

# KIC 010658122

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010658122-01	OBS	No	1.711070	132.311925	21.8	6.268	9.9	10.1	2.99	6626	1.63	15376.26
010658122-02	OBS	No	288.267268	417.801518	195.6	6.009	7.3	6.9	2.99	6626	4.82	16.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010658122-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010658122-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

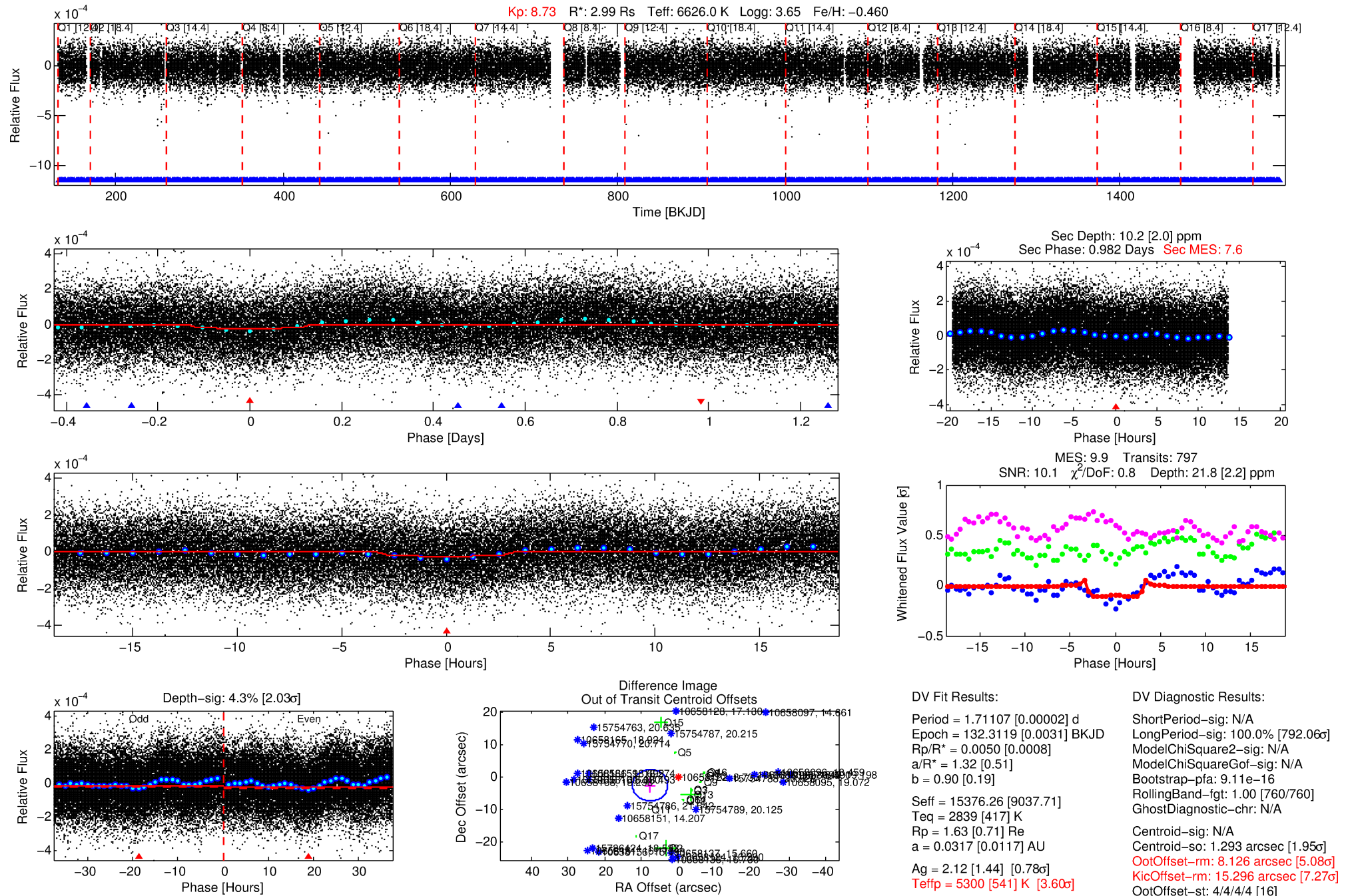
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010658122-01

No Significant Match Found

# DV One-Page Summary

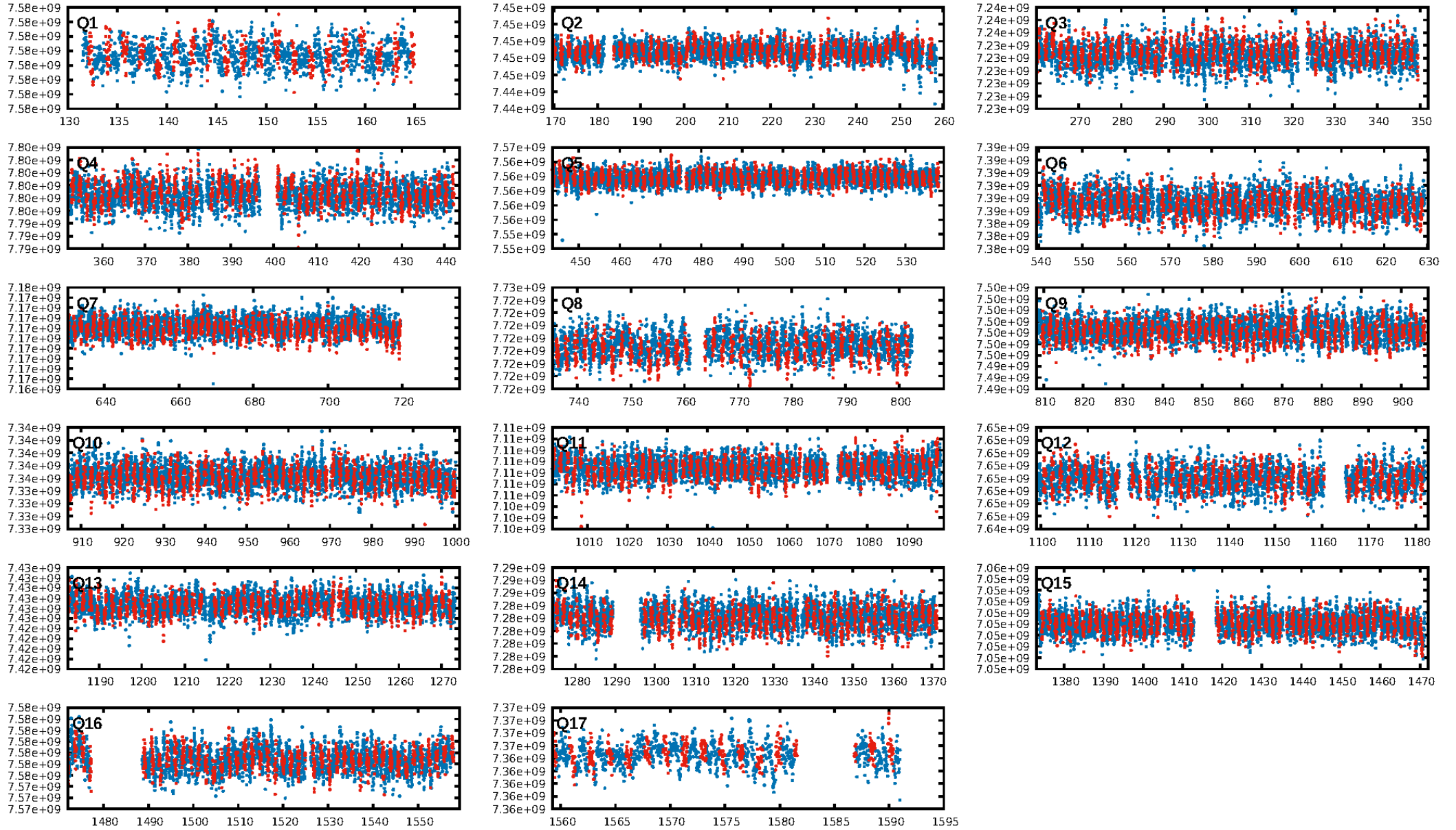
KIC: 10658122 Candidate: 1 of 2 Period: 1.711 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 06:42:39 Z

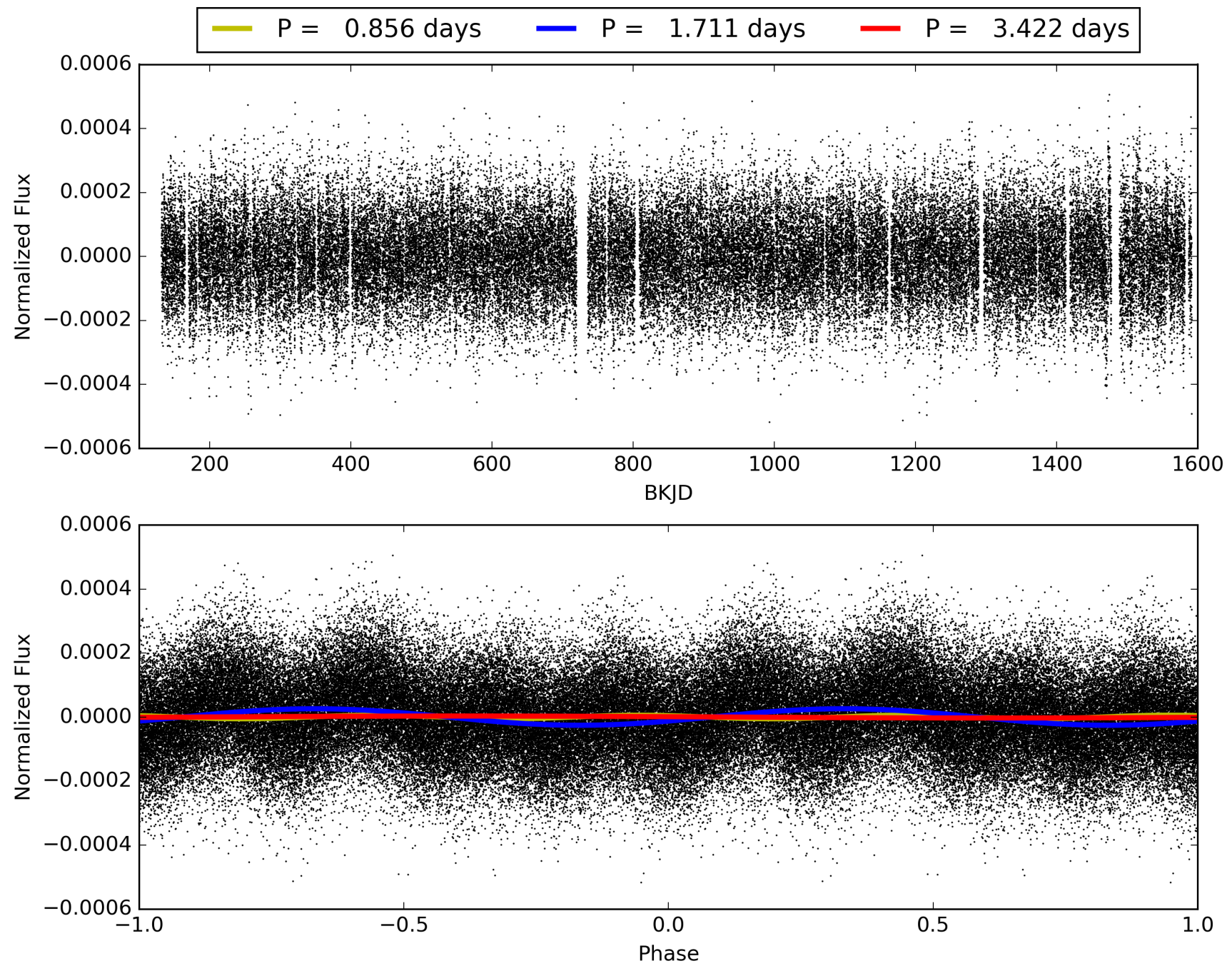
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010658122-01, PDC Light Curves



