

# KIC 003629473

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003629473-01	OBS	No	1.706927	132.936916	32.9	6.938	8.7	10.0	2.42	6927	1.87	11301.70
003629473-02	OBS	No	519.228029	524.359611	359.0	4.121	13.1	6.8	2.42	6927	5.16	5.52
003629473-03	OBS	No	361.307398	479.964538	807.7	16.260	12.3	7.9	2.42	6927	12.95	8.96
003629473-04	OBS	No	246.357037	152.247969	227.8	14.752	8.6	3.1	2.42	6927	3.94	14.93
003629473-05	OBS	No	157.885484	153.773129	195.1	4.376	8.9	4.7	2.42	6927	3.78	27.02
003629473-06	OBS	No	212.128031	243.178808	326.2	13.594	9.2	5.2	2.42	6927	4.70	18.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003629473-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
003629473-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003629473-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
003629473-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003629473-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003629473-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—INCONSISTENT_TRANS

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

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

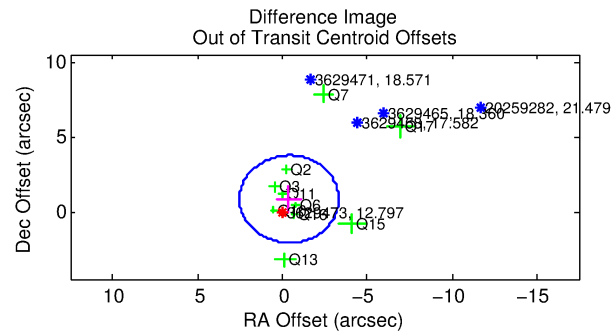
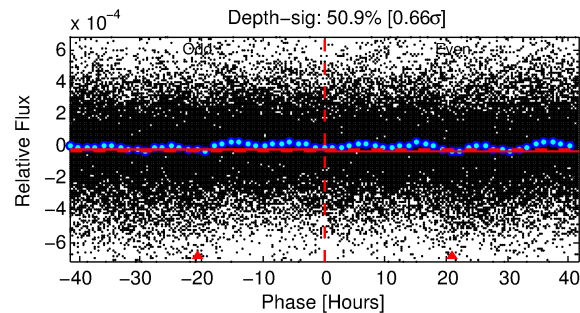
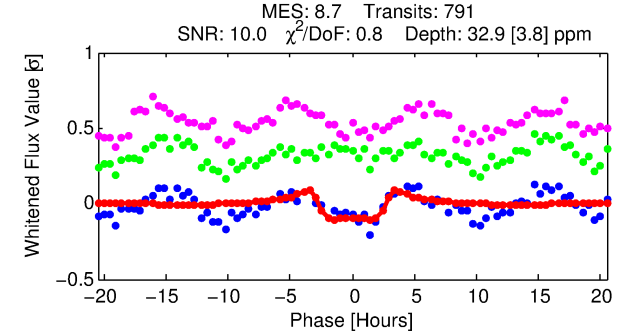
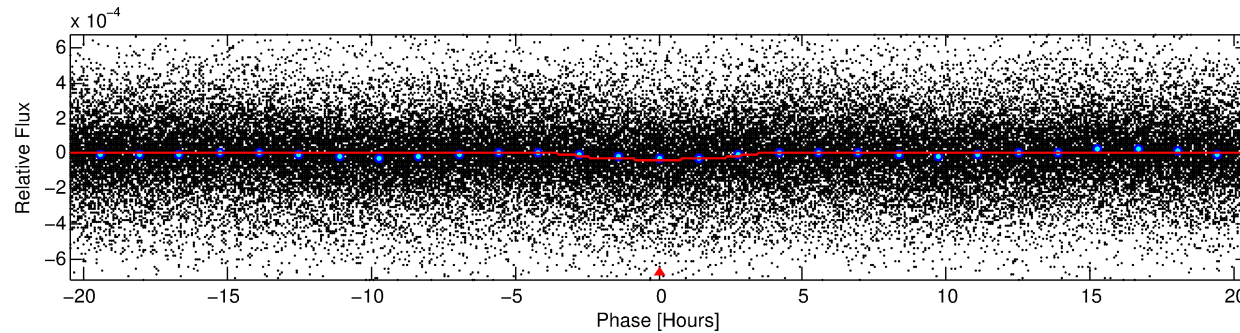
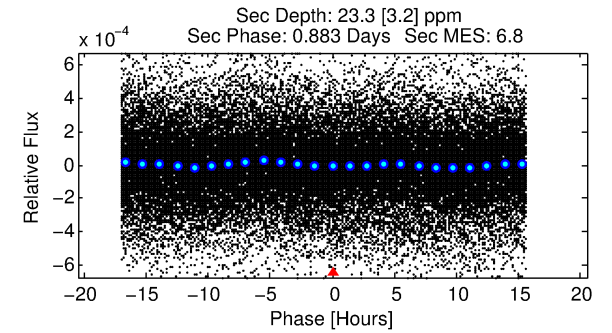
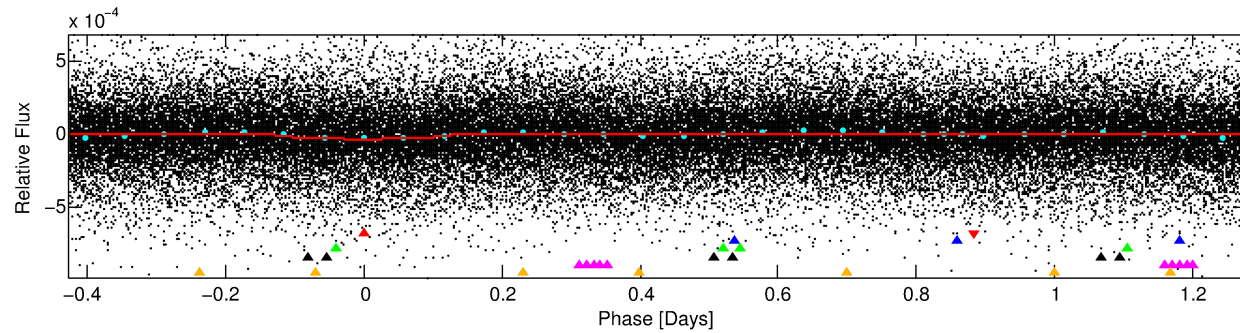
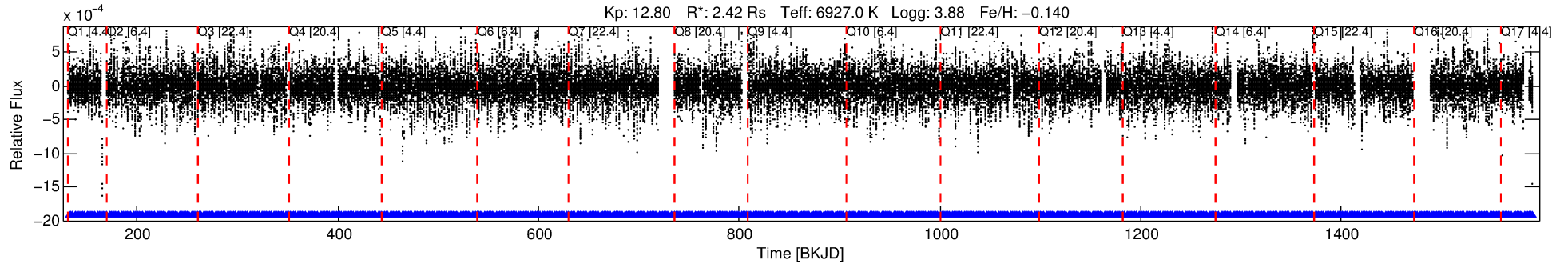
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003629473-01

No Significant Match Found

# DV One-Page Summary

KIC: 3629473 Candidate: 1 of 6 Period: 1.707 d



## DV Fit Results:

Period = 1.70693 [0.00002] d  
Epoch = 132.9369 [0.0054] BKJD  
Rp/R\* = 0.0071 [0.0004]  
a/R\* = 1.06 [0.02]  
b = 0.99 [0.00]  
Seff = 11301.70 [5501.68]  
Teq = 2629 [320] K  
Rp = 1.87 [0.65] Re  
a = 0.0327 [0.0100] AU  
Ag = 3.92 [1.97] [1.48σ]  
Teffp = 5720 [332] K [6.70σ]

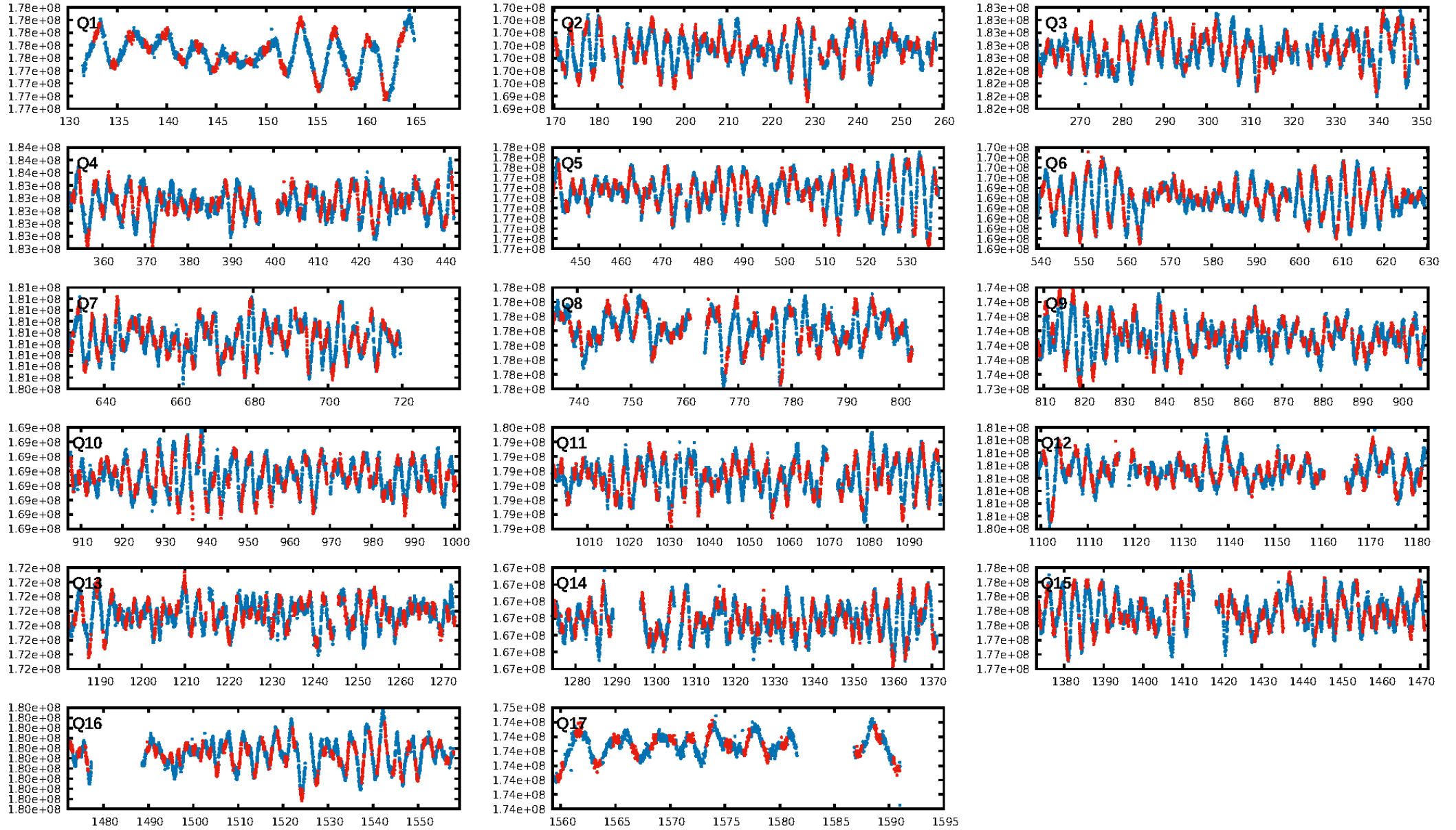
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [456.98σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.27e-15  
RollingBand-fgt: 1.00 [756/756]  
GhostDiagnostic-chr: 2.464  
Centroid-sig: 0.0%  
Centroid-so: 1.471 arcsec [2.74σ]  
OotOffset-rm: 0.927 arcsec [0.95σ]  
KicOffset-rm: 0.845 arcsec [0.78σ]  
OotOffset-st: 3/4/1/2 [10]  
KicOffset-st: 3/4/1/2 [10]  
DiffImageQuality-fgm: 0.40 [4/10]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:06:28 Z

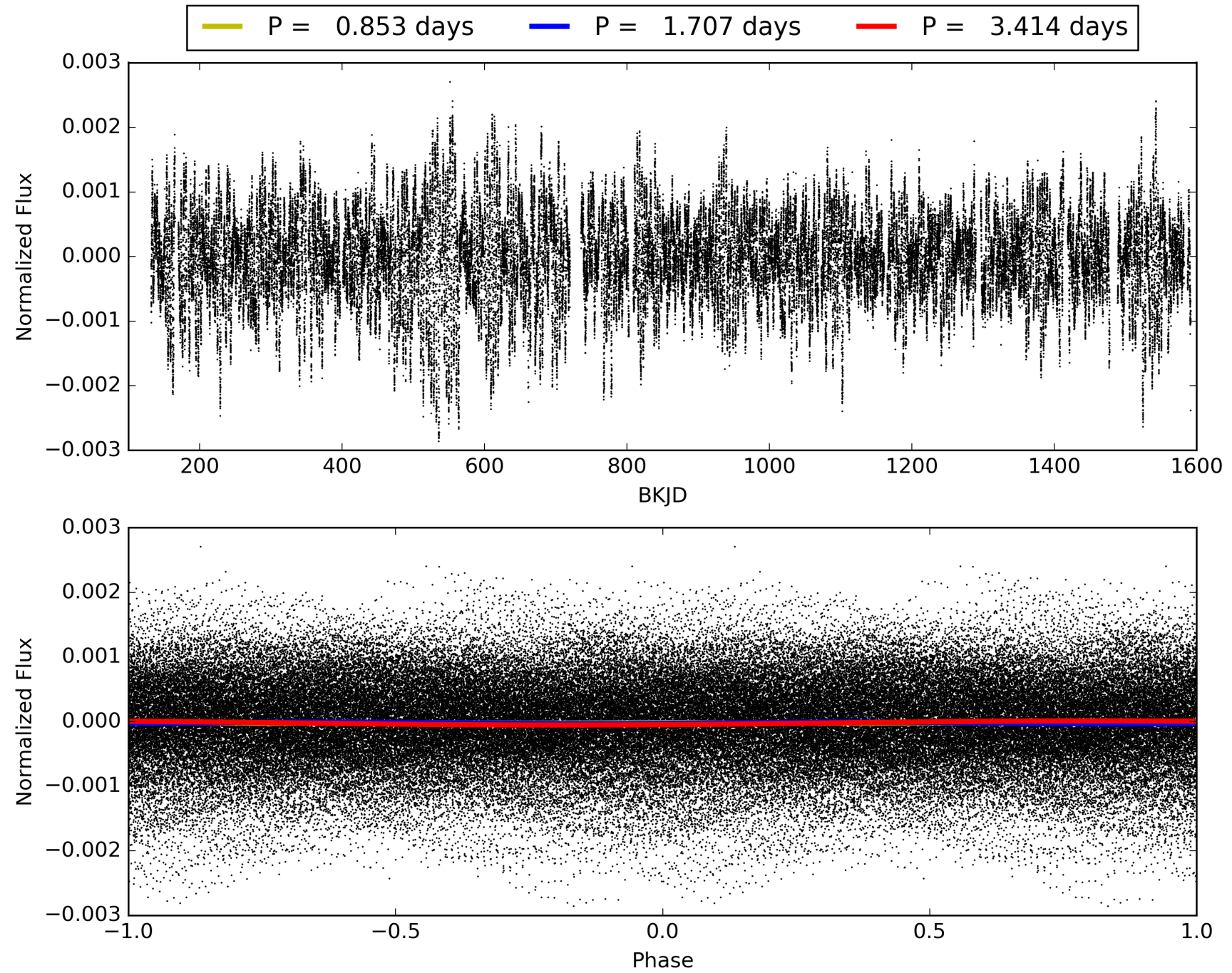
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003629473-01, PDC Light Curves





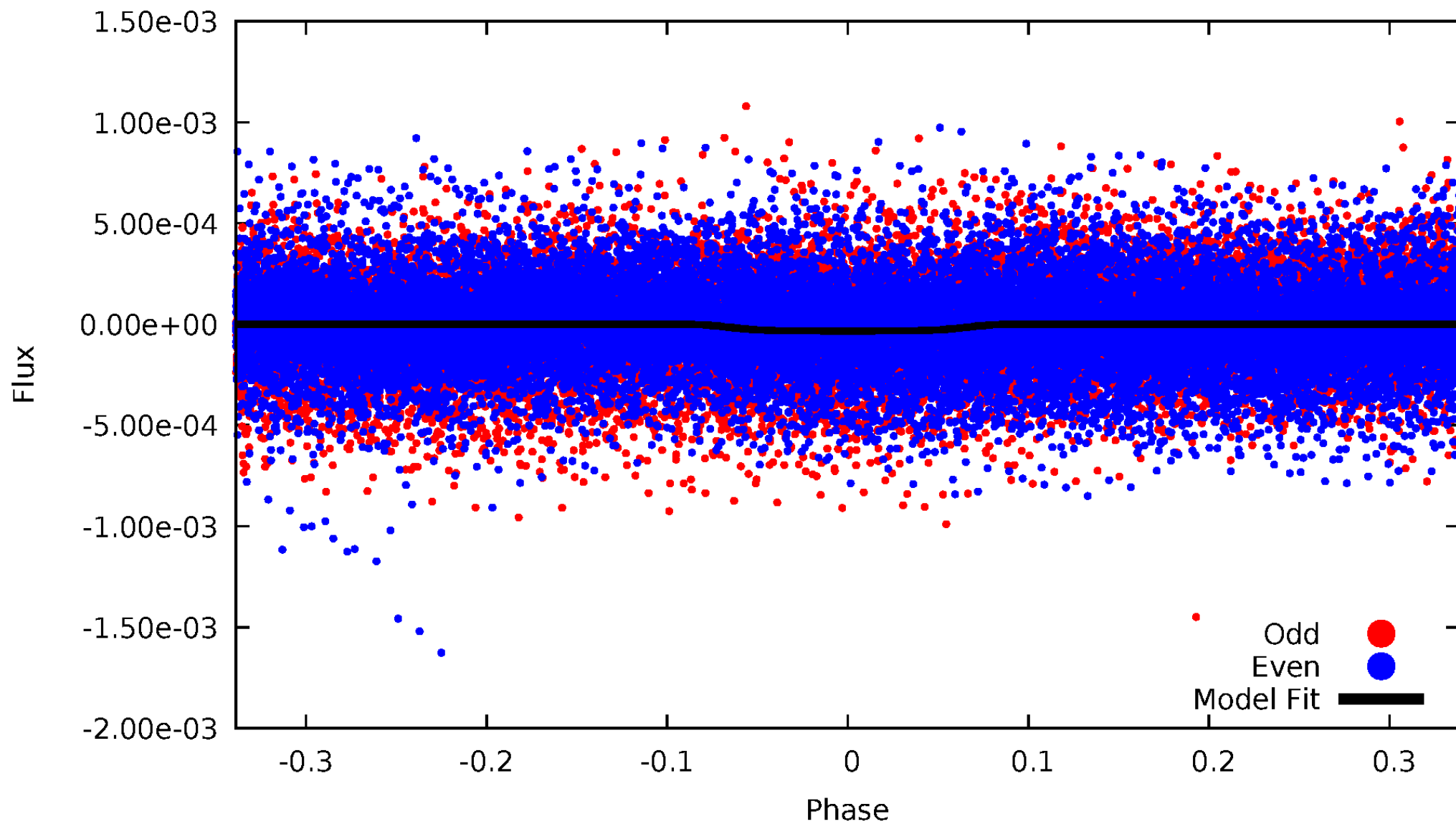
TCE 003629473-01





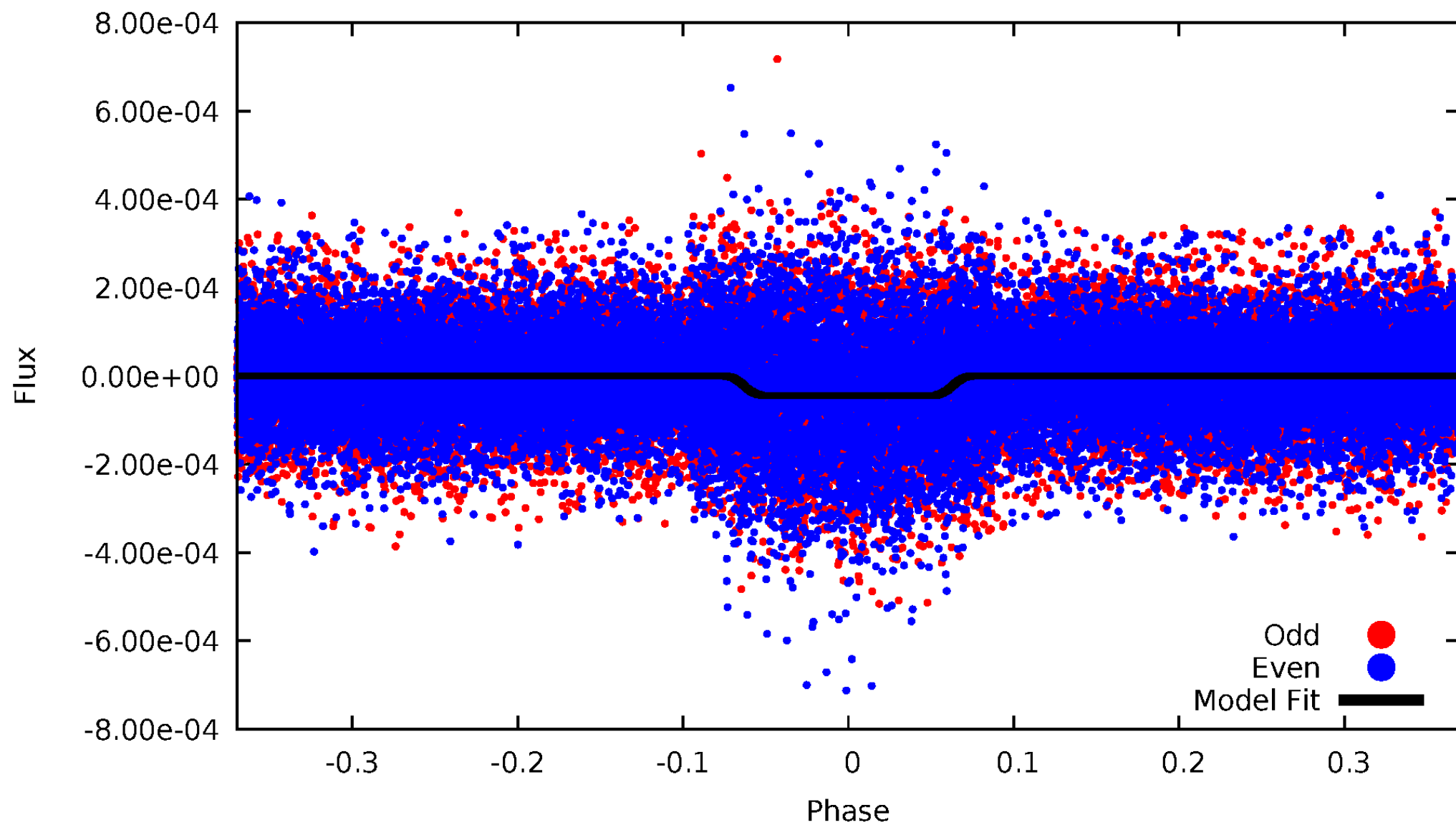
DV Odd/Even

TCE 003629473-01

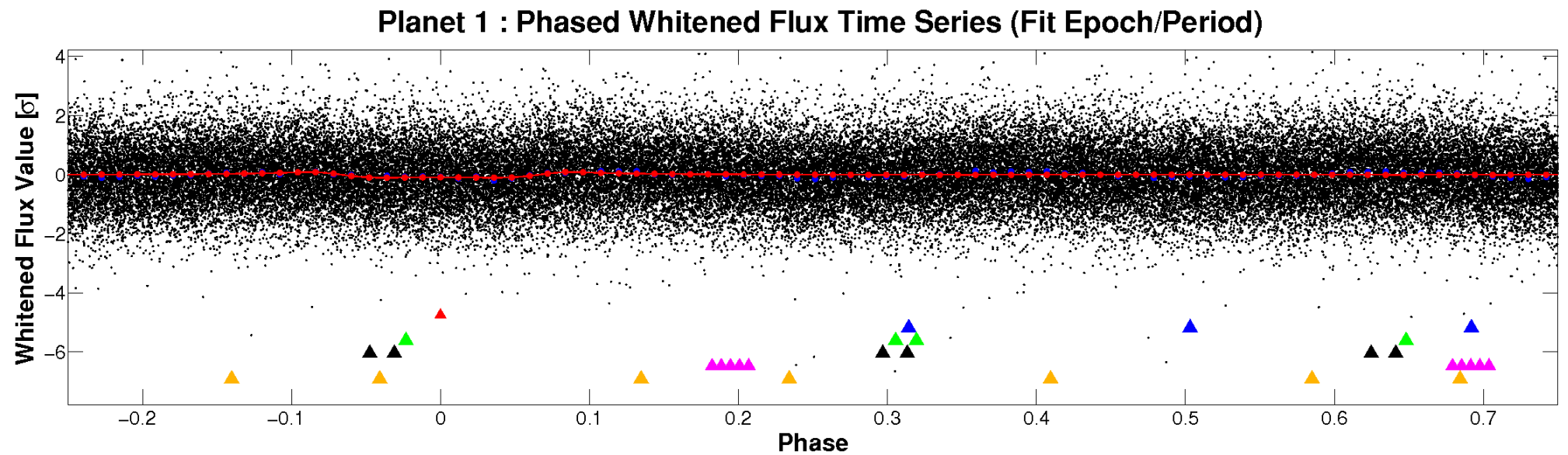
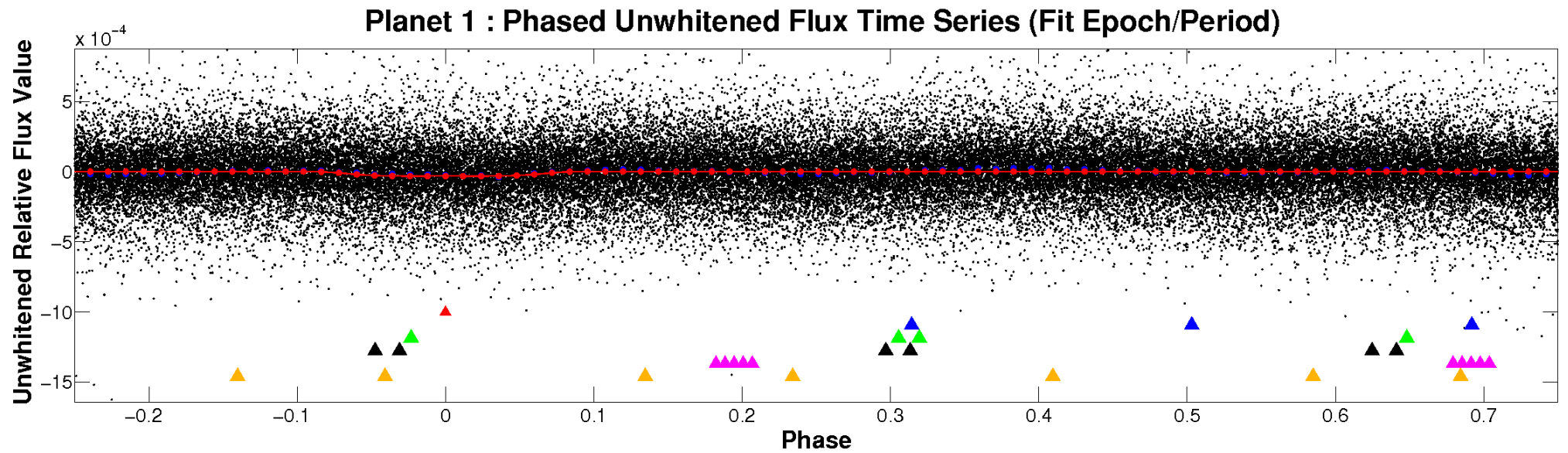


# ALT Odd/Even

TCE 003629473-01



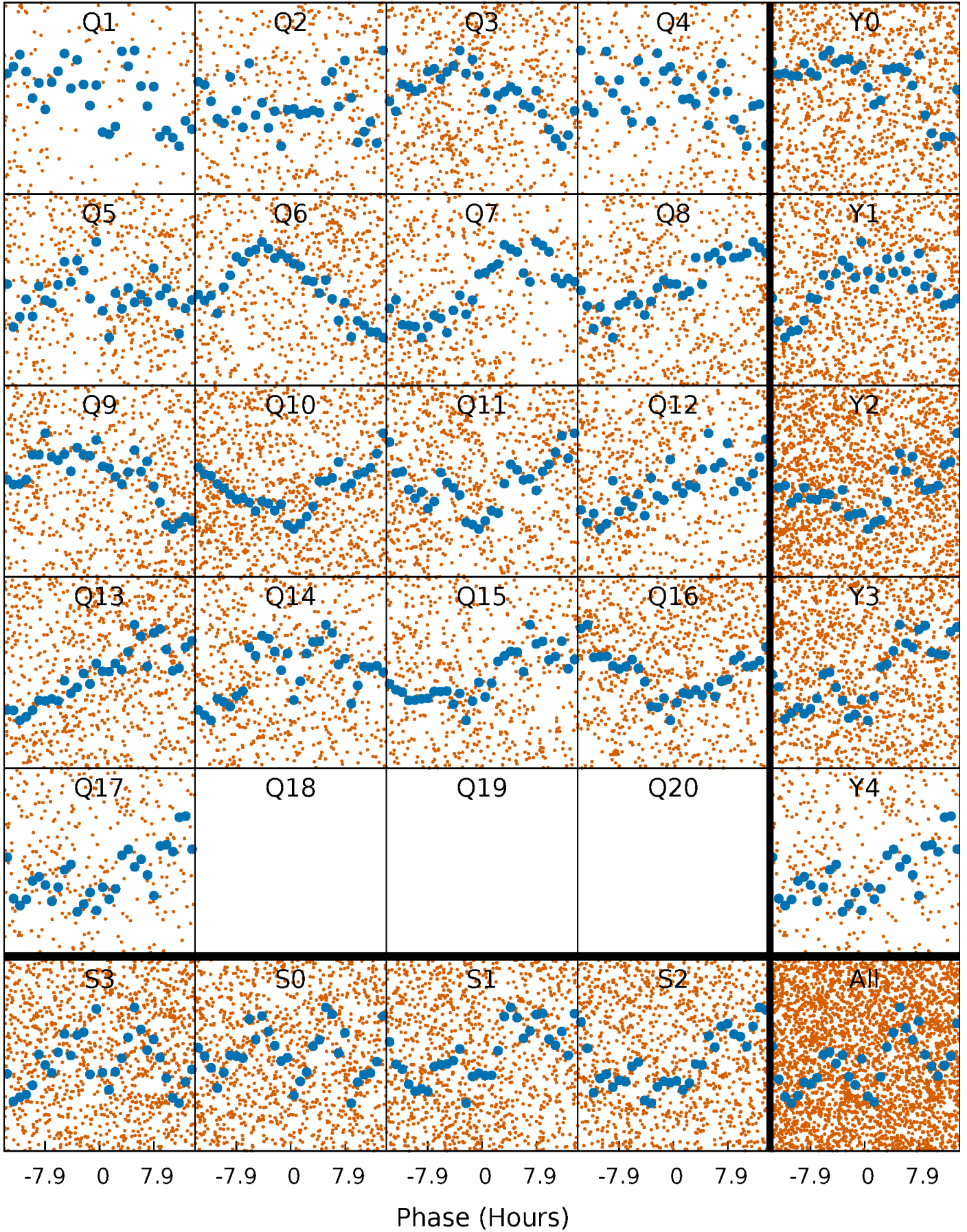
# Non-Whitened Vs. Whitened Light Curve





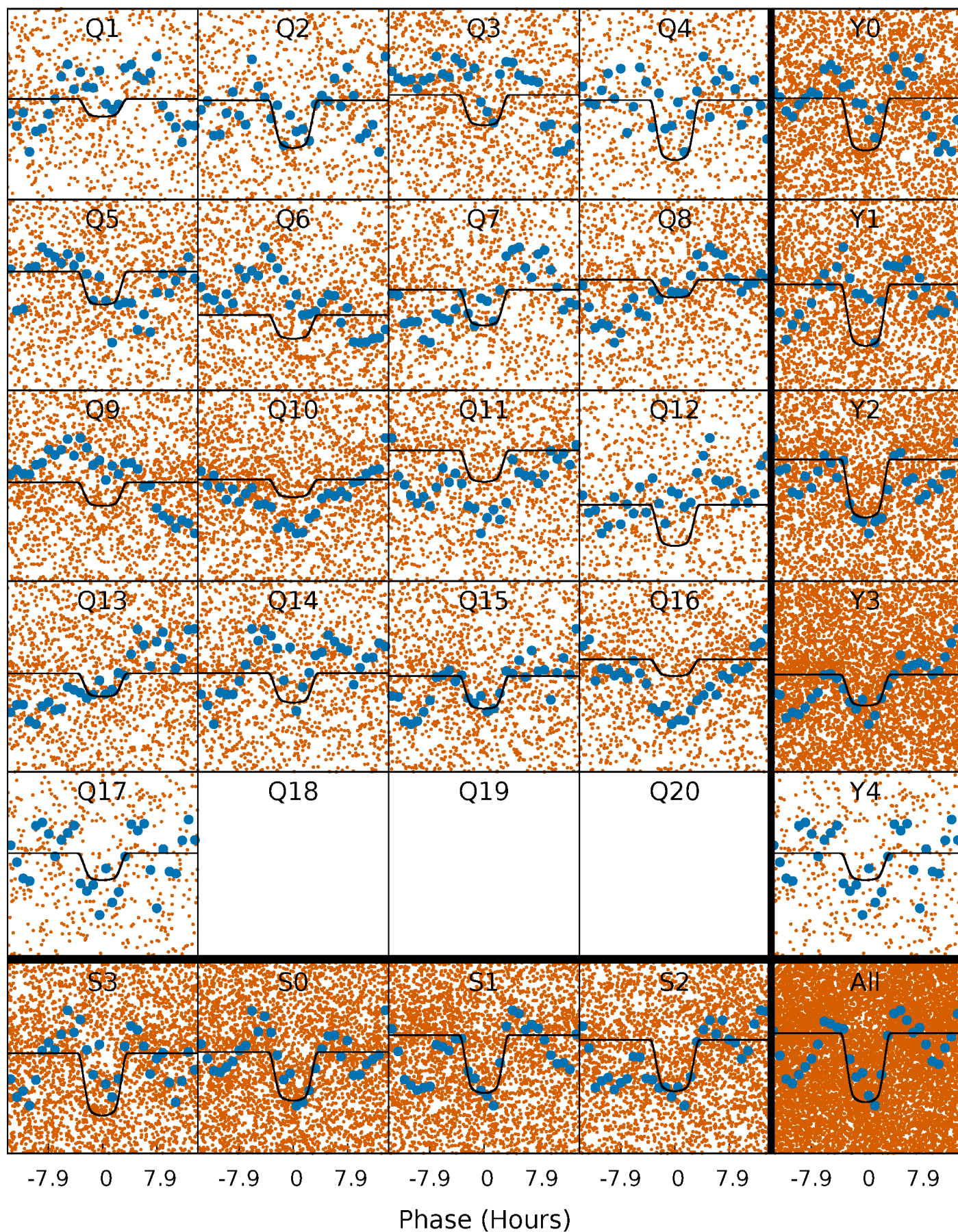
# PDC Quarter-Phased Transit Curves

TCE 003629473-01 P= 1.706927 Days  $T_0=132.936916$  (BKJD)



# DV Quarter-Phased Transit Curves

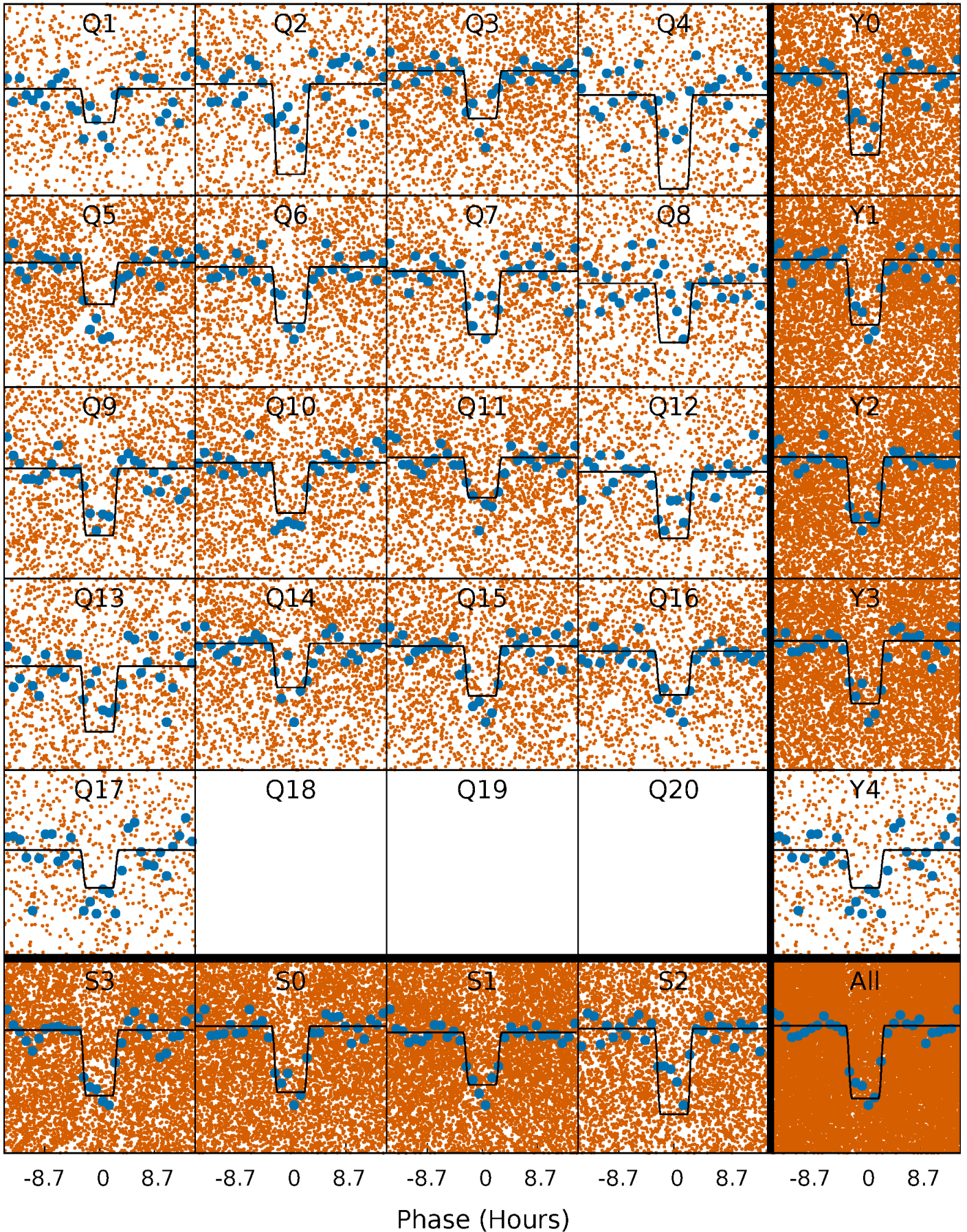
TCE 003629473-01 P= 1.706927 Days  $T_0=132.936916$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 003629473-01 P= 1.706871 Days  $T_0=132.970792$  (BKJD)

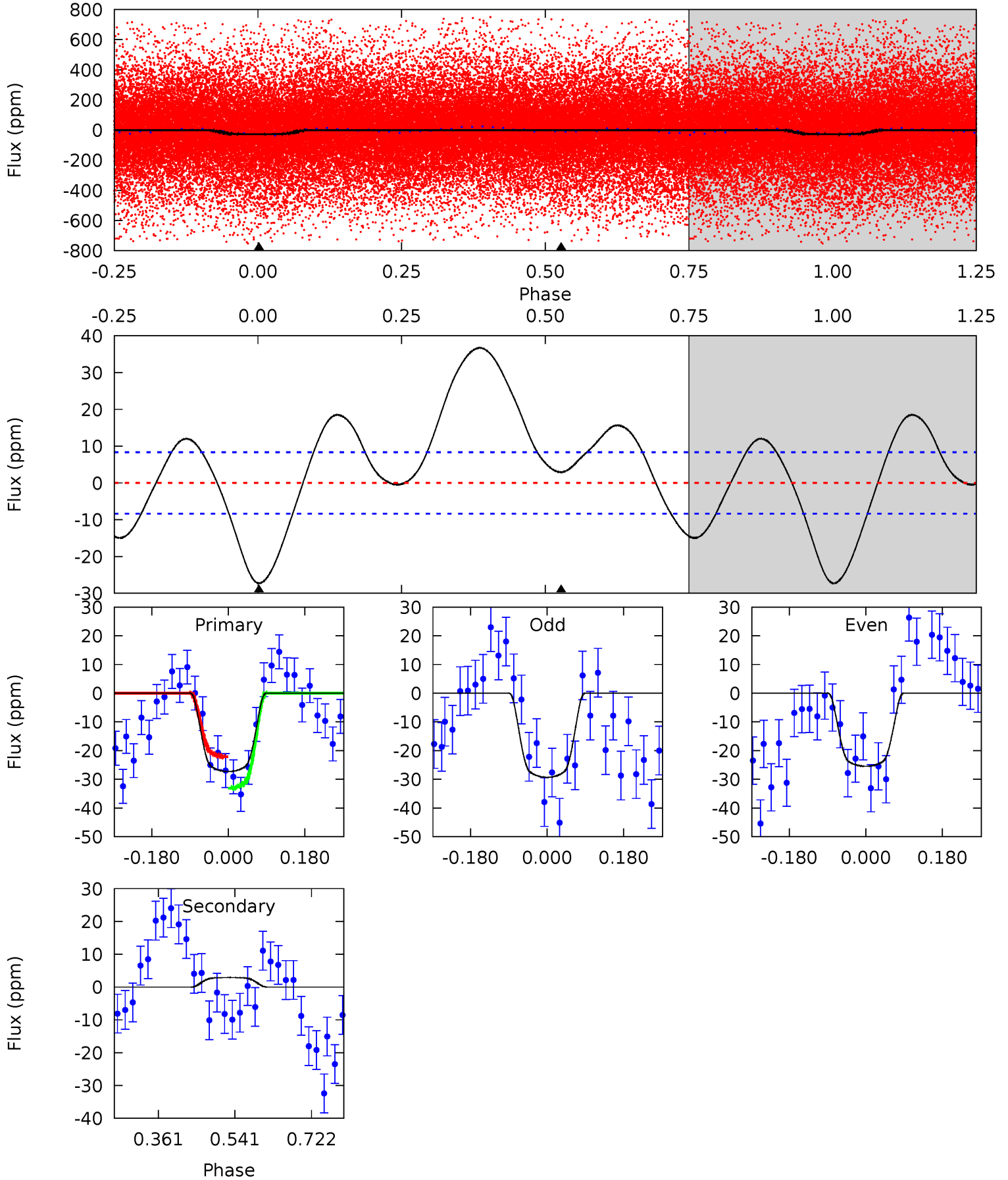




# DV Model-Shift Uniqueness Test

003629473-01, P = 1.706927 Days, E = 131.229989 Days

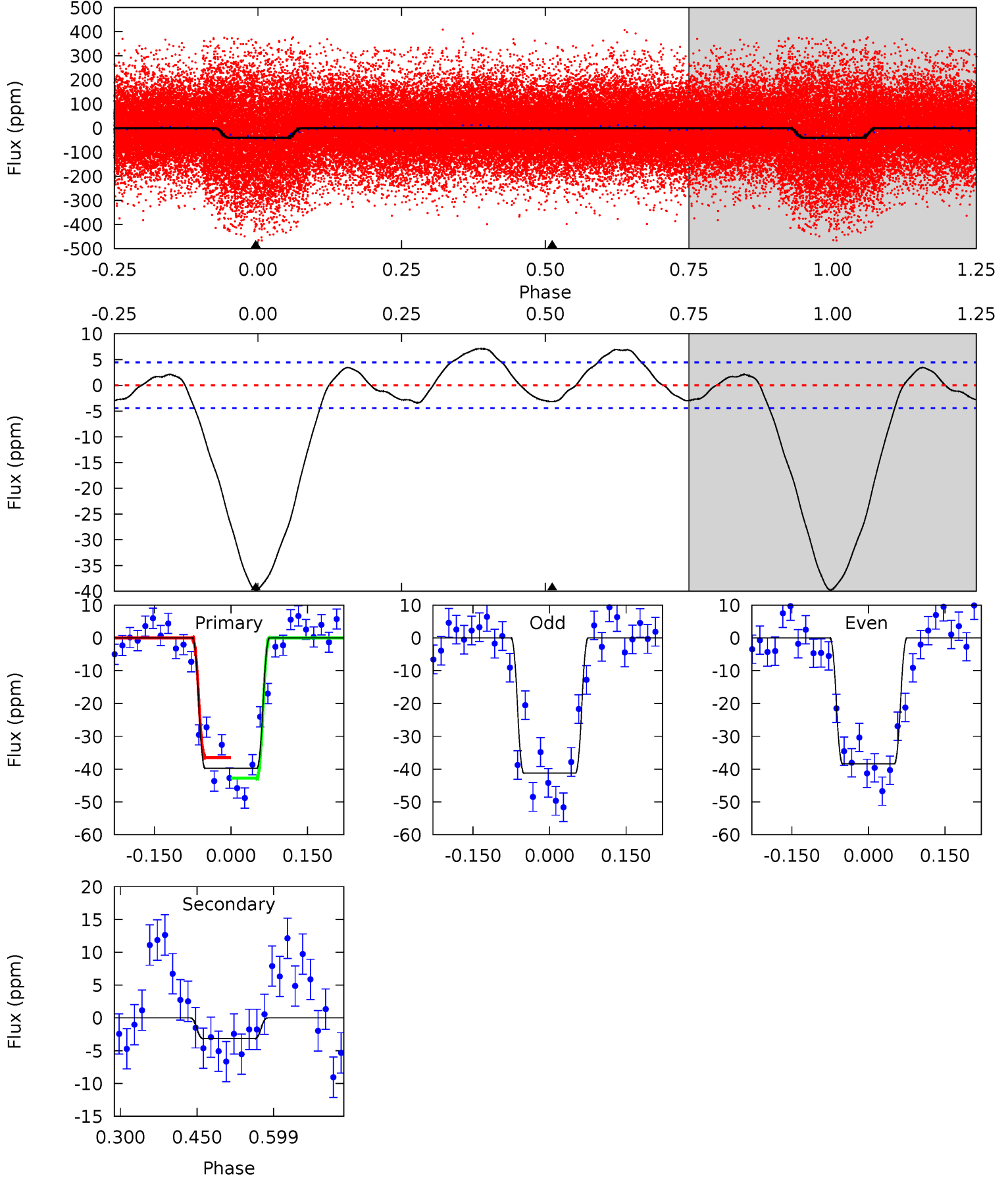
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.5	-1.54	0	0	4.44	1.34	6.25	14.5	14.5	-1.54	-1.54	1.02	1.39	0.57	2.87



# Alt Model-Shift Uniqueness Test

003629473-01, P = 1.706871 Days, E = 131.263921 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
40.2	3.21	0	0	4.48	1.44	2.63	40.2	40.2	3.21	3.21	1.40	0.97	0.15	3.18



### Stellar Parameters For KIC 003629473

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6927^{+167}_{-238}$	$3.875^{+0.266}_{-0.114}$	$-0.140^{+0.300}_{-0.300}$	$2.424^{+0.444}_{-0.824}$	$1.605^{+0.170}_{-0.340}$	$0.159^{+0.273}_{-0.055}$
	+2%/-3%	+7%/-3%	+214%/-214%	+18%/-34%	+11%/-21%	+172%/-35%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003629473-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$3 \pm 2$	$1.82^{+0.27}_{-0.35}$	$3608^{+230}_{-318}$	$-4073^{+377}_{-272}$	$-0.523^{+0.341}_{-0.457}$
Alt.	$-3 \pm 1$	$1.72^{+0.23}_{-0.32}$	$3605^{+220}_{-280}$	$3489^{+328}_{-505}$	$0.633^{+0.323}_{-0.226}$

$T_{\text{max}}$  = 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

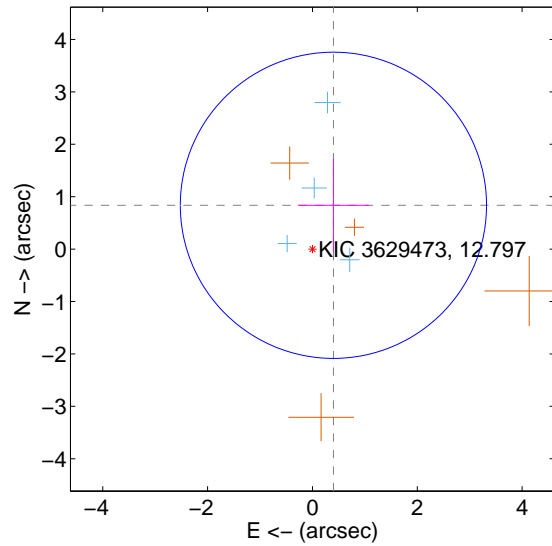
Supplemental centroid analysis for 003629473-01. Kepler magnitude: 12.80. Transit SNR 9.97

There are 4 quarters with good PRF difference image offsets

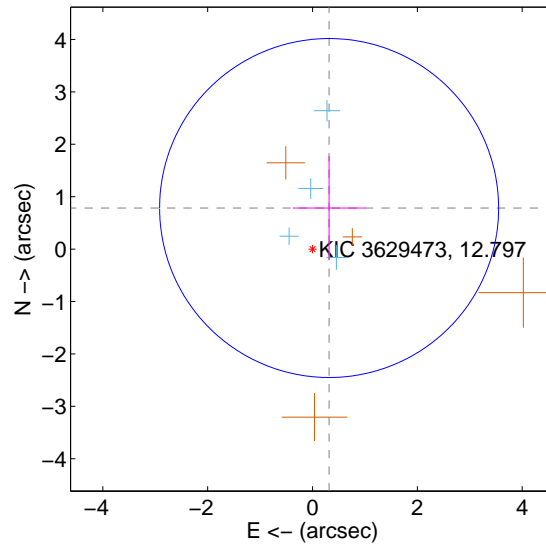
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.927 \pm 0.974$	0.95	$-0.400 \pm 0.678$	$0.836 \pm 0.892$
PRF-fit source offset from KIC position	$0.845 \pm 1.078$	0.78	$-0.316 \pm 0.694$	$0.784 \pm 0.991$
photometric centroid source offset	$1.47 \pm 0.54$	2.74	$1.46 \pm 0.54$	$0.14 \pm 0.60$

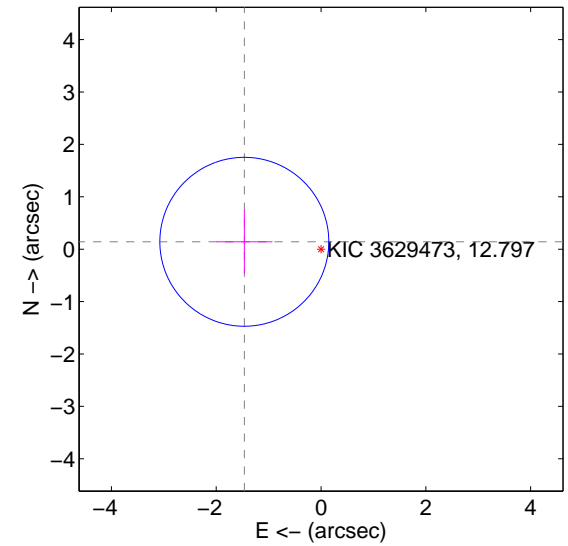
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

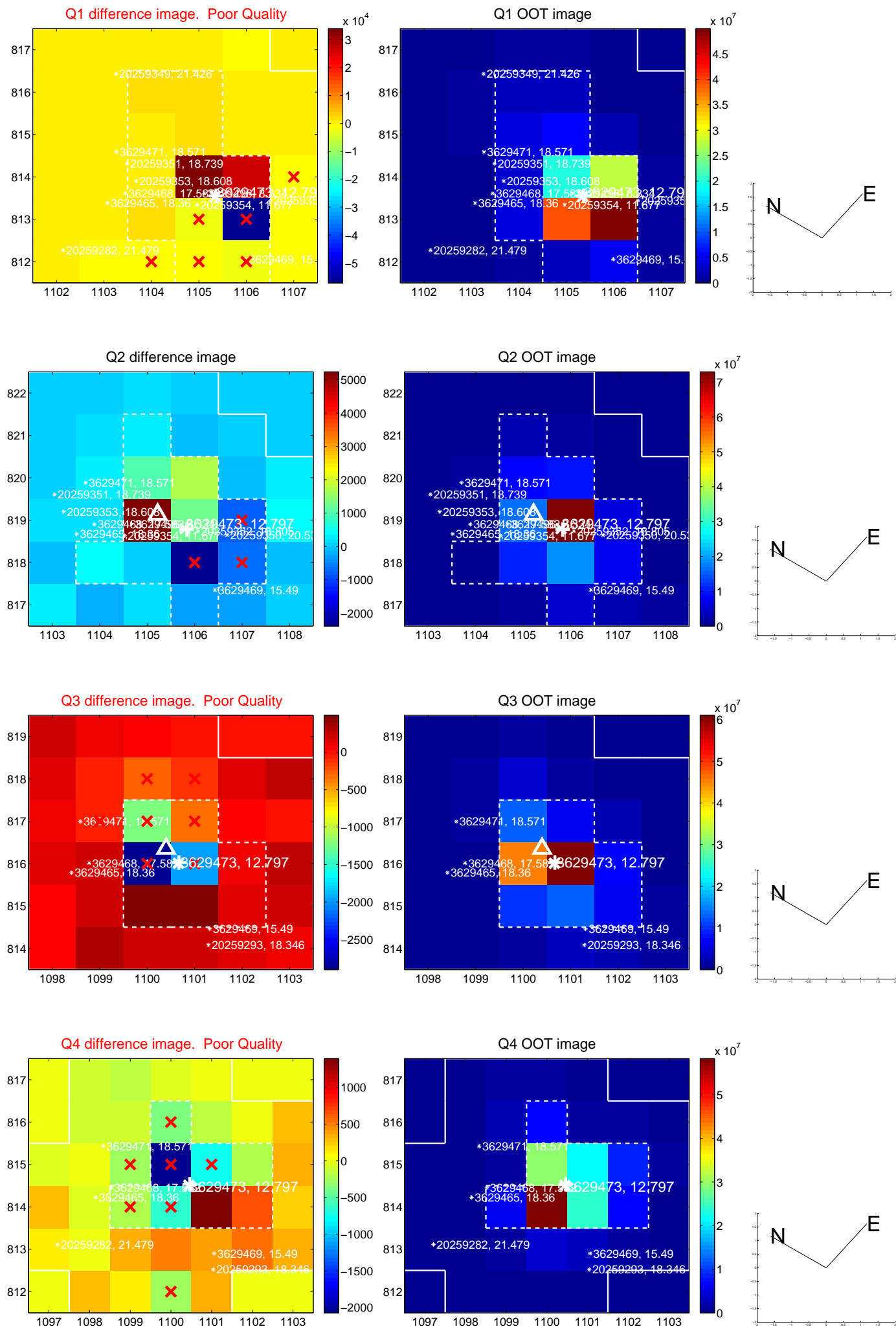


offset from photometric centroids

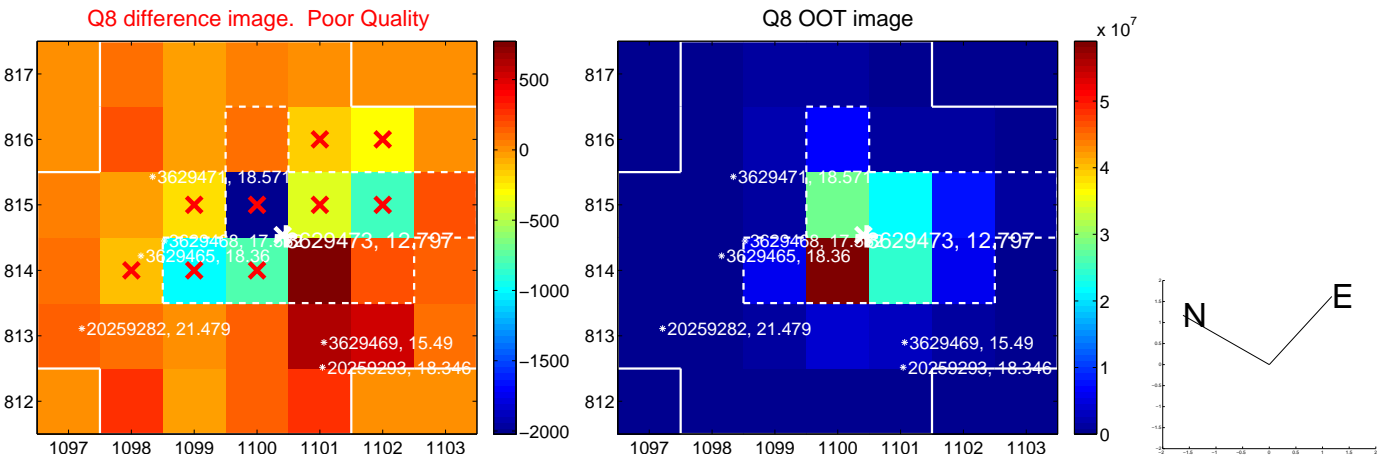
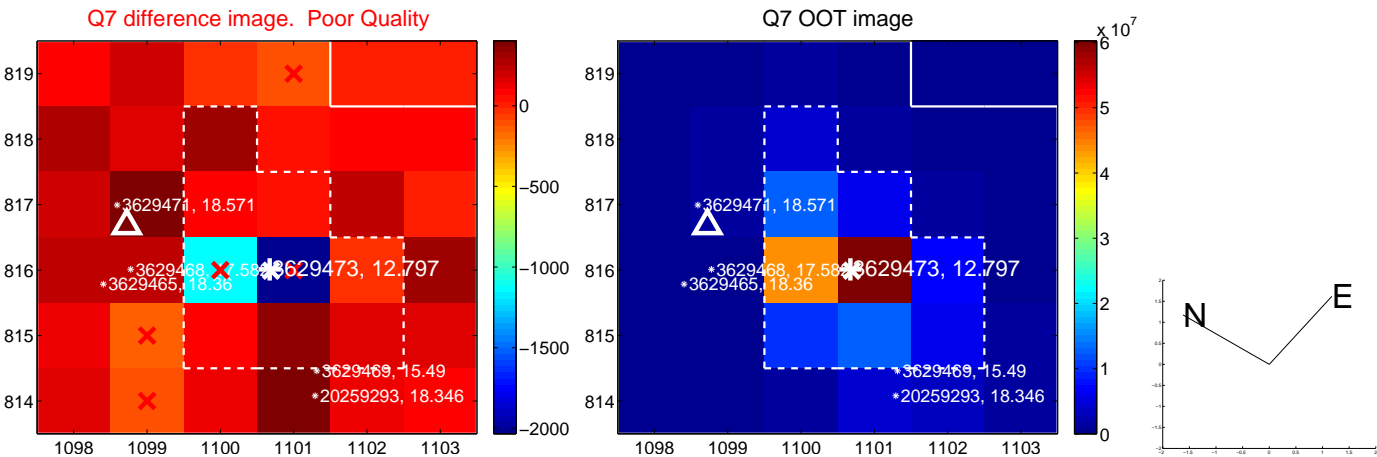
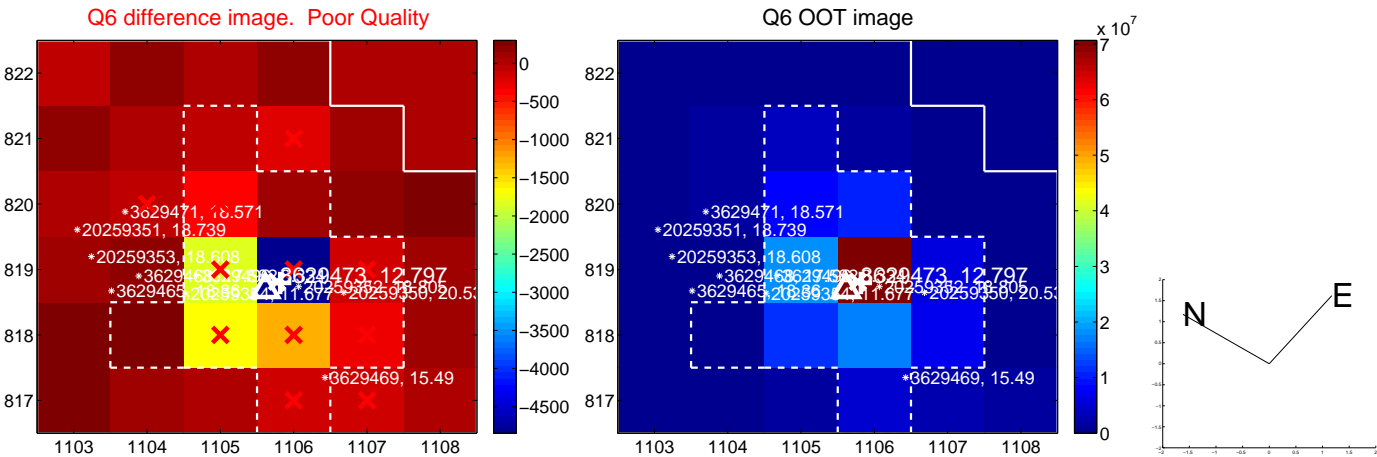
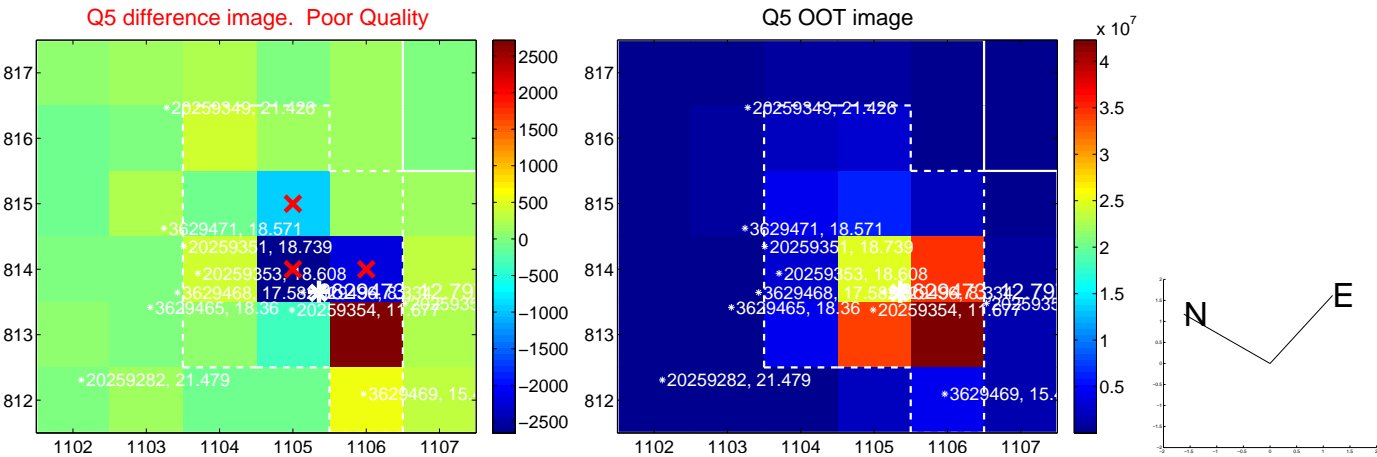


