

# KIC 004579651

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004579651-01	OBS	No	2.969672	133.269297	40.7	6.316	8.1	6.8	1.57	6761	1.17	2231.48
004579651-02	OBS	No	2.969972	131.650832	38.5	10.048	8.9	8.1	1.57	6761	0.98	2231.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004579651-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
004579651-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD

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

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

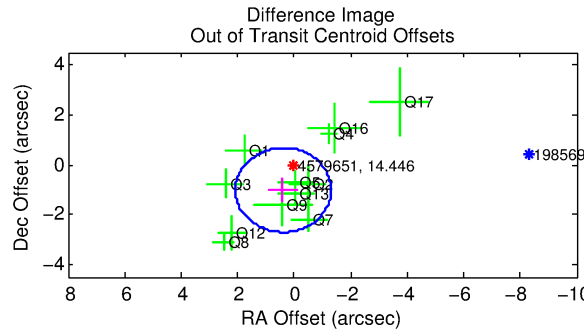
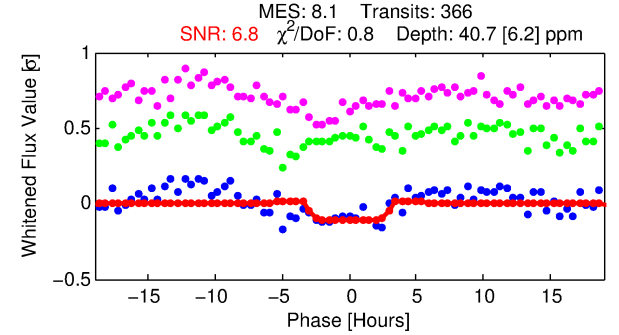
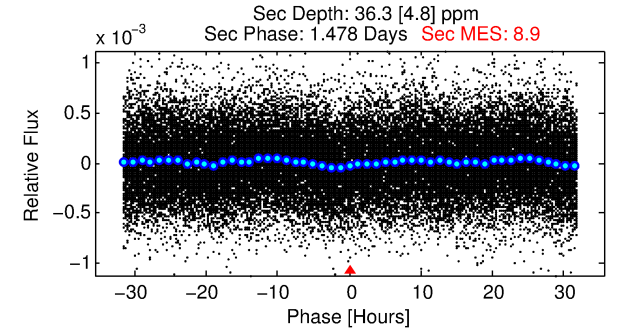
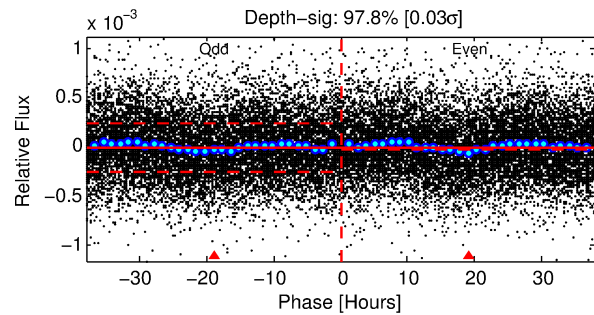
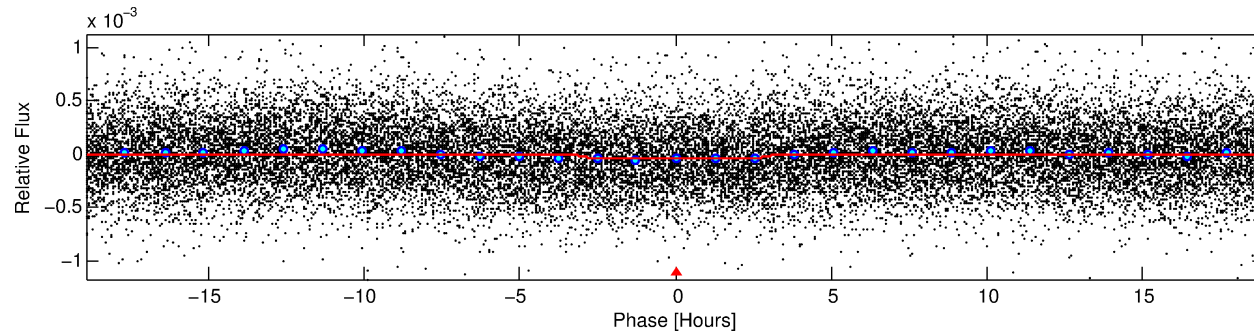
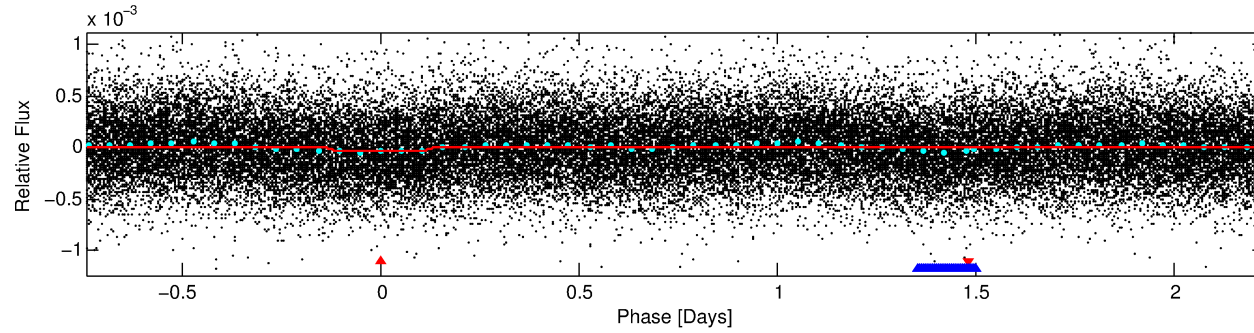
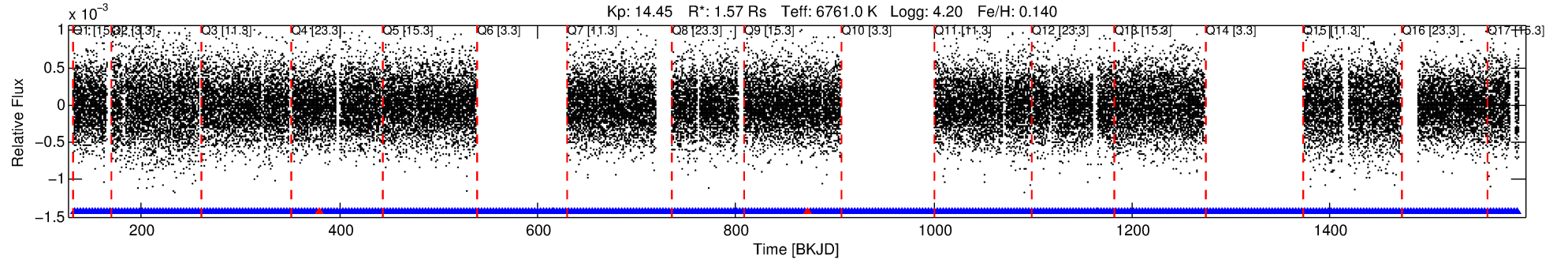
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004579651-01

No Significant Match Found

# DV One-Page Summary

KIC: 4579651 Candidate: 1 of 2 Period: 2.970 d



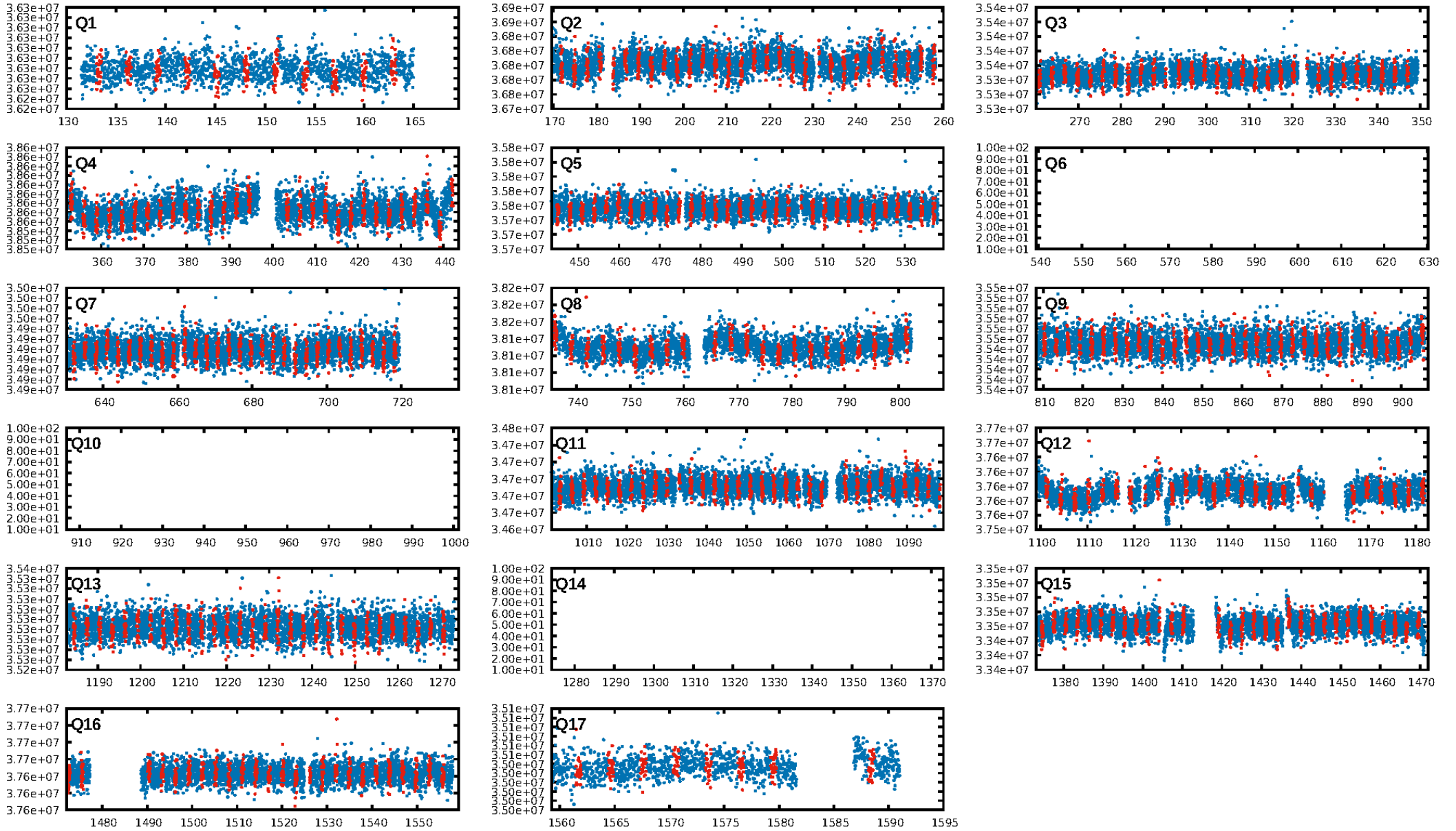
## DV Fit Results:

Period = 2.96967 [0.00005] d  
Epoch = 133.2693 [0.0096] BKJD  
Rp/R\* = 0.0068 [0.0031]  
a/R\* = 1.85 [3.45]  
b = 0.90 [0.54]  
Seff = 2231.48 [467.23]  
Teff = 1753 [92] K  
Rp = 1.17 [0.56] Re  
a = 0.0455 [0.0063] AU  
Ag = 30.10 [27.94] [1.04σ]  
Teffp = 6347 [1440] K [3.18σ]

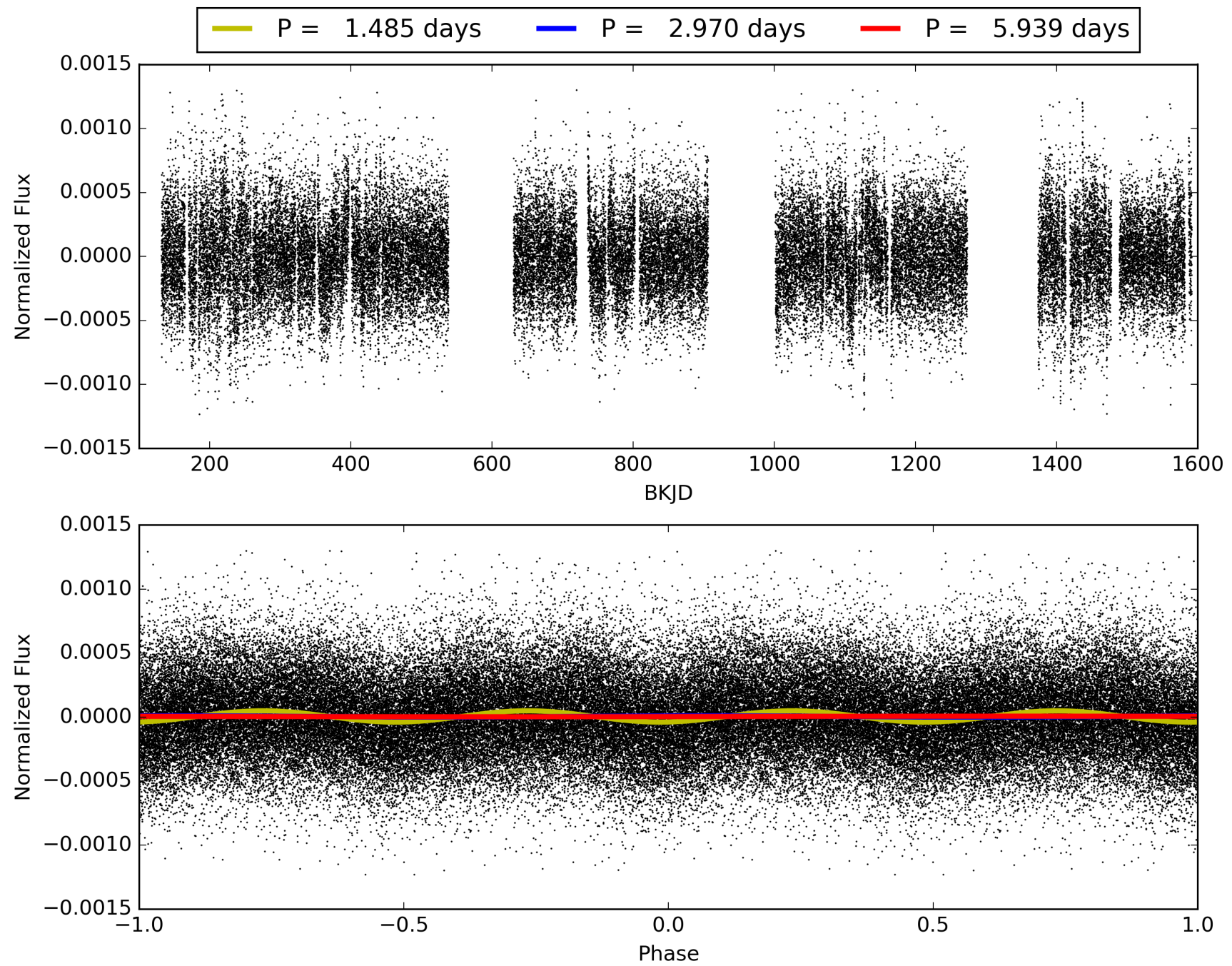
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.92e-15  
RollingBand-fgt: 0.99 [345/347]  
GhostDiagnostic-chr: 2.717  
Centroid-sig: 0.8%  
Centroid-so: 2.235 arcsec [1.34σ]  
OotOffset-rm: 1.093 arcsec [1.94σ]  
KicOffset-rm: 1.071 arcsec [1.92σ]  
OotOffset-st: 1/2/4/5 [12]  
KicOffset-st: 1/2/4/5 [12]  
DiffImageQuality-fgm: 0.92 [11/12]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 004579651-01, PDC Light Curves



