

# KIC 009631995

## 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> )
009631995-01	OBS	0022.01	7.891448	137.792763	10367.1	4.354	1973.1	1908.2	1.24	5972	12.86	264.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009631995-01	OBS	PC	0.99	0	0	0	0	NO_COMMENT

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

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

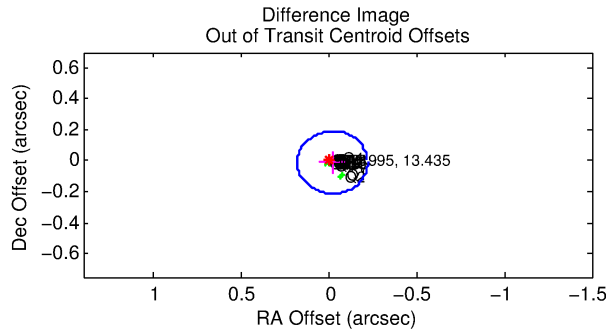
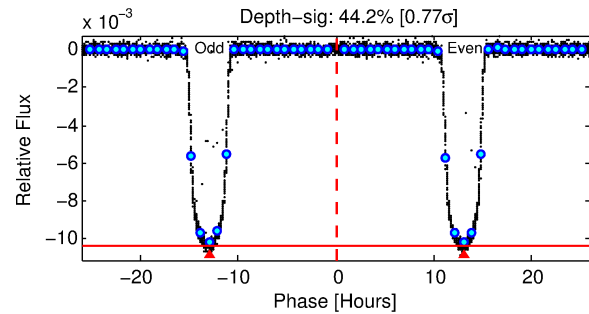
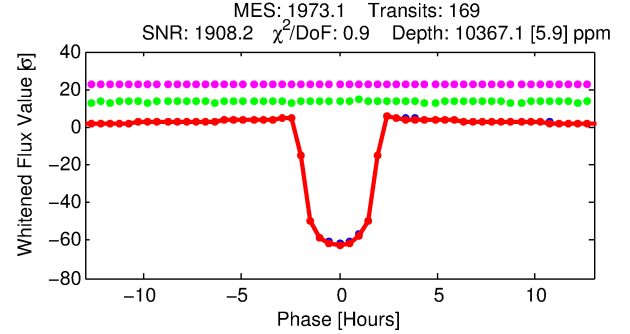
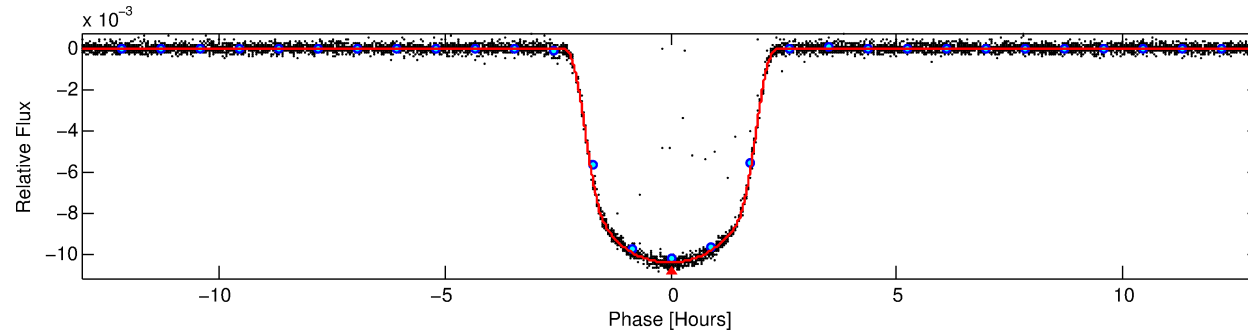
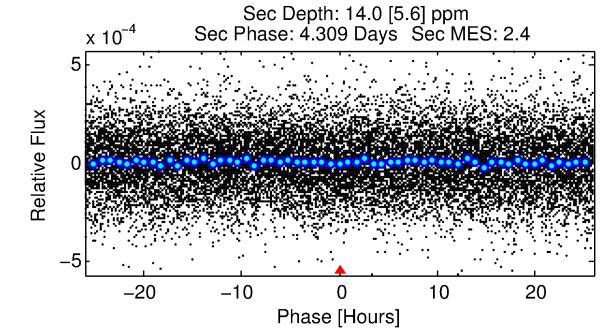
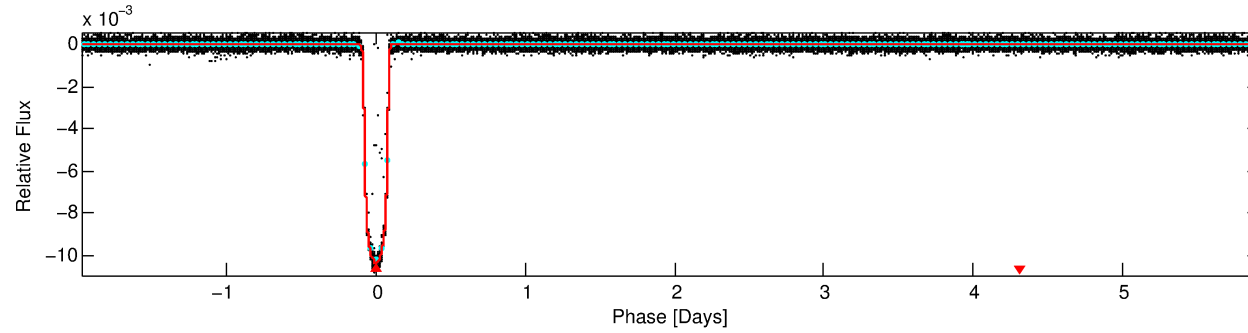
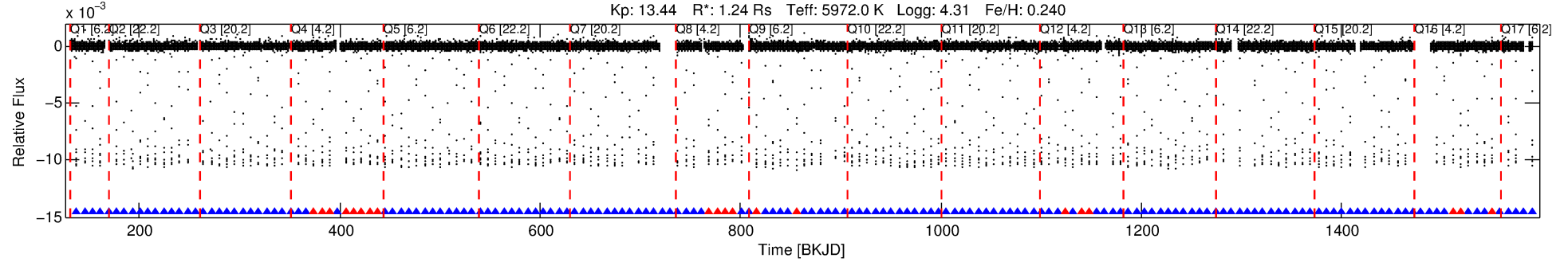
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009631995-01

No Significant Match Found

# DV One-Page Summary

KIC: 9631995 Candidate: 1 of 1 Period: 7.891 d  
KOI: K00022.01 Name: Kepler-422b Corr: 0.994



## DV Fit Results:

Period = 7.89145 [0.00000] d  
Epoch = 137.7928 [0.0000] BKJD  
Rp/R\* = 0.0953 [0.0001]  
a/R\* = 13.65 [0.09]  
b = 0.48 [0.01]  
Seff = 264.29 [57.64]  
Teq = 1028 [56] K  
Rp = 12.86 [2.17] Re  
a = 0.0812 [0.0117] AU  
Ag = 0.31 [0.14] [-4.99 $\sigma$ ]  
Teffp = 1182 [120] K [1.16 $\sigma$ ]

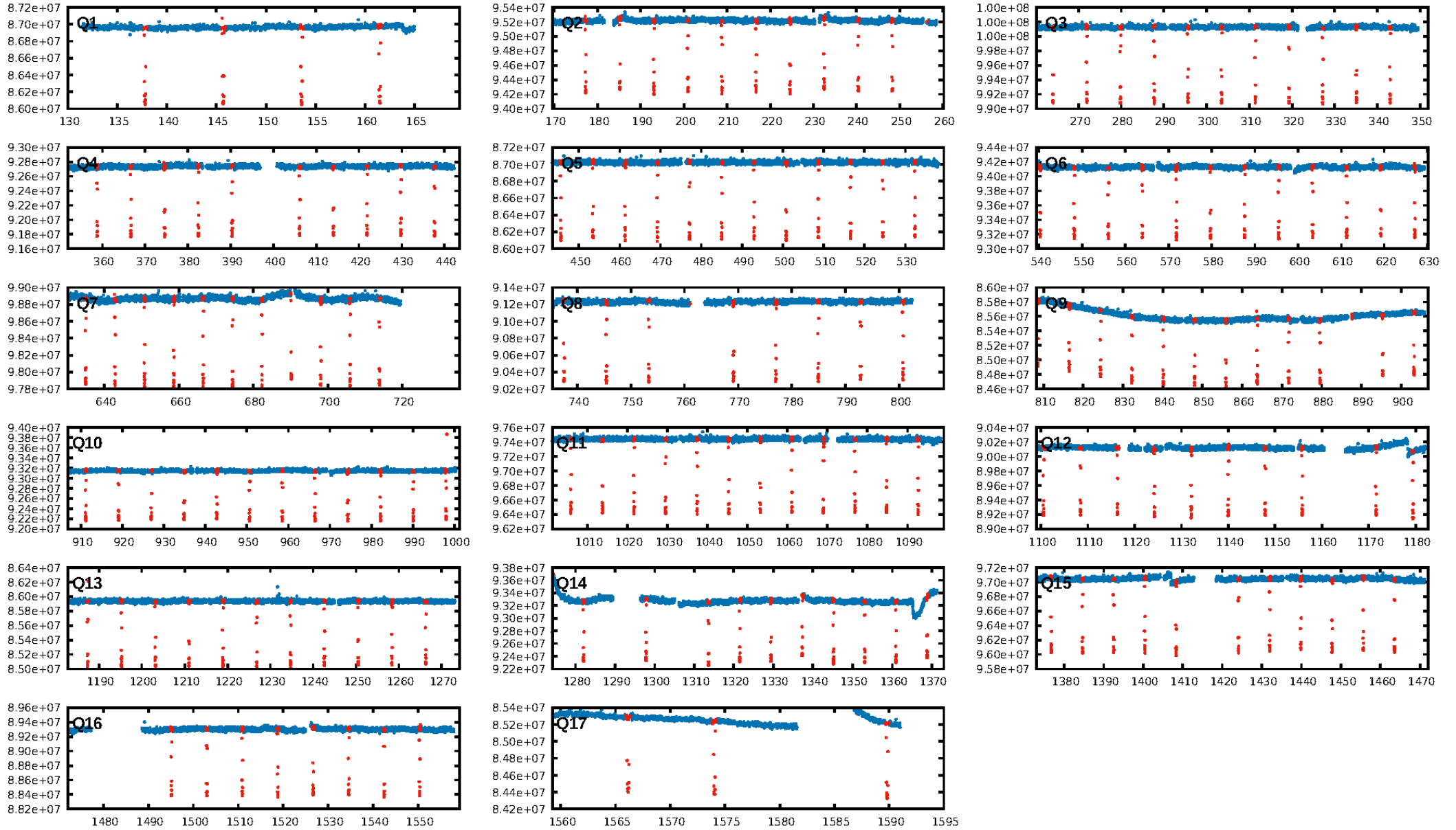
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.88 [142/162]  
GhostDiagnostic-chr: 9.332  
Centroid-sig: 0.0%  
Centroid-so: 0.200 arcsec [23.95 $\sigma$ ]  
OotOffset-rm: 0.023 arcsec [0.34 $\sigma$ ]  
KicOffset-rm: 0.161 arcsec [2.39 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

