

# KIC 009661877

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009661877-01	OBS	0946.01	20.427194	135.863789	1266.7	3.617	54.4	36.0	0.96	6014	5.63	48.85

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009661877-01	OBS	FP	0.00	0	1	1	1	DEEP_V_SHAPED—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.

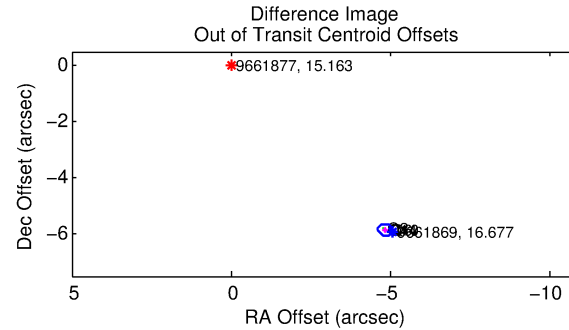
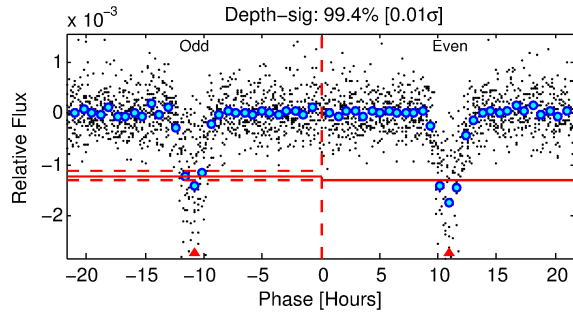
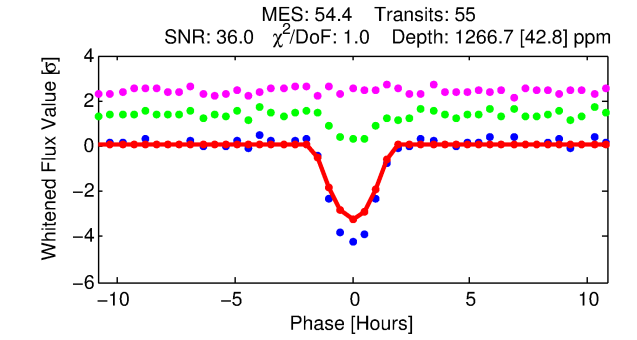
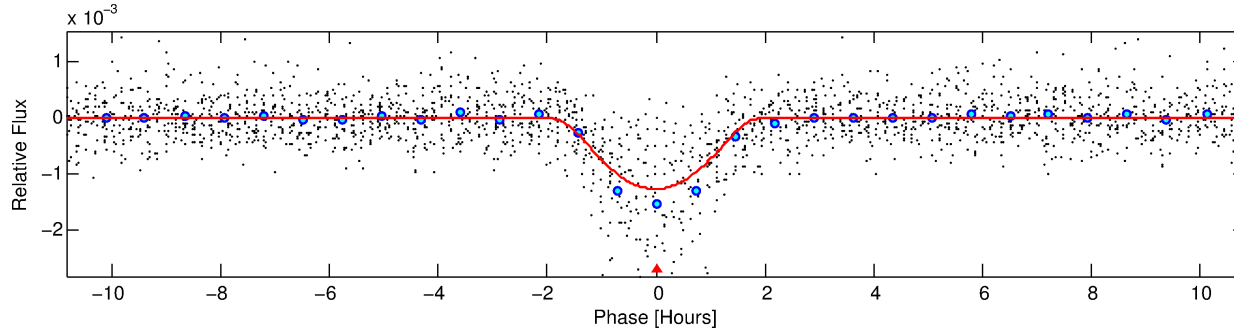
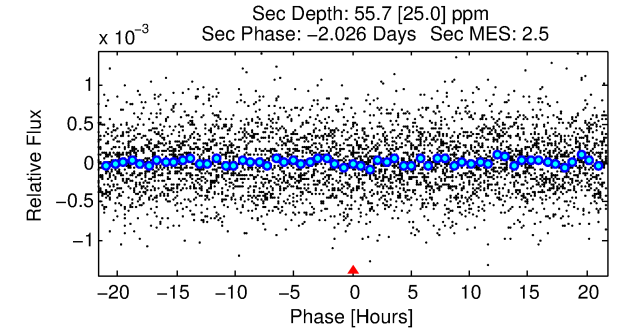
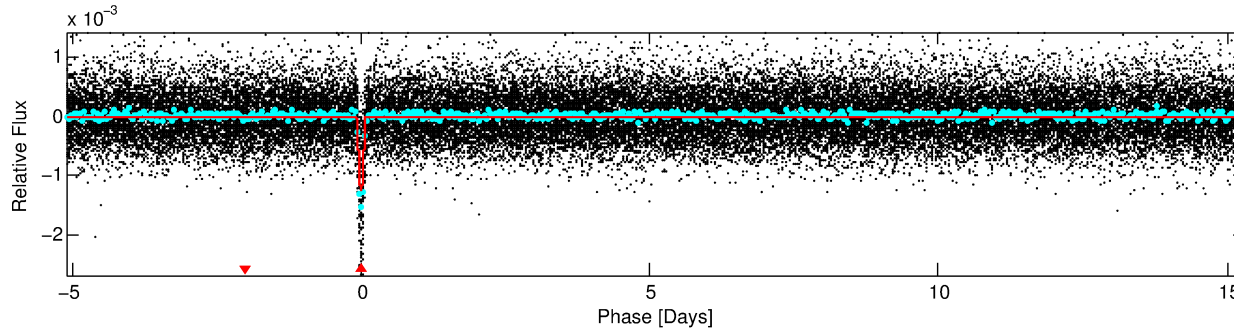
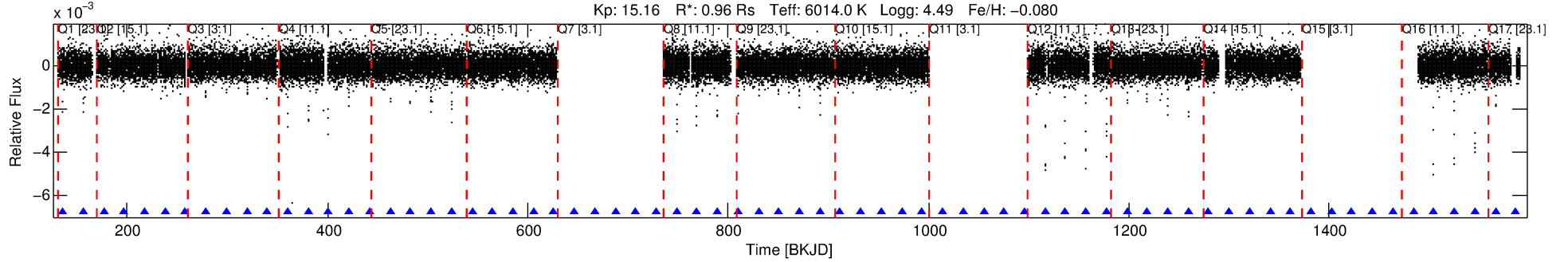
## Ephemeris Match Information For 009661877-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009661877-01	9661877	3647.01	9661869	1:1	7.8	2	0	16.68	15.17	111.73	Direct-PRF	0	0.06	0.03

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 9661877 Candidate: 1 of 1 Period: 20.427 d  
KOI: K00946.01 Corr: 0.996



## DV Fit Results:

Period = 20.42719 [0.00006] d  
Epoch = 135.8638 [0.0022] BKJD  
Rp/R\* = 0.0538 [0.0350]  
a/R\* = 16.05 [3.17]  
b = 0.99 [0.06]  
Seff = 48.85 [20.62]  
Teq = 674 [71] K  
Rp = 5.63 [4.06] Re  
a = 0.1484 [0.0399] AU  
Ag = 21.30 [30.53] [0.66σ]  
Teff = 2239 [775] K [2.01σ]

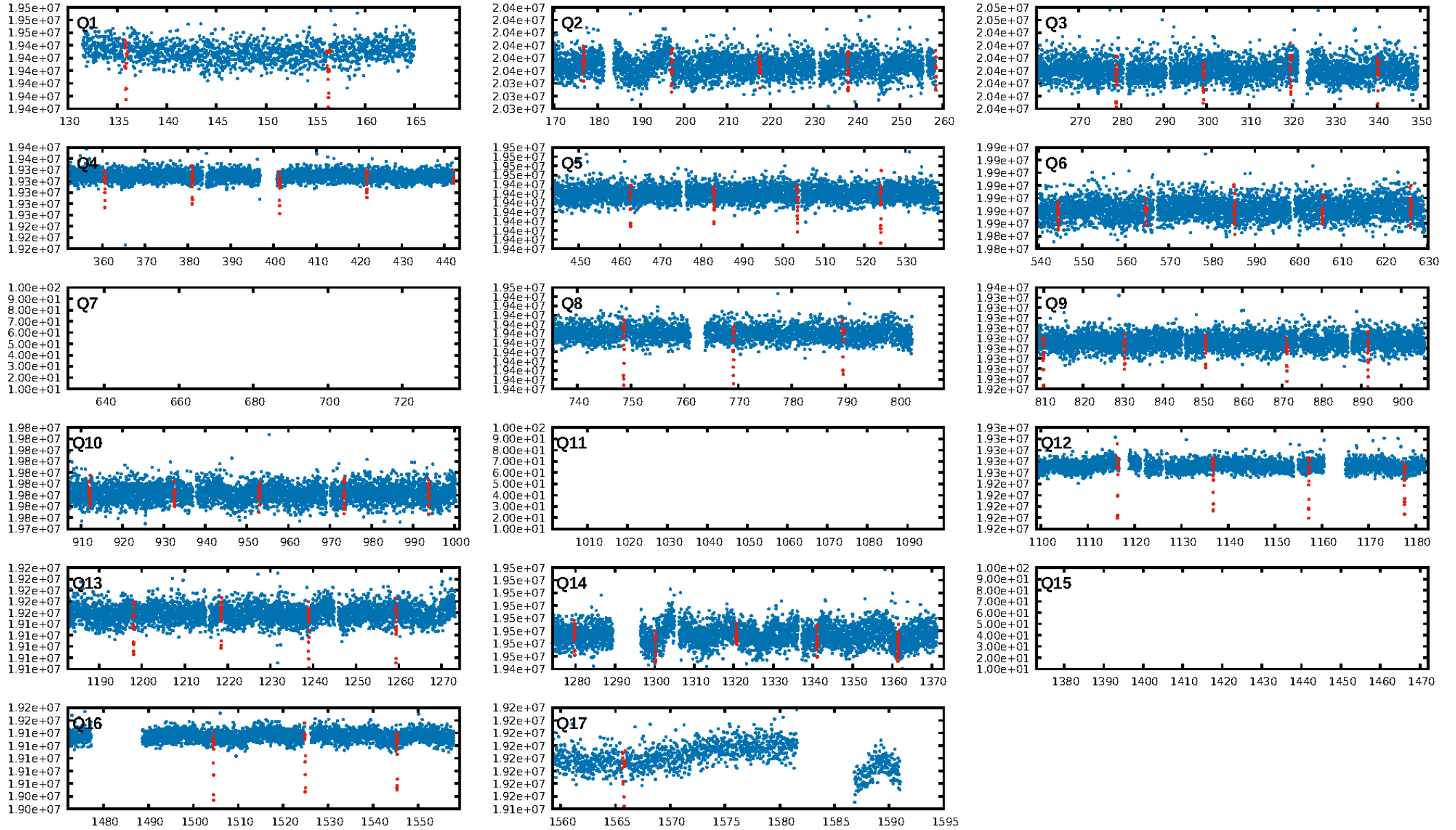
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.3%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [52/52]  
GhostDiagnostic-chr: -0.4259  
Centroid-sig: 0.0%  
Centroid-so: 43.882 arcsec [125.13σ]  
OotOffset-rm: 7.600 arcsec [108.23σ]  
KicOffset-rm: 7.948 arcsec [118.44σ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [14/14]