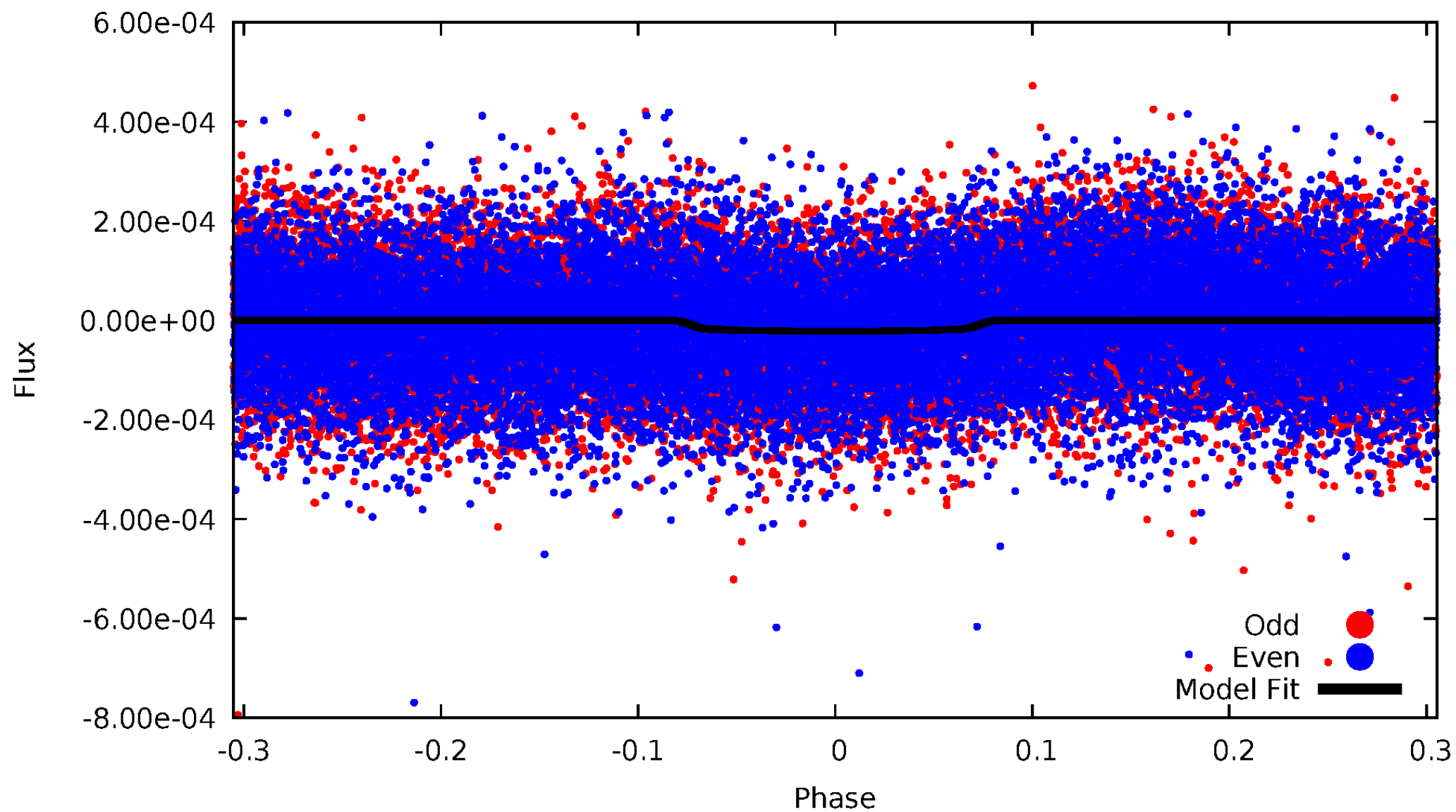


TCE 010658122-01



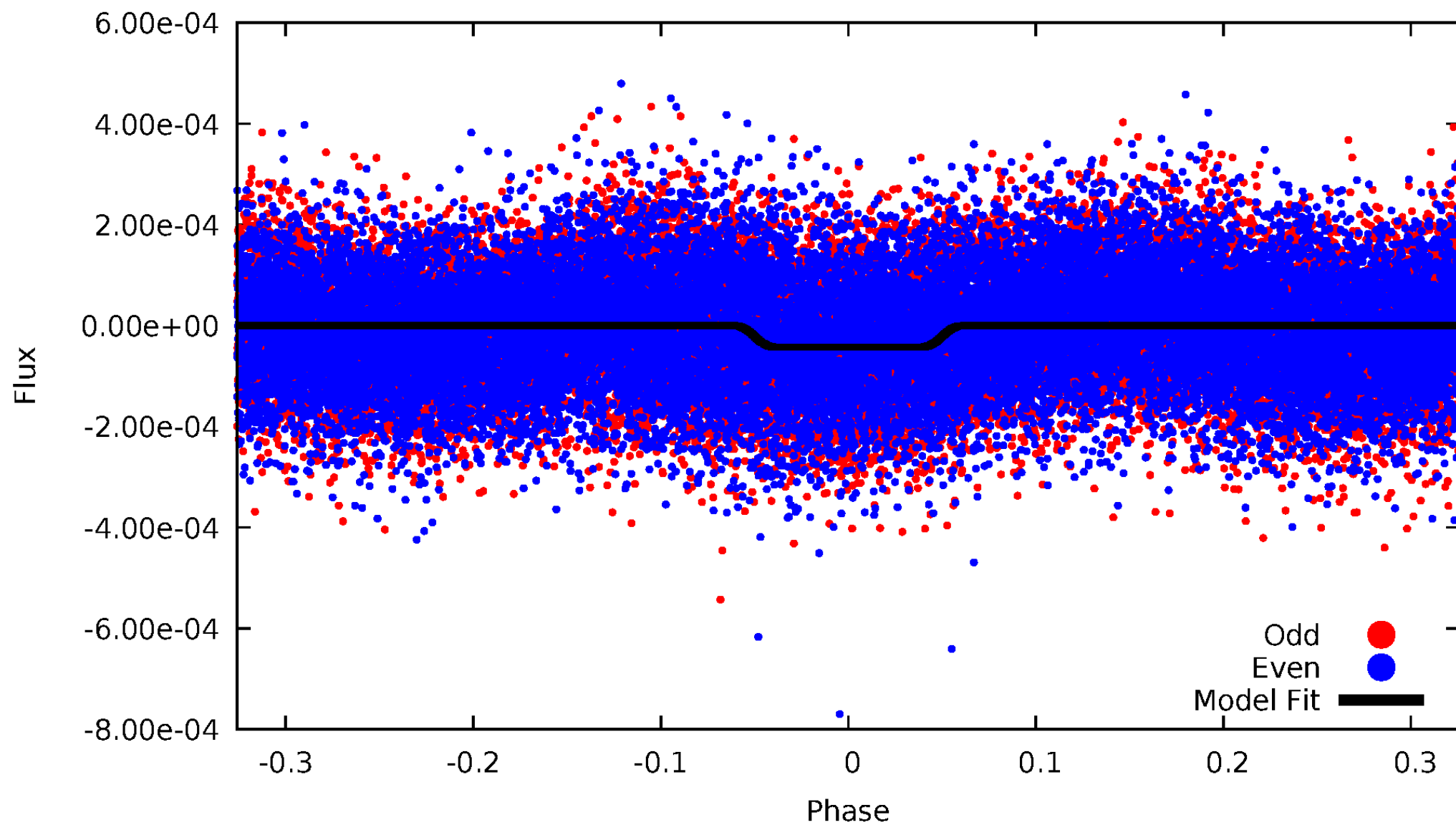
# DV Odd/Even

TCE 010658122-01

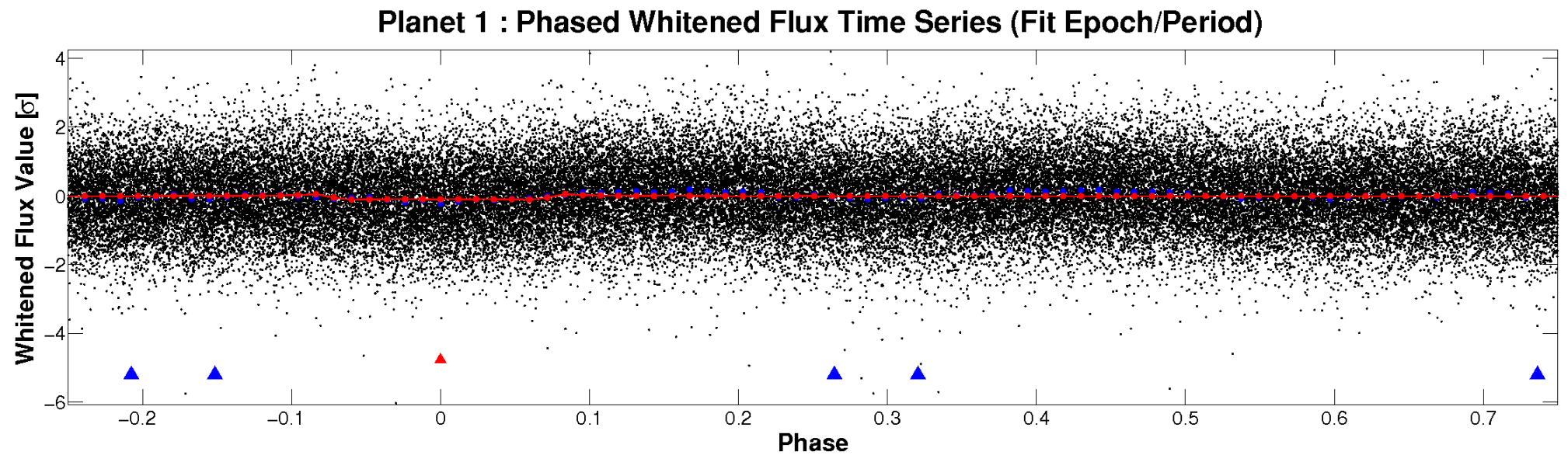
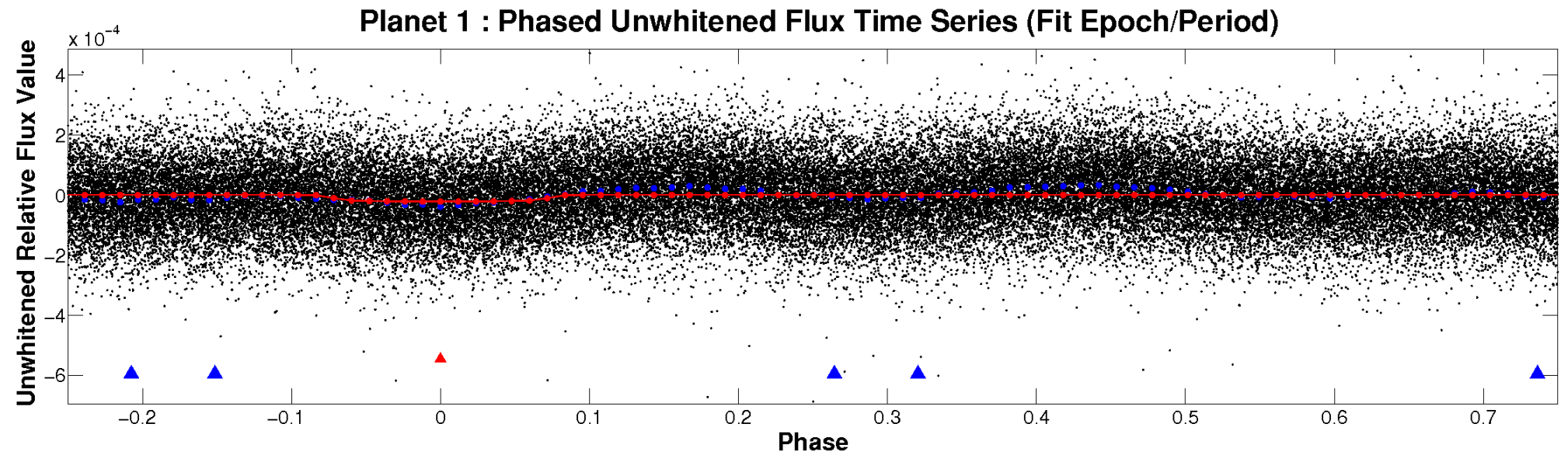


# ALT Odd/Even

TCE 010658122-01



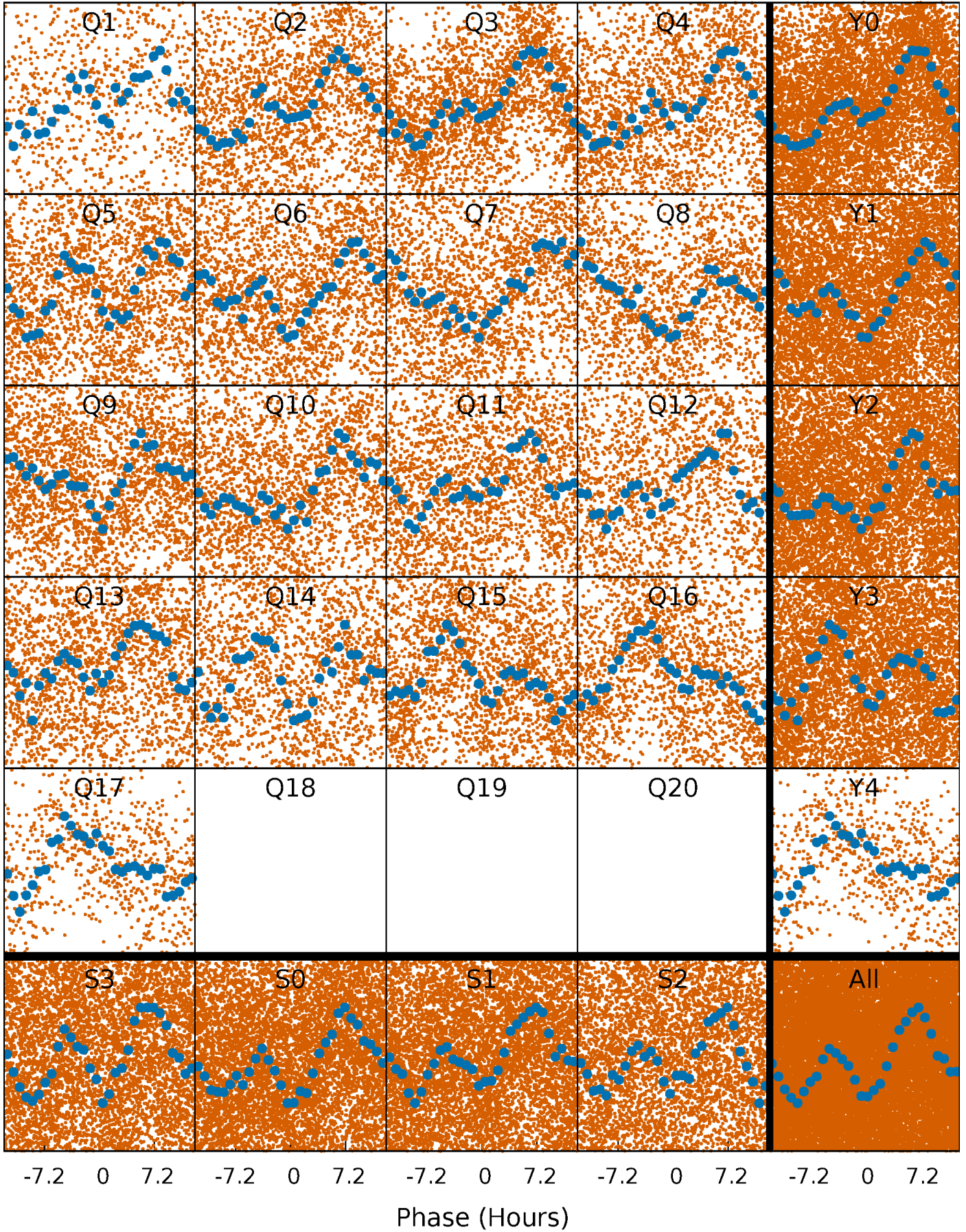
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

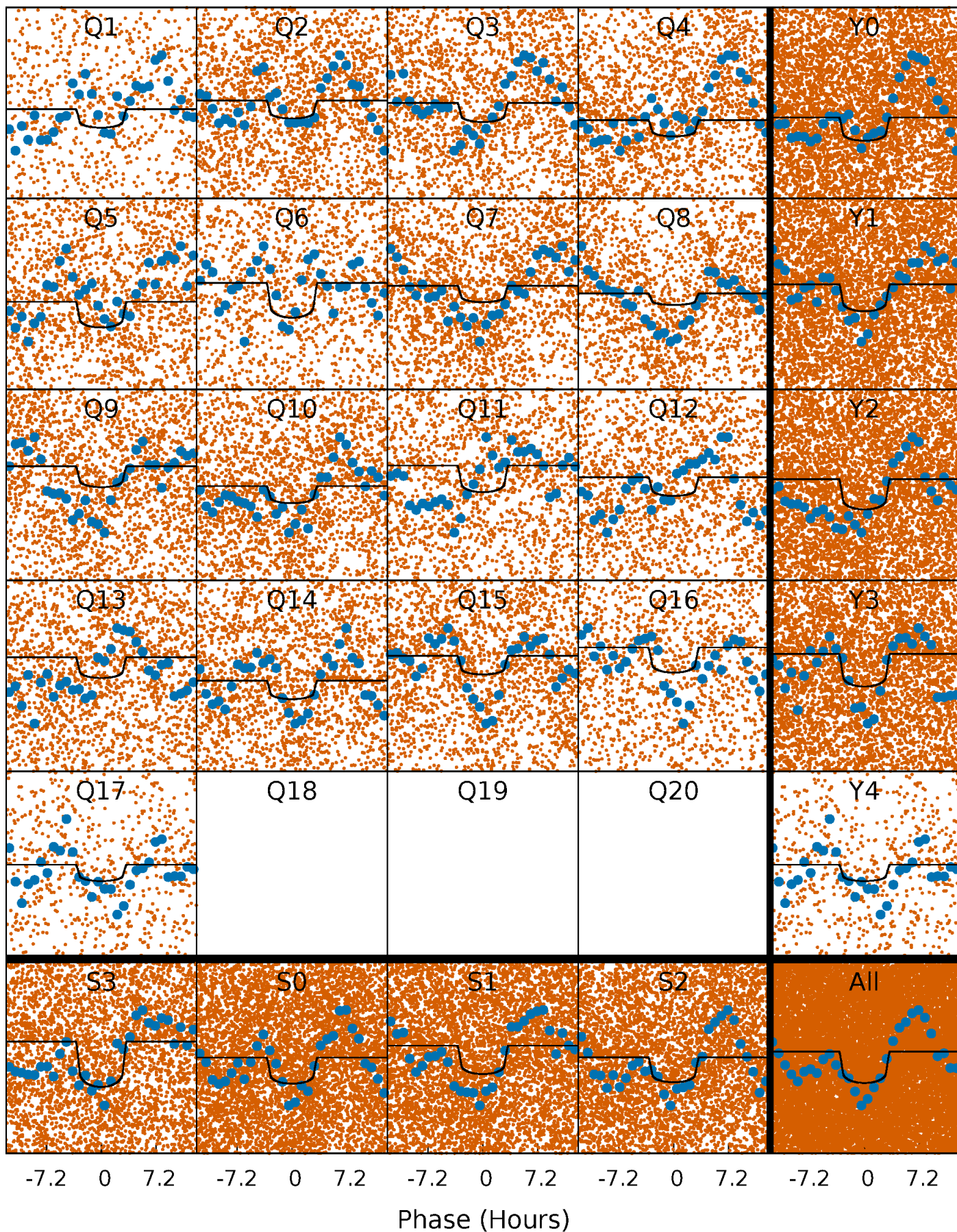
TCE 010658122-01 P= 1.711070 Days  $T_0=132.311925$  (BKJD)





# DV Quarter-Phased Transit Curves

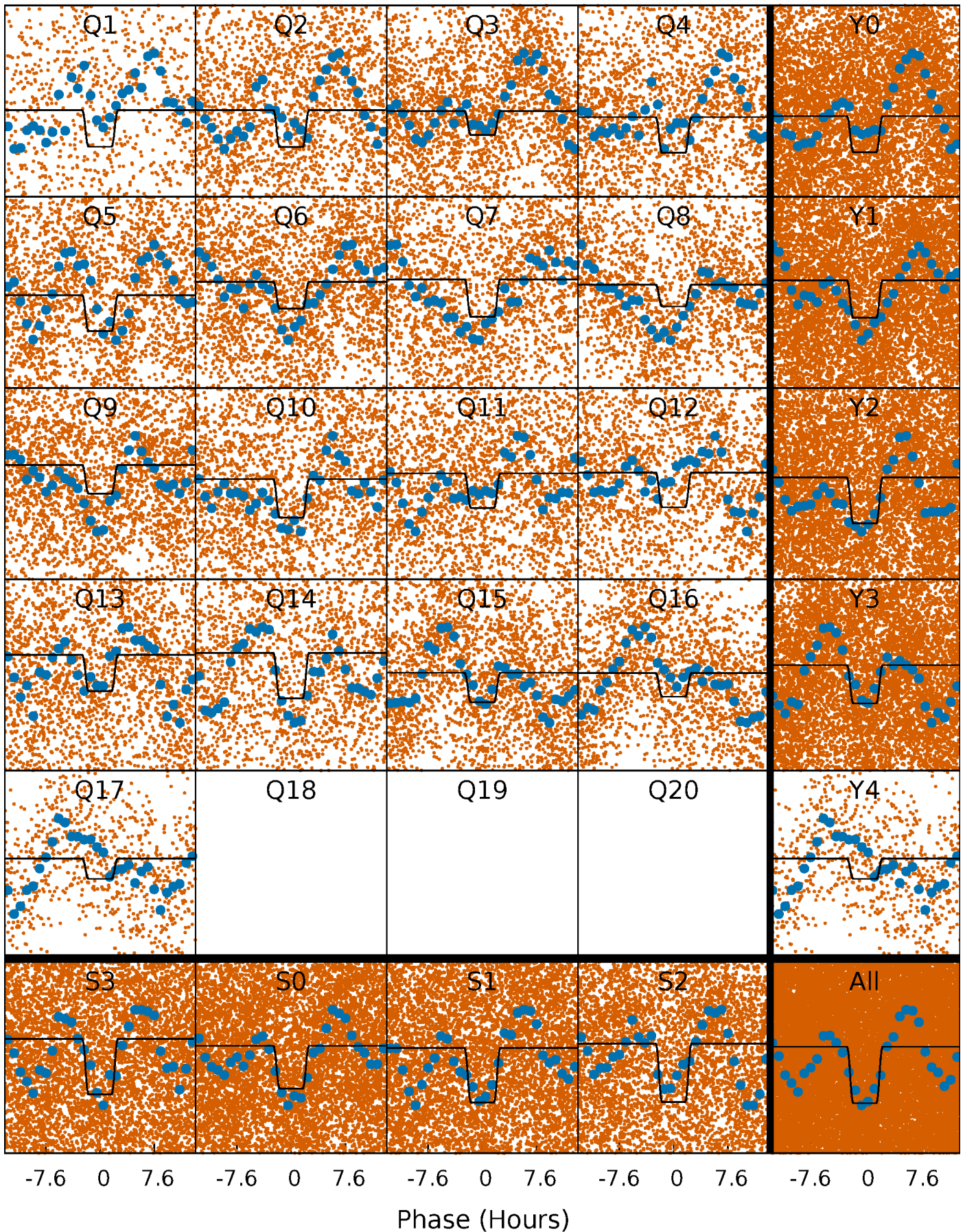
TCE 010658122-01 P= 1.711070 Days  $T_0=132.311925$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

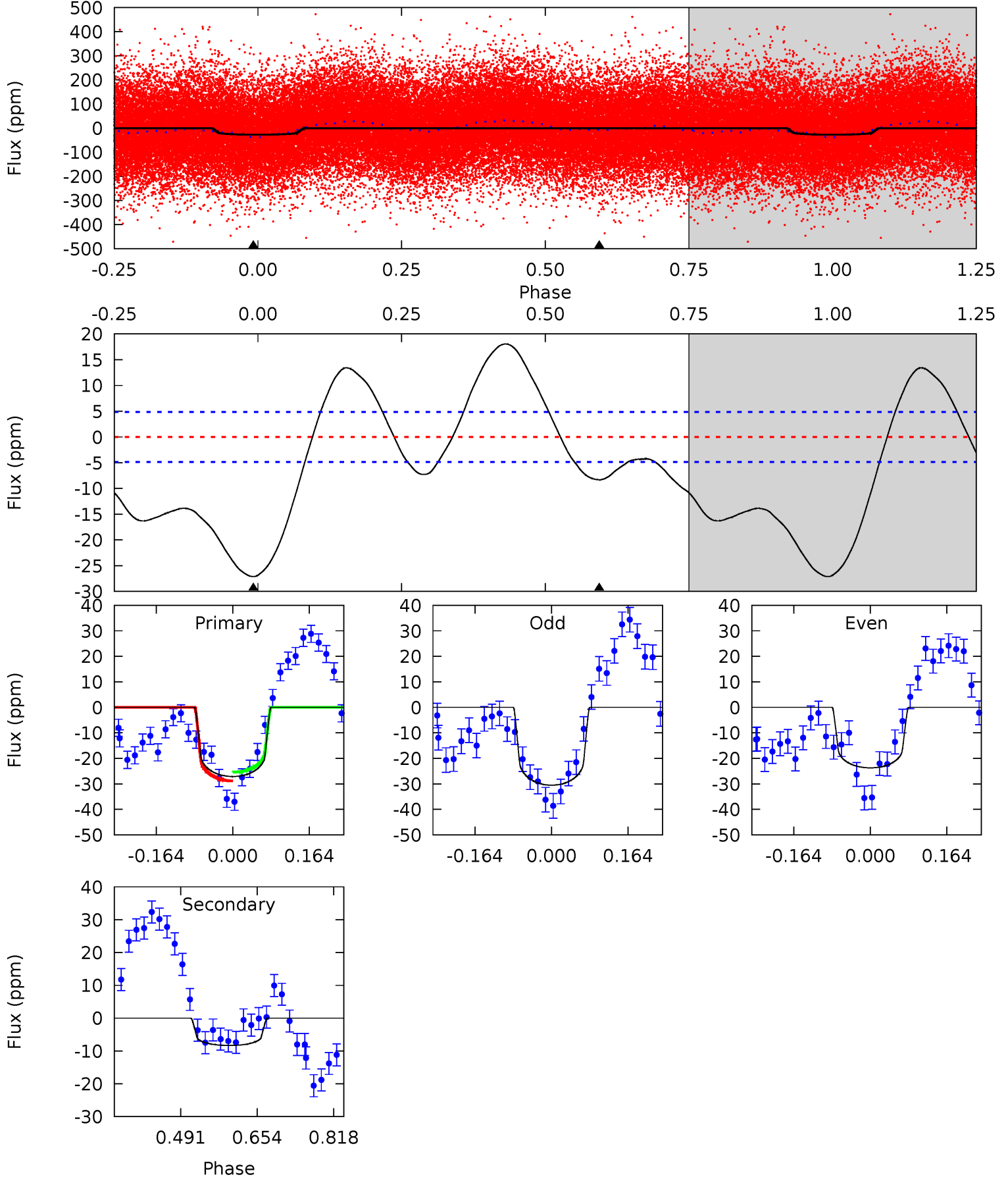
TCE 010658122-01 P= 1.711113 Days  $T_0=132.318598$  (BKJD)



