

# KIC 009474493

## 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> )
009474493-01	OBS	2574.01	0.512569	131.789206	133.1	1.506	21.8	22.2	0.82	5547	1.14	3854.78

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009474493-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—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 009474493-01

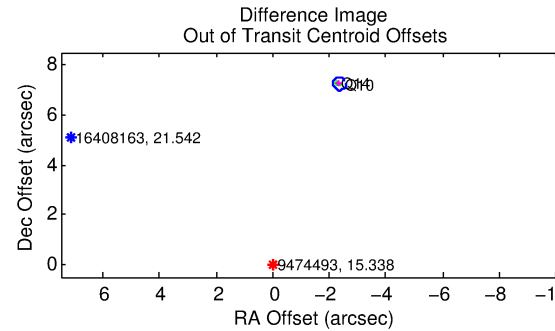
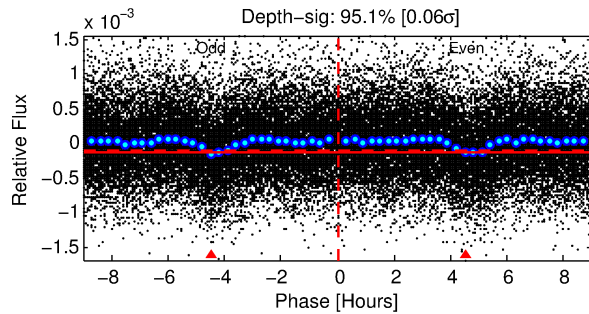
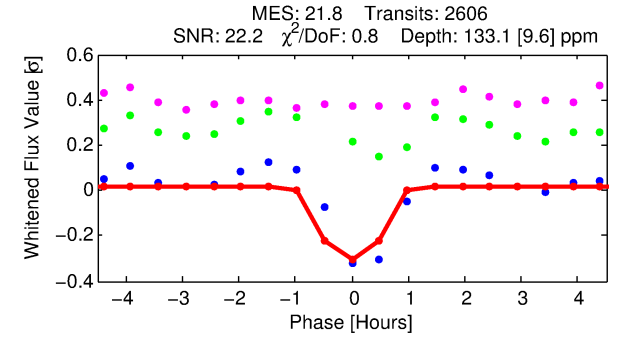
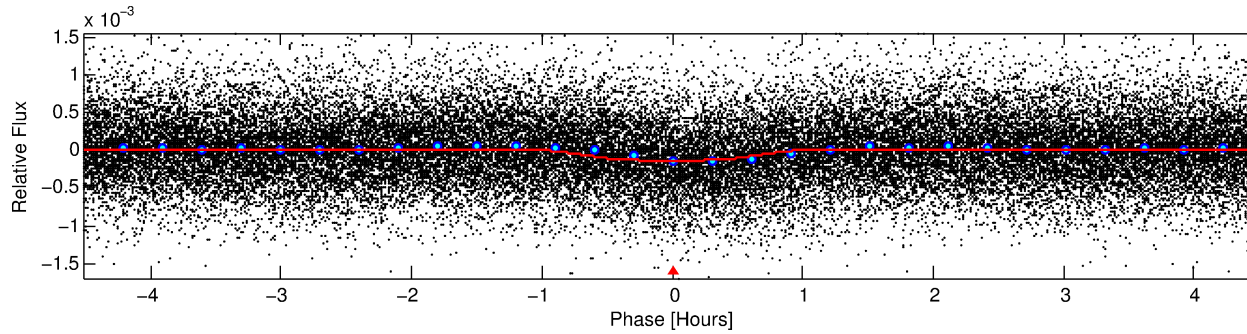
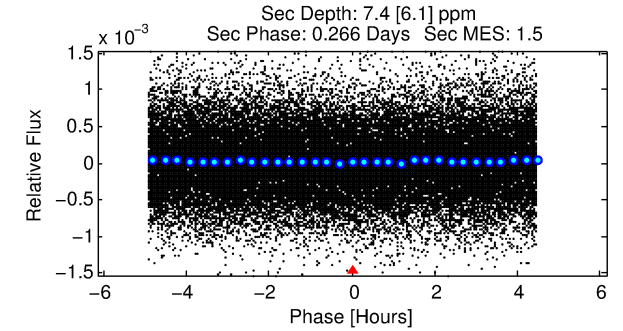
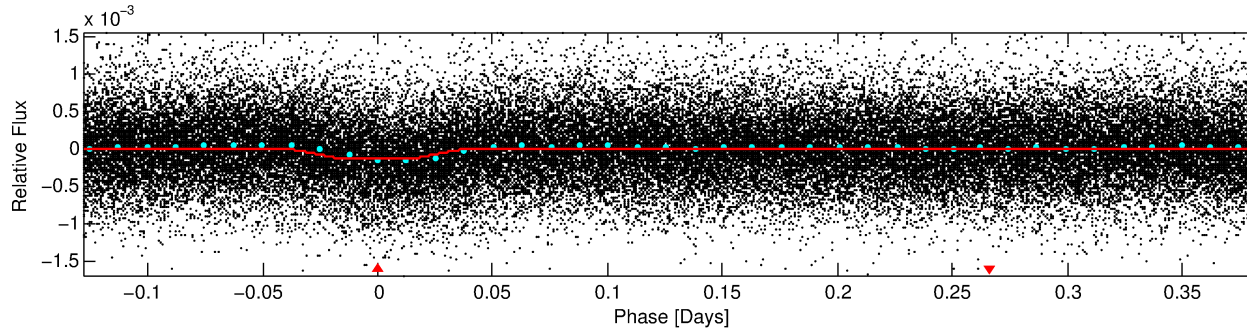
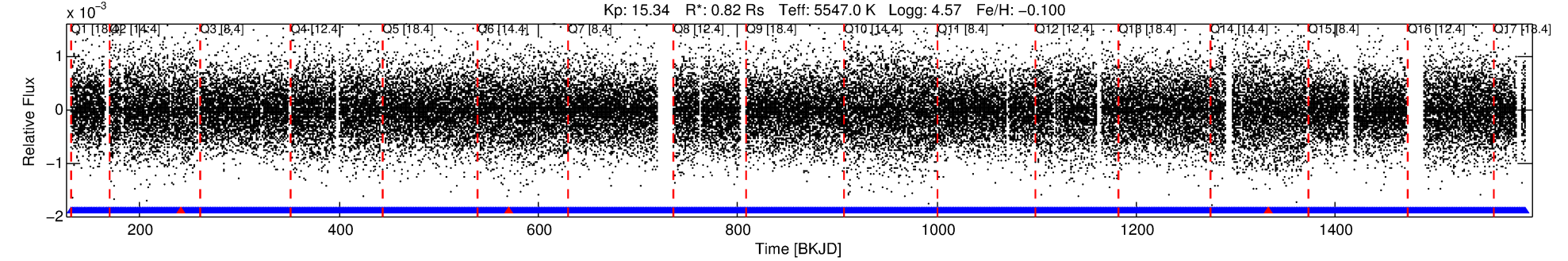
TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist (″)	ΔRow	ΔCol	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	σ <sub>P</sub>	σ <sub>T</sub>
009474493-01	9474493	5683.01	9474485	1:1	17.3	1	-4	14.88	15.33	3045.10	Direct-PRF	0	2.82	0.75

**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: 9474493 Candidate: 1 of 1 Period: 0.513 d  
KOI: K02574.01 Corr: 0.824

Kp: 15.34 R\*: 0.82 Rs Teff: 5547.0 K Logg: 4.57 Fe/H: -0.100



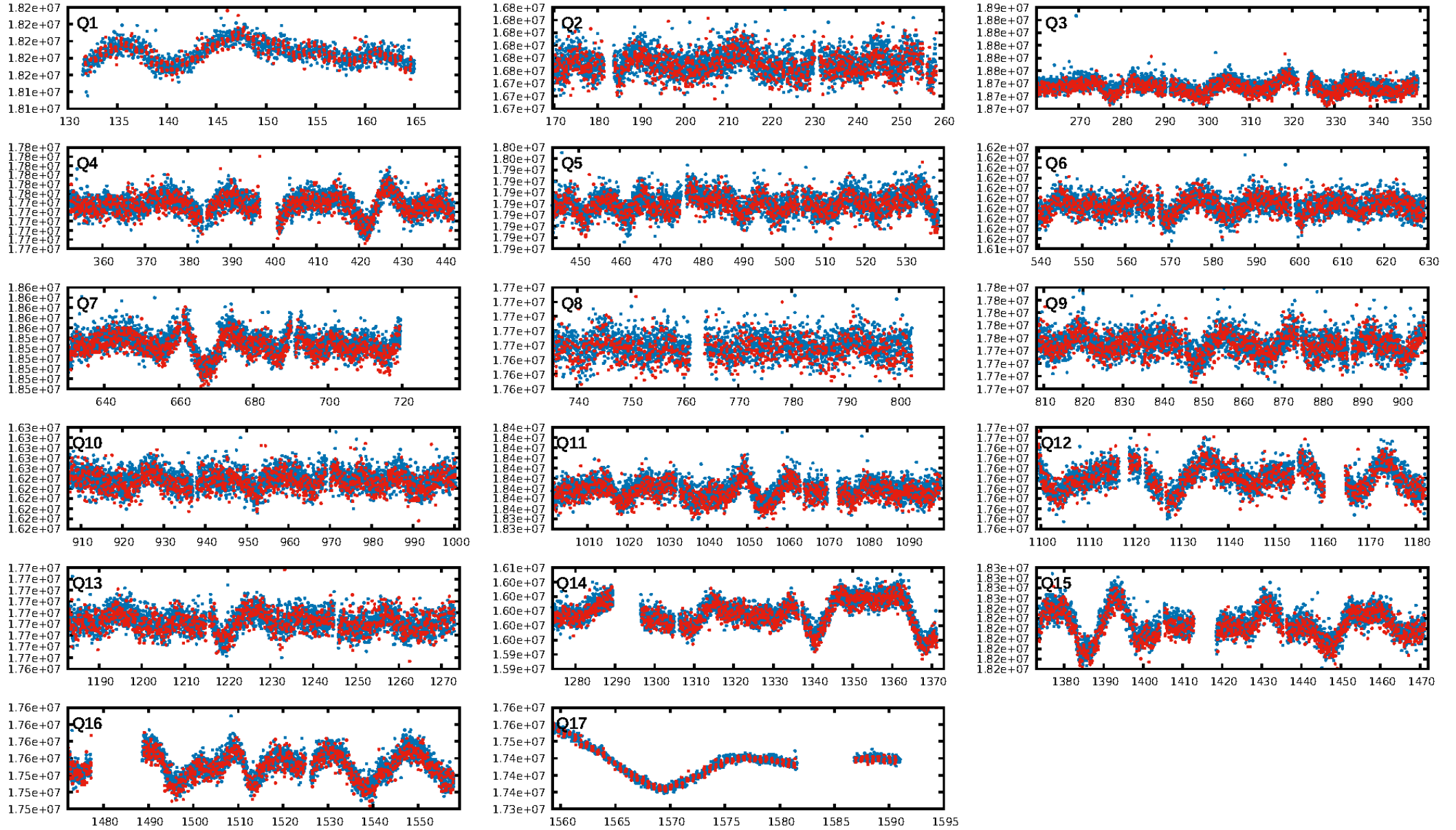
## DV Fit Results:

