

# KIC 009518558

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R <sub>★</sub> (R <sub>☉</sub> )	T <sub>★</sub> (K)	R <sub>p</sub> (R <sub>⊕</sub> )	S <sub>p</sub> (S <sub>⊕</sub> )
009518558-01	OBS	7939.01	2.178123	132.037793	133.7	0.909	11.7	13.0	0.90	6290	1.24	1052.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009518558-01	OBS	FP	0.00	0	0	1	1	HALO_GHOST—EPHEM_MATCH

**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.

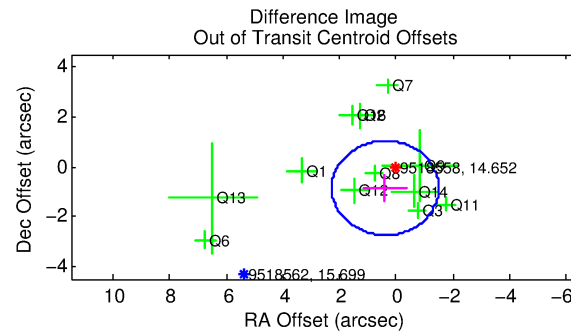
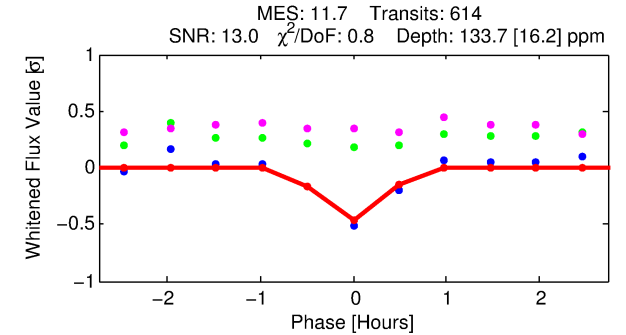
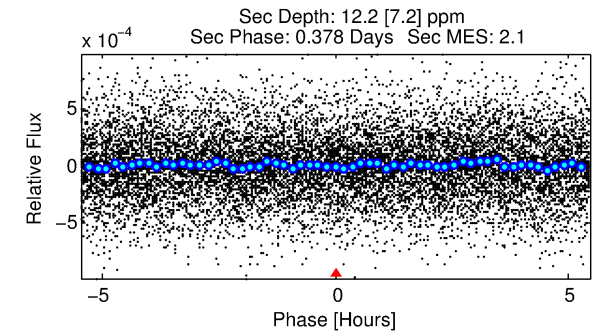
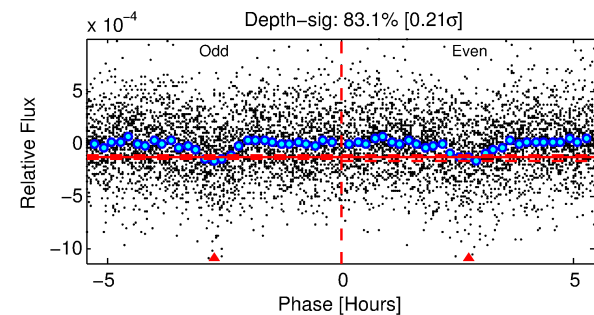
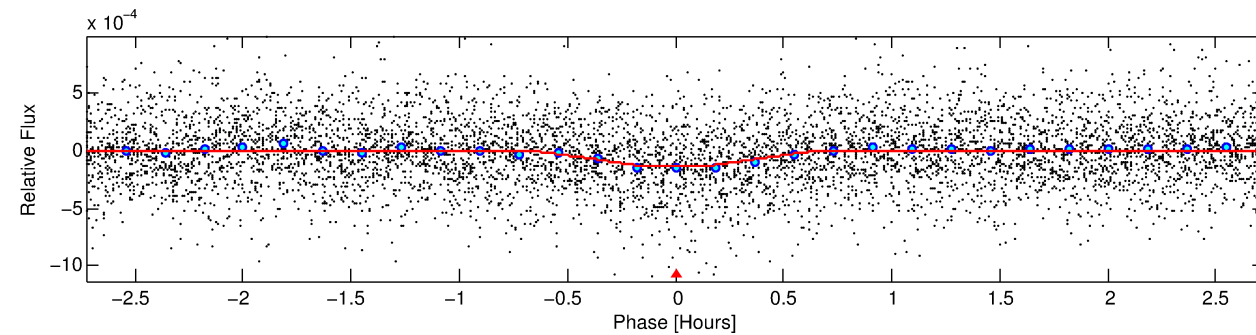
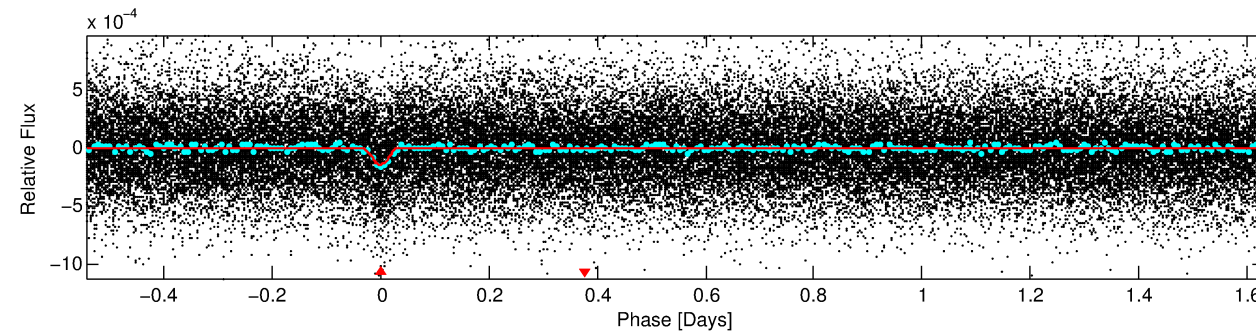
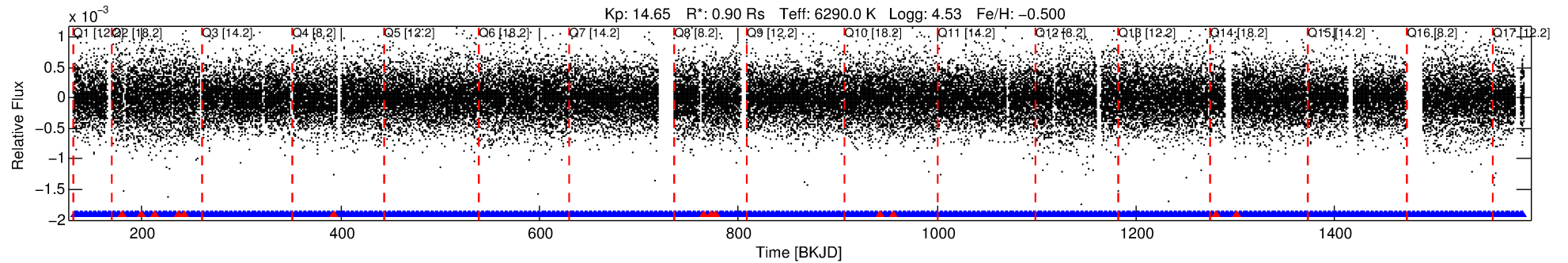
## Ephemeris Match Information For 009518558-01

TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist (″)	ΔRow	ΔCol	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	σ <sub>P</sub>	σ <sub>T</sub>
009518558-01	9518558	FL-Lyr-pri	9641031	1:1	558.6	-140	0	9.18	14.65	3246.70	Direct-PRF	0	0.96	0.87

**Notes:** P<sub>1</sub>:P<sub>2</sub> is the period ratio. Dist is the distance in arcseconds. ΔRow and ΔCol are the number of pixels apart in row and column. m<sub>2</sub> and m<sub>1</sub> are the magnitudes of the parent and child. D<sub>2</sub>/D<sub>1</sub> is the parent's transit depth divided by the child's. σ<sub>P</sub> and σ<sub>T</sub> are the significance of the match in period and epoch. For a match to be considered significant σ<sub>P</sub> < 5.0 and σ<sub>T</sub> < 5.0. Matches which have σ<sub>P</sub> and σ<sub>T</sub> very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 9518558 Candidate: 1 of 1 Period: 2.178 d



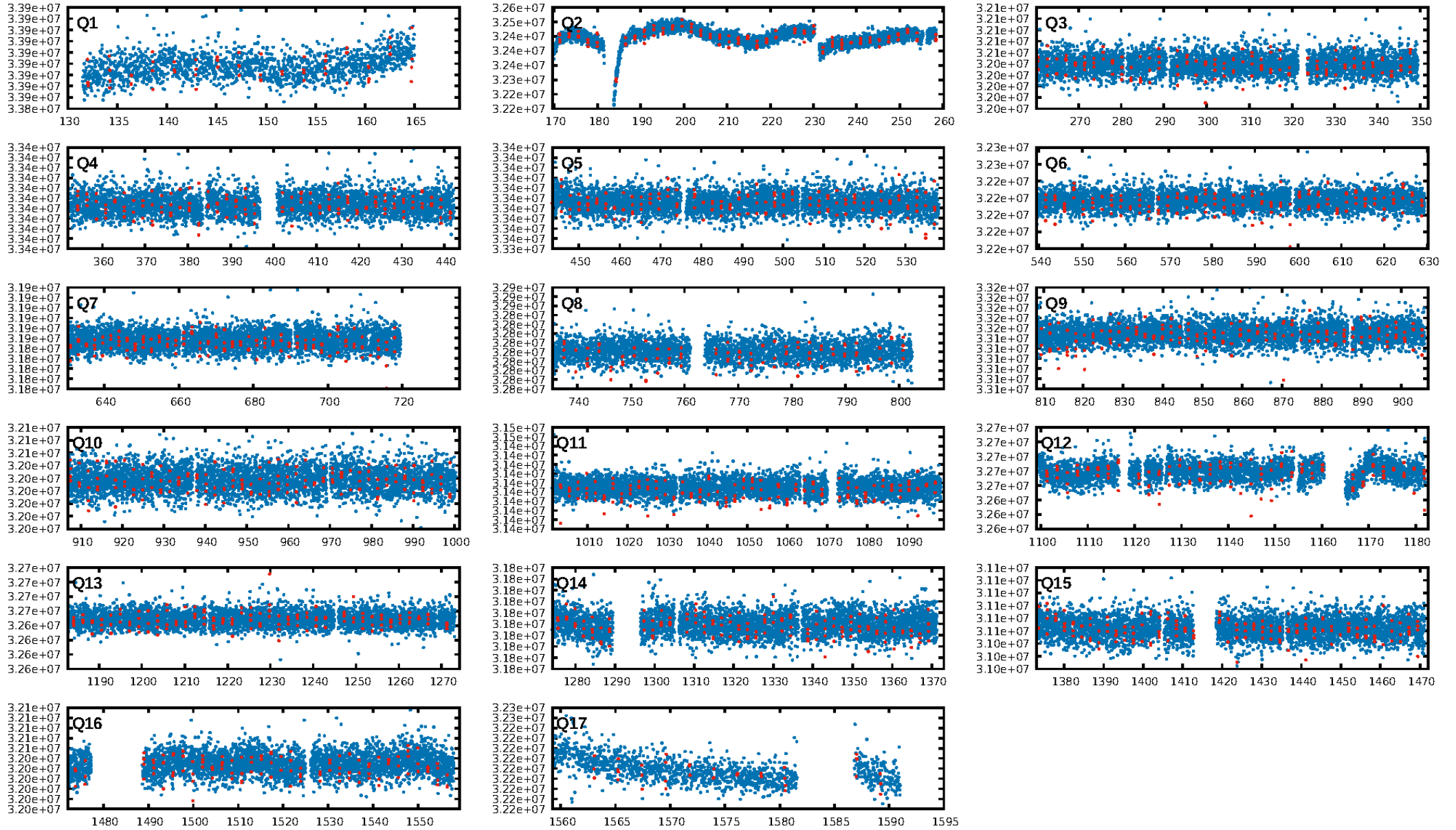
## DV Fit Results:

Period = 2.17812 [0.00001] d  
Epoch = 132.0378 [0.0013] BKJD  
Rp/R\* = 0.0126 [0.0062]  
a/R\* = 8.20 [22.43]  
b = 0.91 [0.54]  
Seff = 1052.54 [389.98]  
Teq = 1452 [135] K  
Rp = 1.24 [0.69] Re  
a = 0.0328 [0.0077] AU  
Ag = 4.73 [5.64] [0.66 $\sigma$ ]  
Teffp = 3312 [947] K [1.94 $\sigma$ ]

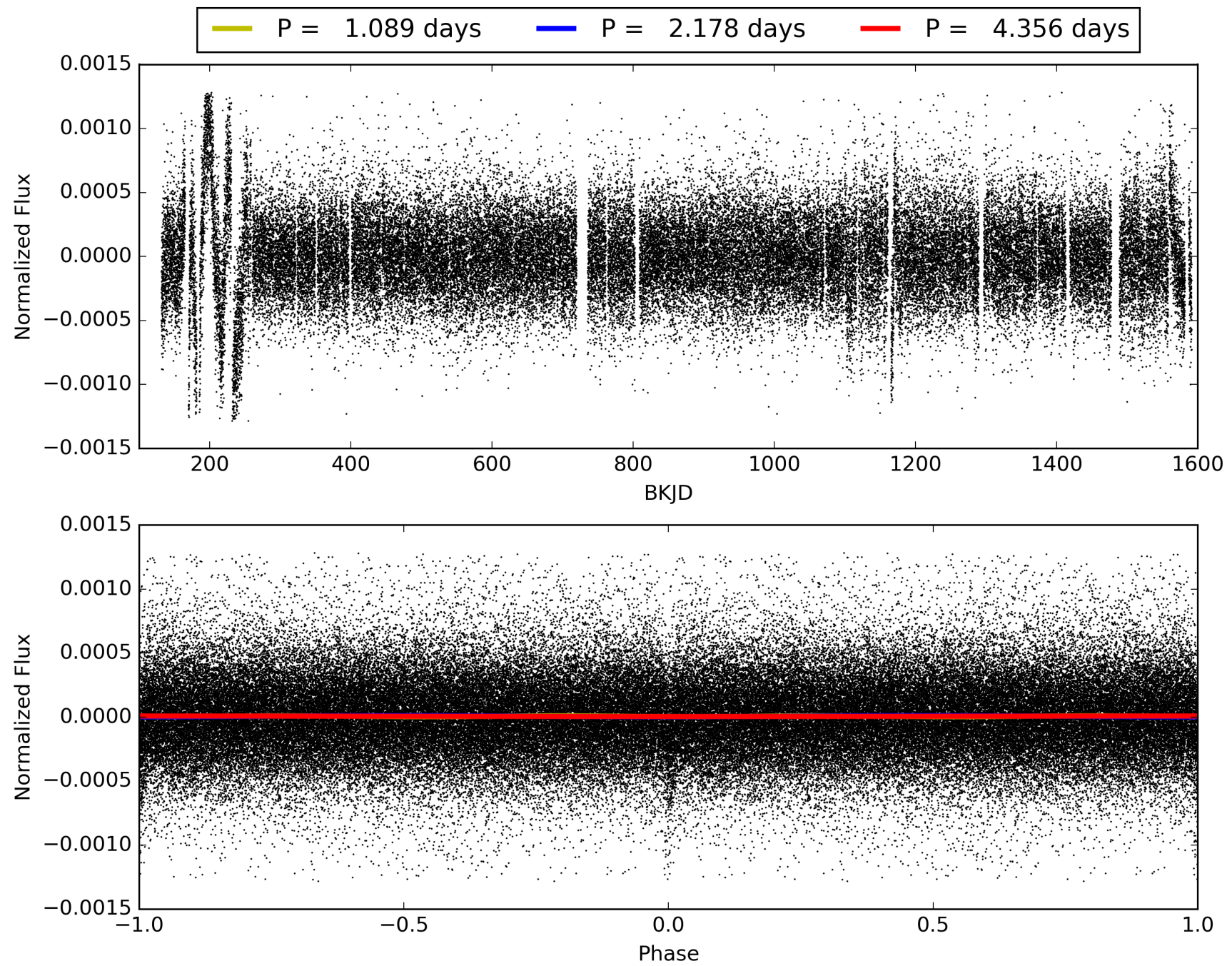
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.93e-30  
RollingBand-fgt: 0.98 [574/587]  
GhostDiagnostic-chr: 0.2222  
Centroid-sig: 0.0%  
Centroid-so: 3.523 arcsec [3.98 $\sigma$ ]  
OotOffset-rm: 0.941 arcsec [1.49 $\sigma$ ]  
KicOffset-rm: 0.978 arcsec [1.32 $\sigma$ ]  
OotOffset-st: 3/3/3 [12]  
KicOffset-st: 3/3/3 [12]  
DiffImageQuality-fgm: 0.33 [4/12]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009518558-01, PDC Light Curves