# DV Model-Shift Uniqueness Test

010658122-01, P = 1.711070 Days, E = 130.600855 Days

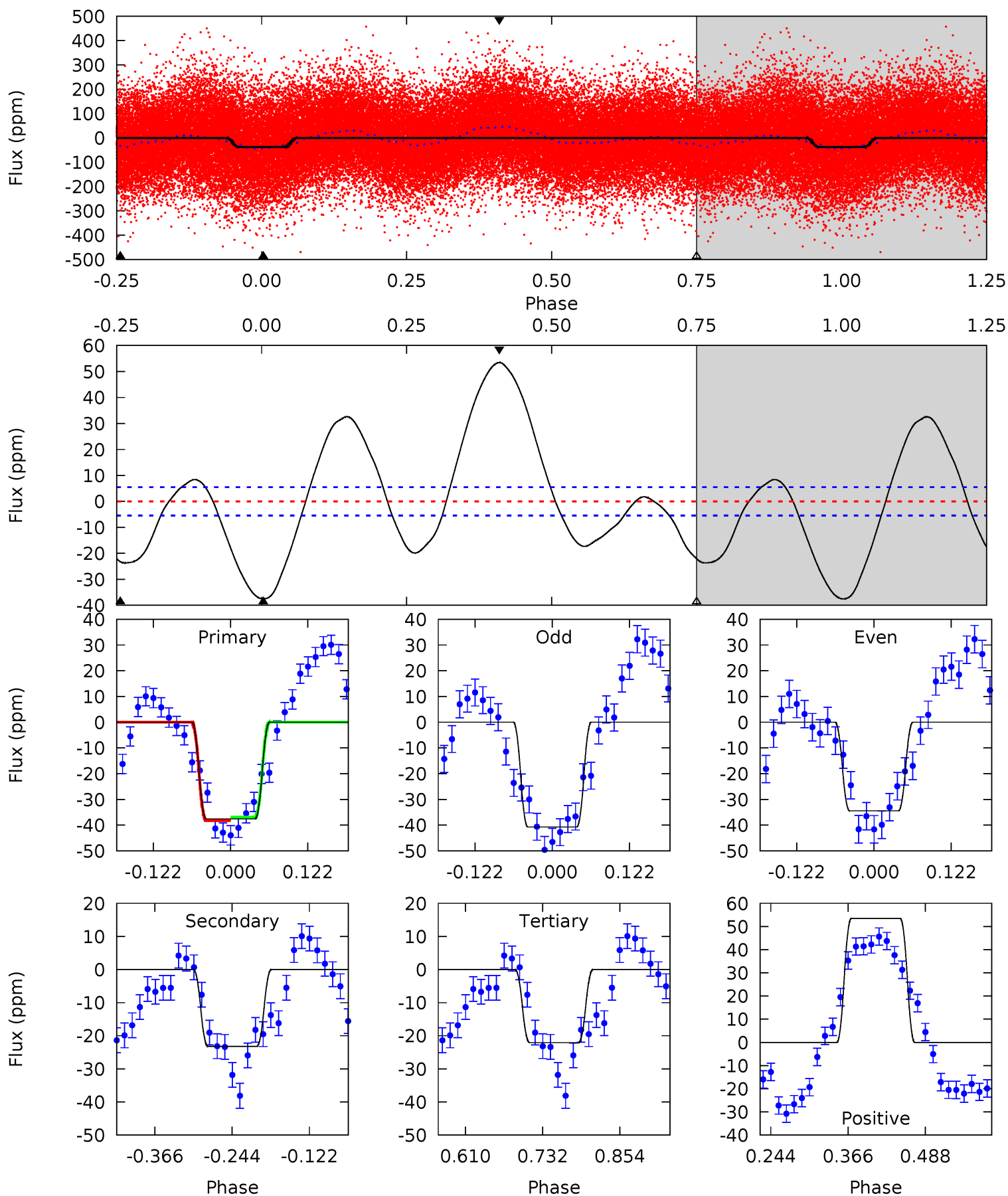
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.9	7.67	0	0	4.46	1.39	9.90	24.9	24.9	7.67	7.67	3.12	1.13	0.40	1.60



# Alt Model-Shift Uniqueness Test

010658122-01, P = 1.711113 Days, E = 130.607485 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
31.0	19.2	18.2	44.1	4.52	1.55	18.7	12.8	-13.1	0.93	-25.0	2.59	0.93	0.59	0.59





### Stellar Parameters For KIC 010658122

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6626^{+240}_{-267}$	$3.648^{+0.323}_{-0.108}$	$-0.460^{+0.350}_{-0.300}$	$2.992^{+0.487}_{-1.218}$	$1.450^{+0.232}_{-0.320}$	$0.076^{+0.180}_{-0.021}$
	+4%/-4%	+9%/-3%	+76%/-65%	+16%/-41%	+16%/-22%	+237%/-28%
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 010658122-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-8 \pm 1$	$1.57^{+0.38}_{-0.36}$	$3901^{+264}_{-372}$	$4892^{+500}_{-398}$	$1.874^{+1.250}_{-0.640}$
Alt.	$-23 \pm 1$	$2.08^{+0.38}_{-0.45}$	$3897^{+288}_{-363}$	$5525^{+452}_{-368}$	$2.997^{+1.623}_{-0.816}$

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

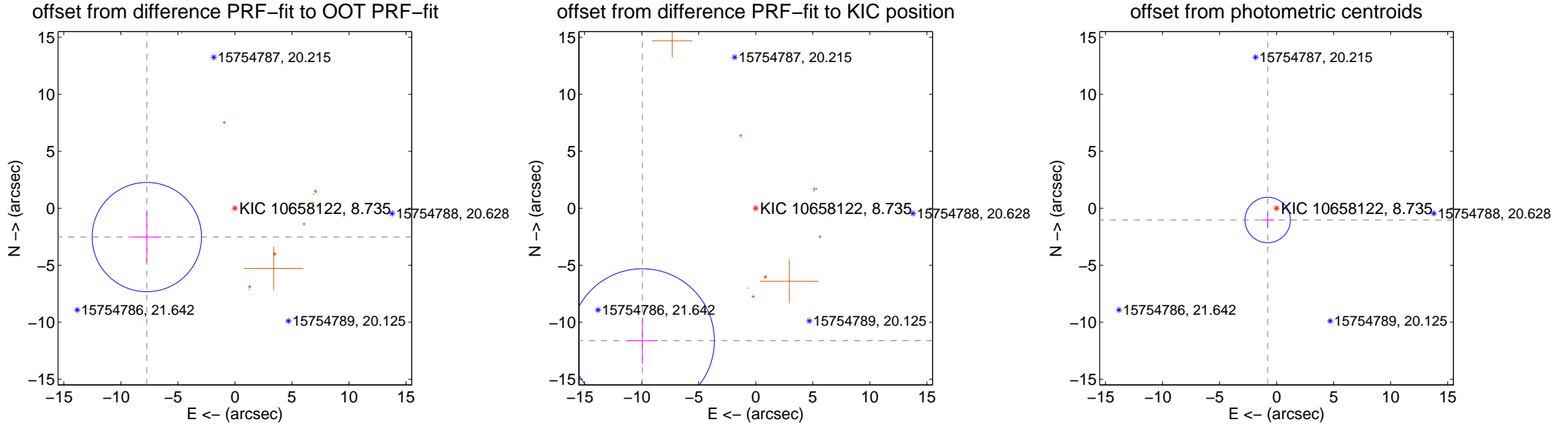
## DV Centroid Data

Supplemental centroid analysis for 010658122-01. **Kepler magnitude: 8.73.** Transit SNR 10.08

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

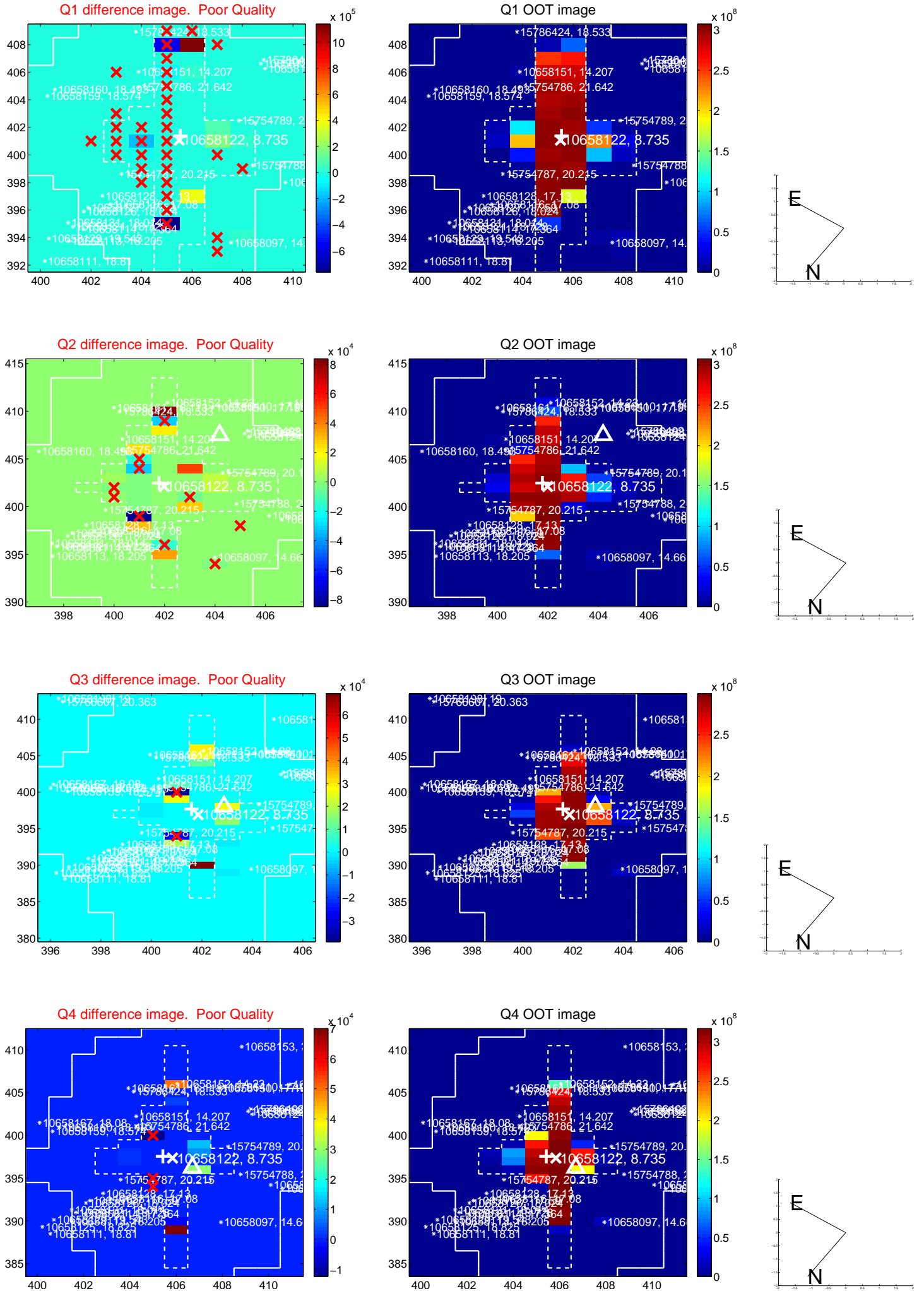
The direct PRF centroid is offset from the target star catalog position by about 1.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>8.126 \pm 1.598</math></b>	<b>5.08</b>	$7.722 \pm 1.287$	$-2.530 \pm 2.240$
PRF-fit source offset from KIC position	<b><math>15.296 \pm 2.105</math></b>	<b>7.27</b>	$9.939 \pm 1.342$	$-11.626 \pm 2.064$
photometric centroid source offset	$1.29 \pm 0.66$	1.95	$0.78 \pm 0.57$	$-1.03 \pm 0.71$

