

# KIC 004160235

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004160235-01	OBS	No	0.609013	131.689776	133.1	2.932	11.3	9.1	1.70	7783	2.27	38013.59

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004160235-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT

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

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

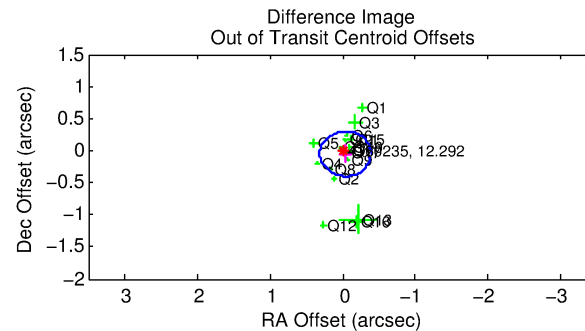
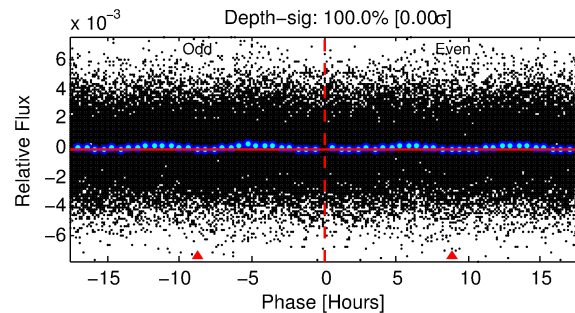
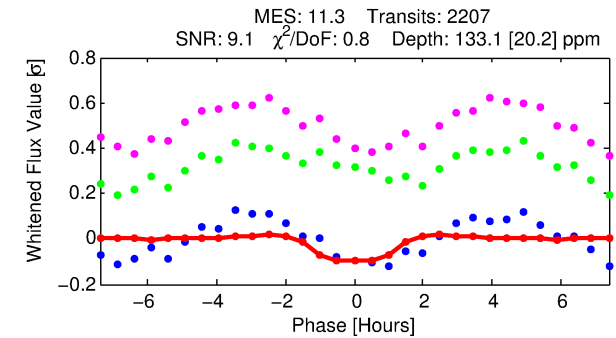
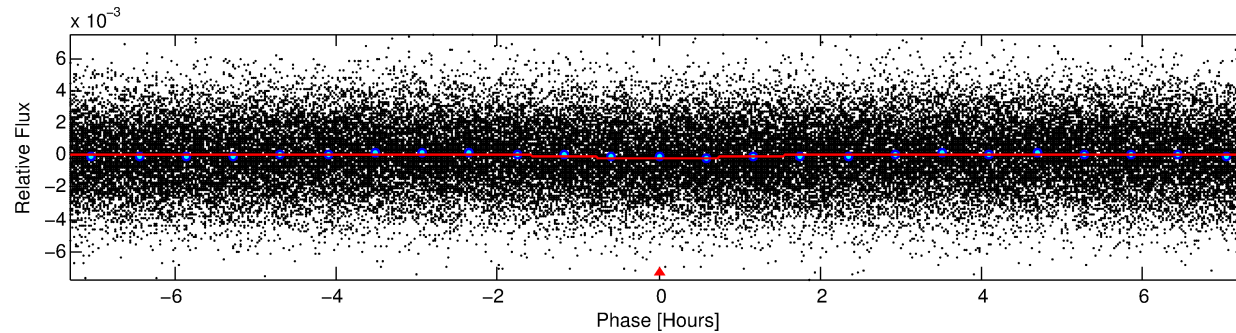
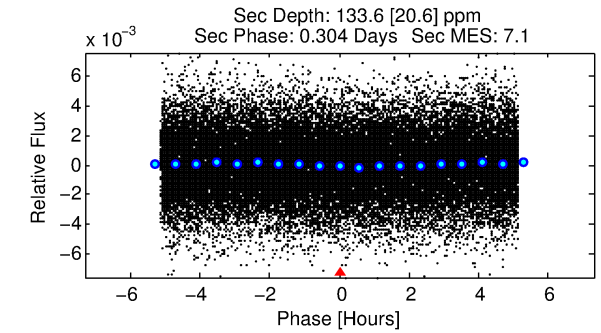
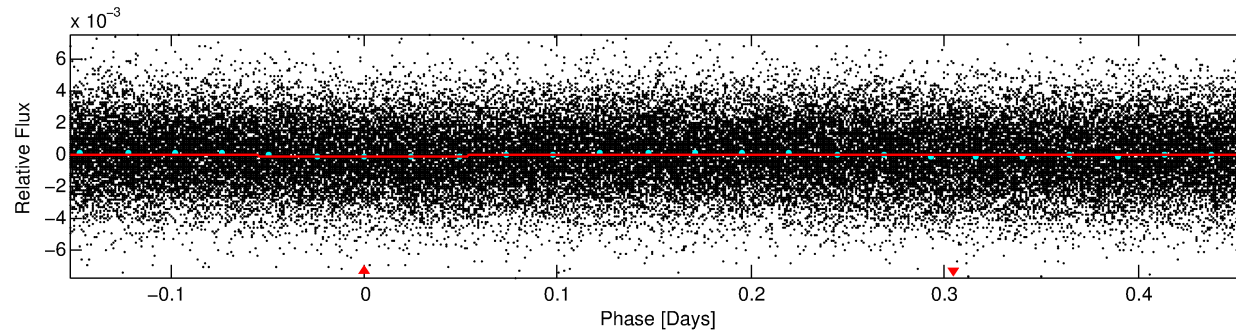
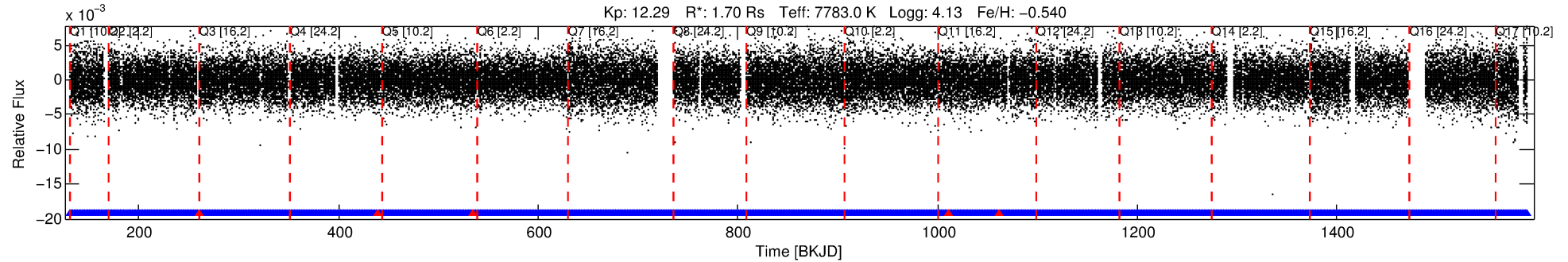
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004160235-01

No Significant Match Found

# DV One-Page Summary

KIC: 4160235 Candidate: 1 of 1 Period: 0.609 d



## DV Fit Results:

Period = 0.60901 [0.00001] d  
Epoch = 131.6898 [0.0041] BKJD  
Rp/R\* = 0.0123 [0.0092]  
a/R\* = 1.20 [1.72]  
b = 0.90 [1.03]  
Seff = 38013.59 [9271.14]  
Teq = 3560 [217] K  
Rp = 2.27 [1.75] Re  
a = 0.0158 [0.0025] AU  
Ag = 3.56 [5.42] [0.47σ]  
Teffp = 7559 [2847] K [1.40σ]

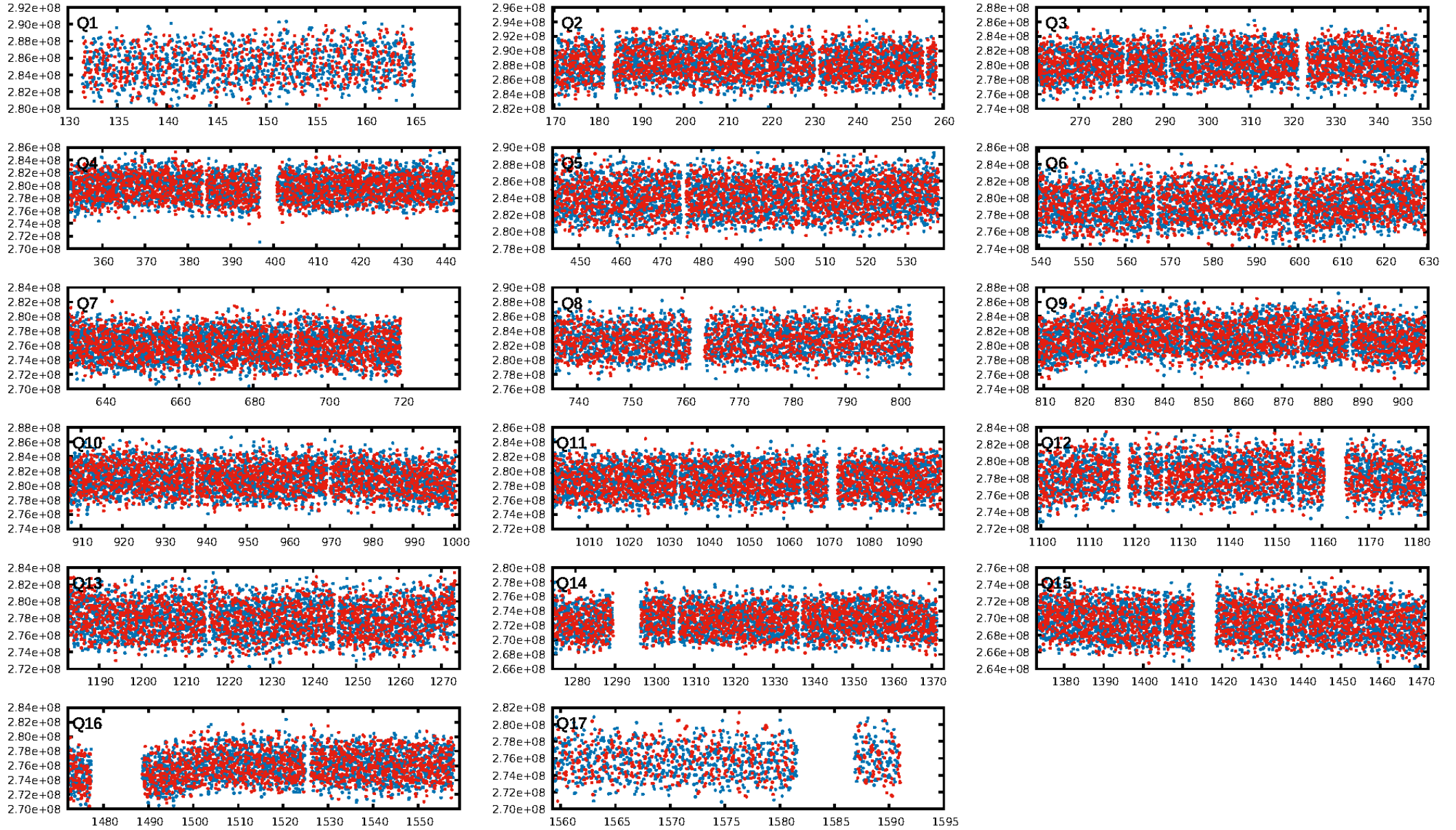
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.96e-26  
RollingBand-fgt: 1.00 [2103/2108]  
GhostDiagnostic-chr: 1.269  
Centroid-sig: 0.1%  
Centroid-so: 0.369 arcsec [3.57σ]  
OotOffset-rm: 0.062 arcsec [0.53σ]  
KicOffset-rm: 0.094 arcsec [0.74σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.47 [8/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 08:46:34 Z

