

# KIC 010556578

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010556578-01	OBS	No	1.253249	131.829030	708.3	2.875	422.9	15.5	0.72	5134	3.91	801.60
010556578-02	OBS	7343.01	0.626428	131.901619	23262.5	1.500	174.6	-1.0	0.72	5134	10.84	2020.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010556578-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
010556578-02	OBS	FP	0.00	0	1	0	0	SWEET_EB—MOD_ODDEVEN_ALT—CENT_NOFITS

**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.

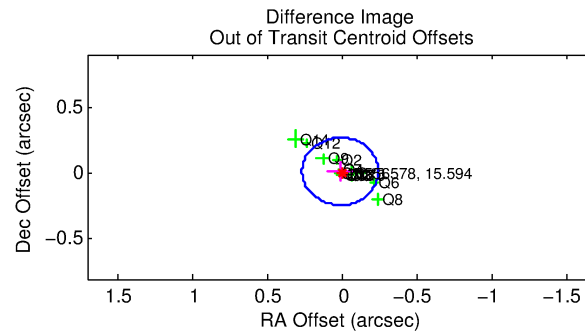
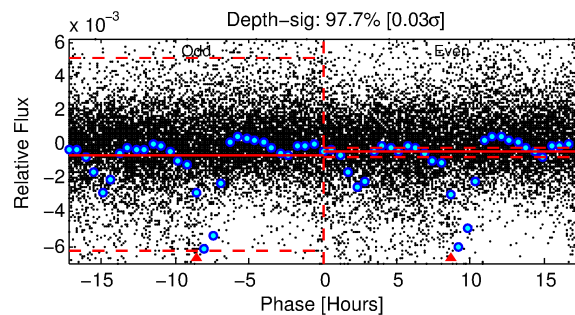
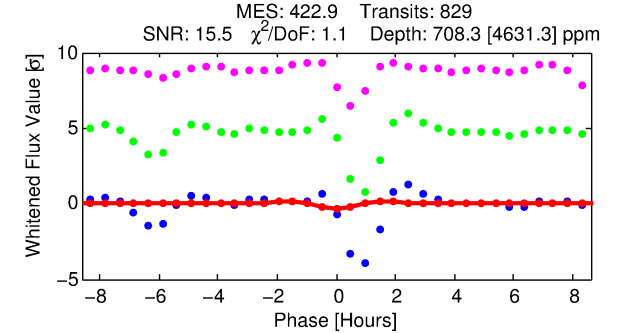
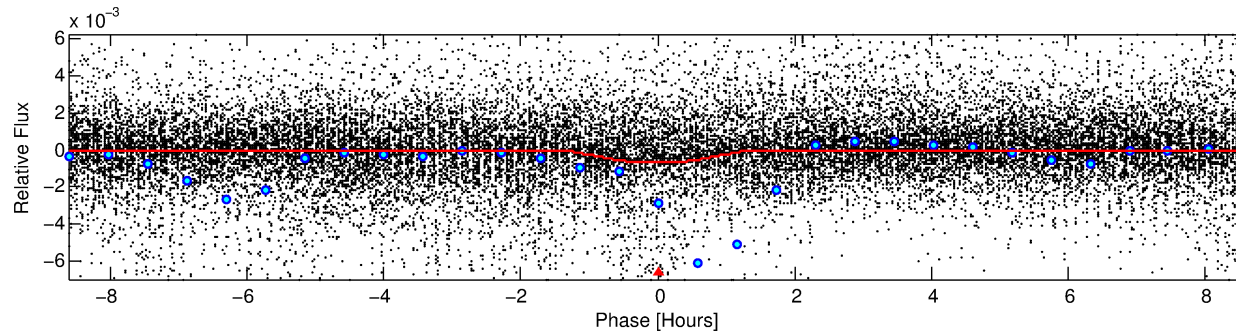
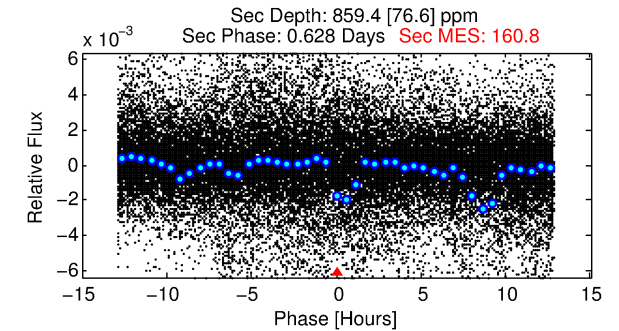
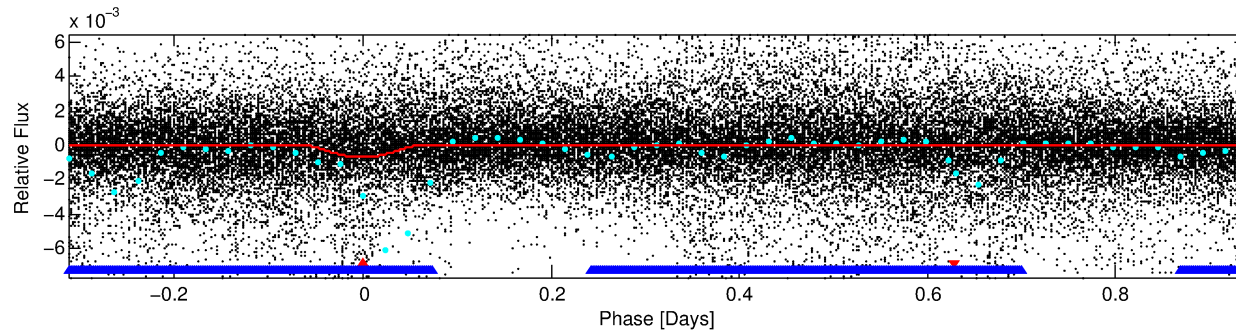
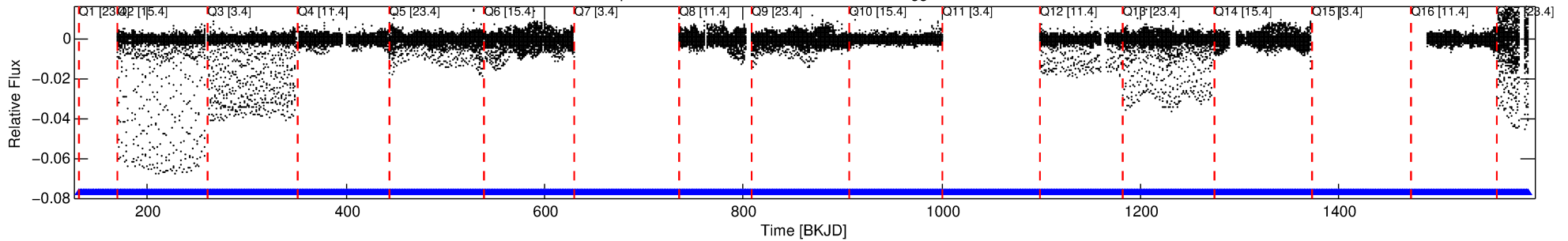
## Ephemeris Match Information For 010556578-01

No Significant Match Found

# DV One-Page Summary

KIC: 10556578 Candidate: 1 of 2 Period: 1.253 d  
KOI: K07343 Corr: No Ephemeris Match

Kp: 15.59 R\*: 0.72 Rs Teff: 5134.0 K Logg: 4.56 Fe/H: -0.440



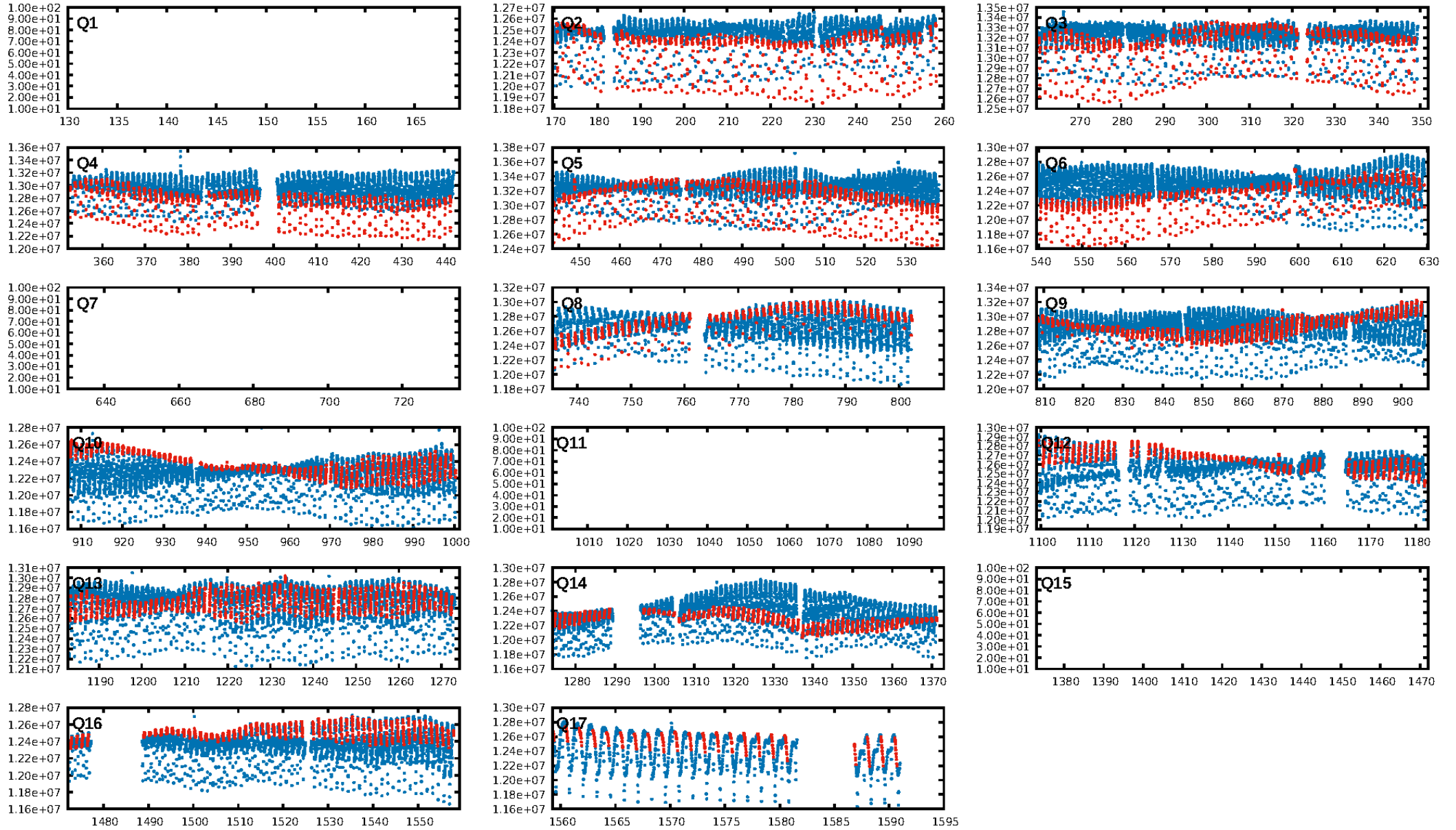
## DV Fit Results:

Period = 1.25325 [0.00001] d  
Epoch = 131.8290 [0.0019] BKJD  
Rp/R\* = 0.0497 [0.0967]  
a/R\* = 1.47 [0.28]  
b = 1.00 [0.08]  
Seff = 801.60 [158.79]  
Teff = 1357 [67] K  
Rp = 3.91 [7.62] Re  
a = 0.0201 [0.0019] AU  
Ag = 12.47 [48.57] [0.24σ]  
Teffp = 3942 [3837] K [0.67σ]

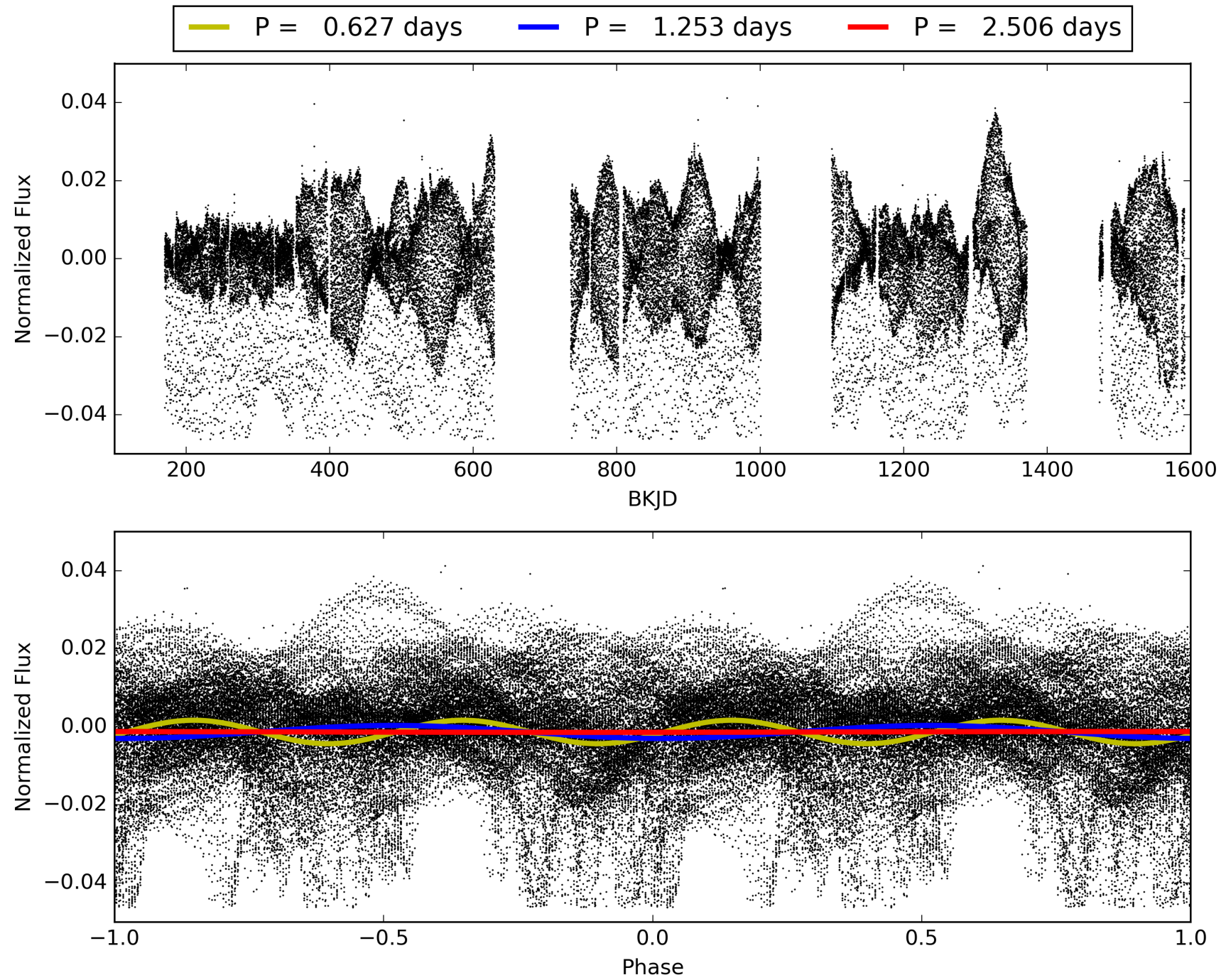
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.64σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [807/807]  
**GhostDiagnostic-chr: 0.9784**  
Centroid-sig: 0.0%  
Centroid-so: 0.838 arcsec [2.27σ]  
OotOffset-rm: 0.017 arcsec [0.20σ]  
KicOffset-rm: 0.121 arcsec [1.67σ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 0.46 [6/13]  
DiffImageOverlap-fno: 0.00 [0/13]

