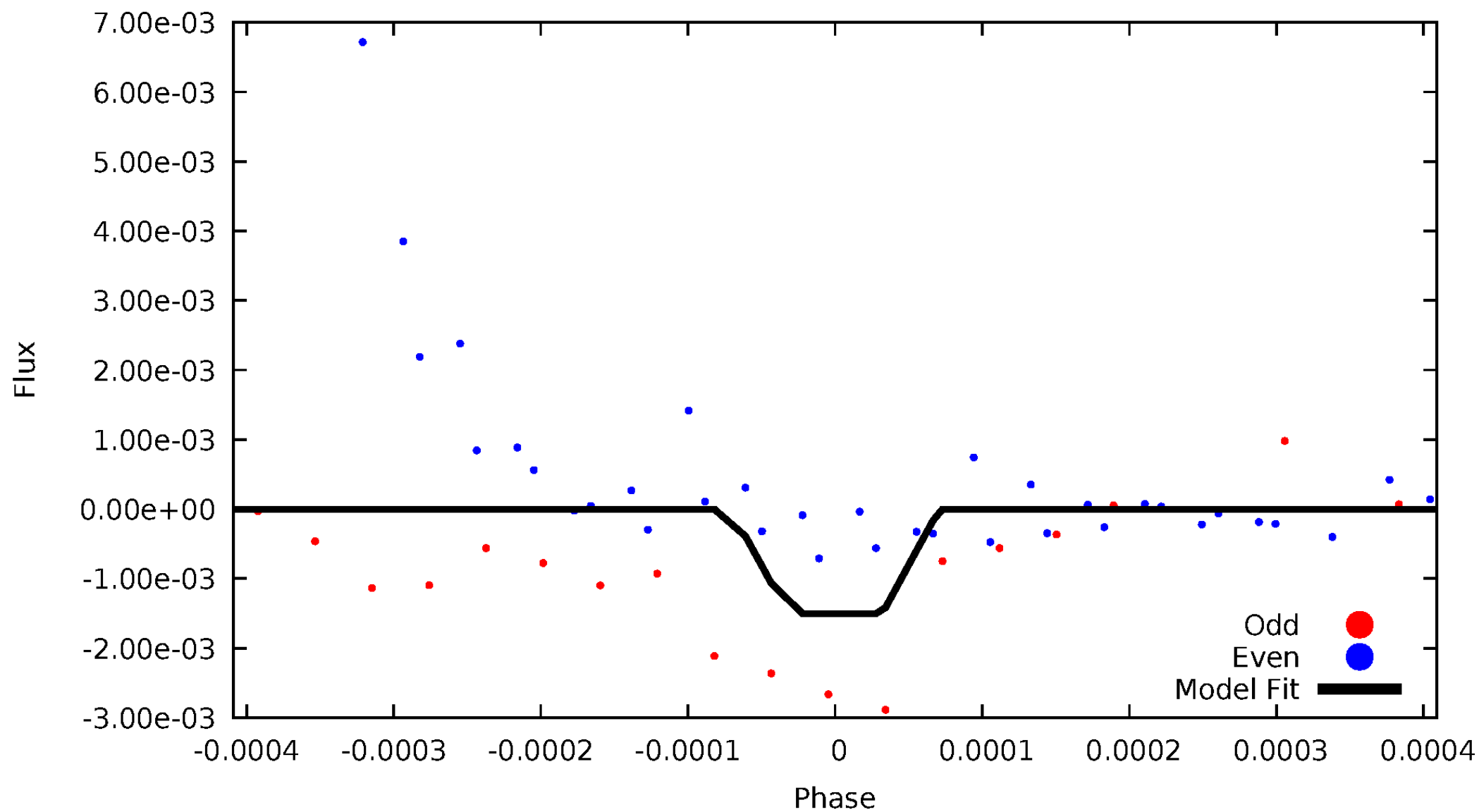
# DV Odd/Even

TCE 010355809-01



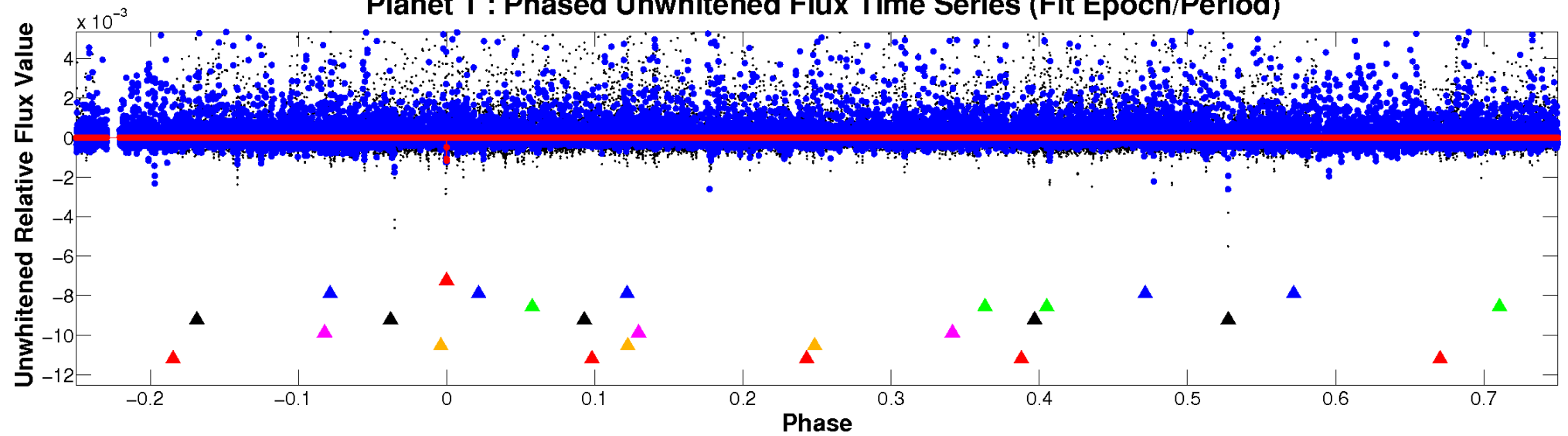
# ALT Odd/Even

TCE 010355809-01

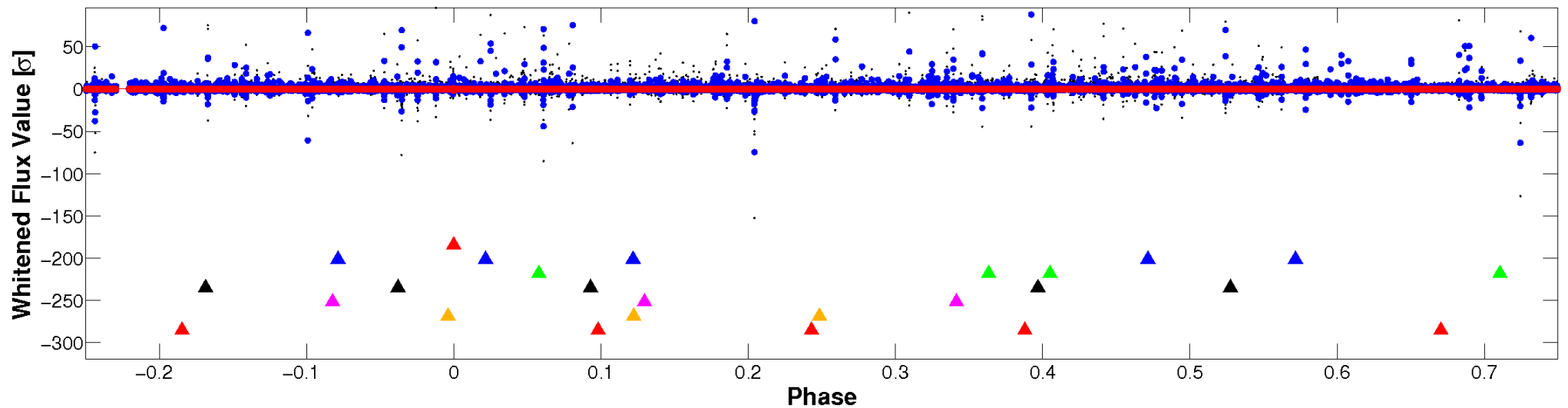


# Non-Whitened Vs. Whitened Light Curve

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

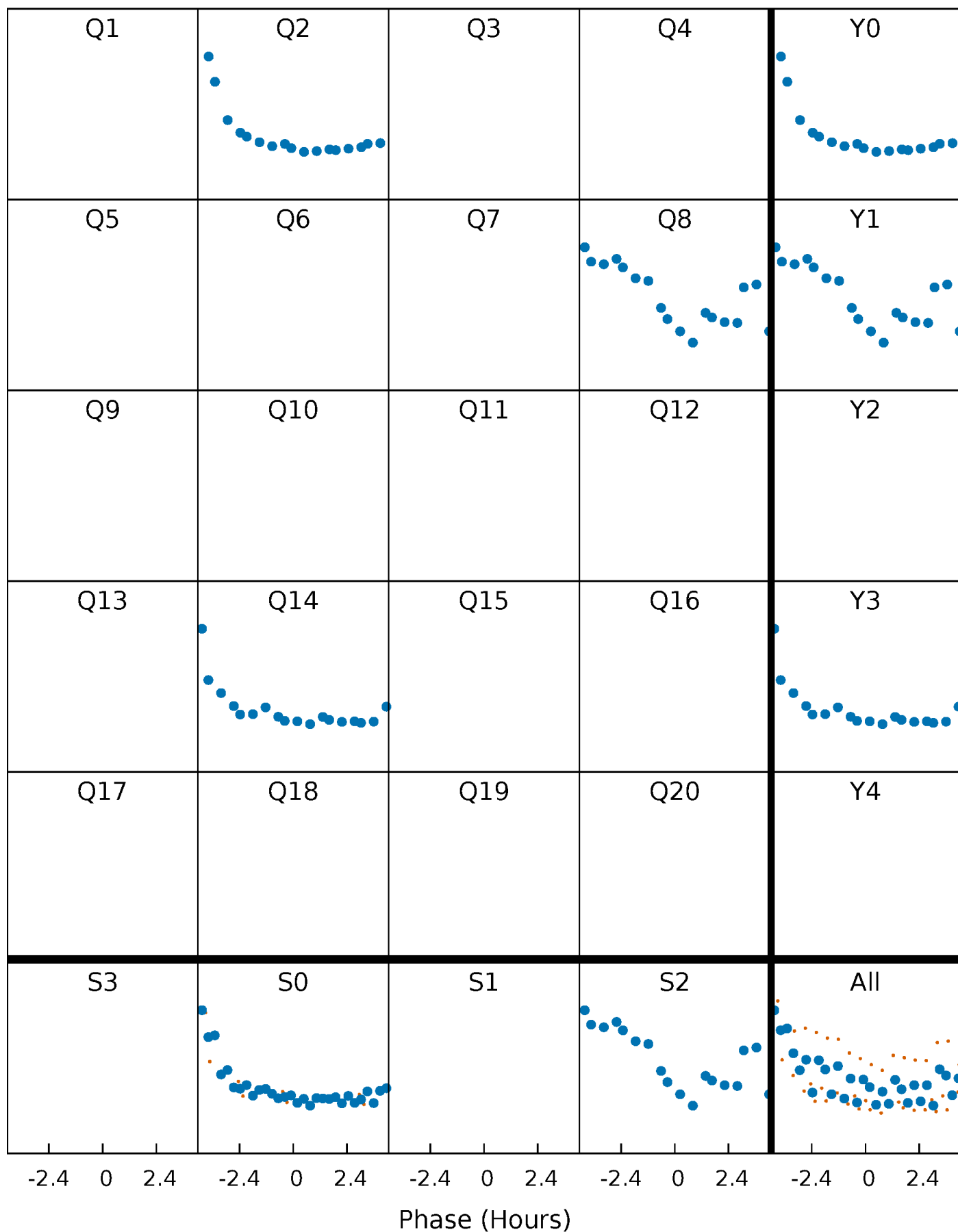


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



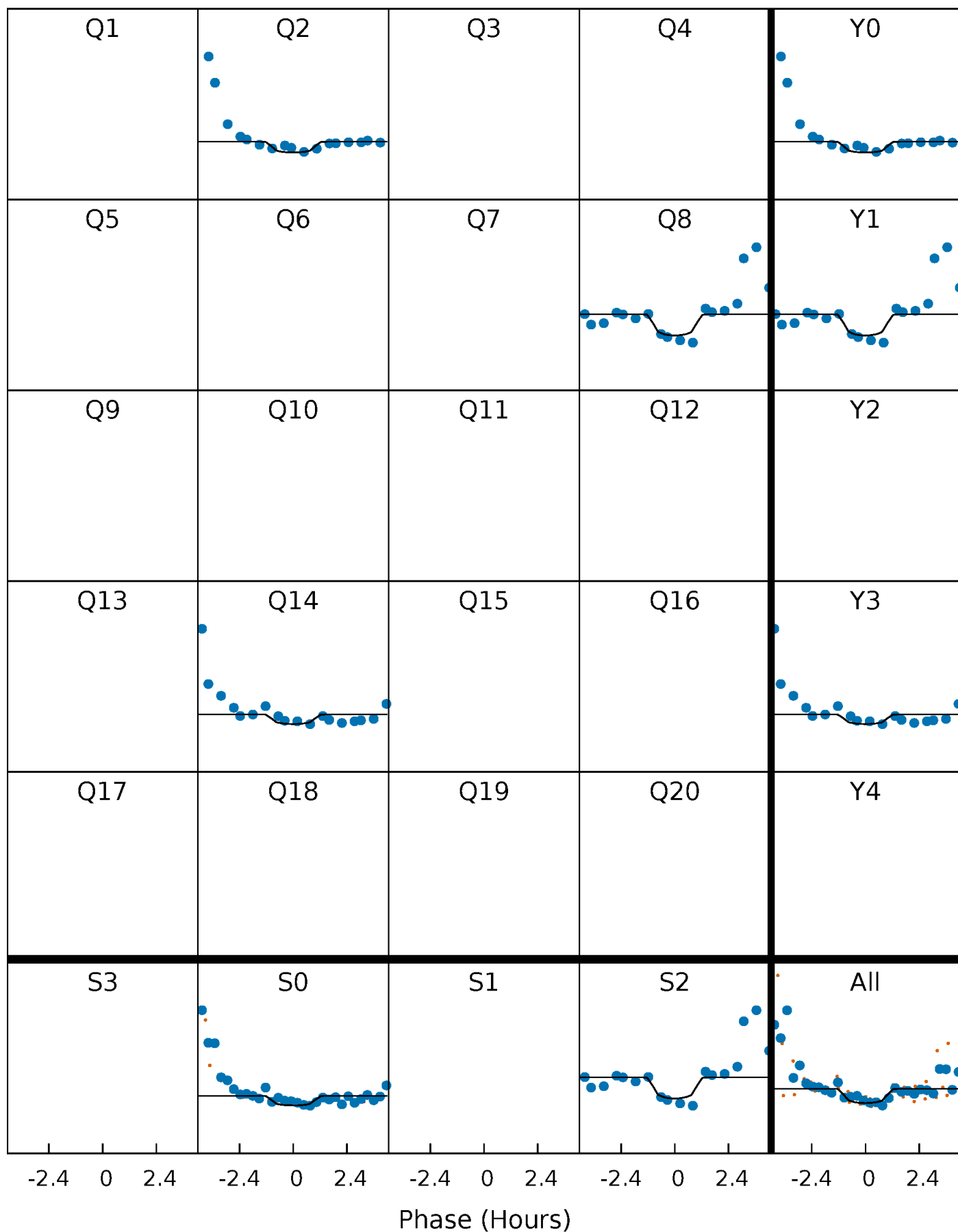
# PDC Quarter-Phased Transit Curves

TCE 010355809-01 P=526.988093 Days  $T_0=227.367712$  (BKJD)



# DV Quarter-Phased Transit Curves

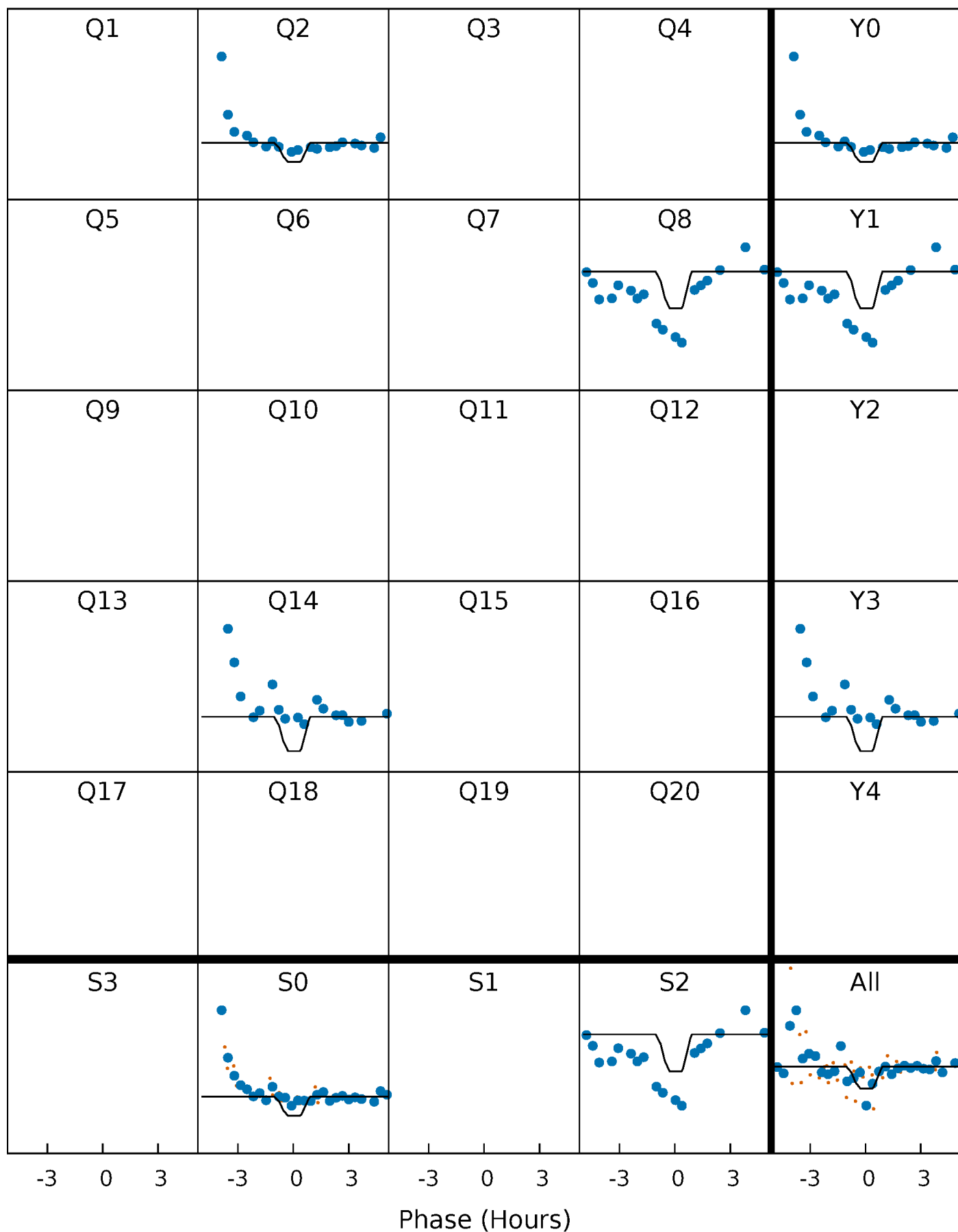
TCE 010355809-01 P=526.988093 Days  $T_0=227.367712$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

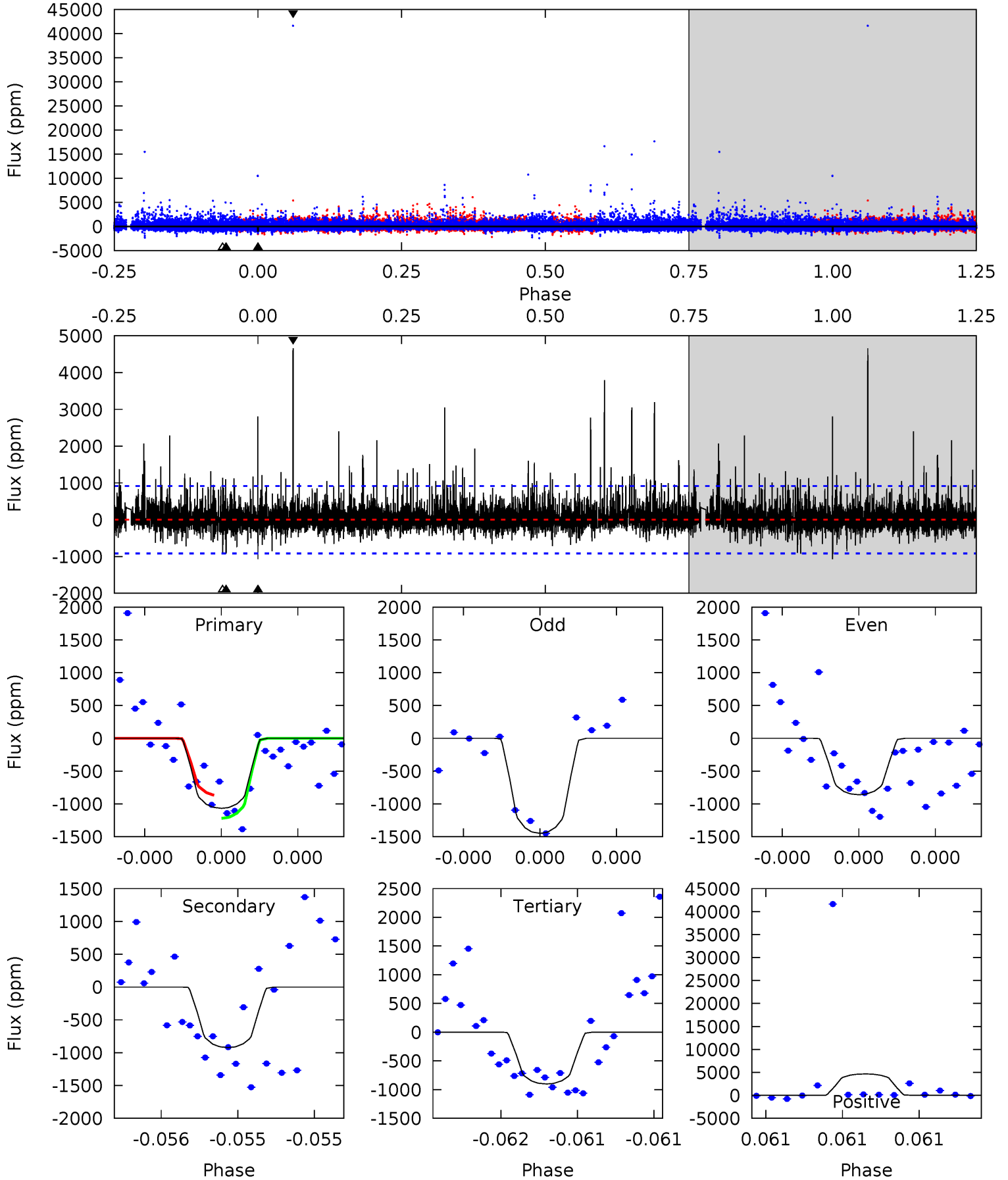
TCE 010355809-01 P=526.974701 Days  $T_0=227.394288$  (BKJD)



# DV Model-Shift Uniqueness Test

010355809-01, P = 526.988093 Days, E = 227.367712 Days

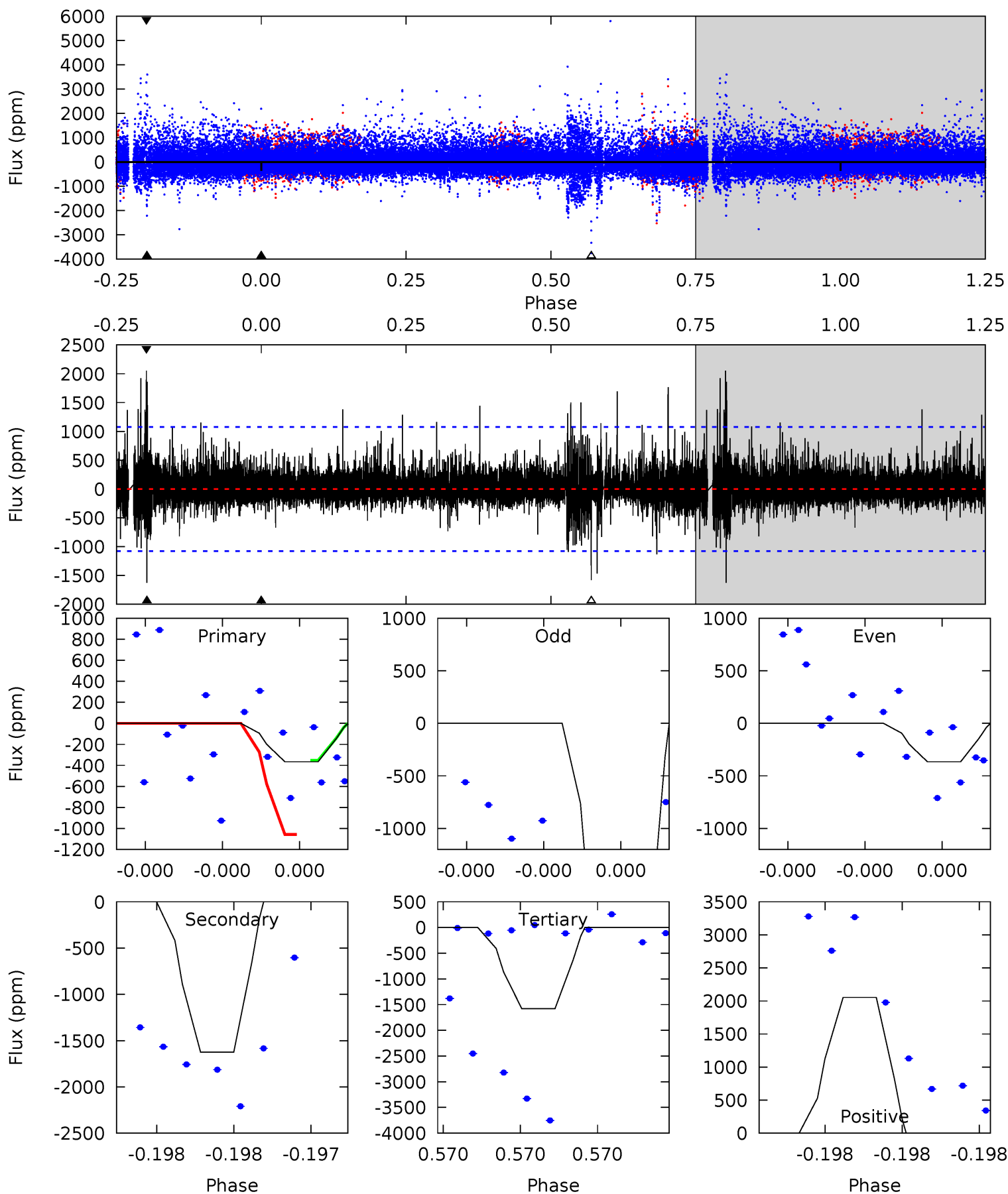
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.67	5.77	5.64	29.1	5.74	3.73	1.77	1.03	-22.4	0.13	-23.3	0.80	1.22	0.81	1.09



# Alt Model-Shift Uniqueness Test

010355809-01, P = 526.974701 Days, E = 227.394288 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
1.98	8.79	8.54	11.1	5.82	3.85	1.19	-6.57	-9.13	0.25	-2.32	7.31	1.91	0.56	2.04



### Stellar Parameters For KIC 010355809

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4064^{+129}_{-158}$	$4.725^{+0.078}_{-0.045}$	$-0.480^{+0.300}_{-0.350}$	$0.522^{+0.057}_{-0.077}$	$0.528^{+0.055}_{-0.067}$	$5.223^{+2.123}_{-0.874}$
	+3%/-4%	+2%/-1%	+62%/-73%	+11%/-15%	+10%/-13%	+41%/-17%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010355809-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-923 \pm 160$	$4.94^{+4.59}_{-3.40}$	$177^{+7}_{-8}$	$2895^{+1291}_{-449}$	$22523^{+211181}_{-16885}$
Alt.	$-1626 \pm 185$	$5.01^{+4.62}_{-3.45}$	$177^{+7}_{-8}$	$3144^{+1573}_{-524}$	$37384^{+383295}_{-27313}$

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

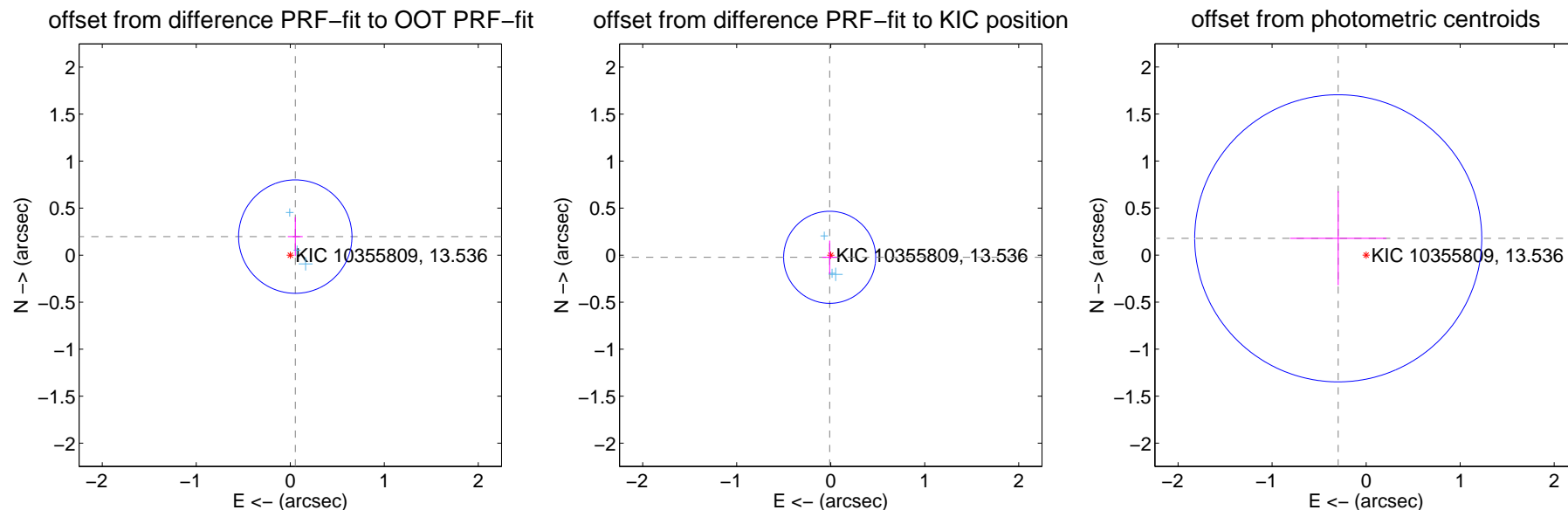
## DV Centroid Data

Supplemental centroid analysis for 010355809-01. Kepler magnitude: 13.54. Transit SNR 6.47

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

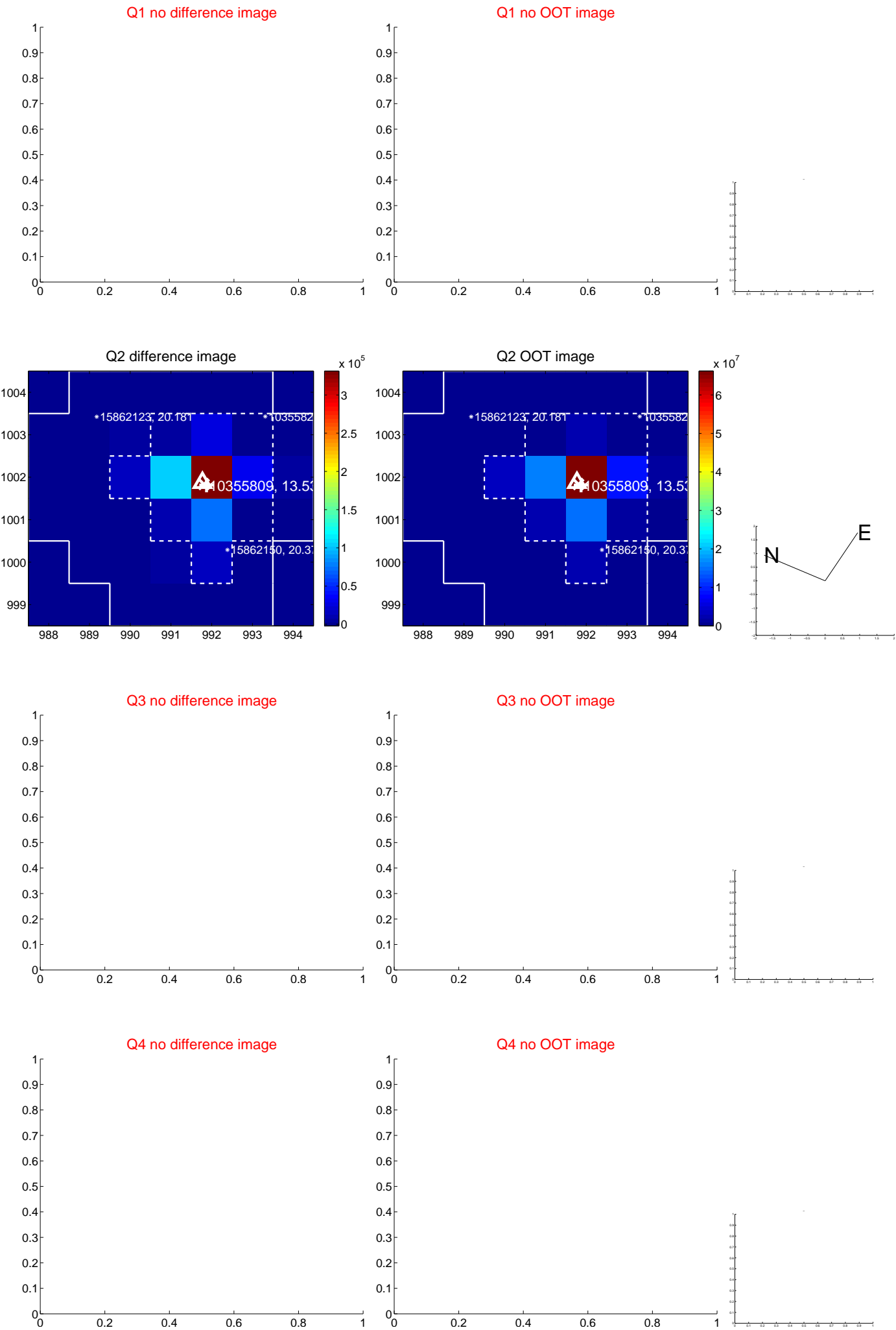
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.204 \pm 0.201$	1.02	$-0.053 \pm 0.079$	$0.197 \pm 0.207$
PRF-fit source offset from KIC position	$0.026 \pm 0.163$	0.16	$0.011 \pm 0.078$	$-0.023 \pm 0.178$
photometric centroid source offset	$0.35 \pm 0.51$	0.68	$0.30 \pm 0.51$	$0.18 \pm 0.50$



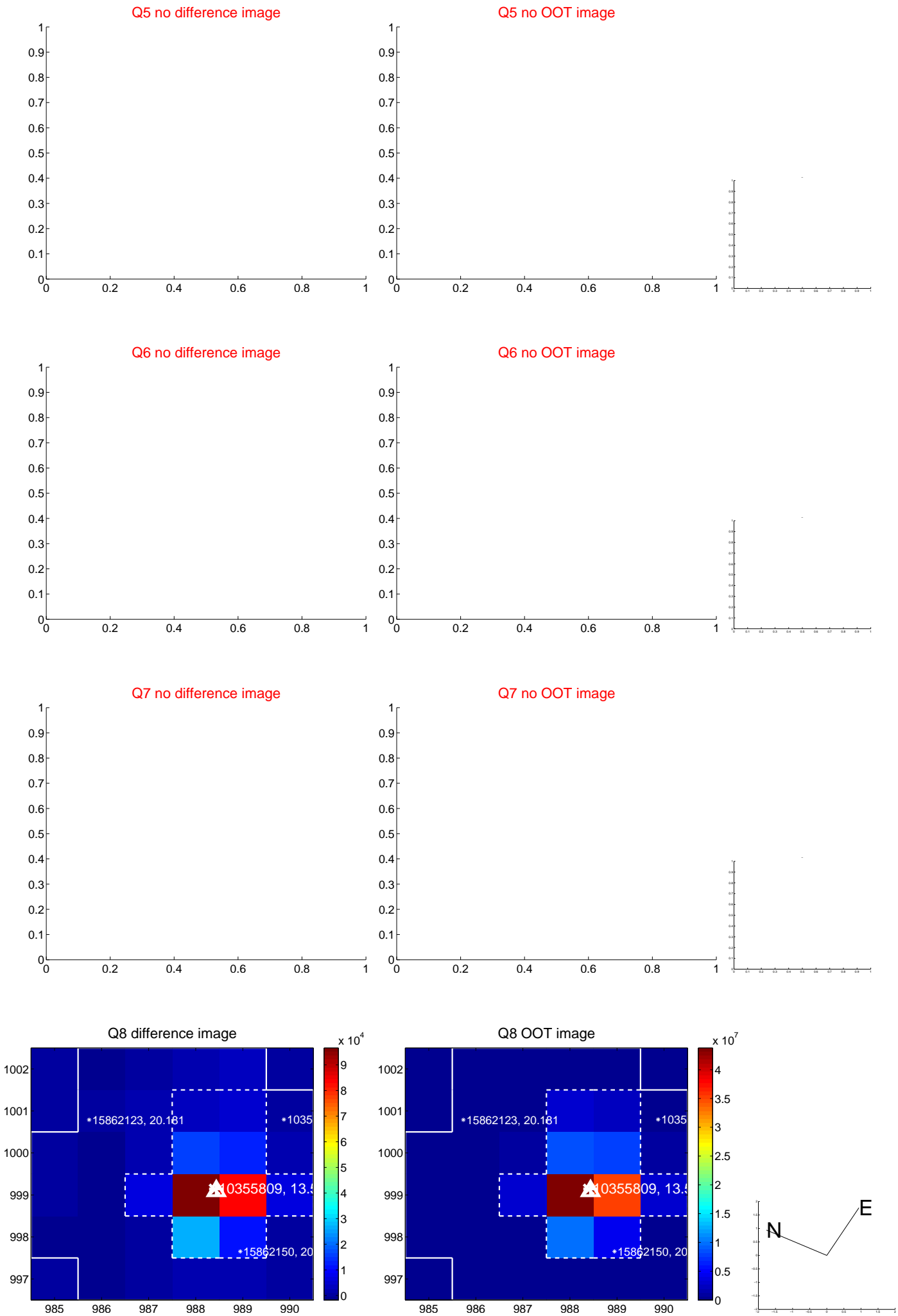
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



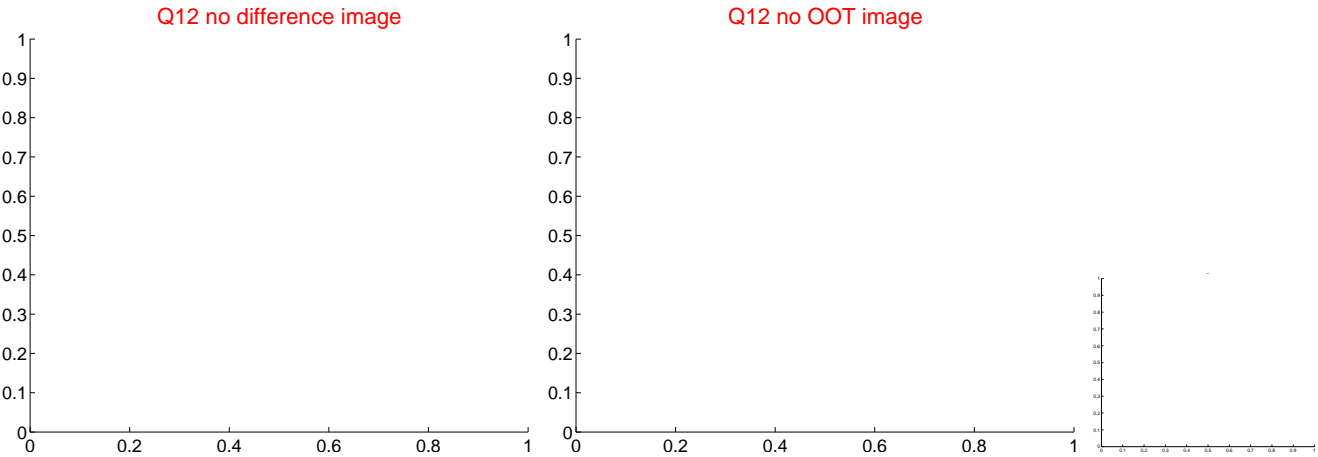
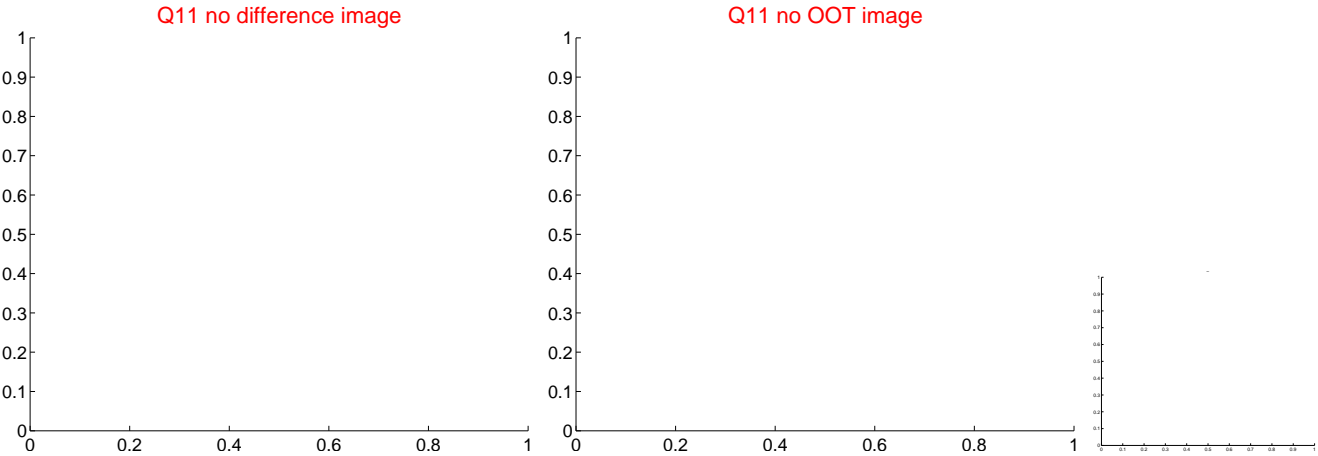
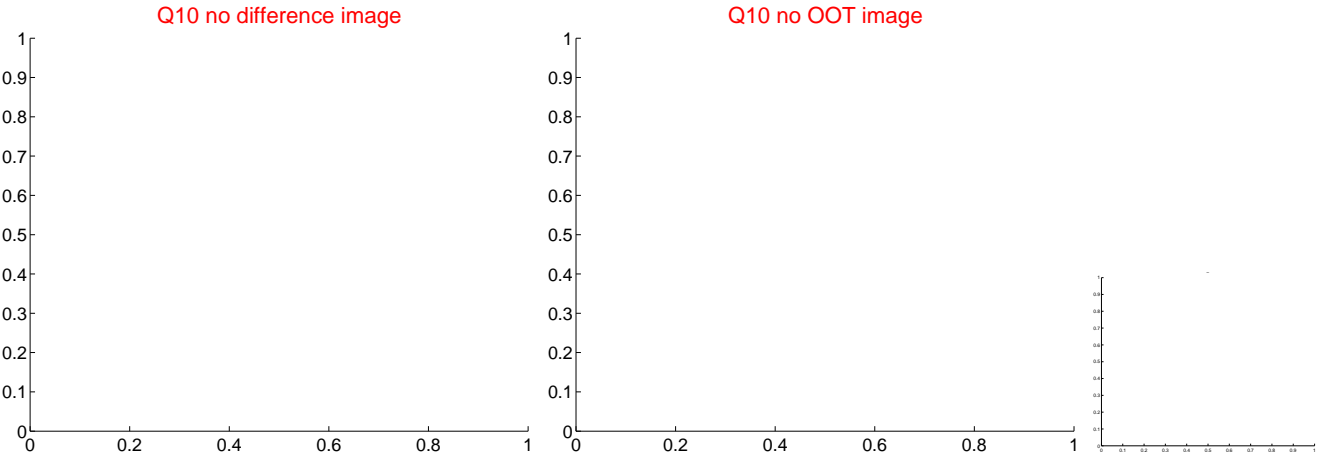
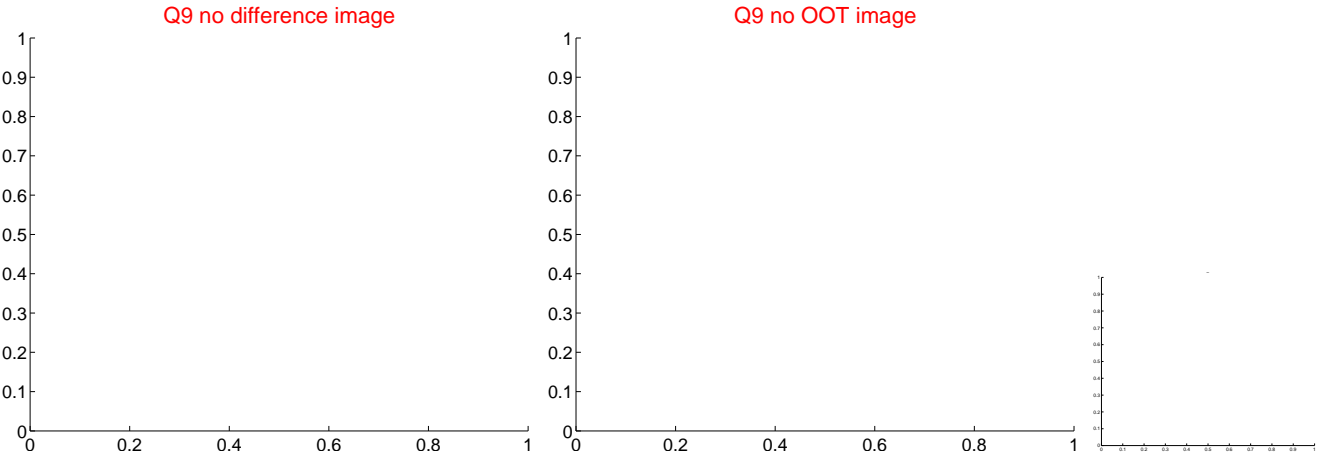
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

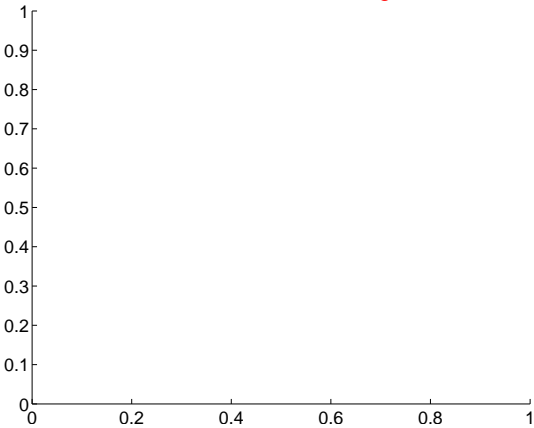


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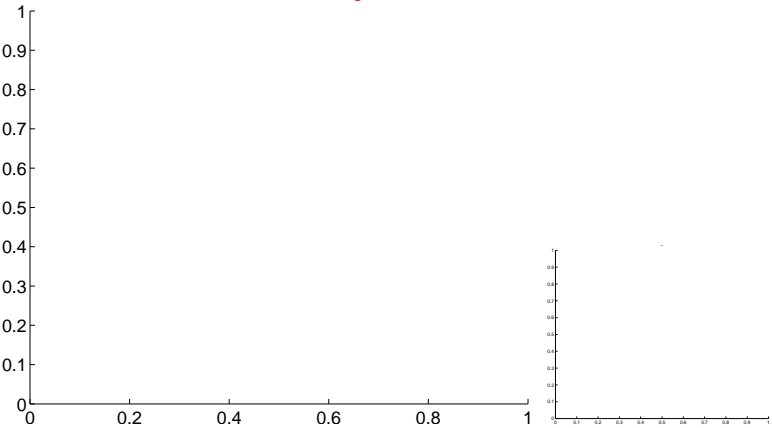


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

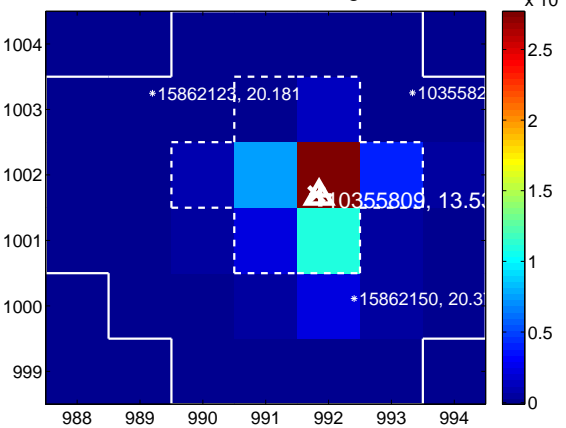
Q13 no difference image



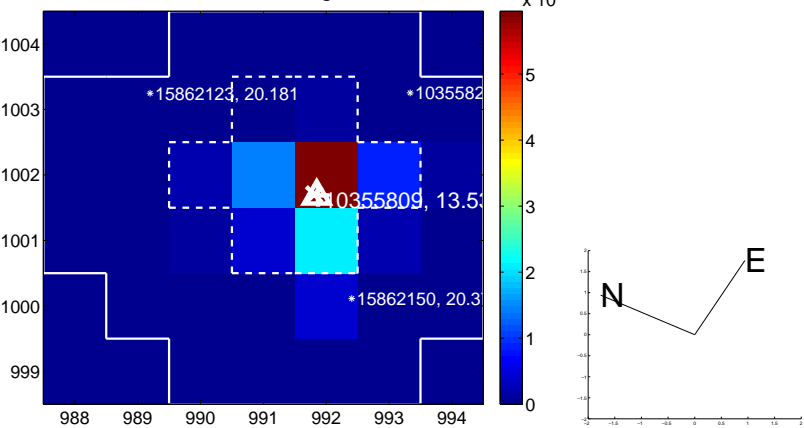
Q13 no OOT image



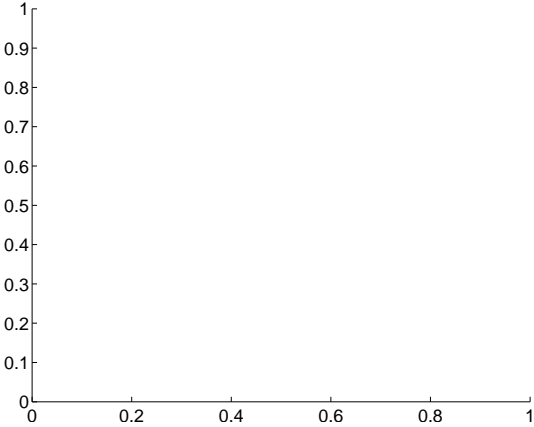
Q14 difference image



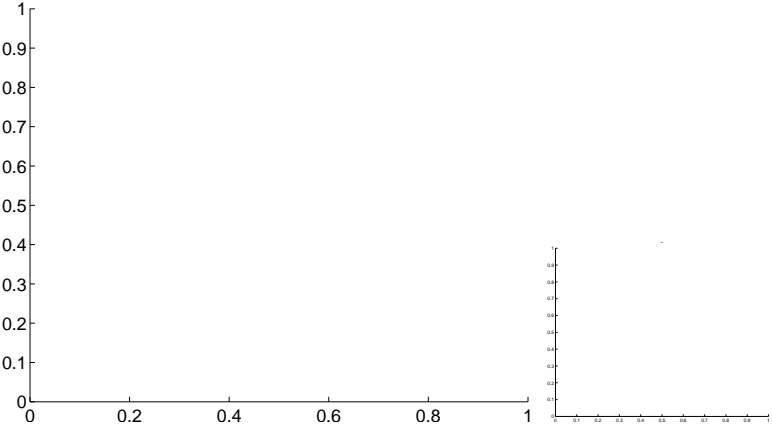
Q14 OOT image



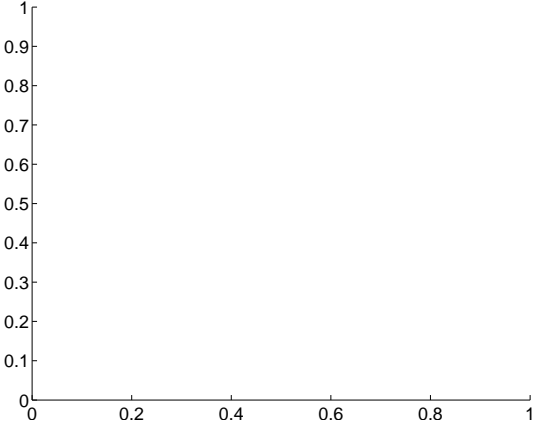
Q15 no difference image



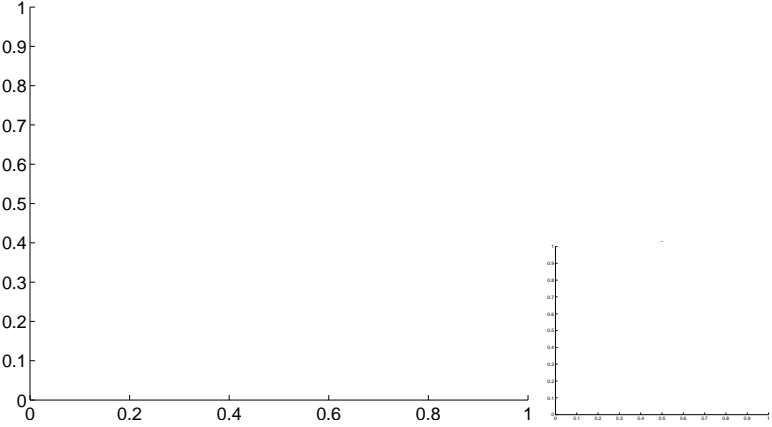
Q15 no OOT image



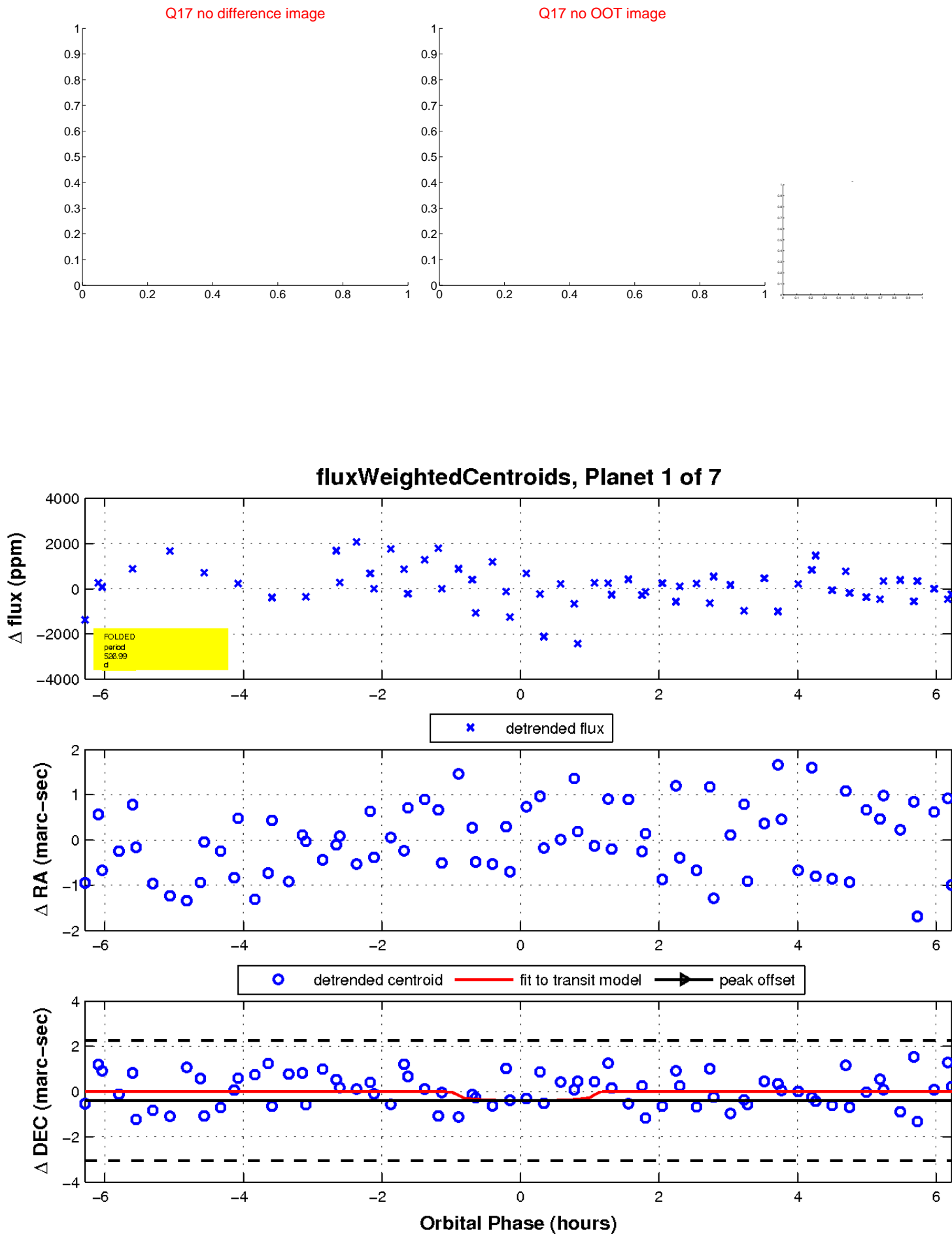
Q16 no difference image



Q16 no OOT image

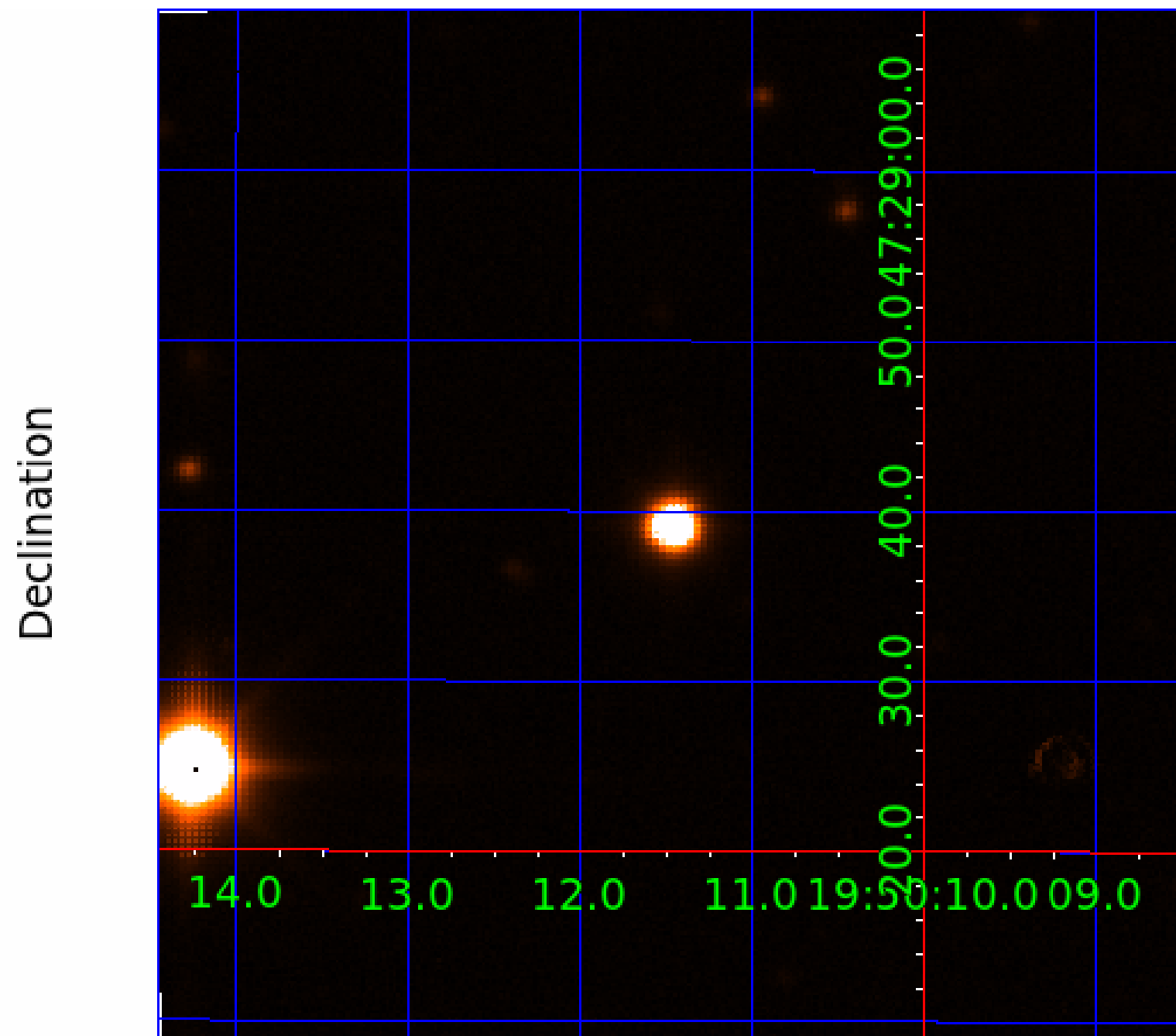


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



# KIC 010355809

## Q1-17 DR25 TCE Parameters

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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010355809-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010355809-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010355809-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010355809-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
010355809-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010355809-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

