

# KIC 006224062

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006224062-01	OBS	No	467.359926	431.663976	763.6	13.636	10.2	5.3	0.45	3707	1.30	0.04
006224062-02	OBS	No	464.641816	334.487553	1154.2	15.677	10.4	7.0	0.45	3707	2.06	0.04
006224062-03	OBS	No	410.463654	532.067431	1445.3	21.809	8.5	8.0	0.45	3707	1.71	0.05
006224062-04	OBS	No	174.826836	295.682146	417.3	6.184	9.6	5.5	0.45	3707	1.01	0.15
006224062-05	OBS	No	513.600992	484.379041	1057.0	6.911	9.9	8.7	0.45	3707	1.84	0.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006224062-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006224062-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006224062-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
006224062-04	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS—HALO_GHOST
006224062-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

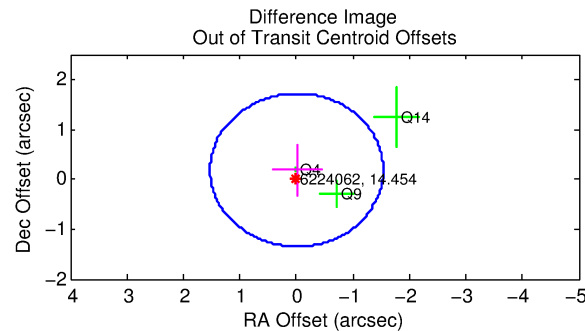
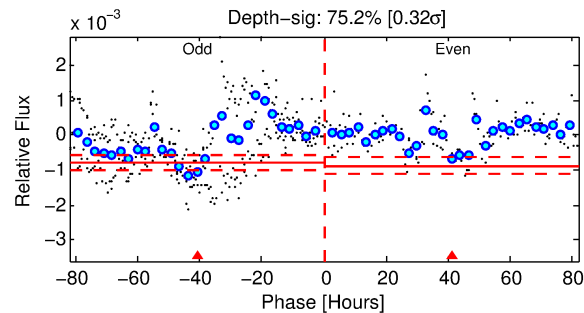
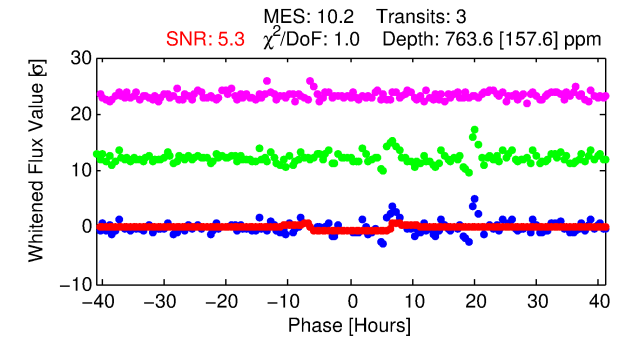
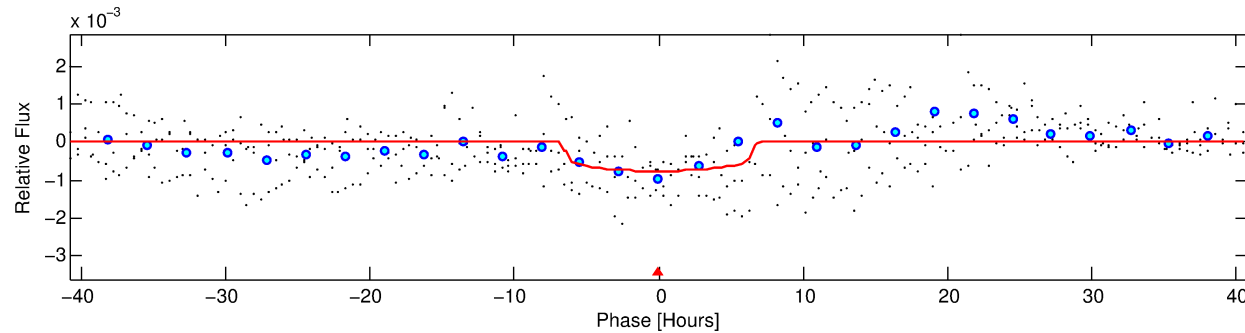
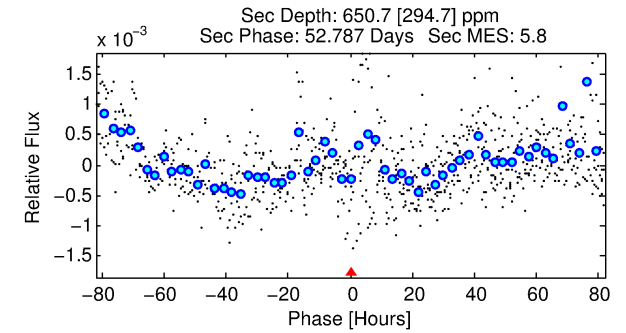
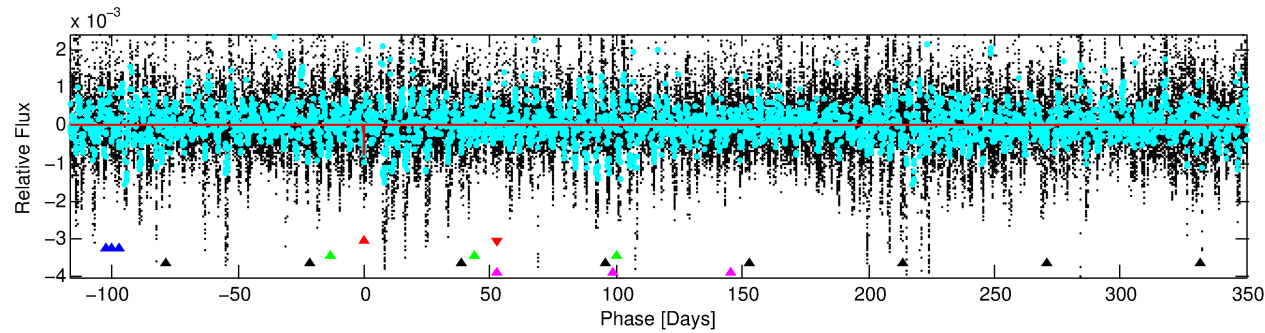
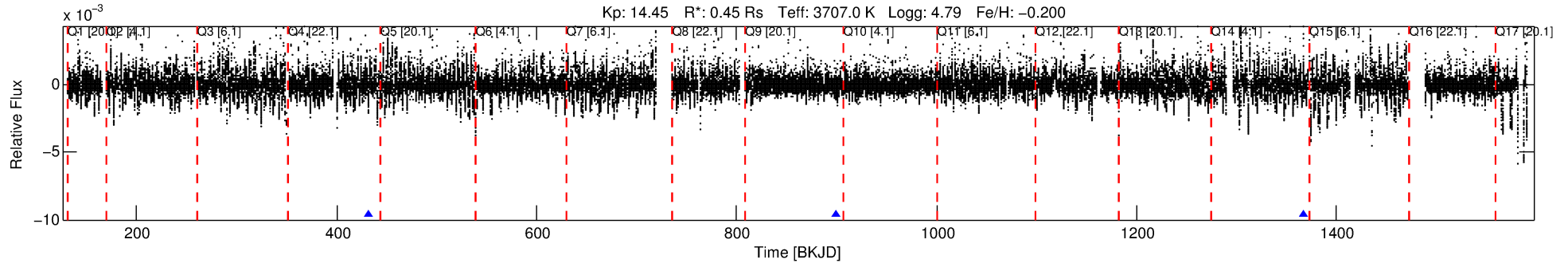
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006224062-01

No Significant Match Found

# DV One-Page Summary

KIC: 6224062 Candidate: 1 of 5 Period: 467.360 d



## DV Fit Results:

Period = 467.35993 [0.01006] d  
Epoch = 431.6640 [0.0138] BKJD  
Rp/R\* = 0.0264 [0.0075]  
a/R\* = 217.47 [253.96]  
b = 0.60 [1.24]  
Seff = 0.04 [0.00]  
Teq = 115 [3] K  
Rp = 1.30 [0.38] Re  
a = 0.9125 [0.0499] AU  
Ag = 176155.06 [129229.24] [1.36 $\sigma$ ]  
Teffp = 3646 [667] K [5.29 $\sigma$ ]

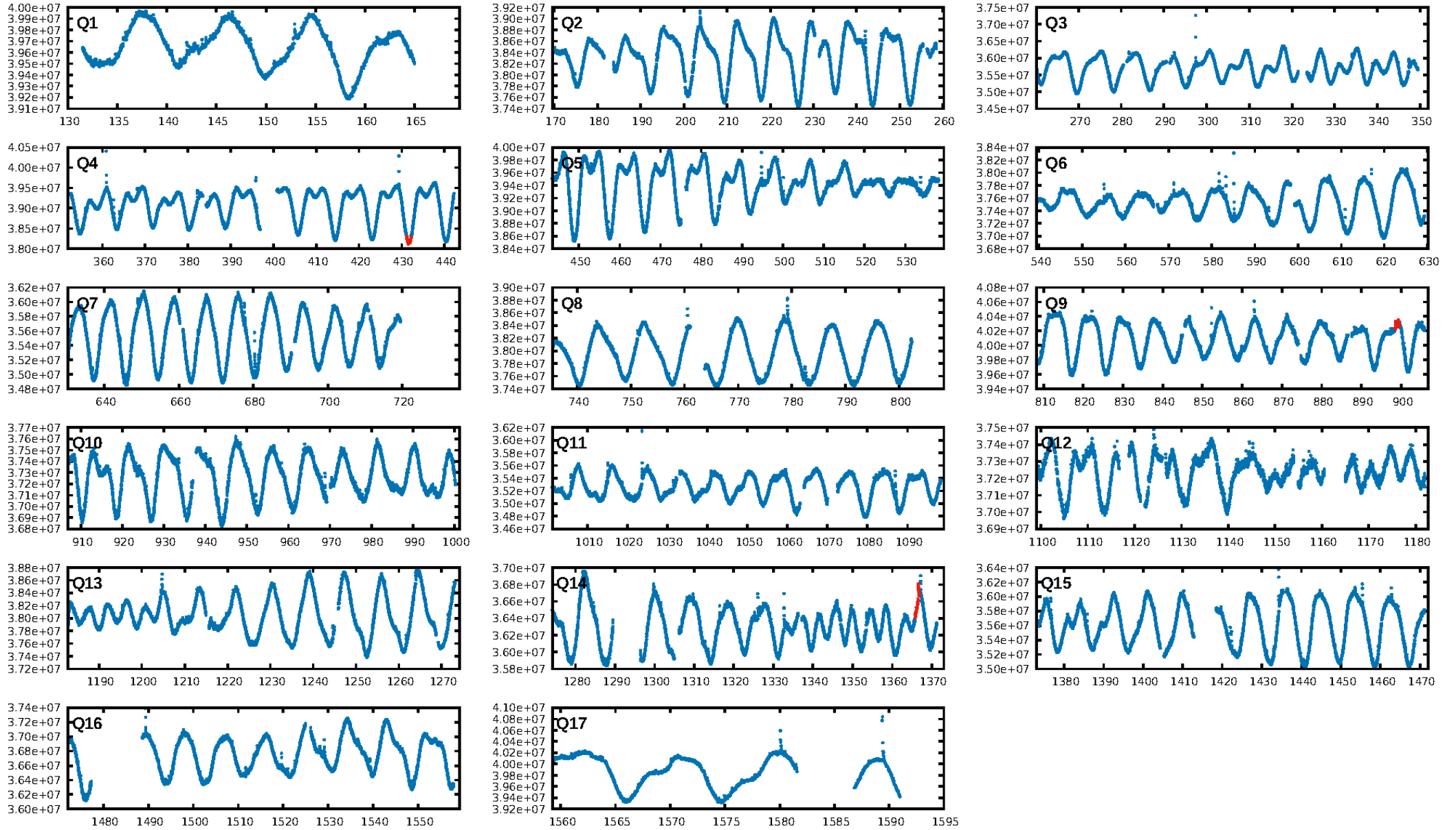
## DV Diagnostic Results:

ShortPeriod-sig: 99.8% [3.14 $\sigma$ ]  
LongPeriod-sig: 100.0% [72.60 $\sigma$ ]  
ModelChiSquare2-sig: 79.6%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.68e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.162  
Centroid-sig: 26.2%  
Centroid-so: 1.181 arcsec [1.84 $\sigma$ ]  
OotOffset-rm: 0.180 arcsec [0.35 $\sigma$ ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-rm: 0.267 arcsec [0.38 $\sigma$ ]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

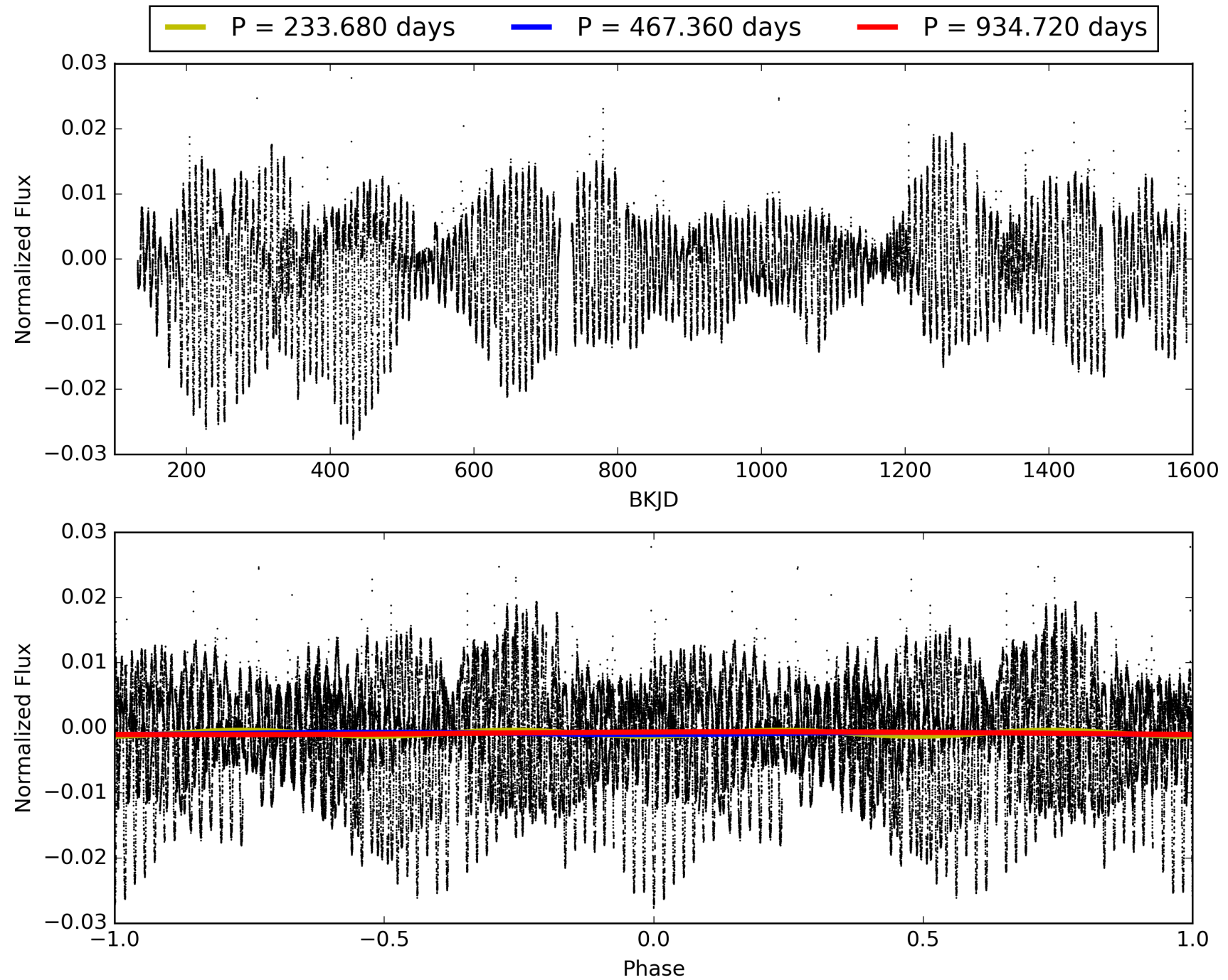
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:53:36 Z

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

# TCE 006224062-01, PDC Light Curves

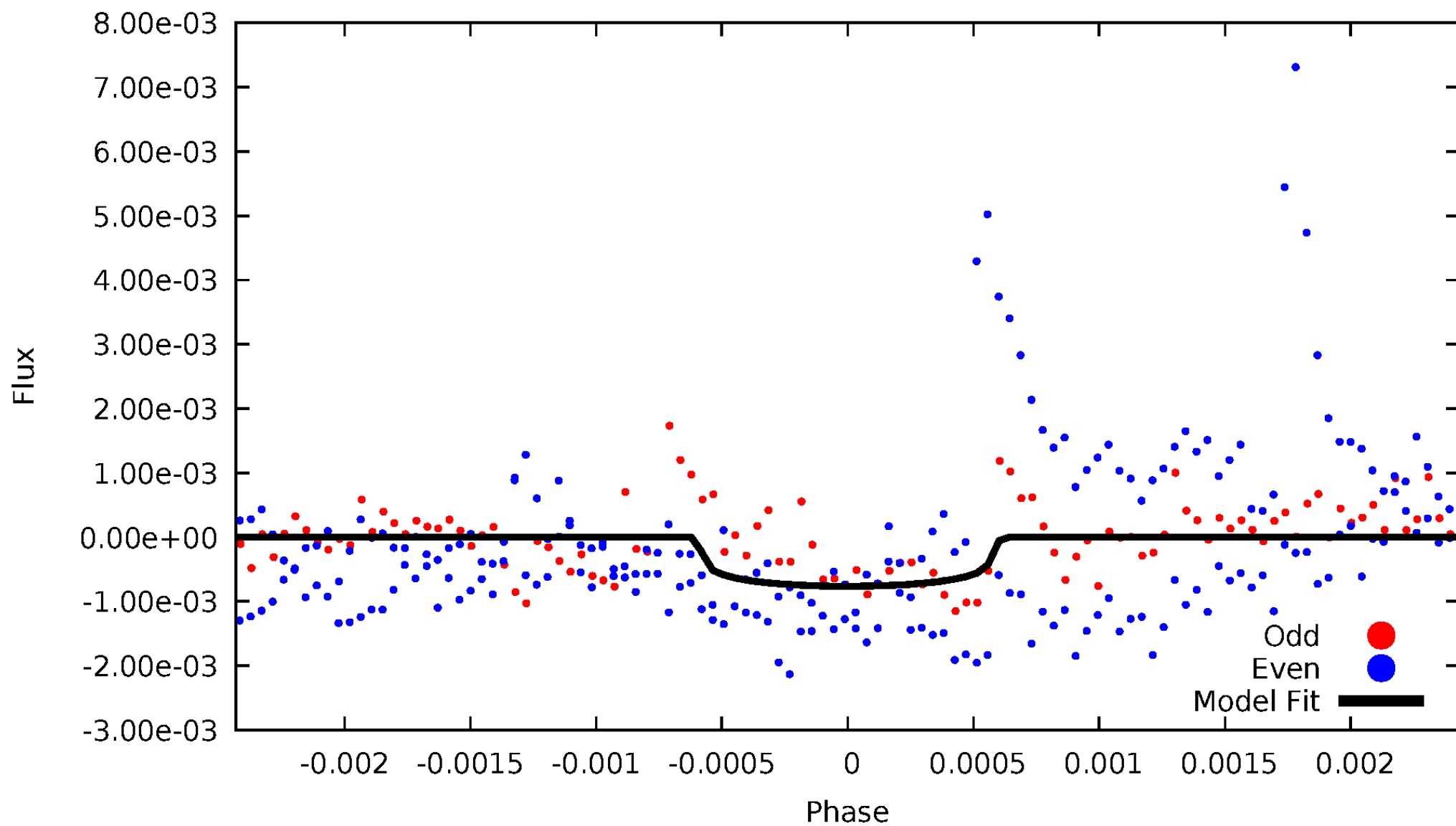


TCE 006224062-01



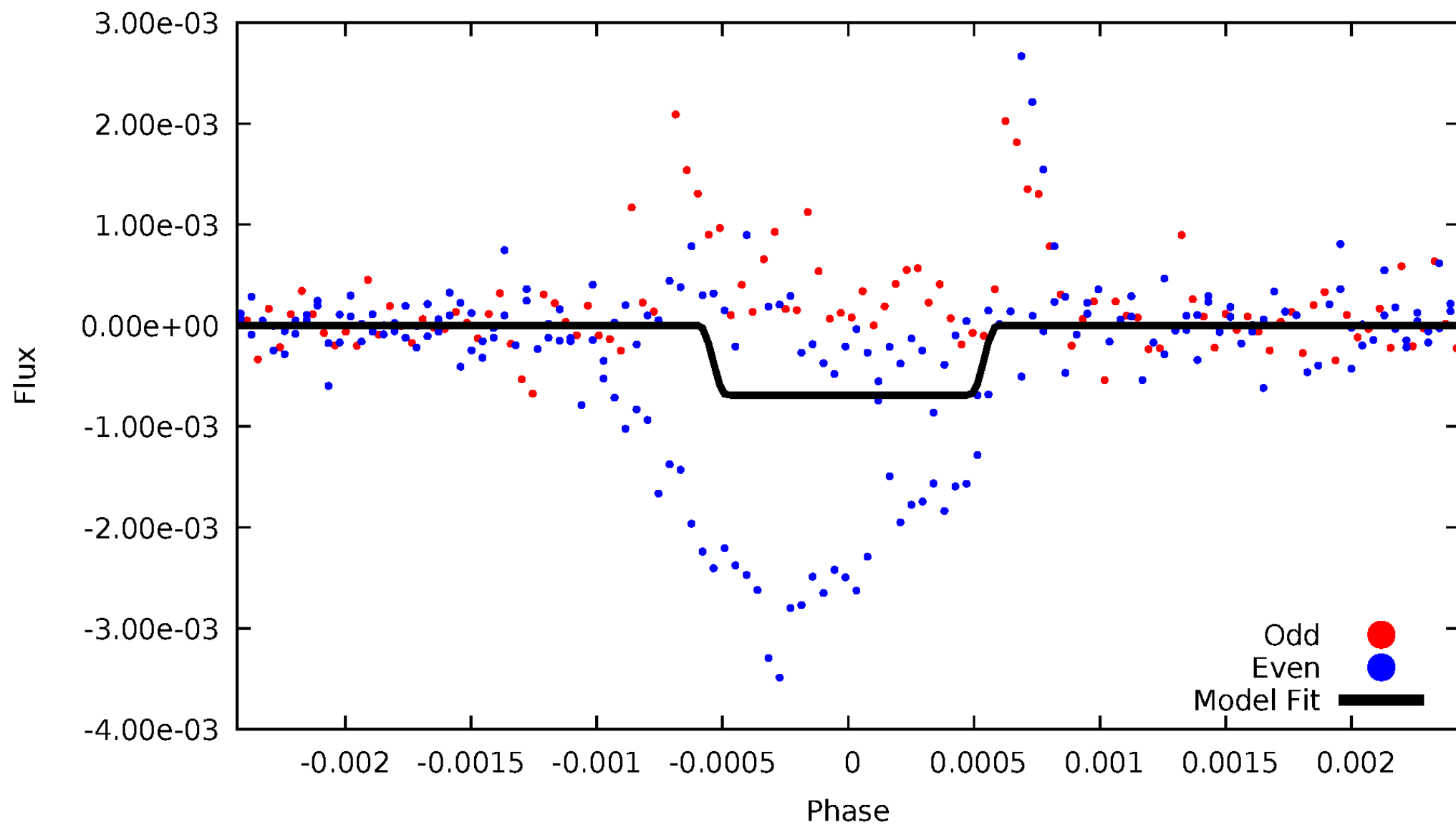
# DV Odd/Even

TCE 006224062-01



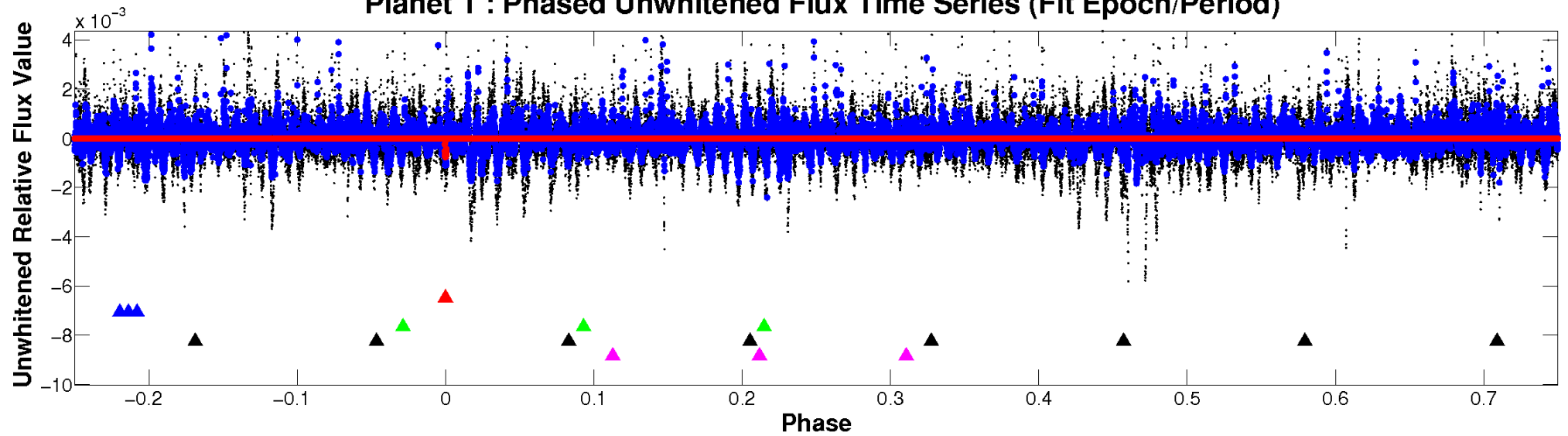
# ALT Odd/Even

TCE 006224062-01

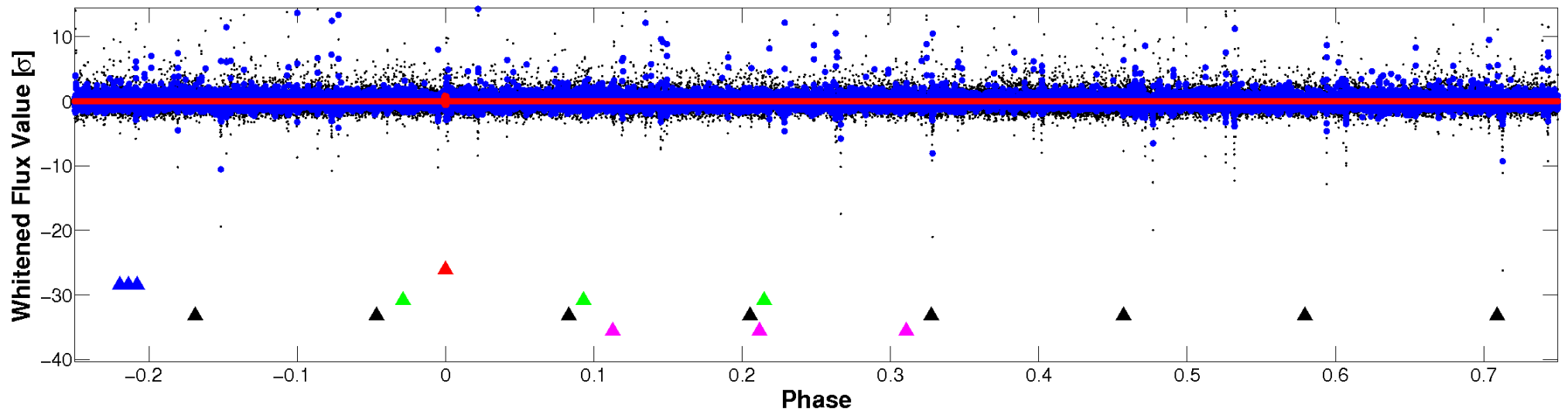


# Non-Whitened Vs. Whitened Light Curve

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

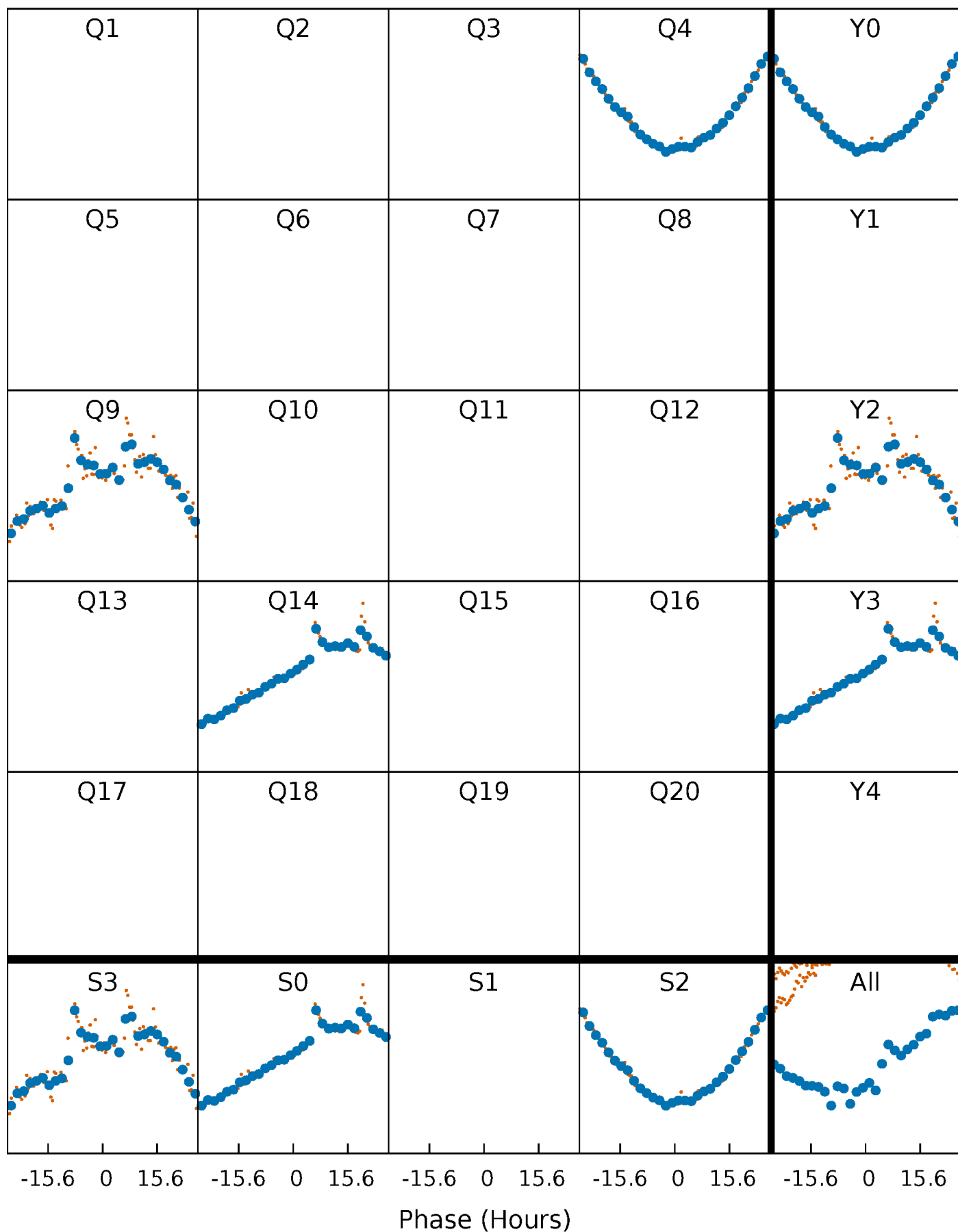


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



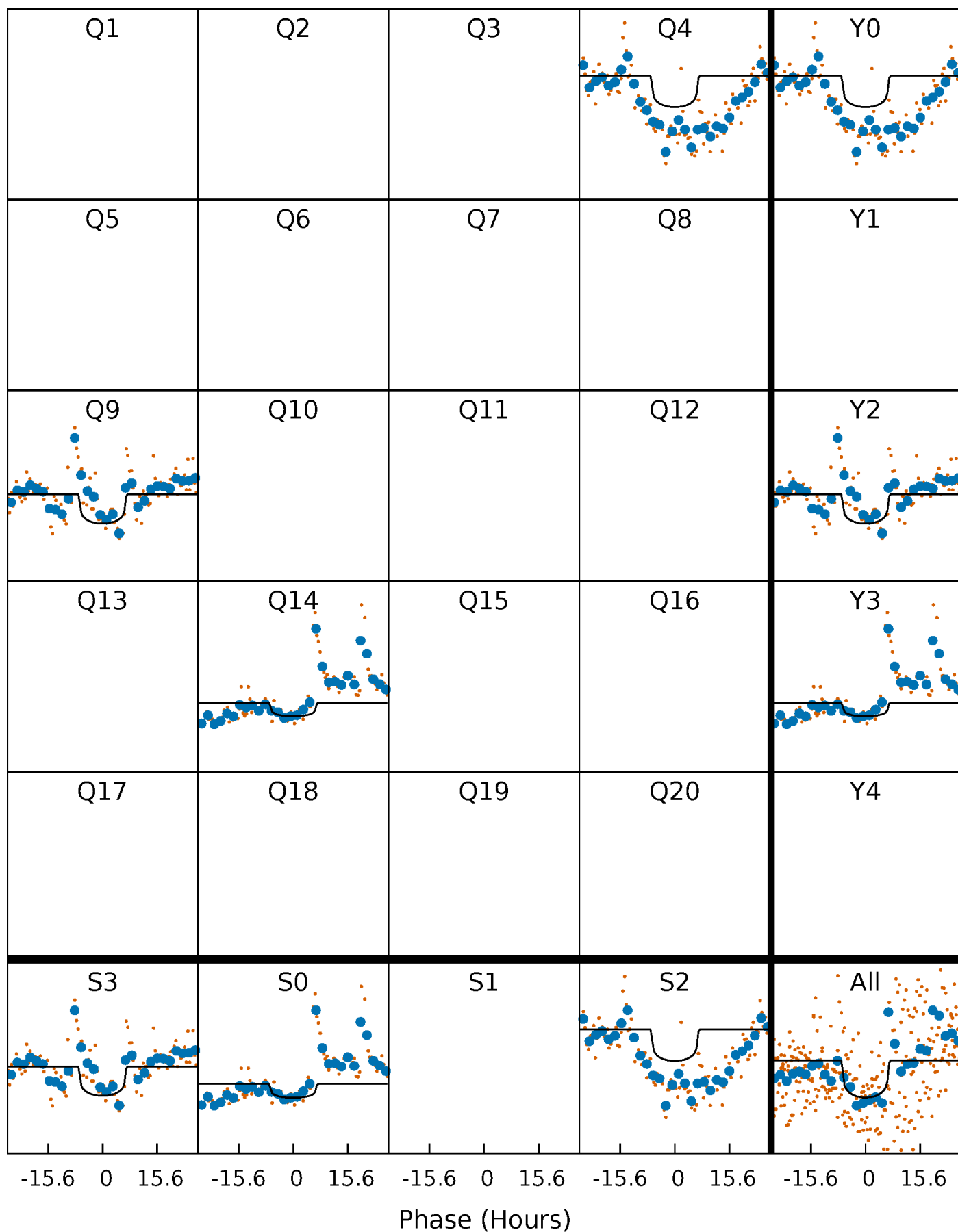
# PDC Quarter-Phased Transit Curves

TCE 006224062-01 P=467.359926 Days  $T_0=431.663976$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 006224062-01 P=467.359926 Days  $T_0=431.663976$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

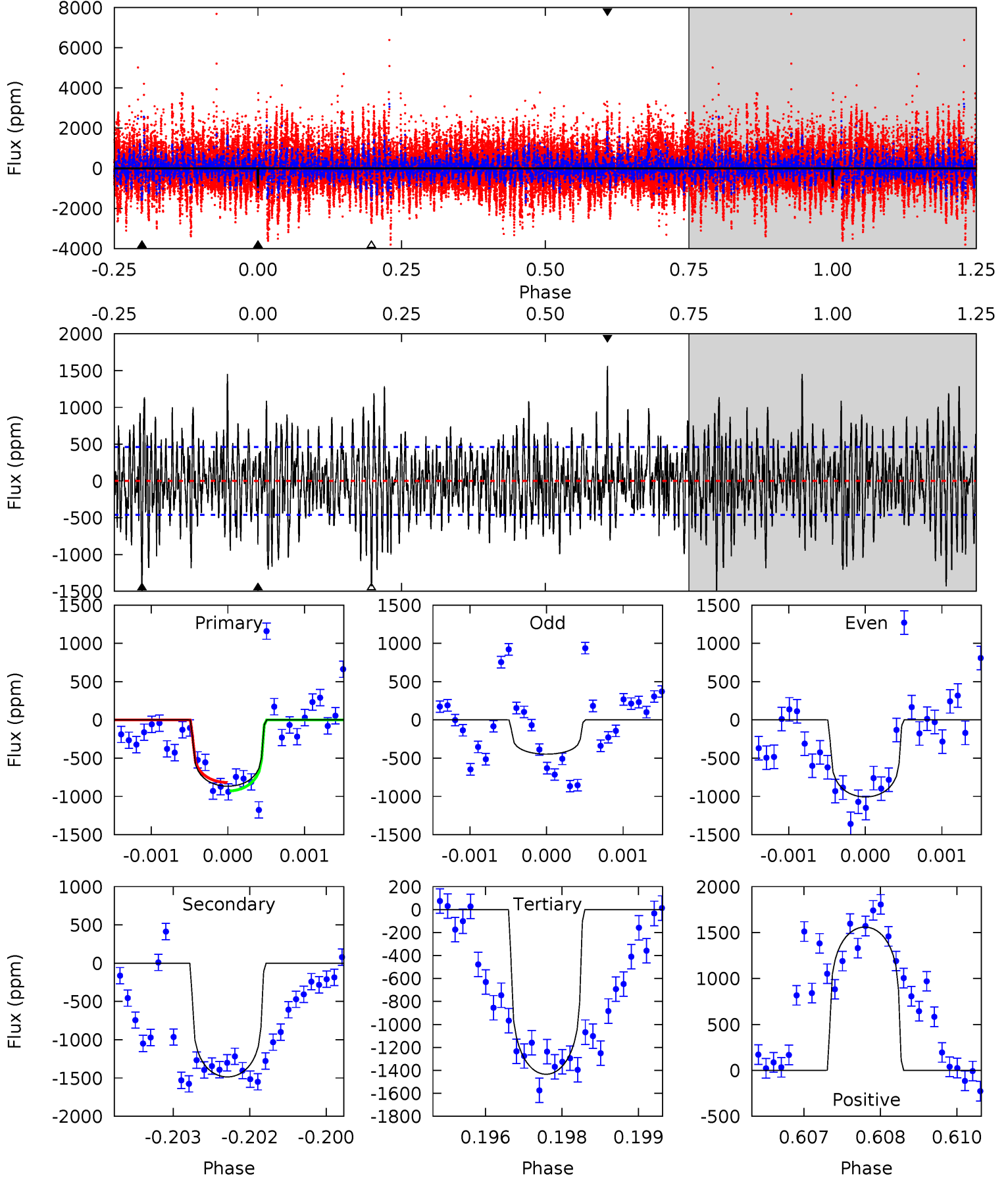
TCE 006224062-01 P=467.329140 Days  $T_0=431.684142$  (BKJD)



# DV Model-Shift Uniqueness Test

006224062-01, P = 467.359926 Days, E = 431.663976 Days

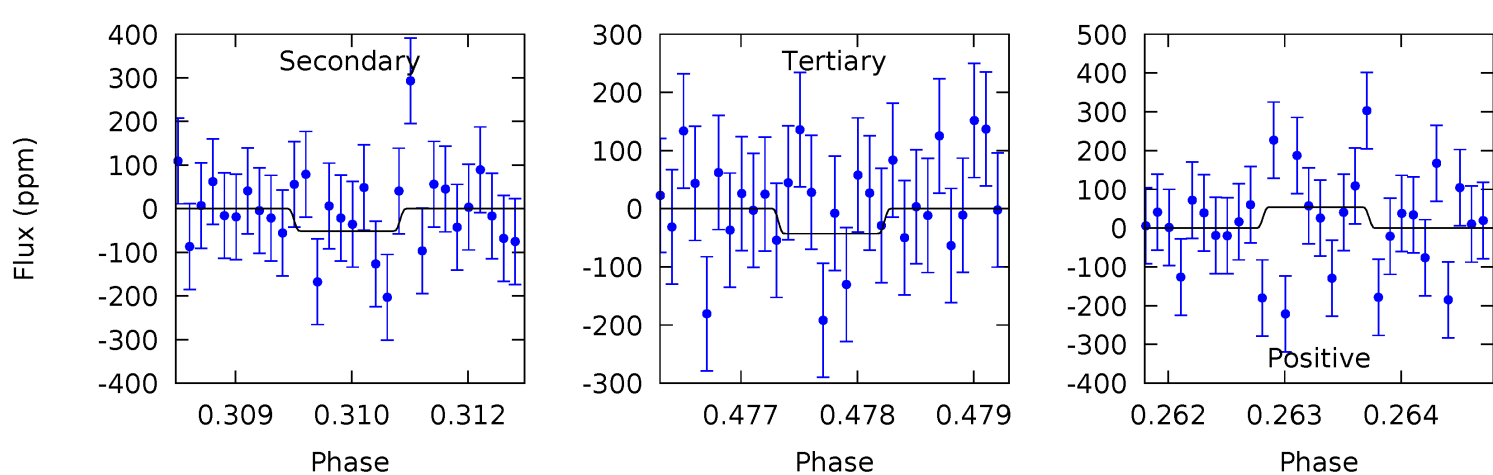
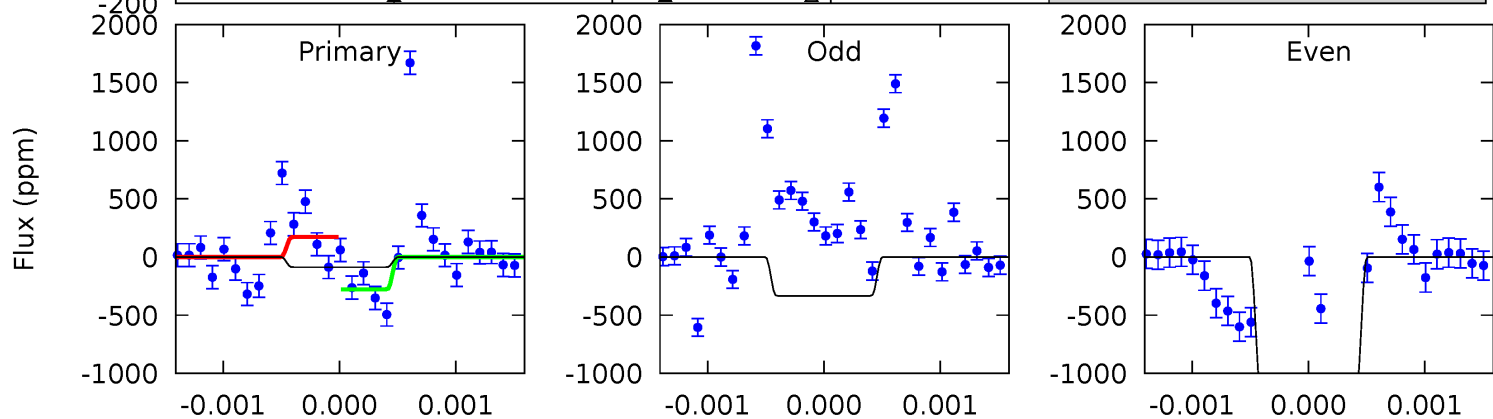
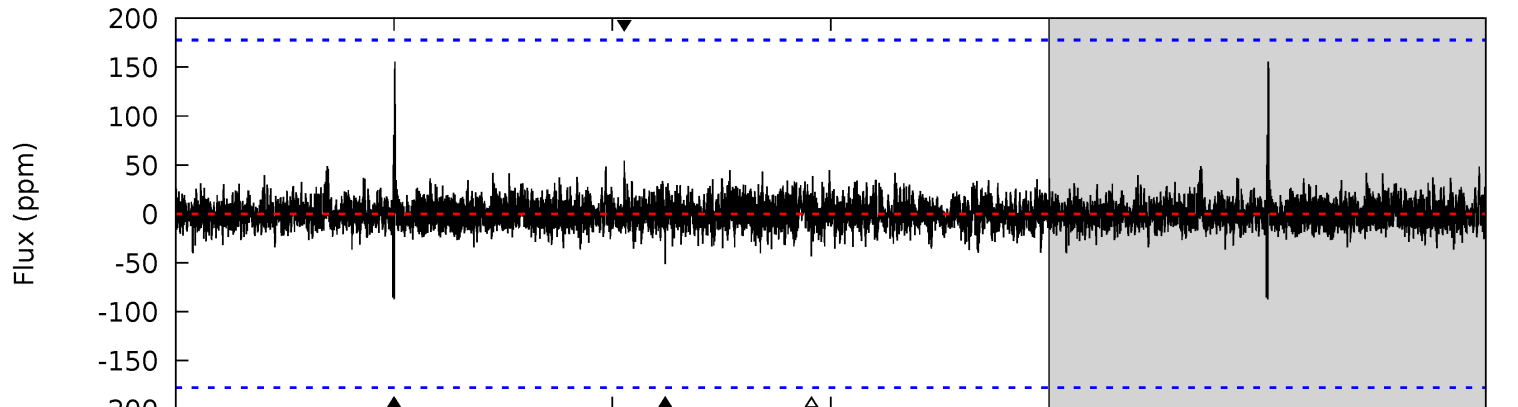
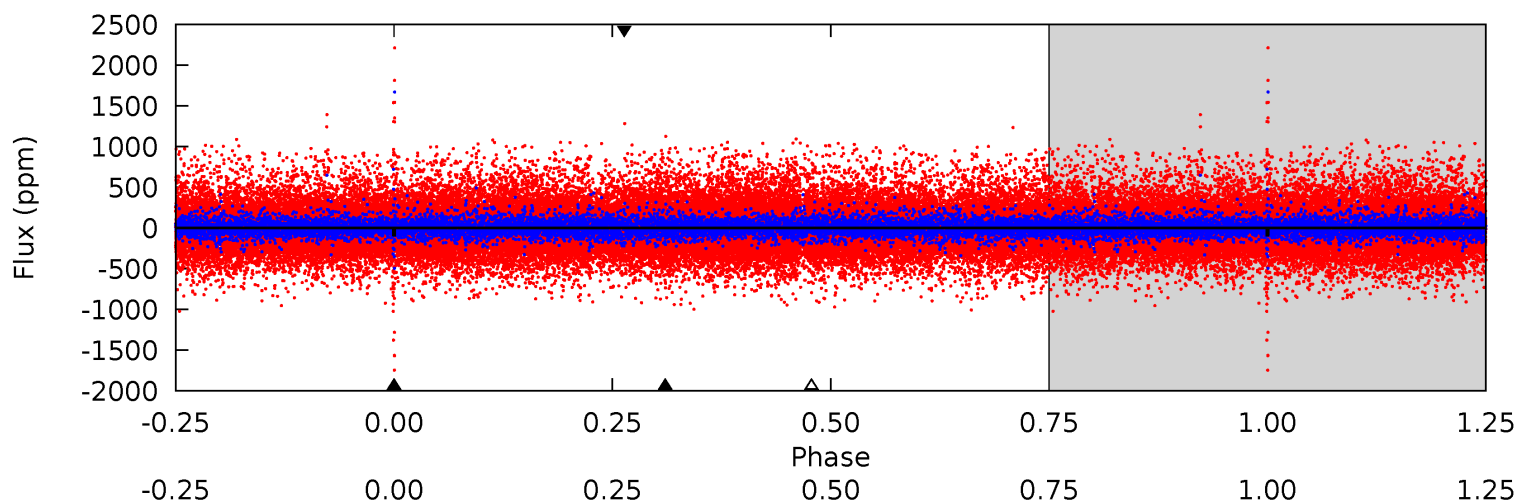
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	17.4	16.8	18.3	5.41	3.22	4.65	-6.66	-8.14	0.61	-0.87	3.07	1.69	0.51	0.65



# Alt Model-Shift Uniqueness Test

006224062-01, P = 467.329140 Days, E = 431.684142 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
2.66	1.56	1.30	1.65	5.42	3.24	0.34	1.36	1.01	0.26	-0.09	12.1	4.08	0.64	0



### Stellar Parameters For KIC 006224062

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3707^{+50}_{-55}$	$4.794^{+0.039}_{-0.024}$	$-0.200^{+0.100}_{-0.100}$	$0.452^{+0.028}_{-0.031}$	$0.464^{+0.029}_{-0.029}$	$7.077^{+1.274}_{-0.739}$
	+1%/-1%	+1%/-1%	+50%/-50%	+6%/-7%	+6%/-6%	+18%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 006224062-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1486 \pm 85$	$1.32^{+0.35}_{-0.39}$	$160^{+3}_{-3}$	$4217^{+622}_{-354}$	$394504^{+394691}_{-151606}$
Alt.	$-51 \pm 33$	$1.28^{+0.38}_{-0.37}$	$160^{+3}_{-3}$	$2553^{+316}_{-319}$	$14393^{+19525}_{-9830}$

$T_{\text{max}}$  = 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

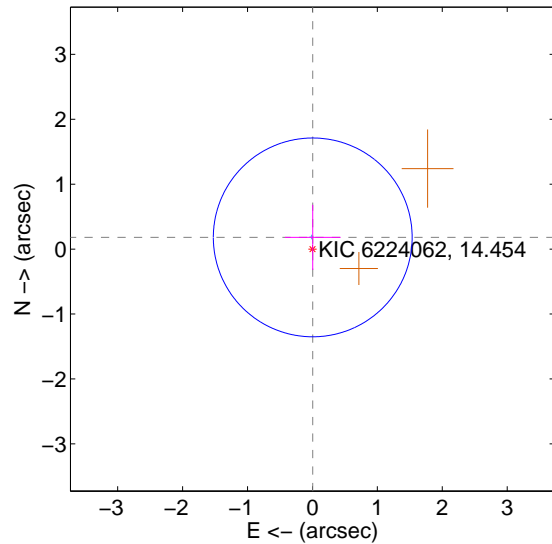
Supplemental centroid analysis for 006224062-01. Kepler magnitude: 14.45. Transit SNR 5.32

There are 1 quarters with good PRF difference image offsets

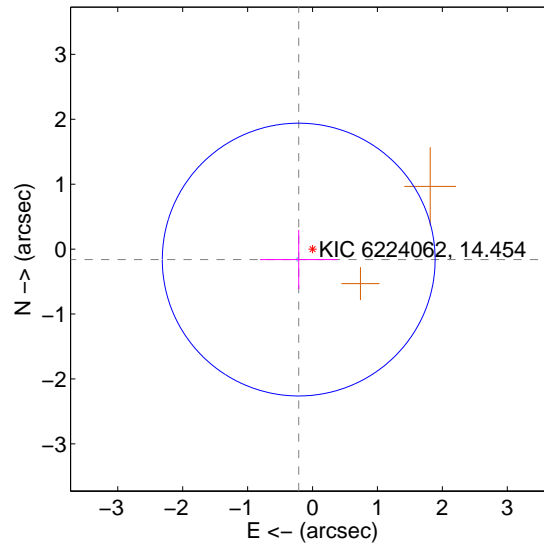
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.180 \pm 0.510$	0.35	$-0.005 \pm 0.429$	$0.180 \pm 0.502$
PRF-fit source offset from KIC position	$0.267 \pm 0.700$	0.38	$0.213 \pm 0.596$	$-0.161 \pm 0.455$
photometric centroid source offset	$1.18 \pm 0.64$	1.84	$-1.04 \pm 0.61$	$-0.56 \pm 0.74$

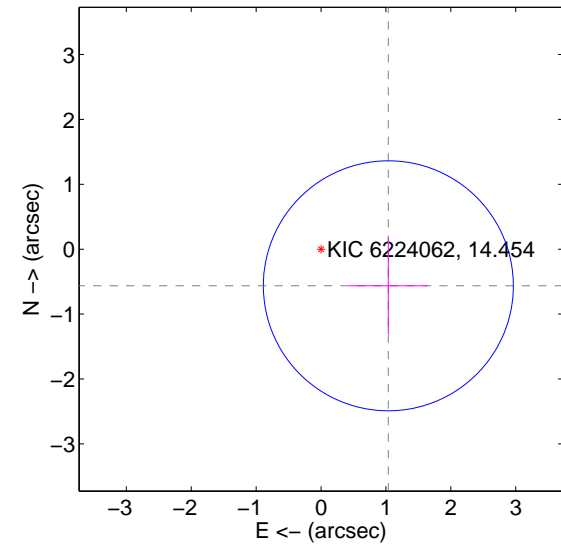
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

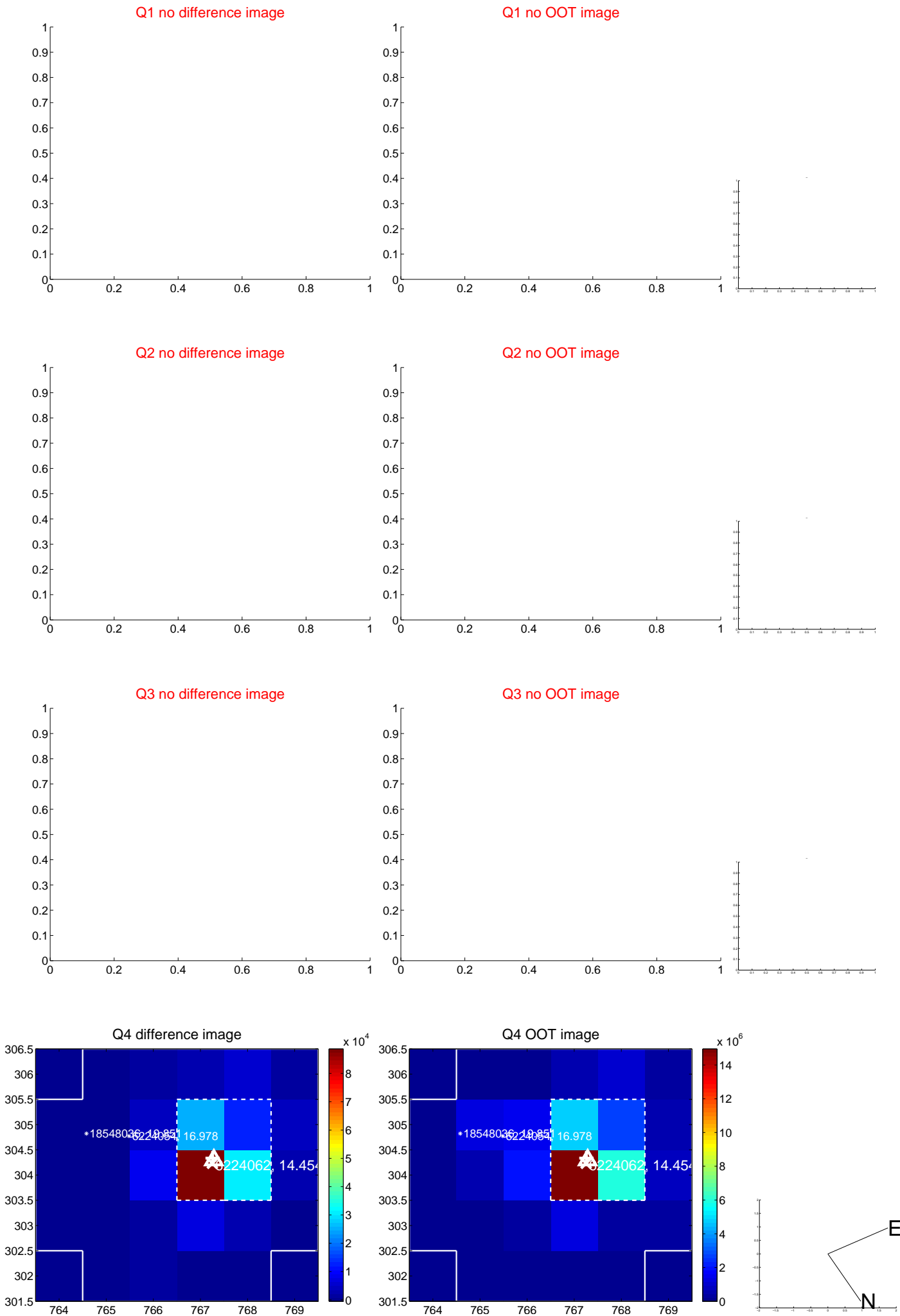


offset from photometric centroids



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.