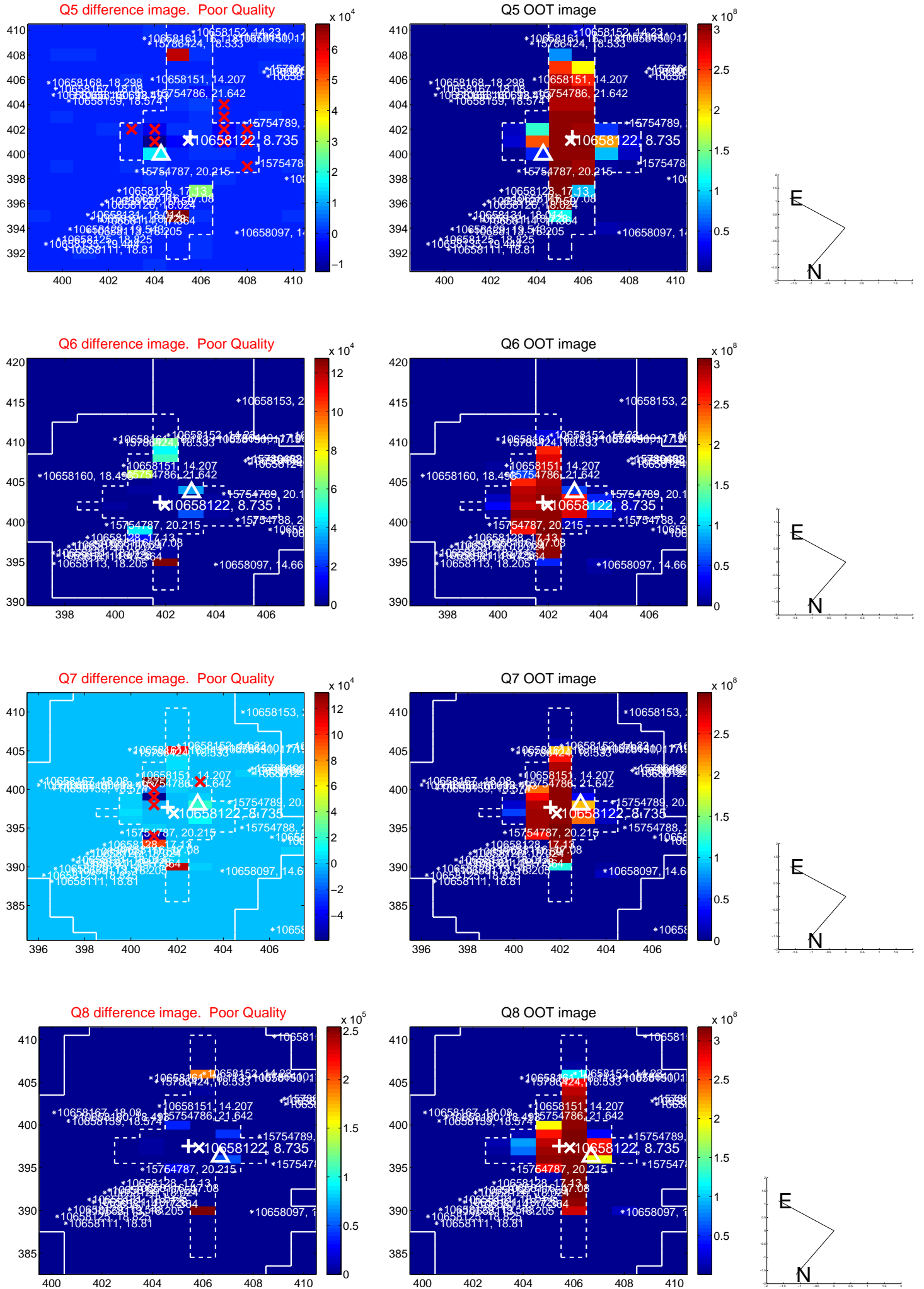


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

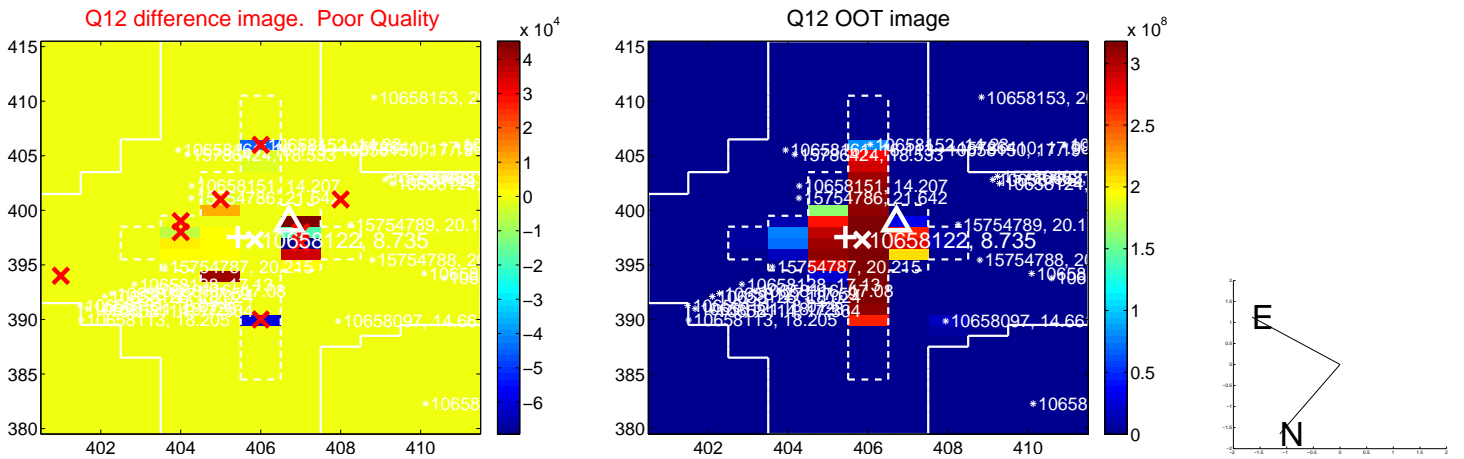
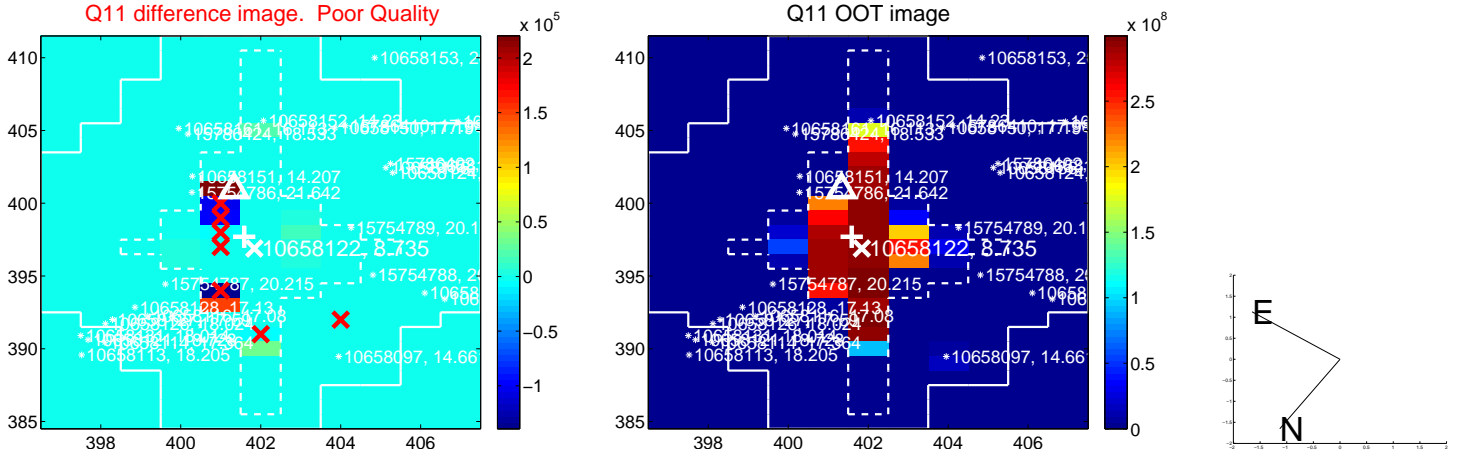
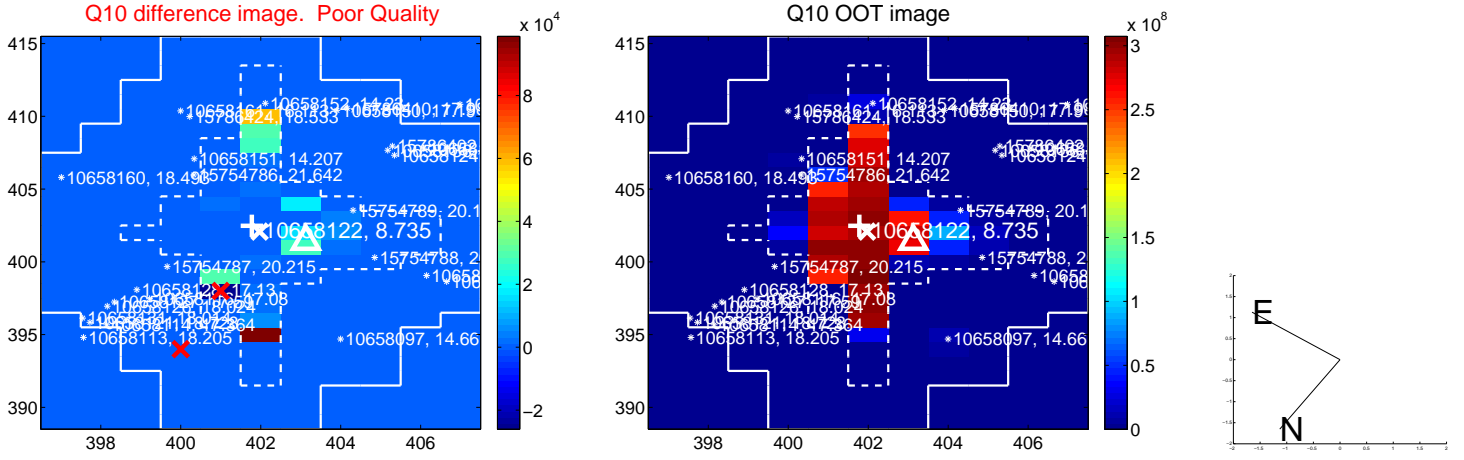
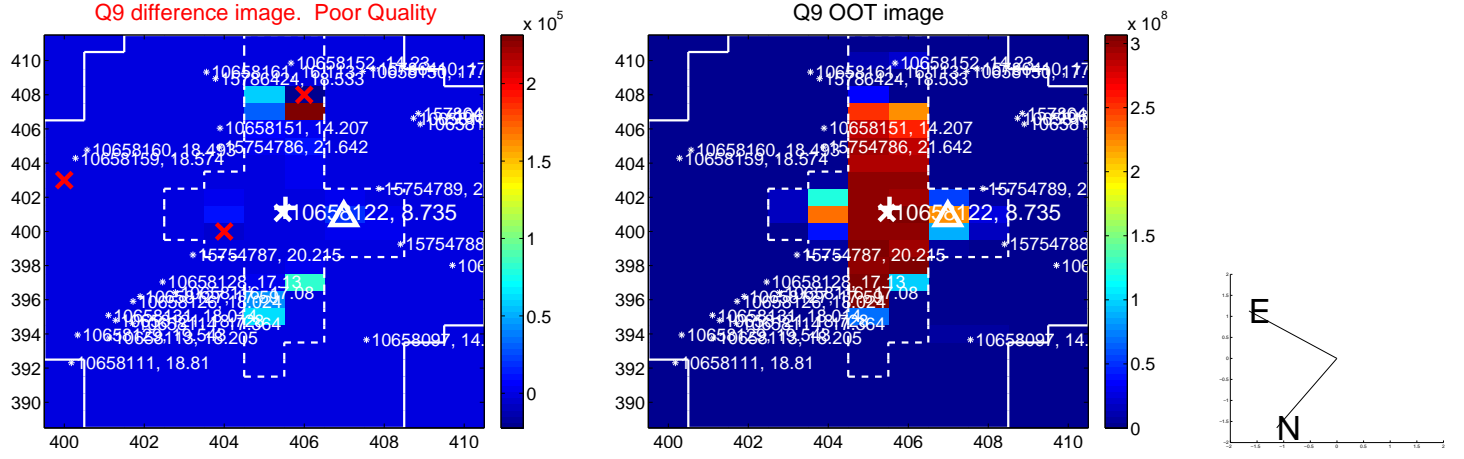


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

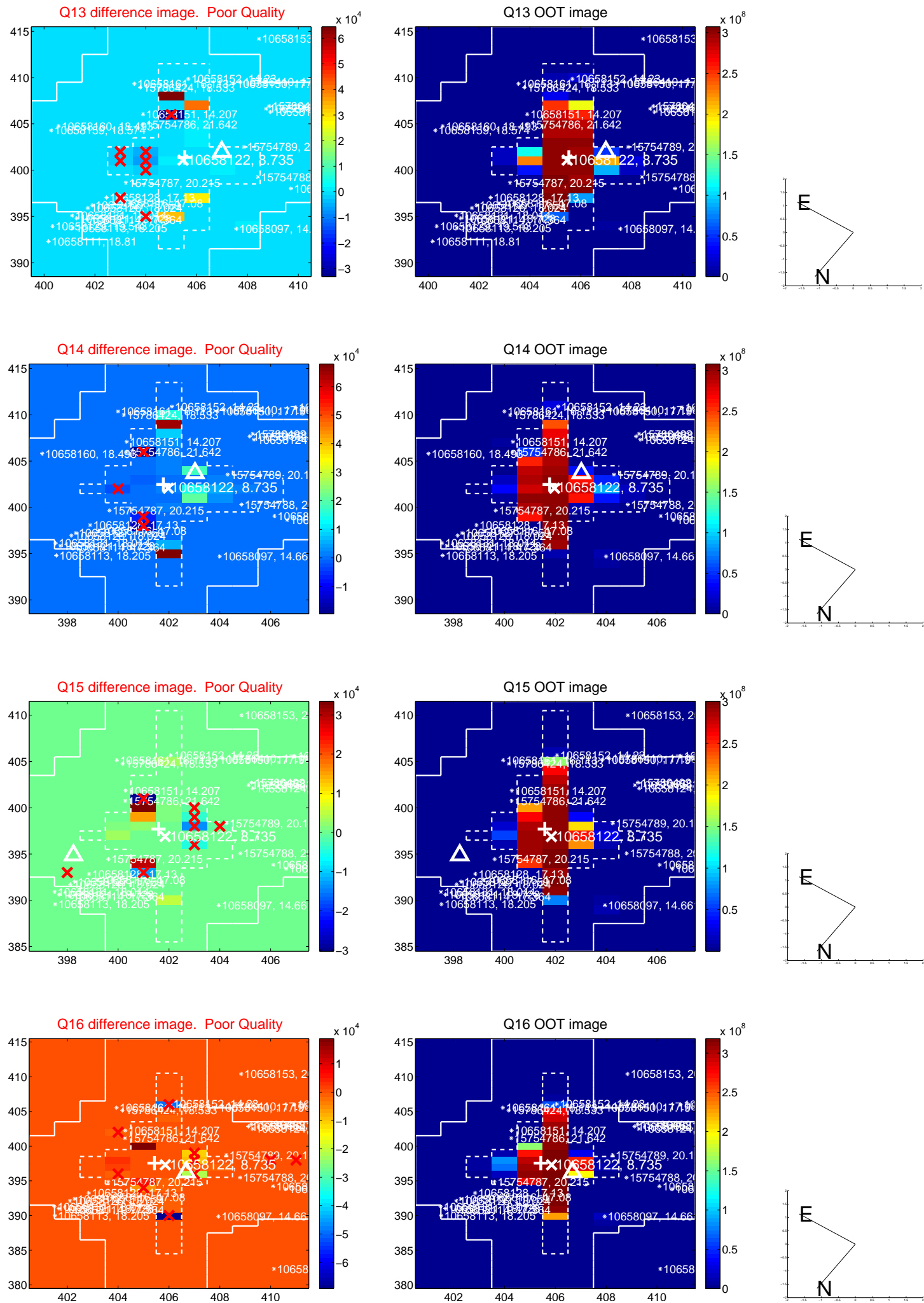




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

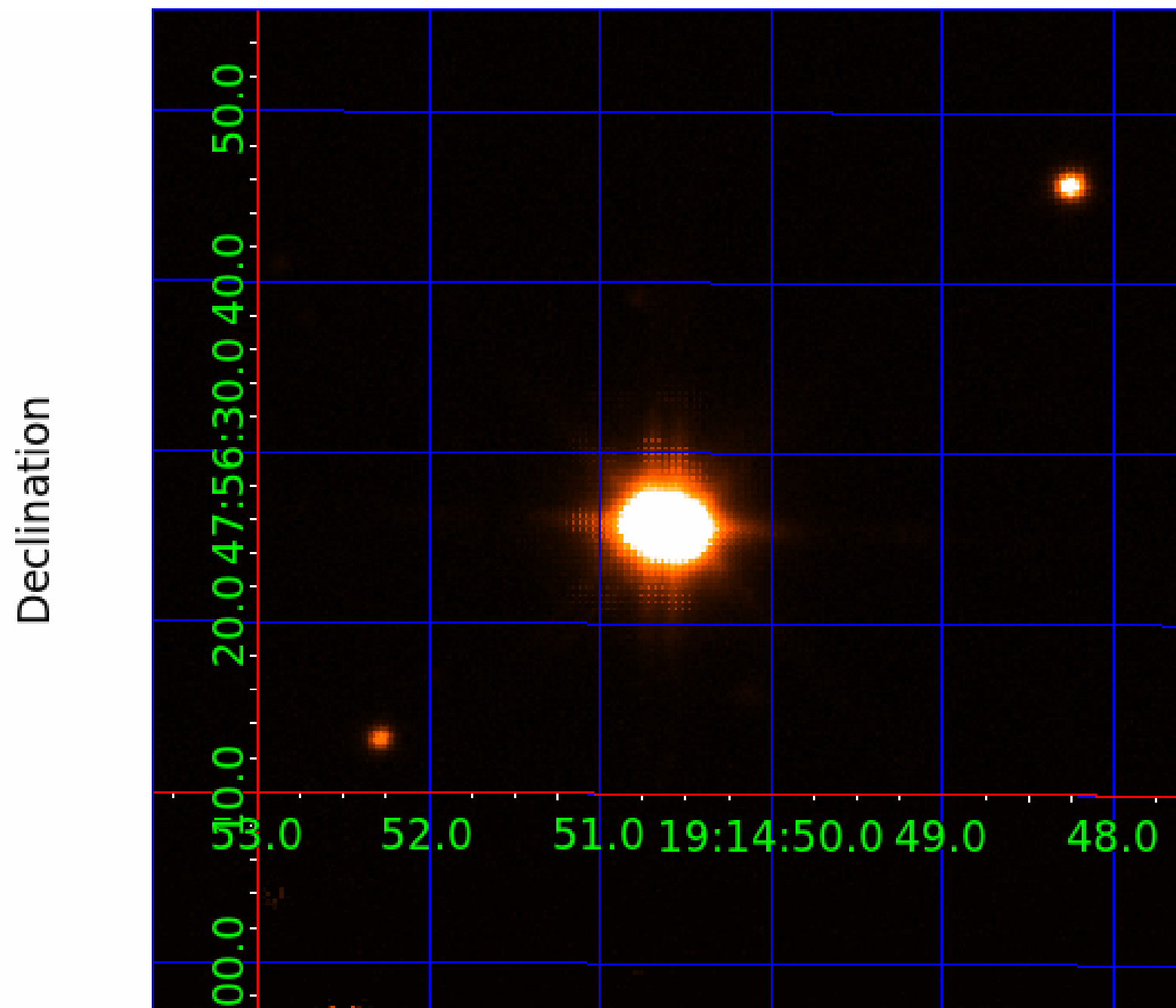


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image





# KIC 010658122

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010658122-01	OBS	No	1.711070	132.311925	21.8	6.268	9.9	10.1	2.99	6626	1.63	15376.26
010658122-02	OBS	No	288.267268	417.801518	195.6	6.009	7.3	6.9	2.99	6626	4.82	16.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010658122-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010658122-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

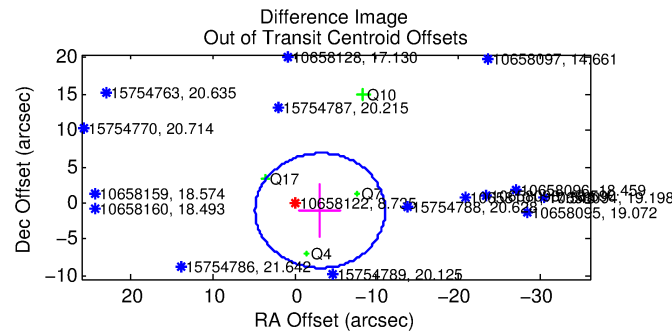
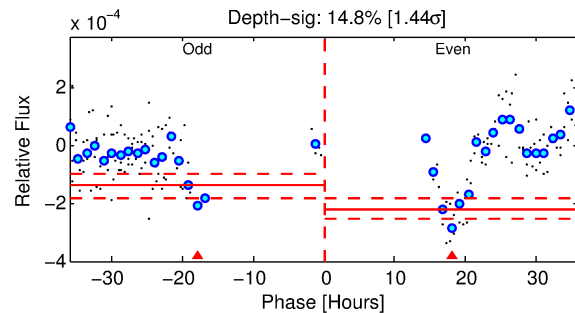
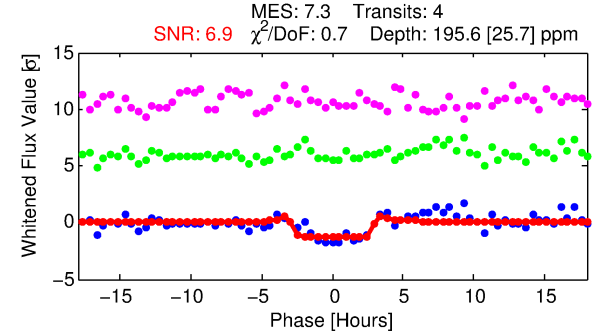
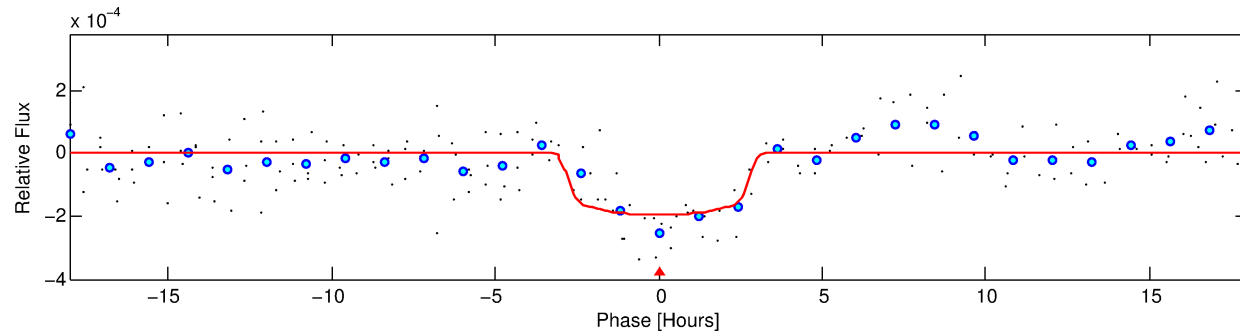
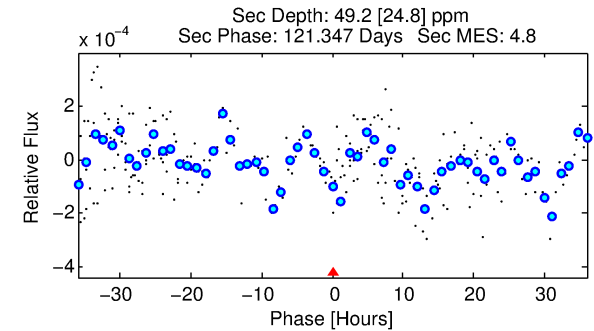
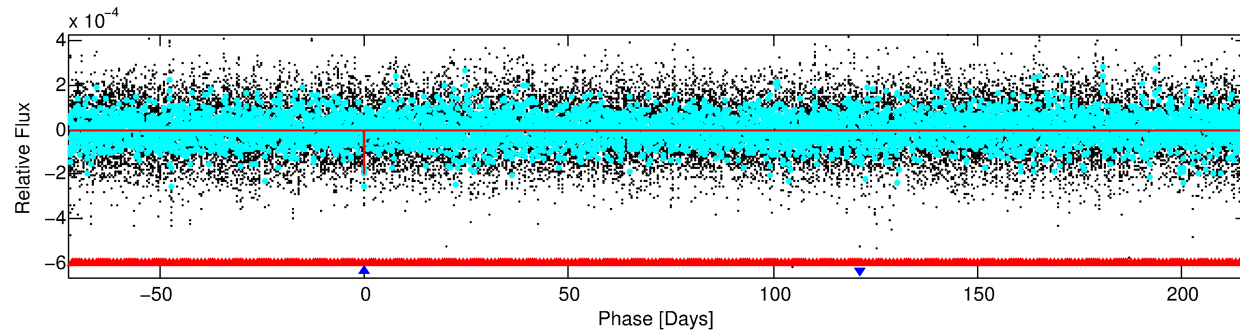
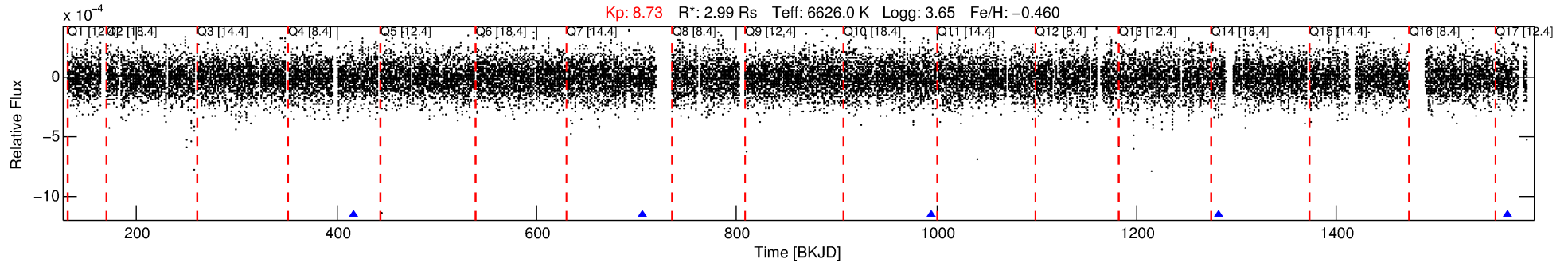
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010658122-02