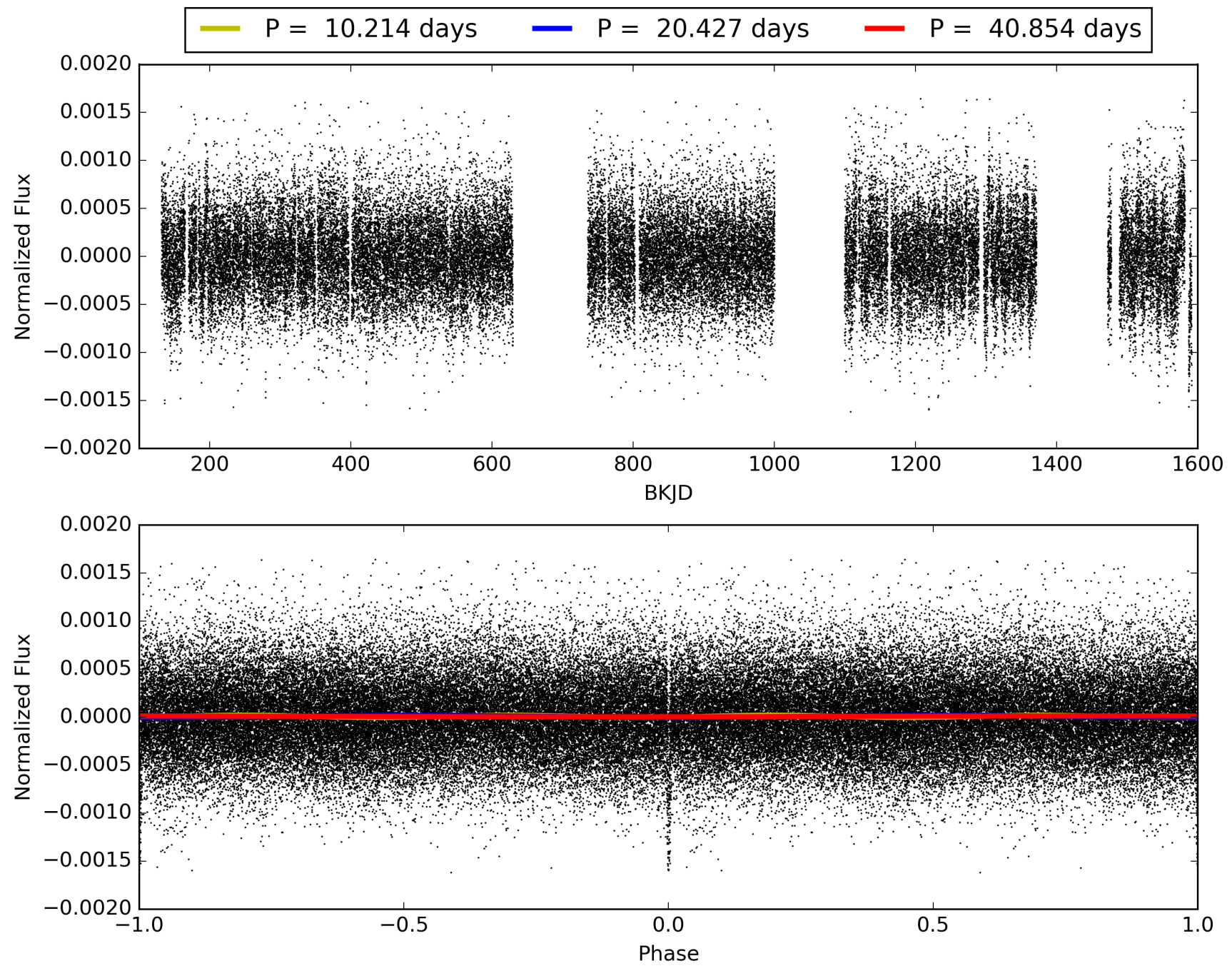
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:40:42 Z