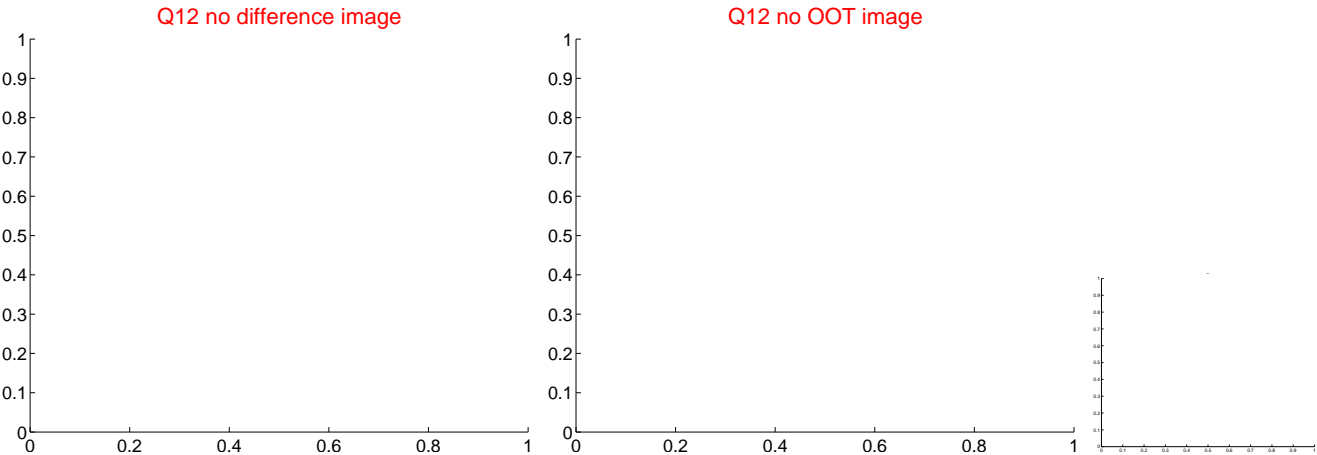
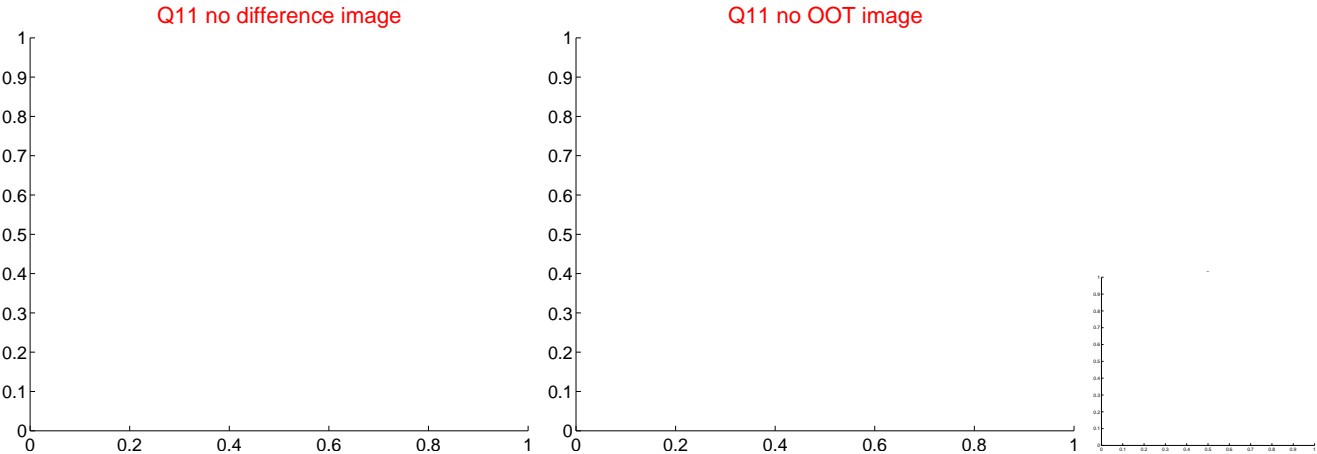
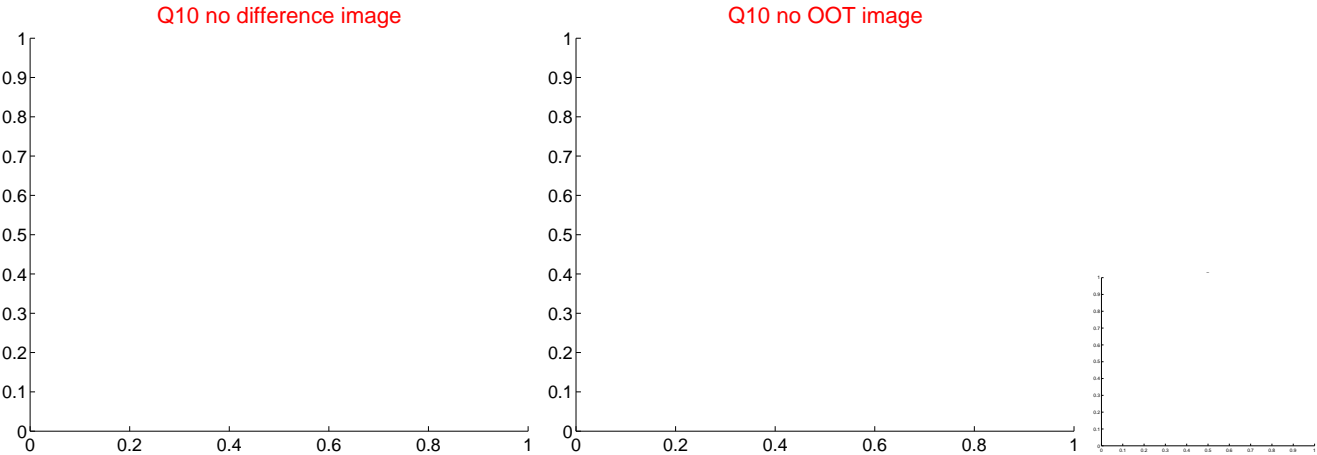
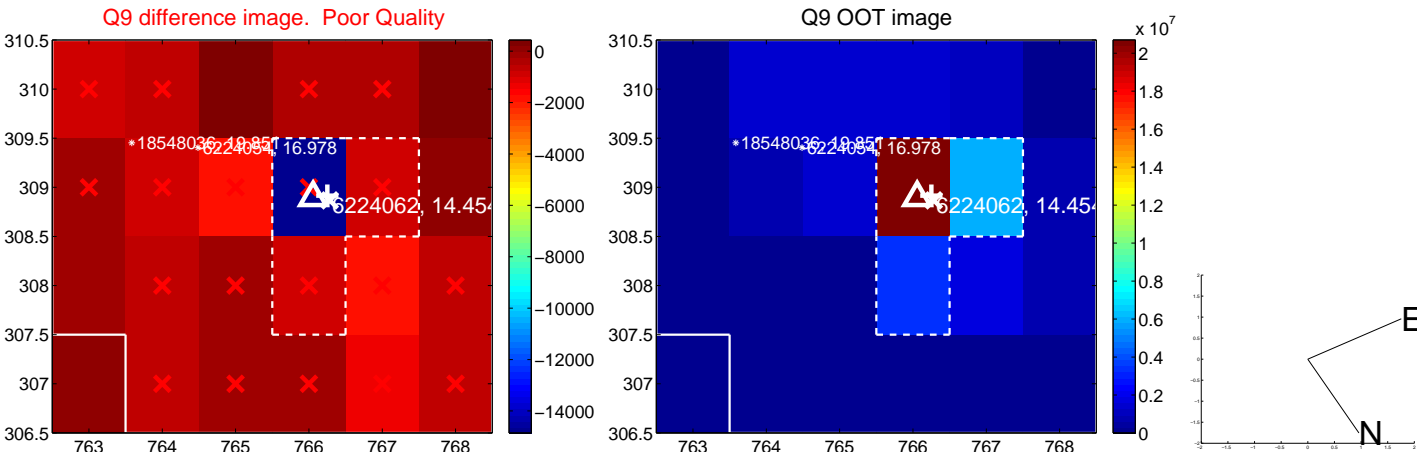
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



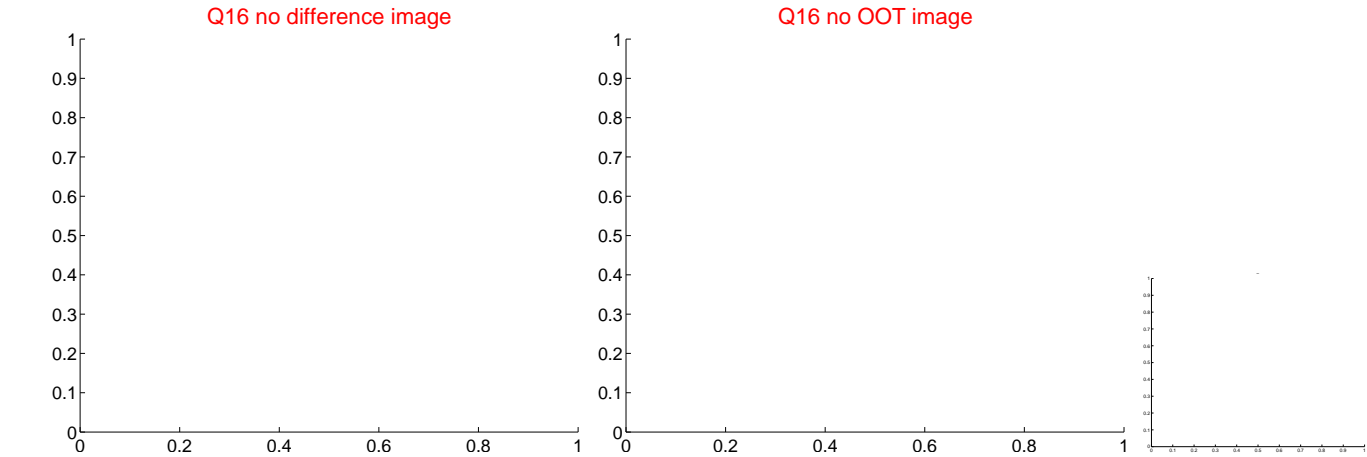
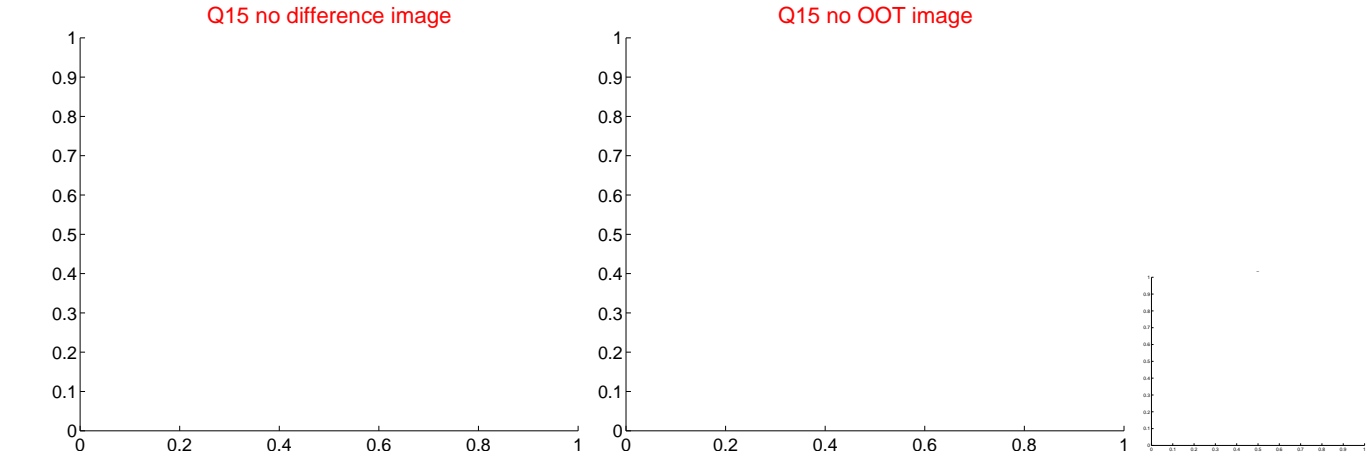
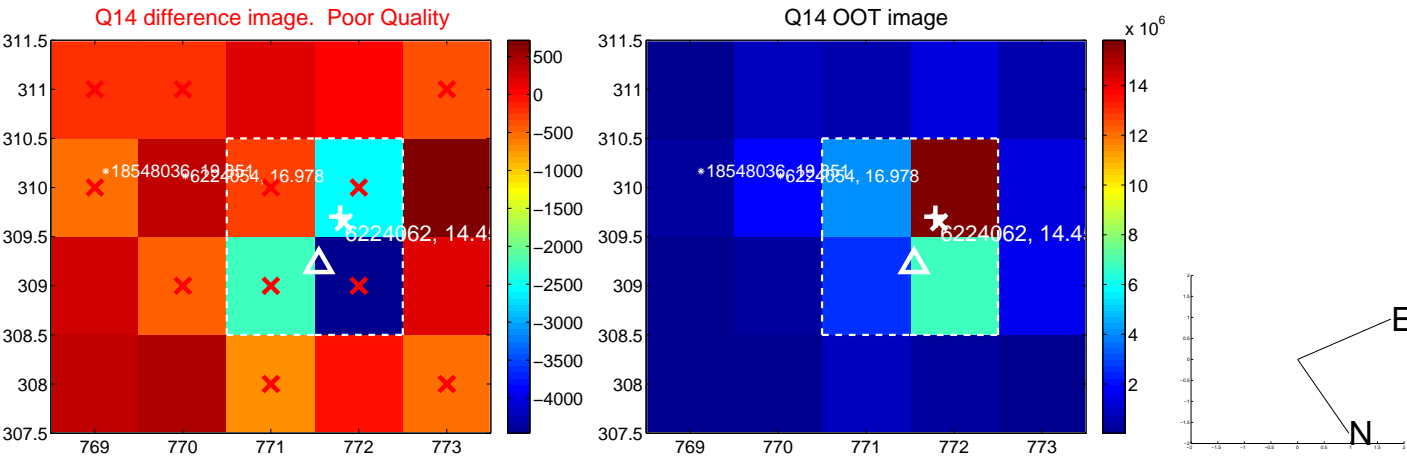
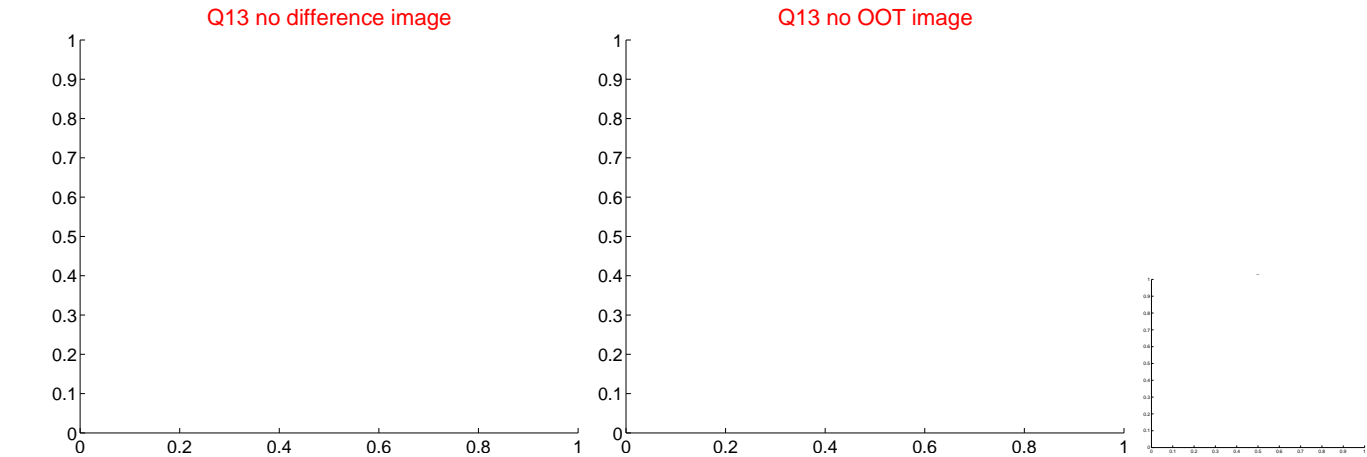
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



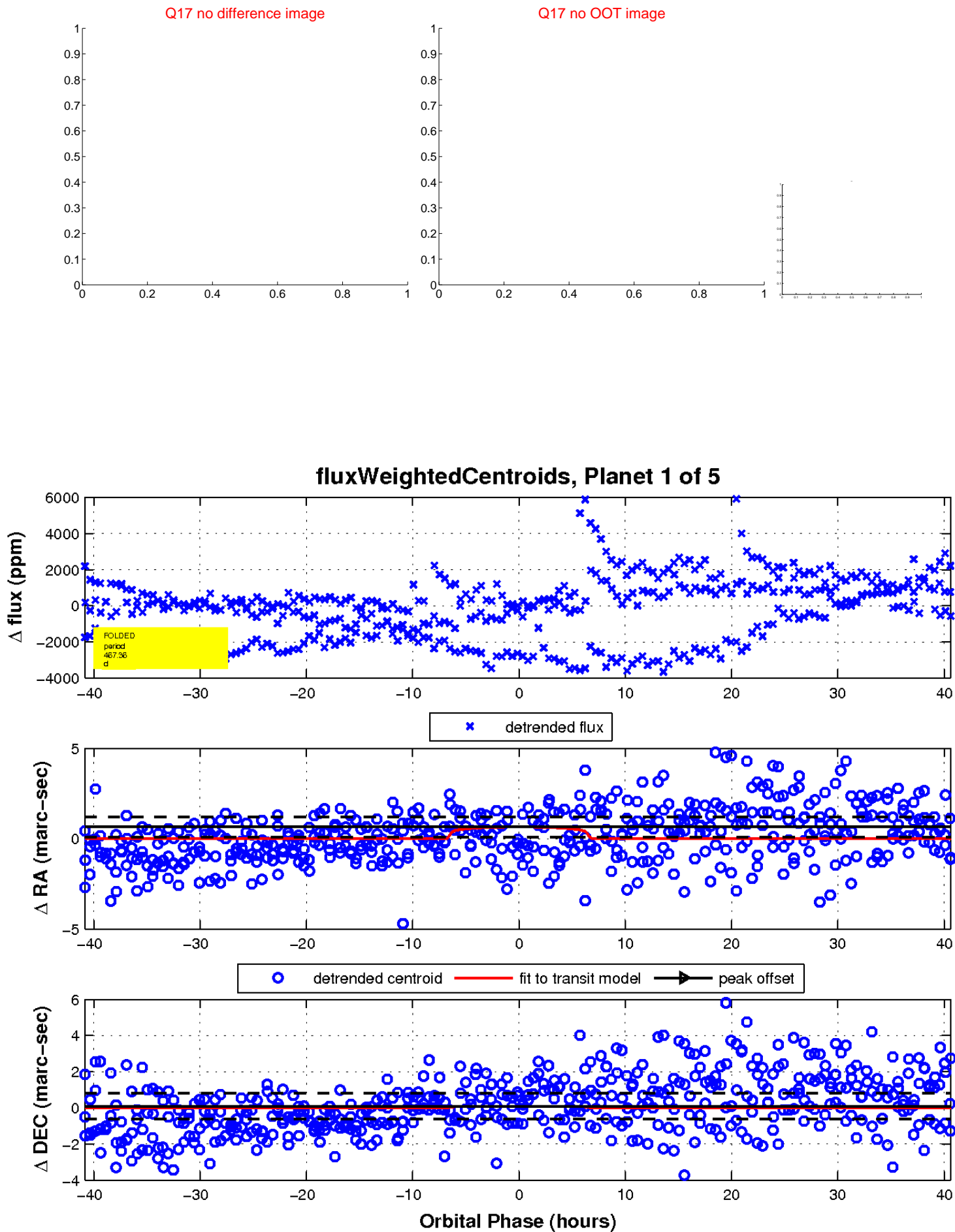
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

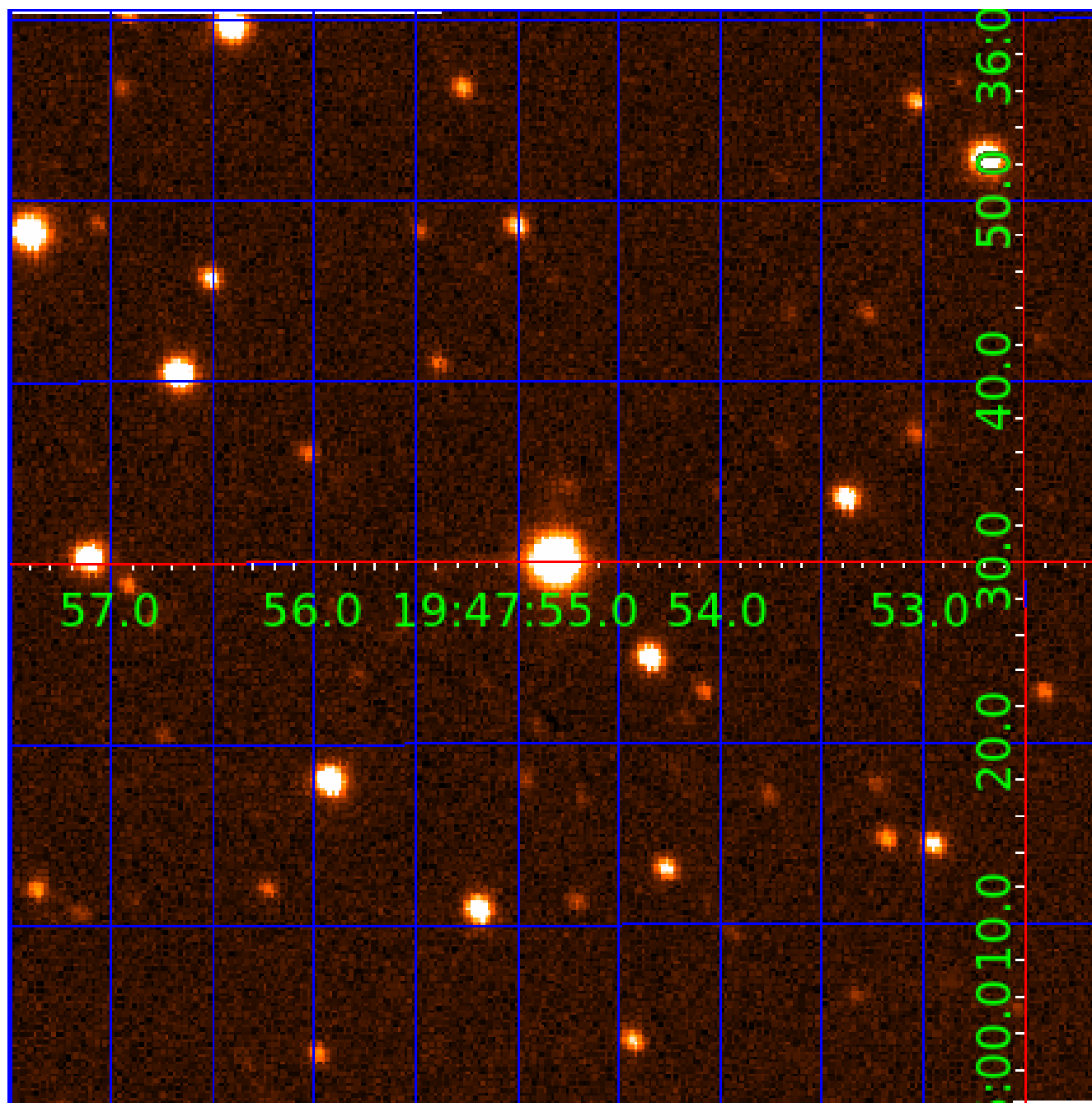


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006224062

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006224062-01	OBS	No	467.359926	431.663976	763.6	13.636	10.2	5.3	0.45	3707	1.30	0.04
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006224062-04	OBS	No	174.826836	295.682146	417.3	6.184	9.6	5.5	0.45	3707	1.01	0.15
006224062-05	OBS	No	513.600992	484.379041	1057.0	6.911	9.9	8.7	0.45	3707	1.84	0.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006224062-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006224062-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006224062-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
006224062-04	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS—HALO_GHOST
006224062-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

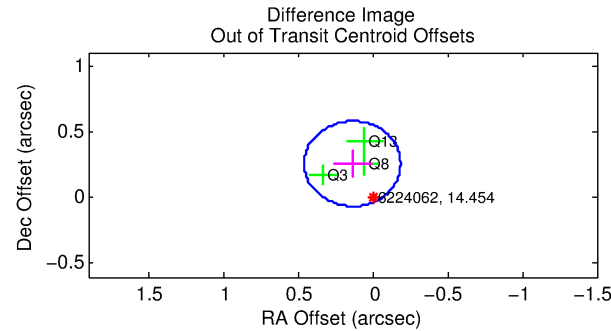
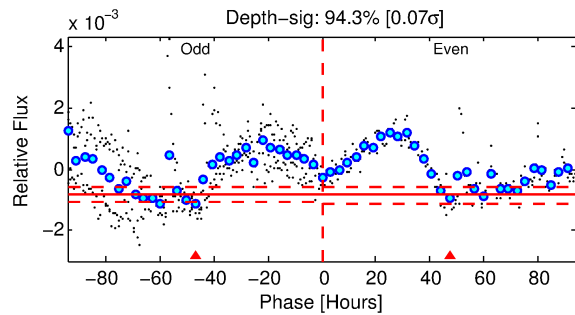
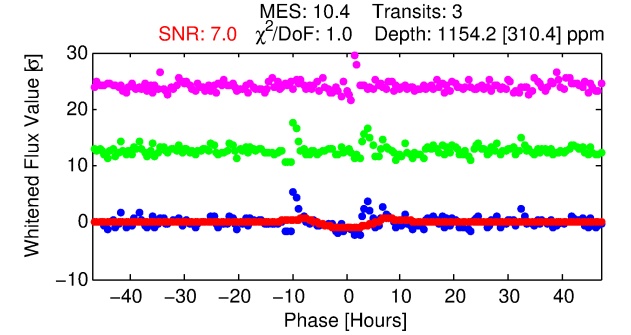
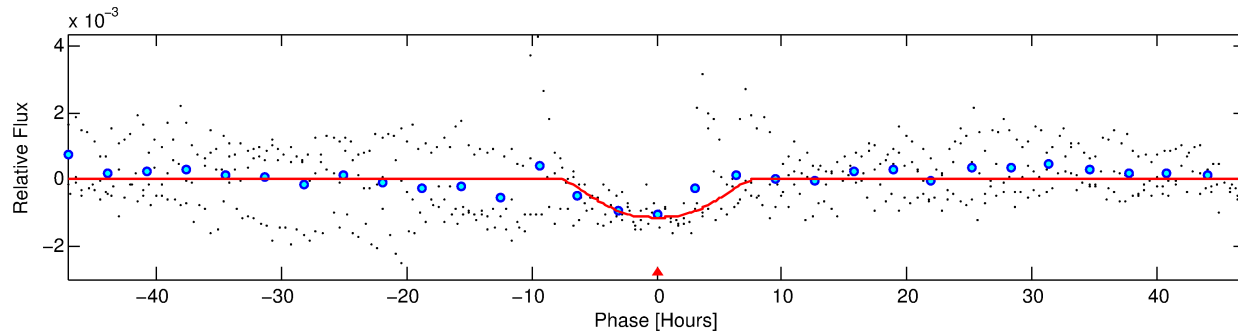
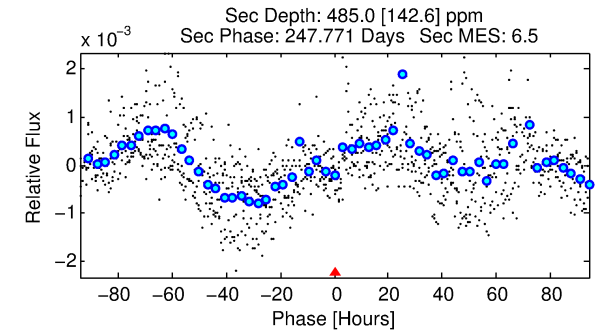
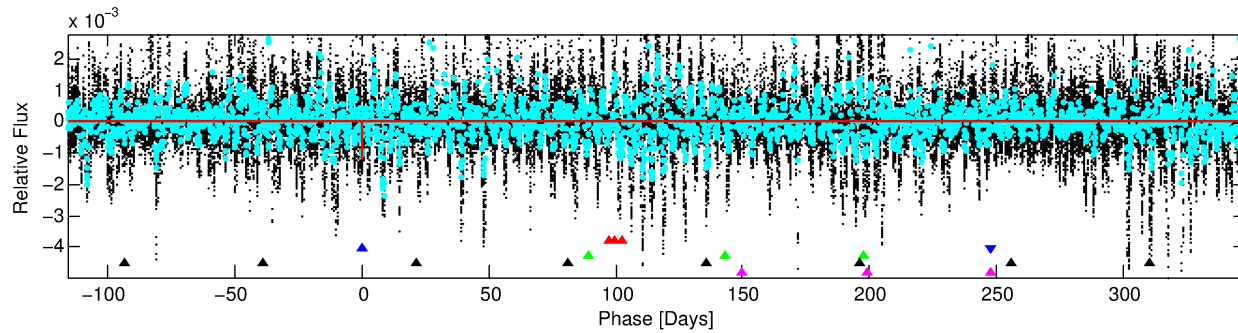
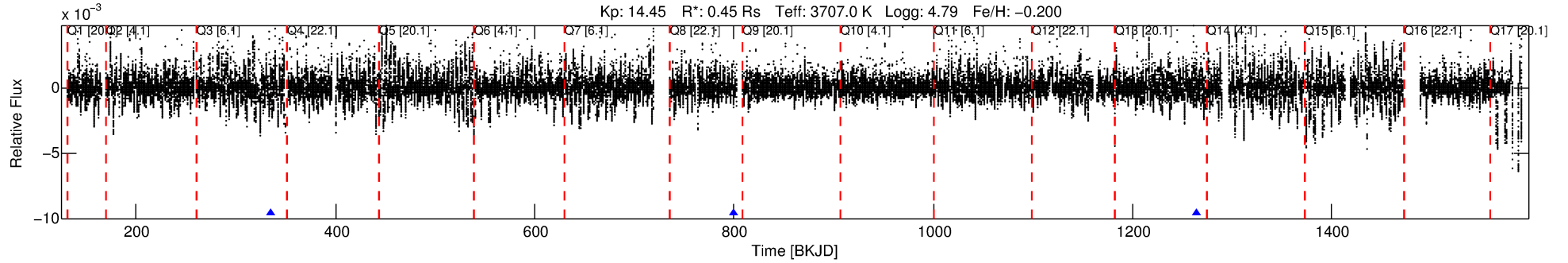
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006224062-02

No Significant Match Found

# DV One-Page Summary

KIC: 6224062 Candidate: 2 of 5 Period: 464.642 d



## DV Fit Results:

Period = 464.64182 [0.02536] d  
Epoch = 334.4876 [0.0316] BKJD  
Rp/R\* = 0.0419 [0.0137]  
a/R\* = 89.45 [20.46]  
b = 0.96 [0.04]  
Seff = 0.04 [0.00]  
Teq = 115 [3] K  
Rp = 2.06 [0.69] Re  
a = 0.9089 [0.0497] AU  
Ag = 51726.79 [37250.76] [1.39 $\sigma$ ]  
Teffp = 2689 [483] K [5.33 $\sigma$ ]

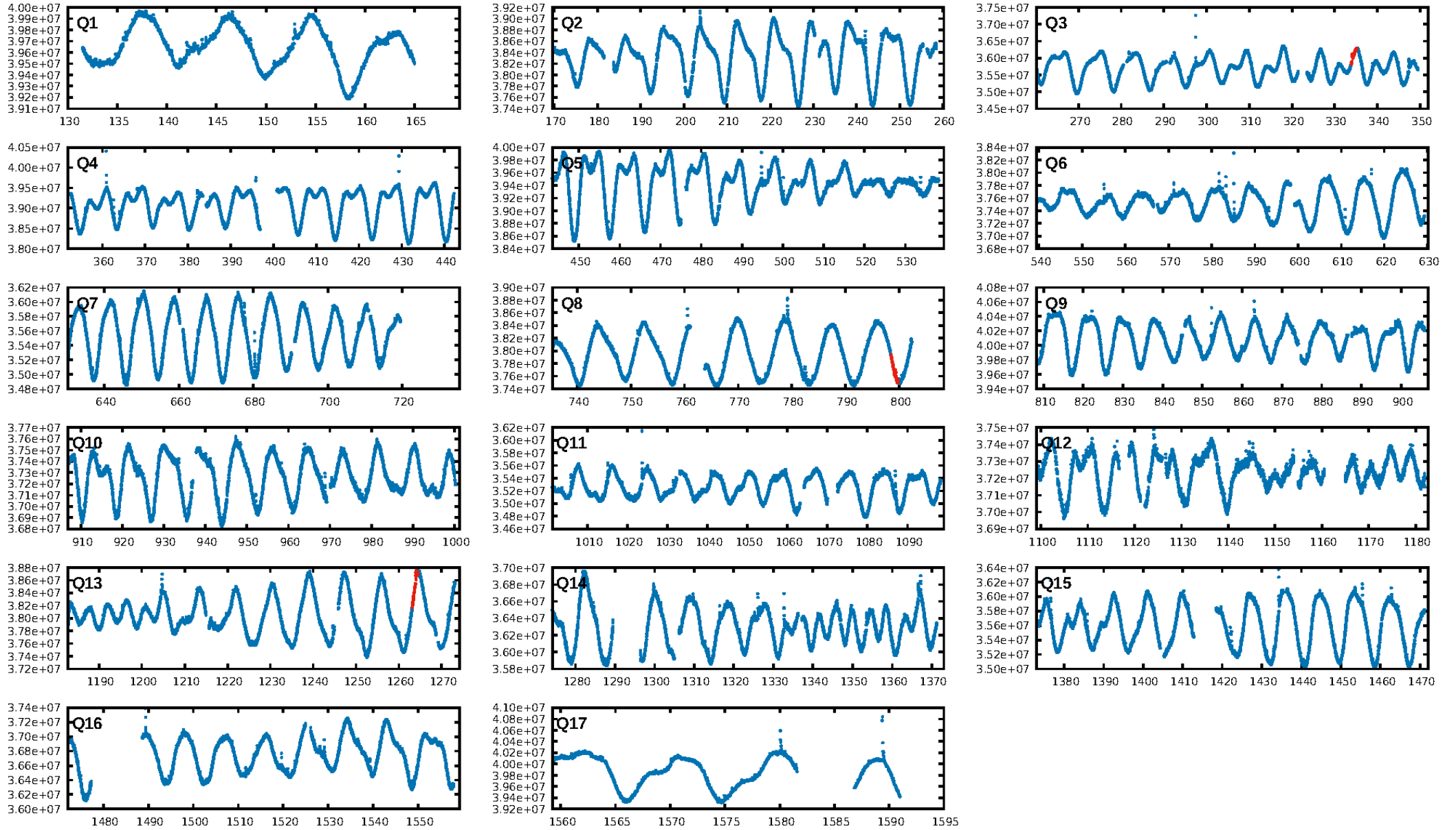
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [48.41 $\sigma$ ]  
LongPeriod-sig: 99.8% [3.14 $\sigma$ ]  
ModelChiSquare2-sig: 66.7%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 5.46e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -57.38  
Centroid-sig: 4.4%  
Centroid-so: 1.442 arcsec [1.36 $\sigma$ ]  
OotOffset-rm: 0.290 arcsec [2.70 $\sigma$ ]  
KicOffset-rm: 0.295 arcsec [2.12 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

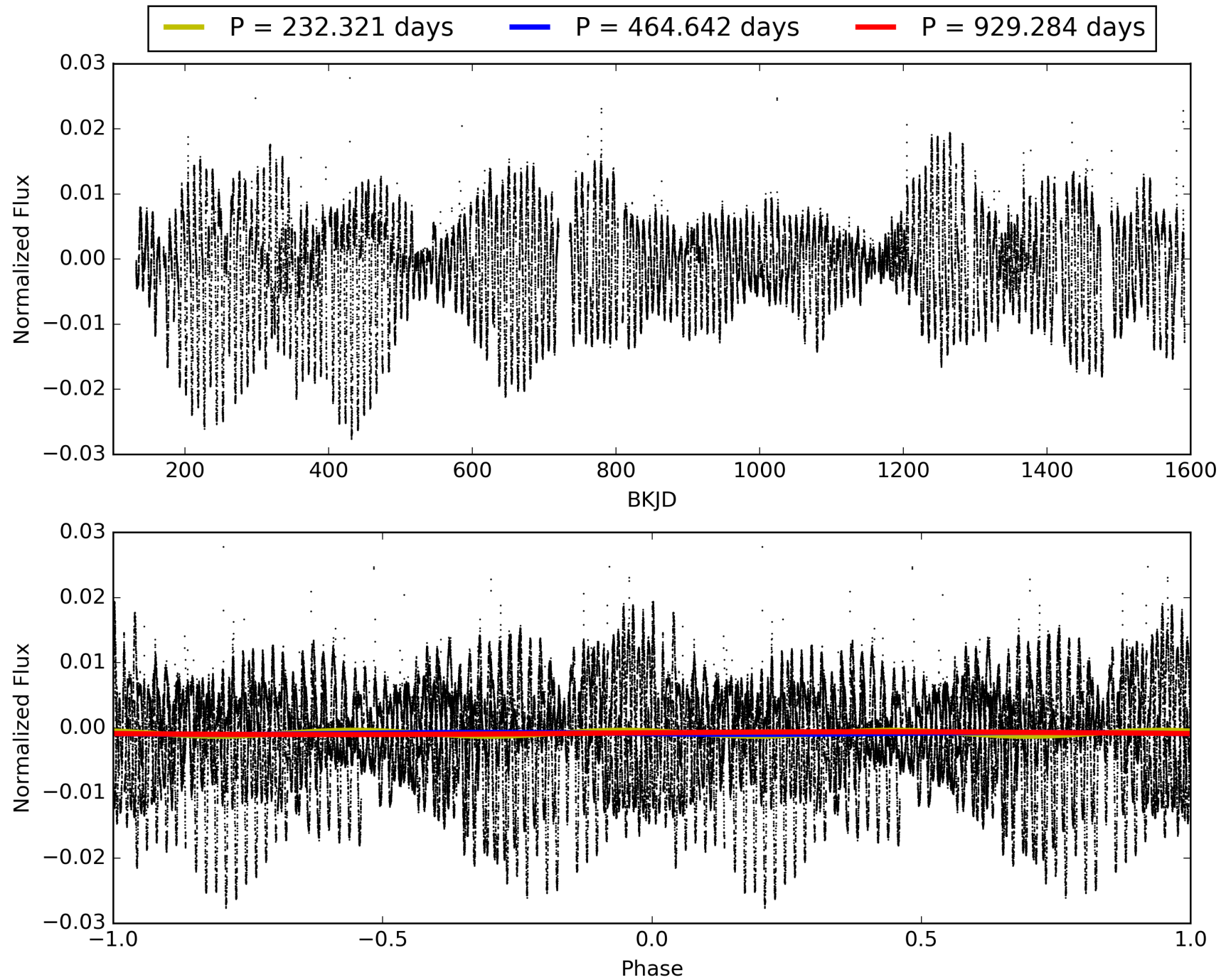
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:53:45 Z