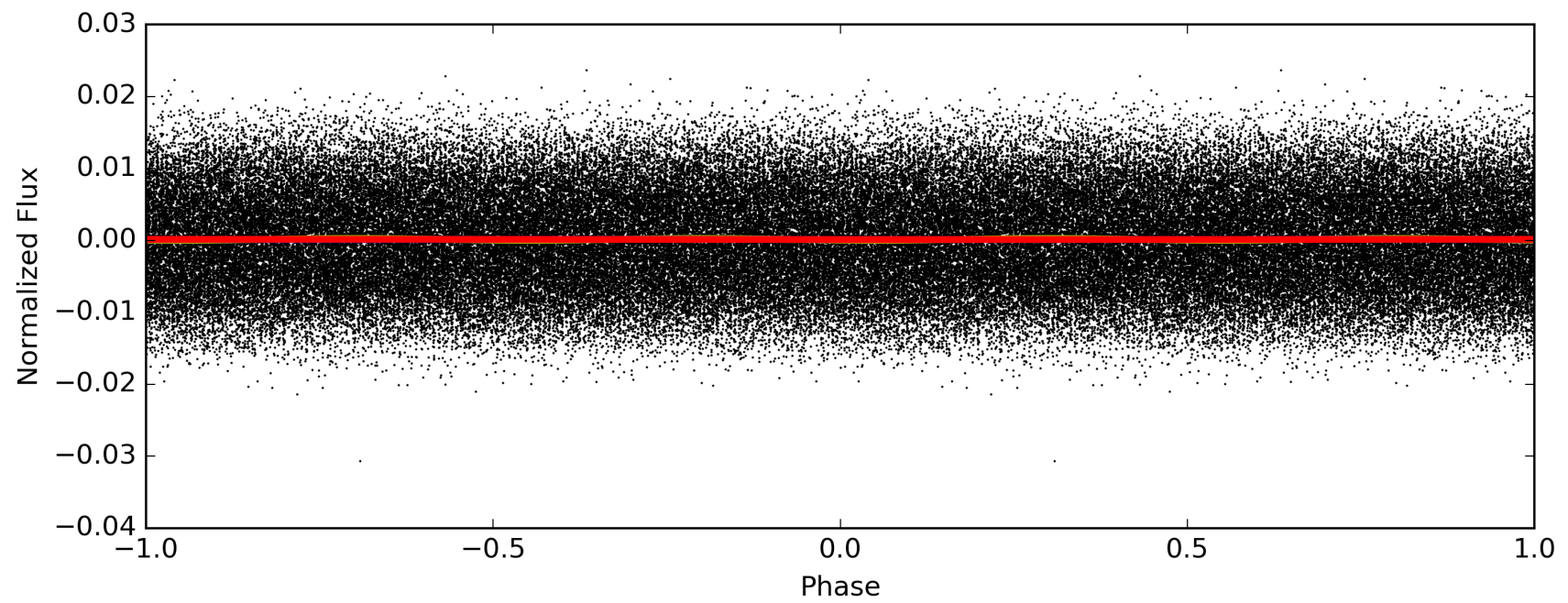
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004160235-01, PDC Light Curves



