

# KIC 009791622

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009791622-01	OBS	No	0.943852	131.890606	24.0	5.046	9.1	7.8	1.41	5604	0.69	5384.06
009791622-02	OBS	No	35.198661	158.309992	301.1	1.901	8.1	7.0	1.41	5604	2.84	43.21

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009791622-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009791622-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

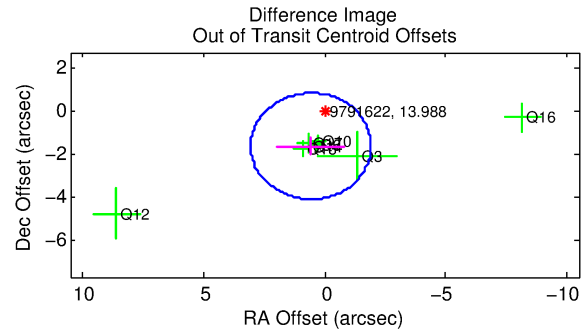
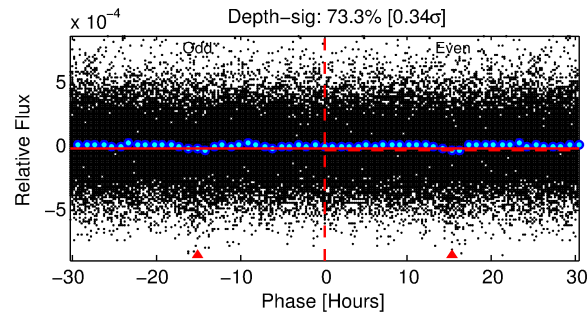
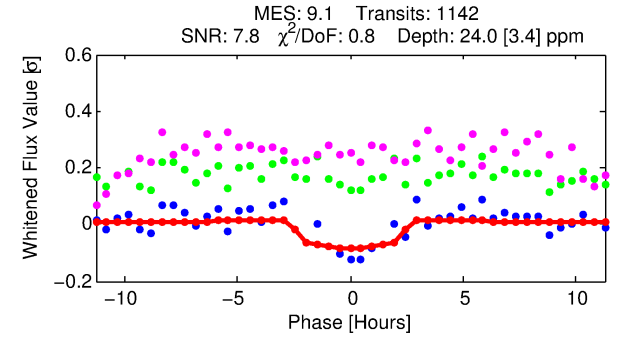
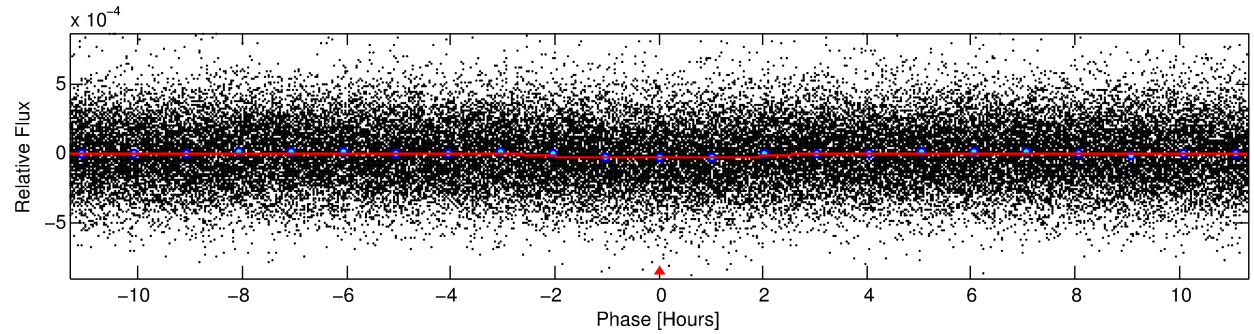
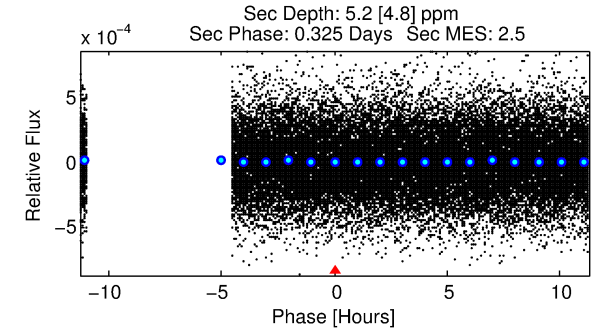
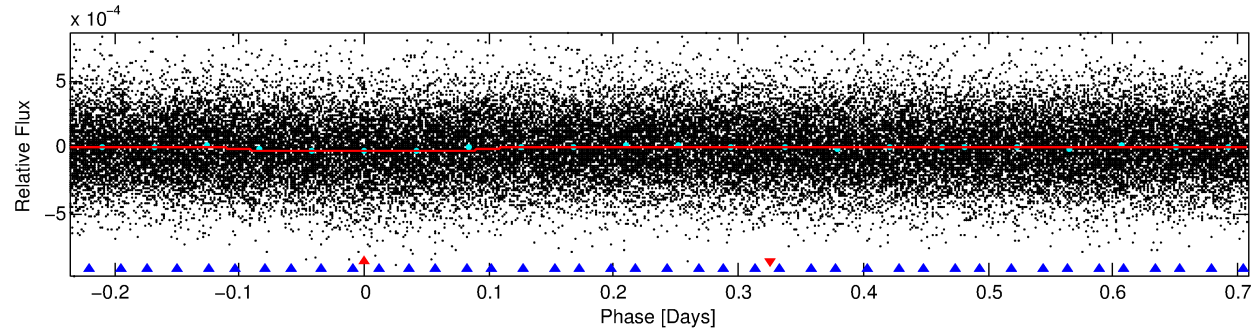
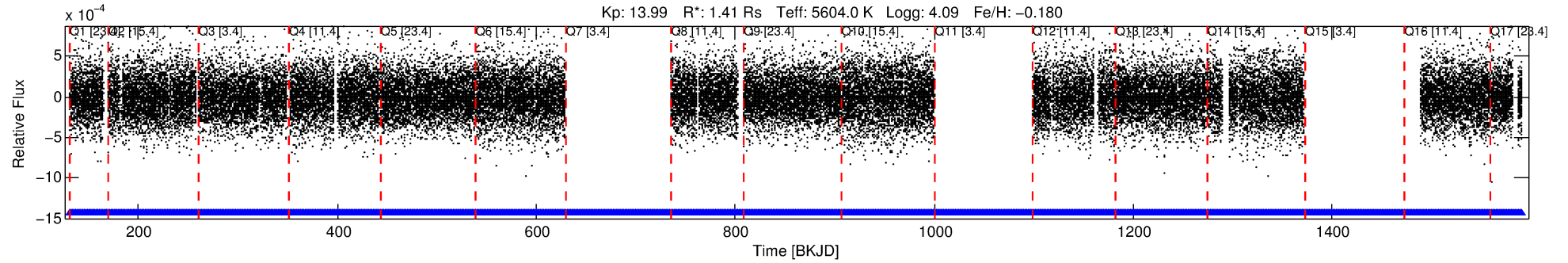
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009791622-01

No Significant Match Found

# DV One-Page Summary

KIC: 9791622 Candidate: 1 of 2 Period: 0.944 d



## DV Fit Results:

Period = 0.94385 [0.00002] d  
Epoch = 131.8906 [0.0065] BKJD  
Rp/R\* = 0.0045 [0.0048]  
a/R\* = 1.49 [3.77]  
b = 0.38 [10.47]  
Seff = 5384.05 [3780.30]  
Teq = 2184 [383] K  
Rp = 0.70 [0.79] Re  
a = 0.0181 [0.0074] AU  
Ag = 1.95 [4.74] [0.20σ]  
Teffp = 3992 [2327] K [0.77σ]

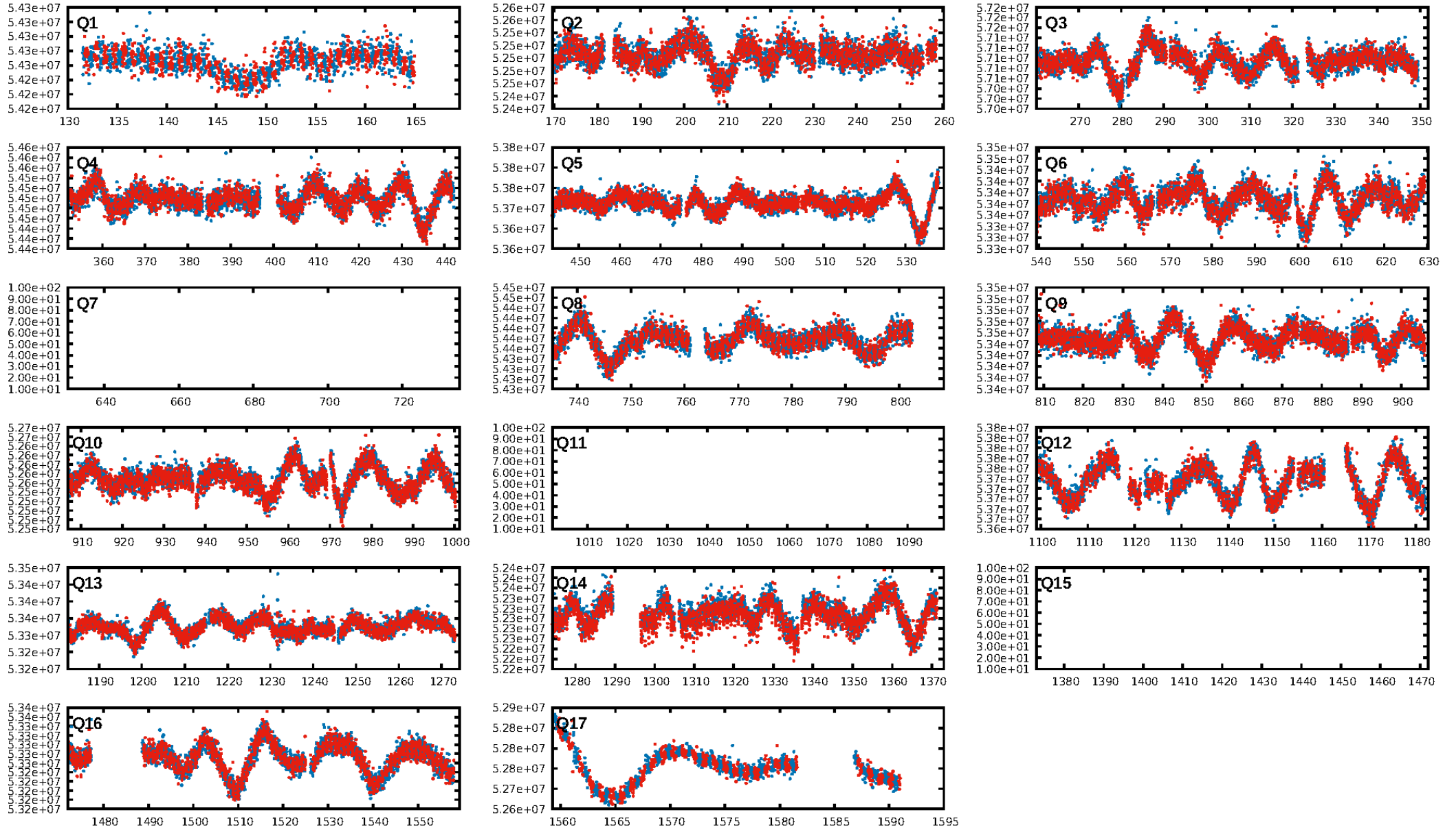
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [152.46σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.13e-18  
RollingBand-fgt: 1.00 [1077/1077]  
GhostDiagnostic-chr: -21.63  
Centroid-sig: 0.0%  
Centroid-so: 5.356 arcsec [3.44σ]  
OotOffset-rm: 1.732 arcsec [2.09σ]  
OotOffset-st: 3/1/2/2 [8]  
KicOffset-rm: 1.684 arcsec [1.61σ]  
KicOffset-st: 3/1/2/2 [8]  
DiffImageQuality-fgm: 0.75 [6/8]  
DiffImageOverlap-fno: 1.00 [14/14]

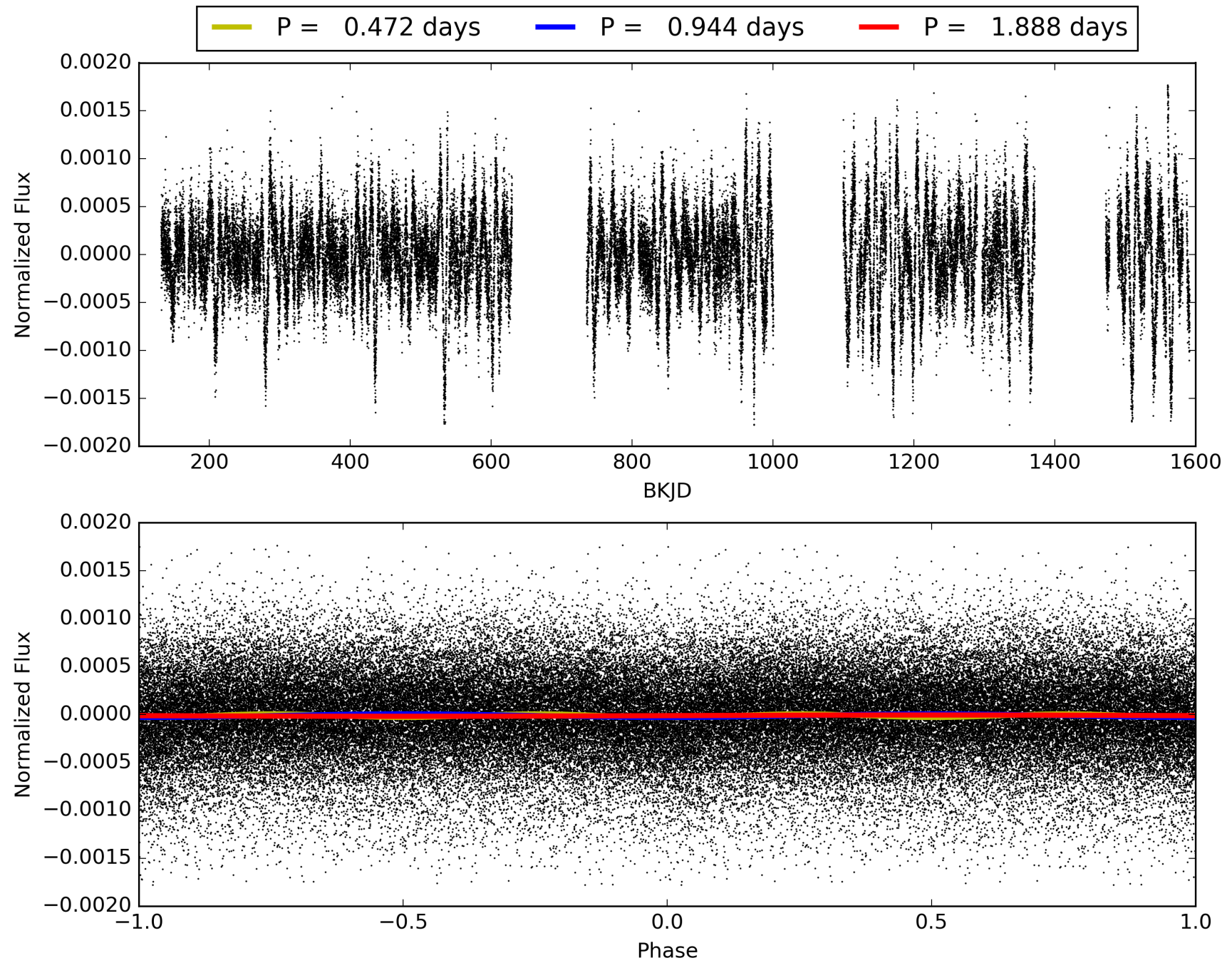
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:15:17 Z