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

# TCE 006224062-02, PDC Light Curves

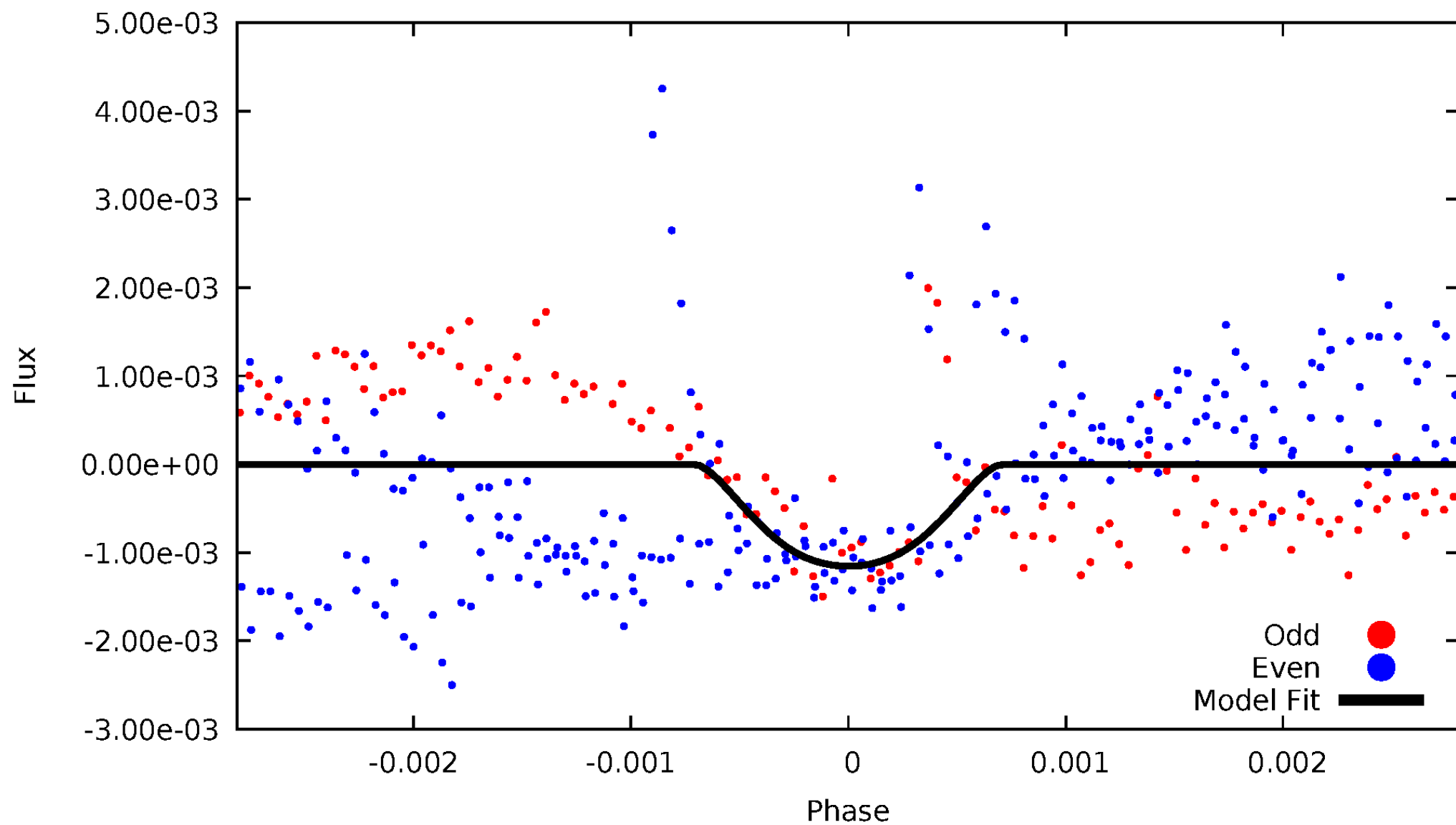


TCE 006224062-02



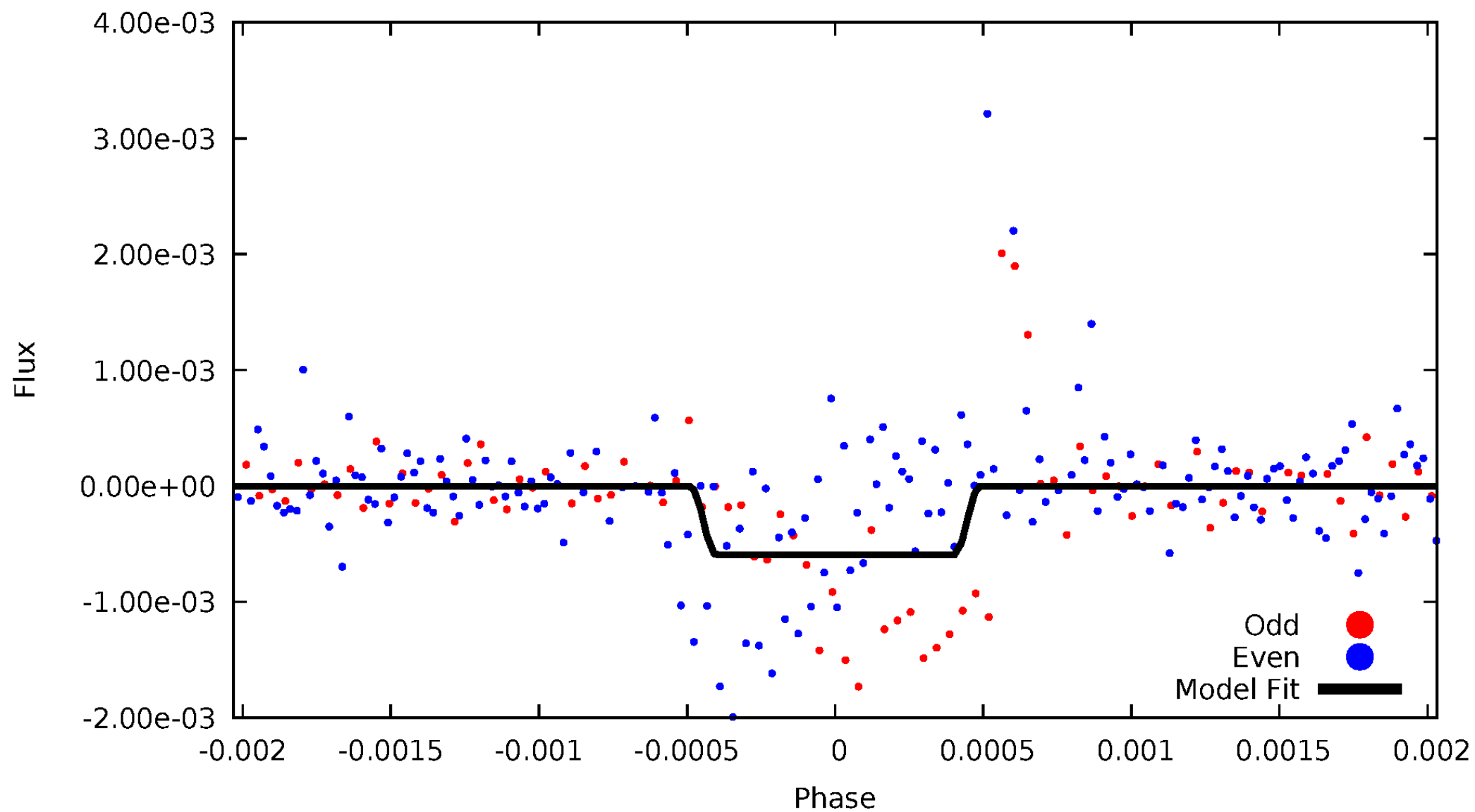
# DV Odd/Even

TCE 006224062-02



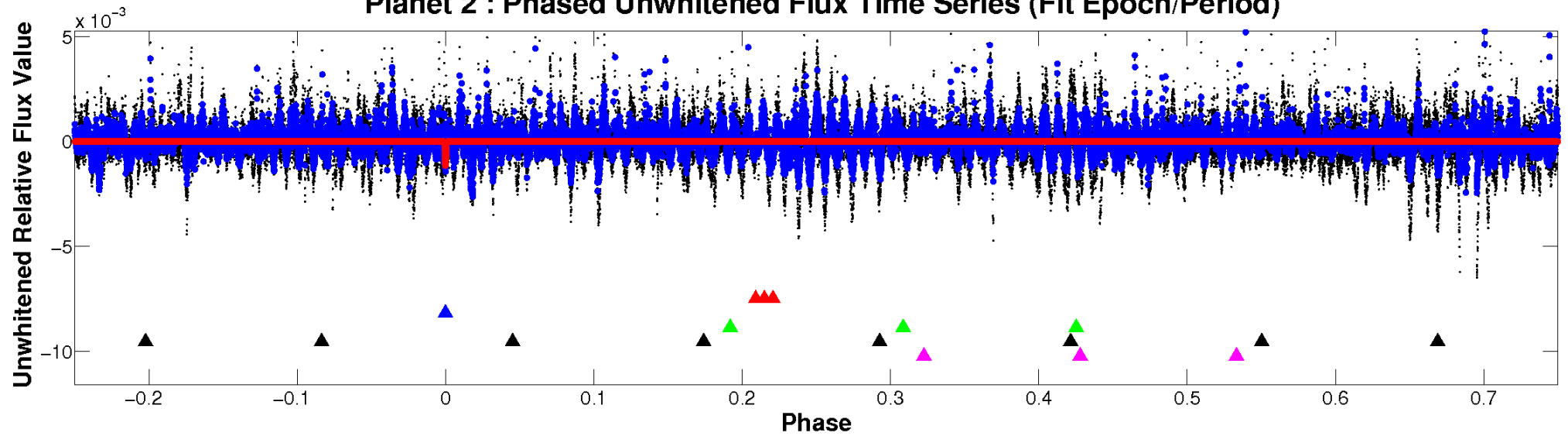
# ALT Odd/Even

TCE 006224062-02

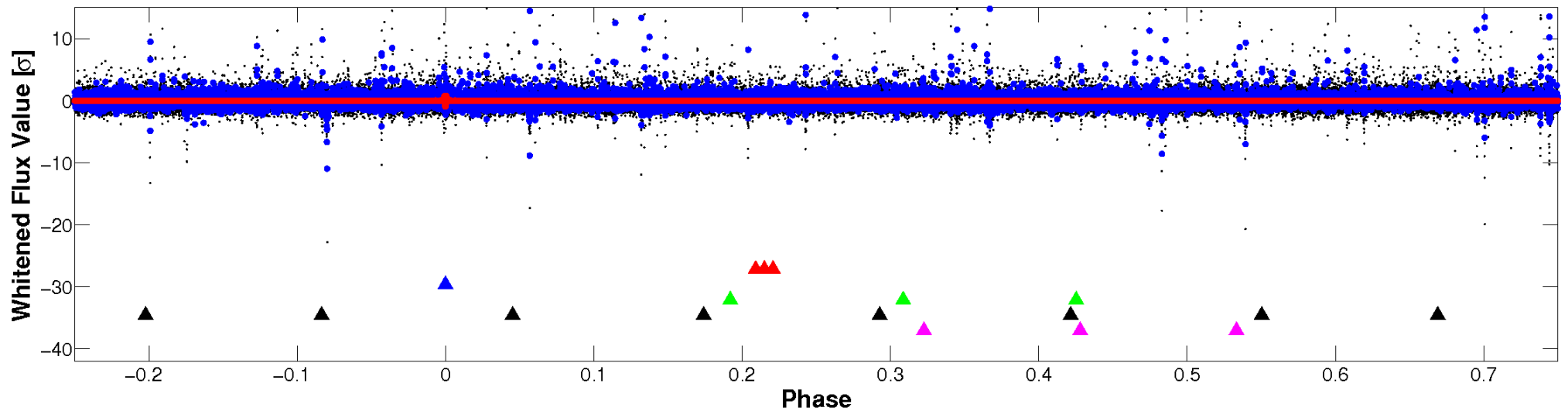


# Non-Whitened Vs. Whitened Light Curve

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

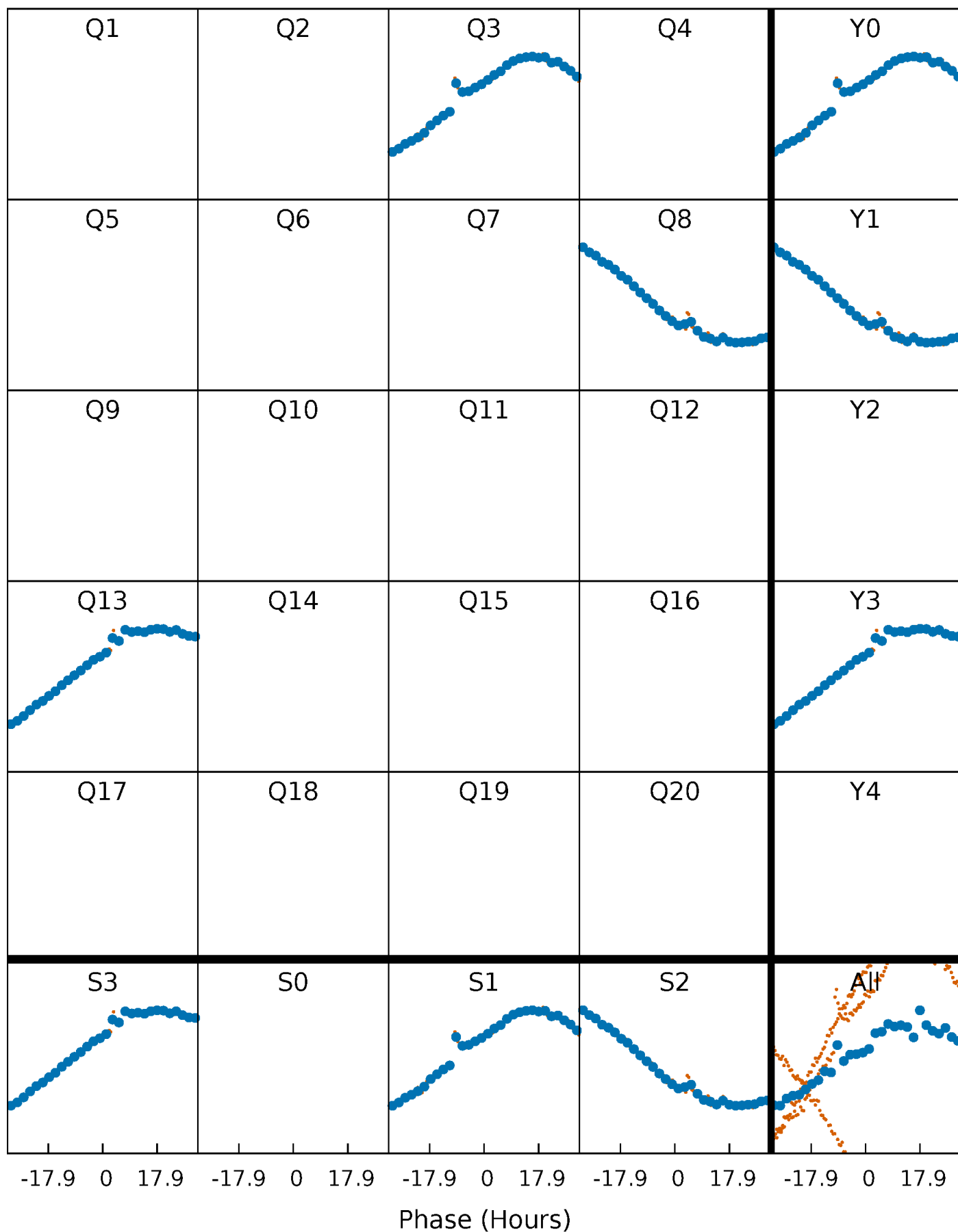


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



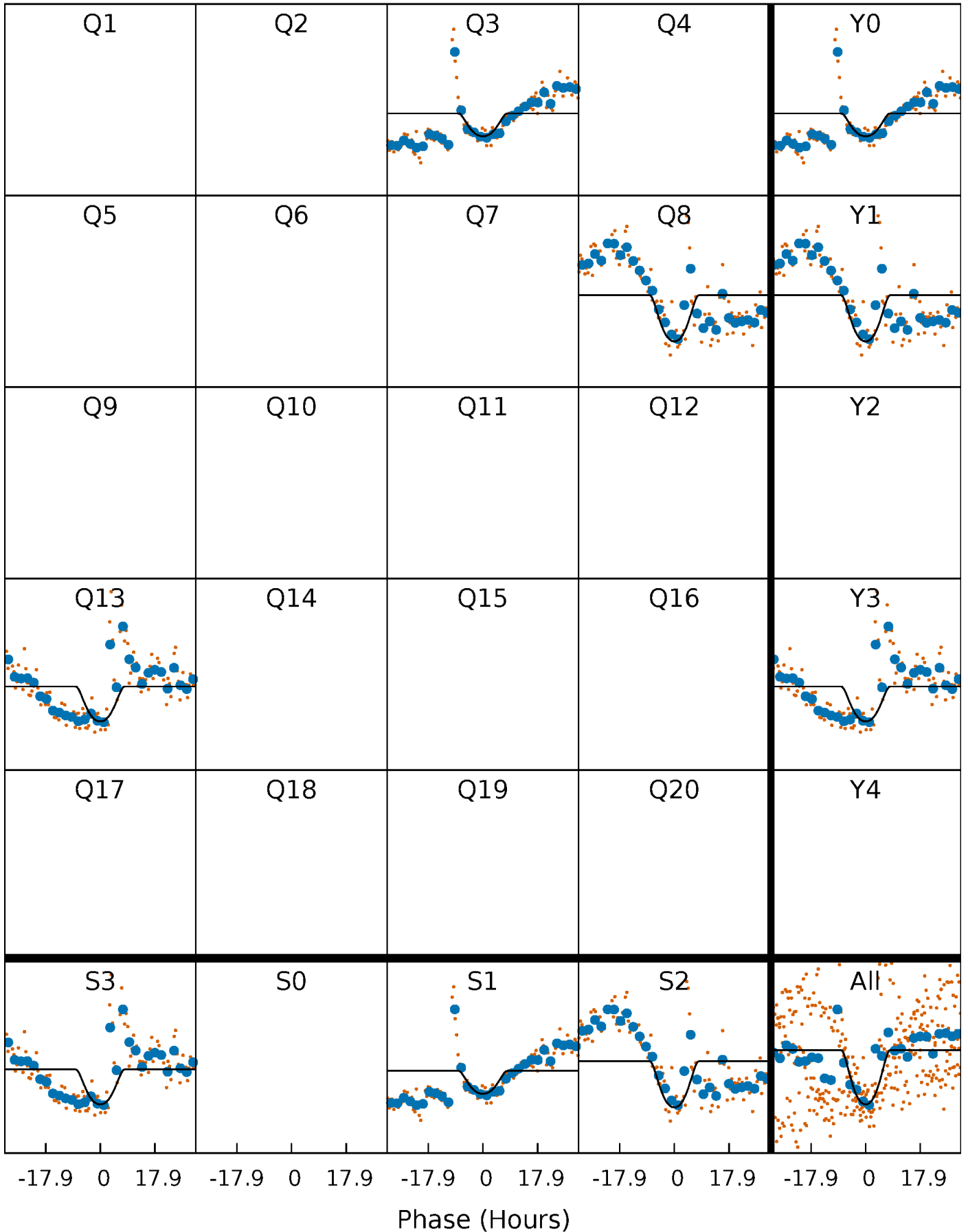
# PDC Quarter-Phased Transit Curves

TCE 006224062-02 P=464.641816 Days  $T_0=334.487553$  (BKJD)



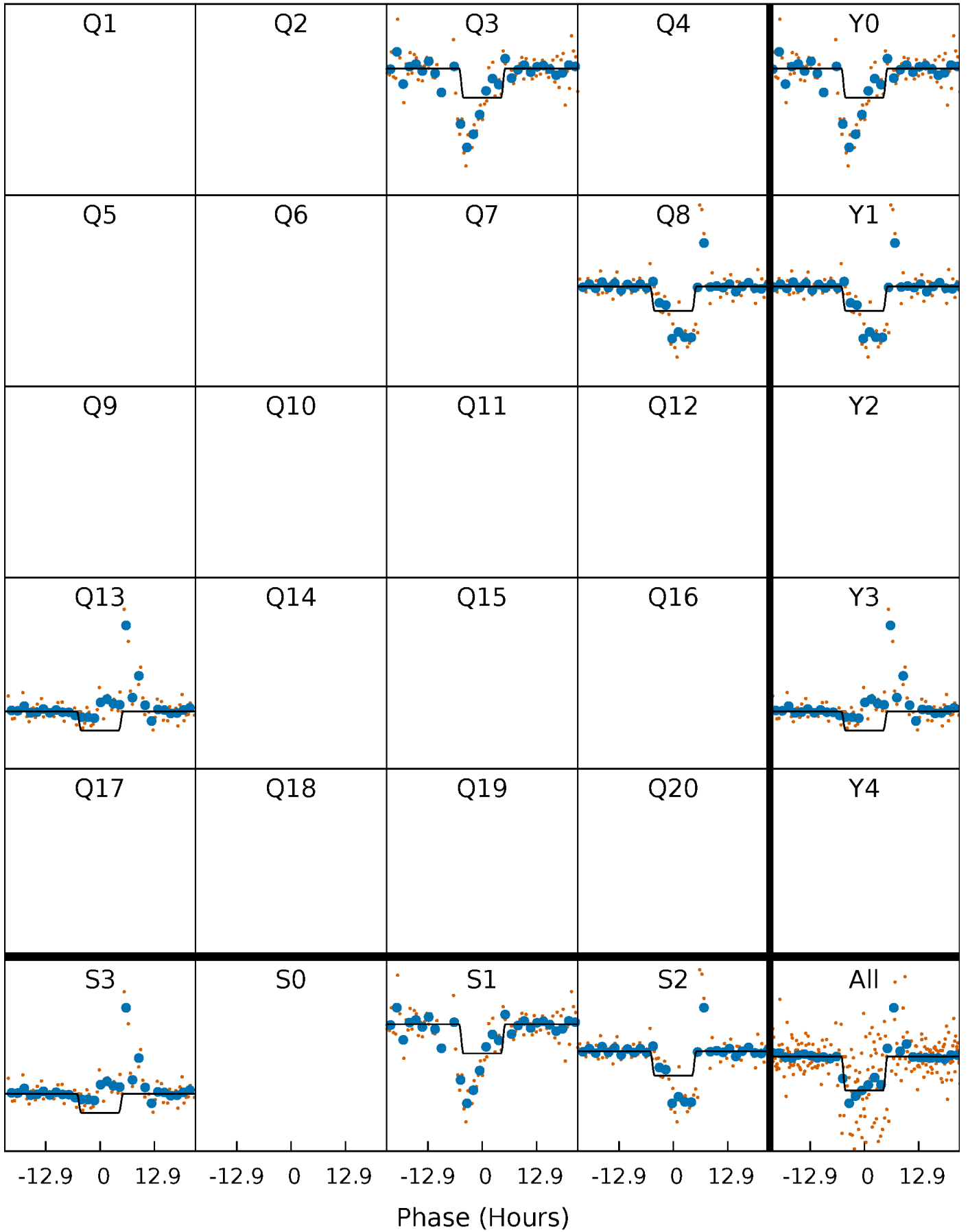
# DV Quarter-Phased Transit Curves

TCE 006224062-02     $P=464.641816$  Days     $T_0=334.487553$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

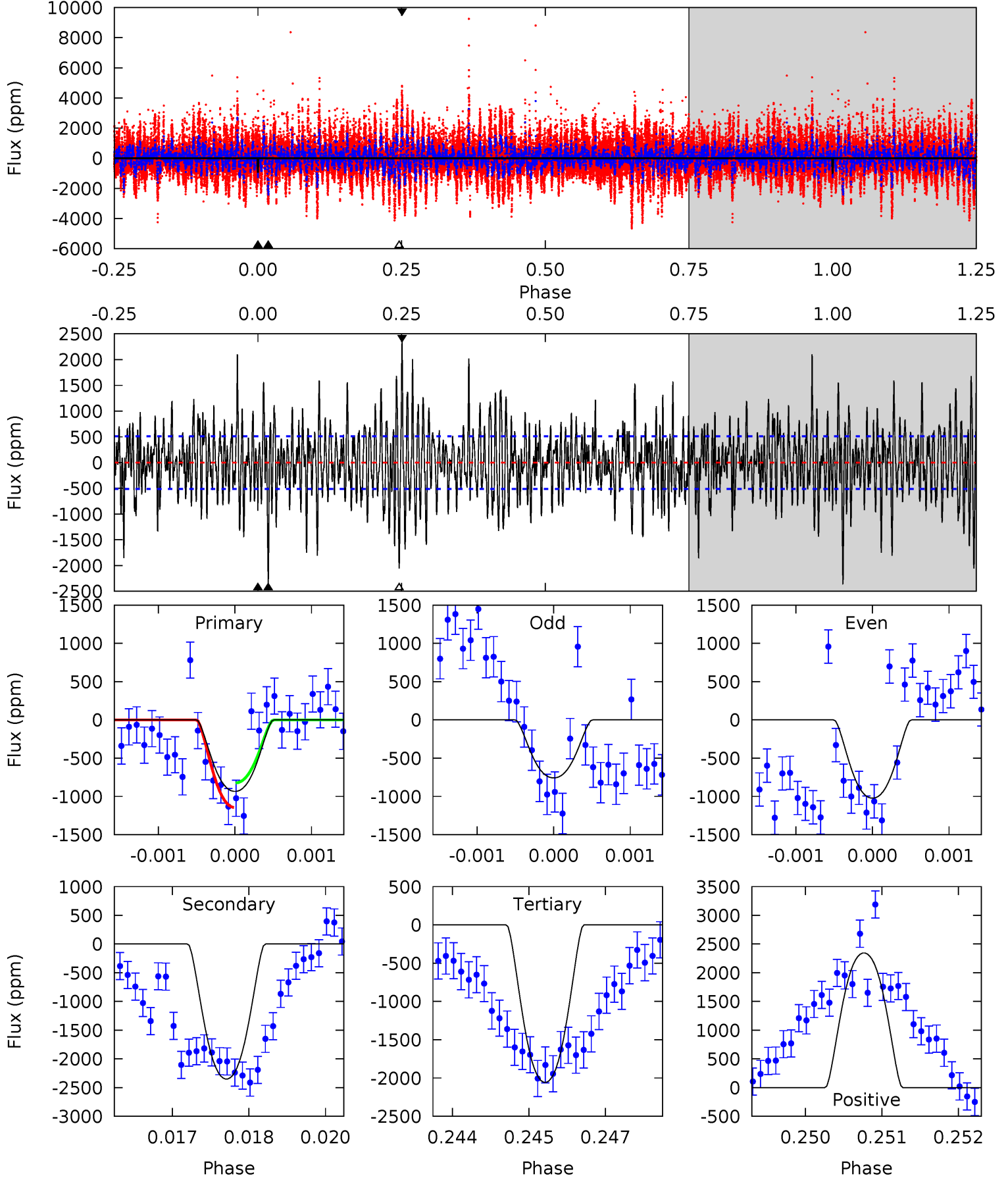
TCE 006224062-02     $P=464.625098$  Days     $T_0=334.413216$  (BKJD)



# DV Model-Shift Uniqueness Test

006224062-02, P = 464.641816 Days, E = 334.487553 Days

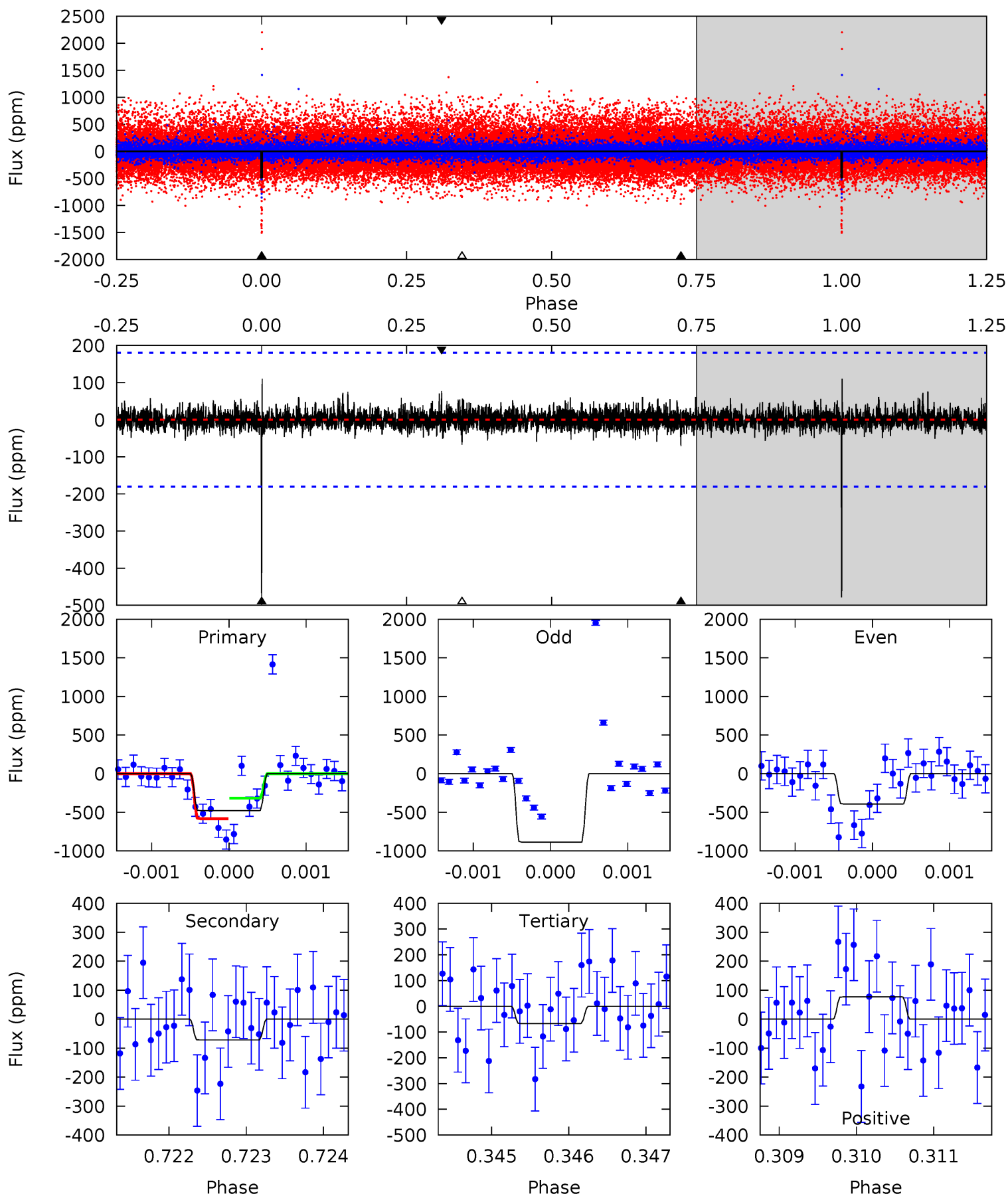
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.83	24.7	21.6	24.7	5.39	3.19	6.08	-11.8	-14.8	3.09	0.06	1.32	1.23	0.50	1.68



# Alt Model-Shift Uniqueness Test

006224062-02, P = 464.625098 Days, E = 334.413216 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	2.16	2.02	2.33	5.45	3.29	0.48	12.4	12.1	0.15	-0.16	7.75	0.65	0.19	4.00



### Stellar Parameters For KIC 006224062

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot cm^{-3})$
	$3707^{+50}_{-55}$	$4.794^{+0.039}_{-0.024}$	$-0.200^{+0.100}_{-0.100}$	$0.452^{+0.028}_{-0.031}$	$0.464^{+0.029}_{-0.029}$	$7.077^{+1.274}_{-0.739}$
	+1%/-1%	+1%/-1%	+50%/-50%	+6%/-7%	+6%/-6%	+18%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 006224062-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2351 \pm 95$	$2.06^{+0.66}_{-0.68}$	$161^{+3}_{-3}$	$3900^{+620}_{-364}$	$250968^{+317509}_{-105609}$
Alt.	$-72 \pm 33$	$1.23^{+0.67}_{-0.60}$	$161^{+3}_{-3}$	$2684^{+624}_{-346}$	$20370^{+71681}_{-13386}$

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

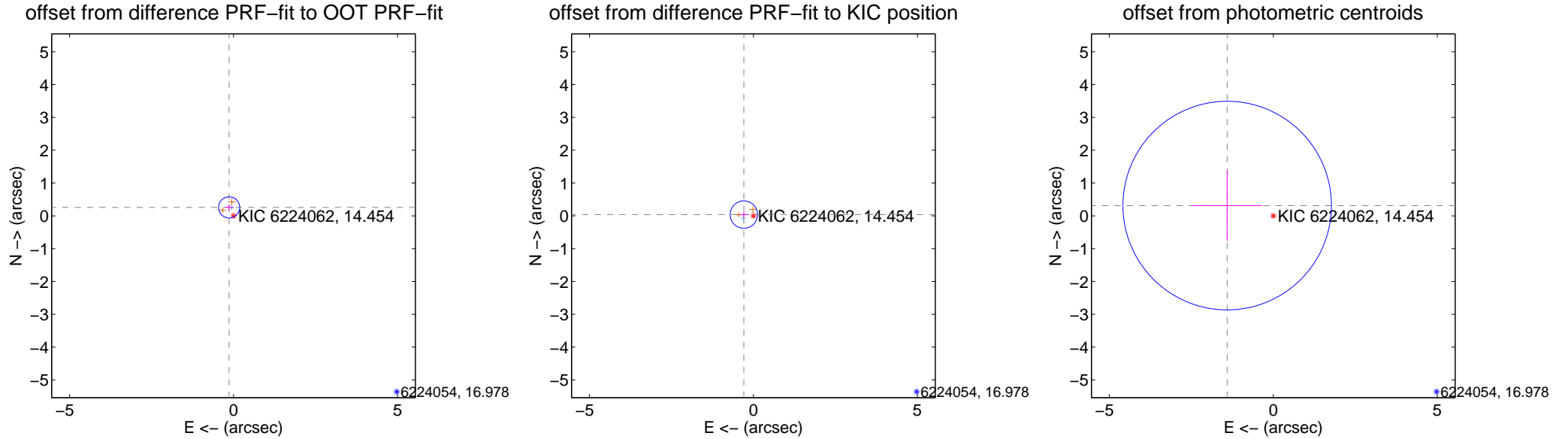
## DV Centroid Data

Supplemental centroid analysis for 006224062-02. Kepler magnitude: 14.45. Transit SNR 6.97

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

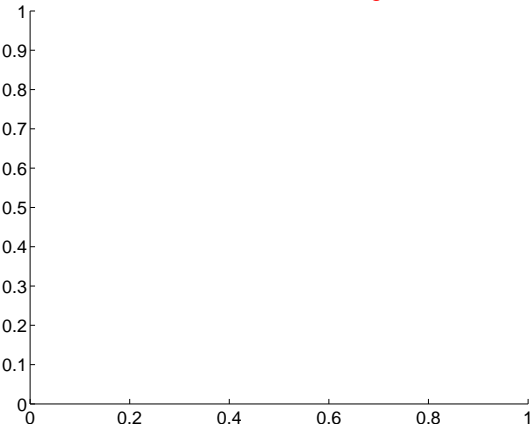
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.290 \pm 0.107$	2.70	$0.134 \pm 0.125$	$0.257 \pm 0.102$
PRF-fit source offset from KIC position	$0.295 \pm 0.139$	2.12	$0.293 \pm 0.140$	$0.037 \pm 0.100$
photometric centroid source offset	$1.44 \pm 1.06$	1.36	$1.41 \pm 1.06$	$0.31 \pm 1.08$



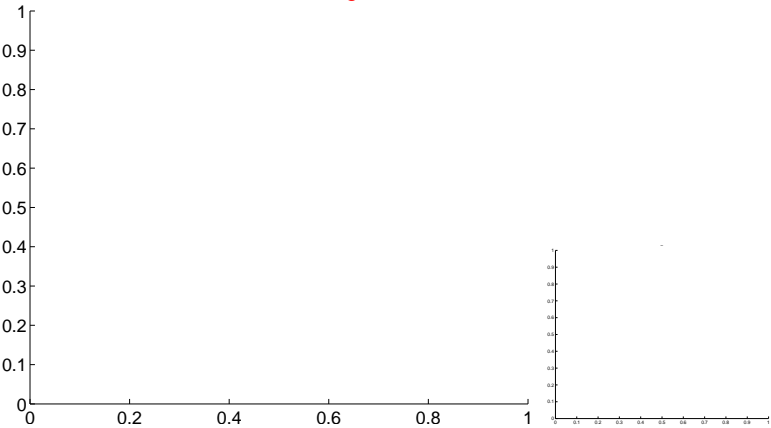
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

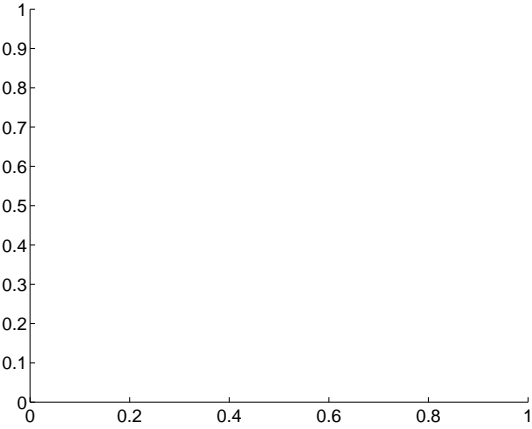
Q1 no difference image



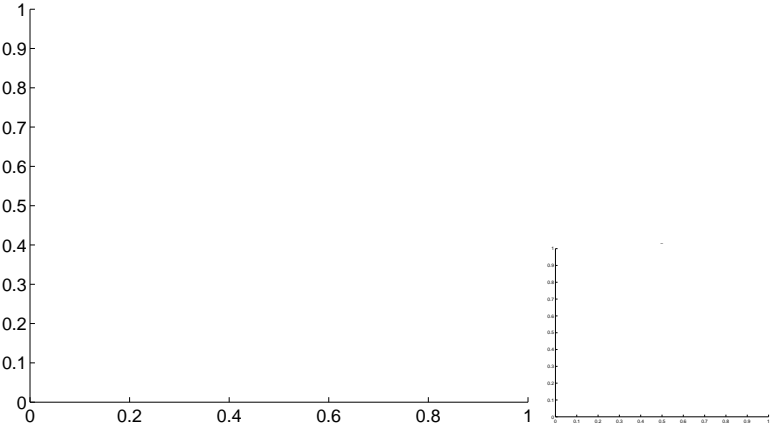
Q1 no OOT image



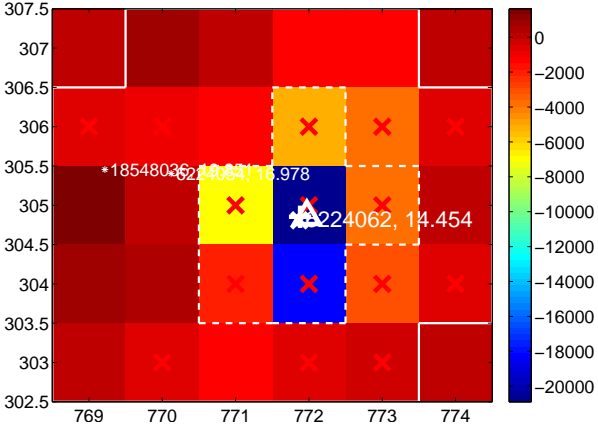
Q2 no difference image



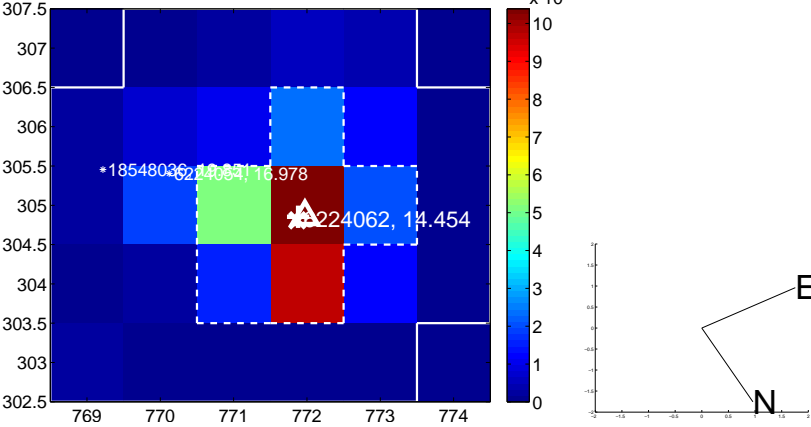
Q2 no OOT image



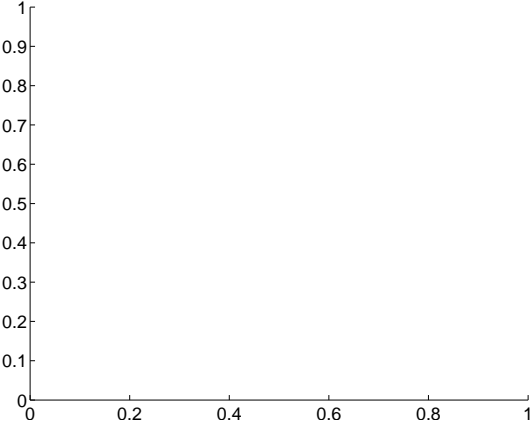
Q3 difference image. Poor Quality



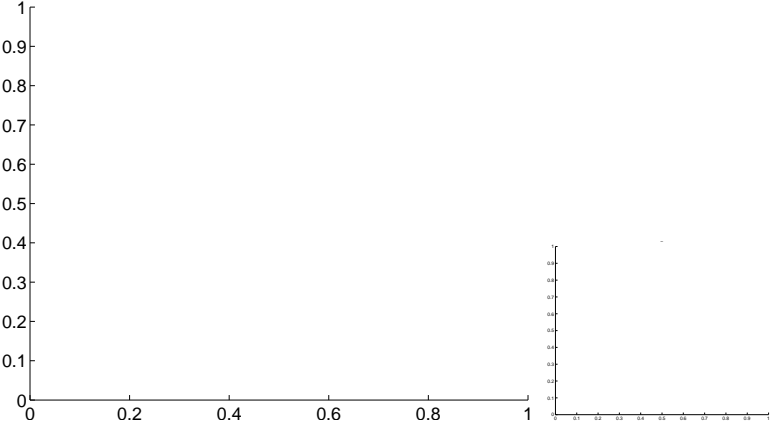
Q3 OOT image



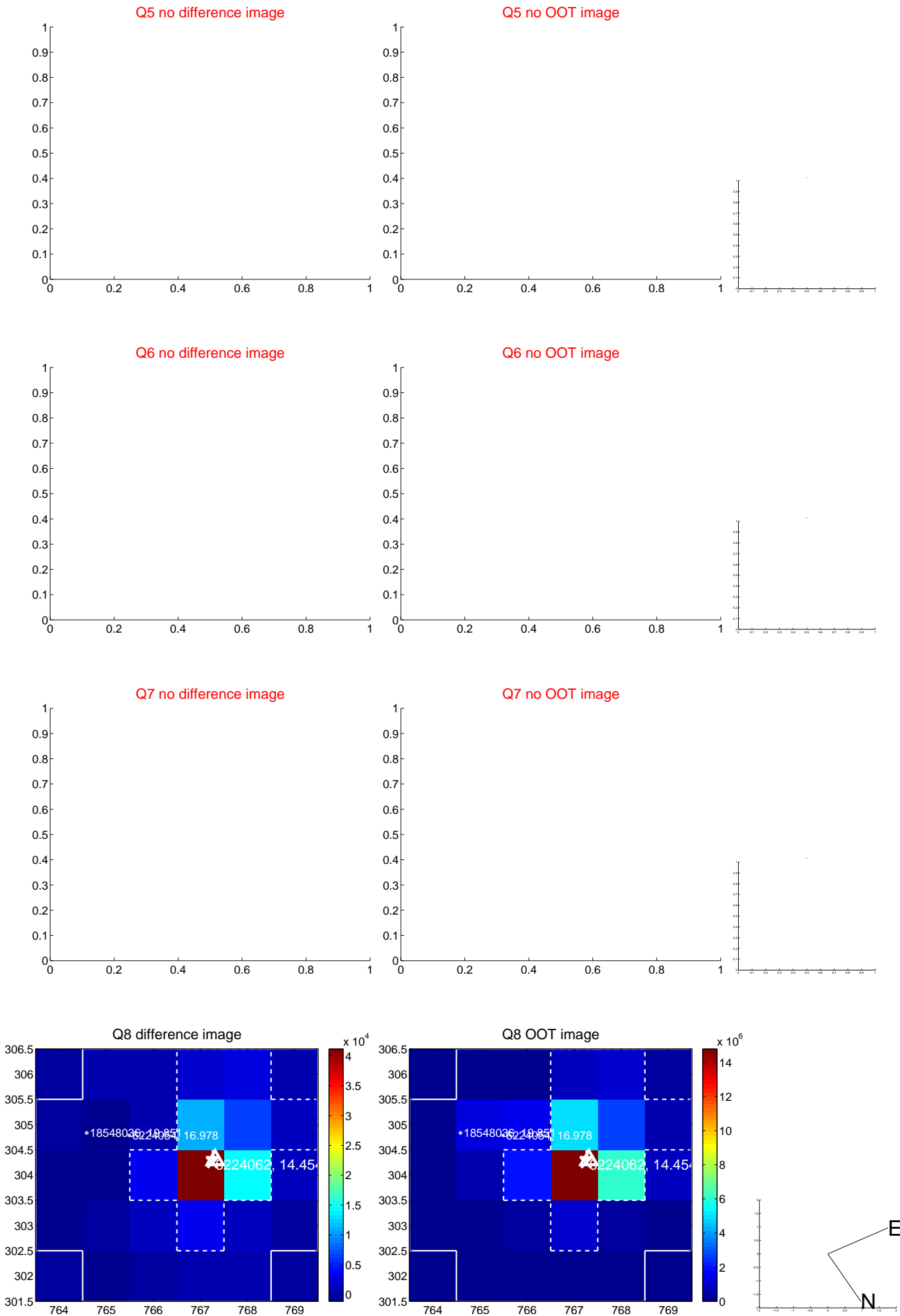
Q4 no difference image



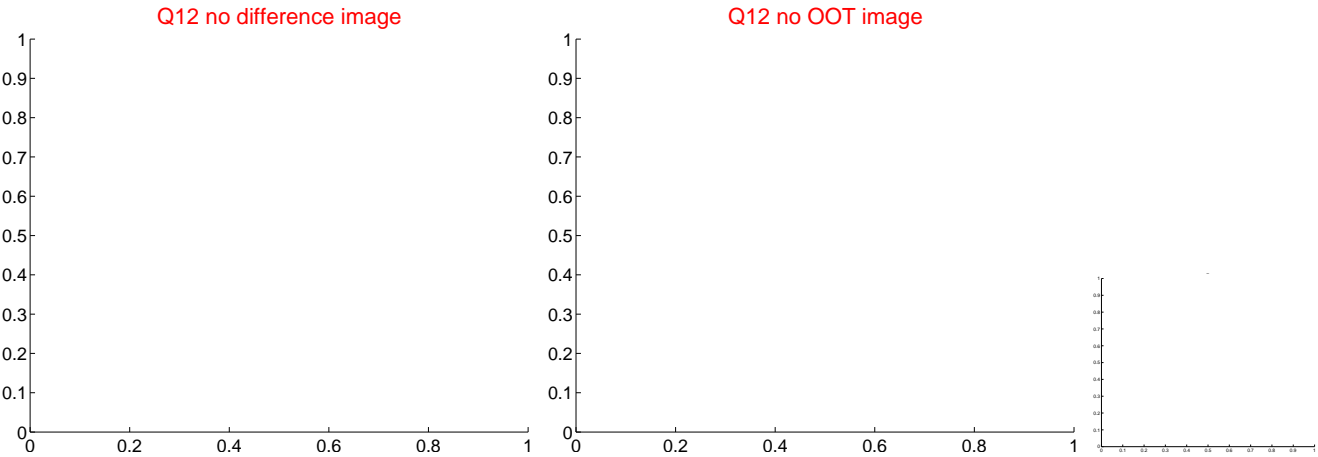
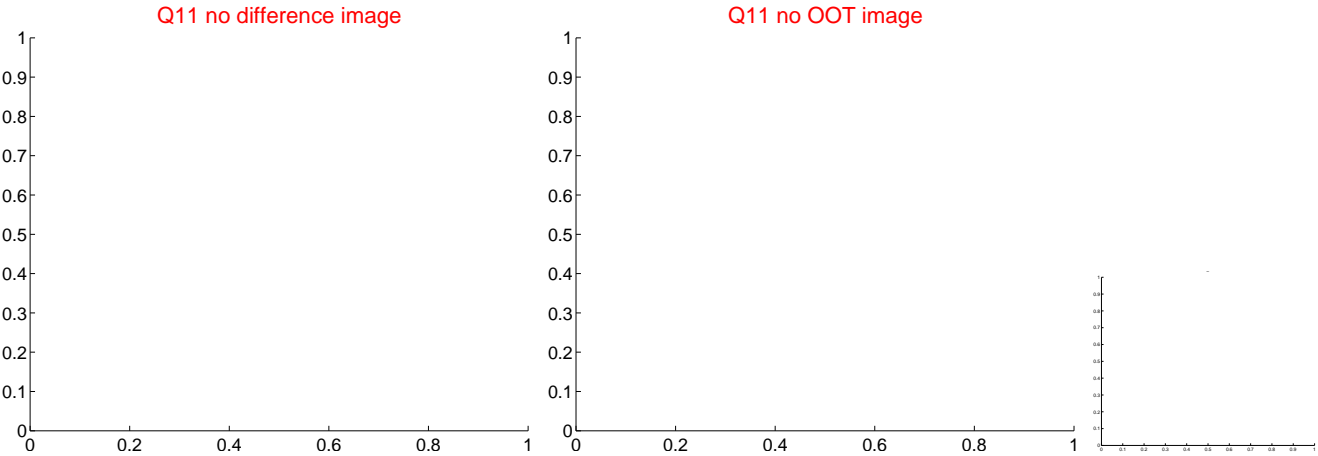
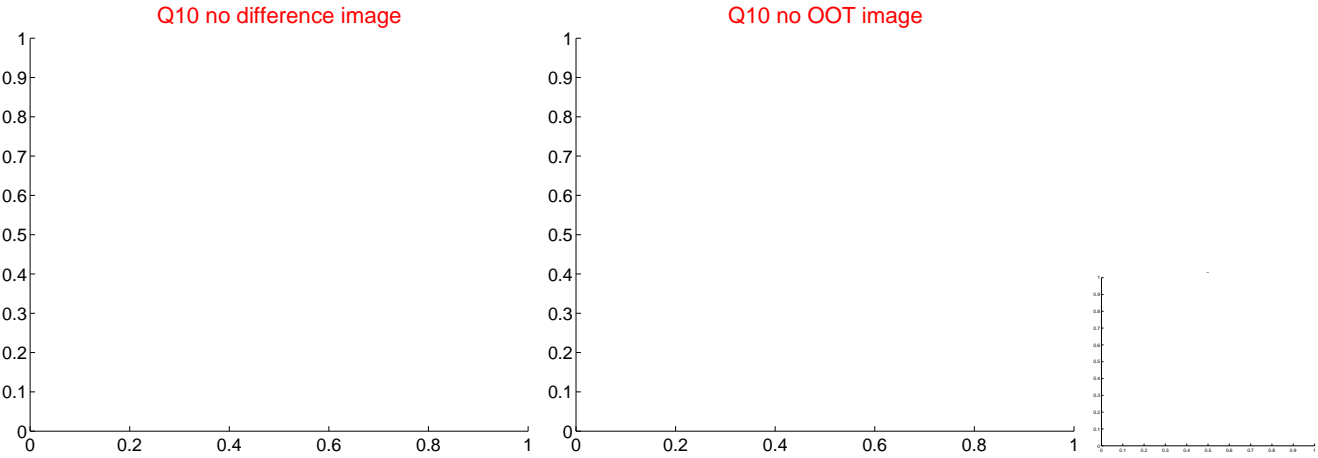
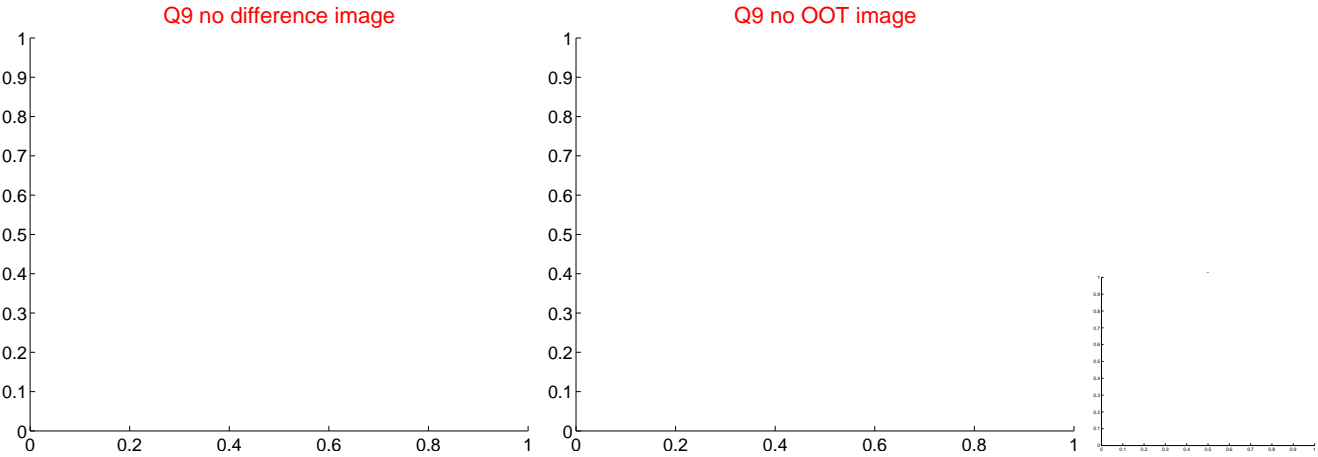
Q4 no OOT image