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

# TCE 009661877-01, PDC Light Curves

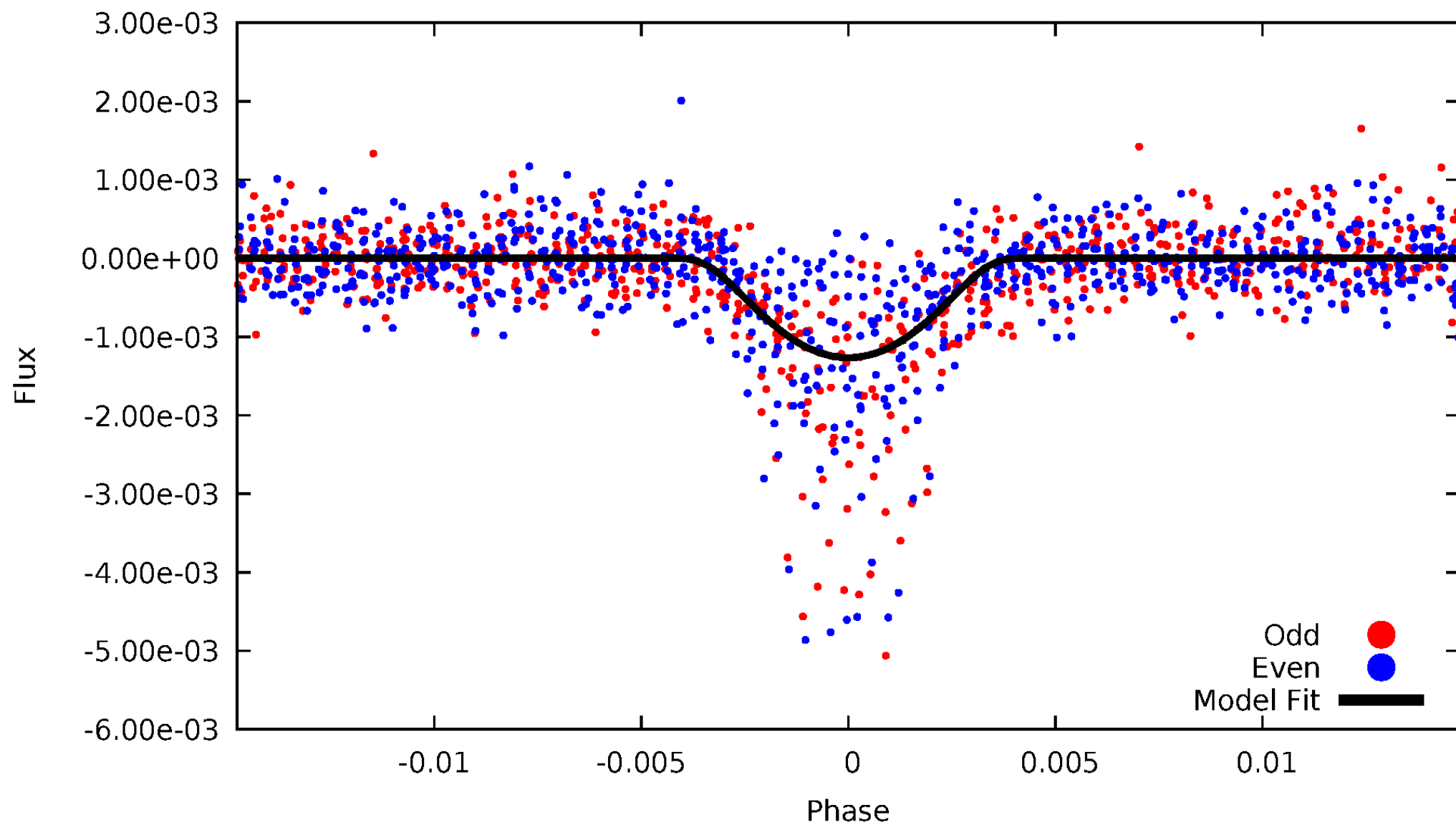


TCE 009661877-01



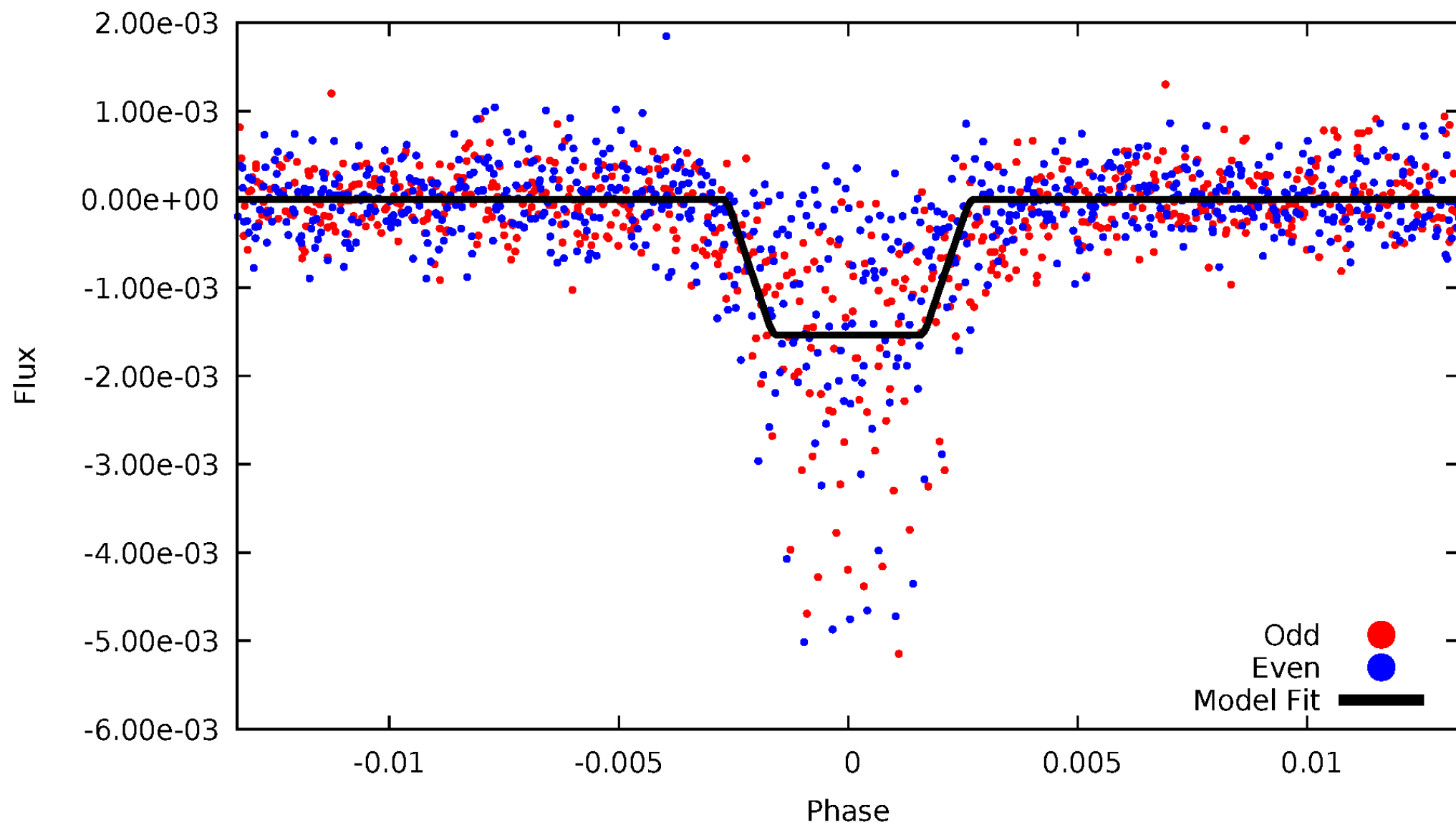
# DV Odd/Even

TCE 009661877-01



# ALT Odd/Even

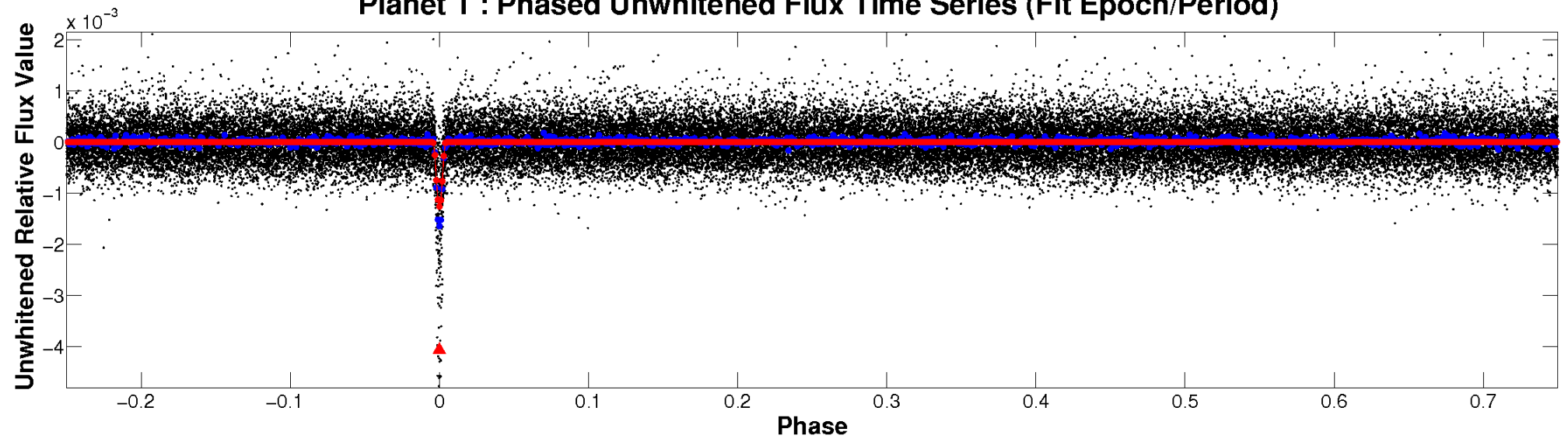
TCE 009661877-01



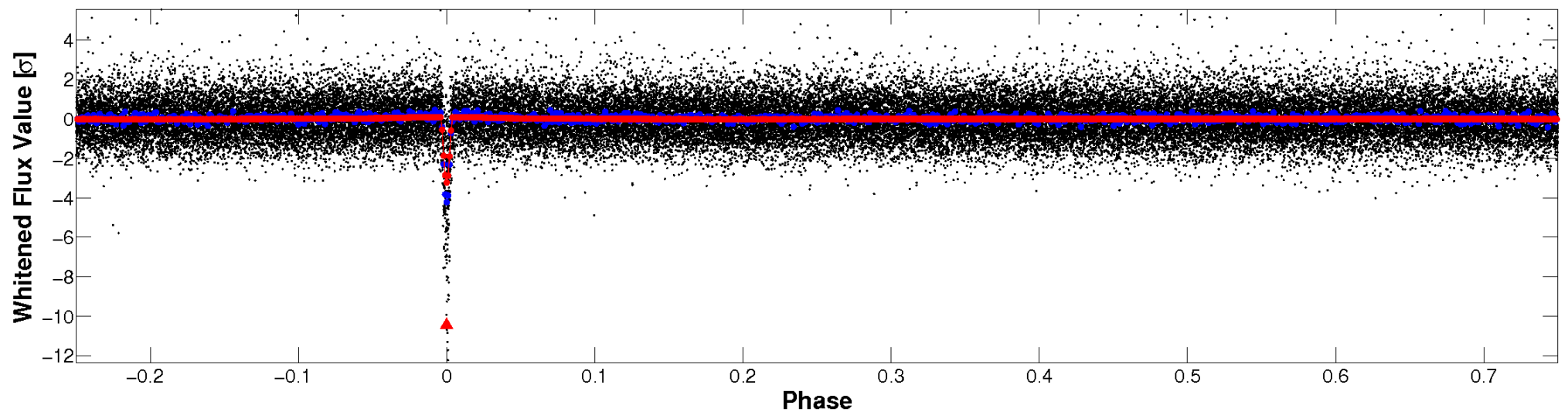


# Non-Whitened Vs. Whitened Light Curve

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

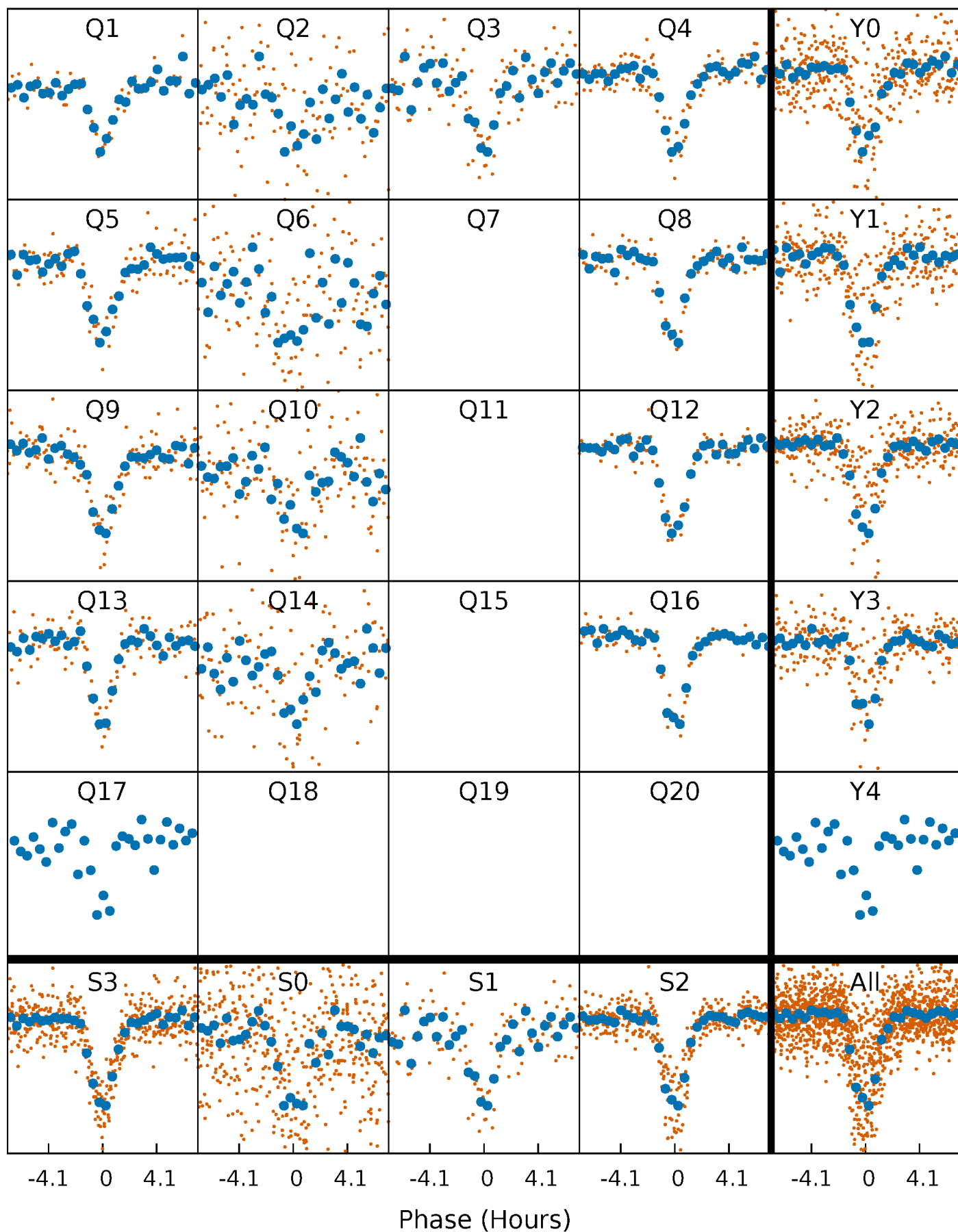


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

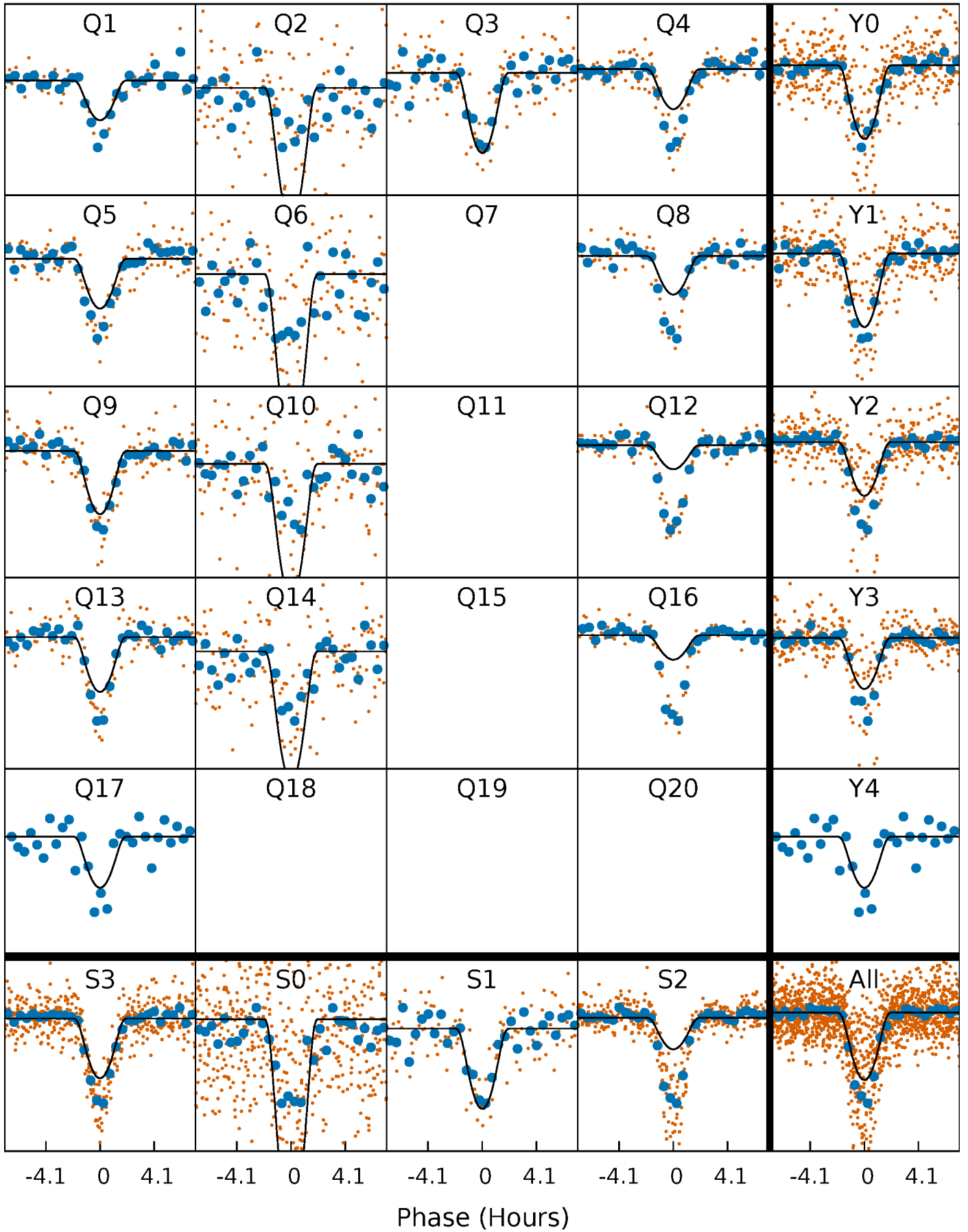
TCE 009661877-01 P= 20.427194 Days  $T_0=135.863789$  (BKJD)