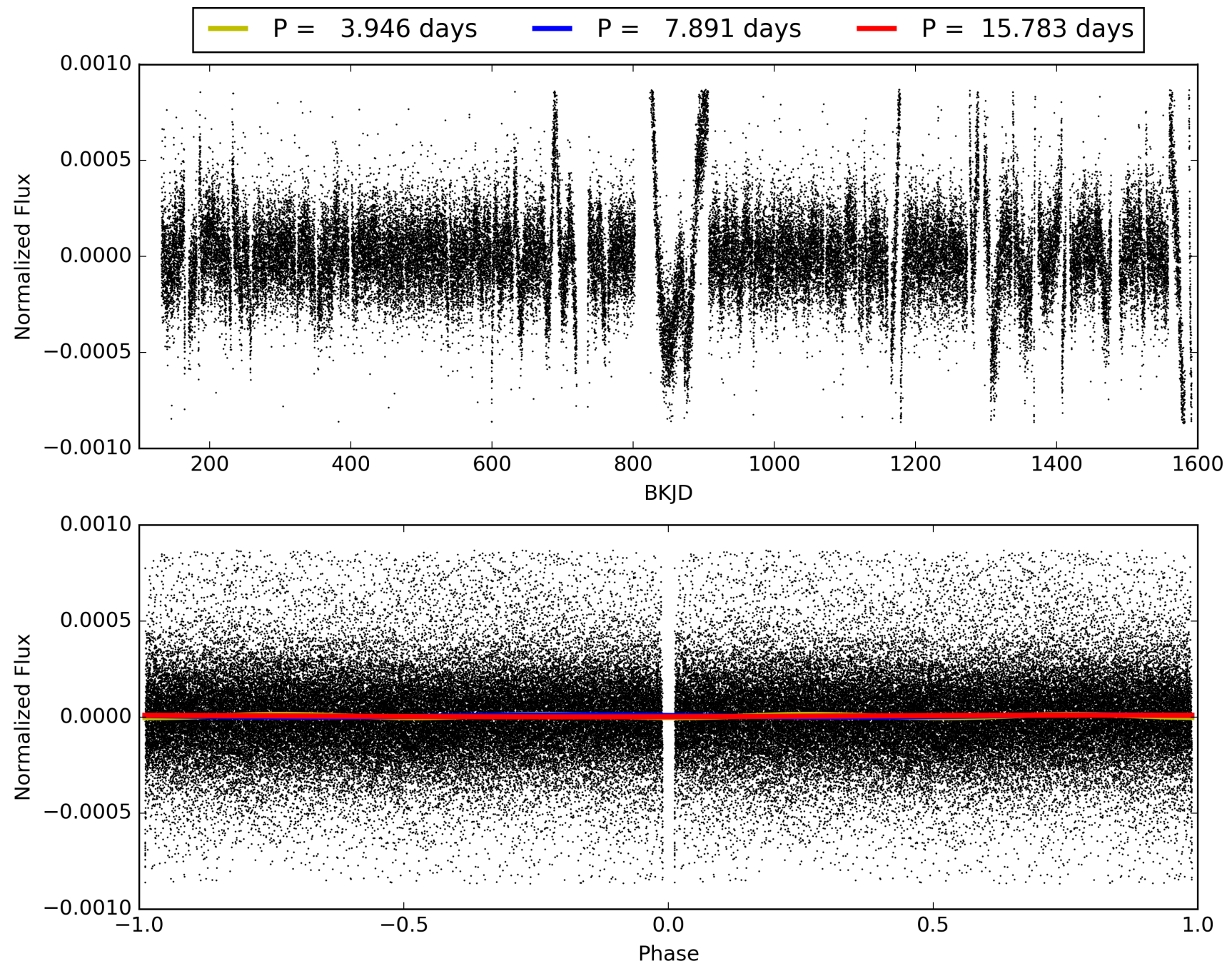
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:05:01 Z

