

# KIC 007939565

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007939565-01	OBS	No	344.012806	340.200312	1099.7	7.969	20.0	4.6	0.21	3295	0.71	0.02
007939565-02	OBS	No	635.435308	245.485049	1629.6	4.492	13.9	5.9	0.21	3295	0.90	0.01
007939565-03	OBS	No	562.940692	215.165497	2009.3	4.039	12.5	6.7	0.21	3295	0.96	0.01
007939565-04	OBS	No	461.985936	464.924425	1965.5	5.788	12.3	8.0	0.21	3295	0.94	0.01
007939565-05	OBS	No	478.436667	495.580905	2302.3	4.076	11.2	8.3	0.21	3295	1.04	0.01
007939565-06	OBS	No	262.612113	373.917722	726.3	5.000	10.2	-1.0	0.21	3295	0.57	0.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007939565-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT— INCONSISTENT_TRANS
007939565-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
007939565-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
007939565-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

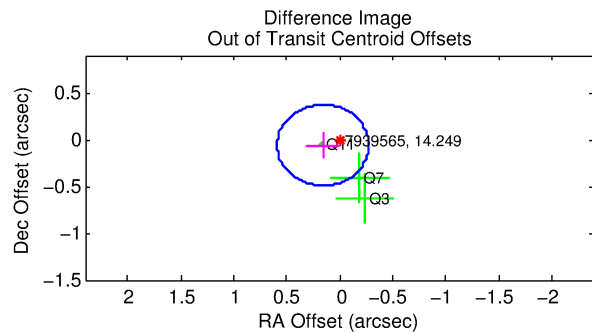
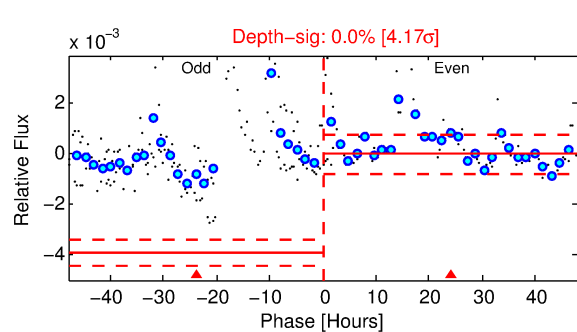
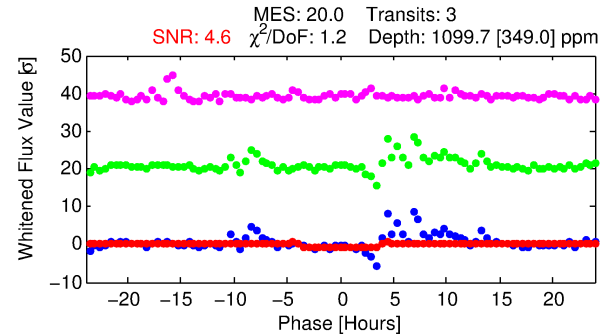
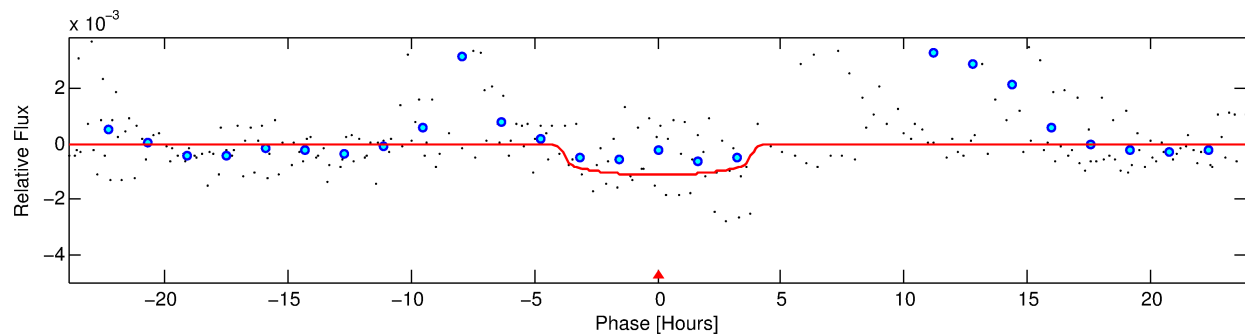
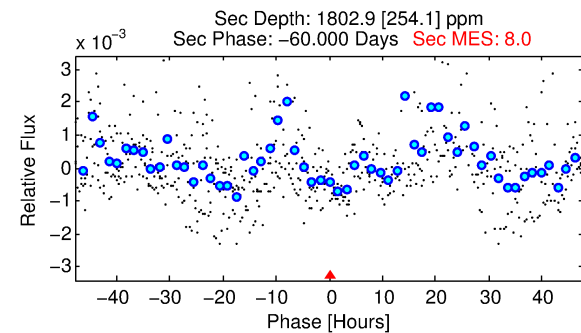
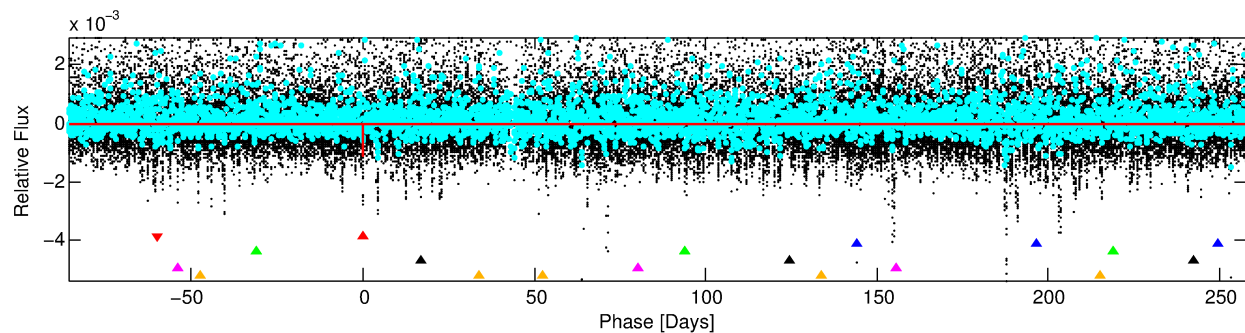
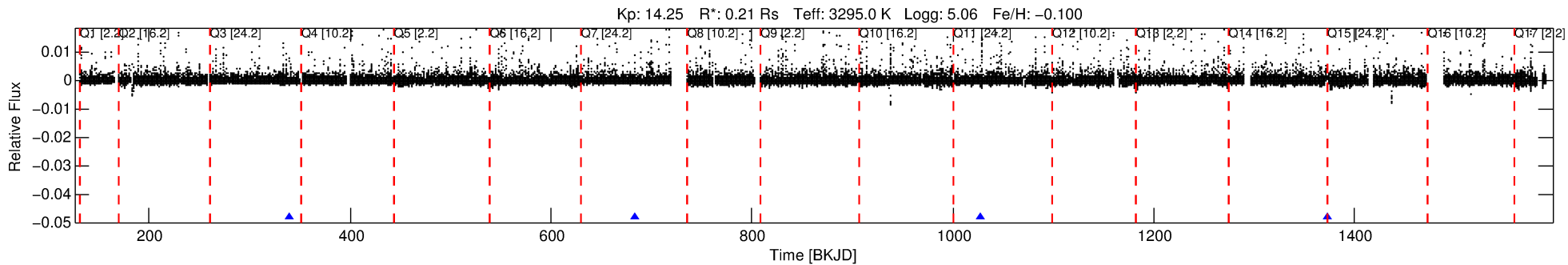
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007939565-01

No Significant Match Found

# DV One-Page Summary

KIC: 7939565 Candidate: 1 of 6 Period: 344.013 d



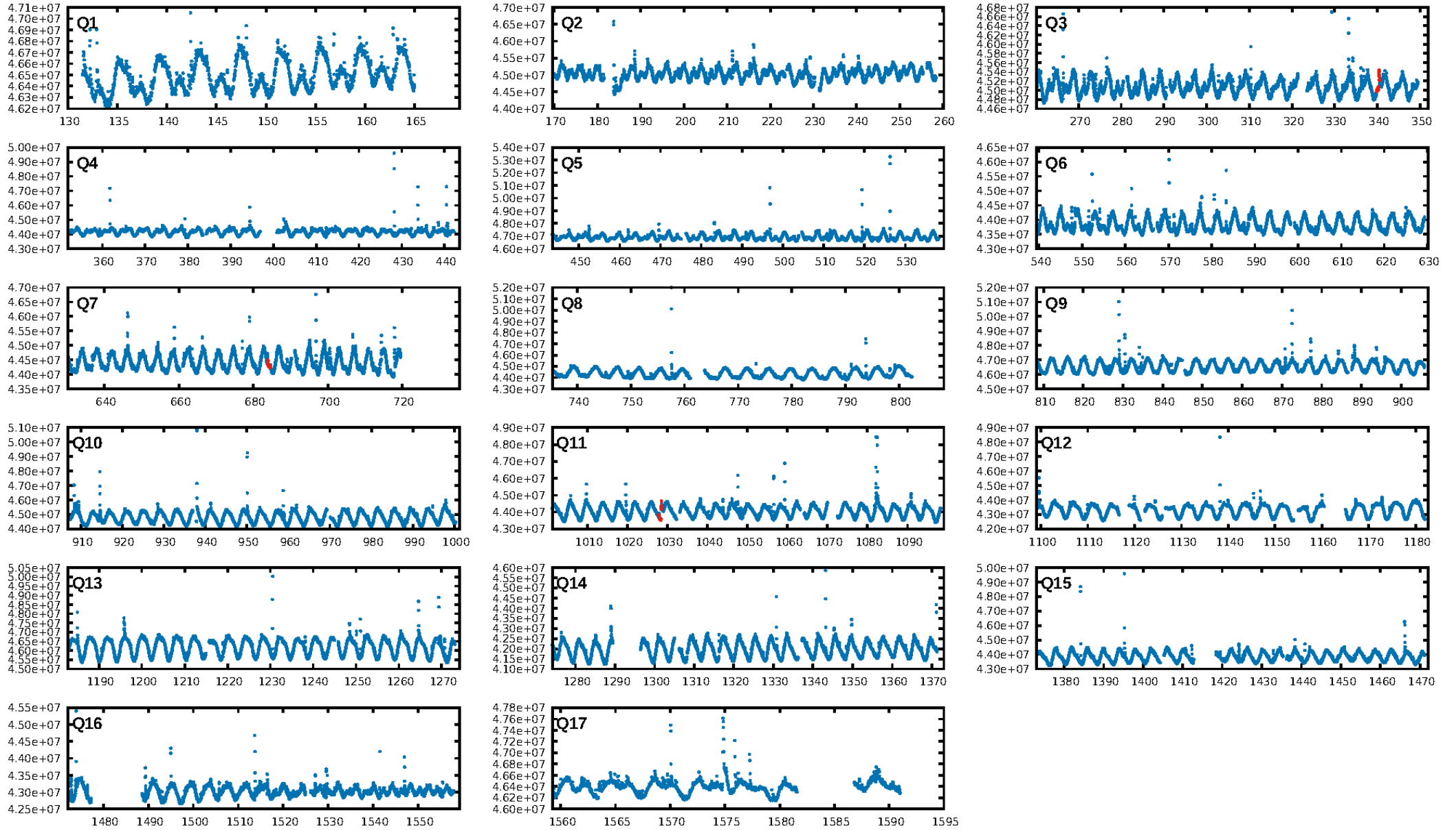
## DV Fit Results:

Period = 344.01281 [0.01394] d  
Epoch = 340.2003 [0.0152] BKJD  
Rp/R\* = 0.0302 [0.0436]  
a/R\* = 330.54 [2084.50]  
b = 0.24 [25.03]  
Seff = 0.02 [0.00]  
Teq = 90 [3] K  
Rp = 0.71 [1.03] Re  
a = 0.5568 [0.0584] AU  
Ag = 611383.17 [1768734.84] [0.35σ]  
Teffp = 3905 [2822] K [1.35σ]

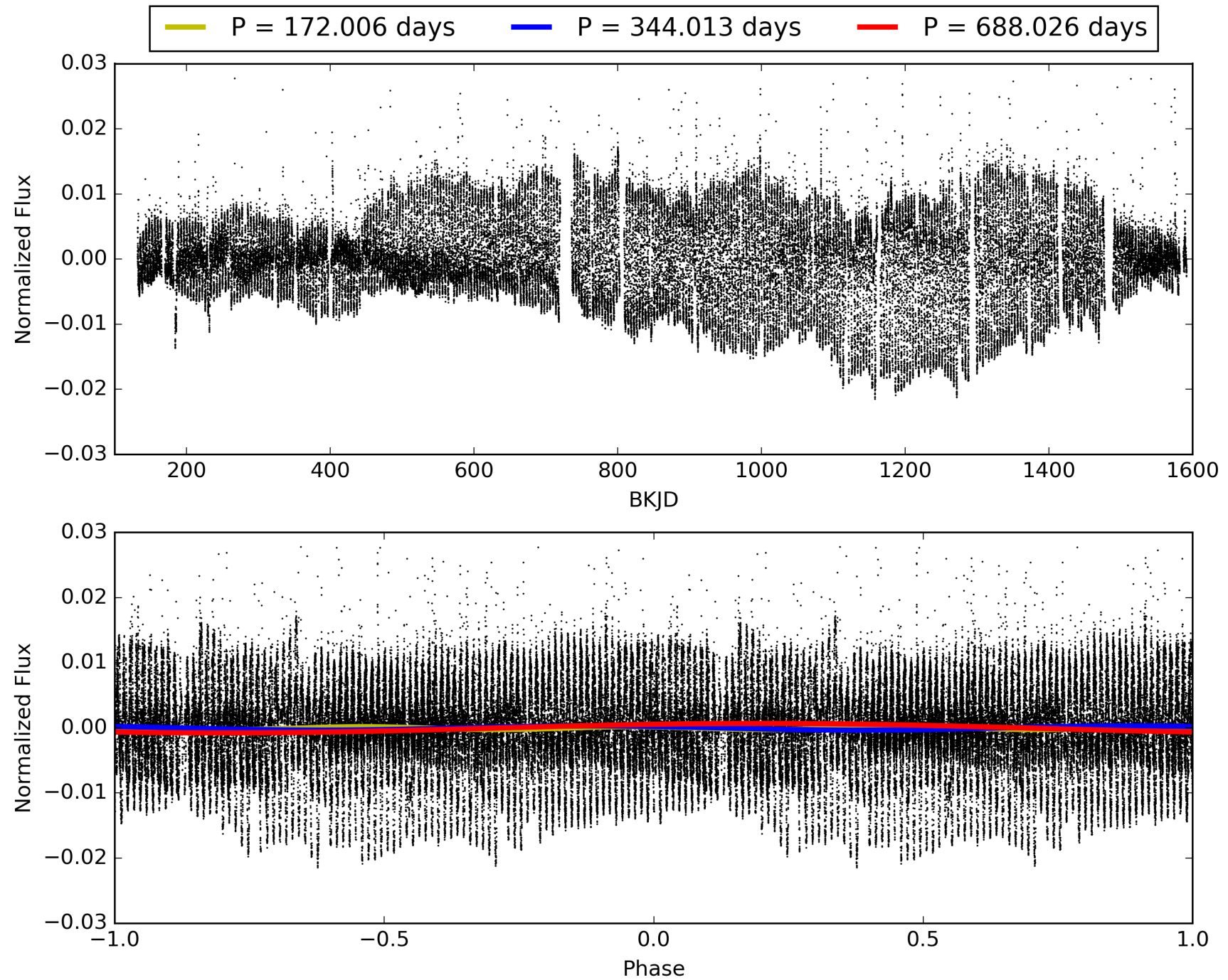
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [207.66σ]  
LongPeriod-sig: 100.0% [287.47σ]  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 57.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.523  
Centroid-sig: 25.4%  
Centroid-so: 0.512 arcsec [0.77σ]  
OotOffset-rm: 0.169 arcsec [1.17σ]  
KicOffset-rm: 0.283 arcsec [1.37σ]  
OotOffset-st: 0/3/0/0 [3]  
KicOffset-st: 0/3/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 007939565-01, PDC Light Curves



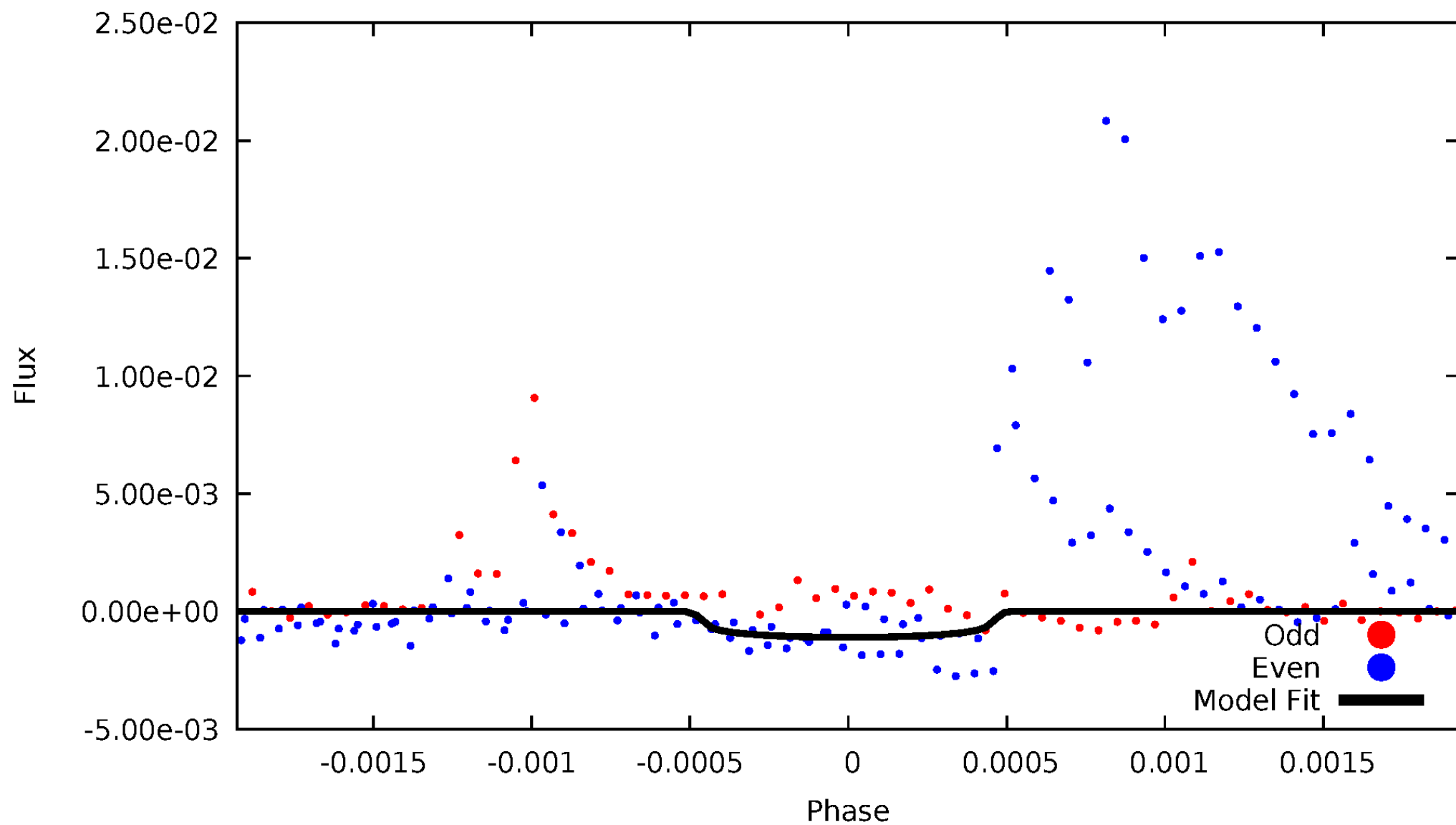
TCE 007939565-01





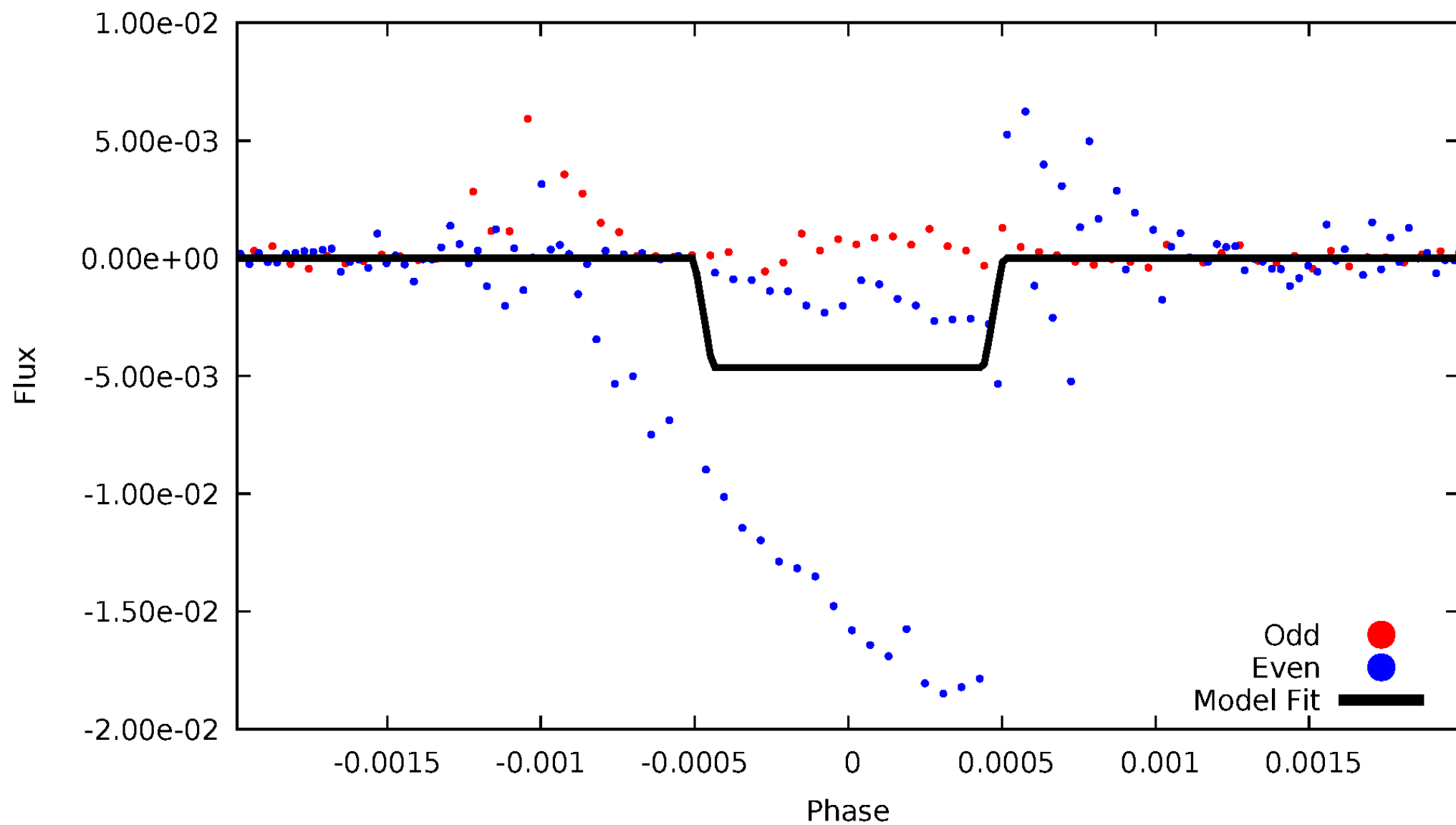
# DV Odd/Even

TCE 007939565-01

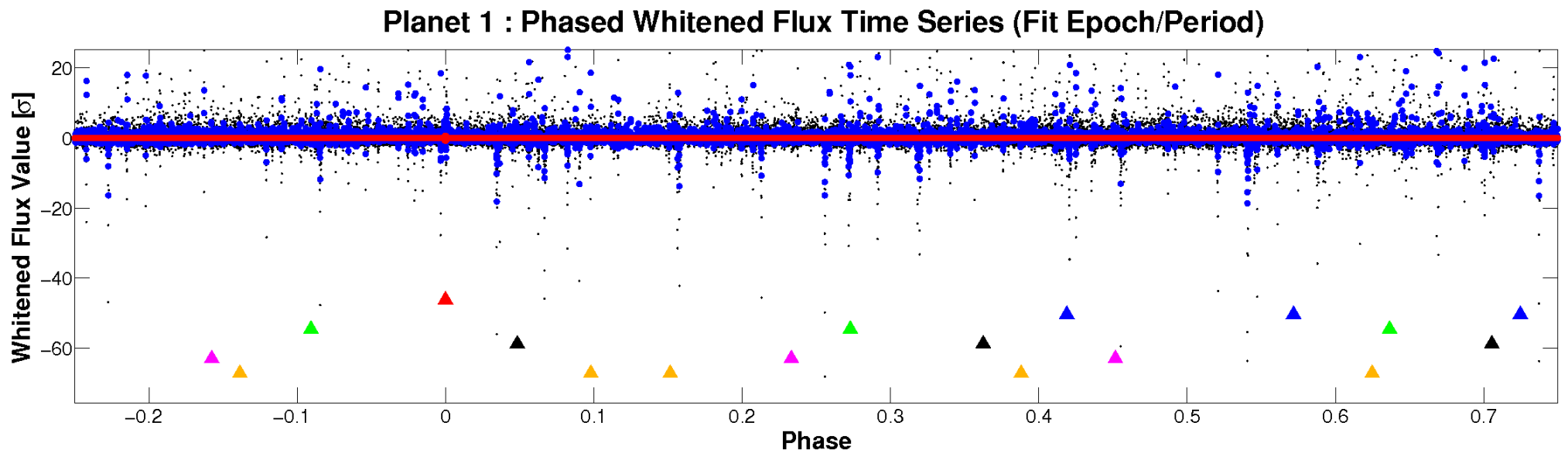
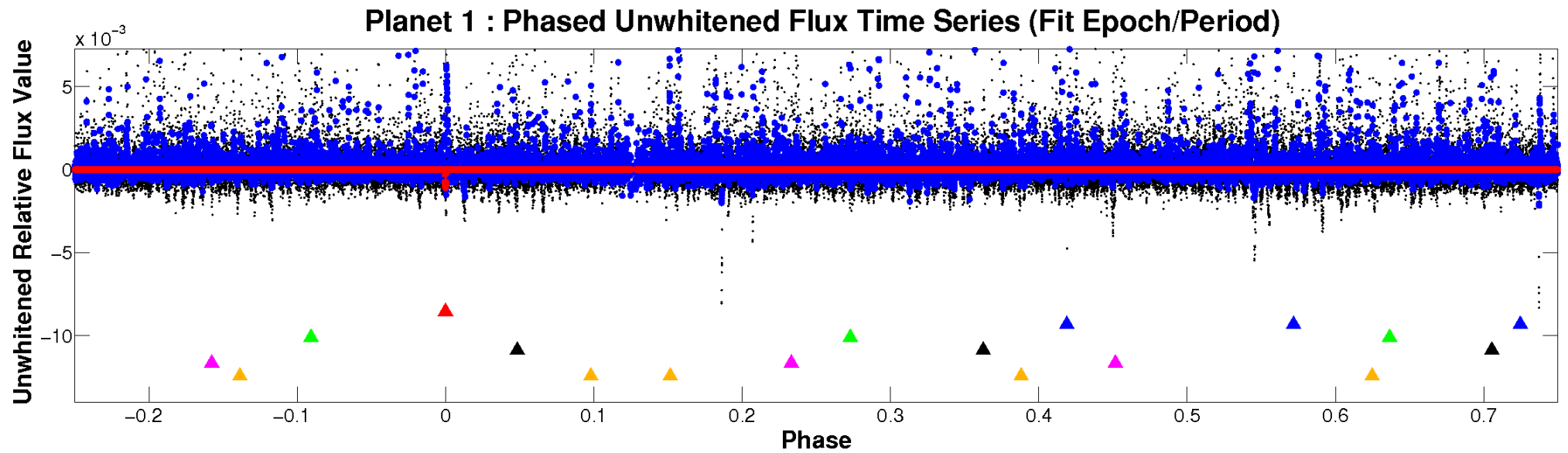


# ALT Odd/Even

TCE 007939565-01

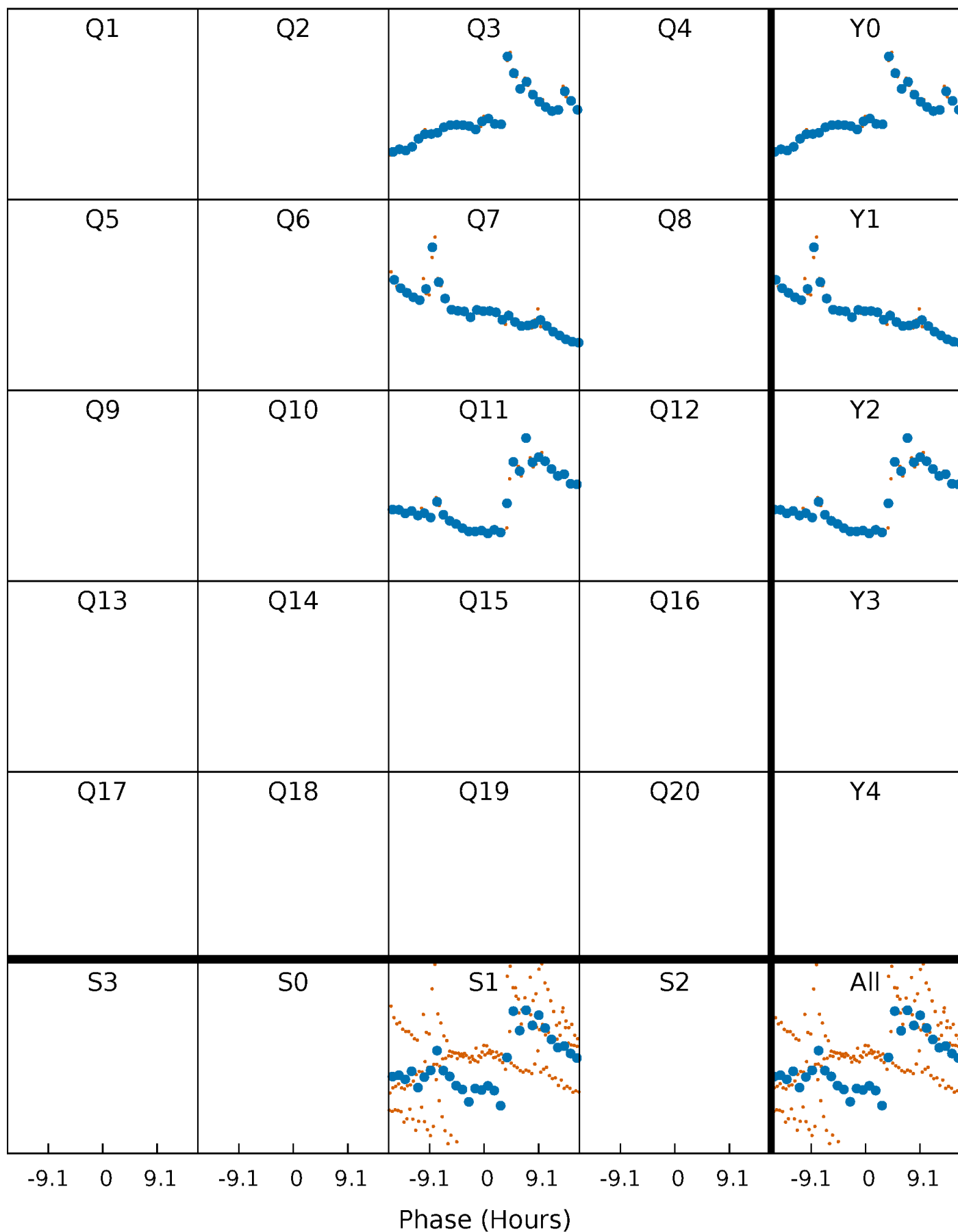


# Non-Whitened Vs. Whitened Light Curve



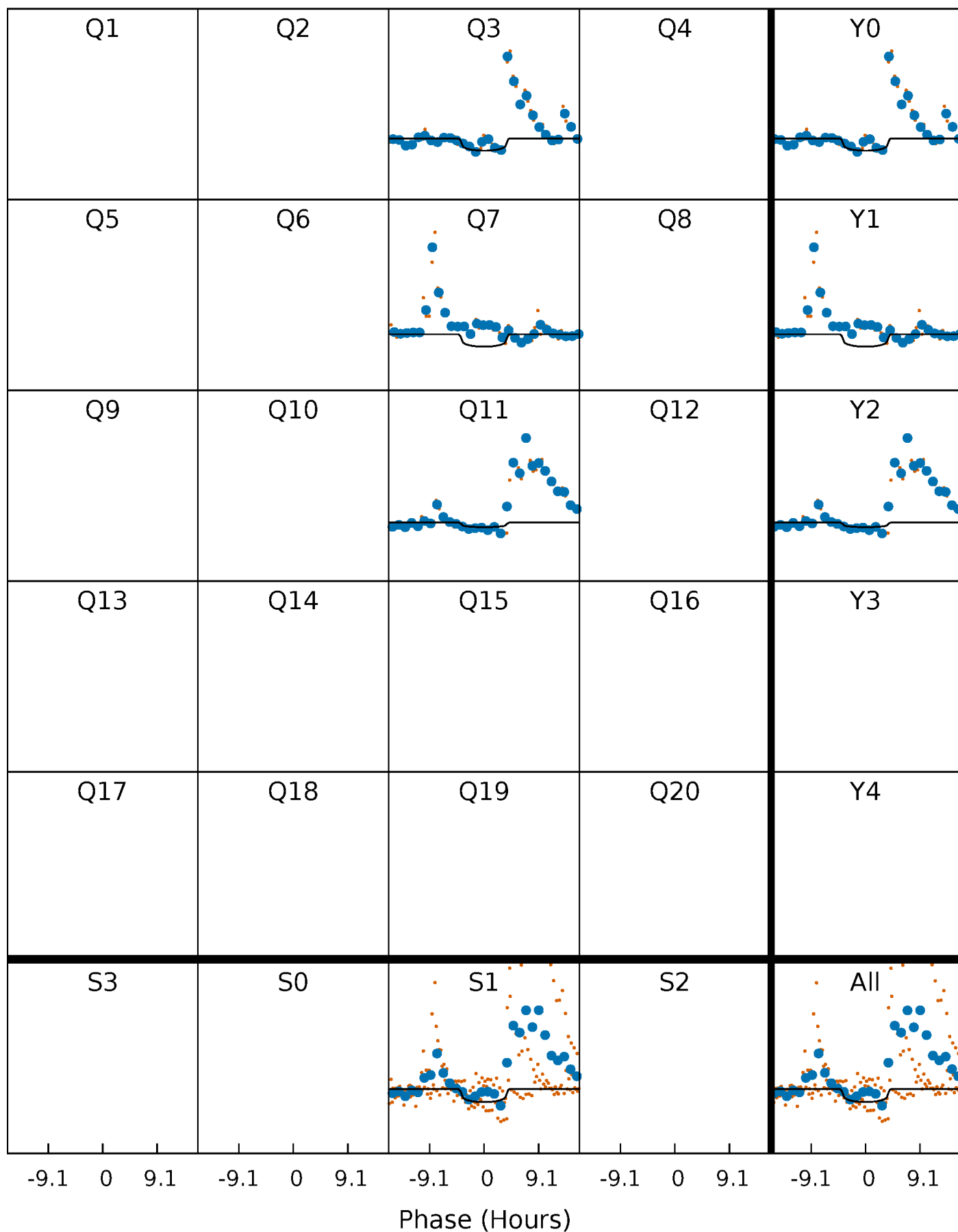
# PDC Quarter-Phased Transit Curves

TCE 007939565-01 P=344.012806 Days  $T_0=340.200311$  (BKJD)



# DV Quarter-Phased Transit Curves

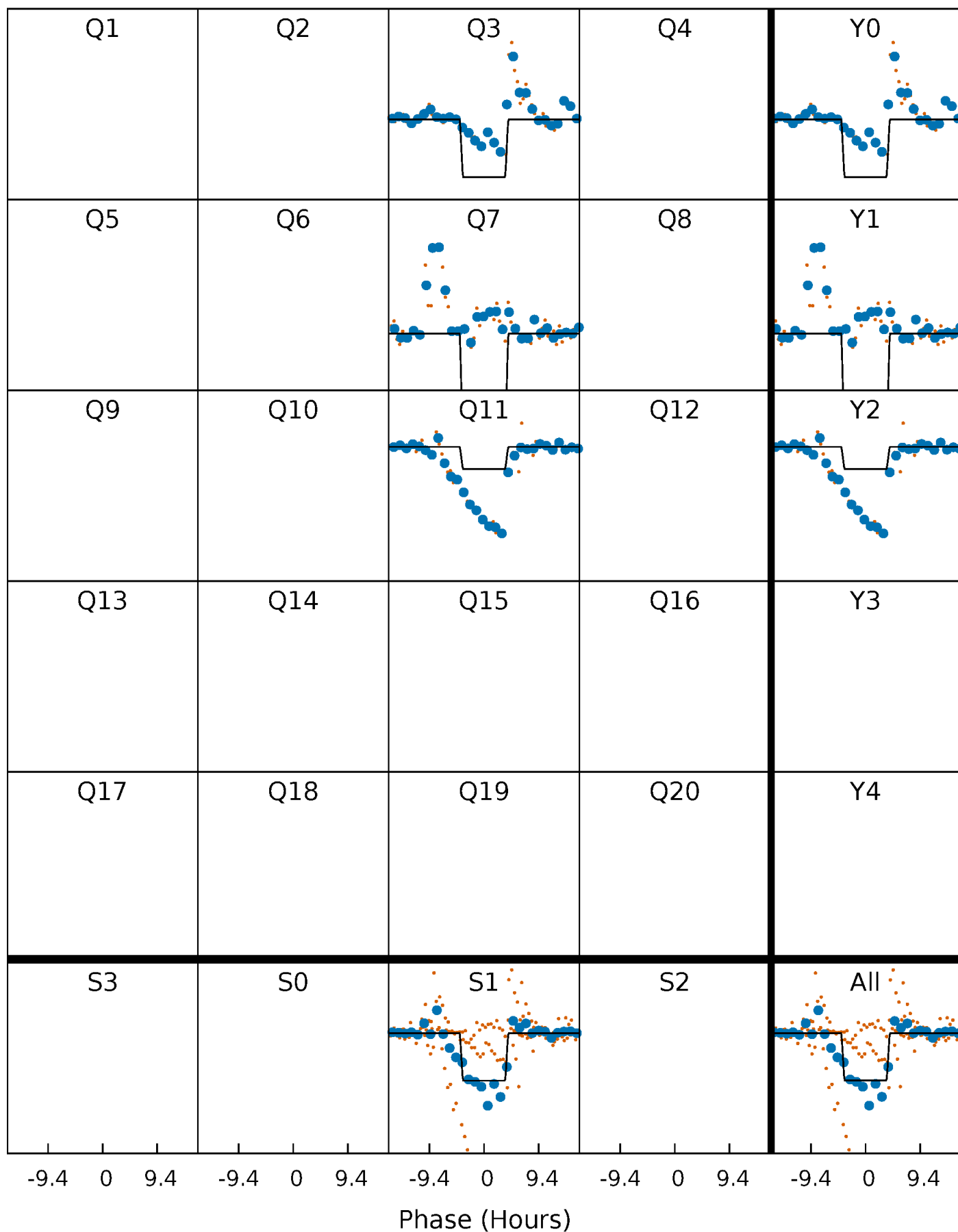
TCE 007939565-01 P=344.012806 Days  $T_0=340.200311$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

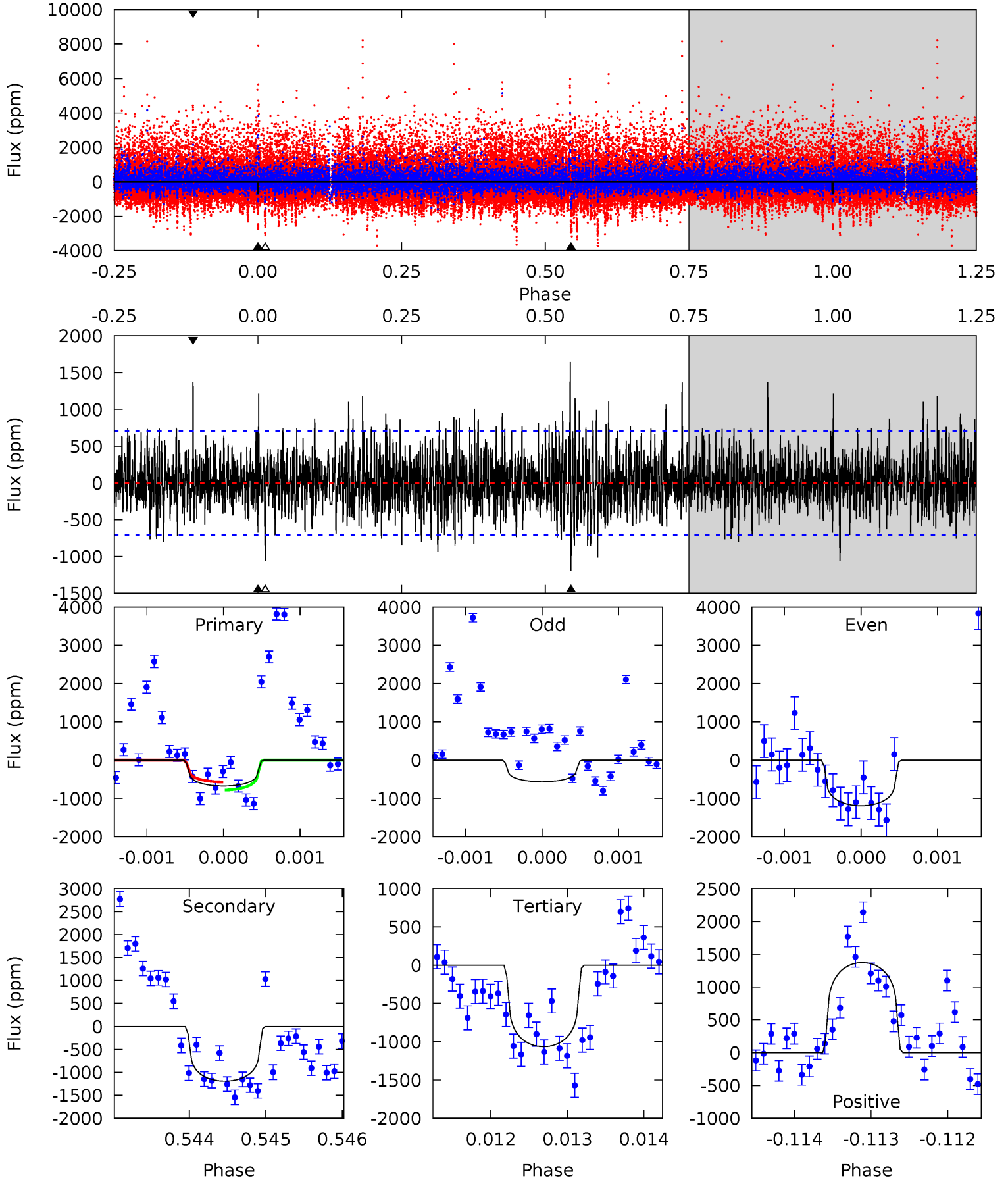
TCE 007939565-01 P=344.026227 Days  $T_0=340.184078$  (BKJD)



# DV Model-Shift Uniqueness Test

007939565-01, P = 344.012806 Days, E = 340.200311 Days

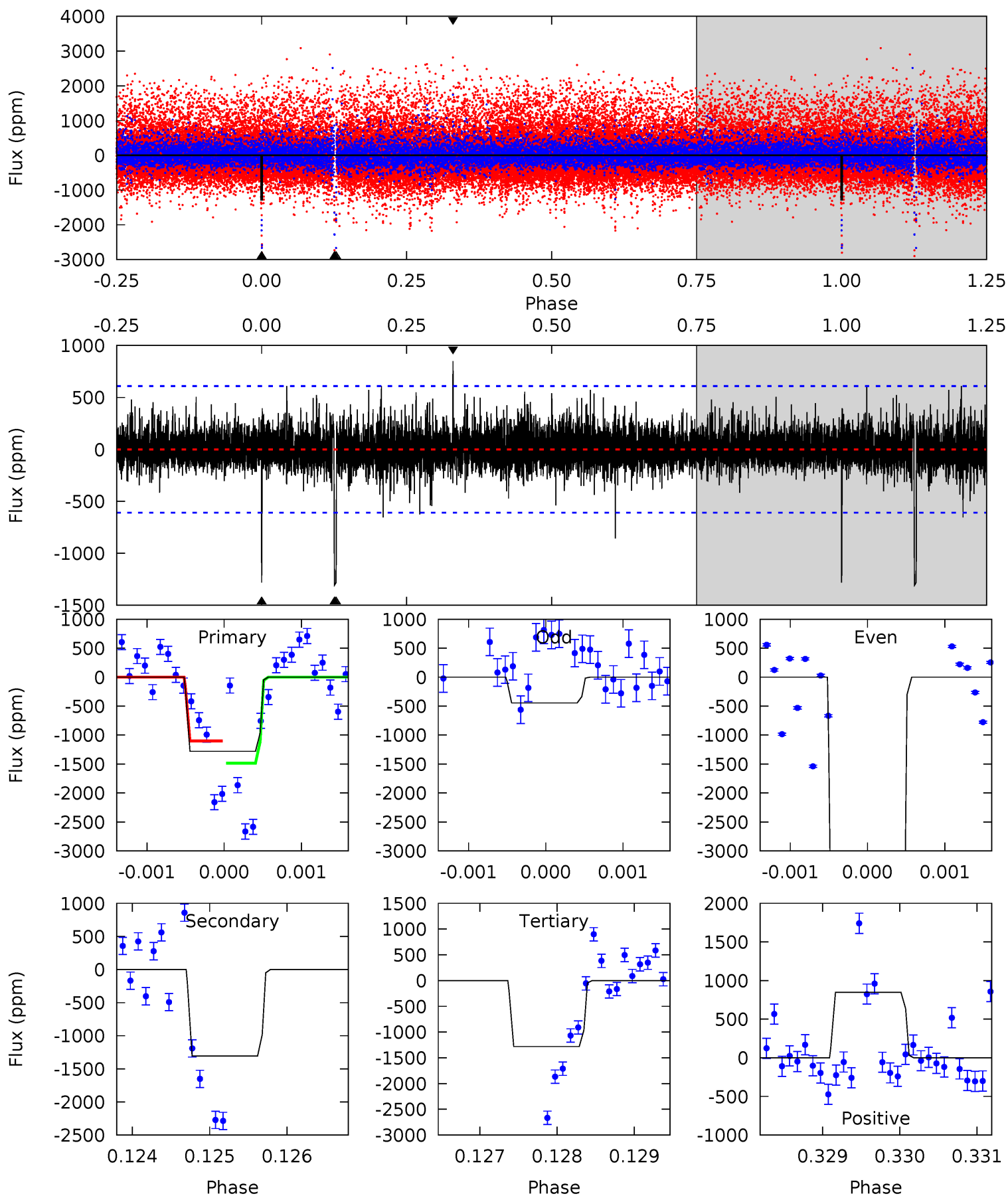
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.19	9.16	8.19	10.6	5.45	3.29	2.35	-2.99	-5.37	0.98	-1.40	1.83	1.00	0.58	0.82



# Alt Model-Shift Uniqueness Test

007939565-01, P = 344.026227 Days, E = 340.184078 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
11.5	11.7	11.5	7.61	5.45	3.30	1.17	-0.01	3.86	0.22	4.09	42.8	3.10	0.39	1.72



### Stellar Parameters For KIC 007939565

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3295^{+42}_{-33}$	$5.062^{+0.044}_{-0.044}$	$-0.100^{+0.100}_{-0.100}$	$0.215^{+0.032}_{-0.023}$	$0.194^{+0.038}_{-0.025}$	$27.610^{+6.807}_{-5.953}$
	+1%/-1%	+1%/-1%	+100%/-100%	+15%/-11%	+20%/-13%	+25%/-22%
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 007939565-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1192 \pm 130$	$1.09^{+0.84}_{-0.71}$	$126^{+3}_{-3}$	$3034^{+1208}_{-431}$	$175098^{+1224469}_{-119692}$
Alt.	$-1306 \pm 112$	$1.65^{+1.00}_{-0.87}$	$126^{+3}_{-3}$	$2737^{+626}_{-308}$	$81711^{+274134}_{-49913}$

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

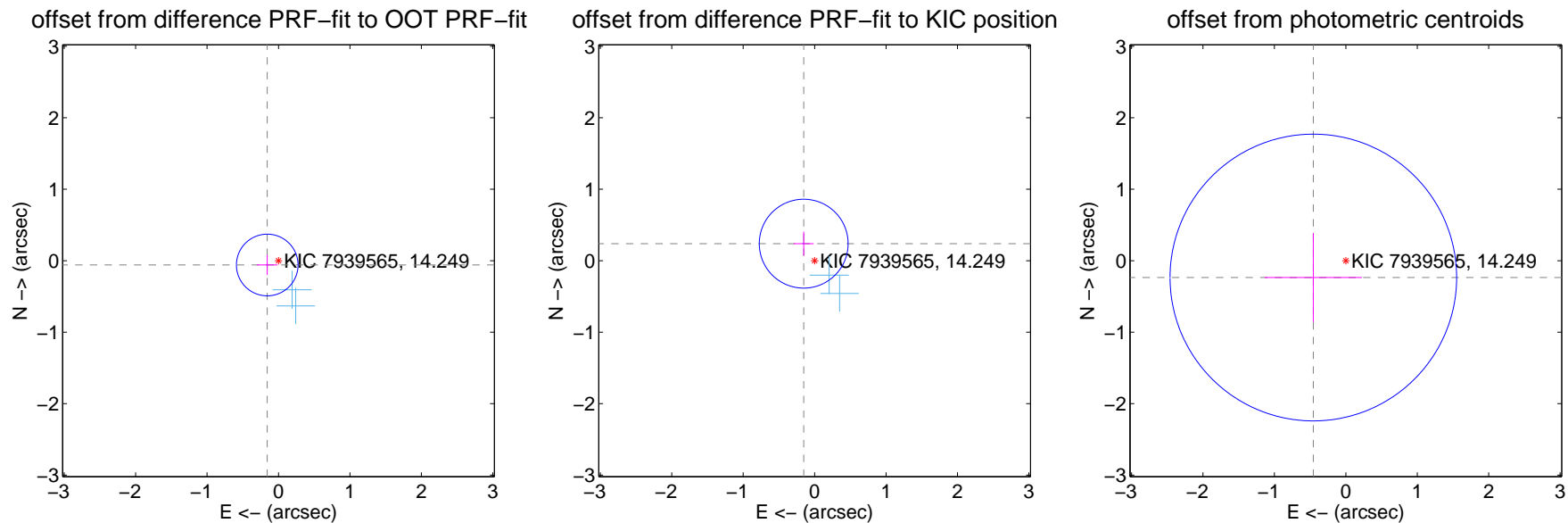
## DV Centroid Data

Supplemental centroid analysis for 007939565-01. Kepler magnitude: 14.25. Transit SNR 4.63

There are 3 quarters with good PRF difference image offsets

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

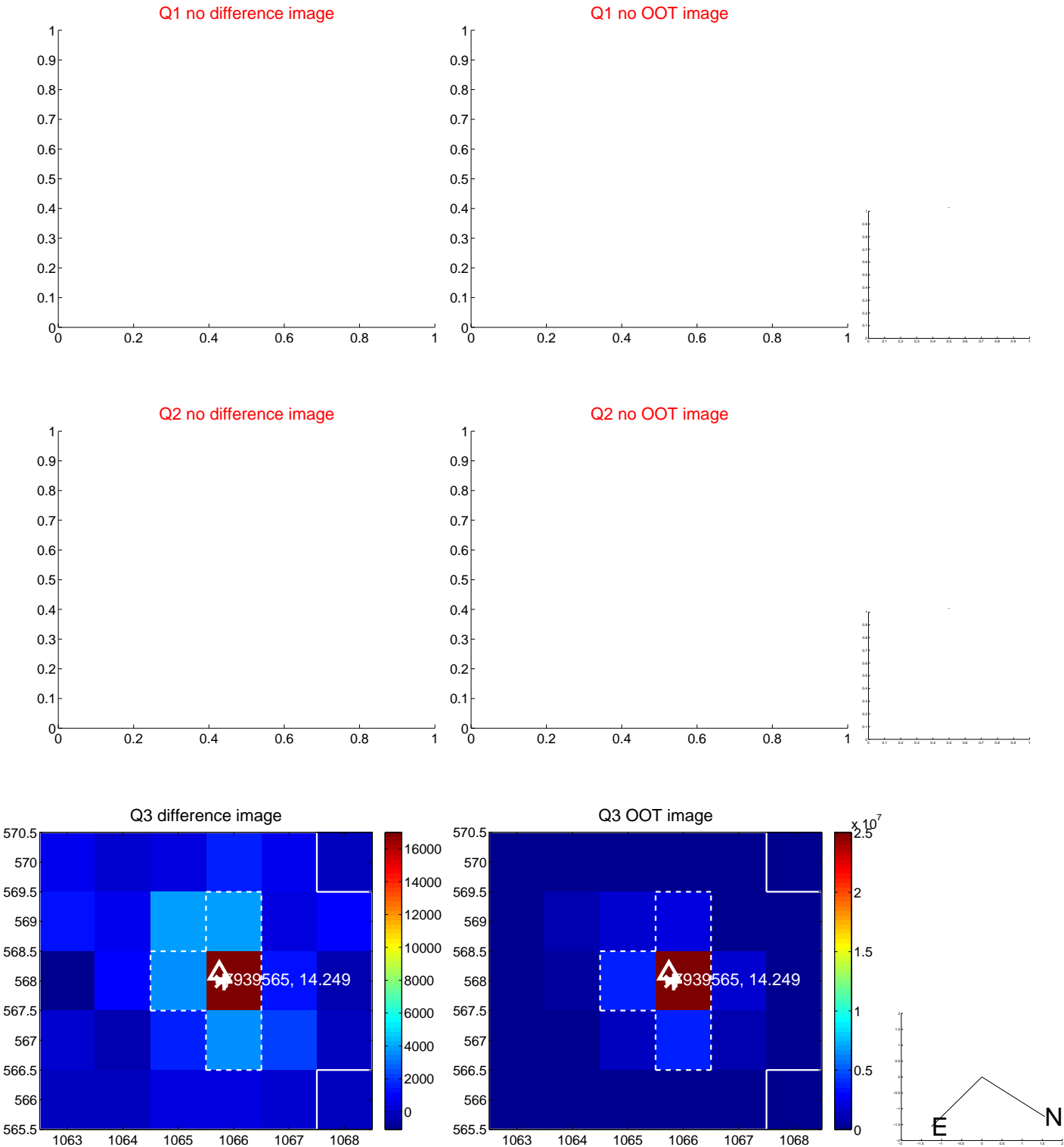
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.169 \pm 0.144$	1.17	$0.158 \pm 0.144$	$-0.060 \pm 0.140$
PRF-fit source offset from KIC position	$0.283 \pm 0.207$	1.37	$0.153 \pm 0.139$	$0.238 \pm 0.169$
photometric centroid source offset	$0.51 \pm 0.67$	0.77	$0.45 \pm 0.68$	$-0.24 \pm 0.62$



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



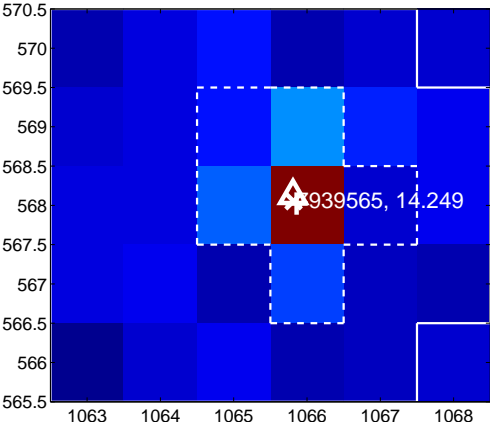
Q6 no difference image



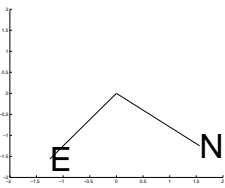
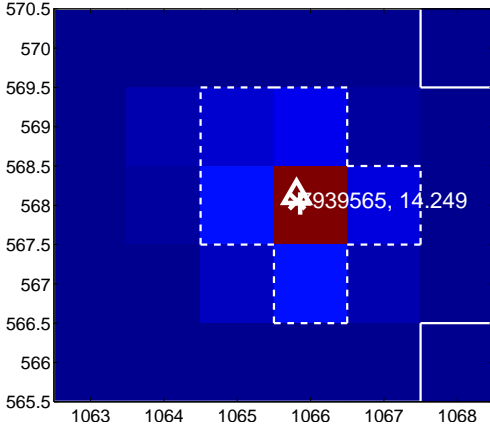
Q6 no OOT image



Q7 difference image



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.