# TCE 010556578-01, PDC Light Curves



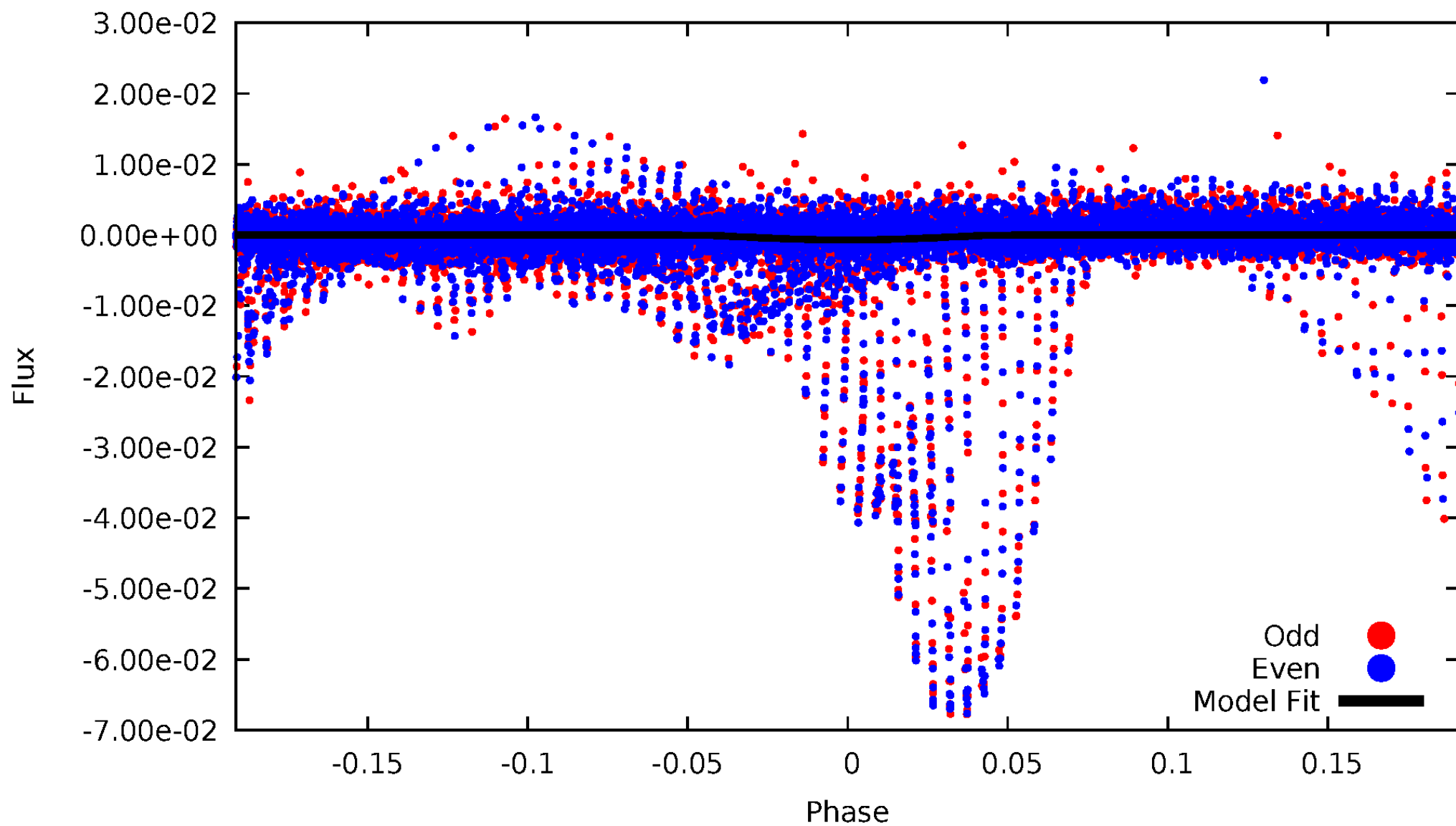
TCE 010556578-01





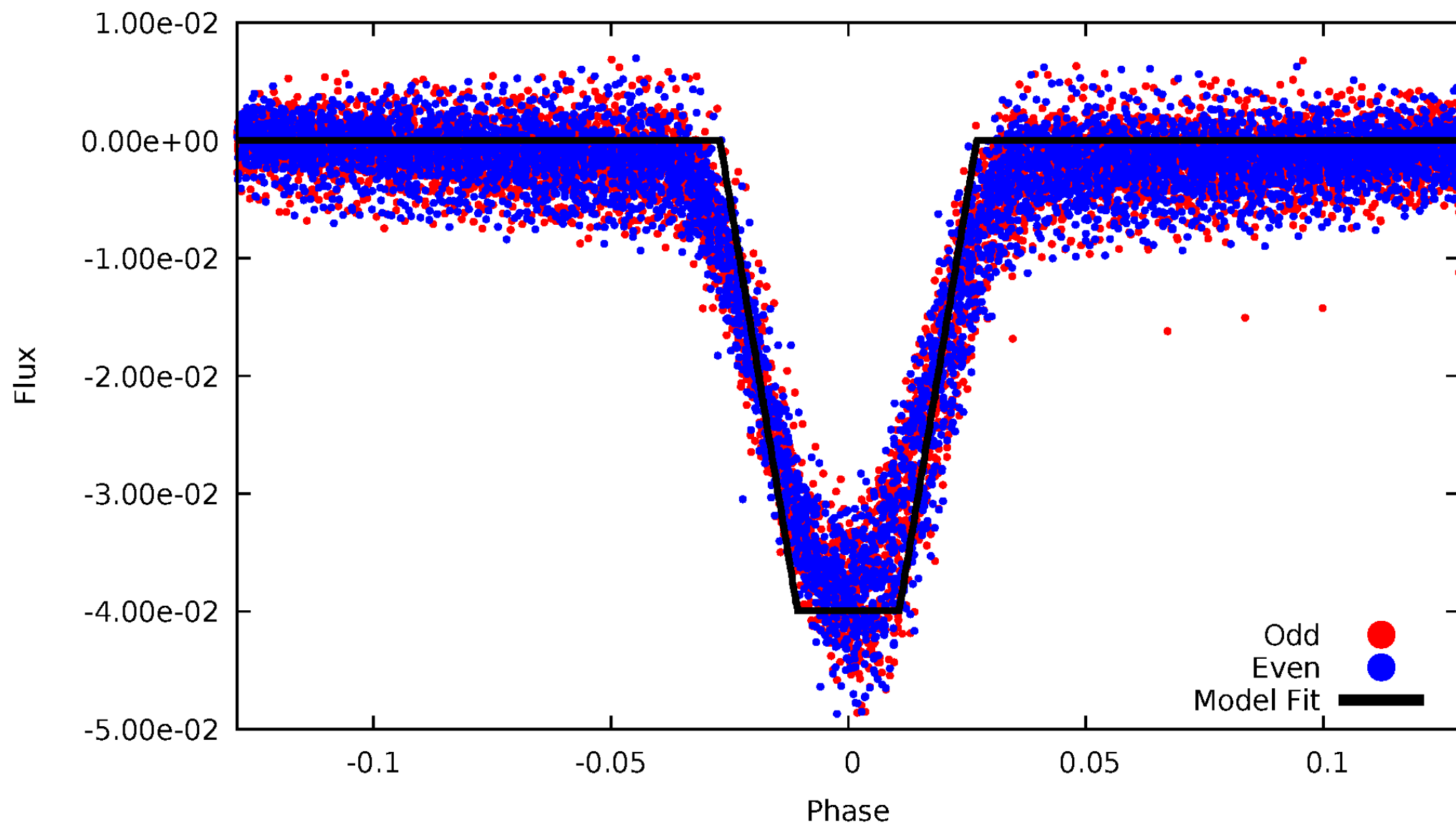
# DV Odd/Even

TCE 010556578-01



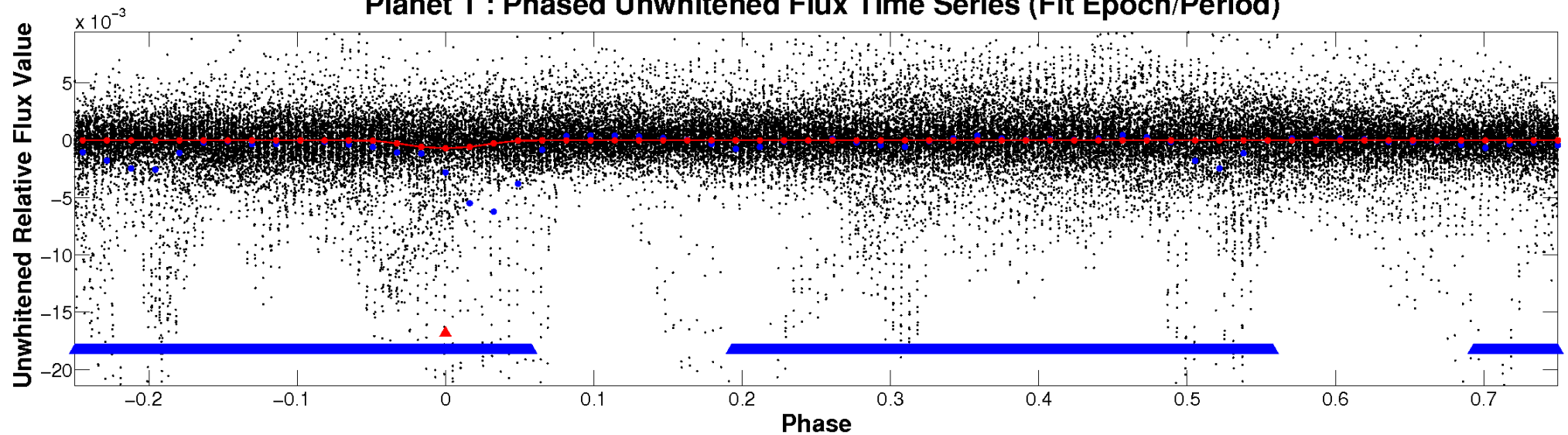
# ALT Odd/Even

TCE 010556578-01

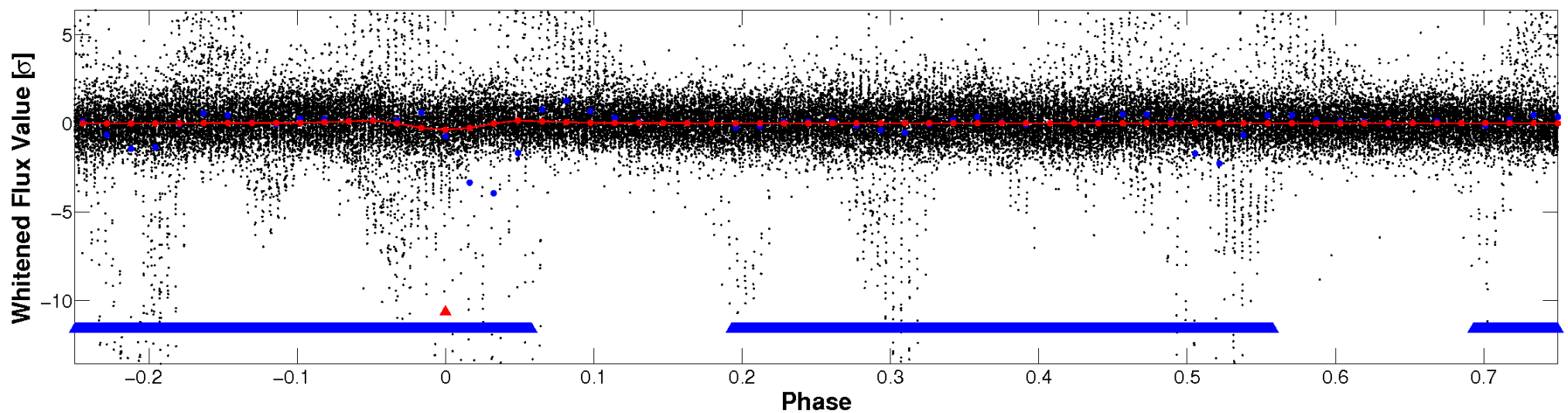


# Non-Whitened Vs. Whitened Light Curve

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

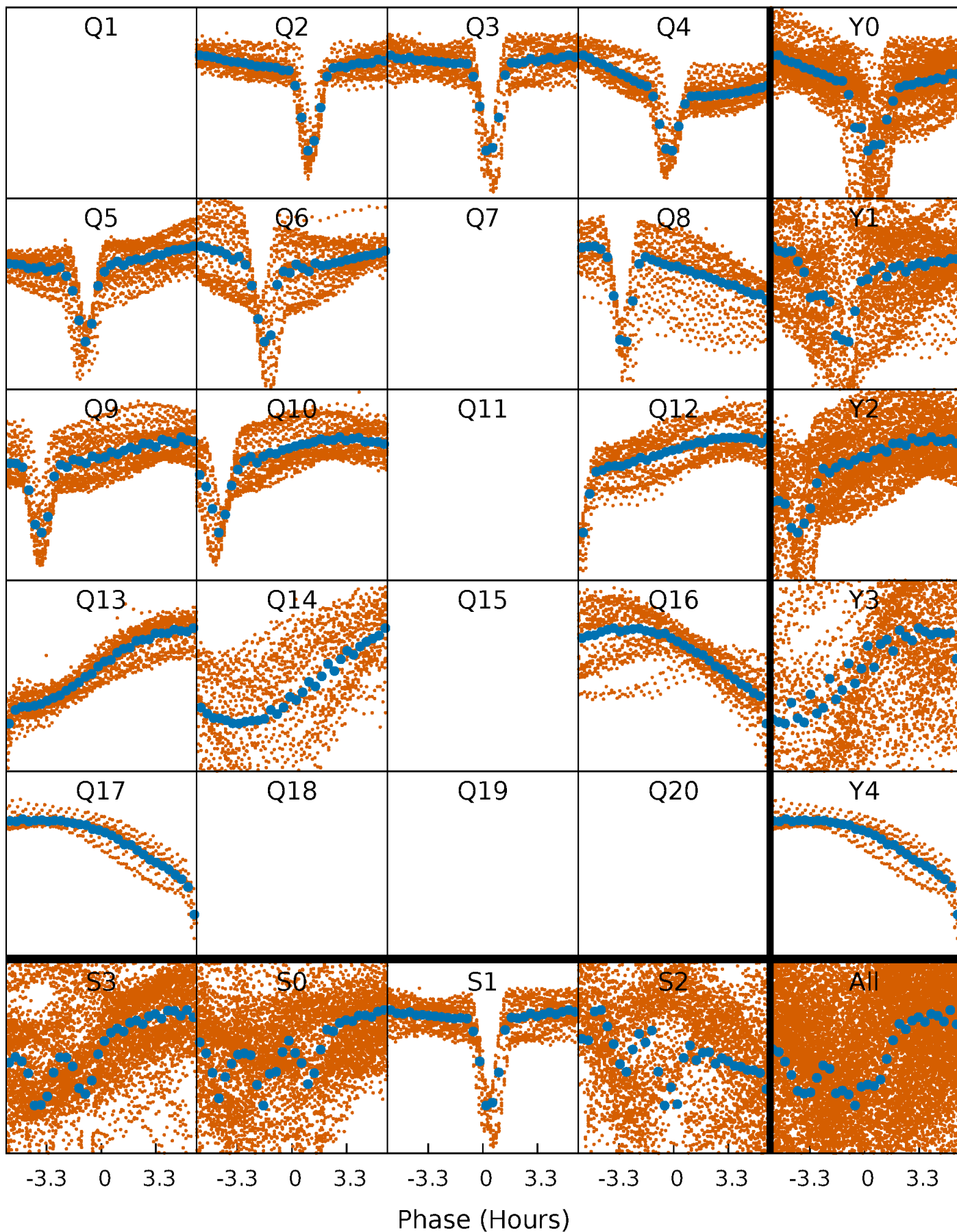


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

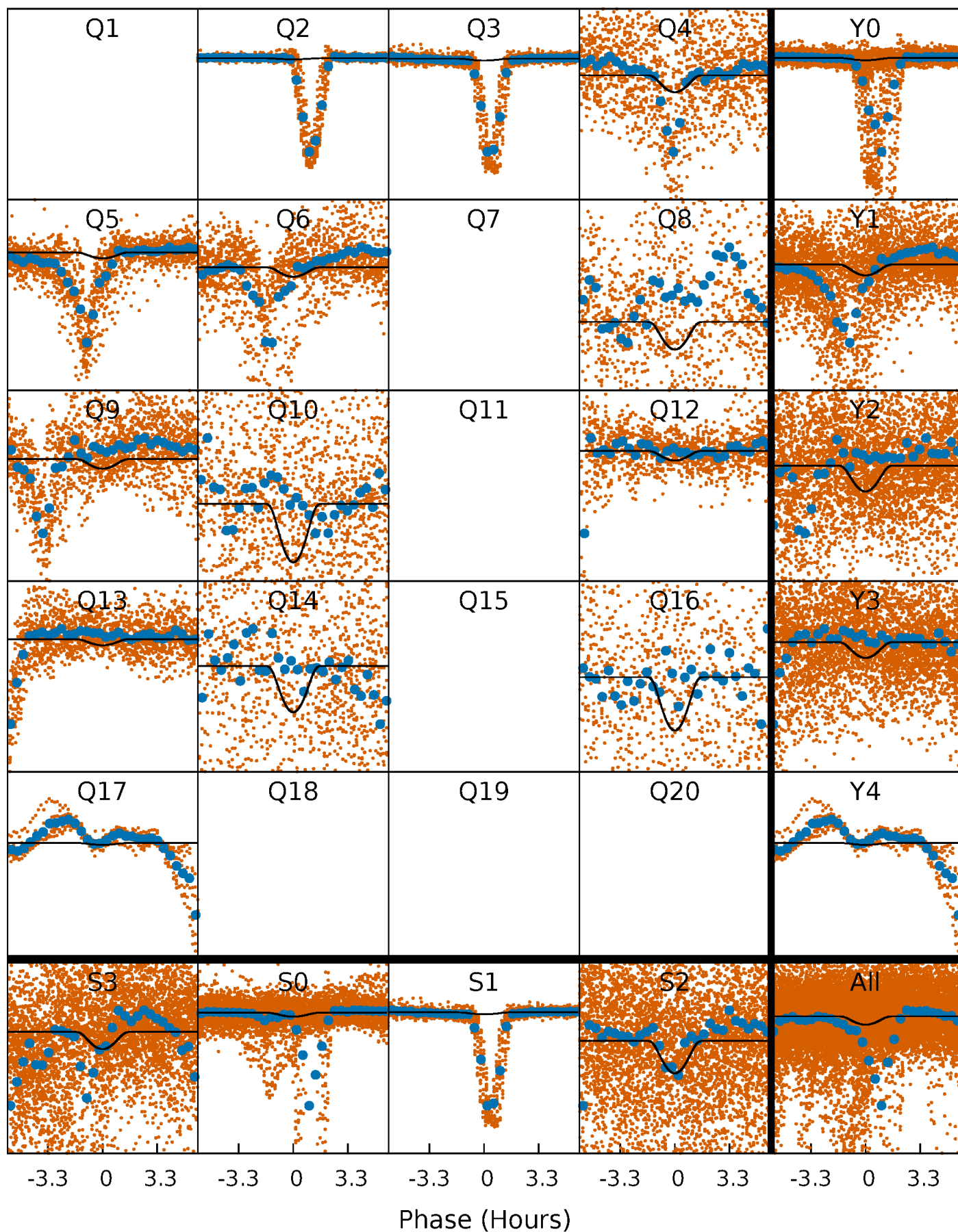
TCE 010556578-01 P= 1.253249 Days  $T_0=131.829030$  (BKJD)





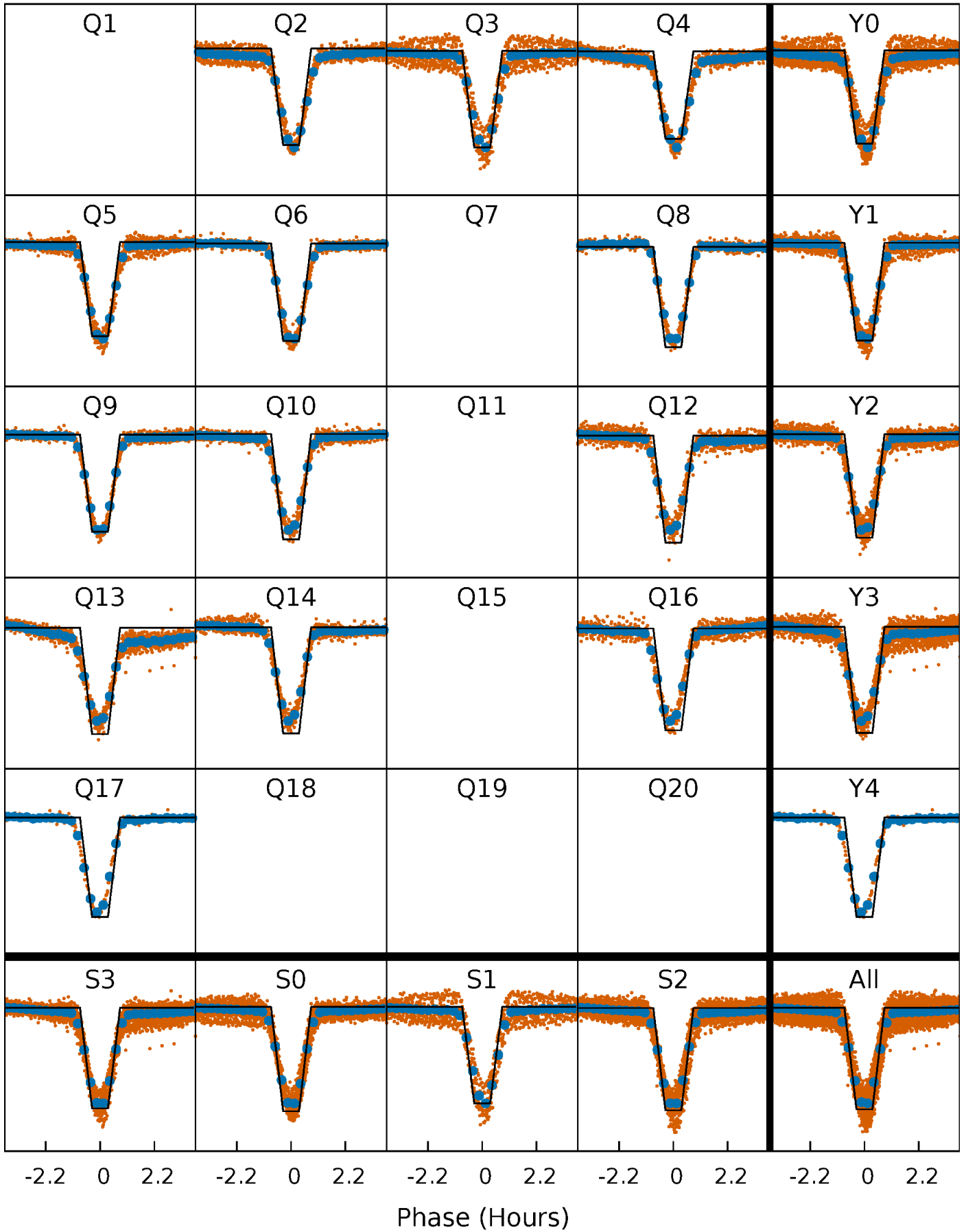
# DV Quarter-Phased Transit Curves

TCE 010556578-01 P= 1.253249 Days  $T_0=131.829030$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

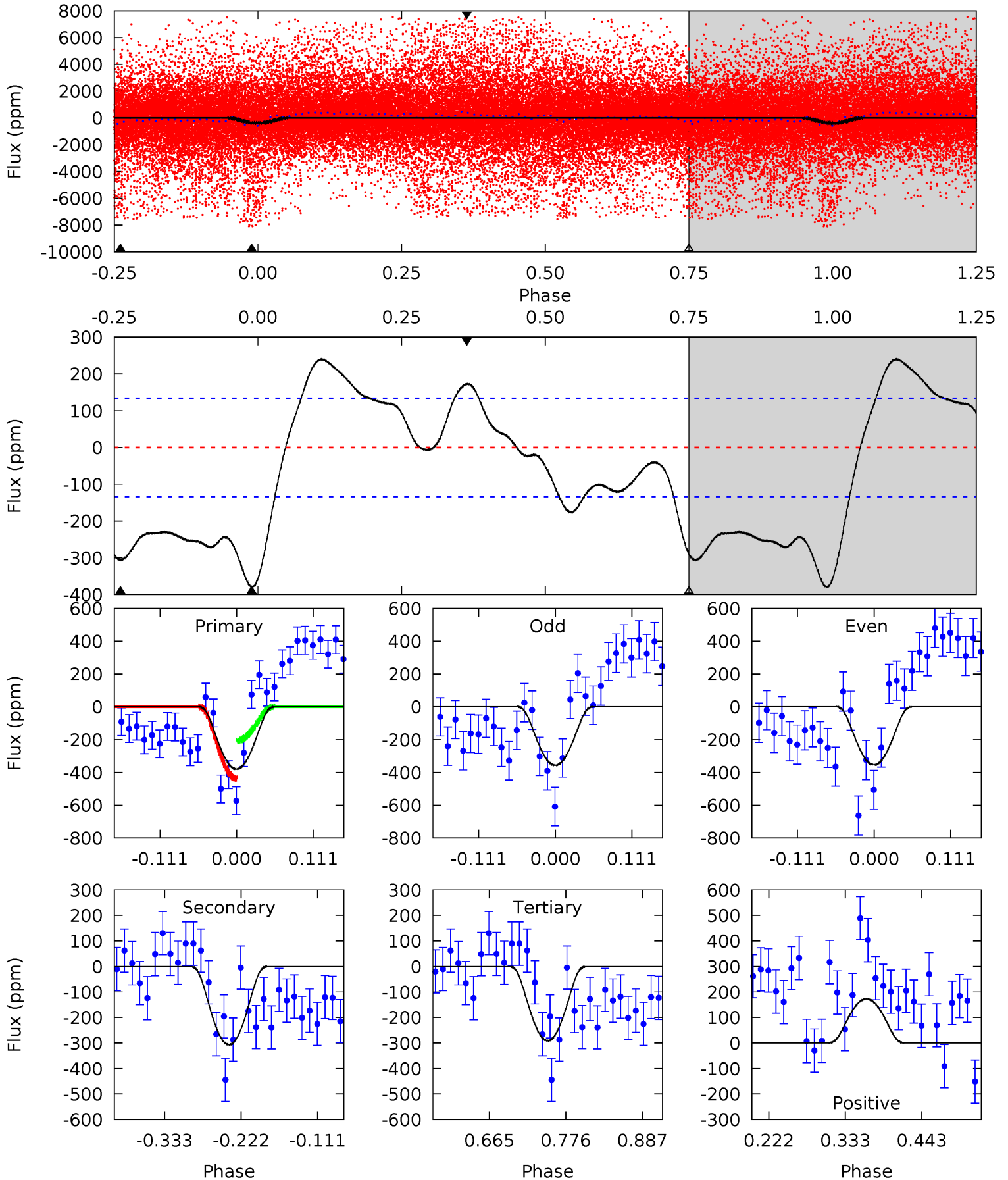
TCE 010556578-01 P= 1.252870 Days  $T_0=131.895512$  (BKJD)