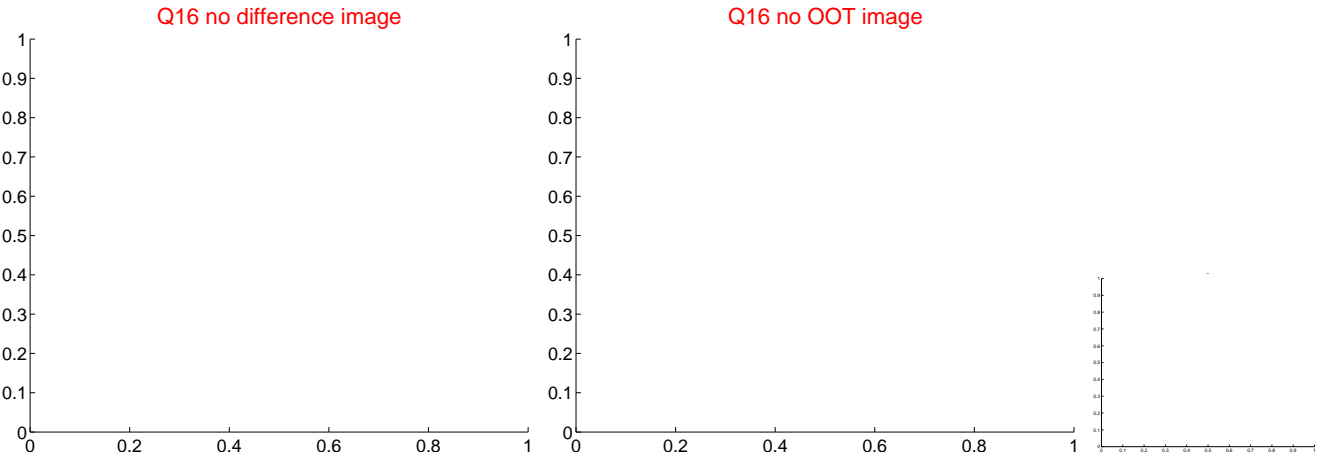
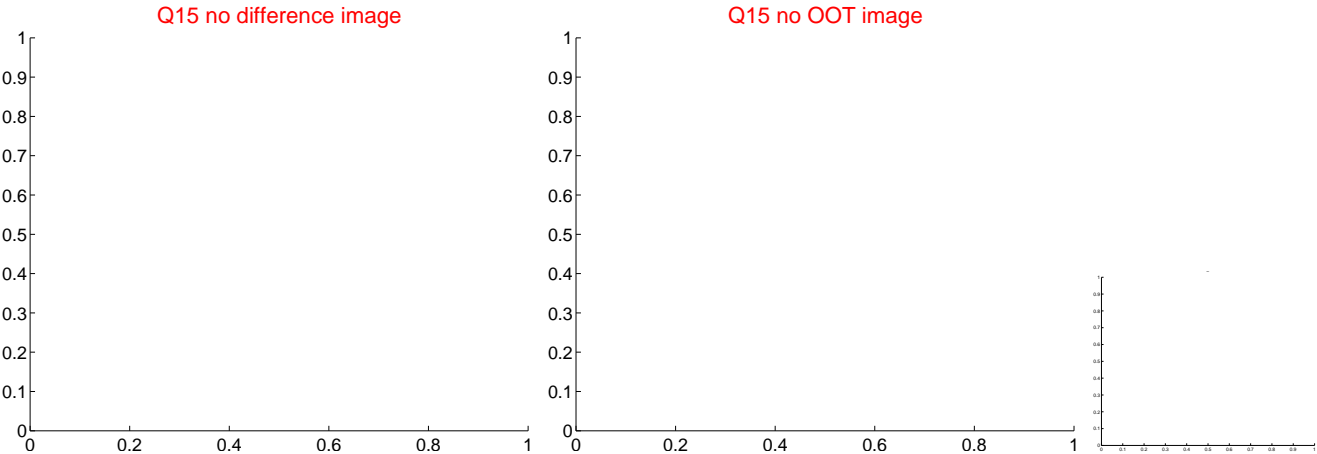
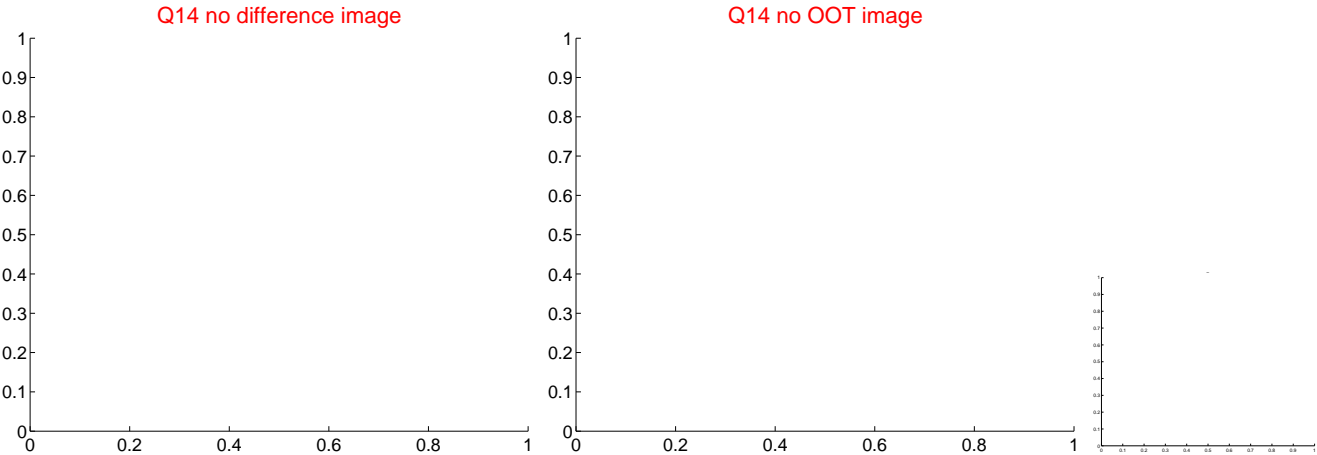
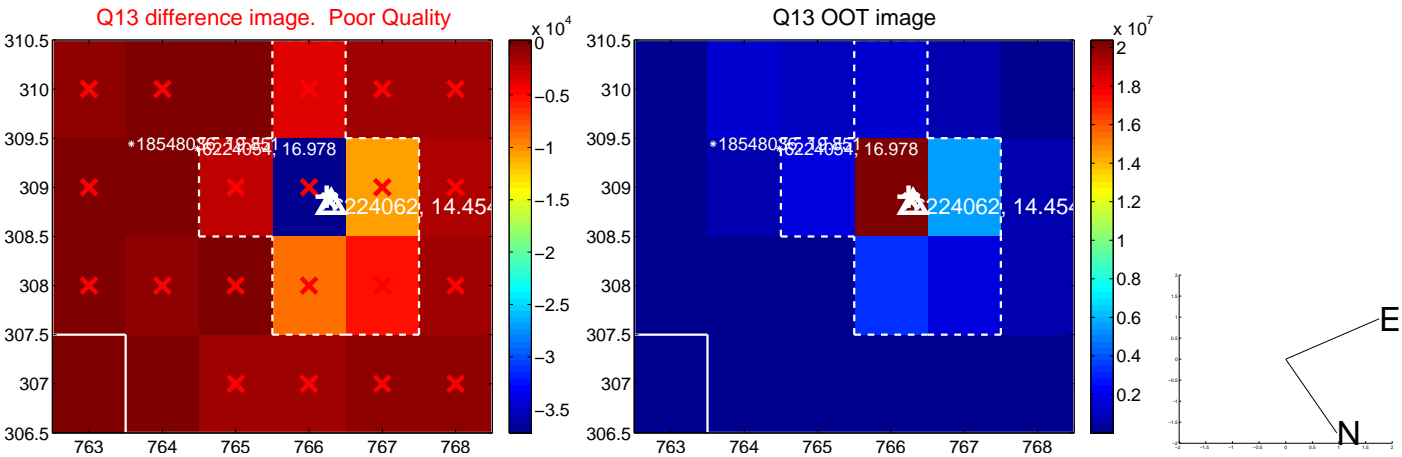
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



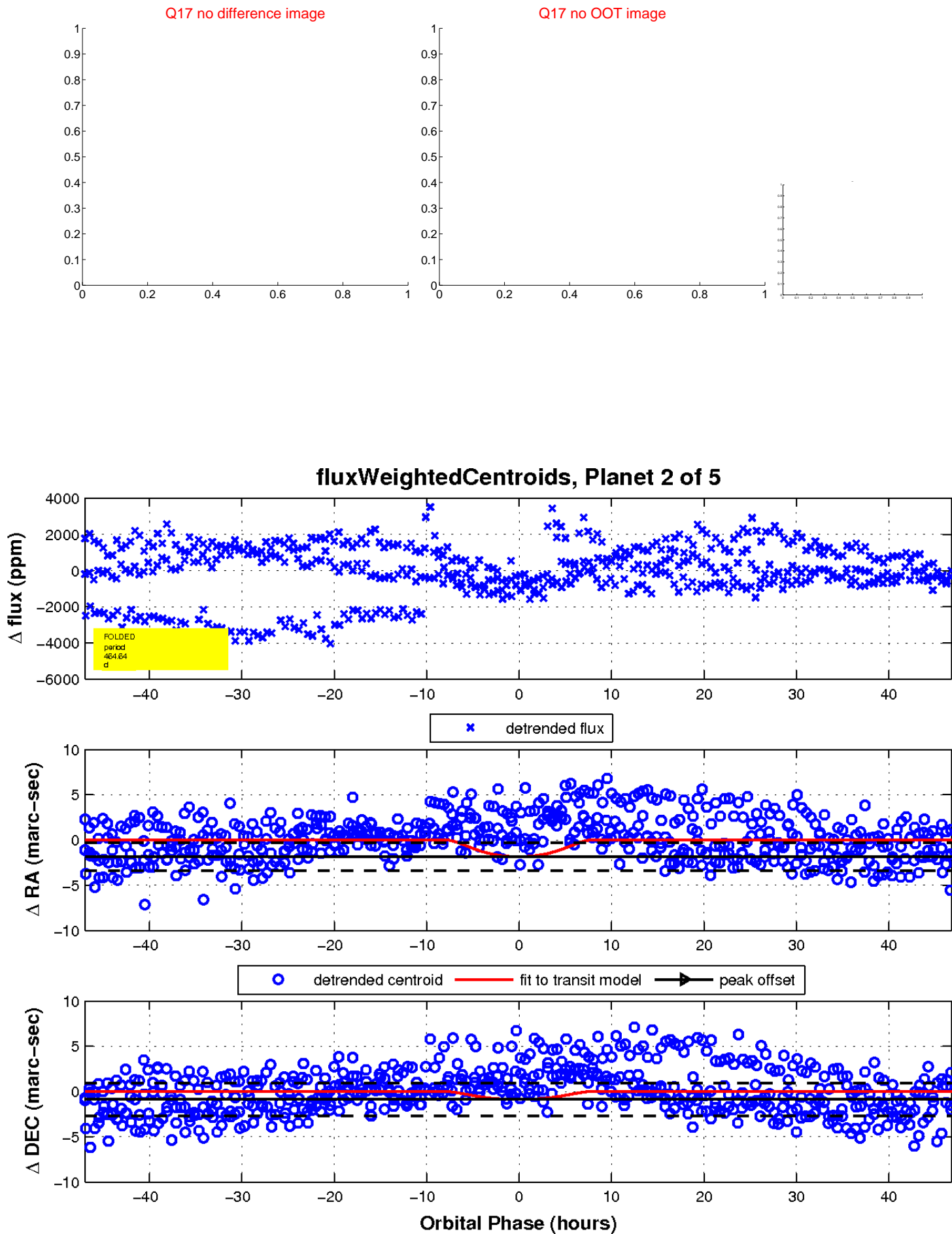
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

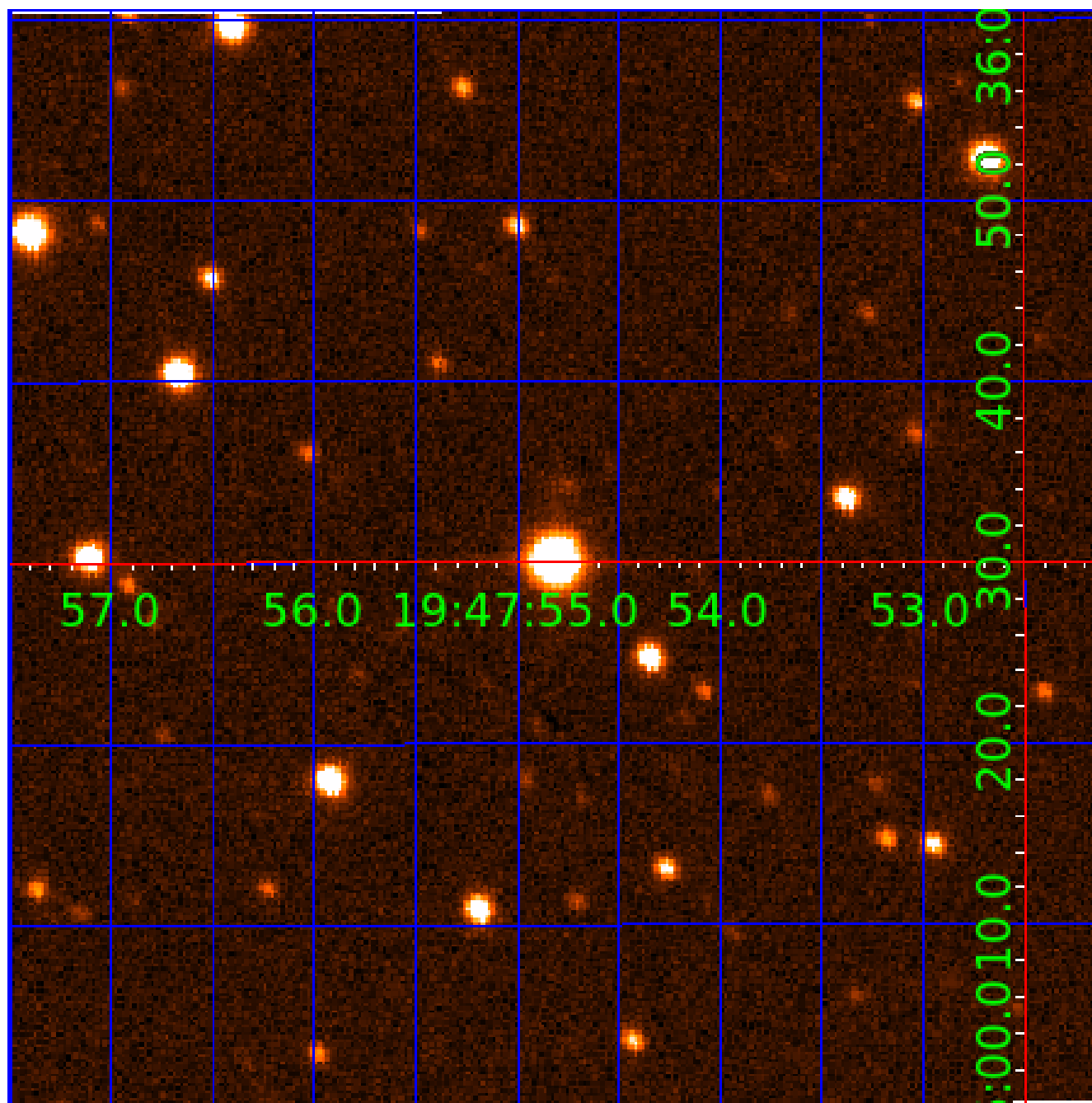


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006224062

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006224062-01	OBS	No	467.359926	431.663976	763.6	13.636	10.2	5.3	0.45	3707	1.30	0.04
006224062-02	OBS	No	464.641816	334.487553	1154.2	15.677	10.4	7.0	0.45	3707	2.06	0.04
006224062-03	OBS	No	410.463654	532.067431	1445.3	21.809	8.5	8.0	0.45	3707	1.71	0.05
006224062-04	OBS	No	174.826836	295.682146	417.3	6.184	9.6	5.5	0.45	3707	1.01	0.15
006224062-05	OBS	No	513.600992	484.379041	1057.0	6.911	9.9	8.7	0.45	3707	1.84	0.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006224062-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006224062-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006224062-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
006224062-04	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS—HALO_GHOST
006224062-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

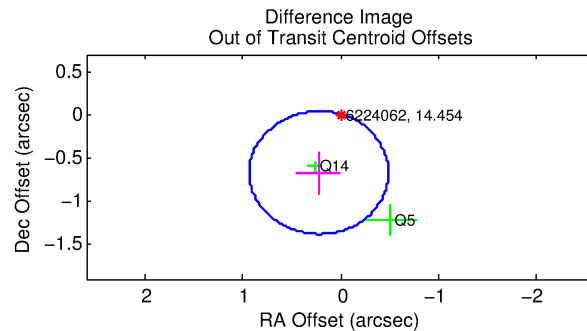
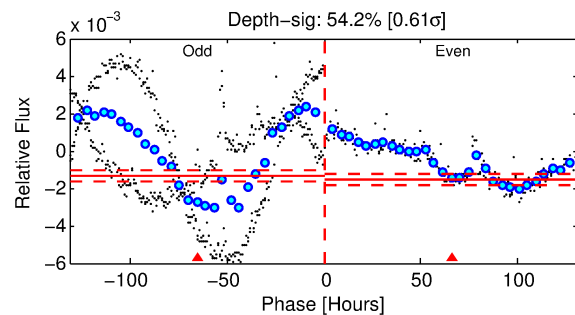
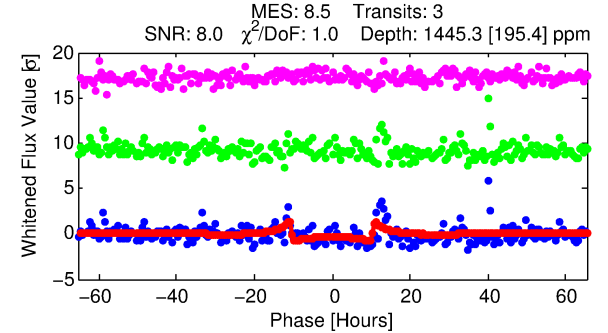
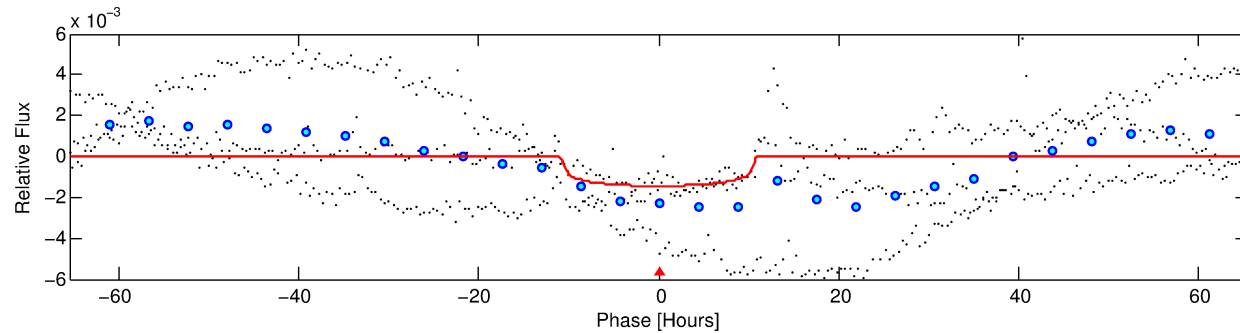
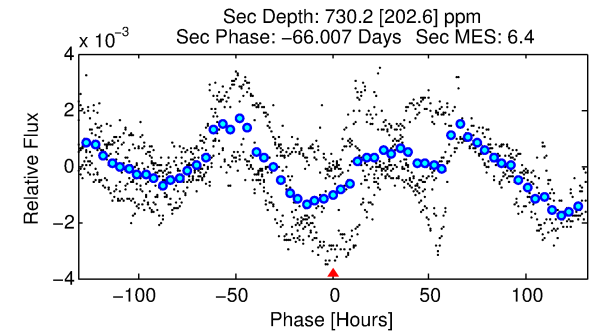
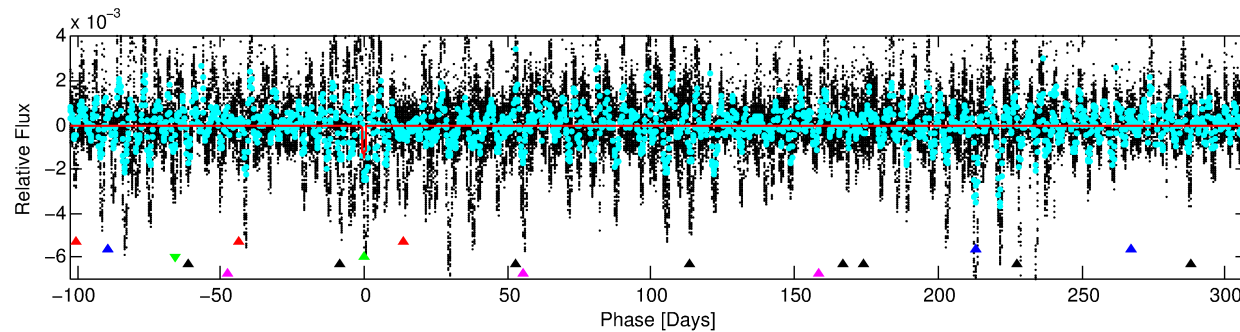
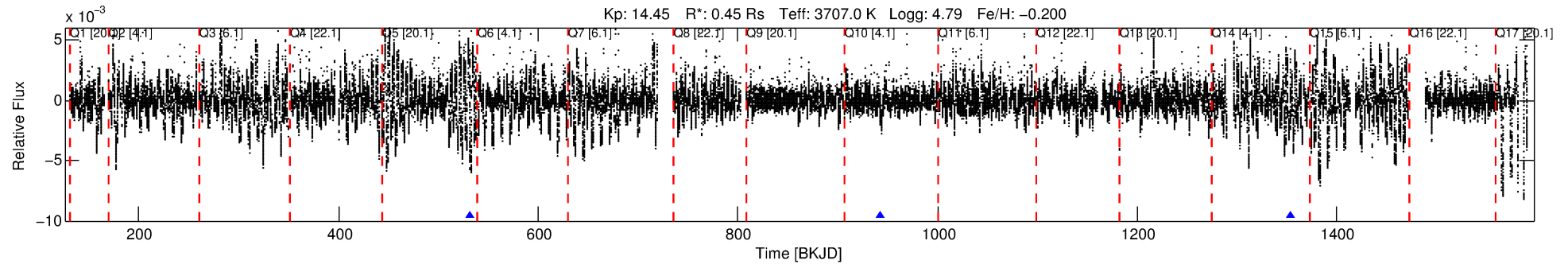
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006224062-03

No Significant Match Found

# DV One-Page Summary

KIC: 6224062 Candidate: 3 of 5 Period: 410.464 d



## DV Fit Results:

Period = 410.46365 [0.00713] d  
Epoch = 532.0674 [0.0091] BKJD  
Rp/R\* = 0.0346 [0.0049]  
a/R\* = 148.67 [78.55]  
b = 0.04 [15.05]  
Seff = 0.05 [0.00]  
Teq = 120 [3] K  
Rp = 1.71 [0.27] Re  
a = 0.8368 [0.0457] AU  
Ag = 96617.49 [39062.68] [2.47σ]  
Teffp = 3276 [329] K [9.59σ]

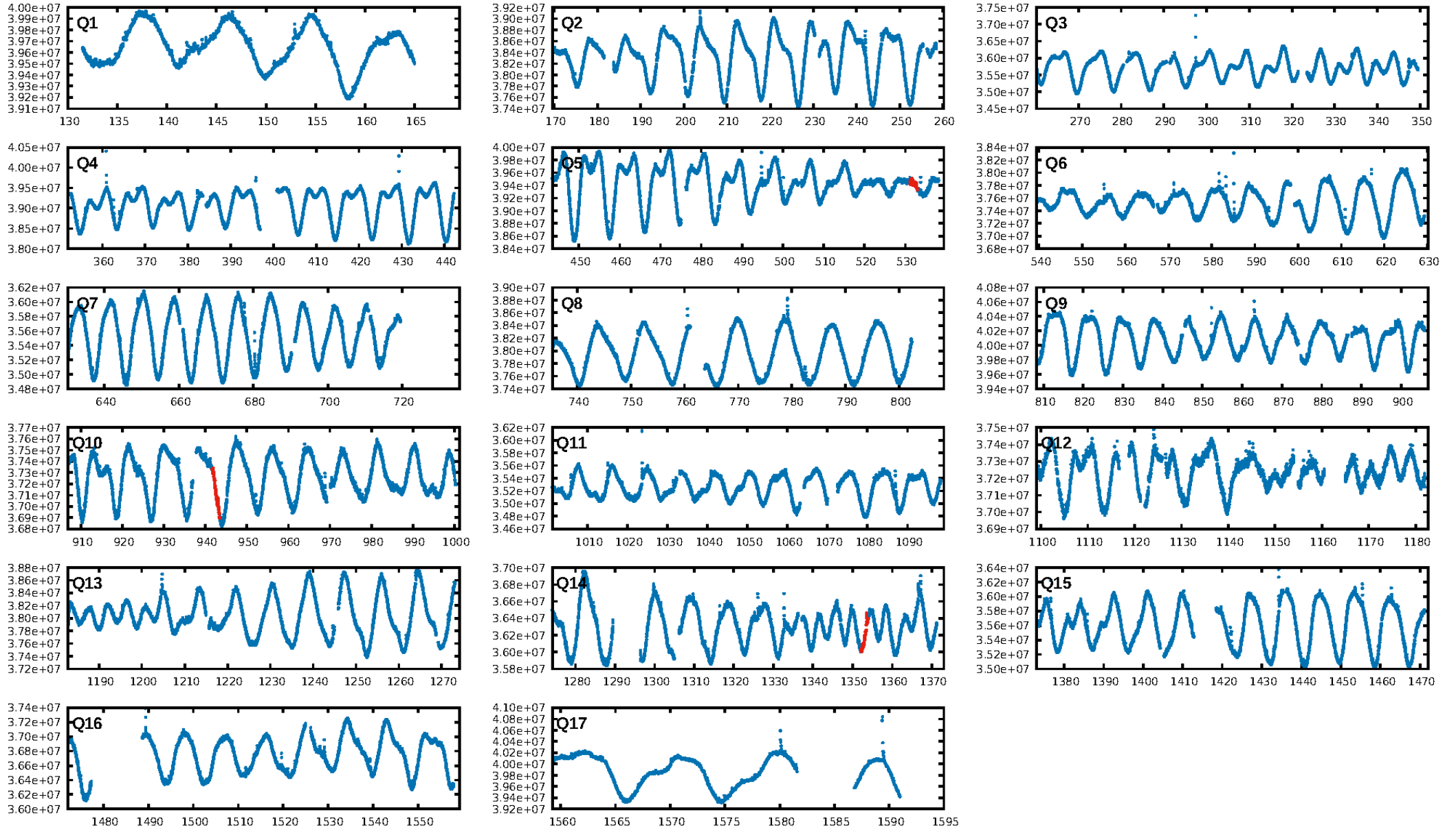
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [249.47σ]  
LongPeriod-sig: 100.0% [48.41σ]  
ModelChiSquare2-sig: 52.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.69e-07**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 3.282  
Centroid-sig: 18.4%  
Centroid-so: 0.213 arcsec [0.42σ]  
OotOffset-rm: 0.706 arcsec [2.98σ]  
**KicOffset-rm: 0.981 arcsec [4.61σ]**  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

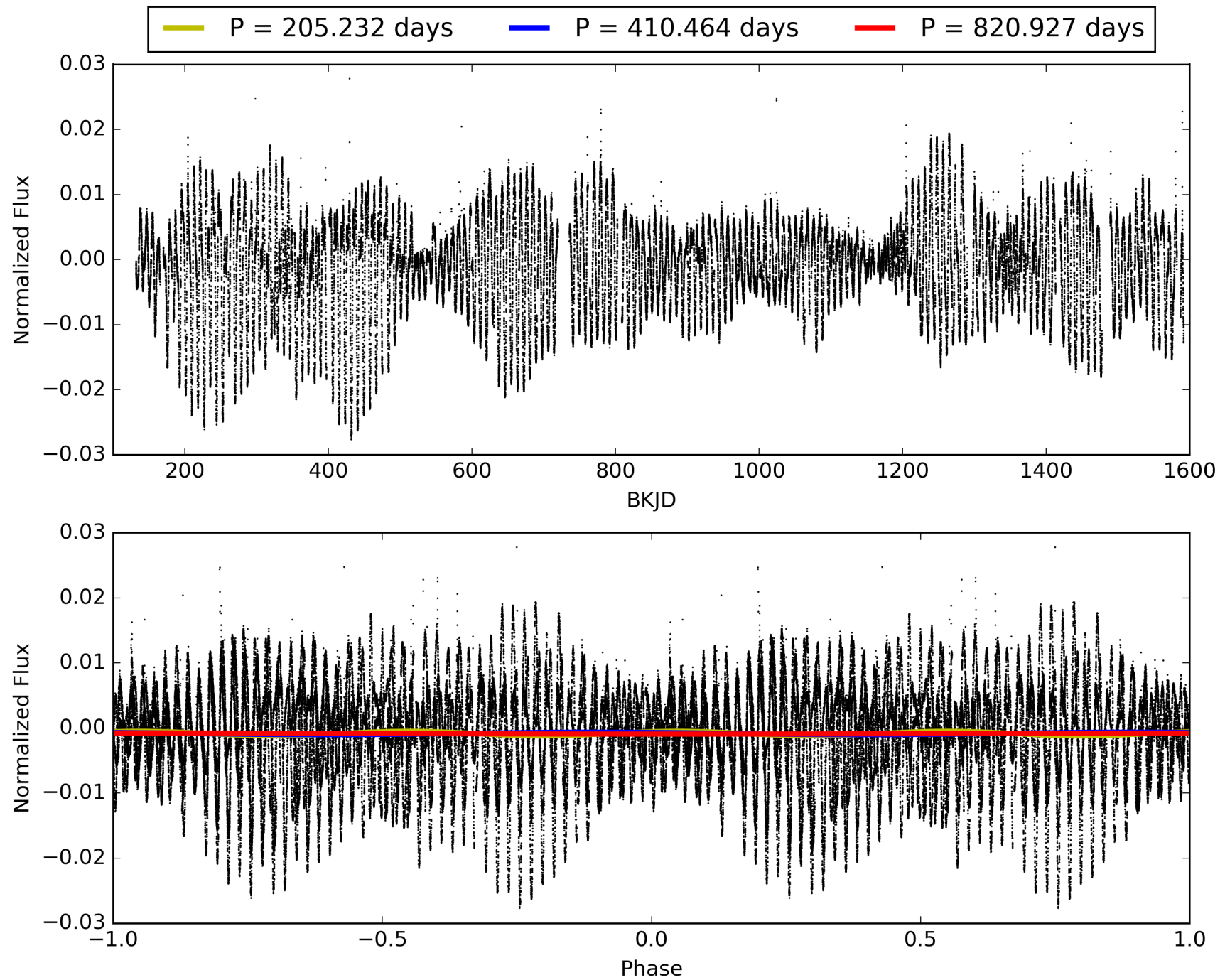
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:53:53 Z

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

# TCE 006224062-03, PDC Light Curves

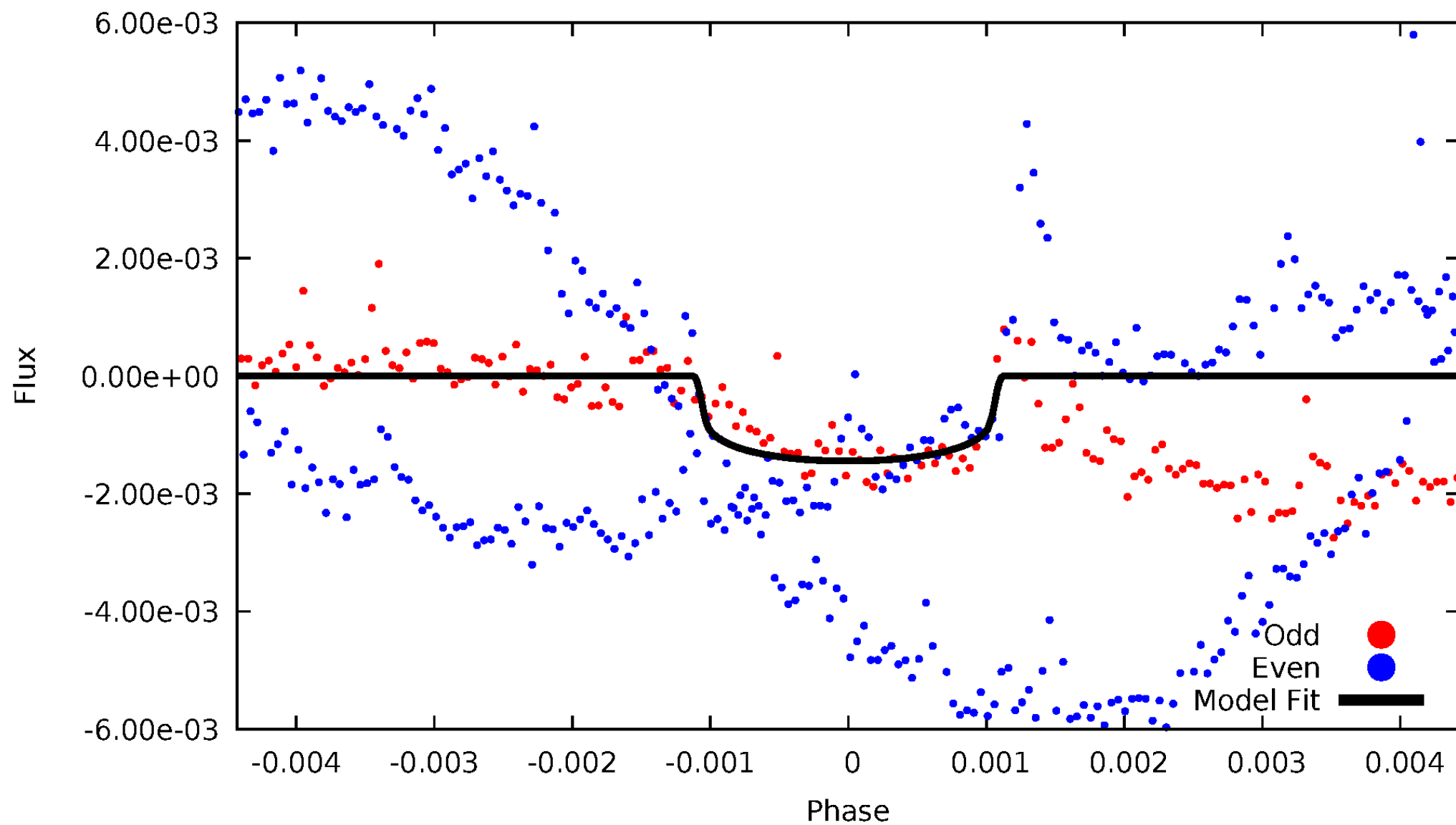


TCE 006224062-03



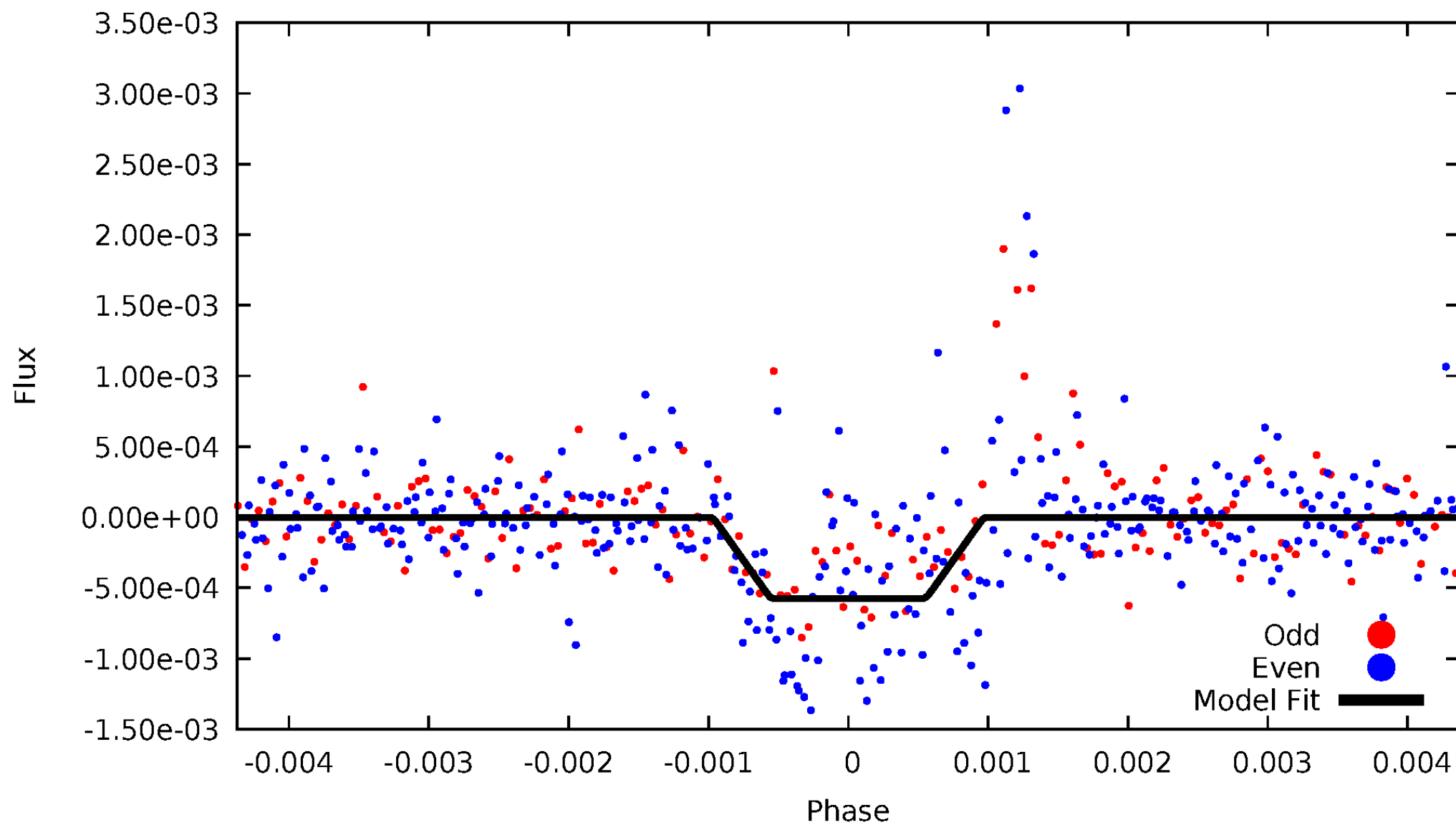
# DV Odd/Even

TCE 006224062-03



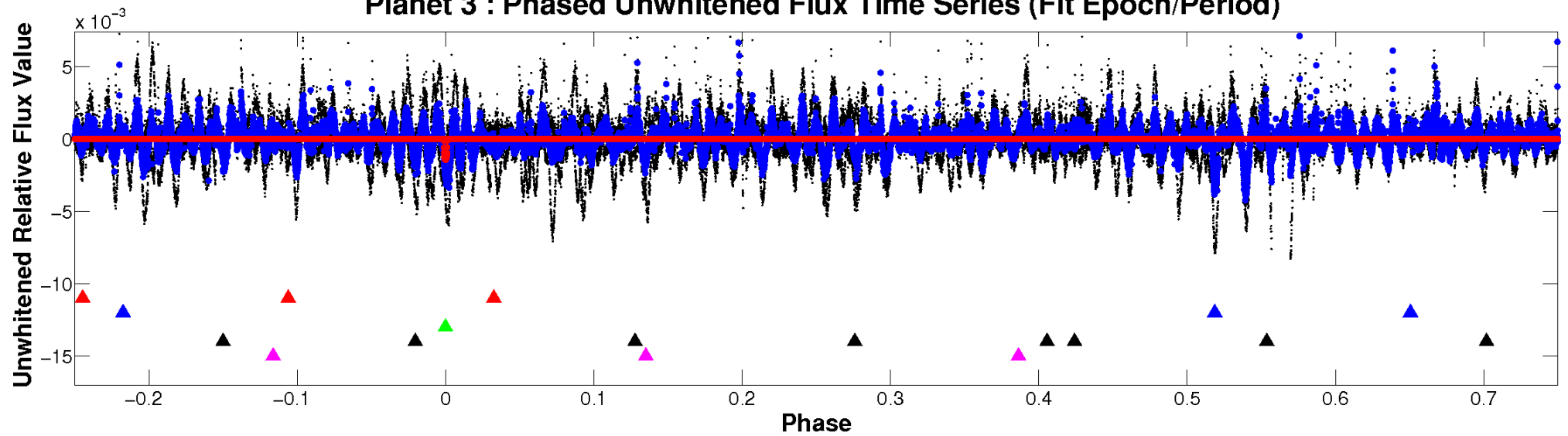
# ALT Odd/Even

TCE 006224062-03

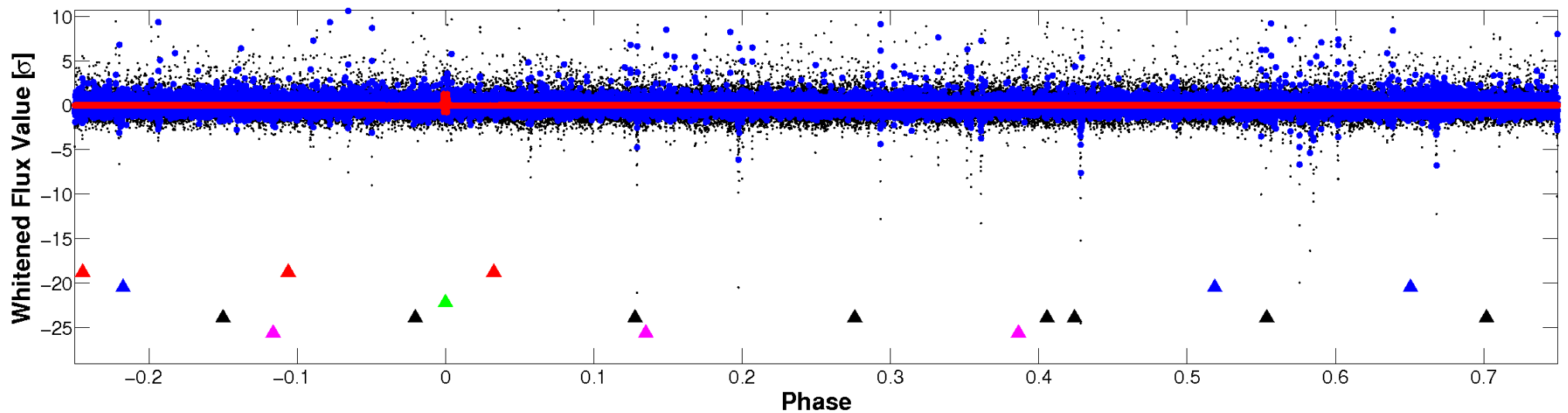


# Non-Whitened Vs. Whitened Light Curve

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

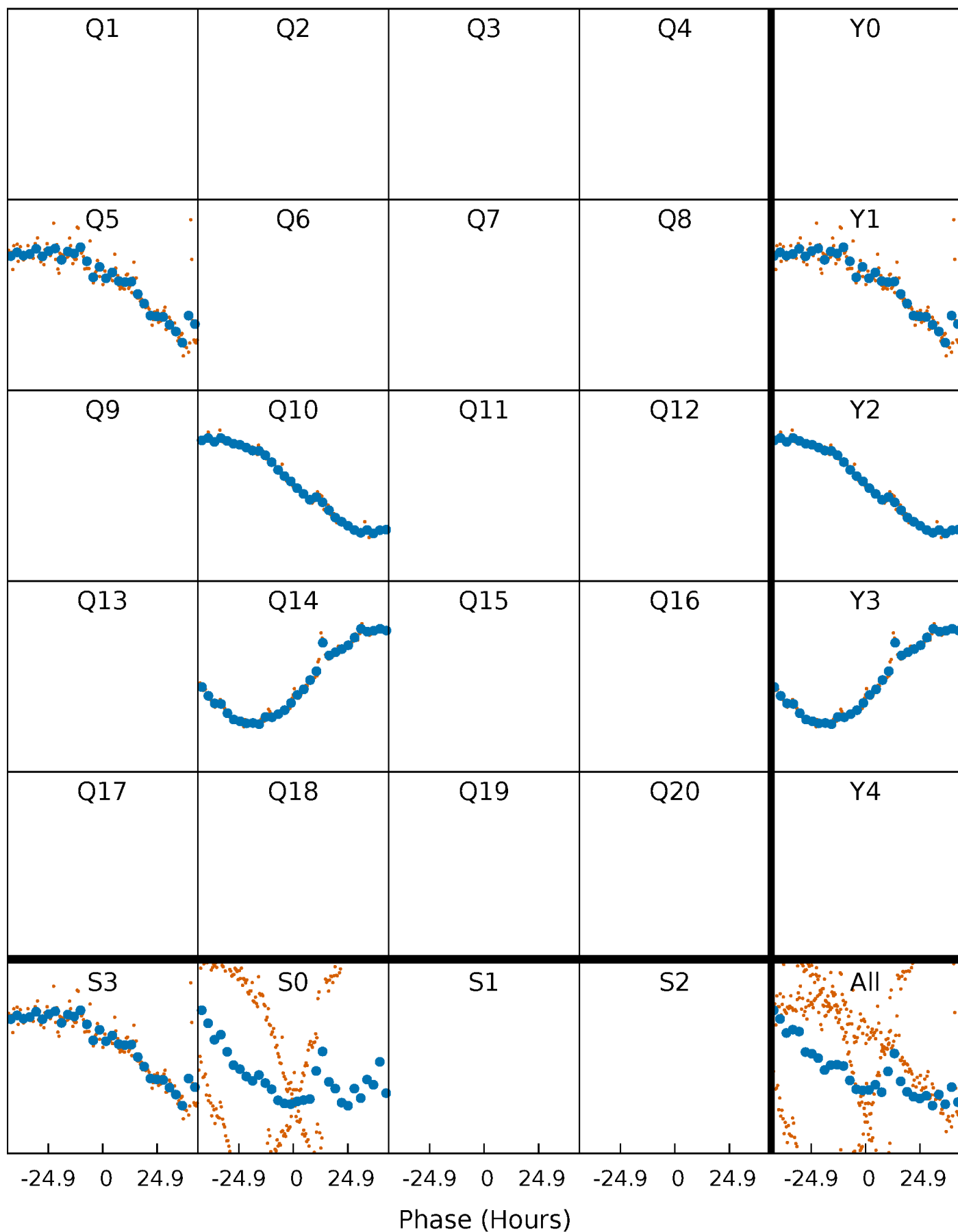


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



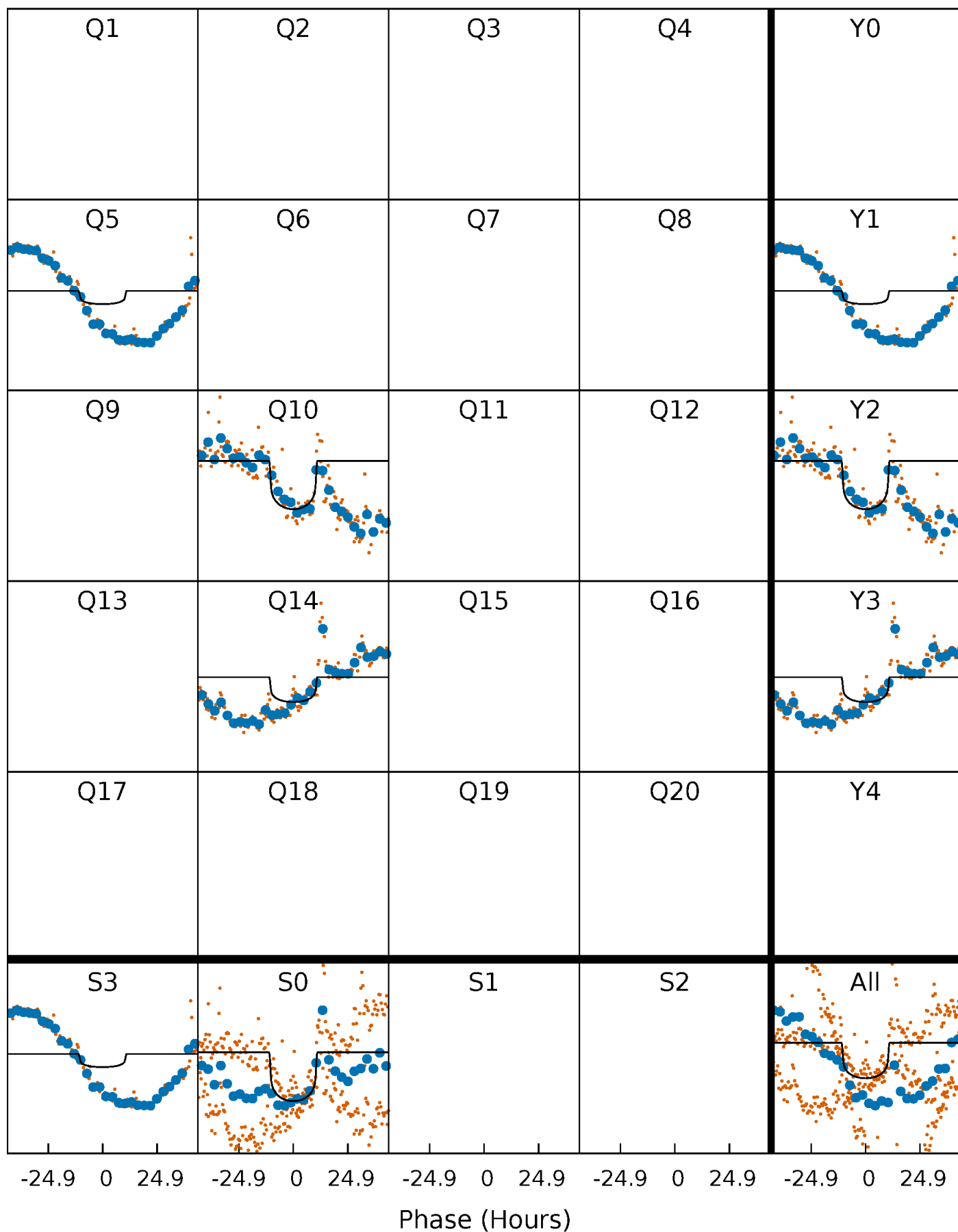
# PDC Quarter-Phased Transit Curves

TCE 006224062-03     $P=410.463654$  Days     $T_0=532.067431$  (BKJD)



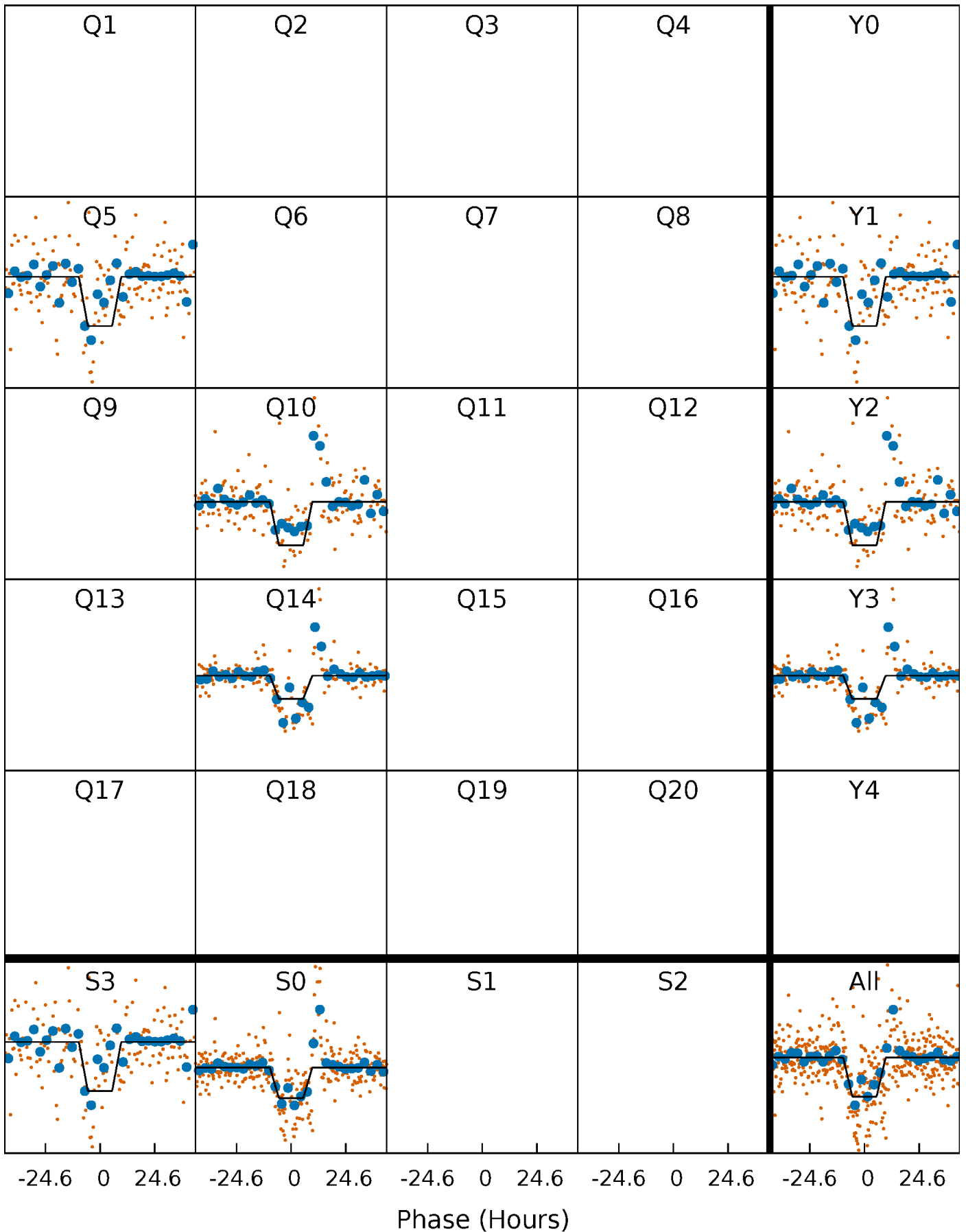
# DV Quarter-Phased Transit Curves

TCE 006224062-03     $P=410.463654$  Days     $T_0=532.067431$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