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

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

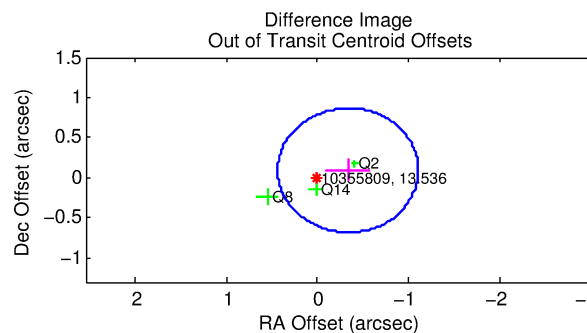
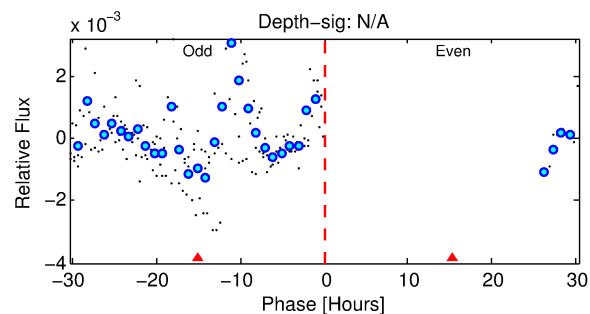
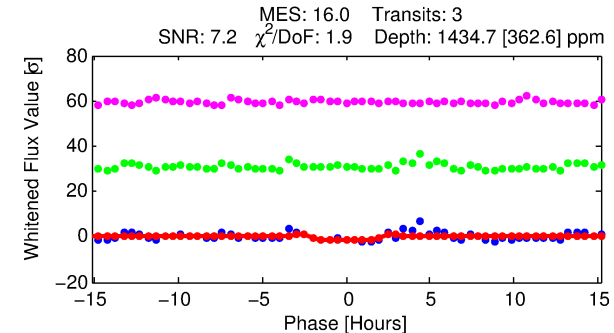
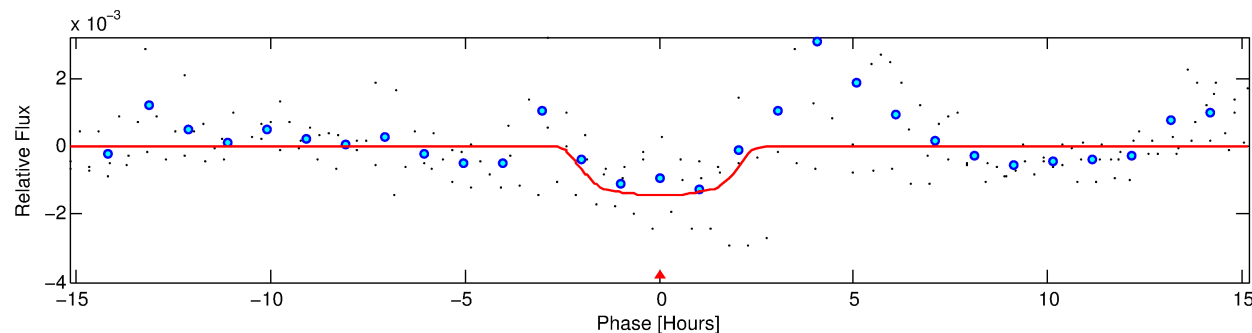
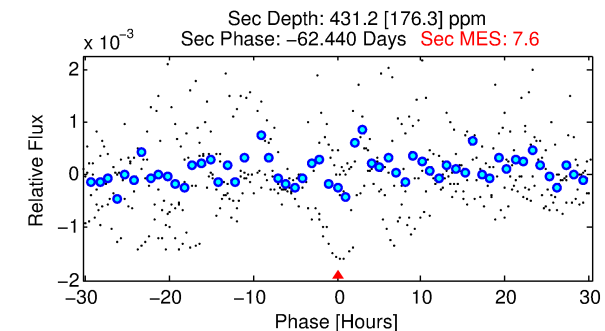
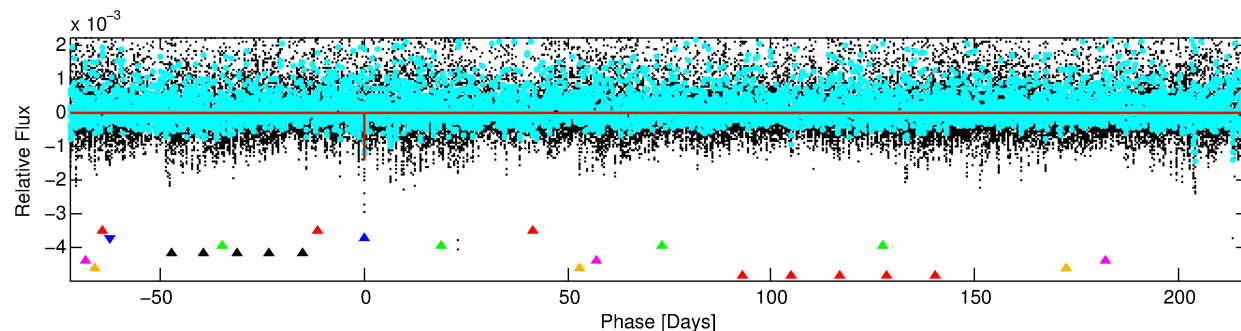
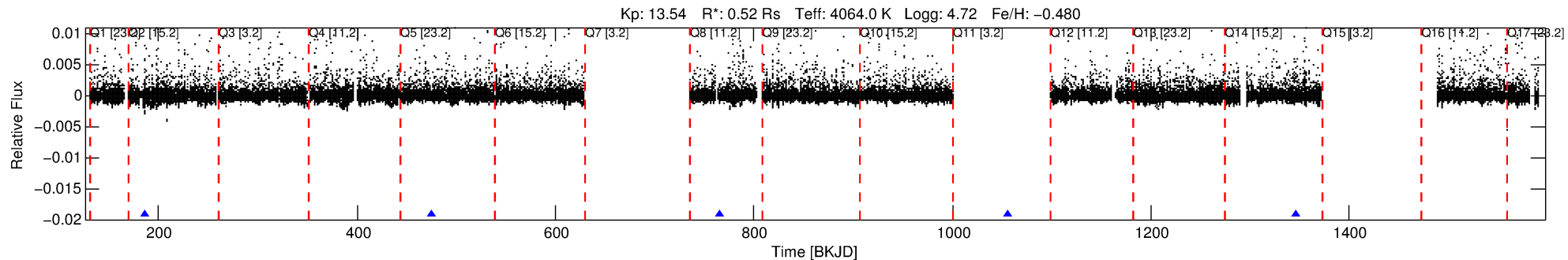
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010355809-02

No Significant Match Found

# DV One-Page Summary

KIC: 10355809 Candidate: 2 of 7 Period: 289.905 d



## DV Fit Results:

Period = 289.90462 [0.00523] d  
Epoch = 185.9350 [0.0125] BKJD  
Rp/R\* = 0.0412 [0.0076]  
a/R\* = 229.94 [115.43]  
b = 0.90 [0.11]  
Seff = 0.14 [0.03]  
Teq = 156 [9] K  
Rp = 2.34 [0.55] Re  
a = 0.6929 [0.0798] AU  
Ag = 20712.56 [11830.57] [1.75σ]  
Teff = 2886 [412] K [6.62σ]

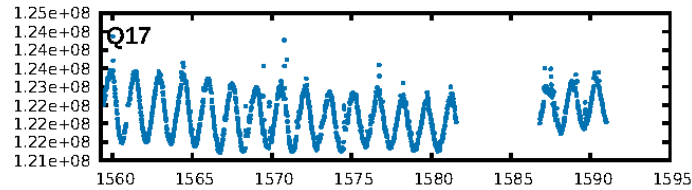
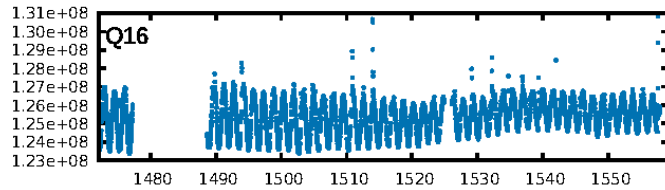
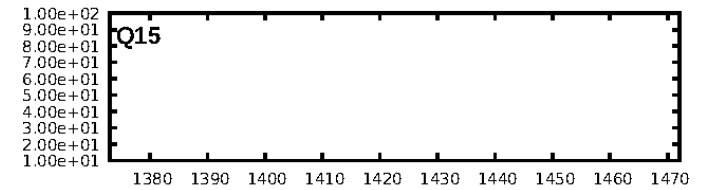
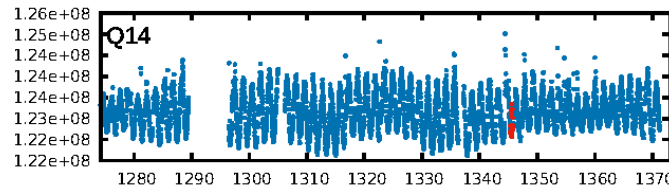
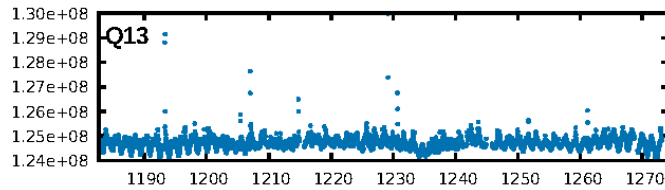
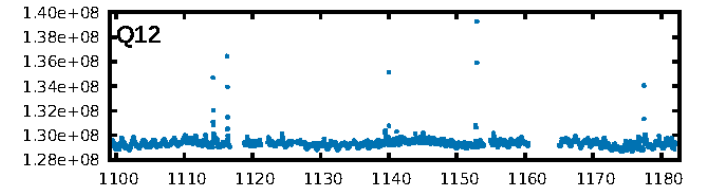
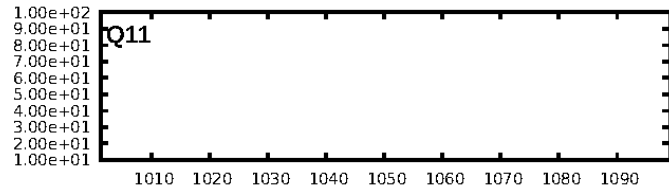
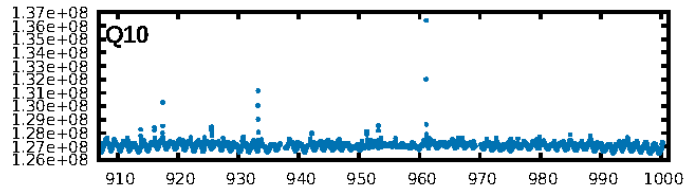
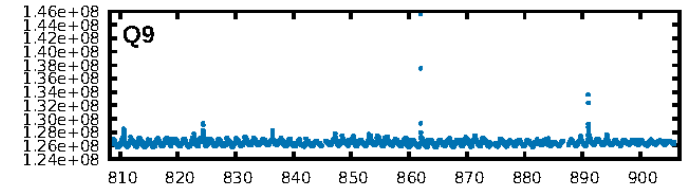
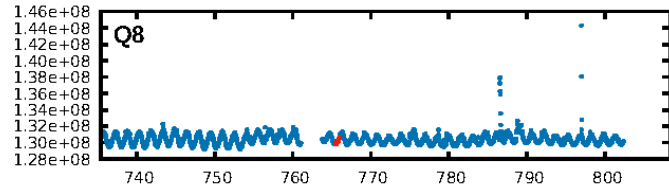
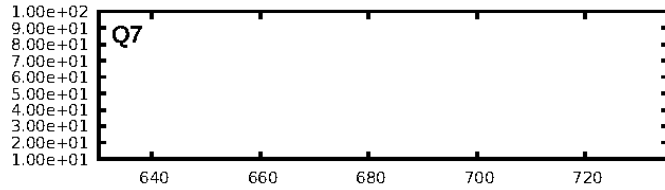
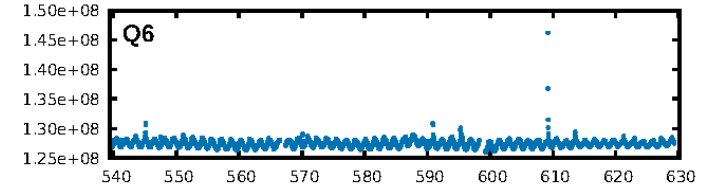
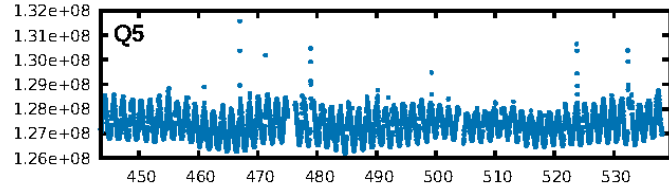
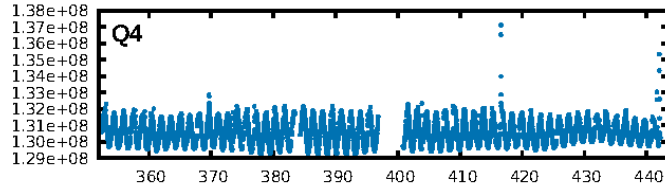
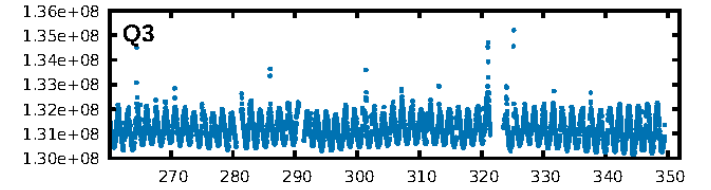
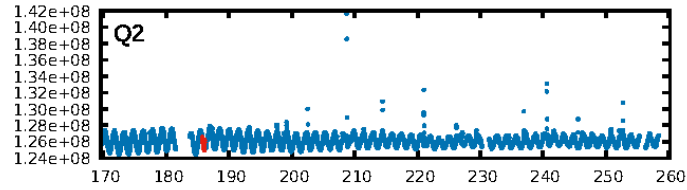
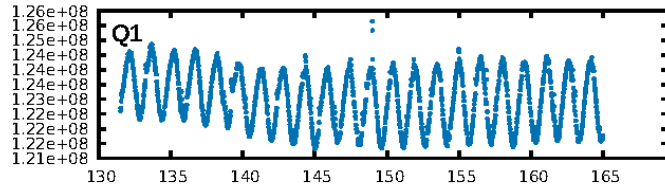
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [25.70σ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 57.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.058  
Centroid-sig: N/A  
Centroid-so: 0.132 arcsec [0.43σ]  
OotOffset-rm: 0.349 arcsec [1.35σ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-rm: 0.240 arcsec [1.32σ]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

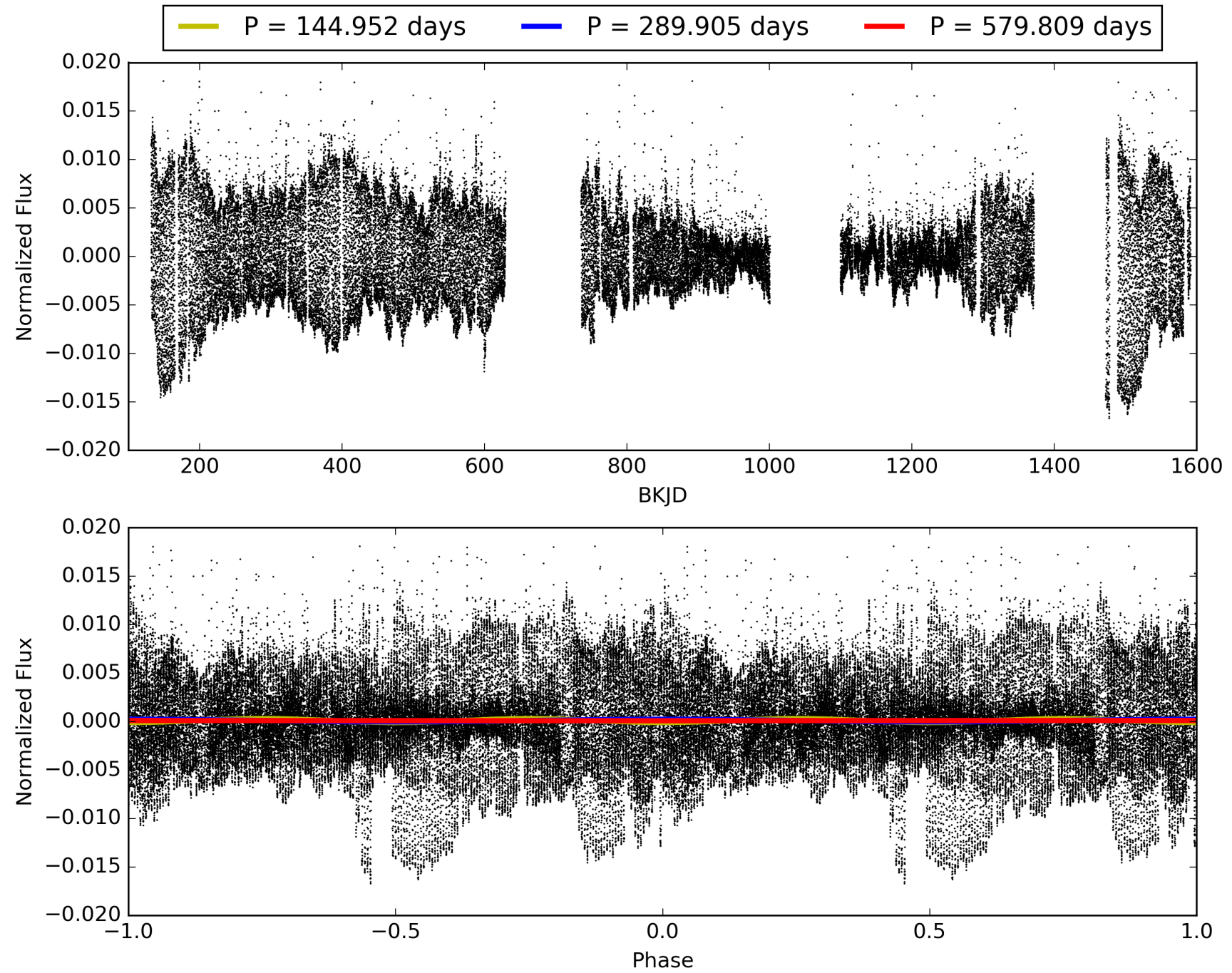
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:40:34 Z

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

# TCE 010355809-02, PDC Light Curves



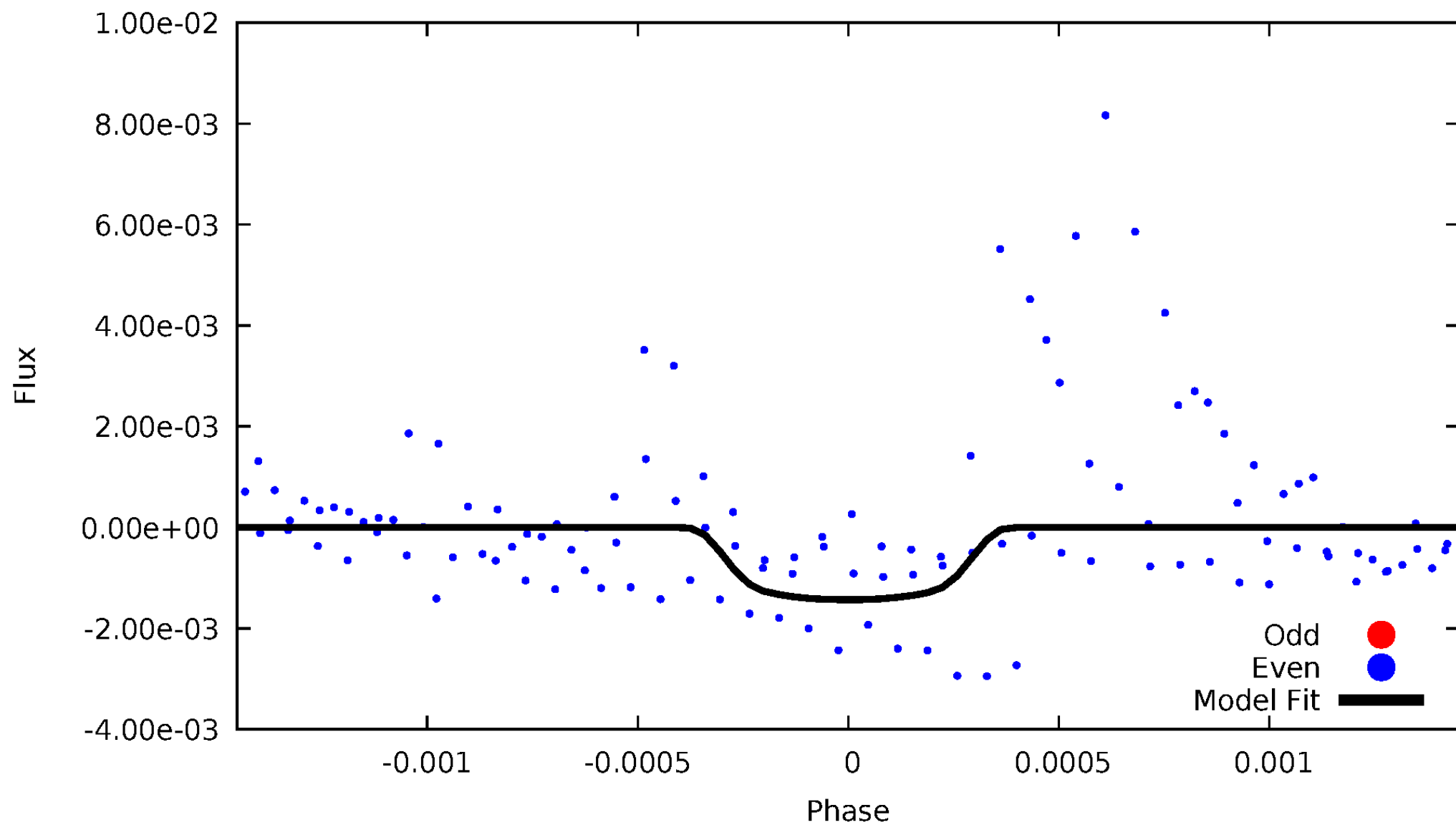
TCE 010355809-02





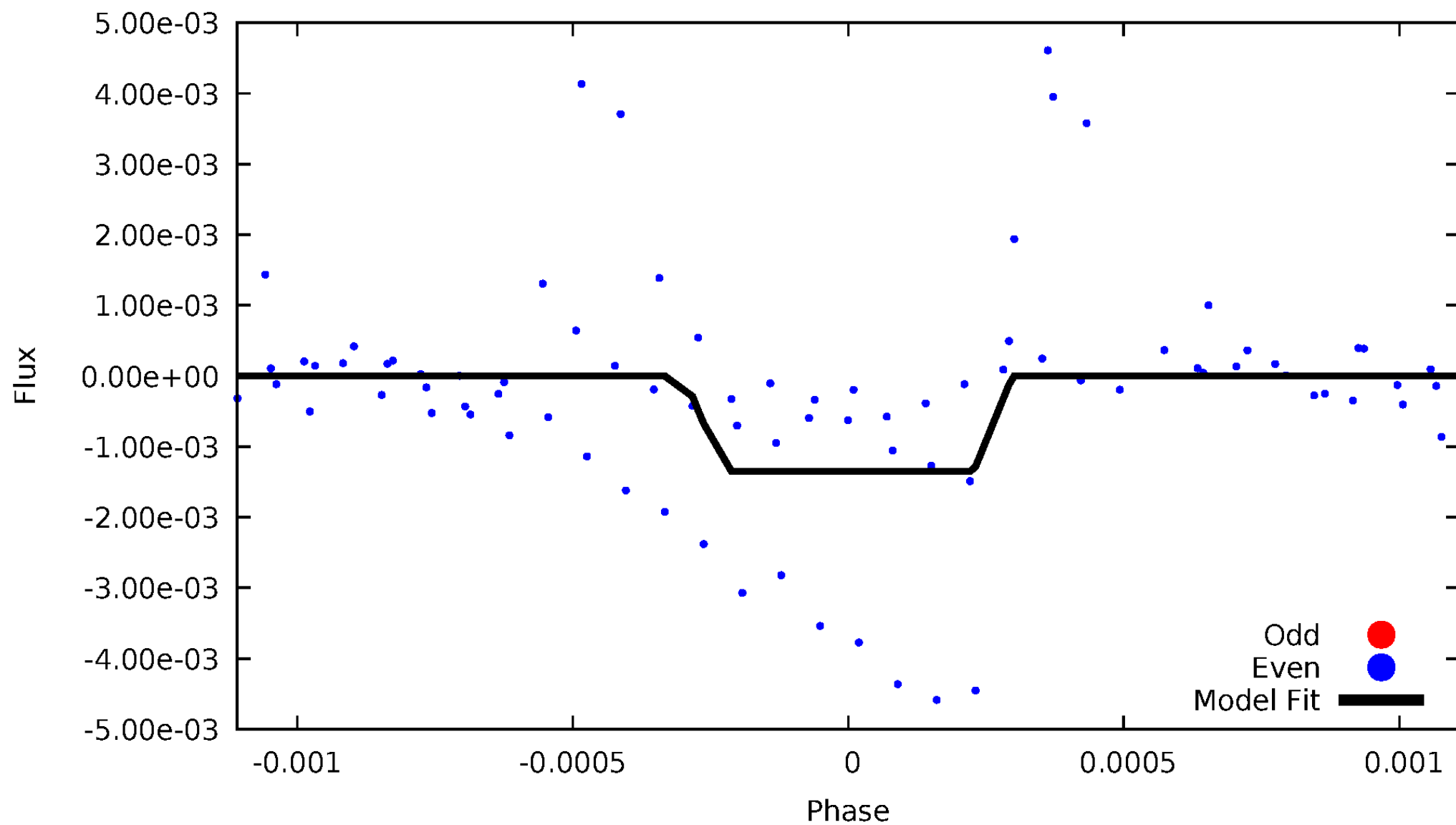
# DV Odd/Even

TCE 010355809-02



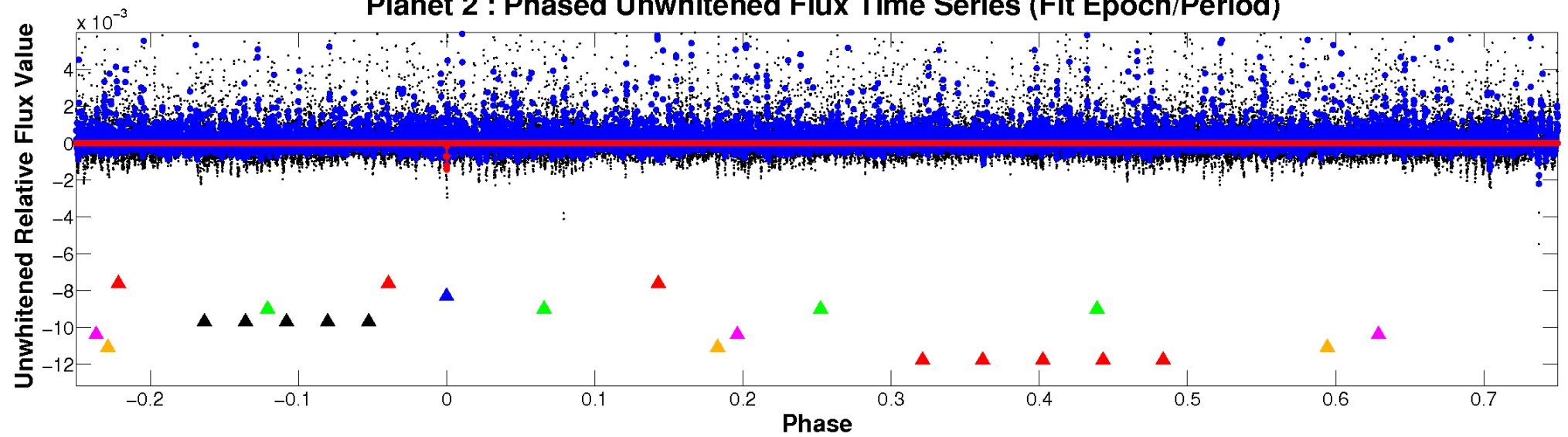
# ALT Odd/Even

TCE 010355809-02

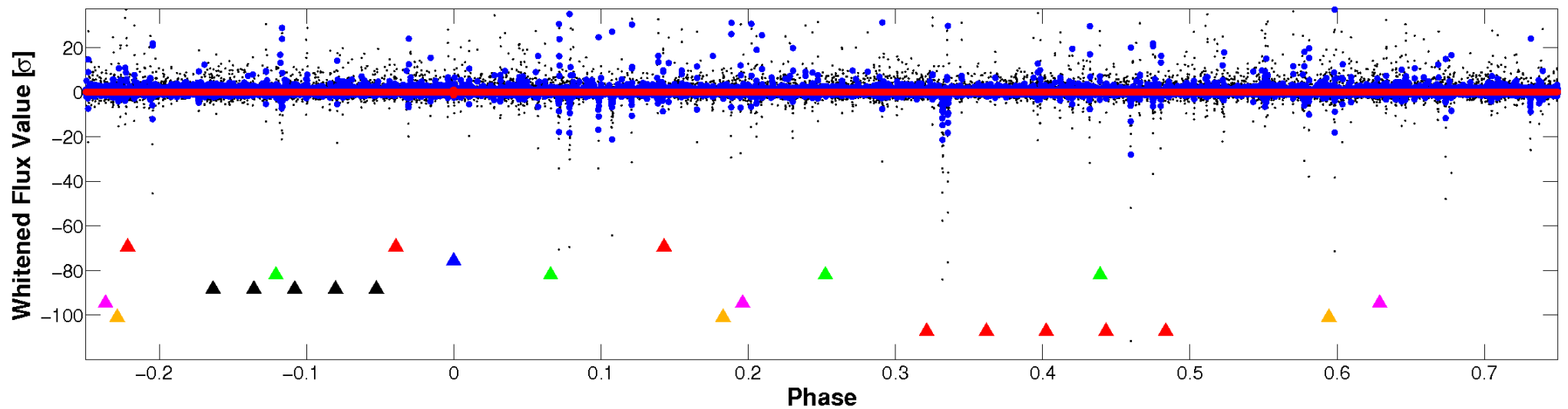


# Non-Whitened Vs. Whitened Light Curve

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

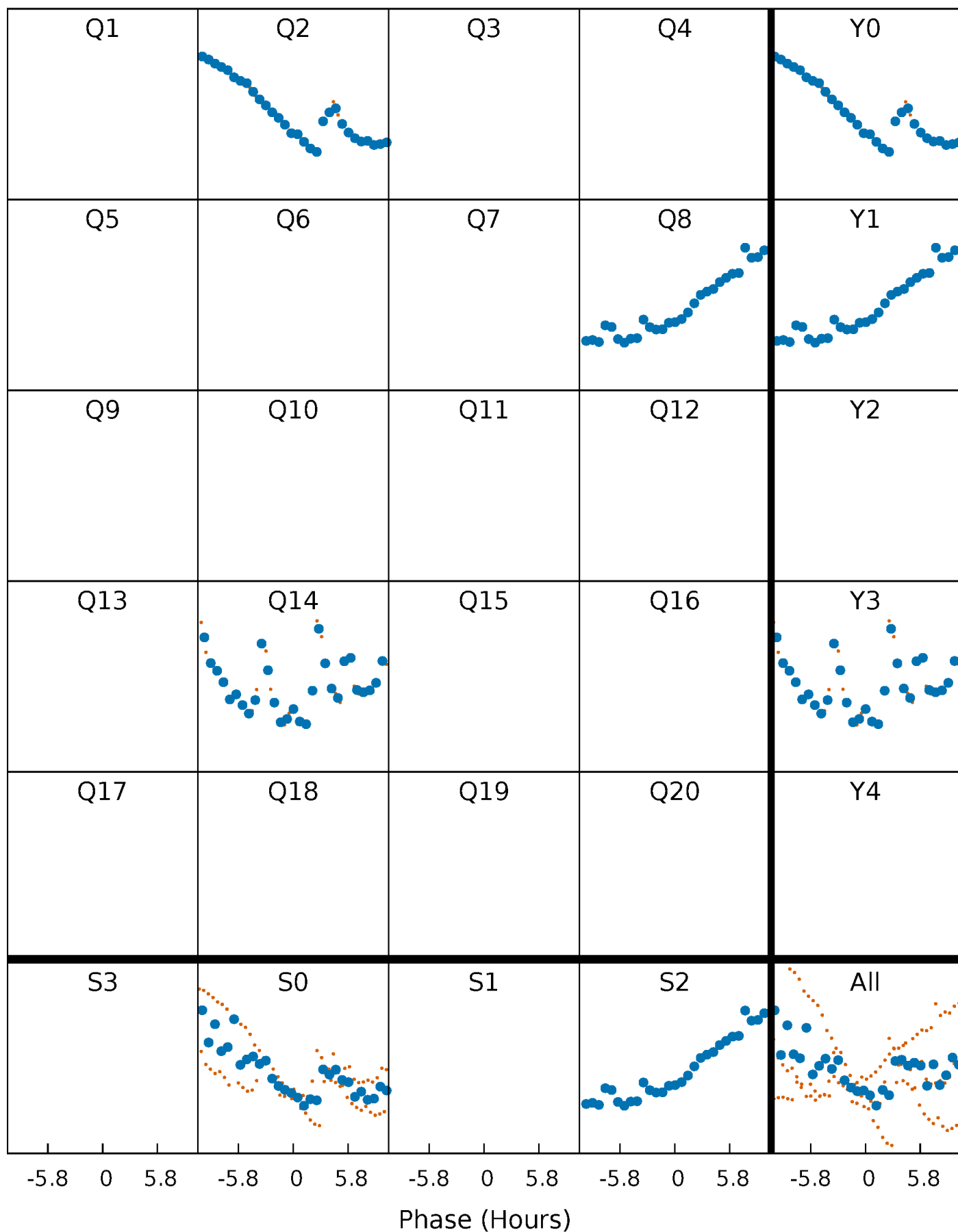


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



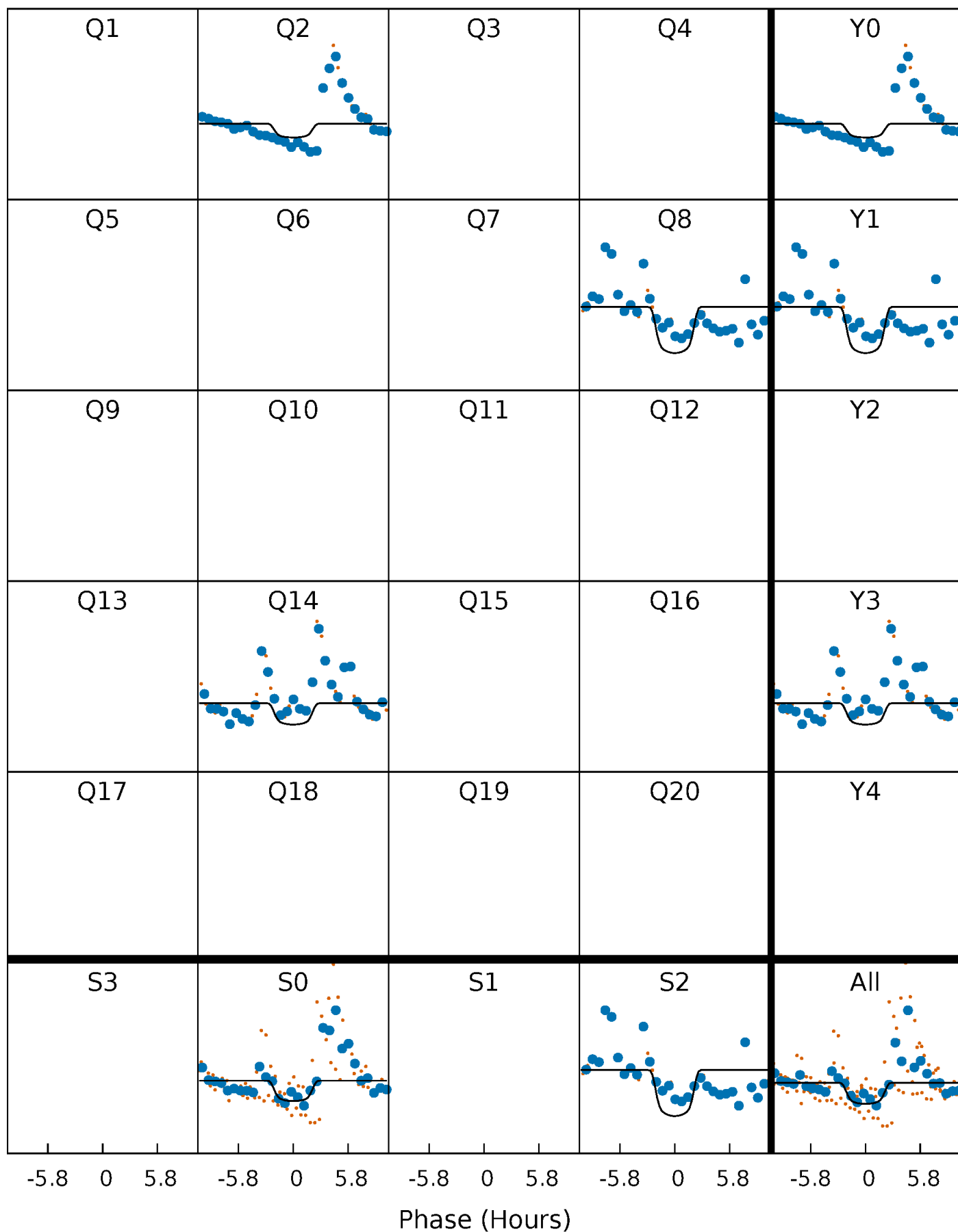
# PDC Quarter-Phased Transit Curves

TCE 010355809-02     $P=289.904625$  Days     $T_0=185.935033$  (BKJD)



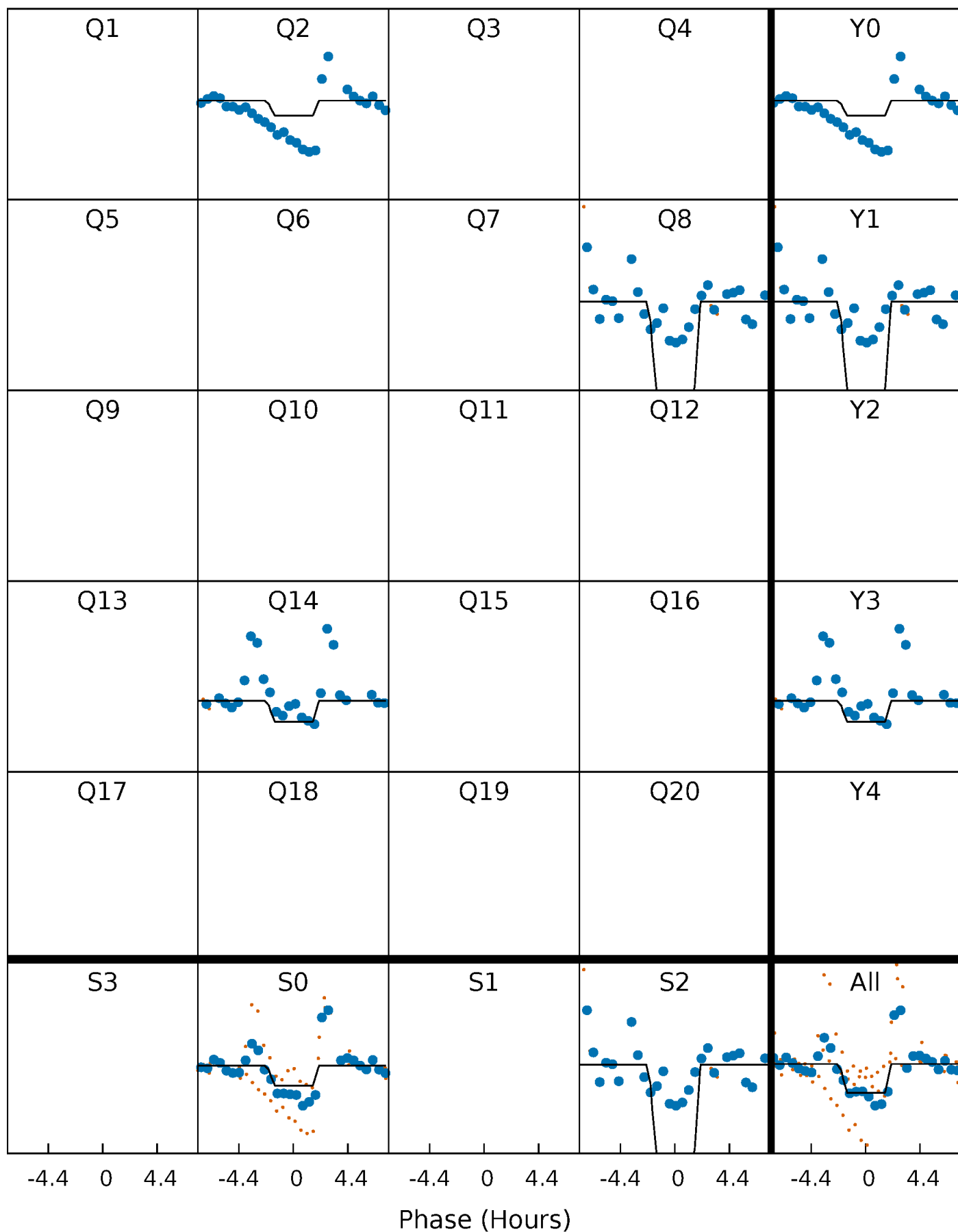
# DV Quarter-Phased Transit Curves

TCE 010355809-02     $P=289.904625$  Days     $T_0=185.935033$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

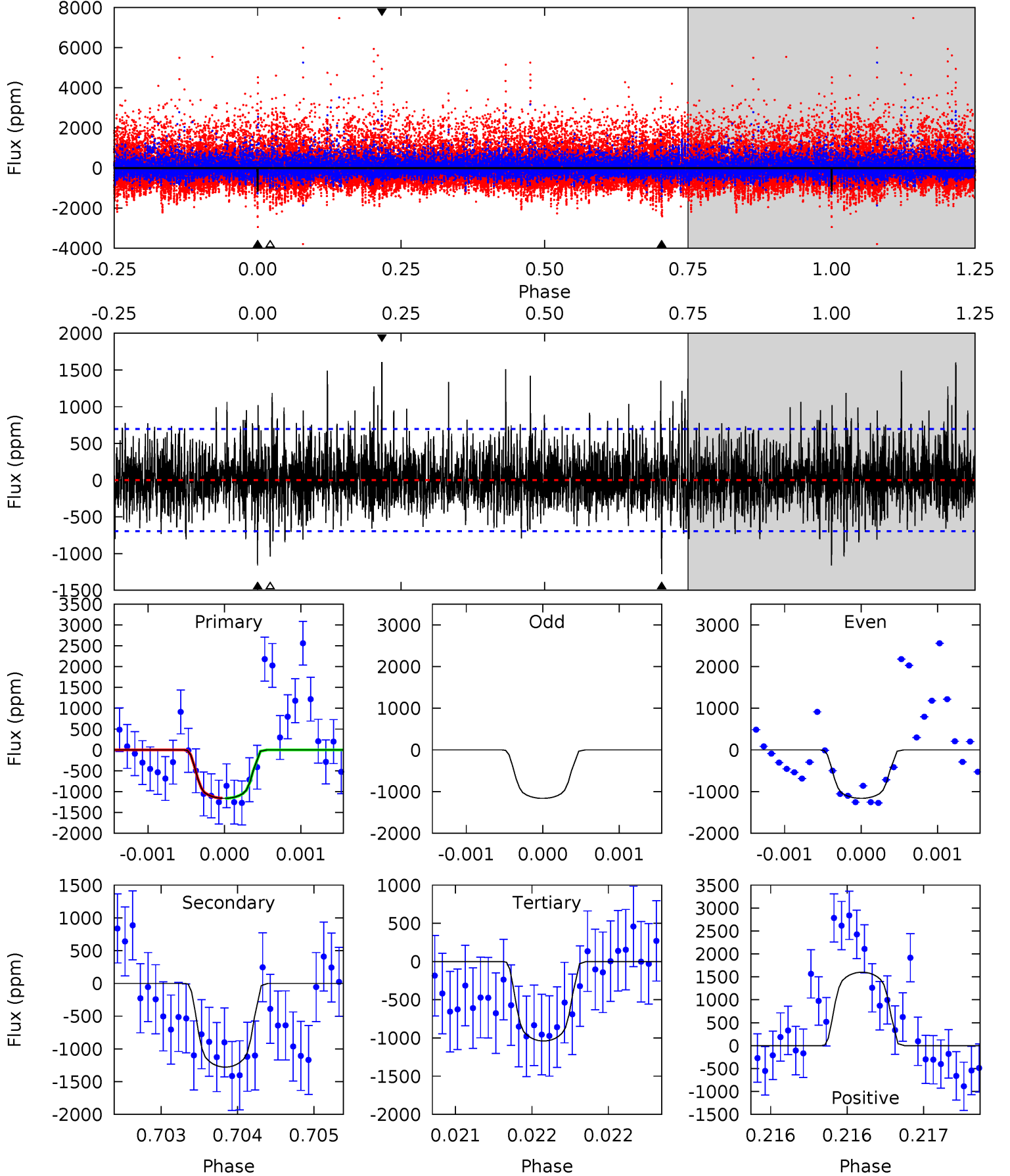
TCE 010355809-02 P=289.892305 Days  $T_0=185.983981$  (BKJD)



# DV Model-Shift Uniqueness Test

010355809-02,  $P = 289.904625$  Days,  $E = 185.935033$  Days

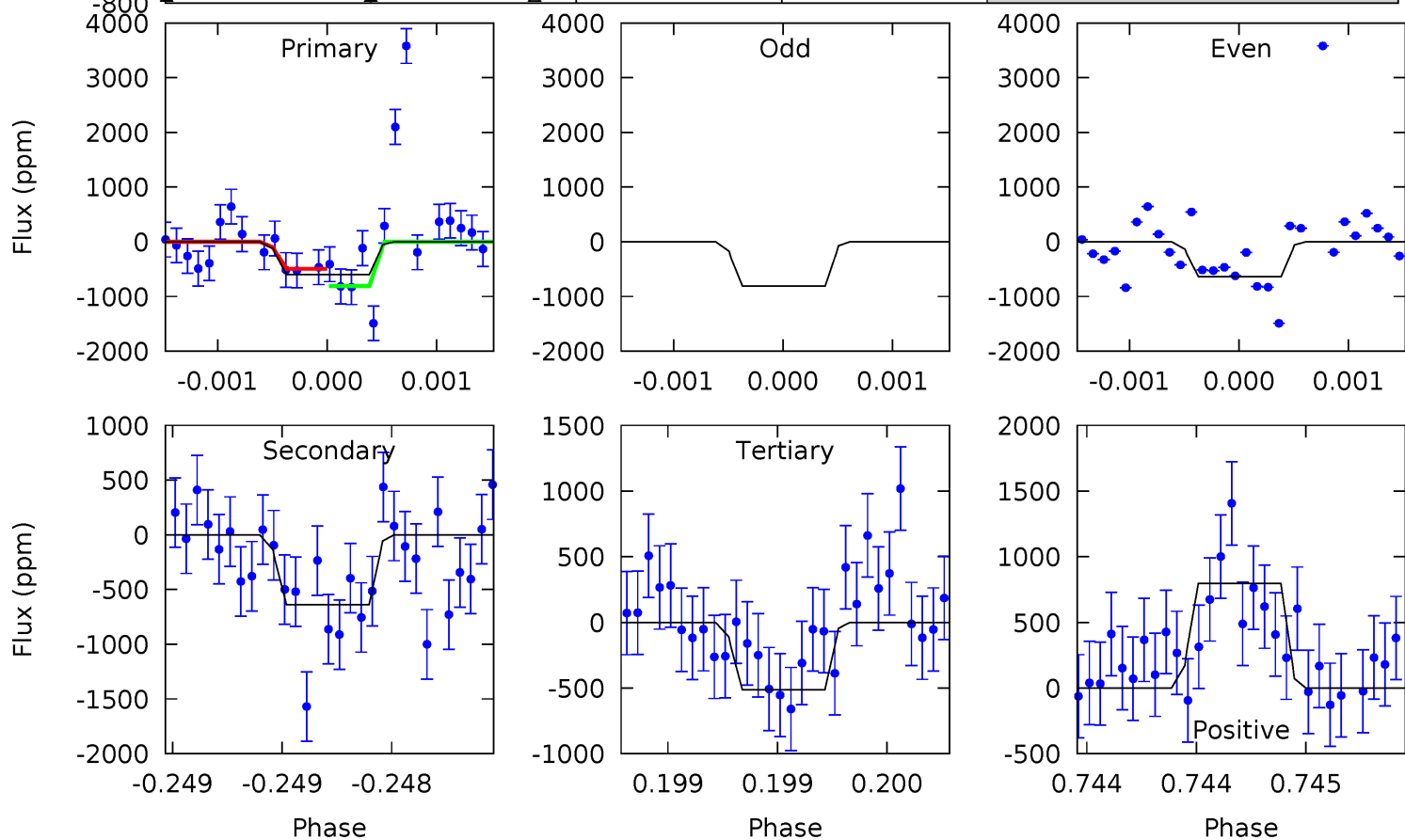
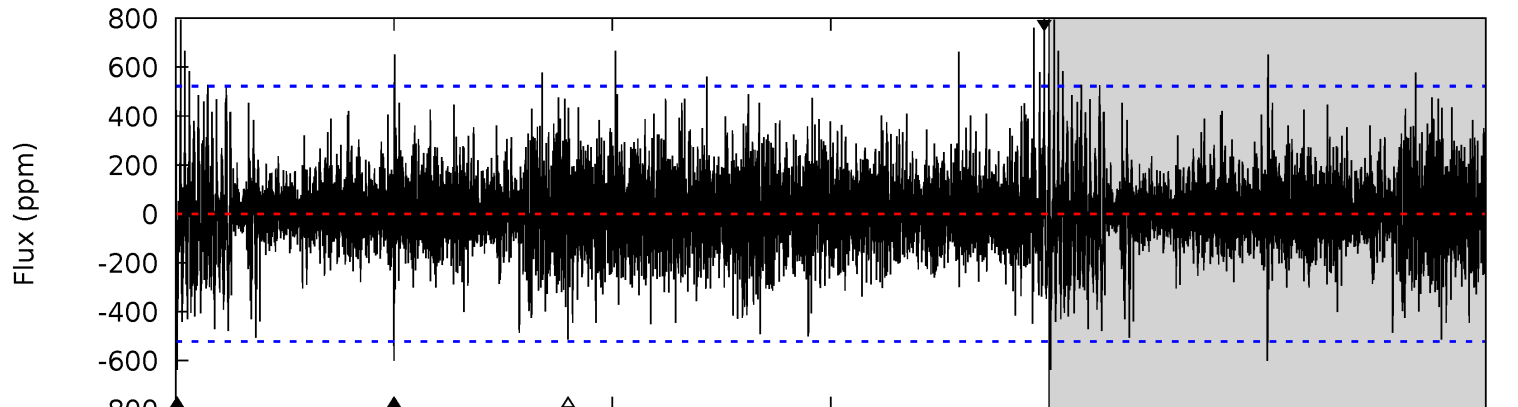
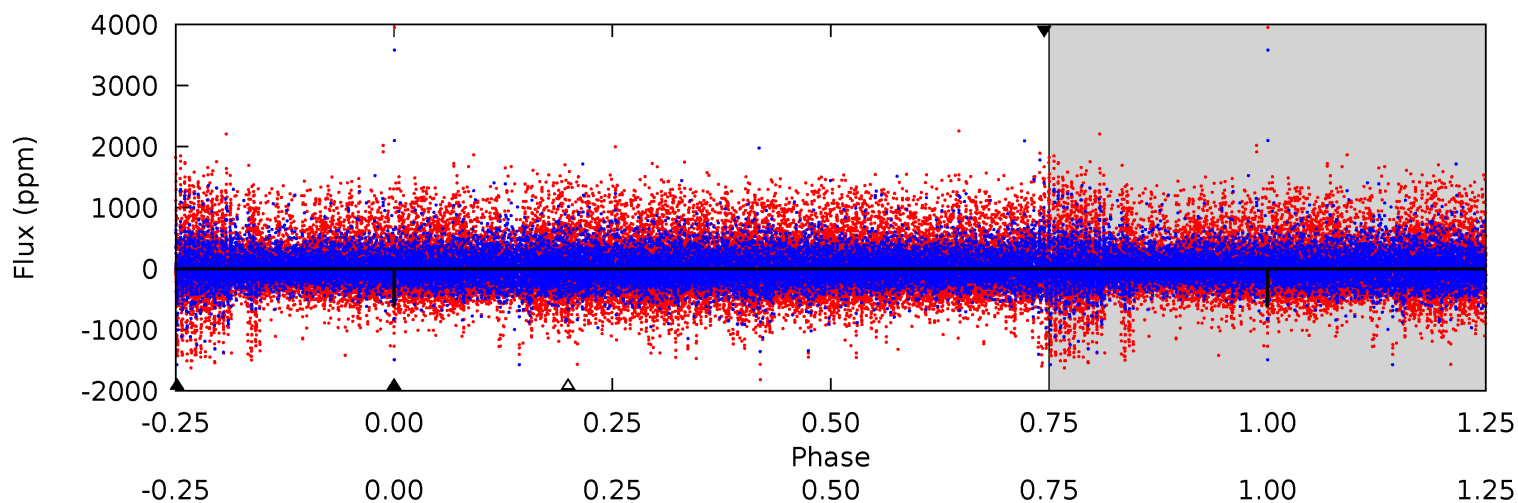
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.16	10.1	8.20	12.6	5.50	3.36	2.31	0.96	-3.46	1.88	-2.54	0.01	1.49	0.56	0.02



