

# KIC 008916492

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008916492-01	OBS	1414.01	4.023775	132.210863	33.3	4.457	32.0	34.3	3.69	7516	3.08	9310.11
008916492-02	OBS	No	568.654806	174.200047	72.5	16.465	7.6	8.1	3.69	7516	3.54	12.65

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008916492-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—CENT_SATURATED
008916492-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

**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.

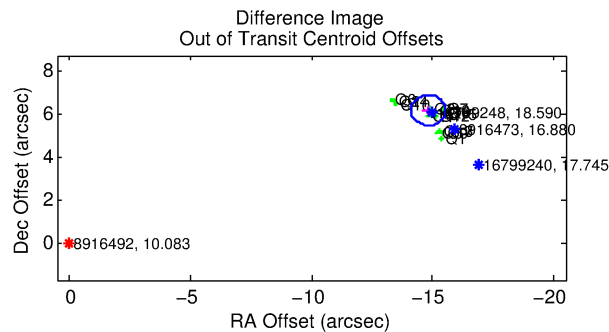
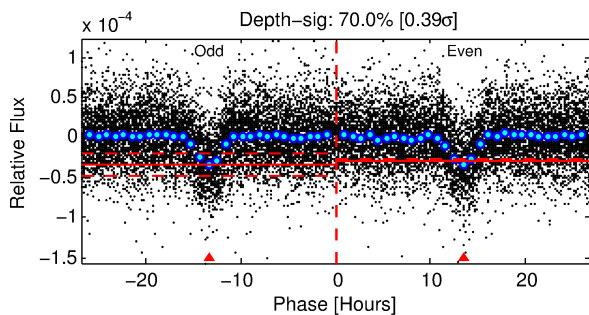
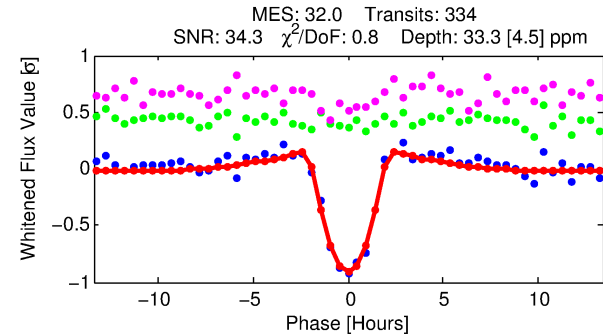
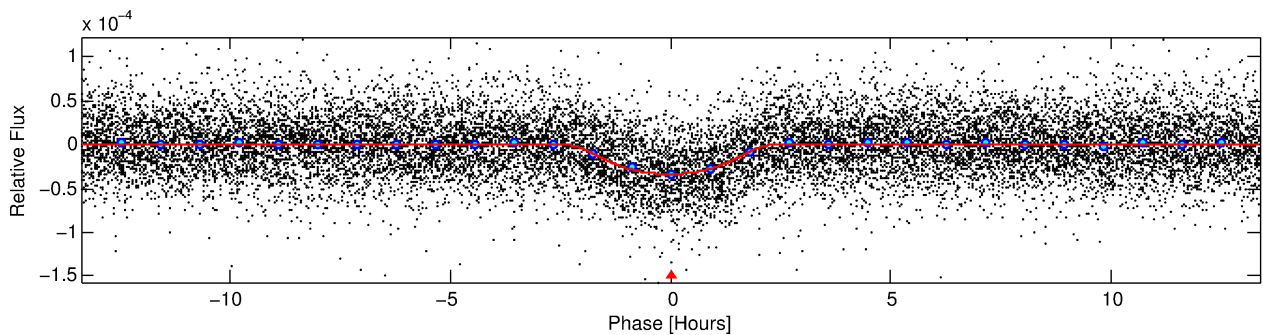
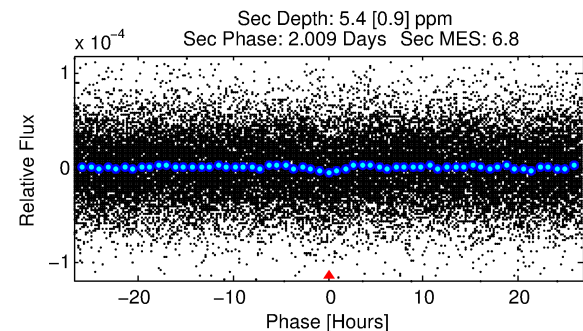
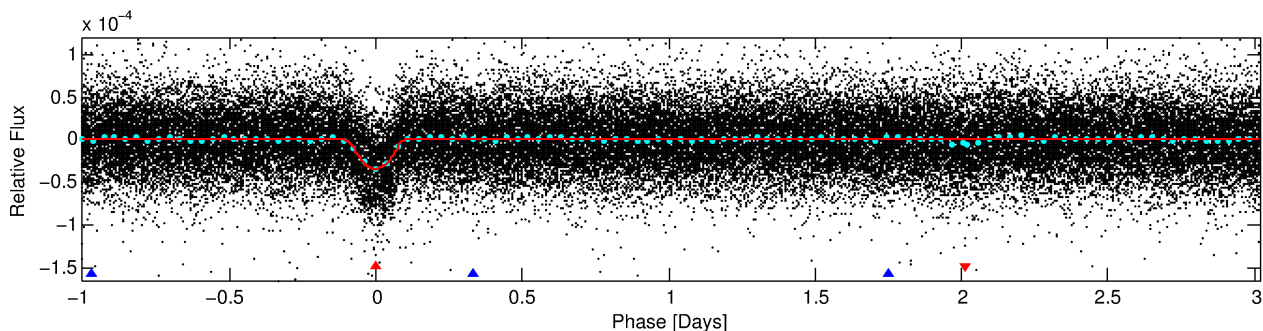
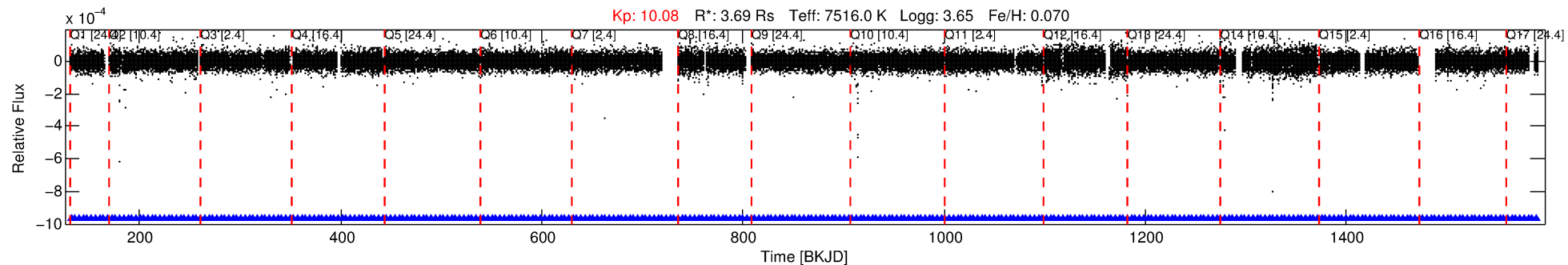
## Ephemeris Match Information For 008916492-01

No Significant Match Found

# DV One-Page Summary

KIC: 8916492 Candidate: 1 of 2 Period: 4.024 d  
KOI: K01414.01 Corr: 0.880

Kp: 10.08 R\*: 3.69 Rs Teff: 7516.0 K Logg: 3.65 Fe/H: 0.070



## DV Fit Results:

Period = 4.02377 [0.00001] d  
Epoch = 132.2109 [0.0024] BKJD  
Rp/R\* = 0.0077 [0.0008]  
a/R\* = 1.51 [0.08]  
b = 0.99 [0.00]  
Seff = 9310.11 [7310.44]  
Teq = 2505 [492] K  
Rp = 3.09 [1.55] Re  
a = 0.0646 [0.0307] AU  
Ag = 1.30 [1.05] [0.28σ]  
Teff = 4133 [338] K [2.73σ]

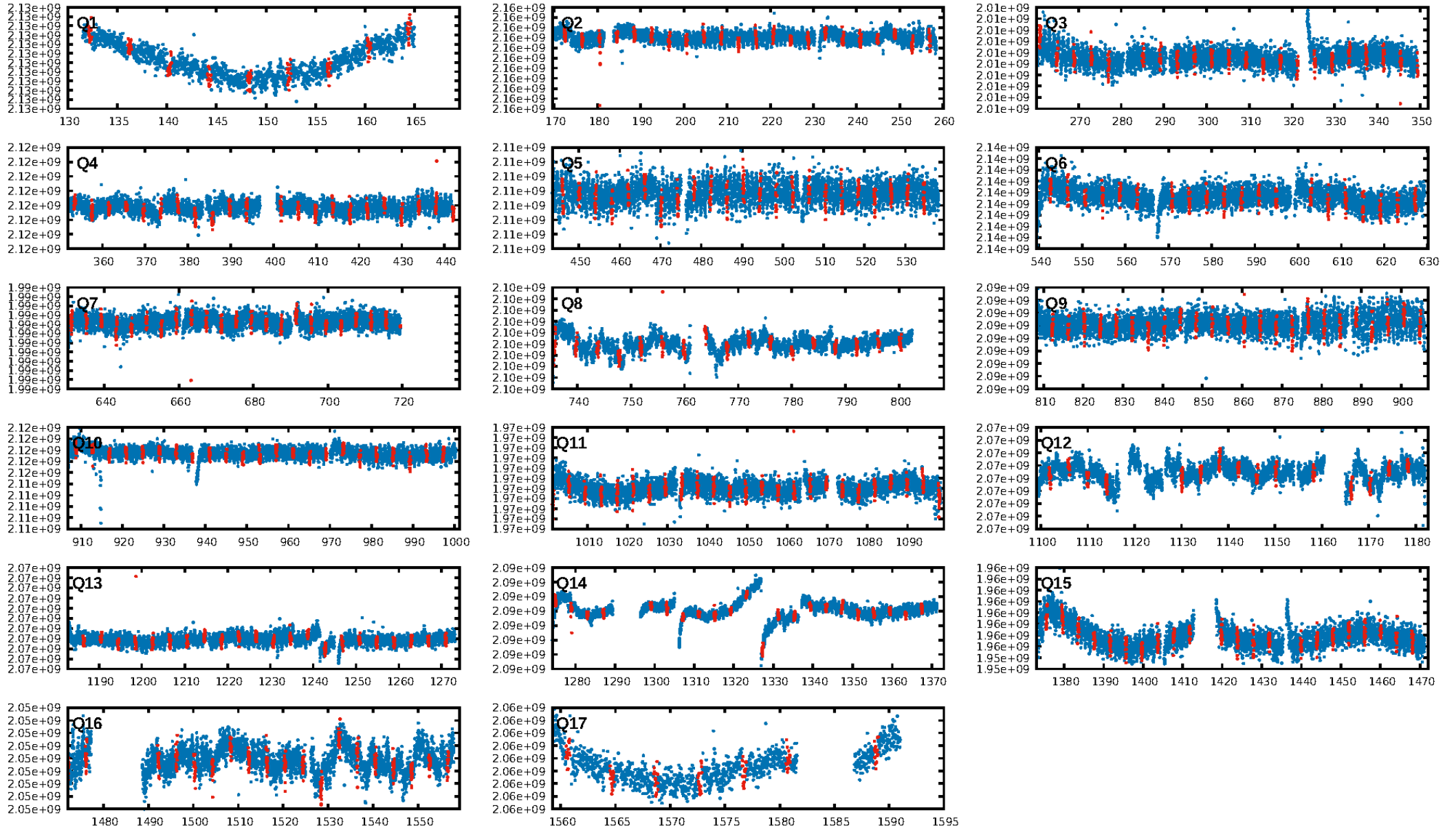
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [794.44σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.13e-205  
RollingBand-fgt: 1.00 [318/318]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 20.244 arcsec [22.00σ]  
OotOffset-rm: 16.056 arcsec [68.38σ]  
KicOffset-rm: 15.999 arcsec [218.56σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.53 [9/17]  
DiffImageOverlap-fno: 1.00 [17/17]

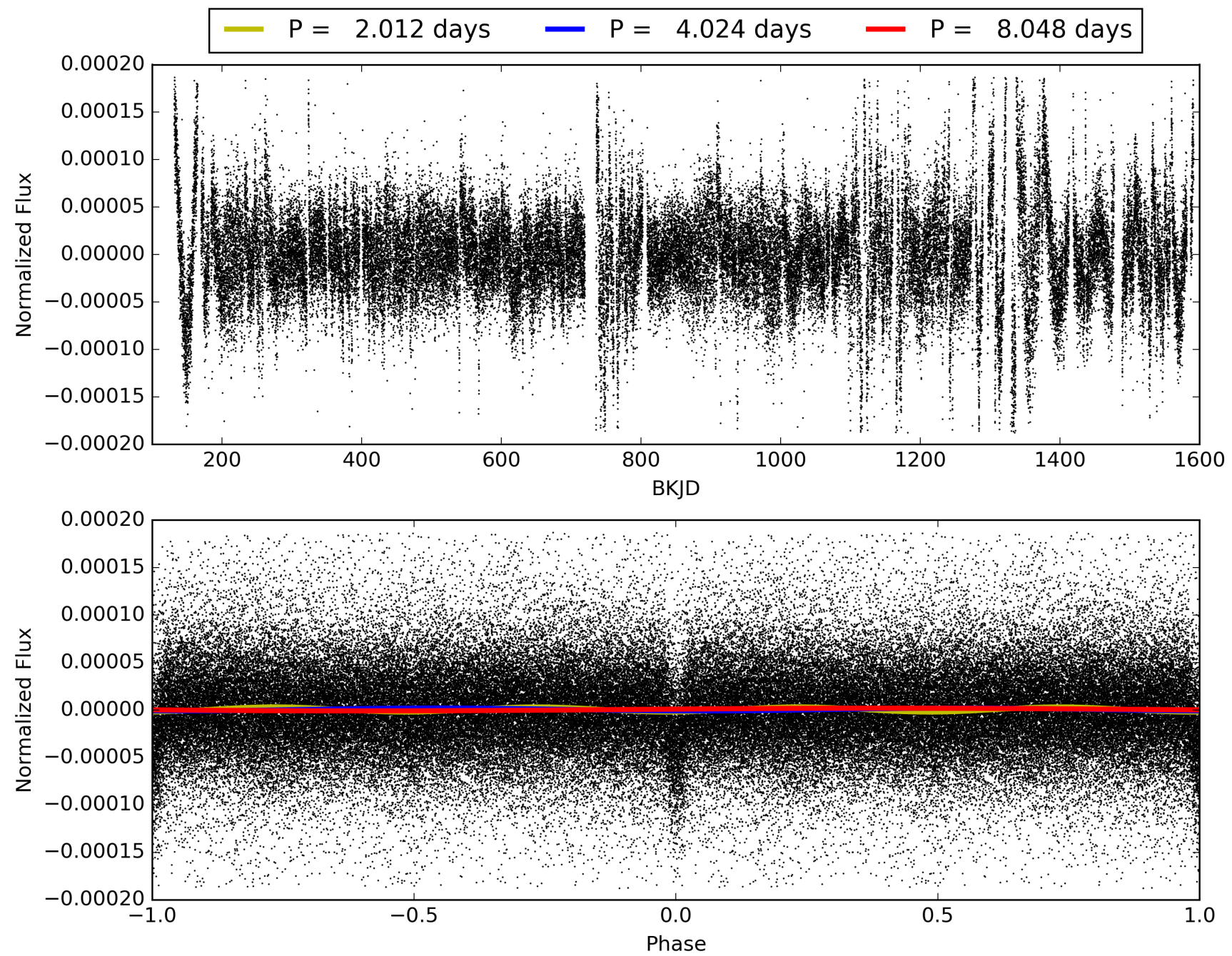
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:29:45 Z