Period = 0.51257 [0.00001] d  
Epoch = 131.7892 [0.0010] BKJD  
Rp/R\* = 0.0127 [0.0052]  
a/R\* = 1.52 [1.63]  
b = 0.90 [0.40]  
Seff = 3854.78 [1079.25]  
Teff = 2009 [141] K  
Rp = 1.14 [0.53] Re  
a = 0.0122 [0.0022] AU  
Ag = 0.46 [0.55] [-0.97σ]  
Teffp = 2563 [752] K [0.72σ]

## DV Diagnostic Results:

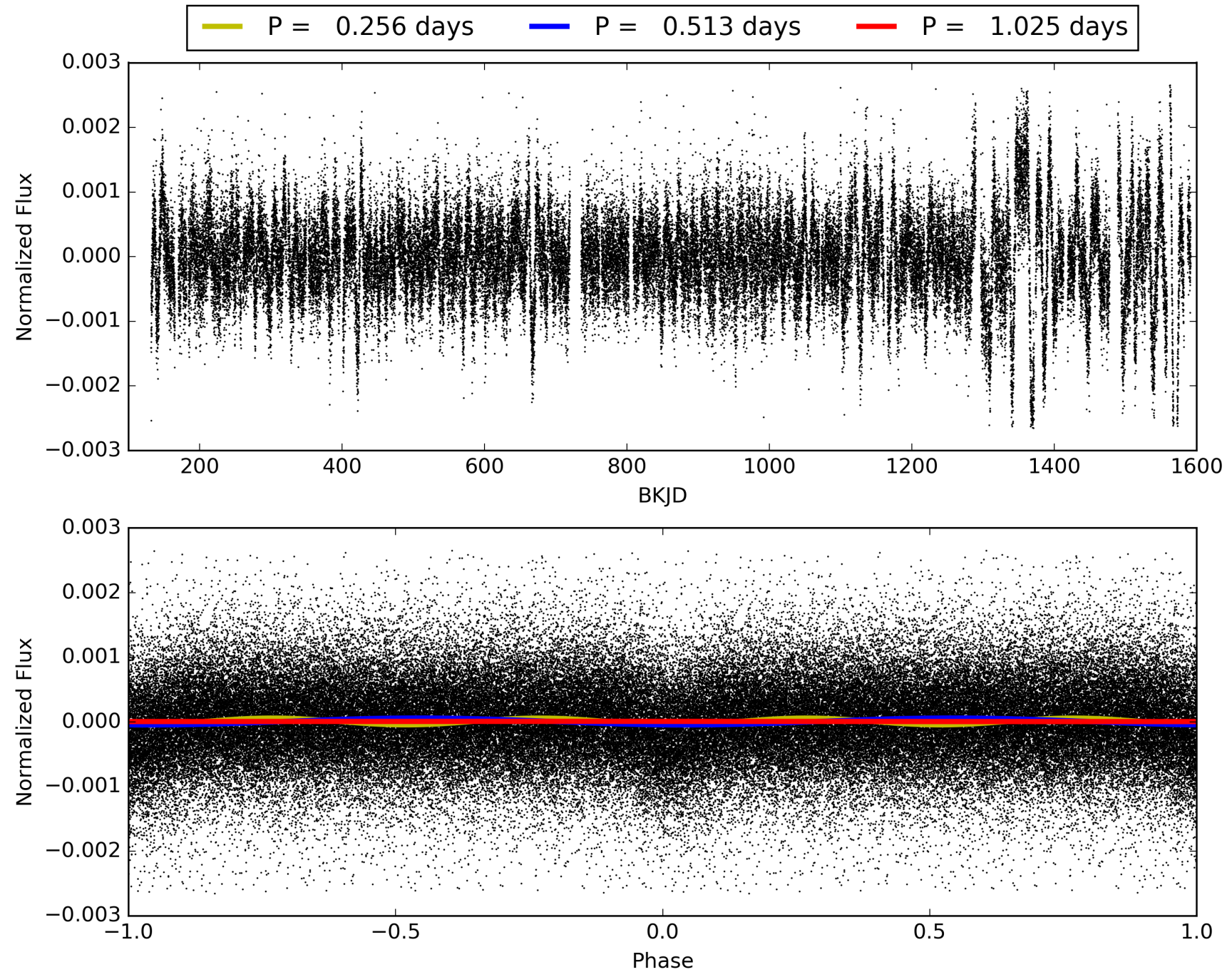
ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.01e-92  
RollingBand-fgt: 1.00 [2486/2489]  
GhostDiagnostic-chr: -0.7733  
Centroid-sig: 0.0%  
Centroid-so: 8.148 arcsec [15.43σ]  
OotOffset-rm: 7.611 arcsec [92.27σ]  
KicOffset-rm: 7.651 arcsec [92.80σ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-st: 2/0/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009474493-01, PDC Light Curves