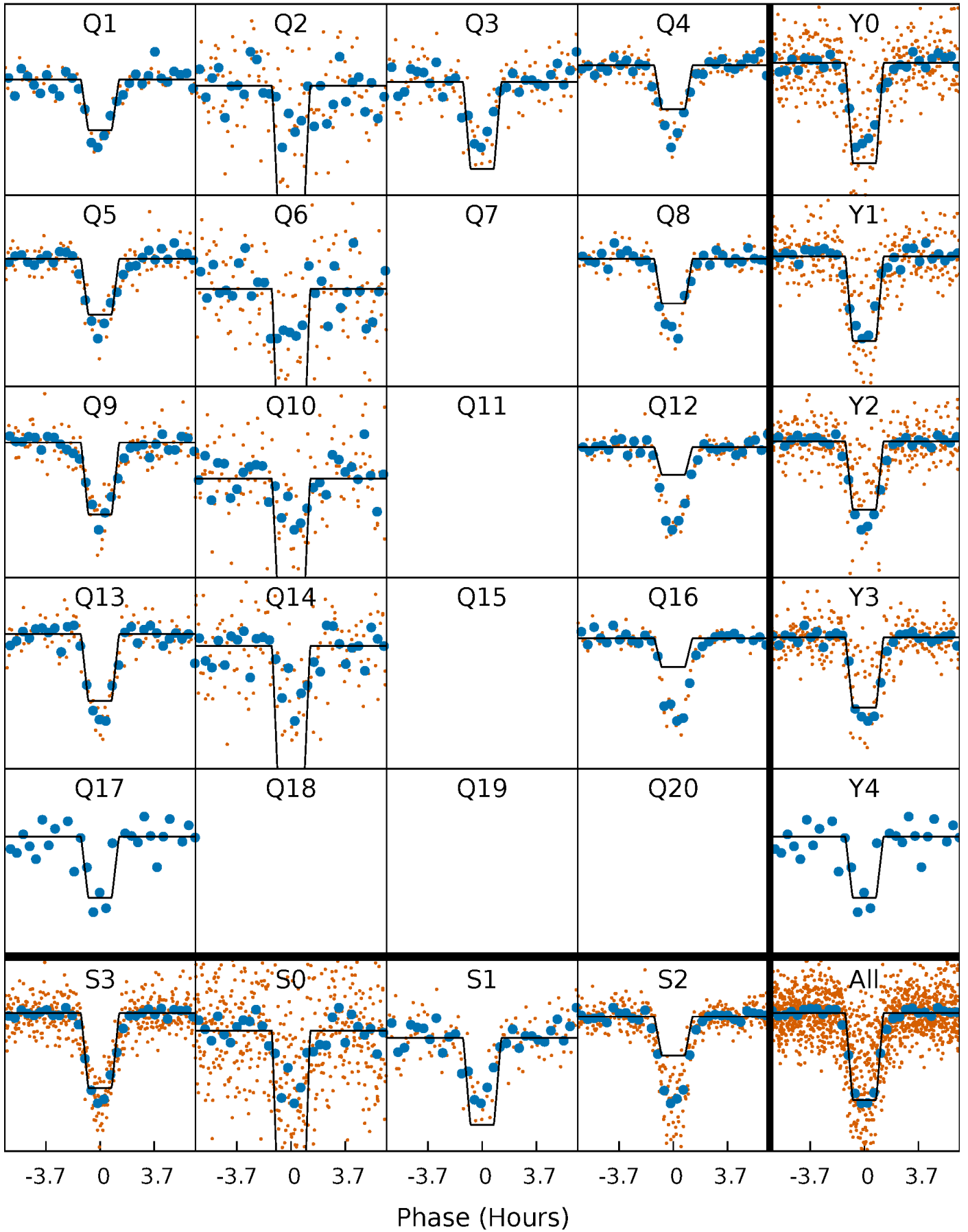
# DV Quarter-Phased Transit Curves

TCE 009661877-01 P= 20.427194 Days  $T_0=135.863789$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

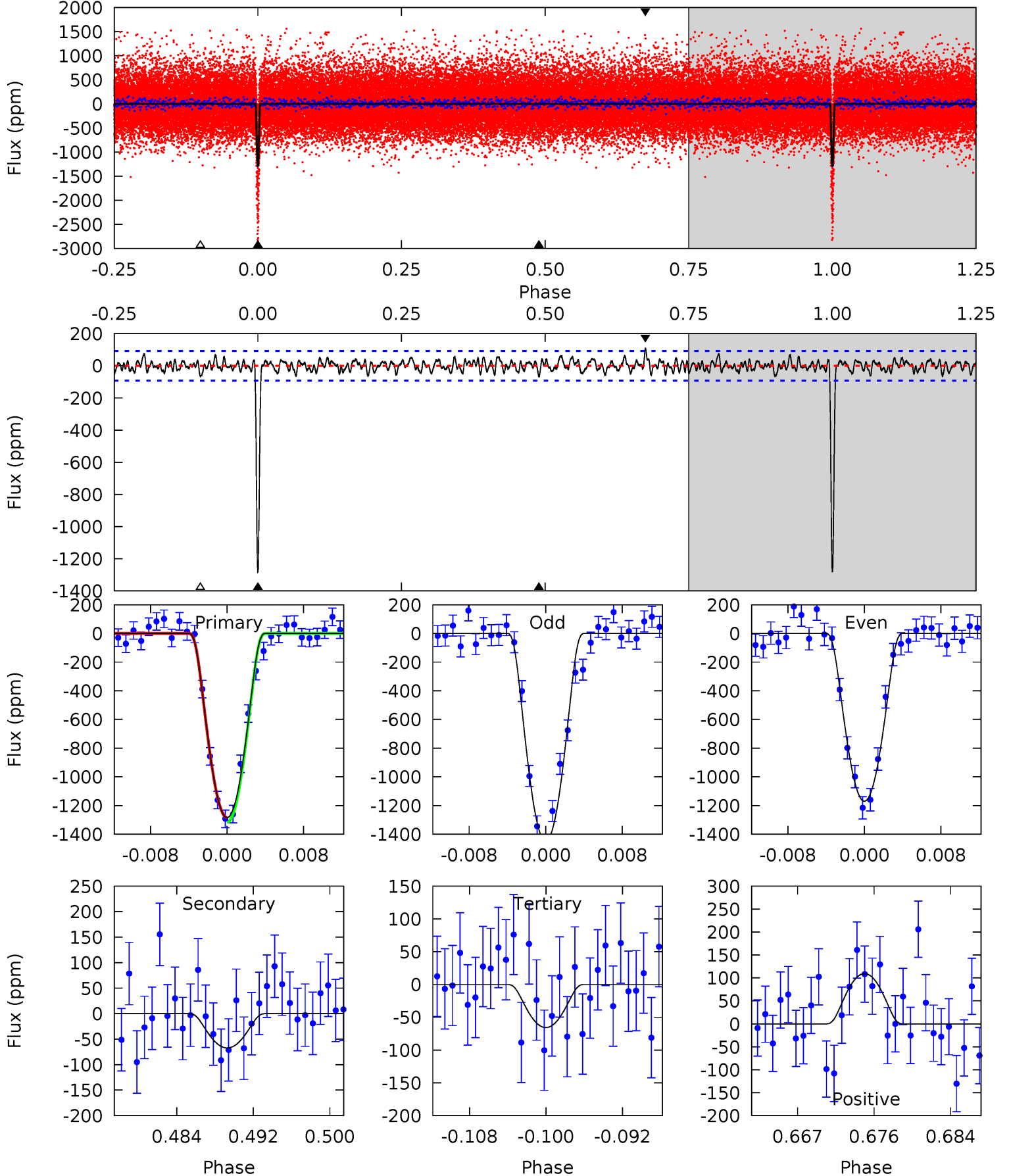
TCE 009661877-01 P= 20.427064 Days  $T_0=135.868493$  (BKJD)



# DV Model-Shift Uniqueness Test

009661877-01, P = 20.427194 Days, E = 115.436595 Days

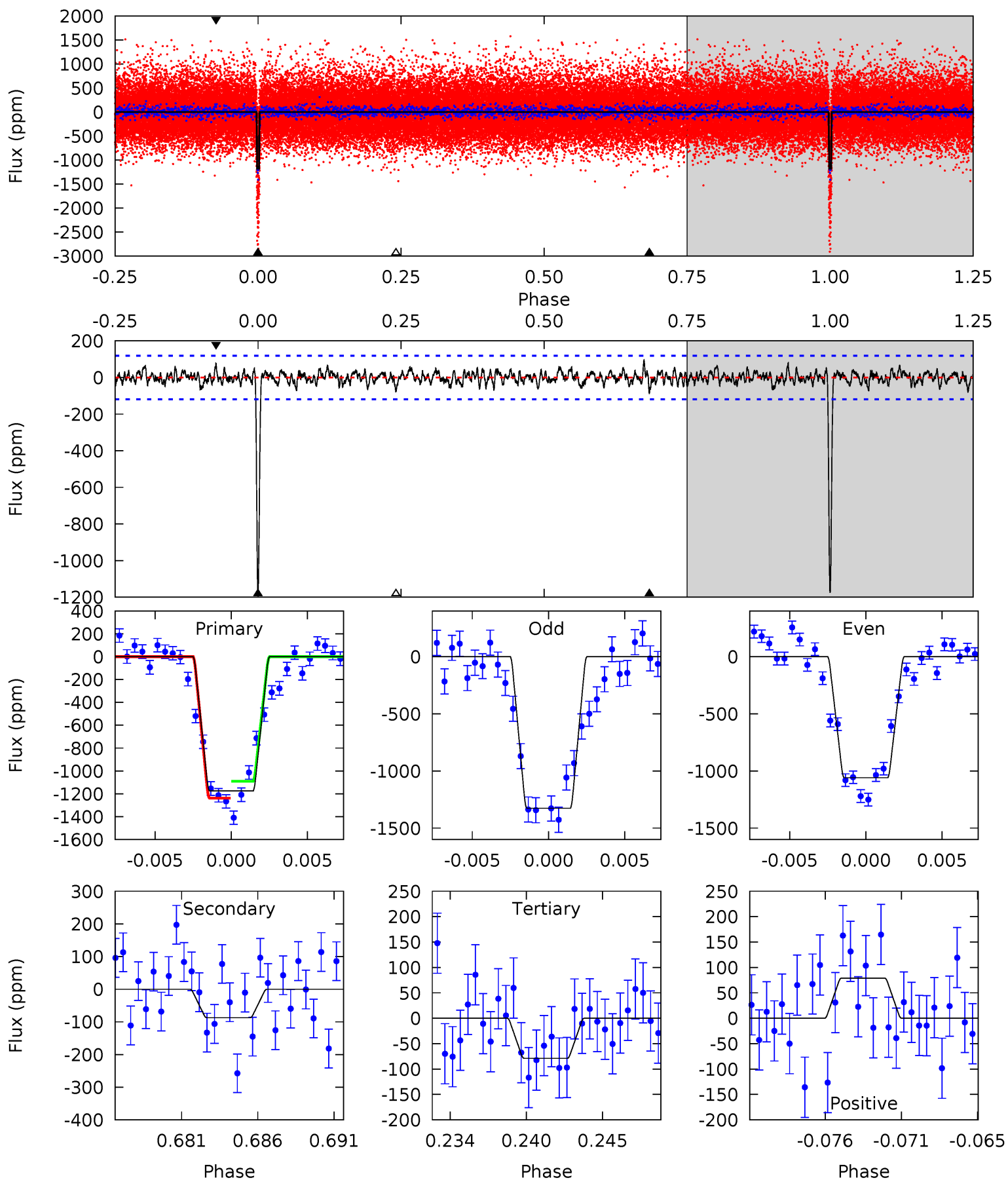
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
70.0	3.67	3.58	5.96	5.06	2.64	1.46	66.4	64.1	0.09	-2.30	7.63	1.07	0.08	0.91



