

# KIC 003327992

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003327992-01	OBS	3635.01	2.115540	131.980940	27279.5	6.331	1857.7	612.1	0.66	4188	19.73	153.16
003327992-02	OBS	No	188.757751	223.776611	1771.2	3.355	7.7	7.4	0.66	4188	3.03	0.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003327992-01	OBS	FP	0.00	0	1	1	1	MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—CENT_RESOLVED_OFFSET—EPHEM_MATCH
003327992-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS—HALO_GHOST

**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 003327992-01

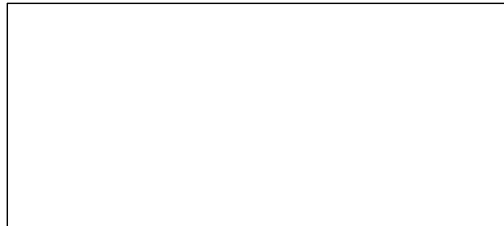
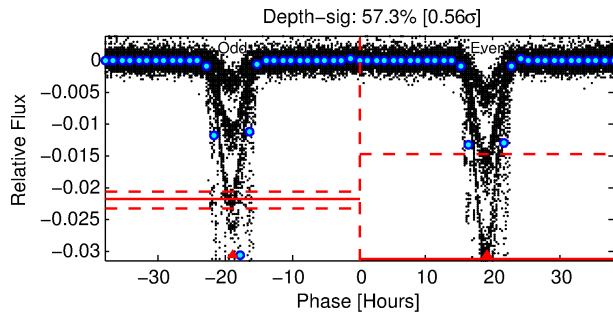
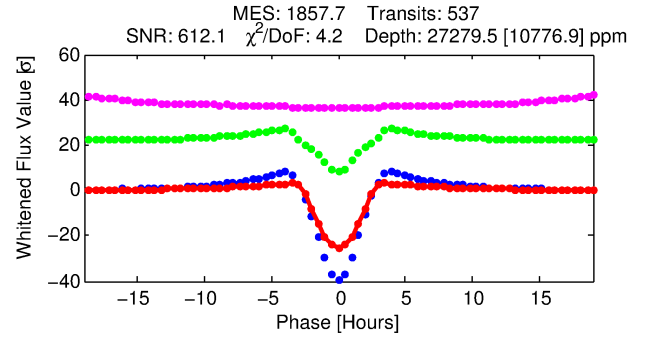
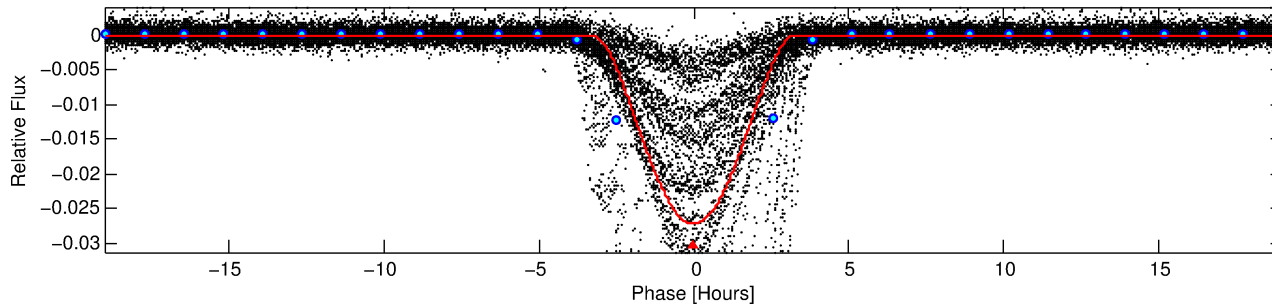
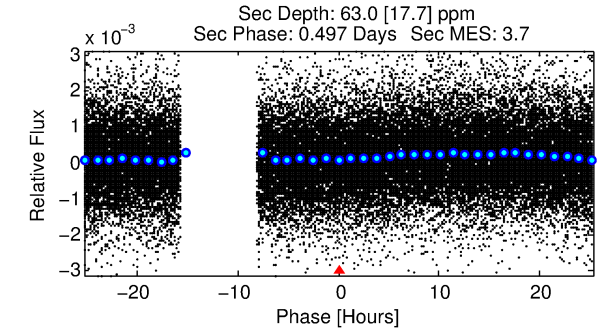
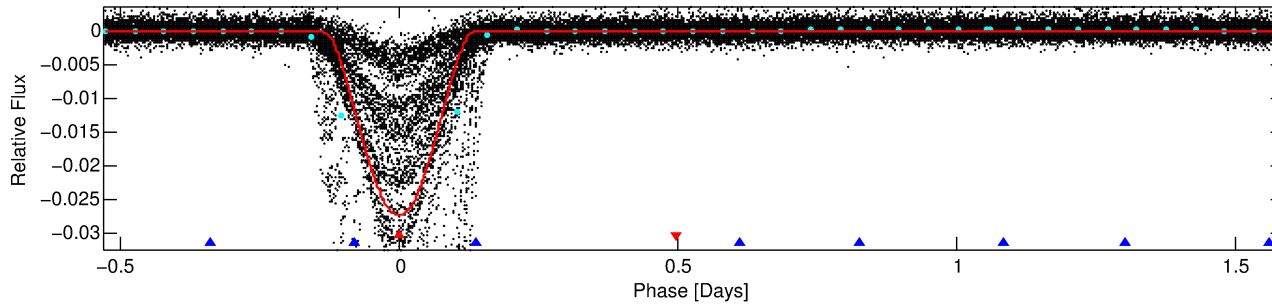
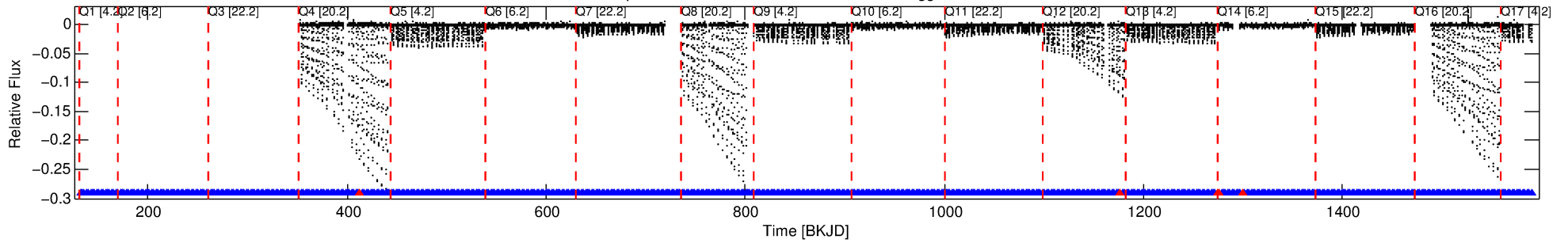
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
003327992-01	3327992	003327980-pri	3327980	1:2	9.1	-2	-1	12.12	15.58	15.59	Direct-PRF	0	1.91	0.56

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 3327992 Candidate: 1 of 2 Period: 2.116 d  
KOI: K03635.01 Corr: 0.925

Kp: 15.58 R\*: 0.66 Rs Teff: 4188.0 K Logg: 4.62 Fe/H: 0.180



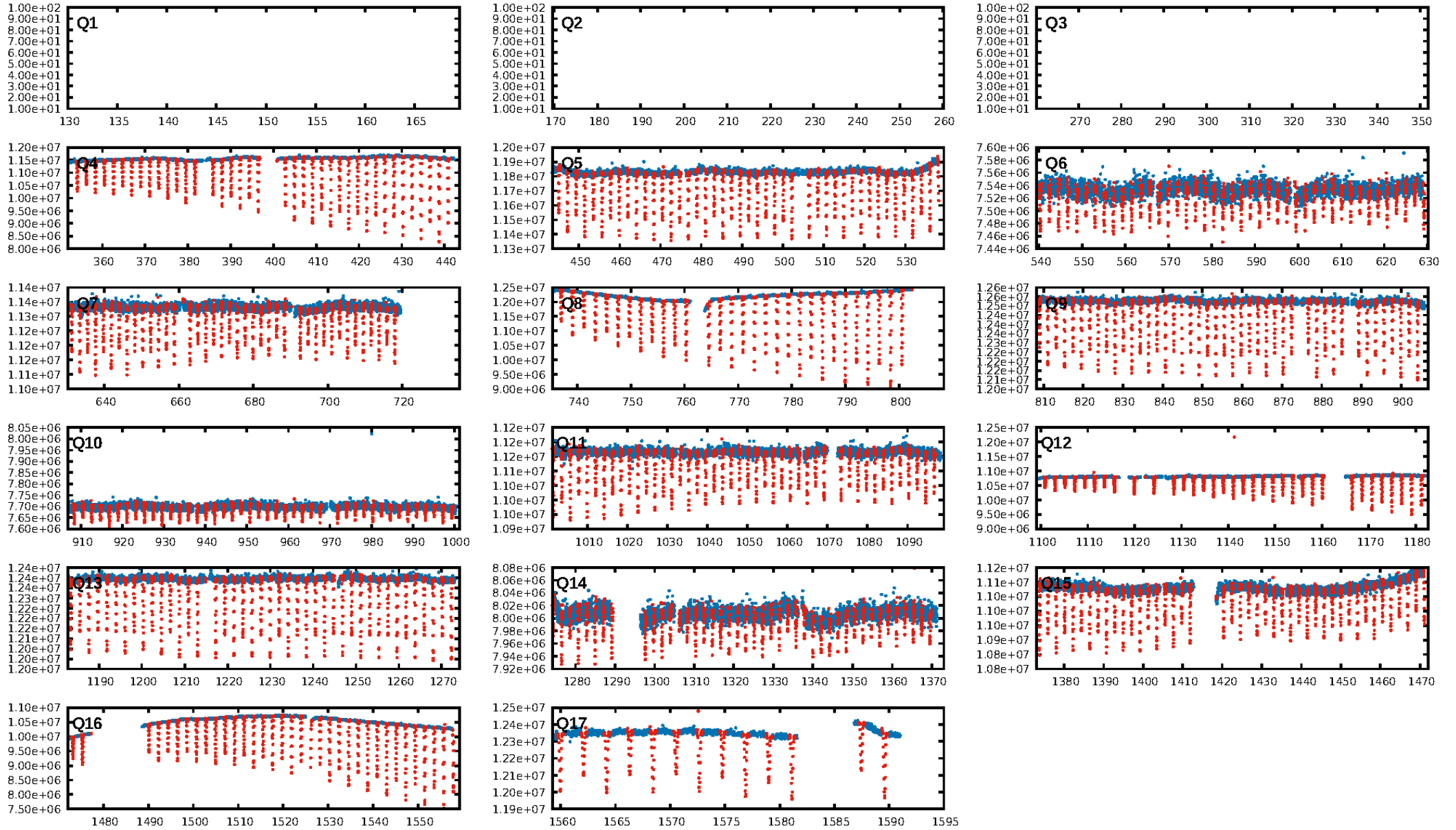
## DV Fit Results:

Period = 2.11554 [0.00000] d  
Epoch = 131.9809 [0.0003] BKJD  
Rp/R\* = 0.2736 [0.0381]  
a/R\* = 2.30 [0.01]  
b = 1.00 [0.02]  
Seff = 153.17 [28.16]  
Teq = 897 [41] K  
Rp = 19.74 [3.27] Re  
a = 0.0280 [0.0020] AU  
Ag = 0.07 [0.03] [-32.58 $\sigma$ ]  
Teffp = 713 [76] K [-2.13 $\sigma$ ]

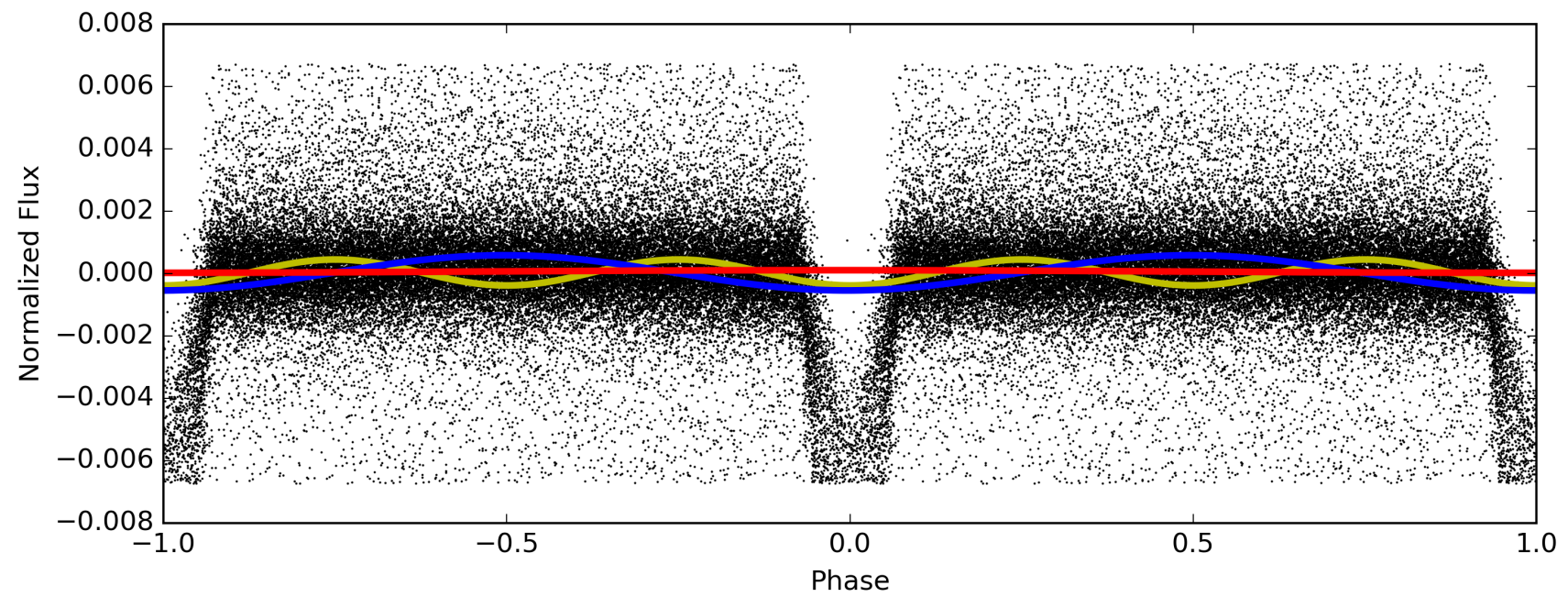
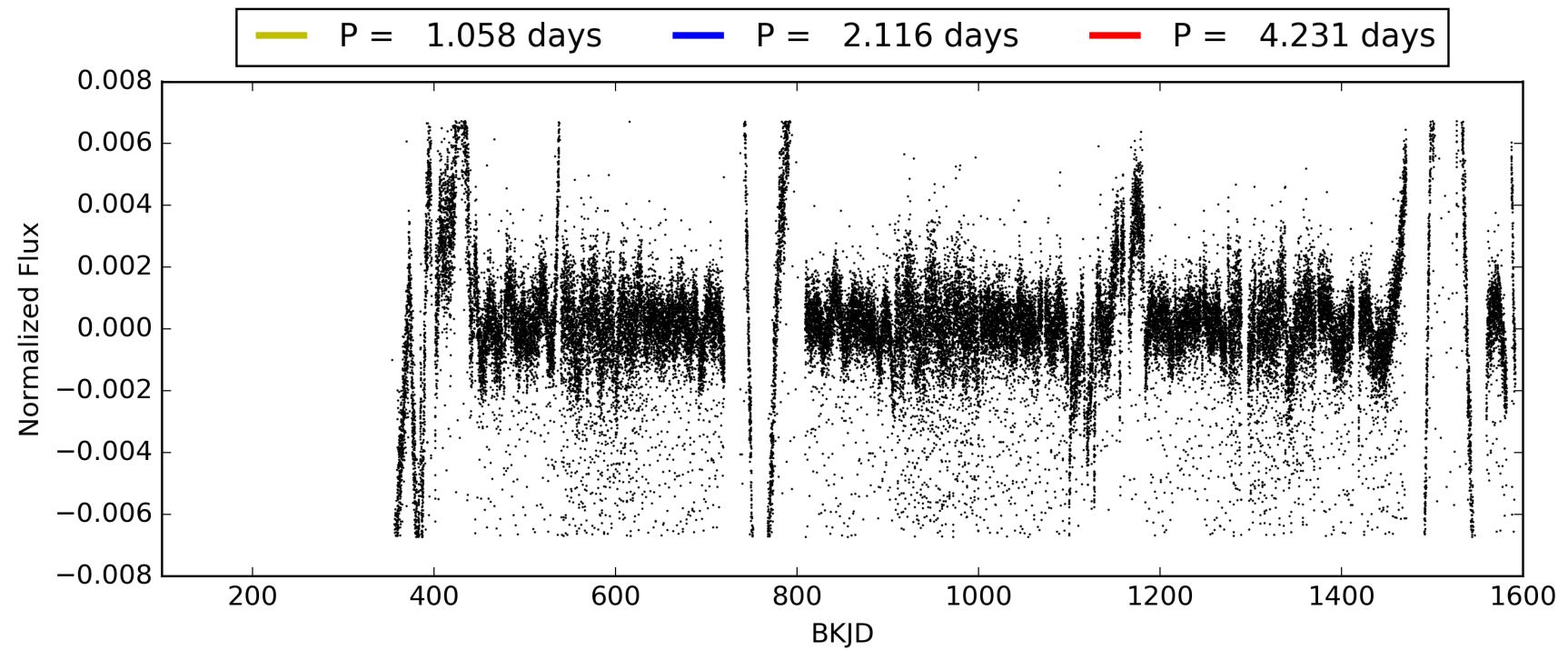
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [625.17 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [519/524]  
GhostDiagnostic-chr: -0.7935  
Centroid-sig: N/A  
Centroid-so: 34.068 arcsec [2457.58 $\sigma$ ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0 [0]  
KicOffset-st: 0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 003327992-01, PDC Light Curves

