

# KIC 010922093

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010922093-01	OBS	No	1.991924	131.588023	17.5	5.704	8.5	8.6	1.79	7006	0.95	5569.65
010922093-02	OBS	No	320.796885	234.455730	131.4	16.660	11.5	4.8	1.79	7006	2.36	6.36

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010922093-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
010922093-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

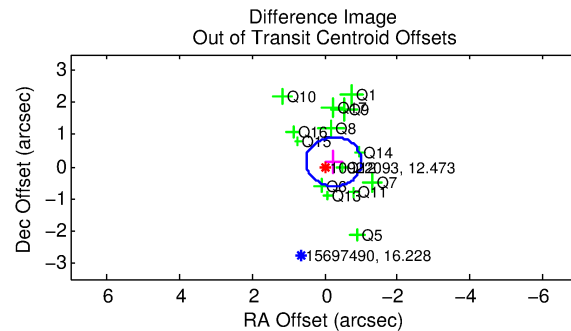
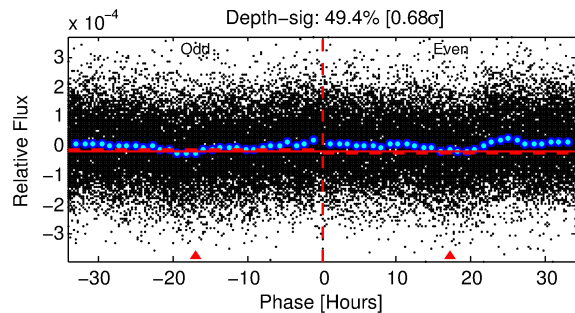
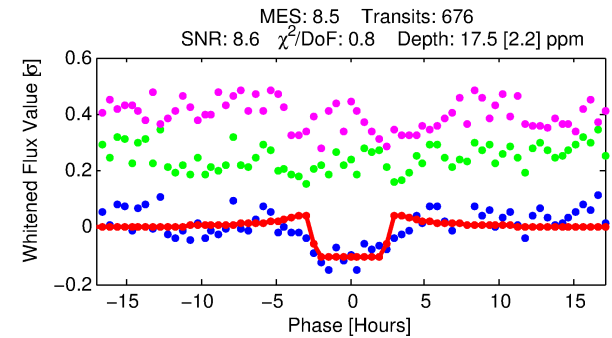
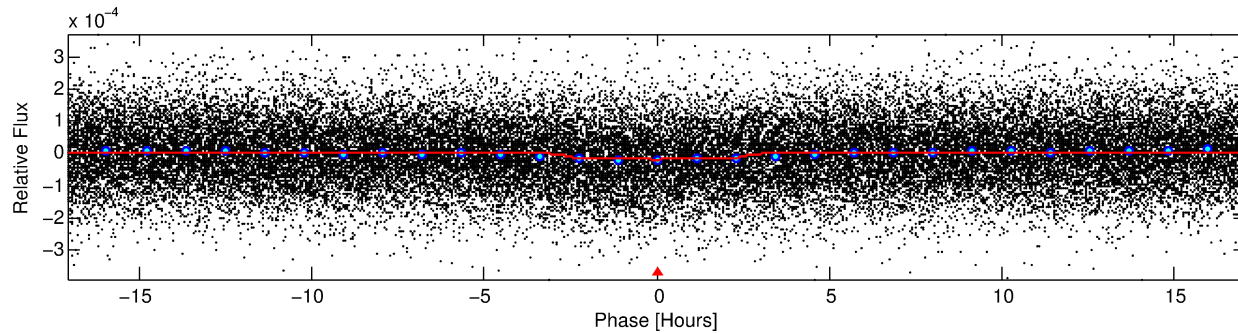
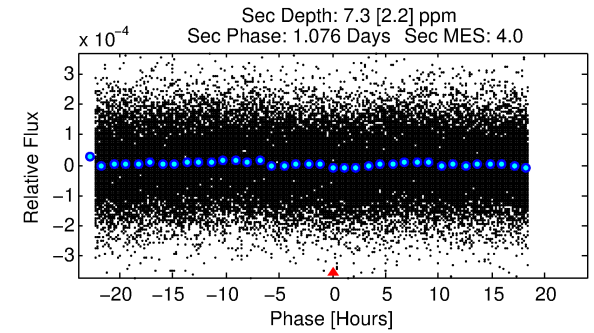
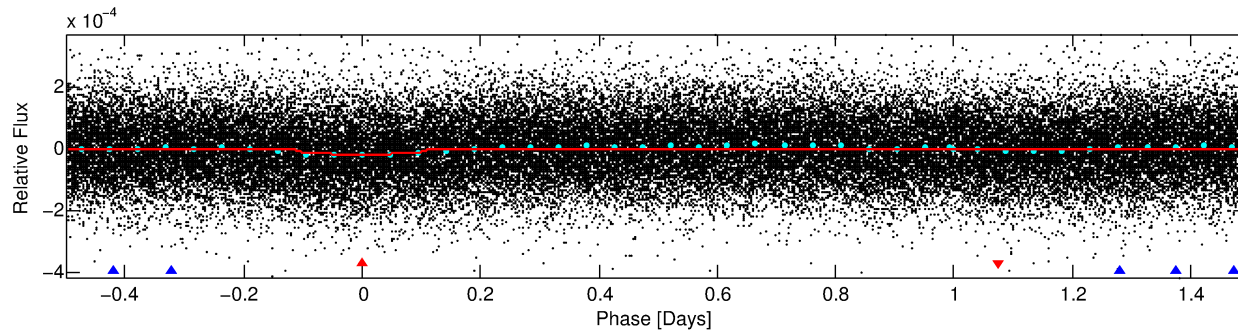
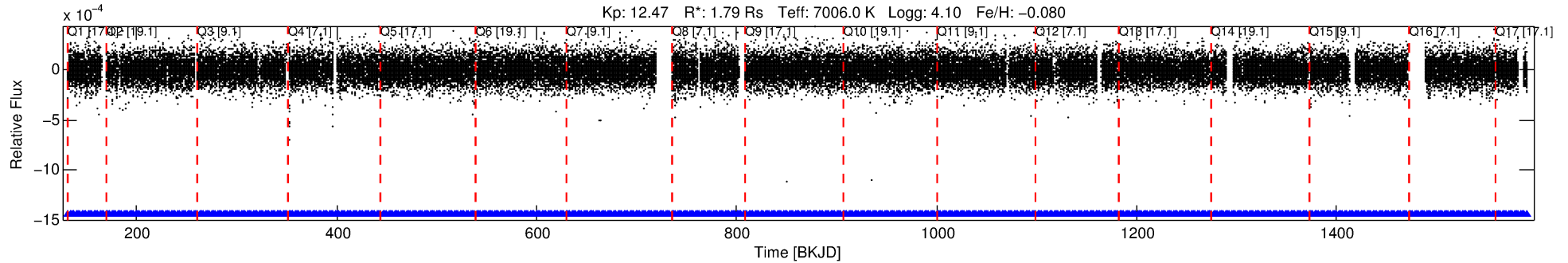
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010922093-01

No Significant Match Found

# DV One-Page Summary

KIC: 10922093 Candidate: 1 of 2 Period: 1.992 d



## DV Fit Results:

Period = 1.99192 [0.00002] d  
Epoch = 131.5880 [0.0048] BKJD  
Rp/R\* = 0.0049 [0.0006]  
a/R\* = 1.20 [0.23]  
b = 0.97 [0.04]  
Seff = 5569.65 [1746.73]  
Teq = 2203 [173] K  
Rp = 0.95 [0.24] Re  
a = 0.0352 [0.0066] AU  
Ag = 5.52 [2.59] [1.74σ]  
Teffp = 5221 [529] K [5.42σ]

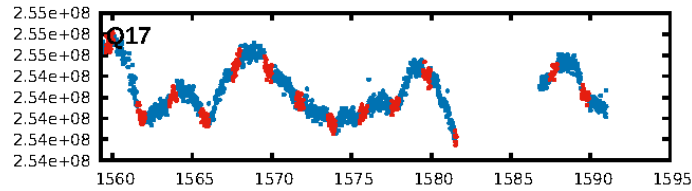
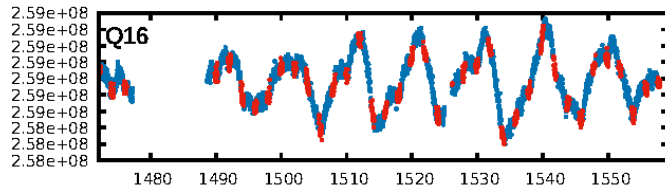
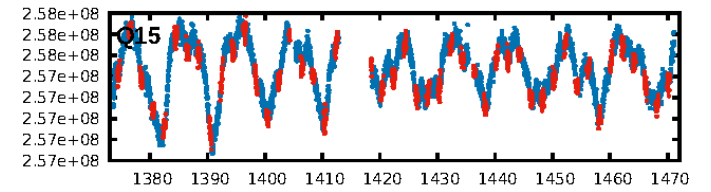
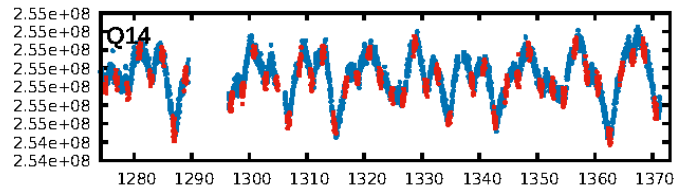
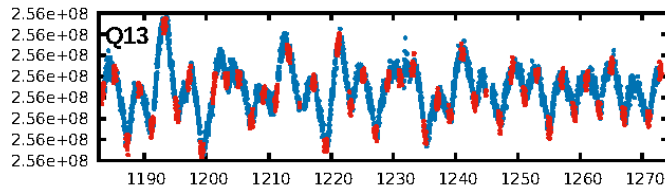
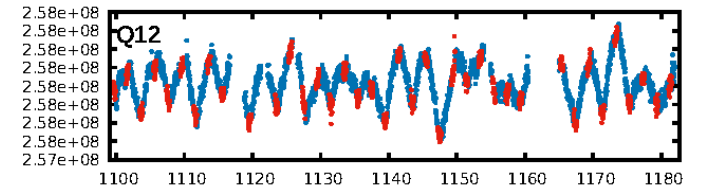
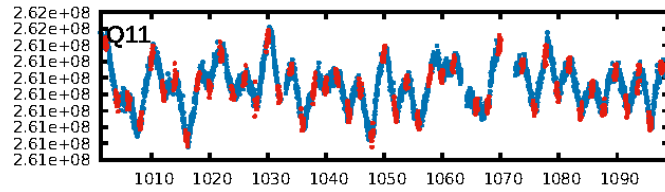
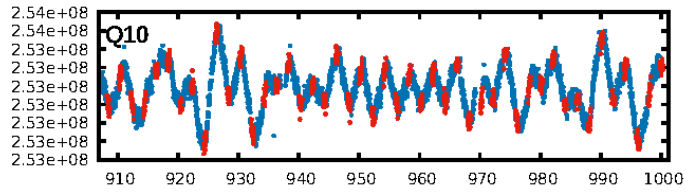
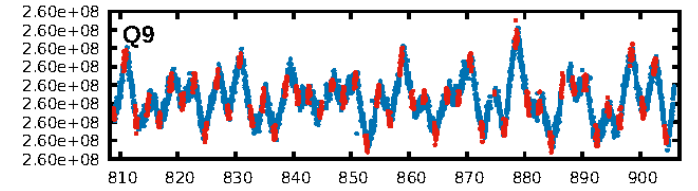
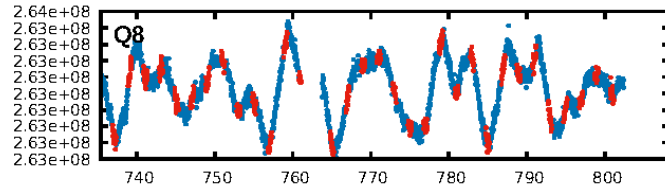
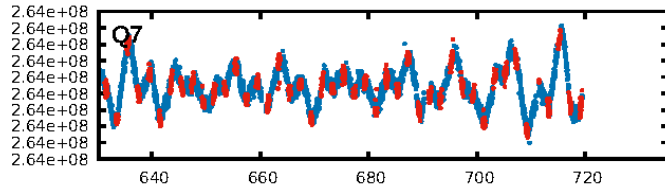
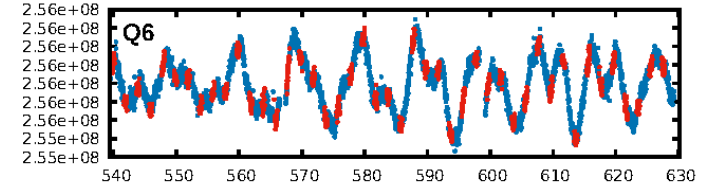
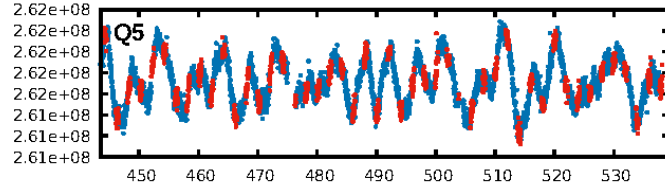
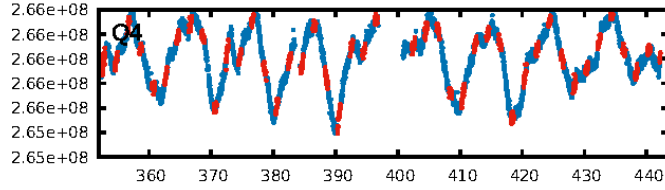
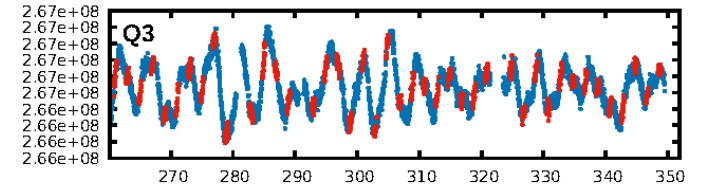
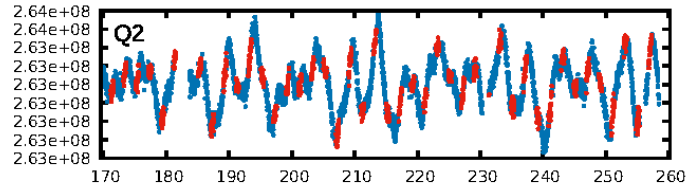
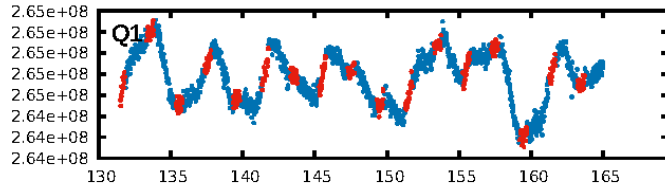
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [434.50σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.76e-14  
RollingBand-fgt: 1.00 [645/645]  
GhostDiagnostic-chr: 1.015  
Centroid-sig: 2.1%  
Centroid-so: 1.655 arcsec [2.30σ]  
OotOffset-rm: 0.294 arcsec [1.16σ]  
KicOffset-rm: 0.268 arcsec [1.03σ]  
OotOffset-st: 3/3/3/5 [14]  
KicOffset-st: 3/3/3/5 [14]  
DiffImageQuality-fgm: 0.93 [13/14]  
DiffImageOverlap-fno: 1.00 [17/17]

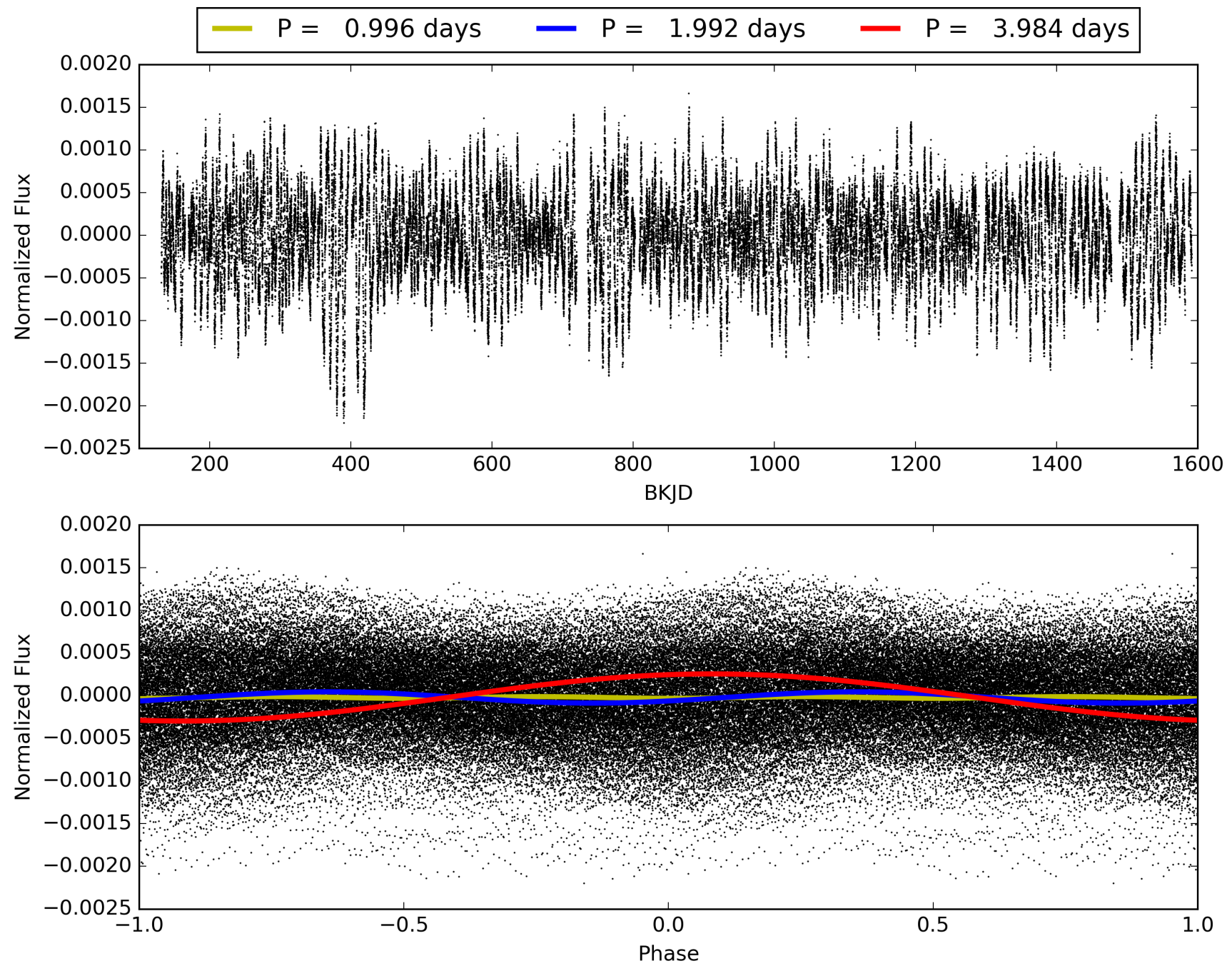
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010922093-01, PDC Light Curves