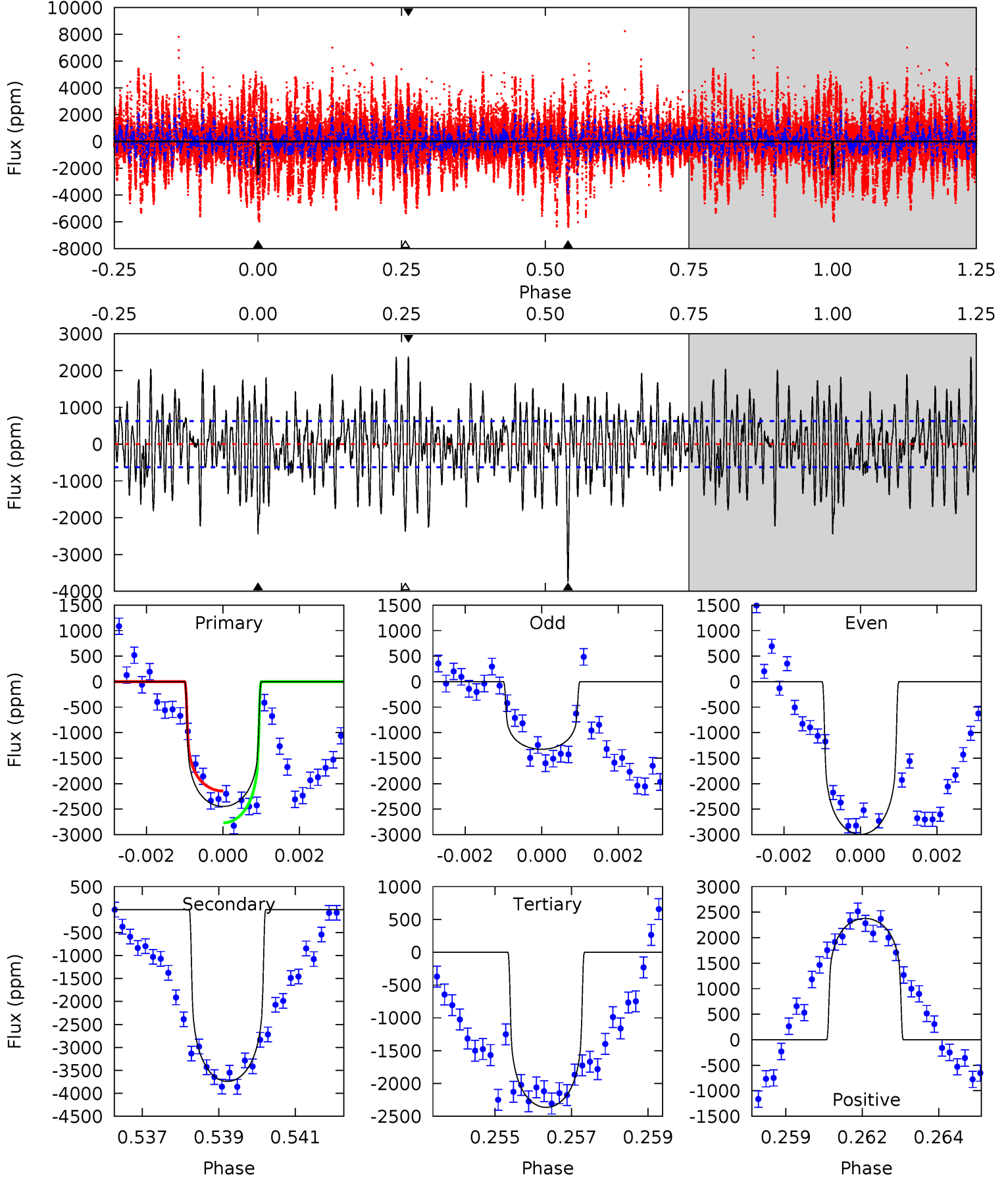
TCE 006224062-03 P=410.503409 Days  $T_0=532.035260$  (BKJD)



# DV Model-Shift Uniqueness Test

006224062-03, P = 410.463654 Days, E = 121.603777 Days

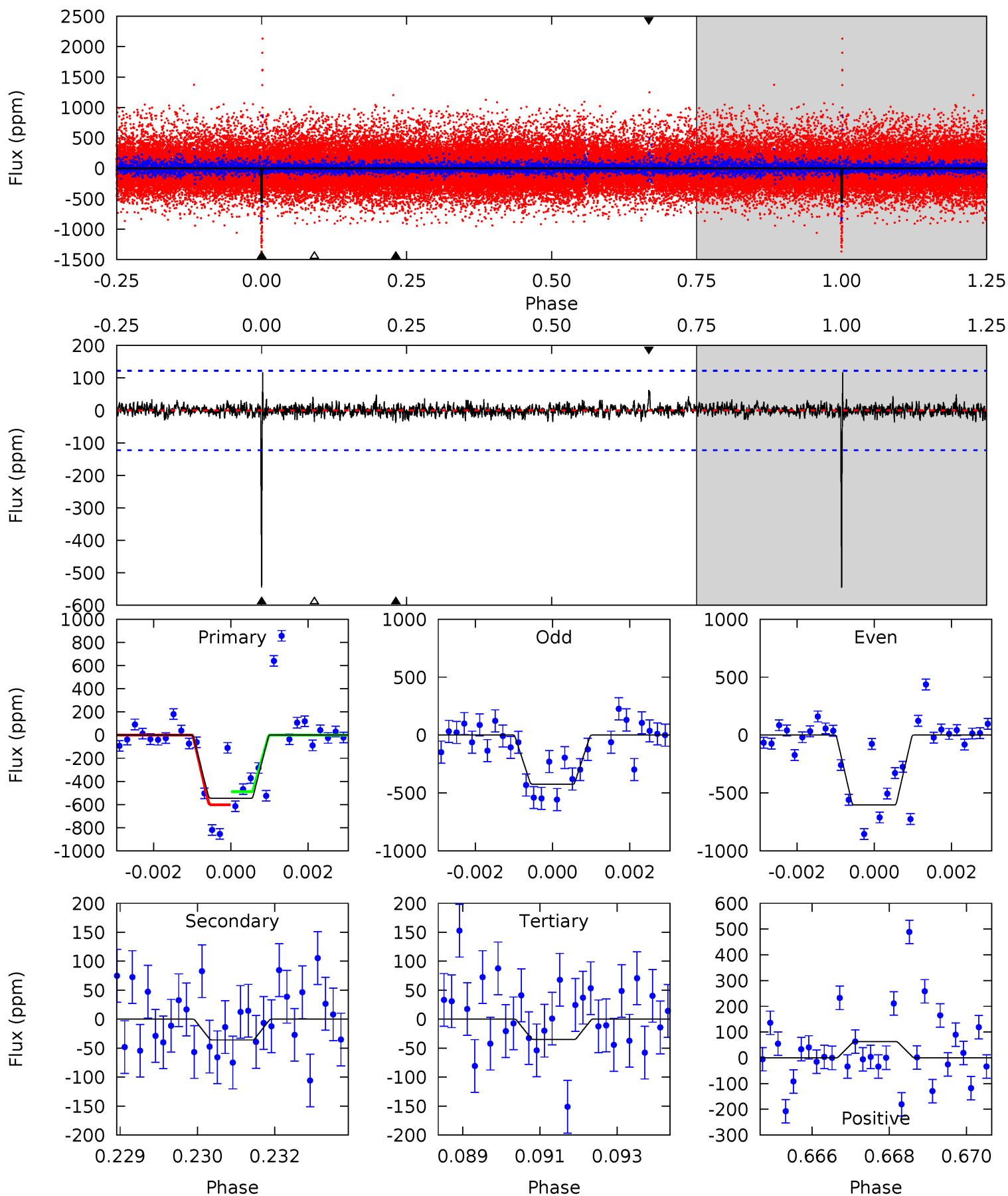
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.7	31.6	20.0	20.1	5.30	3.05	6.46	0.70	0.59	11.6	11.5	6.75	1.40	0.39	2.65



# Alt Model-Shift Uniqueness Test

006224062-03, P = 410.503409 Days, E = 121.531851 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
23.8	1.56	1.52	2.74	5.33	3.09	0.49	22.3	21.0	0.04	-1.17	3.65	1.33	0.18	2.45



### Stellar Parameters For KIC 006224062

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3707^{+50}_{-55}$	$4.794^{+0.039}_{-0.024}$	$-0.200^{+0.100}_{-0.100}$	$0.452^{+0.028}_{-0.031}$	$0.464^{+0.029}_{-0.029}$	$7.077^{+1.274}_{-0.739}$
	+1%/-1%	+1%/-1%	+50%/-50%	+6%/-7%	+6%/-6%	+18%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 006224062-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3740 \pm 118$	$1.69^{+0.25}_{-0.24}$	$167^{+3}_{-3}$	$4560^{+296}_{-248}$	$509443^{+176145}_{-123837}$
Alt.	$-36 \pm 23$	$1.17^{+0.25}_{-0.25}$	$167^{+3}_{-3}$	$2514^{+218}_{-292}$	$10461^{+9643}_{-6948}$

$T_{\text{max}}$  = 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

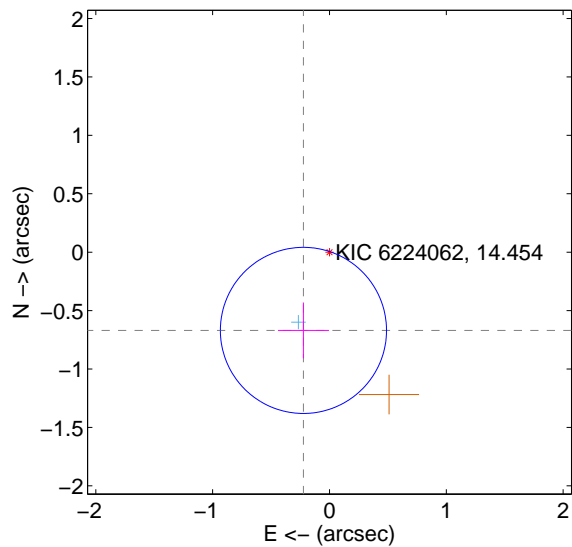
Supplemental centroid analysis for 006224062-03. Kepler magnitude: 14.45. Transit SNR 7.99

There are 1 quarters with good PRF difference image offsets

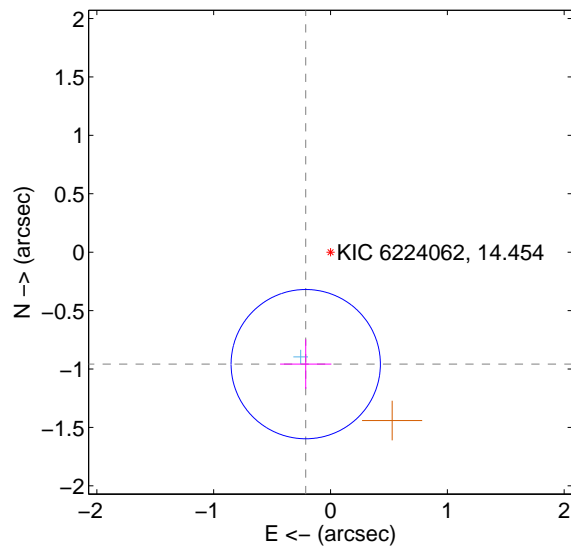
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.706 \pm 0.237$	2.98	$0.223 \pm 0.218$	$-0.670 \pm 0.239$
PRF-fit source offset from KIC position	$0.981 \pm 0.213$	4.61	$0.212 \pm 0.220$	$-0.958 \pm 0.213$
photometric centroid source offset	$0.21 \pm 0.50$	0.42	$0.21 \pm 0.50$	$0.01 \pm 0.57$

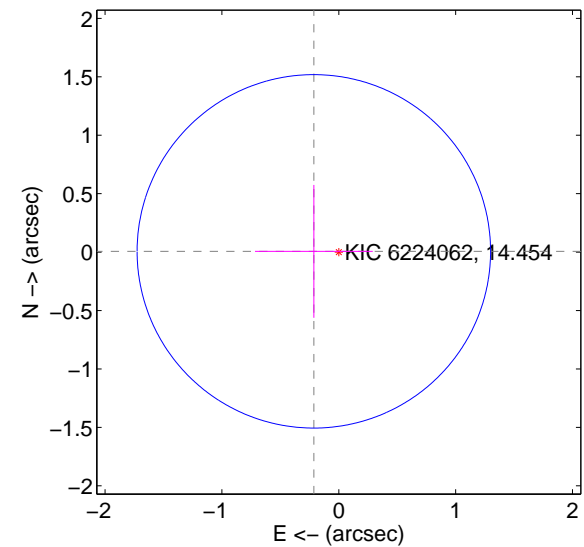
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

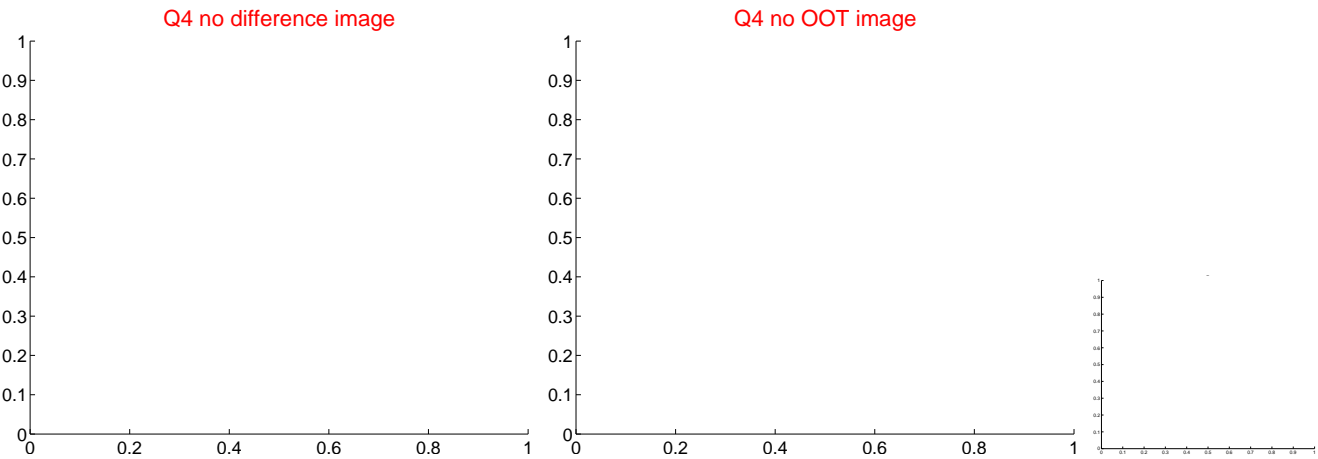
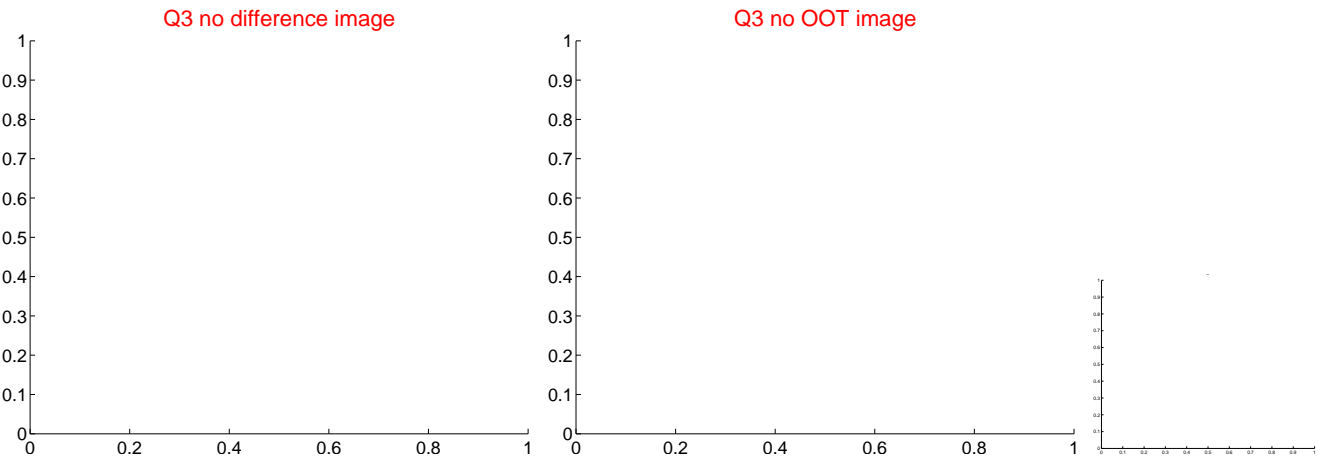
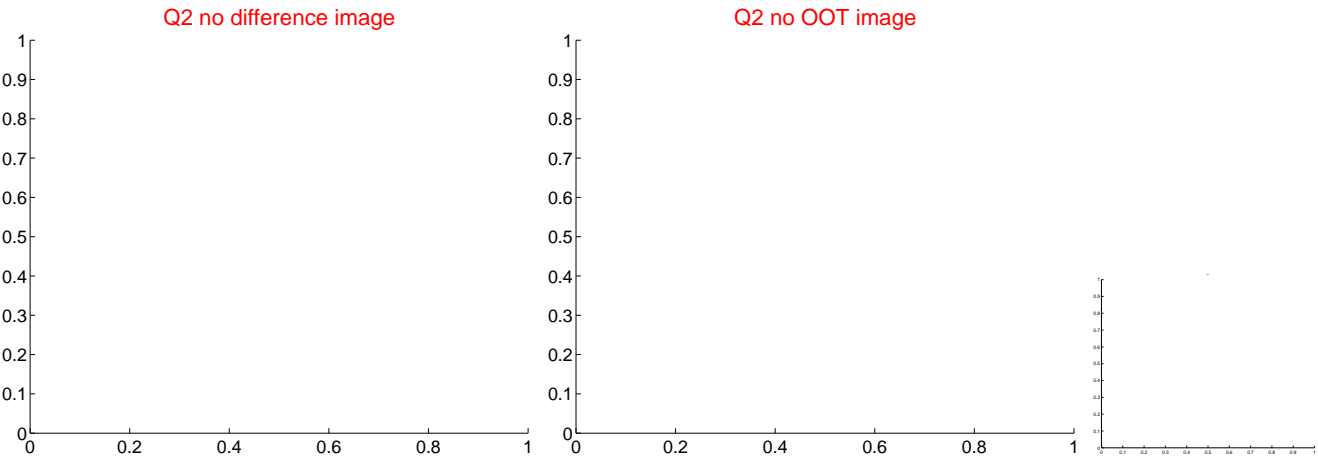
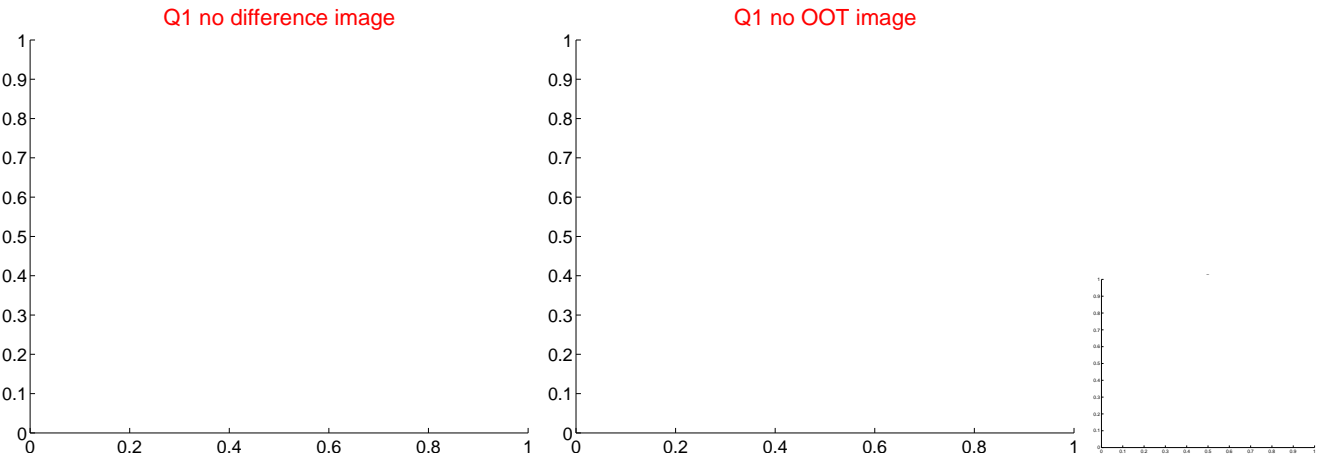


offset from photometric centroids

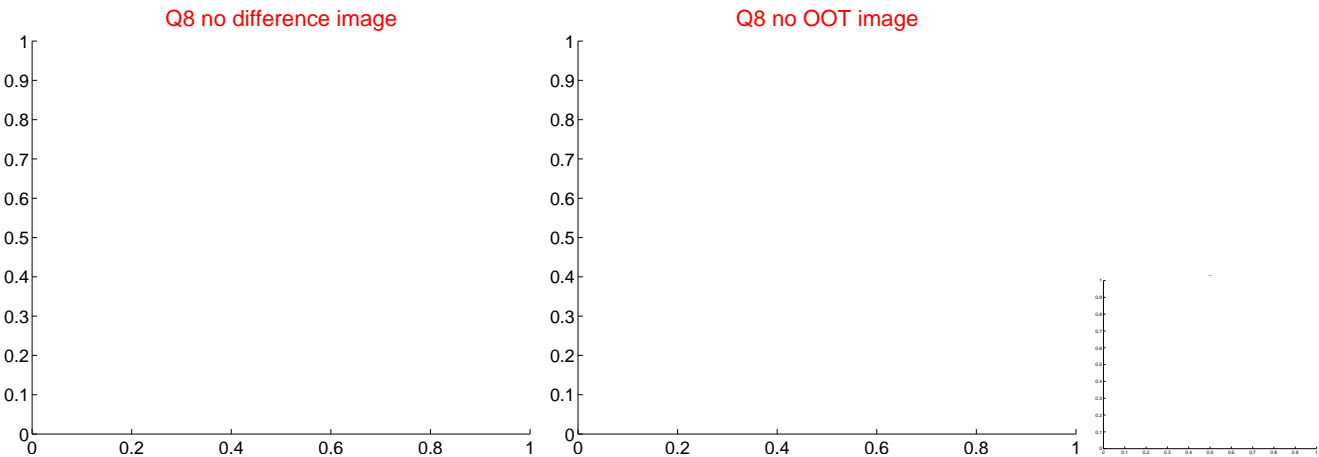
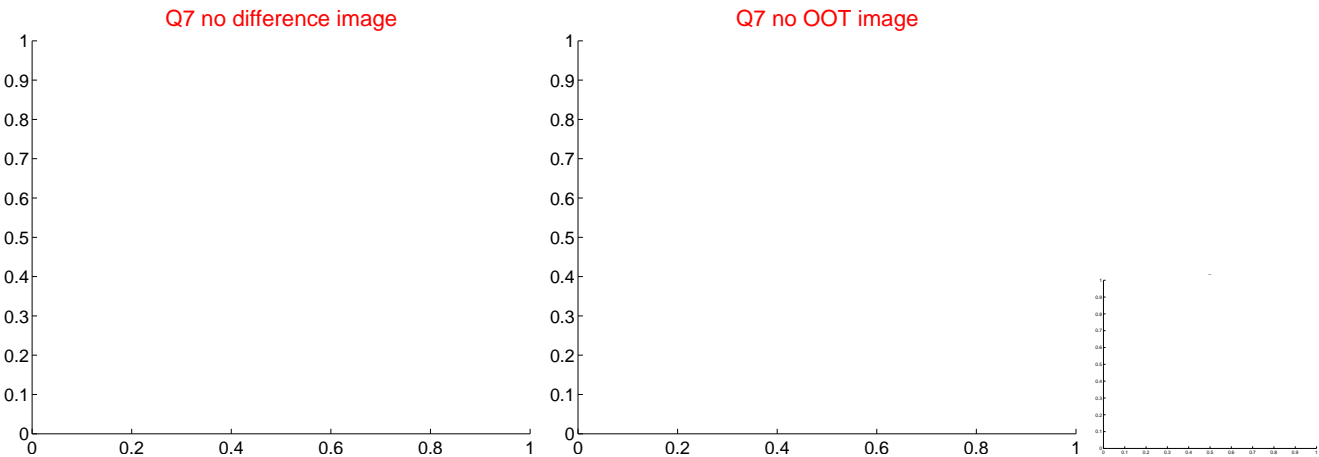
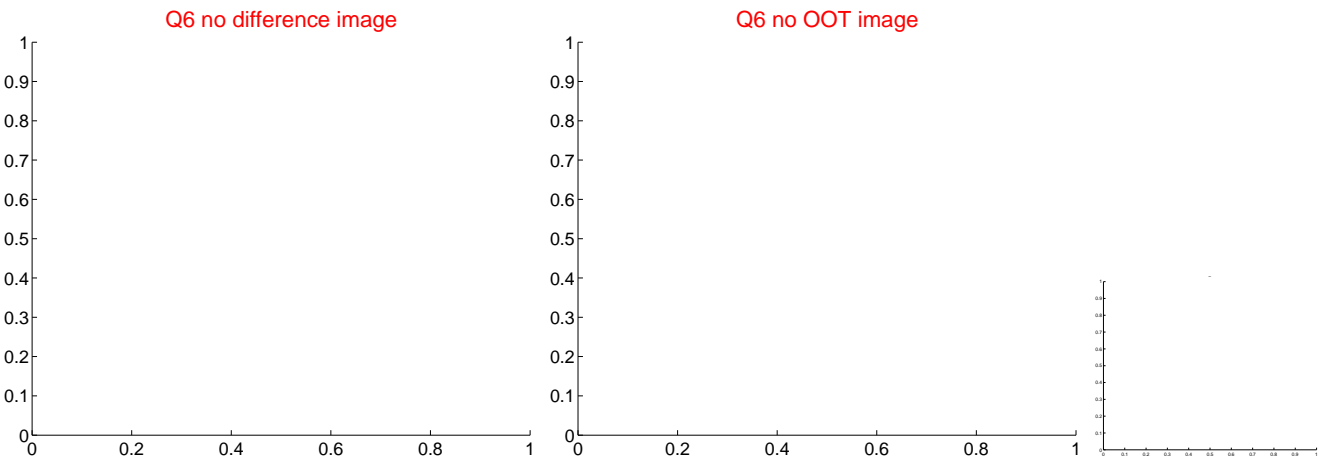
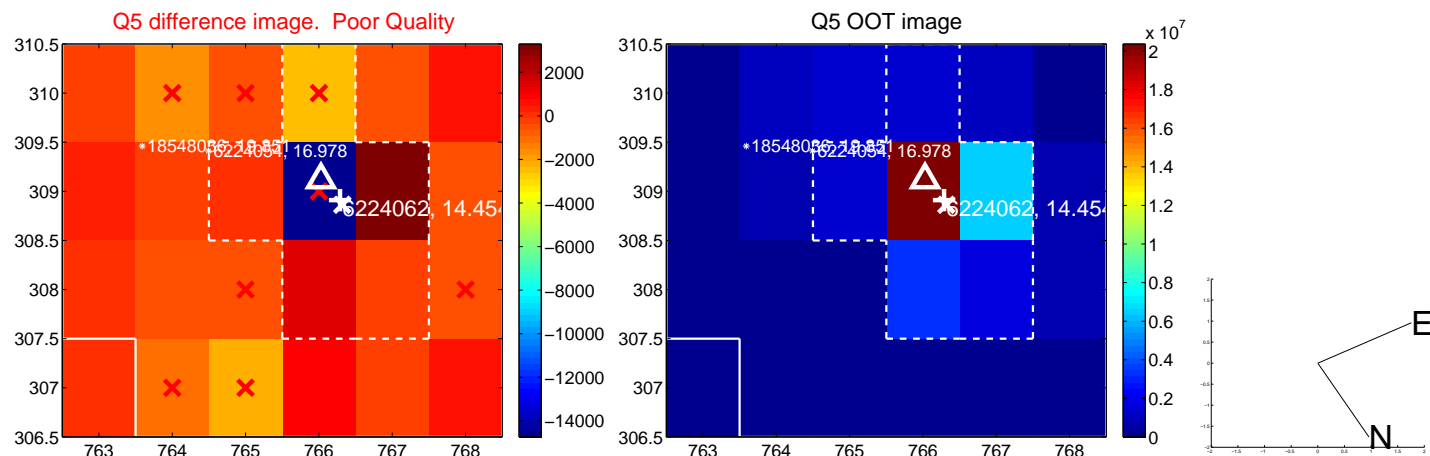


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

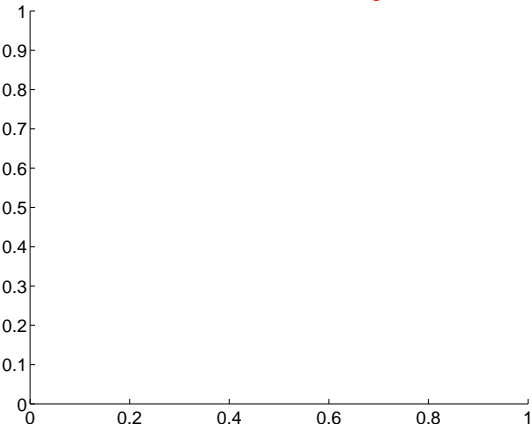


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

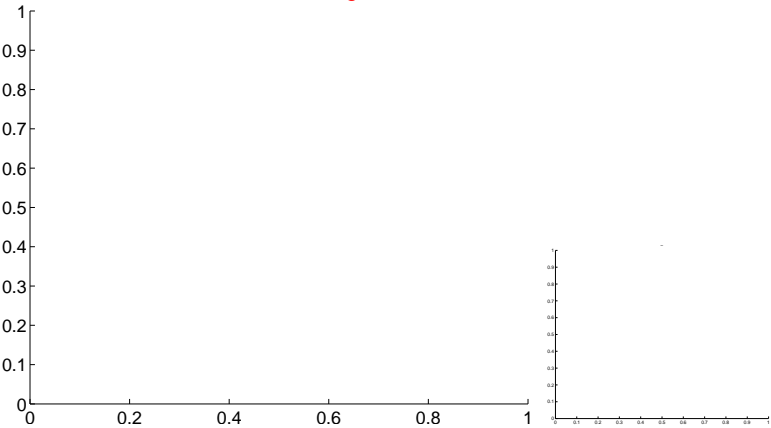


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

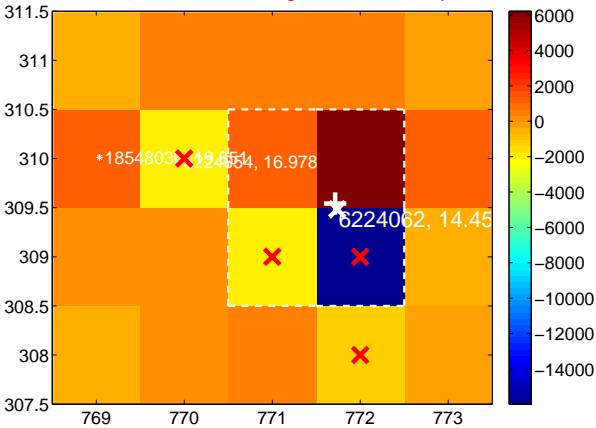
Q9 no difference image



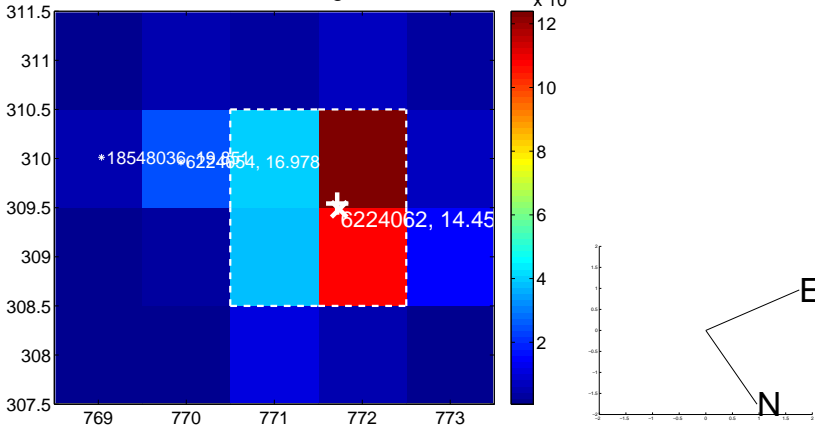
Q9 no OOT image



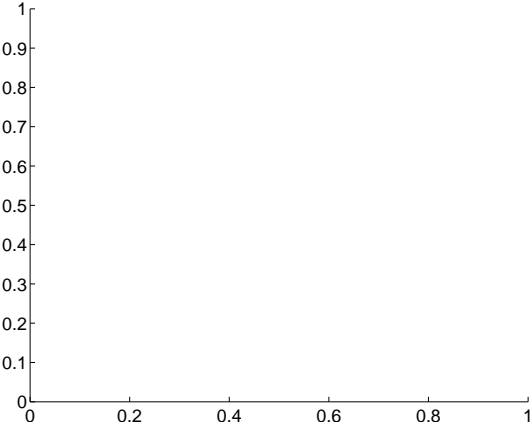
Q10 difference image. Poor Quality



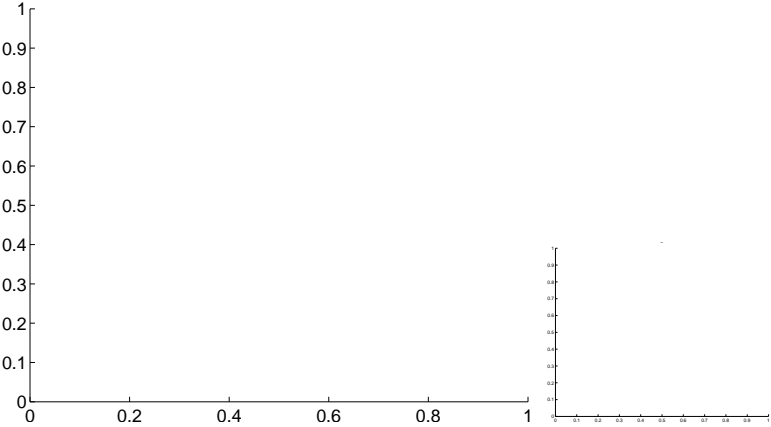
Q10 OOT image



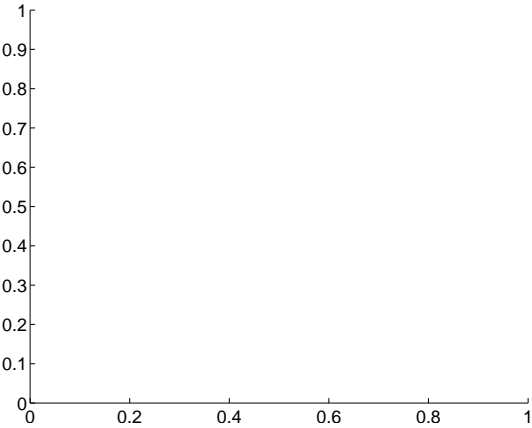
Q11 no difference image



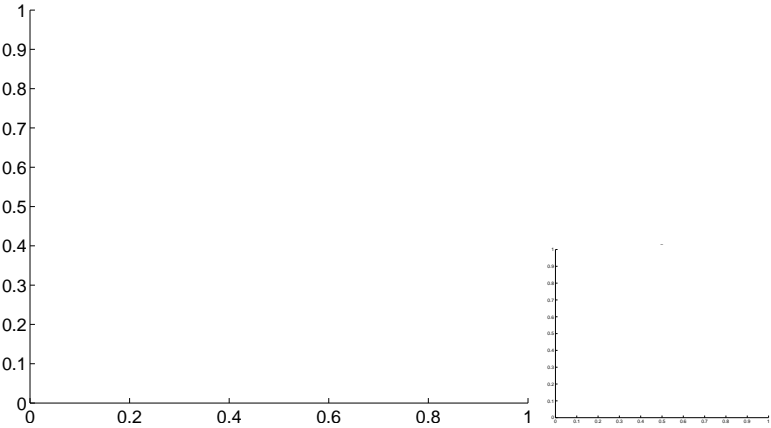
Q11 no OOT image



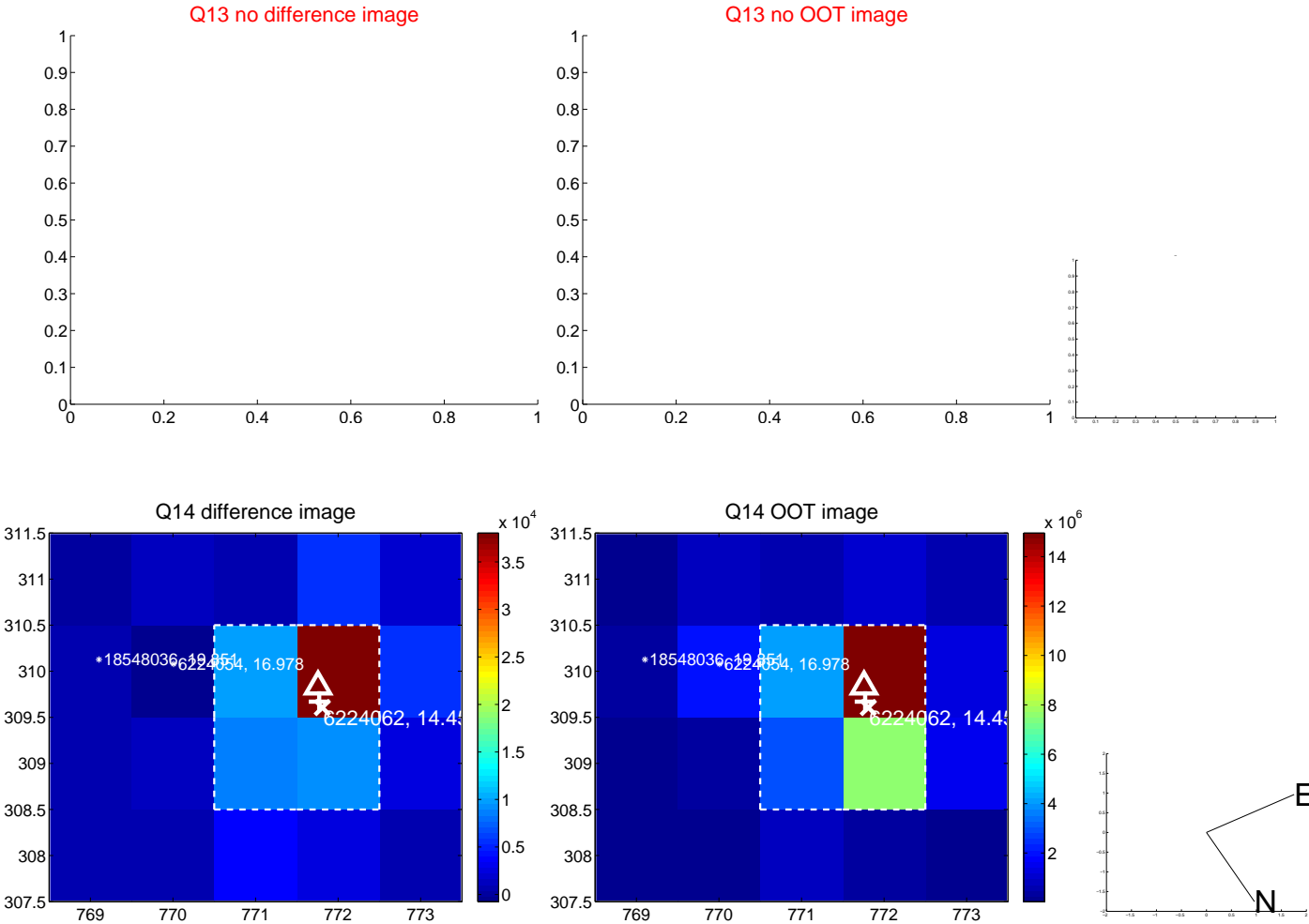
Q12 no difference image



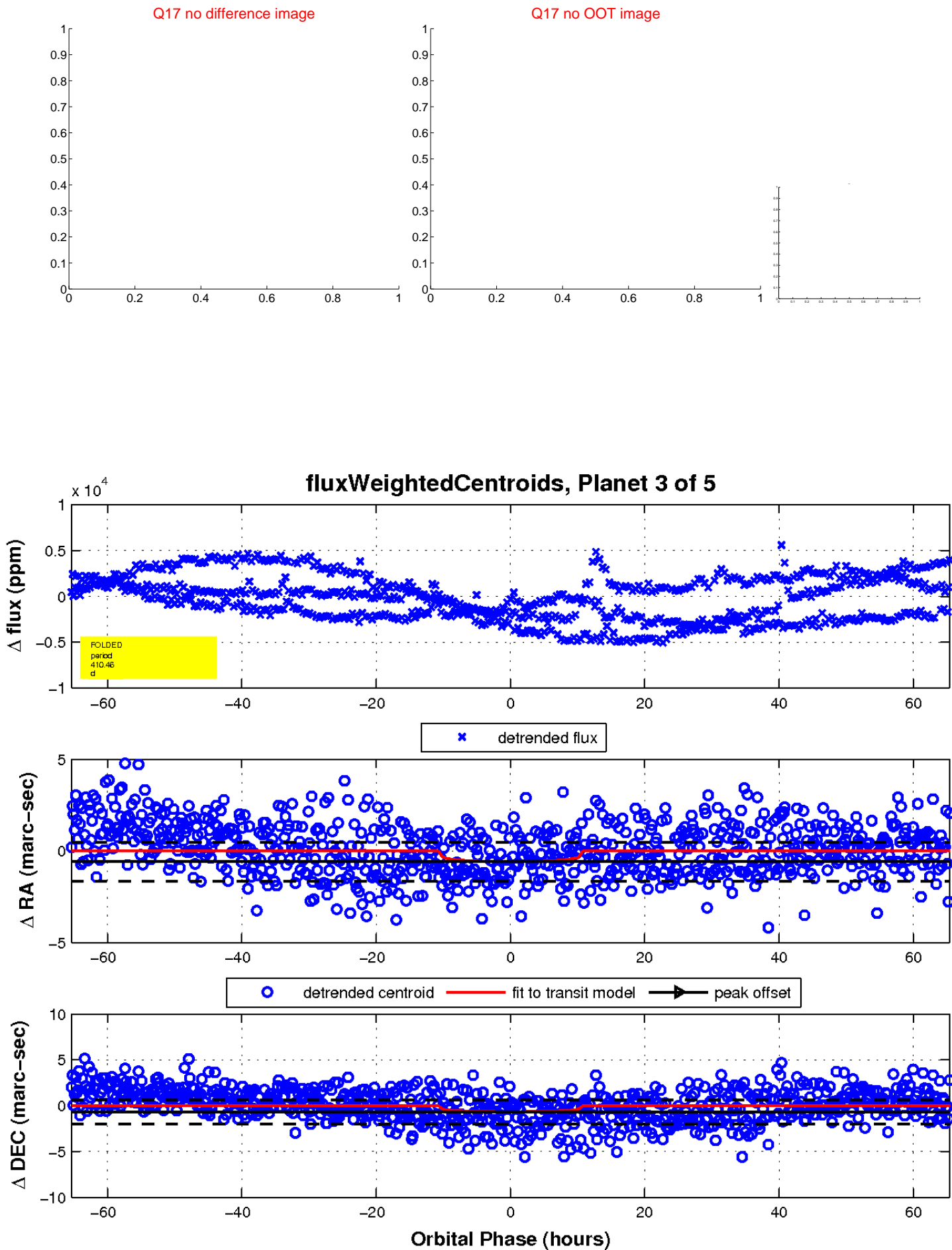
Q12 no OOT image



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

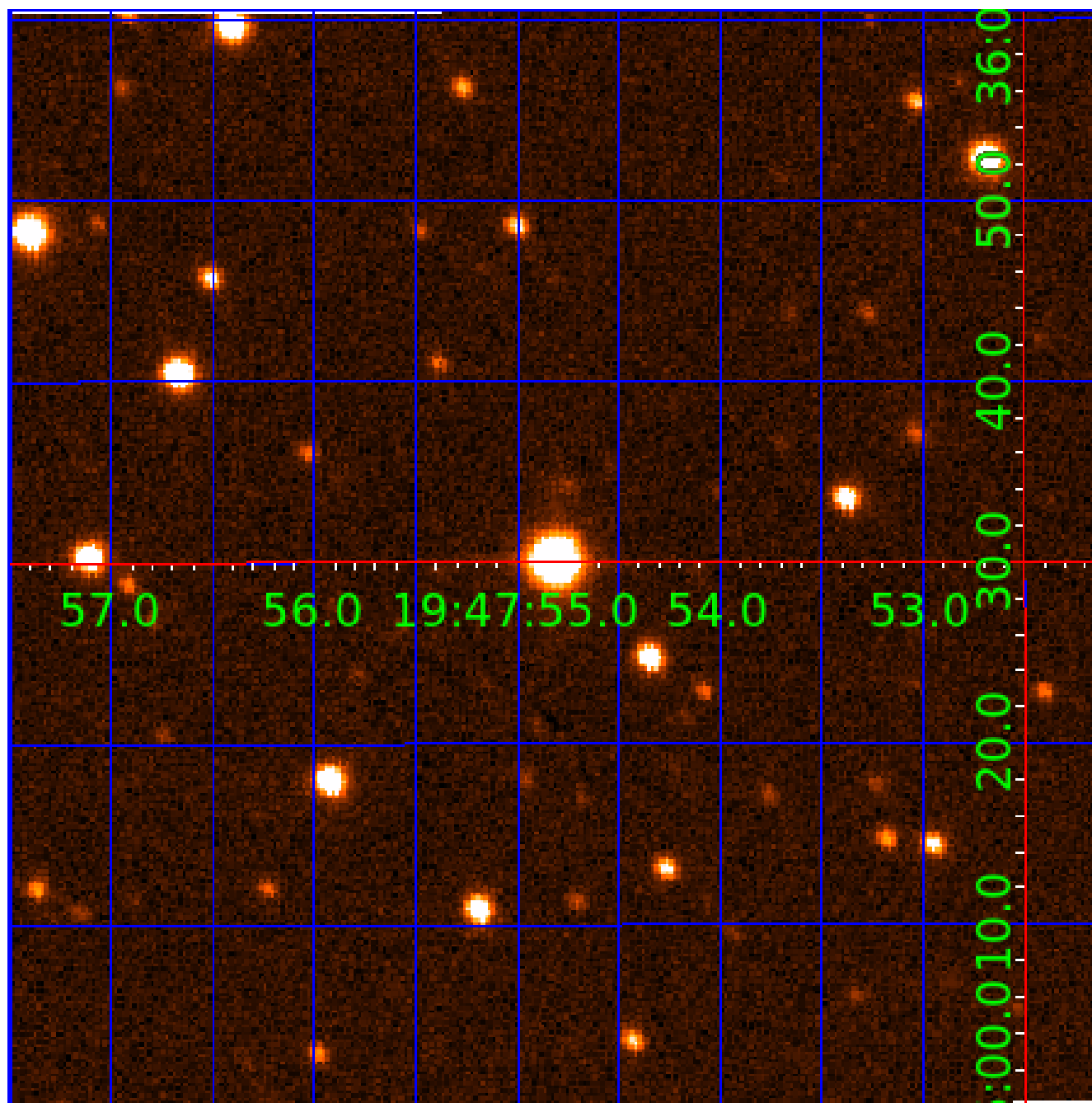


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006224062

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006224062-01	OBS	No	467.359926	431.663976	763.6	13.636	10.2	5.3	0.45	3707	1.30	0.04
006224062-02	OBS	No	464.641816	334.487553	1154.2	15.677	10.4	7.0	0.45	3707	2.06	0.04
006224062-03	OBS	No	410.463654	532.067431	1445.3	21.809	8.5	8.0	0.45	3707	1.71	0.05
006224062-04	OBS	No	174.826836	295.682146	417.3	6.184	9.6	5.5	0.45	3707	1.01	0.15
006224062-05	OBS	No	513.600992	484.379041	1057.0	6.911	9.9	8.7	0.45	3707	1.84	0.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006224062-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006224062-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006224062-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
006224062-04	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS—HALO_GHOST
006224062-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

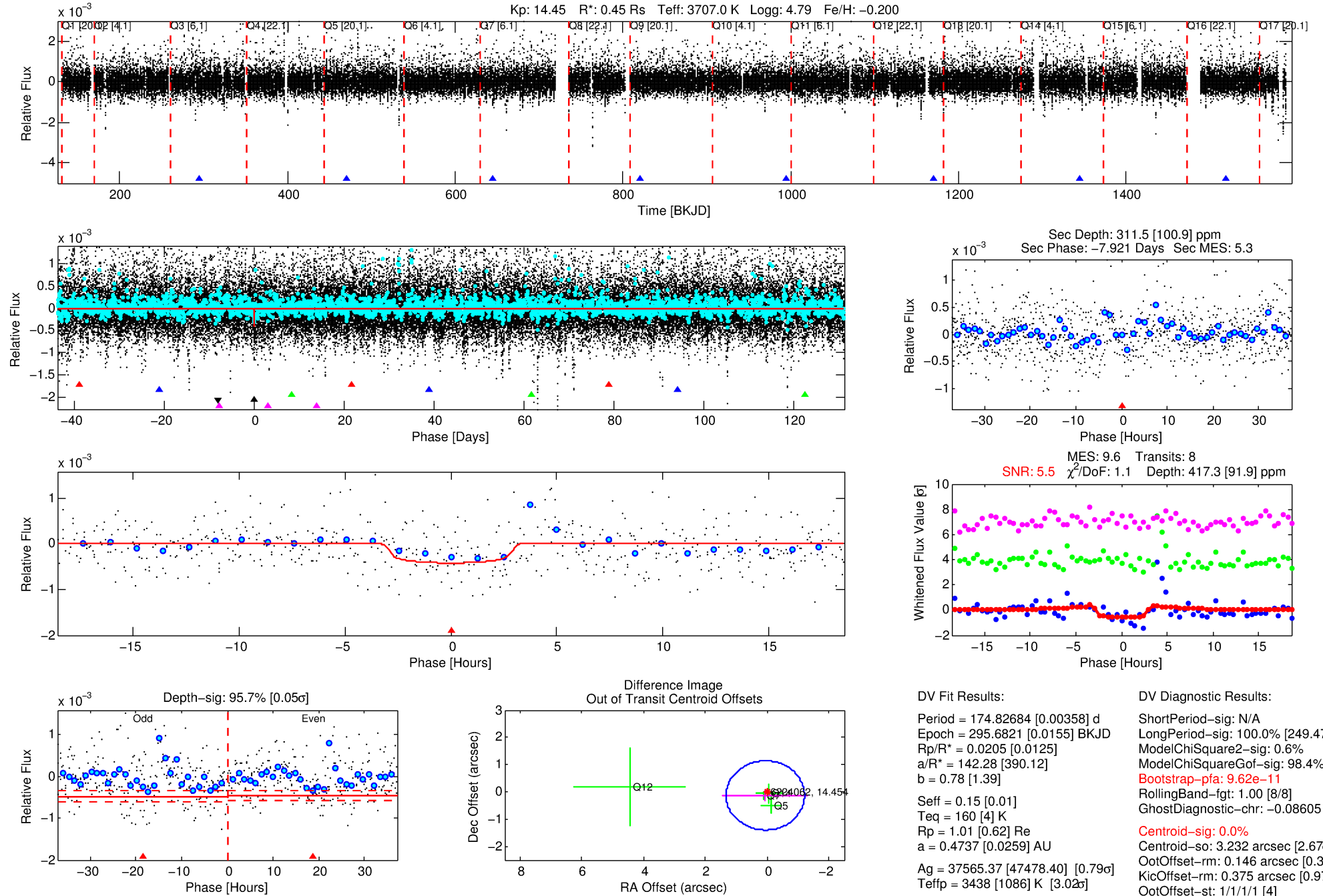
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006224062-04