No Significant Match Found

# DV One-Page Summary

KIC: 10658122 Candidate: 2 of 2 Period: 288.267 d



## DV Fit Results:

Period = 288.26727 [0.00458] d  
Epoch = 417.8015 [0.0115] BKJD  
Rp/R\* = 0.0148 [0.0051]  
a/R\* = 182.72 [367.58]  
b = 0.88 [0.50]  
Seff = 16.53 [9.71]  
Teq = 514 [76] K  
Rp = 4.82 [2.58] Re  
a = 0.9672 [0.3555] AU  
Ag = 1090.39 [1120.88] [0.97σ]  
Teffp = 4568 [998] K [4.05σ]

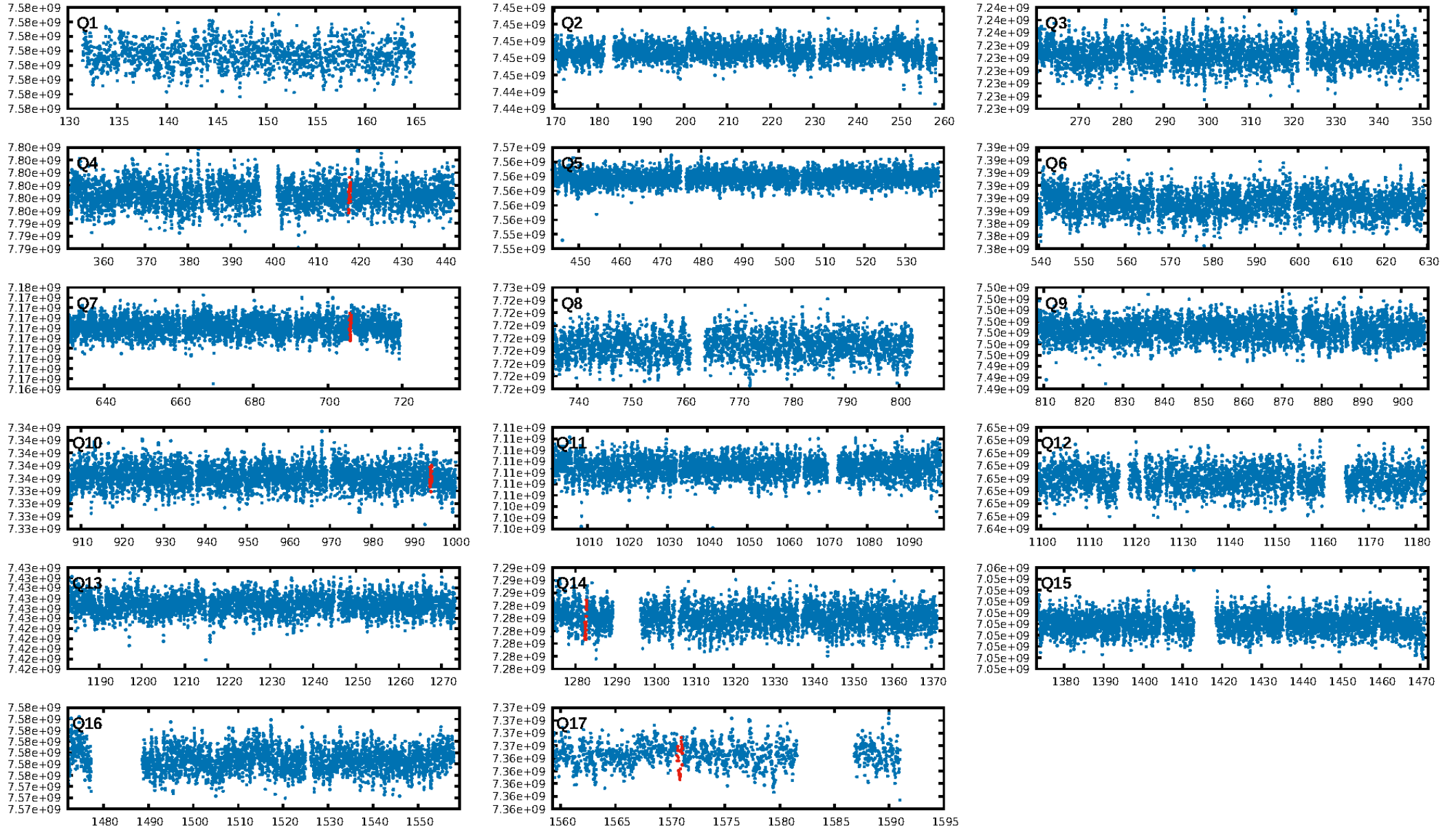
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [792.06σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 26.6%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.40e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 1.493 arcsec [1.71σ]  
OotOffset-rm: 3.288 arcsec [1.25σ]  
KicOffset-rm: 2.380 arcsec [0.81σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.00 [0/4]  
DiffImageOverlap-fno: 0.00 [0/4]

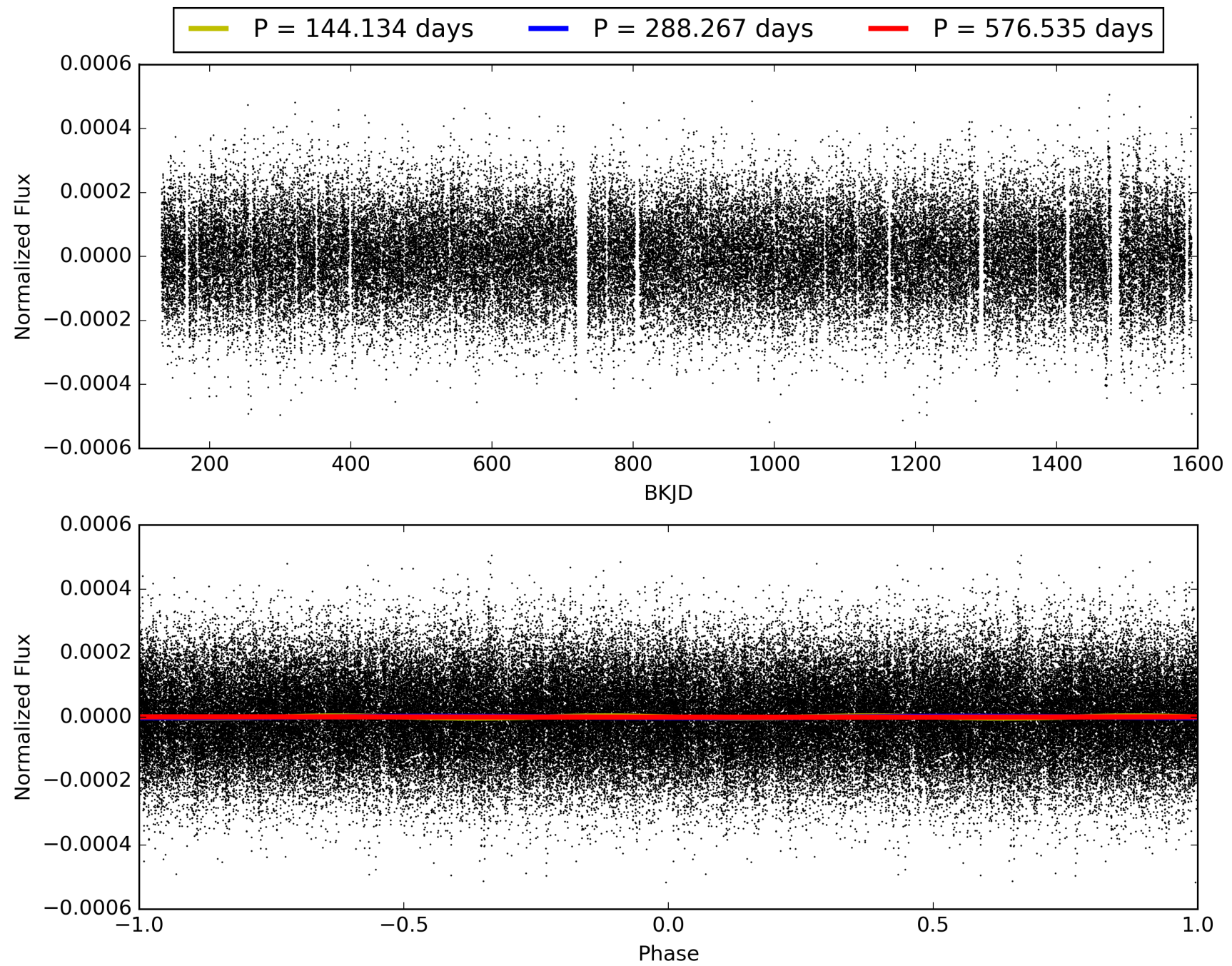
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 06:42:52 Z