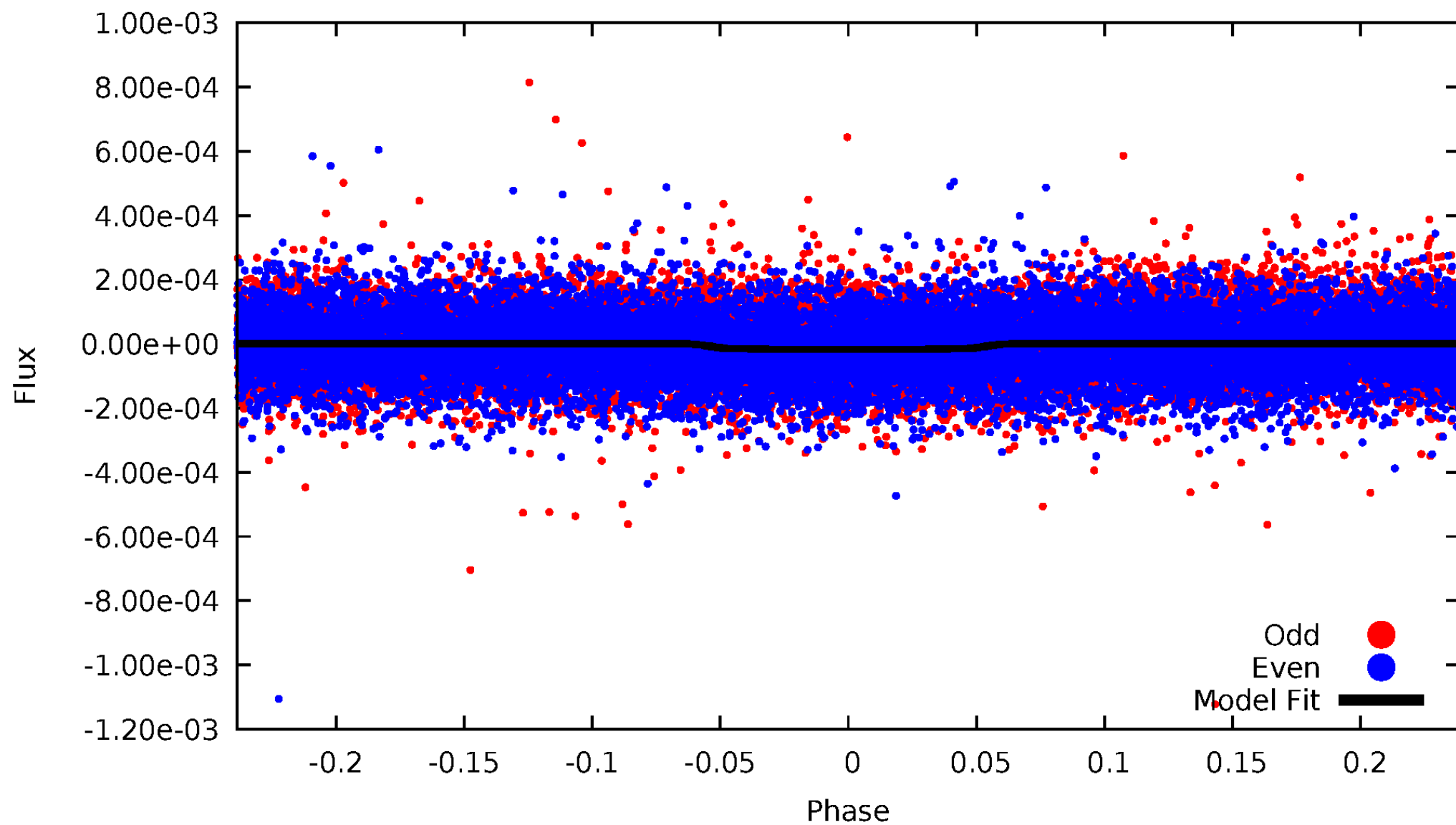


# TCE 010922093-01



# DV Odd/Even

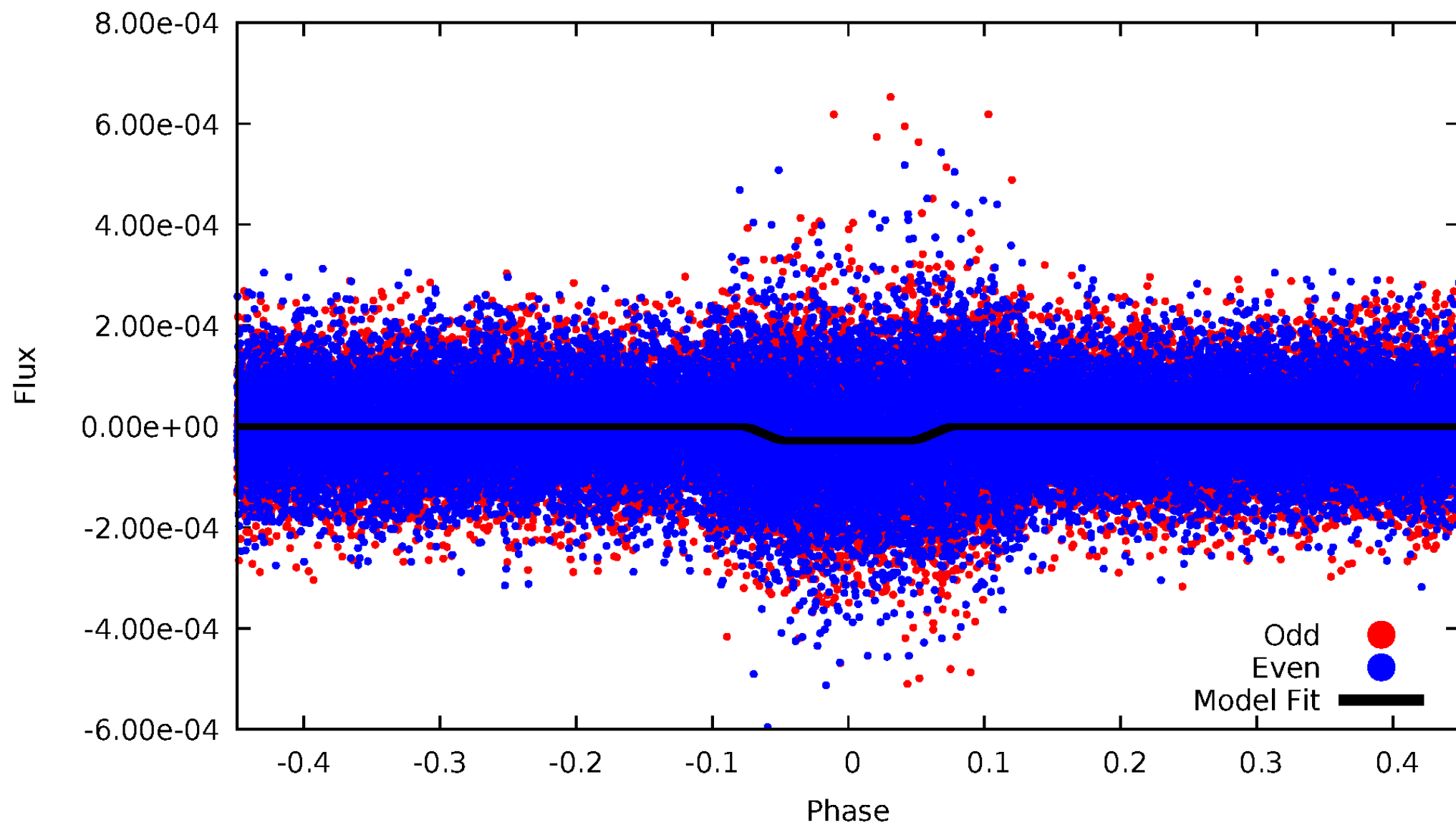
TCE 010922093-01



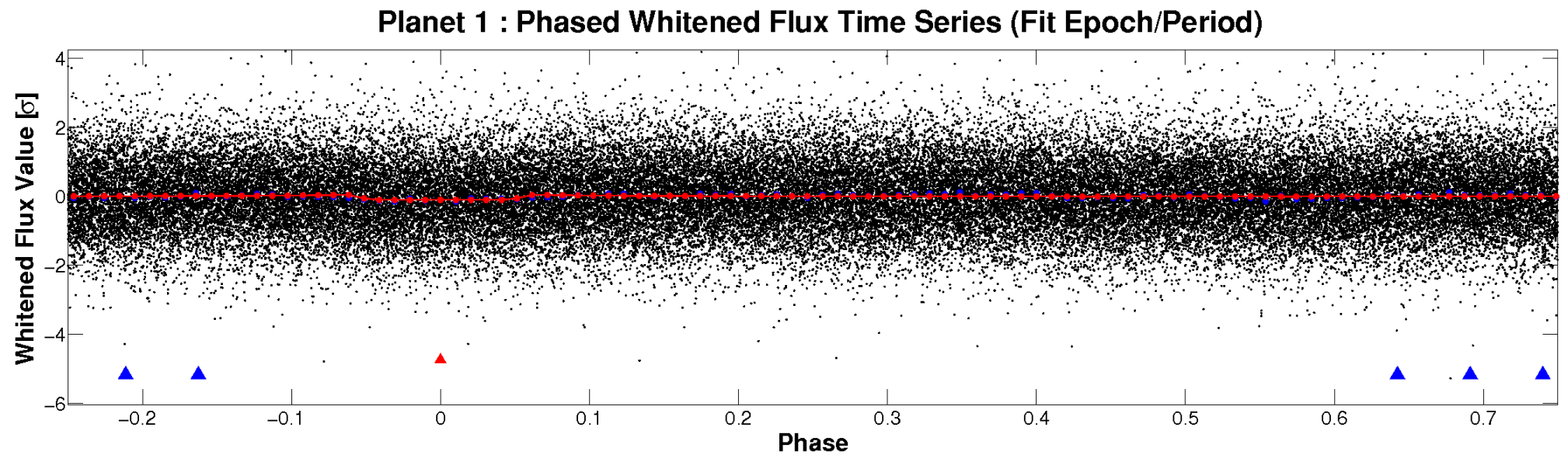
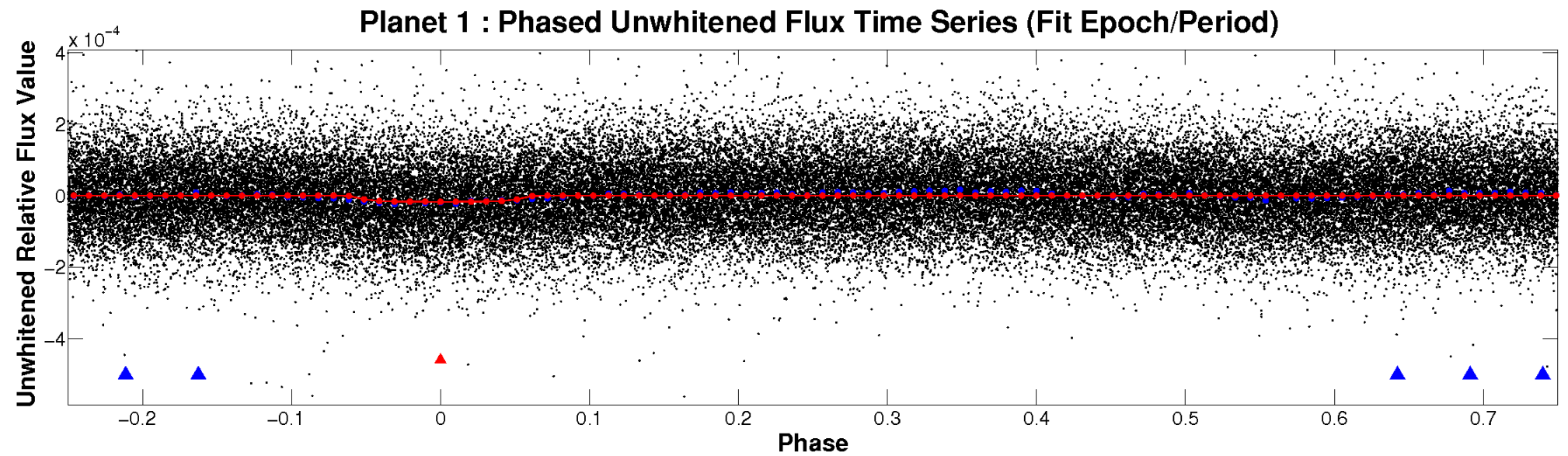


# ALT Odd/Even

TCE 010922093-01

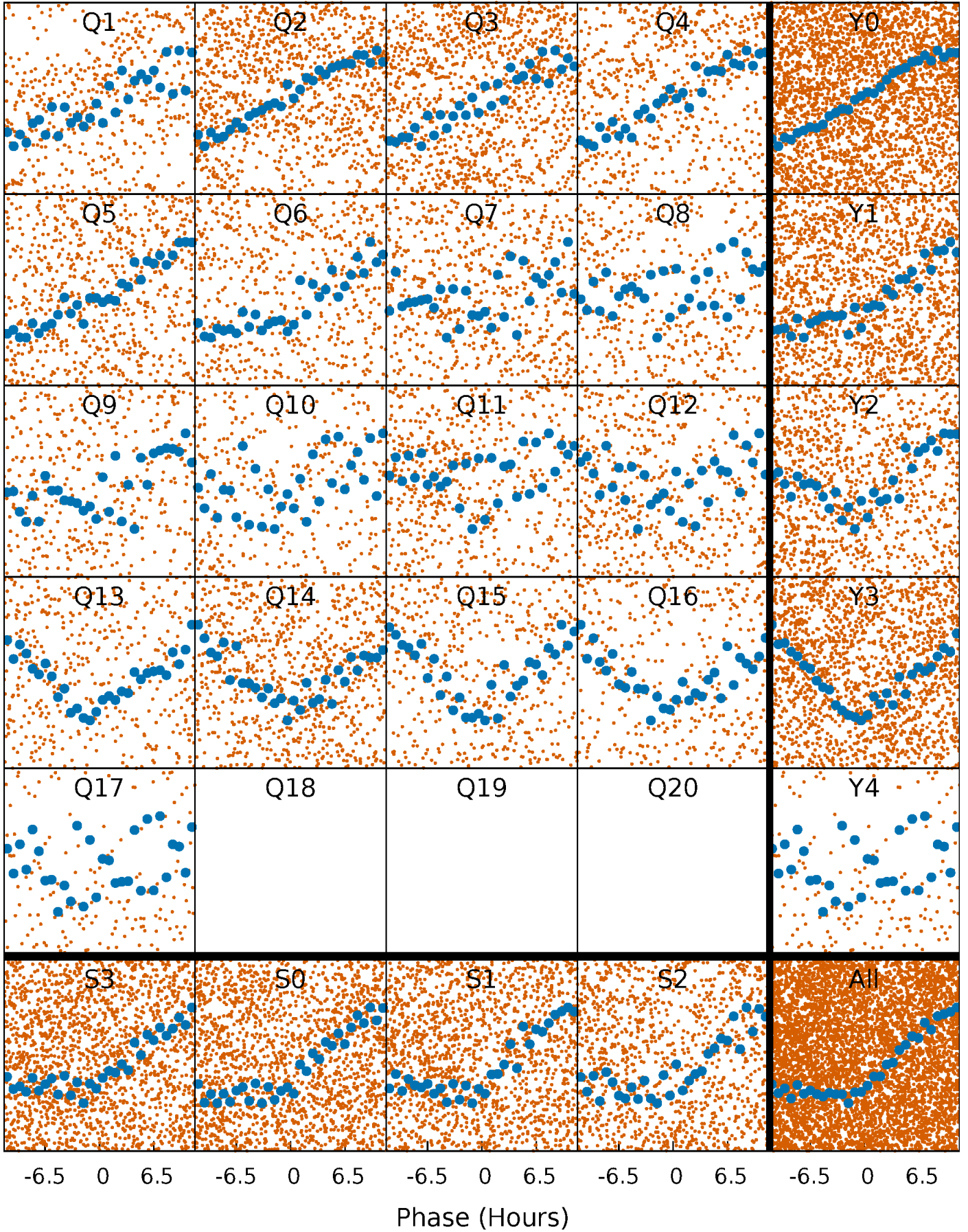


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

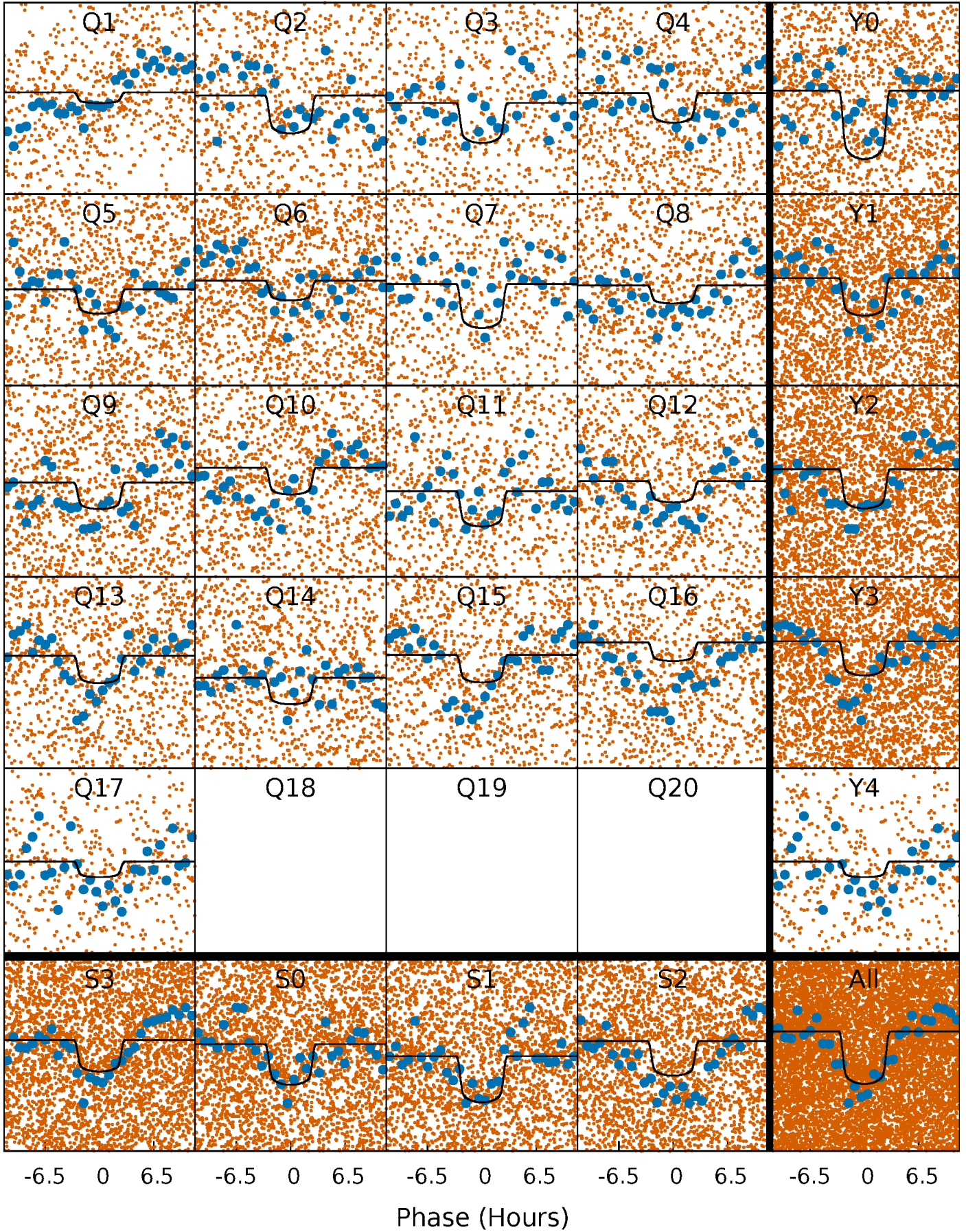
TCE 010922093-01 P= 1.991924 Days  $T_0=131.588023$  (BKJD)





# DV Quarter-Phased Transit Curves

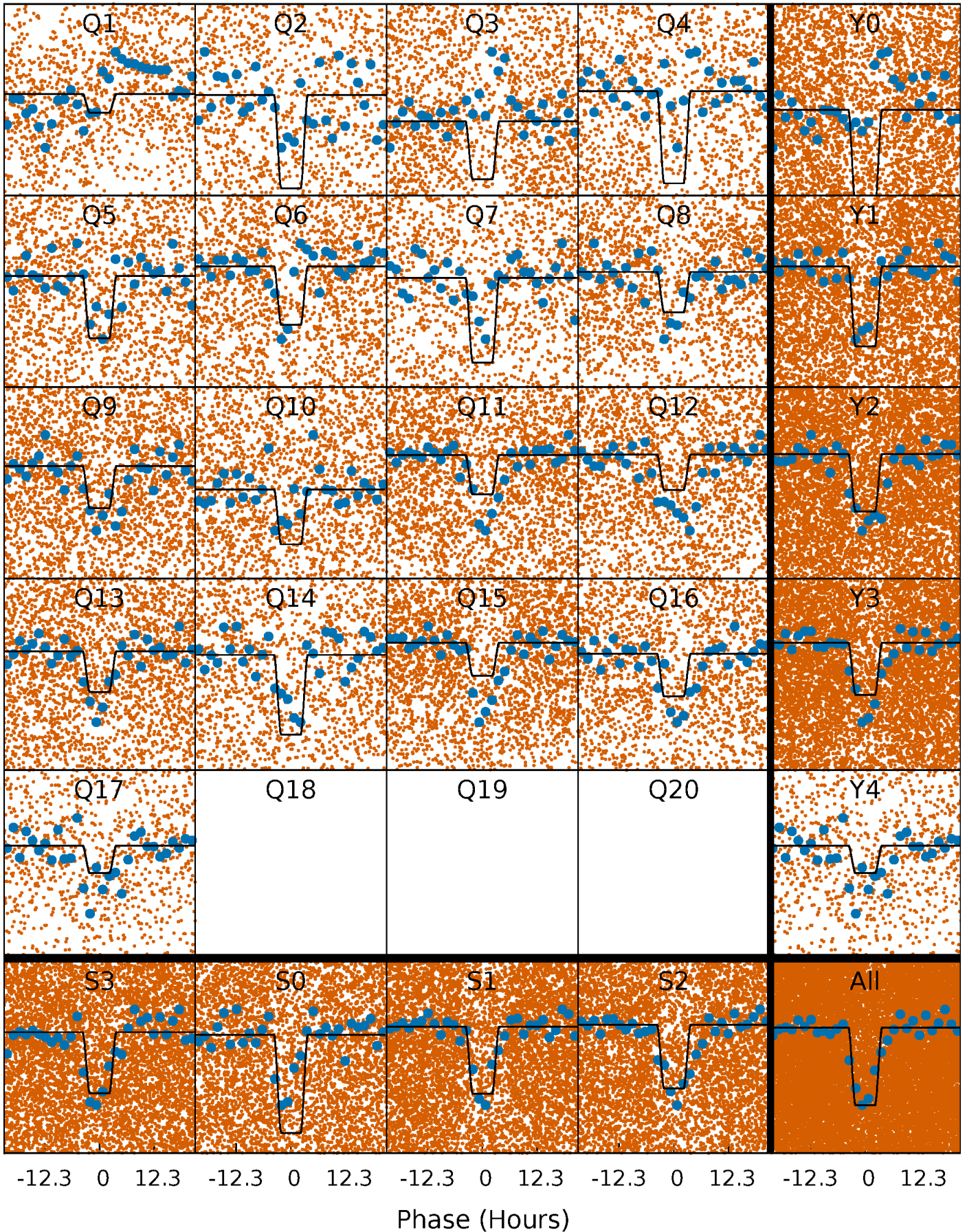
TCE 010922093-01 P= 1.991924 Days  $T_0=131.588023$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

