

# KIC 008566113

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008566113-01	OBS	No	1.214754	131.951842	31.0	3.705	8.3	9.1	3.82	7050	2.48	43779.32
008566113-02	OBS	No	663.234238	251.947387	670.3	7.221	7.4	7.8	3.82	7050	12.51	9.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008566113-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
008566113-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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 008566113-01

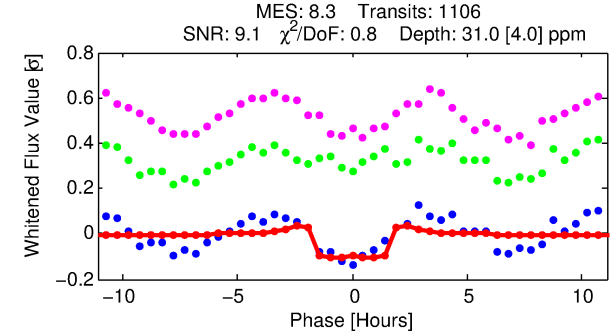
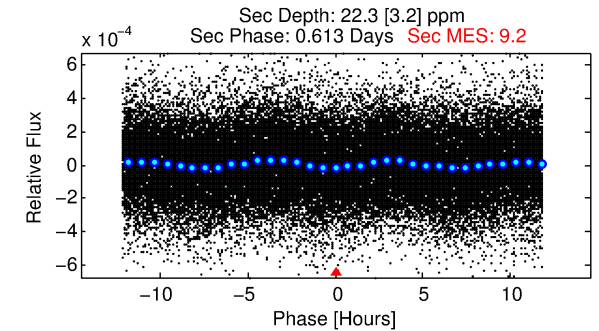
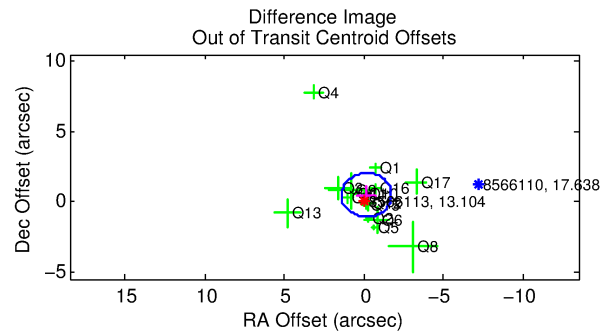
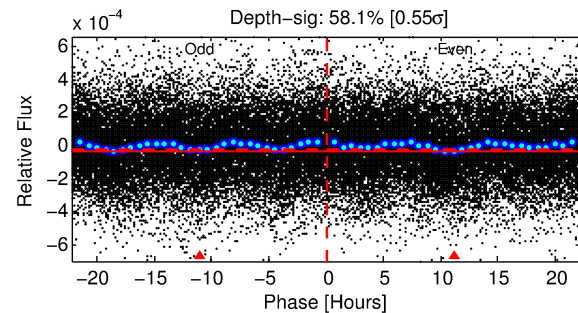
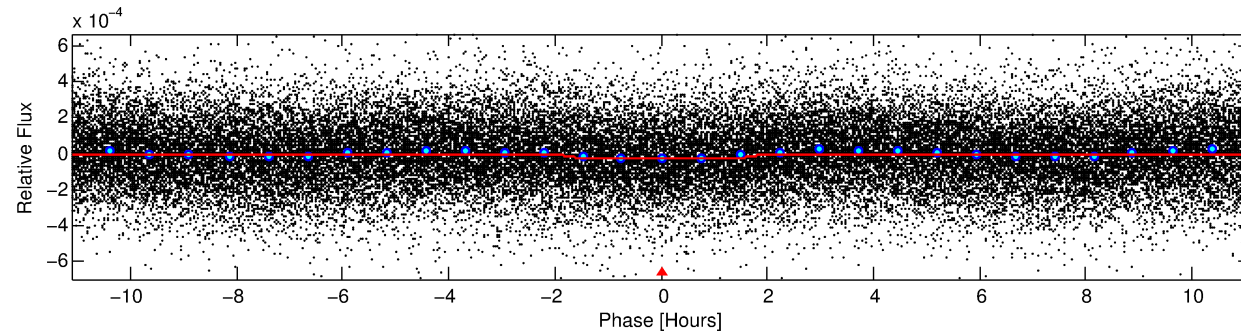
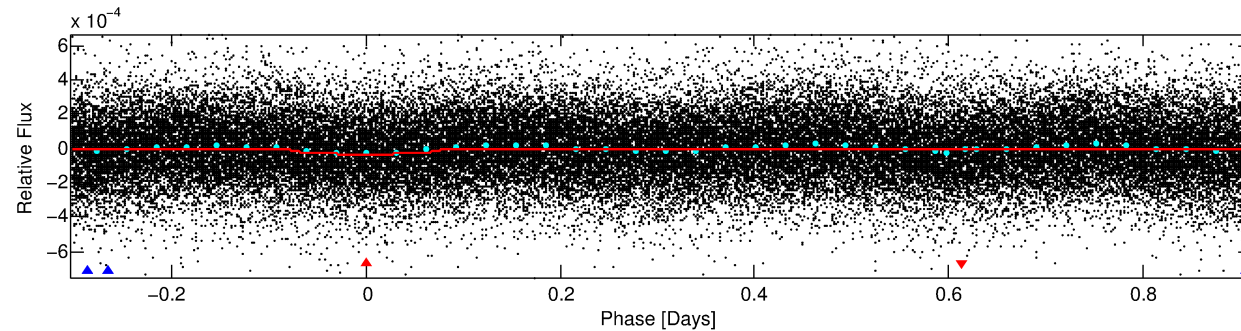
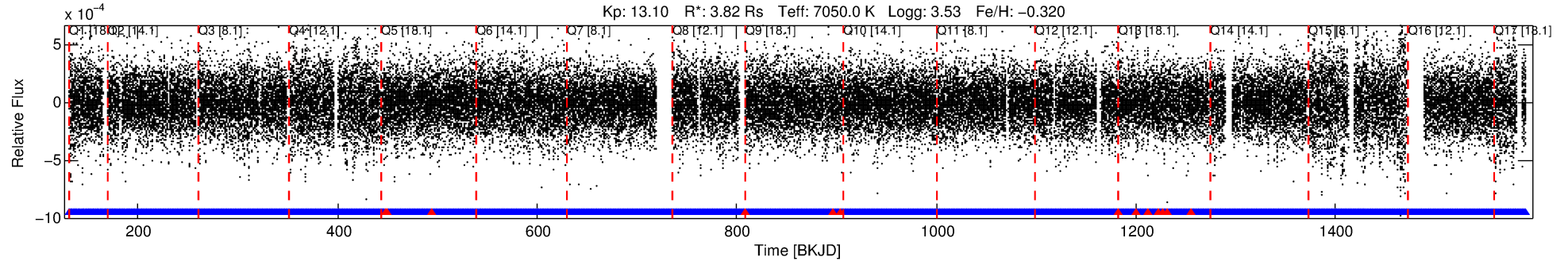
No Significant Match Found

# DV One-Page Summary

KIC: 8566113 Candidate: 1 of 2 Period: 1.215 d

KOI: K07061 Corr: No Ephemeris Match

Kp: 13.10 R\*: 3.82 Rs Teff: 7050.0 K Logg: 3.53 Fe/H: -0.320



## DV Fit Results:

Period = 1.21475 [0.00001] d  
Epoch = 131.9518 [0.0027] BKJD  
Rp/R\* = 0.0059 [0.0015]  
a/R\* = 1.47 [1.15]  
b = 0.90 [0.31]  
Seff = 43779.32 [26602.36]  
Teq = 3688 [560] K  
Rp = 2.48 [1.17] Re  
a = 0.0272 [0.0102] AU  
Ag = 1.47 [1.16] [0.41σ]  
Teffp = 6284 [846] K [2.56σ]

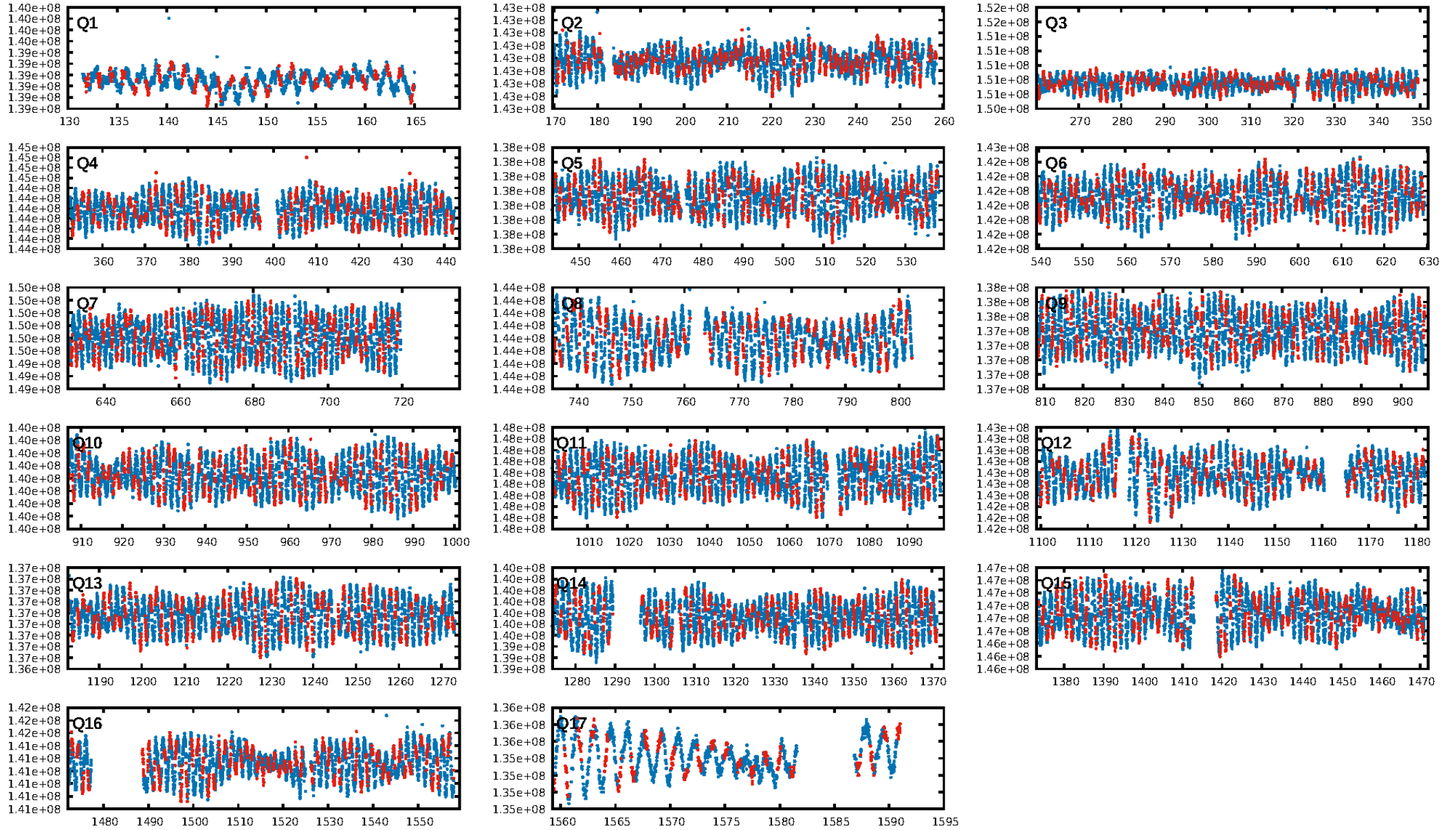
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1957.60σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 7.80e-12**  
RollingBand-figt: 0.99 [1042/1055]  
GhostDiagnostic-chr: 37.09  
Centroid-sig: 0.4%  
Centroid-so: 1.076 arcsec [1.78σ]  
OotOffset-rm: 0.503 arcsec [0.96σ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-rm: 0.702 arcsec [1.31σ]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 0.62 [10/16]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:45:21 Z

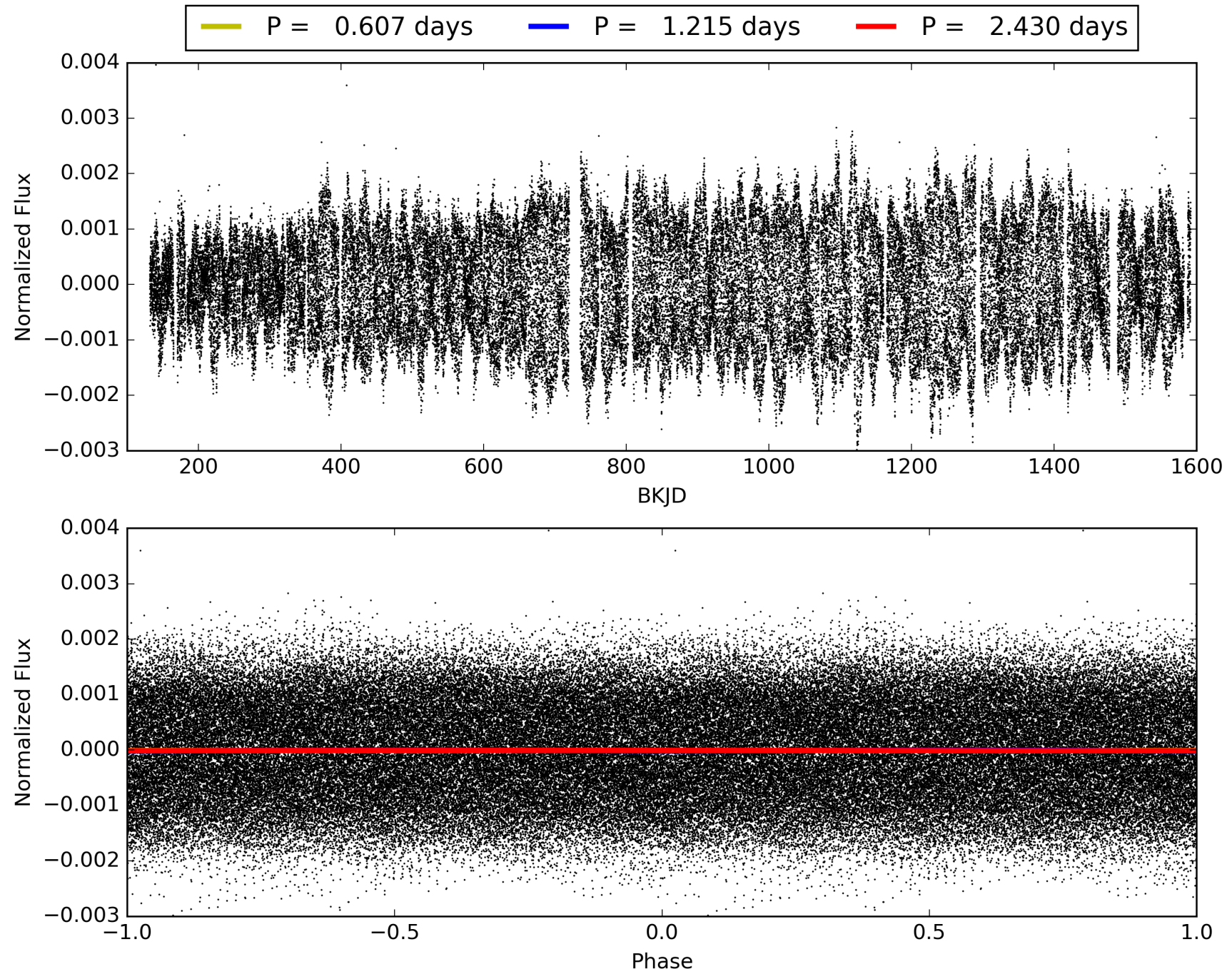
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008566113-01, PDC Light Curves