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

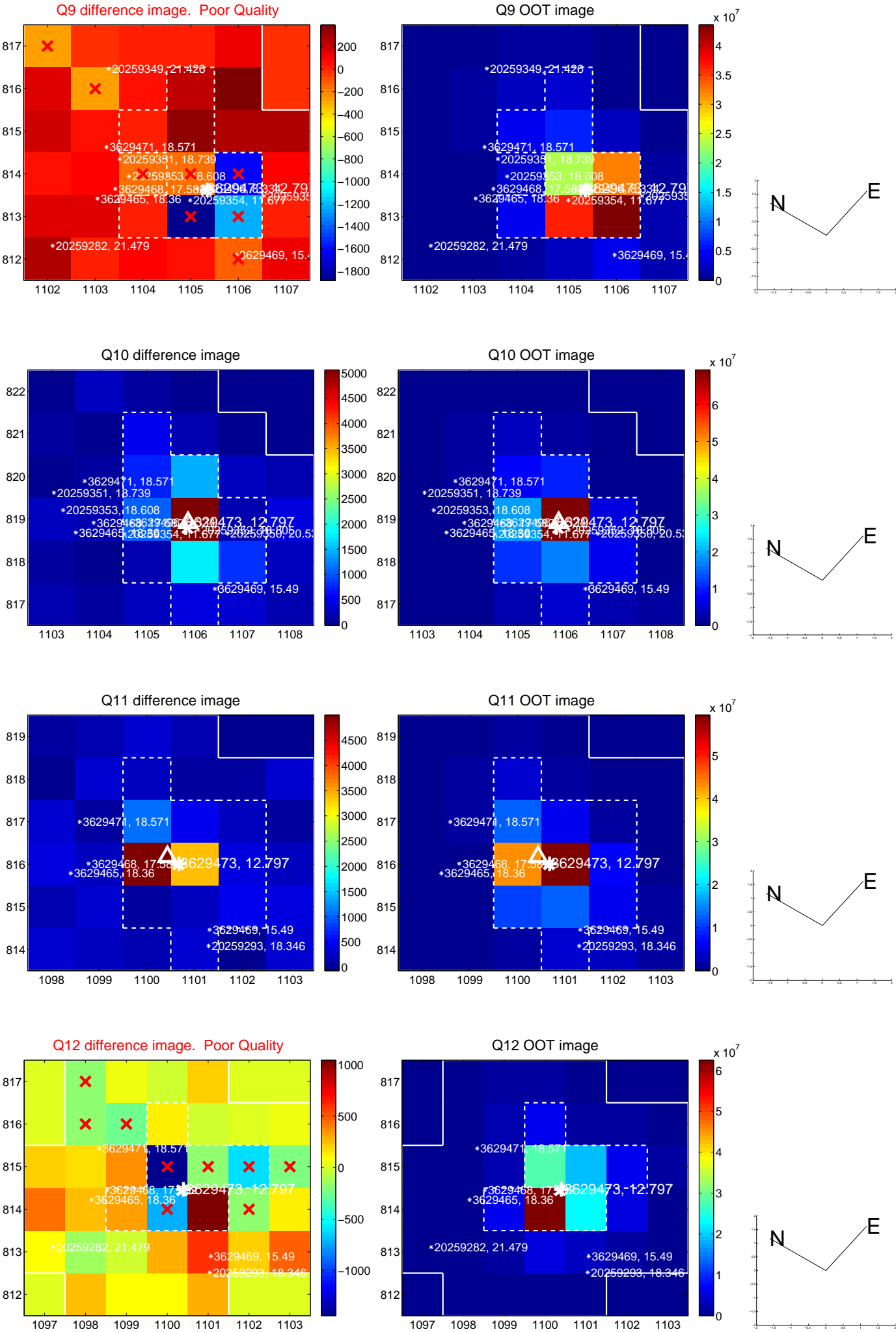


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

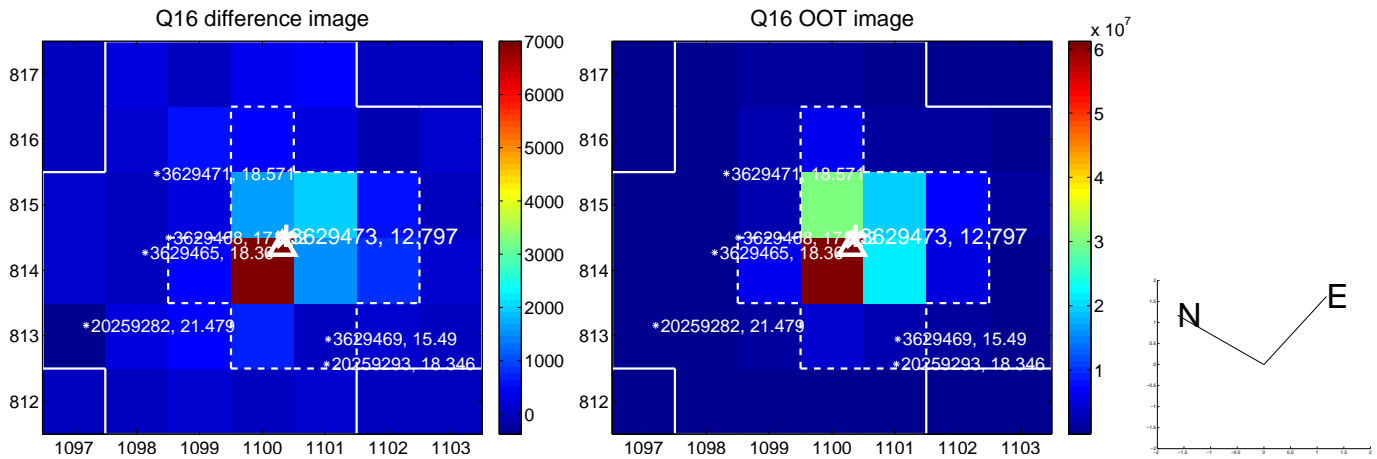
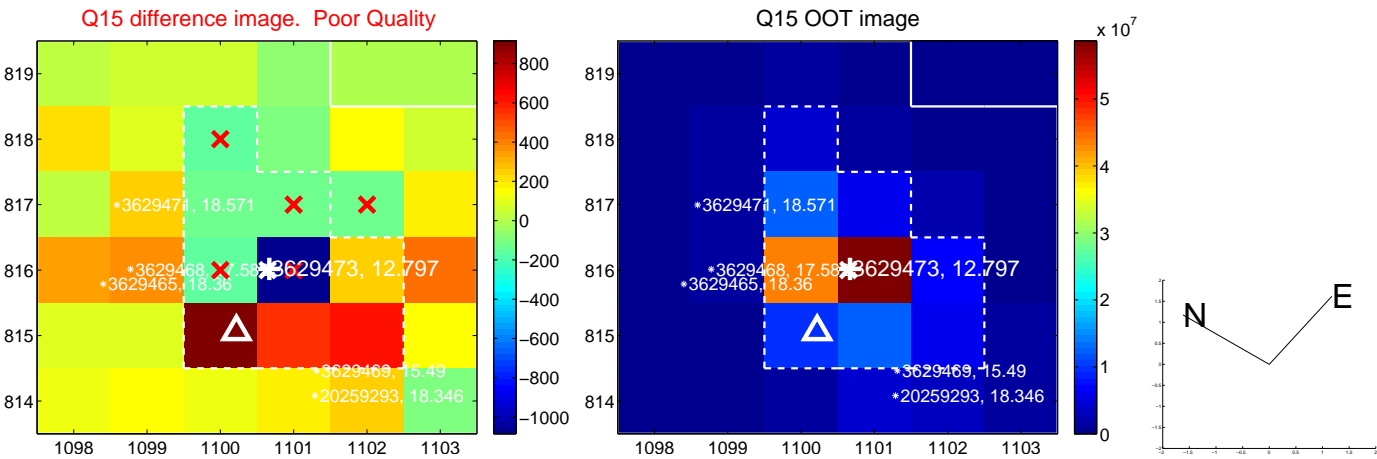
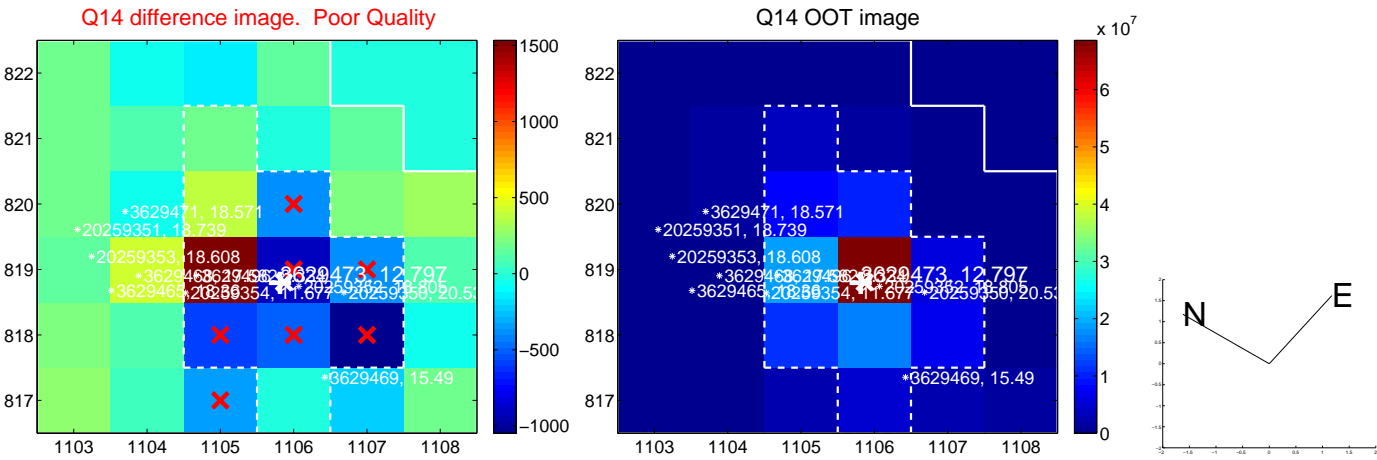
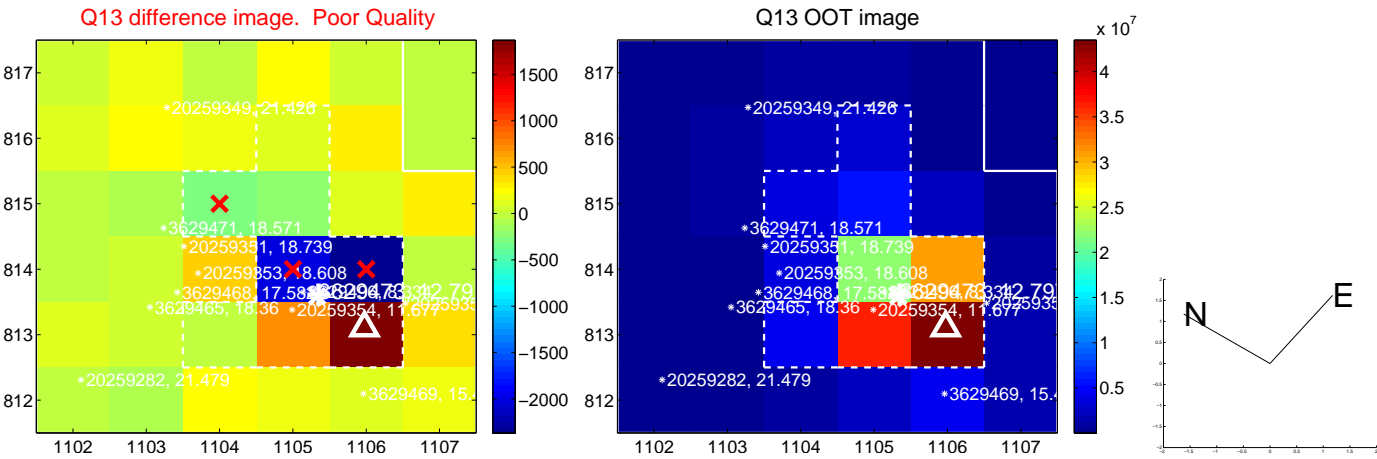




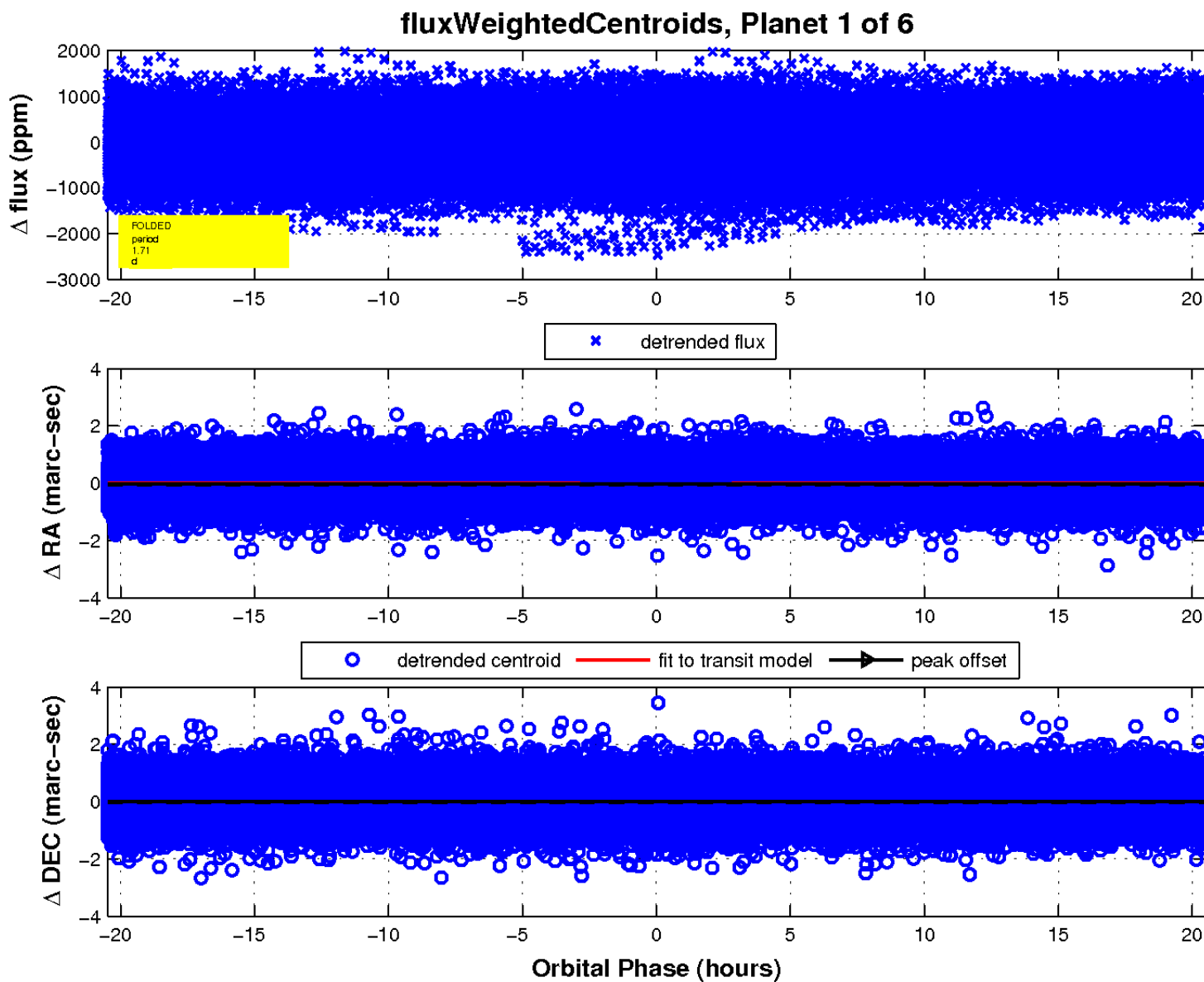
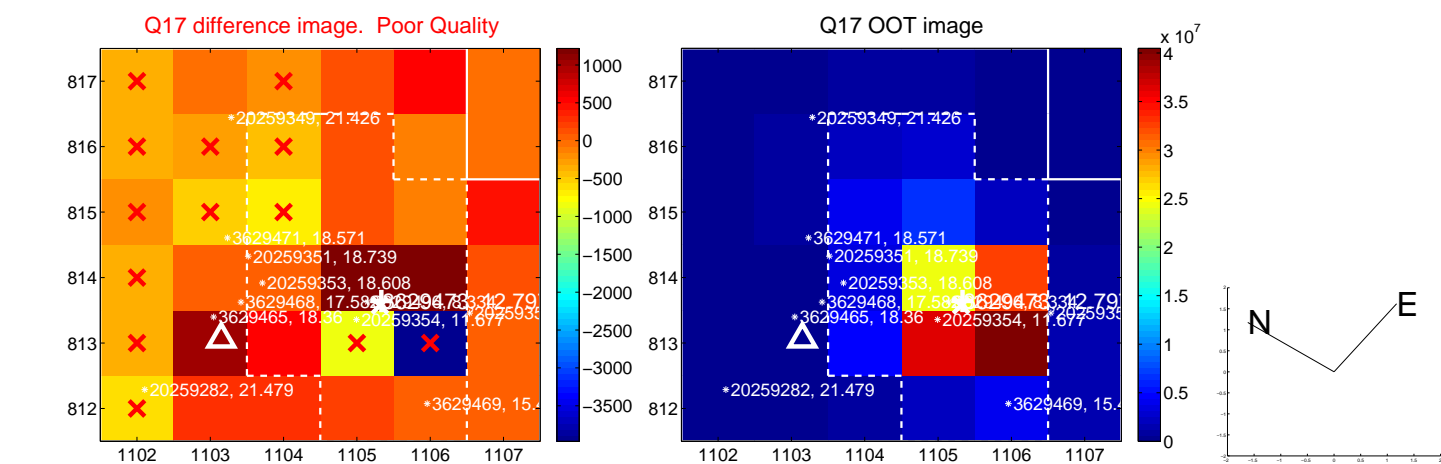
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



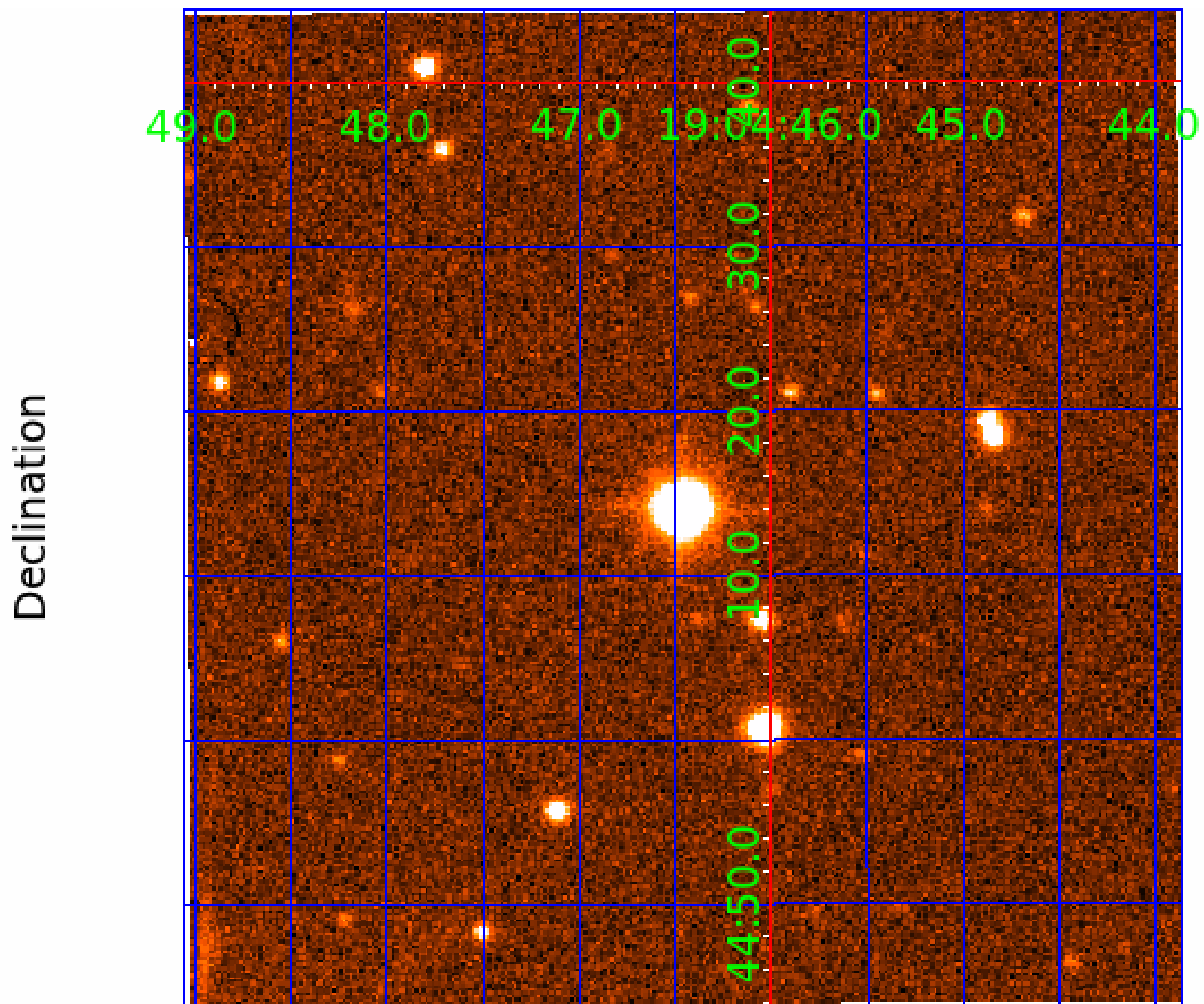
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 003629473

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003629473-01	OBS	No	1.706927	132.936916	32.9	6.938	8.7	10.0	2.42	6927	1.87	11301.70
003629473-02	OBS	No	519.228029	524.359611	359.0	4.121	13.1	6.8	2.42	6927	5.16	5.52
003629473-03	OBS	No	361.307398	479.964538	807.7	16.260	12.3	7.9	2.42	6927	12.95	8.96
003629473-04	OBS	No	246.357037	152.247969	227.8	14.752	8.6	3.1	2.42	6927	3.94	14.93
003629473-05	OBS	No	157.885484	153.773129	195.1	4.376	8.9	4.7	2.42	6927	3.78	27.02
003629473-06	OBS	No	212.128031	243.178808	326.2	13.594	9.2	5.2	2.42	6927	4.70	18.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003629473-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
003629473-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003629473-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
003629473-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003629473-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003629473-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—INCONSISTENT_TRANS

**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.

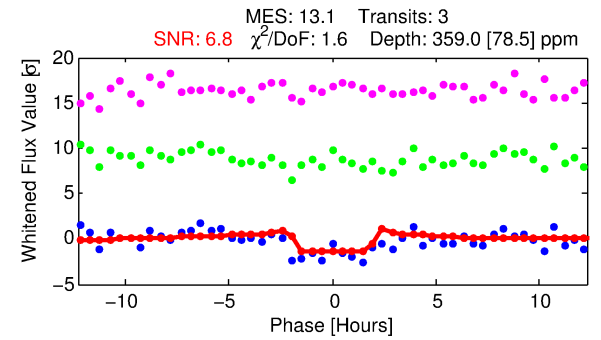
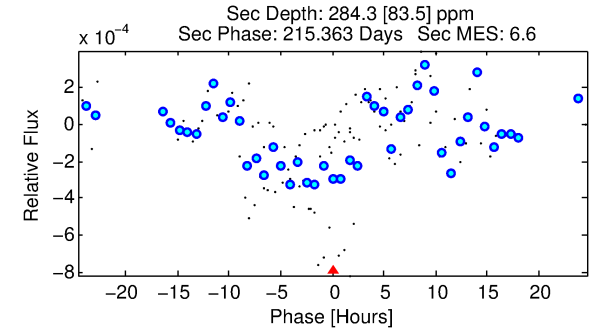
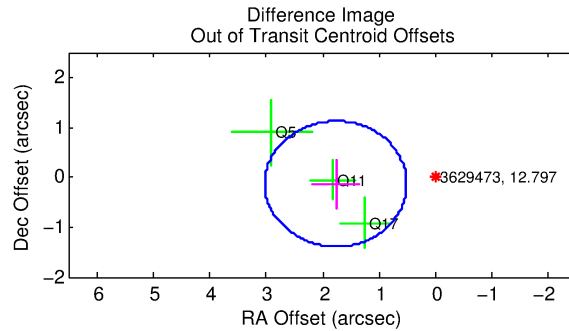
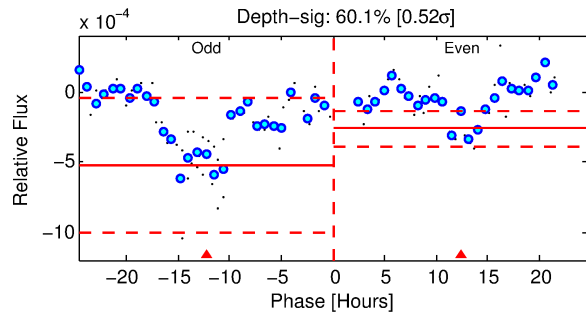
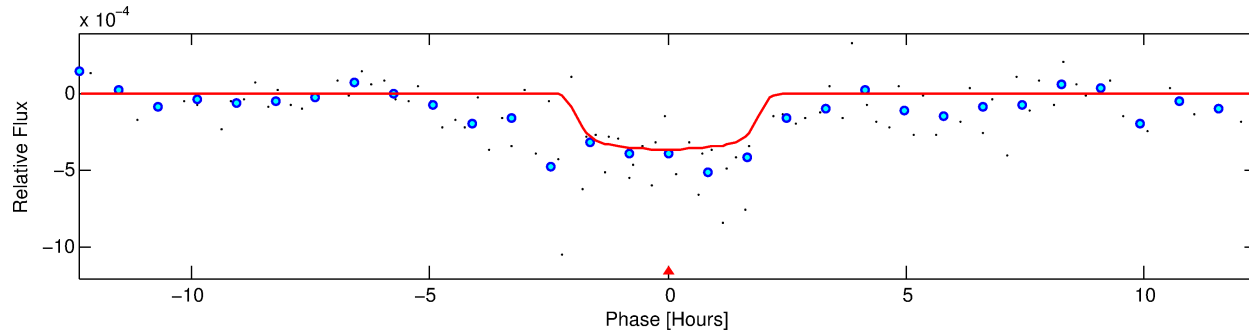
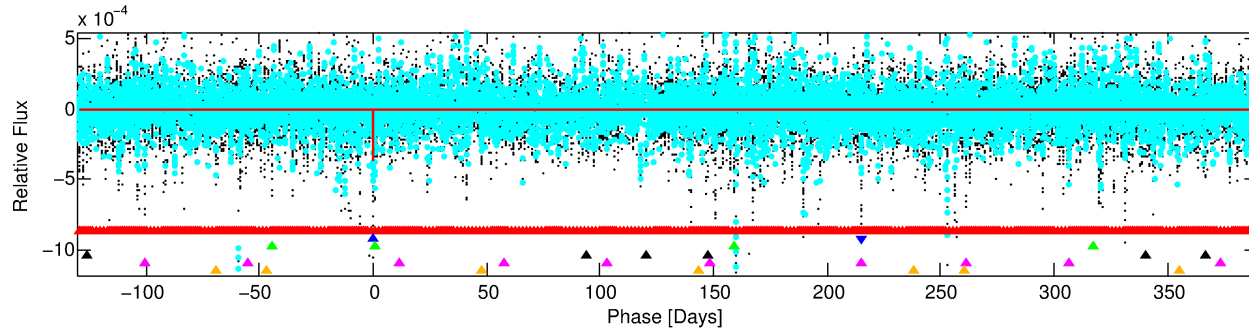
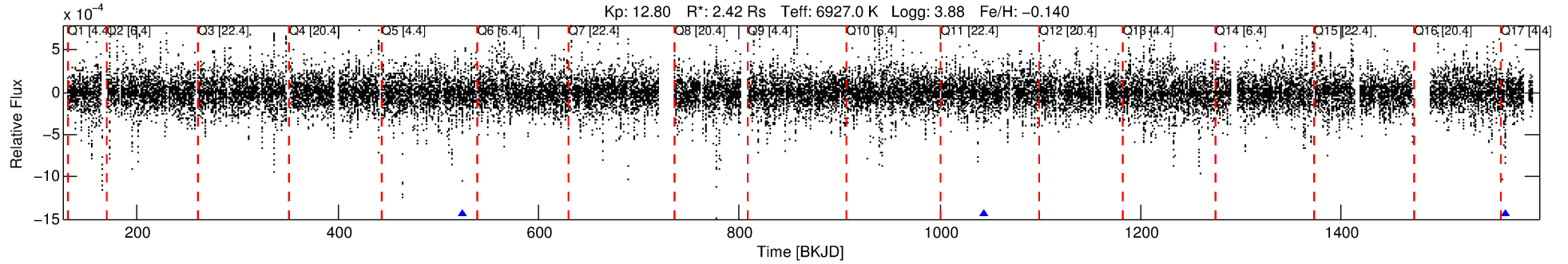
## Ephemeris Match Information For 003629473-02

No Significant Match Found



# DV One-Page Summary

KIC: 3629473 Candidate: 2 of 6 Period: 519.228 d



## DV Fit Results:

Period = 519.22803 [0.00850] d  
Epoch = 524.3596 [0.0104] BKJD  
Rp/R\* = 0.0195 [0.0087]  
a/R\* = 550.80 [1359.97]  
b = 0.84 [0.84]  
Seff = 5.52 [2.69]  
Teq = 391 [48] K  
Rp = 5.16 [2.89] Re  
a = 1.4812 [0.4518] AU  
Ag = 12875.61 [13471.49] [0.96 $\sigma$ ]  
Teffp = 6438 [1523] K [3.97 $\sigma$ ]

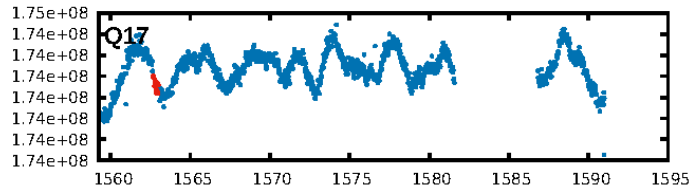
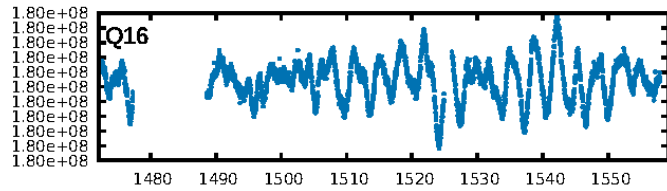
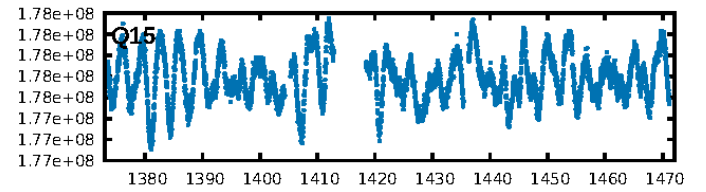
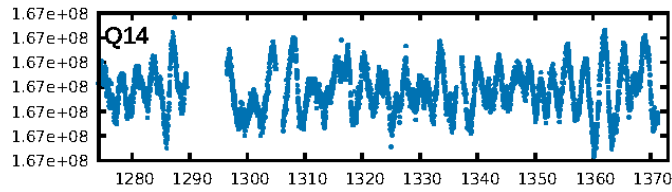
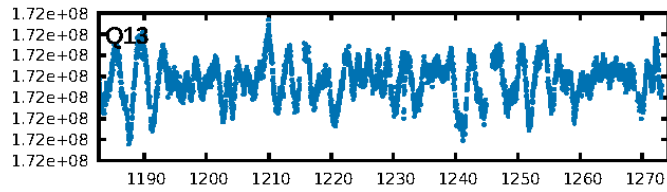
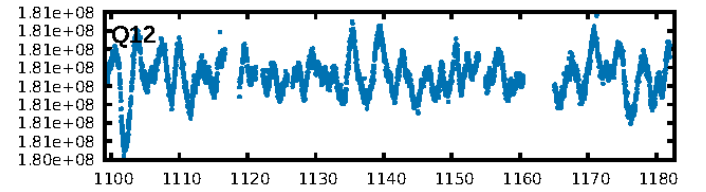
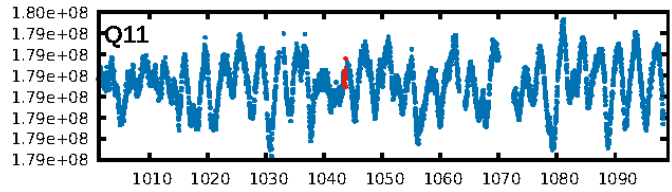
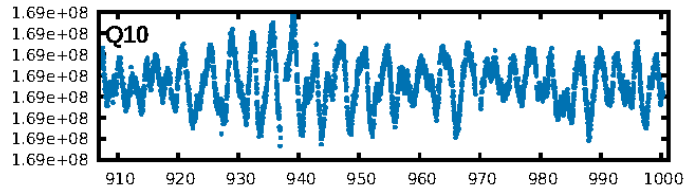
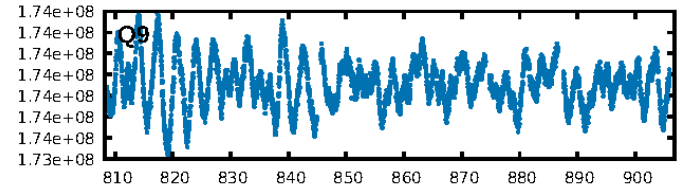
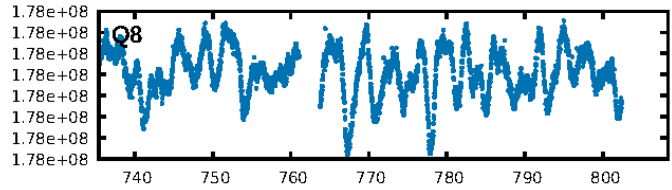
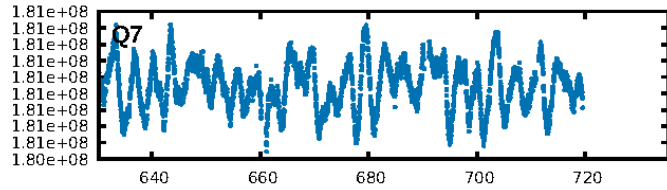
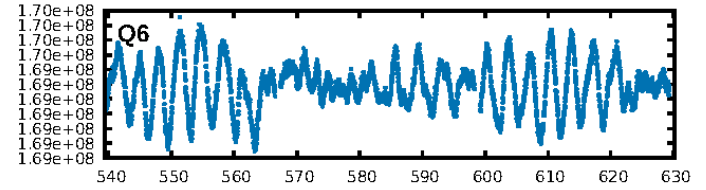
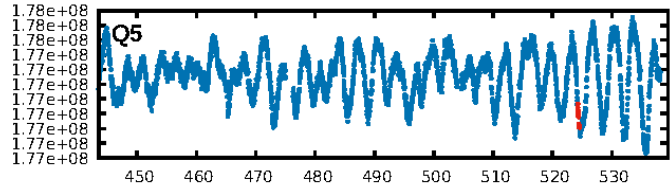
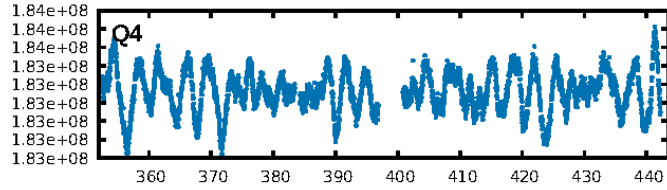
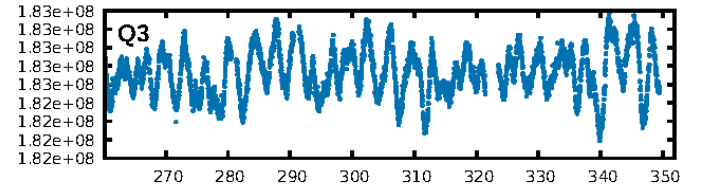
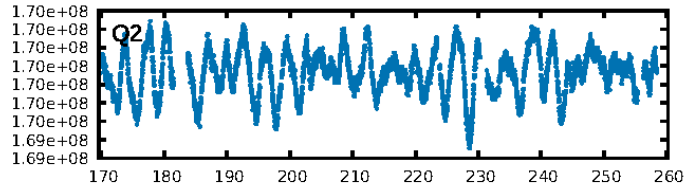
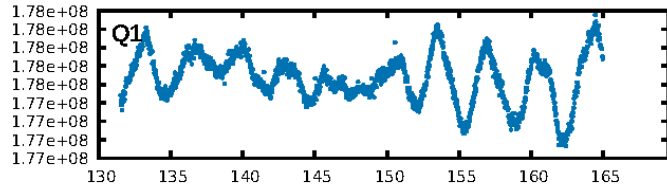
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [225.95 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 7.3%  
ModelChiSquareGof-sig: 32.0%  
Bootstrap-pfa: 4.16e-14  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: -4.774  
Centroid-sig: 6.0%  
Centroid-so: 1.374 arcsec [1.24 $\sigma$ ]  
OotOffset-rm: 1.774 arcsec [4.24 $\sigma$ ]  
KicOffset-rm: 1.907 arcsec [5.13 $\sigma$ ]  
OotOffset-st: 0/1/0/2 [3]  
KicOffset-st: 0/1/0/2 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

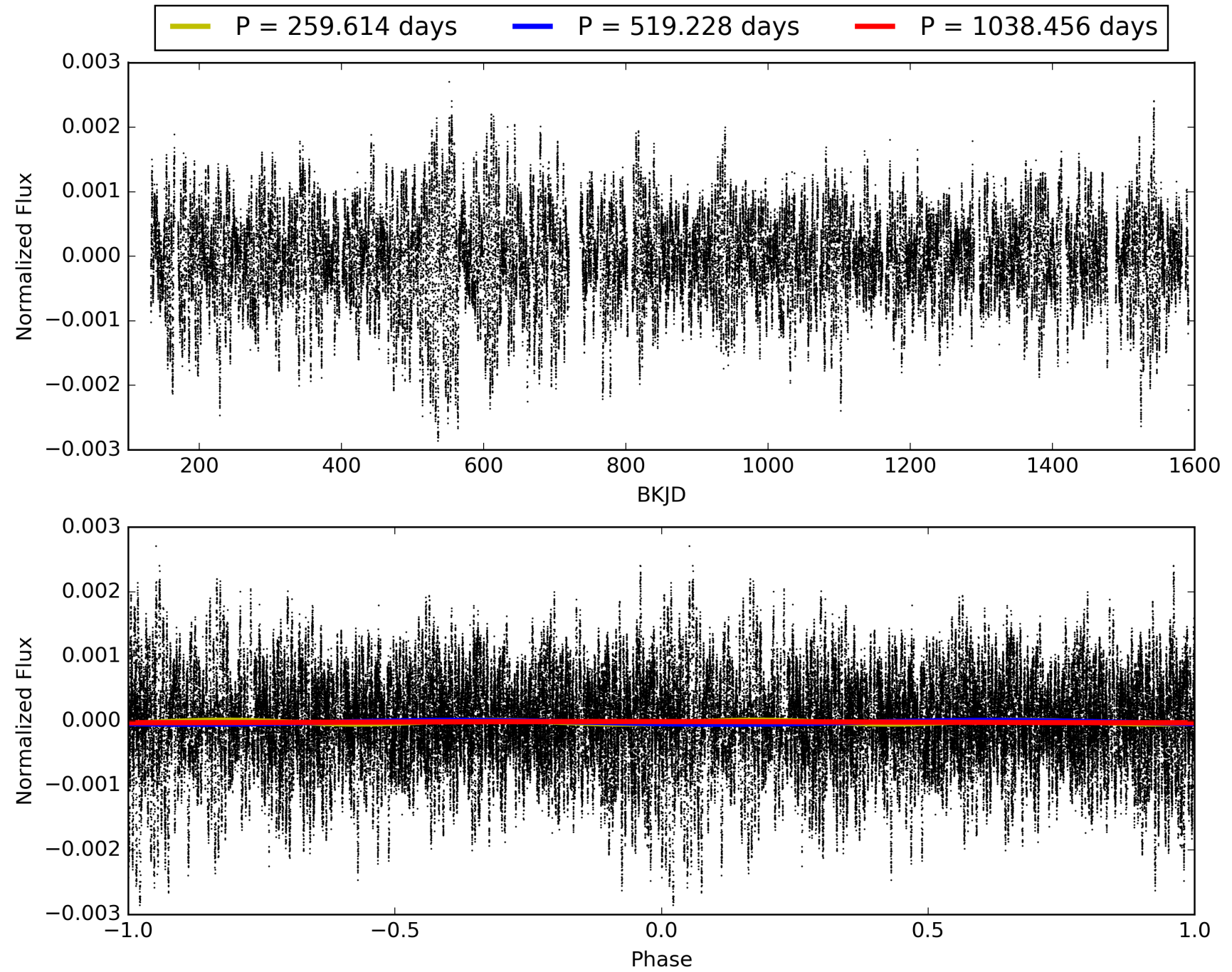
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:06:44 Z

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

## TCE 003629473-02, PDC Light Curves

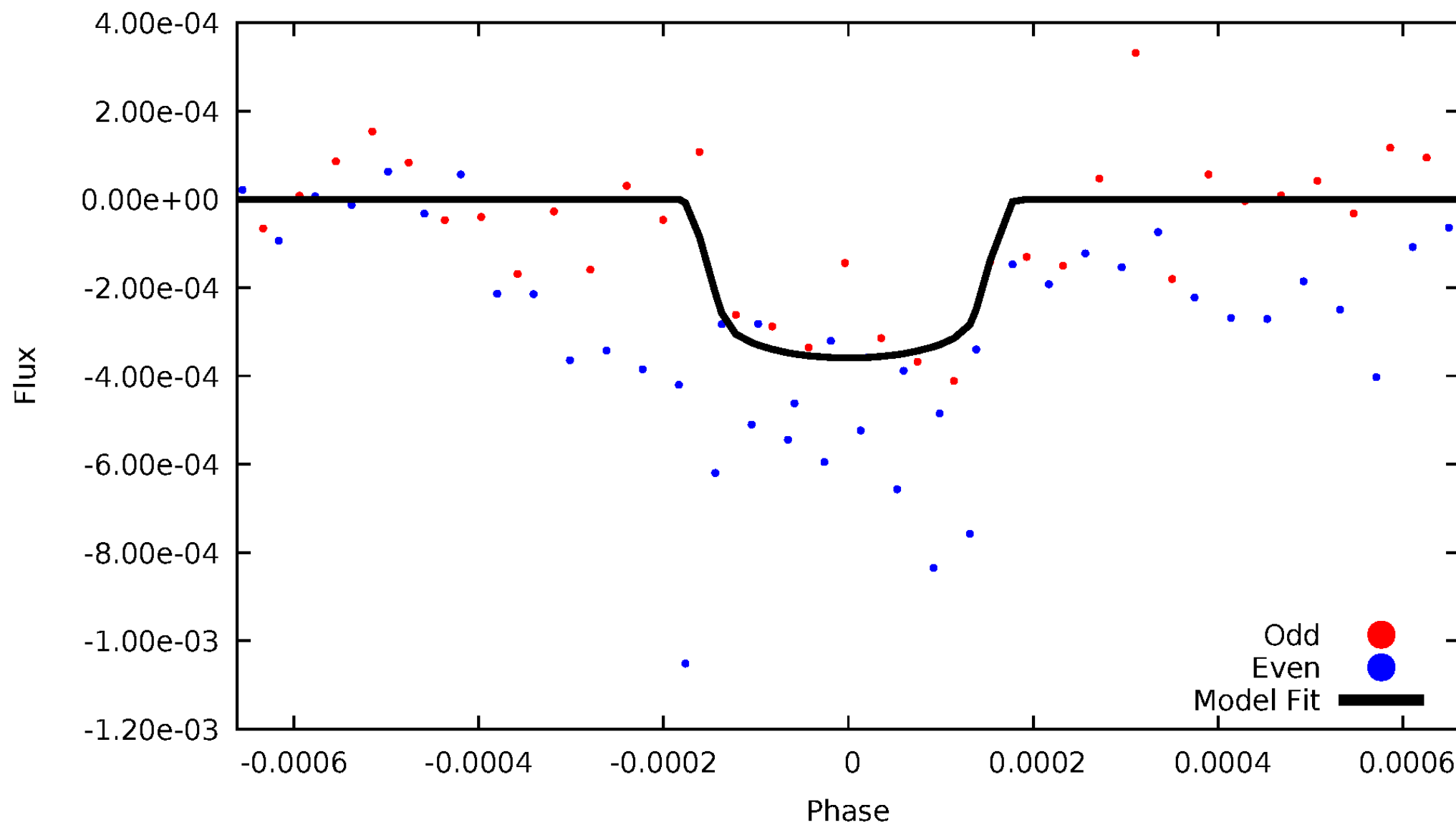


# TCE 003629473-02



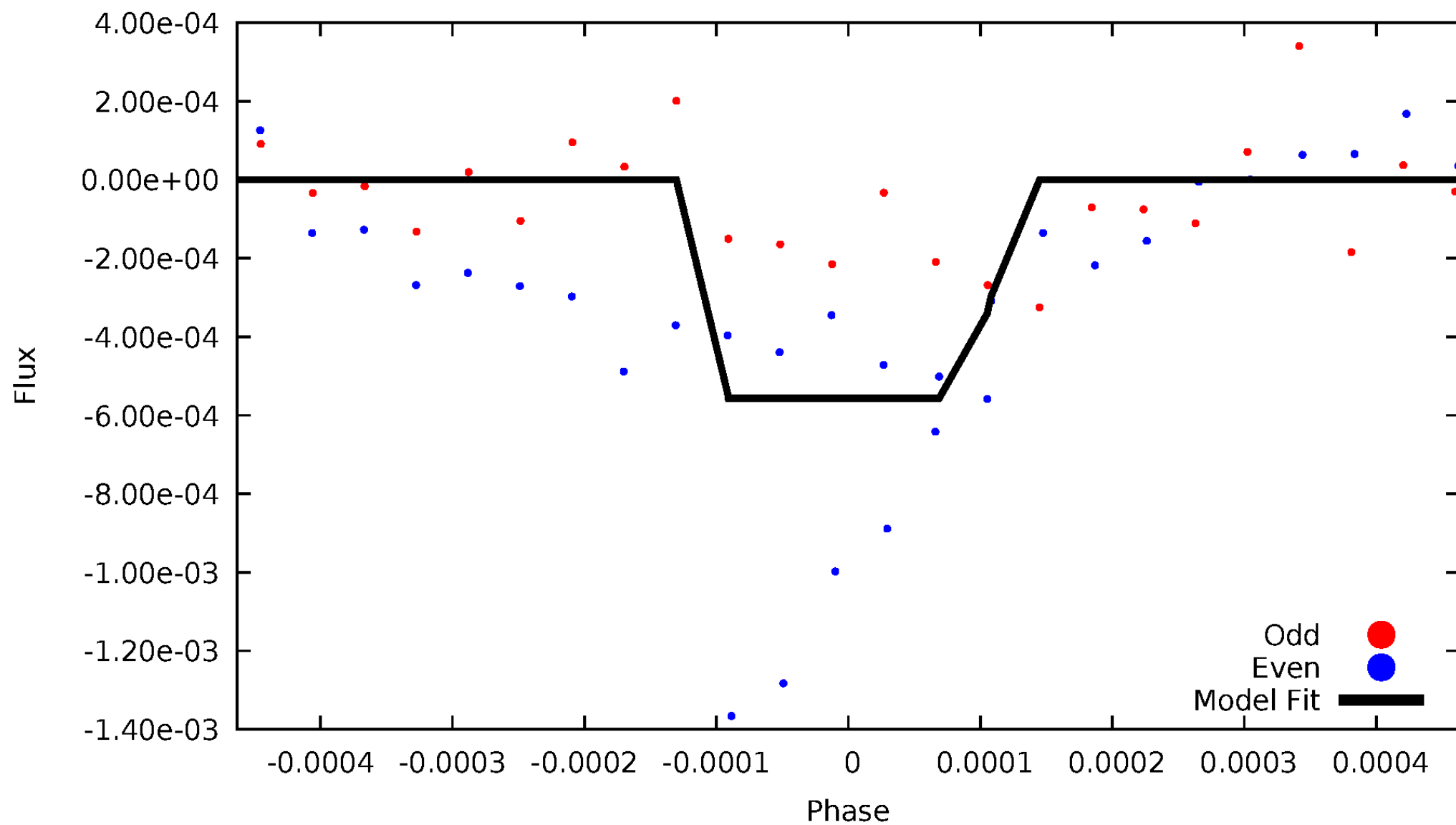
# DV Odd/Even

TCE 003629473-02



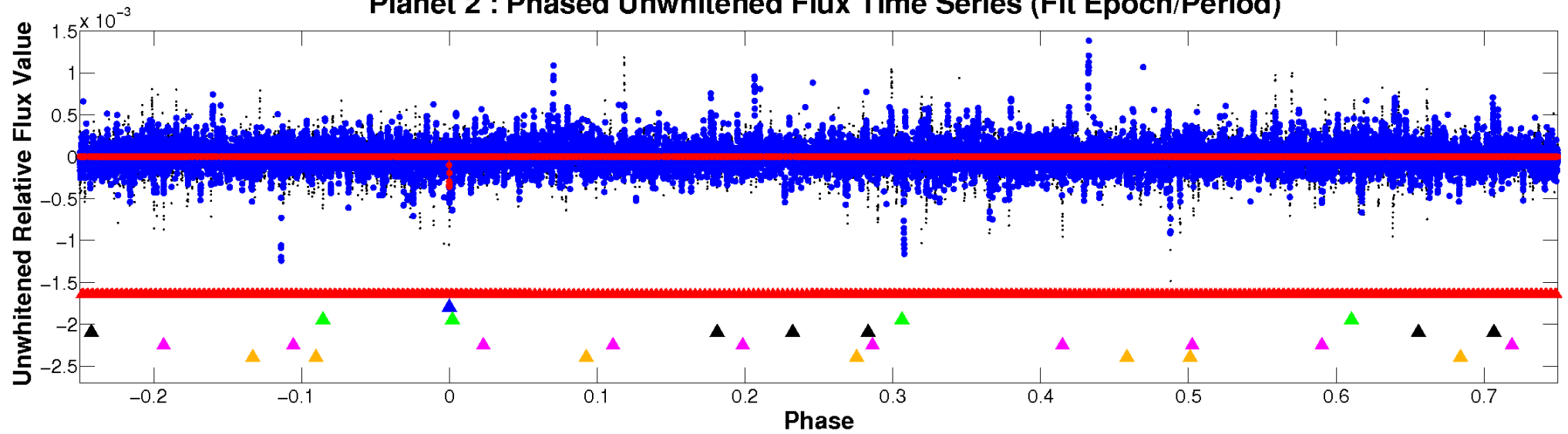
# ALT Odd/Even

TCE 003629473-02

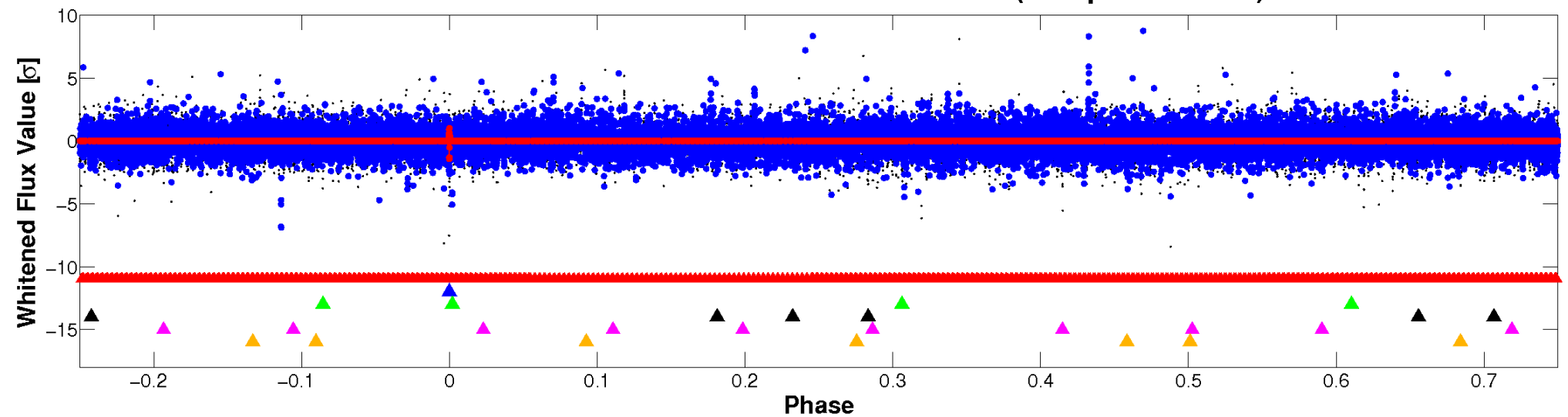


# Non-Whitened Vs. Whitened Light Curve

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



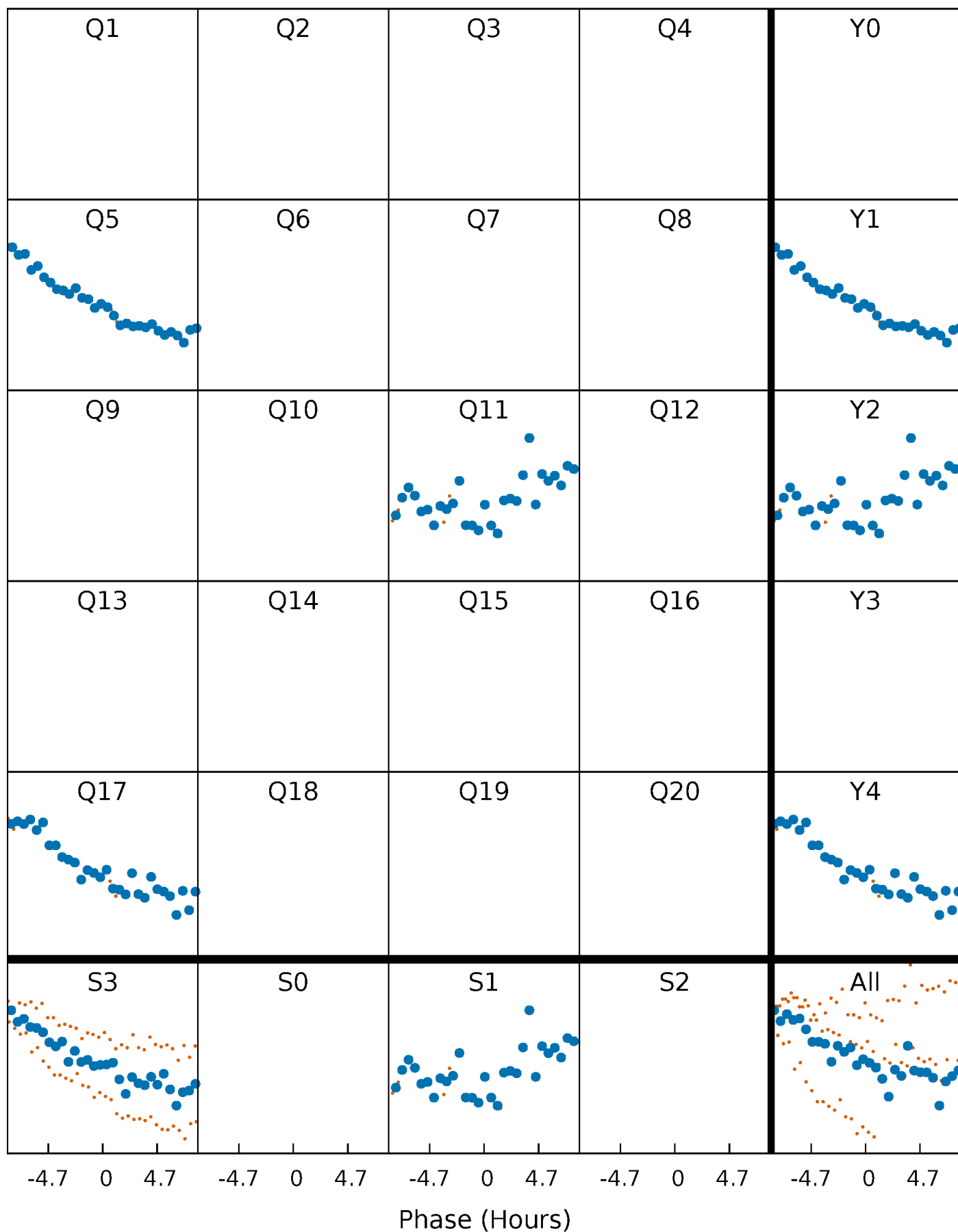
Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