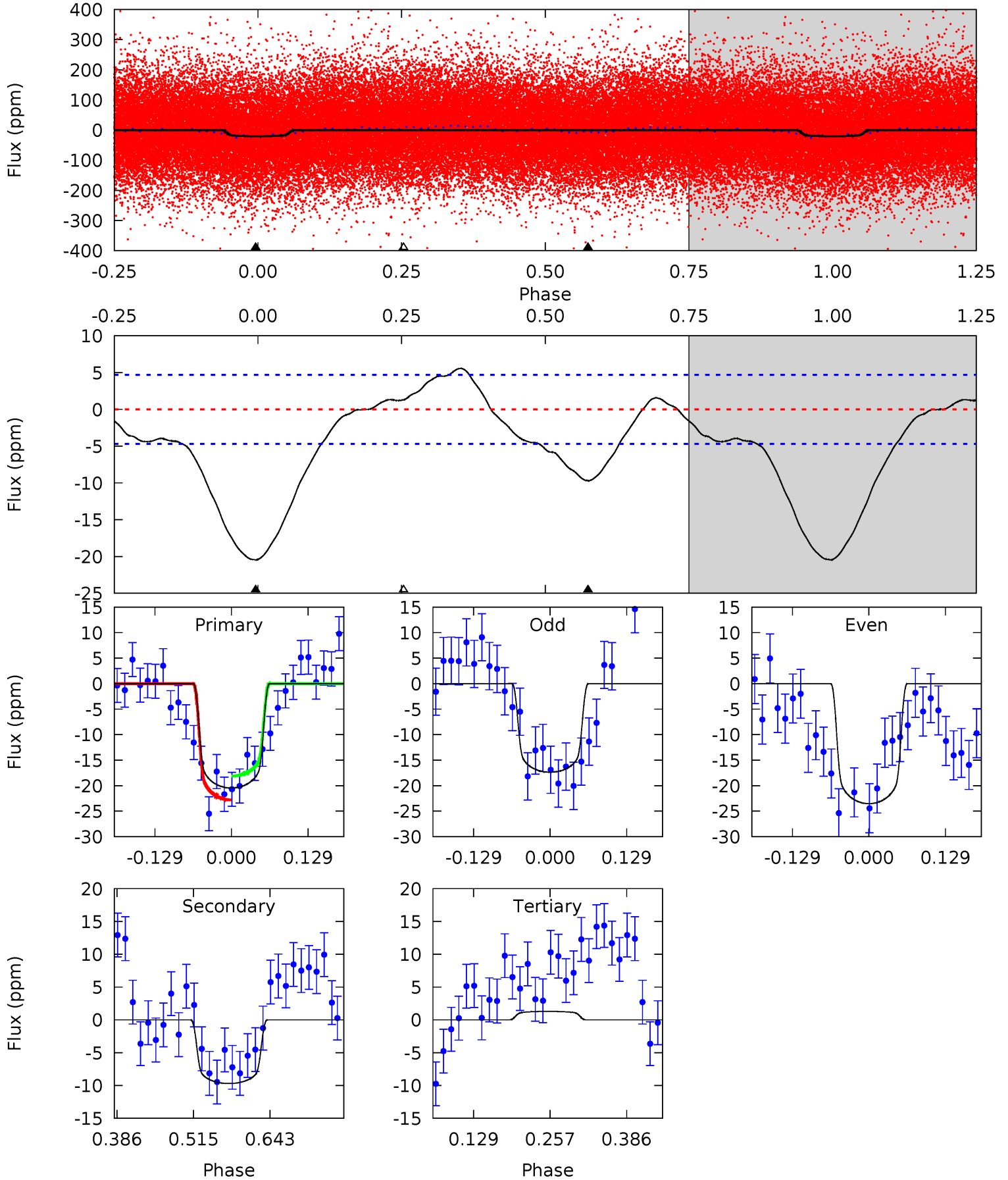
TCE 010922093-01 P= 1.991697 Days  $T_0=131.650555$  (BKJD)



# DV Model-Shift Uniqueness Test

010922093-01, P = 1.991924 Days, E = 129.596099 Days

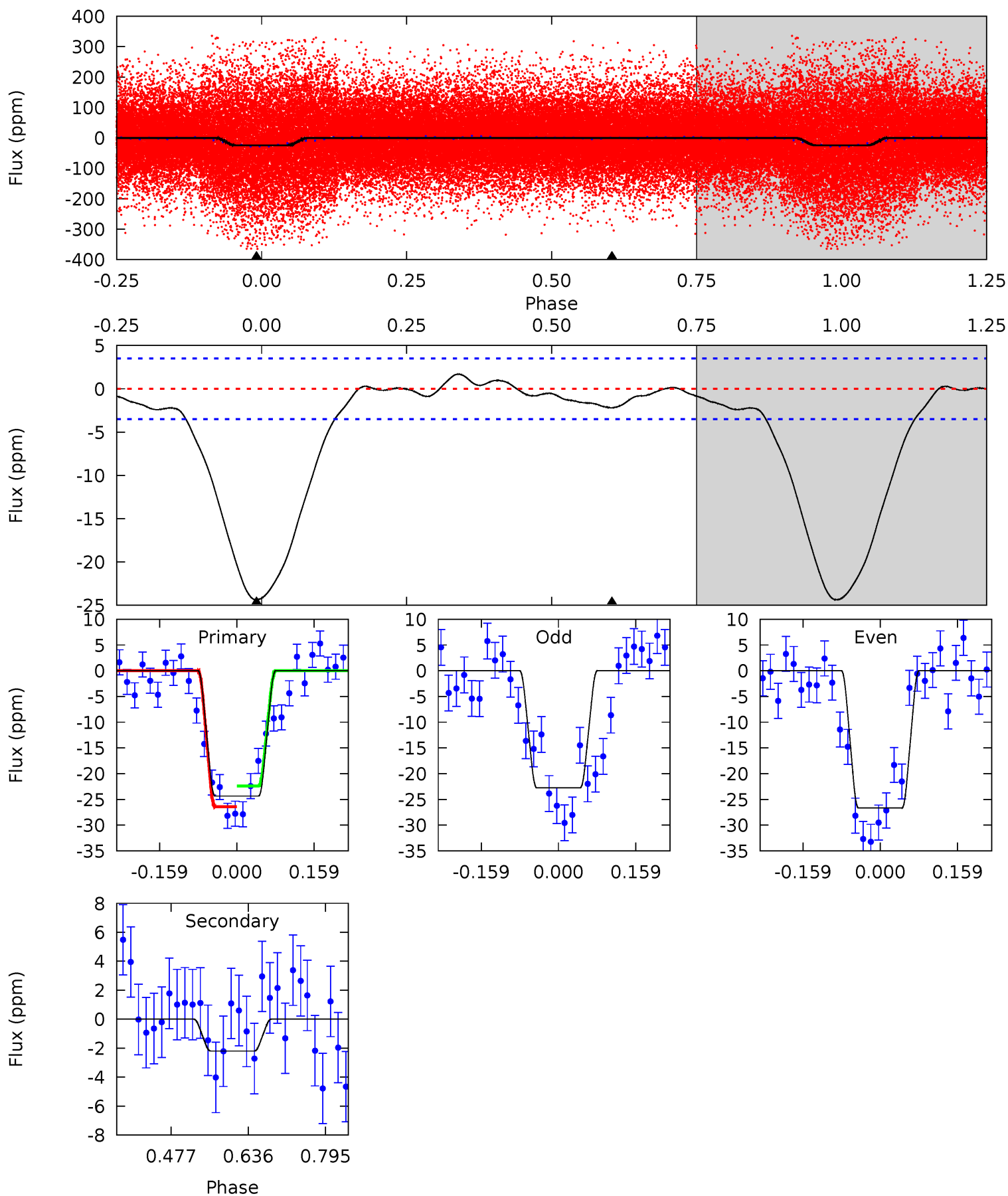
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.6	9.31	-1.24	0	4.51	1.52	2.86	20.9	19.6	10.6	9.31	2.95	1.10	0.21	2.25



# Alt Model-Shift Uniqueness Test

010922093-01, P = 1.991697 Days, E = 129.658858 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
31.1	2.81	0	0	4.47	1.41	1.36	31.1	31.1	2.81	2.81	2.52	0.98	0.07	2.57





### Stellar Parameters For KIC 010922093

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7006^{+169}_{-253}$	$4.099^{+0.154}_{-0.140}$	$-0.080^{+0.250}_{-0.350}$	$1.787^{+0.394}_{-0.394}$	$1.466^{+0.164}_{-0.226}$	$0.361^{+0.293}_{-0.139}$
	+2%/-4%	+4%/-3%	+312%/-438%	+22%/-22%	+11%/-15%	+81%/-38%
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 010922093-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-10 \pm 1$	$0.95^{+0.17}_{-0.17}$	$3071^{+192}_{-199}$	$5483^{+437}_{-312}$	$7.135^{+3.500}_{-1.980}$
Alt.	$-2 \pm 1$	$1.03^{+0.17}_{-0.16}$	$3076^{+177}_{-200}$	$3826^{+355}_{-410}$	$1.397^{+0.776}_{-0.573}$

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

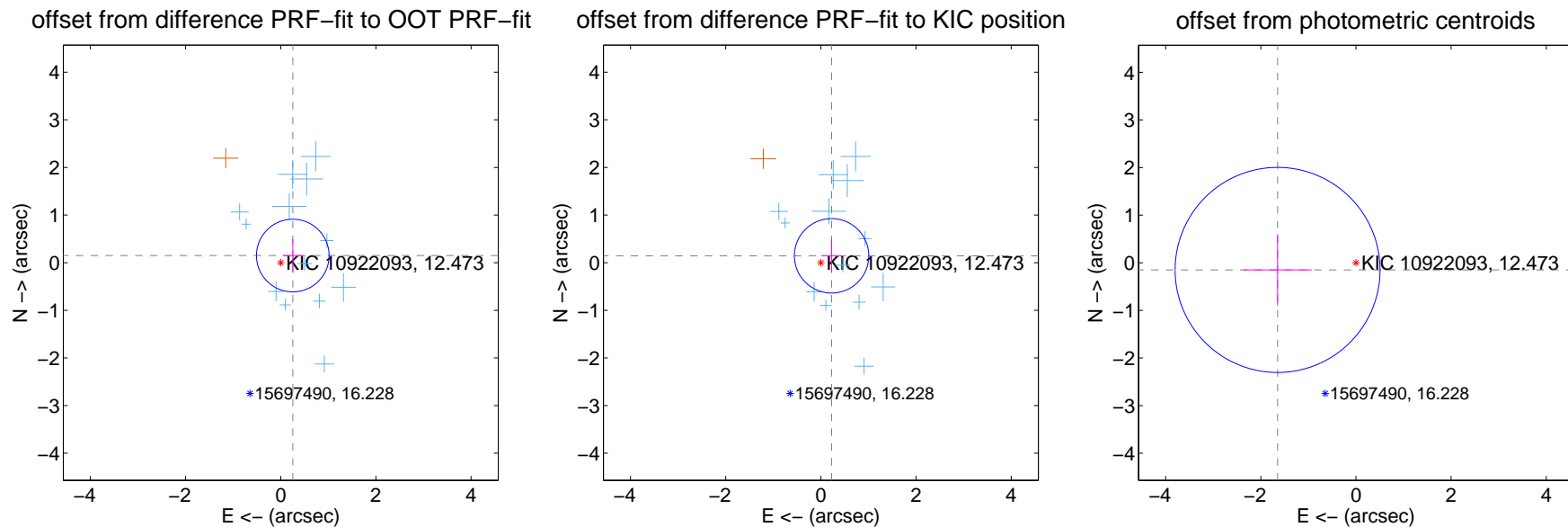
## DV Centroid Data

Supplemental centroid analysis for 010922093-01. Kepler magnitude: 12.47. Transit SNR 8.56

There are 13 quarters with good PRF difference image offsets

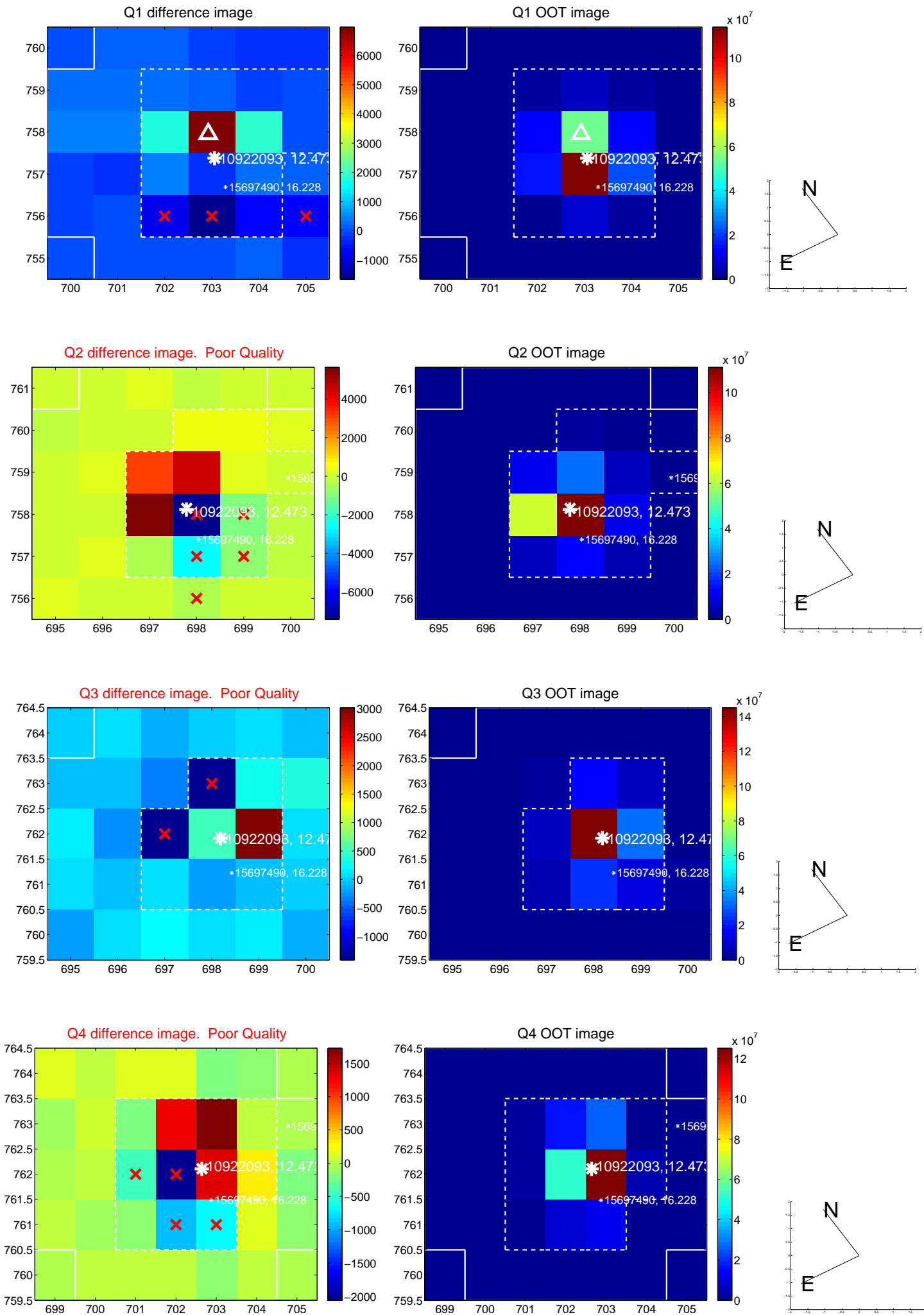
The direct PRF centroid is offset from the target star catalog position by about 0.01 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.294 \pm 0.254$	1.16	$-0.253 \pm 0.212$	$0.150 \pm 0.348$
PRF-fit source offset from KIC position	$0.268 \pm 0.261$	1.03	$-0.225 \pm 0.213$	$0.144 \pm 0.350$
photometric centroid source offset	$1.65 \pm 0.72$	2.30	$1.65 \pm 0.72$	$-0.15 \pm 0.75$