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

# TCE 010658122-02, PDC Light Curves



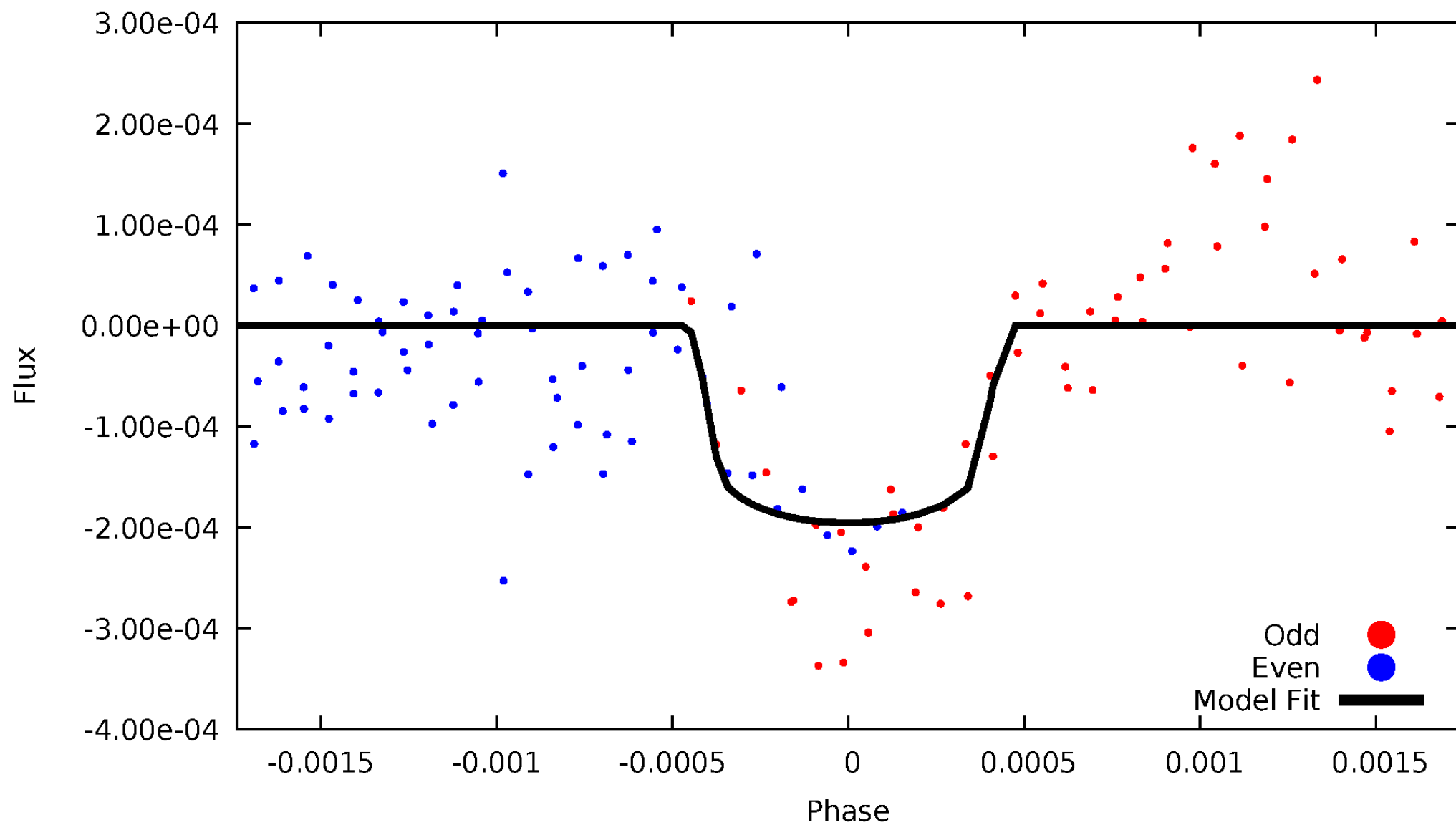
TCE 010658122-02





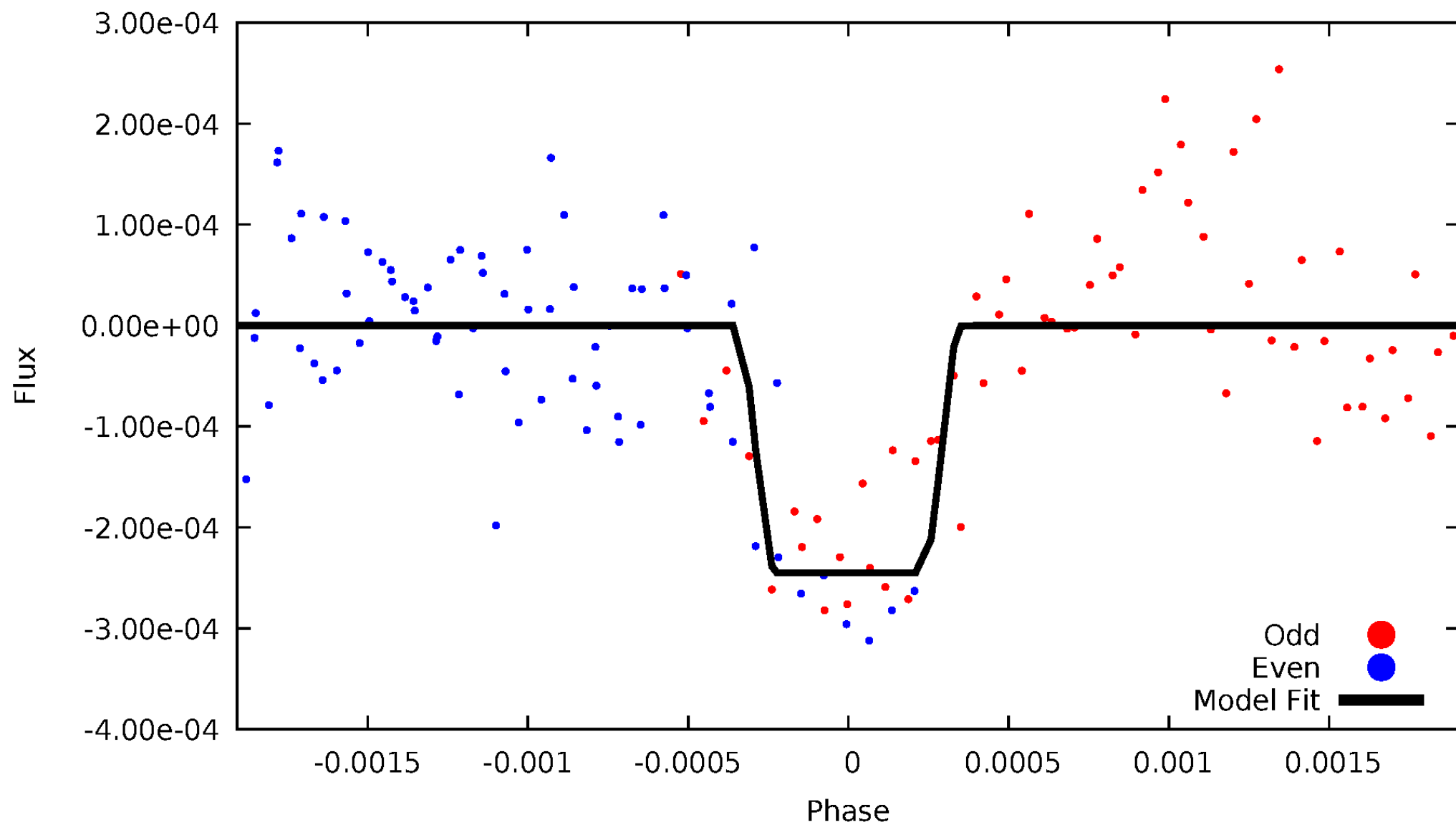
# DV Odd/Even

TCE 010658122-02



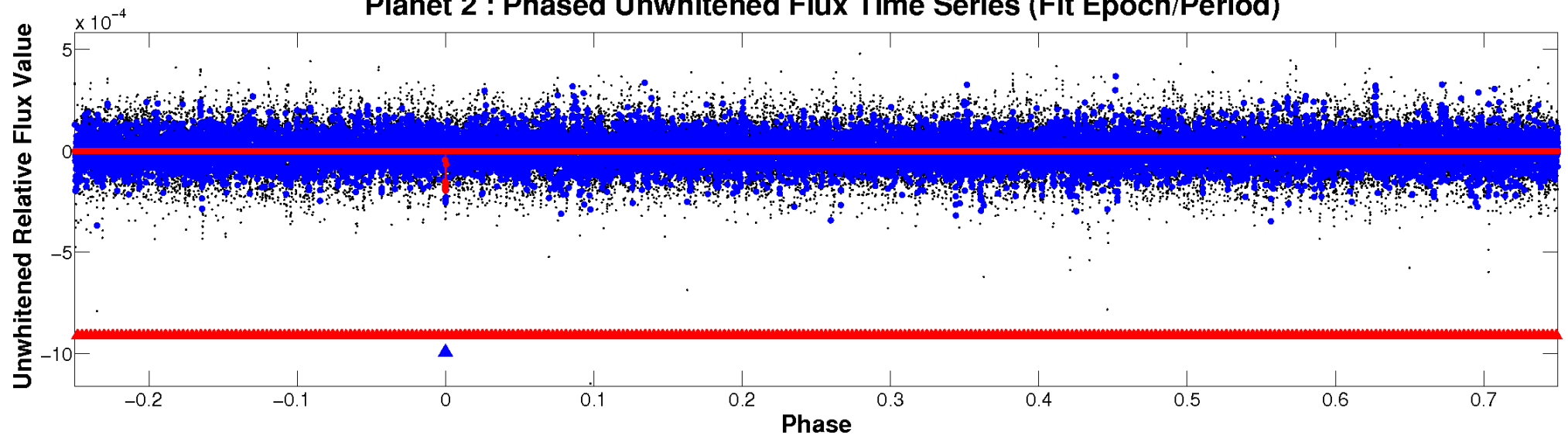
# ALT Odd/Even

TCE 010658122-02

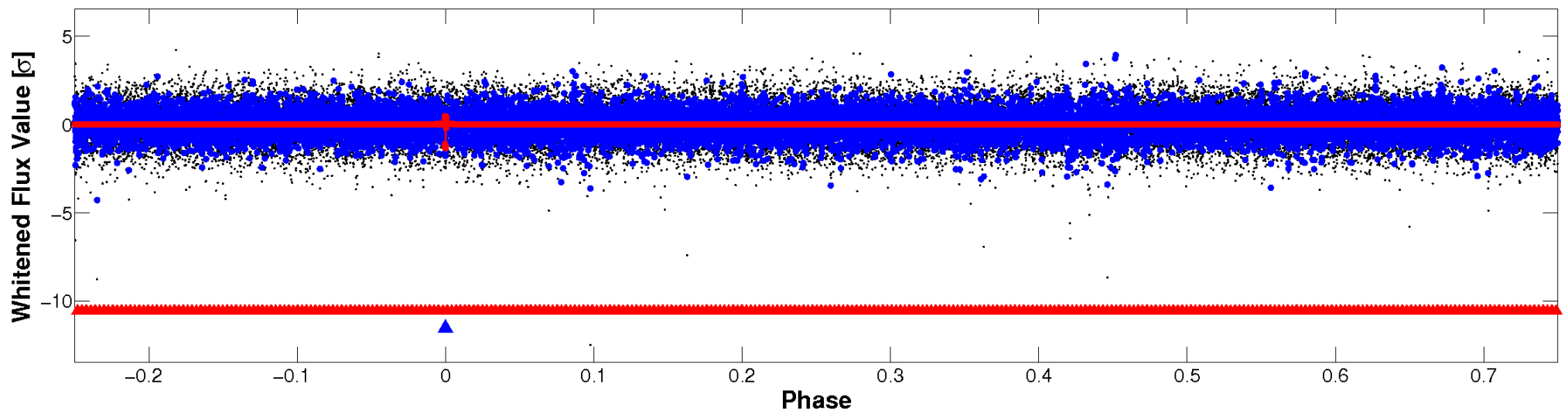


# Non-Whitened Vs. Whitened Light Curve

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

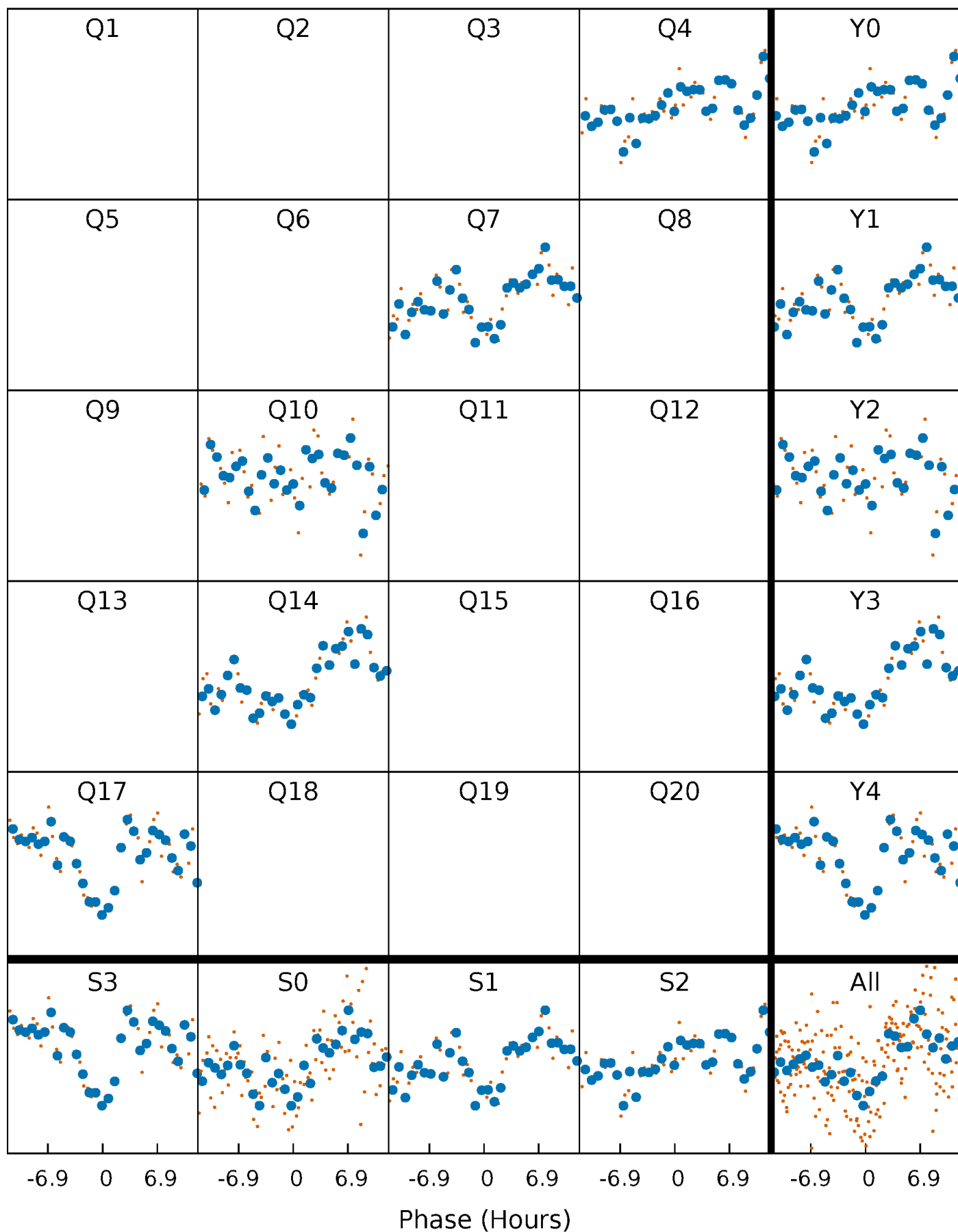


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

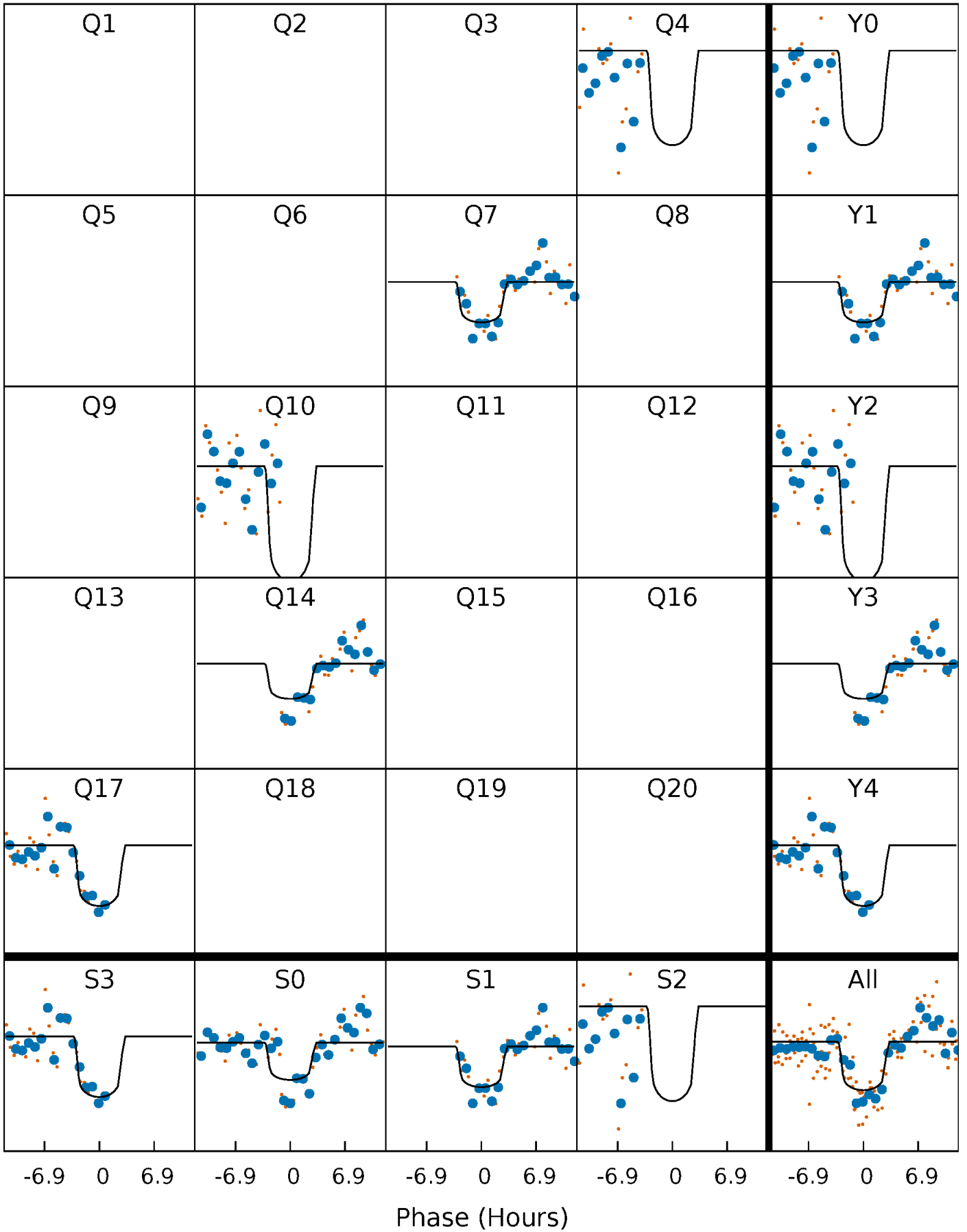
TCE 010658122-02   P=288.267268 Days    $T_0=417.801518$  (BKJD)





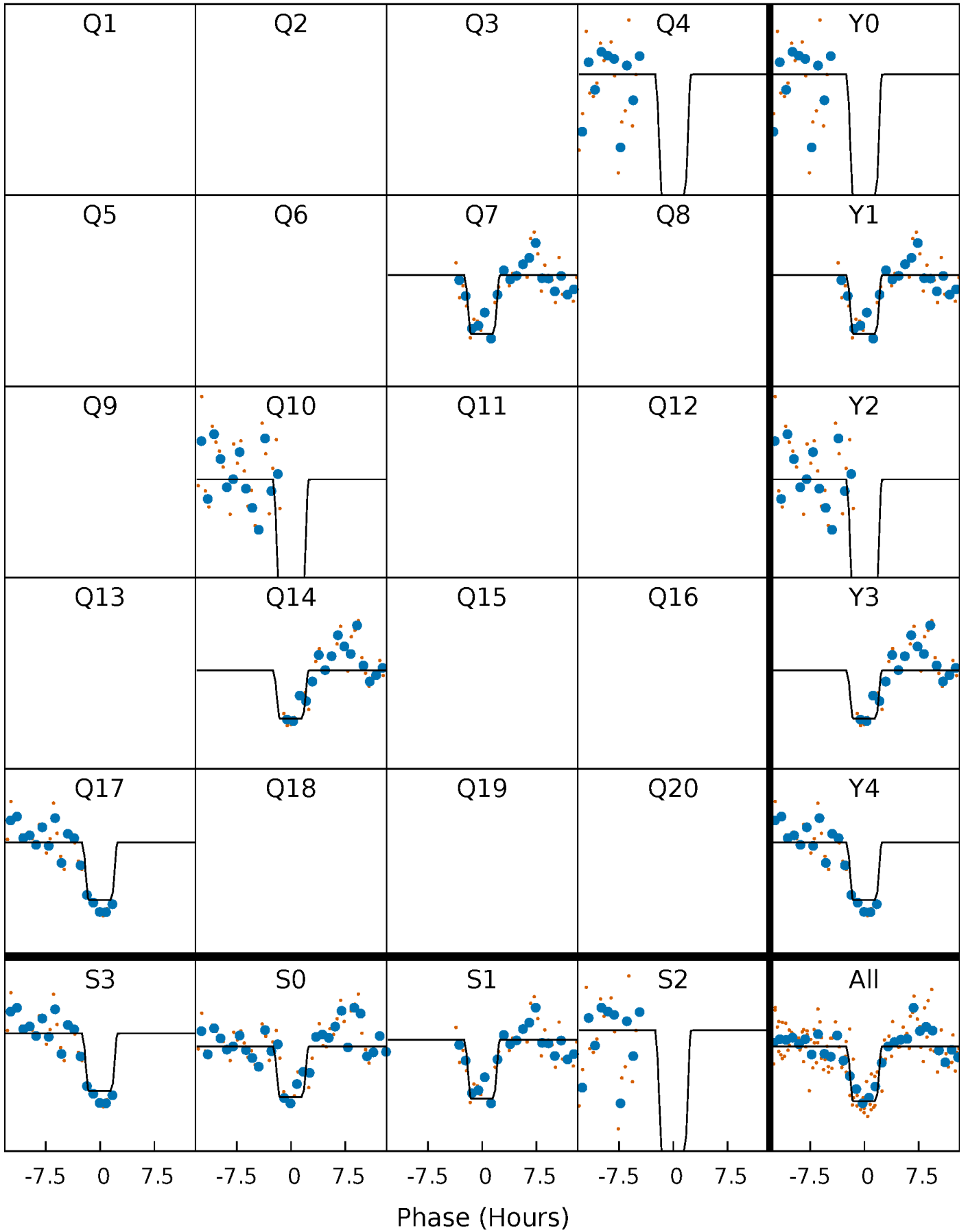
# DV Quarter-Phased Transit Curves

TCE 010658122-02 P=288.267268 Days  $T_0=417.801518$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

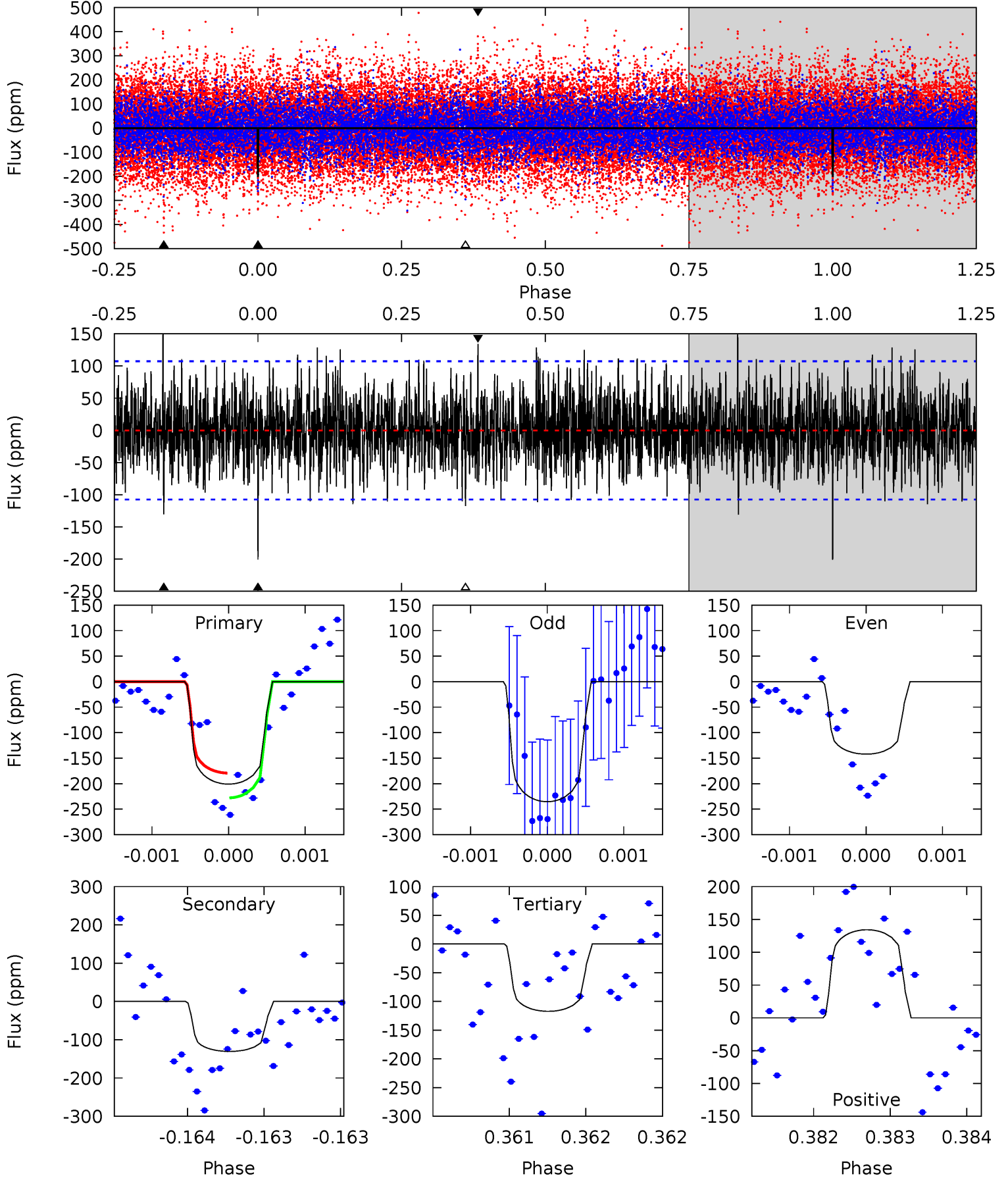
TCE 010658122-02   P=288.254804 Days    $T_0=417.835823$  (BKJD)