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

# TCE 009631995-01, PDC Light Curves

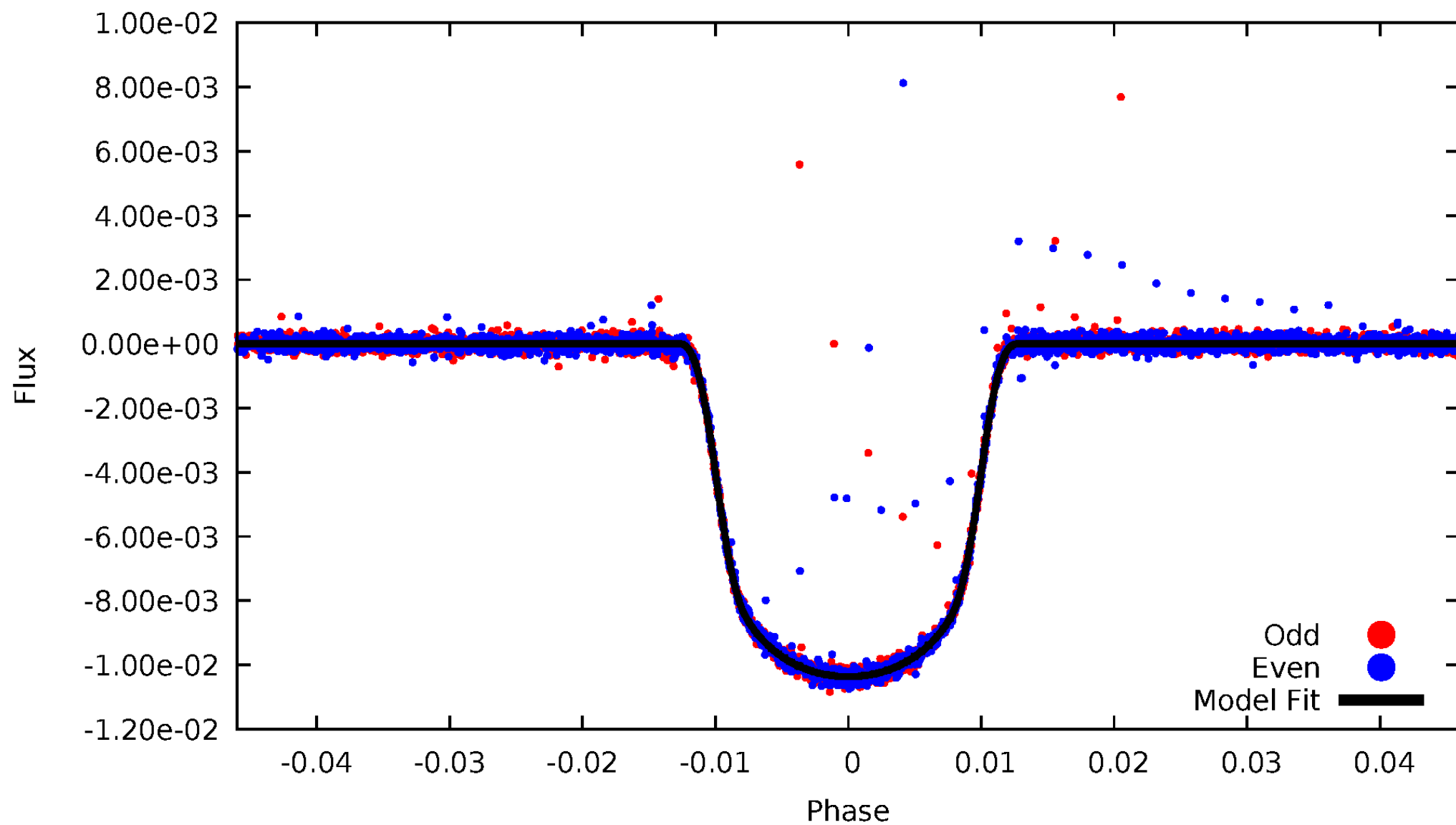


TCE 009631995-01



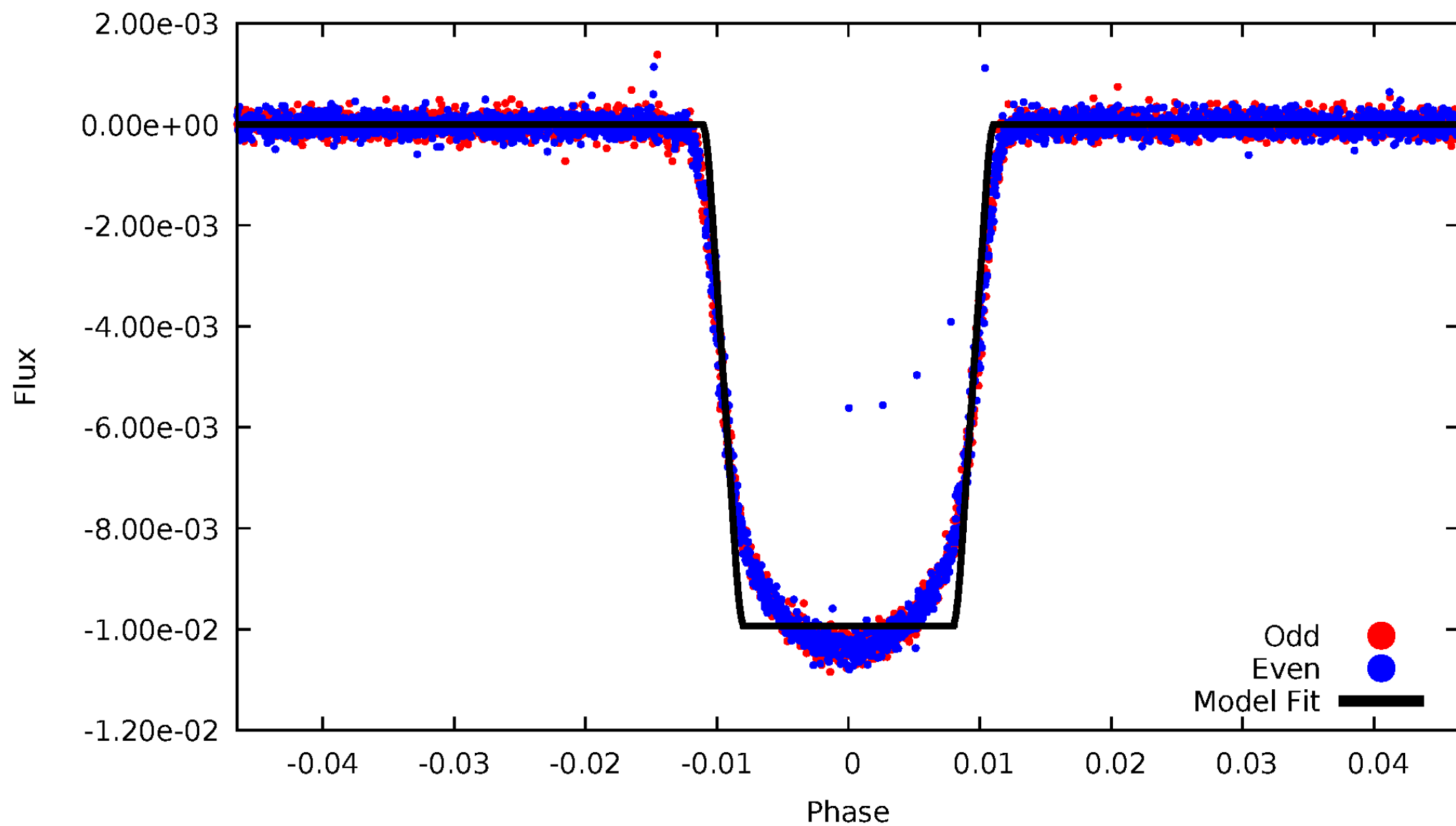
# DV Odd/Even

TCE 009631995-01



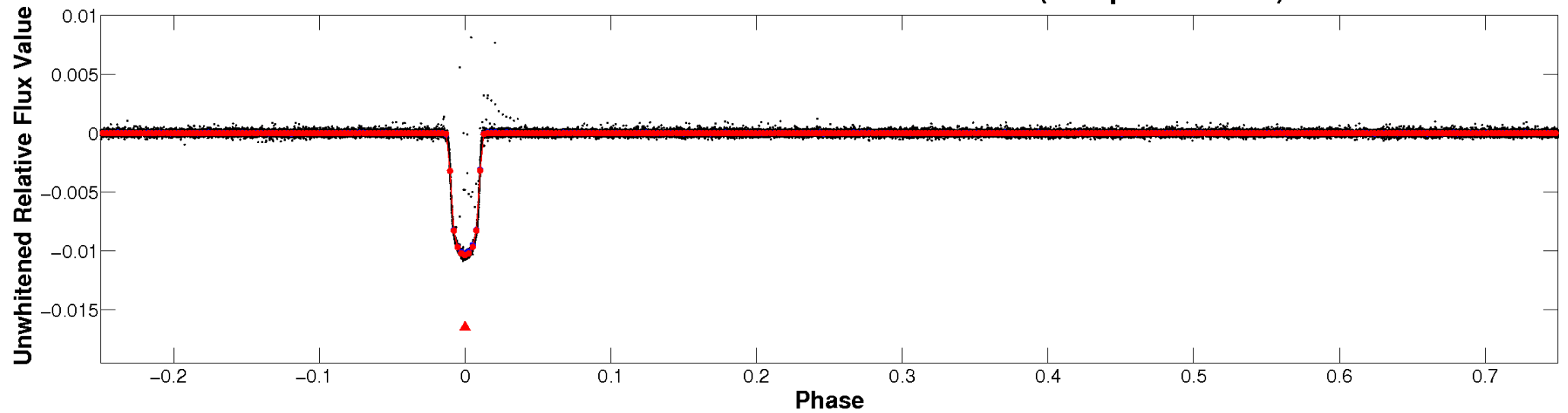
# ALT Odd/Even

TCE 009631995-01

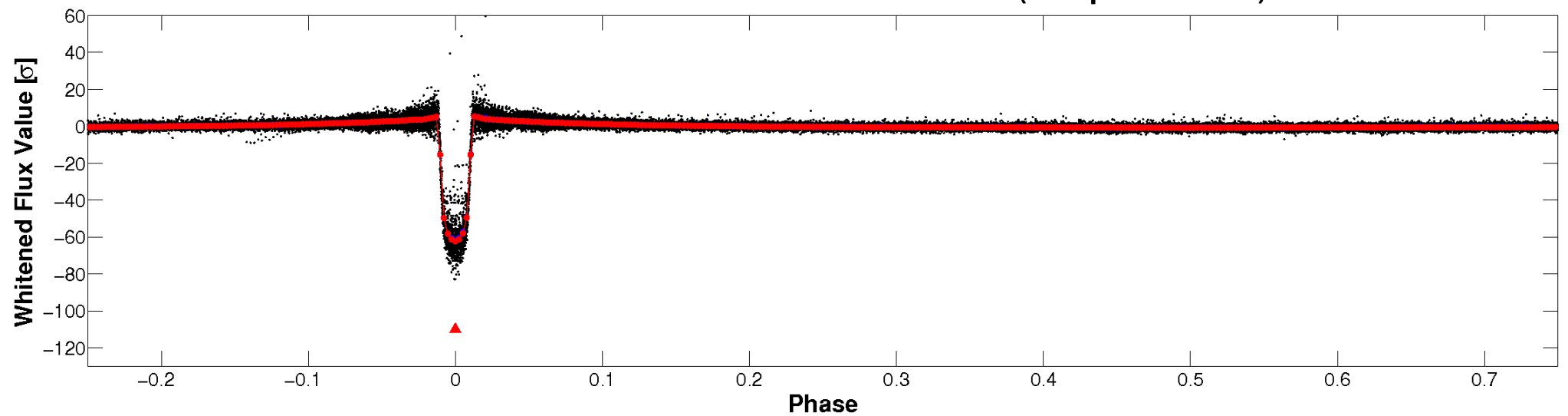


# Non-Whitened Vs. Whitened Light Curve

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

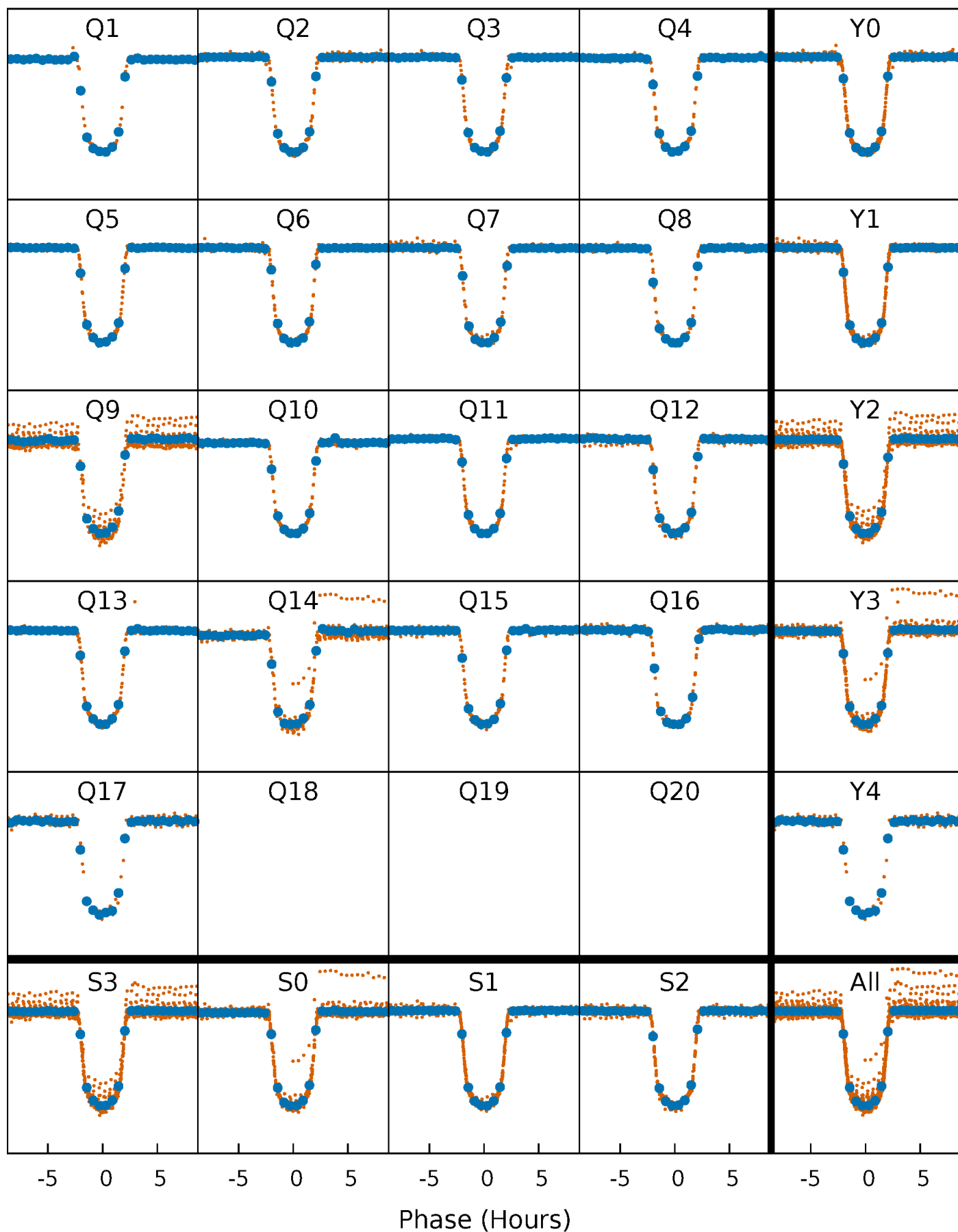