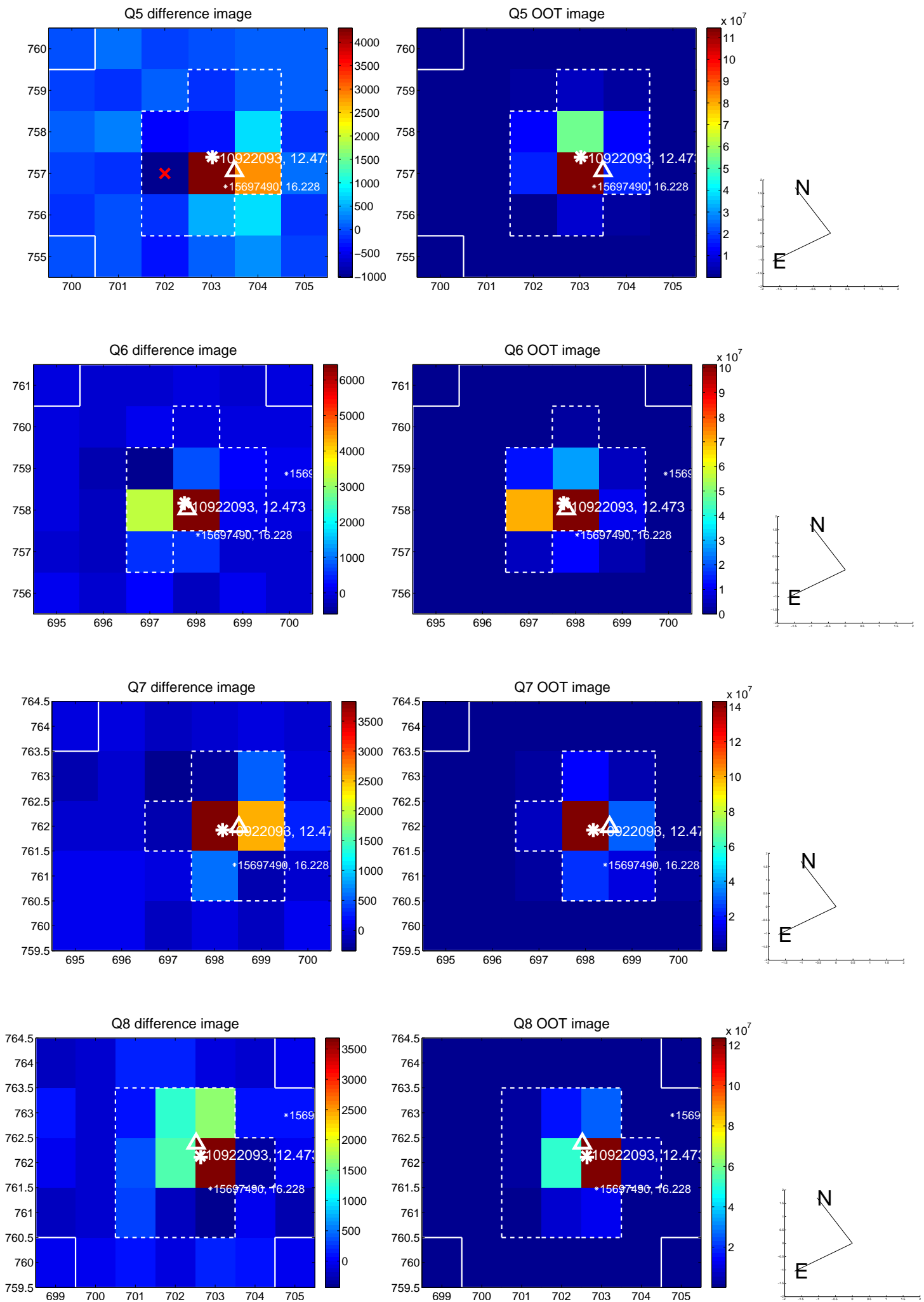


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

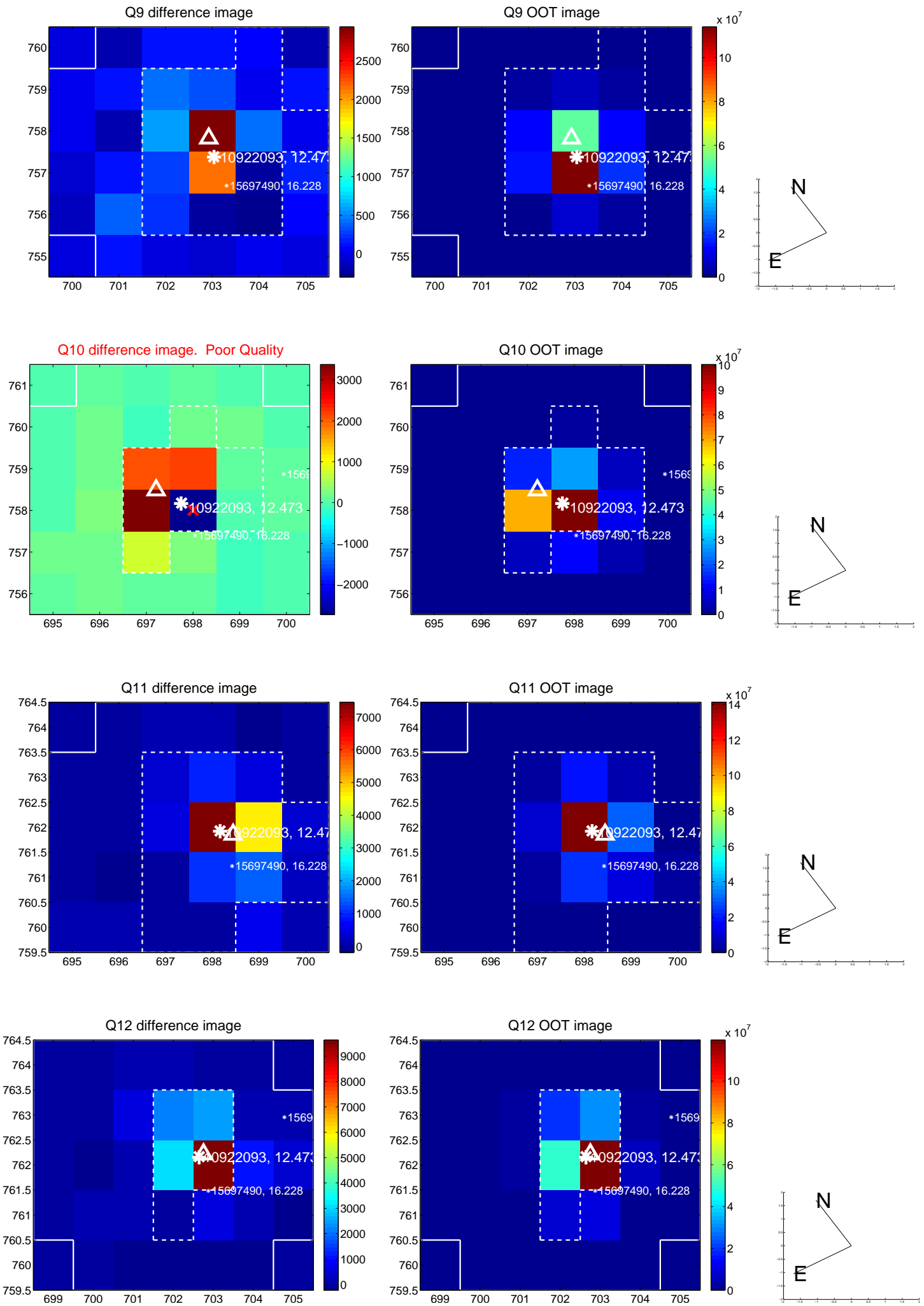


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

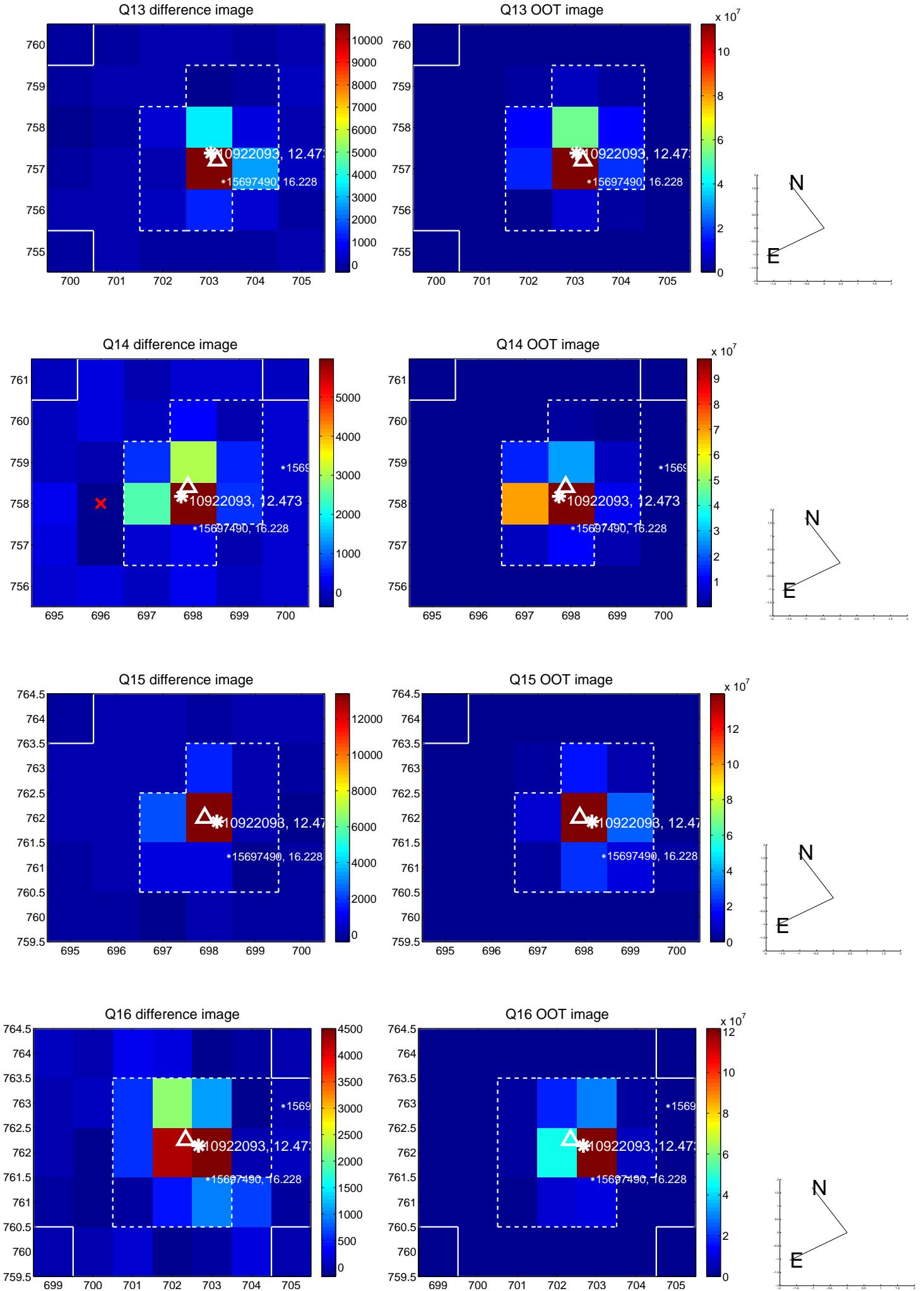




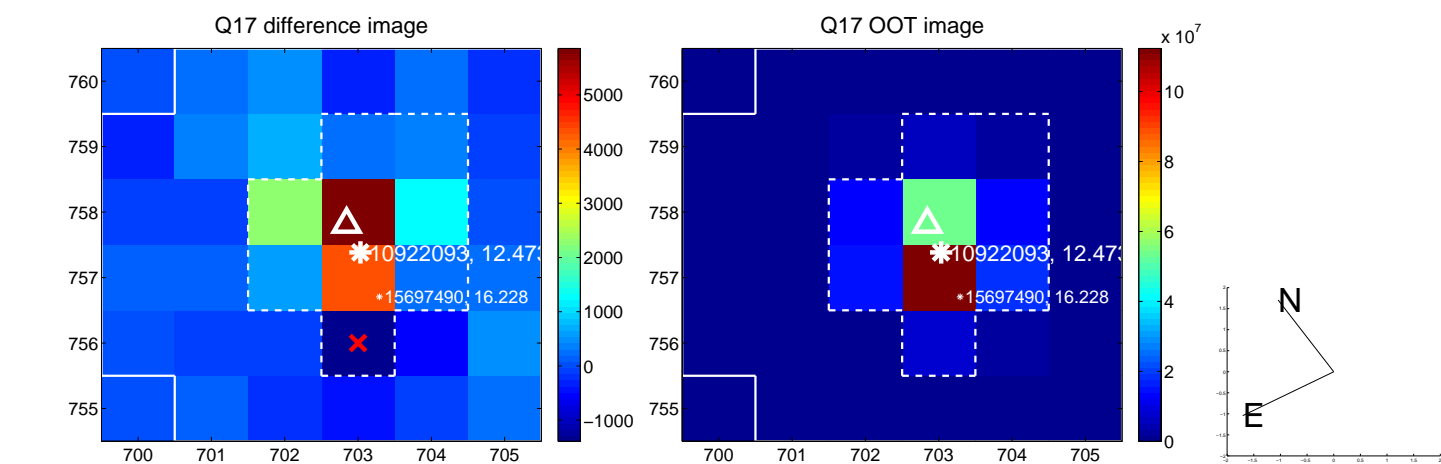
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



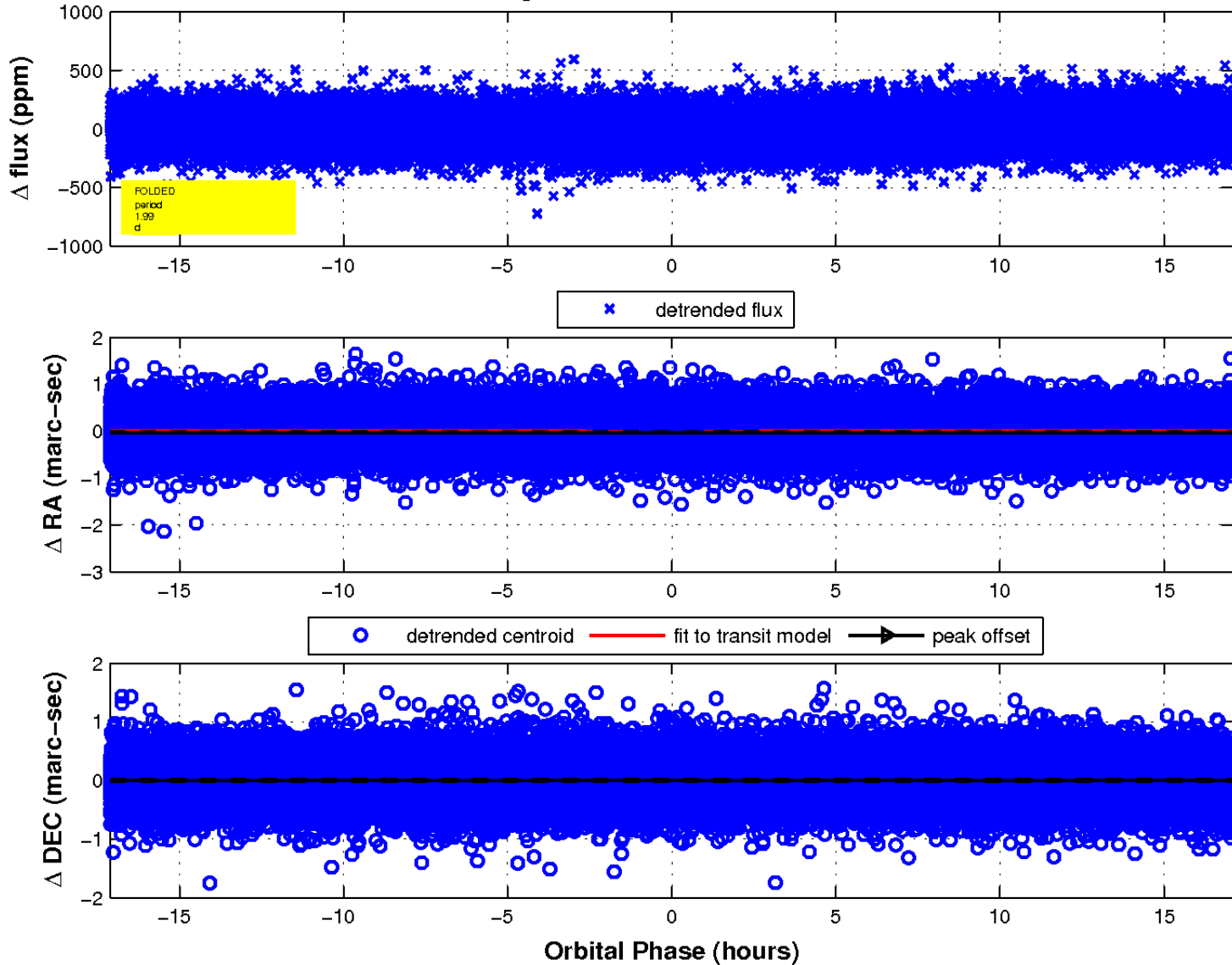
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

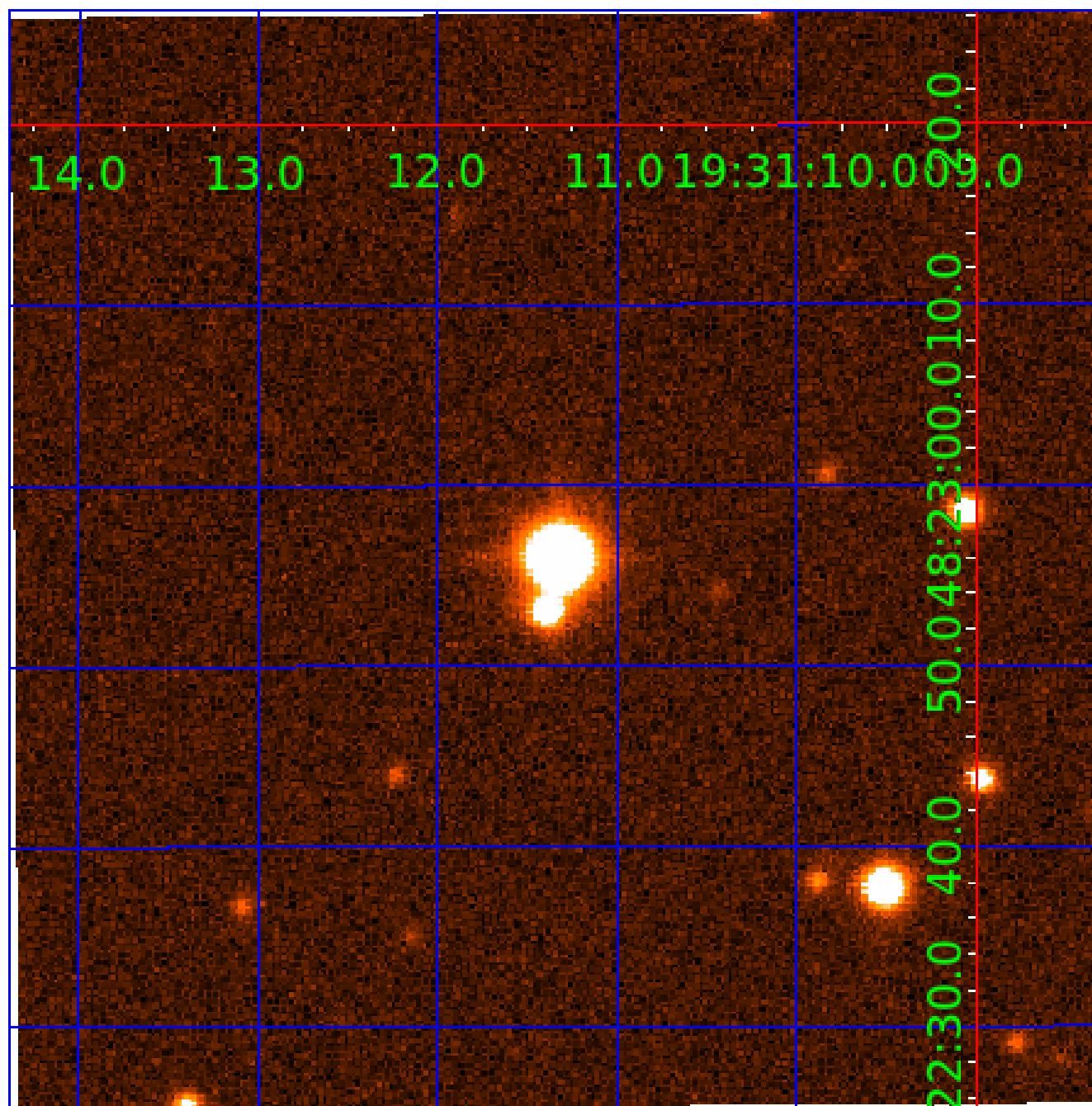


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 010922093

## 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

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010922093-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
010922093-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