# Alt Model-Shift Uniqueness Test

010355809-02, P = 289.892305 Days, E = 185.983981 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
6.39	6.78	5.46	8.47	5.55	3.44	1.45	0.93	-2.09	1.32	-1.69	0.98	2.09	0.56	1.65





### Stellar Parameters For KIC 010355809

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4064^{+129}_{-158}$	$4.725^{+0.078}_{-0.045}$	$-0.480^{+0.300}_{-0.350}$	$0.522^{+0.057}_{-0.077}$	$0.528^{+0.055}_{-0.067}$	$5.223^{+2.123}_{-0.874}$
	+3%/-4%	+2%/-1%	+62%/-73%	+11%/-15%	+10%/-13%	+41%/-17%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010355809-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1278 \pm 127$	$2.29^{+0.46}_{-0.44}$	$216^{+9}_{-10}$	$3865^{+328}_{-261}$	$64518^{+34091}_{-19454}$
Alt.	$-638 \pm 94$	$2.05^{+0.50}_{-0.44}$	$216^{+9}_{-10}$	$3565^{+345}_{-255}$	$40146^{+25947}_{-14770}$

$T_{\text{max}}$  = 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

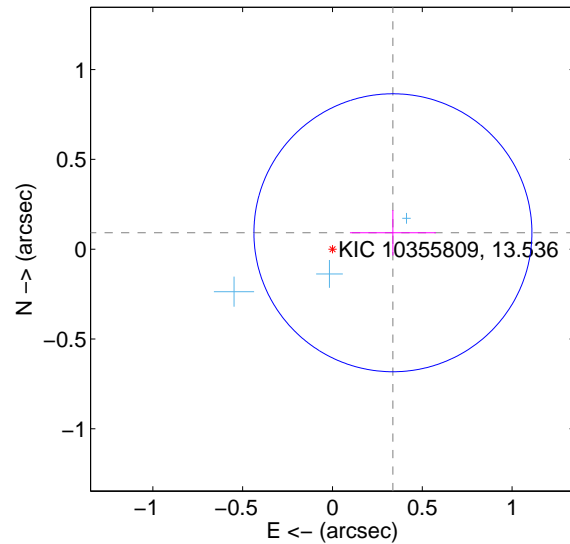
Supplemental centroid analysis for 010355809-02. Kepler magnitude: 13.54. Transit SNR 7.16

There are 3 quarters with good PRF difference image offsets

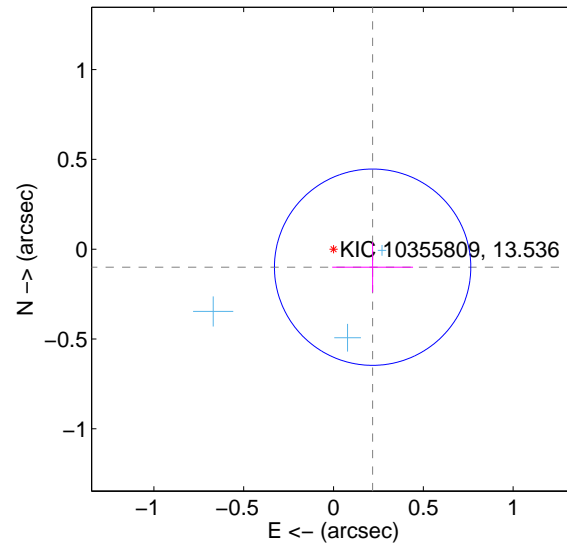
The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.349 \pm 0.258$	1.35	$-0.336 \pm 0.239$	$0.091 \pm 0.127$
PRF-fit source offset from KIC position	$0.240 \pm 0.182$	1.32	$-0.218 \pm 0.225$	$-0.100 \pm 0.139$
photometric centroid source offset	$0.13 \pm 0.31$	0.43	$0.05 \pm 0.32$	$-0.12 \pm 0.31$

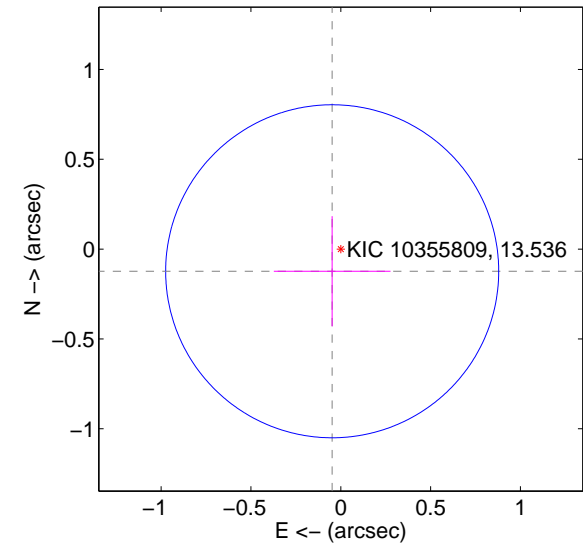
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



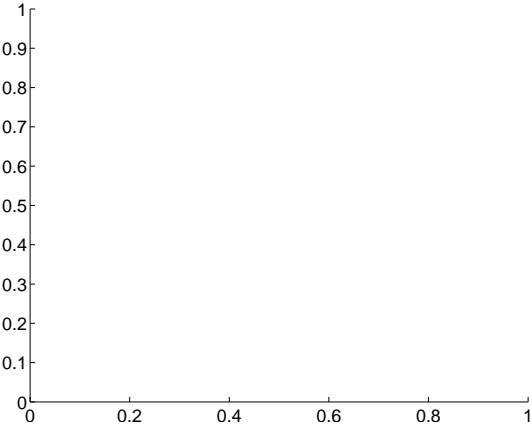
offset from photometric centroids



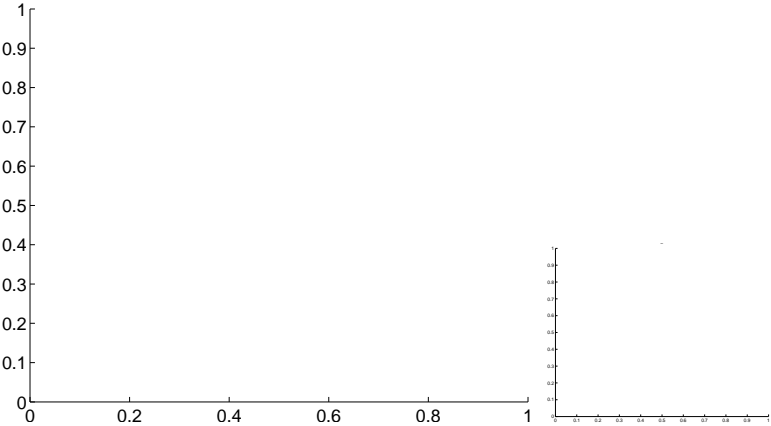
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

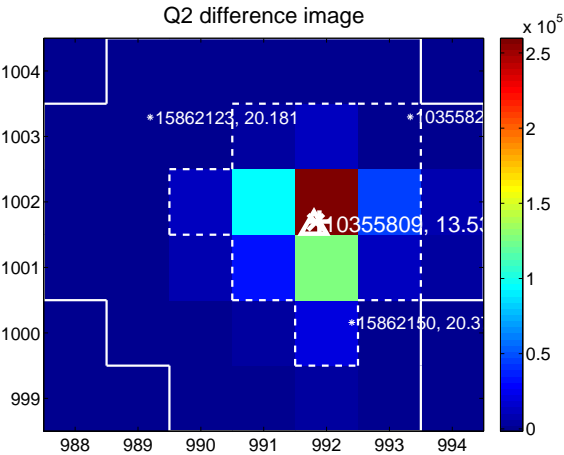
Q1 no difference image



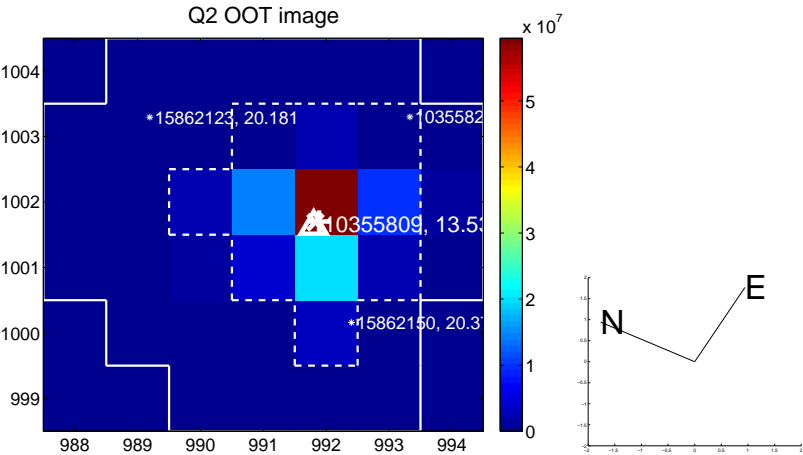
Q1 no OOT image



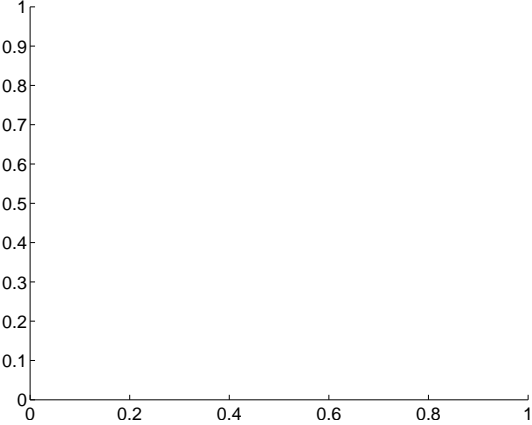
Q2 difference image



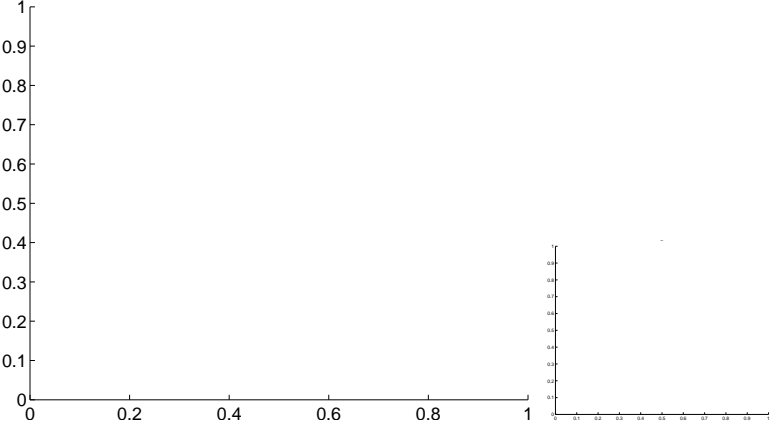
Q2 OOT image



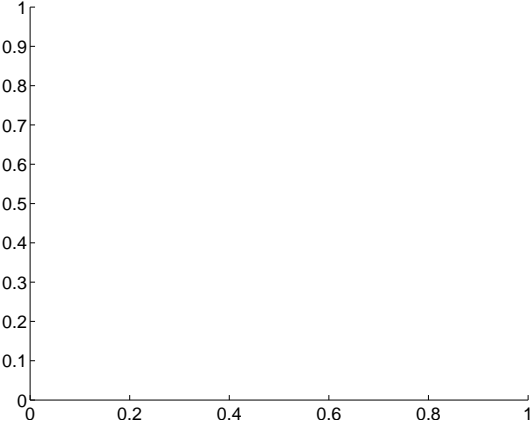
Q3 no difference image



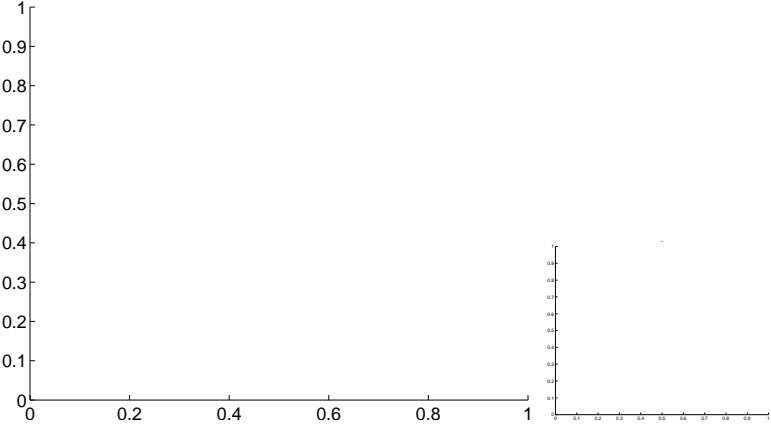
Q3 no OOT image



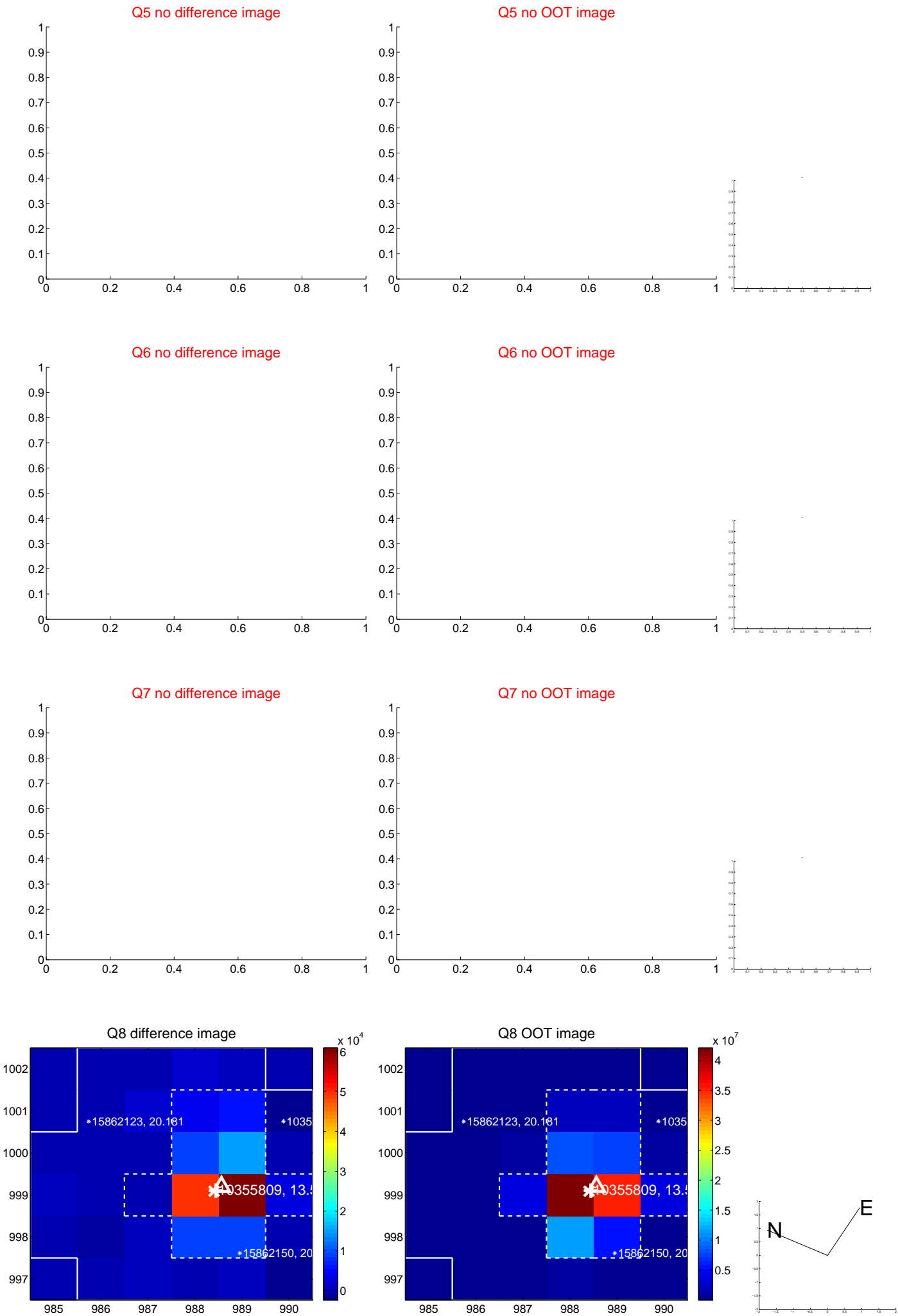
Q4 no difference image



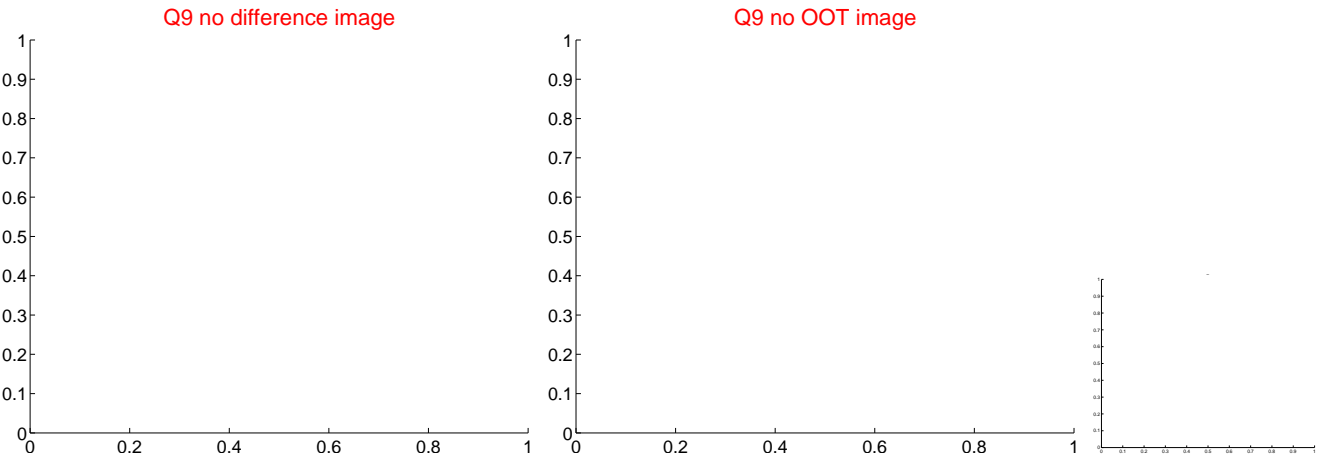
Q4 no OOT image



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

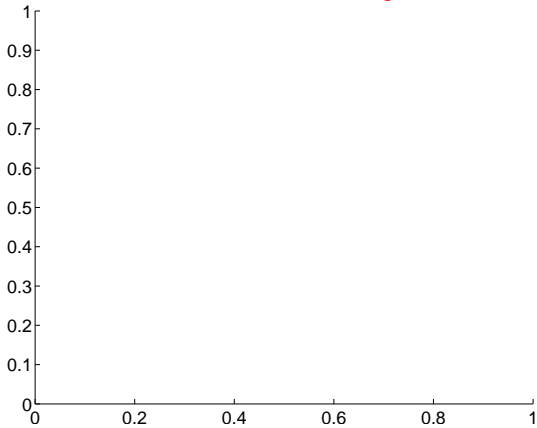


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

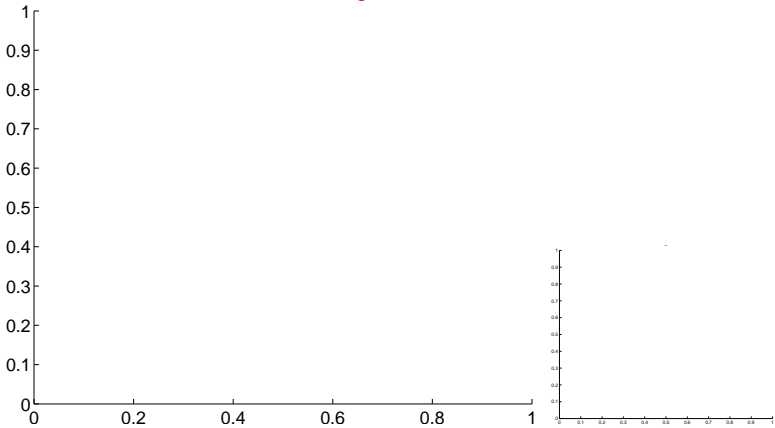


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

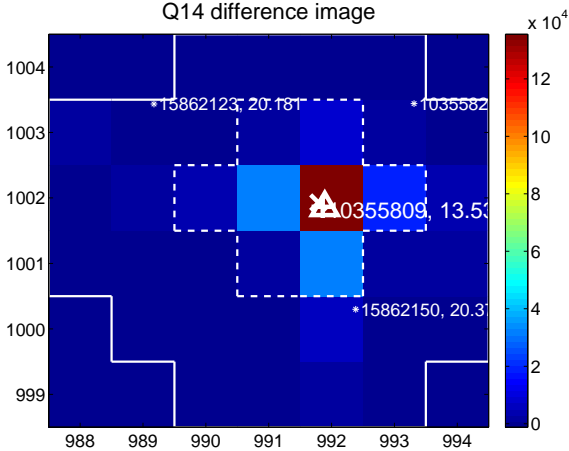
Q13 no difference image



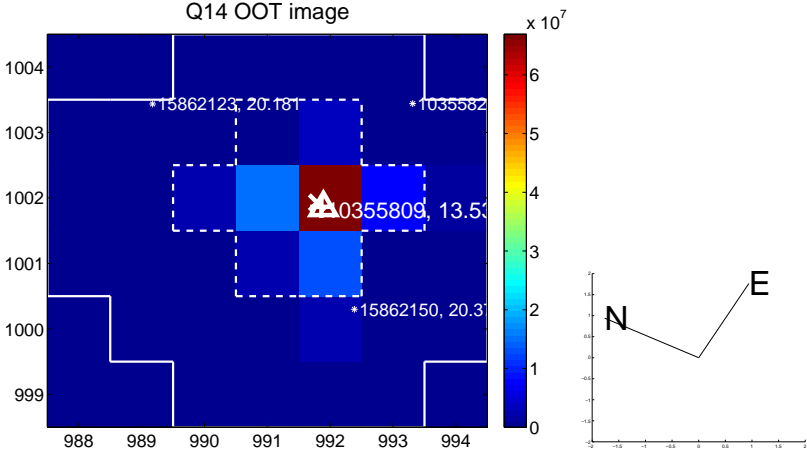
Q13 no OOT image



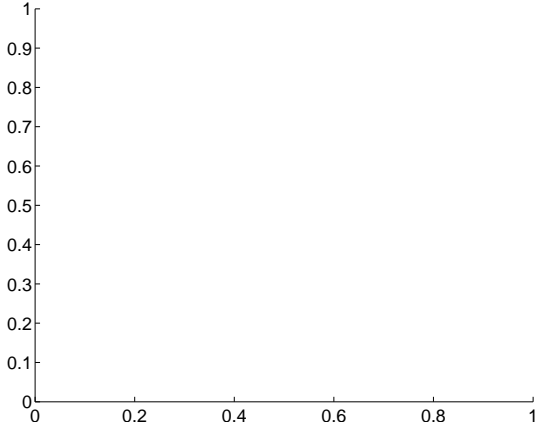
Q14 difference image



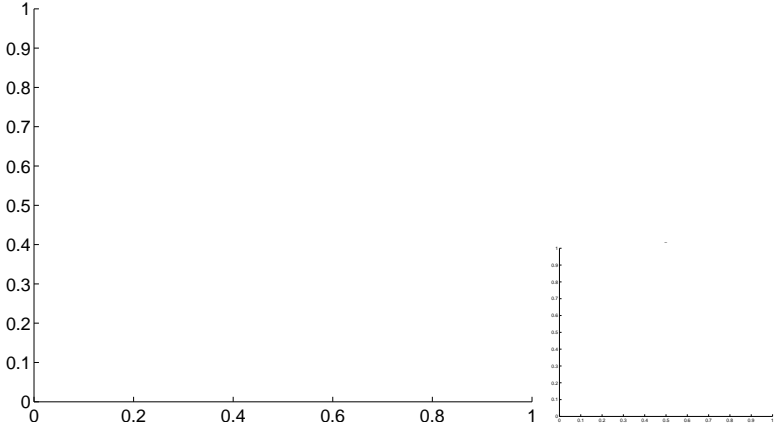
Q14 OOT image



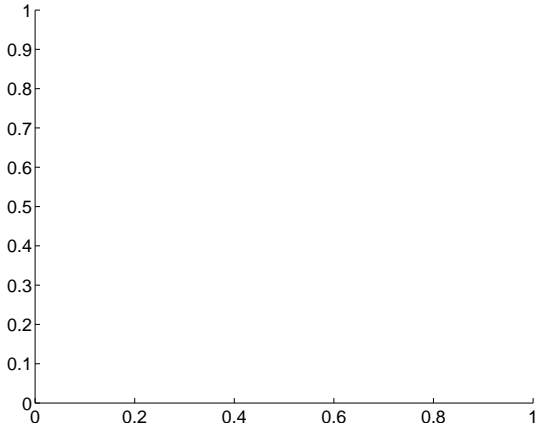
Q15 no difference image



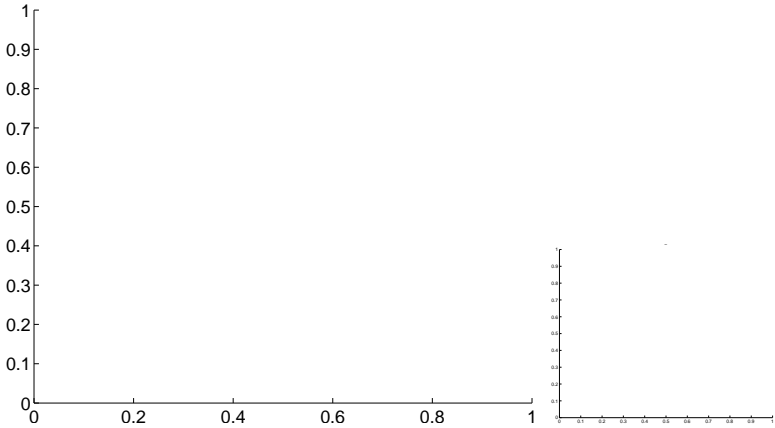
Q15 no OOT image



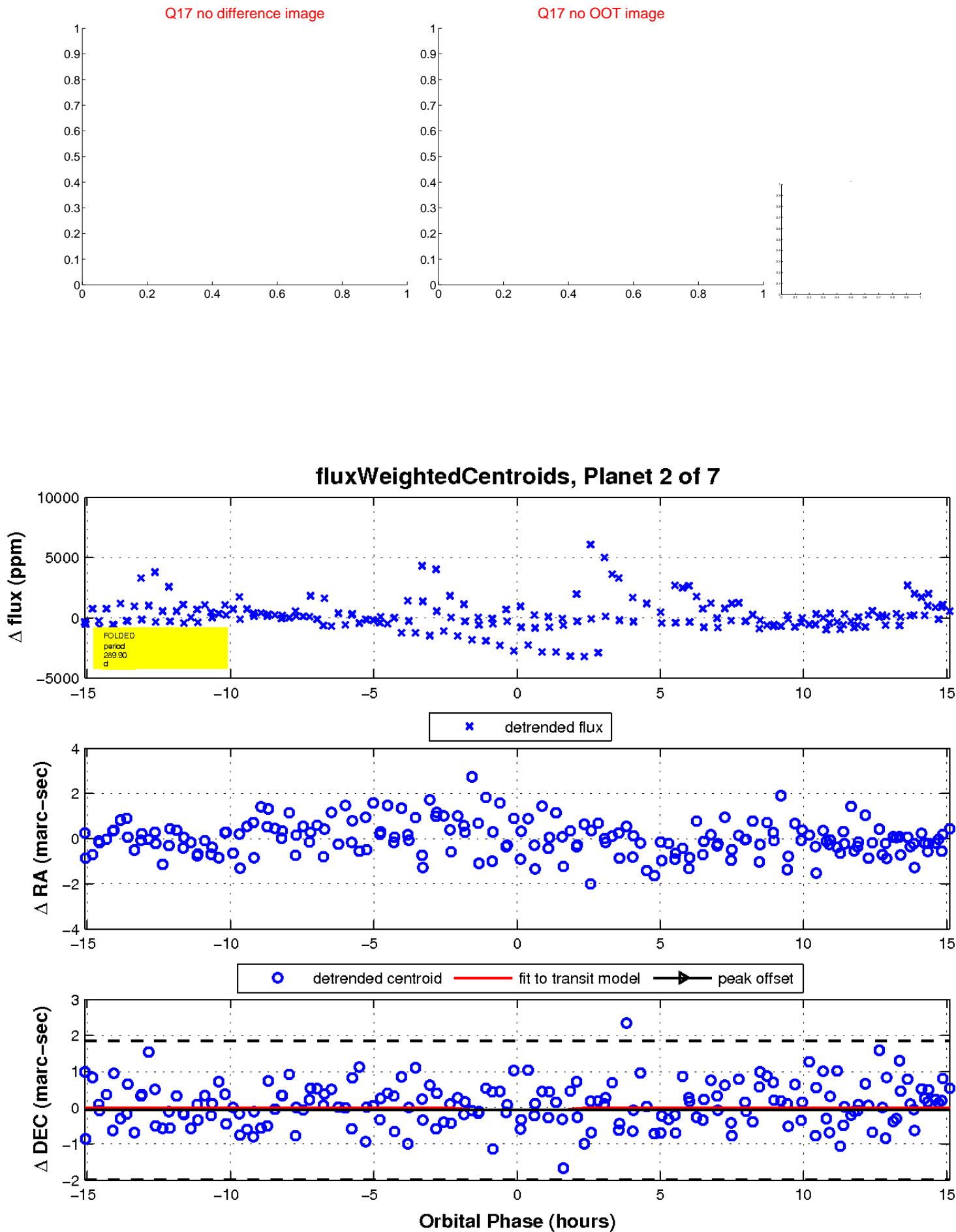
Q16 no difference image



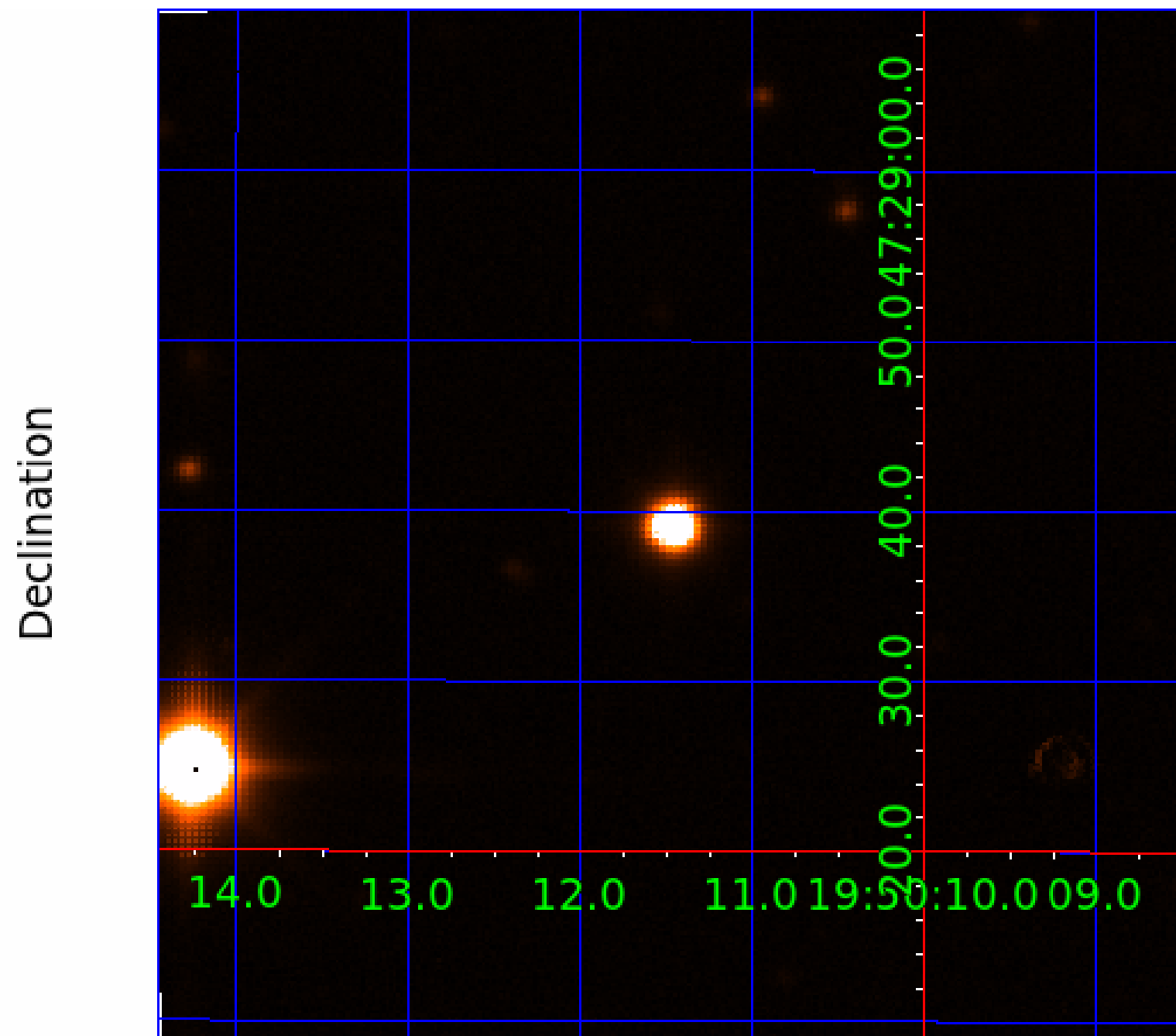
Q16 no OOT image



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



UKIRT Image





# KIC 010355809

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010355809-01	OBS	No	526.988093	227.367712	1174.8	2.126	16.3	6.5	0.52	4064	1.86	0.06
010355809-02	OBS	No	289.904624	185.935033	1434.7	5.049	16.0	7.2	0.52	4064	2.35	0.14
010355809-04	OBS	No	297.941469	138.549550	1169.6	5.551	15.1	5.6	0.52	4064	1.84	0.13
010355809-05	OBS	No	415.344228	407.285097	2218.6	3.520	13.9	10.2	0.52	4064	2.46	0.09
010355809-06	OBS	No	460.511846	358.267837	1587.0	3.600	14.2	7.9	0.52	4064	2.06	0.07
010355809-07	OBS	No	301.674269	279.061731	295.1	10.500	12.9	-1.0	0.52	4064	0.89	0.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010355809-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010355809-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010355809-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010355809-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
010355809-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010355809-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

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

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

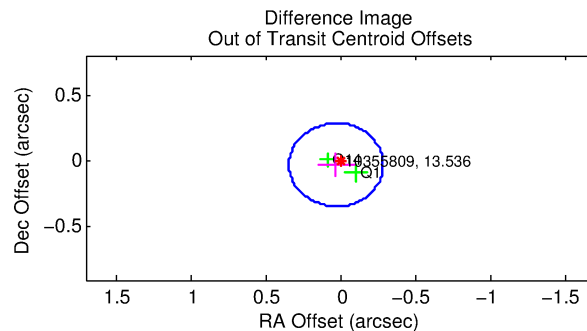
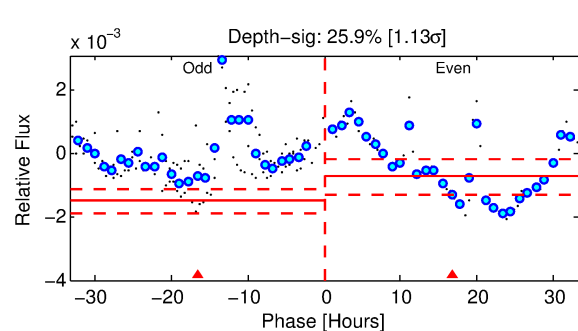
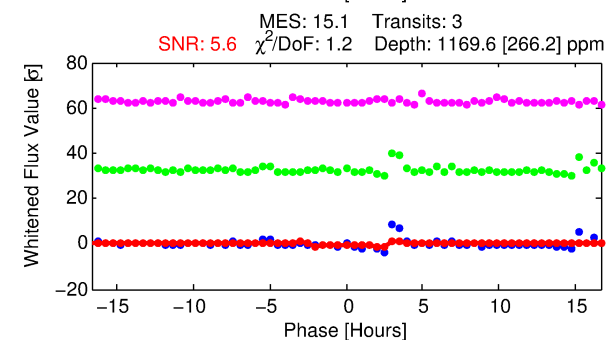
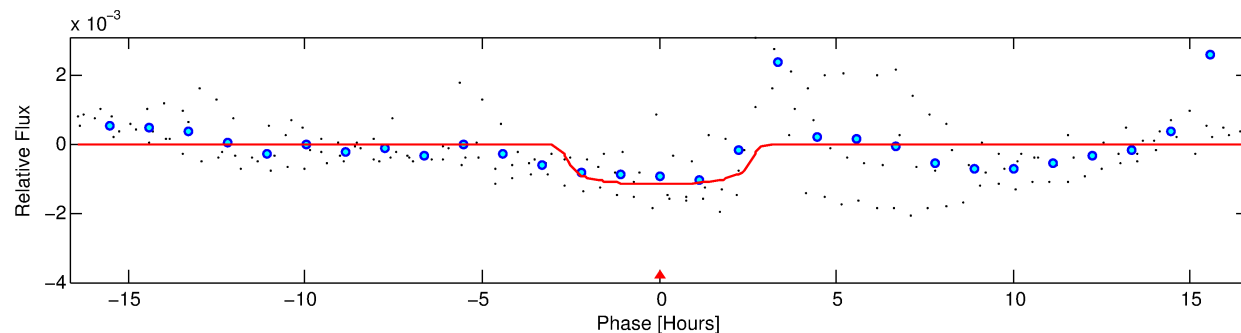
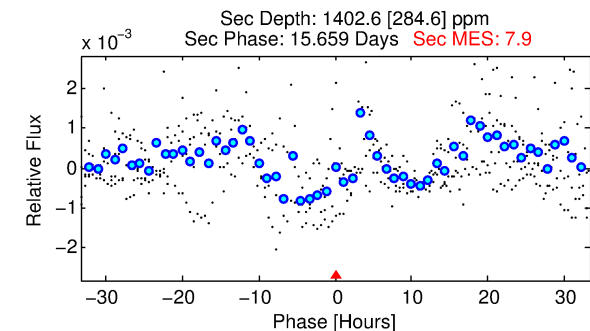
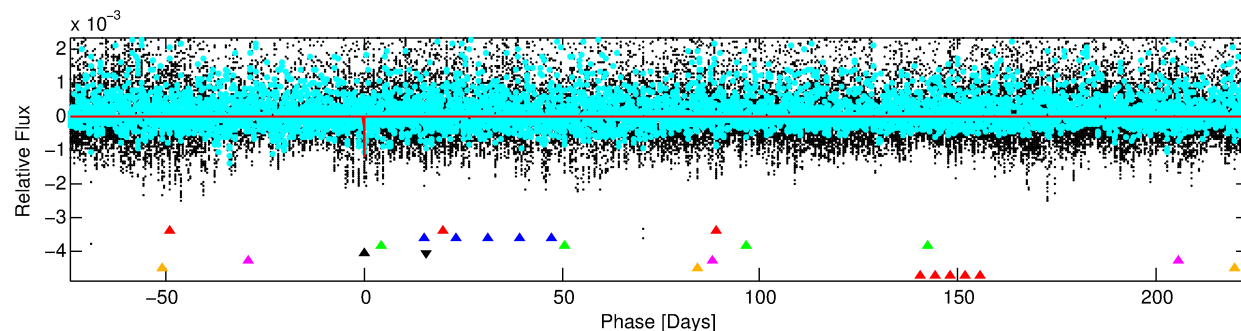
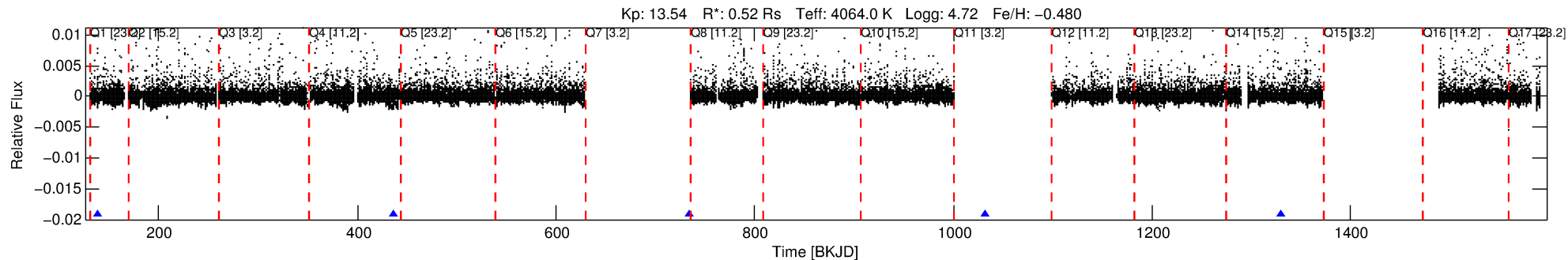
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010355809-04

No Significant Match Found

# DV One-Page Summary

KIC: 10355809 Candidate: 4 of 7 Period: 297.941 d



## DV Fit Results:

Period = 297.94147 [0.00330] d  
Epoch = 138.5495 [0.0066] BKJD  
Rp/R\* = 0.0323 [0.0306]  
a/R\* = 358.71 [1497.24]  
b = 0.55 [5.37]  
Seff = 0.13 [0.03]  
Teq = 154 [8] K  
Rp = 1.84 [1.76] Re  
a = 0.7056 [0.0812] AU  
Ag = 113299.47 [216211.38] [0.52σ]  
Teff = 4374 [2087] K [2.02σ]

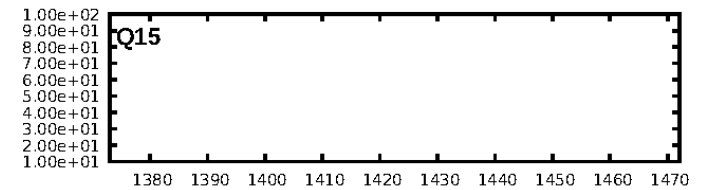
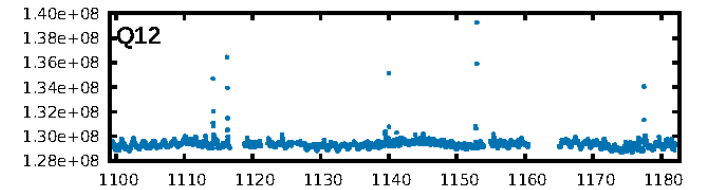
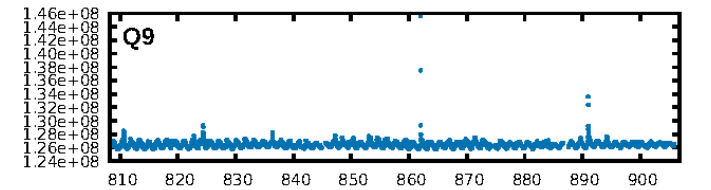
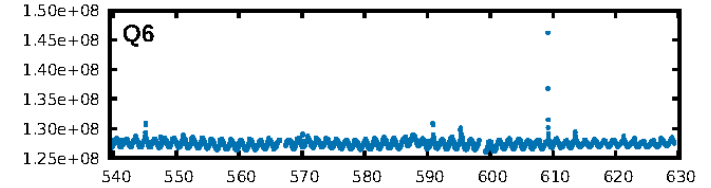
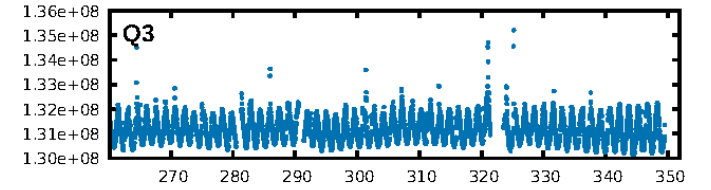
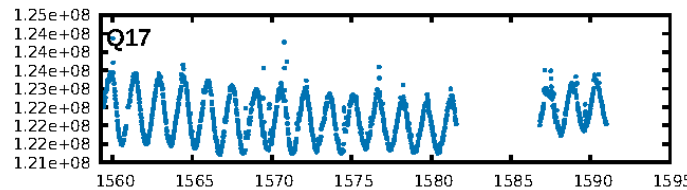
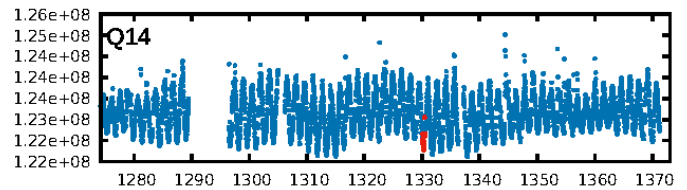
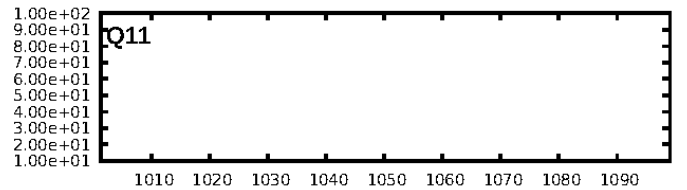
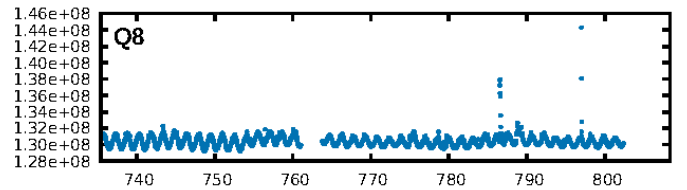
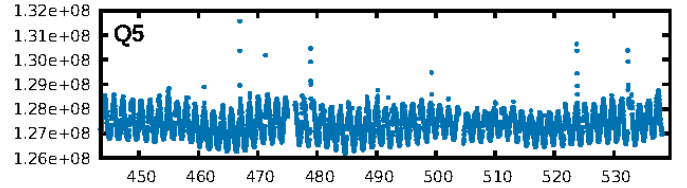
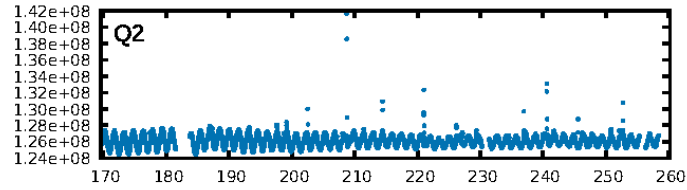
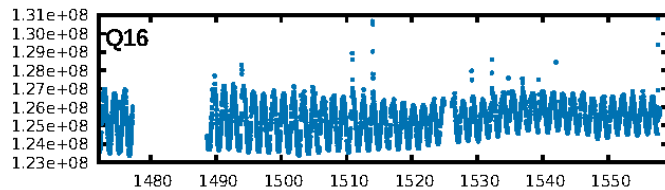
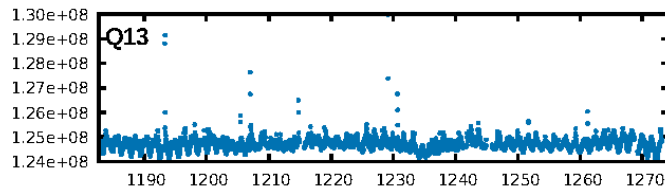
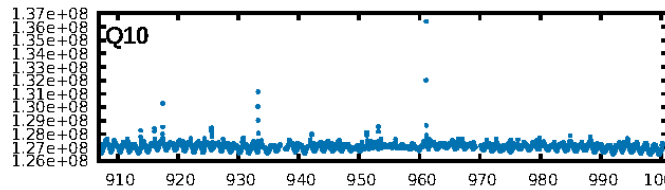
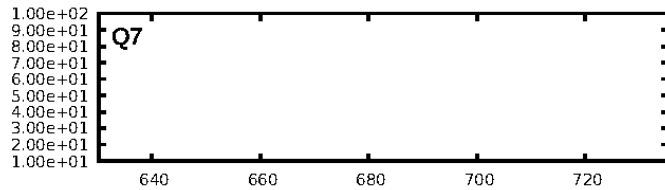
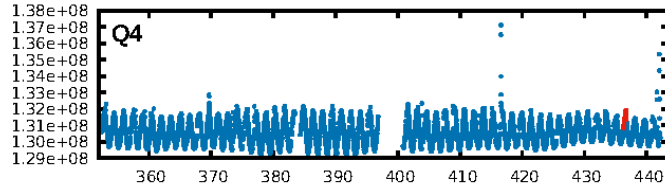
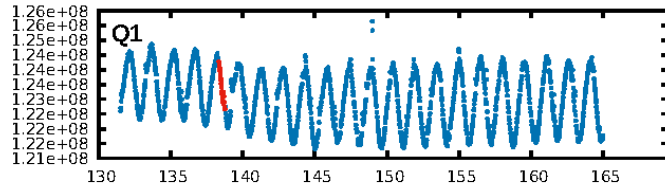
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [25.70σ]  
LongPeriod-sig: 100.0% [7.54σ]  
ModelChiSquare2-sig: 35.1%  
ModelChiSquareGof-sig: 94.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 1.373  
Centroid-sig: N/A  
Centroid-so: 0.222 arcsec [0.64σ]  
OotOffset-rm: 0.040 arcsec [0.38σ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

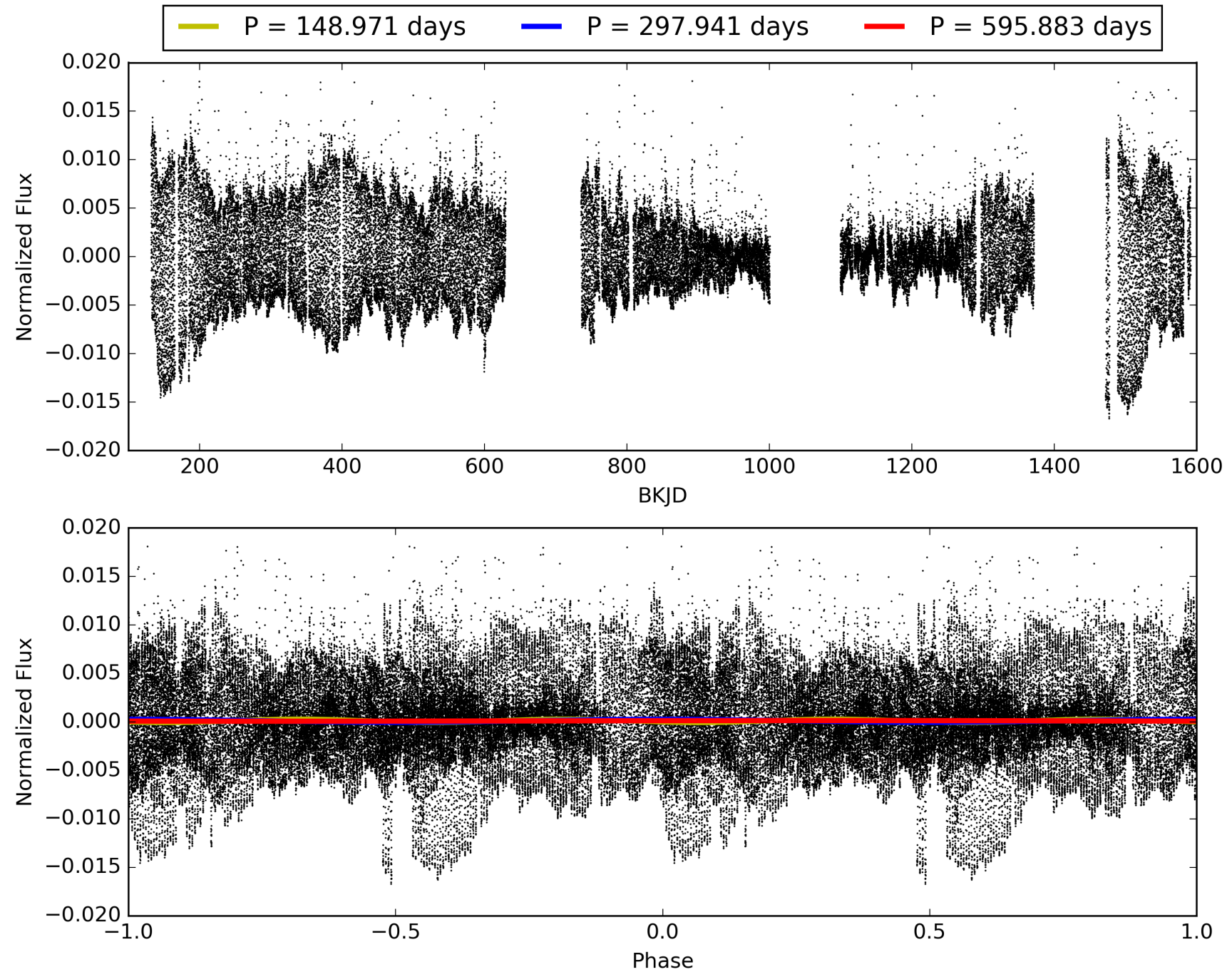
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:40:56 Z