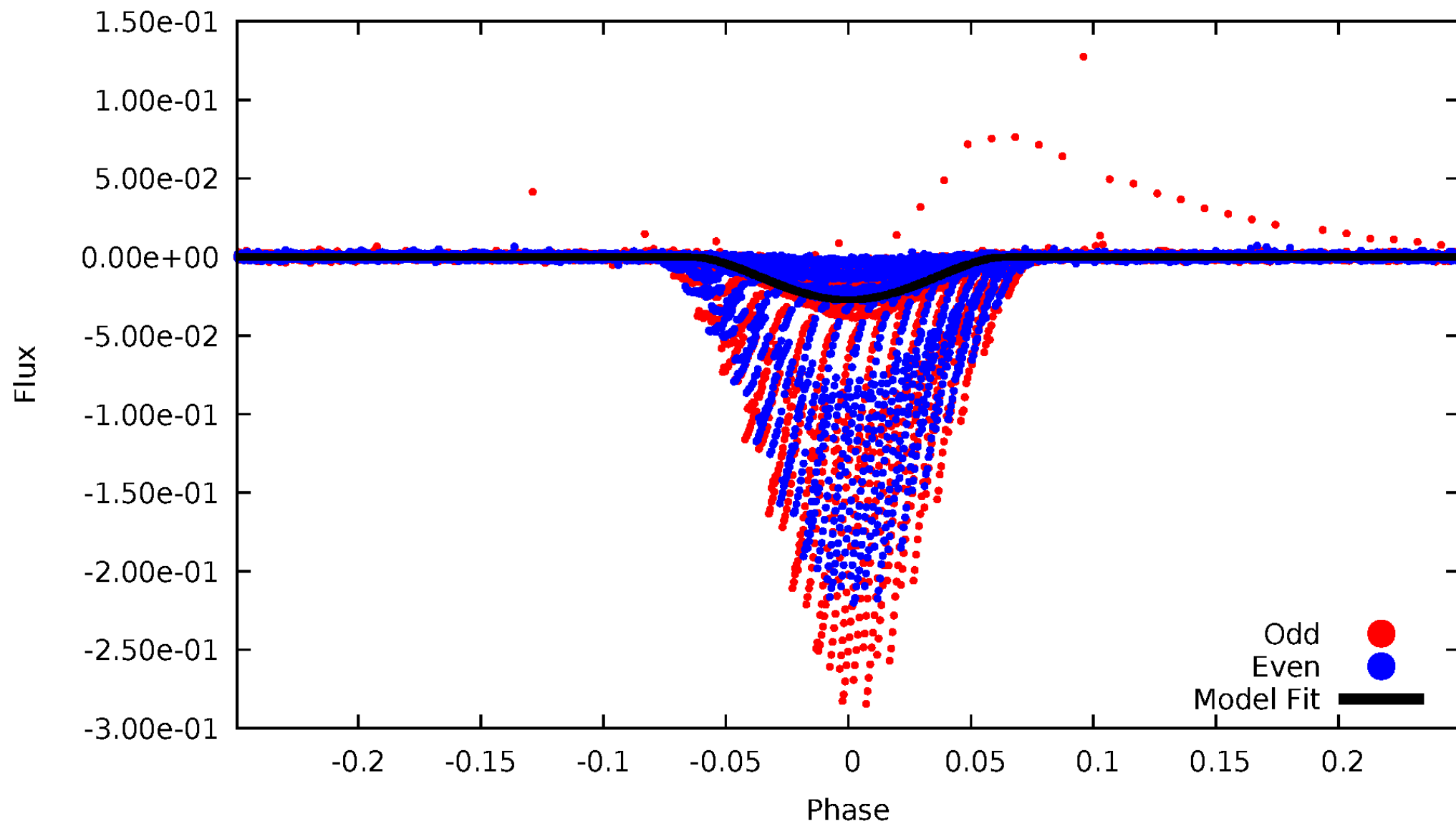


TCE 003327992-01



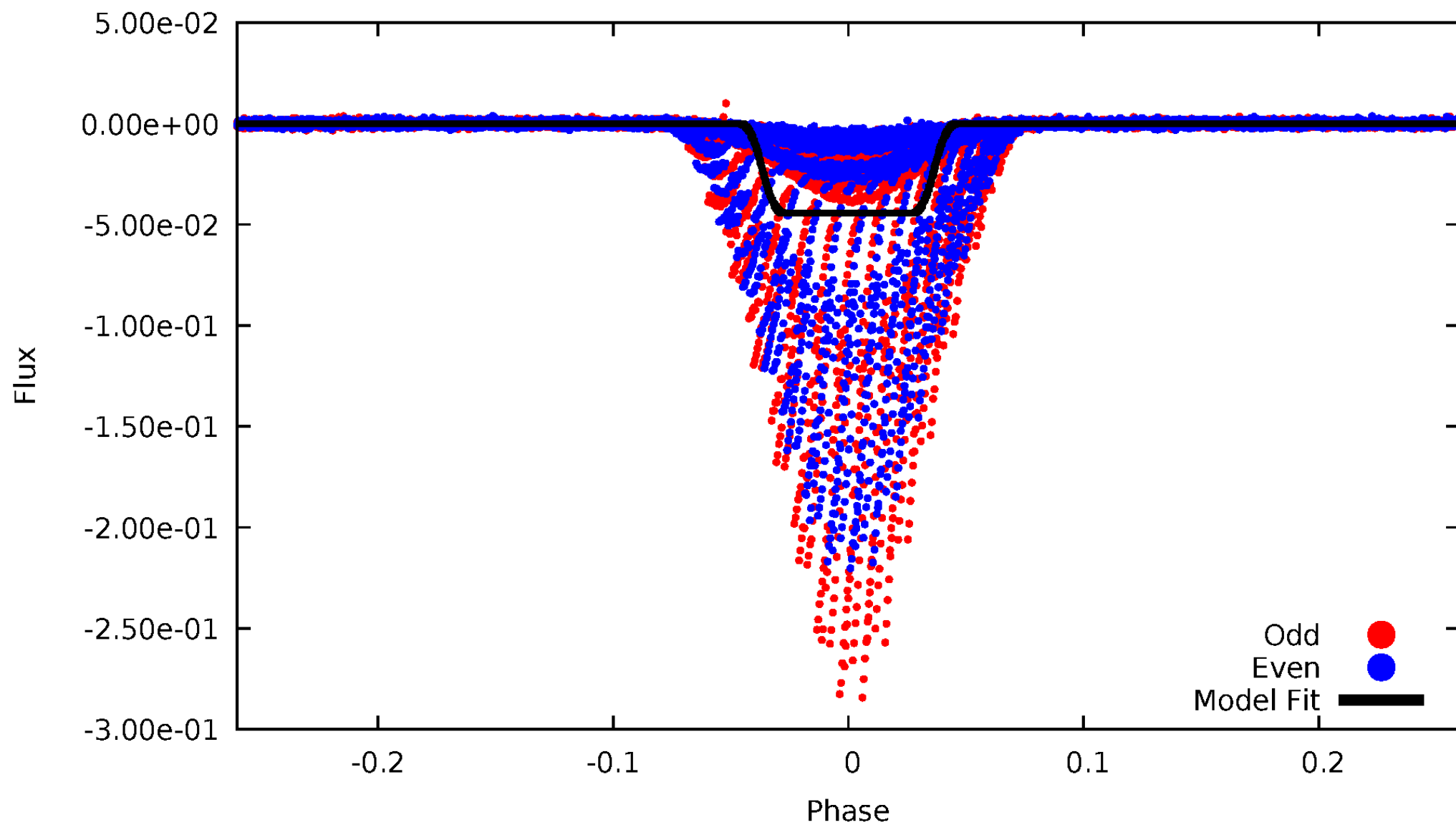
# DV Odd/Even

TCE 003327992-01



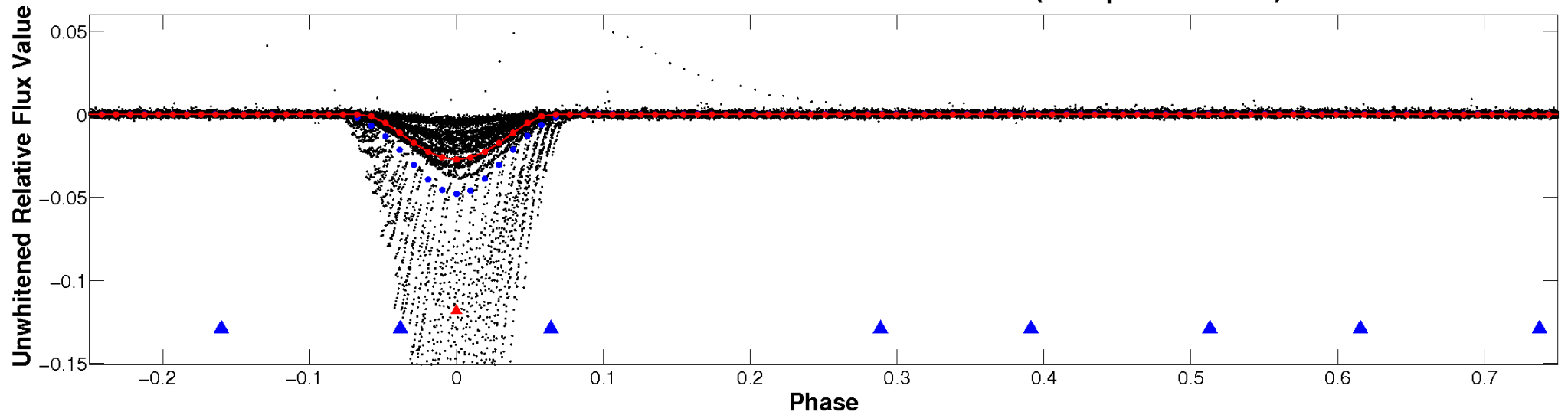
# ALT Odd/Even

TCE 003327992-01

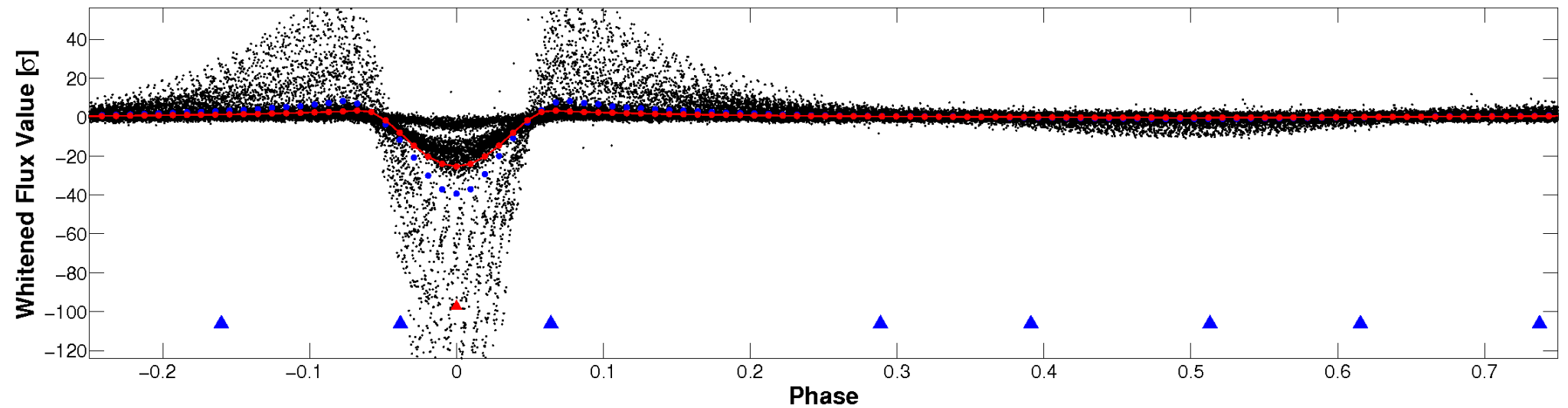


# Non-Whitened Vs. Whitened Light Curve

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



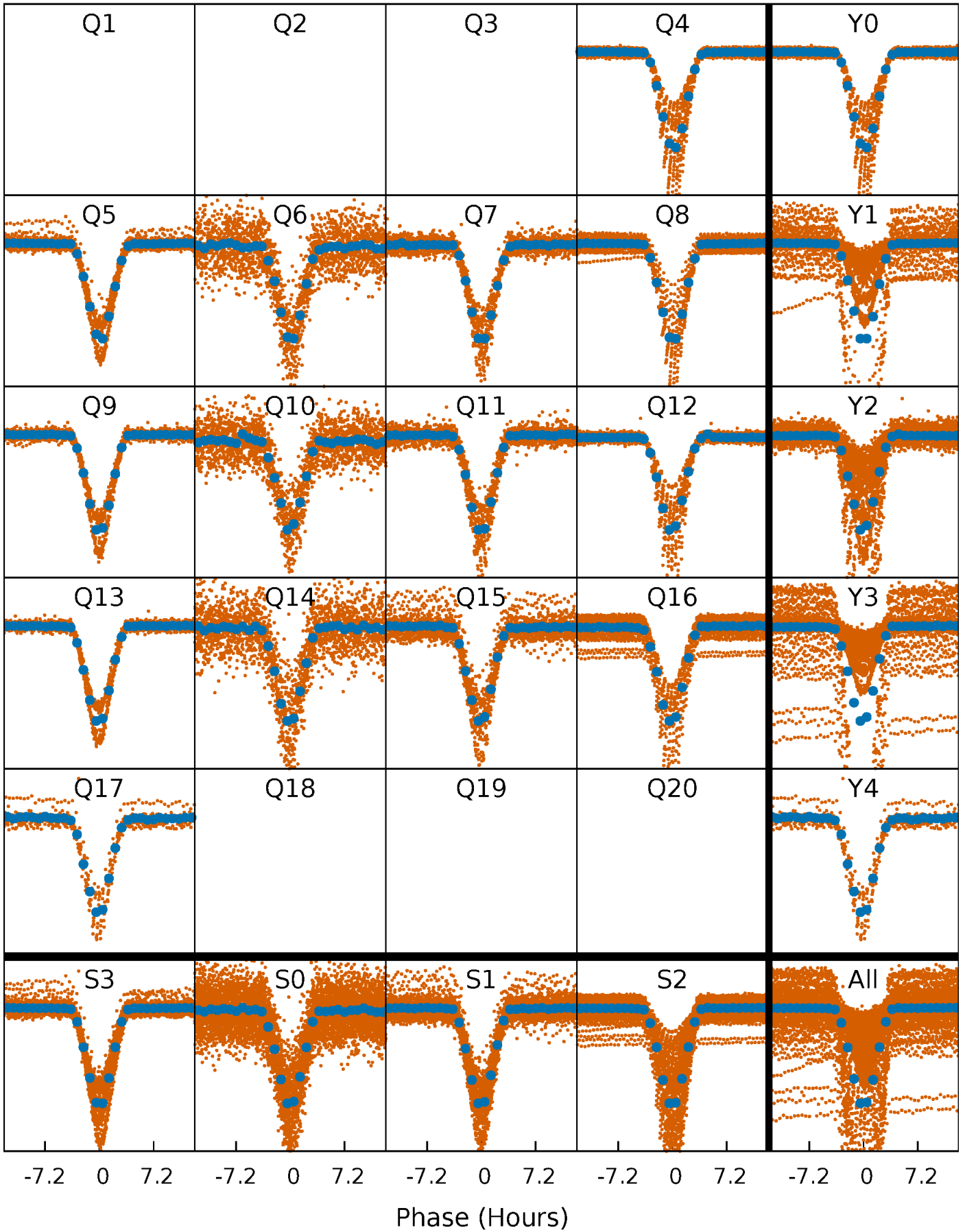
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

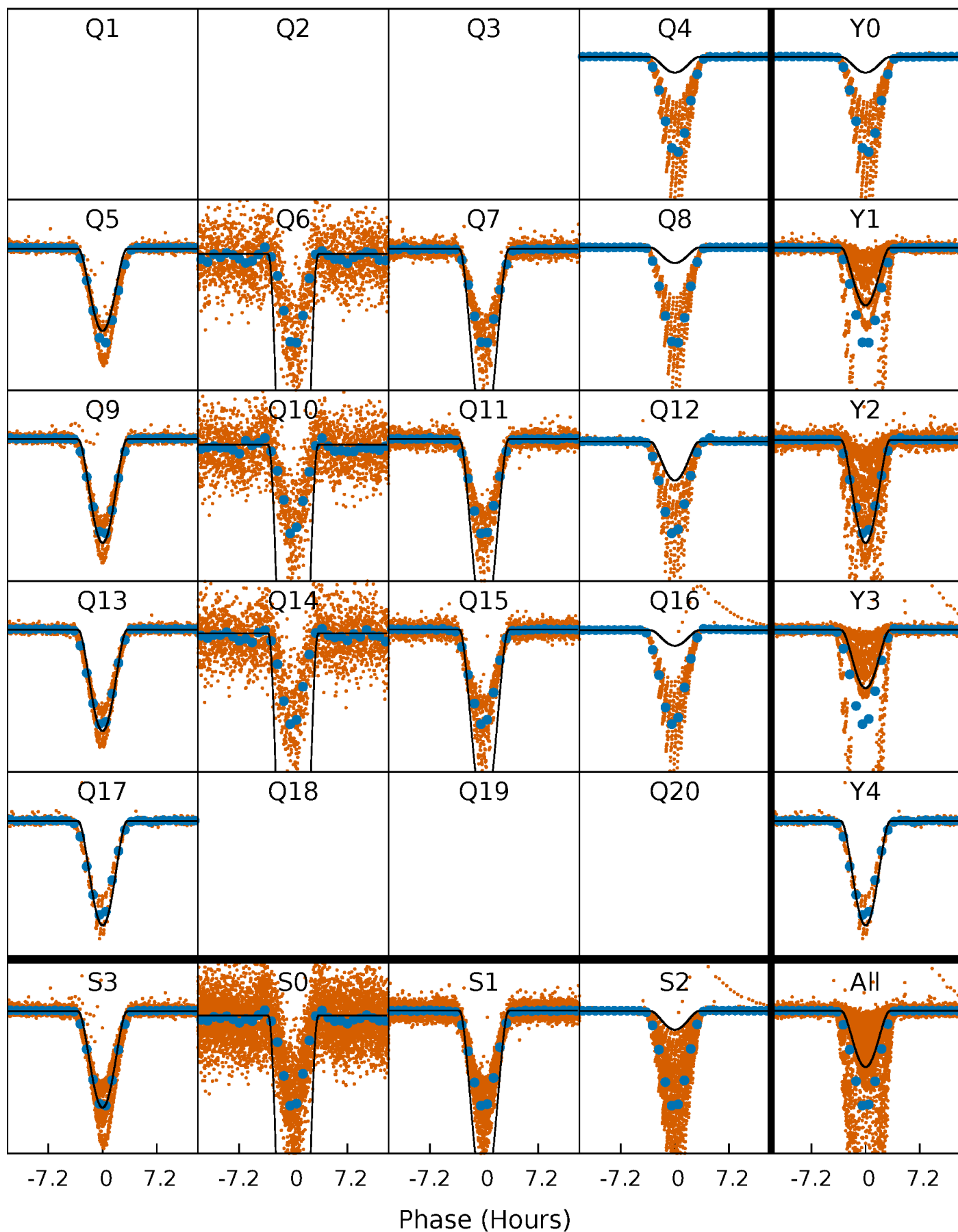
TCE 003327992-01 P= 2.115540 Days  $T_0=131.980940$  (BKJD)





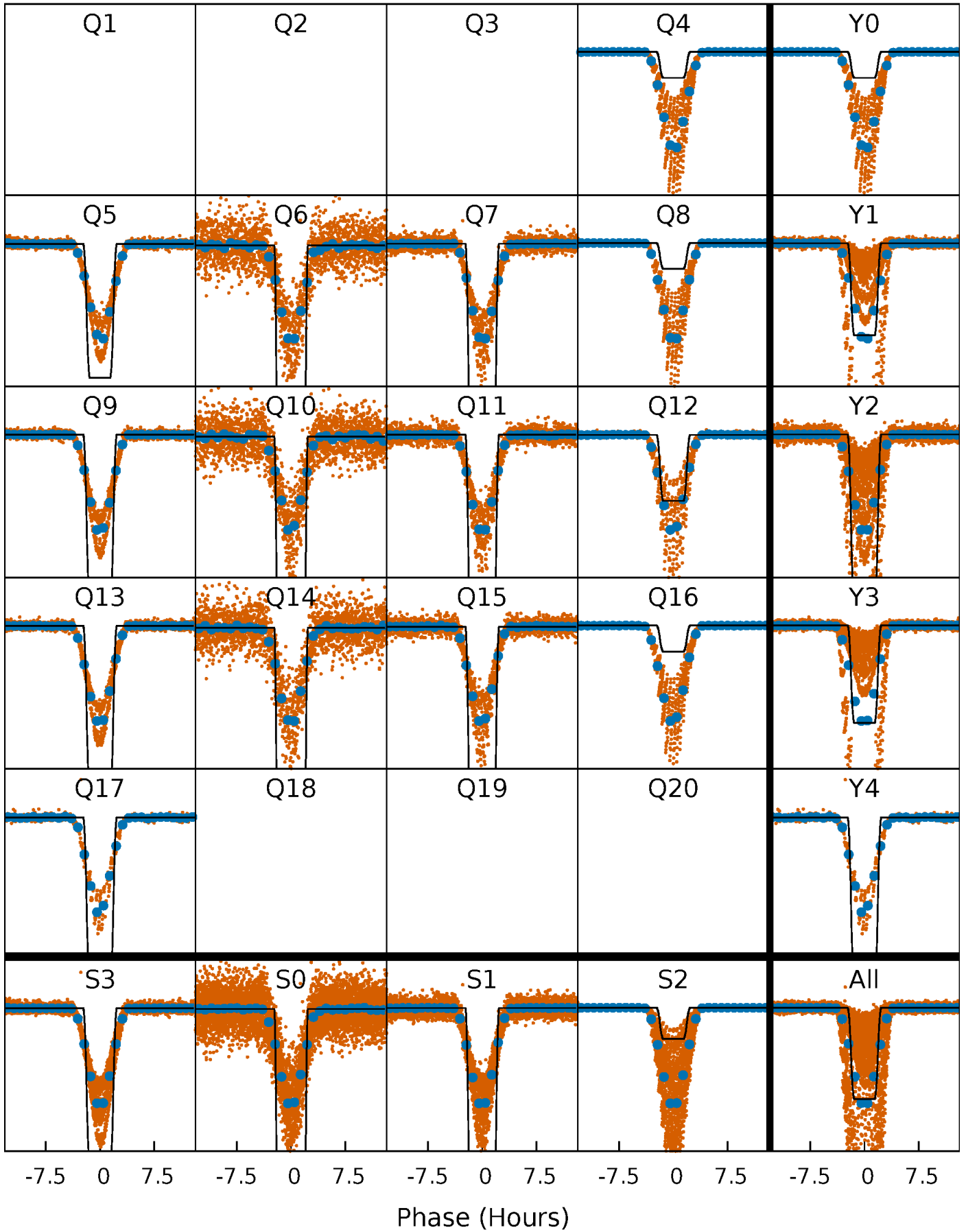
# DV Quarter-Phased Transit Curves

TCE 003327992-01 P= 2.115540 Days  $T_0=131.980940$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