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

# TCE 008916492-01, PDC Light Curves

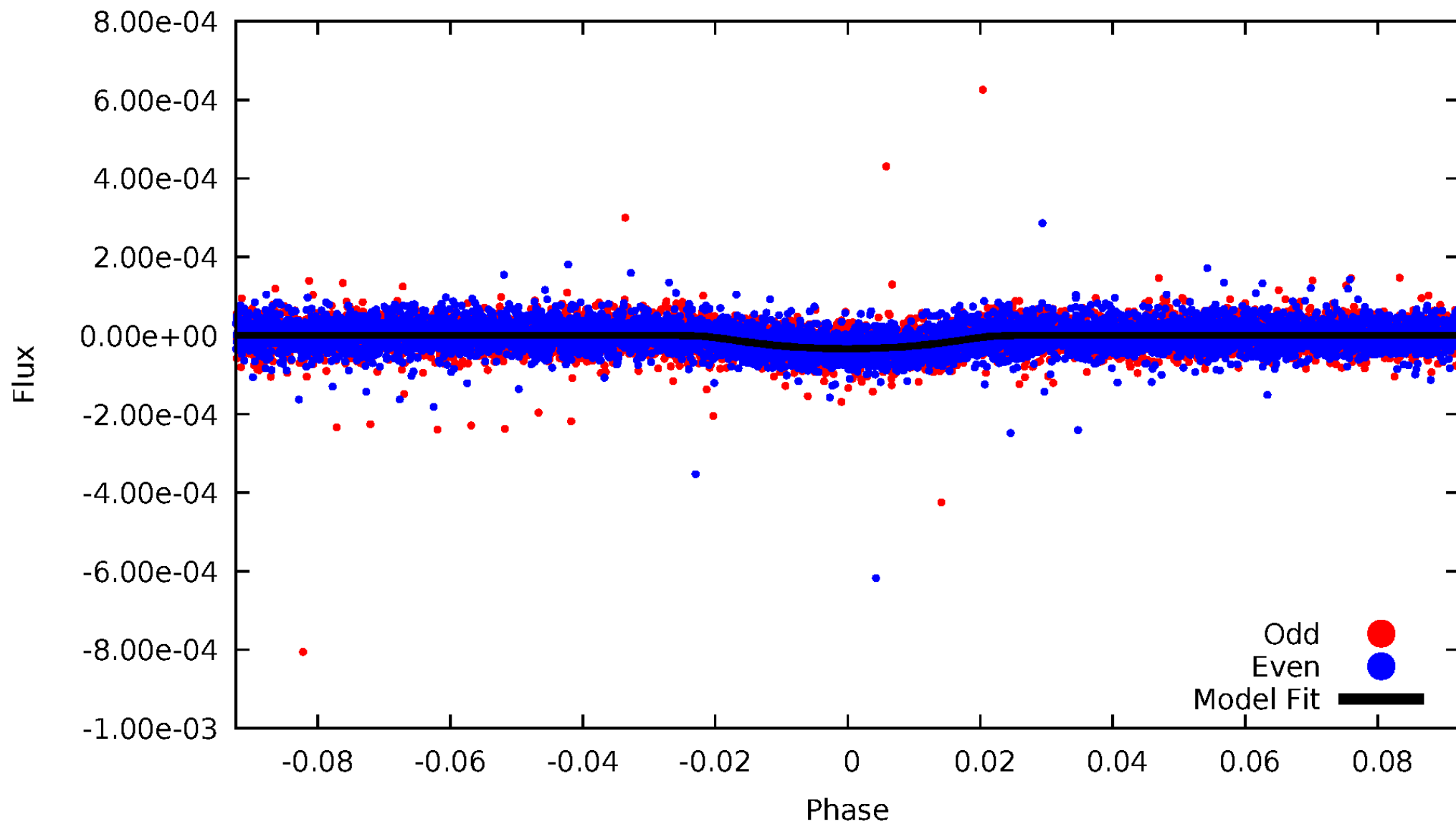


# TCE 008916492-01



# DV Odd/Even

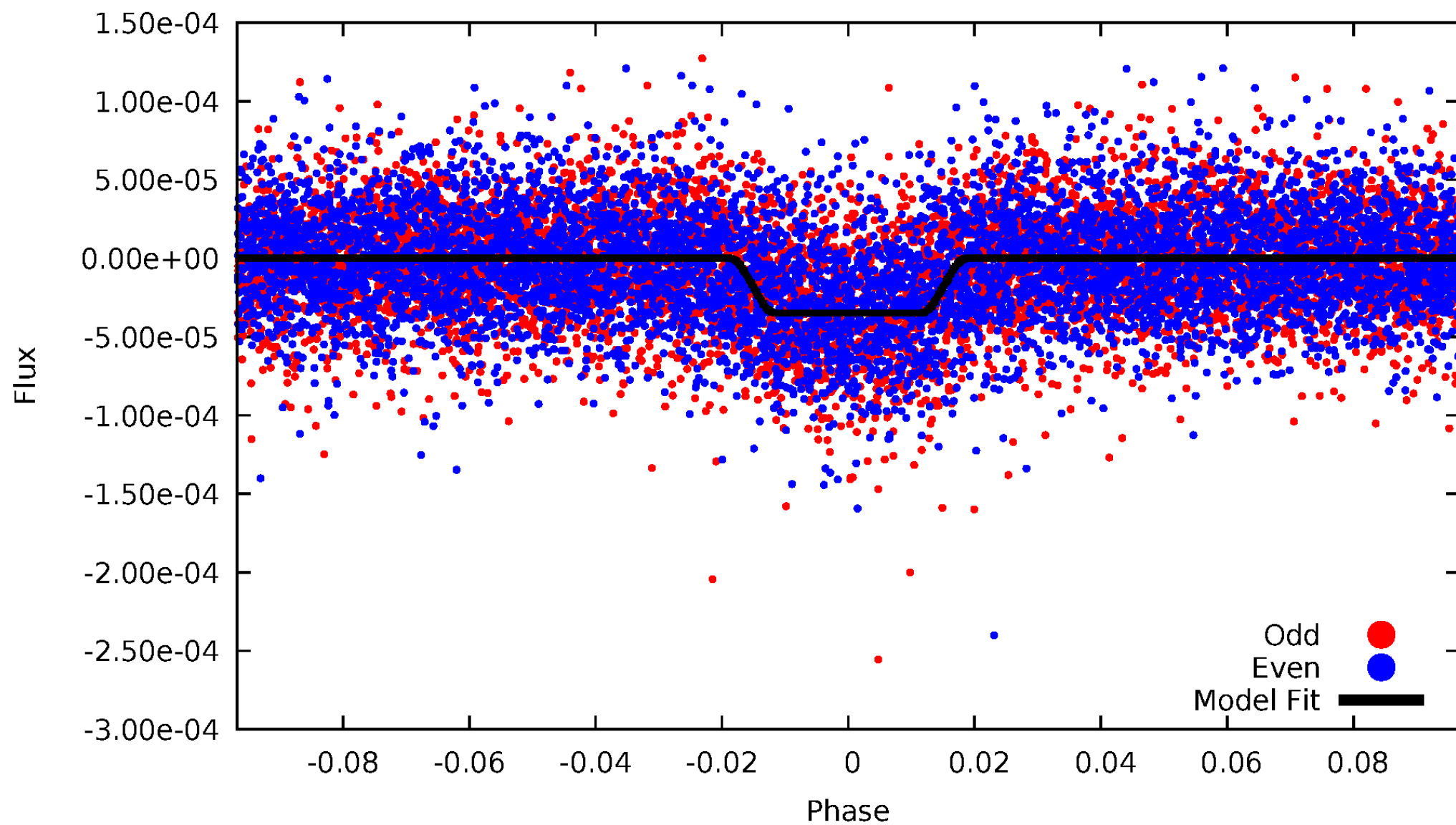
TCE 008916492-01





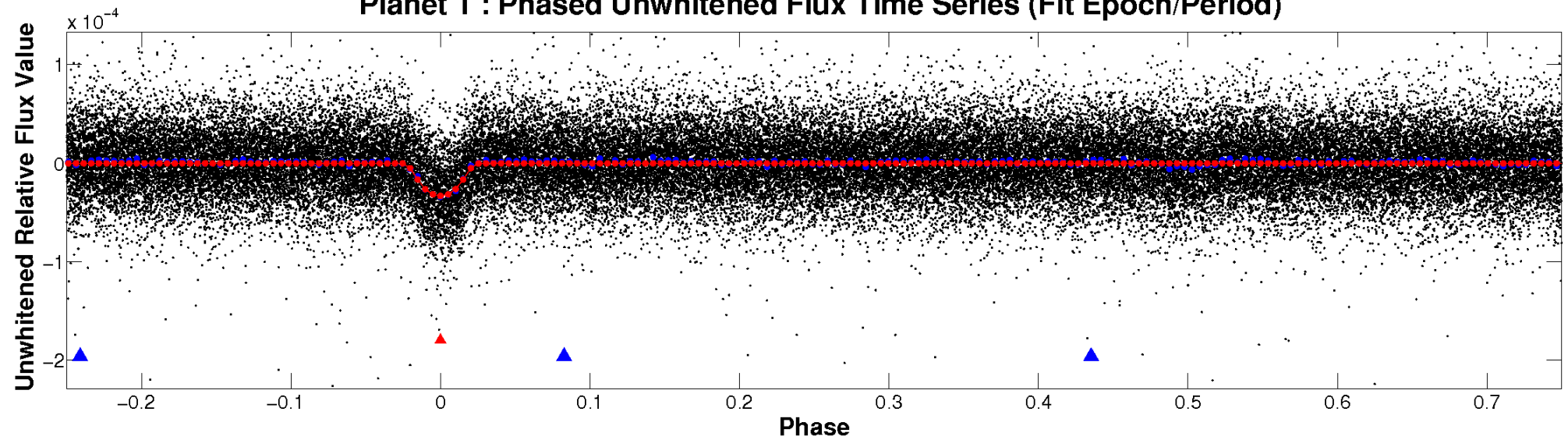
# ALT Odd/Even

TCE 008916492-01

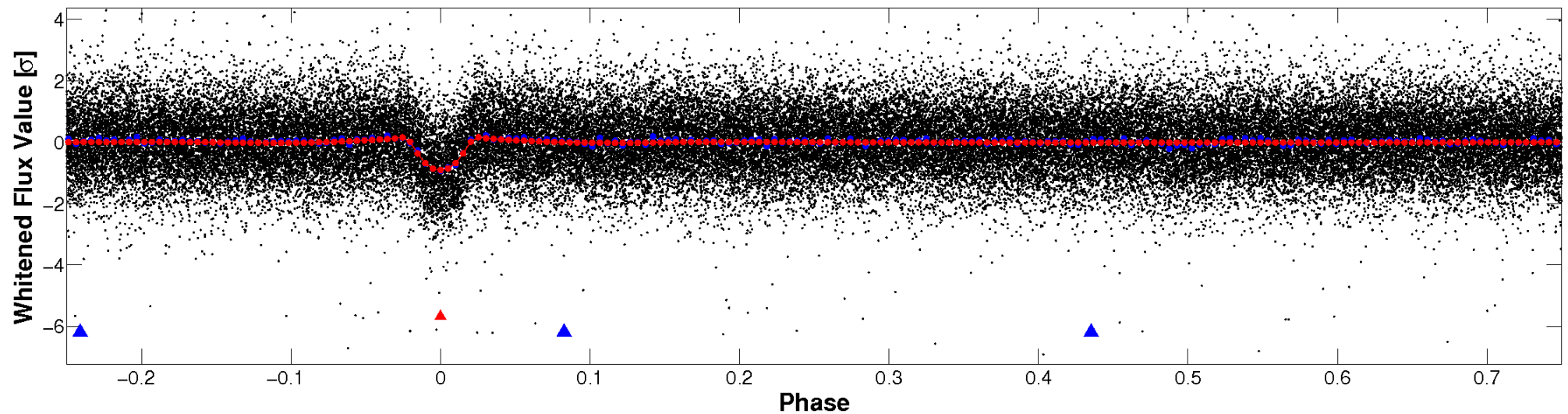


# Non-Whitened Vs. Whitened Light Curve

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

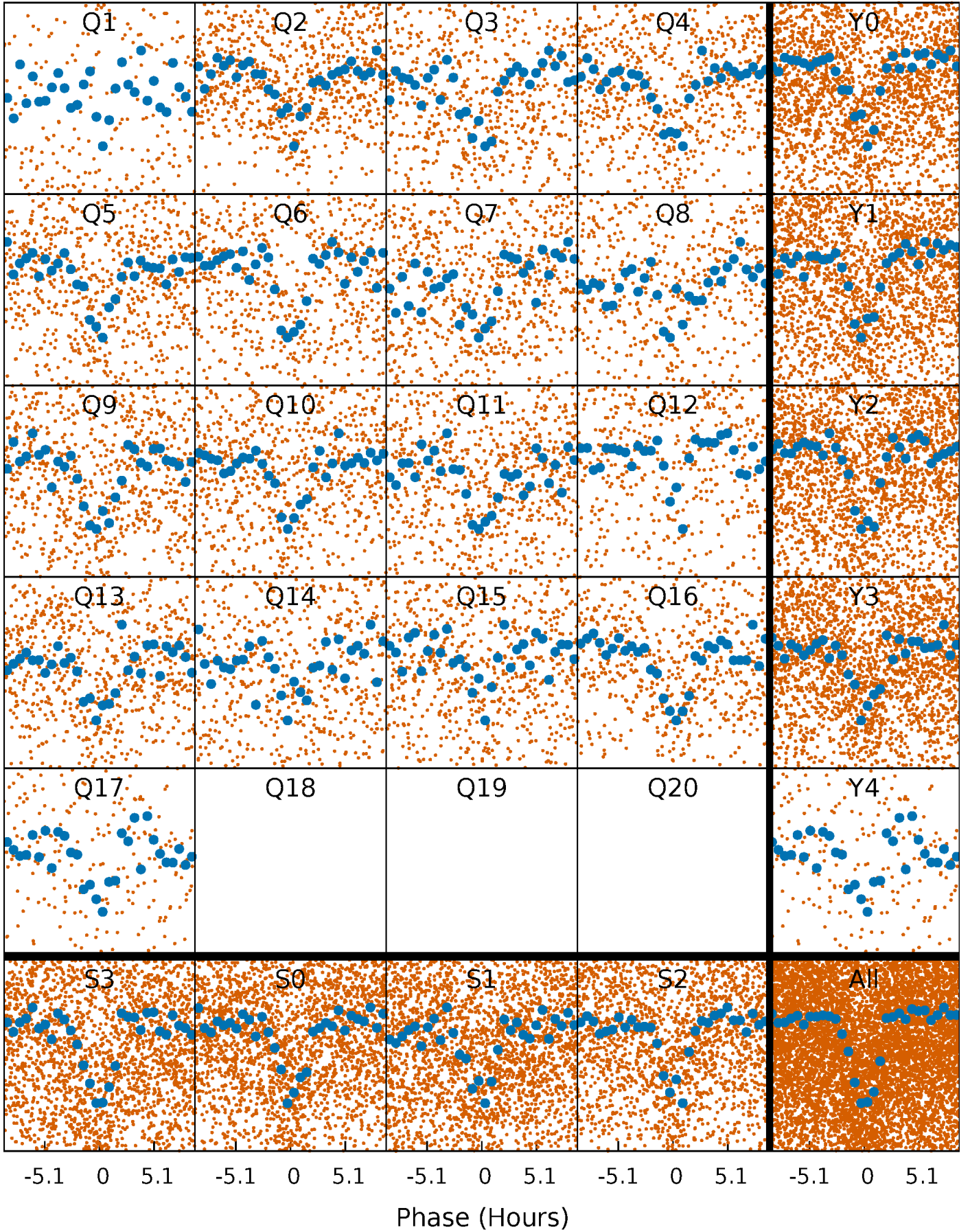


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

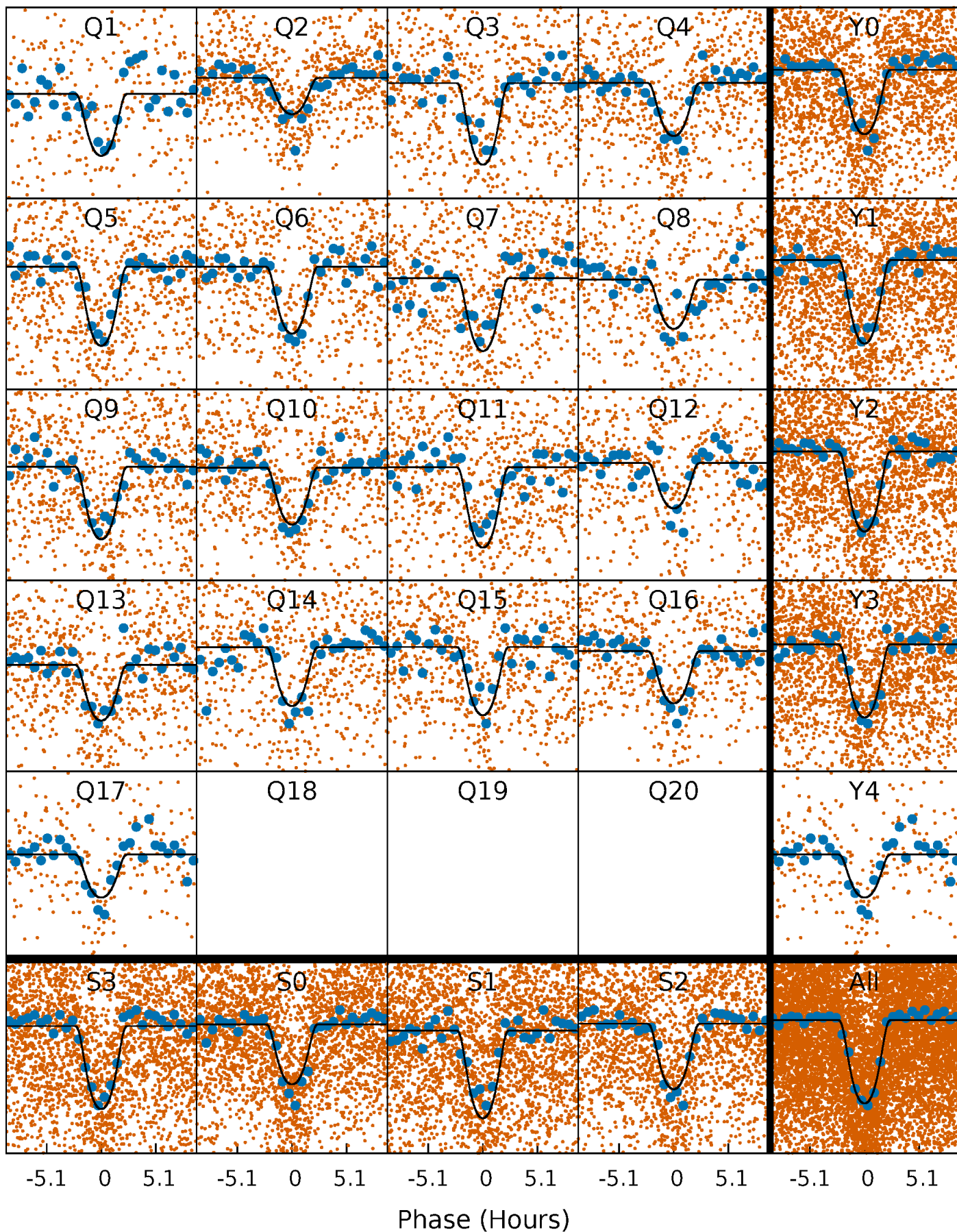
TCE 008916492-01 P= 4.023775 Days  $T_0=132.210863$  (BKJD)