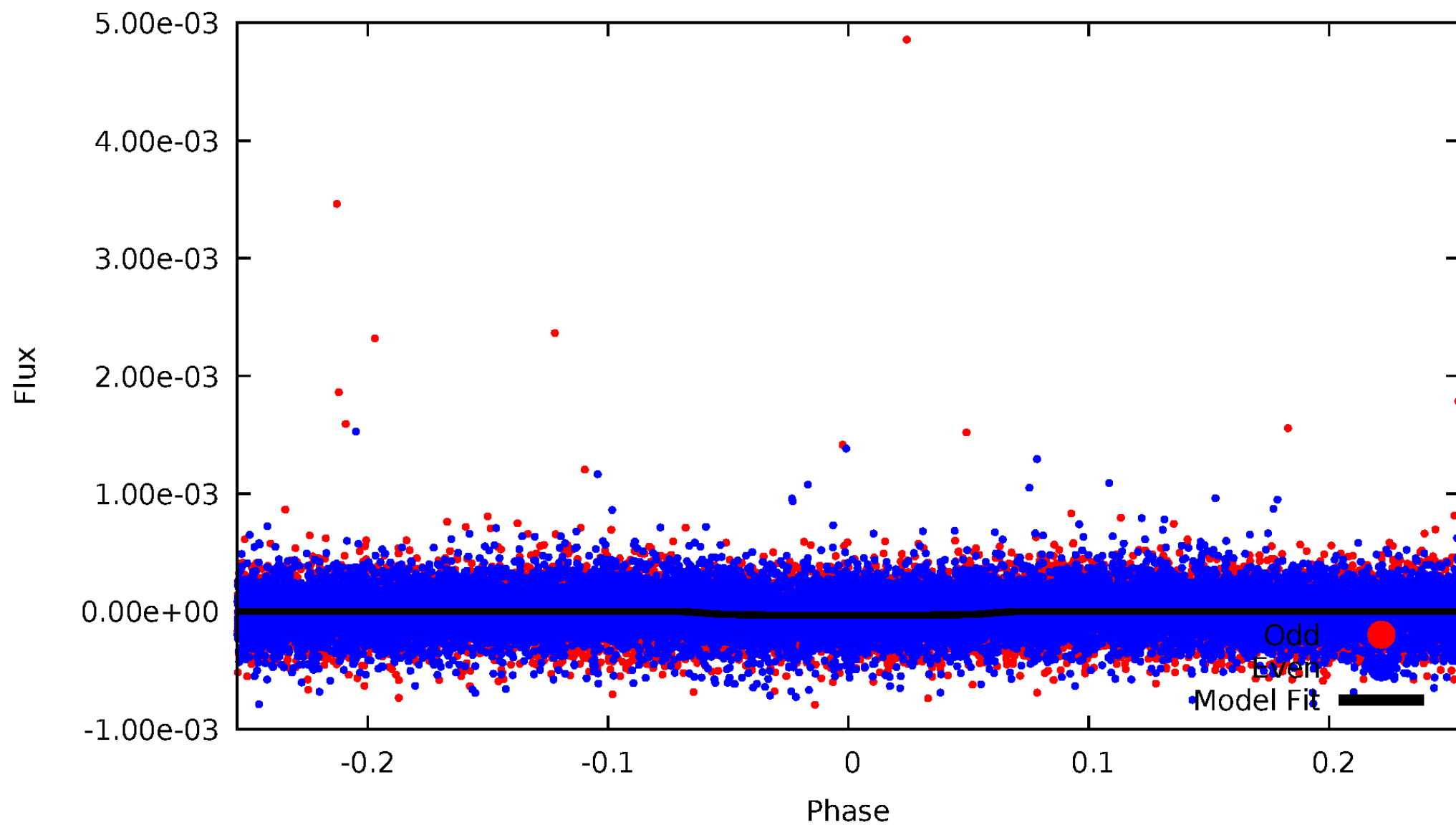


TCE 008566113-01



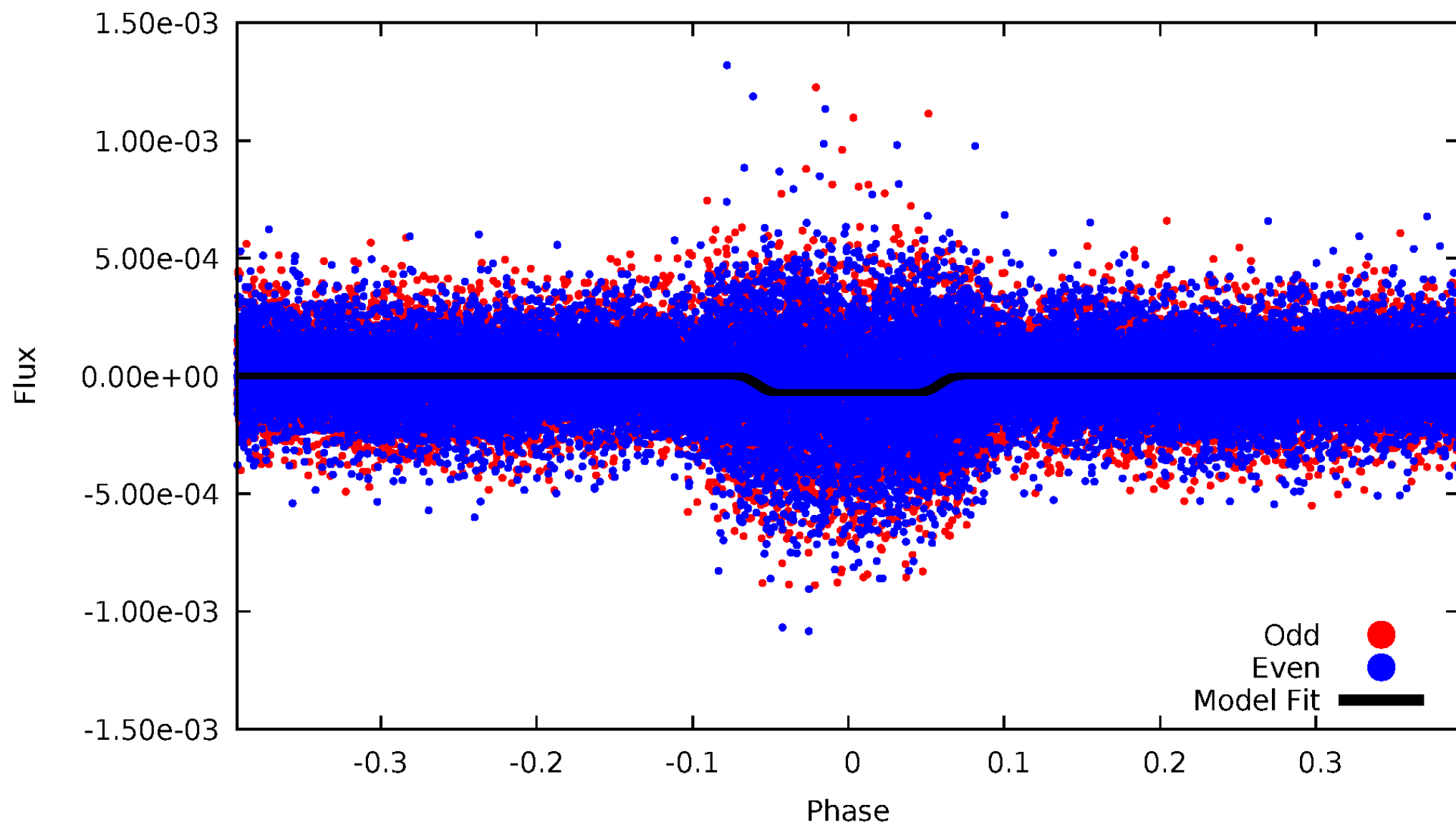
# DV Odd/Even

TCE 008566113-01

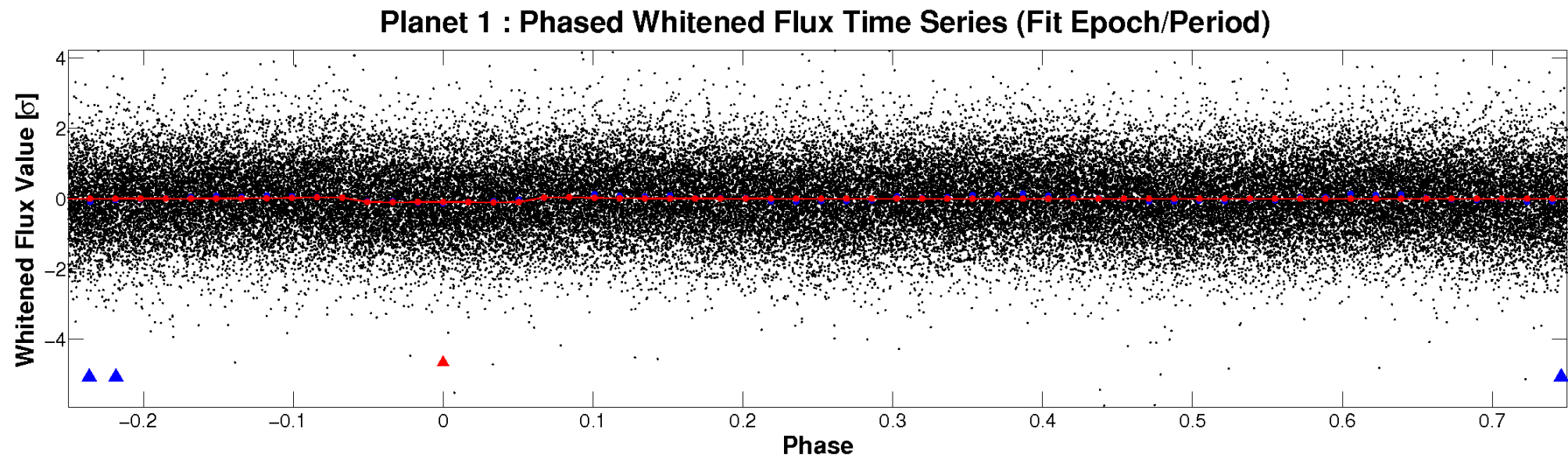
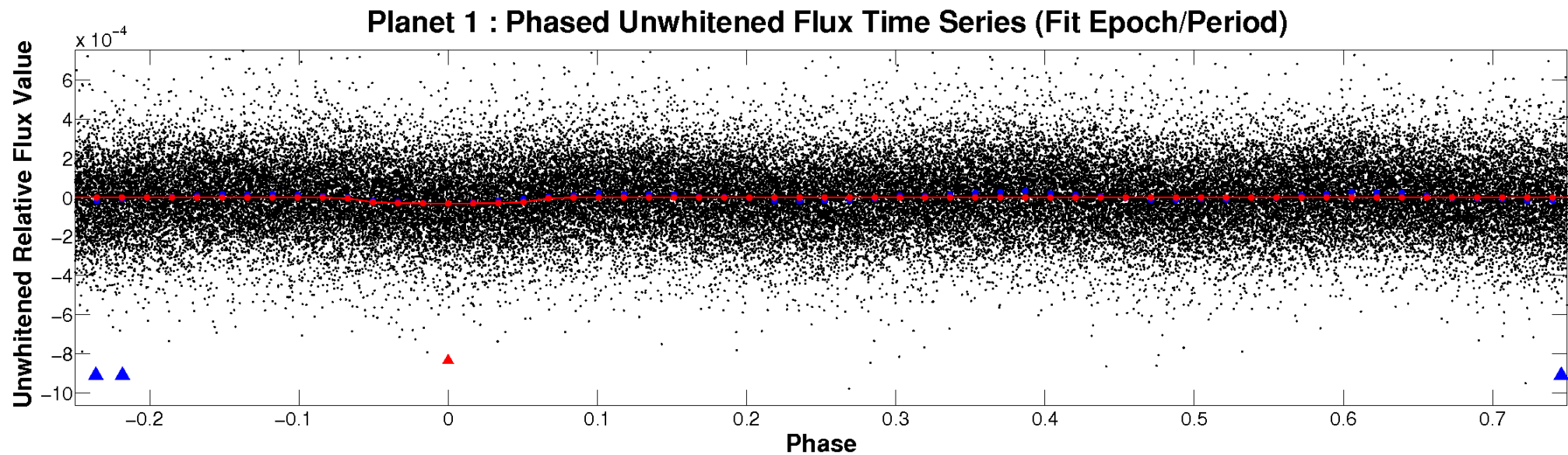


# ALT Odd/Even

TCE 008566113-01



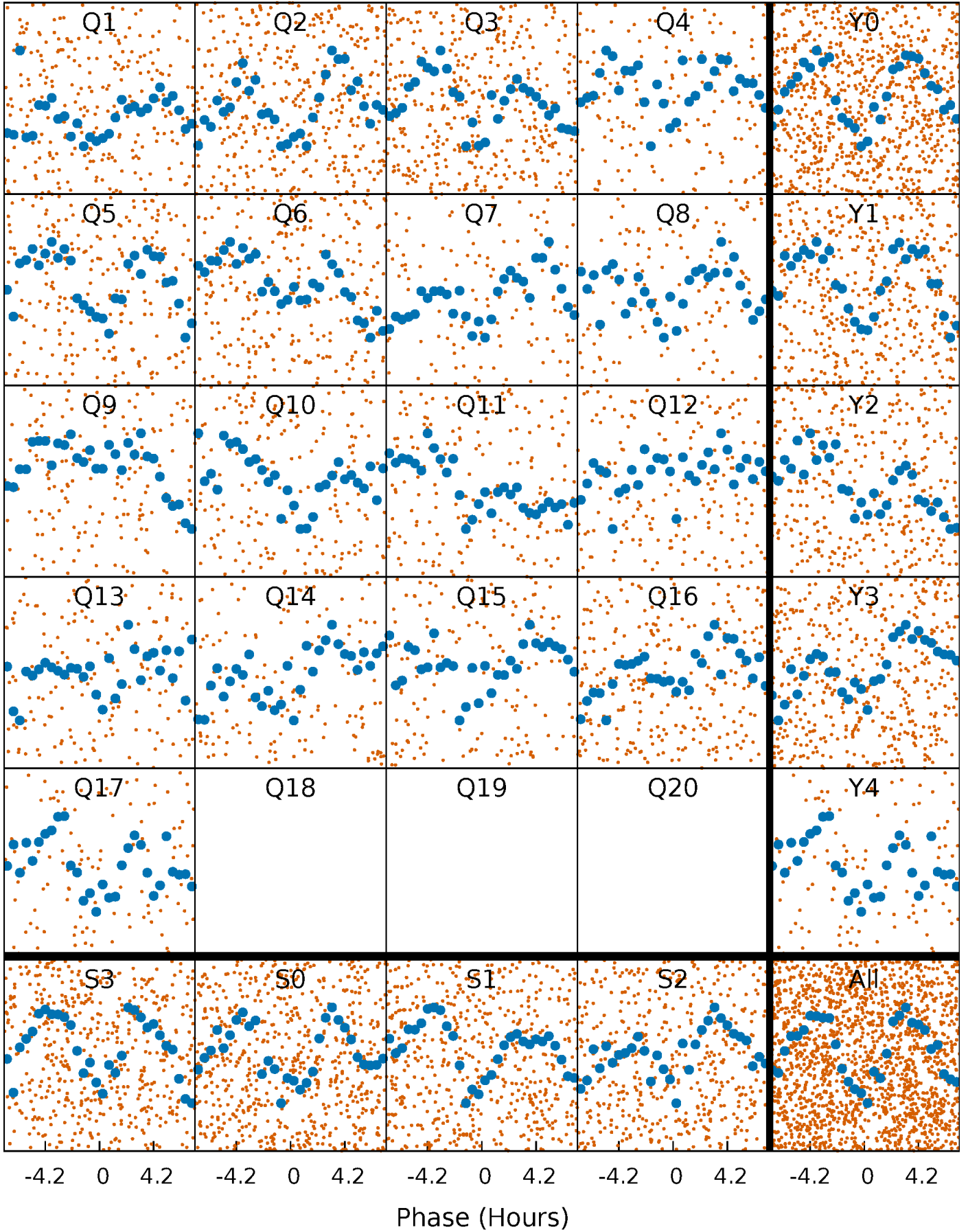
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

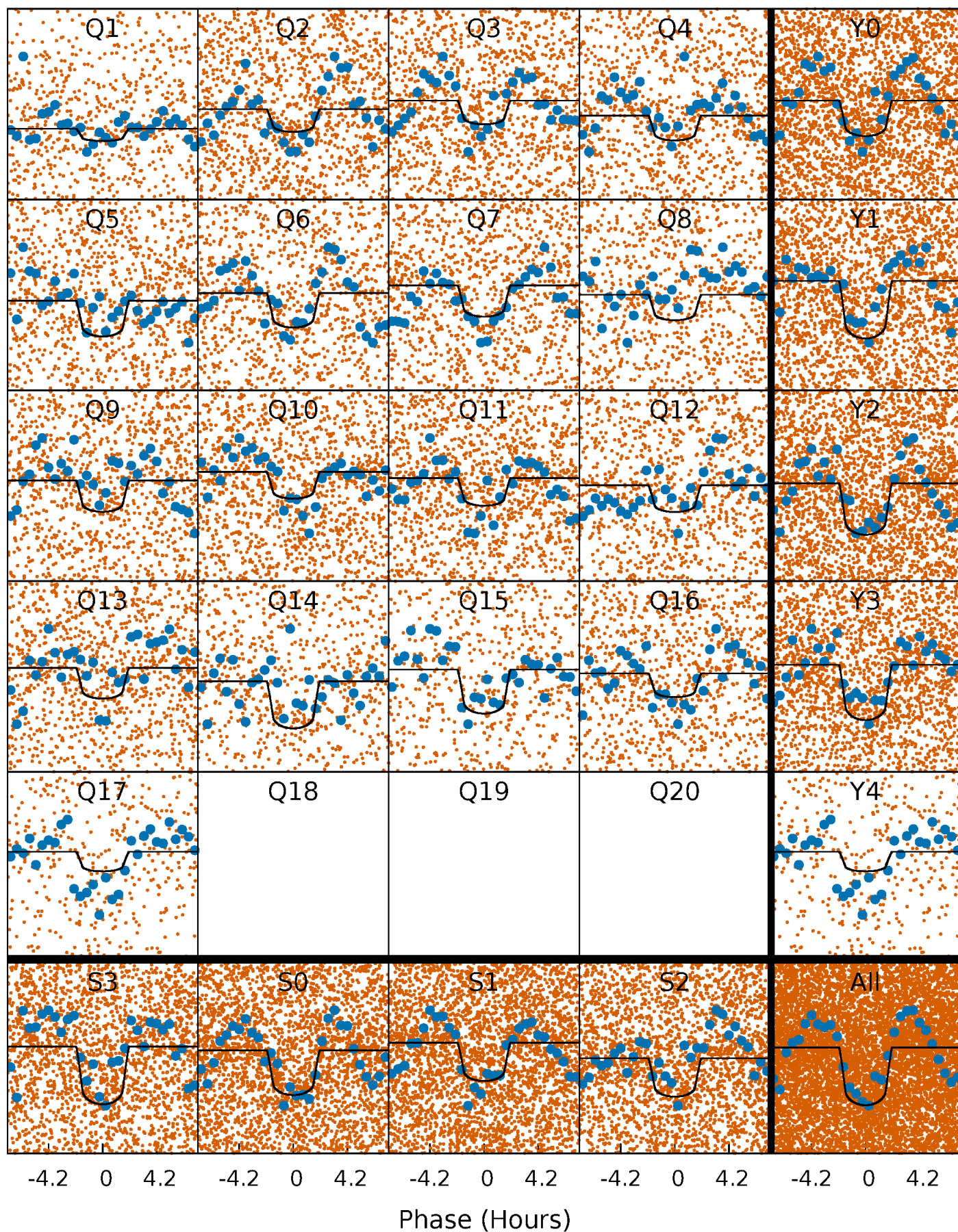
TCE 008566113-01   P= 1.214754 Days    $T_0=131.951842$  (BKJD)