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

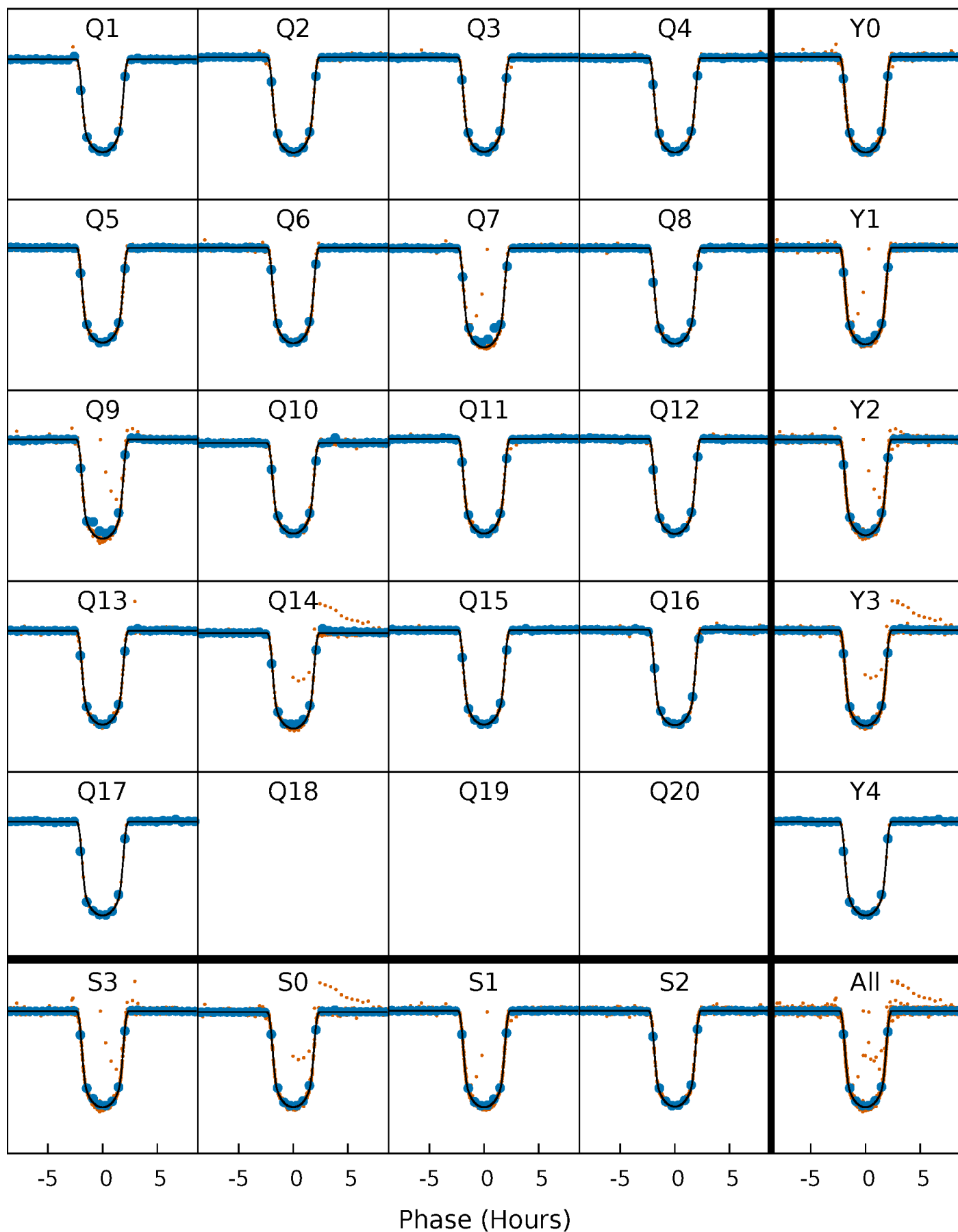
TCE 009631995-01 P= 7.891448 Days  $T_0=137.792763$  (BKJD)





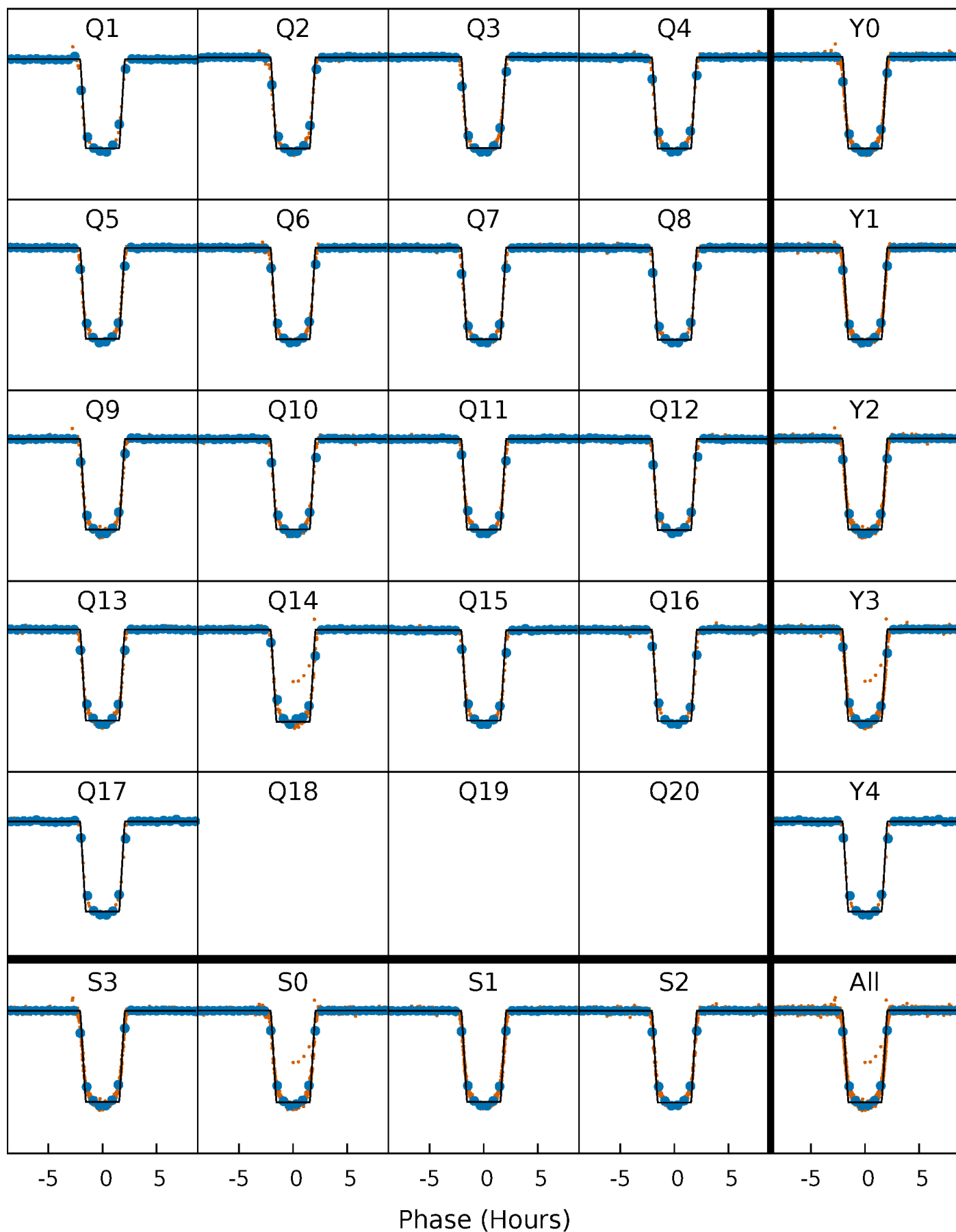
# DV Quarter-Phased Transit Curves

TCE 009631995-01 P= 7.891448 Days  $T_0=137.792763$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

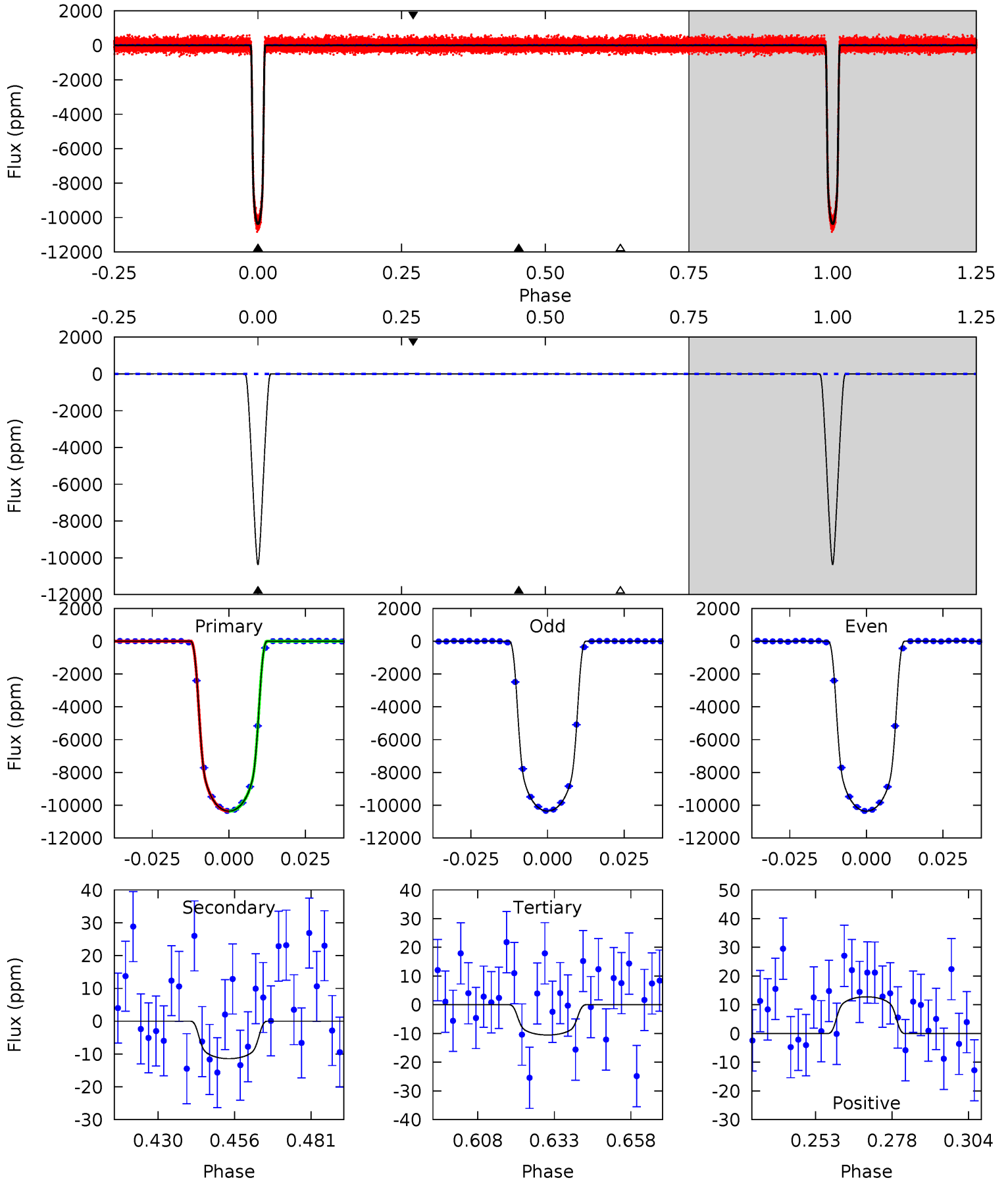
TCE 009631995-01   P= 7.891425 Days    $T_0=137.794769$  (BKJD)