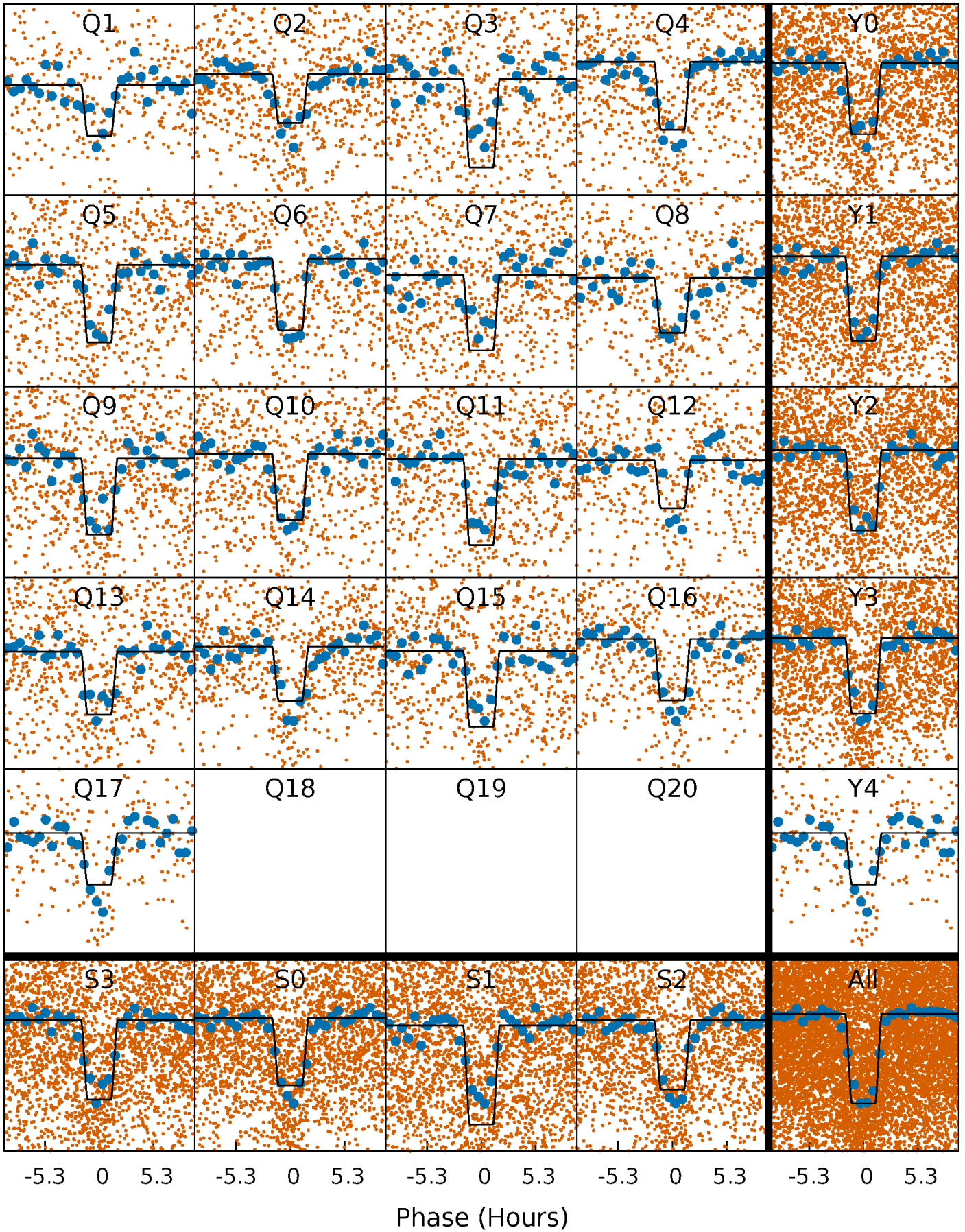
# DV Quarter-Phased Transit Curves

TCE 008916492-01   P= 4.023775 Days    $T_0=132.210863$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

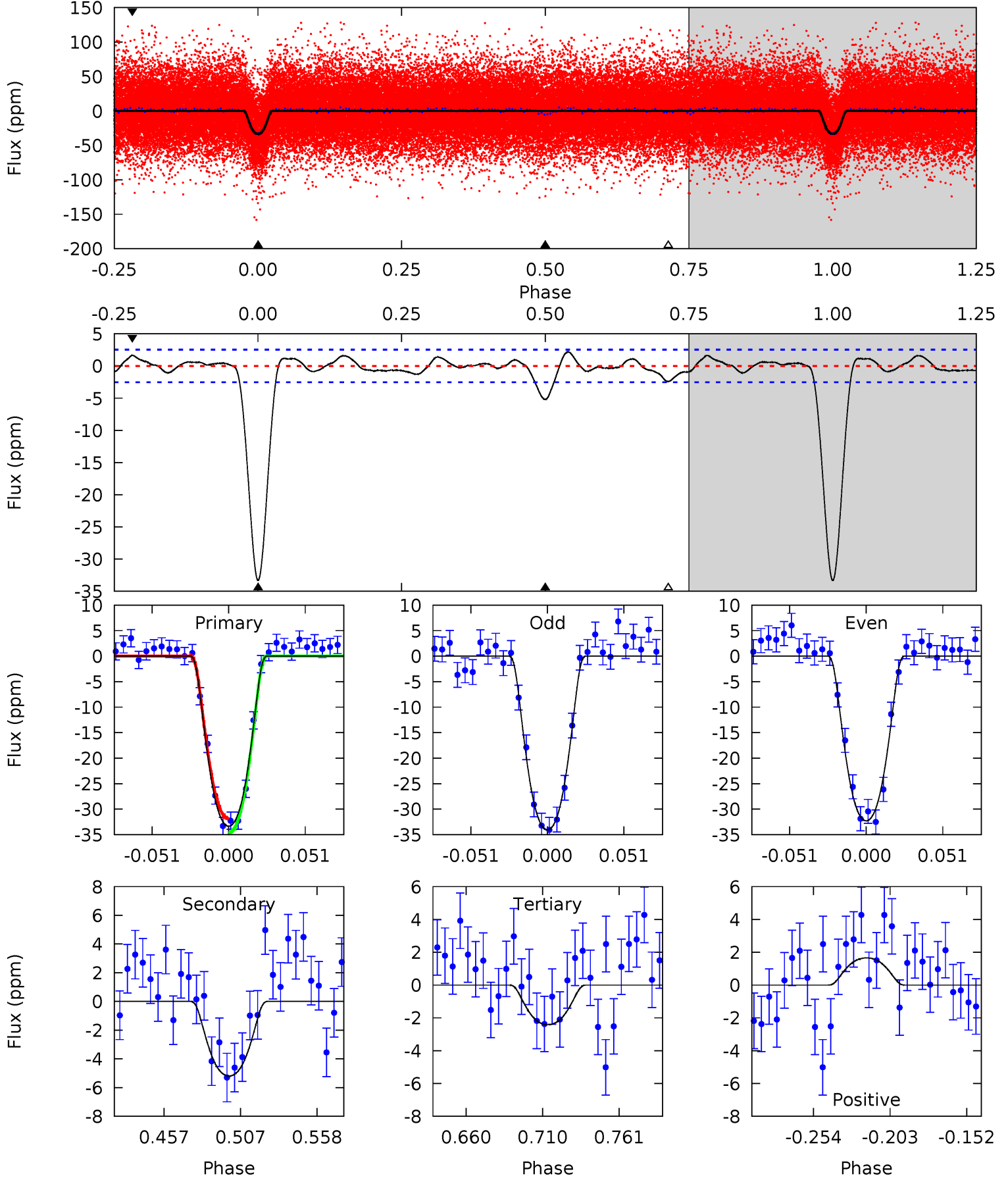
TCE 008916492-01 P= 4.023746 Days  $T_0=132.217120$  (BKJD)



# DV Model-Shift Uniqueness Test

008916492-01, P = 4.023775 Days, E = 128.187088 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
62.0	9.67	4.50	3.08	4.71	1.95	1.51	57.5	58.9	5.17	6.59	1.65	1.04	0.06	2.57

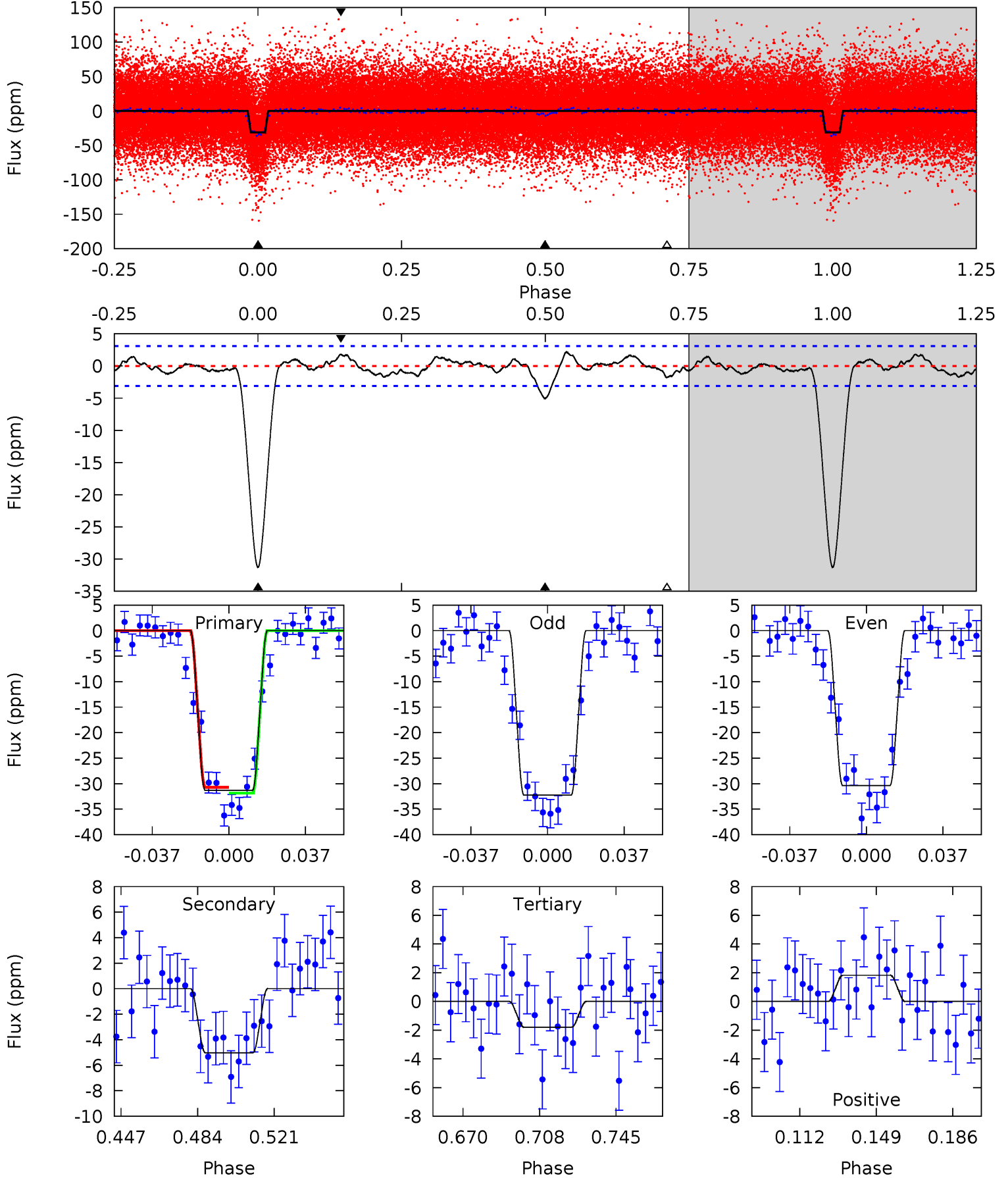




# Alt Model-Shift Uniqueness Test

008916492-01, P = 4.023746 Days, E = 128.193374 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
48.1	7.72	2.76	2.80	4.77	2.08	1.28	45.3	45.3	4.96	4.92	1.43	1.09	0.06	0.87





### Stellar Parameters For KIC 008916492

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7516^{+207}_{-337}$	$3.651^{+0.450}_{-0.079}$	$0.070^{+0.200}_{-0.350}$	$3.685^{+0.603}_{-1.810}$	$2.218^{+0.228}_{-0.685}$	$0.062^{+0.293}_{-0.016}$
	+3%/-4%	+12%/-2%	+286%/-500%	+16%/-49%	+10%/-31%	+470%/-26%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 008916492-01 / KOI 1414.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-5 \pm 1$	$2.80^{+0.62}_{-0.76}$	$3339^{+278}_{-423}$	$4074^{+260}_{-225}$	$1.494^{+1.024}_{-0.458}$
Alt.	$-5 \pm 1$	$2.15^{+0.50}_{-0.59}$	$3349^{+249}_{-396}$	$4576^{+367}_{-325}$	$2.503^{+1.939}_{-0.872}$

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

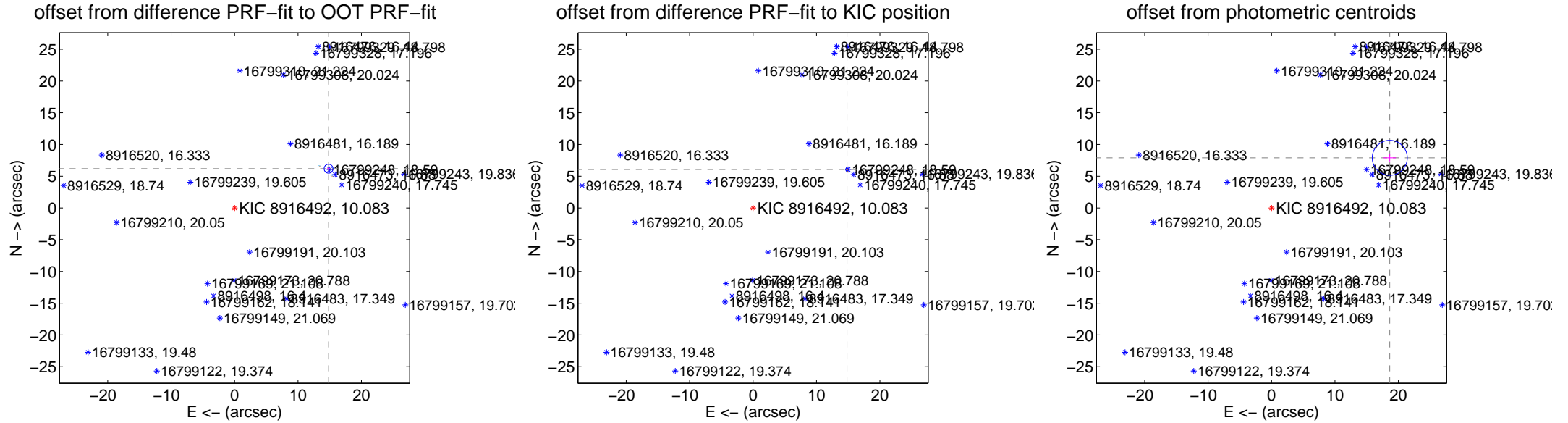
## DV Centroid Data

Supplemental centroid analysis for 008916492-01. **Kepler magnitude: 10.08.** Transit SNR 34.29

There are 9 quarters with good PRF difference image offsets

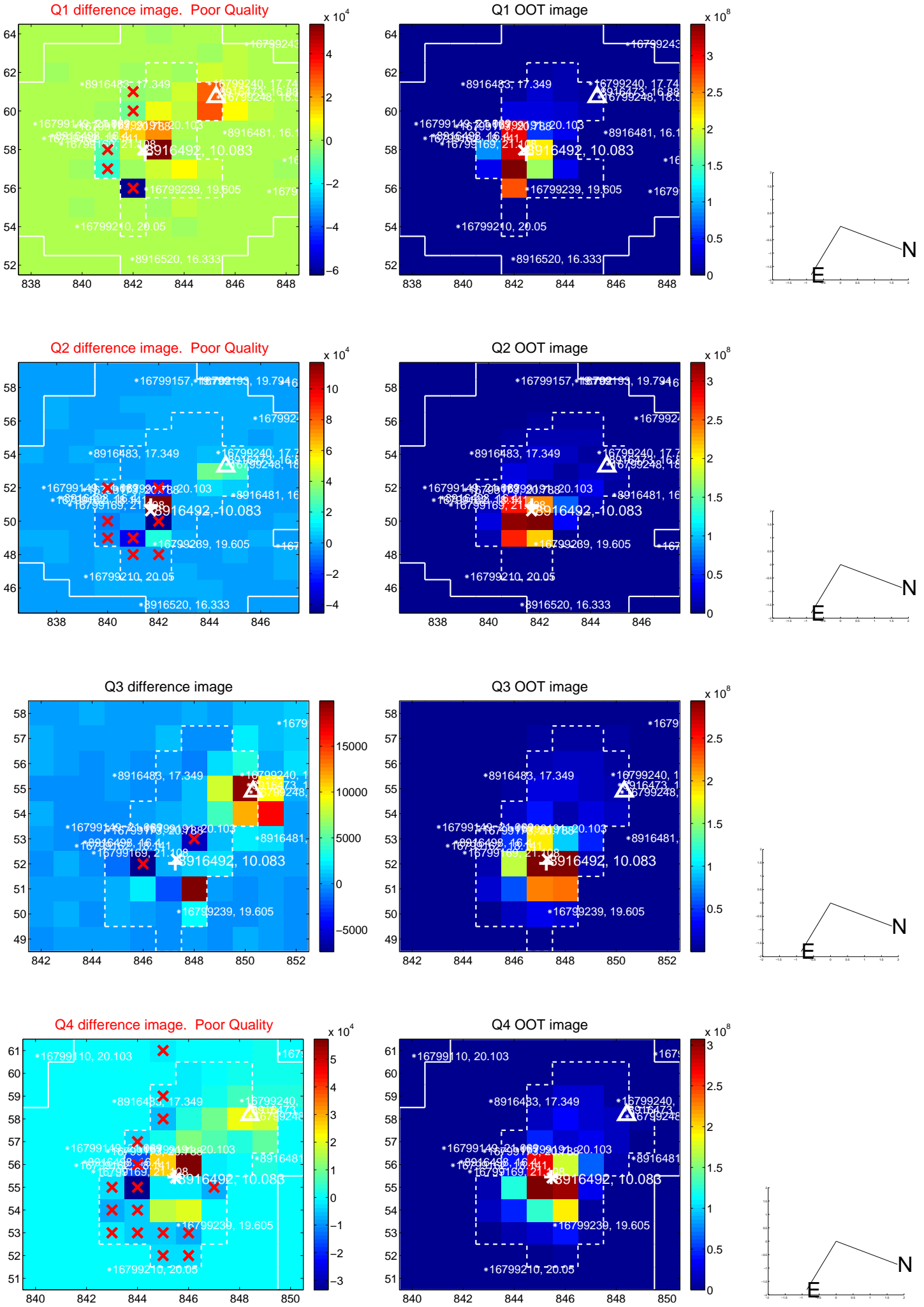
The direct PRF centroid is offset from the target star catalog position by about 0.85 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>16.056 <math>\pm</math> 0.235</b>	<b>68.38</b>	-14.819 $\pm$ 0.245	6.181 $\pm$ 0.160
PRF-fit source offset from KIC position	<b>15.999 <math>\pm</math> 0.073</b>	<b>218.56</b>	-14.812 $\pm$ 0.072	6.050 $\pm$ 0.079
photometric centroid source offset	<b>20.24 <math>\pm</math> 0.92</b>	<b>22.00</b>	-18.64 $\pm$ 0.97	7.90 $\pm$ 0.56