No Significant Match Found

# DV One-Page Summary

KIC: 6224062 Candidate: 4 of 5 Period: 174.827 d



## DV Fit Results:

Period = 174.82684 [0.00358] d  
Epoch = 295.6821 [0.0155] BKJD  
Rp/R\* = 0.0205 [0.0125]  
a/R\* = 142.28 [390.12]  
b = 0.78 [1.39]  
Seff = 0.15 [0.01]  
Teq = 160 [4] K  
Rp = 1.01 [0.62] Re  
a = 0.4737 [0.0259] AU  
Ag = 37565.37 [47478.40] [0.79σ]  
Teffp = 3438 [1086] K [3.02σ]

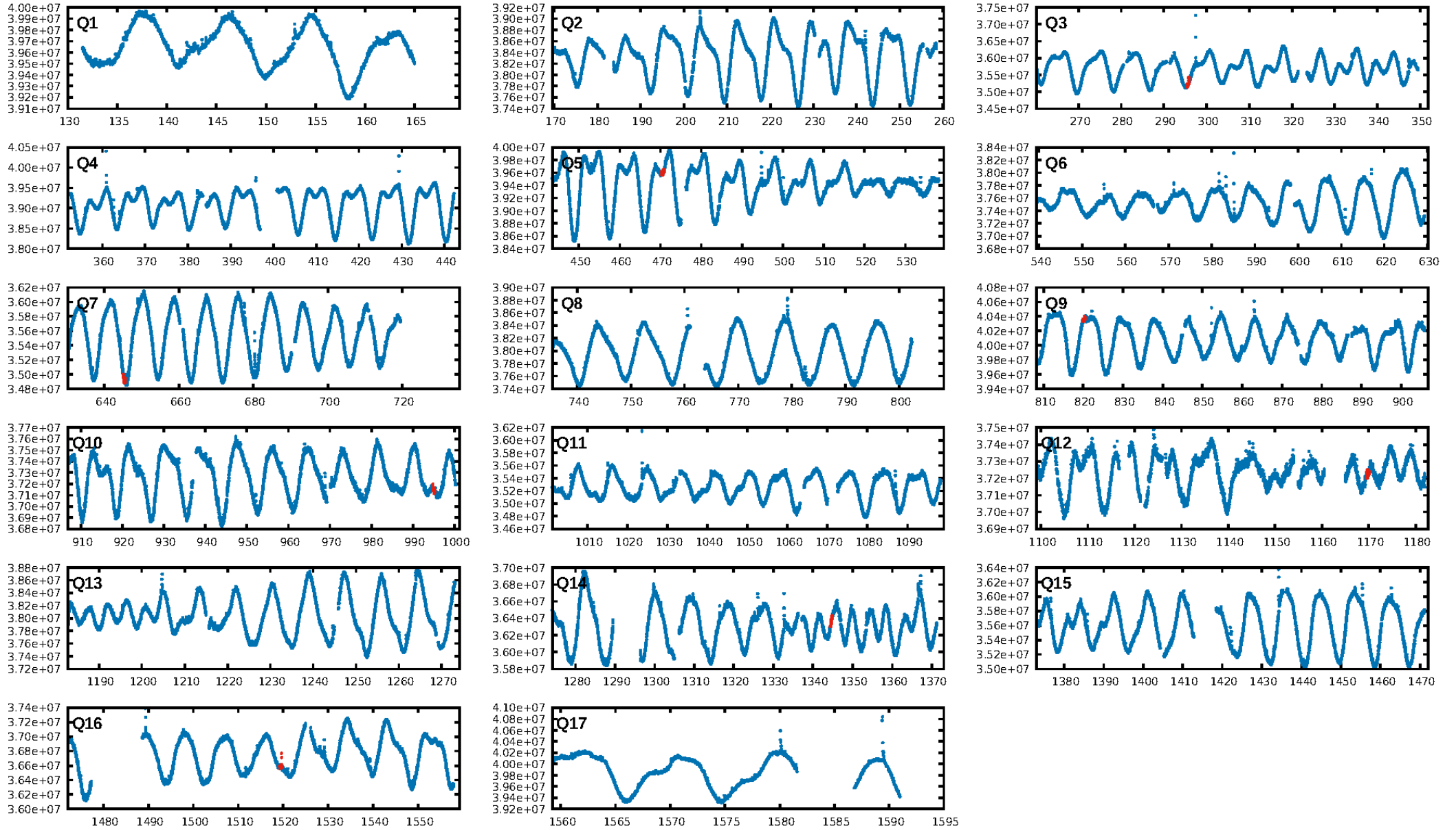
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [249.47σ]  
ModelChiSquare2-sig: 0.6%  
ModelChiSquareGoF-sig: 98.4%  
**Bootstrap-pfa: 9.62e-11**  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: -0.08605  
**Centroid-sig: 0.0%**  
Centroid-so: 3.232 arcsec [2.67σ]  
OotOffset-rm: 0.146 arcsec [0.34σ]  
KicOffset-rm: 0.375 arcsec [0.97σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [8/8]

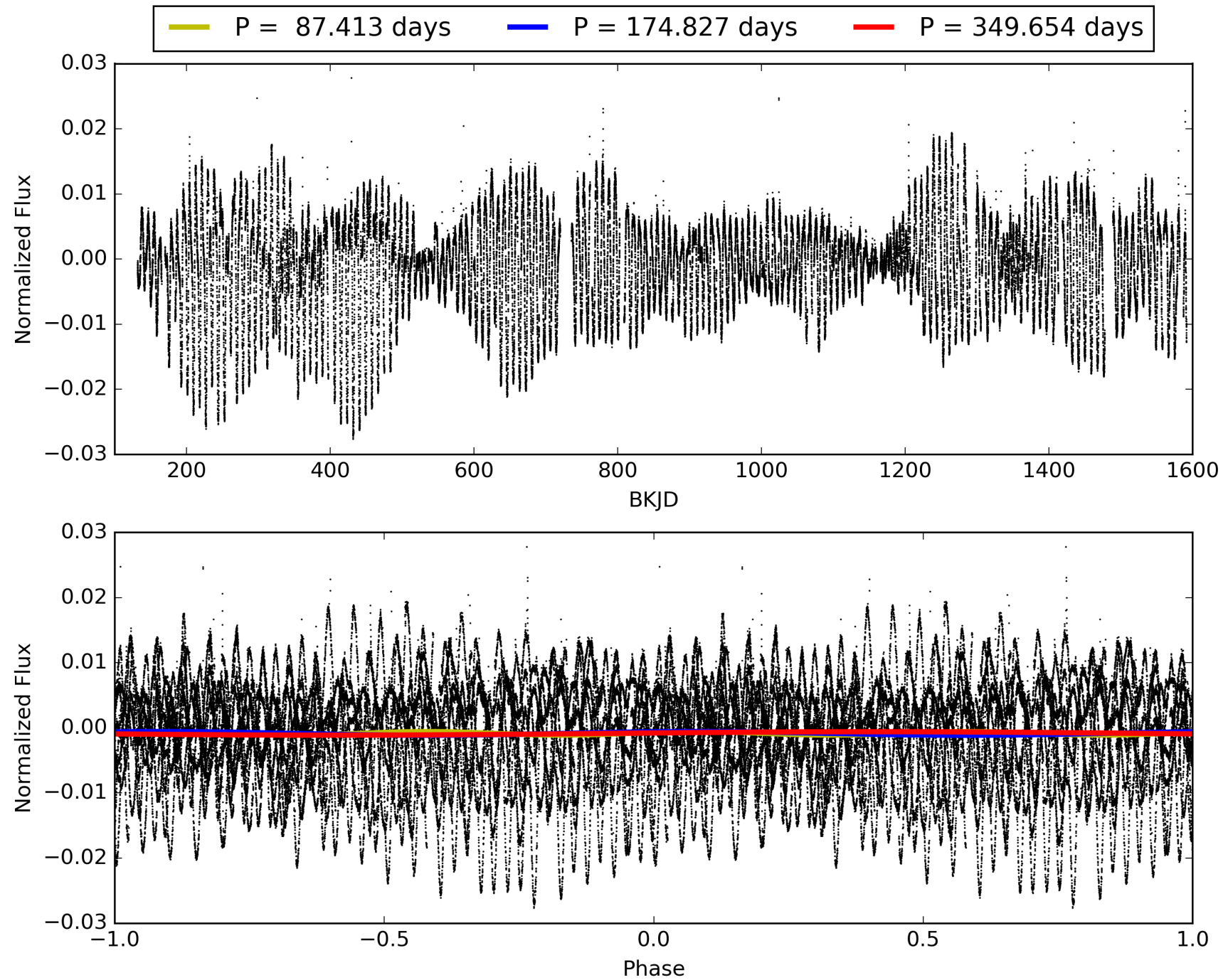
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:54:01 Z

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

# TCE 006224062-04, PDC Light Curves

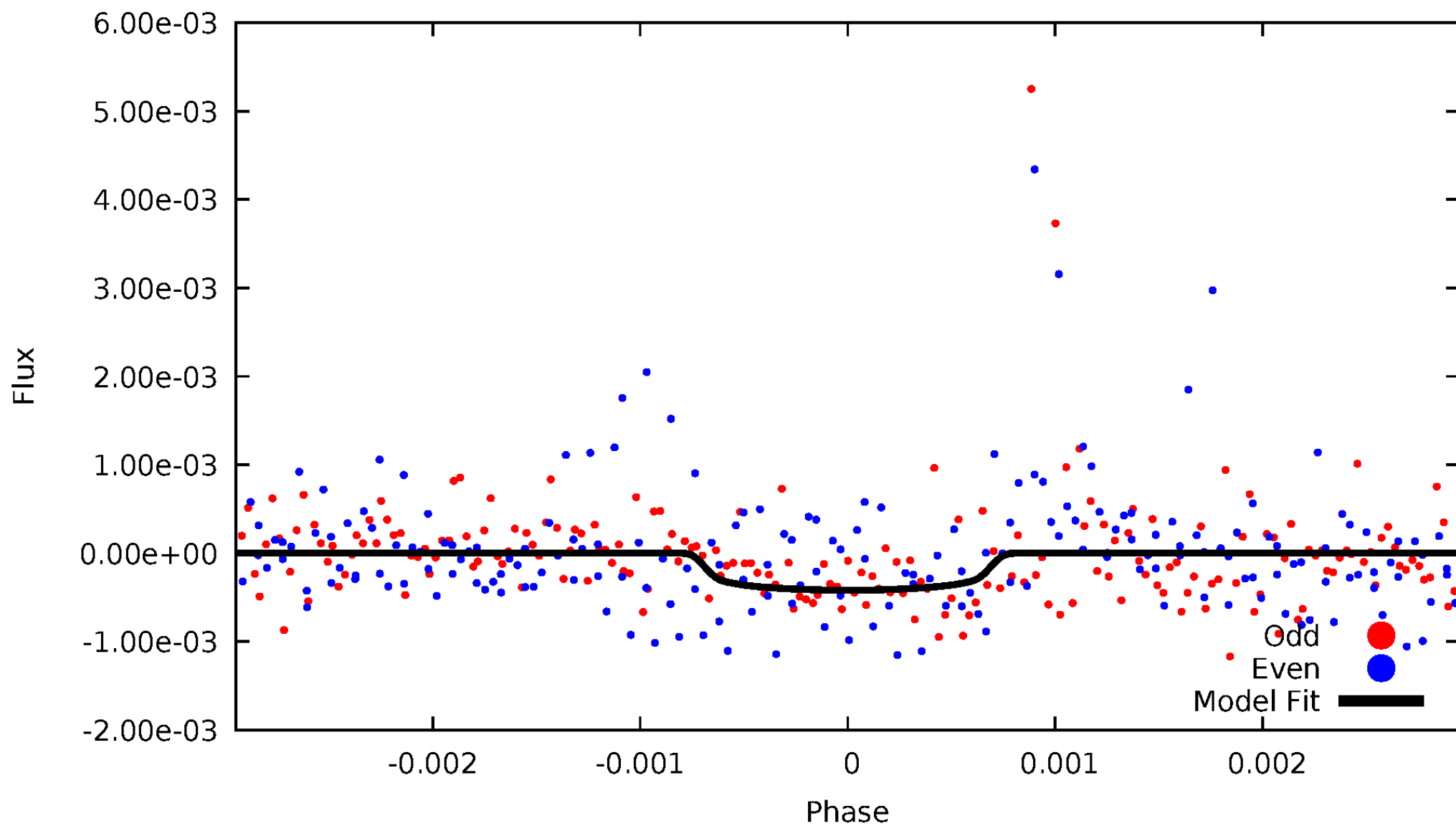


TCE 006224062-04



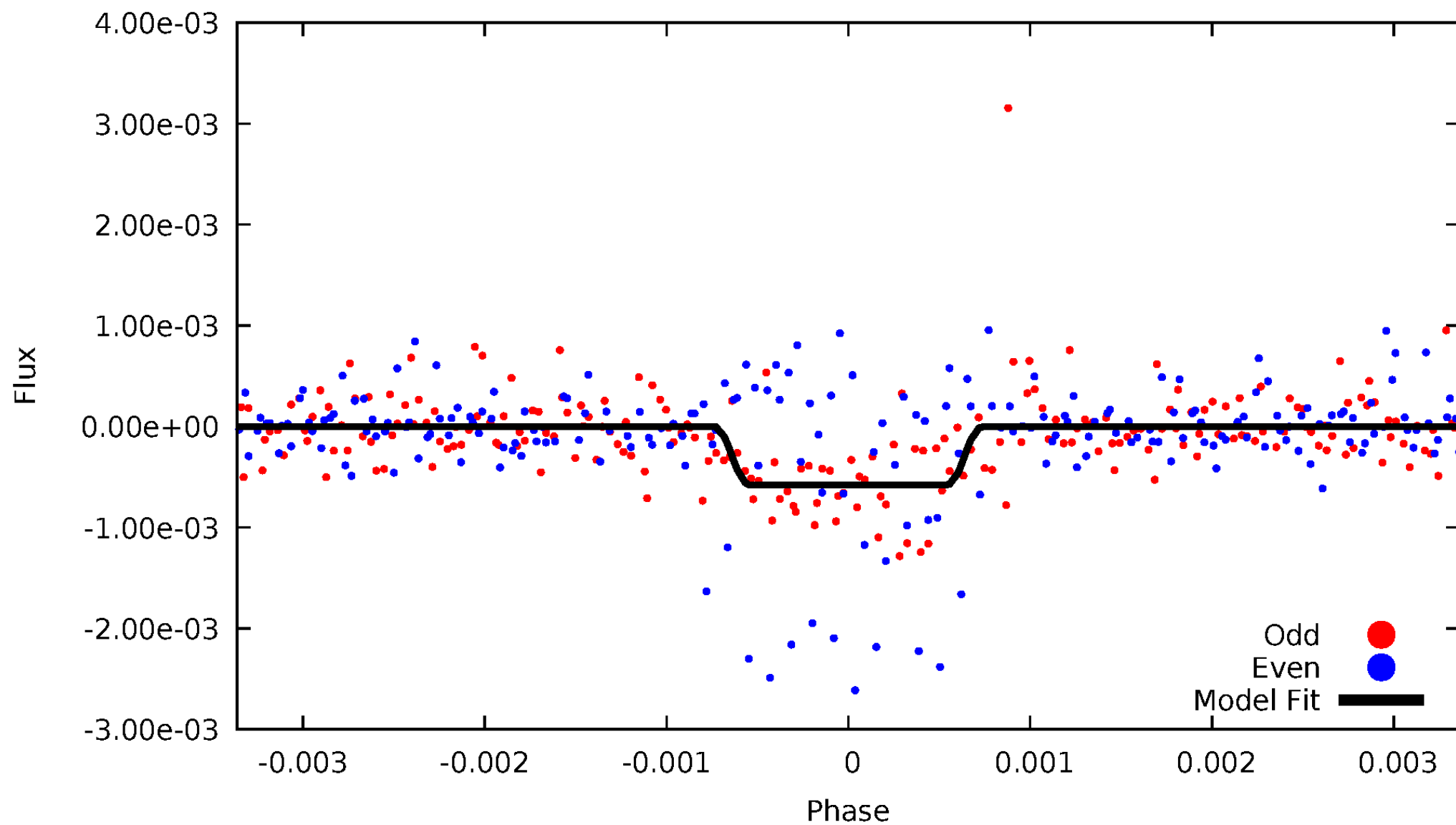
# DV Odd/Even

TCE 006224062-04



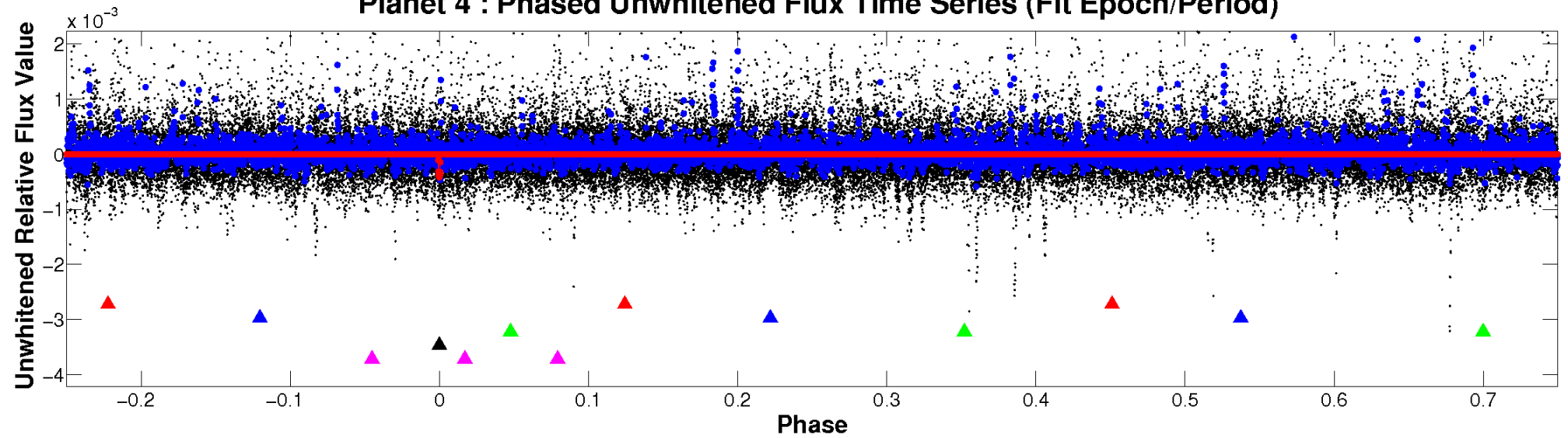
# ALT Odd/Even

TCE 006224062-04

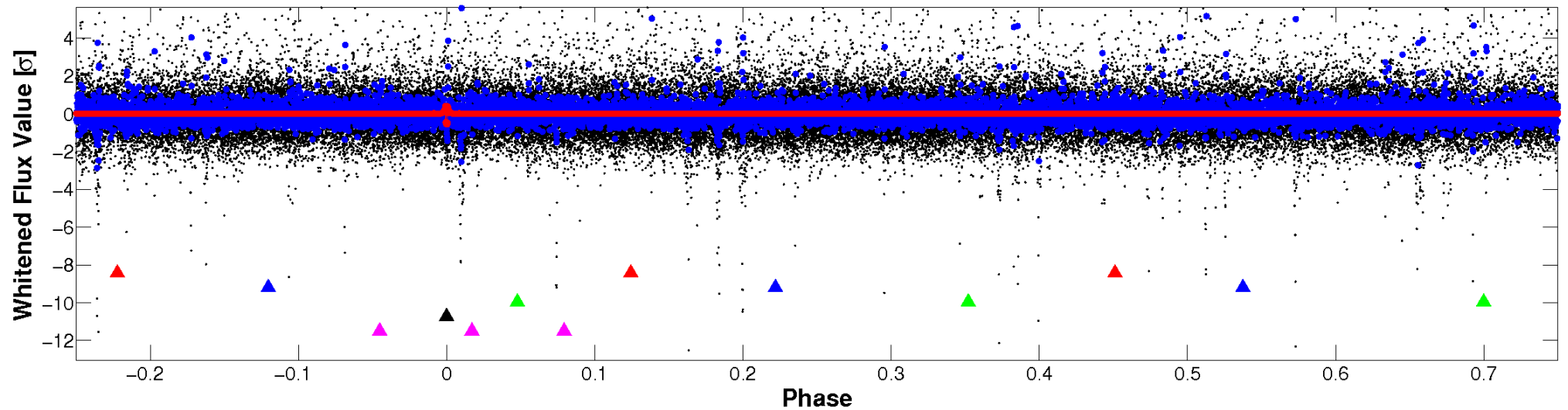


# Non-Whitened Vs. Whitened Light Curve

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

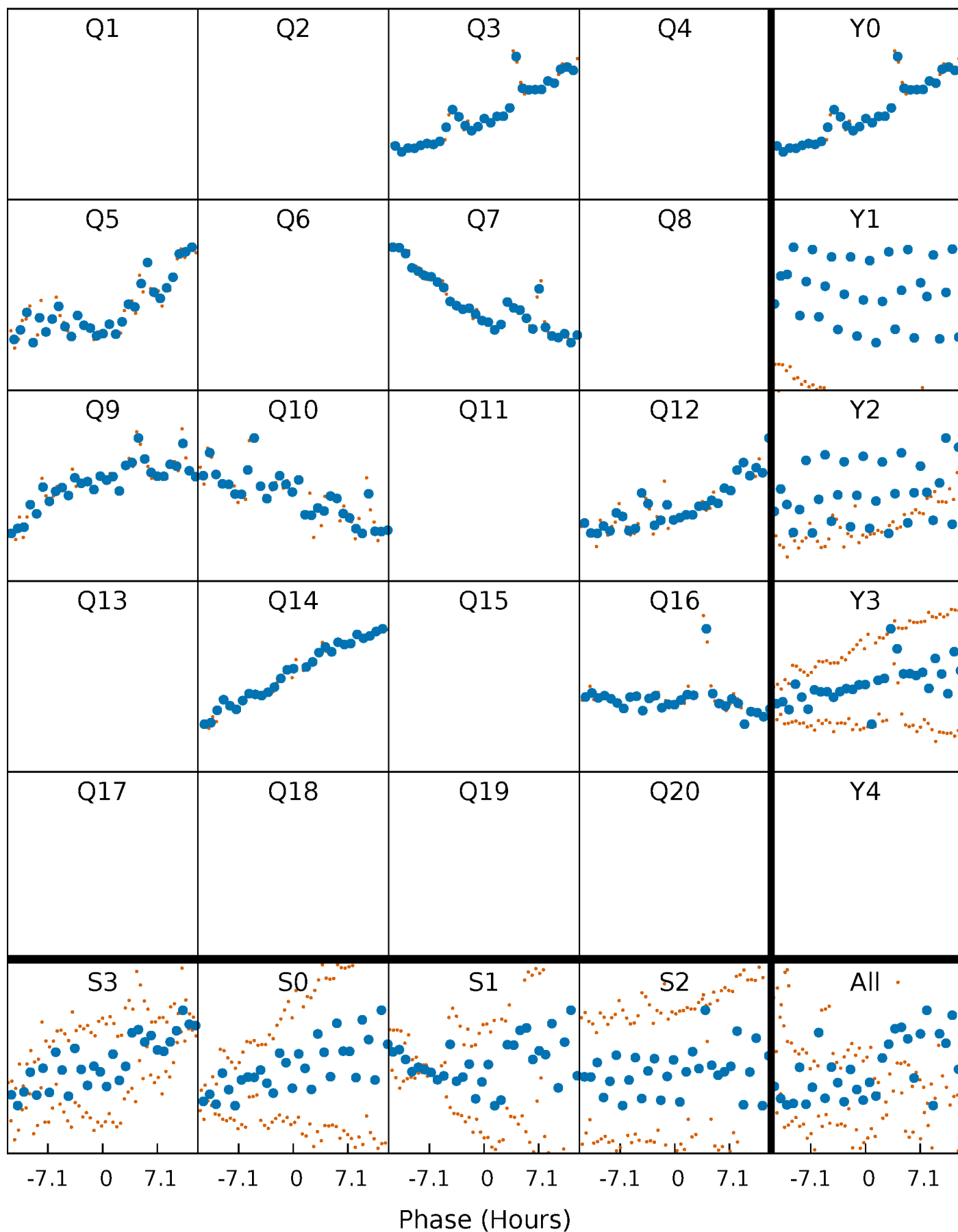


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



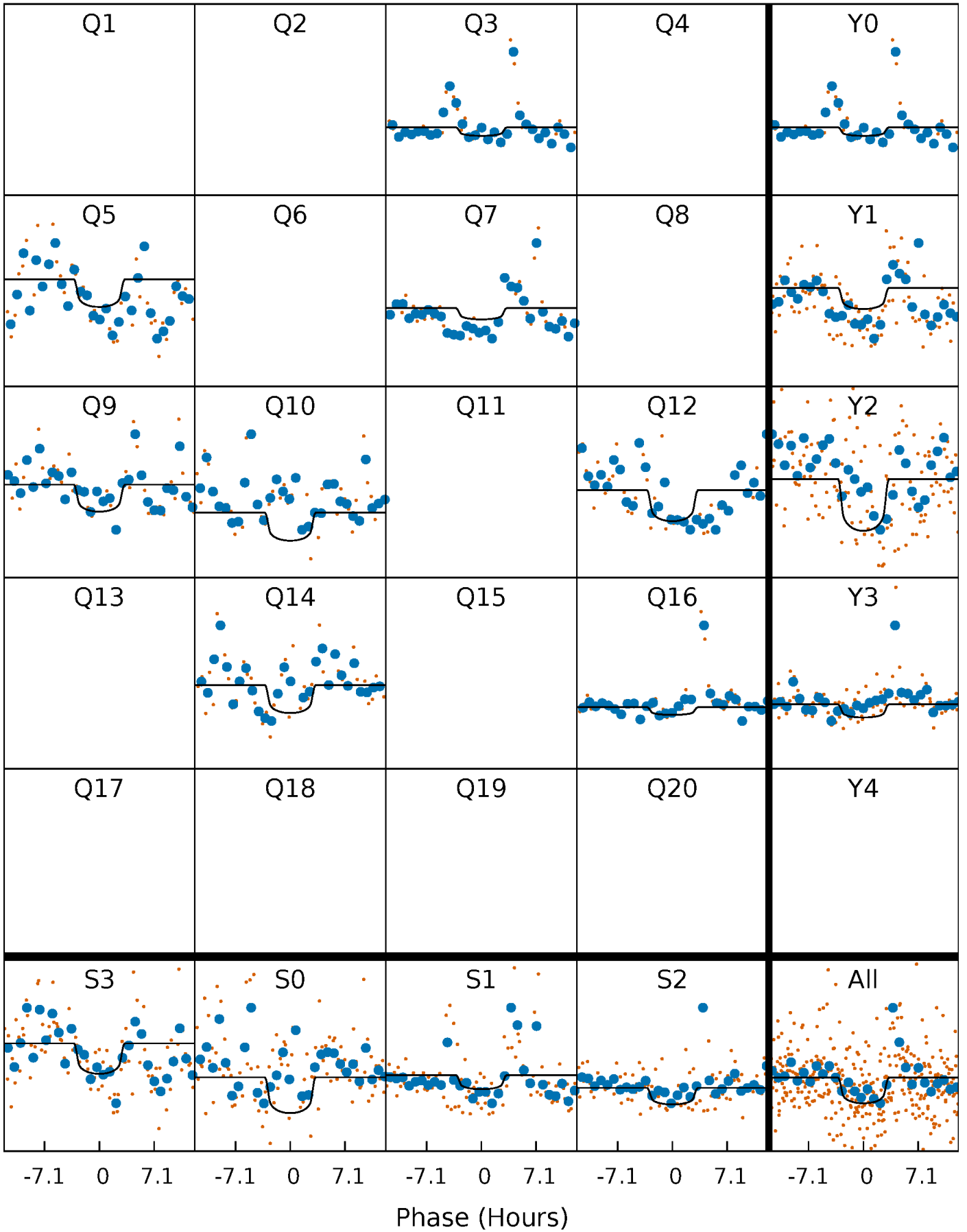
# PDC Quarter-Phased Transit Curves

TCE 006224062-04 P=174.826836 Days  $T_0=295.682146$  (BKJD)



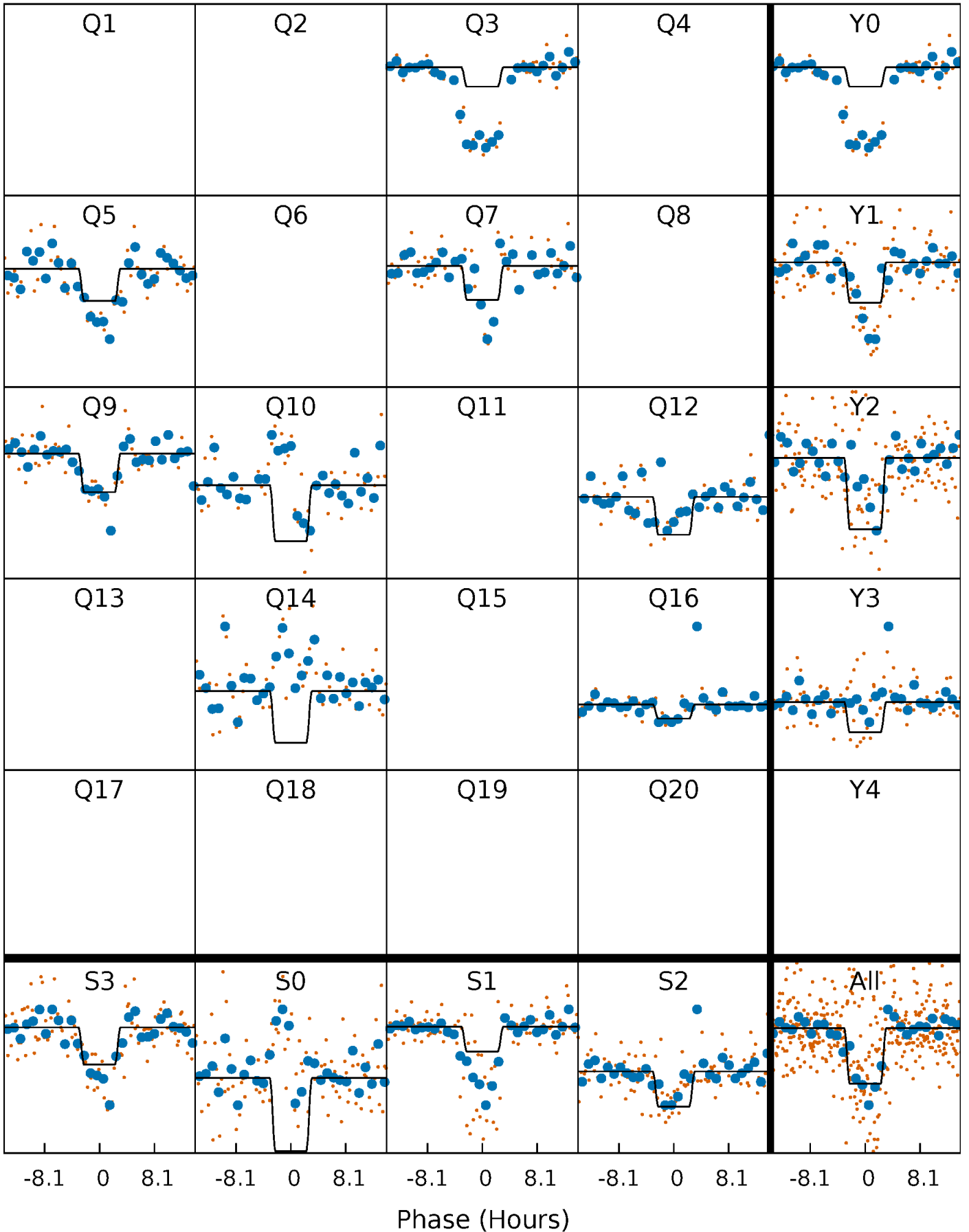
# DV Quarter-Phased Transit Curves

TCE 006224062-04     $P=174.826836$  Days     $T_0=295.682146$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

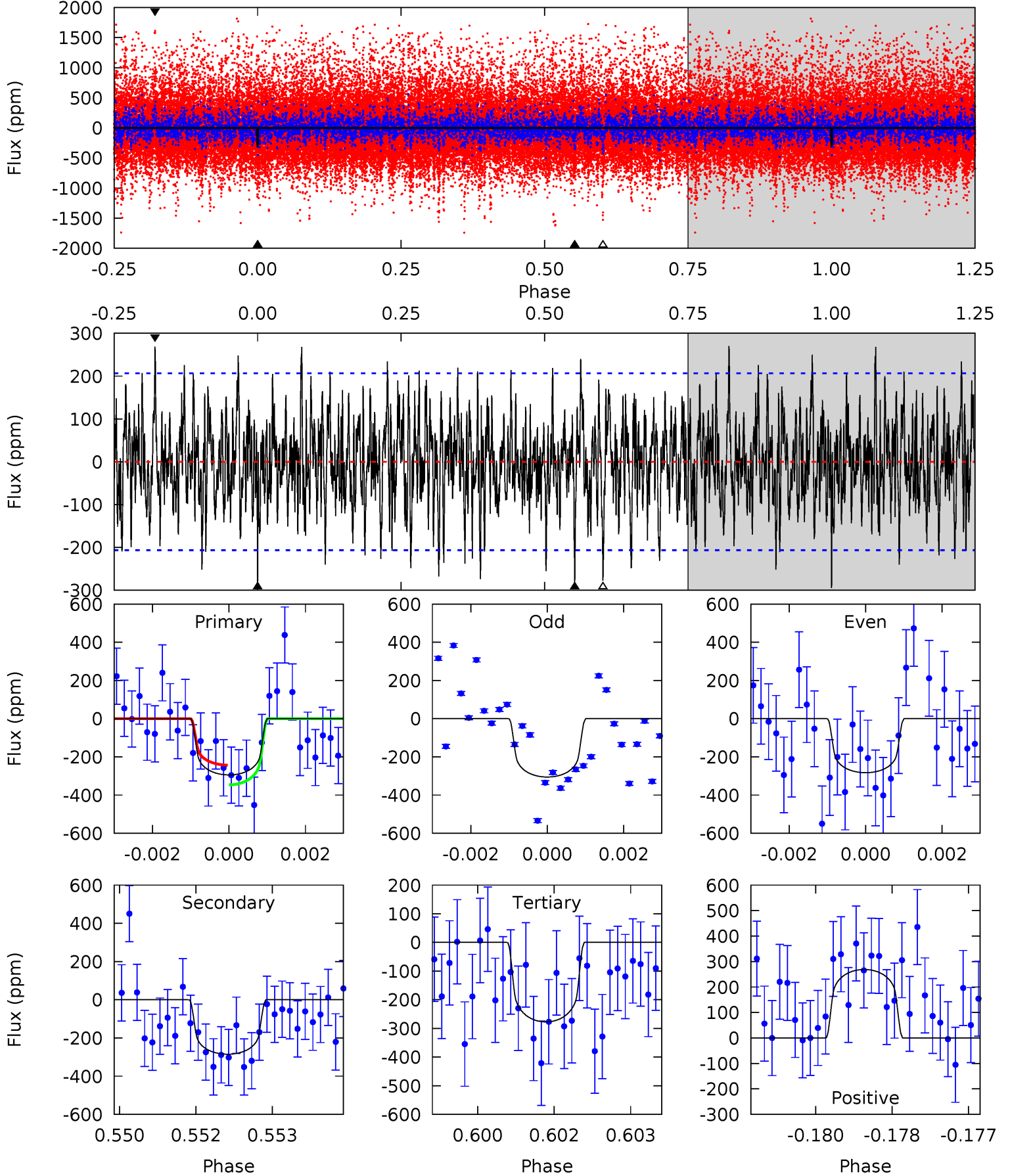
TCE 006224062-04   P=174.825823 Days    $T_0=295.710494$  (BKJD)



# DV Model-Shift Uniqueness Test

006224062-04, P = 174.826836 Days, E = 120.855310 Days

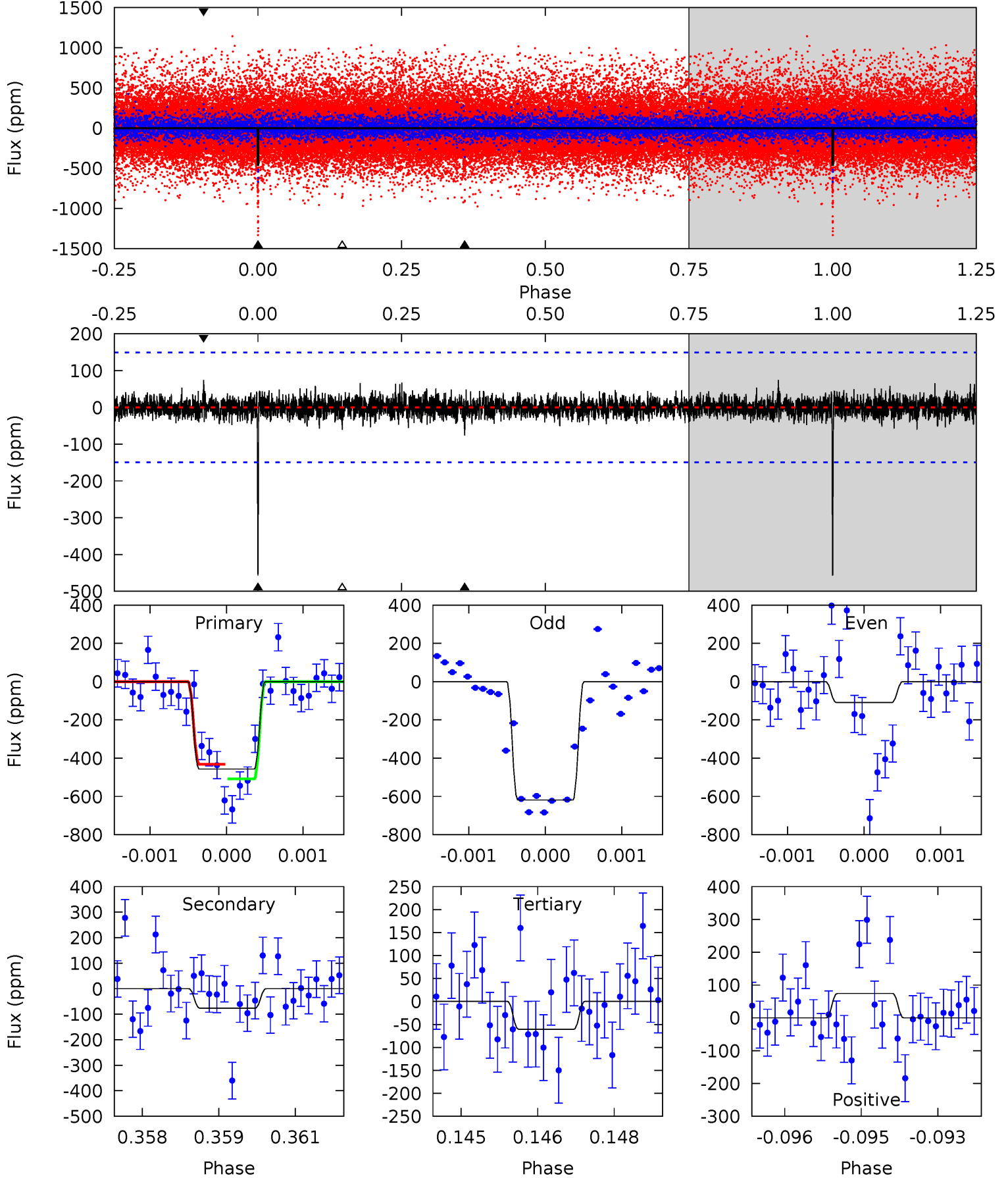
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.66	7.41	7.21	6.99	5.37	3.16	2.26	0.45	0.67	0.20	0.42	0.29	0.96	0.48	1.35



# Alt Model-Shift Uniqueness Test

006224062-04, P = 174.825823 Days, E = 120.884671 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
16.5	2.76	2.18	2.68	5.38	3.18	0.58	14.3	13.8	0.58	0.07	9.25	1.22	0.14	1.38



### Stellar Parameters For KIC 006224062

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3707^{+50}_{-55}$	$4.794^{+0.039}_{-0.024}$	$-0.200^{+0.100}_{-0.100}$	$0.452^{+0.028}_{-0.031}$	$0.464^{+0.029}_{-0.029}$	$7.077^{+1.274}_{-0.739}$
	+1%/-1%	+1%/-1%	+50%/-50%	+6%/-7%	+6%/-6%	+18%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 006224062-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-285 \pm 38$	$1.07^{+0.58}_{-0.59}$	$222^{+4}_{-4}$	$3420^{+1085}_{-419}$	$31325^{+115192}_{-18462}$
Alt.	$-76 \pm 28$	$1.26^{+0.57}_{-0.60}$	$222^{+4}_{-5}$	$2690^{+558}_{-286}$	$5728^{+16319}_{-3381}$

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

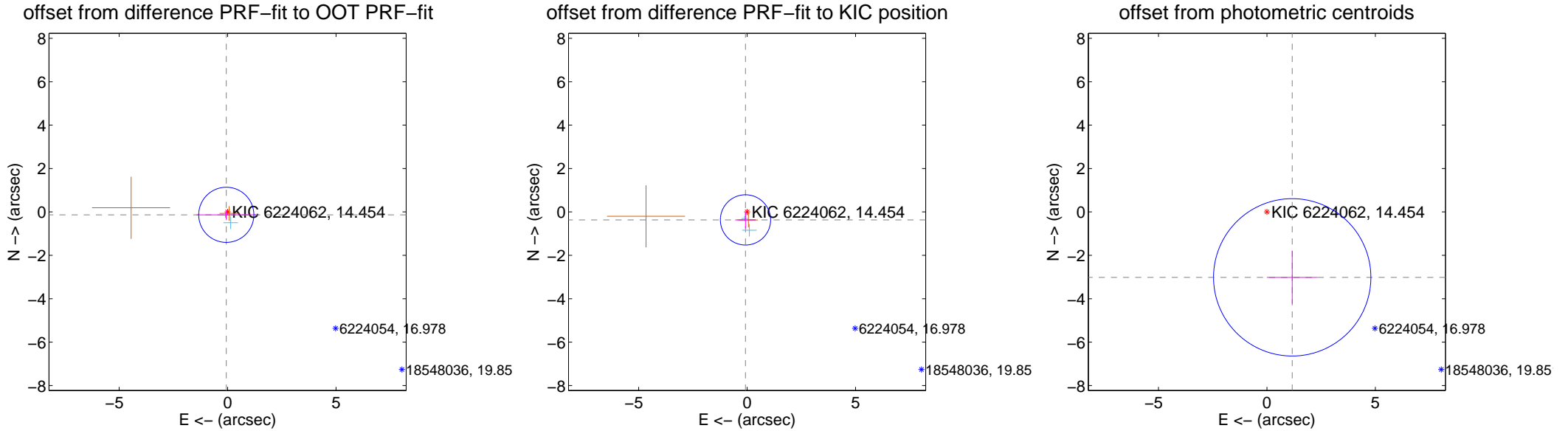
## DV Centroid Data

Supplemental centroid analysis for 006224062-04. Kepler magnitude: 14.45. Transit SNR 5.47

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

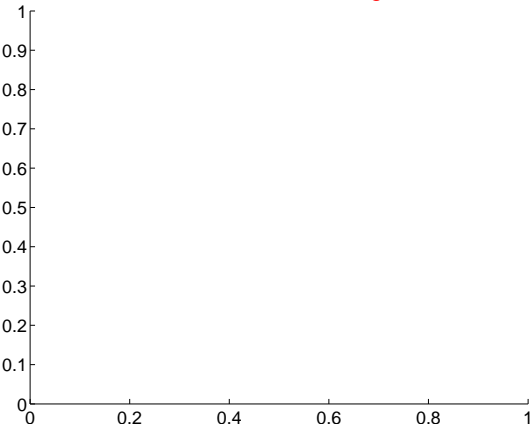
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.146 \pm 0.423$	0.34	$0.060 \pm 1.374$	$-0.133 \pm 0.198$
PRF-fit source offset from KIC position	$0.375 \pm 0.386$	0.97	$0.075 \pm 0.476$	$-0.367 \pm 0.382$
photometric centroid source offset	$3.23 \pm 1.21$	2.67	$-1.17 \pm 1.17$	$-3.01 \pm 1.21$



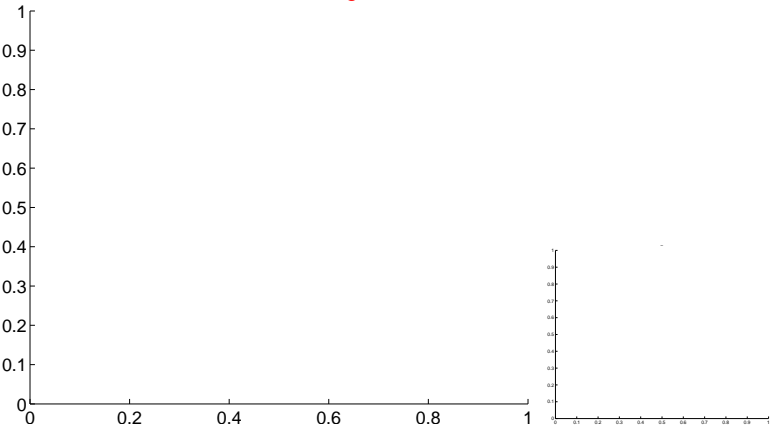
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