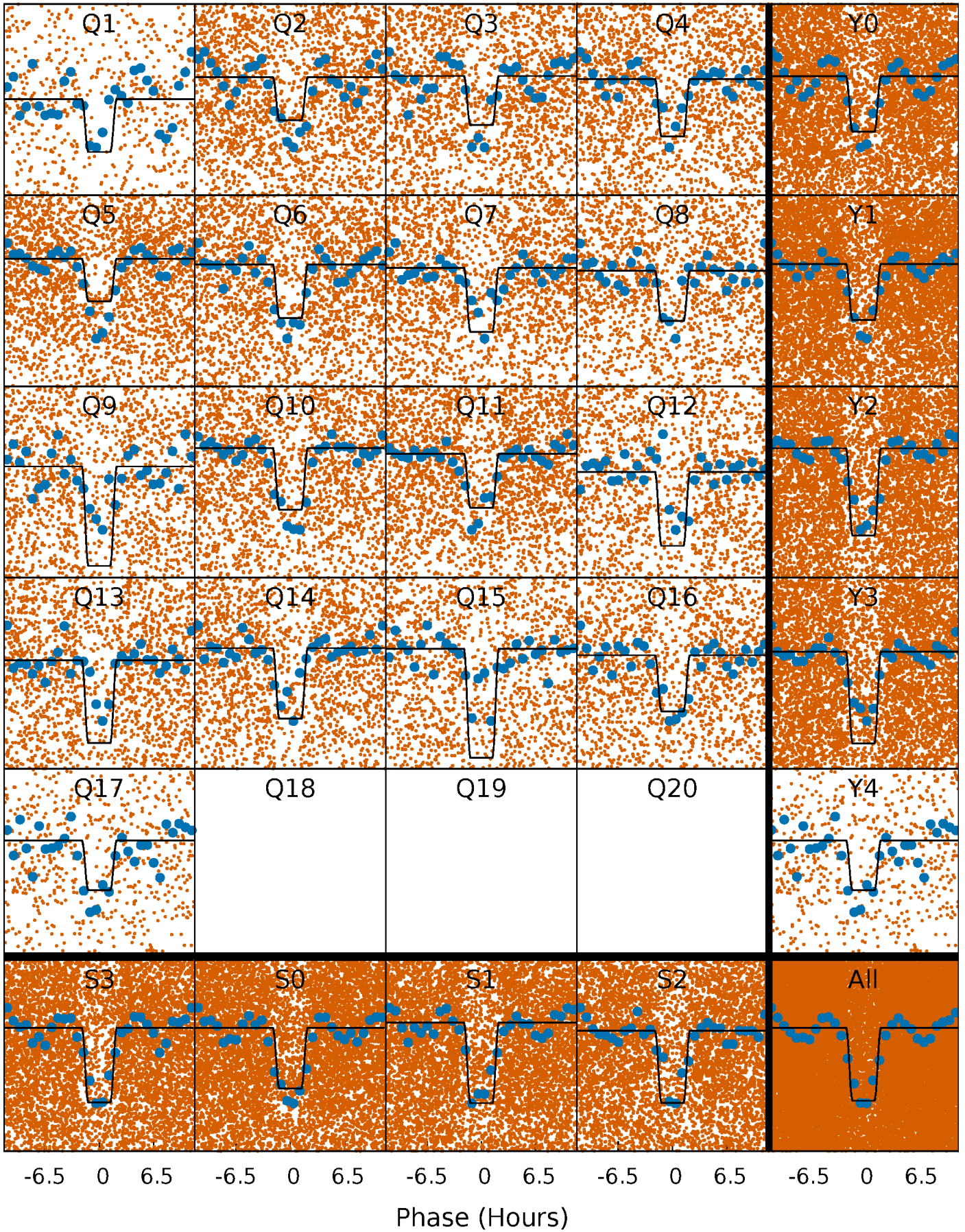
# DV Quarter-Phased Transit Curves

TCE 008566113-01 P= 1.214754 Days  $T_0=131.951842$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008566113-01 P= 1.214767 Days  $T_0=131.942057$  (BKJD)

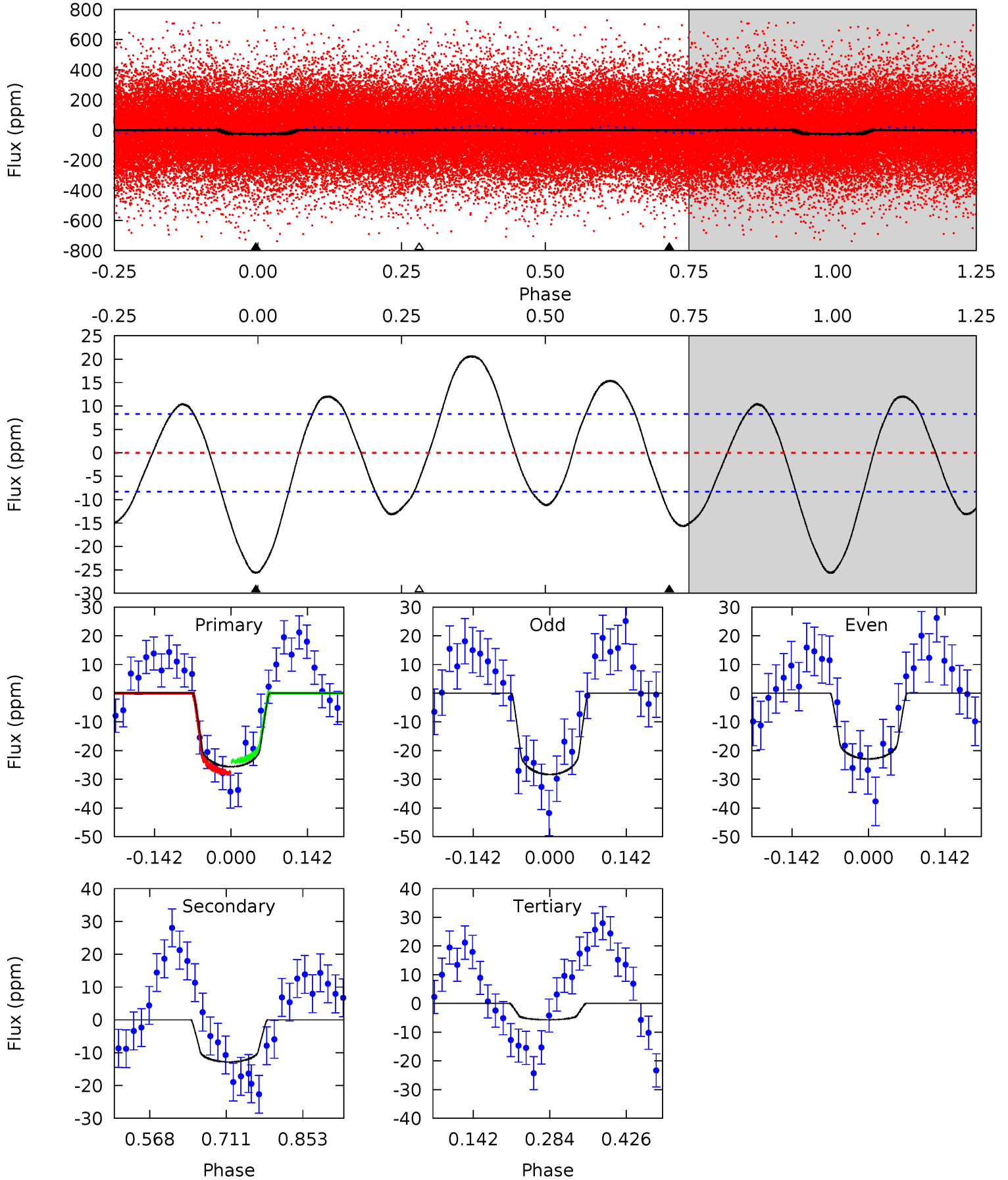




# DV Model-Shift Uniqueness Test

008566113-01, P = 1.214754 Days, E = 130.737088 Days

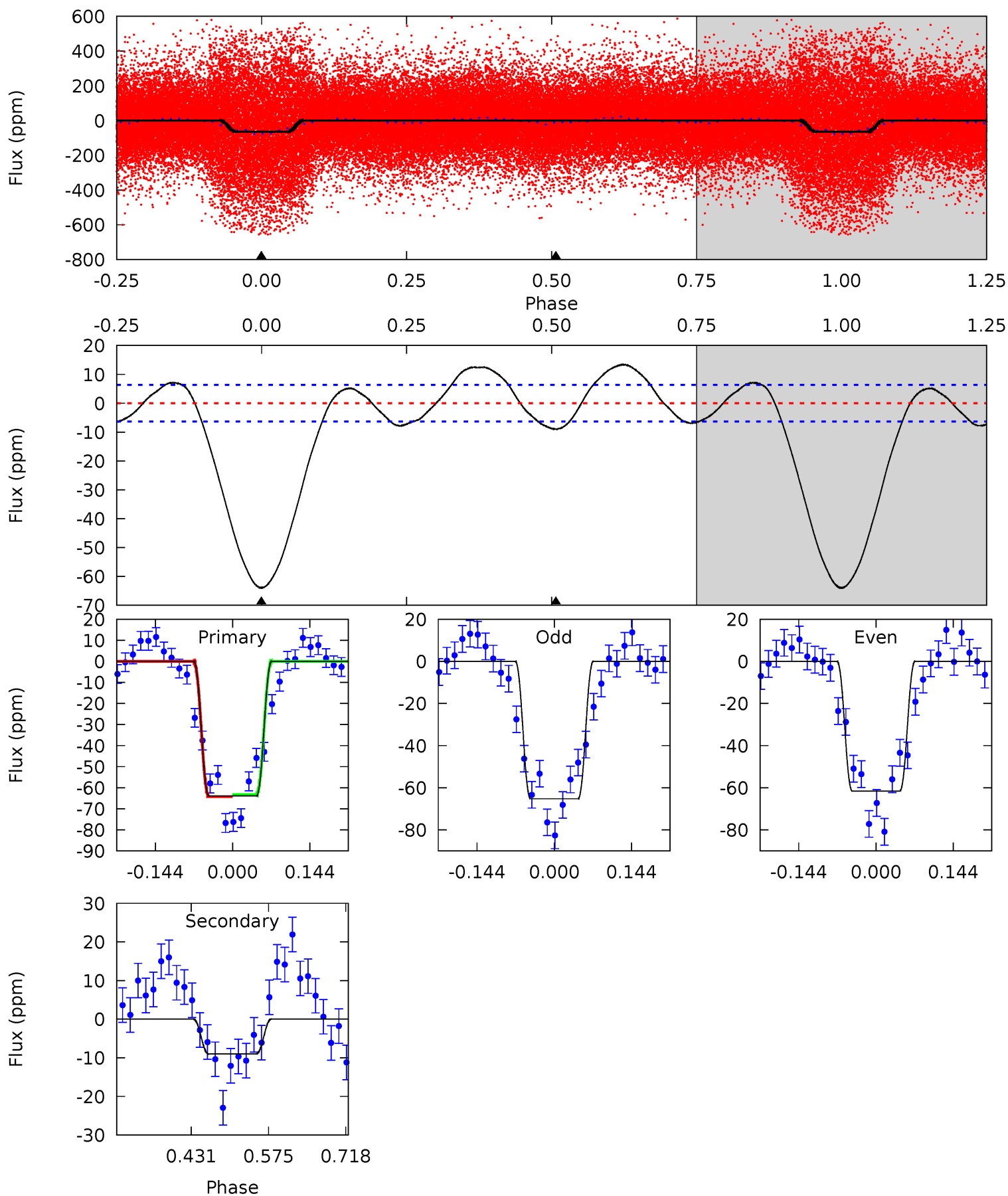
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.8	6.93	3.07	0	4.49	1.47	5.82	10.8	13.8	3.85	6.93	1.47	1.25	0.45	1.08



# Alt Model-Shift Uniqueness Test

008566113-01, P = 1.214767 Days, E = 130.727290 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
45.1	6.34	0	0	4.49	1.46	4.03	45.1	45.1	6.34	6.34	1.29	1.17	0.17	0.33





### Stellar Parameters For KIC 008566113

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7050^{+197}_{-246}$	$3.532^{+0.344}_{-0.086}$	$-0.320^{+0.300}_{-0.250}$	$3.823^{+0.359}_{-1.527}$	$1.815^{+0.193}_{-0.386}$	$0.046^{+0.127}_{-0.012}$
	+3%/-3%	+10%/-2%	+94%/-78%	+9%/-40%	+11%/-21%	+278%/-26%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008566113-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-13 \pm 2$	$2.36^{+0.72}_{-0.68}$	$5057^{+278}_{-467}$	$4972^{+973}_{-754}$	$0.943^{+0.849}_{-0.399}$
Alt.	$-9 \pm 1$	$3.31^{+0.80}_{-0.80}$	$5066^{+274}_{-462}$	$3069^{+942}_{-6637}$	$0.339^{+0.221}_{-0.128}$

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

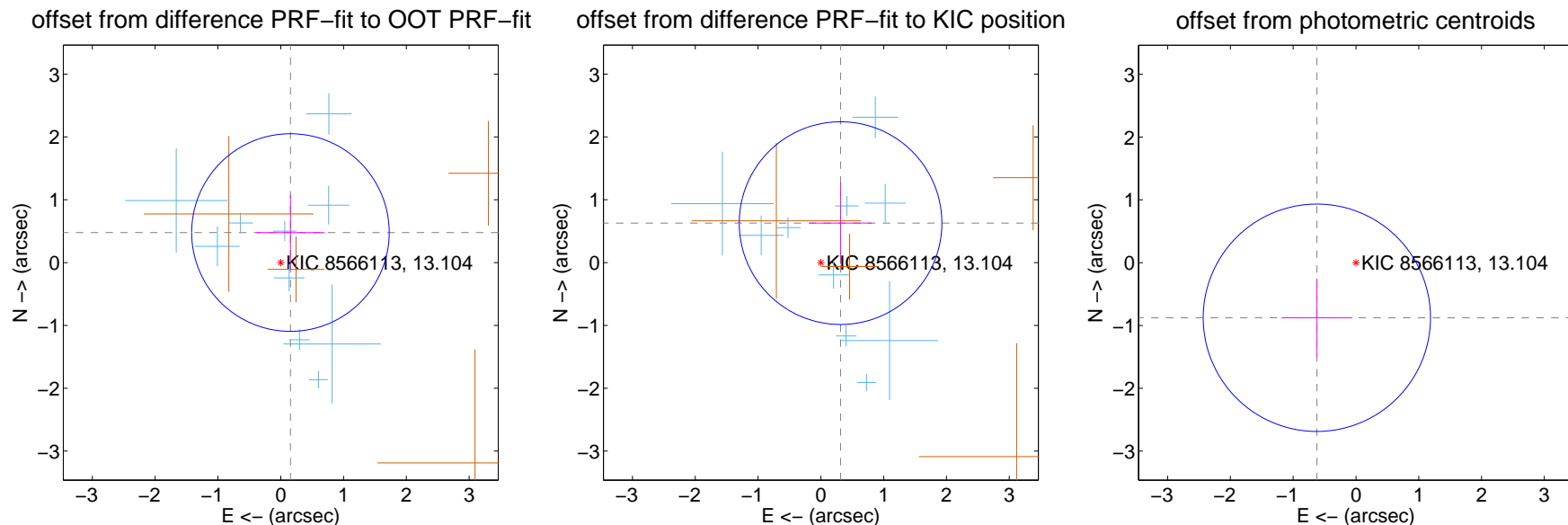
## DV Centroid Data

Supplemental centroid analysis for 008566113-01. Kepler magnitude: 13.10. Transit SNR 9.15

There are 10 quarters with good PRF difference image offsets

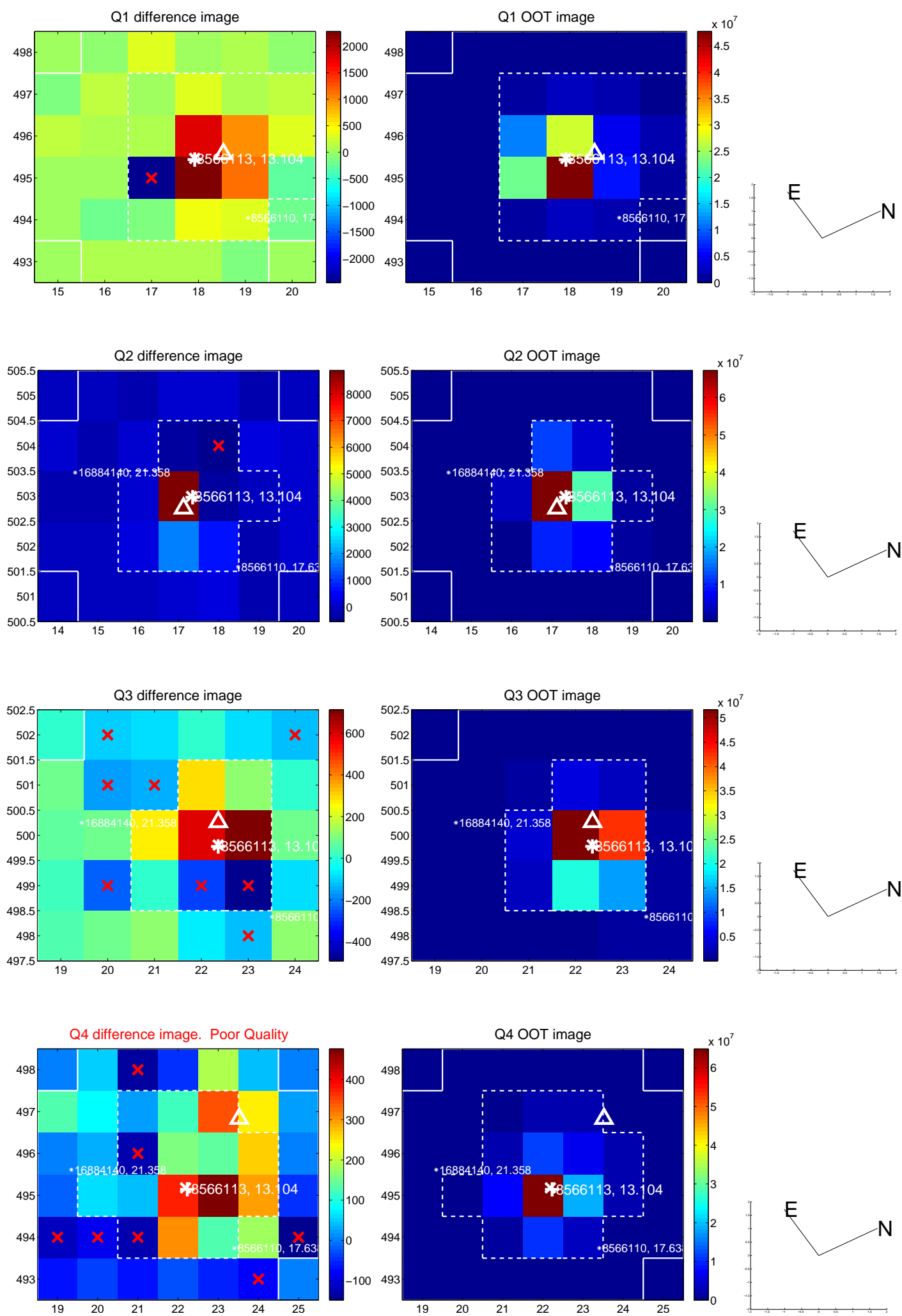
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.503 \pm 0.524$	0.96	$-0.154 \pm 0.543$	$0.479 \pm 0.598$
PRF-fit source offset from KIC position	$0.702 \pm 0.538$	1.31	$-0.314 \pm 0.500$	$0.628 \pm 0.651$
photometric centroid source offset	$1.08 \pm 0.60$	1.78	$0.62 \pm 0.56$	$-0.88 \pm 0.62$