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

# TCE 010355809-04, PDC Light Curves

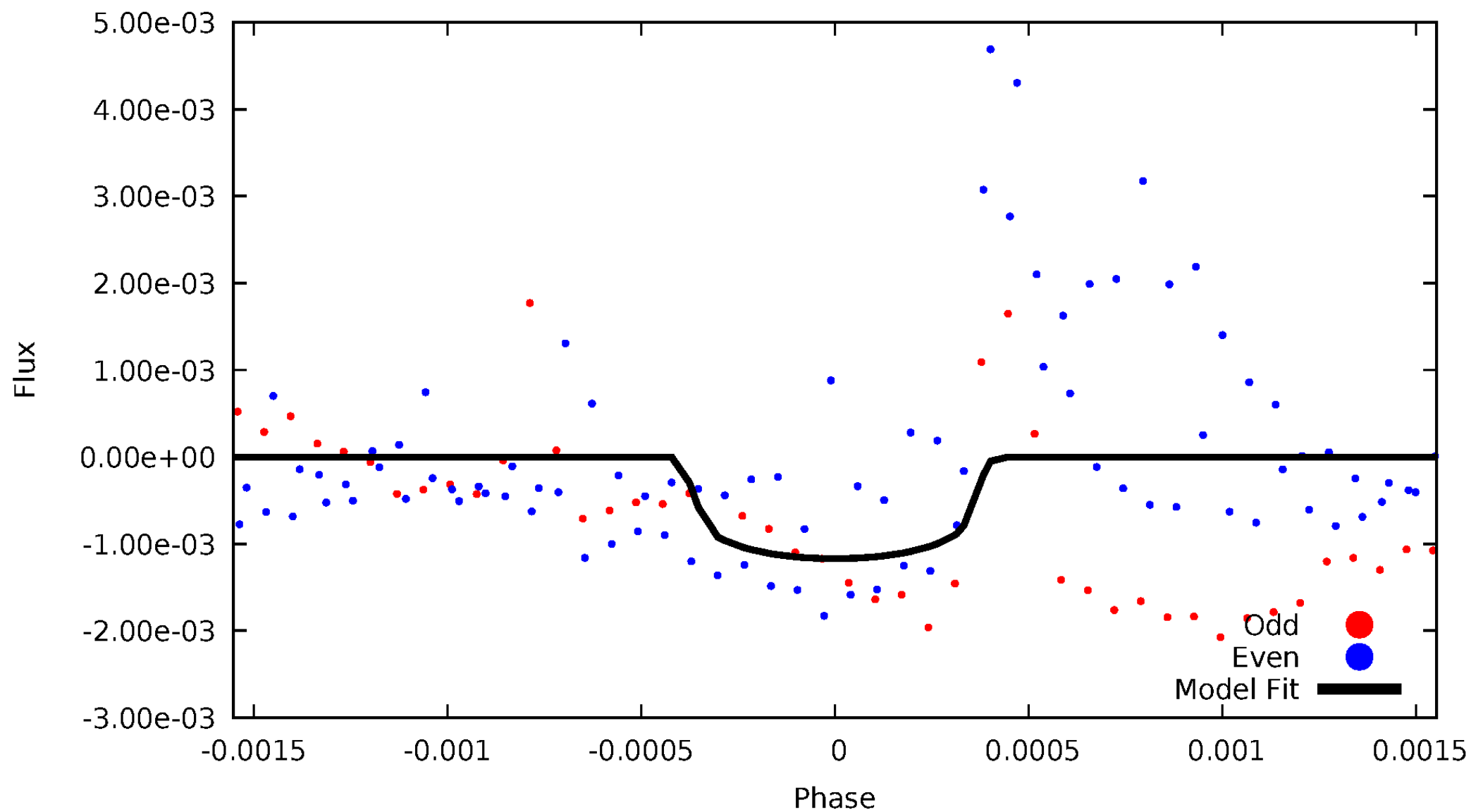


TCE 010355809-04



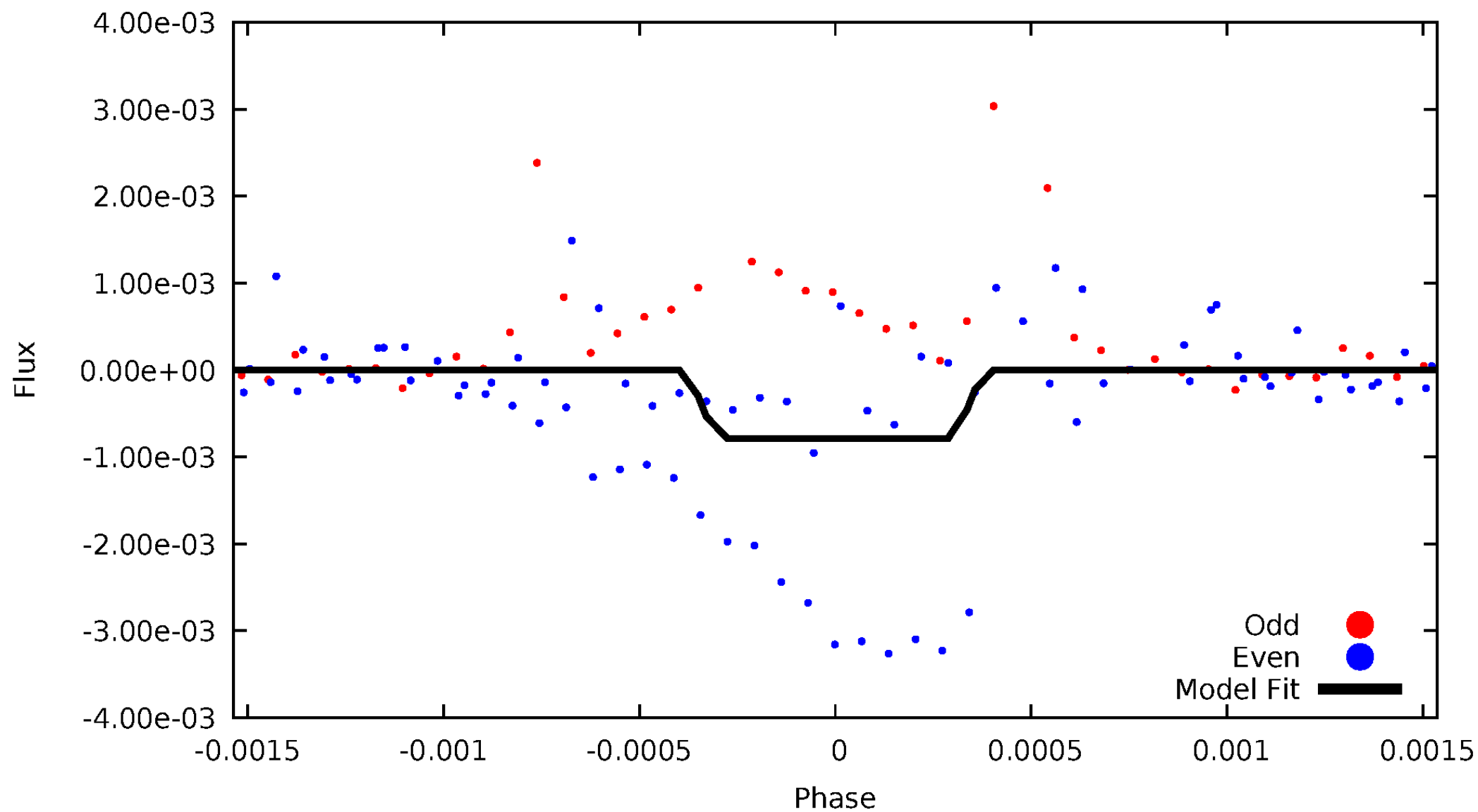
# DV Odd/Even

TCE 010355809-04



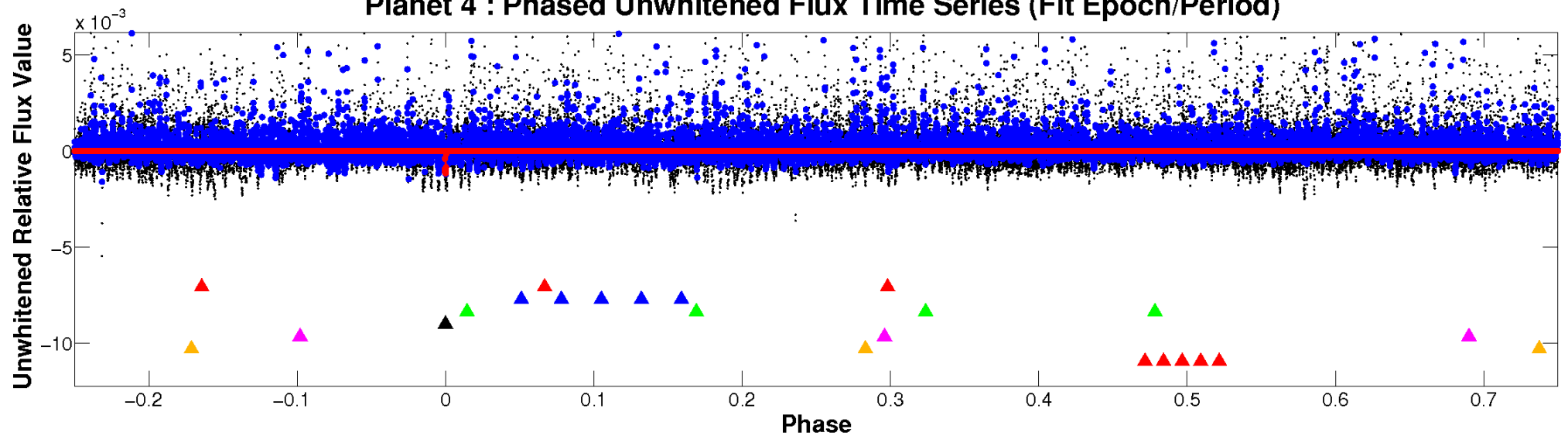
# ALT Odd/Even

TCE 010355809-04

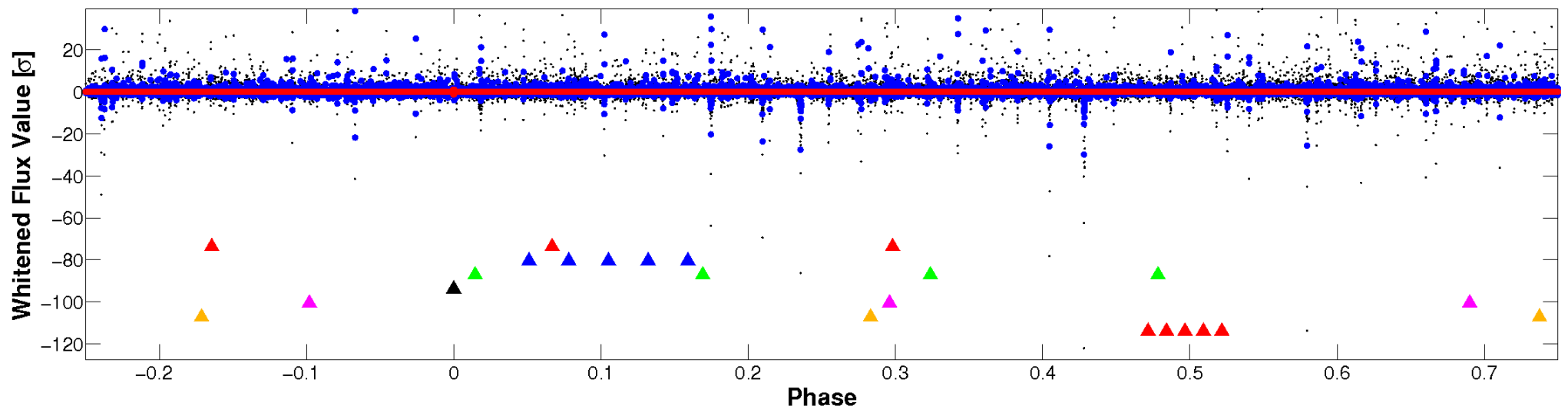


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

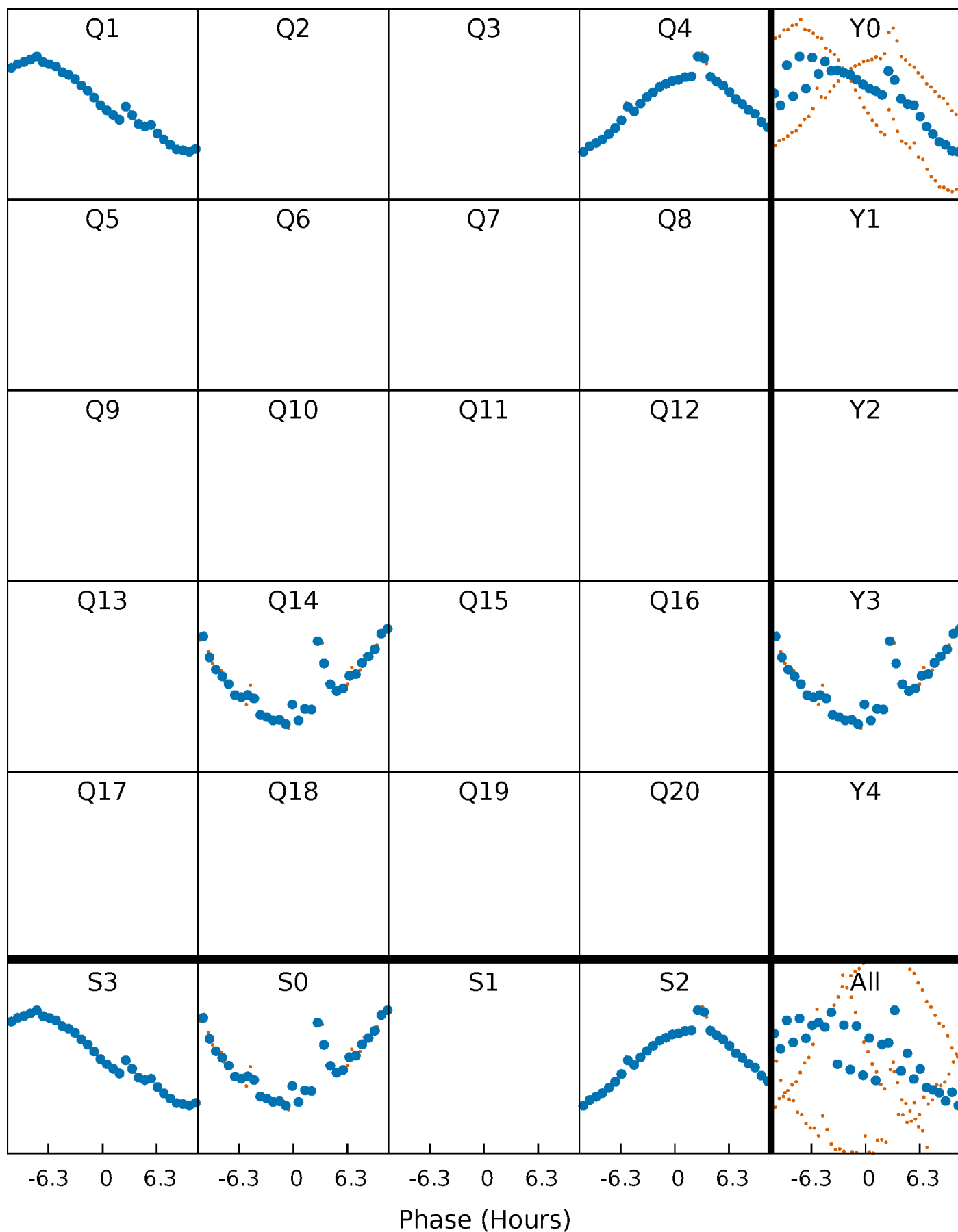


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

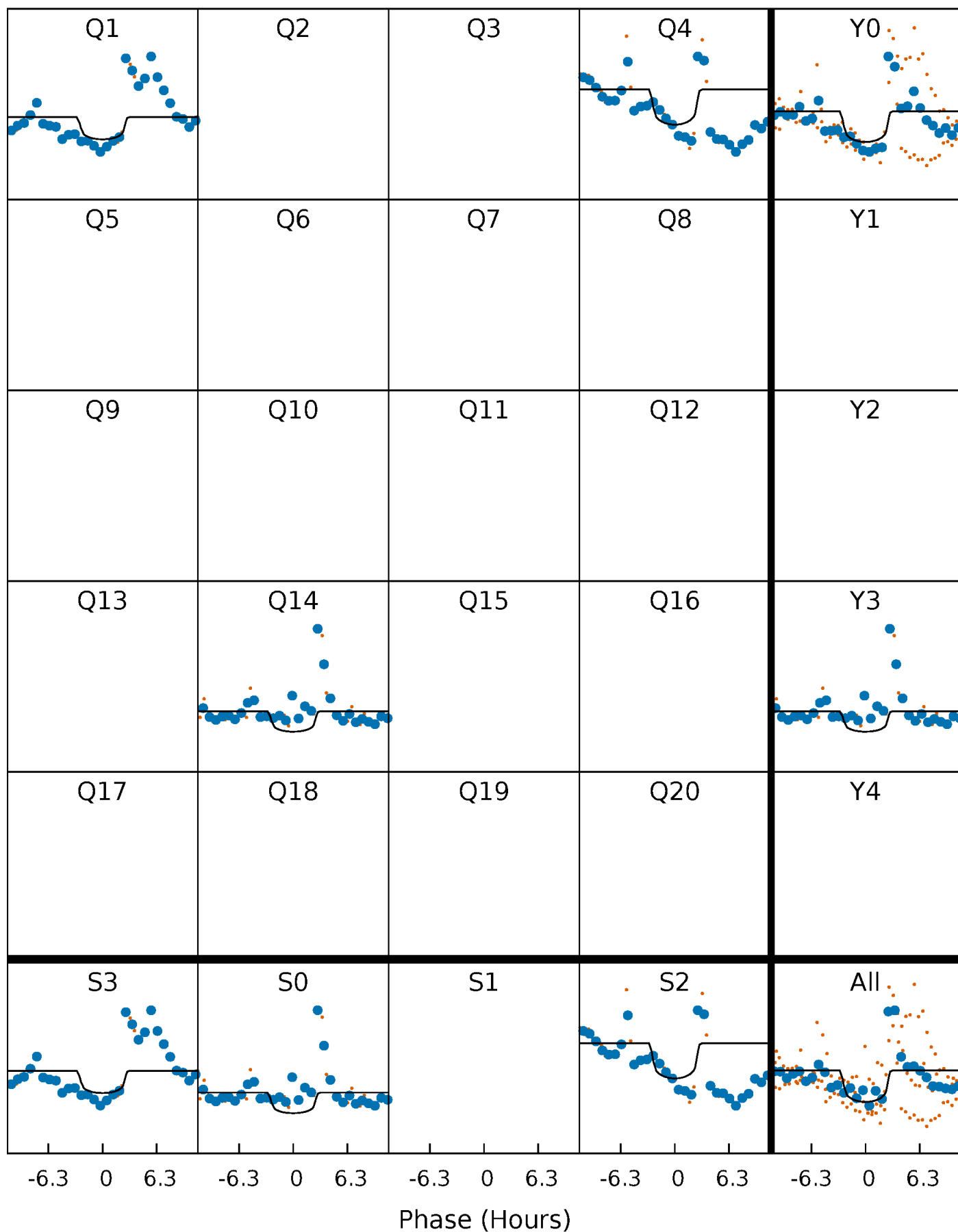
TCE 010355809-04 P=297.941469 Days  $T_0=138.549550$  (BKJD)





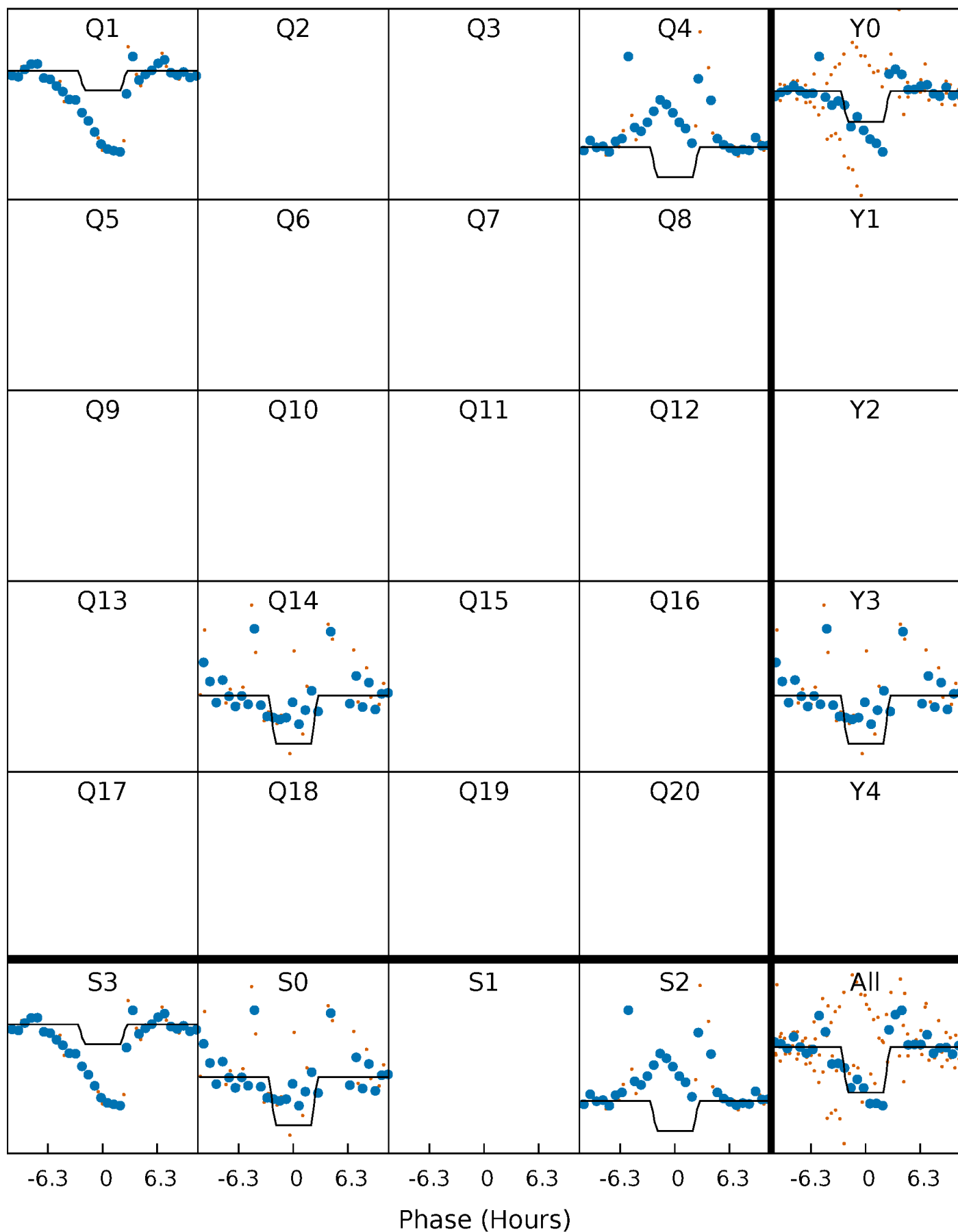
# DV Quarter-Phased Transit Curves

TCE 010355809-04 P=297.941469 Days  $T_0=138.549550$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

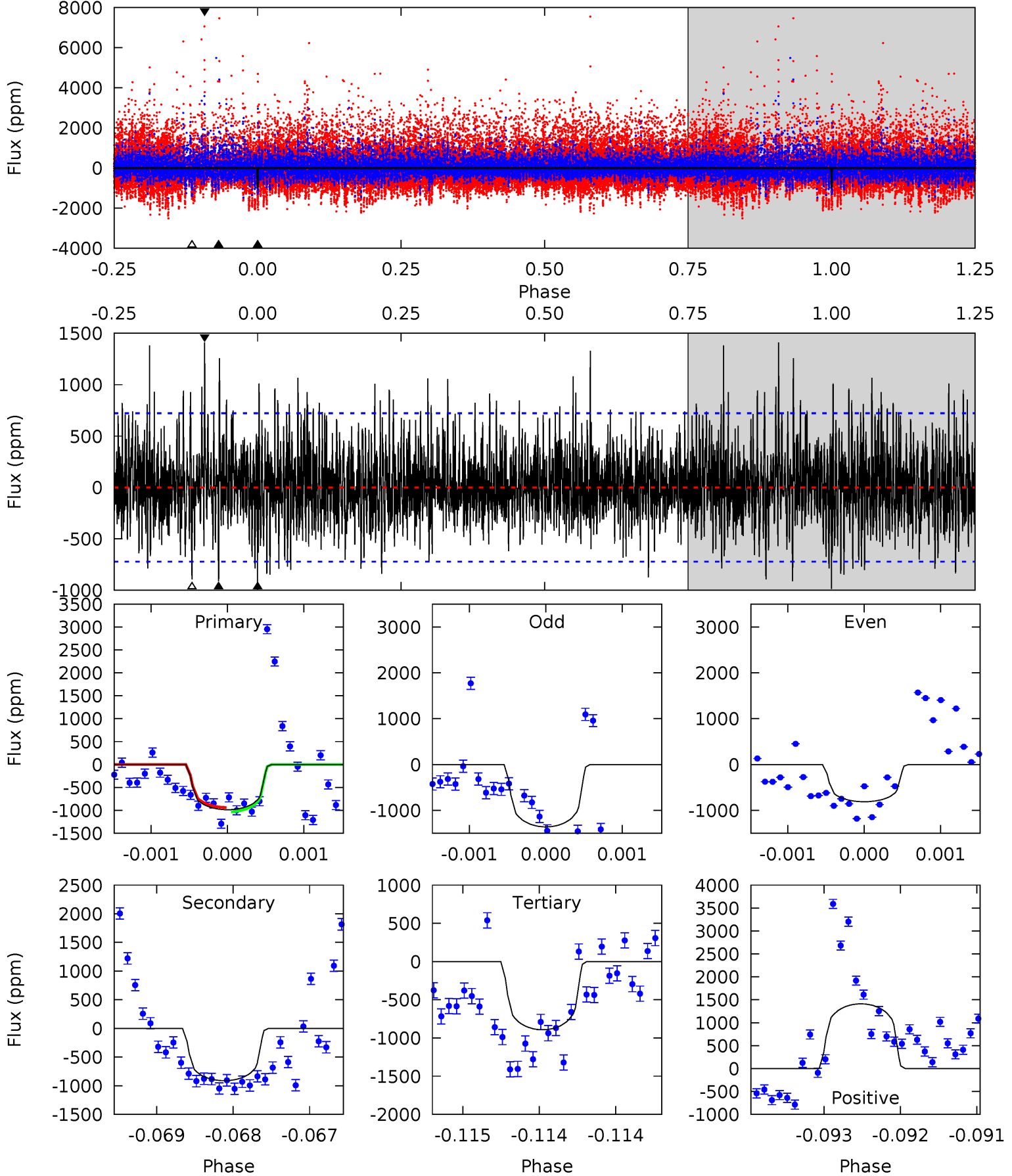
TCE 010355809-04     $P=297.941738$  Days     $T_0=138.541479$  (BKJD)



# DV Model-Shift Uniqueness Test

010355809-04, P = 297.941469 Days, E = 138.549550 Days

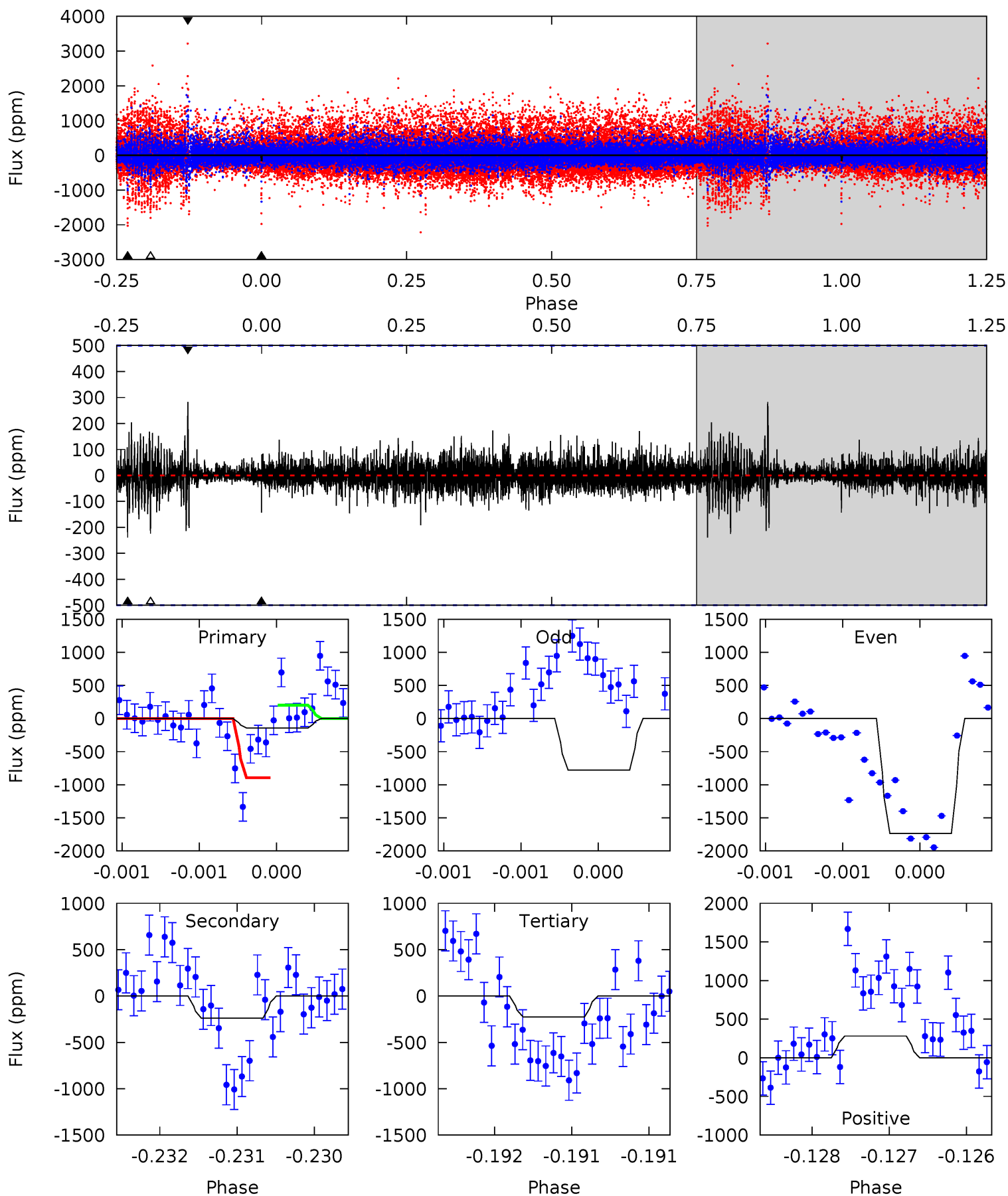
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.52	6.95	6.80	10.8	5.50	3.36	2.20	0.71	-3.24	0.14	-3.81	1.43	0.73	0.59	0.36



# Alt Model-Shift Uniqueness Test

010355809-04, P = 297.941738 Days, E = 138.541479 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
1.58	2.64	2.48	3.11	5.51	3.39	0.45	-0.90	-1.53	0.16	-0.47	5.67	2.96	0.54	0



### Stellar Parameters For KIC 010355809

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4064^{+129}_{-158}$	$4.725^{+0.078}_{-0.045}$	$-0.480^{+0.300}_{-0.350}$	$0.522^{+0.057}_{-0.077}$	$0.528^{+0.055}_{-0.067}$	$5.223^{+2.123}_{-0.874}$
	+3%/-4%	+2%/-1%	+62%/-73%	+11%/-15%	+10%/-13%	+41%/-17%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010355809-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-912 \pm 131$	$2.19^{+1.45}_{-1.29}$	$214^{+8}_{-10}$	$3725^{+1441}_{-569}$	$52090^{+246155}_{-33838}$
Alt.	$-239 \pm 91$	$1.97^{+1.61}_{-1.31}$	$213^{+10}_{-10}$	$3077^{+1309}_{-473}$	$15216^{+109280}_{-10929}$

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

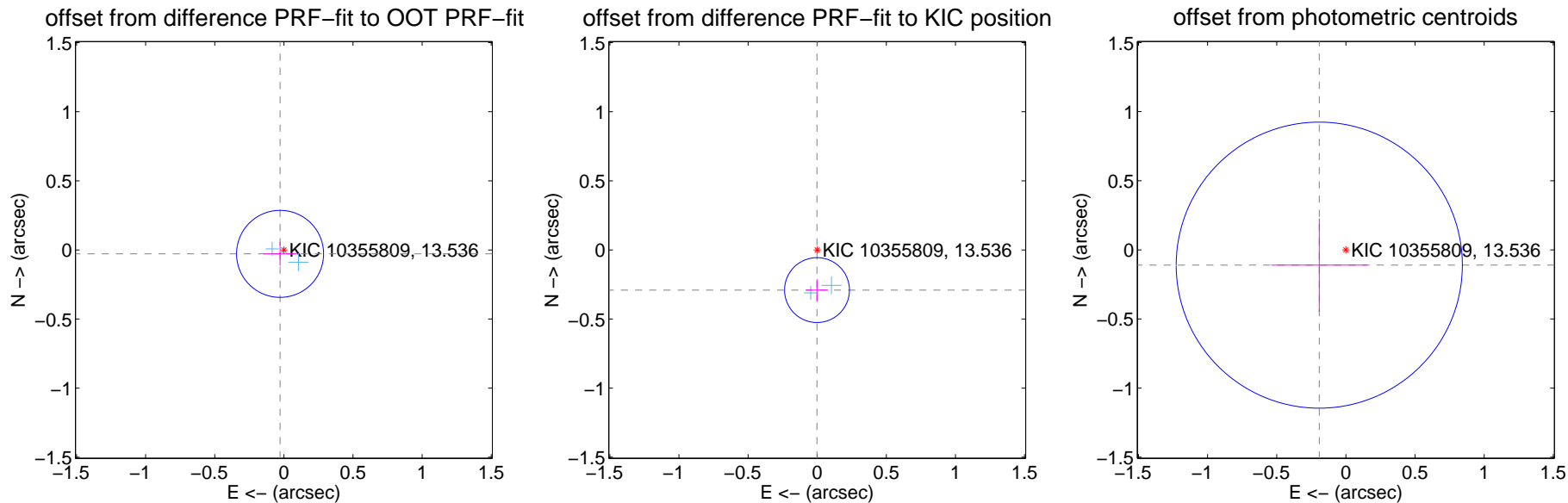
## DV Centroid Data

Supplemental centroid analysis for 010355809-04. Kepler magnitude: 13.54. Transit SNR 5.59

There are 2 quarters with good PRF difference image offsets

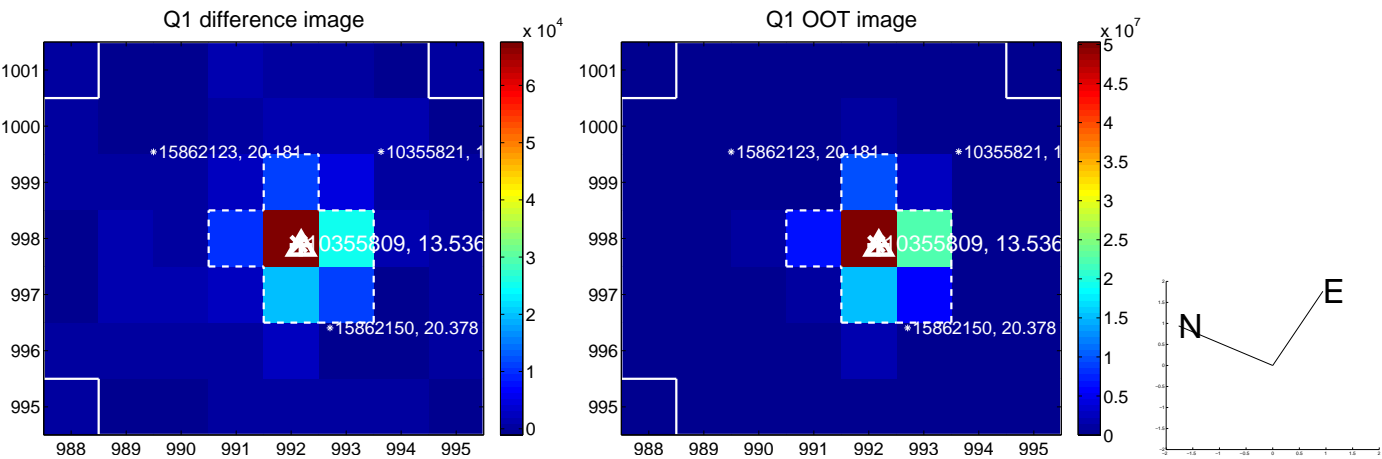
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.040 \pm 0.105$	0.38	$0.028 \pm 0.122$	$-0.028 \pm 0.086$
PRF-fit source offset from KIC position	<b><math>0.291 \pm 0.078</math></b>	<b>3.71</b>	$0.001 \pm 0.080$	$-0.291 \pm 0.078$
photometric centroid source offset	$0.22 \pm 0.34$	0.64	$0.19 \pm 0.35$	$-0.11 \pm 0.34$



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.



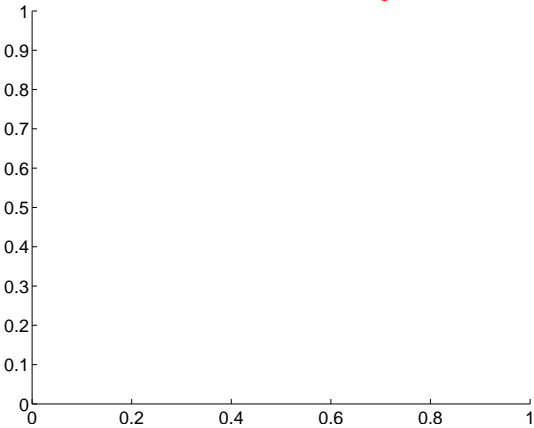


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

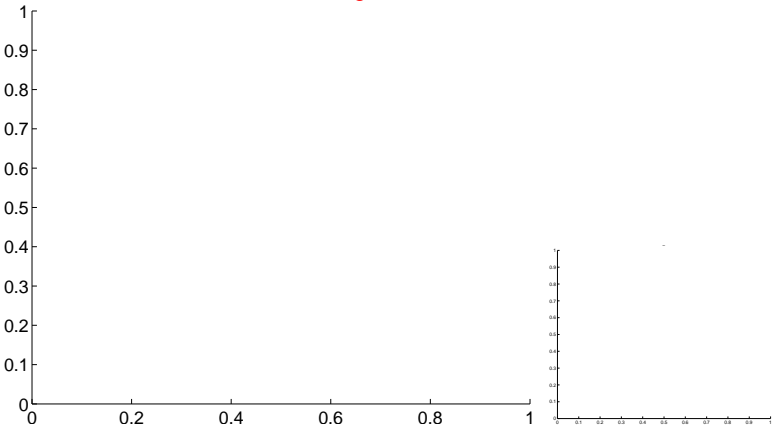


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

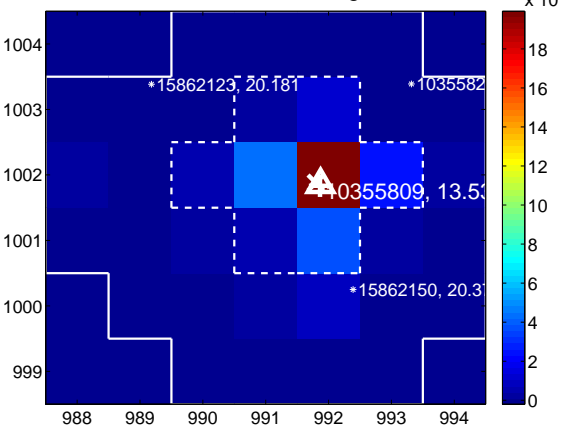
Q13 no difference image



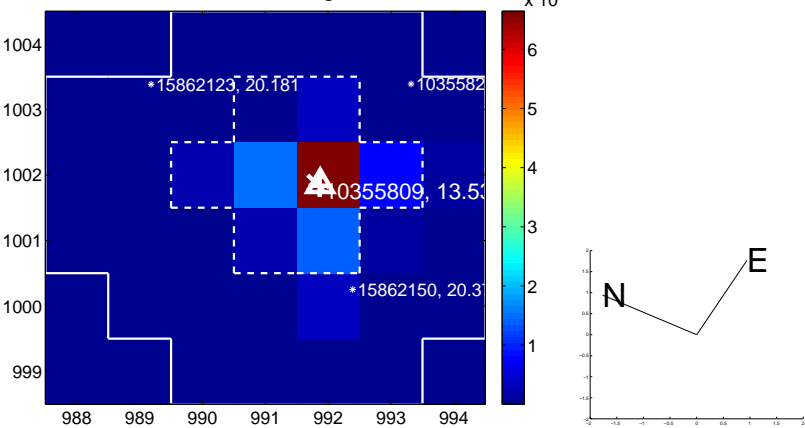
Q13 no OOT image



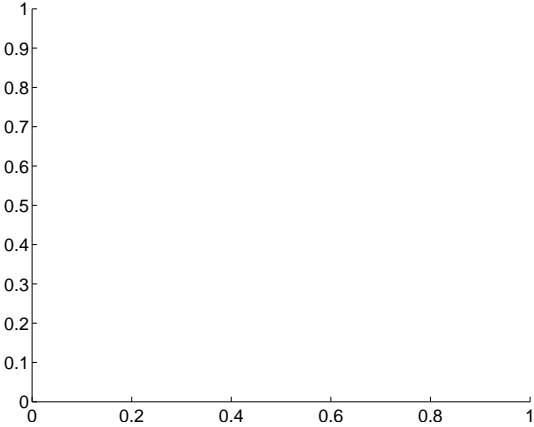
Q14 difference image



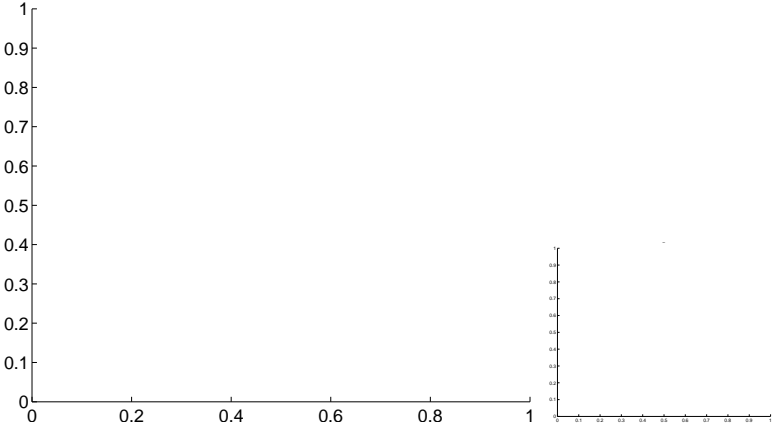
Q14 OOT image



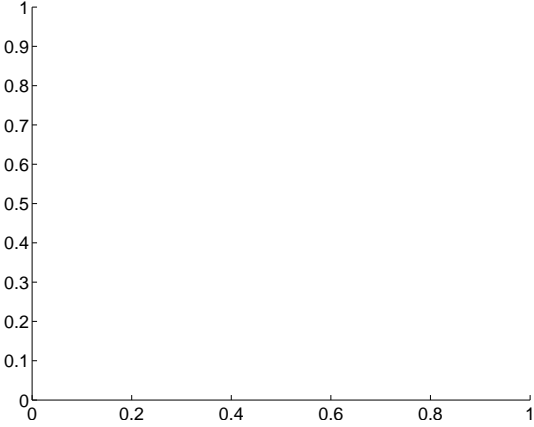
Q15 no difference image



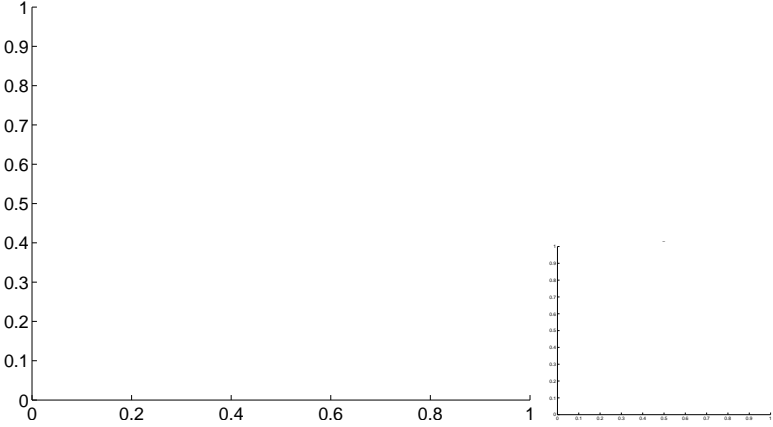
Q15 no OOT image



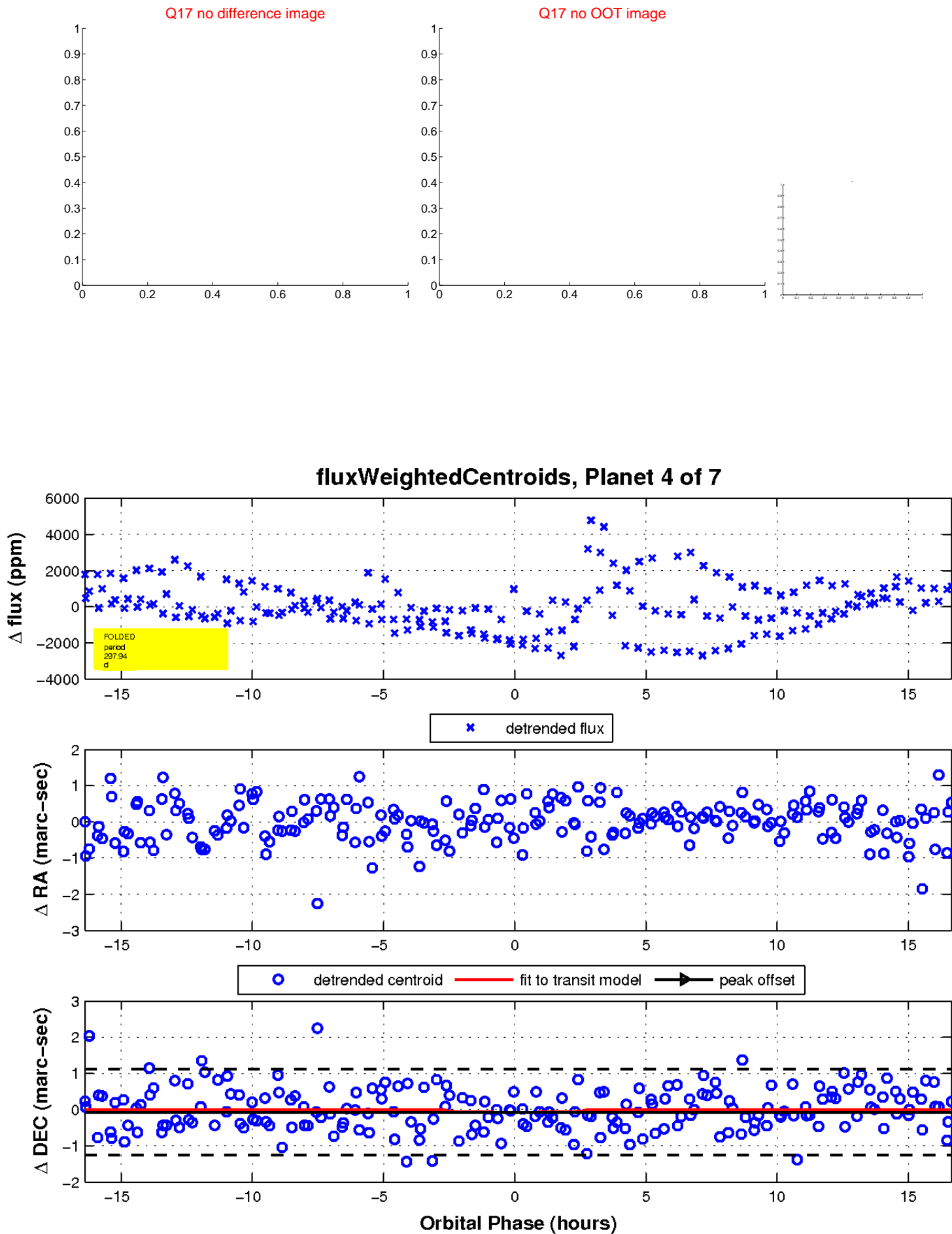
Q16 no difference image



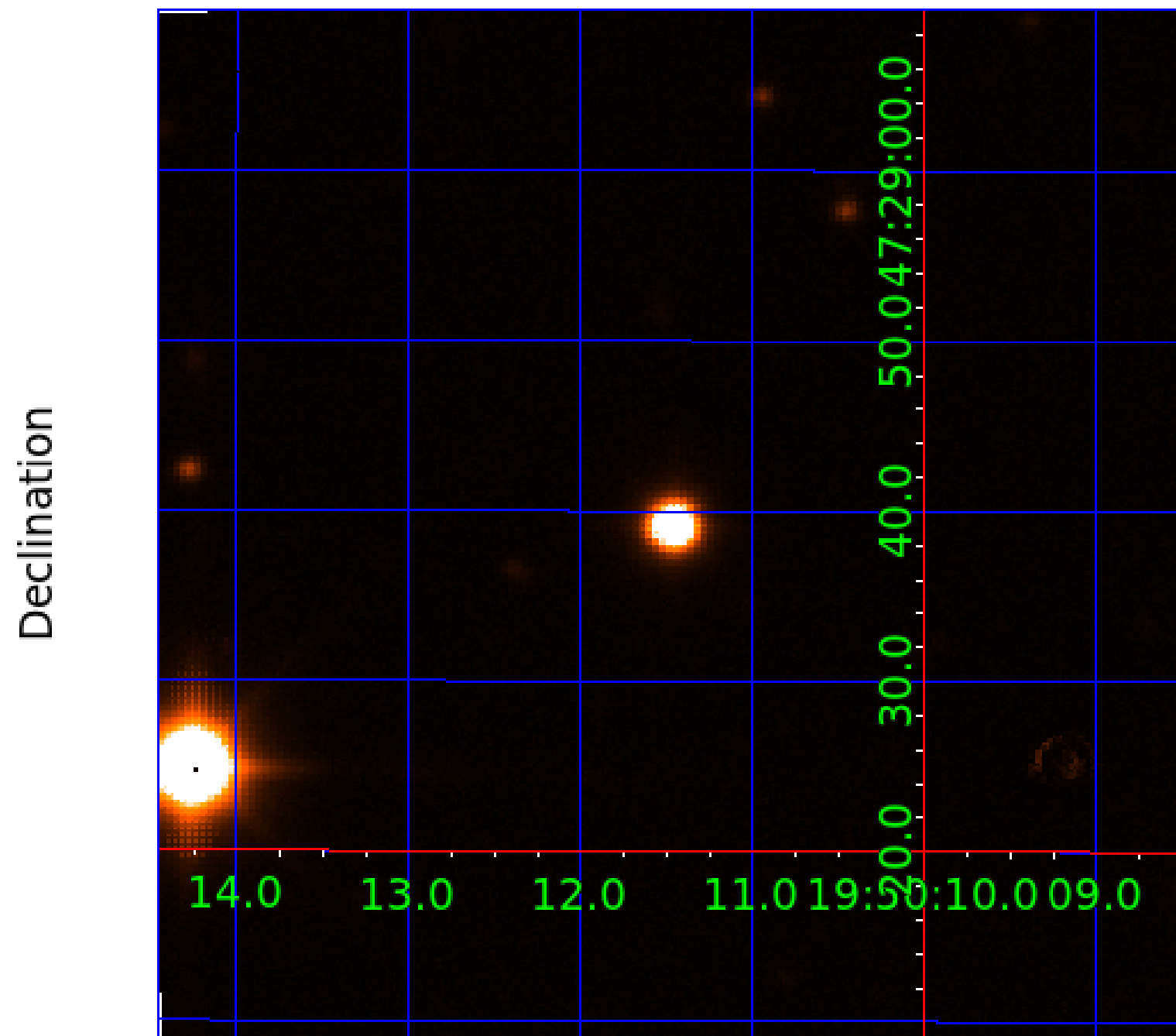
Q16 no OOT image



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



UKIRT Image



# KIC 010355809

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010355809-01	OBS	No	526.988093	227.367712	1174.8	2.126	16.3	6.5	0.52	4064	1.86	0.06
010355809-02	OBS	No	289.904624	185.935033	1434.7	5.049	16.0	7.2	0.52	4064	2.35	0.14
010355809-04	OBS	No	297.941469	138.549550	1169.6	5.551	15.1	5.6	0.52	4064	1.84	0.13
010355809-05	OBS	No	415.344228	407.285097	2218.6	3.520	13.9	10.2	0.52	4064	2.46	0.09
010355809-06	OBS	No	460.511846	358.267837	1587.0	3.600	14.2	7.9	0.52	4064	2.06	0.07
010355809-07	OBS	No	301.674269	279.061731	295.1	10.500	12.9	-1.0	0.52	4064	0.89	0.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010355809-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010355809-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010355809-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010355809-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
010355809-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010355809-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