# DV Model-Shift Uniqueness Test

010556578-01, P = 1.253249 Days, E = 131.829030 Days

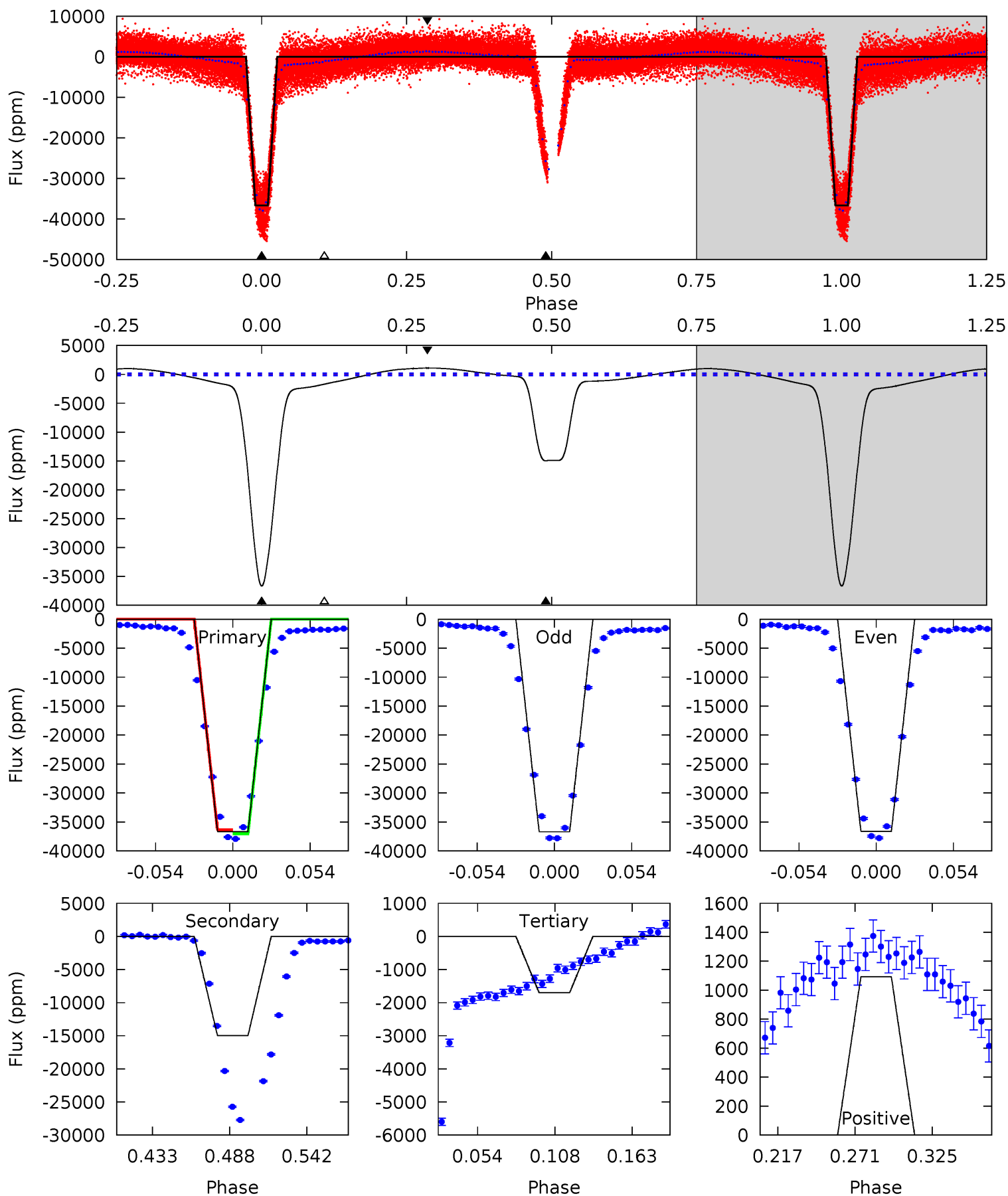
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	10.4	9.90	5.89	4.54	1.59	4.33	3.04	7.04	0.54	4.55	0.04	7.72	0.39	4.15



# Alt Model-Shift Uniqueness Test

010556578-01, P = 1.252870 Days, E = 131.895512 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
886.7	362.3	41.2	26.4	4.69	1.93	24.1	845.5	860.3	321.1	335.9	0.84	1.01	0.03	8.22



### Stellar Parameters For KIC 010556578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5134^{+170}_{-139}$	$4.560^{+0.084}_{-0.056}$	$-0.440^{+0.350}_{-0.300}$	$0.721^{+0.077}_{-0.077}$	$0.688^{+0.095}_{-0.044}$	$2.582^{+0.865}_{-0.488}$
	+3%/-3%	+2%/-1%	+80%/-68%	+11%/-11%	+14%/-6%	+34%/-19%
Source	PHO1	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 010556578-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-307 \pm 29$	$7.01^{+6.68}_{-4.47}$	$1889^{+74}_{-73}$	$2842^{+1223}_{-809}$	$1.389^{+9.183}_{-1.026}$
Alt.	$-14977 \pm 41$	$15.51^{+7.78}_{-7.47}$	$1889^{+73}_{-75}$	$4225^{+1403}_{-579}$	$14^{+40}_{-8}$

$T_{\text{max}}$  = 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

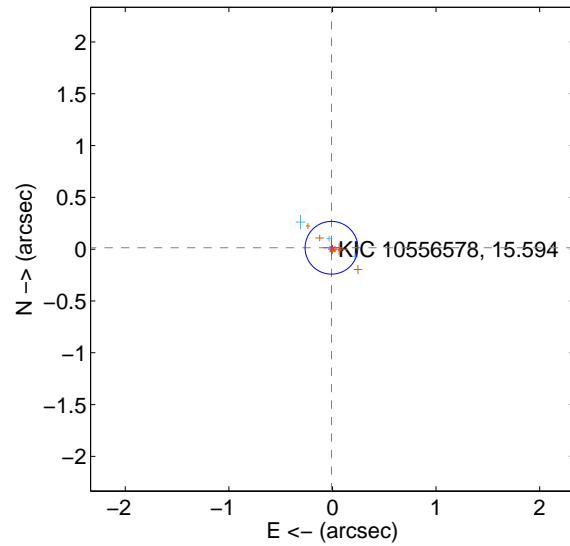
Supplemental centroid analysis for 010556578-01. Kepler magnitude: 15.59. Transit SNR 15.53

There are 6 quarters with good PRF difference image offsets

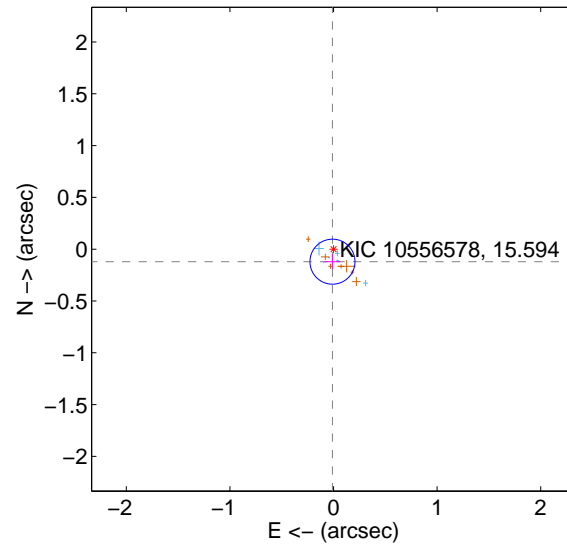
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.017 \pm 0.085$	0.20	$0.010 \pm 0.080$	$0.014 \pm 0.075$
PRF-fit source offset from KIC position	$0.121 \pm 0.072$	1.67	$0.010 \pm 0.077$	$-0.121 \pm 0.074$
photometric centroid source offset	$0.84 \pm 0.37$	2.27	$0.28 \pm 0.33$	$0.79 \pm 0.37$

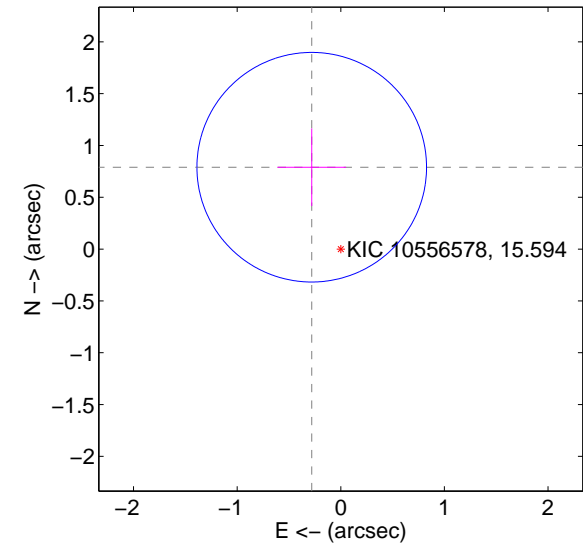
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

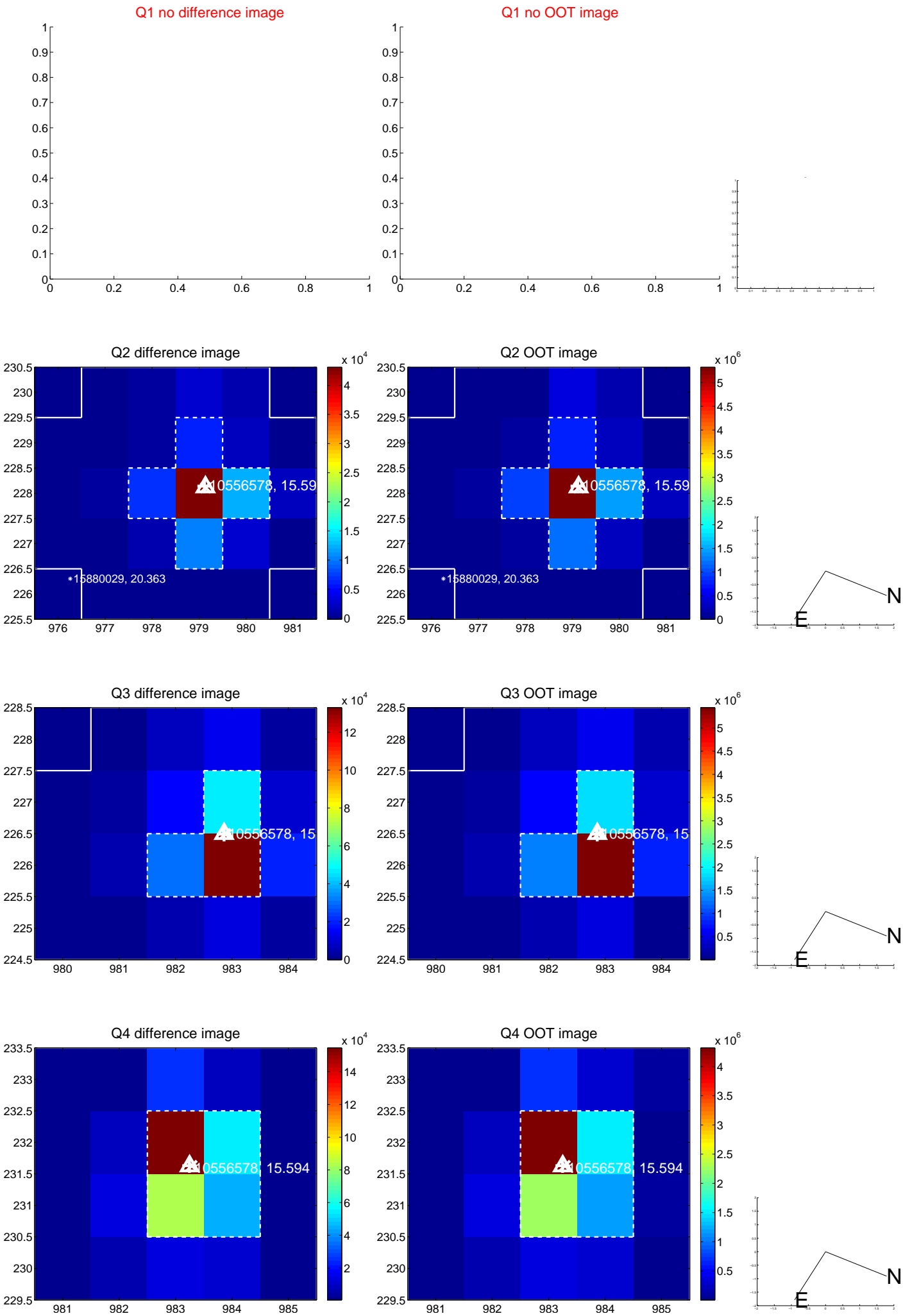


offset from photometric centroids

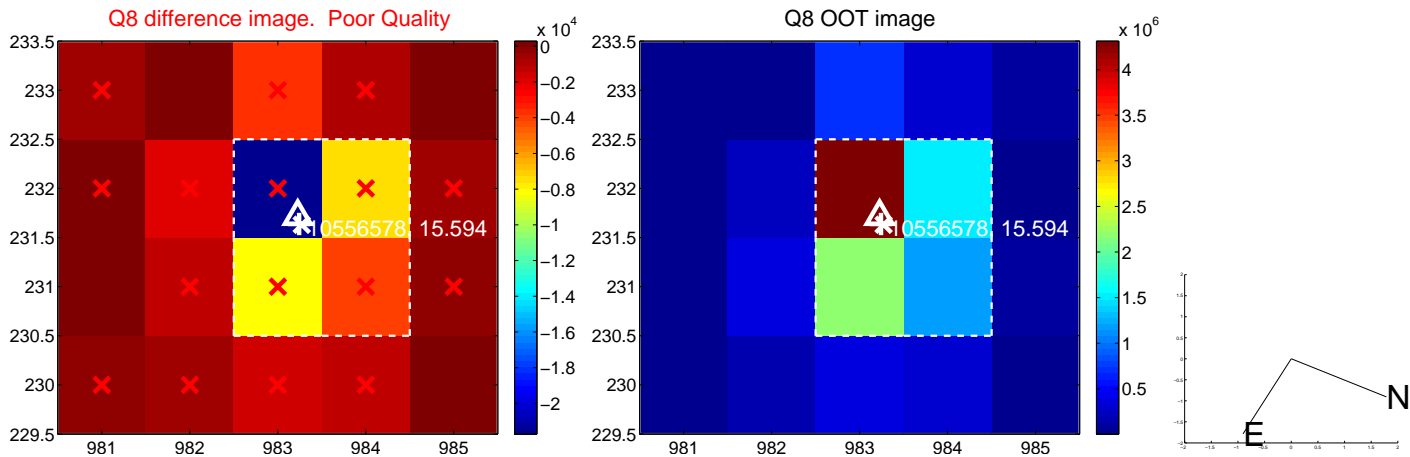
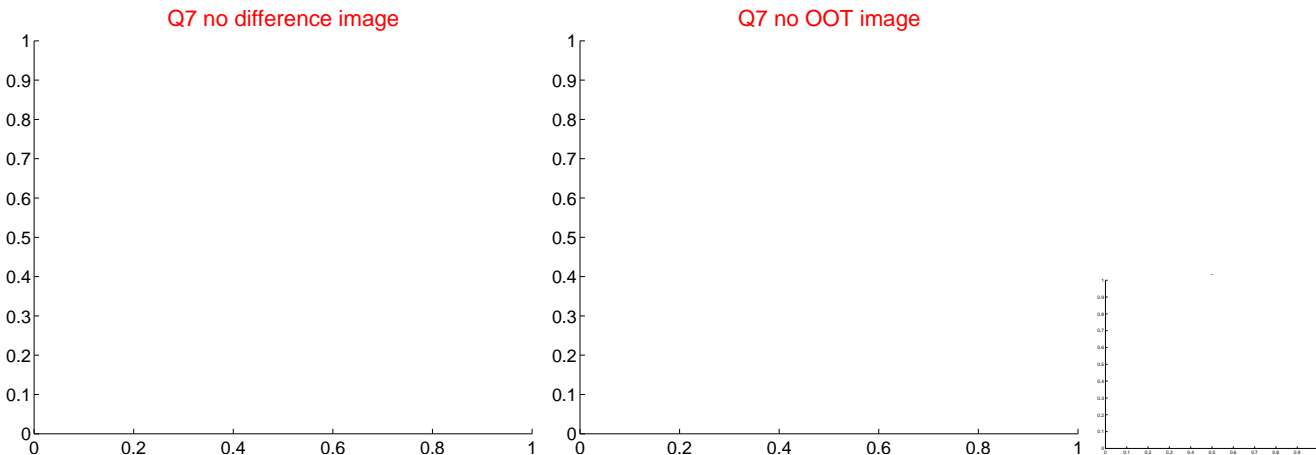
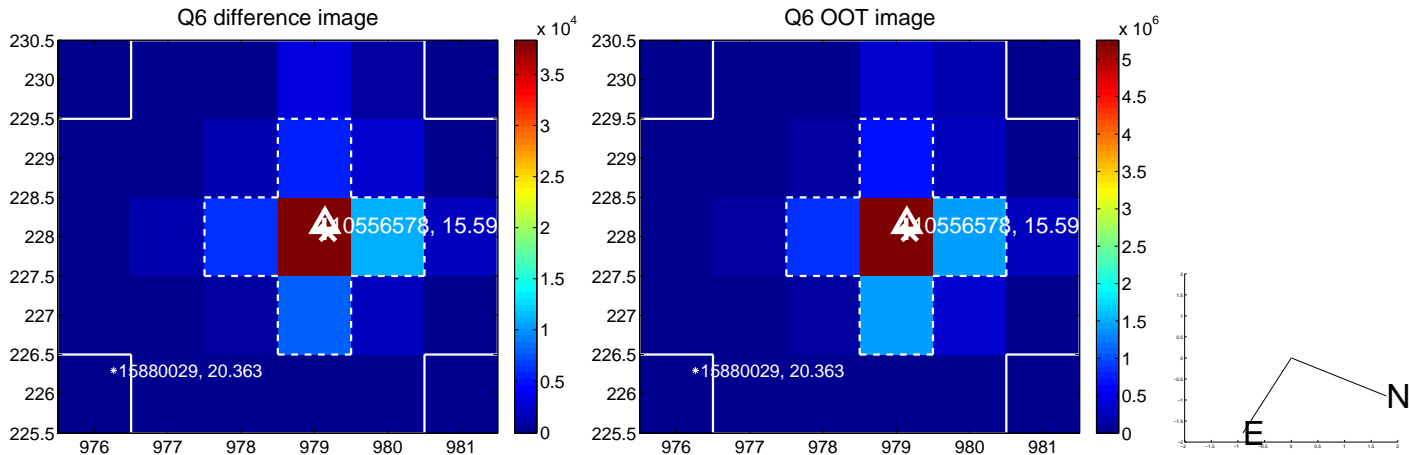
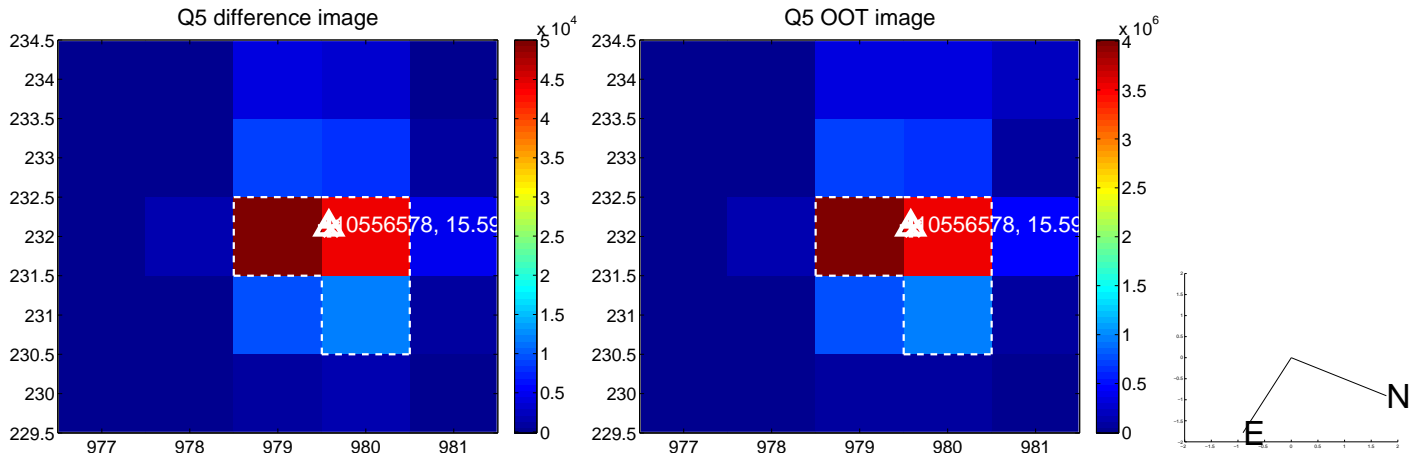