# Alt Model-Shift Uniqueness Test

009661877-01,  $P = 20.427064$  Days,  $E = 115.441429$  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
50.8	3.77	3.41	3.41	5.14	2.78	1.09	47.4	47.4	0.37	0.36	5.73	1.06	0.08	0



### Stellar Parameters For KIC 009661877

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6014^{+189}_{-210}$	$4.494^{+0.052}_{-0.221}$	$-0.080^{+0.250}_{-0.300}$	$0.958^{+0.300}_{-0.100}$	$1.043^{+0.129}_{-0.142}$	$1.673^{+0.456}_{-0.897}$
	+3%/-3%	+1%/-5%	+312%/-375%	+31%/-10%	+12%/-14%	+27%/-54%
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 009661877-01 / KOI 0946.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-67 \pm 18$	$6.29^{+3.87}_{-3.41}$	$965^{+70}_{-51}$	$2960^{+807}_{-393}$	$19^{+81}_{-12}$
Alt.	$-87 \pm 23$	$5.04^{+3.82}_{-3.07}$	$965^{+71}_{-52}$	$3256^{+1298}_{-484}$	$41^{+231}_{-28}$

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

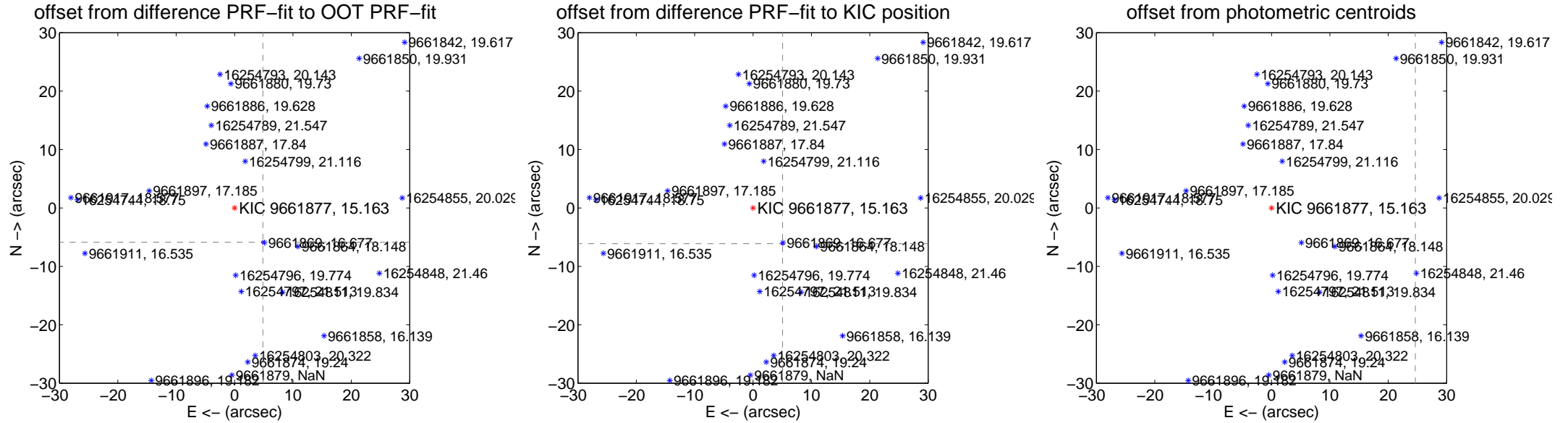
## DV Centroid Data

Supplemental centroid analysis for 009661877-01. Kepler magnitude: 15.16. Transit SNR 36.03

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

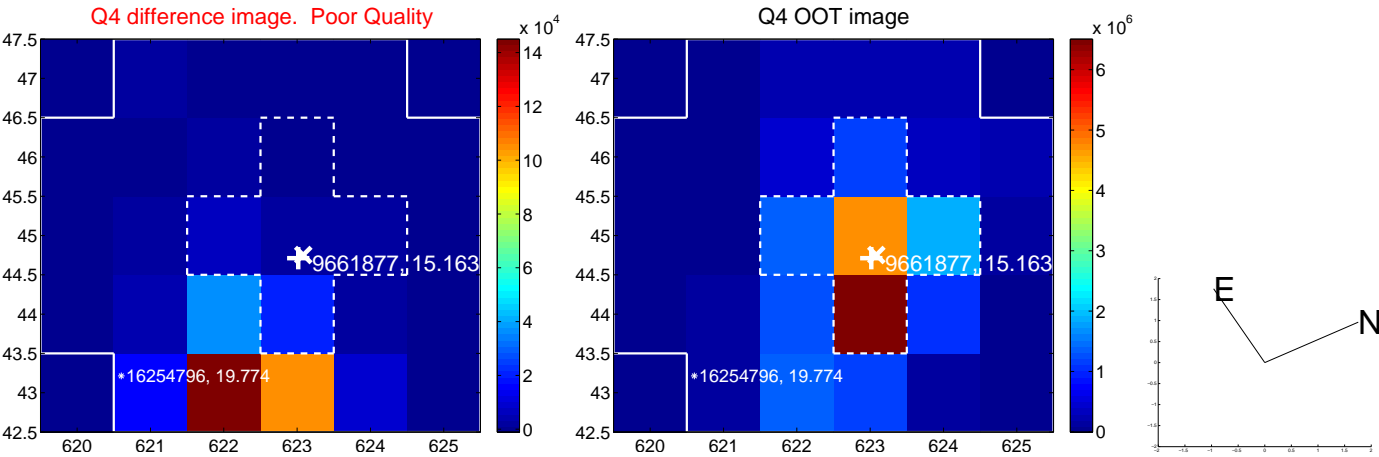
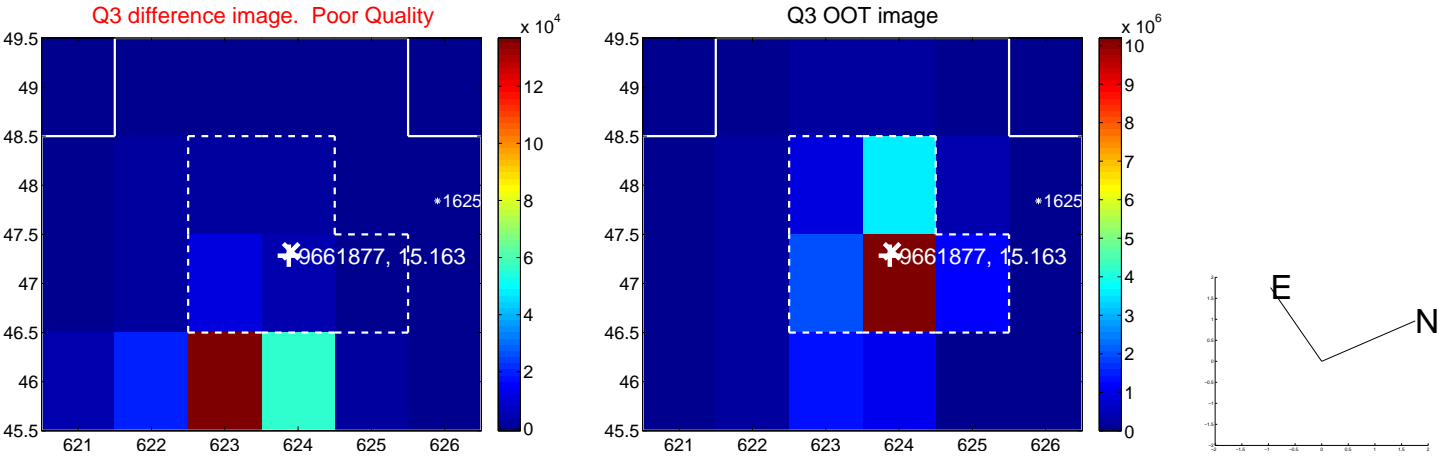
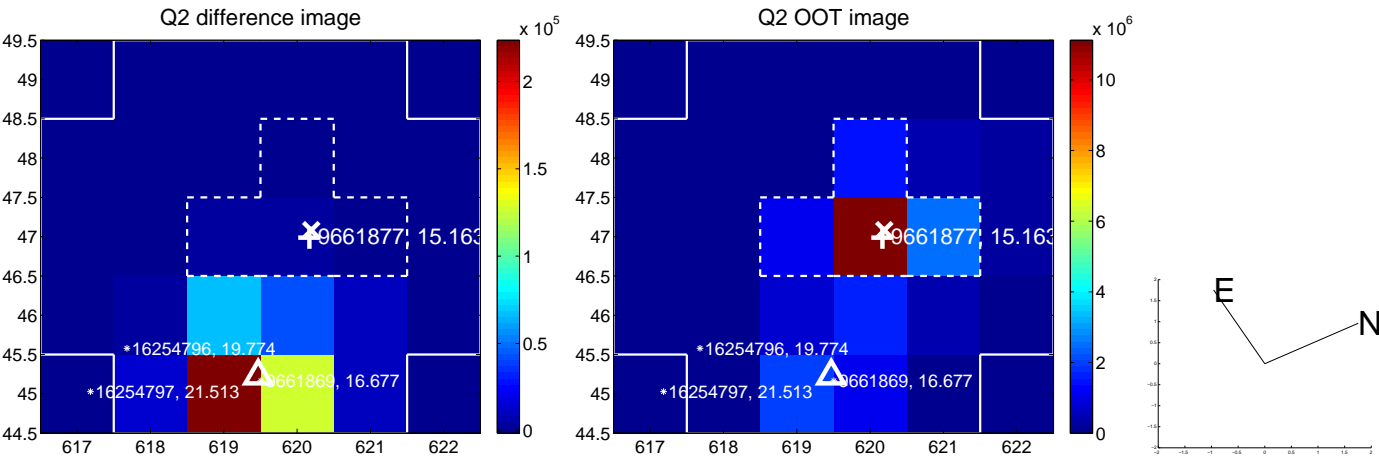
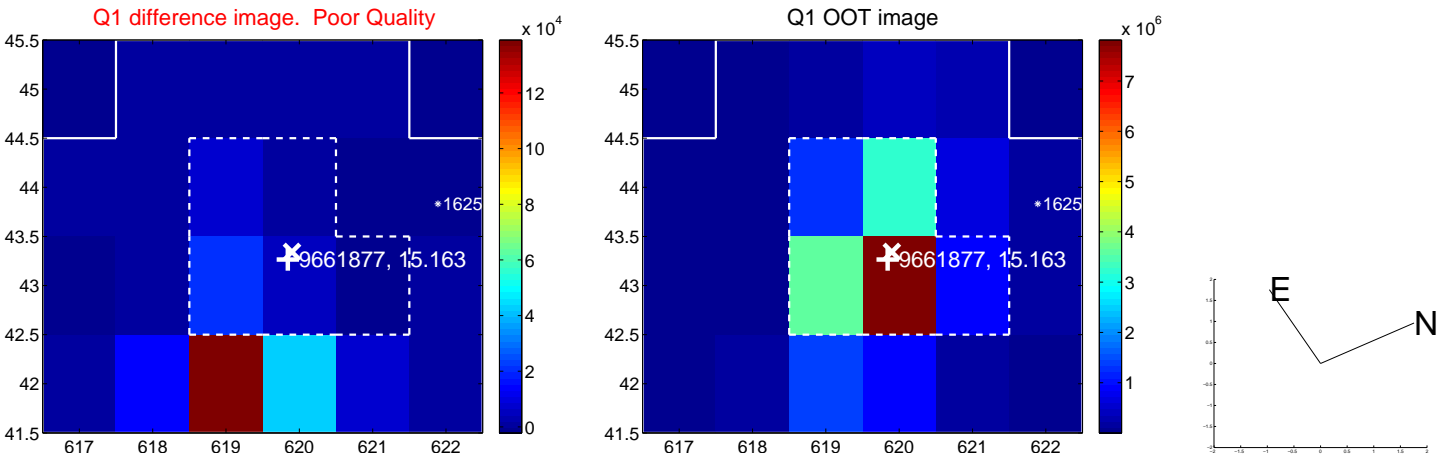
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>7.600 <math>\pm</math> 0.070</b>	<b>108.23</b>	-4.848 $\pm$ 0.070	-5.853 $\pm$ 0.070
PRF-fit source offset from KIC position	<b>7.948 <math>\pm</math> 0.067</b>	<b>118.44</b>	-5.062 $\pm$ 0.067	-6.128 $\pm$ 0.067
photometric centroid source offset	<b>43.88 <math>\pm</math> 0.35</b>	<b>125.14</b>	-24.65 $\pm$ 0.31	-36.31 $\pm$ 0.37