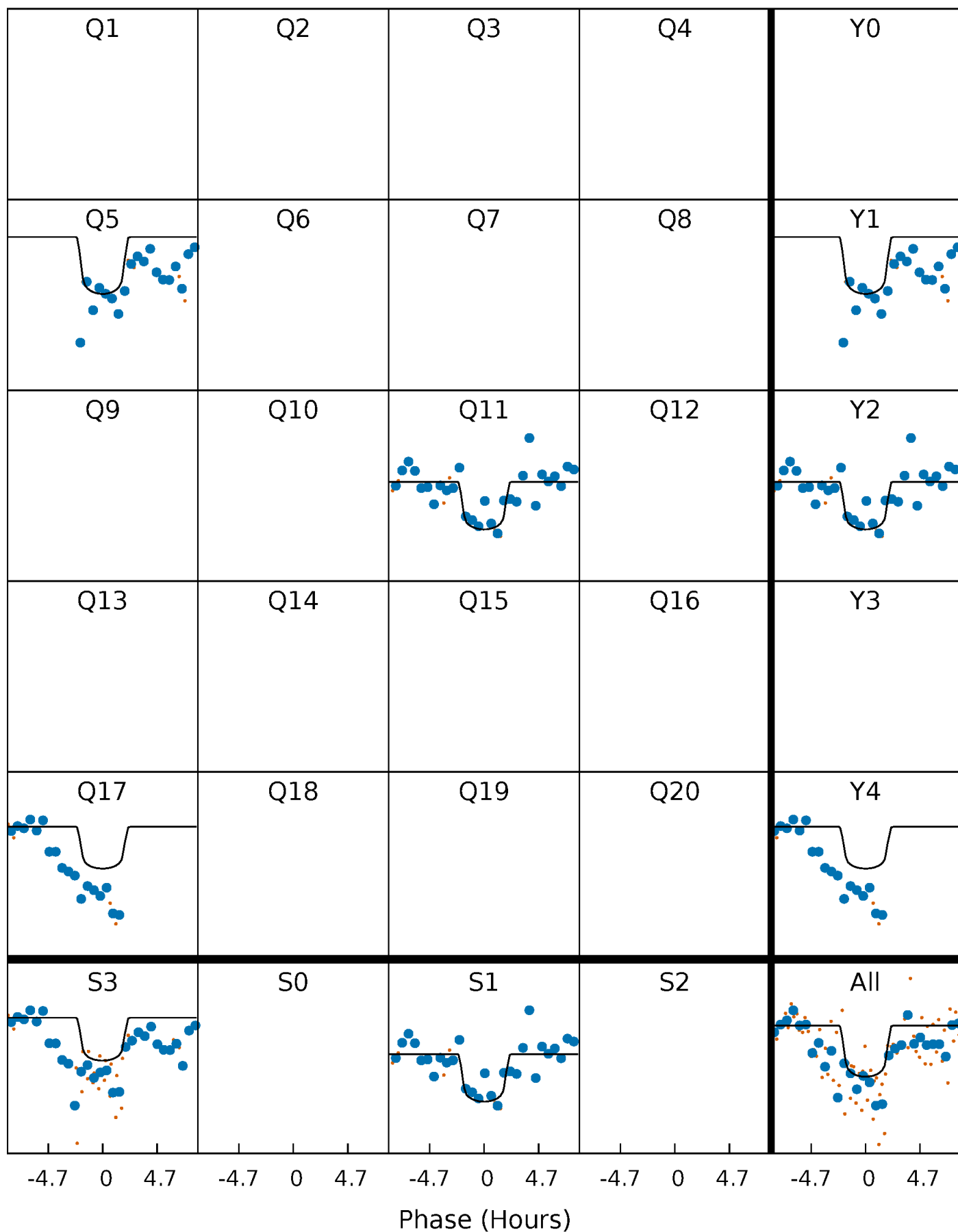
# PDC Quarter-Phased Transit Curves

TCE 003629473-02     $P=519.228029$  Days     $T_0=524.359611$  (BKJD)



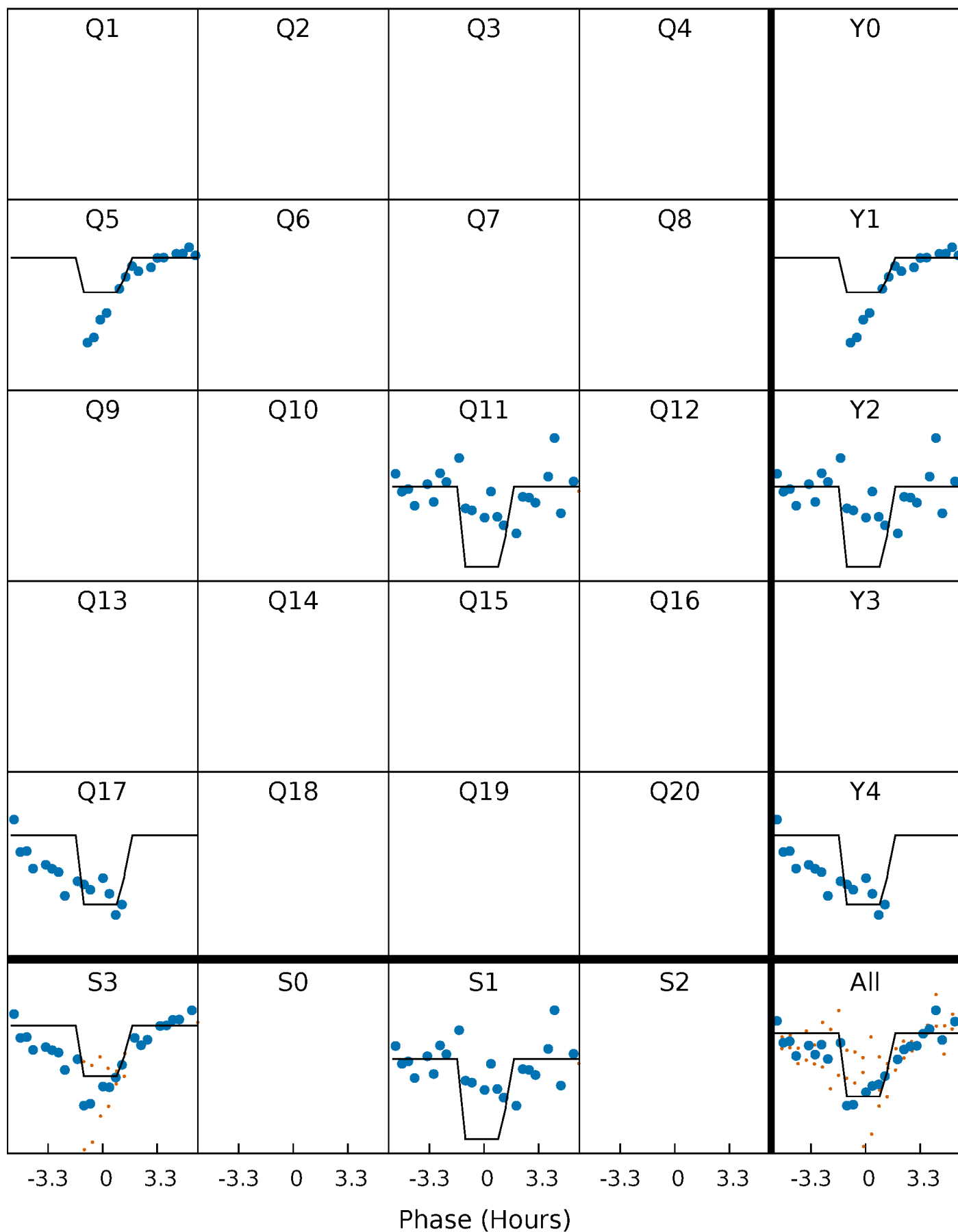
# DV Quarter-Phased Transit Curves

TCE 003629473-02     $P=519.228029$  Days     $T_0=524.359611$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

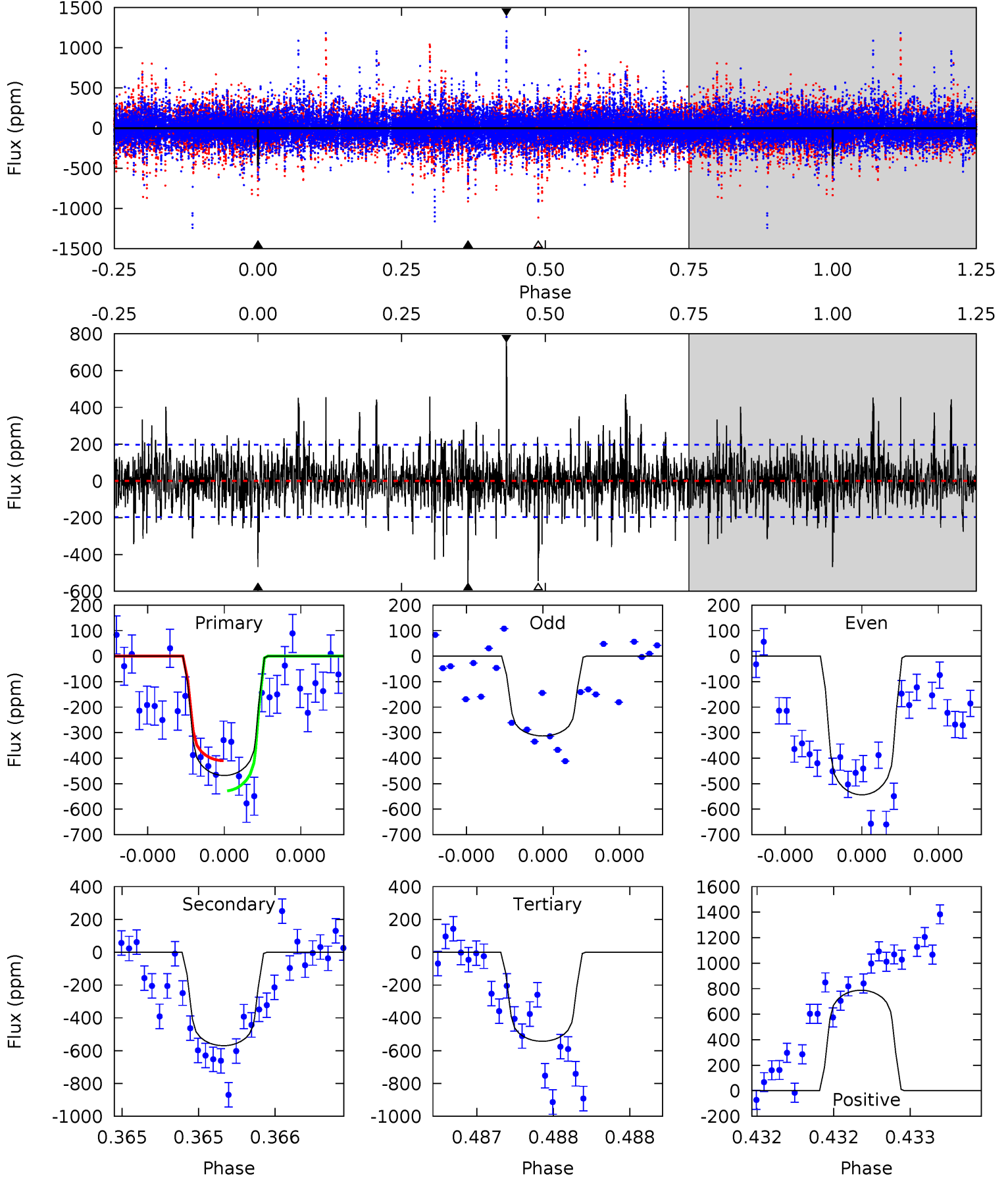
TCE 003629473-02 P=519.257627 Days  $T_0=524.314040$  (BKJD)



# DV Model-Shift Uniqueness Test

003629473-02, P = 519.228029 Days, E = 5.131582 Days

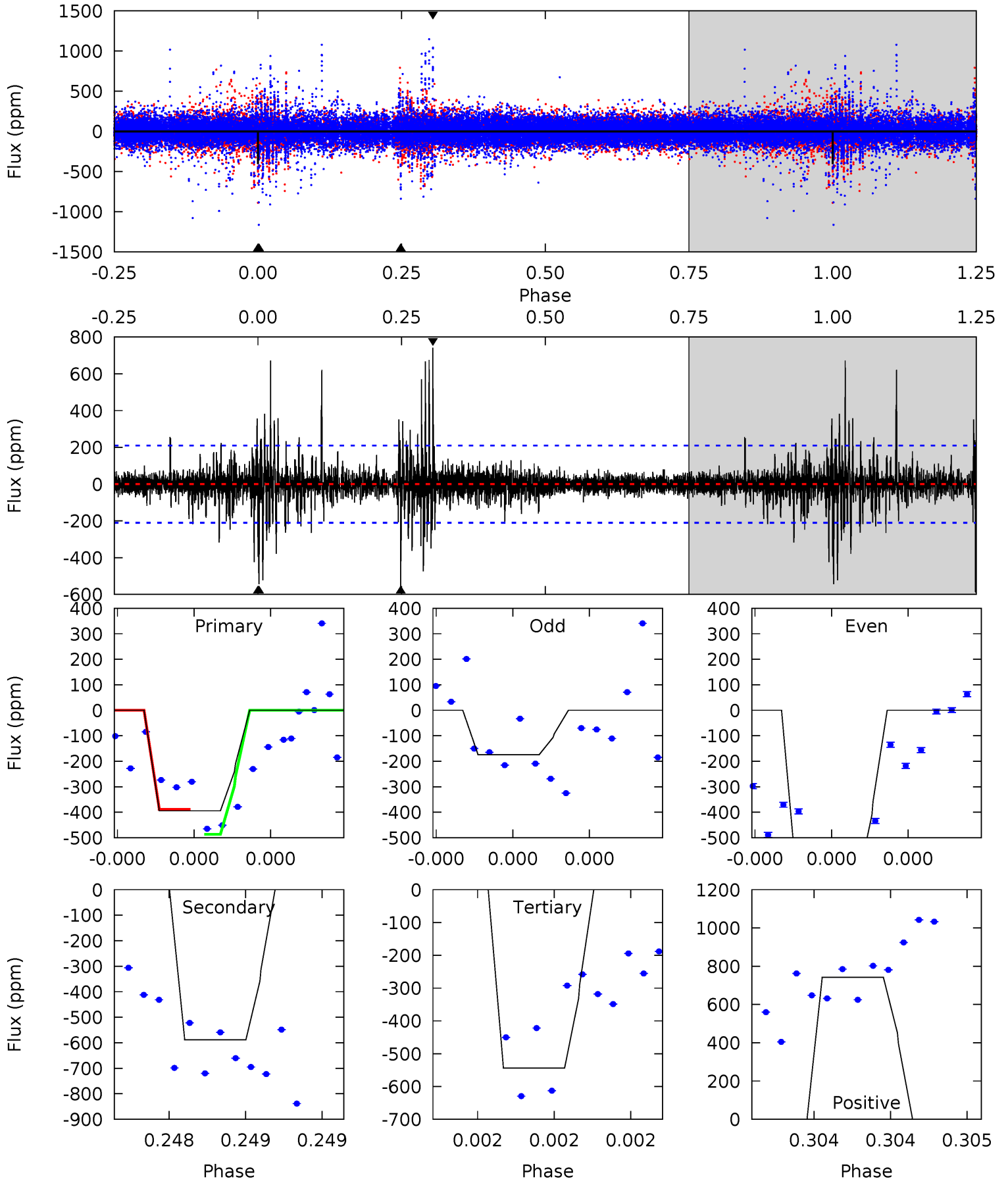
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	16.3	15.6	22.6	5.64	3.58	2.72	-2.15	-9.19	0.76	-6.27	3.11	1.15	0.58	1.69



# Alt Model-Shift Uniqueness Test

003629473-02, P = 519.257627 Days, E = 5.056413 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
10.7	16.0	14.8	20.2	5.73	3.72	1.72	-4.06	-9.47	1.22	-4.18	7.07	1.12	0.56	1.39



### Stellar Parameters For KIC 003629473

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6927^{+167}_{-238}$	$3.875^{+0.266}_{-0.114}$	$-0.140^{+0.300}_{-0.300}$	$2.424^{+0.444}_{-0.824}$	$1.605^{+0.170}_{-0.340}$	$0.159^{+0.273}_{-0.055}$
	+2%/-3%	+7%/-3%	+214%/-214%	+18%/-34%	+11%/-21%	+172%/-35%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003629473-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-570 \pm 35$	$4.68^{+2.52}_{-2.09}$	$536^{+36}_{-48}$	$7731^{+4162}_{-1428}$	$30174^{+71268}_{-17284}$
Alt.	$-588 \pm 37$	$5.88^{+2.41}_{-2.11}$	$538^{+34}_{-40}$	$7044^{+2092}_{-1104}$	$19910^{+30626}_{-9640}$

$T_{\text{max}}$  = 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

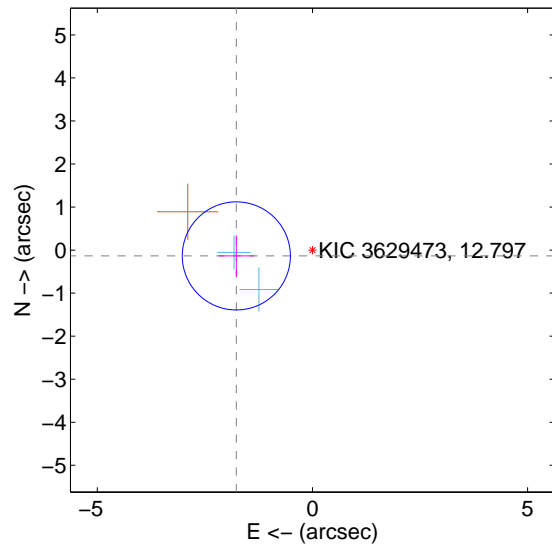
Supplemental centroid analysis for 003629473-02. Kepler magnitude: 12.80. Transit SNR 6.85

There are 2 quarters with good PRF difference image offsets

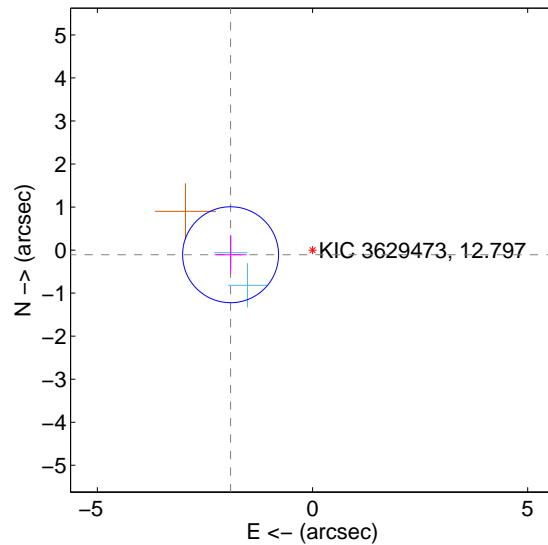
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.774 \pm 0.419$	4.24	$1.768 \pm 0.418$	$-0.135 \pm 0.478$
PRF-fit source offset from KIC position	$1.907 \pm 0.372$	5.13	$1.904 \pm 0.371$	$-0.108 \pm 0.451$
photometric centroid source offset	$1.37 \pm 1.10$	1.24	$-0.01 \pm 0.89$	$1.37 \pm 1.10$

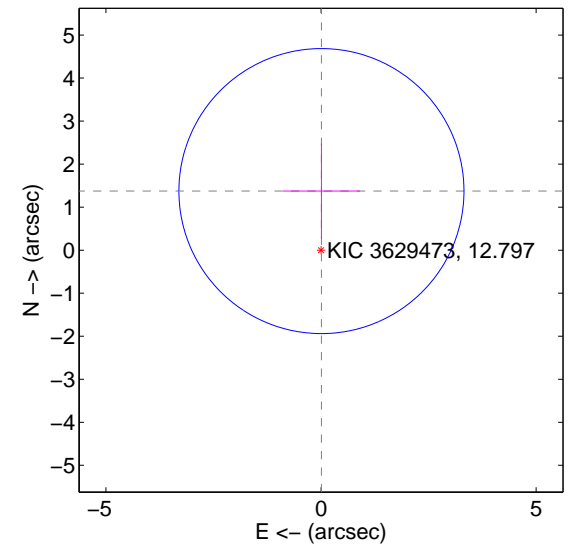
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

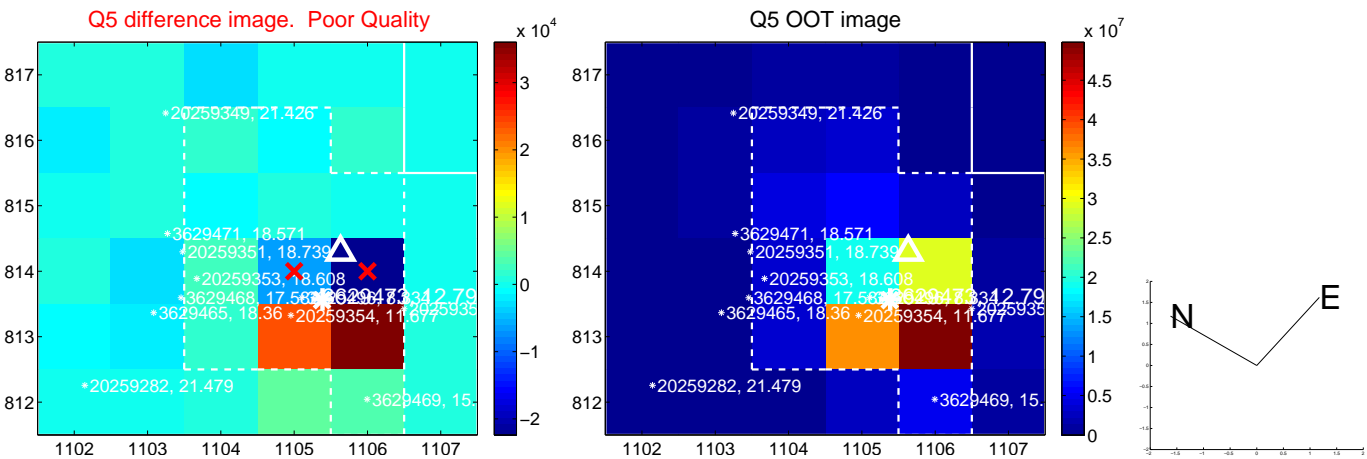


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

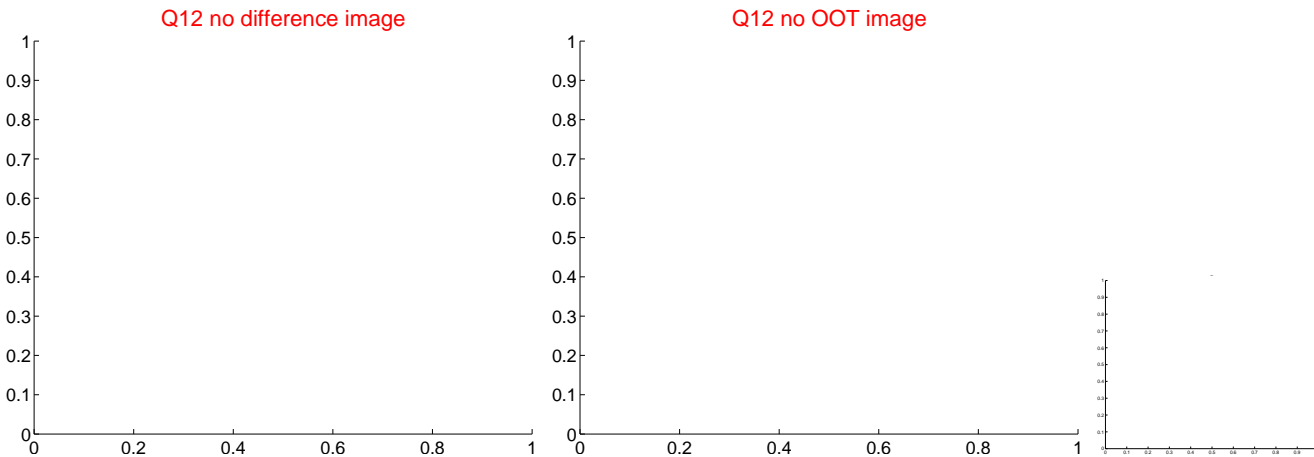
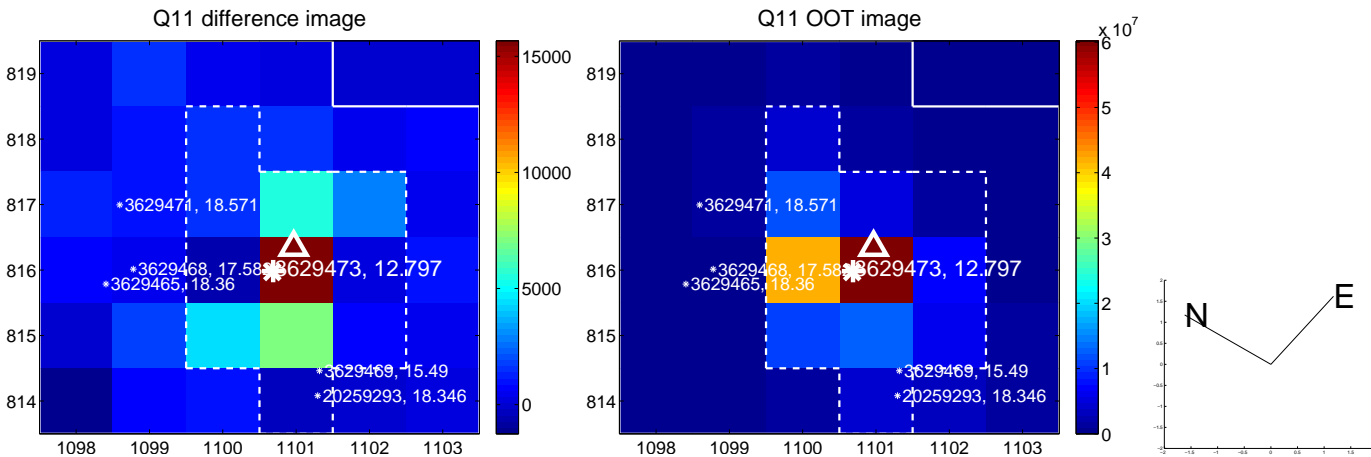
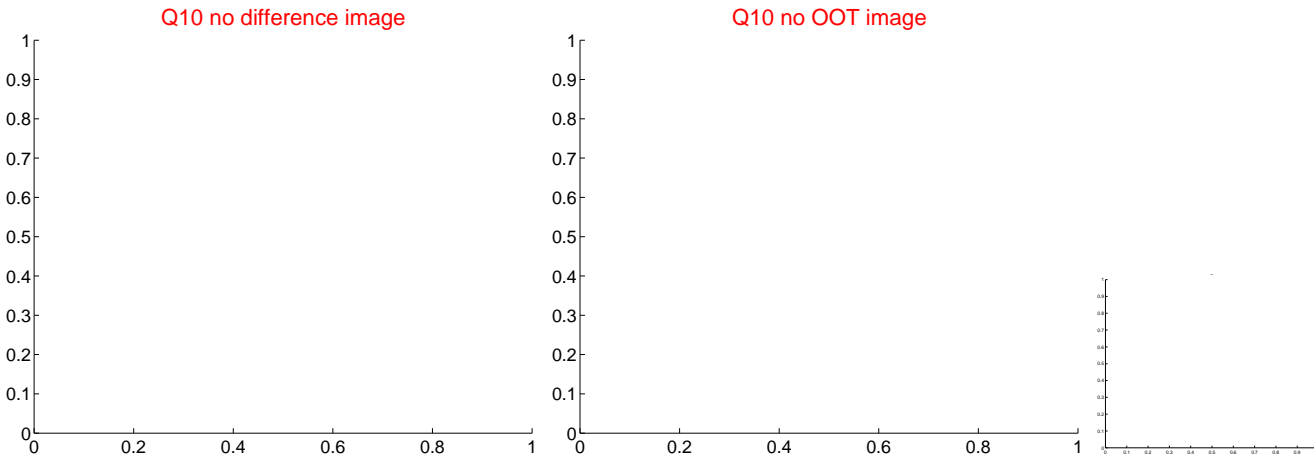
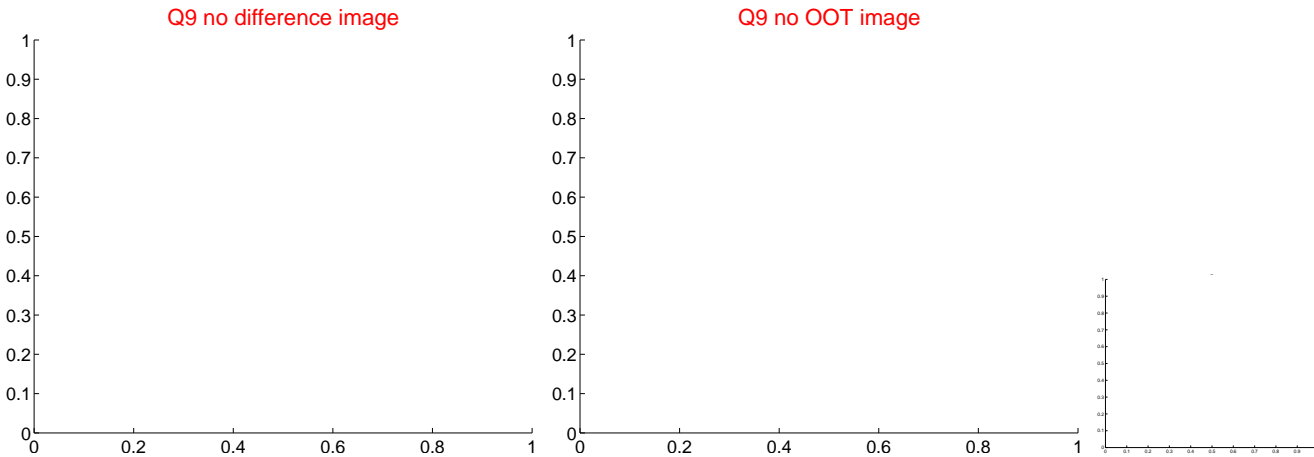
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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

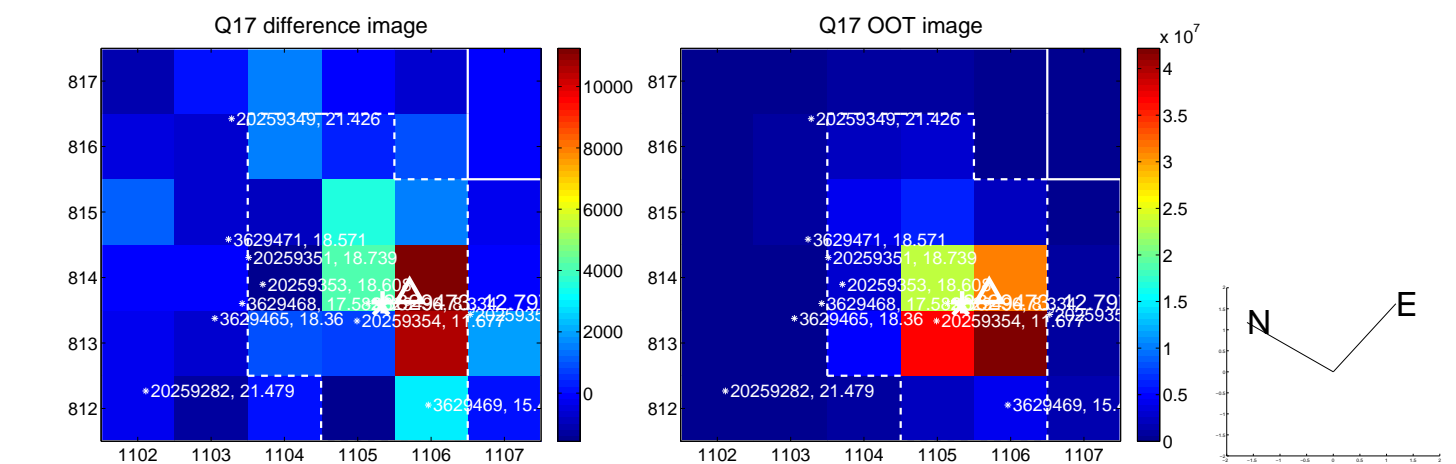




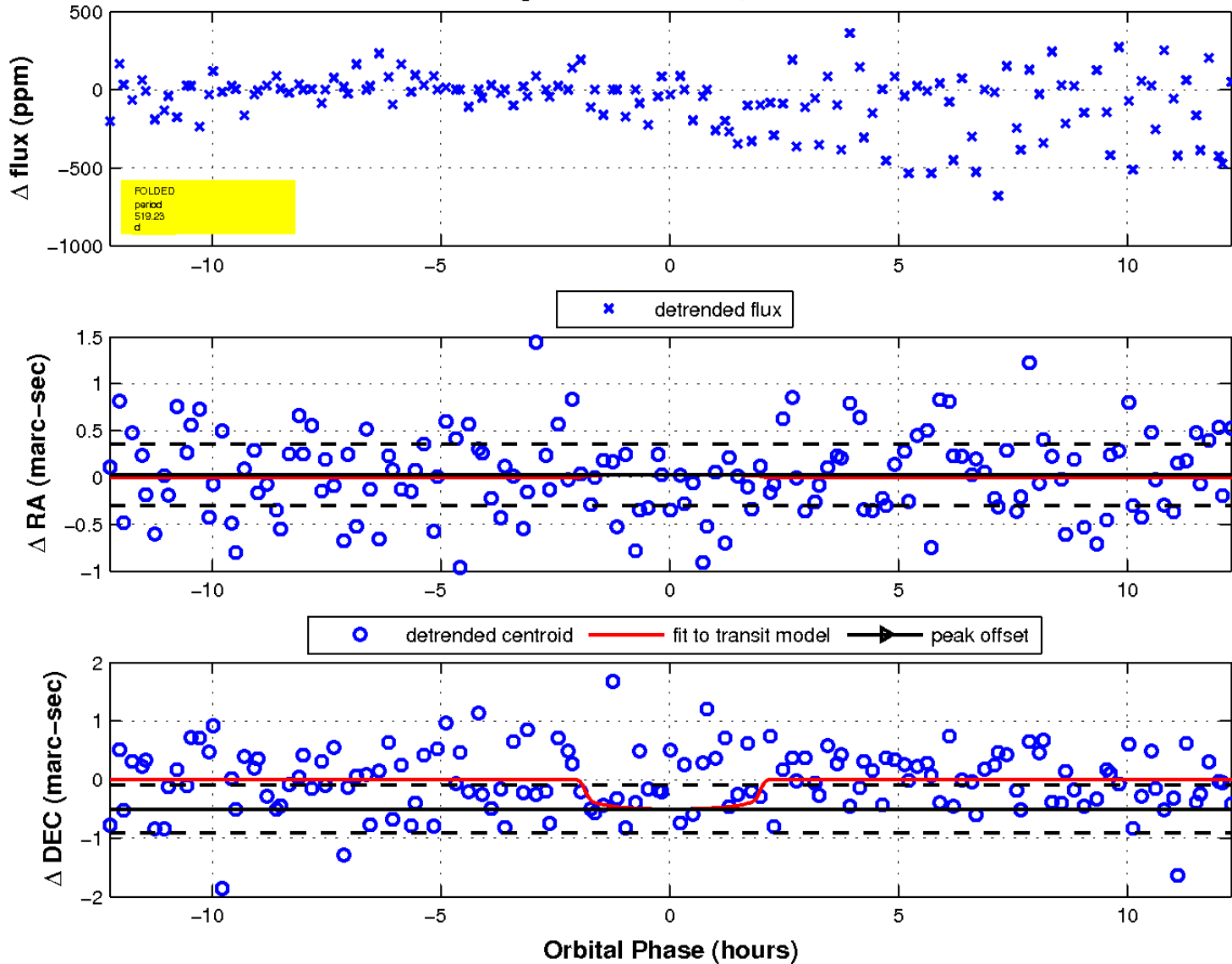
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



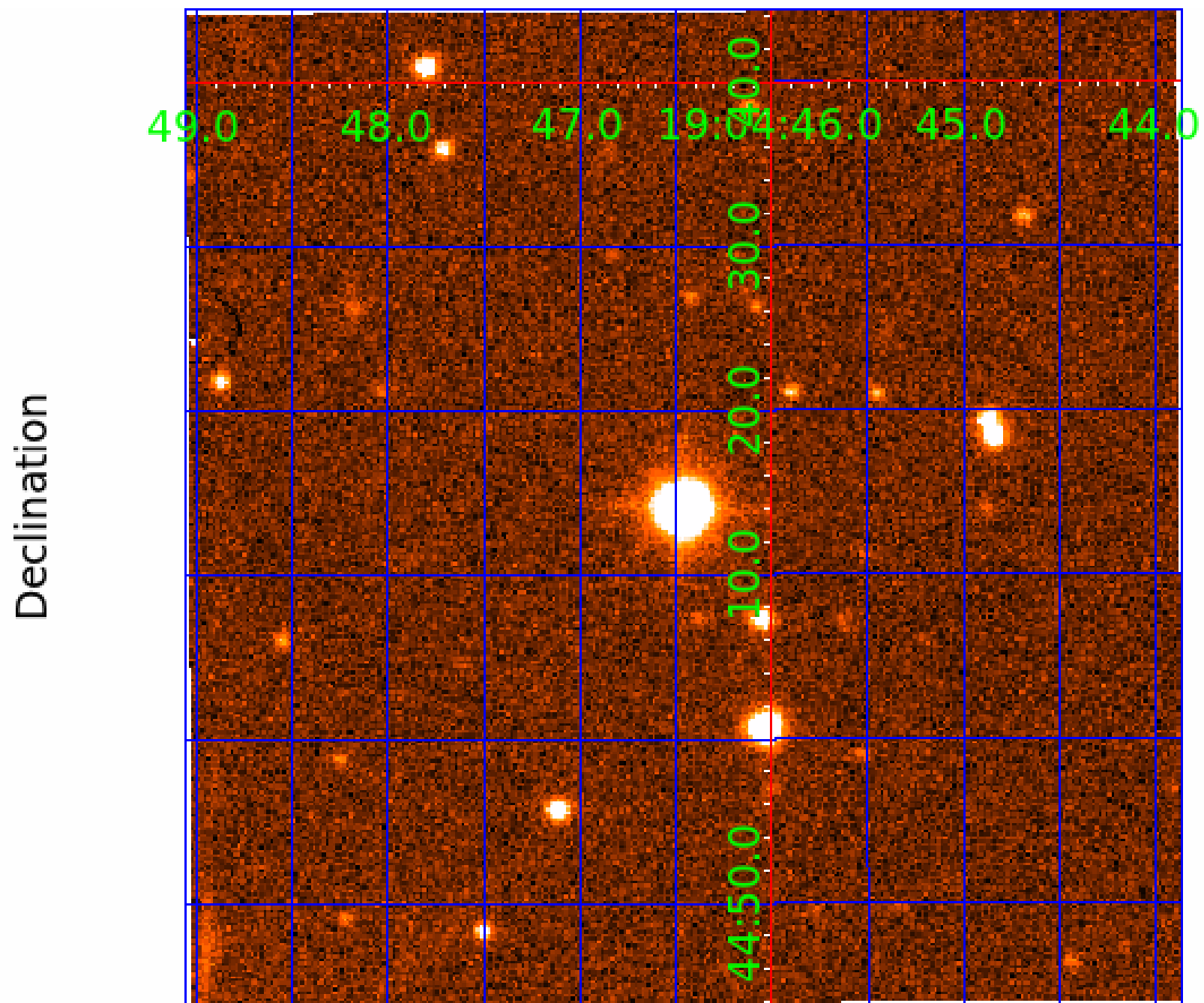
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 6



UKIRT Image



# KIC 003629473

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003629473-01	OBS	No	1.706927	132.936916	32.9	6.938	8.7	10.0	2.42	6927	1.87	11301.70
003629473-02	OBS	No	519.228029	524.359611	359.0	4.121	13.1	6.8	2.42	6927	5.16	5.52
003629473-03	OBS	No	361.307398	479.964538	807.7	16.260	12.3	7.9	2.42	6927	12.95	8.96
003629473-04	OBS	No	246.357037	152.247969	227.8	14.752	8.6	3.1	2.42	6927	3.94	14.93
003629473-05	OBS	No	157.885484	153.773129	195.1	4.376	8.9	4.7	2.42	6927	3.78	27.02
003629473-06	OBS	No	212.128031	243.178808	326.2	13.594	9.2	5.2	2.42	6927	4.70	18.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003629473-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
003629473-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003629473-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
003629473-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003629473-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003629473-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—INCONSISTENT_TRANS

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

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

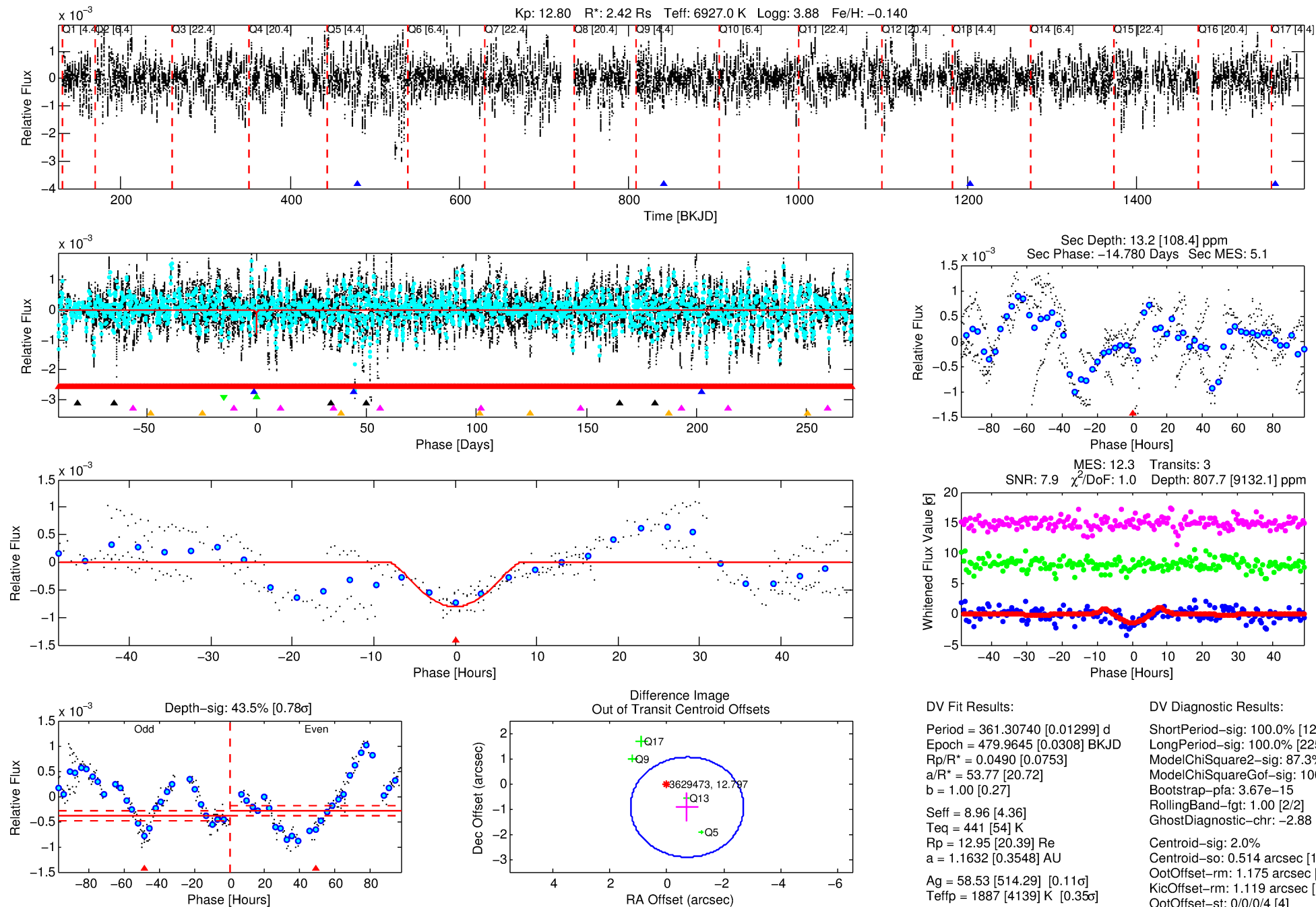
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003629473-03

No Significant Match Found

# DV One-Page Summary

KIC: 3629473 Candidate: 3 of 6 Period: 361.307 d



## DV Fit Results:

Period = 361.30740 [0.01299] d  
Epoch = 479.9645 [0.0308] BKJD  
Rp/R\* = 0.0490 [0.0753]  
a/R\* = 53.77 [20.72]  
b = 1.00 [0.27]  
Seff = 8.96 [4.36]  
Teq = 441 [54] K  
Rp = 12.95 [20.39] Re  
a = 1.1632 [0.3548] AU  
Ag = 58.53 [514.29] [0.11 $\sigma$ ]  
Teffp = 1887 [4139] K [0.35 $\sigma$ ]

## DV Diagnostic Results:

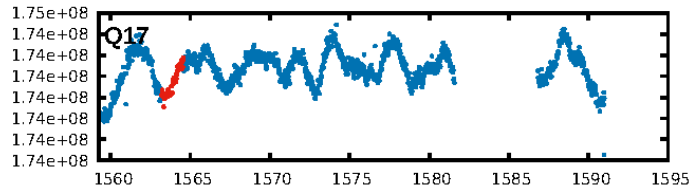
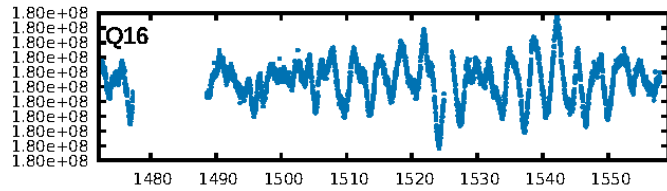
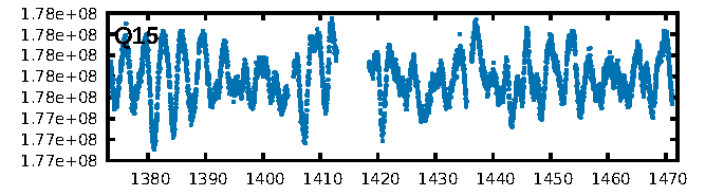
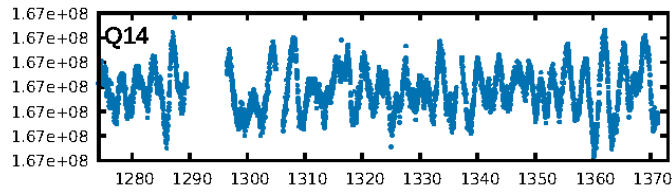
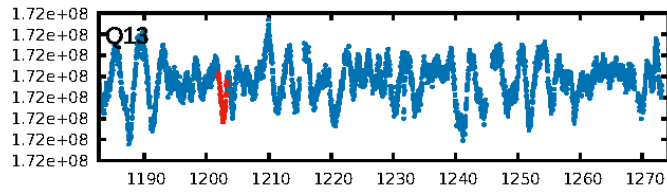
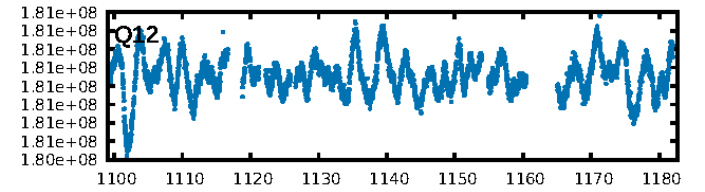
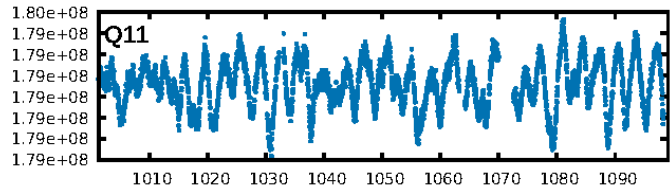
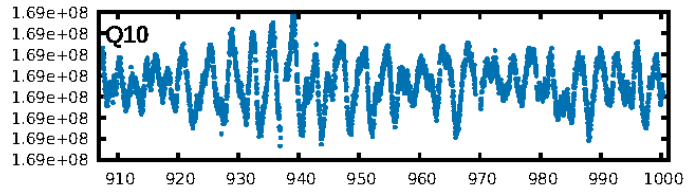
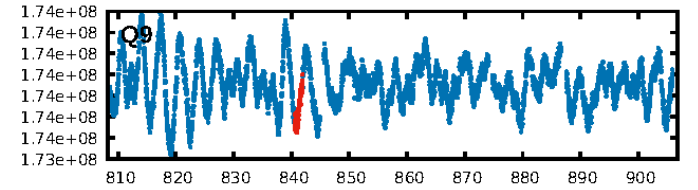
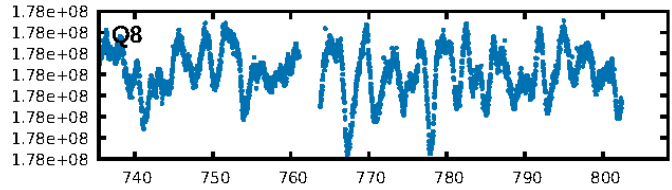
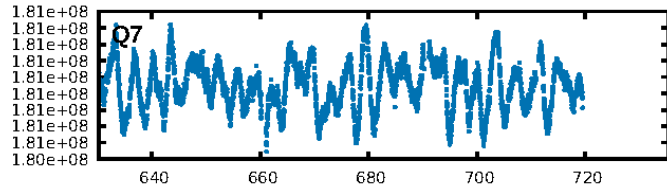
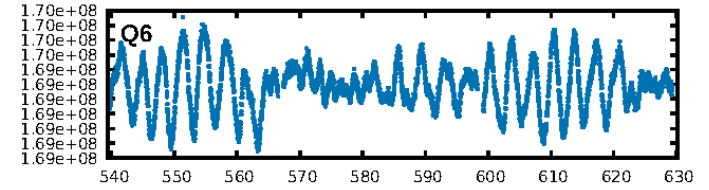
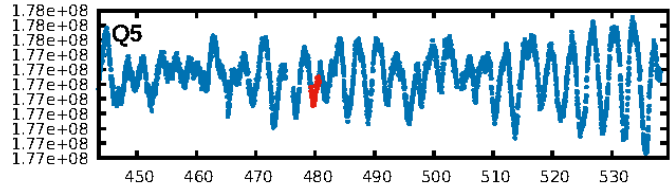
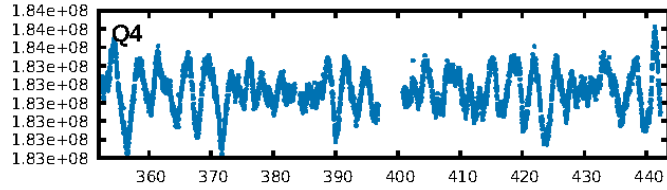
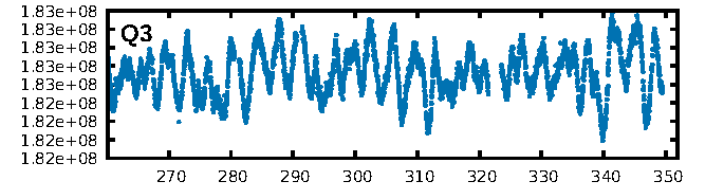
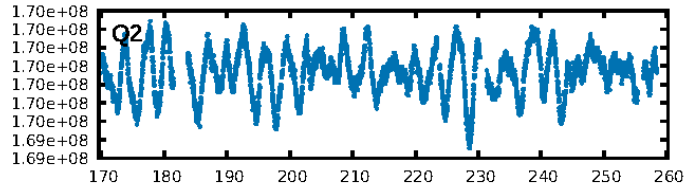
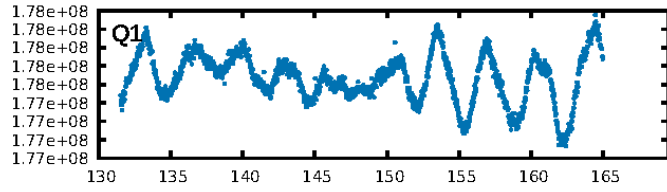
ShortPeriod-sig: 100.0% [125.66 $\sigma$ ]  
LongPeriod-sig: 100.0% [225.95 $\sigma$ ]  
ModelChiSquare2-sig: 87.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.67e-15  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: -2.88  
Centroid-sig: 2.0%  
Centroid-so: 0.514 arcsec [1.73 $\sigma$ ]  
OotOffset-rm: 1.175 arcsec [1.78 $\sigma$ ]  
KicOffset-rm: 1.119 arcsec [1.21 $\sigma$ ]  
OotOffset-st: 0/0/0/4 [4]  
KicOffset-st: 0/0/0/4 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 0.00 [0/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:06:50 Z

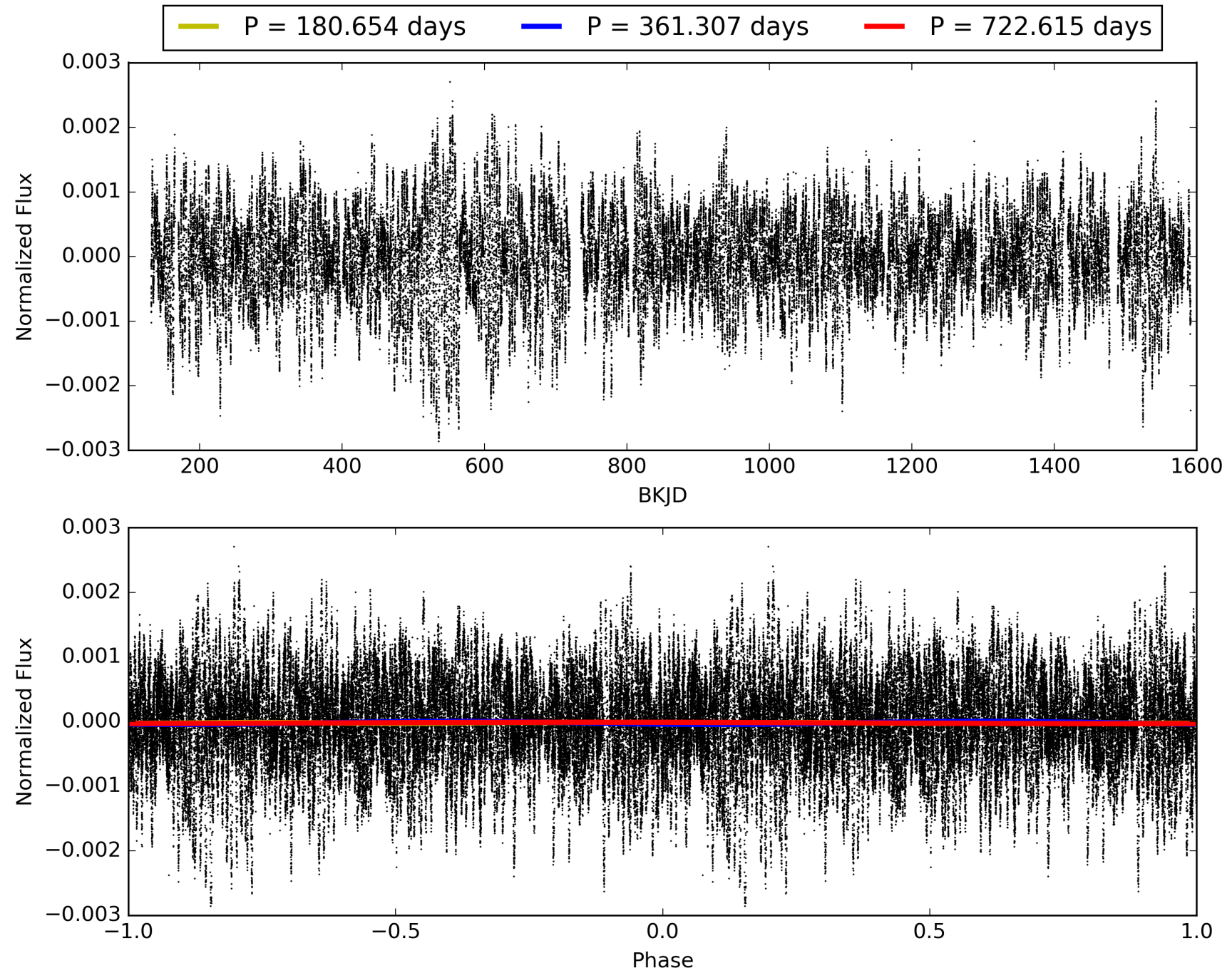
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