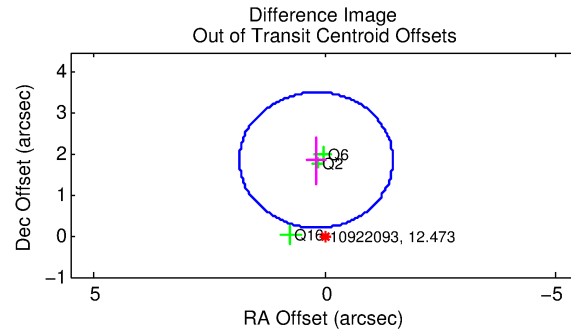
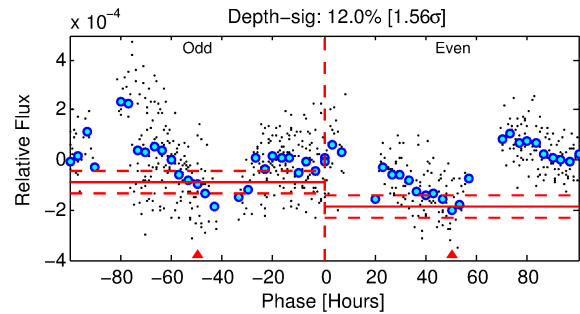
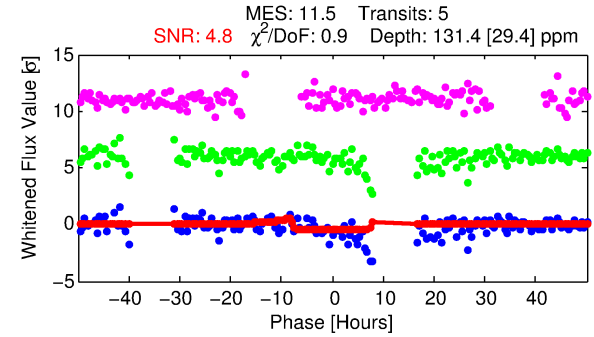
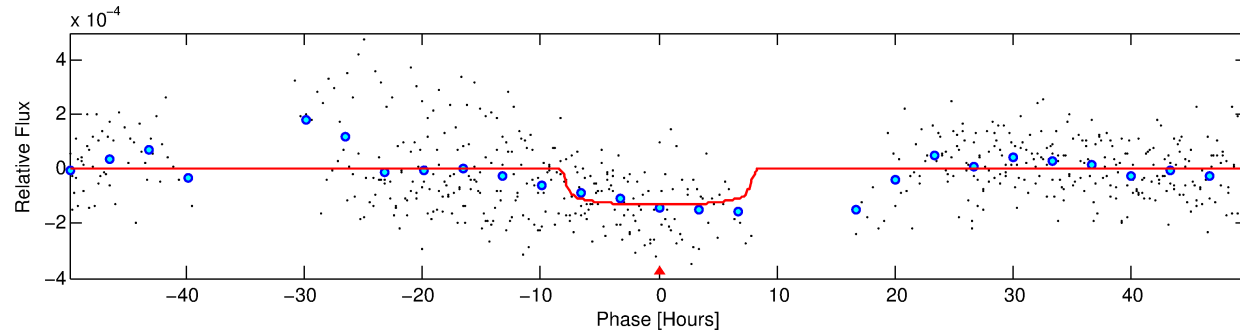
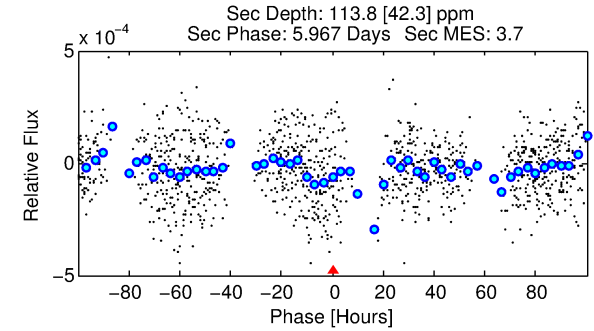
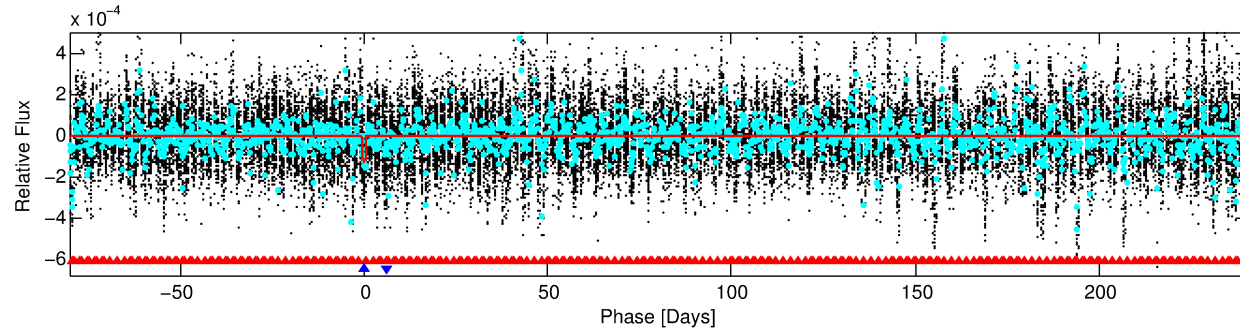
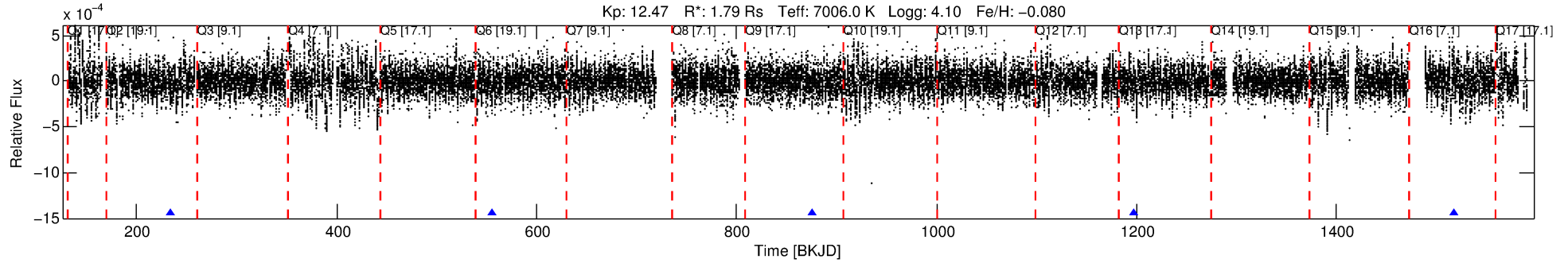
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010922093-02

No Significant Match Found

# DV One-Page Summary

KIC: 10922093 Candidate: 2 of 2 Period: 320.797 d



## DV Fit Results:

Period = 320.79689 [0.01001] d  
Epoch = 234.4557 [0.0212] BKJD  
Rp/R\* = 0.0121 [0.0021]  
a/R\* = 71.92 [52.42]  
b = 0.89 [0.18]  
Seff = 6.36 [1.99]  
Teff = 405 [32] K  
Rp = 2.36 [0.66] Re  
a = 1.0414 [0.1964] AU  
Ag = 12239.45 [7095.76] [1.72 $\sigma$ ]  
Teffp = 6584 [870] K [7.10 $\sigma$ ]

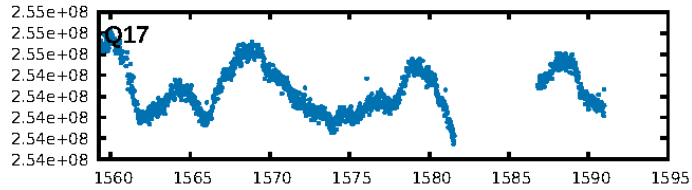
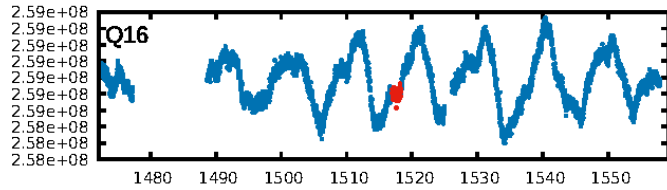
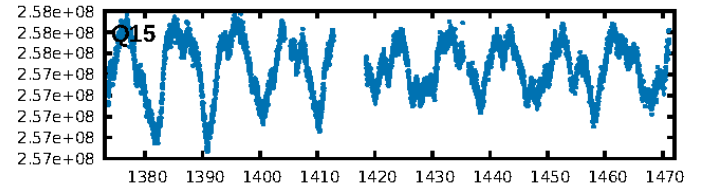
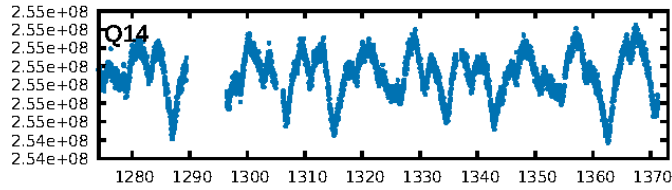
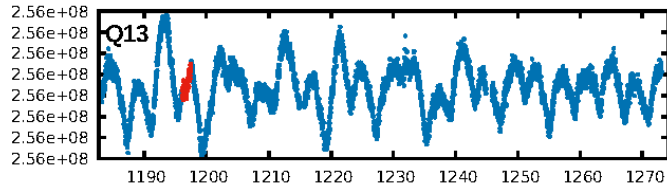
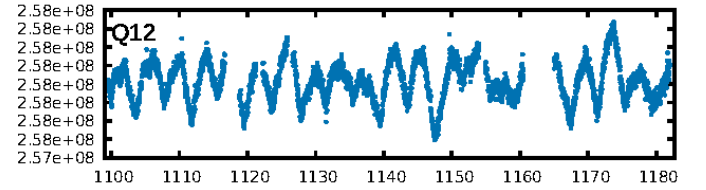
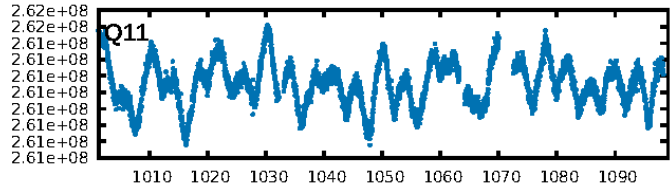
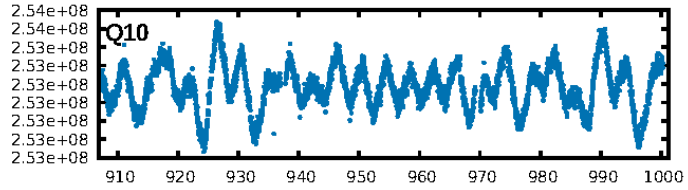
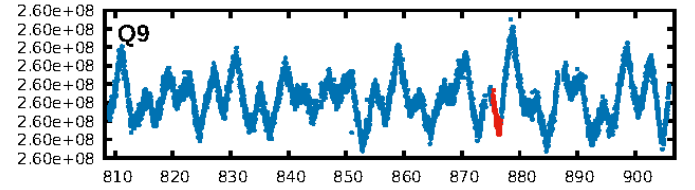
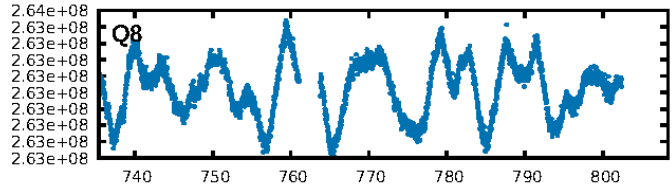
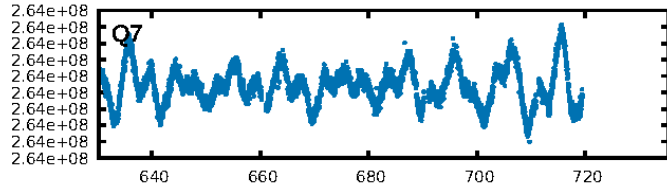
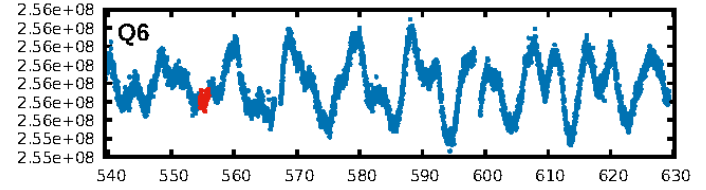
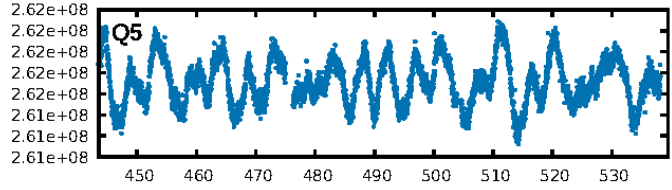
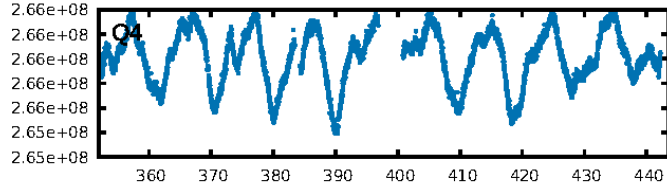
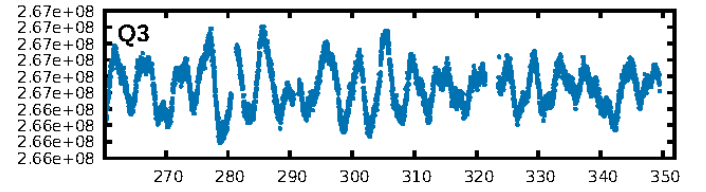
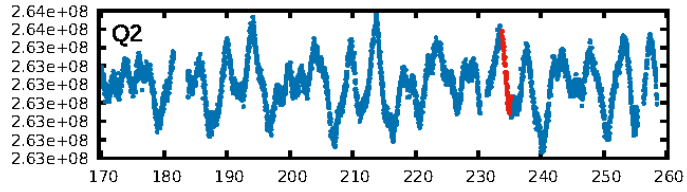
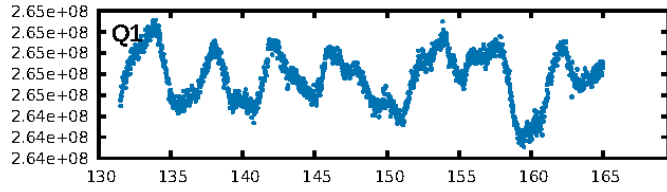
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [434.50 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 33.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 6.20e-15  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 1.698  
Centroid-sig: 0.2%  
Centroid-so: 1.727 arcsec [1.67 $\sigma$ ]  
OotOffset-rm: 1.870 arcsec [3.38 $\sigma$ ]  
KicOffset-rm: 1.822 arcsec [4.11 $\sigma$ ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.00 [0/3]

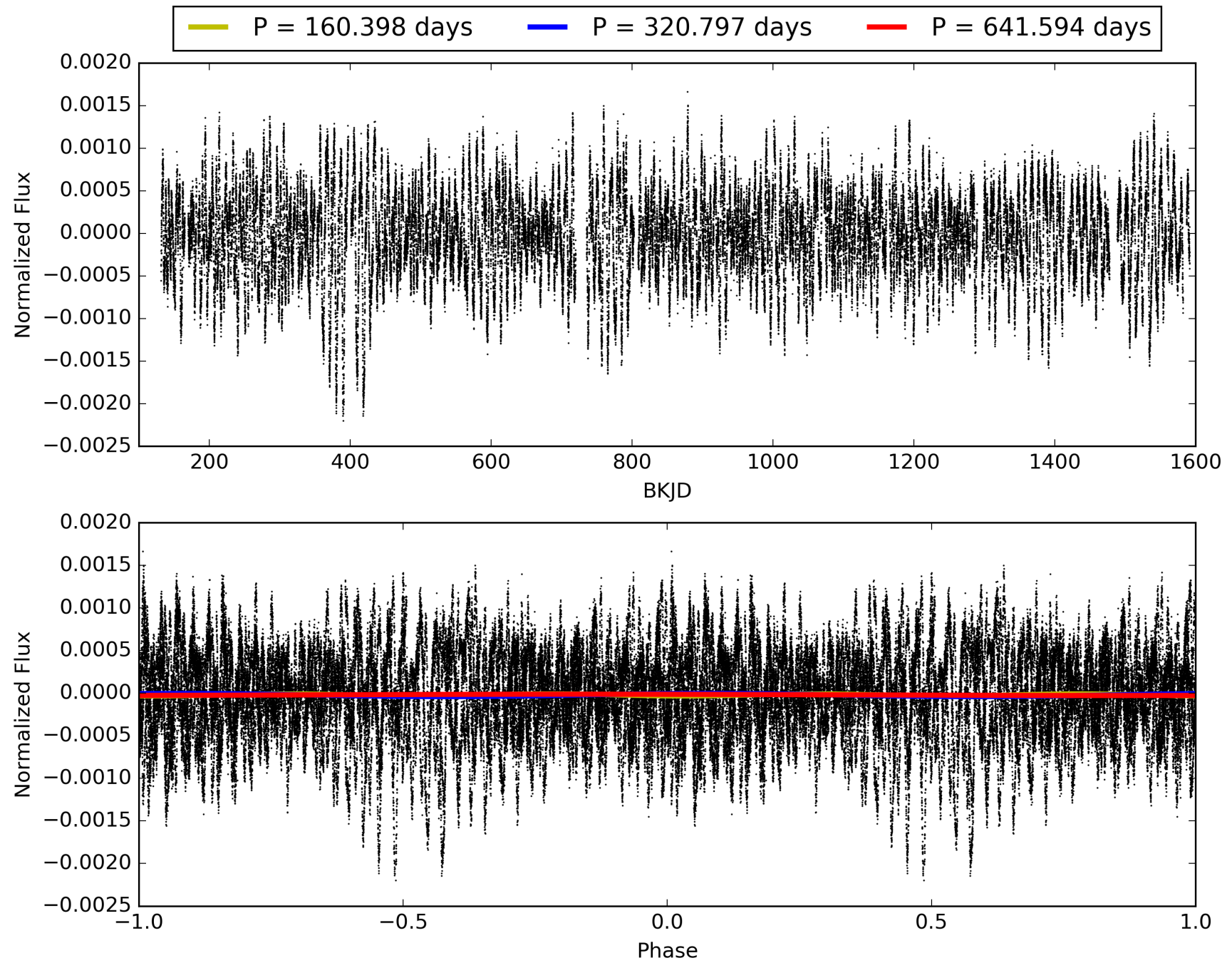
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:38:31 Z