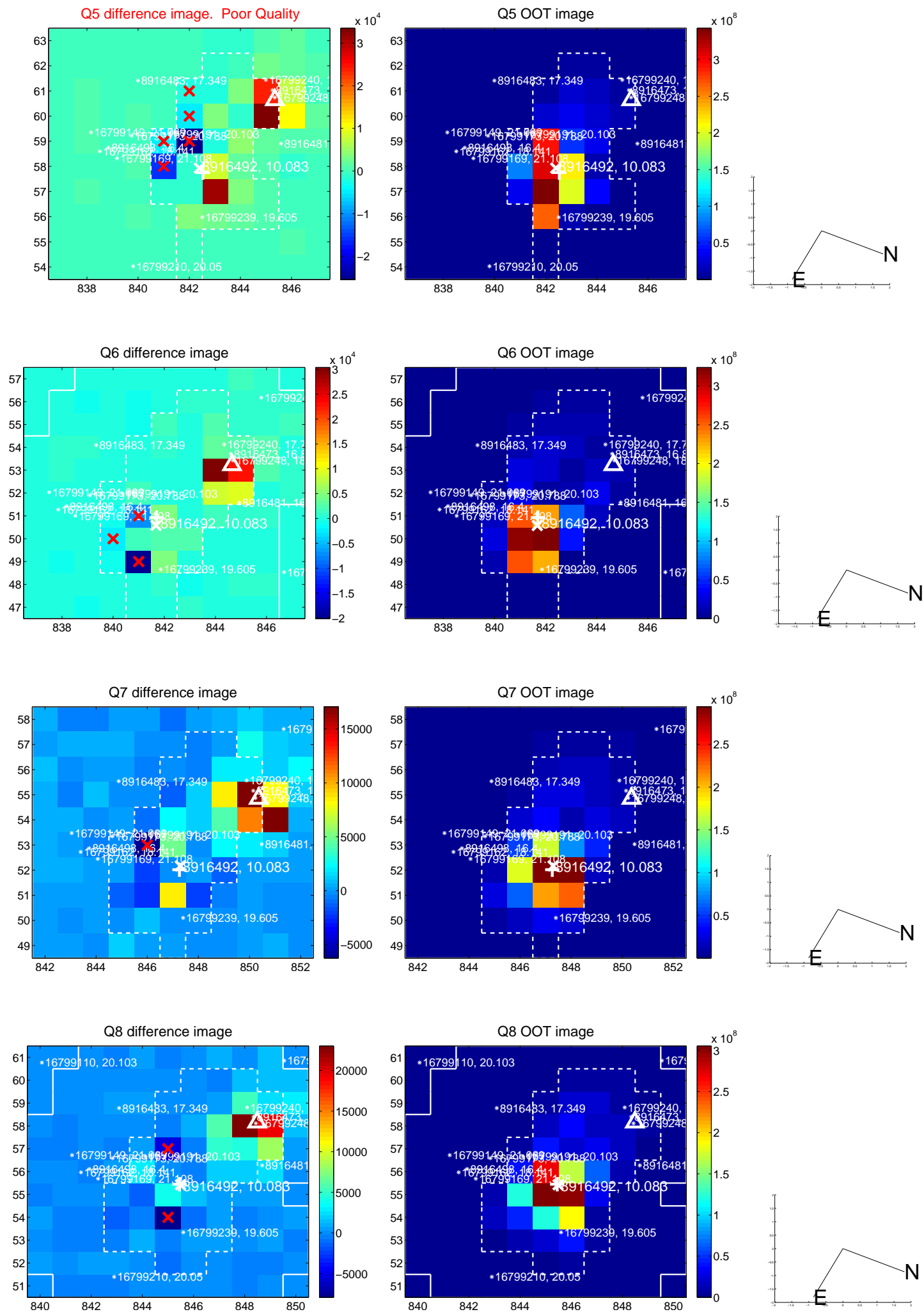


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

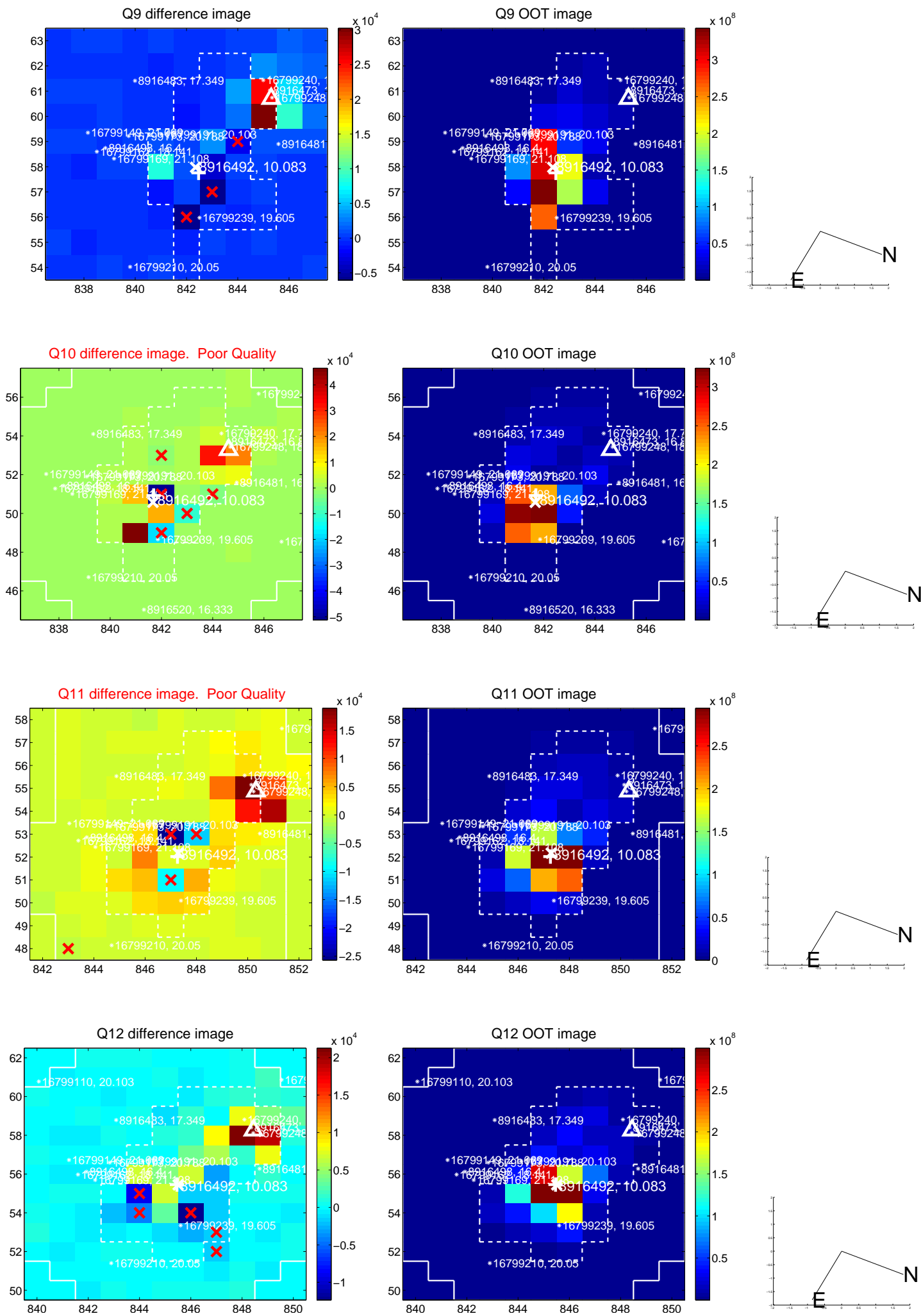


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

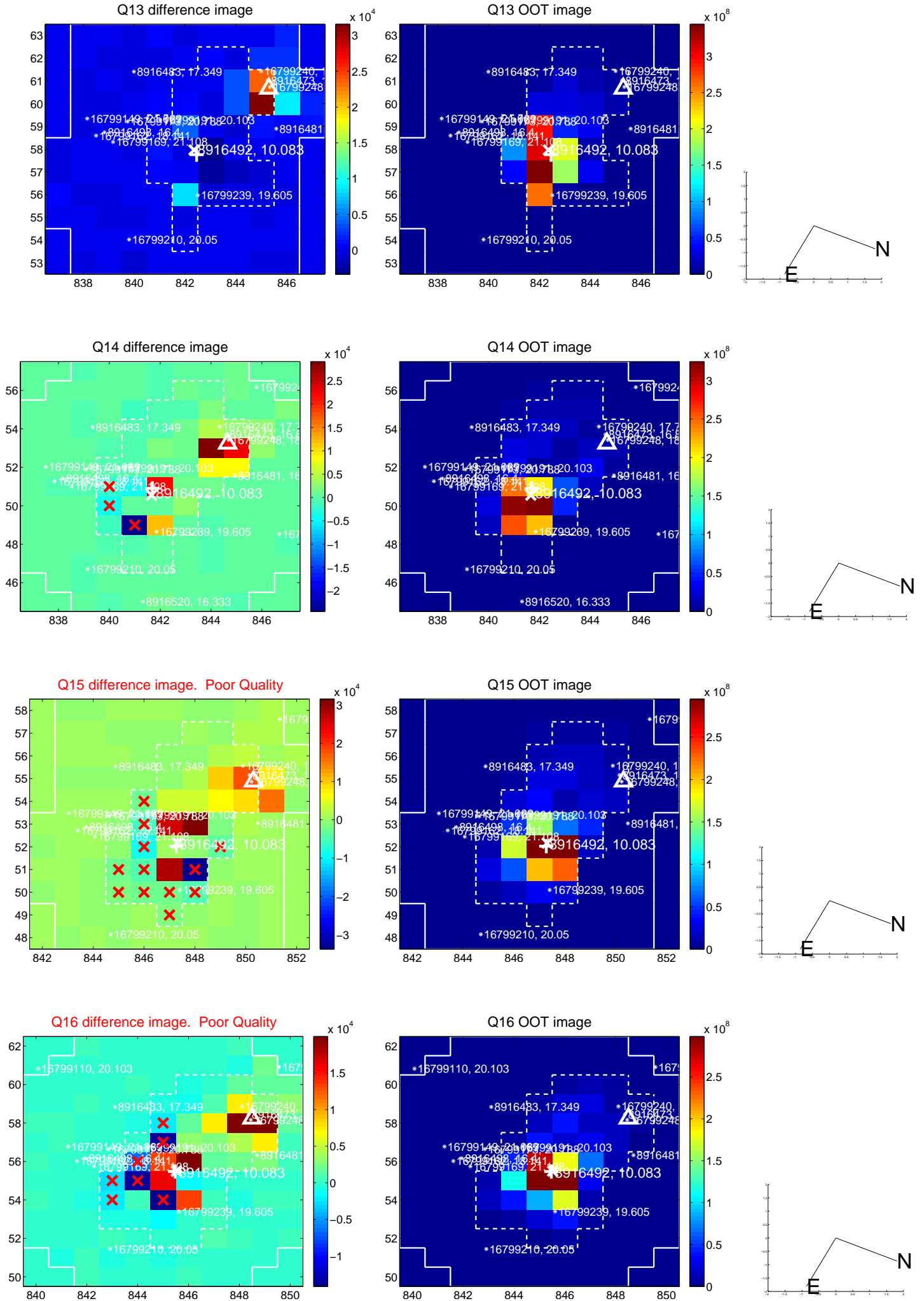




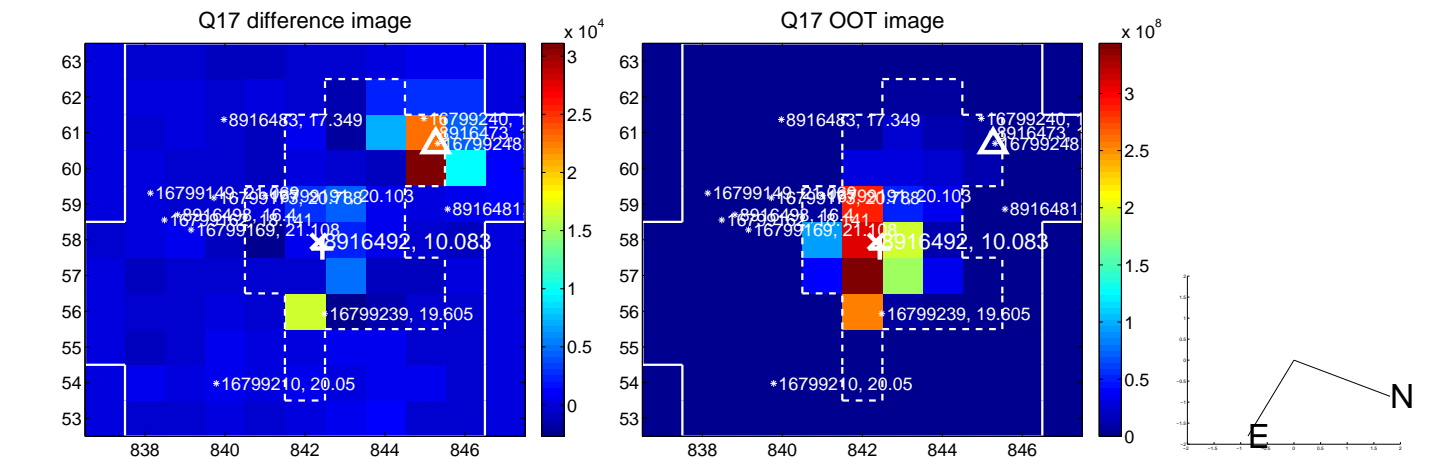
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



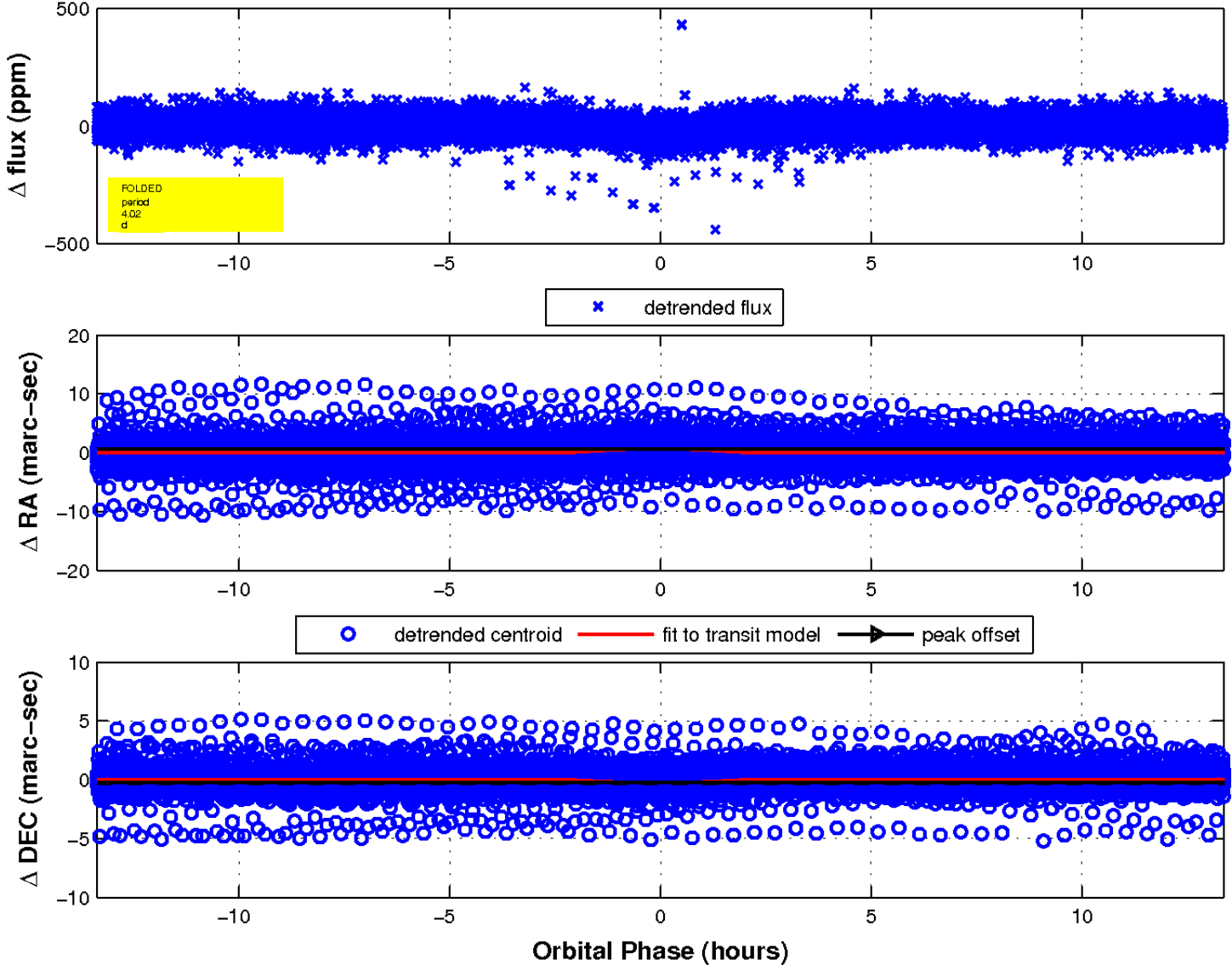
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