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

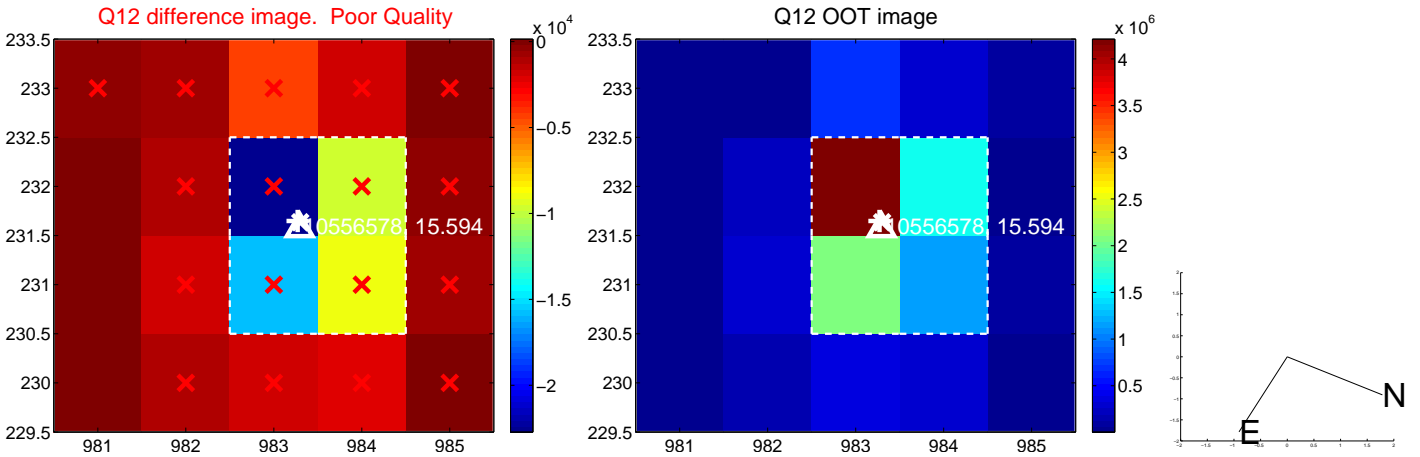
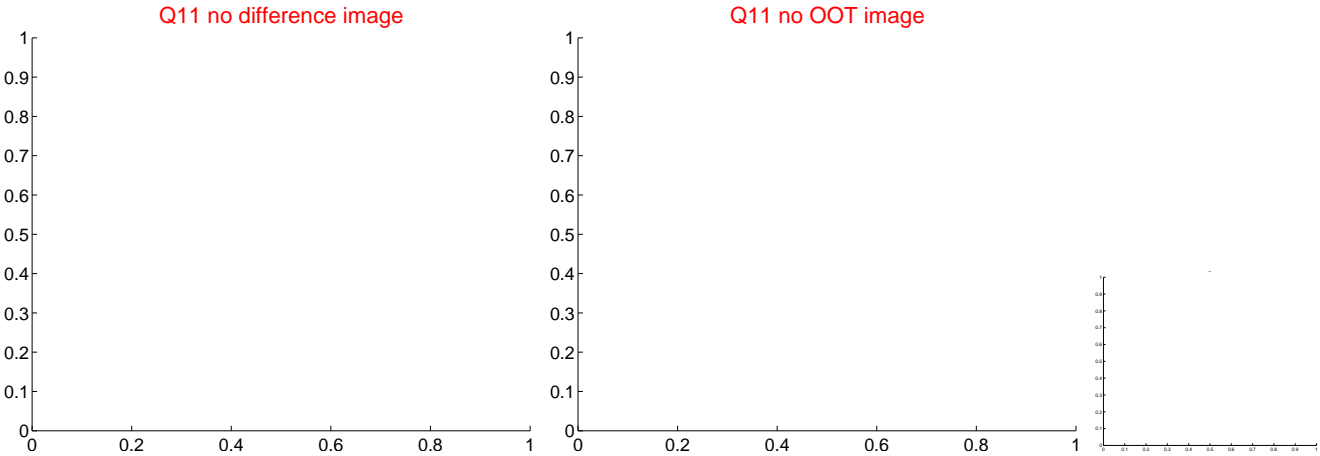
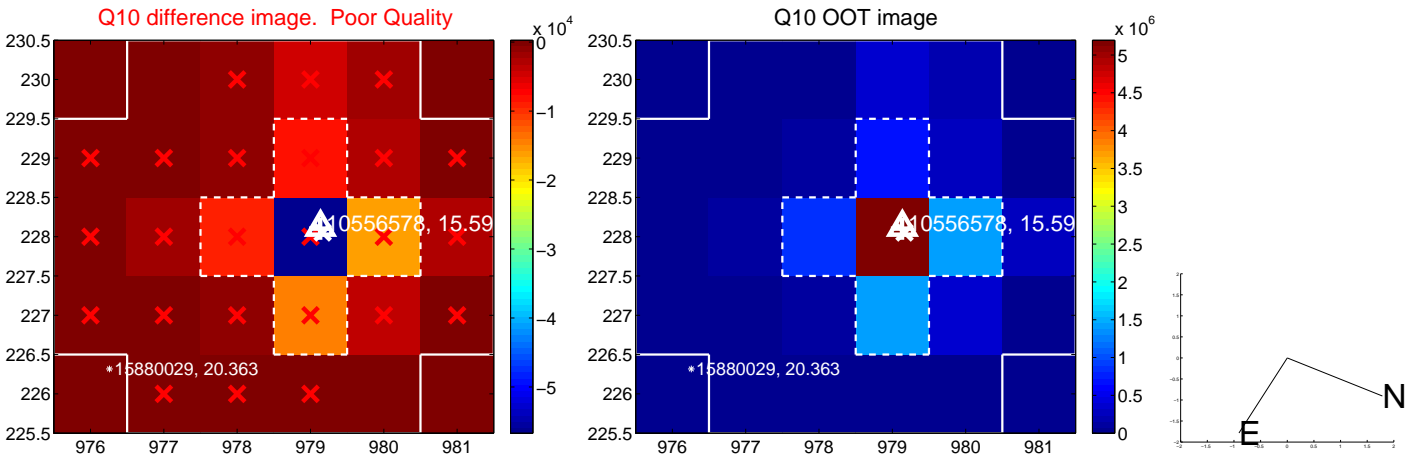
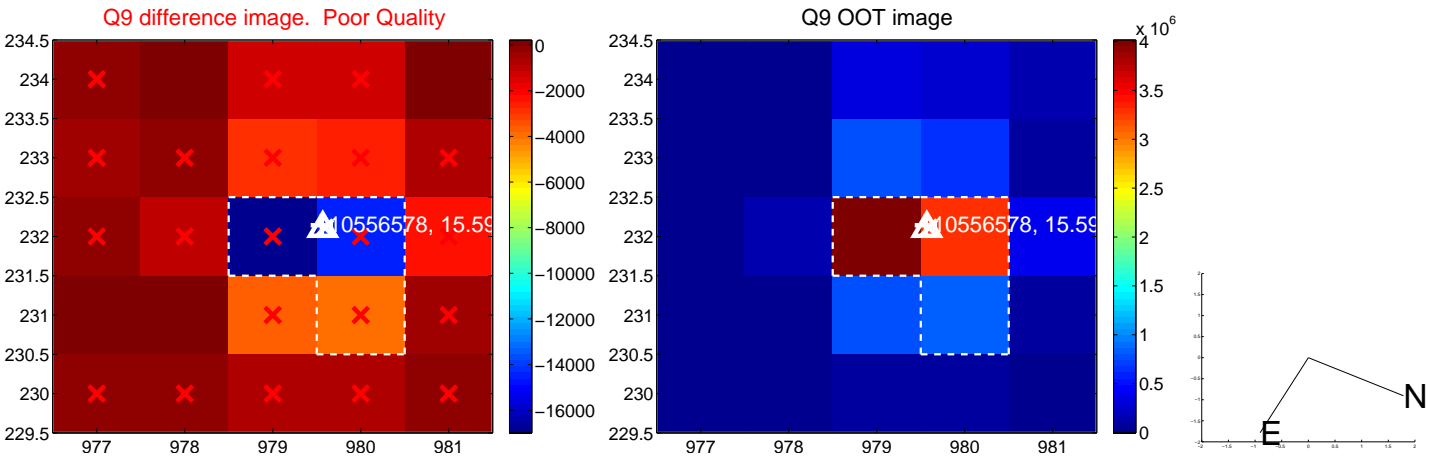
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



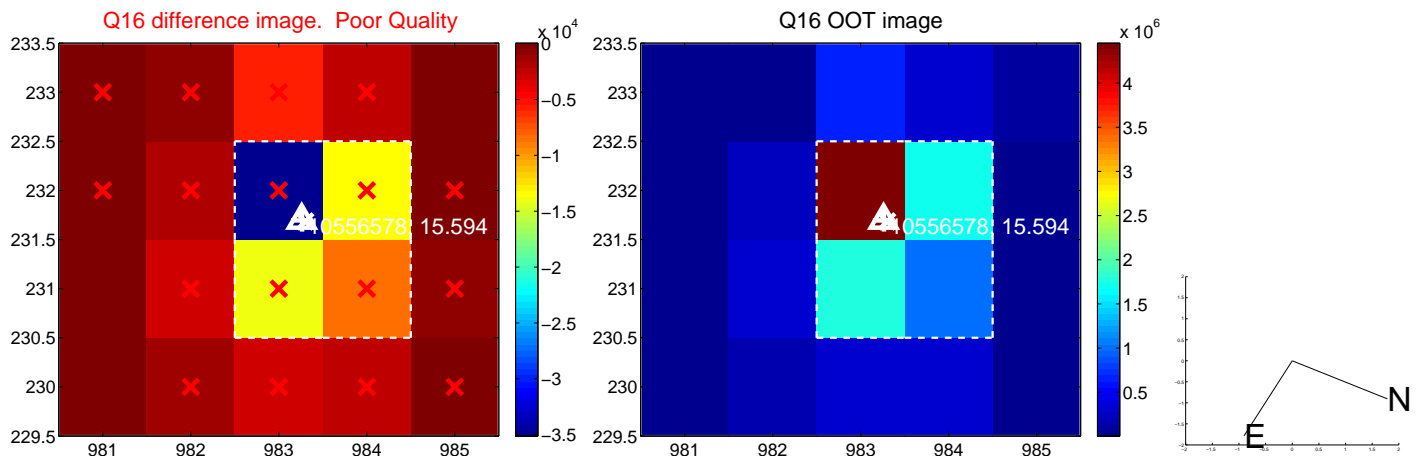
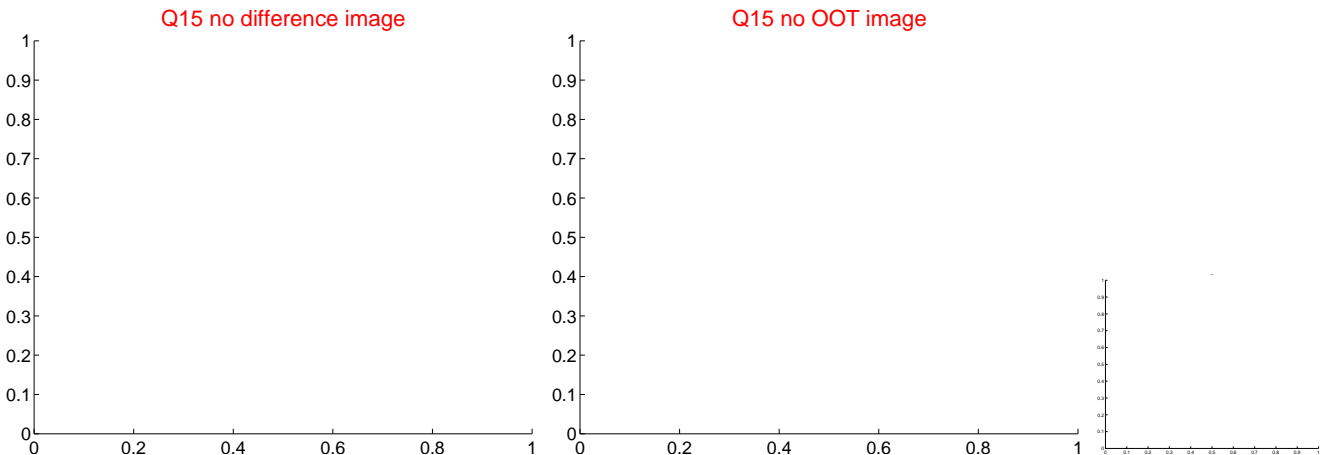
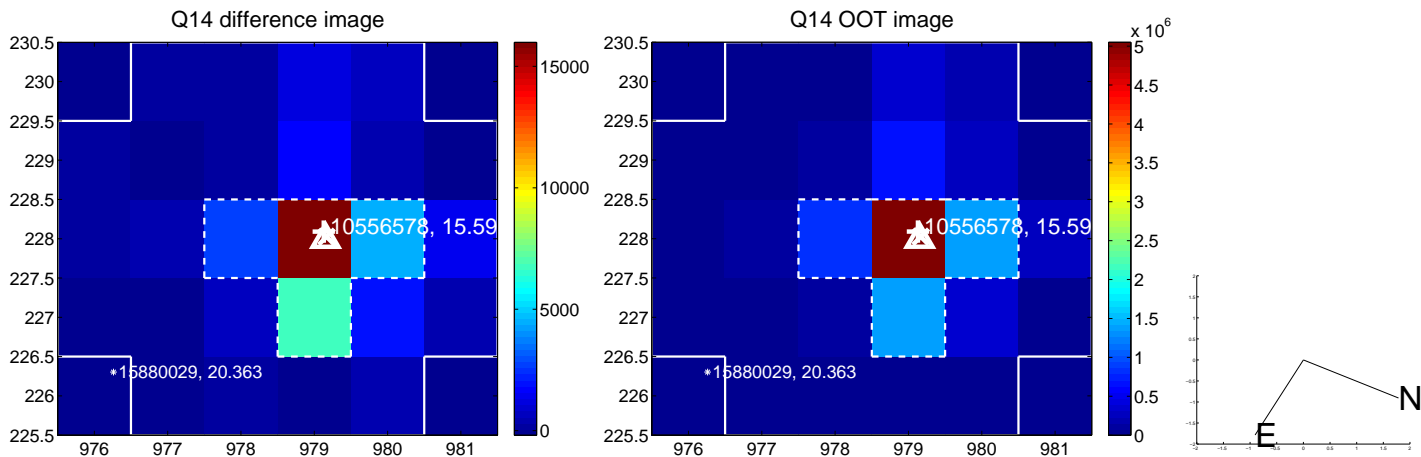
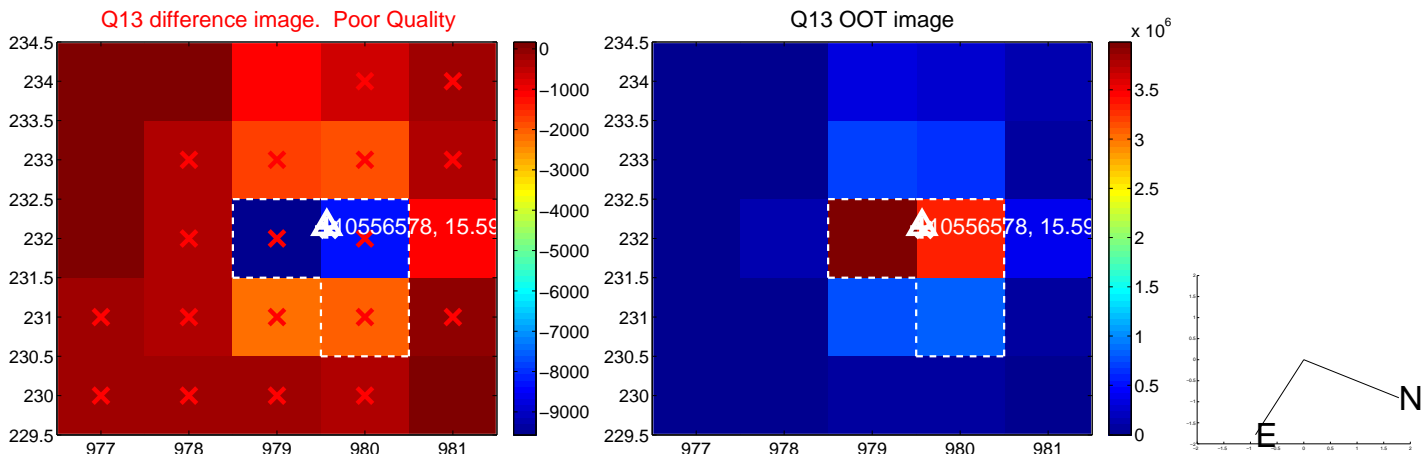
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

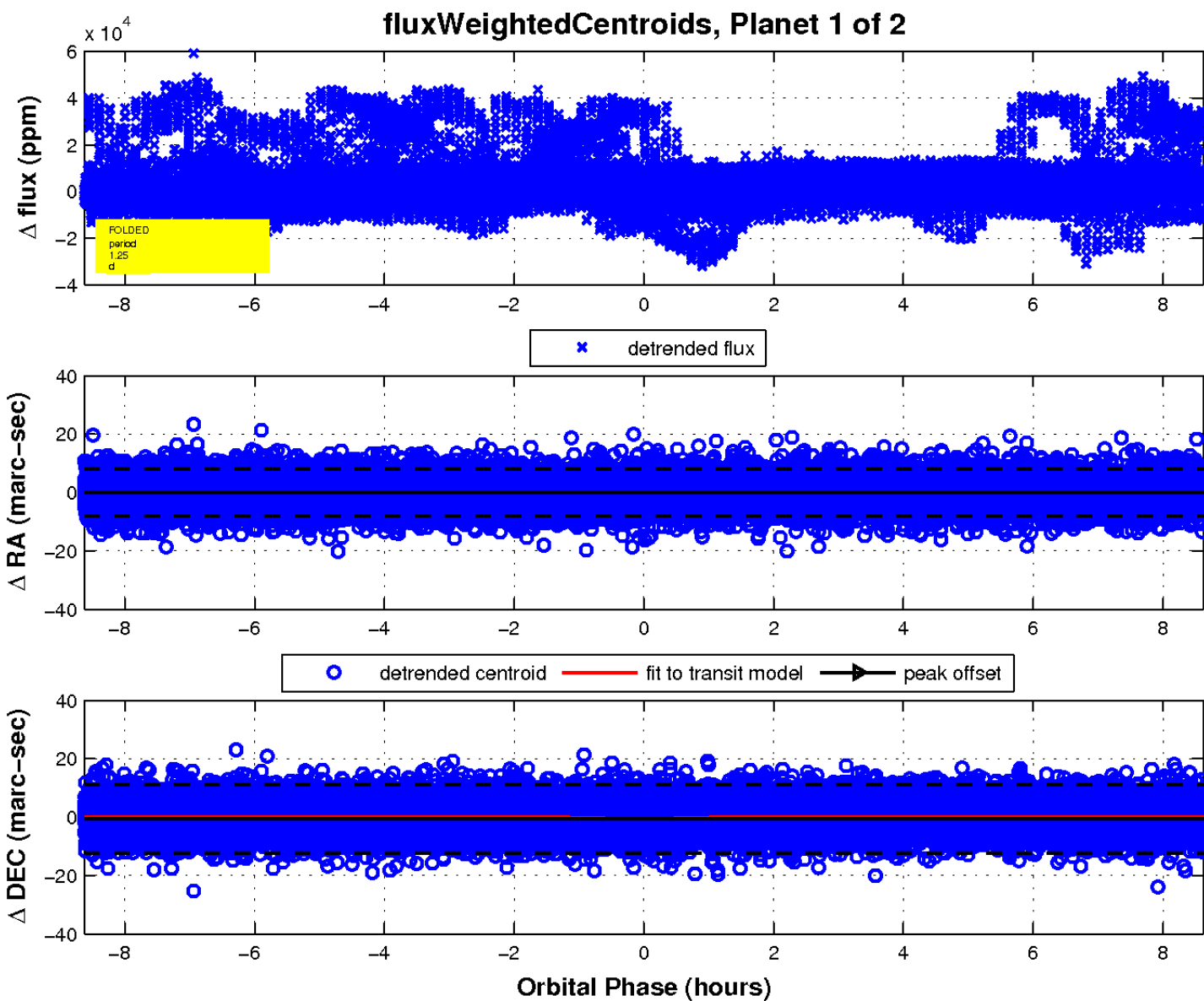
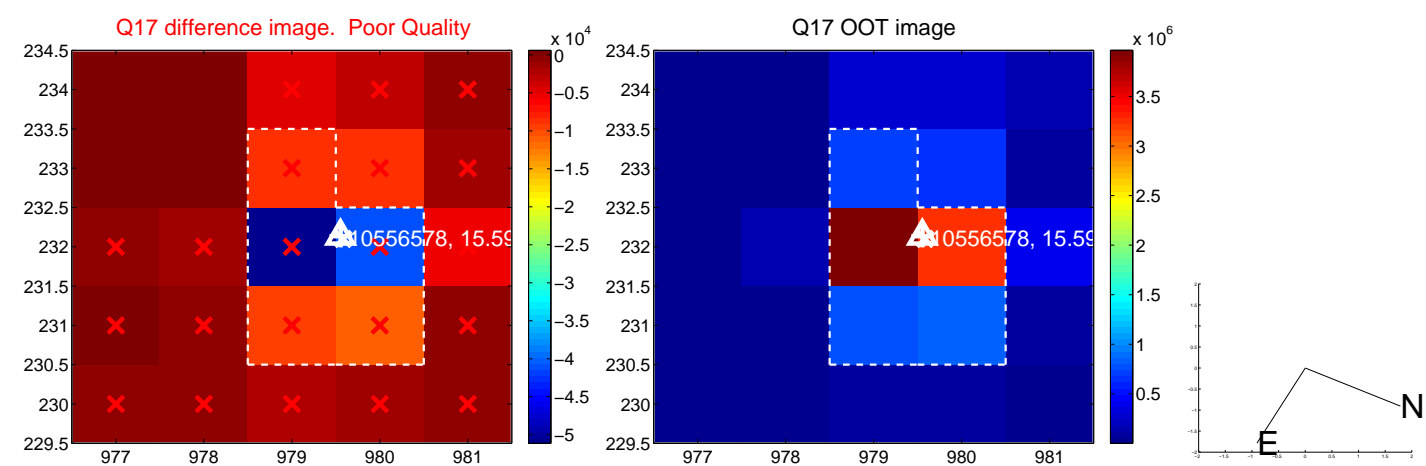