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

## TCE 010922093-02, PDC Light Curves



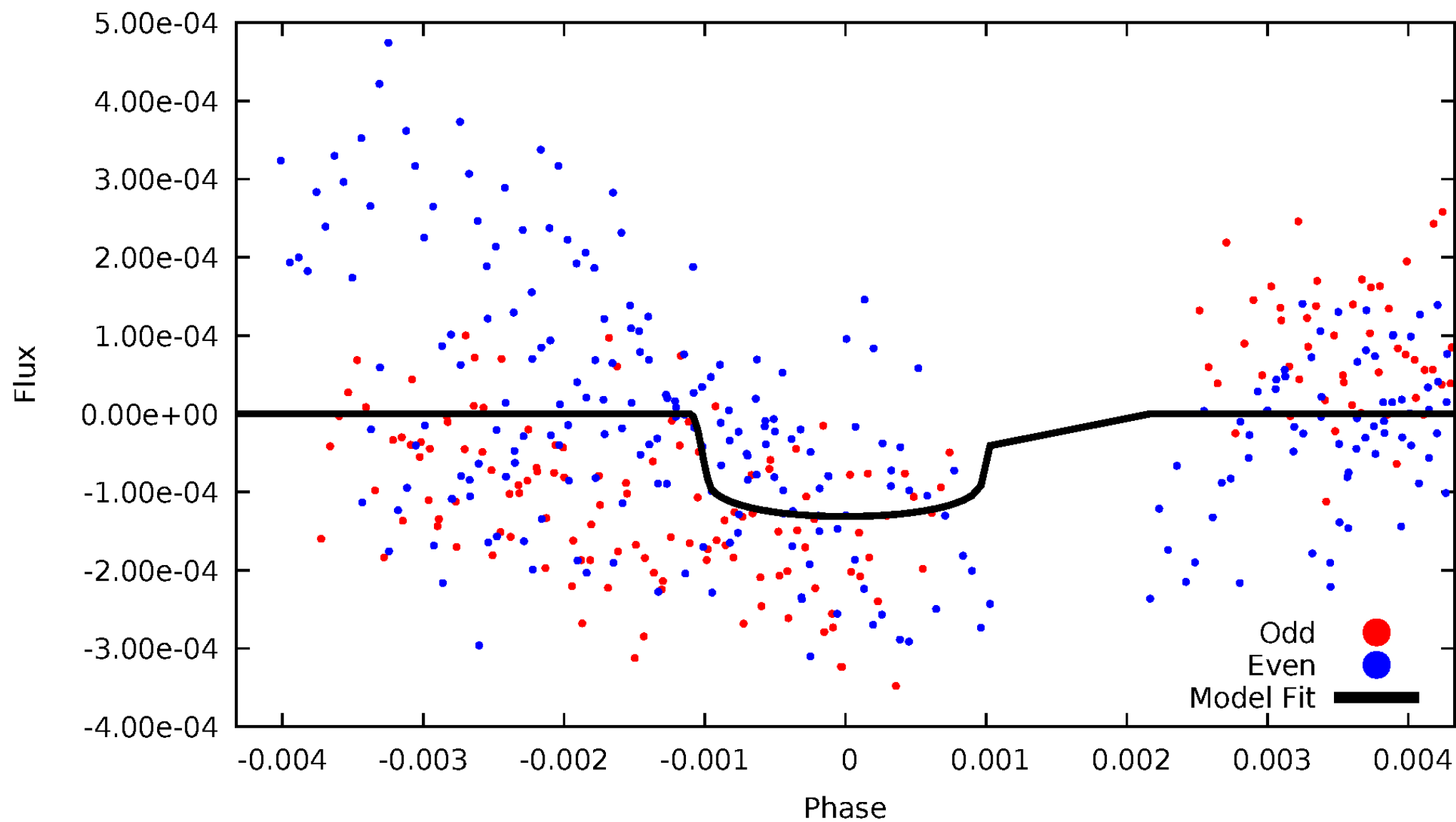
# TCE 010922093-02





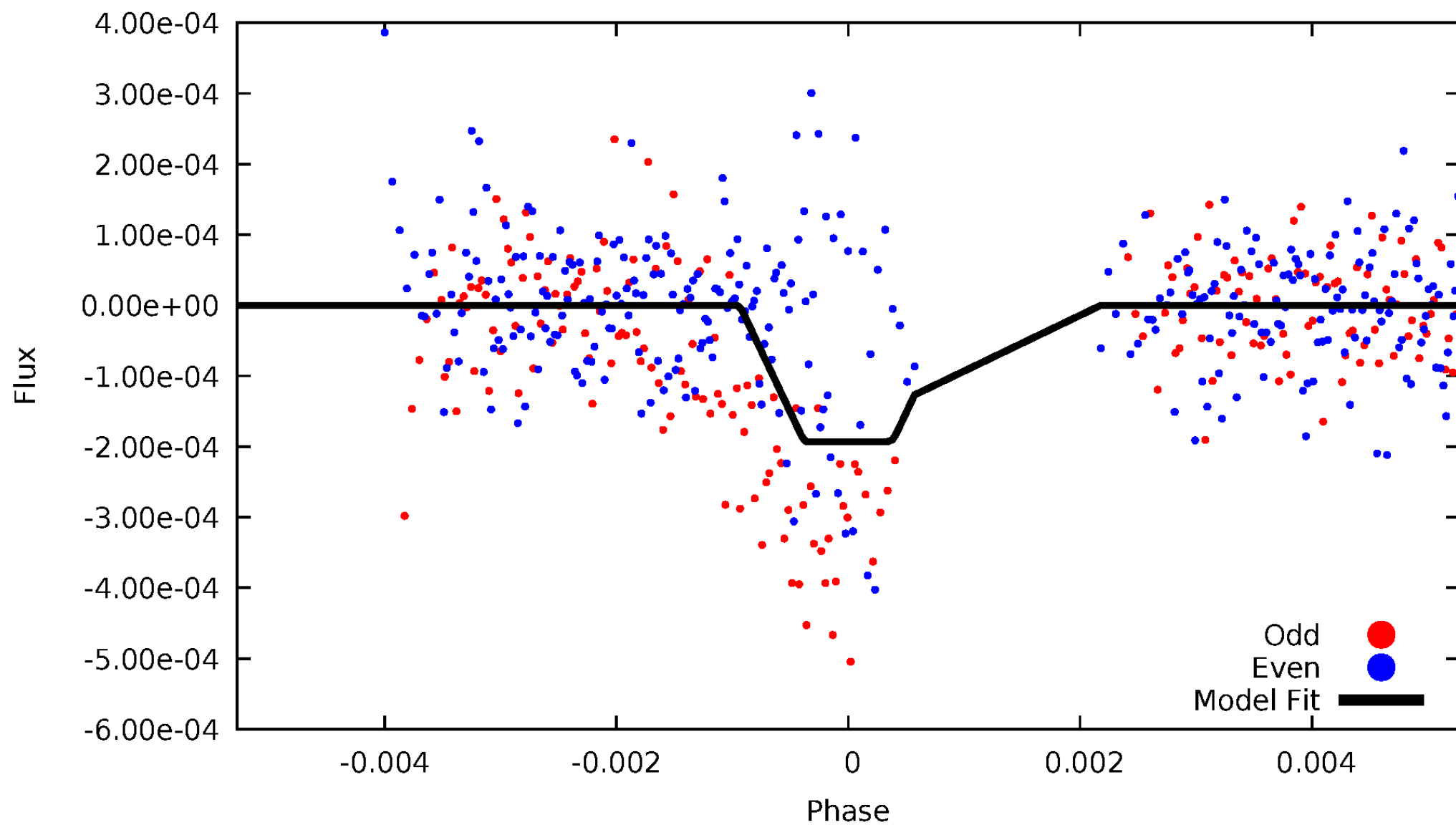
# DV Odd/Even

TCE 010922093-02



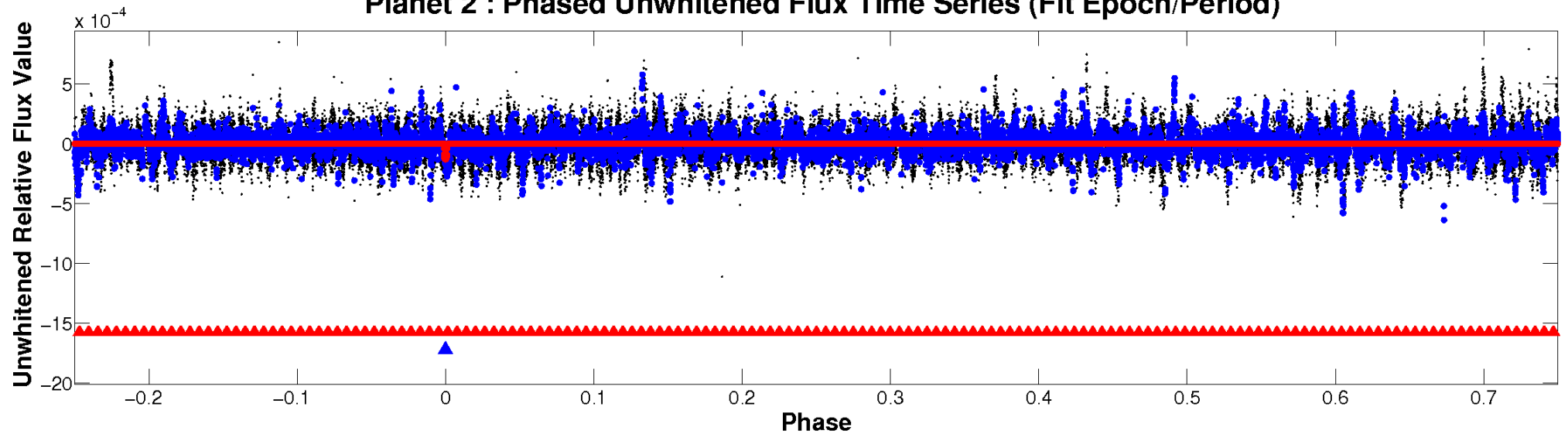
# ALT Odd/Even

TCE 010922093-02

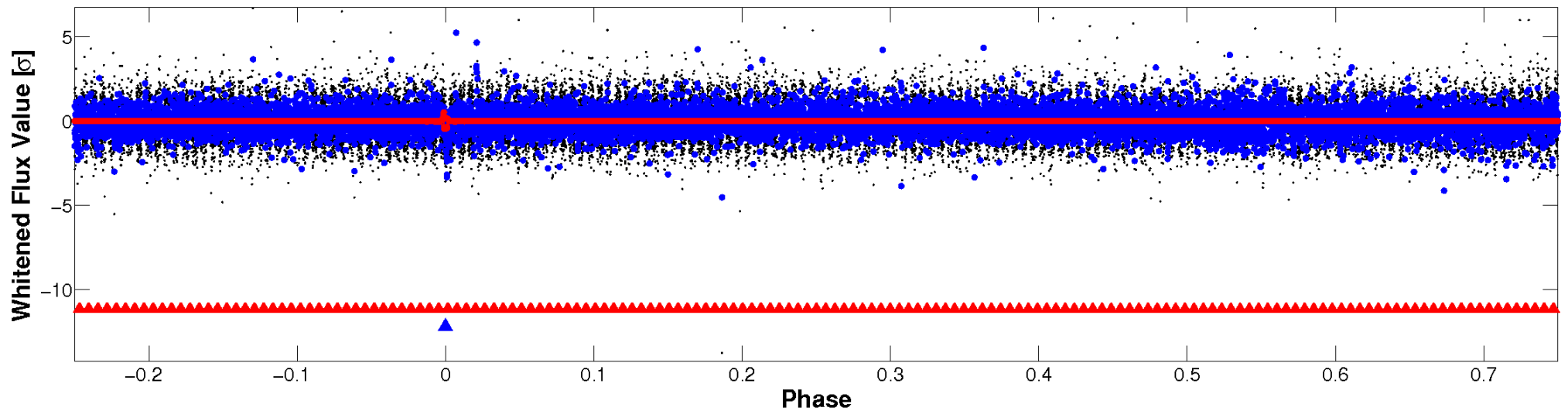


# Non-Whitened Vs. Whitened Light Curve

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

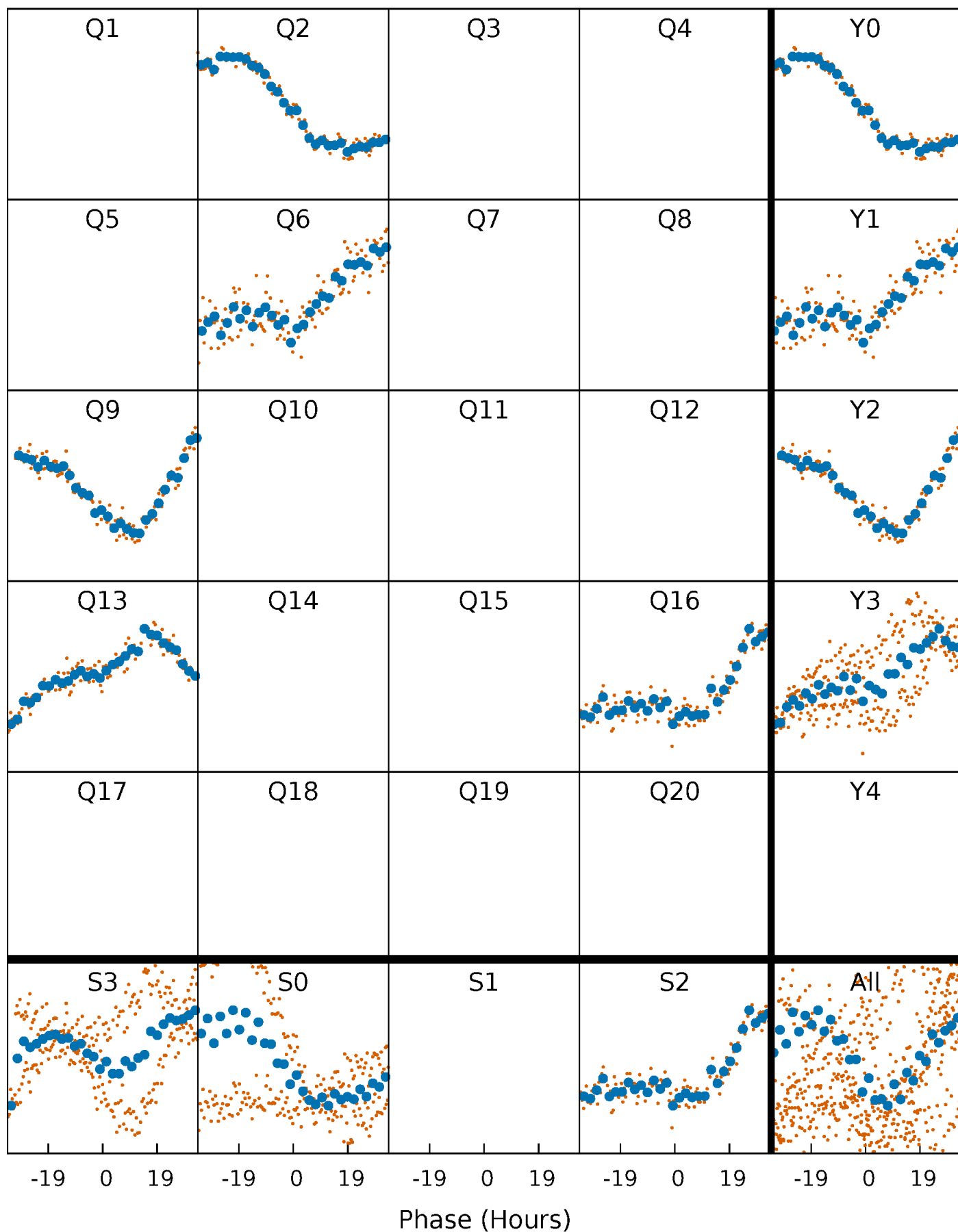


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 010922093-02     $P=320.796885$  Days     $T_0=234.455730$  (BKJD)



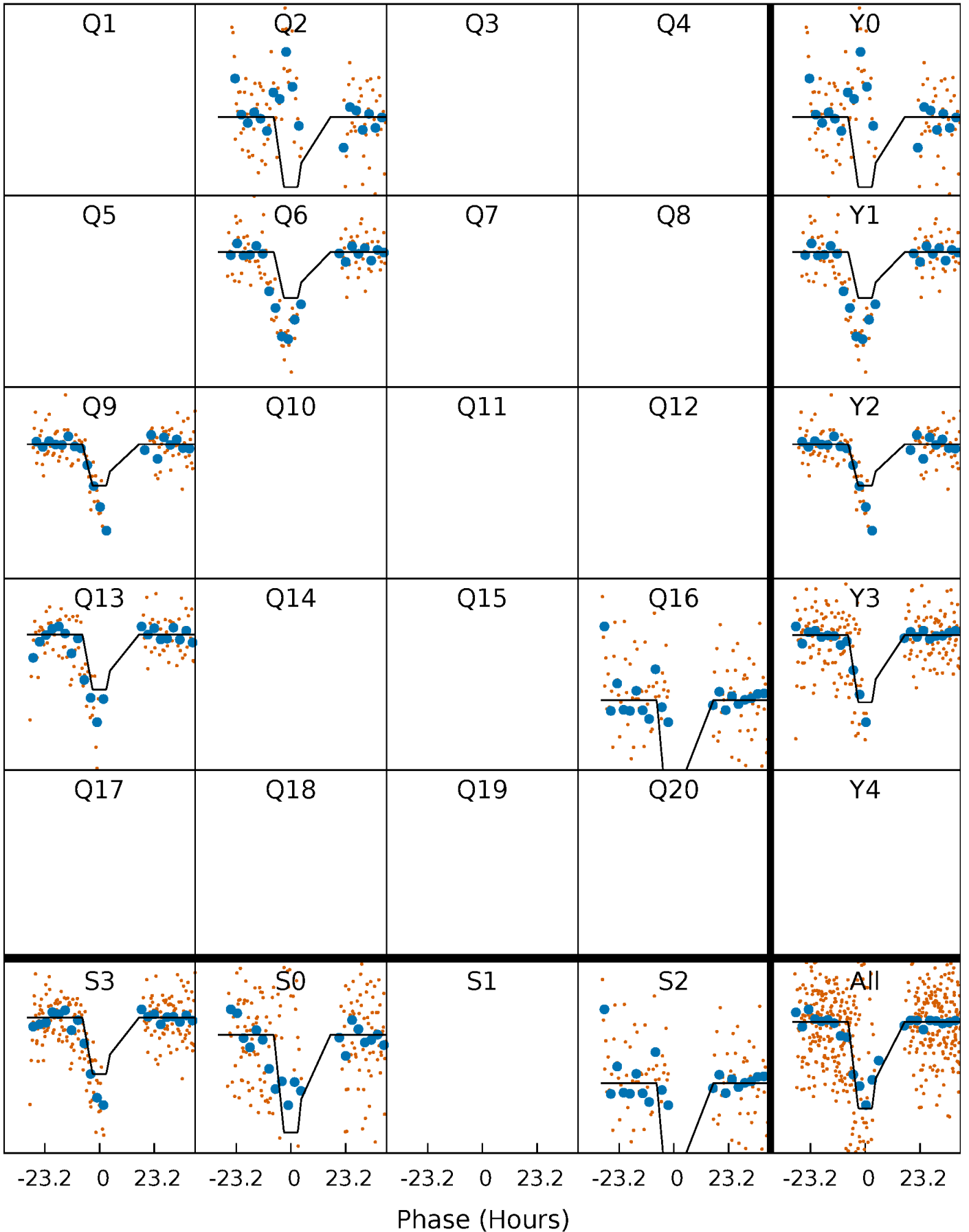
# DV Quarter-Phased Transit Curves

TCE 010922093-02 P=320.796885 Days  $T_0=234.455730$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

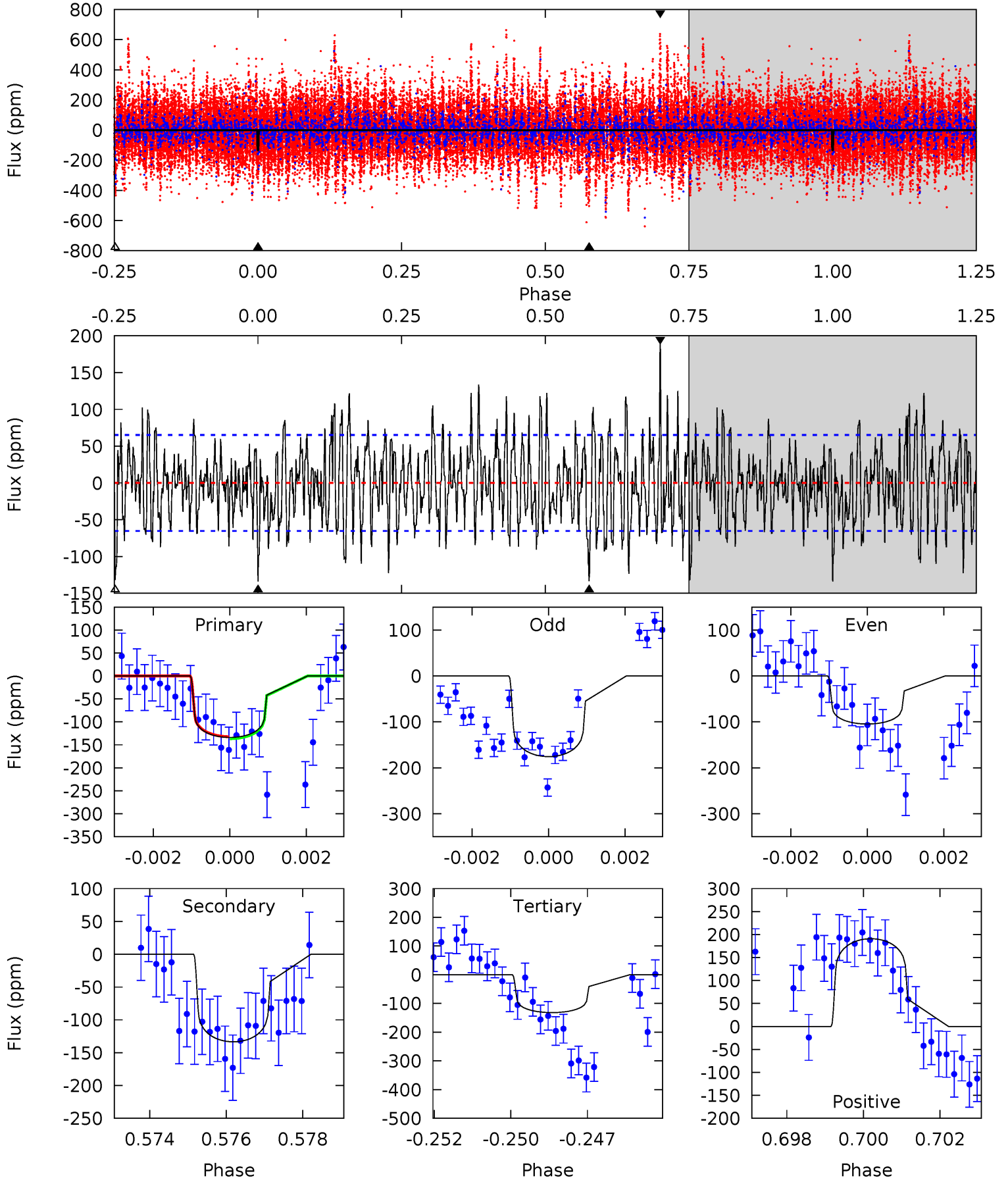
TCE 010922093-02     $P=320.759214$  Days     $T_0=234.601807$  (BKJD)



# DV Model-Shift Uniqueness Test

010922093-02, P = 320.796885 Days, E = 234.455730 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
10.9	10.9	10.7	15.5	5.31	3.07	3.80	0.17	-4.64	0.14	-4.67	2.89	0.86	0.59	0.17