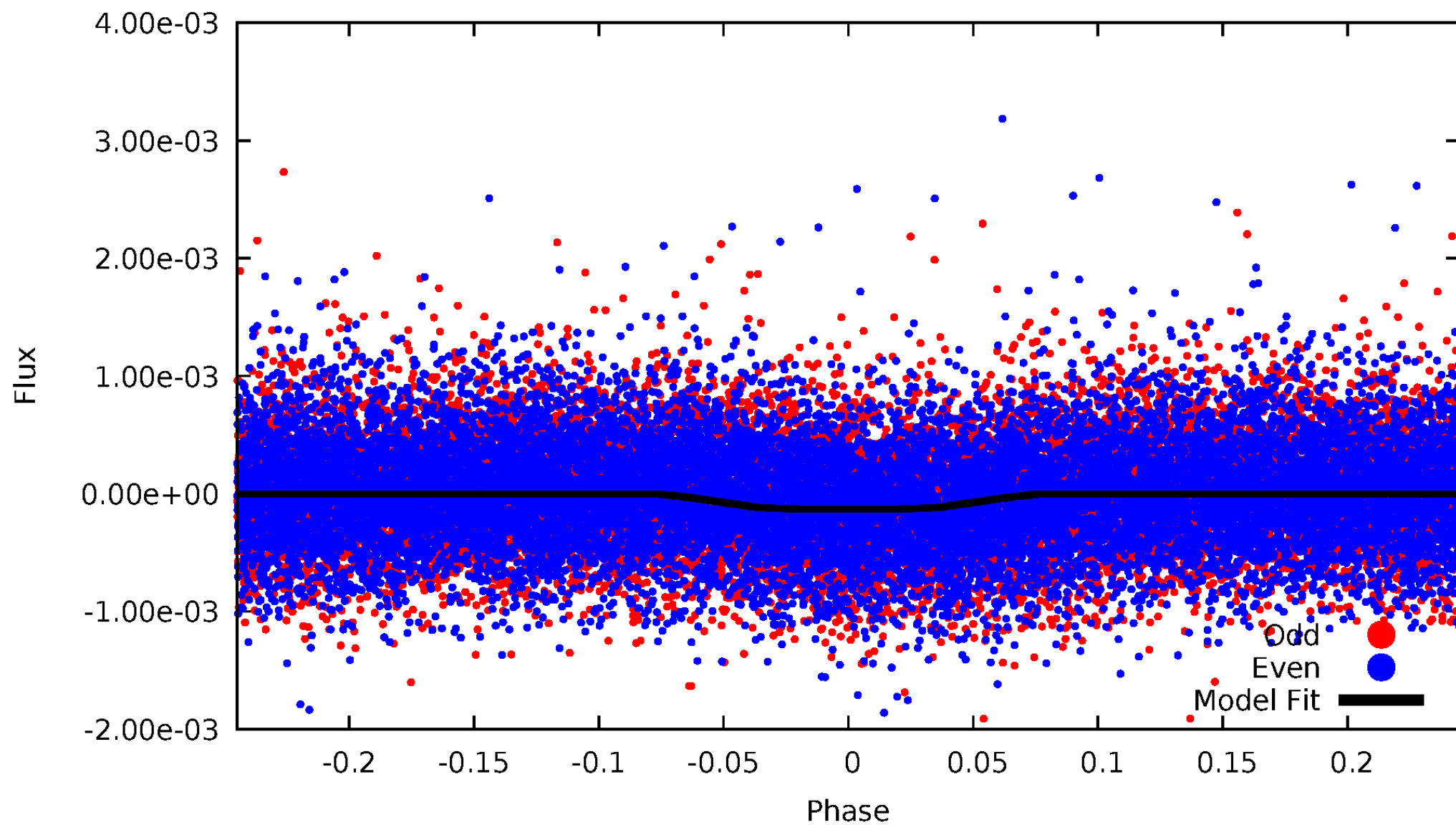


TCE 009474493-01



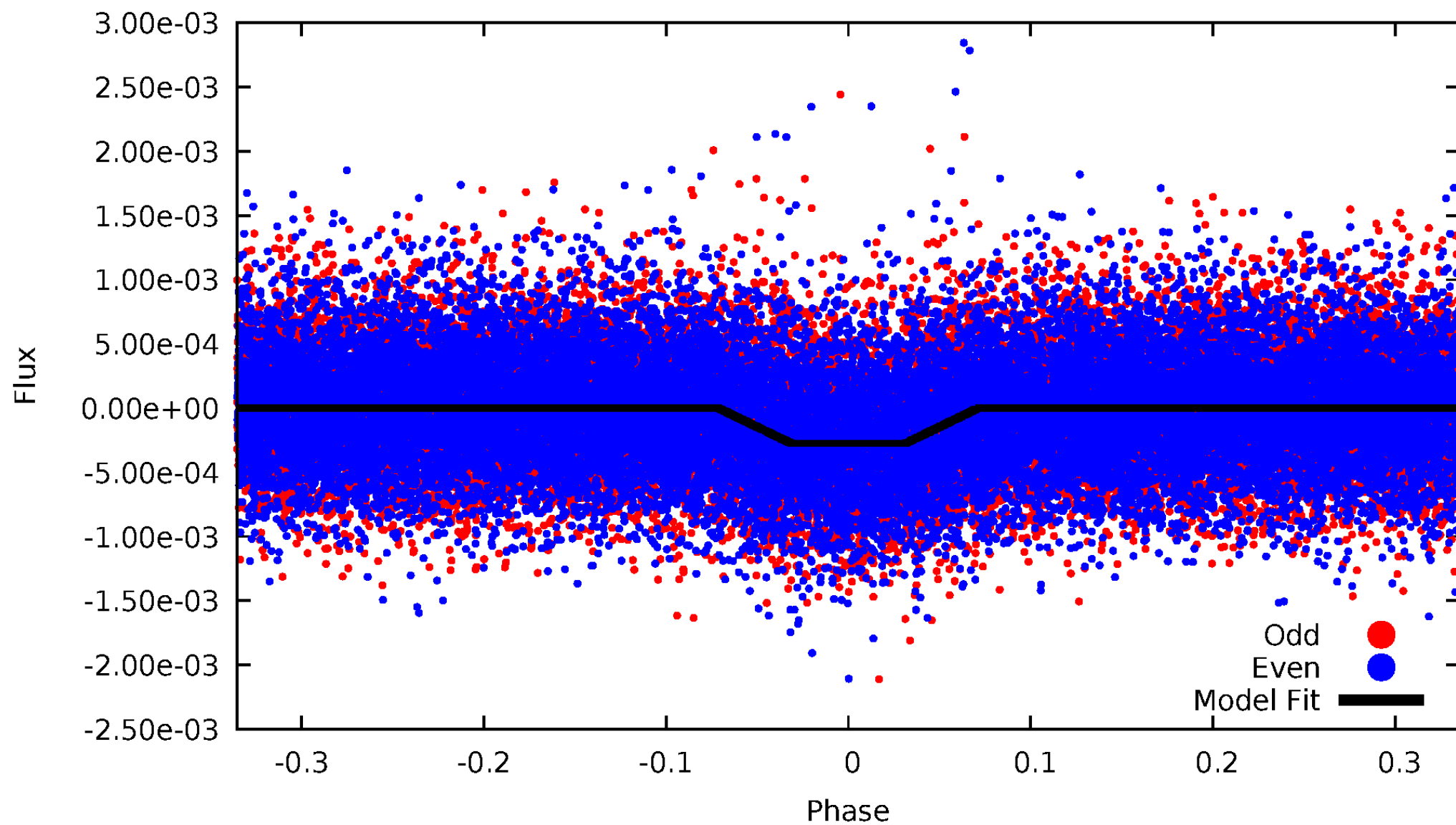
# DV Odd/Even

TCE 009474493-01



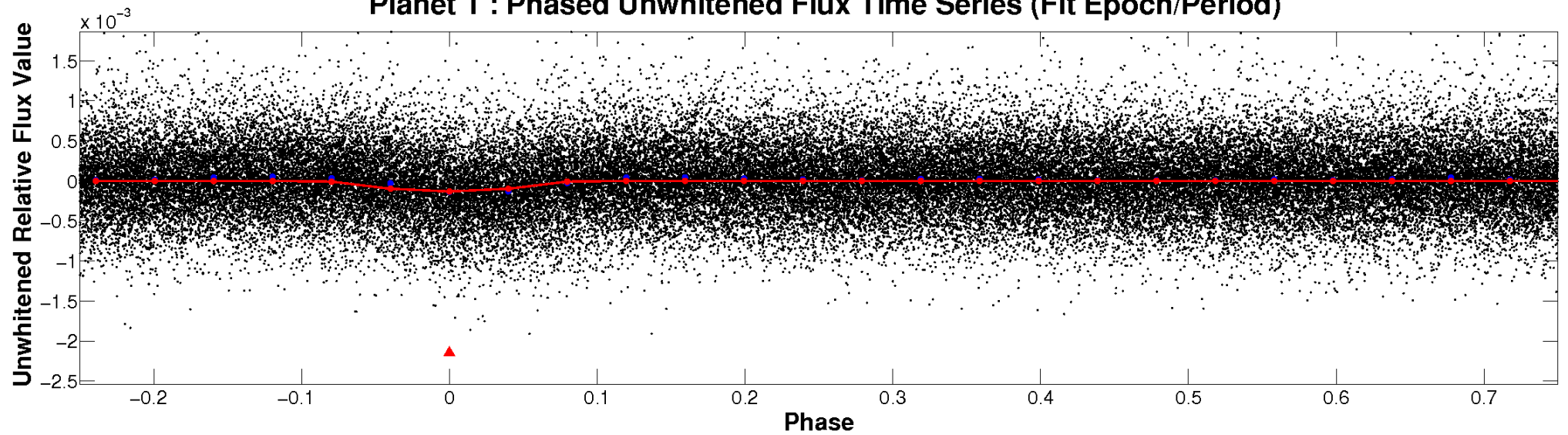
# ALT Odd/Even

TCE 009474493-01

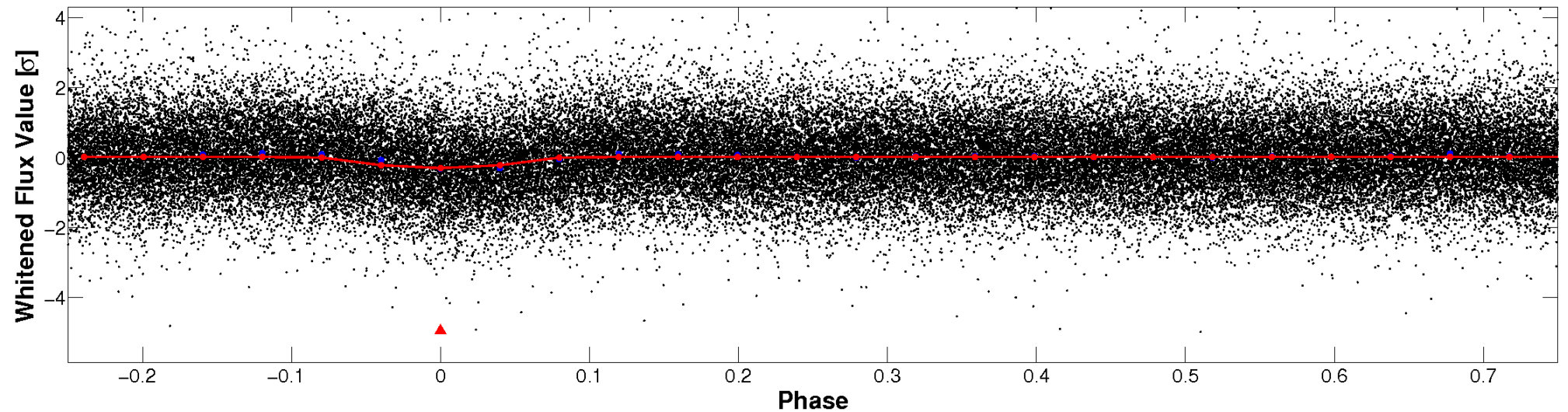


# Non-Whitened Vs. Whitened Light Curve

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



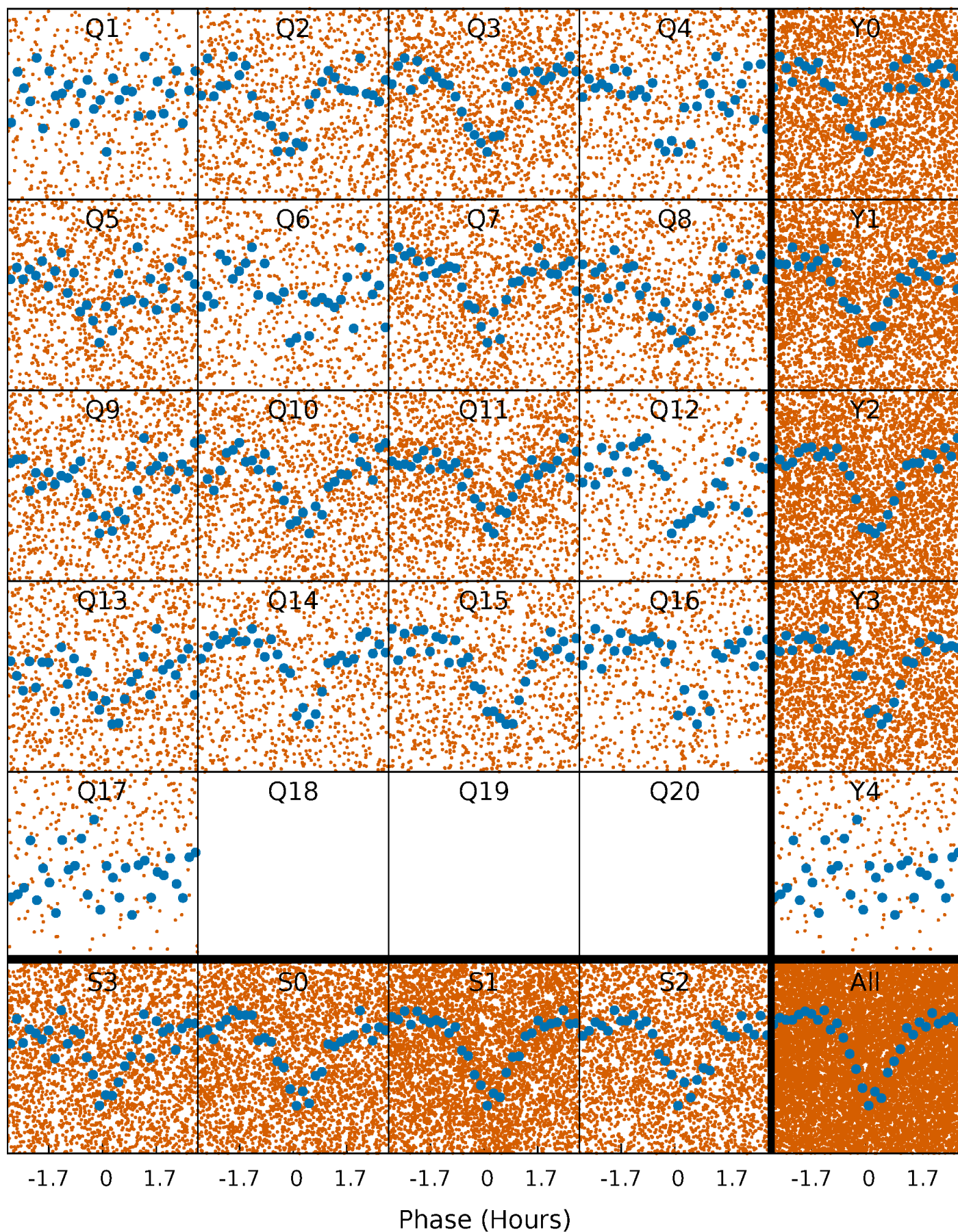
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

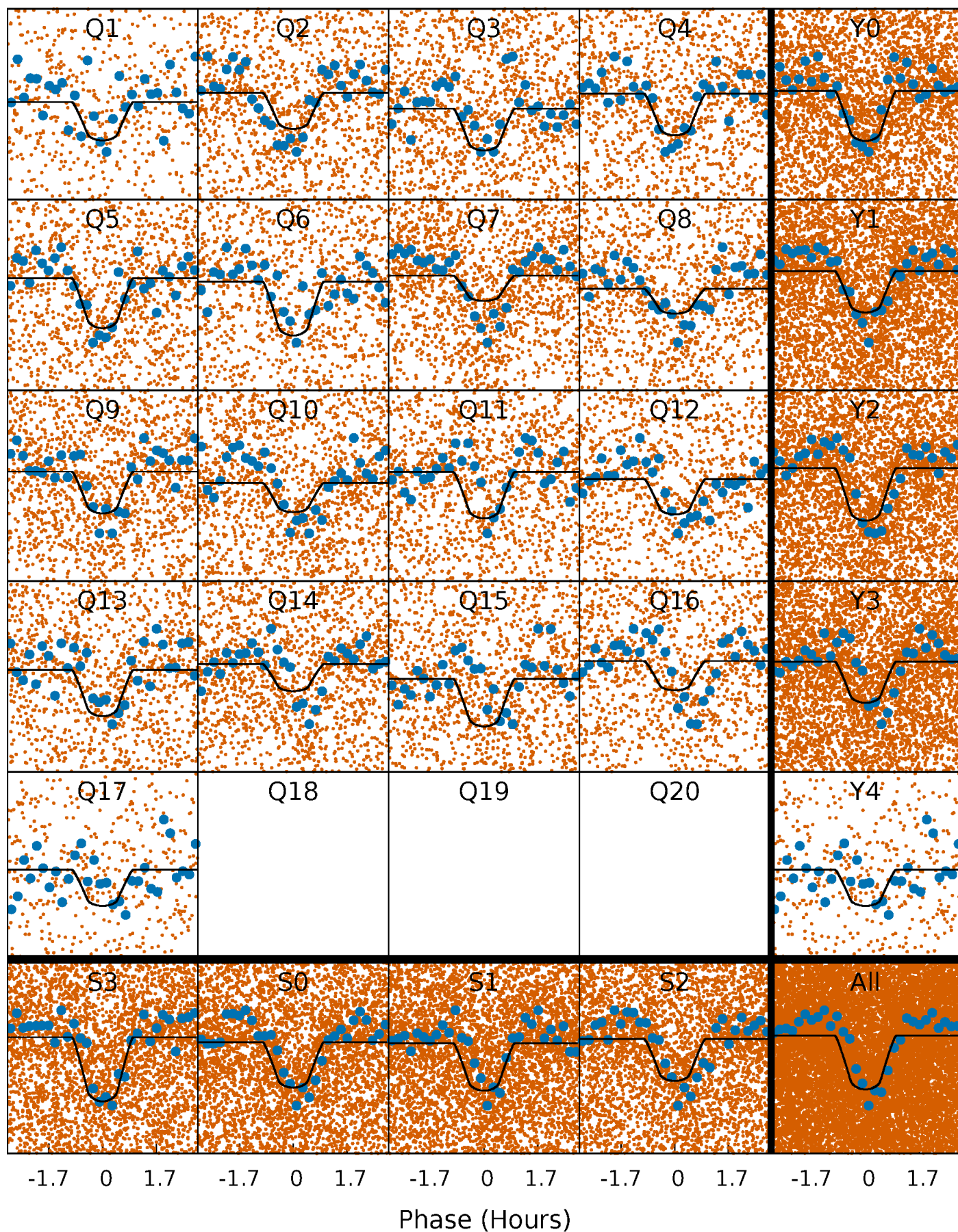
TCE 009474493-01 P= 0.512569 Days  $T_0=131.789206$  (BKJD)