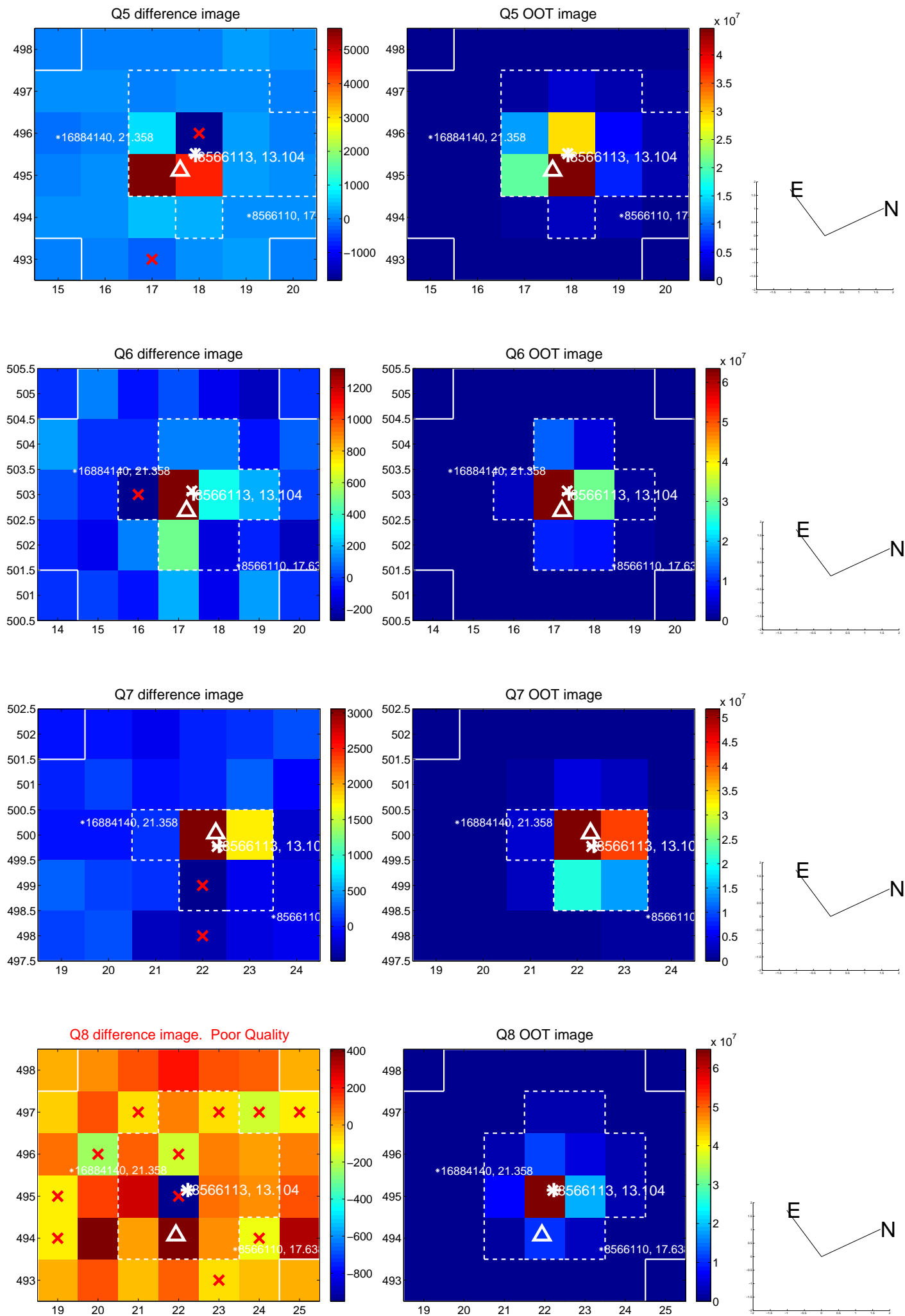


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

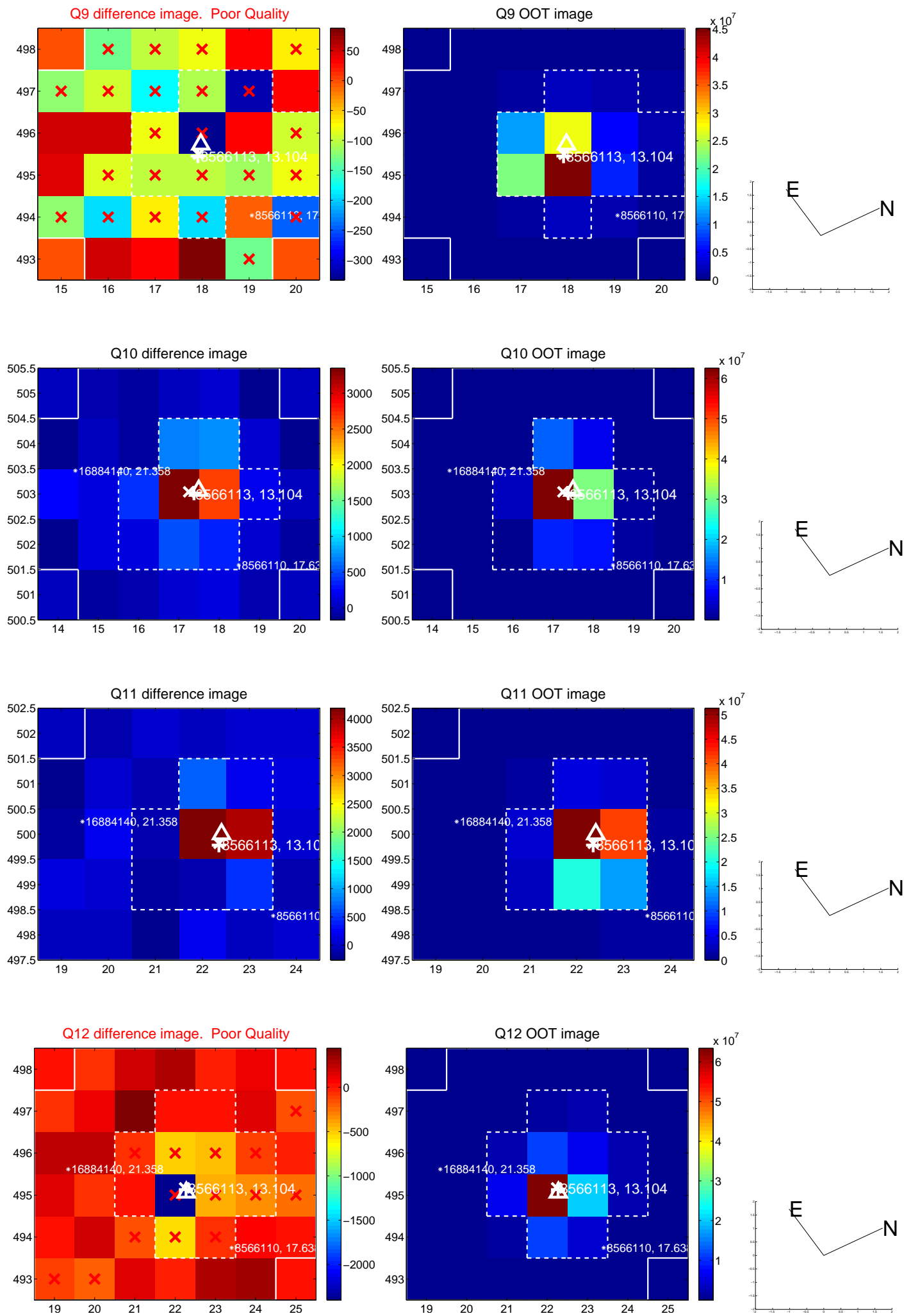


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

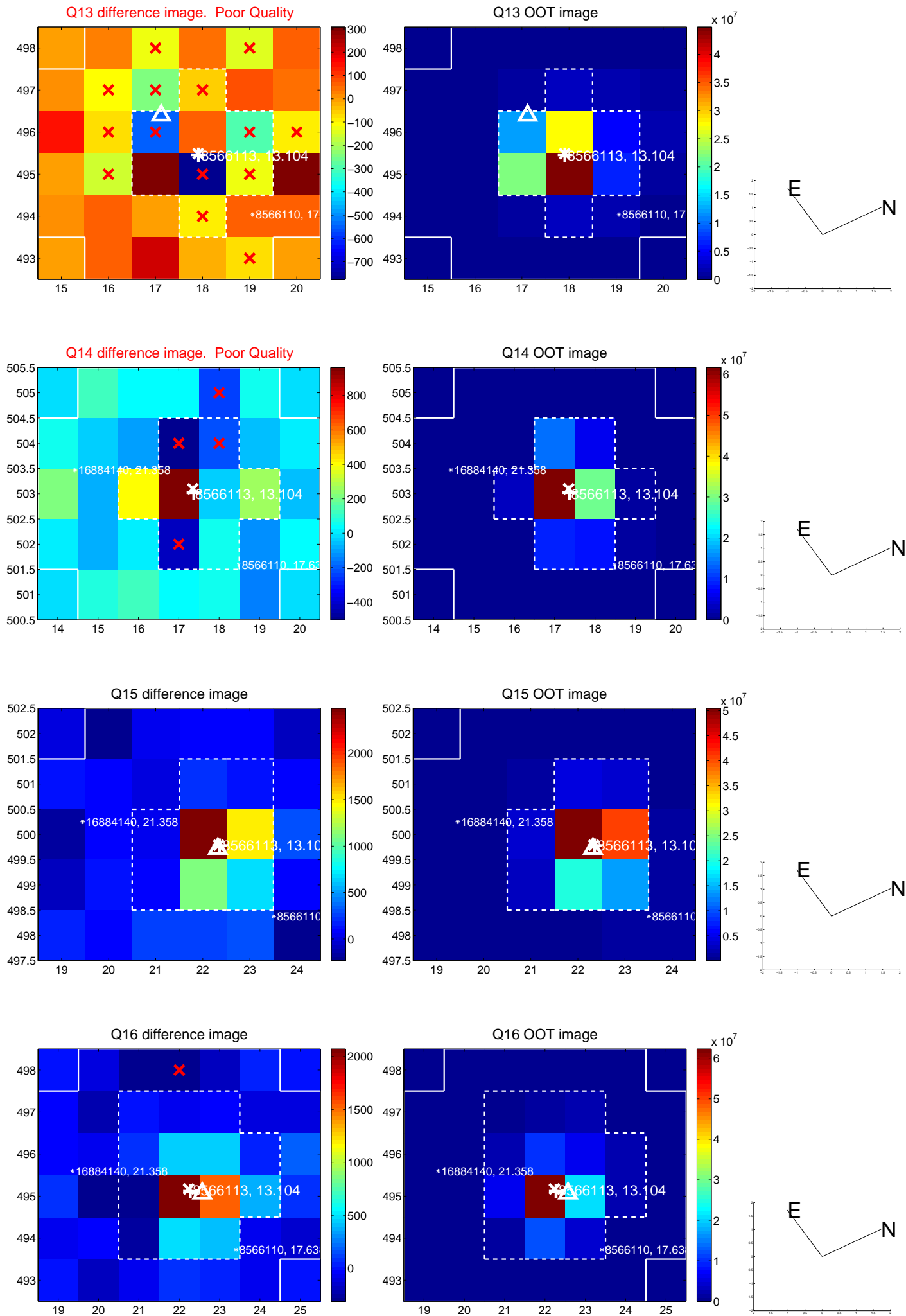




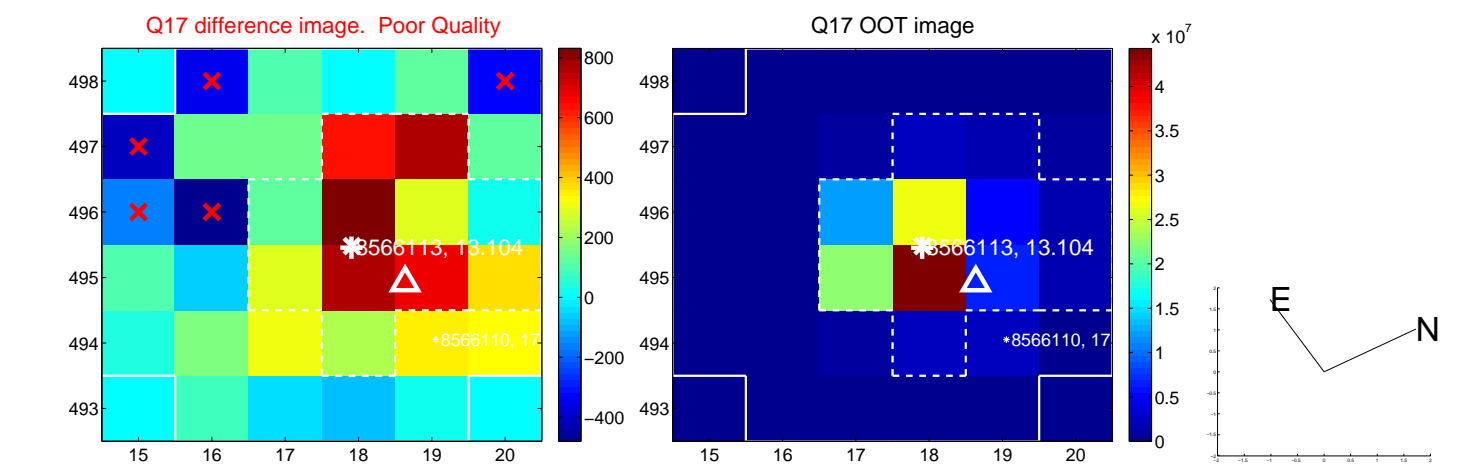
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



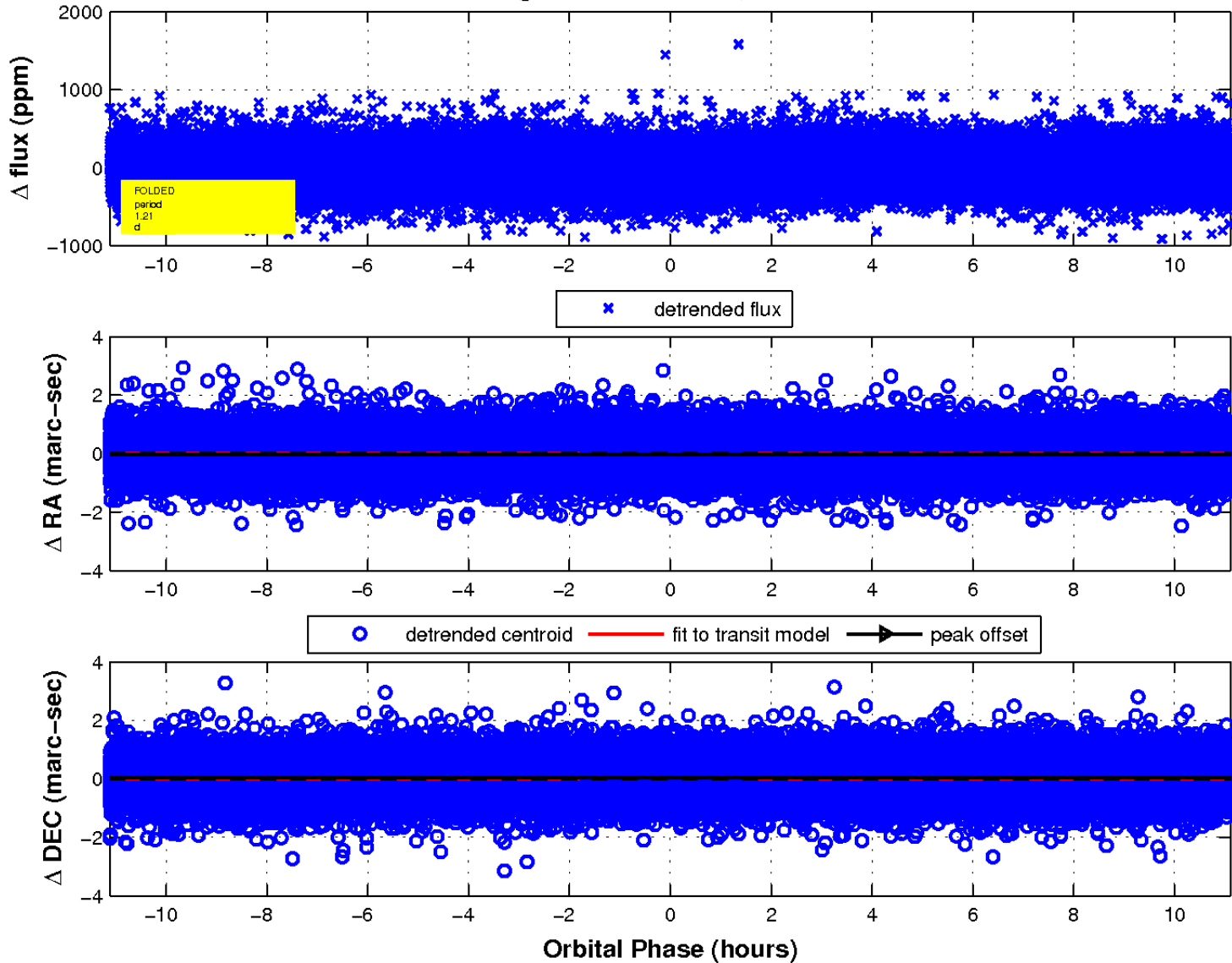
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