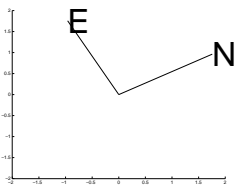
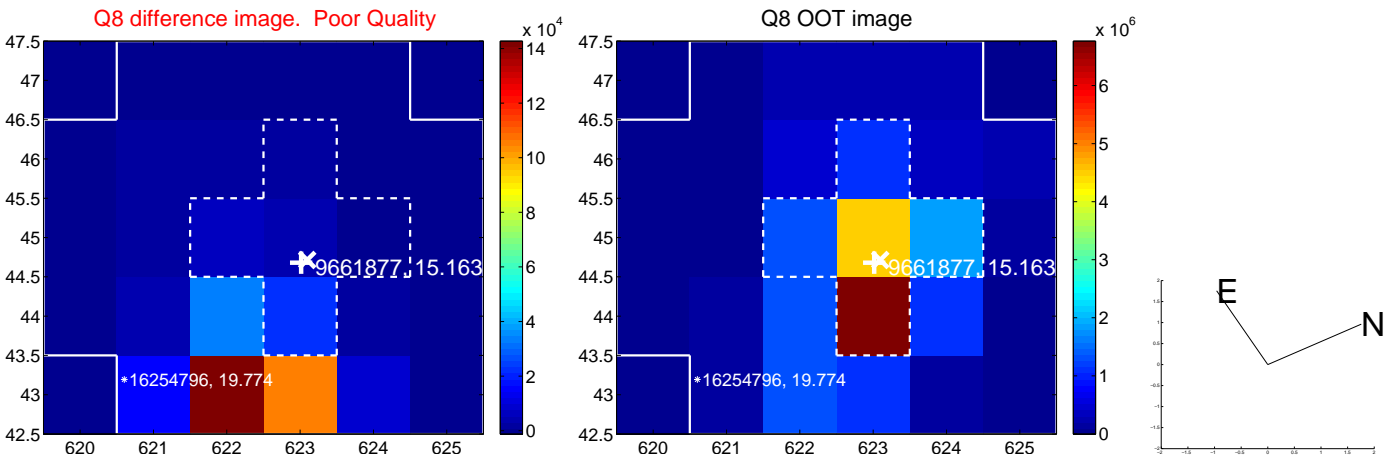
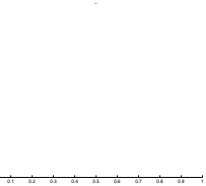
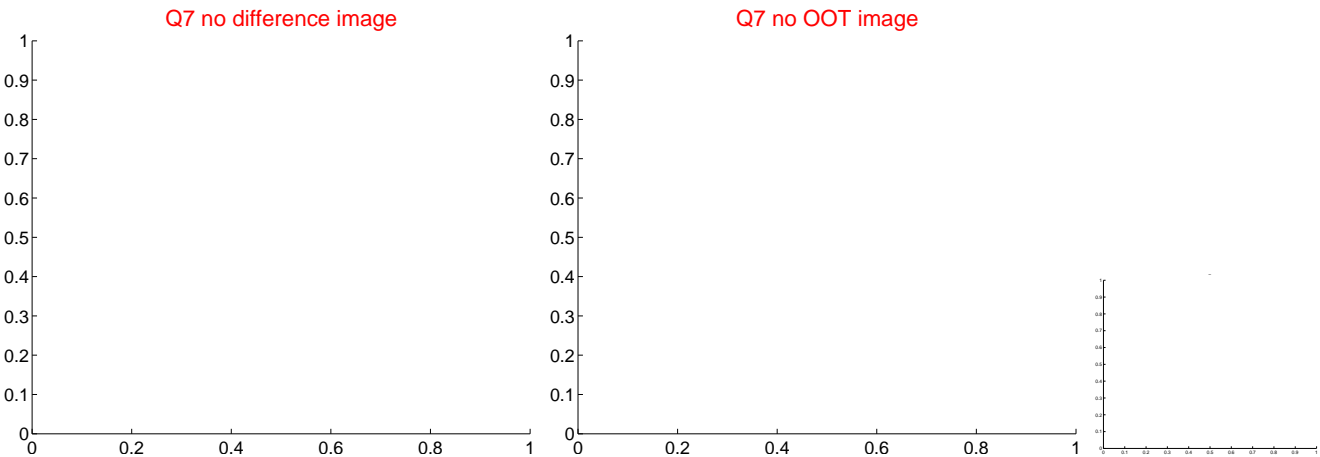
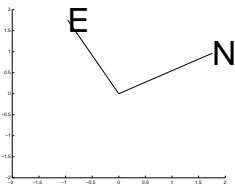
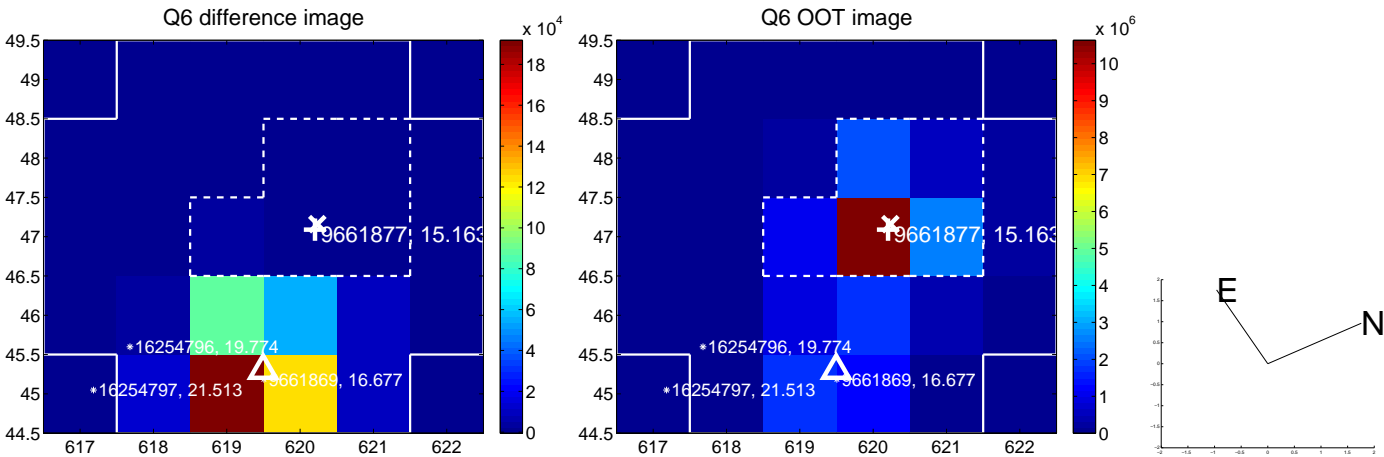
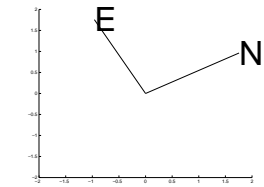
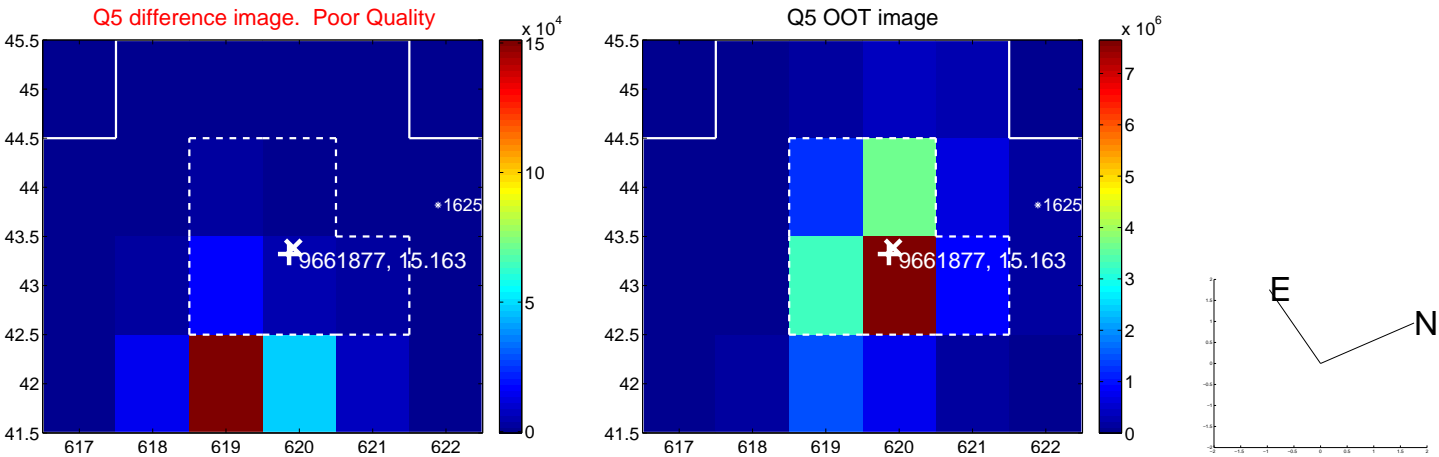
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