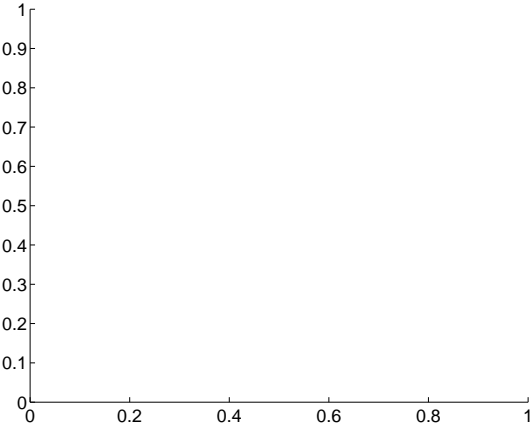
Q1 no difference image



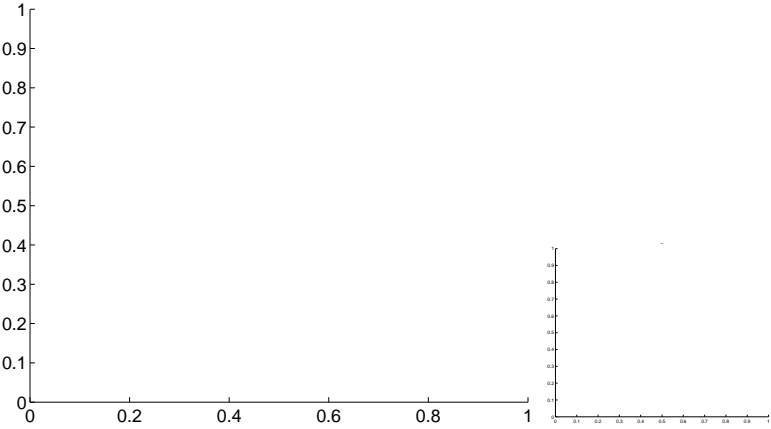
Q1 no OOT image



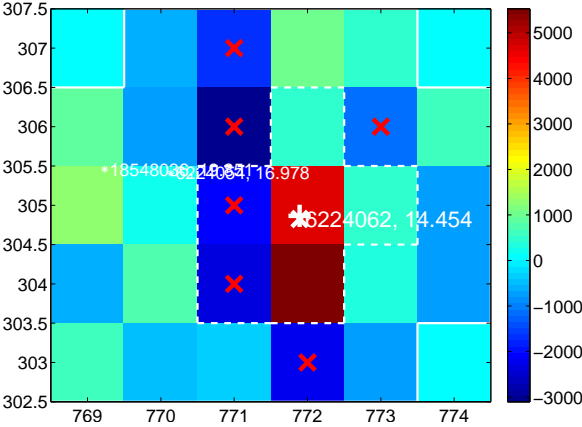
Q2 no difference image



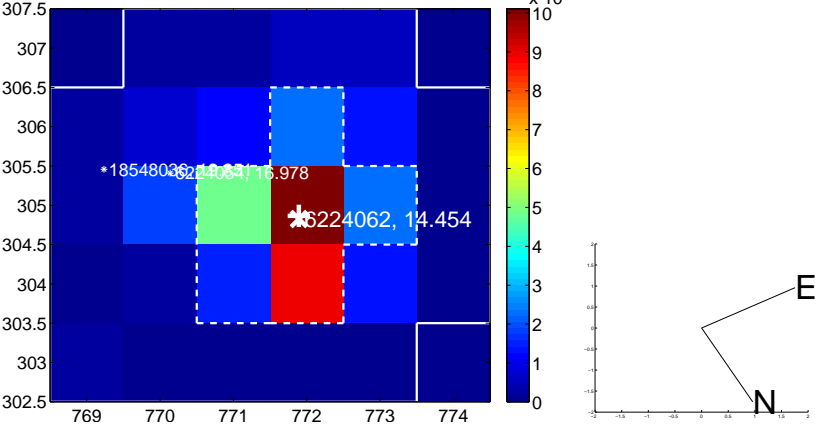
Q2 no OOT image



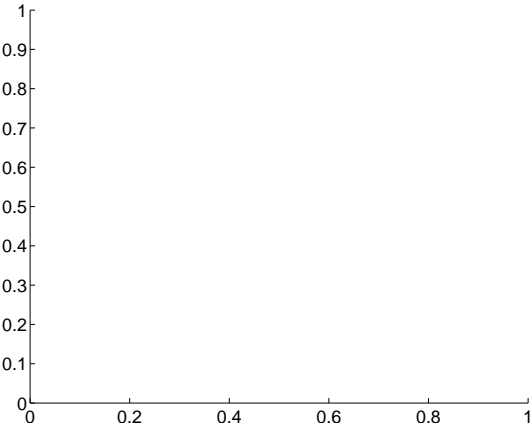
Q3 difference image. Poor Quality



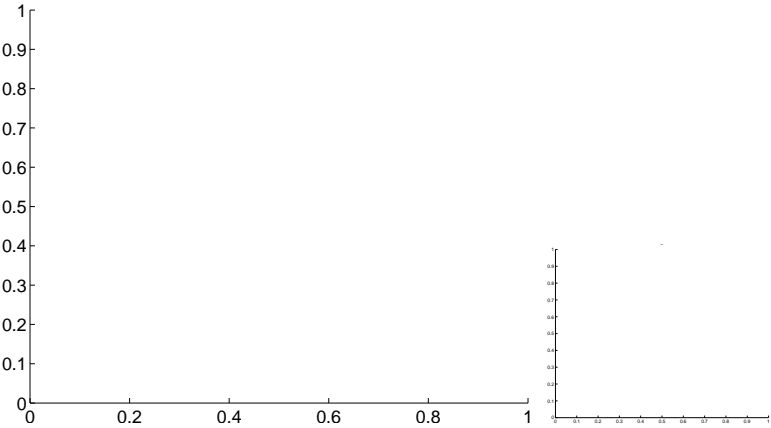
Q3 OOT image



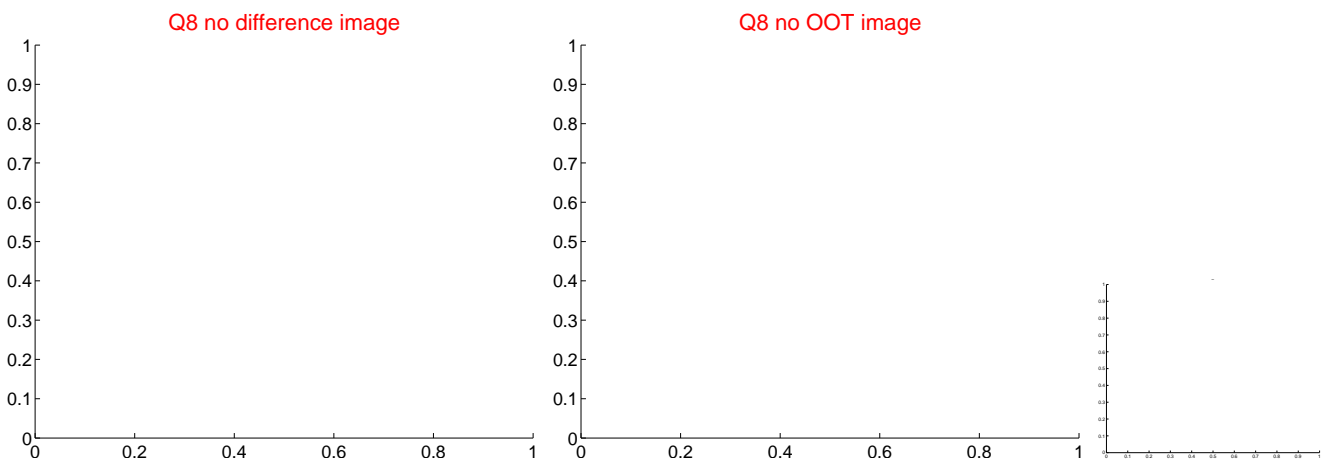
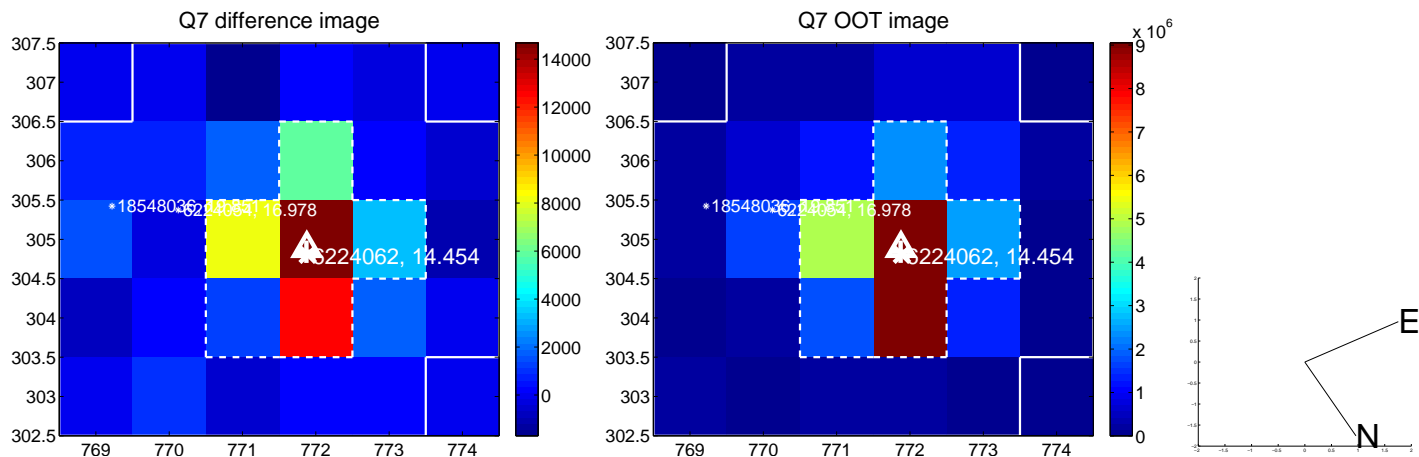
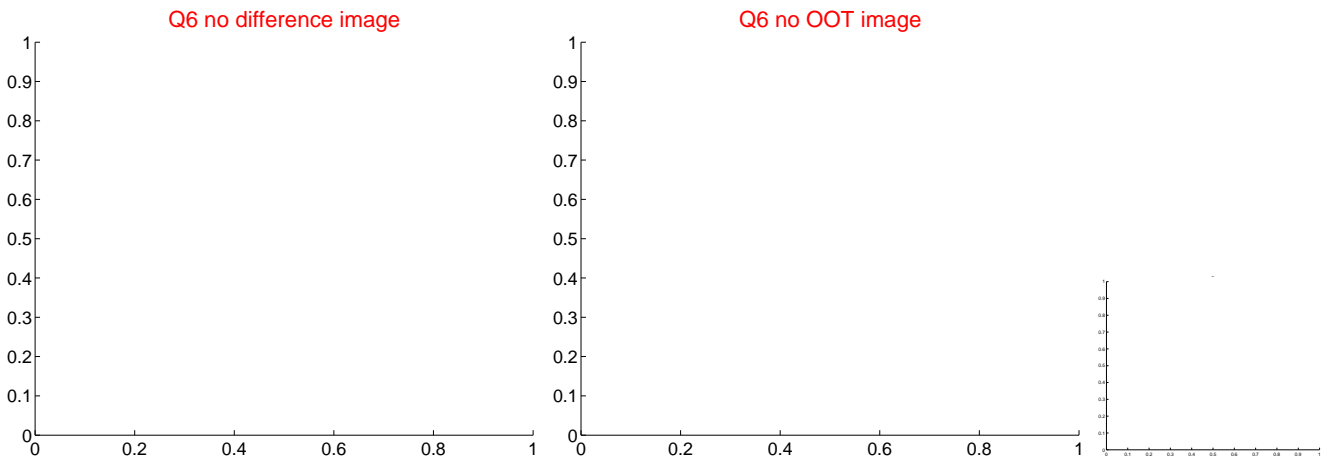
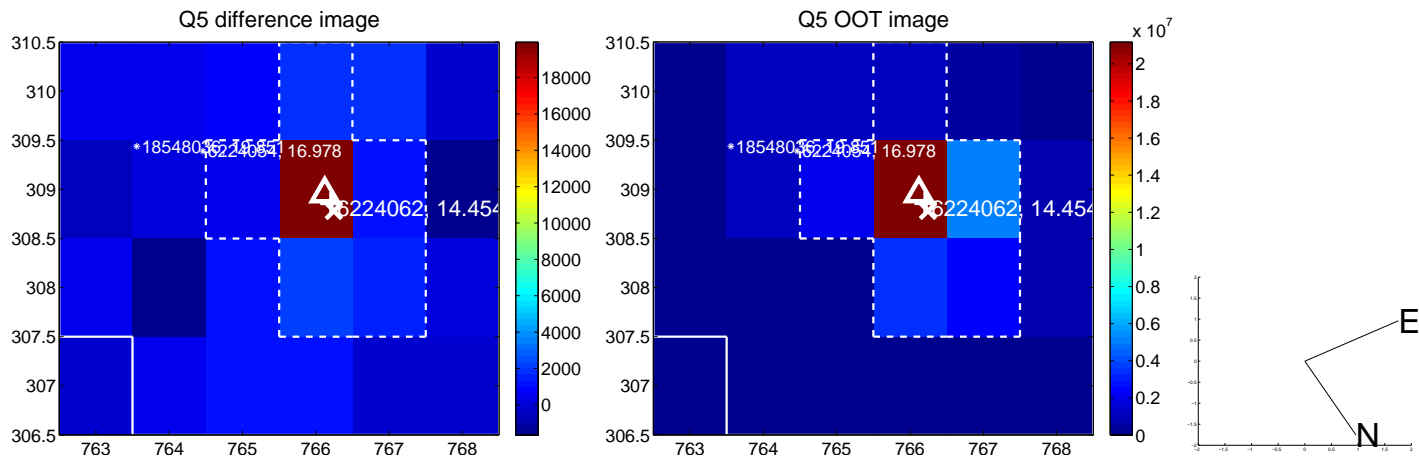
Q4 no difference image



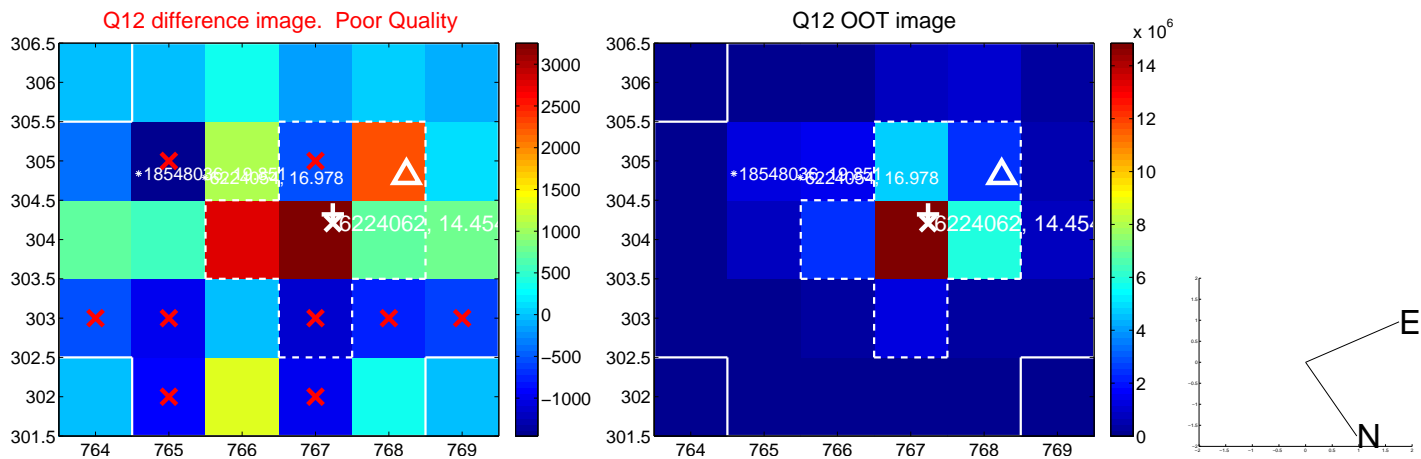
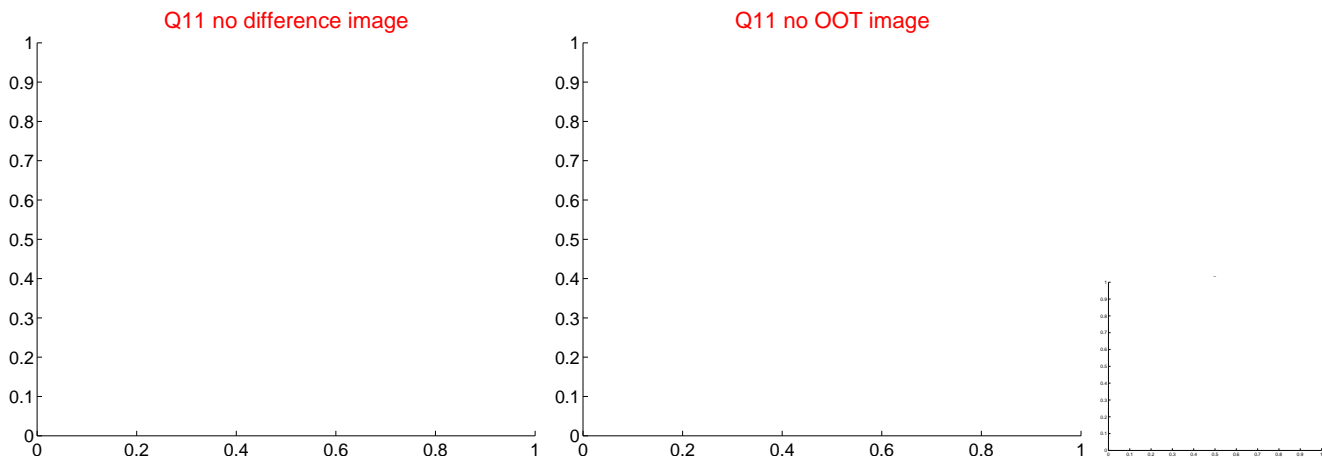
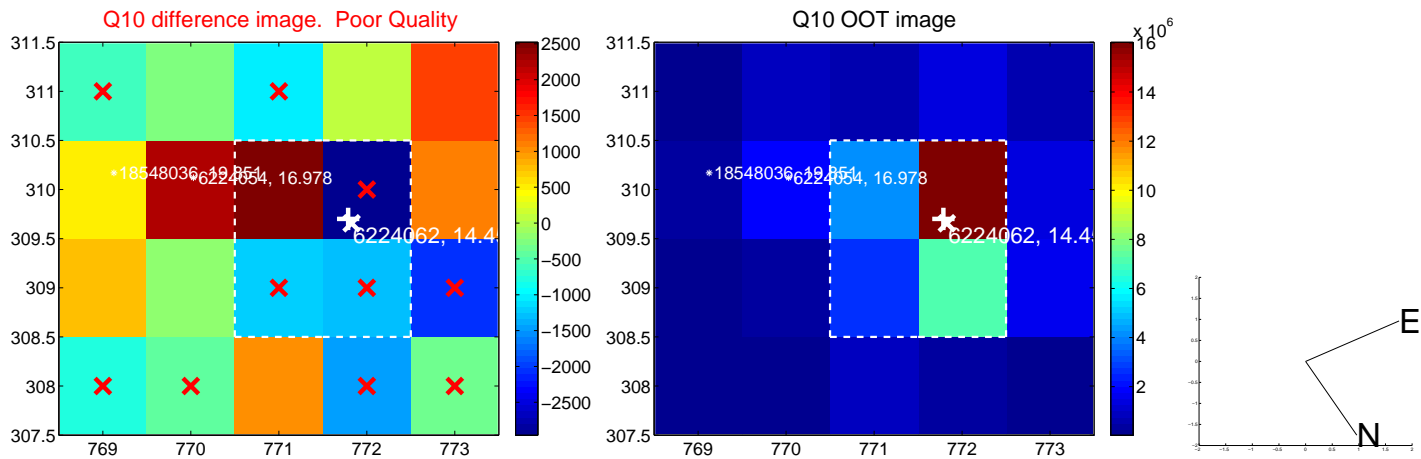
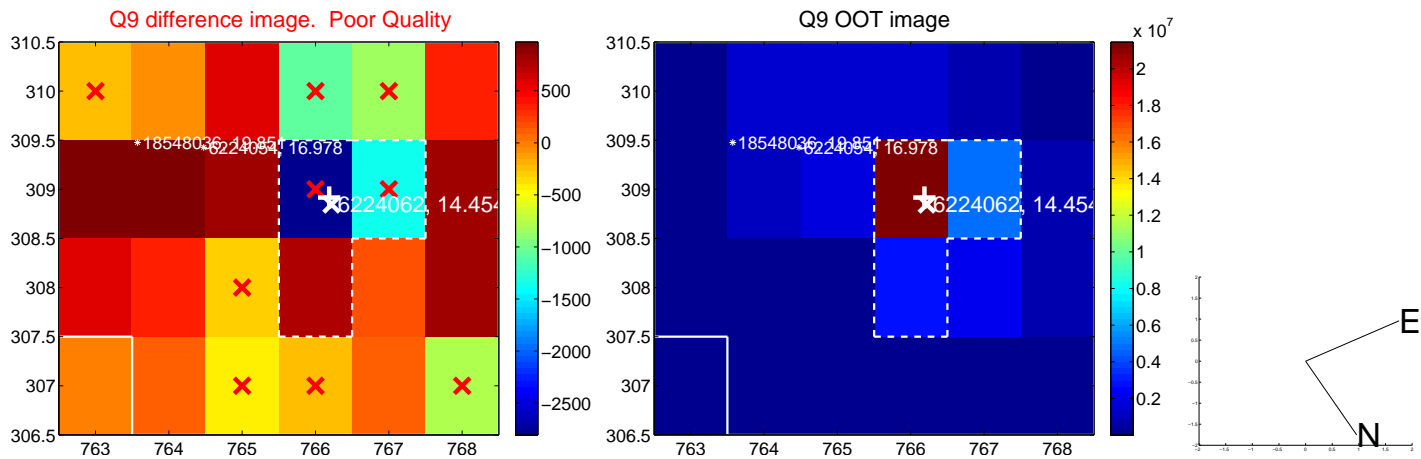
Q4 no OOT image



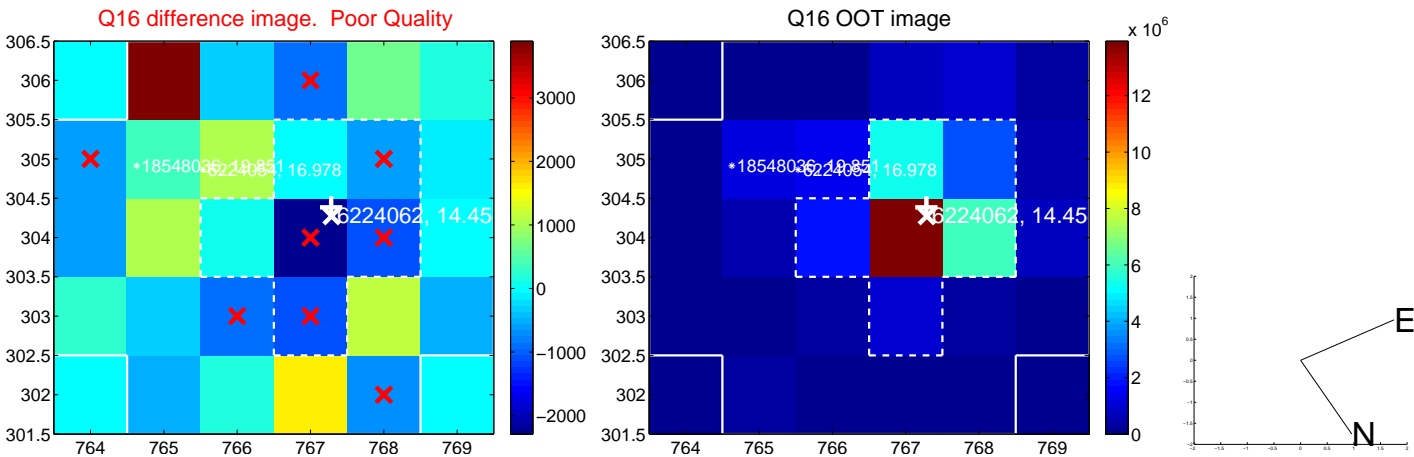
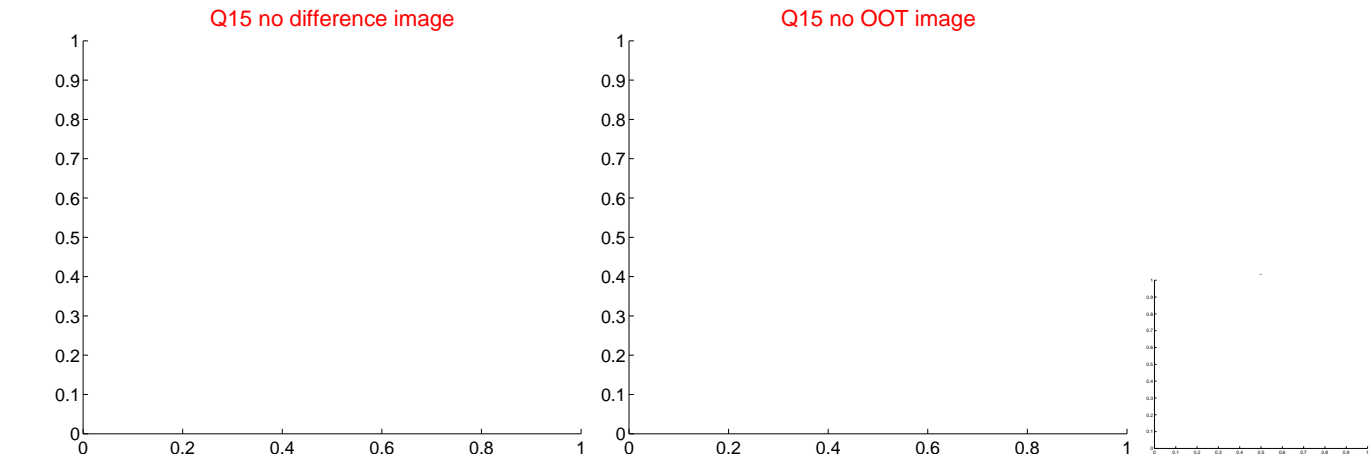
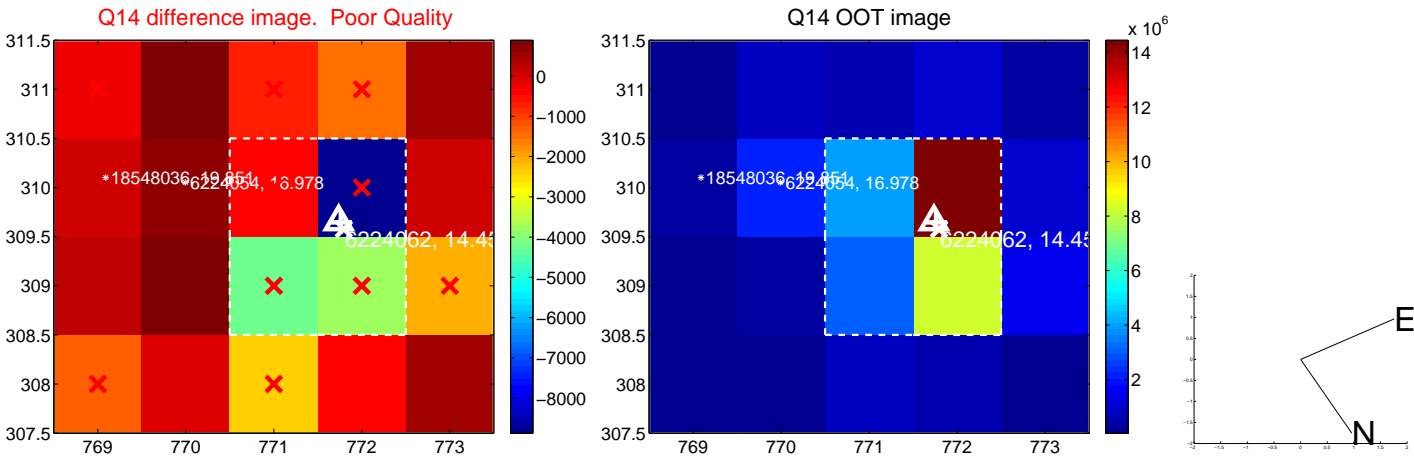
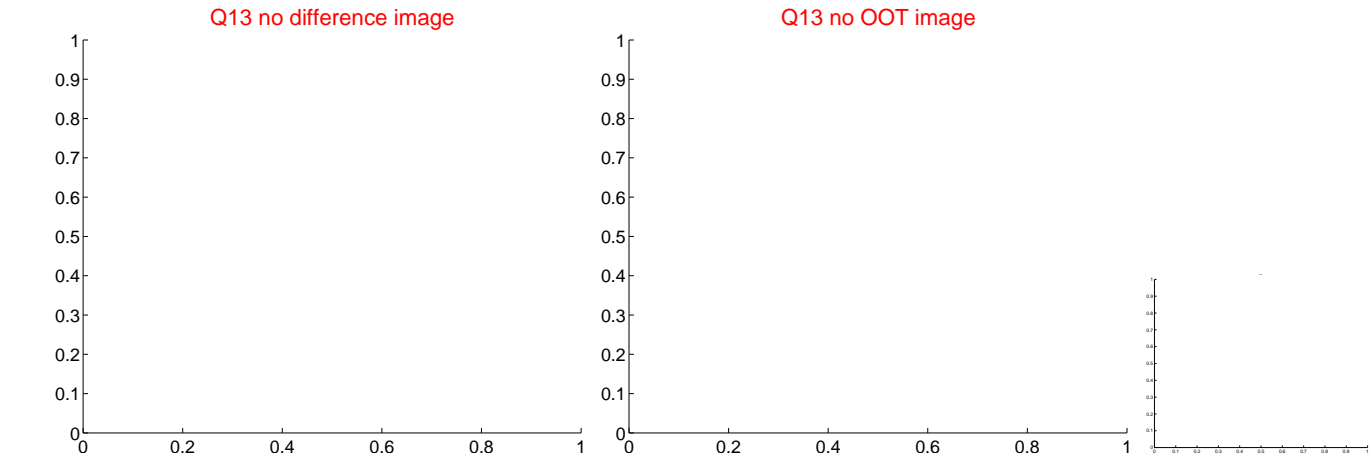
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



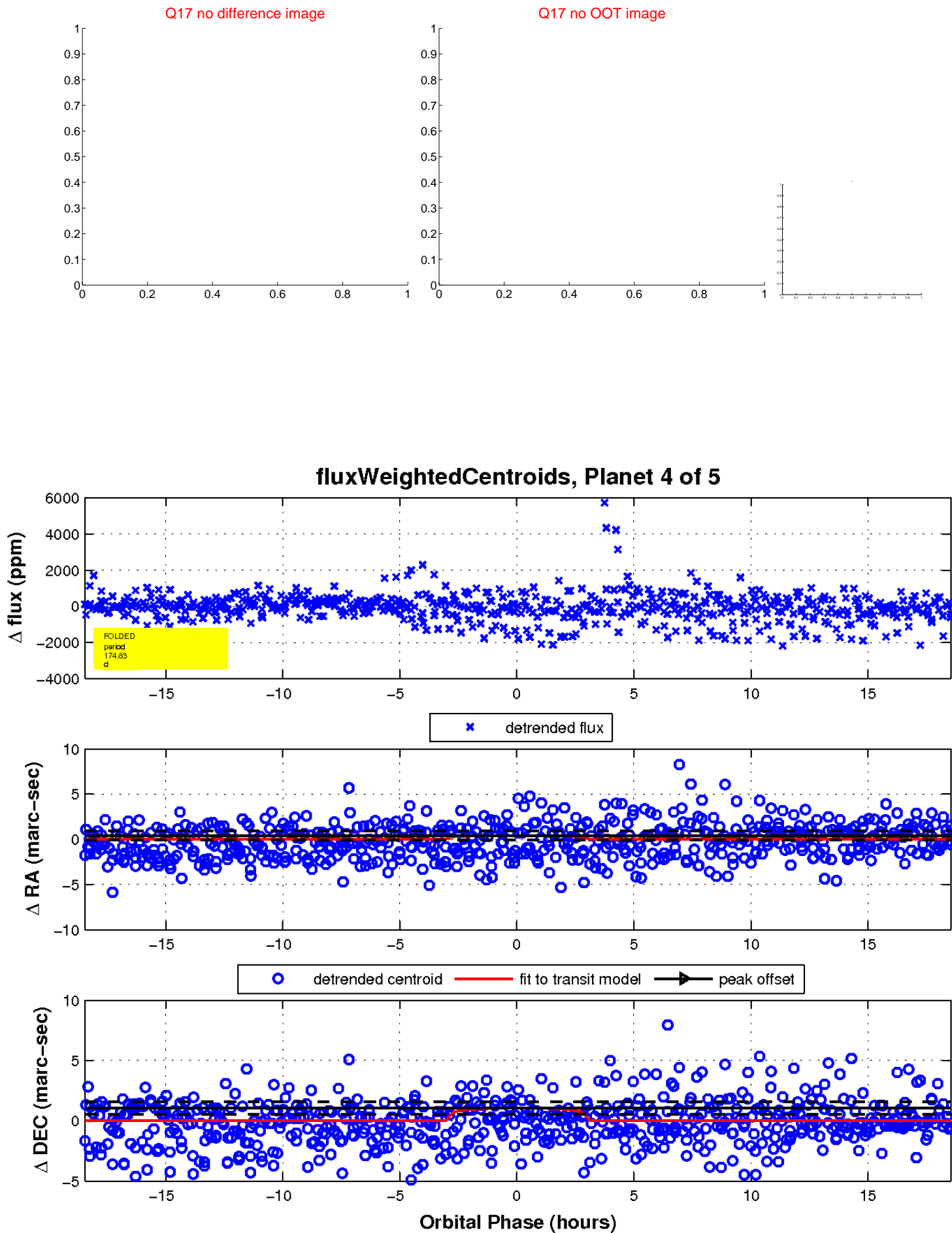
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

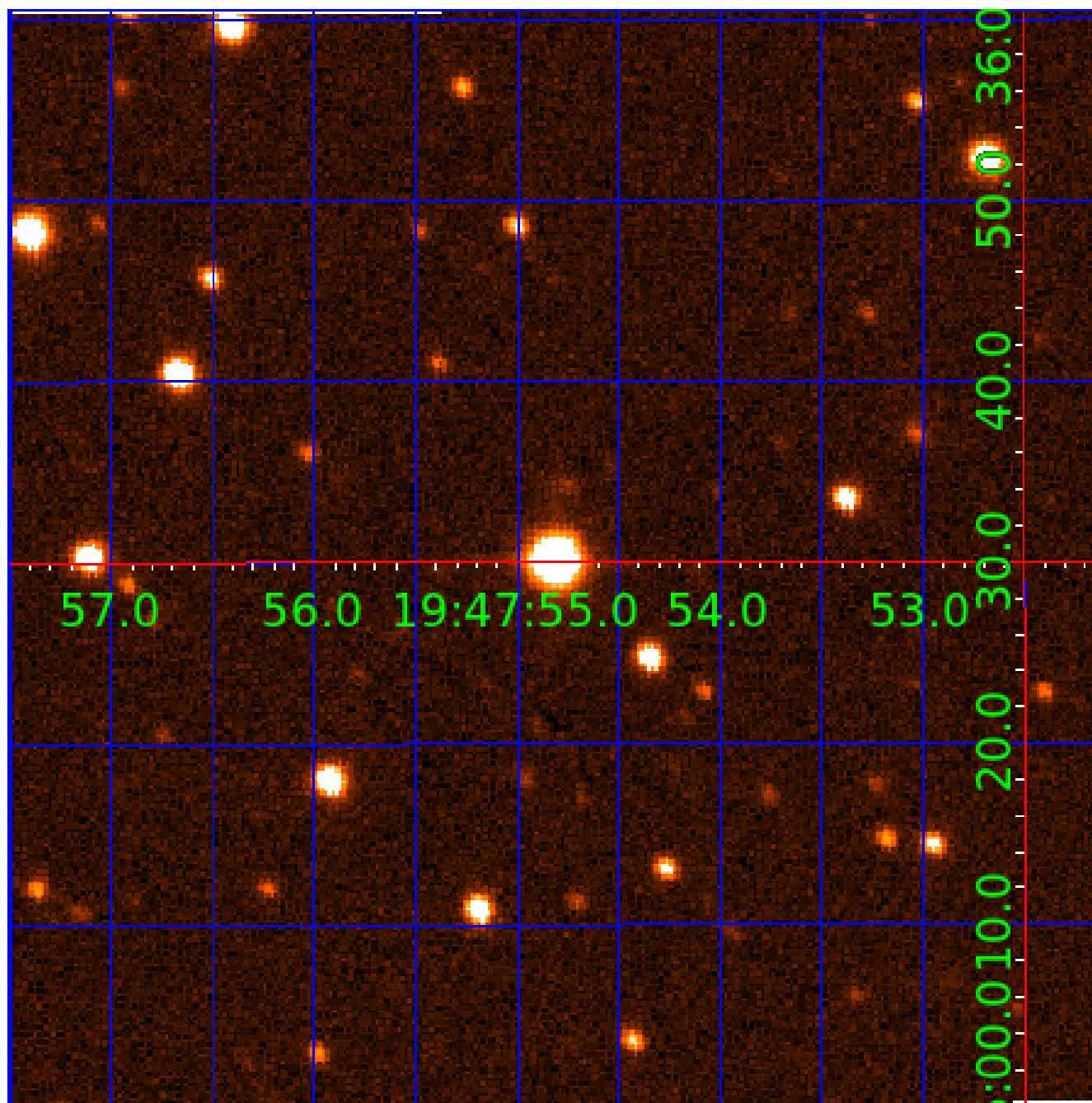


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006224062

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006224062-01	OBS	No	467.359926	431.663976	763.6	13.636	10.2	5.3	0.45	3707	1.30	0.04
006224062-02	OBS	No	464.641816	334.487553	1154.2	15.677	10.4	7.0	0.45	3707	2.06	0.04
006224062-03	OBS	No	410.463654	532.067431	1445.3	21.809	8.5	8.0	0.45	3707	1.71	0.05
006224062-04	OBS	No	174.826836	295.682146	417.3	6.184	9.6	5.5	0.45	3707	1.01	0.15
006224062-05	OBS	No	513.600992	484.379041	1057.0	6.911	9.9	8.7	0.45	3707	1.84	0.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006224062-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006224062-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006224062-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
006224062-04	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS—HALO_GHOST
006224062-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

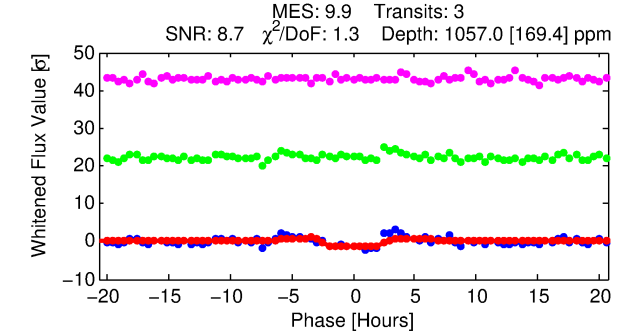
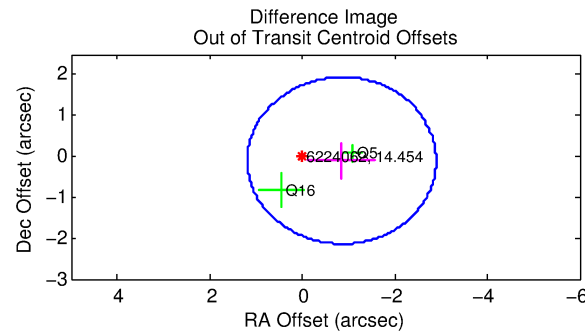
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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 006224062-05

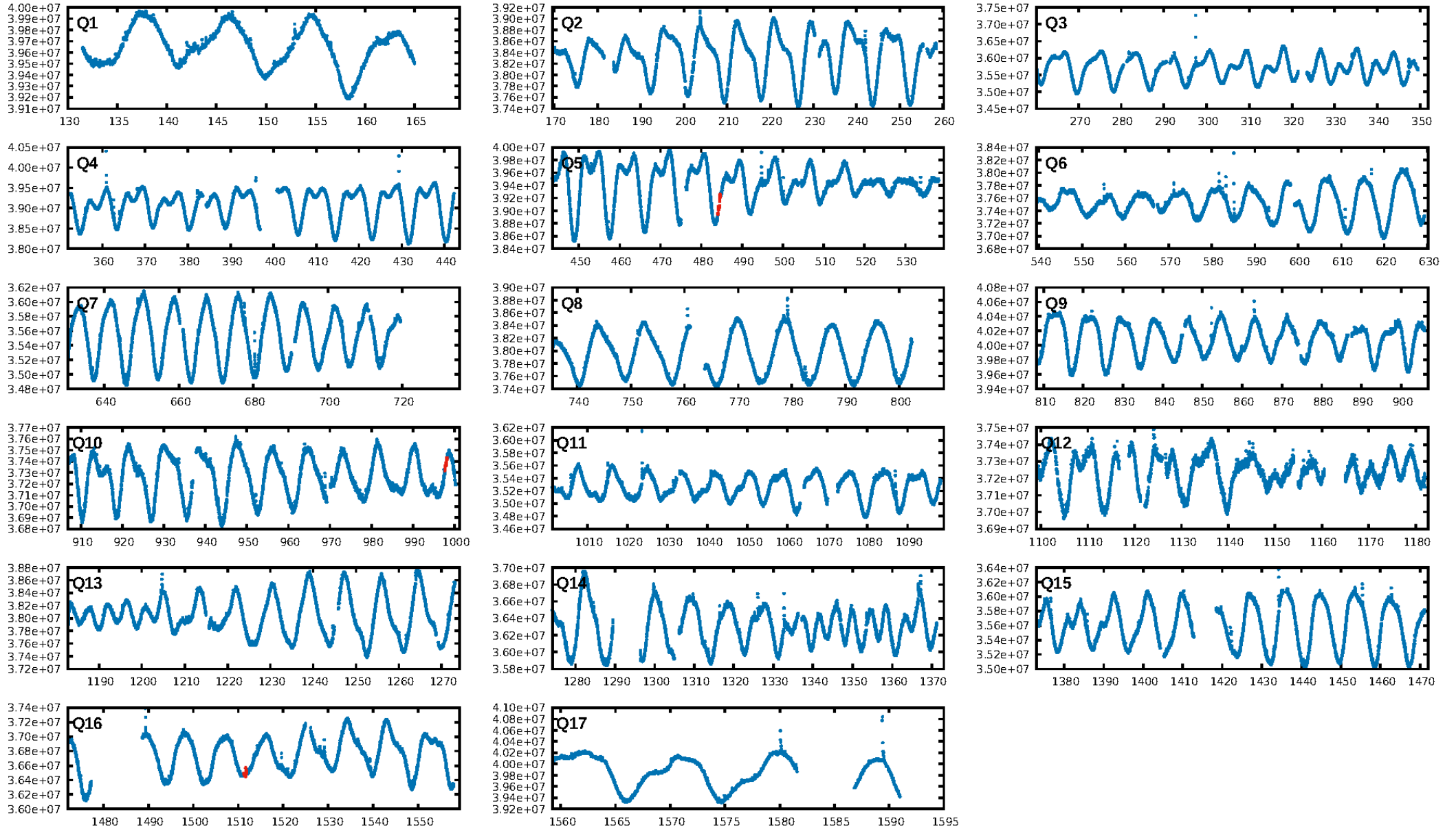
No Significant Match Found

## KIC: 6224062    Candidate: 5 of 5    Period: 513.601 d

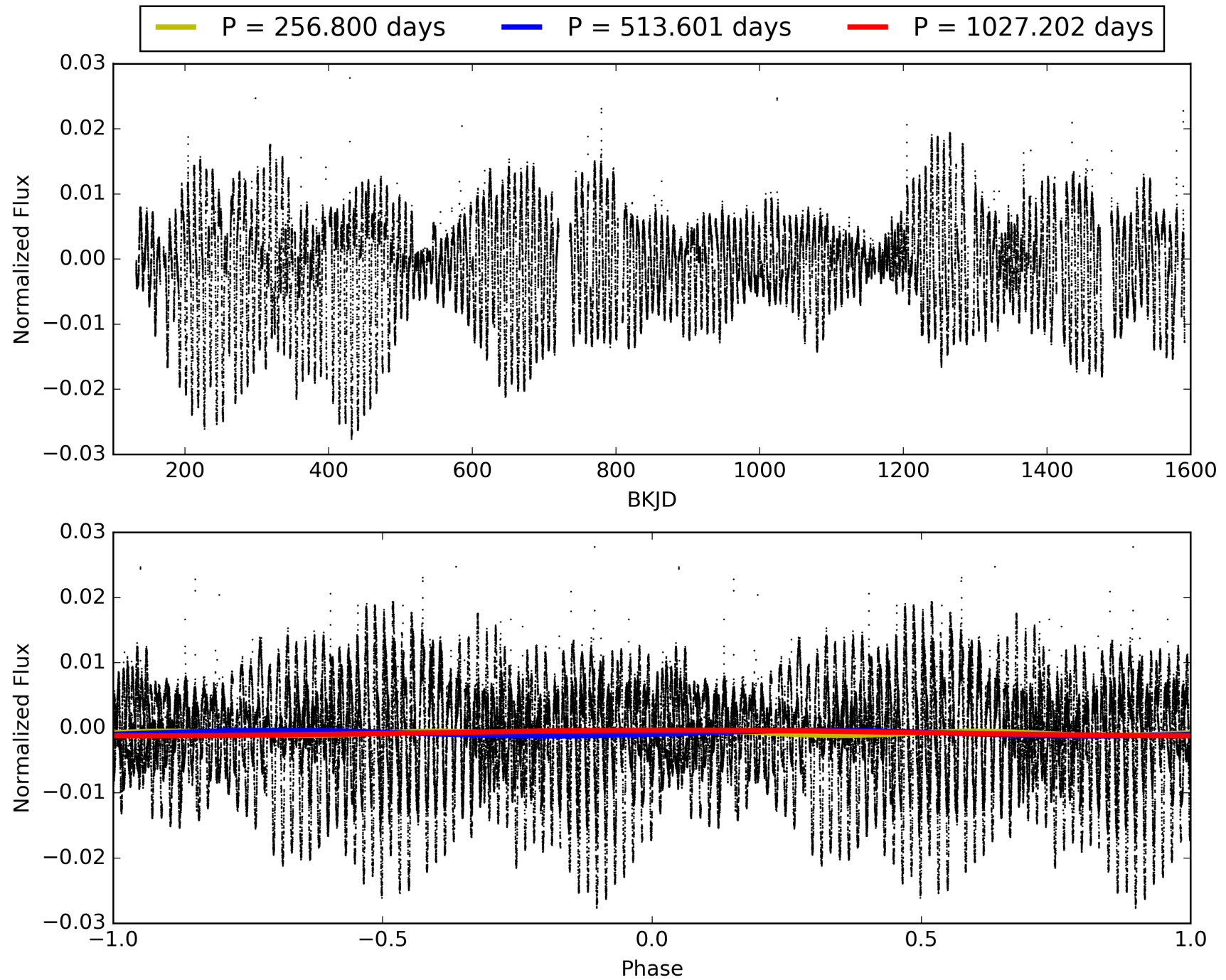


ShortPeriod-sig: 100.0% [72.60σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.7%  
ModelChiSquareGof-sig: 79.0%  
**Bootstrap-pfa: 1.57e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 3.337  
  
Centroid-sig: 22.2%  
Centroid-so: 0.501 arcsec [0.60σ]  
OotOffset-rm: 0.858 arcsec [1.26σ]  
KicOffset-rm: 0.915 arcsec [1.42σ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 006224062-05, PDC Light Curves