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

# TCE 009791622-01, PDC Light Curves



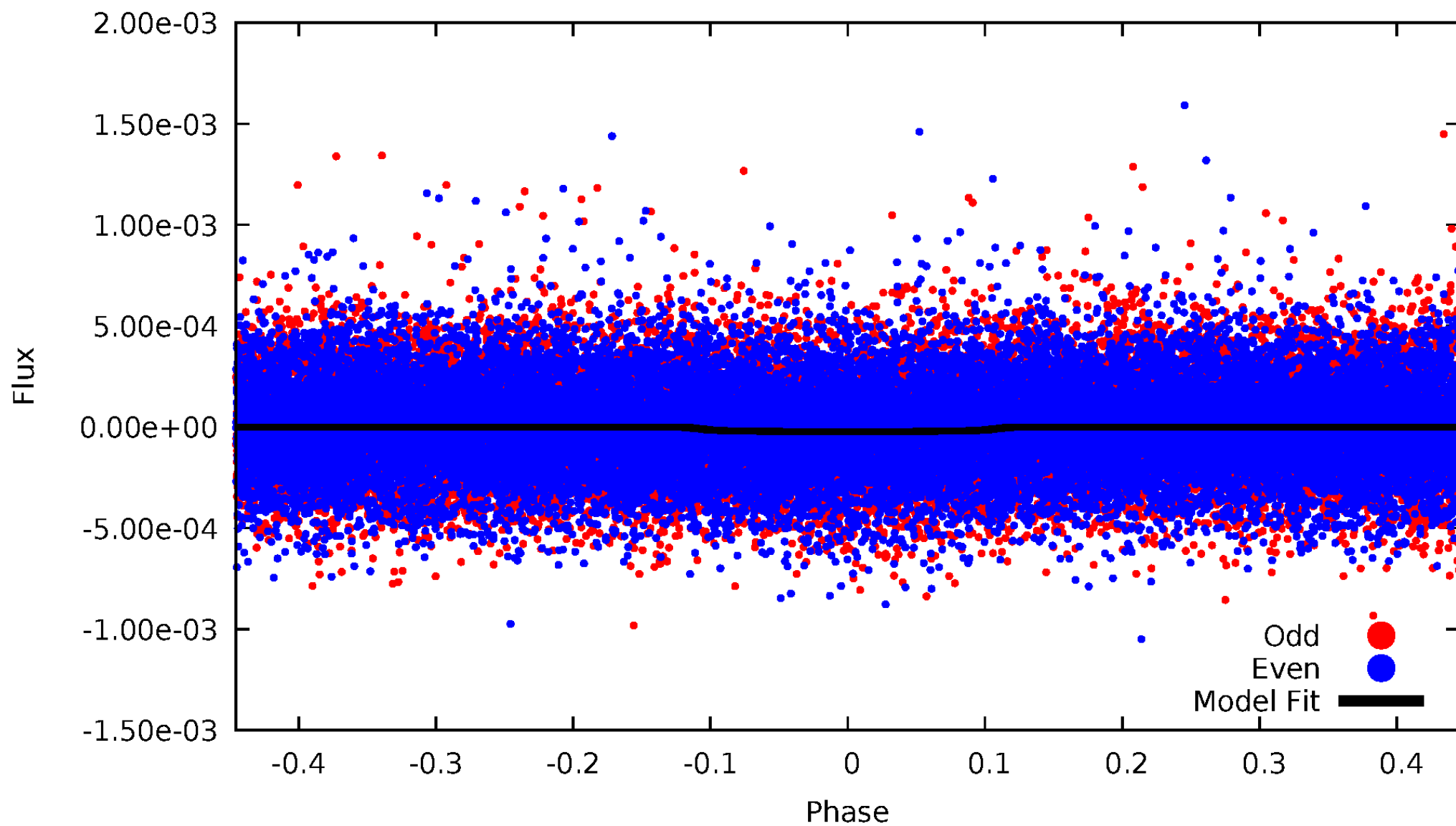
TCE 009791622-01





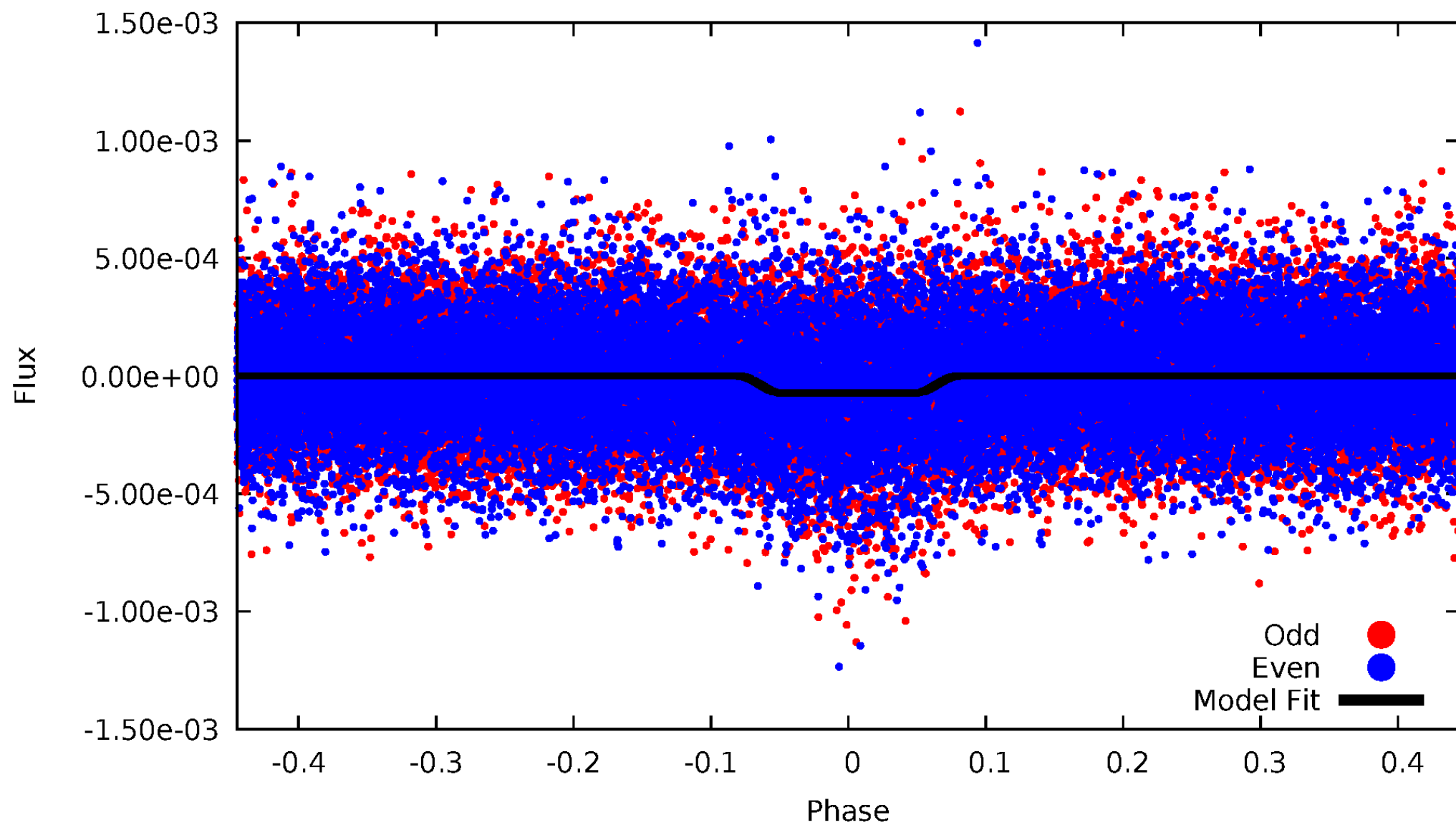
# DV Odd/Even

TCE 009791622-01



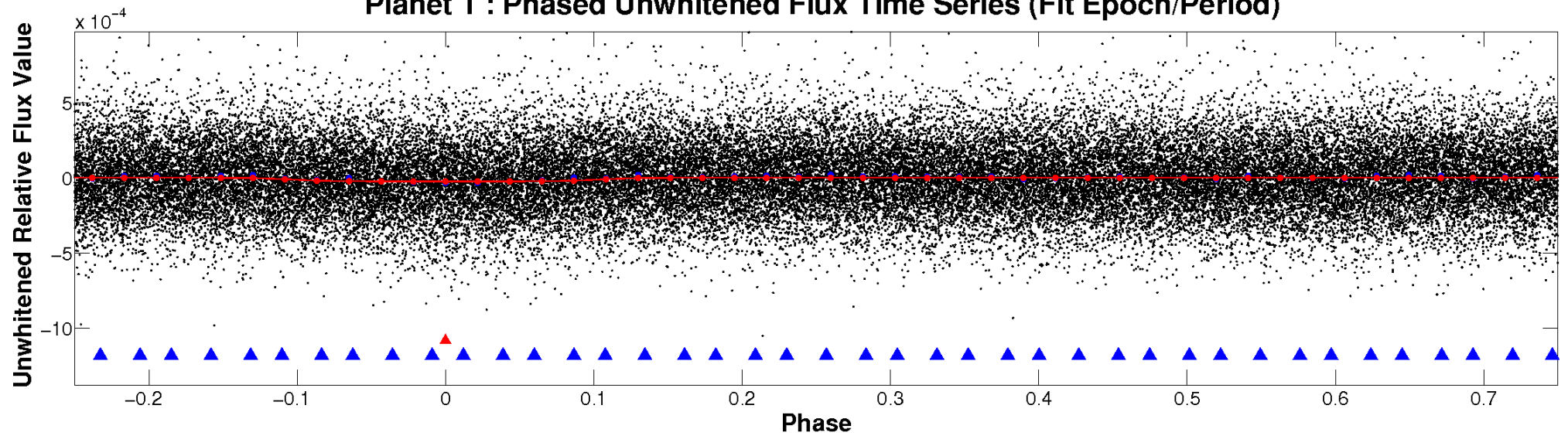
# ALT Odd/Even

TCE 009791622-01

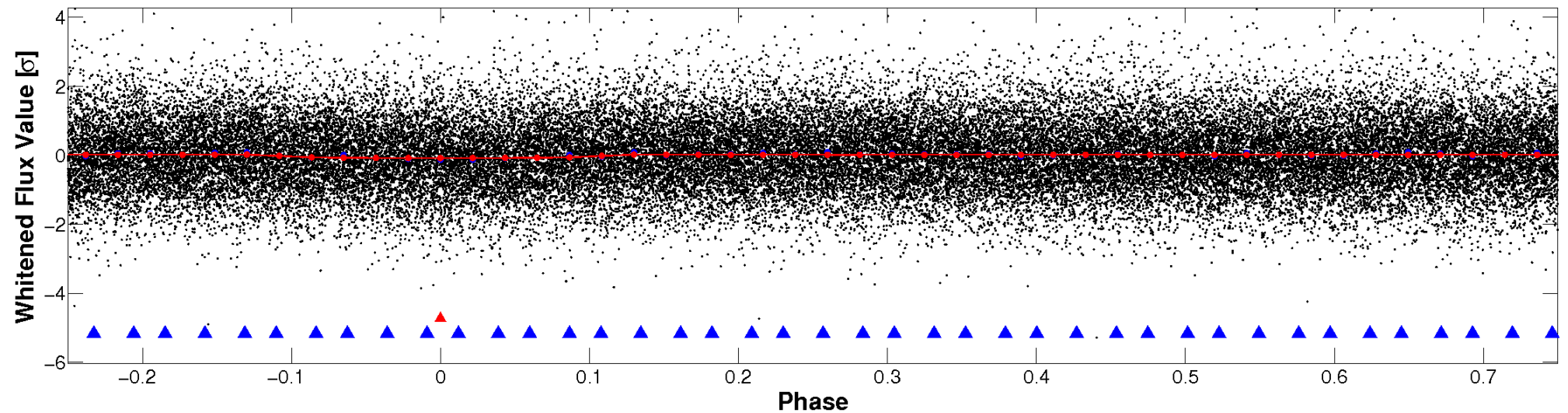


# Non-Whitened Vs. Whitened Light Curve

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

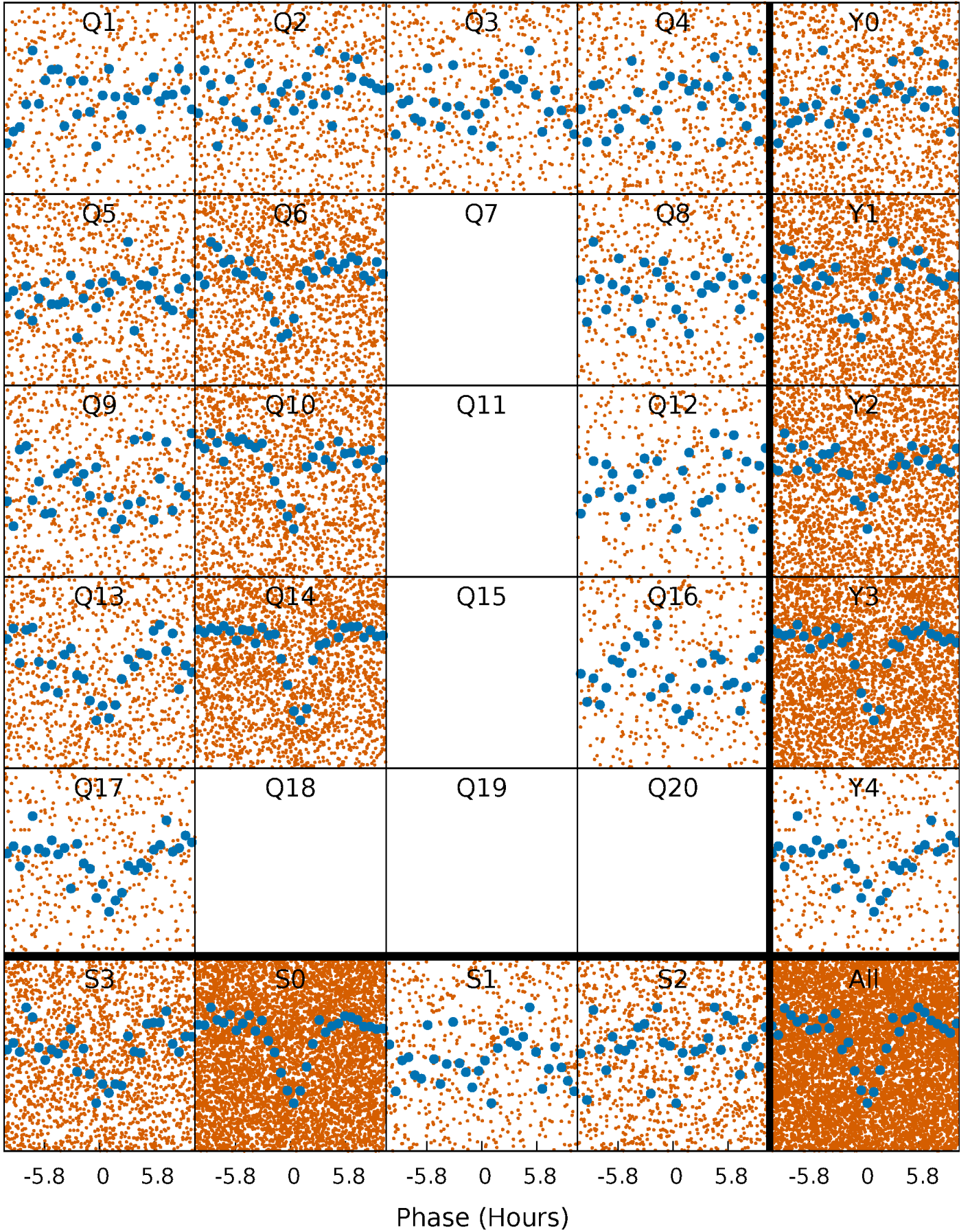


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

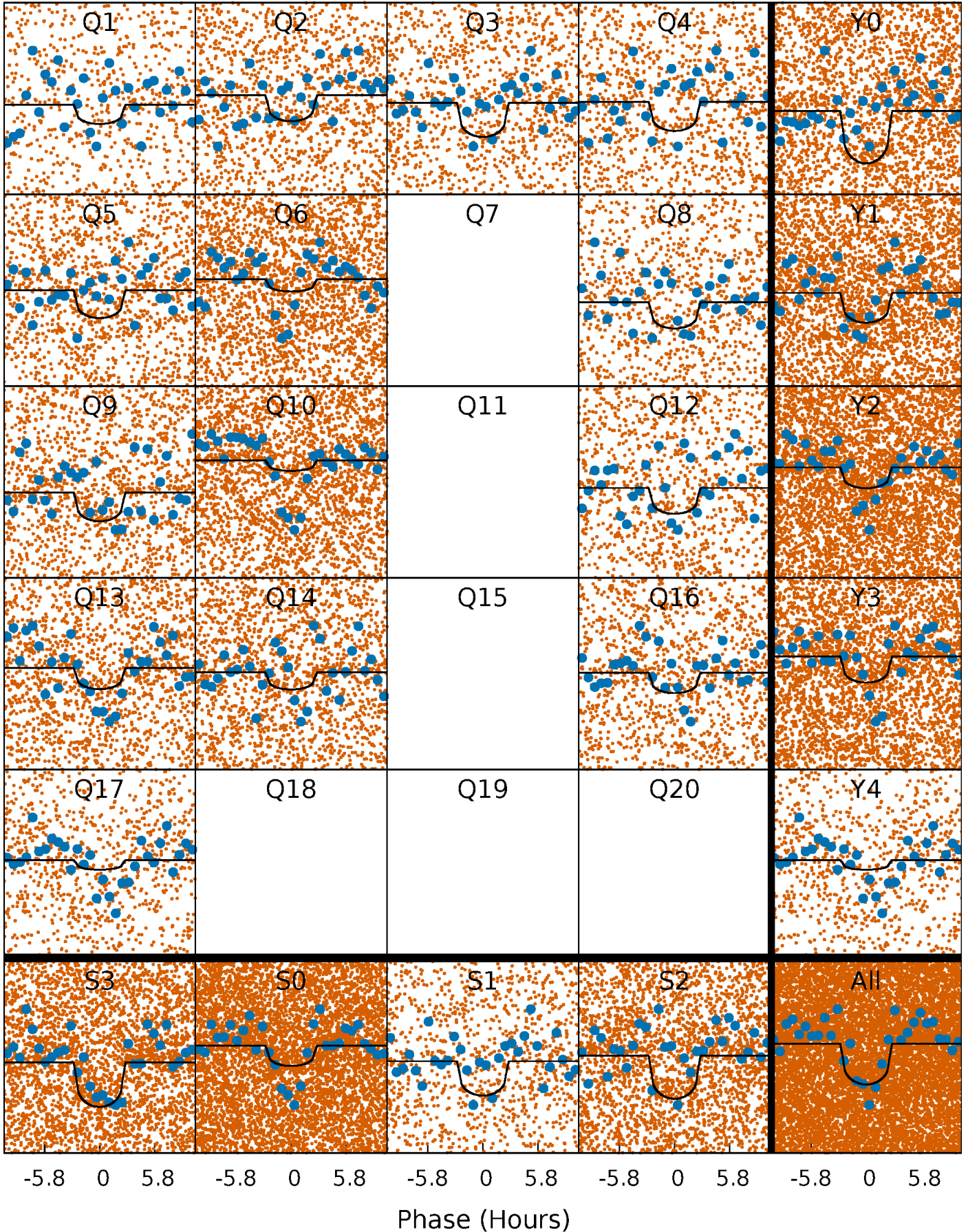