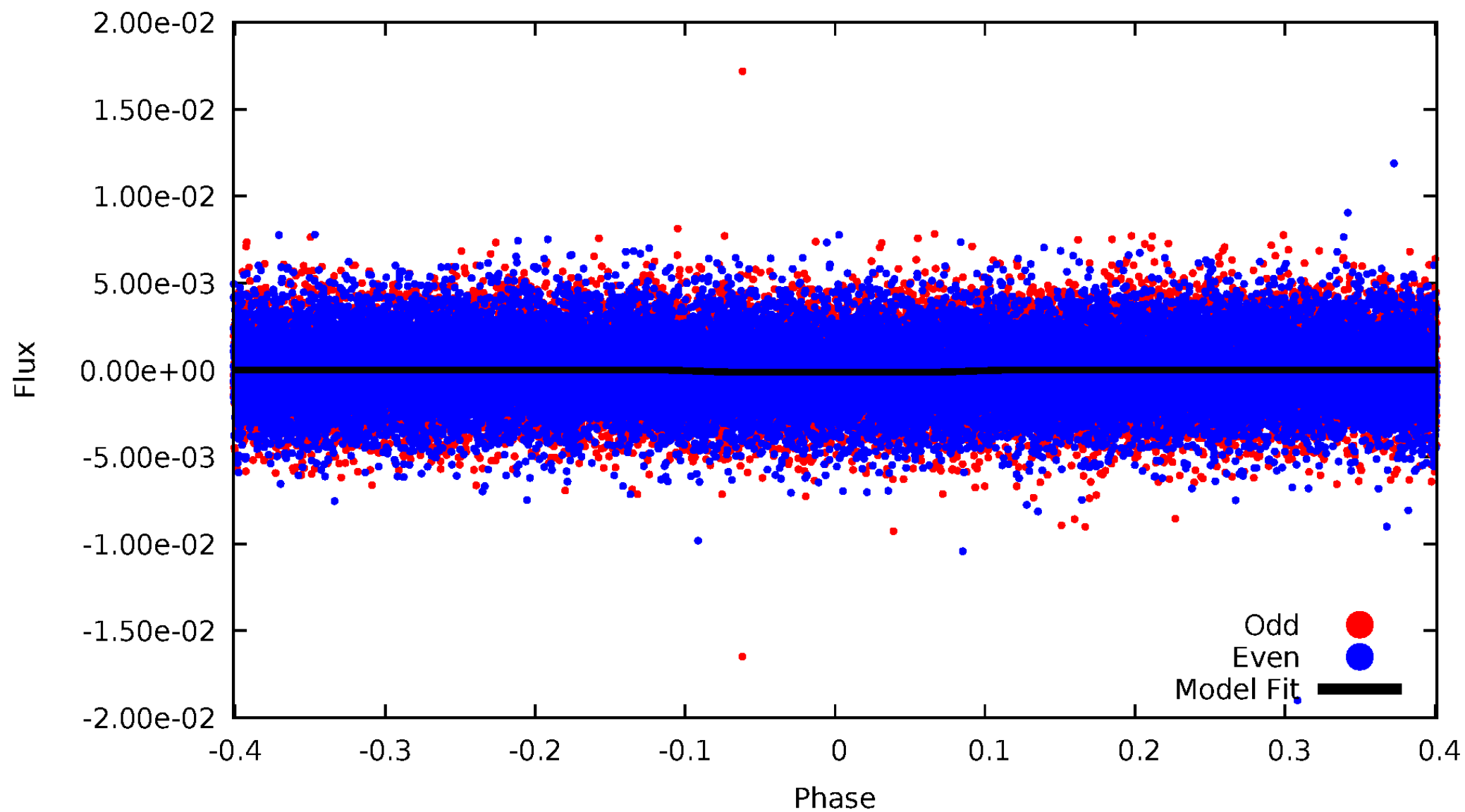


— P = 0.305 days      — P = 0.609 days      — P = 1.218 days



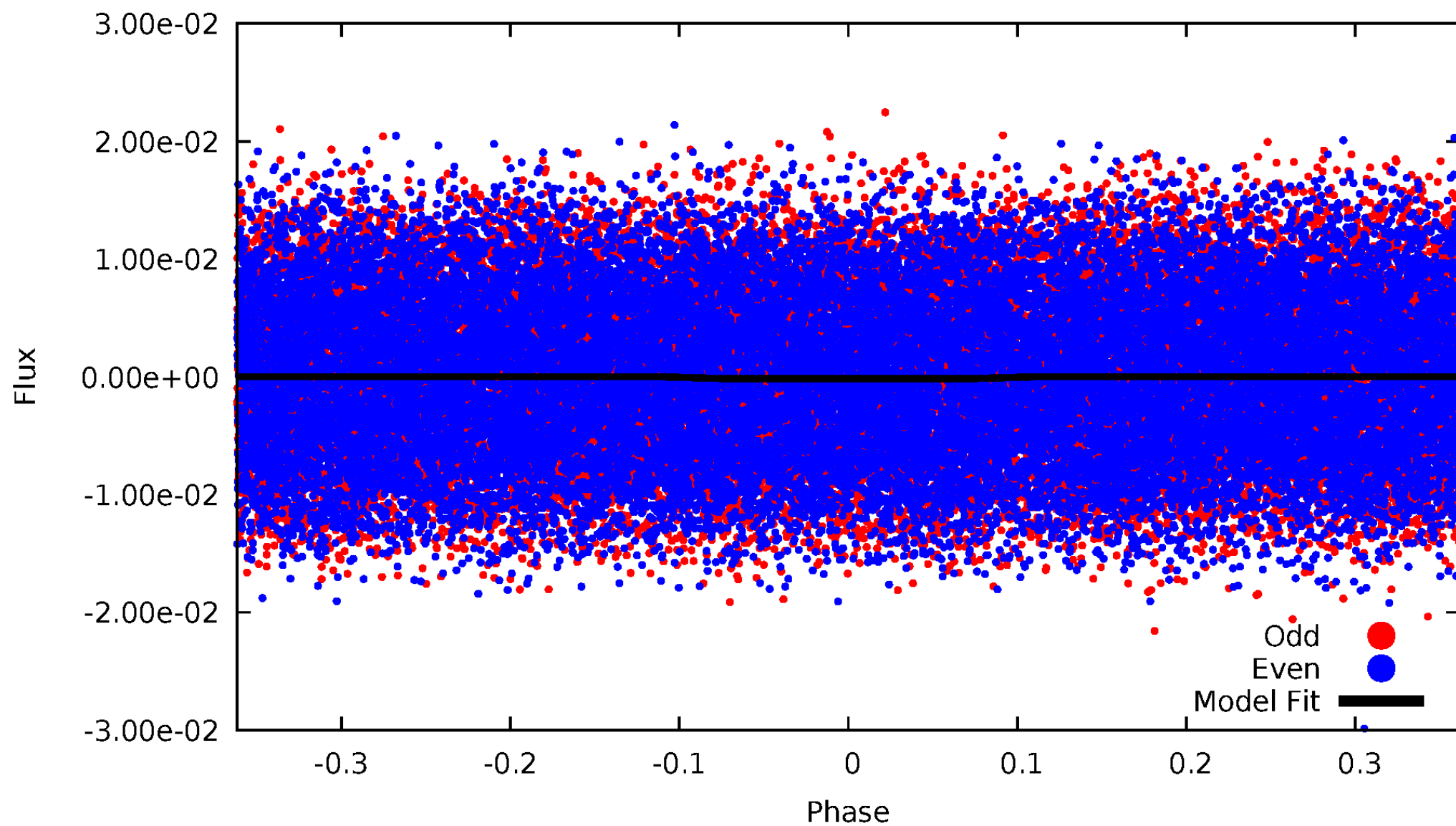
# DV Odd/Even

TCE 004160235-01



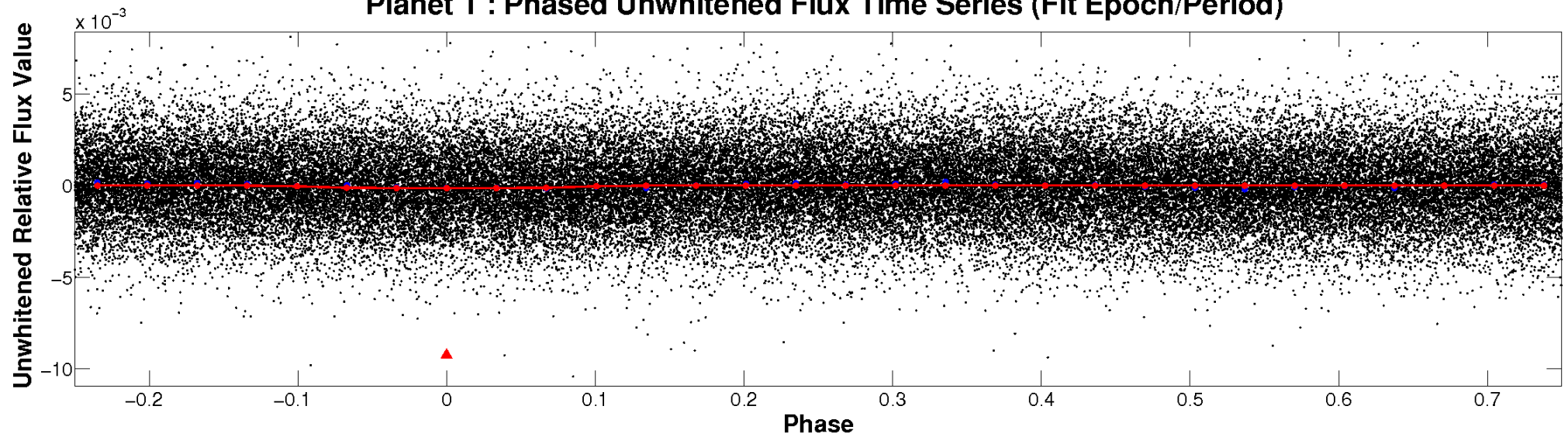
# ALT Odd/Even

TCE 004160235-01

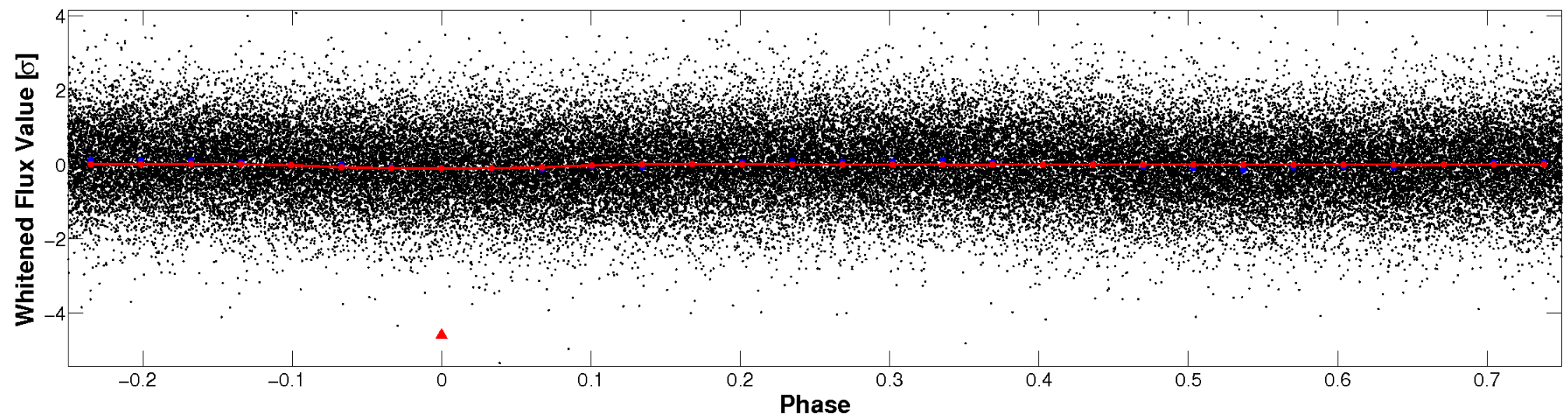


# Non-Whitened Vs. Whitened Light Curve

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



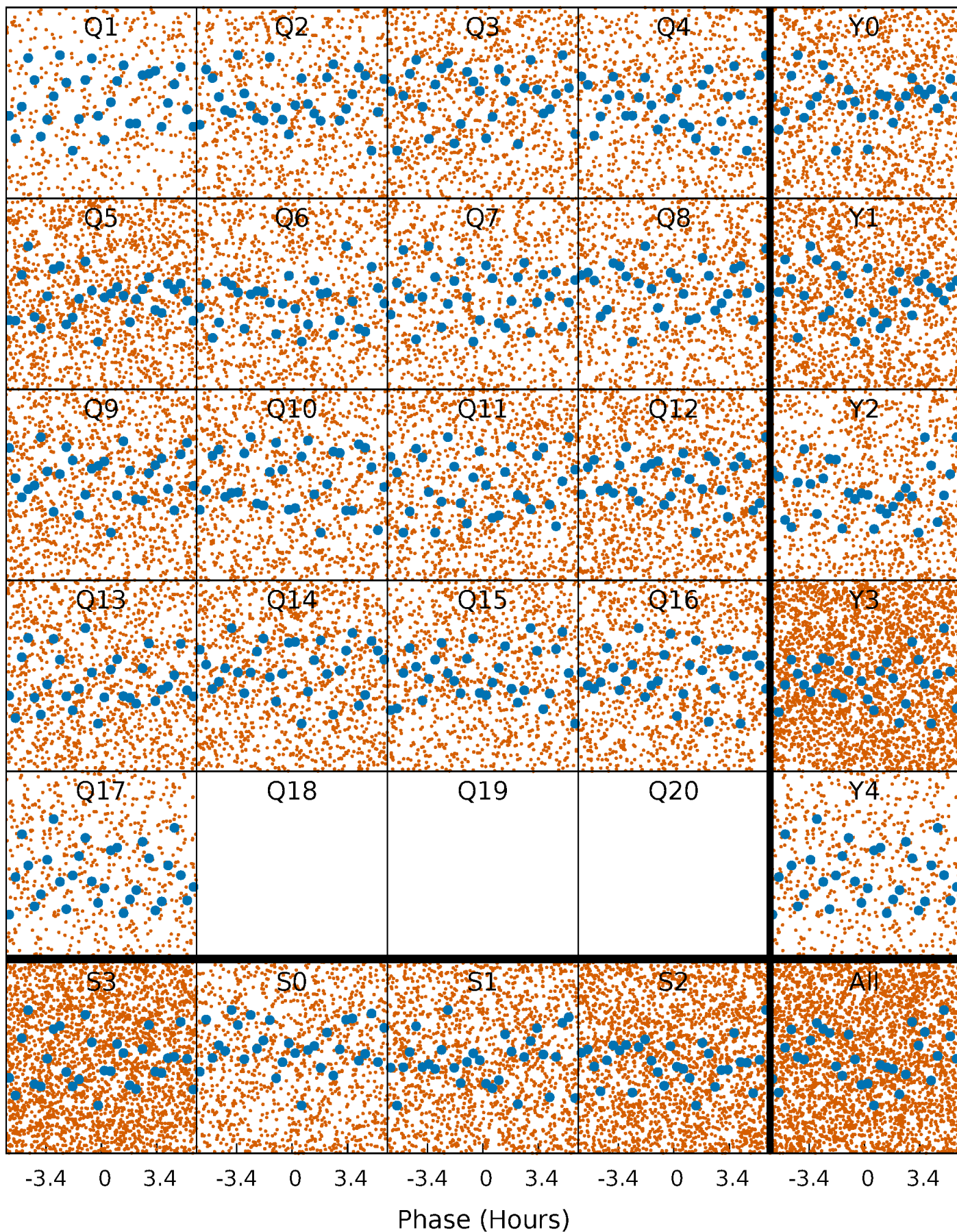
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