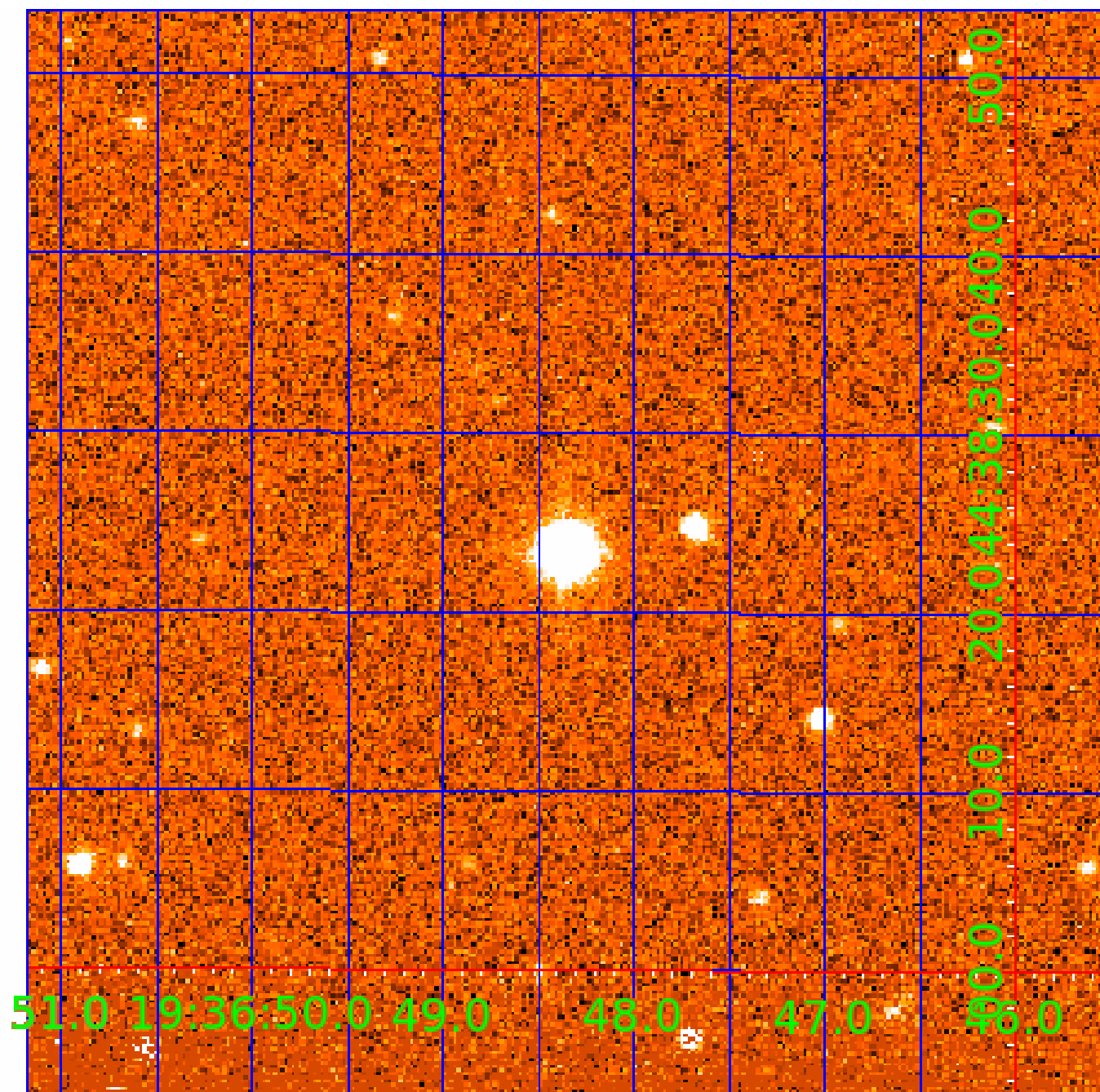


fluxWeightedCentroids, Planet 1 of 2



# UKIRT Image

Declination





# KIC 008566113

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008566113-01	OBS	No	1.214754	131.951842	31.0	3.705	8.3	9.1	3.82	7050	2.48	43779.32
008566113-02	OBS	No	663.234238	251.947387	670.3	7.221	7.4	7.8	3.82	7050	12.51	9.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008566113-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
008566113-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

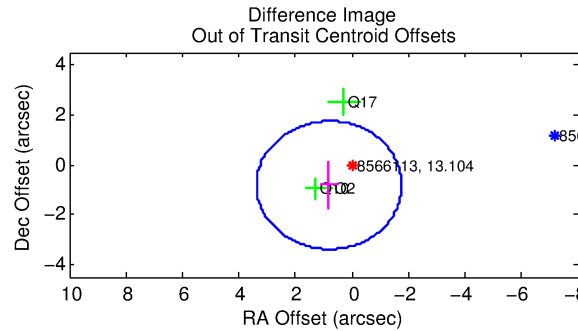
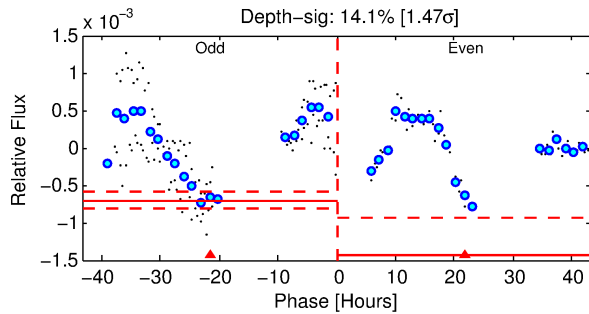
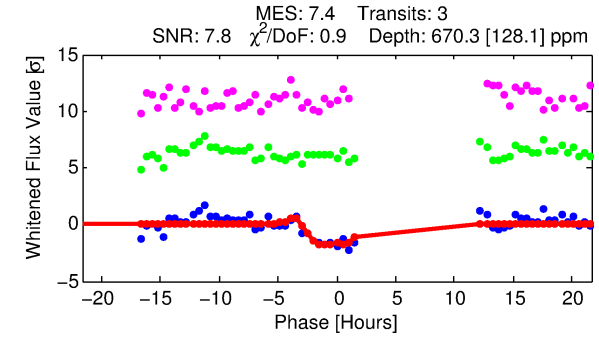
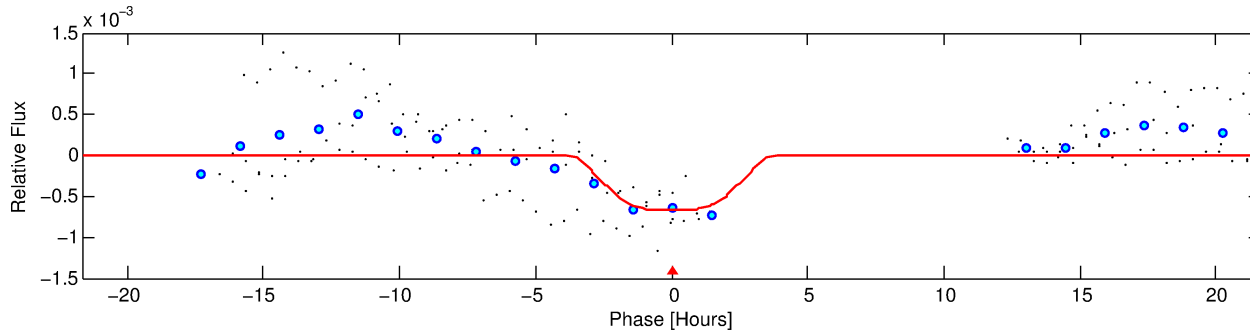
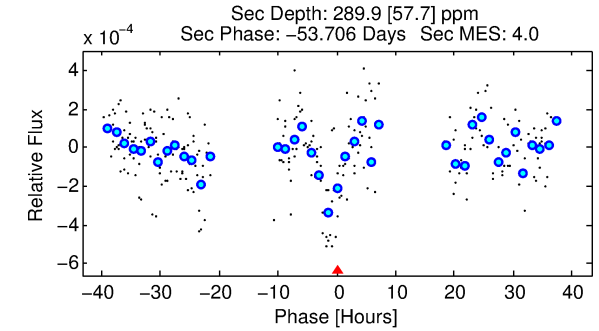
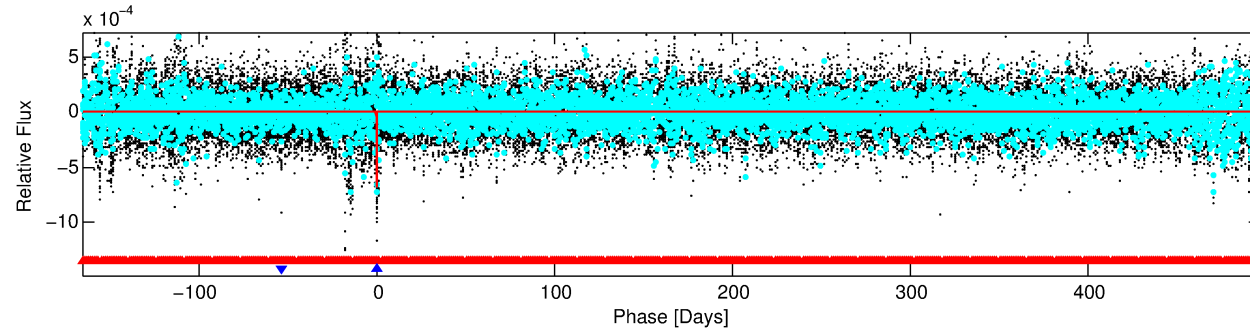
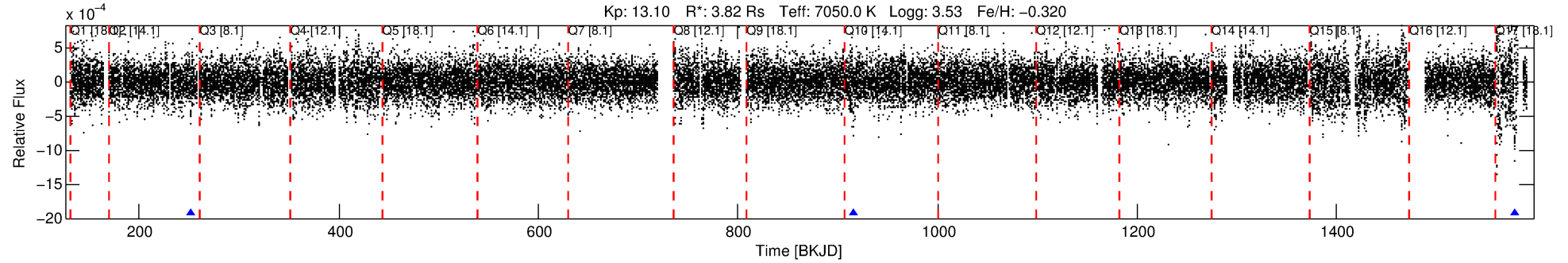
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008566113-02

No Significant Match Found

# DV One-Page Summary

KIC: 8566113 Candidate: 2 of 2 Period: 663.234 d  
KOI: K07061 Corr: No Ephemeris Match



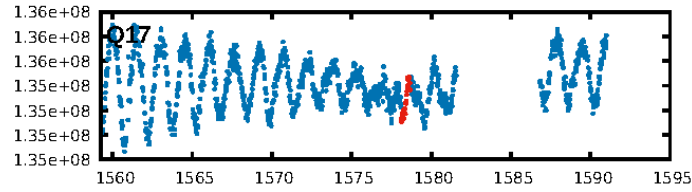
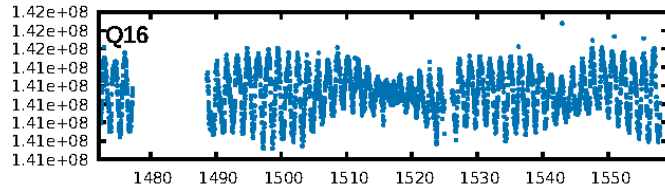
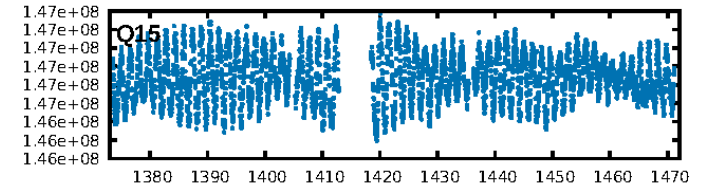
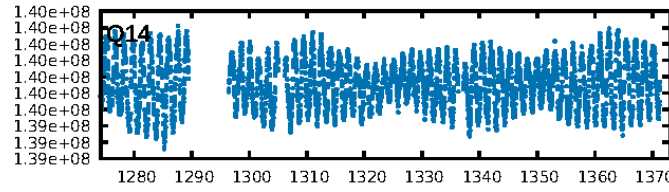
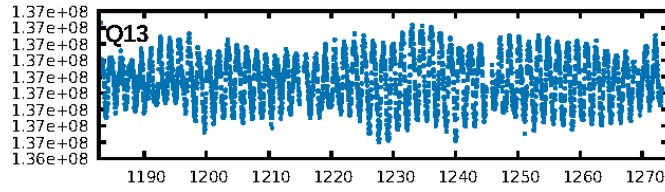
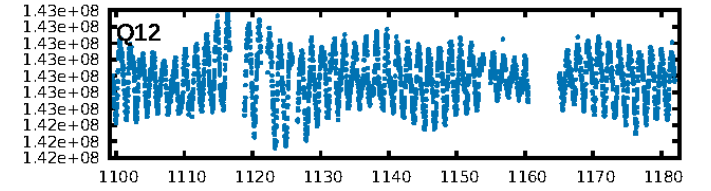
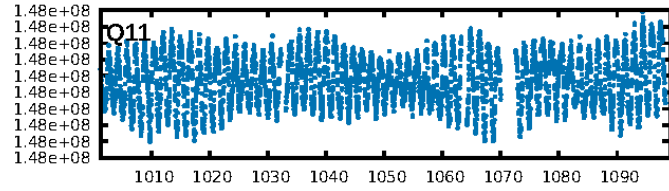
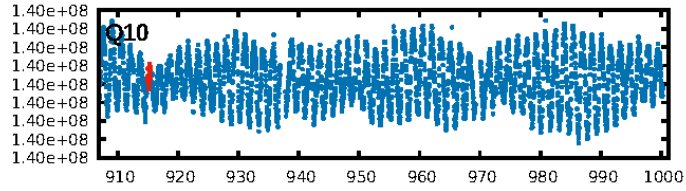
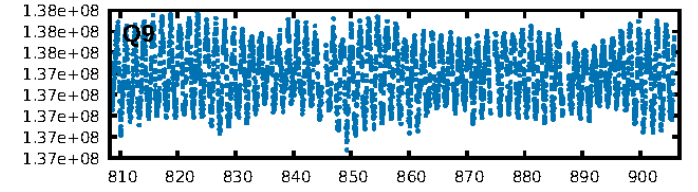
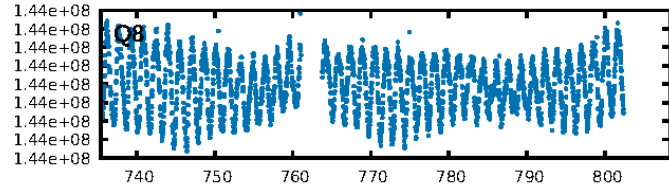
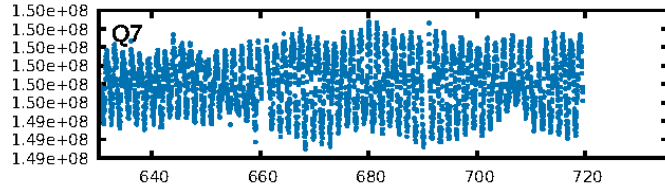
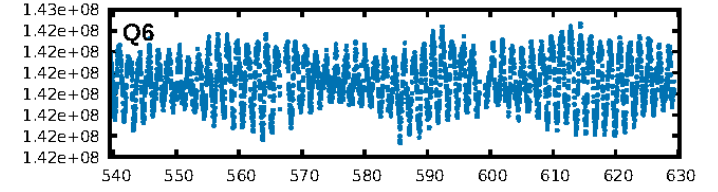
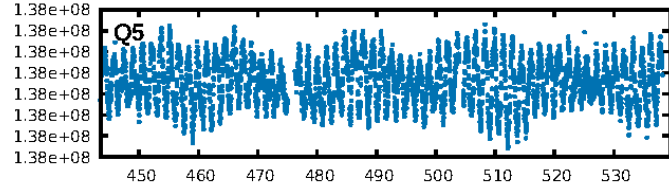
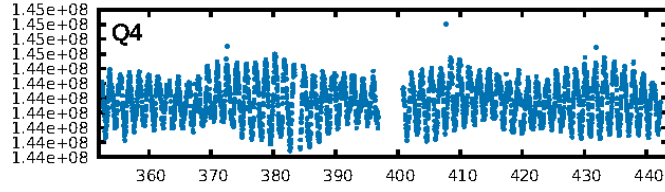
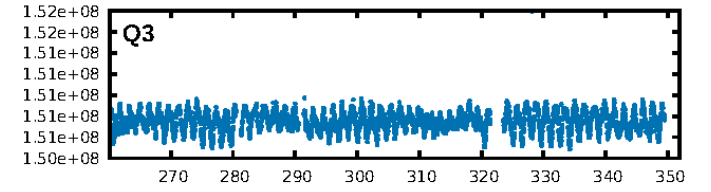
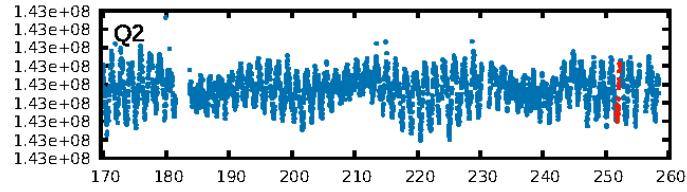
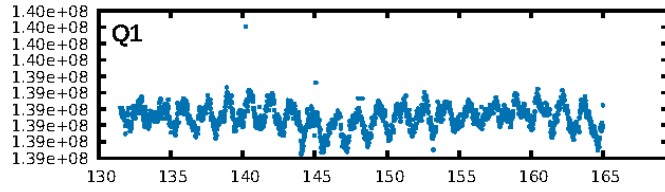
## DV Fit Results:

Period = 663.23424 [0.01313] d  
Epoch = 251.9474 [0.0451] BKJD  
Rp/R\* = 0.0300 [0.0027]  
a/R\* = 255.09 [63.39]  
b = 0.96 [0.02]  
Seff = 9.81 [5.96]  
Teq = 451 [69] K  
Rp = 12.51 [5.12] Re  
a = 1.8158 [0.6809] AU  
Ag = 3361.29 [2183.15] [1.54σ]  
Teffp = 5313 [402] K [11.92σ]