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



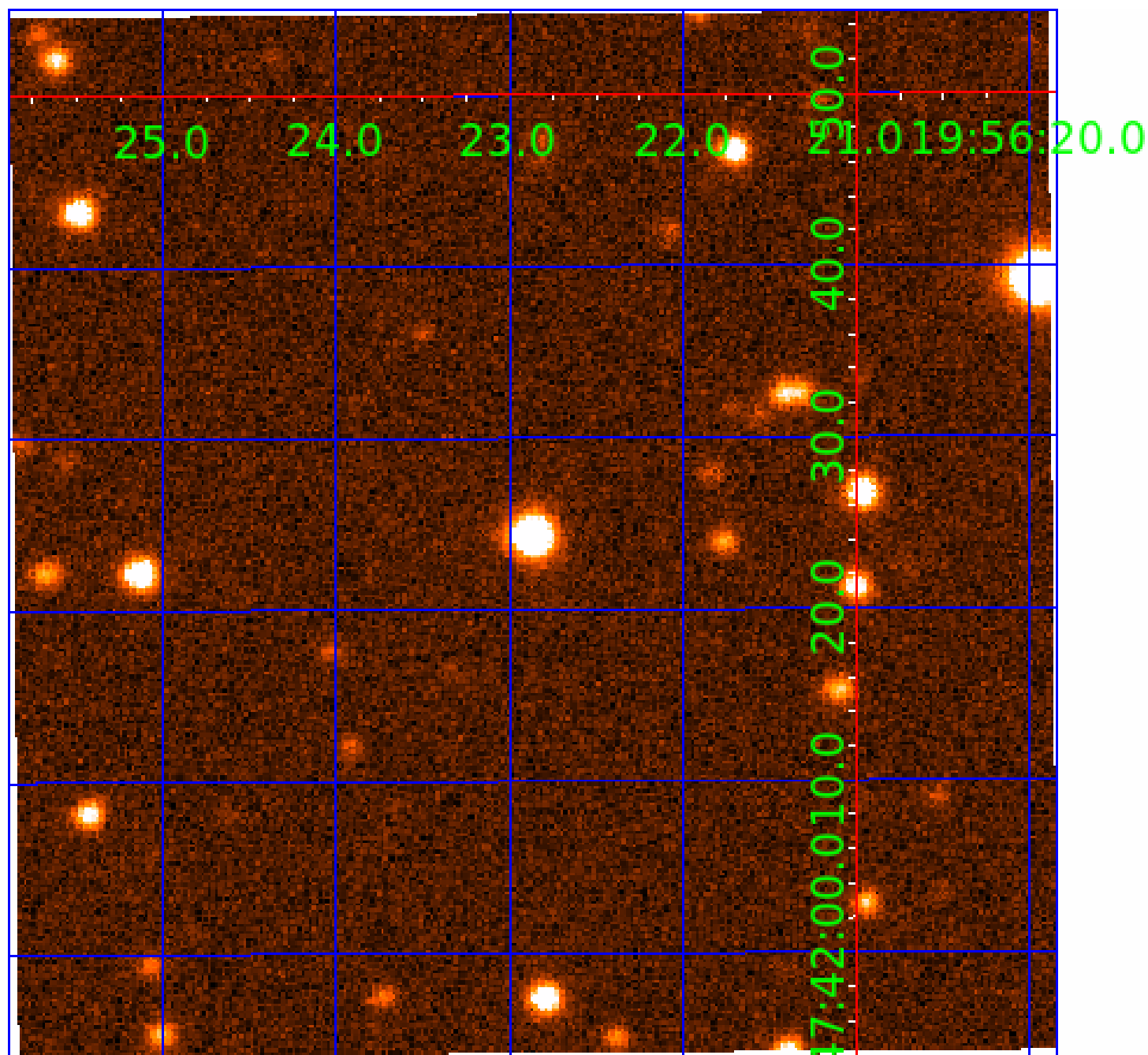


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010556578

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010556578-01	OBS	No	1.253249	131.829030	708.3	2.875	422.9	15.5	0.72	5134	3.91	801.60
010556578-02	OBS	7343.01	0.626428	131.901619	23262.5	1.500	174.6	-1.0	0.72	5134	10.84	2020.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010556578-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
010556578-02	OBS	FP	0.00	0	1	0	0	SWEET_EB—MOD_ODDEVEN_ALT—CENT_NOFITS

**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.

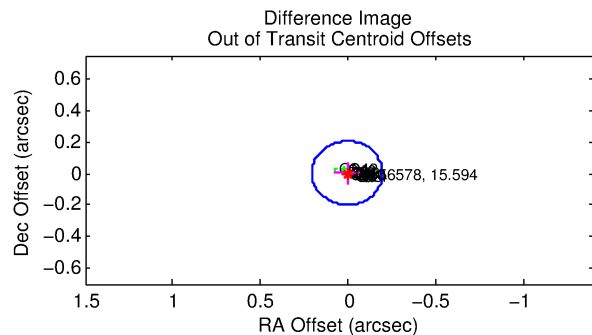
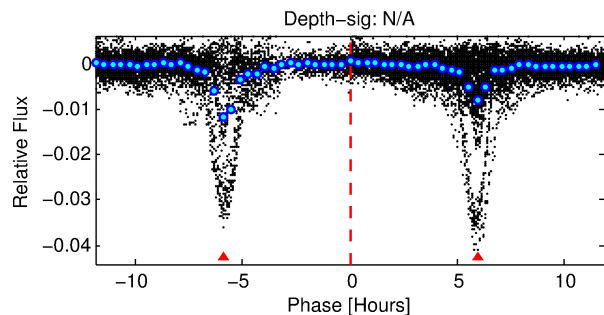
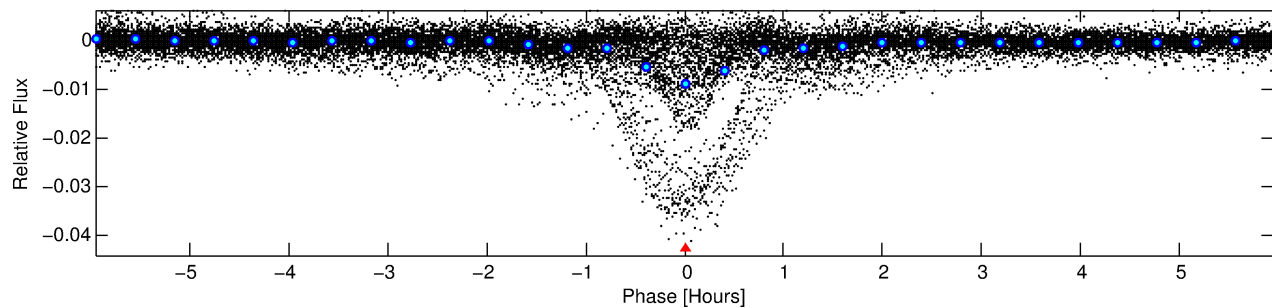
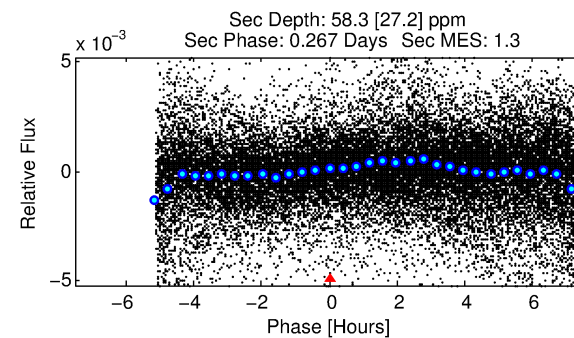
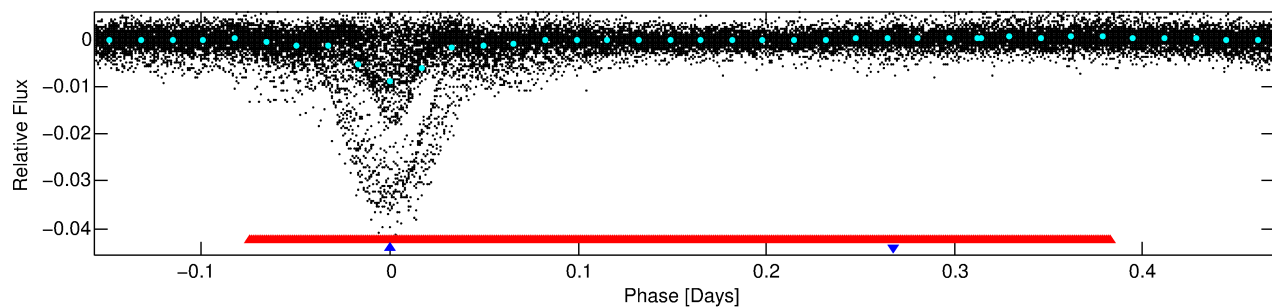
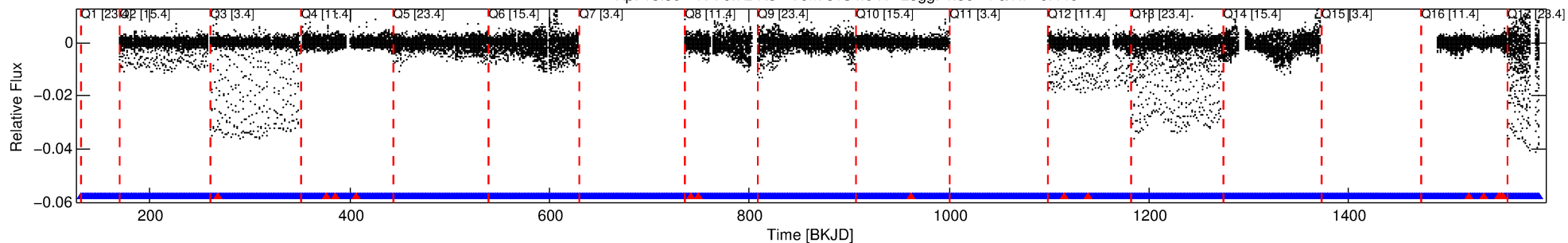
## Ephemeris Match Information For 010556578-02

No Significant Match Found

# DV One-Page Summary

KIC: 10556578 Candidate: 2 of 2 Period: 0.626 d  
KOI: K07343.01 Corr: 0.865

Kp: 15.59 R\*: 0.72 Rs Teff: 5134.0 K Logg: 4.56 Fe/H: -0.440



## TPS TCE Results:

Period = 0.62643 d  
Epoch = 131.9016 BKJD

DV fit results are unavailable

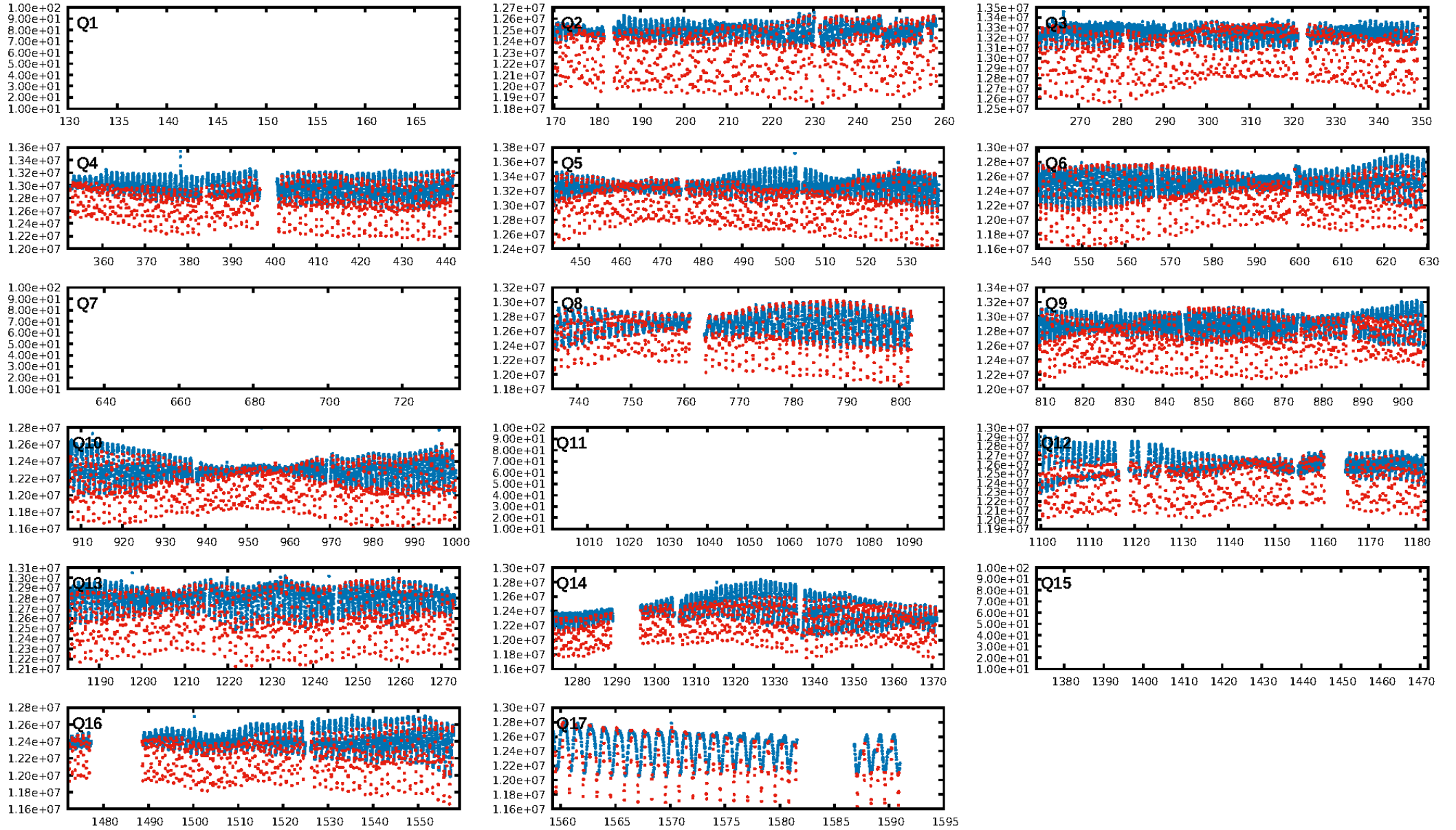
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [4.64σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [1166/1180]  
GhostDiagnostic-chr: 0.9037  
Centroid-sig: 0.0%  
Centroid-so: 0.380 arcsec [74.03σ]  
OotOffset-rm: 0.008 arcsec [0.12σ]  
KicOffset-rm: 0.146 arcsec [2.14σ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 17:37:25 Z

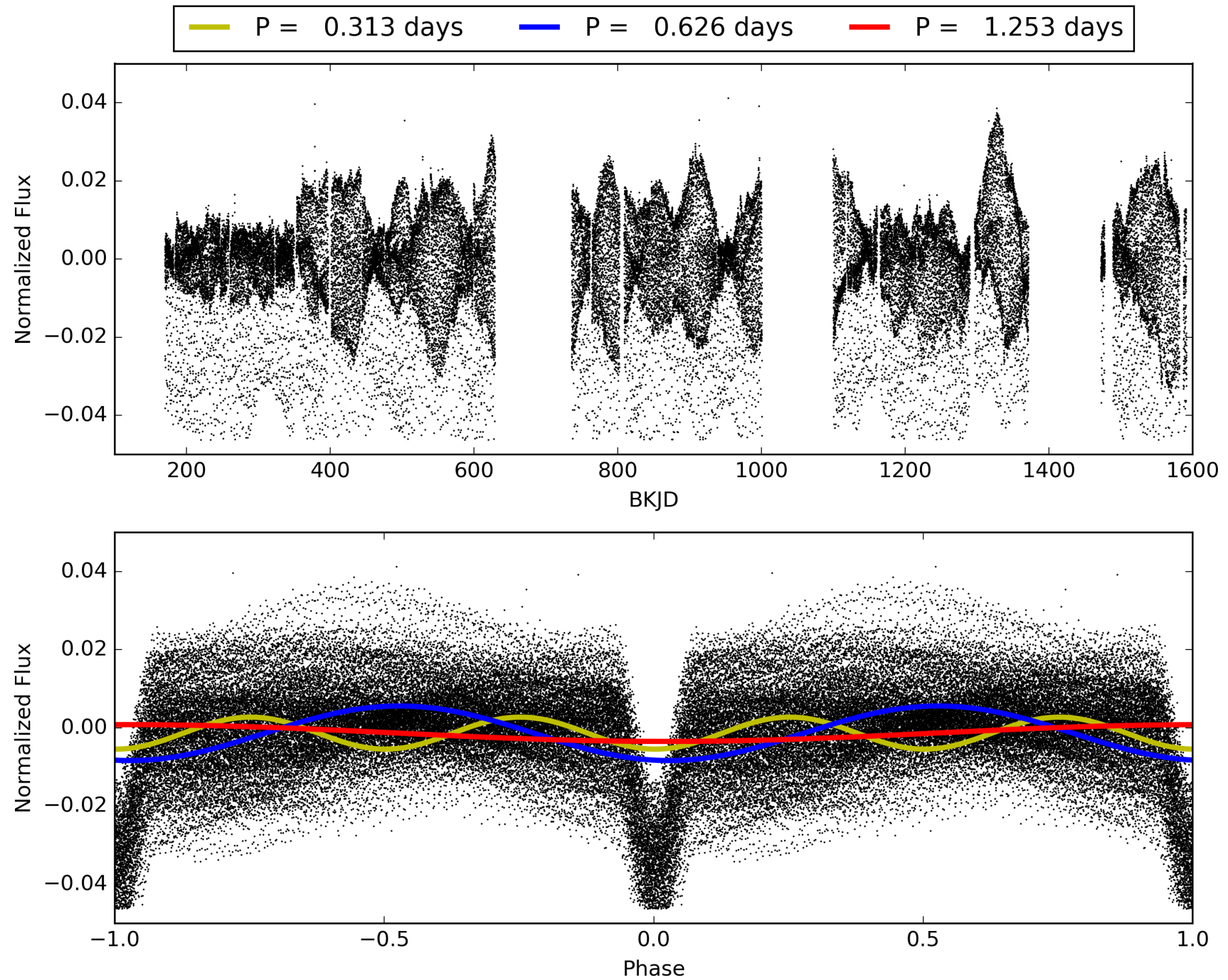
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010556578-02, PDC Light Curves