## TCE 003629473-03, PDC Light Curves

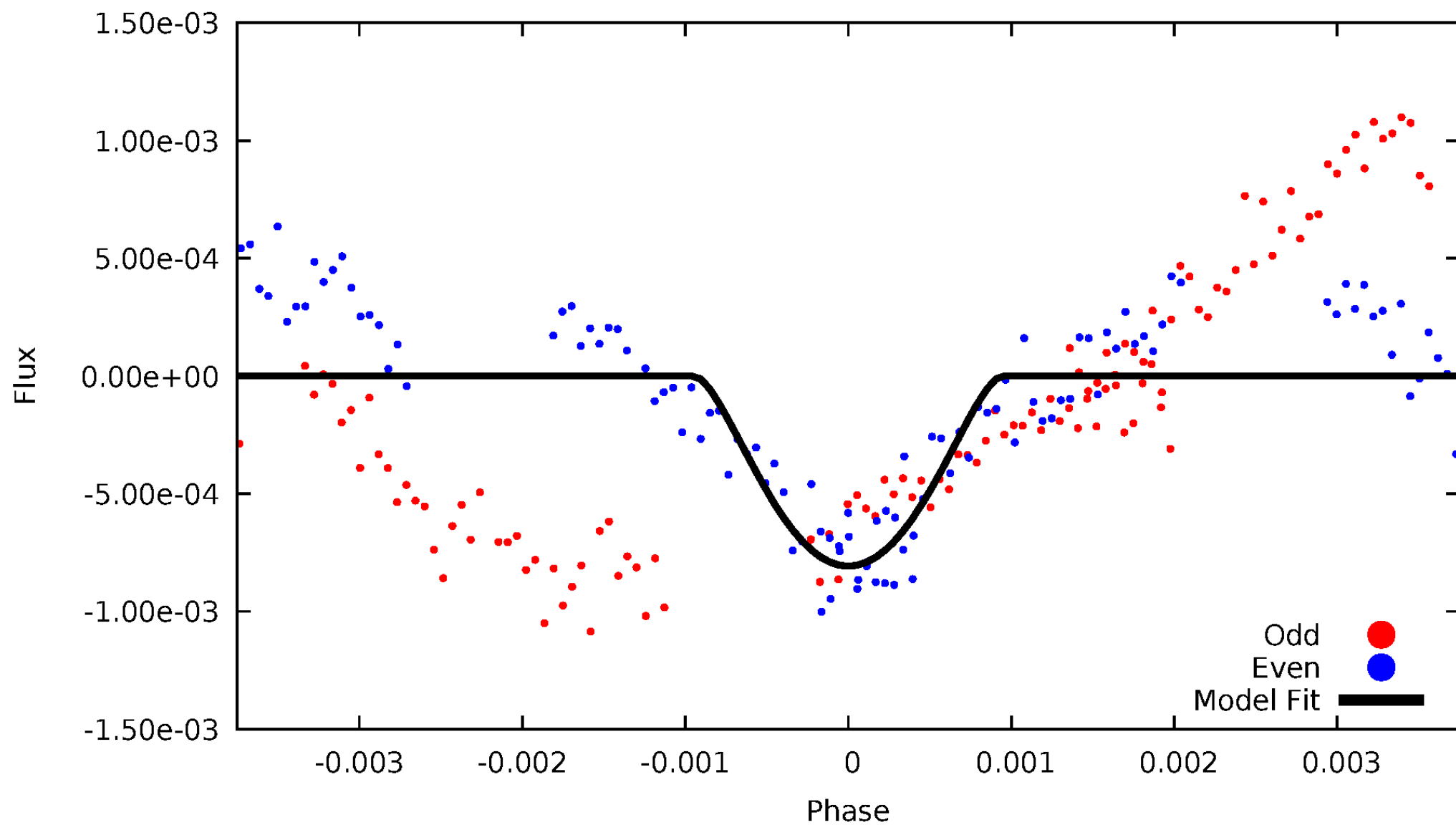


# TCE 003629473-03



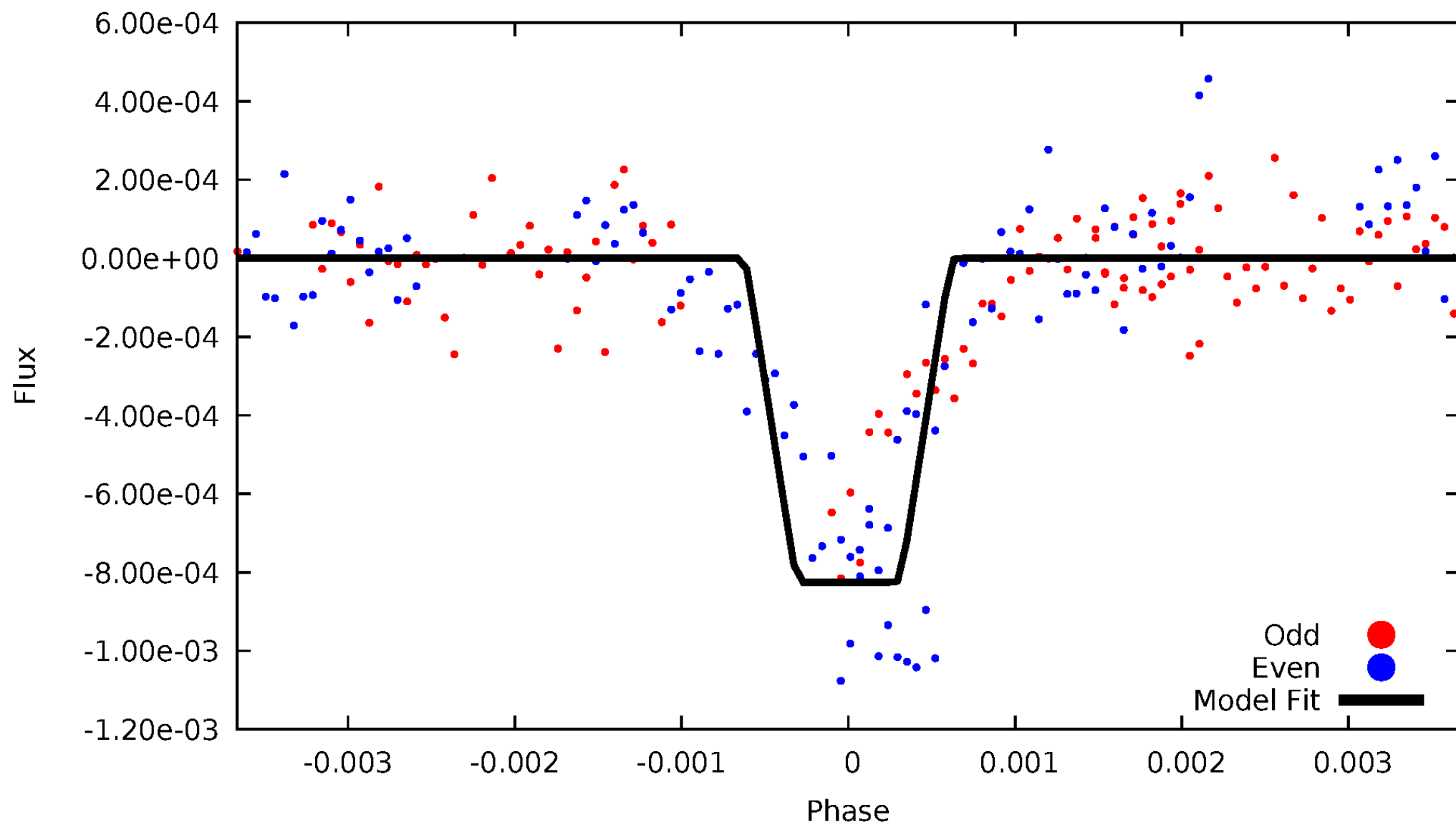
# DV Odd/Even

TCE 003629473-03



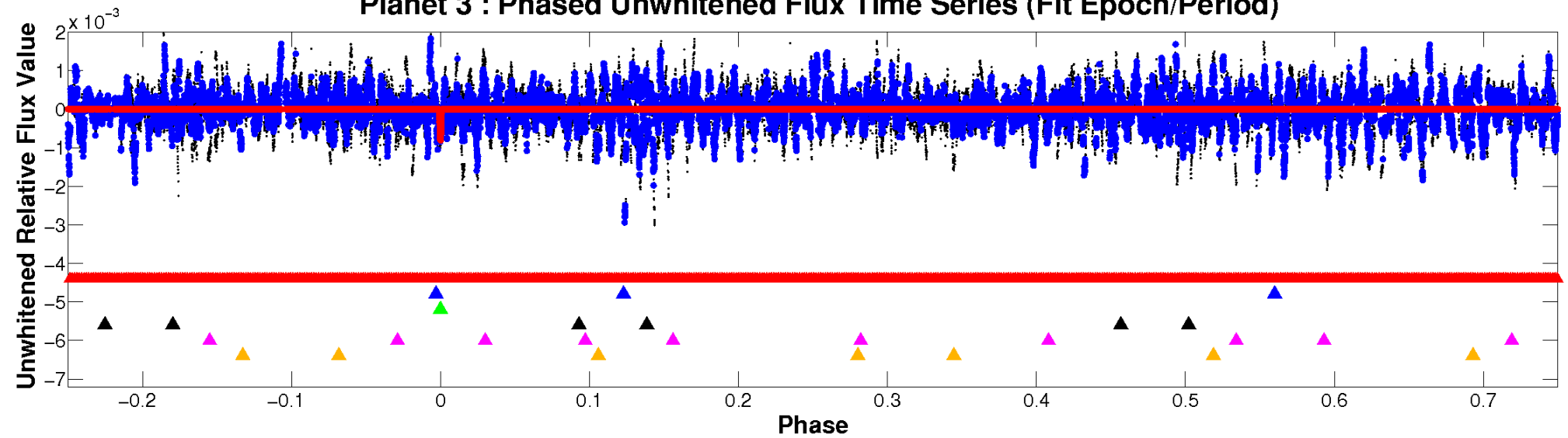
# ALT Odd/Even

TCE 003629473-03

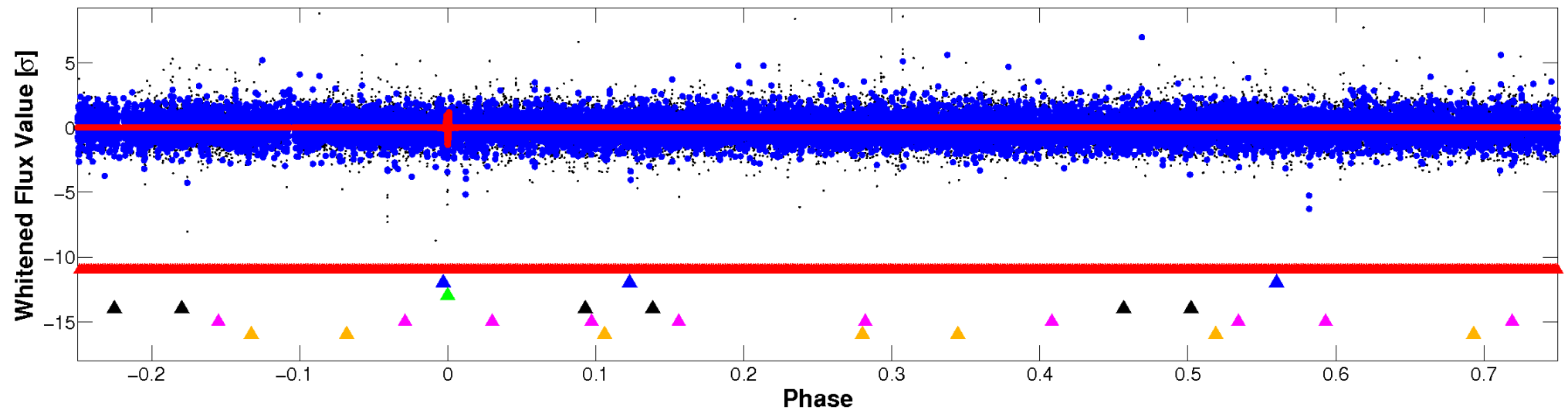


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



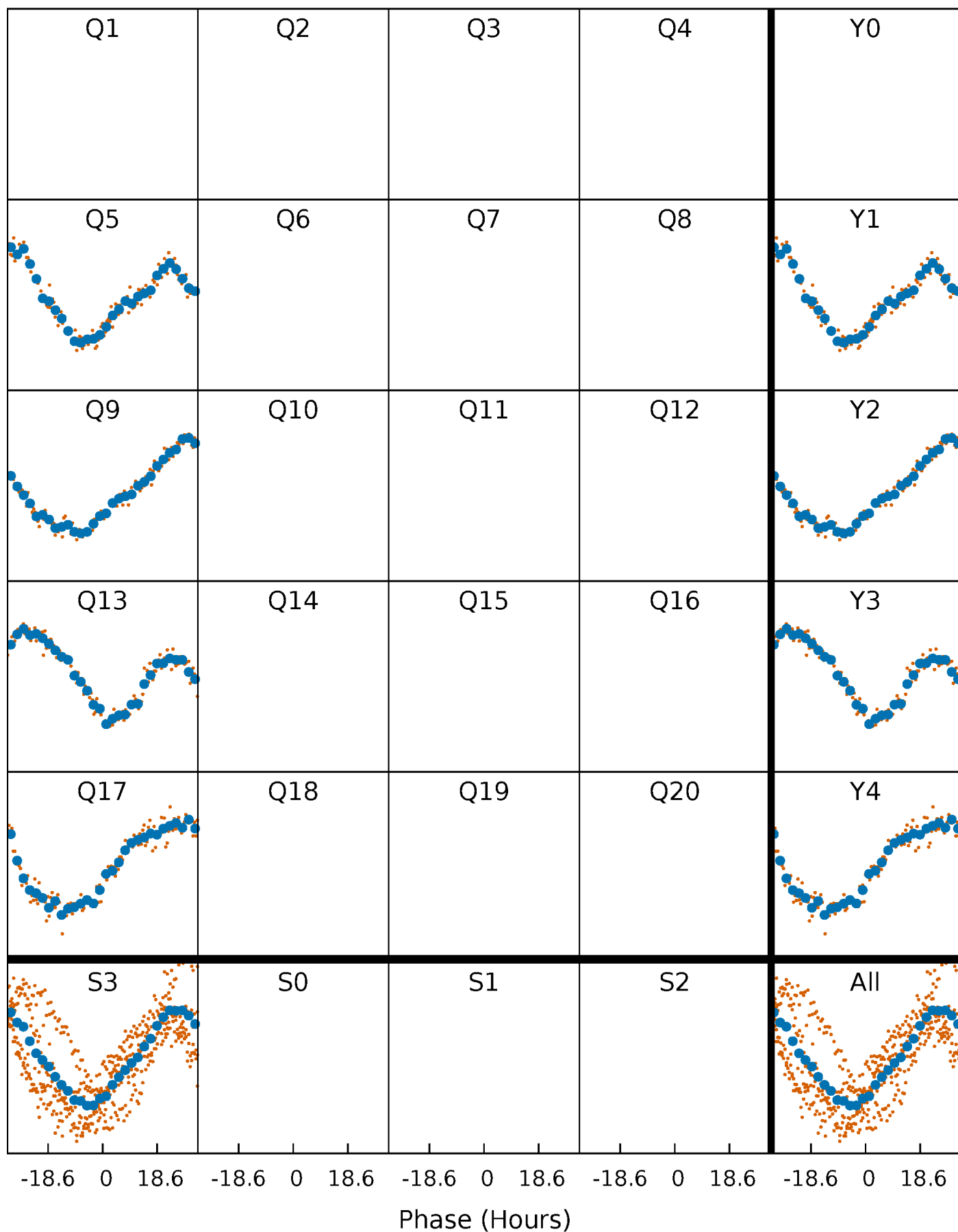
Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





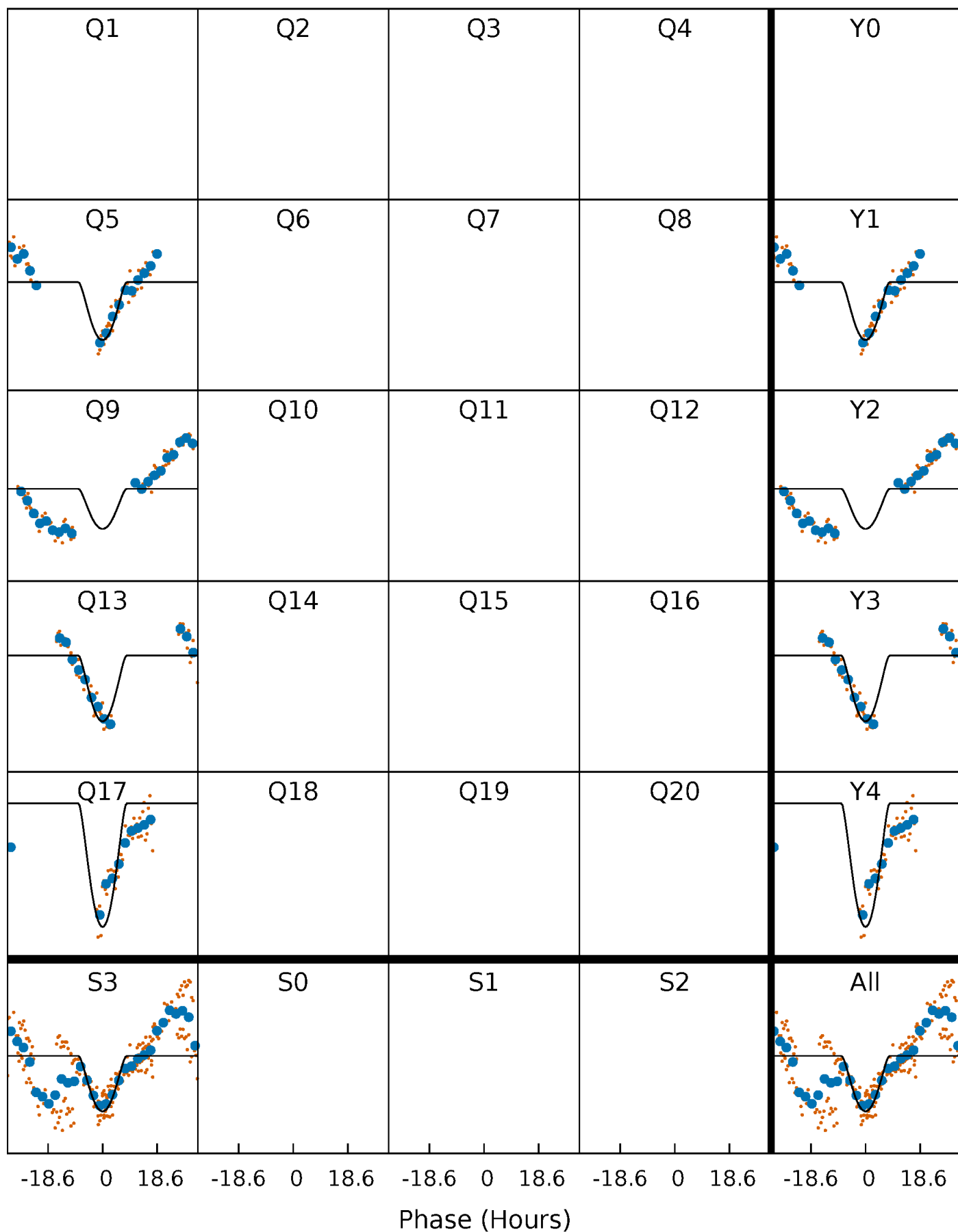
# PDC Quarter-Phased Transit Curves

TCE 003629473-03     $P=361.307398$  Days     $T_0=479.964538$  (BKJD)



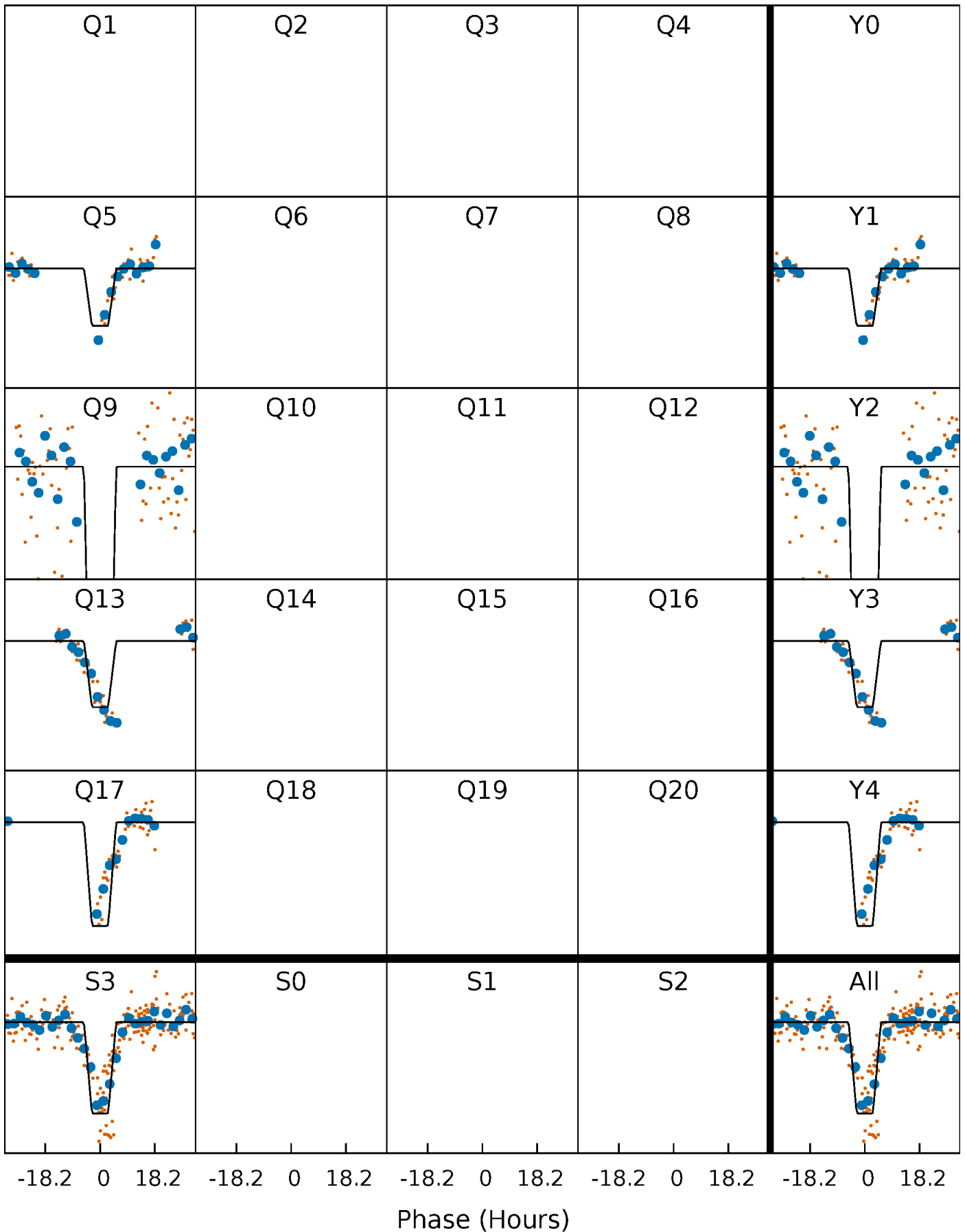
# DV Quarter-Phased Transit Curves

TCE 003629473-03     $P=361.307398$  Days     $T_0=479.964538$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

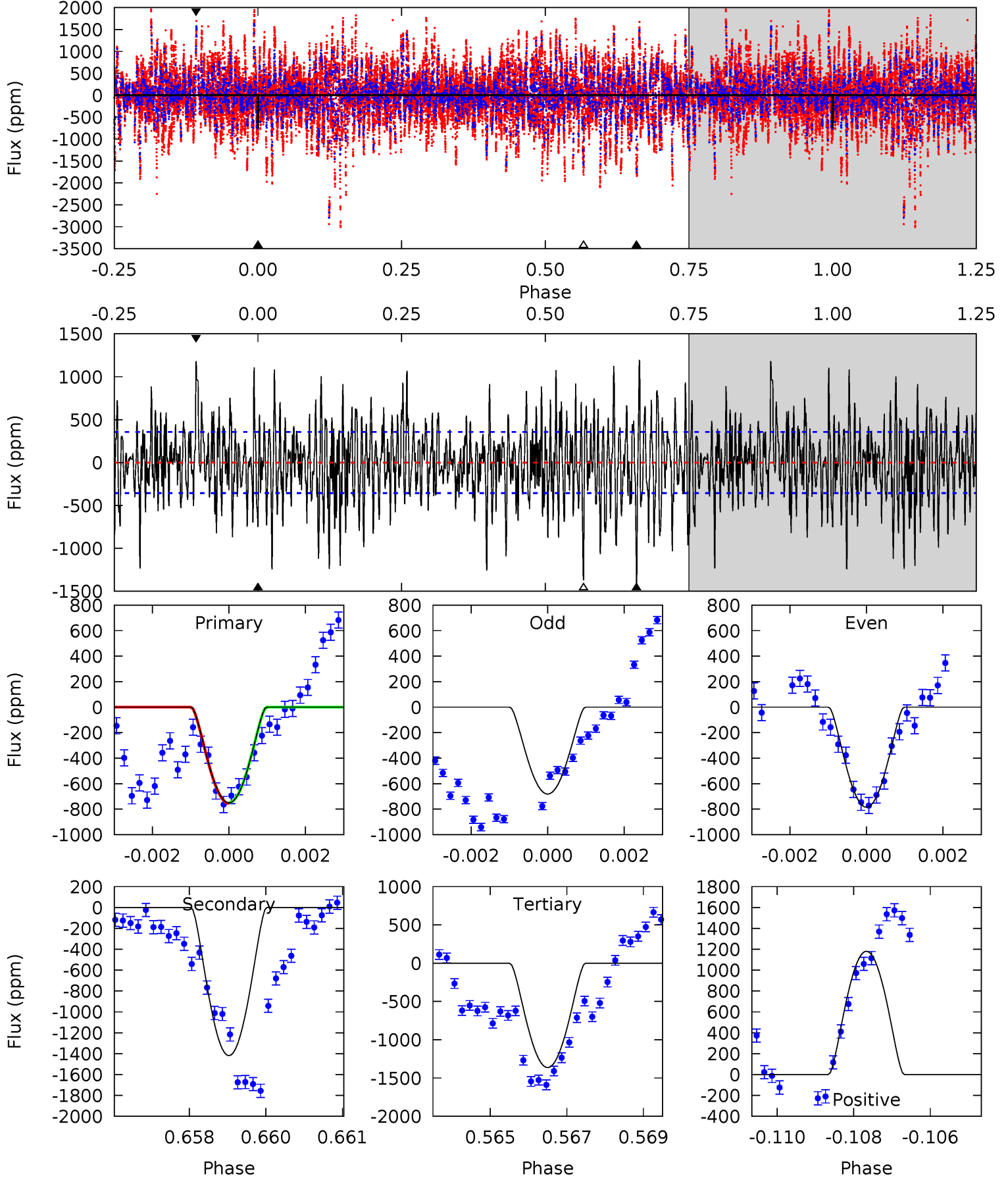
TCE 003629473-03     $P=361.306208$  Days     $T_0=479.921094$  (BKJD)



# DV Model-Shift Uniqueness Test

003629473-03, P = 361.307398 Days, E = 118.657140 Days

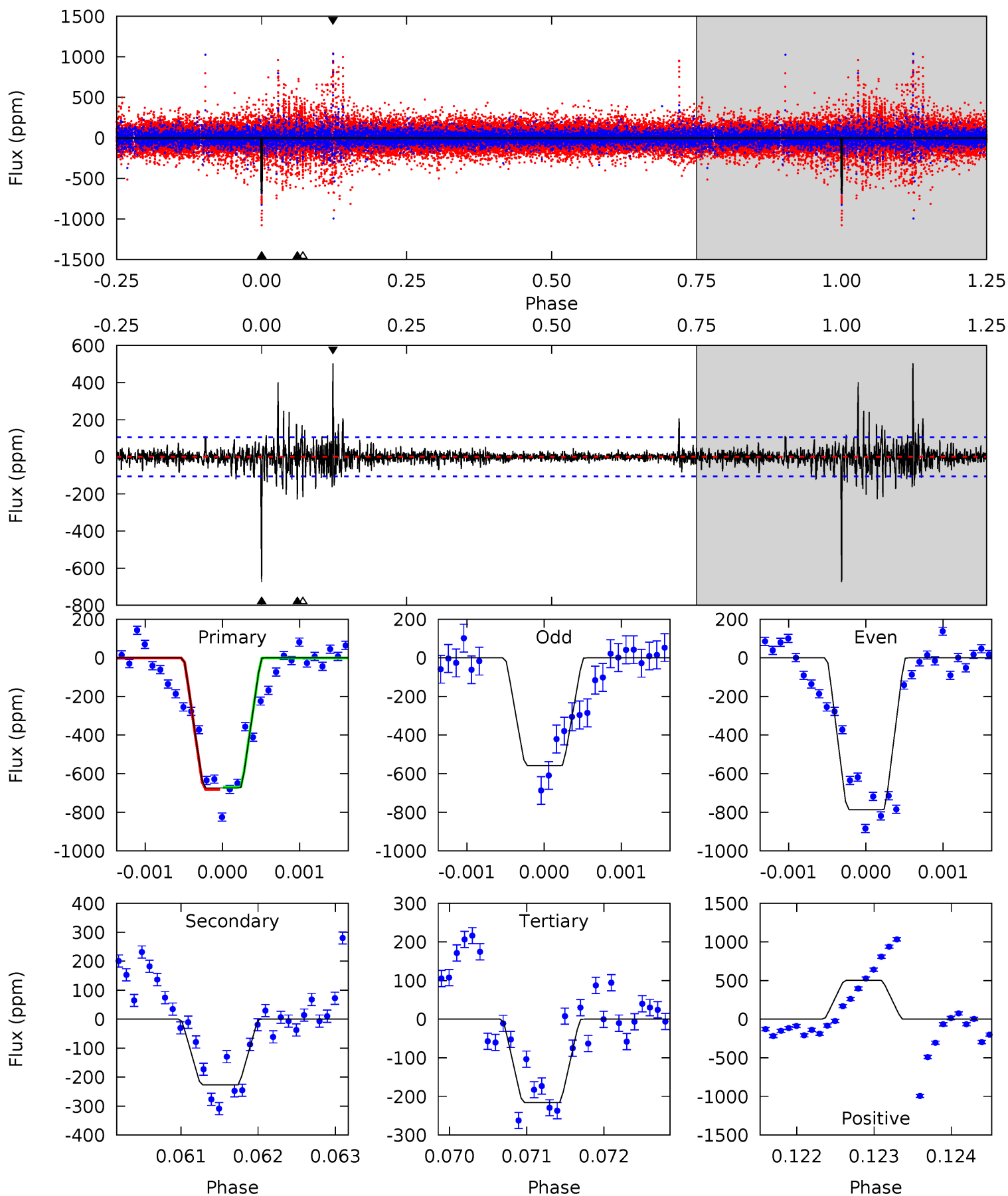
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	21.3	20.4	17.7	5.33	3.10	5.64	-9.18	-6.43	0.83	3.57	0.74	0.98	0.46	0.05



# Alt Model-Shift Uniqueness Test

003629473-03, P = 361.306208 Days, E = 118.614886 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
34.6	11.7	11.1	25.8	5.41	3.23	1.98	23.5	8.77	0.56	-14.2	5.34	0.96	0.43	0.26



### Stellar Parameters For KIC 003629473

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6927^{+167}_{-238}$	$3.875^{+0.266}_{-0.114}$	$-0.140^{+0.300}_{-0.300}$	$2.424^{+0.444}_{-0.824}$	$1.605^{+0.170}_{-0.340}$	$0.159^{+0.273}_{-0.055}$
	+2%/-3%	+7%/-3%	+214%/-214%	+18%/-34%	+11%/-21%	+172%/-35%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003629473-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1419 \pm 67$	$18.75^{+18.36}_{-12.81}$	$609^{+39}_{-53}$	$4962^{+4195}_{-1097}$	$2859^{+27703}_{-2112}$
Alt.	$-227 \pm 19$	$16.44^{+16.15}_{-11.16}$	$605^{+36}_{-49}$	$3712^{+2158}_{-695}$	$614^{+5596}_{-456}$

$T_{max}$  = Theoretical Maximum Planetary Temperature  
 $T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$



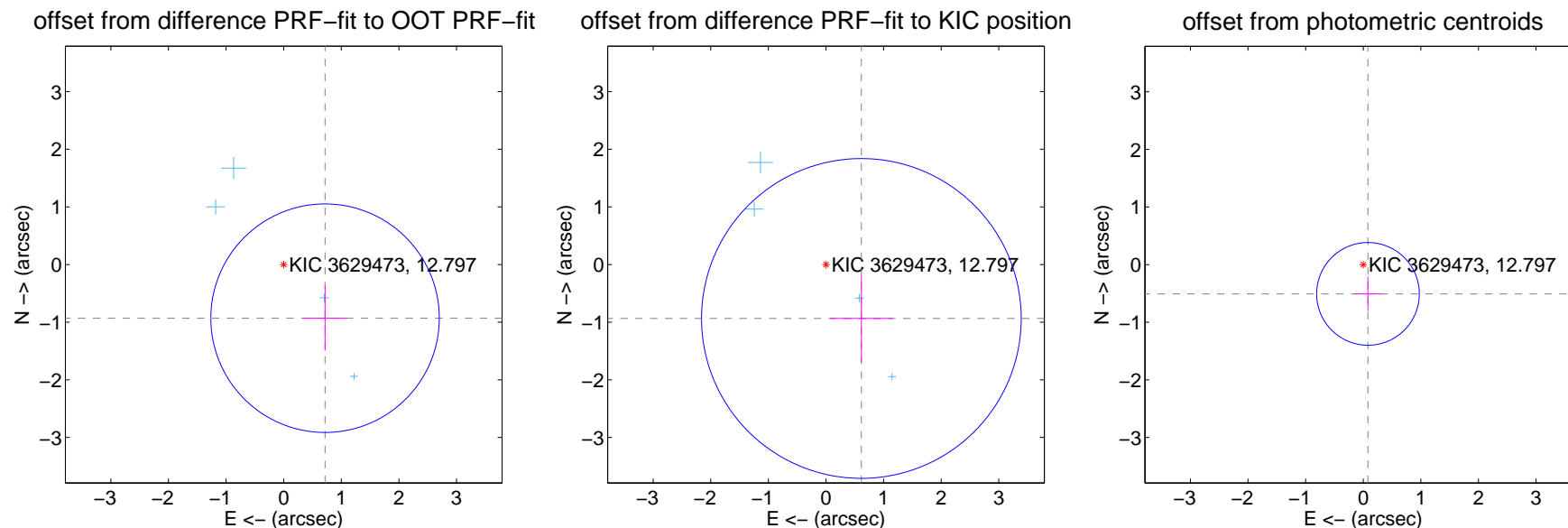
## DV Centroid Data

Supplemental centroid analysis for 003629473-03. Kepler magnitude: 12.80. Transit SNR 7.92

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.175 \pm 0.661$	1.78	$-0.718 \pm 0.380$	$-0.931 \pm 0.561$
PRF-fit source offset from KIC position	$1.119 \pm 0.925$	1.21	$-0.614 \pm 0.543$	$-0.936 \pm 0.760$
photometric centroid source offset	$0.51 \pm 0.30$	1.73	$-0.08 \pm 0.24$	$-0.51 \pm 0.30$

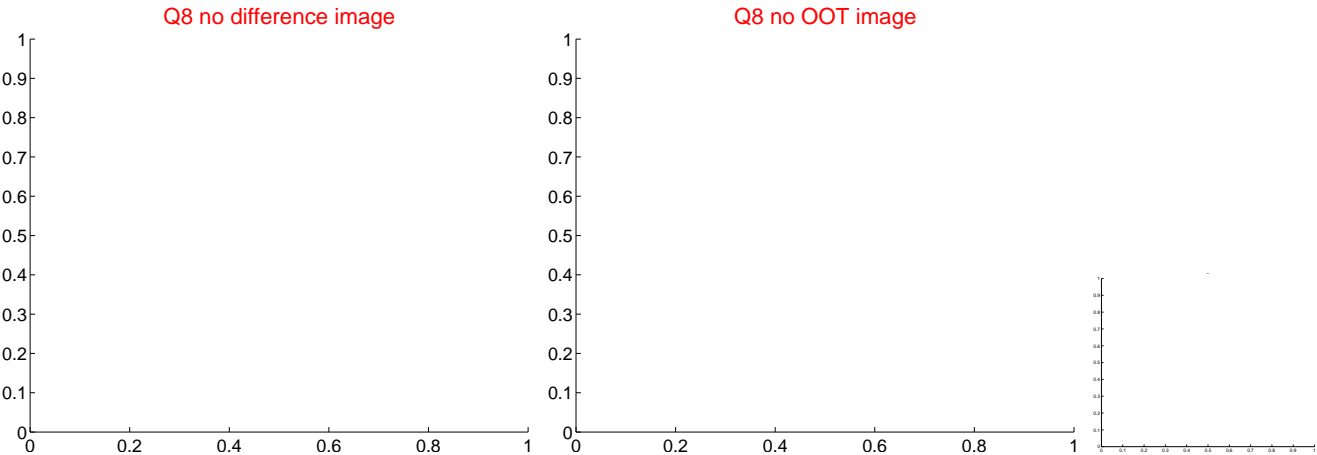
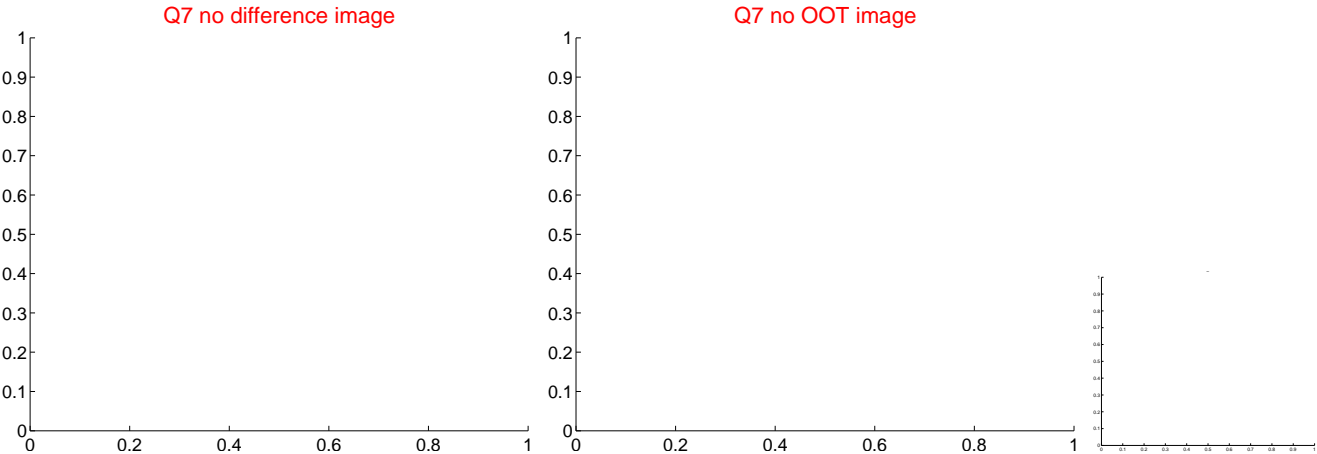
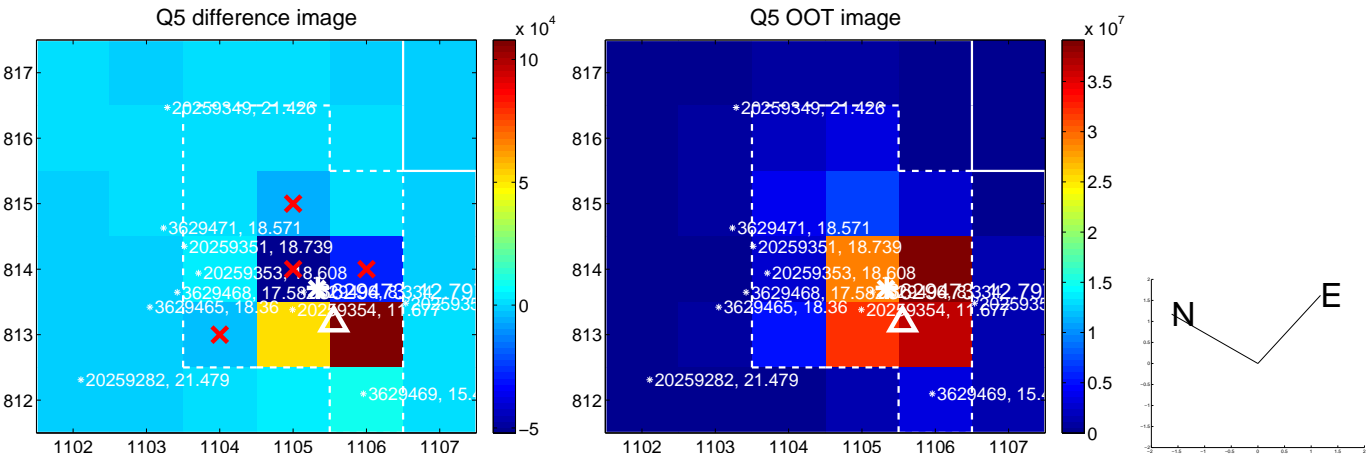


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

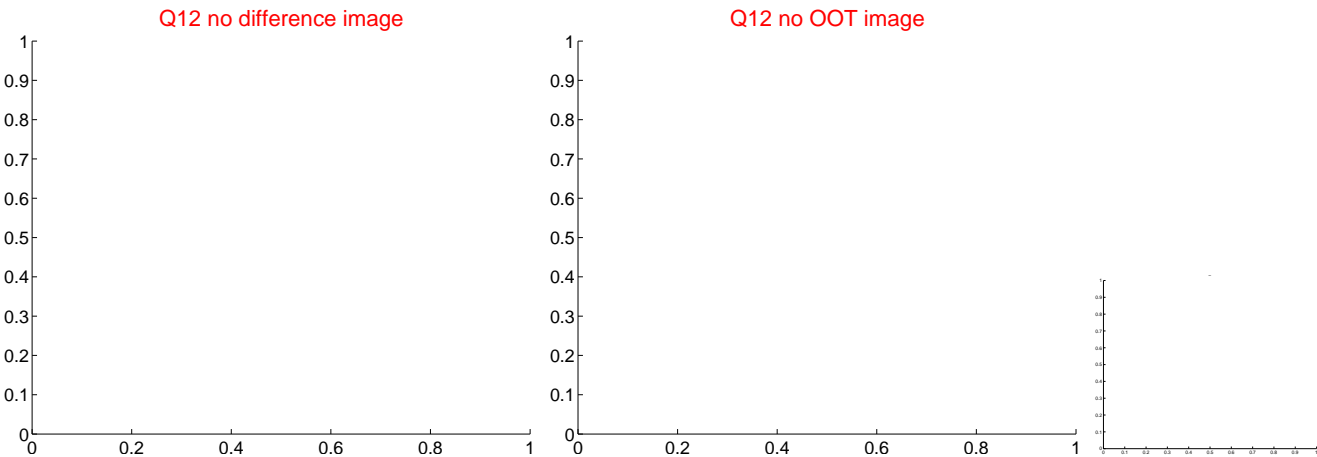
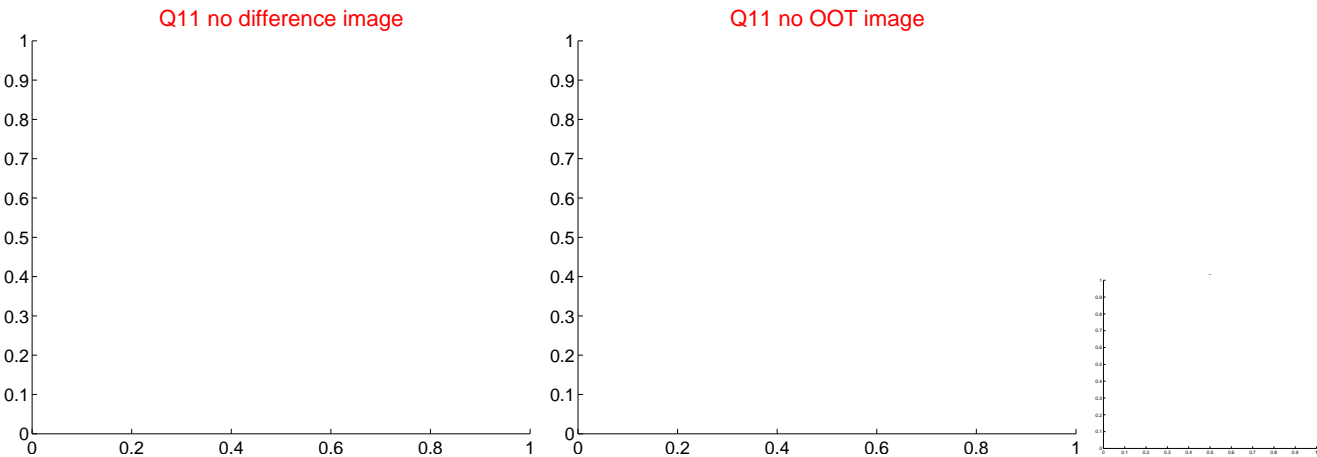
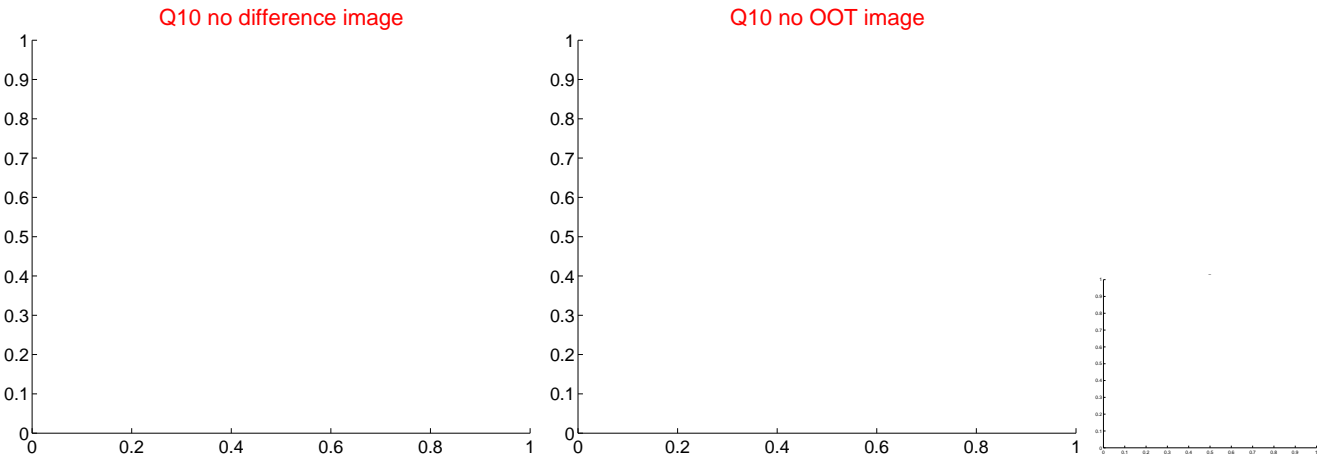
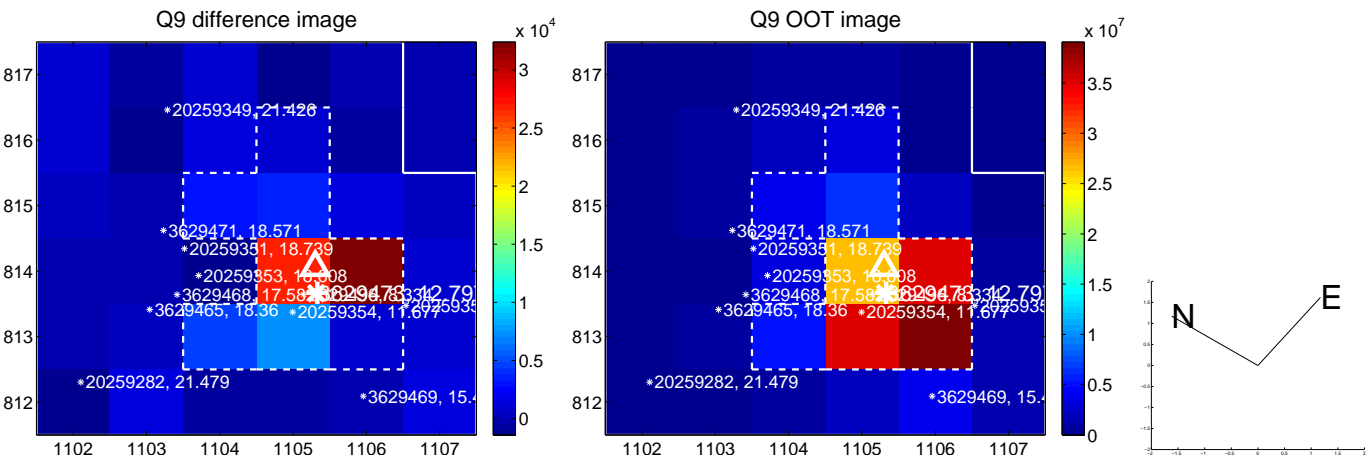
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



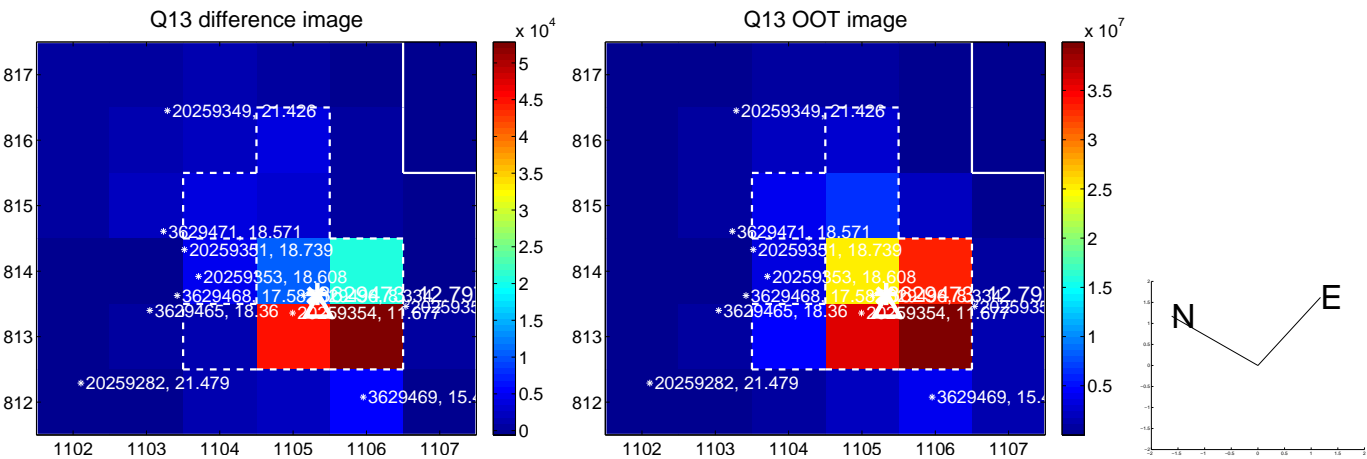
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



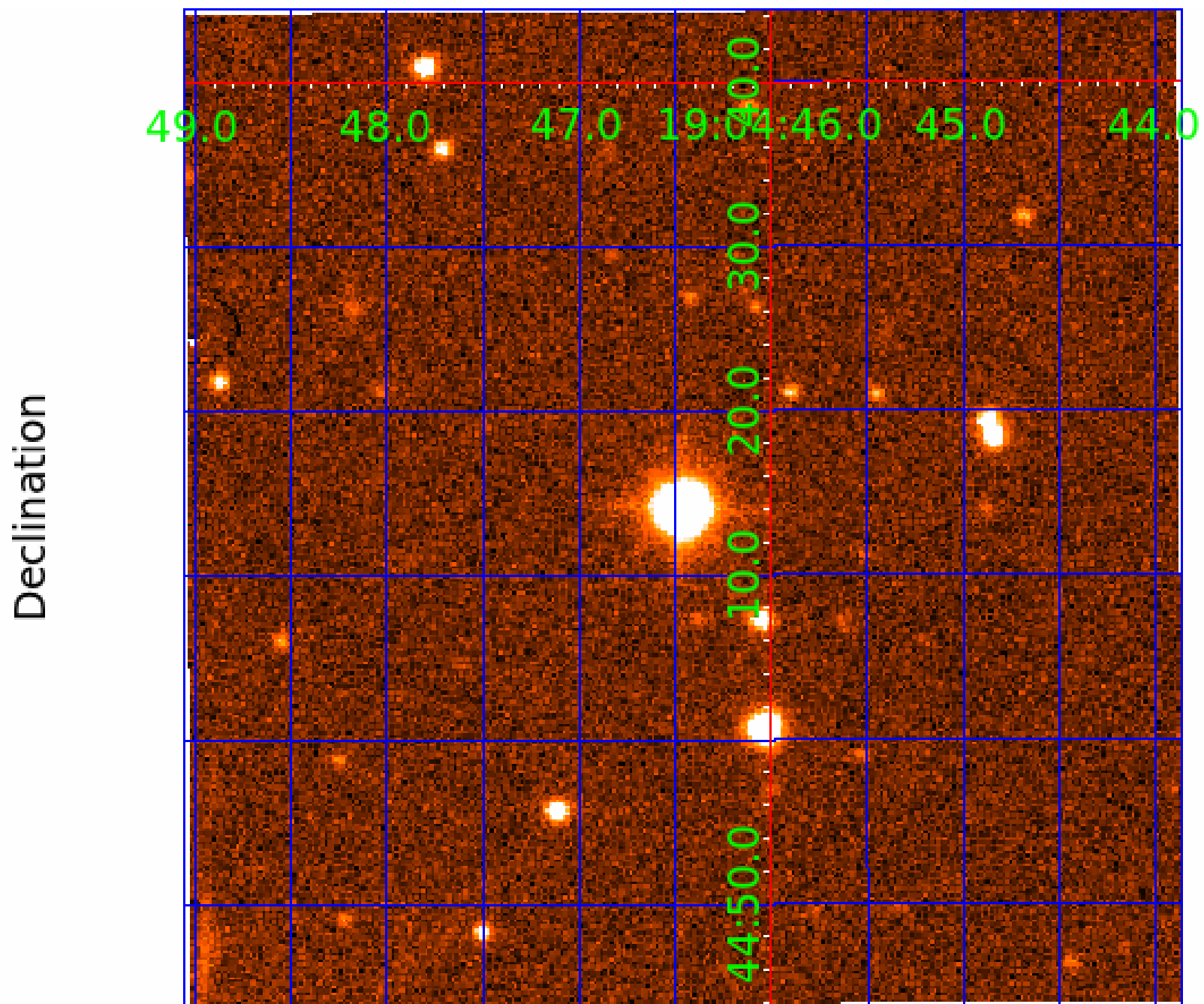
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.







UKIRT Image



# KIC 003629473

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003629473-01	OBS	No	1.706927	132.936916	32.9	6.938	8.7	10.0	2.42	6927	1.87	11301.70
003629473-02	OBS	No	519.228029	524.359611	359.0	4.121	13.1	6.8	2.42	6927	5.16	5.52
003629473-03	OBS	No	361.307398	479.964538	807.7	16.260	12.3	7.9	2.42	6927	12.95	8.96
003629473-04	OBS	No	246.357037	152.247969	227.8	14.752	8.6	3.1	2.42	6927	3.94	14.93
003629473-05	OBS	No	157.885484	153.773129	195.1	4.376	8.9	4.7	2.42	6927	3.78	27.02
003629473-06	OBS	No	212.128031	243.178808	326.2	13.594	9.2	5.2	2.42	6927	4.70	18.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003629473-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
003629473-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003629473-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
003629473-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003629473-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003629473-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—INCONSISTENT_TRANS

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

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

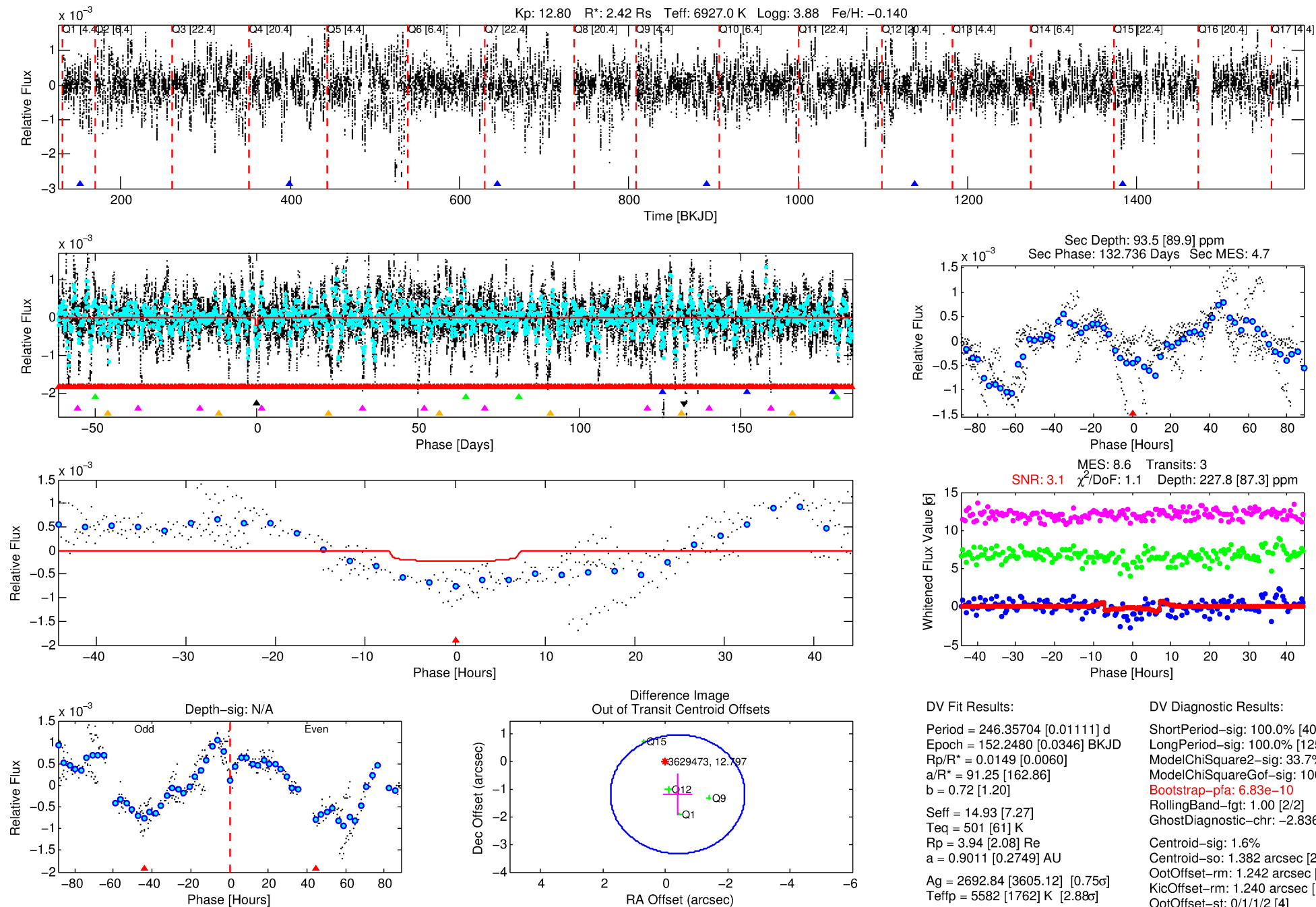
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003629473-04

No Significant Match Found

# DV One-Page Summary

KIC: 3629473 Candidate: 4 of 6 Period: 246.357 d



## DV Fit Results:

Period = 246.35704 [0.01111] d  
Epoch = 152.2480 [0.0346] BKJD  
Rp/R\* = 0.0149 [0.0060]  
a/R\* = 91.25 [162.86]  
b = 0.72 [1.20]  
Seff = 14.93 [7.27]  
Teq = 501 [61] K  
Rp = 3.94 [2.08] Re  
a = 0.9011 [0.2749] AU  
Ag = 2692.84 [3605.12] [0.75] $\sigma$   
Teffp = 5582 [1762] K [2.88] $\sigma$

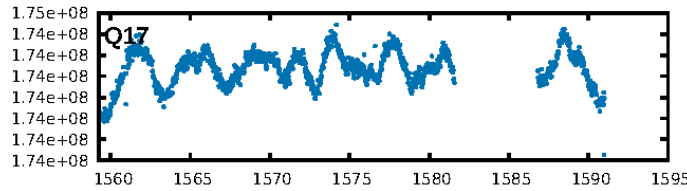
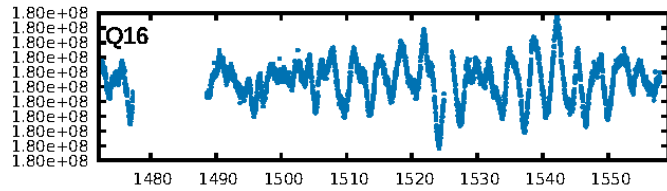
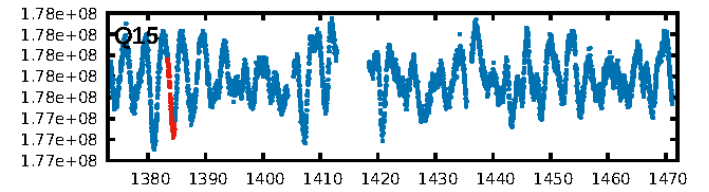
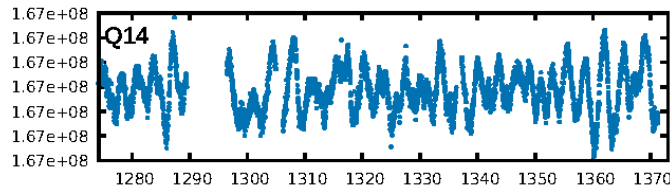
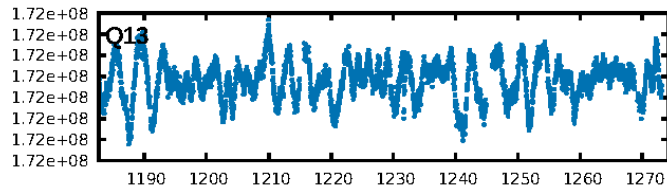
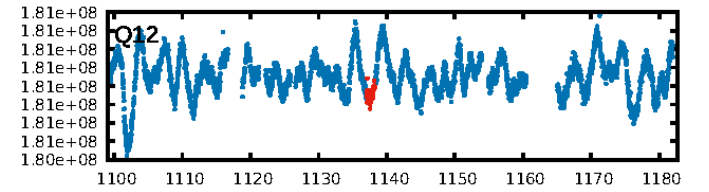
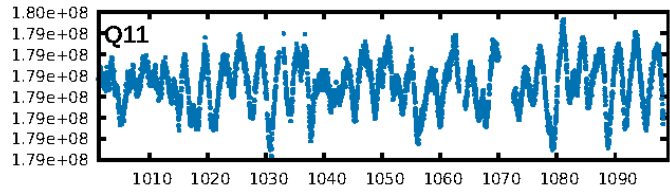
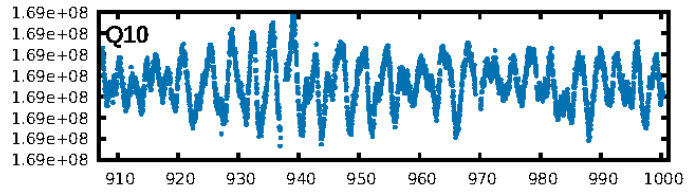
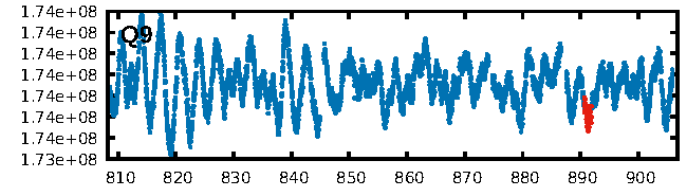
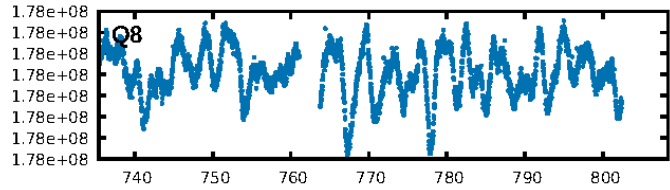
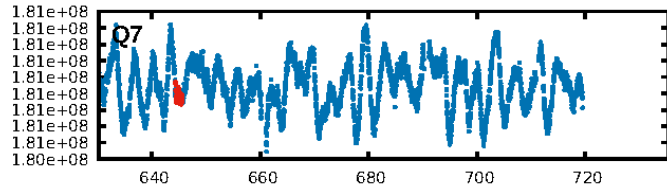
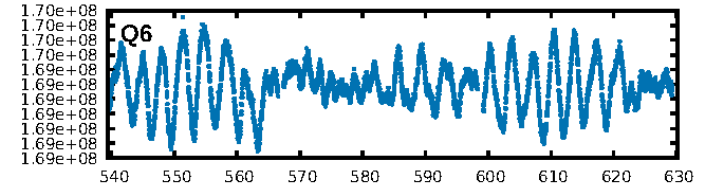
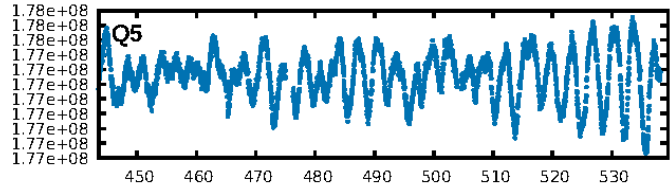
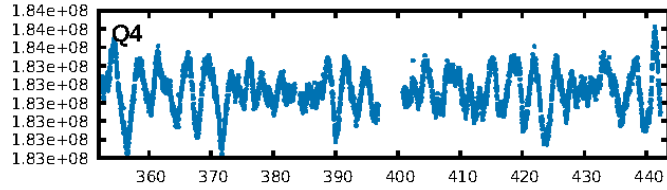
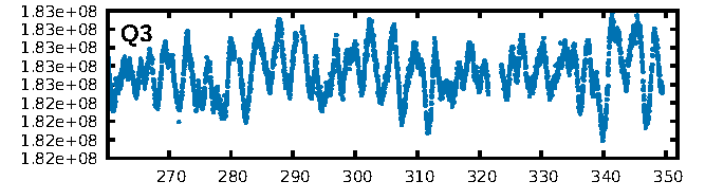
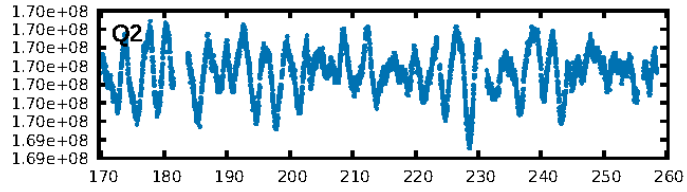
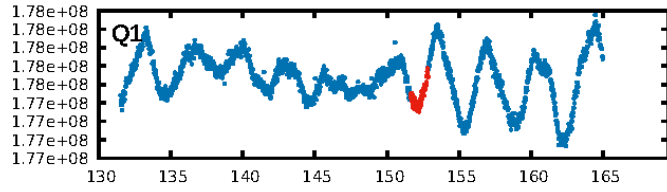
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [40.95] $\sigma$   
LongPeriod-sig: 100.0% [125.66] $\sigma$   
ModelChiSquare2-sig: 33.7%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 6.83e-10**  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: -2.836  
Centroid-sig: 1.6%  
Centroid-so: 1.382 arcsec [2.04] $\sigma$   
OotOffset-rm: 1.242 arcsec [1.73] $\sigma$   
KicOffset-rm: 1.240 arcsec [1.70] $\sigma$   
OotOffset-st: 0/1/1/2 [4]  
KicOffset-st: 0/1/1/2 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 0.00 [0/4]