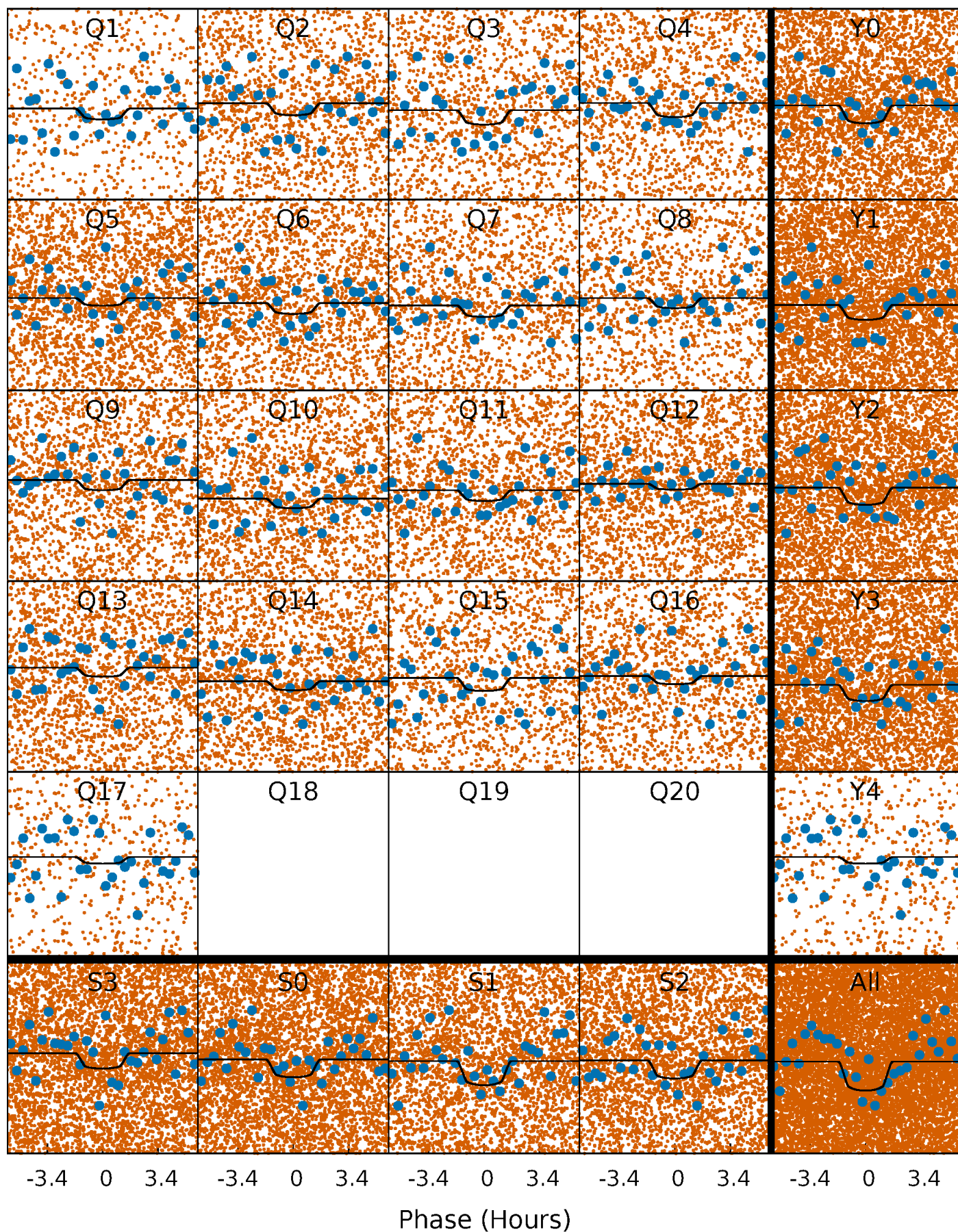
TCE 004160235-01 P= 0.609013 Days  $T_0=131.689776$  (BKJD)





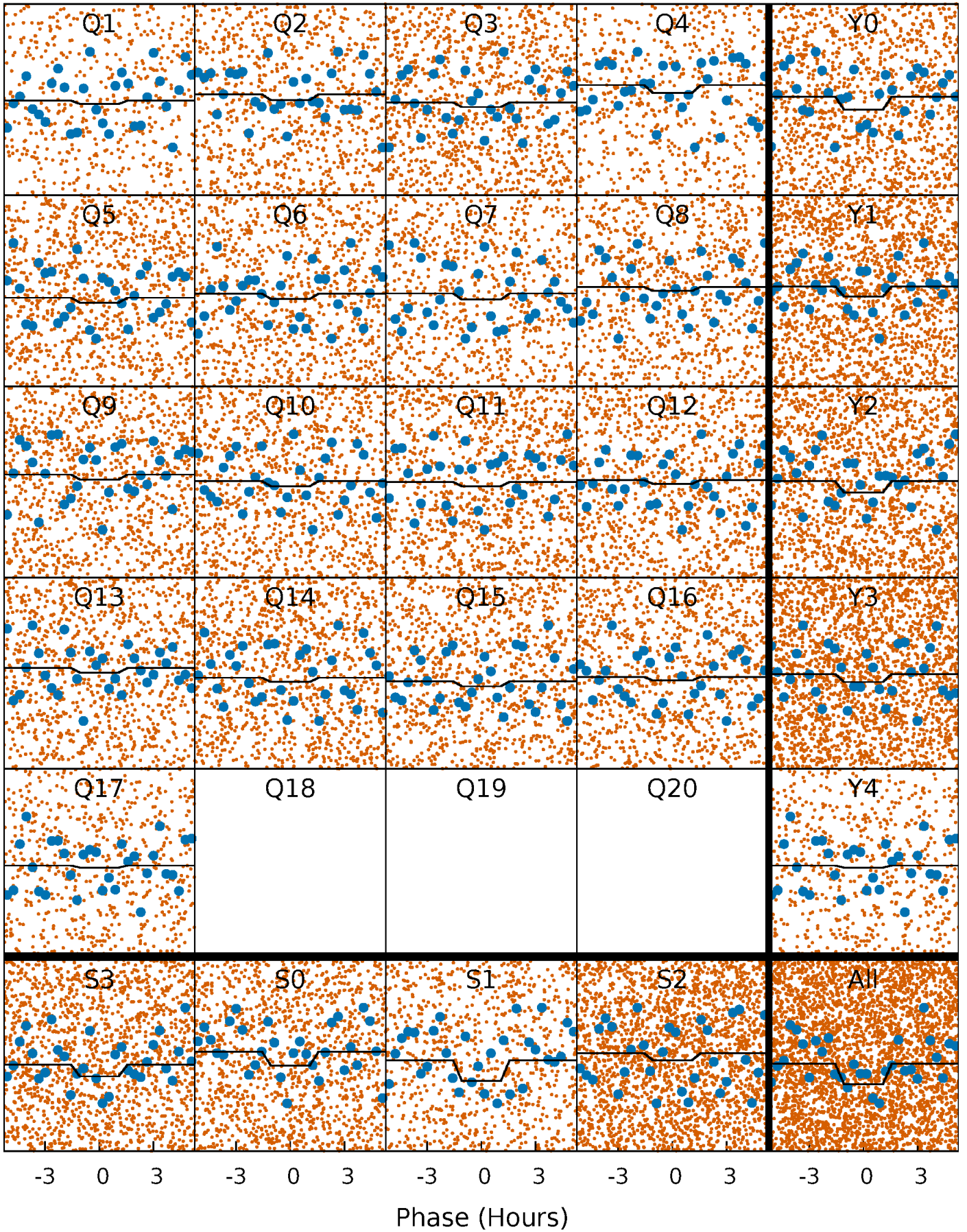
# DV Quarter-Phased Transit Curves

TCE 004160235-01 P= 0.609013 Days  $T_0=131.689776$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004160235-01 P= 0.609037 Days  $T_0=131.681230$  (BKJD)

