

# KIC 003749207

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003749207-01	OBS	No	252.558043	167.173077	845.3	2.849	9.9	3.7	0.67	4274	2.13	0.29
003749207-02	OBS	No	557.769962	447.384840	1645.0	3.990	8.6	6.0	0.67	4274	2.87	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003749207-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
003749207-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—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.

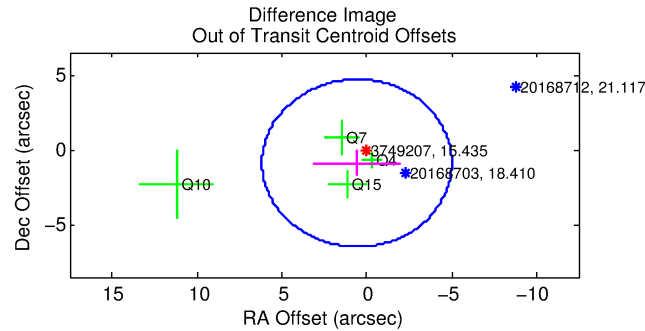
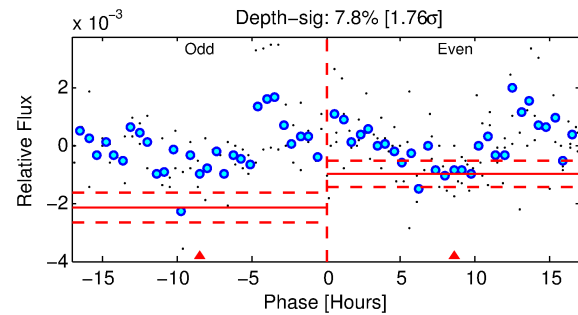
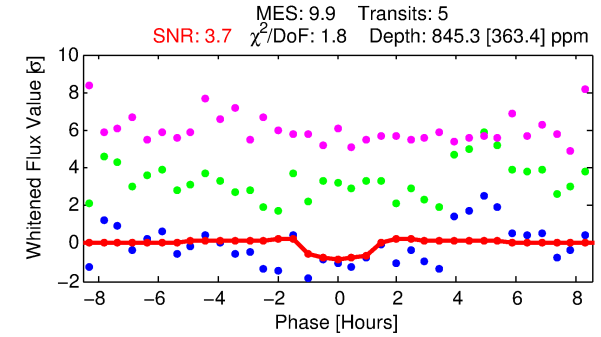
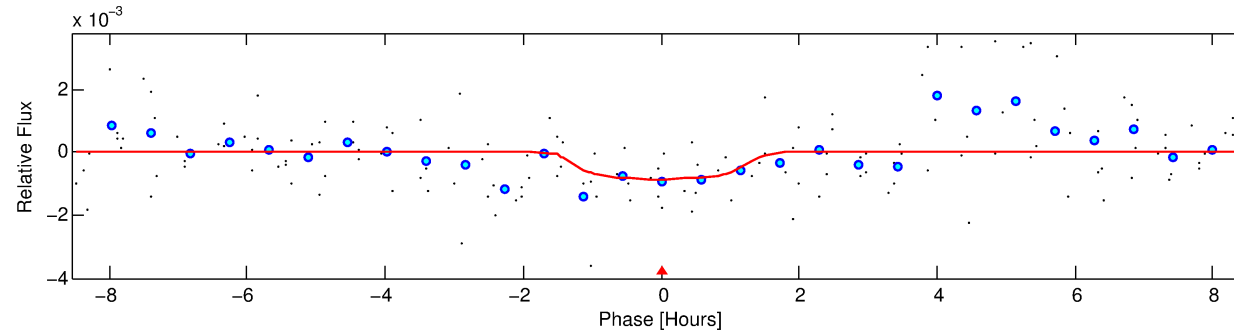
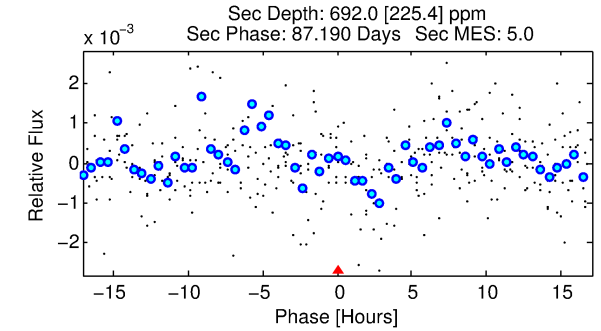
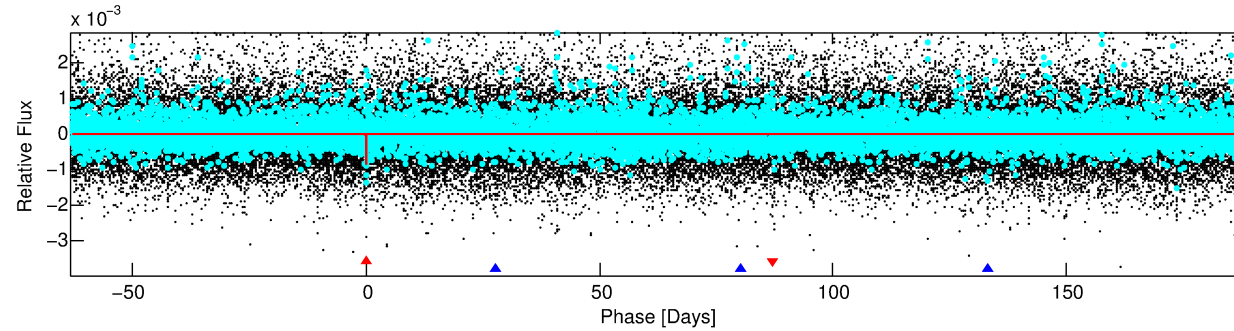
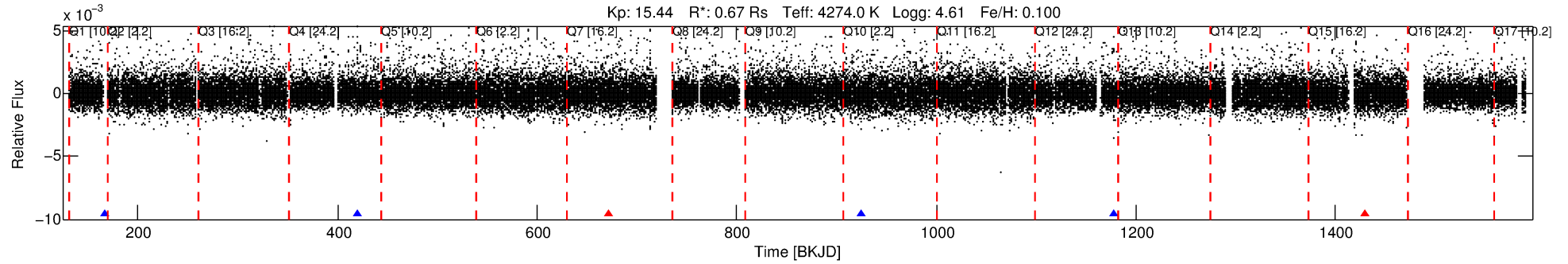
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003749207-01

No Significant Match Found

# DV One-Page Summary

KIC: 3749207 Candidate: 1 of 2 Period: 252.558 d



## DV Fit Results:

Period = 252.55804 [0.00729] d  
Epoch = 167.1731 [0.0224] BKJD  
Rp/R\* = 0.0292 [0.1238]  
a/R\* = 476.66 [6396.47]  
b = 0.75 [8.05]  
Seff = 0.29 [0.04]  
Teq = 187 [7] K  
Rp = 2.13 [9.02] Re  
a = 0.6810 [0.0464] AU  
Ag = 38994.59 [330957.41] [0.12σ]  
Teffp = 4057 [8609] K [0.45σ]

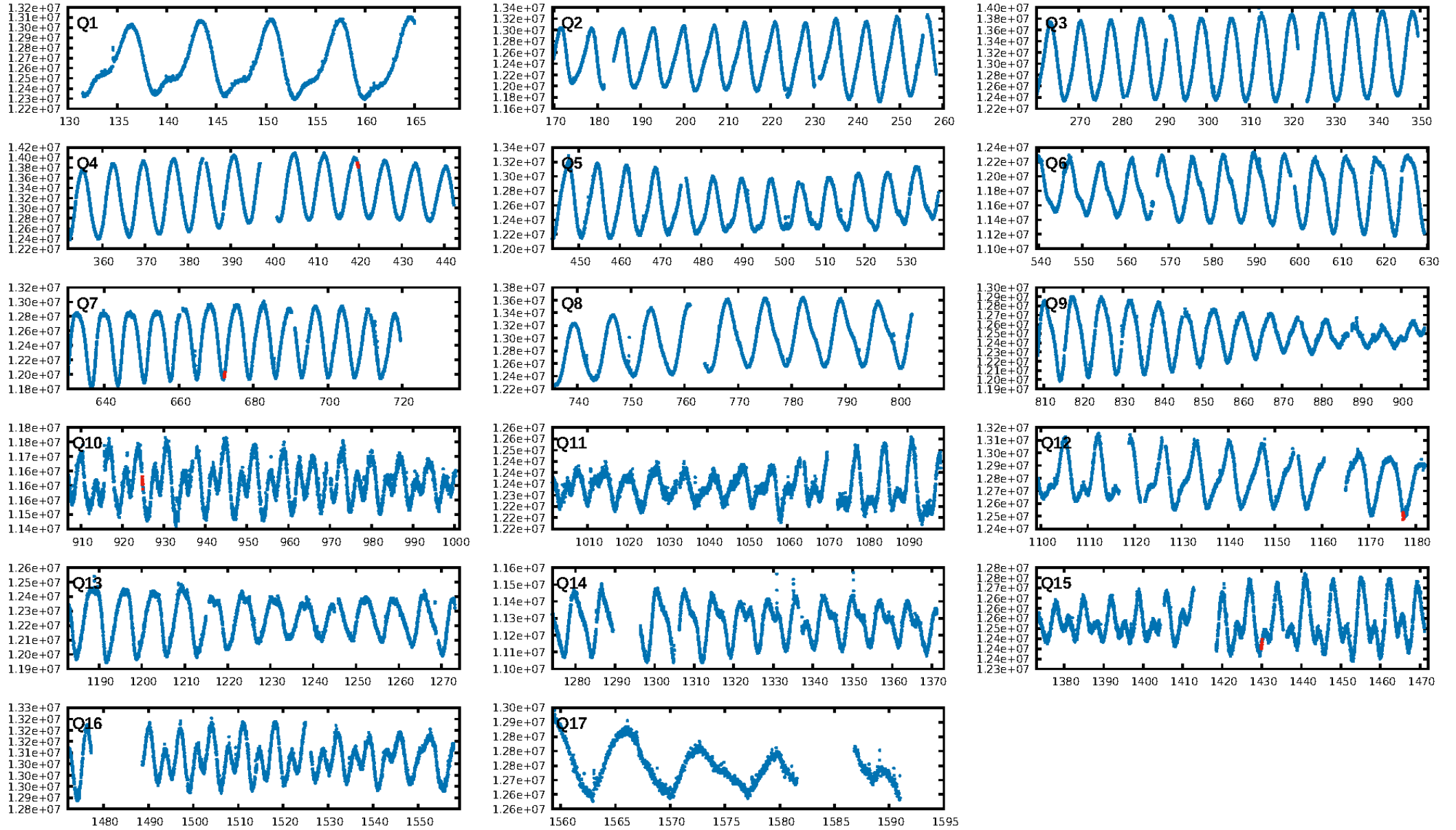
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1494.00σ]  
ModelChiSquare2-sig: 45.0%  
ModelChiSquareGof-sig: 89.5%  
Bootstrap-pfa: 2.77e-10  
RollingBand-fgt: 0.60 [3/5]  
GhostDiagnostic-chr: -0.1093  
Centroid-sig: 51.5%  
Centroid-so: 2.317 arcsec [0.80σ]  
OotOffset-rm: 1.059 arcsec [0.57σ]  
OotOffset-st: 1/2/1/0 [4]  
KicOffset-rm: 0.969 arcsec [0.89σ]  
KicOffset-st: 1/2/1/0 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 1.00 [4/4]

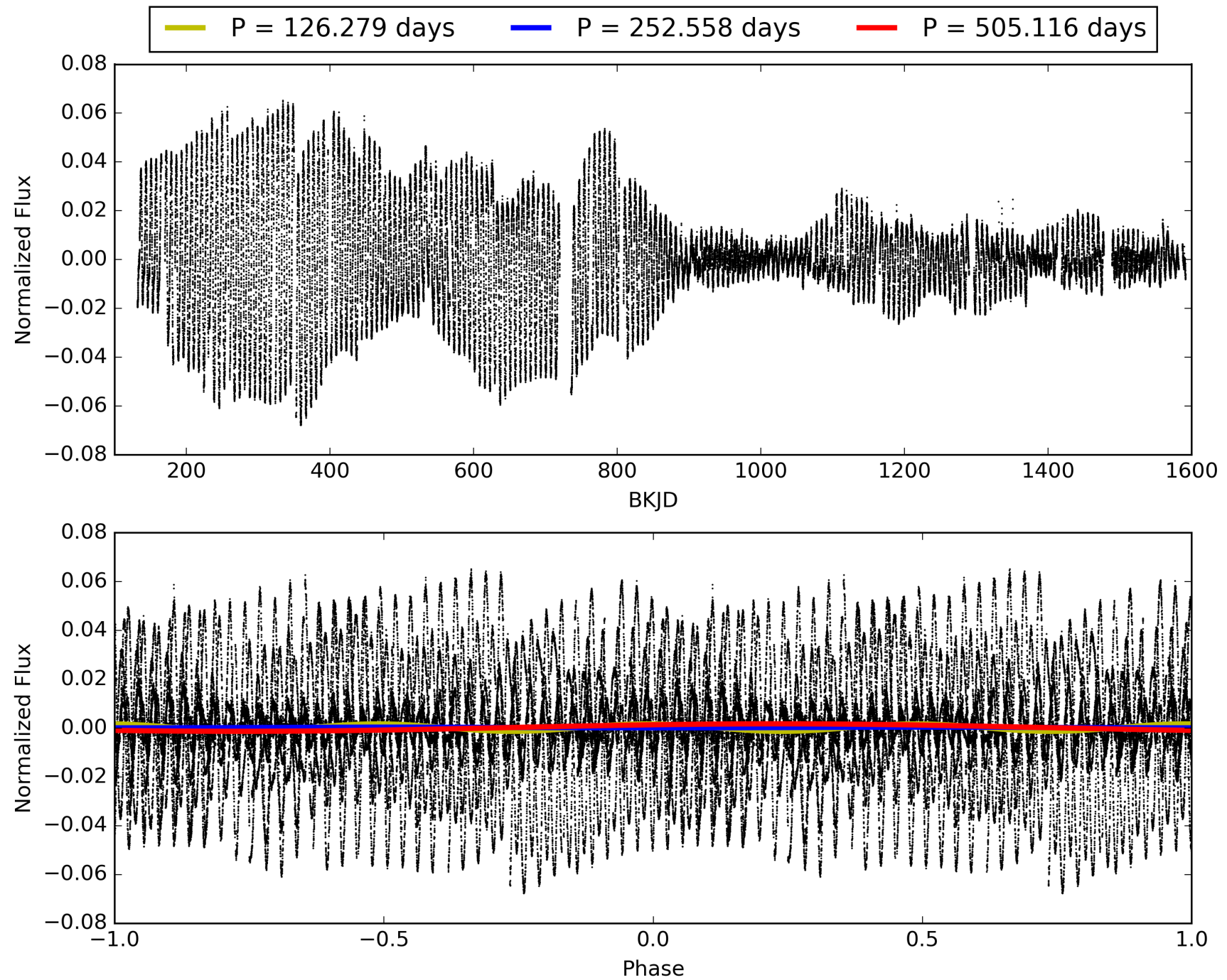
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 04:34:50 Z