Q9 no difference image



Q9 no OOT image



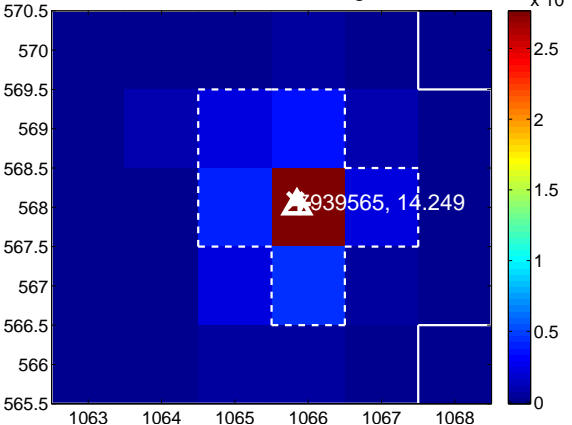
Q10 no difference image



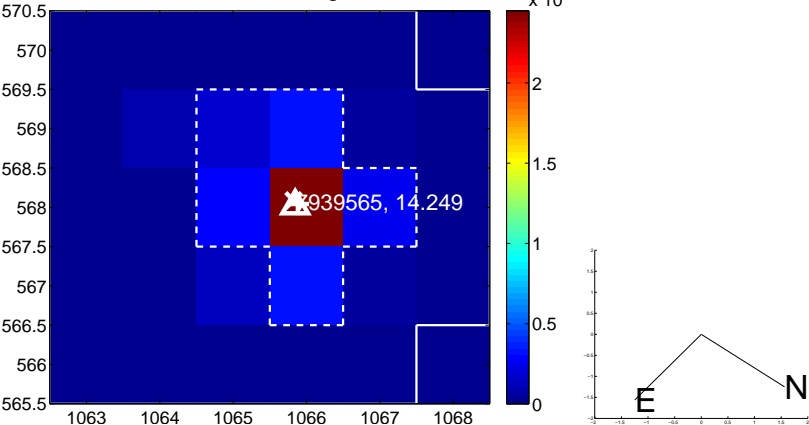
Q10 no OOT image



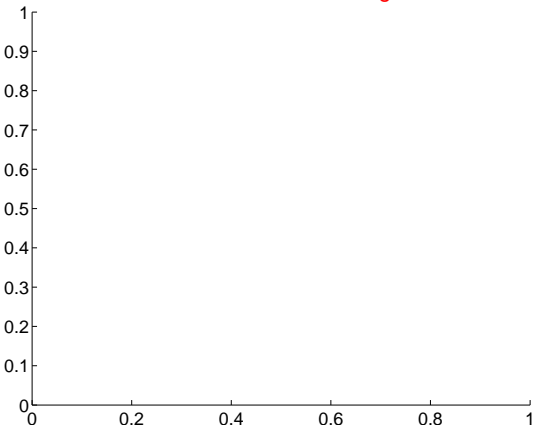
Q11 difference image



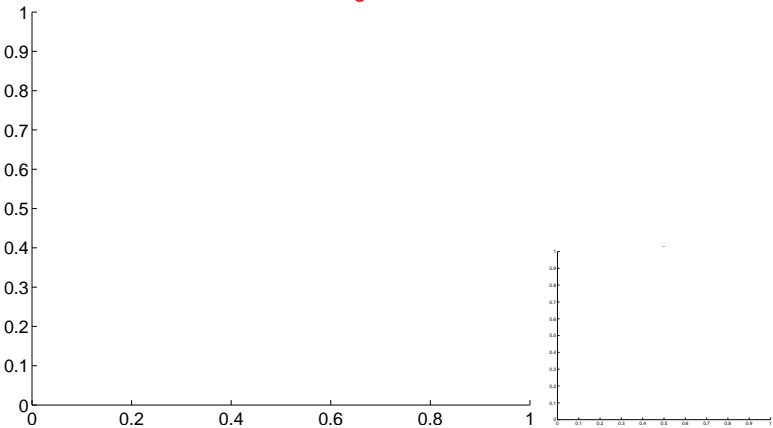
Q11 OOT image



Q12 no difference image



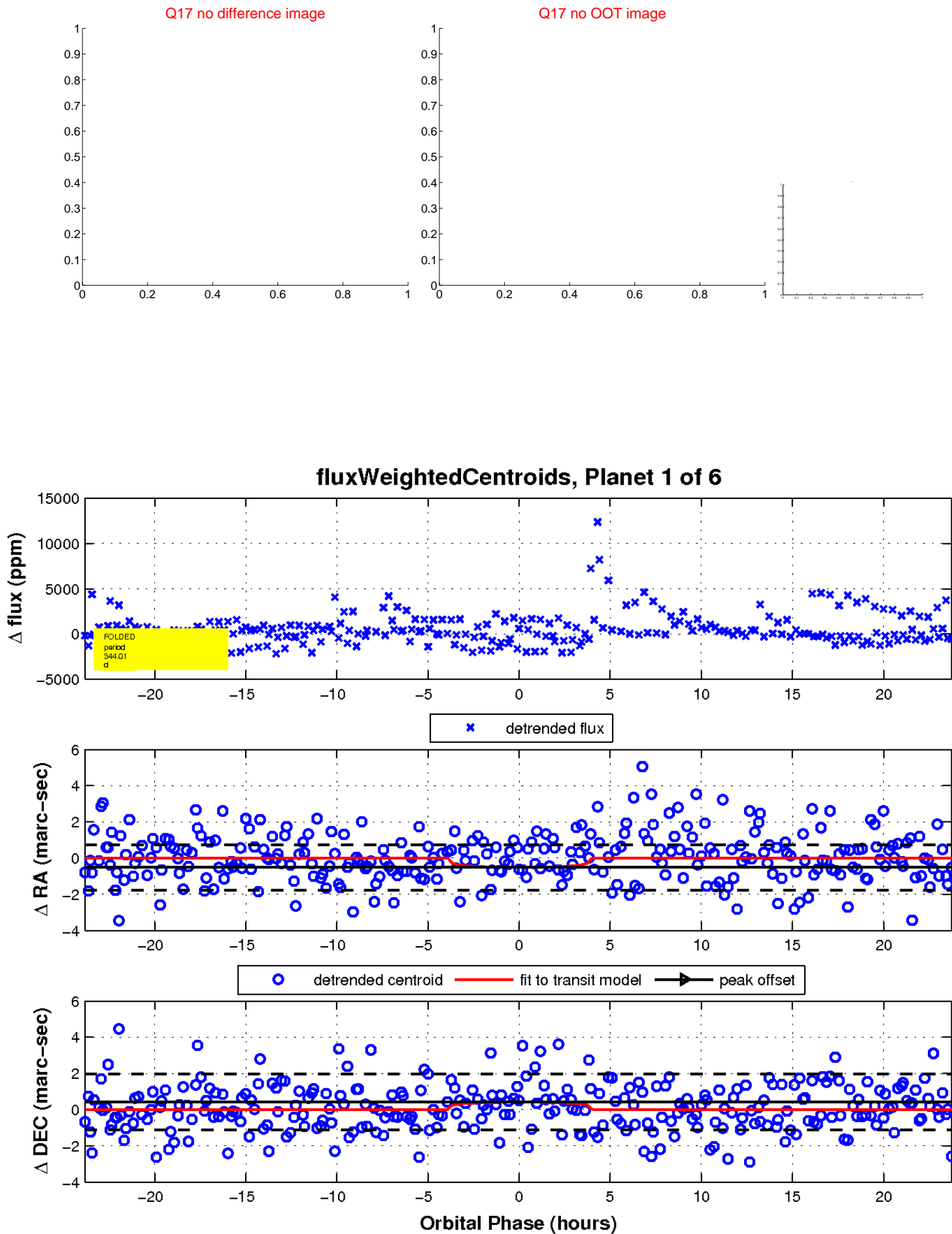
Q12 no OOT image



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

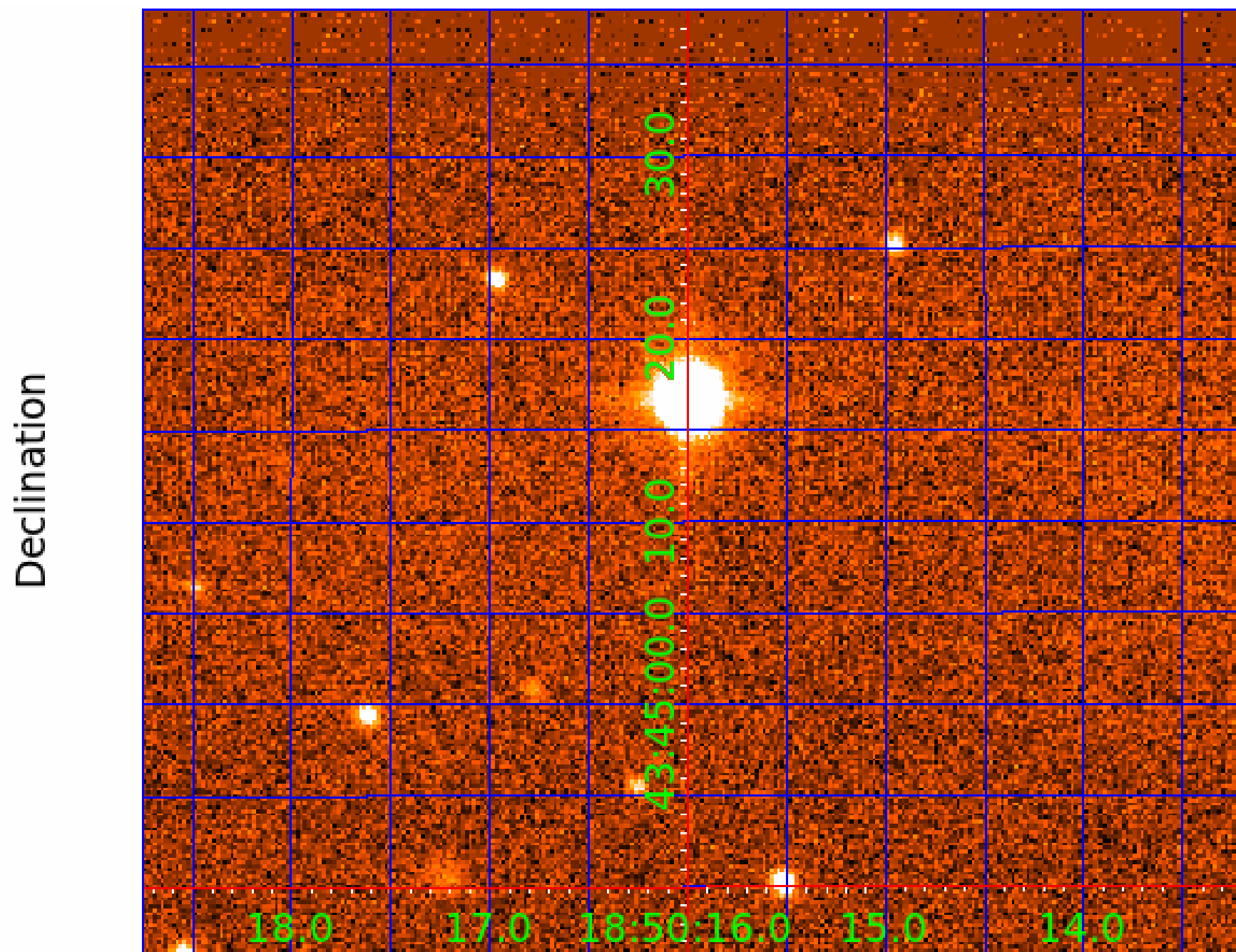


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



# KIC 007939565

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007939565-01	OBS	No	344.012806	340.200312	1099.7	7.969	20.0	4.6	0.21	3295	0.71	0.02
007939565-02	OBS	No	635.435308	245.485049	1629.6	4.492	13.9	5.9	0.21	3295	0.90	0.01
007939565-03	OBS	No	562.940692	215.165497	2009.3	4.039	12.5	6.7	0.21	3295	0.96	0.01
007939565-04	OBS	No	461.985936	464.924425	1965.5	5.788	12.3	8.0	0.21	3295	0.94	0.01
007939565-05	OBS	No	478.436667	495.580905	2302.3	4.076	11.2	8.3	0.21	3295	1.04	0.01
007939565-06	OBS	No	262.612113	373.917722	726.3	5.000	10.2	-1.0	0.21	3295	0.57	0.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007939565-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—INCONSISTENT_TRANS
007939565-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
007939565-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
007939565-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

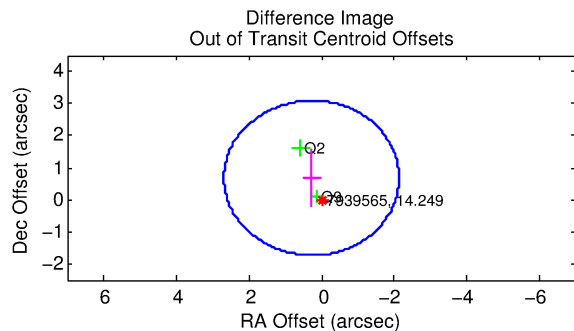
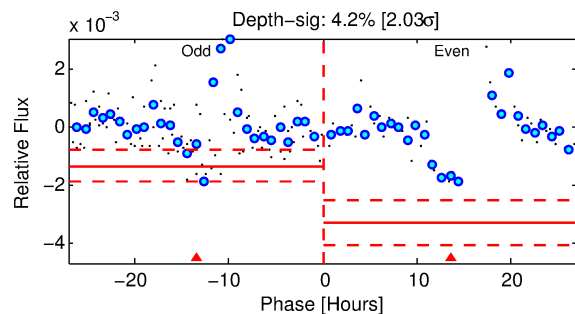
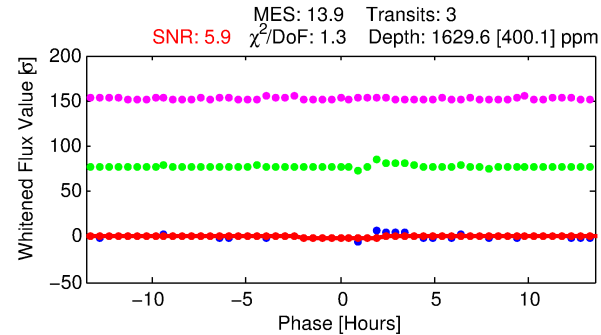
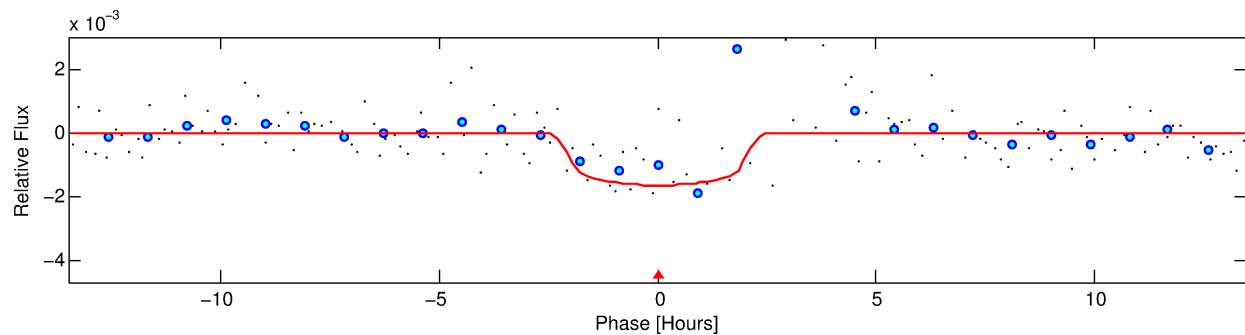
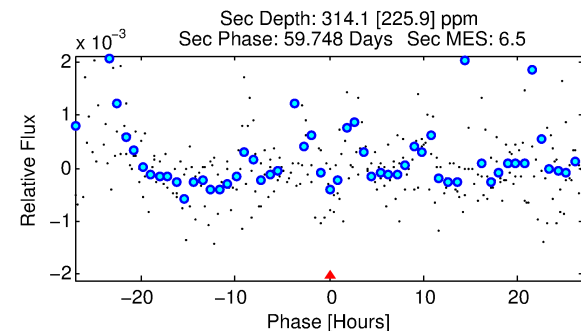
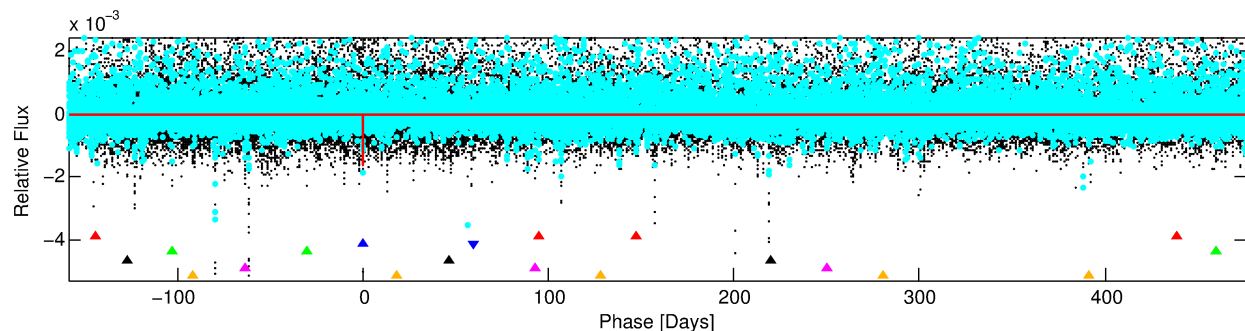
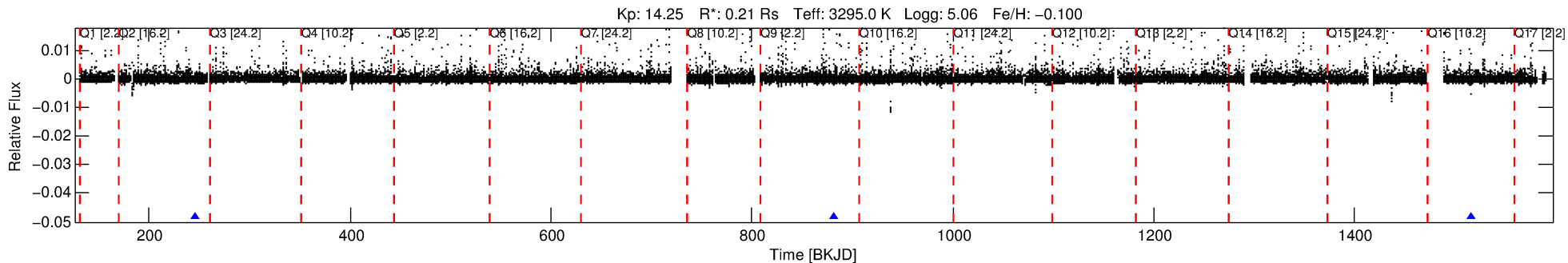
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007939565-02

No Significant Match Found

# DV One-Page Summary

KIC: 7939565 Candidate: 2 of 6 Period: 635.435 d



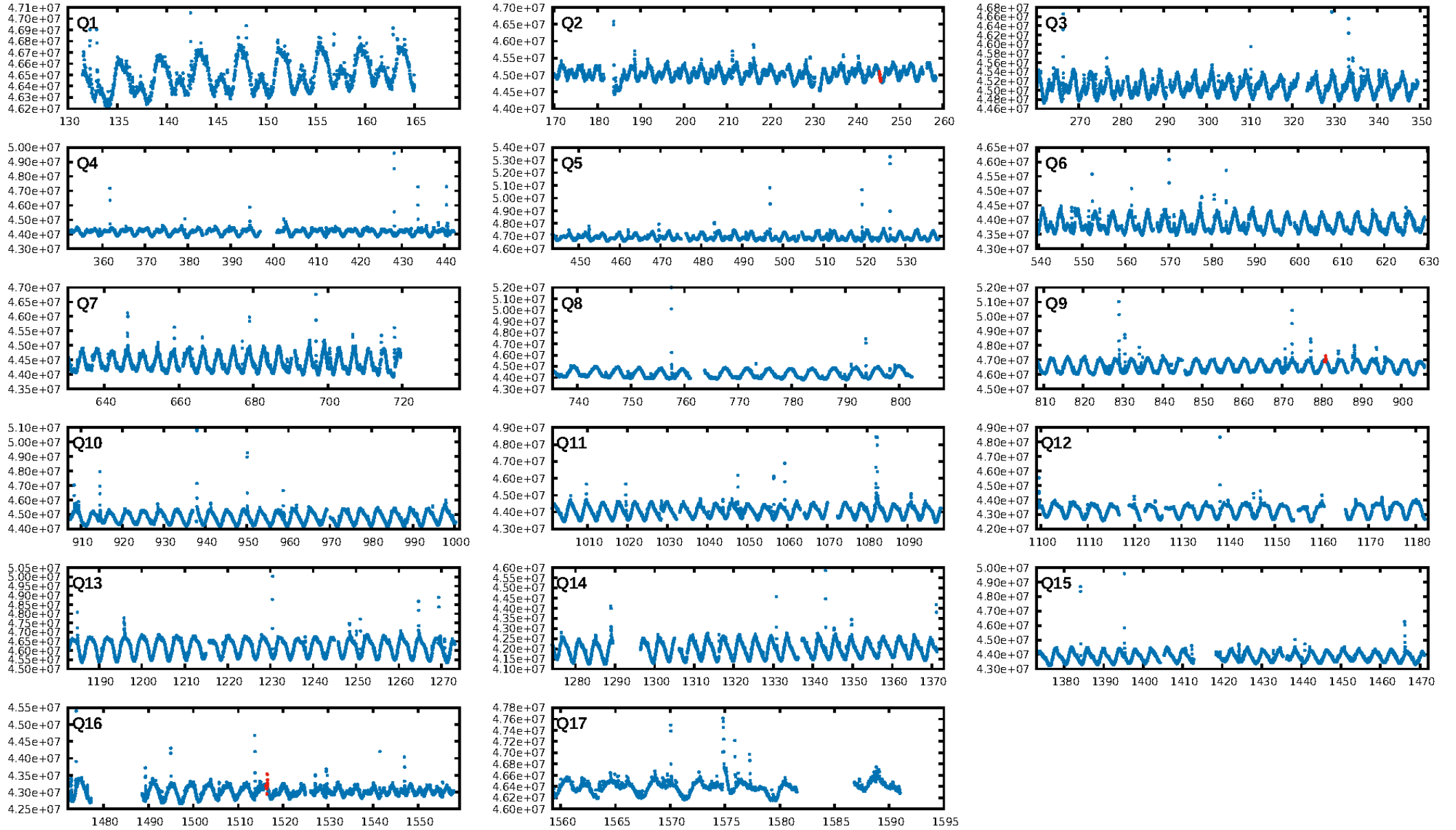
## DV Fit Results:

Period = 635.43531 [0.00874] d  
Epoch = 245.4850 [0.0107] BKJD  
Rp/R\* = 0.0382 [0.0368]  
a/R\* = 937.76 [3839.54]  
b = 0.57 [4.87]  
Seff = 0.01 [0.00]  
Teq = 74 [2] K  
Rp = 0.90 [0.87] Re  
a = 0.8382 [0.0879] AU  
Ag = 151137.28 [311019.74] [0.49σ]  
Teffp = 2244 [1153] K [1.88σ]

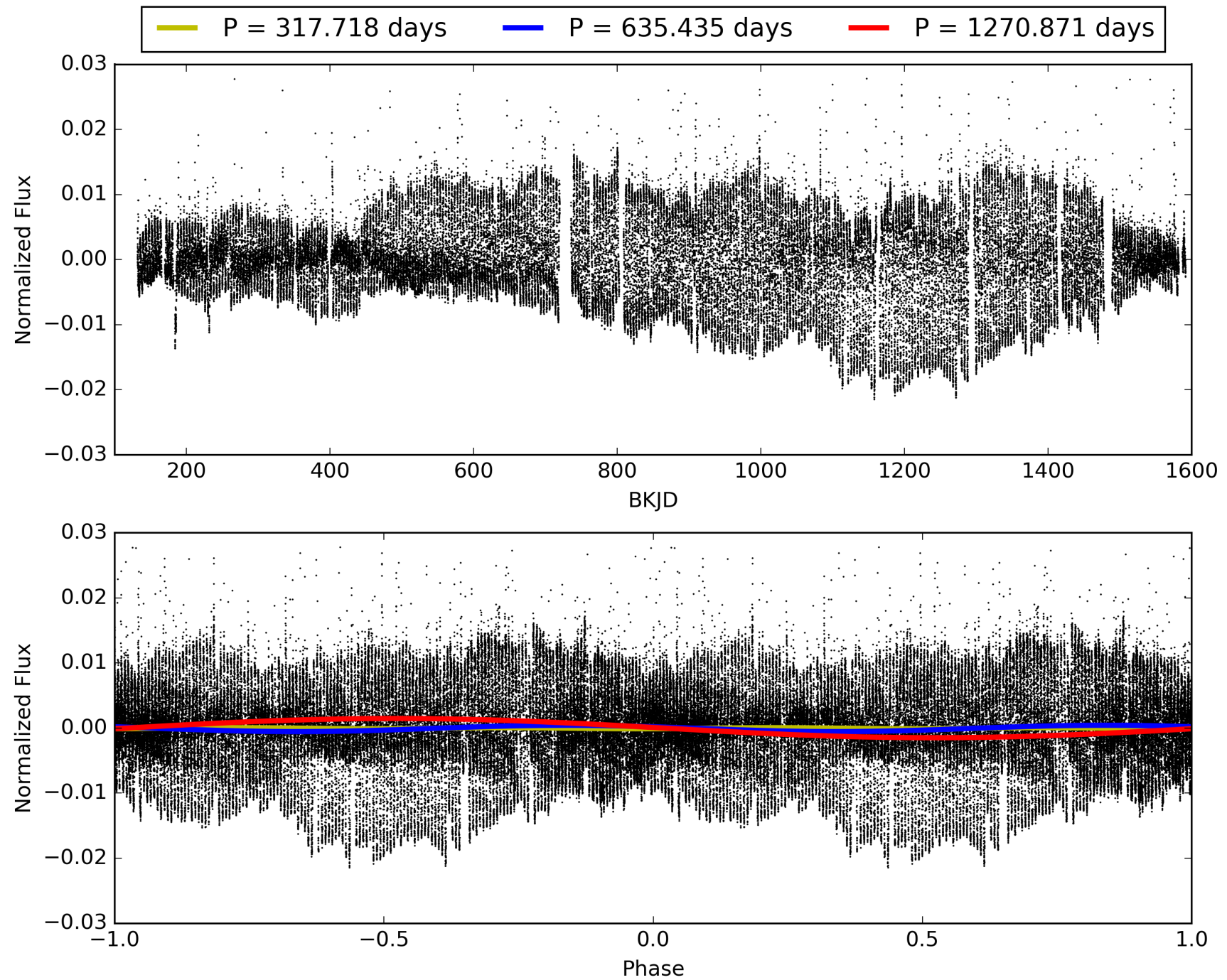
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [288.05σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 1.6%  
ModelChiSquareGof-sig: 87.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.448  
Centroid-sig: 4.9%  
Centroid-so: 0.912 arcsec [1.47σ]  
OotOffset-rm: 0.731 arcsec [0.91σ]  
KicOffset-rm: 0.849 arcsec [1.45σ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

# TCE 007939565-02, PDC Light Curves



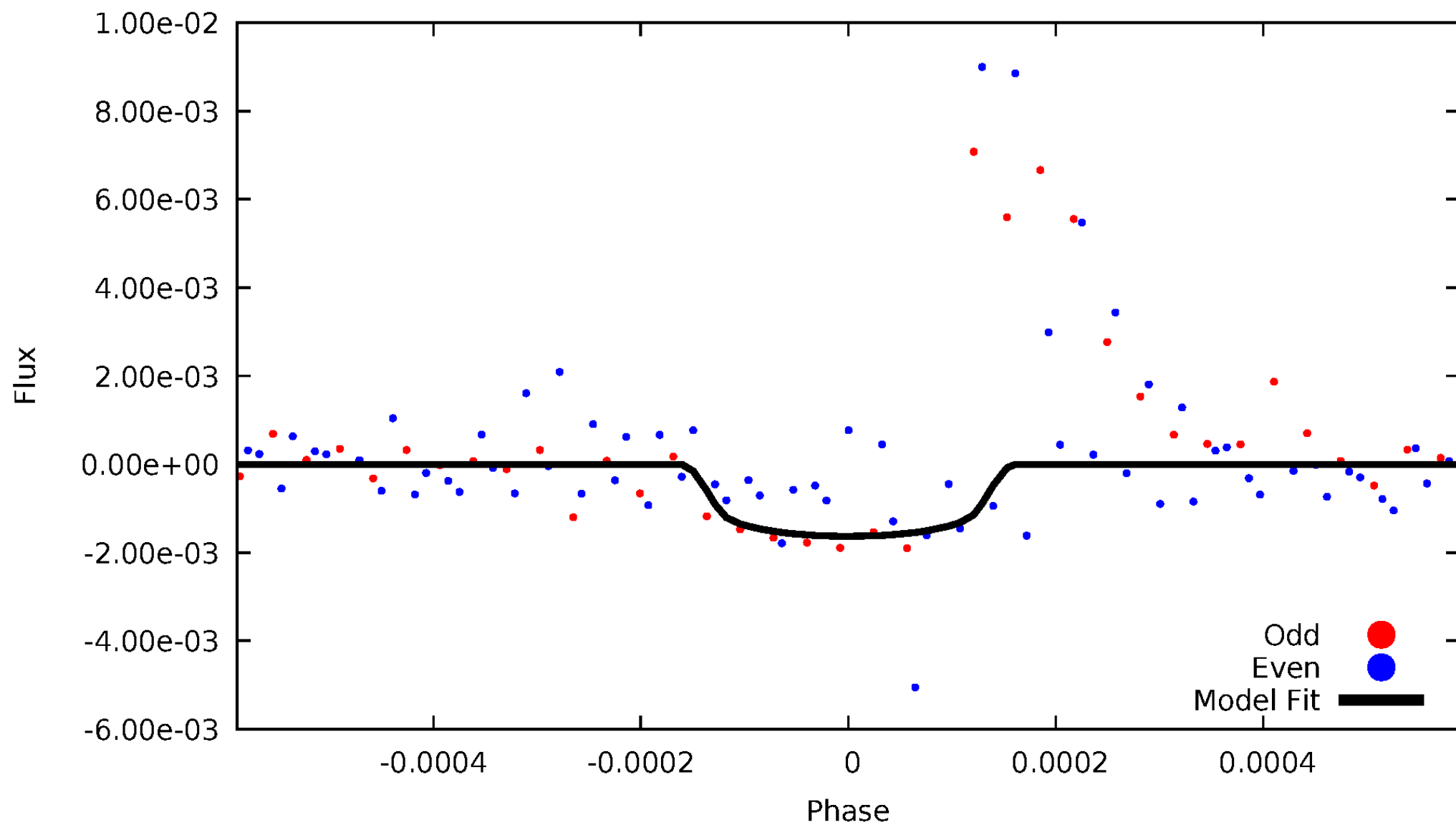
TCE 007939565-02





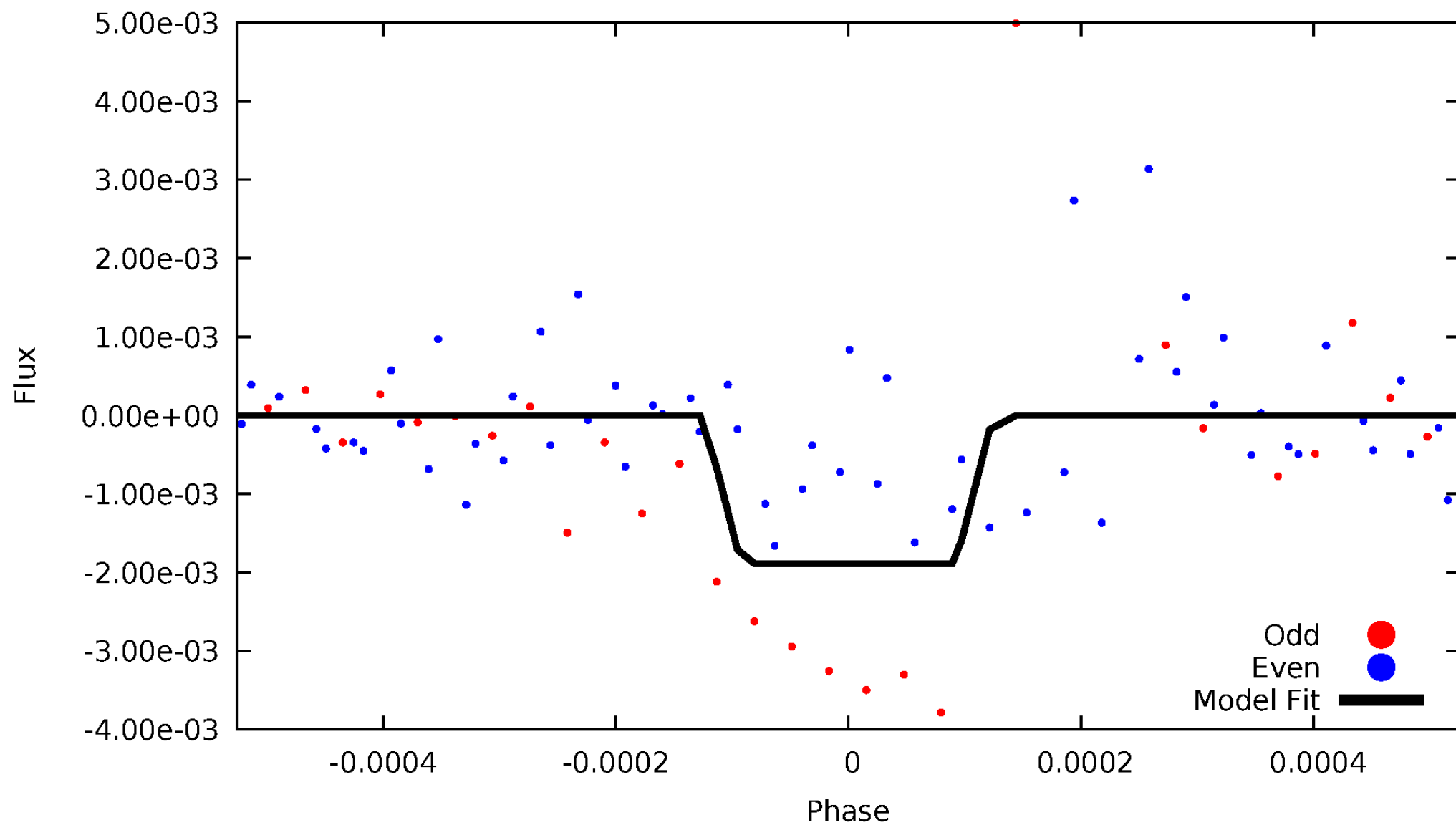
# DV Odd/Even

TCE 007939565-02



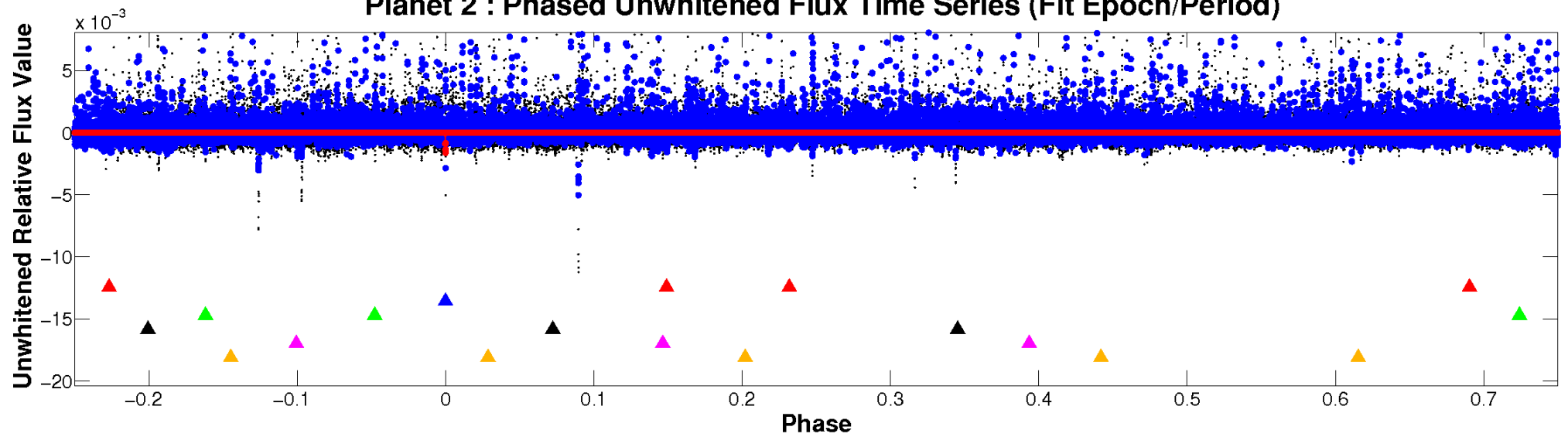
# ALT Odd/Even

TCE 007939565-02

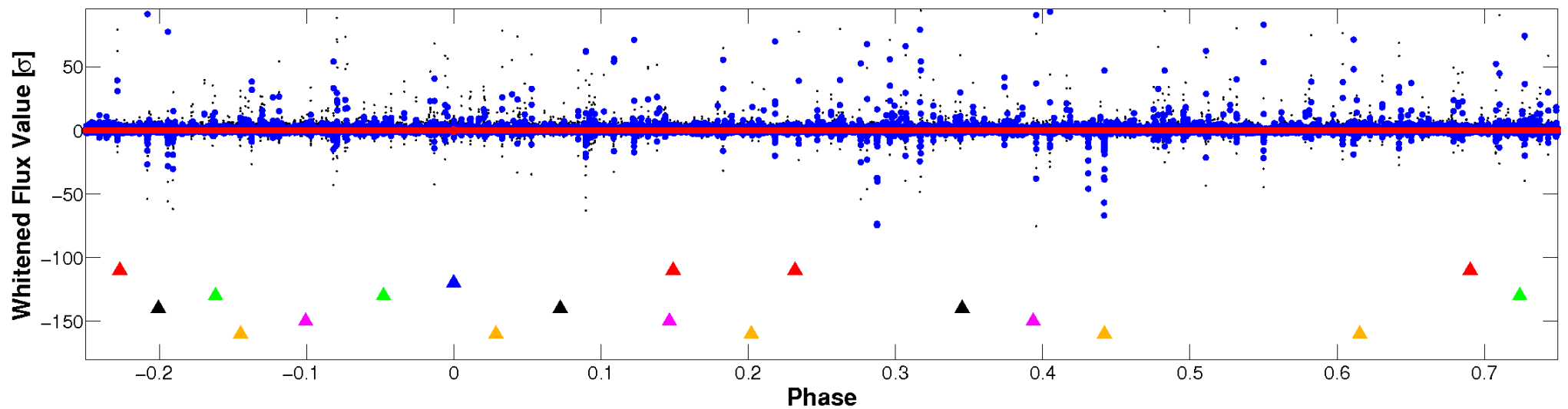


# Non-Whitened Vs. Whitened Light Curve

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

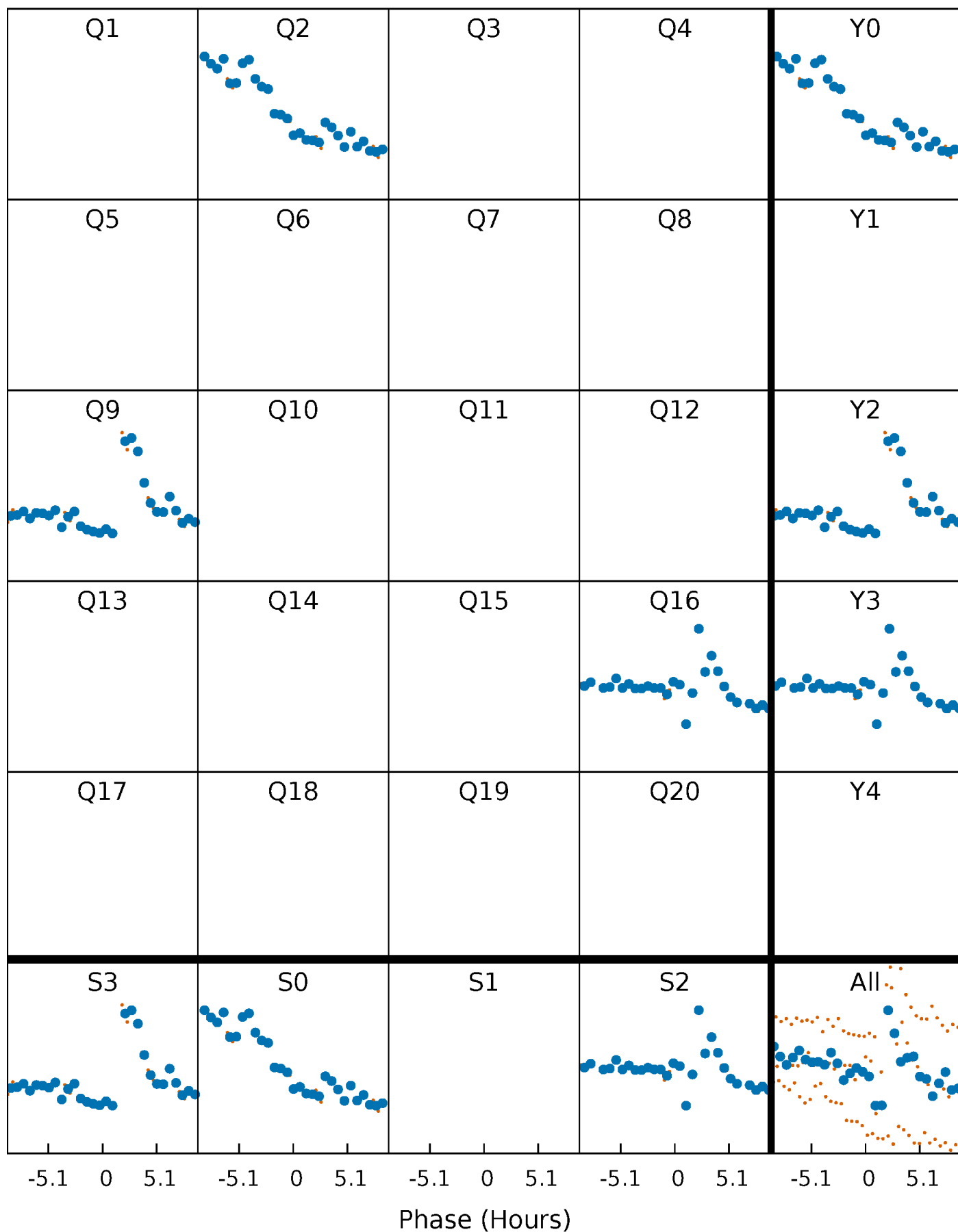


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



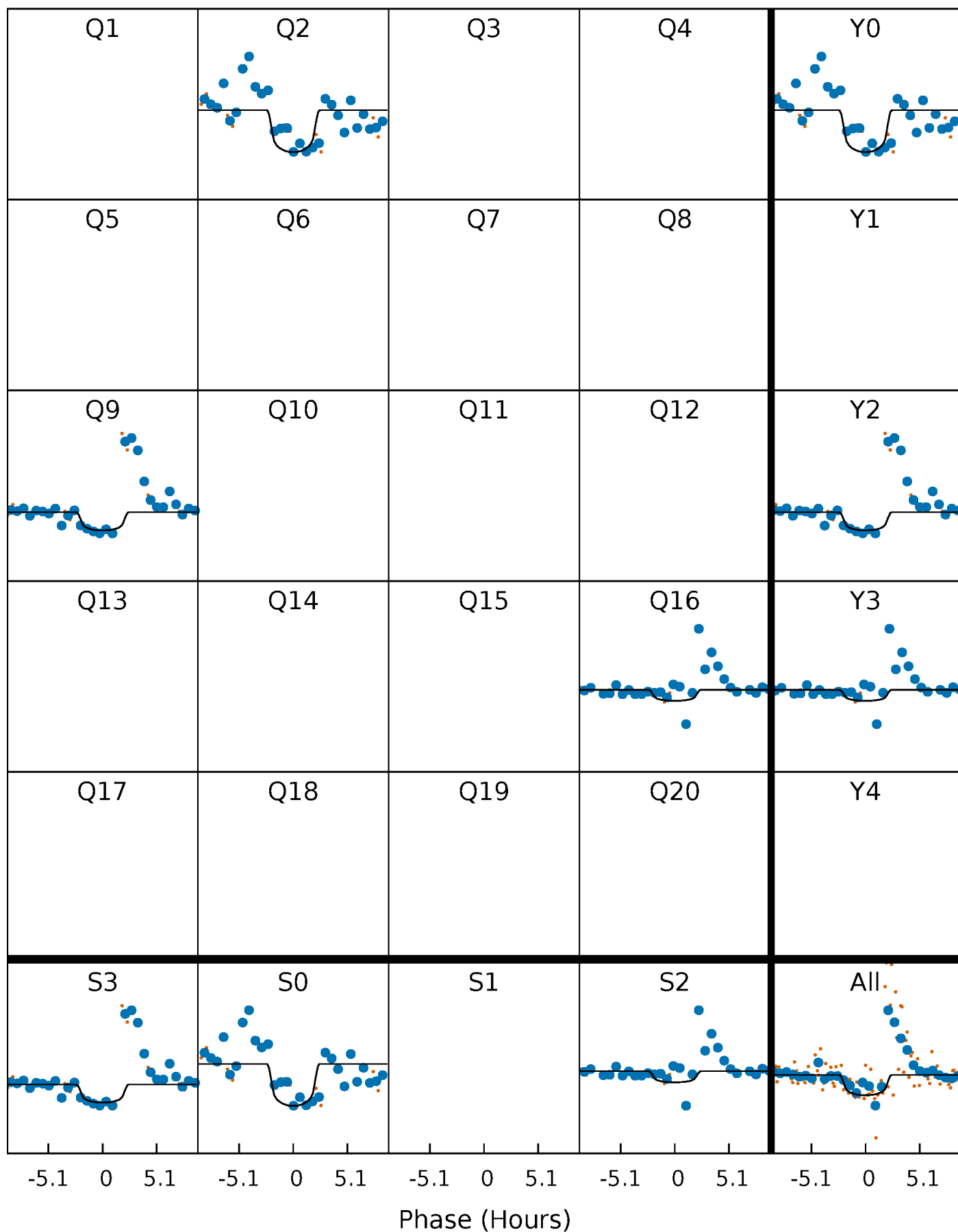
# PDC Quarter-Phased Transit Curves

TCE 007939565-02 P=635.435309 Days  $T_0=245.485049$  (BKJD)