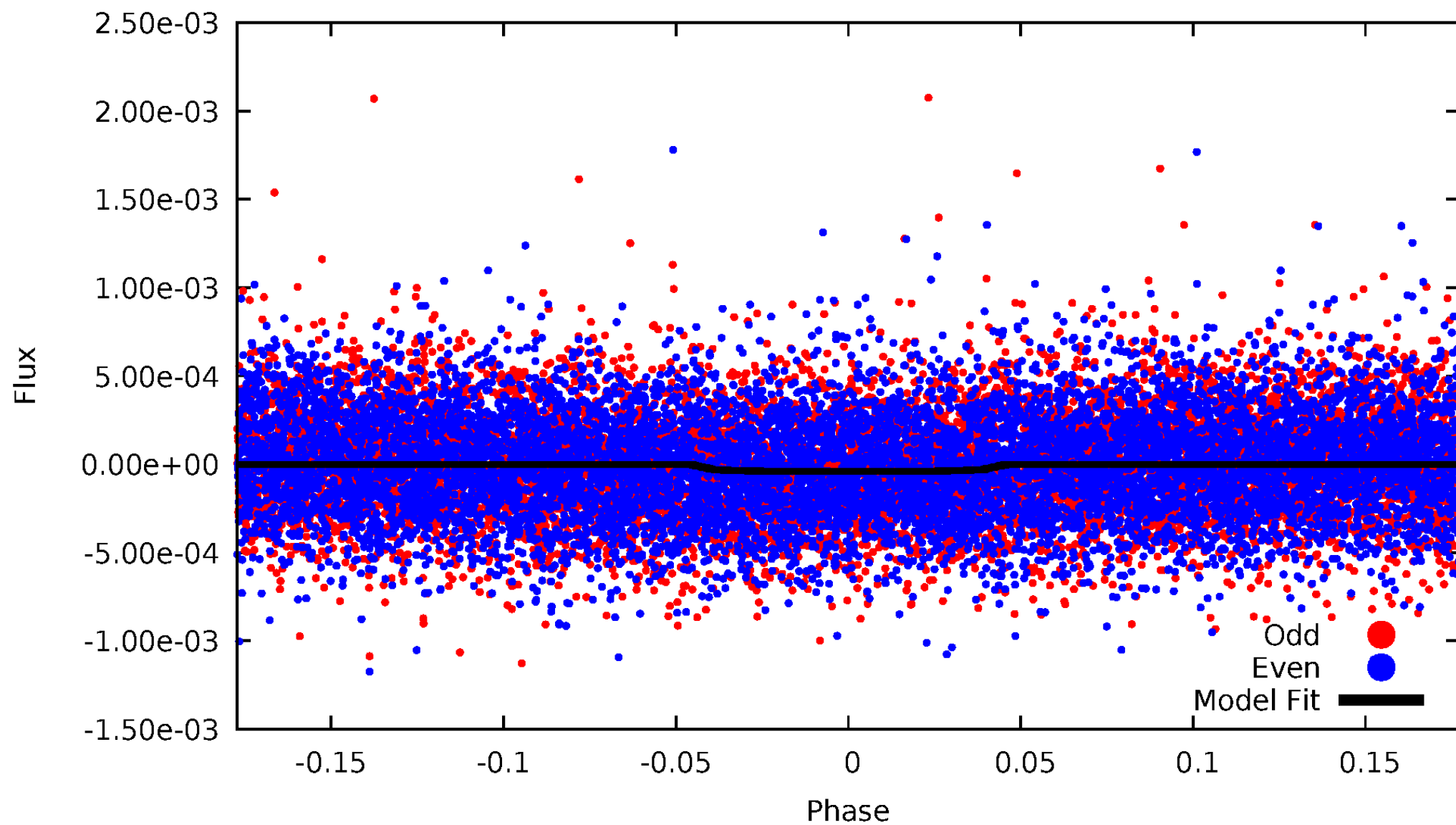
TCE 004579651-01





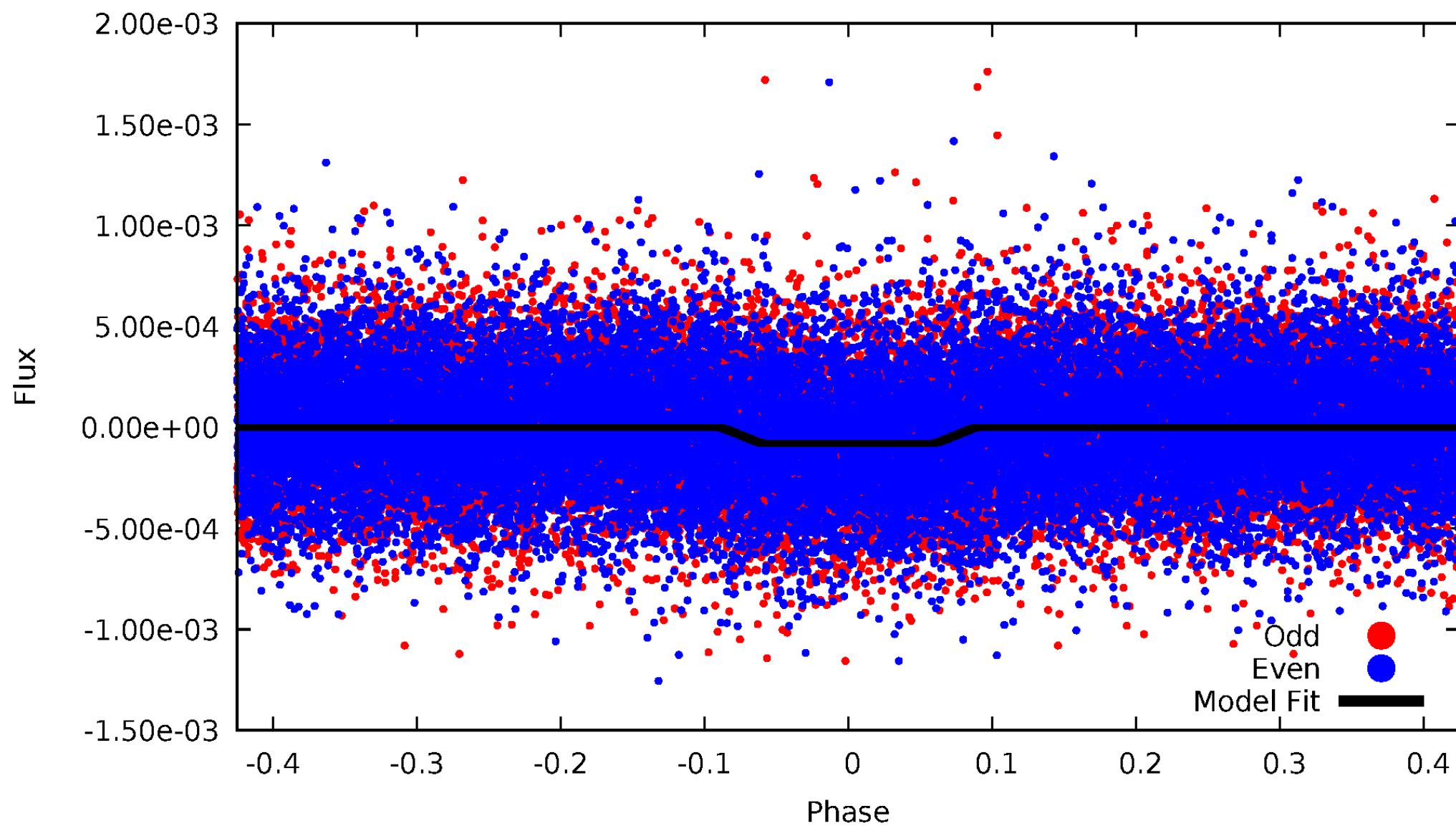
# DV Odd/Even

TCE 004579651-01



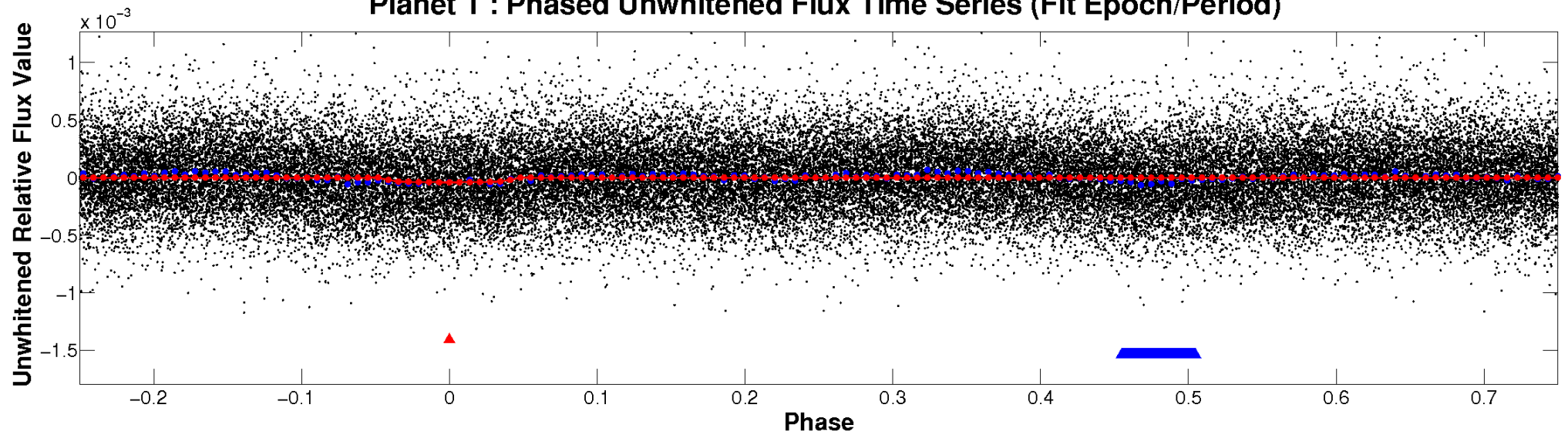
# ALT Odd/Even

TCE 004579651-01

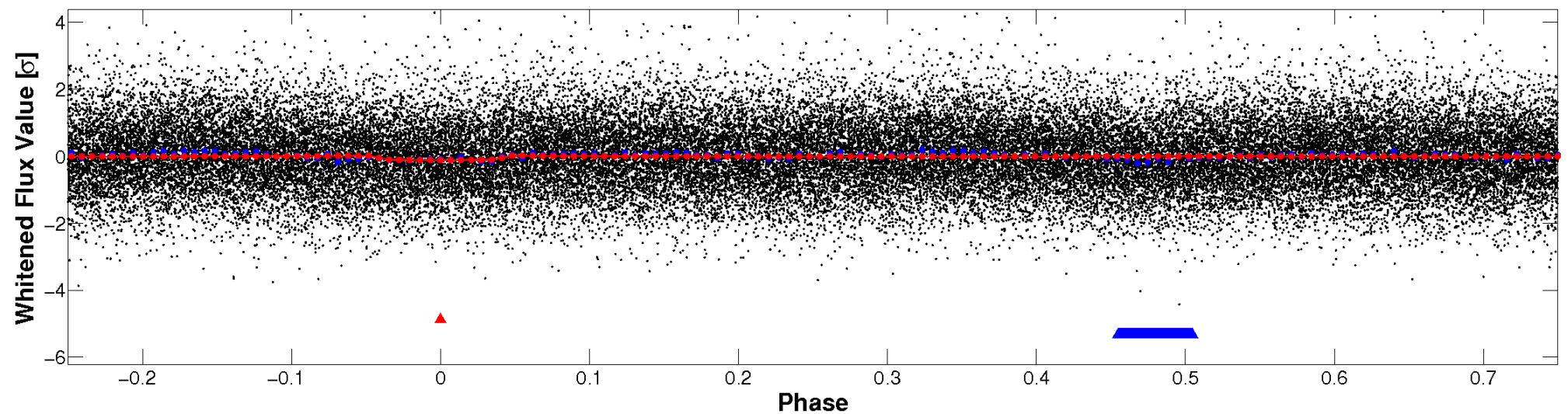


# Non-Whitened Vs. Whitened Light Curve

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

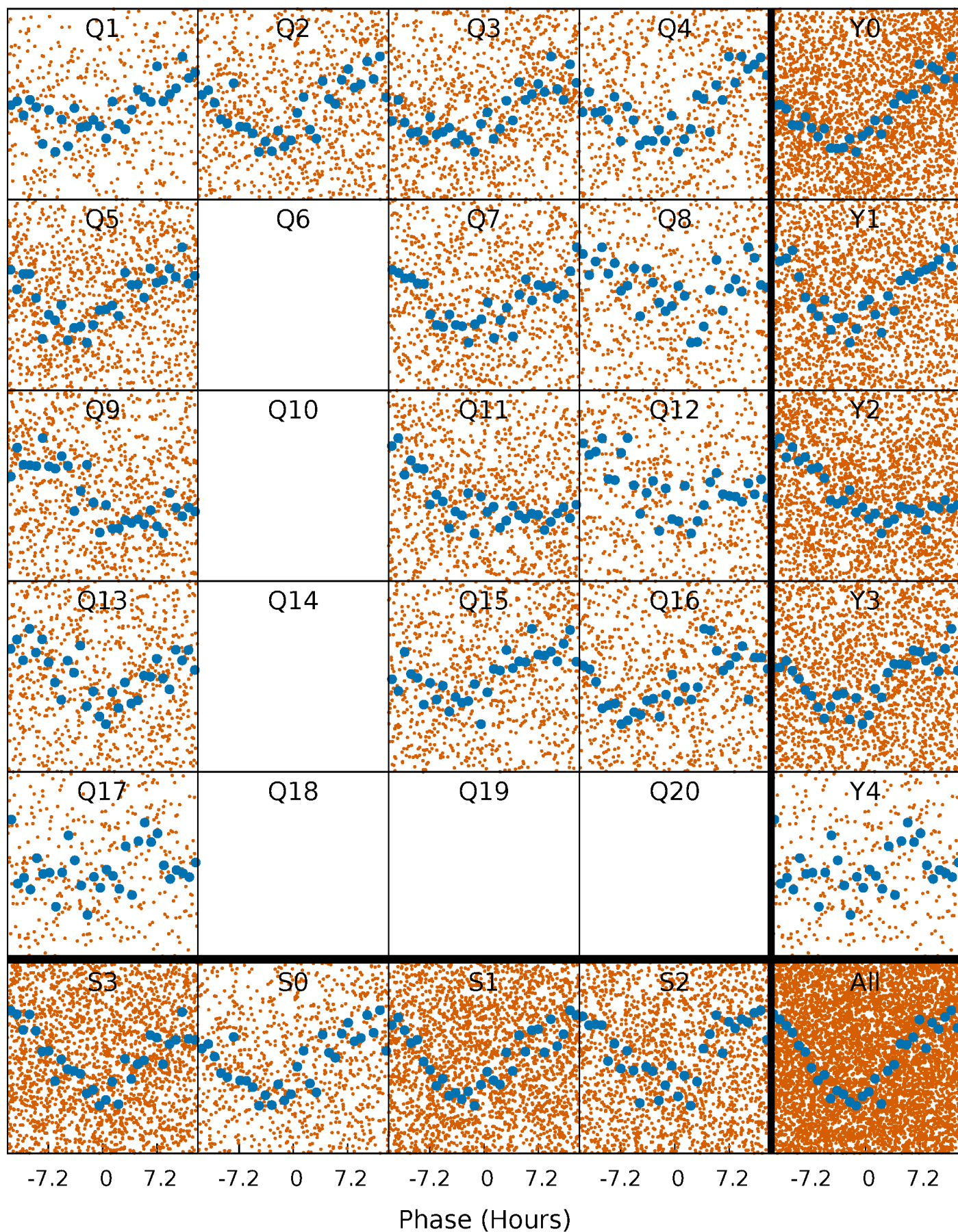


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

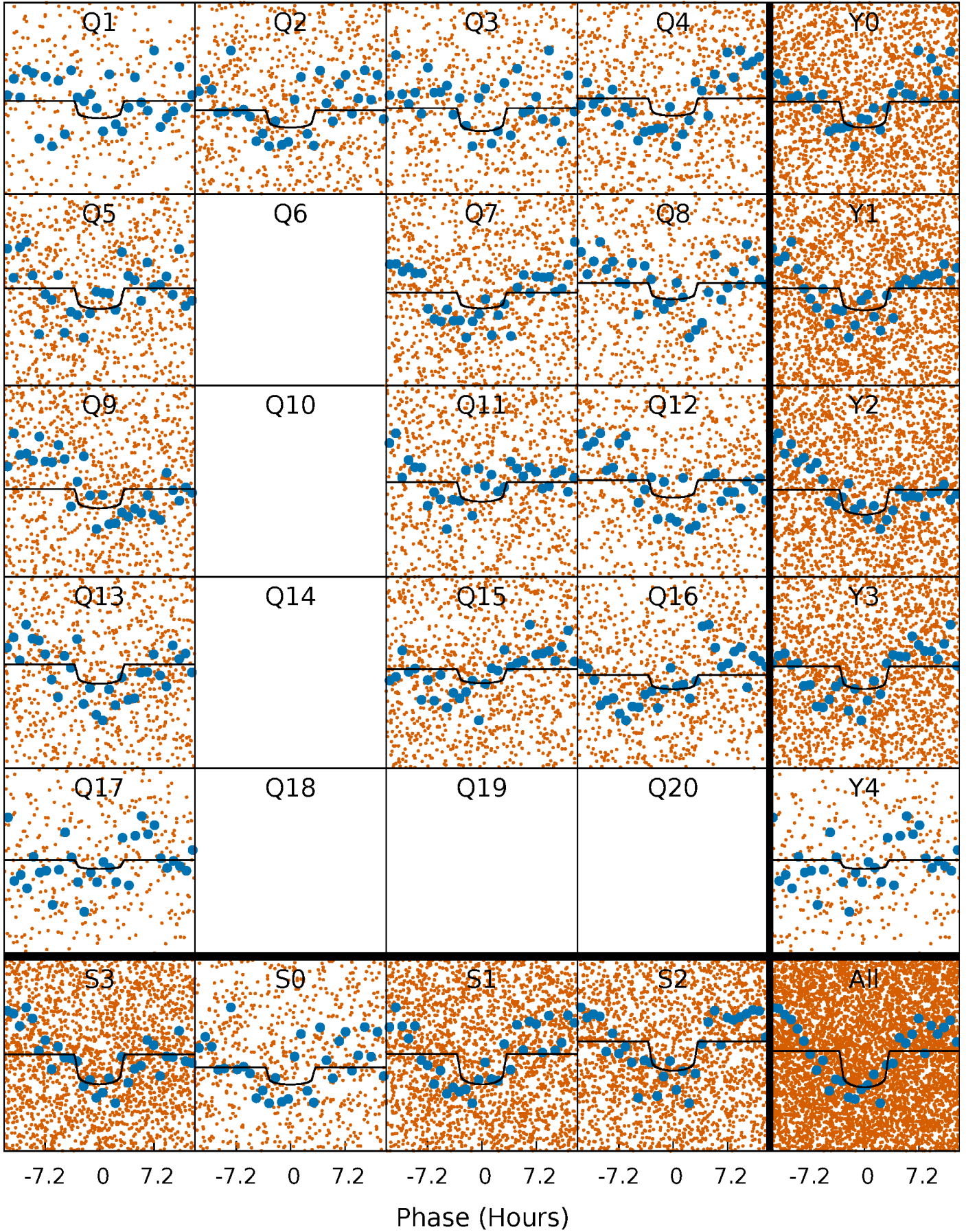
TCE 004579651-01 P= 2.969672 Days  $T_0=133.269297$  (BKJD)





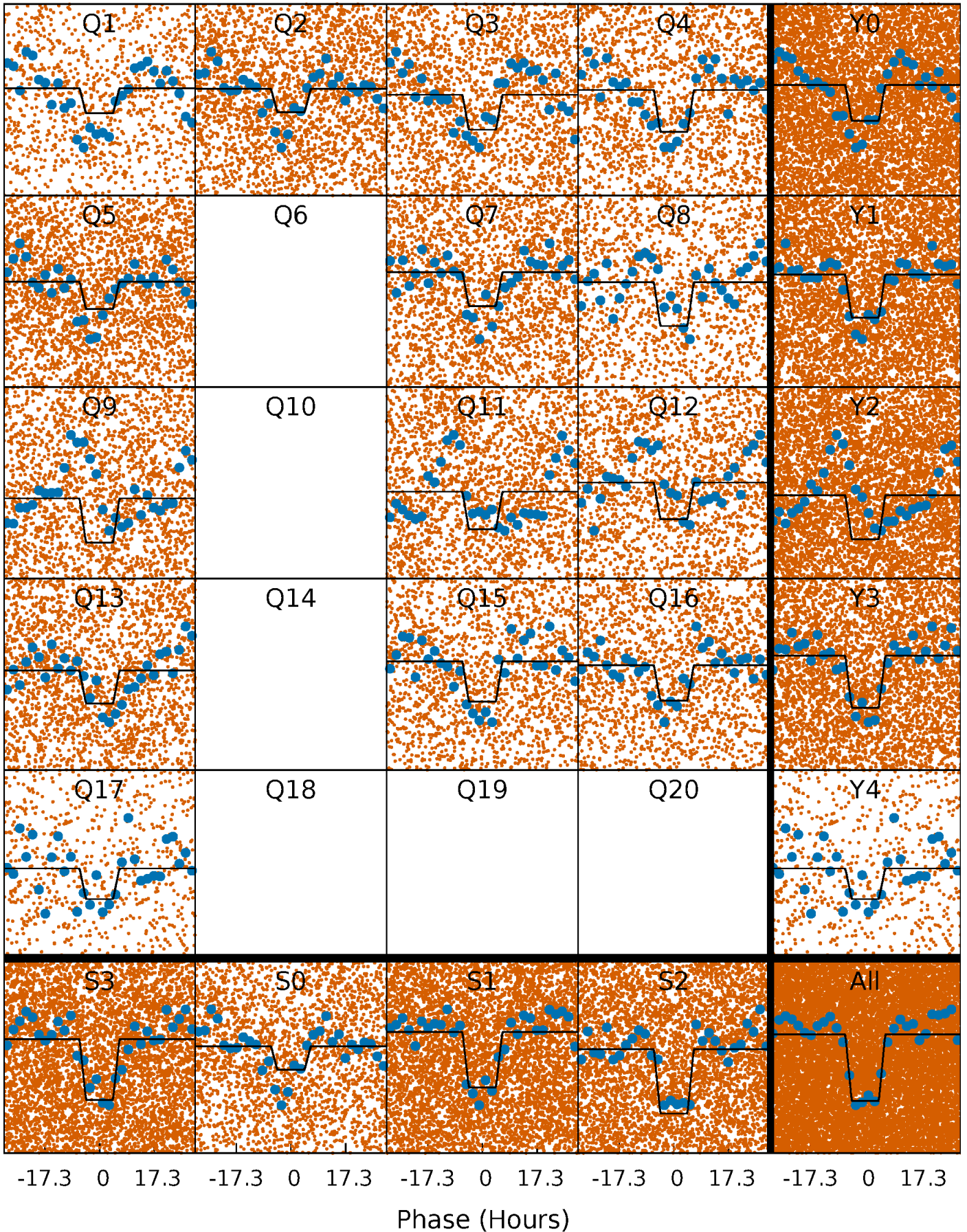
# DV Quarter-Phased Transit Curves

TCE 004579651-01 P= 2.969672 Days  $T_0=133.269297$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004579651-01 P= 2.969440 Days  $T_0=133.256730$  (BKJD)