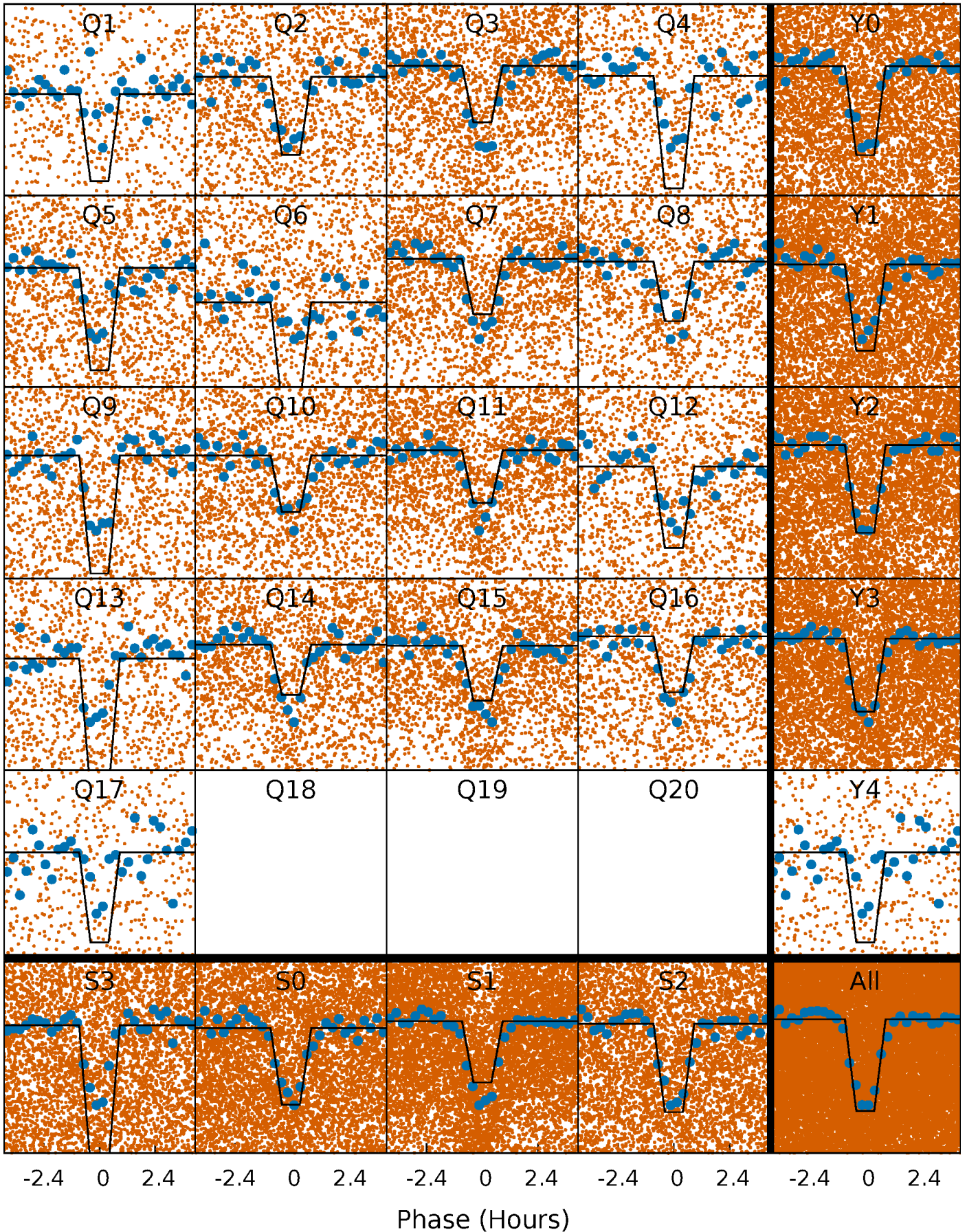
# DV Quarter-Phased Transit Curves

TCE 009474493-01 P= 0.512569 Days  $T_0=131.789206$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009474493-01   P= 0.512581 Days    $T_0=131.782531$  (BKJD)

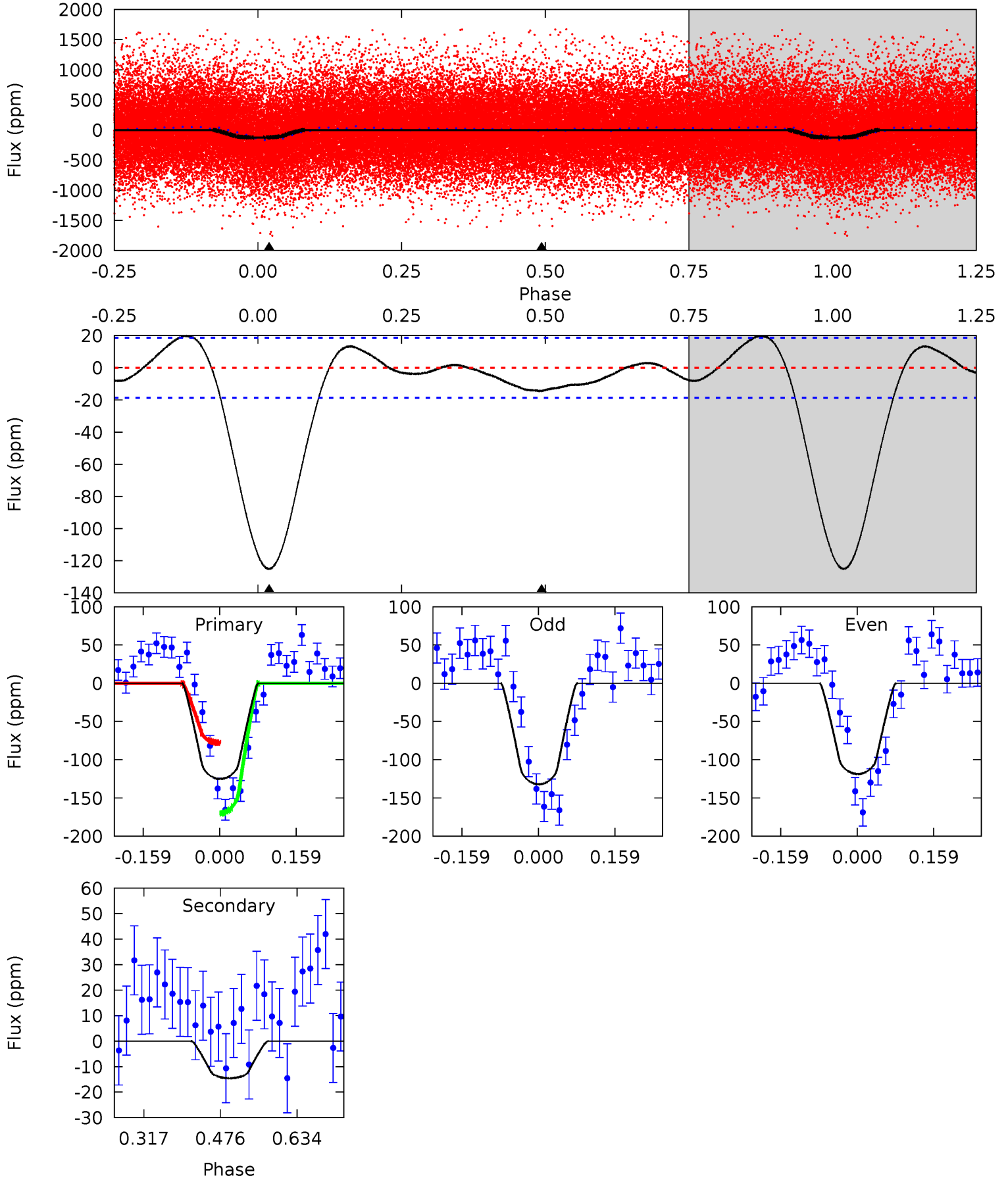




# DV Model-Shift Uniqueness Test

009474493-01, P = 0.512569 Days, E = 131.276637 Days

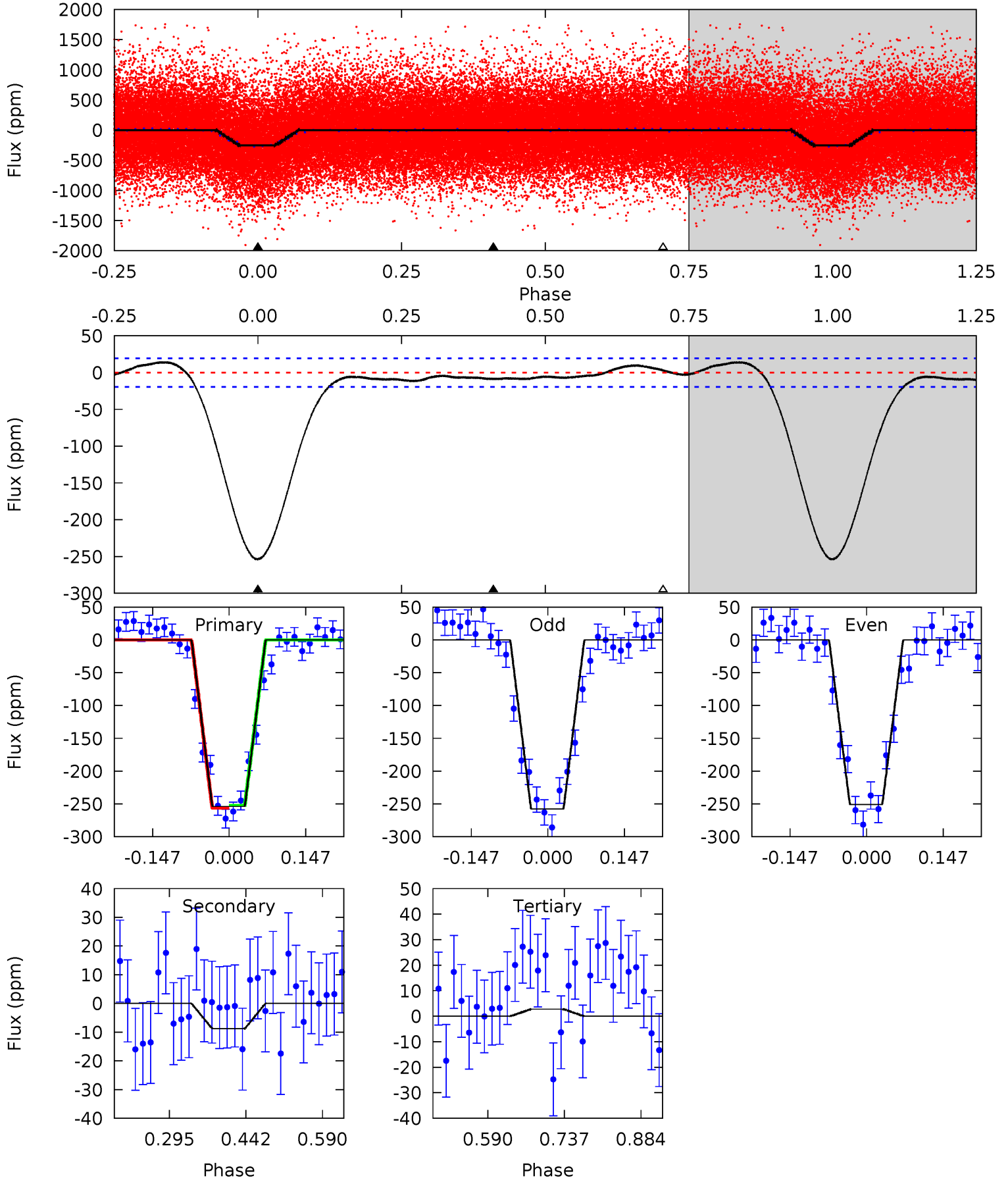
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.9	3.48	0	0	4.47	1.41	1.44	29.9	29.9	3.48	3.48	1.61	1.02	0.14	11.1