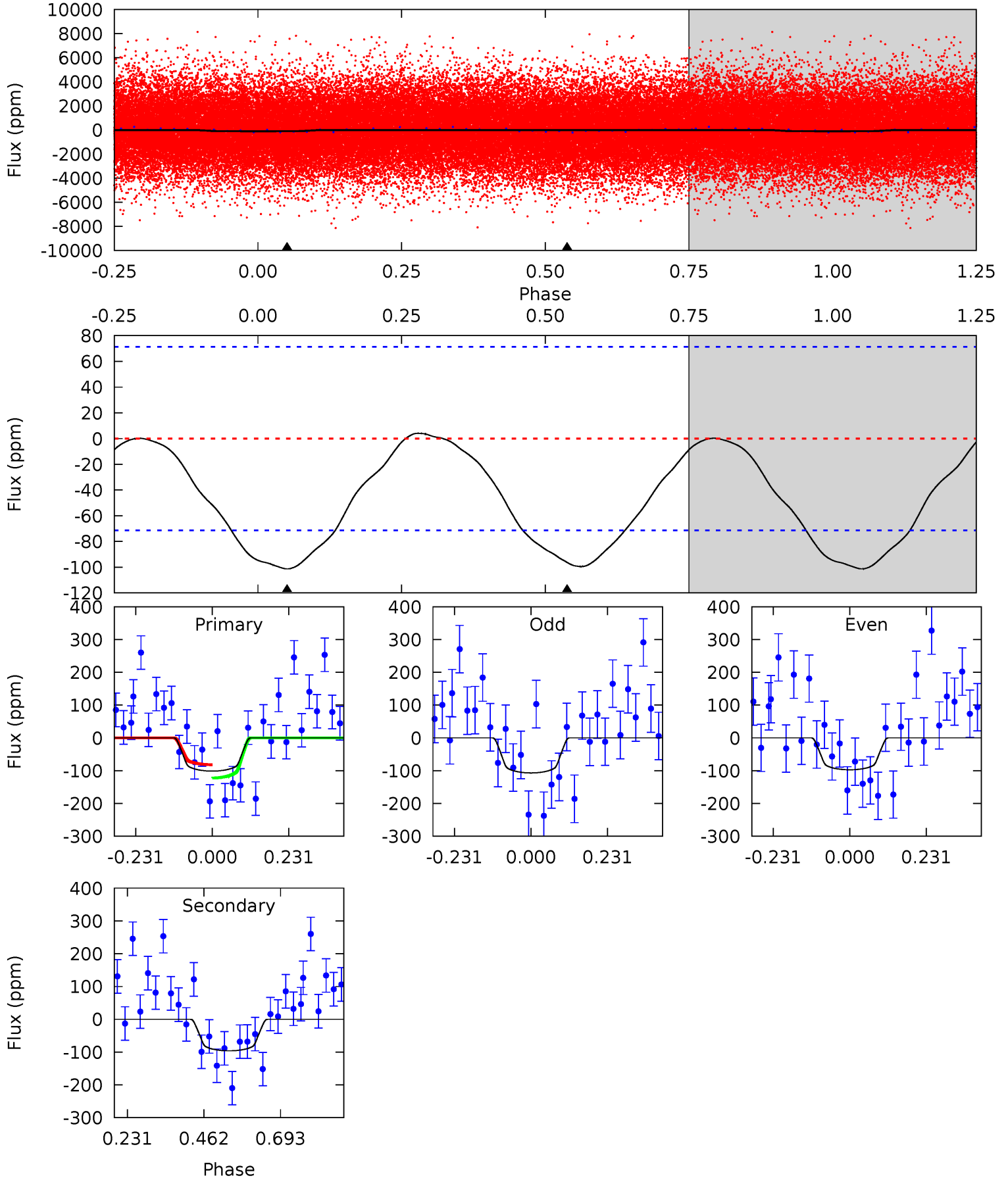




# DV Model-Shift Uniqueness Test

004160235-01, P = 0.609013 Days, E = 131.080763 Days

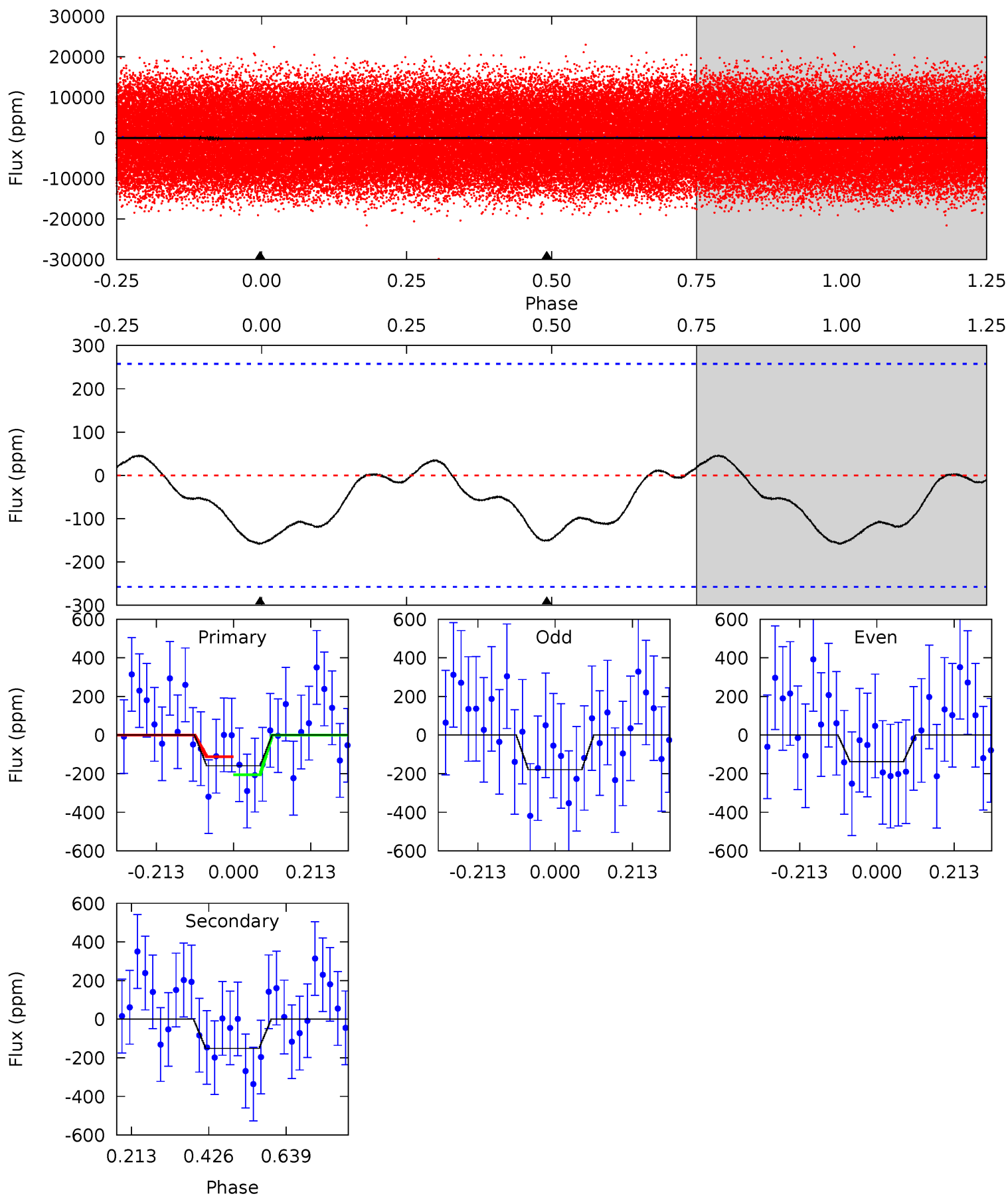
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.23	5.92	0	0	4.39	1.20	0.15	6.23	6.23	5.92	5.92	0.29	1.00	0.04	1.25



# Alt Model-Shift Uniqueness Test

004160235-01, P = 0.609037 Days, E = 131.072193 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
2.71	2.58	0	0	4.40	1.25	0.31	2.71	2.71	2.58	2.58	0.35	0.89	0.23	0.79





### Stellar Parameters For KIC 004160235

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7783^{+62}_{-77}$	$4.129^{+0.137}_{-0.112}$	$-0.540^{+0.150}_{-0.150}$	$1.698^{+0.268}_{-0.298}$	$1.417^{+0.110}_{-0.099}$	$0.408^{+0.277}_{-0.141}$
	+1%/-1%	+3%/-3%	+28%/-28%	+16%/-18%	+8%/-7%	+68%/-34%
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 004160235-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-96 \pm 16$	$2.45^{+1.62}_{-1.46}$	$4984^{+210}_{-217}$	$6347^{+5511}_{-1675}$	$2.229^{+10.621}_{-1.439}$
Alt.	$-151 \pm 59$	$2.49^{+1.73}_{-1.41}$	$4977^{+208}_{-226}$	$7022^{+6207}_{-1966}$	$3.111^{+13.927}_{-2.092}$

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

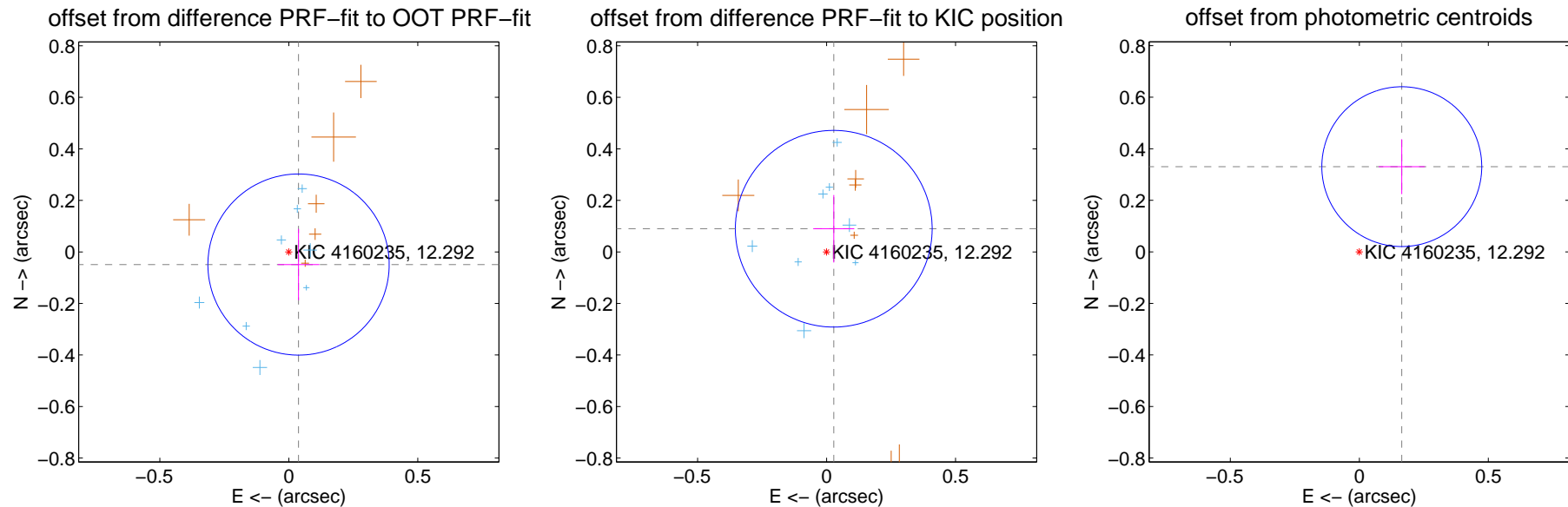
## DV Centroid Data

Supplemental centroid analysis for 004160235-01. Kepler magnitude: 12.29. Transit SNR 9.13