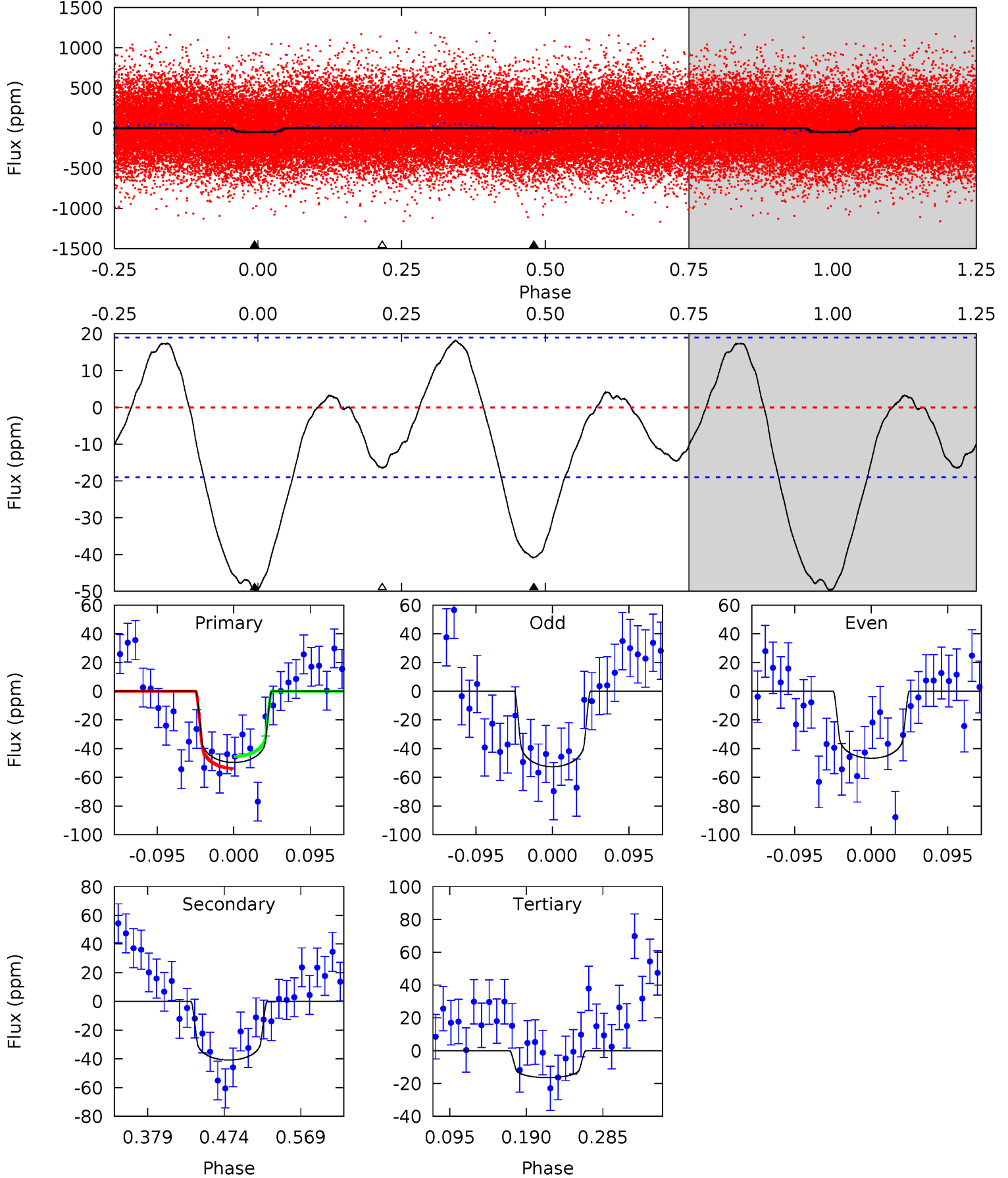




# DV Model-Shift Uniqueness Test

004579651-01, P = 2.969672 Days, E = 130.299625 Days

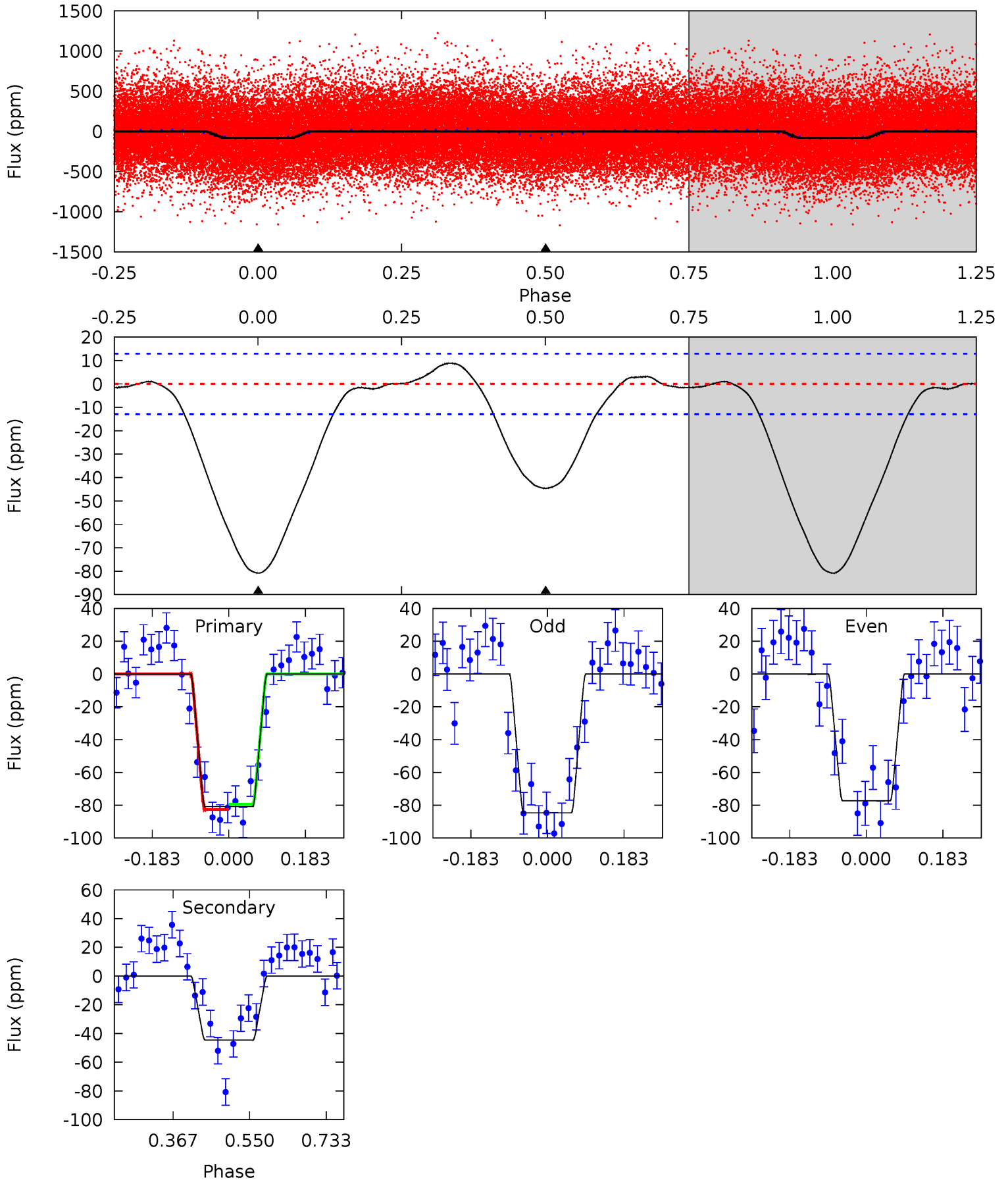
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	9.85	3.96	0	4.58	1.67	2.38	8.02	12.0	5.89	9.85	0.71	0.91	0.27	1.00



# Alt Model-Shift Uniqueness Test

004579651-01, P = 2.969440 Days, E = 130.287290 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
27.8	15.3	0	0	4.44	1.33	0.75	27.8	27.8	15.3	15.3	1.26	0.93	0.10	0.55





### Stellar Parameters For KIC 004579651

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6761^{+70}_{-91}$	$4.199^{+0.060}_{-0.111}$	$0.140^{+0.150}_{-0.150}$	$1.570^{+0.257}_{-0.138}$	$1.422^{+0.109}_{-0.079}$	$0.518^{+0.133}_{-0.168}$
	+1%/-1%	+1%/-3%	+107%/-107%	+16%/-9%	+8%/-6%	+26%/-33%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 004579651-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-41 \pm 4$	$1.23^{+0.56}_{-0.51}$	$2461^{+96}_{-71}$	$6395^{+2312}_{-1051}$	$31^{+59}_{-17}$
Alt.	$-45 \pm 3$	$1.57^{+0.53}_{-0.53}$	$2462^{+93}_{-73}$	$5812^{+1388}_{-727}$	$20^{+28}_{-9}$

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

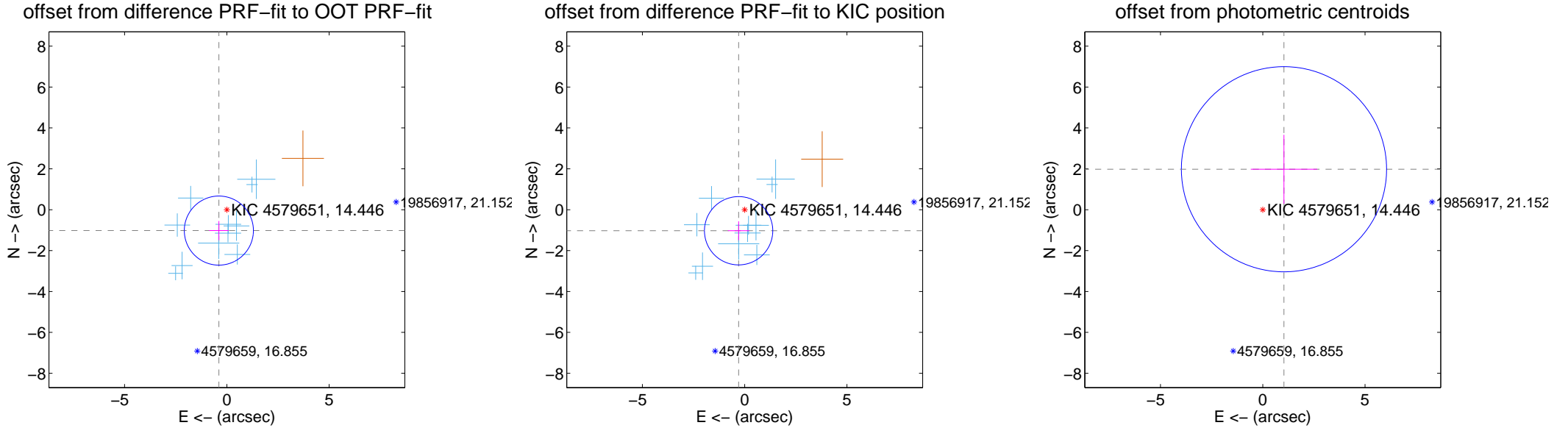
## DV Centroid Data

Supplemental centroid analysis for 004579651-01. Kepler magnitude: 14.45. Transit SNR 6.75

There are 11 quarters with good PRF difference image offsets

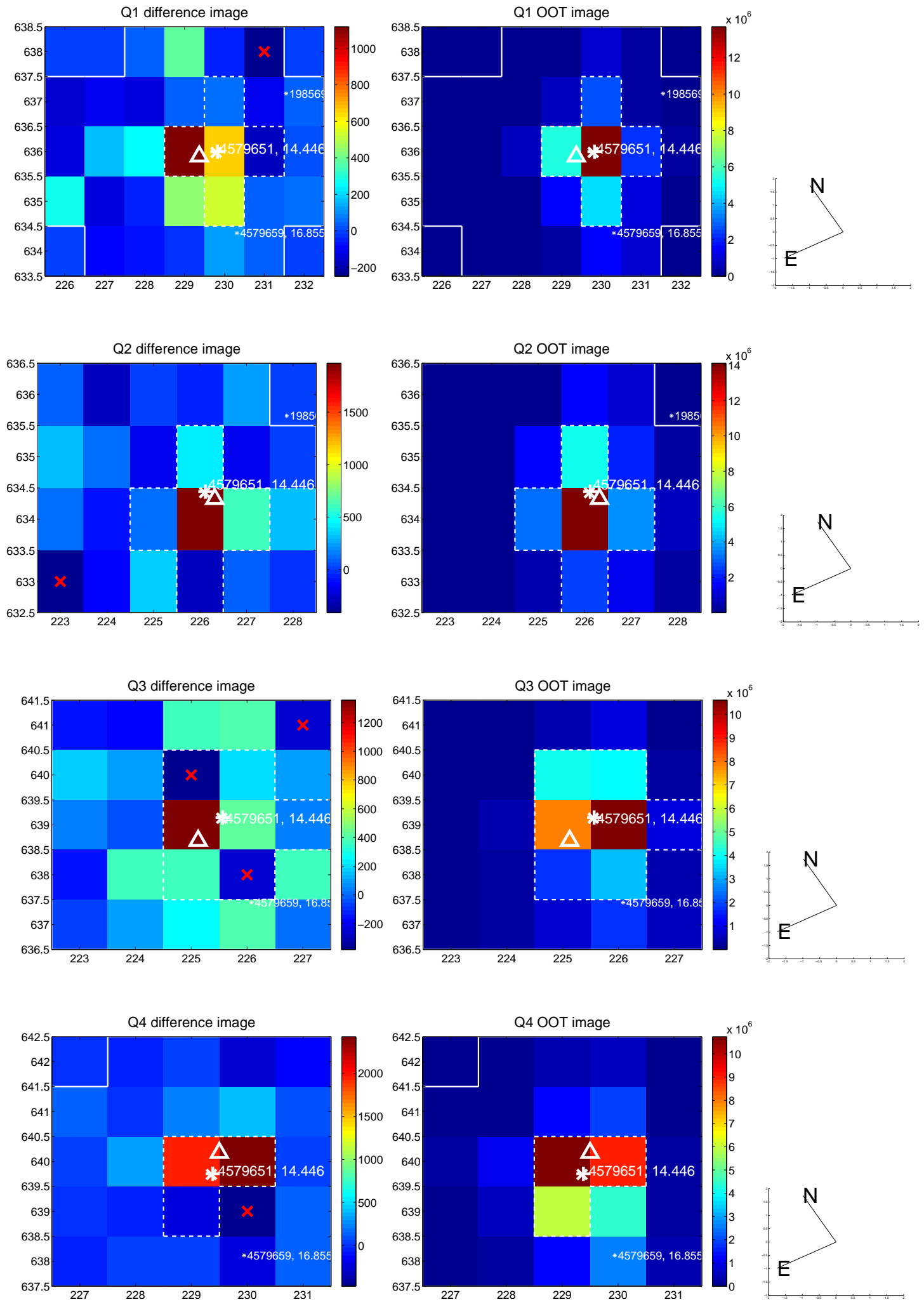
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.093 \pm 0.563$	1.94	$0.391 \pm 0.476$	$-1.021 \pm 0.466$
PRF-fit source offset from KIC position	$1.071 \pm 0.557$	1.92	$0.296 \pm 0.525$	$-1.029 \pm 0.461$
photometric centroid source offset	$2.23 \pm 1.67$	1.34	$-1.04 \pm 1.62$	$1.98 \pm 1.69$

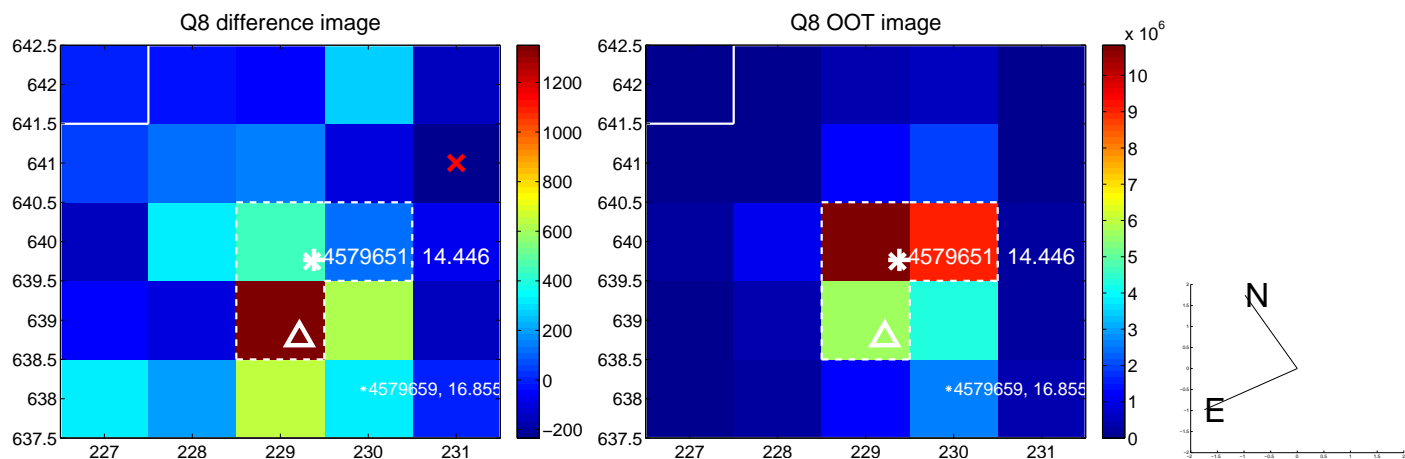
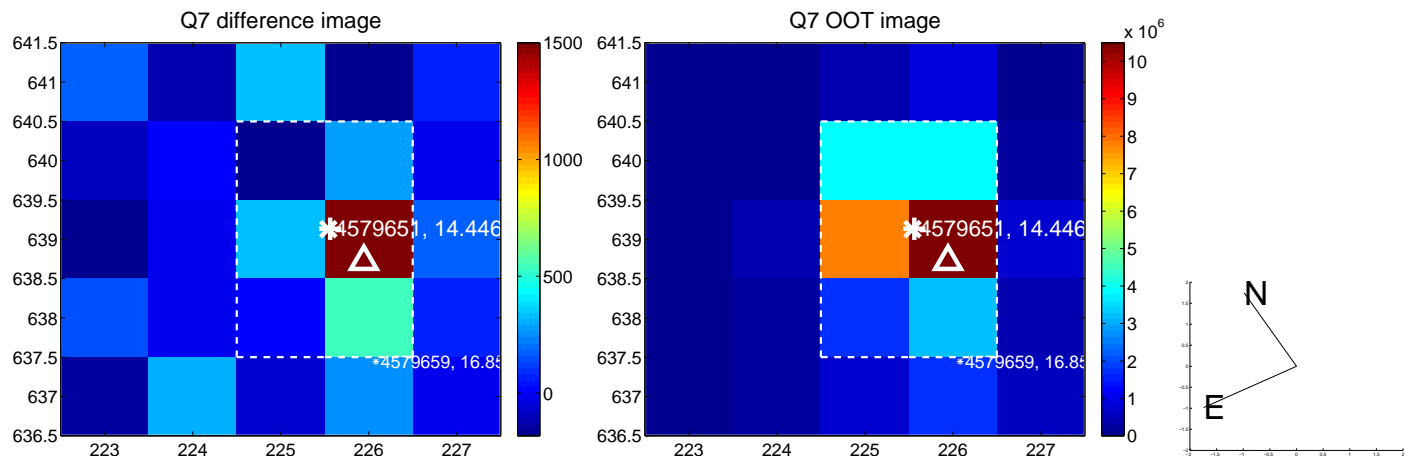
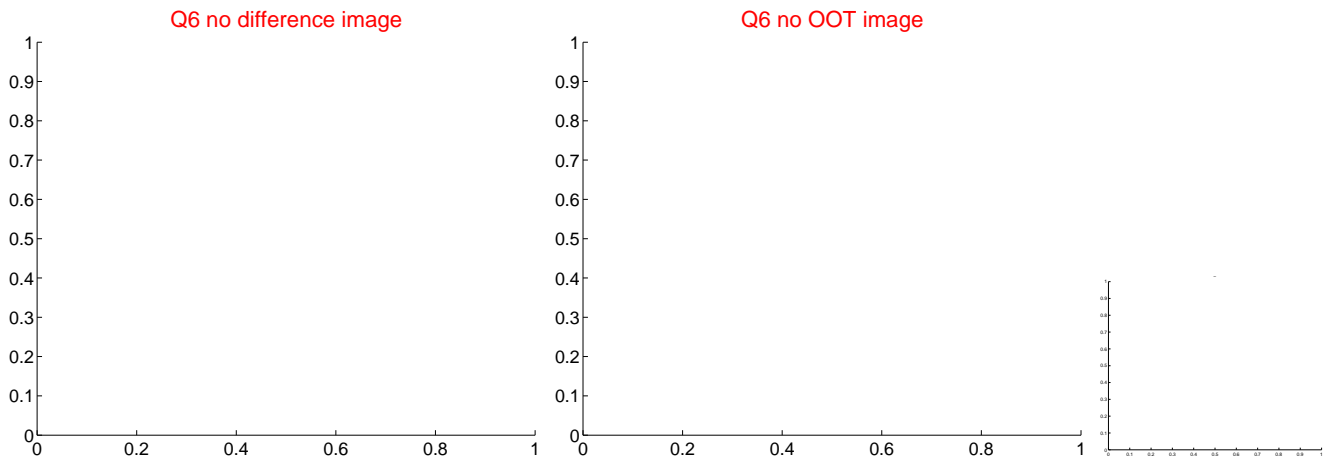
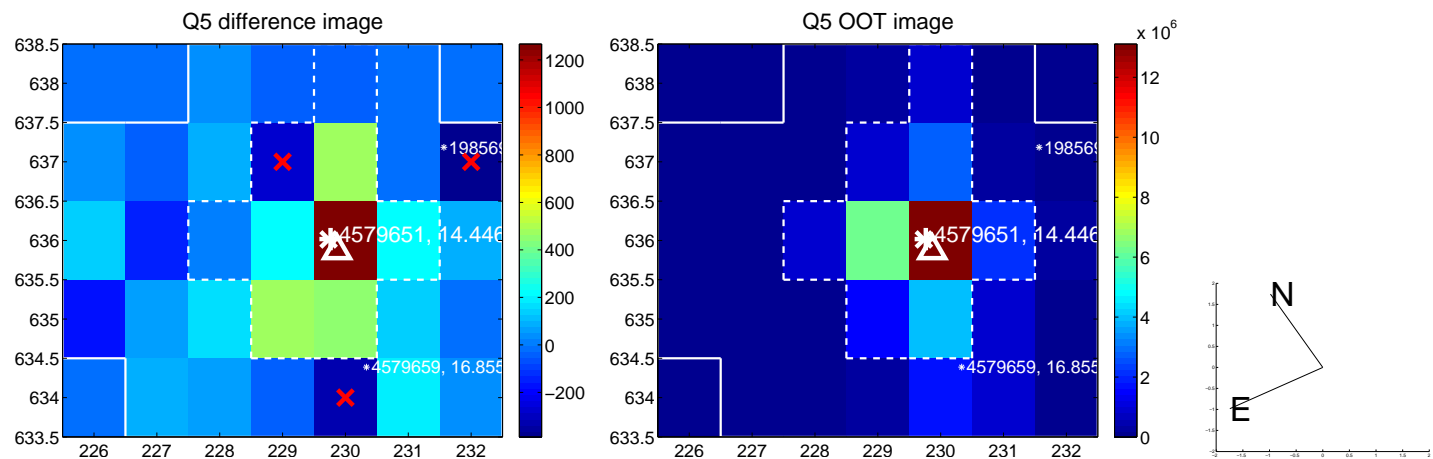