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

# TCE 003749207-01, PDC Light Curves

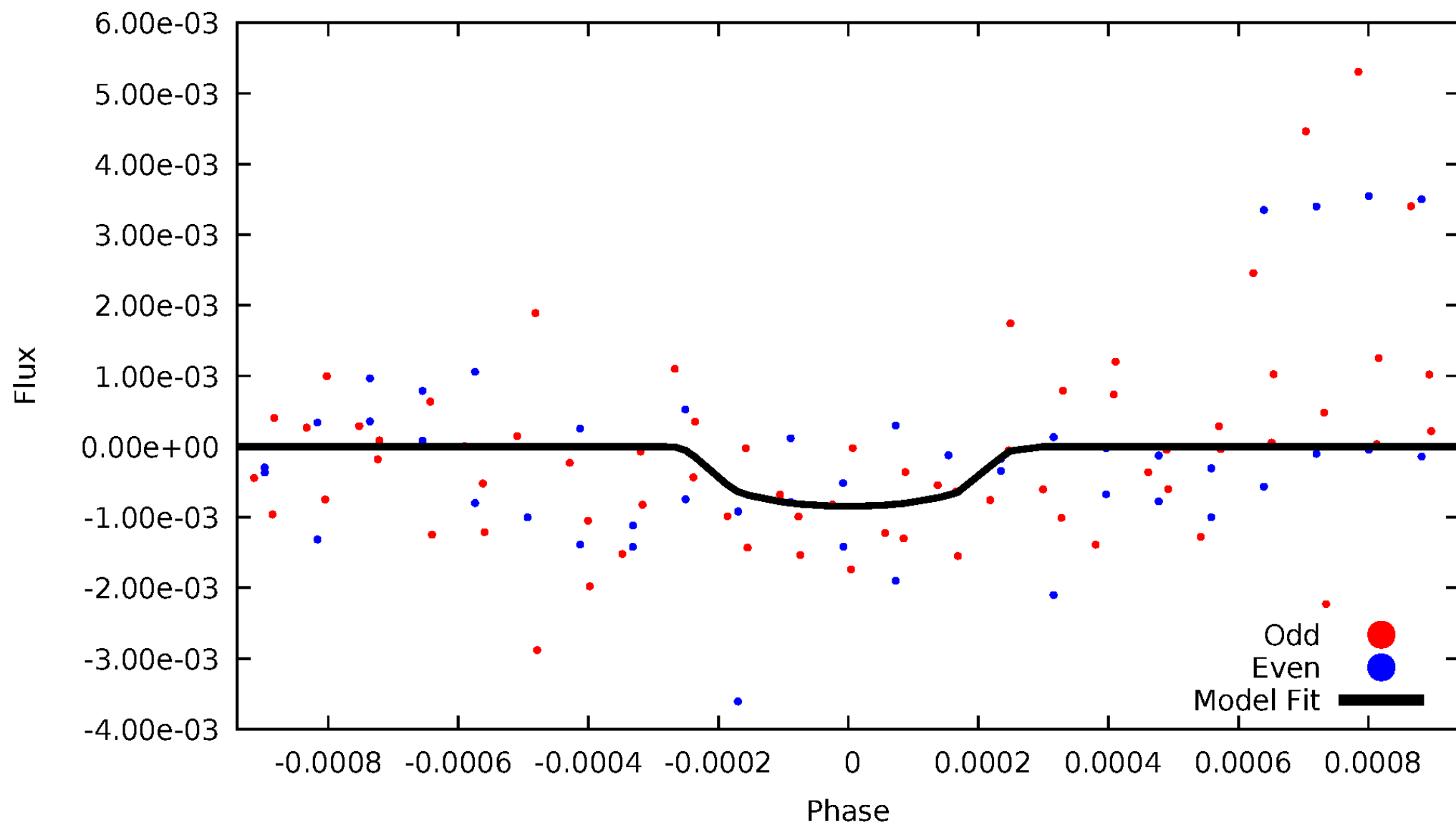


TCE 003749207-01



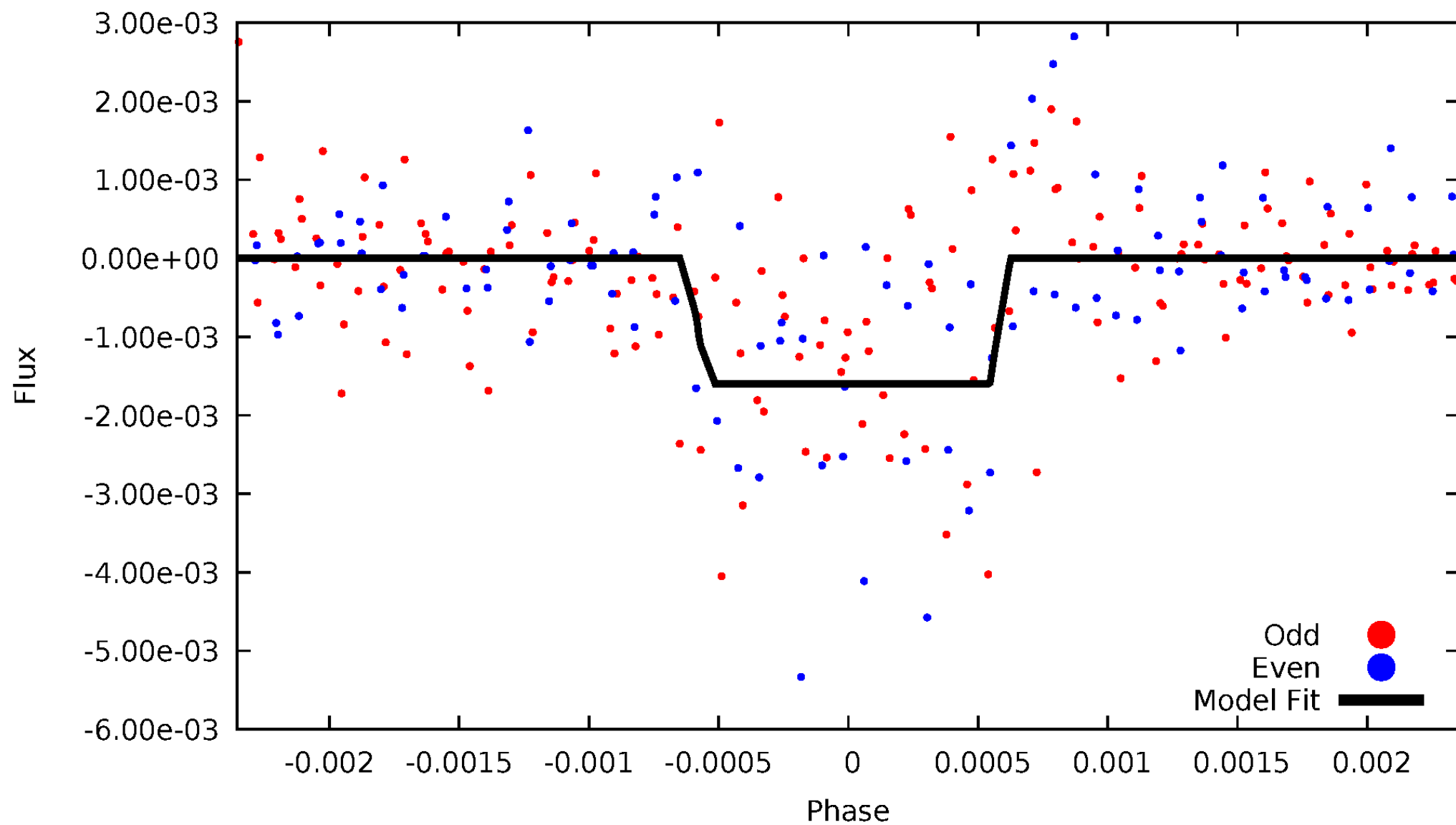
# DV Odd/Even

TCE 003749207-01



# ALT Odd/Even

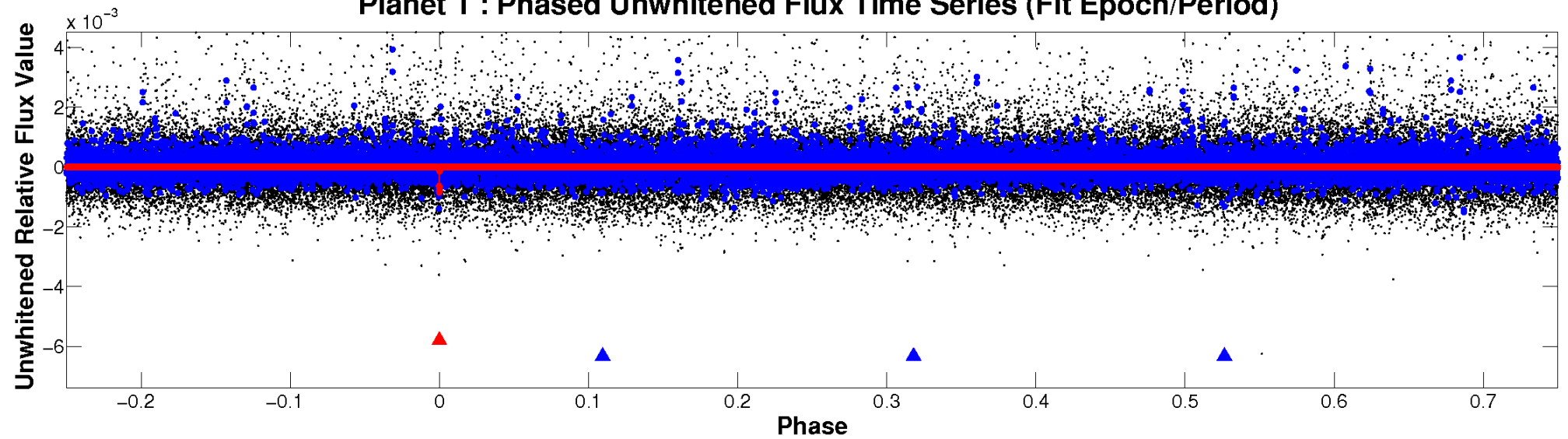
TCE 003749207-01



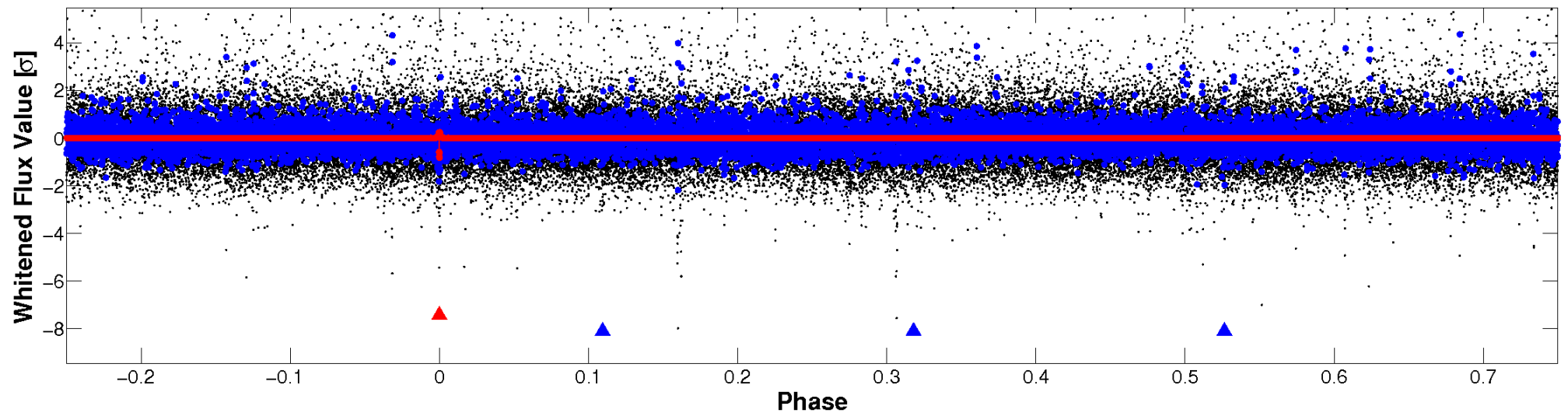


# Non-Whitened Vs. Whitened Light Curve

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

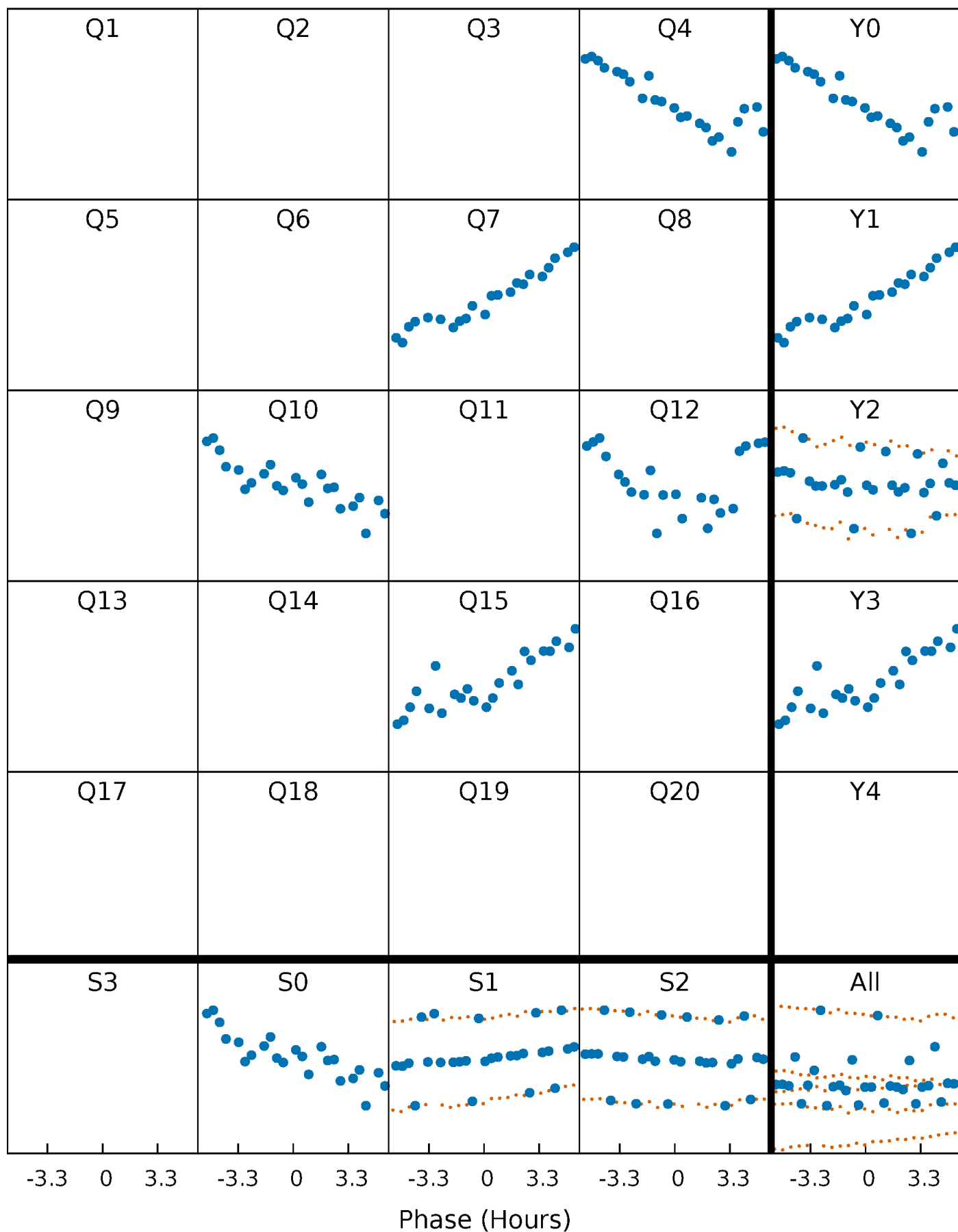


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

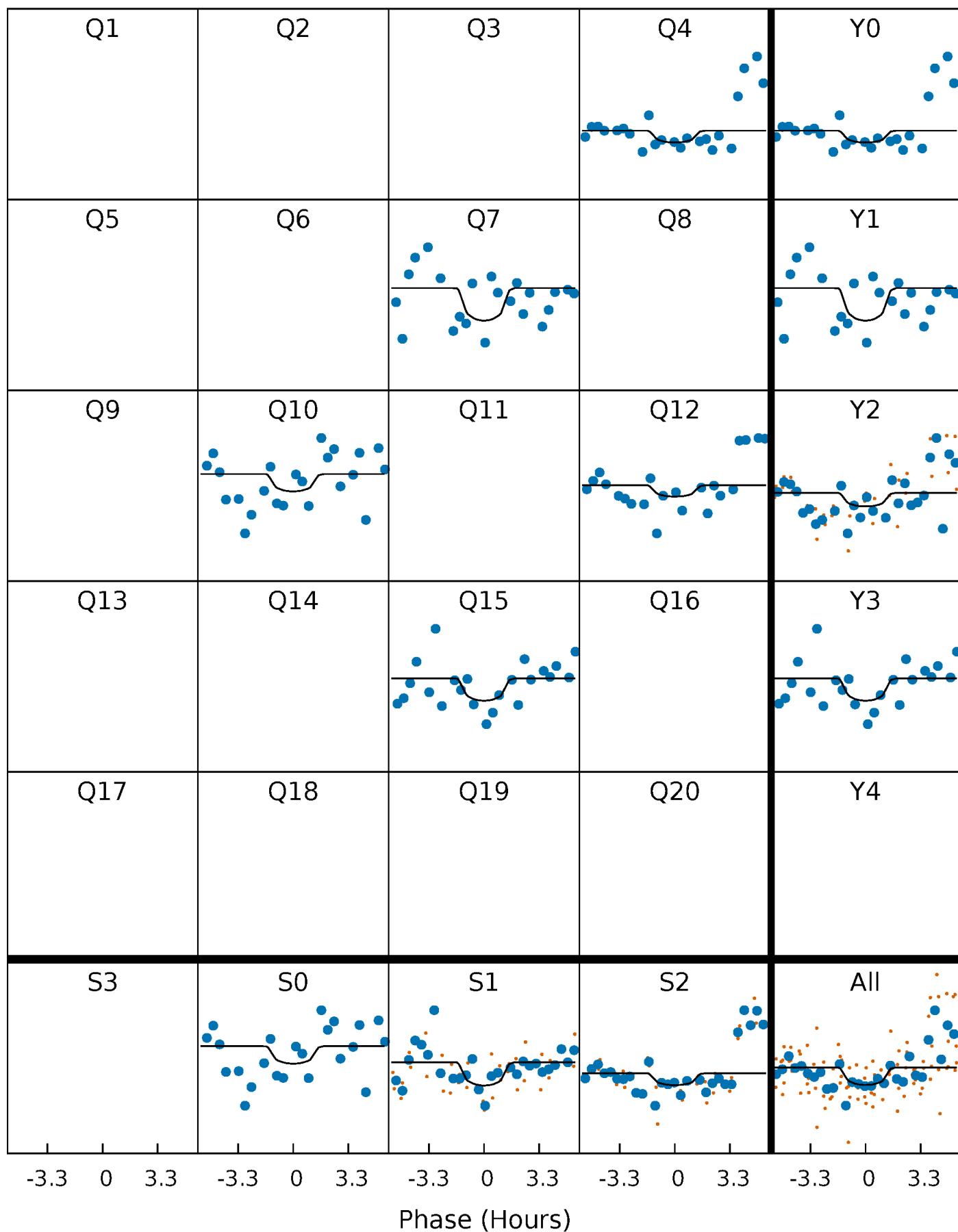
TCE 003749207-01 P=252.558043 Days  $T_0=167.173077$  (BKJD)





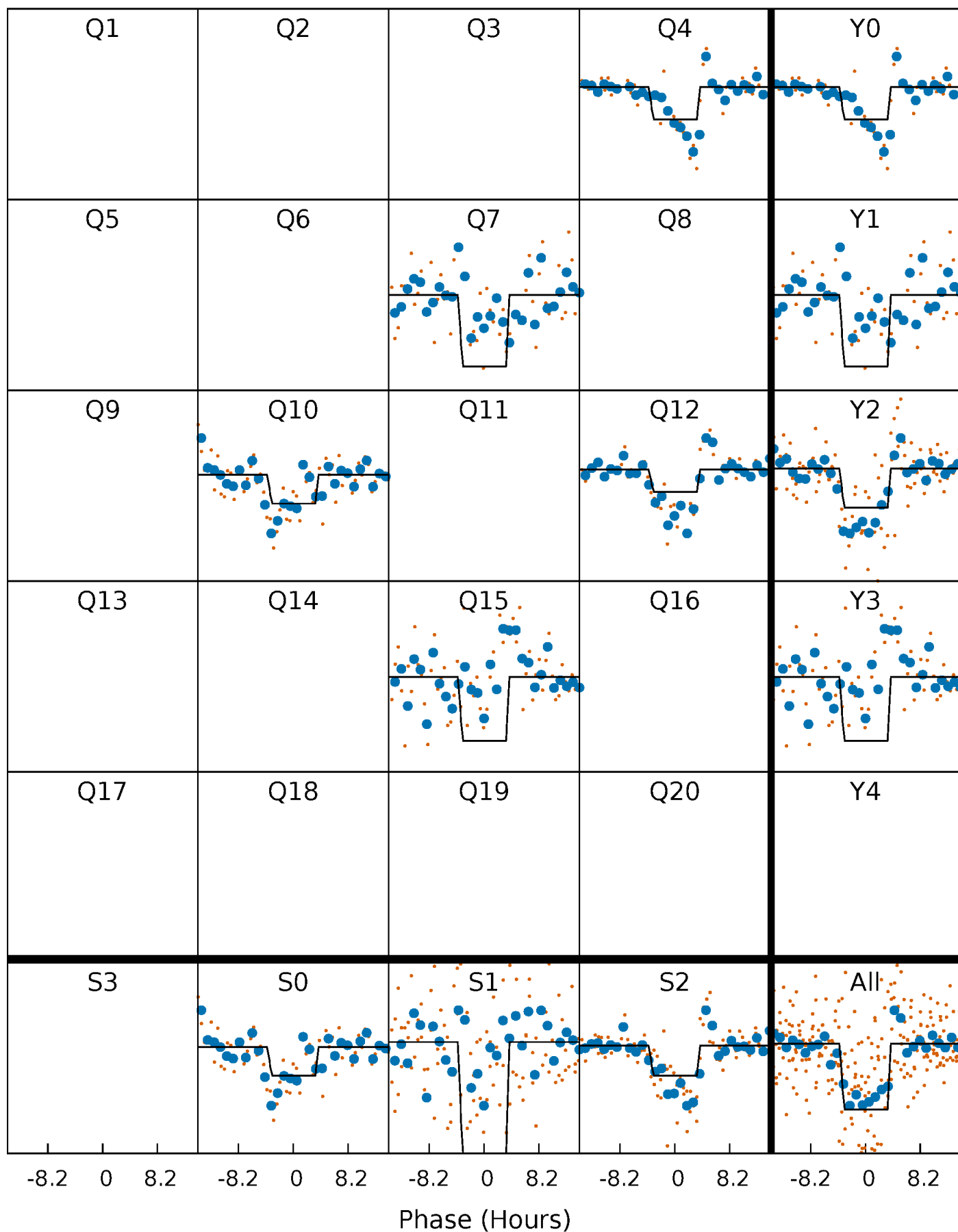
# DV Quarter-Phased Transit Curves

TCE 003749207-01 P=252.558043 Days  $T_0=167.173077$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