# DV Model-Shift Uniqueness Test

009631995-01, P = 7.891448 Days, E = 129.901315 Days

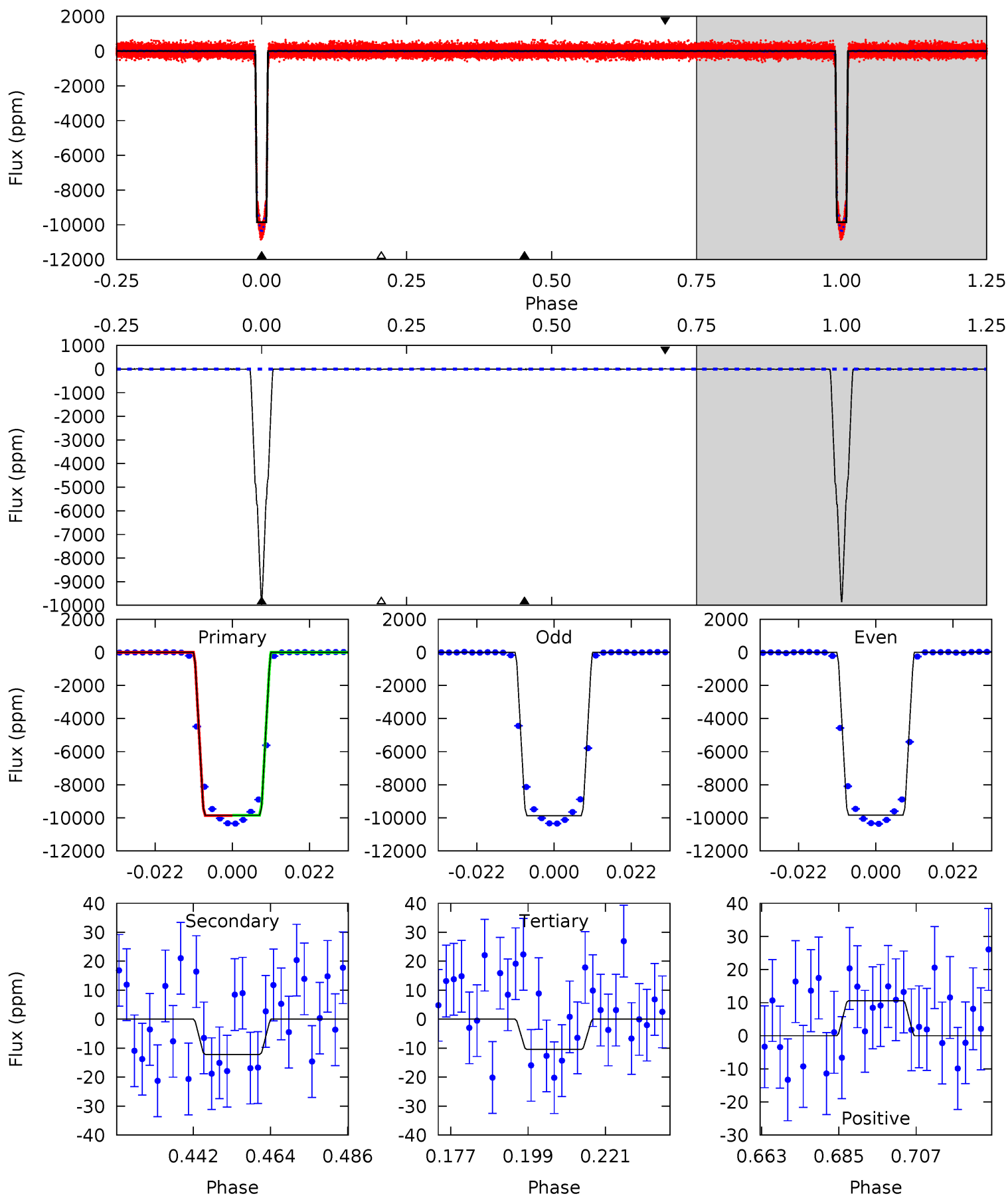
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2749	3.03	2.79	3.39	4.85	2.24	1.24	2746	2745	0.24	-0.36	0.62	0.99	0.00	0.34



# Alt Model-Shift Uniqueness Test

009631995-01, P = 7.891425 Days, E = 129.903344 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
2196	2.71	2.33	2.36	4.87	2.29	0.92	2194	2194	0.38	0.35	2.98	1.00	0.00	1.17



### Stellar Parameters For KIC 009631995

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5972^{+72}_{-84}$	$4.313^{+0.095}_{-0.116}$	$0.240^{+0.150}_{-0.150}$	$1.237^{+0.209}_{-0.139}$	$1.148^{+0.071}_{-0.079}$	$0.854^{+0.347}_{-0.312}$
	+1%/-1%	+2%/-3%	+62%/-62%	+17%/-11%	+6%/-7%	+41%/-37%
Source	SPE81	SPE81	SPE81	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009631995-01 / KOI 0022.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-11 \pm 4$	$12.91^{+1.08}_{-0.90}$	$1438^{+63}_{-53}$	$-1818^{+3568}_{-181}$	$0.241^{+0.098}_{-0.082}$
Alt.	$-12 \pm 4$	$13.46^{+1.35}_{-0.94}$	$1438^{+67}_{-53}$	$-1830^{+3587}_{-185}$	$0.237^{+0.107}_{-0.090}$

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

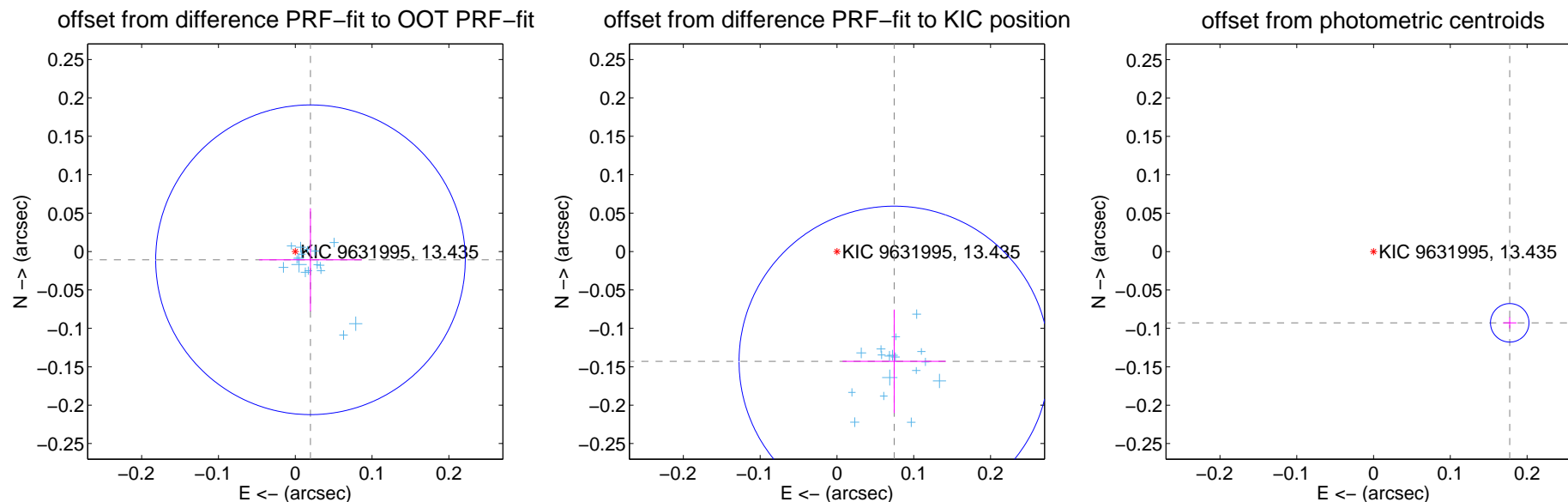
## DV Centroid Data

Supplemental centroid analysis for 009631995-01. Kepler magnitude: 13.44. Transit SNR 1908.22