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

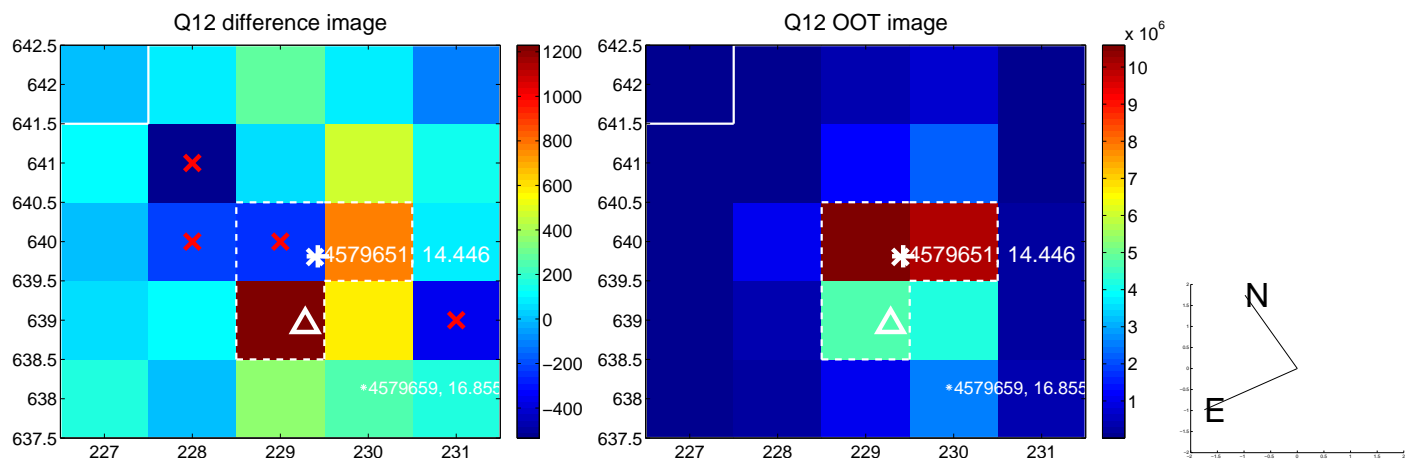
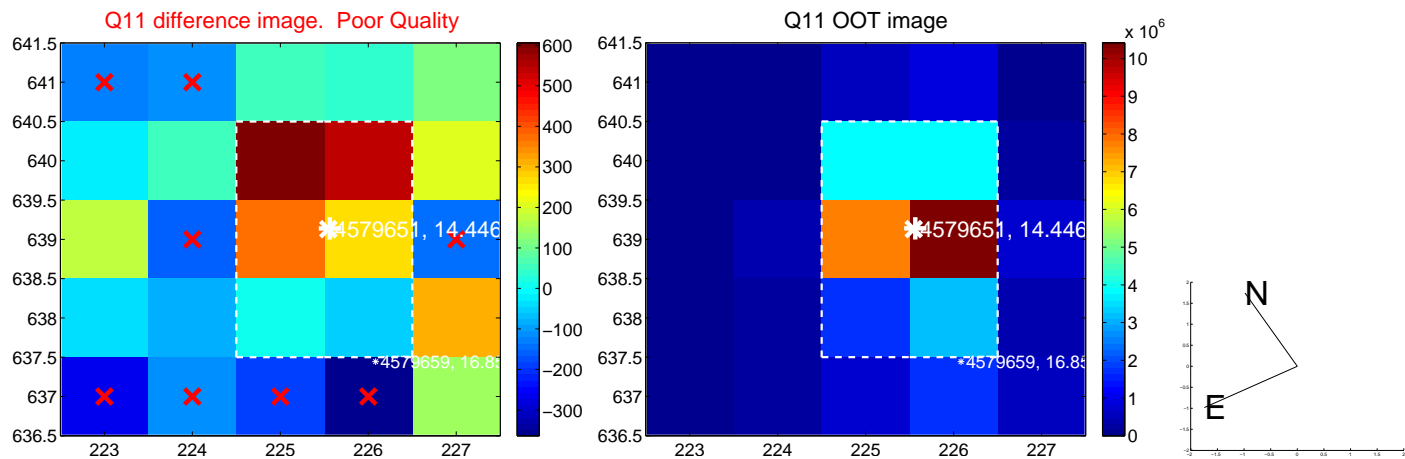
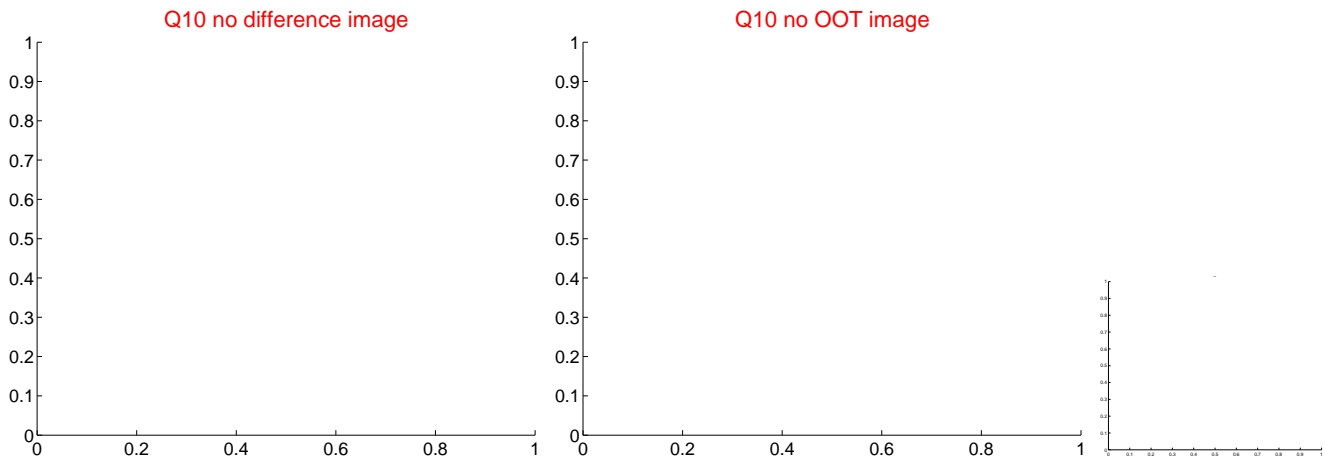
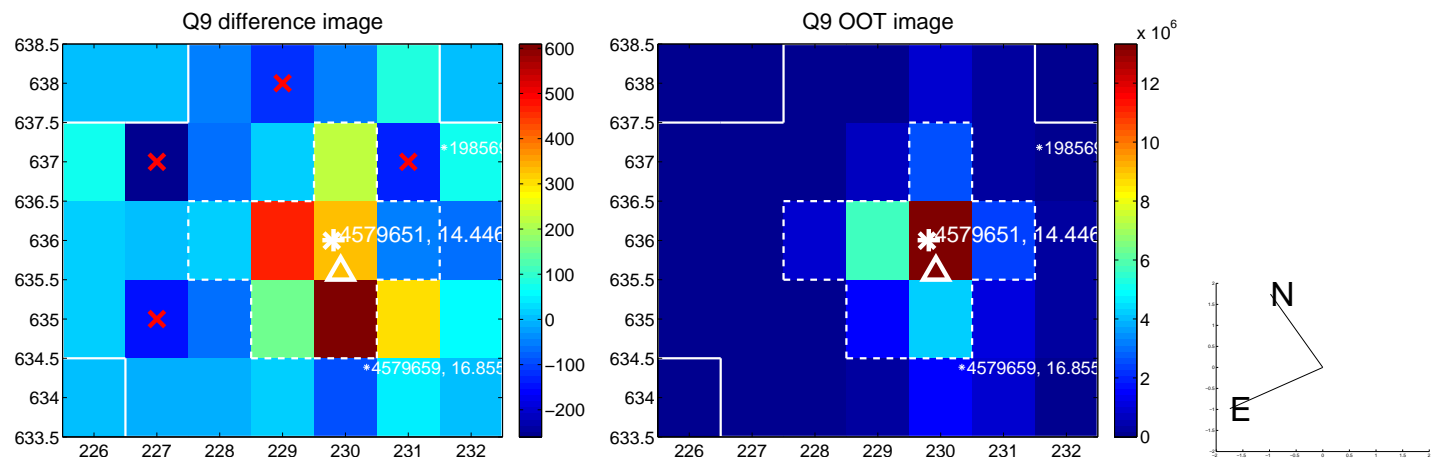


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

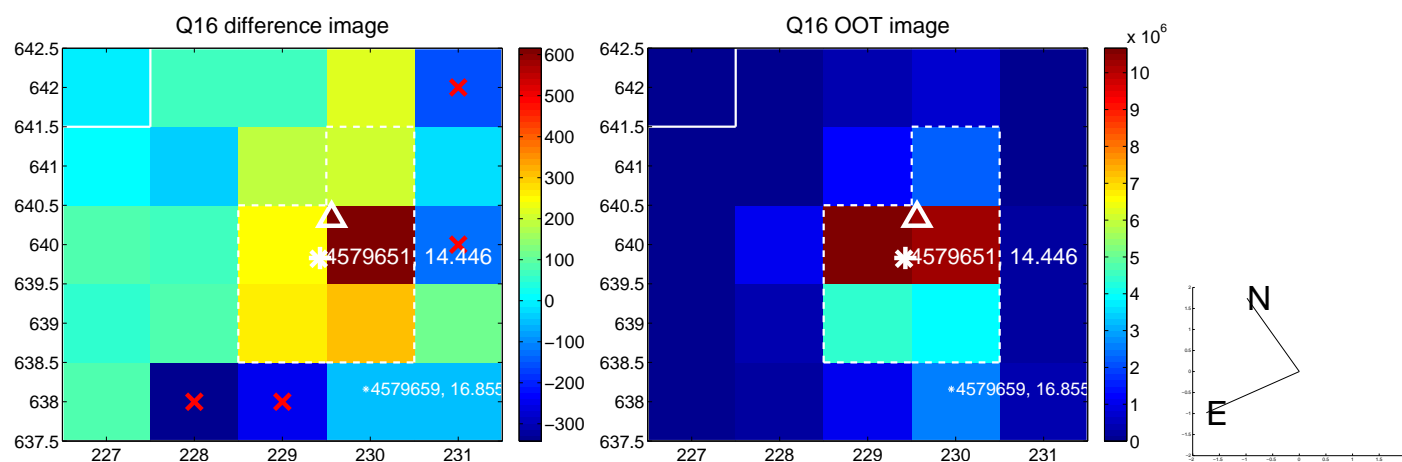
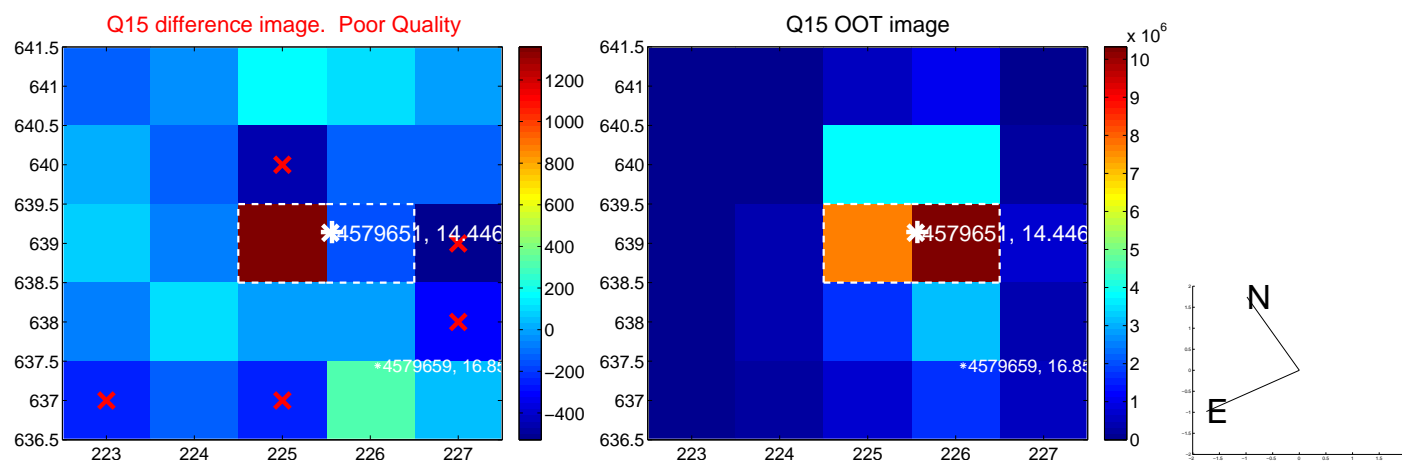
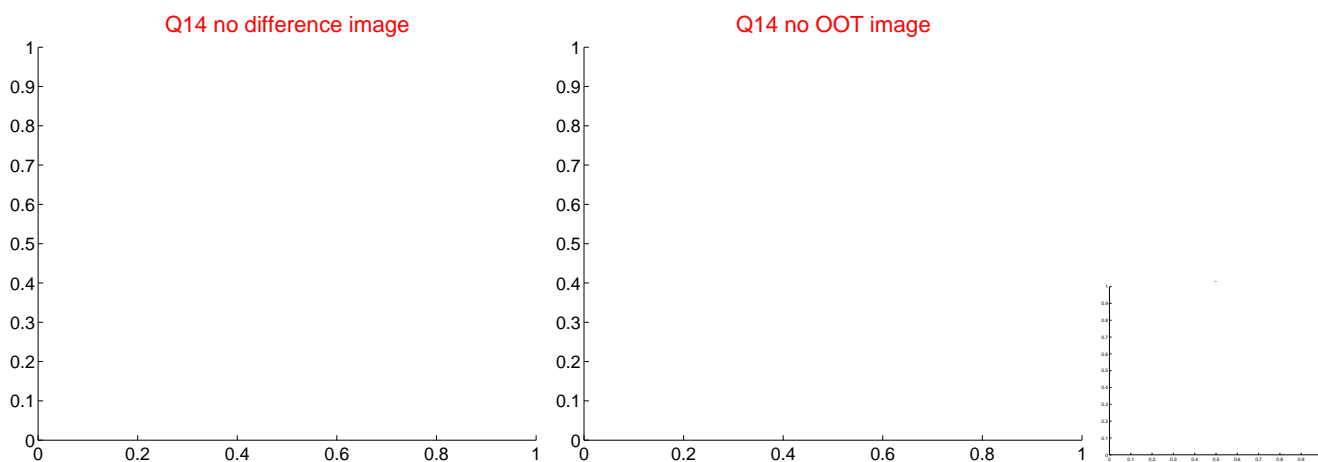
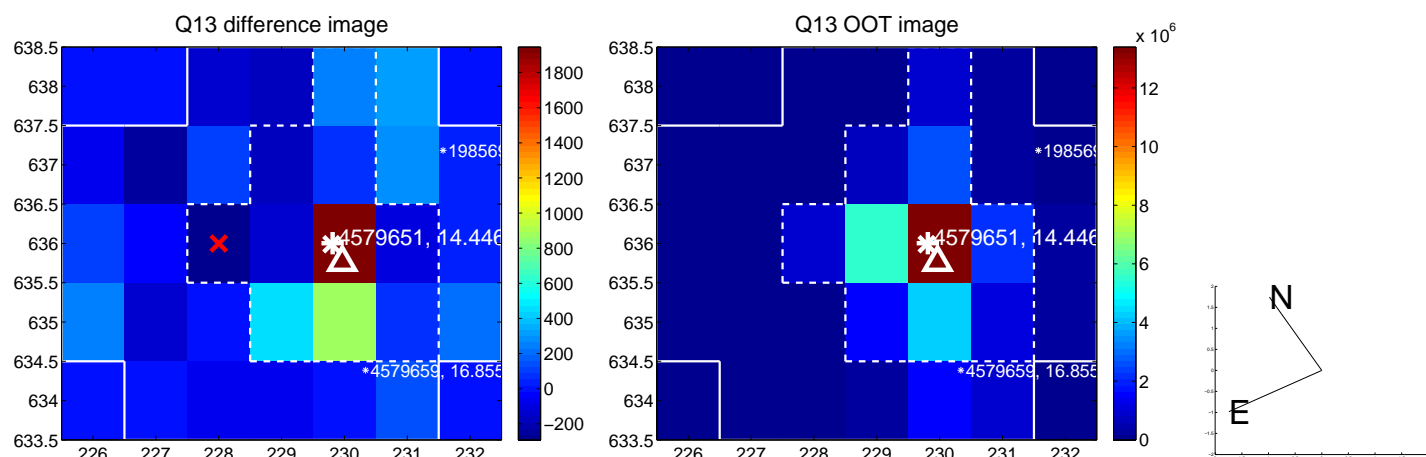




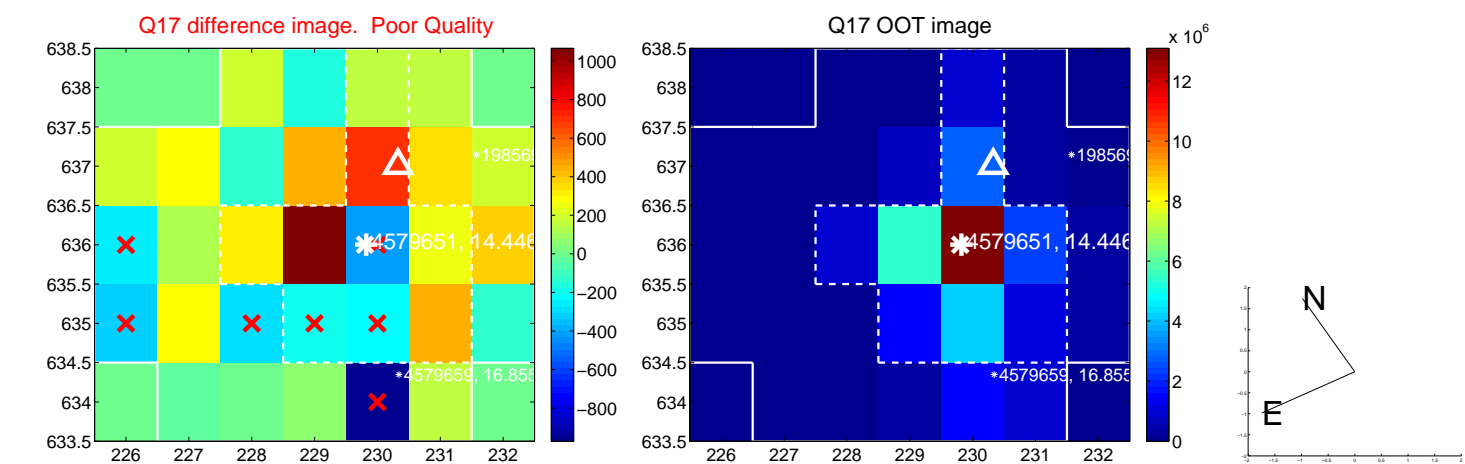
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



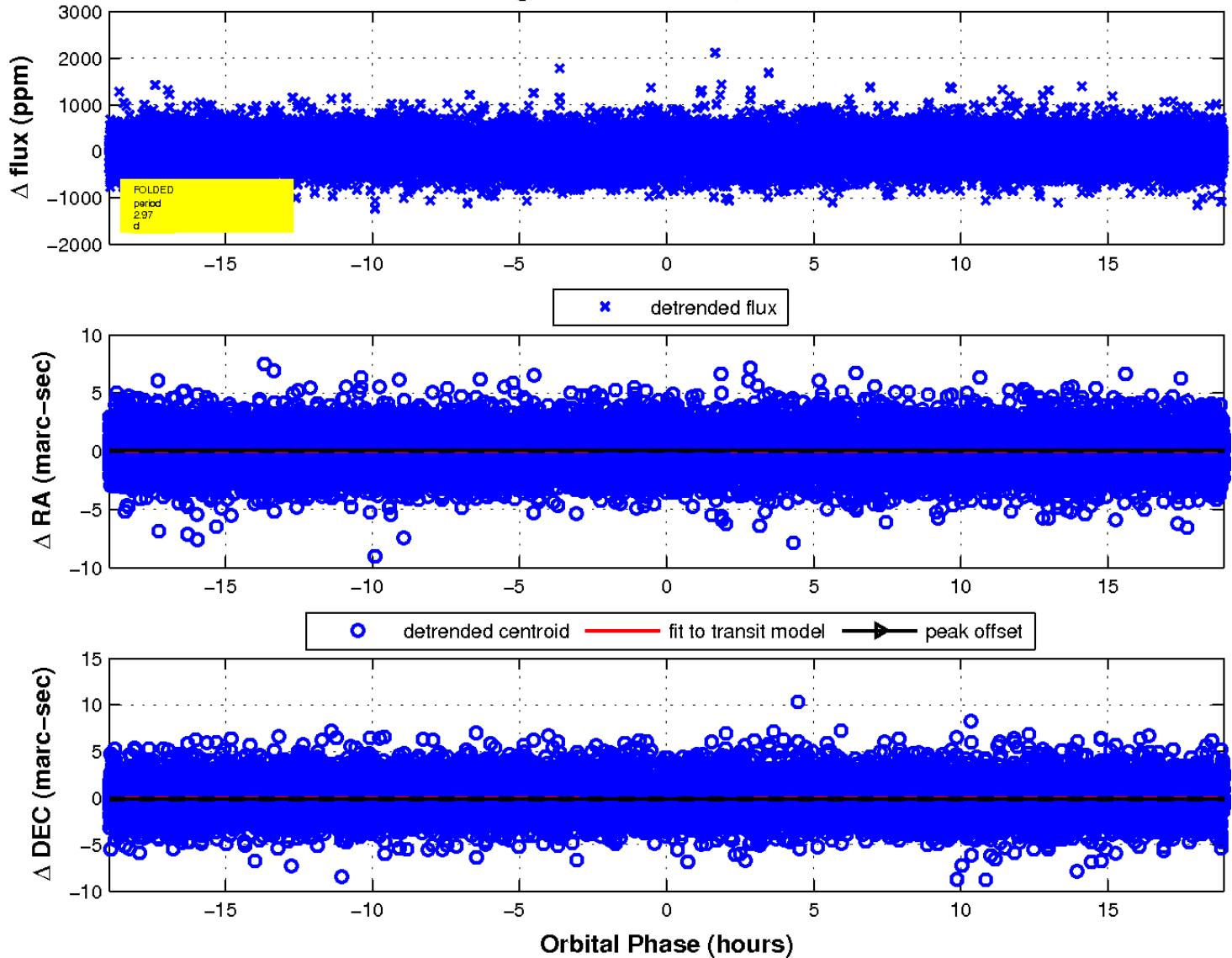
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