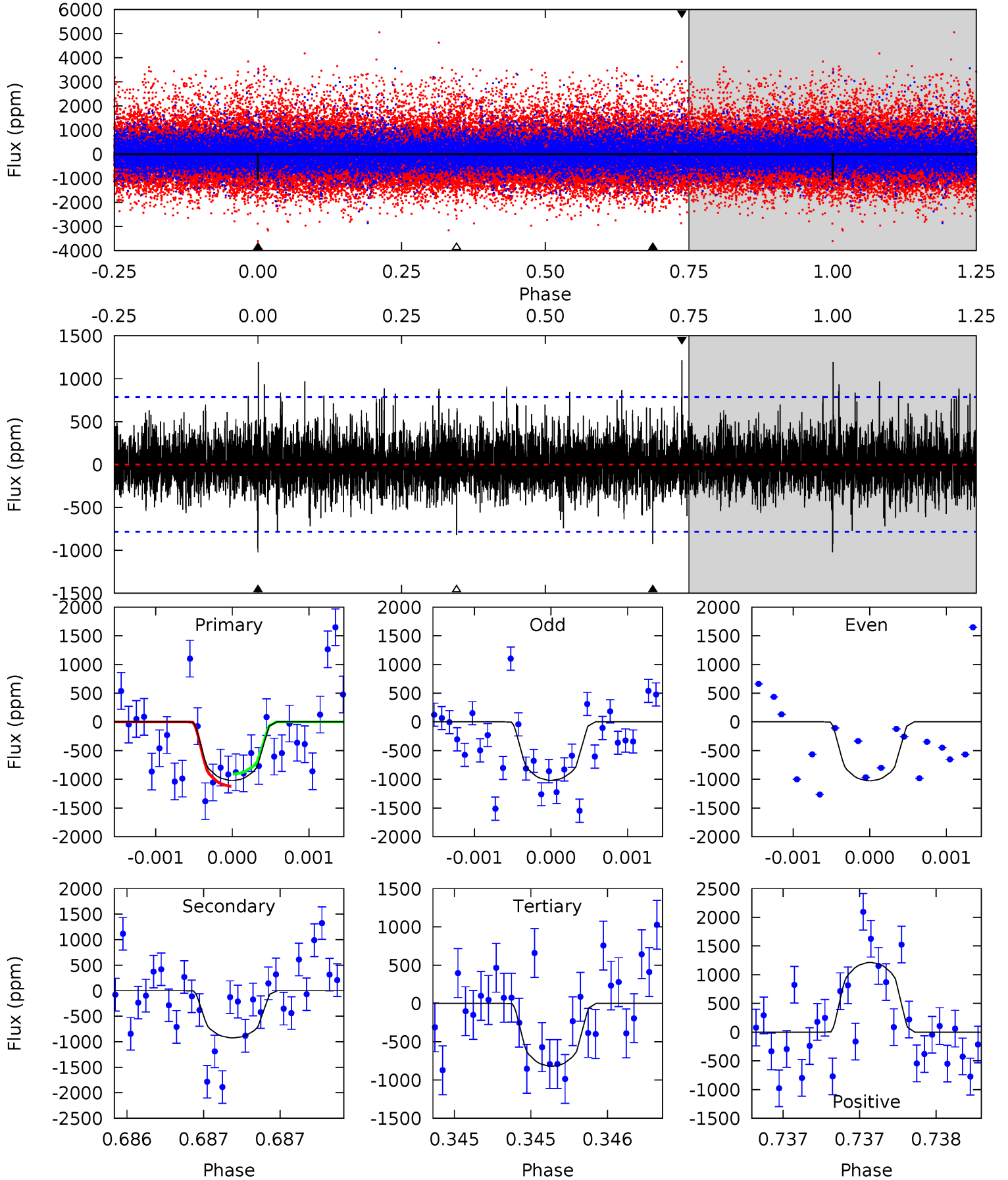
TCE 003749207-01 P=252.558802 Days  $T_0=167.173102$  (BKJD)



# DV Model-Shift Uniqueness Test

003749207-01, P = 252.558043 Days, E = 167.173077 Days

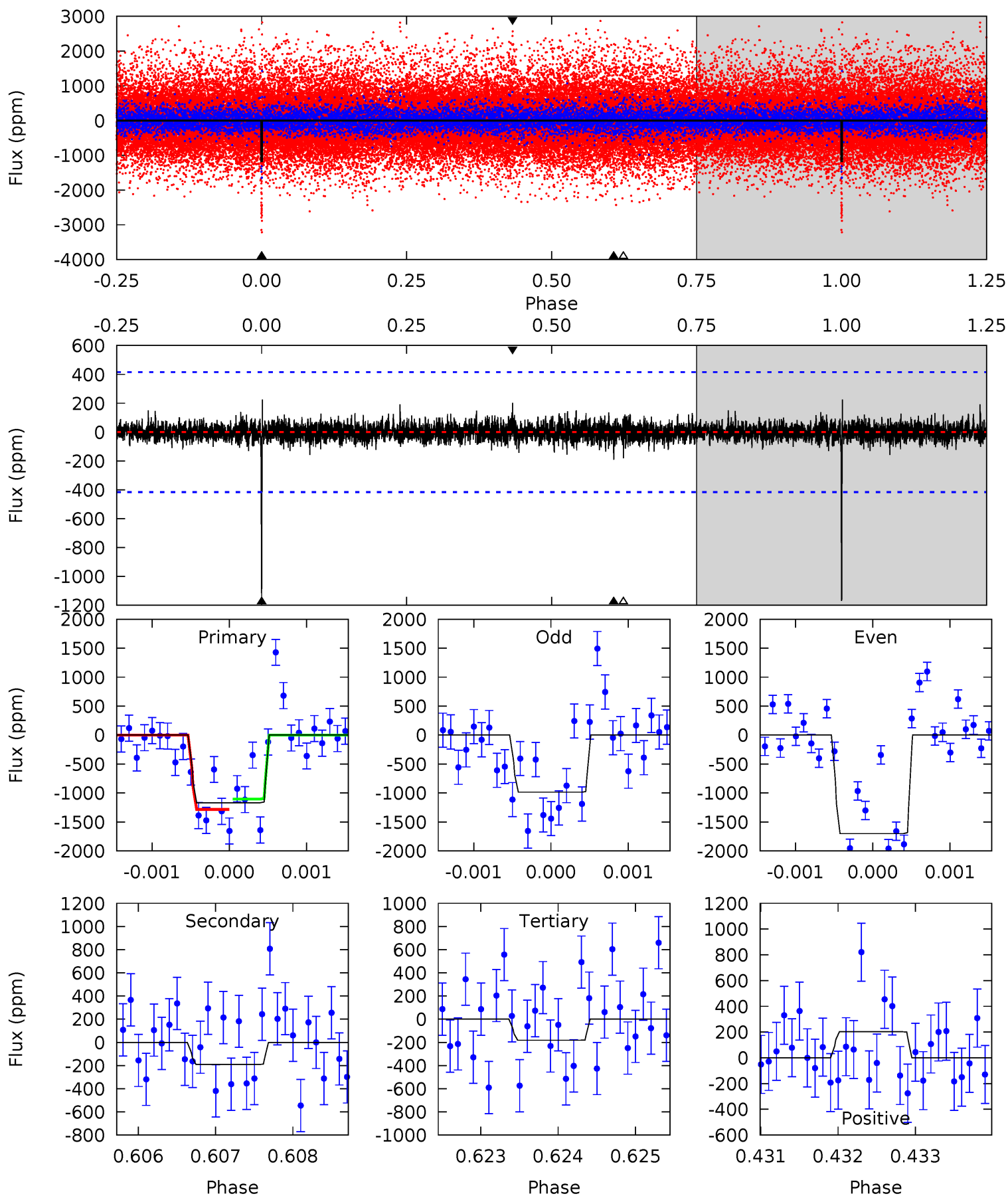
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.25	6.57	5.82	8.63	5.57	3.47	1.51	1.43	-1.37	0.74	-2.06	0.03	1.06	0.54	0.76



# Alt Model-Shift Uniqueness Test

003749207-01, P = 252.558802 Days, E = 167.173102 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
15.2	2.48	2.37	2.63	5.42	3.24	0.50	12.9	12.6	0.11	-0.15	4.62	0.83	0.16	1.16



### Stellar Parameters For KIC 003749207

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4274^{+129}_{-129}$	$4.608^{+0.049}_{-0.018}$	$0.100^{+0.250}_{-0.300}$	$0.668^{+0.028}_{-0.057}$	$0.660^{+0.053}_{-0.053}$	$3.118^{+0.715}_{-0.247}$
	+3%/-3%	+1%/-0%	+250%/-300%	+4%/-9%	+8%/-8%	+23%/-8%
Source	PHO1	KIC0	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 003749207-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-925 \pm 141$	$6.75^{+7.20}_{-4.55}$	$259^{+9}_{-8}$	$2983^{+1256}_{-522}$	$5201^{+42954}_{-3967}$
Alt.	$-190 \pm 77$	$6.80^{+7.04}_{-4.69}$	$259^{+8}_{-8}$	$2377^{+910}_{-357}$	$930^{+9325}_{-723}$

$T_{max}$  = 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

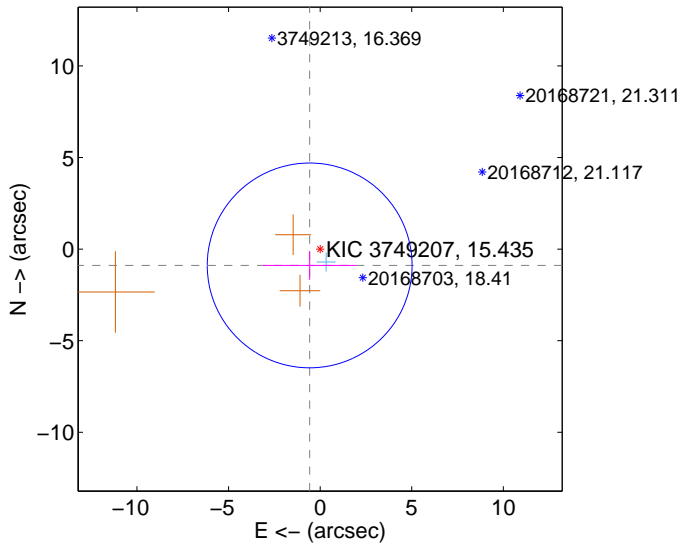
Supplemental centroid analysis for 003749207-01. Kepler magnitude: 15.44. Transit SNR 3.74

There are 1 quarters with good PRF difference image offsets

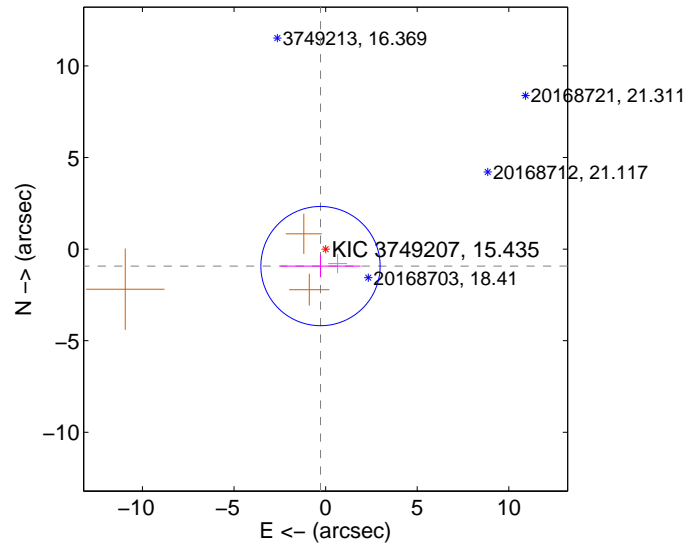
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.059 \pm 1.863$	0.57	$0.572 \pm 2.542$	$-0.891 \pm 0.787$
PRF-fit source offset from KIC position	$0.969 \pm 1.085$	0.89	$0.280 \pm 2.192$	$-0.927 \pm 0.615$
photometric centroid source offset	$2.32 \pm 2.90$	0.80	$0.60 \pm 2.80$	$2.24 \pm 2.90$

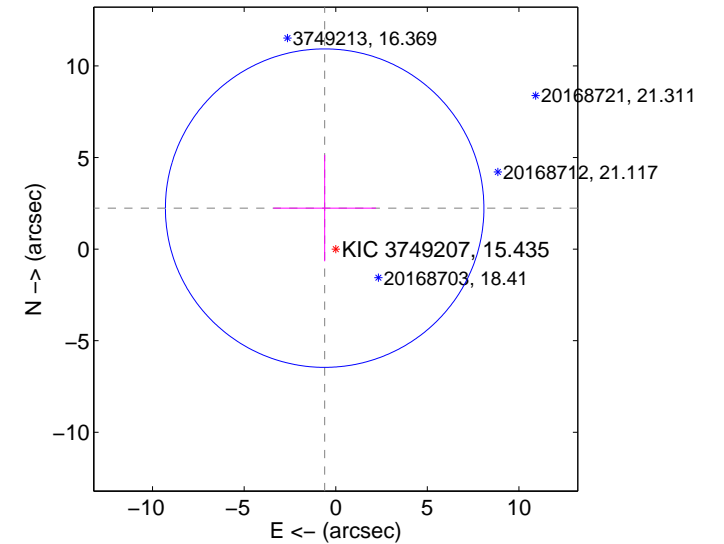
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

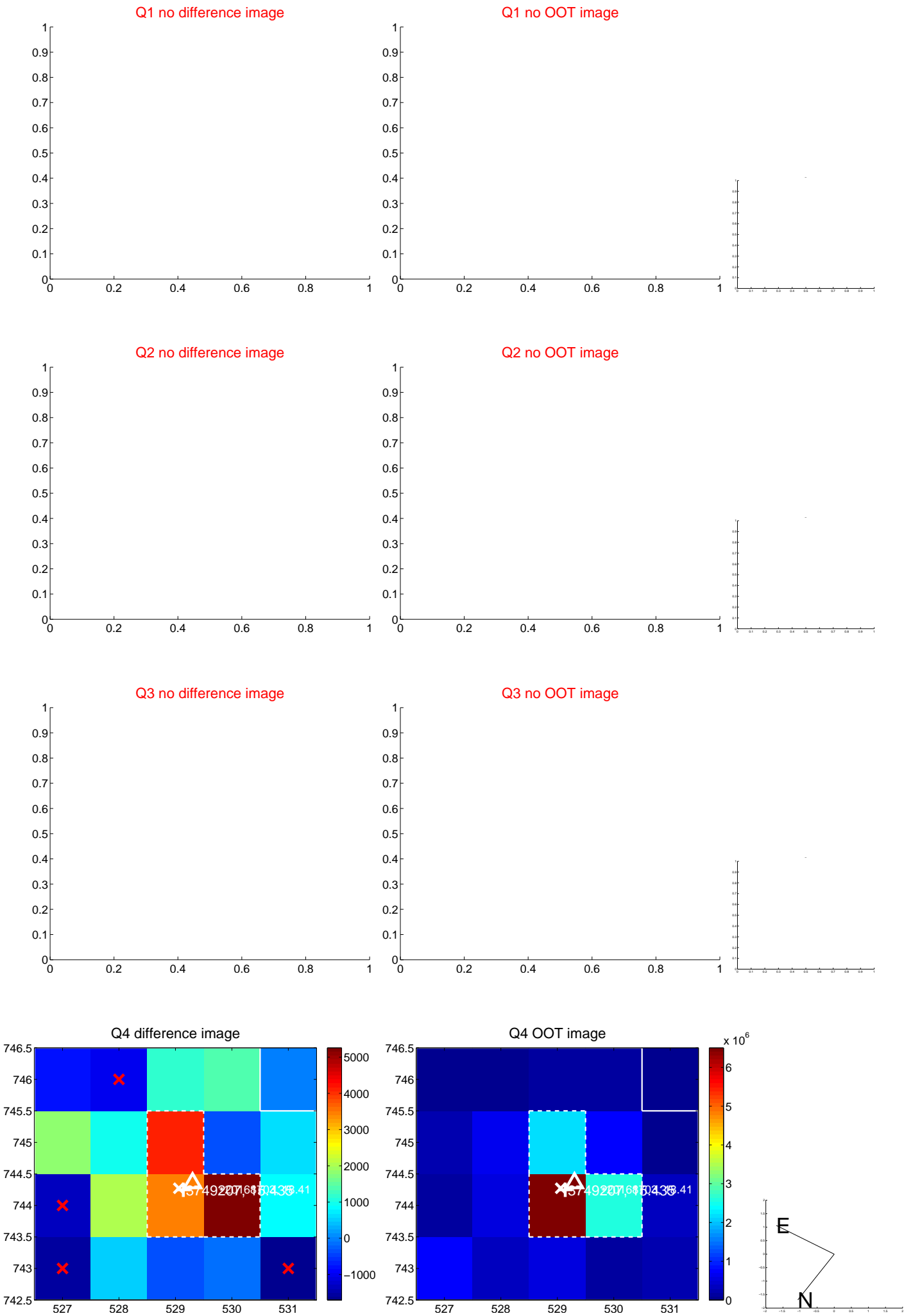


offset from photometric centroids



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.