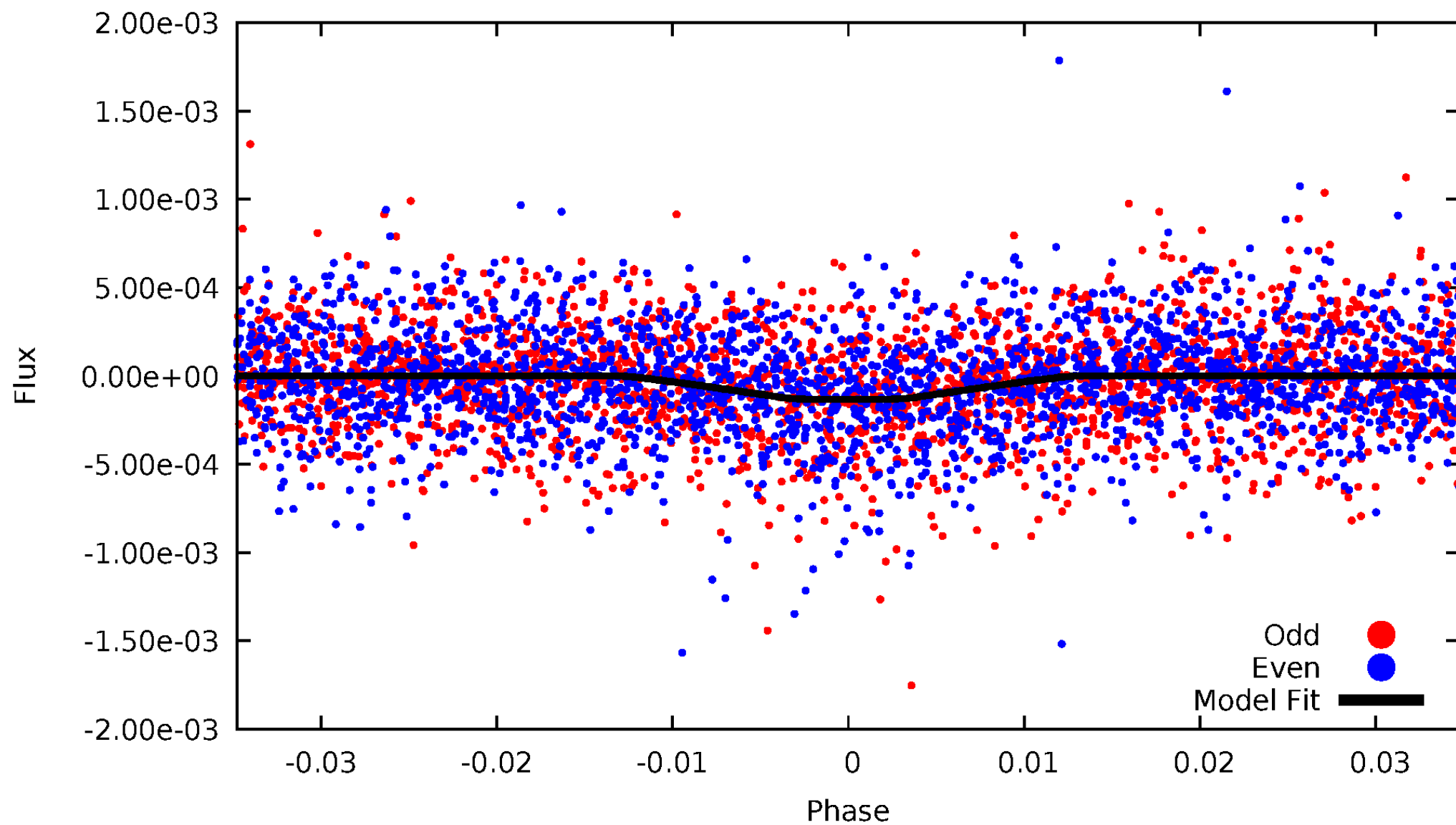
TCE 009518558-01





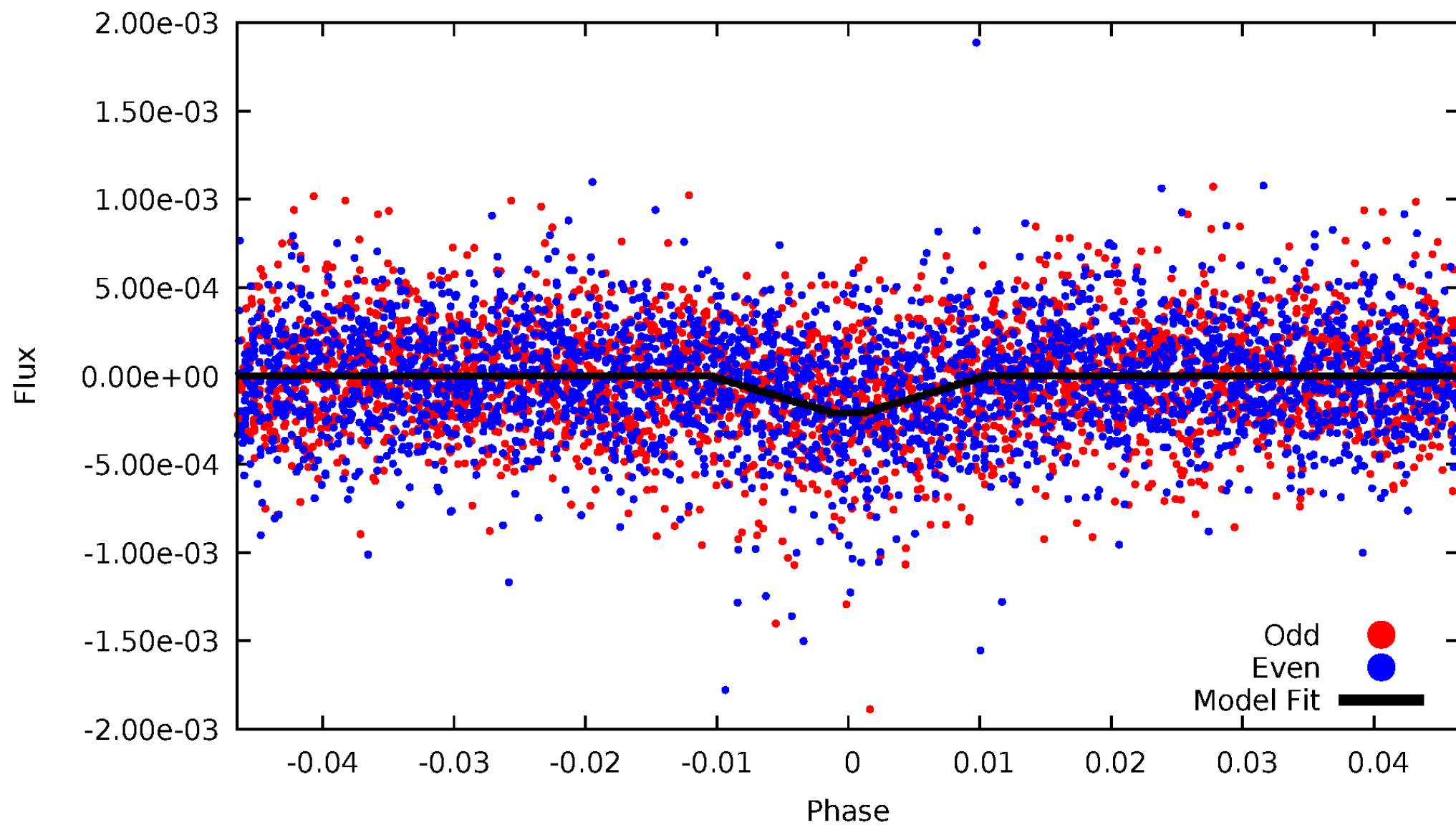
# DV Odd/Even

TCE 009518558-01

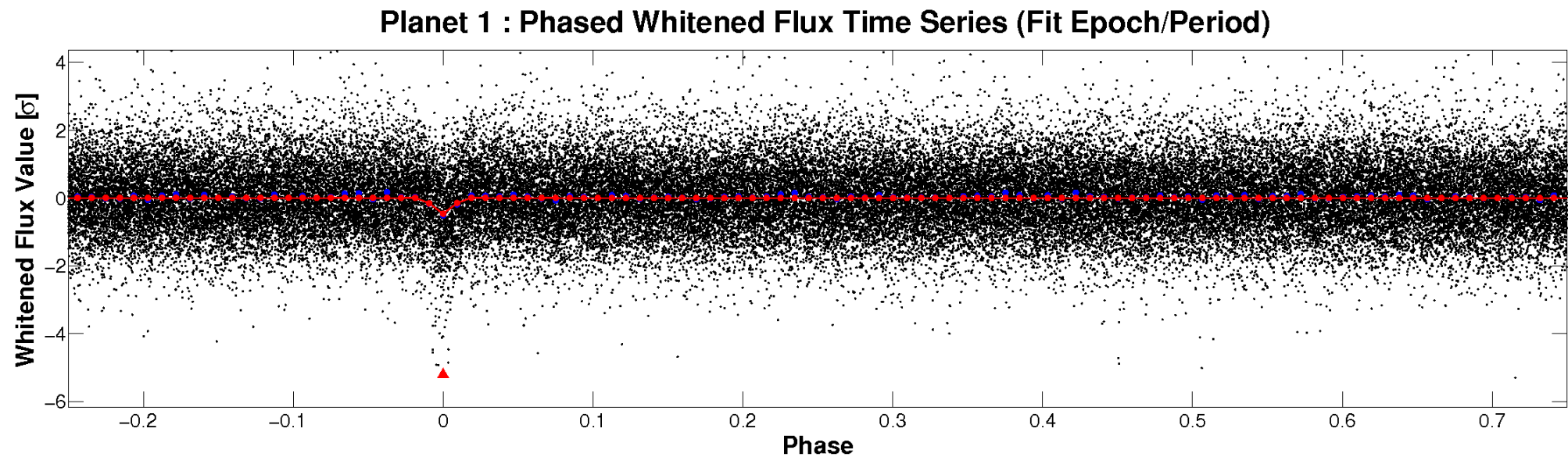
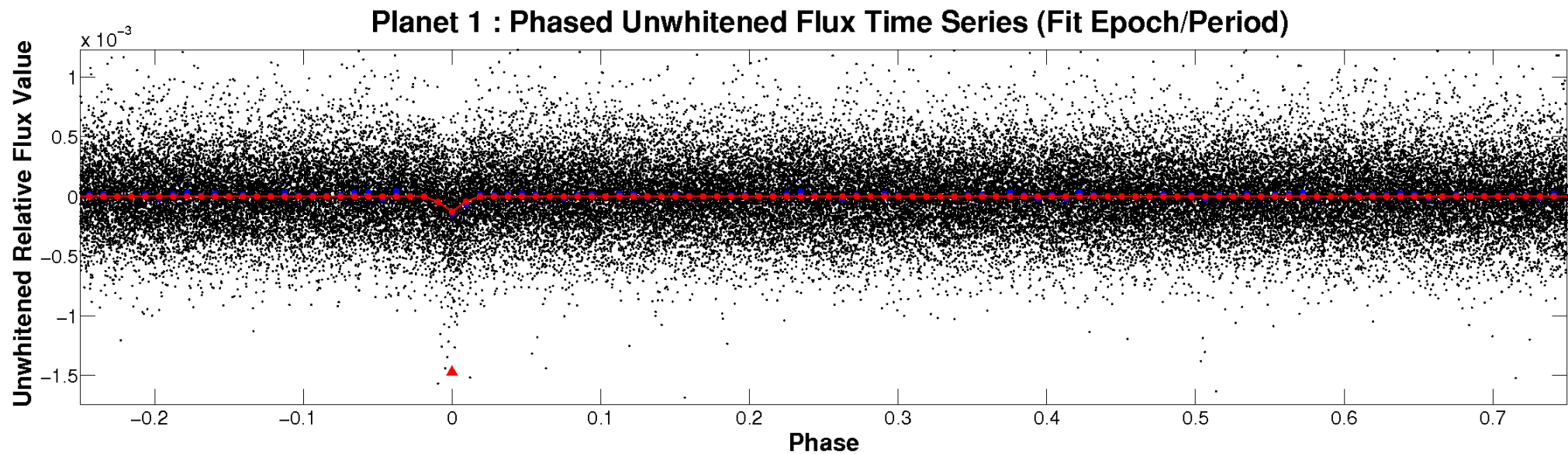