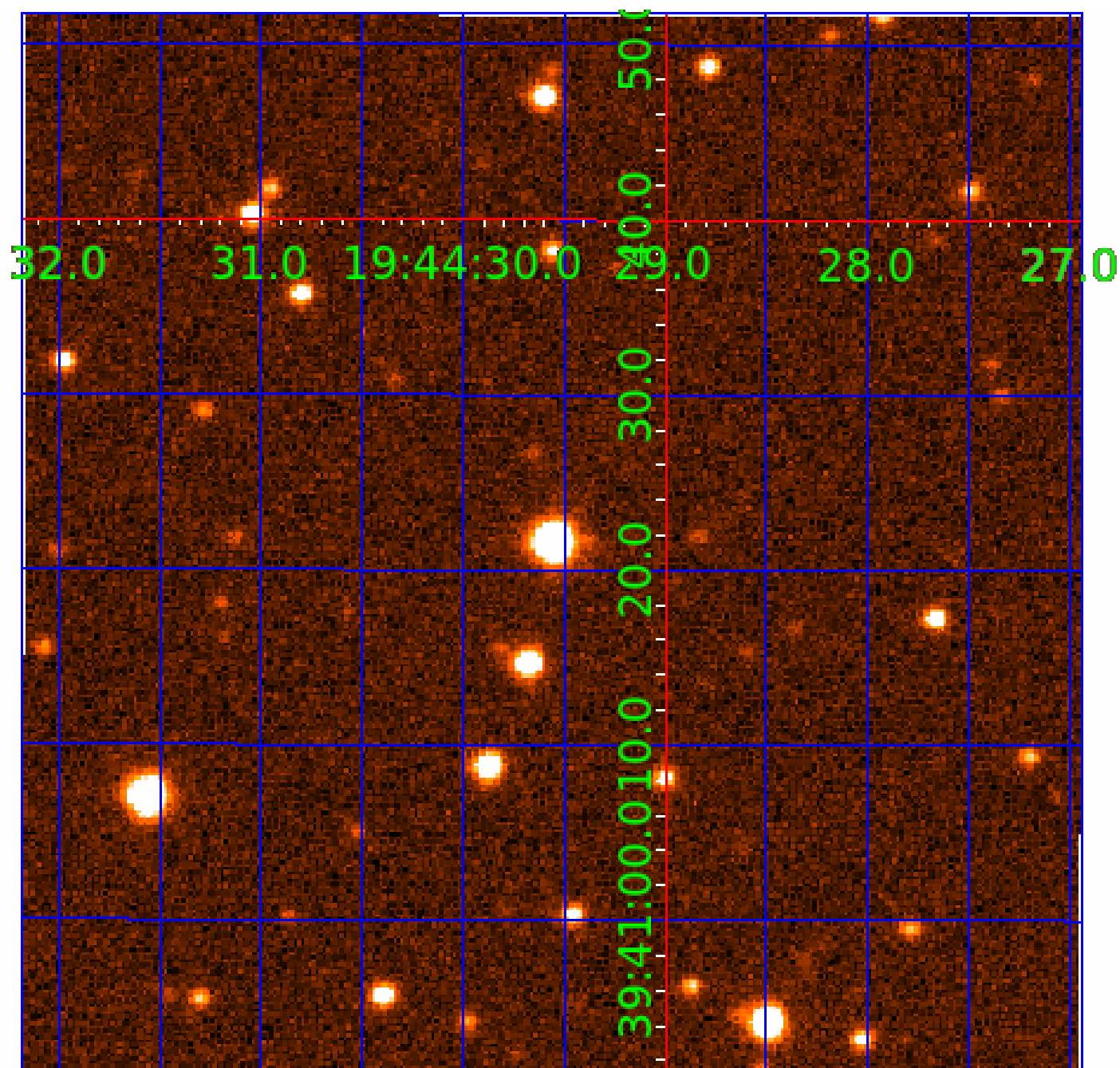


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 004579651

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004579651-01	OBS	No	2.969672	133.269297	40.7	6.316	8.1	6.8	1.57	6761	1.17	2231.48
004579651-02	OBS	No	2.969972	131.650832	38.5	10.048	8.9	8.1	1.57	6761	0.98	2231.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004579651-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
004579651-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD

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

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

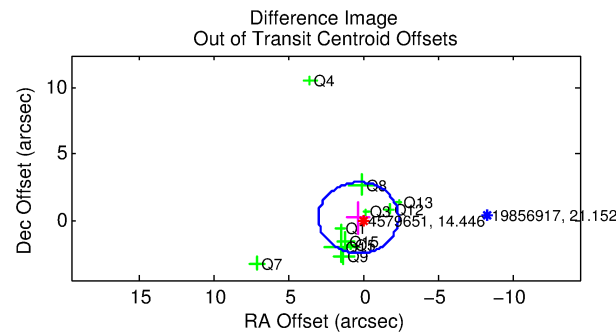
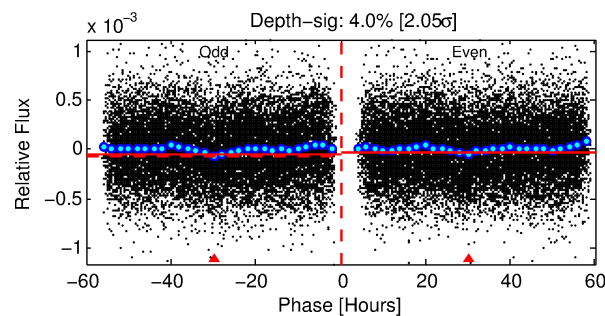
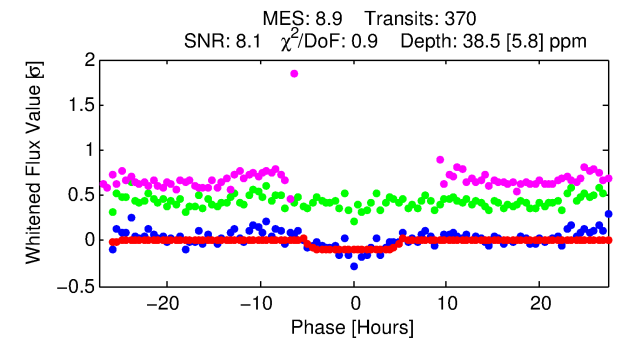
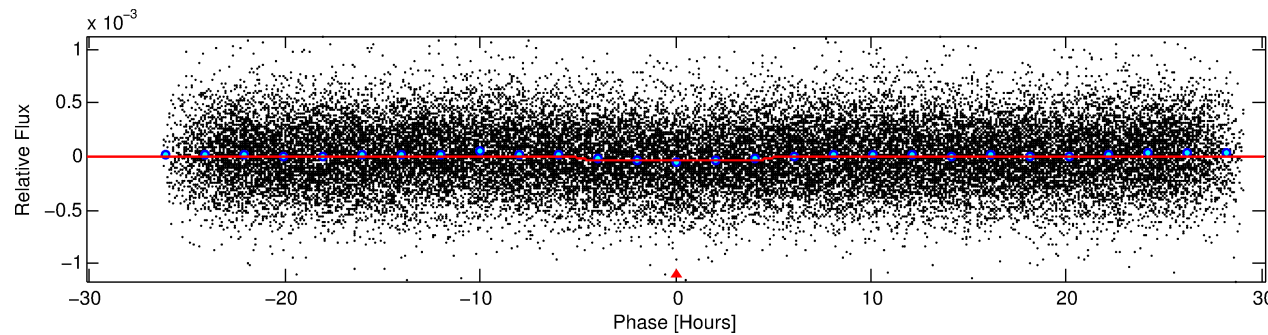
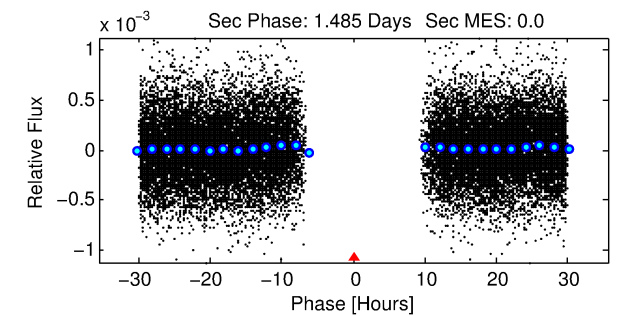
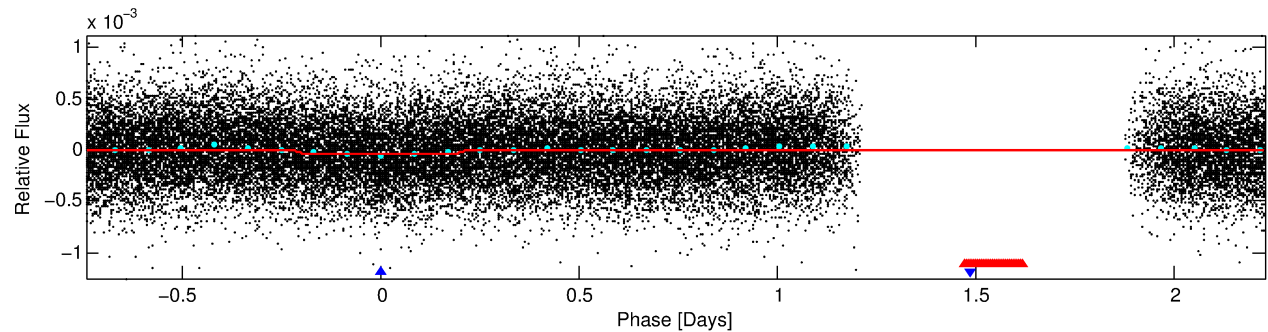
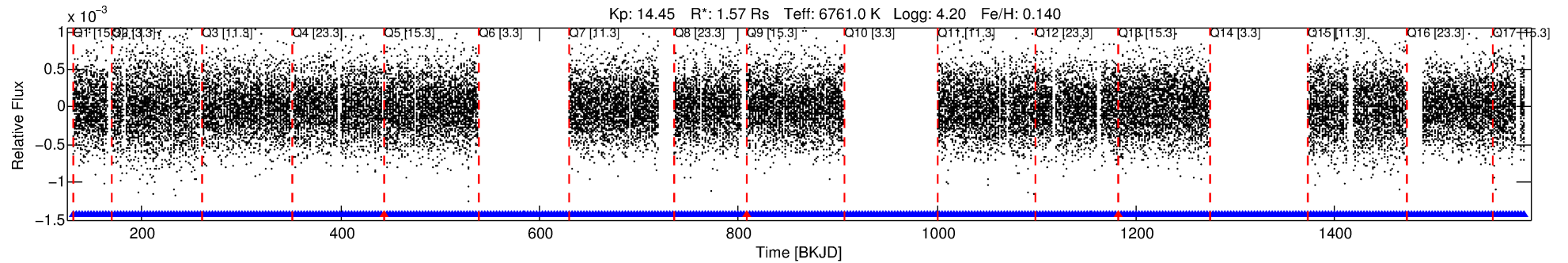
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004579651-02

No Significant Match Found

# DV One-Page Summary

KIC: 4579651 Candidate: 2 of 2 Period: 2.970 d



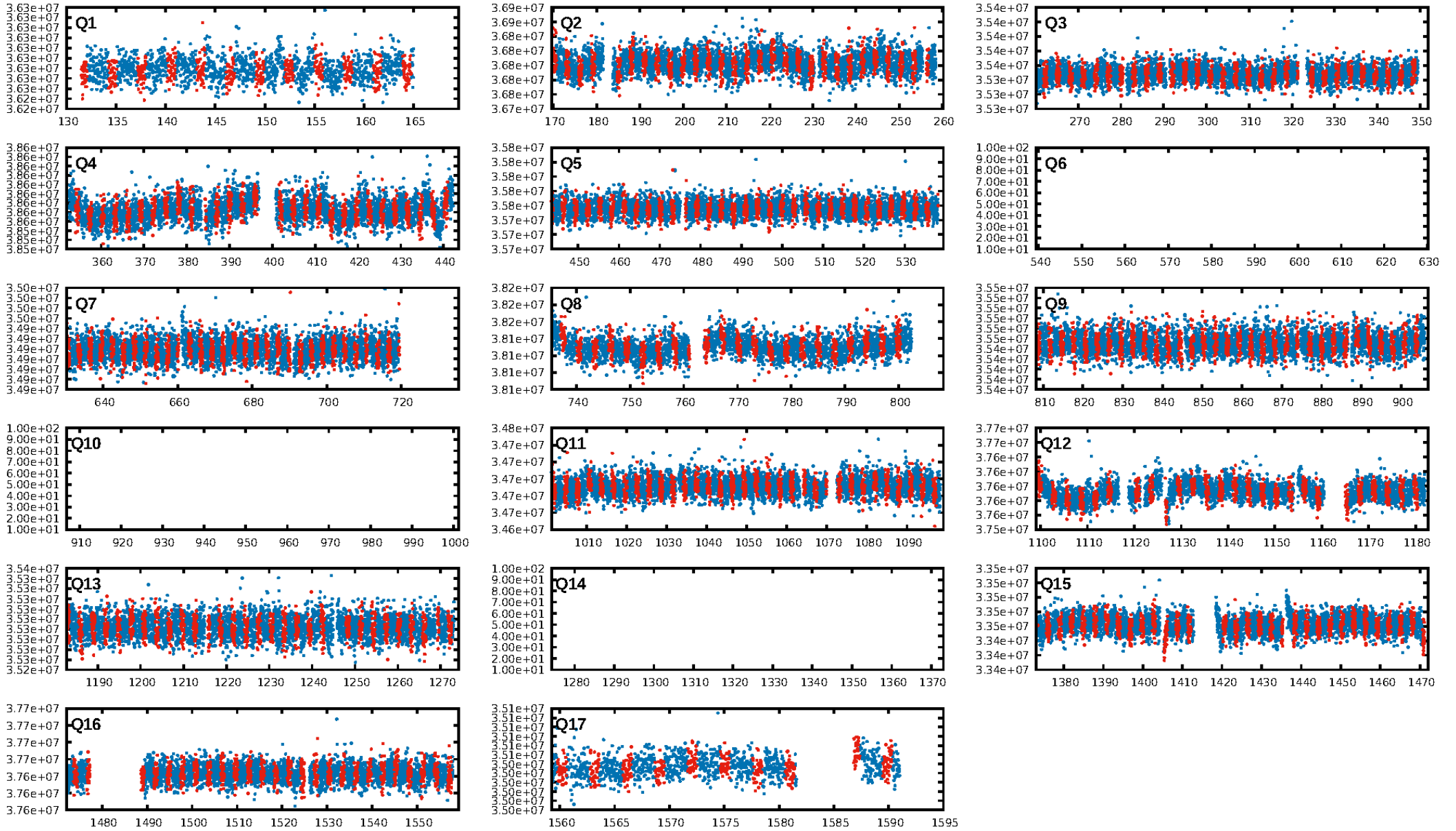
## DV Fit Results:

Period = 2.96997 [0.00005] d  
Epoch = 131.6508 [0.0111] BKJD  
Rp/R\* = 0.0057 [0.0098]  
a/R\* = 2.34 [17.75]  
b = 0.11 [84.32]  
Seff = 2231.18 [467.17]  
Teff = 1753 [92] K  
Rp = 0.98 [1.69] Re  
a = 0.0455 [0.0063] AU  
Ag = N/A  
Teffp = N/A

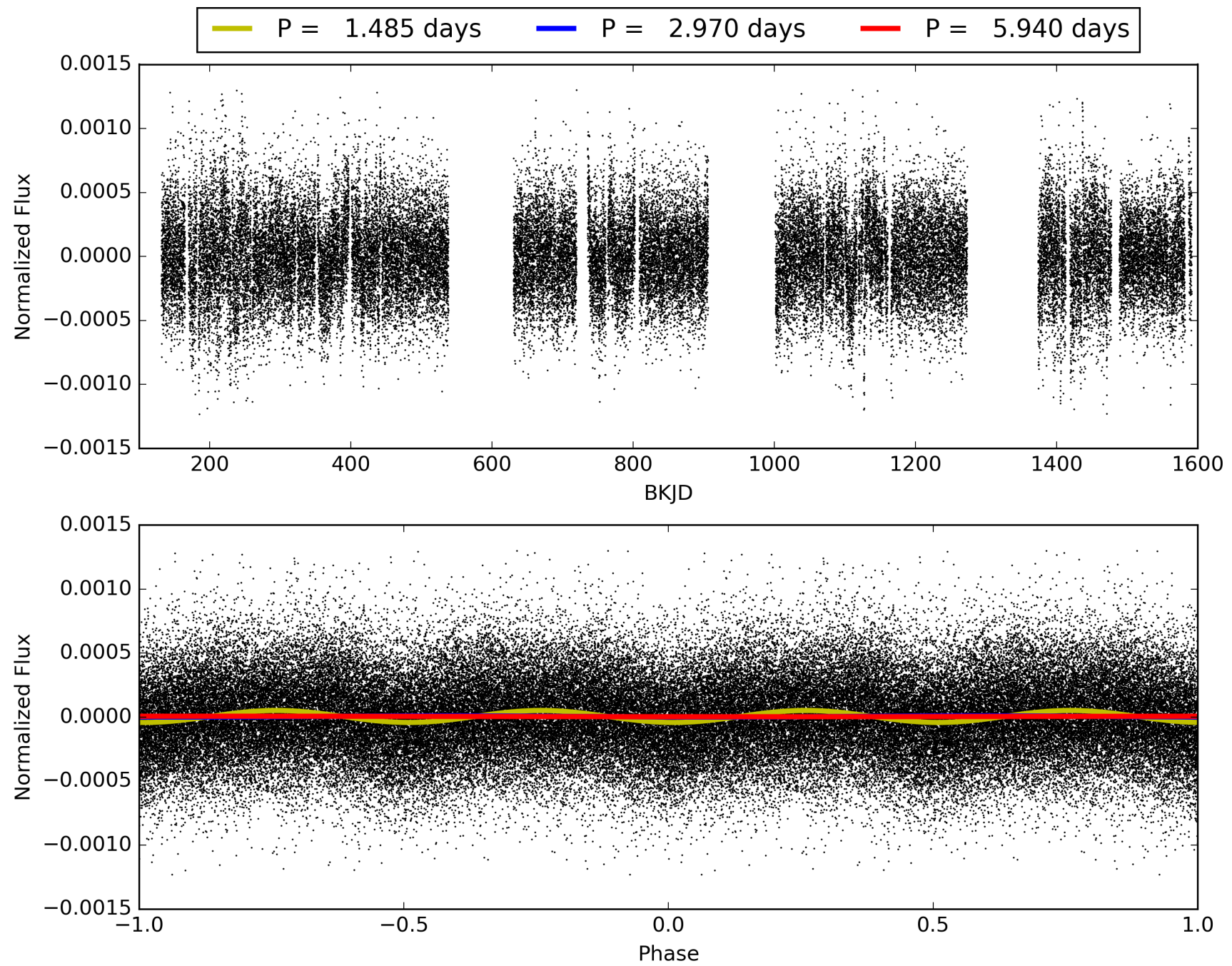
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.57e-17  
RollingBand-fgt: 0.99 [345/348]  
GhostDiagnostic-chr: 2.195  
Centroid-sig: 90.6%  
Centroid-so: 0.398 arcsec [0.28 $\sigma$ ]  
OotOffset-rm: 0.364 arcsec [0.41 $\sigma$ ]  
KicOffset-rm: 0.292 arcsec [0.31 $\sigma$ ]  
OotOffset-st: 0/4/3/4 [11]  
KicOffset-st: 0/4/3/4 [11]  
DiffImageQuality-fgm: 0.45 [5/11]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 004579651-02, PDC Light Curves