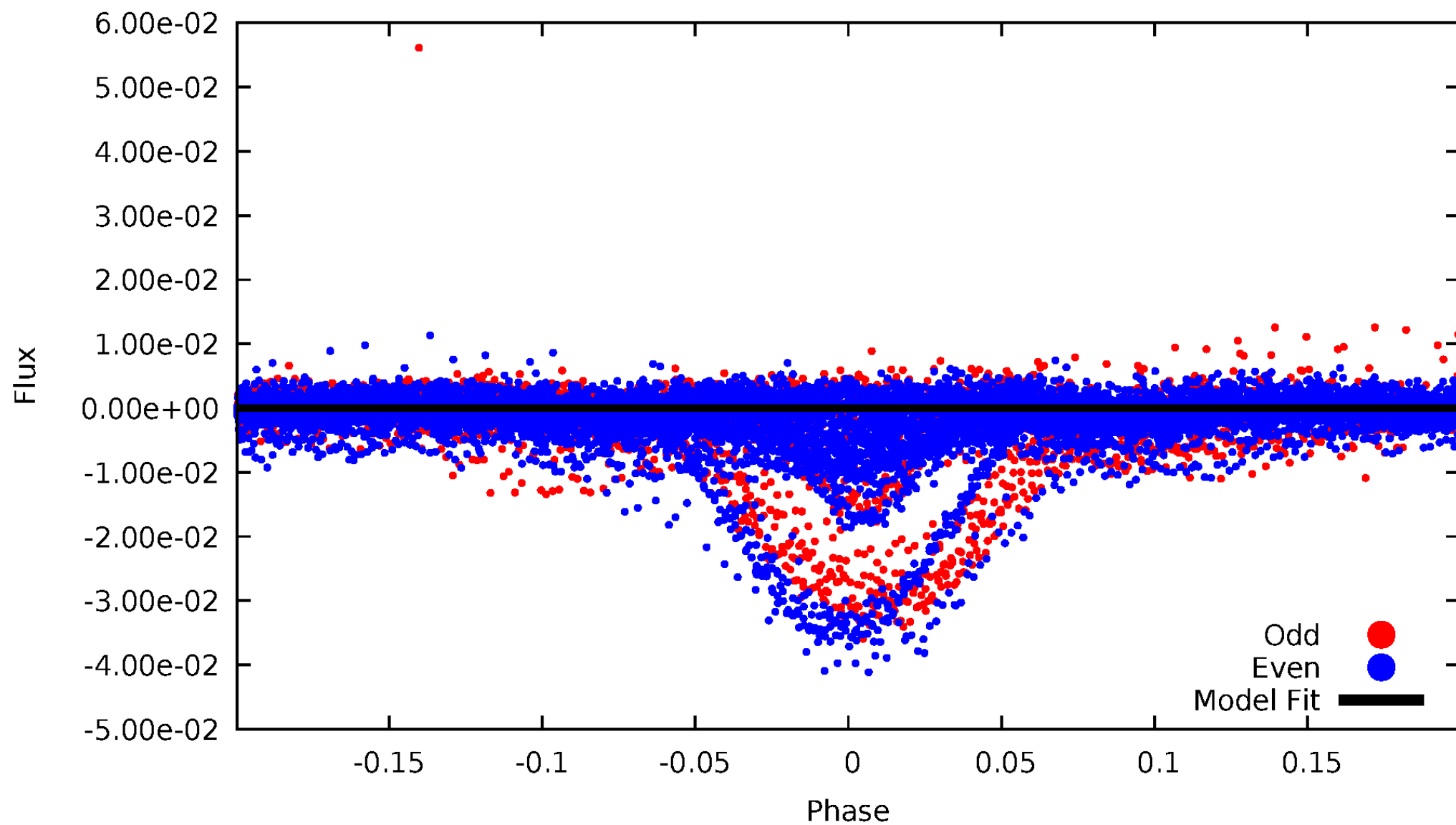


TCE 010556578-02



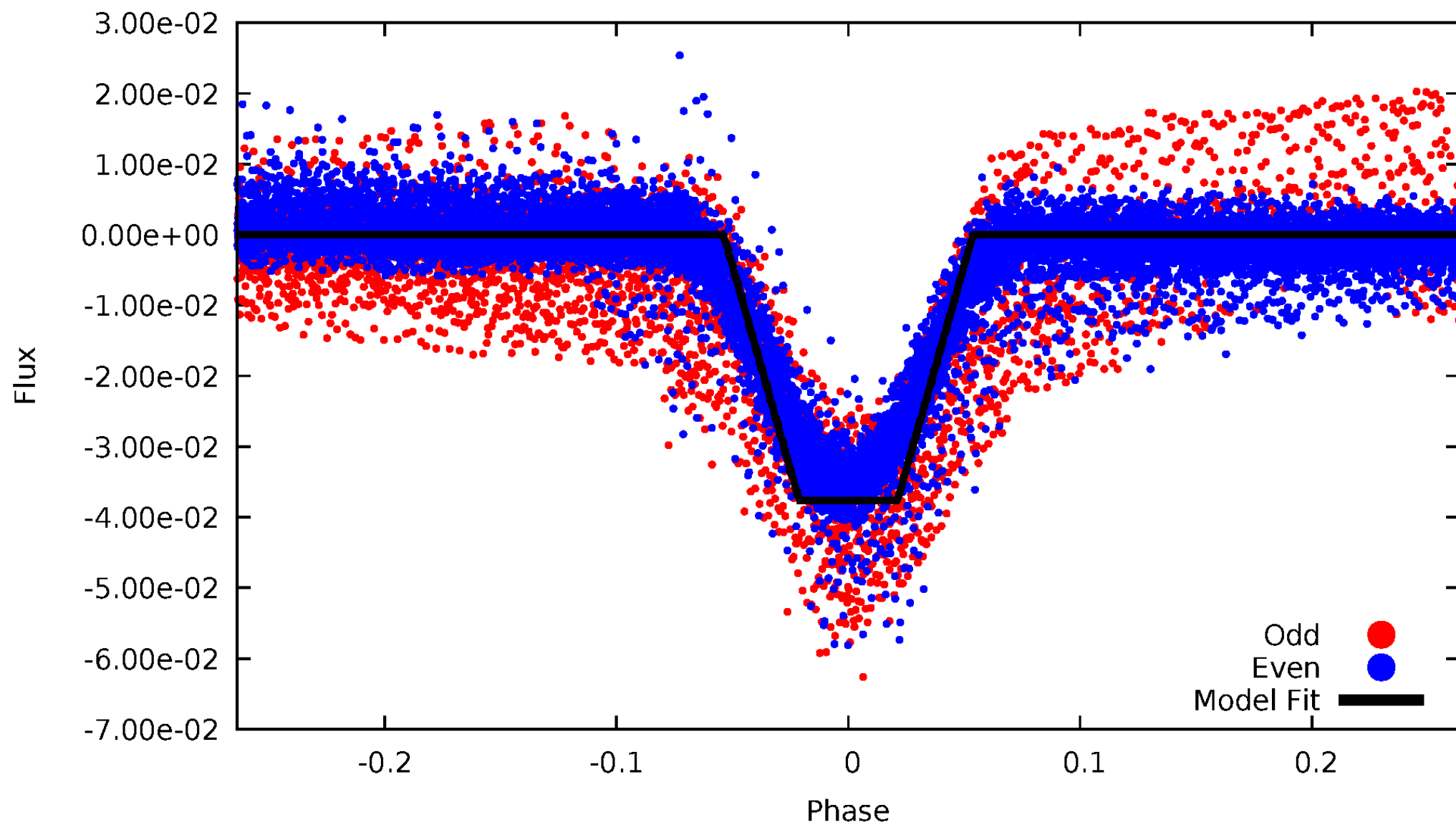
# DV Odd/Even

TCE 010556578-02



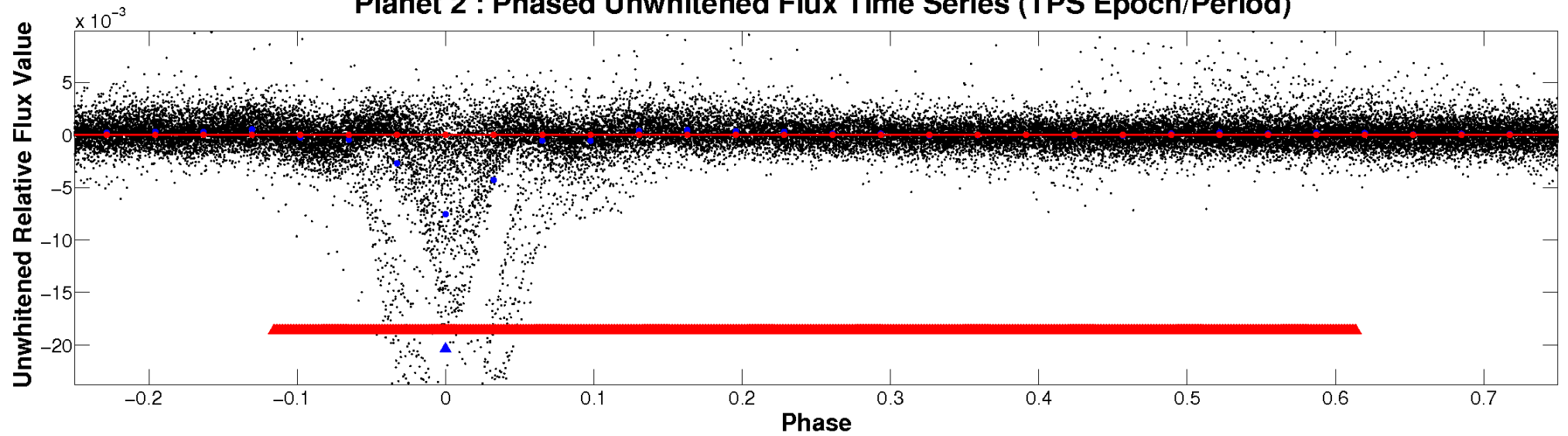
# ALT Odd/Even

TCE 010556578-02

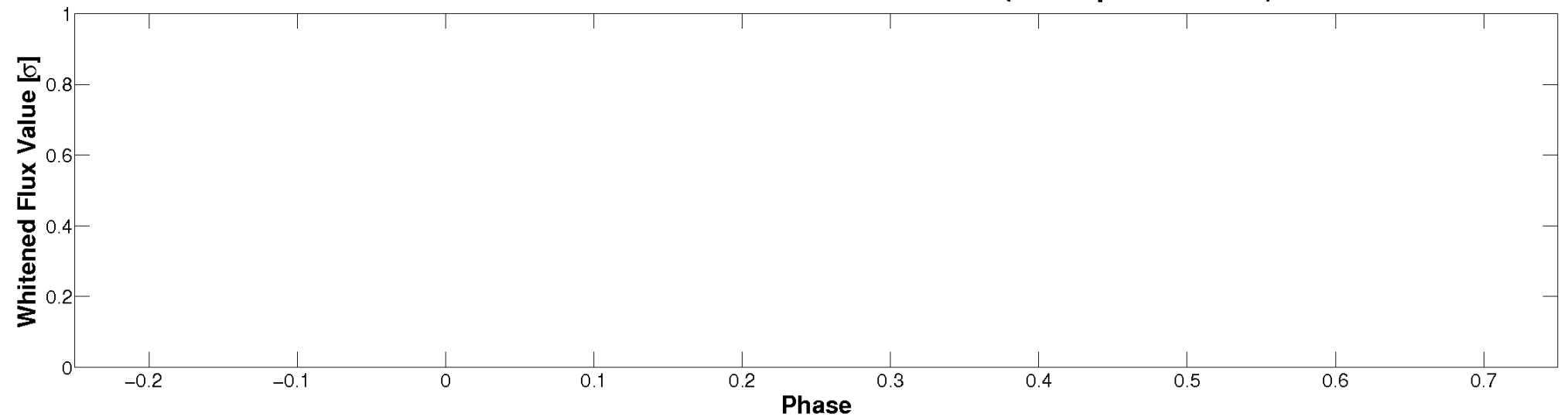


# Non-Whitened Vs. Whitened Light Curve

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

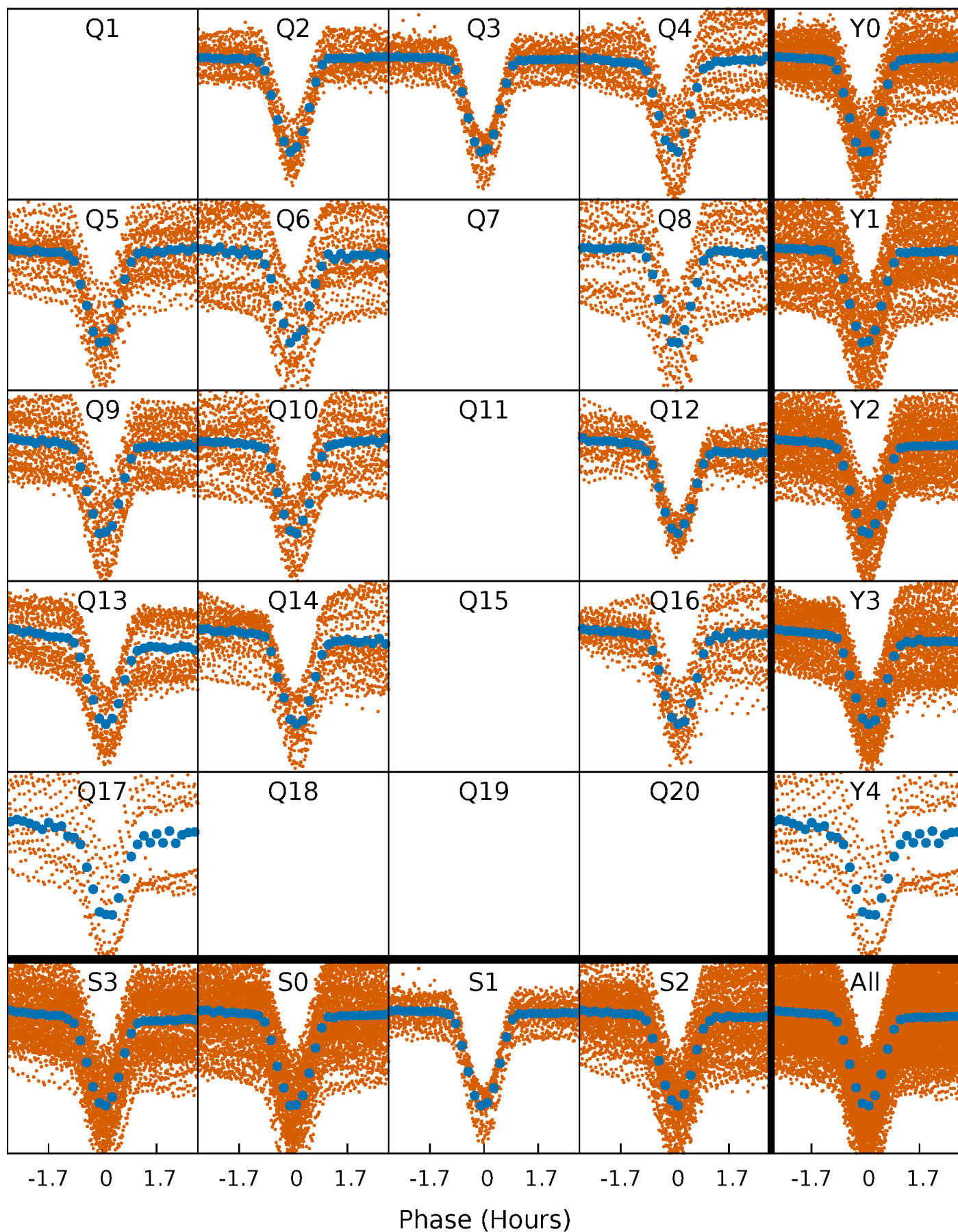


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

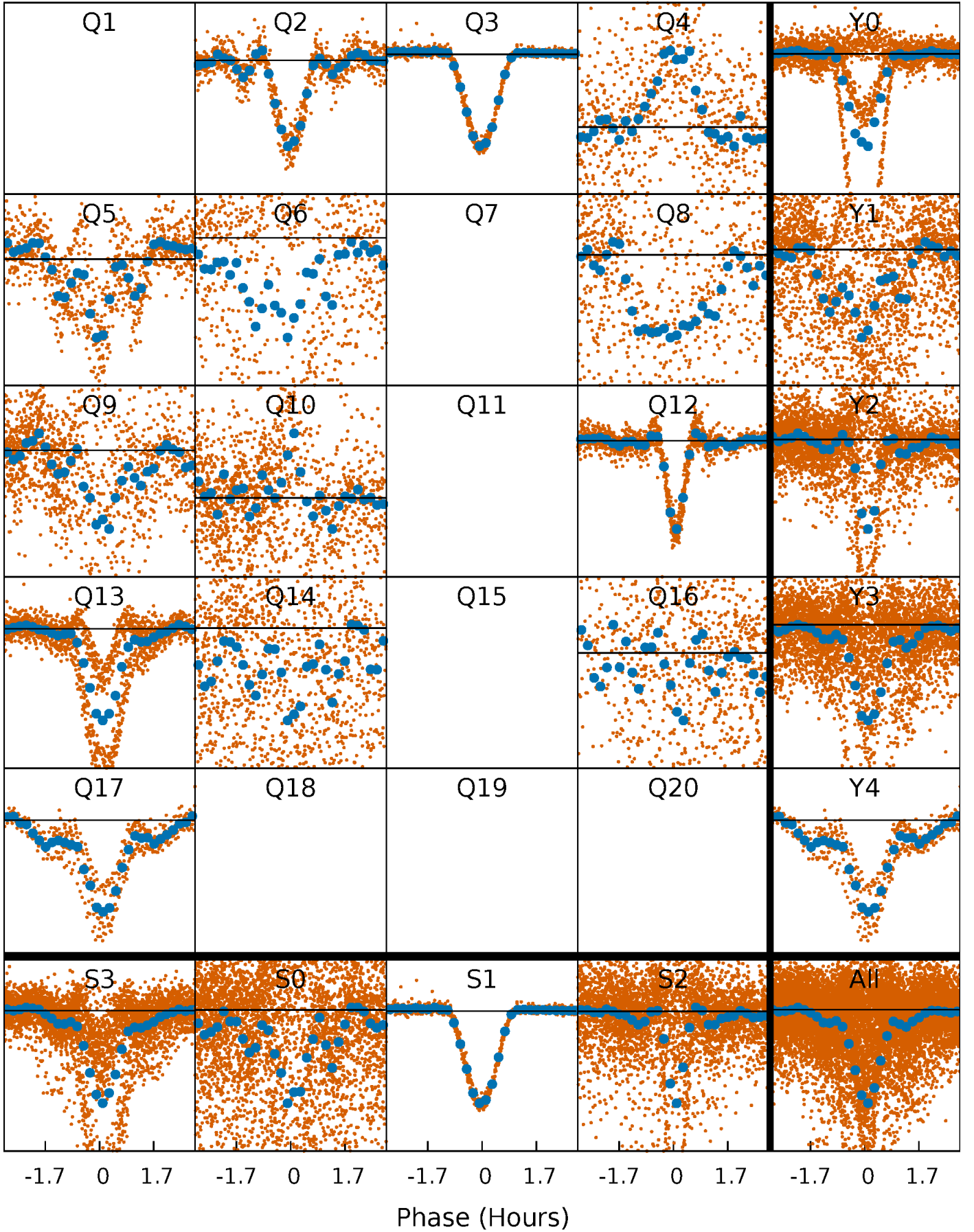
TCE 010556578-02 P= 0.626428 Days  $T_0=131.901619$  (BKJD)





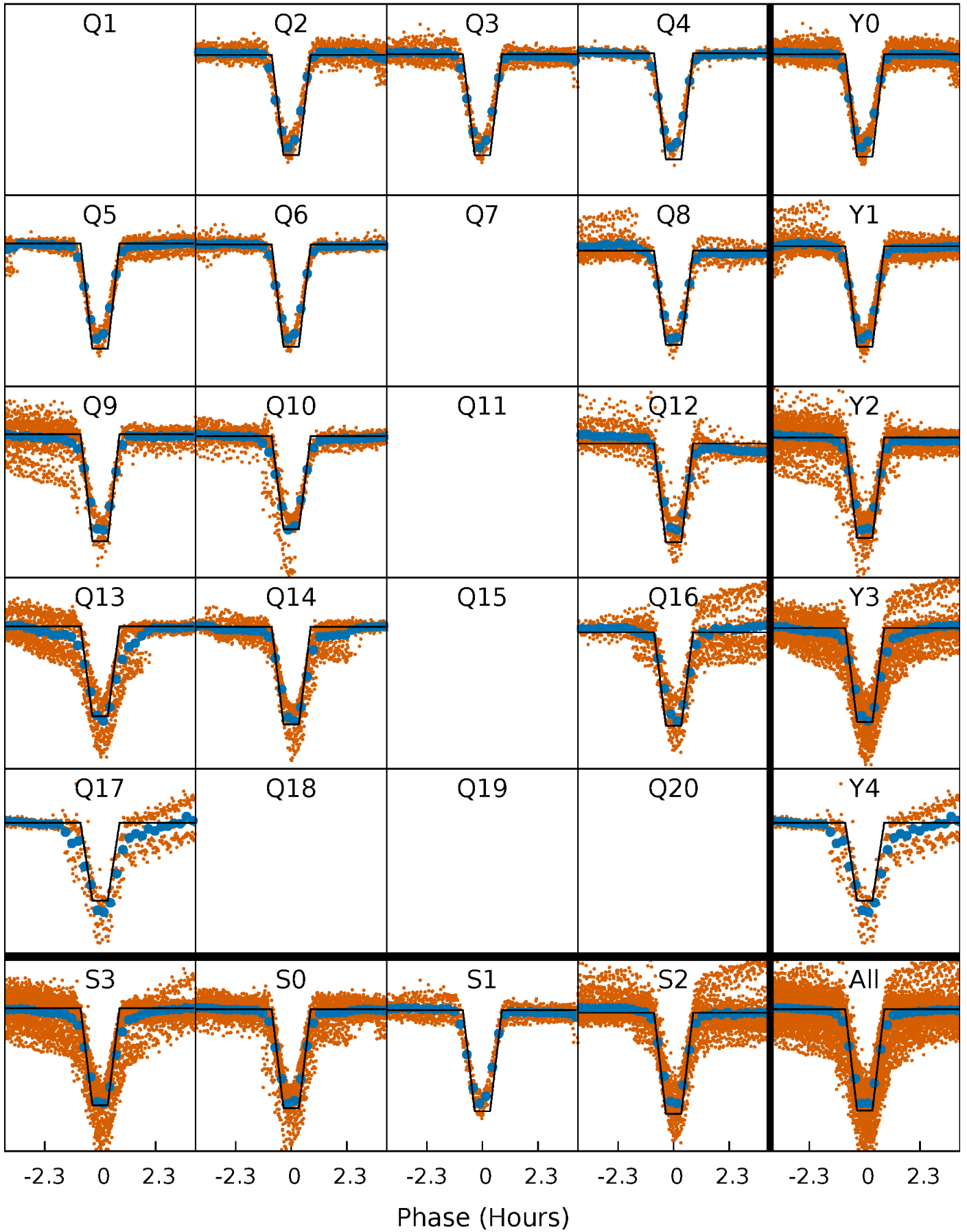
# DV Quarter-Phased Transit Curves

TCE 010556578-02     $P = 0.626428$  Days     $T_0 = 131.901619$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