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

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

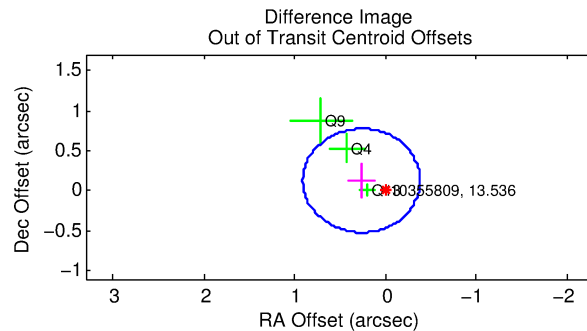
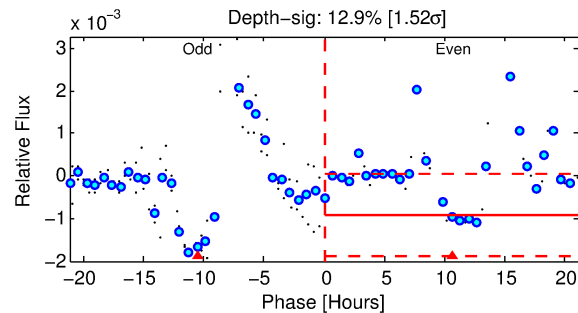
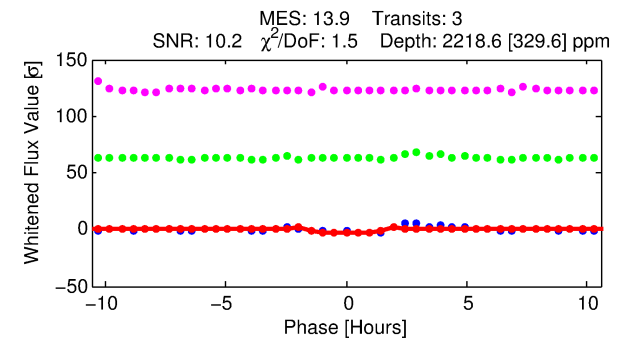
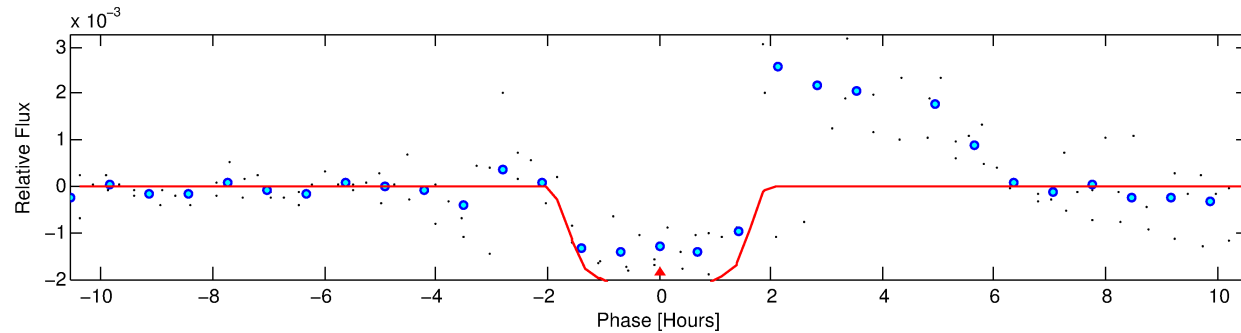
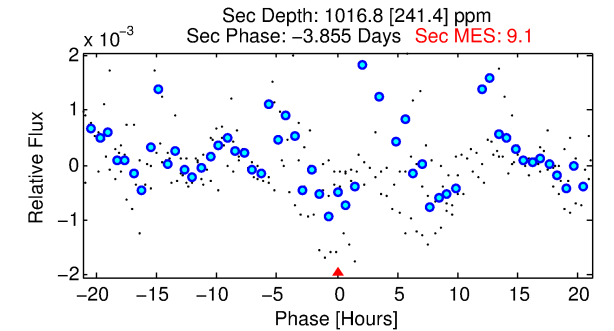
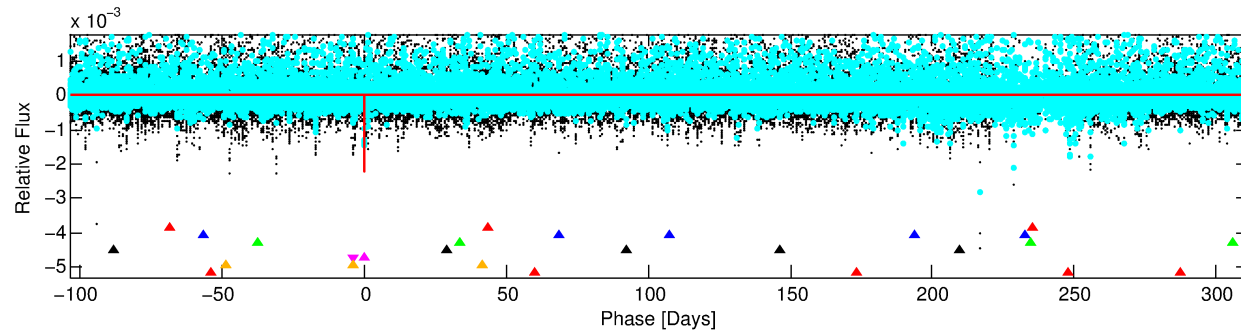
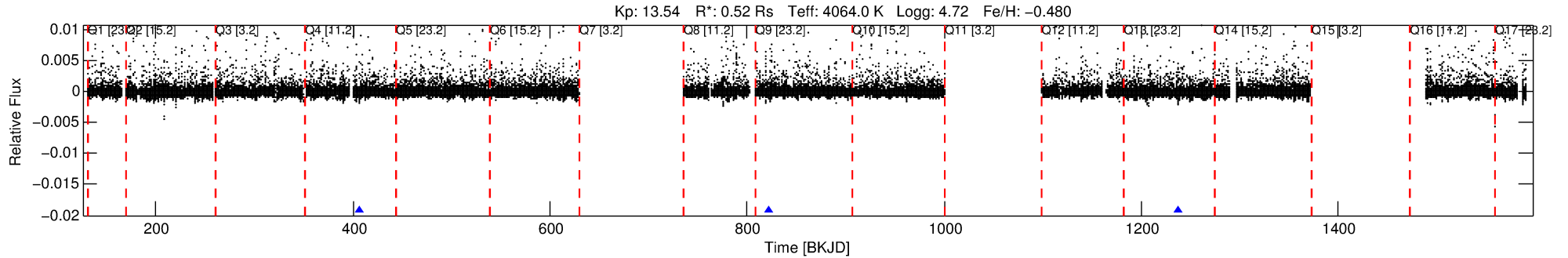
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010355809-05

No Significant Match Found

# DV One-Page Summary

KIC: 10355809 Candidate: 5 of 7 Period: 415.344 d



## DV Fit Results:

Period = 415.34423 [0.00395] d  
Epoch = 407.2851 [0.0054] BKJD  
Rp/R\* = 0.0432 [0.0504]  
a/R\* = 906.16 [4512.68]  
b = 0.28 [16.70]  
Seff = 0.09 [0.02]  
Teq = 138 [8] K  
Rp = 2.46 [2.90] Re  
a = 0.8805 [0.1014] AU  
Ag = 71763.65 [168928.29] [0.42σ]  
Teff = 3493 [2056] K [1.63σ]

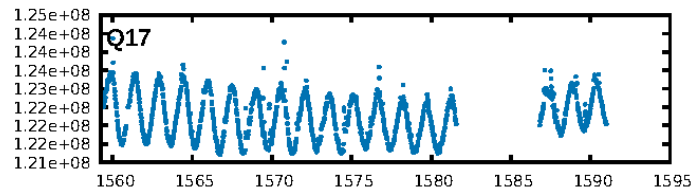
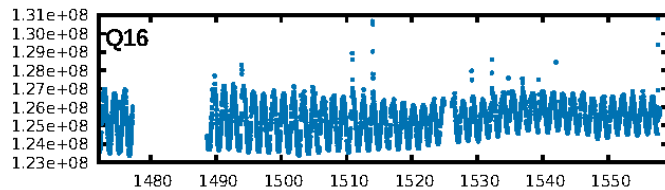
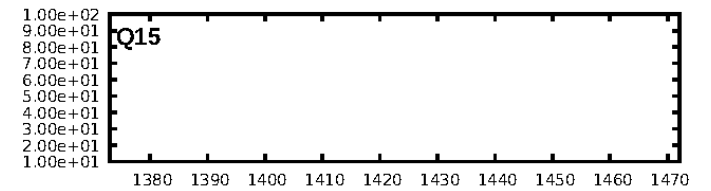
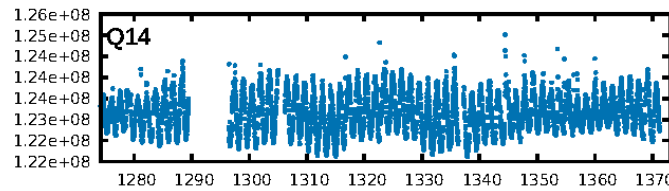
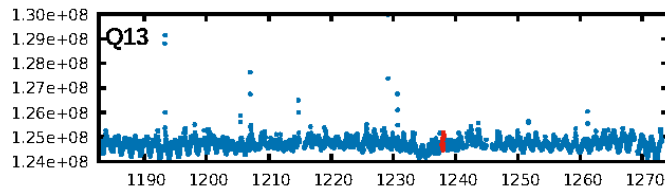
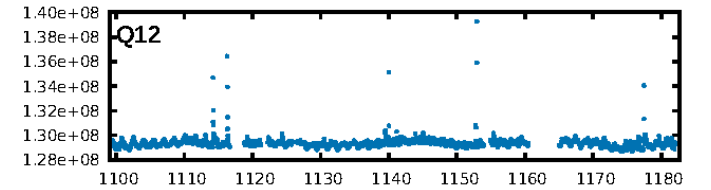
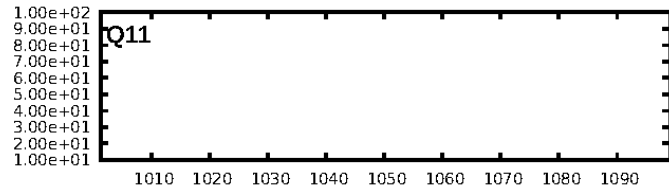
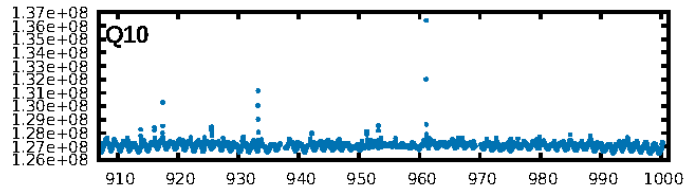
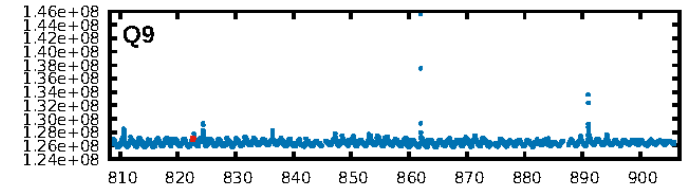
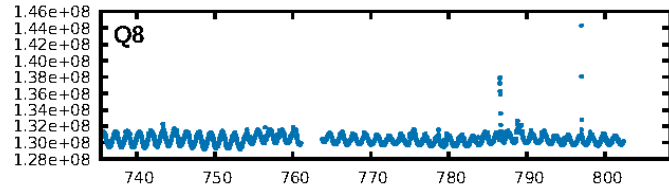
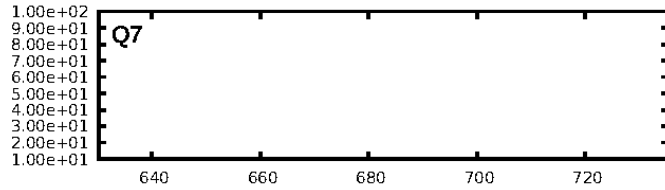
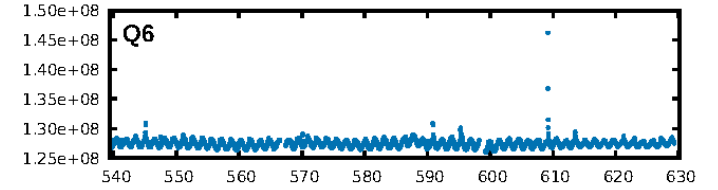
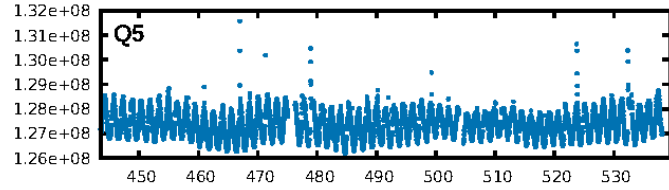
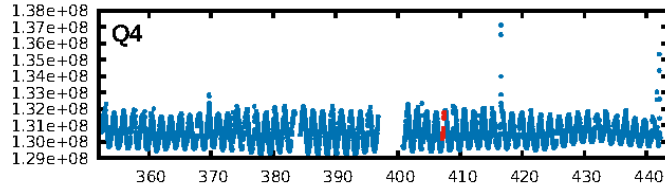
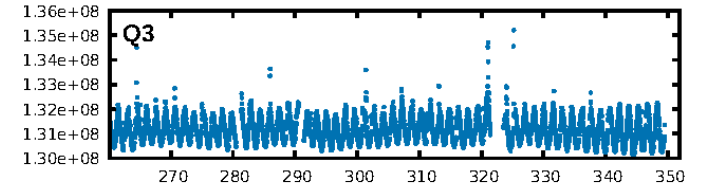
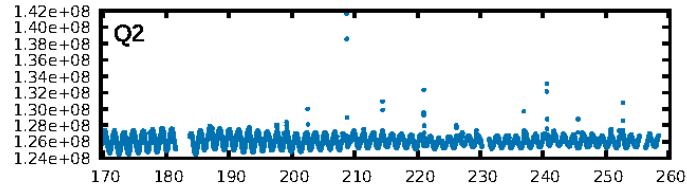
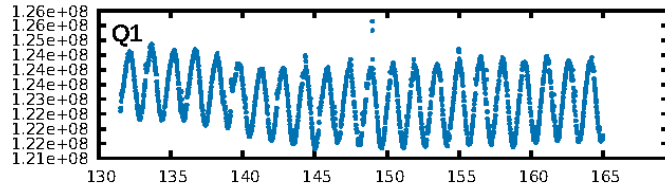
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [337.30σ]  
LongPeriod-sig: 100.0% [215.29σ]  
ModelChiSquare2-sig: 15.4%  
ModelChiSquareGof-sig: 91.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.177  
Centroid-sig: N/A  
Centroid-so: 0.250 arcsec [1.30σ]  
OotOffset-rm: 0.294 arcsec [1.37σ]  
KicOffset-rm: 0.335 arcsec [2.24σ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

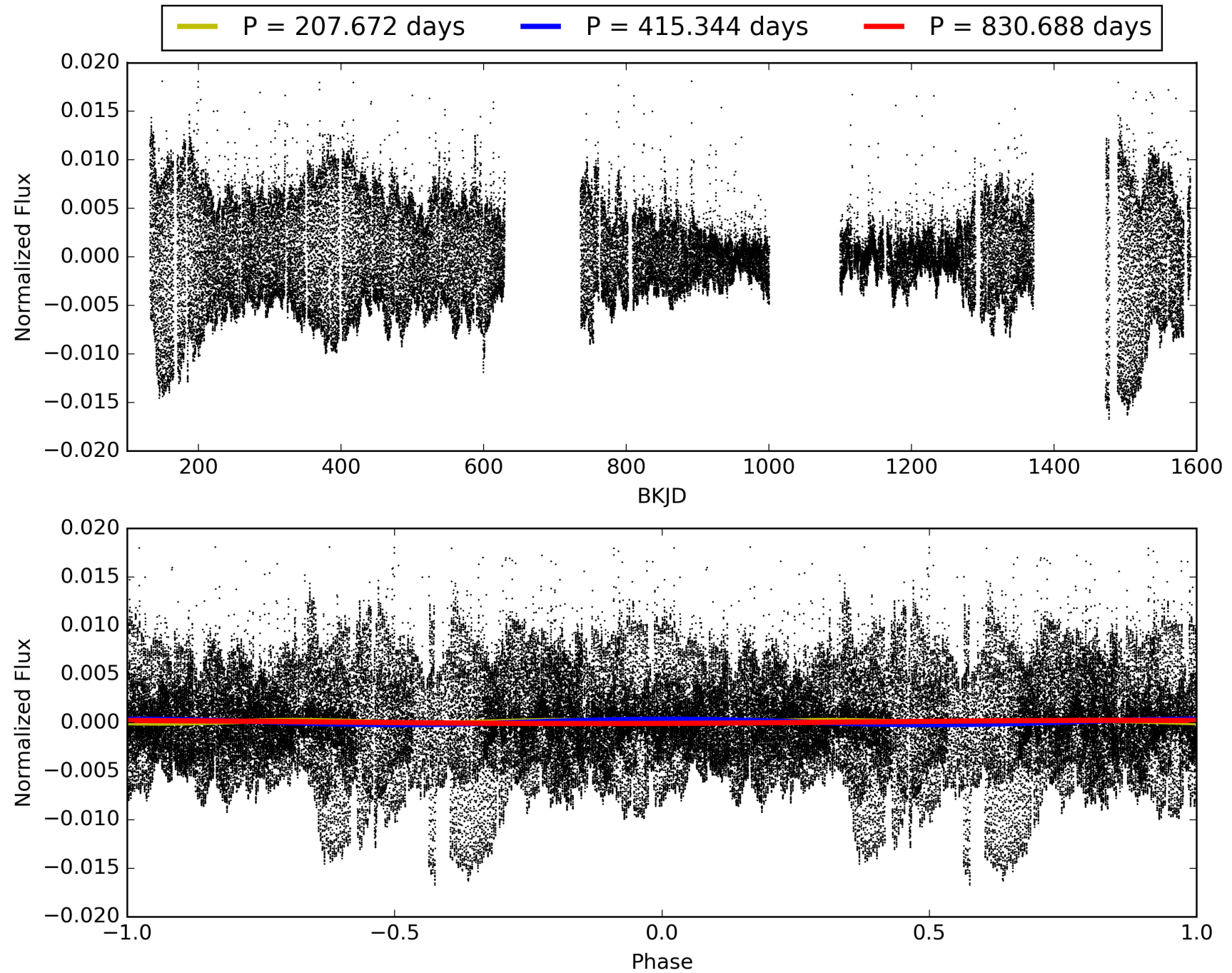
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:10 Z

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

# TCE 010355809-05, PDC Light Curves



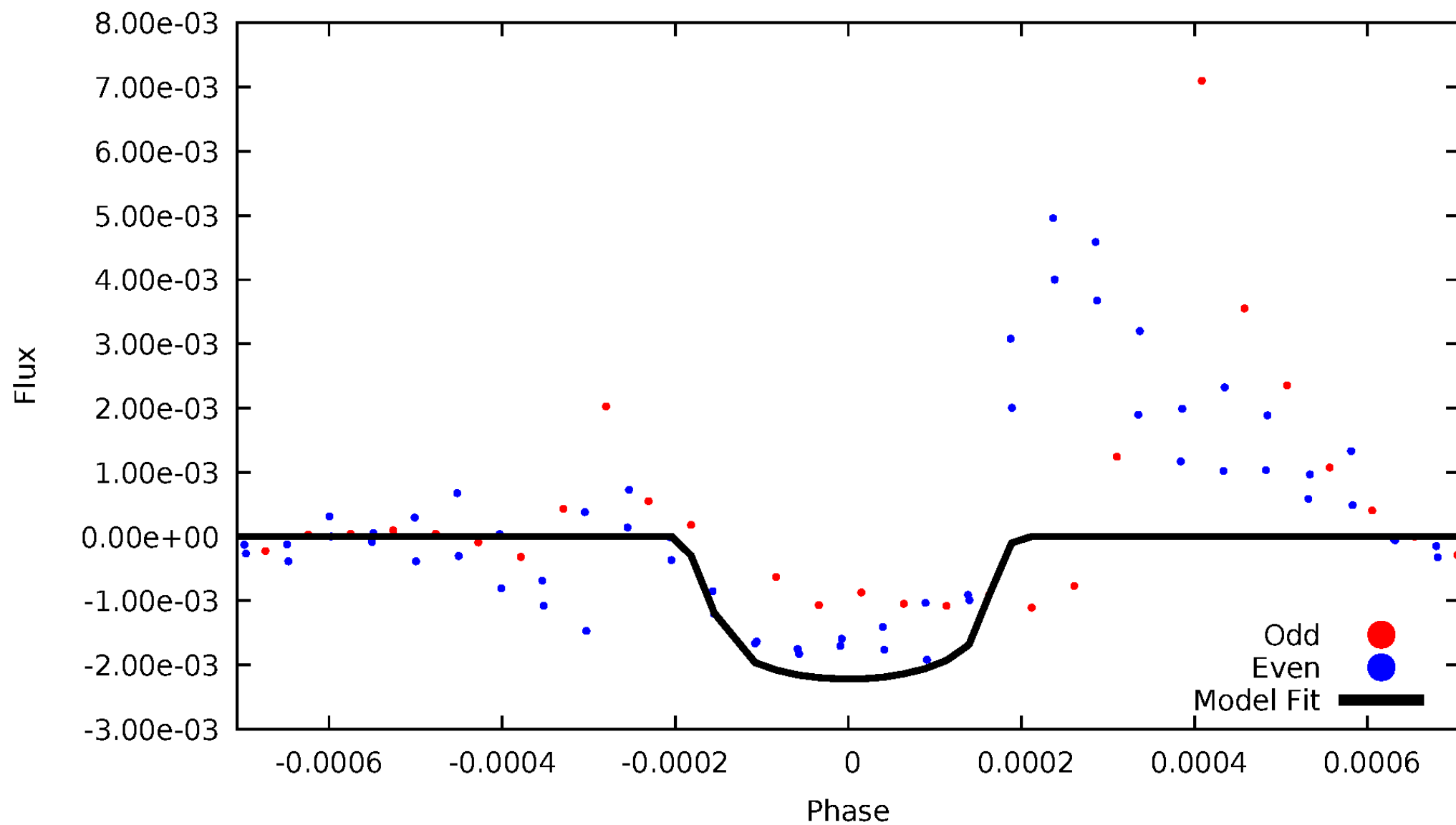
TCE 010355809-05





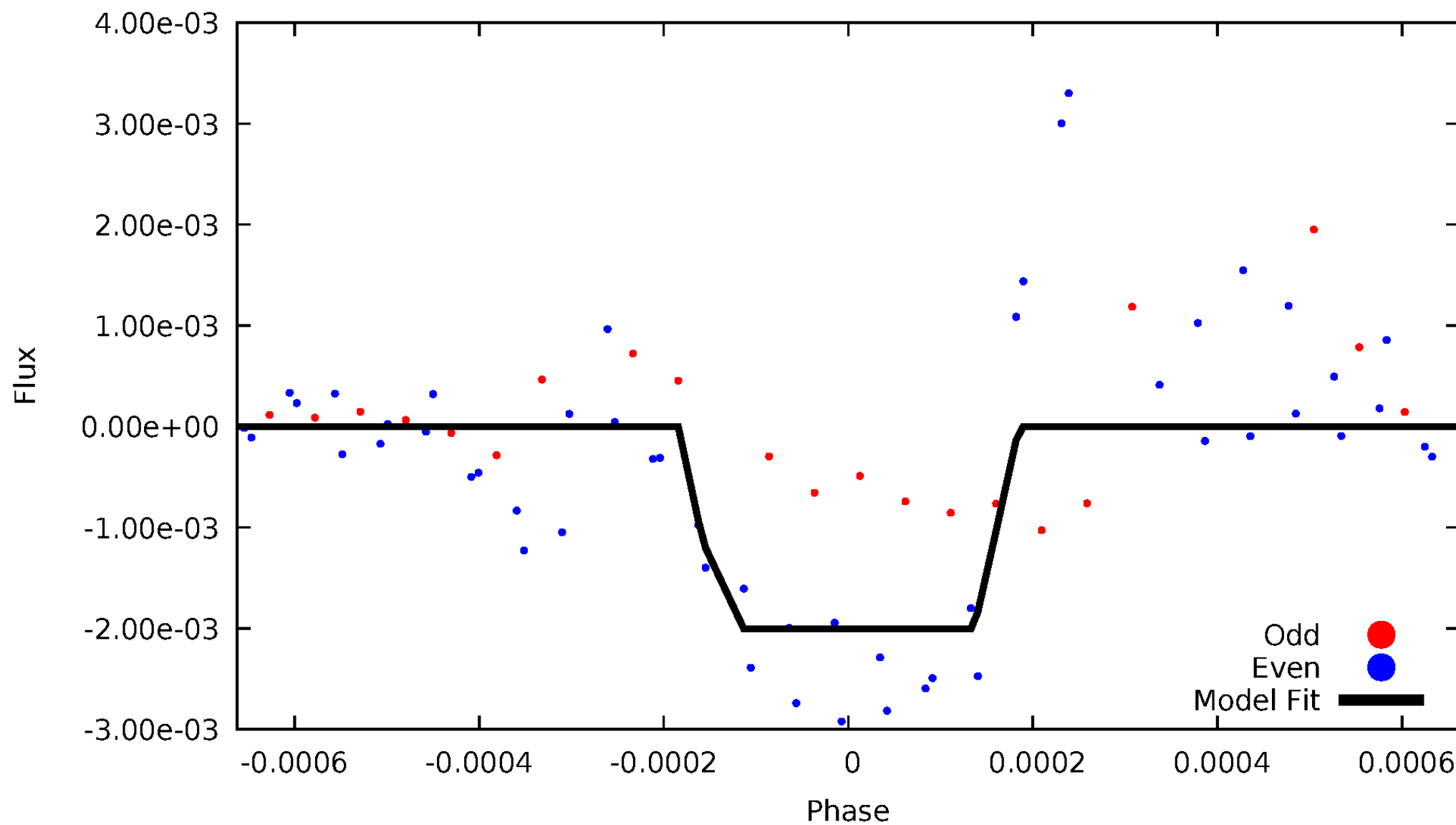
# DV Odd/Even

TCE 010355809-05



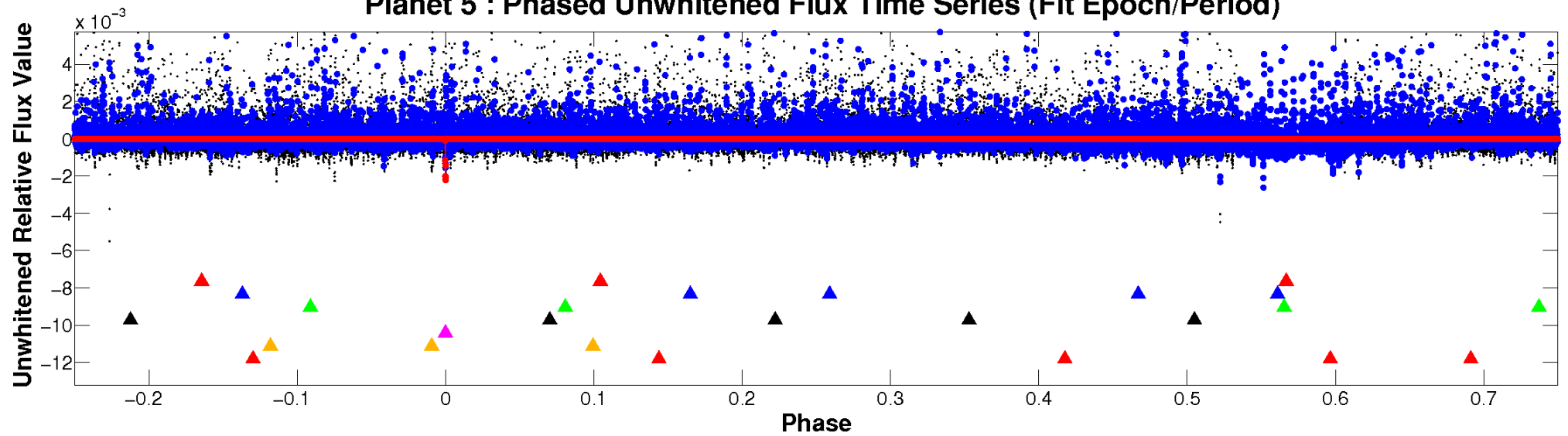
# ALT Odd/Even

TCE 010355809-05

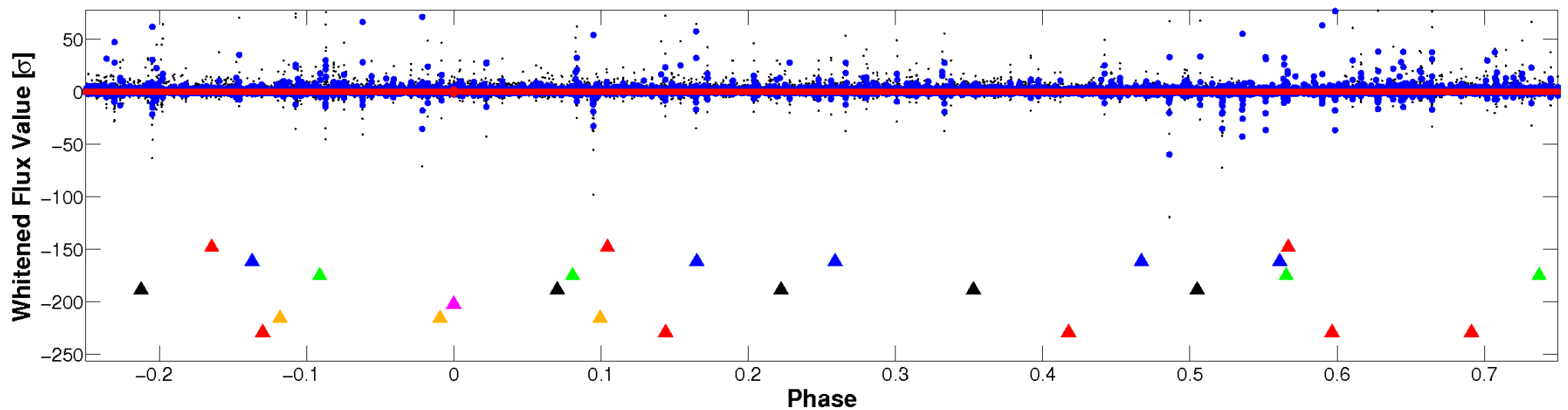


# Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

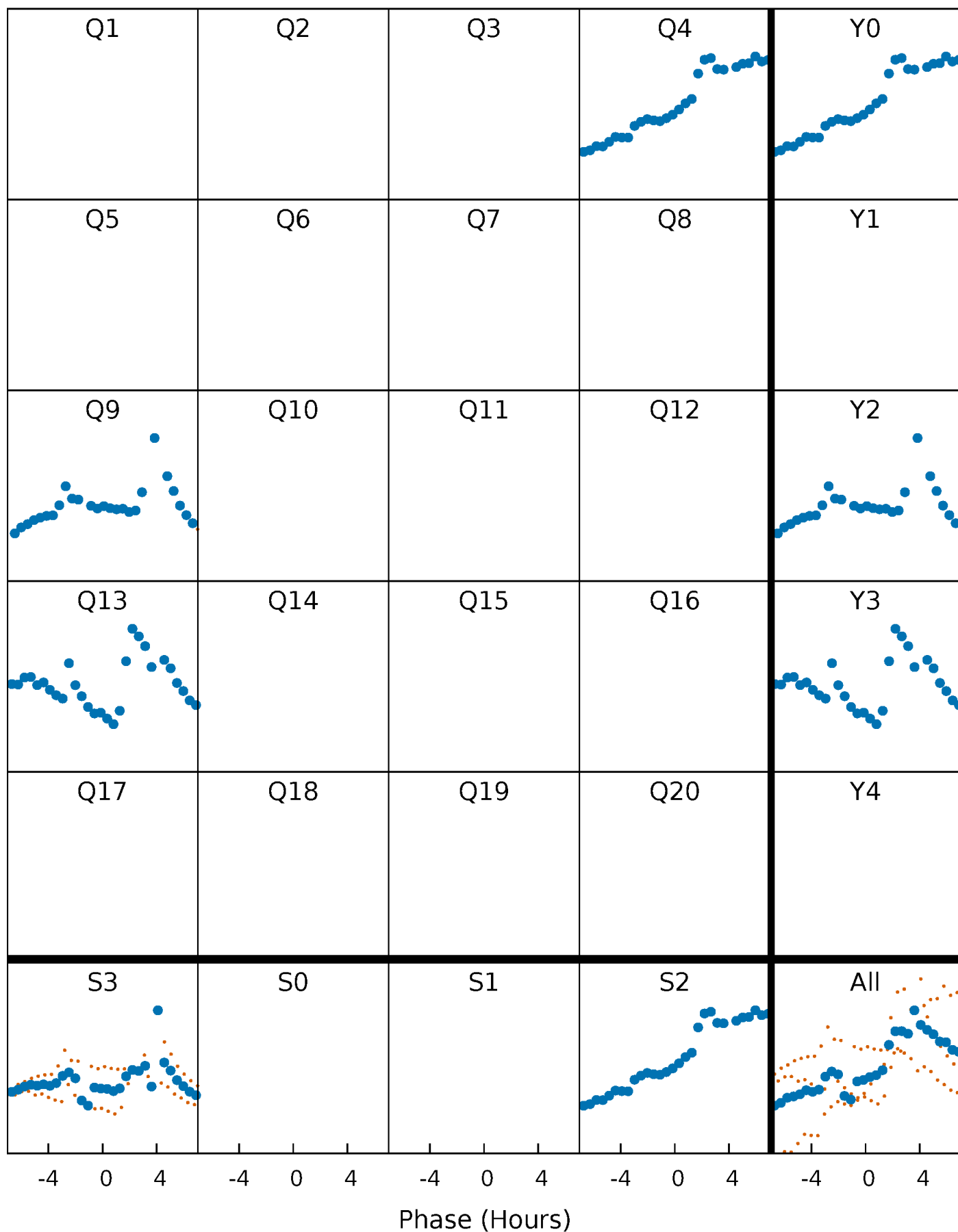


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



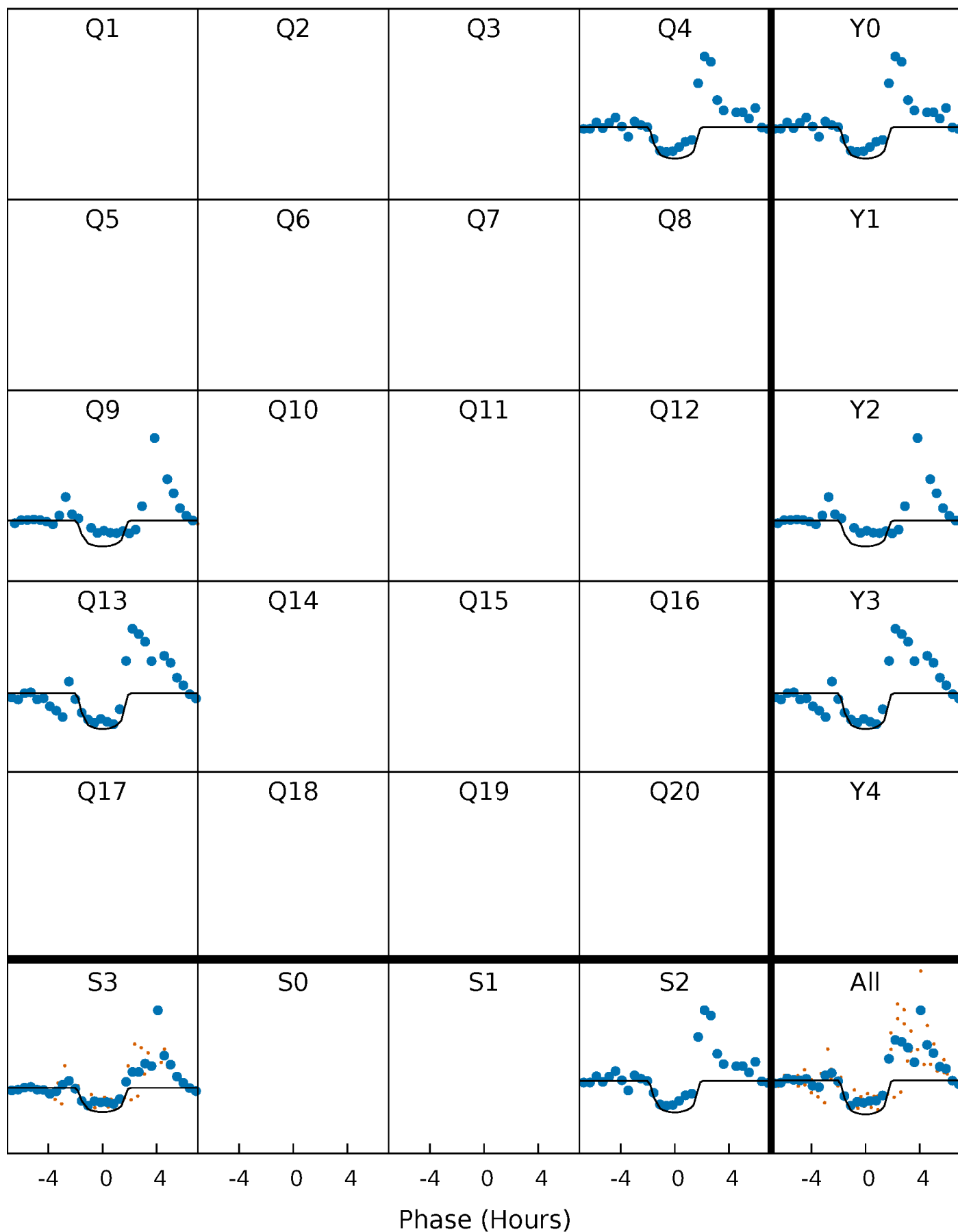
# PDC Quarter-Phased Transit Curves

TCE 010355809-05     $P=415.344228$  Days     $T_0=407.285097$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 010355809-05     $P=415.344228$  Days     $T_0=407.285097$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

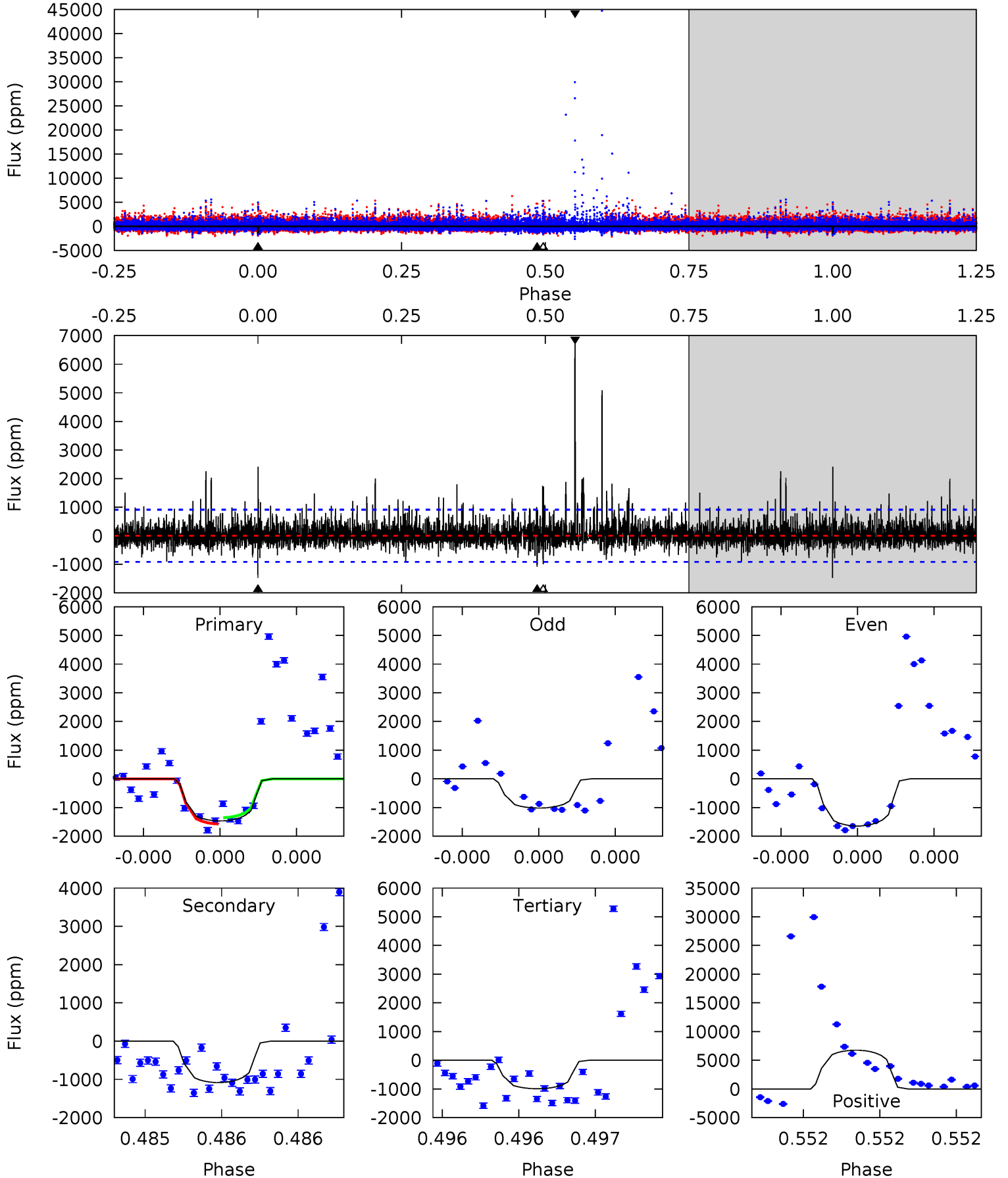
TCE 010355809-05     $P=415.346163$  Days     $T_0=407.284242$  (BKJD)



# DV Model-Shift Uniqueness Test

010355809-05, P = 415.344228 Days, E = 407.285097 Days

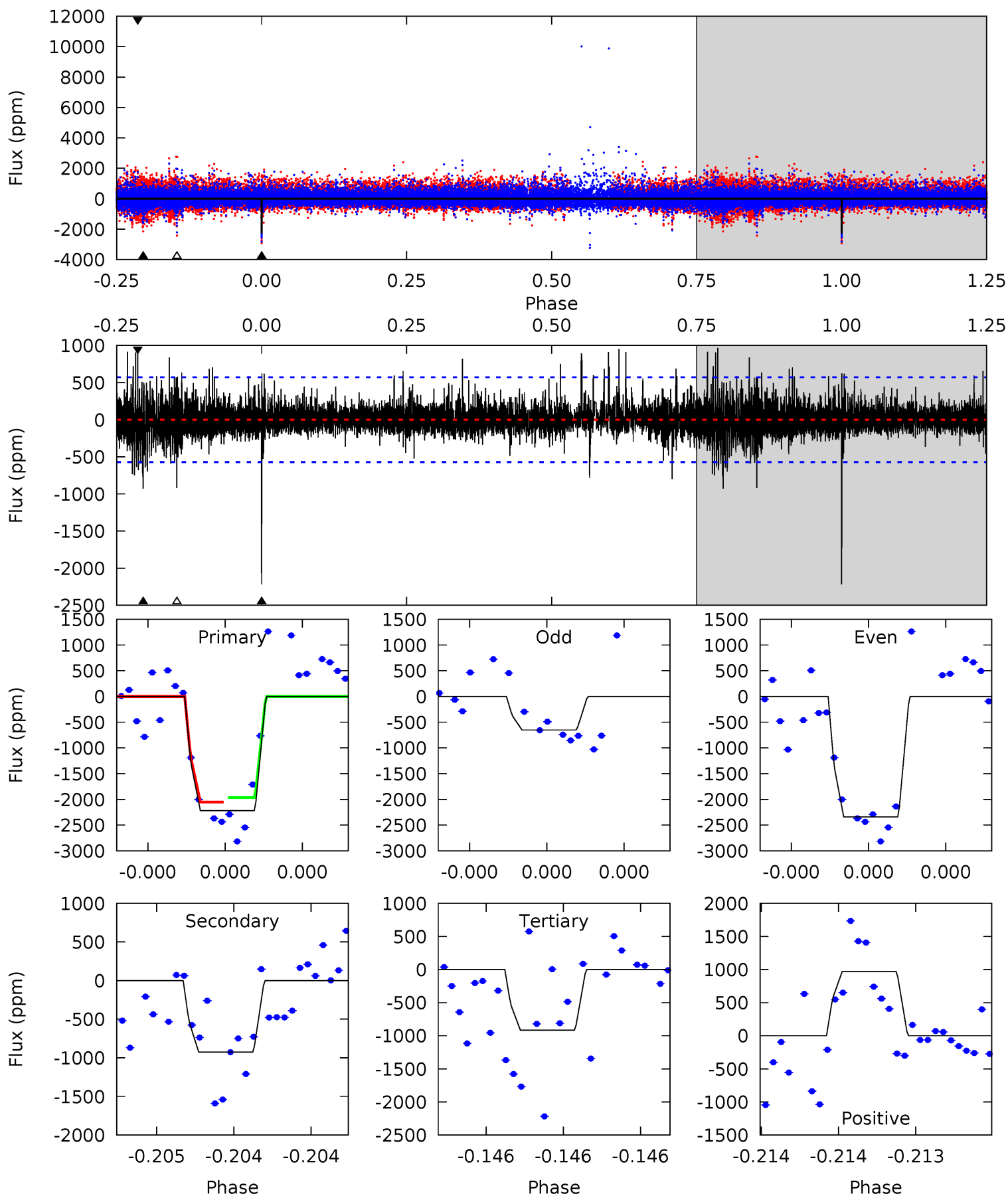
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.07	6.70	6.13	41.7	5.64	3.58	2.01	2.94	-32.7	0.57	-35.0	0.93	0.95	0.82	0.66



# Alt Model-Shift Uniqueness Test

010355809-05, P = 415.346163 Days, E = 407.284242 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
21.9	9.14	9.05	9.55	5.63	3.57	1.53	12.8	12.3	0.09	-0.40	7.10	0.88	0.30	0.45





### Stellar Parameters For KIC 010355809

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4064^{+129}_{-158}$	$4.725^{+0.078}_{-0.045}$	$-0.480^{+0.300}_{-0.350}$	$0.522^{+0.057}_{-0.077}$	$0.528^{+0.055}_{-0.067}$	$5.223^{+2.123}_{-0.874}$
	+3%/-4%	+2%/-1%	+62%/-73%	+11%/-15%	+10%/-13%	+41%/-17%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010355809-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1084 \pm 162$	$3.10^{+2.61}_{-1.91}$	$192^{+8}_{-9}$	$3409^{+1413}_{-567}$	$47781^{+275804}_{-33719}$
Alt.	$-927 \pm 101$	$3.18^{+2.33}_{-2.02}$	$191^{+8}_{-8}$	$3288^{+1430}_{-476}$	$37440^{+273951}_{-25276}$

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

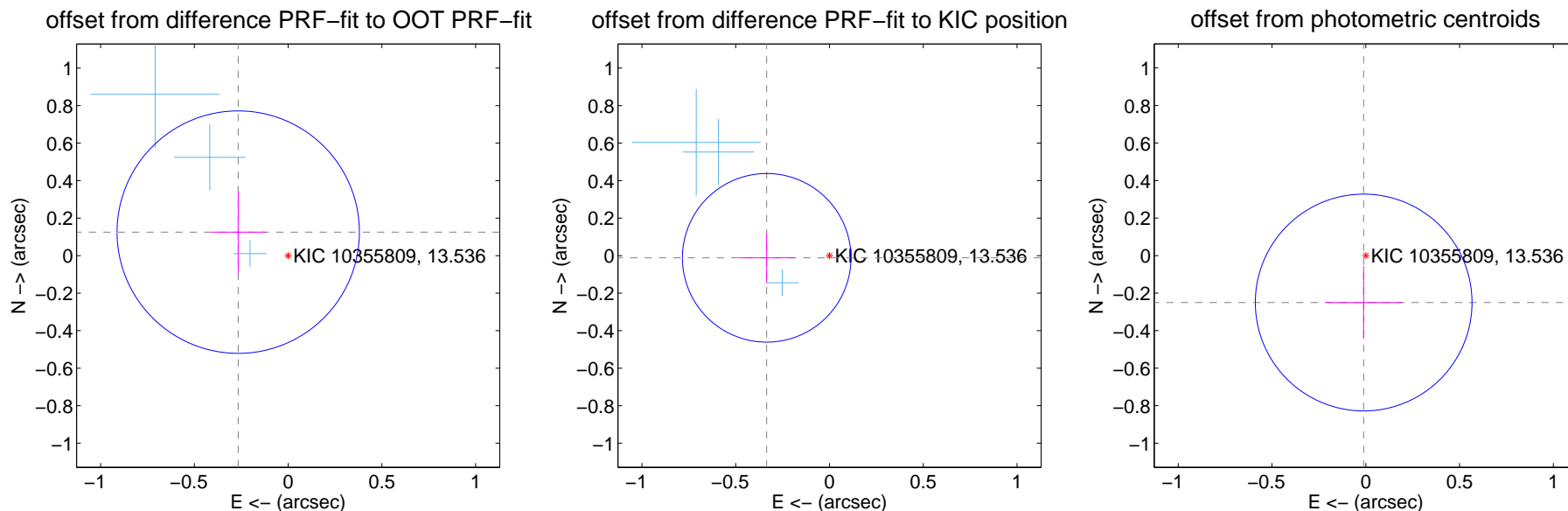
## DV Centroid Data

Supplemental centroid analysis for 010355809-05. Kepler magnitude: 13.54. Transit SNR 10.16

There are 3 quarters with good PRF difference image offsets

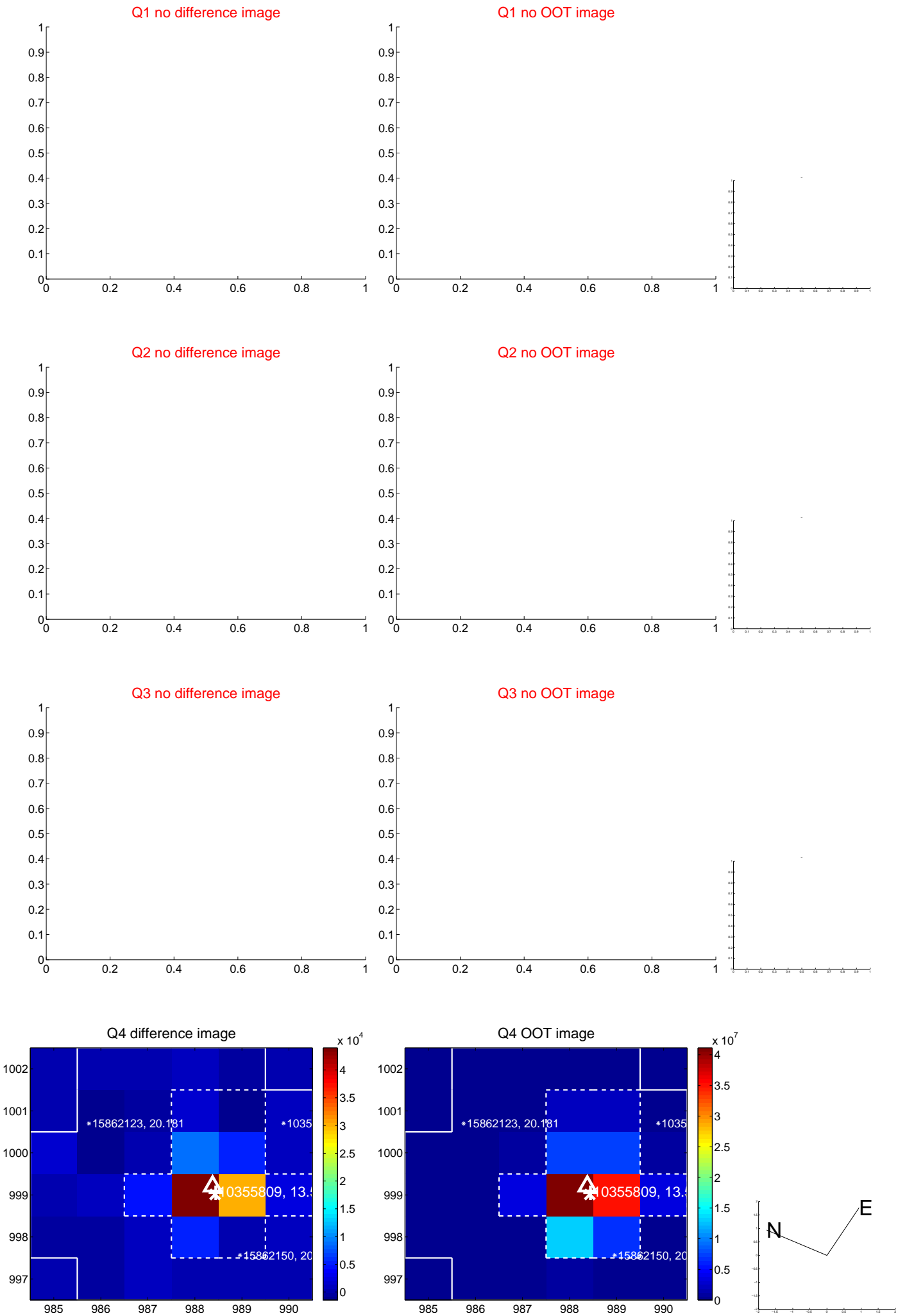
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.294 \pm 0.215$	1.37	$0.266 \pm 0.145$	$0.125 \pm 0.218$
PRF-fit source offset from KIC position	$0.335 \pm 0.150$	2.24	$0.335 \pm 0.150$	$-0.012 \pm 0.132$
photometric centroid source offset	$0.25 \pm 0.19$	1.30	$0.01 \pm 0.20$	$-0.25 \pm 0.19$



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.