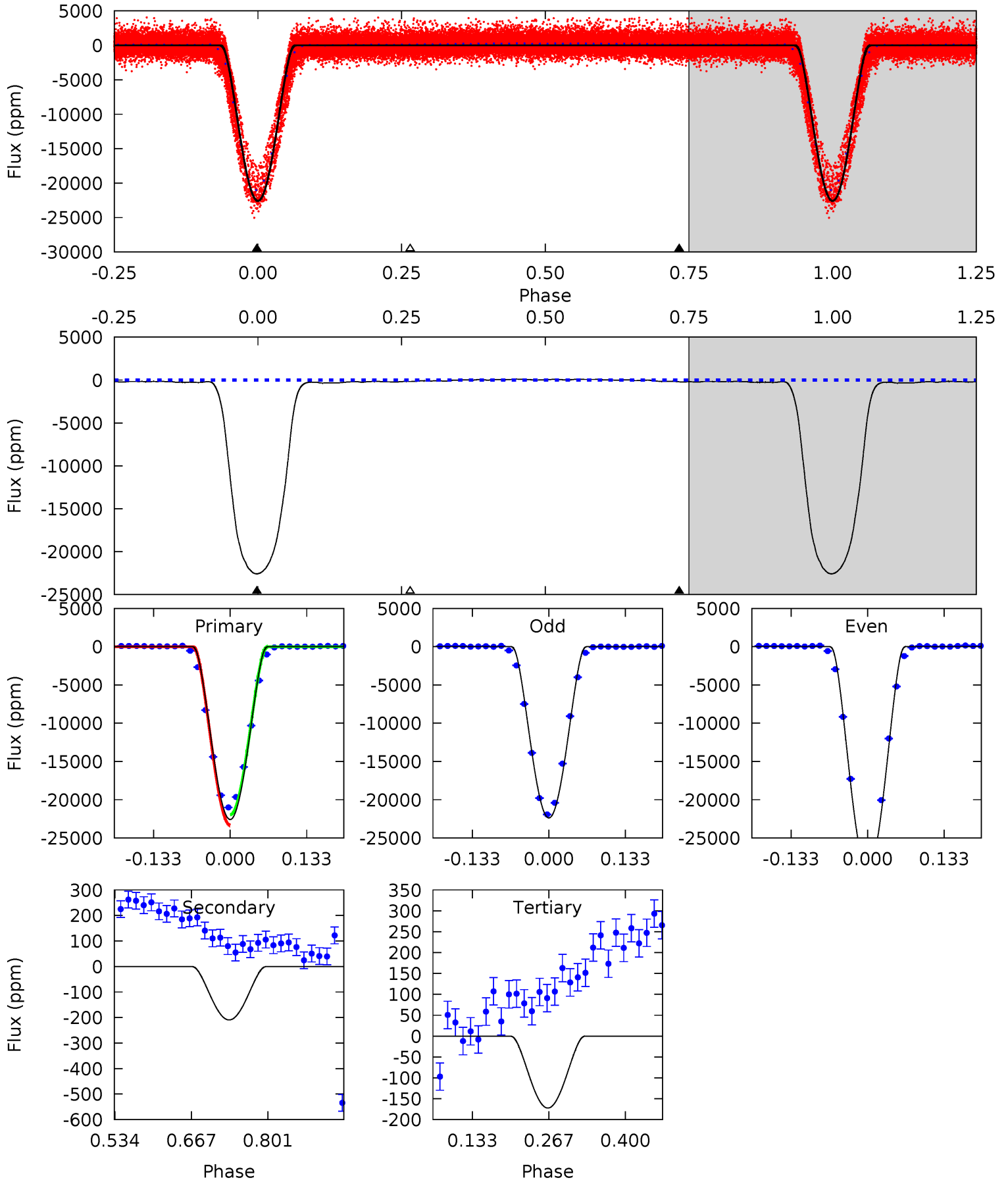
TCE 003327992-01 P= 2.115527 Days  $T_0=131.985386$  (BKJD)



# DV Model-Shift Uniqueness Test

003327992-01, P = 2.115540 Days, E = 131.980940 Days

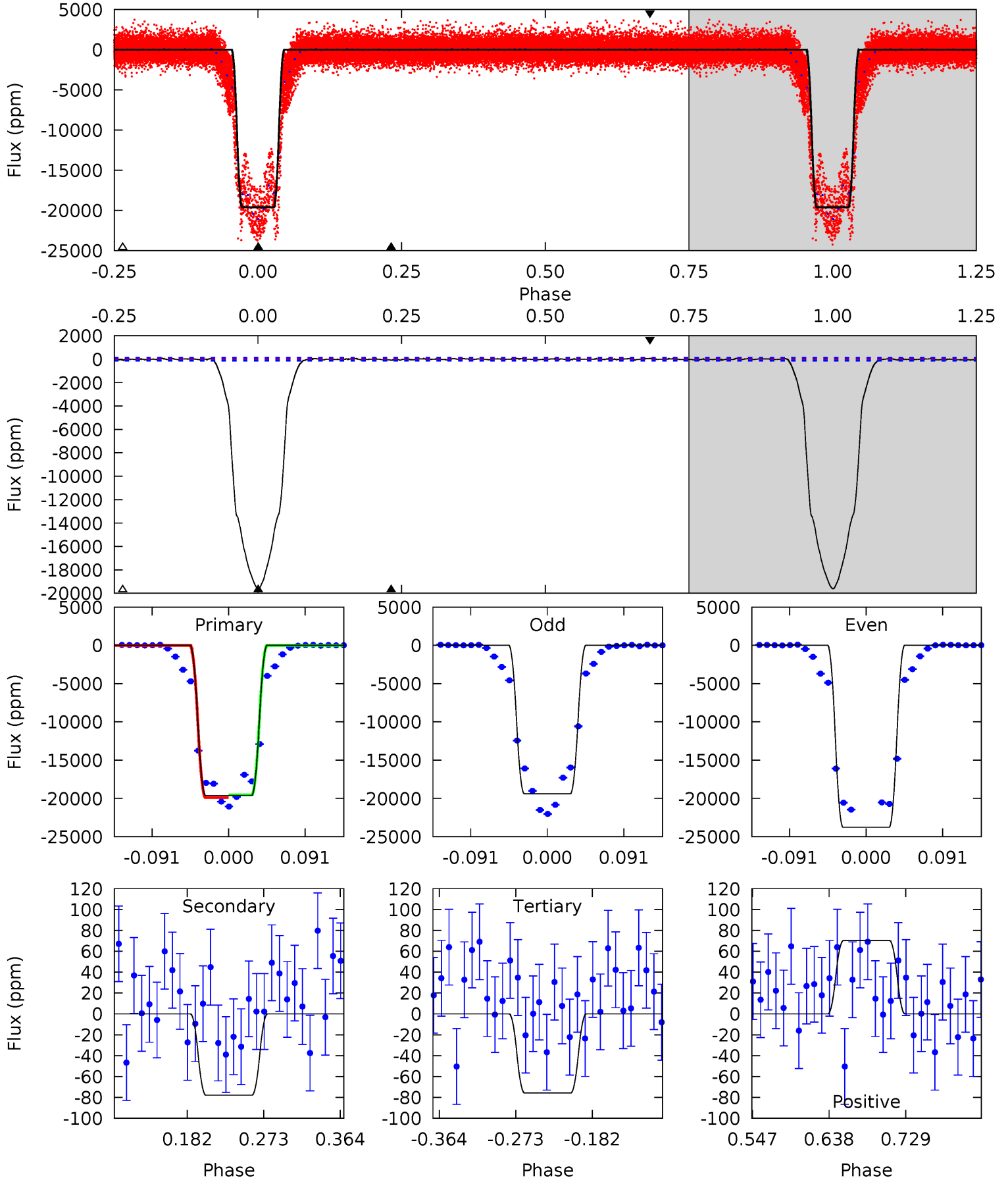
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1314	12.2	10.0	0	4.50	1.50	6.94	1304	1314	2.16	12.2	197.0	2.24	0.00	0



# Alt Model-Shift Uniqueness Test

003327992-01, P = 2.115527 Days, E = 131.985386 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
752.7	2.99	2.91	2.69	4.58	1.69	1.02	749.8	750.0	0.08	0.29	80.6	2.25	0.00	0



### Stellar Parameters For KIC 003327992

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4188^{+146}_{-161}$	$4.615^{+0.053}_{-0.018}$	$0.180^{+0.200}_{-0.300}$	$0.661^{+0.032}_{-0.059}$	$0.656^{+0.050}_{-0.055}$	$3.202^{+0.745}_{-0.231}$
	+3%/-4%	+1%/-0%	+111%/-167%	+5%/-9%	+8%/-8%	+23%/-7%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003327992-01 / KOI 3635.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-209 \pm 17$	$19.50^{+2.79}_{-2.97}$	$1245^{+46}_{-52}$	$-1684^{+3294}_{-117}$	$0.239^{+0.096}_{-0.054}$
Alt.	$-78 \pm 26$	$15.06^{+2.93}_{-2.74}$	$1243^{+47}_{-52}$	$-1834^{+150}_{-75}$	$0.143^{+0.090}_{-0.060}$

$T_{\text{max}}$  = 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

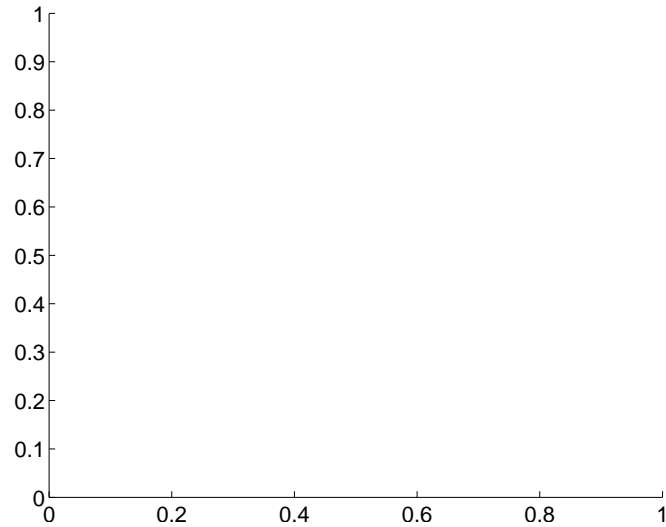
Supplemental centroid analysis for 003327992-01. Kepler magnitude: 15.58. Transit SNR 612.12

There are 0 quarters with good PRF difference image offsets

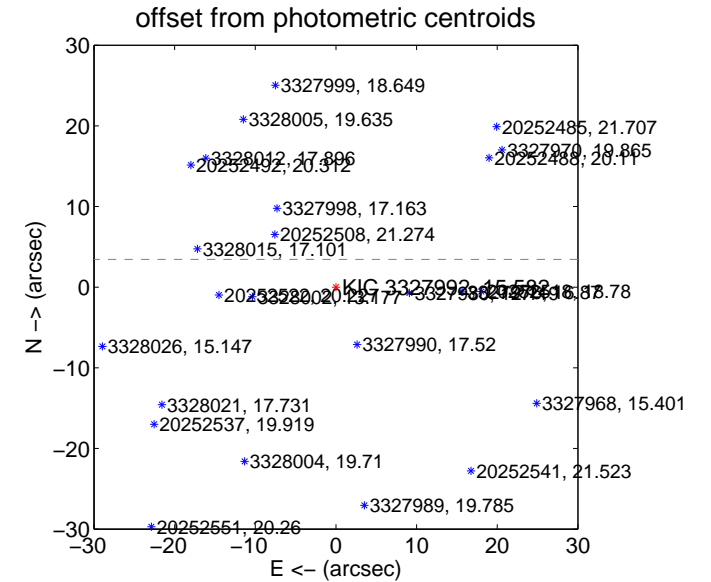
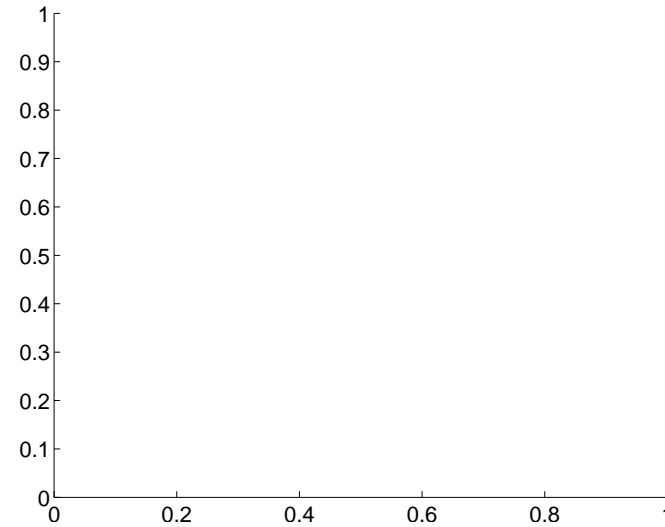
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$34.07 \pm 0.01$	$2457.58$	$-33.89 \pm 0.01$	$3.45 \pm 0.00$