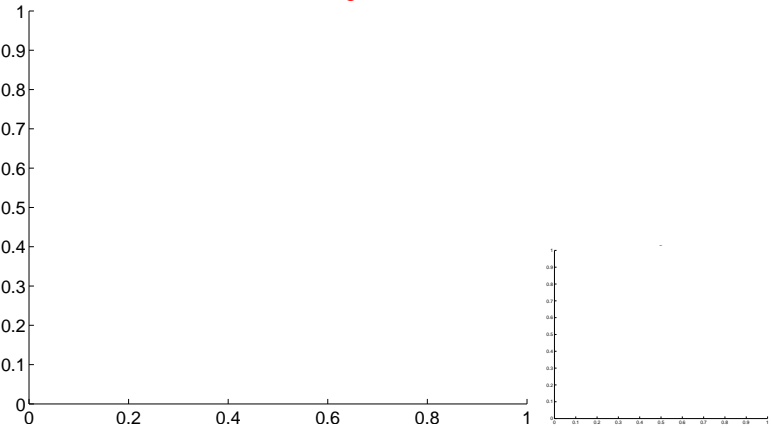


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q5 no difference image



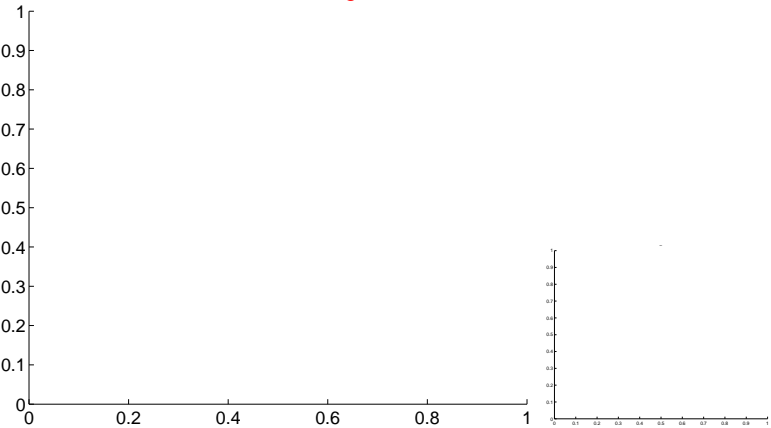
Q5 no OOT image



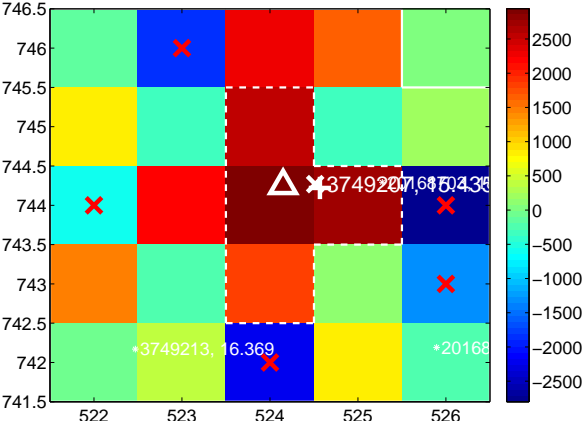
Q6 no difference image



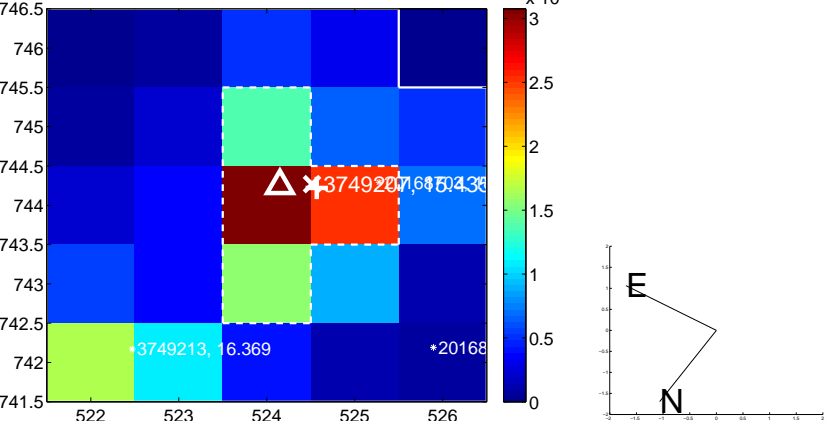
Q6 no OOT image



Q7 difference image. Poor Quality



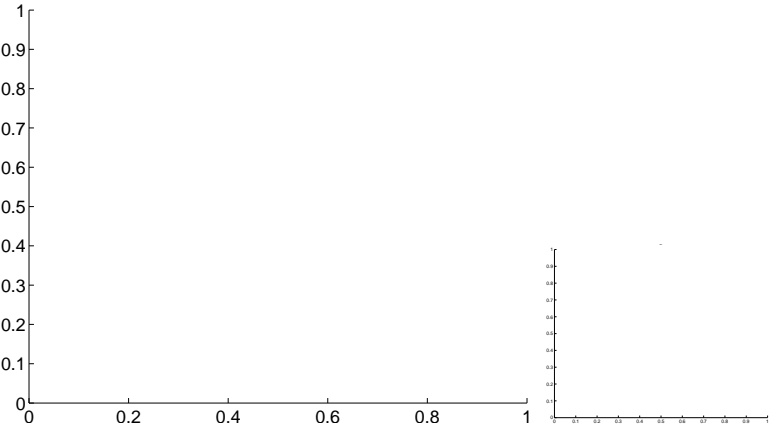
Q7 OOT image



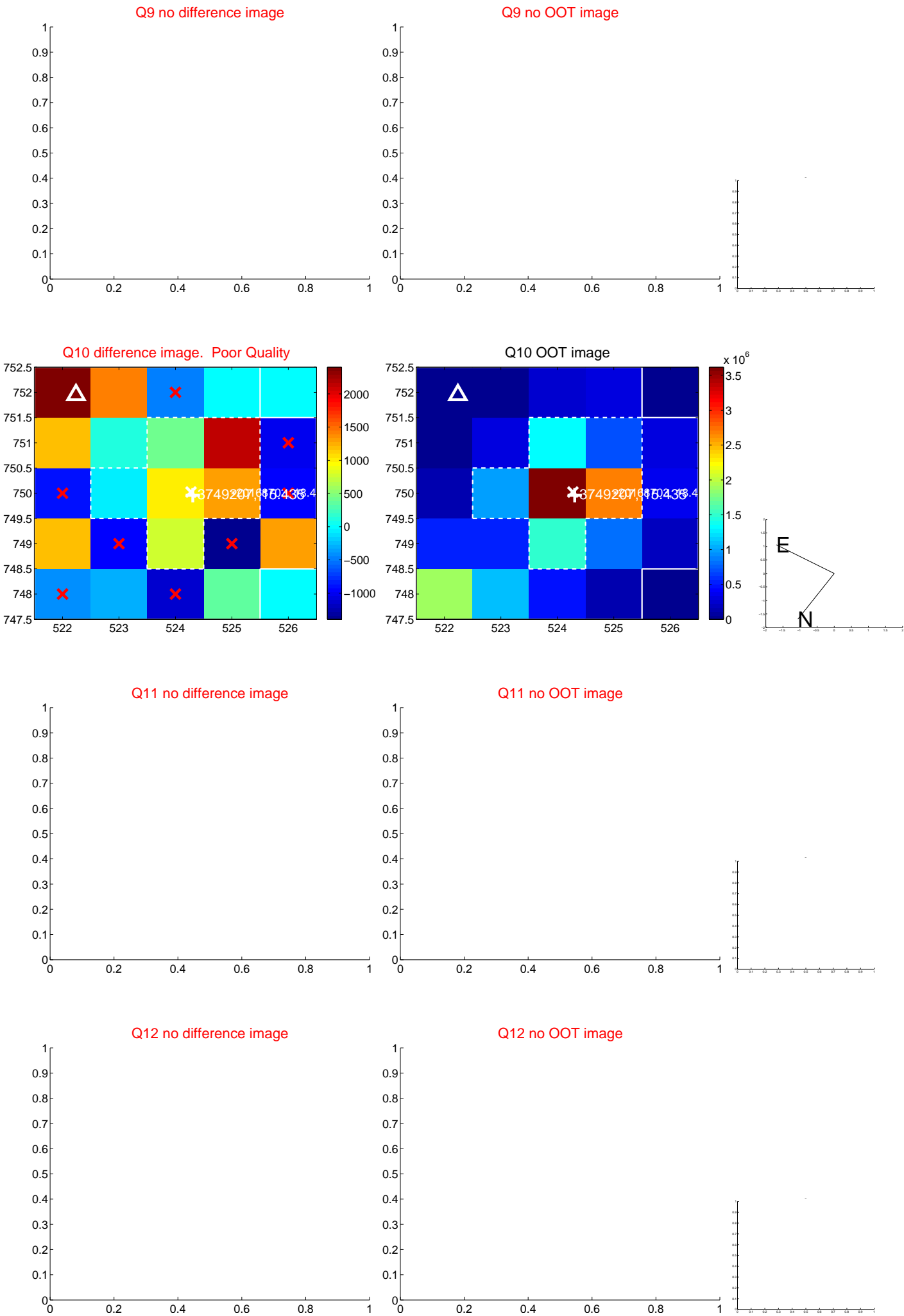
Q8 no difference image



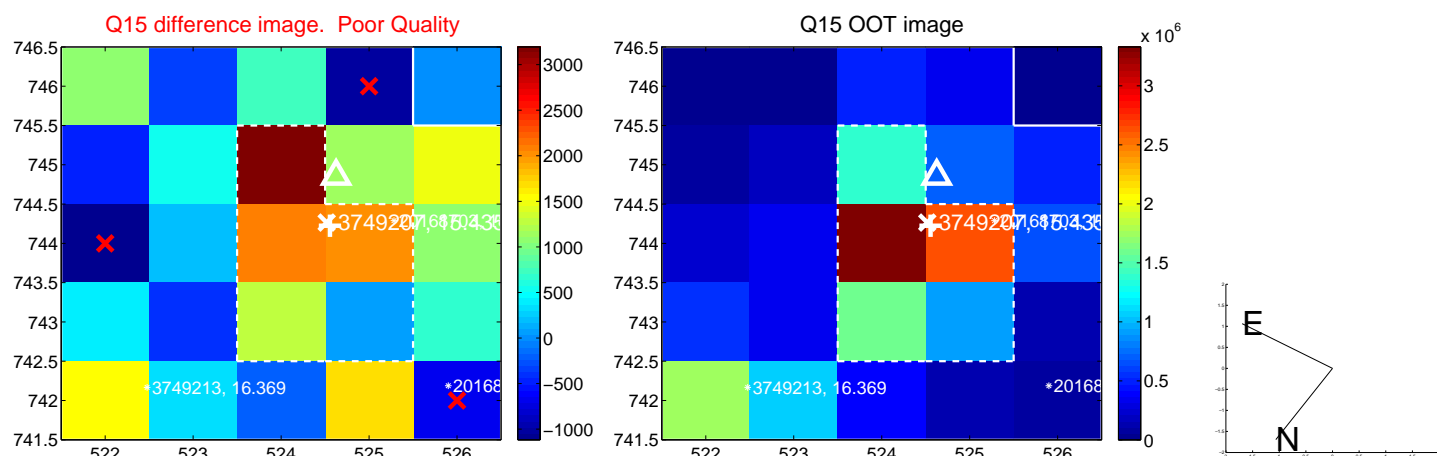
Q8 no OOT image



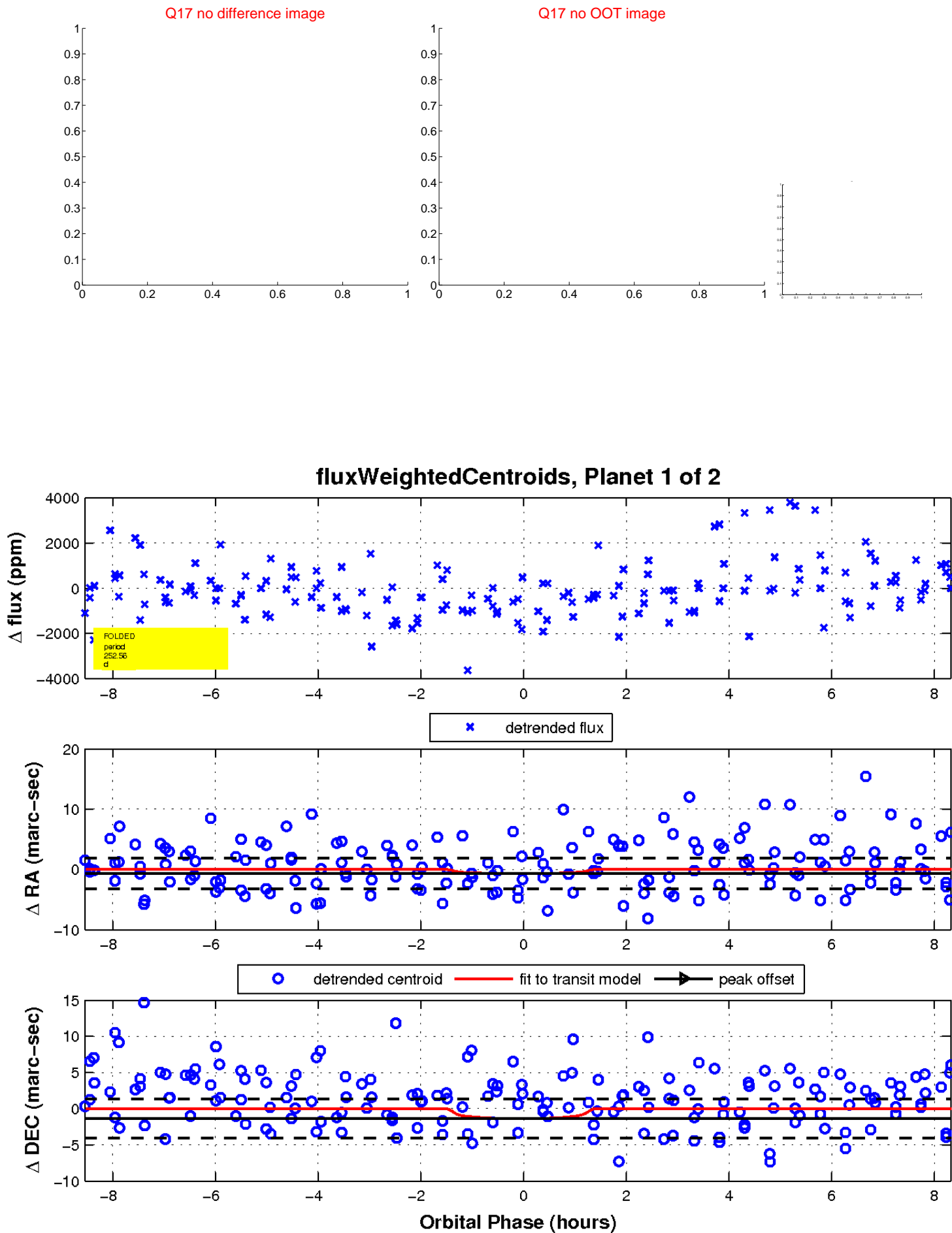
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

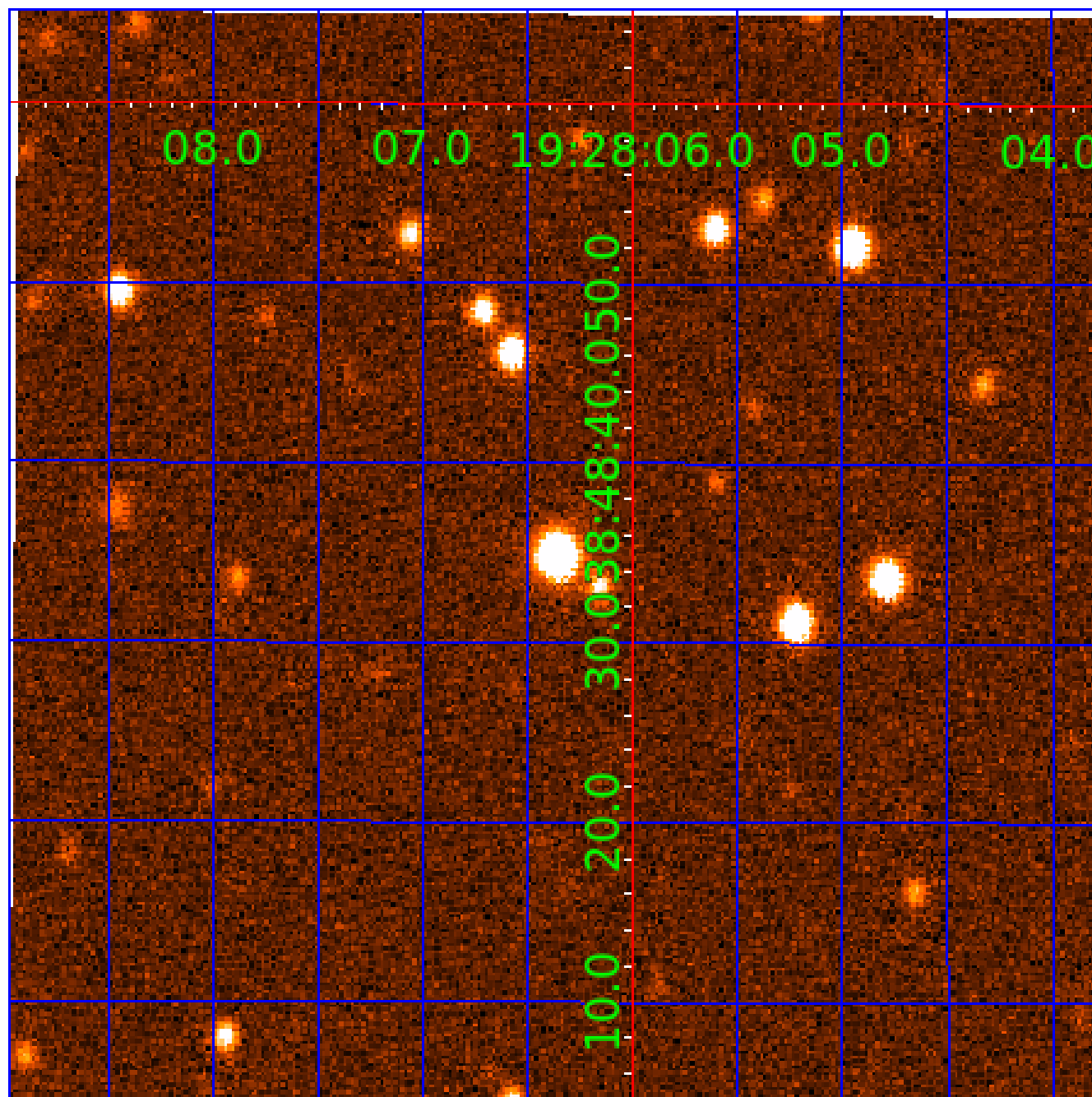


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003749207

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003749207-01	OBS	No	252.558043	167.173077	845.3	2.849	9.9	3.7	0.67	4274	2.13	0.29
003749207-02	OBS	No	557.769962	447.384840	1645.0	3.990	8.6	6.0	0.67	4274	2.87	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003749207-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
003749207-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—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.