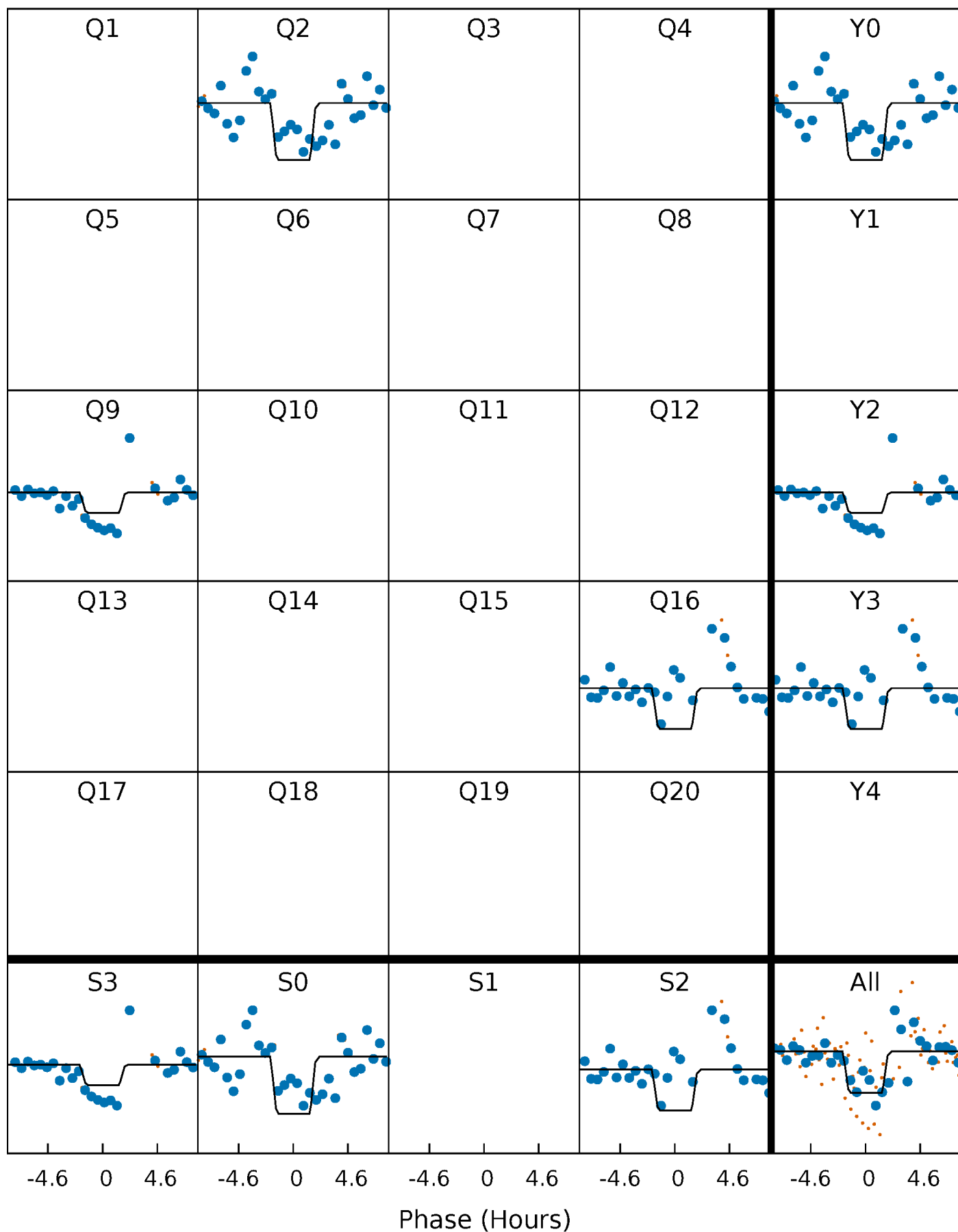
# DV Quarter-Phased Transit Curves

TCE 007939565-02     $P=635.435309$  Days     $T_0=245.485049$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

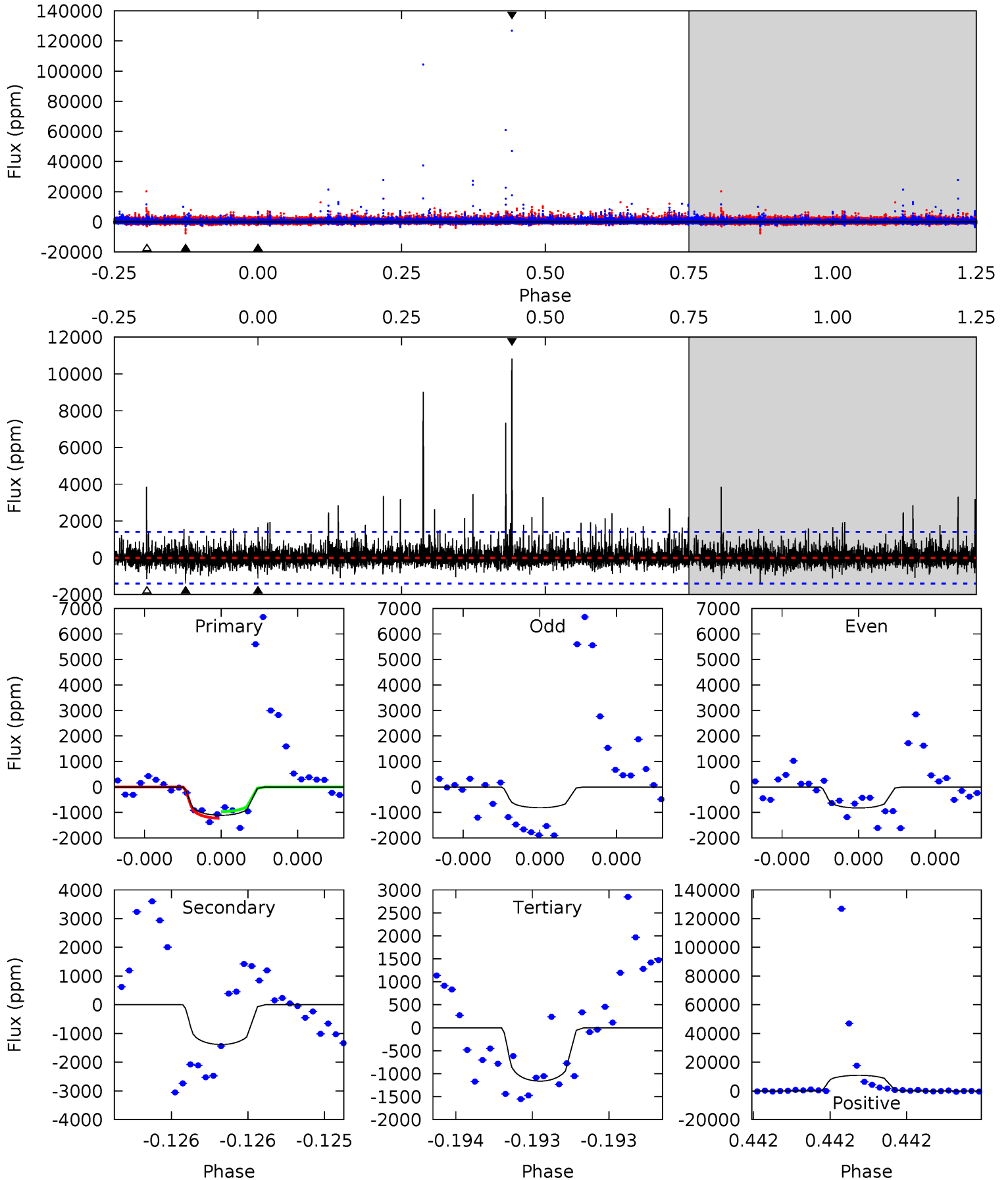
TCE 007939565-02 P=635.449660 Days  $T_0=245.455809$  (BKJD)



# DV Model-Shift Uniqueness Test

007939565-02, P = 635.435309 Days, E = 245.485049 Days

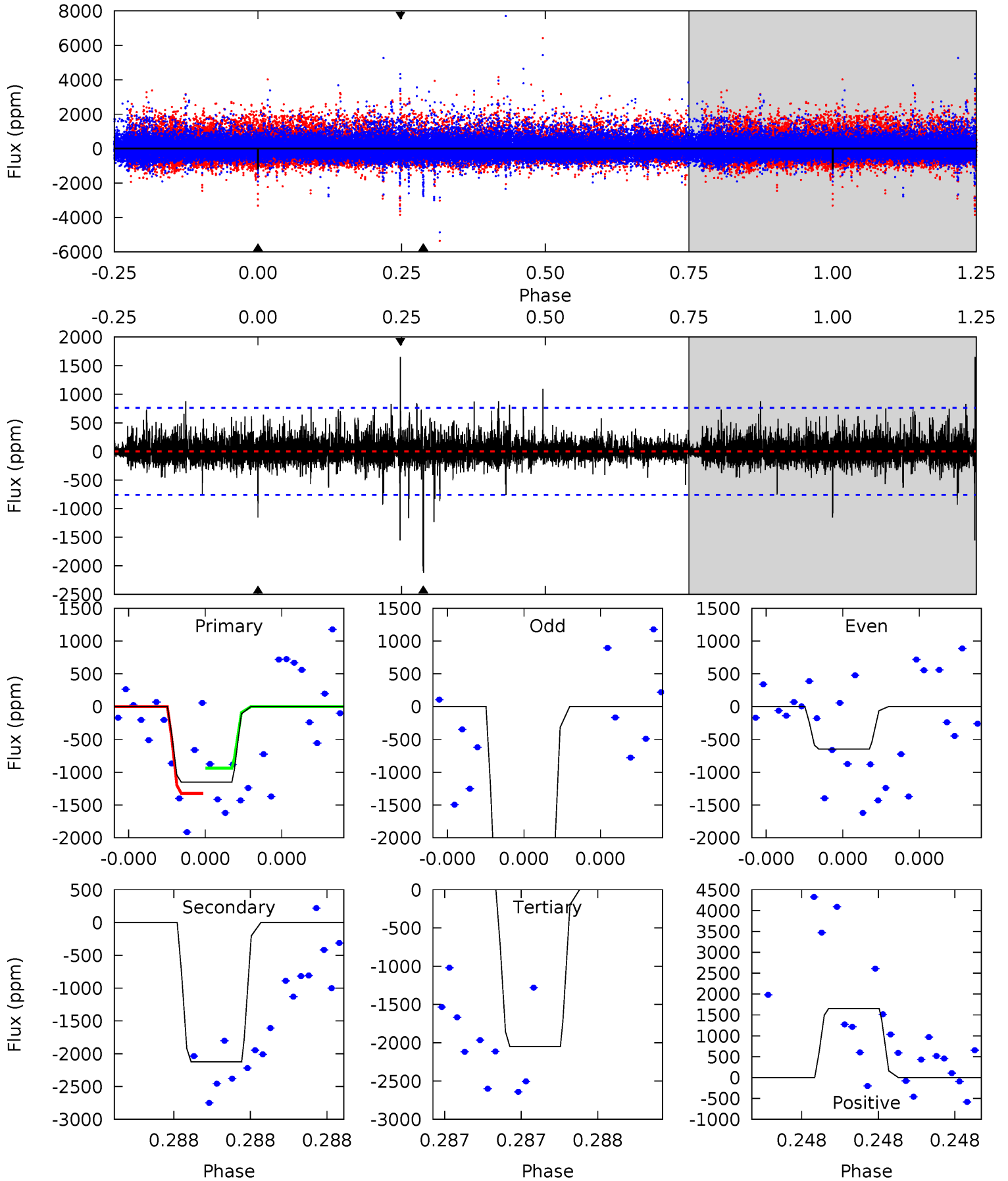
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.45	5.55	4.66	43.4	5.65	3.60	1.84	-0.22	-39.0	0.89	-37.9	0.01	0.94	0.89	0.51



# Alt Model-Shift Uniqueness Test

007939565-02, P = 635.449660 Days, E = 245.455809 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
8.62	15.9	15.3	12.3	5.69	3.65	1.14	-6.70	-3.73	0.55	3.52	9.03	1.53	0.44	1.45





### Stellar Parameters For KIC 007939565

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3295^{+42}_{-33}$	$5.062^{+0.044}_{-0.044}$	$-0.100^{+0.100}_{-0.100}$	$0.215^{+0.032}_{-0.023}$	$0.194^{+0.038}_{-0.025}$	$27.610^{+6.807}_{-5.953}$
	+1%/-1%	+1%/-1%	+100%/-100%	+15%/-11%	+20%/-13%	+25%/-22%
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 007939565-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1384 \pm 249$	$1.06^{+0.79}_{-0.67}$	$103^{+3}_{-2}$	$3113^{+1246}_{-429}$	$465292^{+3272033}_{-309777}$
Alt.	$-2121 \pm 134$	$1.14^{+0.81}_{-0.66}$	$103^{+2}_{-2}$	$3229^{+1083}_{-435}$	$618825^{+2871183}_{-404814}$

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

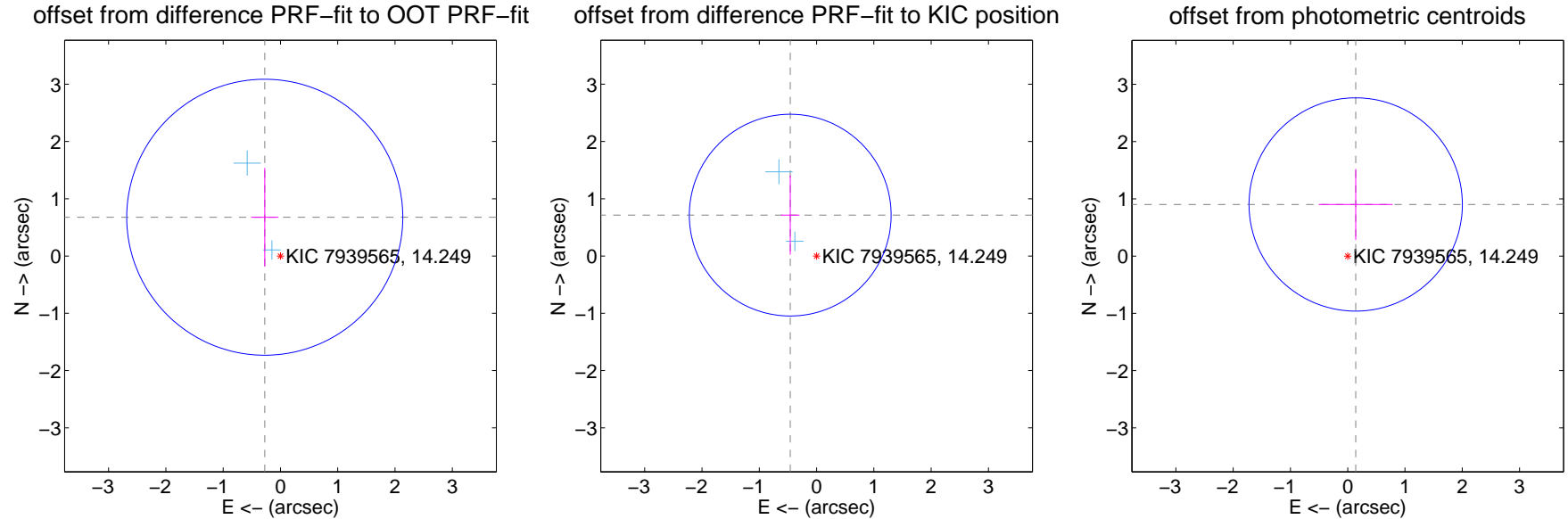
## DV Centroid Data

Supplemental centroid analysis for 007939565-02. Kepler magnitude: 14.25. Transit SNR 5.92

There are 2 quarters with good PRF difference image offsets

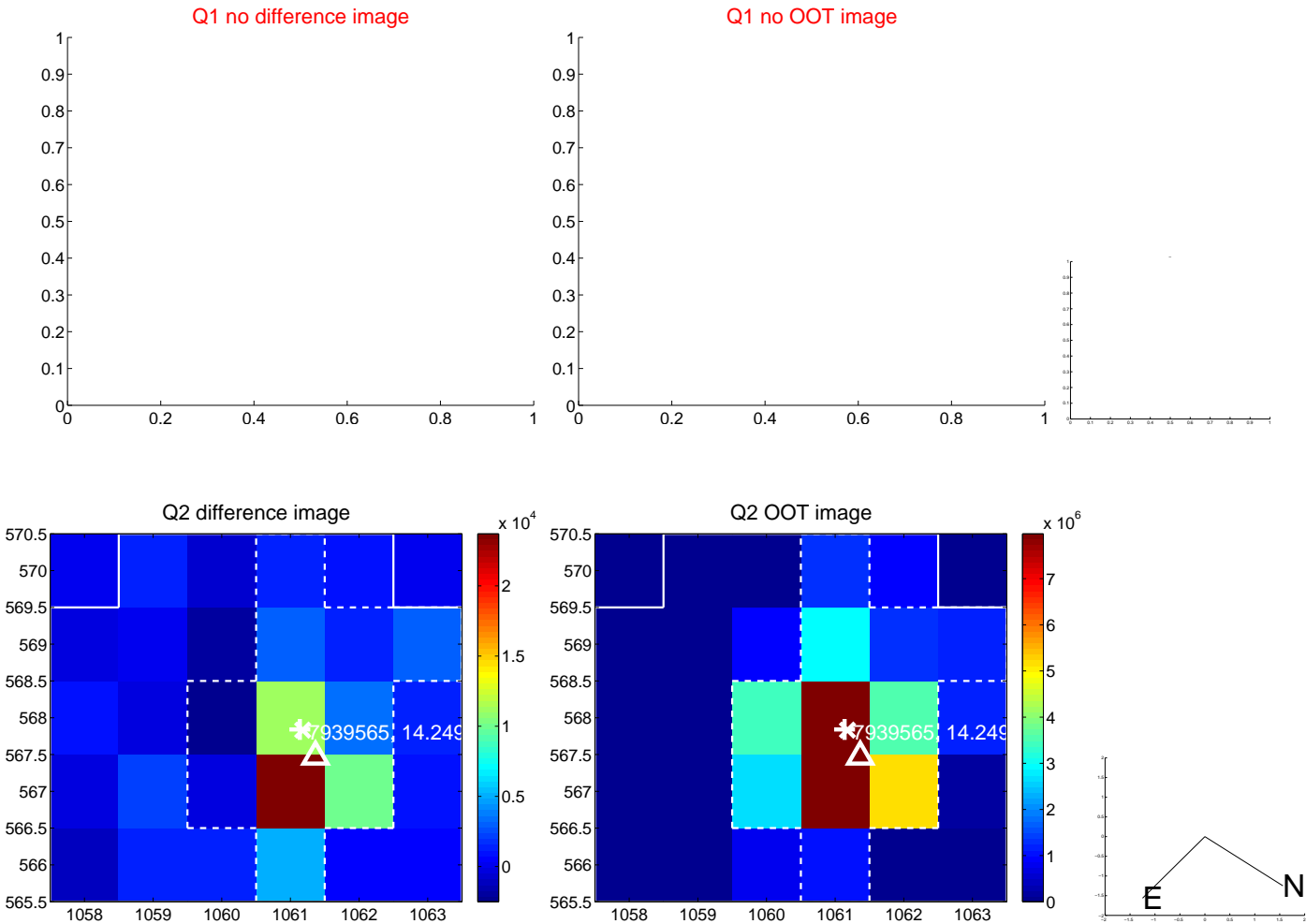
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.731 \pm 0.803$	0.91	$0.274 \pm 0.239$	$0.677 \pm 0.861$
PRF-fit source offset from KIC position	$0.849 \pm 0.587$	1.45	$0.460 \pm 0.162$	$0.714 \pm 0.690$
photometric centroid source offset	$0.91 \pm 0.62$	1.47	$-0.14 \pm 0.65$	$0.90 \pm 0.62$



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.

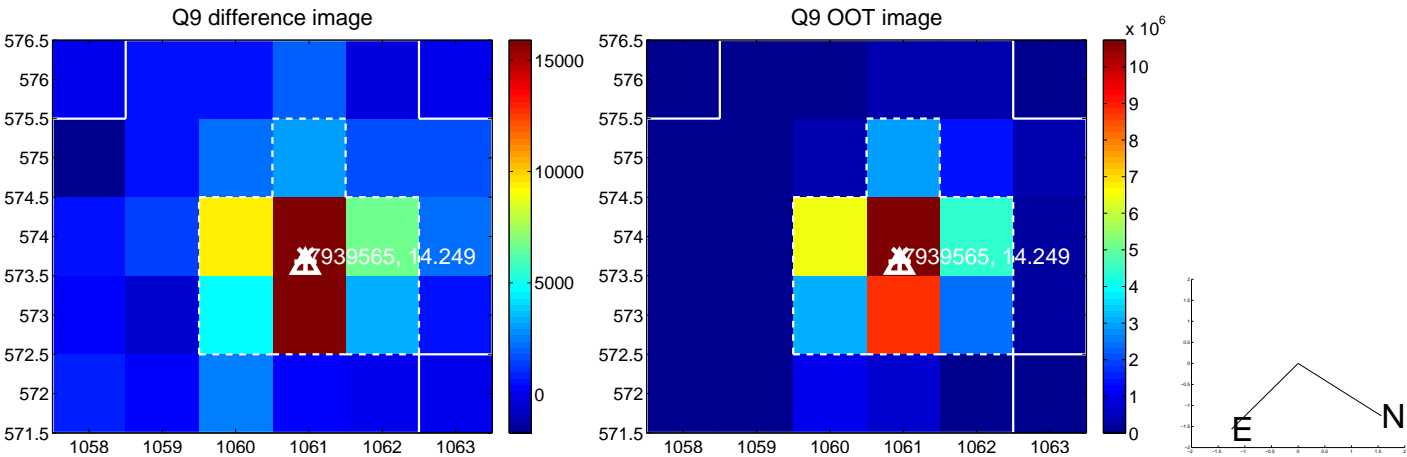
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



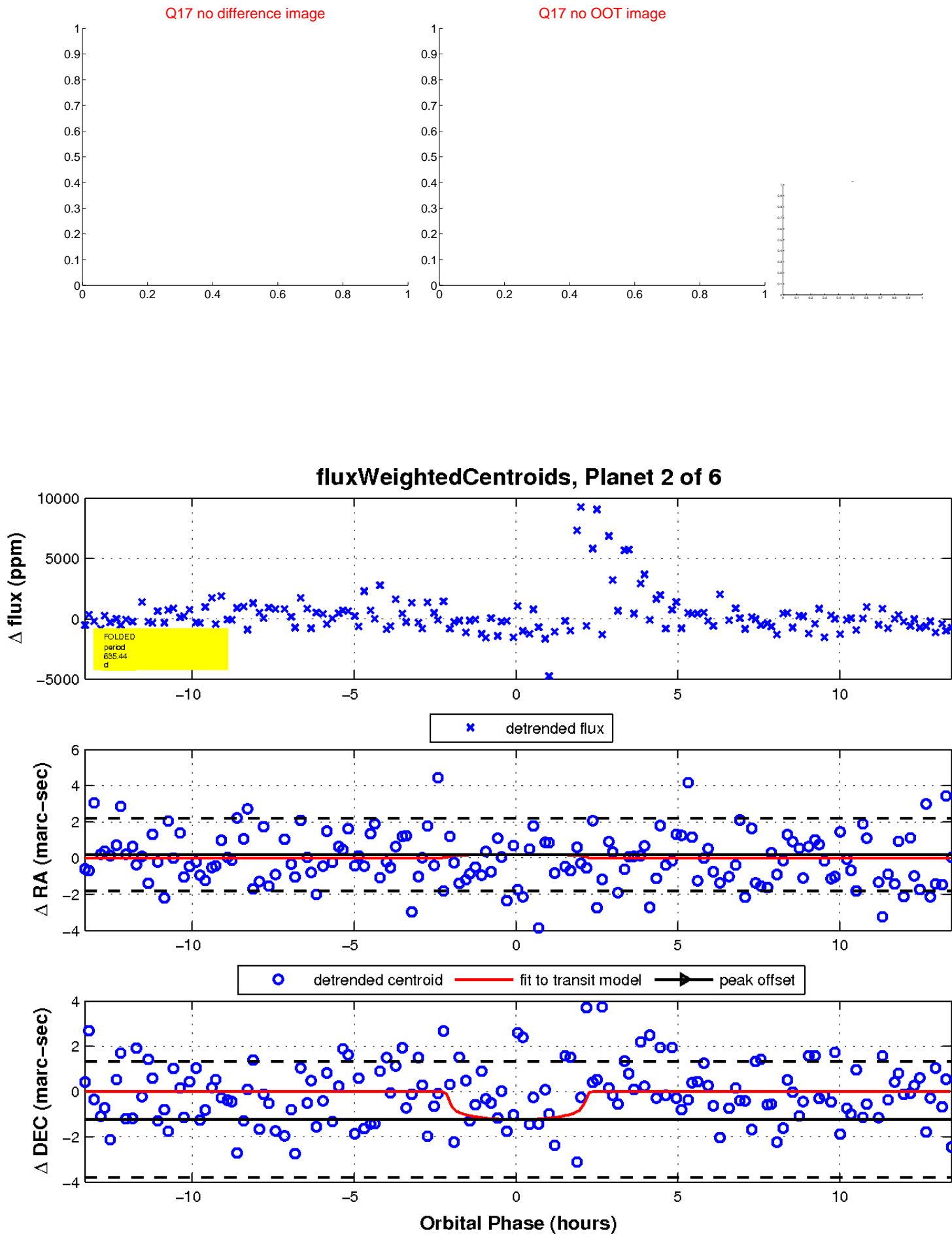
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



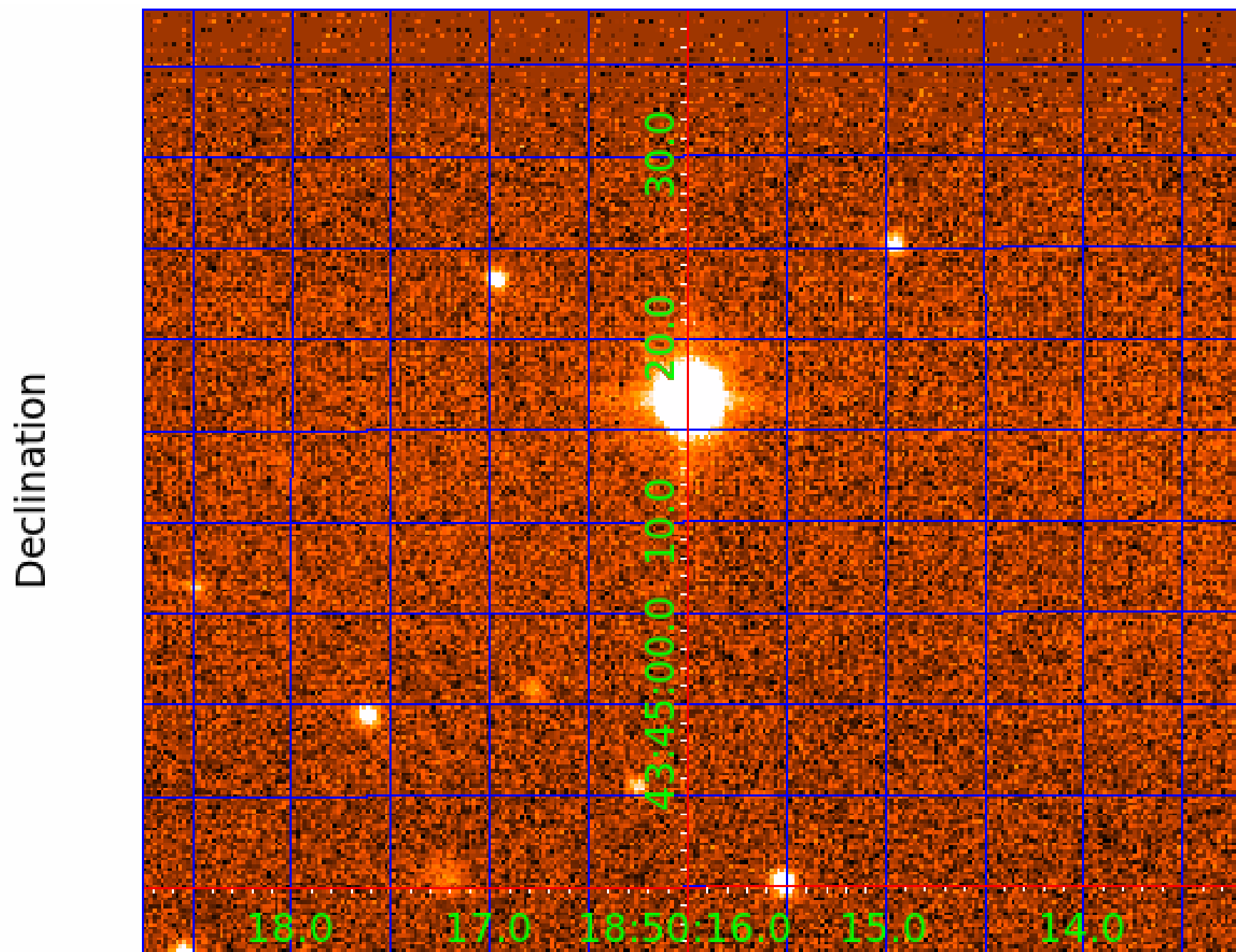
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 007939565

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007939565-01	OBS	No	344.012806	340.200312	1099.7	7.969	20.0	4.6	0.21	3295	0.71	0.02
007939565-02	OBS	No	635.435308	245.485049	1629.6	4.492	13.9	5.9	0.21	3295	0.90	0.01
007939565-03	OBS	No	562.940692	215.165497	2009.3	4.039	12.5	6.7	0.21	3295	0.96	0.01
007939565-04	OBS	No	461.985936	464.924425	1965.5	5.788	12.3	8.0	0.21	3295	0.94	0.01
007939565-05	OBS	No	478.436667	495.580905	2302.3	4.076	11.2	8.3	0.21	3295	1.04	0.01
007939565-06	OBS	No	262.612113	373.917722	726.3	5.000	10.2	-1.0	0.21	3295	0.57	0.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007939565-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—INCONSISTENT_TRANS
007939565-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
007939565-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
007939565-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

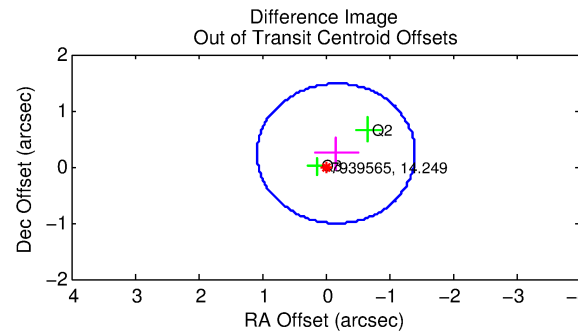
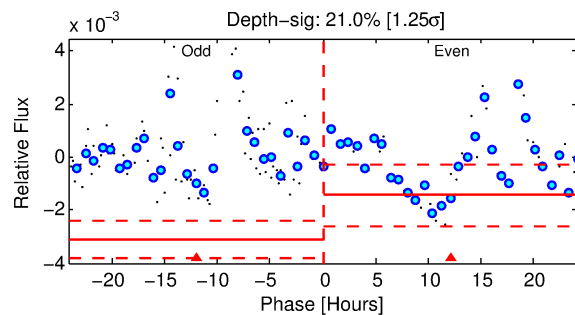
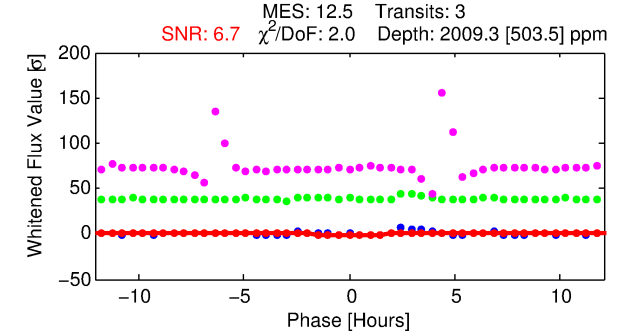
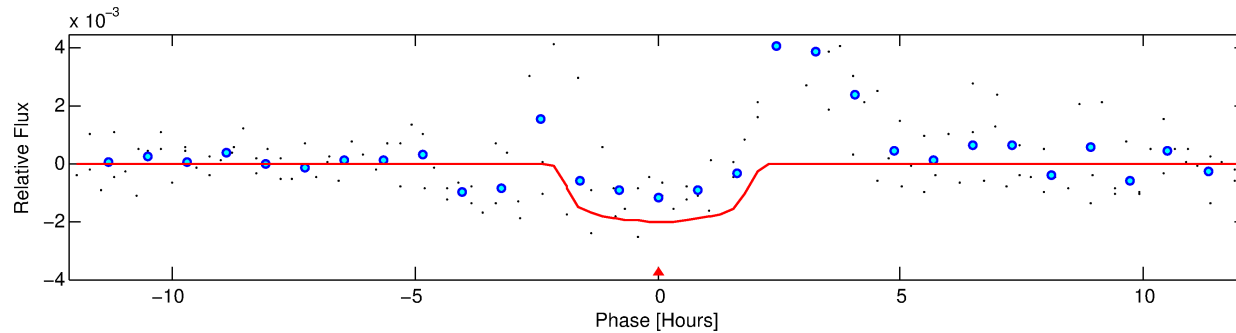
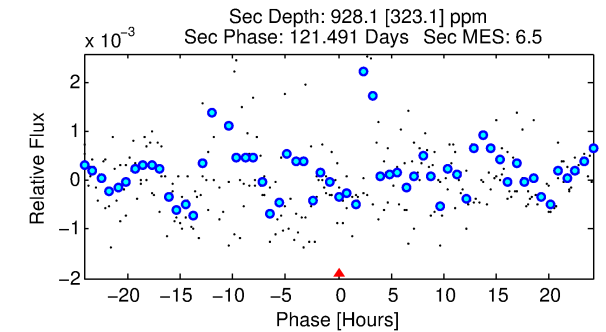
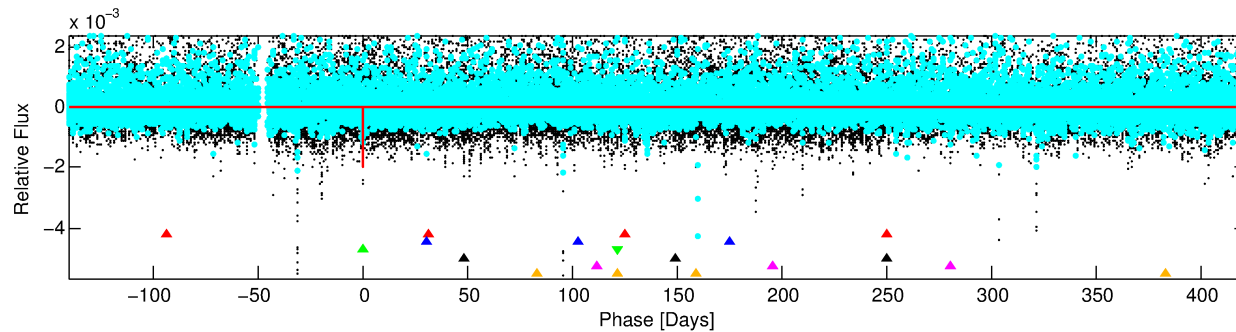
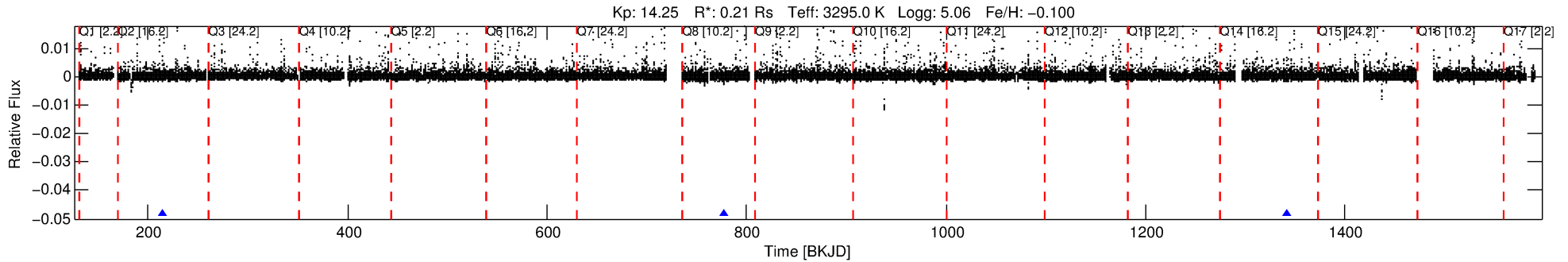
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007939565-03

No Significant Match Found

# DV One-Page Summary

KIC: 7939565 Candidate: 3 of 6 Period: 562.941 d



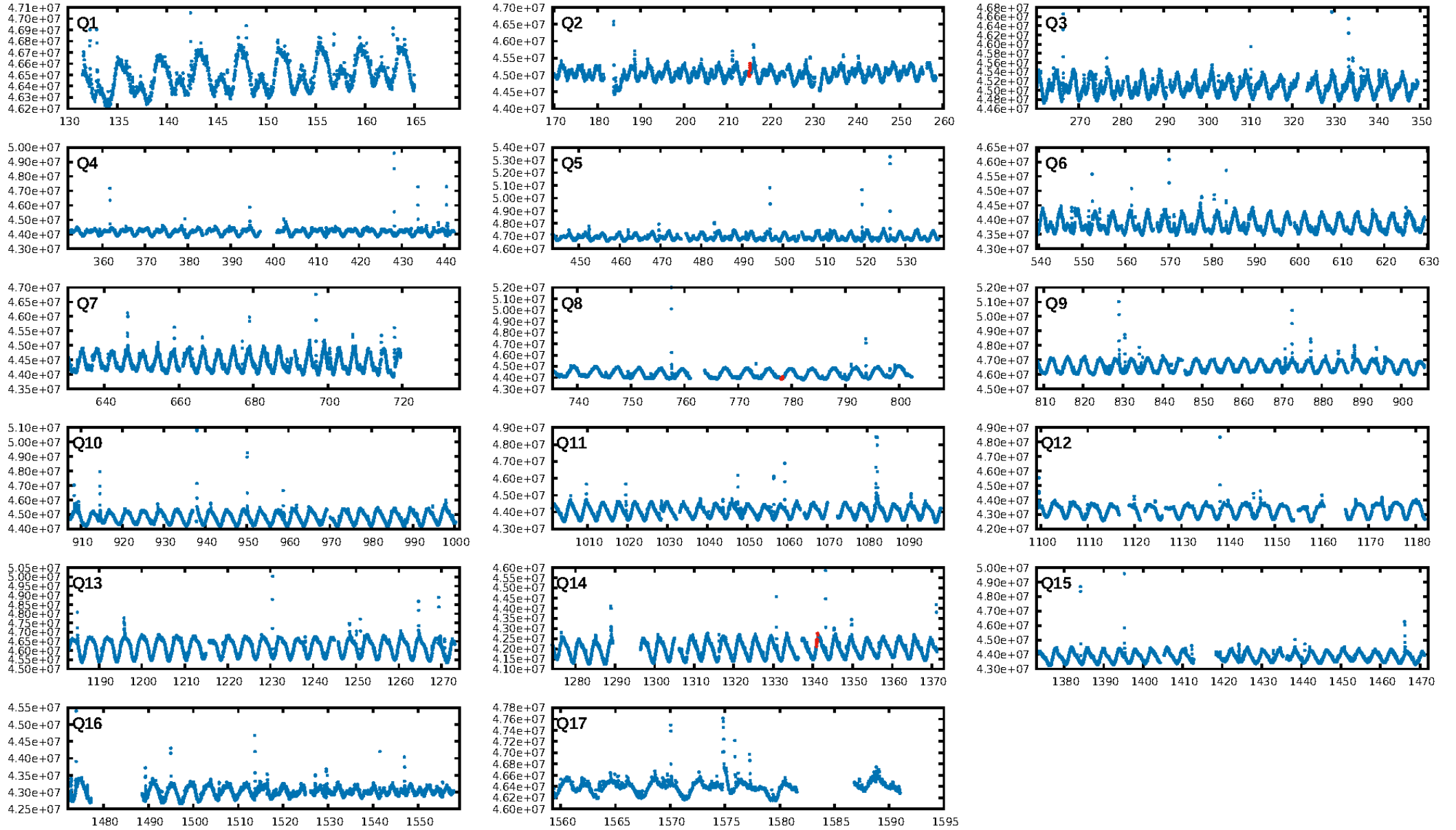
## DV Fit Results:

Period = 562.94069 [0.00728] d  
Epoch = 215.1655 [0.0097] BKJD  
Rp/R\* = 0.0408 [0.0909]  
a/R\* = 1092.70 [10793.94]  
b = 0.17 [55.27]  
Seff = 0.01 [0.00]  
Teff = 77 [2] K  
Rp = 0.96 [2.14] Re  
a = 0.7732 [0.0810] AU  
Ag = 333722.16 [1493705.66] [0.22σ]  
Teffp = 2848 [3186] K [0.87σ]

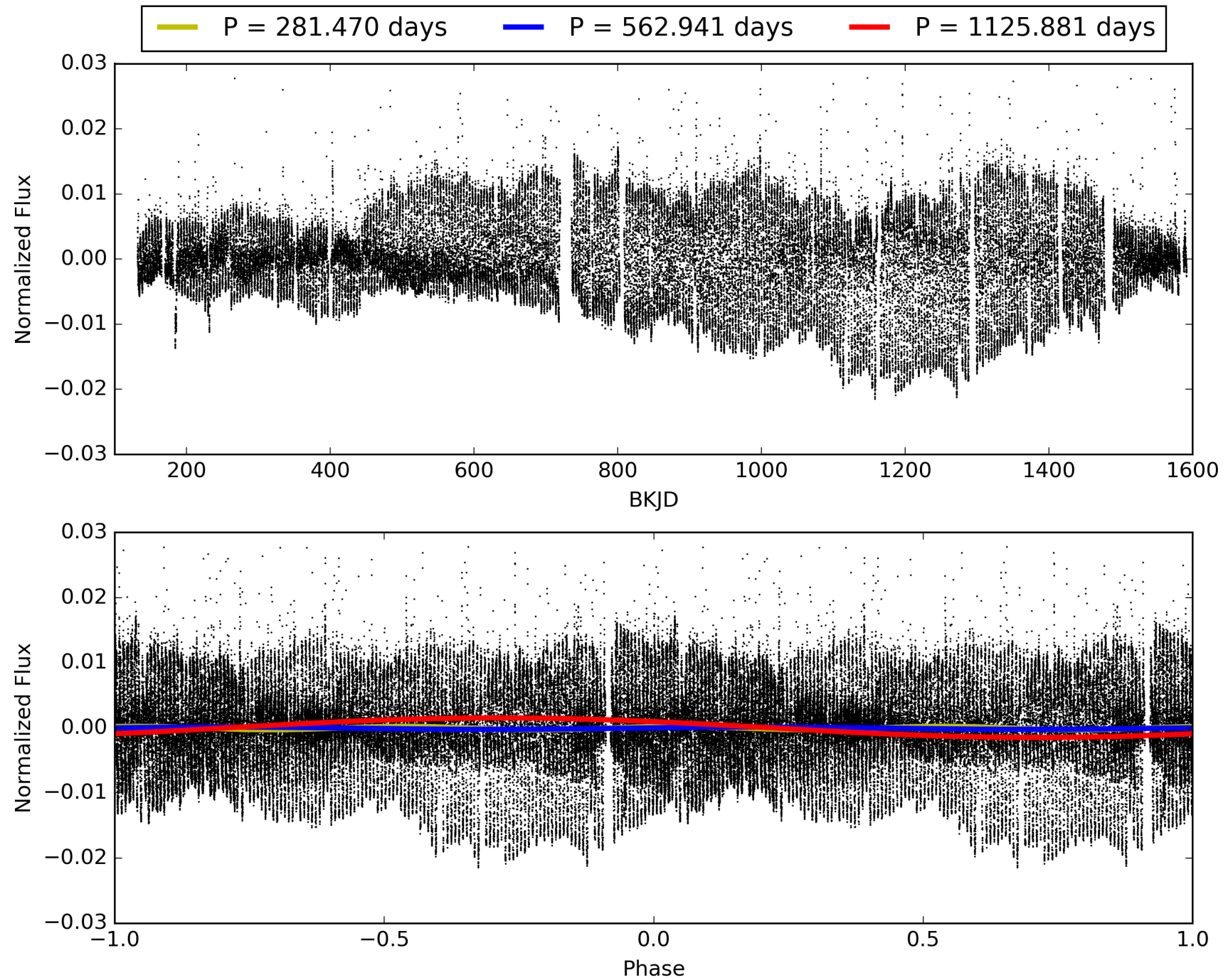
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [353.45σ]  
LongPeriod-sig: 100.0% [288.05σ]  
ModelChiSquare2-sig: 29.7%  
ModelChiSquareGof-sig: 23.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -17.71  
Centroid-sig: 44.9%  
Centroid-so: 0.467 arcsec [0.92σ]  
OotOffset-rm: 0.287 arcsec [0.69σ]  
OotOffset-st: 1/0/1/0 [2]  
KicOffset-rm: 0.300 arcsec [1.10σ]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 007939565-03, PDC Light Curves