There are 8 quarters with good PRF difference image offsets

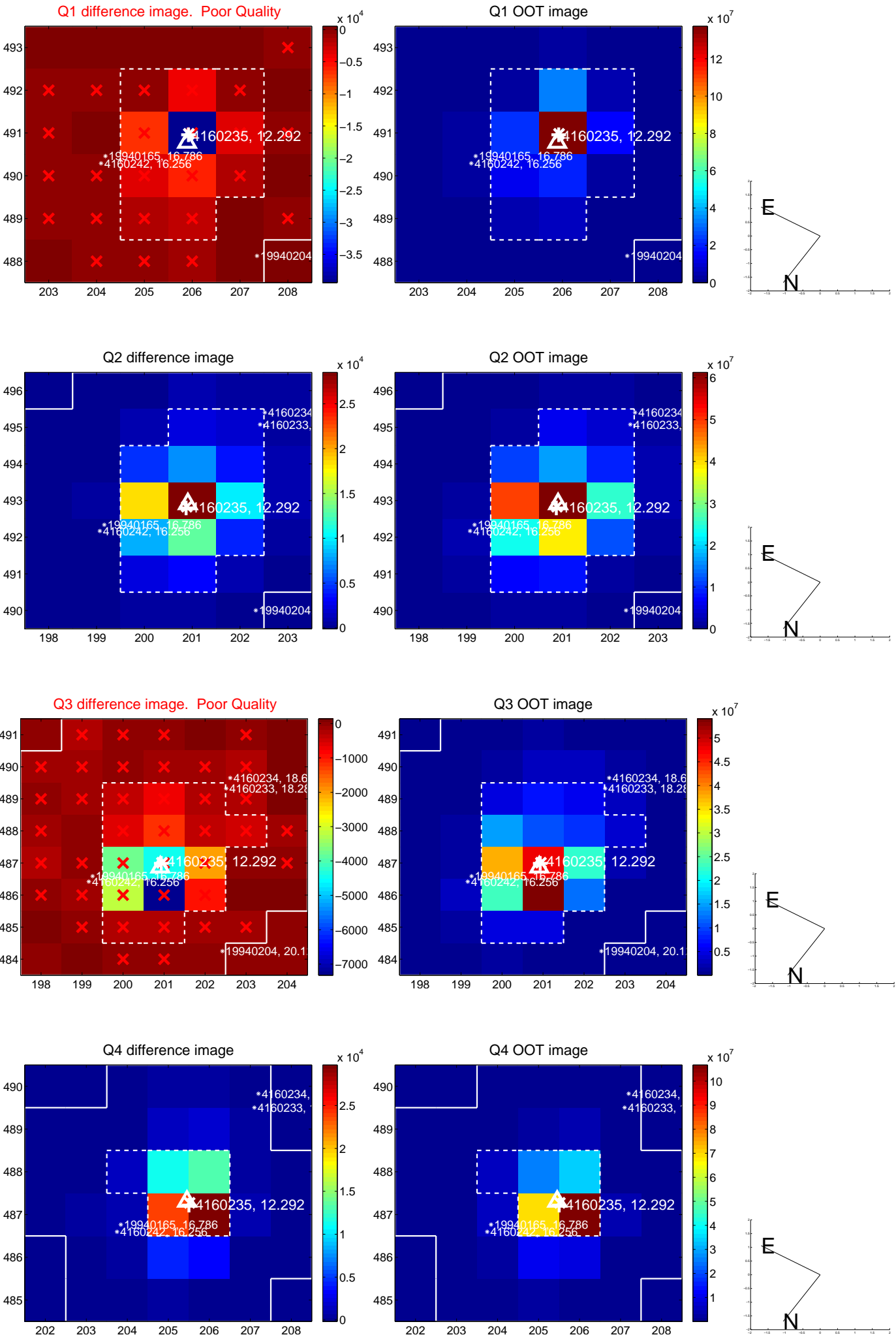
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.062 \pm 0.117$	0.53	$-0.038 \pm 0.081$	$-0.049 \pm 0.138$
PRF-fit source offset from KIC position	$0.094 \pm 0.127$	0.74	$-0.028 \pm 0.080$	$0.090 \pm 0.131$
photometric centroid source offset	$0.37 \pm 0.10$	3.57	$-0.16 \pm 0.09$	$0.33 \pm 0.11$