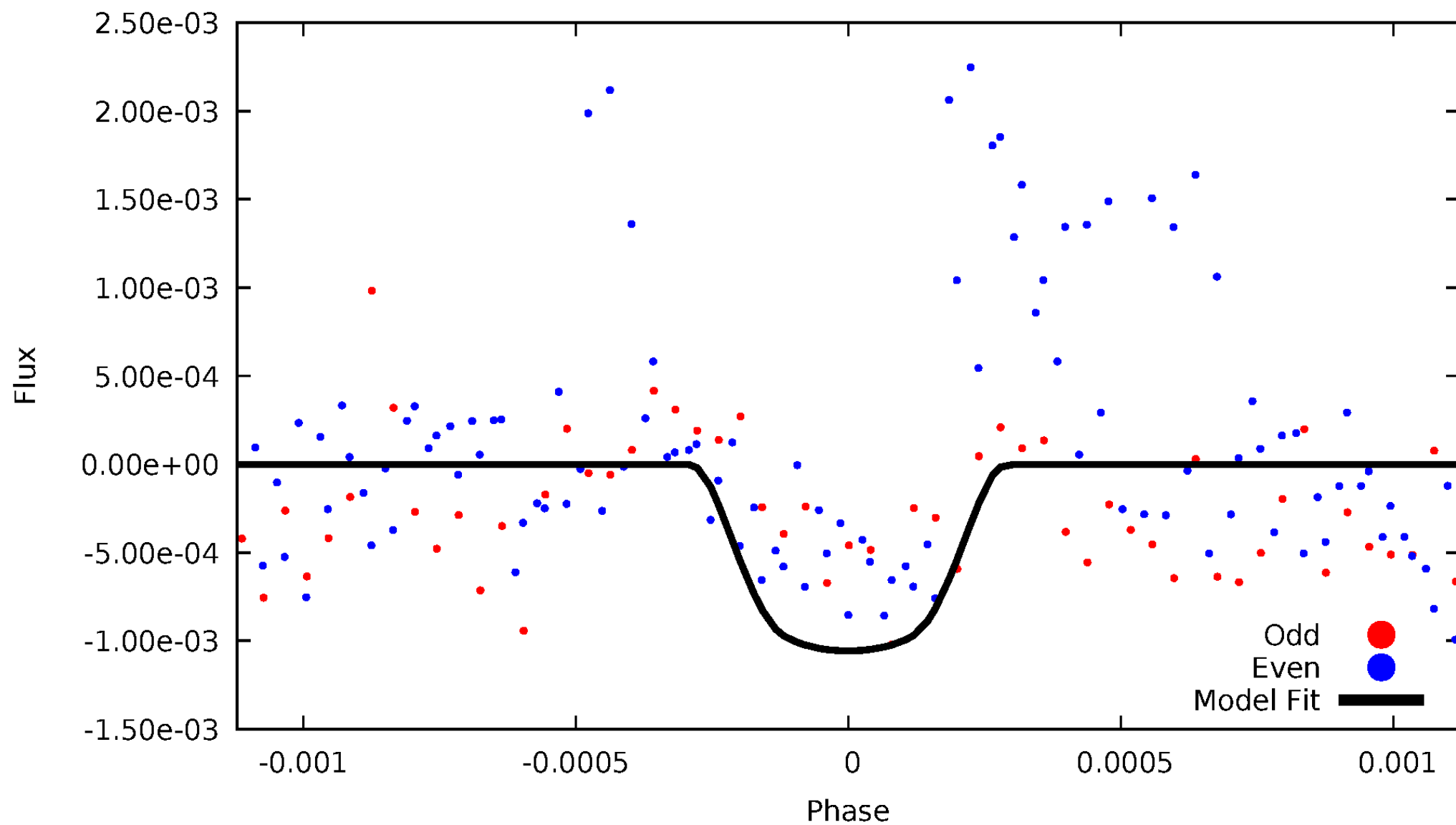


TCE 006224062-05



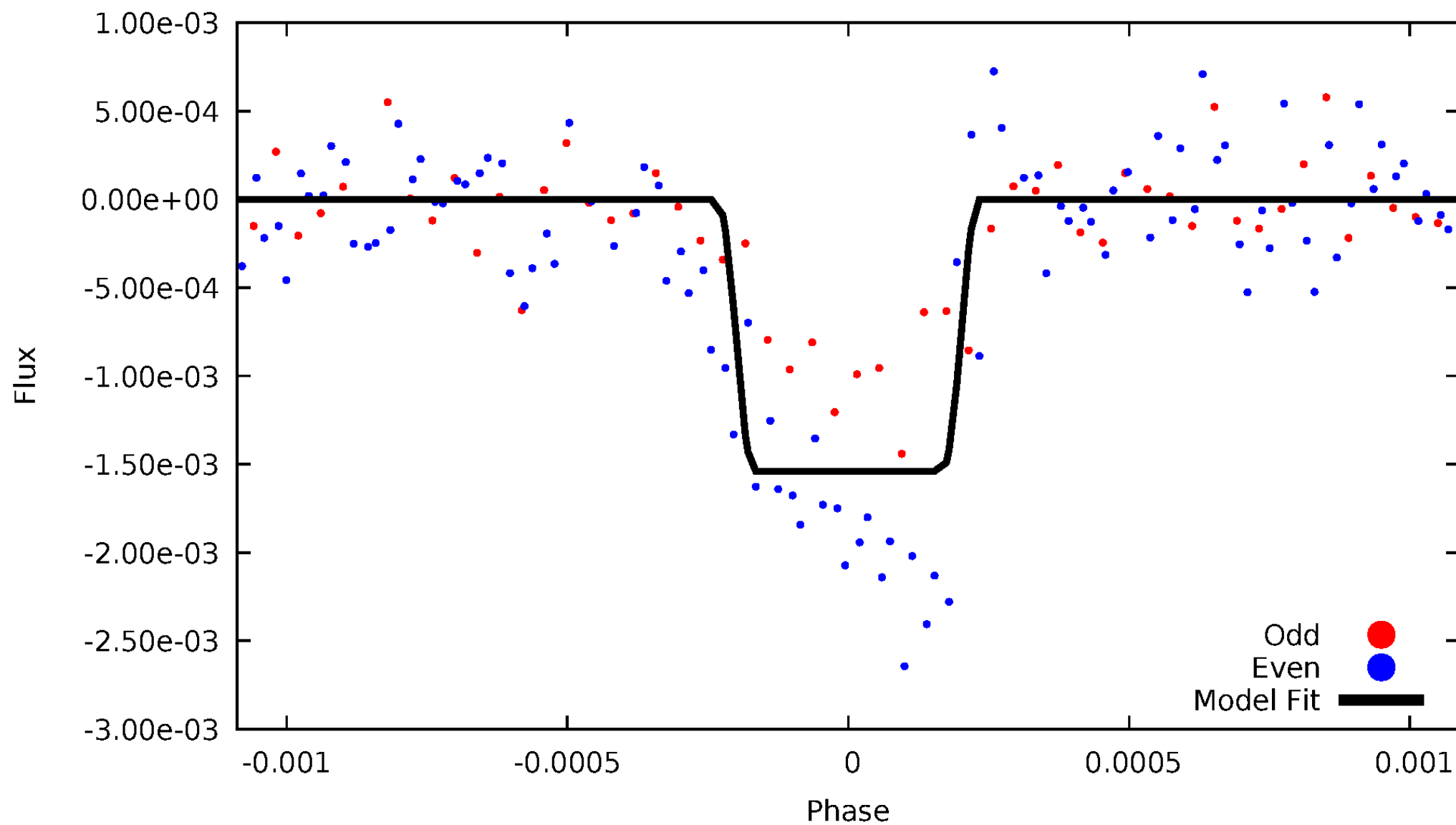
# DV Odd/Even

TCE 006224062-05



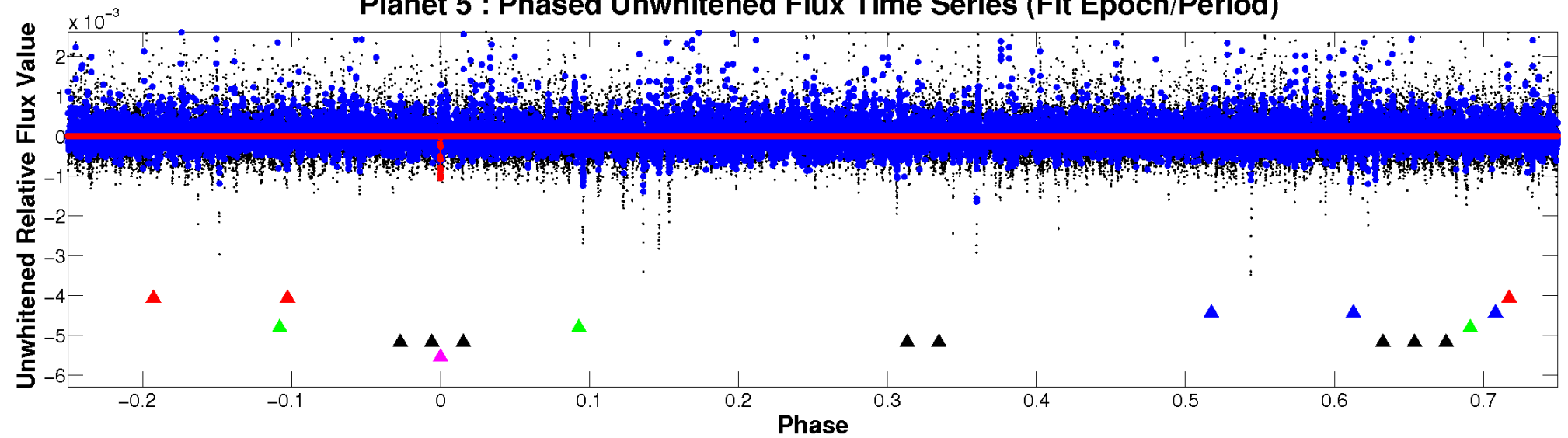
# ALT Odd/Even

TCE 006224062-05

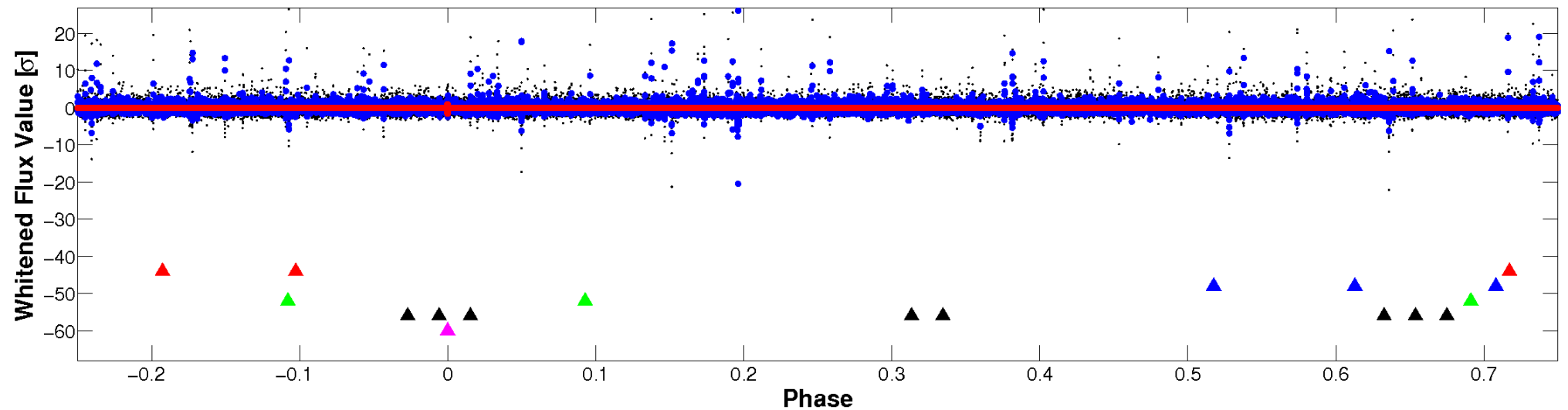


# Non-Whitened Vs. Whitened Light Curve

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

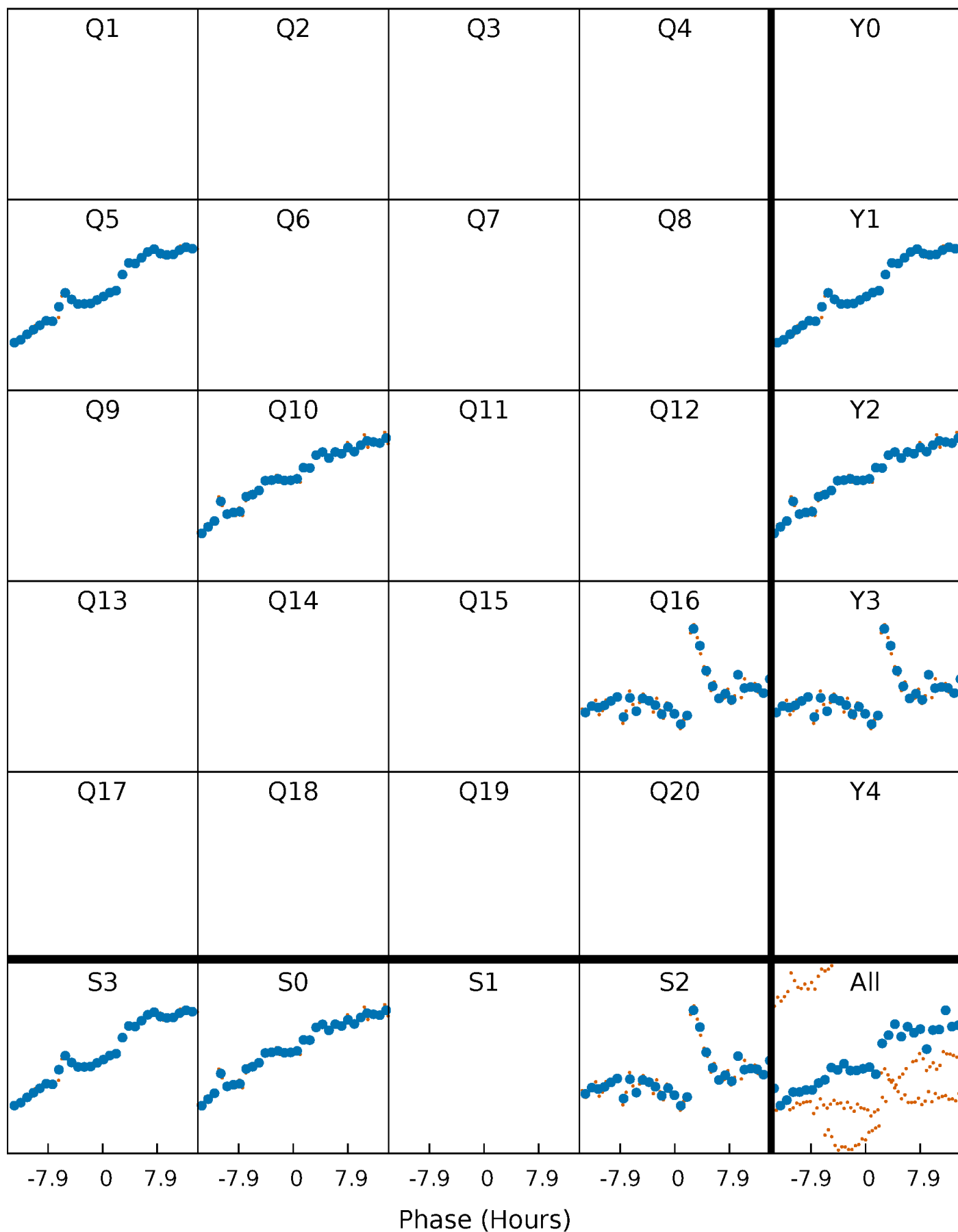


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



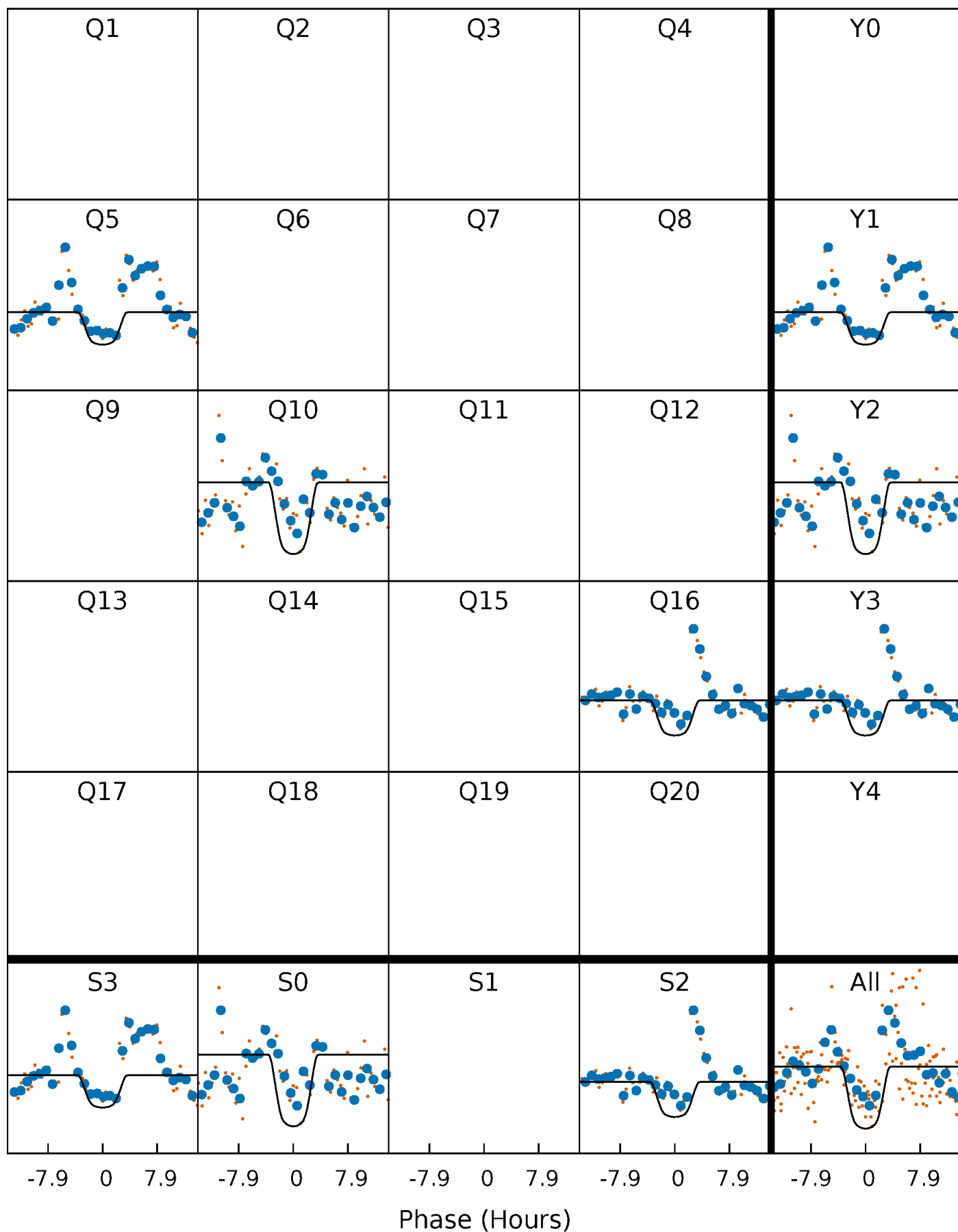
# PDC Quarter-Phased Transit Curves

TCE 006224062-05     $P=513.600992$  Days     $T_0=484.379041$  (BKJD)



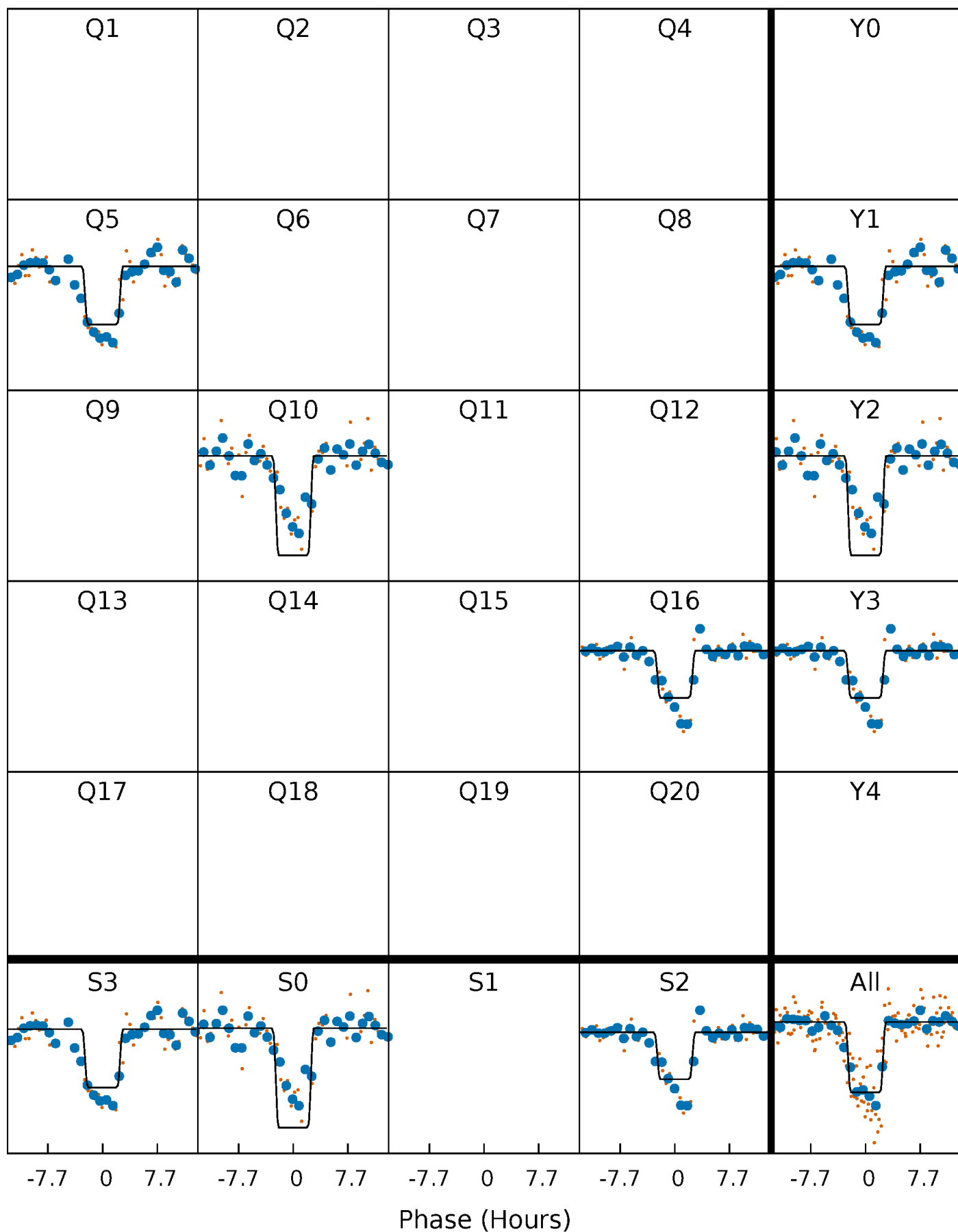
# DV Quarter-Phased Transit Curves

TCE 006224062-05     $P=513.600992$  Days     $T_0=484.379041$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

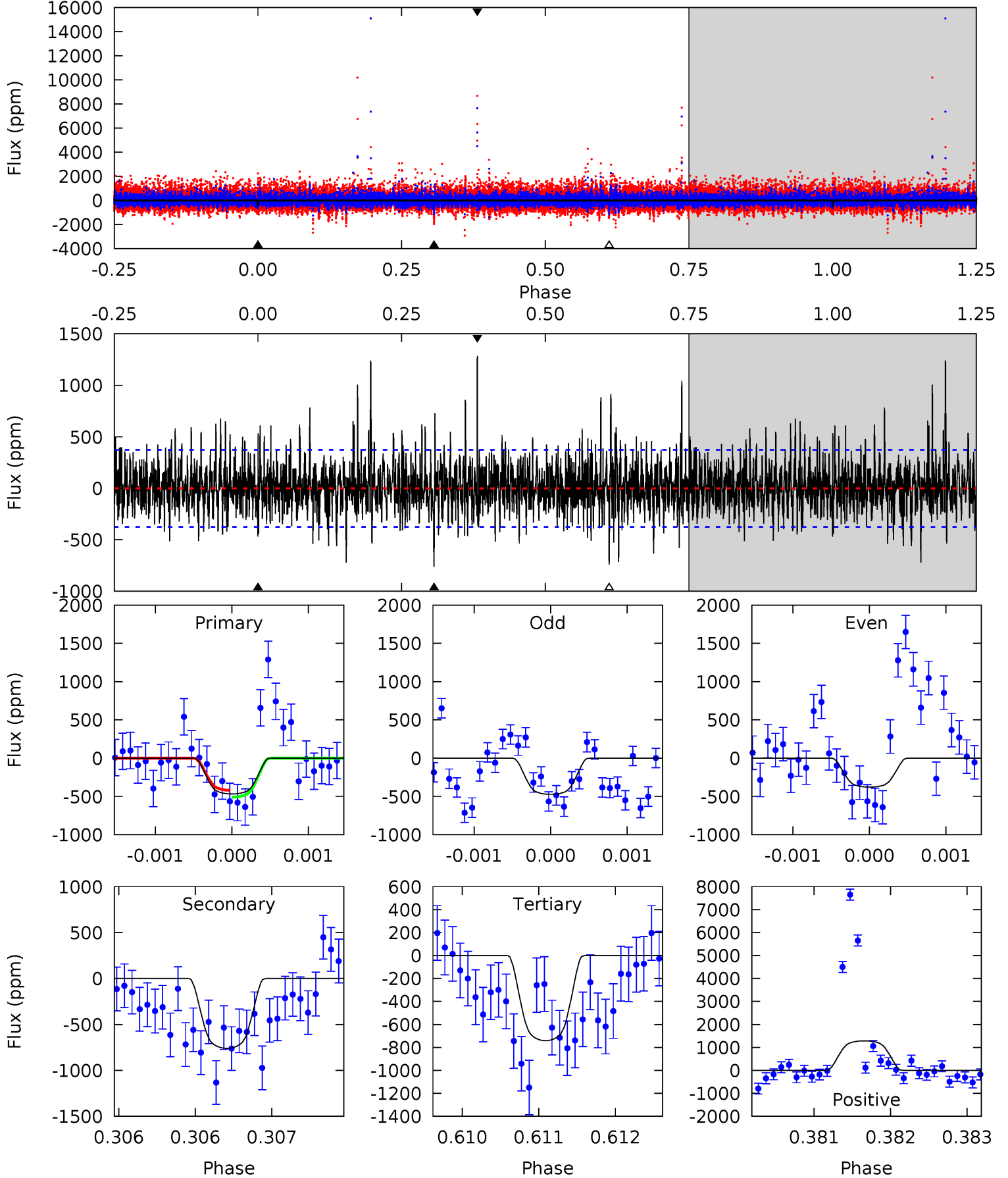
TCE 006224062-05 P=513.590719 Days  $T_0=484.381931$  (BKJD)



# DV Model-Shift Uniqueness Test

006224062-05, P = 513.600992 Days, E = 484.379041 Days

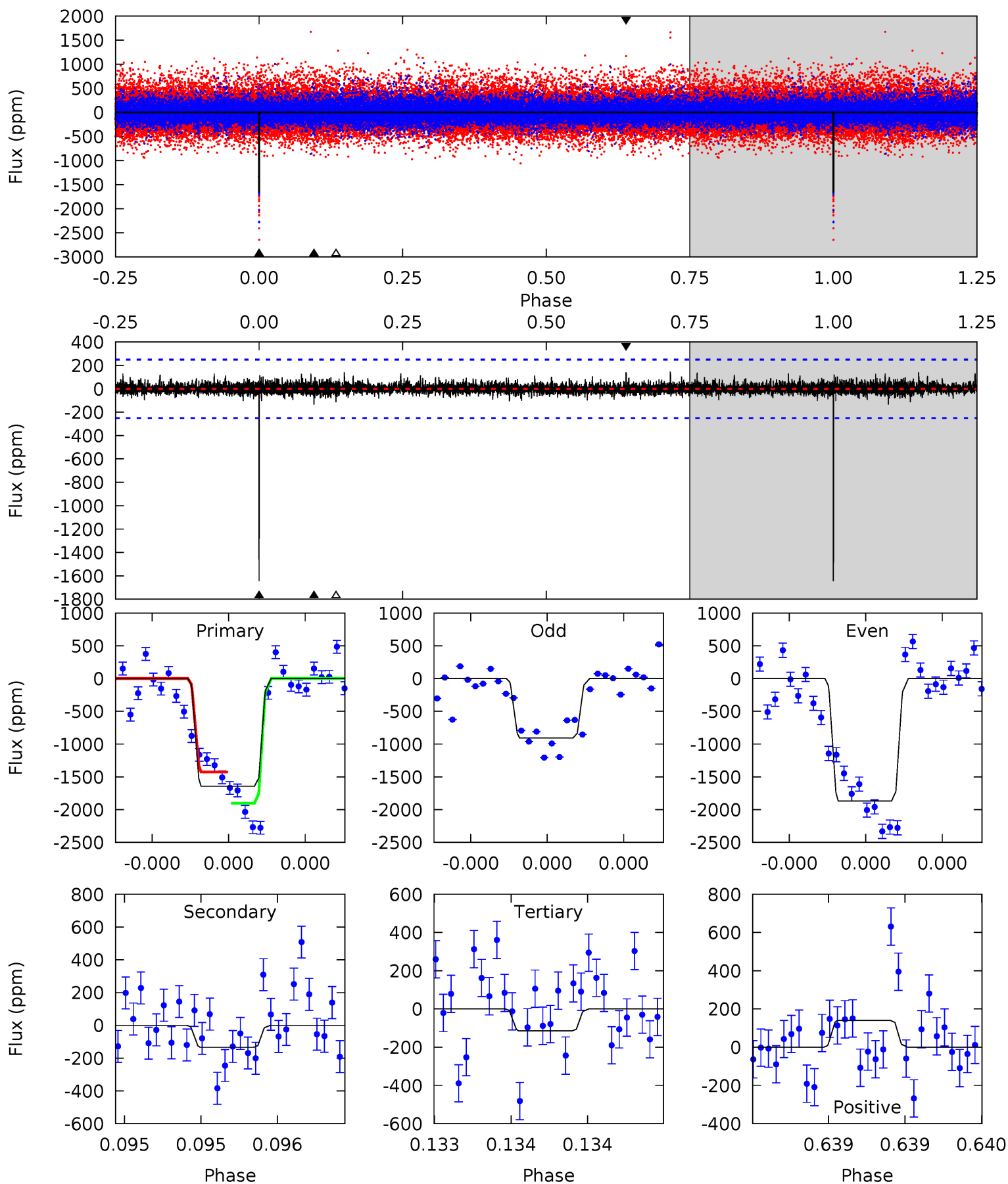
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.93	11.3	11.0	19.0	5.54	3.43	2.81	-4.06	-12.1	0.27	-7.77	0.58	0.87	0.63	0.66



# Alt Model-Shift Uniqueness Test

006224062-05, P = 513.590719 Days, E = 484.381931 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
36.8	3.00	2.57	3.14	5.59	3.51	0.58	34.2	33.7	0.43	-0.13	10.7	0.84	0.08	5.31



### Stellar Parameters For KIC 006224062

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3707^{+50}_{-55}$	$4.794^{+0.039}_{-0.024}$	$-0.200^{+0.100}_{-0.100}$	$0.452^{+0.028}_{-0.031}$	$0.464^{+0.029}_{-0.029}$	$7.077^{+1.274}_{-0.739}$
	+1%/-1%	+1%/-1%	+50%/-50%	+6%/-7%	+6%/-6%	+18%/-10%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 006224062-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-760 \pm 68$	$1.82^{+0.23}_{-0.21}$	$155^{+3}_{-3}$	$3366^{+148}_{-126}$	$119541^{+34089}_{-25939}$
Alt.	$-134 \pm 45$	$1.92^{+0.21}_{-0.22}$	$155^{+3}_{-3}$	$2606^{+125}_{-139}$	$19107^{+8198}_{-6494}$

$T_{max}$  = 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

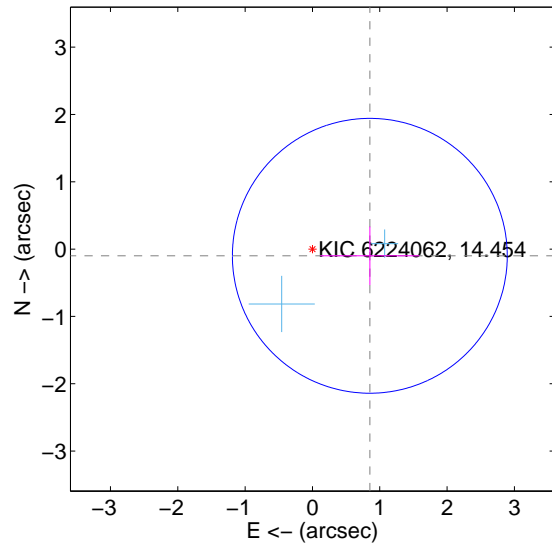
Supplemental centroid analysis for 006224062-05. Kepler magnitude: 14.45. Transit SNR 8.69

There are 2 quarters with good PRF difference image offsets

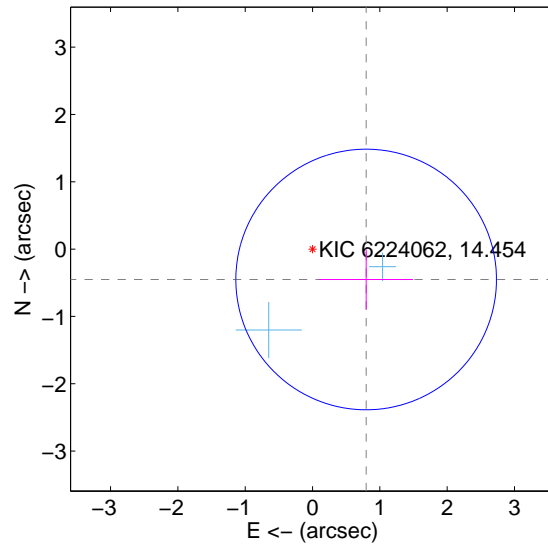
The direct PRF centroid is offset from the target star catalog position by about 0.43 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.858 \pm 0.680$	1.26	$-0.852 \pm 0.735$	$-0.100 \pm 0.434$
PRF-fit source offset from KIC position	$0.915 \pm 0.645$	1.42	$-0.796 \pm 0.697$	$-0.451 \pm 0.446$
photometric centroid source offset	$0.50 \pm 0.83$	0.60	$0.47 \pm 0.83$	$0.18 \pm 0.87$

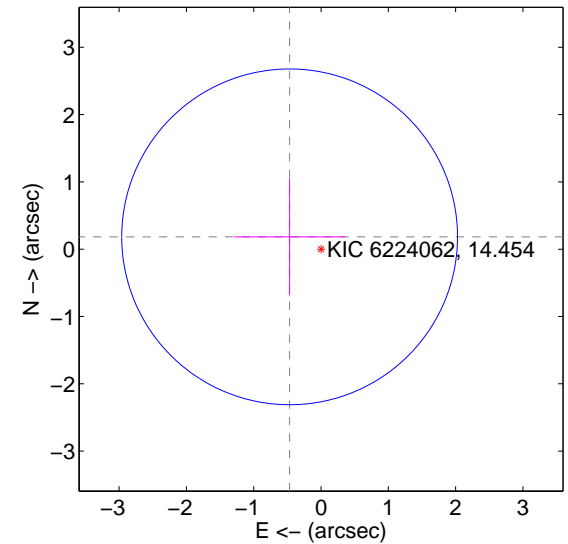
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

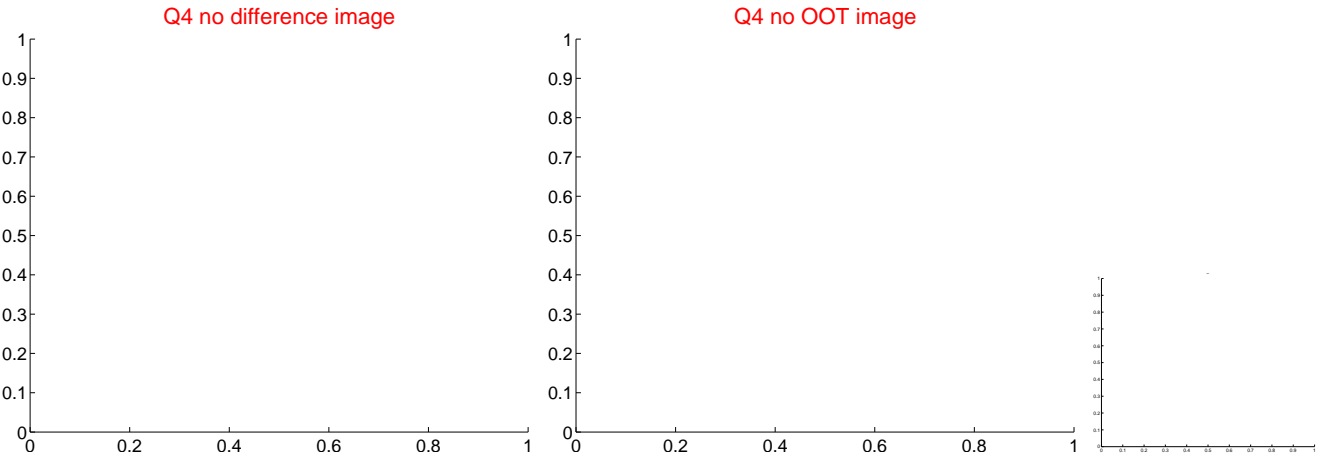
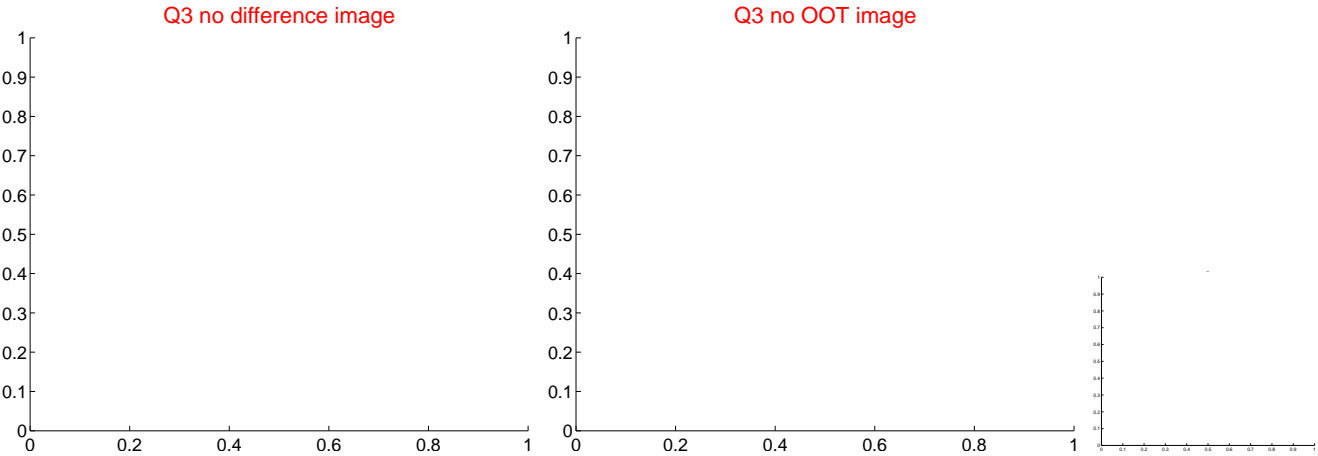
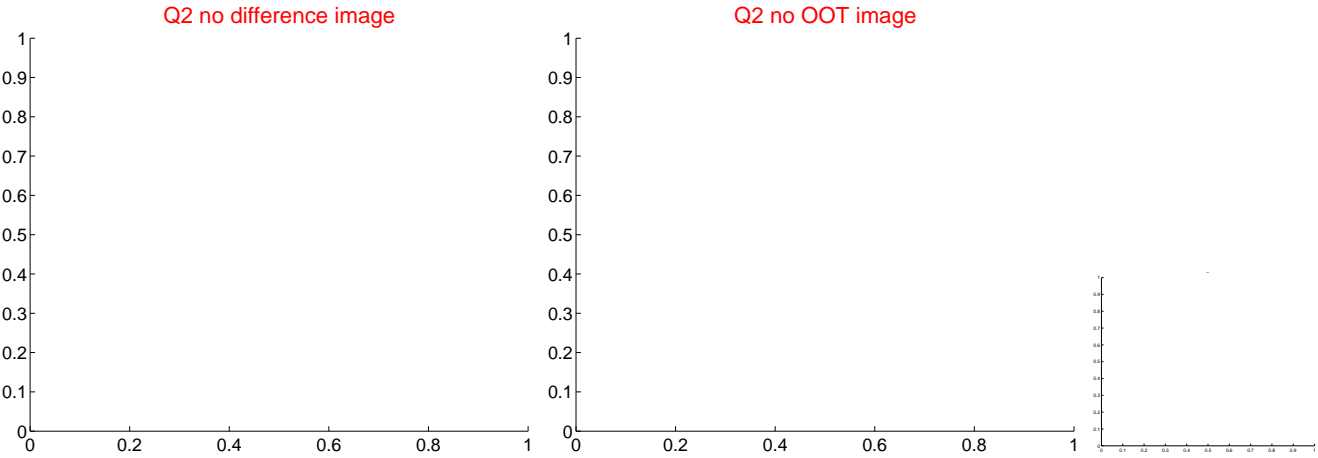
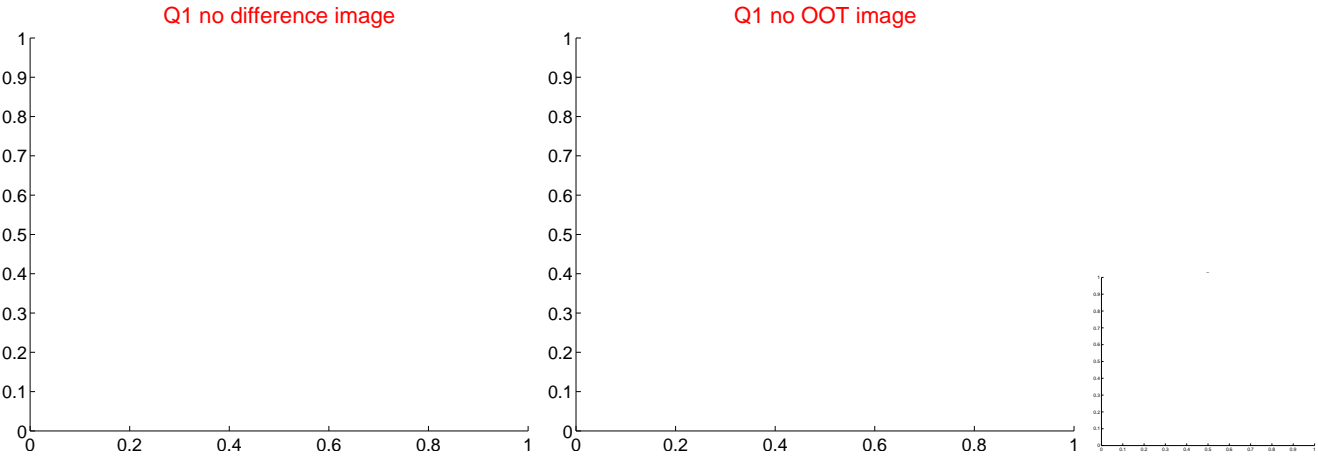


offset from photometric centroids



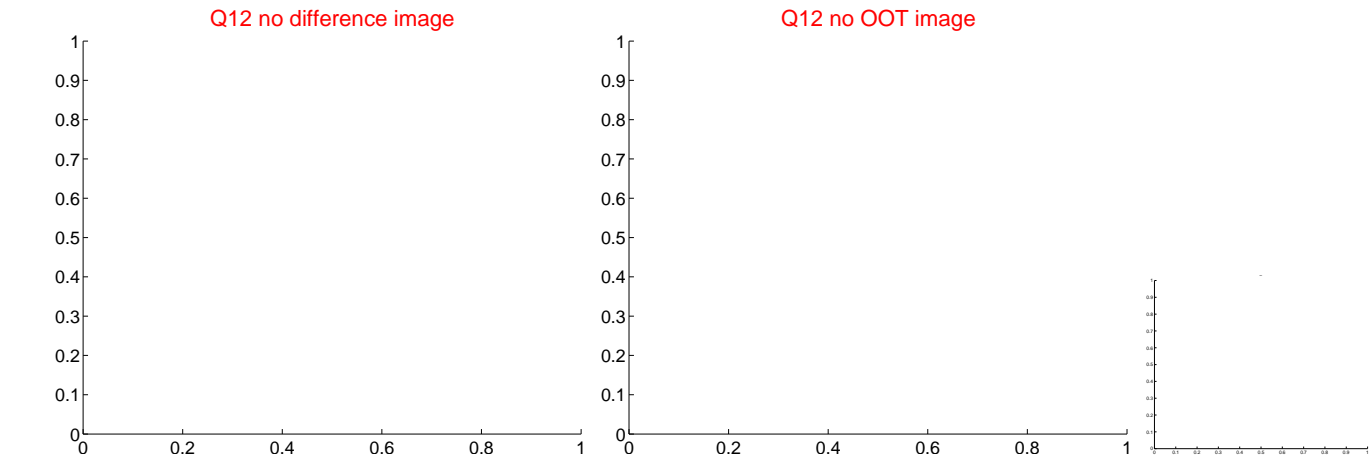
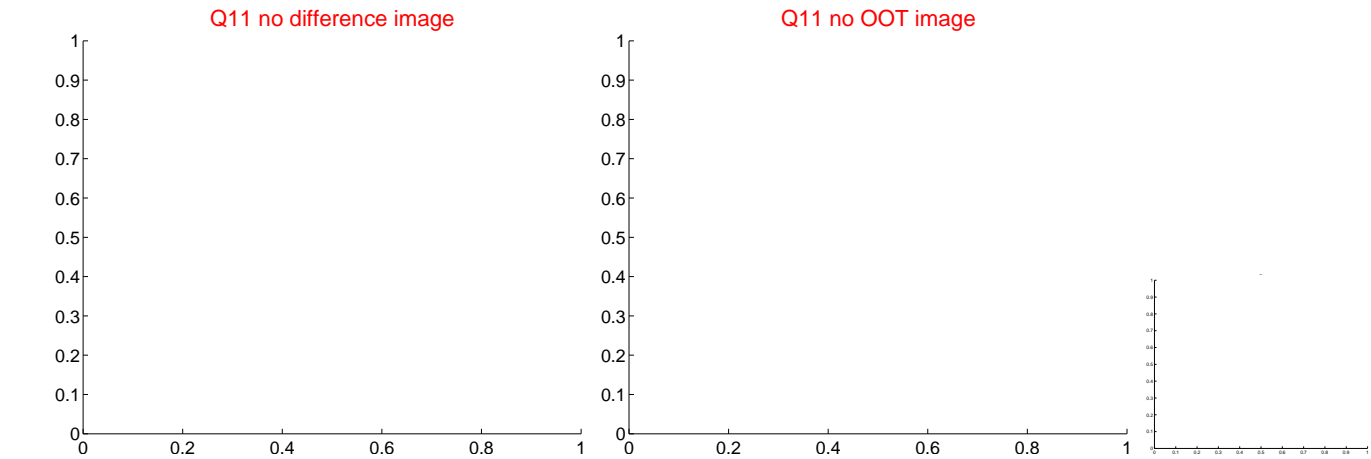
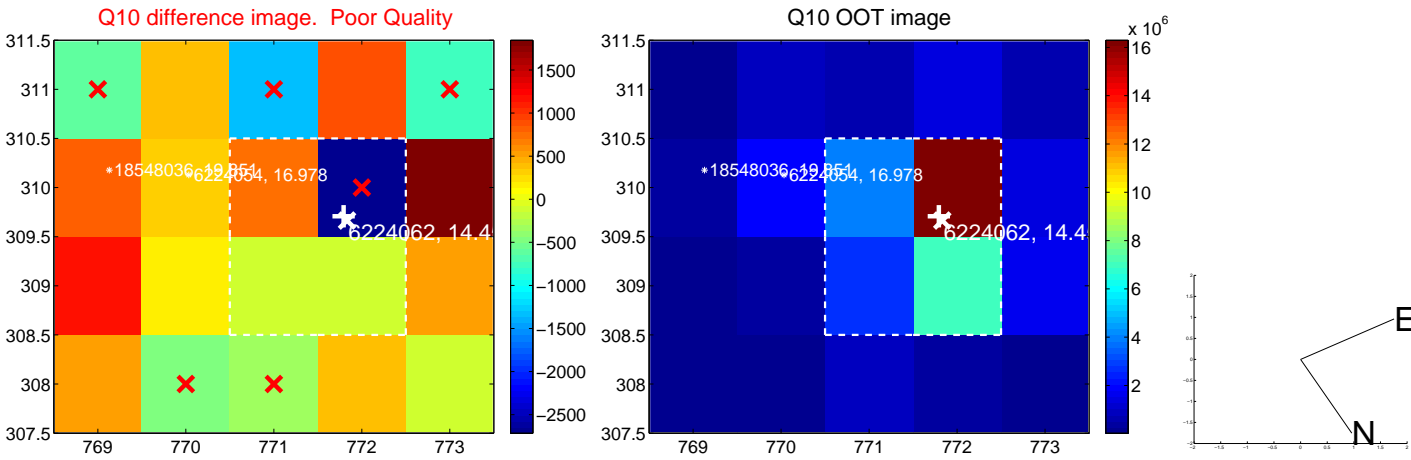
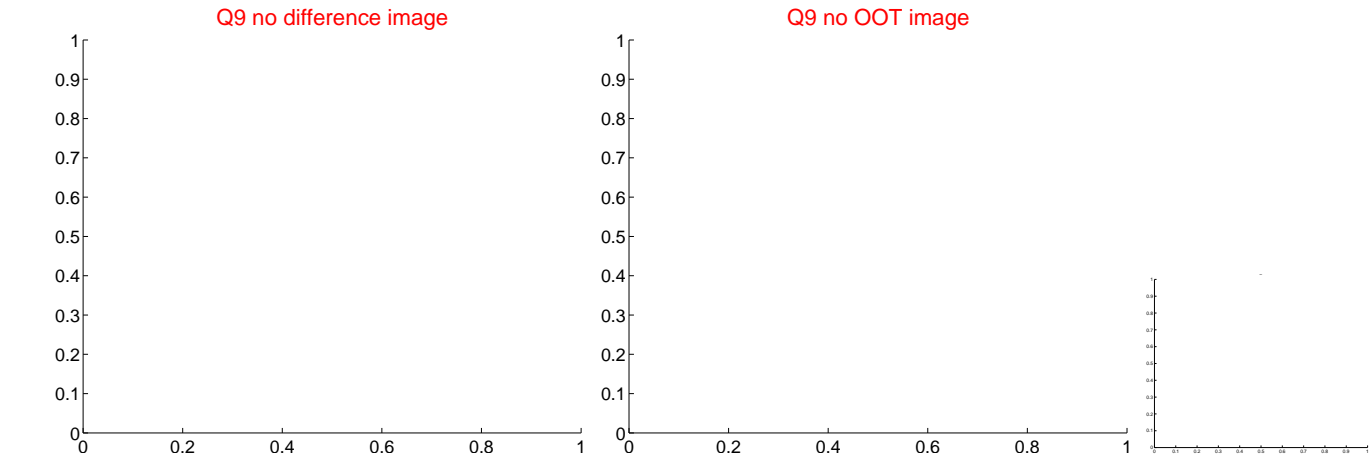
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

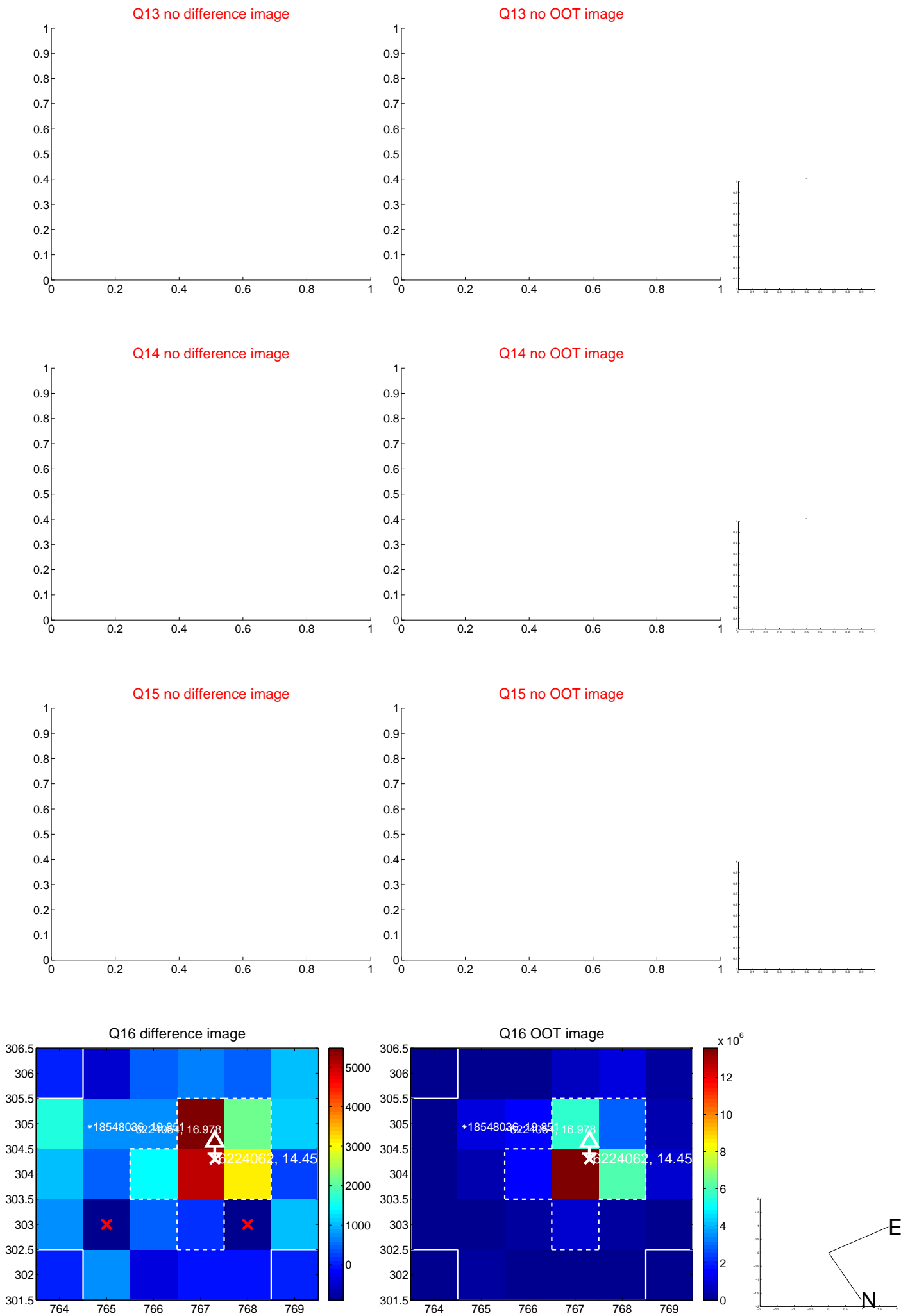




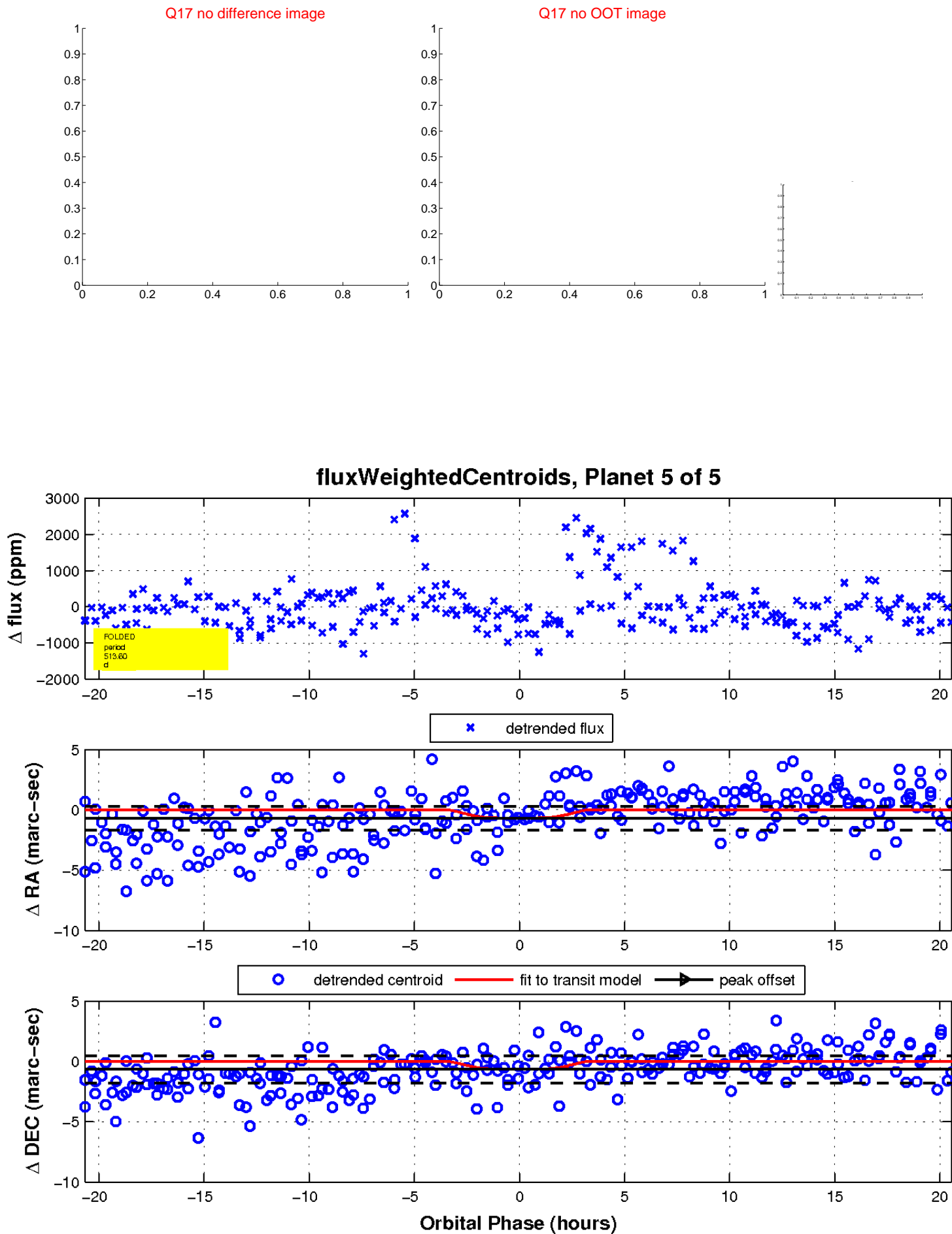
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



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



UKIRT Image

Declination