TCE 009791622-01   P= 0.943852 Days    $T_0=131.890606$  (BKJD)





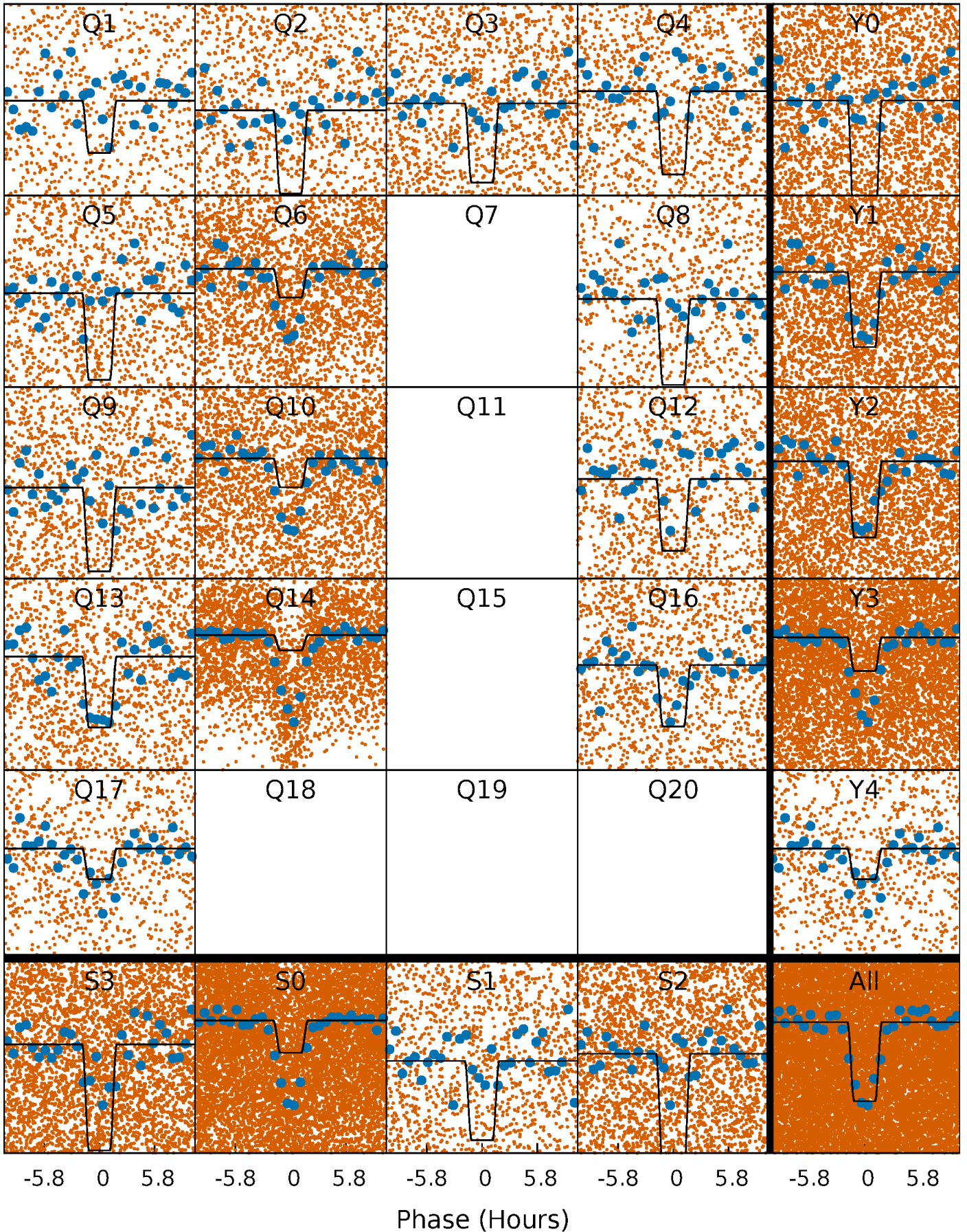
# DV Quarter-Phased Transit Curves

TCE 009791622-01 P= 0.943852 Days  $T_0=131.890606$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009791622-01 P= 0.943924 Days  $T_0=131.832876$  (BKJD)

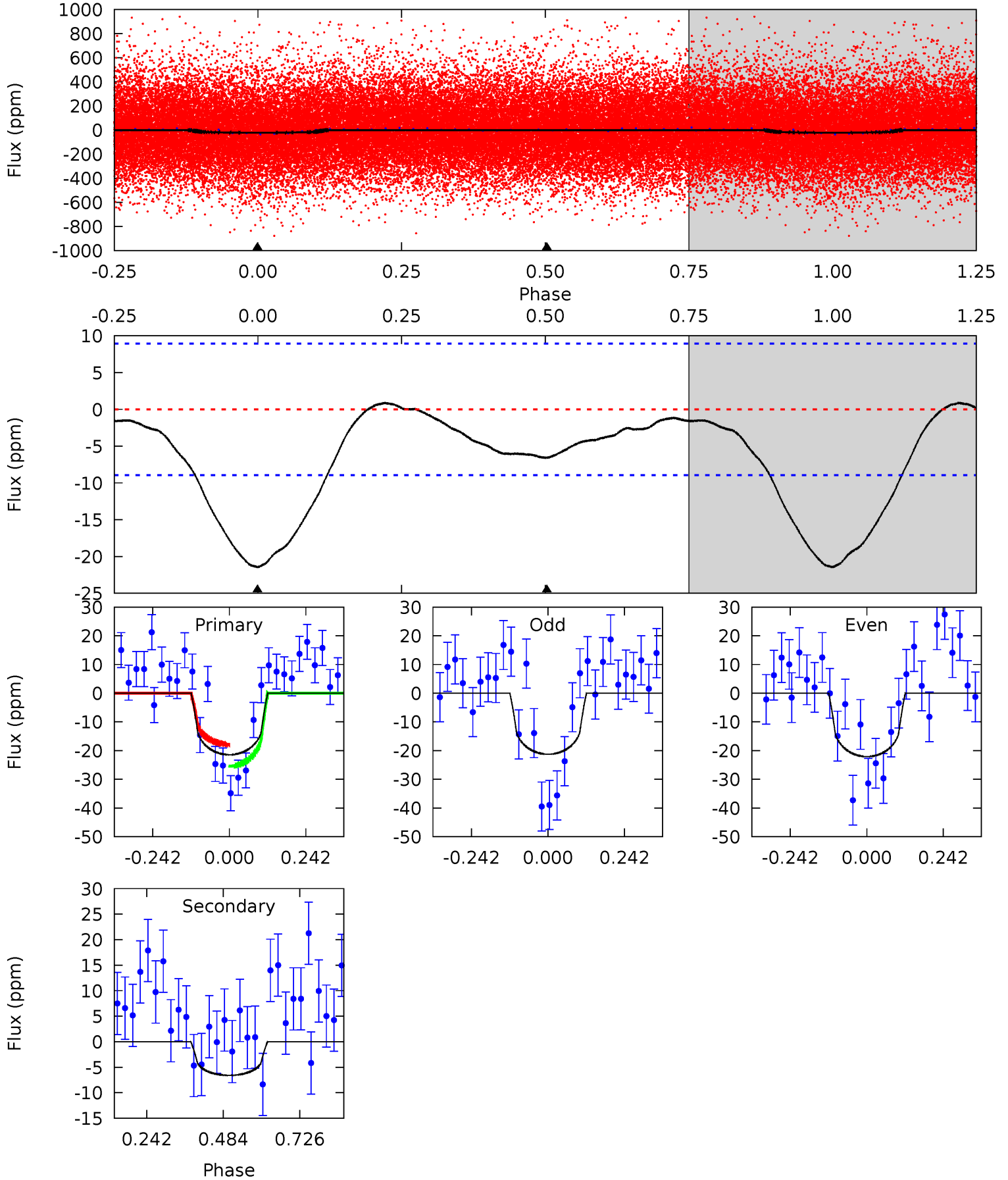




# DV Model-Shift Uniqueness Test

009791622-01, P = 0.943852 Days, E = 130.946754 Days

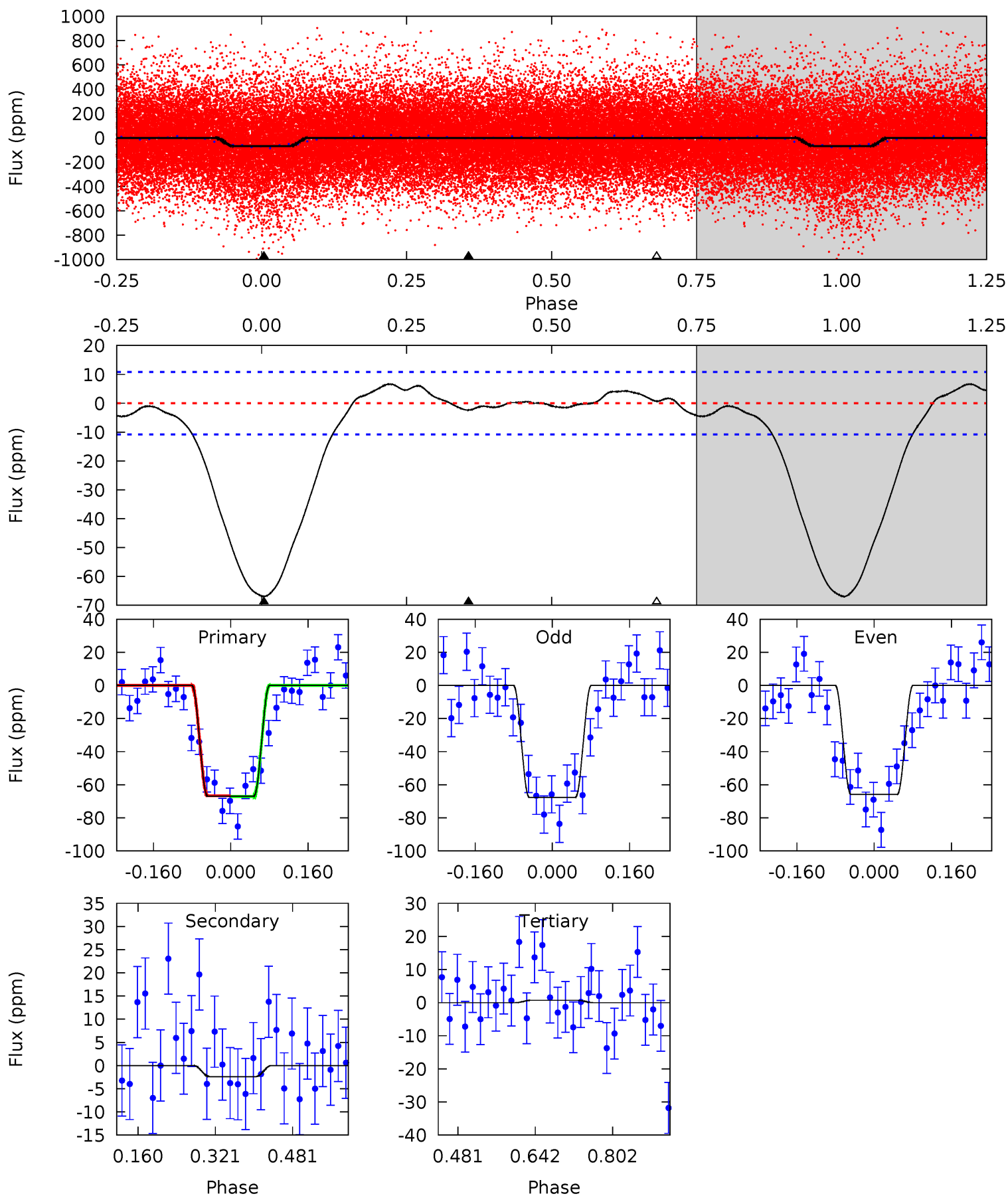
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	3.23	0	0	4.38	1.17	0.45	10.5	10.5	3.23	3.23	0.20	0.98	0.04	1.87