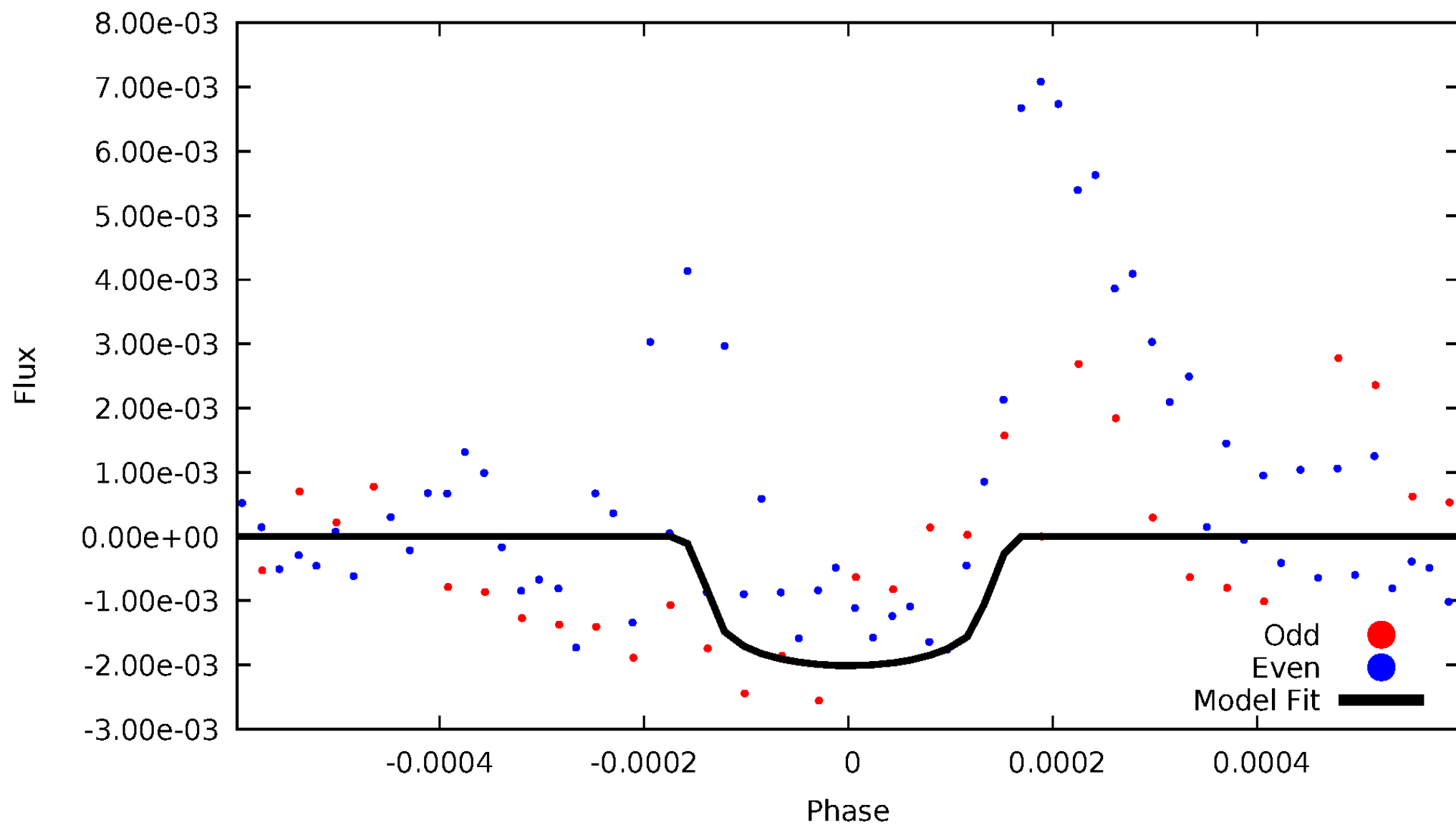


TCE 007939565-03



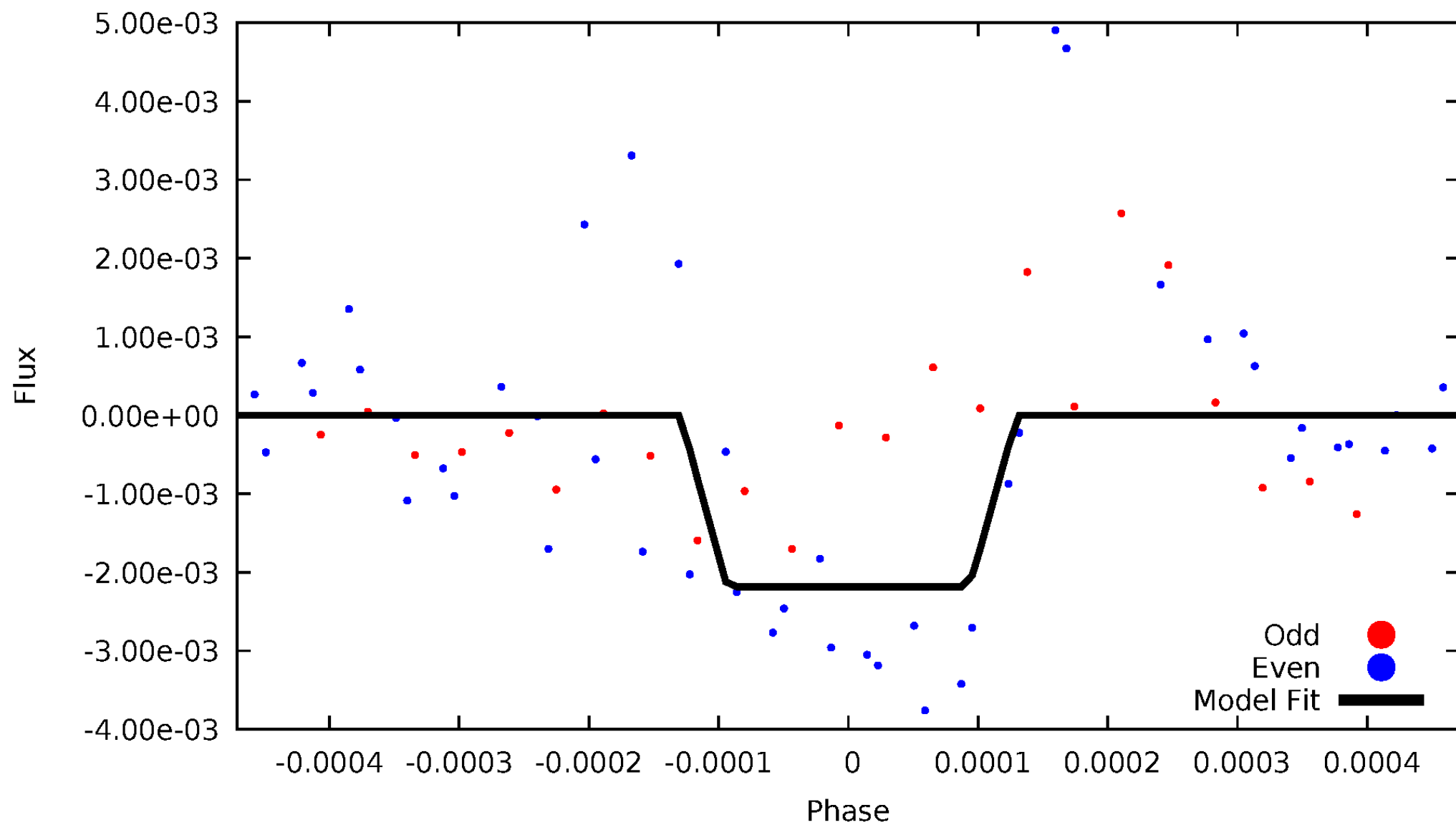
# DV Odd/Even

TCE 007939565-03



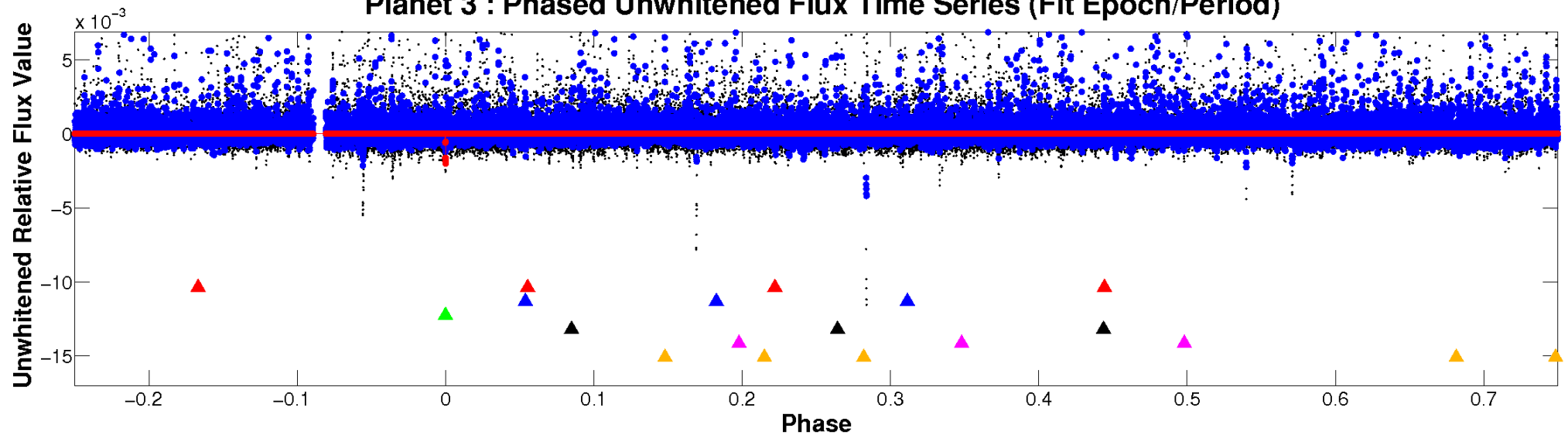
# ALT Odd/Even

TCE 007939565-03

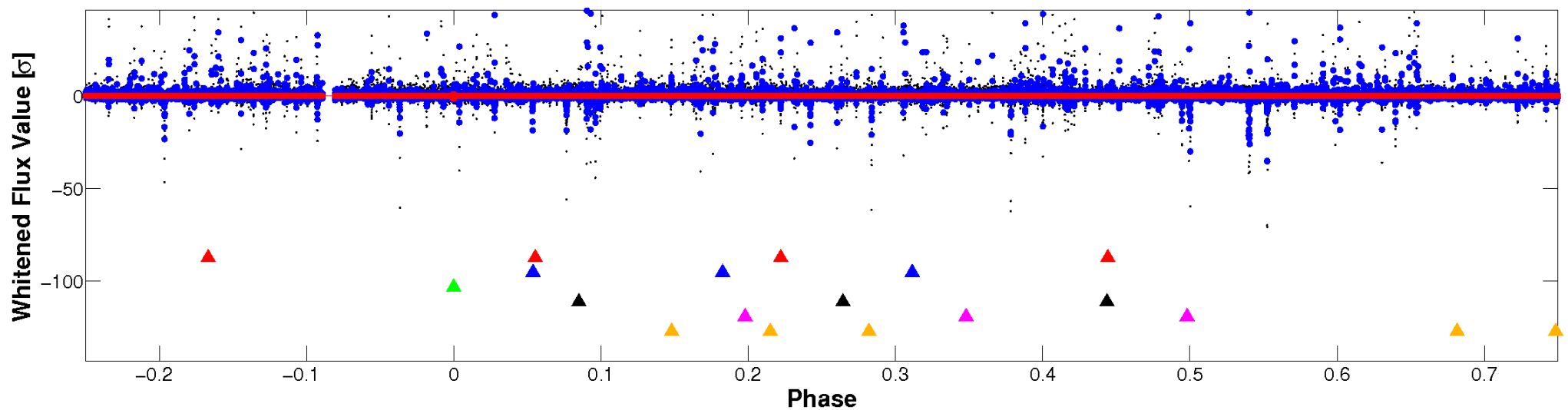


# Non-Whitened Vs. Whitened Light Curve

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

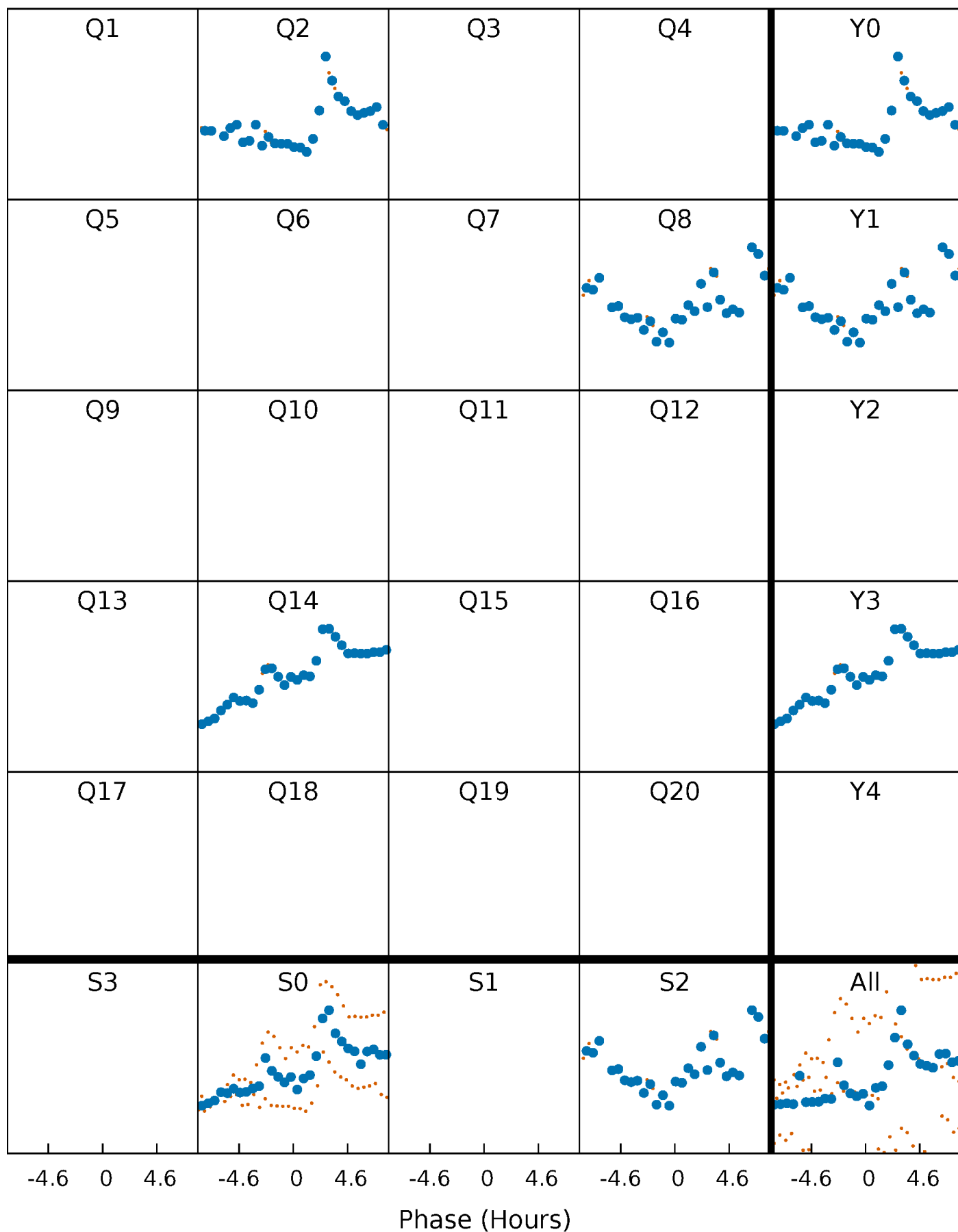


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

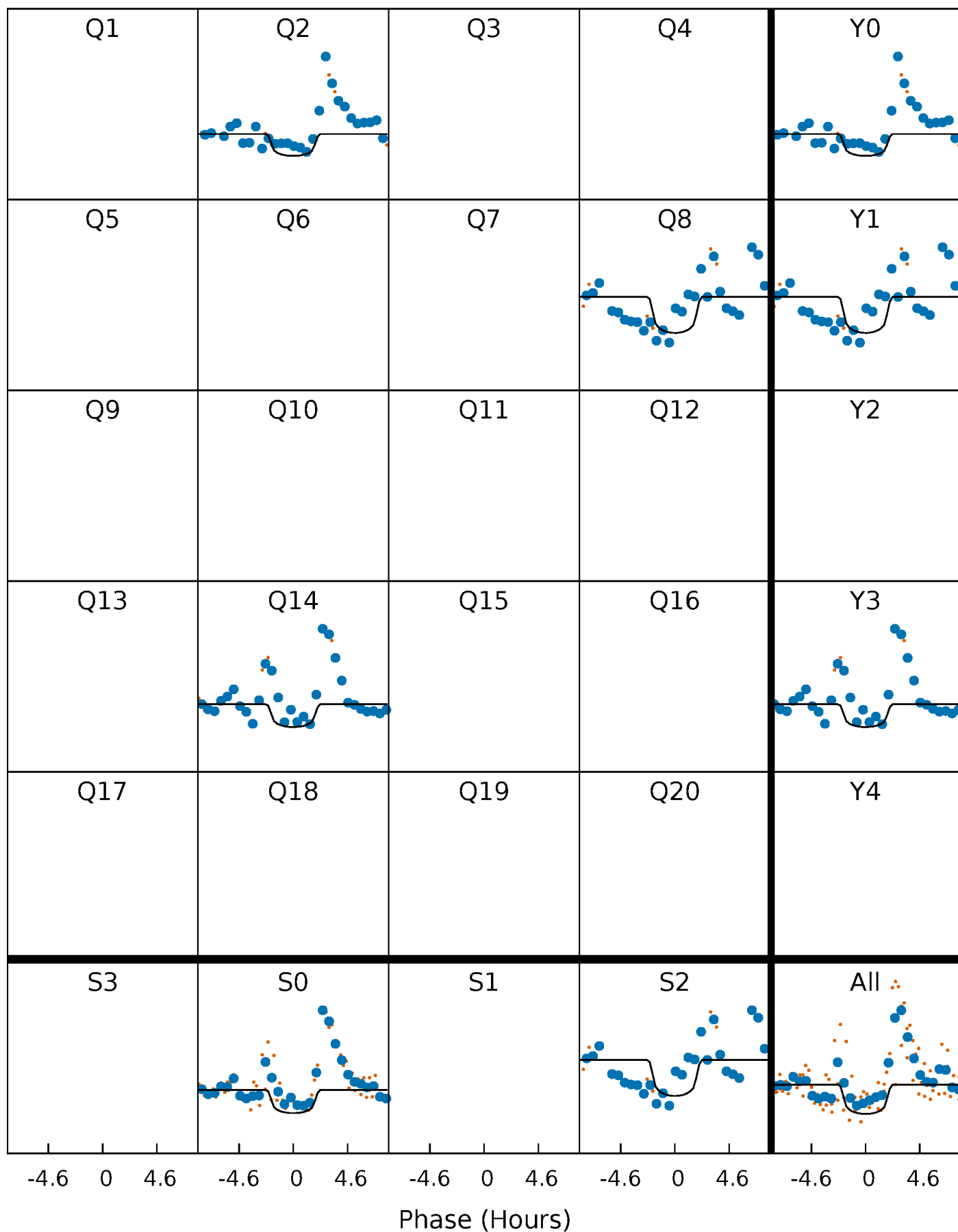
TCE 007939565-03 P=562.940692 Days  $T_0=215.165497$  (BKJD)





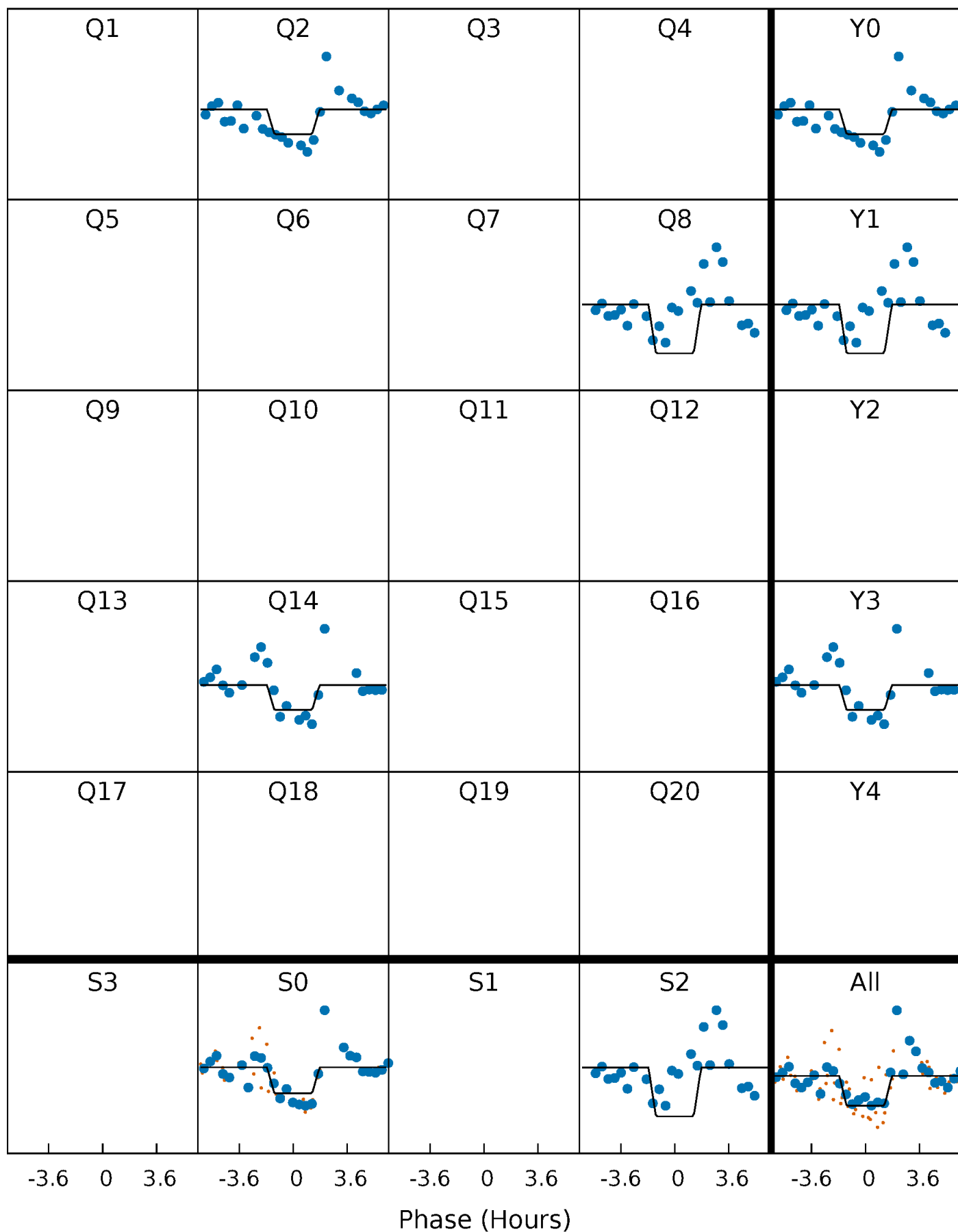
# DV Quarter-Phased Transit Curves

TCE 007939565-03 P=562.940692 Days  $T_0=215.165497$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

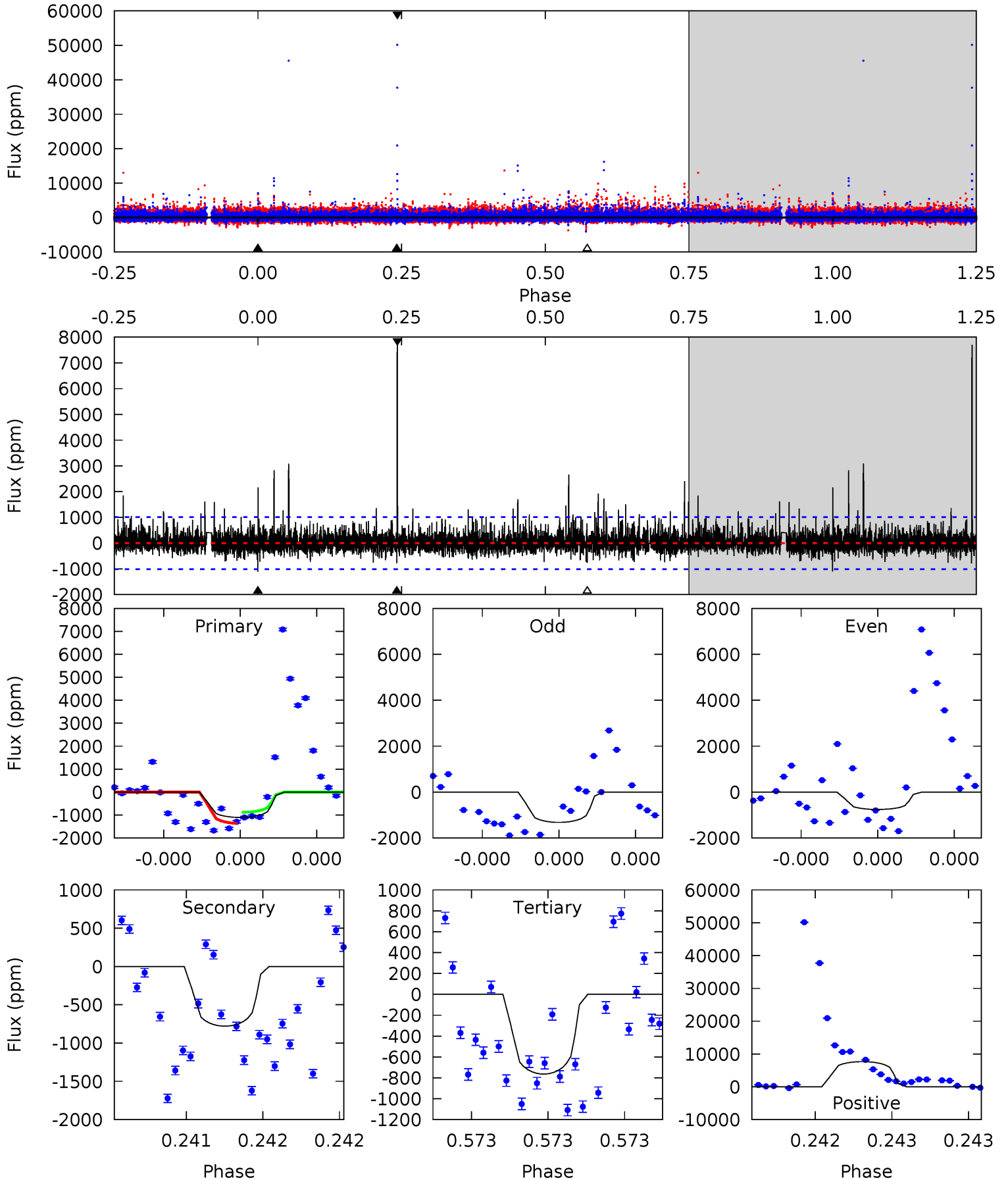
TCE 007939565-03 P=562.937767 Days  $T_0=215.176772$  (BKJD)



# DV Model-Shift Uniqueness Test

007939565-03, P = 562.940692 Days, E = 215.165497 Days

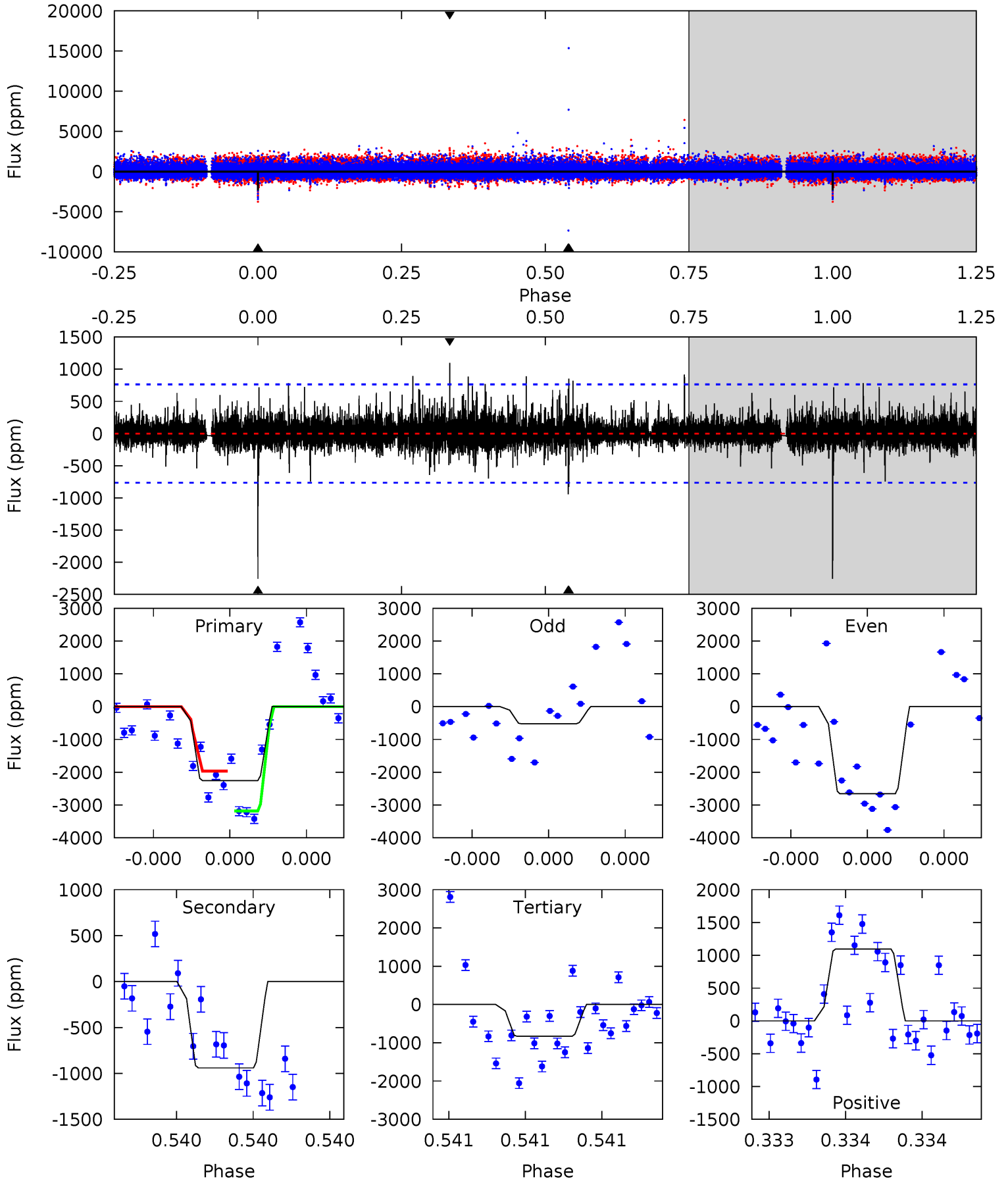
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.17	4.34	4.26	42.7	5.65	3.59	1.76	1.91	-36.6	0.09	-38.4	0.66	0.88	0.87	1.35



# Alt Model-Shift Uniqueness Test

007939565-03, P = 562.937767 Days, E = 215.176772 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
16.8	7.00	6.17	8.17	5.70	3.67	1.07	10.6	8.62	0.83	-1.17	7.38	0.82	0.33	4.24



### Stellar Parameters For KIC 007939565

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3295^{+42}_{-33}$	$5.062^{+0.044}_{-0.044}$	$-0.100^{+0.100}_{-0.100}$	$0.215^{+0.032}_{-0.023}$	$0.194^{+0.038}_{-0.025}$	$27.610^{+6.807}_{-5.953}$
	+1%/-1%	+1%/-1%	+100%/-100%	+15%/-11%	+20%/-13%	+25%/-22%
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 007939565-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-779 \pm 179$	$1.78^{+1.81}_{-1.24}$	$107^{+3}_{-2}$	$2517^{+975}_{-383}$	$79887^{+787145}_{-60701}$
Alt.	$-940 \pm 134$	$1.81^{+1.99}_{-1.18}$	$107^{+2}_{-3}$	$2553^{+925}_{-398}$	$88418^{+728776}_{-66940}$

$T_{\text{max}}$  = 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

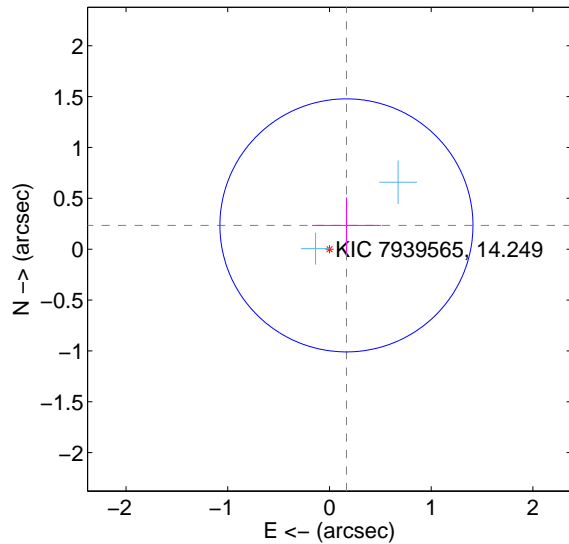
Supplemental centroid analysis for 007939565-03. Kepler magnitude: 14.25. Transit SNR 6.74

There are 2 quarters with good PRF difference image offsets

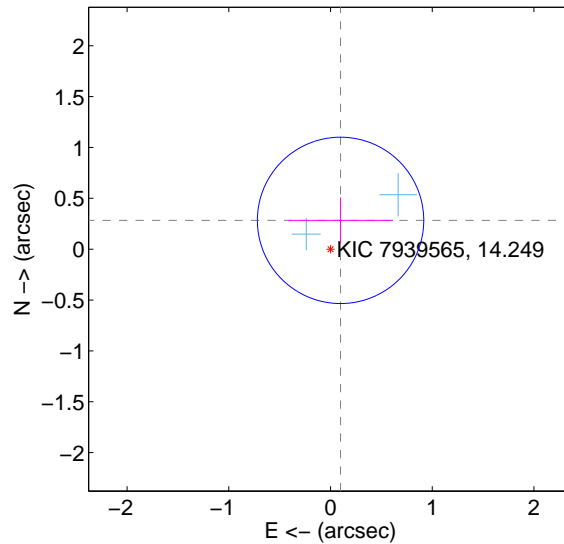
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.287 \pm 0.415$	0.69	$-0.167 \pm 0.338$	$0.234 \pm 0.275$
PRF-fit source offset from KIC position	$0.300 \pm 0.273$	1.10	$-0.099 \pm 0.515$	$0.283 \pm 0.226$
photometric centroid source offset	$0.47 \pm 0.50$	0.92	$-0.07 \pm 0.48$	$0.46 \pm 0.51$

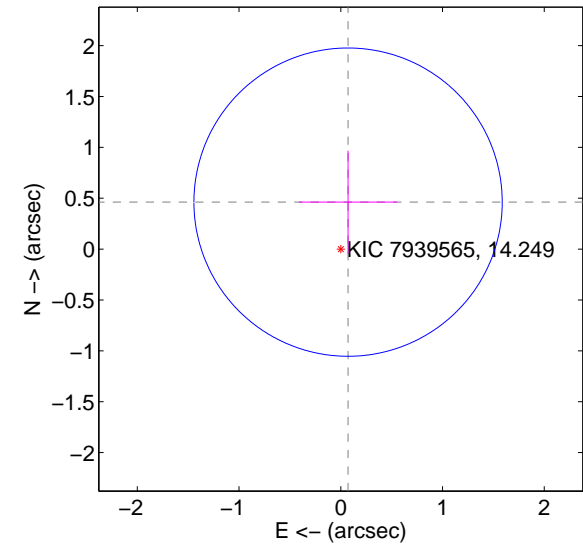
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

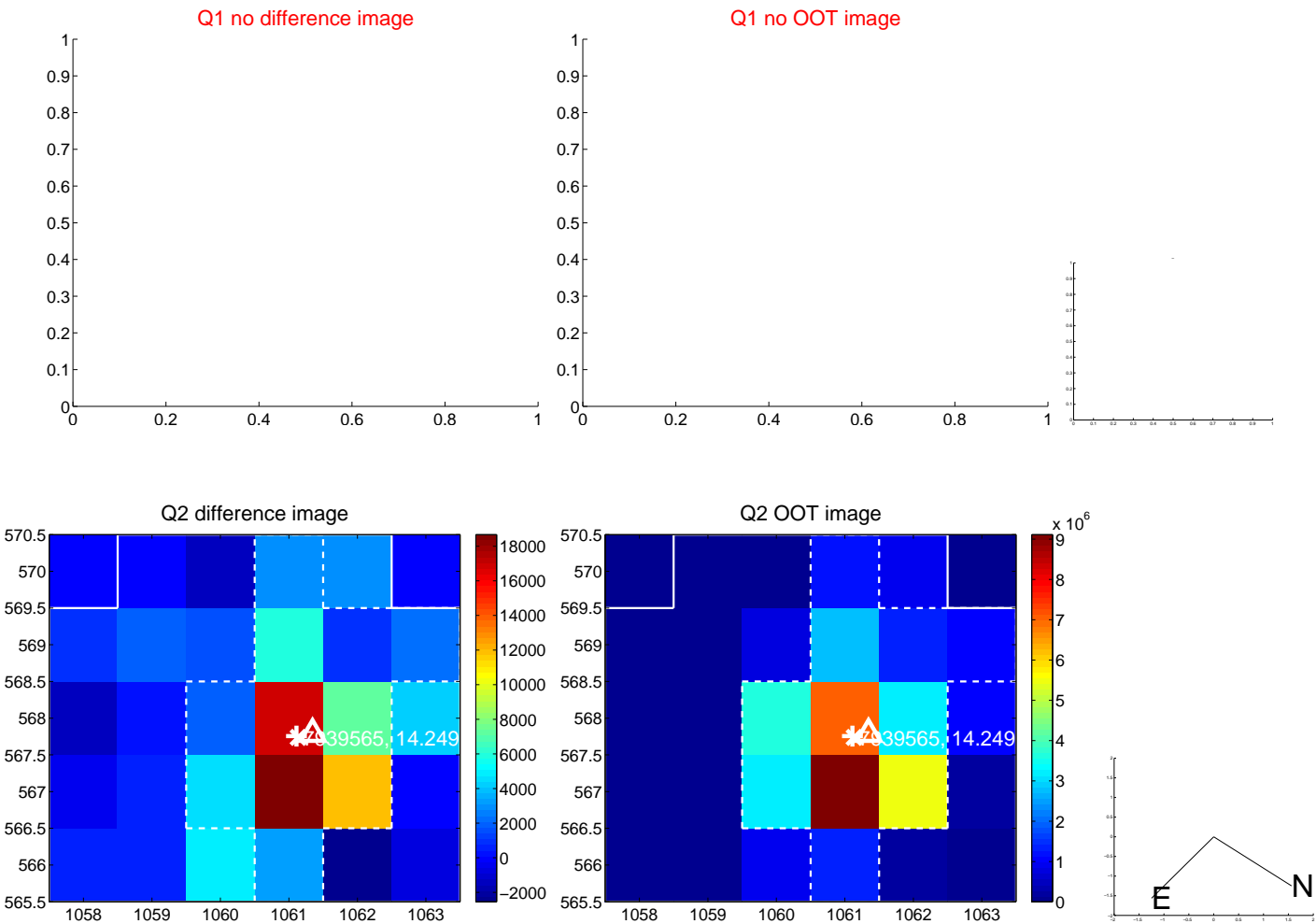


offset from photometric centroids

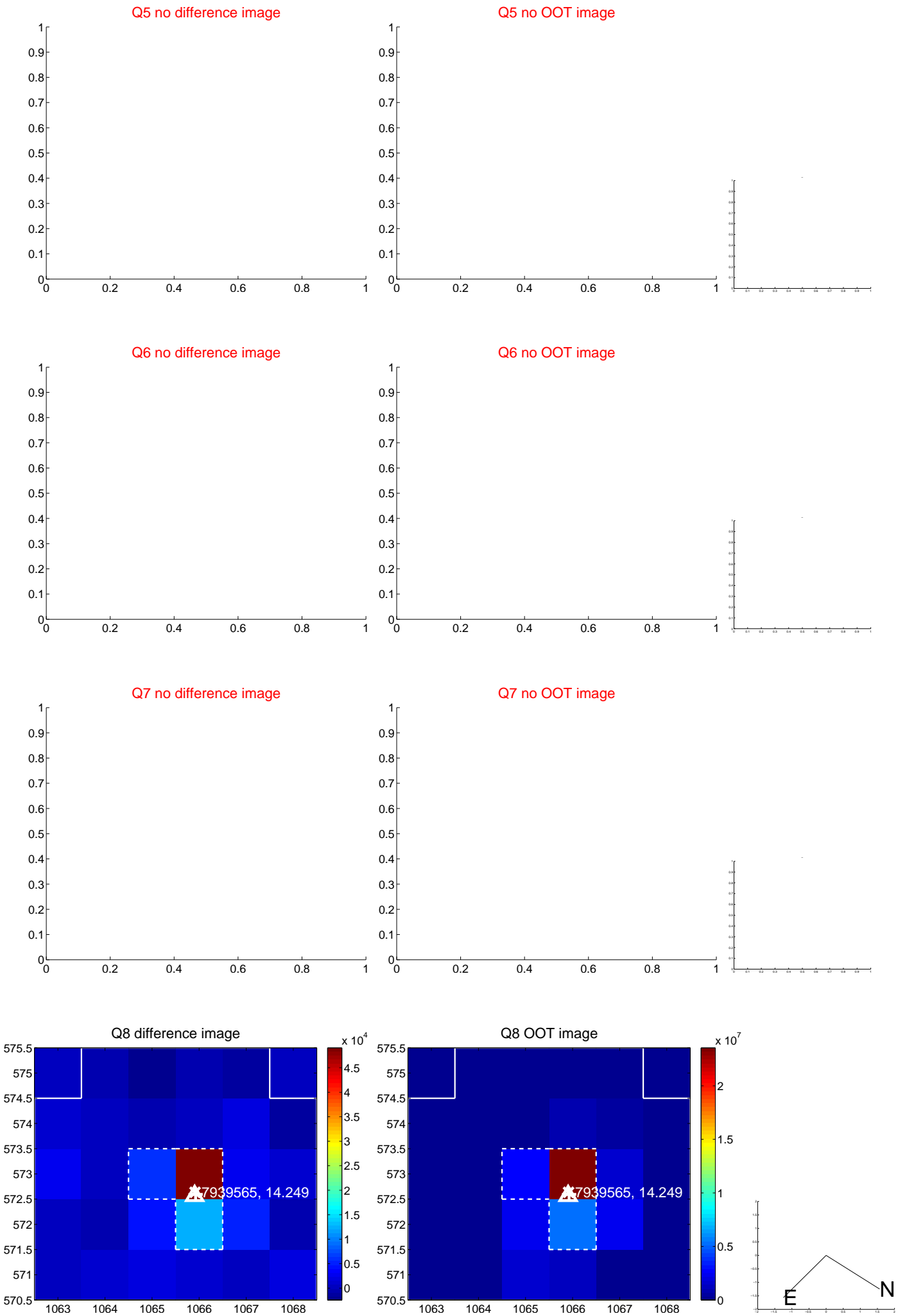


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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

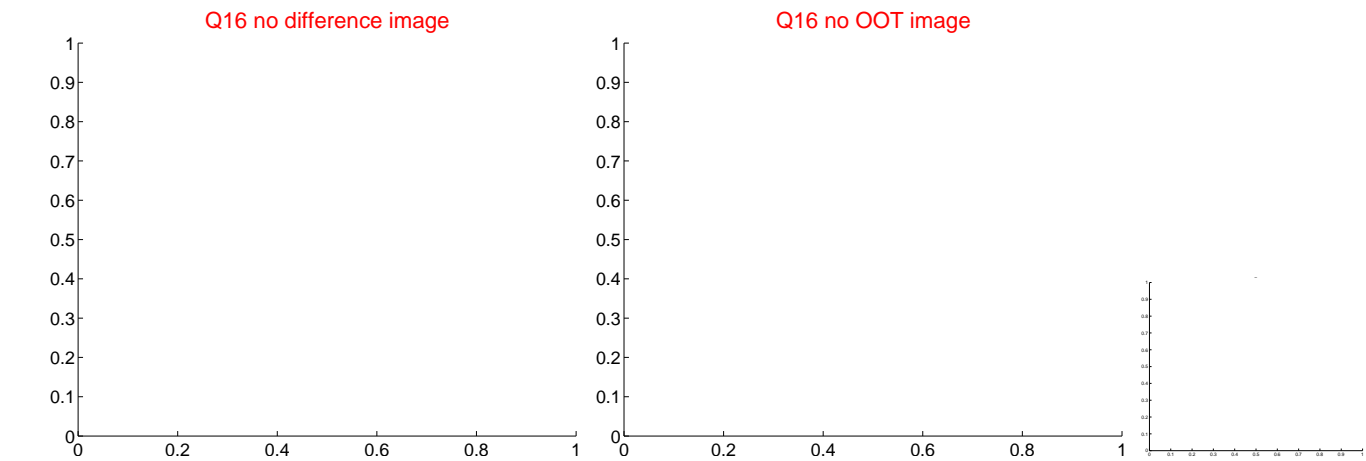
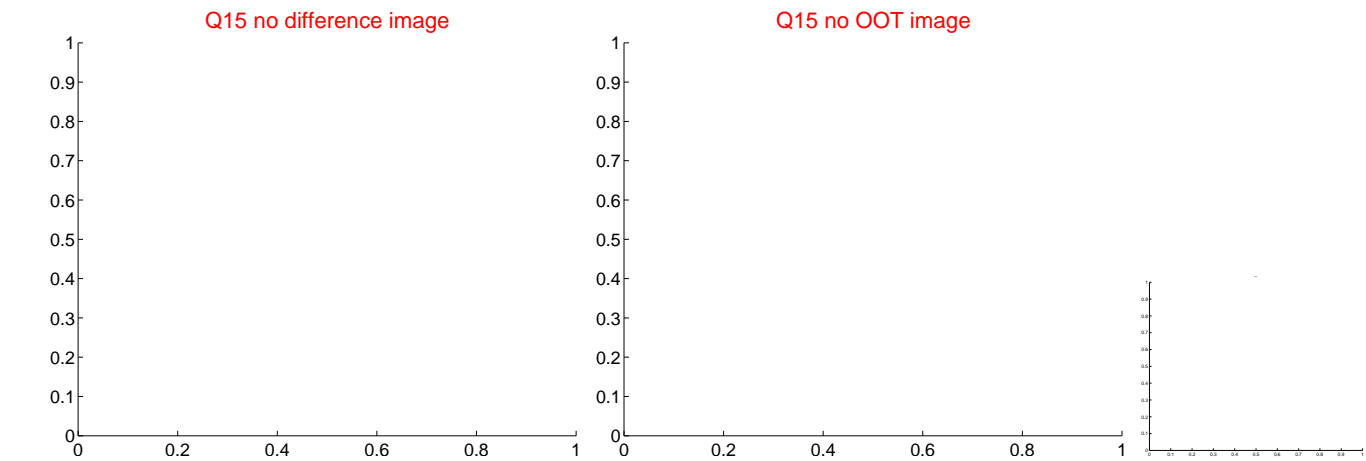
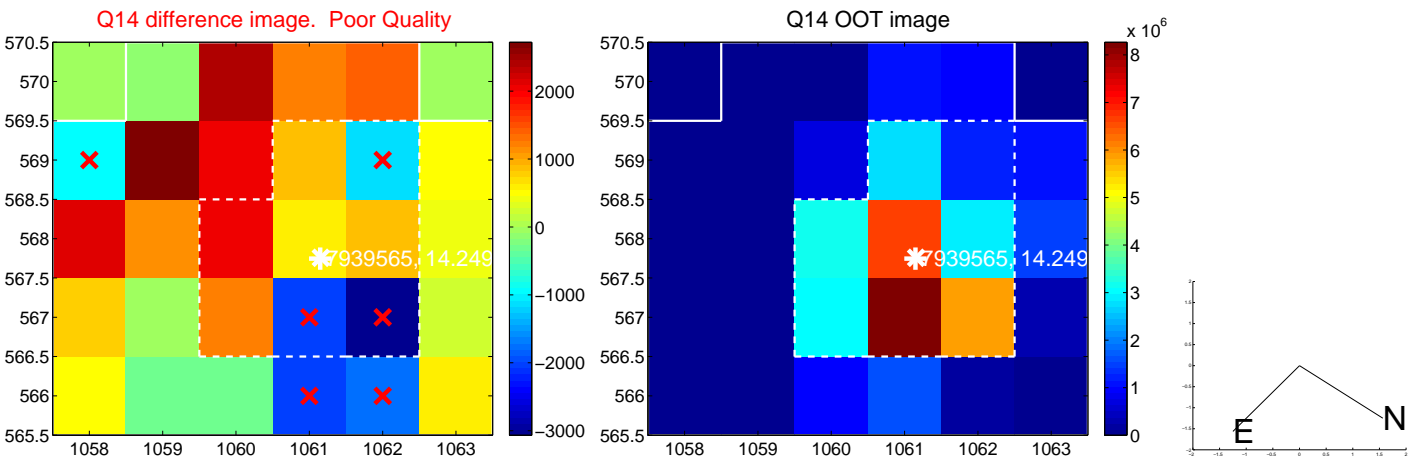
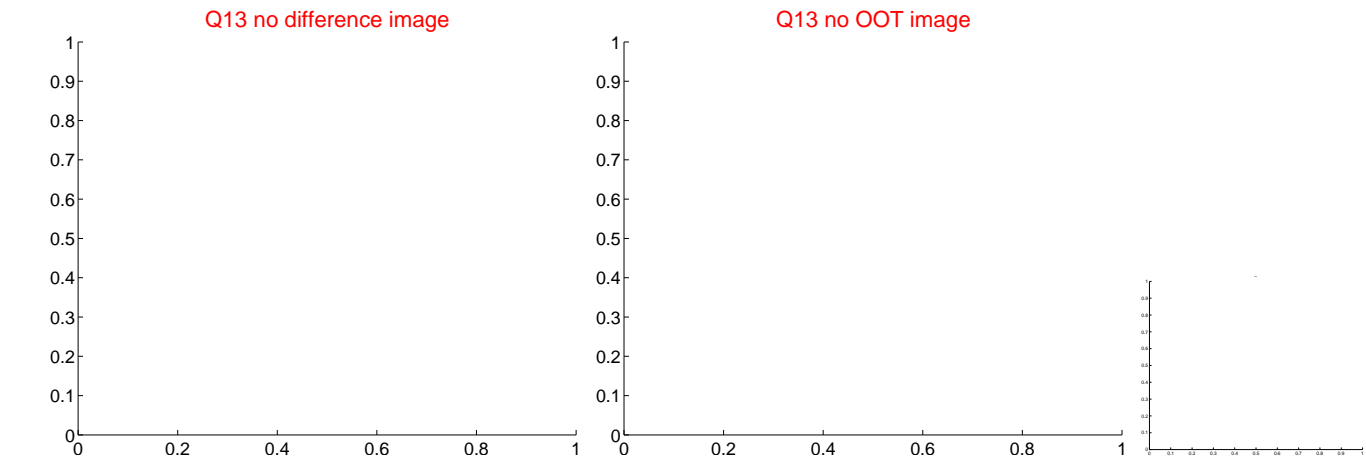




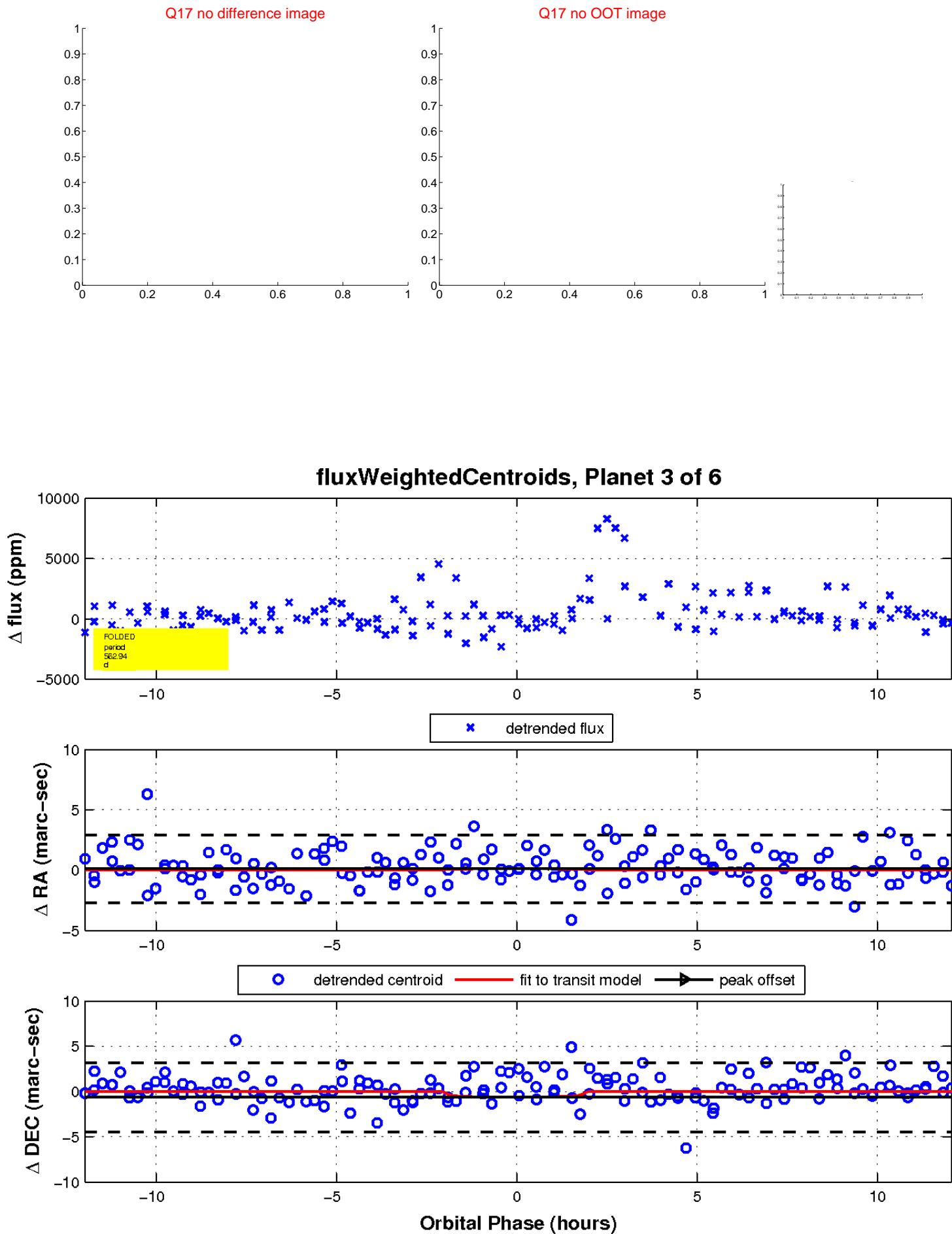
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