# Alt Model-Shift Uniqueness Test

009474493-01, P = 0.512581 Days, E = 131.269950 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
58.5	2.03	-0.63	0	4.48	1.45	1.73	59.1	58.5	2.66	2.03	0.82	0.98	0.05	0.55





### Stellar Parameters For KIC 009474493

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5547^{+149}_{-166}$	$4.571^{+0.034}_{-0.136}$	$-0.100^{+0.300}_{-0.300}$	$0.820^{+0.176}_{-0.070}$	$0.918^{+0.083}_{-0.111}$	$2.348^{+0.434}_{-0.940}$
	+3%/-3%	+1%/-3%	+300%/-300%	+21%/-9%	+9%/-12%	+18%/-40%
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 009474493-01 / KOI 2574.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-15 \pm 4$	$1.20^{+0.49}_{-0.49}$	$2855^{+155}_{-109}$	$3228^{+814}_{-743}$	$0.788^{+1.398}_{-0.418}$
Alt.	$-9 \pm 4$	$1.50^{+0.57}_{-0.49}$	$2859^{+129}_{-115}$	$-1943^{+5114}_{-873}$	$0.291^{+0.455}_{-0.175}$

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

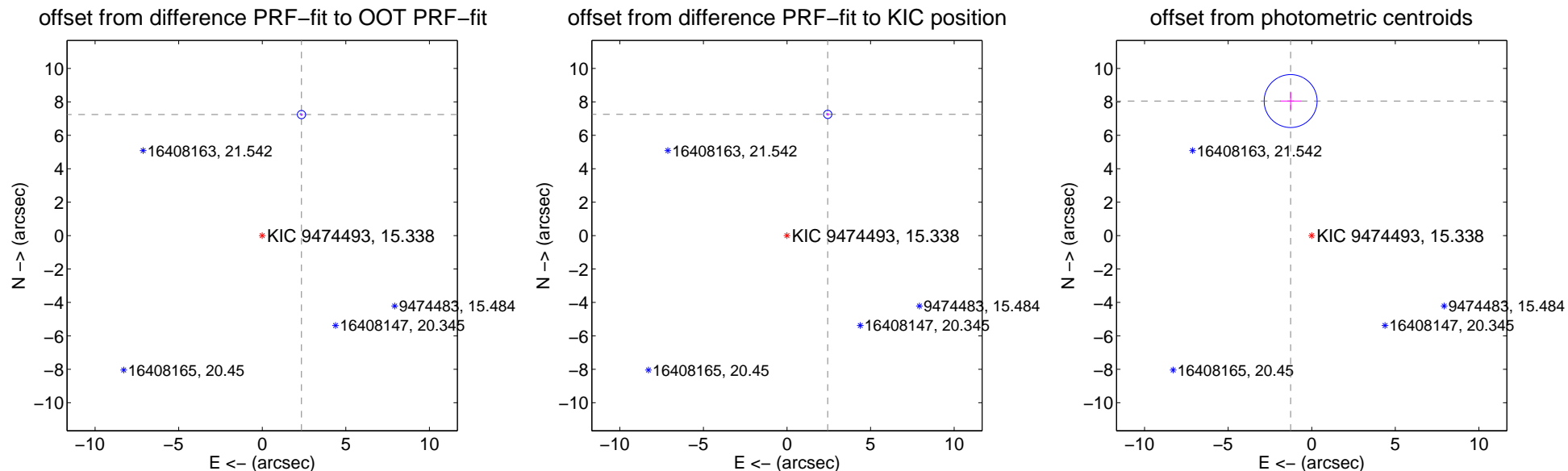
## DV Centroid Data

Supplemental centroid analysis for 009474493-01. Kepler magnitude: 15.34. Transit SNR 22.18

There are 2 quarters with good PRF difference image offsets

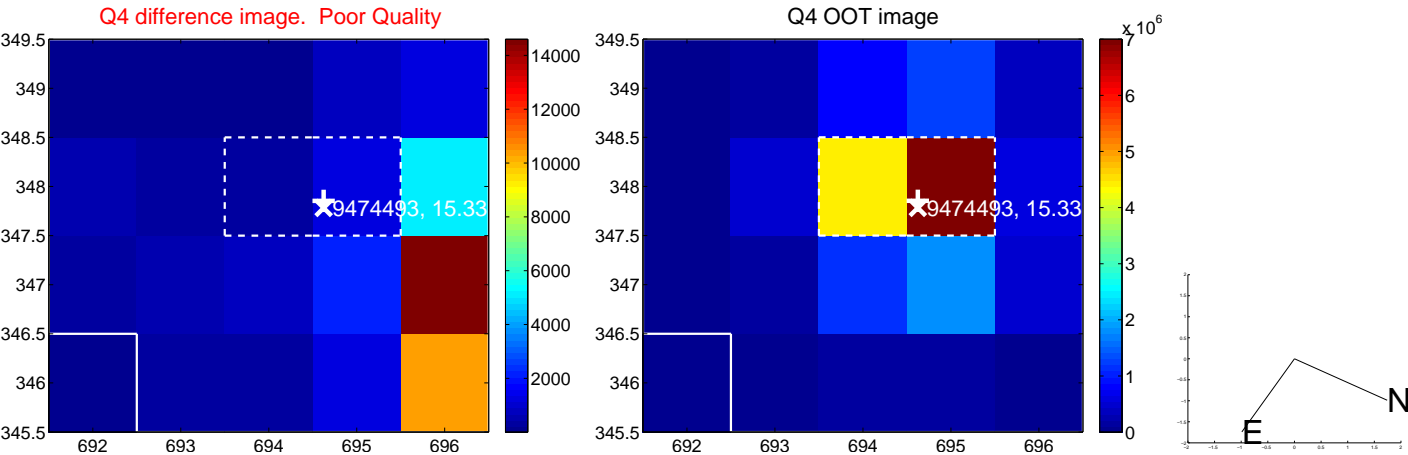
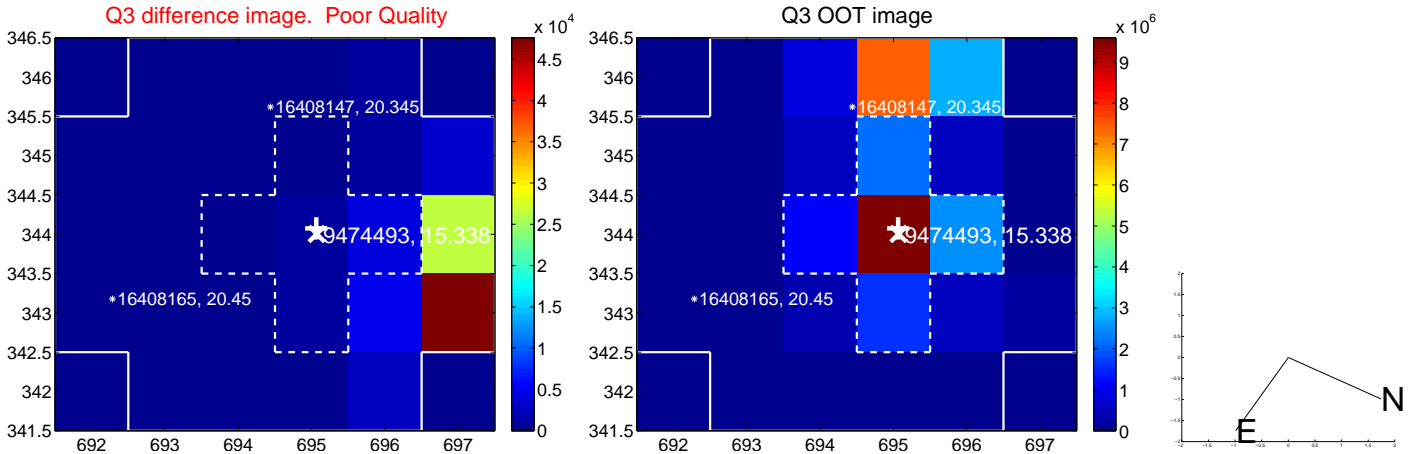
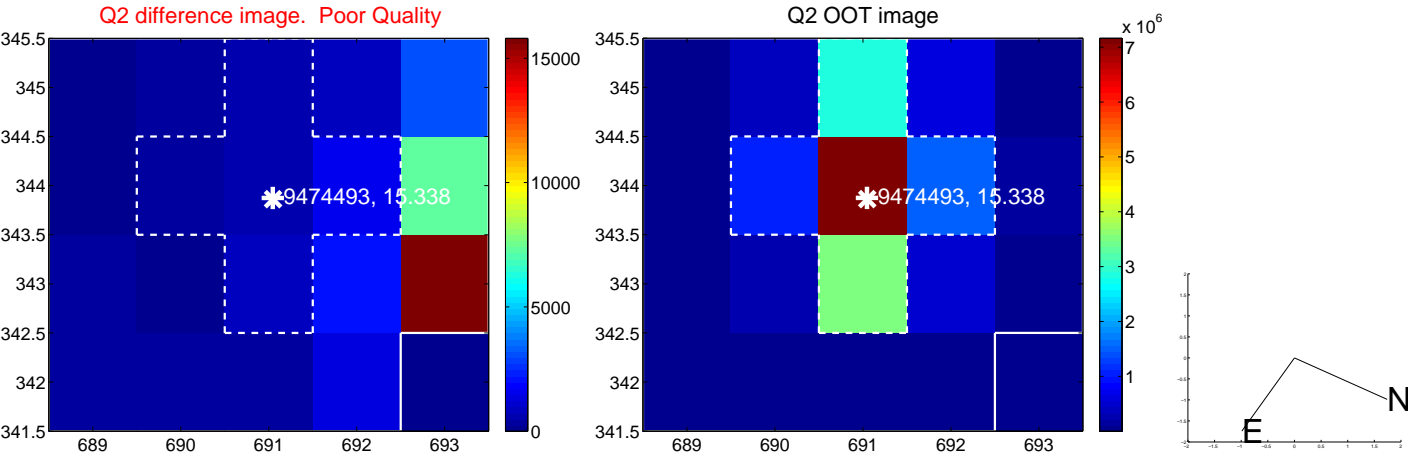
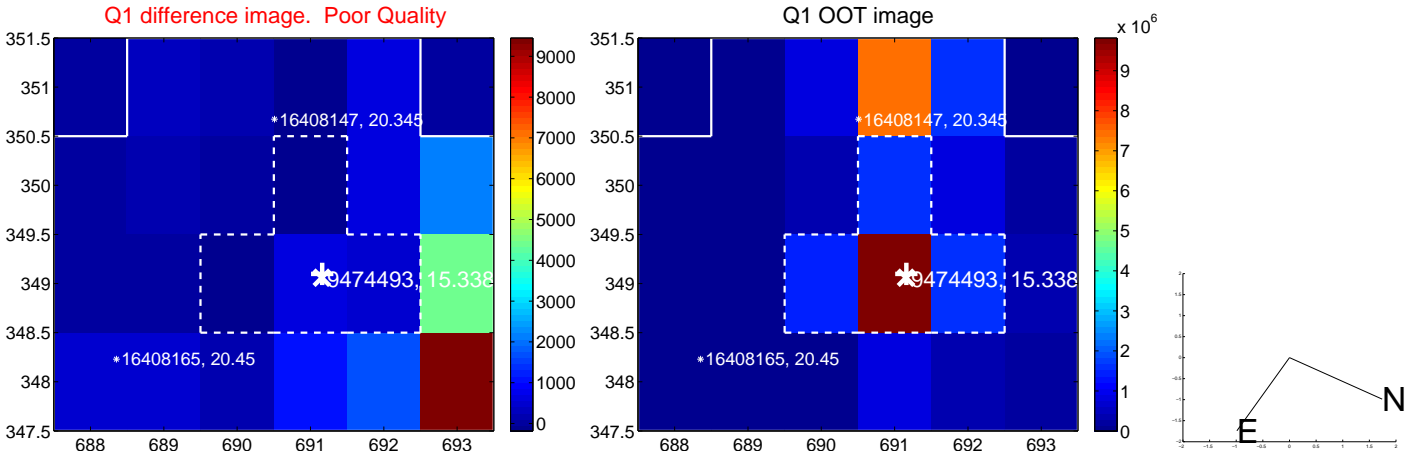
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$7.611 \pm 0.082$	92.27	$-2.346 \pm 0.077$	$7.241 \pm 0.083$
PRF-fit source offset from KIC position	$7.651 \pm 0.082$	92.80	$-2.436 \pm 0.077$	$7.253 \pm 0.083$
photometric centroid source offset	$8.15 \pm 0.53$	15.43	$1.26 \pm 0.64$	$8.05 \pm 0.53$