There are 17 quarters with good PRF difference image offsets

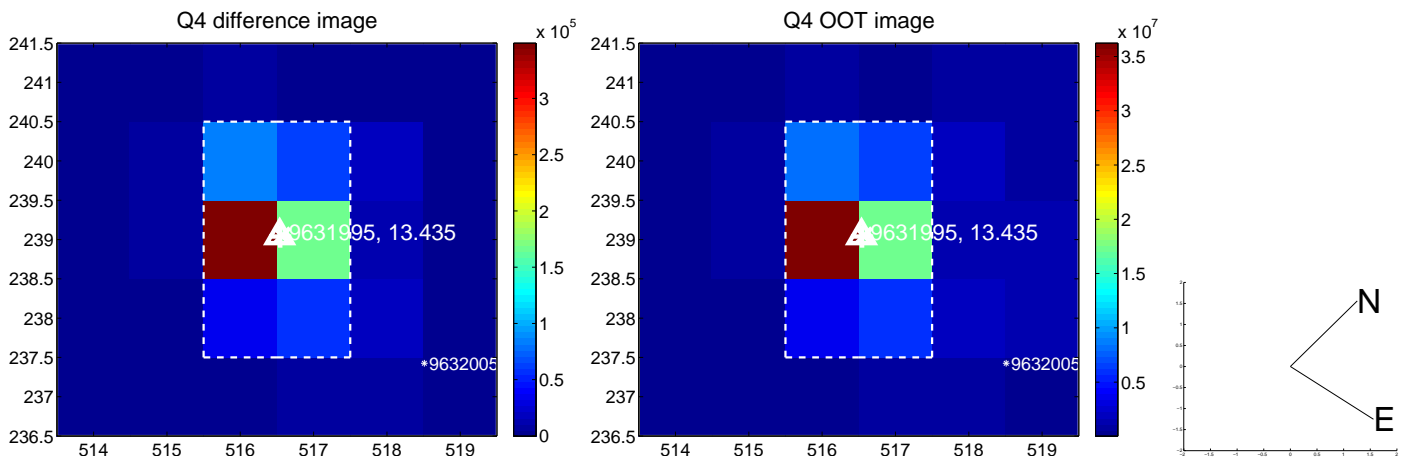
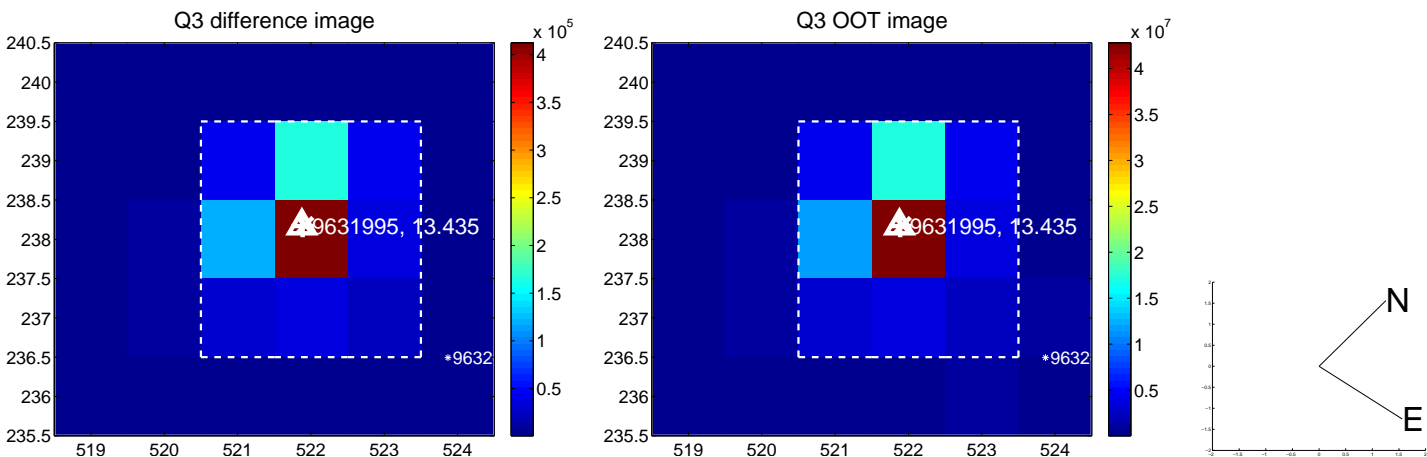
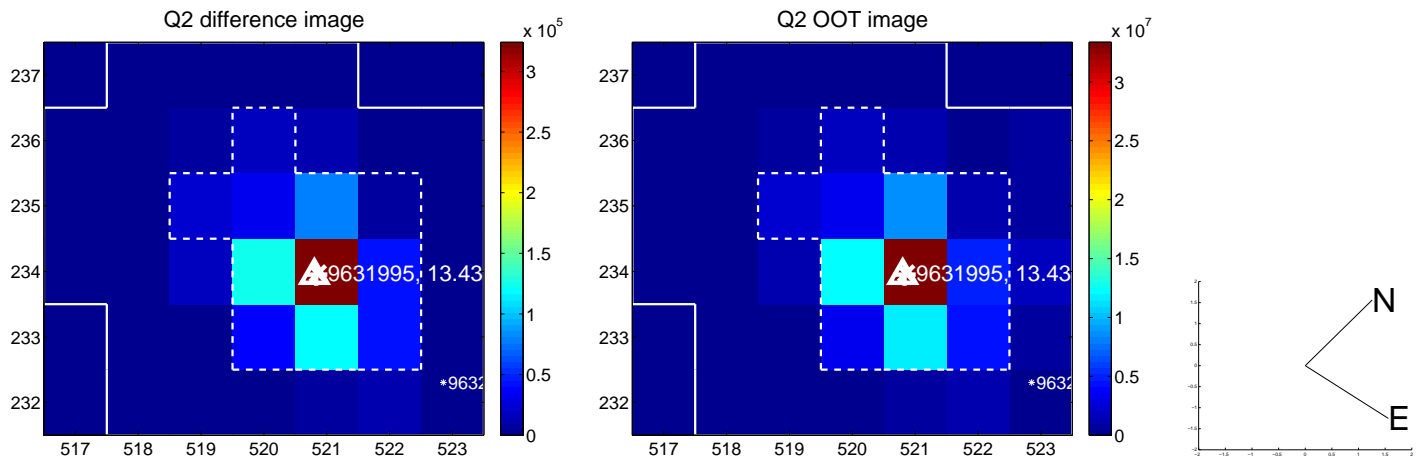
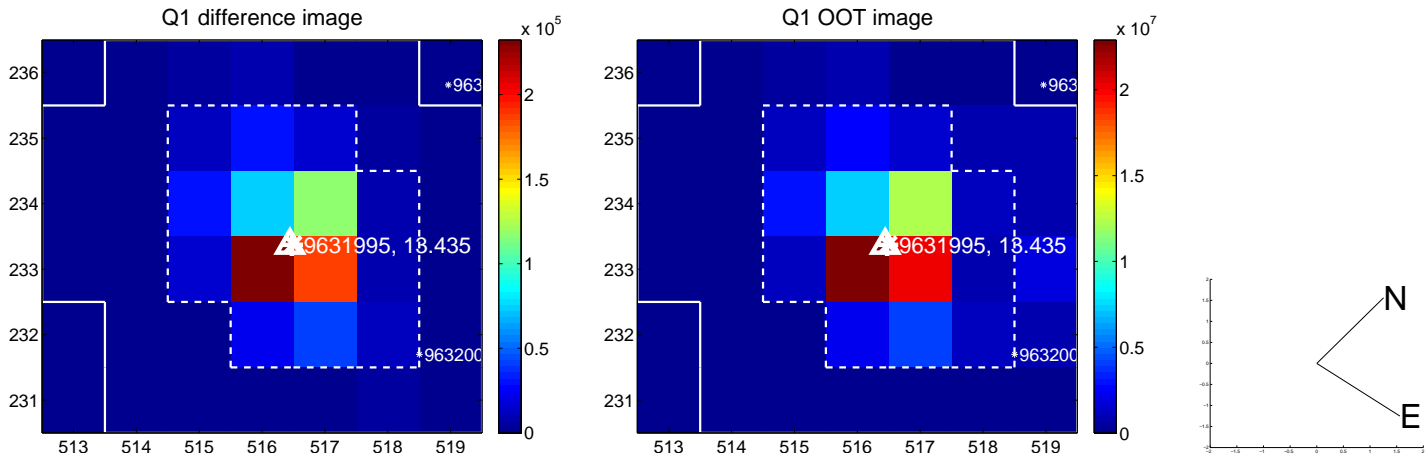
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.023 \pm 0.067$	0.34	$-0.020 \pm 0.067$	$-0.011 \pm 0.067$
PRF-fit source offset from KIC position	$0.161 \pm 0.067$	2.39	$-0.075 \pm 0.067$	$-0.143 \pm 0.067$
photometric centroid source offset	$0.20 \pm 0.01$	23.95	$-0.18 \pm 0.01$	$-0.09 \pm 0.01$