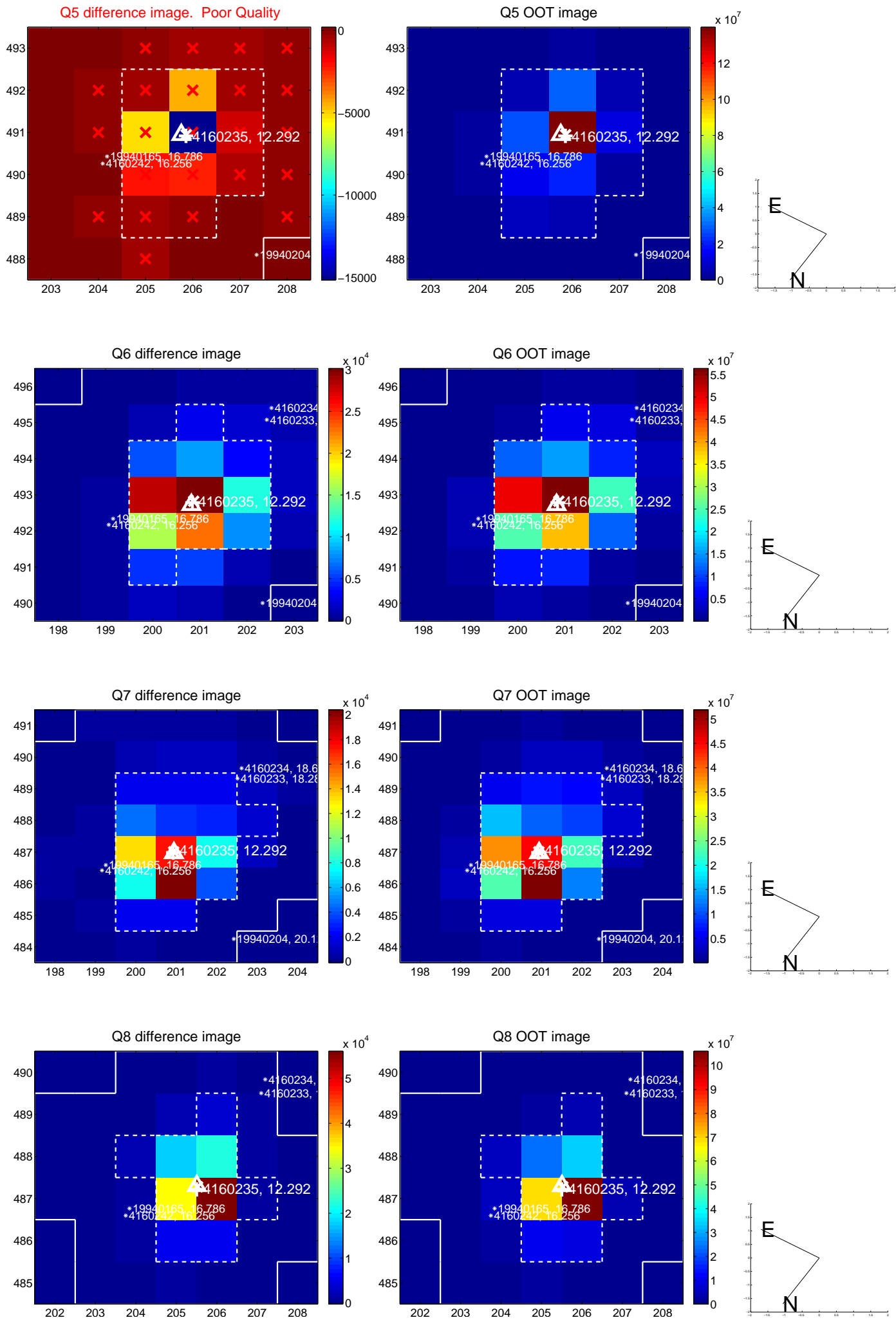


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

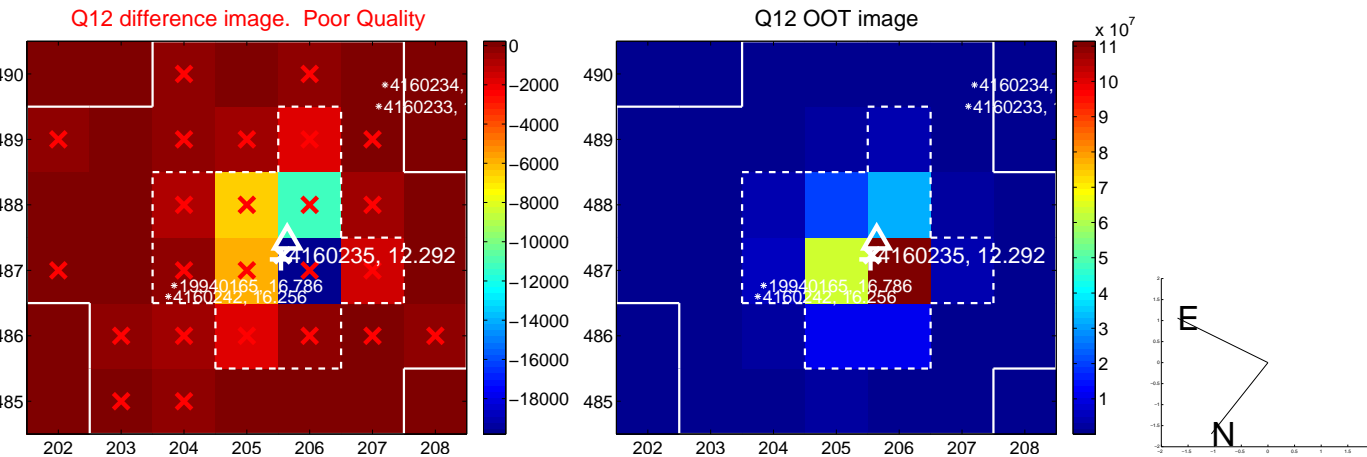
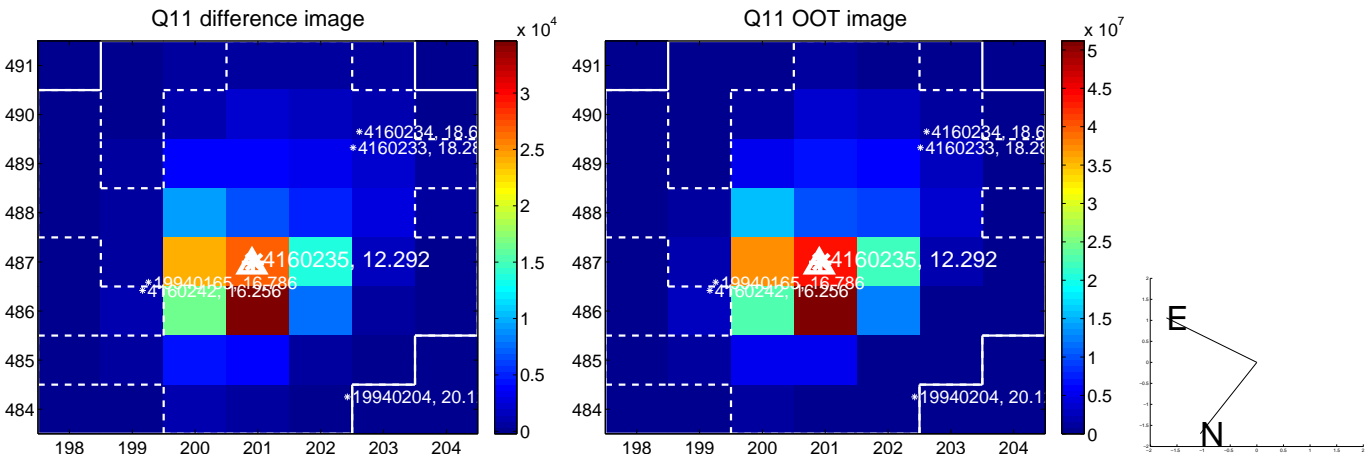
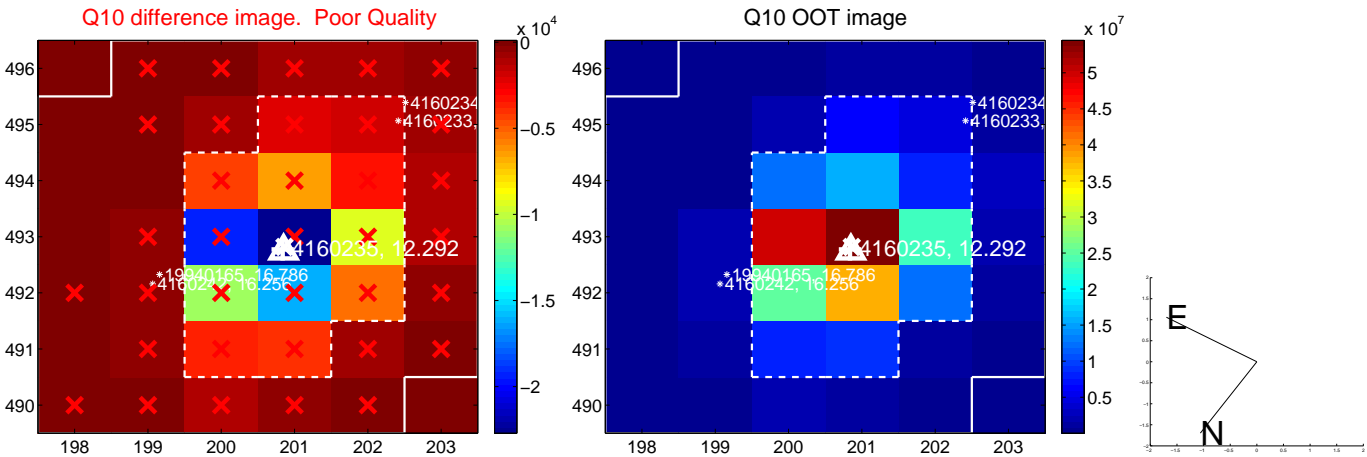
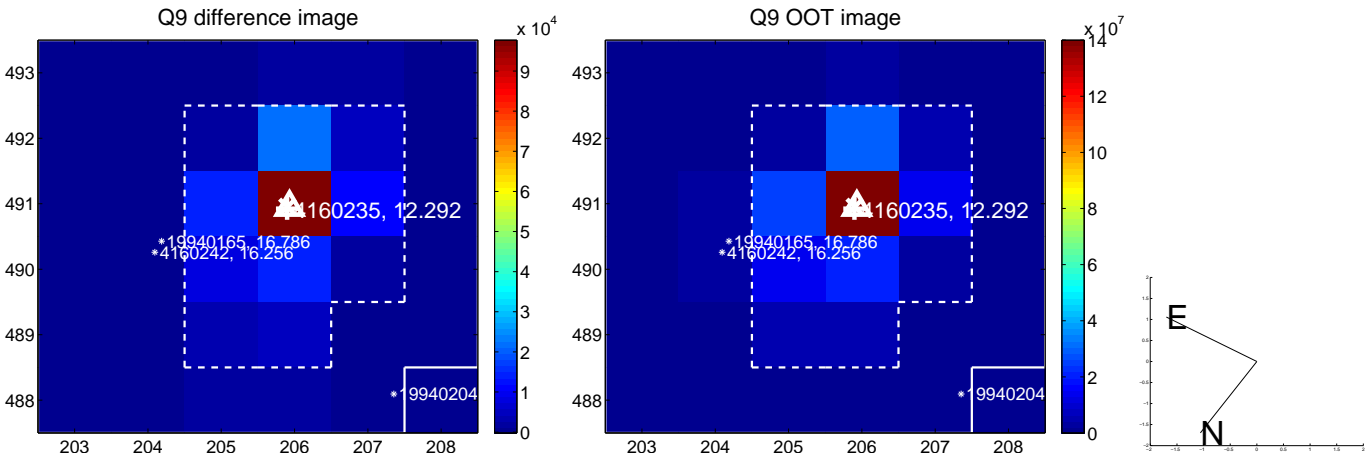


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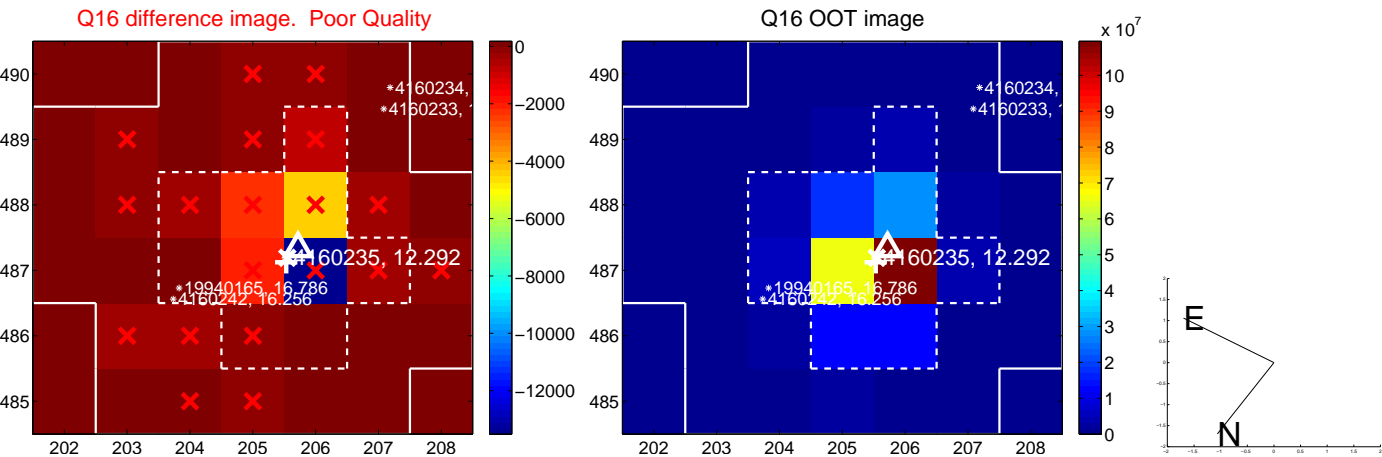
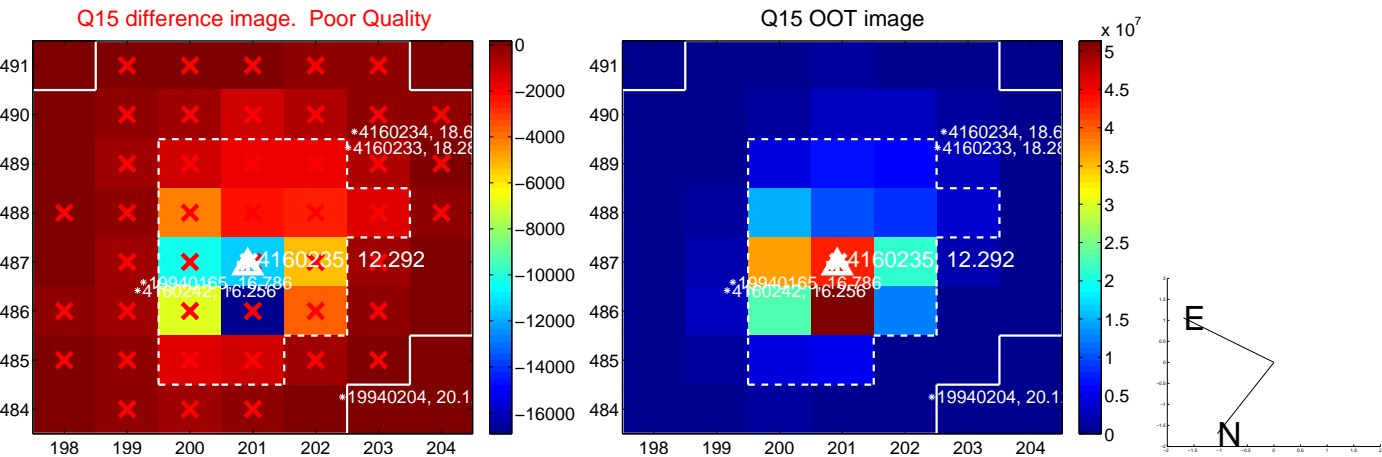
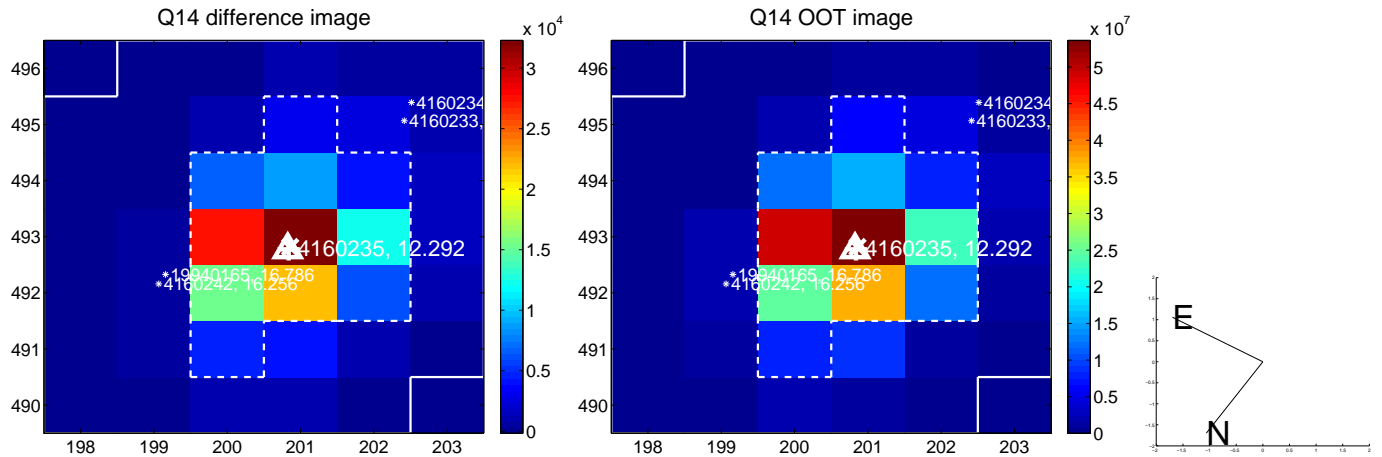
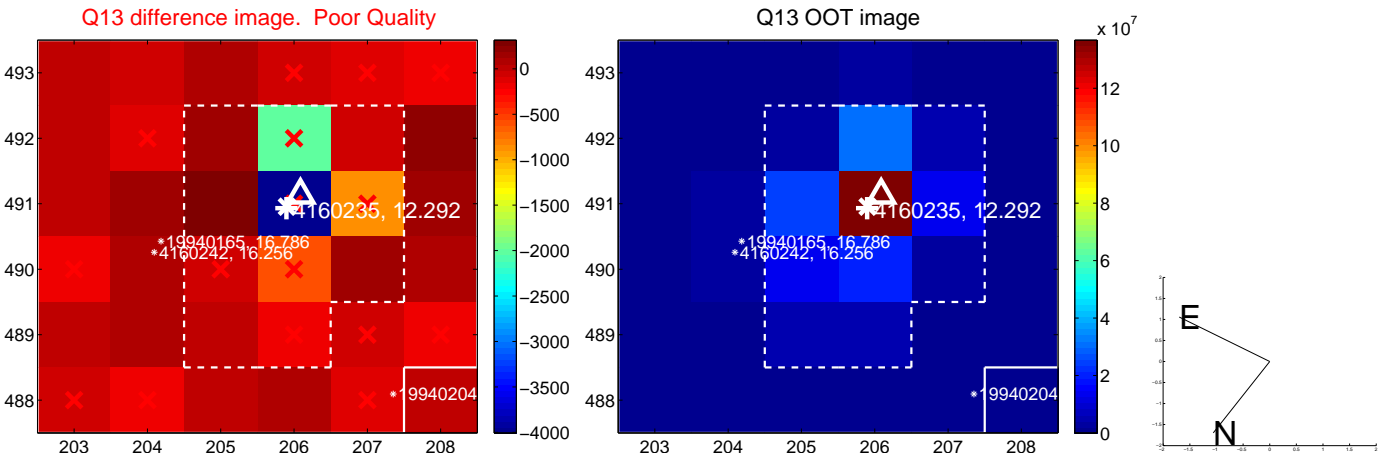