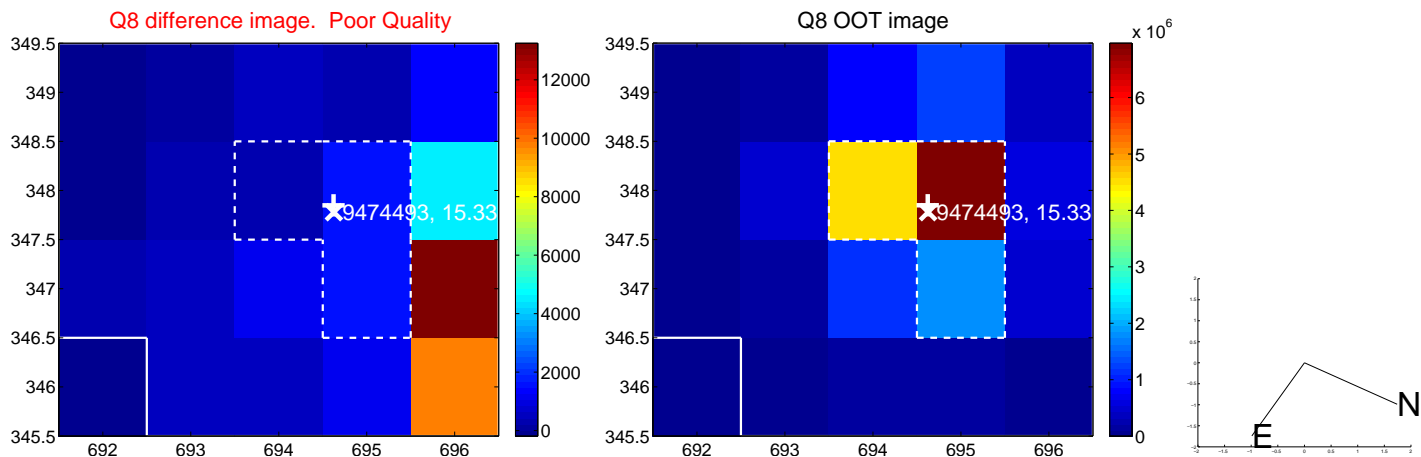
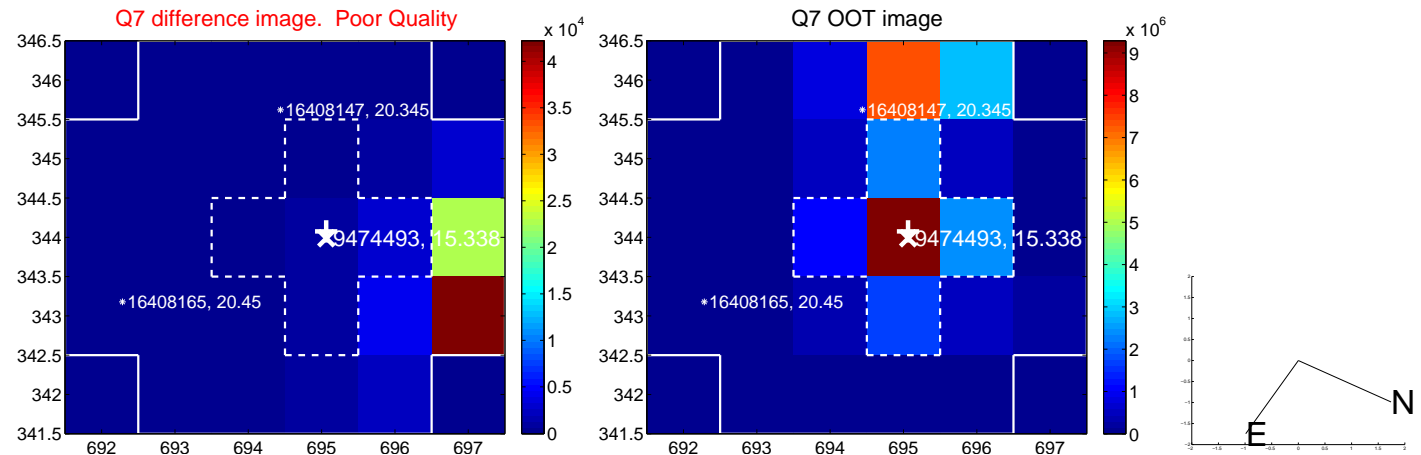
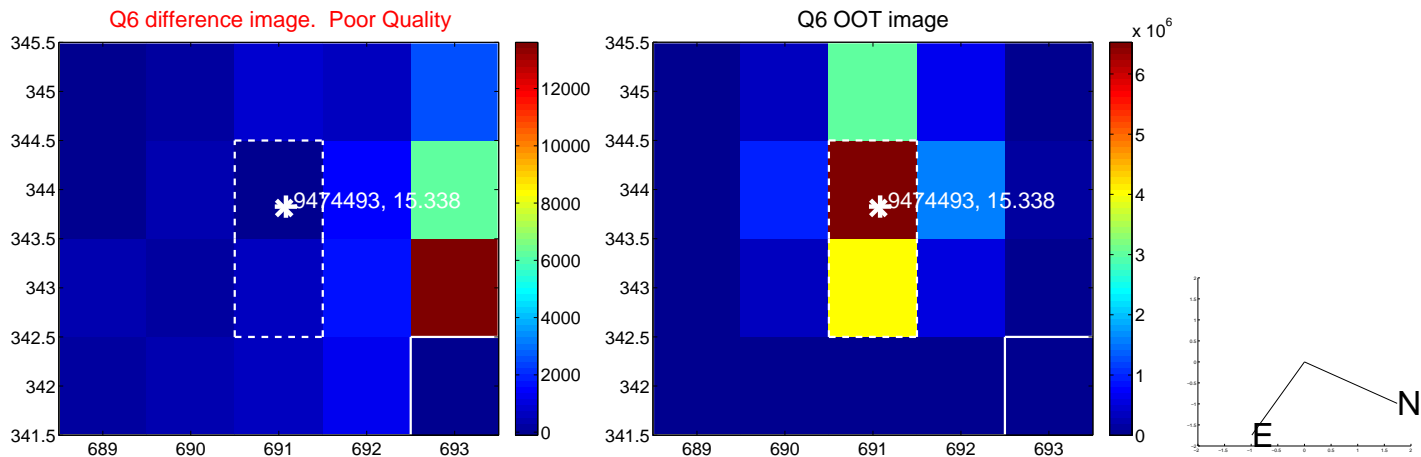
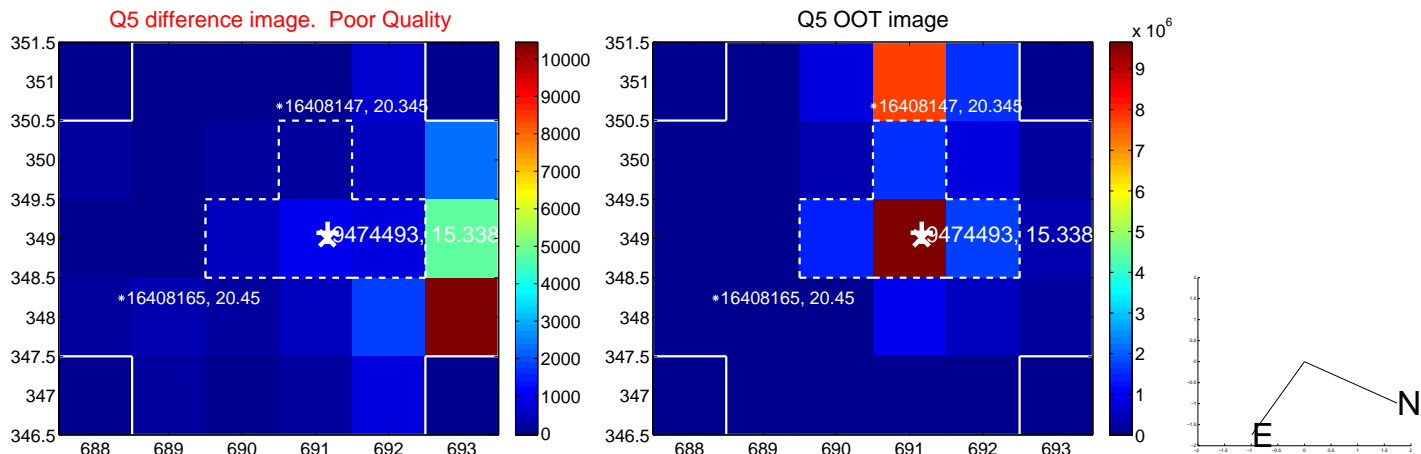