# Alt Model-Shift Uniqueness Test

009791622-01, P = 0.943924 Days, E = 130.888952 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
27.5	0.99	-0.29	0	4.46	1.40	1.11	27.8	27.5	1.27	0.99	0.34	1.28	0.09	0.09





### Stellar Parameters For KIC 009791622

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5604^{+169}_{-152}$	$4.086^{+0.420}_{-0.180}$	$-0.180^{+0.300}_{-0.250}$	$1.413^{+0.435}_{-0.531}$	$0.889^{+0.114}_{-0.085}$	$0.444^{+1.467}_{-0.205}$
	+3%/-3%	+10%/-4%	+167%/-139%	+31%/-38%	+13%/-10%	+331%/-46%
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 009791622-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-7 \pm 2$	$0.84^{+0.71}_{-0.52}$	$3023^{+262}_{-337}$	$3861^{+2059}_{-999}$	$1.636^{+9.558}_{-1.145}$
Alt.	$-2 \pm 2$	$1.24^{+0.77}_{-0.73}$	$2995^{+287}_{-314}$	$-2314^{+6173}_{-824}$	$0.269^{+1.438}_{-0.264}$

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

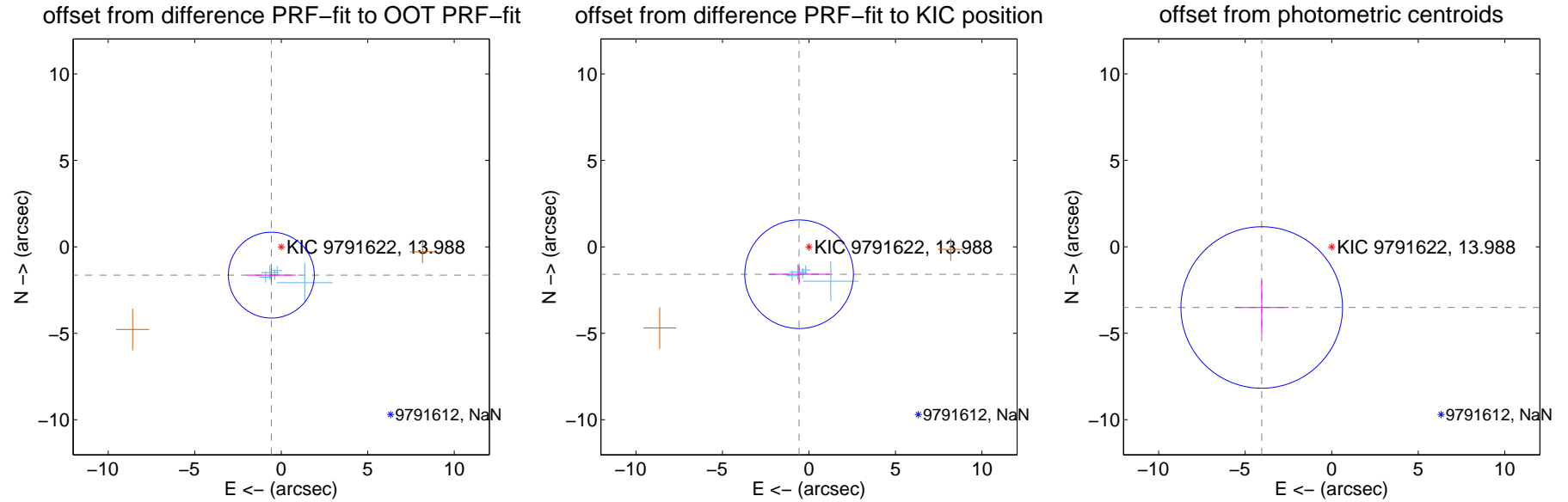
## DV Centroid Data

Supplemental centroid analysis for 009791622-01. Kepler magnitude: 13.99. Transit SNR 7.81

There are 6 quarters with good PRF difference image offsets

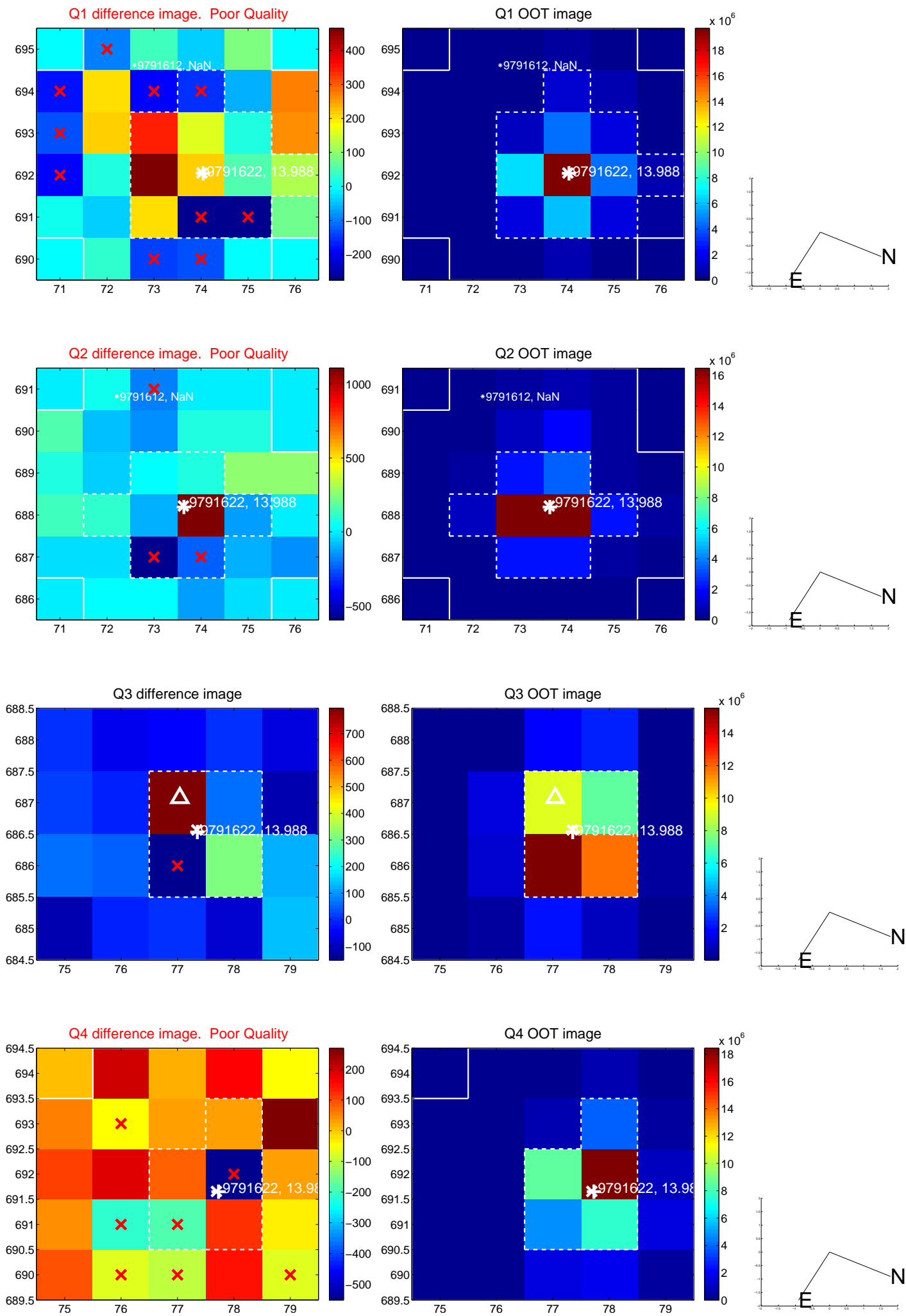
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.732 \pm 0.828$	2.09	$0.571 \pm 1.402$	$-1.635 \pm 0.408$
PRF-fit source offset from KIC position	$1.684 \pm 1.047$	1.61	$0.570 \pm 1.774$	$-1.584 \pm 0.493$
photometric centroid source offset	$5.36 \pm 1.56$	3.44	$4.04 \pm 1.57$	$-3.51 \pm 1.54$

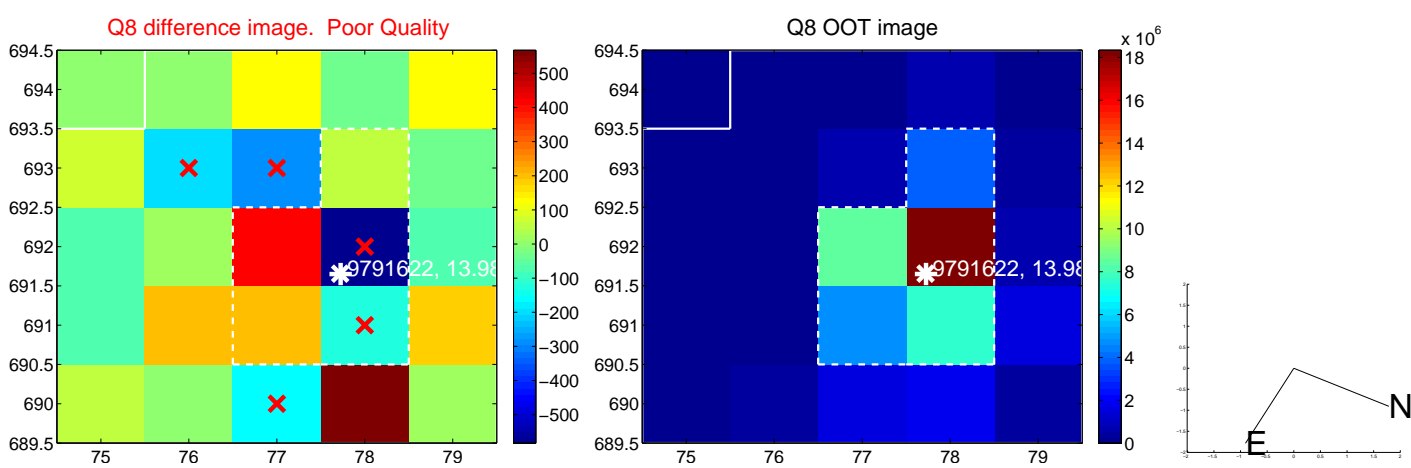
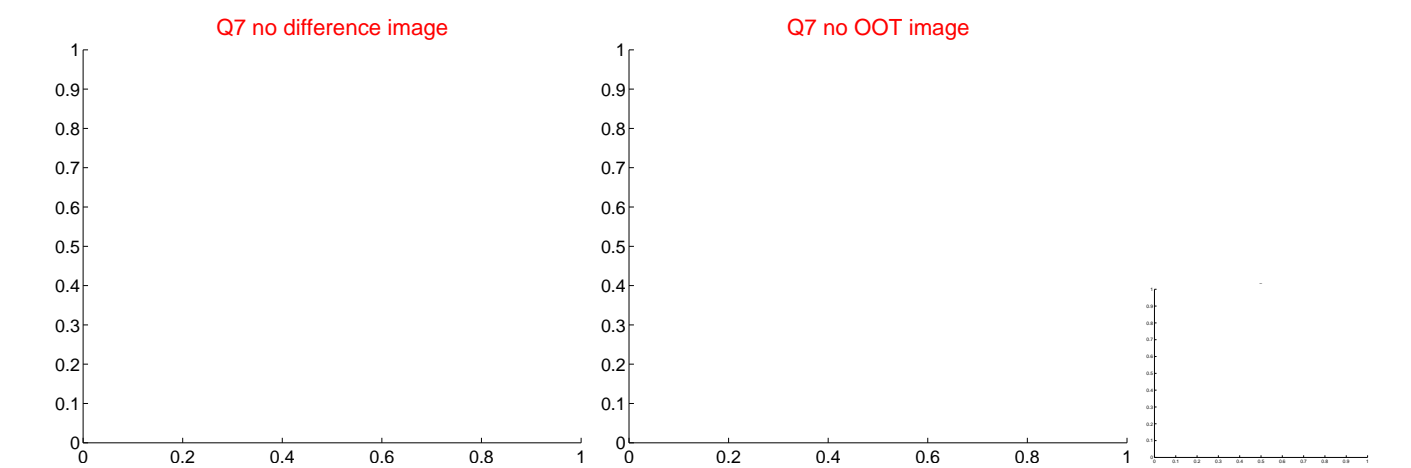
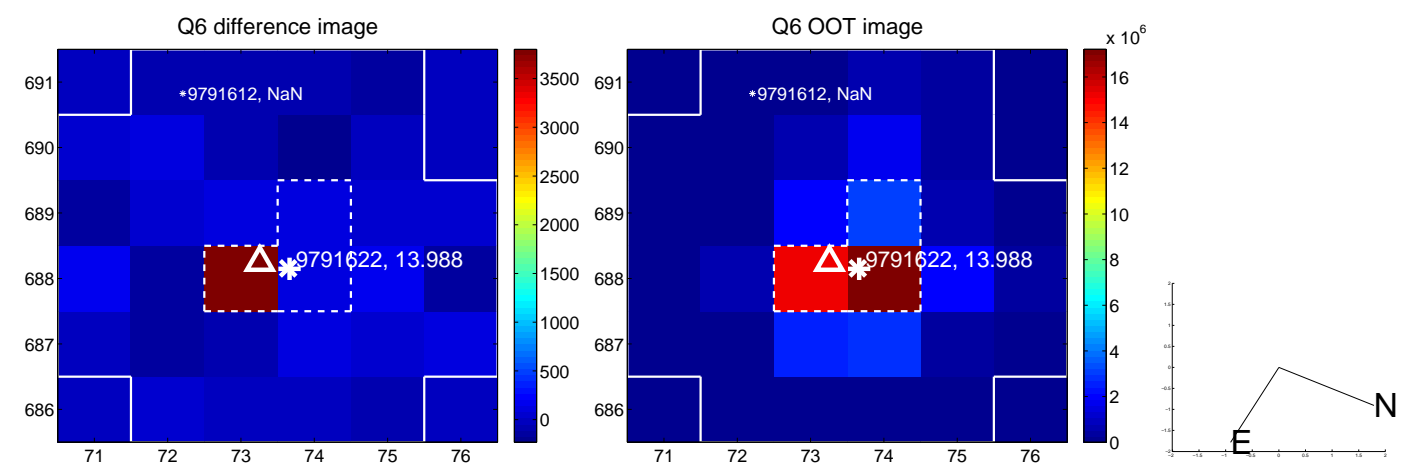
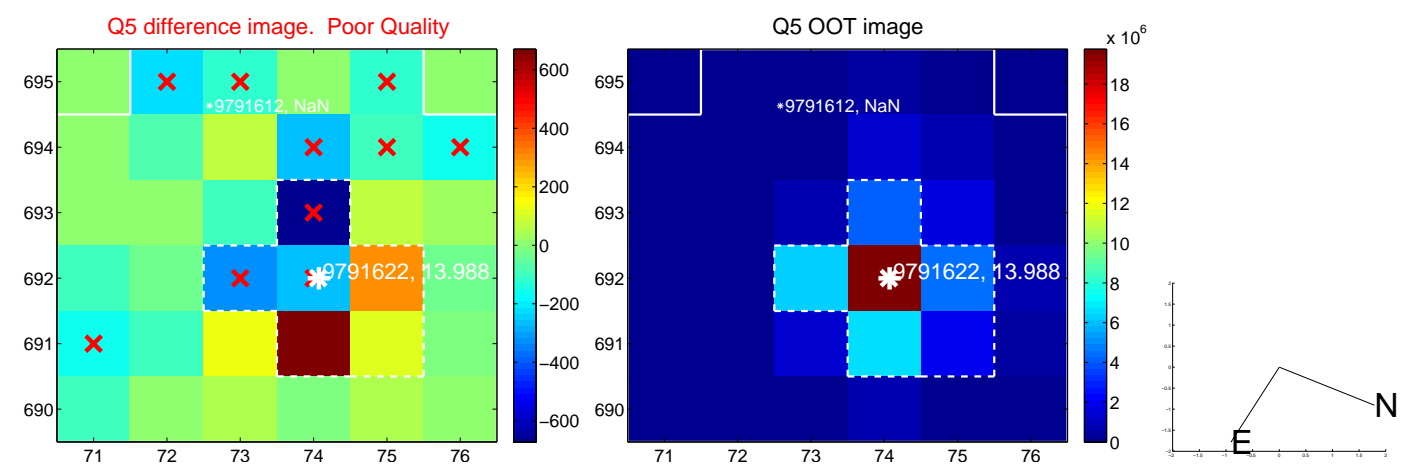