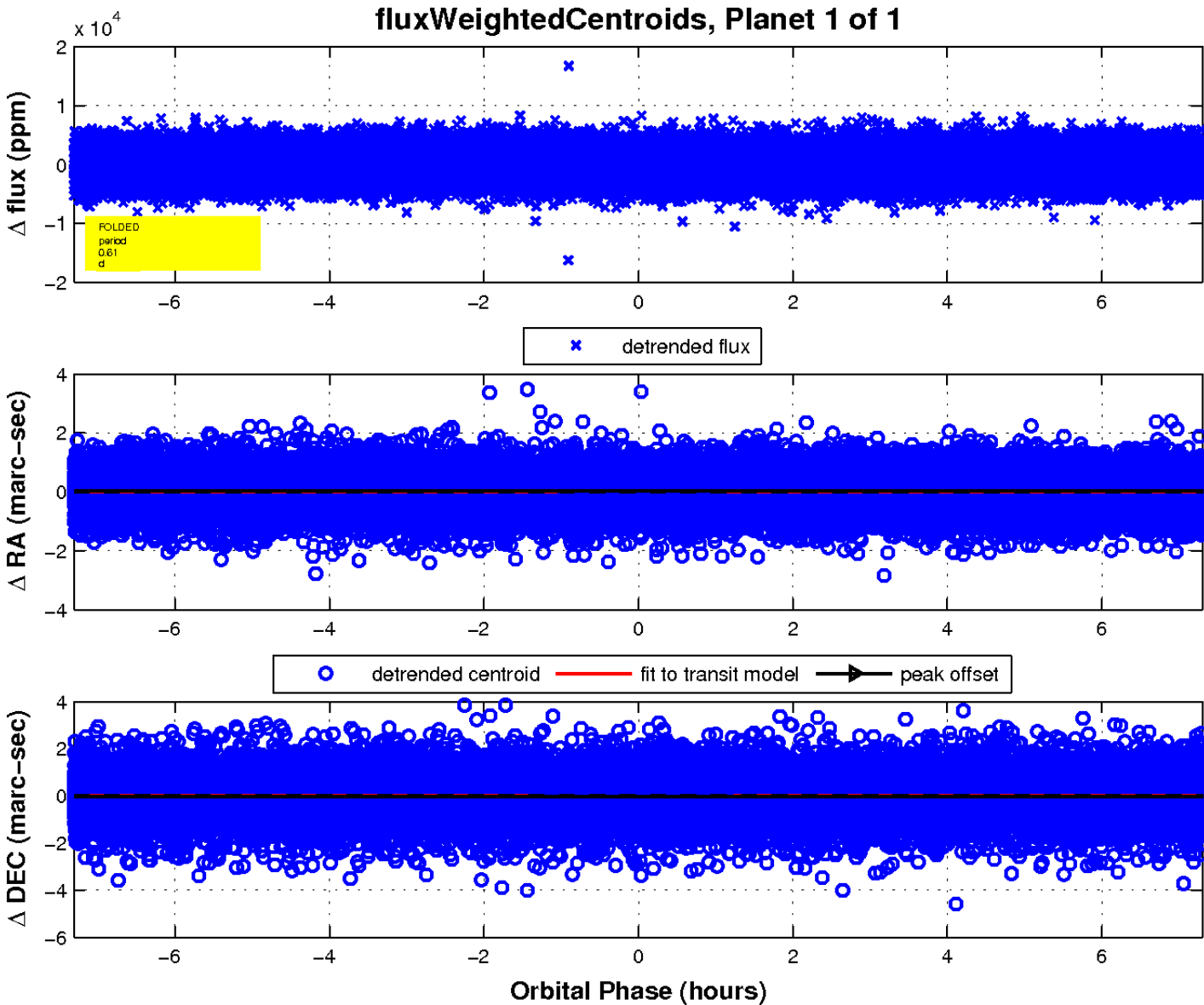
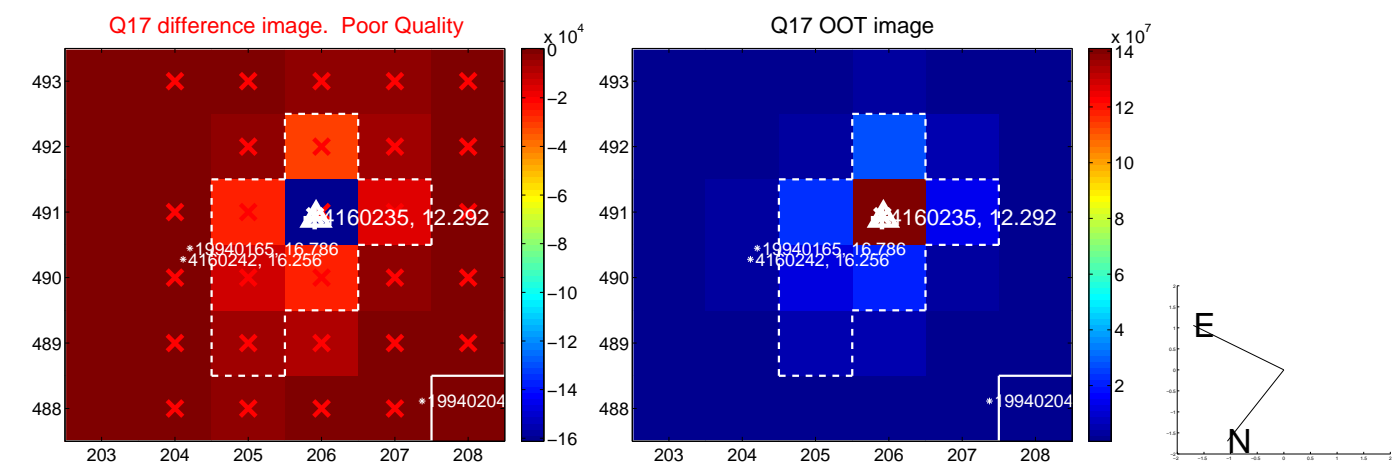
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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UKIRT Image

Declination