There is no PRF-fit offset from OOT-fit



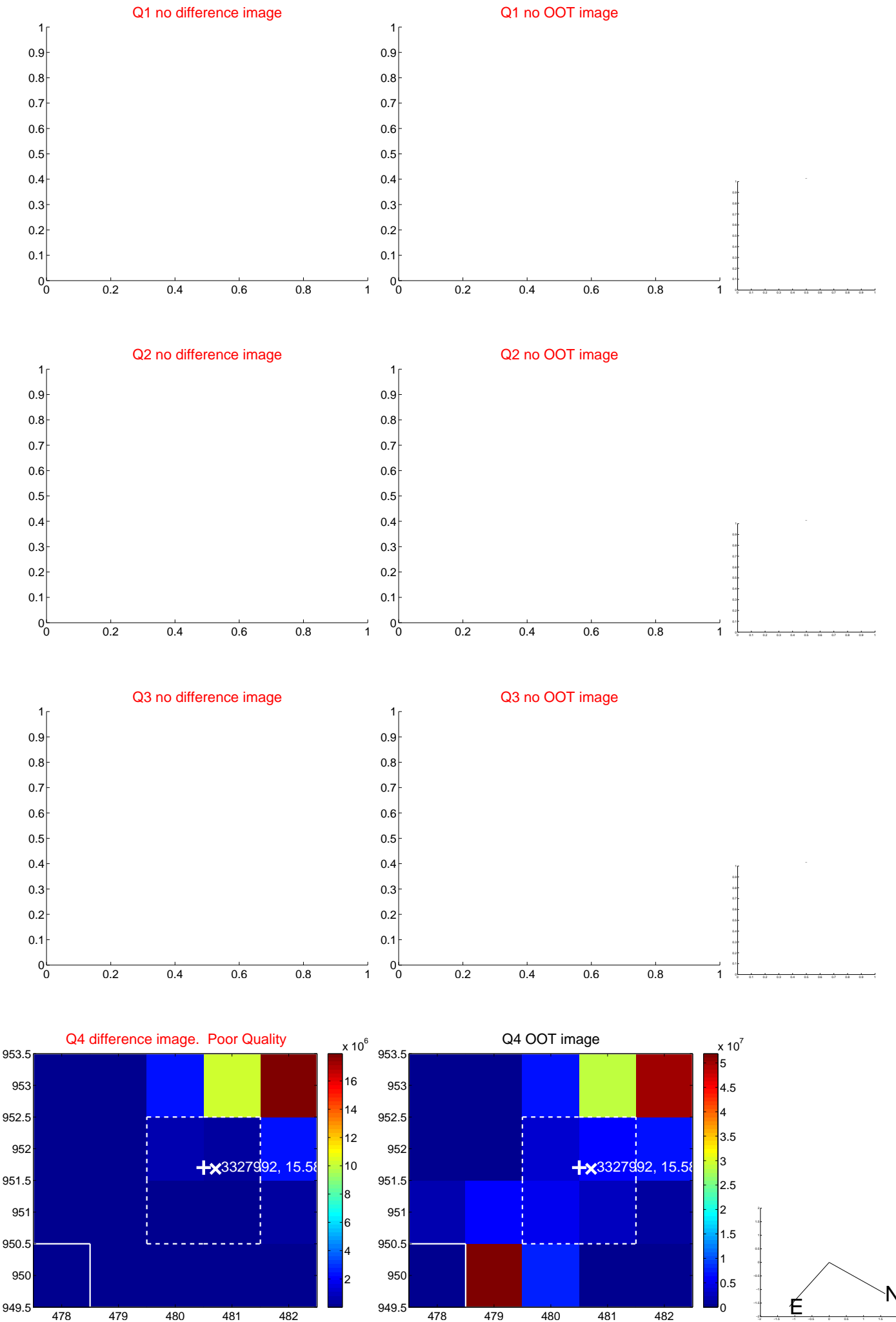
There is no PRF-fit offset from KIC



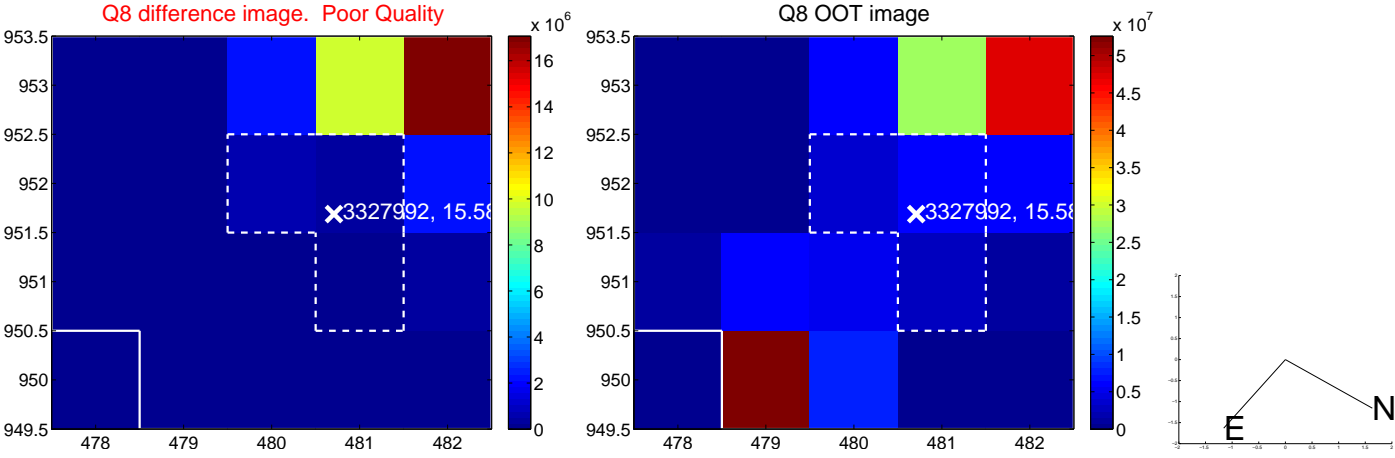
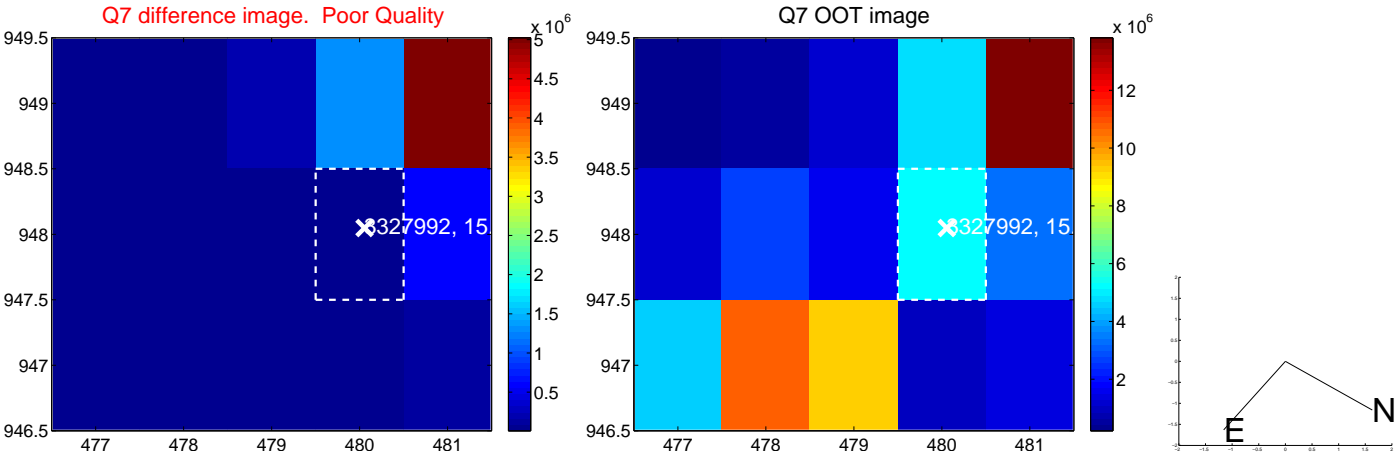
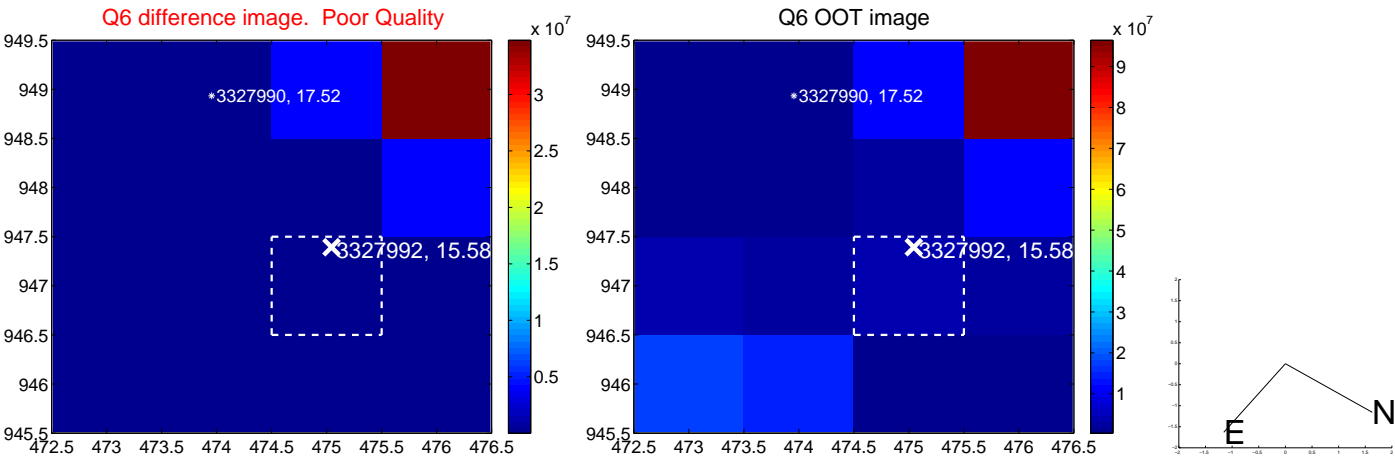
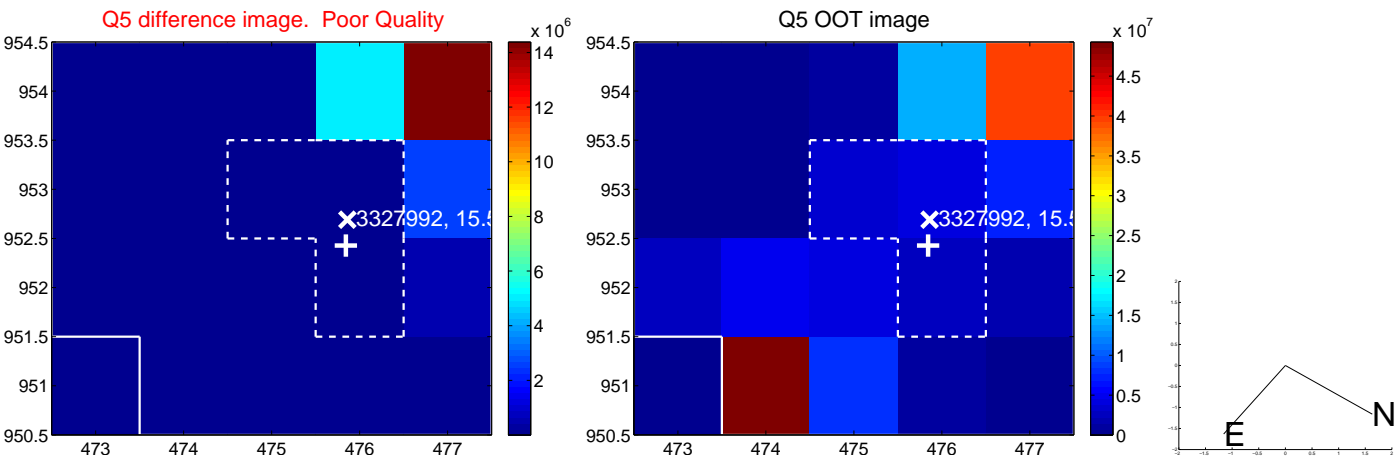
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



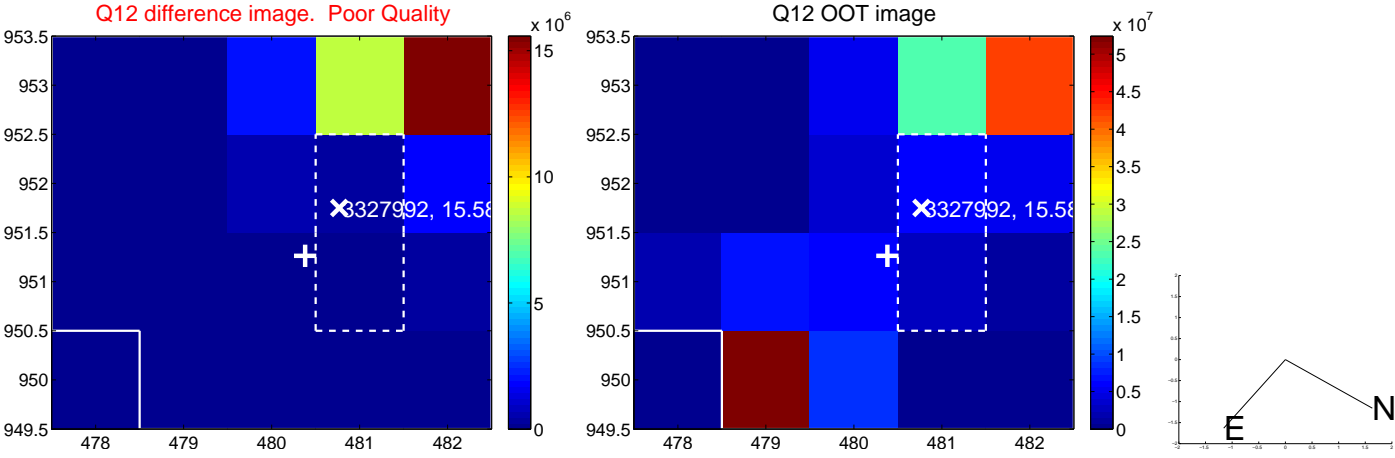
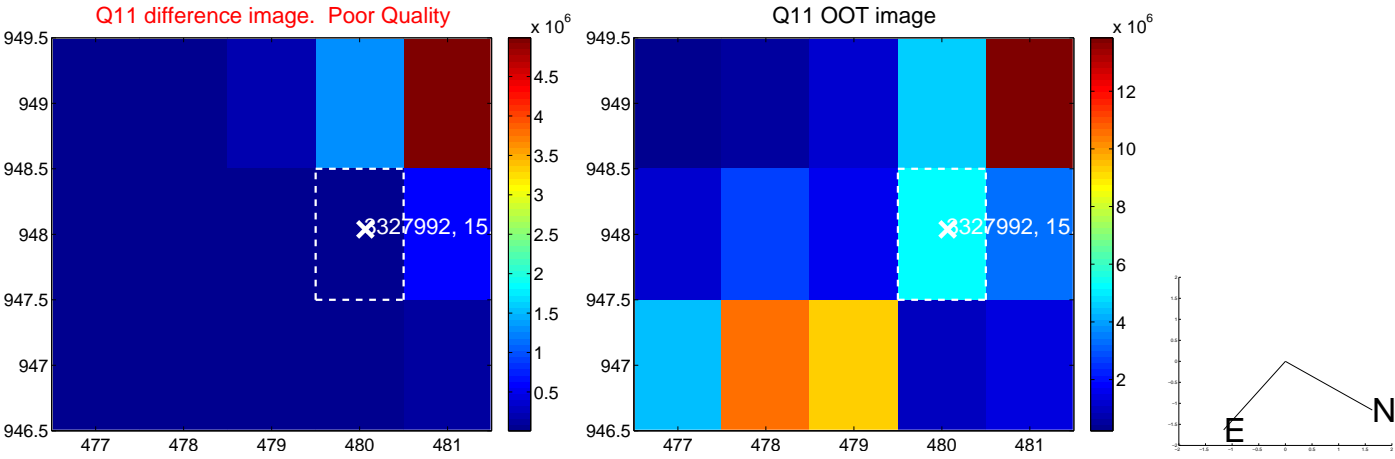
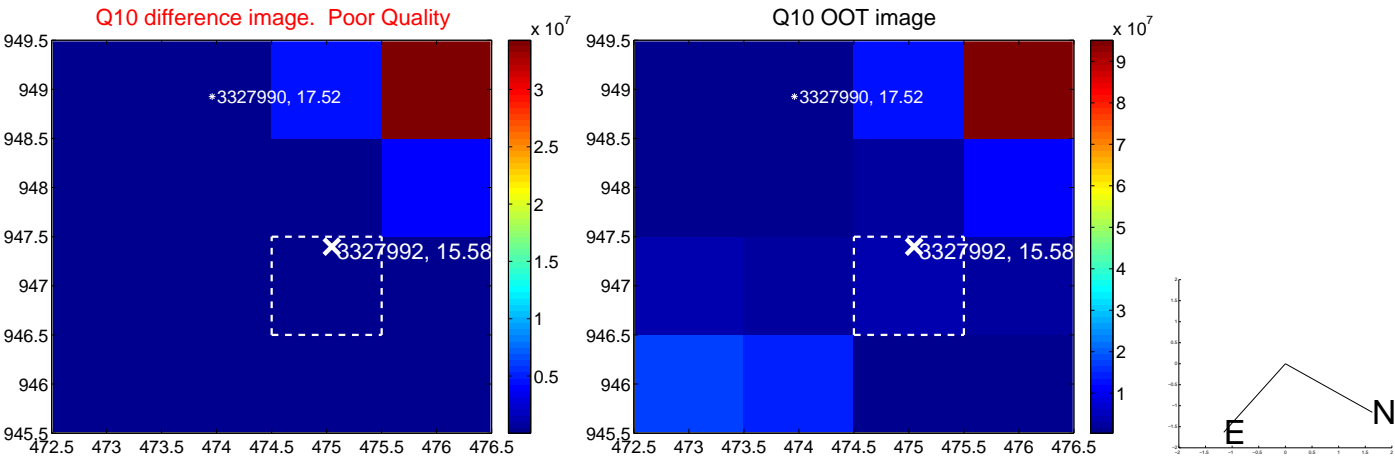
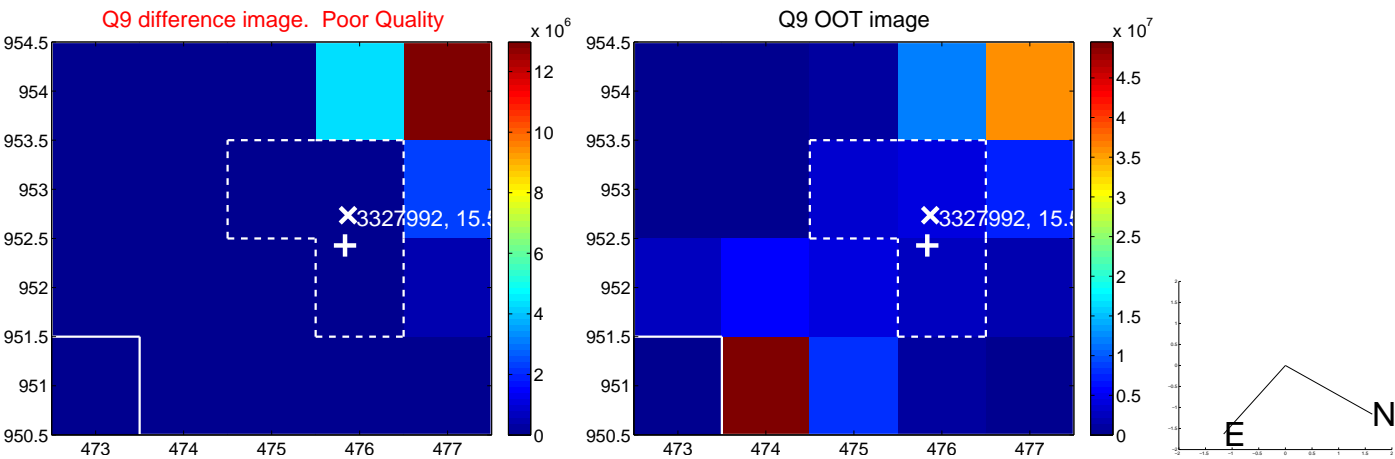
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



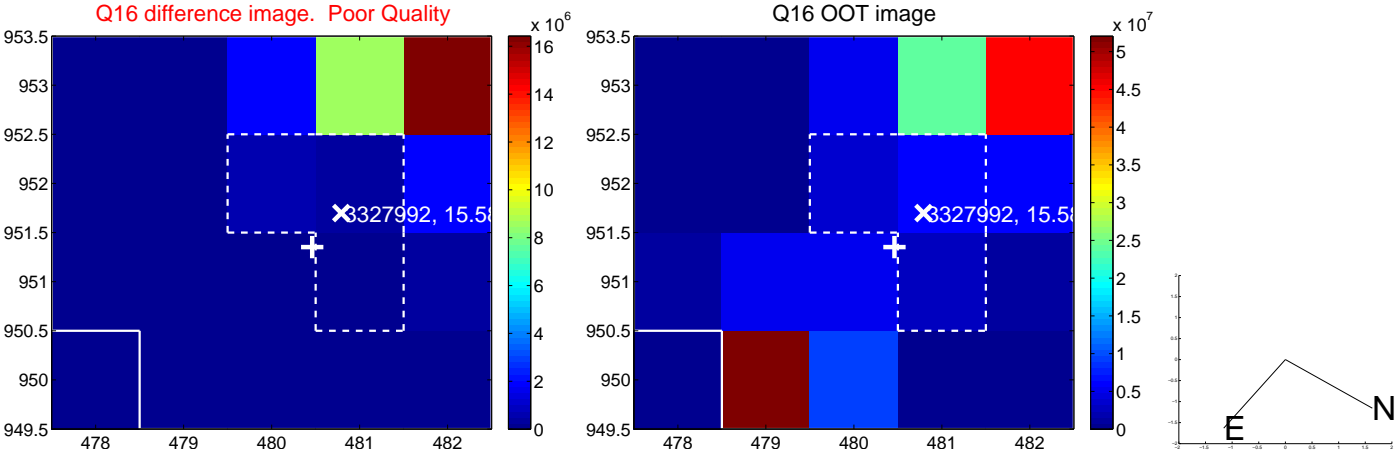
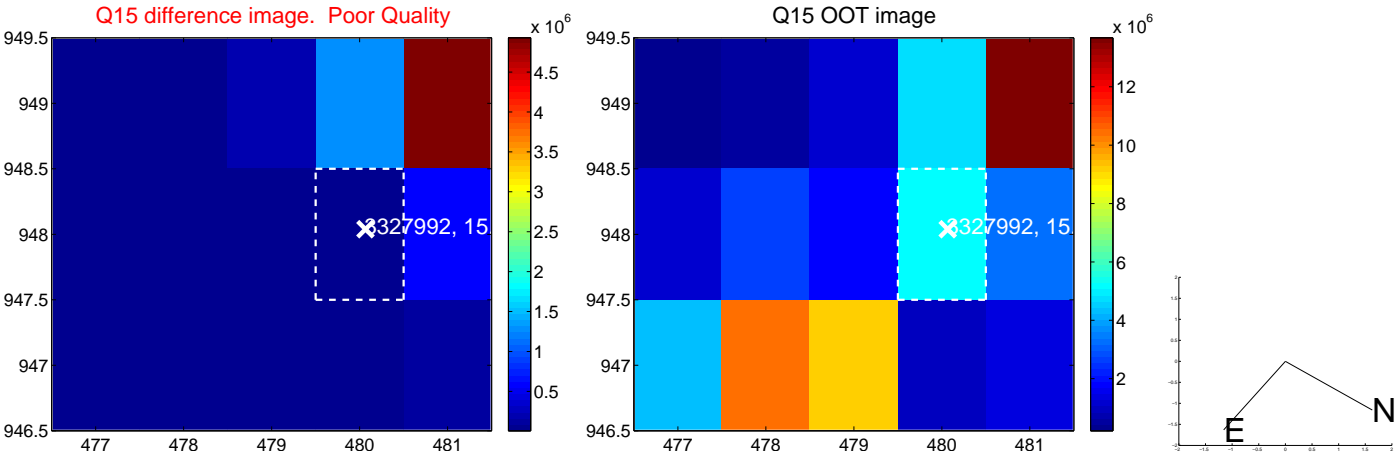
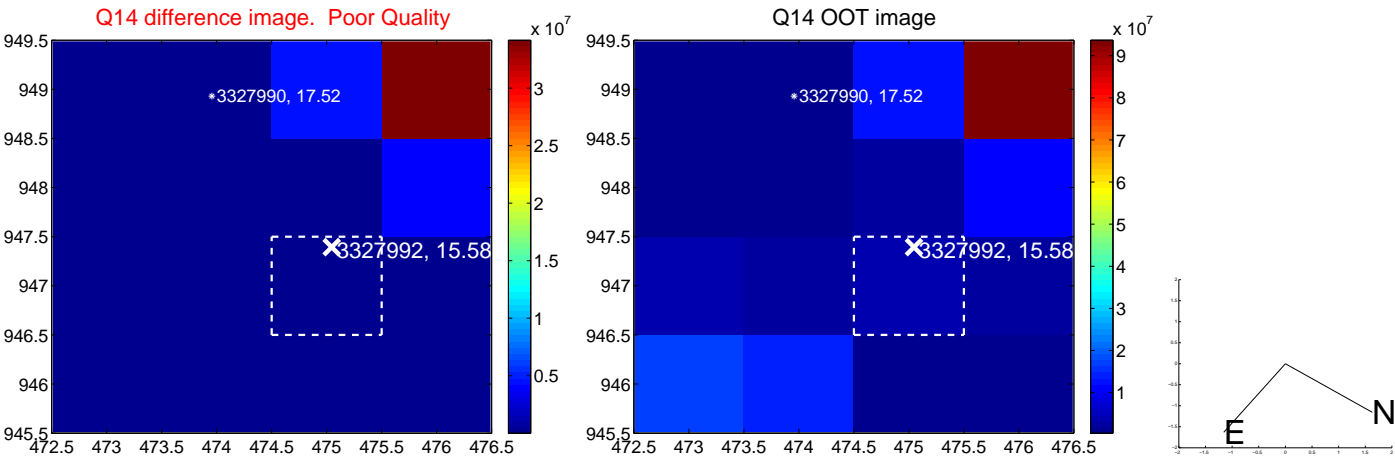
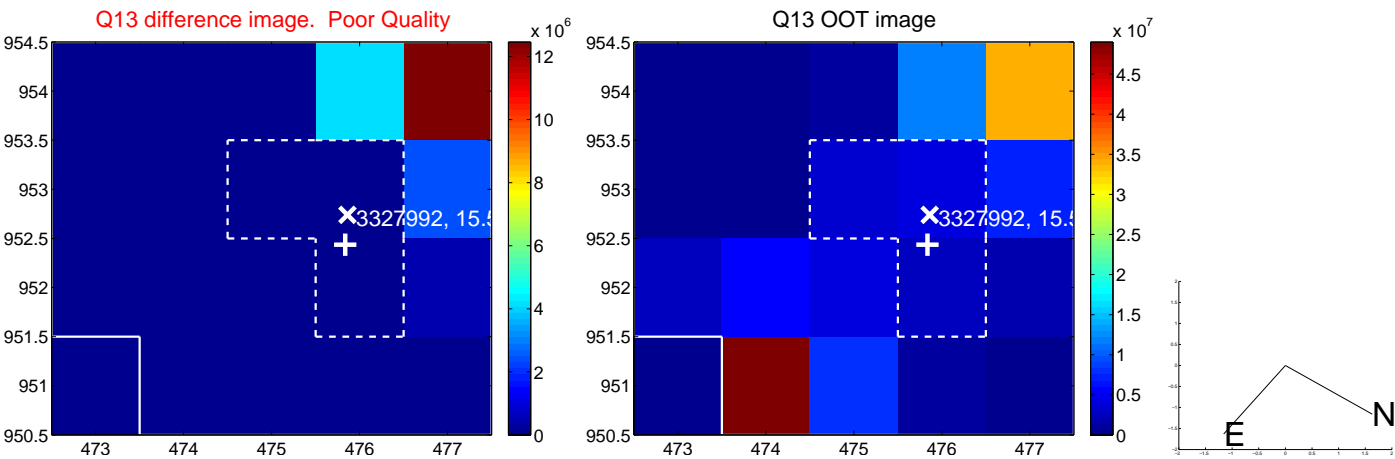
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