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

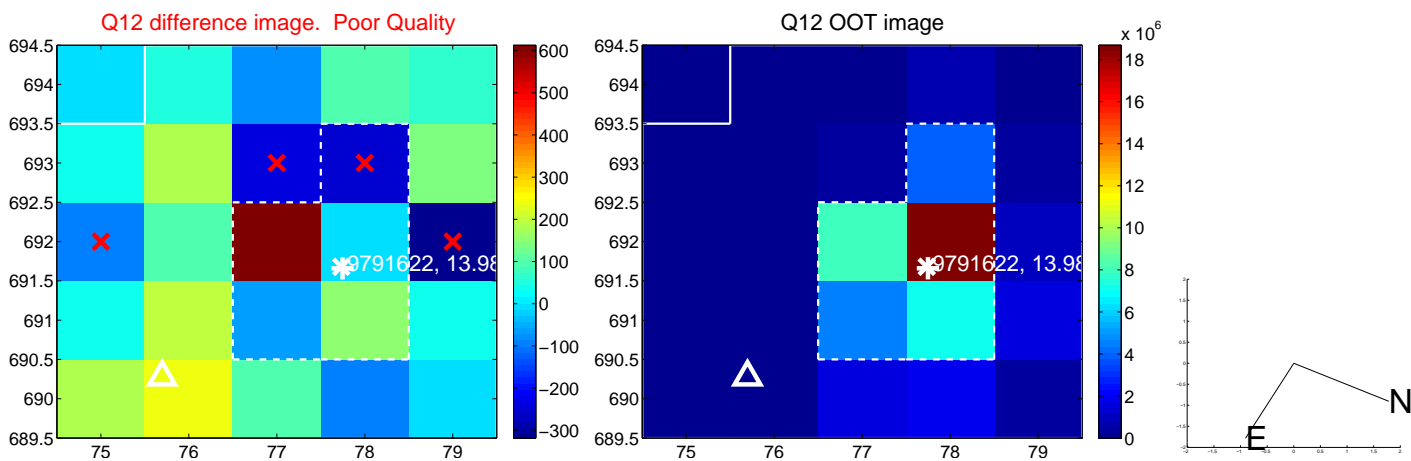
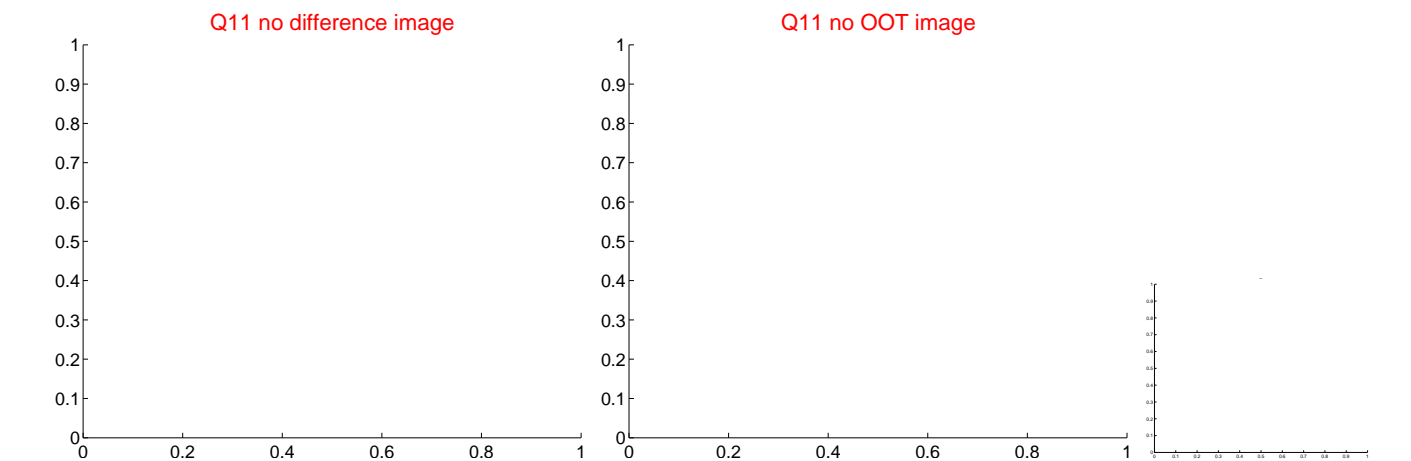
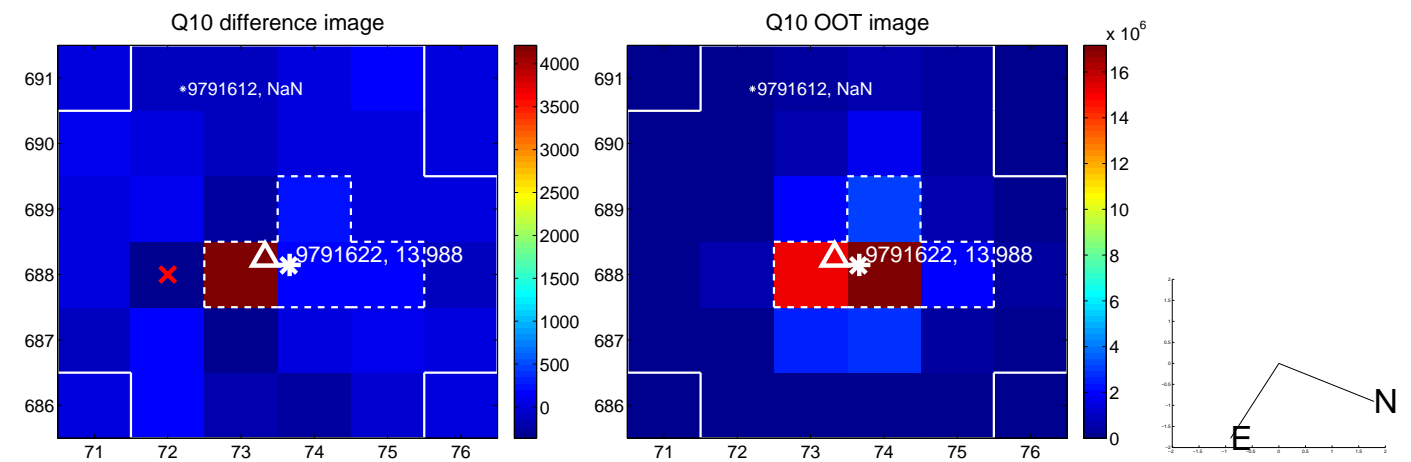
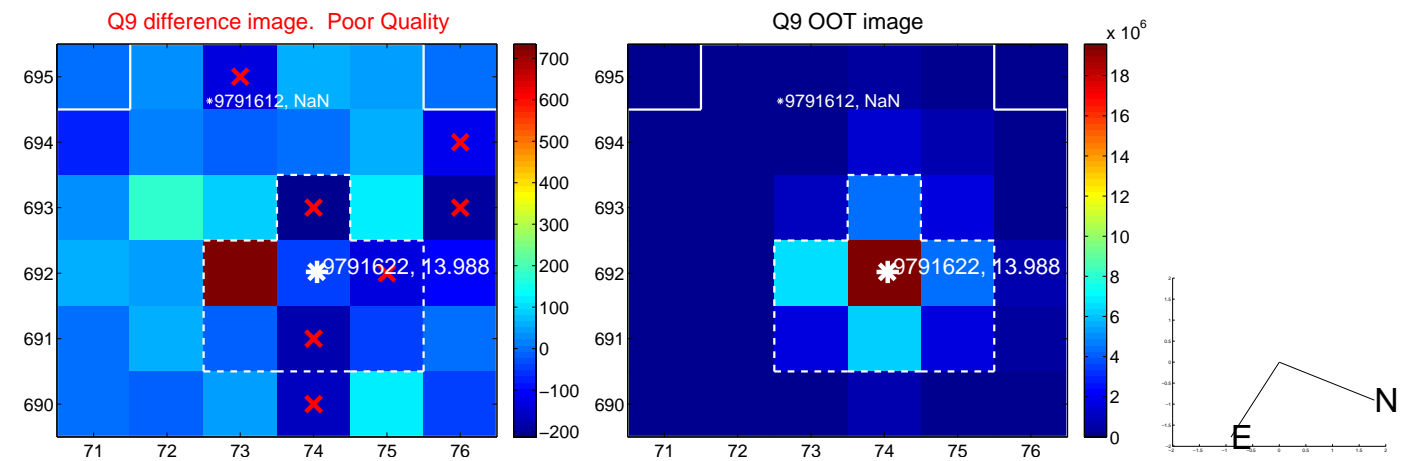


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

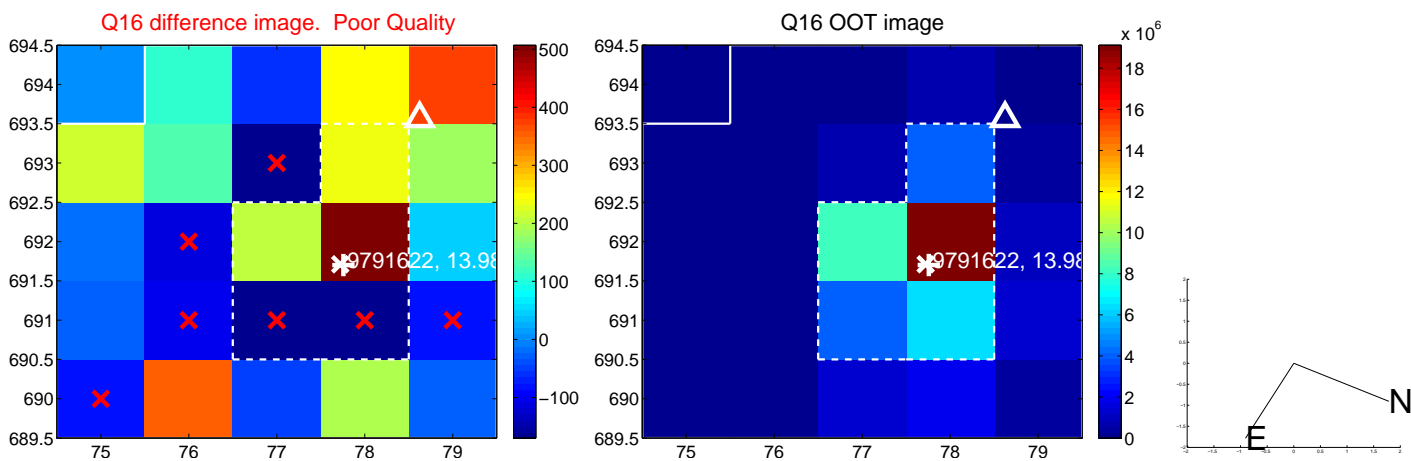
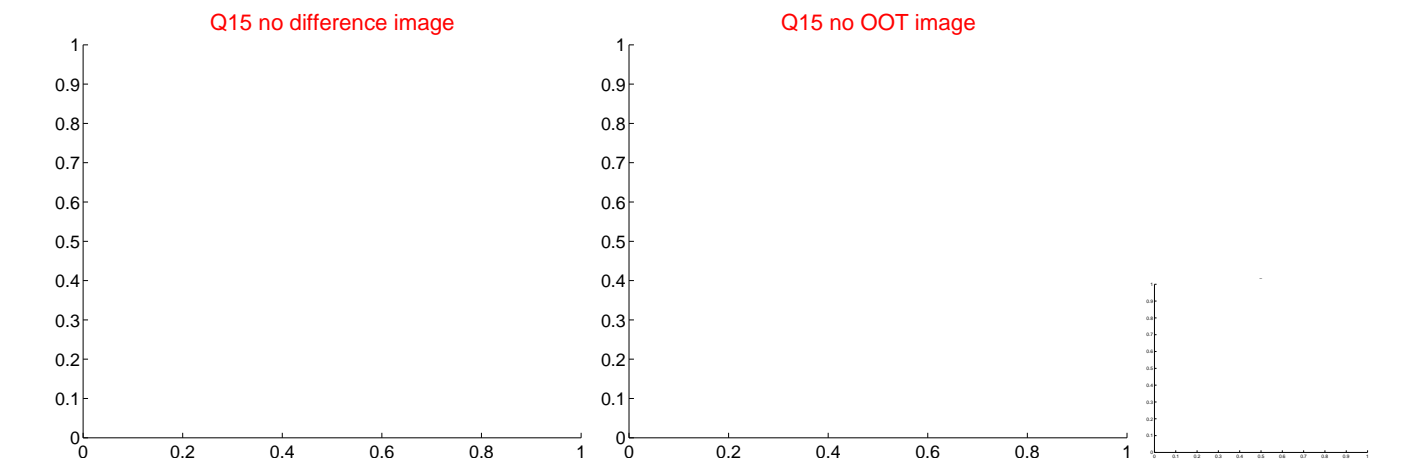
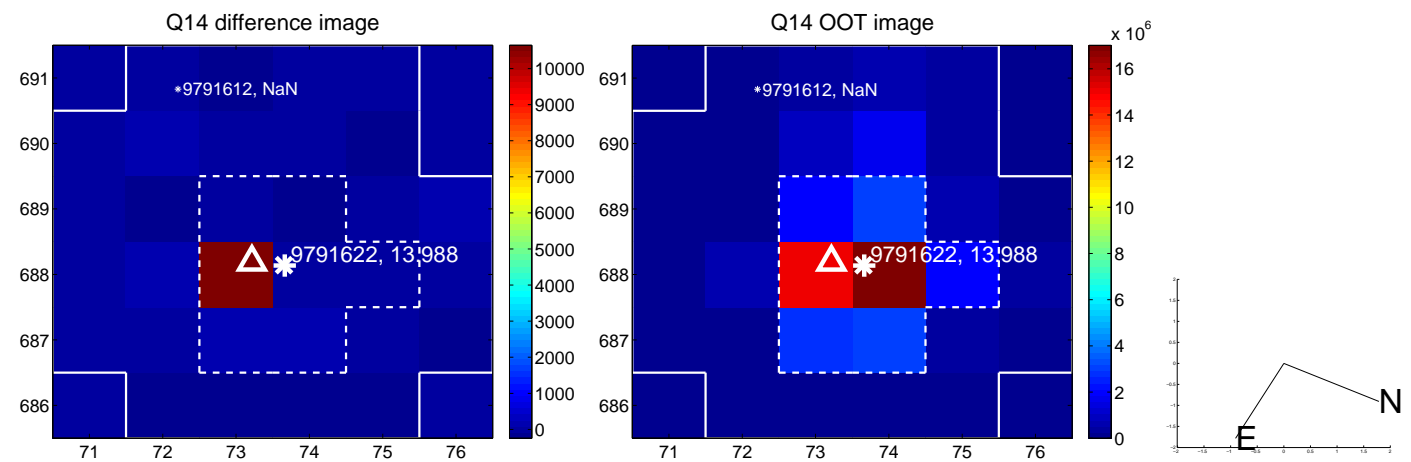
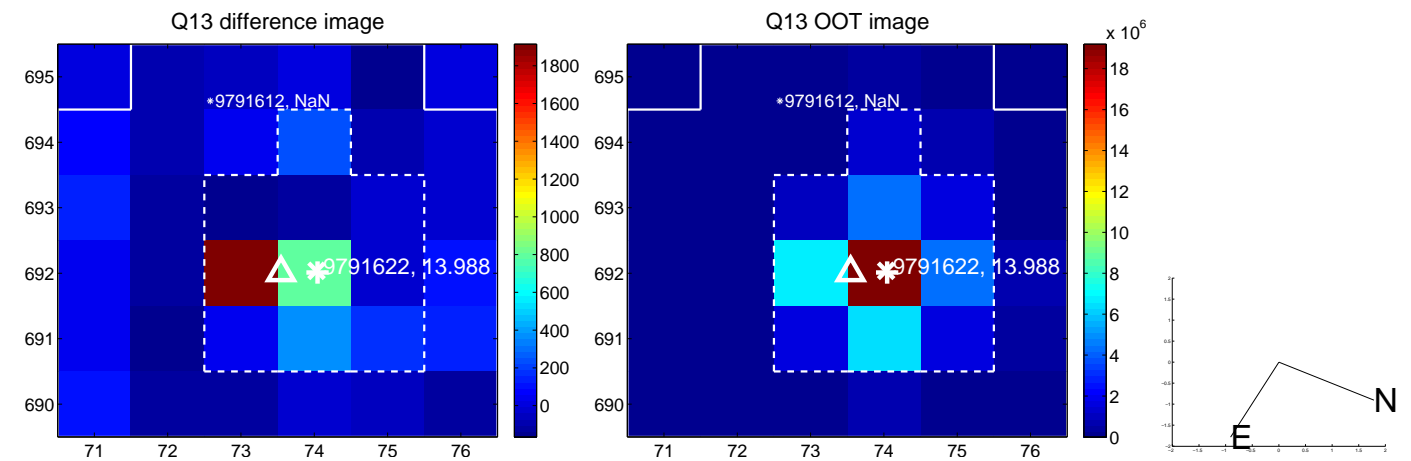