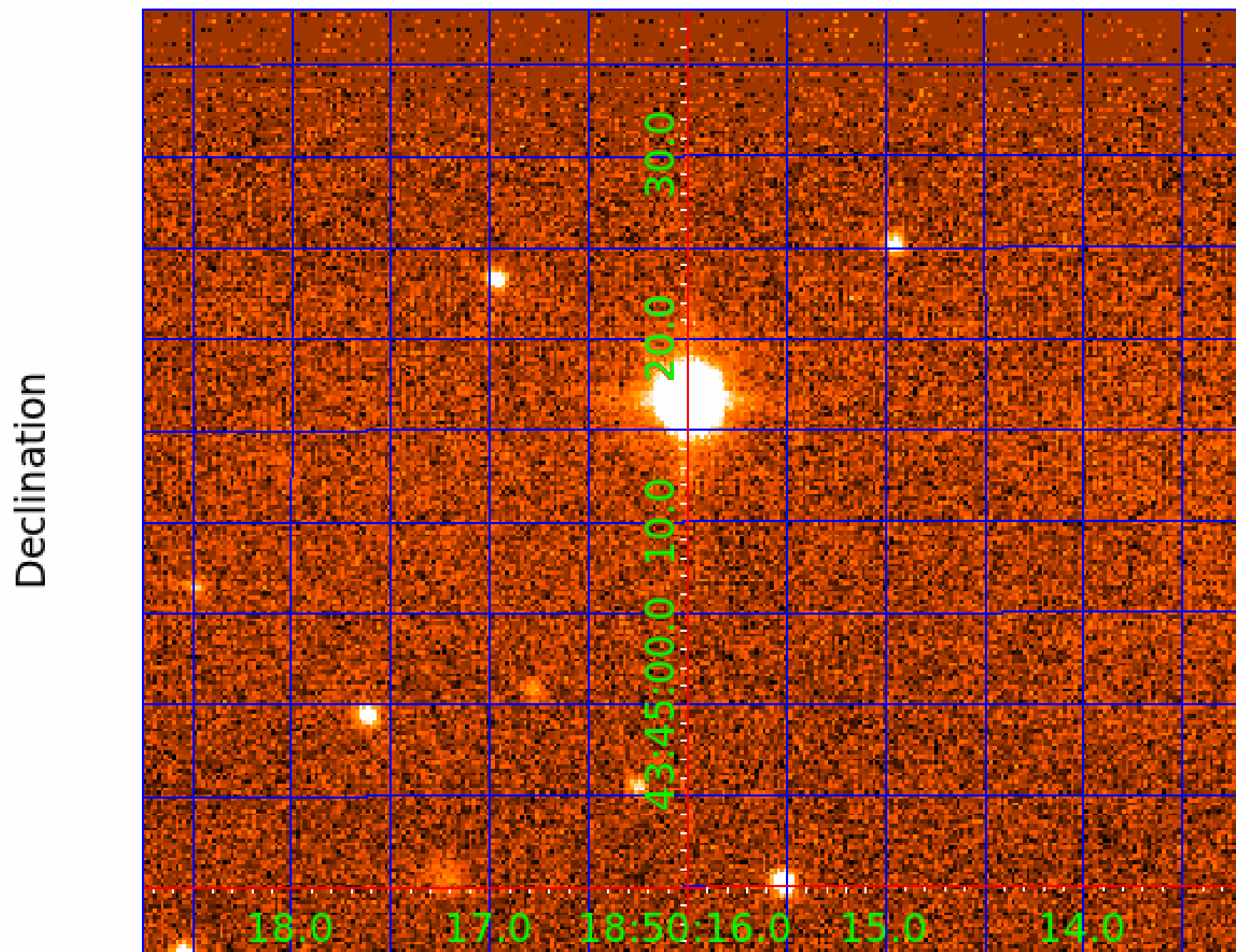
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 007939565

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007939565-01	OBS	No	344.012806	340.200312	1099.7	7.969	20.0	4.6	0.21	3295	0.71	0.02
007939565-02	OBS	No	635.435308	245.485049	1629.6	4.492	13.9	5.9	0.21	3295	0.90	0.01
007939565-03	OBS	No	562.940692	215.165497	2009.3	4.039	12.5	6.7	0.21	3295	0.96	0.01
007939565-04	OBS	No	461.985936	464.924425	1965.5	5.788	12.3	8.0	0.21	3295	0.94	0.01
007939565-05	OBS	No	478.436667	495.580905	2302.3	4.076	11.2	8.3	0.21	3295	1.04	0.01
007939565-06	OBS	No	262.612113	373.917722	726.3	5.000	10.2	-1.0	0.21	3295	0.57	0.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007939565-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—INCONSISTENT_TRANS
007939565-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
007939565-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
007939565-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

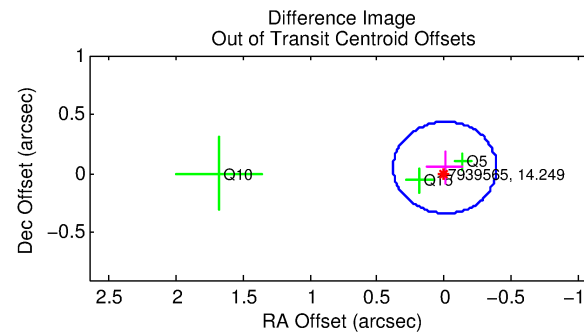
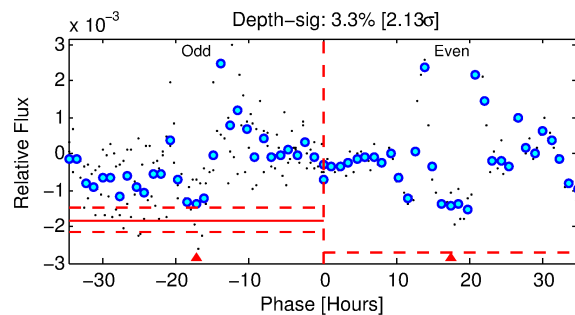
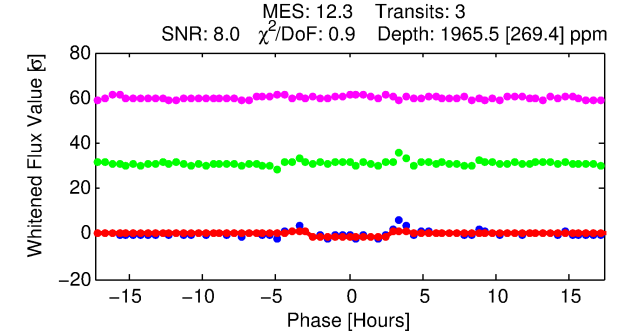
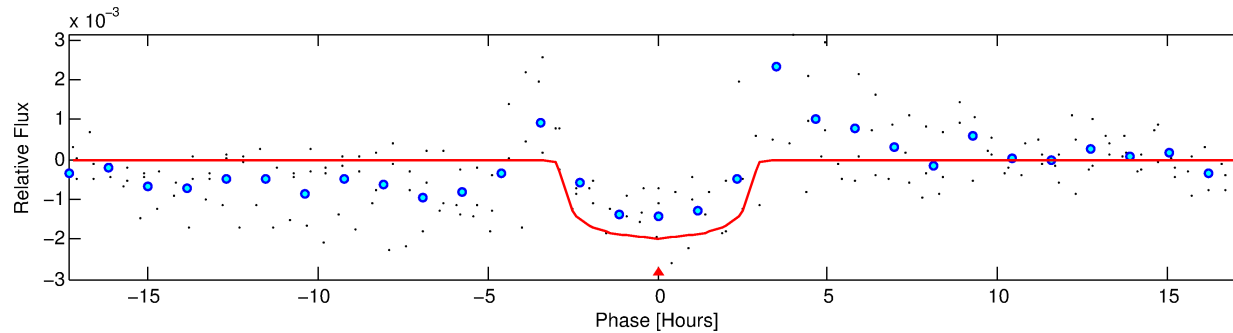
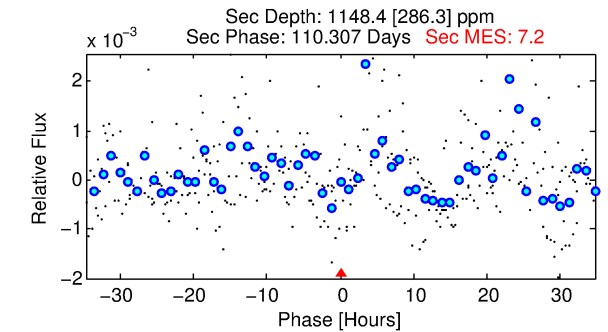
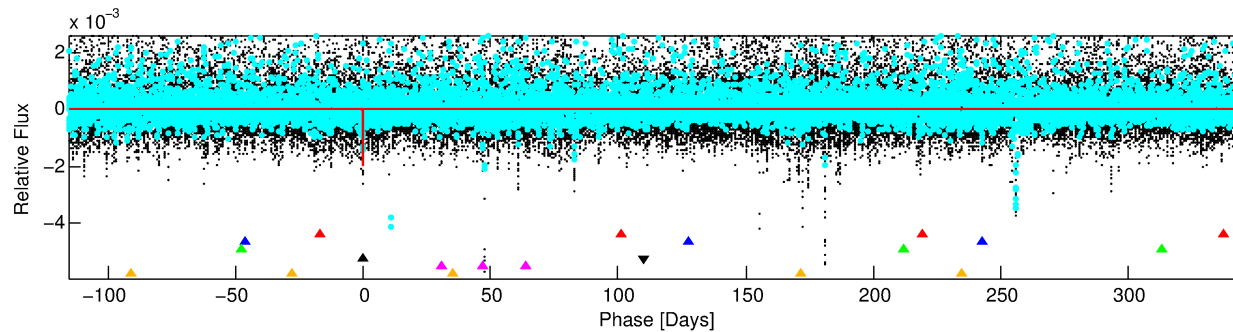
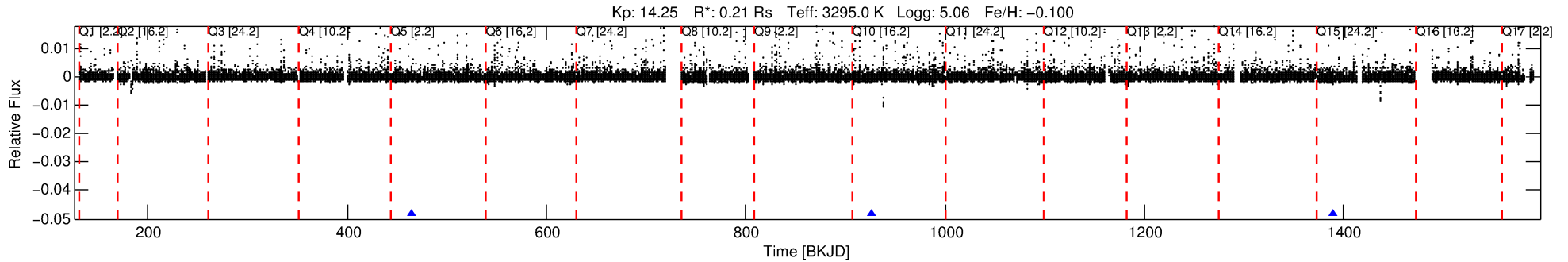
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007939565-04

No Significant Match Found

# DV One-Page Summary

KIC: 7939565 Candidate: 4 of 6 Period: 461.986 d



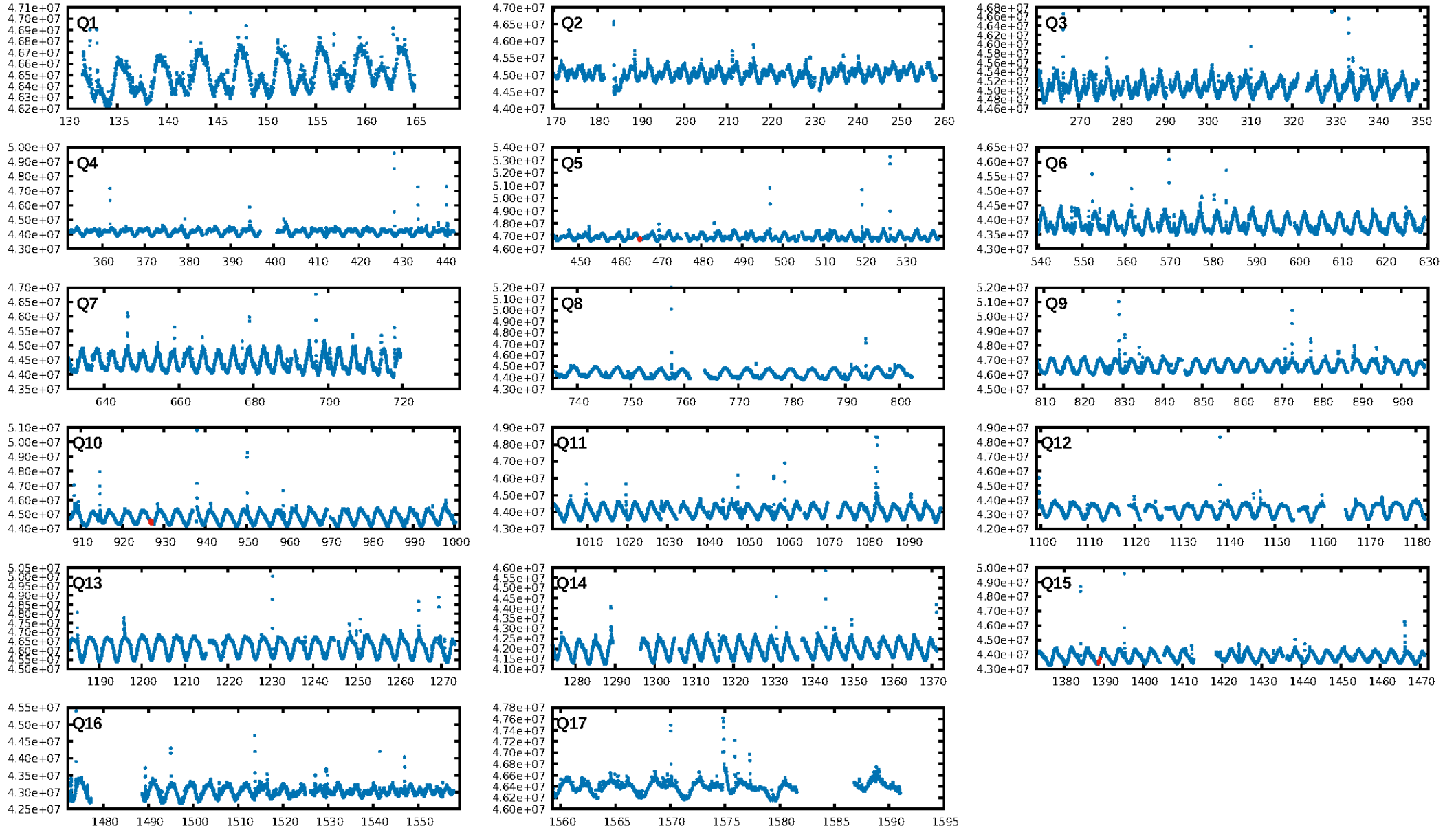
## DV Fit Results:

Period = 461.98594 [0.00520] d  
Epoch = 464.9244 [0.0065] BKJD  
Rp/R\* = 0.0402 [0.0187]  
a/R\* = 634.25 [1251.63]  
b = 0.00 [1460.95]  
Seff = 0.01 [0.00]  
Teq = 82 [3] K  
Rp = 0.94 [0.46] Re  
a = 0.6778 [0.0710] AU  
Ag = 326884.75 [318223.97] [1.03σ]  
Teffp = 3027 [732] K [4.02σ]

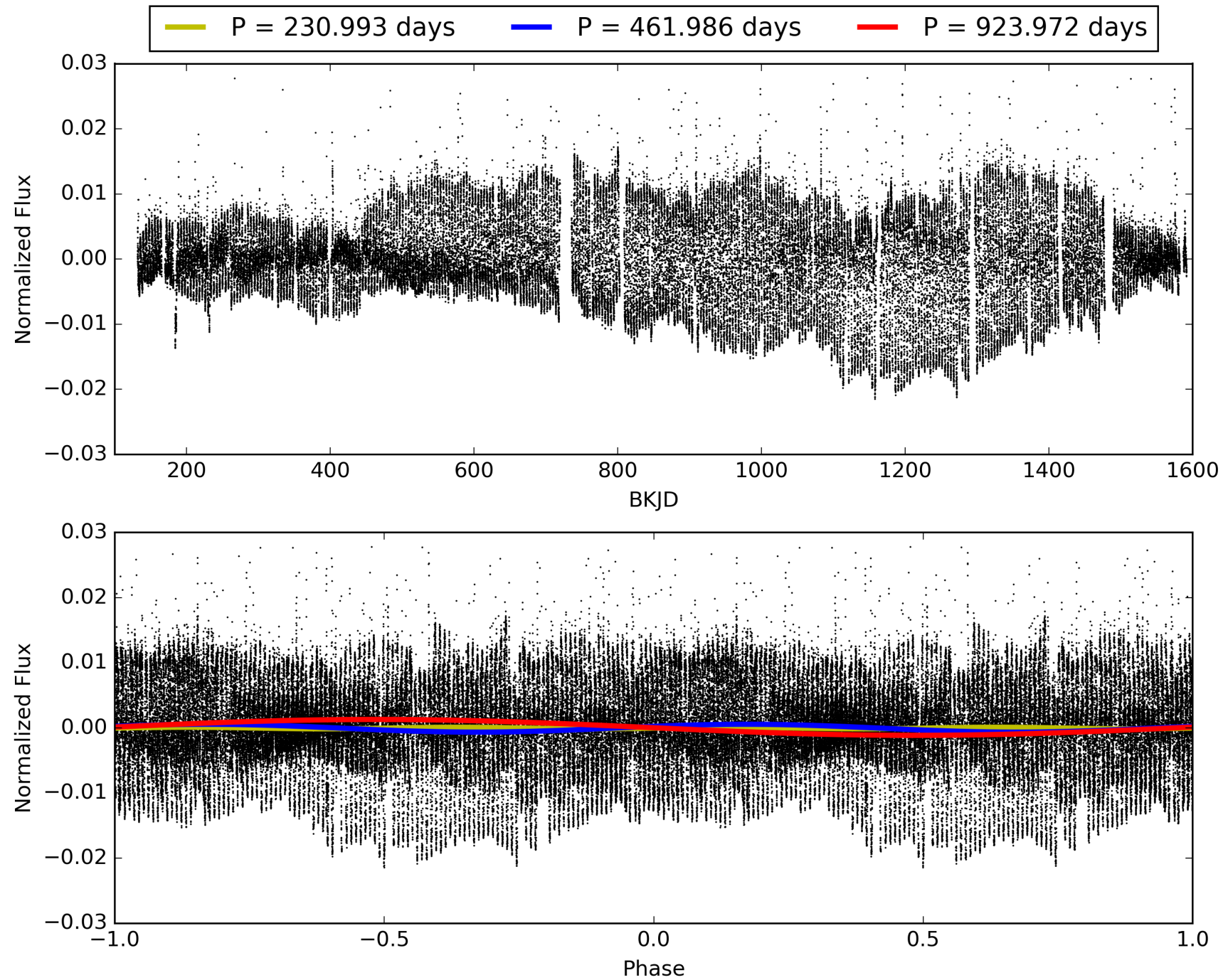
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [287.47σ]  
LongPeriod-sig: 100.0% [55.77σ]  
ModelChiSquare2-sig: 43.7%  
ModelChiSquareGof-sig: 99.3%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.3987  
Centroid-sig: 53.3%  
Centroid-so: 0.107 arcsec [0.22σ]  
OotOffset-rm: 0.051 arcsec [0.39σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-rm: 0.334 arcsec [2.58σ]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 007939565-04, PDC Light Curves



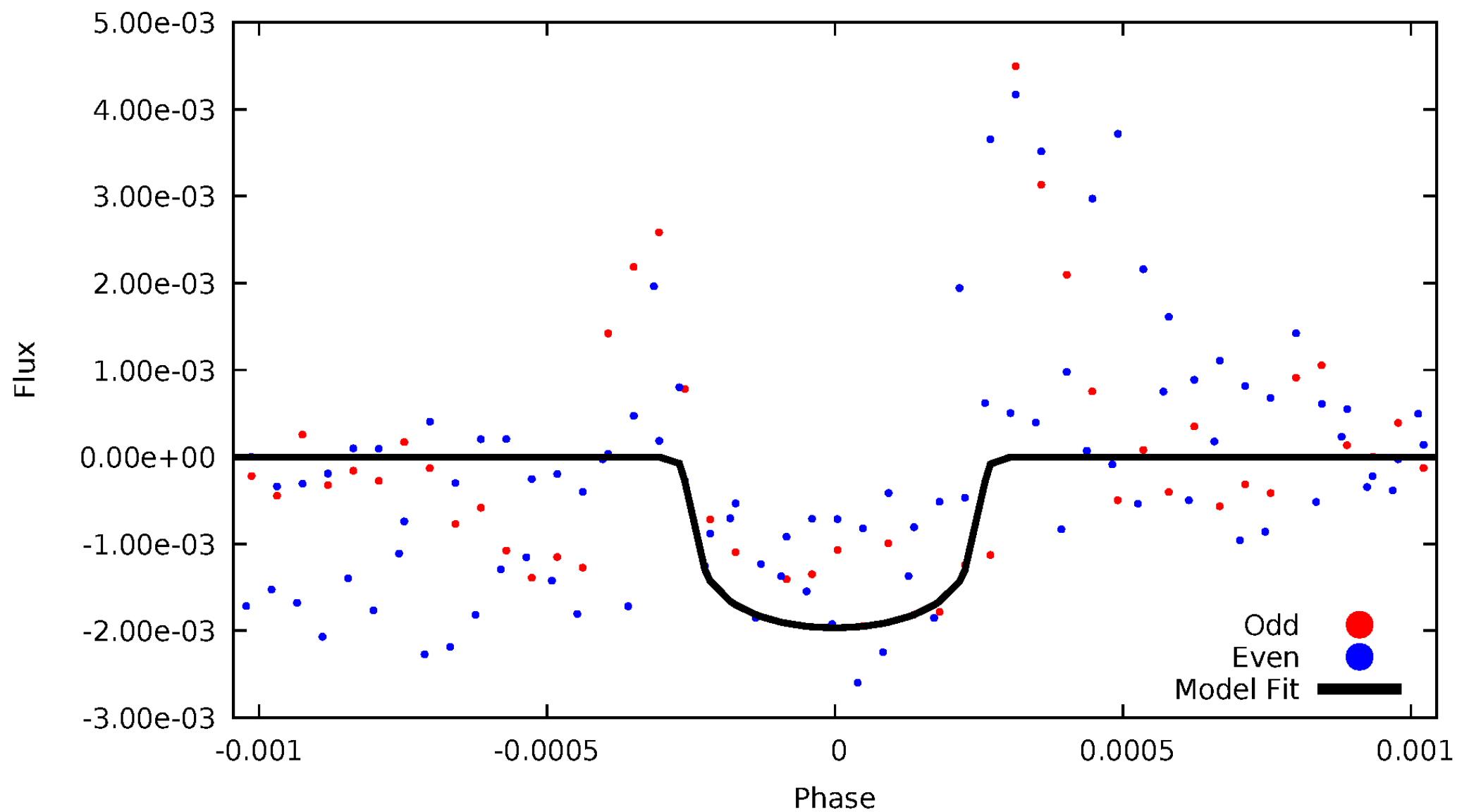
TCE 007939565-04





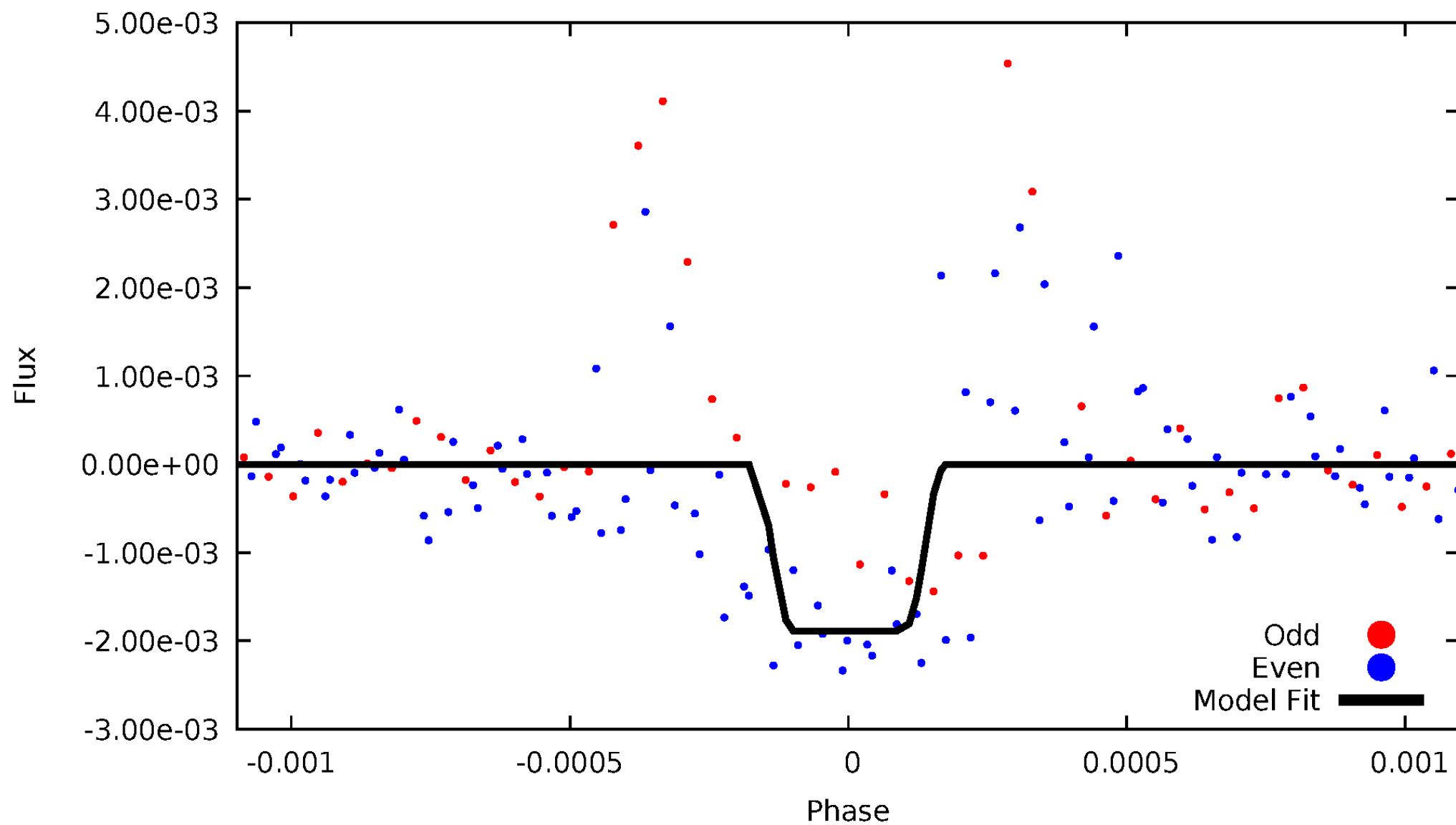
# DV Odd/Even

TCE 007939565-04



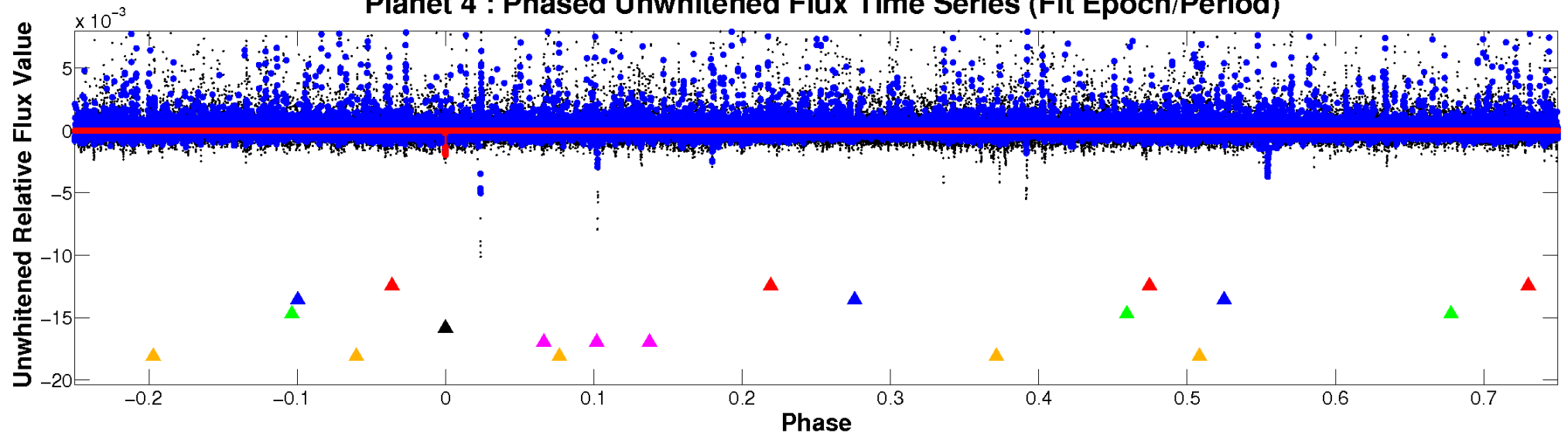
# ALT Odd/Even

TCE 007939565-04

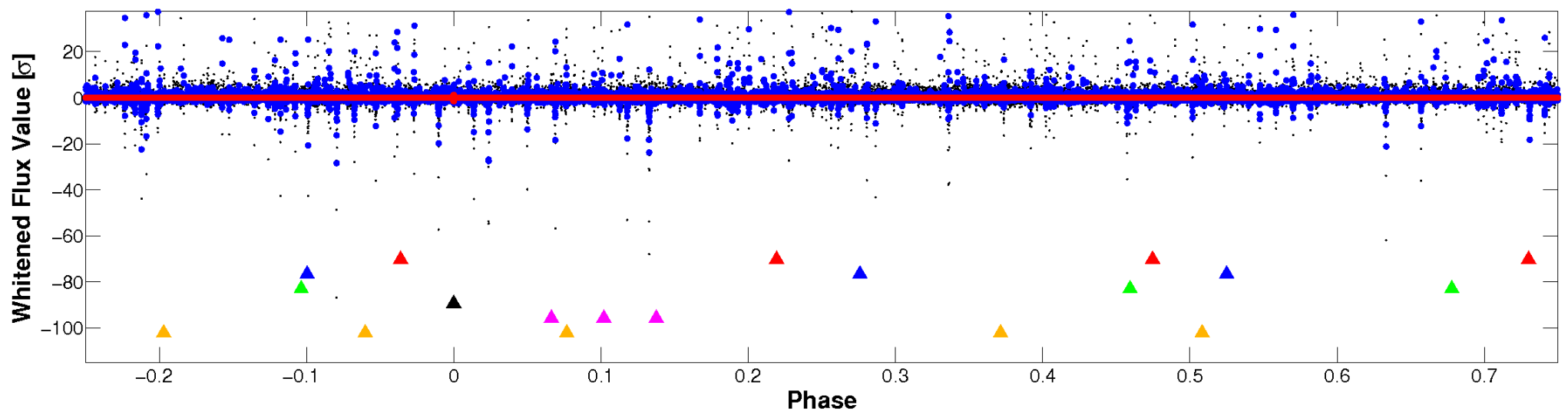


# Non-Whitened Vs. Whitened Light Curve

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

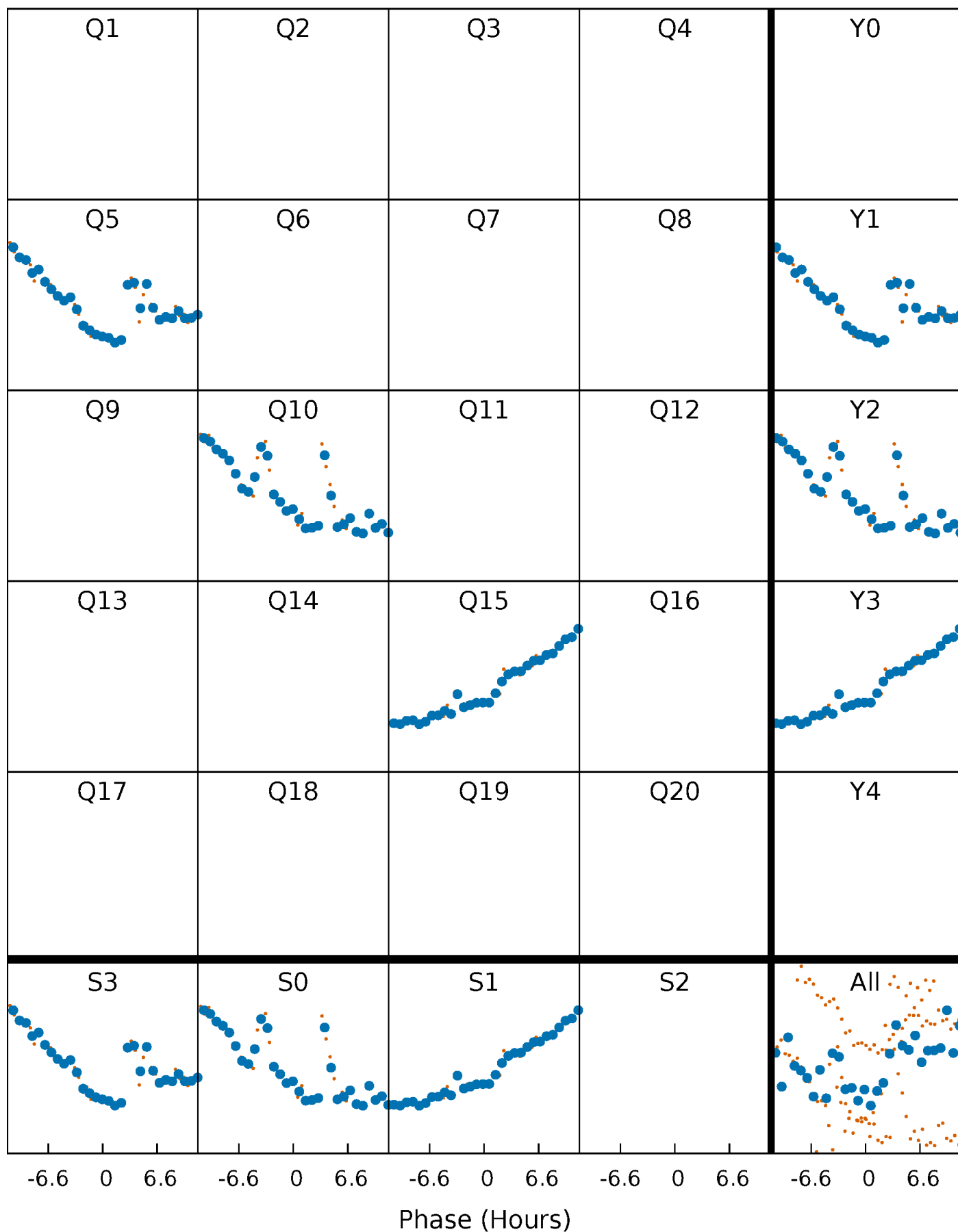


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



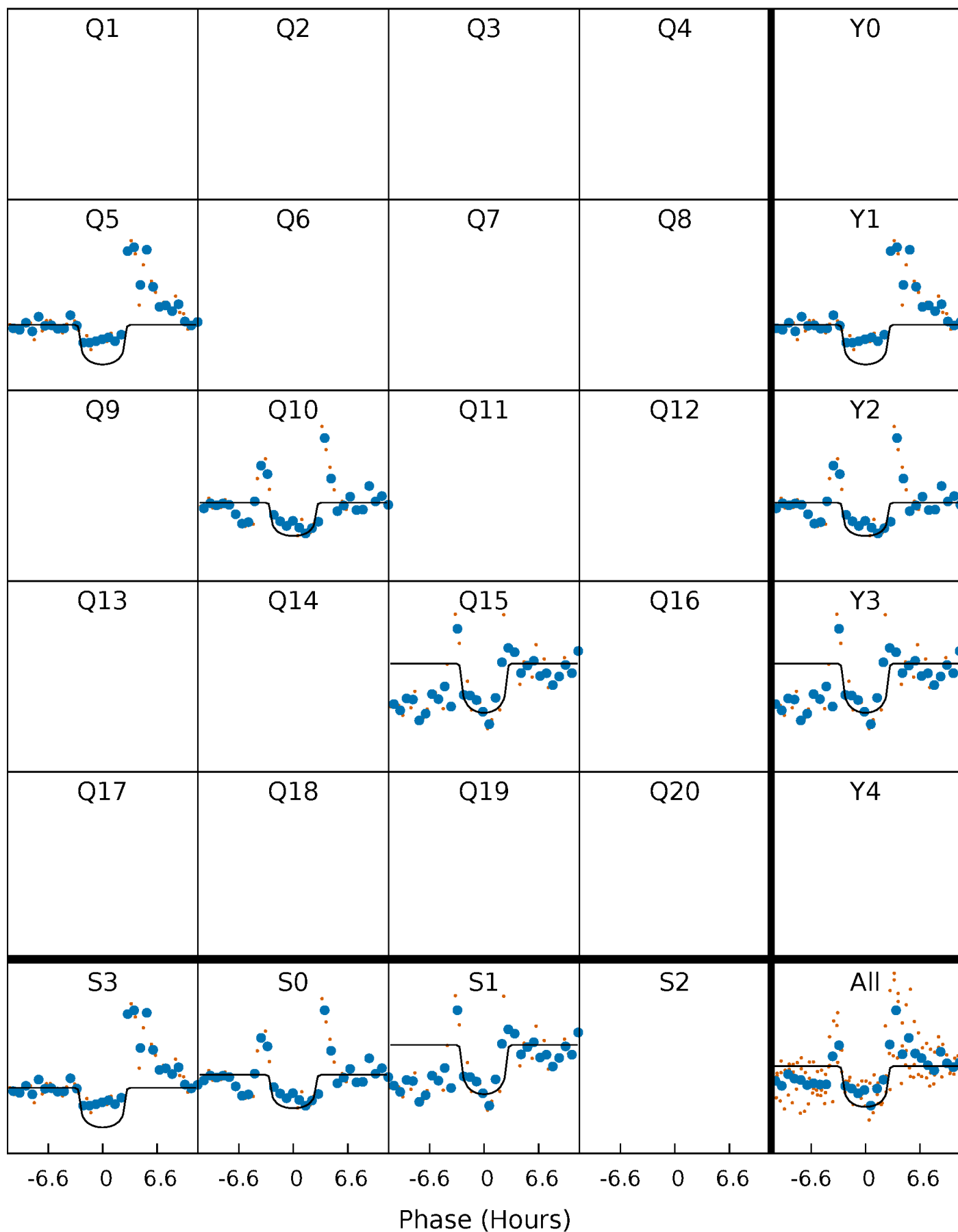
# PDC Quarter-Phased Transit Curves

TCE 007939565-04 P=461.985936 Days  $T_0=464.924425$  (BKJD)



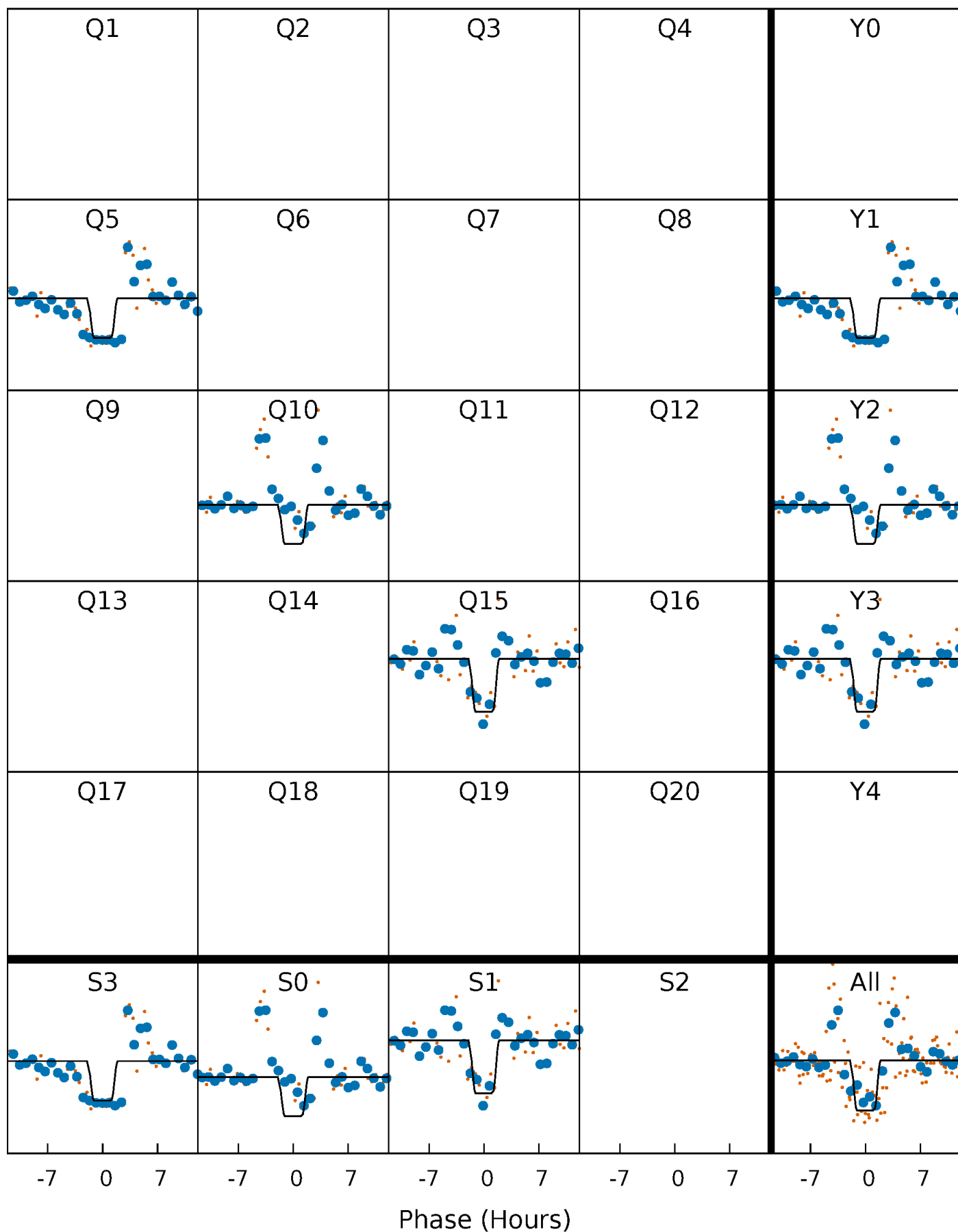
# DV Quarter-Phased Transit Curves

TCE 007939565-04     $P=461.985936$  Days     $T_0=464.924425$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

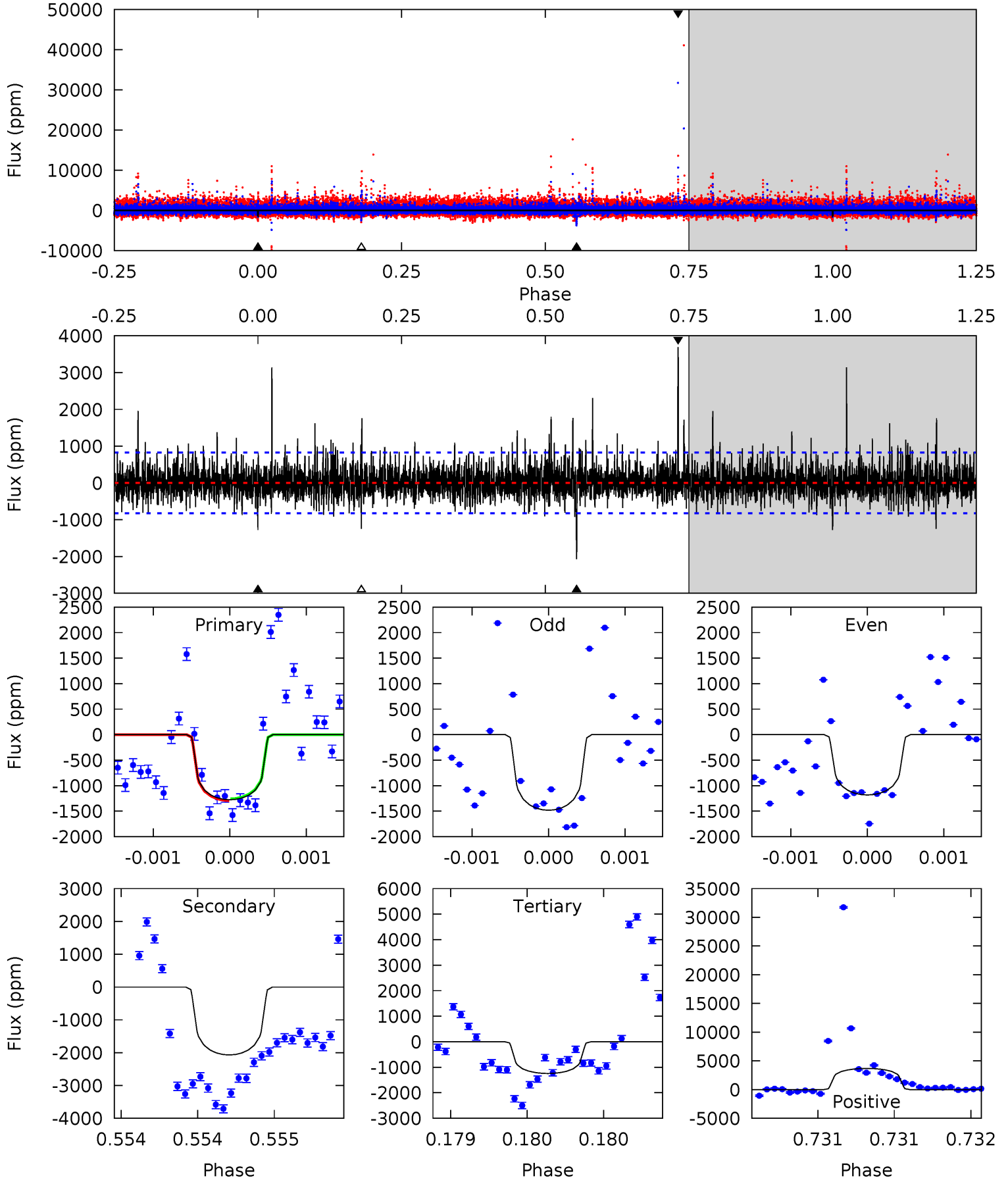
TCE 007939565-04 P=461.995980 Days  $T_0=464.927282$  (BKJD)



# DV Model-Shift Uniqueness Test

007939565-04, P = 461.985936 Days, E = 2.938489 Days

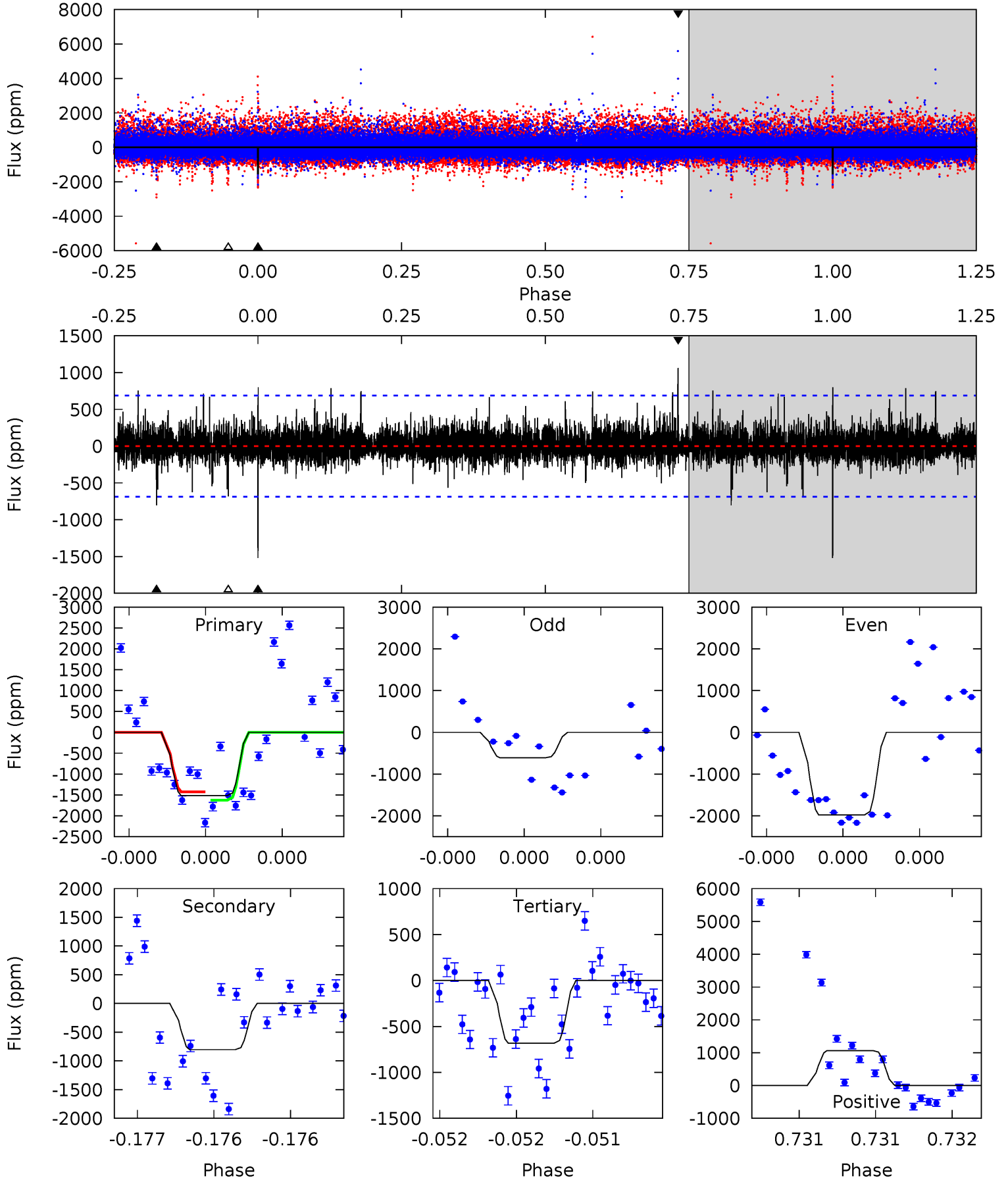
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.57	13.9	8.35	24.8	5.56	3.46	2.26	0.22	-16.2	5.55	-10.8	0.41	0.86	0.64	0.12