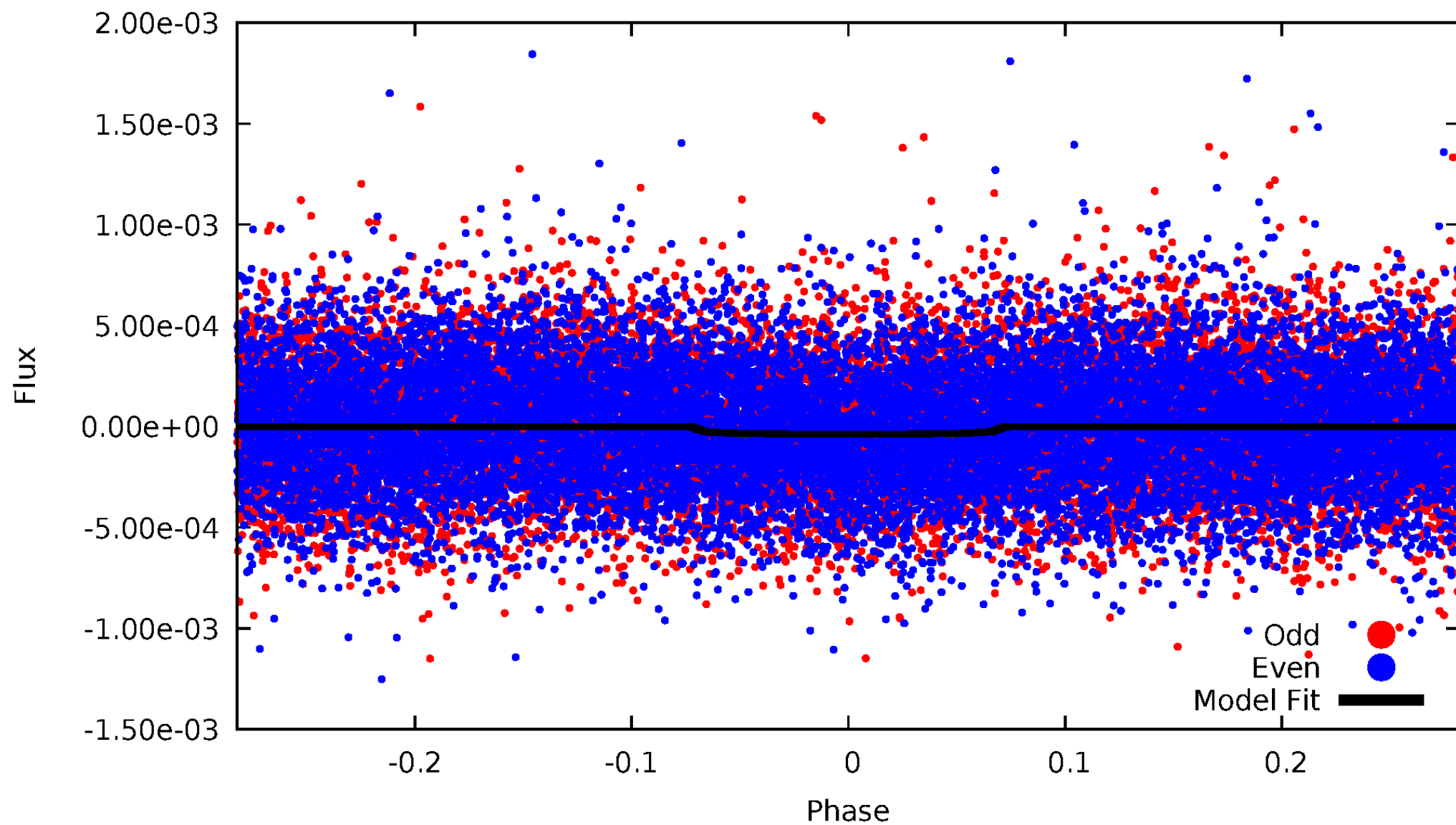
TCE 004579651-02





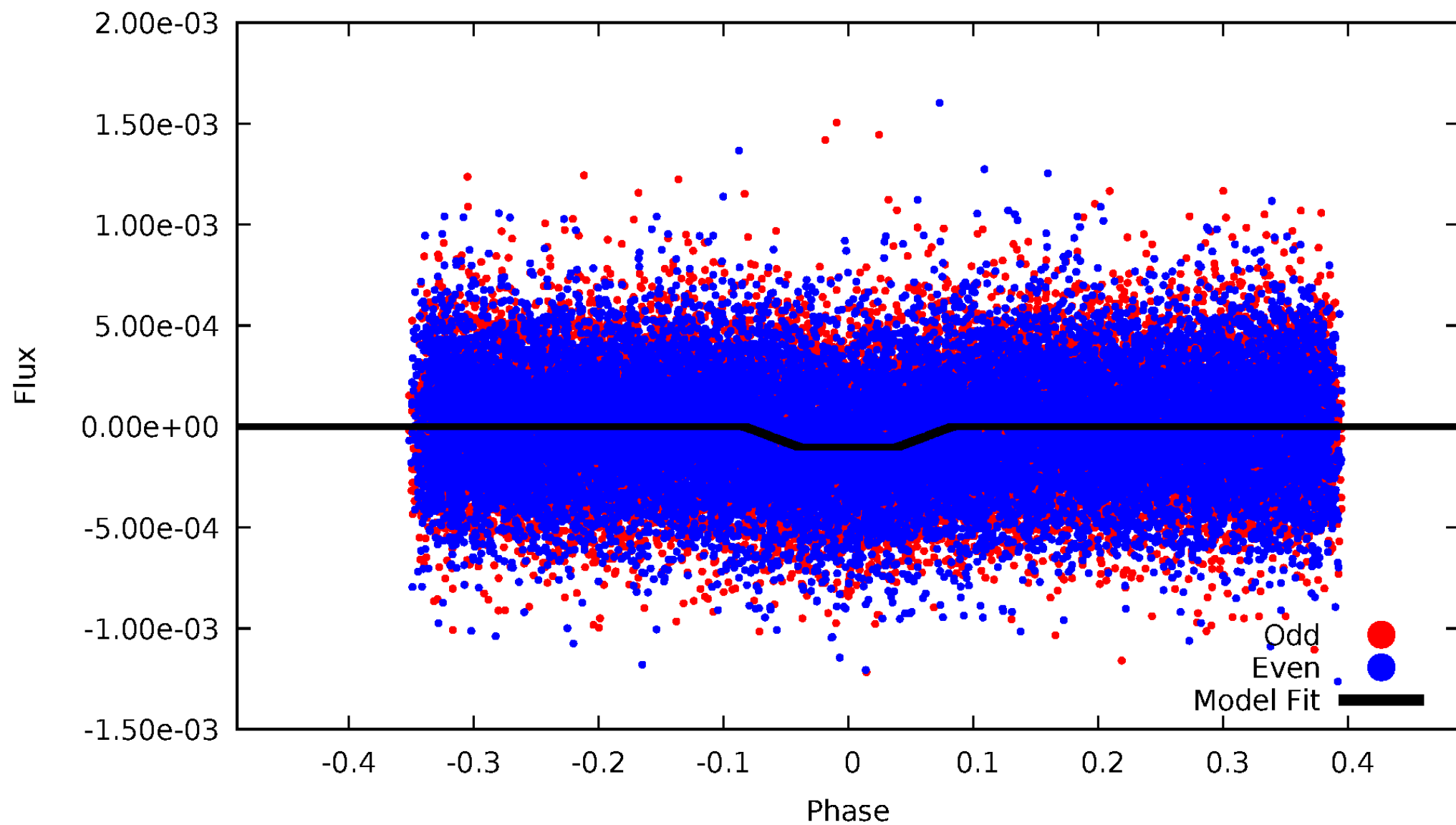
# DV Odd/Even

TCE 004579651-02



# ALT Odd/Even

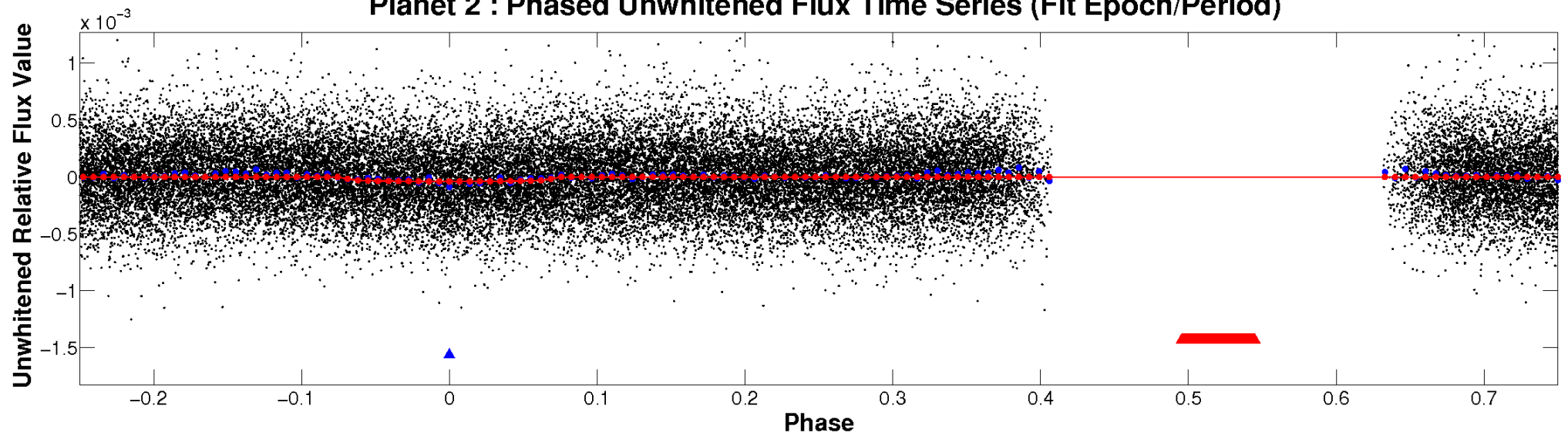
TCE 004579651-02



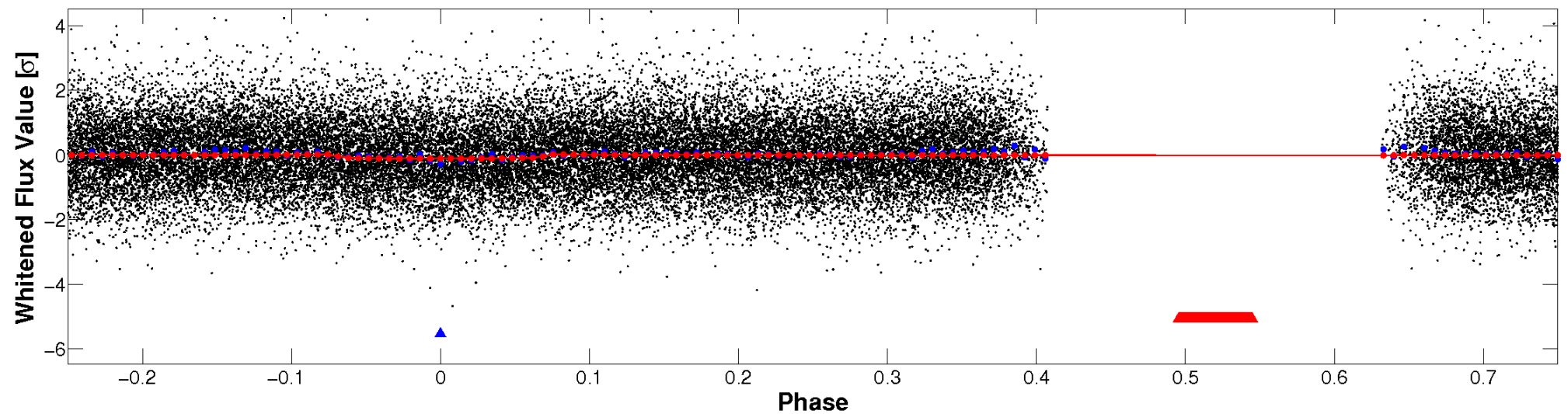


# Non-Whitened Vs. Whitened Light Curve

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

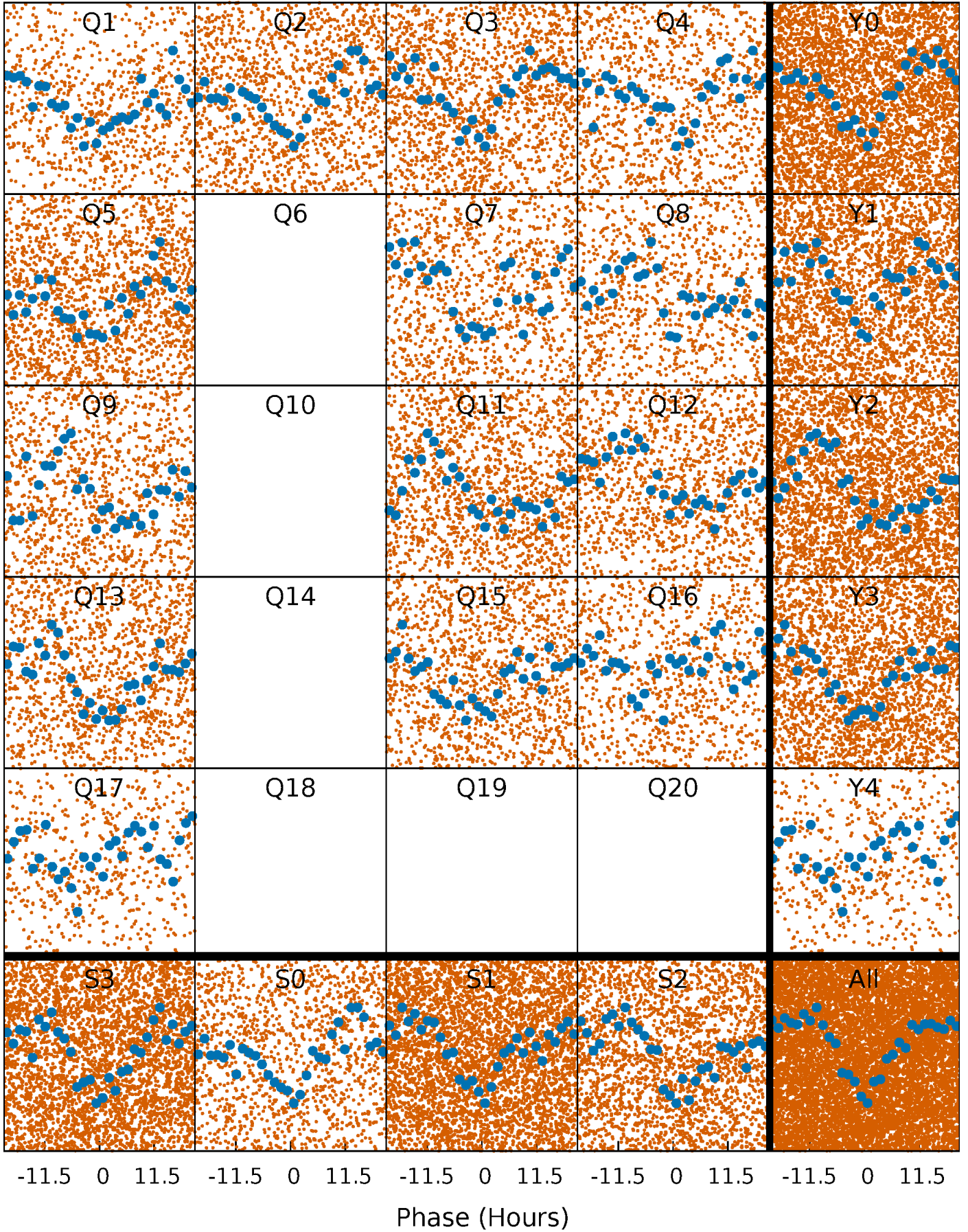


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

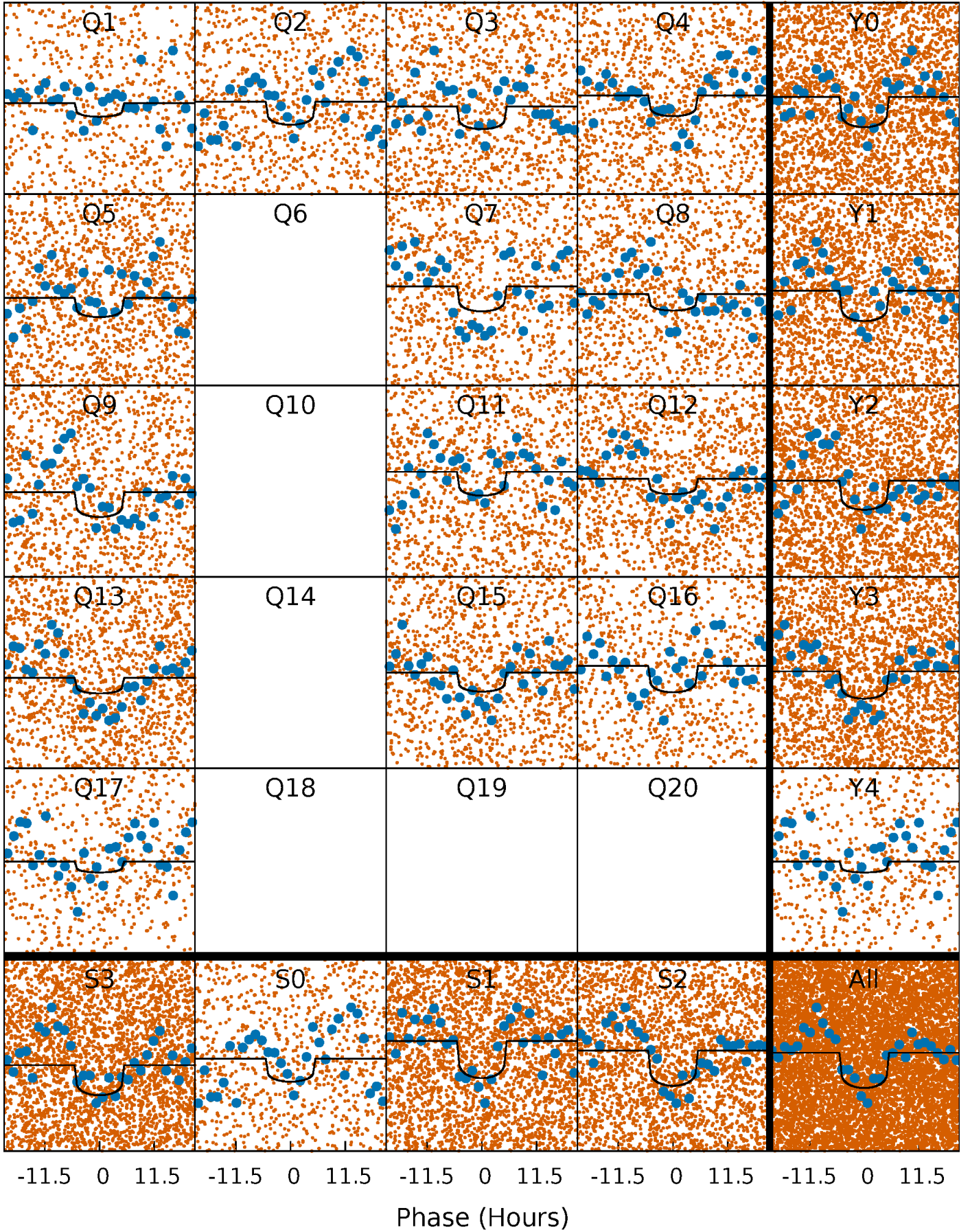
TCE 004579651-02    P= 2.969972 Days     $T_0=131.650833$  (BKJD)





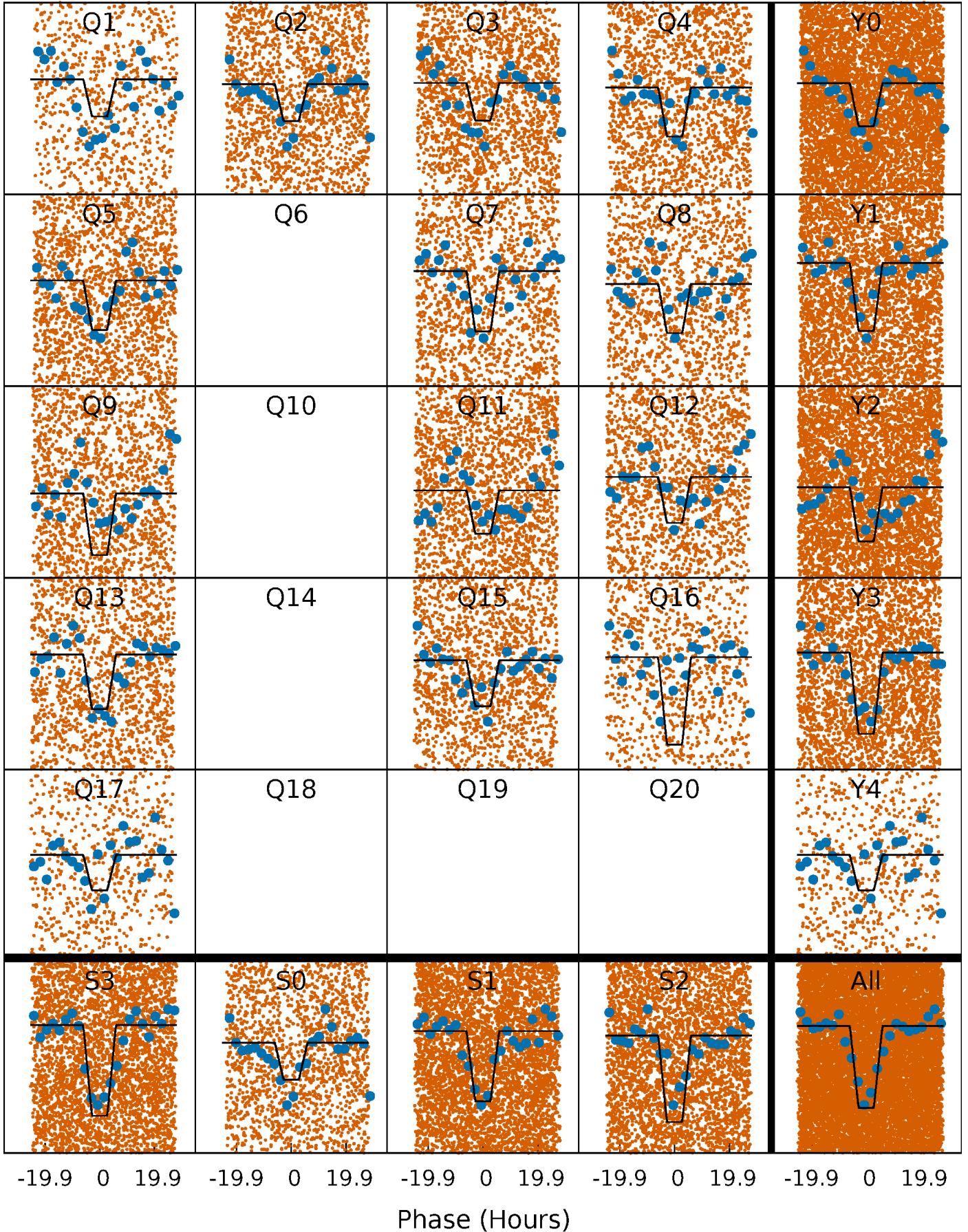
# DV Quarter-Phased Transit Curves

TCE 004579651-02   P= 2.969972 Days    $T_0=131.650833$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