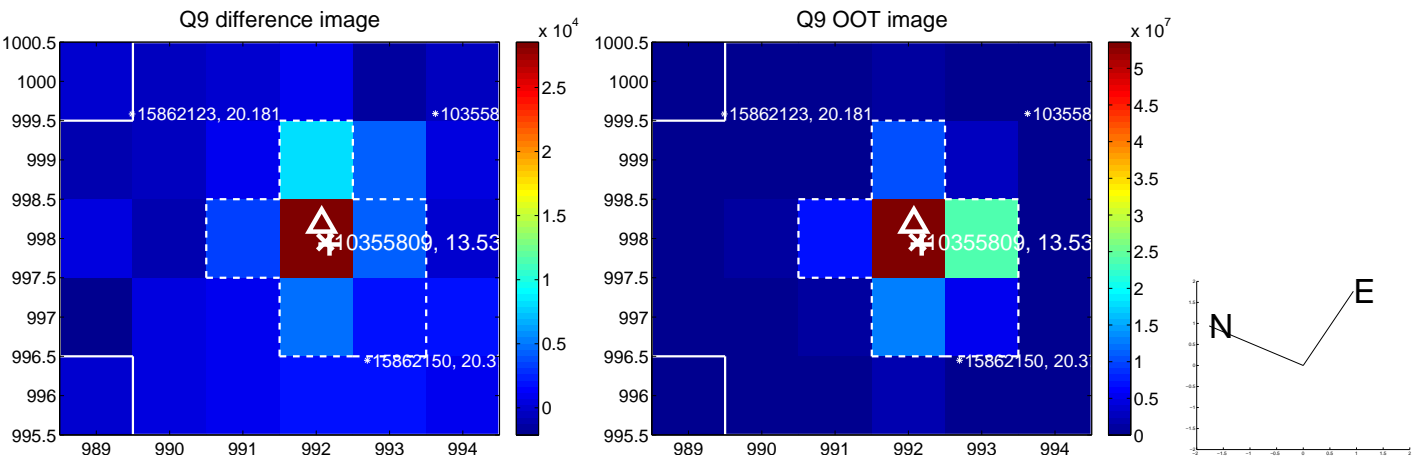
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



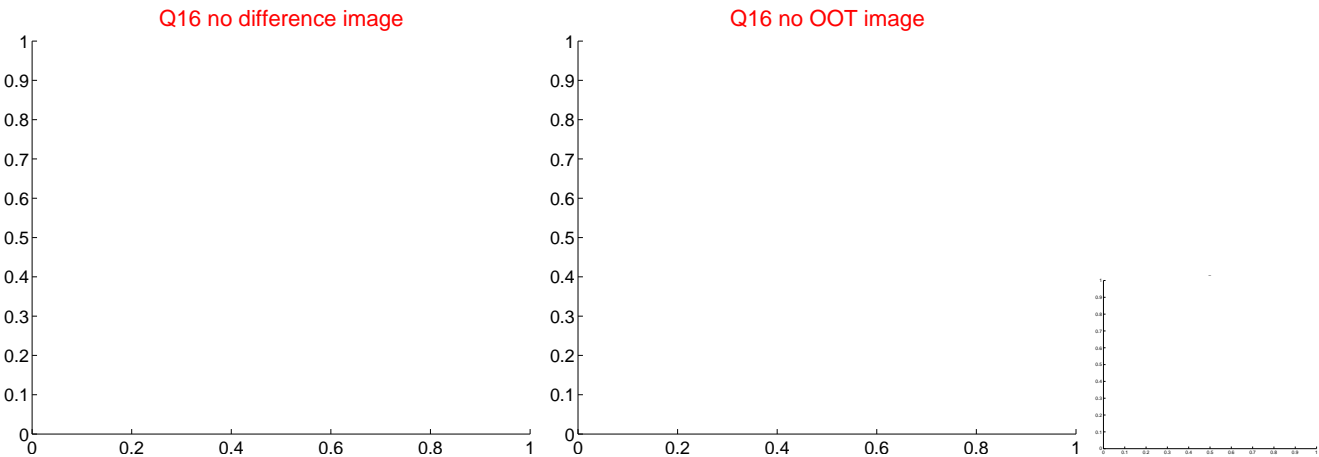
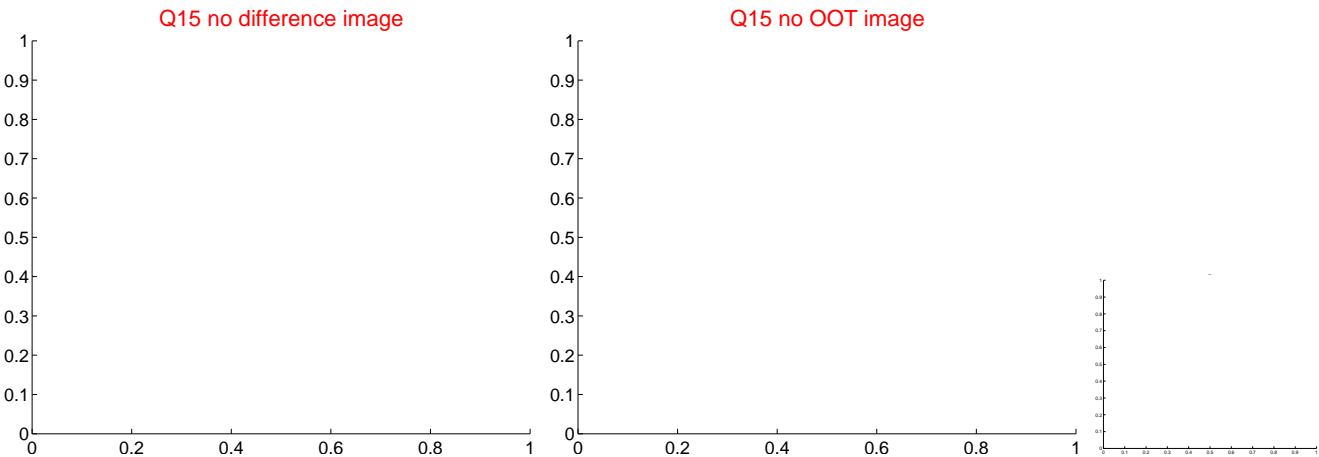
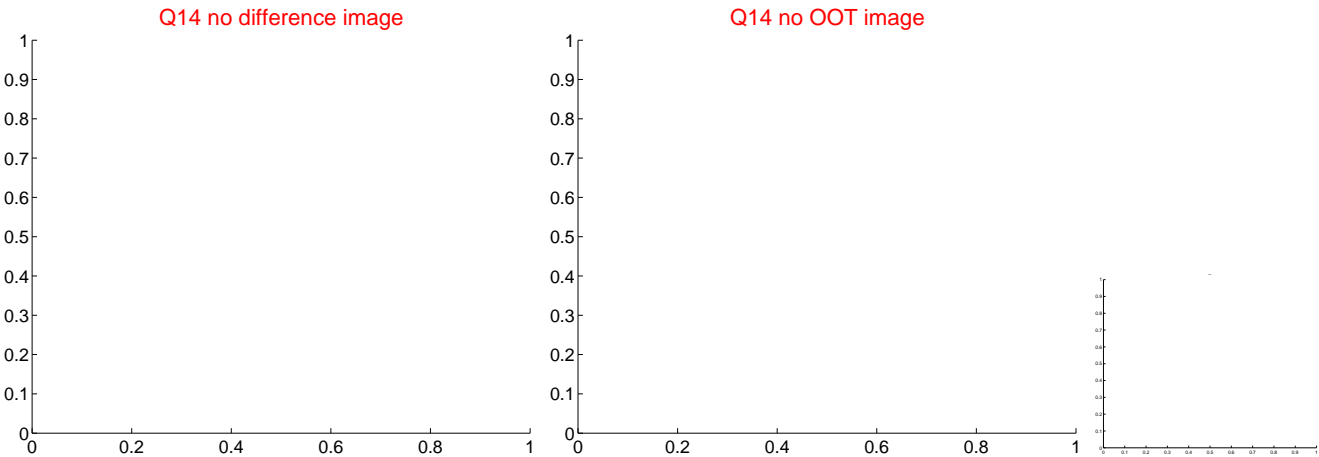
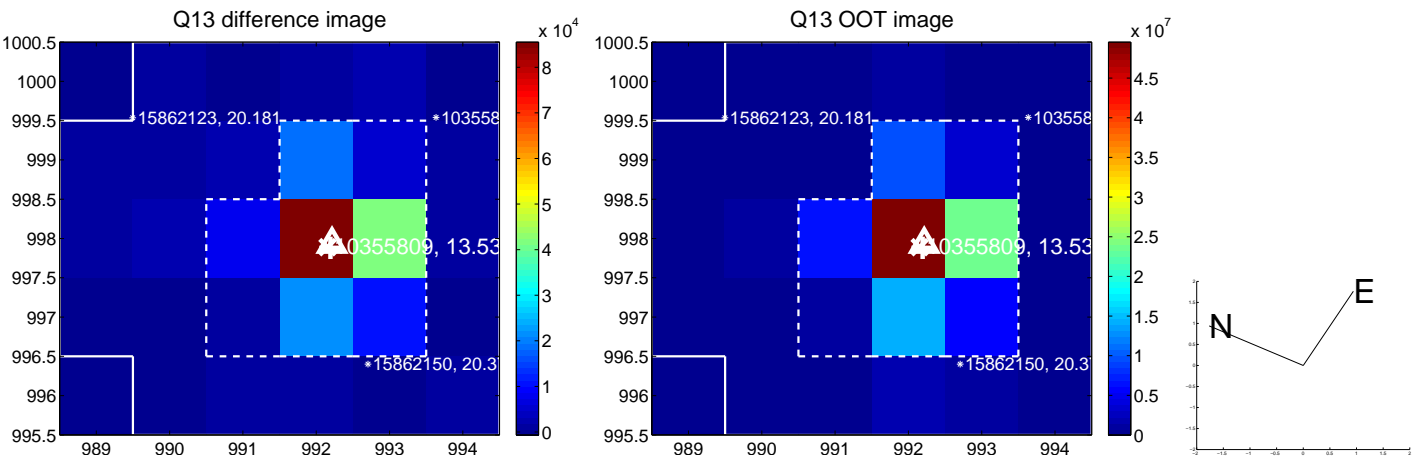
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



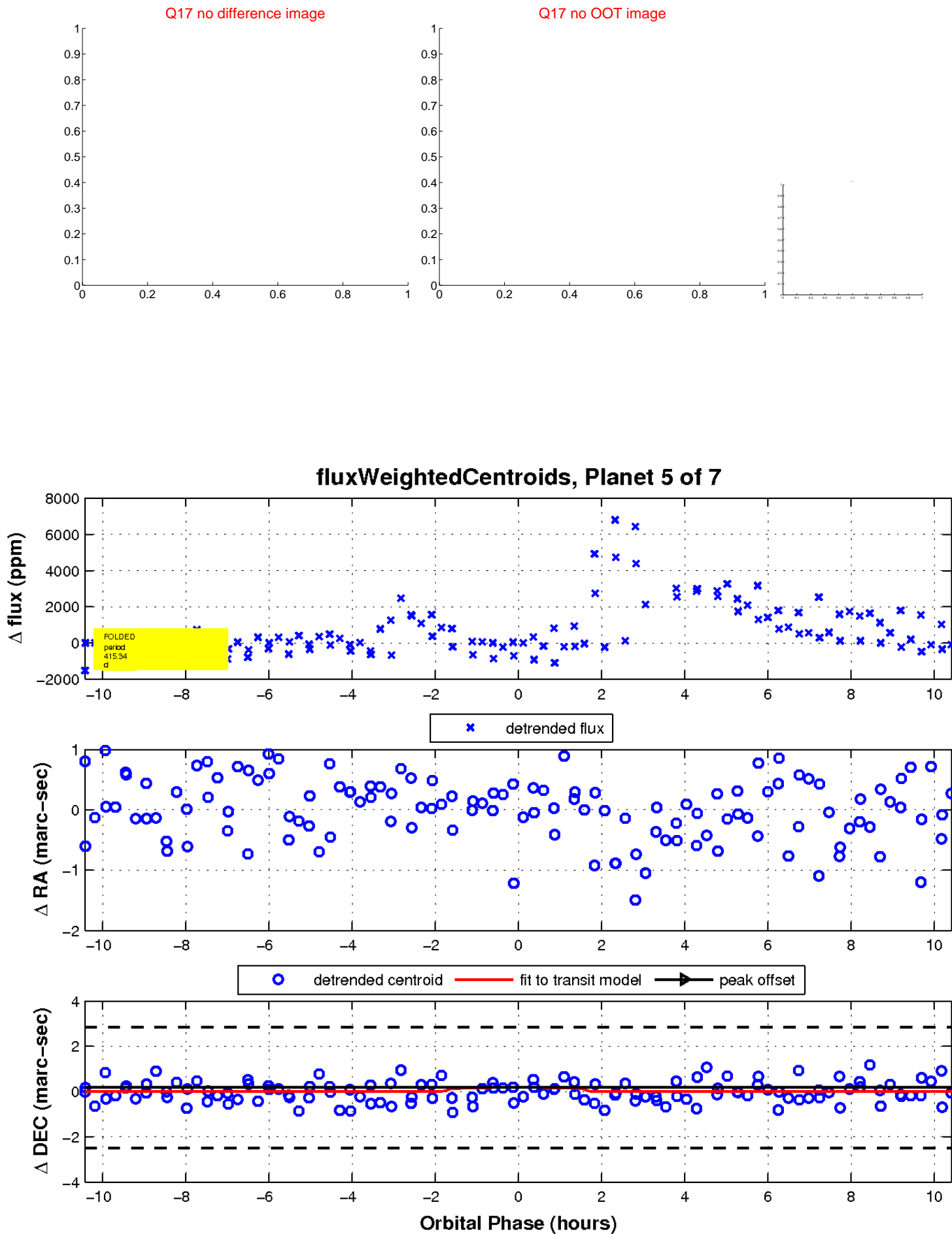
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



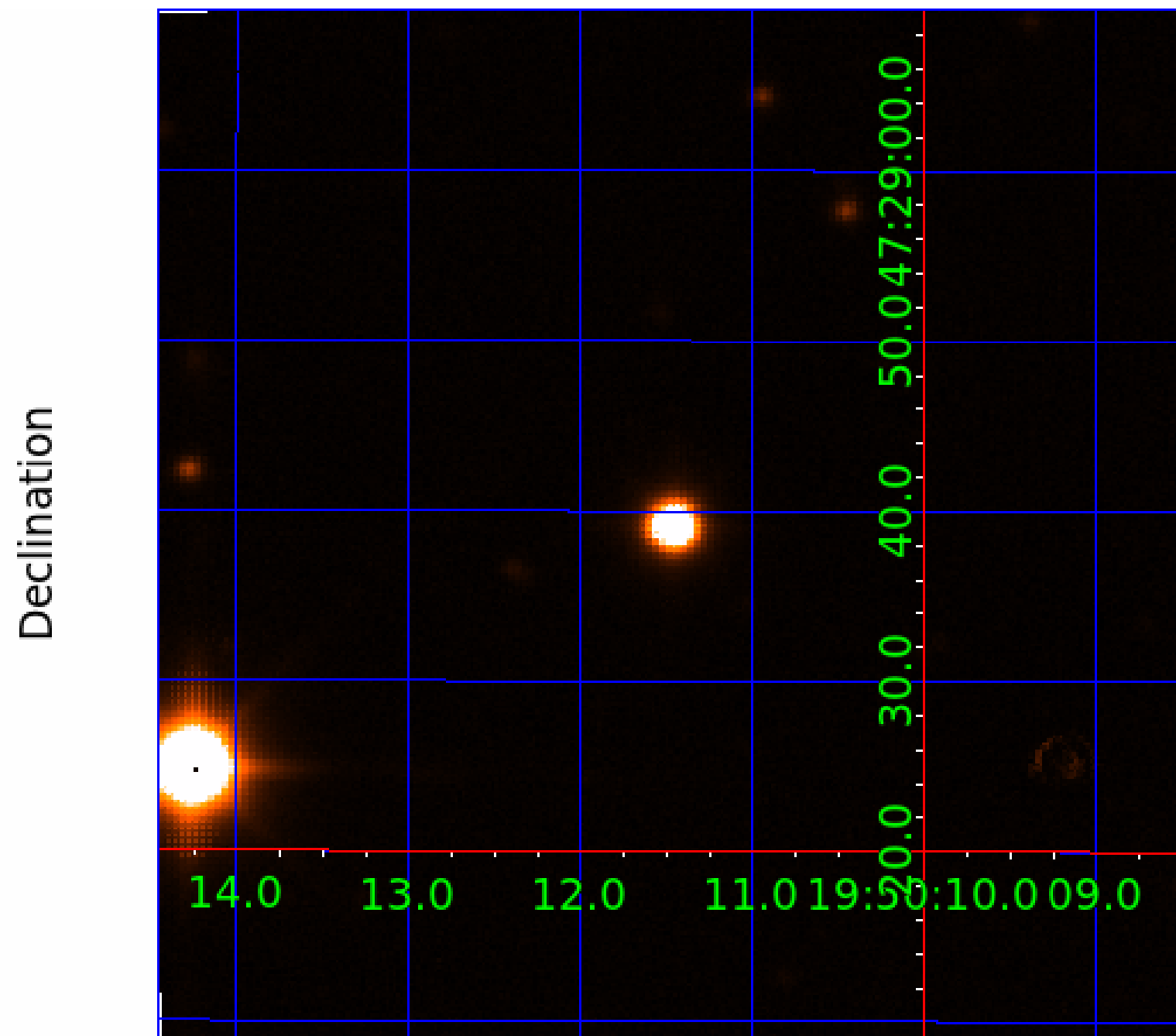
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 010355809

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010355809-01	OBS	No	526.988093	227.367712	1174.8	2.126	16.3	6.5	0.52	4064	1.86	0.06
010355809-02	OBS	No	289.904624	185.935033	1434.7	5.049	16.0	7.2	0.52	4064	2.35	0.14
010355809-04	OBS	No	297.941469	138.549550	1169.6	5.551	15.1	5.6	0.52	4064	1.84	0.13
010355809-05	OBS	No	415.344228	407.285097	2218.6	3.520	13.9	10.2	0.52	4064	2.46	0.09
010355809-06	OBS	No	460.511846	358.267837	1587.0	3.600	14.2	7.9	0.52	4064	2.06	0.07
010355809-07	OBS	No	301.674269	279.061731	295.1	10.500	12.9	-1.0	0.52	4064	0.89	0.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010355809-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010355809-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010355809-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010355809-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
010355809-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010355809-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

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

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

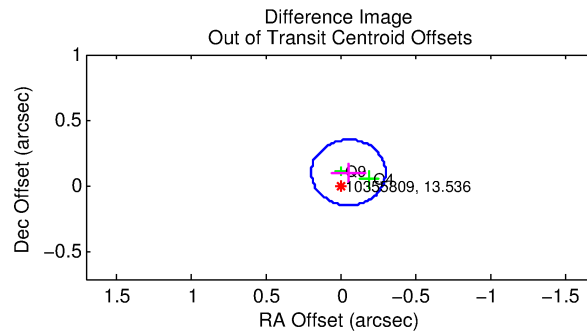
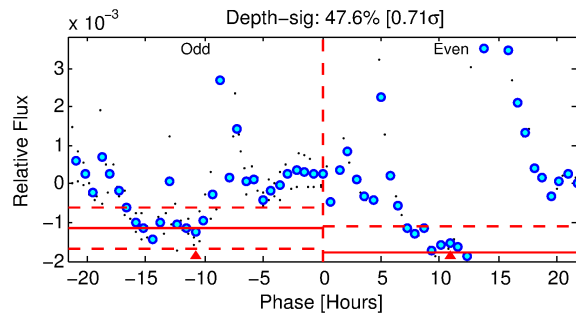
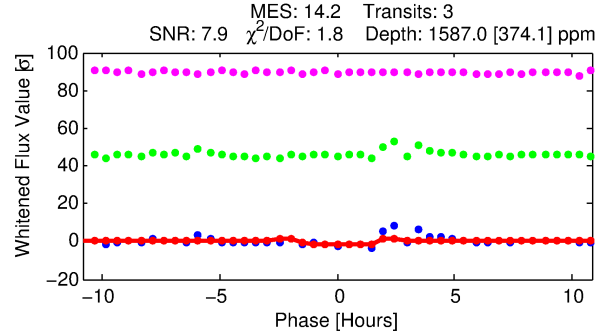
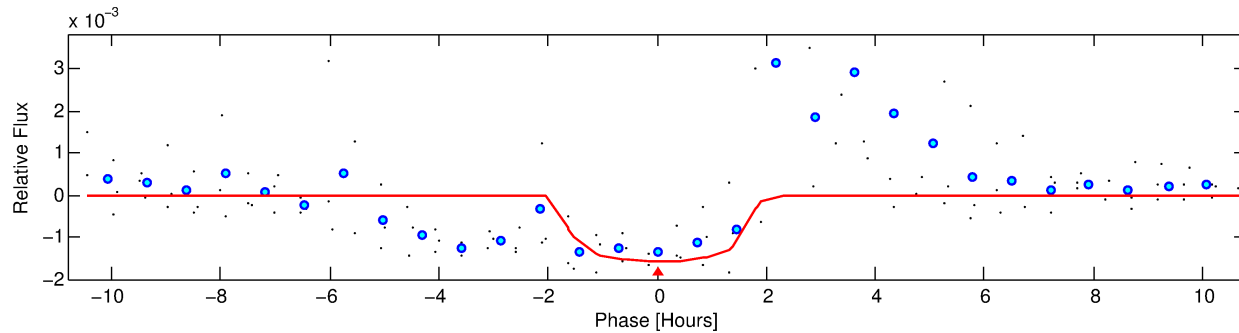
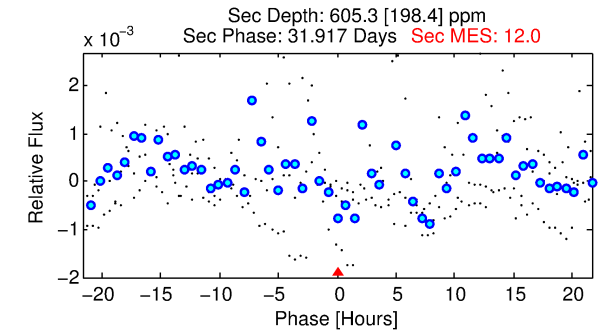
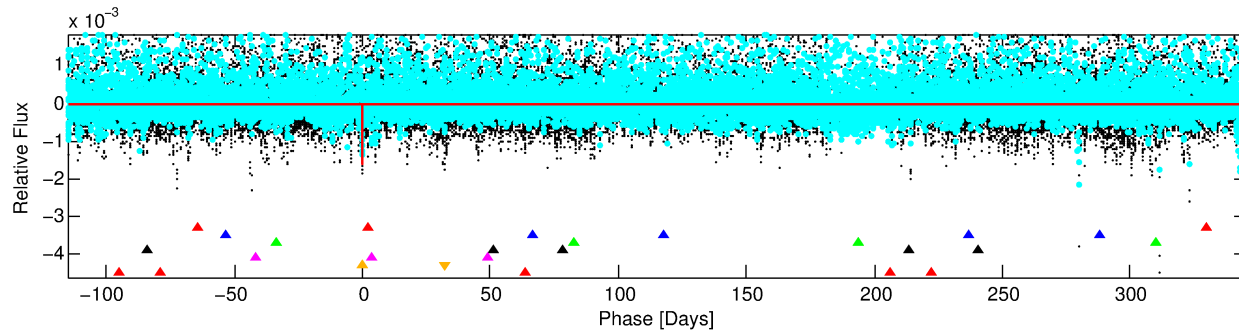
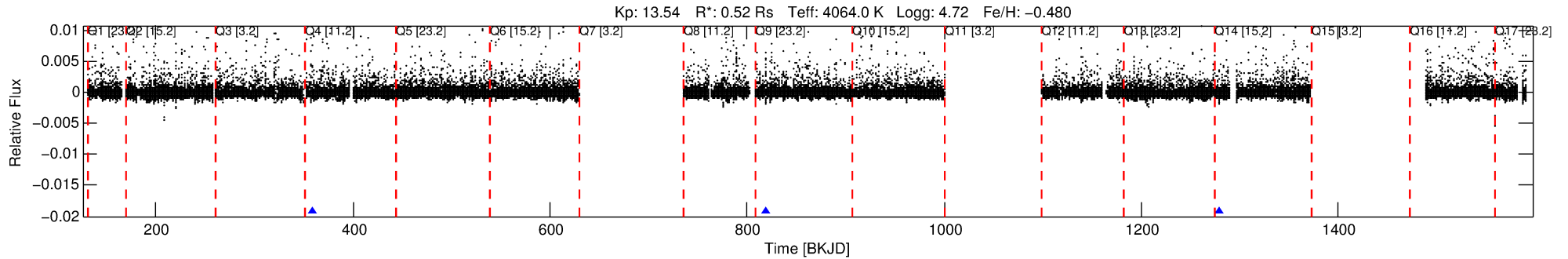
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010355809-06

No Significant Match Found

# DV One-Page Summary

KIC: 10355809 Candidate: 6 of 7 Period: 460.512 d



## DV Fit Results:

Period = 460.51185 [0.00595] d  
Epoch = 358.2678 [0.0078] BKJD  
Rp/R\* = 0.0362 [0.0667]  
a/R\* = 1010.08 [8044.67]  
b = 0.07 [110.25]  
Seff = 0.07 [0.02]  
Teq = 133 [7] K  
Rp = 2.06 [3.81] Re  
a = 0.9433 [0.1086] AU  
Ag = 69783.96 [258586.78] [0.27σ]  
Teff = 3352 [3105] K [1.04σ]

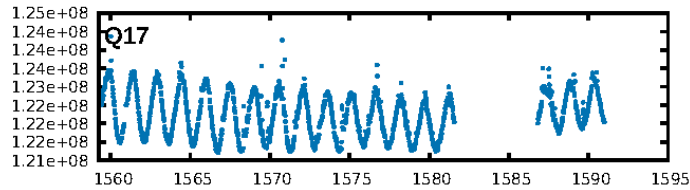
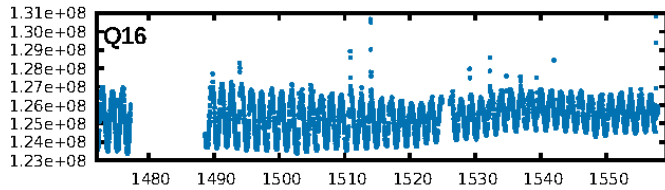
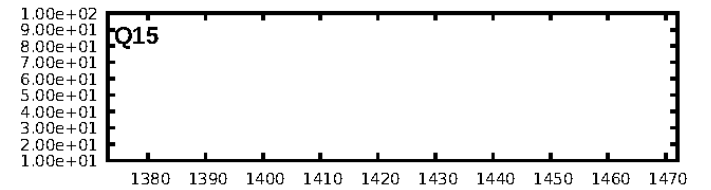
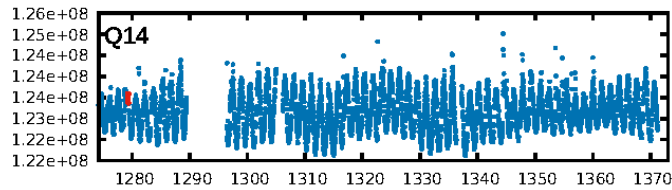
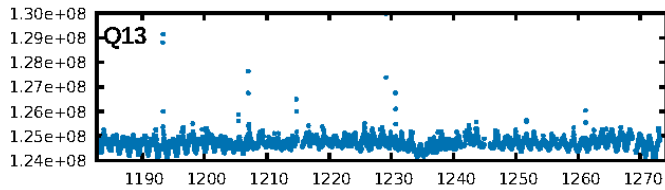
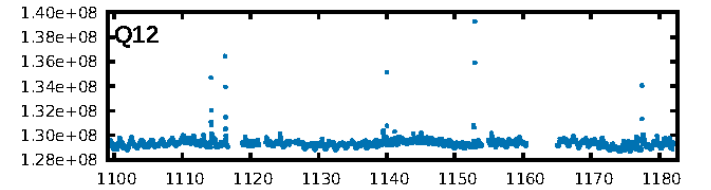
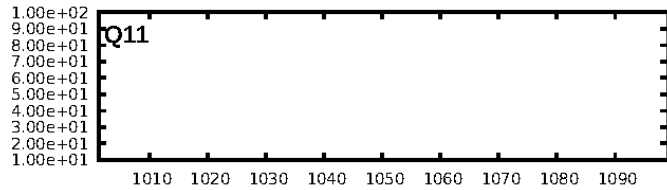
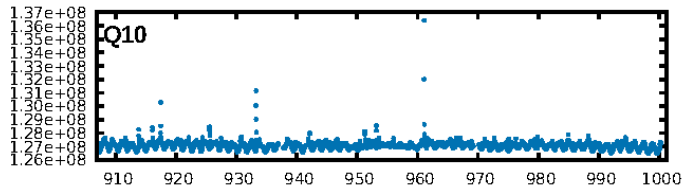
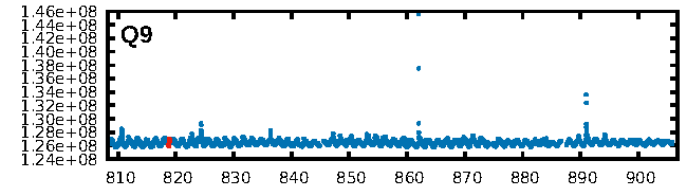
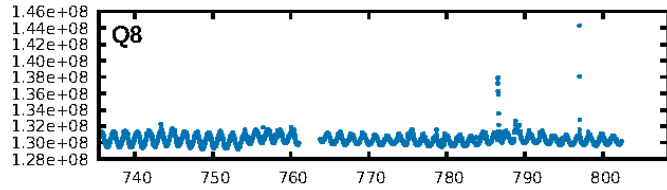
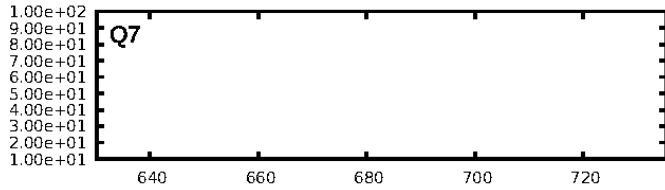
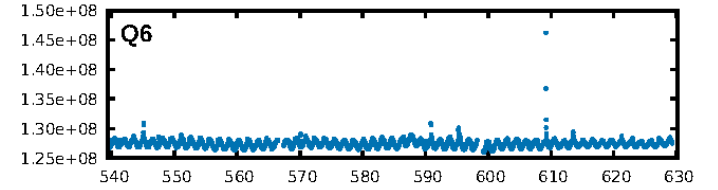
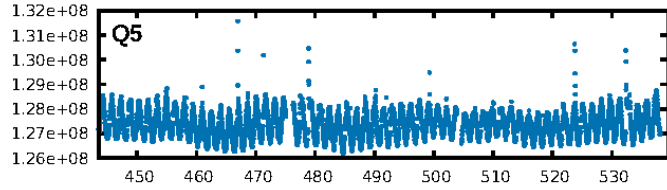
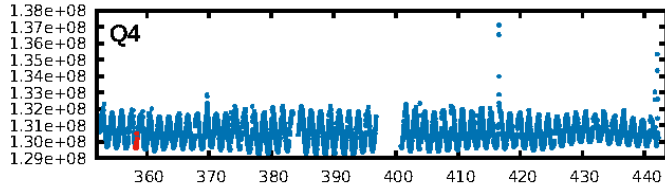
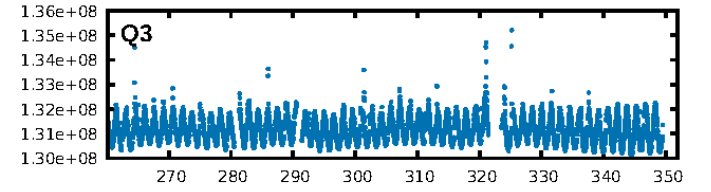
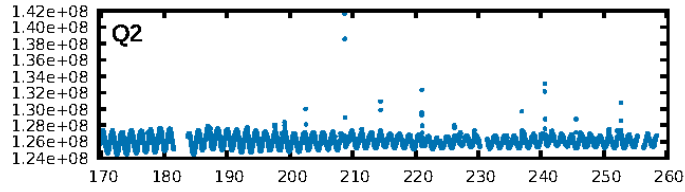
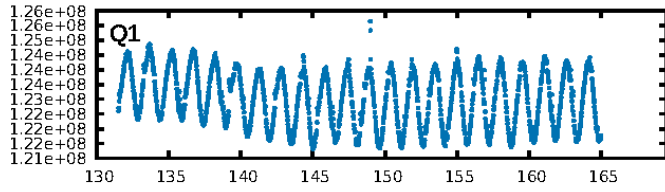
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [215.29σ]  
LongPeriod-sig: 100.0% [381.61σ]  
ModelChiSquare2-sig: 3.2%  
ModelChiSquareGof-sig: 79.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.9216  
Centroid-sig: N/A  
Centroid-so: 0.382 arcsec [1.33σ]  
OotOffset-rm: 0.119 arcsec [1.43σ]  
KicOffset-rm: 0.111 arcsec [1.03σ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

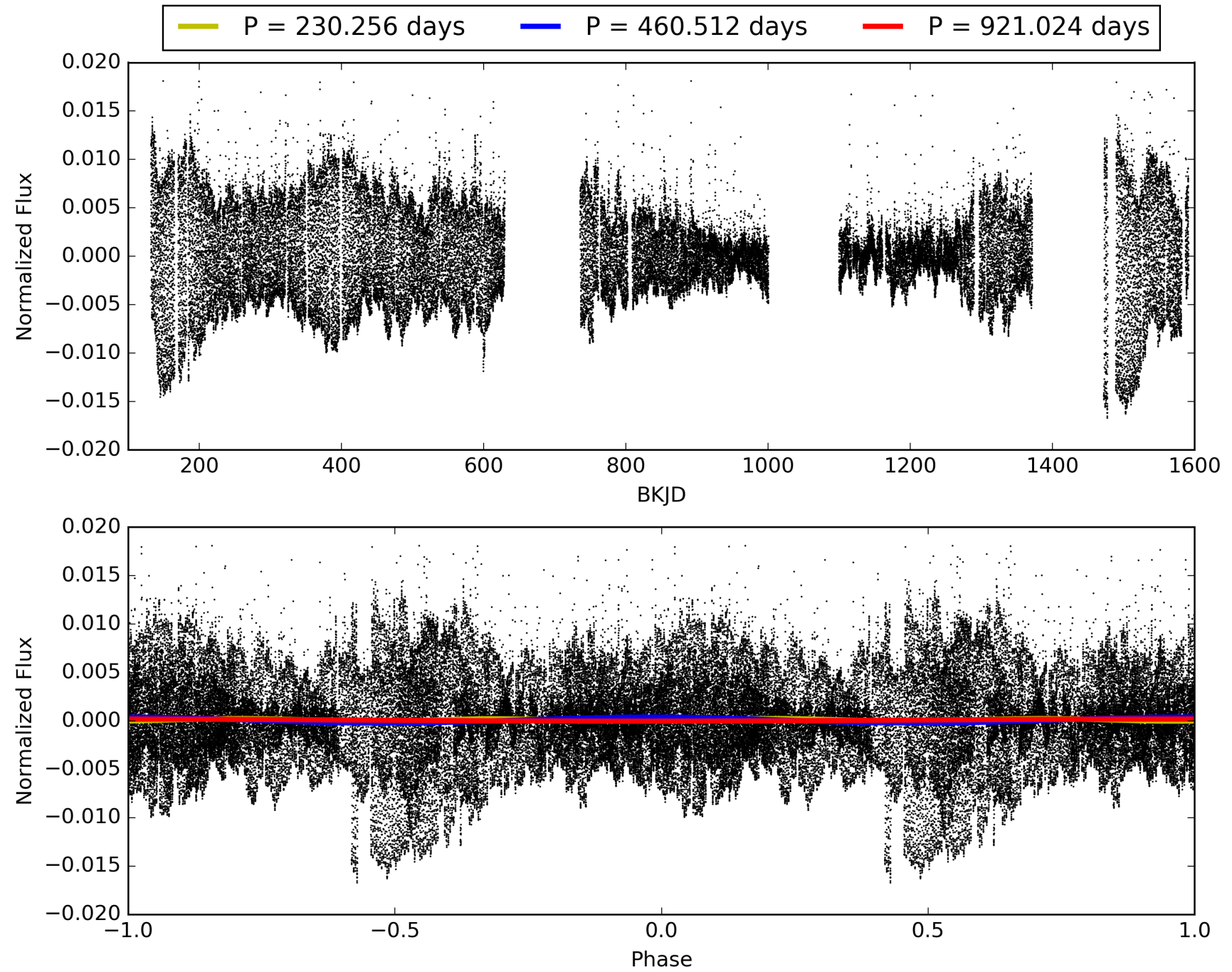
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:26 Z

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

# TCE 010355809-06, PDC Light Curves

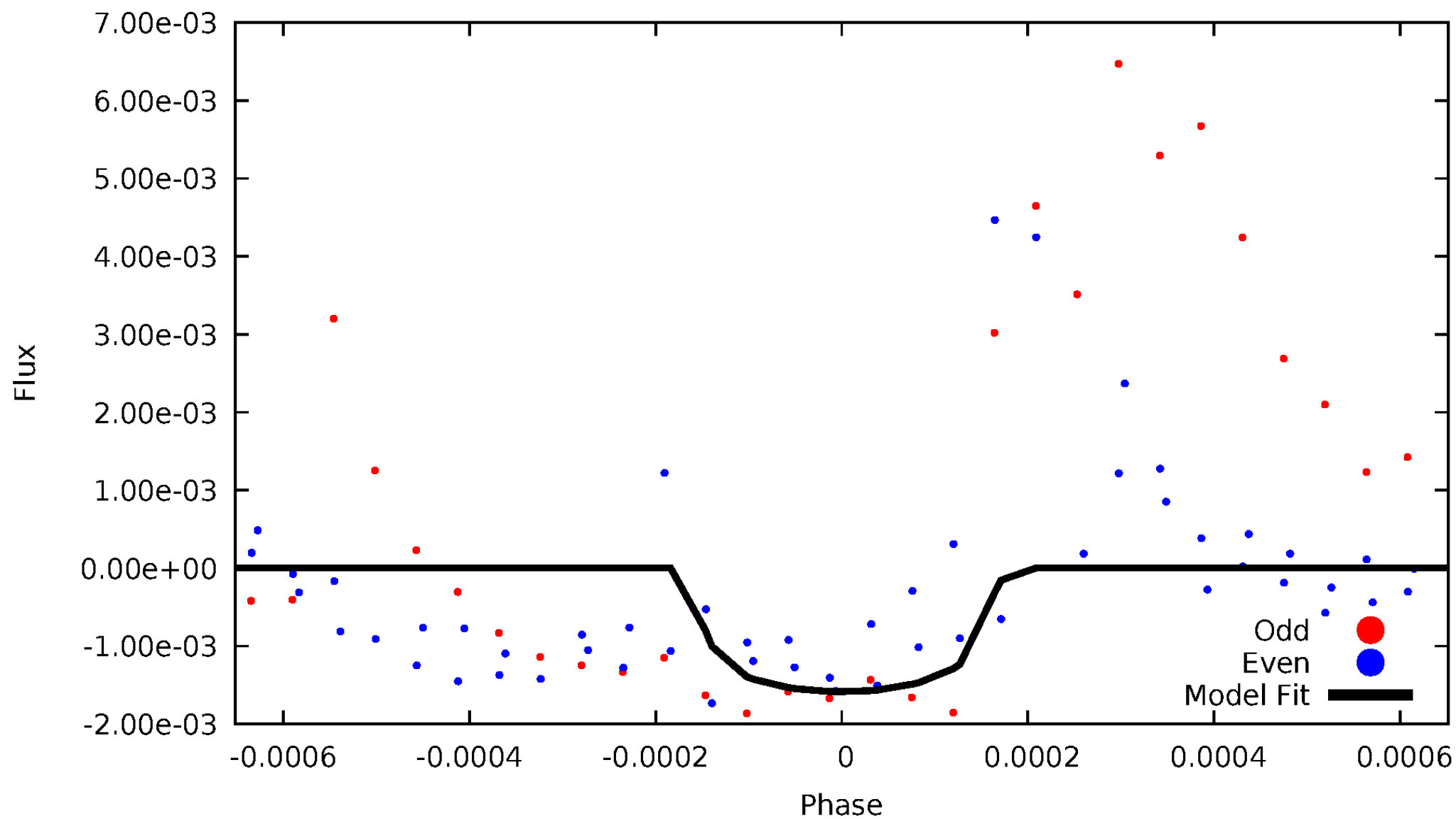


# TCE 010355809-06



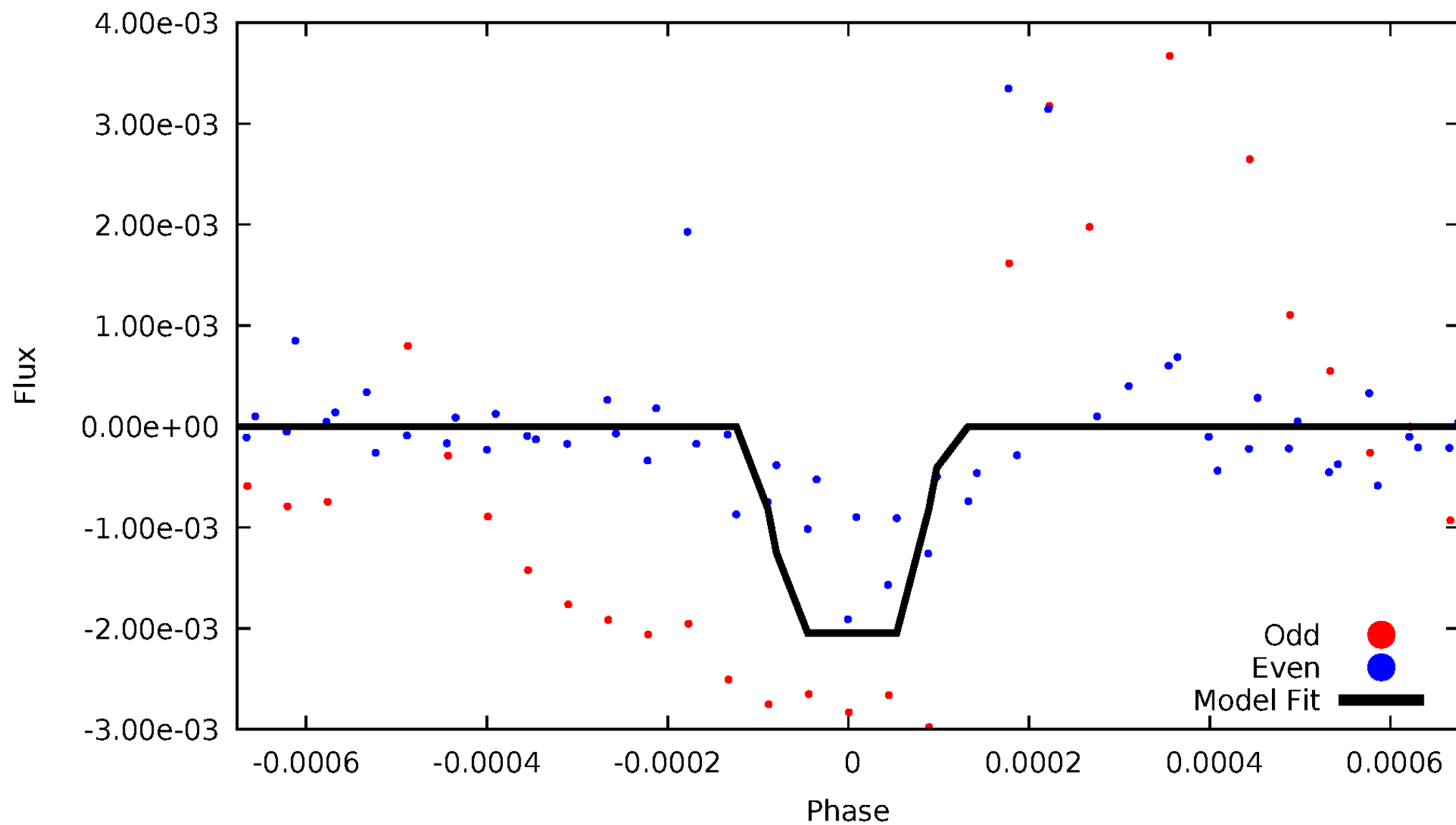
# DV Odd/Even

TCE 010355809-06



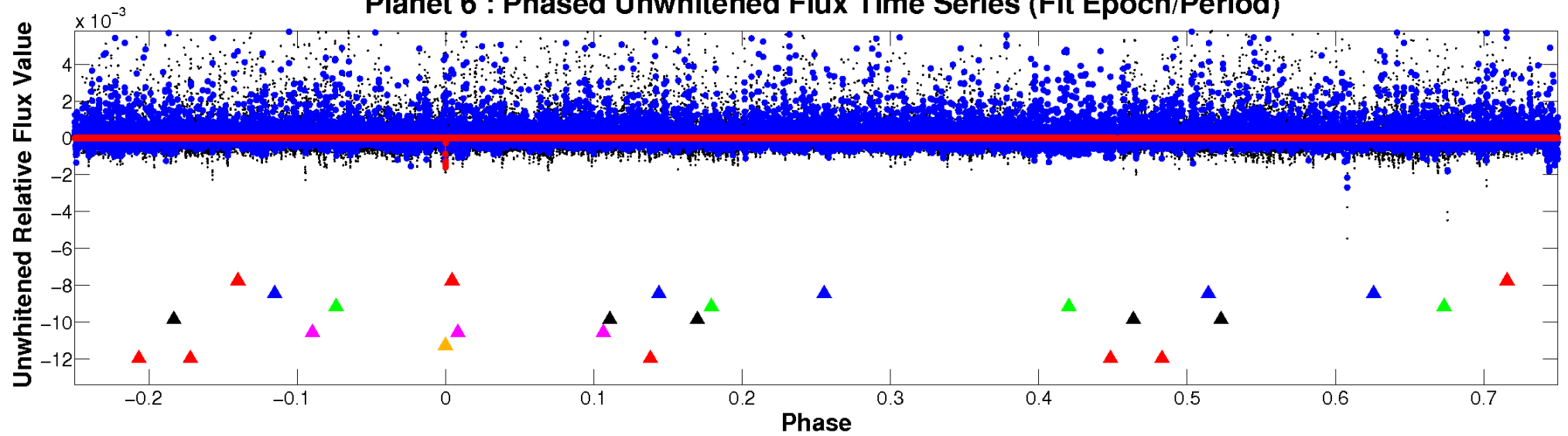
# ALT Odd/Even

TCE 010355809-06

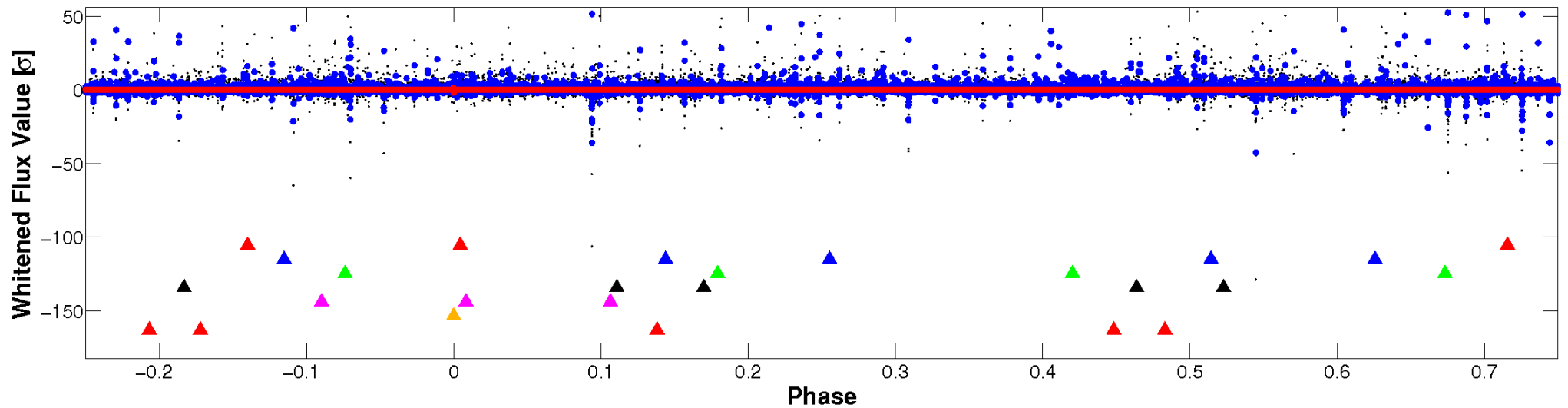


# Non-Whitened Vs. Whitened Light Curve

**Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

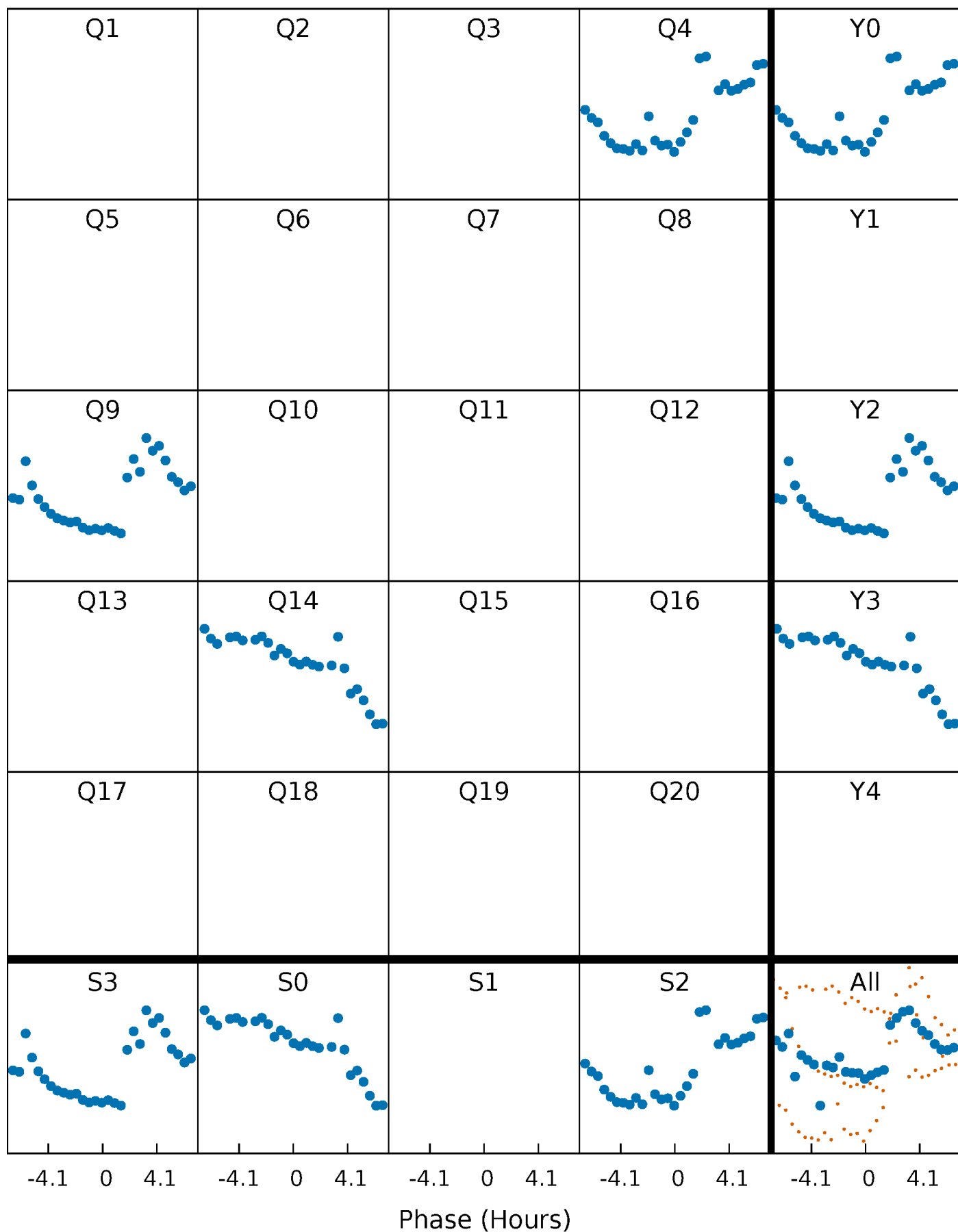


**Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

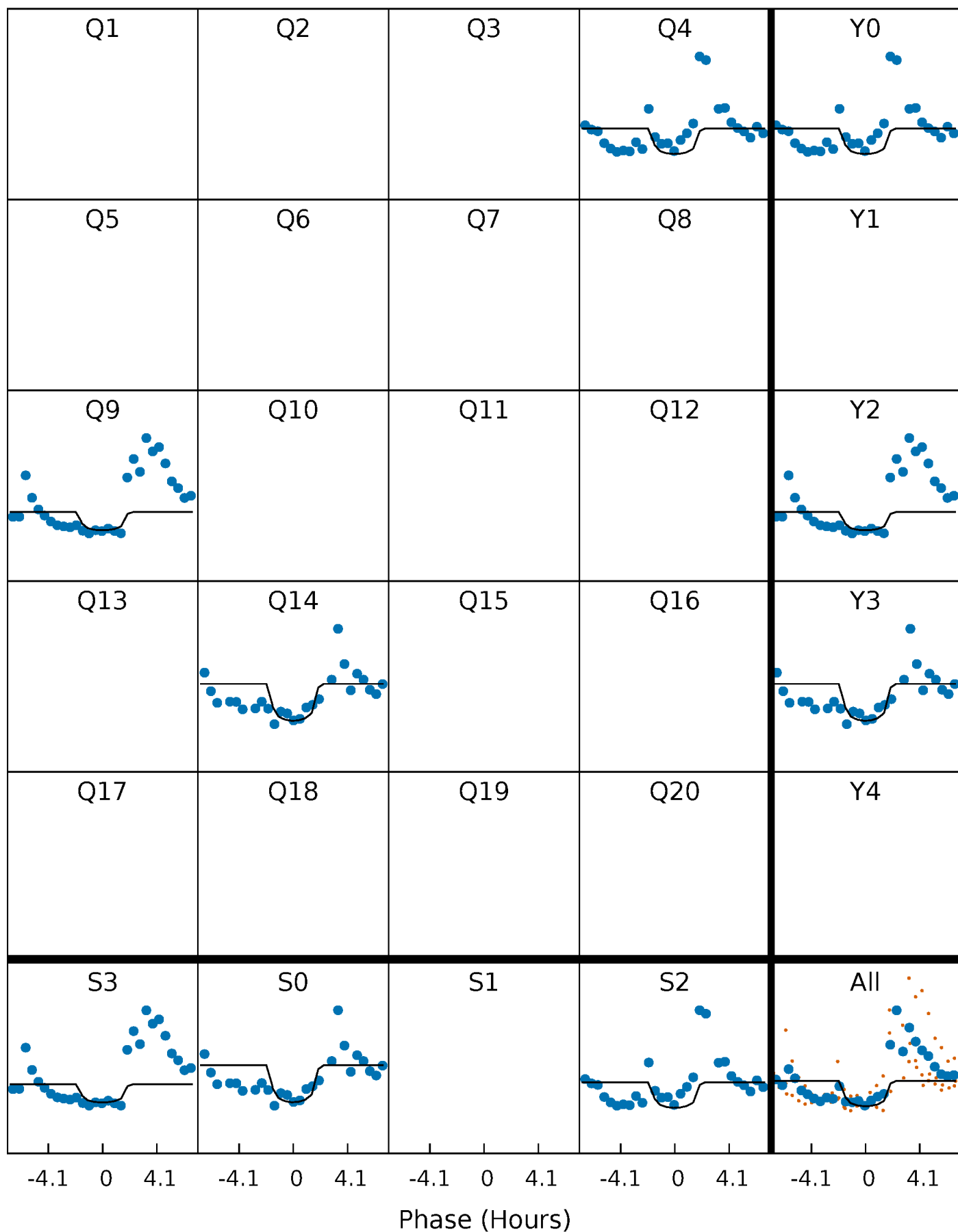
TCE 010355809-06 P=460.511846 Days  $T_0=358.267837$  (BKJD)





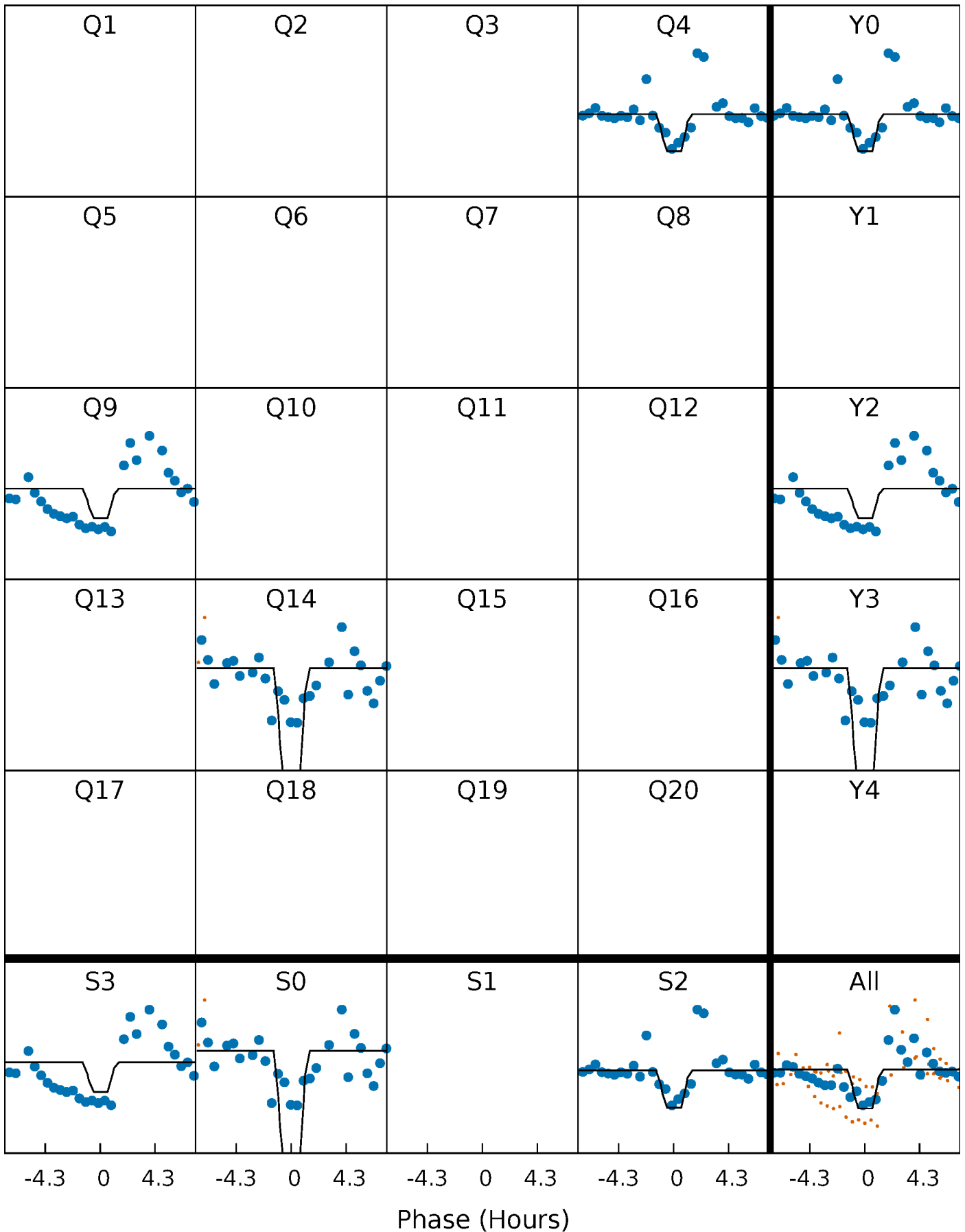
# DV Quarter-Phased Transit Curves

TCE 010355809-06     $P=460.511846$  Days     $T_0=358.267837$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