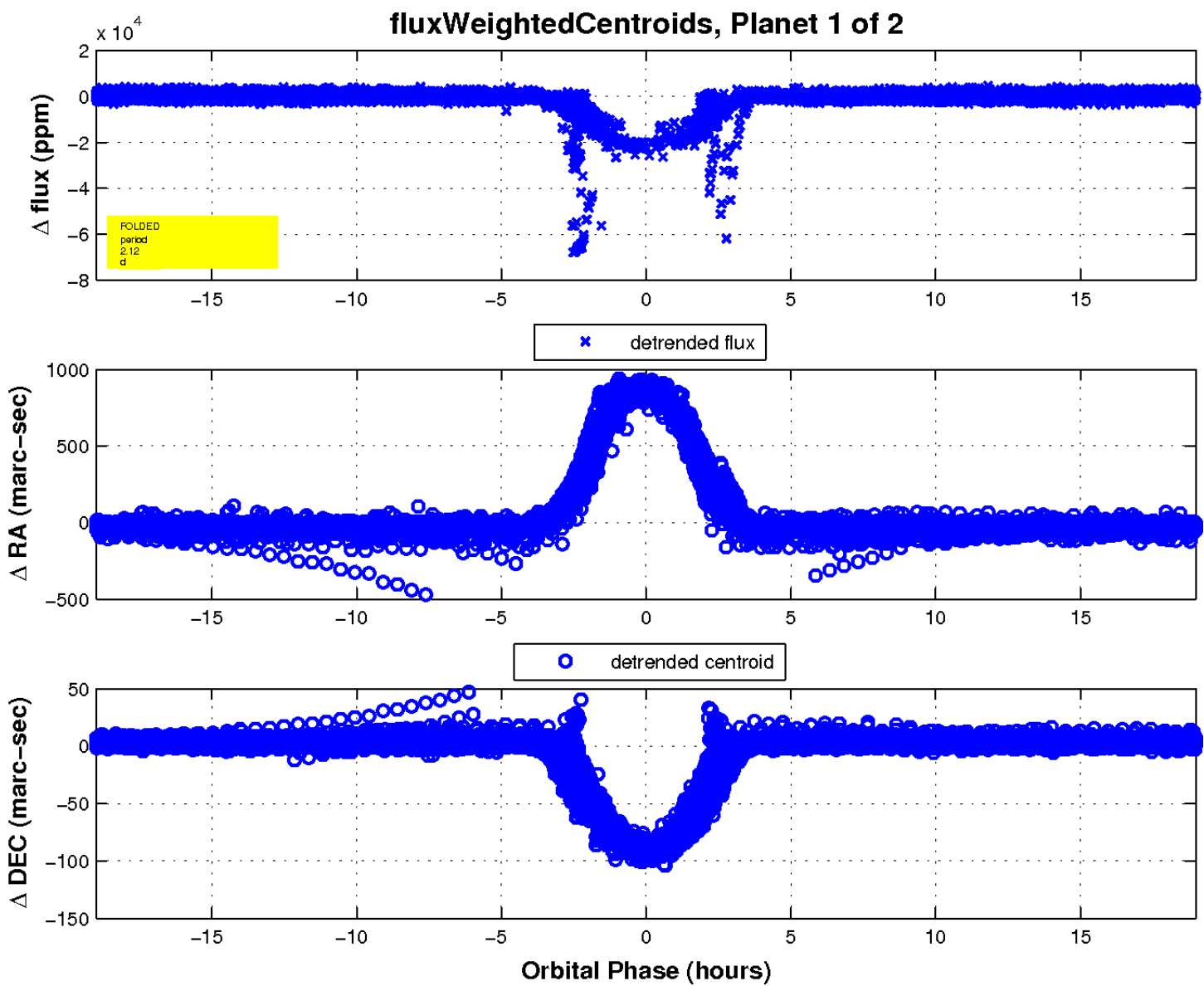
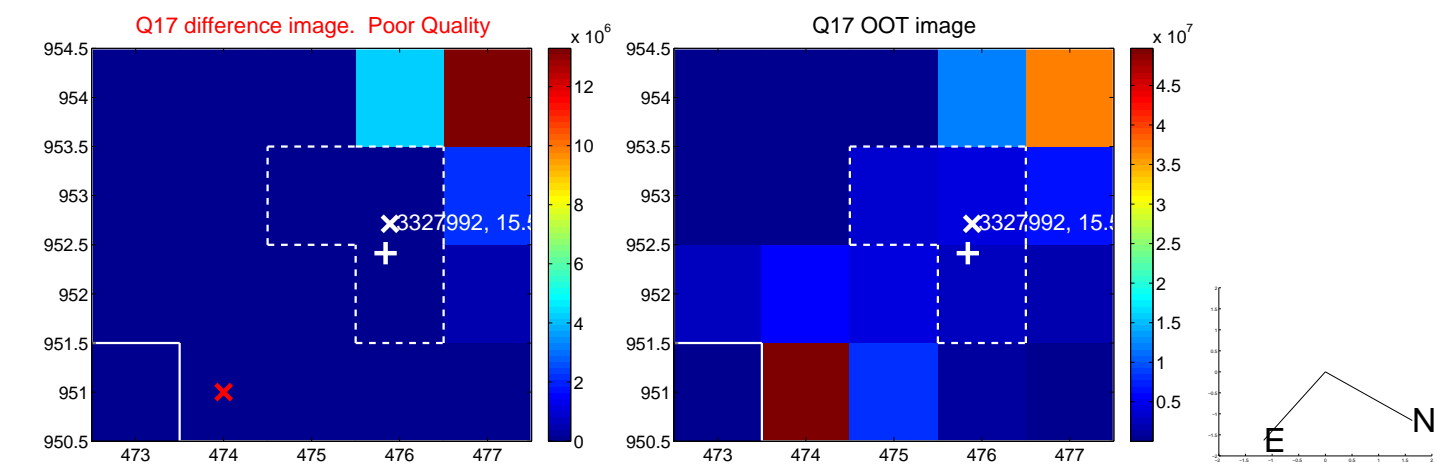
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

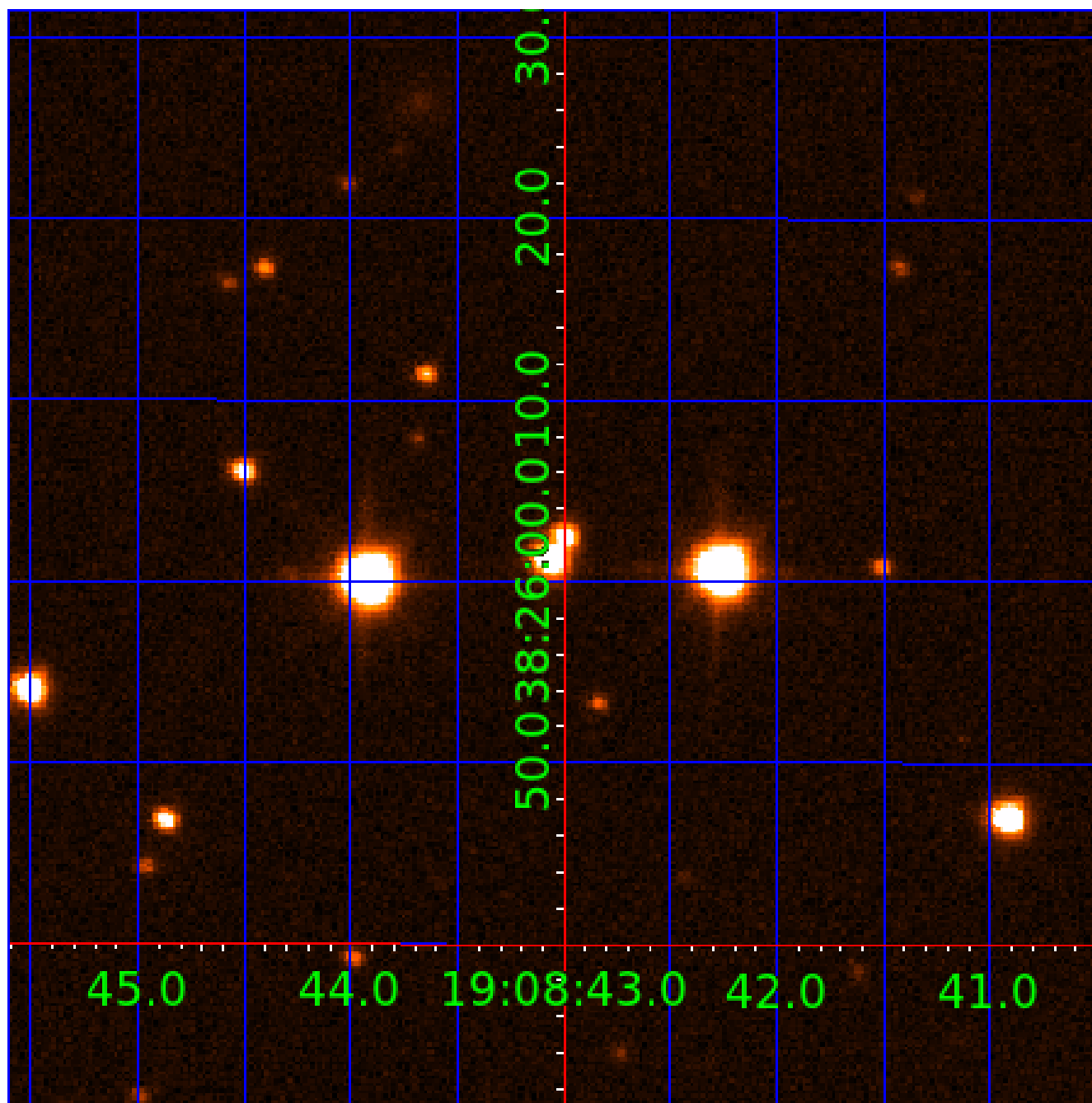


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 003327992

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

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003327992-01	OBS	FP	0.00	0	1	1	1	MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—CENT_RESOLVED_OFFSET—EPHEM_MATCH
003327992-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

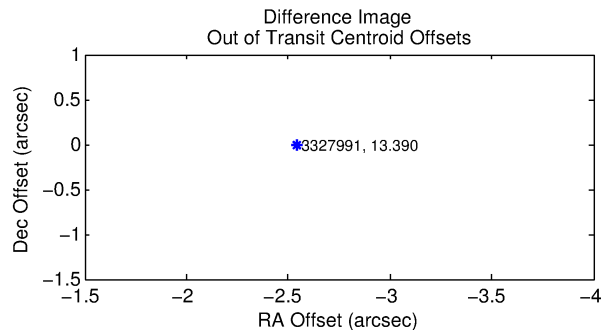
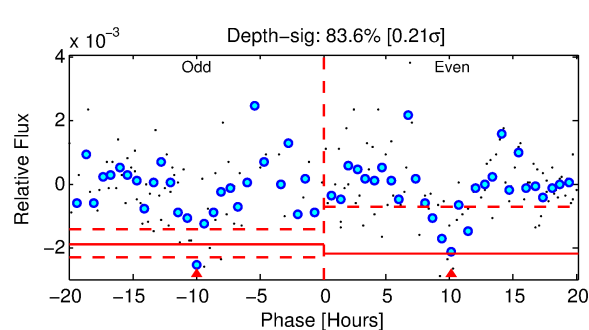
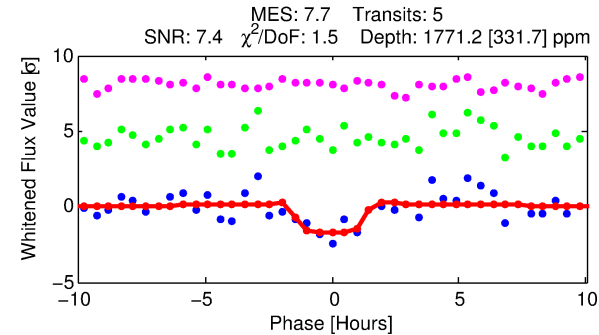
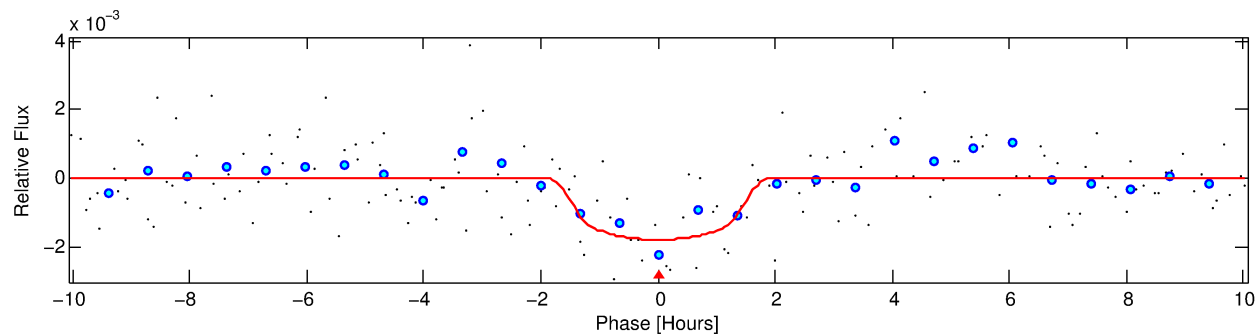
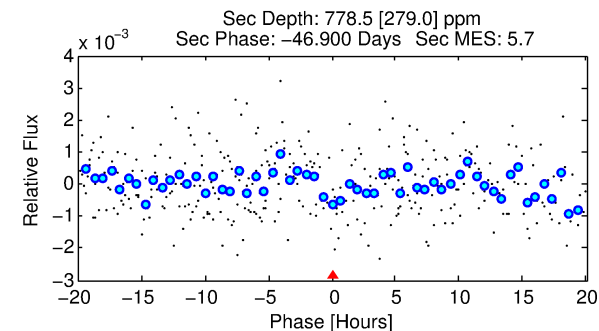
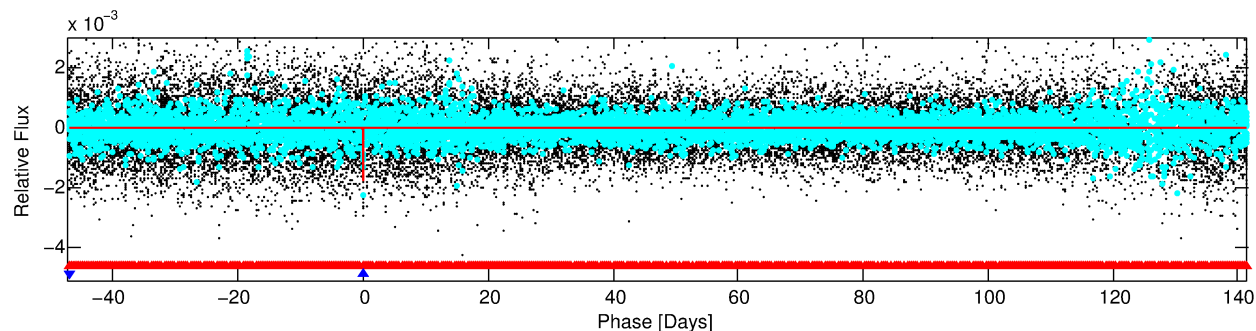
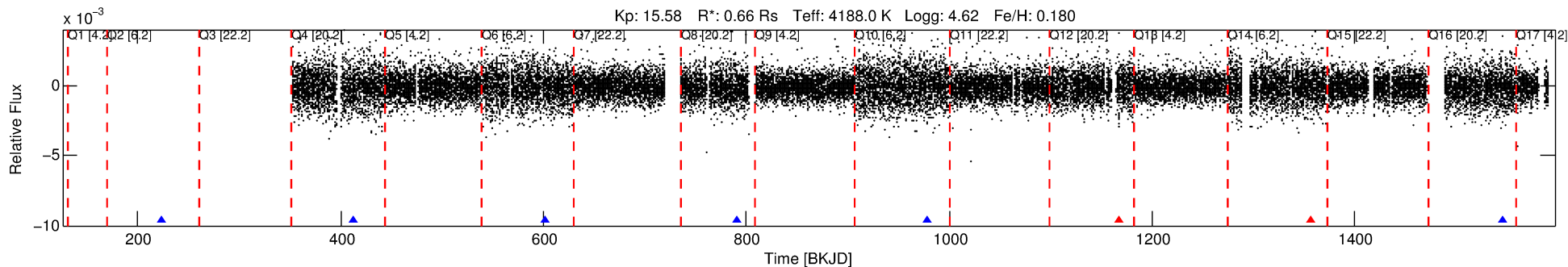
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003327992-02