# DV Model-Shift Uniqueness Test

010658122-02, P = 288.267268 Days, E = 129.534250 Days

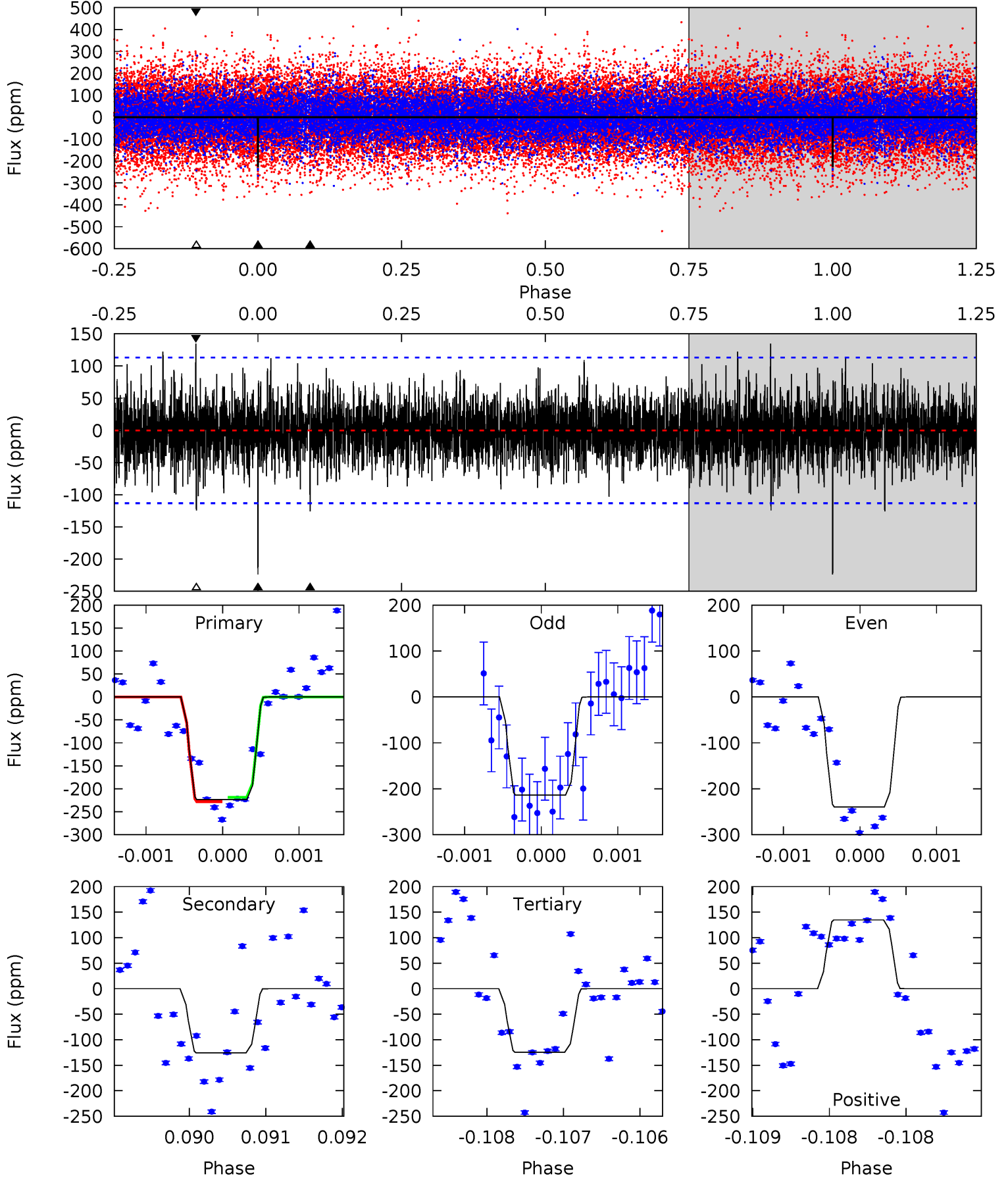
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	6.66	5.98	6.85	5.49	3.34	2.00	4.27	3.40	0.68	-0.19	2.31	0.85	0.43	1.23



# Alt Model-Shift Uniqueness Test

010658122-02, P = 288.254804 Days, E = 129.581019 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	6.13	6.07	6.57	5.52	3.41	1.59	4.84	4.34	0.06	-0.44	0.61	0.85	0.38	0.23





### Stellar Parameters For KIC 010658122

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6626^{+240}_{-267}$	$3.648^{+0.323}_{-0.108}$	$-0.460^{+0.350}_{-0.300}$	$2.992^{+0.487}_{-1.218}$	$1.450^{+0.232}_{-0.320}$	$0.076^{+0.180}_{-0.021}$
	+4%/-4%	+9%/-3%	+76%/-65%	+16%/-41%	+16%/-22%	+237%/-28%
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 010658122-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-131 \pm 20$	$4.59^{+1.82}_{-1.75}$	$708^{+45}_{-75}$	$5819^{+1479}_{-807}$	$3315^{+5124}_{-1699}$
Alt.	$-126 \pm 21$	$4.86^{+1.84}_{-1.74}$	$707^{+49}_{-68}$	$5619^{+1280}_{-716}$	$2744^{+3785}_{-1290}$

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

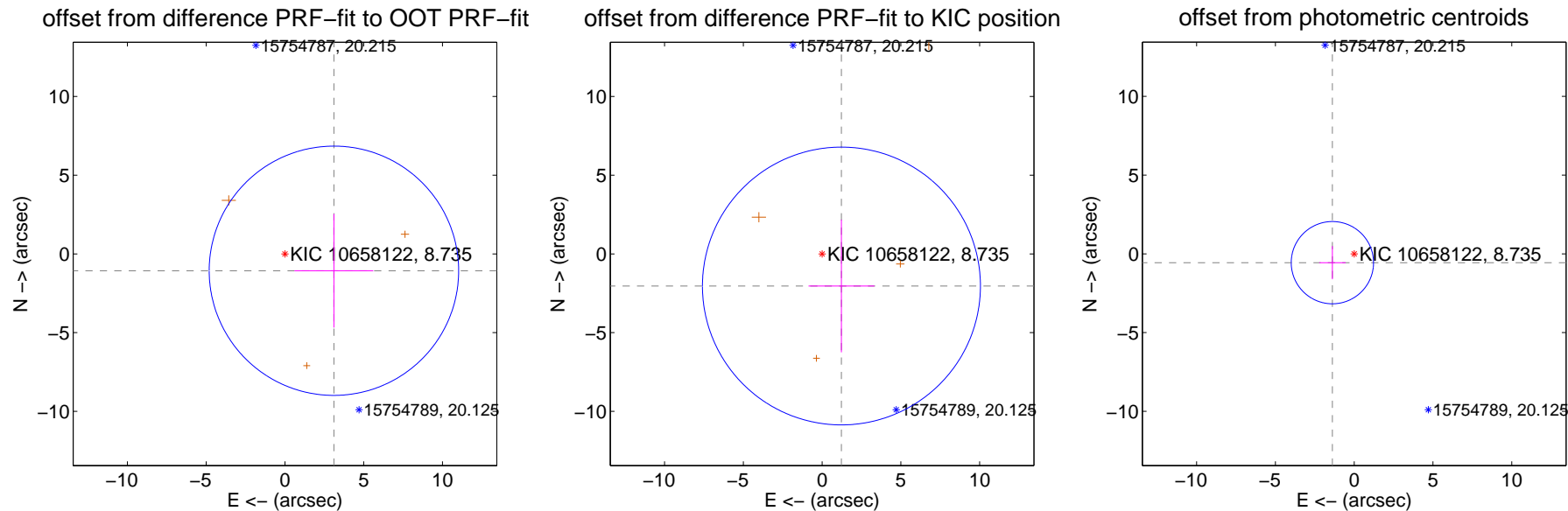
## DV Centroid Data

Supplemental centroid analysis for 010658122-02. **Kepler magnitude: 8.73.** Transit SNR 6.94

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

The direct PRF centroid is offset from the target star catalog position by about 1.16 arcsec

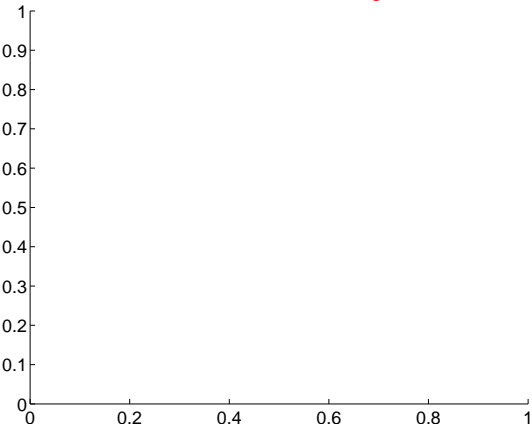
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.288 \pm 2.639$	1.25	$-3.109 \pm 2.499$	$-1.070 \pm 3.608$
PRF-fit source offset from KIC position	$2.380 \pm 2.941$	0.81	$-1.228 \pm 2.088$	$-2.038 \pm 4.216$
photometric centroid source offset	$1.49 \pm 0.87$	1.71	$1.38 \pm 0.84$	$-0.56 \pm 1.05$



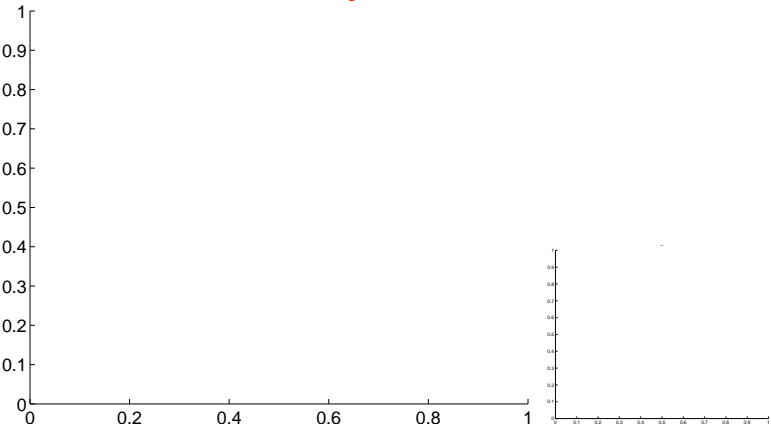
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