# ALT Odd/Even

TCE 009518558-01

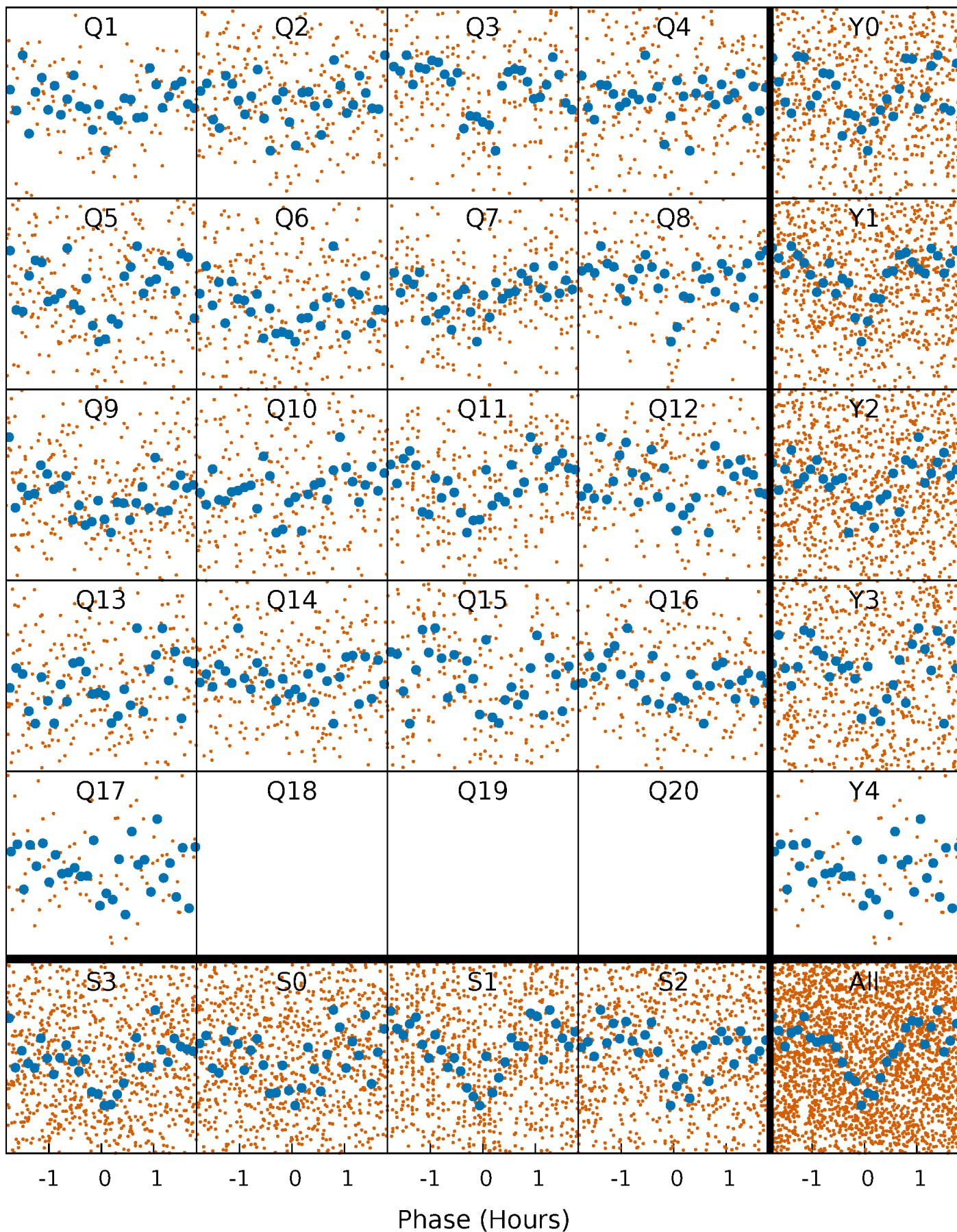


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

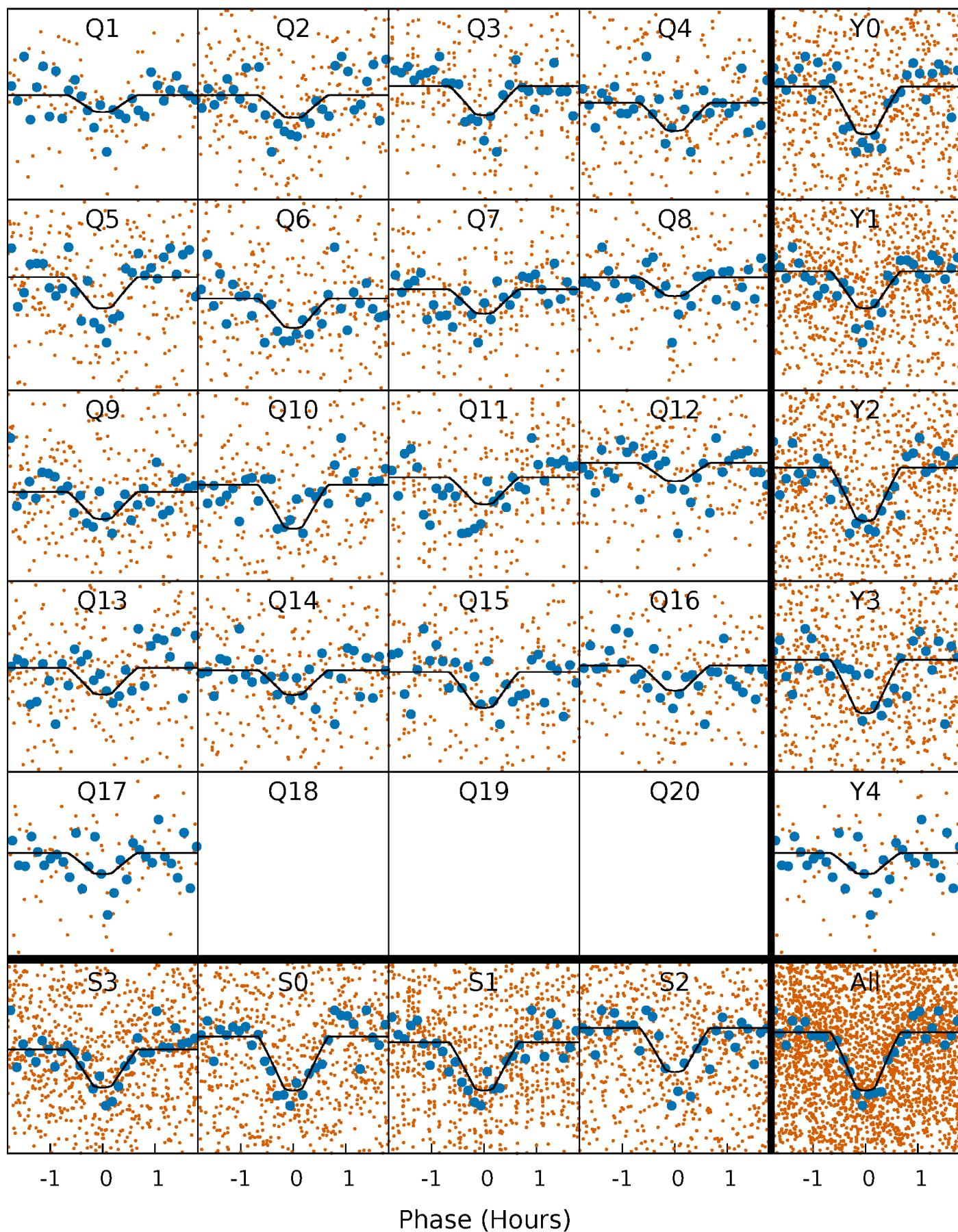
TCE 009518558-01 P= 2.178123 Days  $T_0=132.037792$  (BKJD)





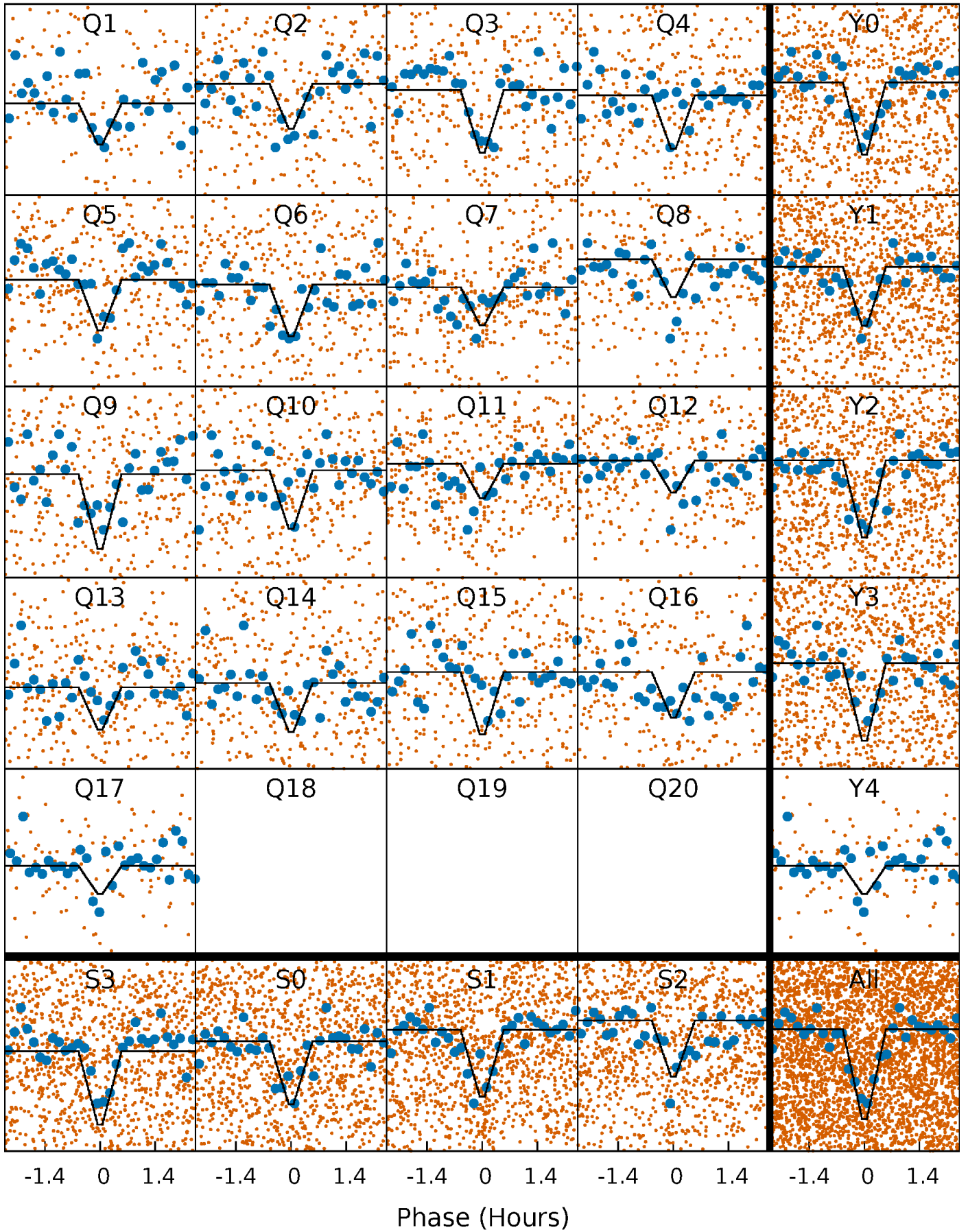
# DV Quarter-Phased Transit Curves

TCE 009518558-01 P= 2.178123 Days  $T_0=132.037792$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

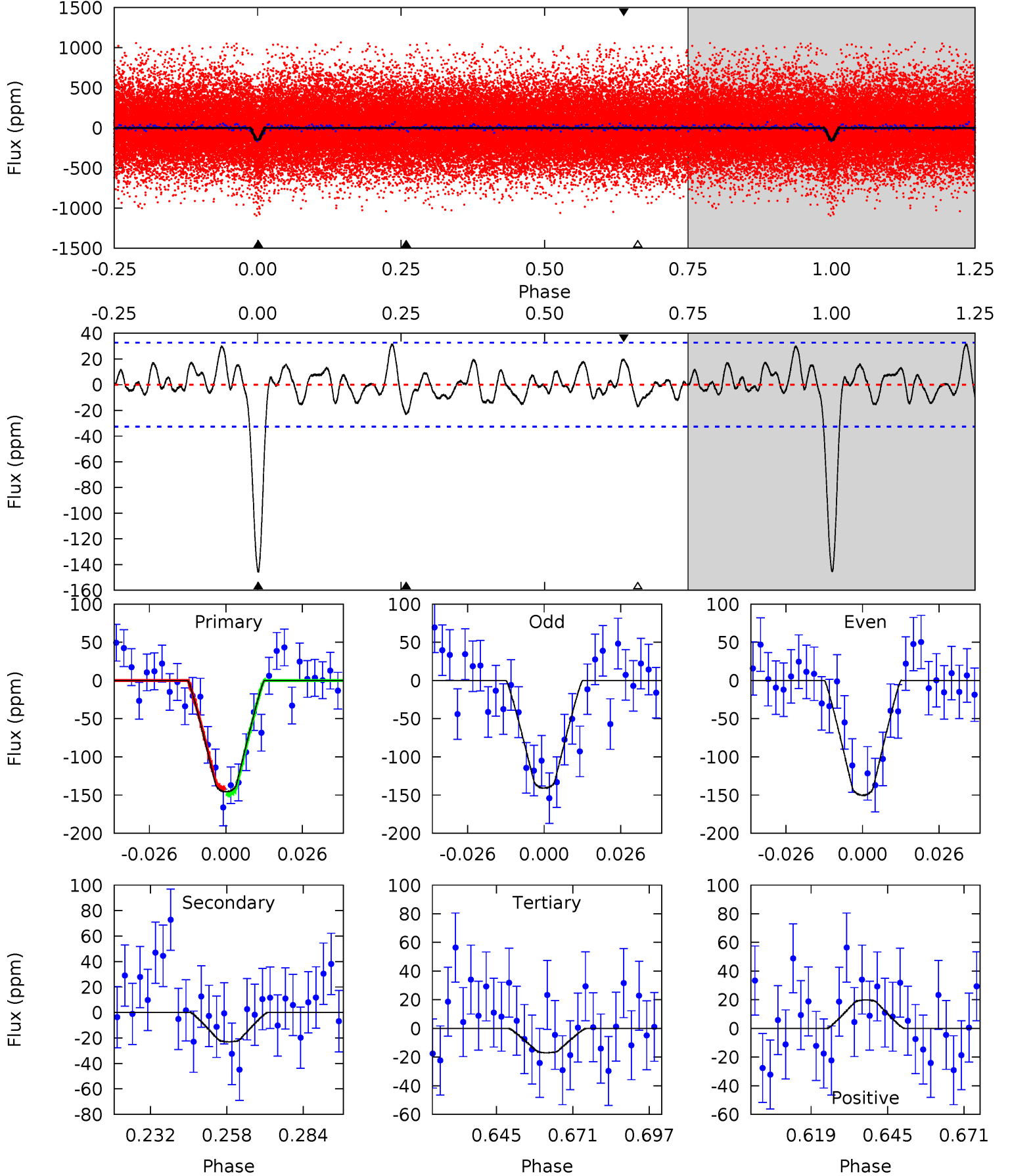
TCE 009518558-01 P= 2.178141 Days  $T_0=132.033818$  (BKJD)