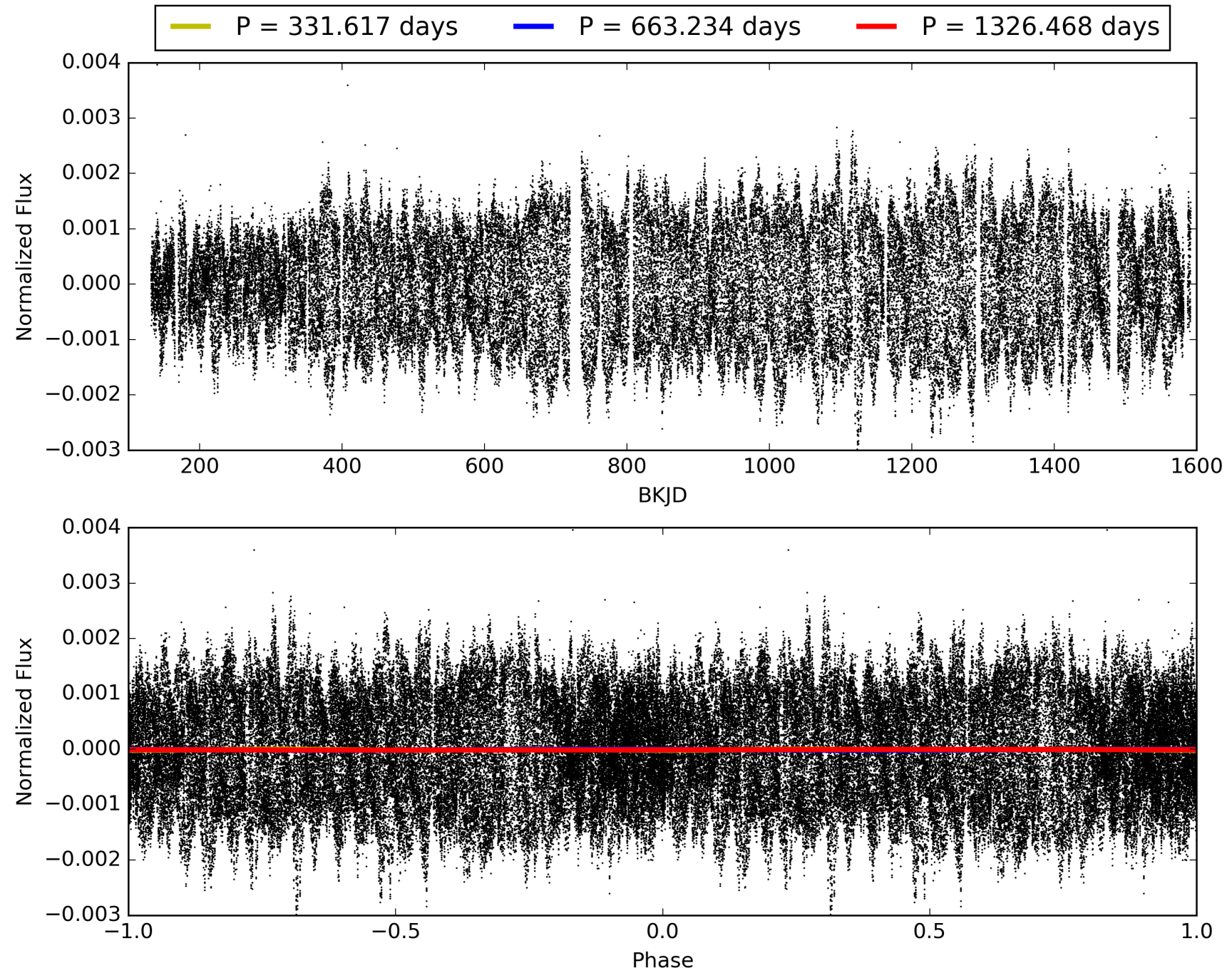
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1957.60σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 74.2%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.67e-10**  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 1.827  
Centroid-sig: 16.7%  
Centroid-so: 0.822 arcsec [1.88σ]  
OotOffset-rm: 1.159 arcsec [1.36σ]  
OotOffset-st: 2/0/0/1 [3]  
KicOffset-rm: 1.011 arcsec [1.44σ]  
KicOffset-st: 2/0/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]