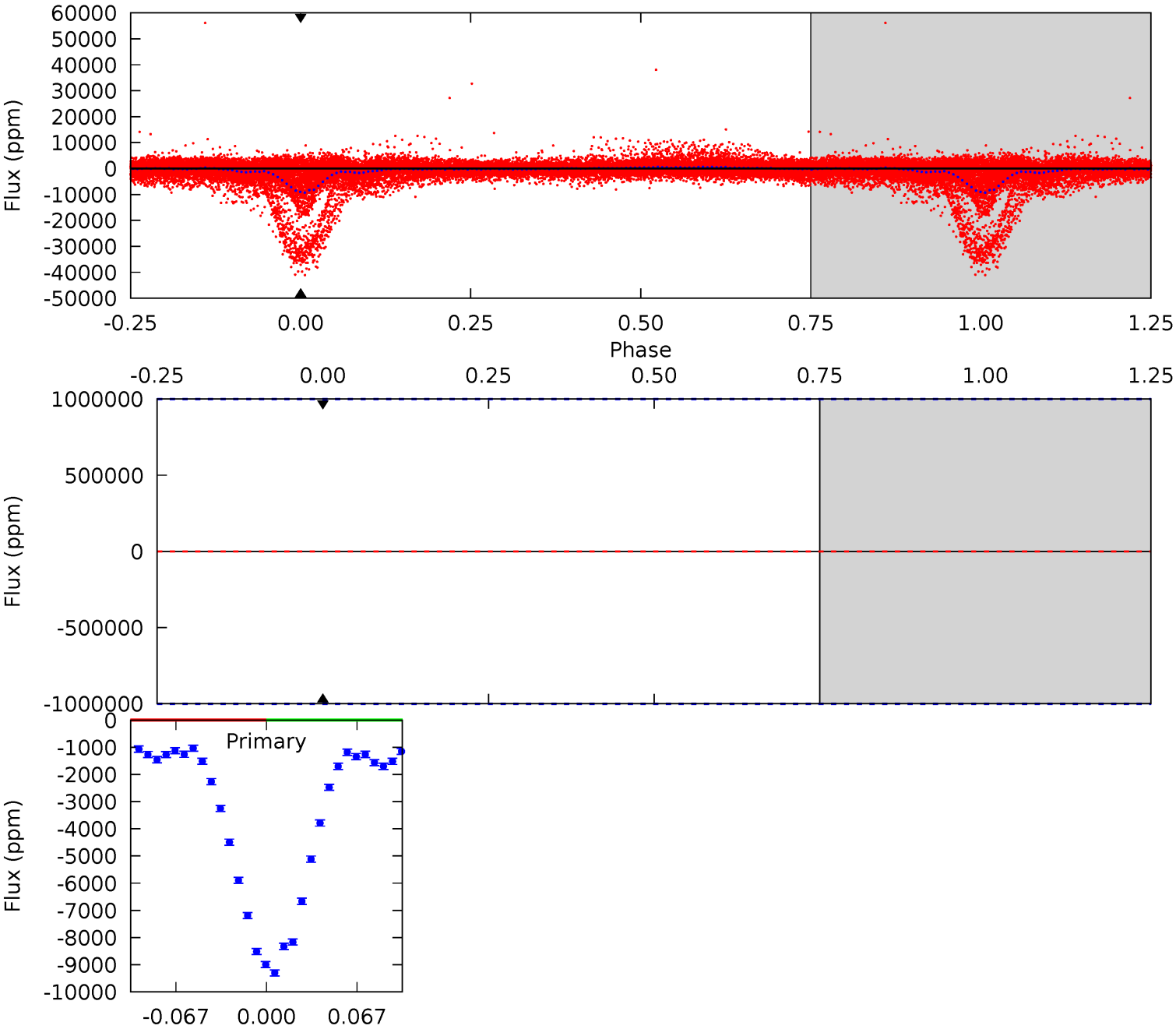
TCE 010556578-02     $P = 0.626428$  Days     $T_0 = 131.903169$  (BKJD)



# DV Model-Shift Uniqueness Test

010556578-02, P = 0.626428 Days, E = 131.901619 Days

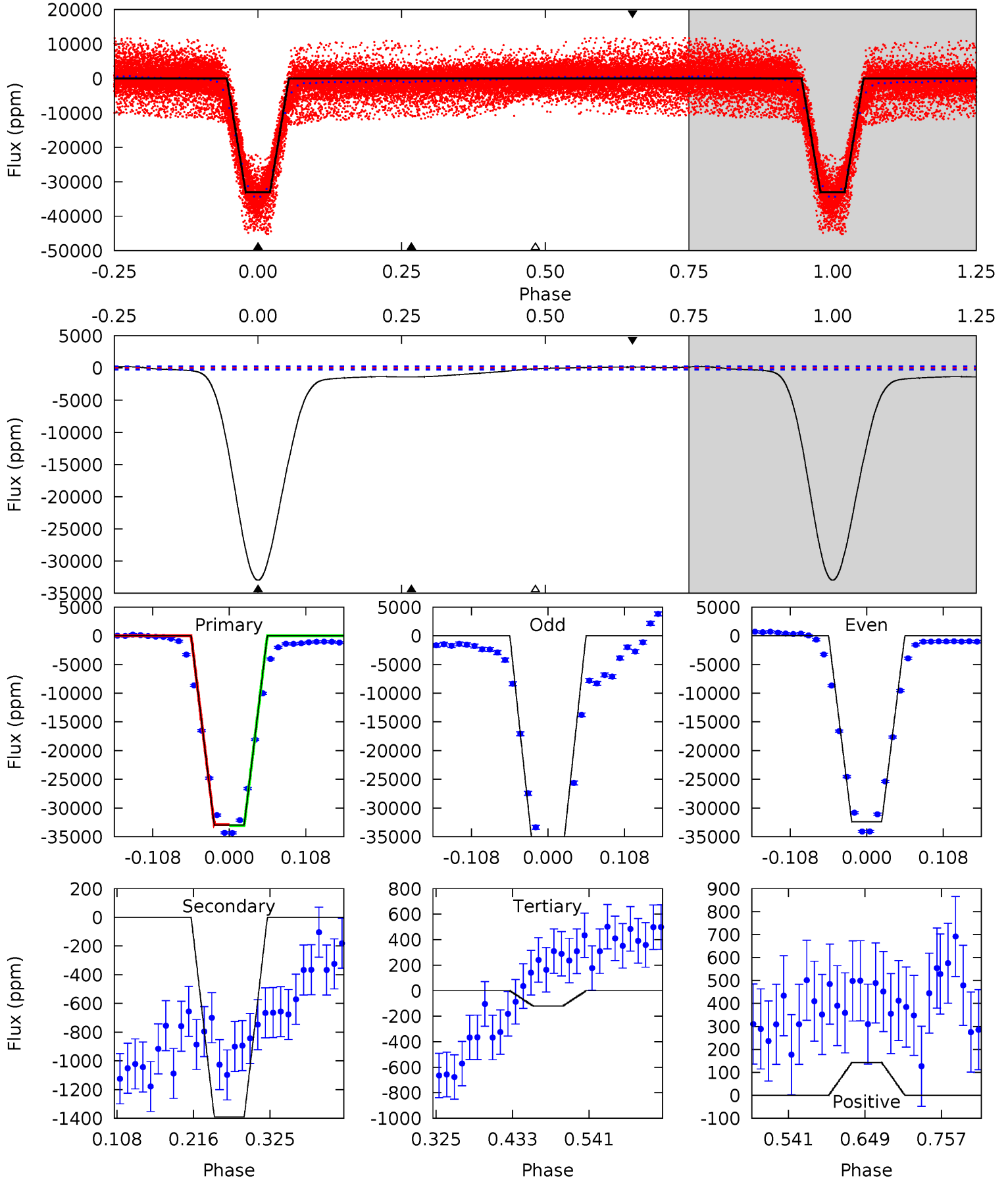
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

010556578-02, P = 0.626428 Days, E = 131.903169 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
616.7	26.0	2.24	2.66	4.55	1.61	8.98	614.4	614.0	23.8	23.3	36.1	1.06	0.01	1.74



### Stellar Parameters For KIC 010556578

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5134^{+170}_{-139}$	$4.560^{+0.084}_{-0.056}$	$-0.440^{+0.350}_{-0.300}$	$0.721^{+0.077}_{-0.077}$	$0.688^{+0.095}_{-0.044}$	$2.582^{+0.865}_{-0.488}$
	+3%/-3%	+2%/-1%	+80%/-68%	+11%/-11%	+14%/-6%	+34%/-19%
Source	PHO1	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 010556578-02 / KOI 7343.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$12.13^{+7.43}_{-6.66}$	$2385^{+94}_{-97}$	$2338^{+6644}_{-10226}$	$0.424^{+113.510}_{-78.831}$
Alt.	$-1390 \pm 53$	$15.51^{+7.95}_{-6.70}$	$2373^{+103}_{-83}$	$2598^{+730}_{-4862}$	$0.524^{+1.159}_{-0.294}$

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

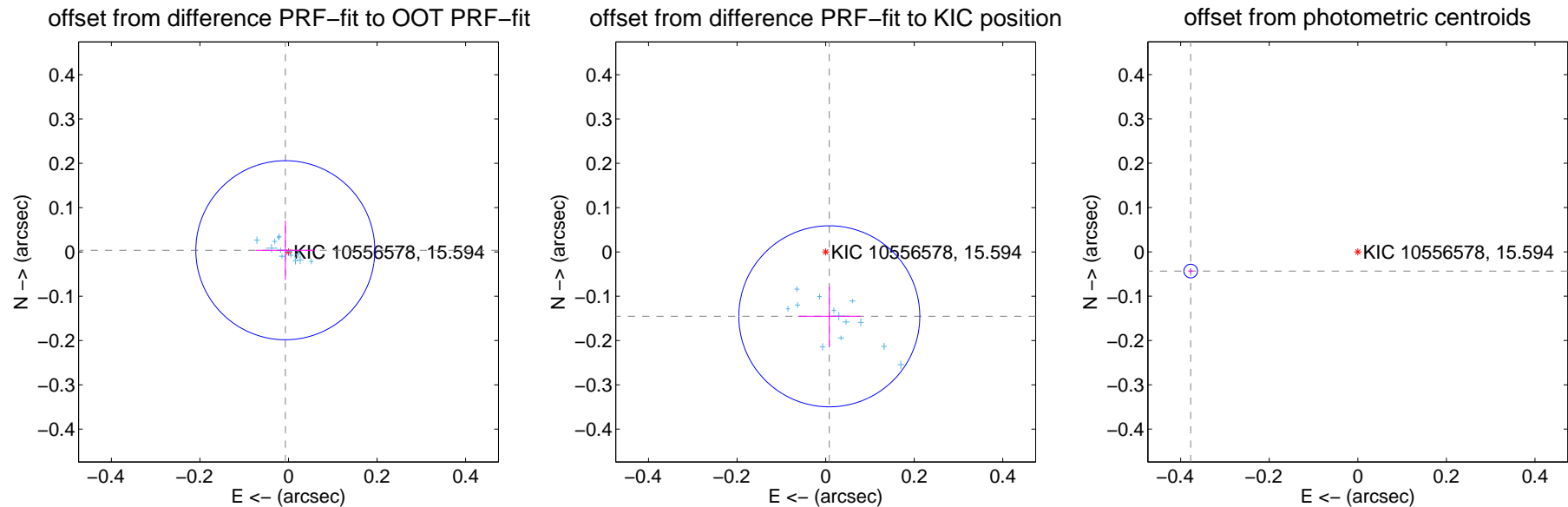
## DV Centroid Data

Supplemental centroid analysis for 010556578-02. Kepler magnitude: 15.59. Transit SNR -1.00

There are 13 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

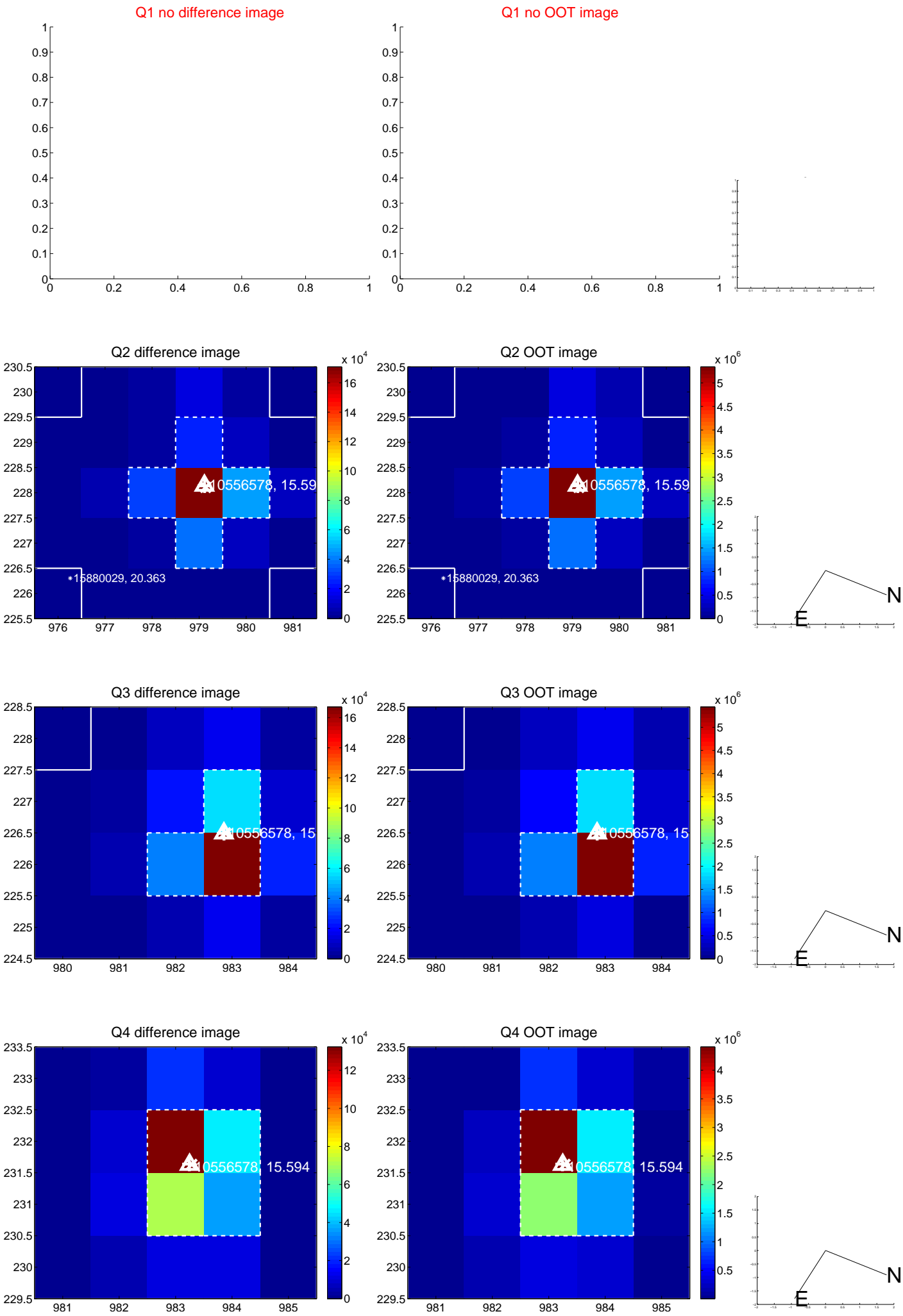
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.008 \pm 0.067$	0.12	$0.007 \pm 0.067$	$0.004 \pm 0.067$
PRF-fit source offset from KIC position	$0.146 \pm 0.068$	2.14	$-0.008 \pm 0.071$	$-0.145 \pm 0.068$
photometric centroid source offset	$0.38 \pm 0.01$	74.03	$0.38 \pm 0.01$	$-0.04 \pm 0.01$



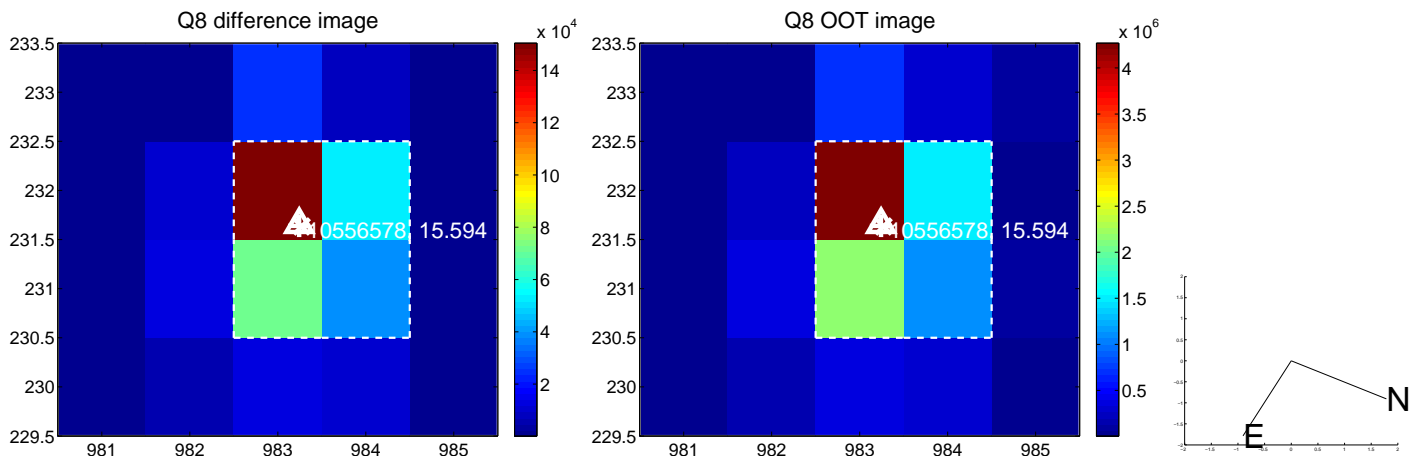
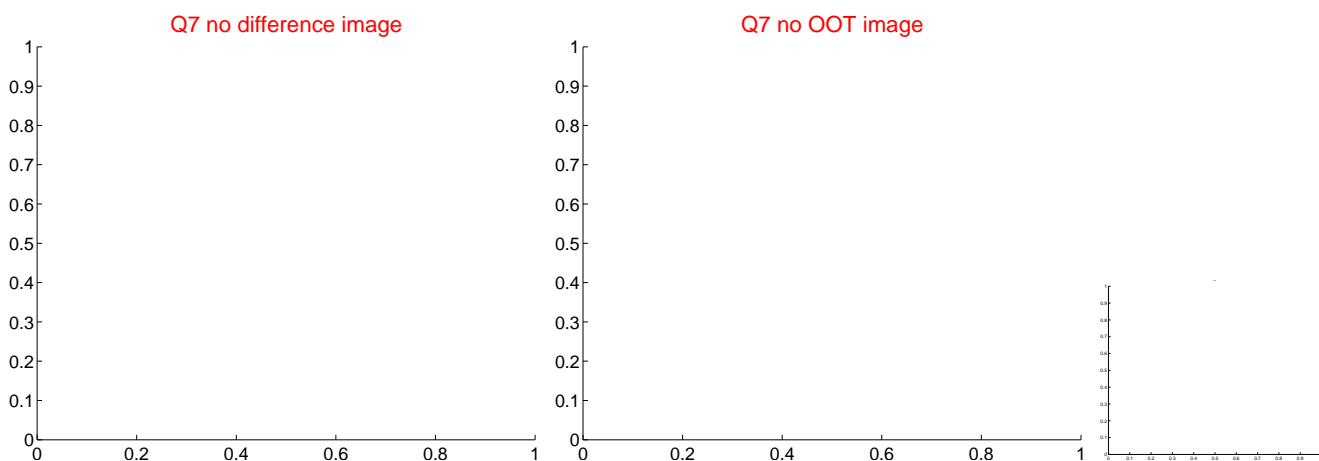
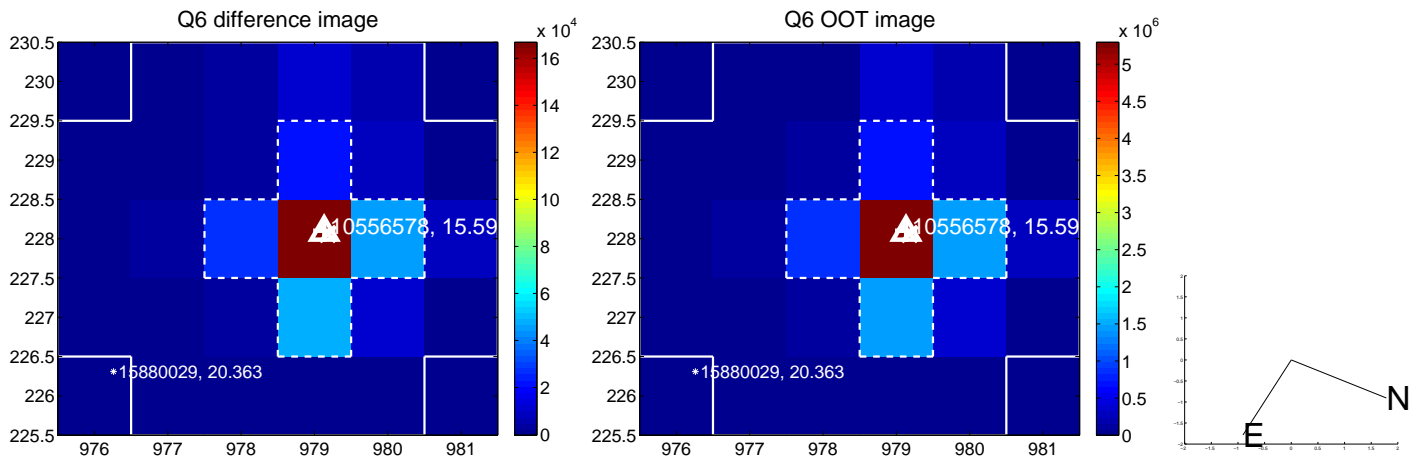
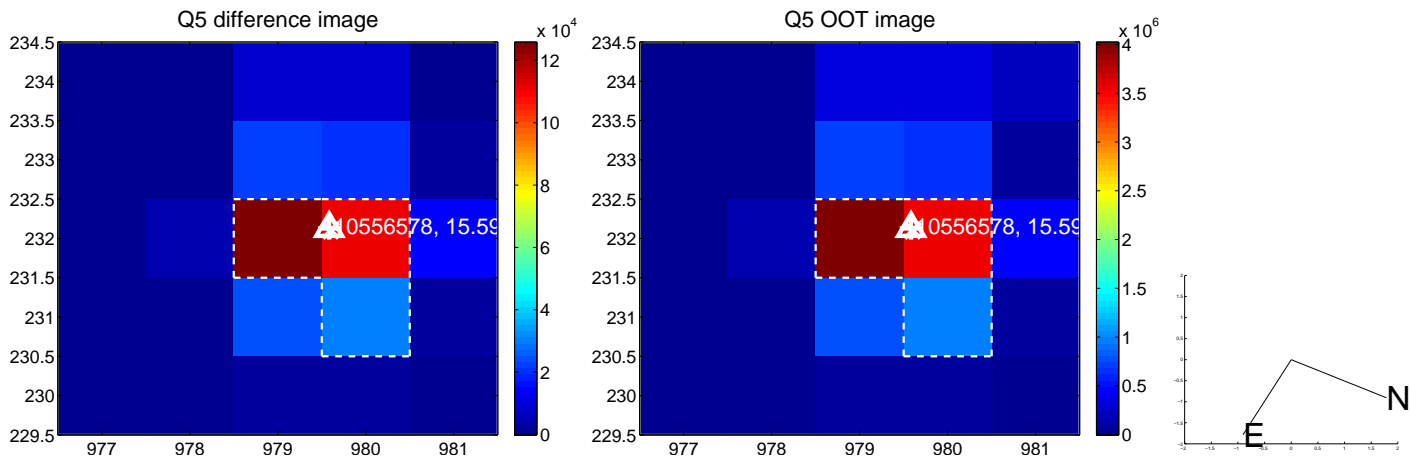
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