No Significant Match Found

# DV One-Page Summary

KIC: 3327992 Candidate: 2 of 2 Period: 188.758 d  
KOI: K03635 Corr: No Ephemeris Match



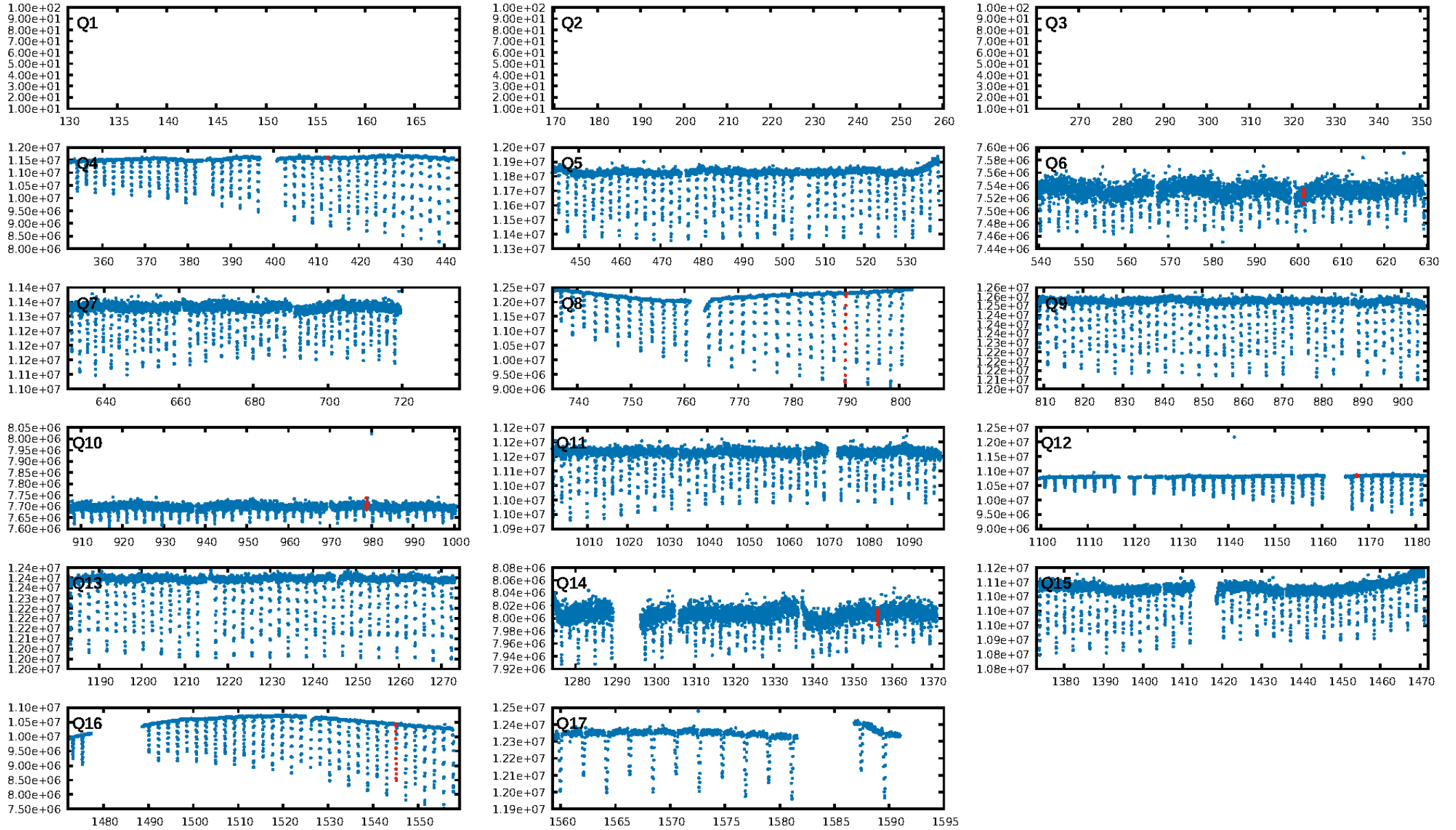
## DV Fit Results:

Period = 188.75775 [0.00324] d  
Epoch = 223.7766 [0.0143] BKJD  
Rp/R\* = 0.0420 [0.0619]  
a/R\* = 315.76 [1466.48]  
b = 0.74 [2.96]  
Seff = 0.38 [0.07]  
Teq = 201 [9] K  
Rp = 3.03 [4.47] Re  
a = 0.5599 [0.0404] AU  
Ag = 14657.49 [43574.64] [0.34 $\sigma$ ]  
Teff = 3415 [2540] K [1.27 $\sigma$ ]

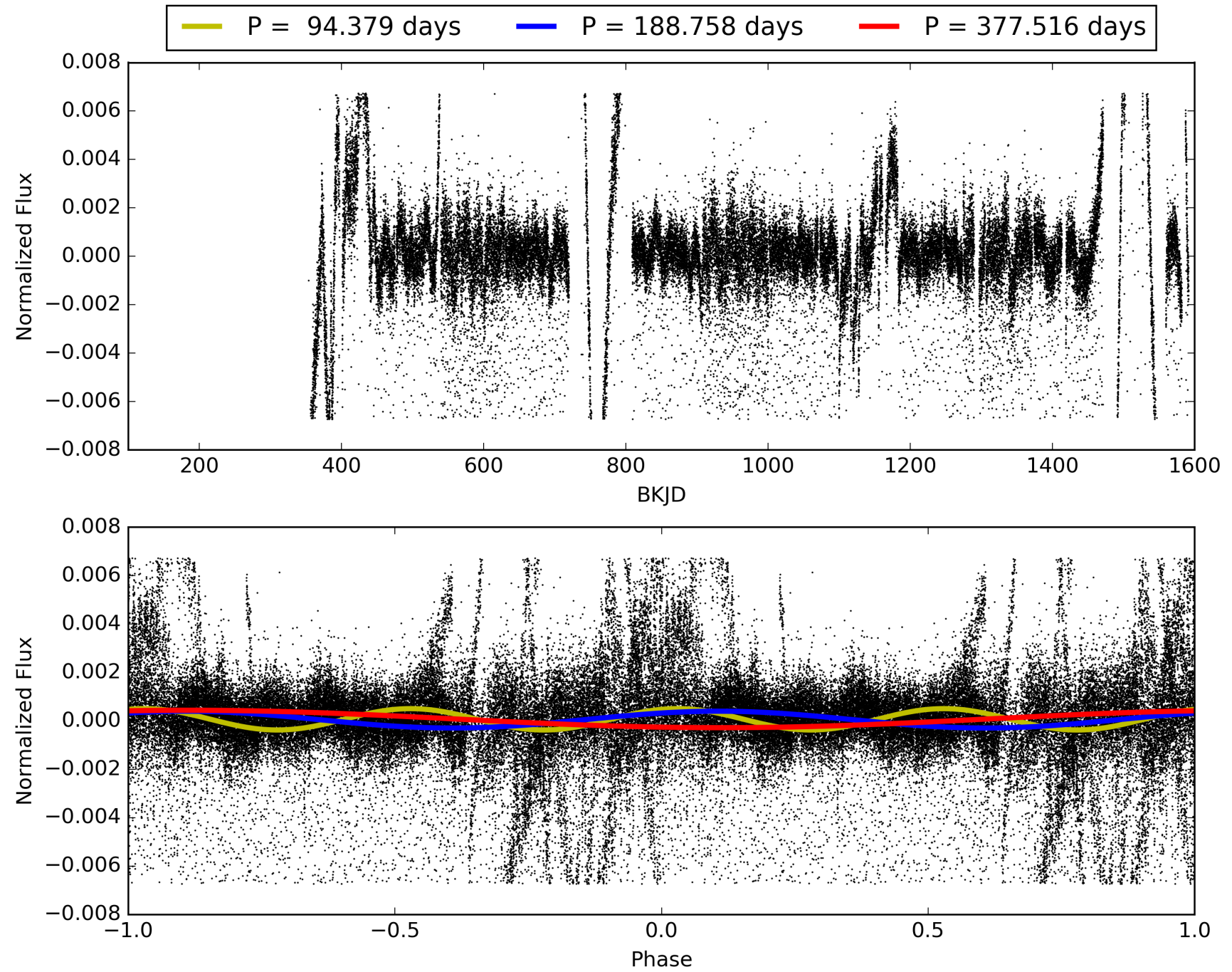
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [625.17 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 15.3%  
ModelChiSquareGof-sig: 91.8%  
Bootstrap-pfa: 4.42e-11  
RollingBand-fgt: 0.60 [3/5]  
GhostDiagnostic-chr: 0.03722  
Centroid-sig: N/A  
Centroid-so: 6.251 arcsec [4.61 $\sigma$ ]  
OotOffset-rm: N/A  
KicOffset-rm: 3.263 arcsec [1.75 $\sigma$ ]  
OotOffset-st: 0/0/0 [0]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.57 [4/7]

# TCE 003327992-02, PDC Light Curves

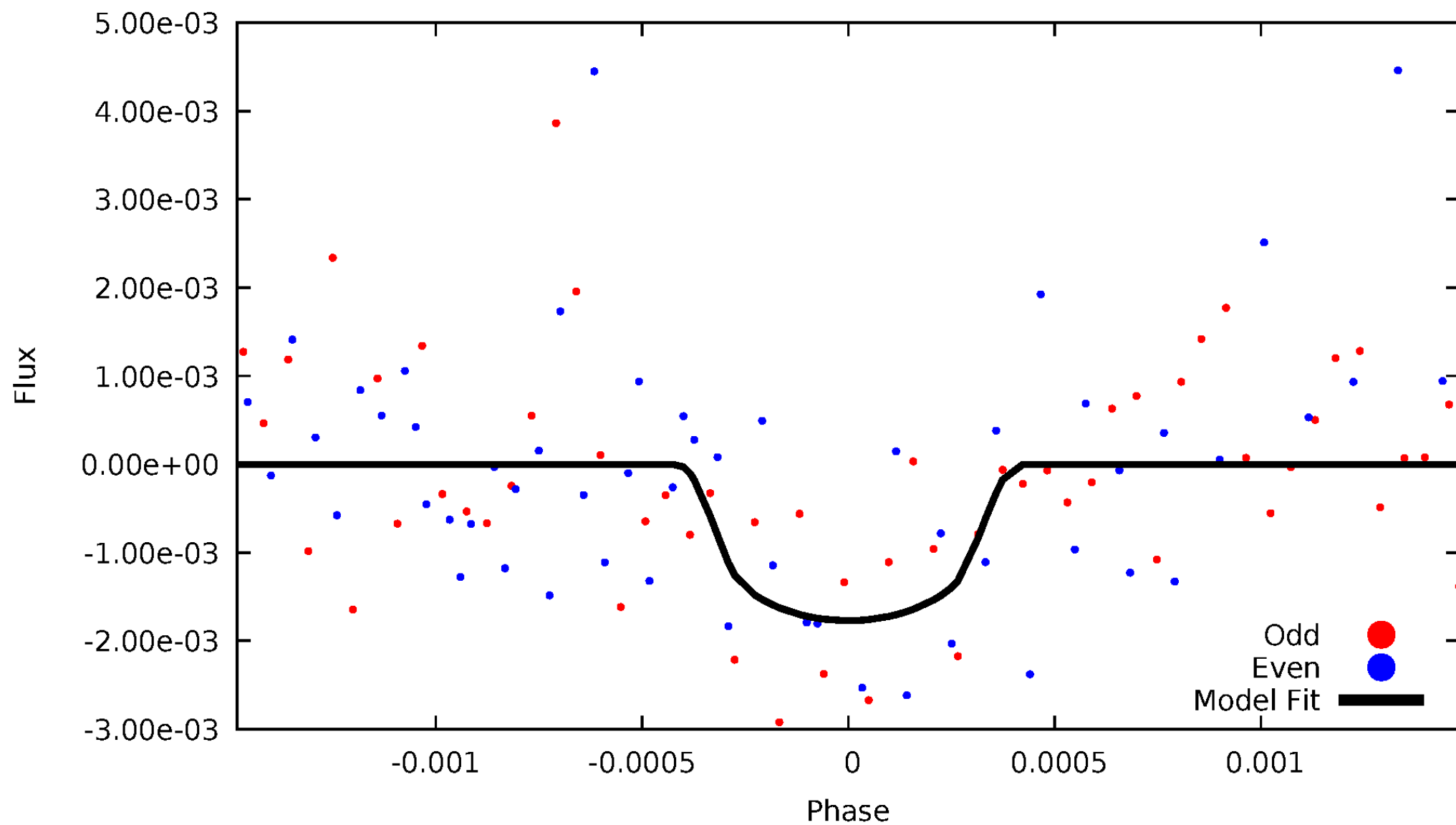


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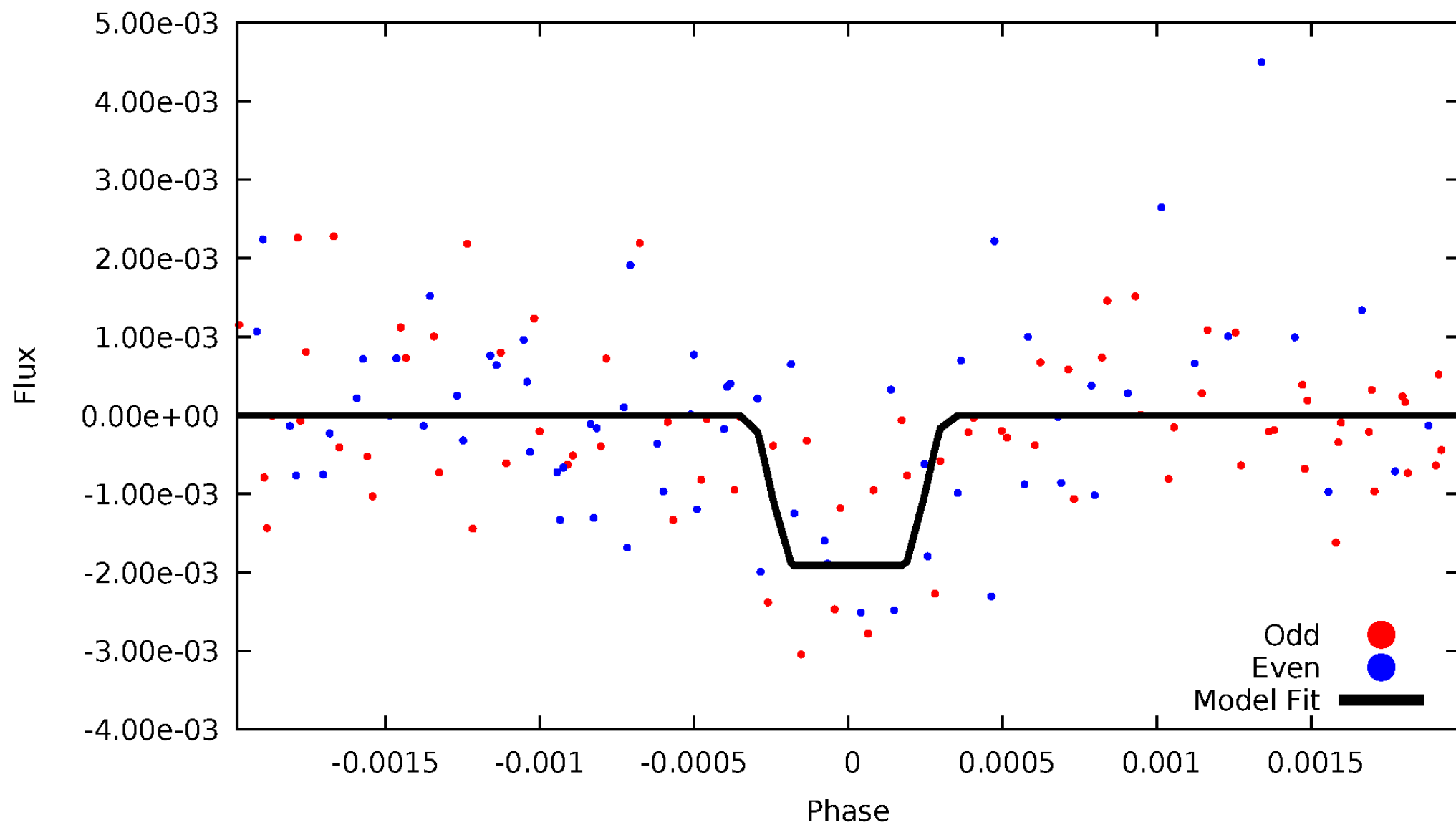
# DV Odd/Even