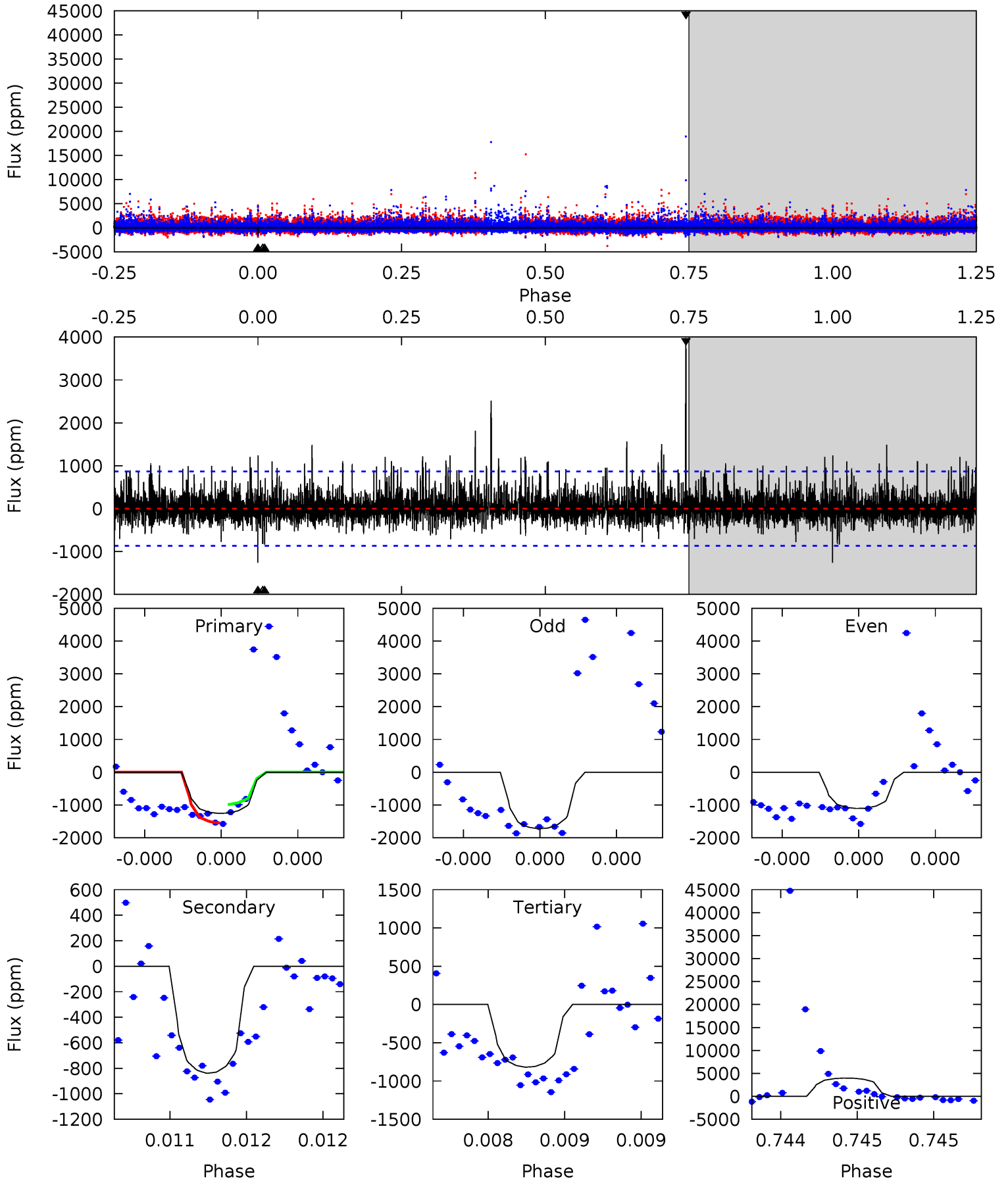
TCE 010355809-06 P=460.511142 Days  $T_0=358.262128$  (BKJD)



# DV Model-Shift Uniqueness Test

010355809-06, P = 460.511846 Days, E = 358.267837 Days

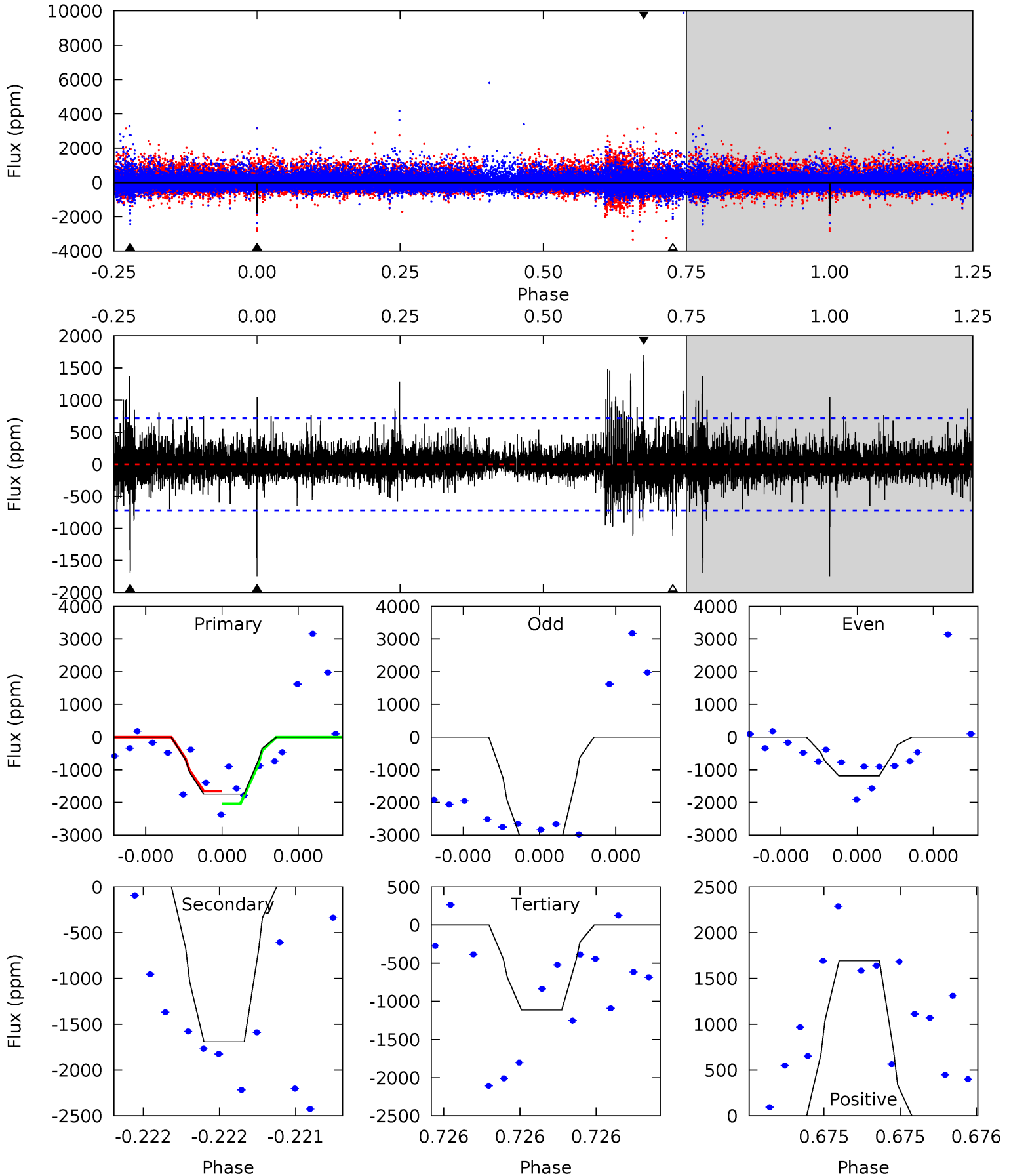
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.17	5.46	5.32	25.9	5.63	3.57	1.75	2.85	-17.7	0.13	-20.4	1.03	0.86	0.76	1.80



# Alt Model-Shift Uniqueness Test

010355809-06, P = 460.511142 Days, E = 358.262128 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
13.9	13.5	8.90	13.5	5.74	3.74	1.58	5.02	0.39	4.61	-0.02	6.49	1.15	0.49	1.47



### Stellar Parameters For KIC 010355809

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4064^{+129}_{-158}$	$4.725^{+0.078}_{-0.045}$	$-0.480^{+0.300}_{-0.350}$	$0.522^{+0.057}_{-0.077}$	$0.528^{+0.055}_{-0.067}$	$5.223^{+2.123}_{-0.874}$
	+3%/-4%	+2%/-1%	+62%/-73%	+11%/-15%	+10%/-13%	+41%/-17%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010355809-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-839 \pm 154$	$3.54^{+3.09}_{-2.46}$	$185^{+7}_{-8}$	$3170^{+1673}_{-524}$	$33083^{+335704}_{-24267}$
Alt.	$-1691 \pm 125$	$3.66^{+3.18}_{-2.45}$	$184^{+8}_{-8}$	$3480^{+1758}_{-610}$	$62243^{+495669}_{-44281}$

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

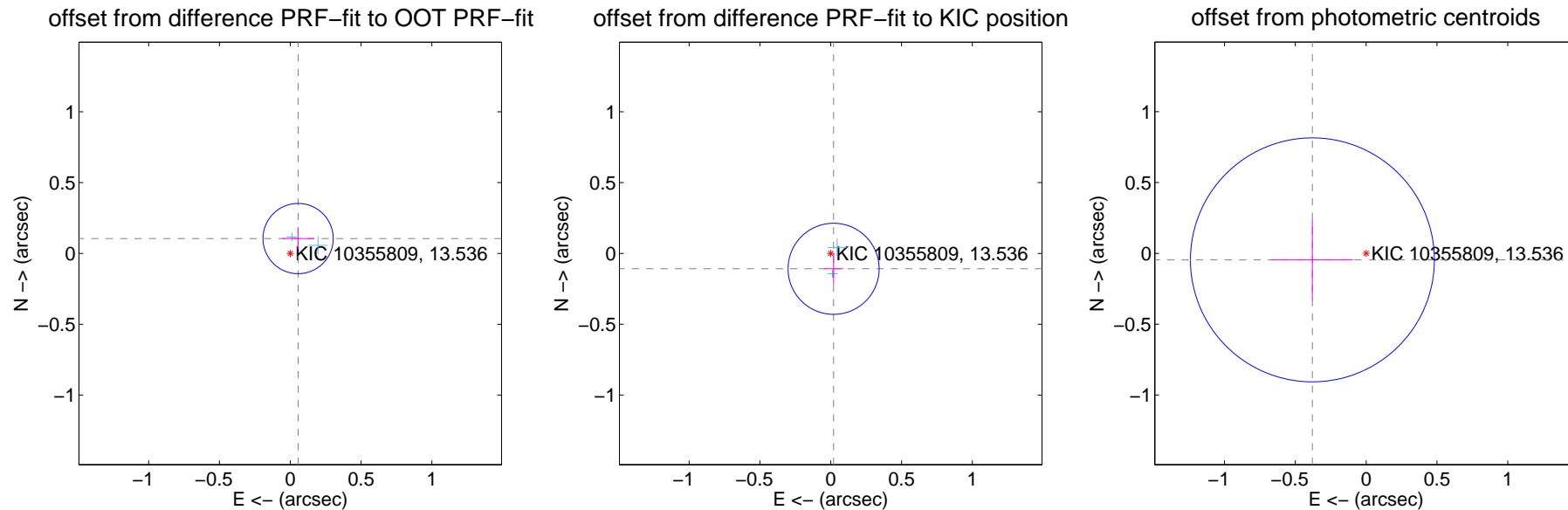
## DV Centroid Data

Supplemental centroid analysis for 010355809-06. Kepler magnitude: 13.54. Transit SNR 7.87

There are 2 quarters with good PRF difference image offsets

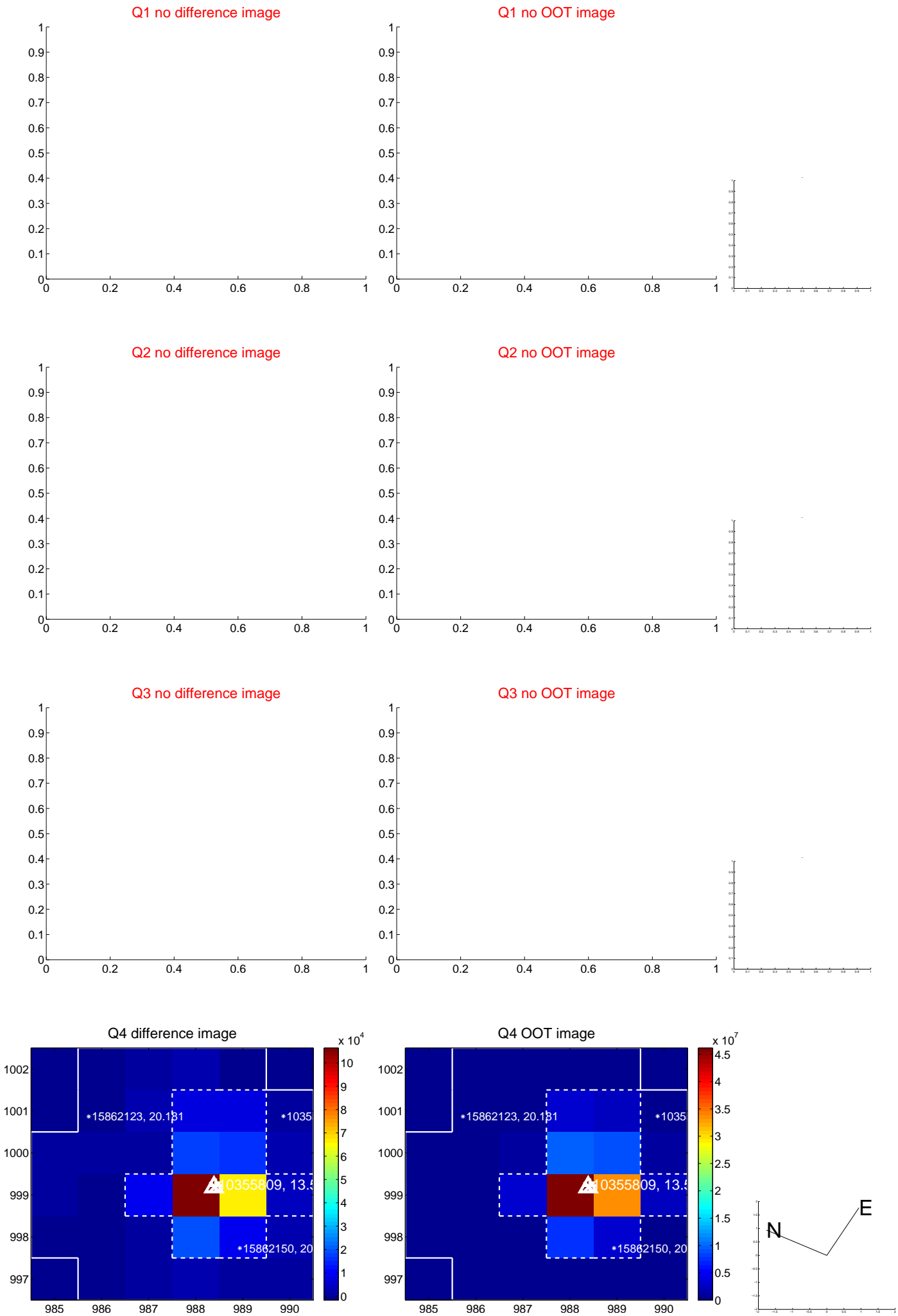
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.119 \pm 0.083$	1.43	$-0.055 \pm 0.113$	$0.105 \pm 0.072$
PRF-fit source offset from KIC position	$0.111 \pm 0.107$	1.03	$-0.020 \pm 0.069$	$-0.109 \pm 0.111$
photometric centroid source offset	$0.38 \pm 0.29$	1.33	$0.38 \pm 0.29$	$-0.05 \pm 0.28$



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.

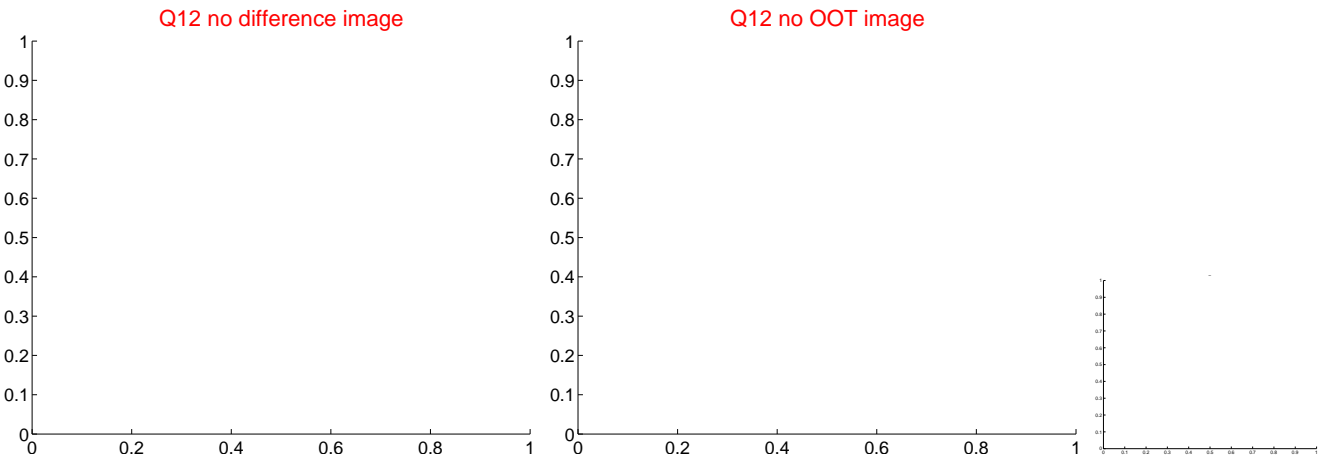
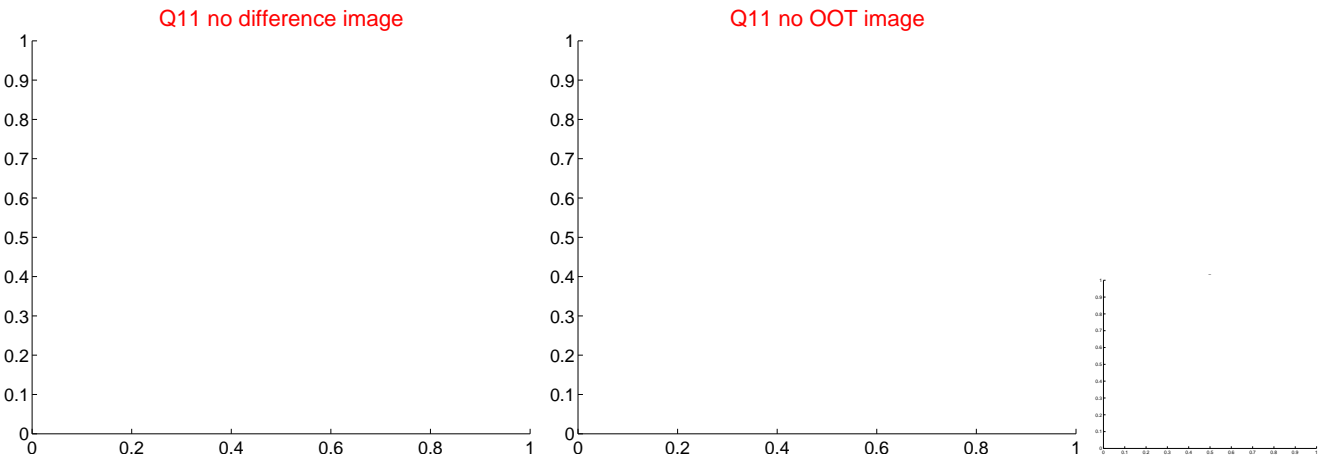
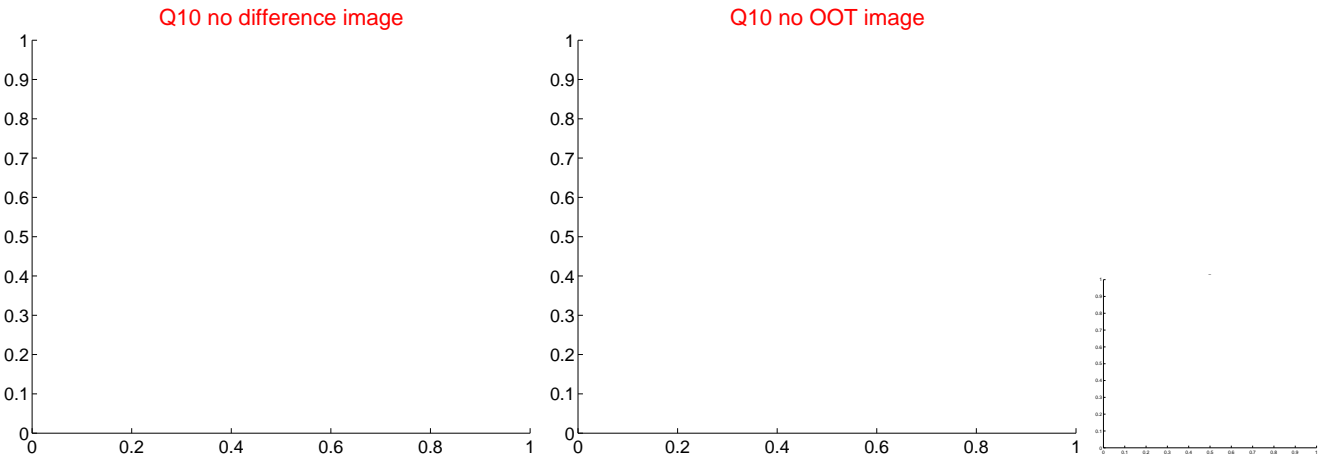
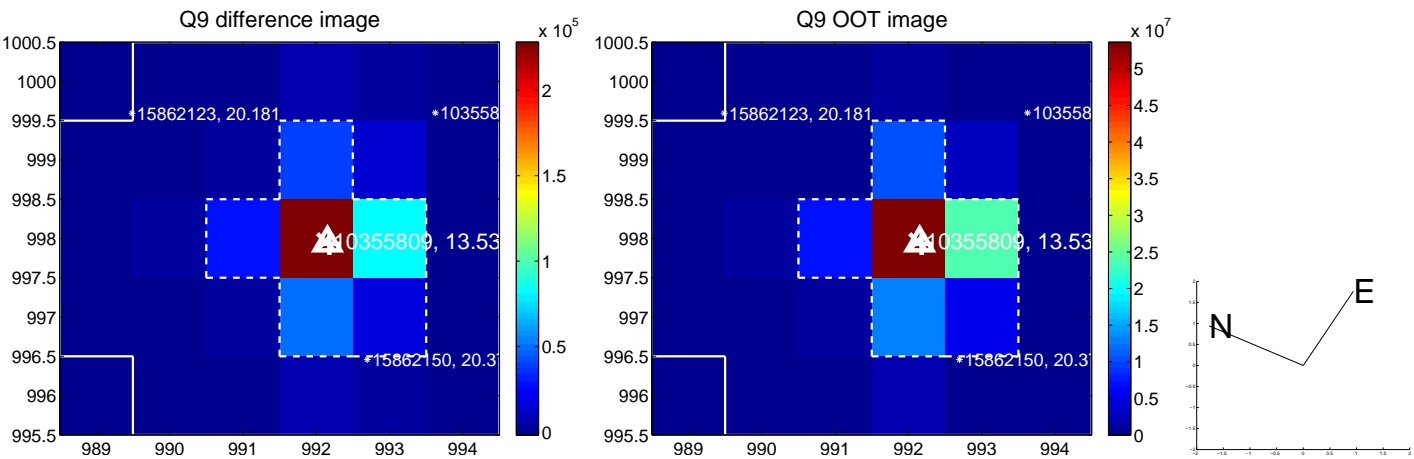


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





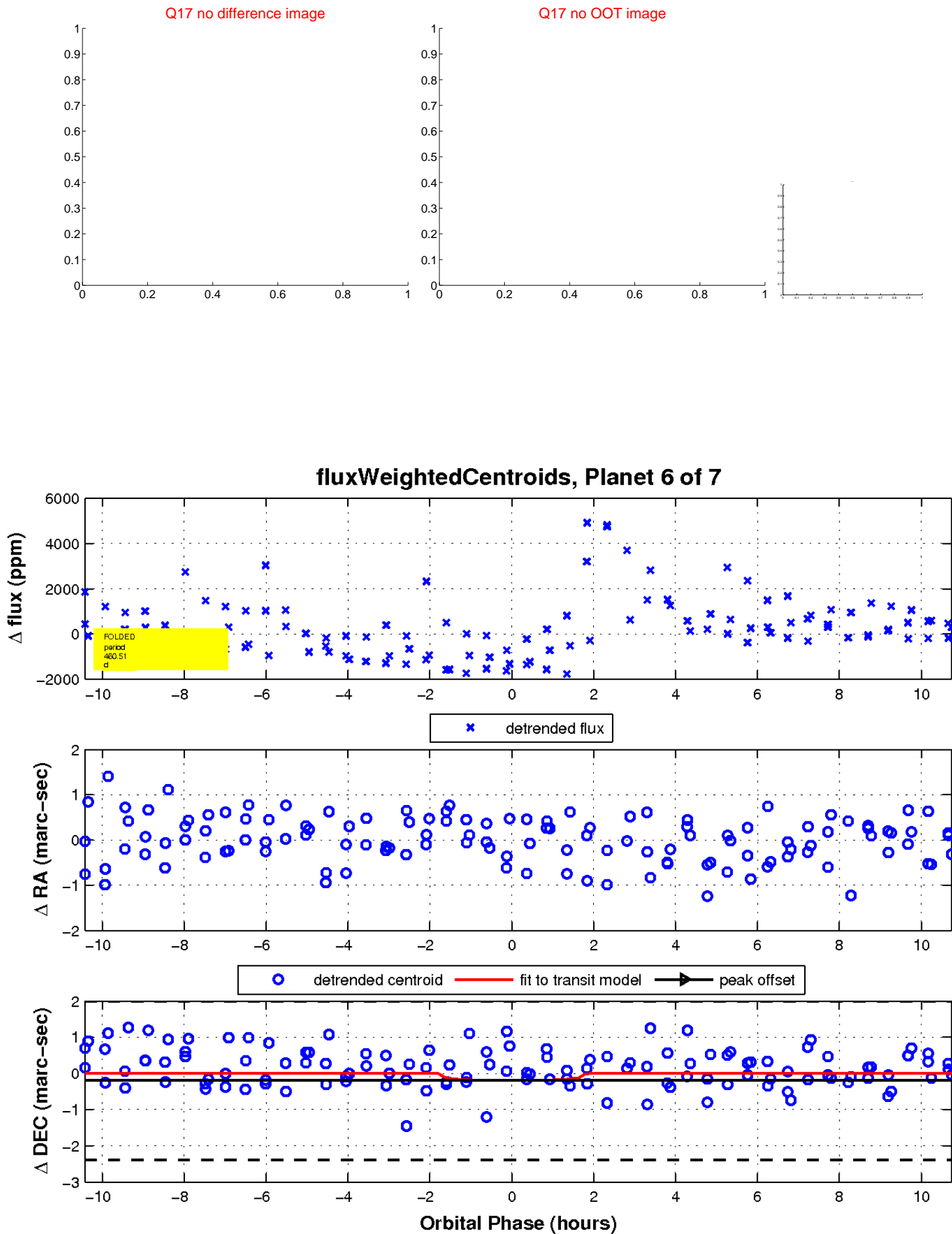
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



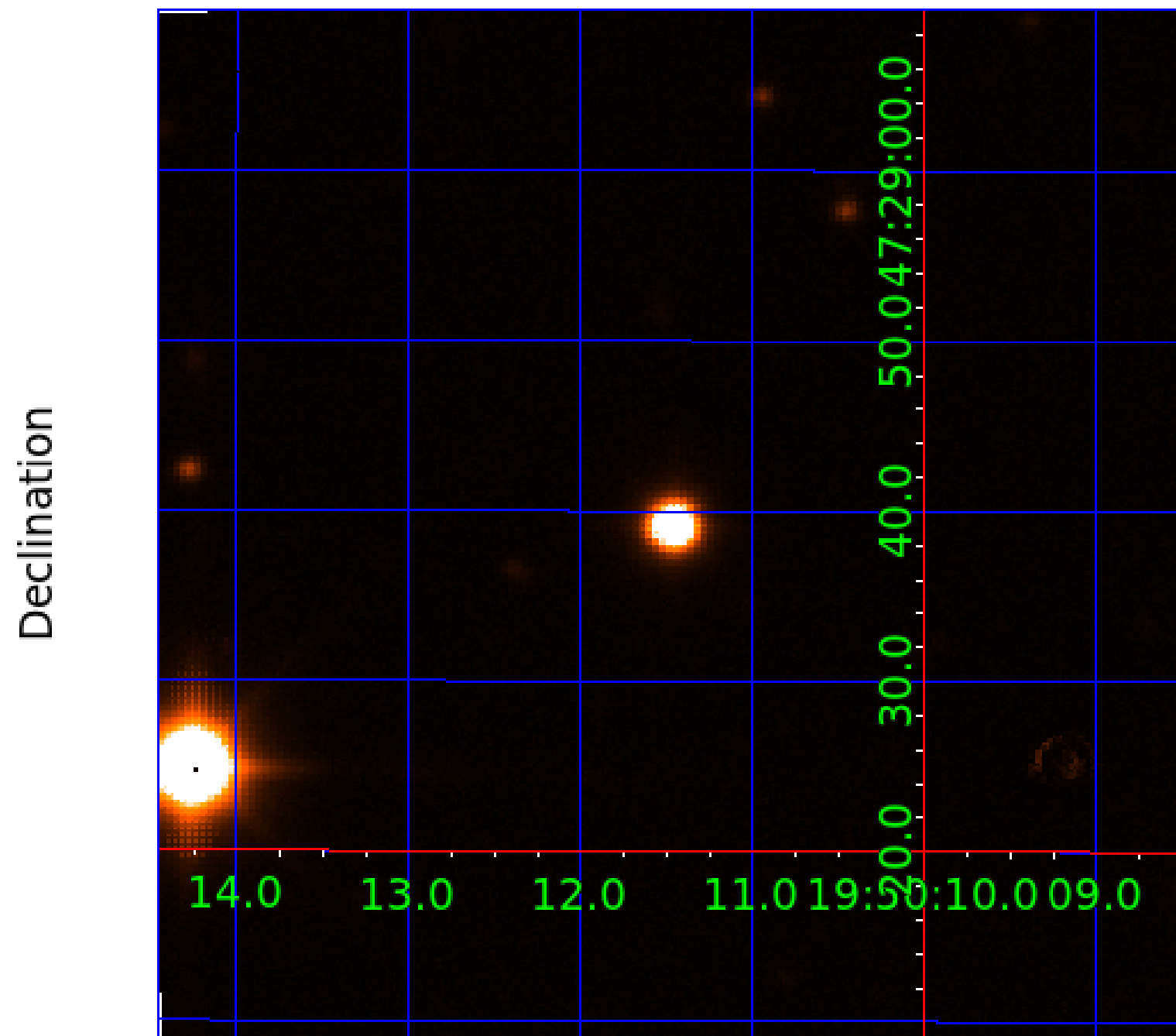
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 010355809

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010355809-01	OBS	No	526.988093	227.367712	1174.8	2.126	16.3	6.5	0.52	4064	1.86	0.06
010355809-02	OBS	No	289.904624	185.935033	1434.7	5.049	16.0	7.2	0.52	4064	2.35	0.14
010355809-04	OBS	No	297.941469	138.549550	1169.6	5.551	15.1	5.6	0.52	4064	1.84	0.13
010355809-05	OBS	No	415.344228	407.285097	2218.6	3.520	13.9	10.2	0.52	4064	2.46	0.09
010355809-06	OBS	No	460.511846	358.267837	1587.0	3.600	14.2	7.9	0.52	4064	2.06	0.07
010355809-07	OBS	No	301.674269	279.061731	295.1	10.500	12.9	-1.0	0.52	4064	0.89	0.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010355809-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010355809-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010355809-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010355809-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
010355809-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010355809-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

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

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

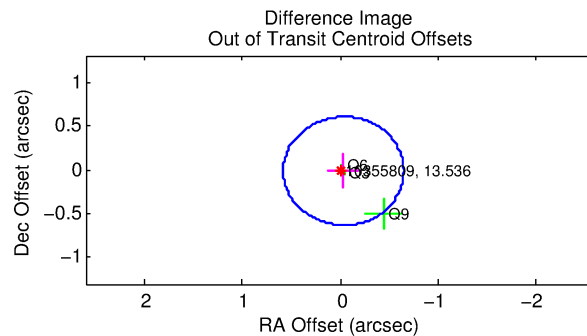
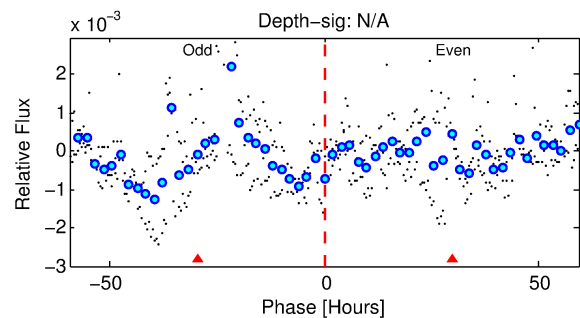
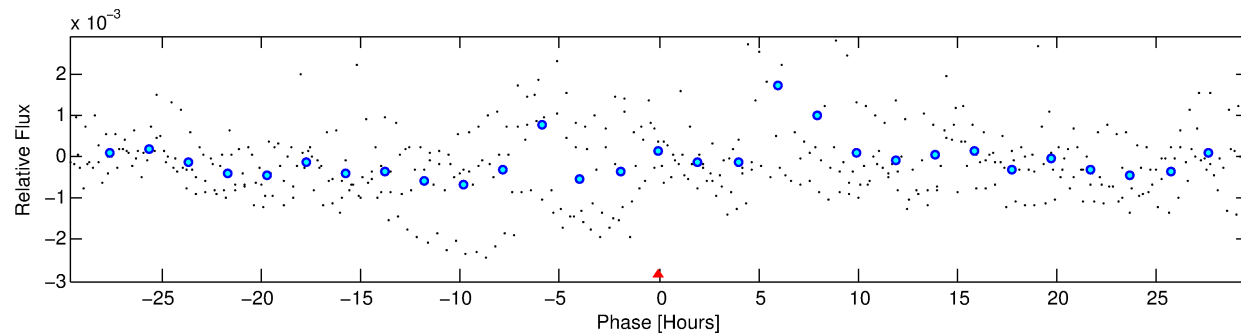
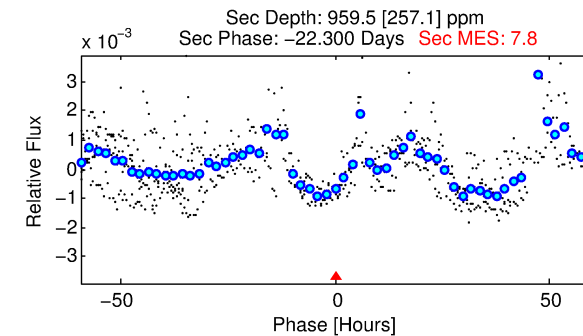
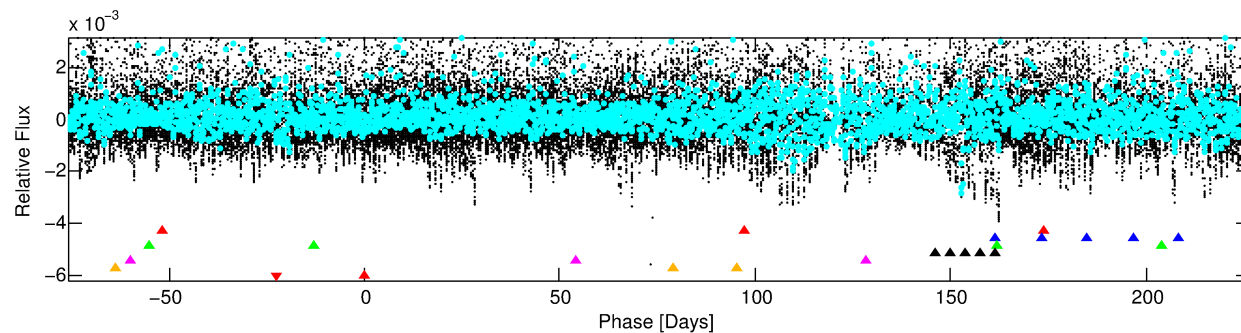
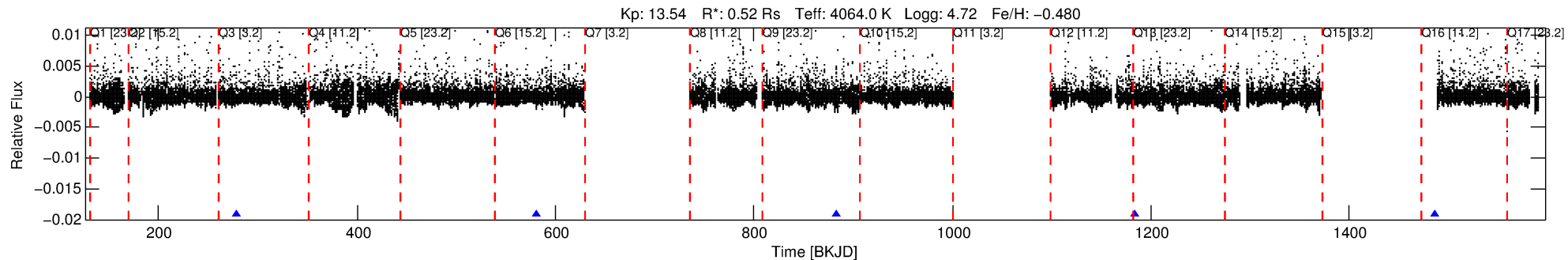
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010355809-07

No Significant Match Found

# DV One-Page Summary

KIC: 10355809 Candidate: 7 of 7 Period: 301.674 d



## TPS TCE Results:

Period = 301.67427 d  
Epoch = 279.0617 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

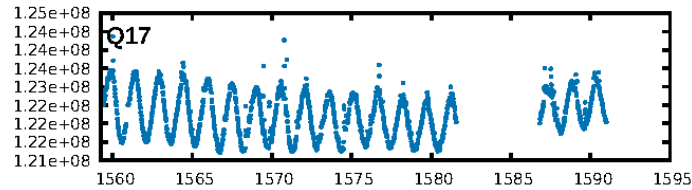
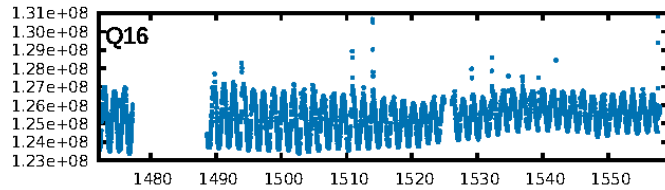
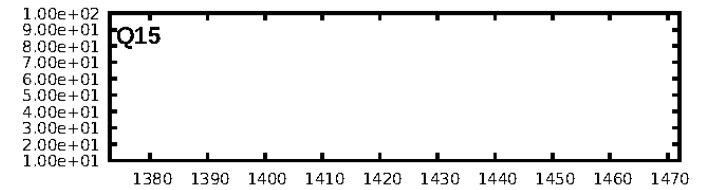
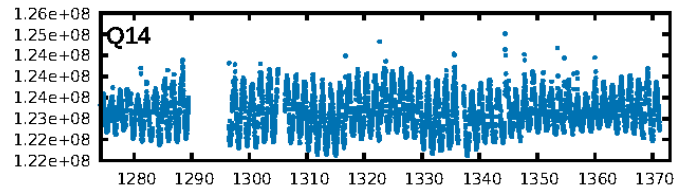
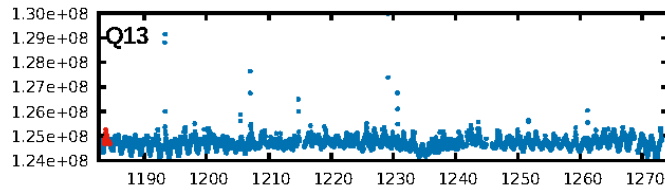
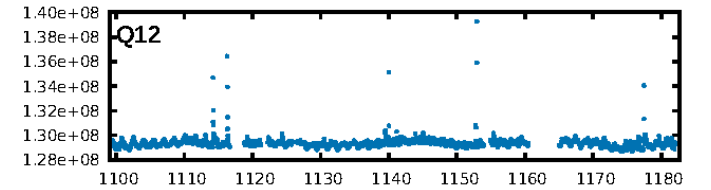
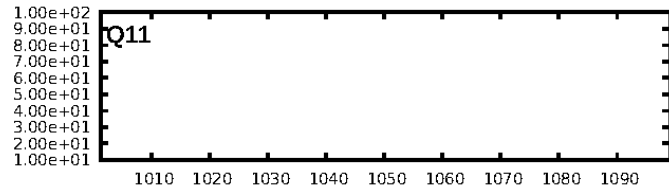
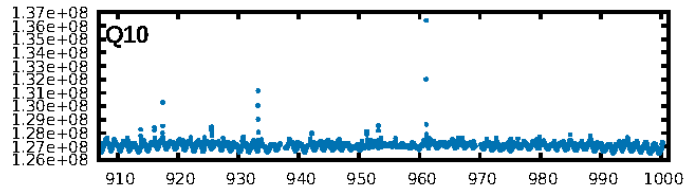
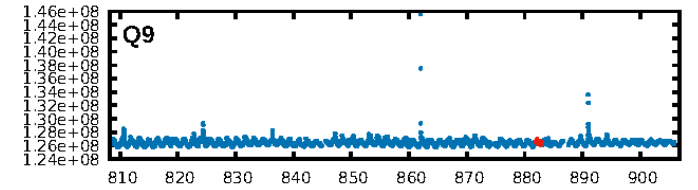
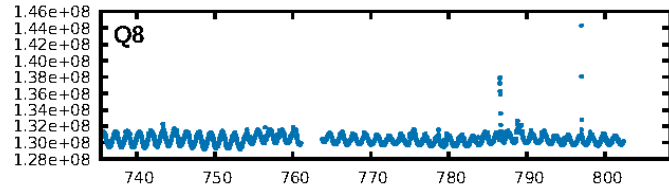
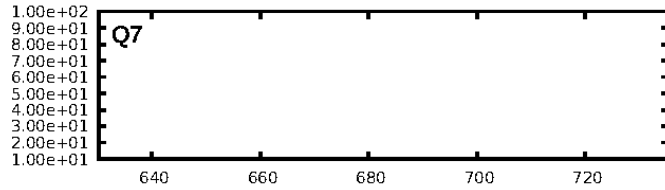
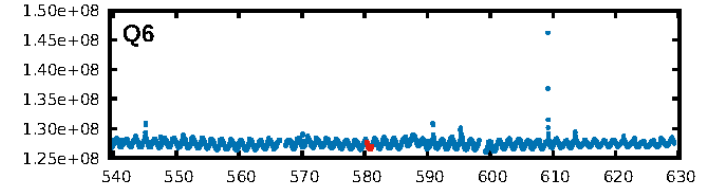
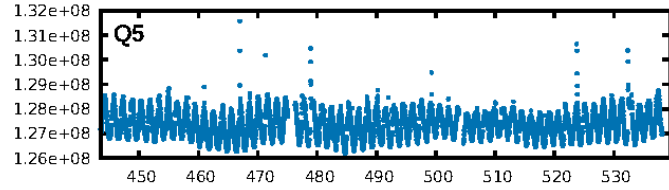
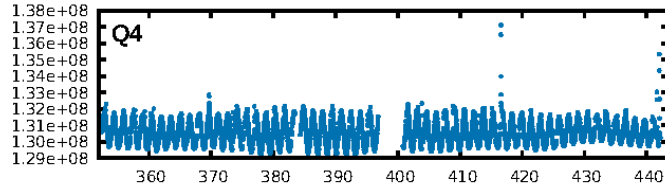
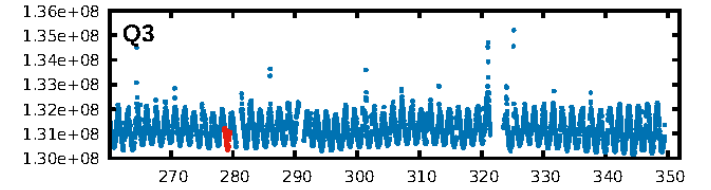
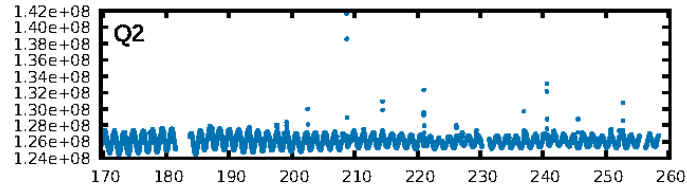
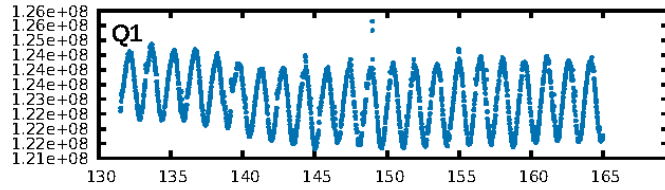
ShortPeriod-sig: 100.0% [7.54σ]  
LongPeriod-sig: 100.0% [91.37σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 2.289

Centroid-sig: N/A  
Centroid-so: 0.262 arcsec [1.42σ]  
OotOffset-rm: 0.037 arcsec [0.18σ]  
KicOffset-rm: 0.166 arcsec [0.70σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

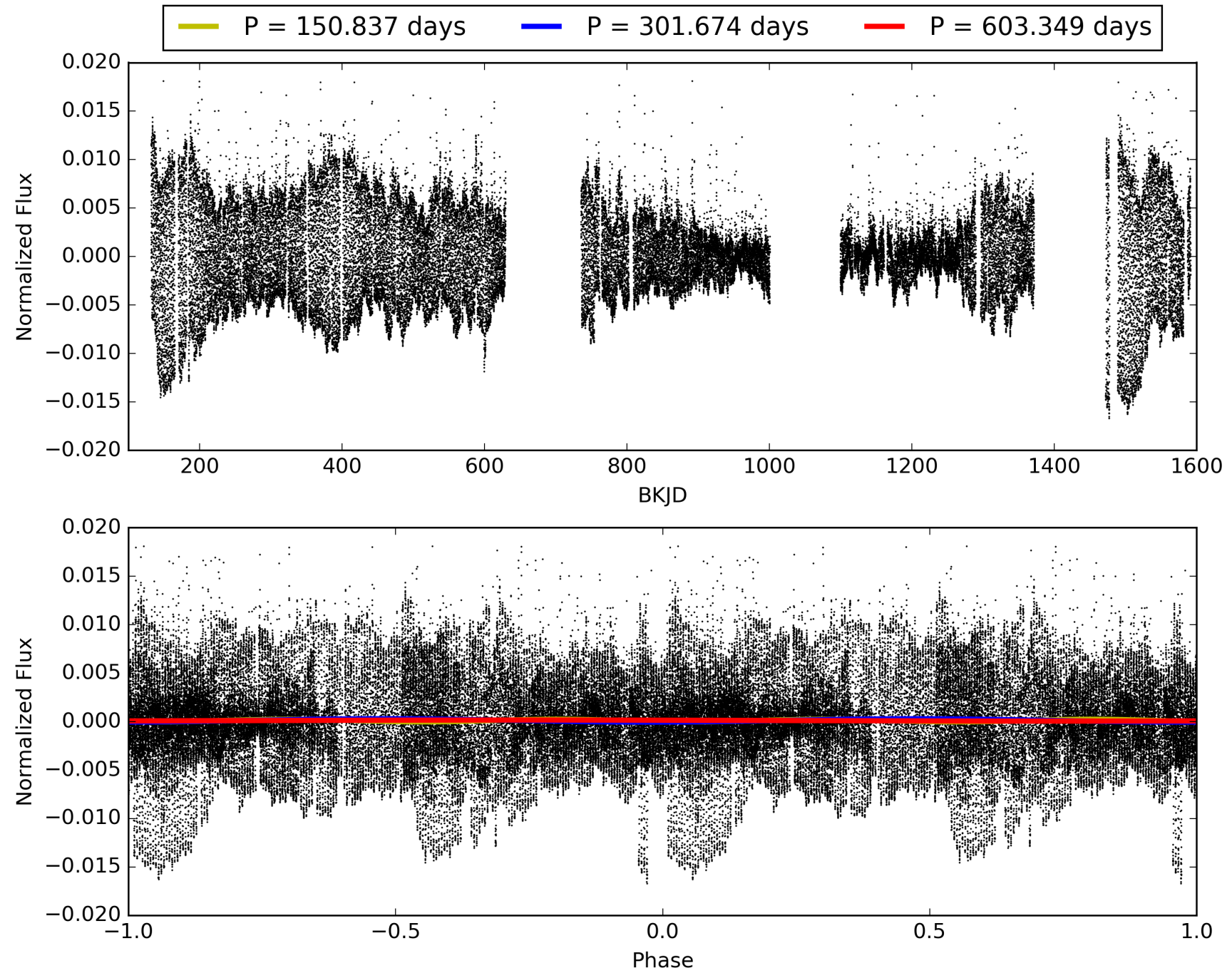
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:33 Z

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

# TCE 010355809-07, PDC Light Curves



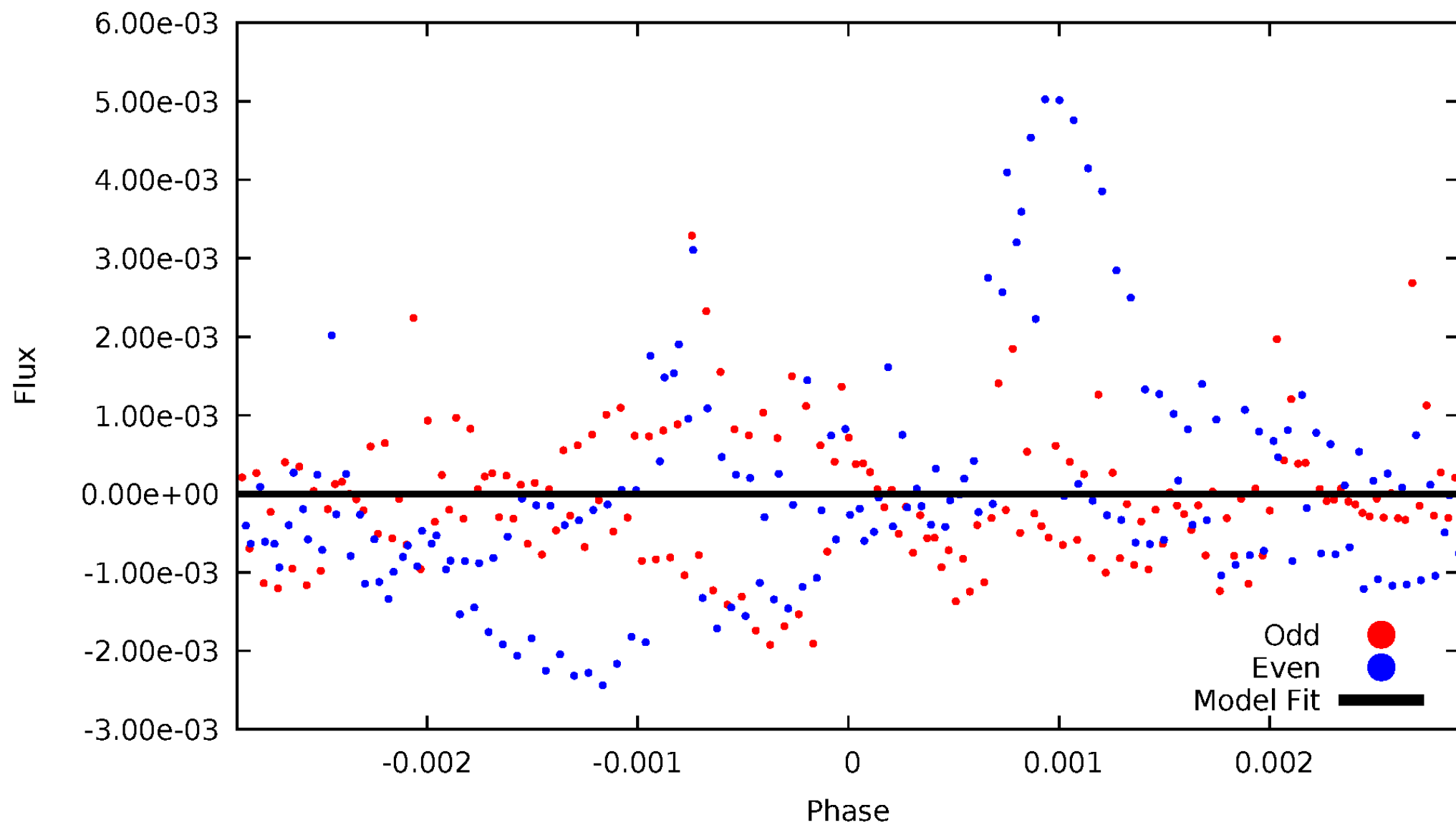
TCE 010355809-07





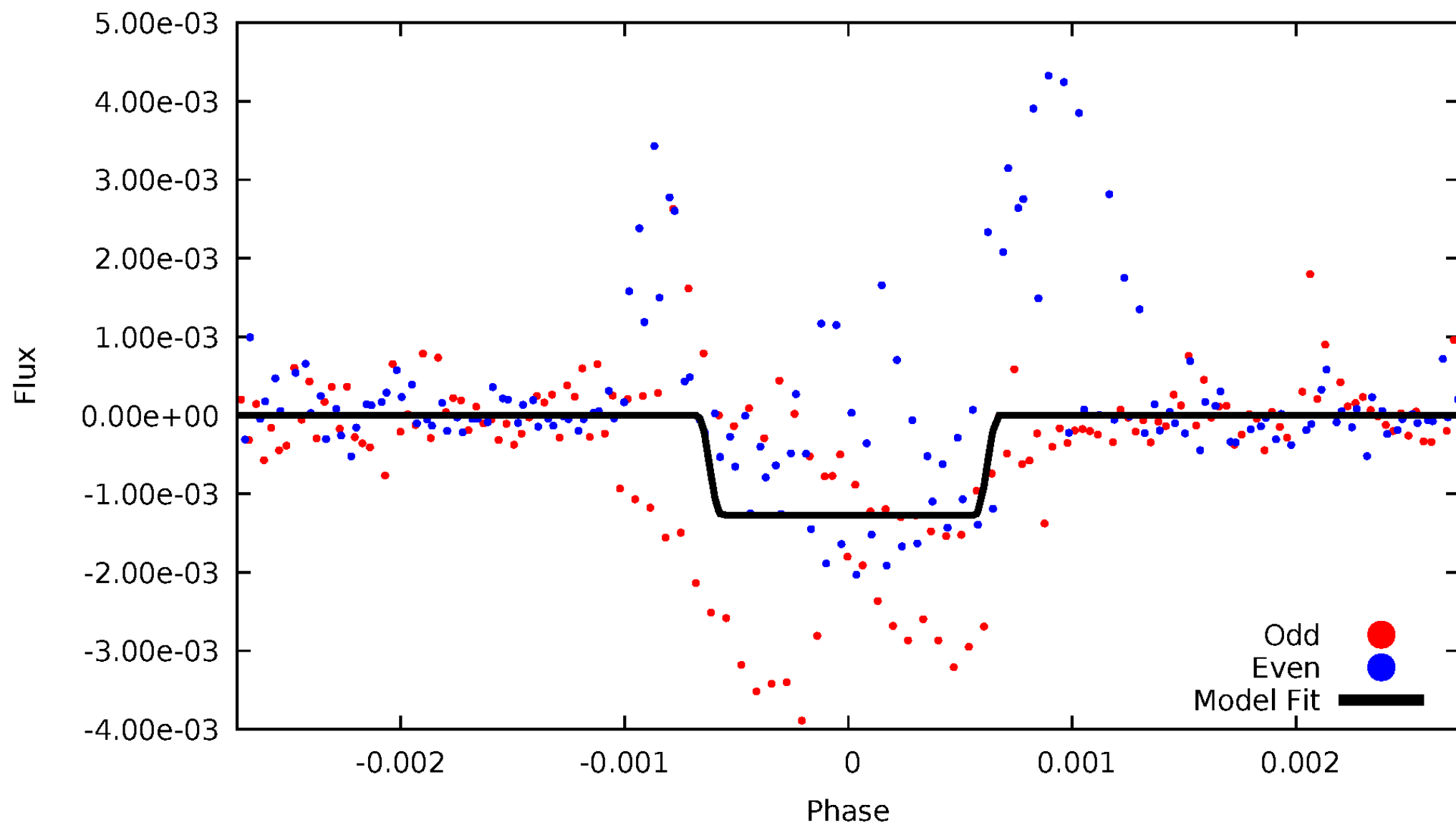
# DV Odd/Even

TCE 010355809-07

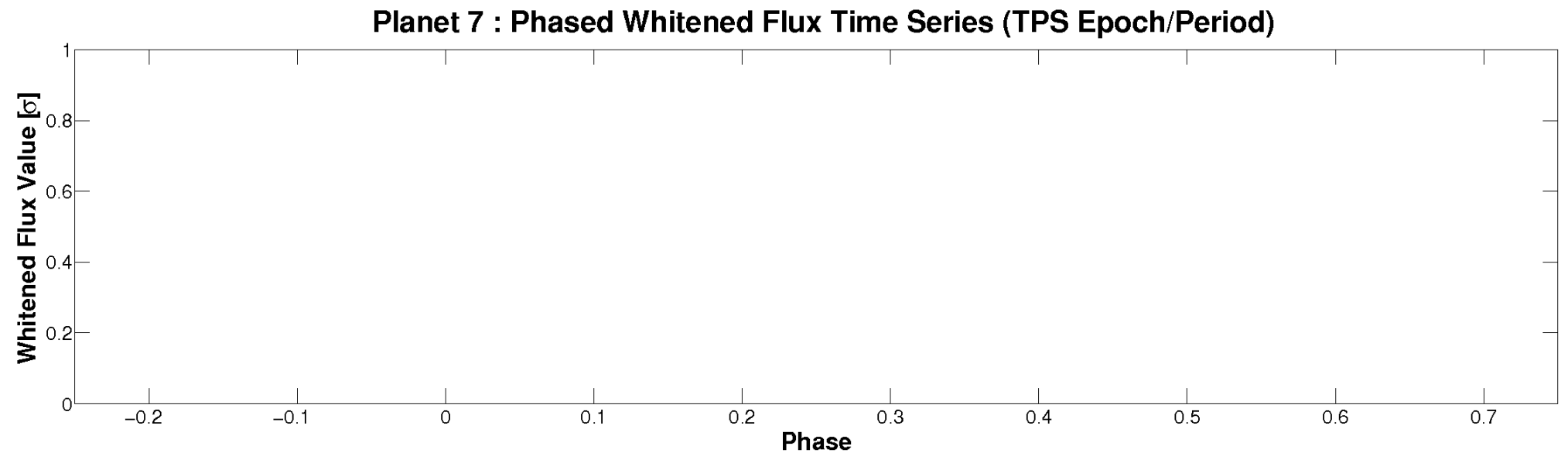
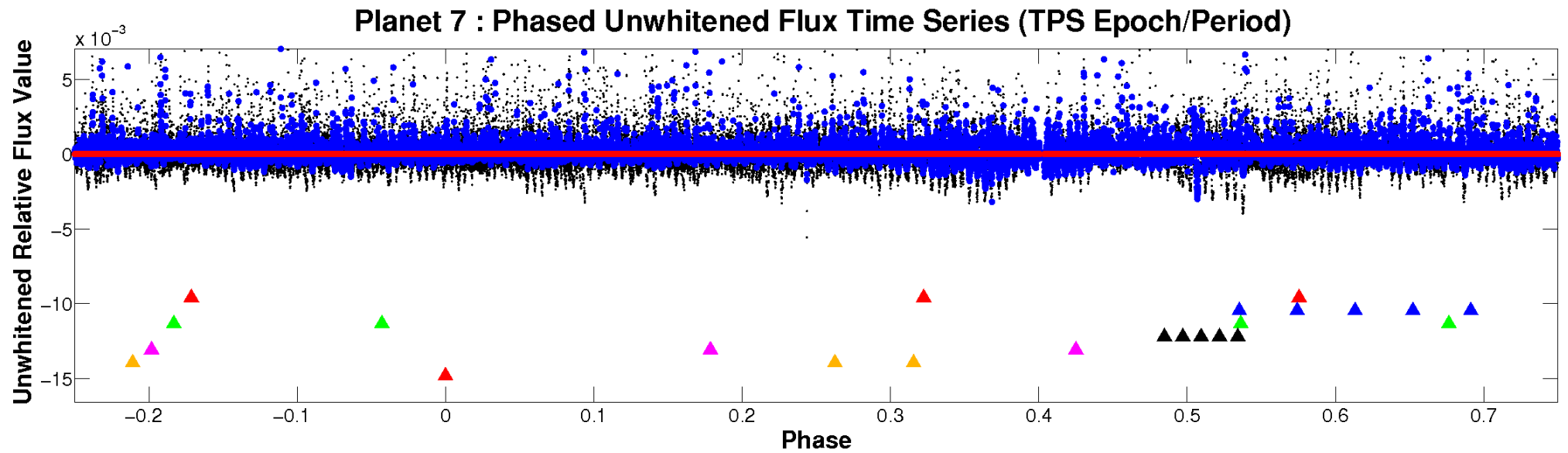