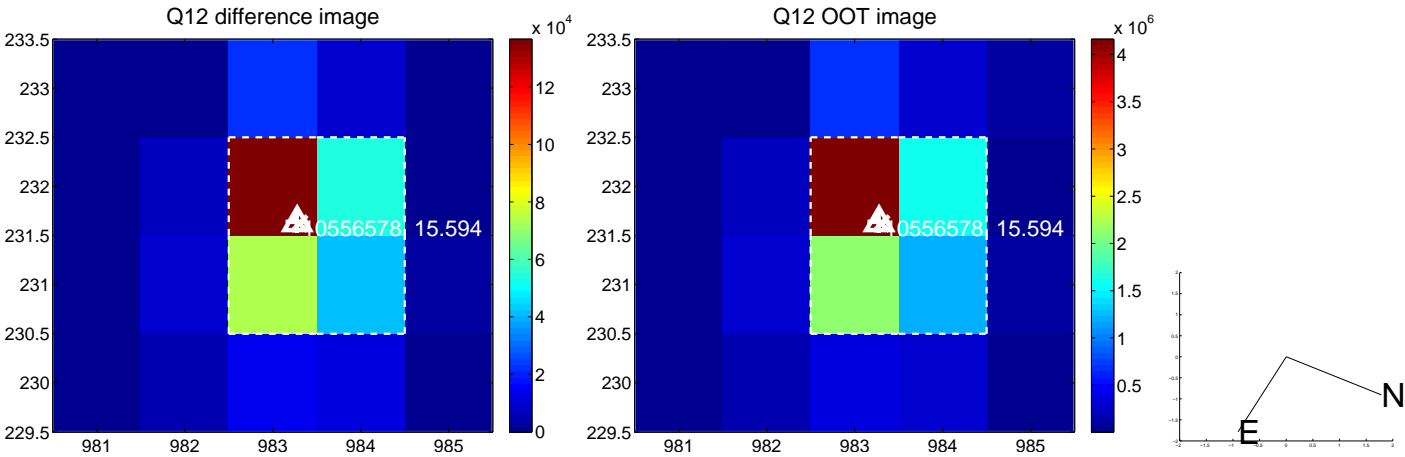
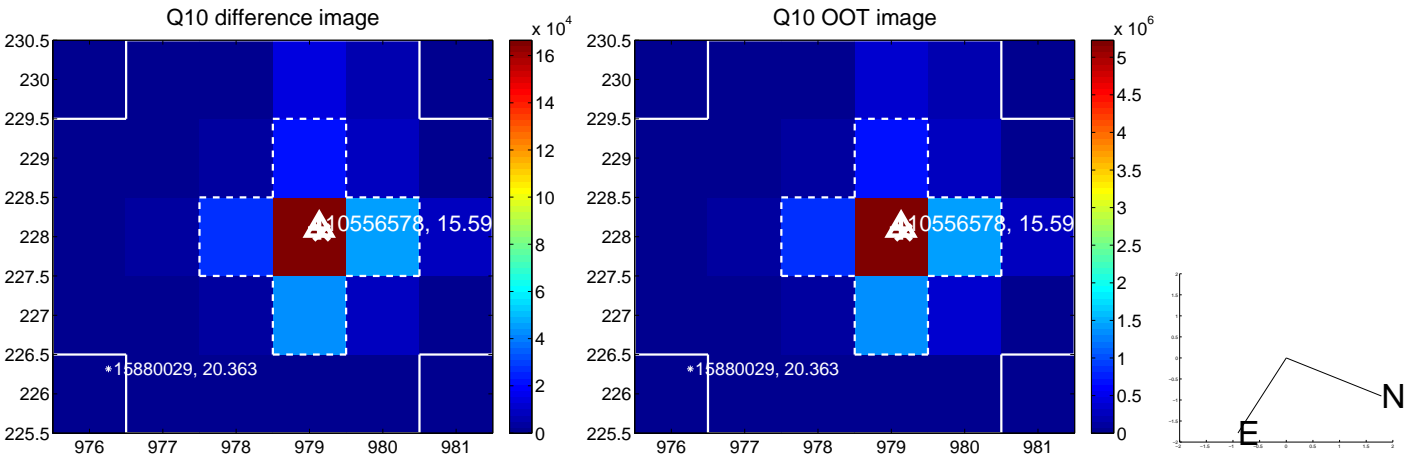
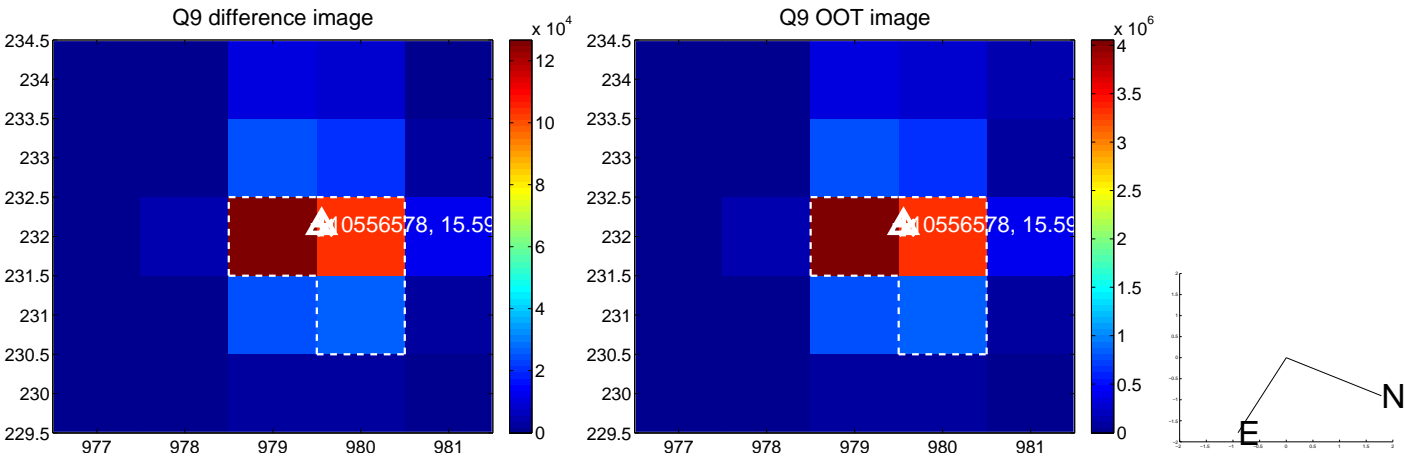
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



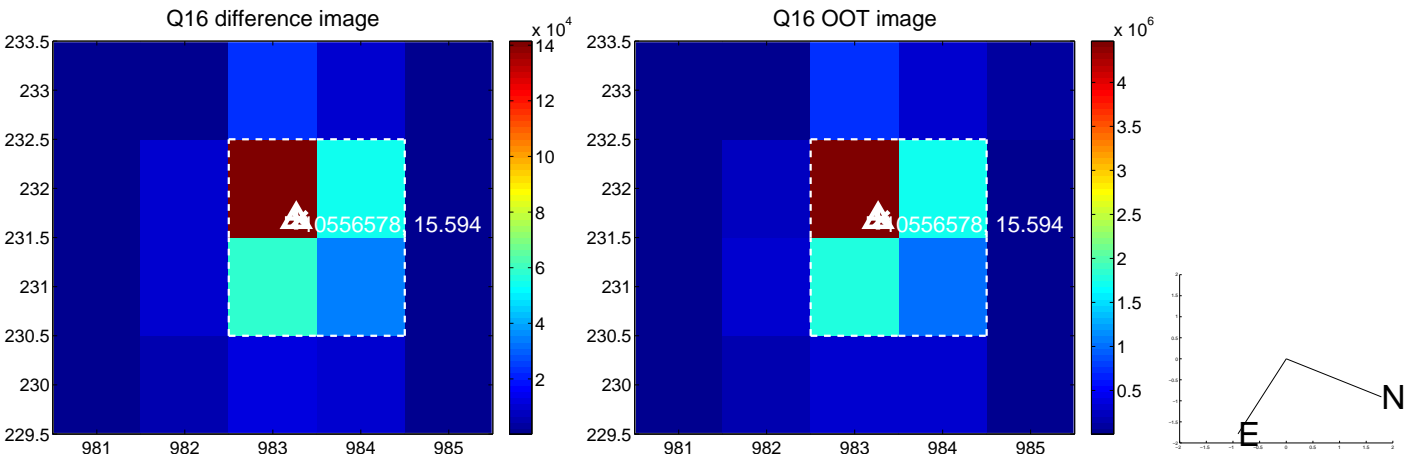
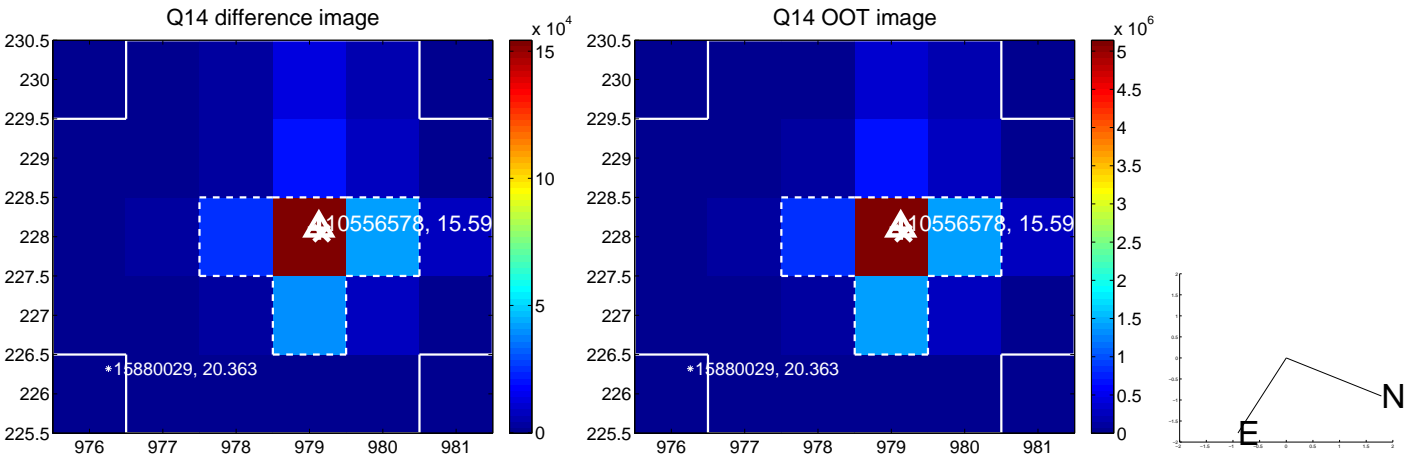
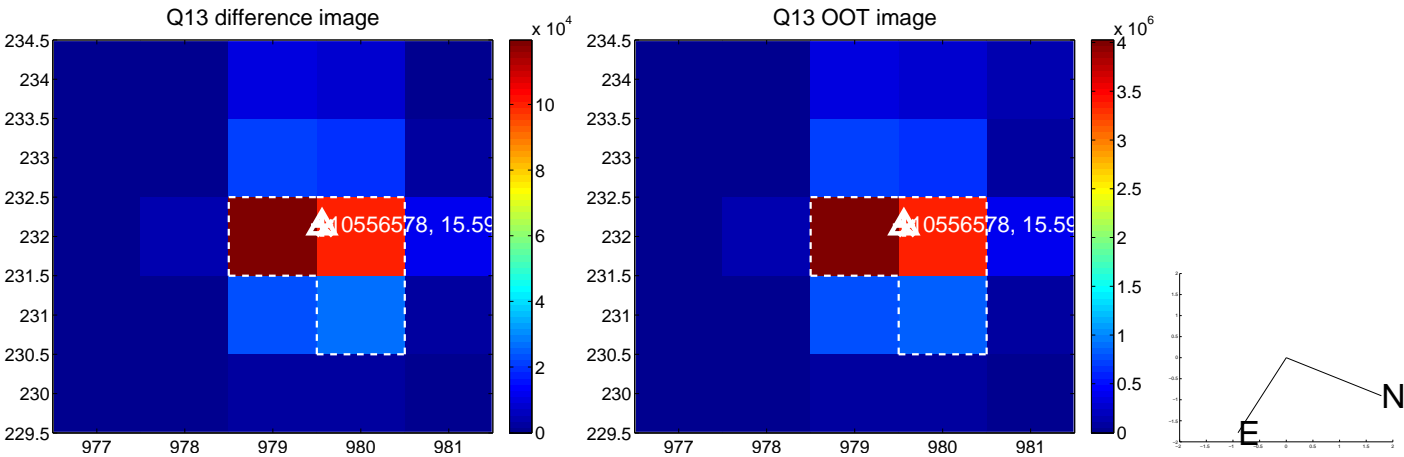
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



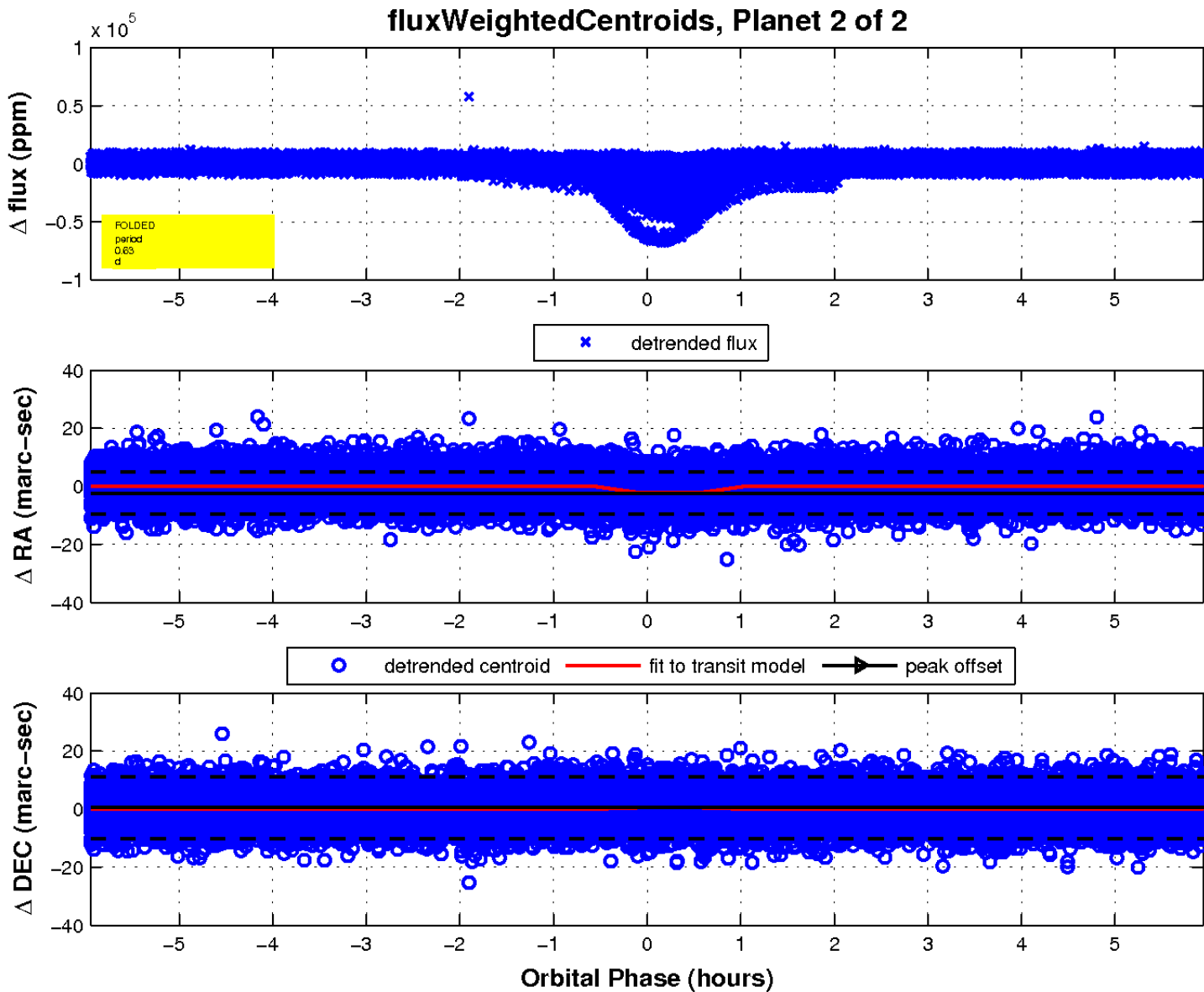
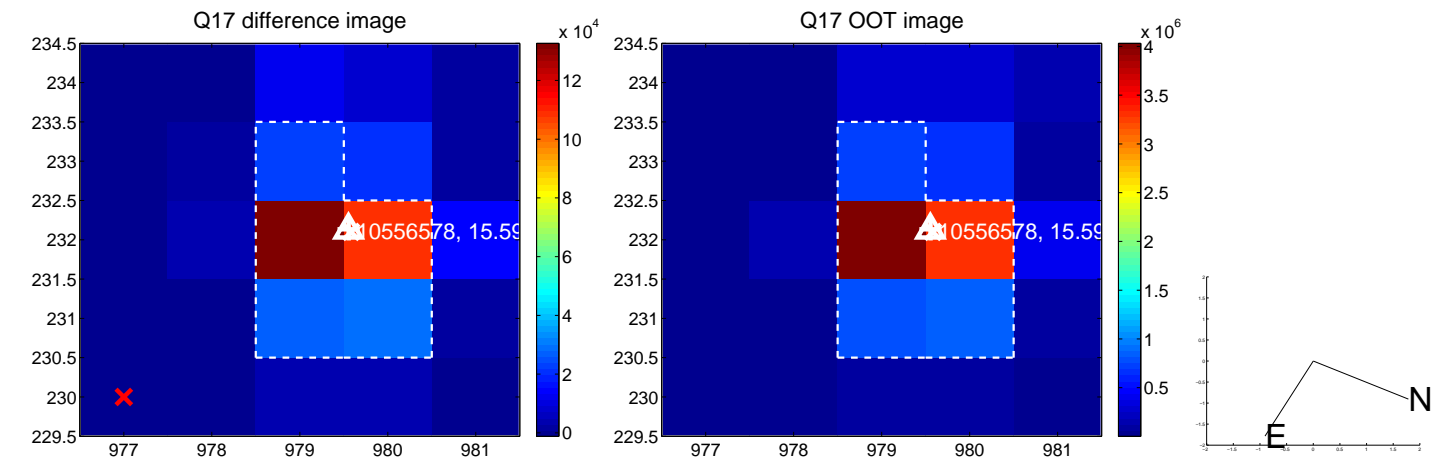
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