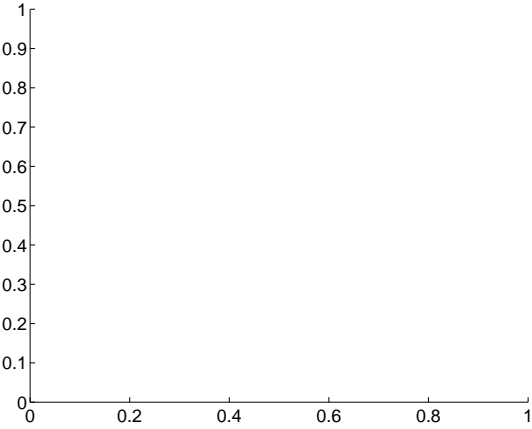
Q1 no difference image



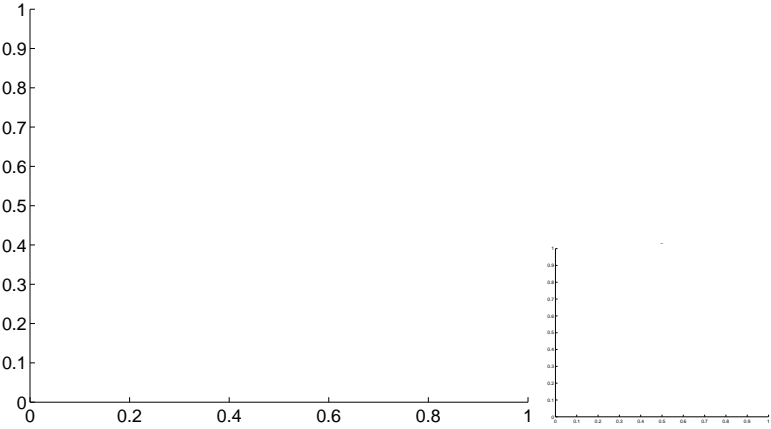
Q1 no OOT image



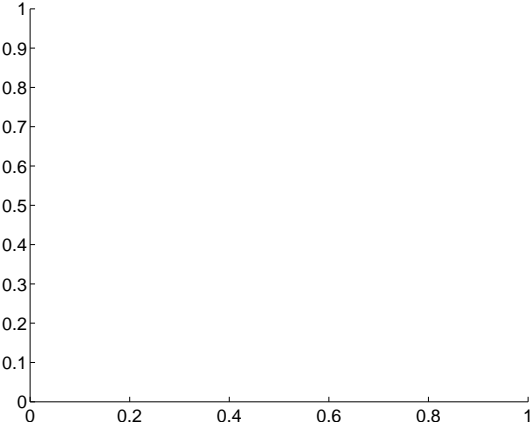
Q2 no difference image



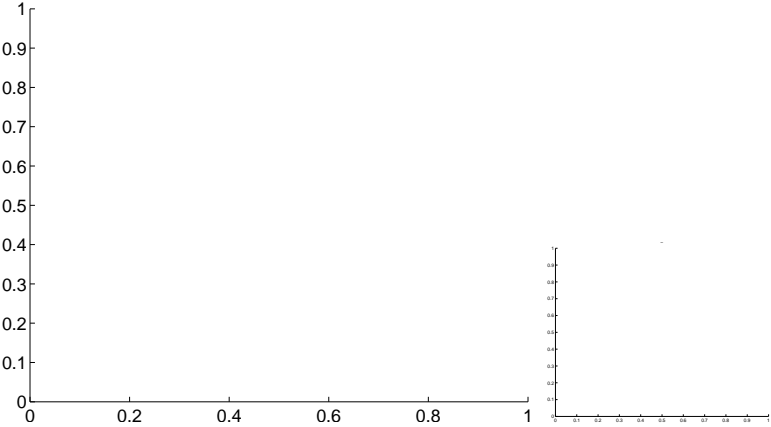
Q2 no OOT image



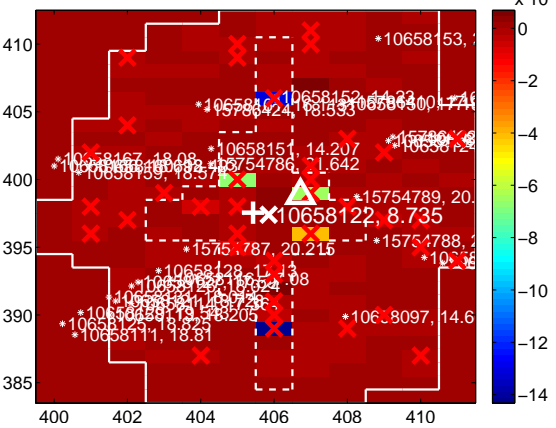
Q3 no difference image



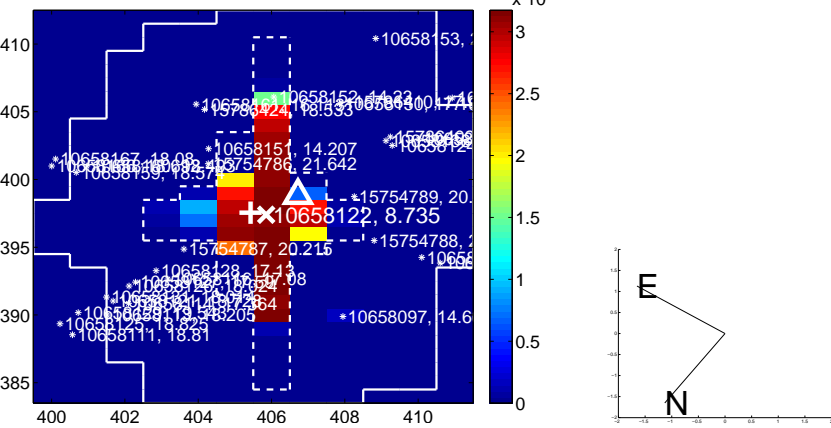
Q3 no OOT image



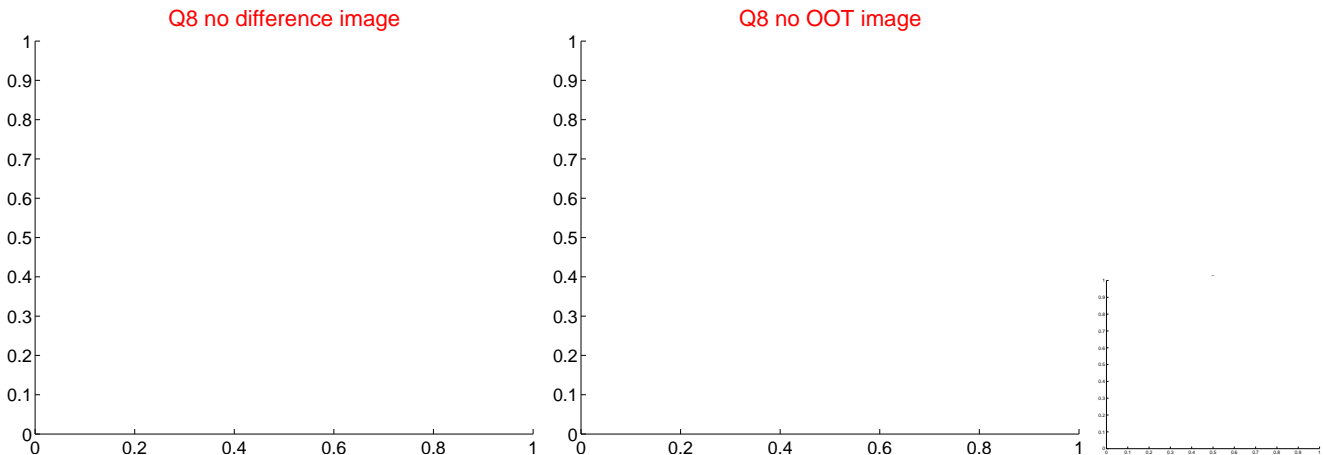
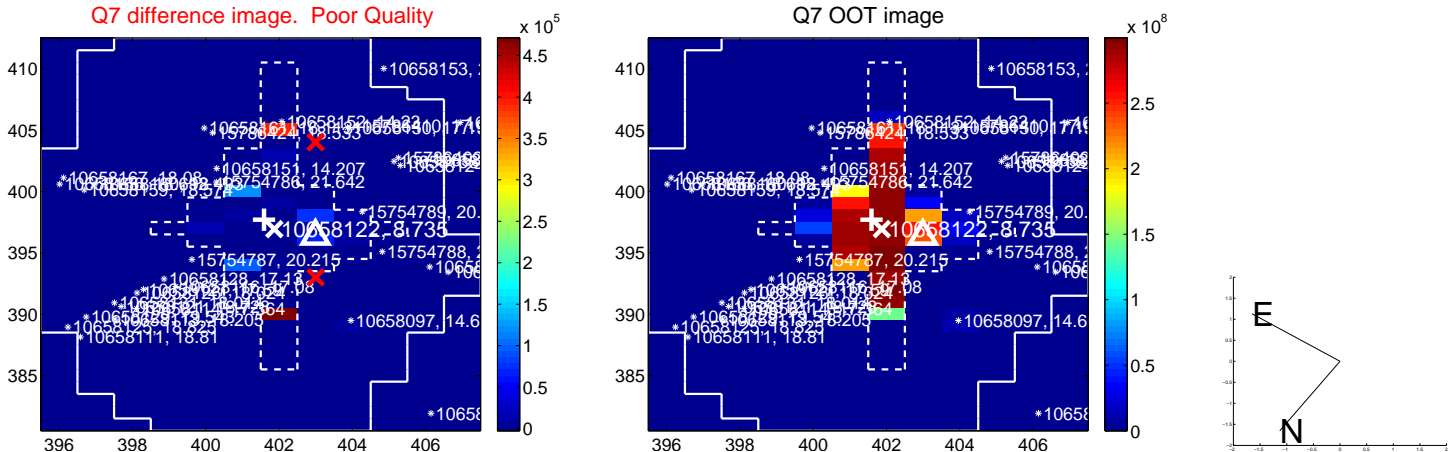
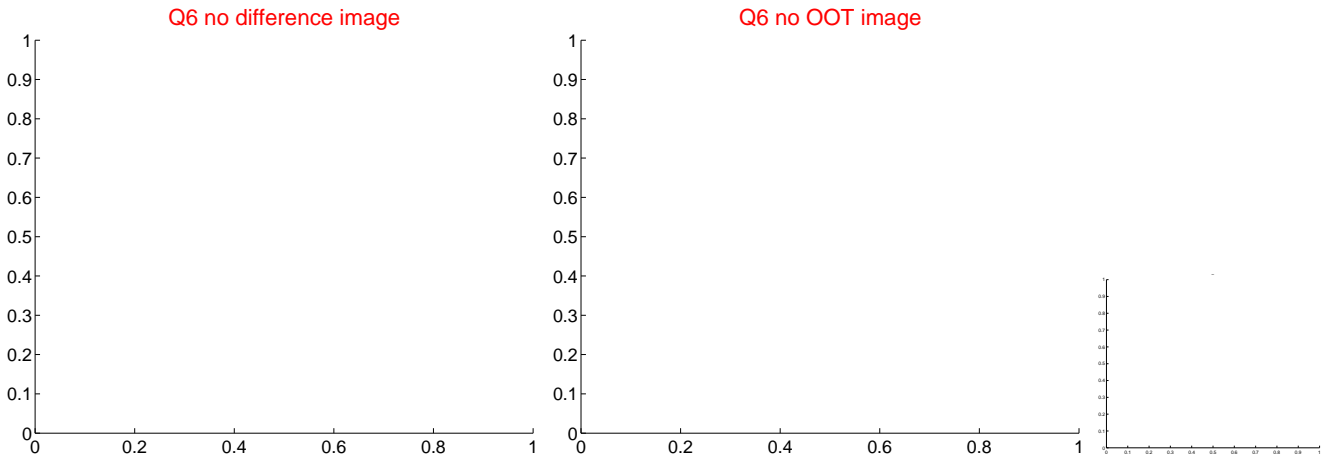
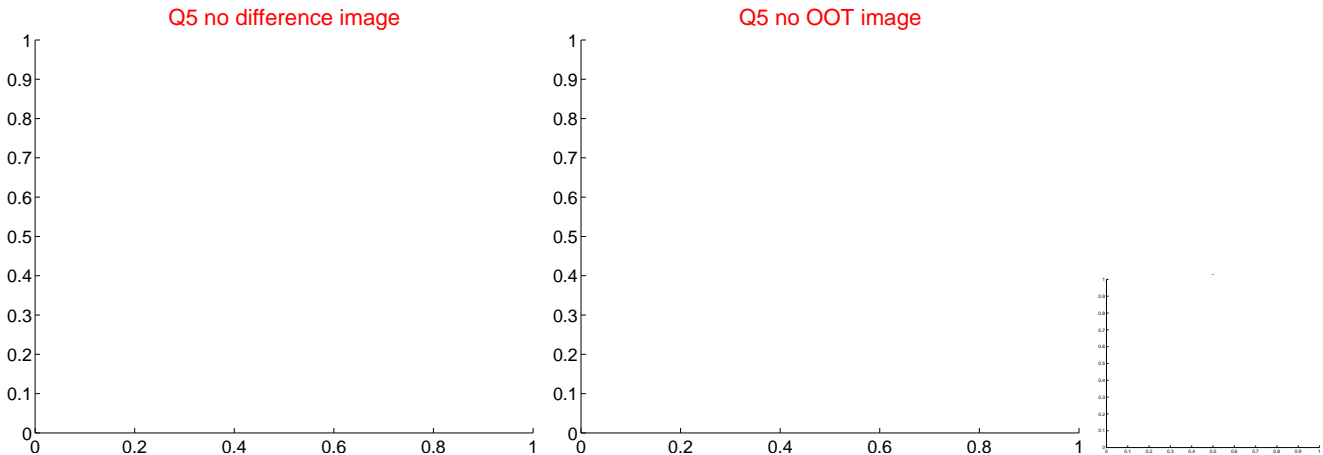
Q4 difference image. Poor Quality



Q4 OOT image



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



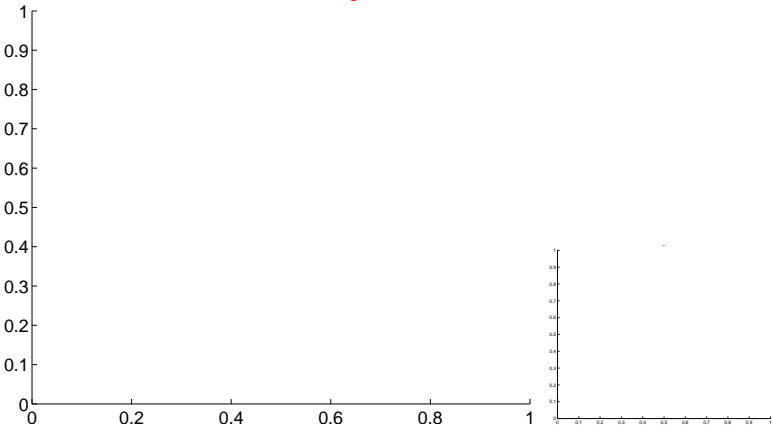


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

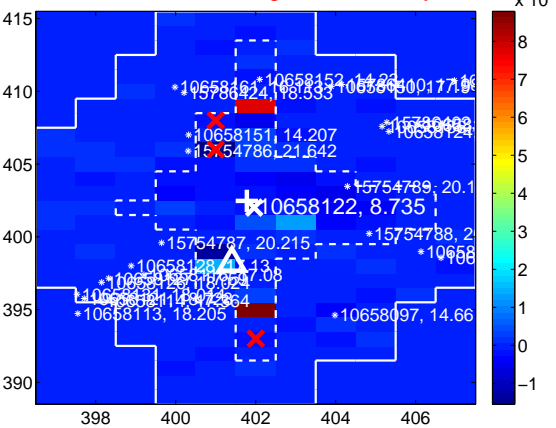
Q9 no difference image



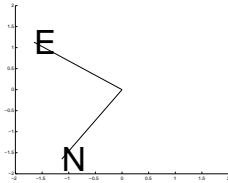
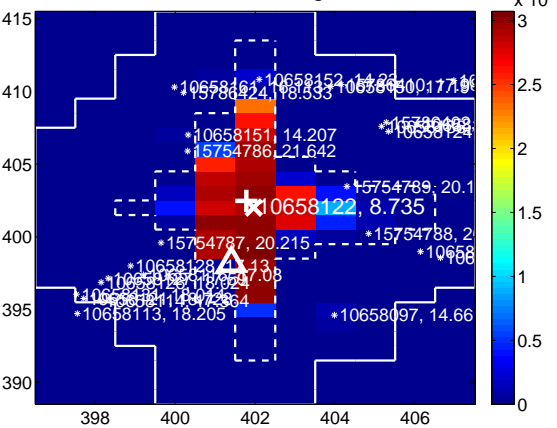
Q9 no OOT image



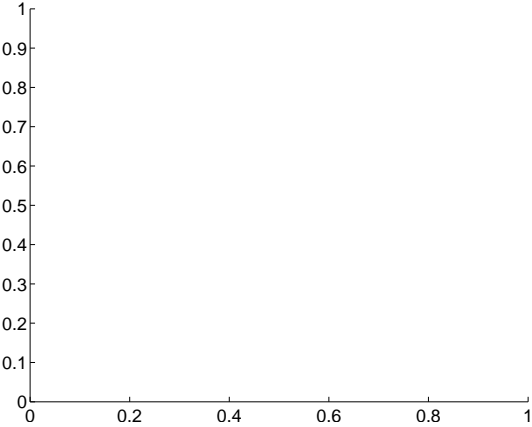
Q10 difference image. Poor Quality



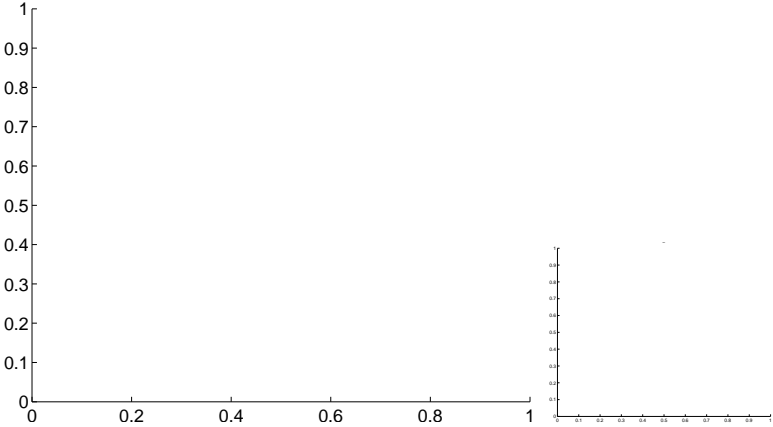
Q10 OOT image



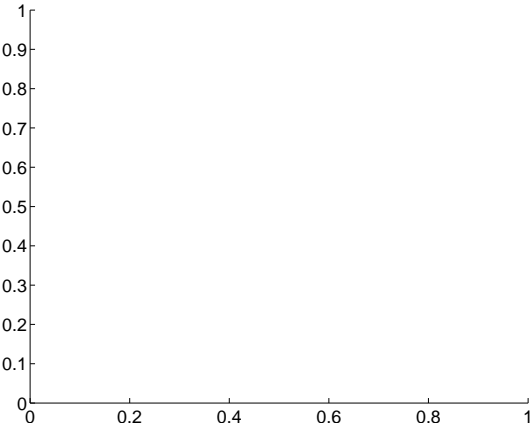
Q11 no difference image



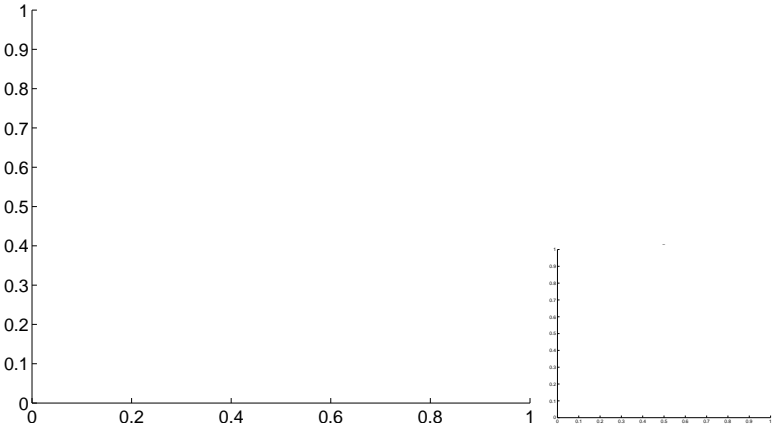
Q11 no OOT image



Q12 no difference image



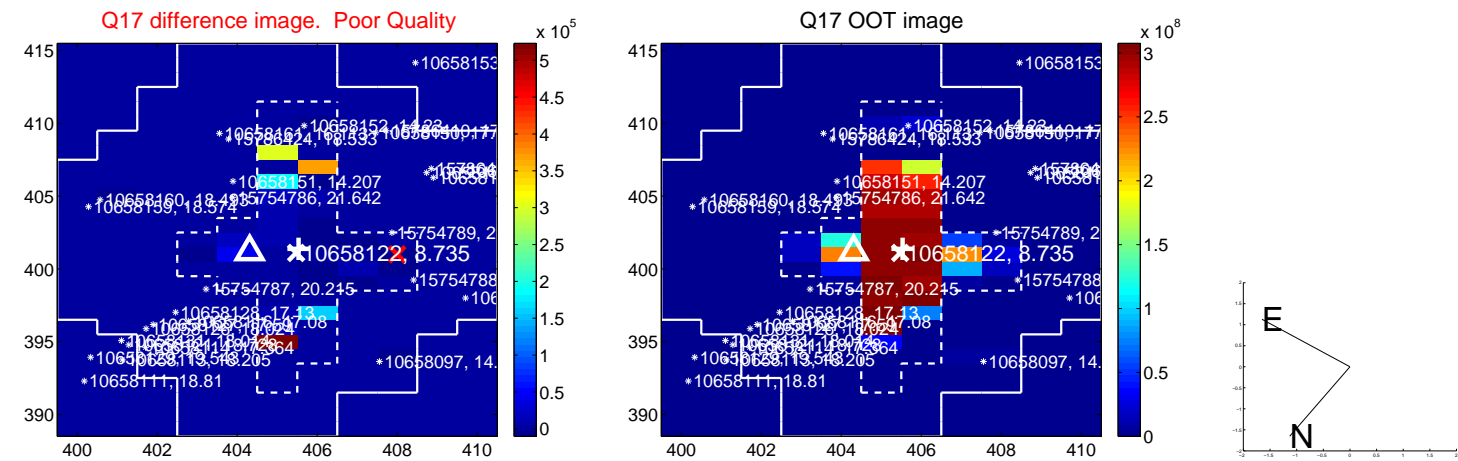
Q12 no OOT image



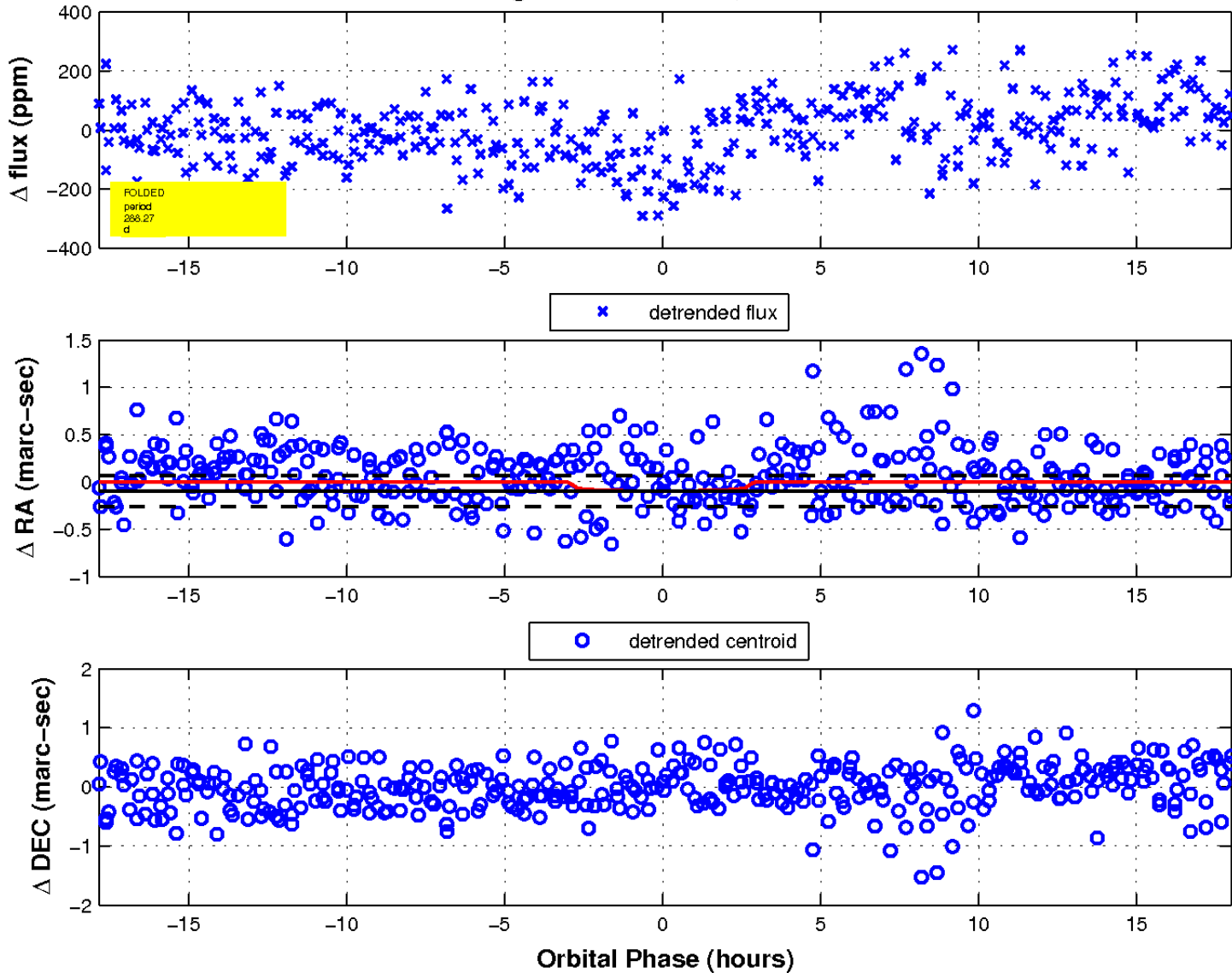
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