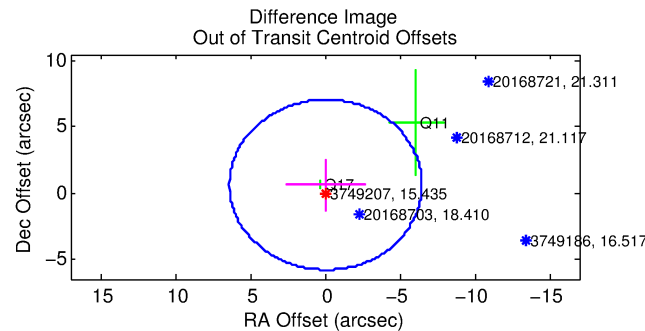
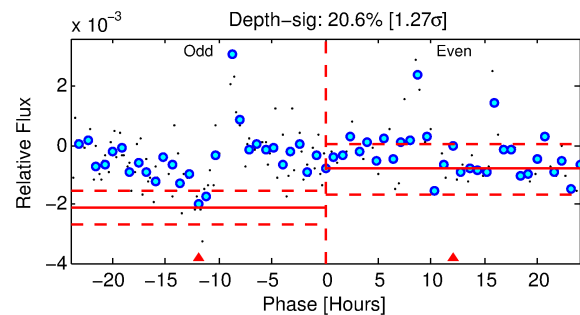
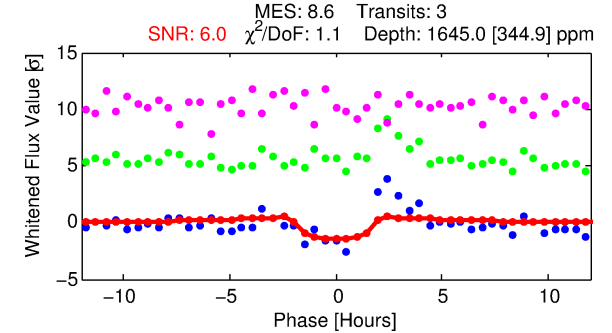
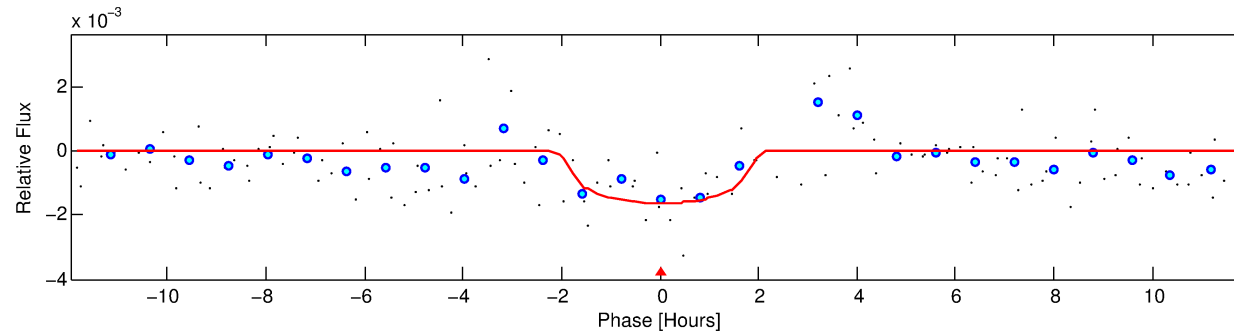
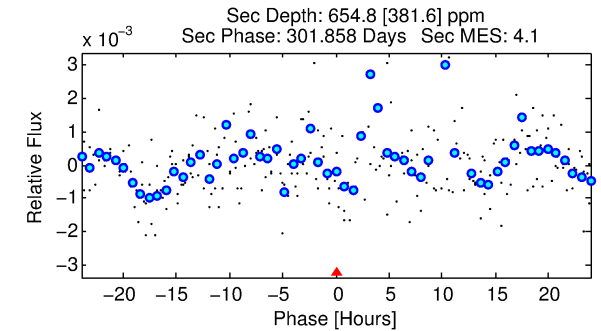
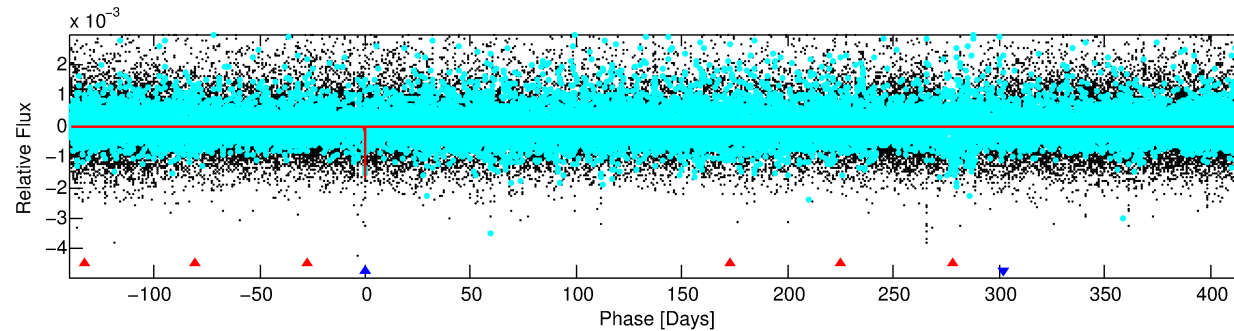
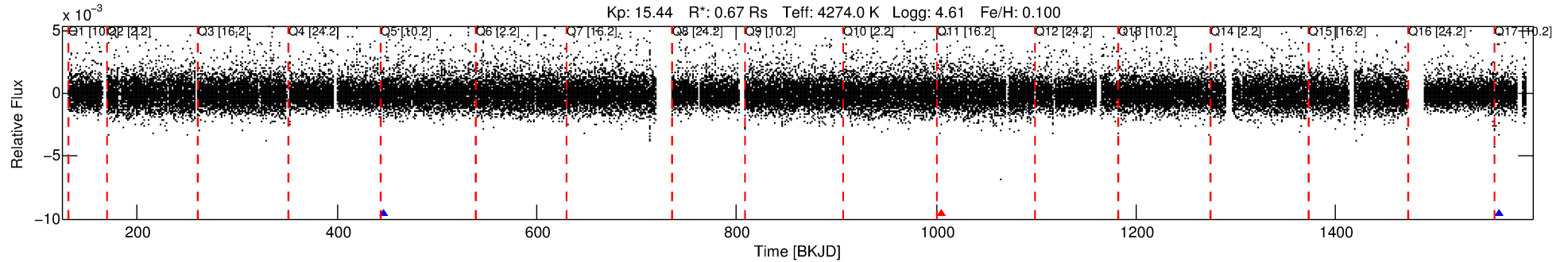
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003749207-02

No Significant Match Found

# DV One-Page Summary

KIC: 3749207 Candidate: 2 of 2 Period: 557.770 d



## DV Fit Results:

Period = 557.76996 [0.00817] d  
Epoch = 447.3848 [0.0116] BKJD  
Rp/R\* = 0.0393 [0.0695]  
a/R\* = 839.98 [4535.87]  
b = 0.68 [4.40]  
Seff = 0.10 [0.02]  
Teq = 143 [5] K  
Rp = 2.87 [5.07] Re  
a = 1.1548 [0.0788] AU  
Ag = 58409.84 [209133.65] [0.28σ]  
Teffp = 3447 [3086] K [1.07σ]

## DV Diagnostic Results:

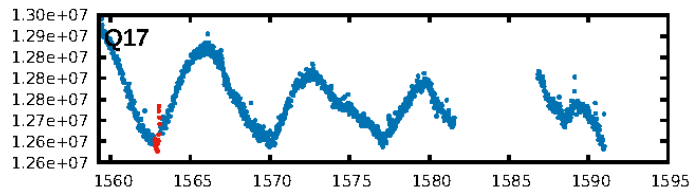
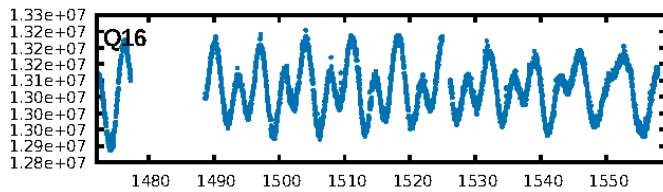
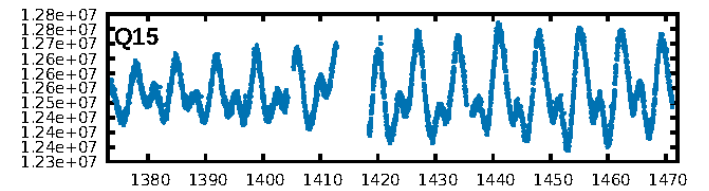
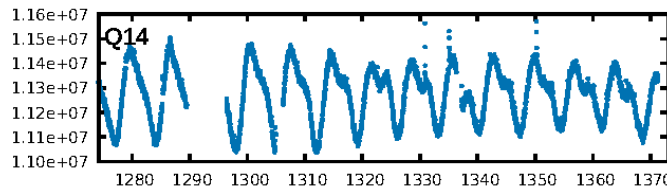
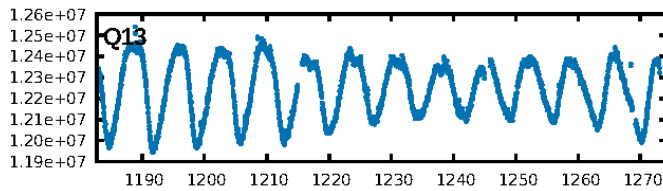
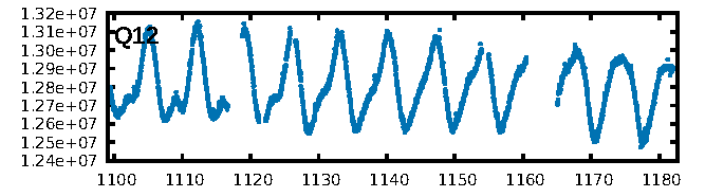
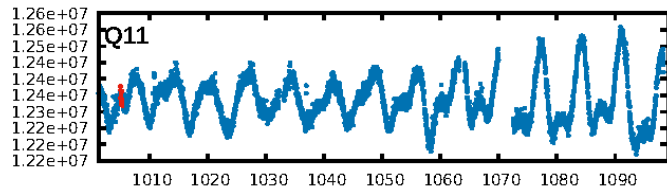
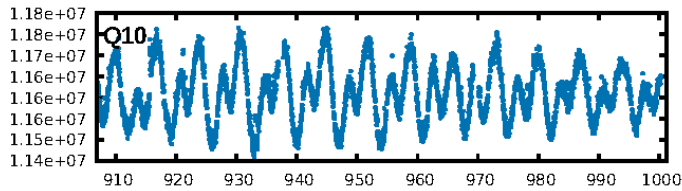
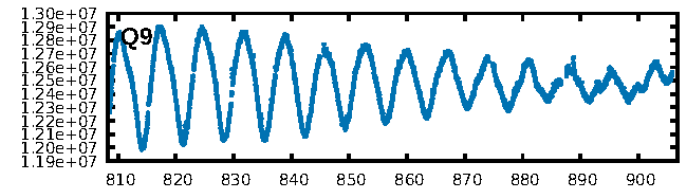
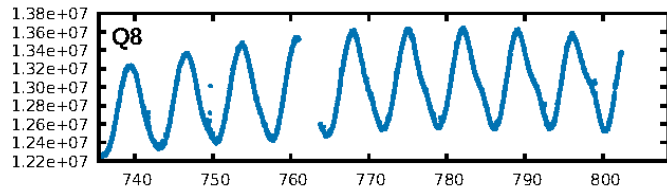
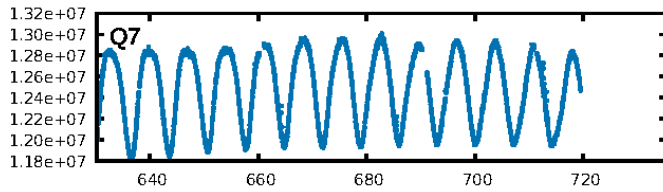
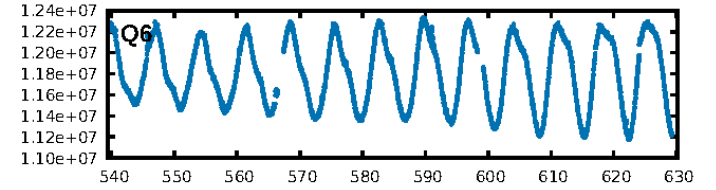
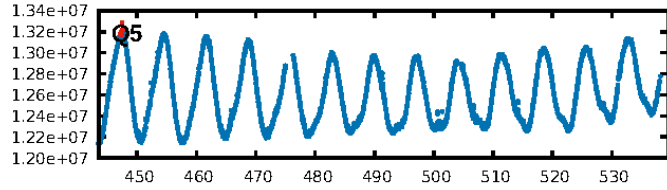
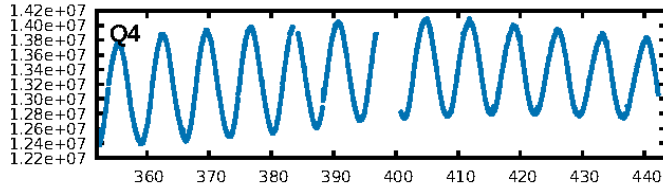
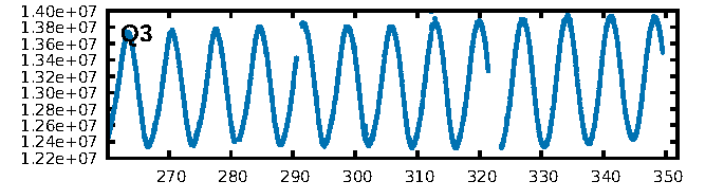
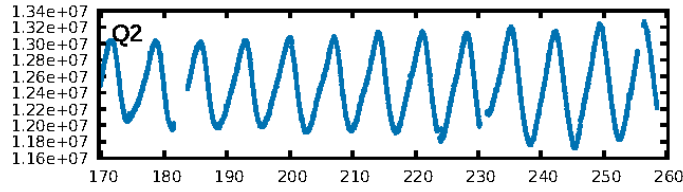
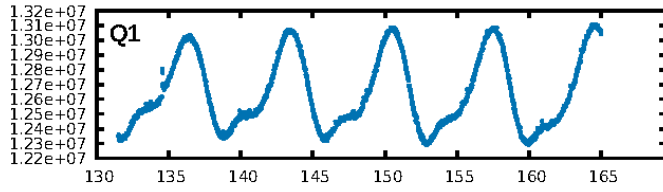
ShortPeriod-sig: 100.0% [1494.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 43.2%  
ModelChiSquareGof-sig: 95.9%  
Bootstrap-pfa: 7.75e-09  
RollingBand-fgt: 0.50 [1/2]  
GhostDiagnostic-chr: 1.833  
Centroid-sig: 12.6%  
Centroid-so: 1.236 arcsec [0.87σ]  
OotOffset-rm: 0.631 arcsec [0.29σ]  
KicOffset-rm: 0.575 arcsec [0.26σ]  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-st: 0/1/0/1 [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 04:35:10 Z

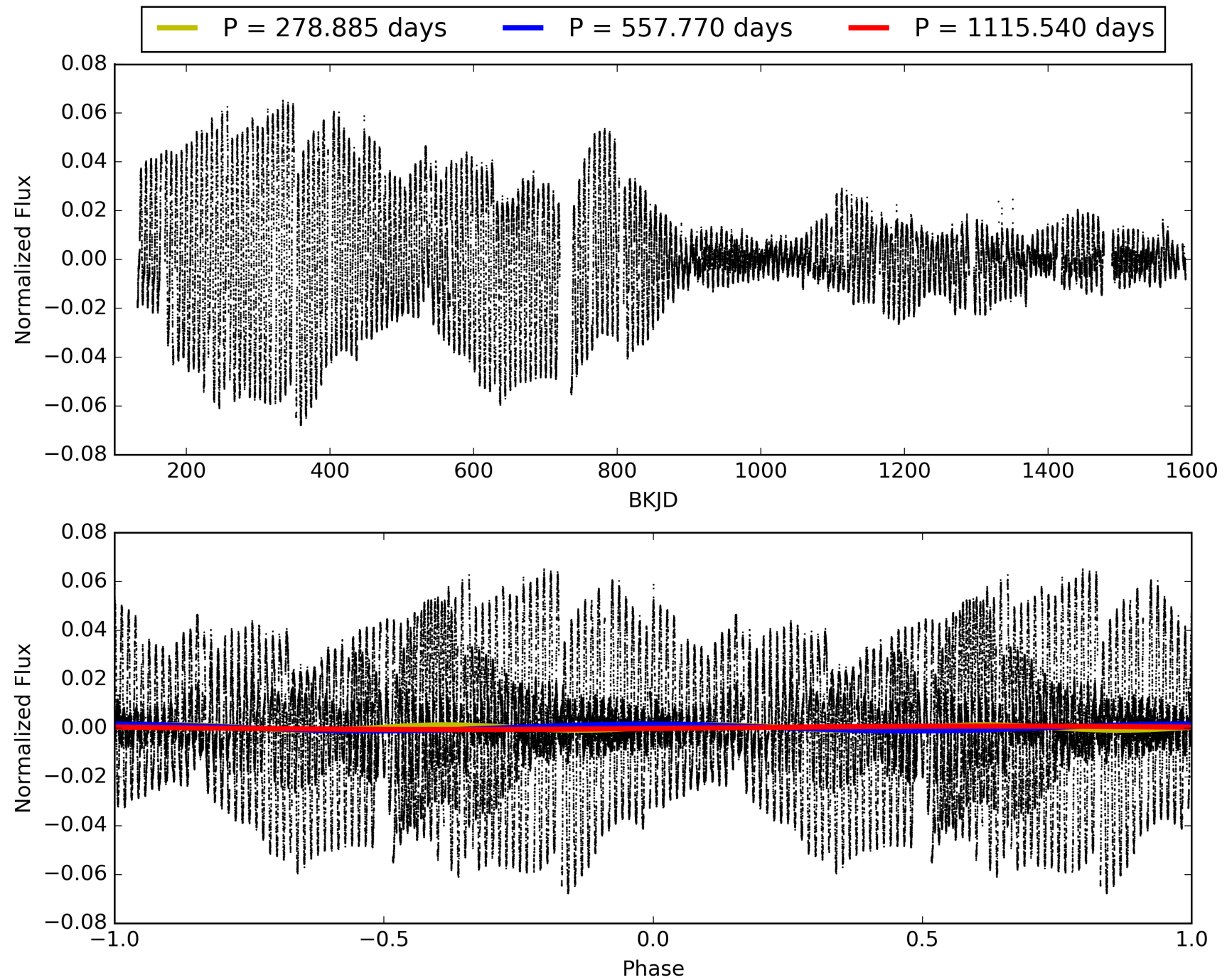
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 003749207-02, PDC Light Curves