# Alt Model-Shift Uniqueness Test

007939565-04, P = 461.995980 Days, E = 2.931302 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
12.5	6.61	5.61	8.75	5.66	3.61	1.12	6.88	3.75	0.99	-2.14	5.18	0.88	0.41	0.83





### Stellar Parameters For KIC 007939565

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3295^{+42}_{-33}$	$5.062^{+0.044}_{-0.044}$	$-0.100^{+0.100}_{-0.100}$	$0.215^{+0.032}_{-0.023}$	$0.194^{+0.038}_{-0.025}$	$27.610^{+6.807}_{-5.953}$
	+1%/-1%	+1%/-1%	+100%/-100%	+15%/-11%	+20%/-13%	+25%/-22%
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 007939565-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2068 \pm 149$	$0.98^{+0.43}_{-0.44}$	$115^{+3}_{-2}$	$3400^{+763}_{-354}$	$548957^{+1252930}_{-287206}$
Alt.	$-803 \pm 122$	$1.06^{+0.39}_{-0.45}$	$115^{+3}_{-3}$	$2892^{+509}_{-251}$	$183844^{+370750}_{-92668}$

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

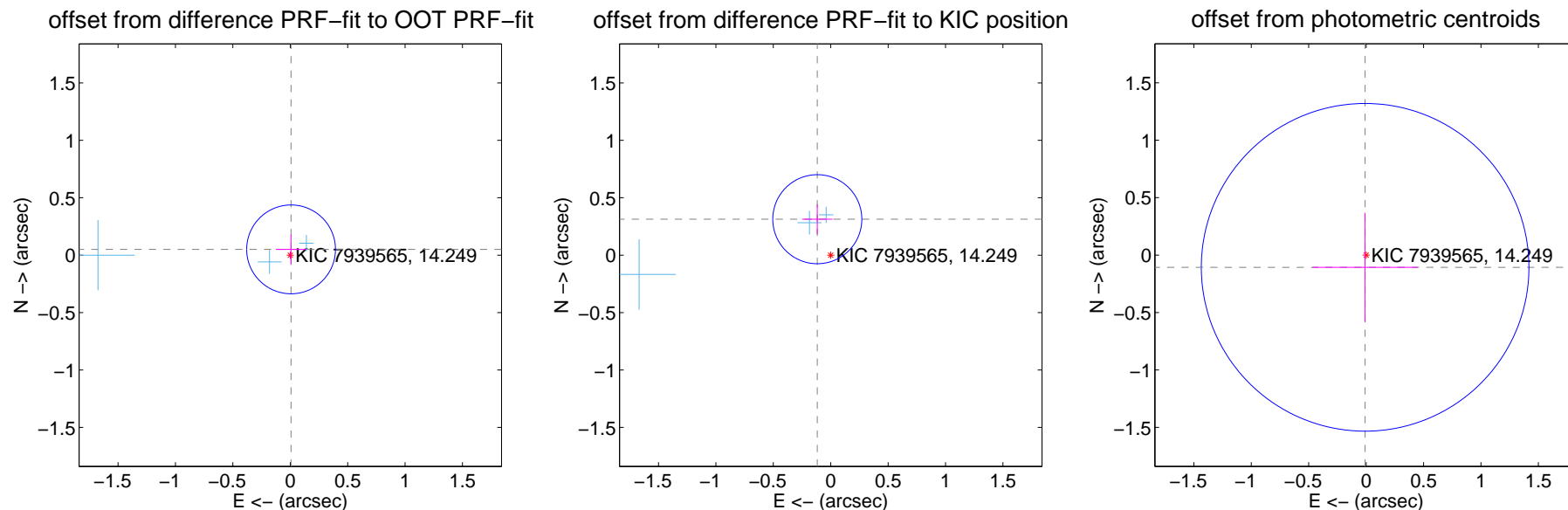
## DV Centroid Data

Supplemental centroid analysis for 007939565-04. Kepler magnitude: 14.25. Transit SNR 7.98

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.051 \pm 0.129$	0.39	$-0.007 \pm 0.132$	$0.050 \pm 0.129$
PRF-fit source offset from KIC position	$0.334 \pm 0.129$	2.58	$0.117 \pm 0.132$	$0.313 \pm 0.129$
photometric centroid source offset	$0.11 \pm 0.48$	0.22	$0.01 \pm 0.46$	$-0.11 \pm 0.48$

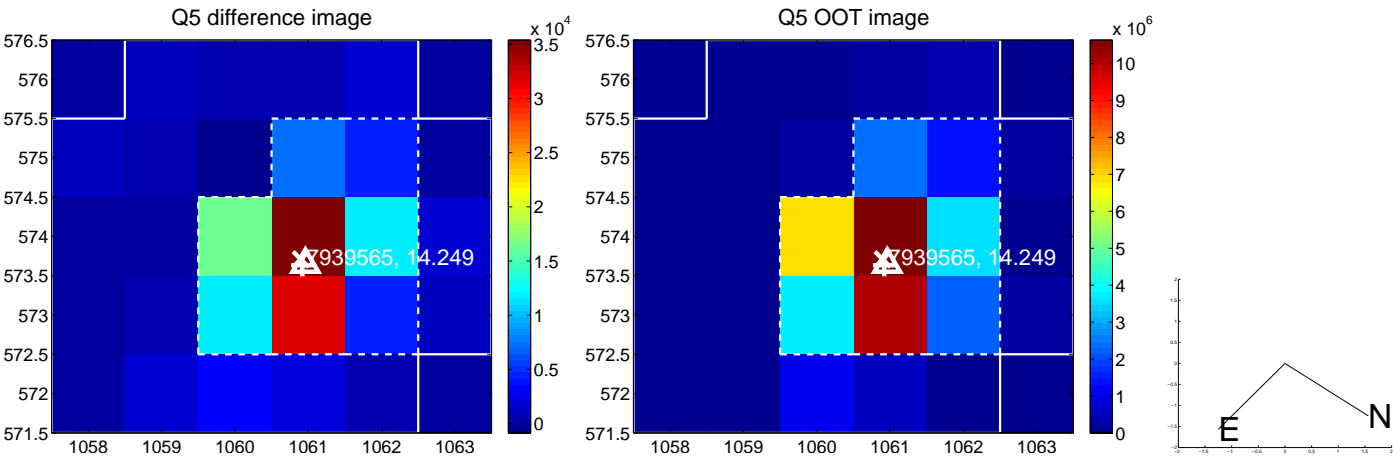


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

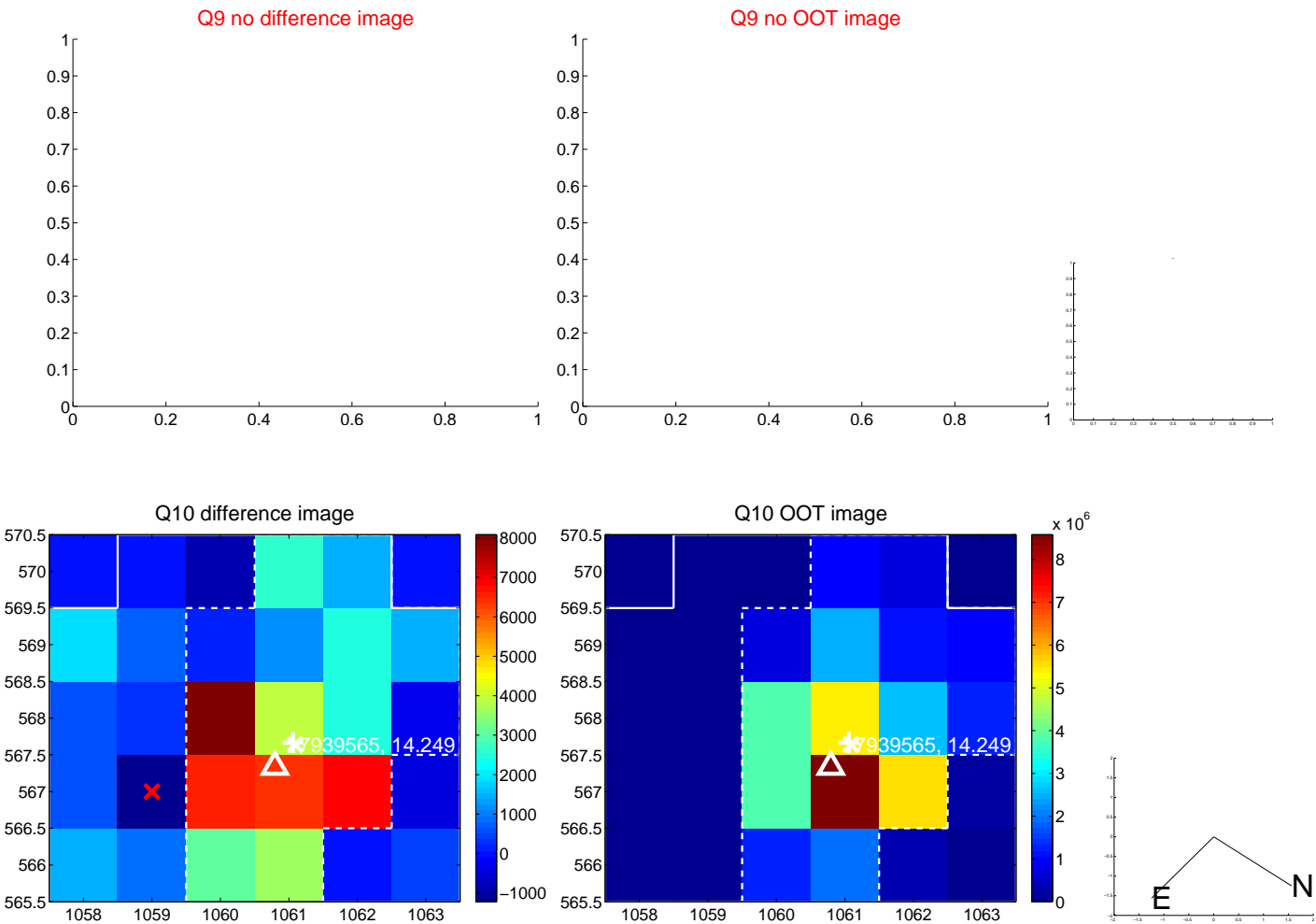
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



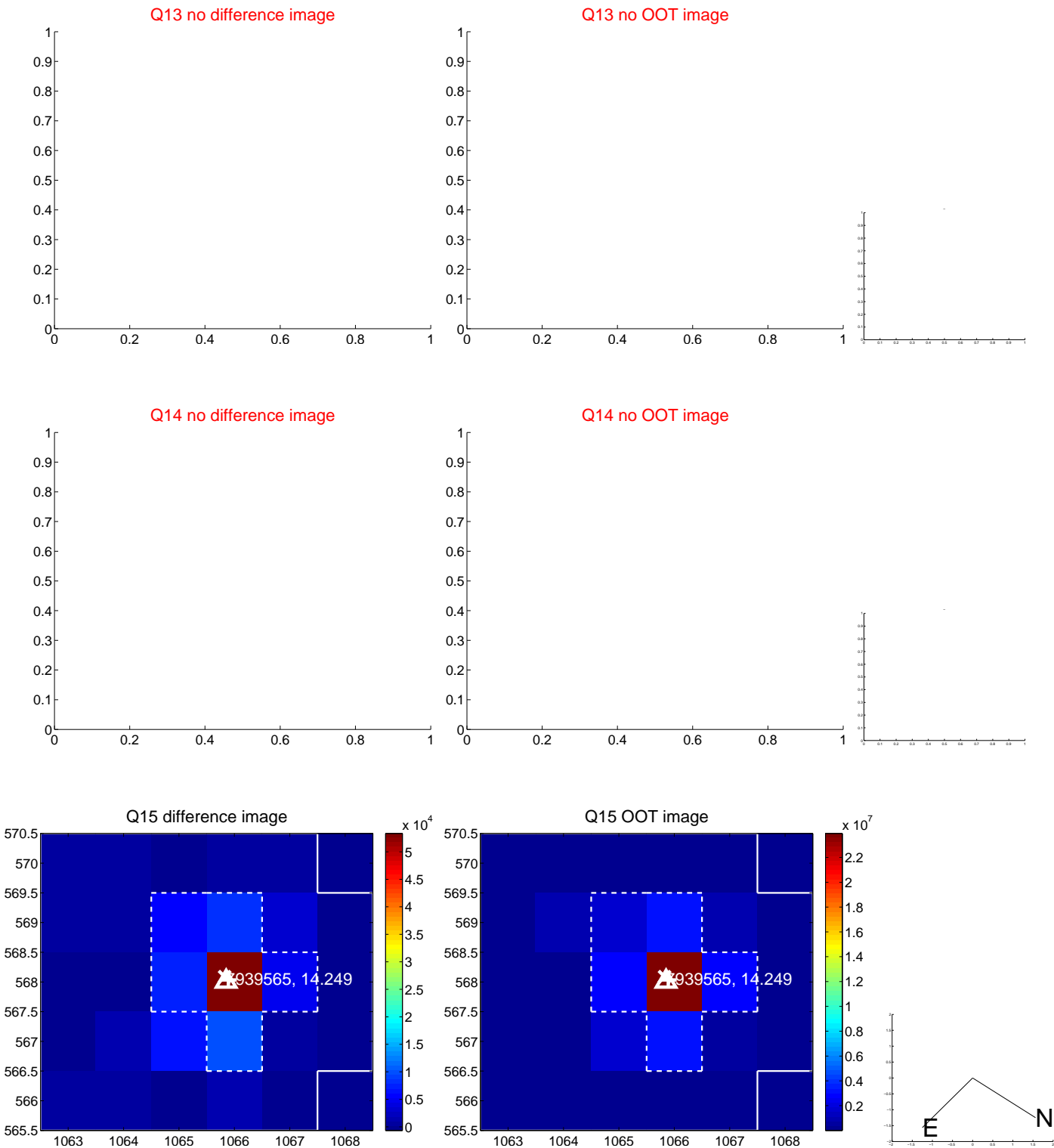
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



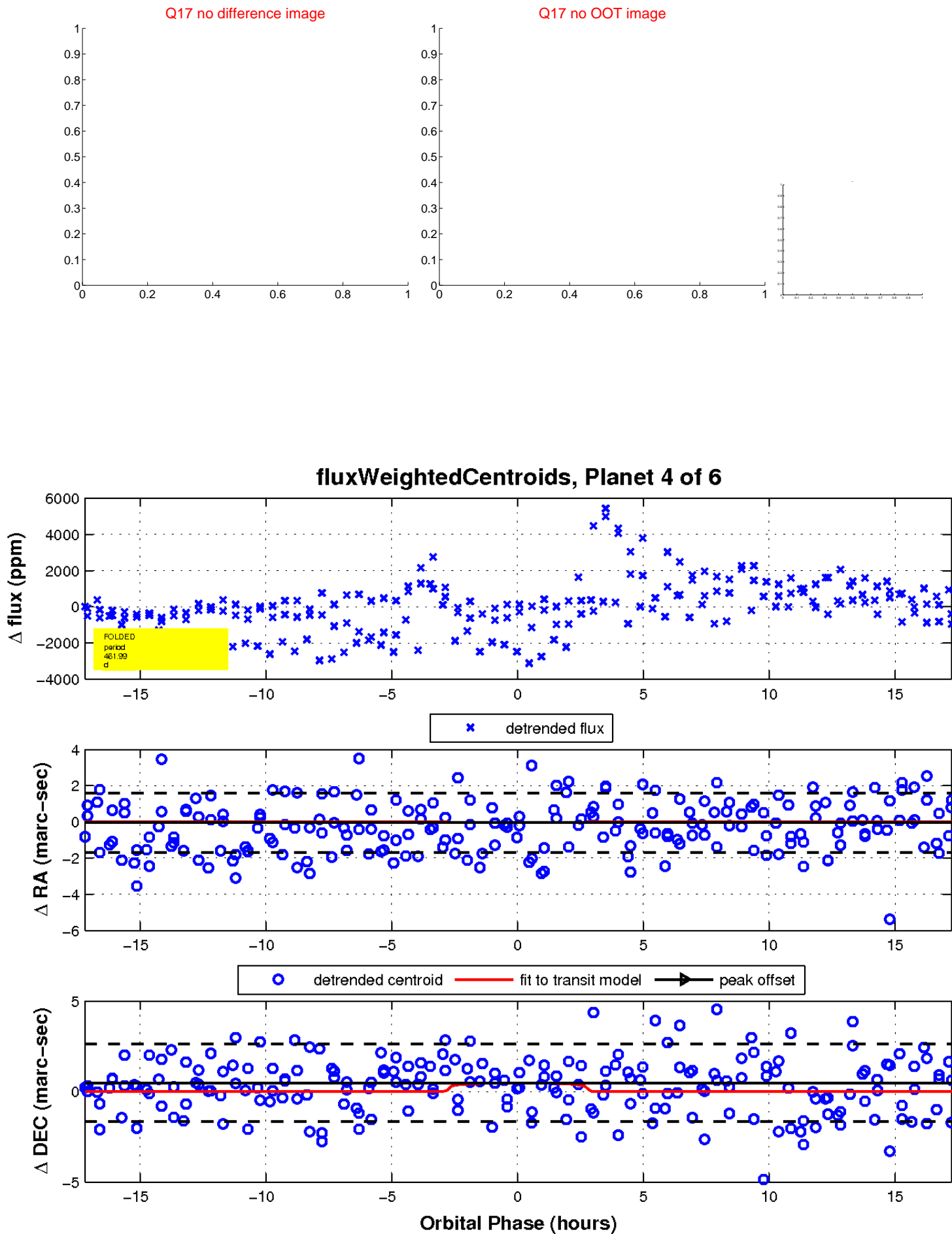
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

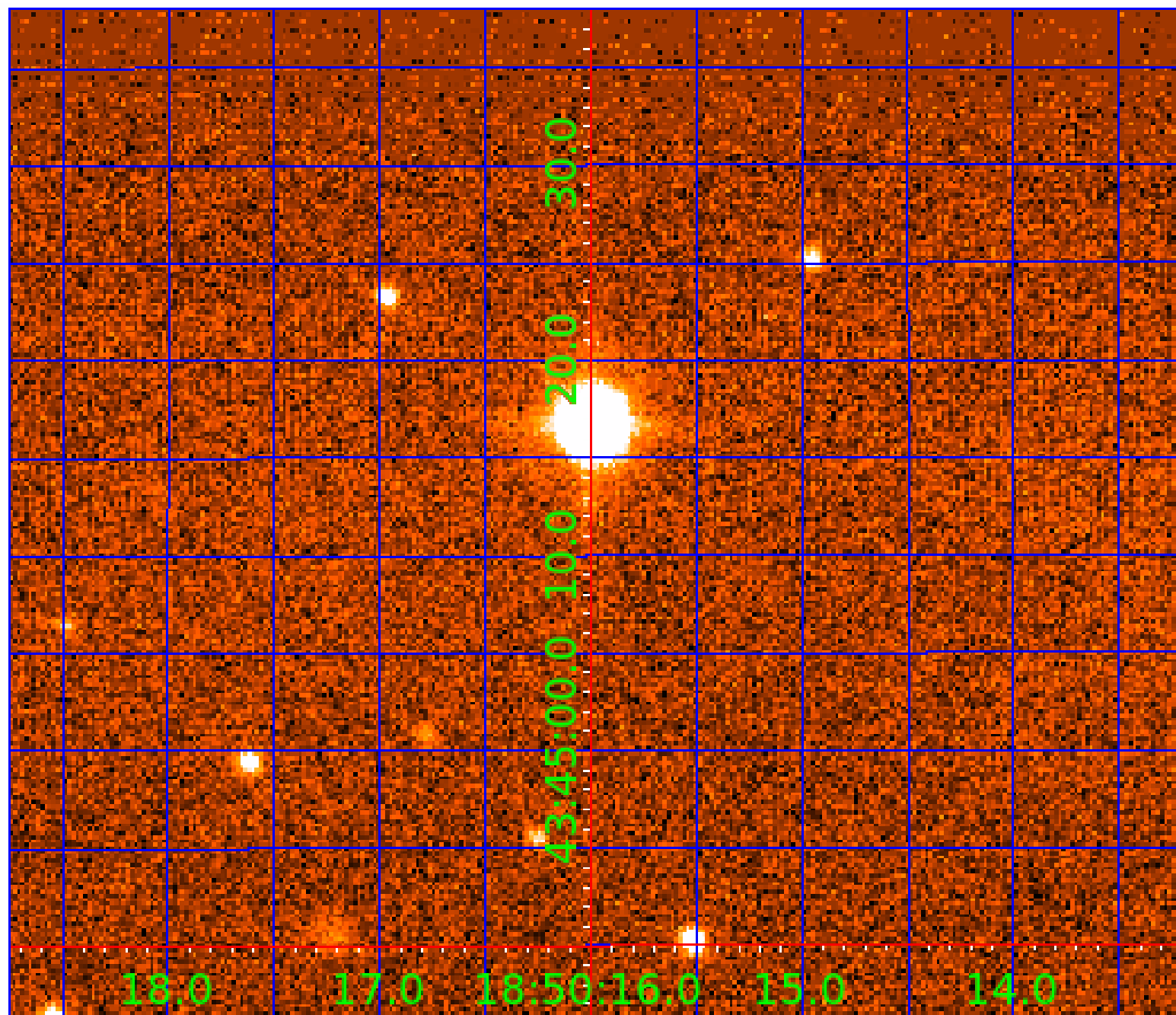


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 007939565

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007939565-01	OBS	No	344.012806	340.200312	1099.7	7.969	20.0	4.6	0.21	3295	0.71	0.02
007939565-02	OBS	No	635.435308	245.485049	1629.6	4.492	13.9	5.9	0.21	3295	0.90	0.01
007939565-03	OBS	No	562.940692	215.165497	2009.3	4.039	12.5	6.7	0.21	3295	0.96	0.01
007939565-04	OBS	No	461.985936	464.924425	1965.5	5.788	12.3	8.0	0.21	3295	0.94	0.01
007939565-05	OBS	No	478.436667	495.580905	2302.3	4.076	11.2	8.3	0.21	3295	1.04	0.01
007939565-06	OBS	No	262.612113	373.917722	726.3	5.000	10.2	-1.0	0.21	3295	0.57	0.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007939565-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—INCONSISTENT_TRANS
007939565-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
007939565-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
007939565-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

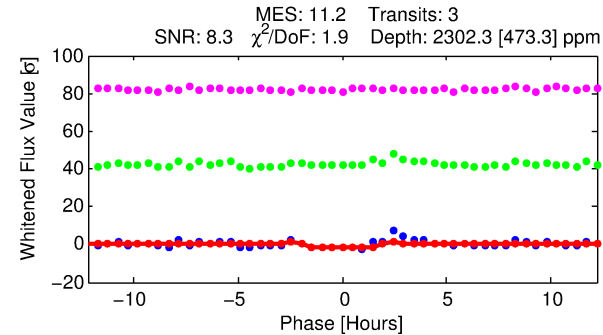
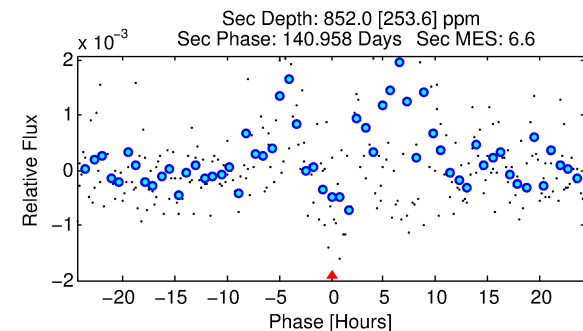
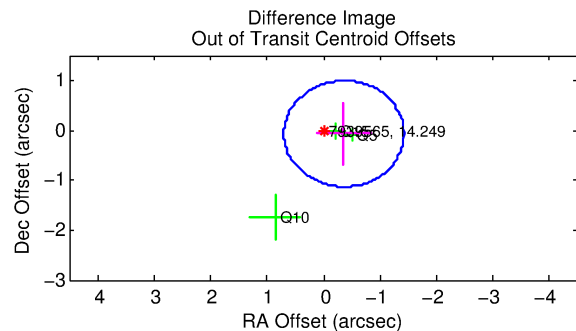
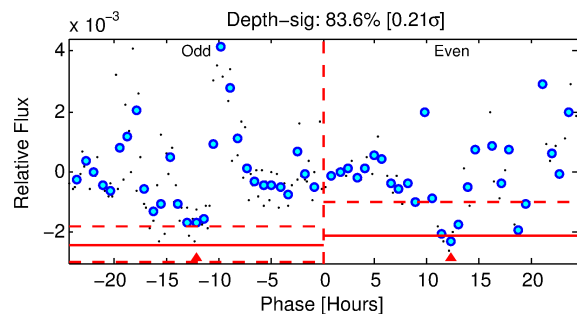
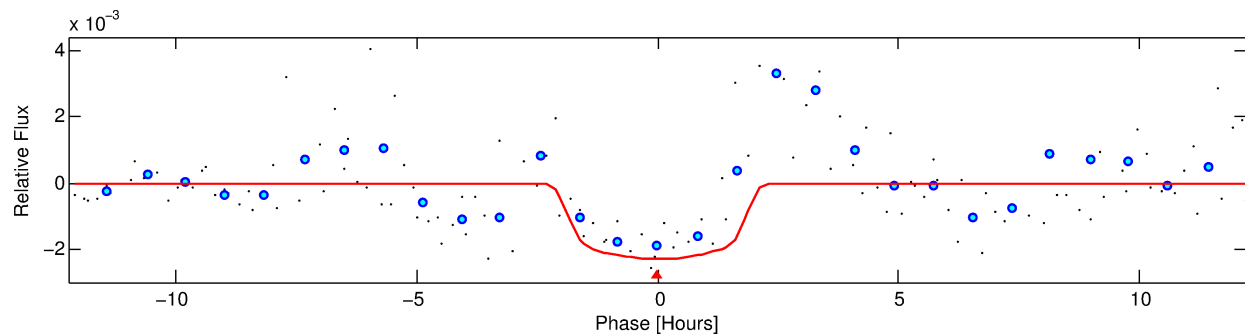
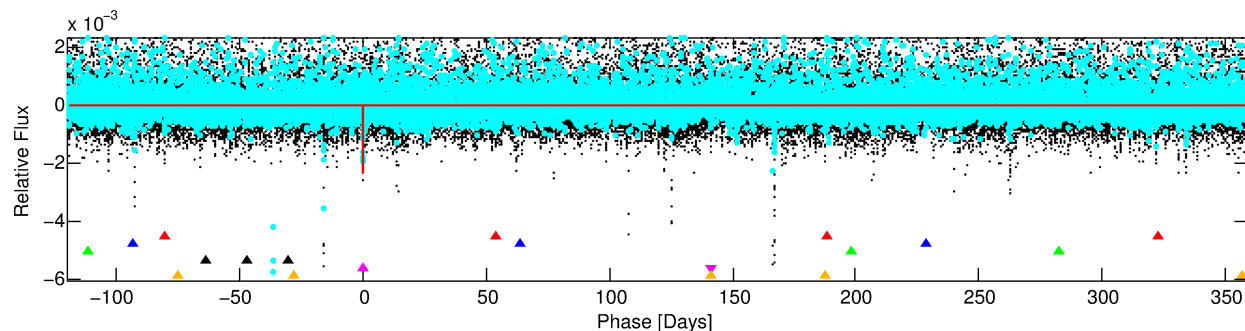
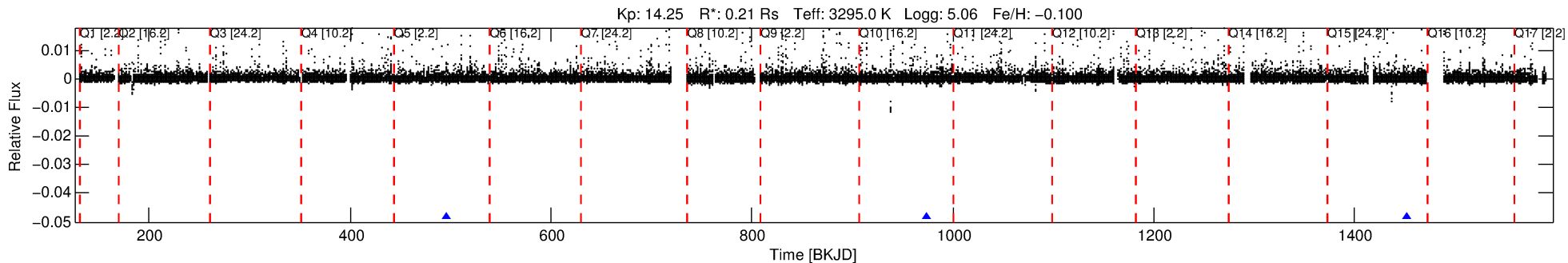
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007939565-05

No Significant Match Found

# DV One-Page Summary

KIC: 7939565 Candidate: 5 of 6 Period: 478.437 d



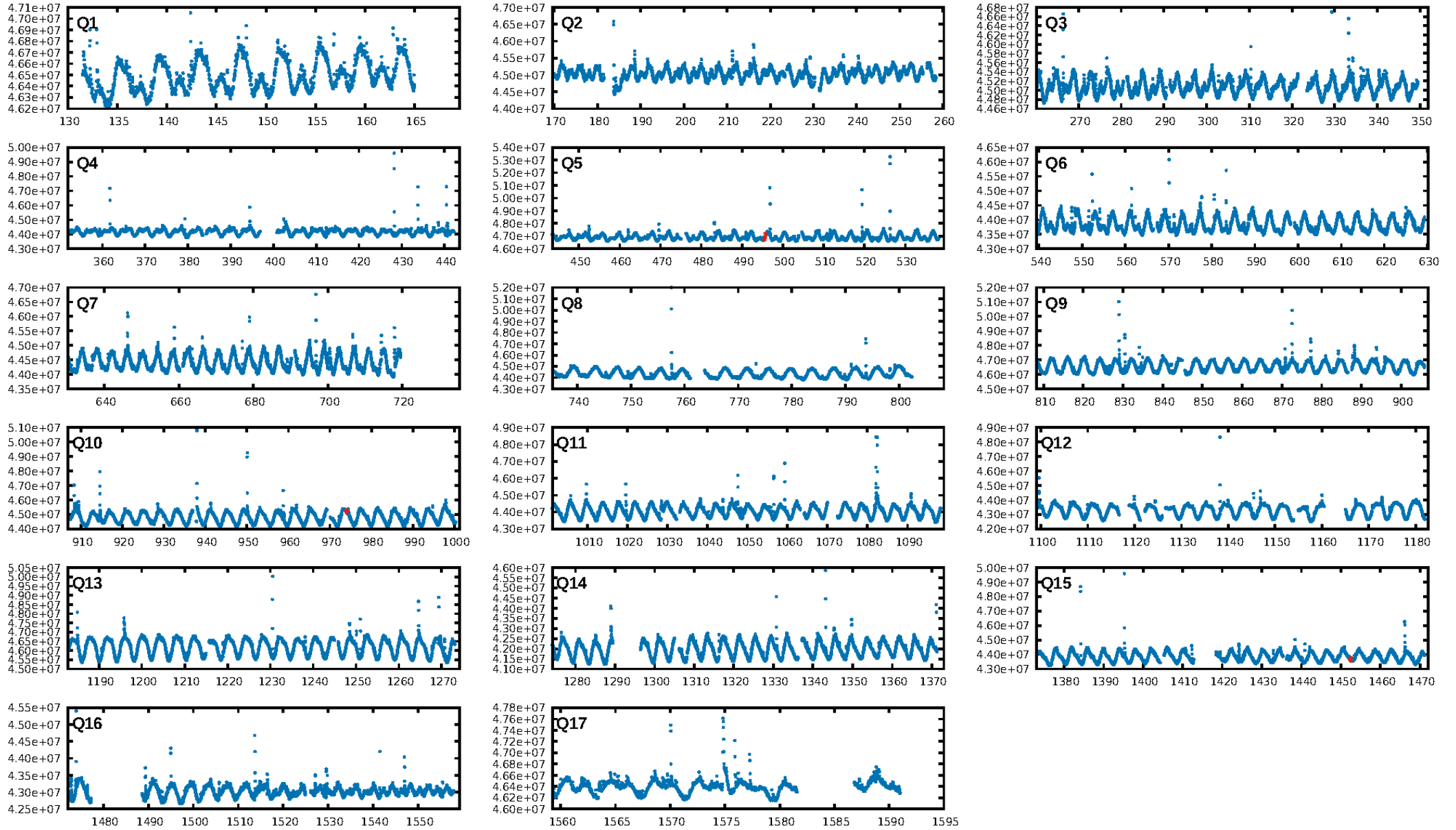
## DV Fit Results:

Period = 478.43667 [0.00575] d  
Epoch = 495.5809 [0.0076] BKJD  
Rp/R\* = 0.0443 [0.0494]  
a/R\* = 865.44 [4167.95]  
b = 0.40 [10.21]  
Seff = 0.01 [0.00]  
Teq = 81 [3] K  
Rp = 1.04 [1.17] Re  
a = 0.6938 [0.0727] AU  
Ag = 208610.32 [469964.61] [0.44 $\sigma$ ]  
Teffp = 2674 [1504] K [1.72 $\sigma$ ]

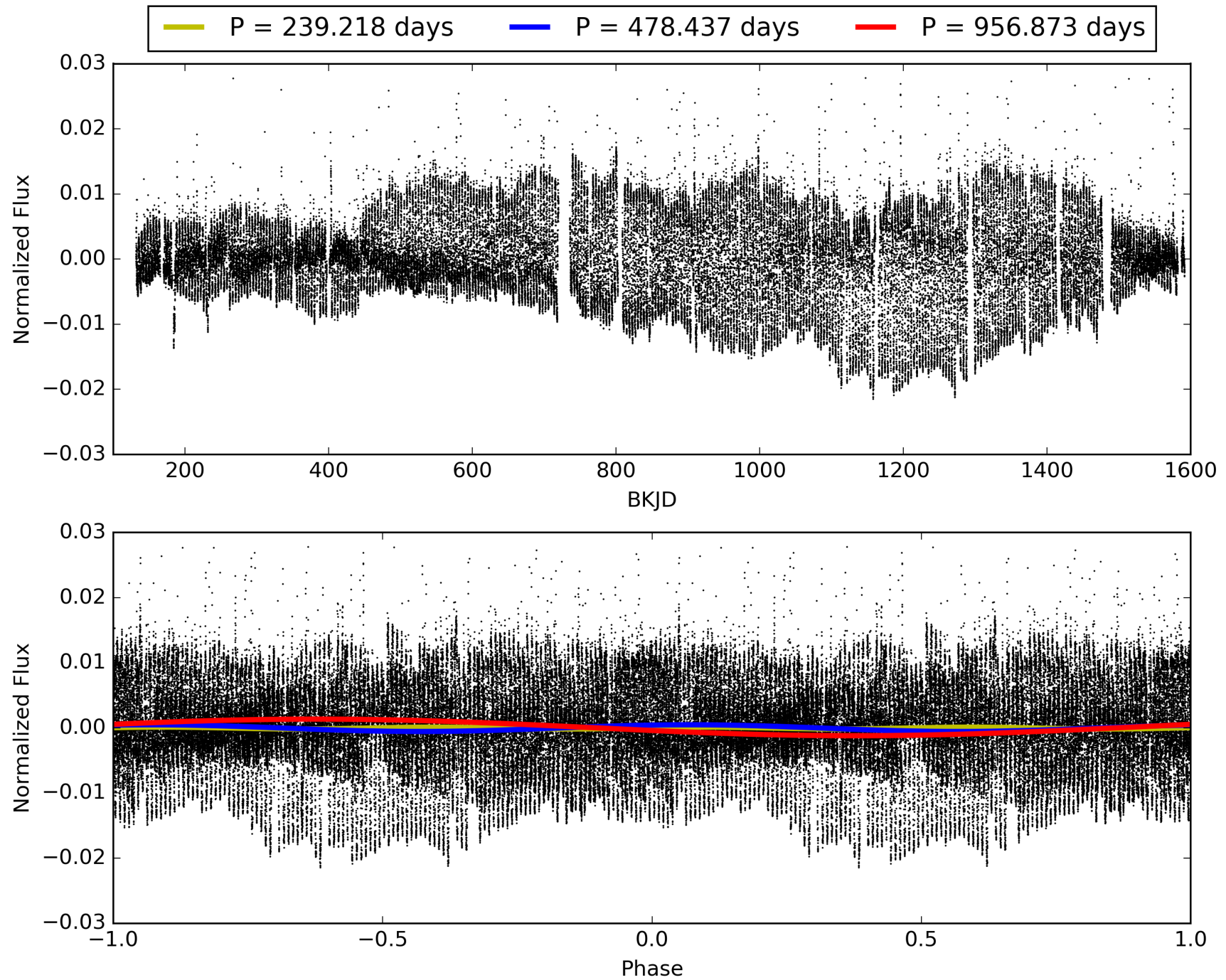
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [55.77 $\sigma$ ]  
LongPeriod-sig: 100.0% [353.45 $\sigma$ ]  
ModelChiSquare2-sig: 79.5%  
ModelChiSquareGof-sig: 90.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.784  
Centroid-sig: 11.8%  
Centroid-so: 0.637 arcsec [1.38 $\sigma$ ]  
OotOffset-rm: 0.368 arcsec [1.04 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-rm: 0.318 arcsec [0.52 $\sigma$ ]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 007939565-05, PDC Light Curves

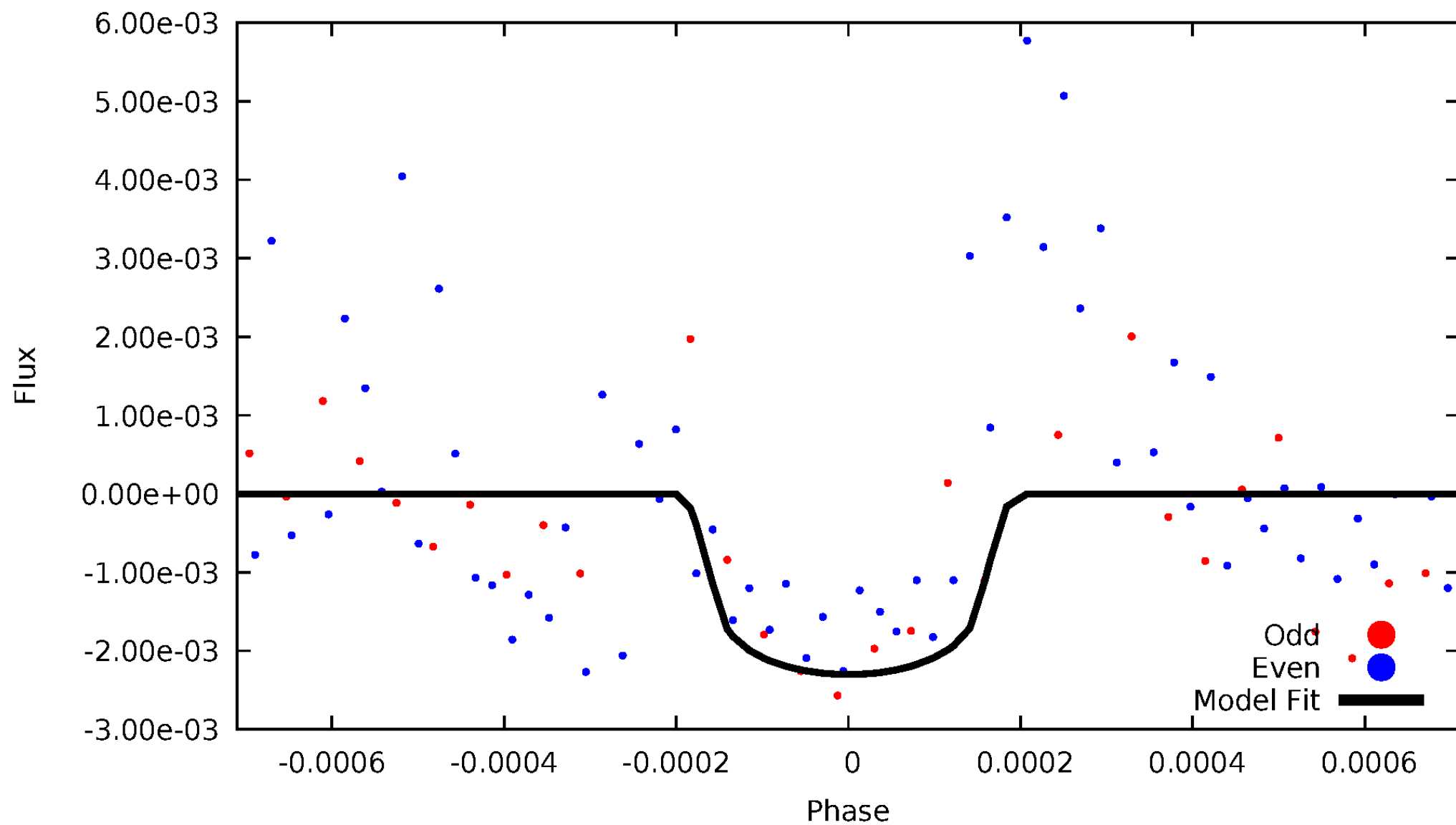


TCE 007939565-05



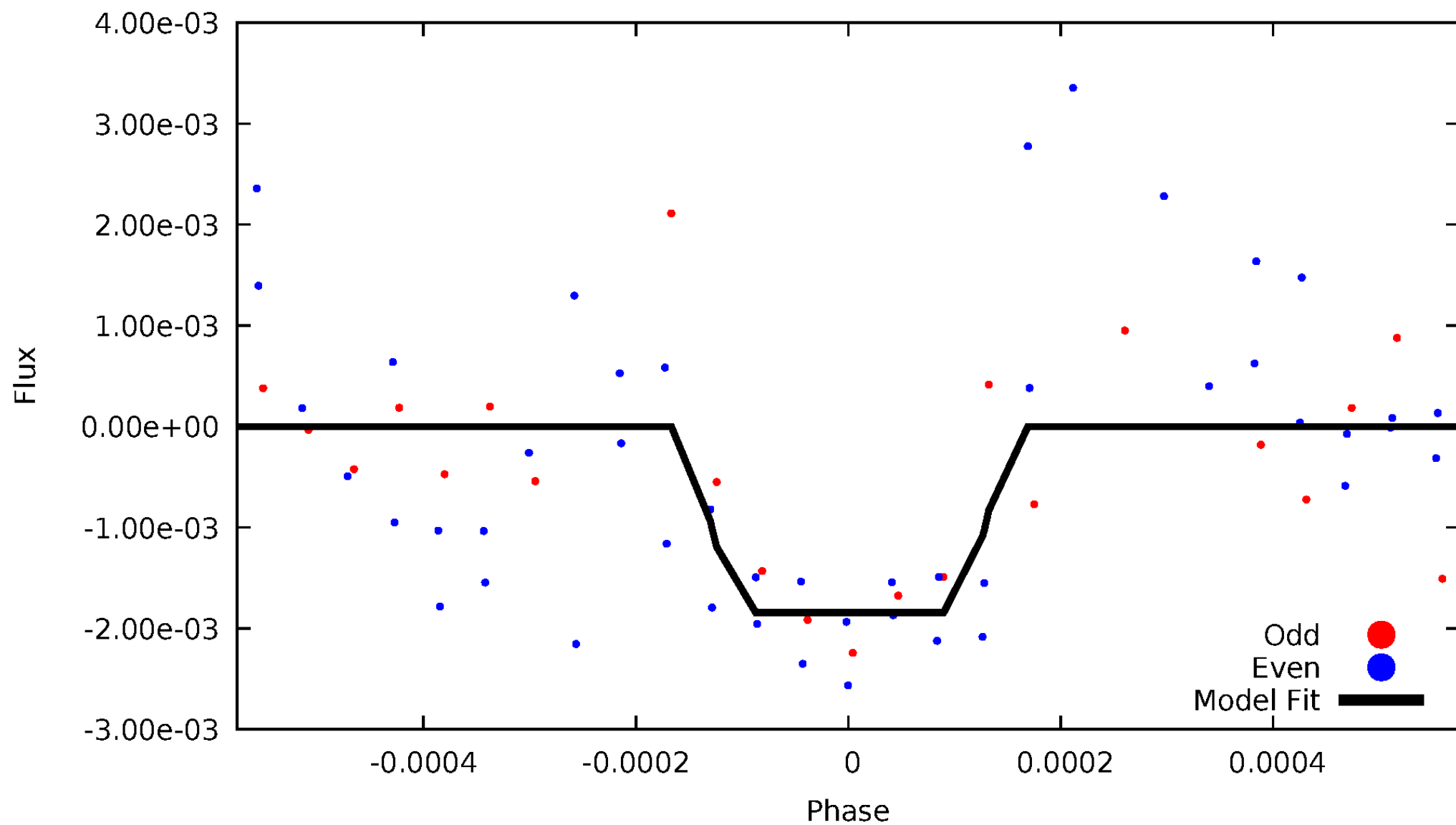
# DV Odd/Even

TCE 007939565-05



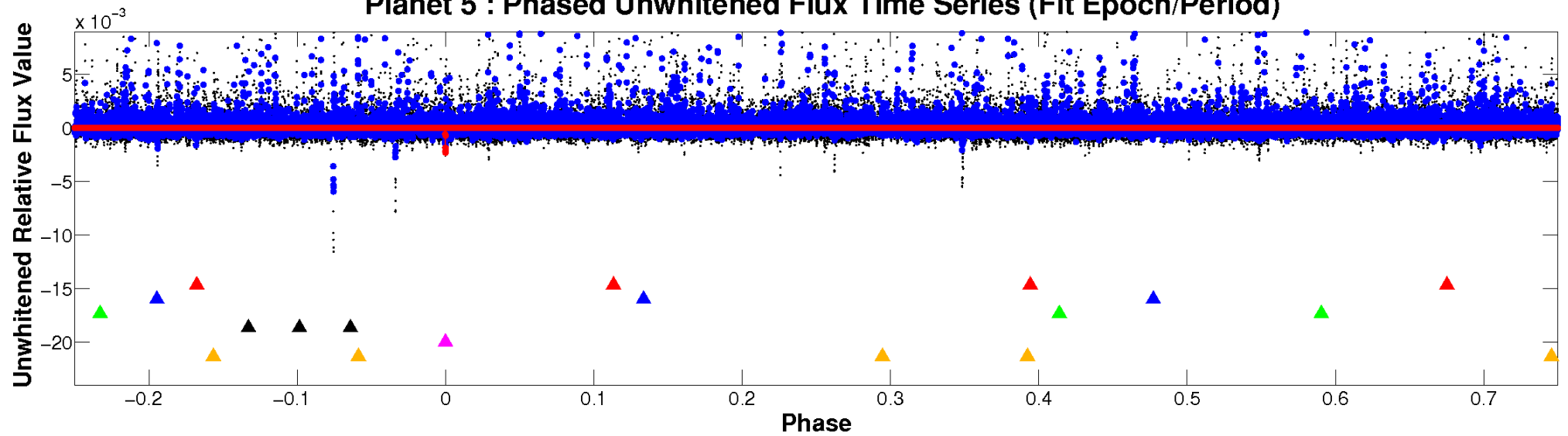
# ALT Odd/Even

TCE 007939565-05

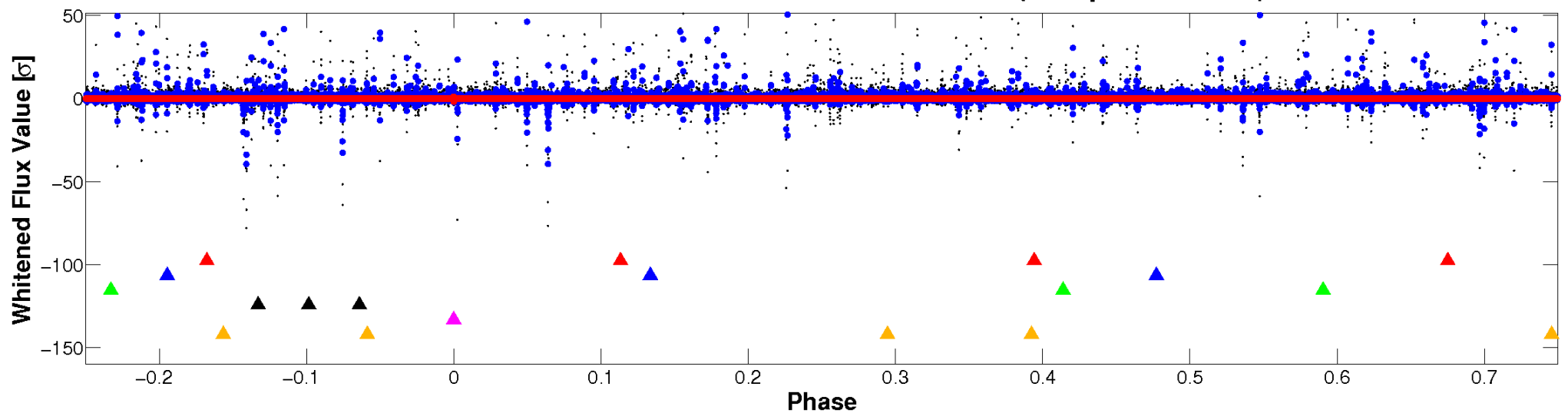


# Non-Whitened Vs. Whitened Light Curve

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

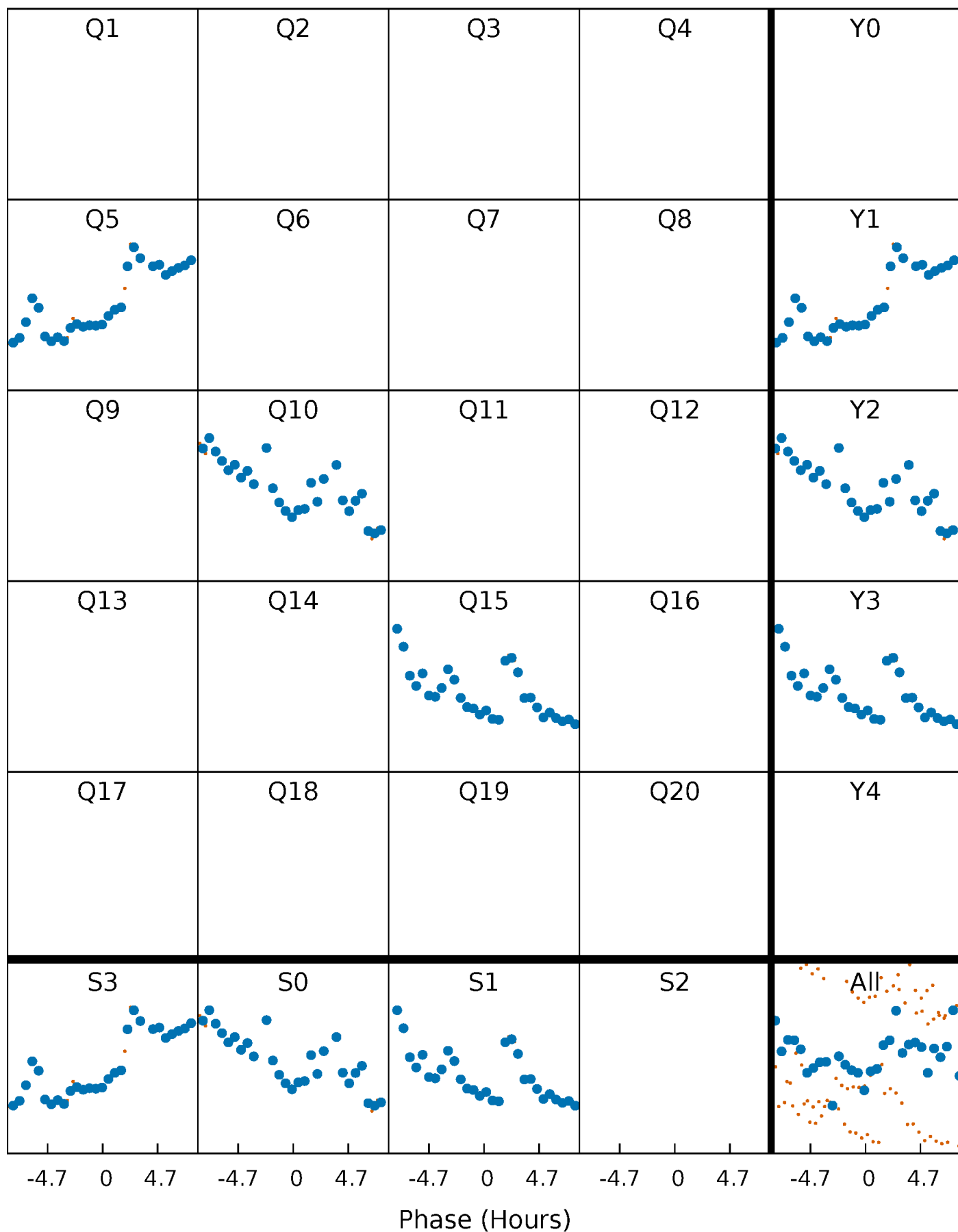


**Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

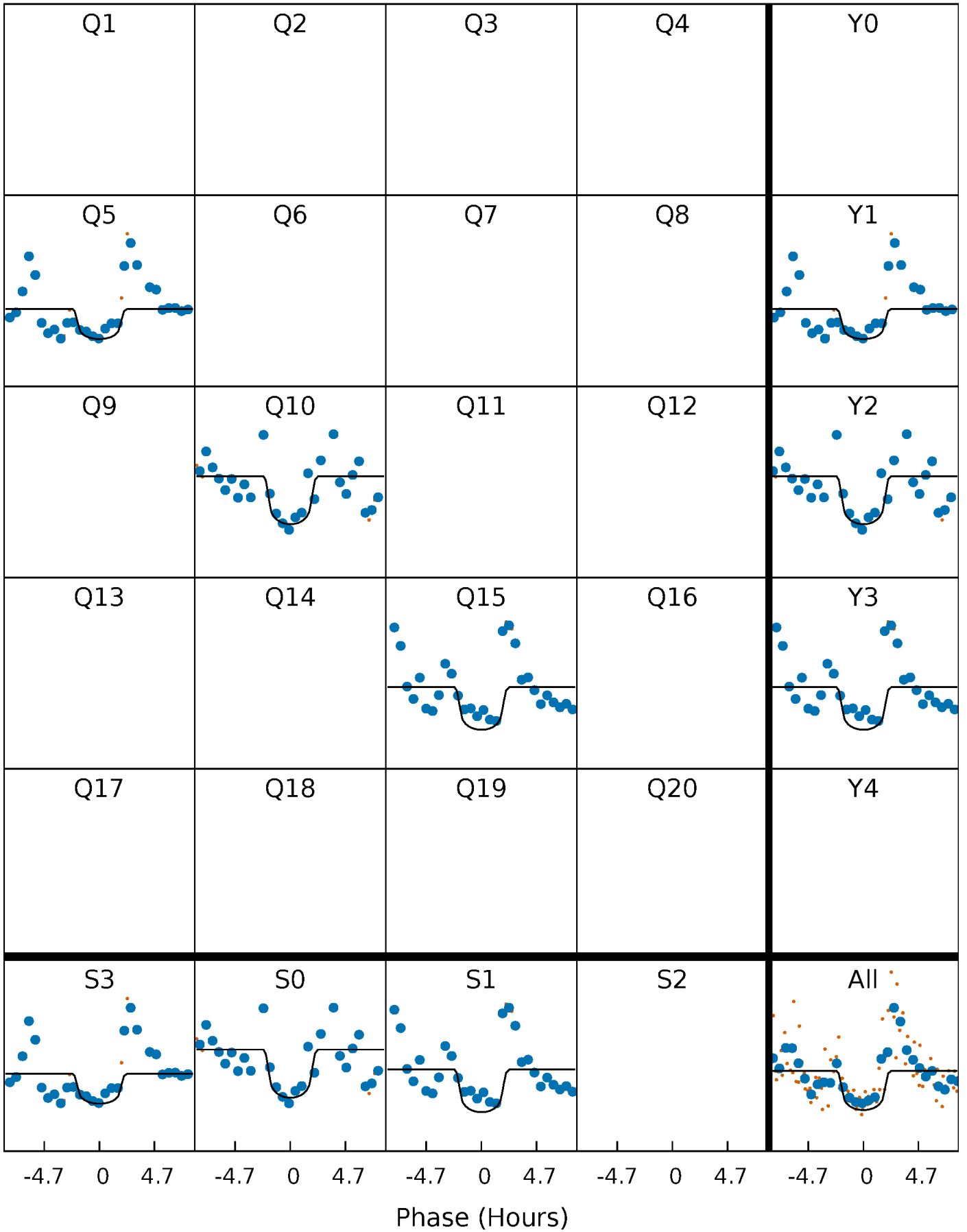
TCE 007939565-05     $P=478.436667$  Days     $T_0=495.580905$  (BKJD)