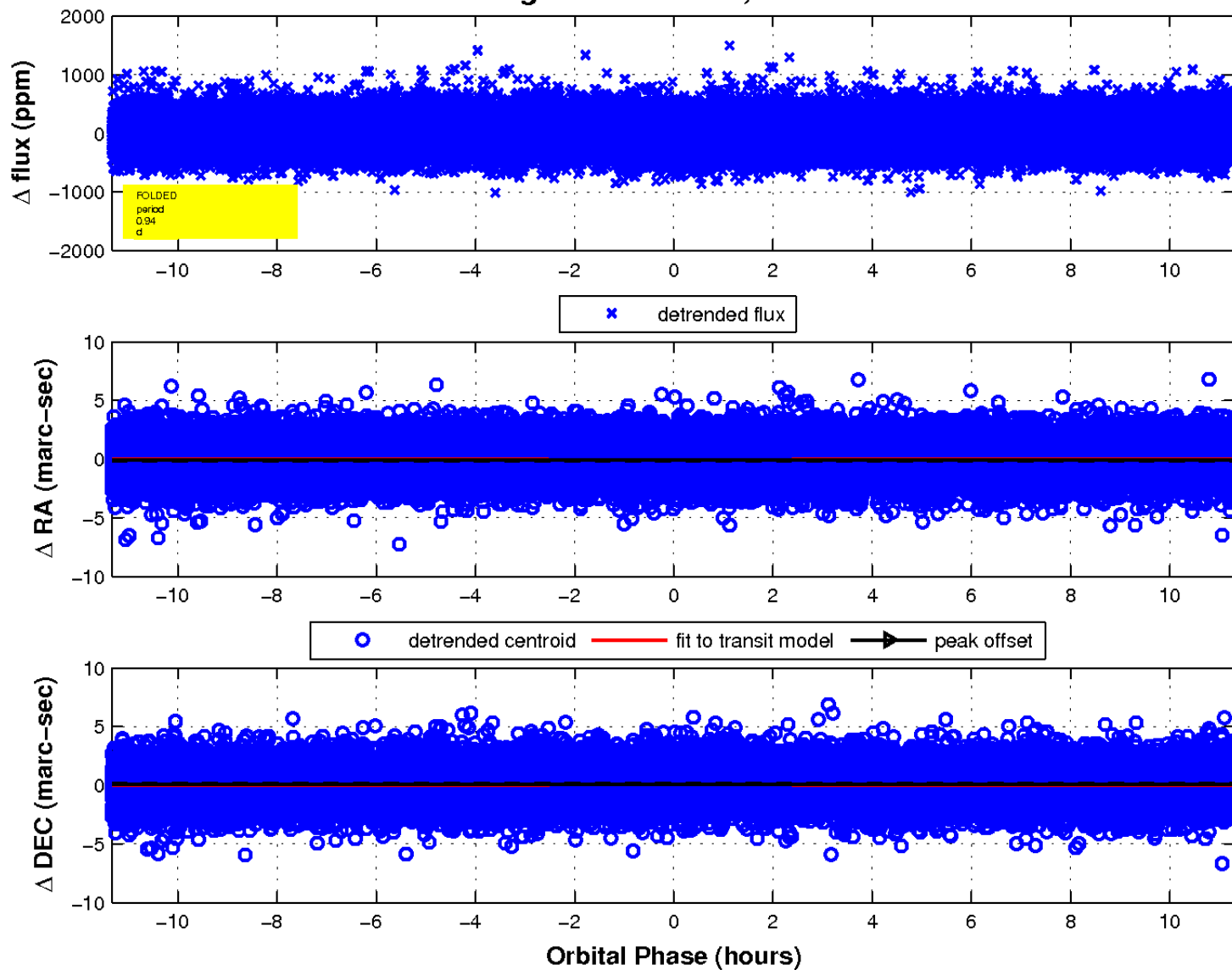
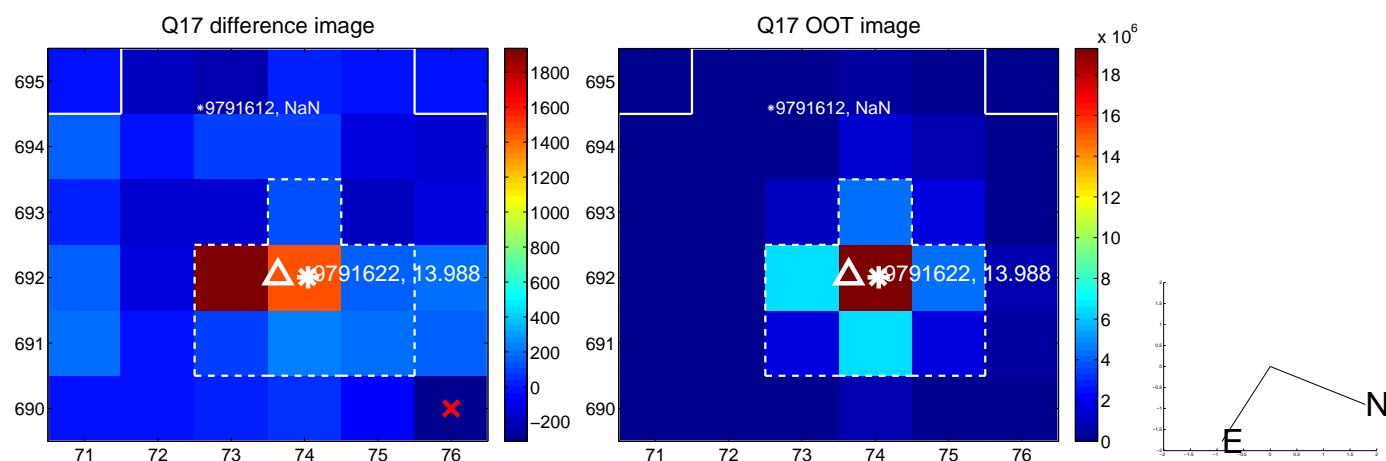
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

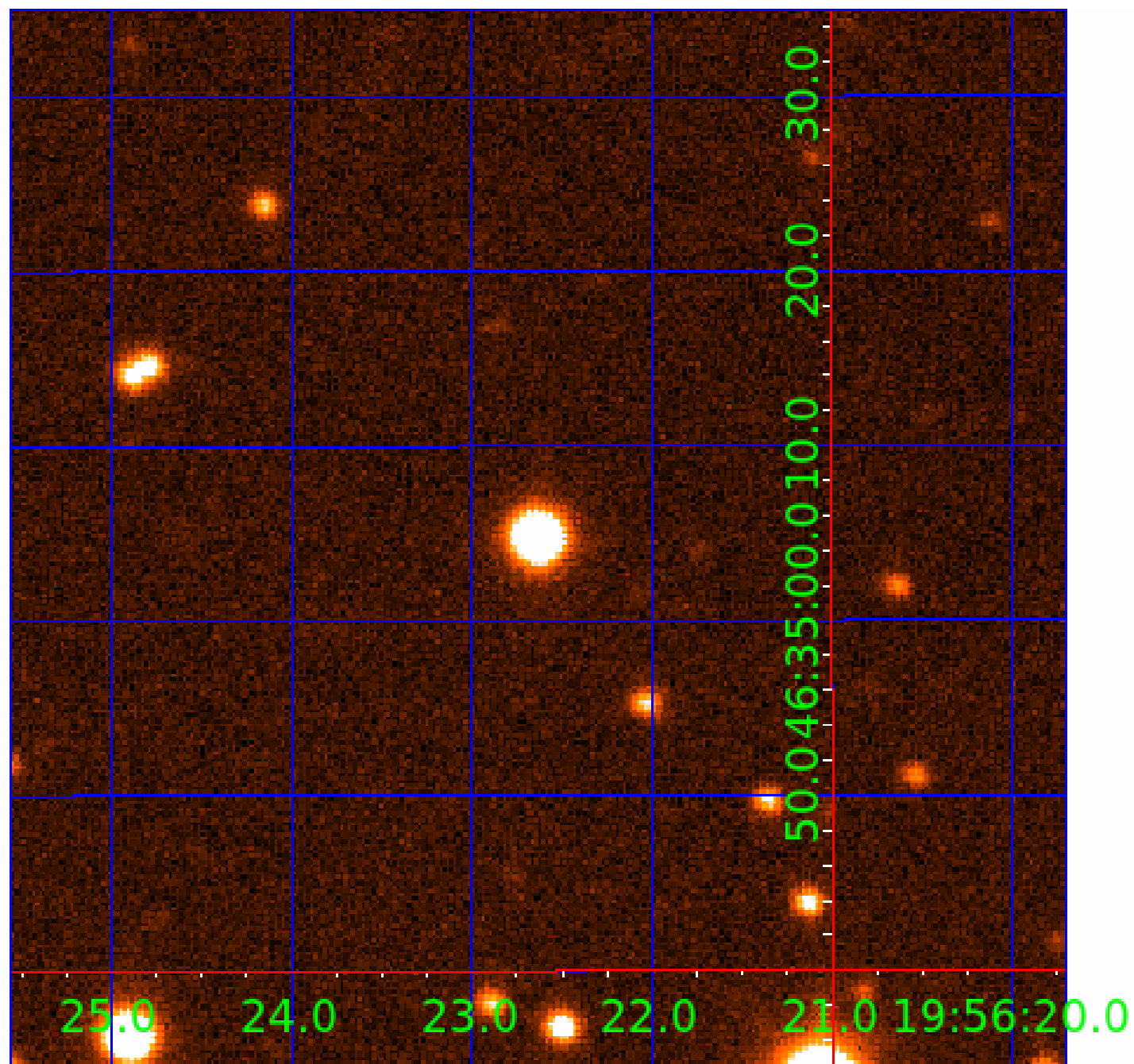


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009791622

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009791622-01	OBS	No	0.943852	131.890606	24.0	5.046	9.1	7.8	1.41	5604	0.69	5384.06
009791622-02	OBS	No	35.198661	158.309992	301.1	1.901	8.1	7.0	1.41	5604	2.84	43.21

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009791622-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009791622-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

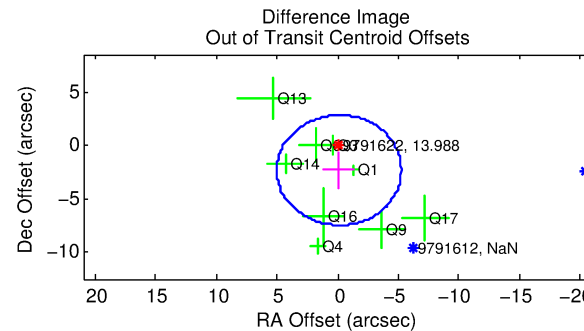
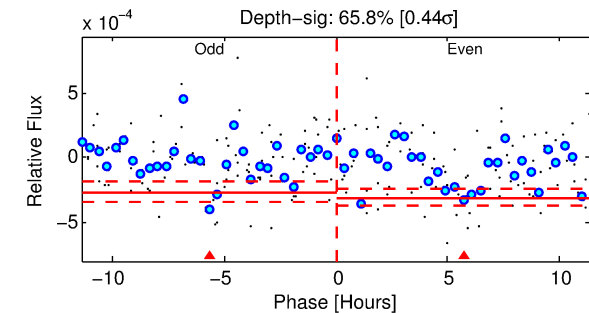
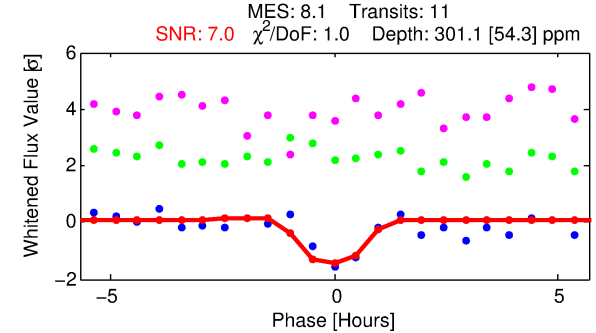
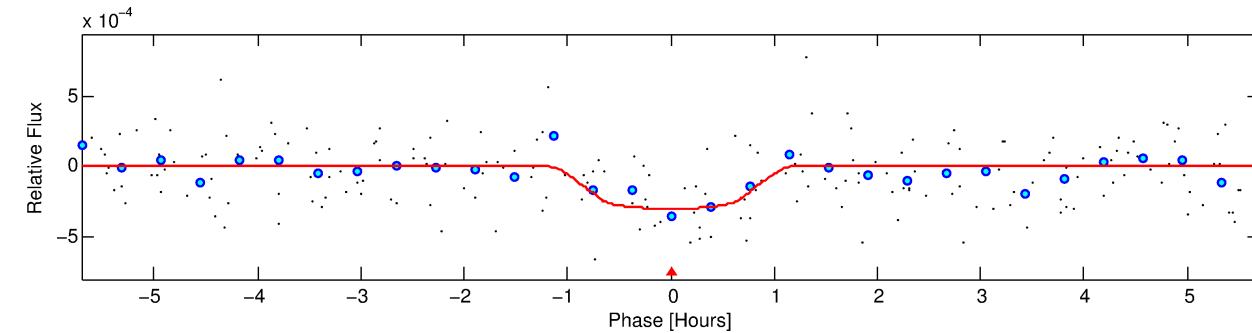
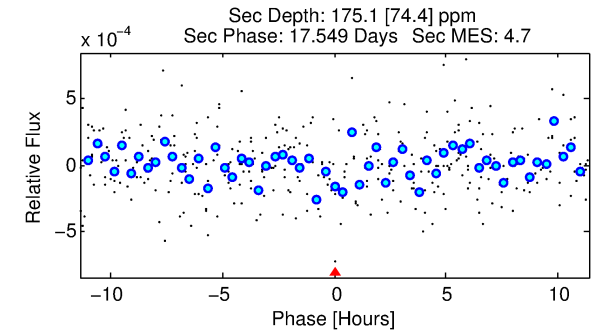
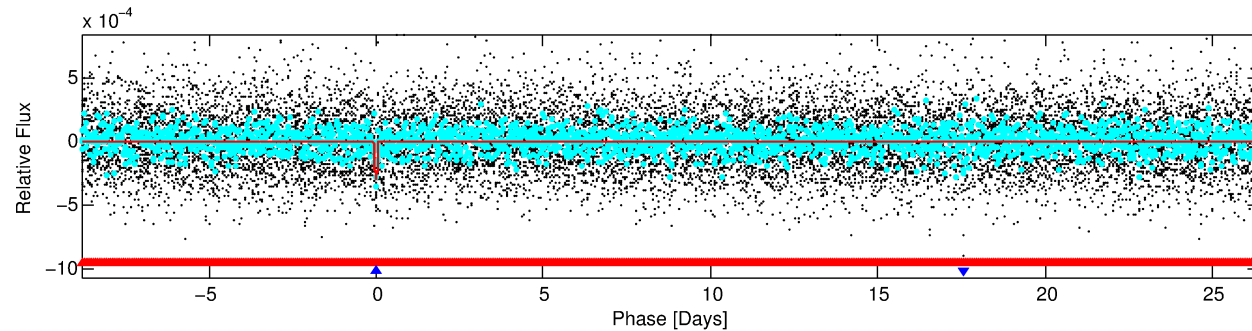
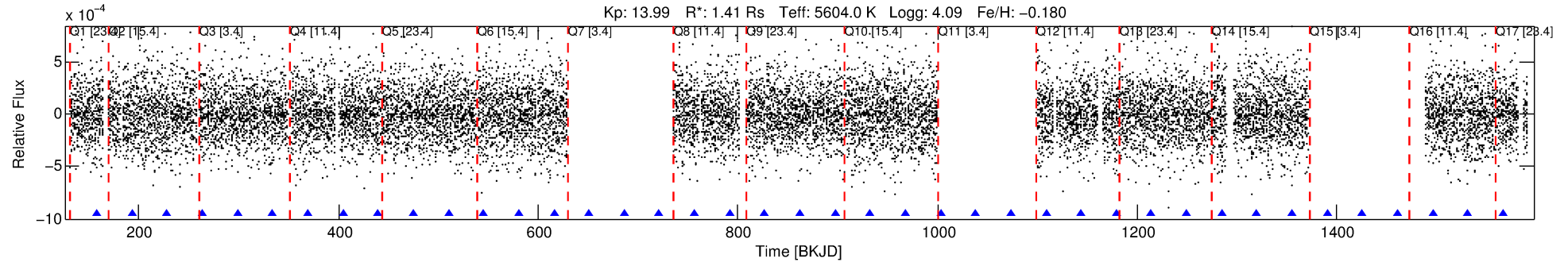
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009791622-02