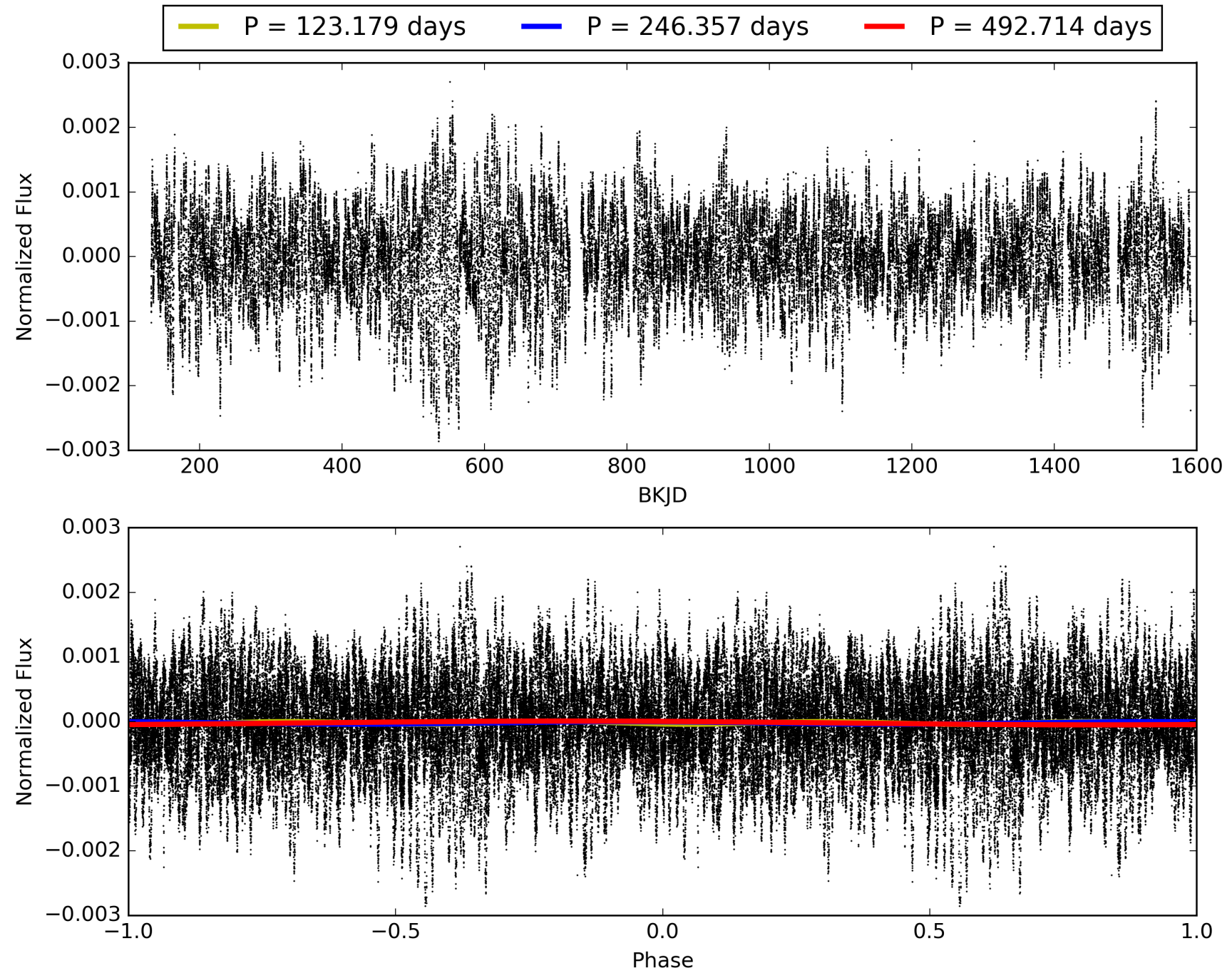
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:06:55 Z

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

## TCE 003629473-04, PDC Light Curves

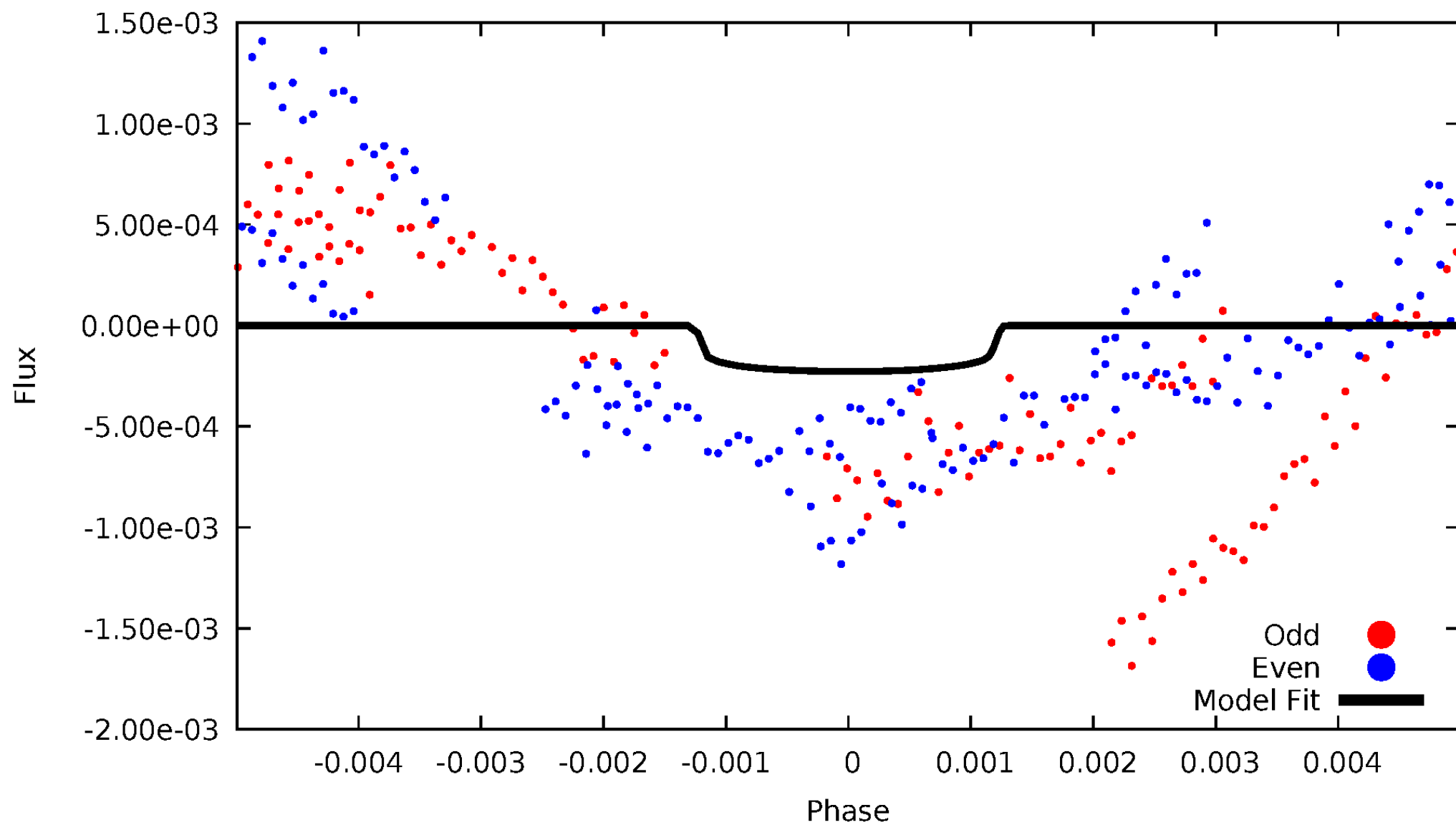


TCE 003629473-04



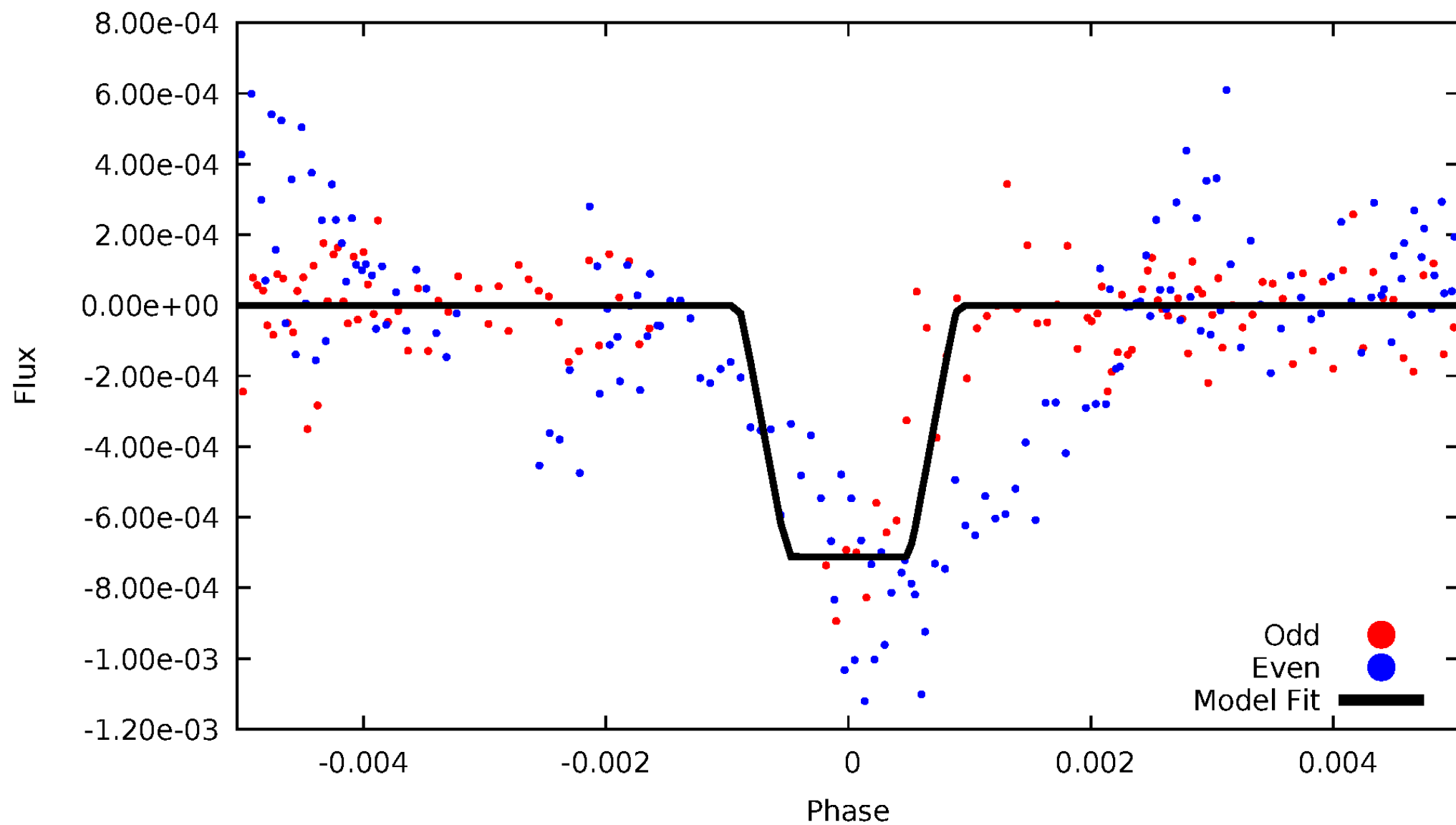
# DV Odd/Even

TCE 003629473-04



# ALT Odd/Even

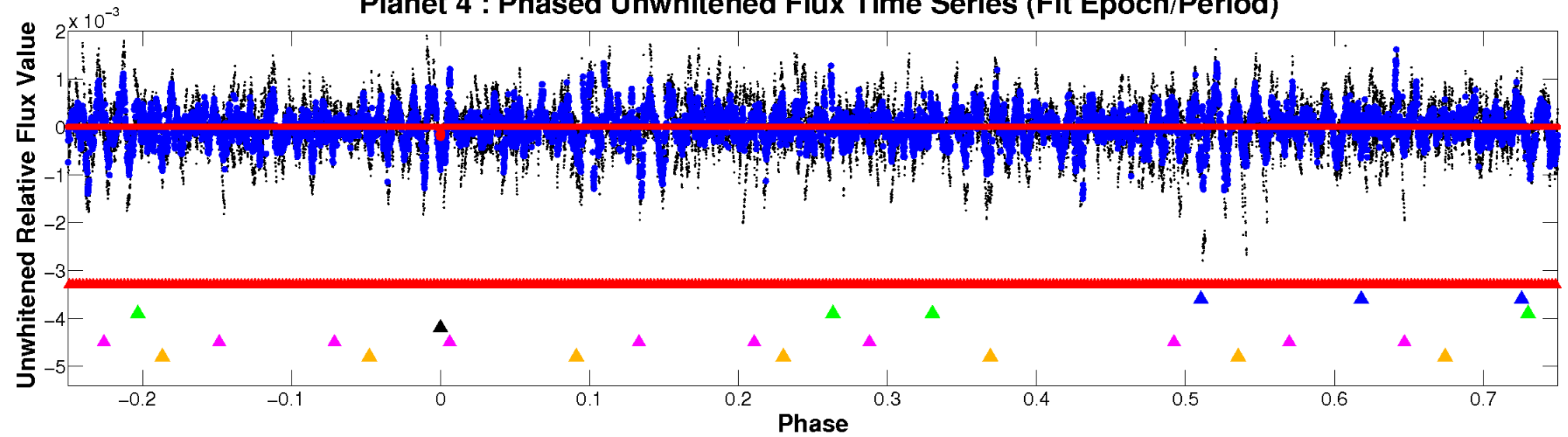
TCE 003629473-04



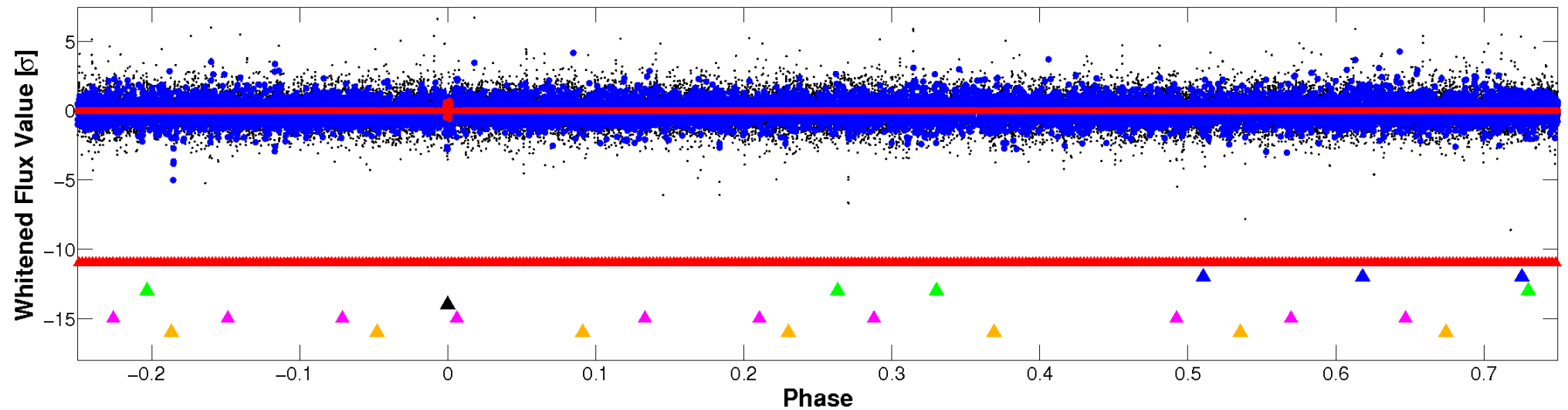


# Non-Whitened Vs. Whitened Light Curve

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

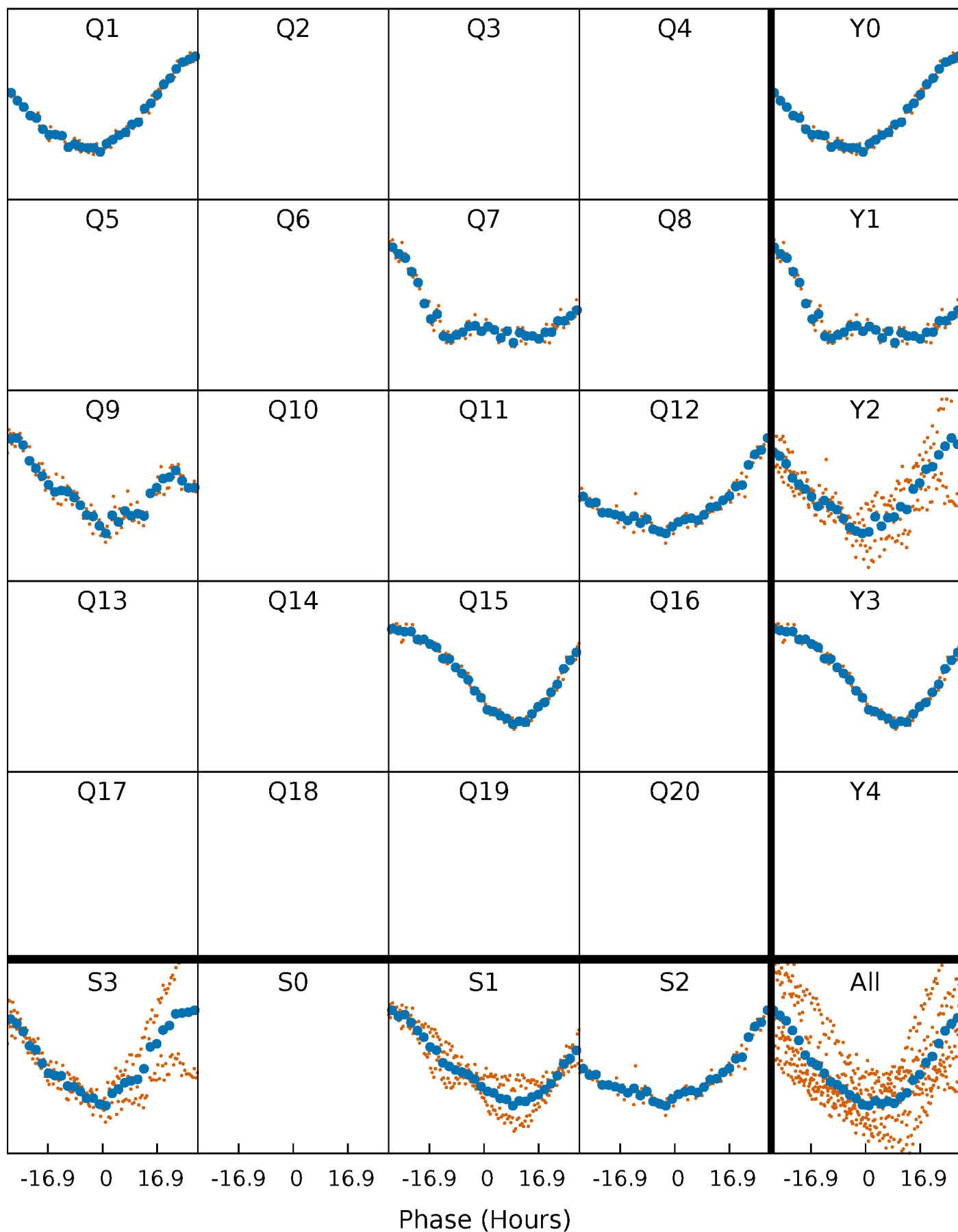


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



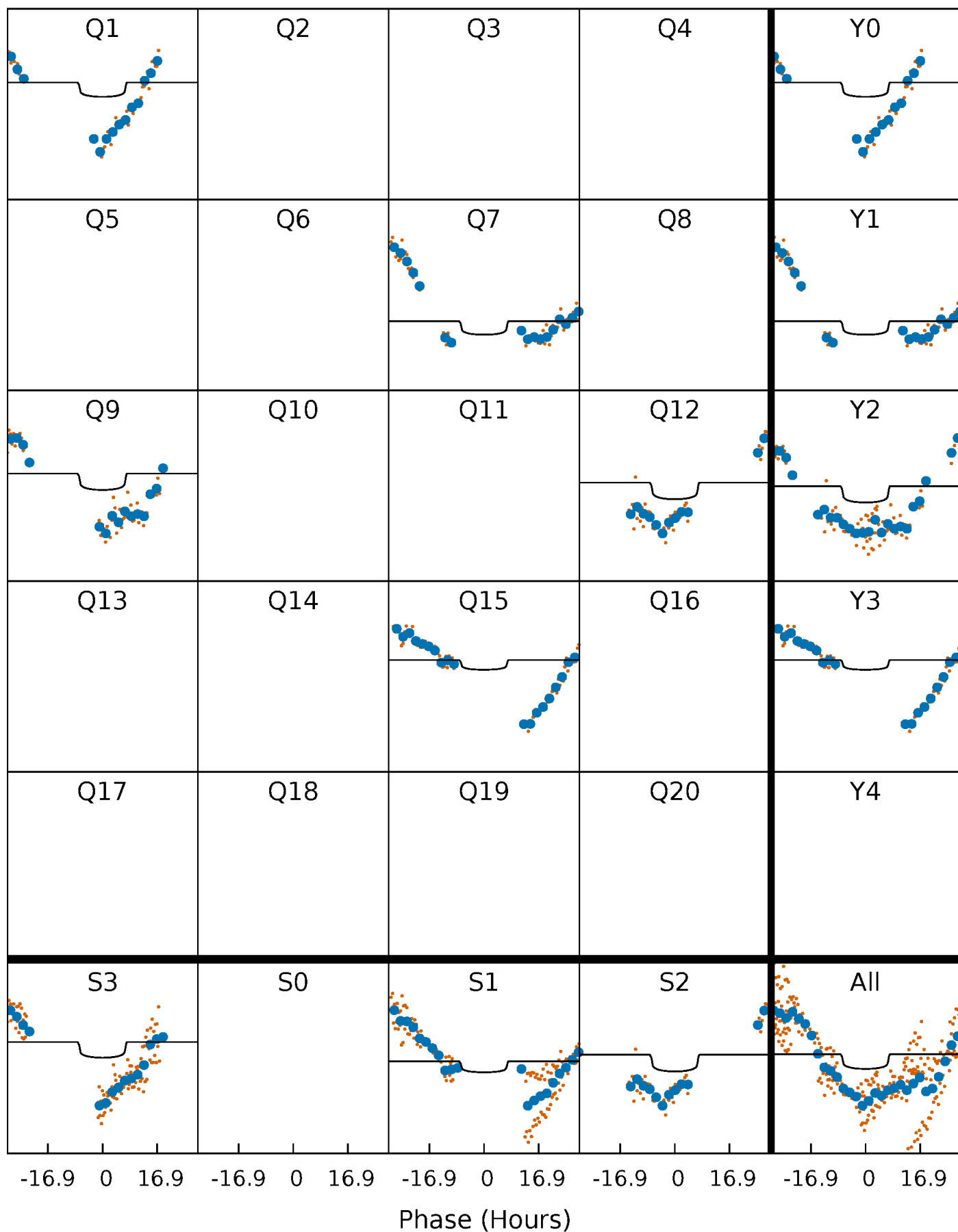
# PDC Quarter-Phased Transit Curves

TCE 003629473-04     $P=246.357037$  Days     $T_0=152.247969$  (BKJD)



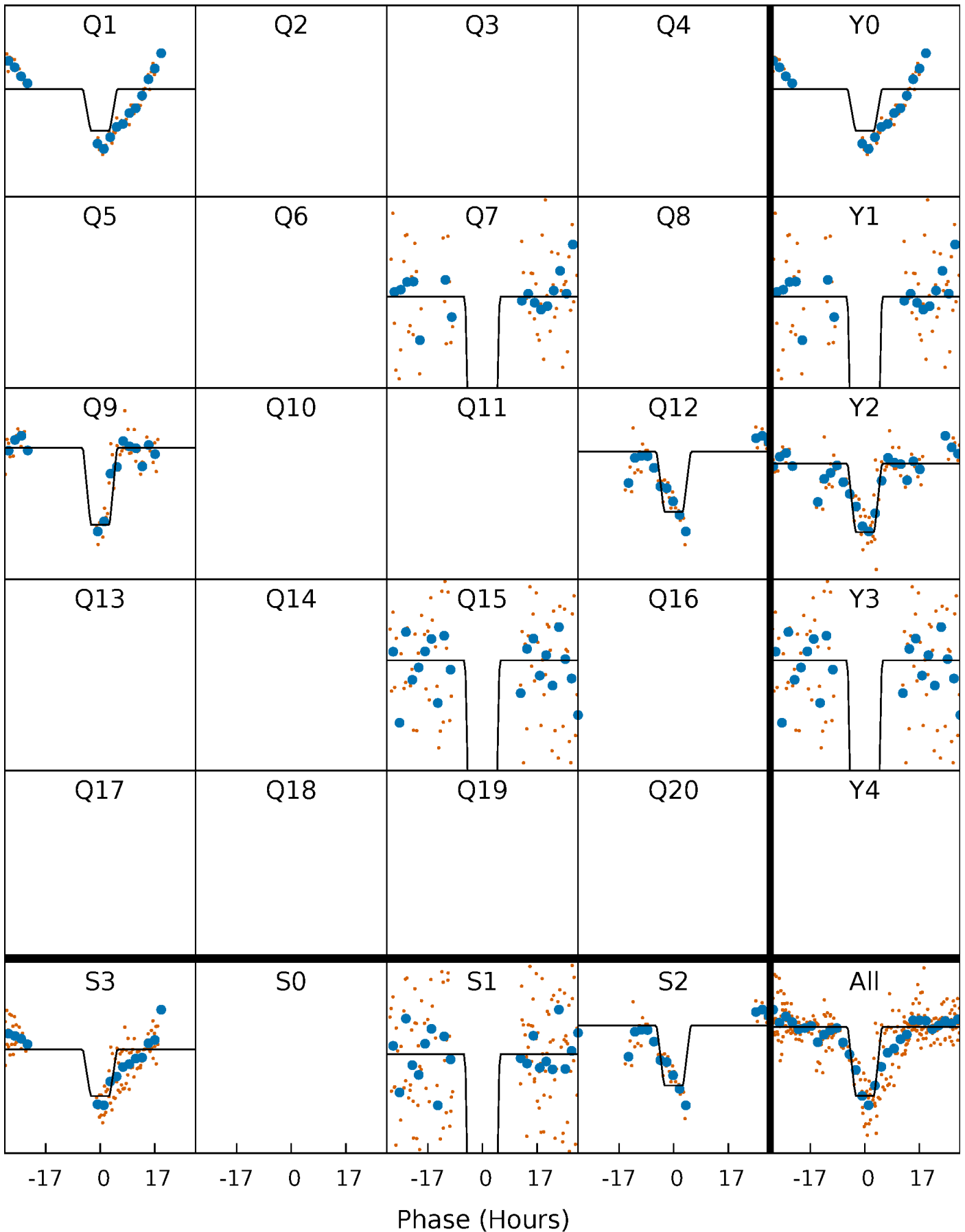
# DV Quarter-Phased Transit Curves

TCE 003629473-04     $P=246.357037$  Days     $T_0=152.247969$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

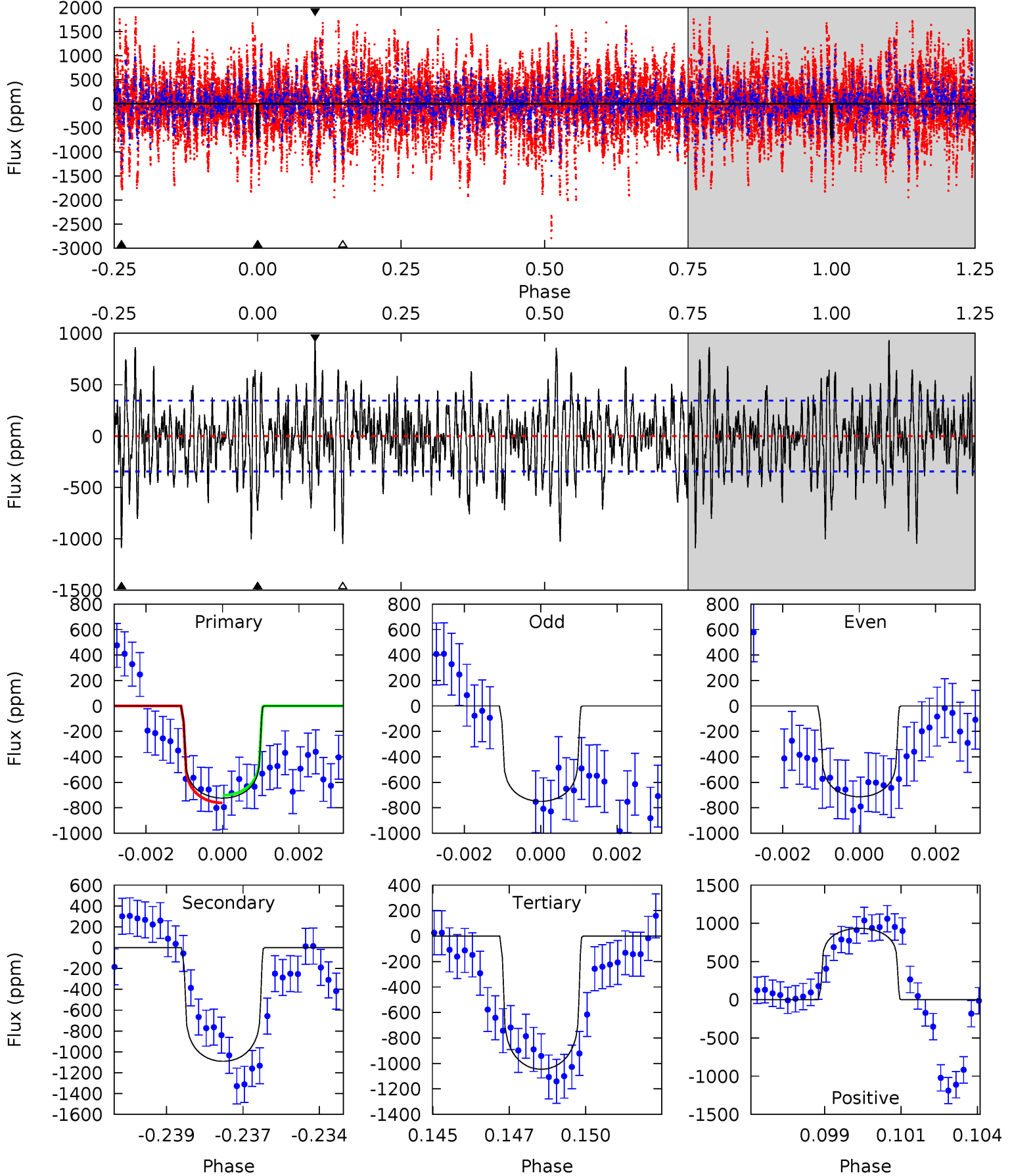
TCE 003629473-04     $P=246.373545$  Days     $T_0=152.200245$  (BKJD)



# DV Model-Shift Uniqueness Test

003629473-04, P = 246.357037 Days, E = 152.247969 Days

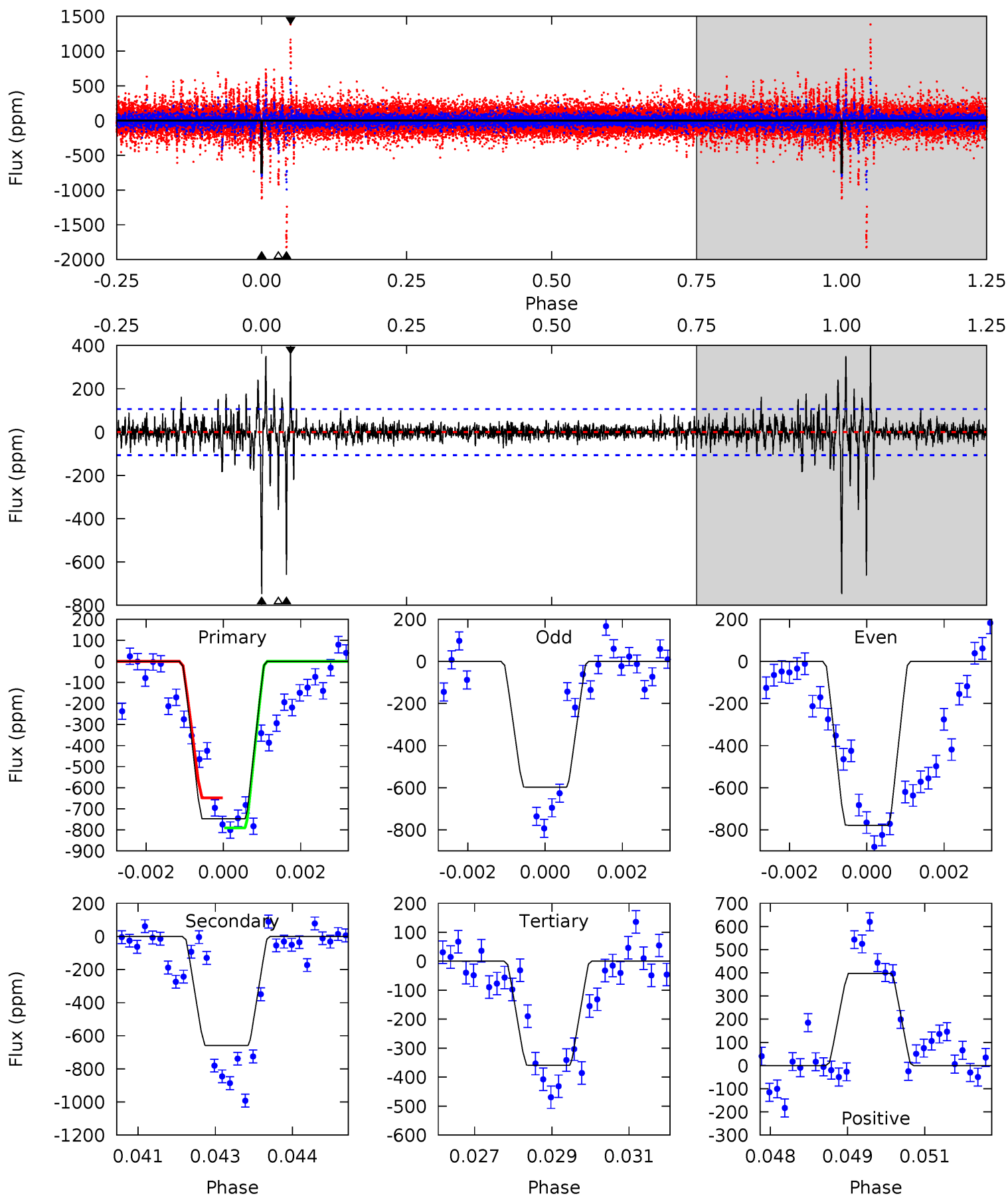
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	16.7	16.0	14.3	5.29	3.03	4.35	-4.94	-3.23	0.69	2.40	0.25	0.99	0.46	0.44



# Alt Model-Shift Uniqueness Test

003629473-04, P = 246.373545 Days, E = 152.200245 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
37.6	33.1	18.1	20.0	5.36	3.14	2.04	19.5	17.6	15.1	13.1	4.19	1.16	0.35	3.40



### Stellar Parameters For KIC 003629473

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6927^{+167}_{-238}$	$3.875^{+0.266}_{-0.114}$	$-0.140^{+0.300}_{-0.300}$	$2.424^{+0.444}_{-0.824}$	$1.605^{+0.170}_{-0.340}$	$0.159^{+0.273}_{-0.055}$
	+2%/-3%	+7%/-3%	+214%/-214%	+18%/-34%	+11%/-21%	+172%/-35%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003629473-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1091 \pm 65$	$3.64^{+1.66}_{-1.50}$	$685^{+46}_{-49}$	$11840^{+7724}_{-2700}$	$35942^{+68423}_{-18888}$
Alt.	$-659 \pm 20$	$6.64^{+1.99}_{-1.79}$	$691^{+41}_{-62}$	$6775^{+1127}_{-713}$	$6621^{+5474}_{-2695}$

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



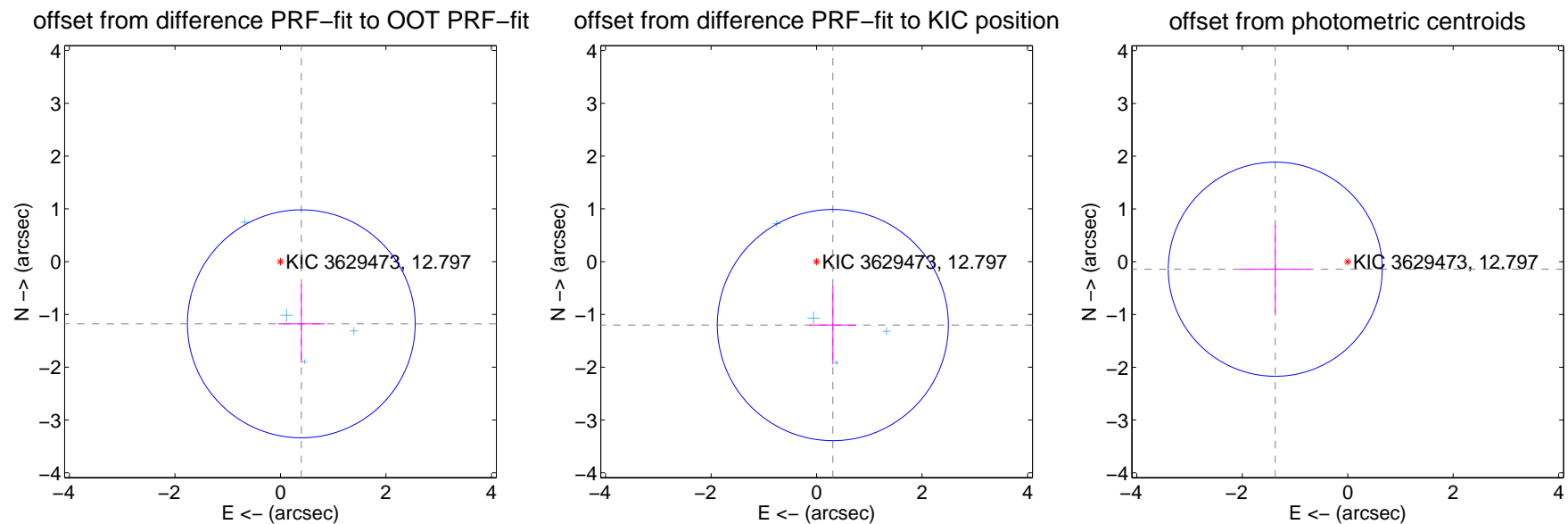
## DV Centroid Data

Supplemental centroid analysis for 003629473-04. Kepler magnitude: 12.80. Transit SNR 3.08

There are 4 quarters with good PRF difference image offsets

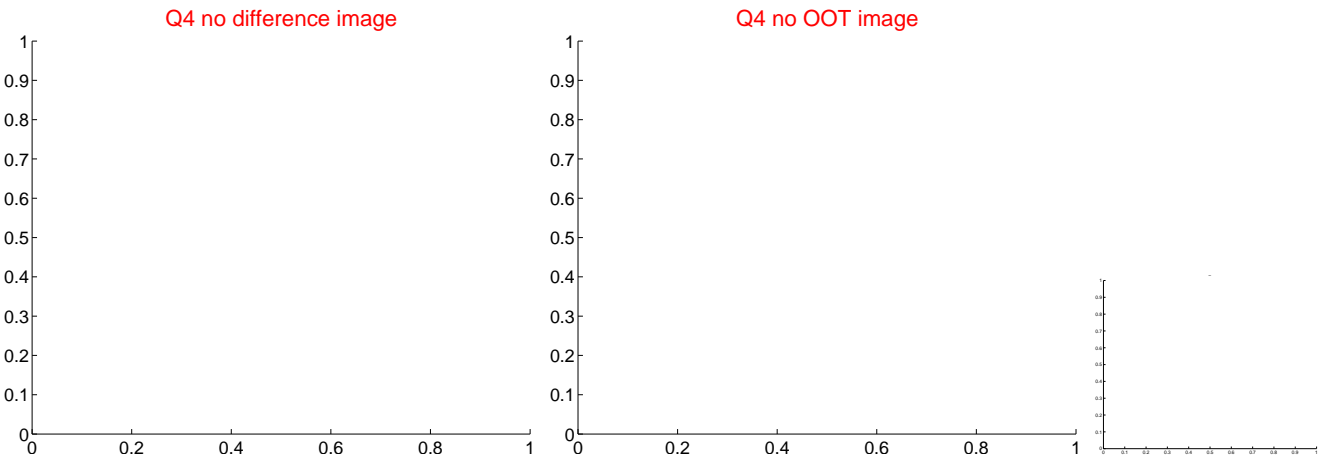
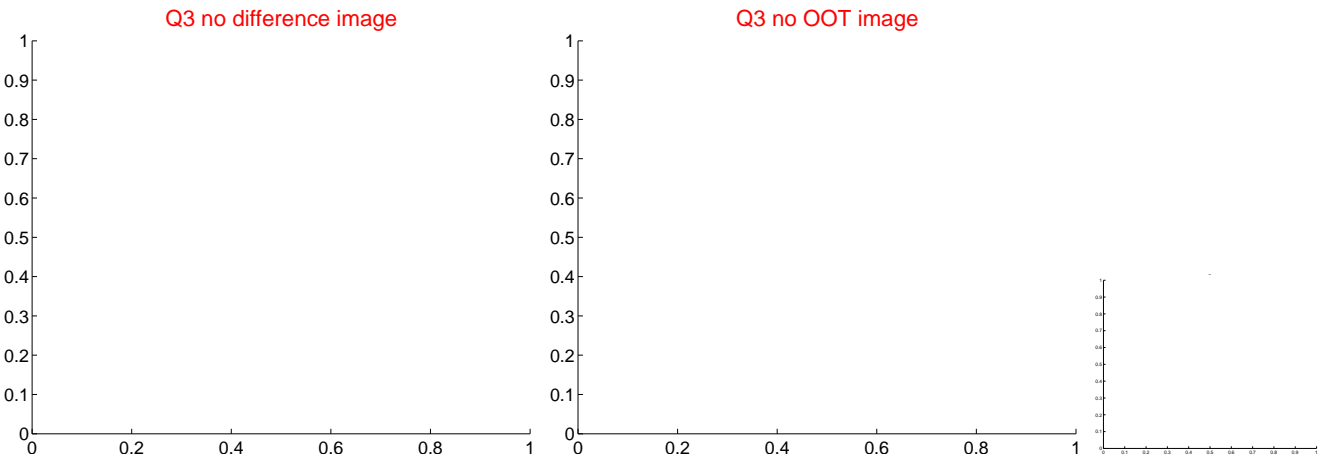
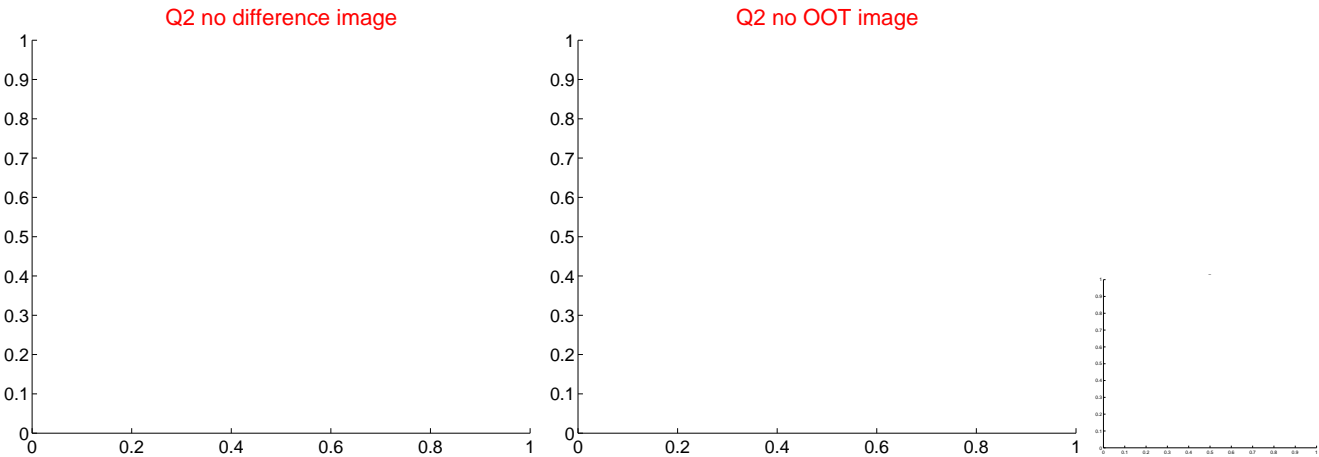
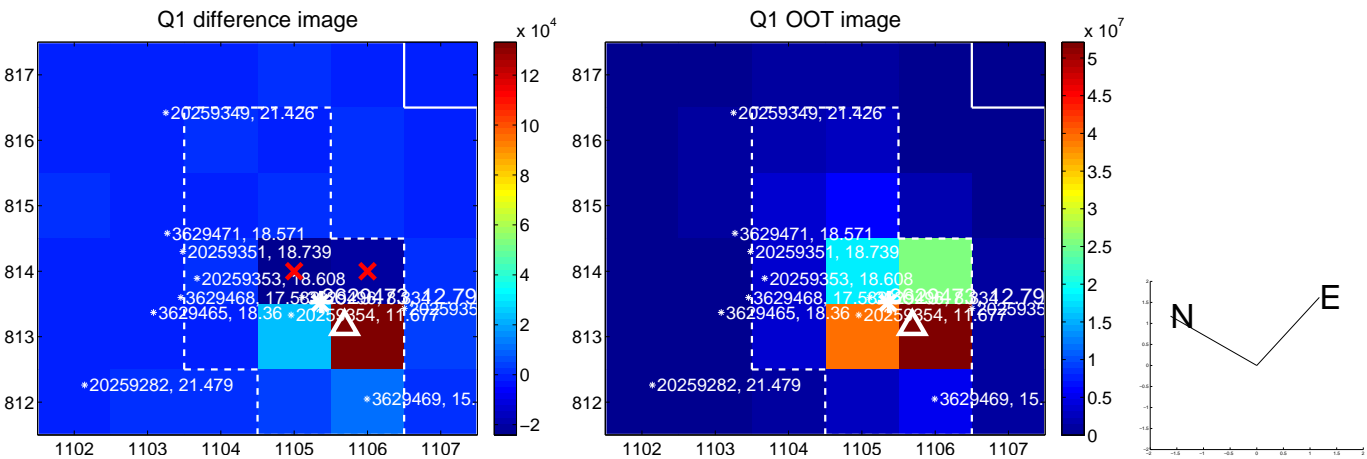
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.242 \pm 0.720$	1.73	$-0.395 \pm 0.443$	$-1.178 \pm 0.744$
PRF-fit source offset from KIC position	$1.240 \pm 0.730$	1.70	$-0.308 \pm 0.444$	$-1.202 \pm 0.745$
photometric centroid source offset	$1.38 \pm 0.68$	2.04	$1.37 \pm 0.67$	$-0.14 \pm 0.84$

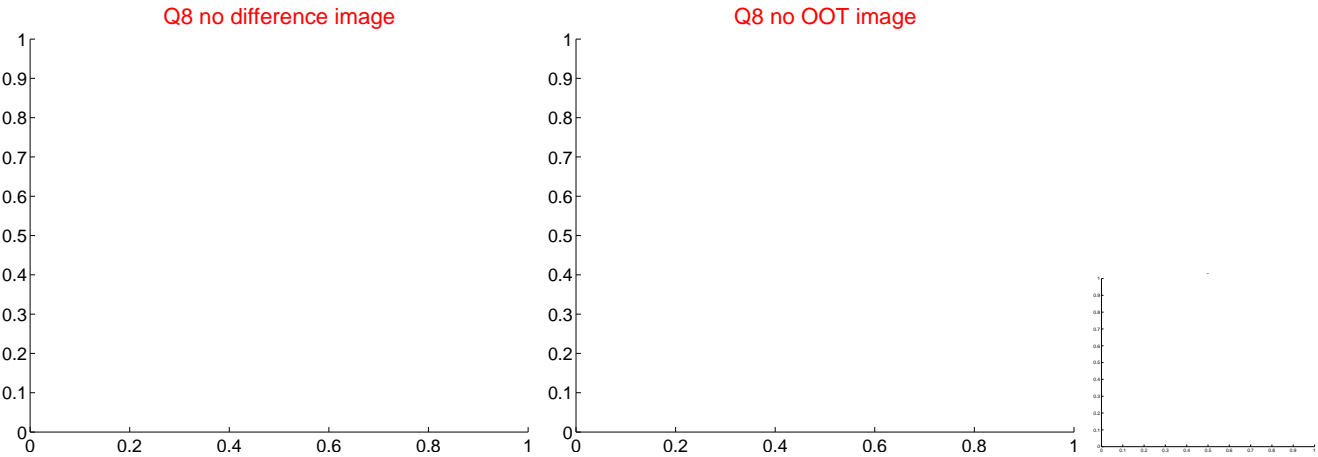
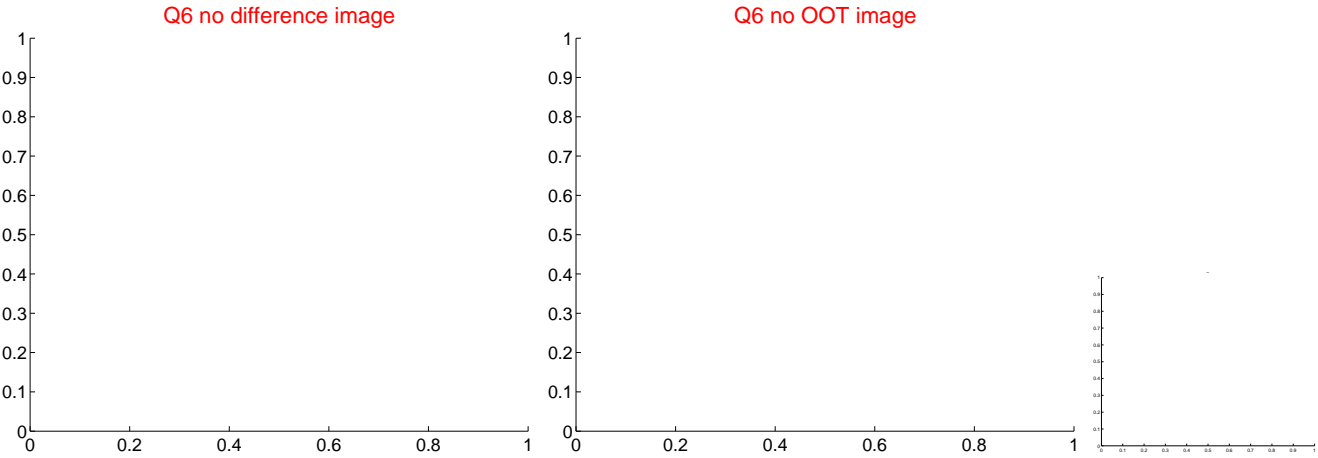
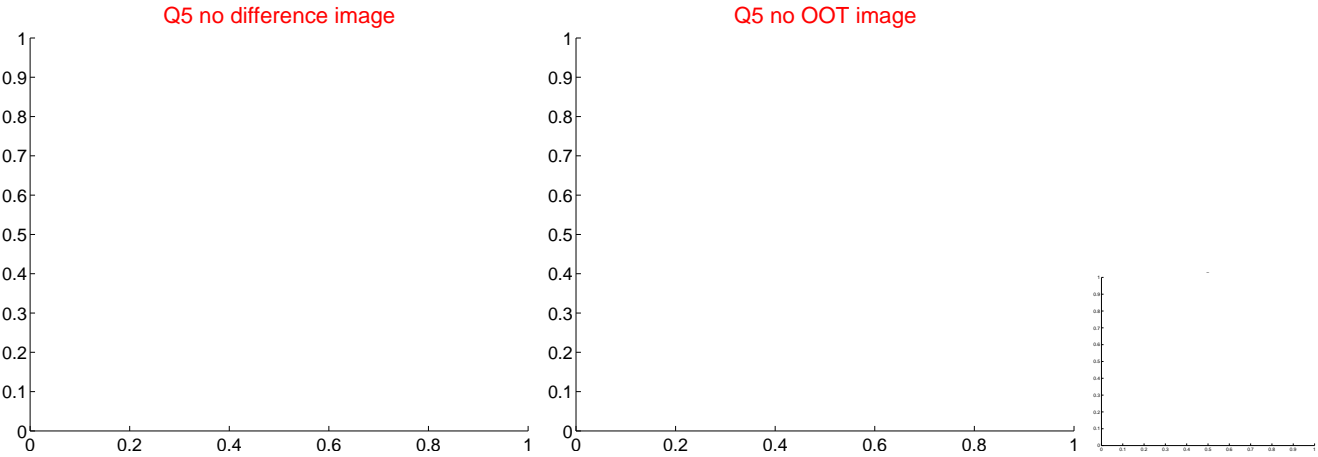


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

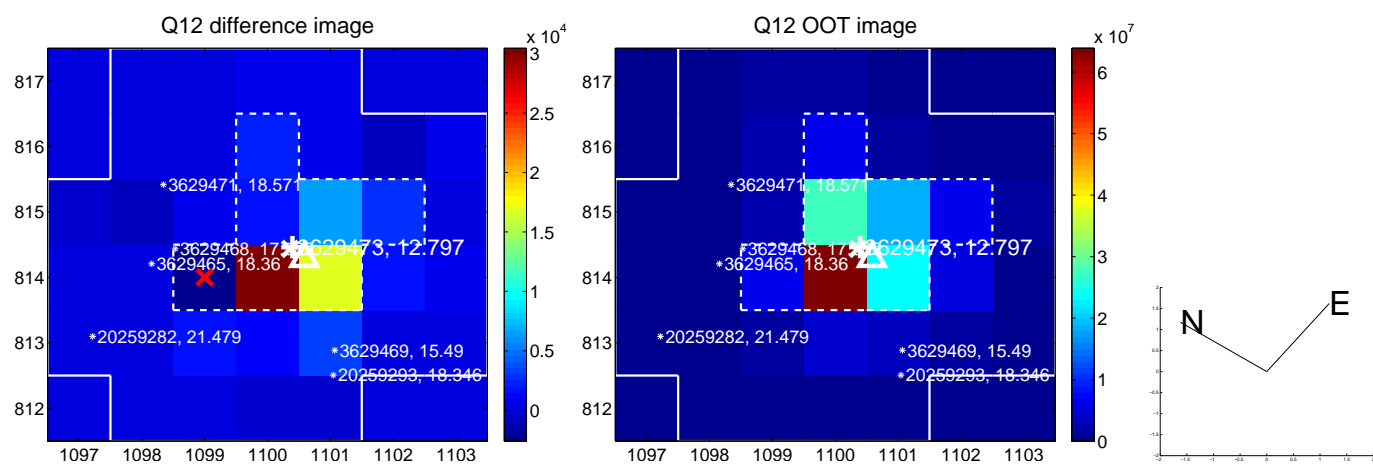
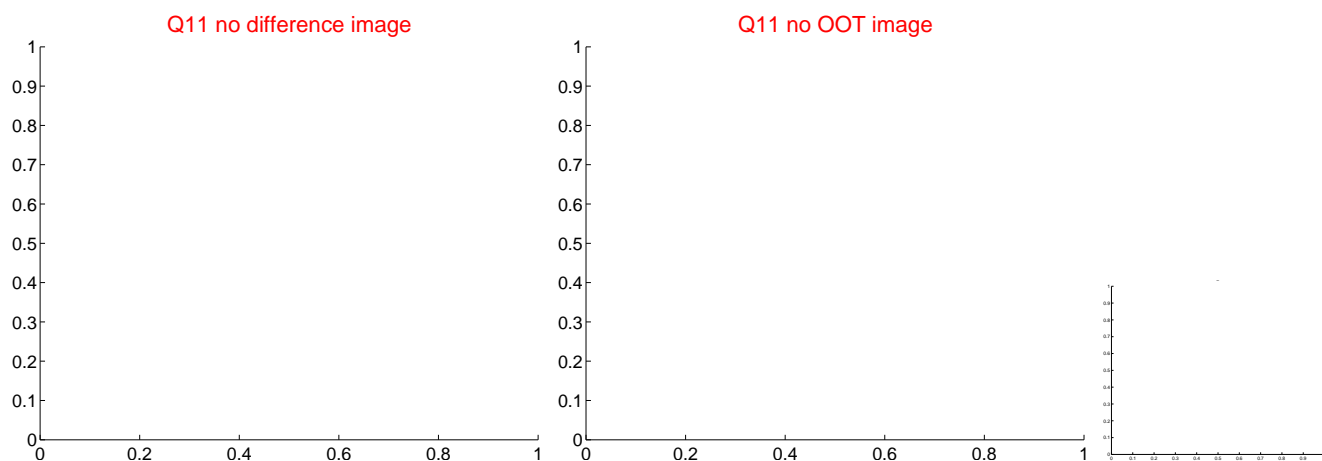
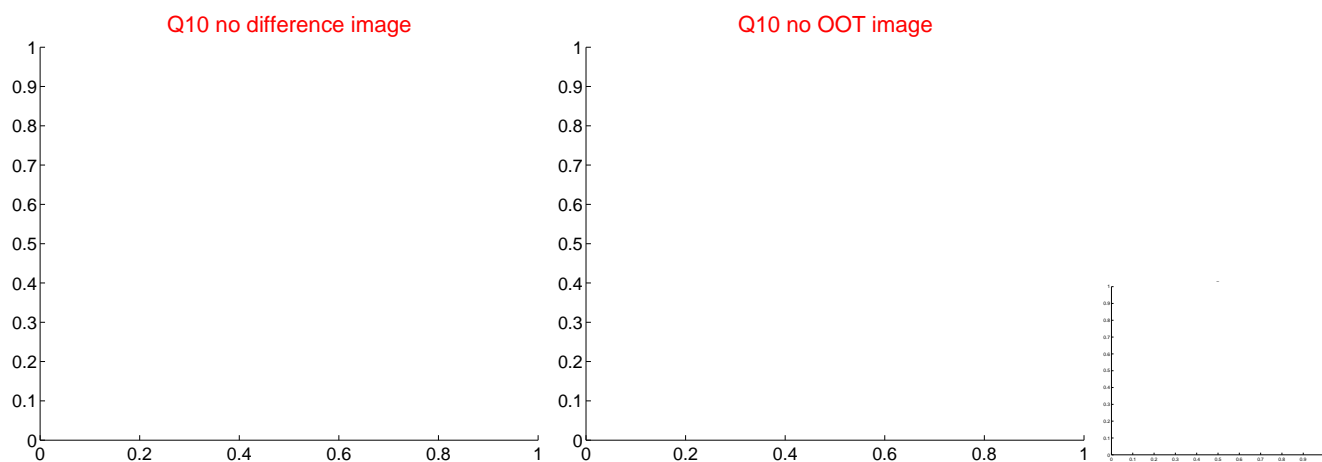
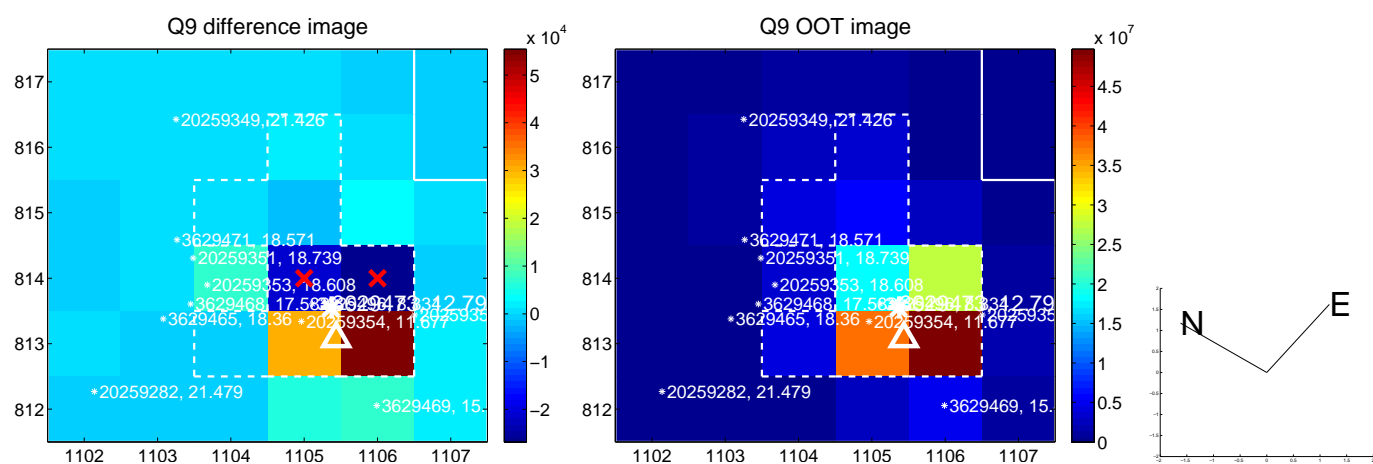
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