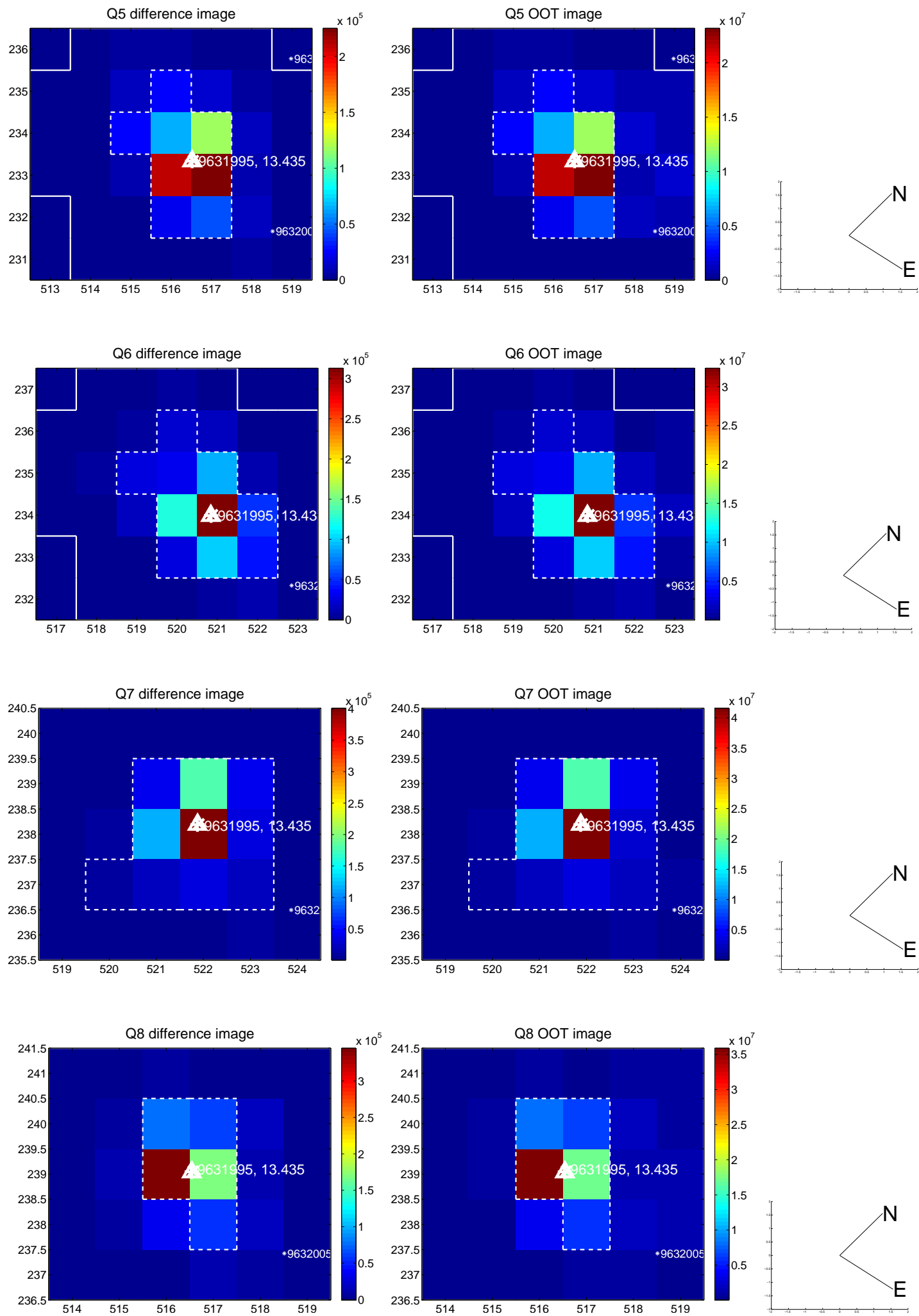


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

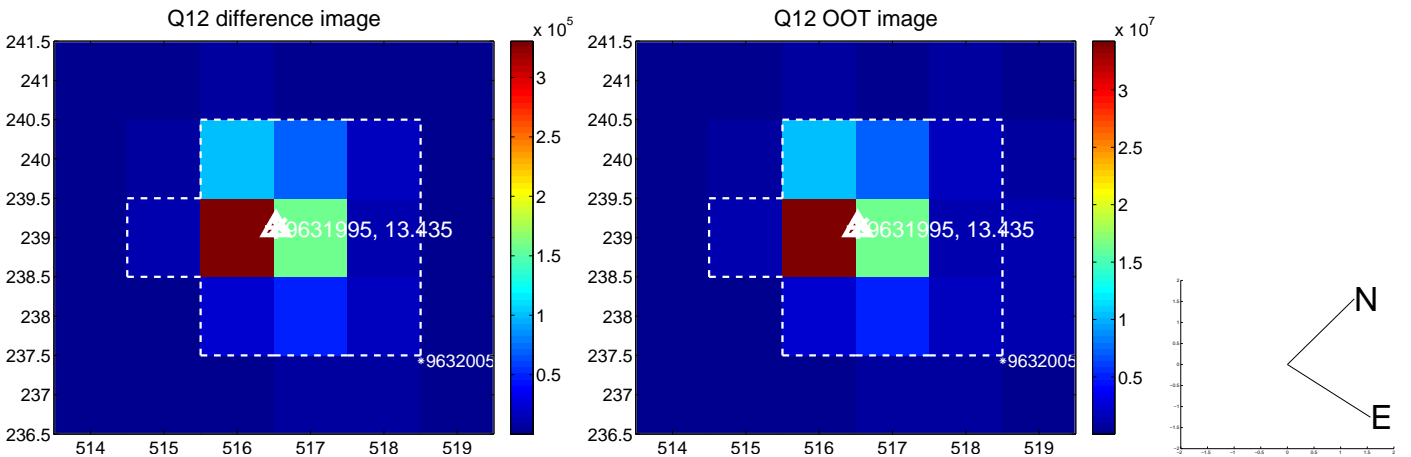
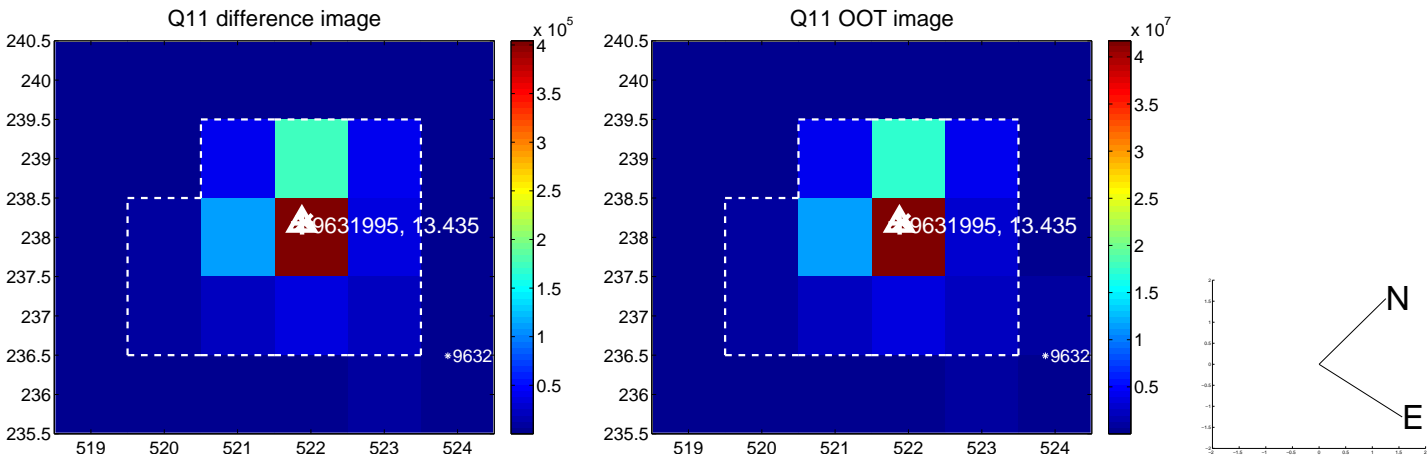
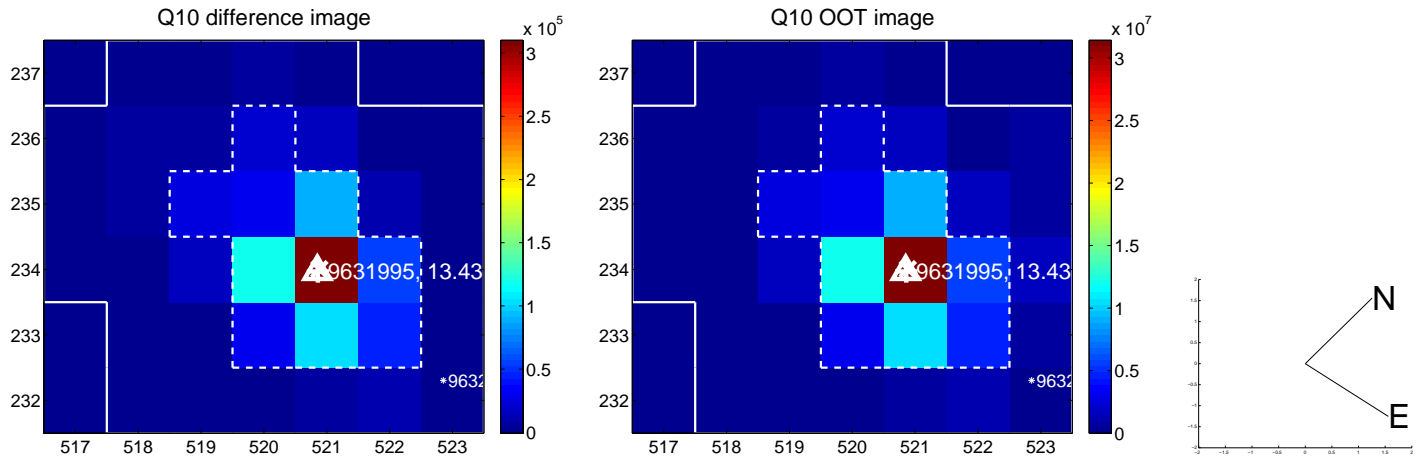
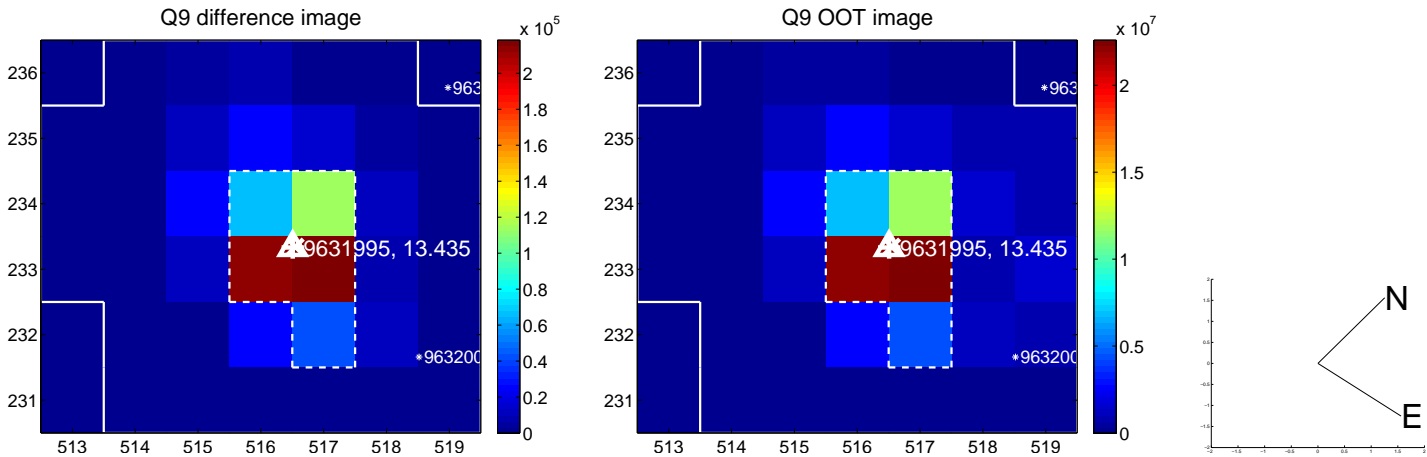