No Significant Match Found

# DV One-Page Summary

KIC: 9791622 Candidate: 2 of 2 Period: 35.199 d



## DV Fit Results:

Period = 35.19866 [0.00032] d  
Epoch = 158.3100 [0.0074] BKJD  
Rp/R\* = 0.0184 [0.0267]  
a/R\* = 75.80 [494.30]  
b = 0.87 [1.93]  
Seff = 43.21 [30.34]  
Teff = 654 [115] K  
Rp = 2.84 [4.26] Re  
a = 0.2021 [0.0825] AU  
Ag = 486.73 [1466.43] [0.33σ]  
Teffp = 4748 [3483] K [1.17σ]

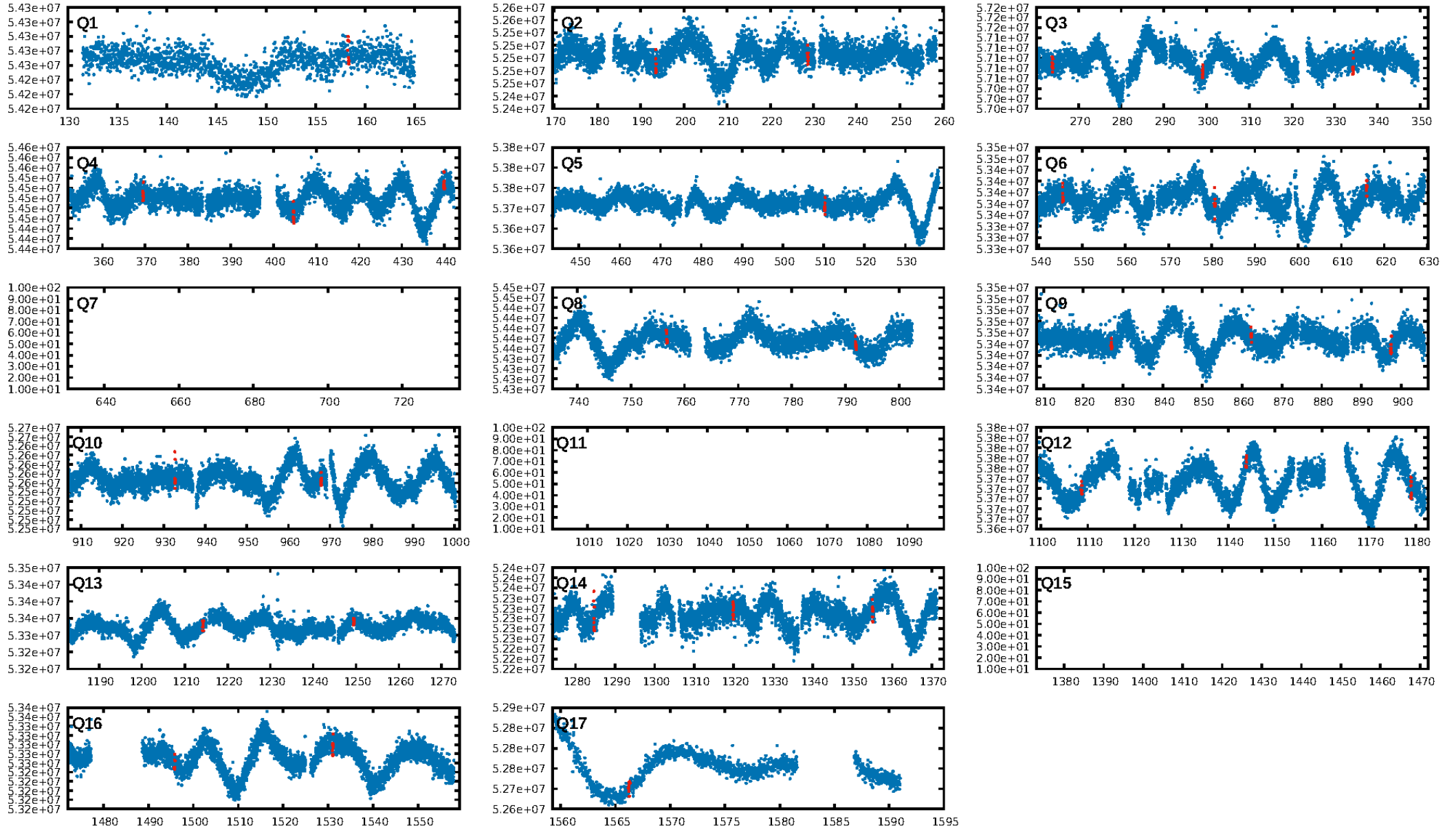
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [152.46σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 17.3%  
ModelChiSquareGof-sig: 99.4%  
**Bootstrap-pfa: 3.68e-12**  
RollingBand-fgt: 1.00 [10/10]  
GhostDiagnostic-chr: -1.309  
**Centroid-sig: 0.0%**  
Centroid-so: 3.214 arcsec [2.64σ]  
OotOffset-rm: 2.336 arcsec [1.36σ]  
KicOffset-rm: 2.279 arcsec [1.55σ]  
OotOffset-st: 2/1/2/4 [9]  
KicOffset-st: 2/1/2/4 [9]  
DiffImageQuality-fgm: 0.11 [1/9]  
DiffImageOverlap-fno: 0.43 [6/14]

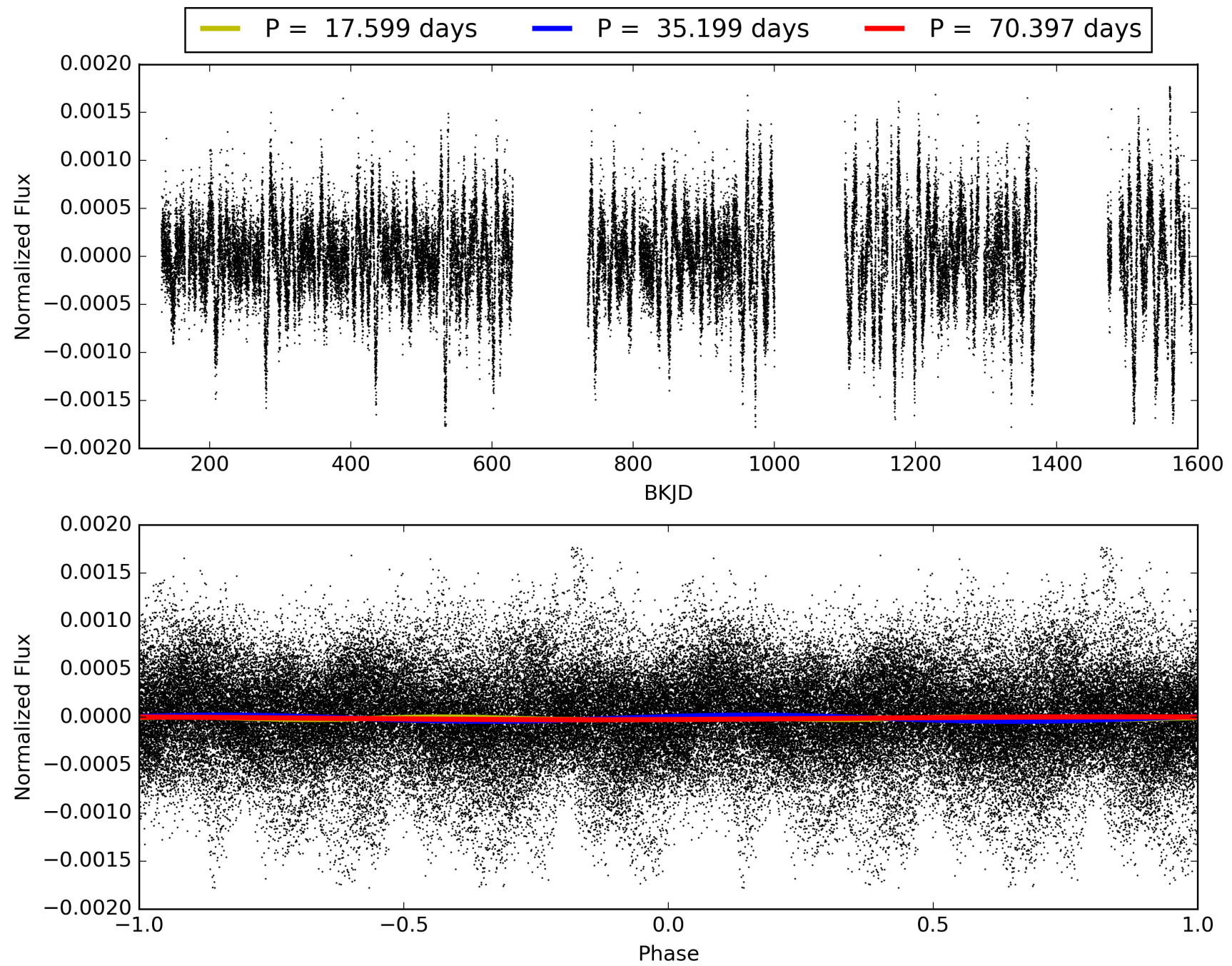
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:15:27 Z