# TCE 008566113-02, PDC Light Curves



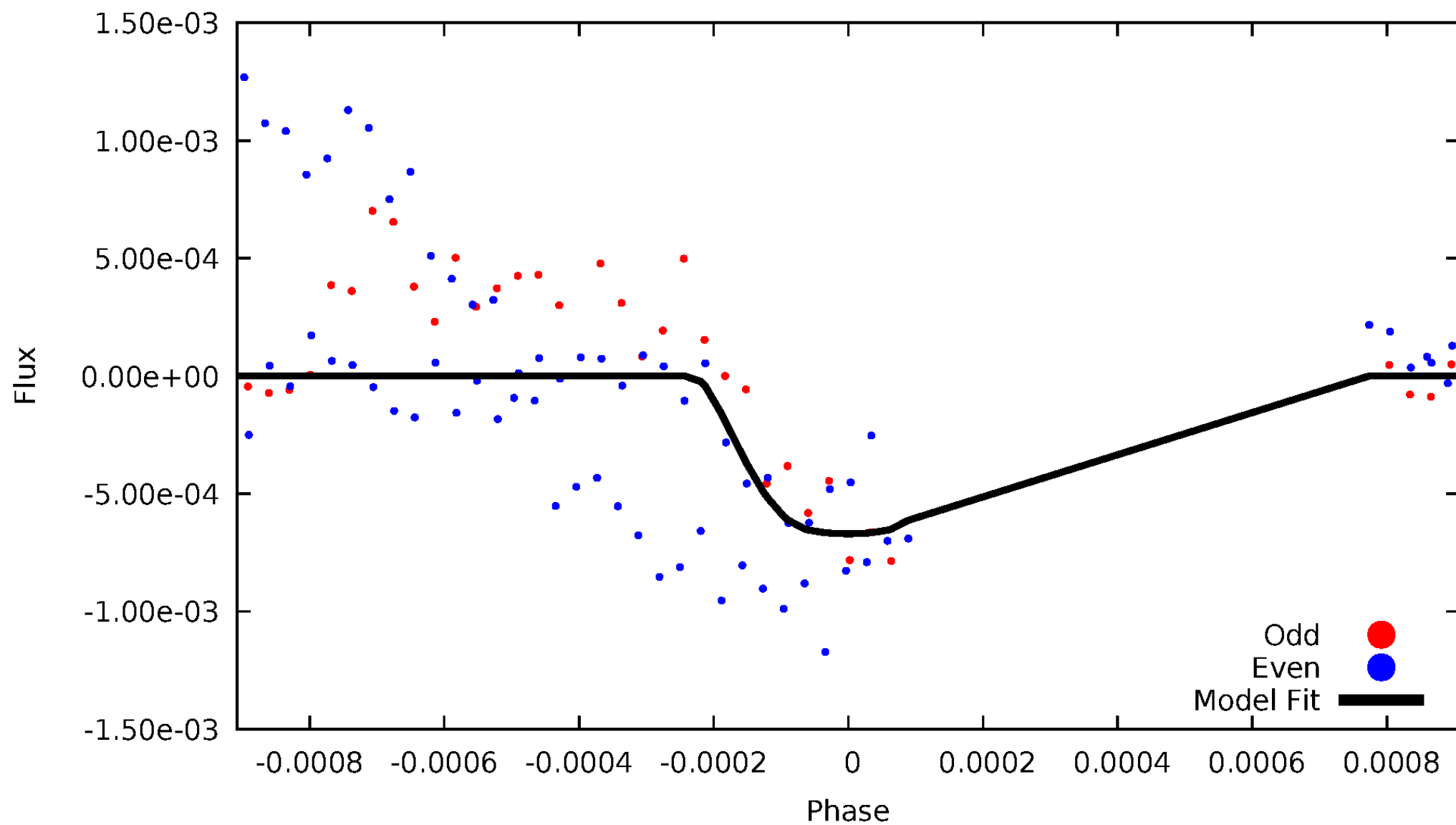
# TCE 008566113-02





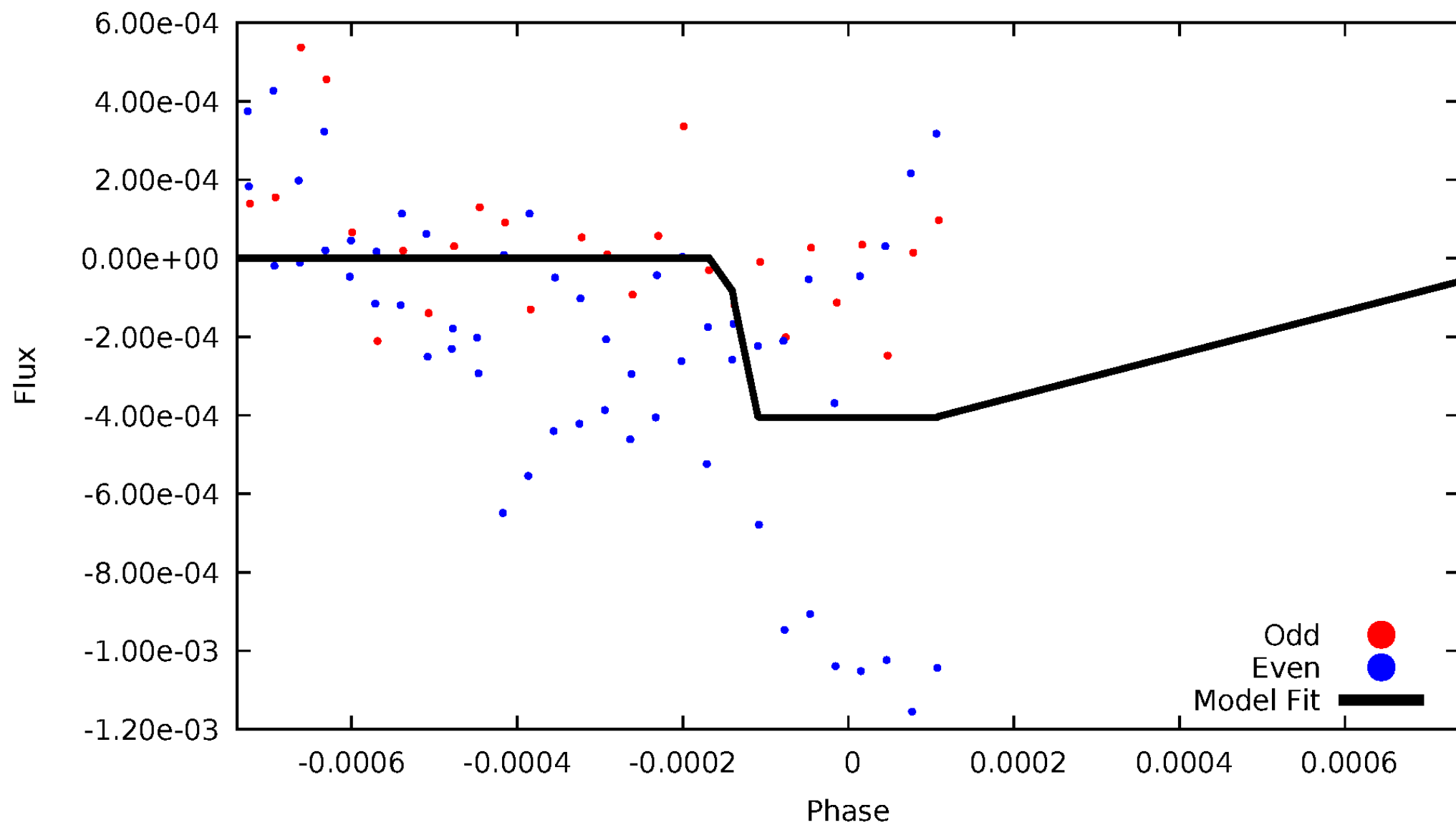
DV Odd/Even

TCE 008566113-02



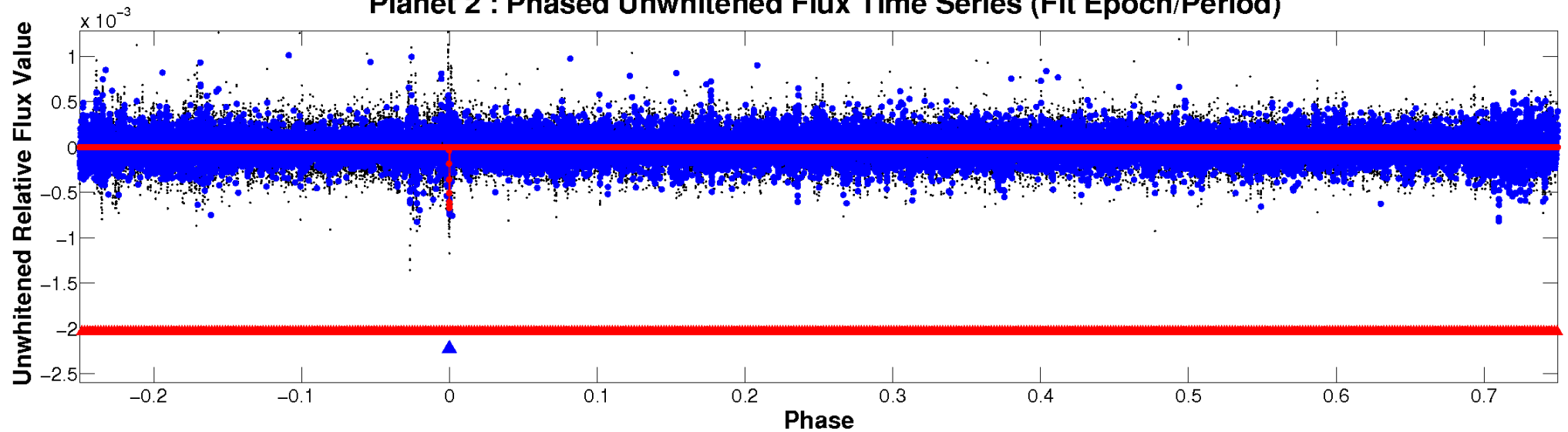
# ALT Odd/Even

TCE 008566113-02

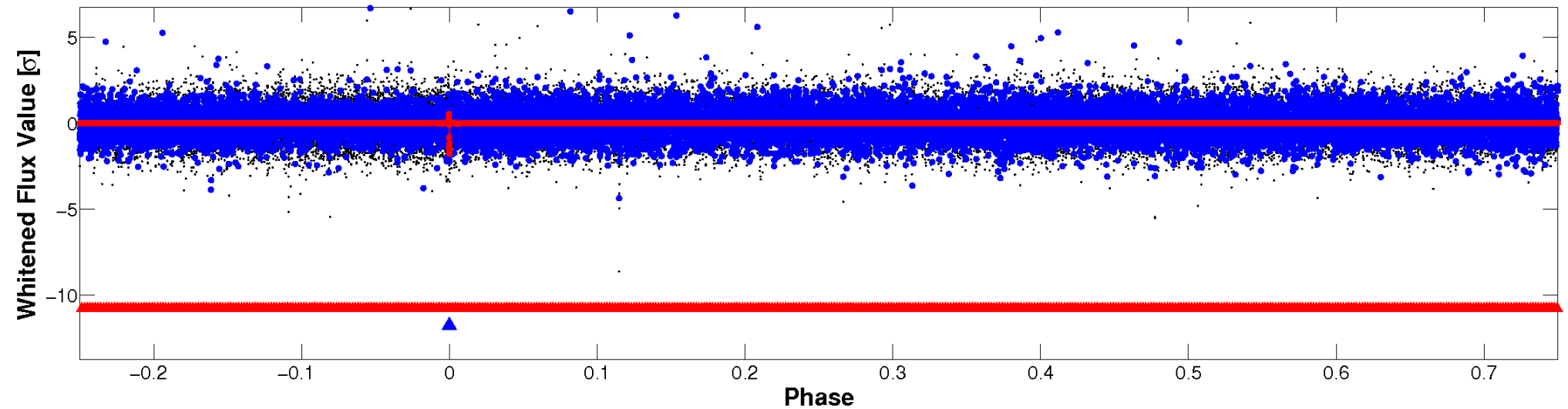


# Non-Whitened Vs. Whitened Light Curve

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

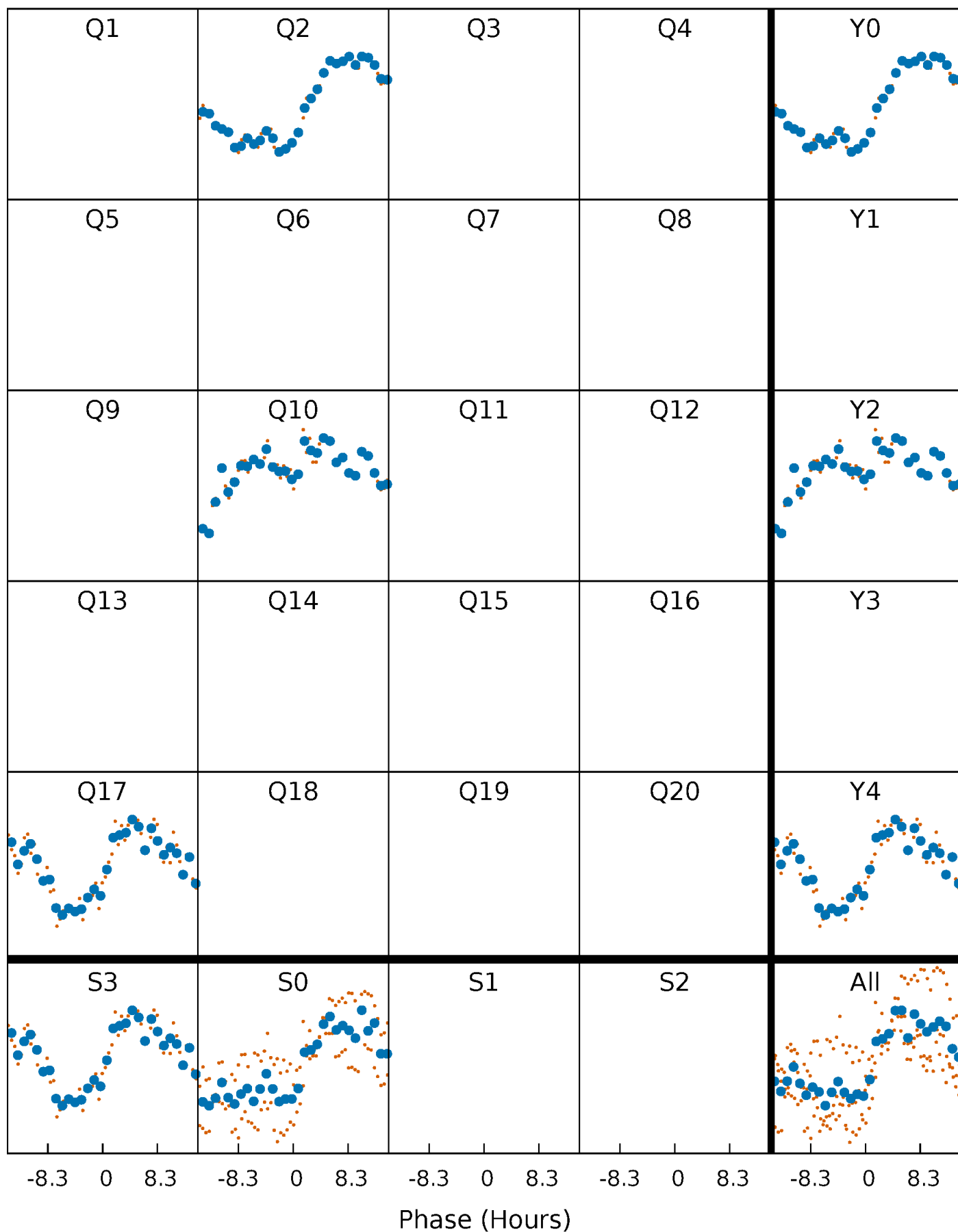


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



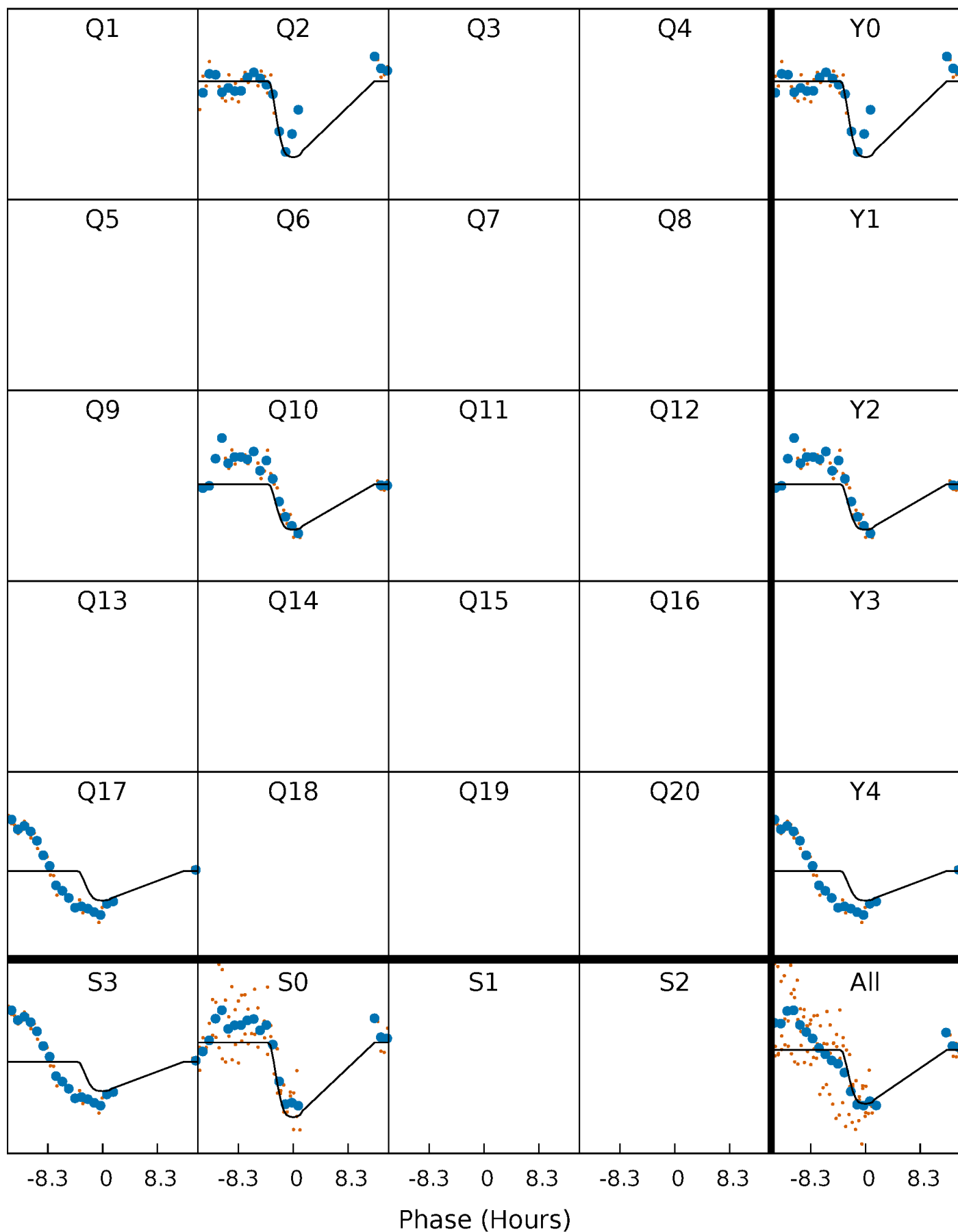
# PDC Quarter-Phased Transit Curves

TCE 008566113-02 P=663.234237 Days  $T_0=251.947387$  (BKJD)



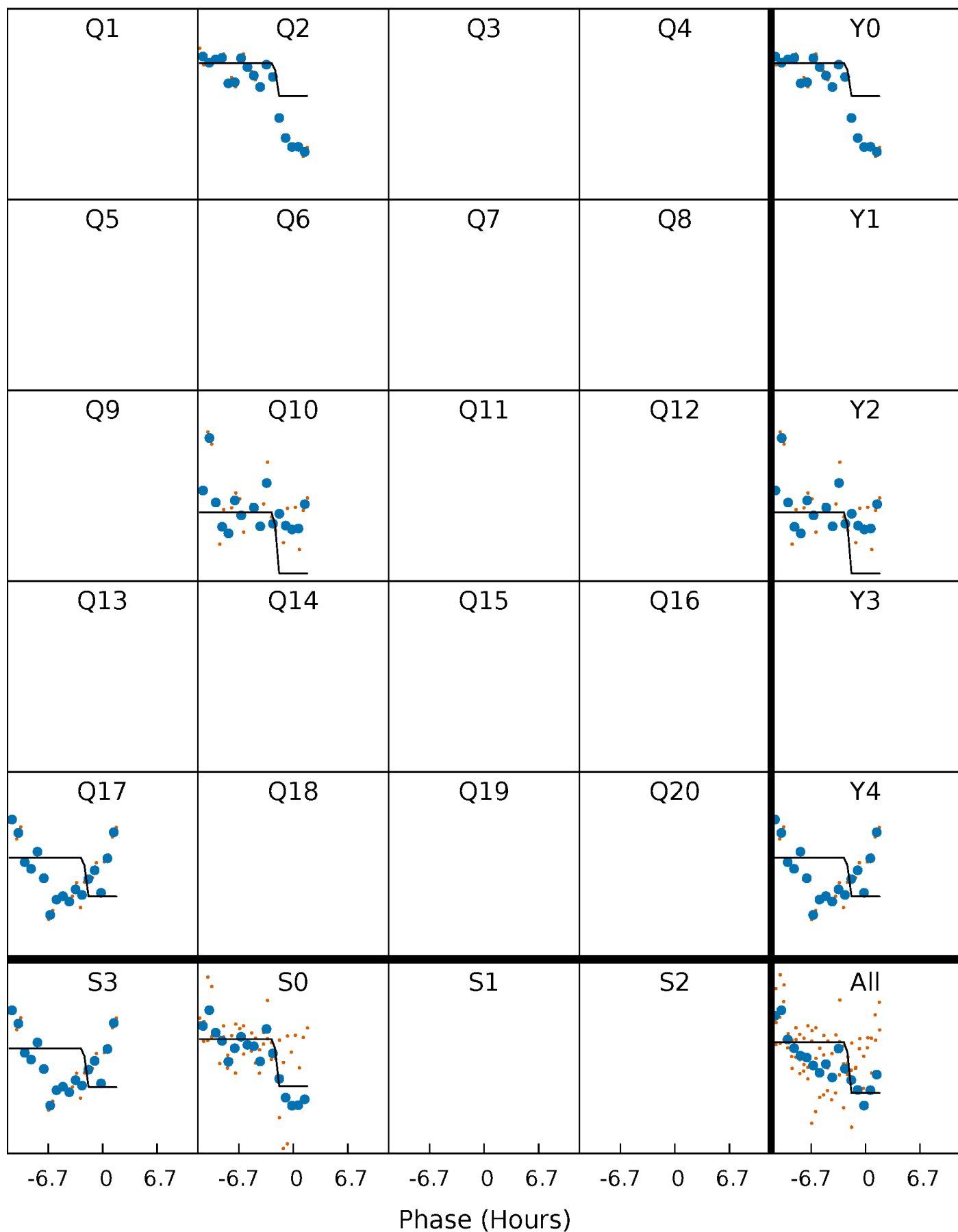
# DV Quarter-Phased Transit Curves

TCE 008566113-02 P=663.234237 Days  $T_0=251.947387$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008566113-02 P=663.252924 Days  $T_0=251.898514$  (BKJD)

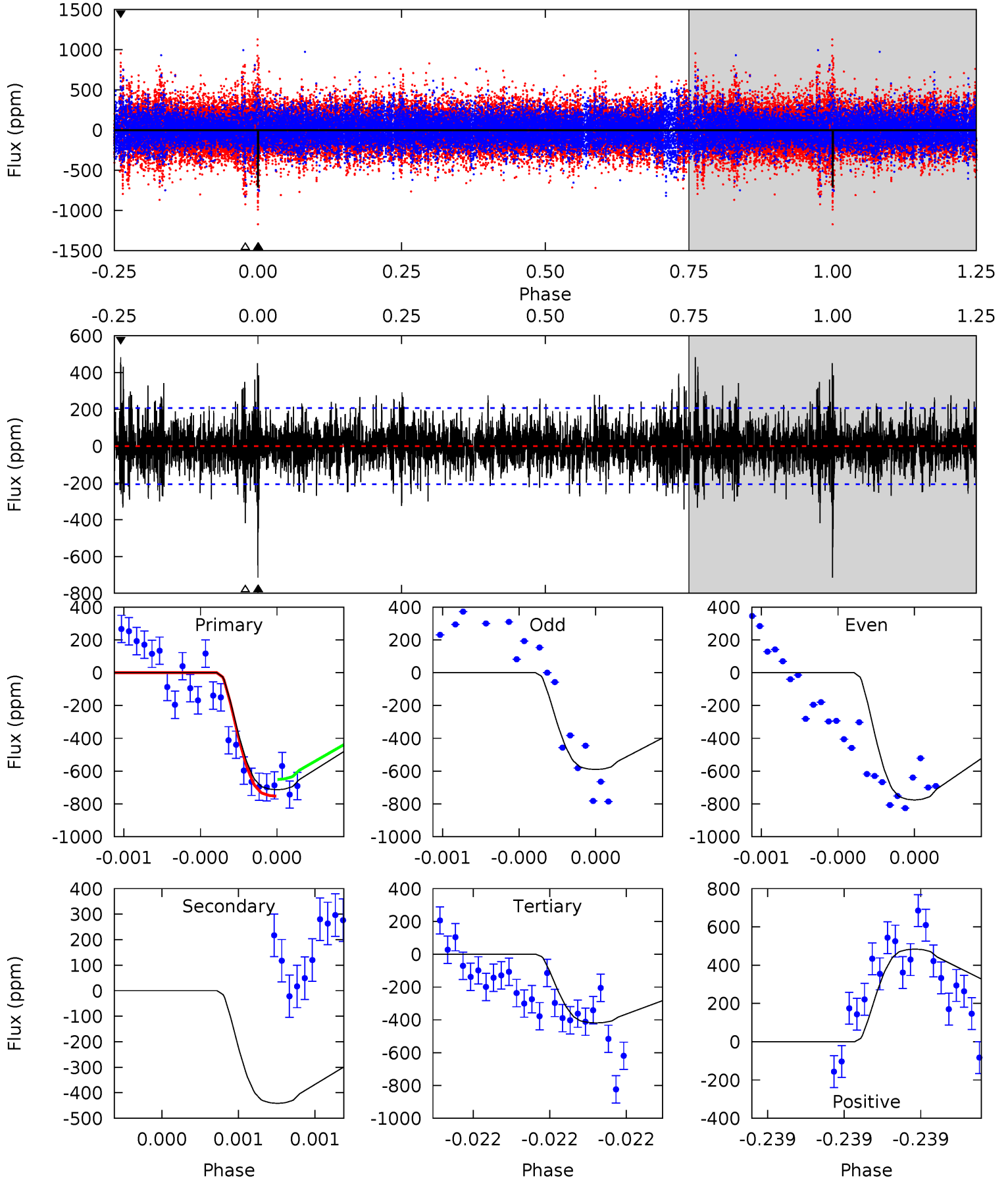




# DV Model-Shift Uniqueness Test

008566113-02, P = 663.234237 Days, E = 251.947387 Days

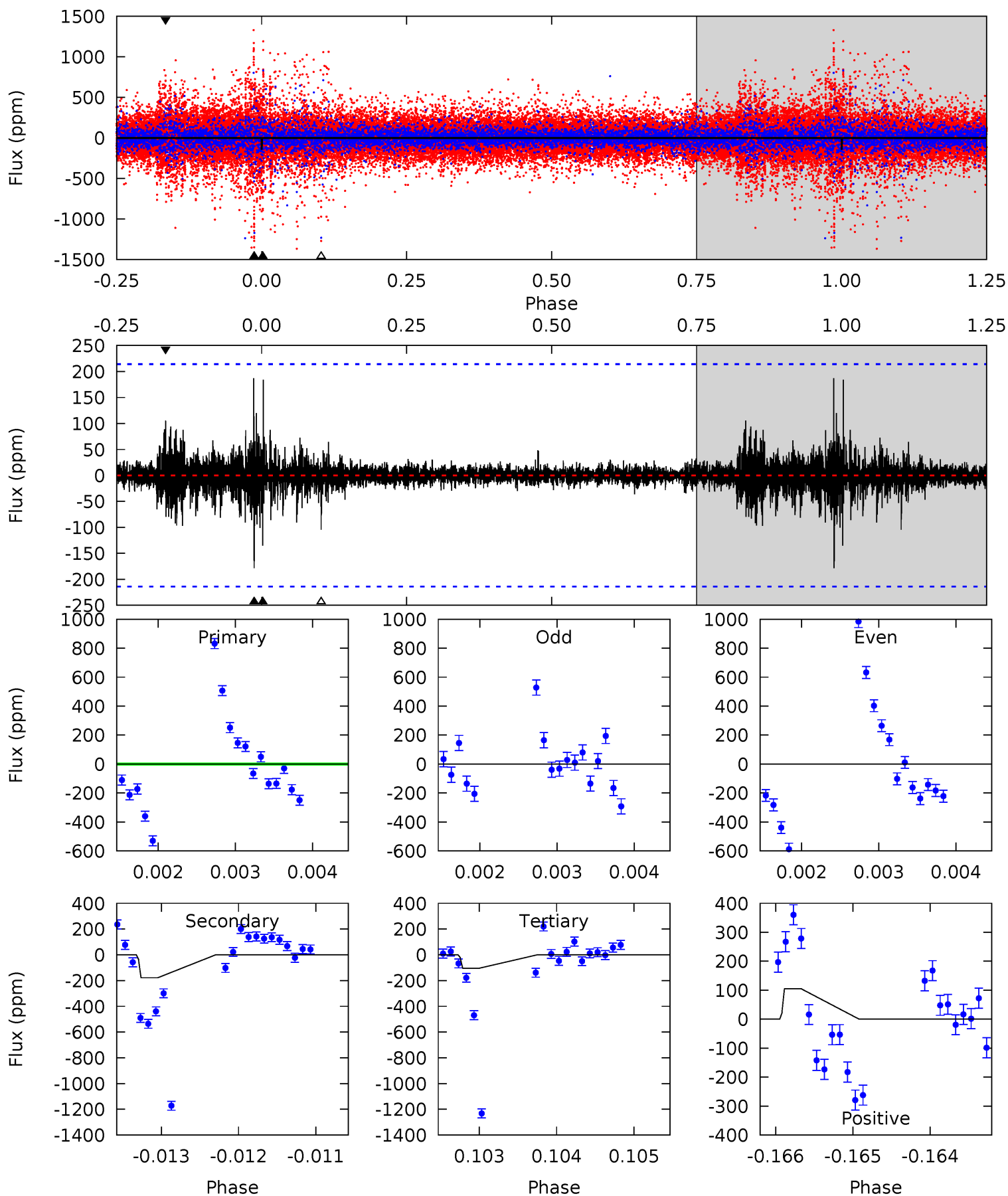
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.5	12.1	11.4	13.2	5.66	3.61	2.55	8.07	6.27	0.63	-1.16	2.48	1.18	0.40	1.23



# Alt Model-Shift Uniqueness Test

008566113-02, P = 663.252924 Days, E = 251.898514 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
3.44	4.55	2.67	2.69	5.45	3.29	0.47	0.77	0.75	1.89	1.86	6.84	6.71	0.51	2.90



### Stellar Parameters For KIC 008566113

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7050^{+197}_{-246}$	$3.532^{+0.344}_{-0.086}$	$-0.320^{+0.300}_{-0.250}$	$3.823^{+0.359}_{-1.527}$	$1.815^{+0.193}_{-0.386}$	$0.046^{+0.127}_{-0.012}$
	+3%/-3%	+10%/-2%	+94%/-78%	+9%/-40%	+11%/-21%	+278%/-26%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008566113-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-441 \pm 37$	$12.12^{+1.88}_{-2.49}$	$619^{+36}_{-55}$	$5841^{+302}_{-278}$	$5477^{+2828}_{-1349}$
Alt.	$-179 \pm 39$	$8.03^{+1.47}_{-1.75}$	$618^{+32}_{-58}$	$5657^{+573}_{-450}$	$5081^{+3149}_{-1750}$

$T_{max}$  = 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

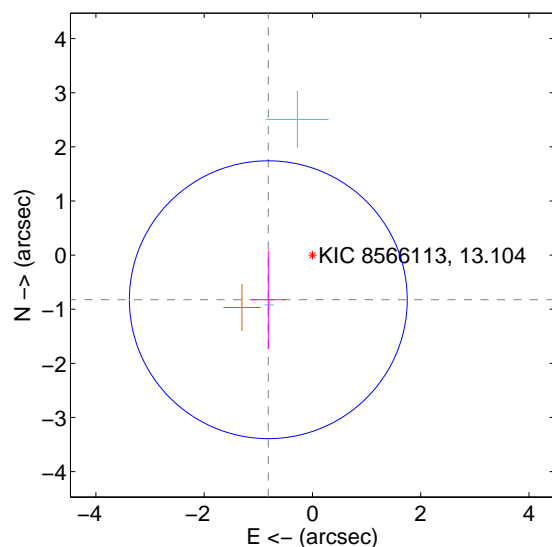
Supplemental centroid analysis for 008566113-02. Kepler magnitude: 13.10. Transit SNR 7.80

There are 2 quarters with good PRF difference image offsets

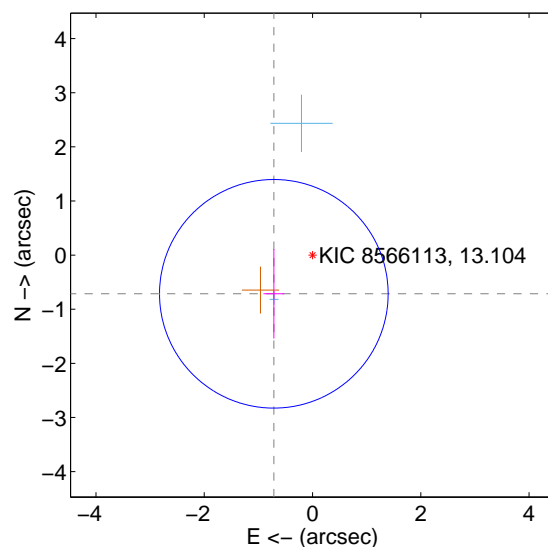
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.159 \pm 0.855$	1.36	$0.815 \pm 0.314$	$-0.824 \pm 0.910$
PRF-fit source offset from KIC position	$1.011 \pm 0.704$	1.44	$0.715 \pm 0.191$	$-0.715 \pm 0.827$
photometric centroid source offset	$0.82 \pm 0.44$	1.88	$-0.80 \pm 0.43$	$0.19 \pm 0.50$