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

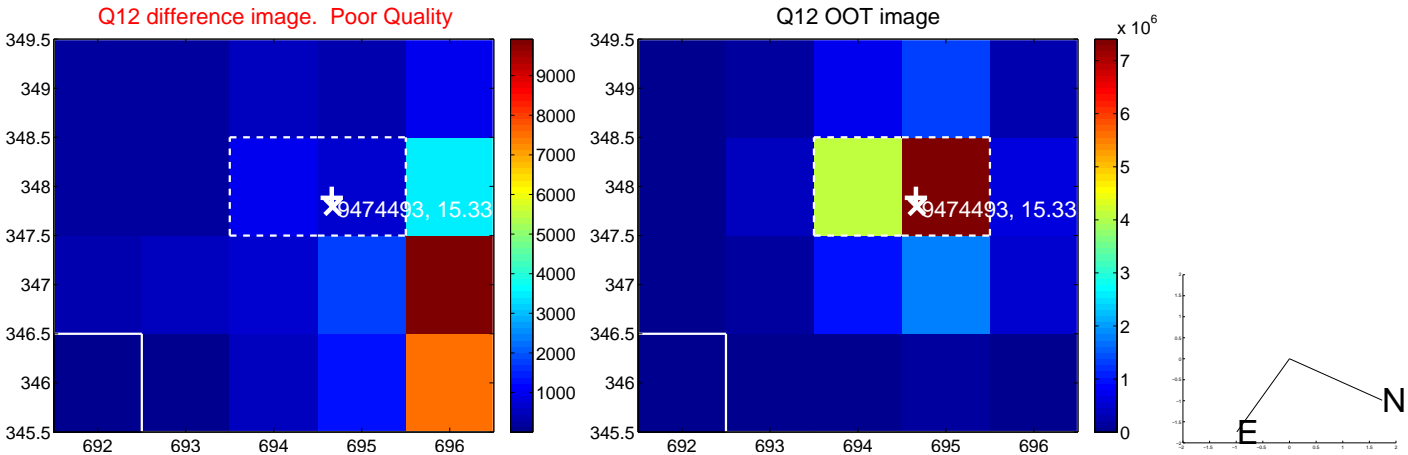
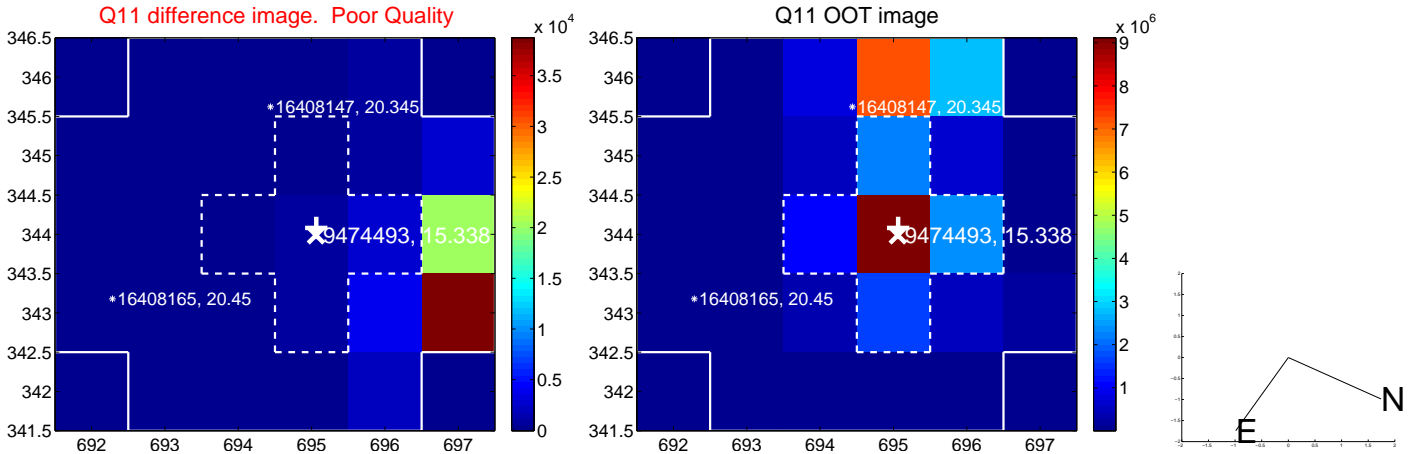
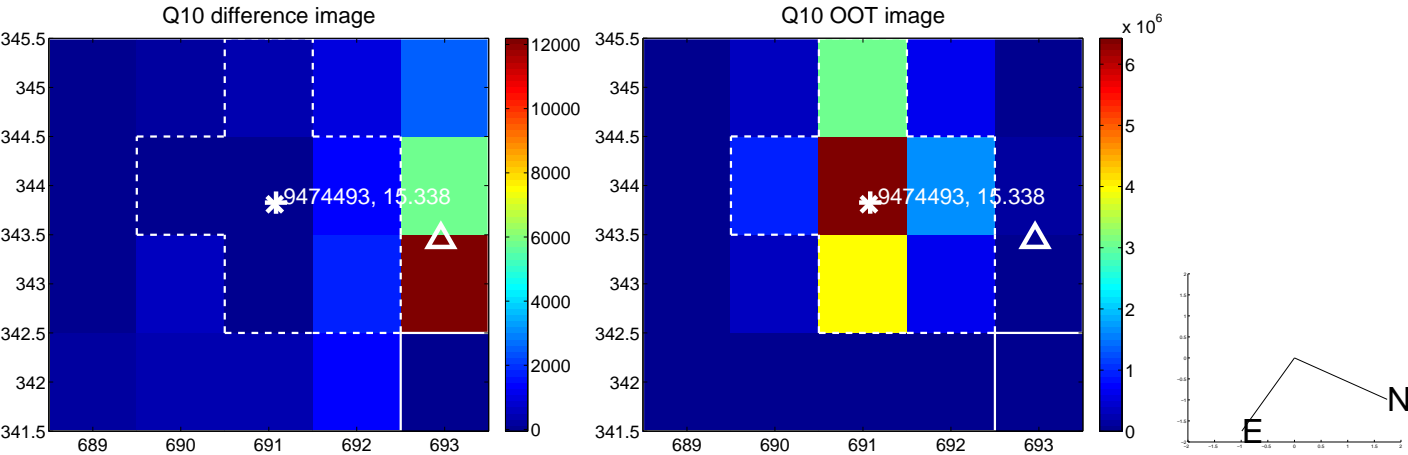
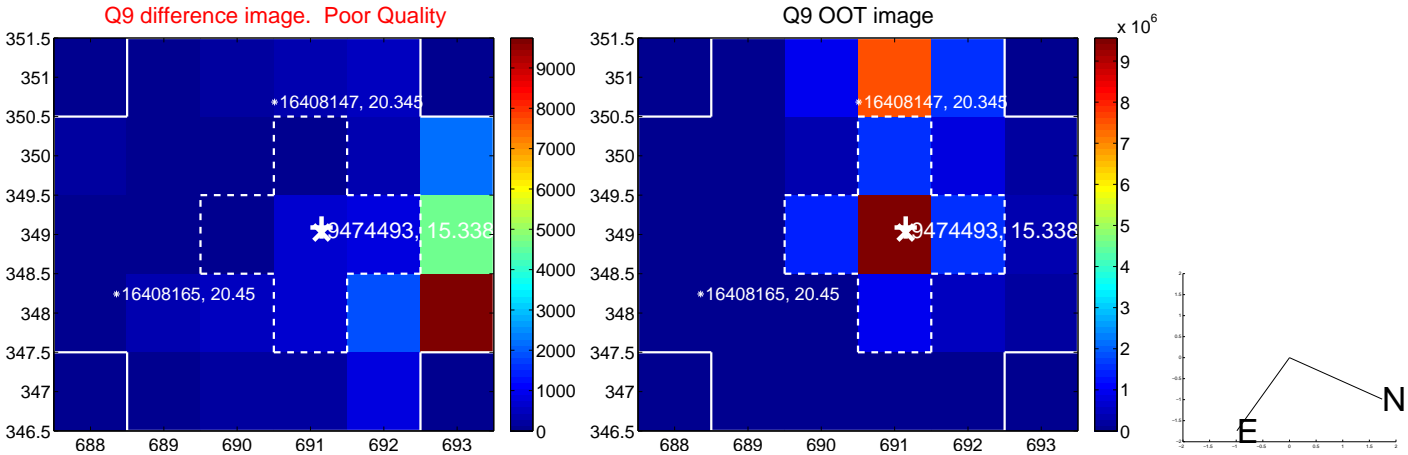