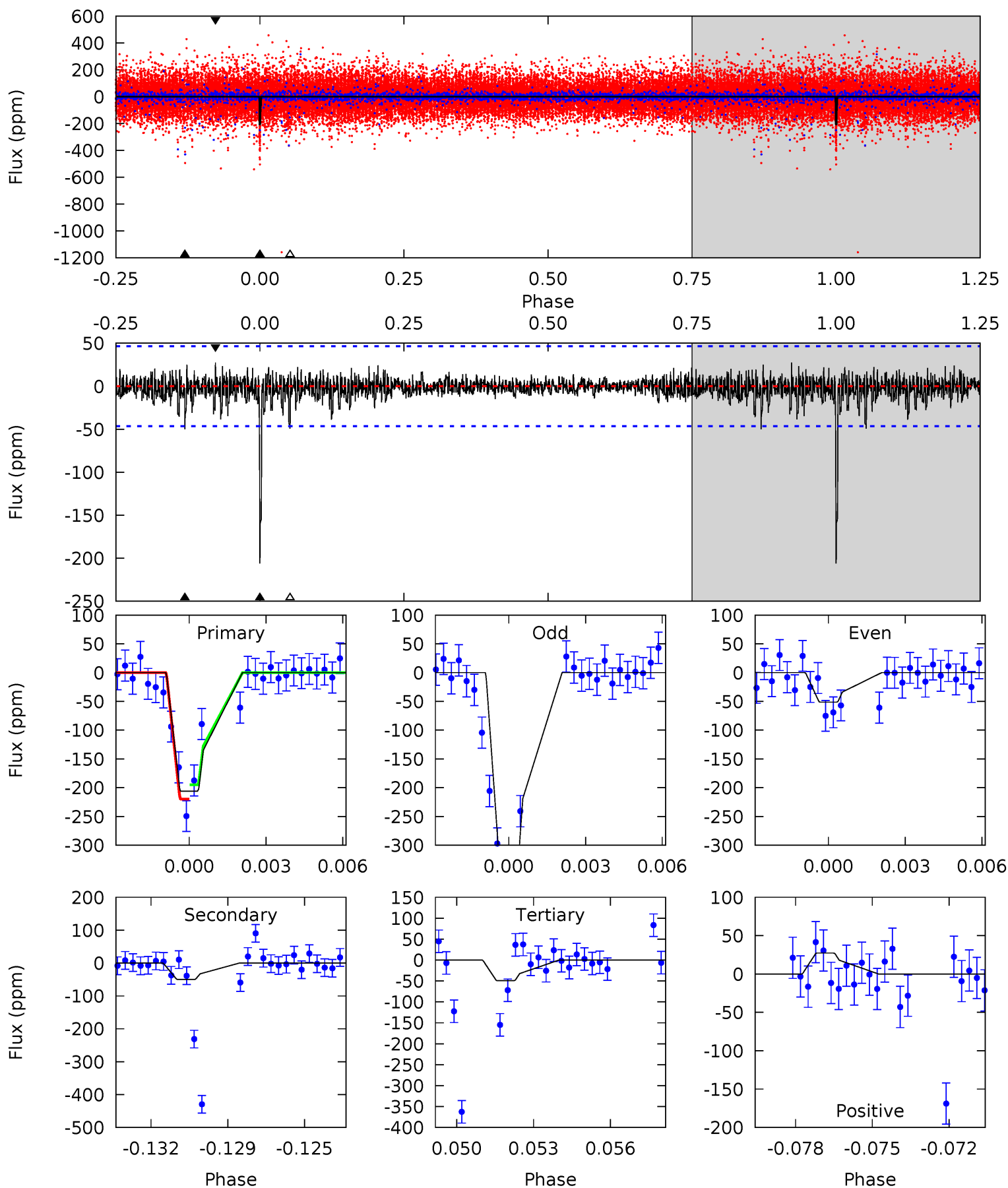




# Alt Model-Shift Uniqueness Test

010922093-02, P = 320.759214 Days, E = 234.601807 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
23.2	5.64	5.54	3.08	5.24	2.95	0.78	17.7	20.1	0.10	2.56	15.9	0.66	0.12	0



### Stellar Parameters For KIC 010922093

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7006^{+169}_{-253}$	$4.099^{+0.154}_{-0.140}$	$-0.080^{+0.250}_{-0.350}$	$1.787^{+0.394}_{-0.394}$	$1.466^{+0.164}_{-0.226}$	$0.361^{+0.293}_{-0.139}$
	$+2\%/-4\%$	$+4\%/-3\%$	$+312\%/-438\%$	$+22\%/-22\%$	$+11\%/-15\%$	$+81\%/-38\%$
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 010922093-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-133 \pm 12$	$2.35^{+0.52}_{-0.49}$	$563^{+39}_{-33}$	$6802^{+839}_{-601}$	$14165^{+8630}_{-4457}$
Alt.	$-50 \pm 9$	$2.68^{+0.57}_{-0.49}$	$565^{+37}_{-36}$	$5026^{+458}_{-368}$	$4046^{+2316}_{-1464}$

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

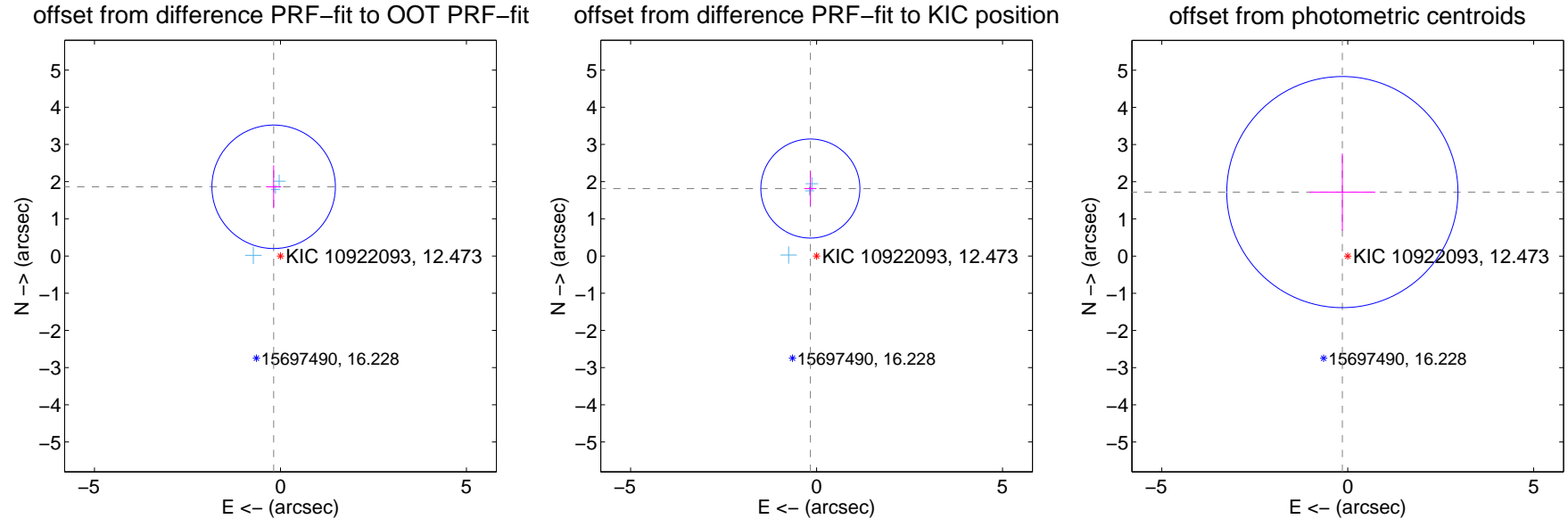
## DV Centroid Data

Supplemental centroid analysis for 010922093-02. Kepler magnitude: 12.47. Transit SNR 4.82

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

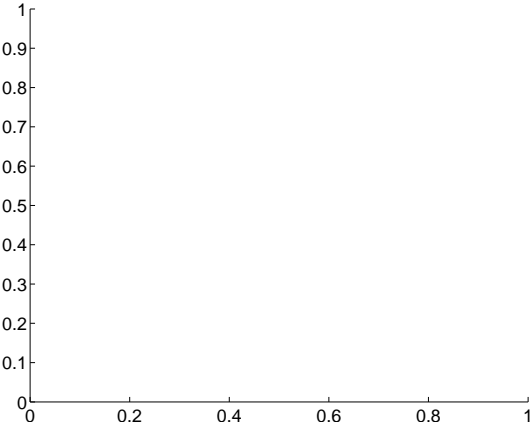
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.870 \pm 0.553$	3.38	$0.183 \pm 0.202$	$1.861 \pm 0.574$
PRF-fit source offset from KIC position	$1.822 \pm 0.444$	4.11	$0.167 \pm 0.163$	$1.814 \pm 0.459$
photometric centroid source offset	$1.73 \pm 1.04$	1.67	$0.14 \pm 0.89$	$1.72 \pm 1.04$



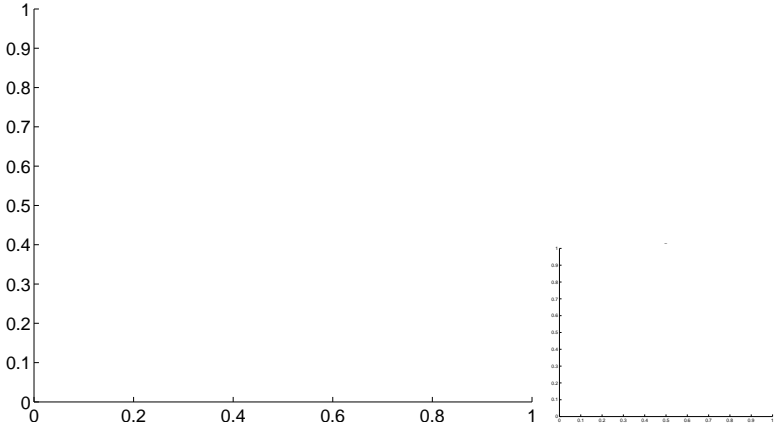
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

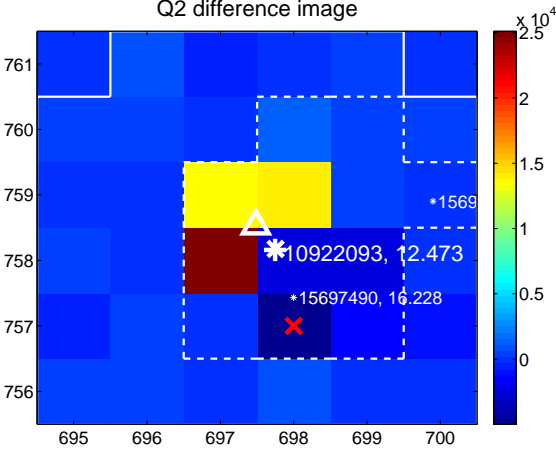
Q1 no difference image



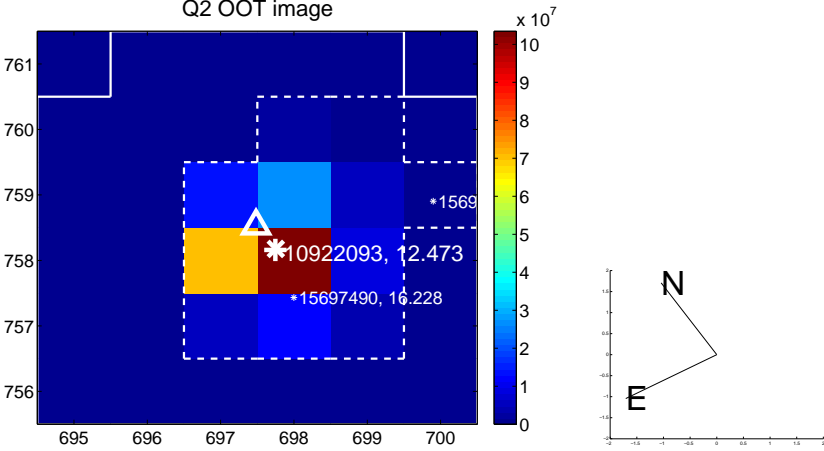
Q1 no OOT image



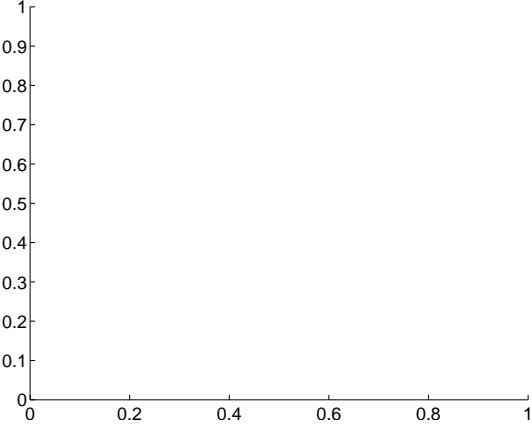
Q2 difference image



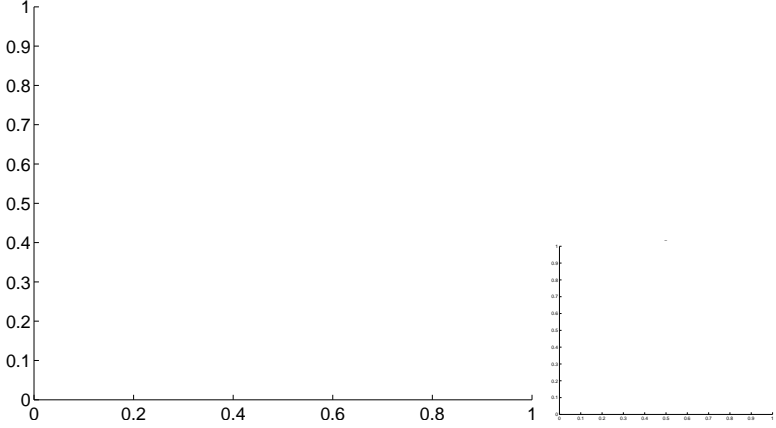
Q2 OOT image



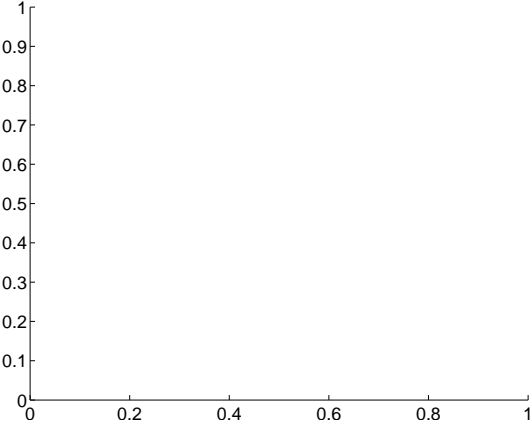
Q3 no difference image



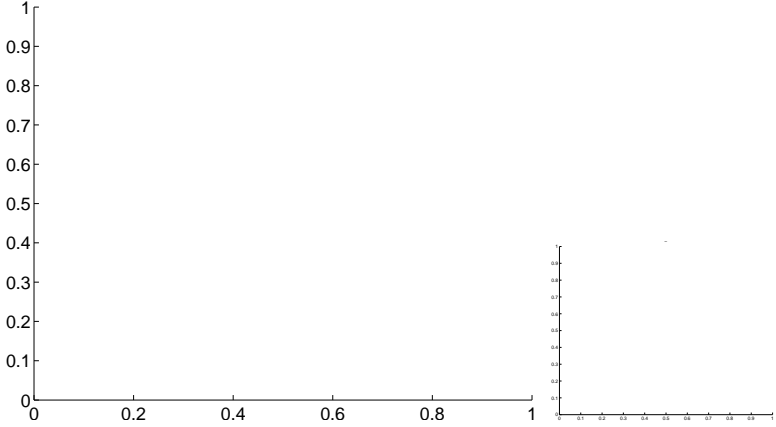
Q3 no OOT image



Q4 no difference image

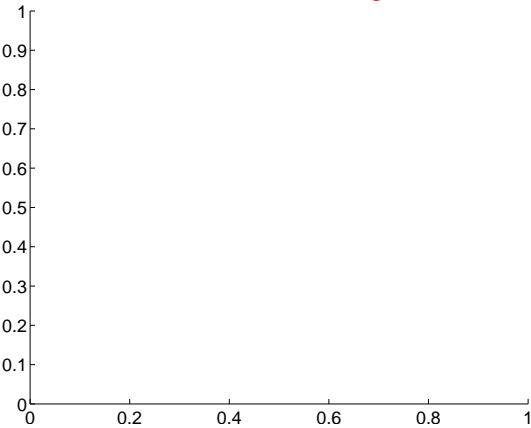


Q4 no OOT image

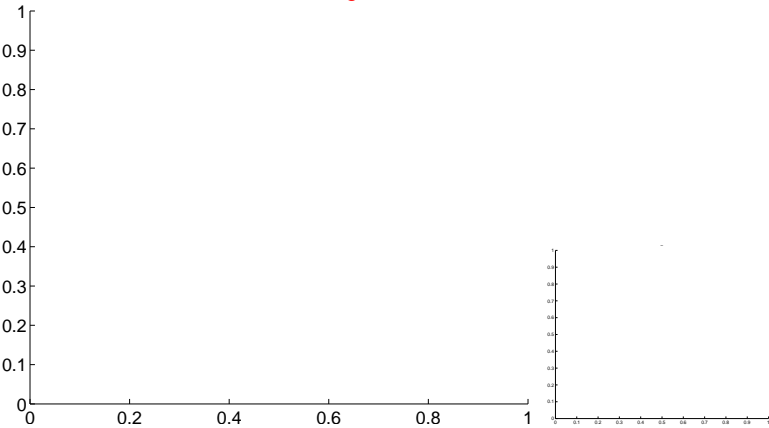


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

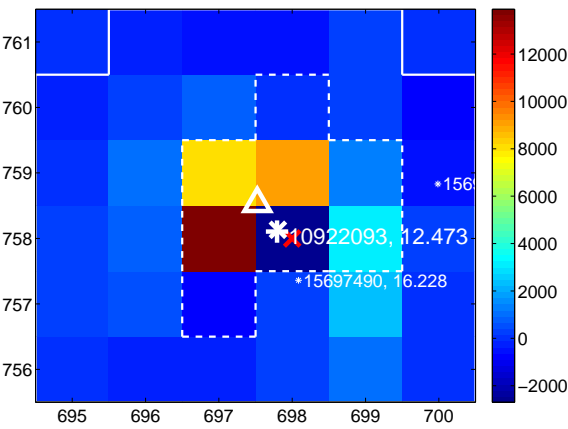
Q5 no difference image



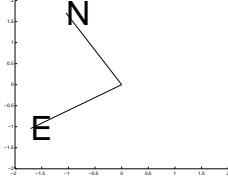
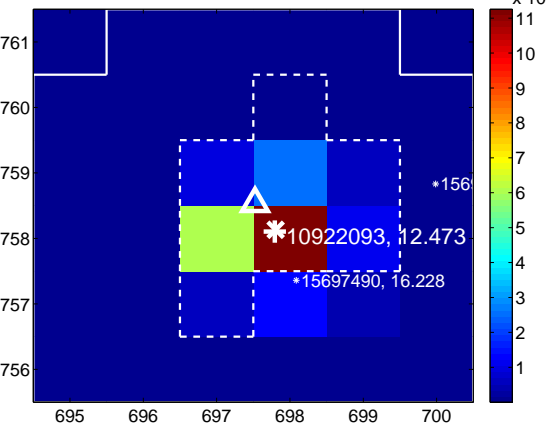
Q5 no OOT image