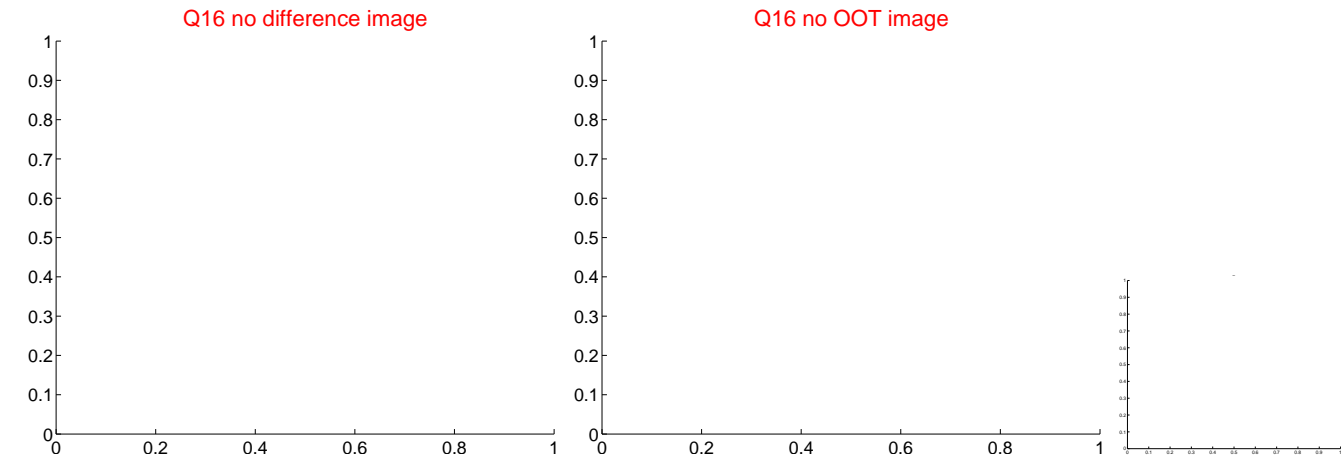
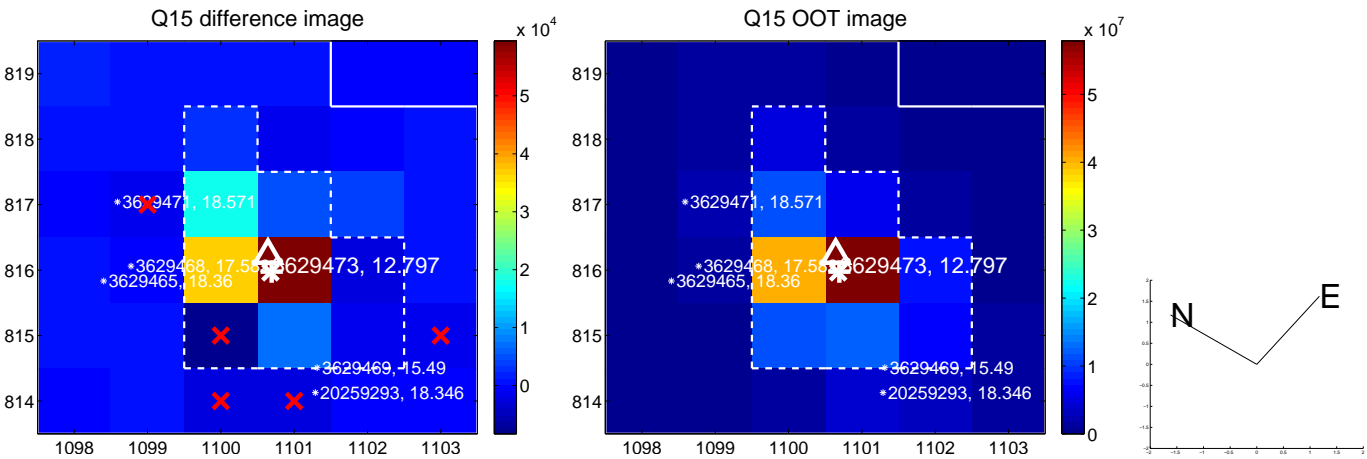
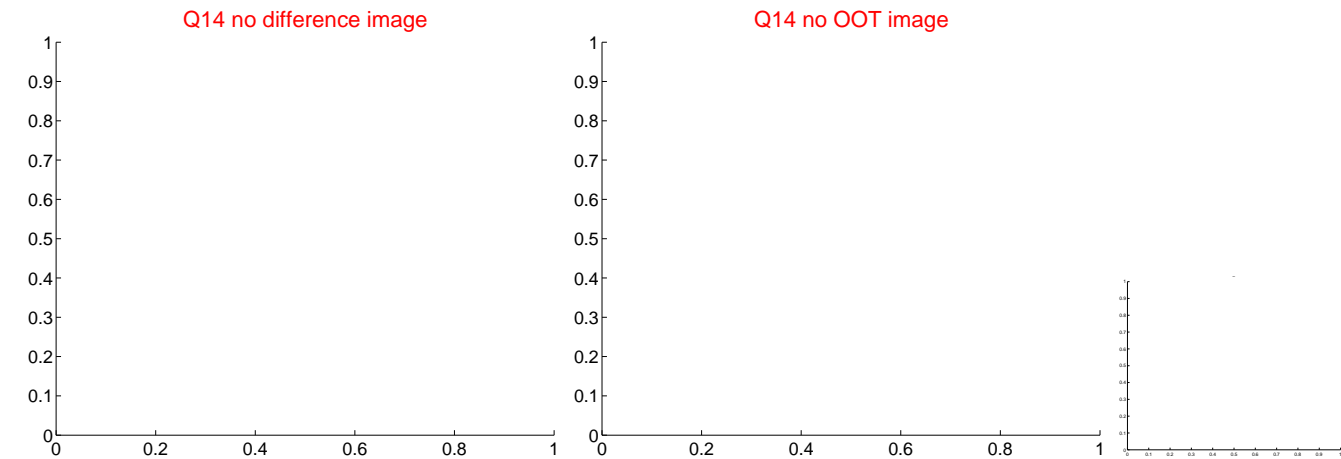
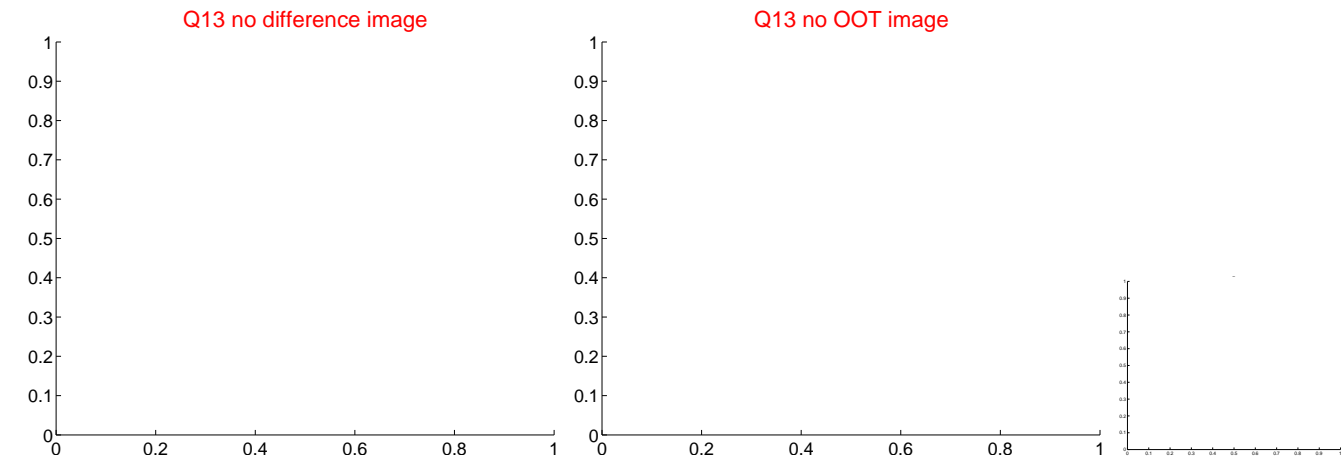
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



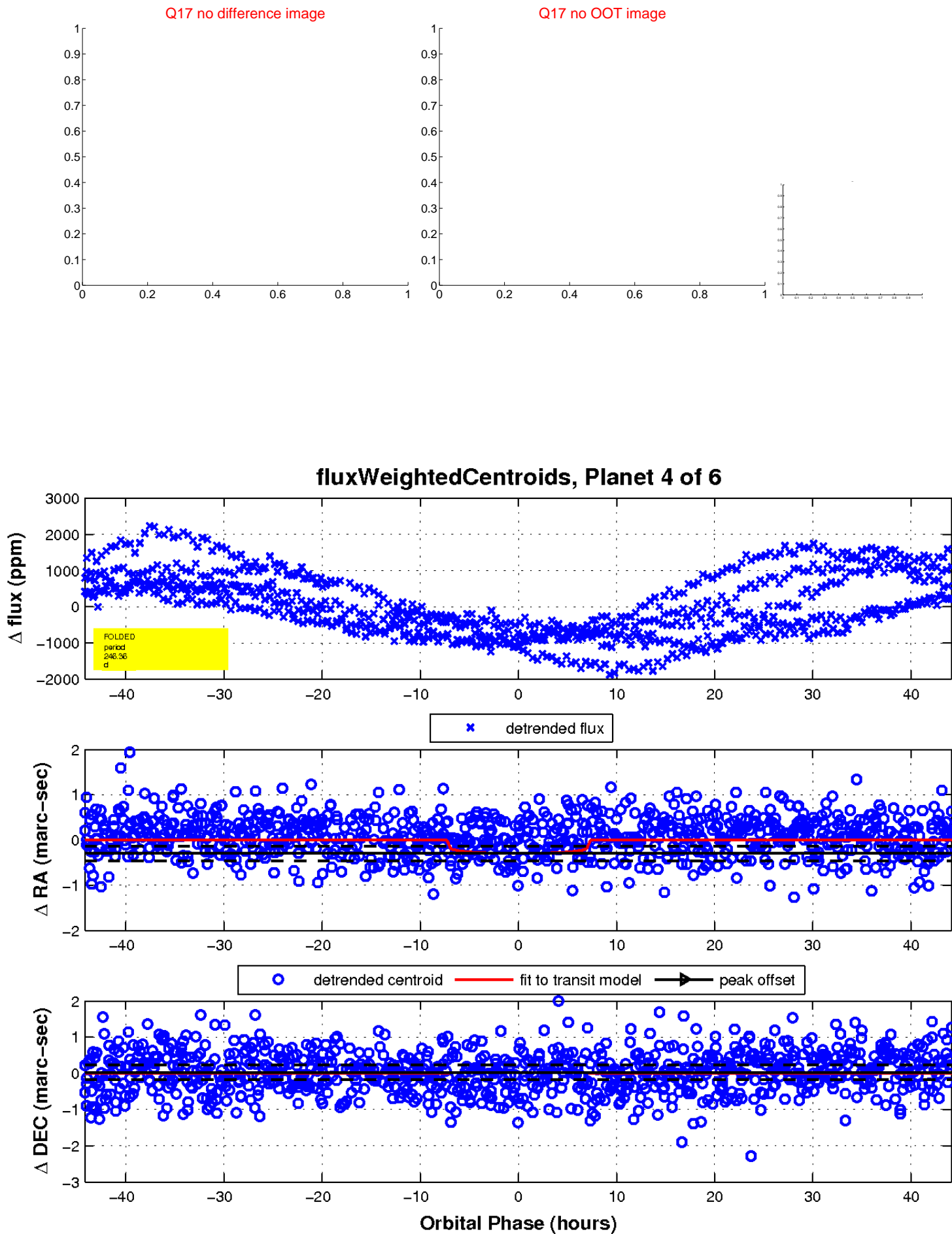
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



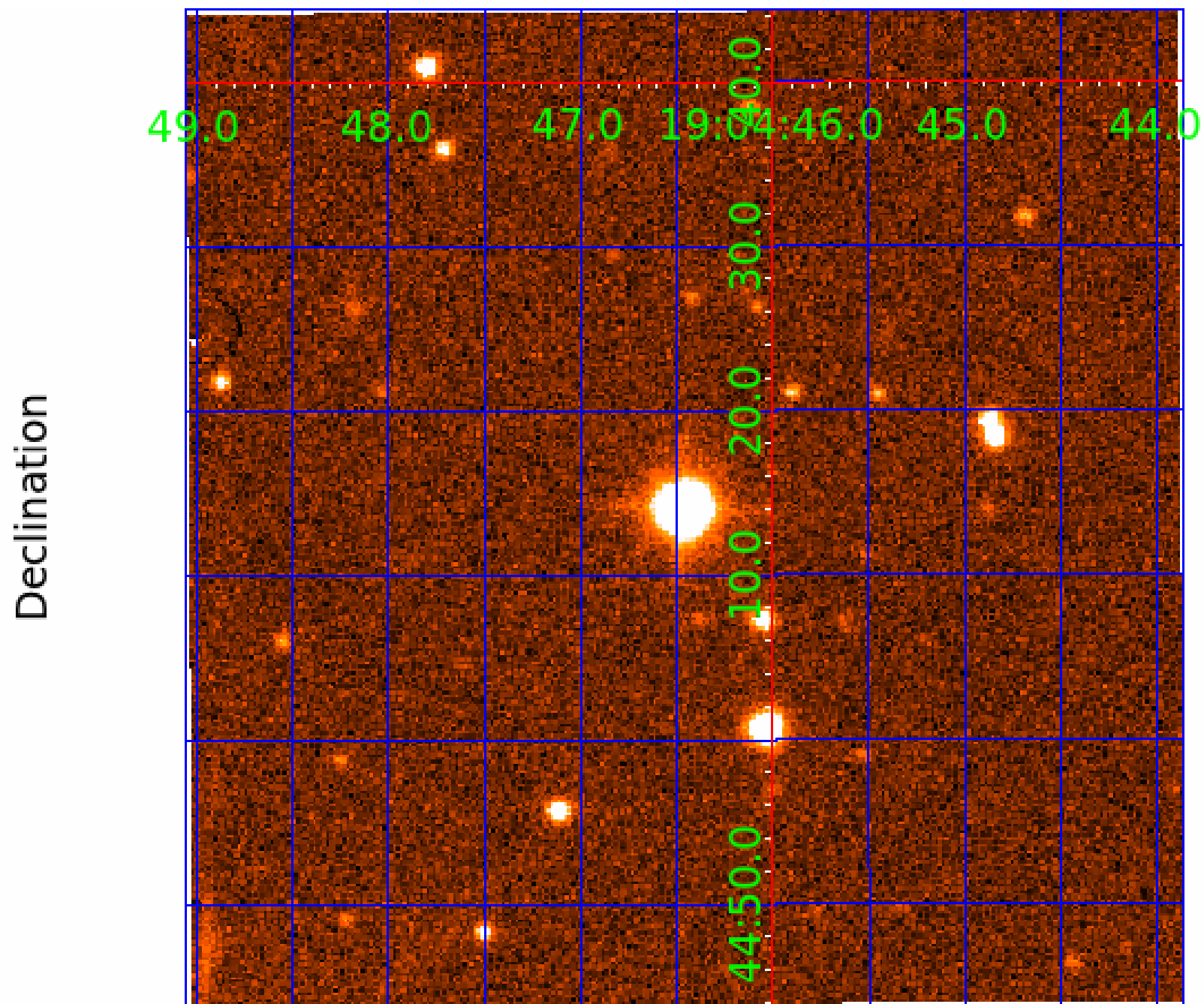
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 003629473

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003629473-01	OBS	No	1.706927	132.936916	32.9	6.938	8.7	10.0	2.42	6927	1.87	11301.70
003629473-02	OBS	No	519.228029	524.359611	359.0	4.121	13.1	6.8	2.42	6927	5.16	5.52
003629473-03	OBS	No	361.307398	479.964538	807.7	16.260	12.3	7.9	2.42	6927	12.95	8.96
003629473-04	OBS	No	246.357037	152.247969	227.8	14.752	8.6	3.1	2.42	6927	3.94	14.93
003629473-05	OBS	No	157.885484	153.773129	195.1	4.376	8.9	4.7	2.42	6927	3.78	27.02
003629473-06	OBS	No	212.128031	243.178808	326.2	13.594	9.2	5.2	2.42	6927	4.70	18.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003629473-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
003629473-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003629473-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
003629473-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003629473-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003629473-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—INCONSISTENT_TRANS

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

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

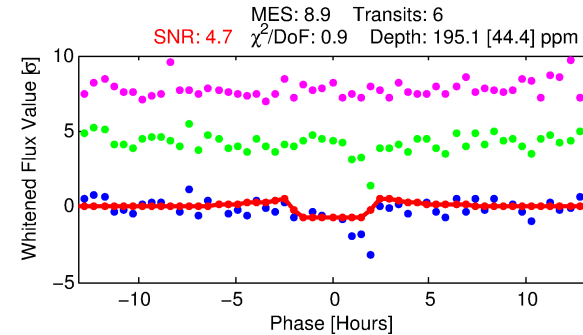
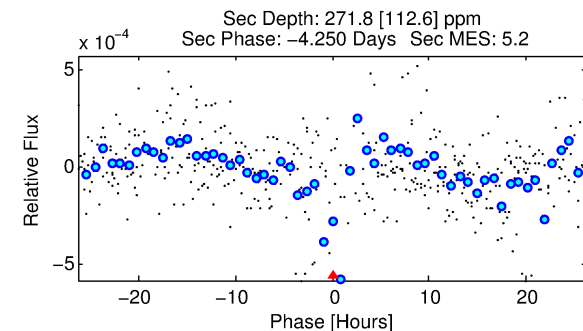
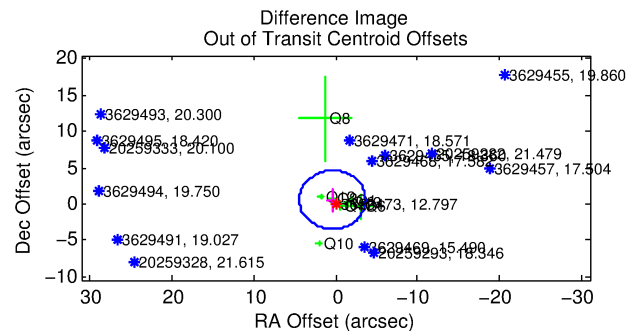
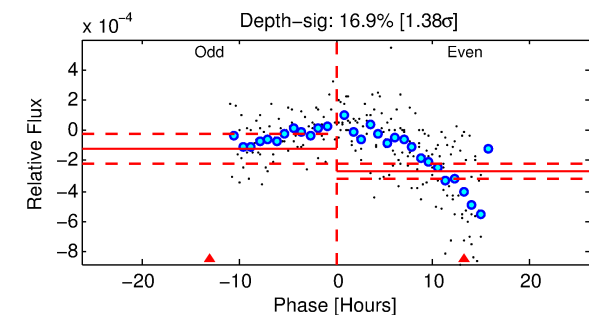
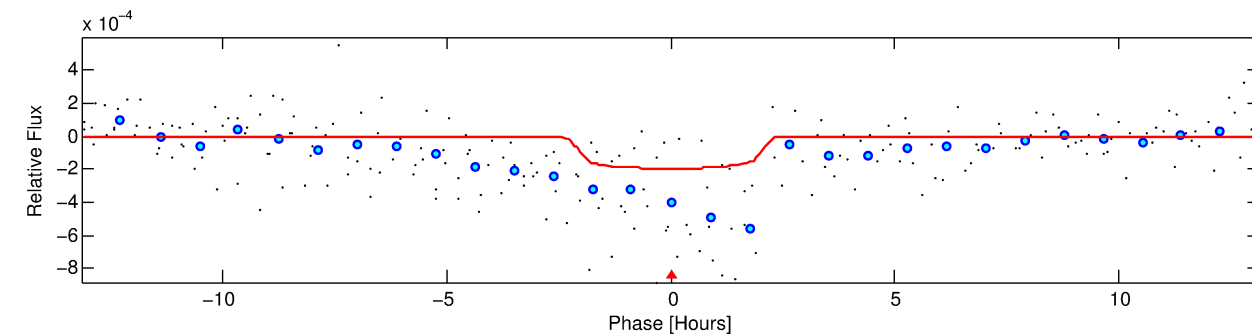
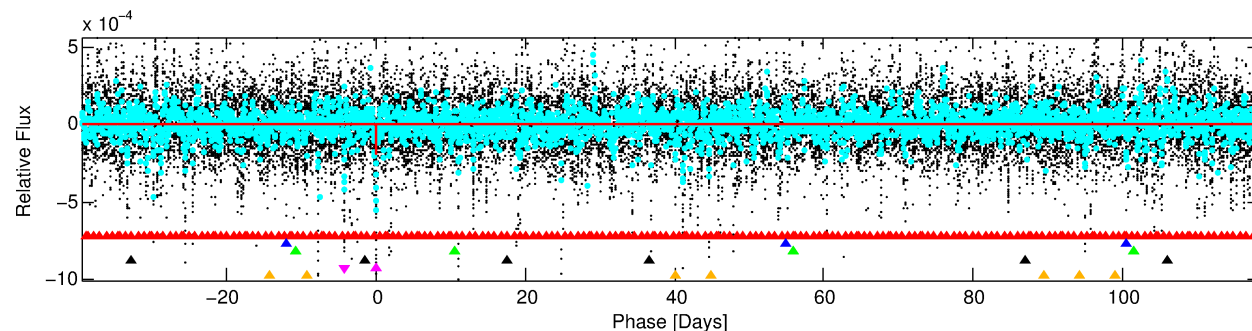
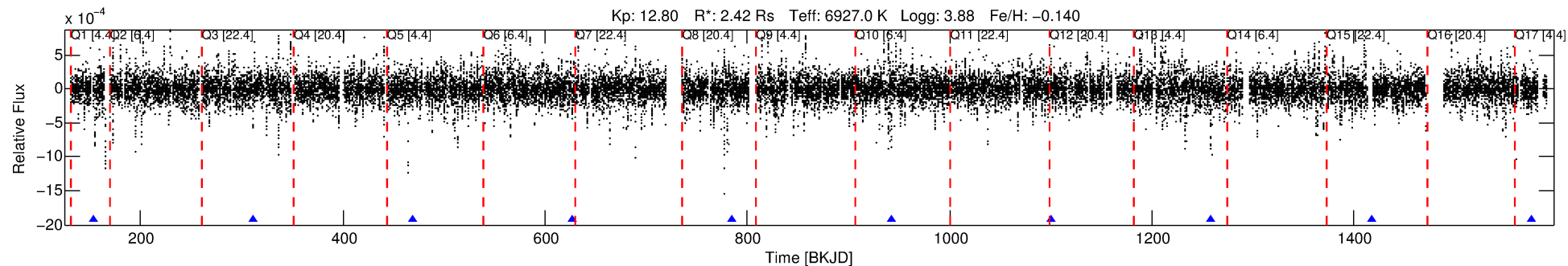
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003629473-05

No Significant Match Found

# DV One-Page Summary

KIC: 3629473 Candidate: 5 of 6 Period: 157.885 d



## DV Fit Results:

Period = 157.88548 [0.00231] d  
Epoch = 153.7731 [0.0143] BKJD  
Rp/R\* = 0.0143 [0.0107]  
a/R\* = 159.98 [690.29]  
b = 0.83 [1.62]  
Seff = 27.02 [13.15]  
Teq = 581 [71] K  
Rp = 3.78 [3.11] Re  
a = 0.6698 [0.2043] AU  
Ag = 4685.31 [7586.52] [0.62 $\sigma$ ]  
Teffp = 7436 [2894] K [2.37 $\sigma$ ]

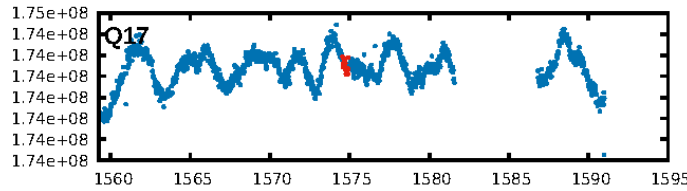
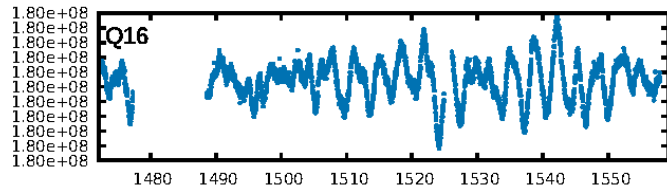
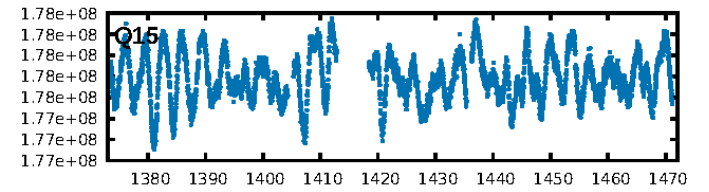
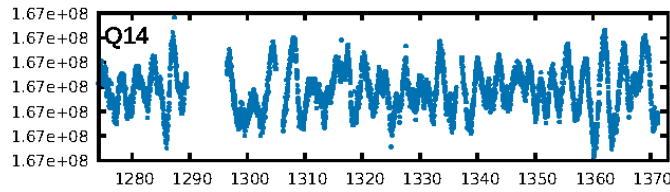
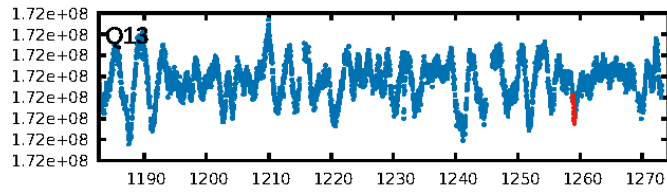
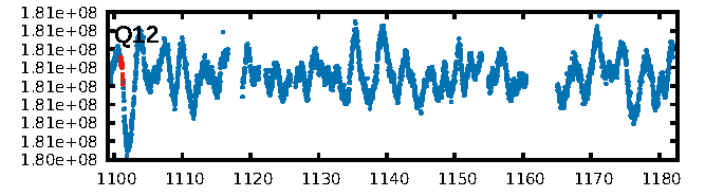
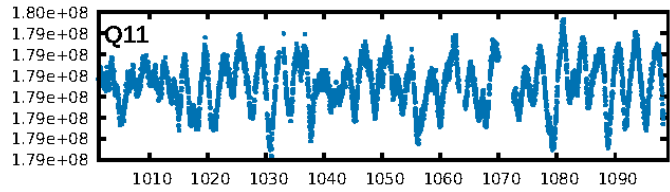
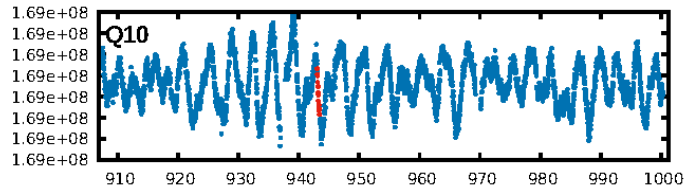
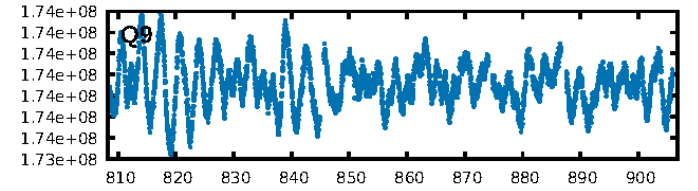
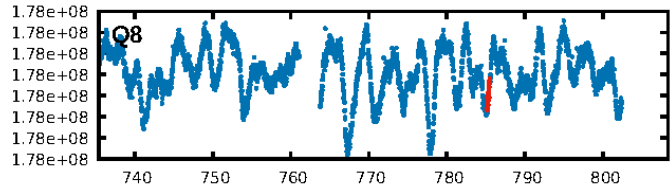
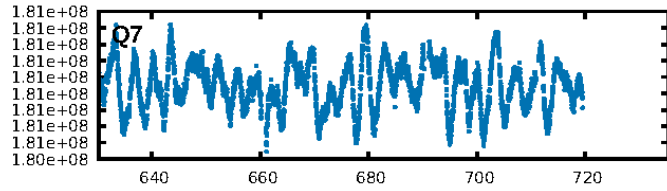
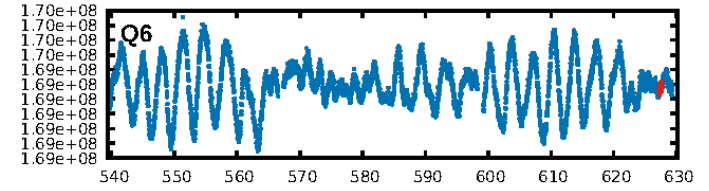
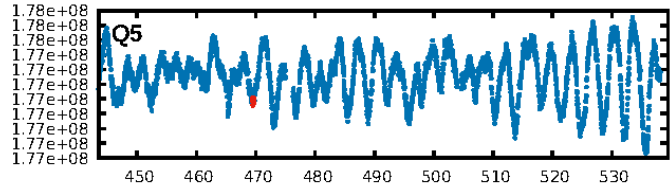
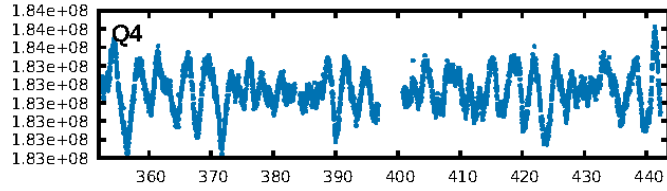
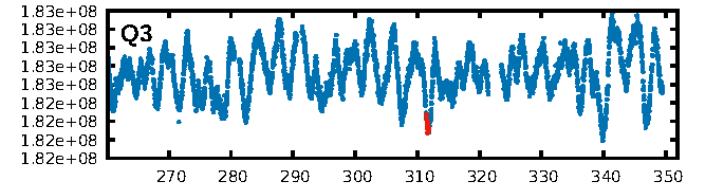
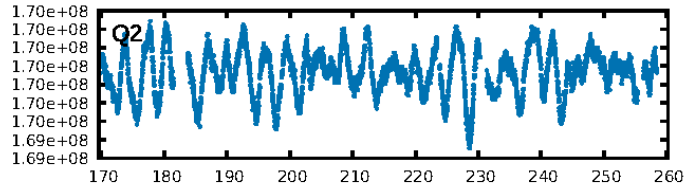
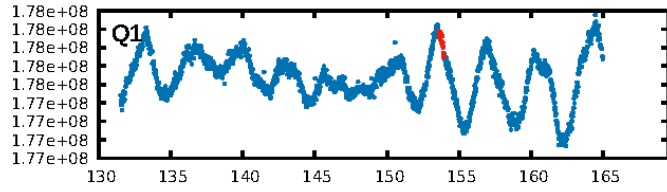
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [456.98 $\sigma$ ]  
LongPeriod-sig: 100.0% [91.16 $\sigma$ ]  
ModelChiSquare2-sig: 6.3%  
ModelChiSquareGof-sig: 99.8%  
**Bootstrap-pfa: 4.43e-12**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: -3.432**  
Centroid-sig: 0.6%  
Centroid-so: 1.801 arcsec [1.71 $\sigma$ ]  
OotOffset-rm: 0.690 arcsec [0.51 $\sigma$ ]  
KicOffset-rm: 0.745 arcsec [0.54 $\sigma$ ]  
OotOffset-st: 2/1/2/3 [8]  
KicOffset-st: 2/1/2/3 [8]  
DiffImageQuality-fgm: 0.38 [3/8]  
DiffImageOverlap-fno: 0.00 [0/9]

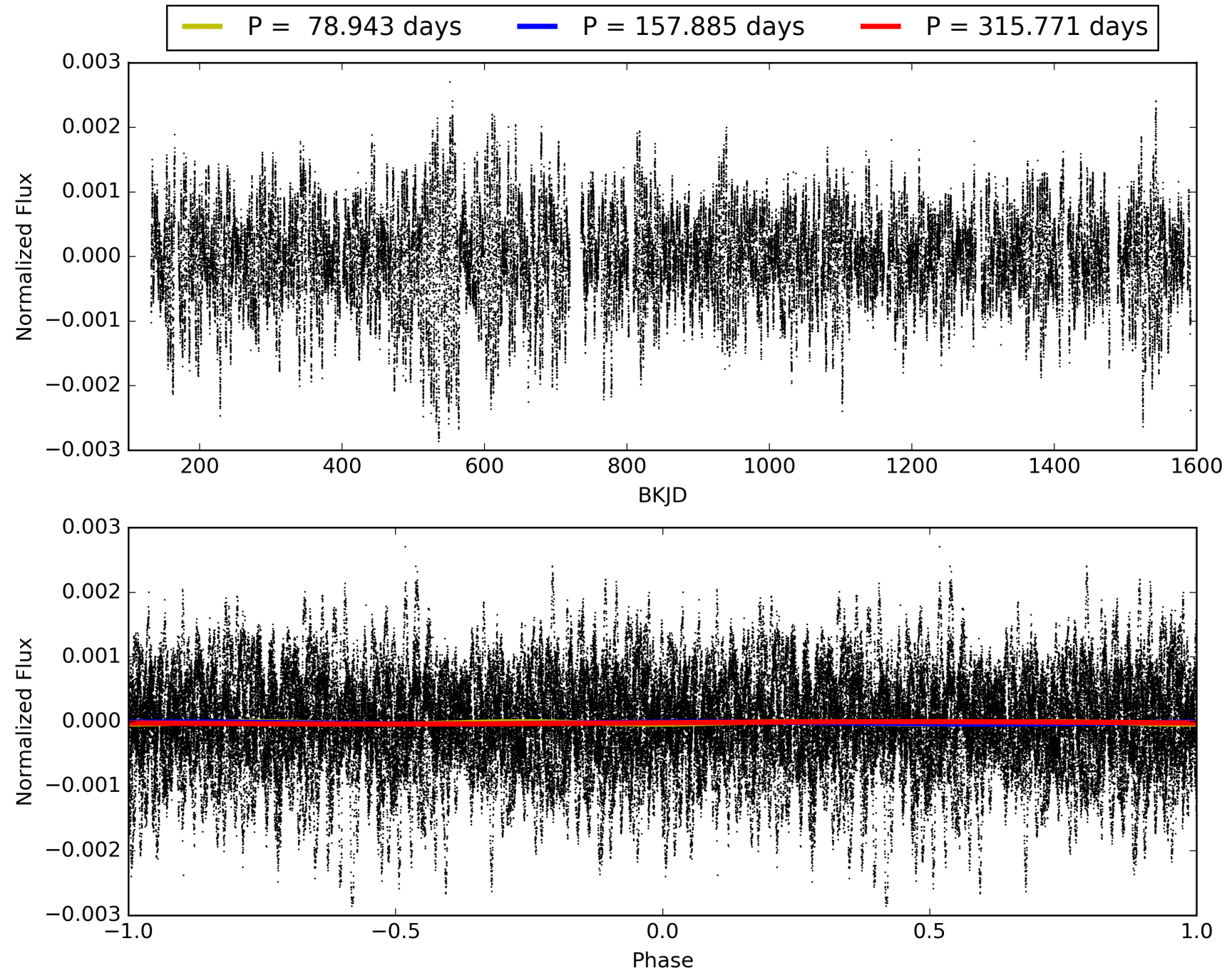
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:07:01 Z

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

## TCE 003629473-05, PDC Light Curves

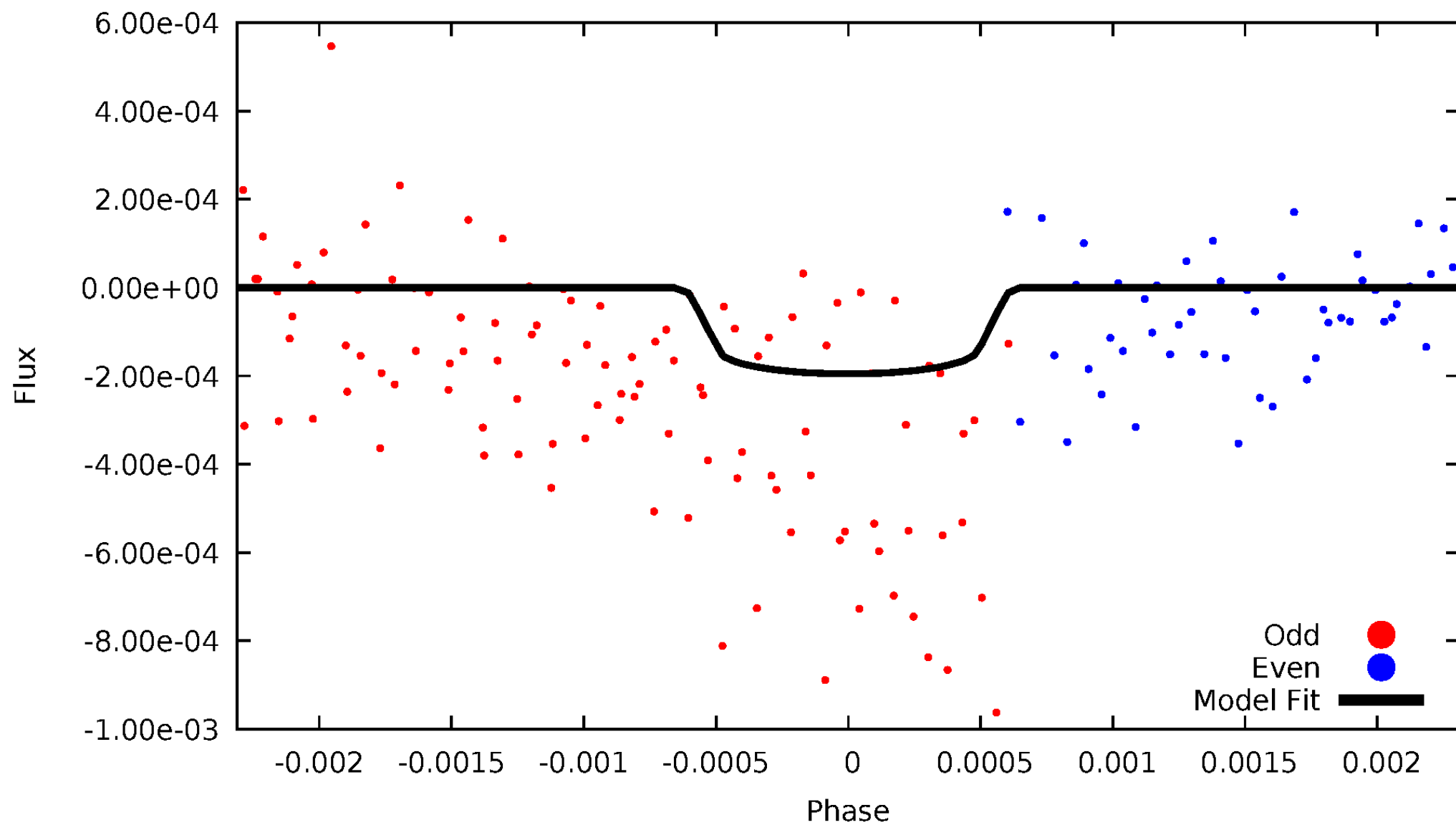


# TCE 003629473-05



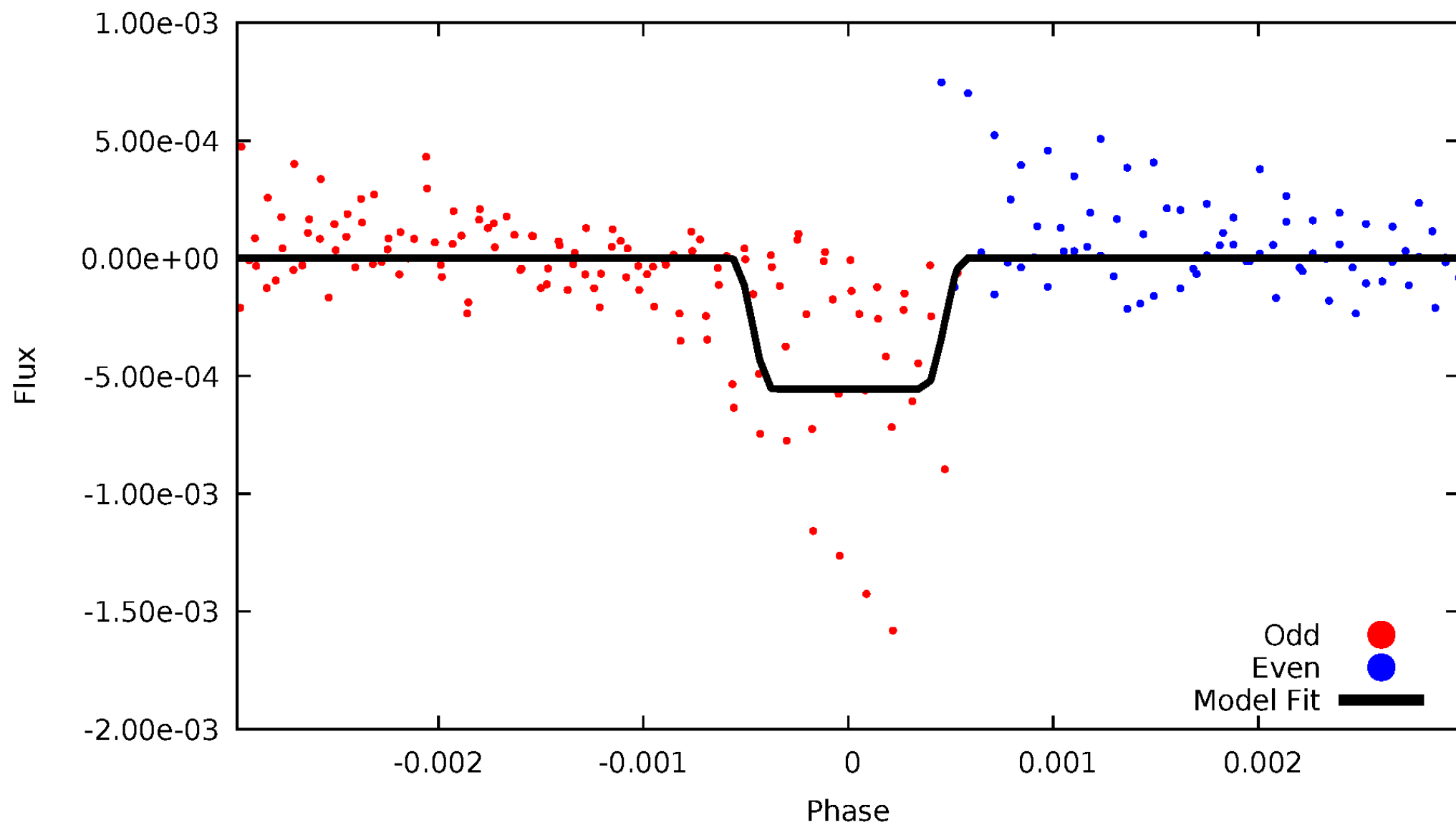
# DV Odd/Even

TCE 003629473-05



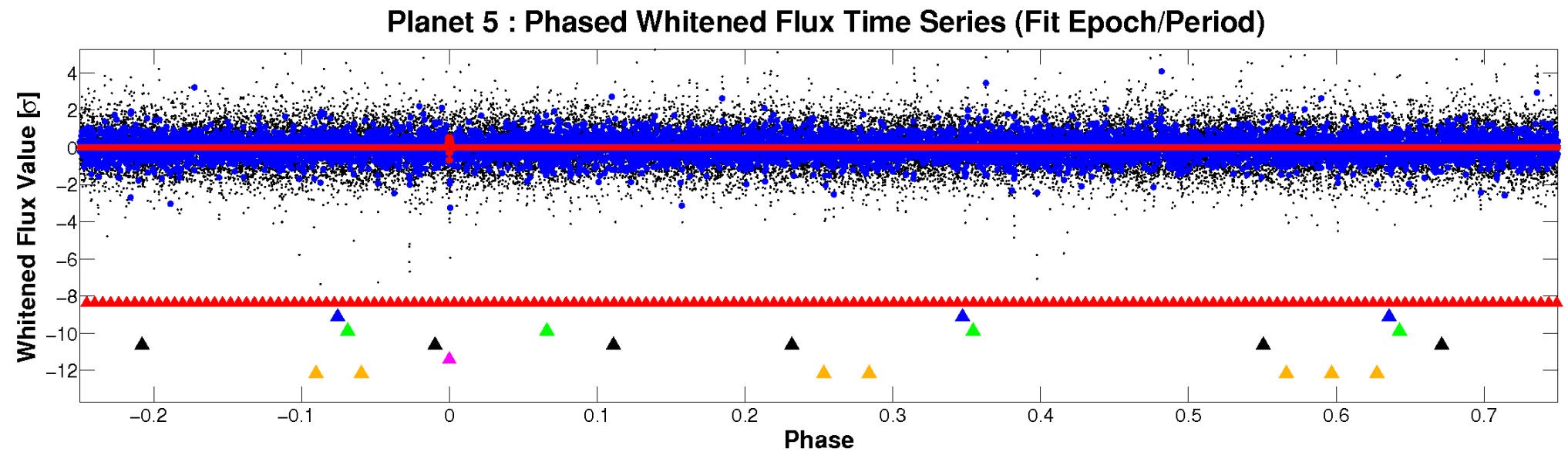
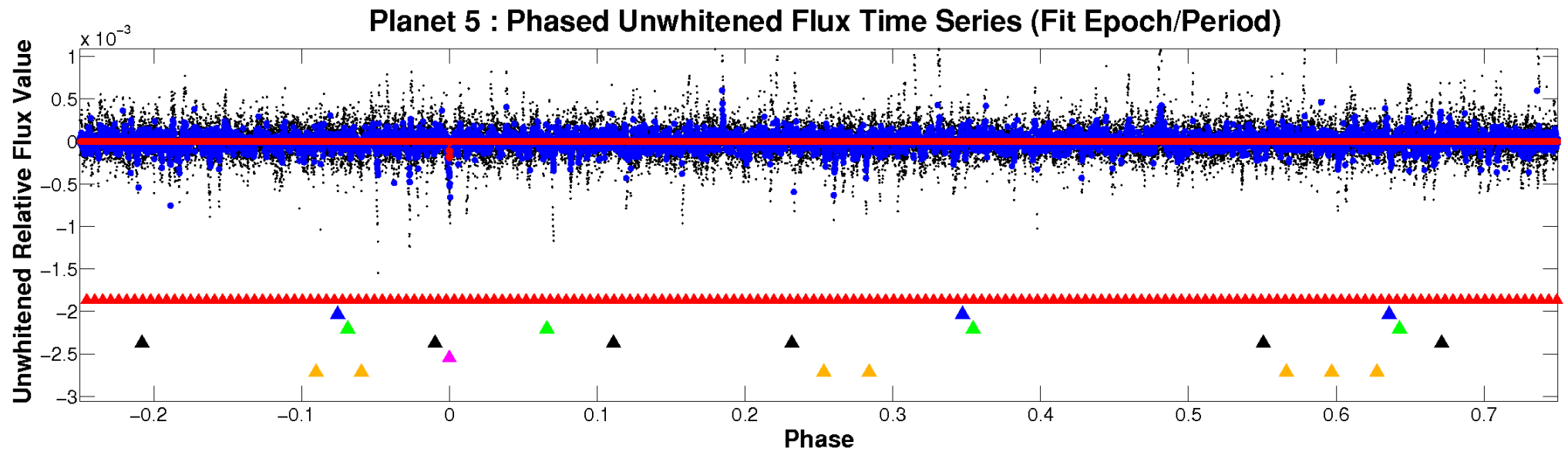
# ALT Odd/Even

TCE 003629473-05





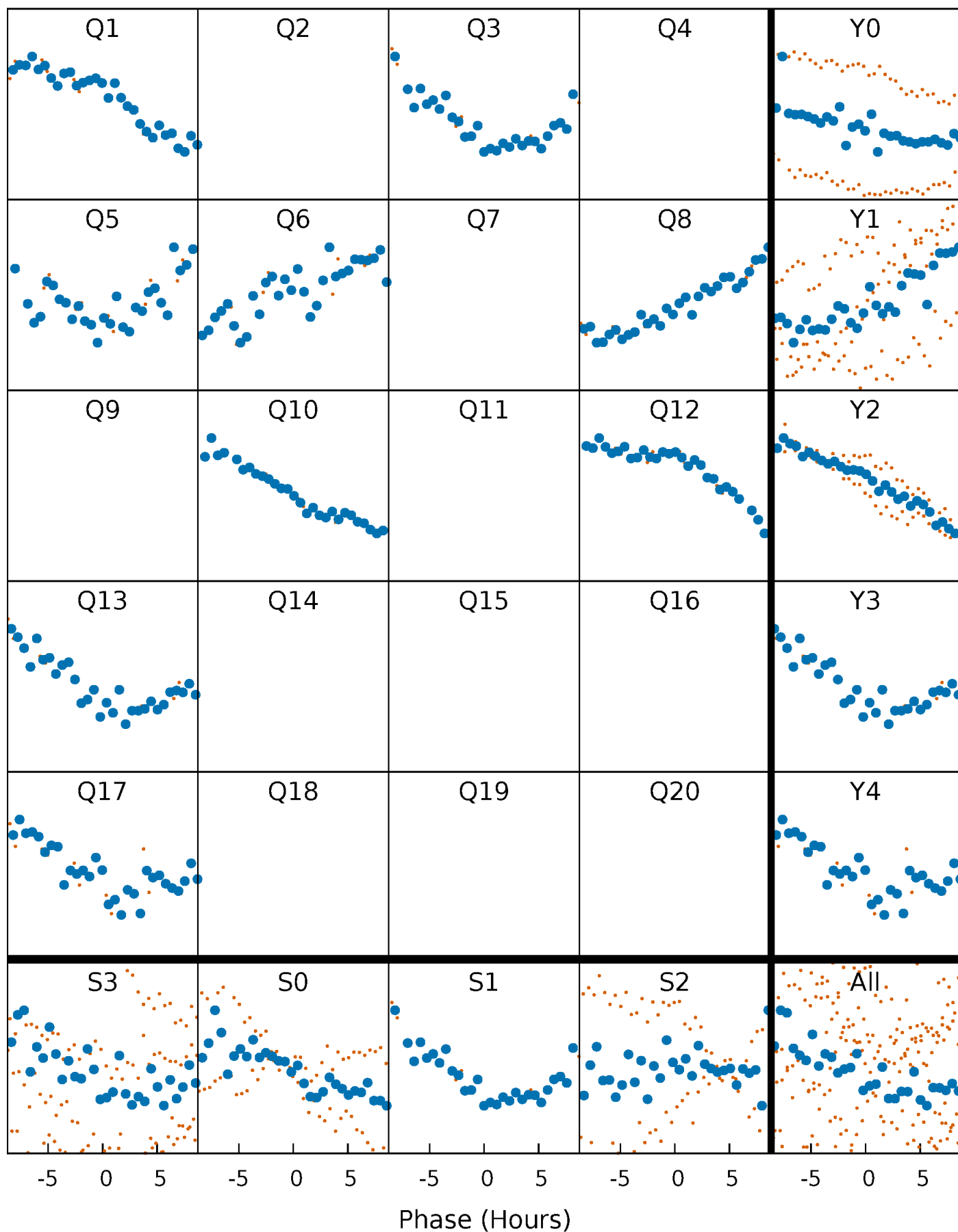
# Non-Whitened Vs. Whitened Light Curve





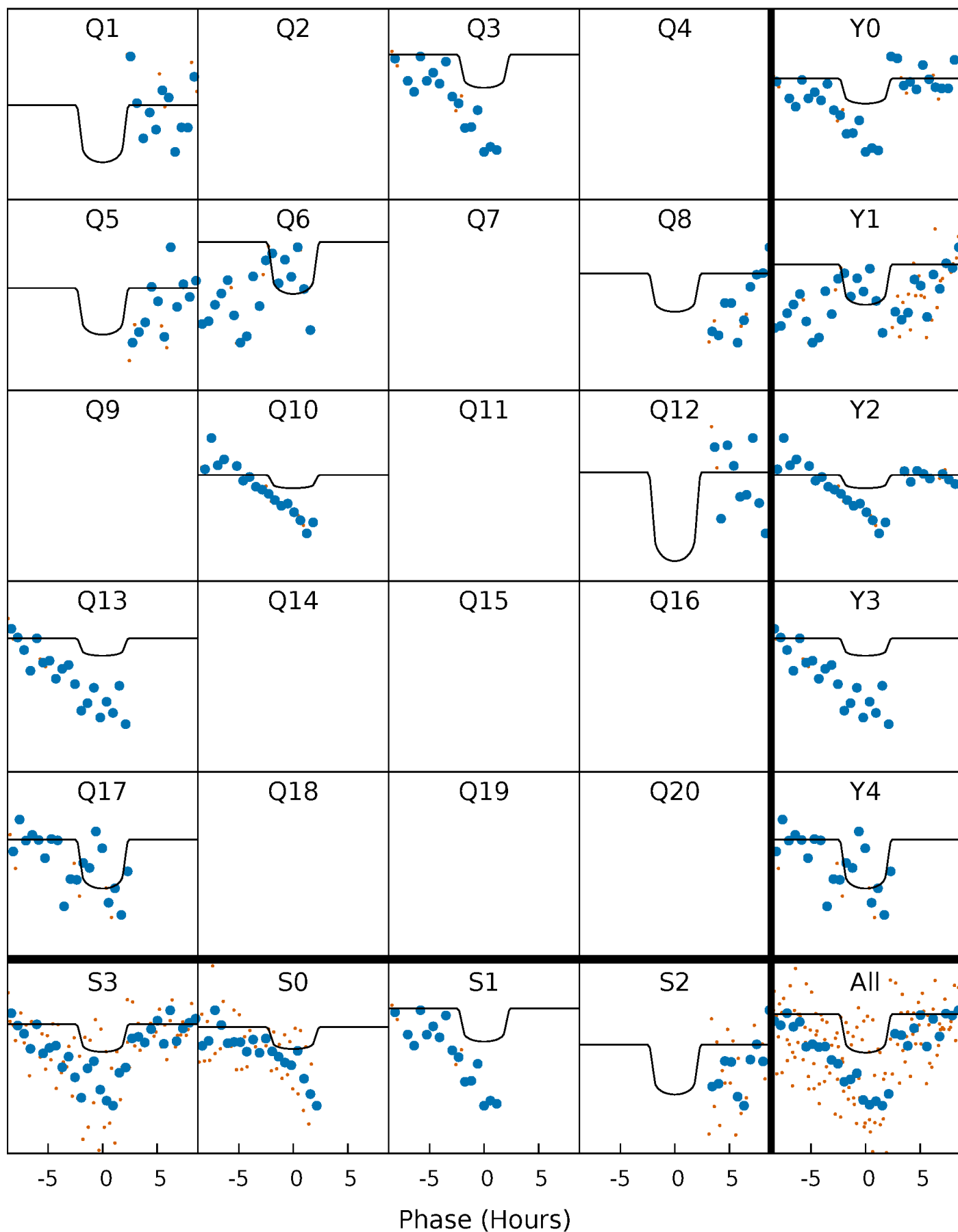
# PDC Quarter-Phased Transit Curves

TCE 003629473-05     $P=157.885484$  Days     $T_0=153.773129$  (BKJD)



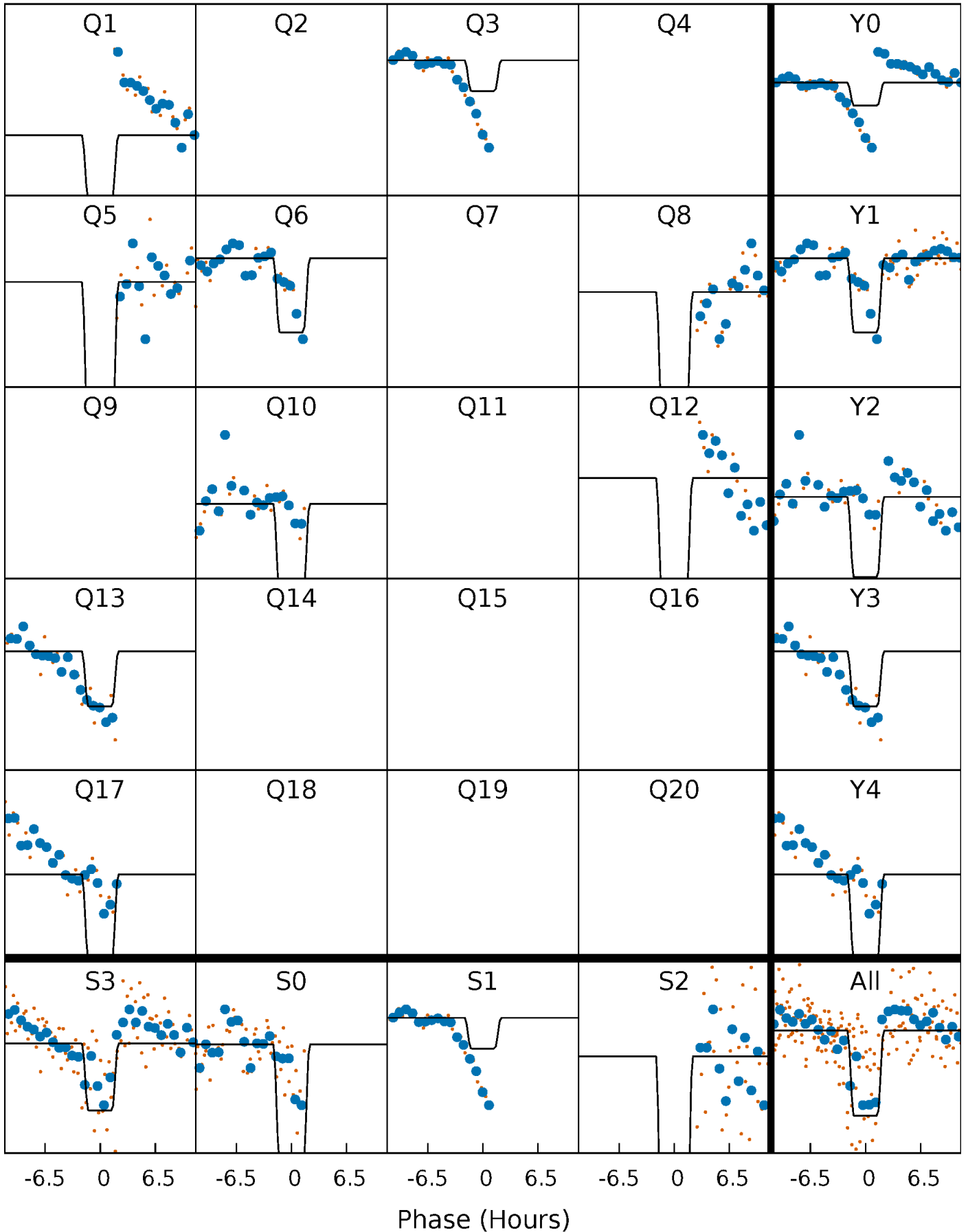
# DV Quarter-Phased Transit Curves

TCE 003629473-05     $P=157.885484$  Days     $T_0=153.773129$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

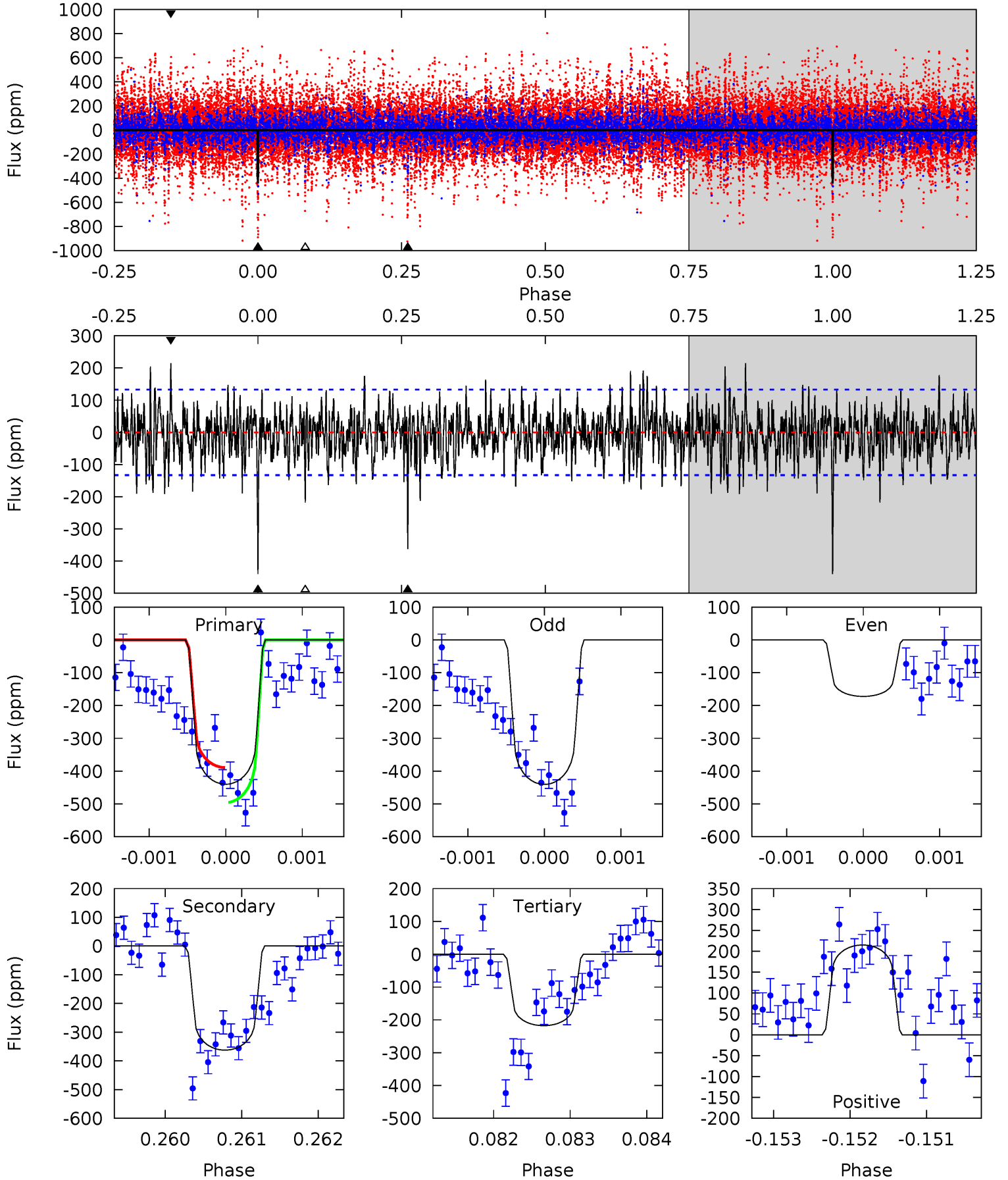
TCE 003629473-05     $P=157.884169$  Days     $T_0=153.796452$  (BKJD)