TCE 003327992-02



# ALT Odd/Even

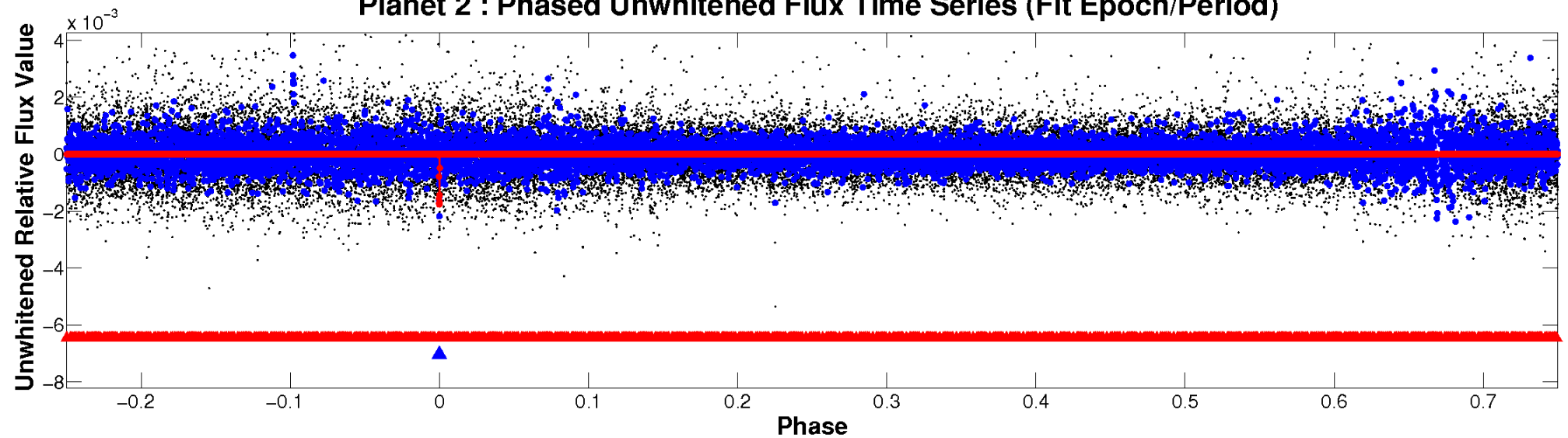
TCE 003327992-02



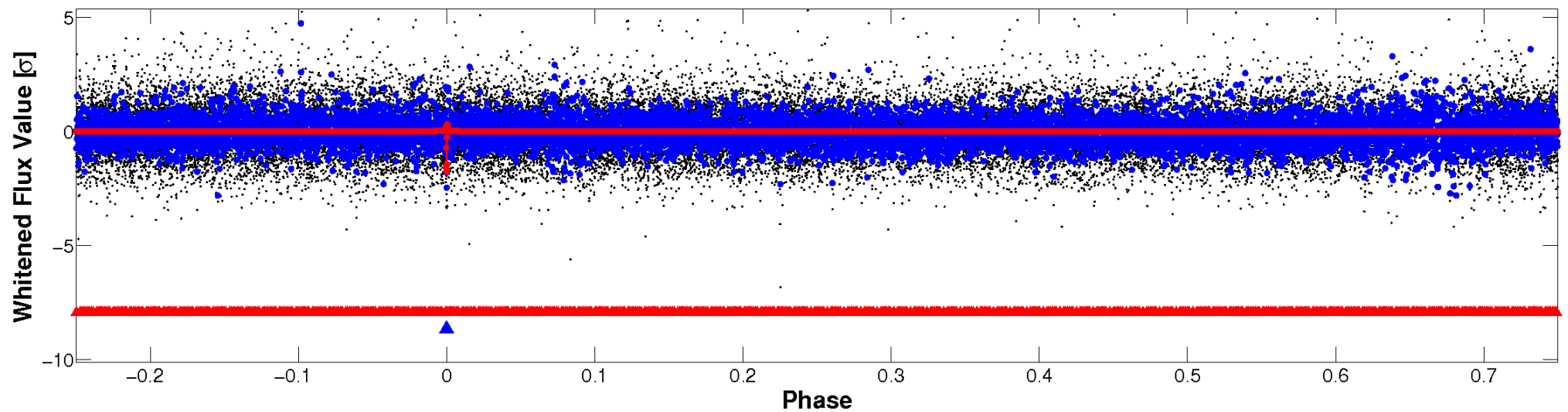


# Non-Whitened Vs. Whitened Light Curve

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



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



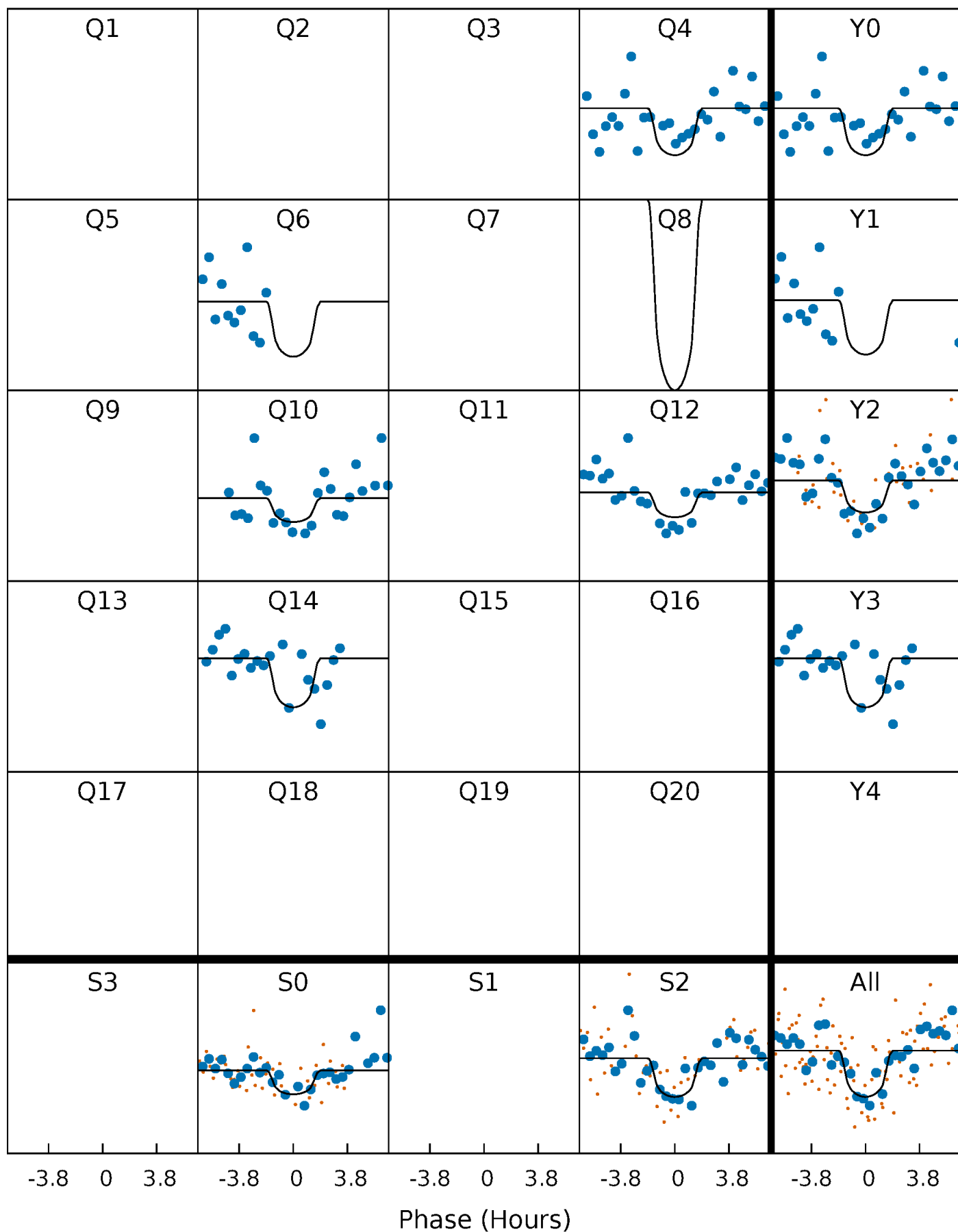
# PDC Quarter-Phased Transit Curves

TCE 003327992-02 P=188.757751 Days  $T_0=223.776611$  (BKJD)



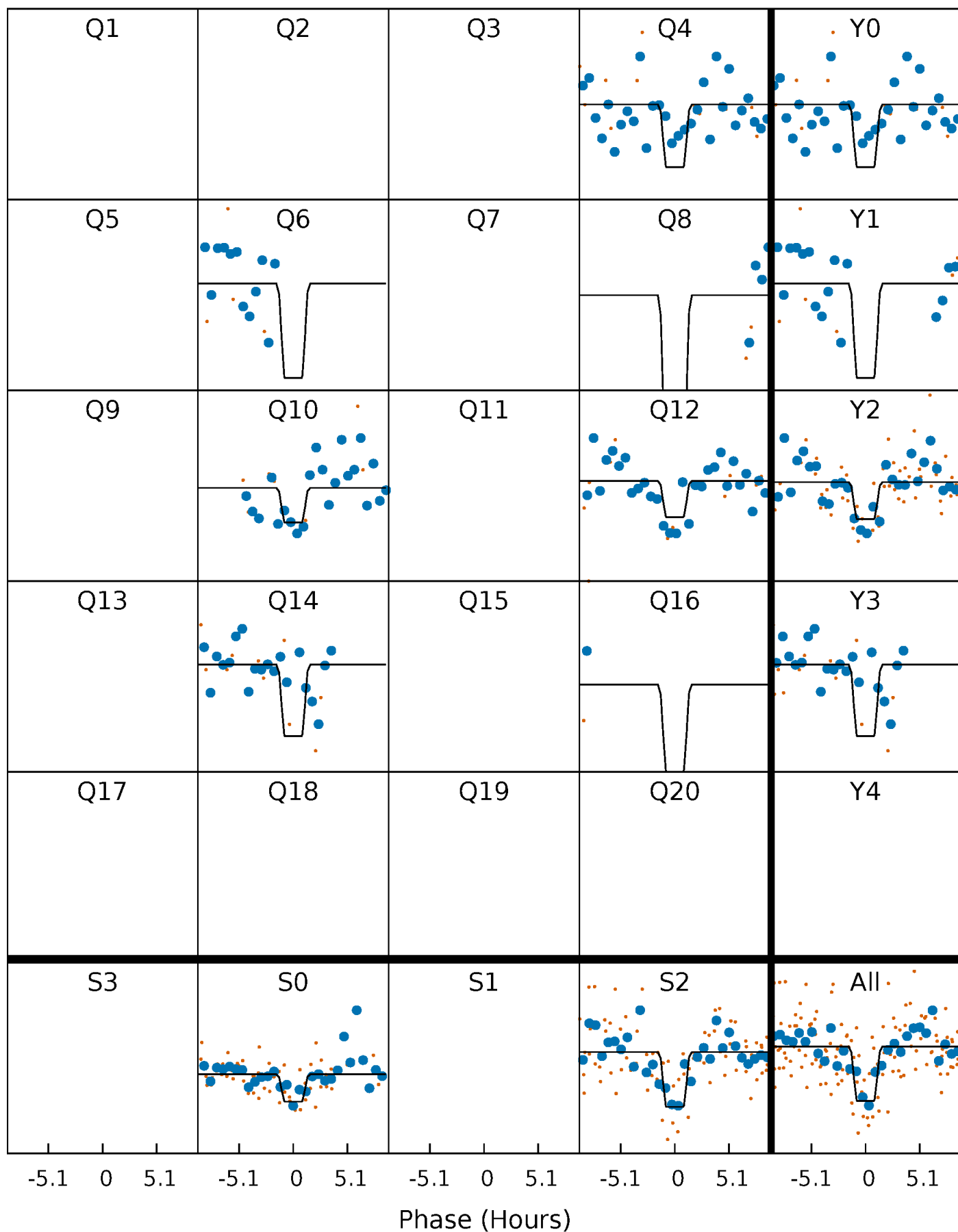
# DV Quarter-Phased Transit Curves

TCE 003327992-02 P=188.757751 Days  $T_0=223.776611$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

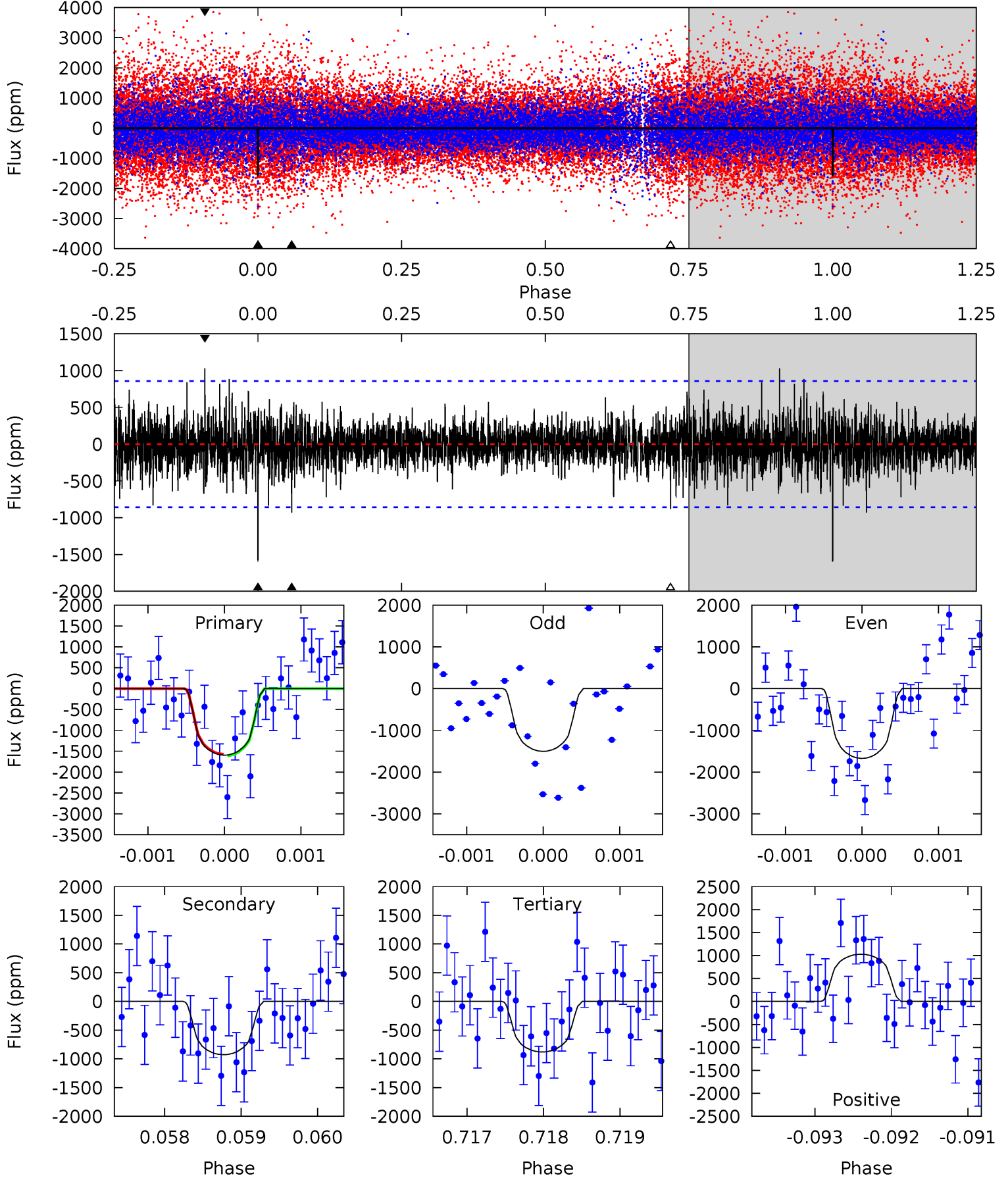
TCE 003327992-02 P=188.756270 Days  $T_0=223.781213$  (BKJD)



# DV Model-Shift Uniqueness Test

003327992-02, P = 188.757751 Days, E = 223.776611 Days

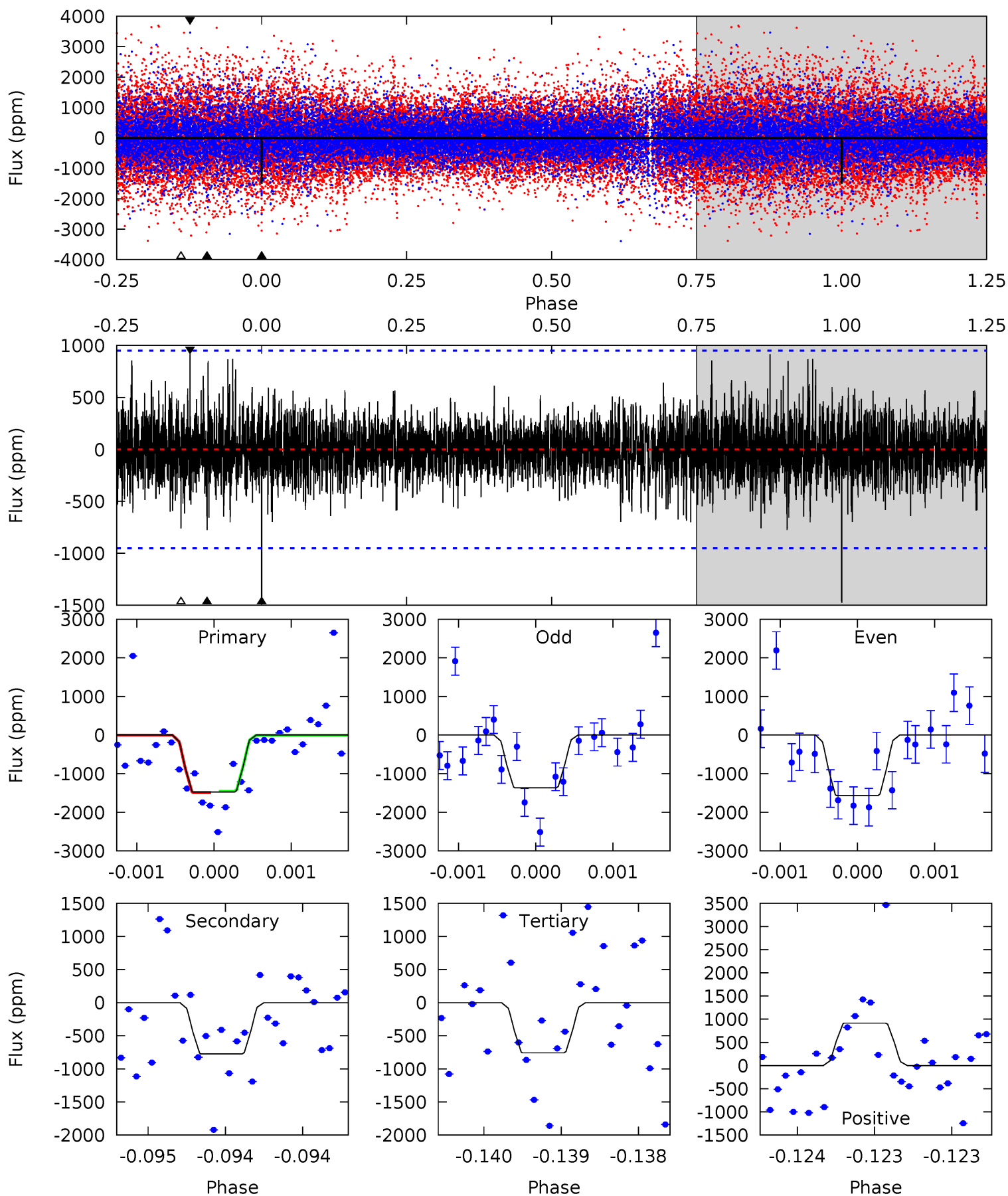
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	5.93	5.63	6.58	5.49	3.35	1.34	4.57	3.62	0.30	-0.65	0.54	0.94	0.39	0.13



# Alt Model-Shift Uniqueness Test

003327992-02, P = 188.756270 Days, E = 223.781213 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	4.50	4.42	5.32	5.53	3.41	1.15	4.16	3.25	0.09	-0.82	0.58	0.94	0.38	0.10





### Stellar Parameters For KIC 003327992

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4188^{+146}_{-161}$	$4.615^{+0.053}_{-0.018}$	$0.180^{+0.200}_{-0.300}$	$0.661^{+0.032}_{-0.059}$	$0.656^{+0.050}_{-0.055}$	$3.202^{+0.745}_{-0.231}$
	+3%/-4%	+1%/-0%	+111%/-167%	+5%/-9%	+8%/-8%	+23%/-7%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003327992-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	-927±156	$4.51^{+4.00}_{-2.92}$	$278^{+11}_{-11}$	$3289^{+1420}_{-544}$	$8074^{+59453}_{-5828}$
Alt.	-774±172	$4.41^{+3.77}_{-2.83}$	$279^{+10}_{-12}$	$3223^{+1211}_{-539}$	$6947^{+41992}_{-5057}$

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

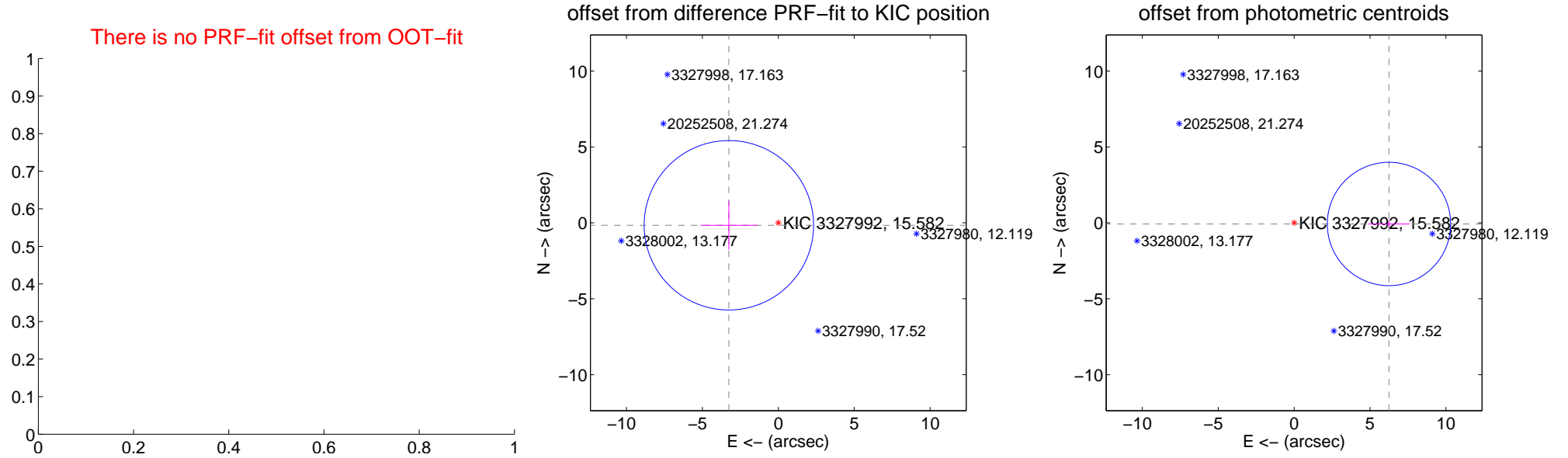
## DV Centroid Data

Supplemental centroid analysis for 003327992-02. Kepler magnitude: 15.58. Transit SNR 7.44