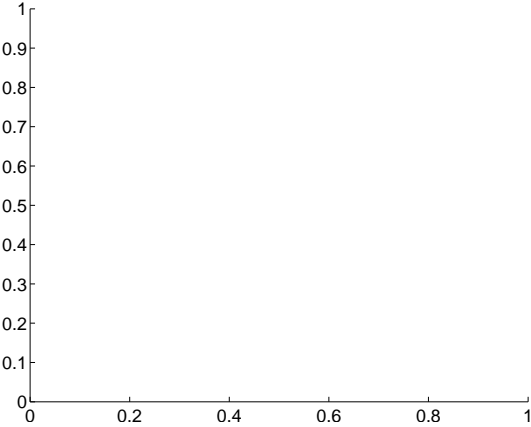
Q6 difference image



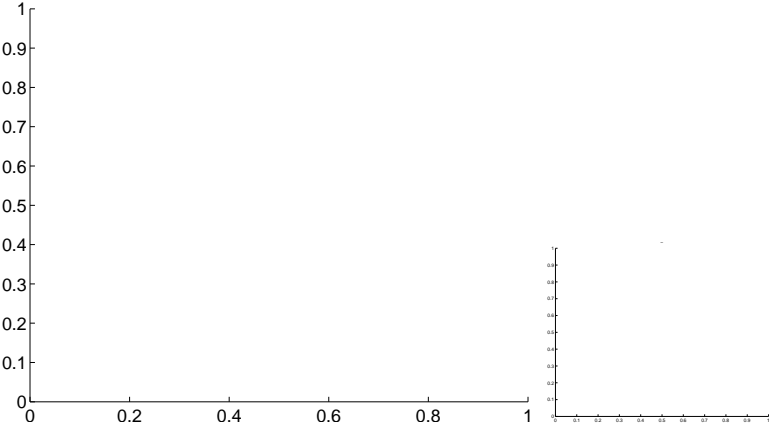
Q6 OOT image



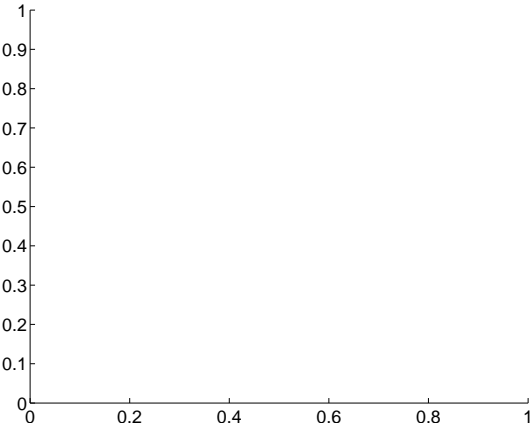
Q7 no difference image



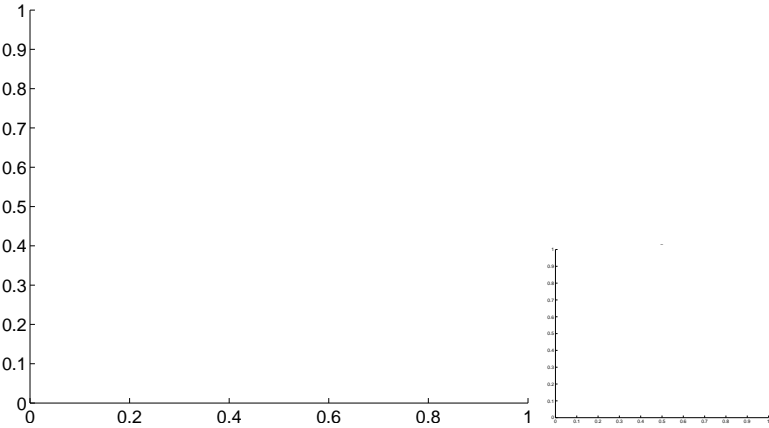
Q7 no OOT image



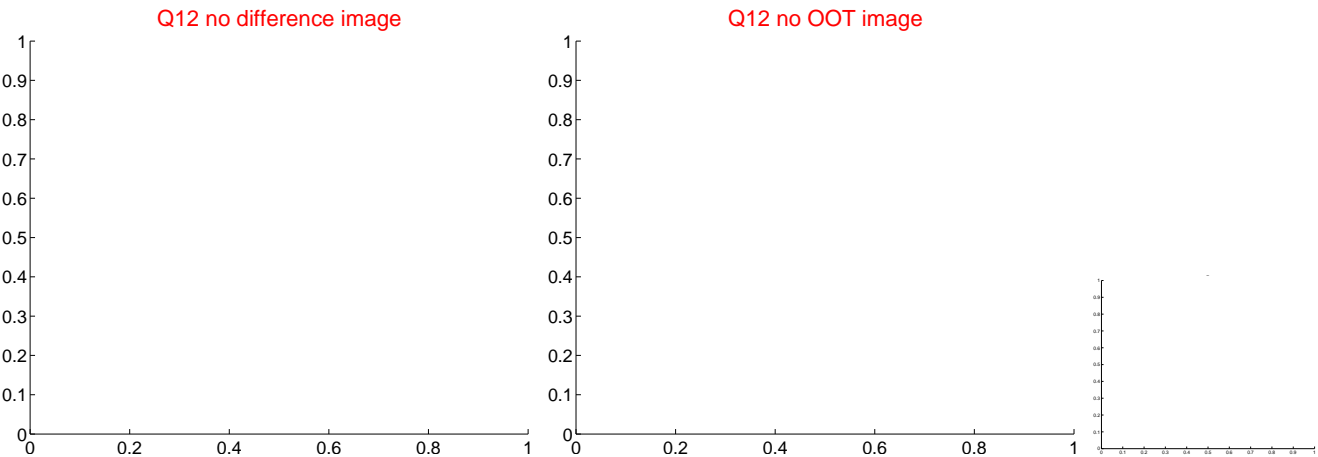
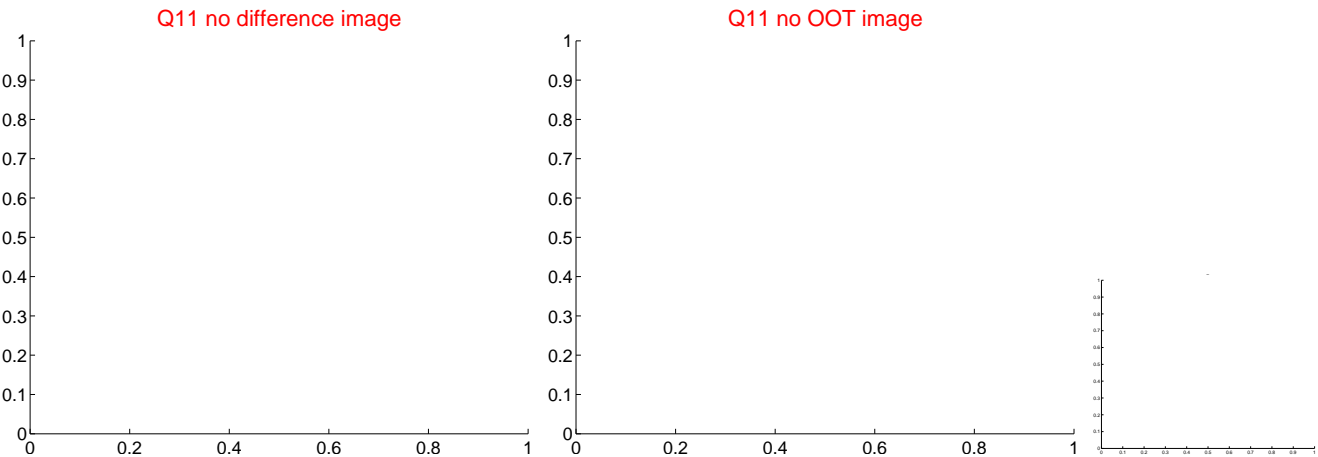
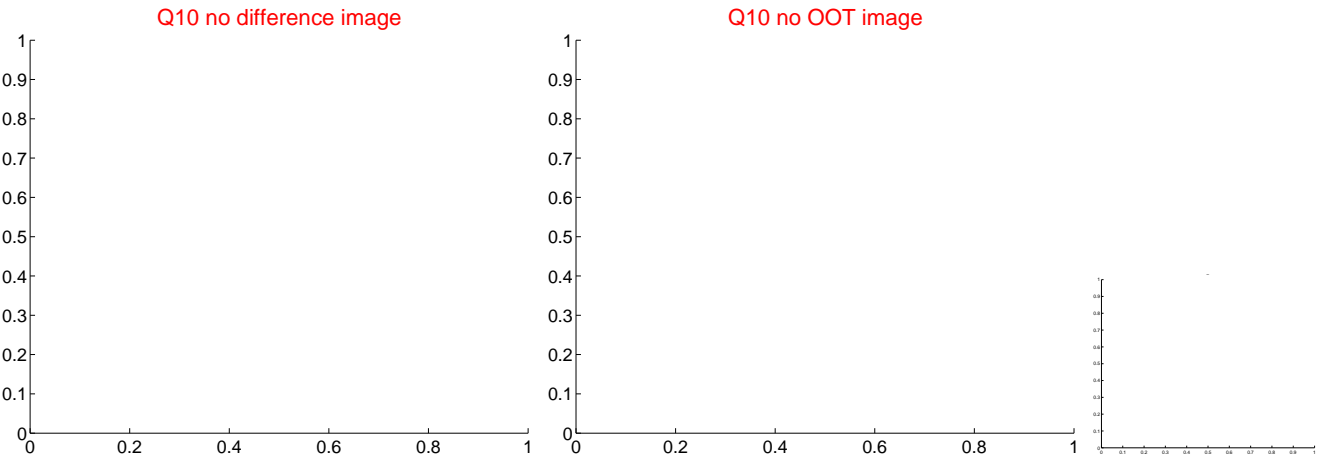
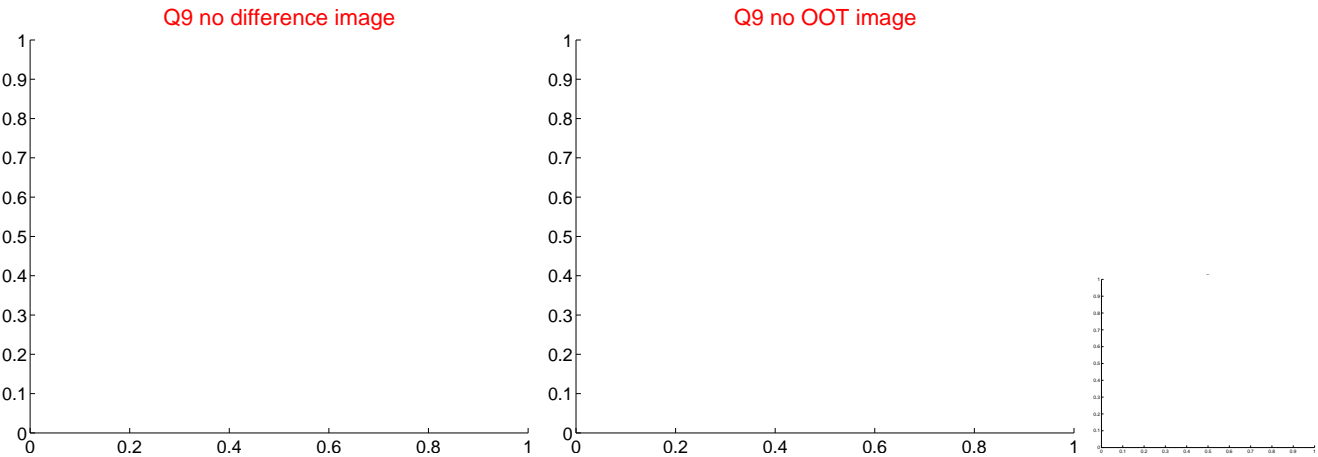
Q8 no difference image



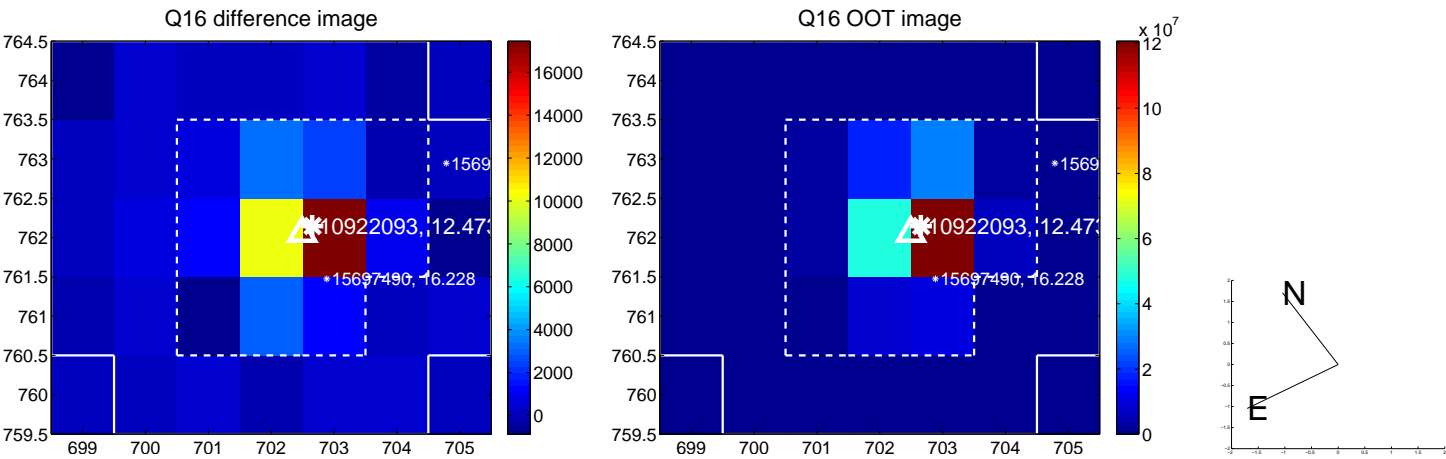
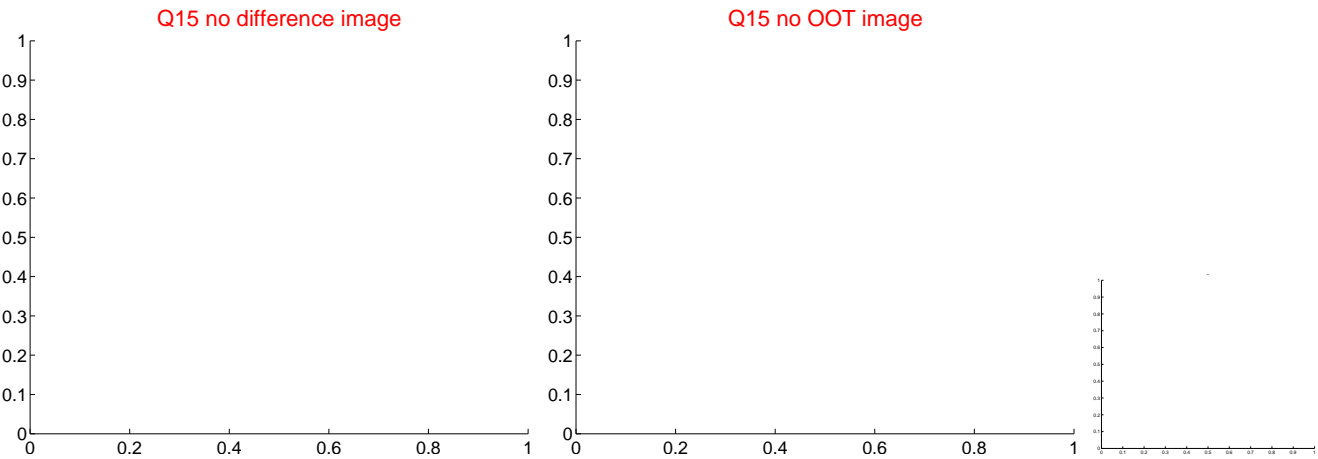
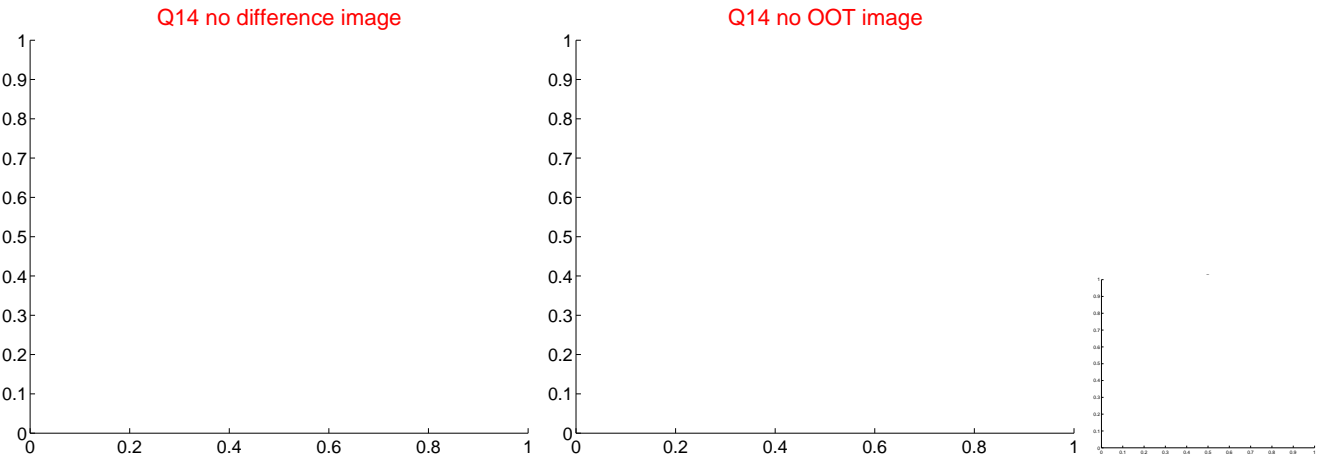
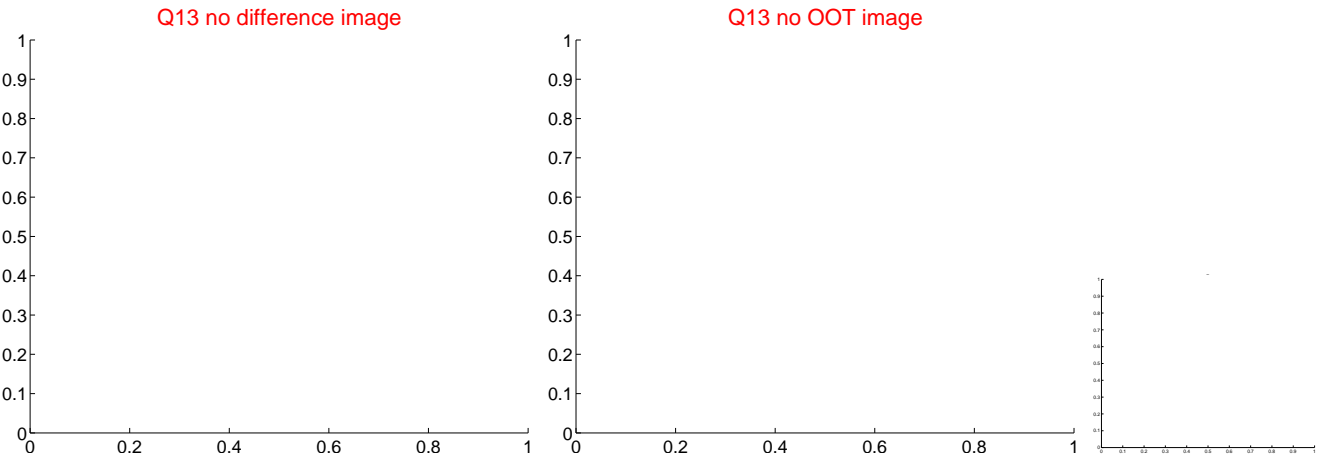
Q8 no OOT image



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

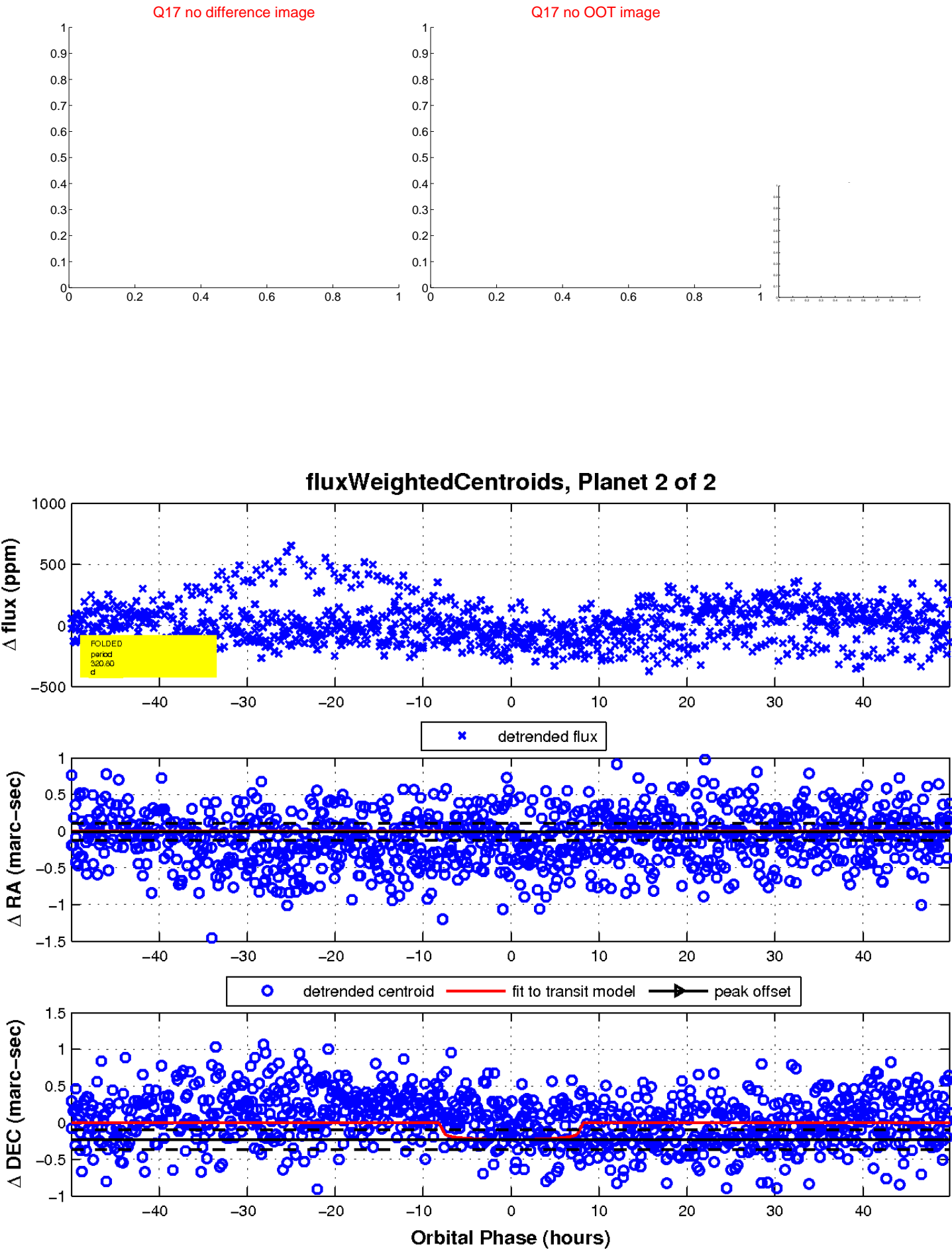


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.





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



UKIRT Image

Declination