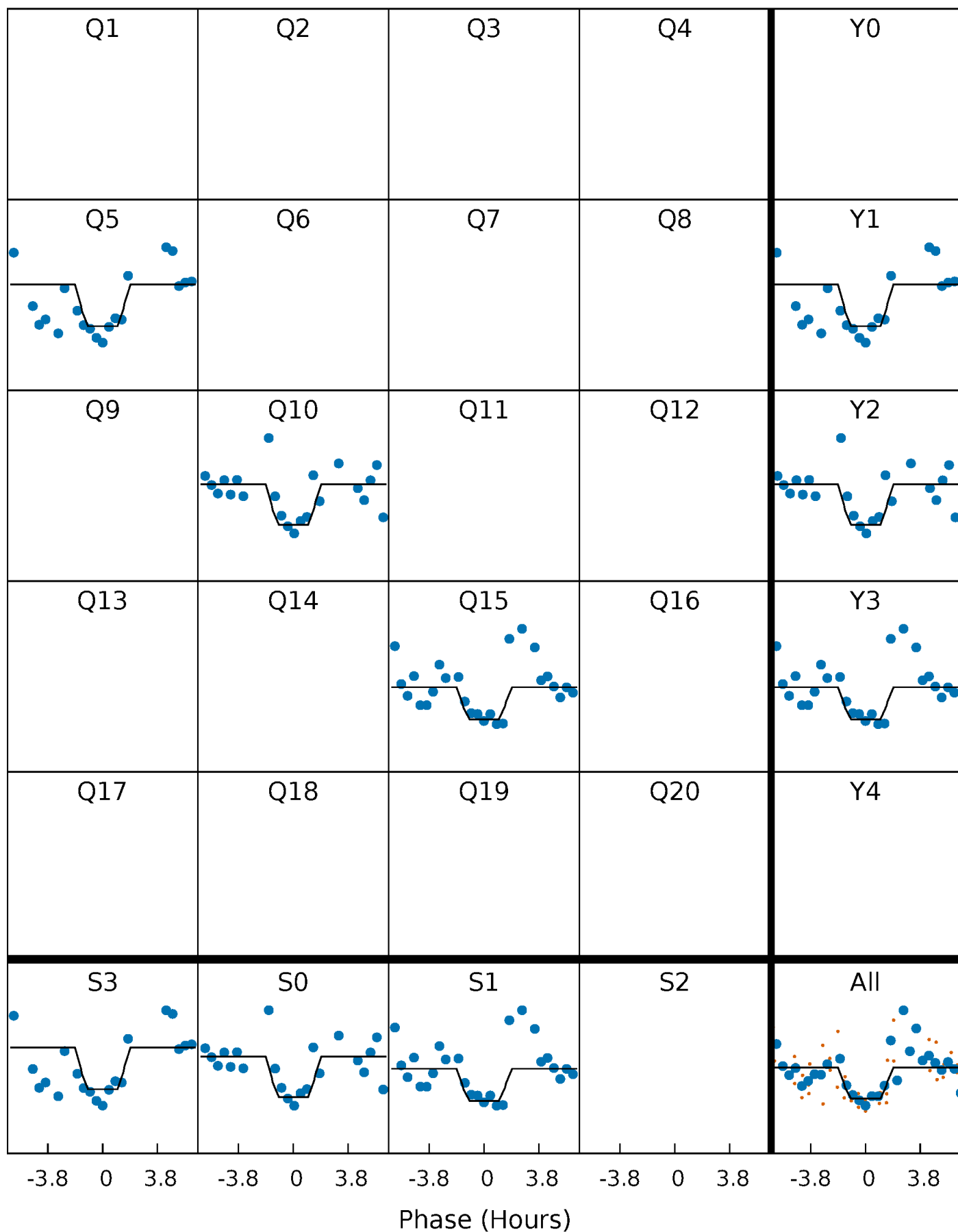
# DV Quarter-Phased Transit Curves

TCE 007939565-05     $P=478.436667$  Days     $T_0=495.580905$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

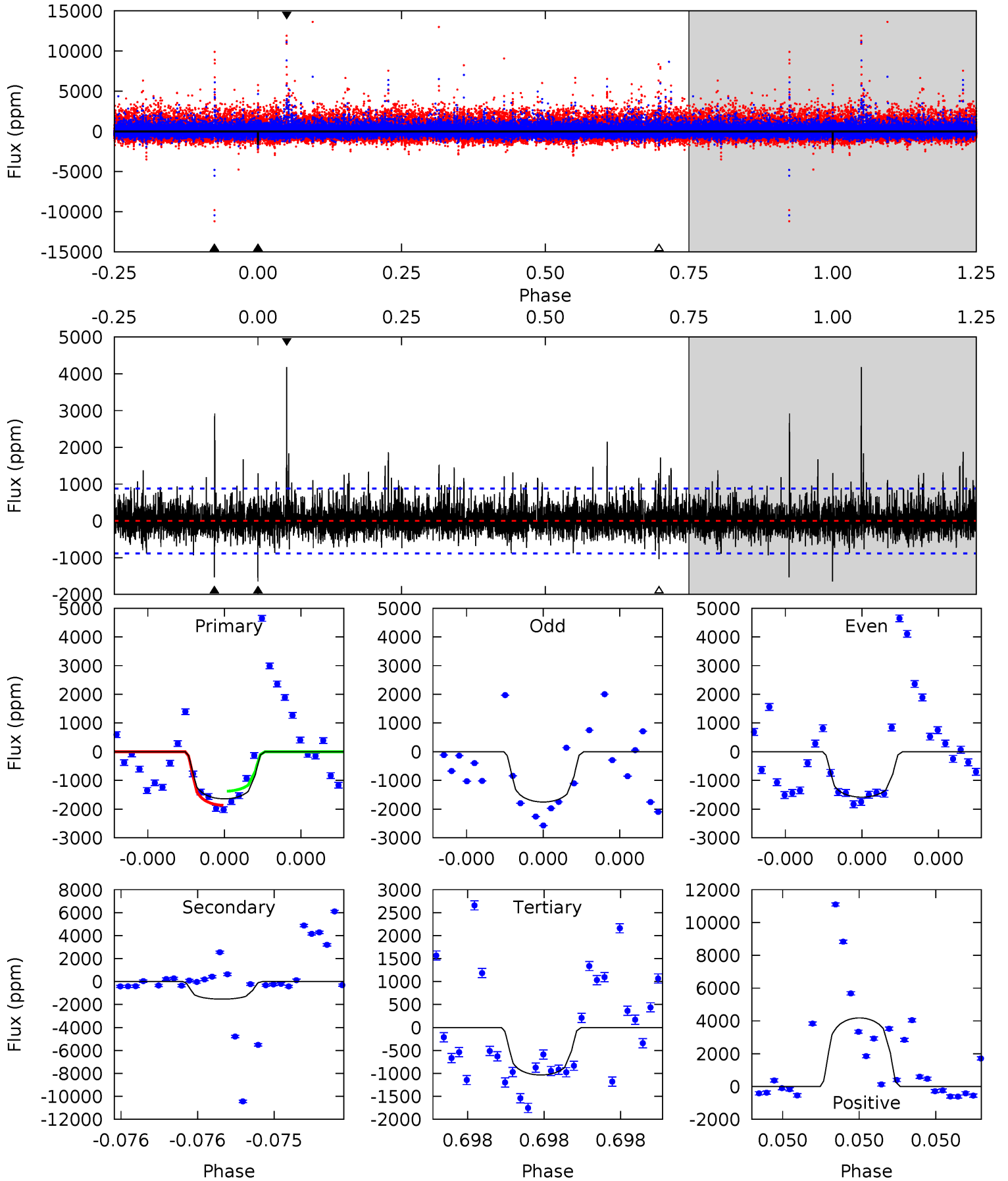
TCE 007939565-05     $P=478.431374$  Days     $T_0=495.578197$  (BKJD)



# DV Model-Shift Uniqueness Test

007939565-05, P = 478.436667 Days, E = 17.144238 Days

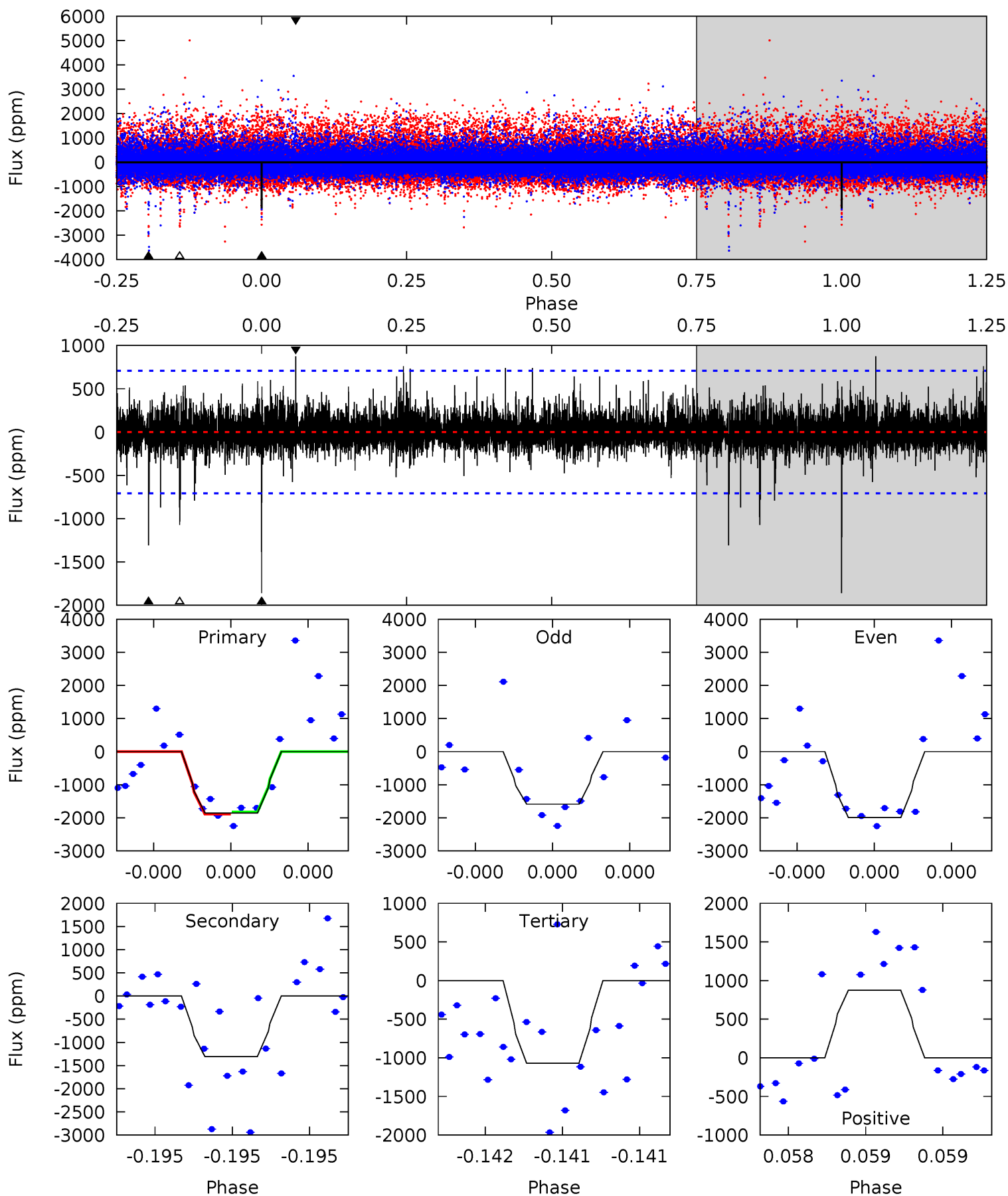
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	9.75	6.59	26.6	5.62	3.55	1.96	3.87	-16.2	3.16	-16.9	0.21	0.87	0.72	1.59



# Alt Model-Shift Uniqueness Test

007939565-05, P = 478.431374 Days, E = 17.146823 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
14.9	10.5	8.60	7.02	5.69	3.65	1.12	6.35	7.92	1.93	3.50	1.38	1.01	0.32	0.26



### Stellar Parameters For KIC 007939565

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3295^{+42}_{-33}$	$5.062^{+0.044}_{-0.044}$	$-0.100^{+0.100}_{-0.100}$	$0.215^{+0.032}_{-0.023}$	$0.194^{+0.038}_{-0.025}$	$27.610^{+6.807}_{-5.953}$
	+1%/-1%	+1%/-1%	+100%/-100%	+15%/-11%	+20%/-13%	+25%/-22%
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 007939565-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1532 \pm 157$	$1.30^{+0.96}_{-0.80}$	$113^{+3}_{-3}$	$2981^{+1097}_{-395}$	$239804^{+1449837}_{-158208}$
Alt.	$-1309 \pm 124$	$1.24^{+1.07}_{-0.75}$	$113^{+3}_{-3}$	$2961^{+1014}_{-450}$	$227594^{+1270843}_{-162036}$

$T_{max}$  = 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

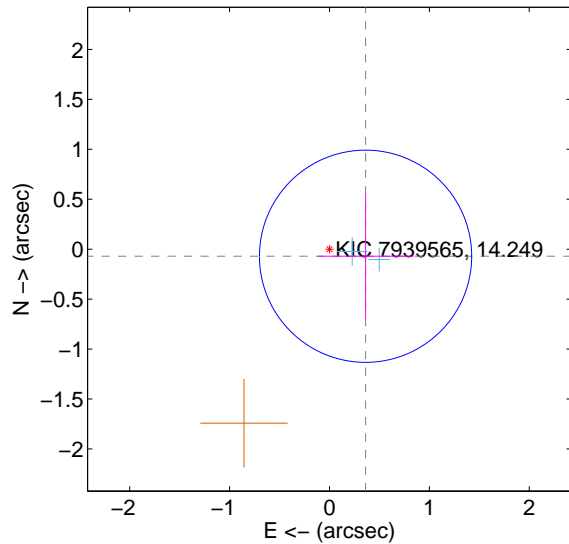
Supplemental centroid analysis for 007939565-05. Kepler magnitude: 14.25. Transit SNR 8.26

There are 2 quarters with good PRF difference image offsets

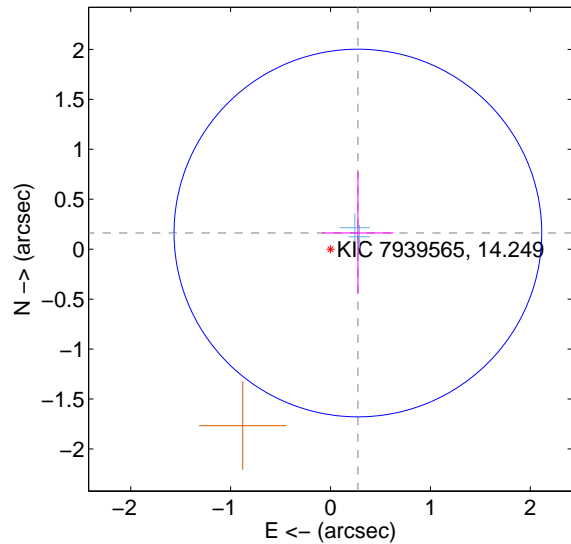
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.368 \pm 0.354$	1.04	$-0.361 \pm 0.480$	$-0.071 \pm 0.623$
PRF-fit source offset from KIC position	$0.318 \pm 0.613$	0.52	$-0.274 \pm 0.358$	$0.162 \pm 0.609$
photometric centroid source offset	$0.64 \pm 0.46$	1.38	$0.15 \pm 0.48$	$0.62 \pm 0.46$

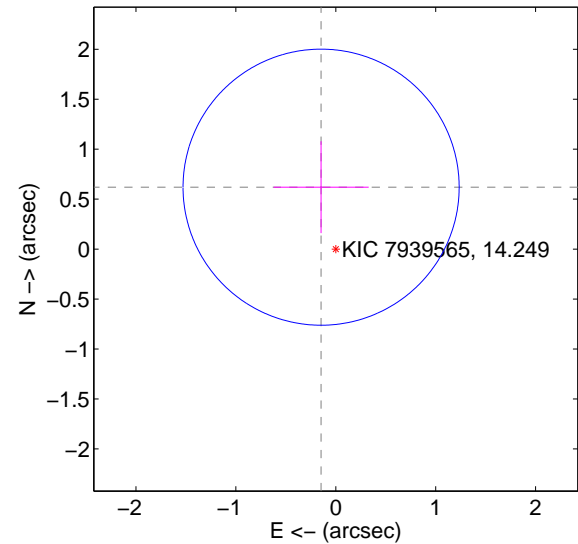
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

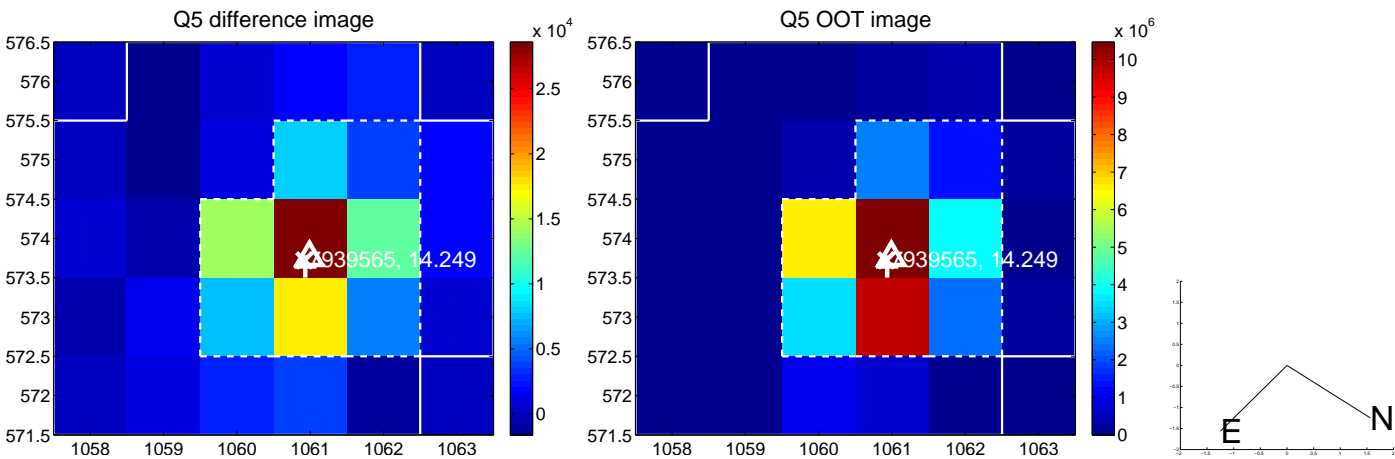


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

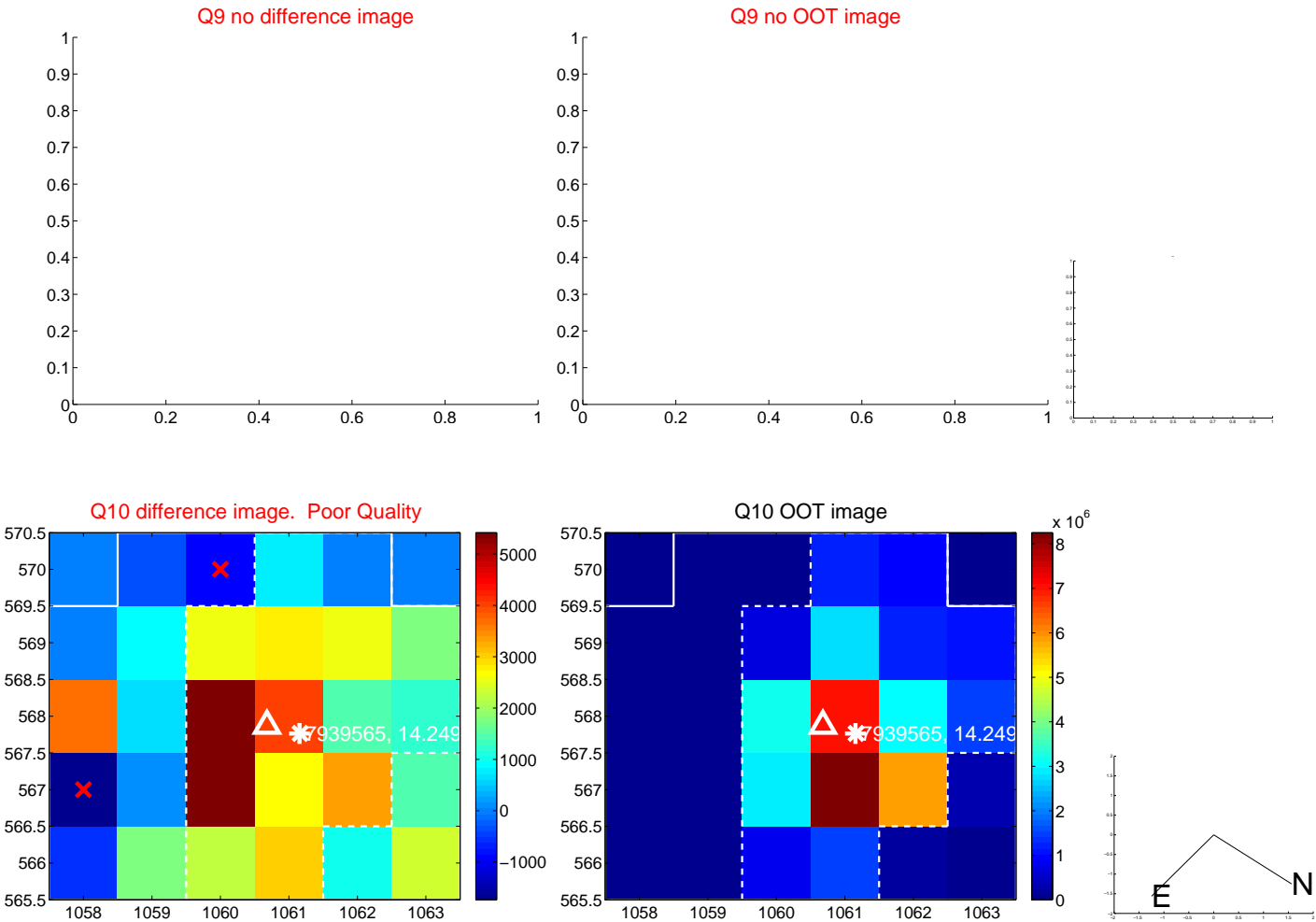


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



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

Q13 no difference image



Q13 no OOT image



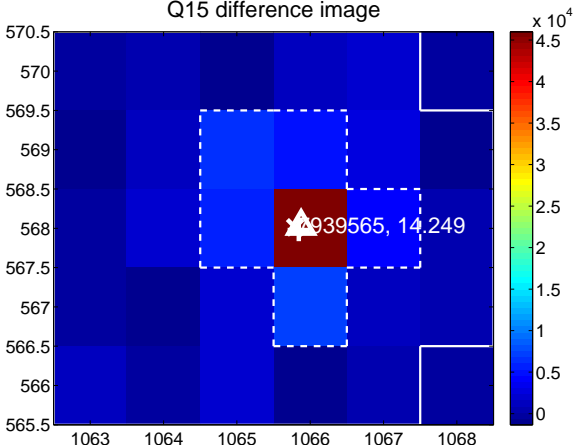
Q14 no difference image



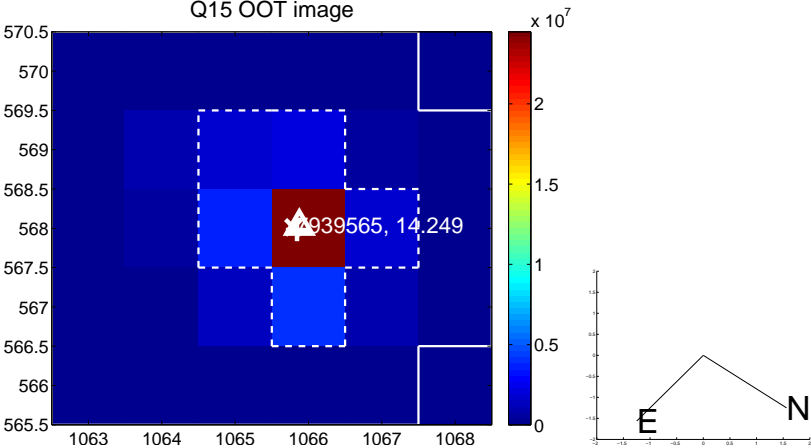
Q14 no OOT image



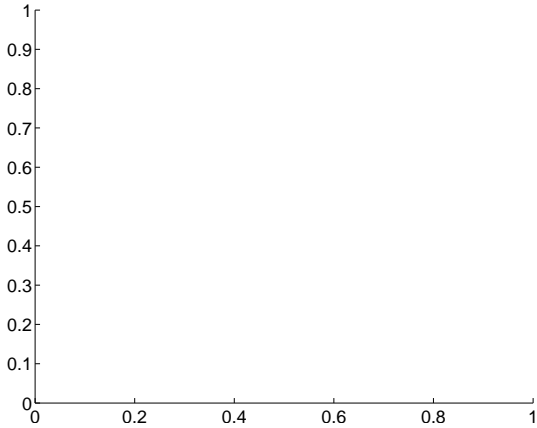
Q15 difference image



Q15 OOT image



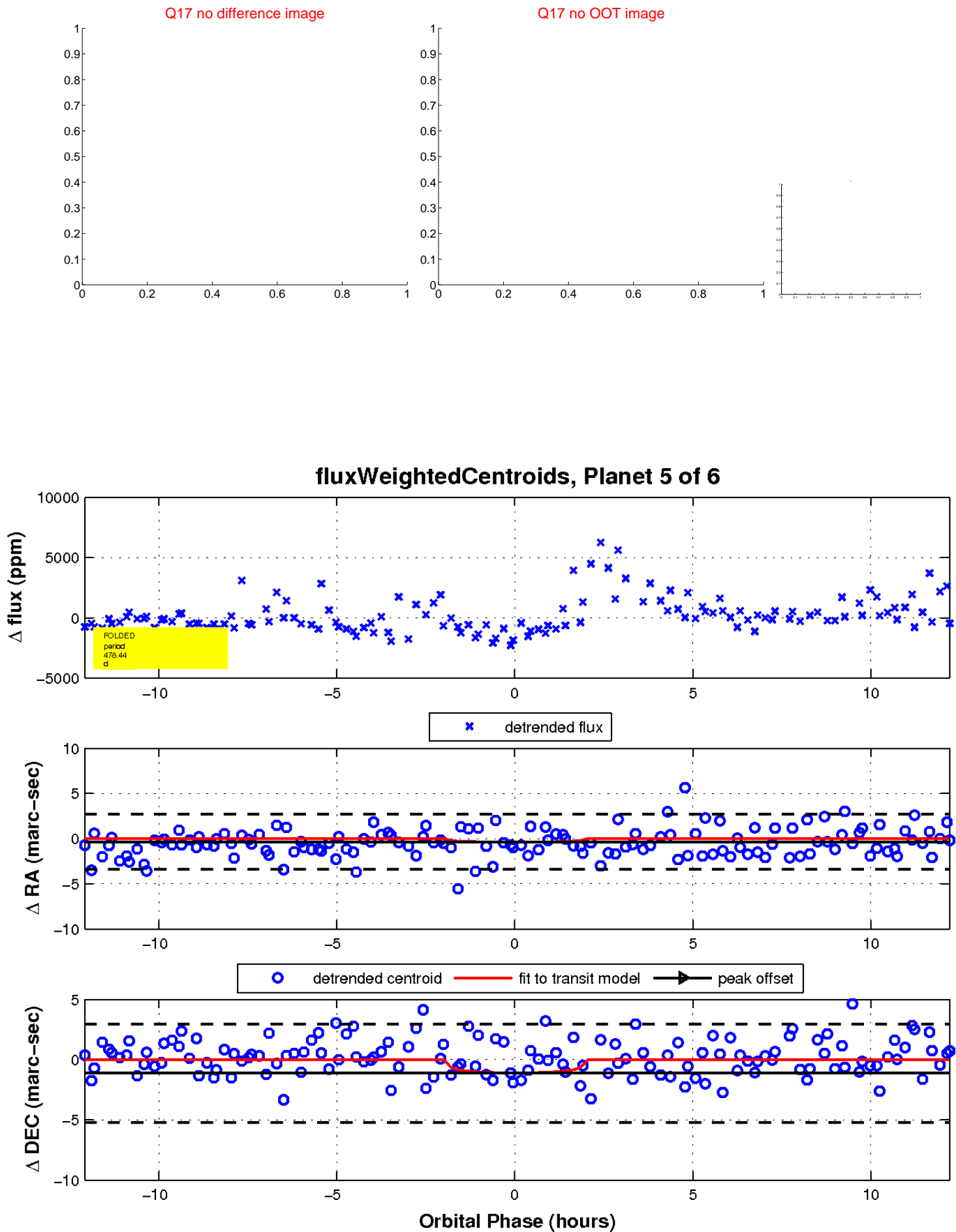
Q16 no difference image



Q16 no OOT image

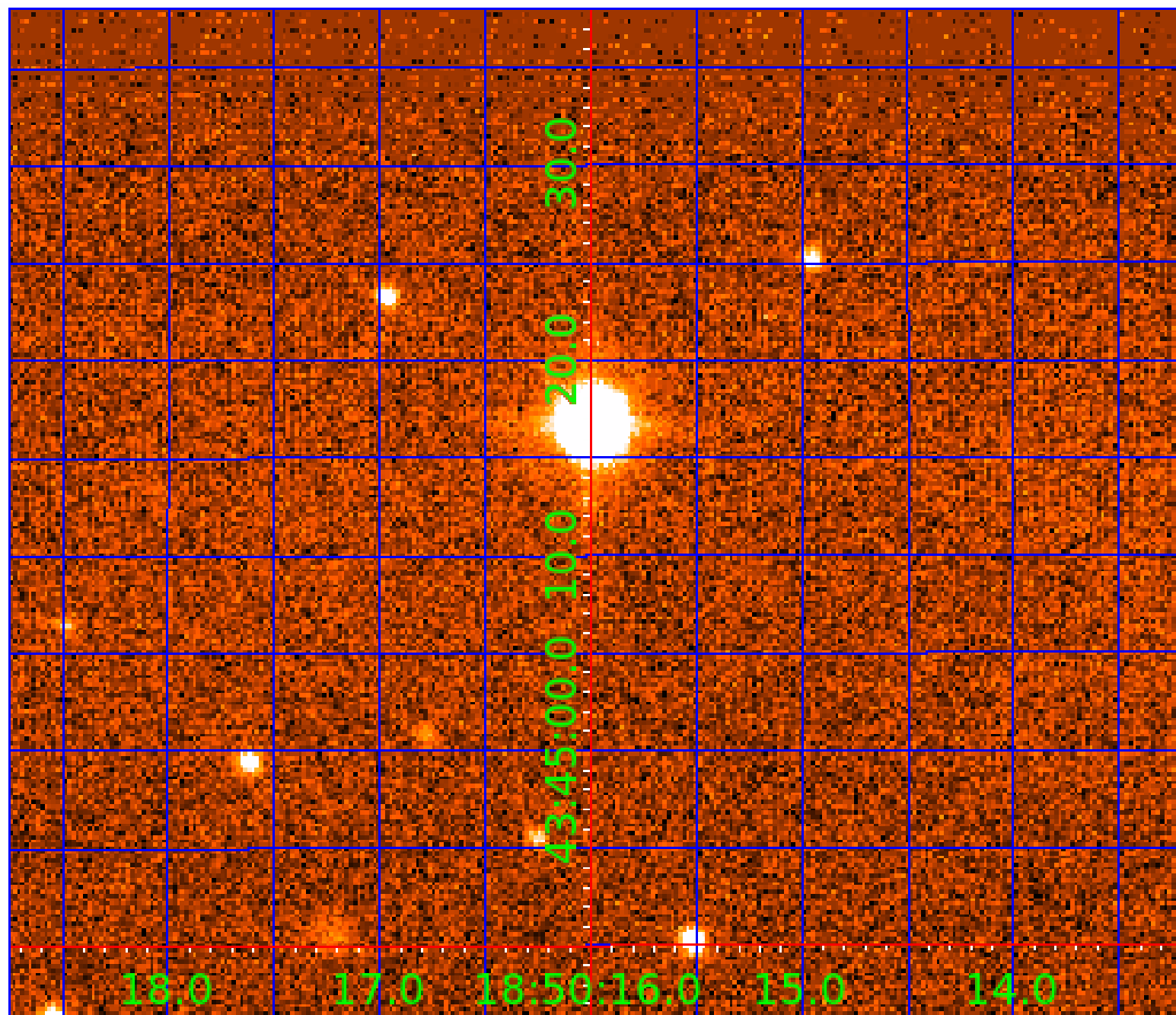


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 007939565

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007939565-01	OBS	No	344.012806	340.200312	1099.7	7.969	20.0	4.6	0.21	3295	0.71	0.02
007939565-02	OBS	No	635.435308	245.485049	1629.6	4.492	13.9	5.9	0.21	3295	0.90	0.01
007939565-03	OBS	No	562.940692	215.165497	2009.3	4.039	12.5	6.7	0.21	3295	0.96	0.01
007939565-04	OBS	No	461.985936	464.924425	1965.5	5.788	12.3	8.0	0.21	3295	0.94	0.01
007939565-05	OBS	No	478.436667	495.580905	2302.3	4.076	11.2	8.3	0.21	3295	1.04	0.01
007939565-06	OBS	No	262.612113	373.917722	726.3	5.000	10.2	-1.0	0.21	3295	0.57	0.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007939565-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—INCONSISTENT_TRANS
007939565-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007939565-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
007939565-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
007939565-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

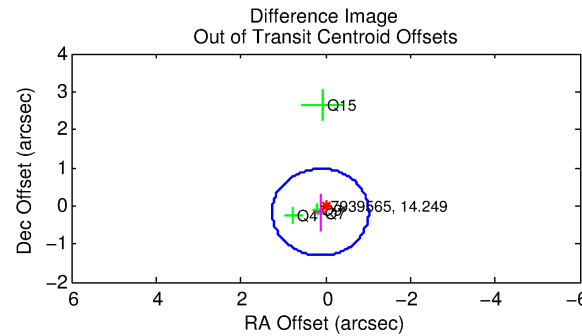
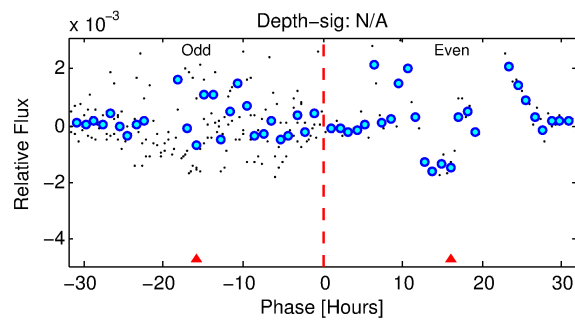
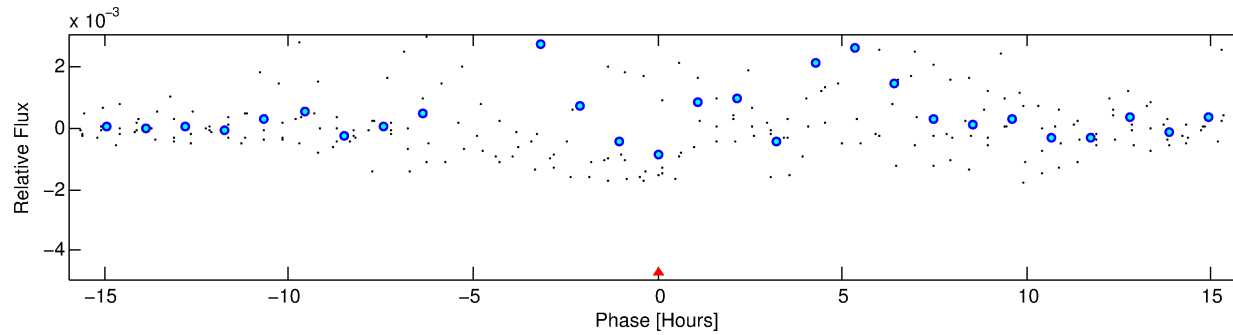
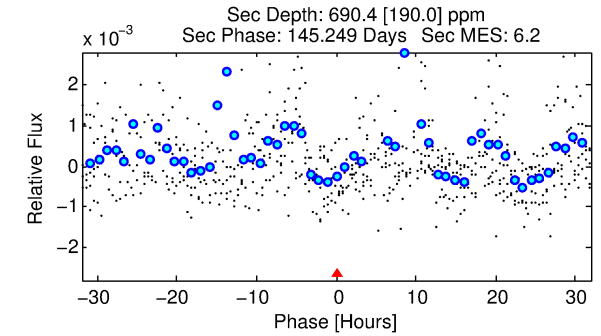
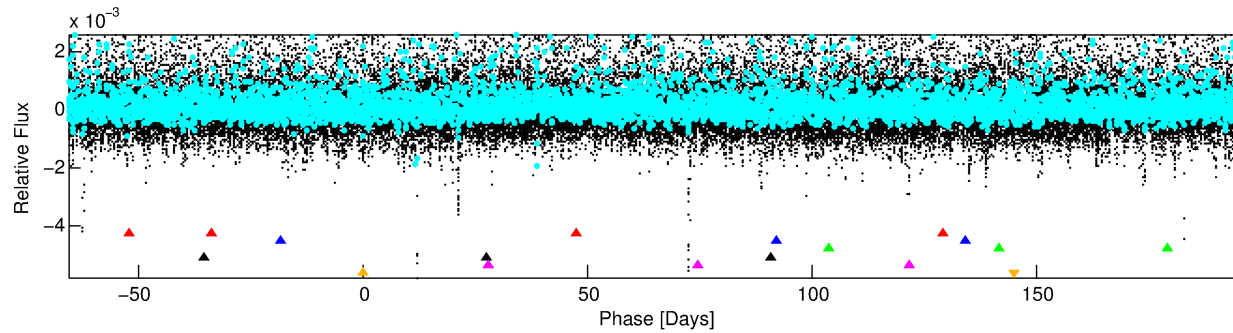
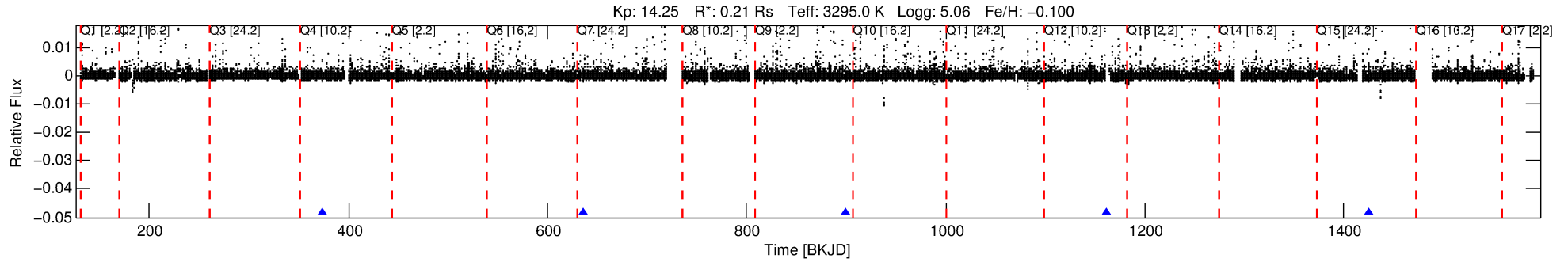
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007939565-06

No Significant Match Found

# DV One-Page Summary

KIC: 7939565 Candidate: 6 of 6 Period: 262.612 d



## TPS TCE Results:

Period = 262.61211 d  
Epoch = 373.9177 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

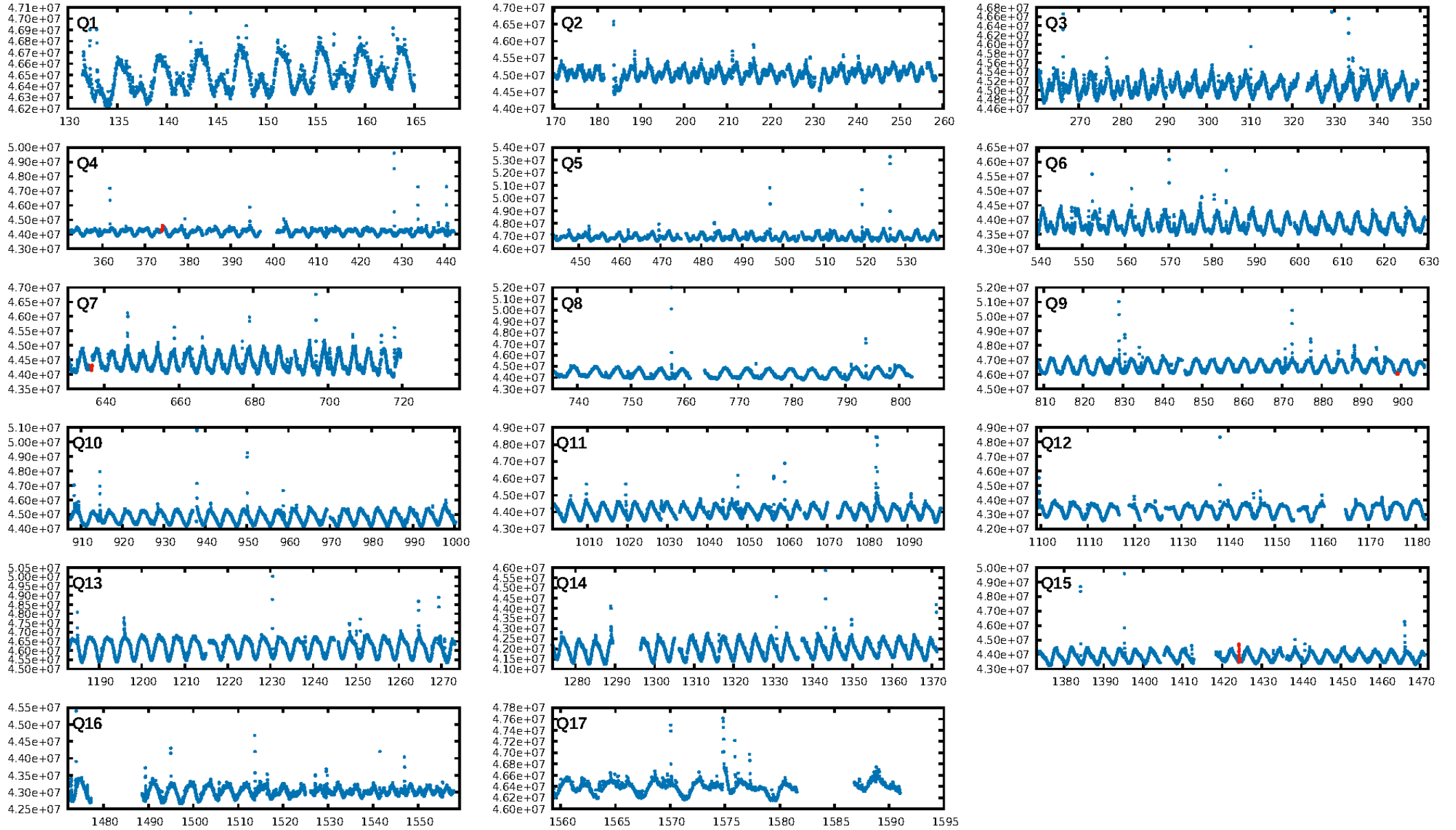
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [207.66σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.9616

Centroid-sig: 93.4%  
Centroid-so: 0.192 arcsec [0.37σ]  
OotOffset-rm: 0.208 arcsec [0.55σ]  
KicOffset-rm: 0.289 arcsec [1.56σ]  
OotOffset-st: 0/2/1/1 [4]  
KicOffset-st: 0/2/1/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [4/4]