# DV Model-Shift Uniqueness Test

003629473-05, P = 157.885484 Days, E = 153.773129 Days

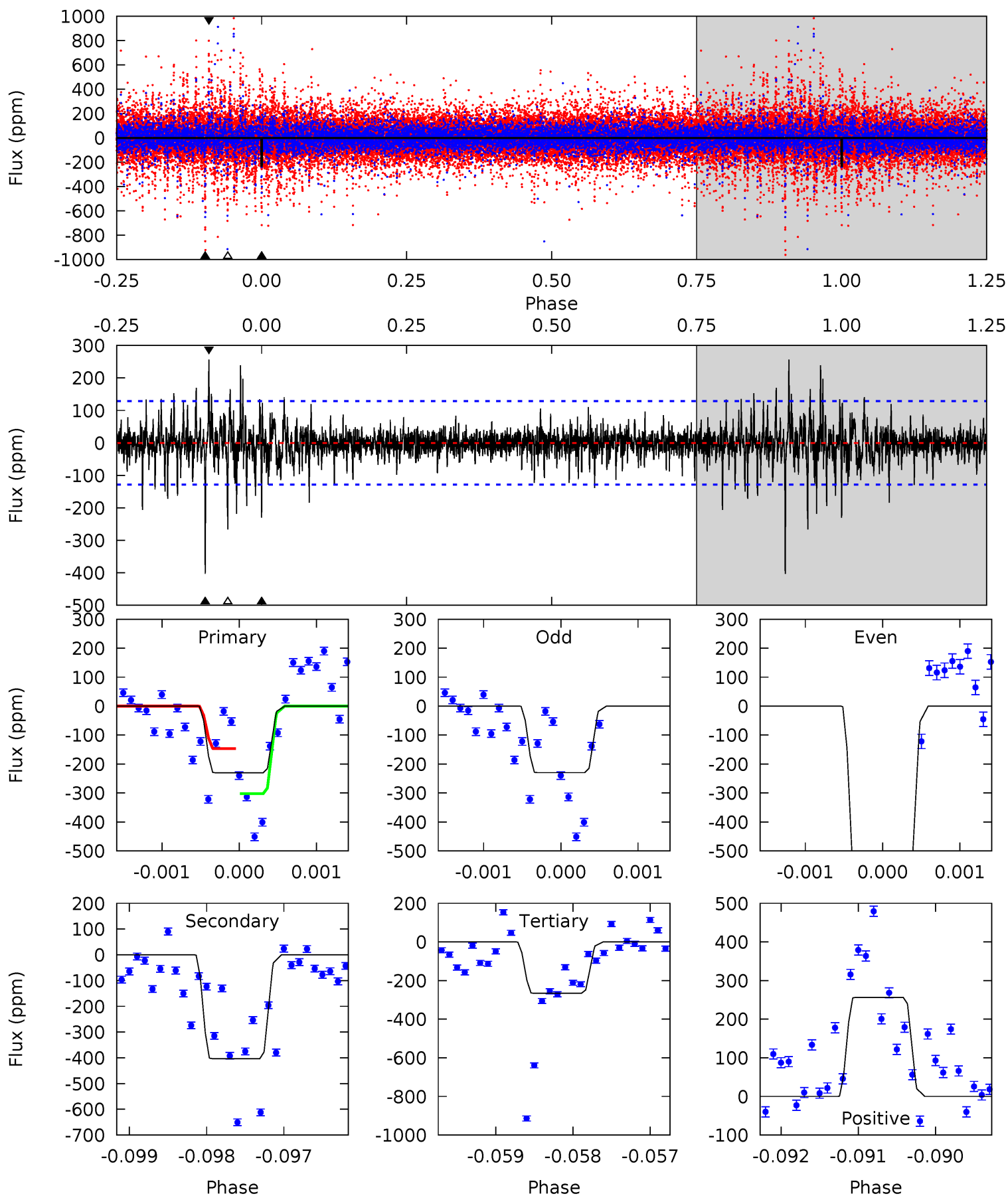
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	14.7	8.85	8.74	5.41	3.23	2.41	9.05	9.16	5.90	6.01	1.61	0.88	0.33	2.16



# Alt Model-Shift Uniqueness Test

003629473-05, P = 157.884169 Days, E = 153.796452 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
9.73	17.0	11.2	10.8	5.43	3.26	1.65	-1.51	-1.11	5.81	6.21	5.29	1.52	0.39	0



### Stellar Parameters For KIC 003629473

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6927^{+167}_{-238}$	$3.875^{+0.266}_{-0.114}$	$-0.140^{+0.300}_{-0.300}$	$2.424^{+0.444}_{-0.824}$	$1.605^{+0.170}_{-0.340}$	$0.159^{+0.273}_{-0.055}$
	+2%/-3%	+7%/-3%	+214%/-214%	+18%/-34%	+11%/-21%	+172%/-35%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003629473-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-363 \pm 25$	$3.73^{+2.71}_{-2.20}$	$799^{+50}_{-67}$	$7963^{+7958}_{-1979}$	$6137^{+31386}_{-3940}$
Alt.	$-403 \pm 24$	$6.05^{+2.76}_{-2.61}$	$800^{+52}_{-63}$	$6281^{+2266}_{-1023}$	$2704^{+5560}_{-1433}$

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

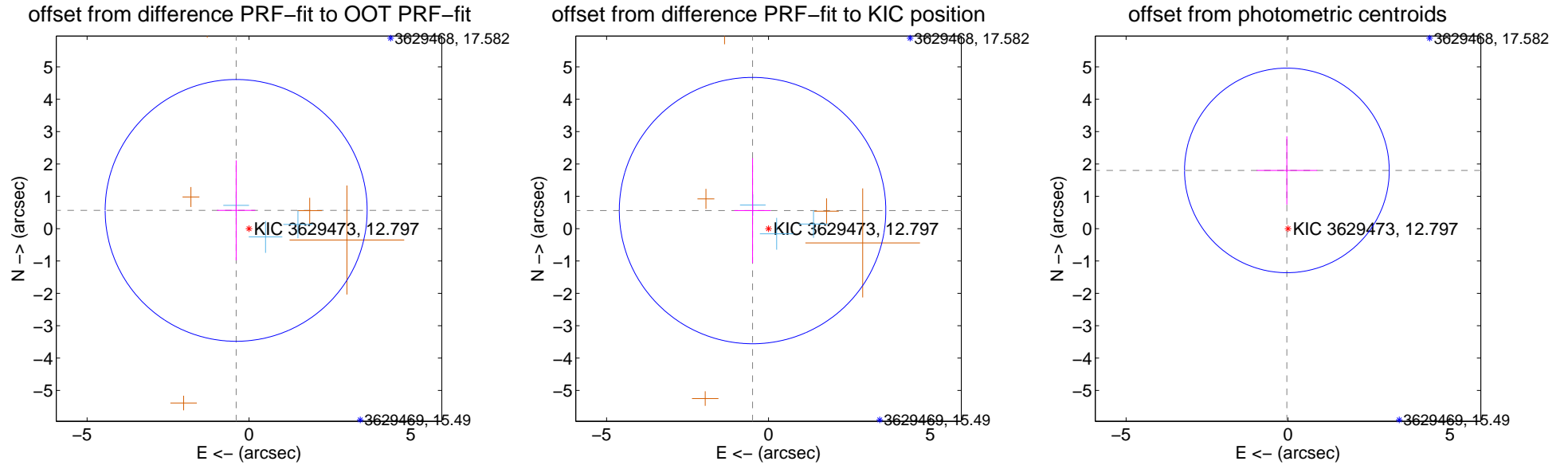
## DV Centroid Data

Supplemental centroid analysis for 003629473-05. Kepler magnitude: 12.80. Transit SNR 4.73

There are 3 quarters with good PRF difference image offsets

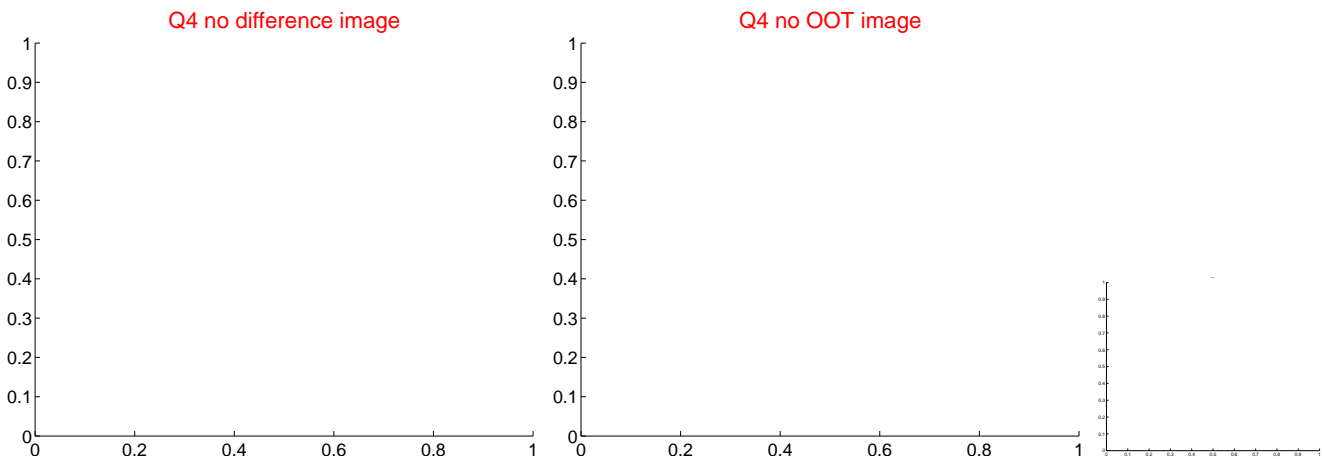
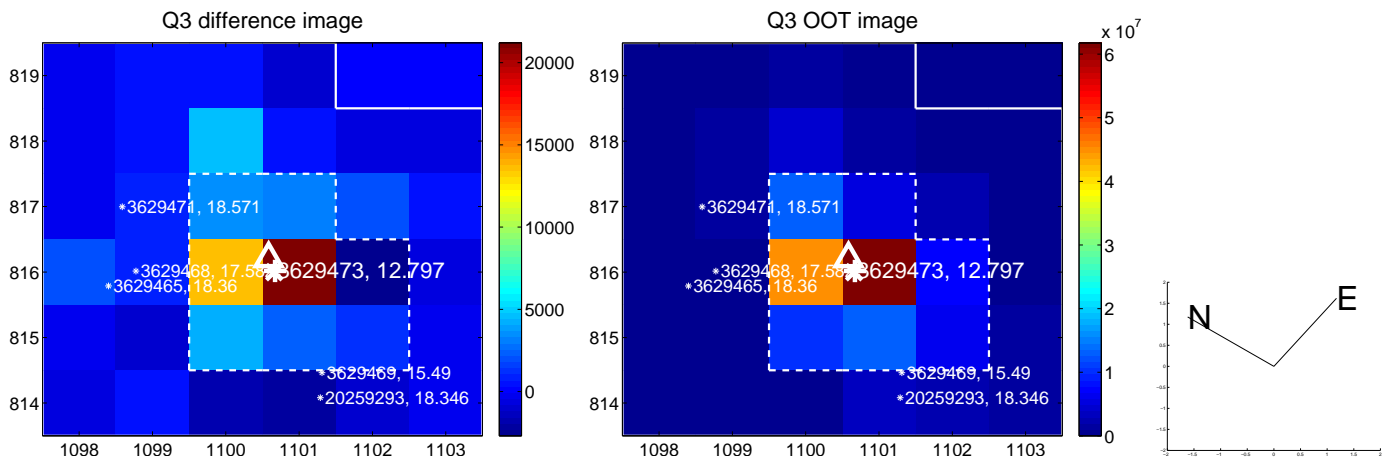
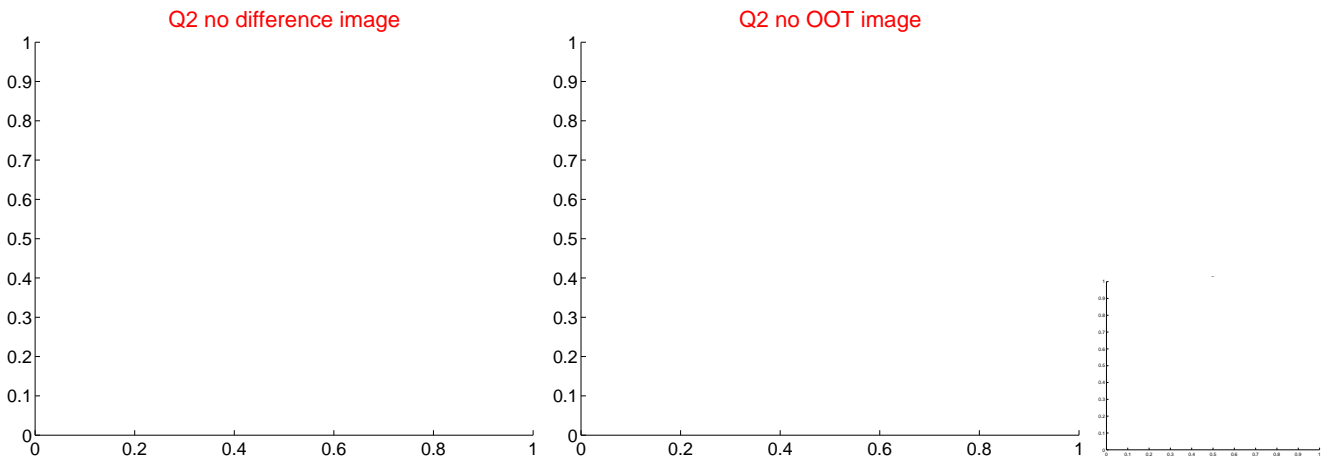
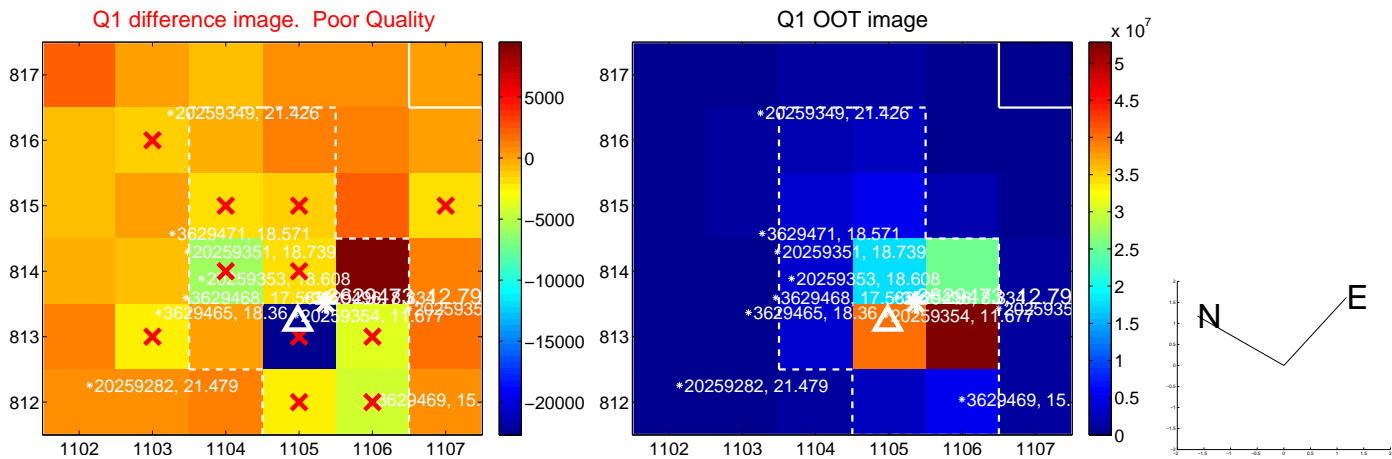
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.690 \pm 1.349$	0.51	$0.396 \pm 0.591$	$0.565 \pm 1.545$
PRF-fit source offset from KIC position	$0.745 \pm 1.372$	0.54	$0.492 \pm 0.564$	$0.559 \pm 1.620$
photometric centroid source offset	$1.80 \pm 1.05$	1.71	$0.03 \pm 0.93$	$1.80 \pm 1.05$



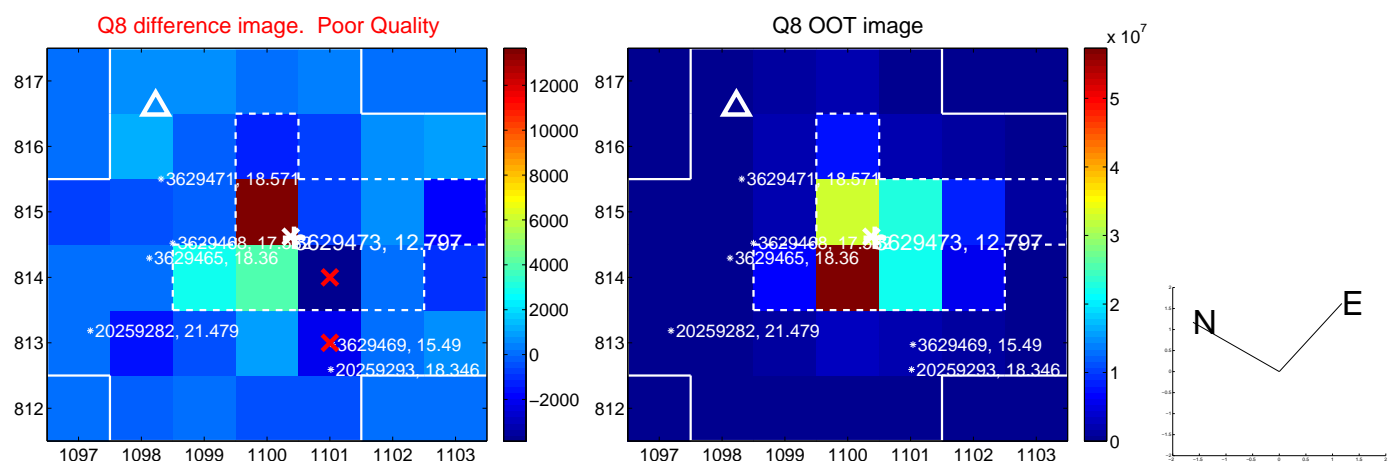
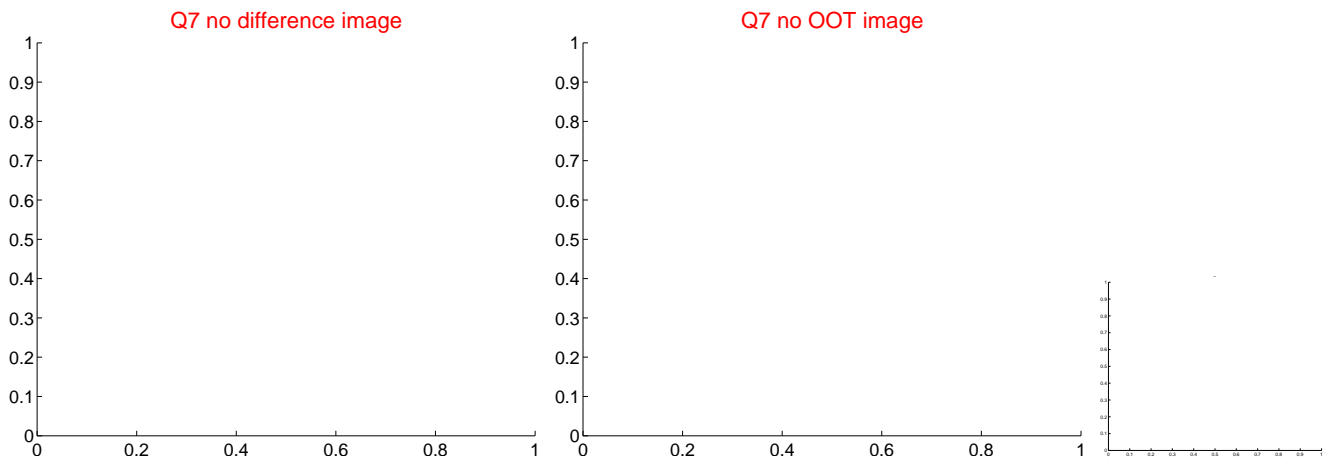
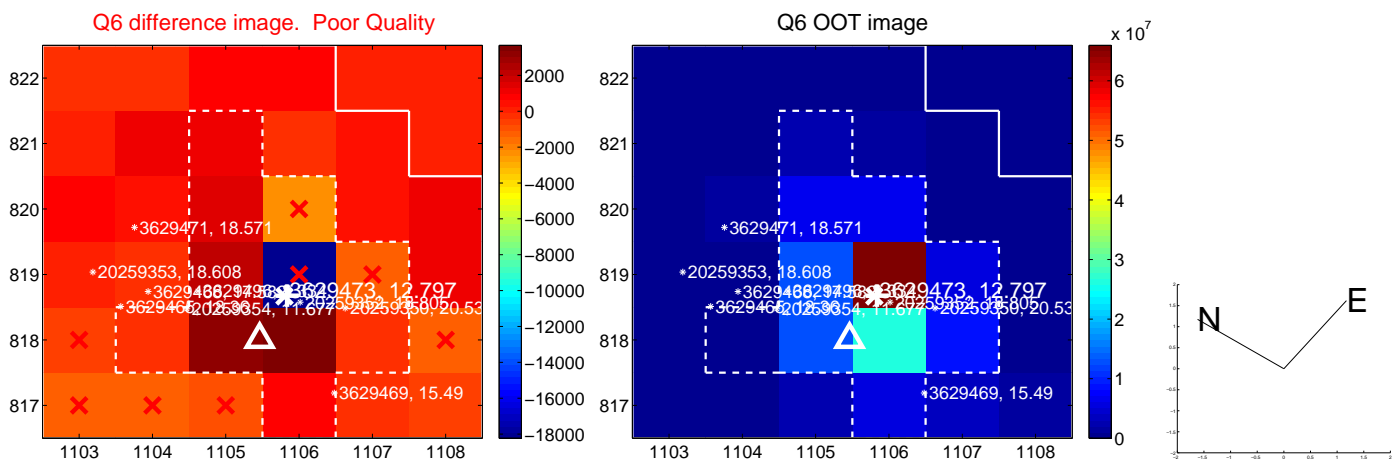
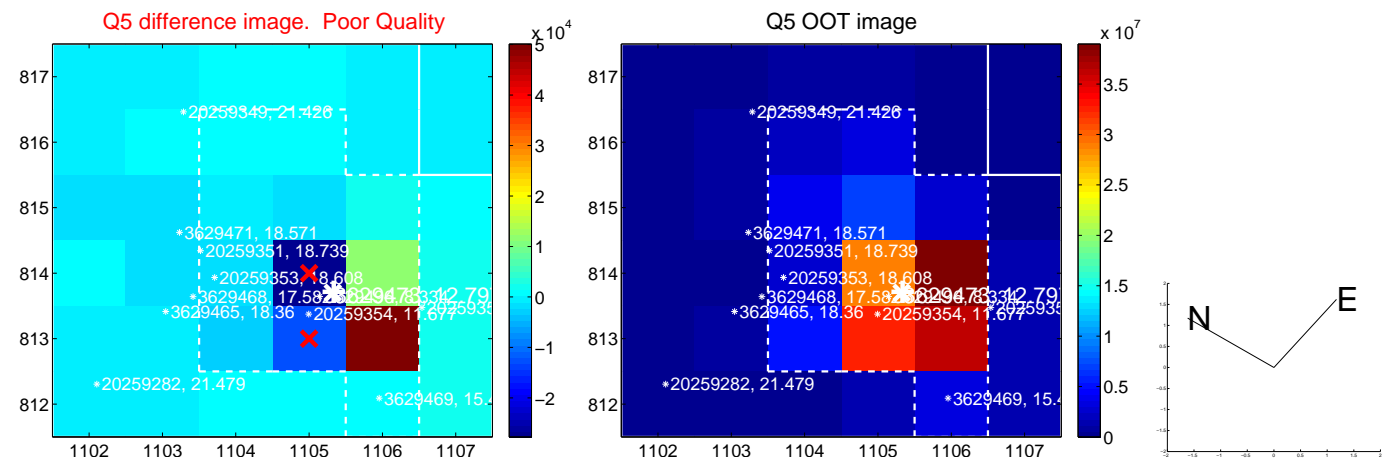
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

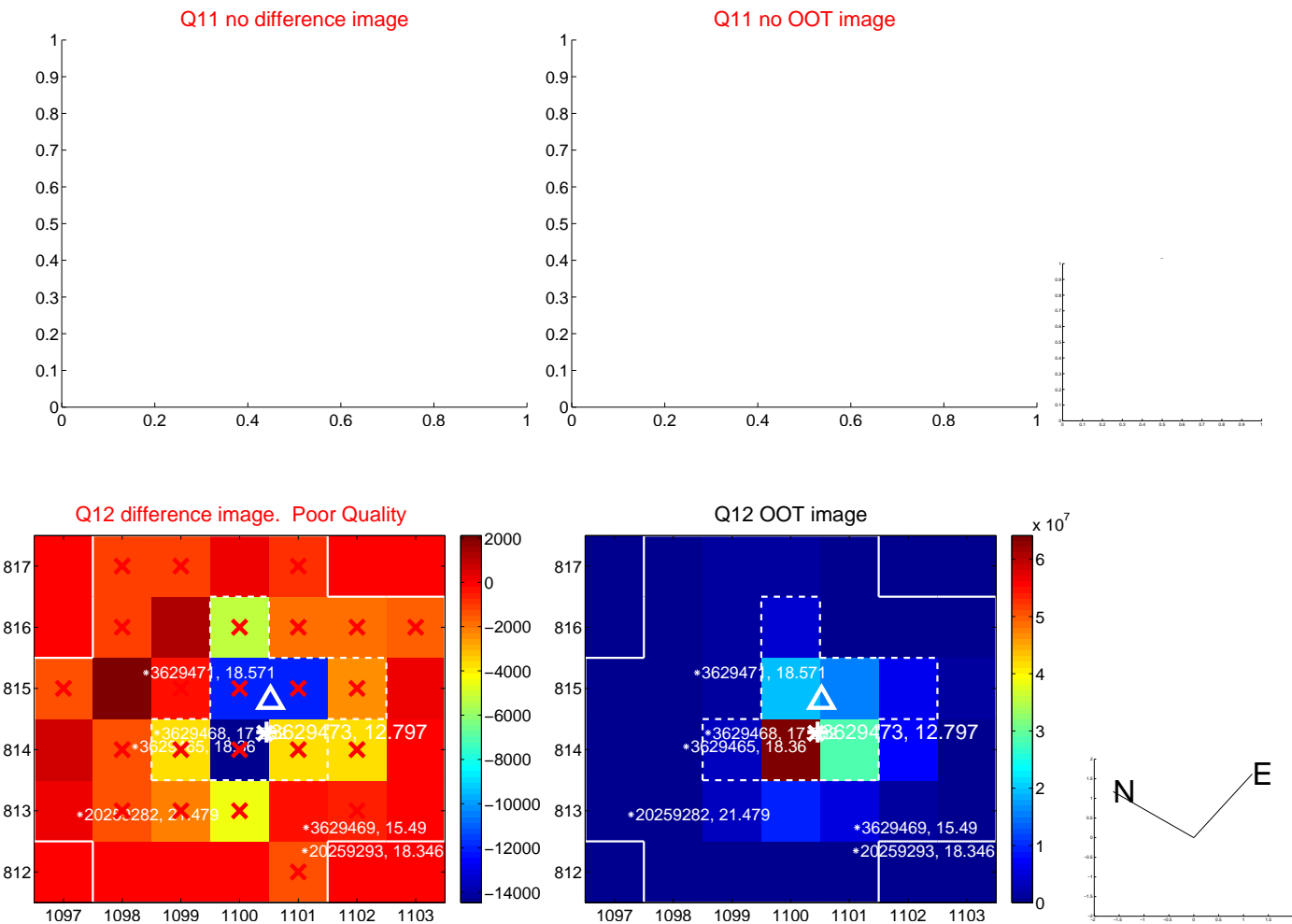
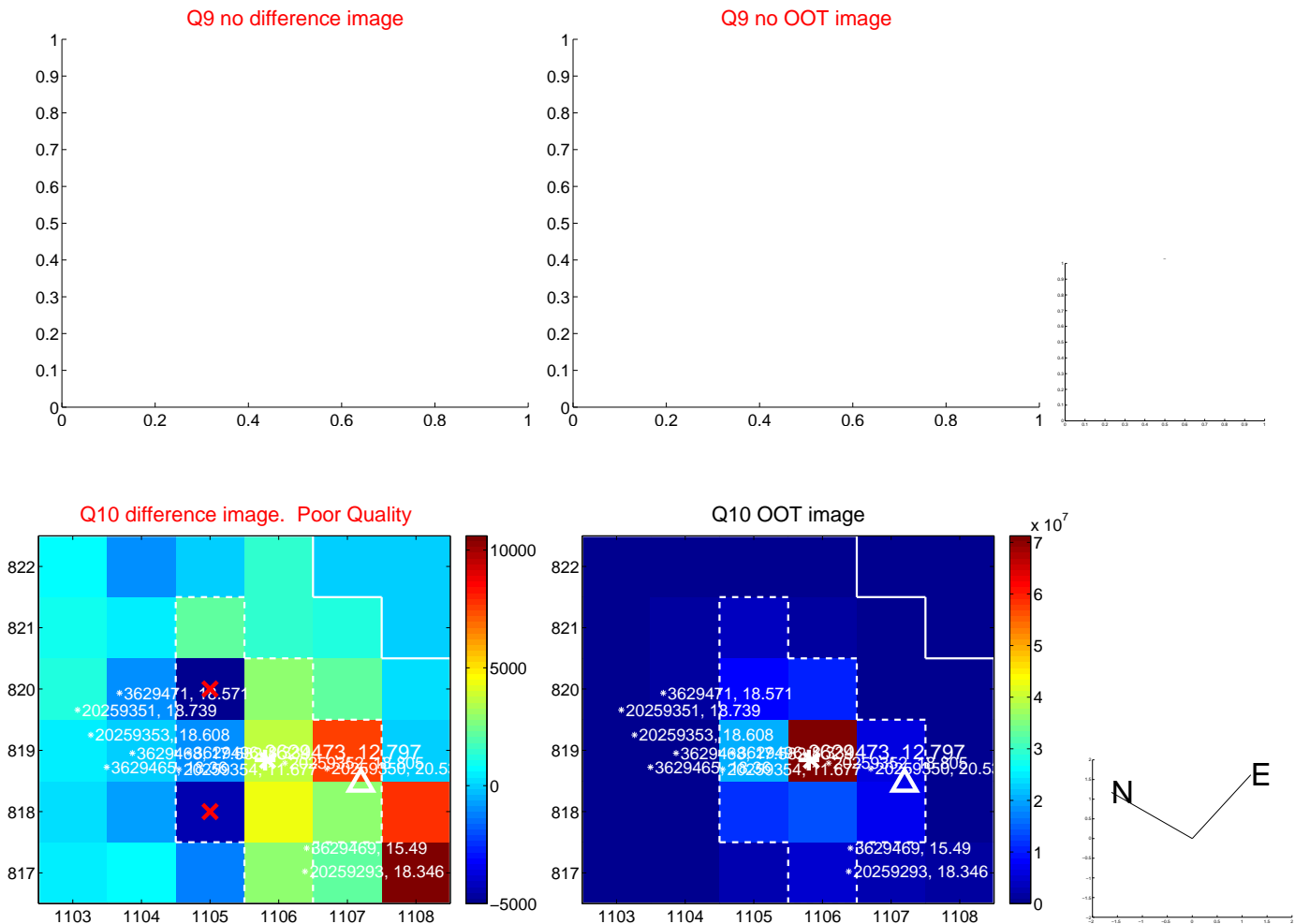




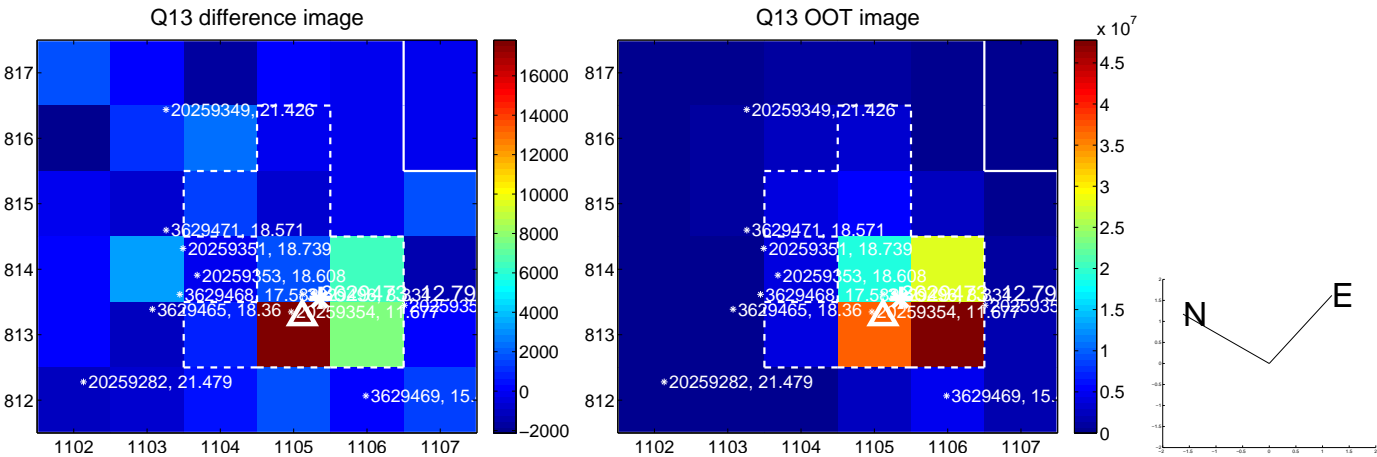
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



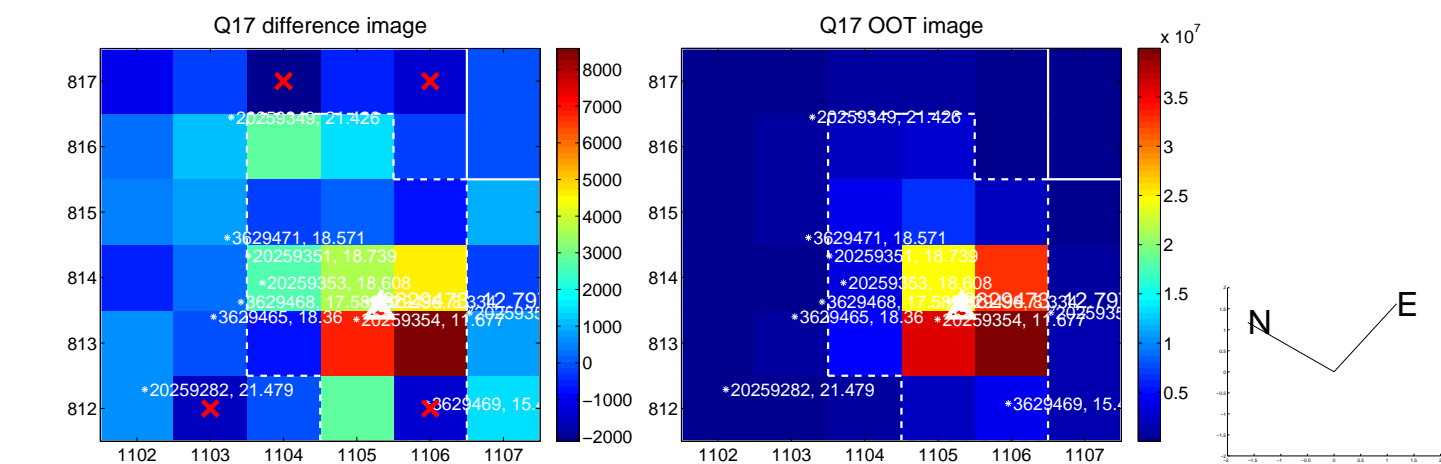
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



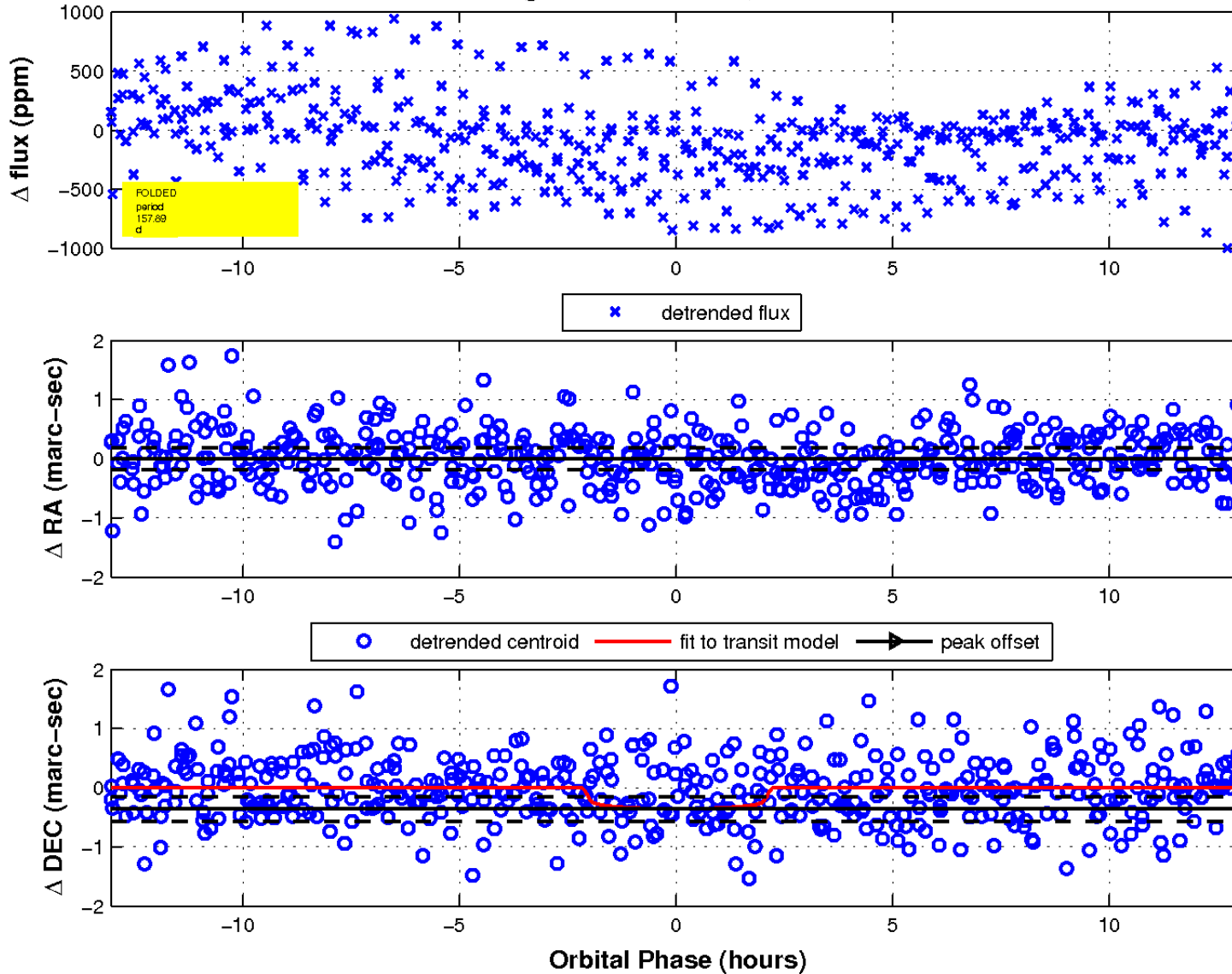
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



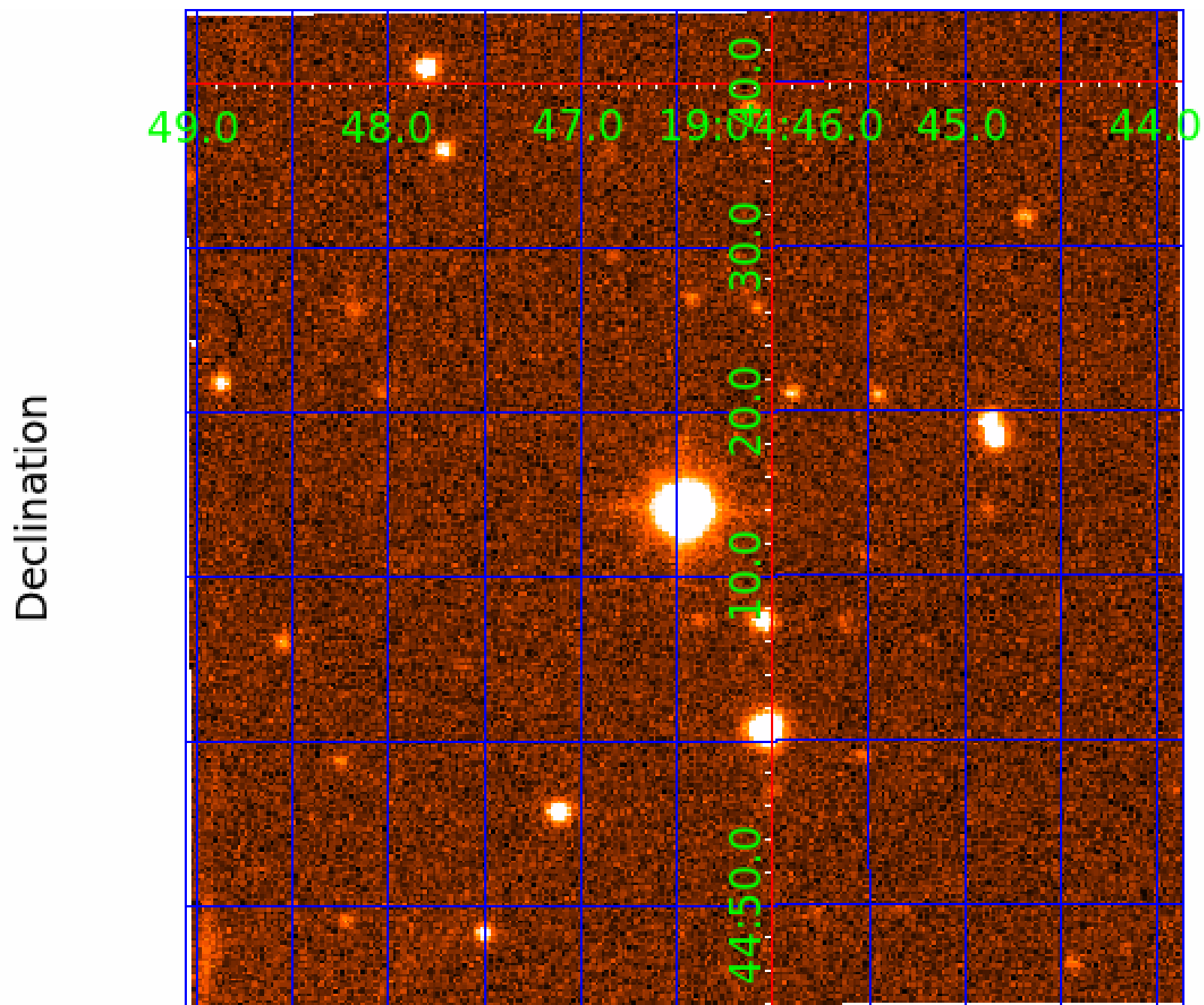
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 5 of 6



UKIRT Image



# KIC 003629473

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003629473-01	OBS	No	1.706927	132.936916	32.9	6.938	8.7	10.0	2.42	6927	1.87	11301.70
003629473-02	OBS	No	519.228029	524.359611	359.0	4.121	13.1	6.8	2.42	6927	5.16	5.52
003629473-03	OBS	No	361.307398	479.964538	807.7	16.260	12.3	7.9	2.42	6927	12.95	8.96
003629473-04	OBS	No	246.357037	152.247969	227.8	14.752	8.6	3.1	2.42	6927	3.94	14.93
003629473-05	OBS	No	157.885484	153.773129	195.1	4.376	8.9	4.7	2.42	6927	3.78	27.02
003629473-06	OBS	No	212.128031	243.178808	326.2	13.594	9.2	5.2	2.42	6927	4.70	18.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003629473-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
003629473-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003629473-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
003629473-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003629473-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003629473-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—INCONSISTENT_TRANS

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

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

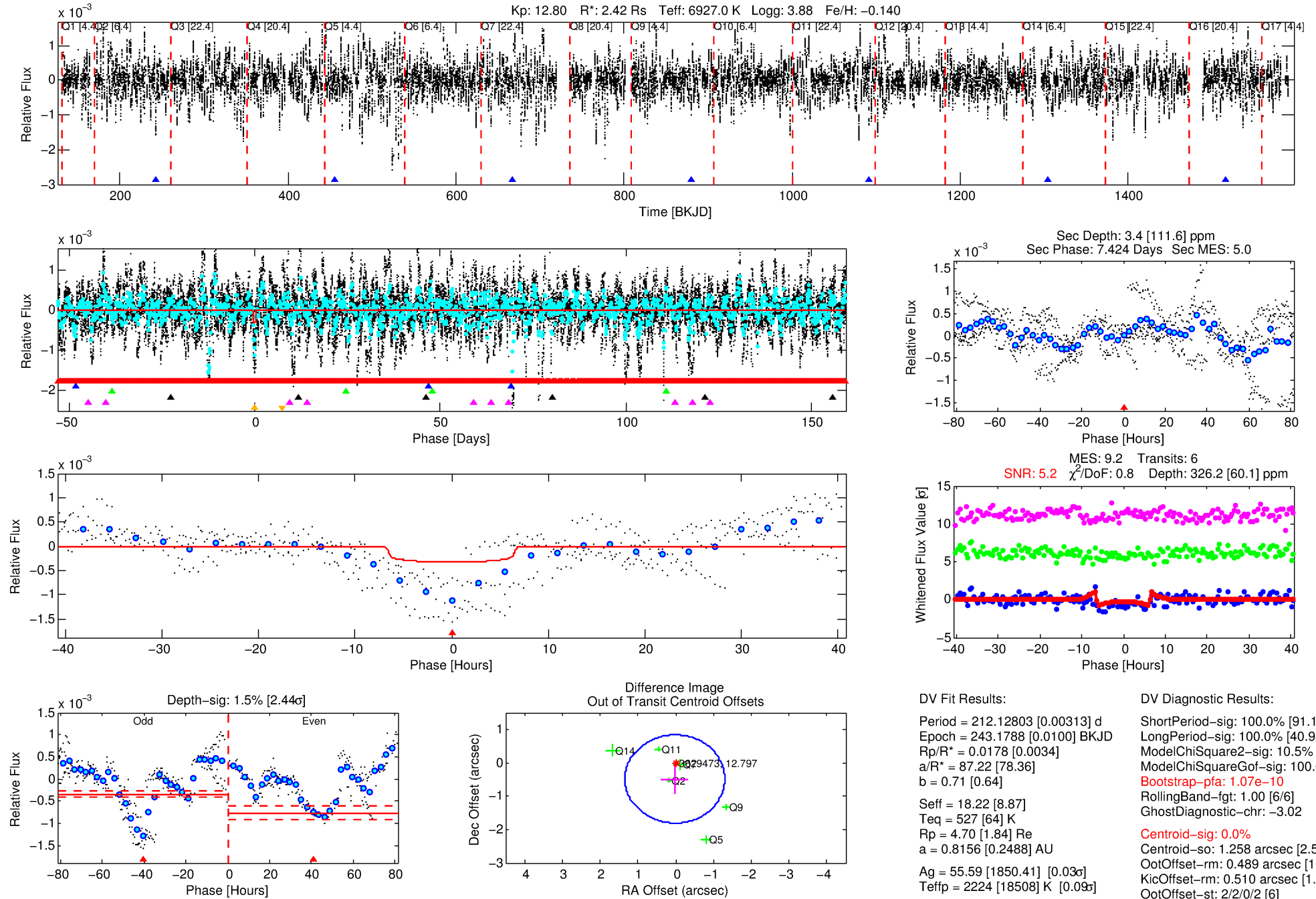
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003629473-06

No Significant Match Found

# DV One-Page Summary

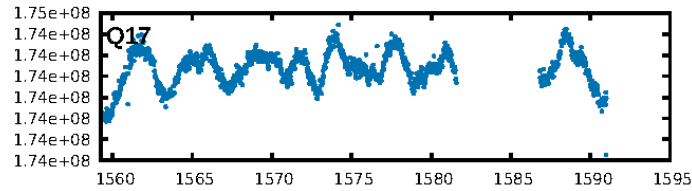
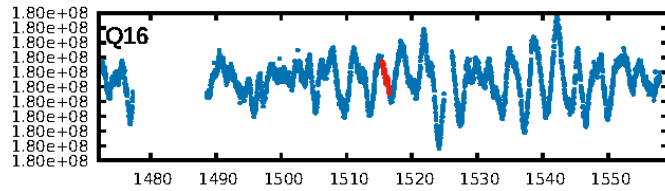
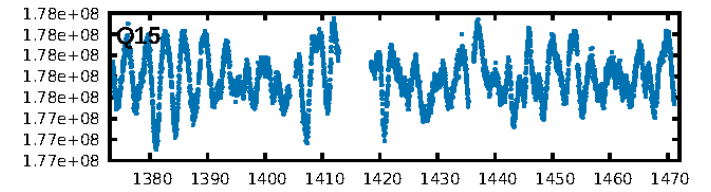
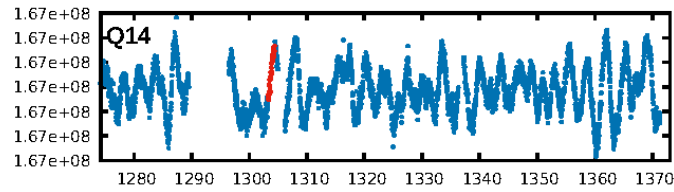
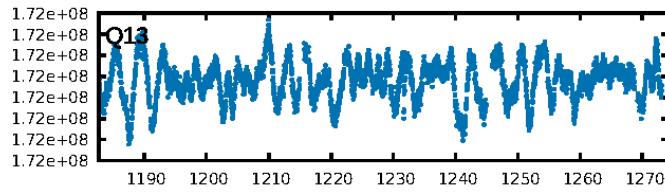
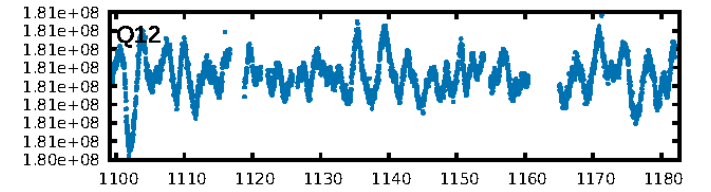
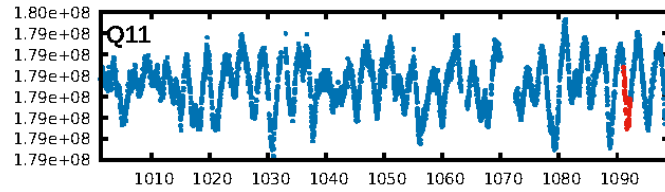
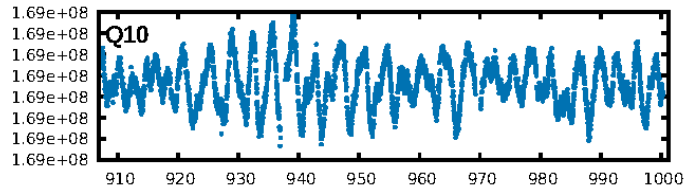
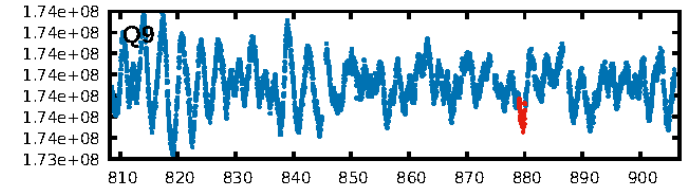
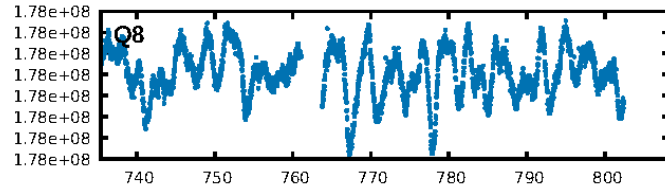
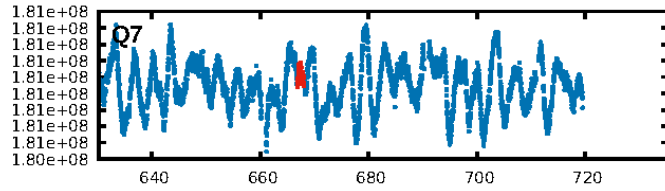
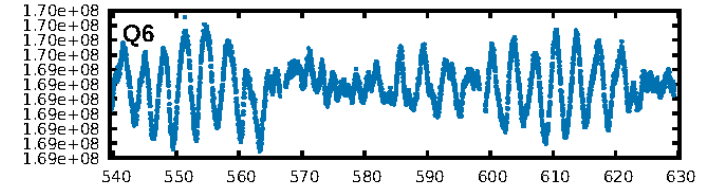
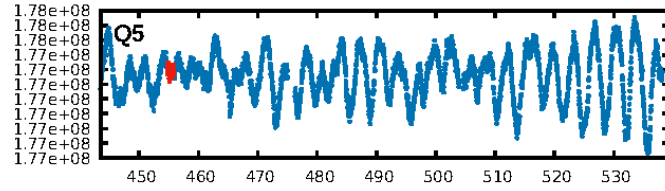
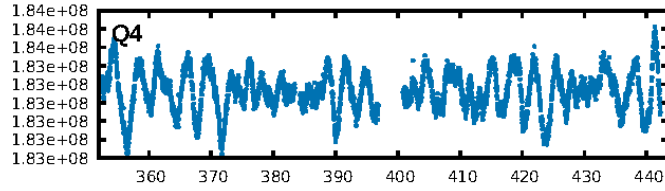
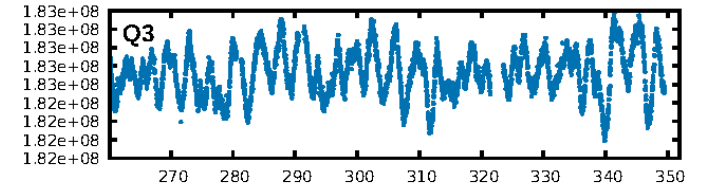
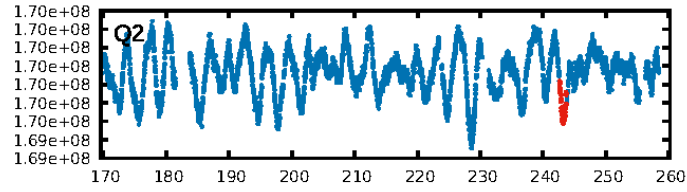
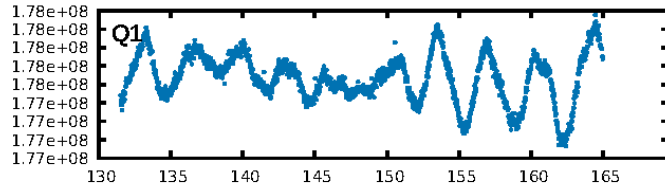
KIC: 3629473 Candidate: 6 of 6 Period: 212.128 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:07:07 Z

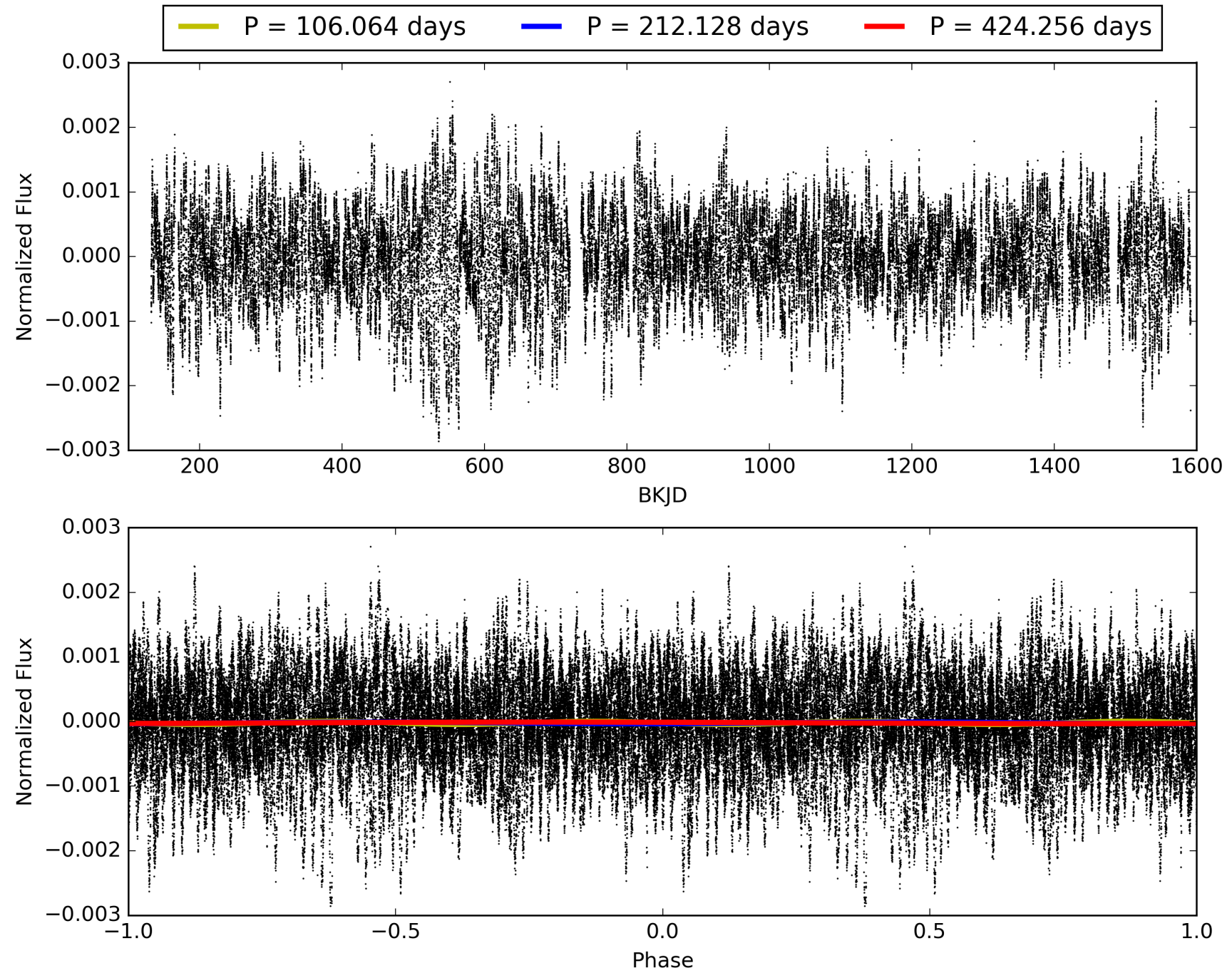
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003629473-06, PDC Light Curves