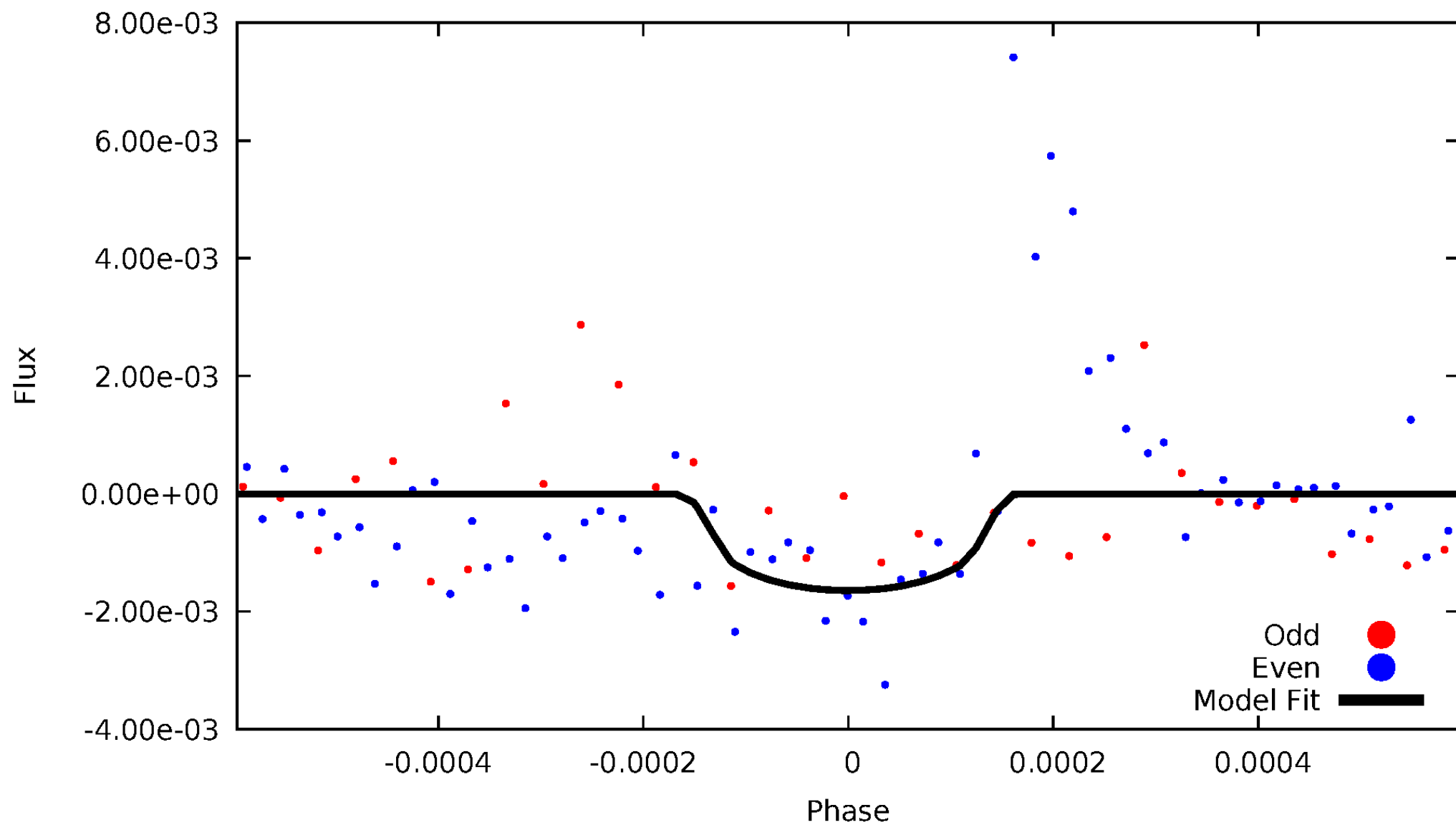


TCE 003749207-02



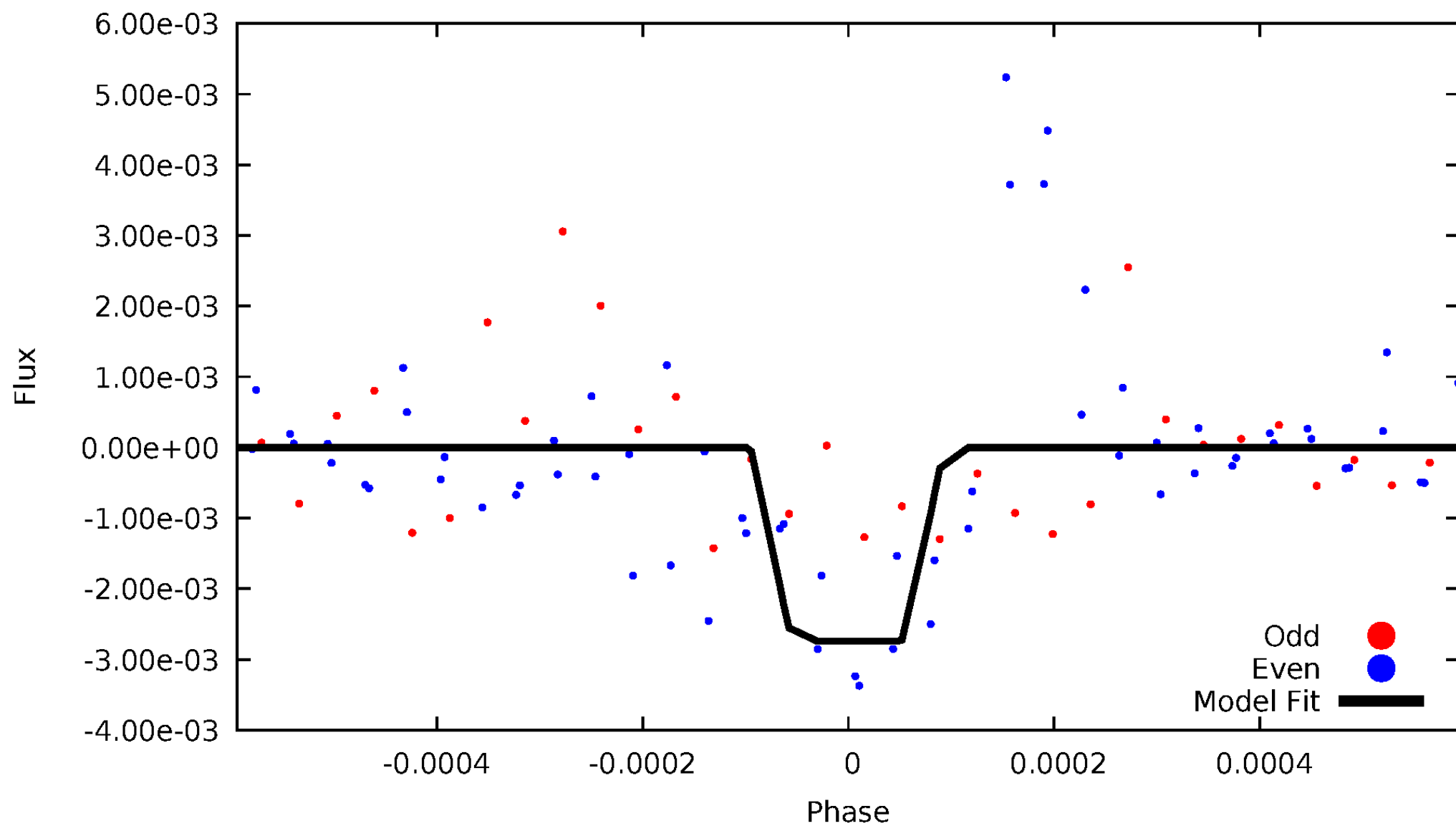
# DV Odd/Even

TCE 003749207-02



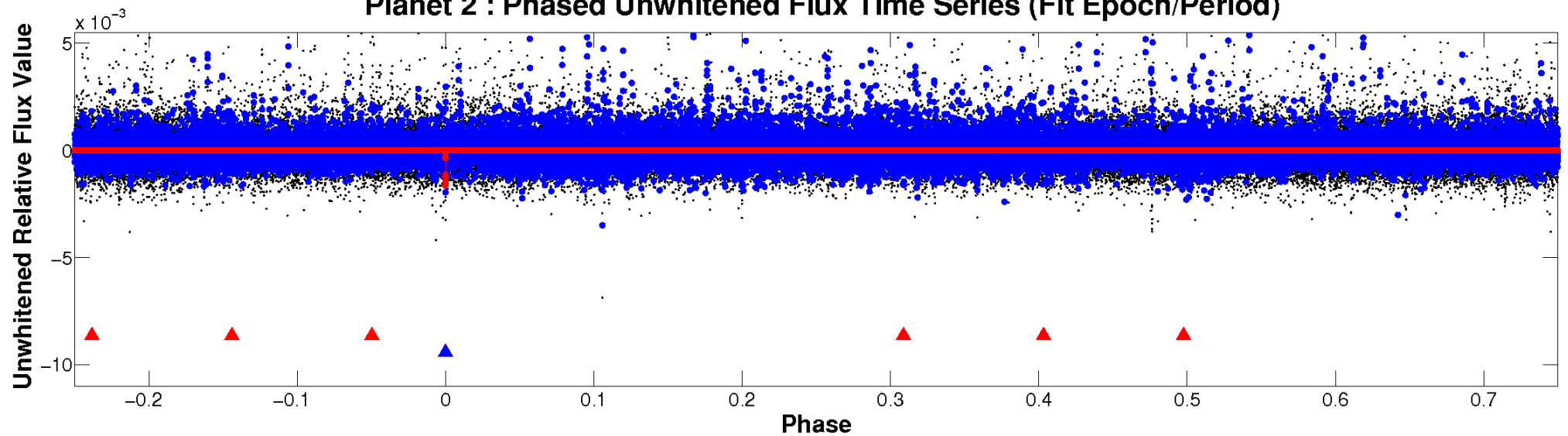
# ALT Odd/Even

TCE 003749207-02

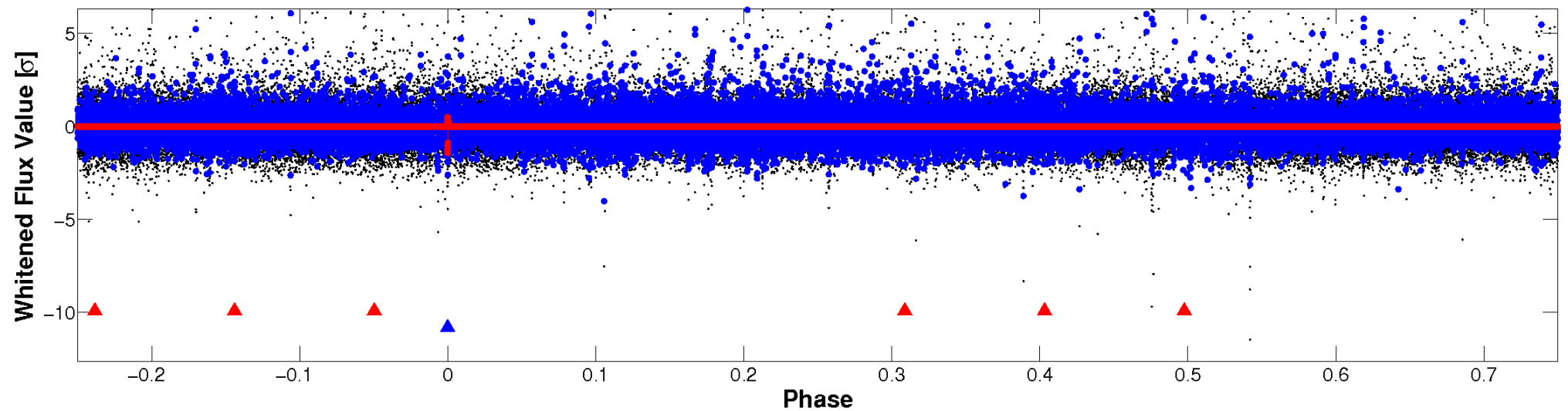


# Non-Whitened Vs. Whitened Light Curve

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

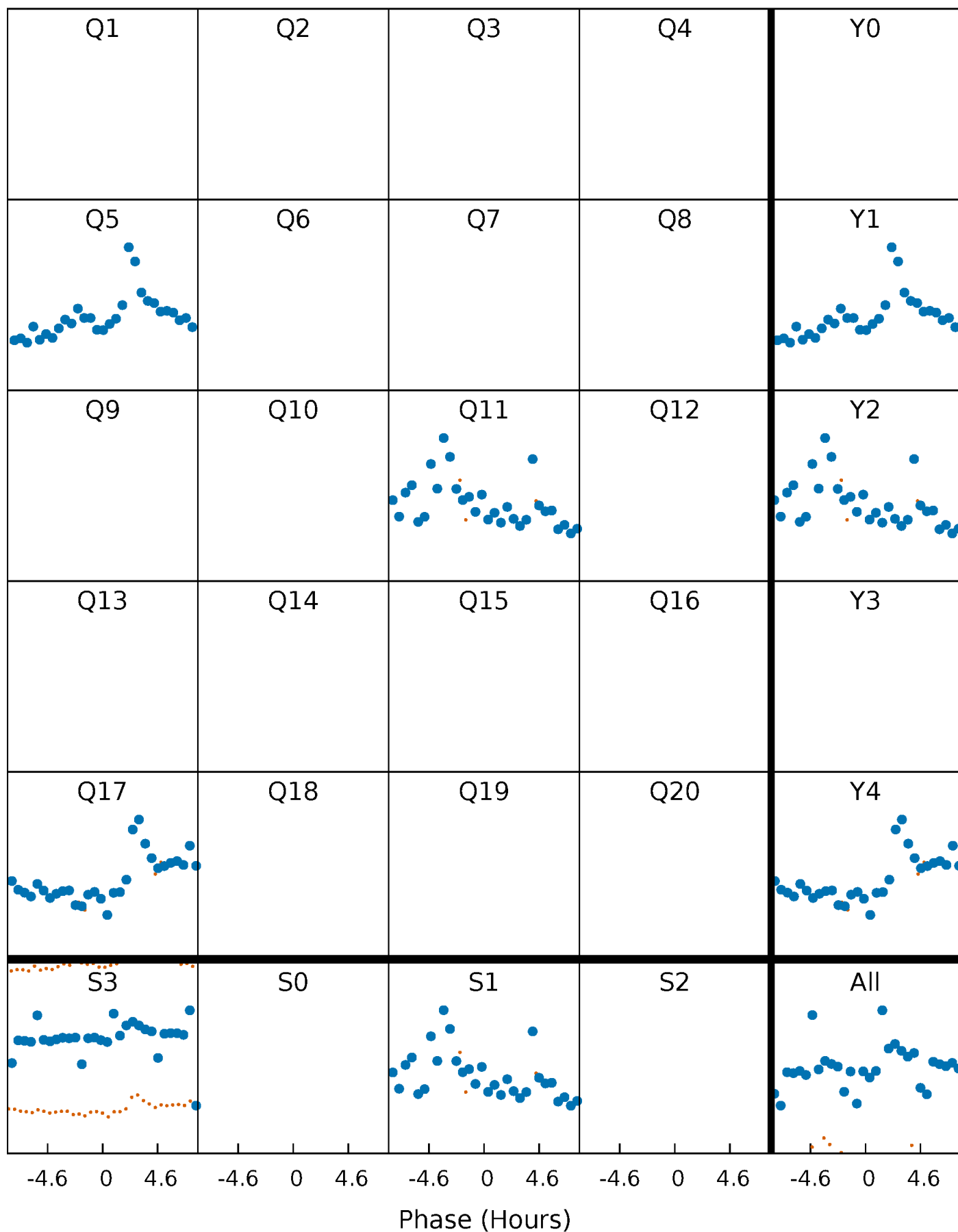


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



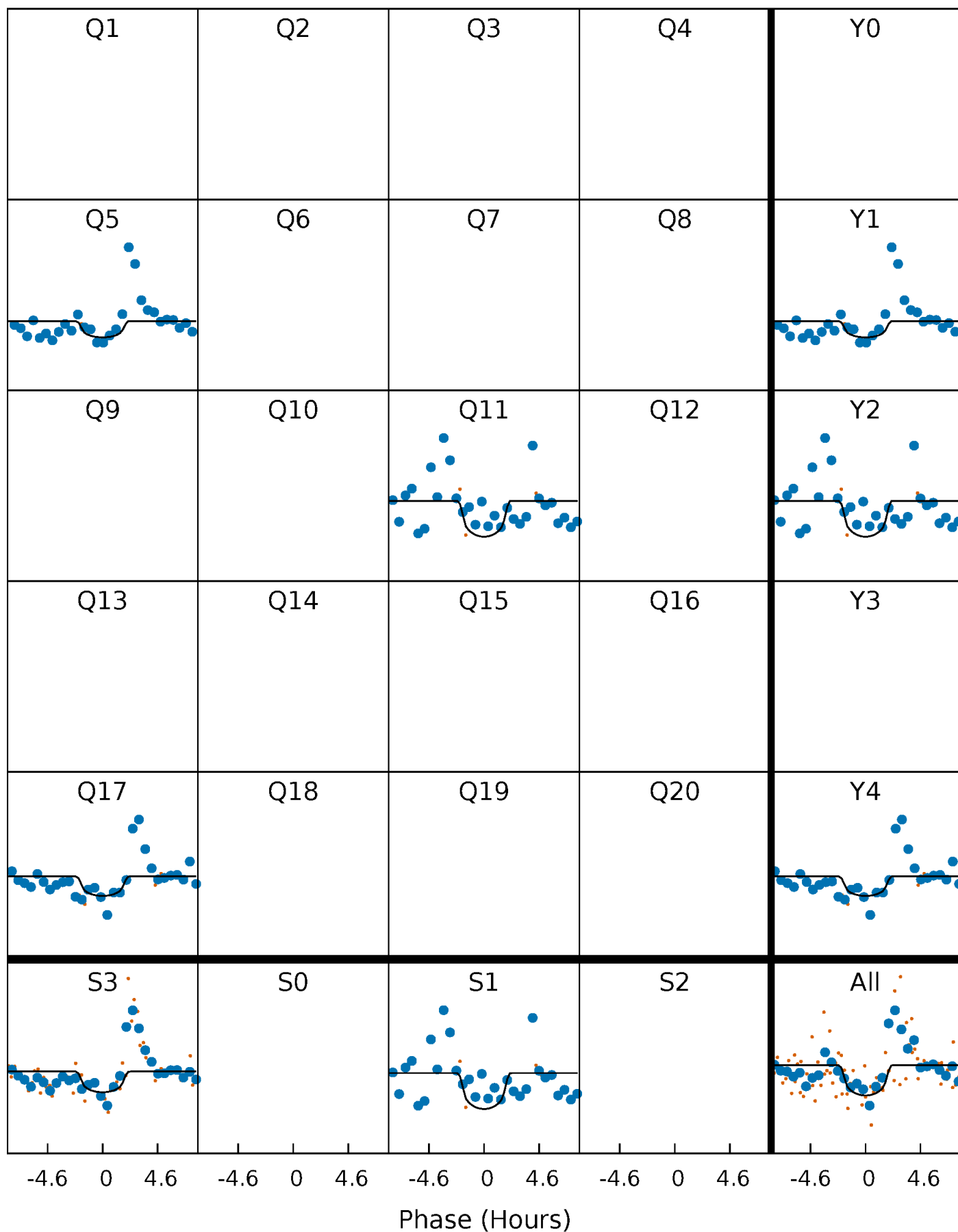
# PDC Quarter-Phased Transit Curves

TCE 003749207-02     $P=557.769962$  Days     $T_0=447.384840$  (BKJD)