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

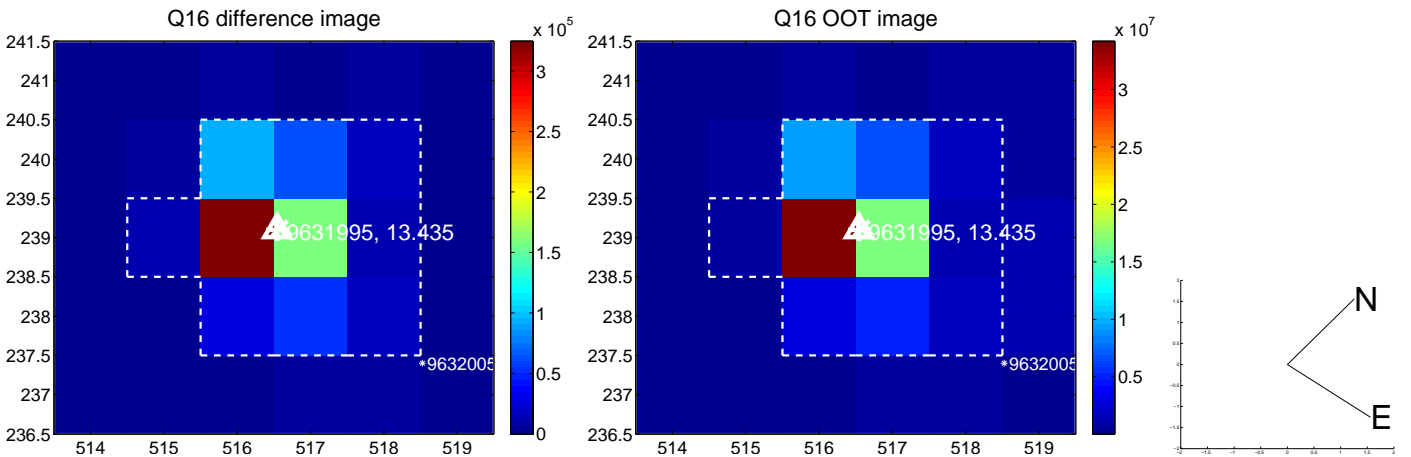
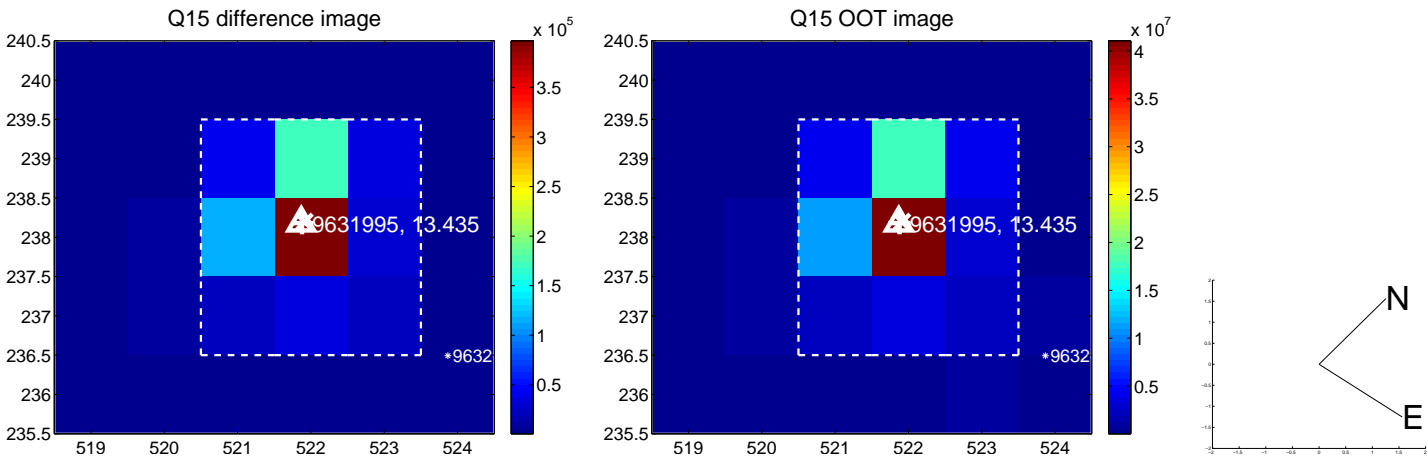
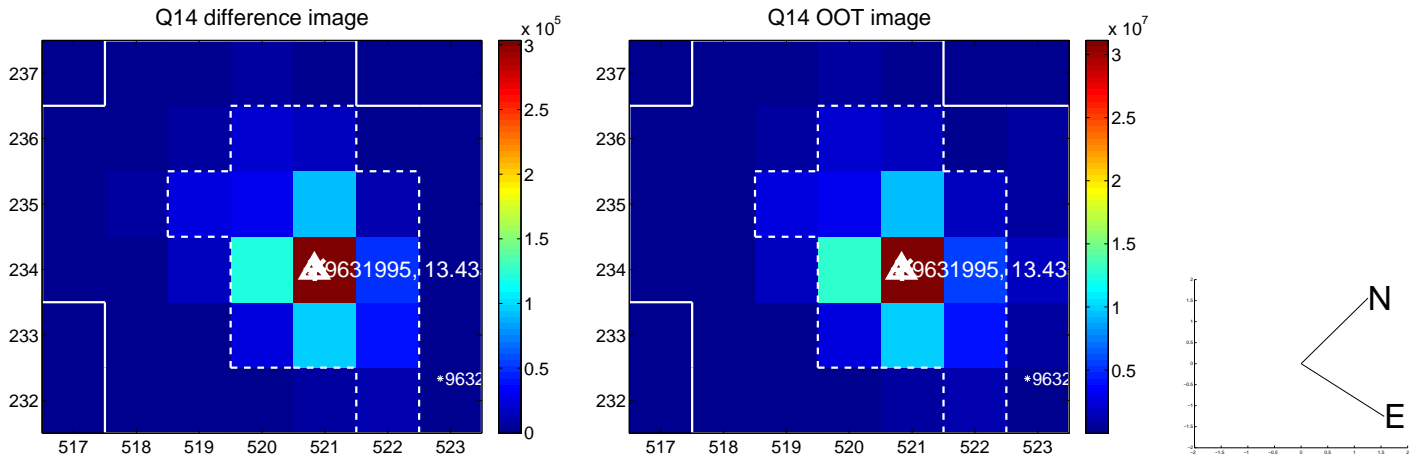
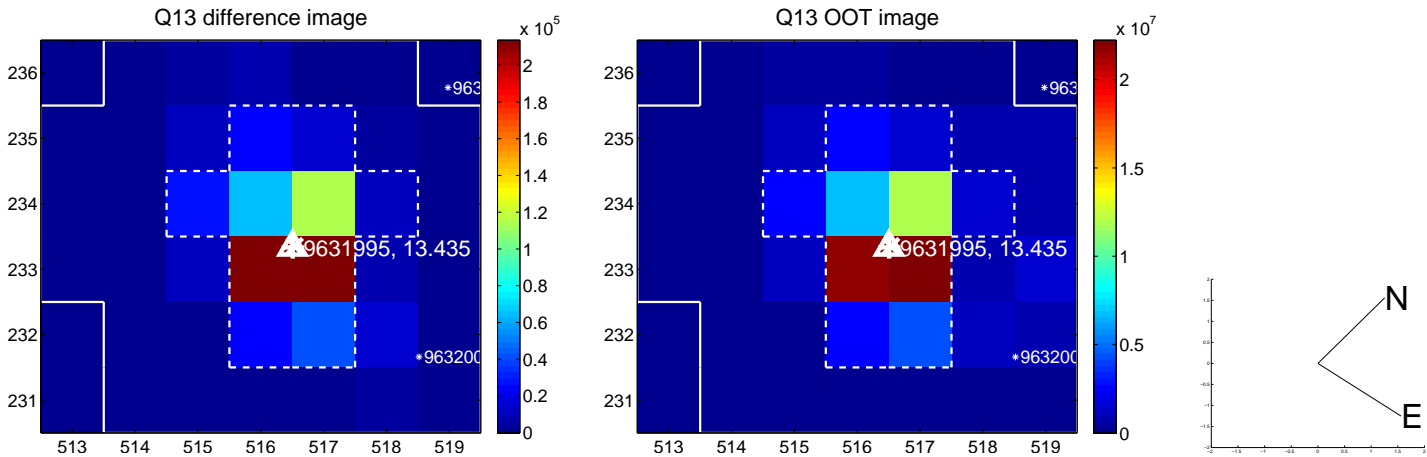




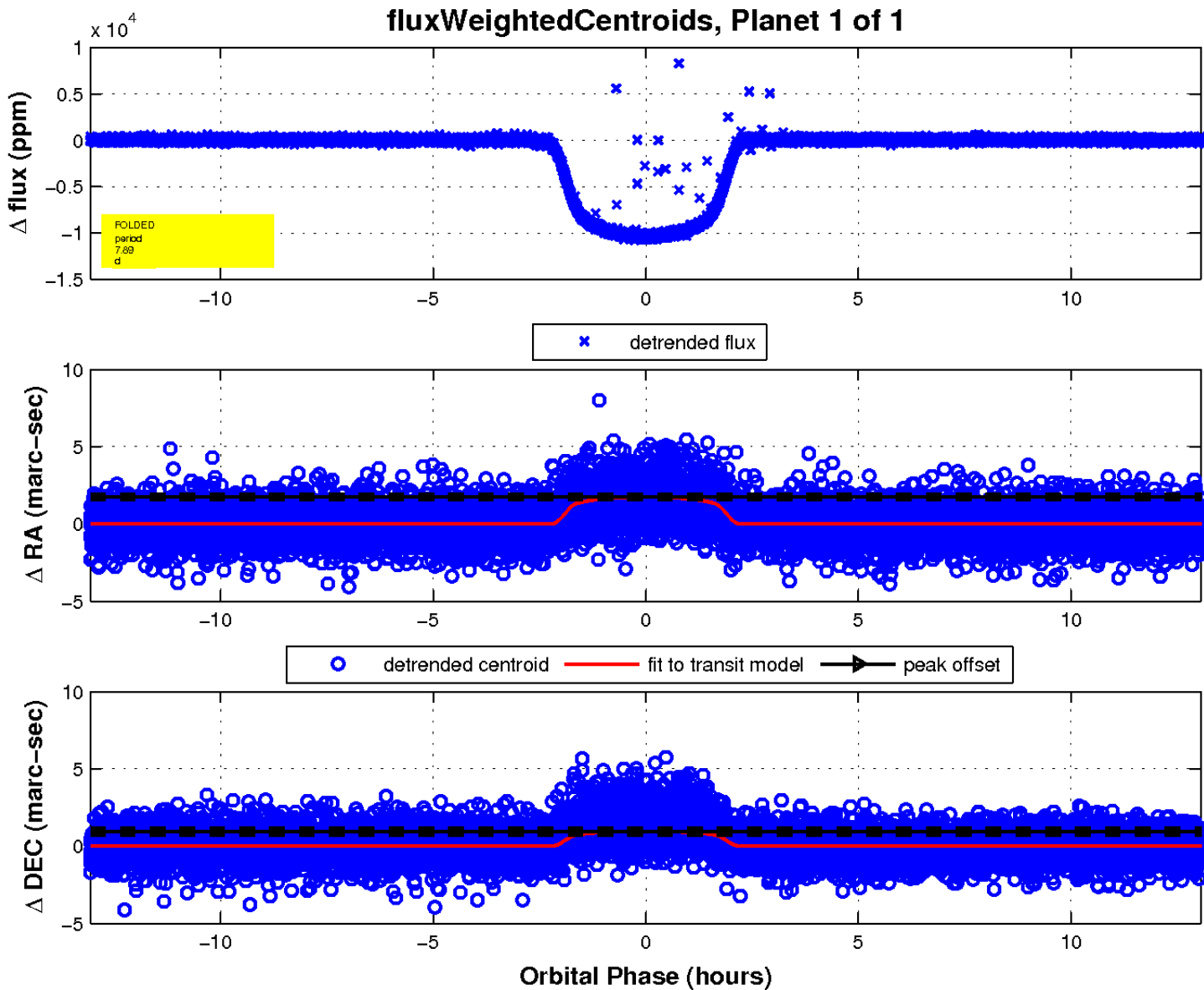
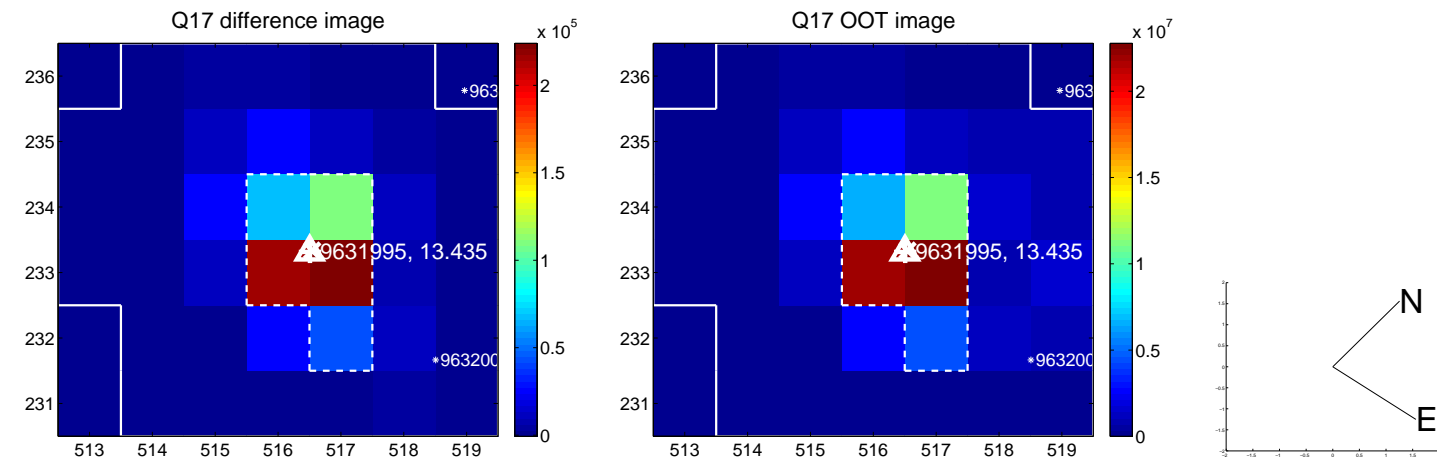
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