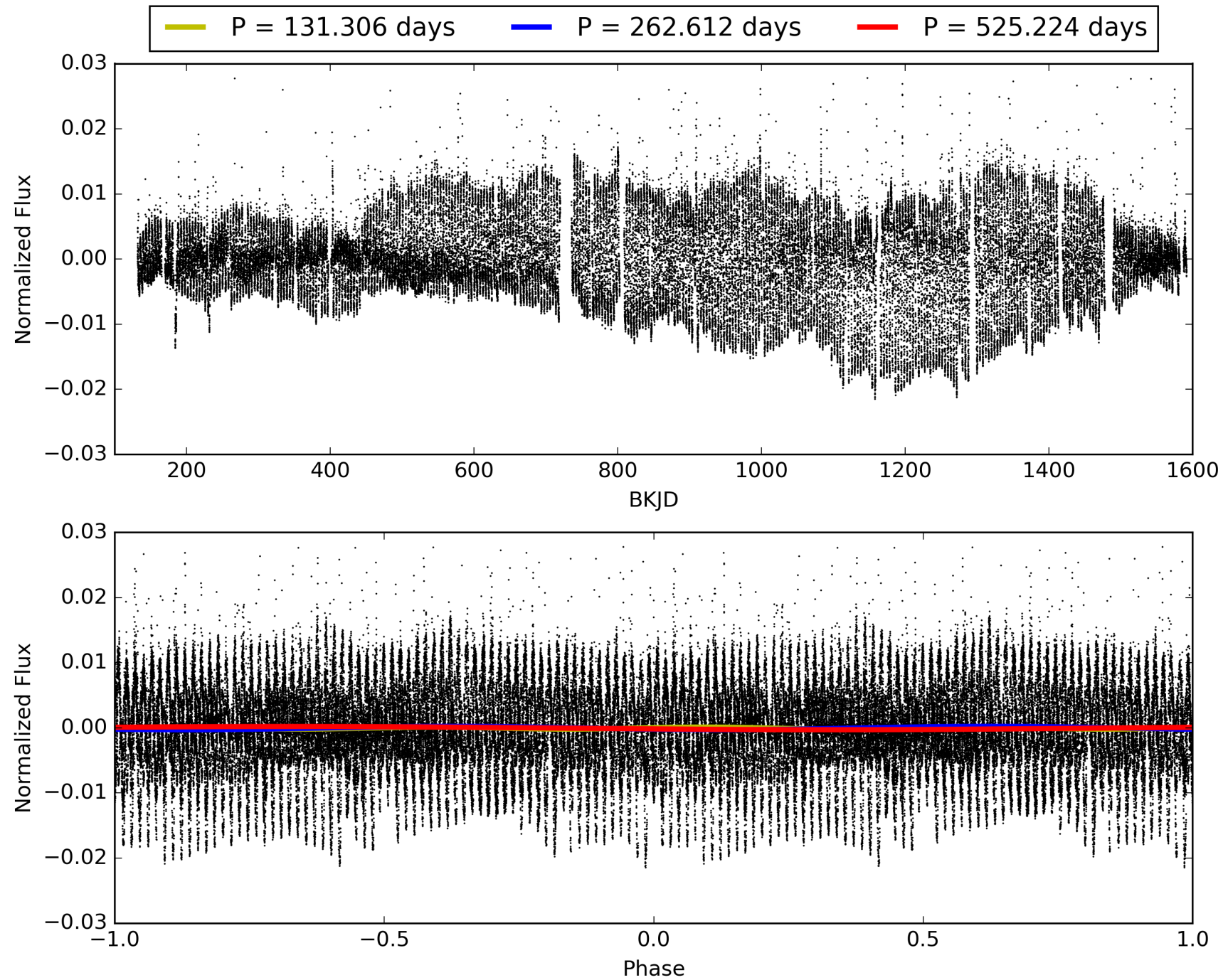
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 09:18:56 Z

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

# TCE 007939565-06, PDC Light Curves



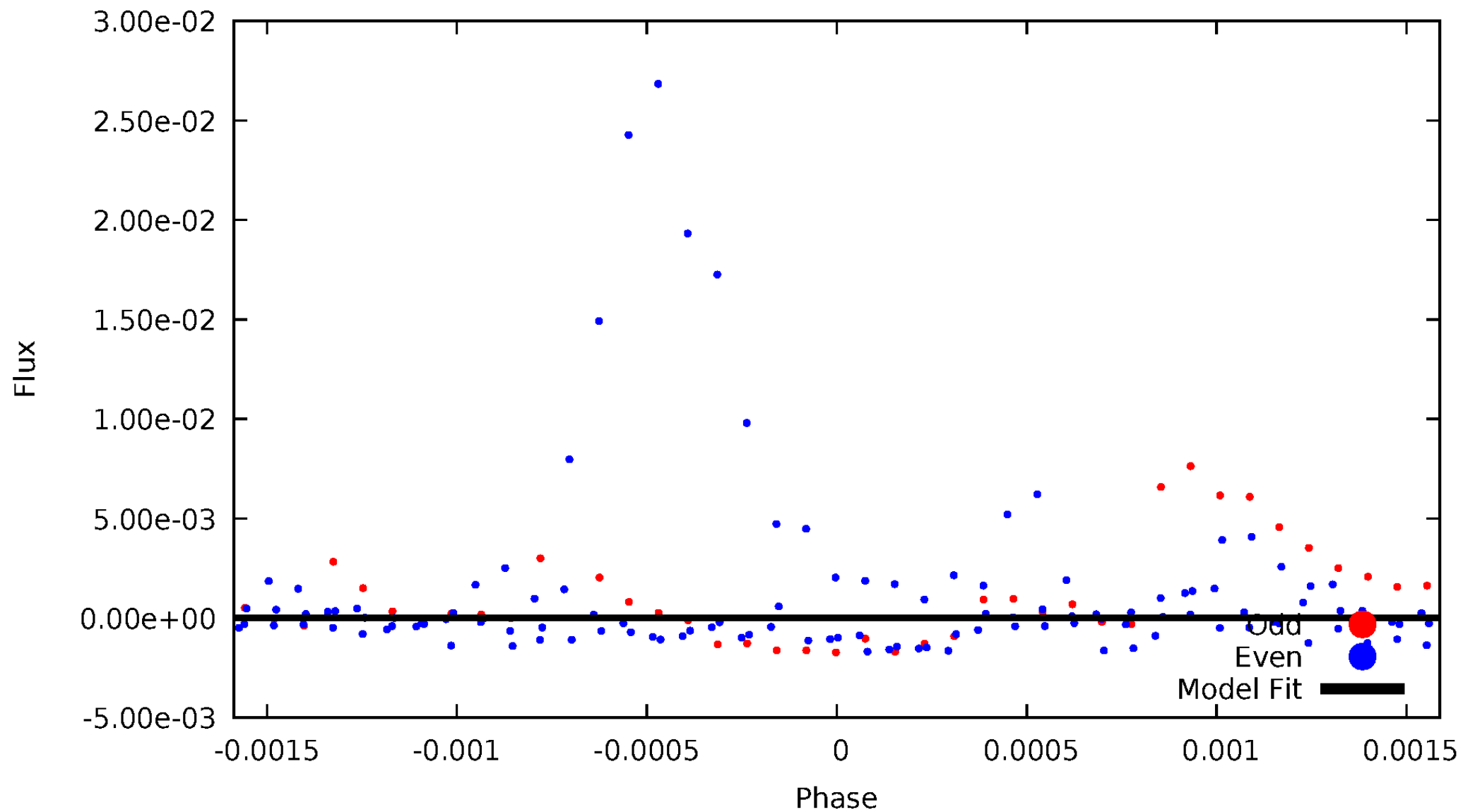
TCE 007939565-06





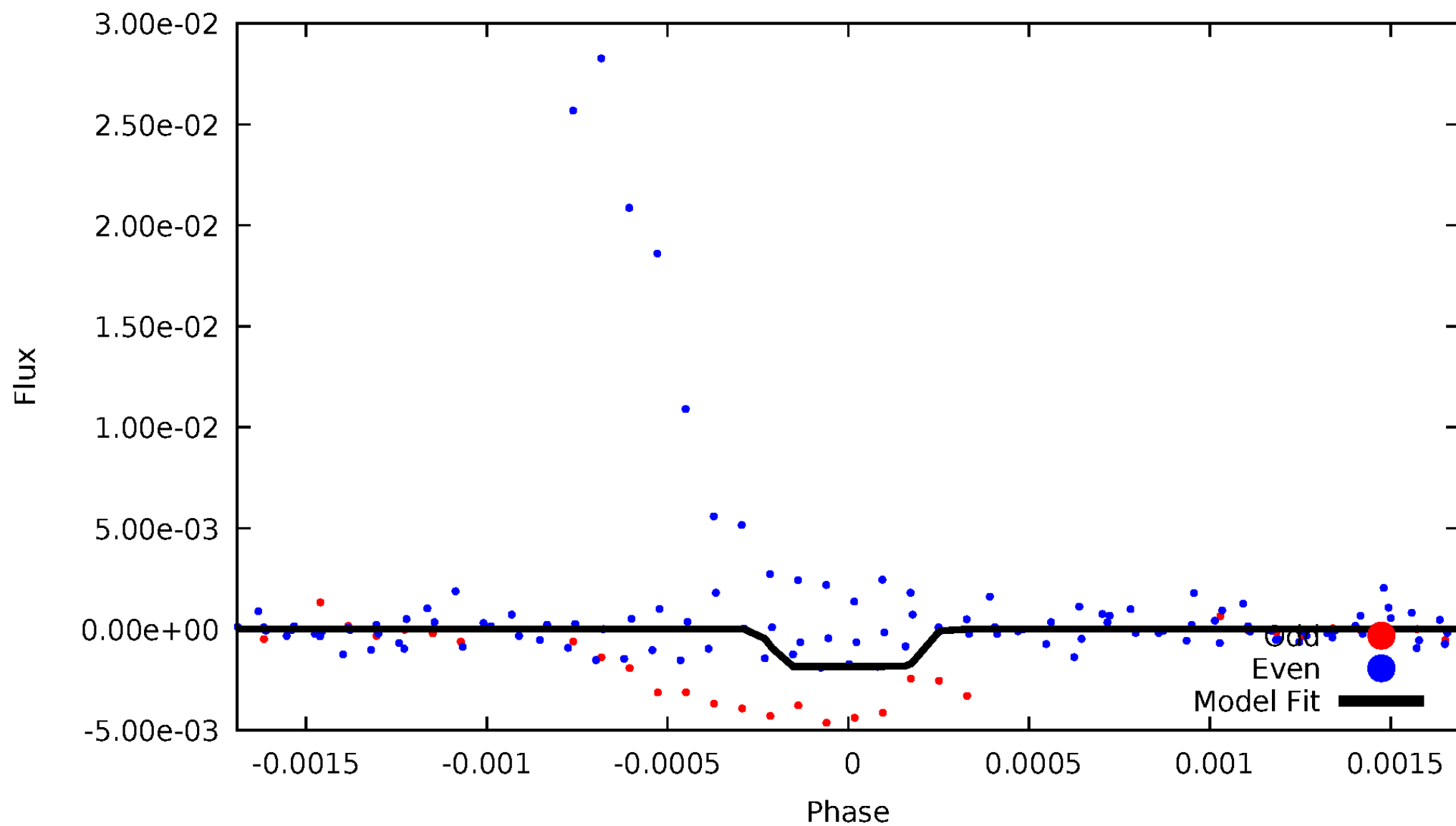
# DV Odd/Even

TCE 007939565-06



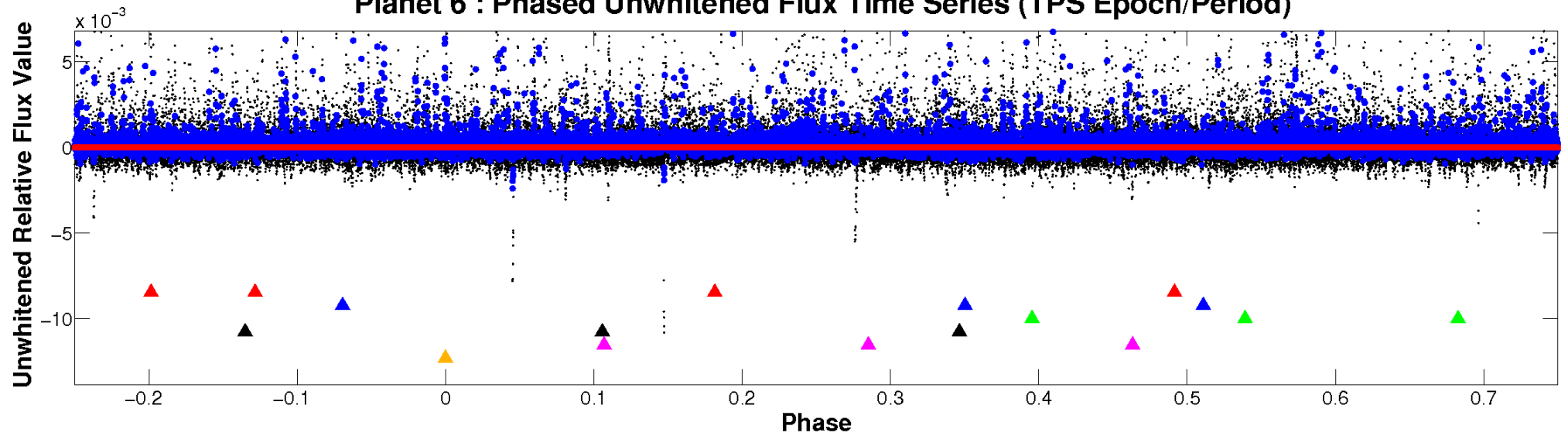
# ALT Odd/Even

TCE 007939565-06



# Non-Whitened Vs. Whitened Light Curve

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

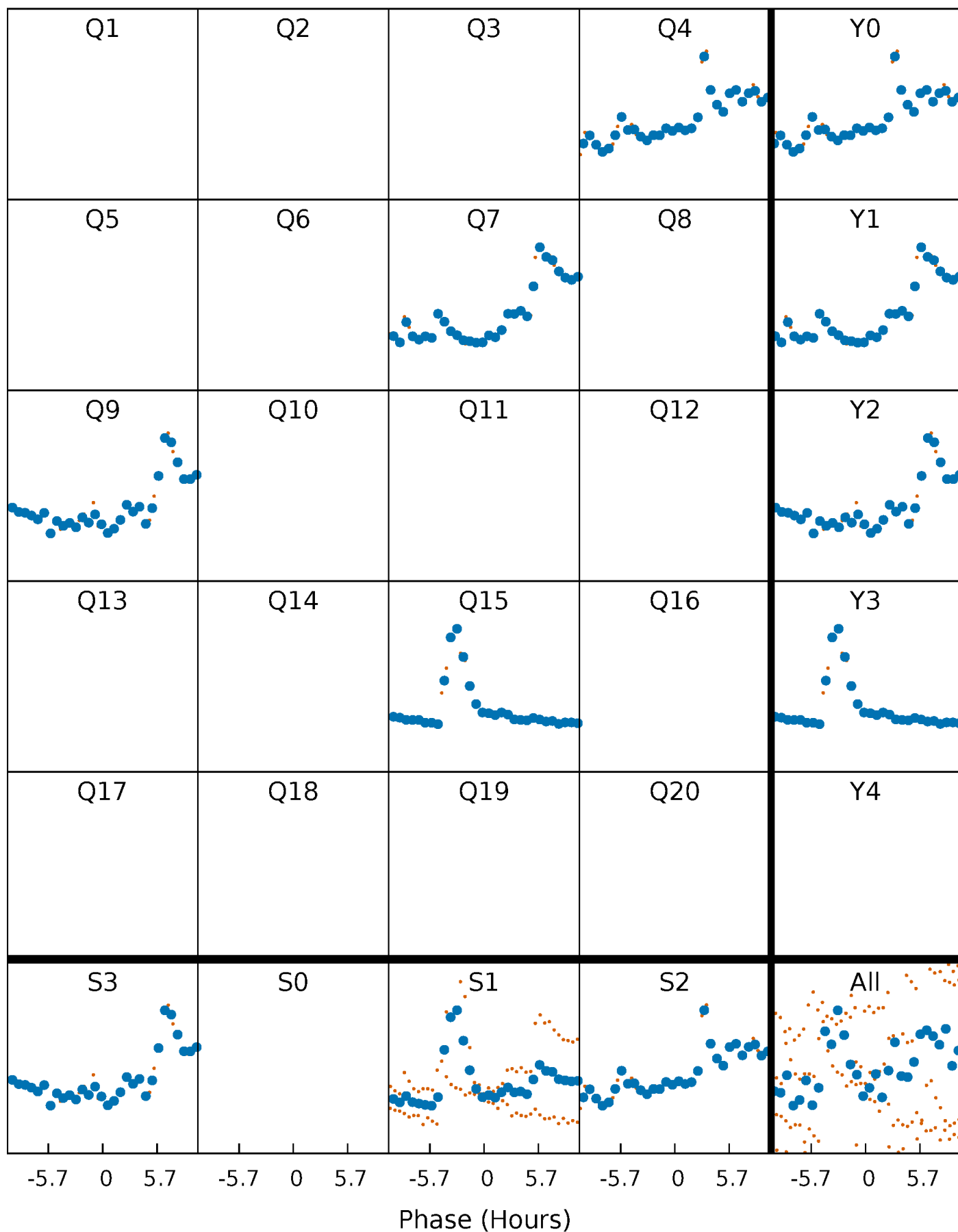


**Planet 6 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



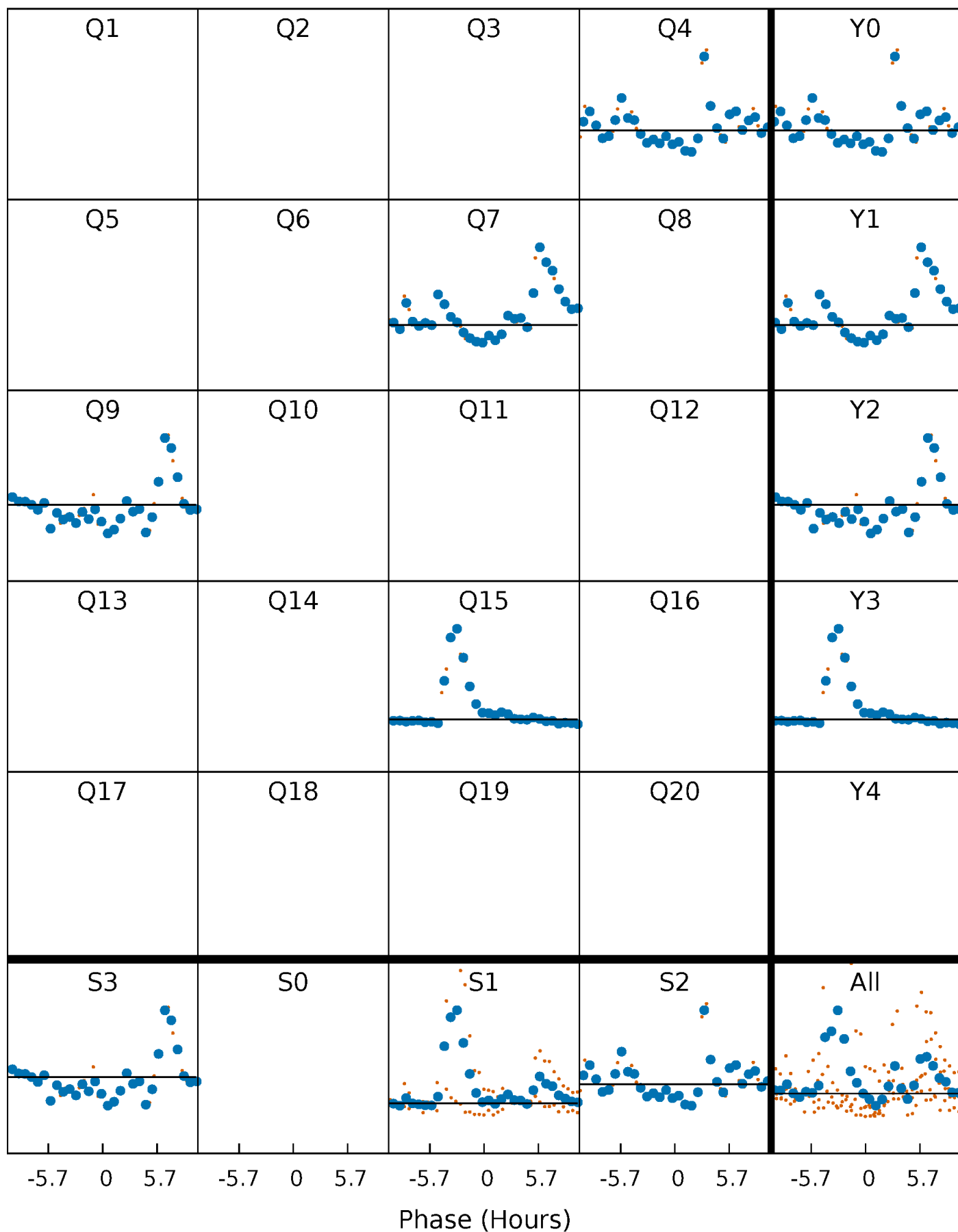
# PDC Quarter-Phased Transit Curves

TCE 007939565-06     $P=262.612113$  Days     $T_0=373.917722$  (BKJD)



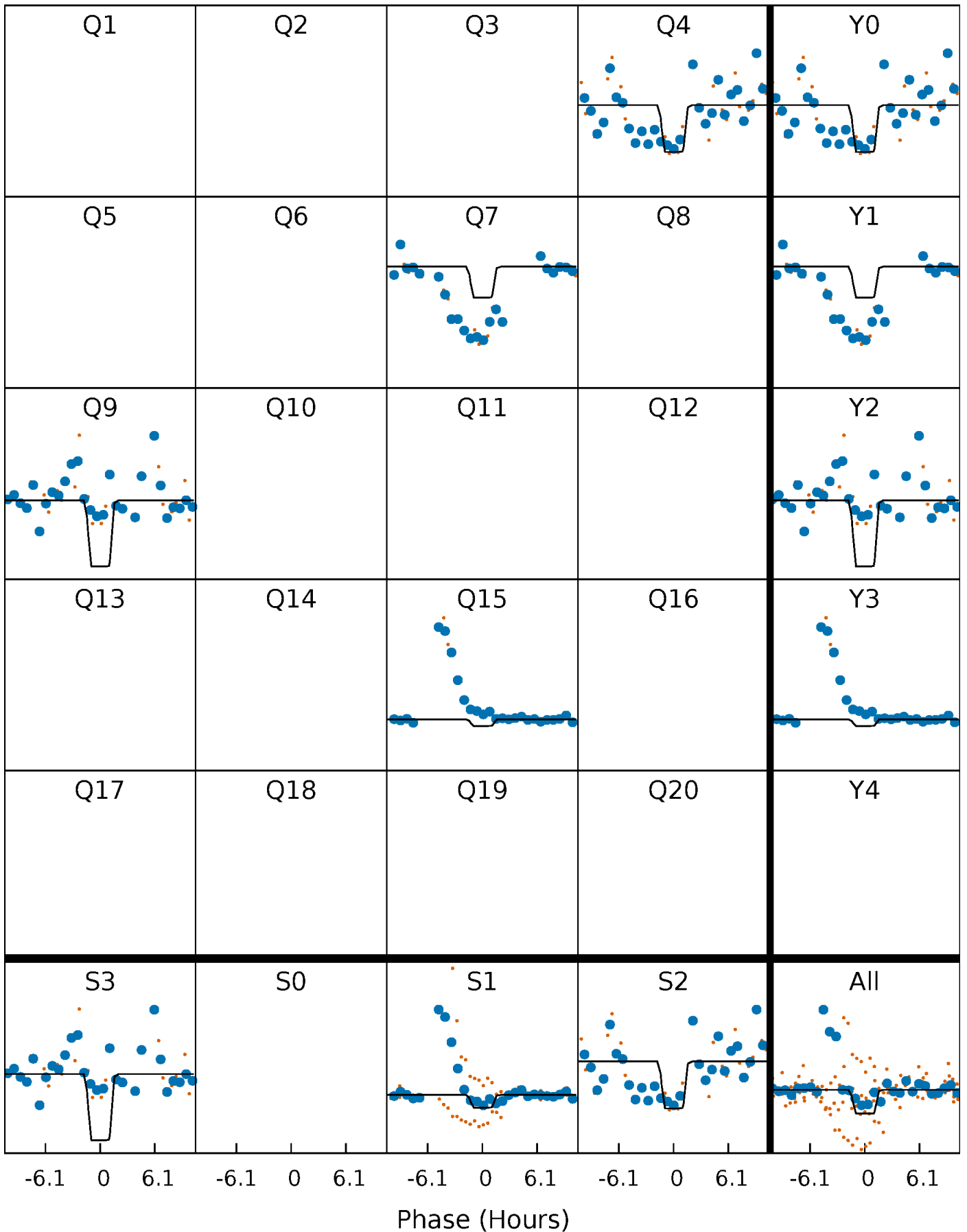
# DV Quarter-Phased Transit Curves

TCE 007939565-06 P=262.612113 Days  $T_0=373.917722$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

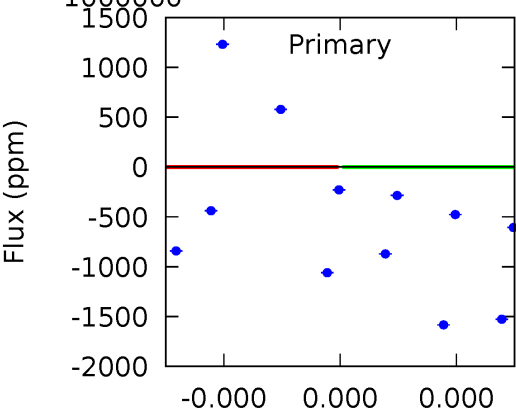
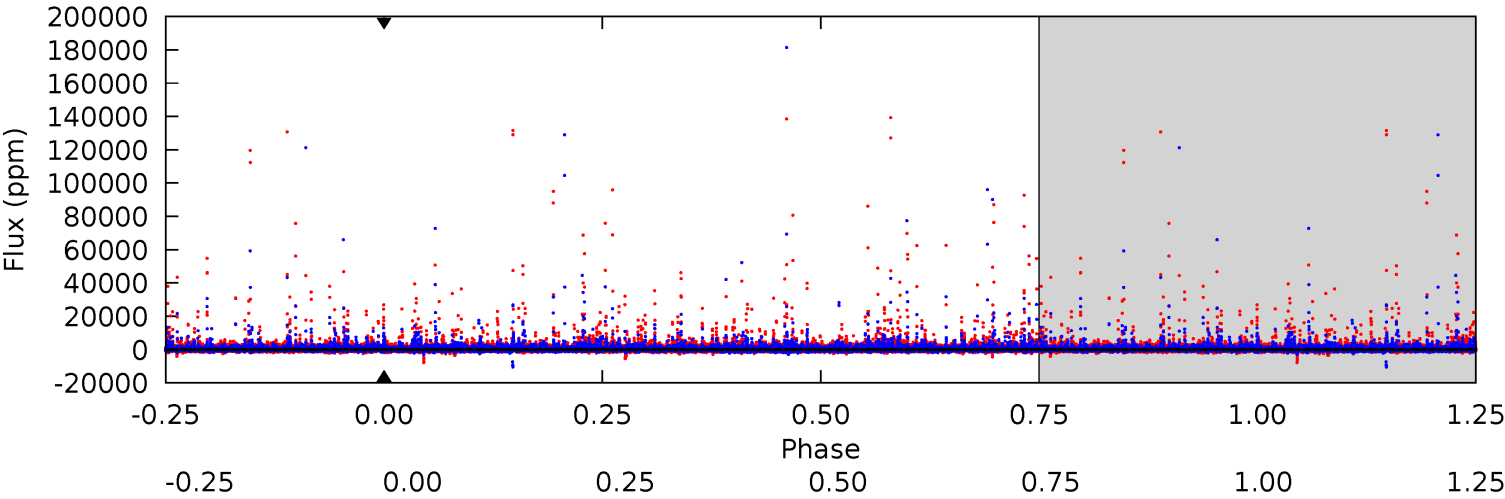
TCE 007939565-06 P=262.612113 Days  $T_0=373.973845$  (BKJD)



DV Model-Shift Uniqueness Test

007939565-06, P = 262.612113 Days, E = 111.305609 Days

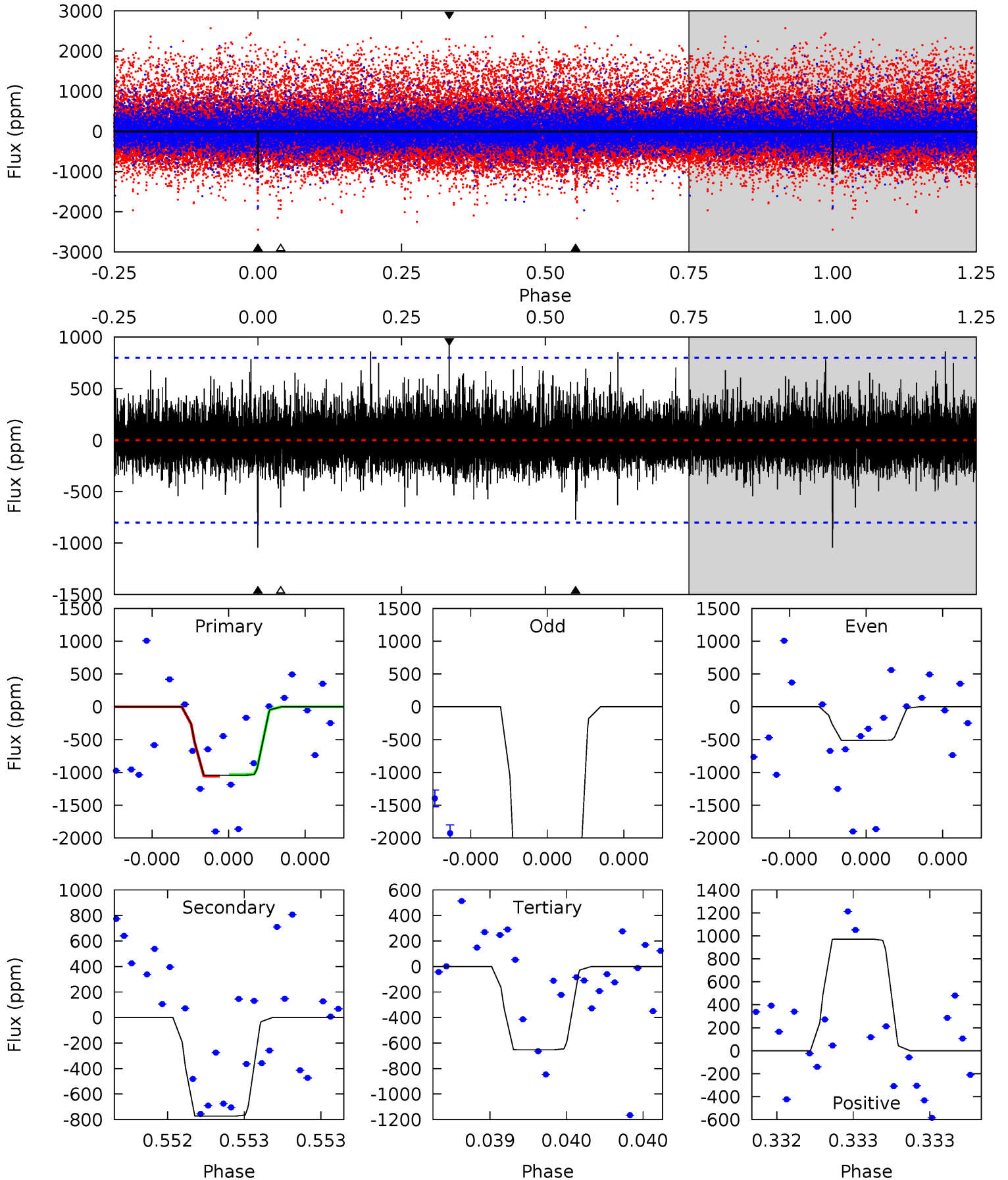
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

007939565-06, P = 262.612113 Days, E = 111.361732 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
7.28	5.39	4.55	6.78	5.58	3.50	1.16	2.73	0.51	0.84	-1.39	15.2	1.04	0.48	0.07





### Stellar Parameters For KIC 007939565

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3295^{+42}_{-33}$	$5.062^{+0.044}_{-0.044}$	$-0.100^{+0.100}_{-0.100}$	$0.215^{+0.032}_{-0.023}$	$0.194^{+0.038}_{-0.025}$	$27.610^{+6.807}_{-5.953}$
	+1%/-1%	+1%/-1%	+100%/-100%	+15%/-11%	+20%/-13%	+25%/-22%
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 007939565-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$1.76^{+1.89}_{-1.24}$	$138^{+4}_{-3}$	$-2250^{+8539}_{-4442}$	$-11811.095^{+5974550.109}_{-7600603.534}$
Alt.	$-773 \pm 143$	$1.85^{+1.95}_{-1.25}$	$138^{+3}_{-3}$	$2480^{+872}_{-372}$	$26079^{+209032}_{-19737}$

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

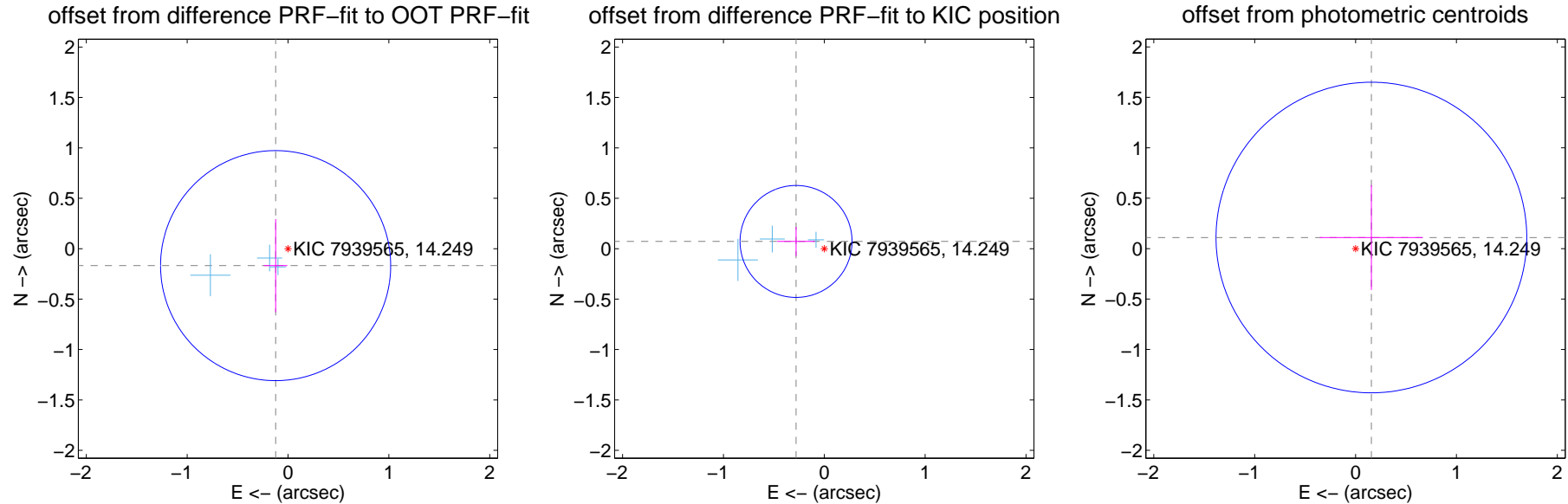
## DV Centroid Data

Supplemental centroid analysis for 007939565-06. Kepler magnitude: 14.25. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

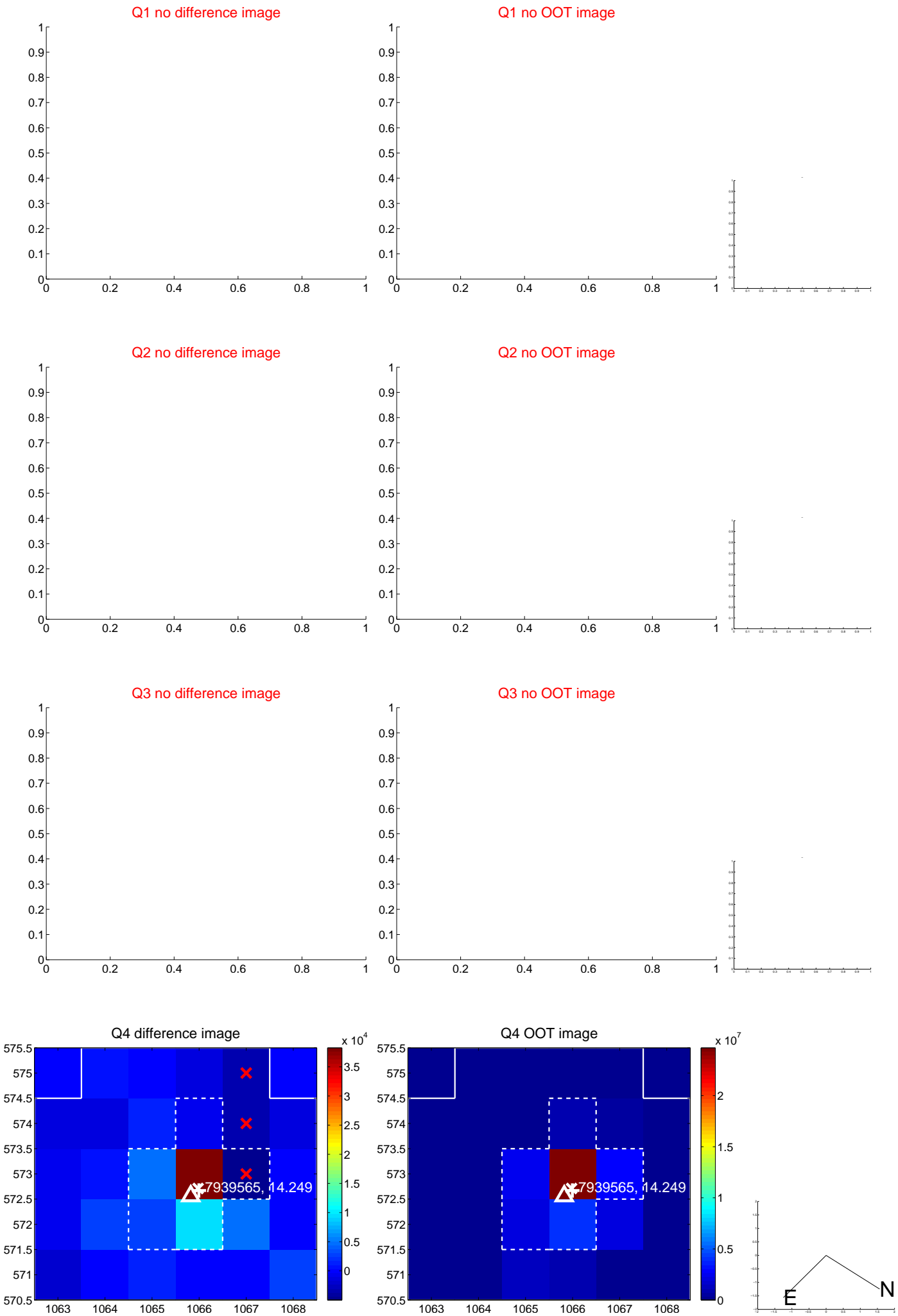
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.208 \pm 0.380$	0.55	$0.123 \pm 0.116$	$-0.168 \pm 0.462$
PRF-fit source offset from KIC position	$0.289 \pm 0.185$	1.56	$0.280 \pm 0.187$	$0.072 \pm 0.144$
photometric centroid source offset	$0.19 \pm 0.51$	0.37	$-0.16 \pm 0.51$	$0.11 \pm 0.52$



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



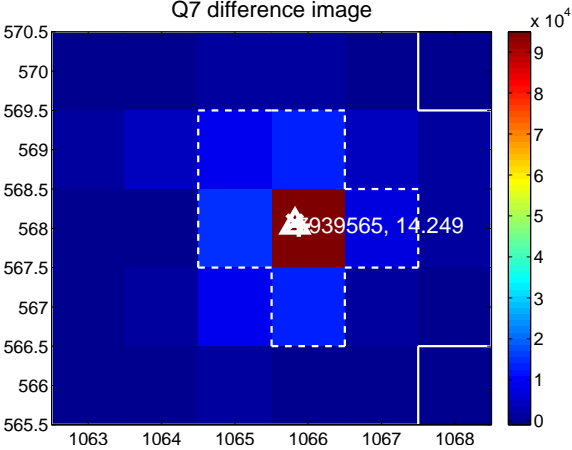
Q6 no difference image



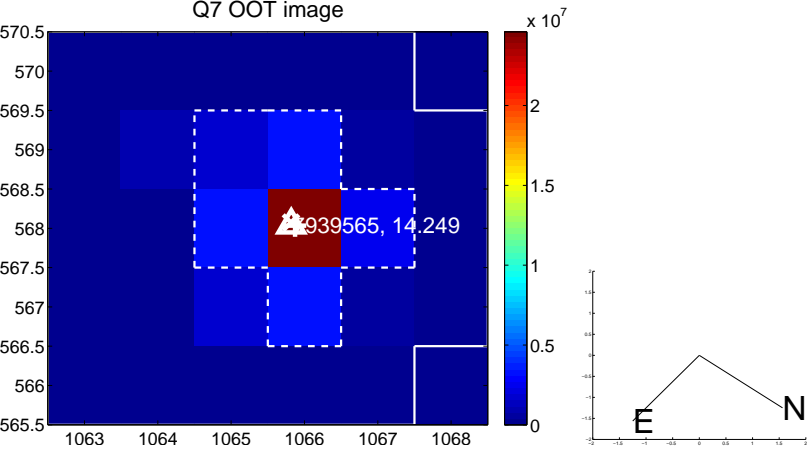
Q6 no OOT image



Q7 difference image



Q7 OOT image



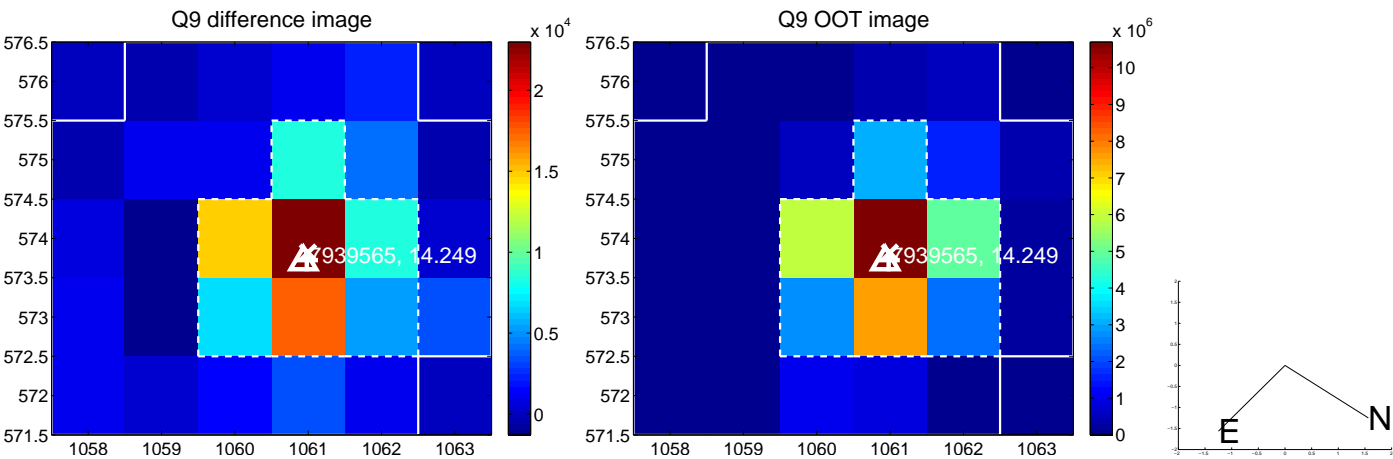
Q8 no difference image



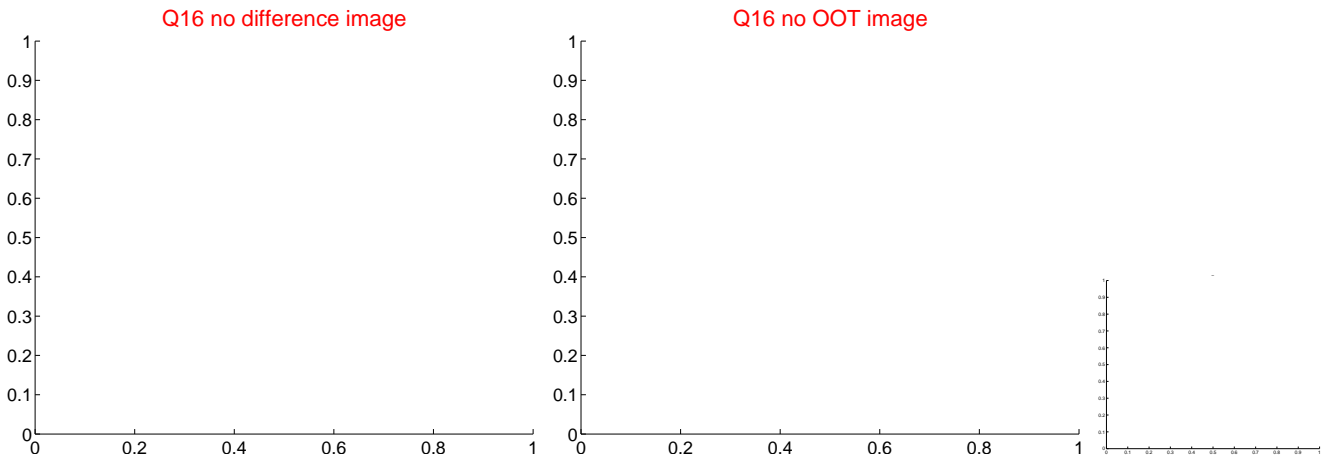
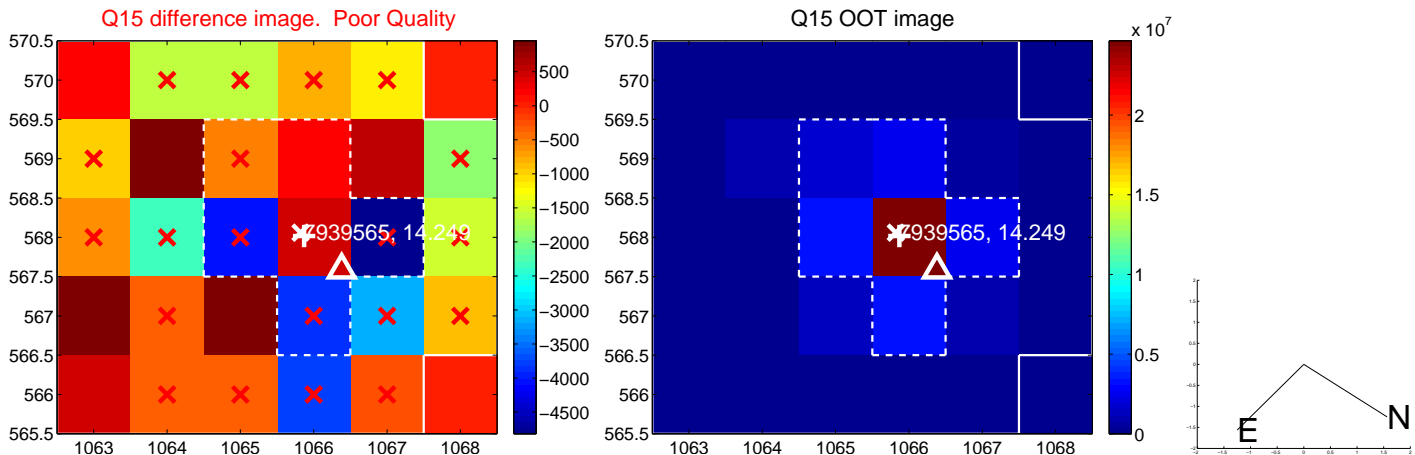
Q8 no OOT image



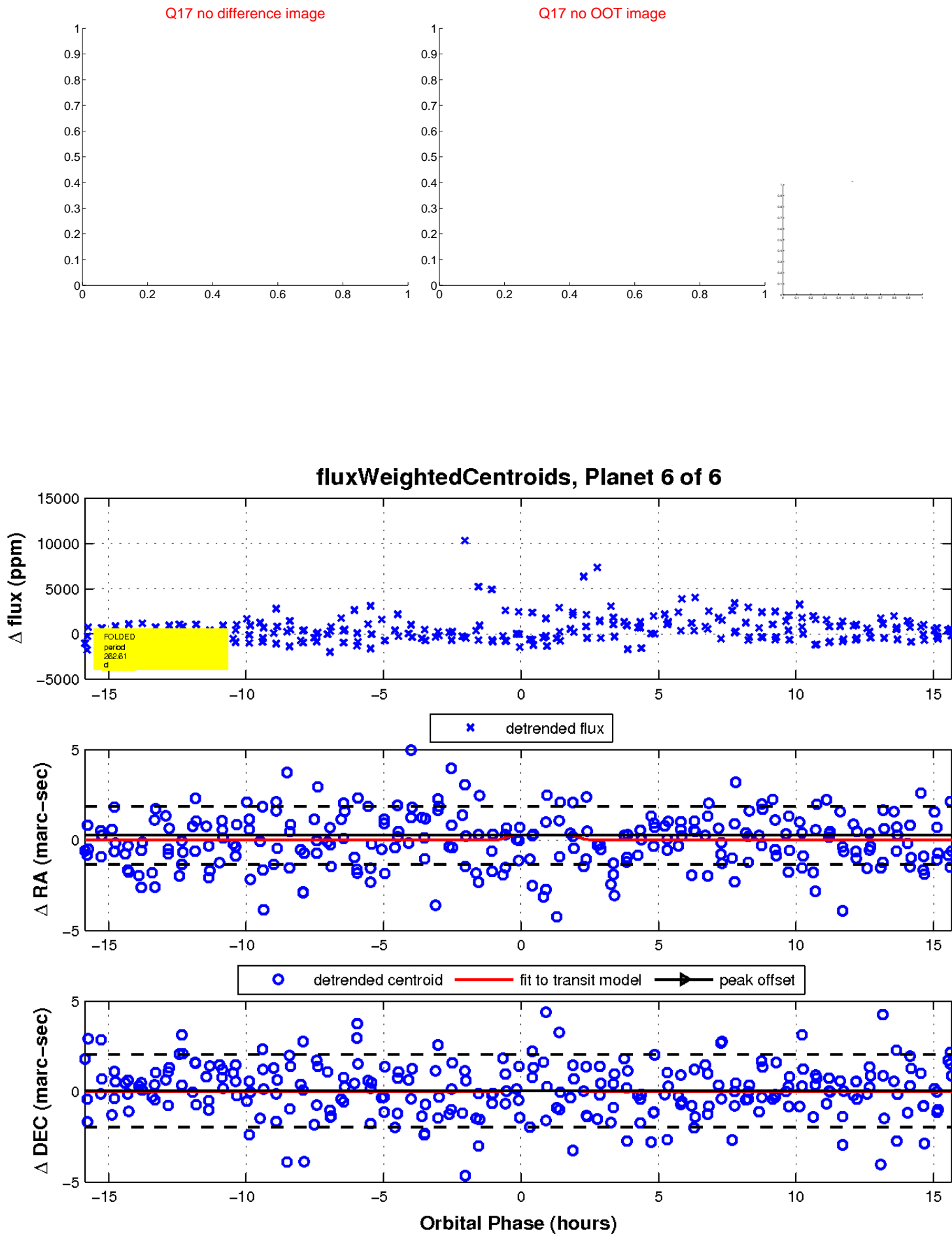
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