# ALT Odd/Even

TCE 010355809-07

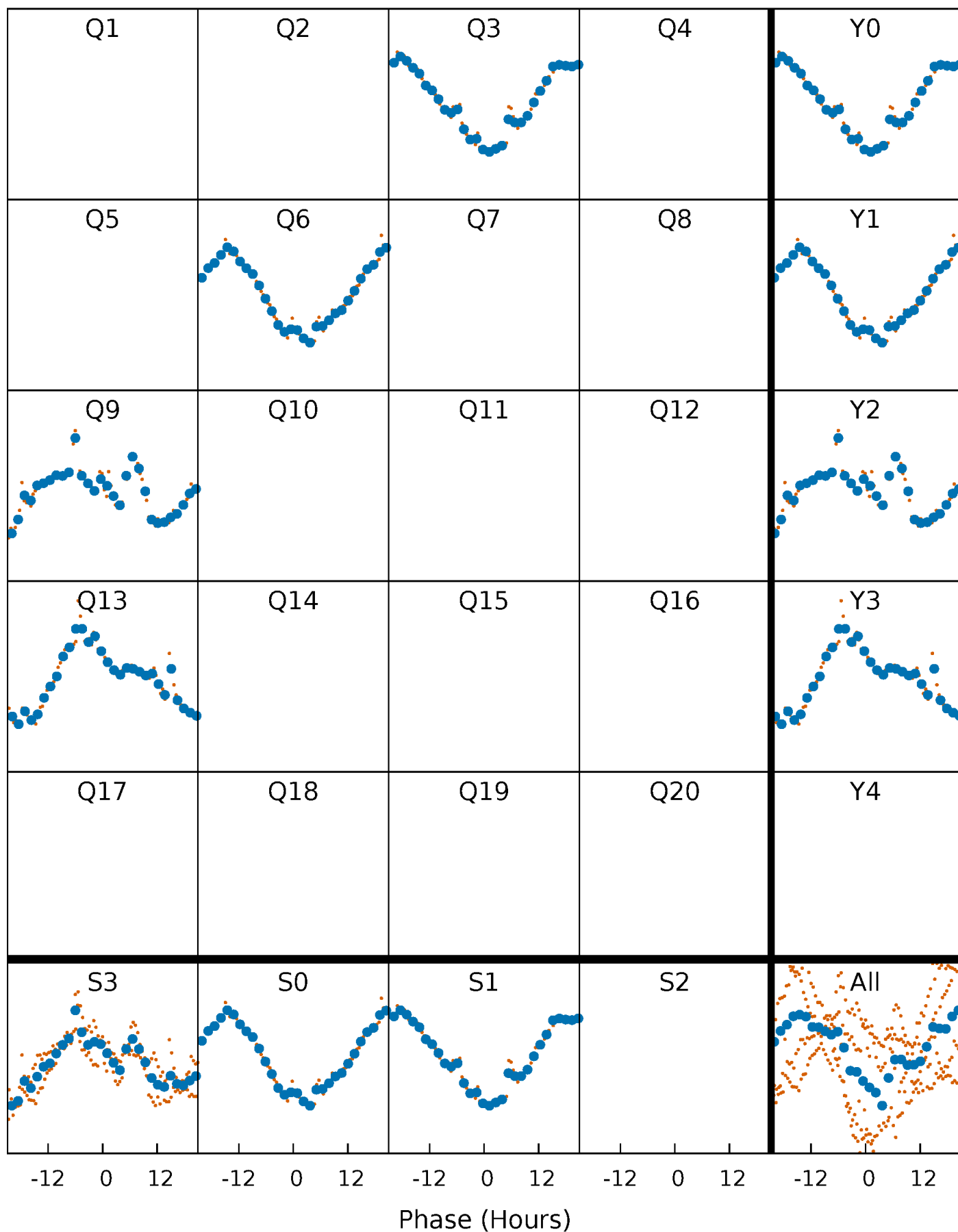


# Non-Whitened Vs. Whitened Light Curve



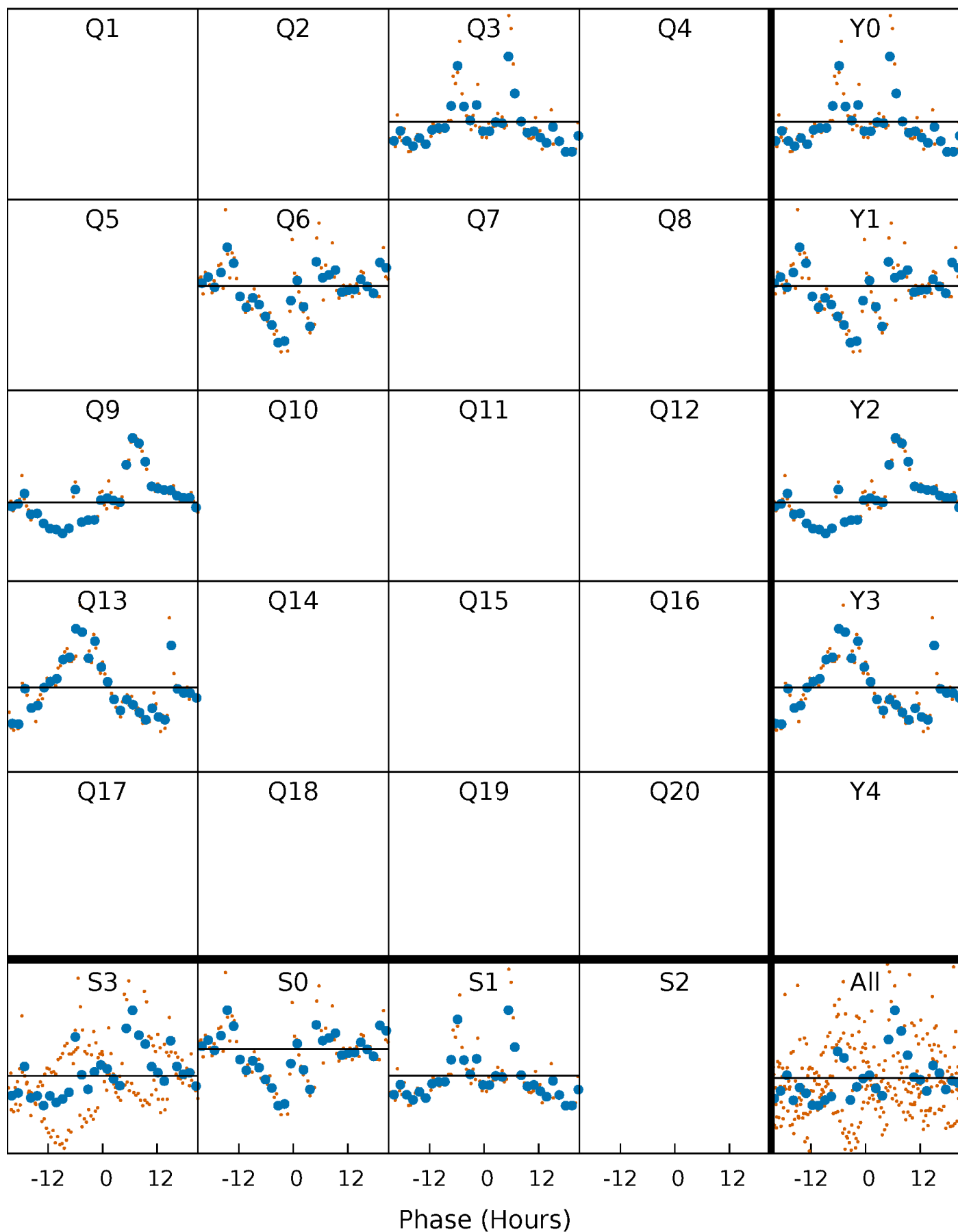
# PDC Quarter-Phased Transit Curves

TCE 010355809-07     $P=301.674269$  Days     $T_0=279.061731$  (BKJD)



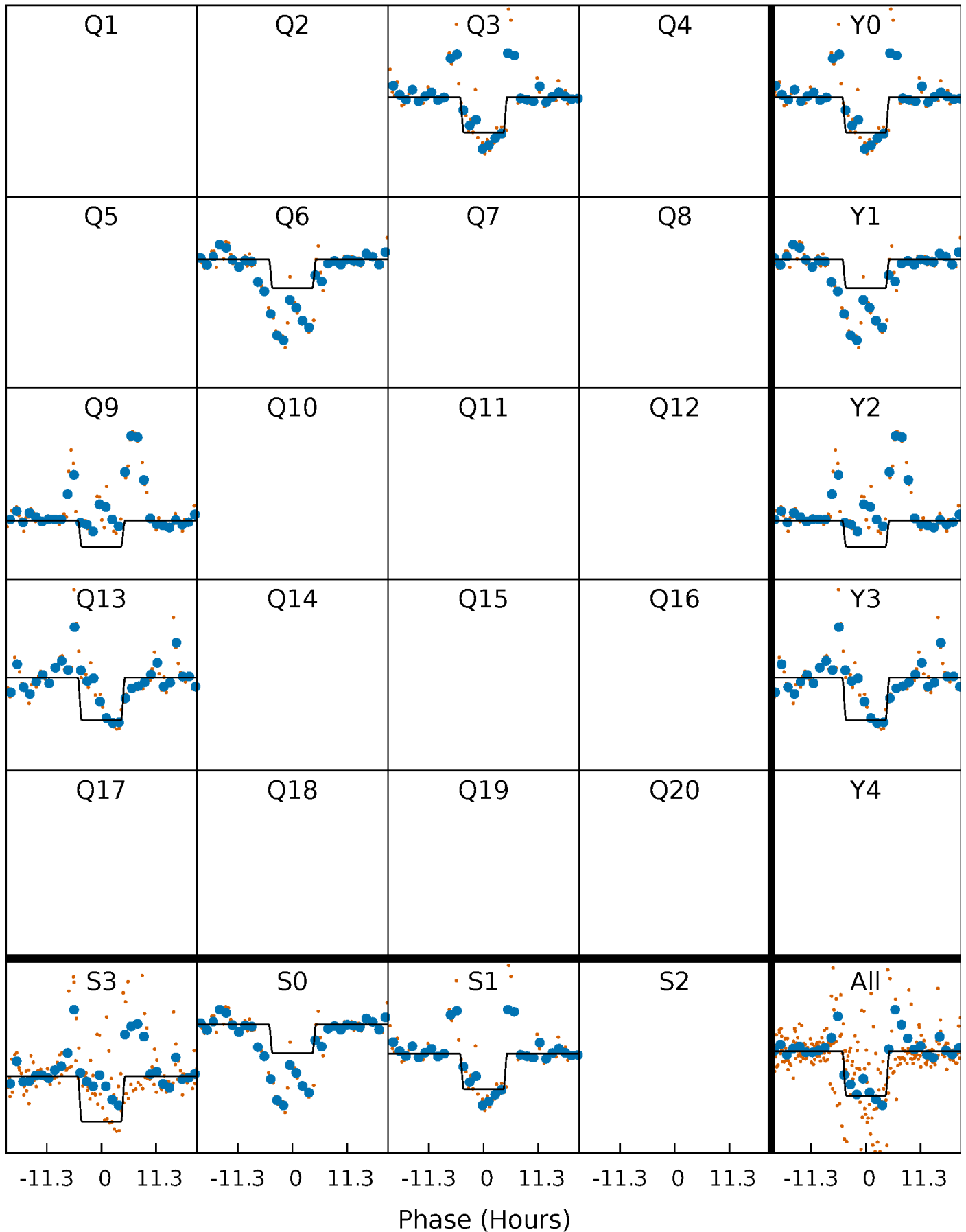
# DV Quarter-Phased Transit Curves

TCE 010355809-07     $P=301.674269$  Days     $T_0=279.061731$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

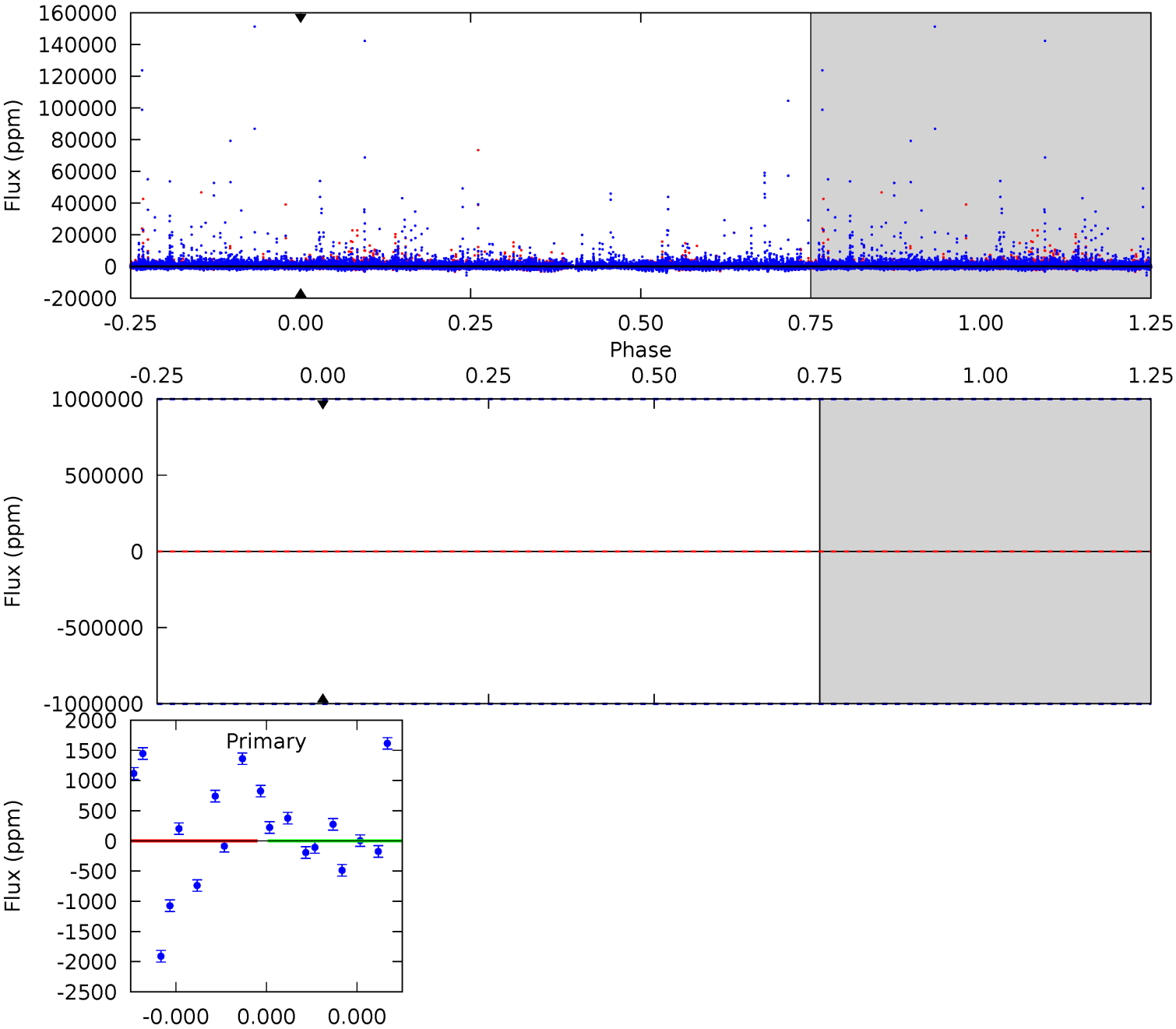
TCE 010355809-07     $P=301.674269$  Days     $T_0=279.073620$  (BKJD)



# DV Model-Shift Uniqueness Test

010355809-07, P = 301.674269 Days, E = 279.061731 Days

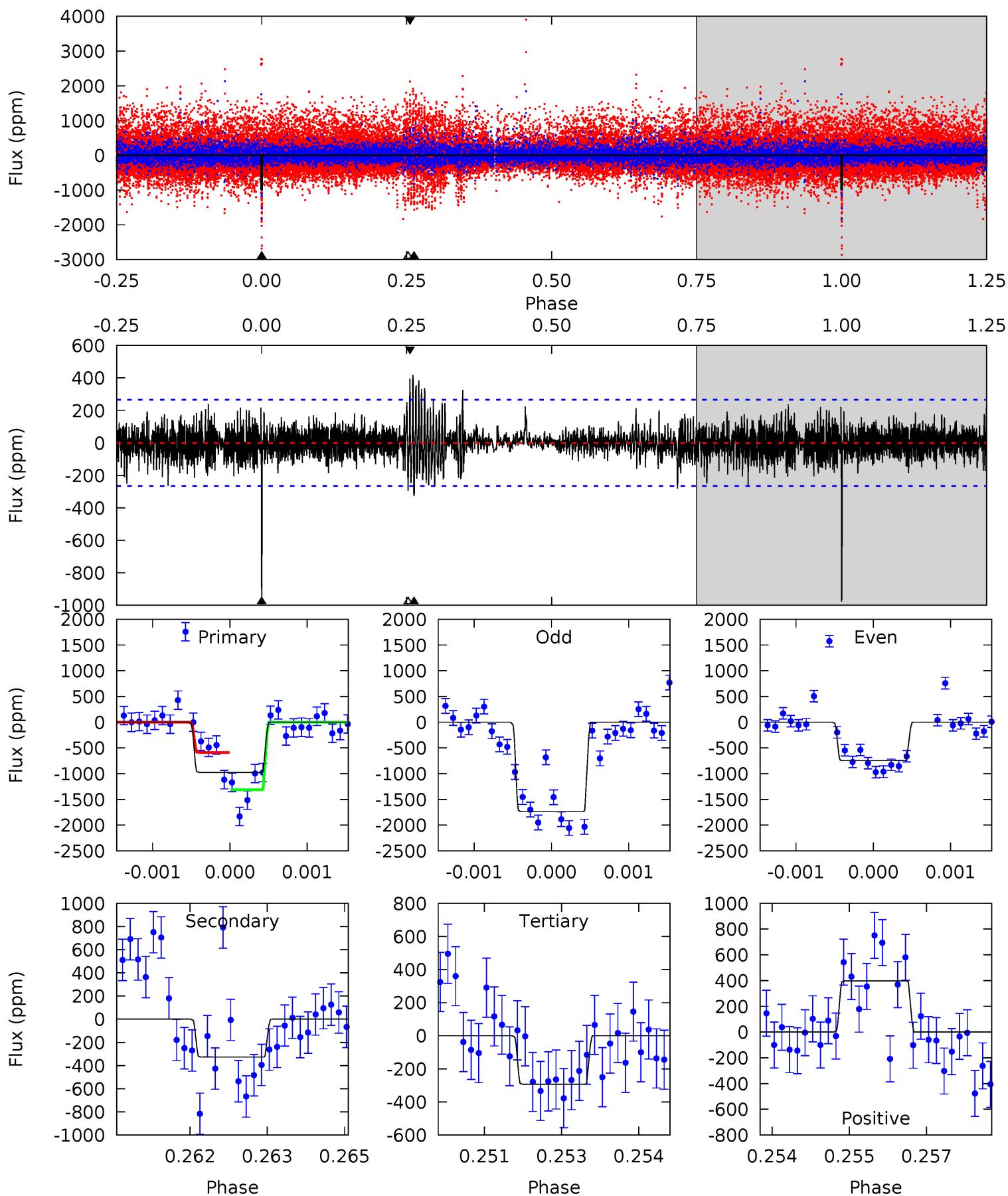
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

010355809-07, P = 301.674269 Days, E = 279.073620 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
19.9	6.65	5.96	8.07	5.40	3.21	1.55	13.9	11.8	0.69	-1.42	10.2	1.17	0.30	7.32





### Stellar Parameters For KIC 010355809

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4064^{+129}_{-158}$	$4.725^{+0.078}_{-0.045}$	$-0.480^{+0.300}_{-0.350}$	$0.522^{+0.057}_{-0.077}$	$0.528^{+0.055}_{-0.067}$	$5.223^{+2.123}_{-0.874}$
	+3%/-4%	+2%/-1%	+62%/-73%	+11%/-15%	+10%/-13%	+41%/-17%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010355809-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$3.91^{+4.59}_{-2.75}$	$213^{+9}_{-10}$	$3256^{+8271}_{-12797}$	$25993^{+4810773}_{-2990215}$
Alt.	$-327 \pm 49$	$4.52^{+4.51}_{-3.27}$	$213^{+8}_{-10}$	$2603^{+1129}_{-397}$	$4437^{+56538}_{-3326}$

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

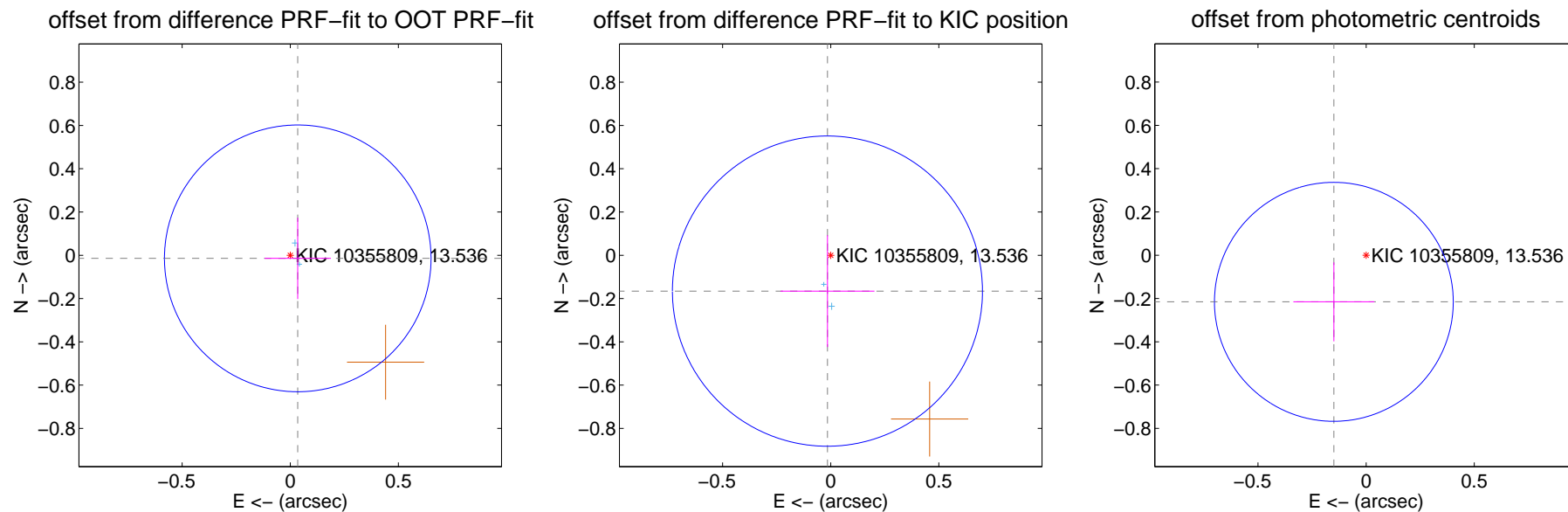
## DV Centroid Data

Supplemental centroid analysis for 010355809-07. Kepler magnitude: 13.54. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

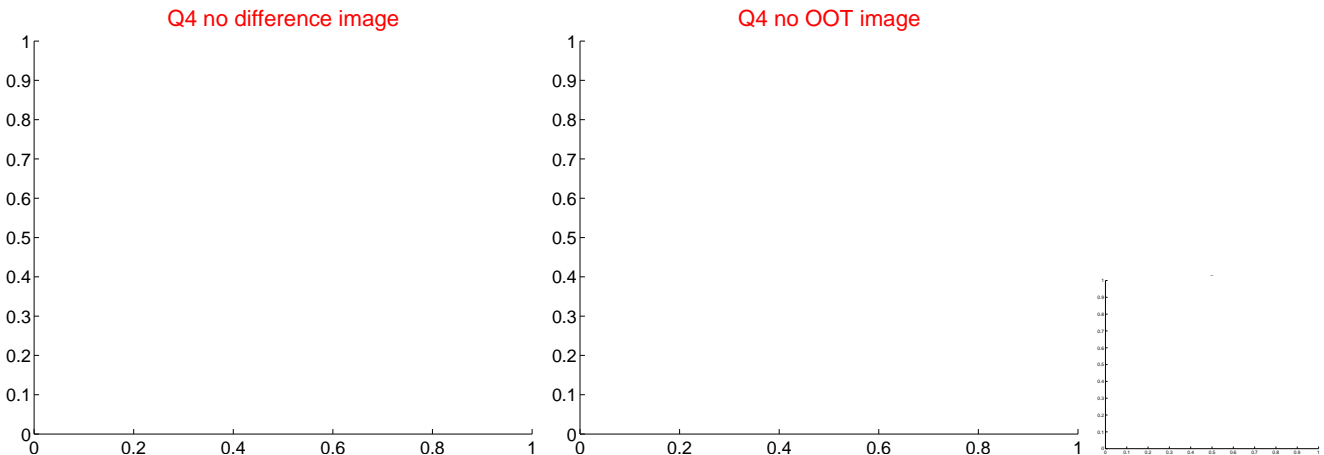
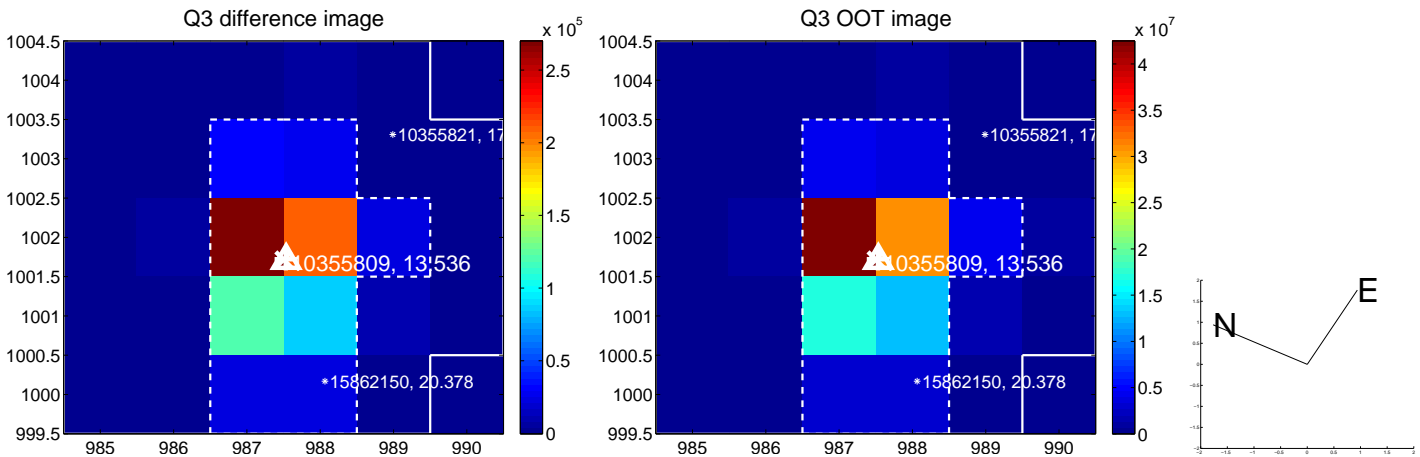
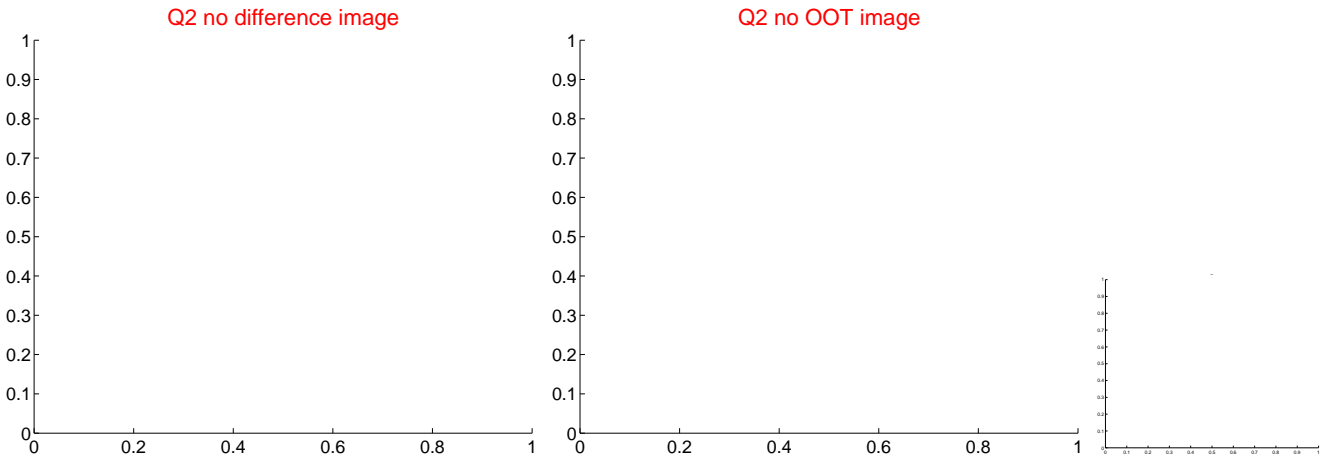
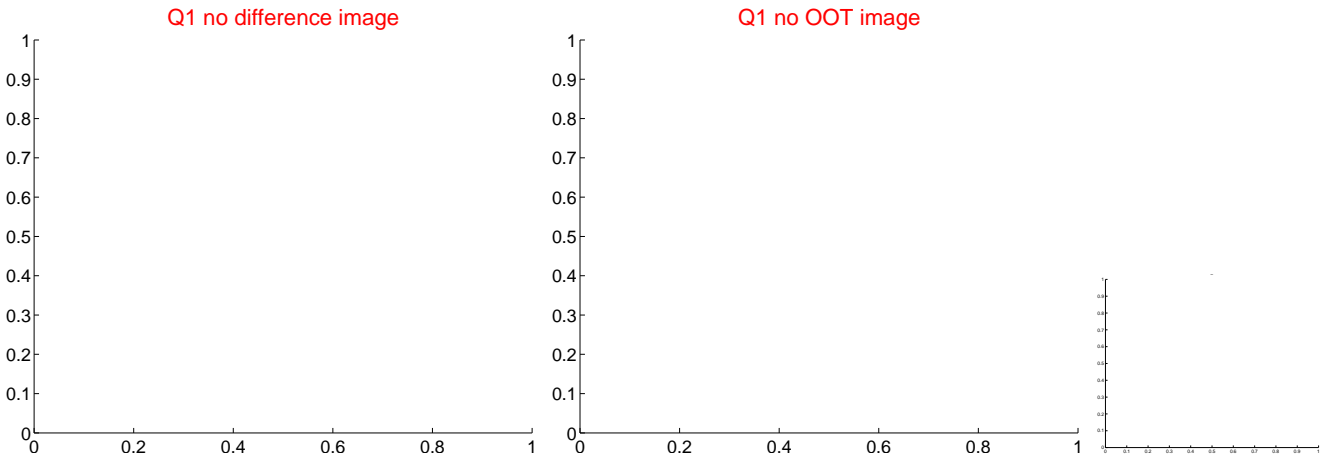
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.037 \pm 0.205$	0.18	$-0.035 \pm 0.153$	$-0.014 \pm 0.188$
PRF-fit source offset from KIC position	$0.166 \pm 0.239$	0.70	$0.015 \pm 0.217$	$-0.166 \pm 0.258$
photometric centroid source offset	$0.26 \pm 0.18$	1.42	$0.15 \pm 0.19$	$-0.22 \pm 0.18$



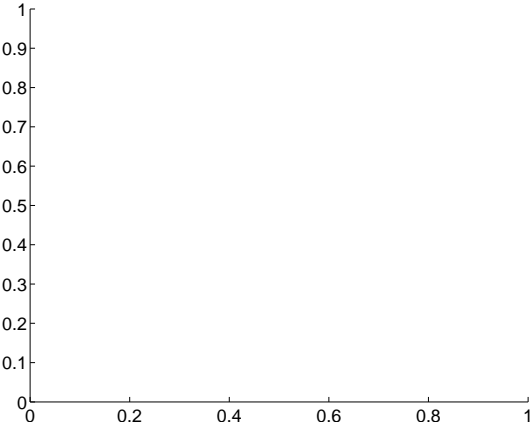
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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

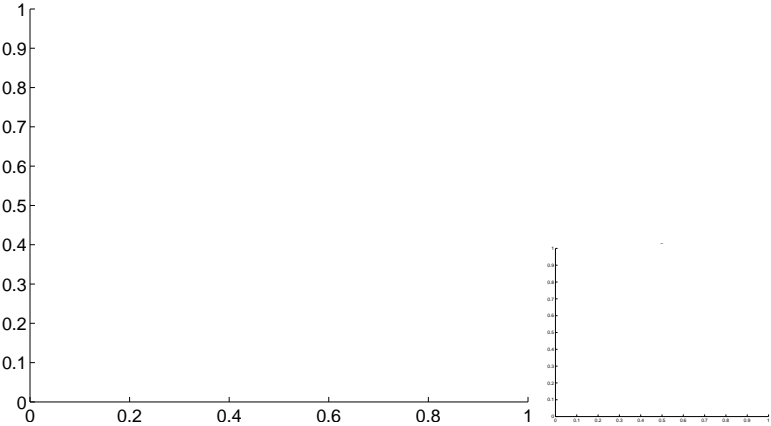


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

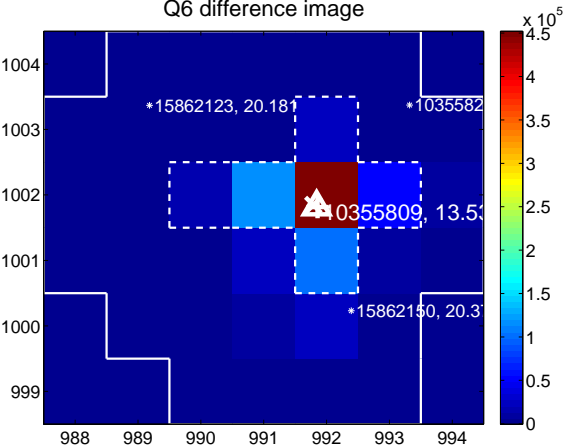
Q5 no difference image



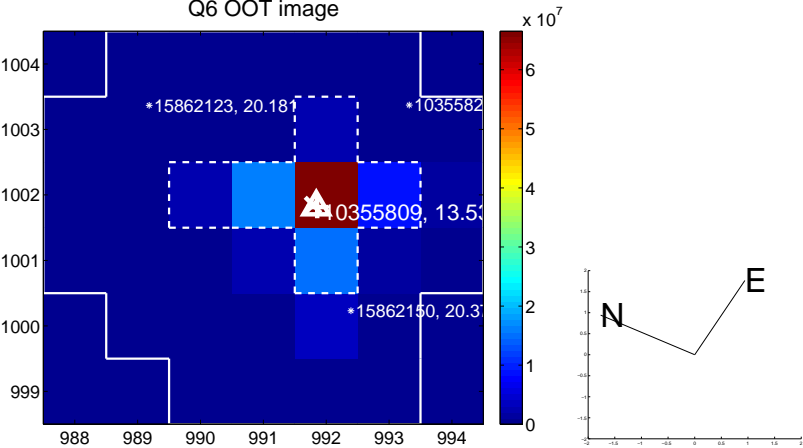
Q5 no OOT image



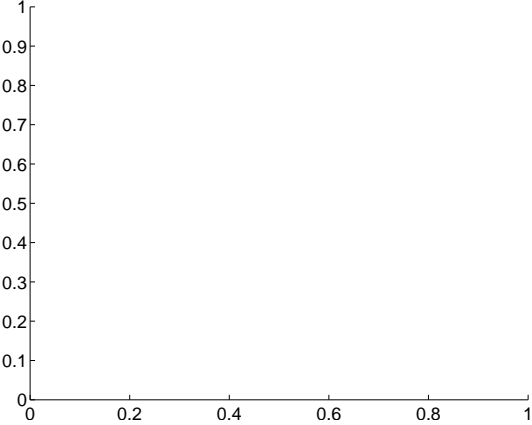
Q6 difference image



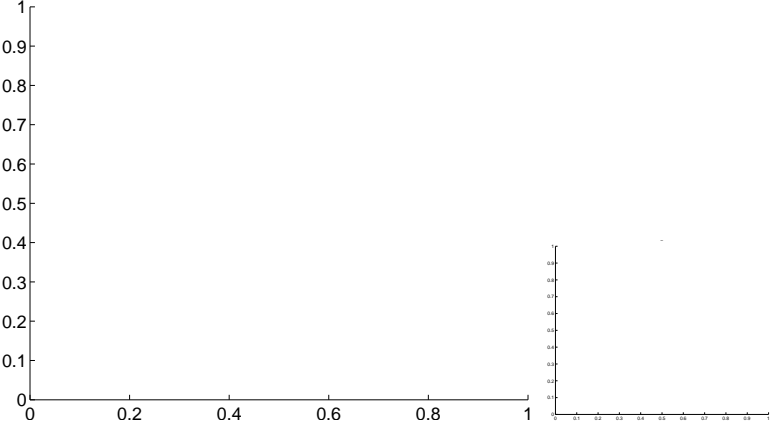
Q6 OOT image



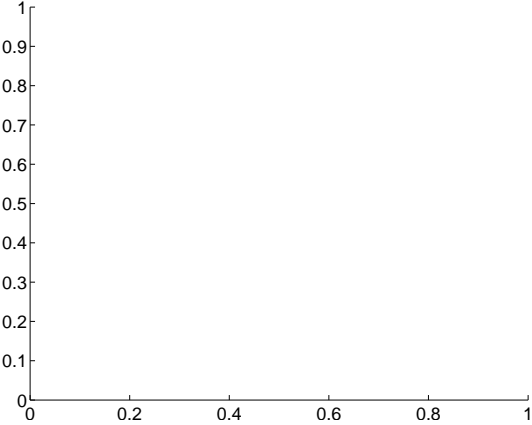
Q7 no difference image



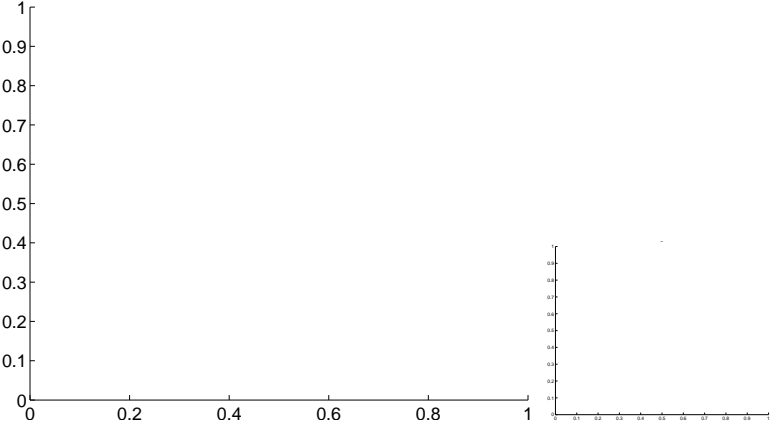
Q7 no OOT image



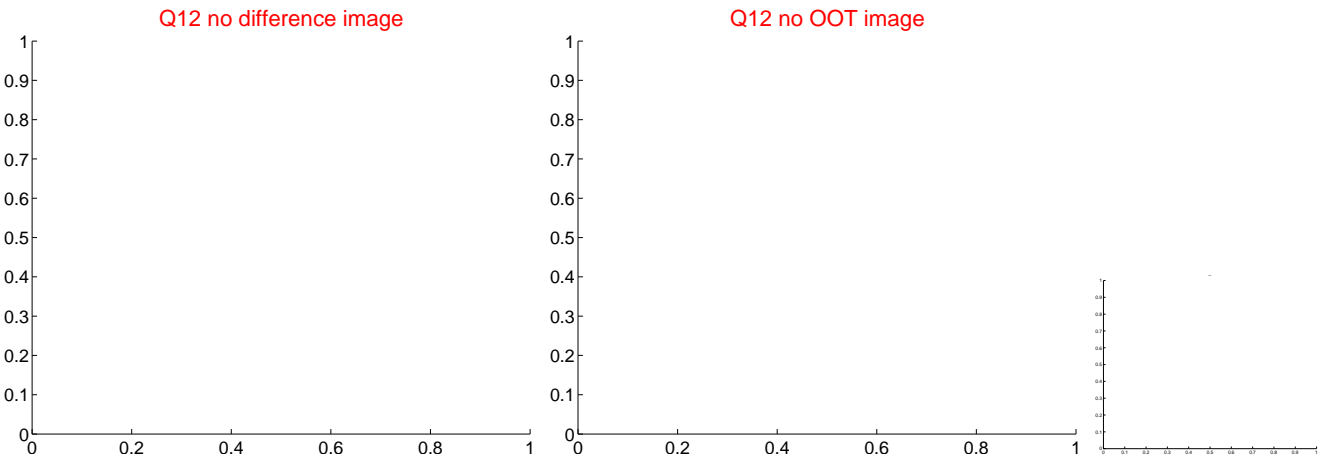
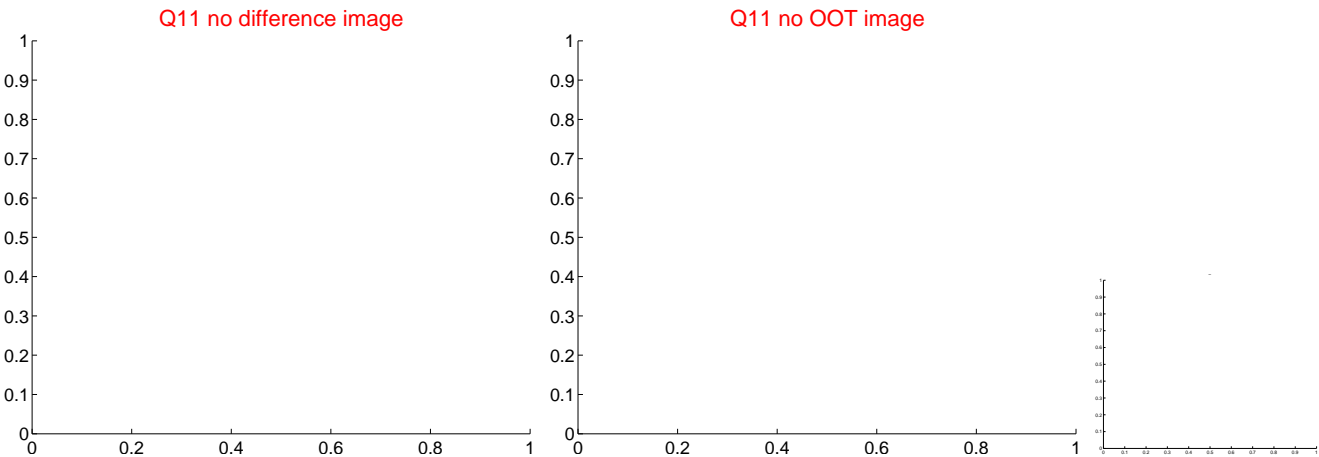
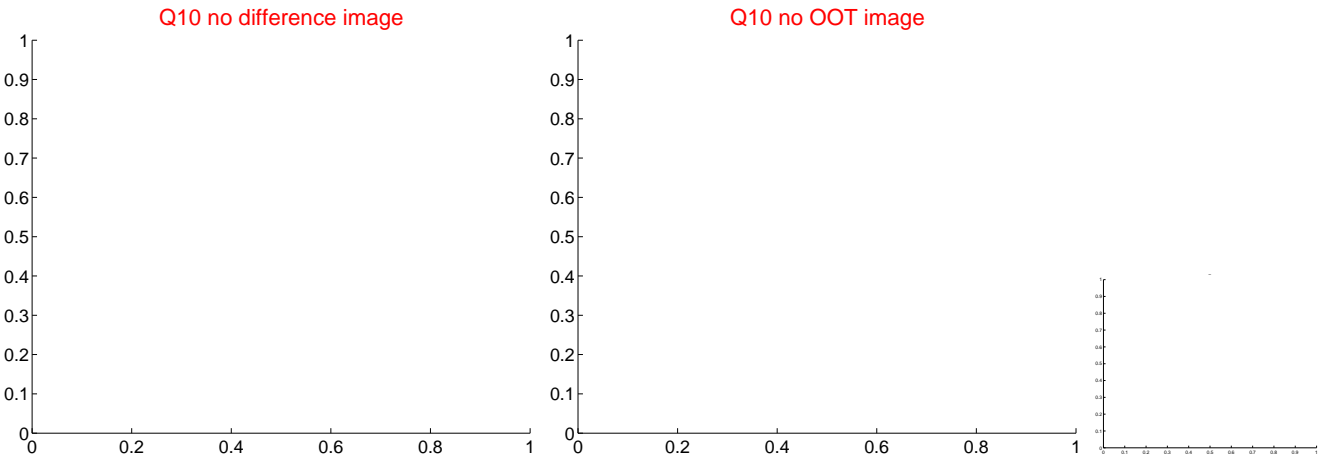
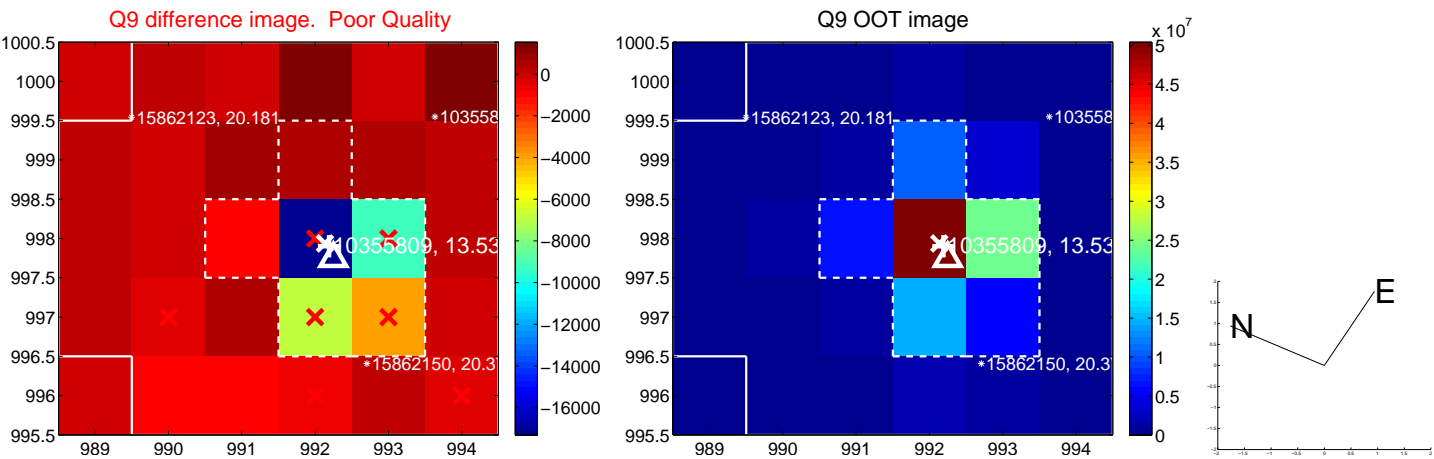
Q8 no difference image



Q8 no OOT image



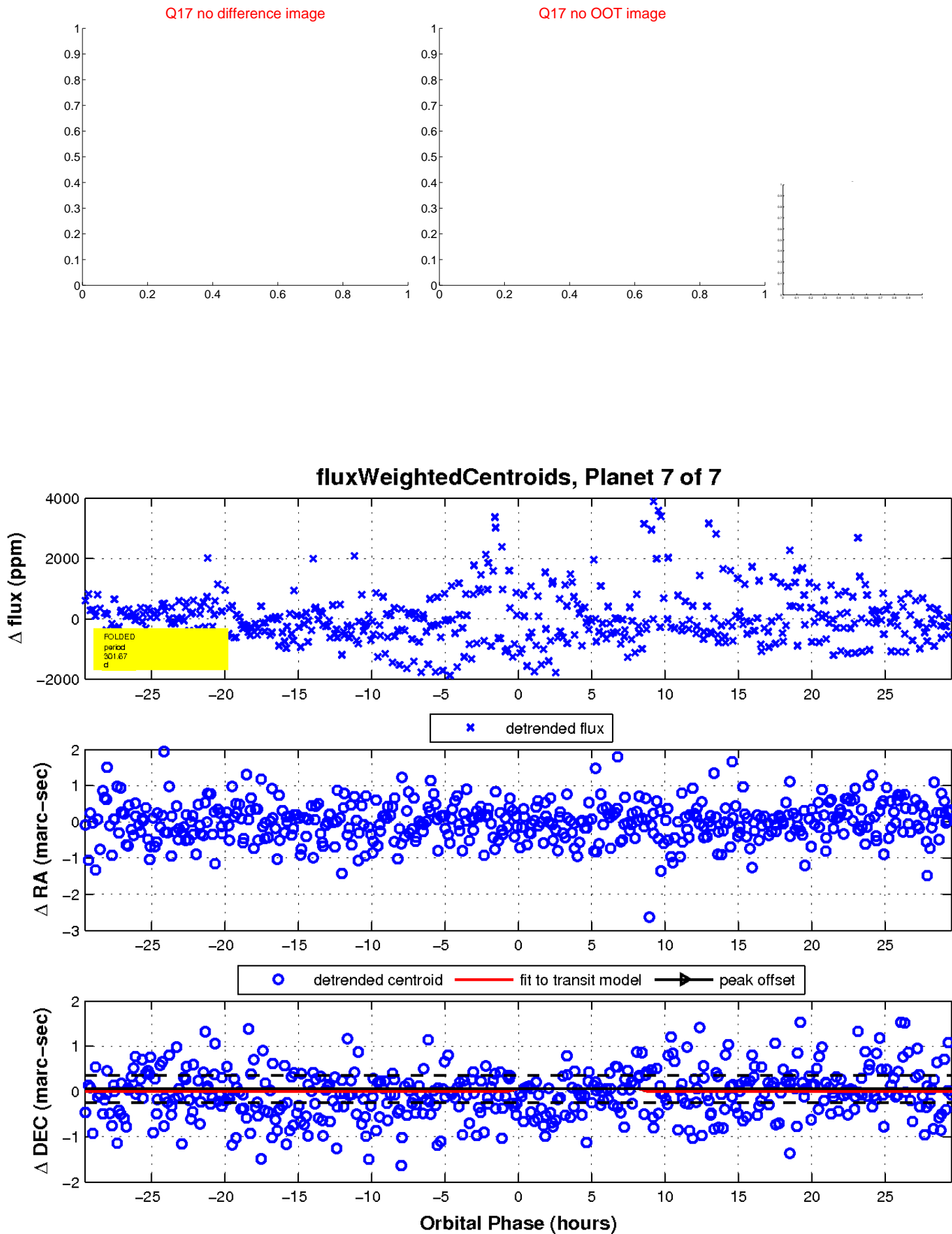
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