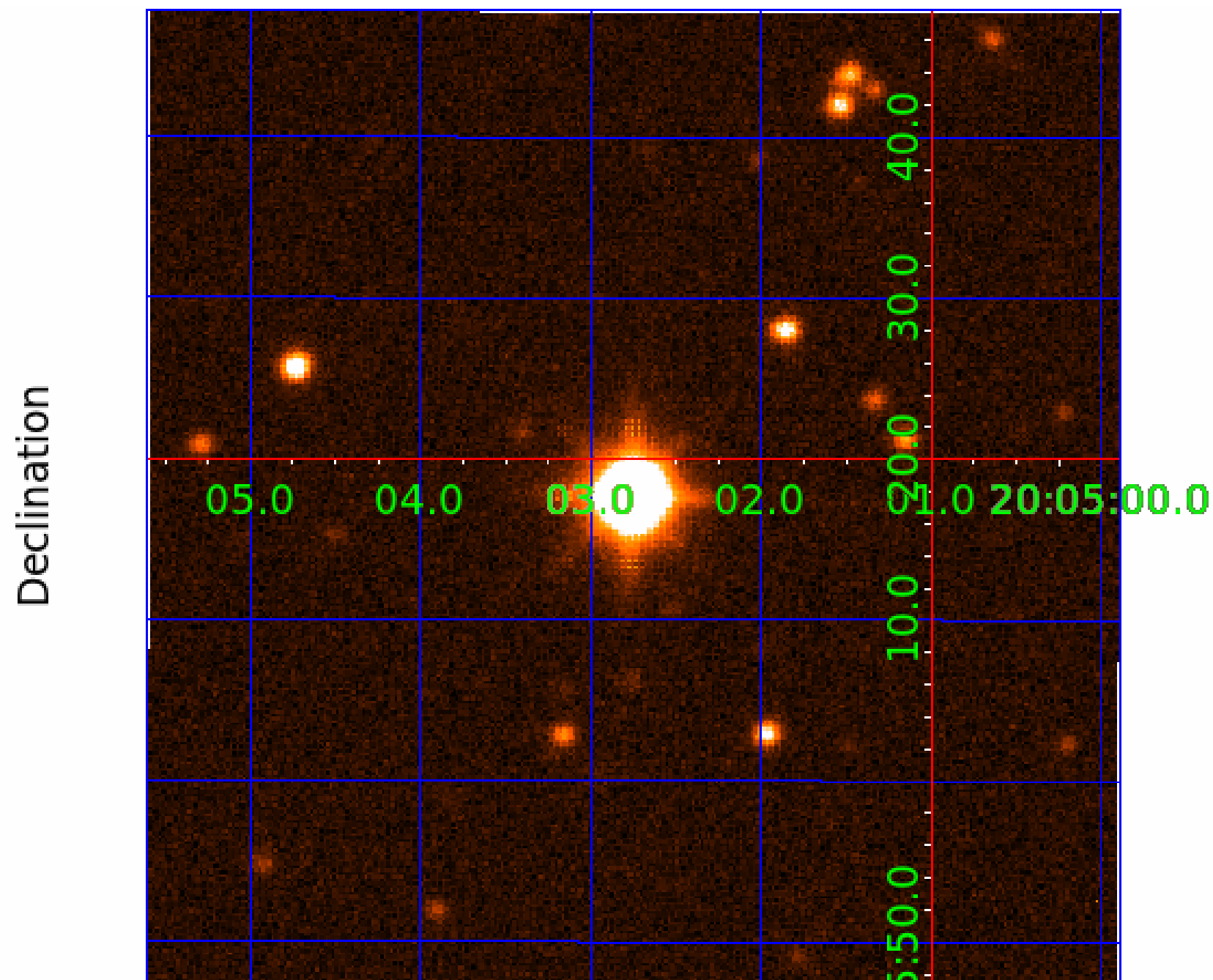
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image





# KIC 008916492

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008916492-01	OBS	1414.01	4.023775	132.210863	33.3	4.457	32.0	34.3	3.69	7516	3.08	9310.11
008916492-02	OBS	No	568.654806	174.200047	72.5	16.465	7.6	8.1	3.69	7516	3.54	12.65

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008916492-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—CENT_SATURATED
008916492-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

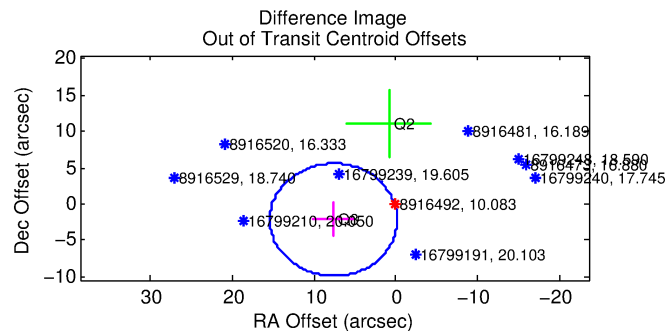
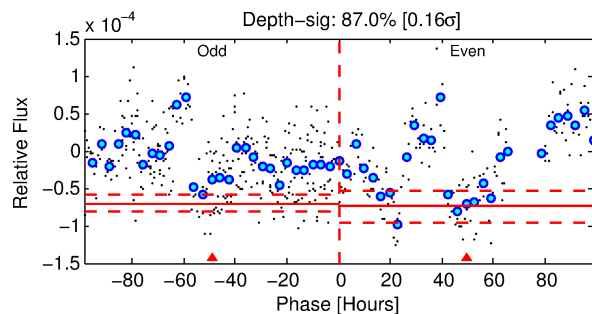
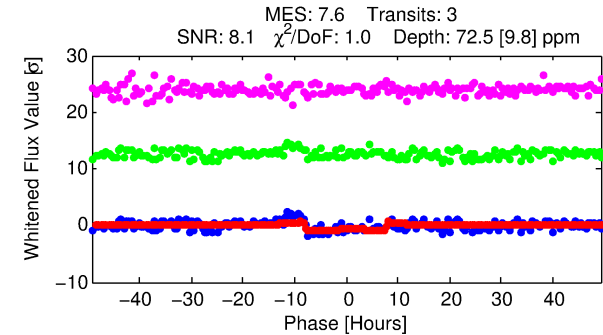
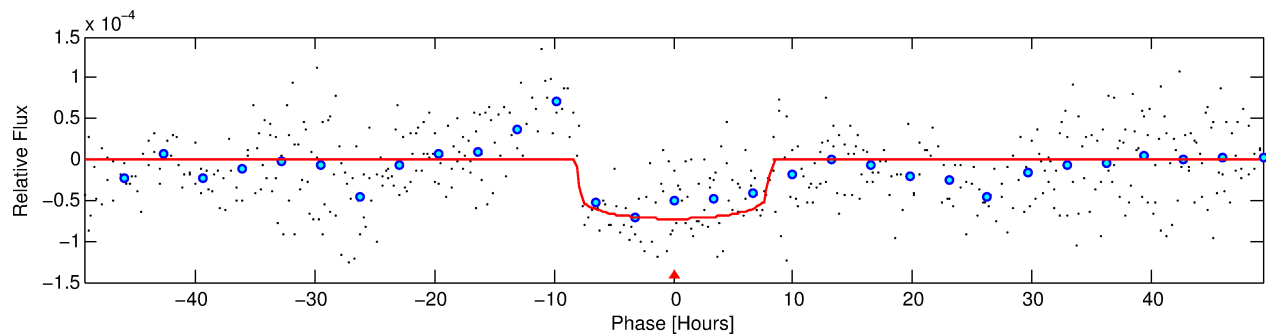
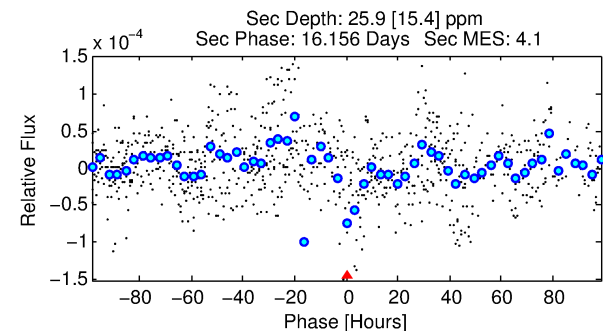
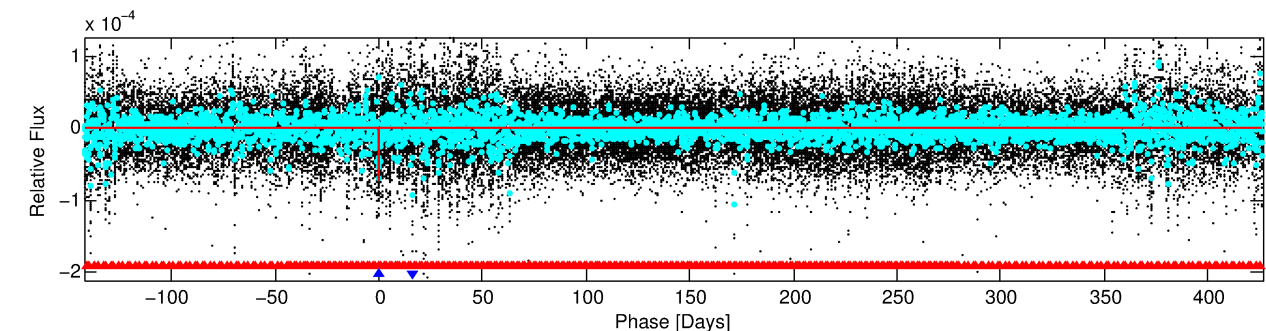
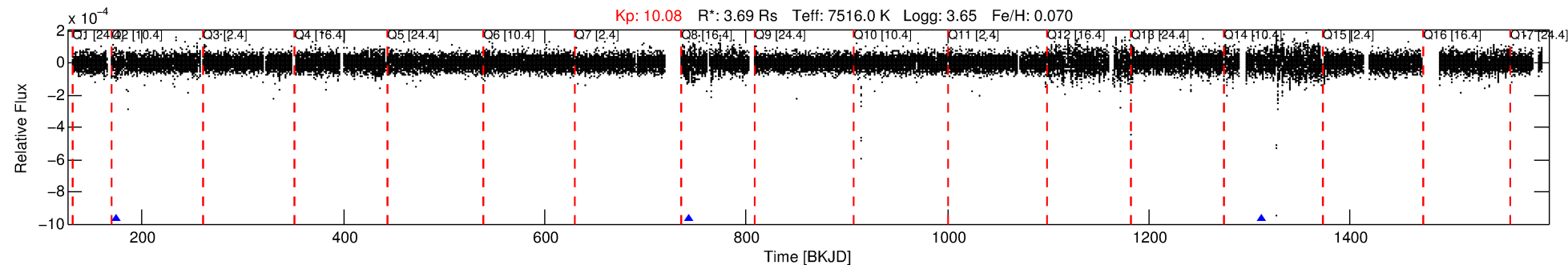
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008916492-02

No Significant Match Found

# DV One-Page Summary

KIC: 8916492 Candidate: 2 of 2 Period: 568.655 d  
KOI: K01414 Corr: No Ephemeris Match



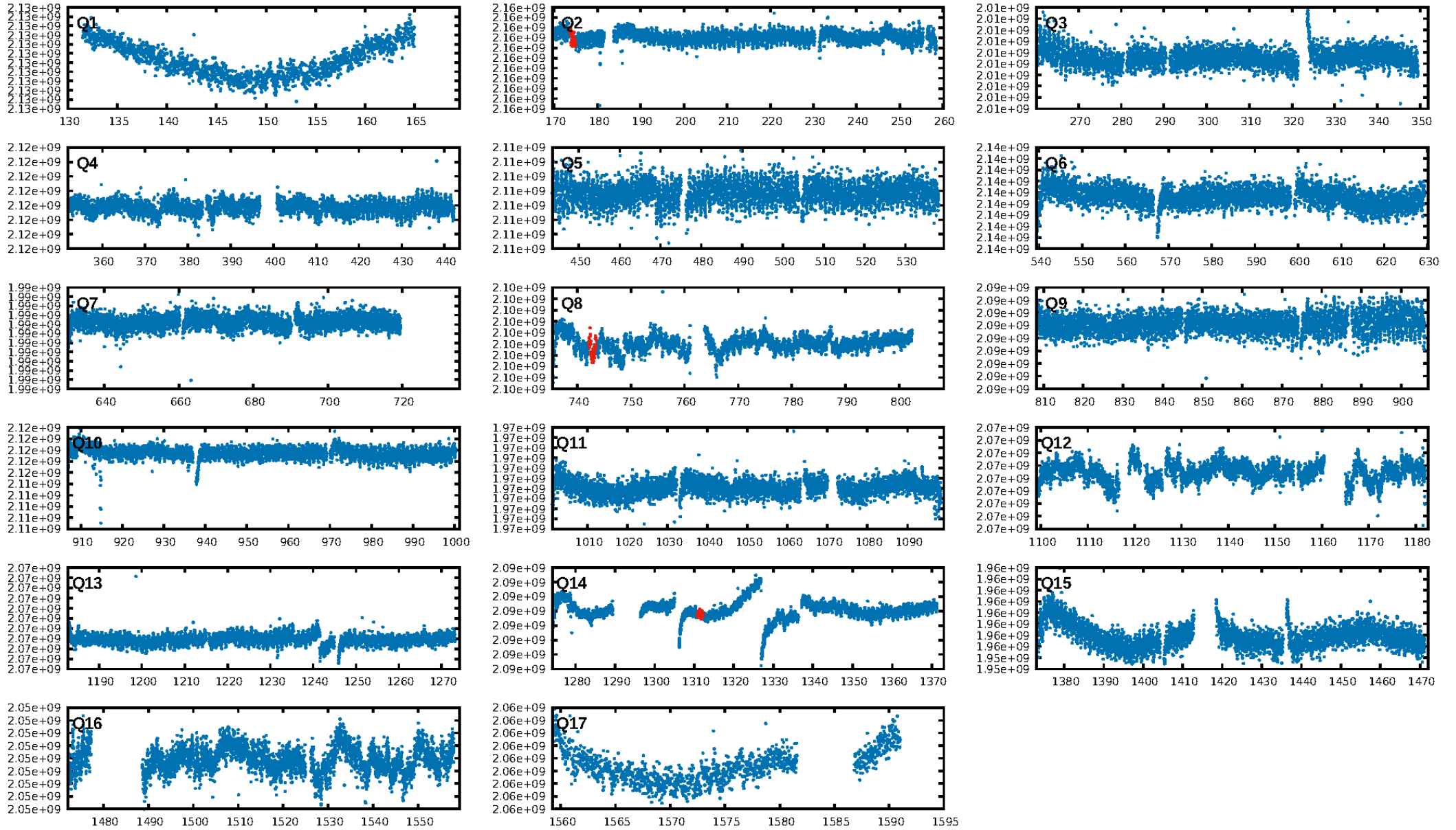
## DV Fit Results:

Period = 568.65481 [0.01088] d  
Epoch = 174.2000 [0.0115] BKJD  
Rp/R\* = 0.0088 [0.0012]  
a/R\* = 141.78 [99.28]  
b = 0.85 [0.22]  
Seff = 12.65 [9.93]  
Teff = 481 [94] K  
Rp = 3.54 [1.81] Re  
a = 1.7521 [0.8339] AU  
Ag = 3485.38 [3507.30] [0.99σ]  
Teffp = 5713 [969] K [5.37σ]

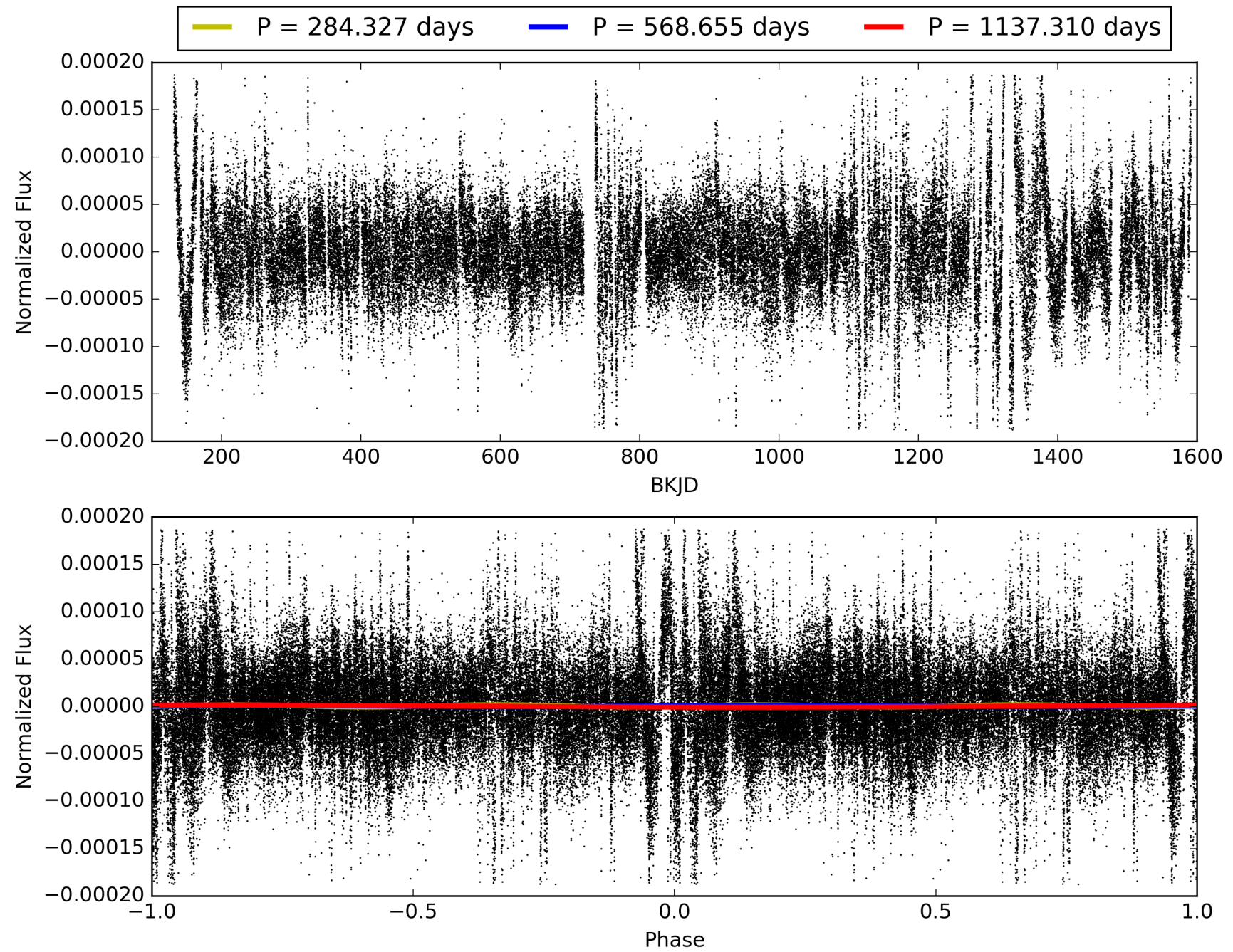
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [794.44σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 77.2%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.34e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 59.7%  
Centroid-so: 4.829 arcsec [0.65σ]  
**OotOffset-rm: 7.924 arcsec [3.06σ]**  
KicOffset-st: 1/0/1/0 [2]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.33 [1/3]