# DV Model-Shift Uniqueness Test

009518558-01, P = 2.178123 Days, E = 129.859669 Days

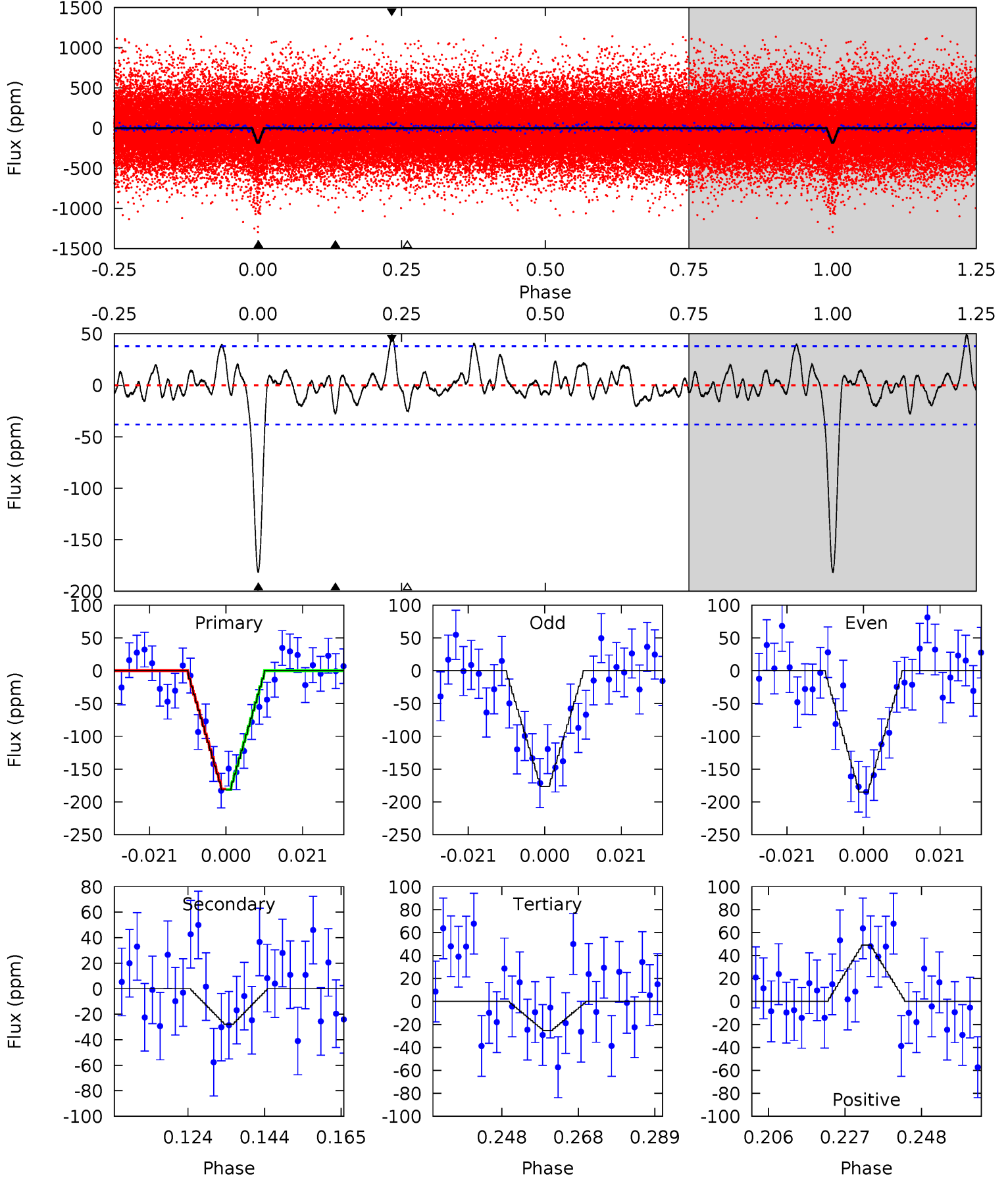
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.6	3.41	2.52	2.94	4.84	2.23	1.33	19.1	18.6	0.89	0.47	0.69	1.07	0.18	0.59



# Alt Model-Shift Uniqueness Test

009518558-01, P = 2.178141 Days, E = 129.855677 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
23.4	3.58	3.25	6.30	4.89	2.31	1.58	20.1	17.1	0.33	-2.73	0.57	1.06	0.21	0.05





### Stellar Parameters For KIC 009518558

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6290^{+171}_{-190}$	$4.527^{+0.034}_{-0.195}$	$-0.500^{+0.300}_{-0.300}$	$0.898^{+0.245}_{-0.082}$	$0.990^{+0.112}_{-0.123}$	$1.925^{+0.361}_{-0.961}$
	+3%/-3%	+1%/-4%	+60%/-60%	+27%/-9%	+11%/-12%	+19%/-50%
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 009518558-01 / KOI 7939.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-23 \pm 7$	$1.35^{+0.62}_{-0.65}$	$2077^{+134}_{-90}$	$4075^{+1290}_{-548}$	$7.414^{+18.601}_{-4.106}$
Alt.	$-28 \pm 8$	$1.46^{+0.71}_{-0.58}$	$2076^{+127}_{-88}$	$4064^{+918}_{-569}$	$7.208^{+13.887}_{-4.144}$

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

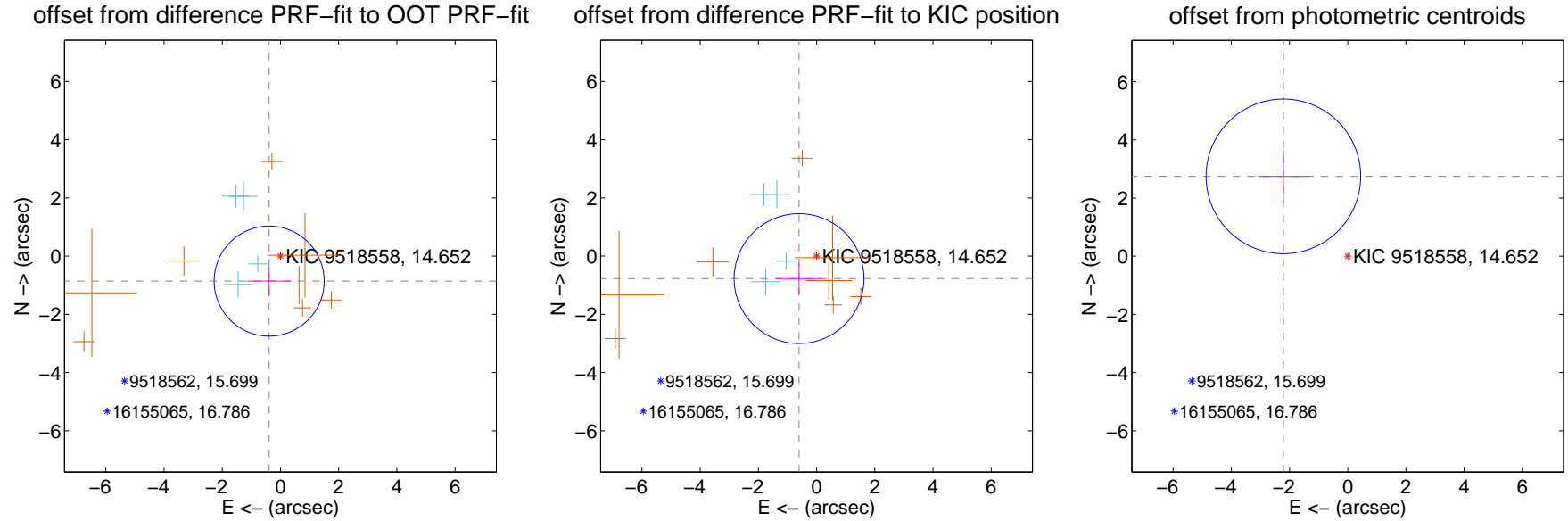
## DV Centroid Data

Supplemental centroid analysis for 009518558-01. Kepler magnitude: 14.65. Transit SNR 13.03

There are 4 quarters with good PRF difference image offsets

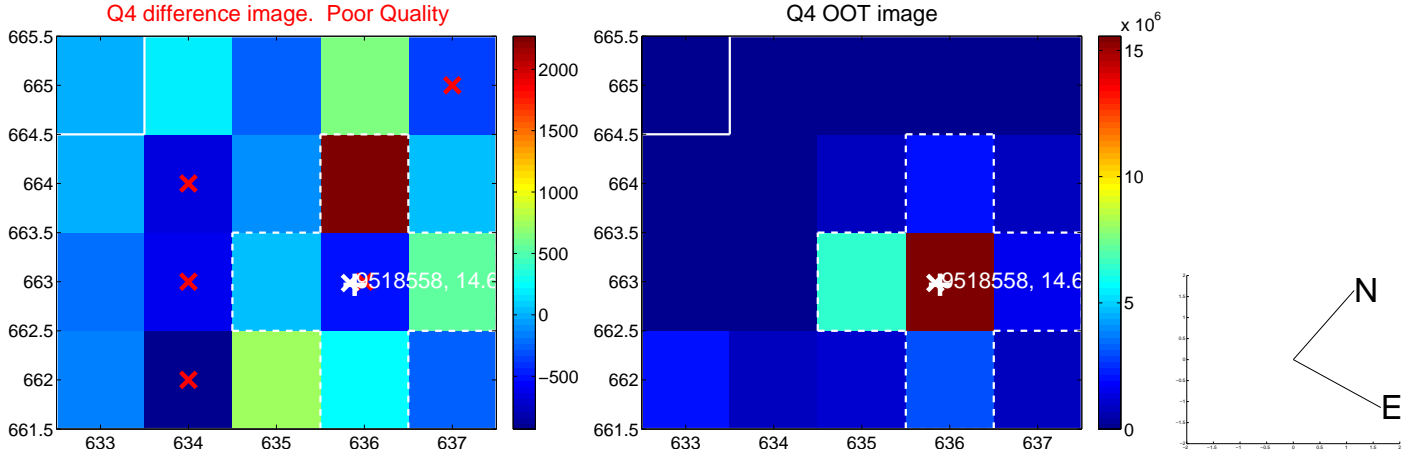
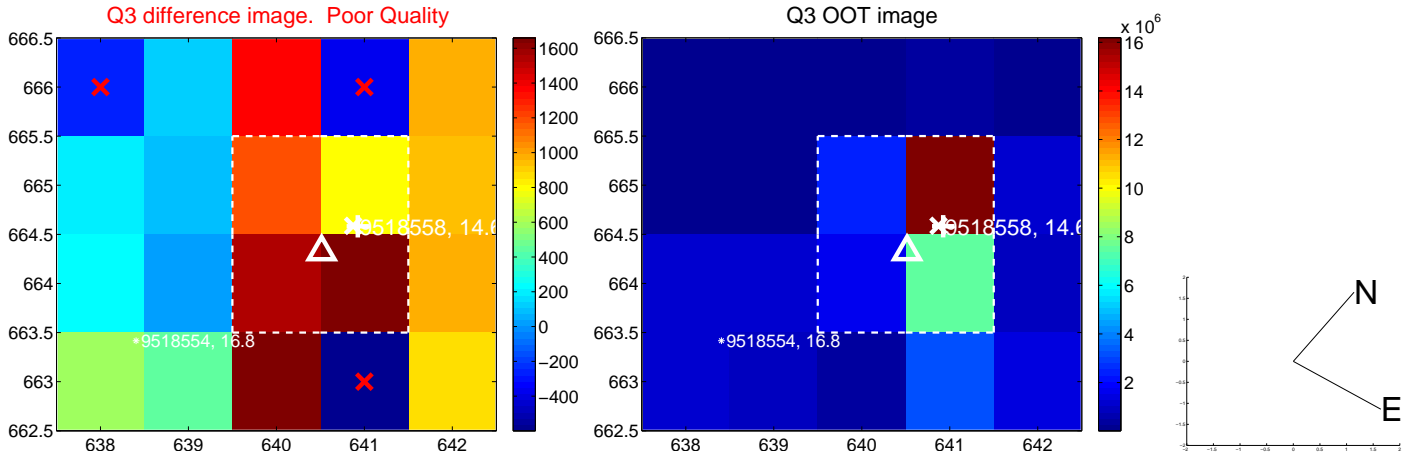
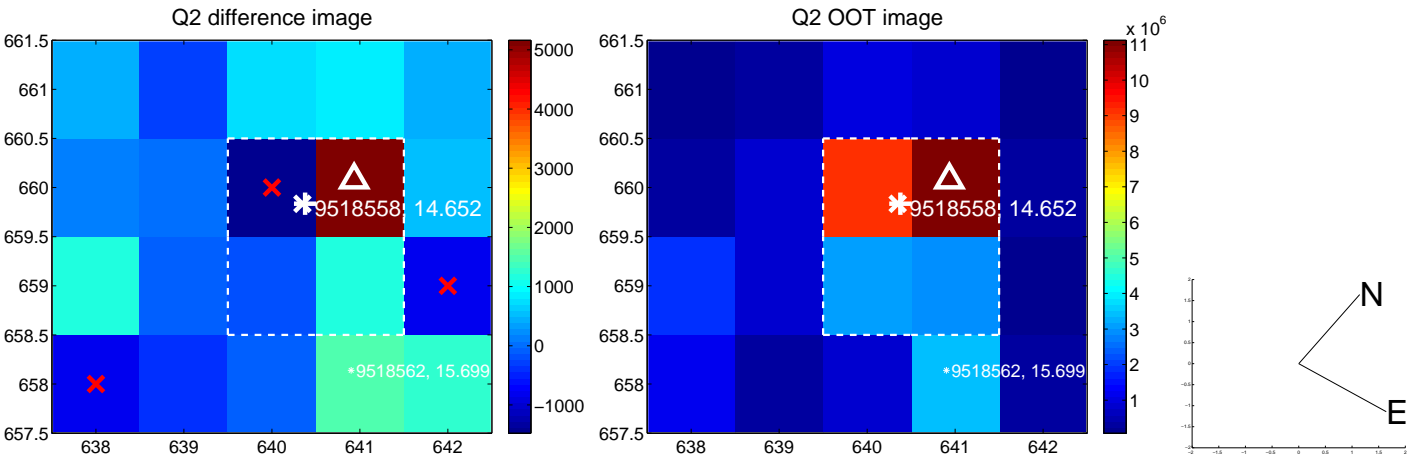
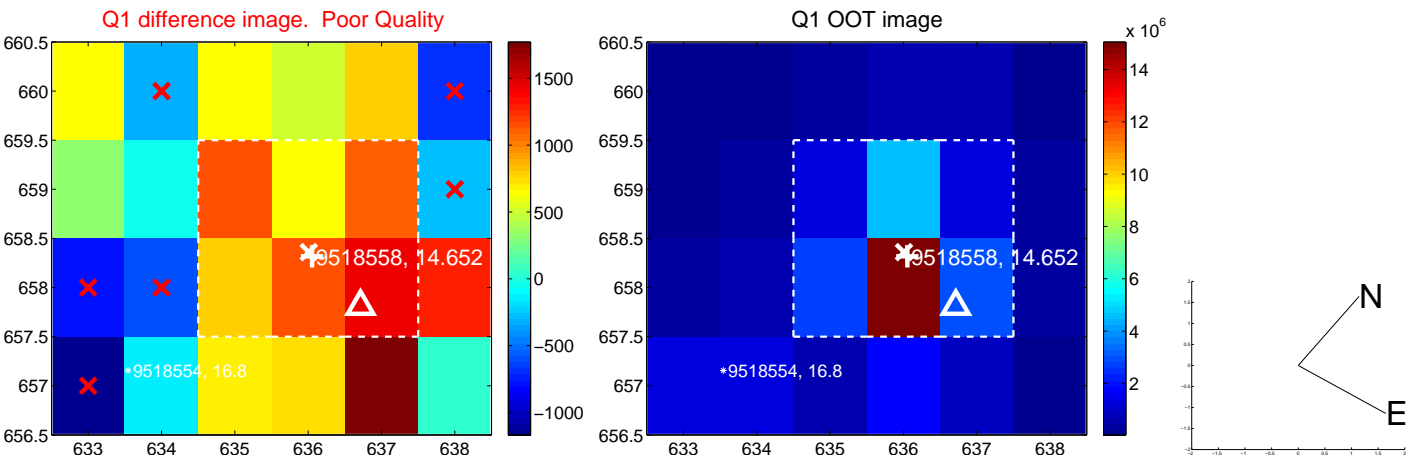
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.941 \pm 0.630$	1.49	$0.388 \pm 0.764$	$-0.858 \pm 0.512$
PRF-fit source offset from KIC position	$0.978 \pm 0.743$	1.32	$0.602 \pm 0.784$	$-0.771 \pm 0.529$
photometric centroid source offset	$3.52 \pm 0.89$	<b>3.98</b>	$2.21 \pm 0.87$	$2.74 \pm 0.90$