There are 0 quarters with good PRF difference image offsets

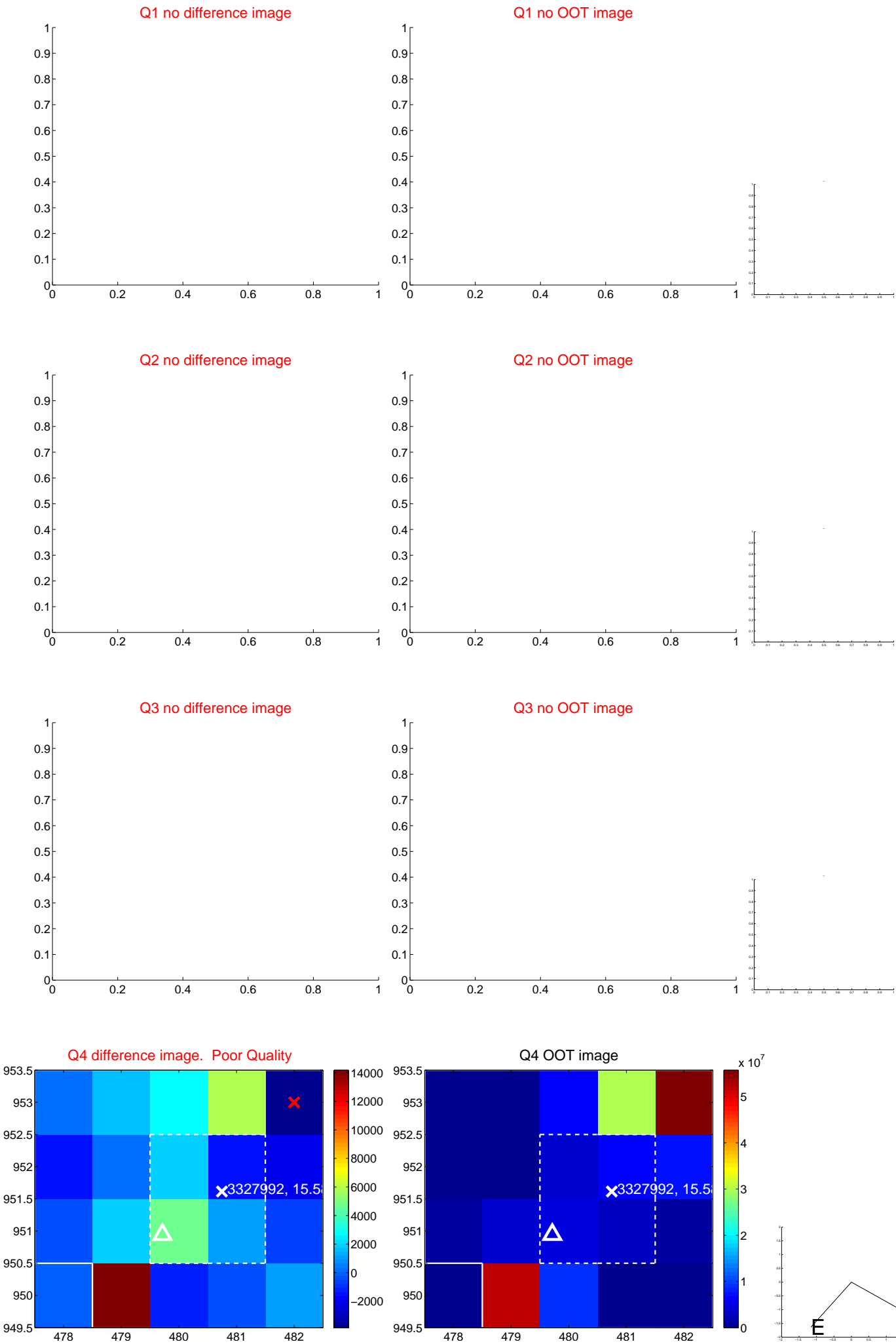
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	$3.263 \pm 1.860$	1.75	$3.259 \pm 1.861$	$-0.158 \pm 1.616$
photometric centroid source offset	$6.25 \pm 1.35$	4.61	$-6.25 \pm 1.35$	$-0.07 \pm 0.27$

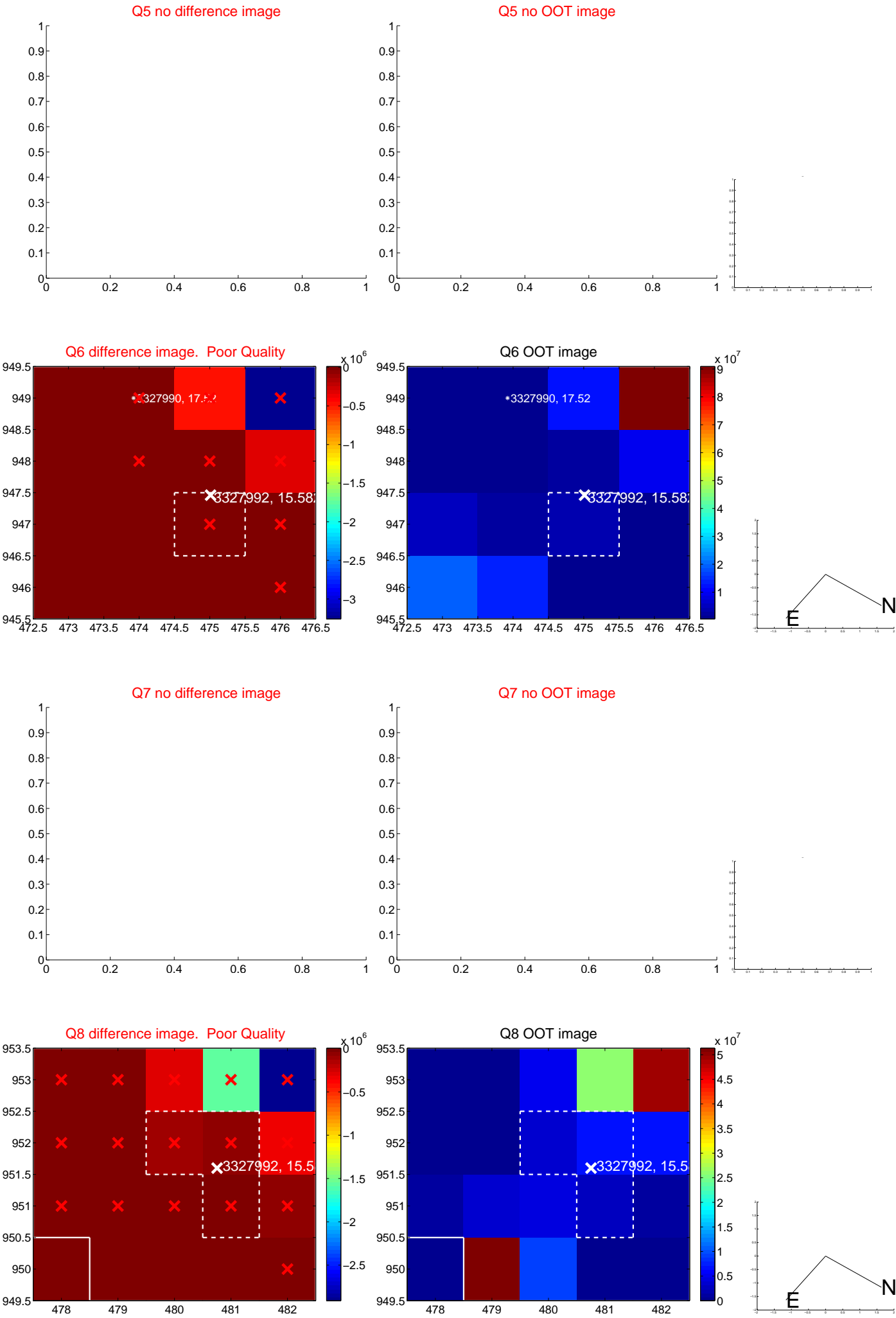


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

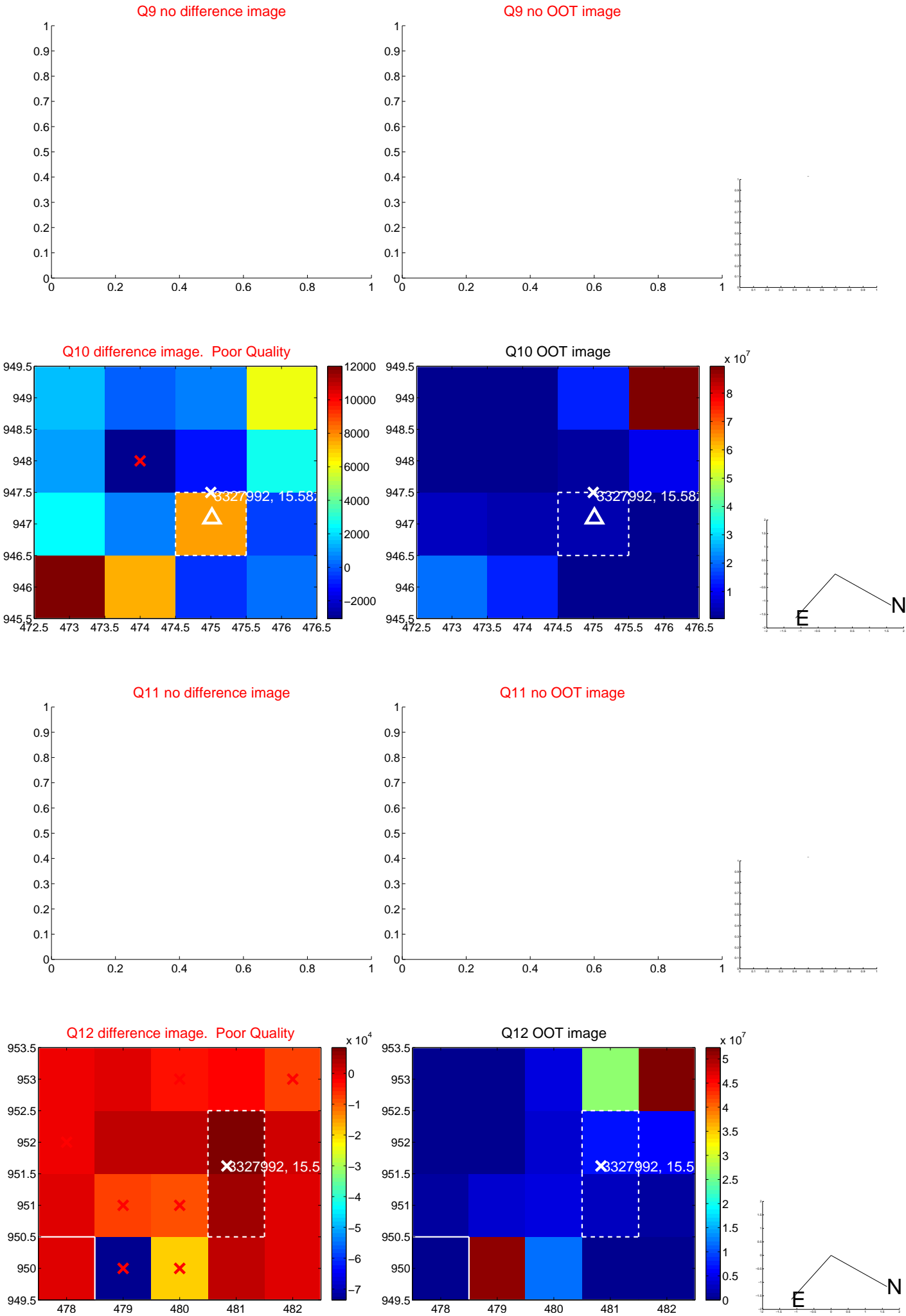
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

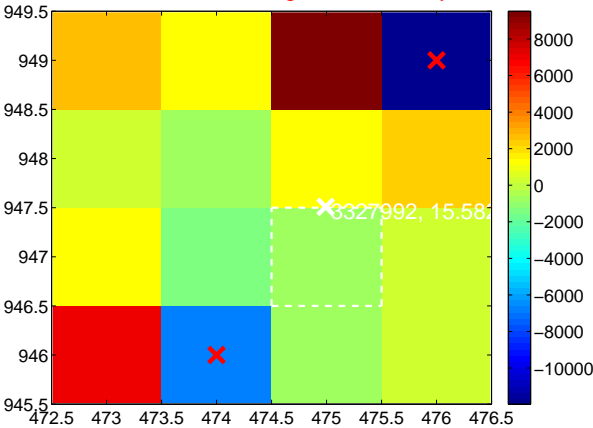
Q13 no difference image



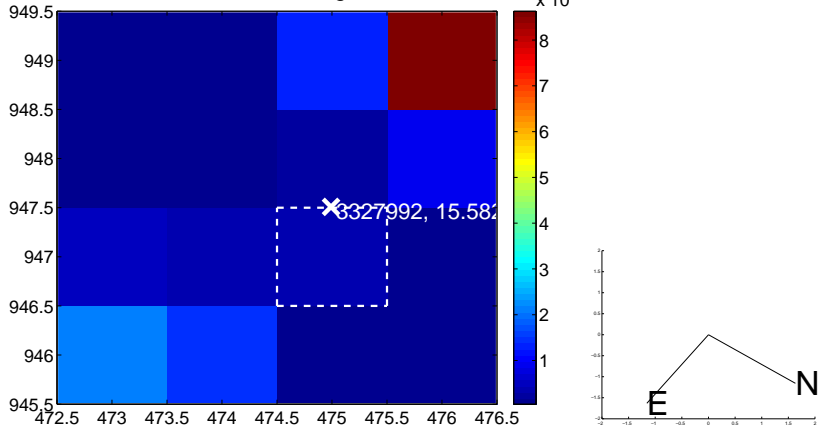
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



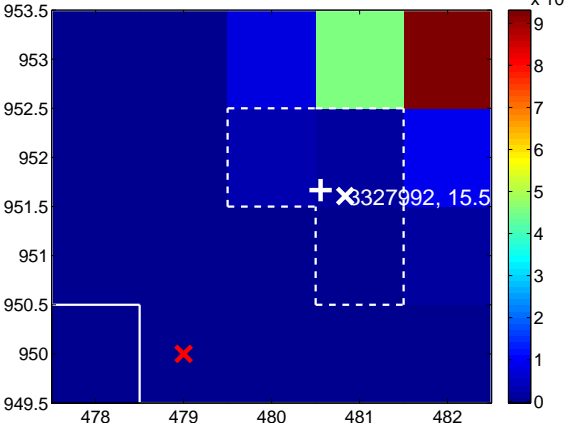
Q15 no difference image



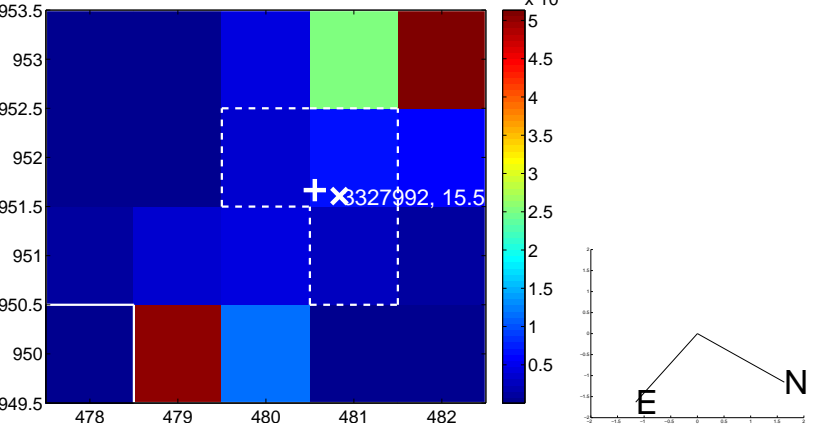
Q15 no OOT image



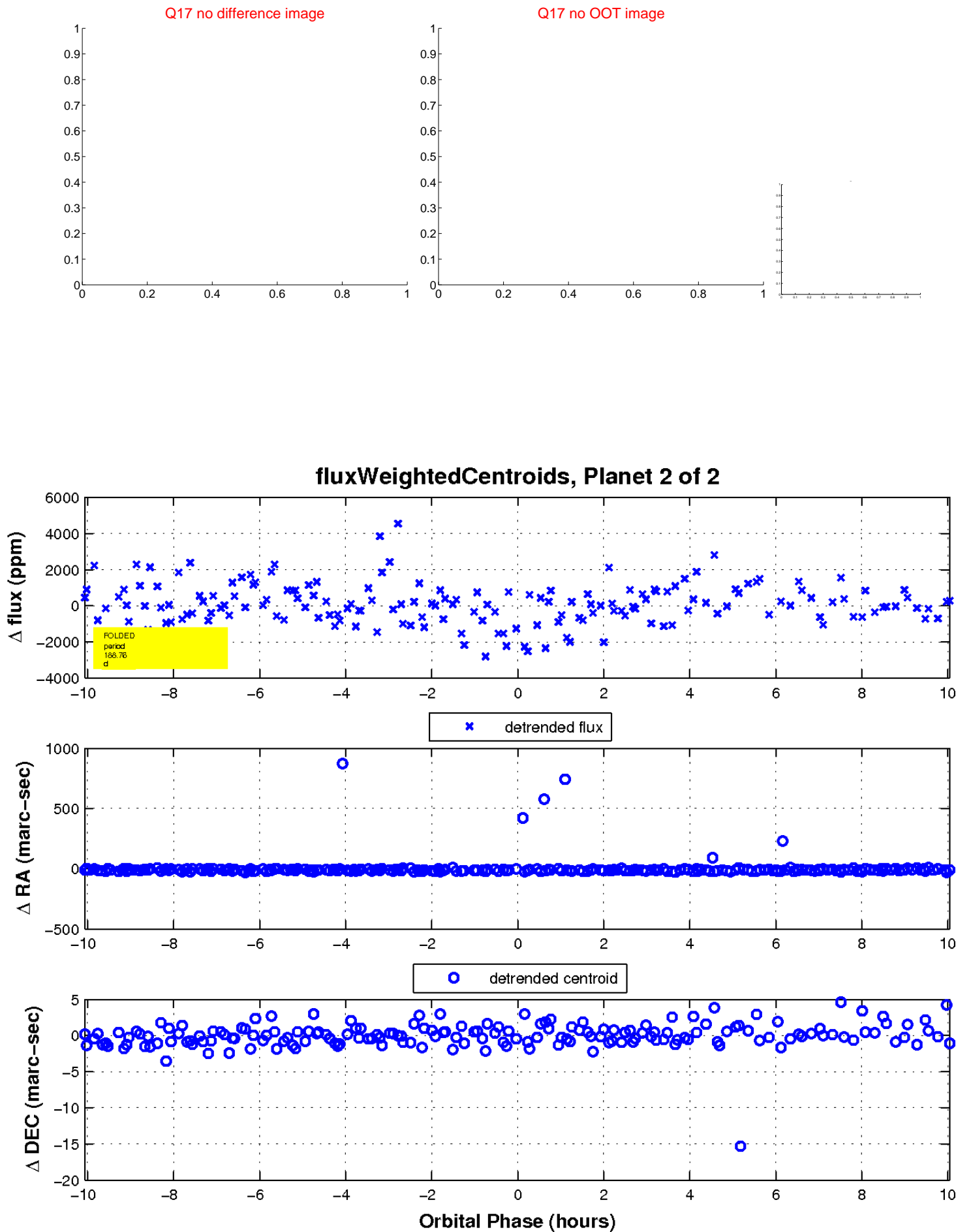
Q16 difference image. Poor Quality



Q16 OOT image



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



UKIRT Image

Declination