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

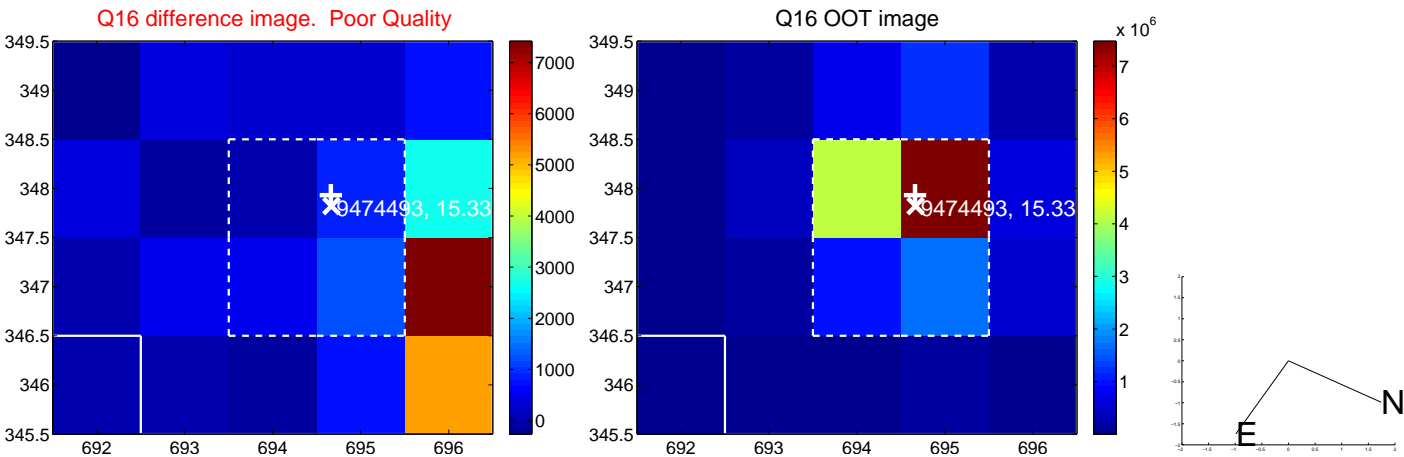
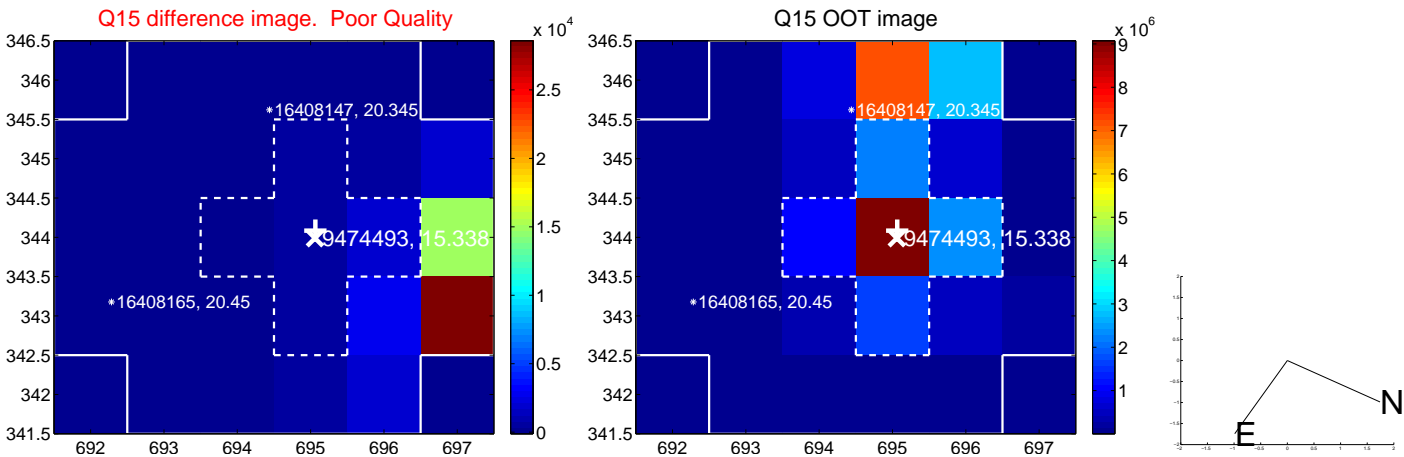
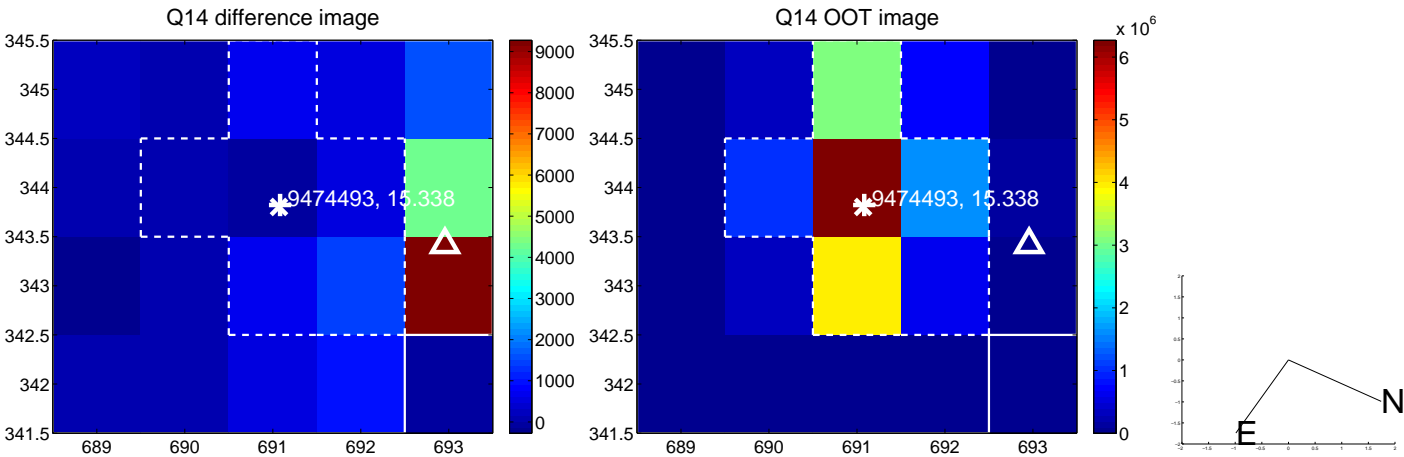
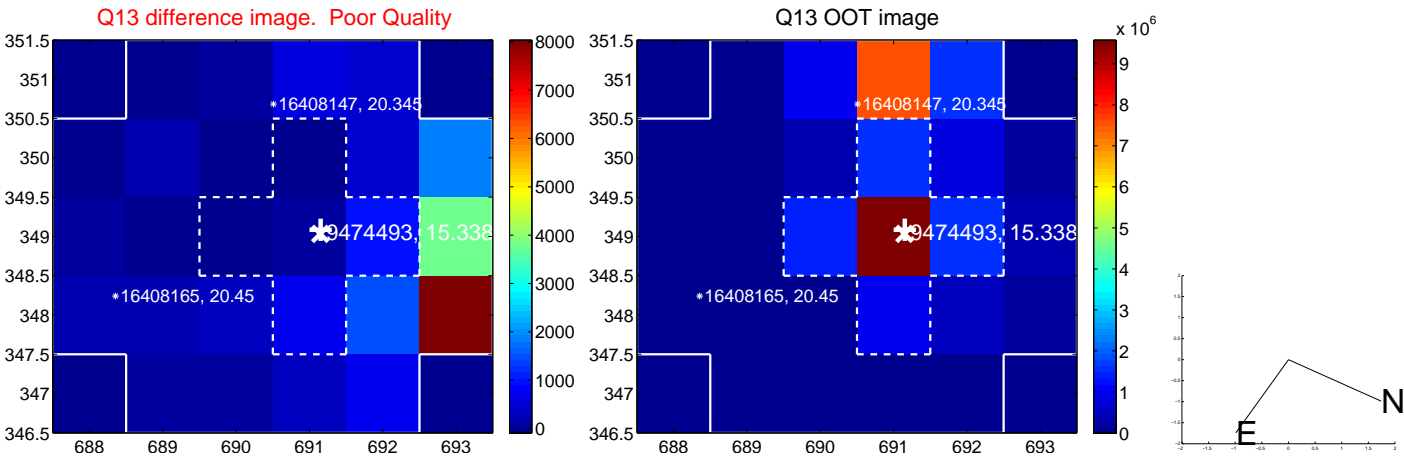




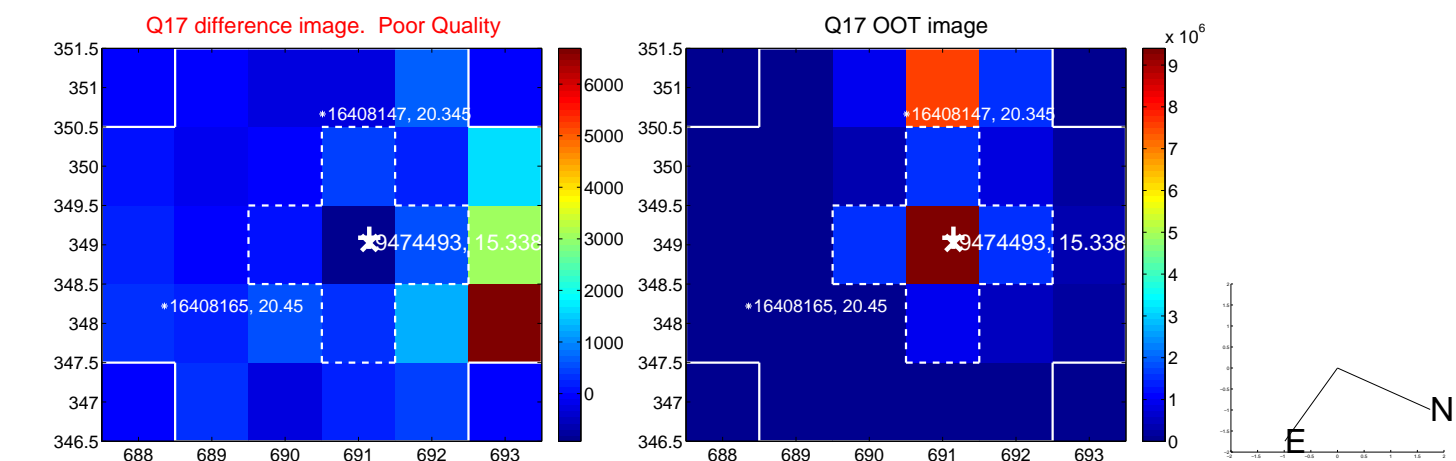
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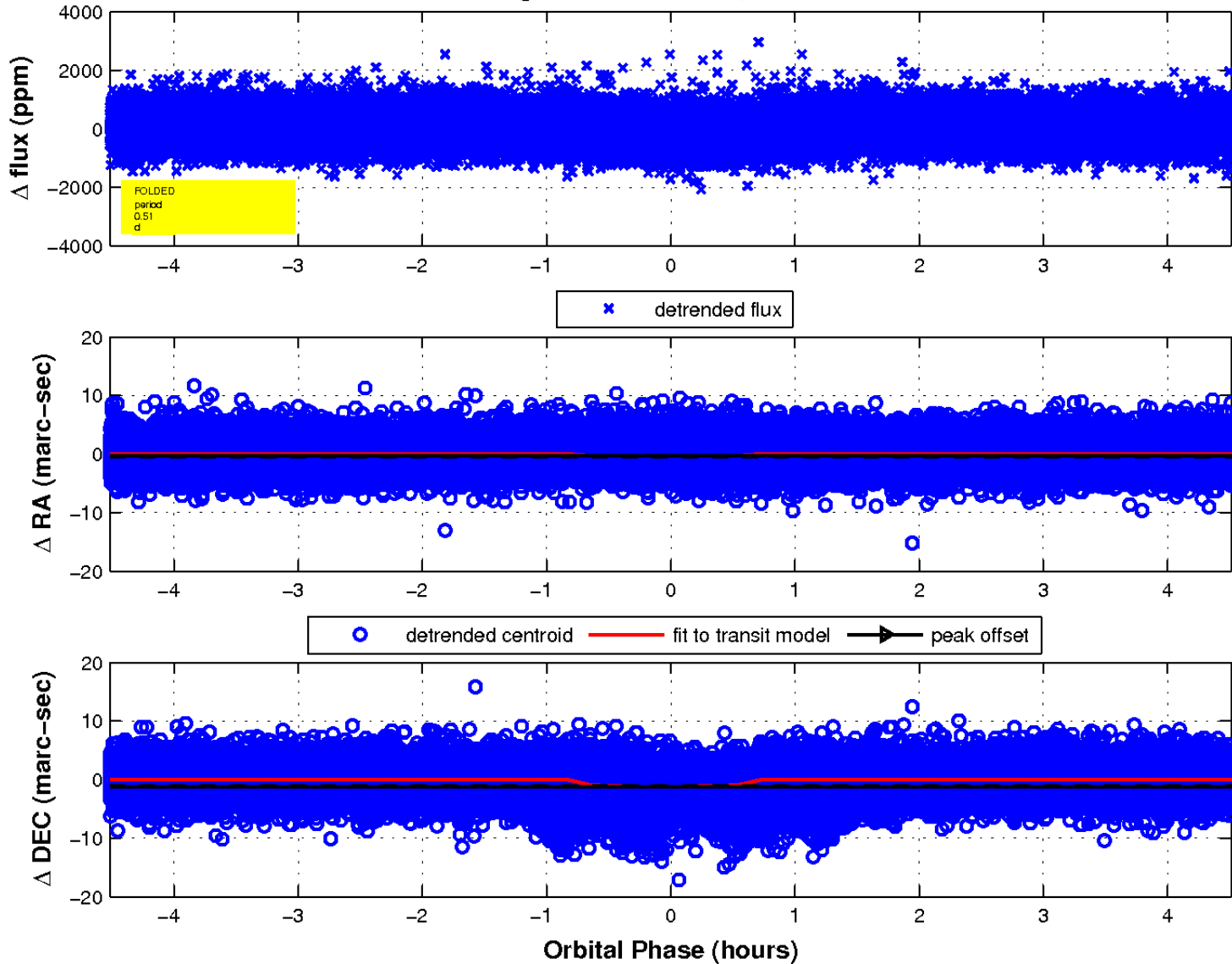
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