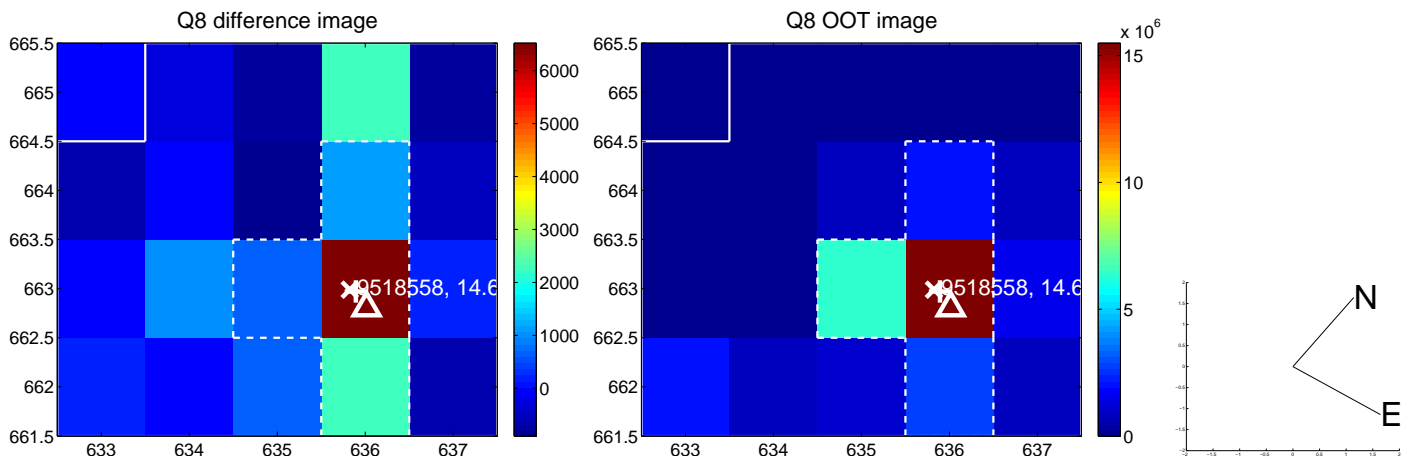
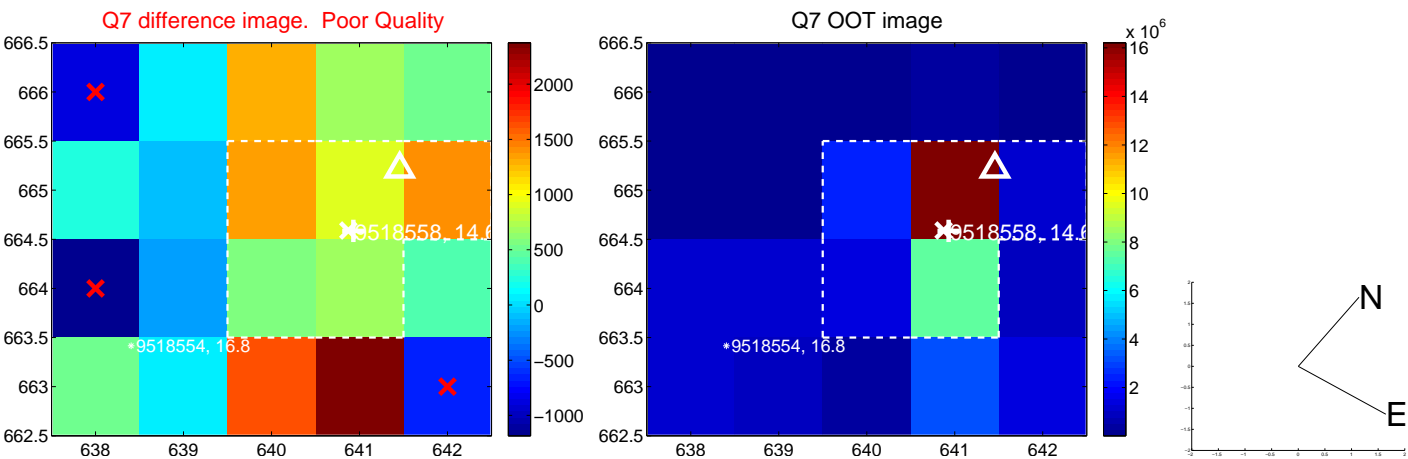
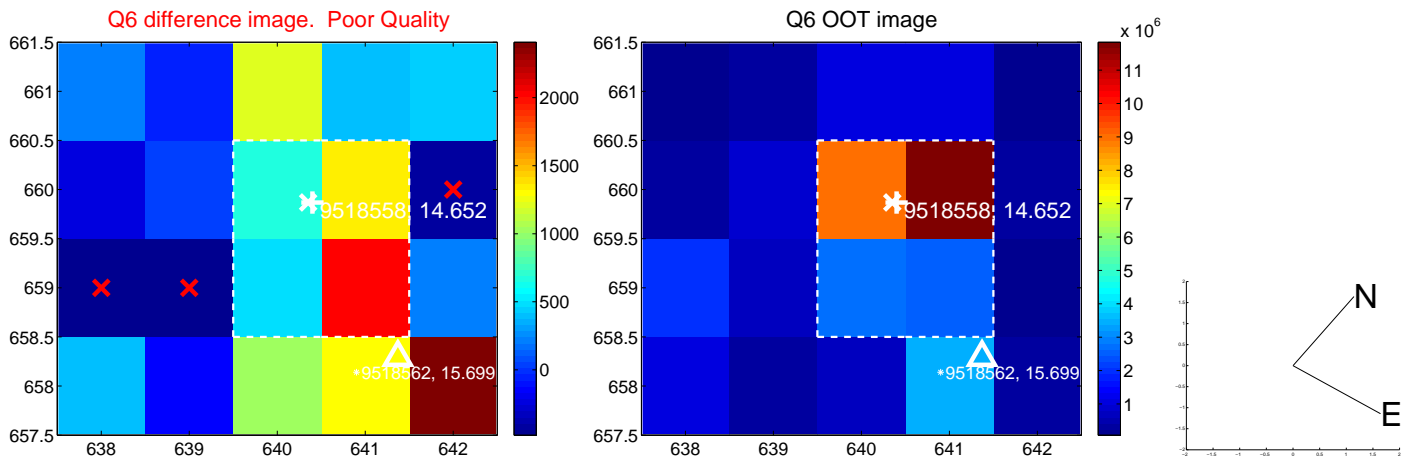
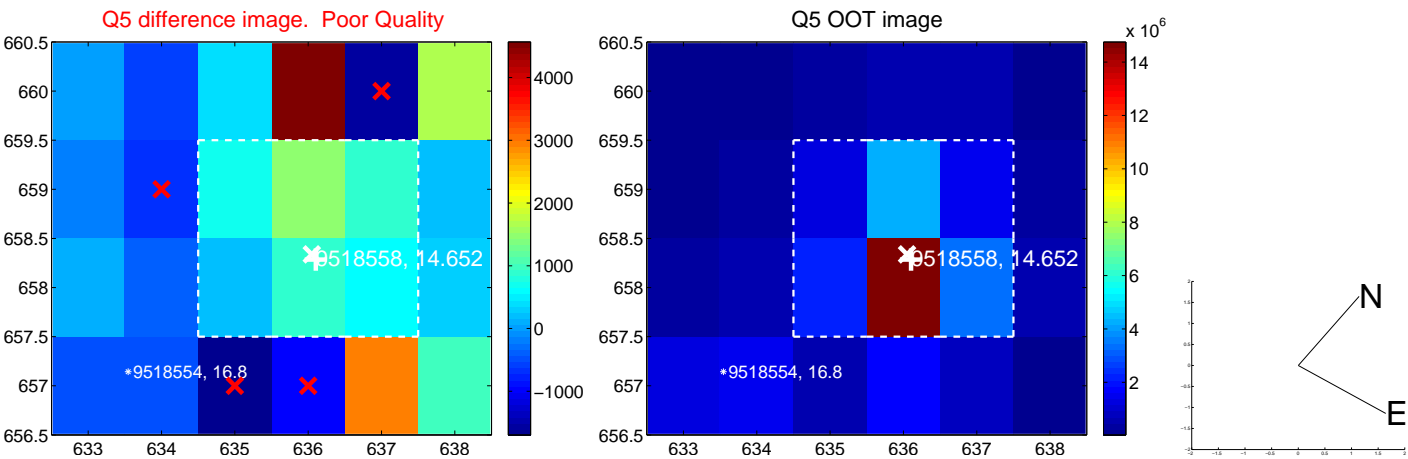