# DV Quarter-Phased Transit Curves

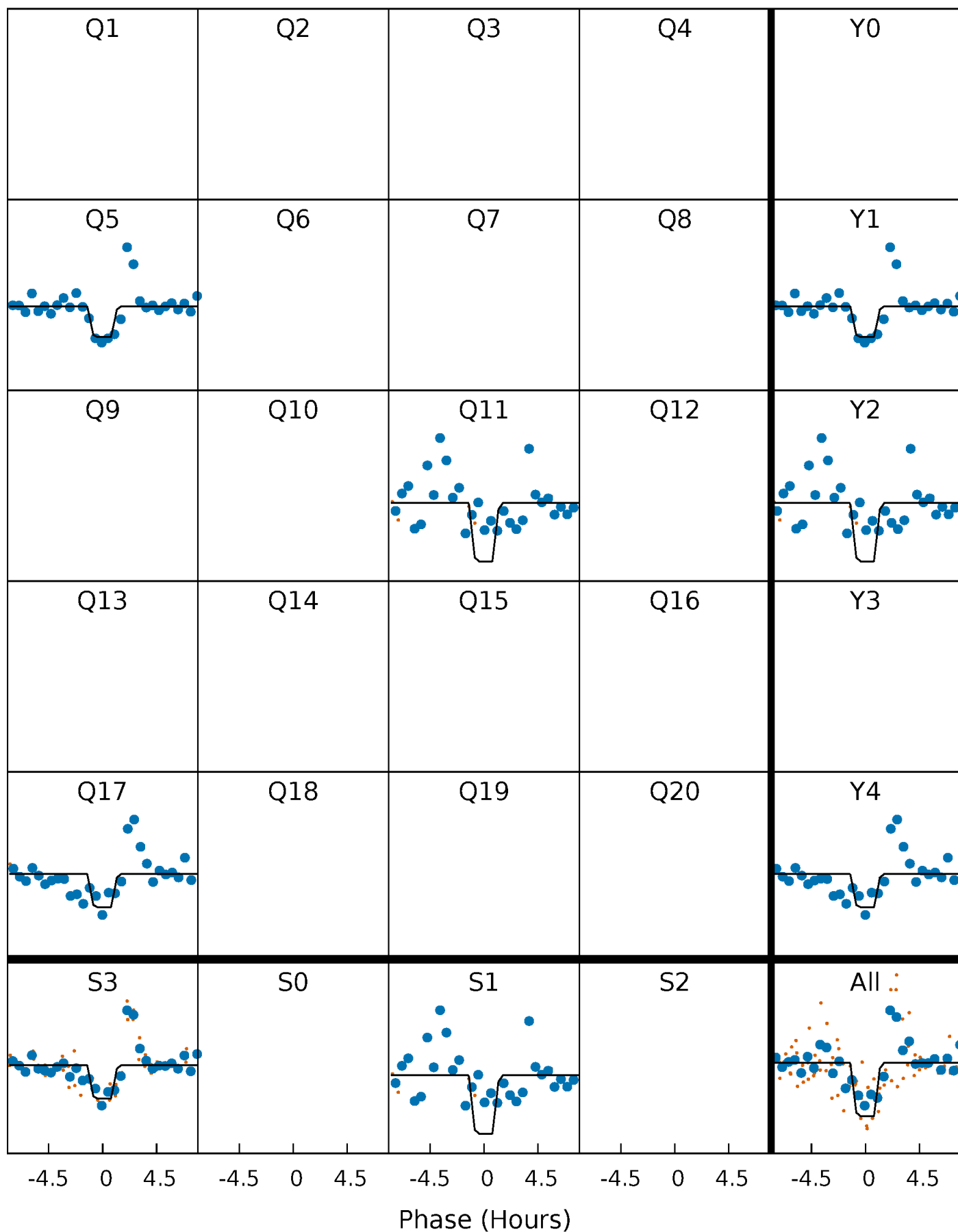
TCE 003749207-02     $P=557.769962$  Days     $T_0=447.384840$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

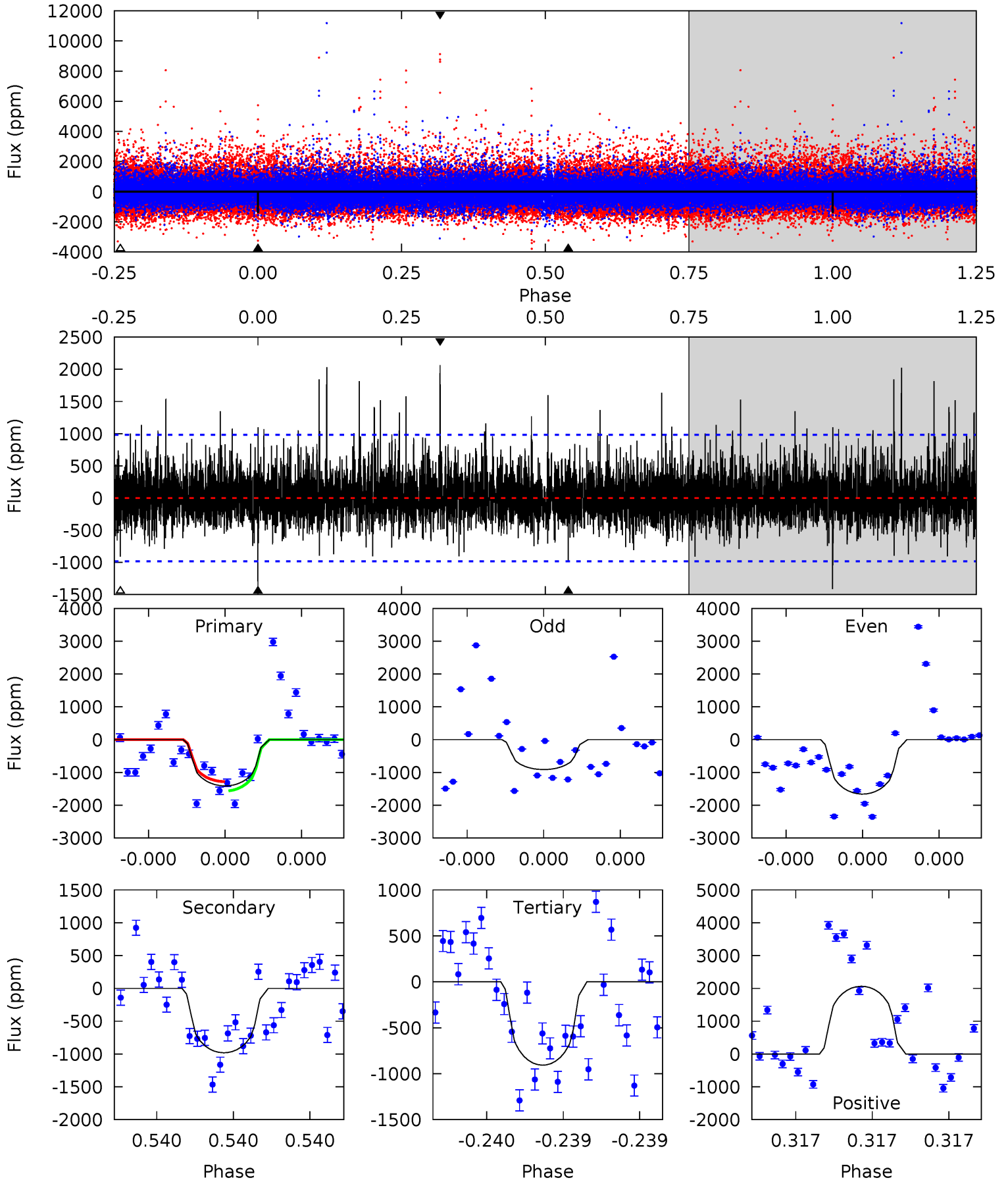
TCE 003749207-02 P=557.774887 Days  $T_0=447.389156$  (BKJD)



# DV Model-Shift Uniqueness Test

003749207-02, P = 557.769962 Days, E = 447.384840 Days

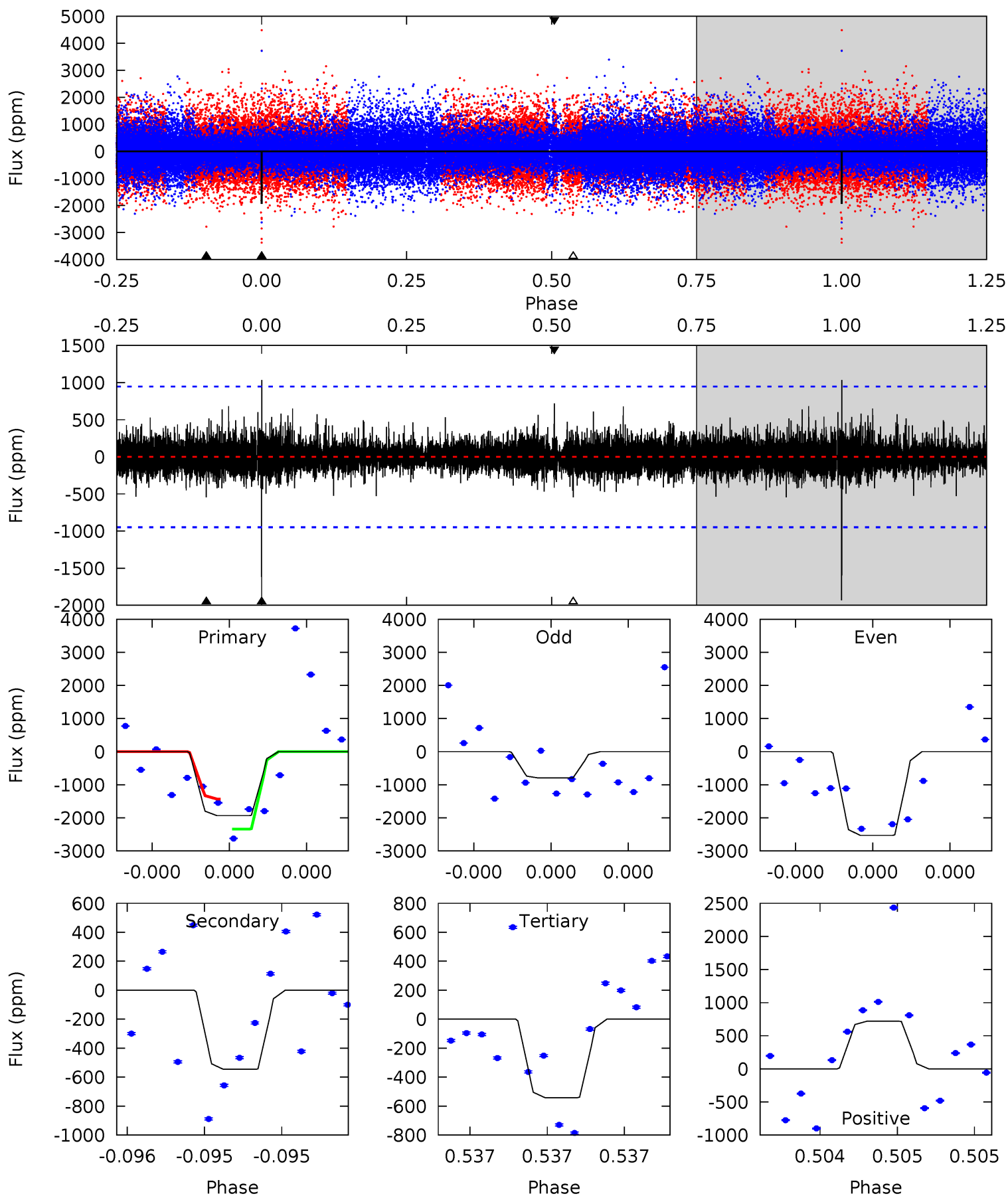
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.12	5.65	5.22	11.9	5.66	3.61	1.64	2.90	-3.75	0.43	-6.22	1.86	1.04	0.59	0.81



# Alt Model-Shift Uniqueness Test

003749207-02, P = 557.774887 Days, E = 447.389156 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
11.7	3.31	3.28	4.36	5.75	3.74	0.74	8.44	7.36	0.03	-1.05	4.70	0.91	0.35	2.75



### Stellar Parameters For KIC 003749207

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4274^{+129}_{-129}$	$4.608^{+0.049}_{-0.018}$	$0.100^{+0.250}_{-0.300}$	$0.668^{+0.028}_{-0.057}$	$0.660^{+0.053}_{-0.053}$	$3.118^{+0.715}_{-0.247}$
	+3%/-3%	+1%/-0%	+250%/-300%	+4%/-9%	+8%/-8%	+23%/-8%
Source	PHO1	KIC0	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 003749207-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-982 \pm 174$	$4.60^{+4.56}_{-3.07}$	$199^{+6}_{-7}$	$3348^{+1708}_{-604}$	$34430^{+294542}_{-25768}$
Alt.	$-546 \pm 165$	$5.10^{+4.40}_{-3.34}$	$199^{+7}_{-7}$	$2982^{+1148}_{-483}$	$14279^{+106677}_{-10159}$

$T_{max}$  = 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

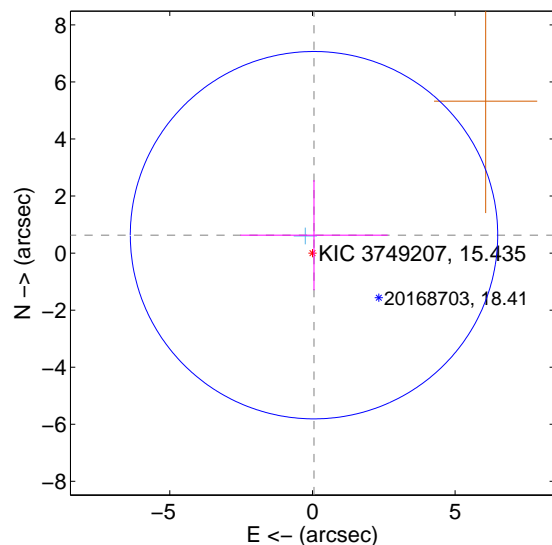
Supplemental centroid analysis for 003749207-02. Kepler magnitude: 15.44. Transit SNR 5.99

There are 1 quarters with good PRF difference image offsets

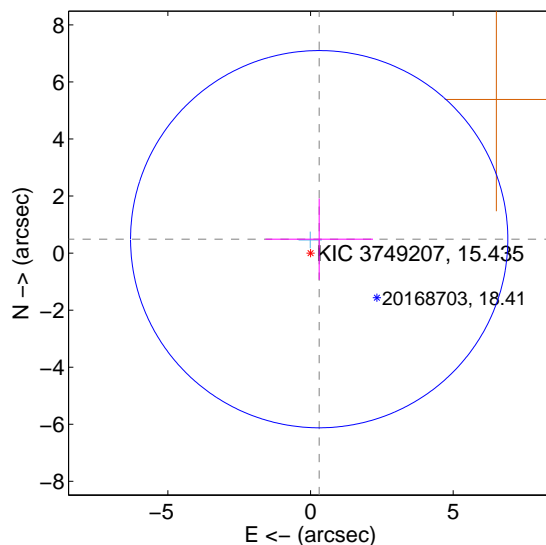
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.631 \pm 2.146$	0.29	$-0.055 \pm 2.582$	$0.628 \pm 1.930$
PRF-fit source offset from KIC position	$0.575 \pm 2.204$	0.26	$-0.304 \pm 1.885$	$0.488 \pm 1.424$
photometric centroid source offset	$1.24 \pm 1.42$	0.87	$1.14 \pm 1.40$	$-0.47 \pm 1.49$

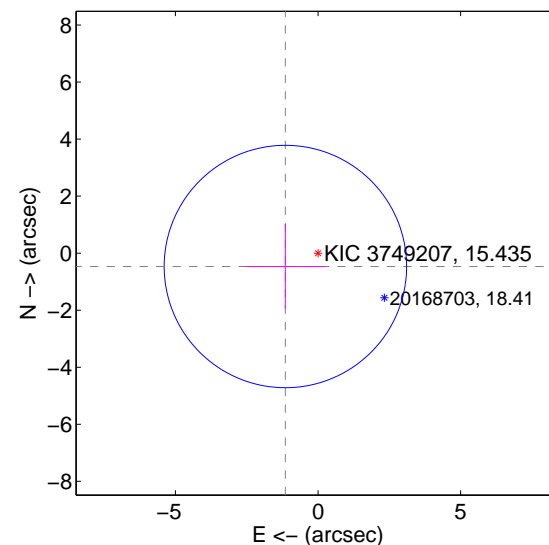
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