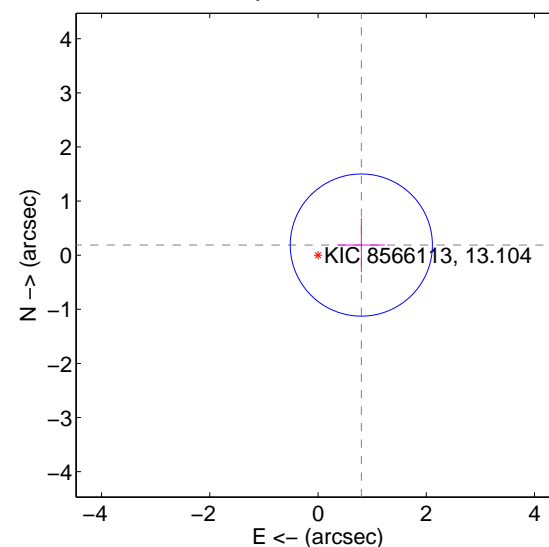
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

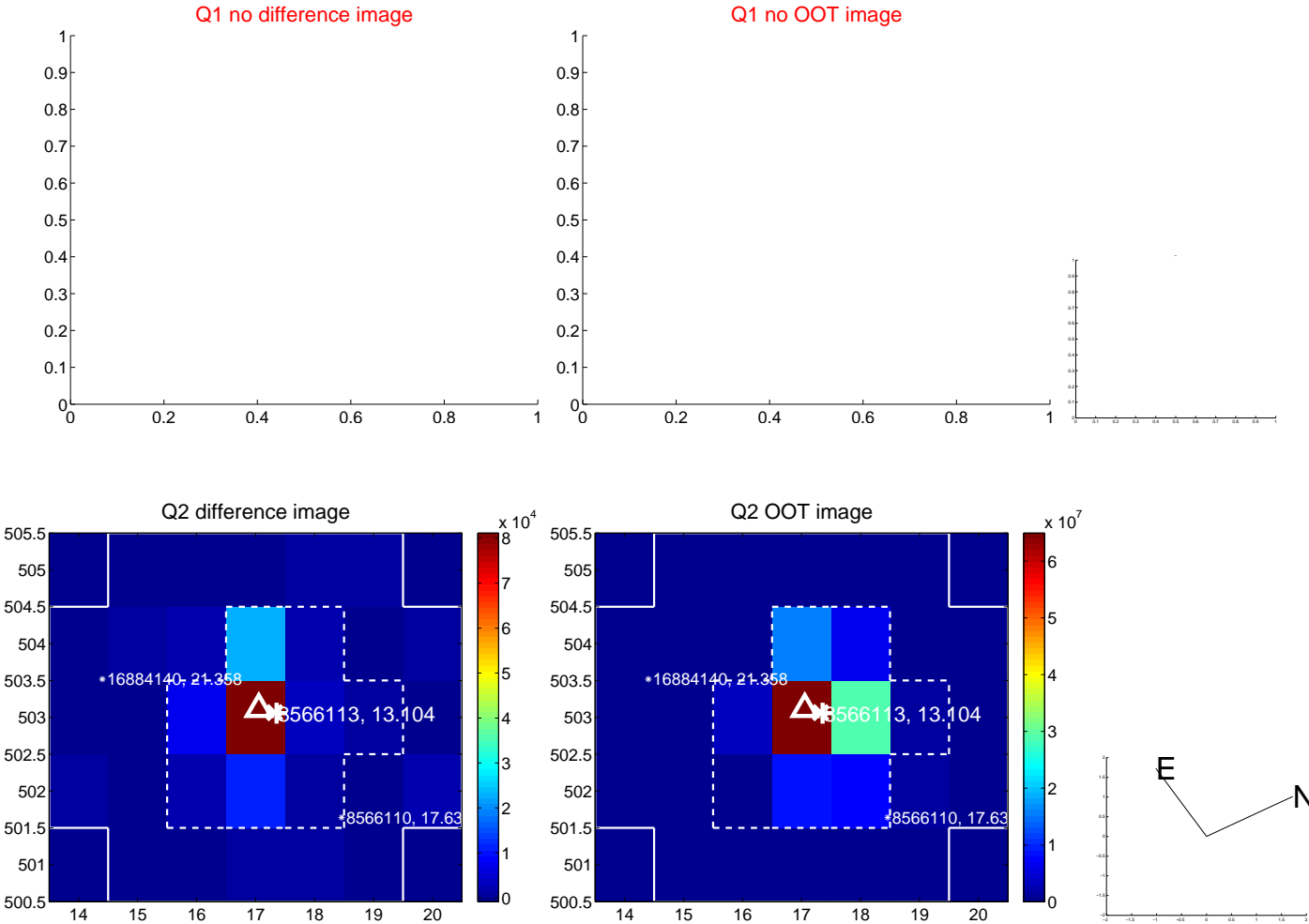


offset from photometric centroids



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.

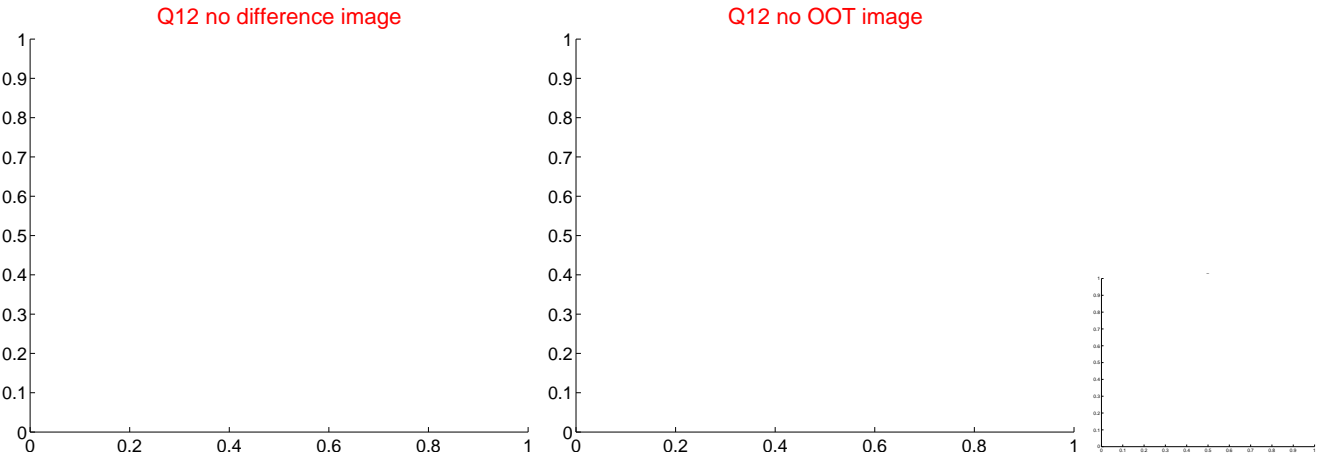
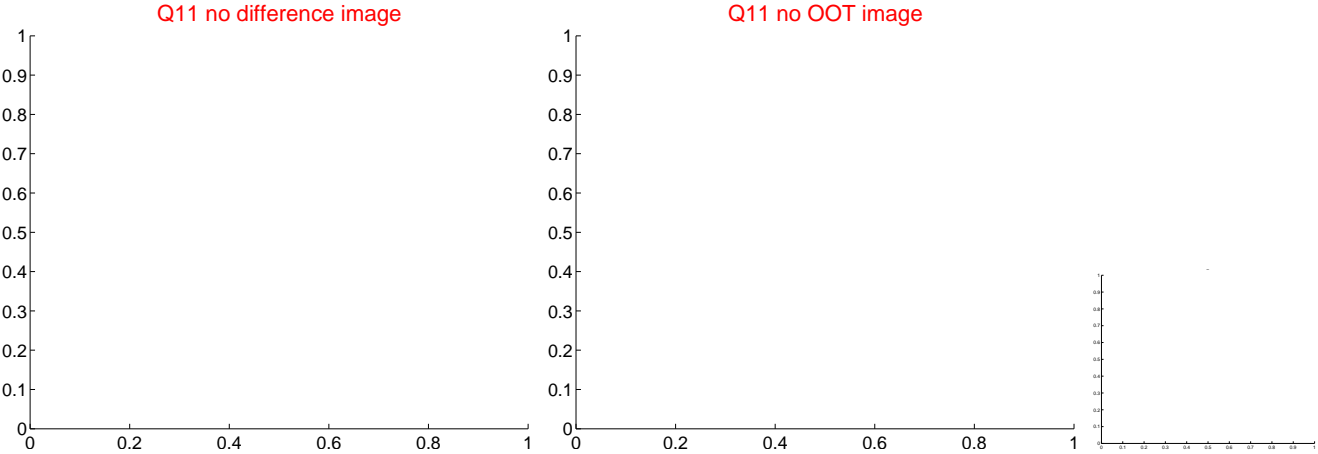
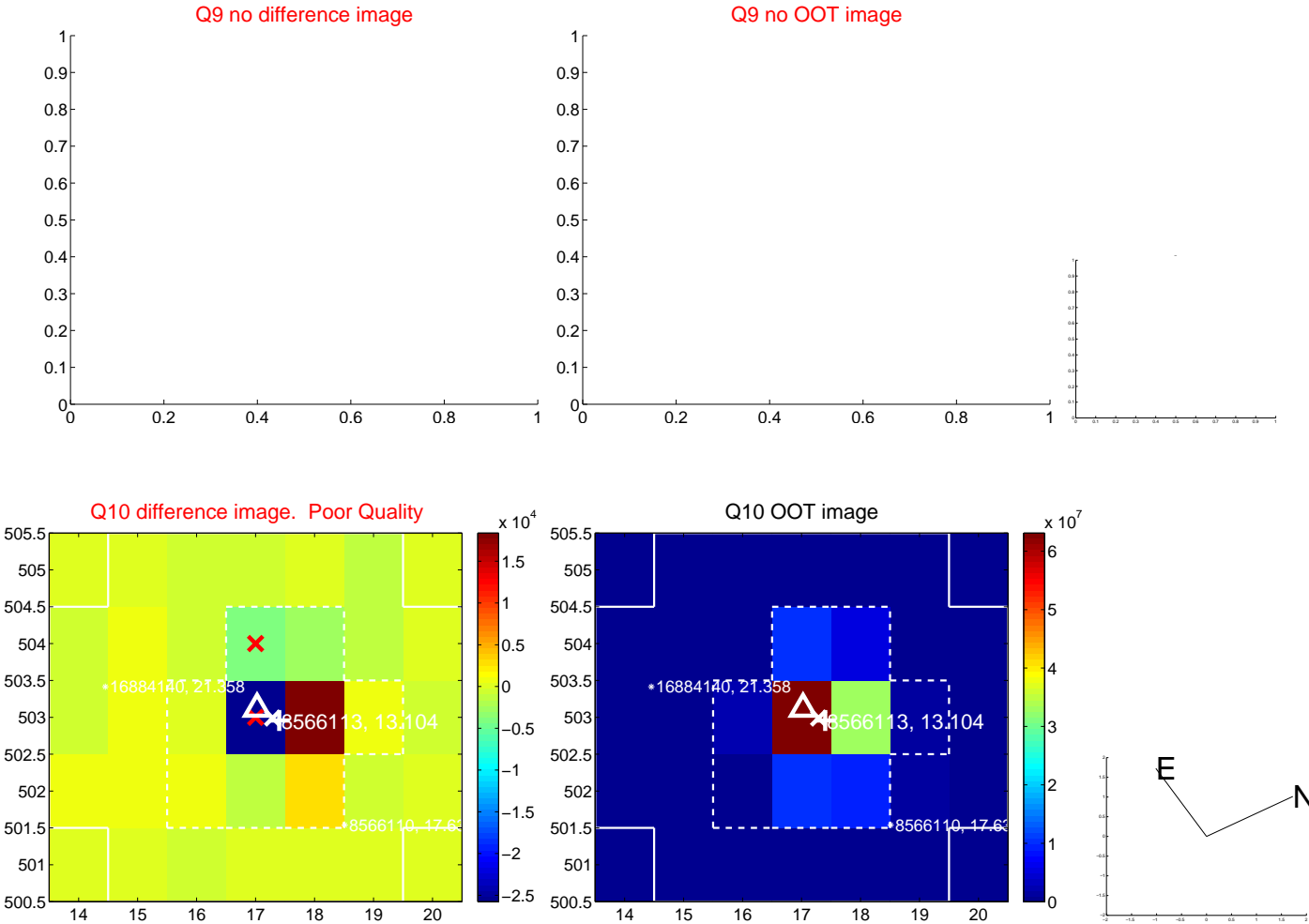


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





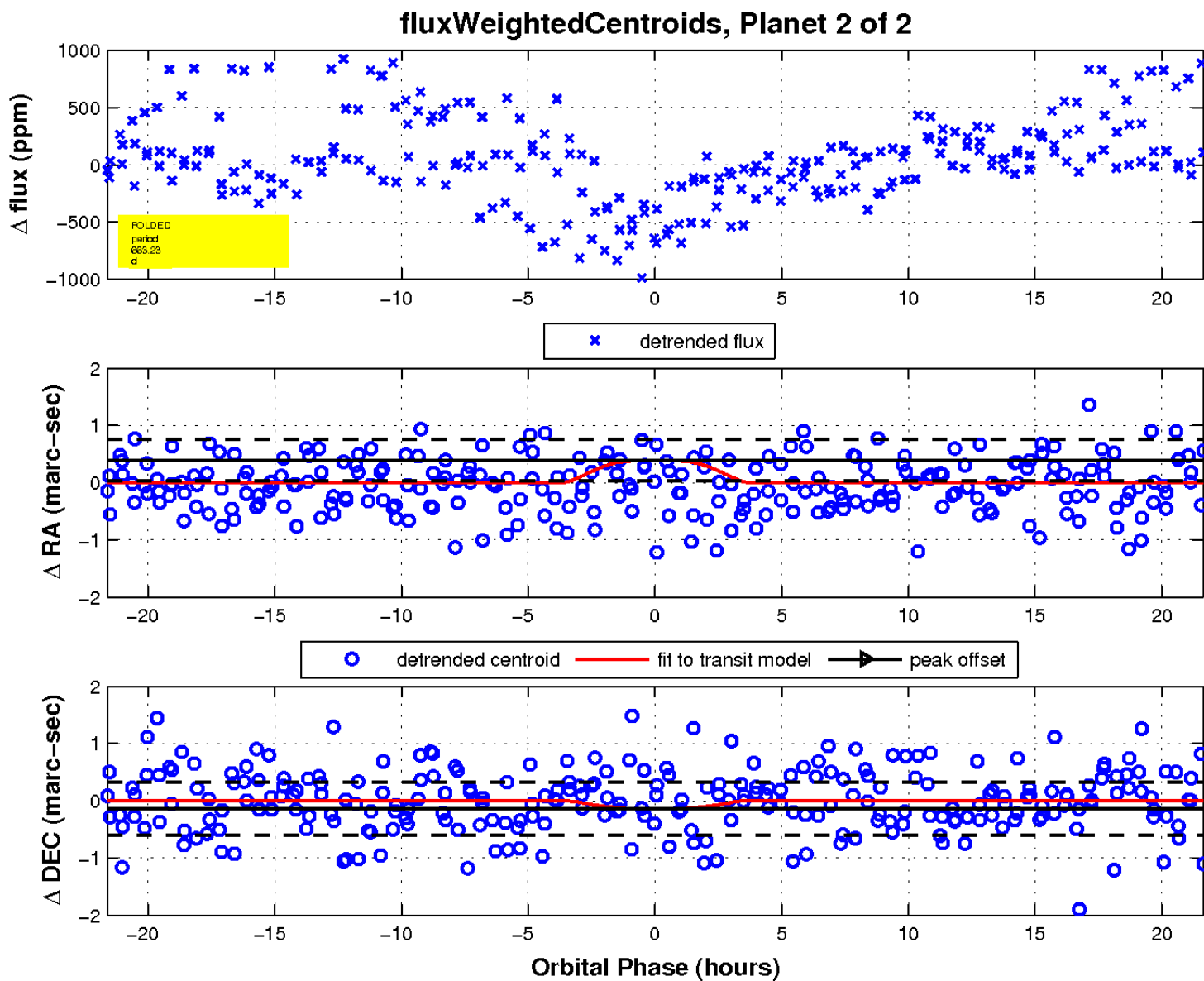
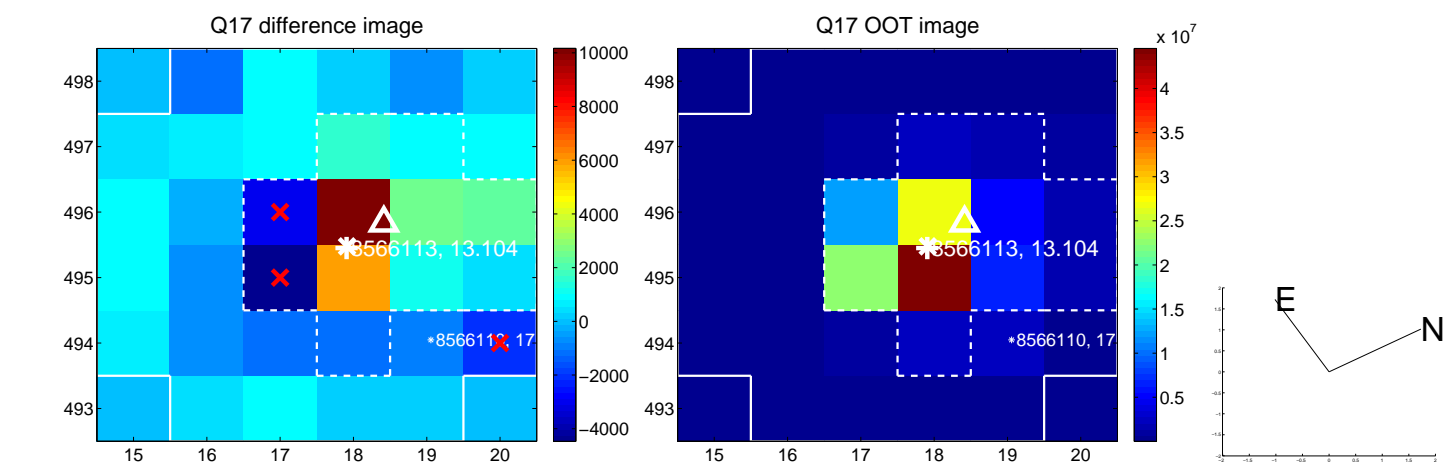
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

Declination