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

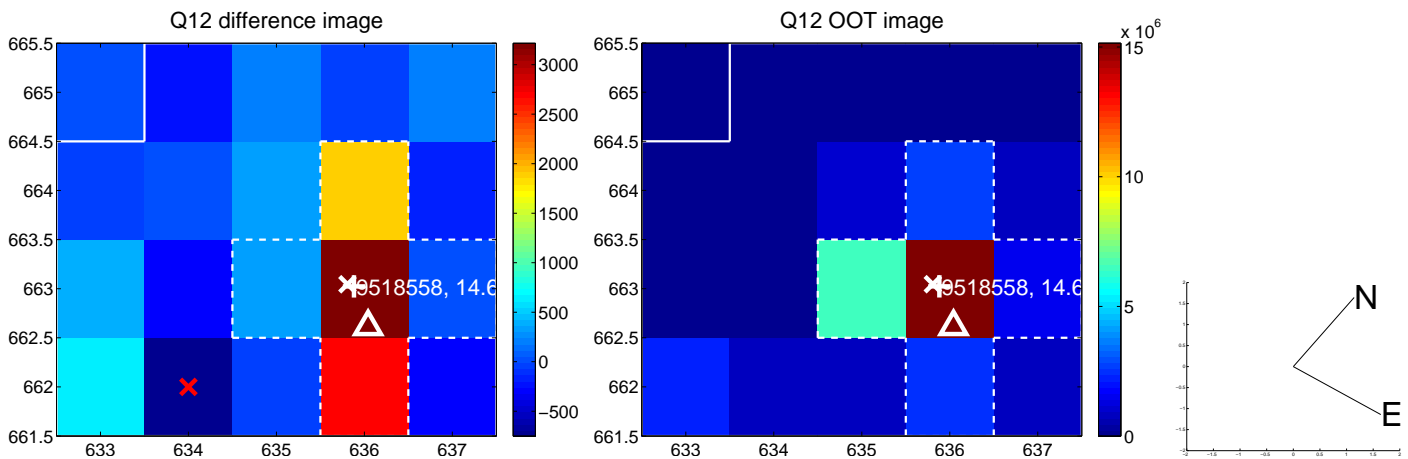
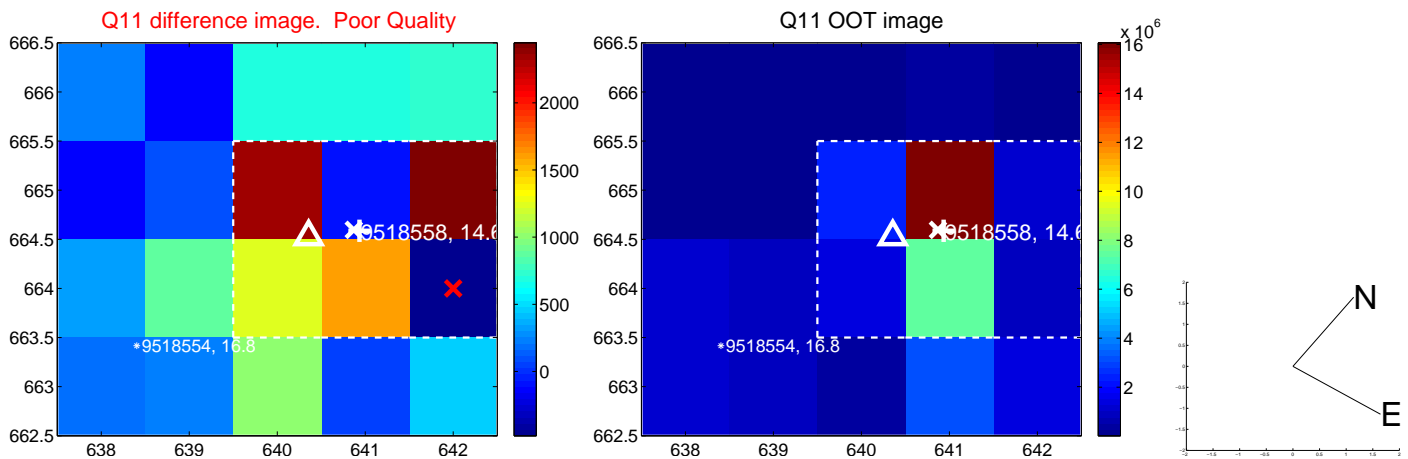
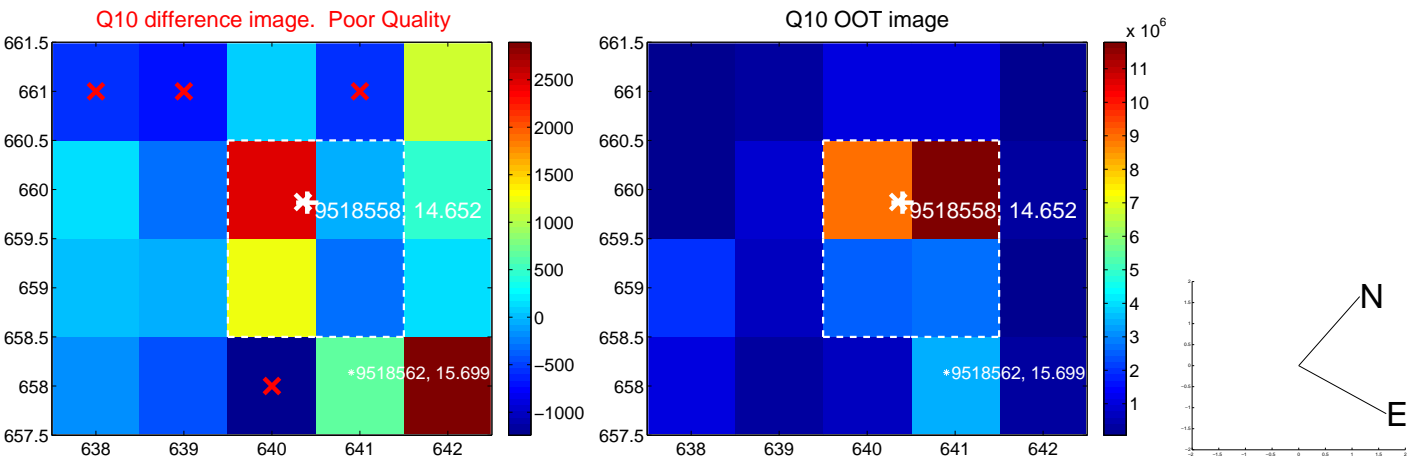
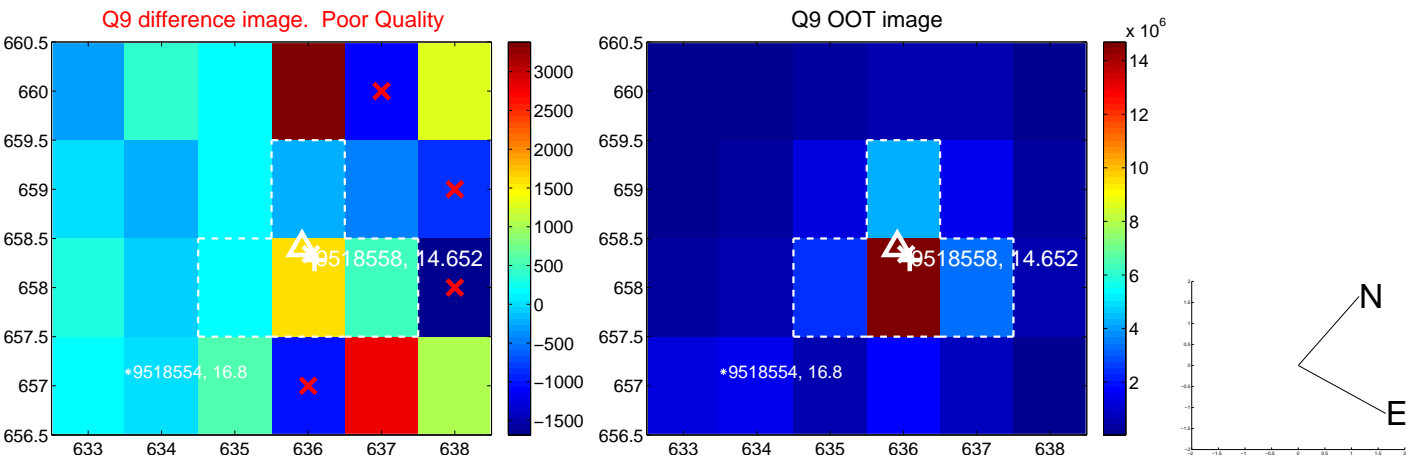