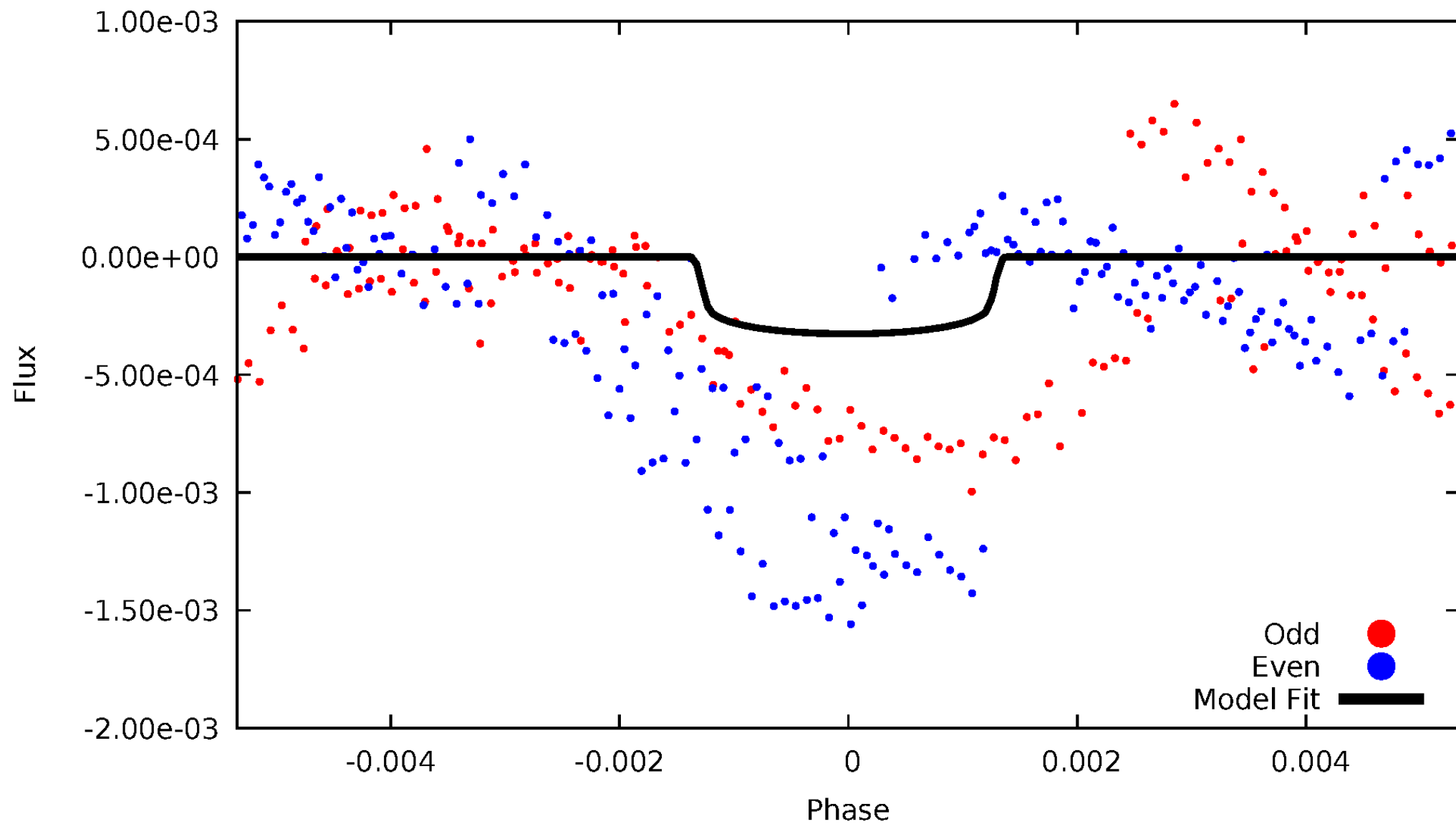


TCE 003629473-06



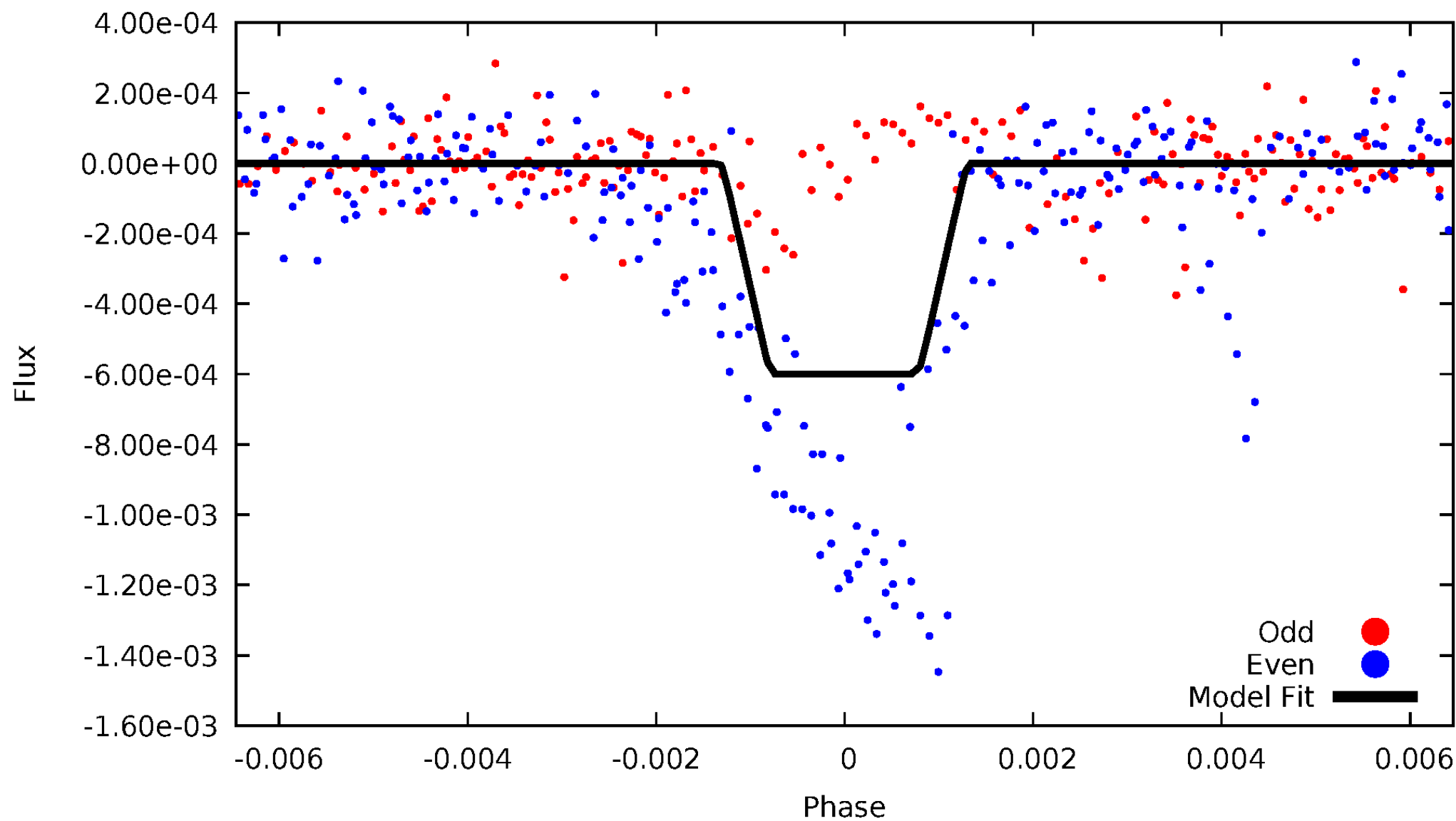
# DV Odd/Even

TCE 003629473-06



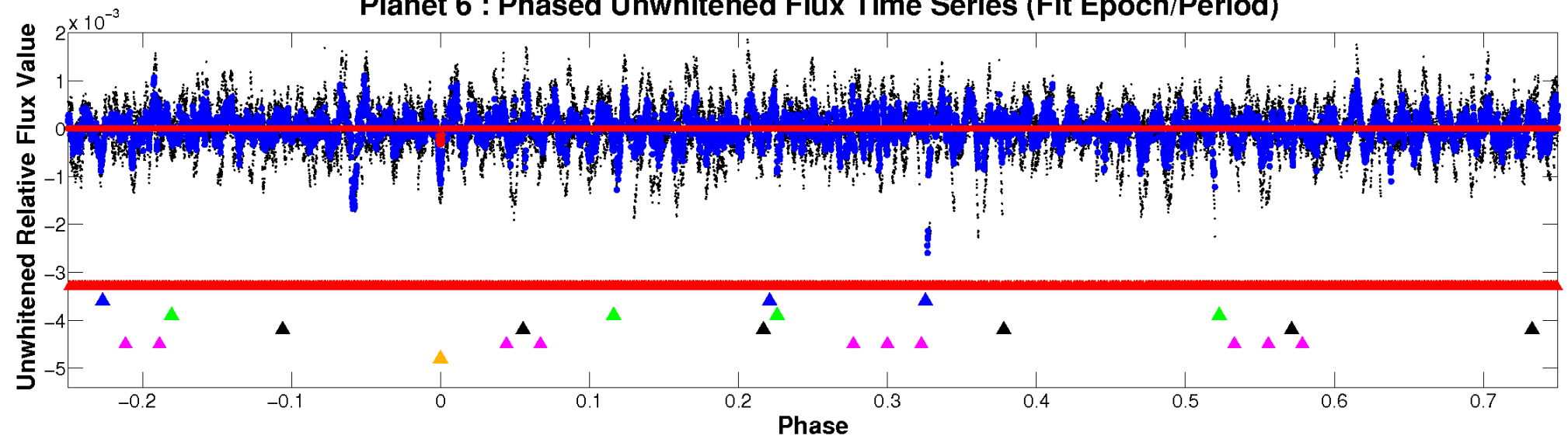
# ALT Odd/Even

TCE 003629473-06

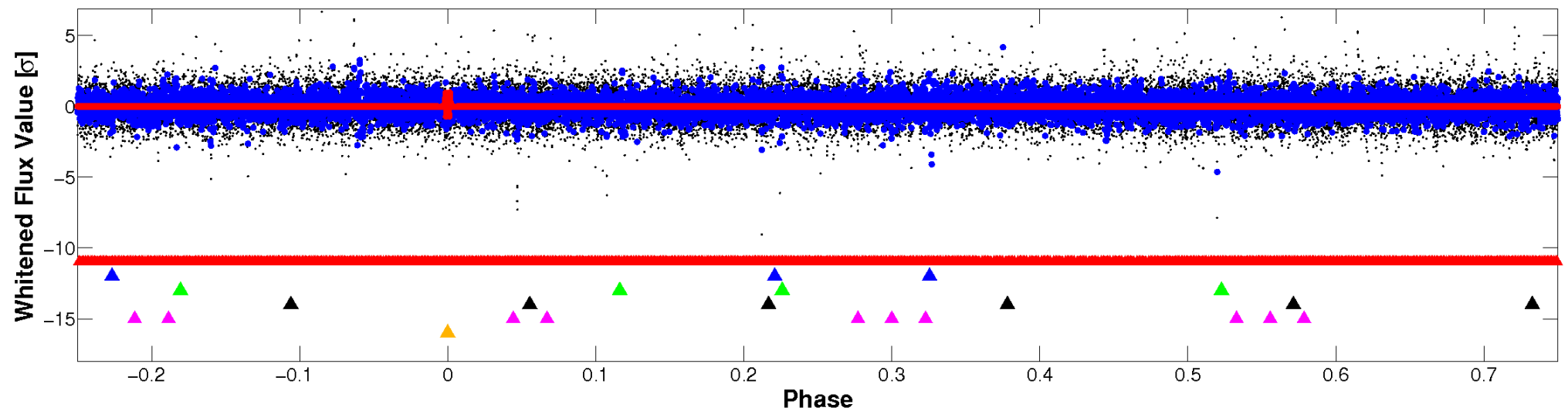


# Non-Whitened Vs. Whitened Light Curve

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

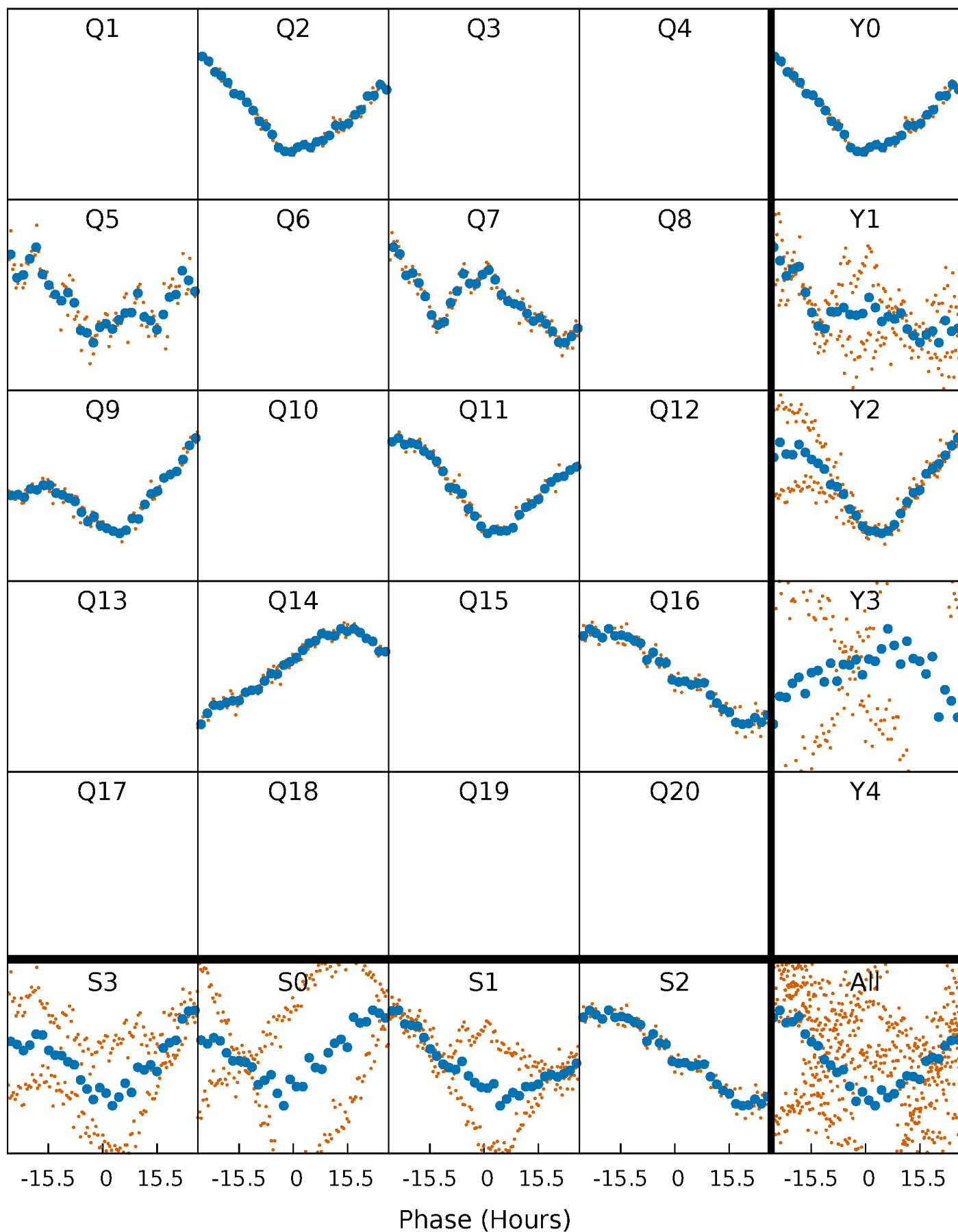


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



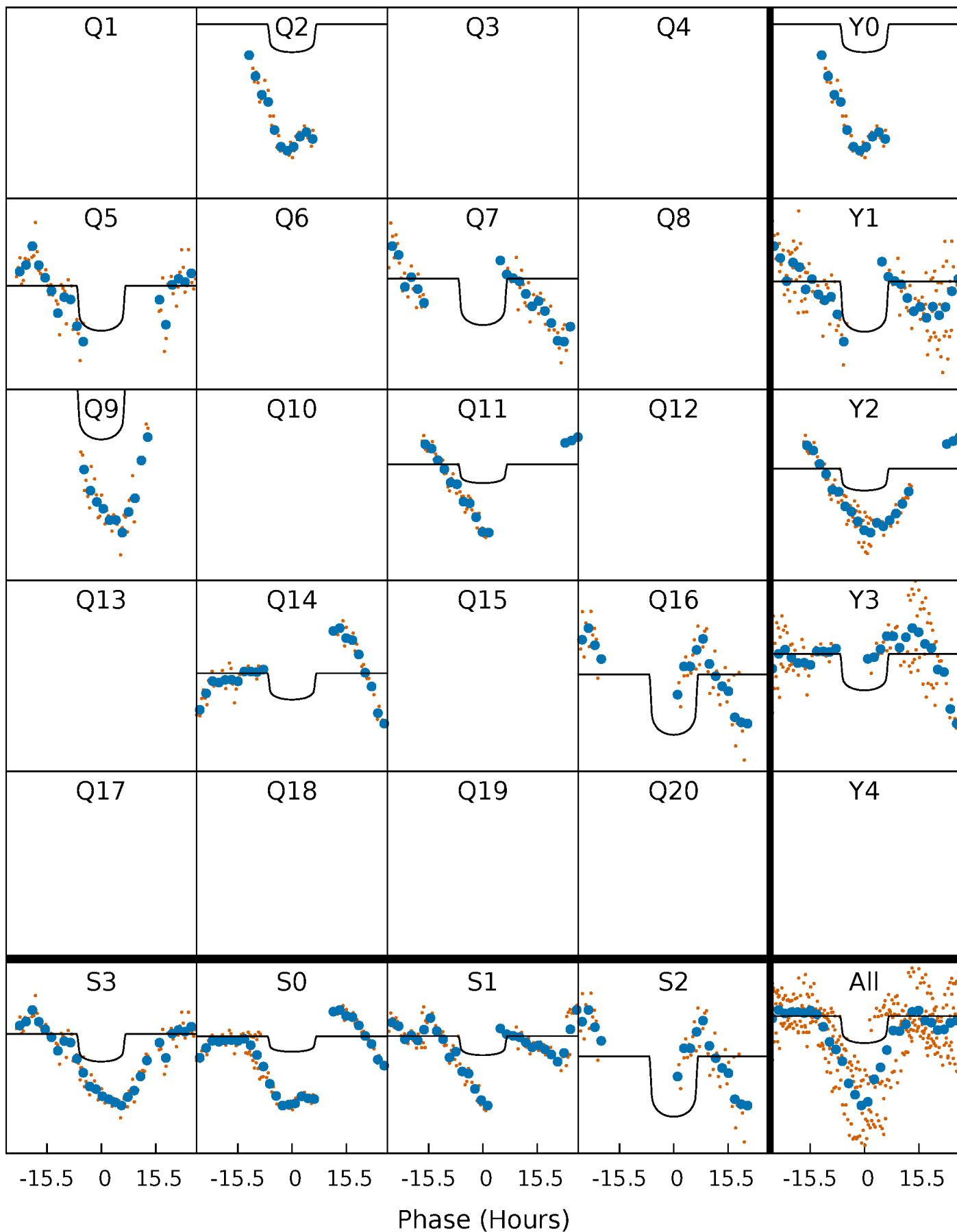
# PDC Quarter-Phased Transit Curves

TCE 003629473-06 P=212.128031 Days  $T_0=243.178808$  (BKJD)



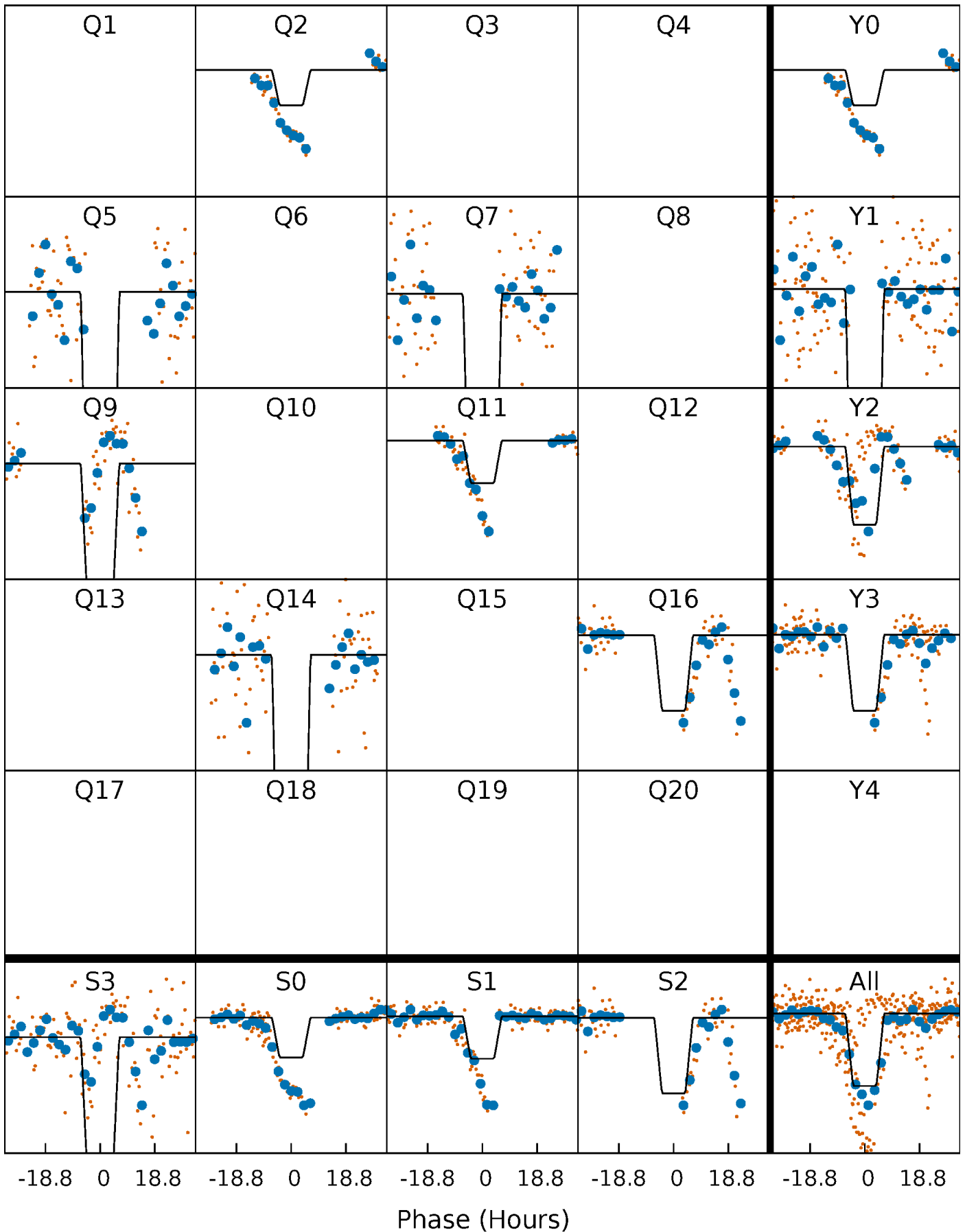
# DV Quarter-Phased Transit Curves

TCE 003629473-06 P=212.128031 Days  $T_0=243.178808$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

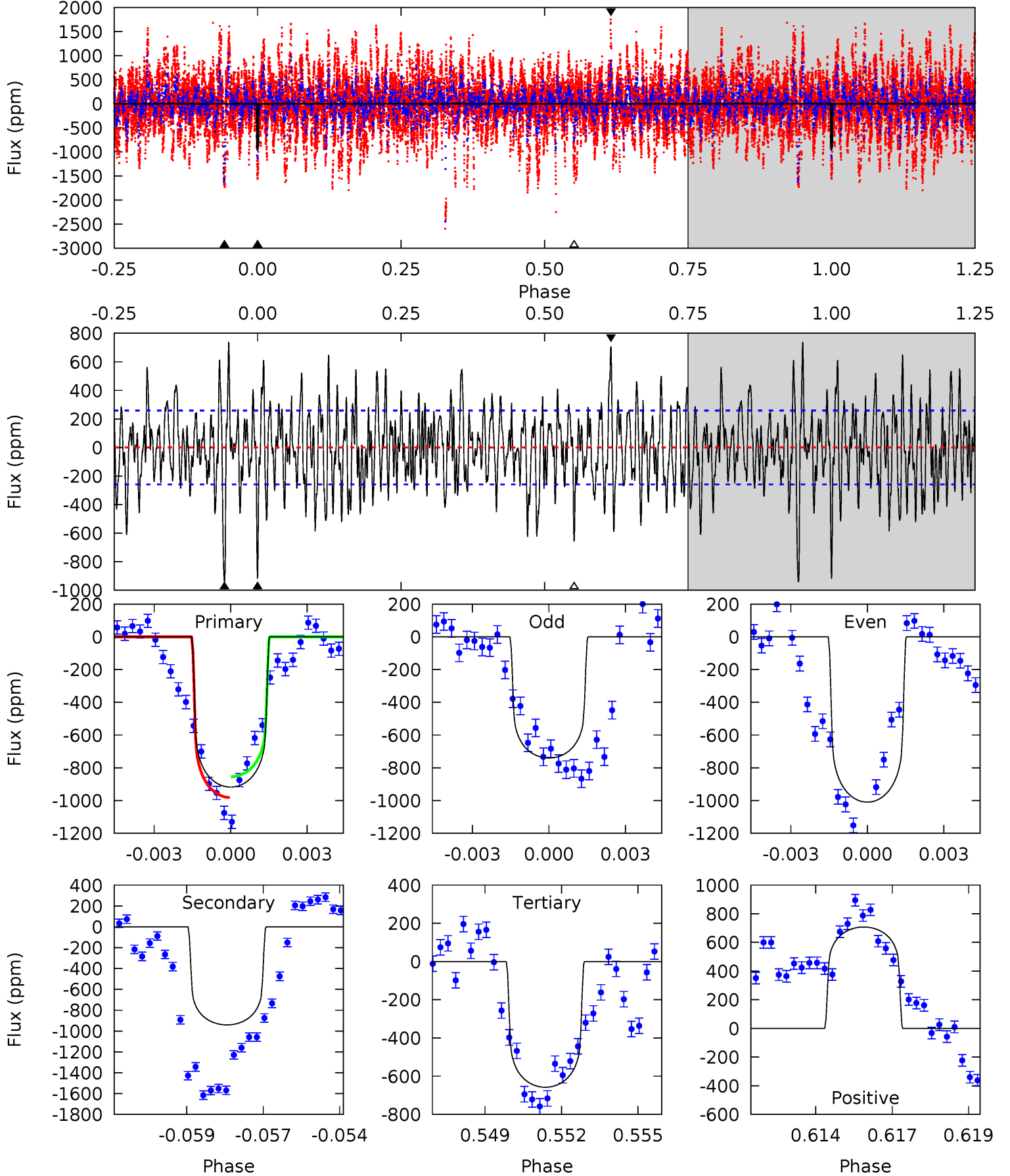
TCE 003629473-06 P=212.113975 Days  $T_0=243.197219$  (BKJD)



# DV Model-Shift Uniqueness Test

003629473-06, P = 212.128031 Days, E = 31.050777 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
18.7	19.2	13.4	14.4	5.27	3.00	4.73	5.29	4.28	5.77	4.76	2.61	0.93	0.44	1.31

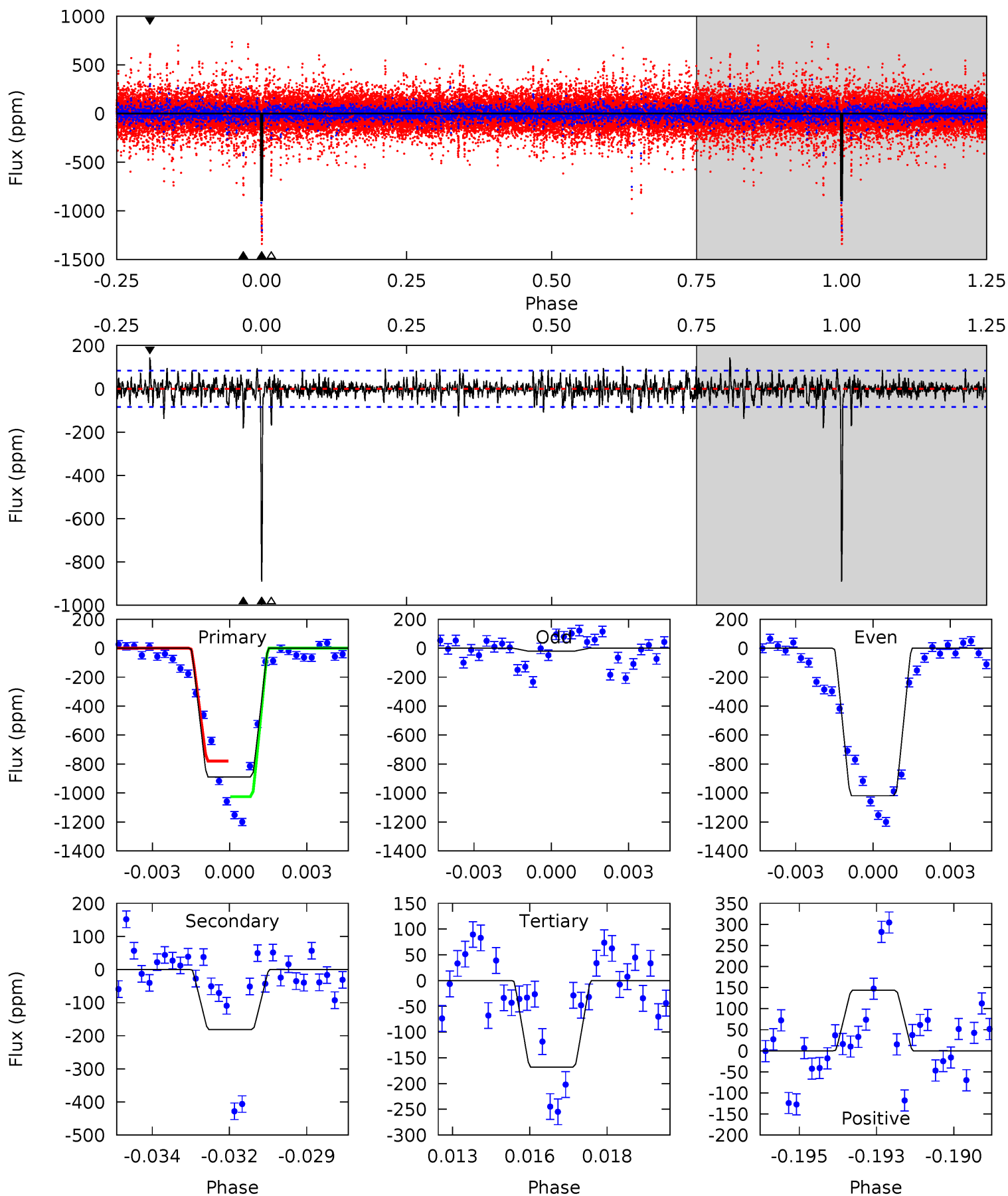




# Alt Model-Shift Uniqueness Test

003629473-06, P = 212.113975 Days, E = 31.083244 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
55.9	11.4	10.6	9.02	5.28	3.01	1.90	45.4	46.9	0.85	2.39	33.2	1.10	0.14	7.75



### Stellar Parameters For KIC 003629473

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6927^{+167}_{-238}$	$3.875^{+0.266}_{-0.114}$	$-0.140^{+0.300}_{-0.300}$	$2.424^{+0.444}_{-0.824}$	$1.605^{+0.170}_{-0.340}$	$0.159^{+0.273}_{-0.055}$
	+2%/-3%	+7%/-3%	+214%/-214%	+18%/-34%	+11%/-21%	+172%/-35%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003629473-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-941 \pm 49$	$4.46^{+1.23}_{-1.07}$	$726^{+45}_{-61}$	$9753^{+1775}_{-1207}$	$16908^{+12619}_{-6013}$
Alt.	$-182 \pm 16$	$6.20^{+1.31}_{-1.31}$	$727^{+42}_{-64}$	$5171^{+383}_{-316}$	$1727^{+986}_{-537}$

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

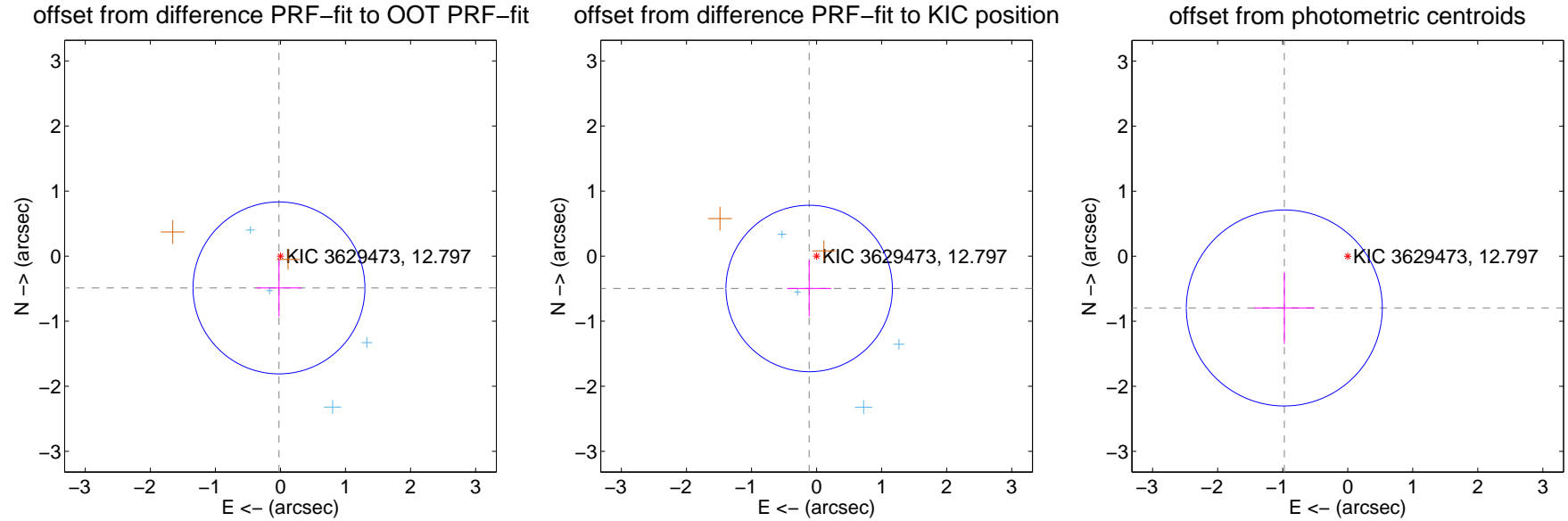
## DV Centroid Data

Supplemental centroid analysis for 003629473-06. Kepler magnitude: 12.80. Transit SNR 5.23

There are 4 quarters with good PRF difference image offsets

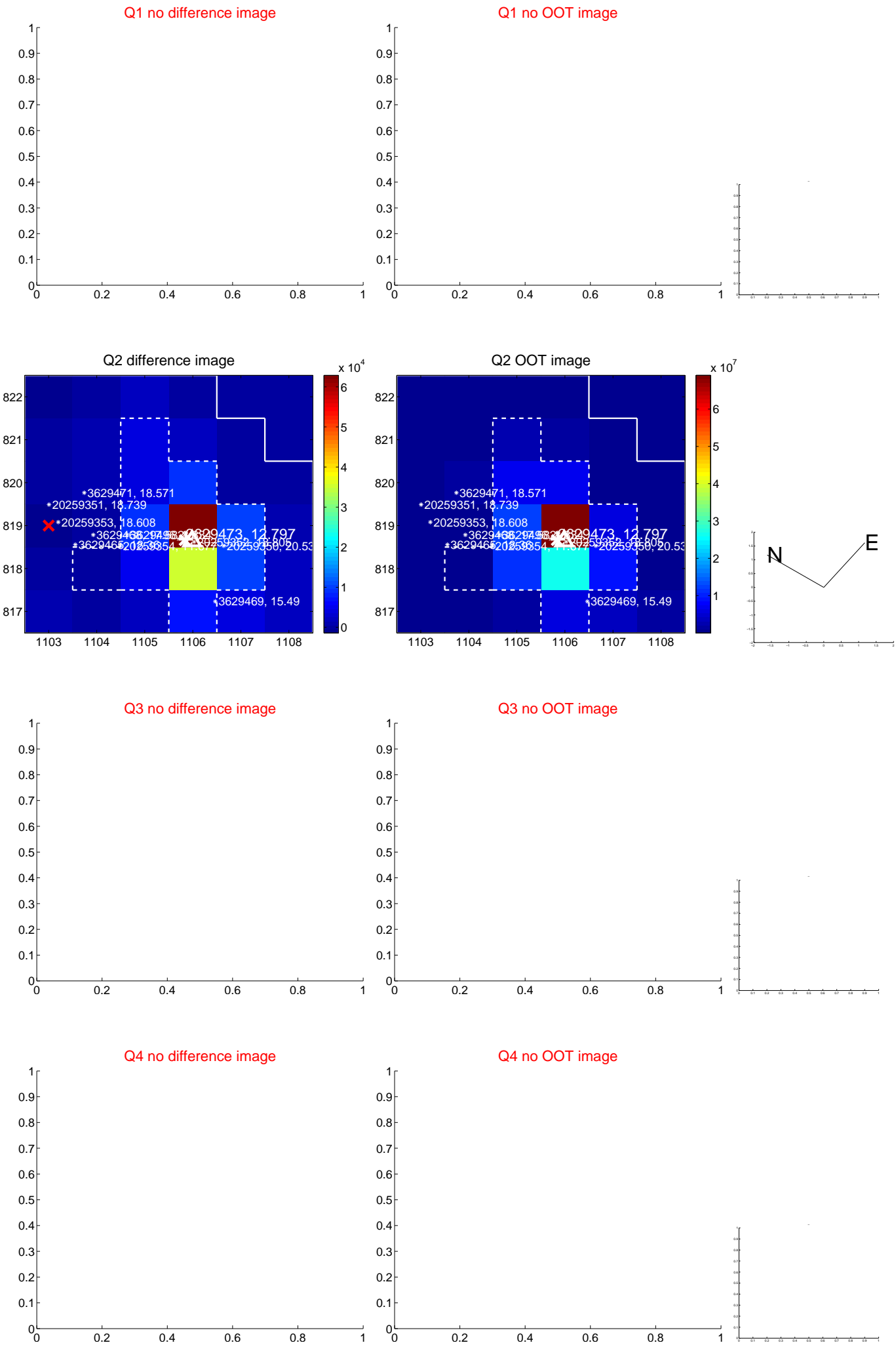
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.489 \pm 0.440$	1.11	$0.023 \pm 0.347$	$-0.488 \pm 0.441$
PRF-fit source offset from KIC position	$0.510 \pm 0.426$	1.20	$0.114 \pm 0.339$	$-0.497 \pm 0.430$
photometric centroid source offset	$1.26 \pm 0.50$	2.51	$0.97 \pm 0.46$	$-0.80 \pm 0.55$

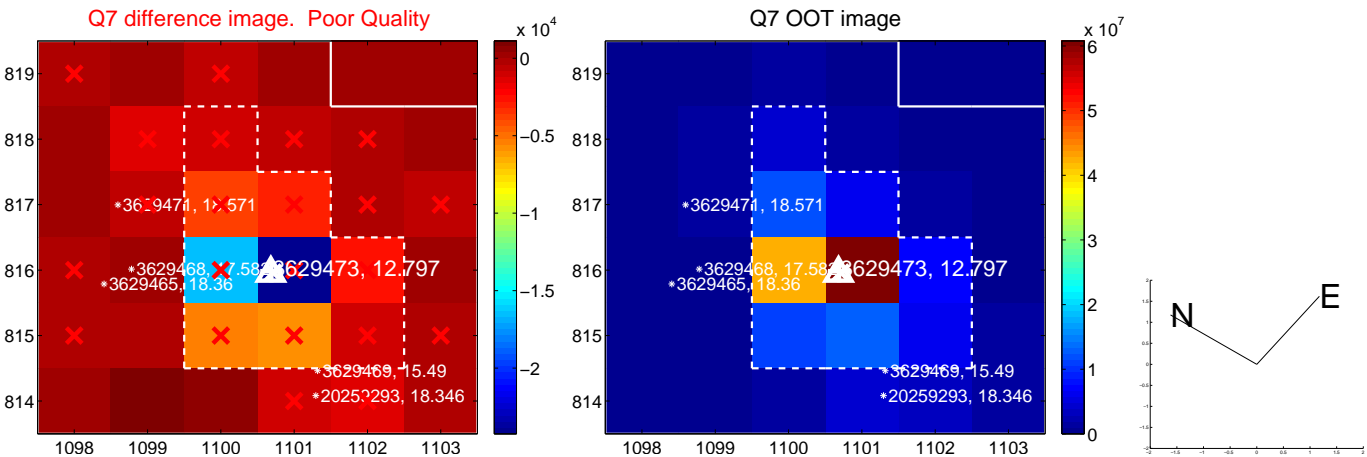
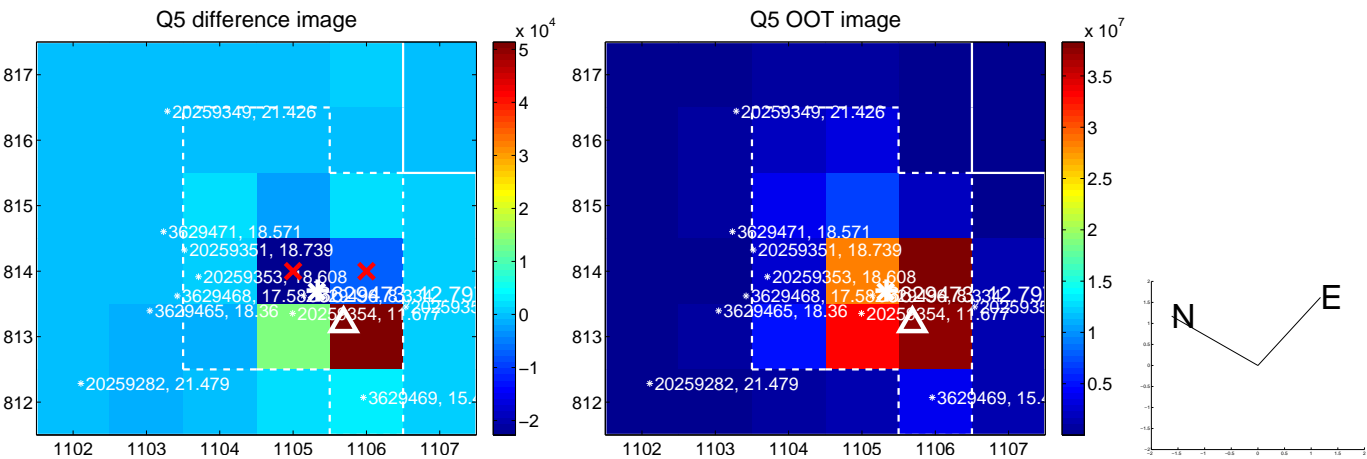


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

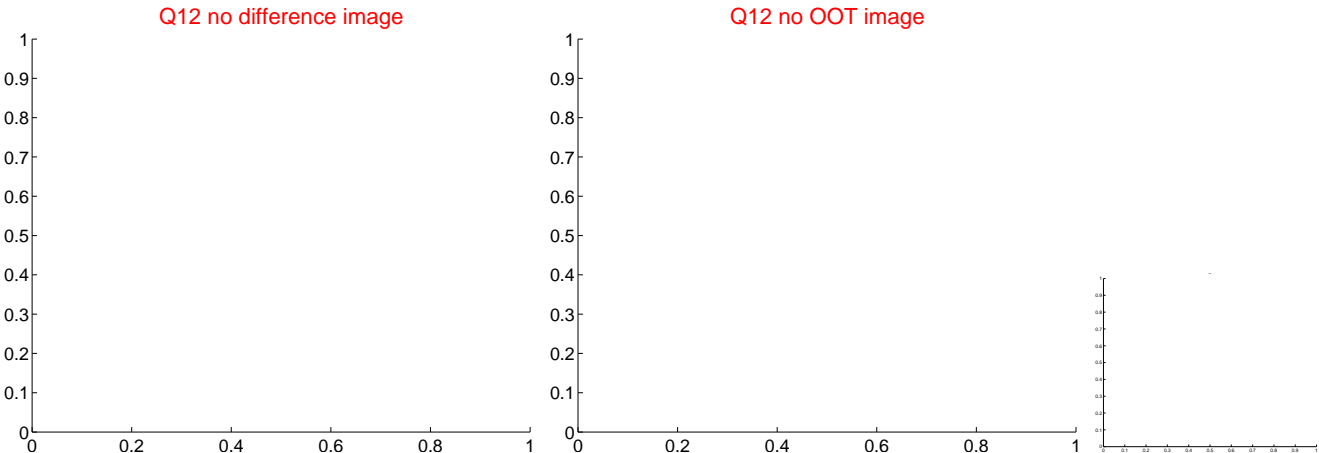
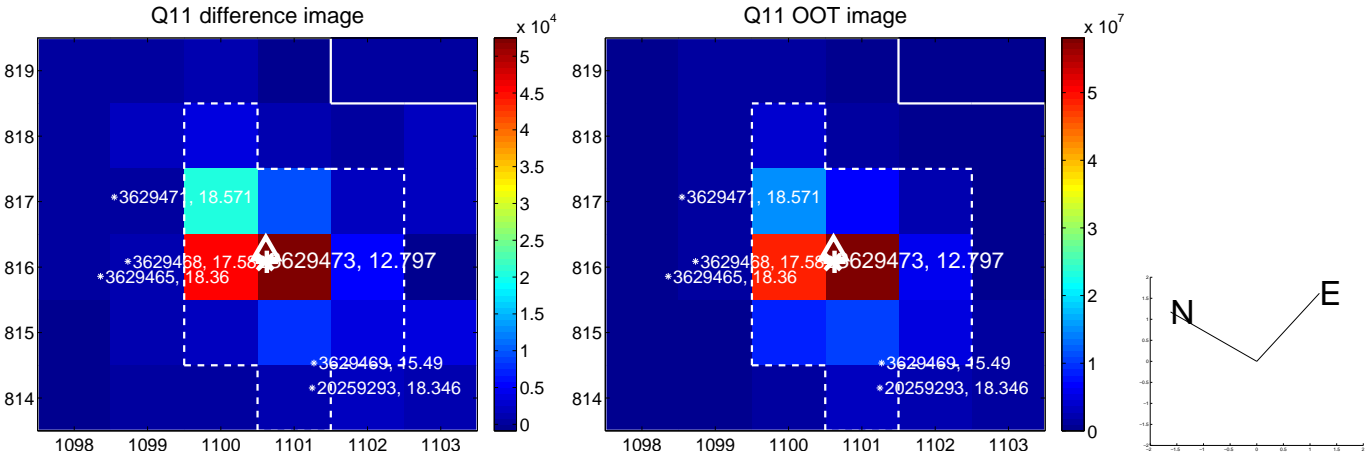
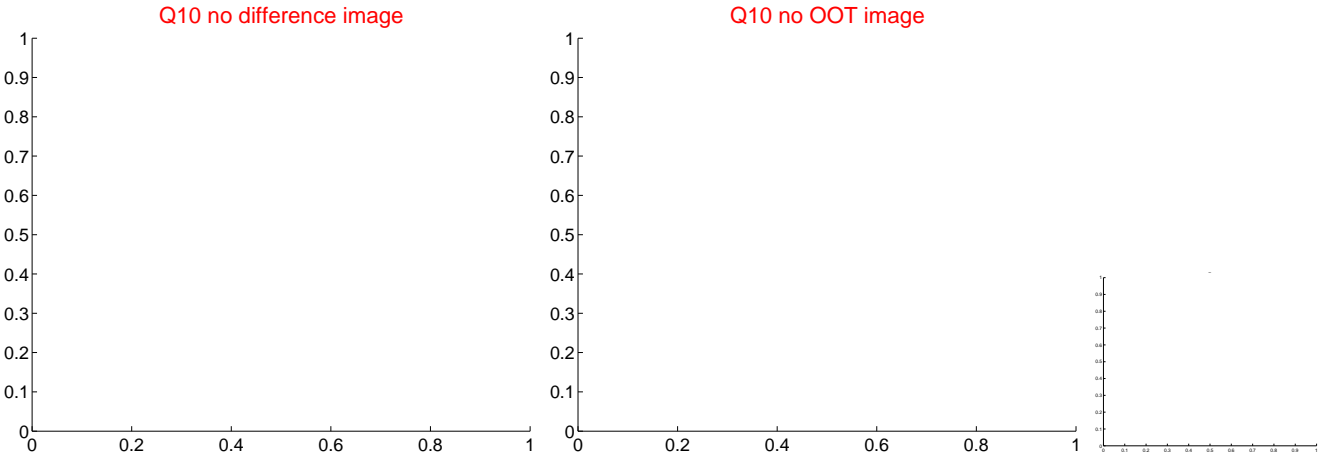
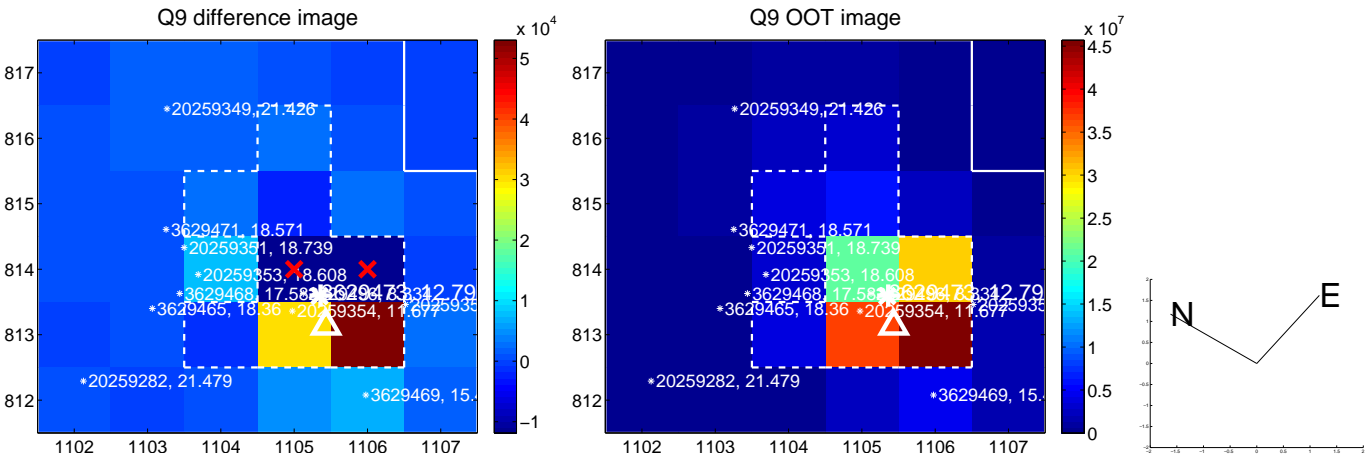
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



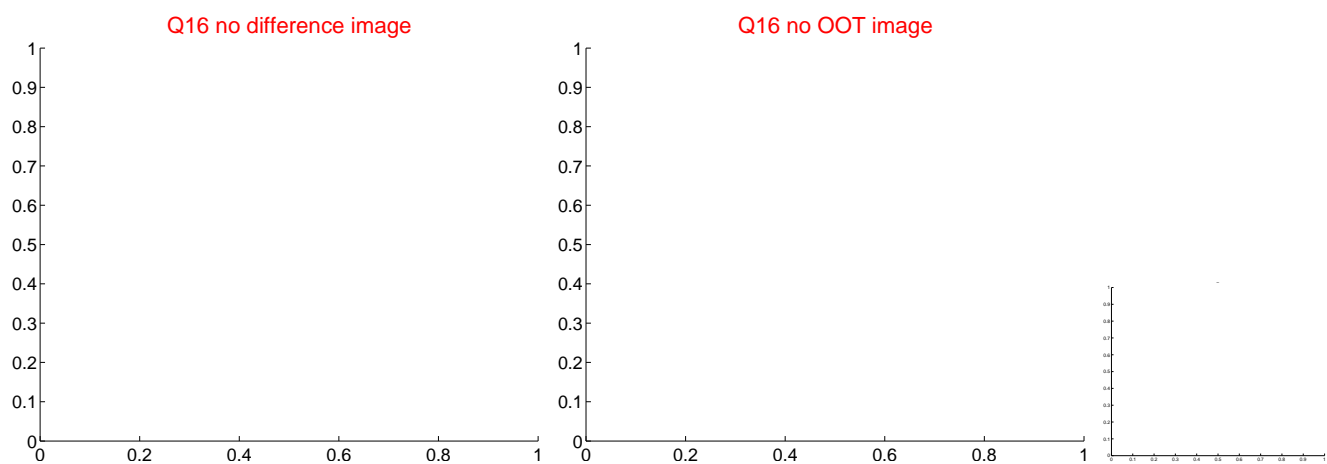
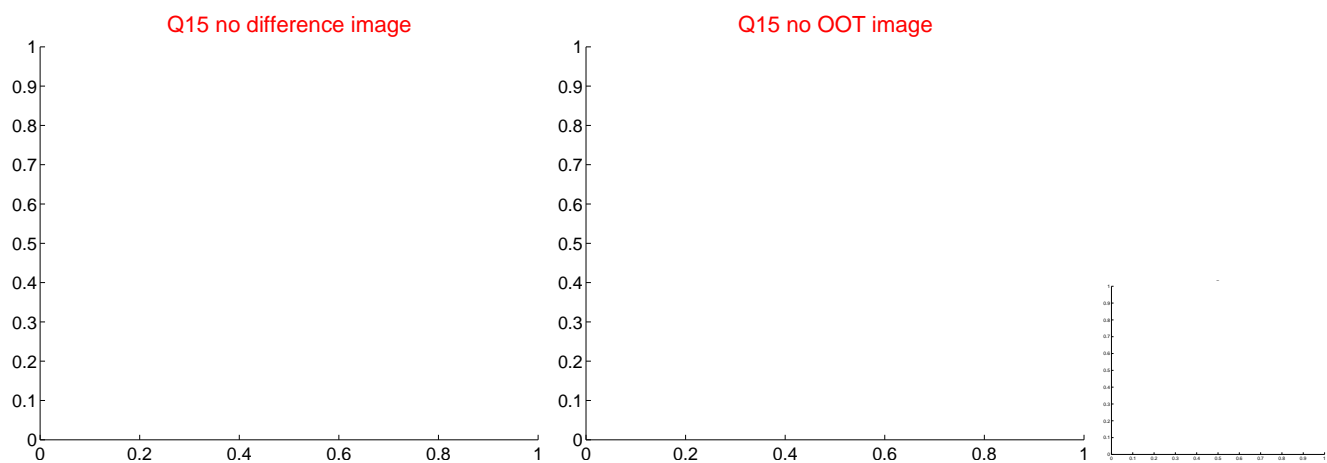
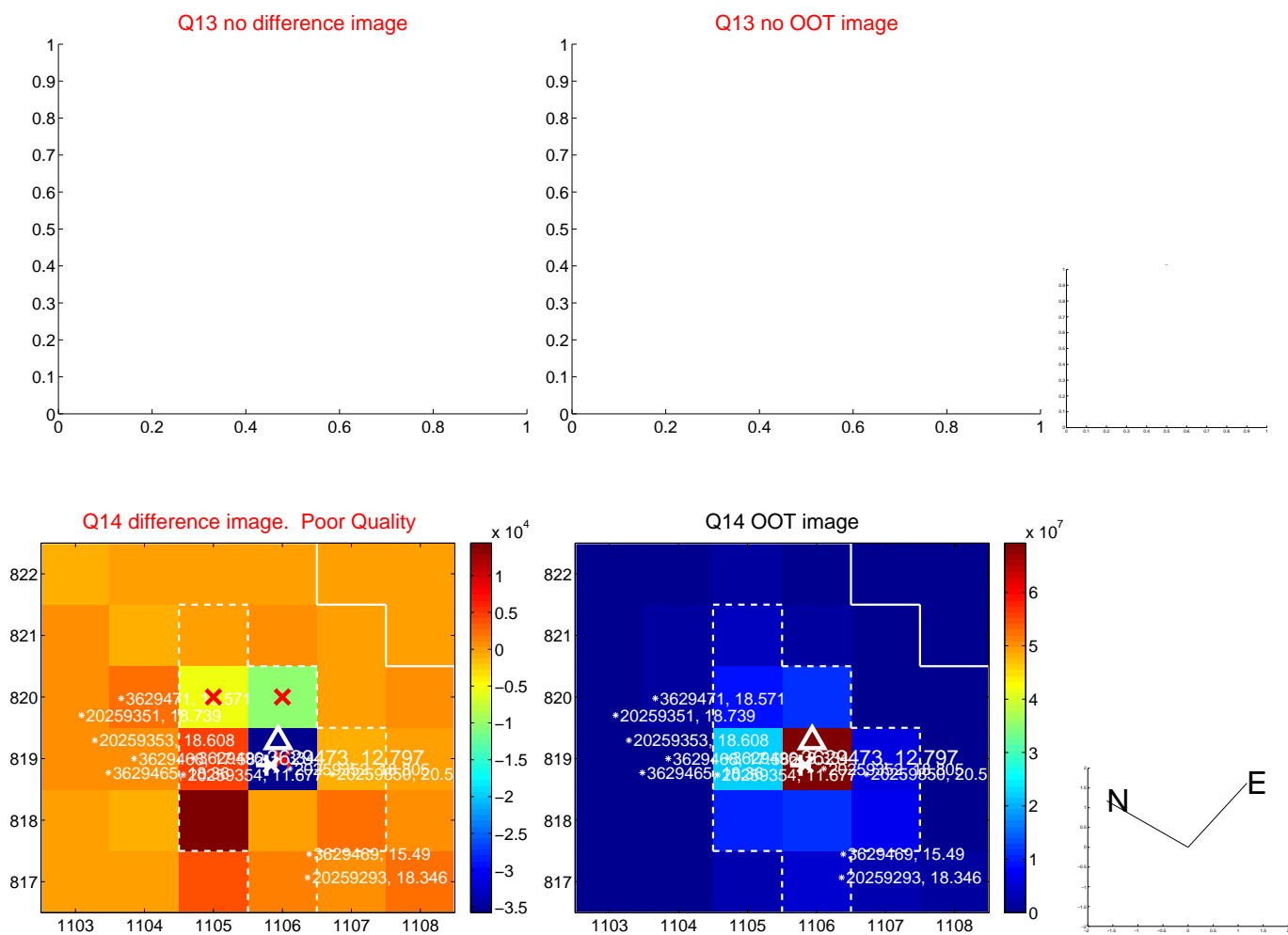
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



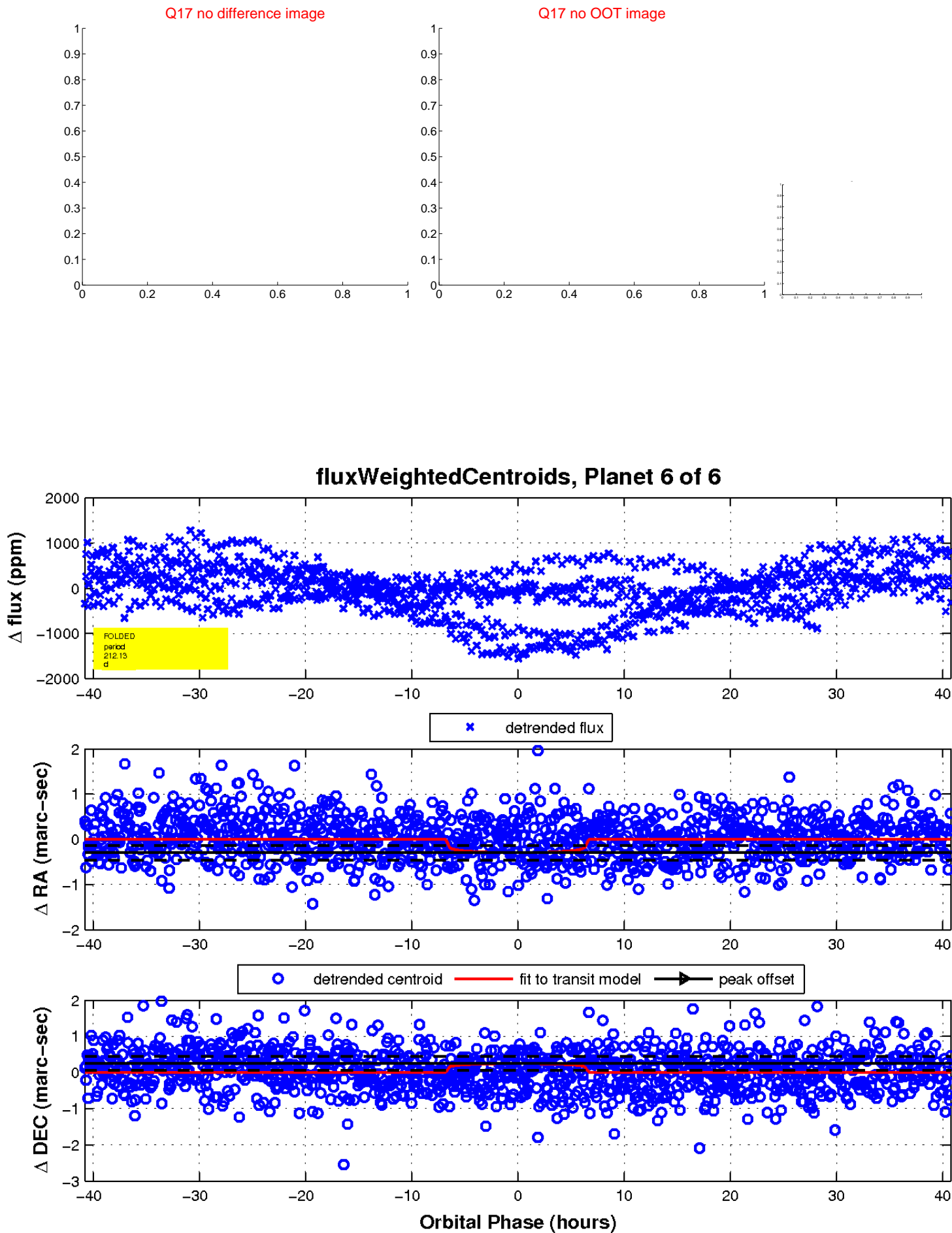
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