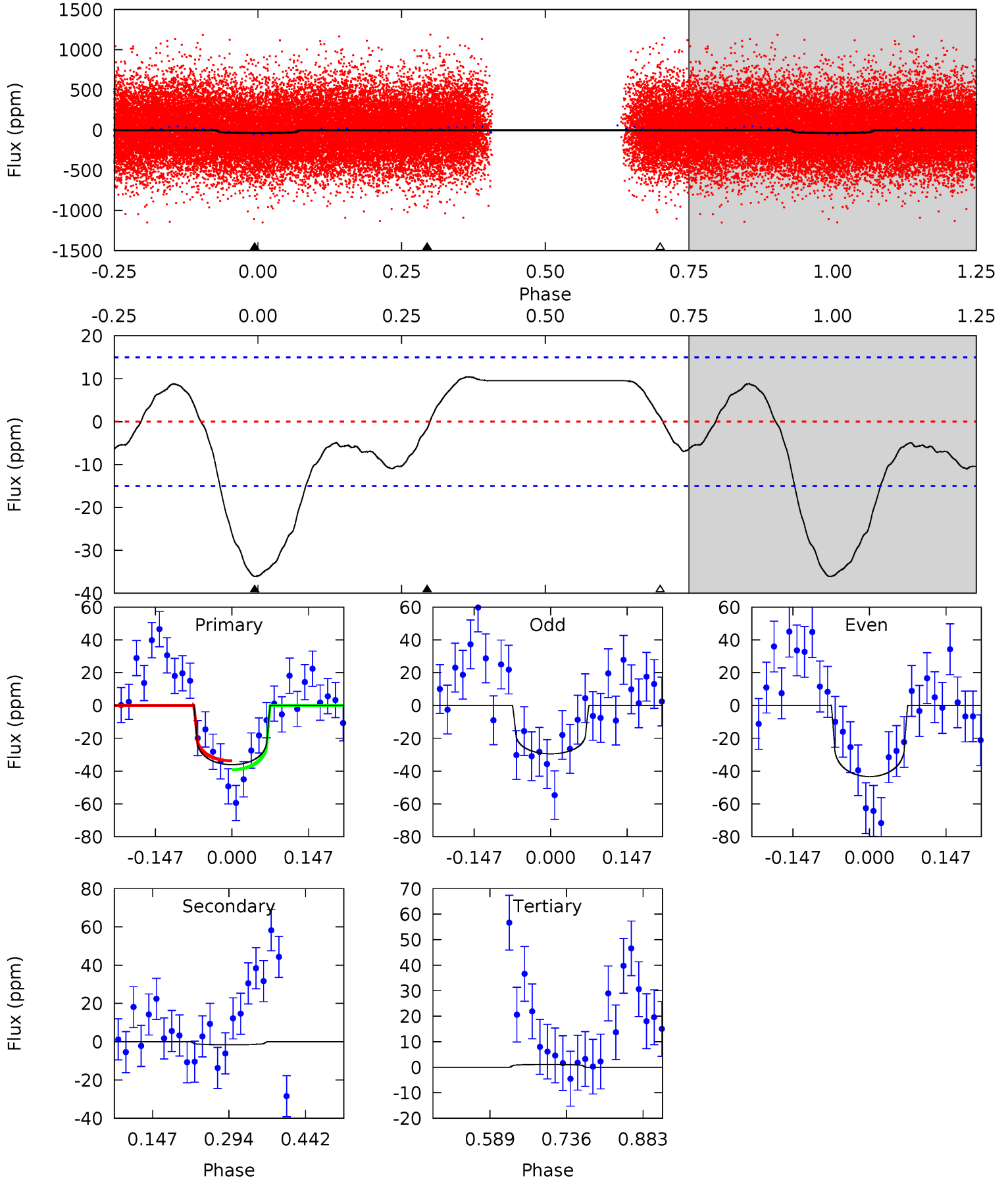
TCE 004579651-02   P= 2.969796 Days    $T_0=131.688666$  (BKJD)



# DV Model-Shift Uniqueness Test

004579651-02, P = 2.969972 Days, E = 128.680861 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
10.8	0.48	-0.33	0	4.48	1.45	1.58	11.1	10.8	0.81	0.48	2.08	0.98	0.22	0.82

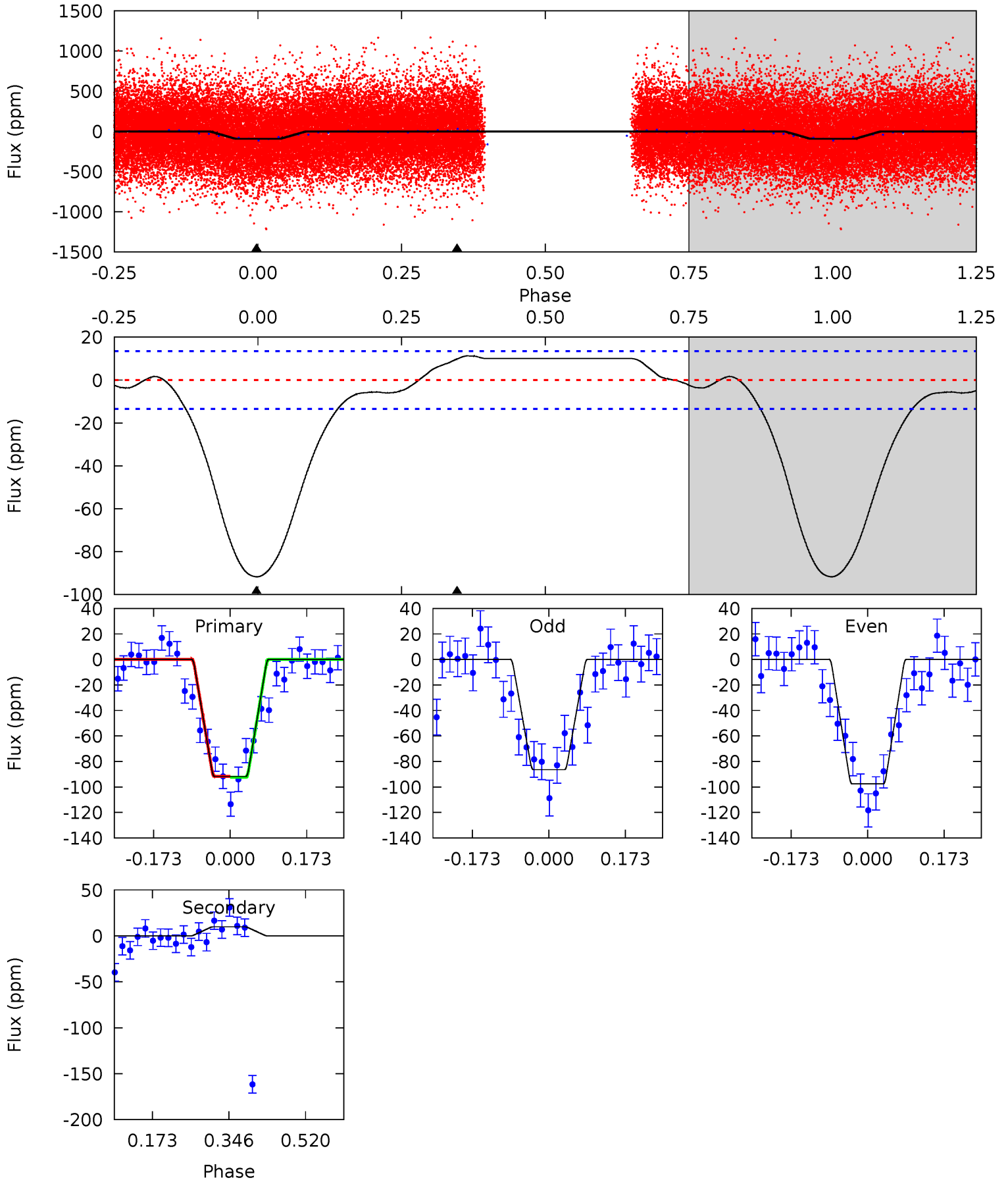




# Alt Model-Shift Uniqueness Test

004579651-02, P = 2.969796 Days, E = 128.718870 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
30.3	-3.26	0	0	4.45	1.36	1.21	30.3	30.3	-3.26	-3.26	1.84	1.02	0.11	0.12





### Stellar Parameters For KIC 004579651

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$6761^{+70}_{-91}$	$4.199^{+0.060}_{-0.111}$	$0.140^{+0.150}_{-0.150}$	$1.570^{+0.257}_{-0.138}$	$1.422^{+0.109}_{-0.079}$	$0.518^{+0.133}_{-0.168}$
	+1%/-1%	+1%/-3%	+107%/-107%	+16%/-9%	+8%/-6%	+26%/-33%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 004579651-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2 \pm 3$	$1.60^{+1.40}_{-1.07}$	$2457^{+95}_{-70}$	$2591^{+1768}_{-5848}$	$0.491^{+5.263}_{-1.174}$
Alt.	$10 \pm 3$	$2.05^{+1.55}_{-1.32}$	$2458^{+95}_{-71}$	$-3899^{+554}_{-1848}$	$-2.587^{+1.795}_{-17.777}$

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

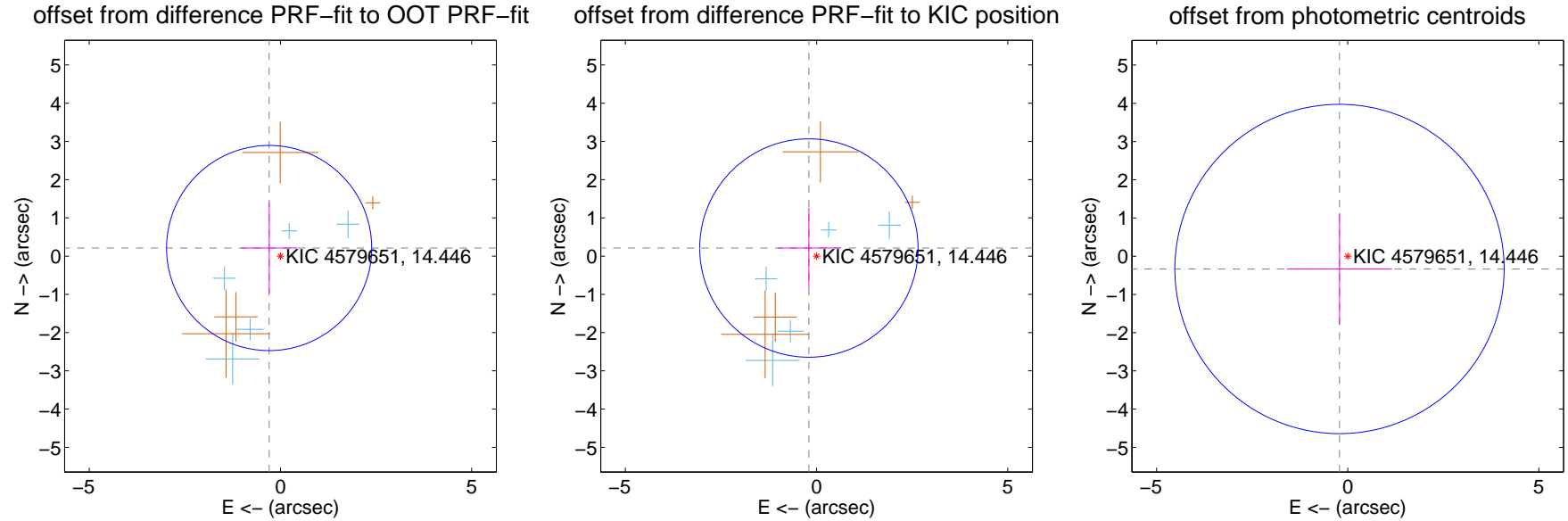
## DV Centroid Data

Supplemental centroid analysis for 004579651-02. Kepler magnitude: 14.45. Transit SNR 8.11

There are 5 quarters with good PRF difference image offsets

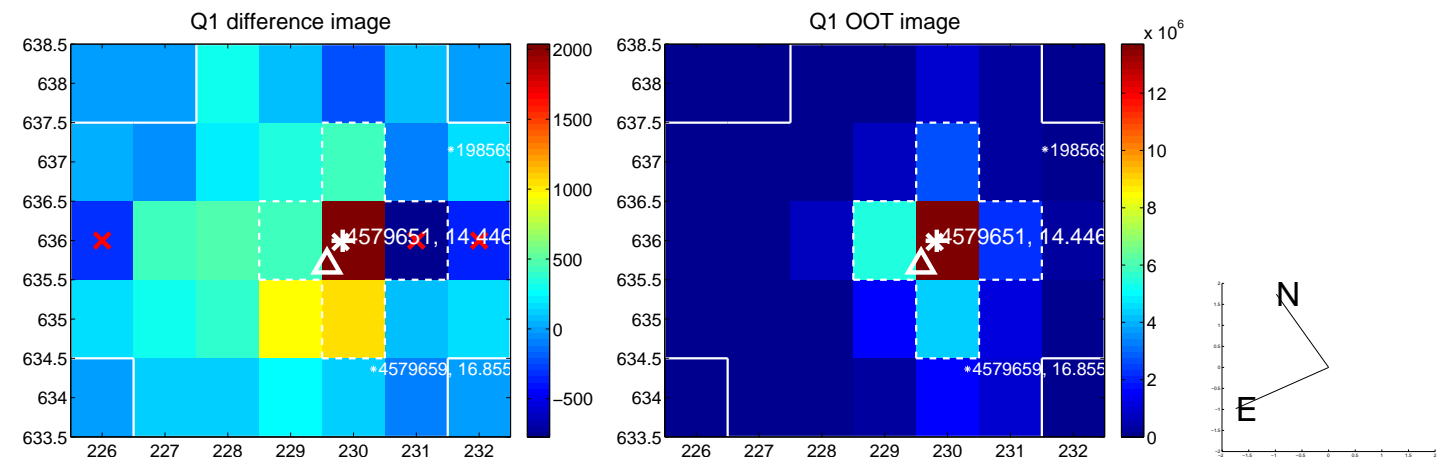
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.364 \pm 0.894$	0.41	$0.296 \pm 0.733$	$0.212 \pm 1.195$
PRF-fit source offset from KIC position	$0.292 \pm 0.952$	0.31	$0.201 \pm 0.805$	$0.212 \pm 1.051$
photometric centroid source offset	$0.40 \pm 1.44$	0.28	$0.22 \pm 1.38$	$-0.33 \pm 1.46$

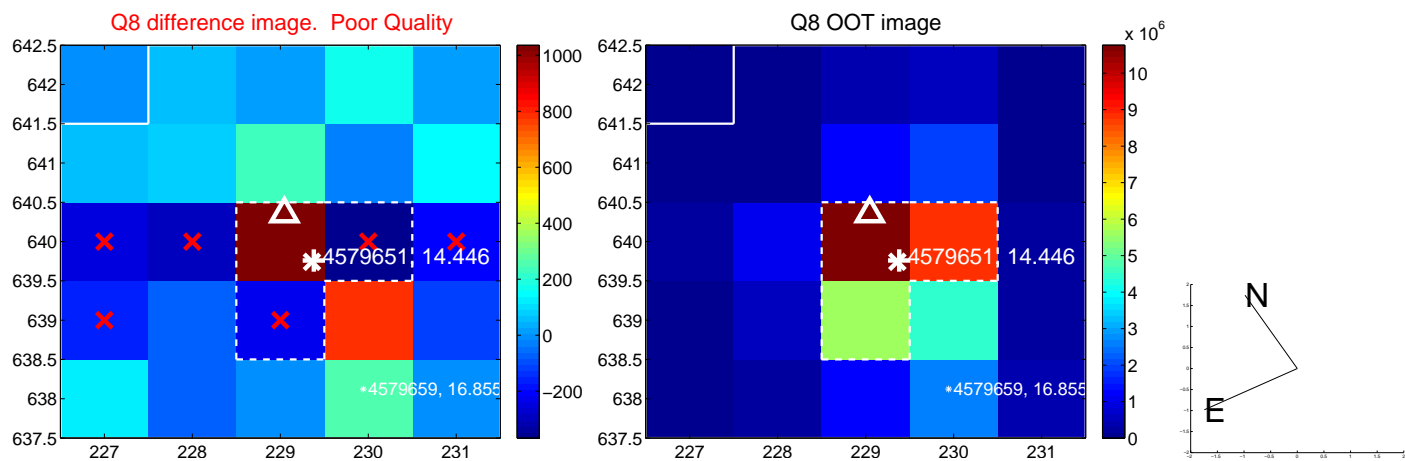
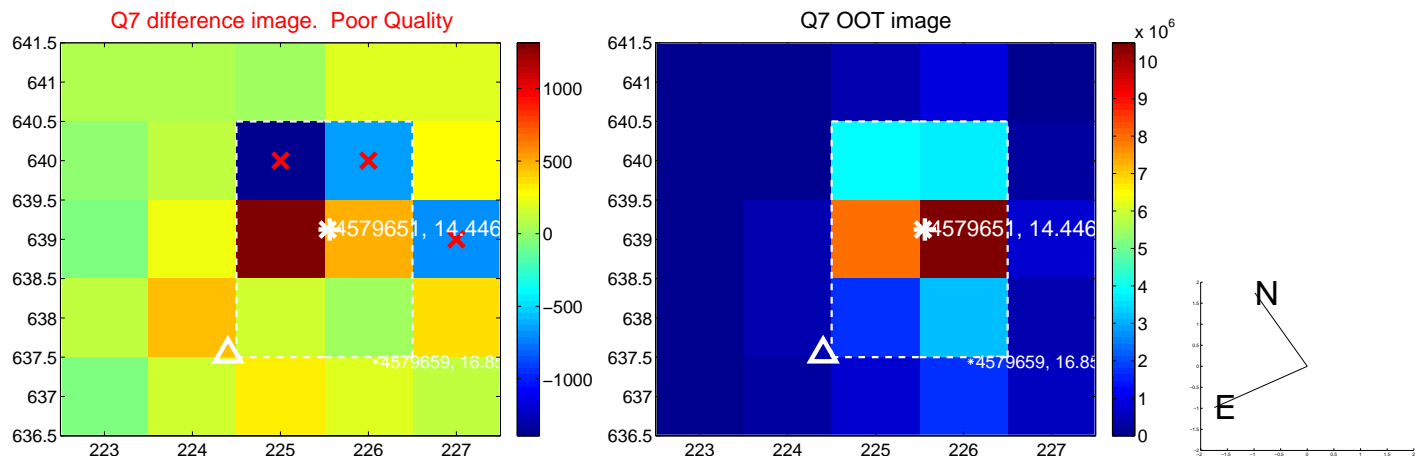
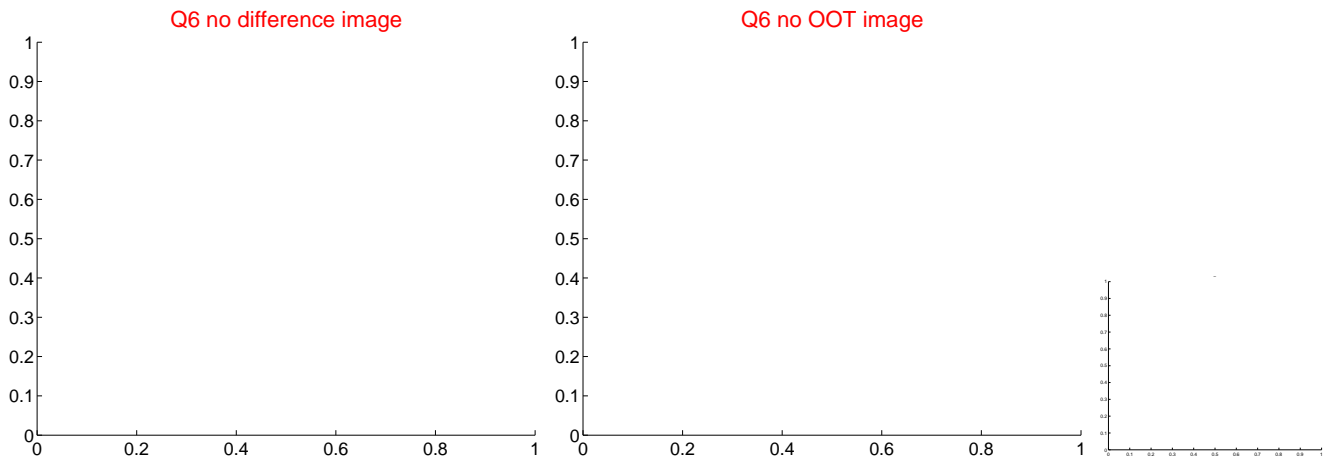
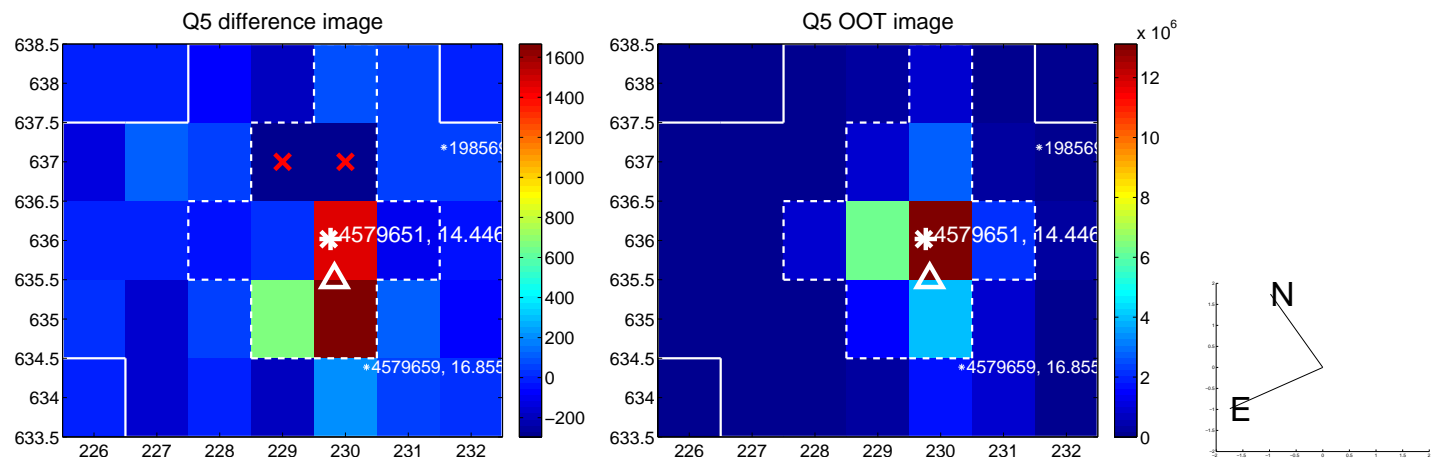