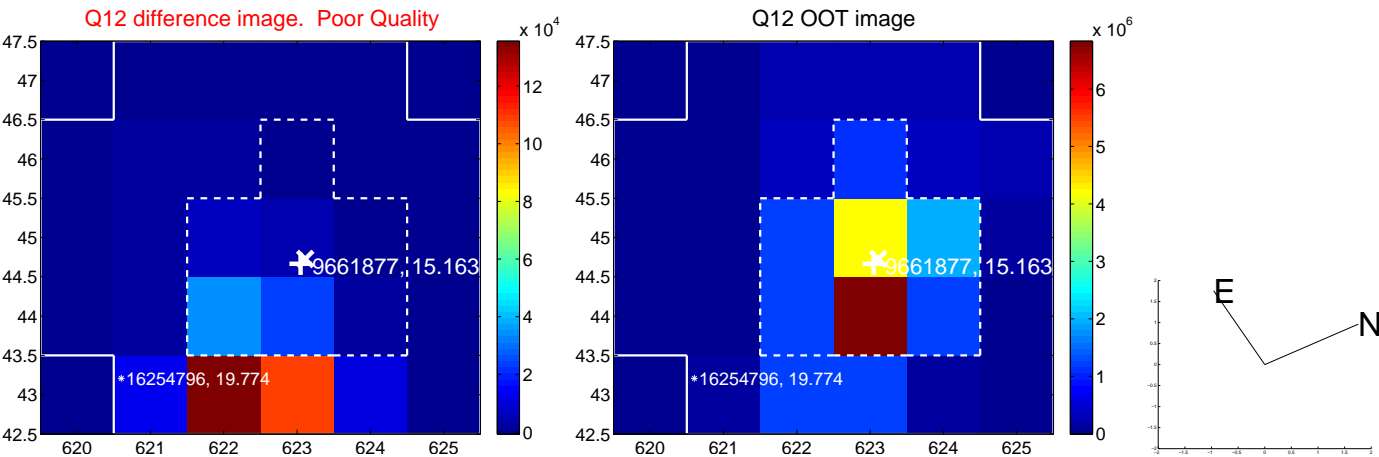
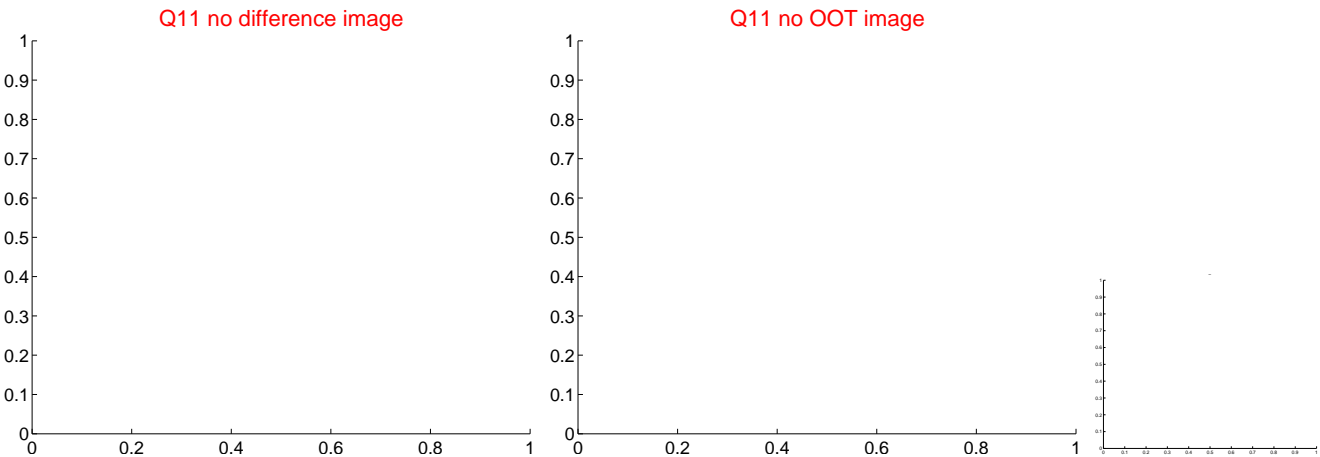
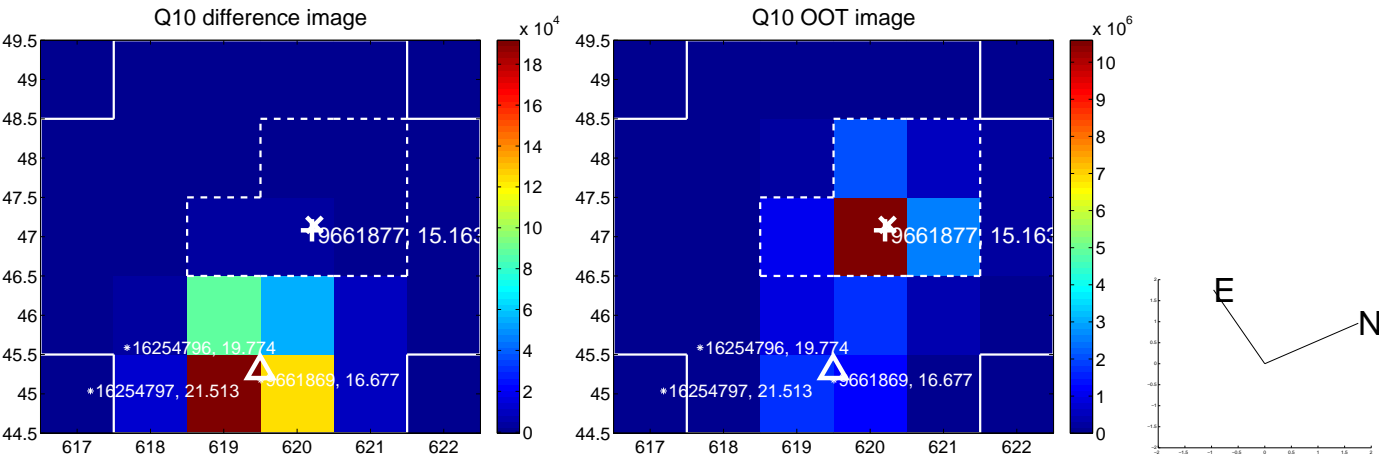
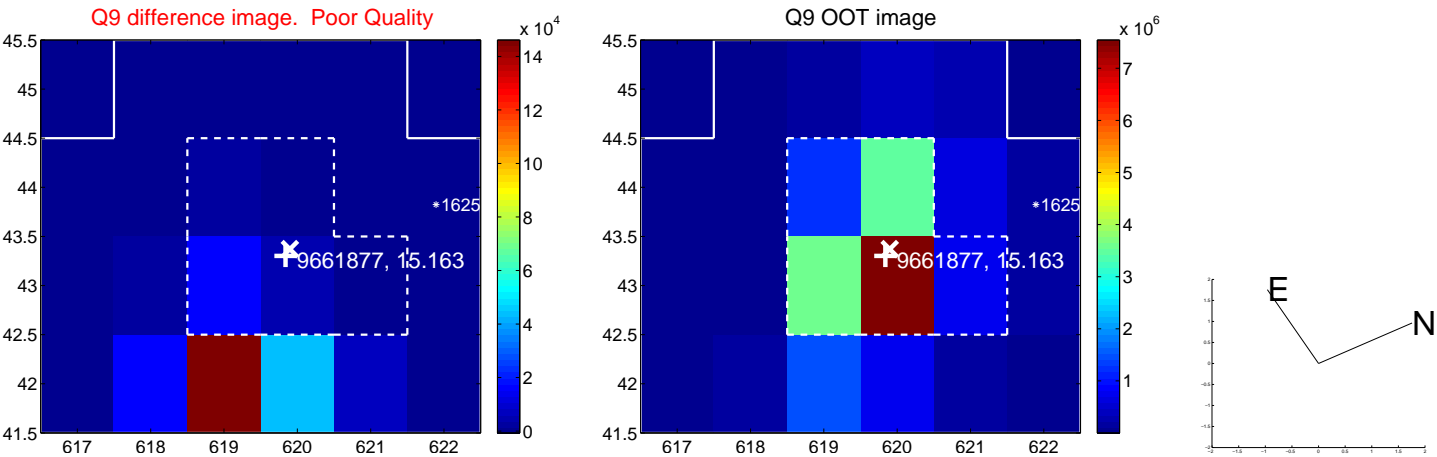
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