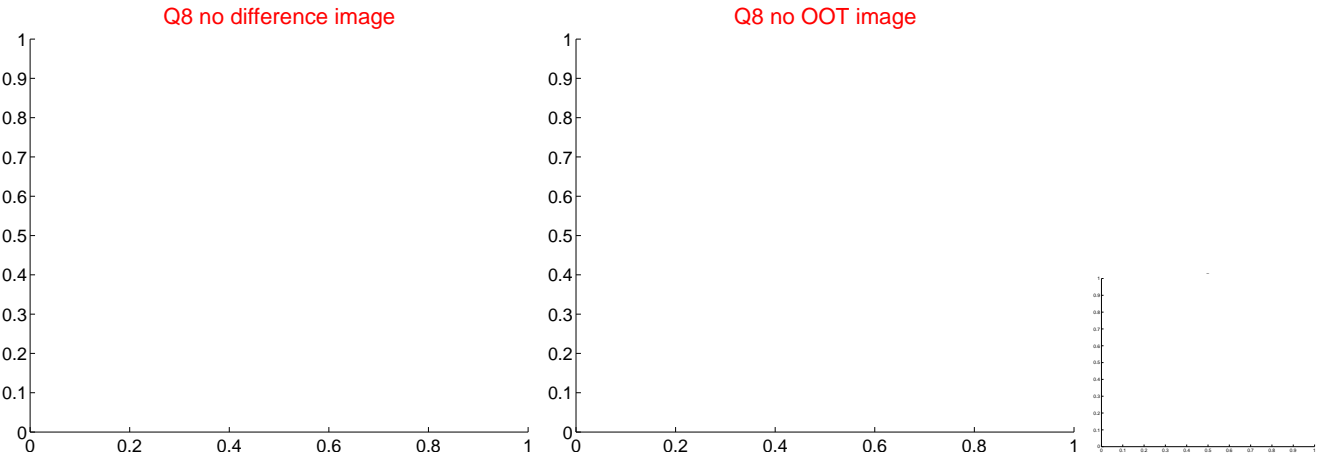
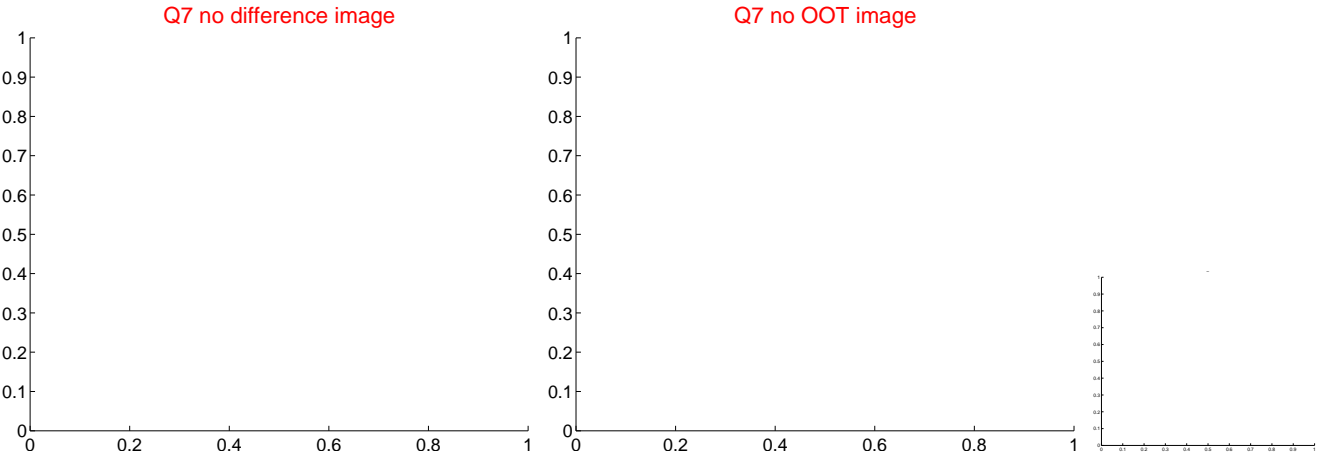
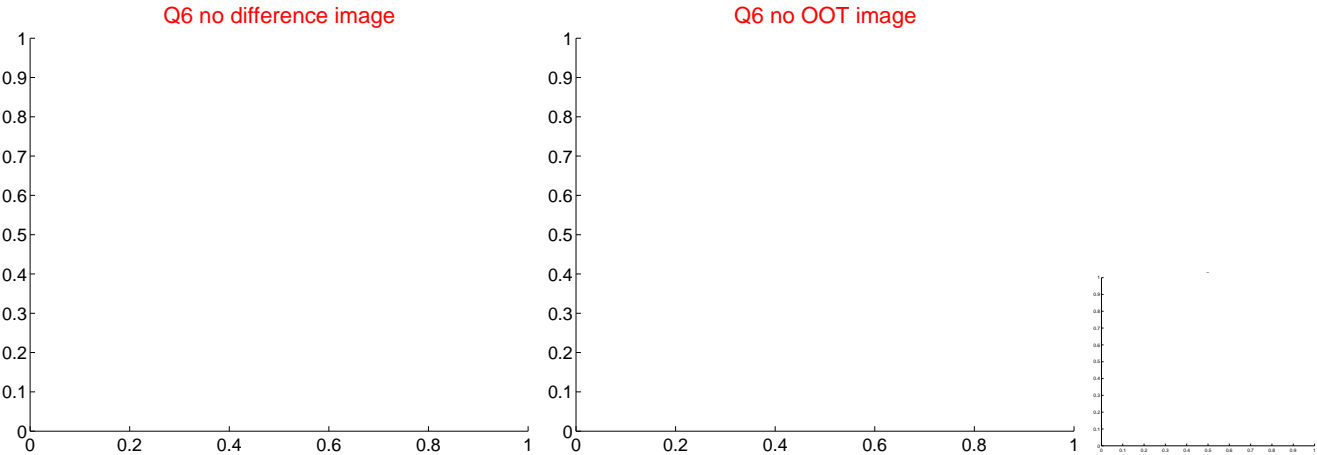
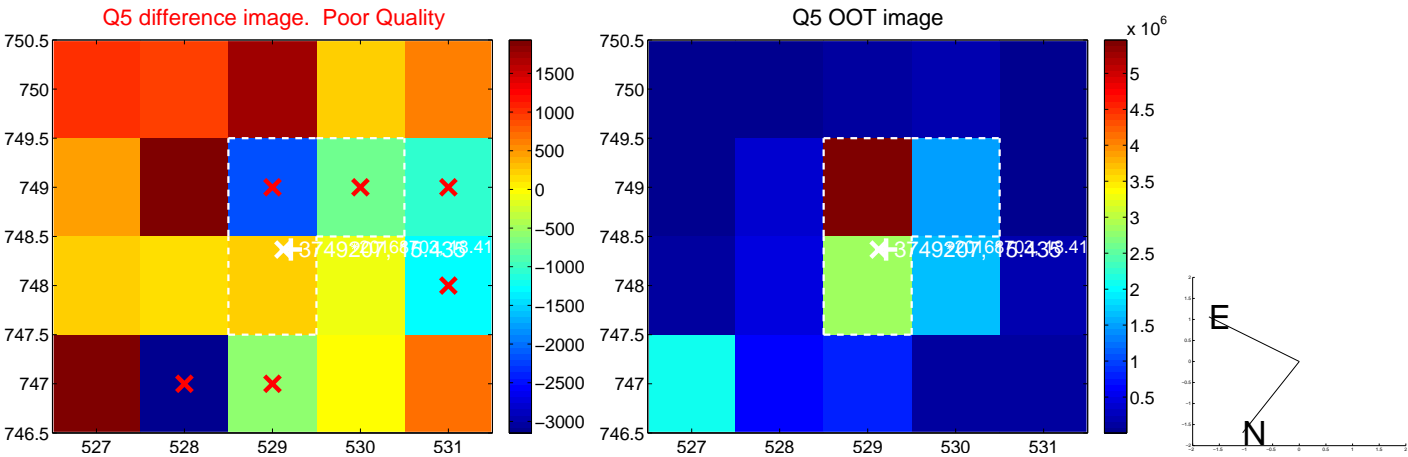


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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



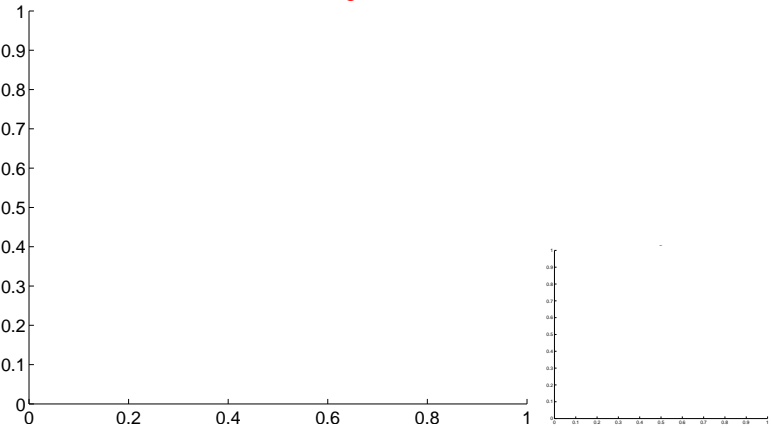


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q9 no difference image



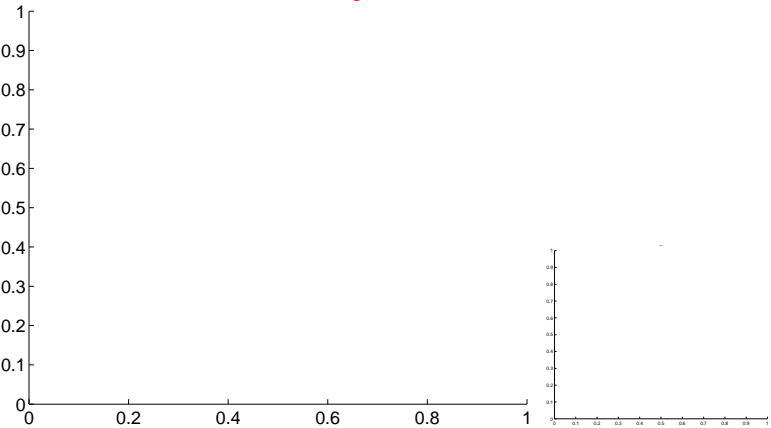
Q9 no OOT image



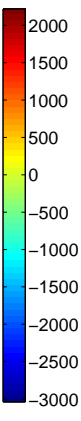
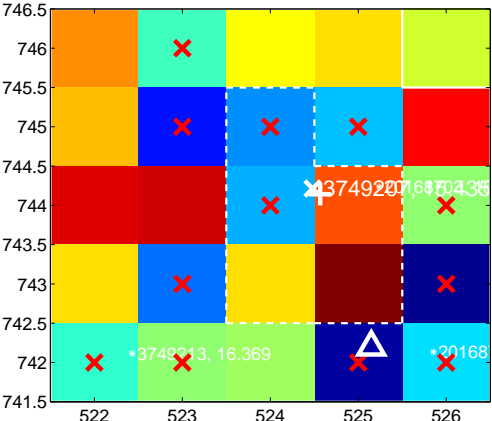
Q10 no difference image



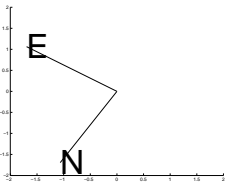
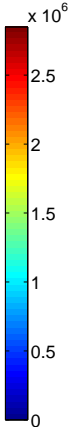
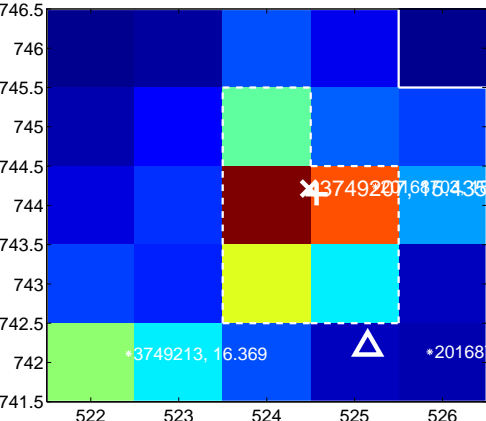
Q10 no OOT image



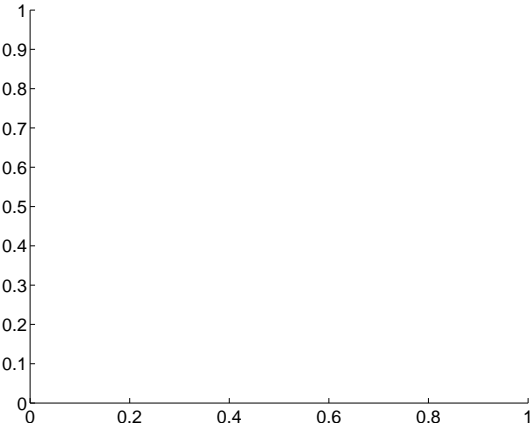
Q11 difference image. Poor Quality



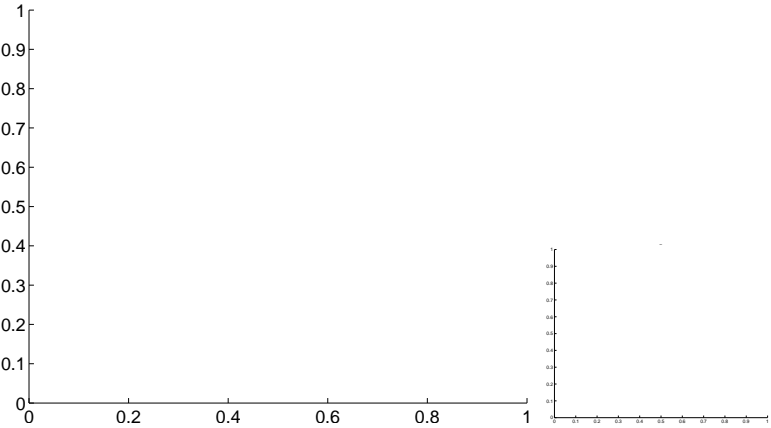
Q11 OOT image



Q12 no difference image



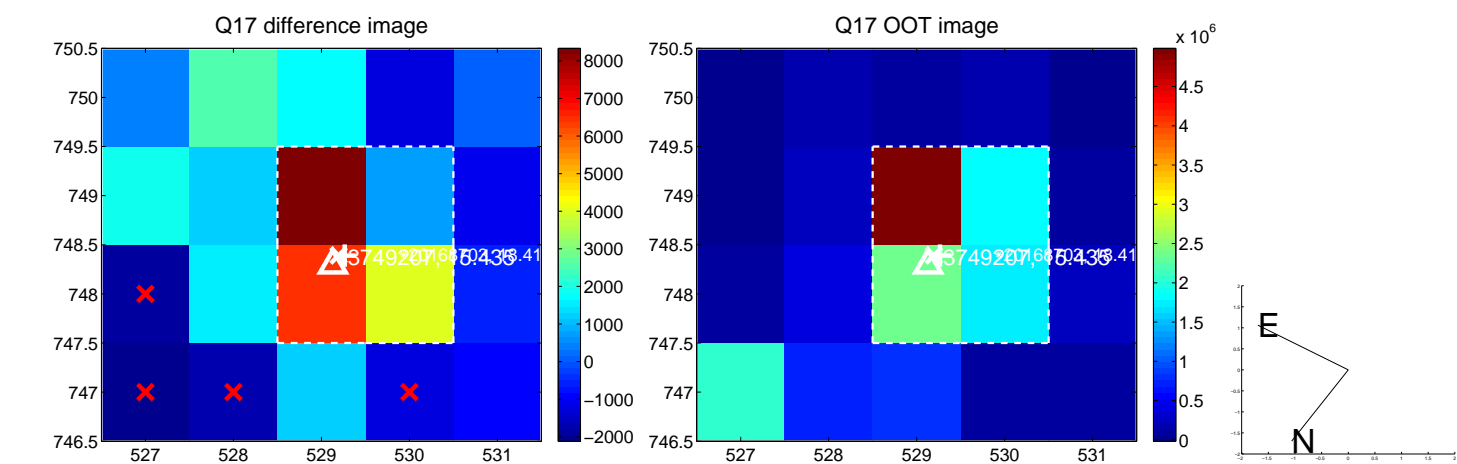
Q12 no OOT image



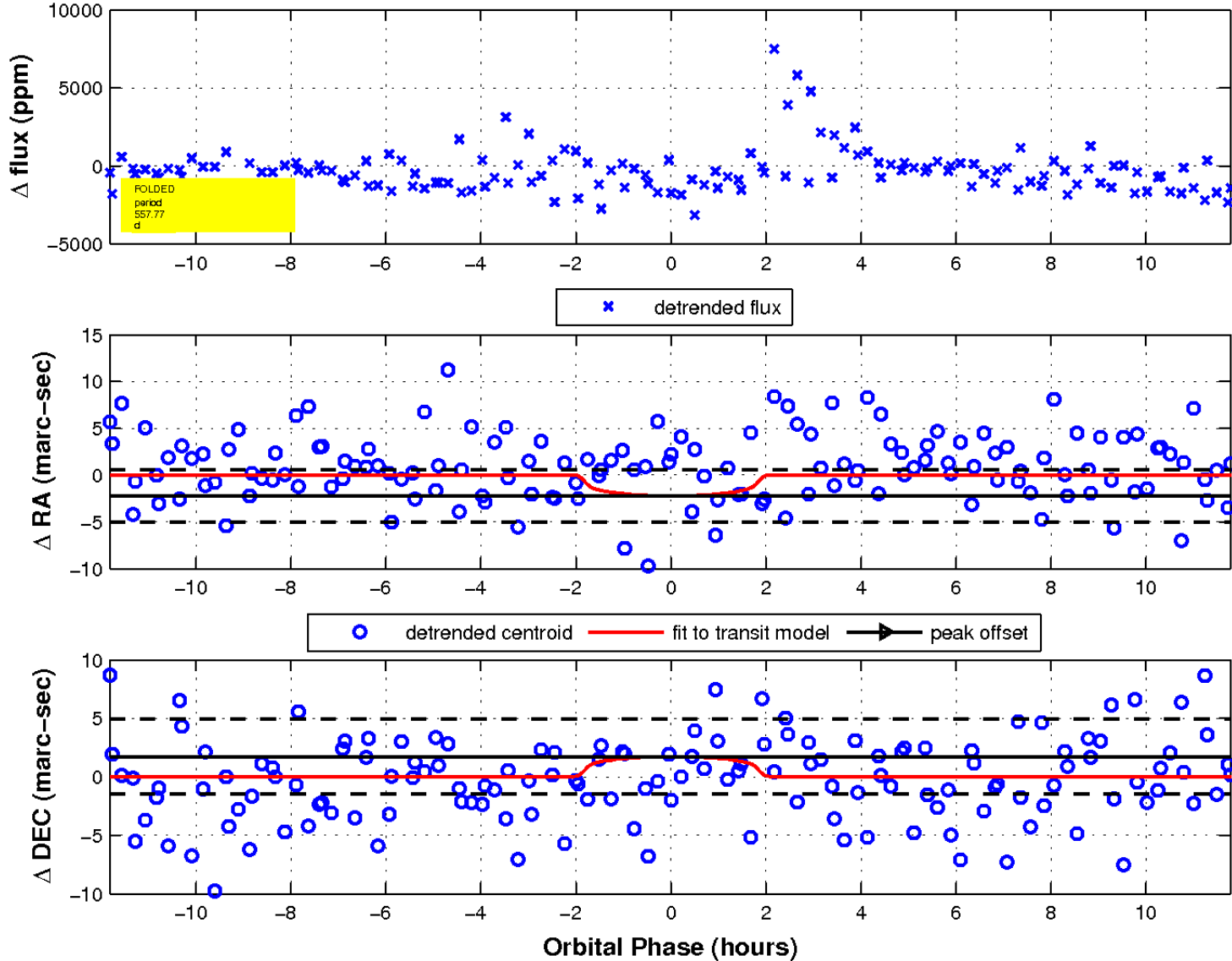
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