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

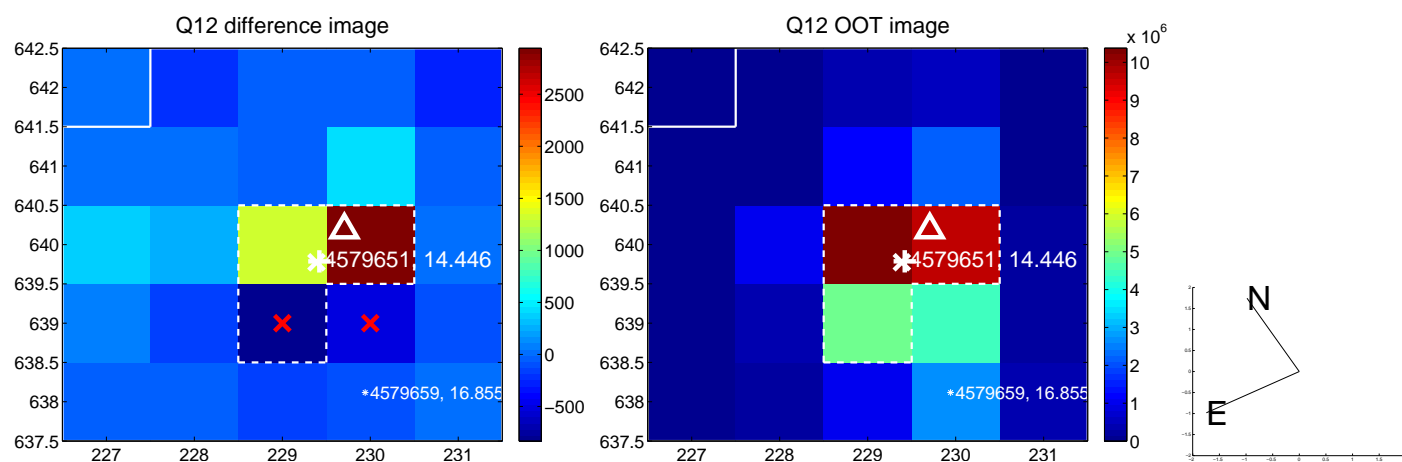
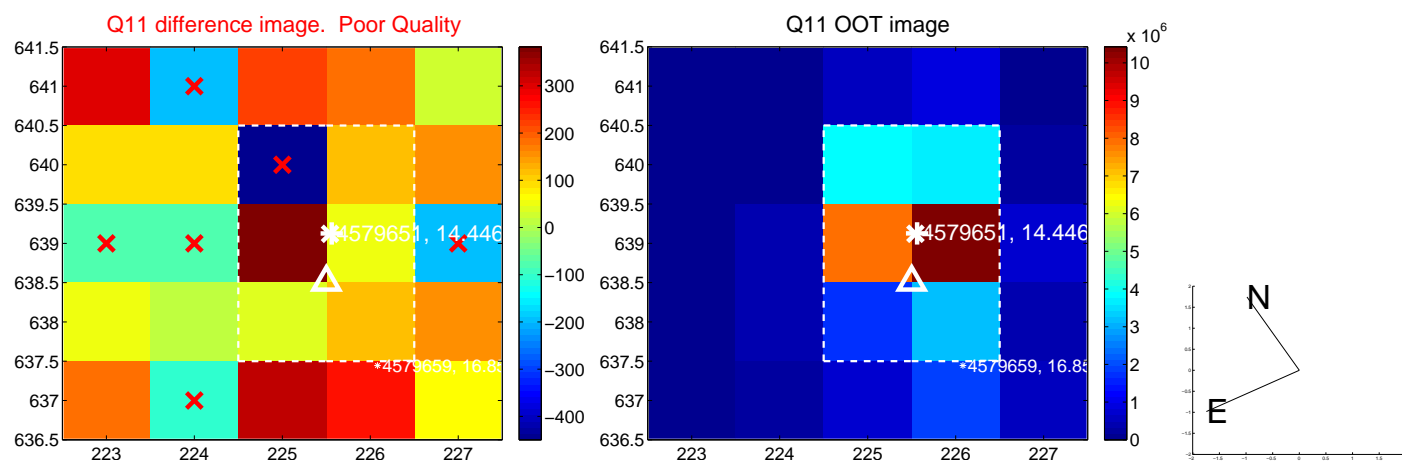
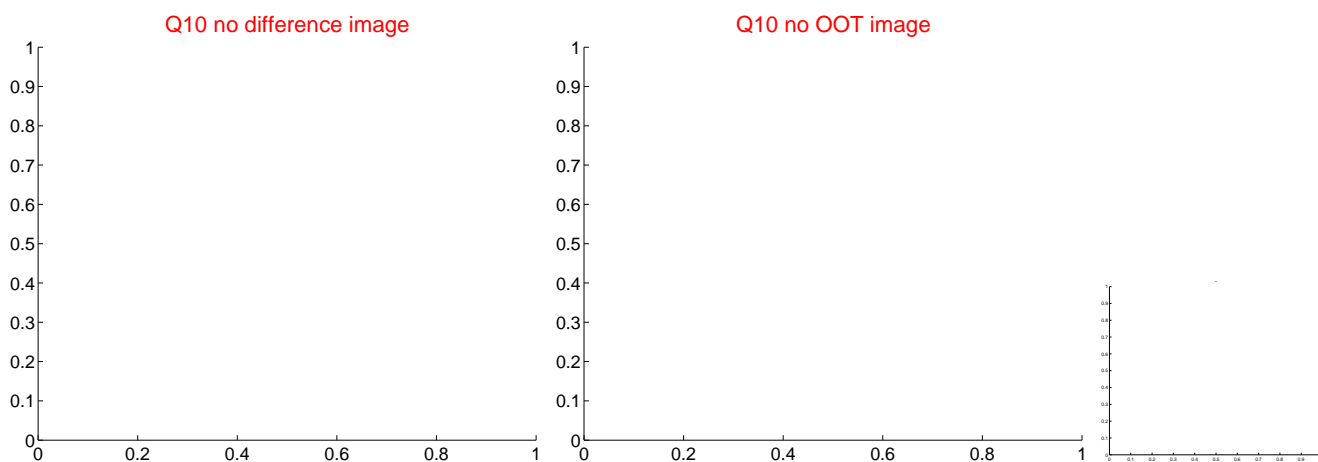
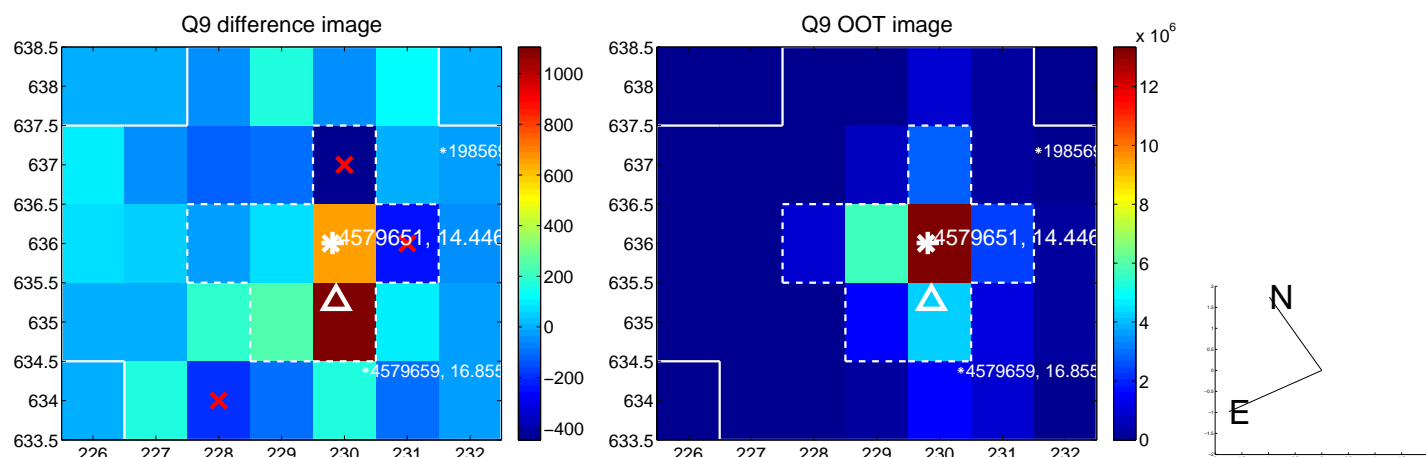
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

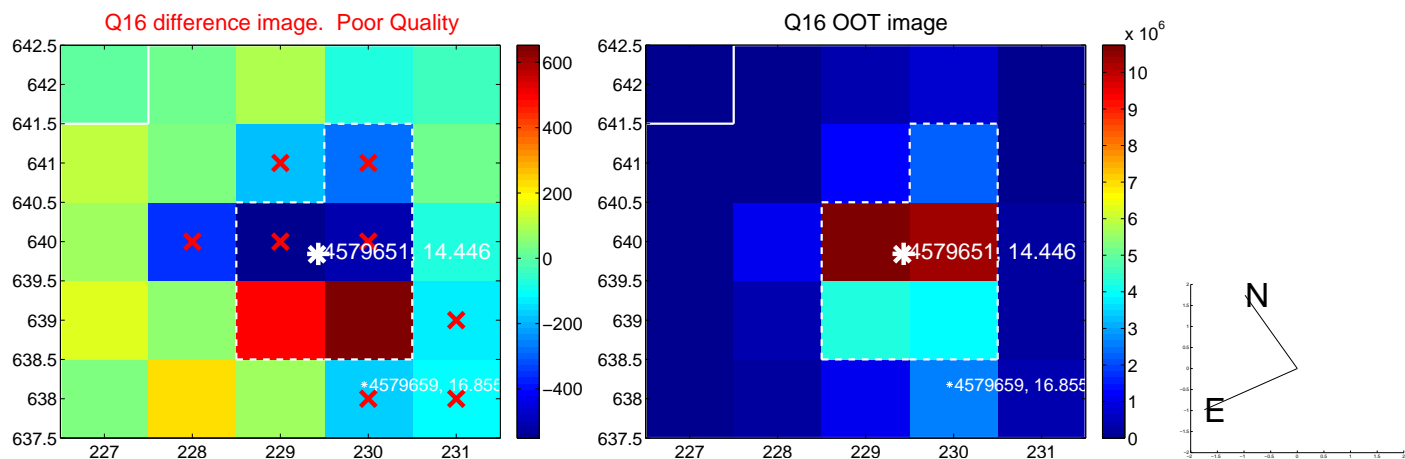
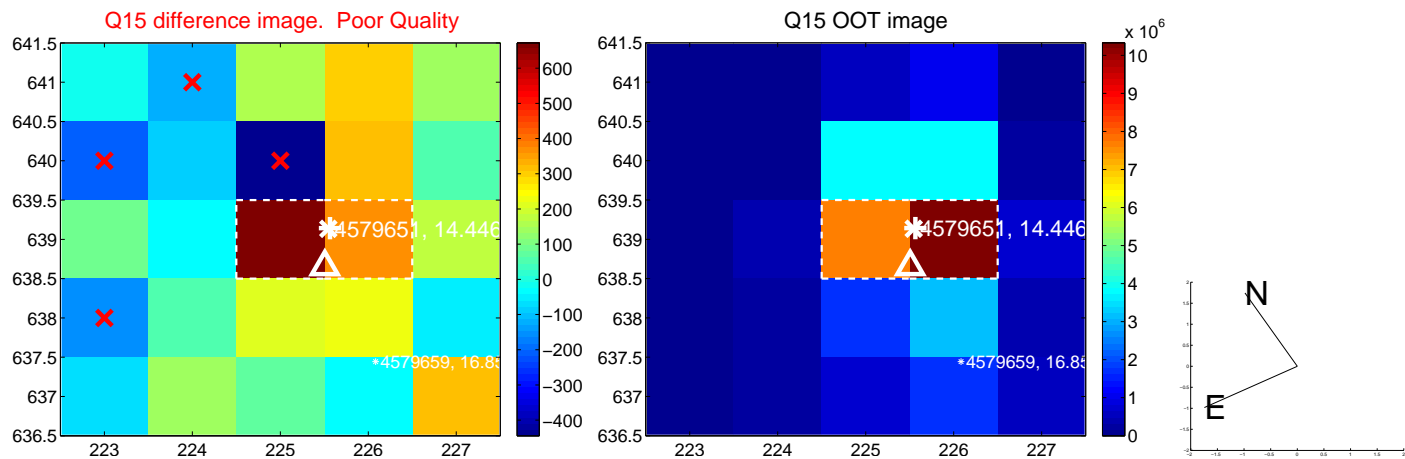
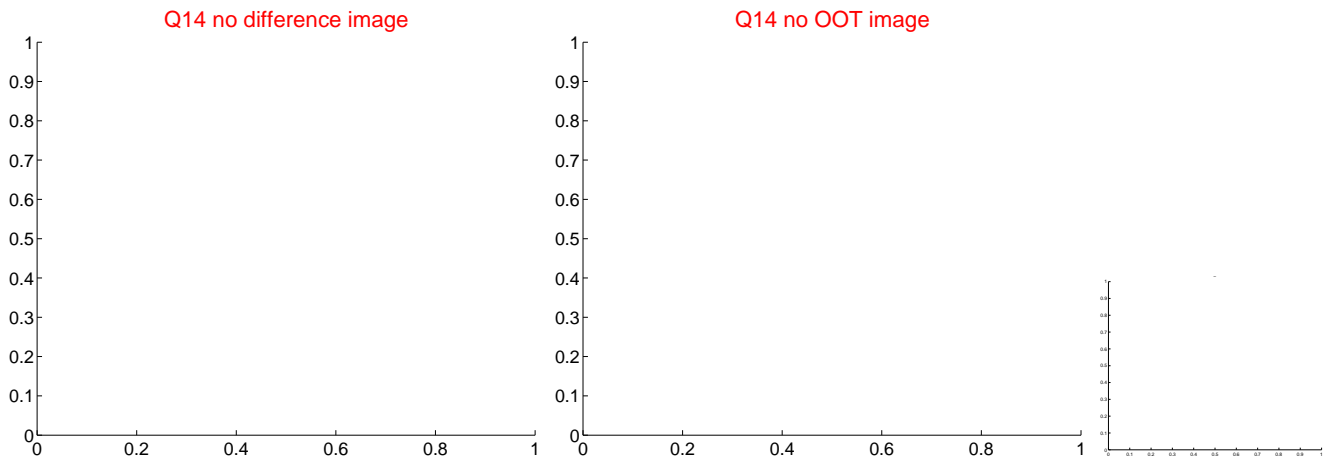
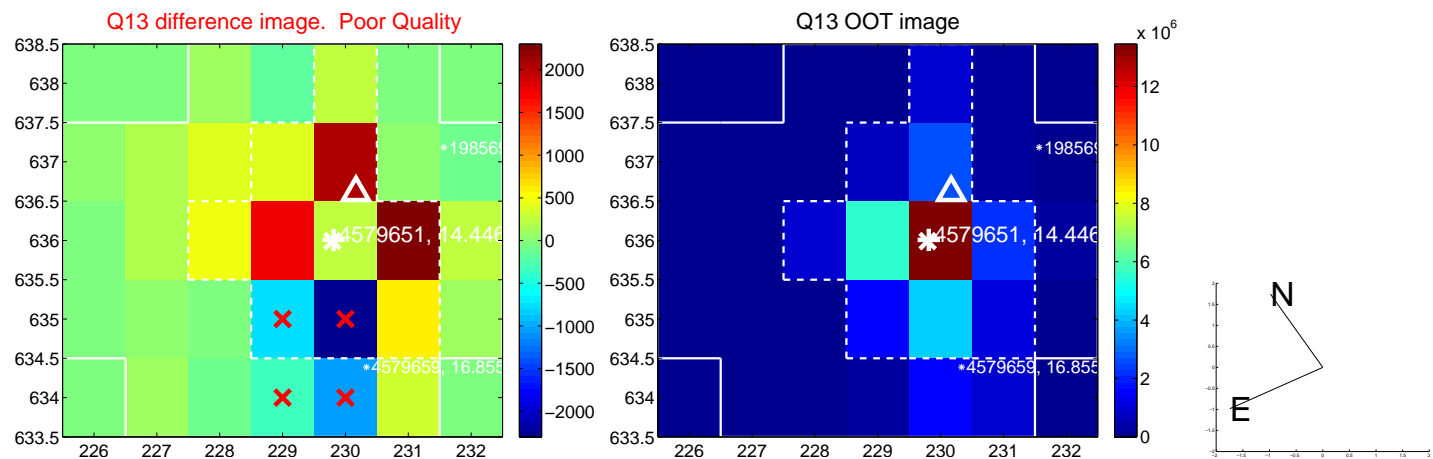


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

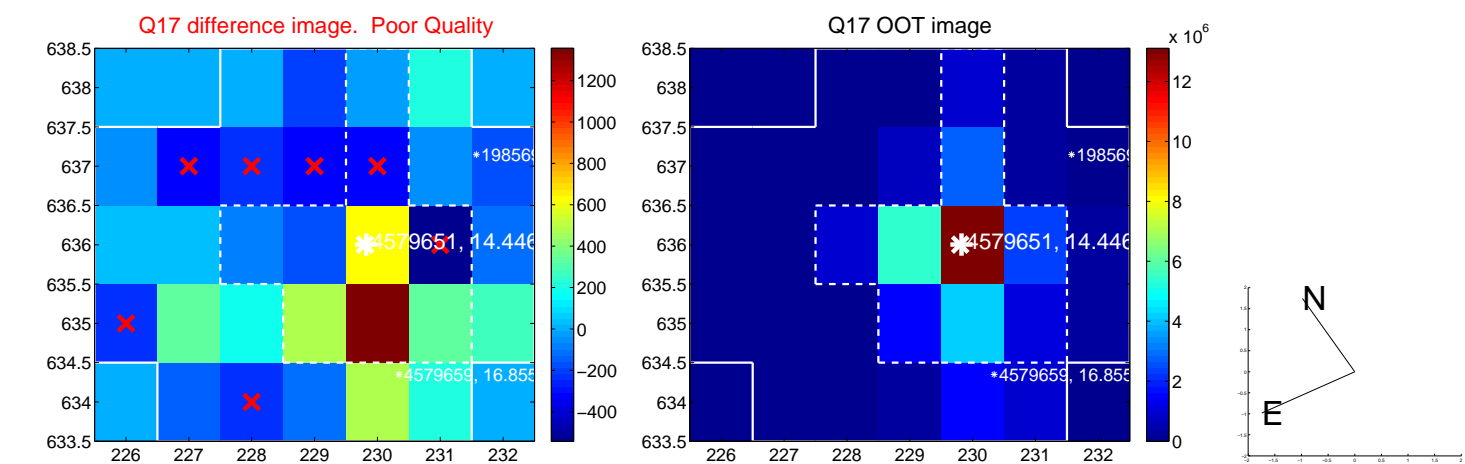




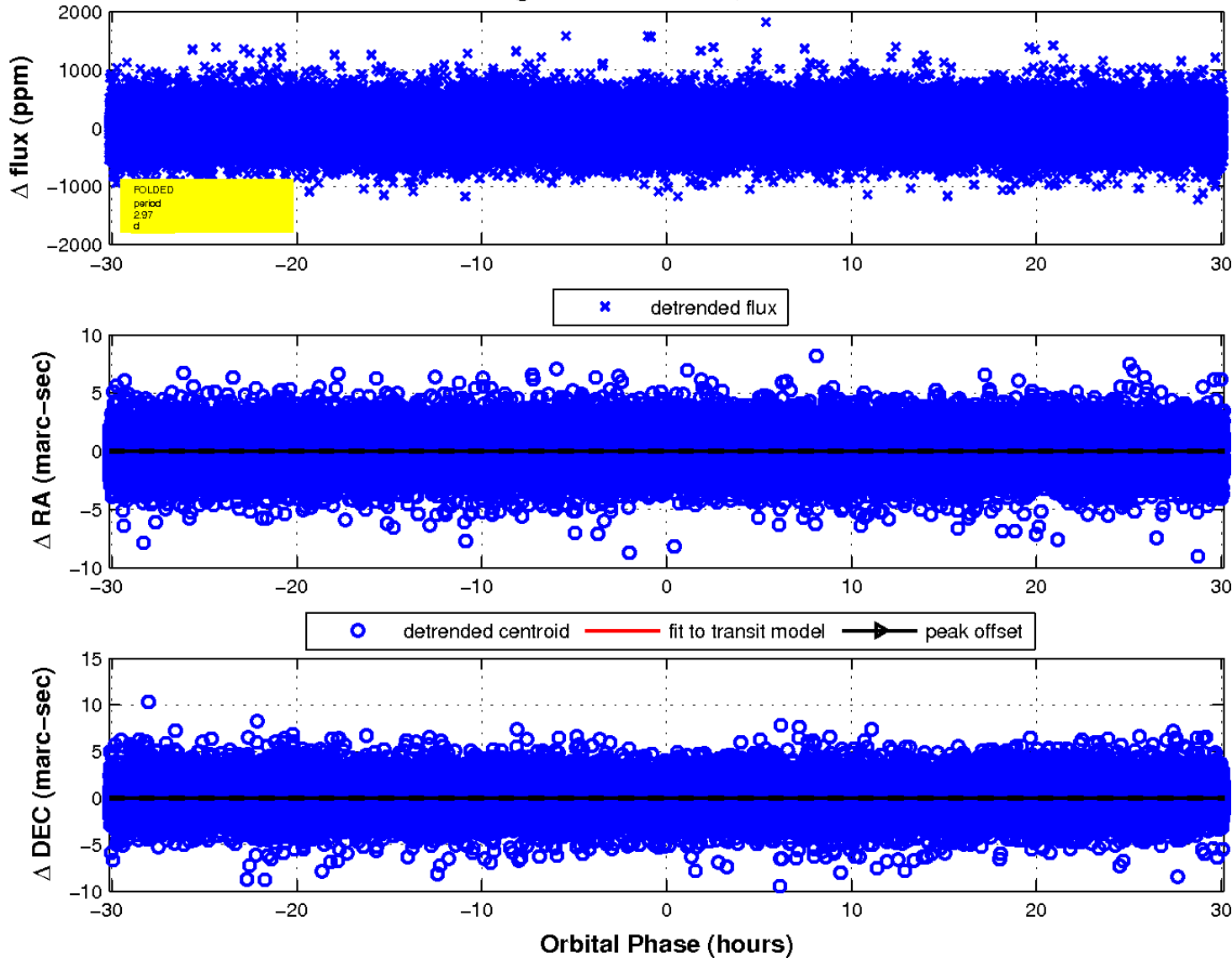
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