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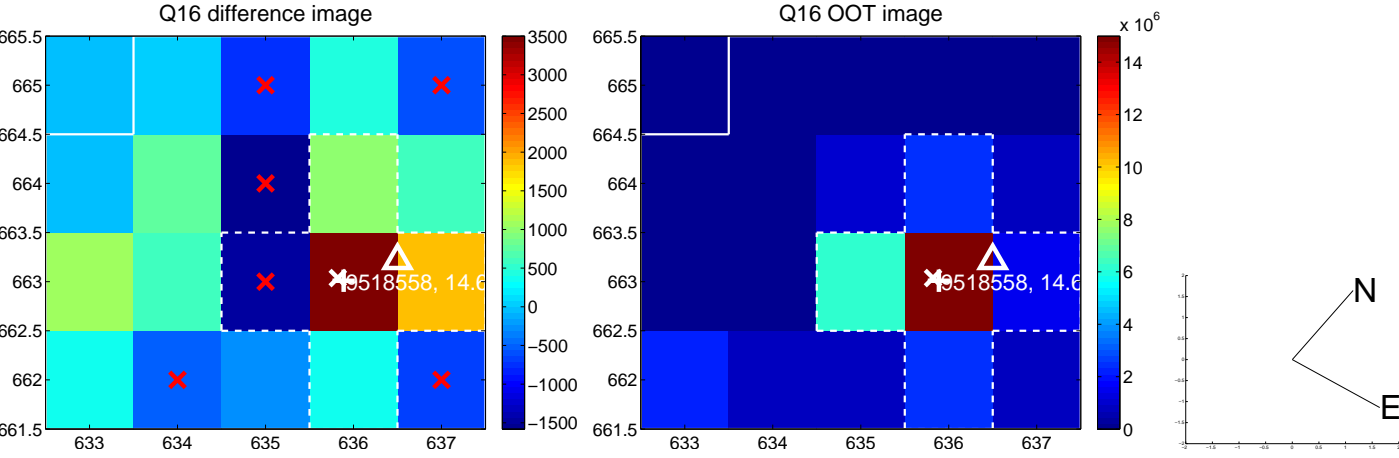
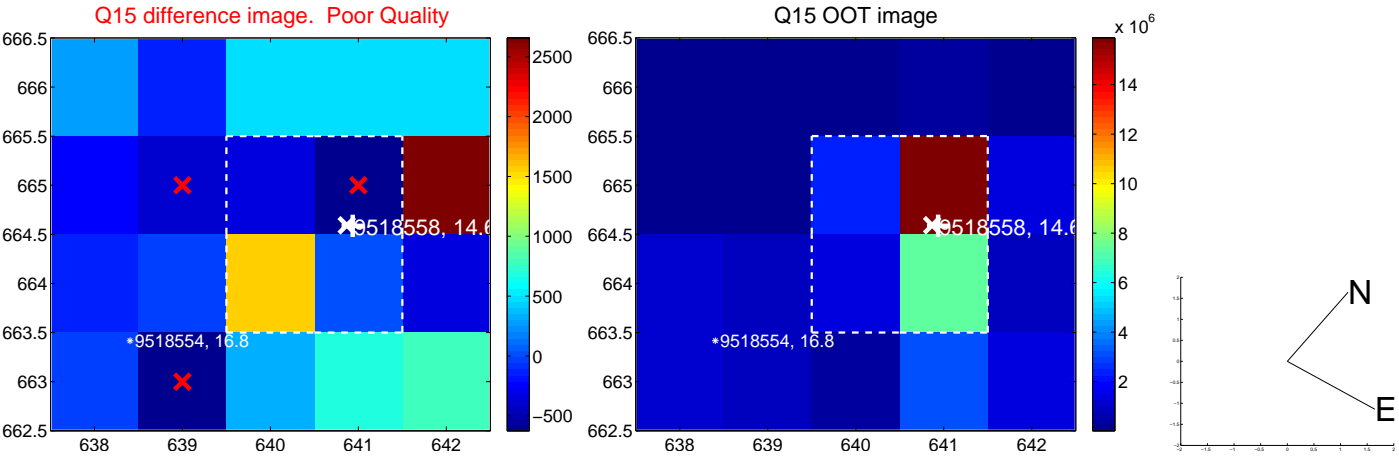
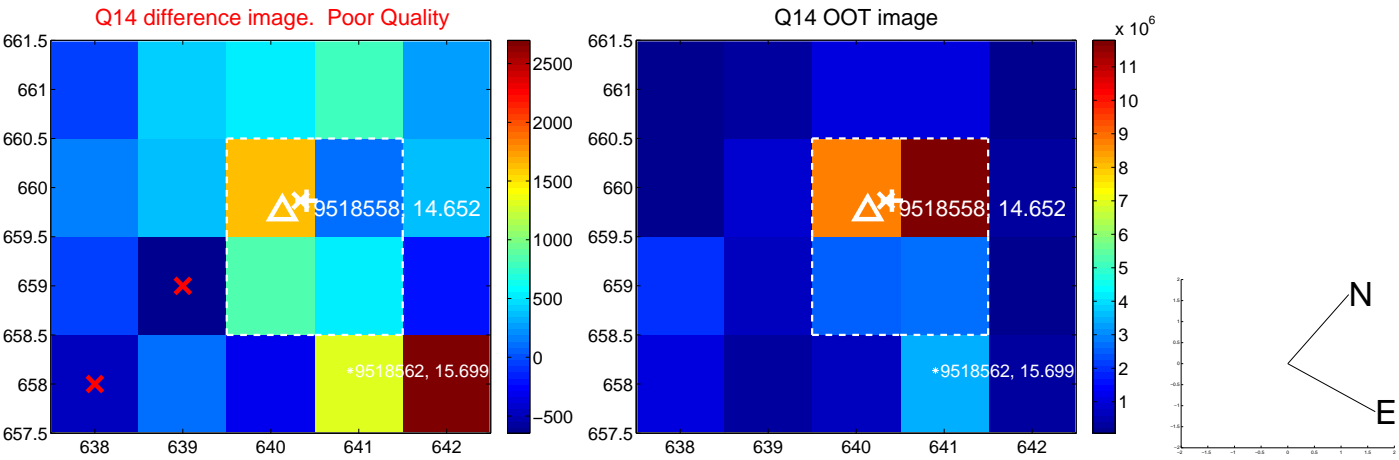
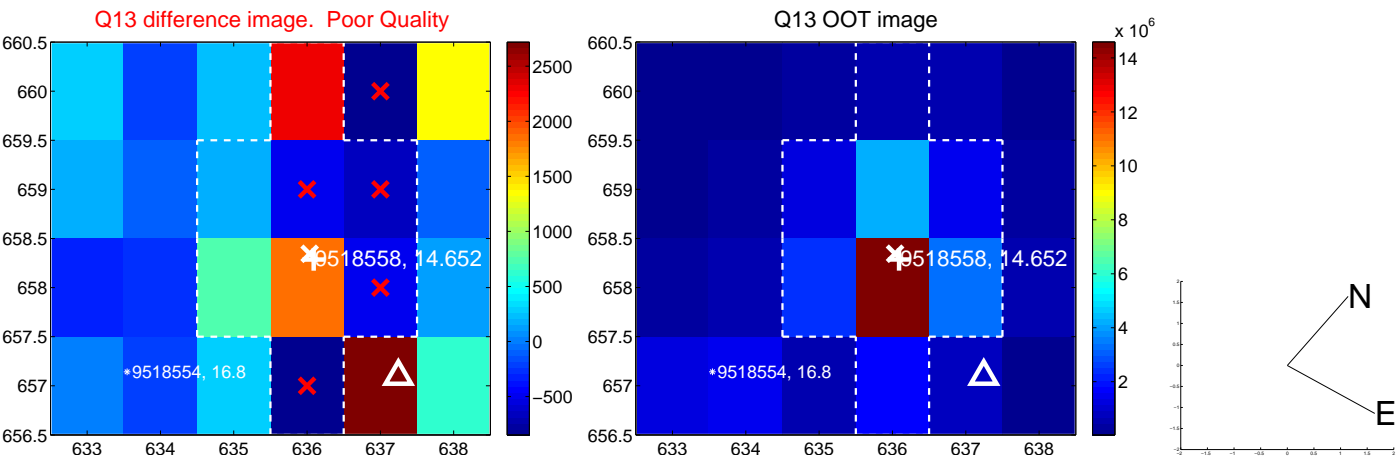




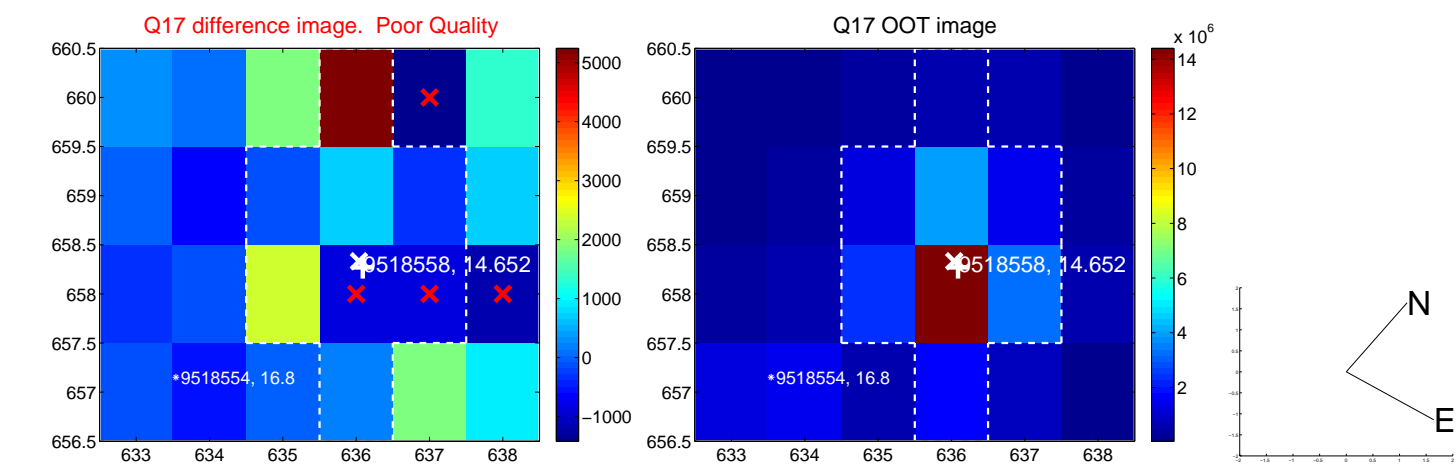
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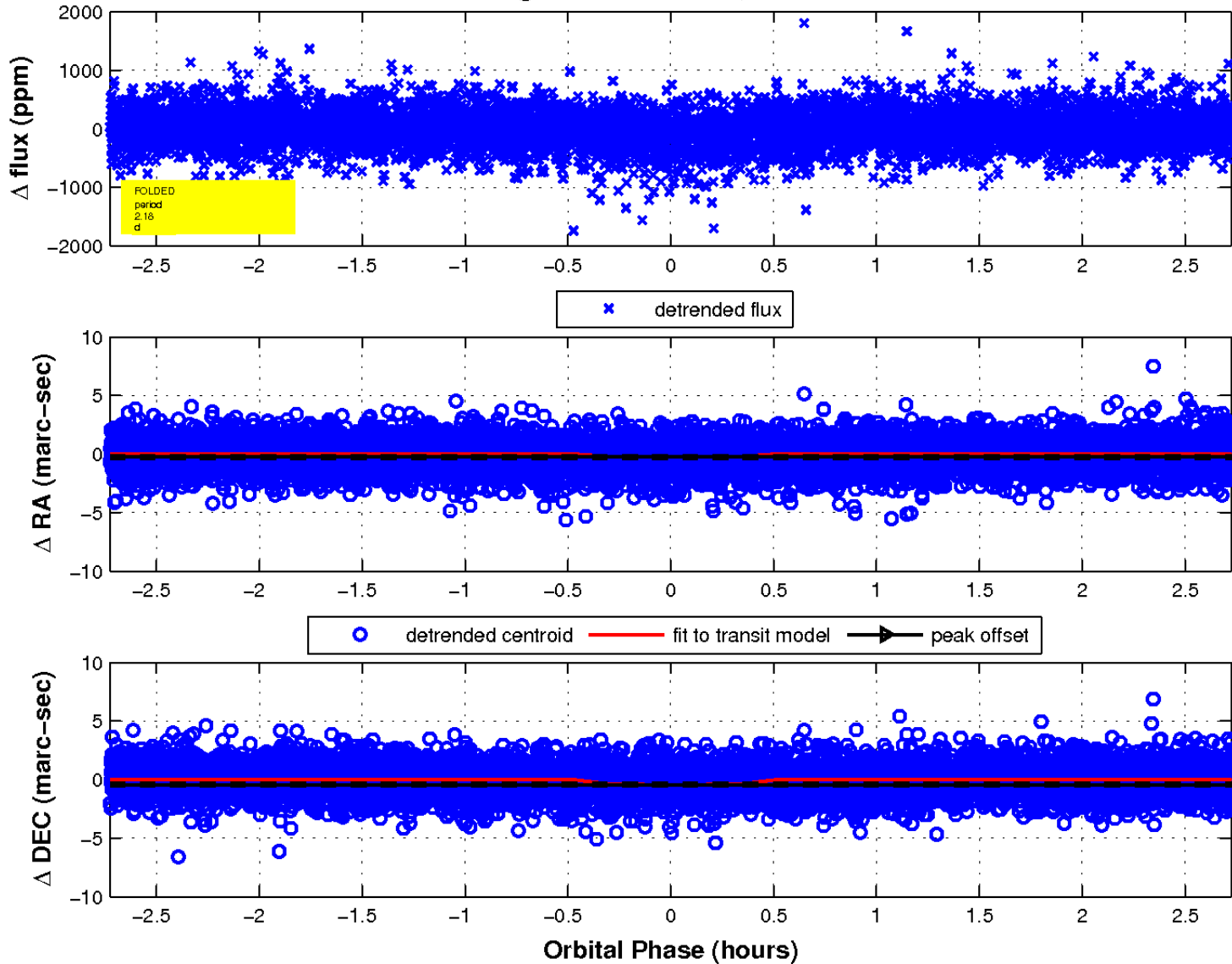
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