# TCE 008916492-02, PDC Light Curves



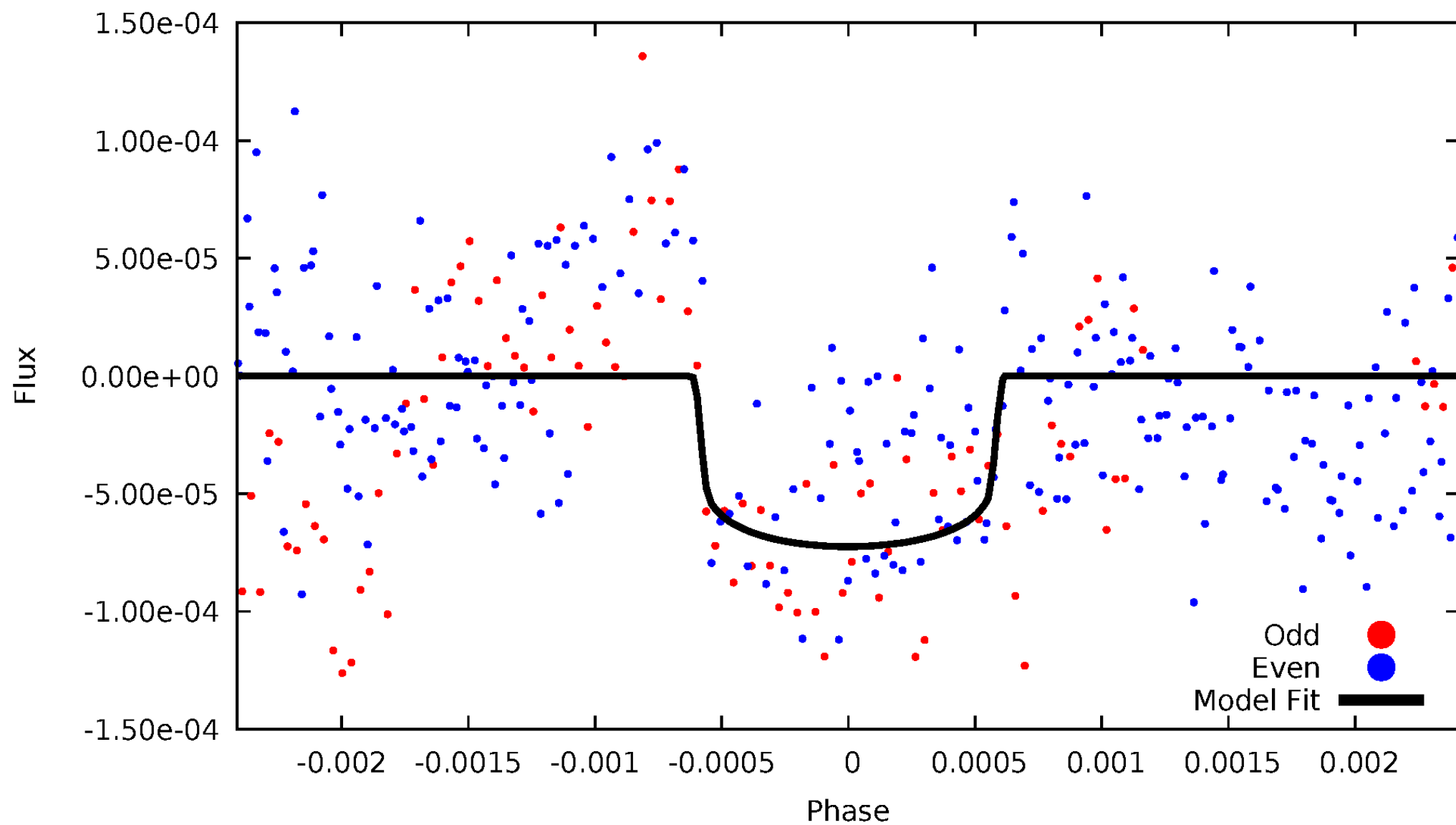
# TCE 008916492-02





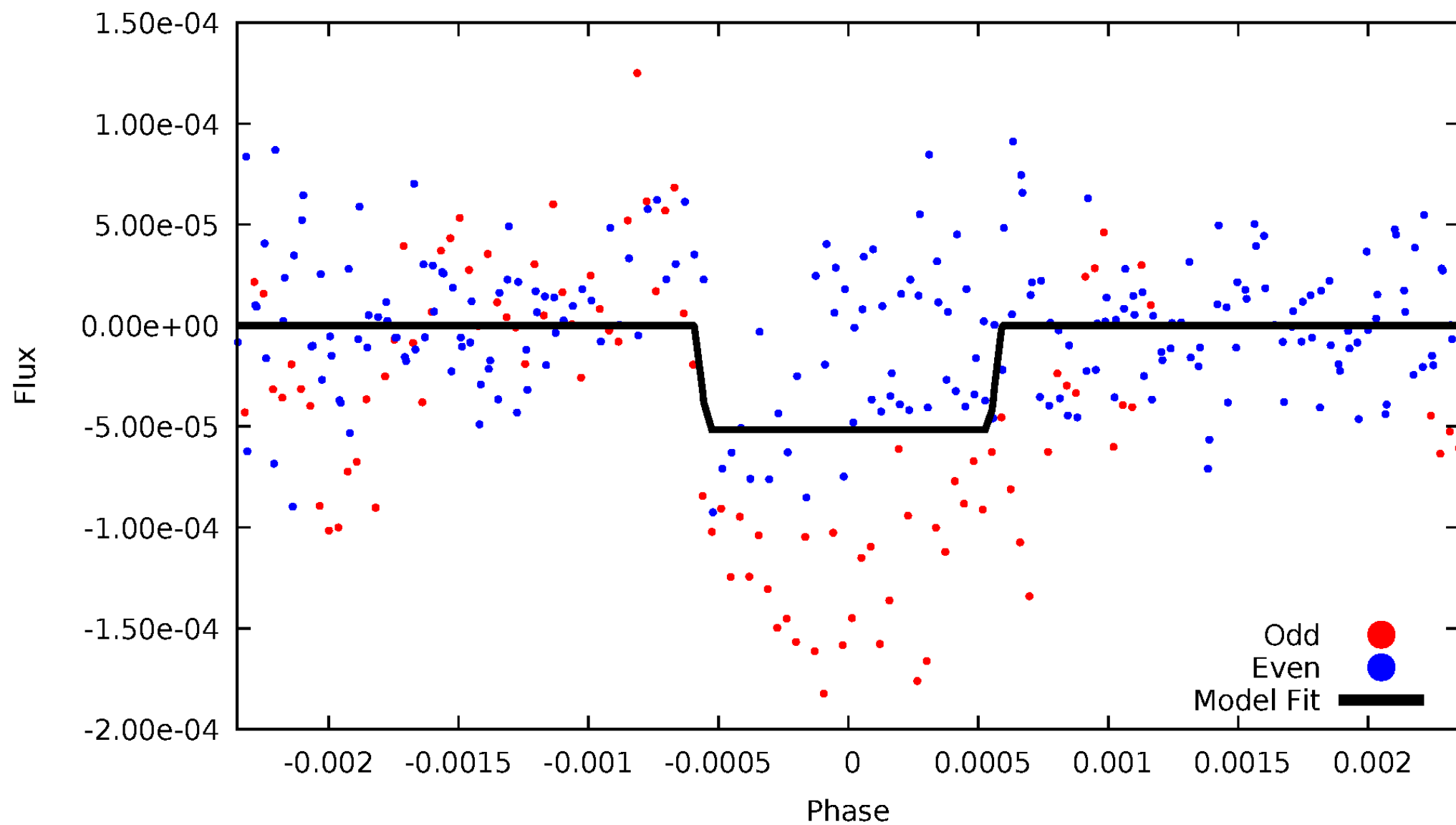
# DV Odd/Even

TCE 008916492-02



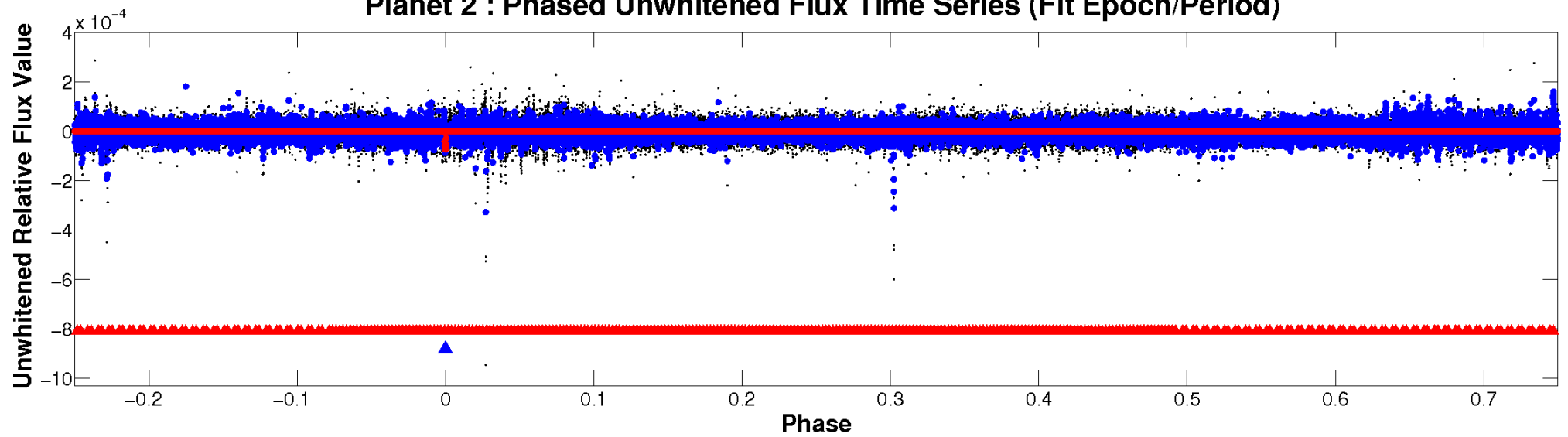
# ALT Odd/Even

TCE 008916492-02

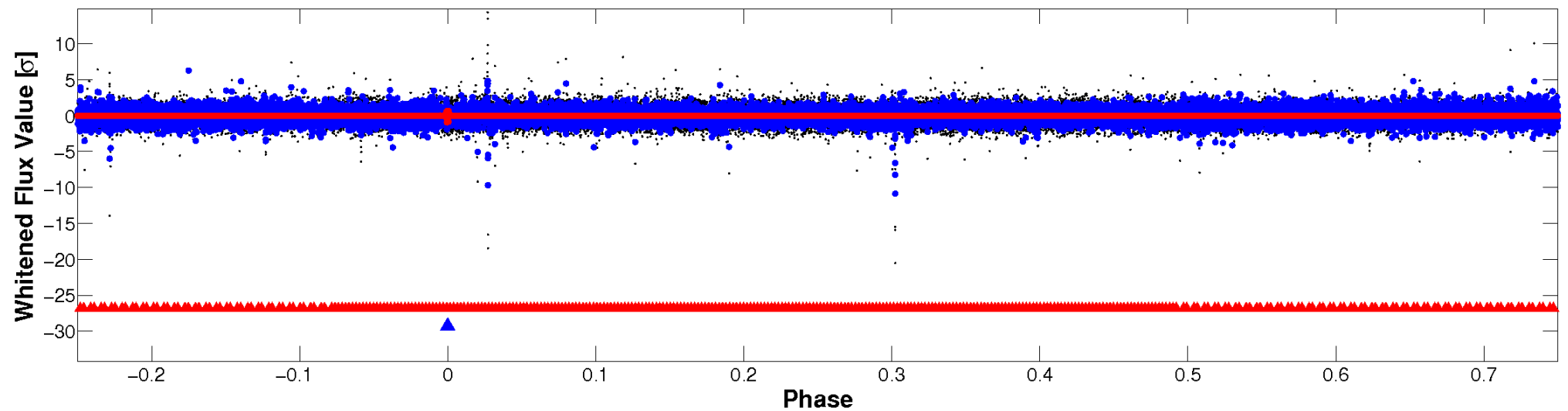


# Non-Whitened Vs. Whitened Light Curve

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

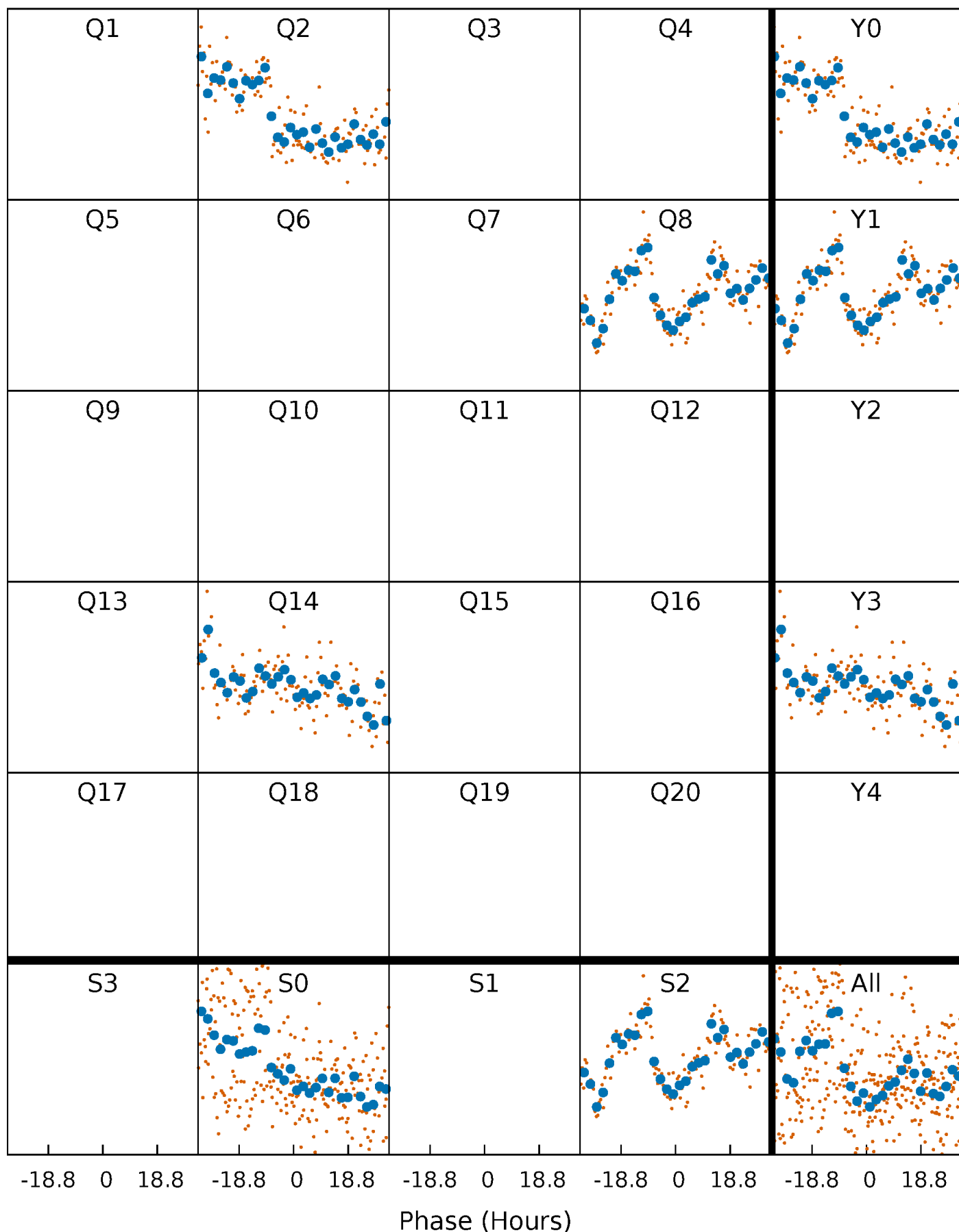


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



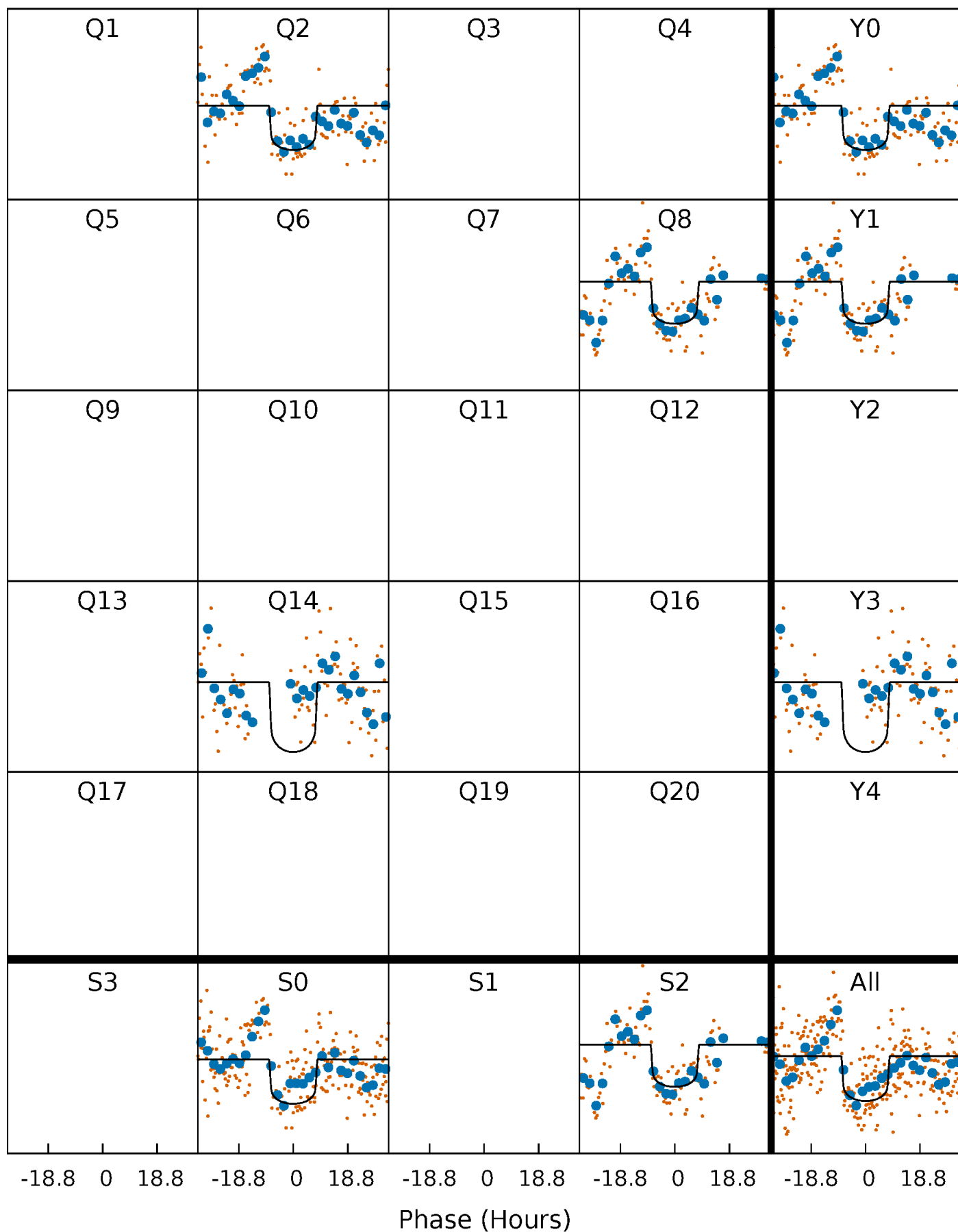
# PDC Quarter-Phased Transit Curves

TCE 008916492-02 P=568.654806 Days  $T_0=174.200047$  (BKJD)