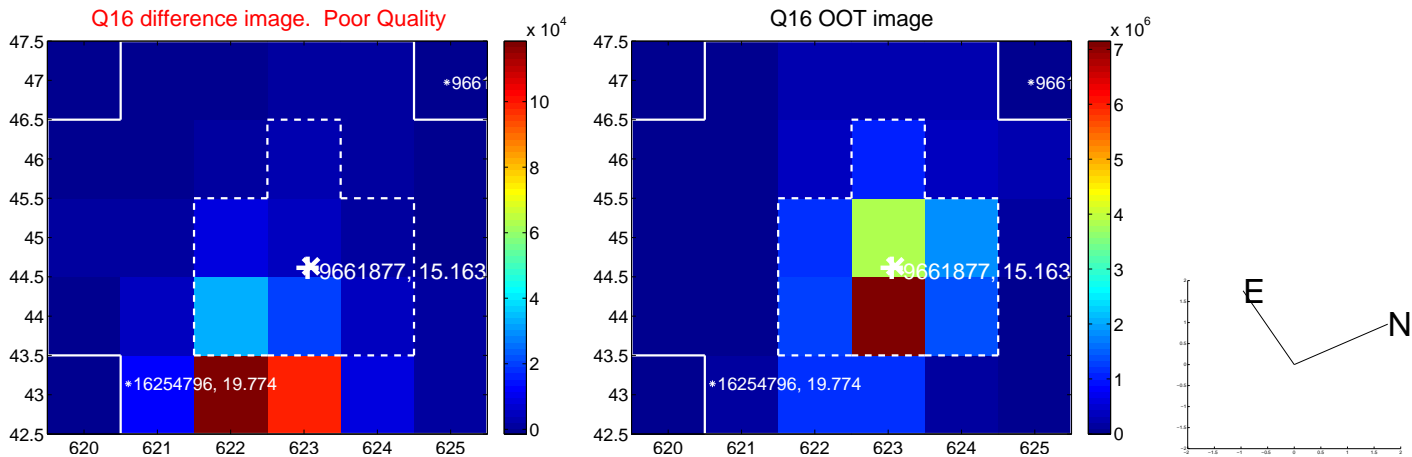
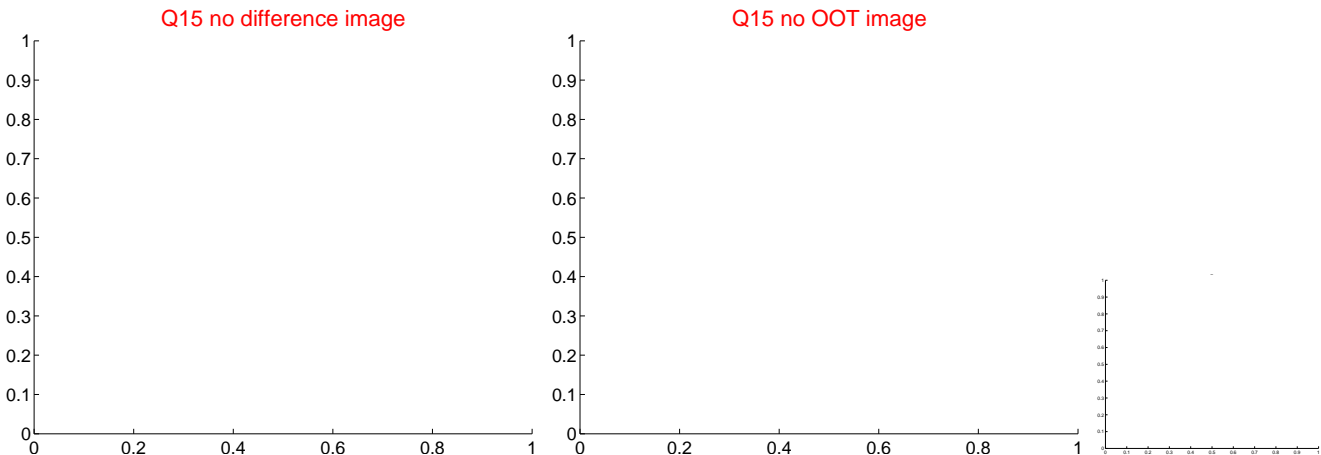
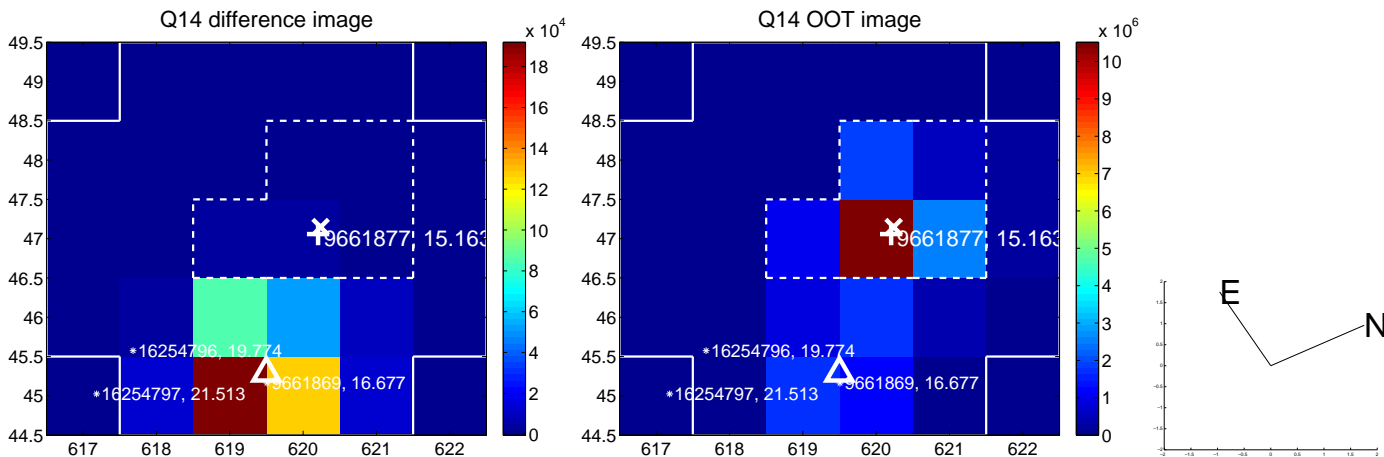
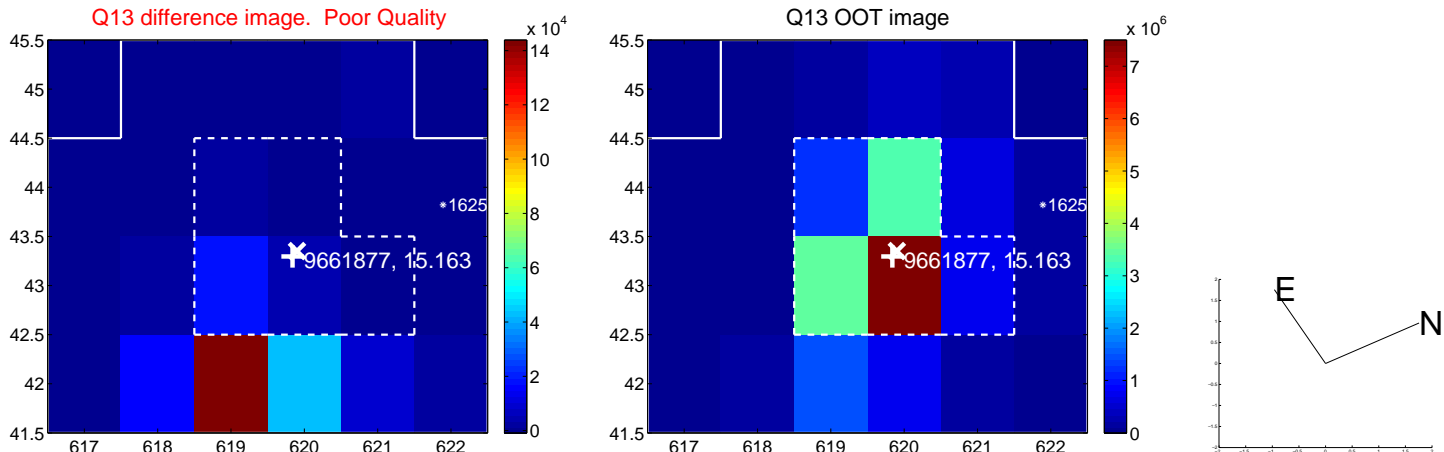
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



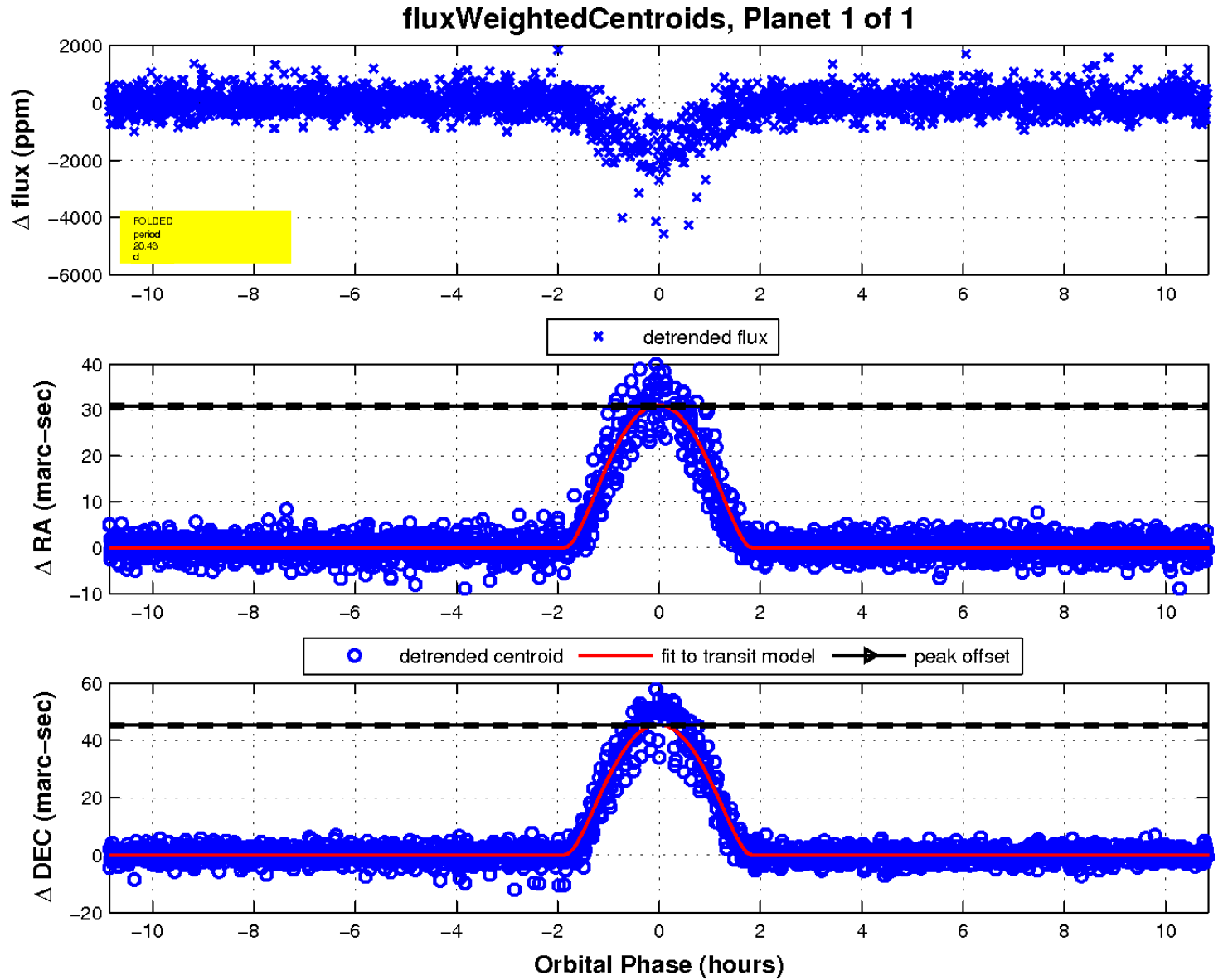
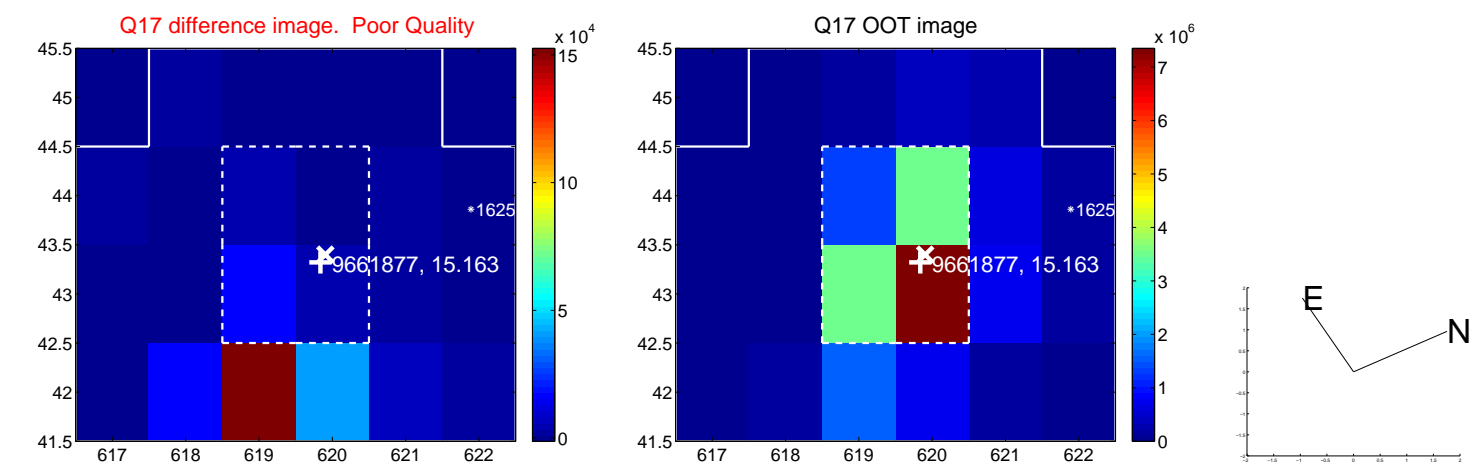
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