# DV Quarter-Phased Transit Curves

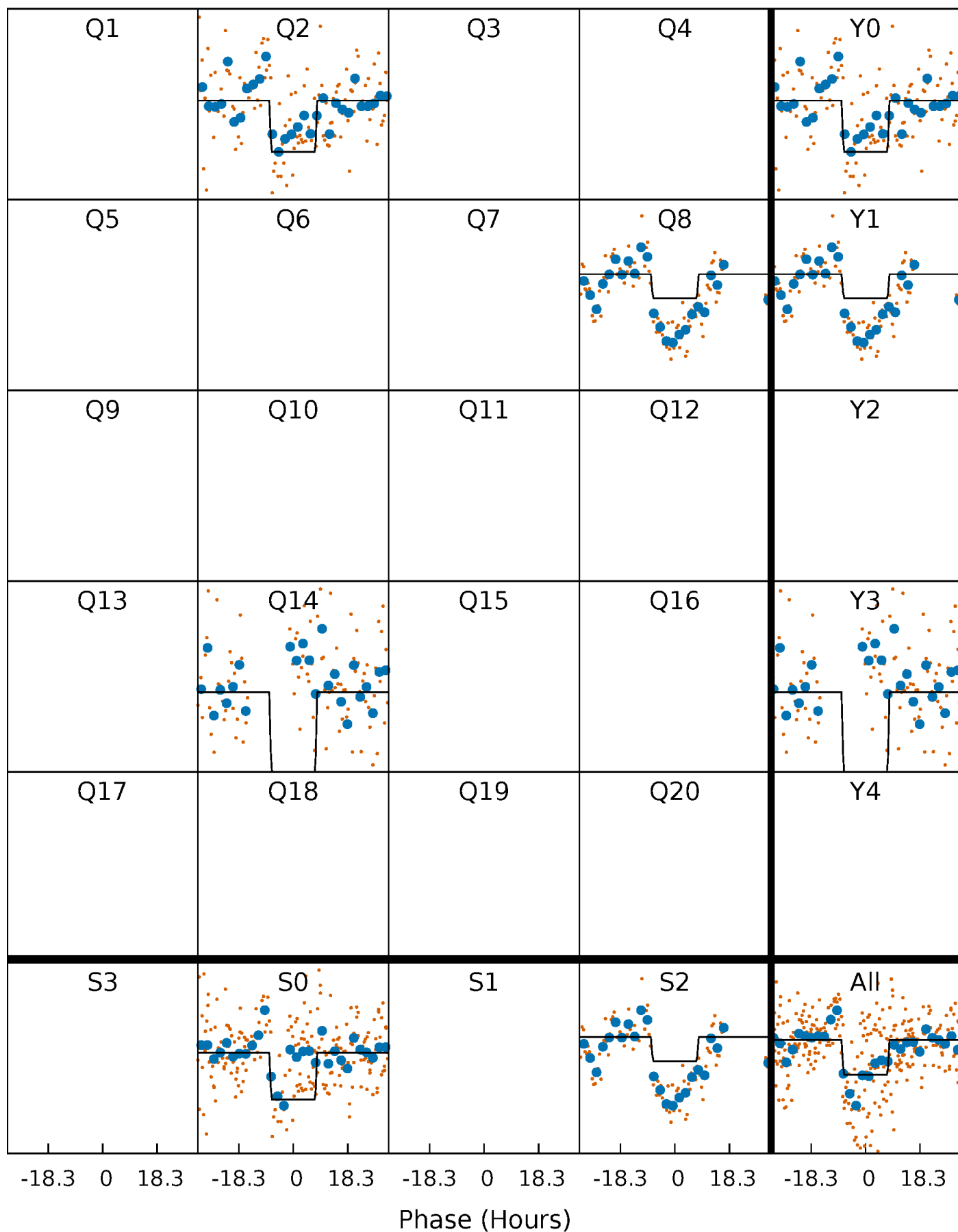
TCE 008916492-02     $P=568.654806$  Days     $T_0=174.200047$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

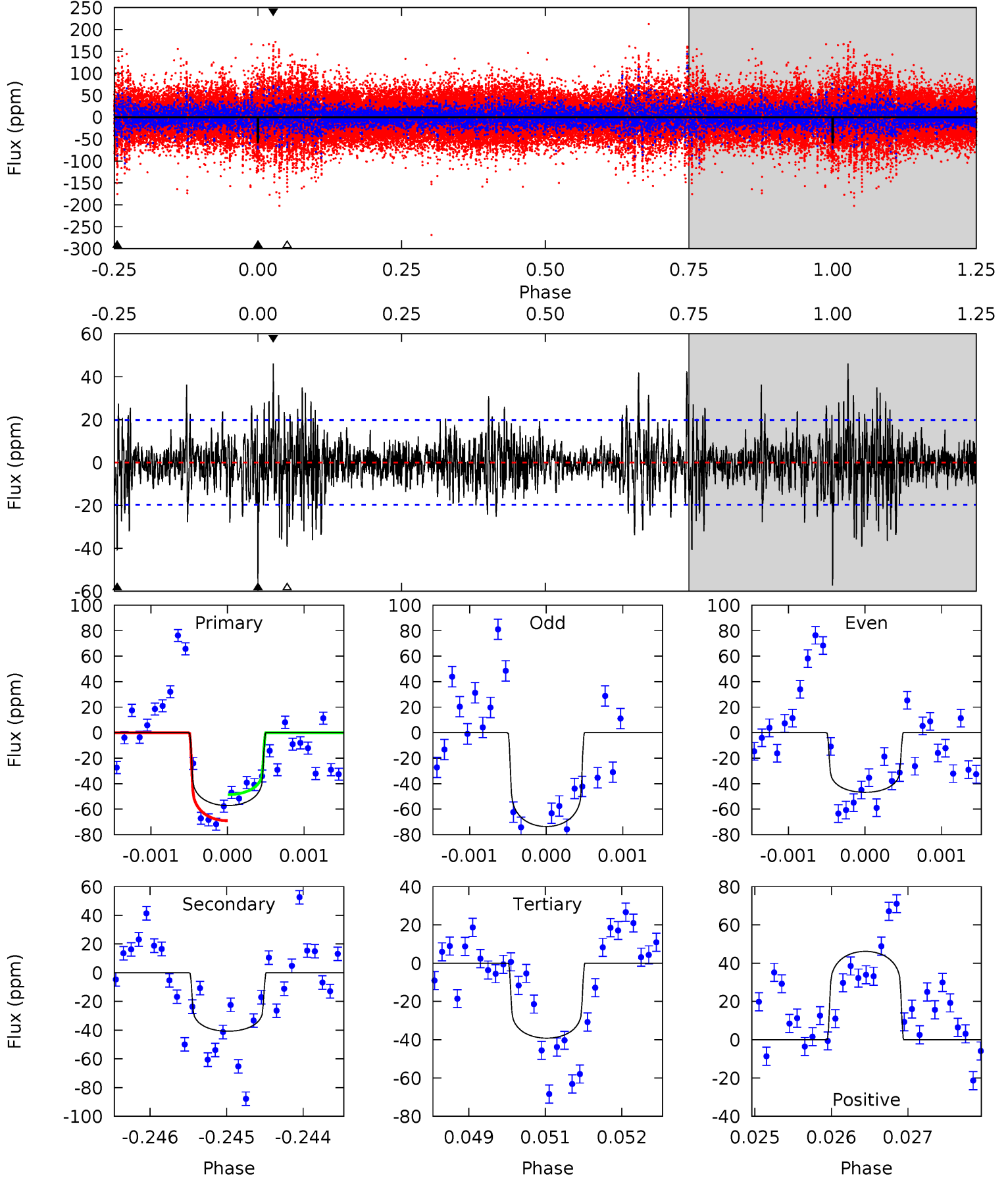
TCE 008916492-02 P=568.665975 Days  $T_0=174.188724$  (BKJD)



# DV Model-Shift Uniqueness Test

008916492-02, P = 568.654806 Days, E = 174.200047 Days

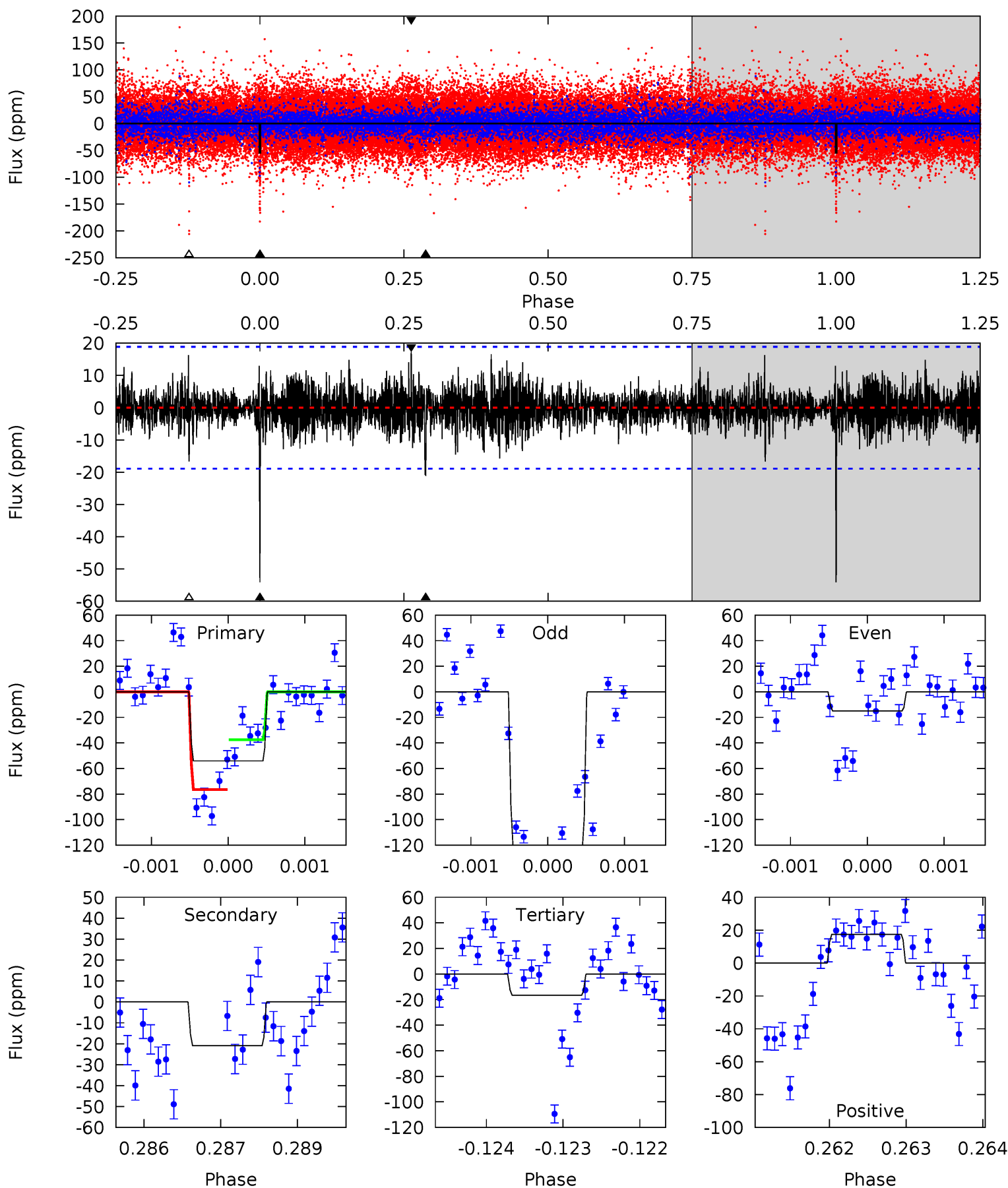
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.7	11.2	10.7	12.7	5.41	3.23	2.51	4.94	3.02	0.43	-1.49	3.67	0.79	0.45	2.76



# Alt Model-Shift Uniqueness Test

008916492-02, P = 568.665975 Days, E = 174.188724 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.5	5.99	4.78	5.01	5.42	3.25	1.21	10.7	10.5	1.21	0.99	14.9	1.30	0.24	5.50



### Stellar Parameters For KIC 008916492

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7516^{+207}_{-337}$	$3.651^{+0.450}_{-0.079}$	$0.070^{+0.200}_{-0.350}$	$3.685^{+0.603}_{-1.810}$	$2.218^{+0.228}_{-0.685}$	$0.062^{+0.293}_{-0.016}$
	+3%/-4%	+12%/-2%	+286%/-500%	+16%/-49%	+10%/-31%	+470%/-26%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 008916492-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-41 \pm 4$	$3.23^{+0.72}_{-0.87}$	$642^{+47}_{-79}$	$6251^{+531}_{-468}$	$6463^{+5262}_{-1994}$
Alt.	$-21 \pm 3$	$2.59^{+0.69}_{-0.71}$	$643^{+49}_{-78}$	$5890^{+666}_{-560}$	$5184^{+4284}_{-2080}$

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

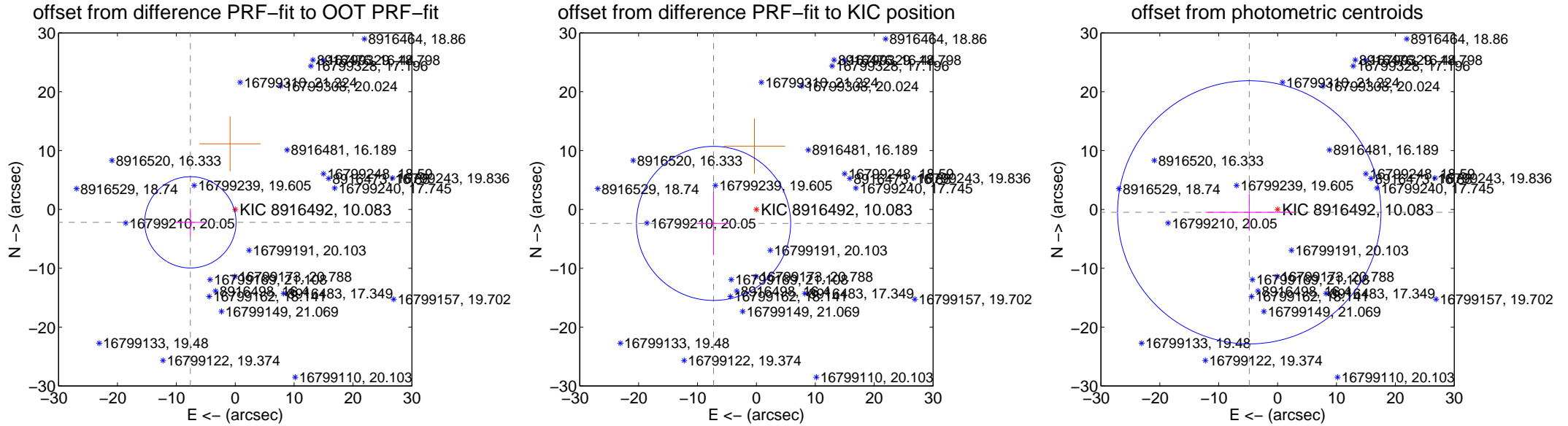
## DV Centroid Data

Supplemental centroid analysis for 008916492-02. **Kepler magnitude: 10.08.** Transit SNR 8.09

**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>7.924 <math>\pm</math> 2.586</b>	<b>3.06</b>	7.615 $\pm$ 2.606	-2.194 $\pm$ 2.335
PRF-fit source offset from KIC position	7.655 $\pm$ 4.364	1.75	7.278 $\pm$ 2.841	-2.374 $\pm$ 5.366
photometric centroid source offset	4.83 $\pm$ 7.45	0.65	4.80 $\pm$ 7.49	-0.49 $\pm$ 3.13



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



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

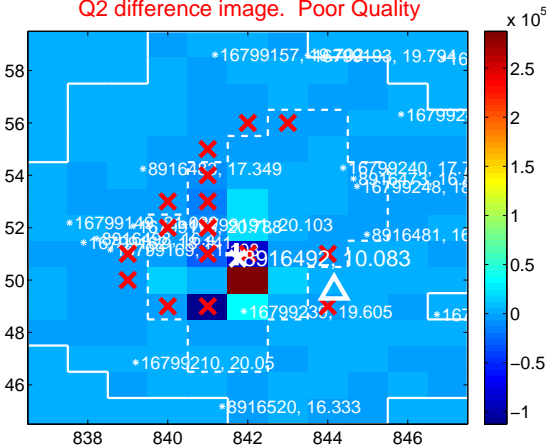
Q1 no difference image



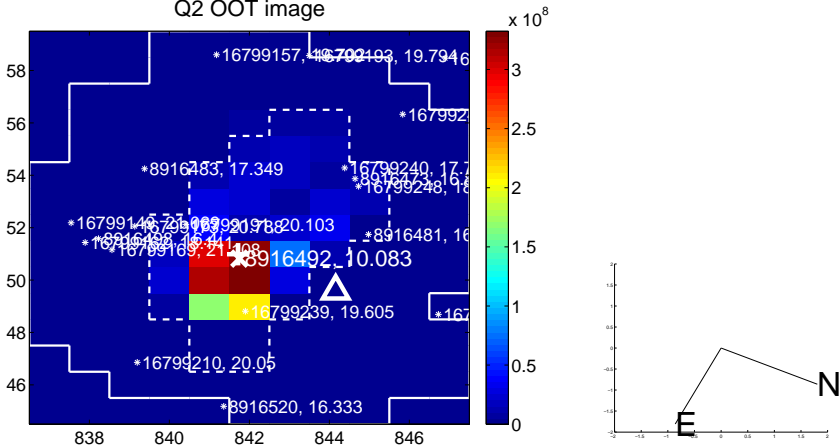
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



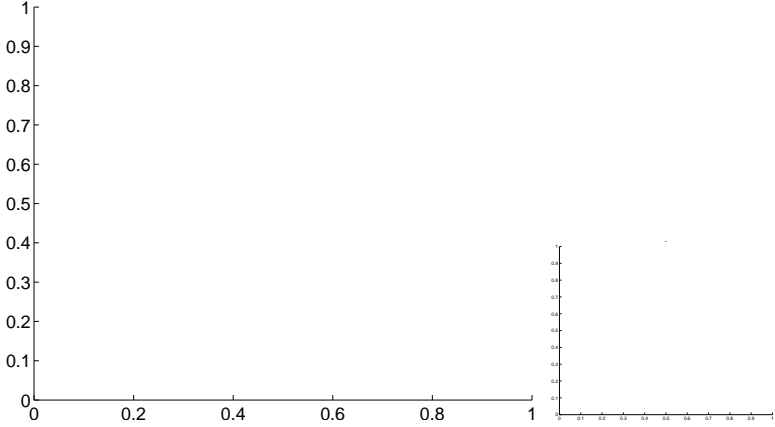
Q3 no OOT image



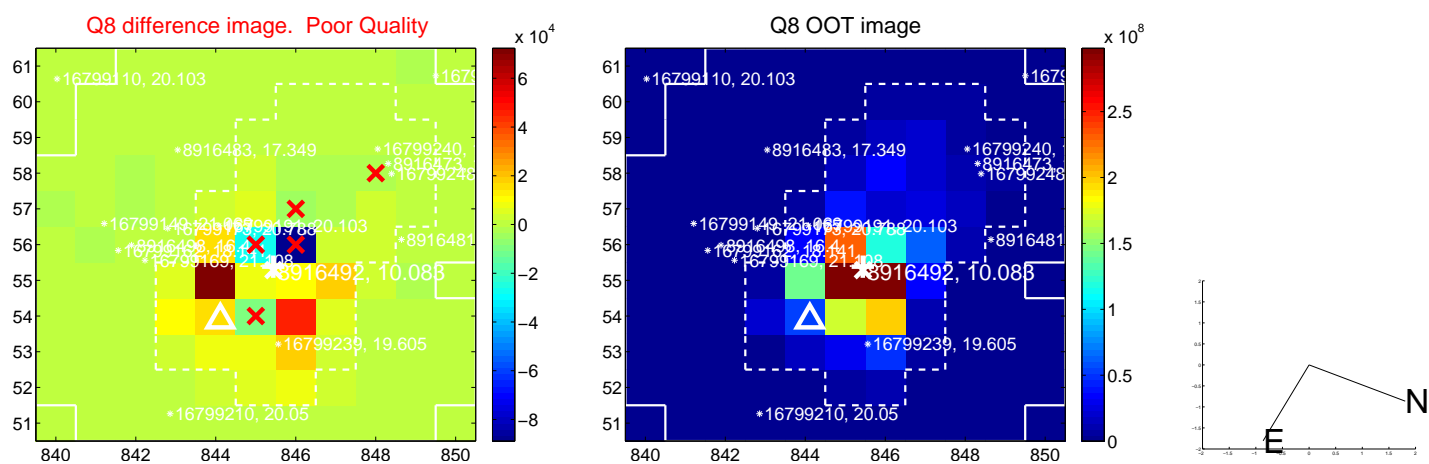
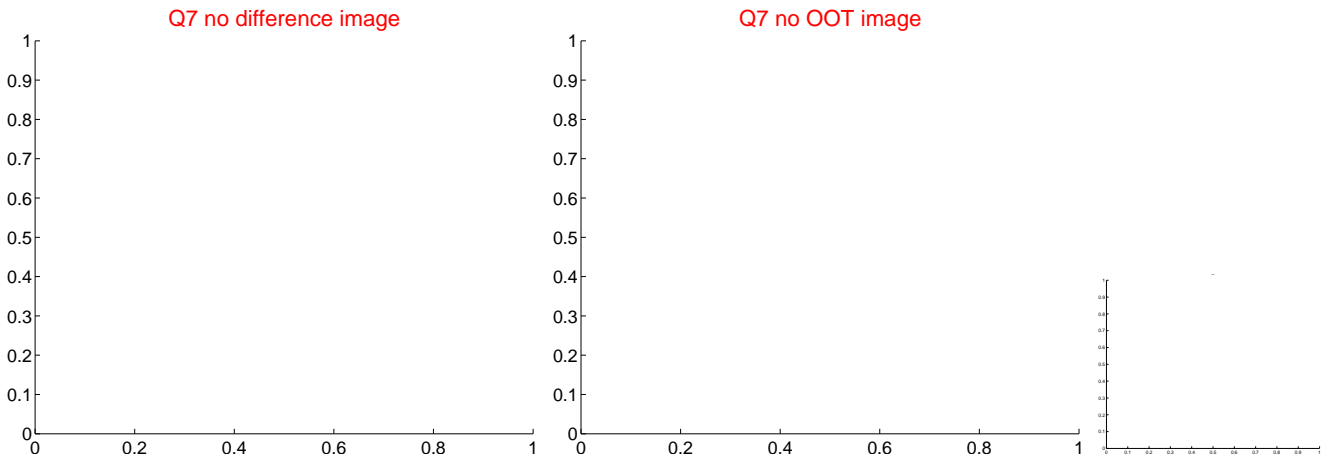
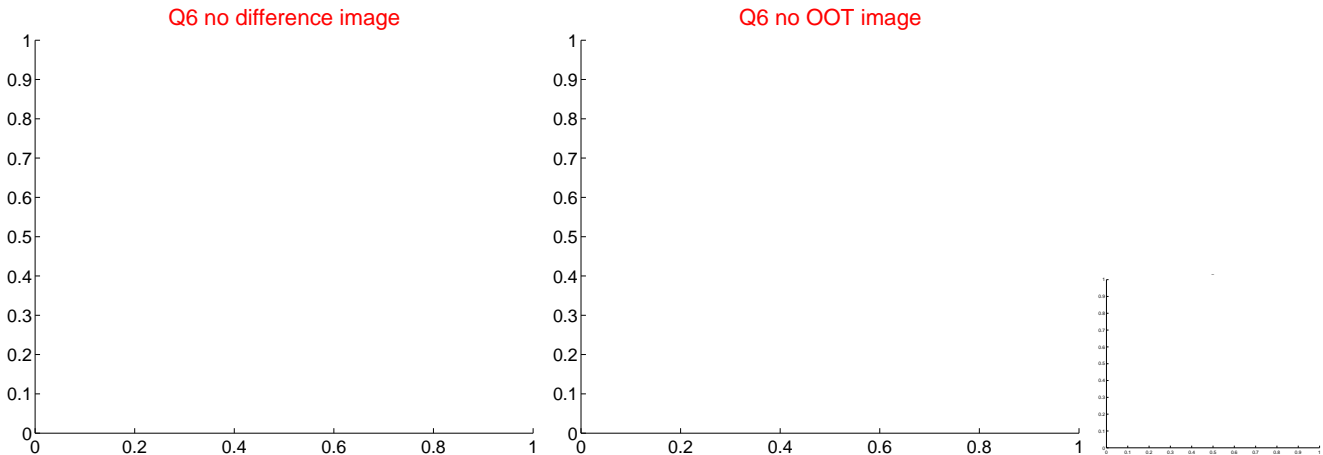
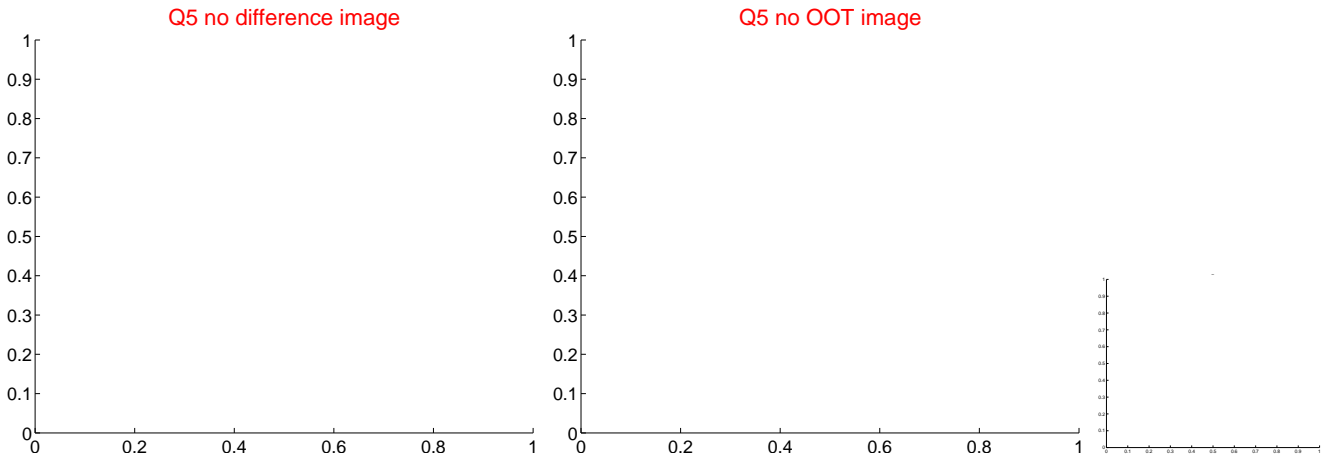
Q4 no difference image



Q4 no OOT image



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



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



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

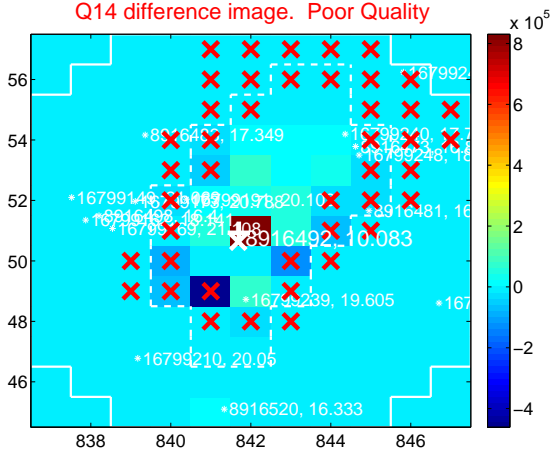
Q13 no difference image



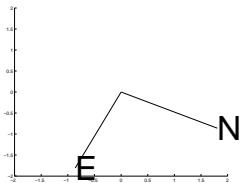
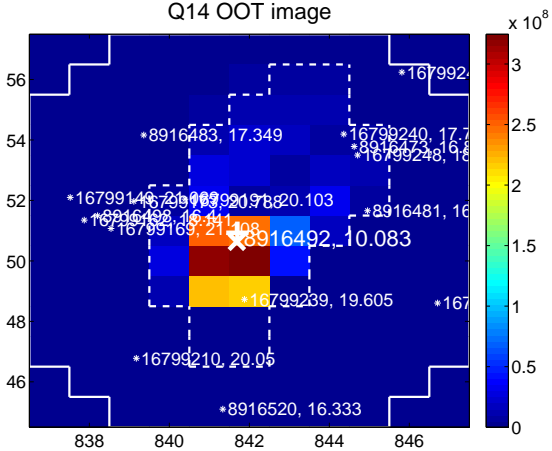
Q13 no OOT image



Q14 difference image. Poor Quality



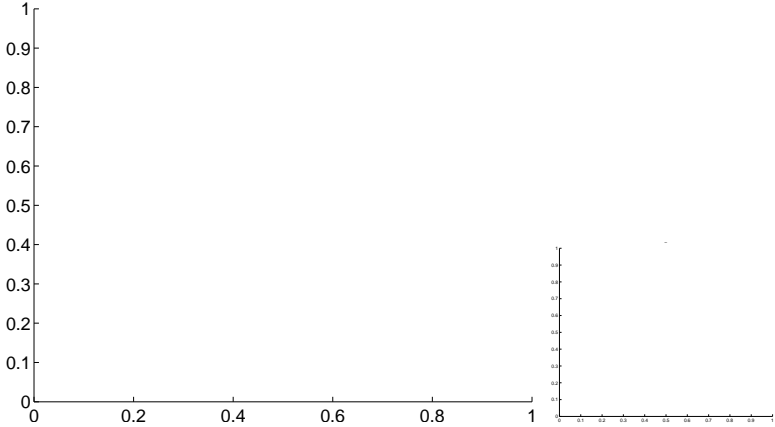
Q14 OOT image



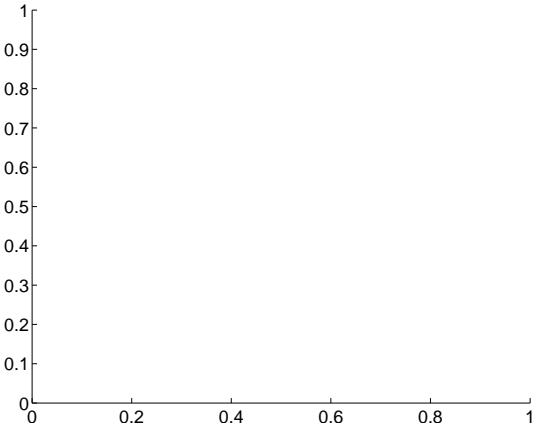
Q15 no difference image



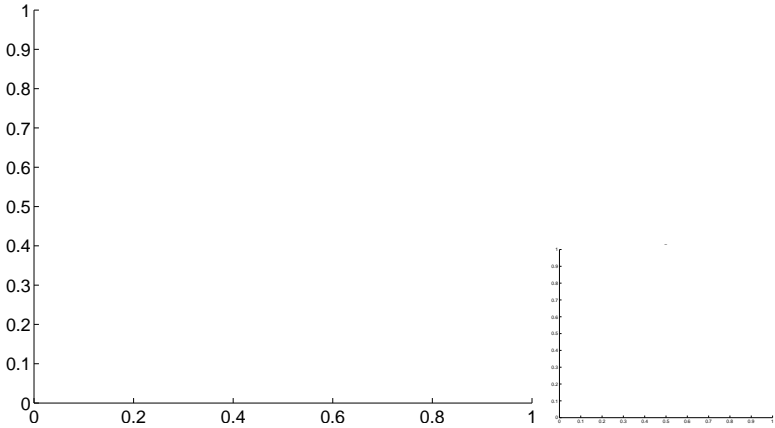
Q15 no OOT image



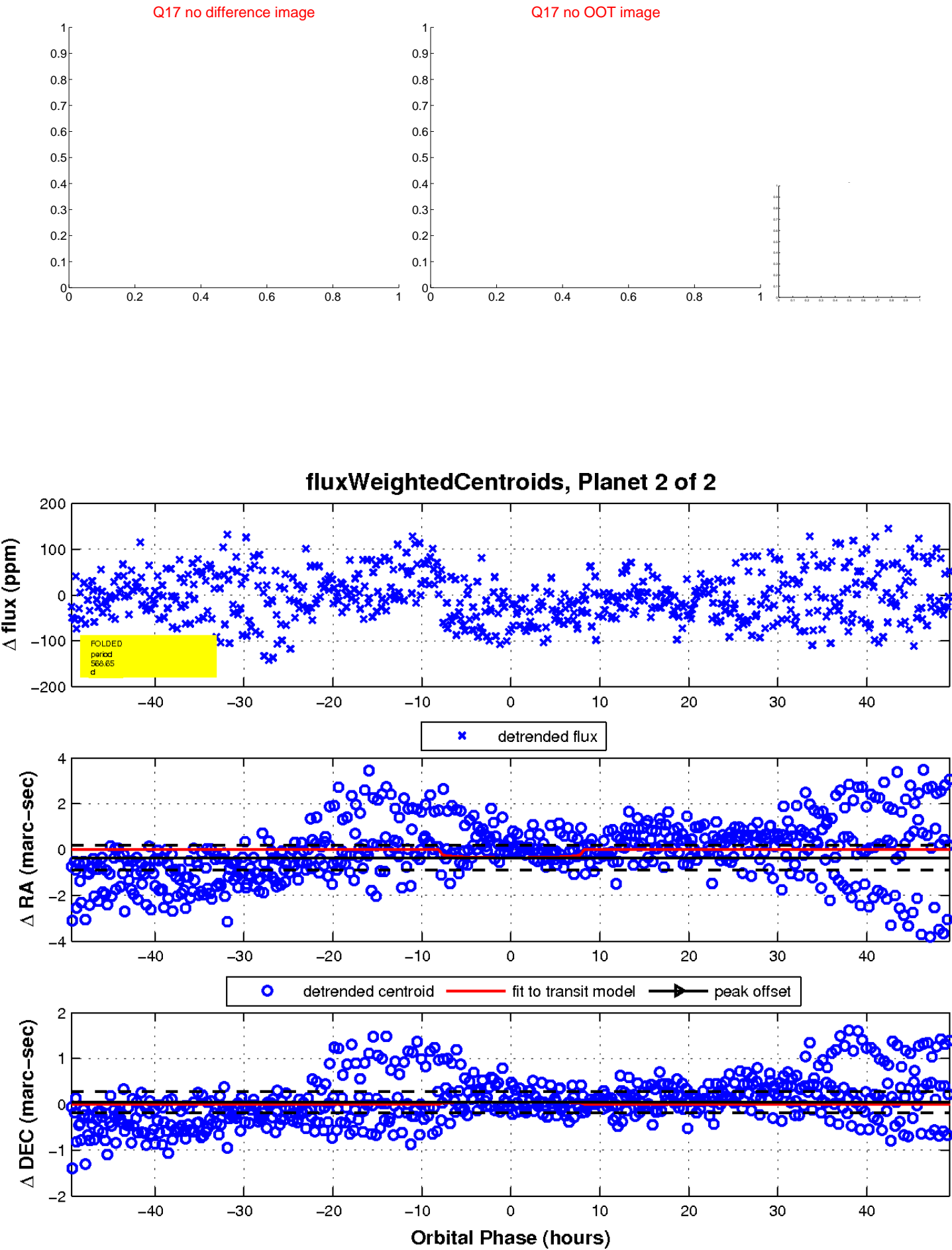
Q16 no difference image



Q16 no OOT image



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





UKIRT Image