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

# TCE 009791622-02, PDC Light Curves



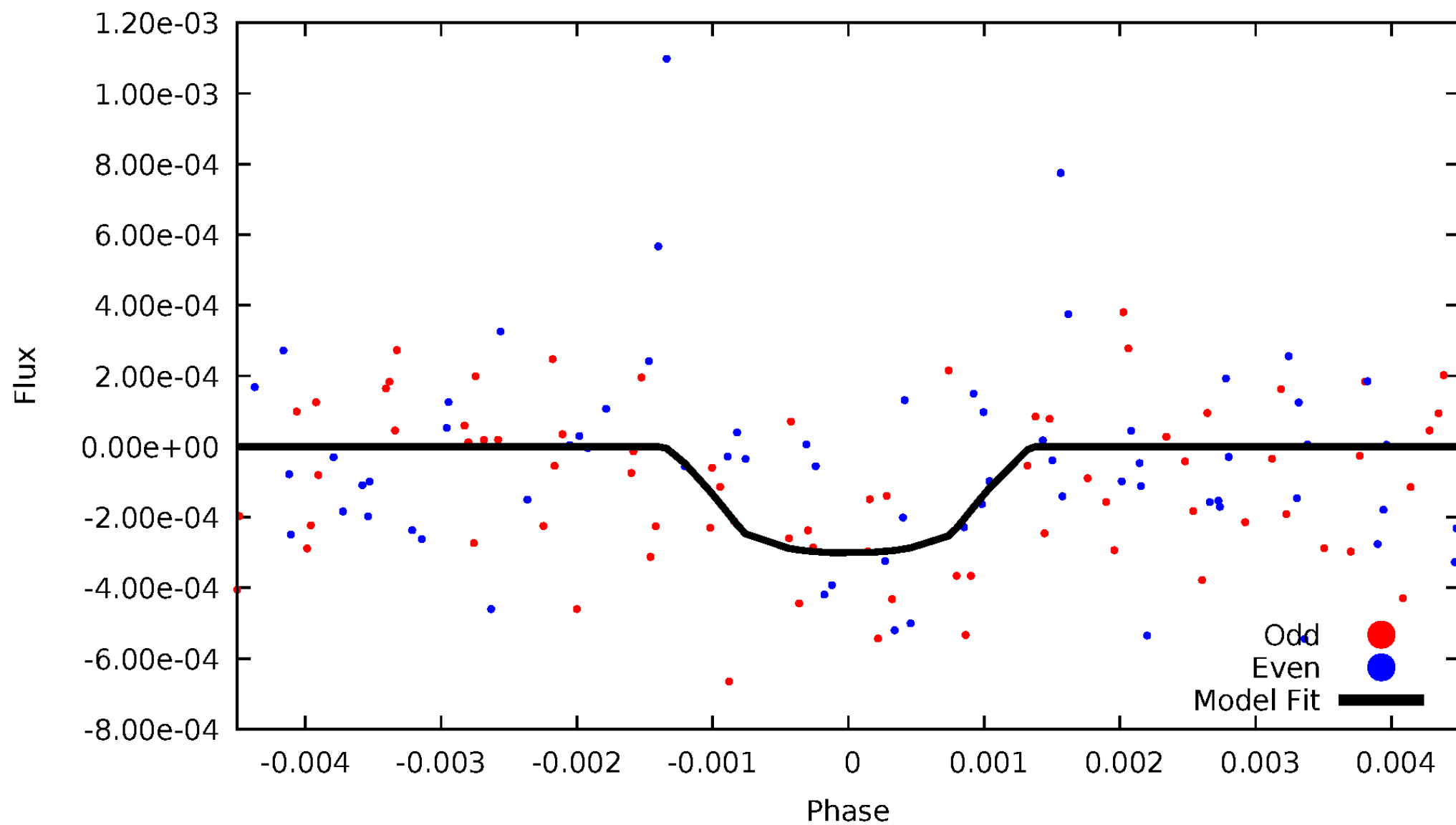
TCE 009791622-02





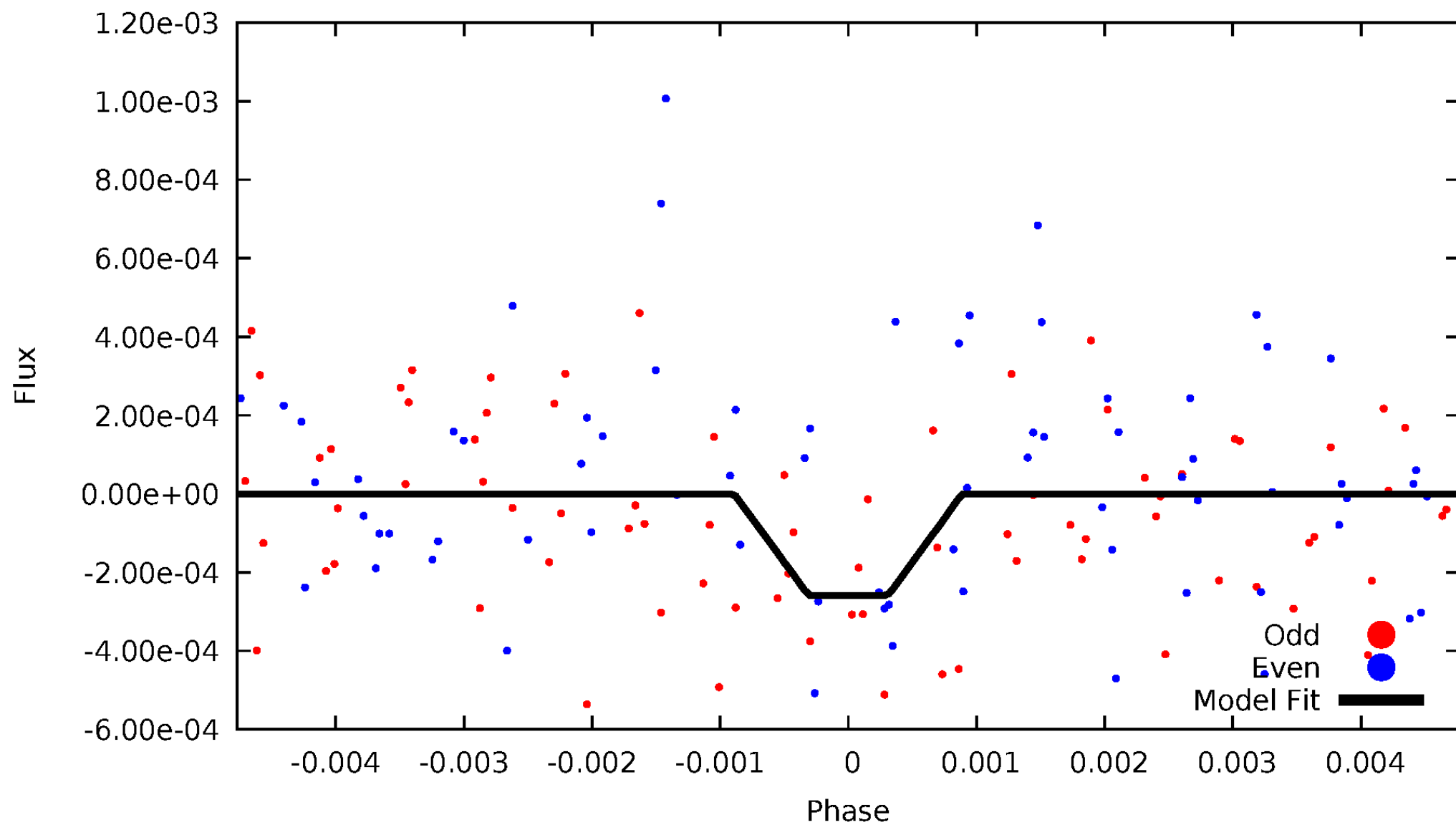
# DV Odd/Even

TCE 009791622-02



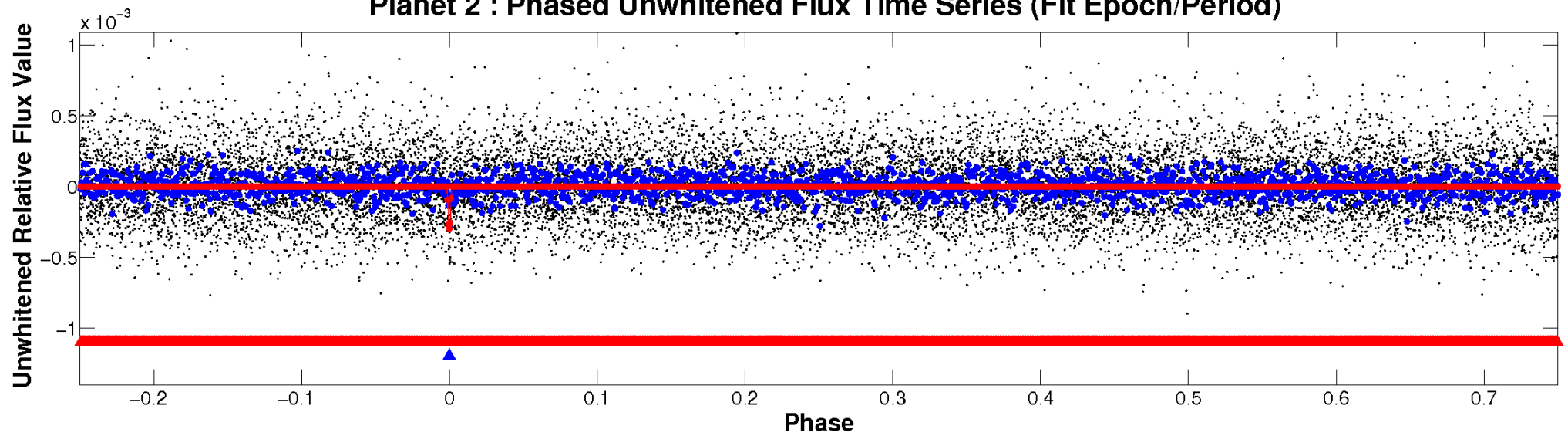
# ALT Odd/Even

TCE 009791622-02

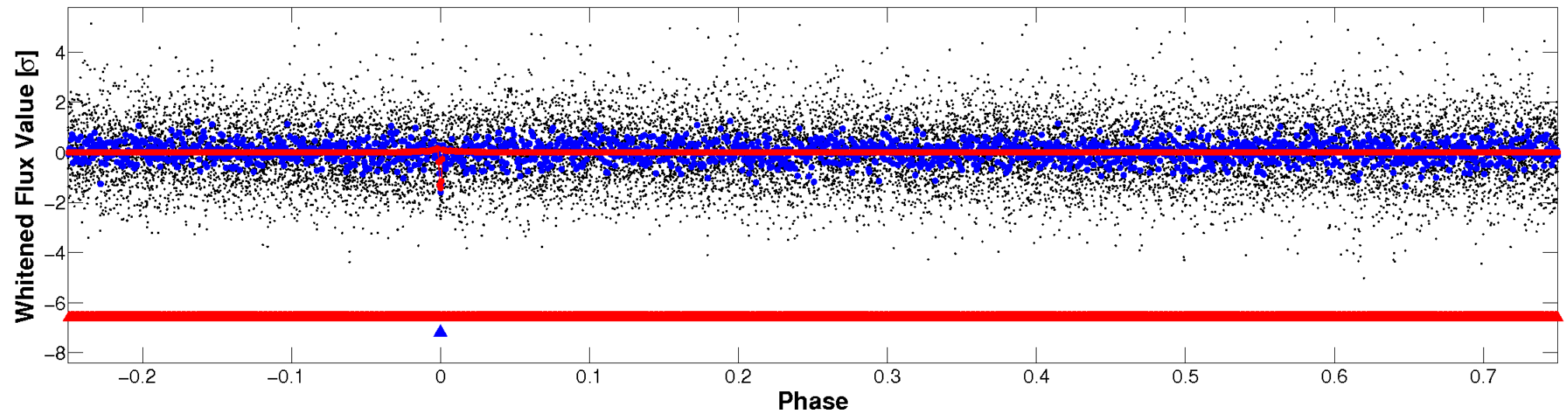


# Non-Whitened Vs. Whitened Light Curve

**Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

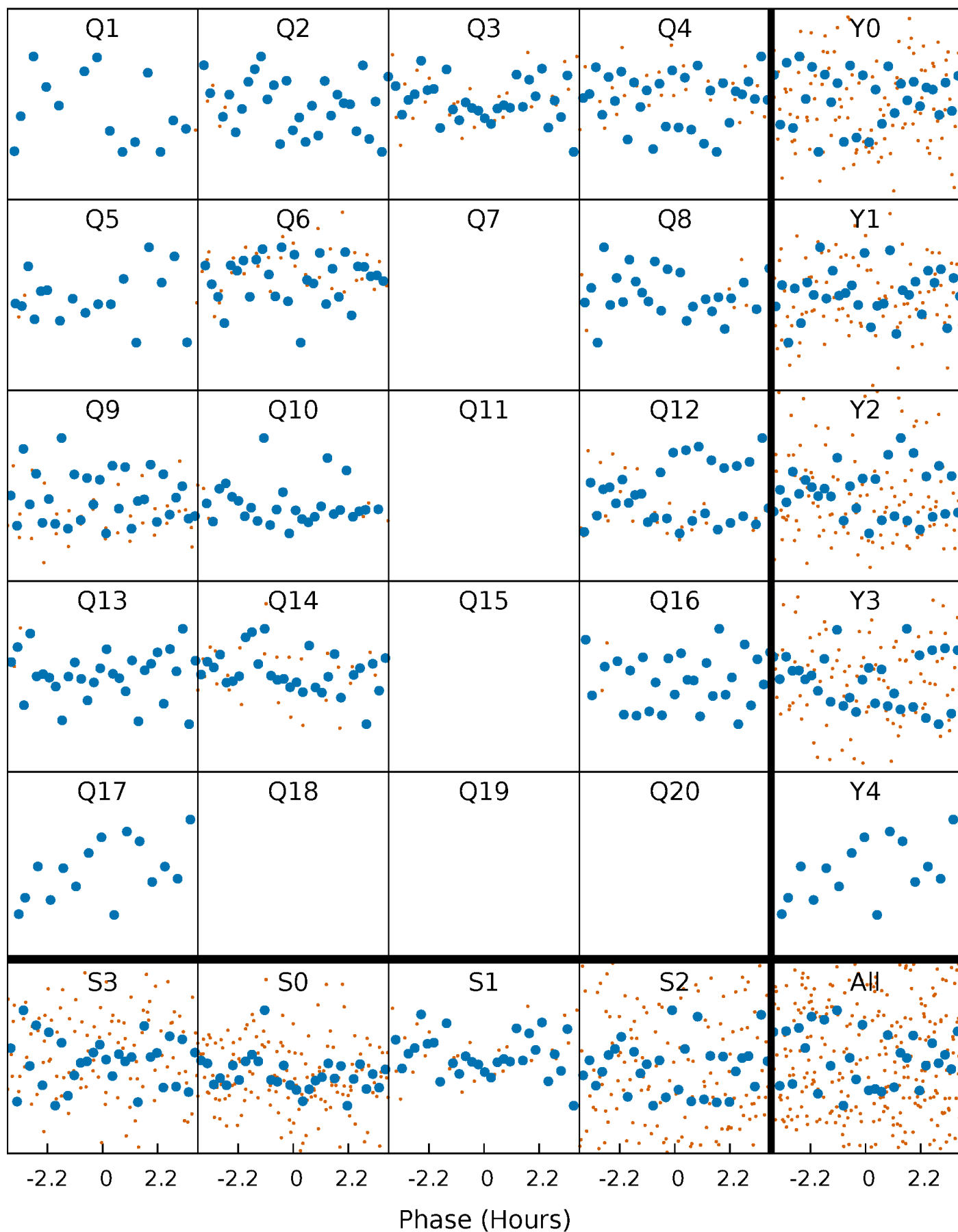


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



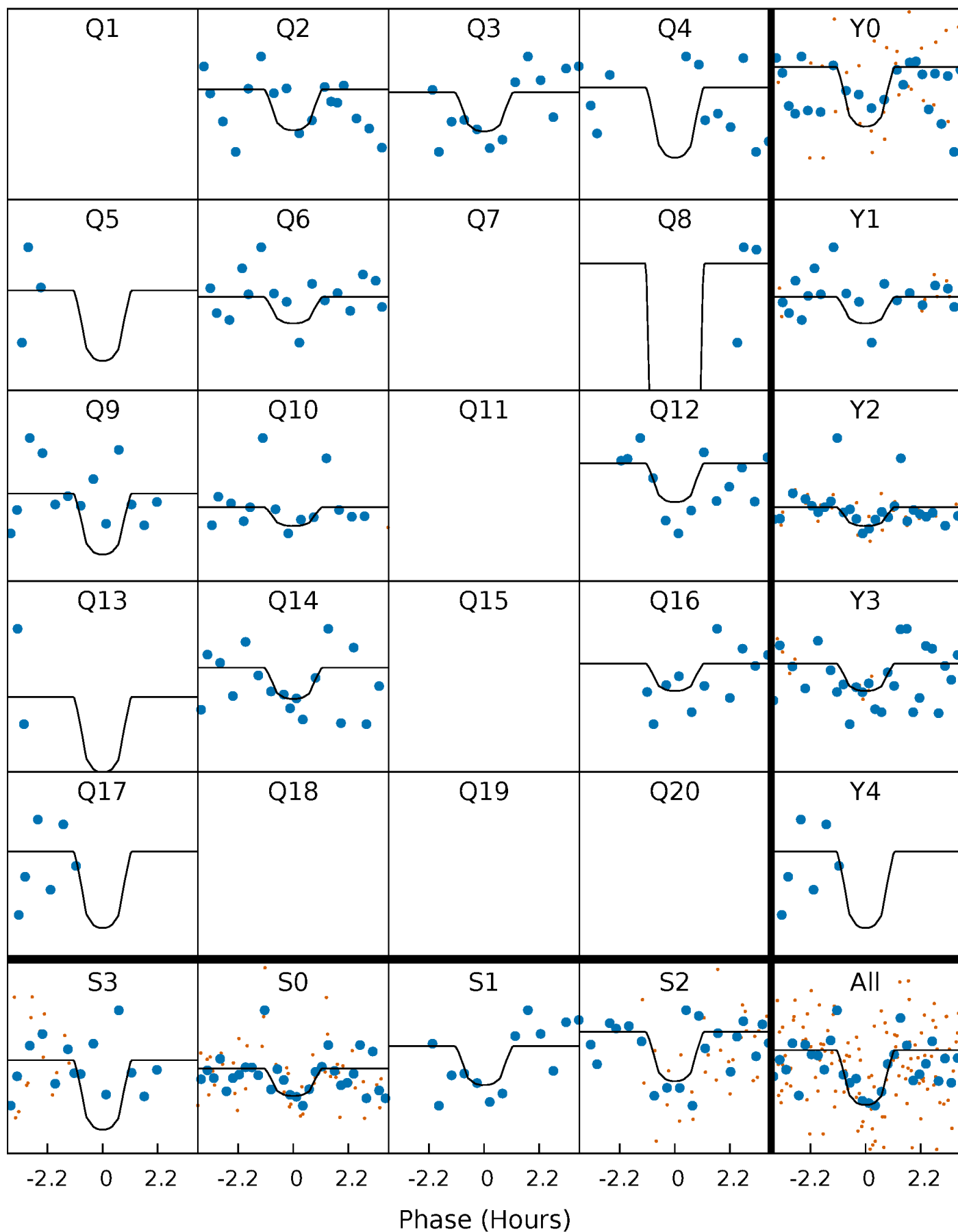
# PDC Quarter-Phased Transit Curves

TCE 009791622-02 P= 35.198661 Days  $T_0=158.309992$  (BKJD)



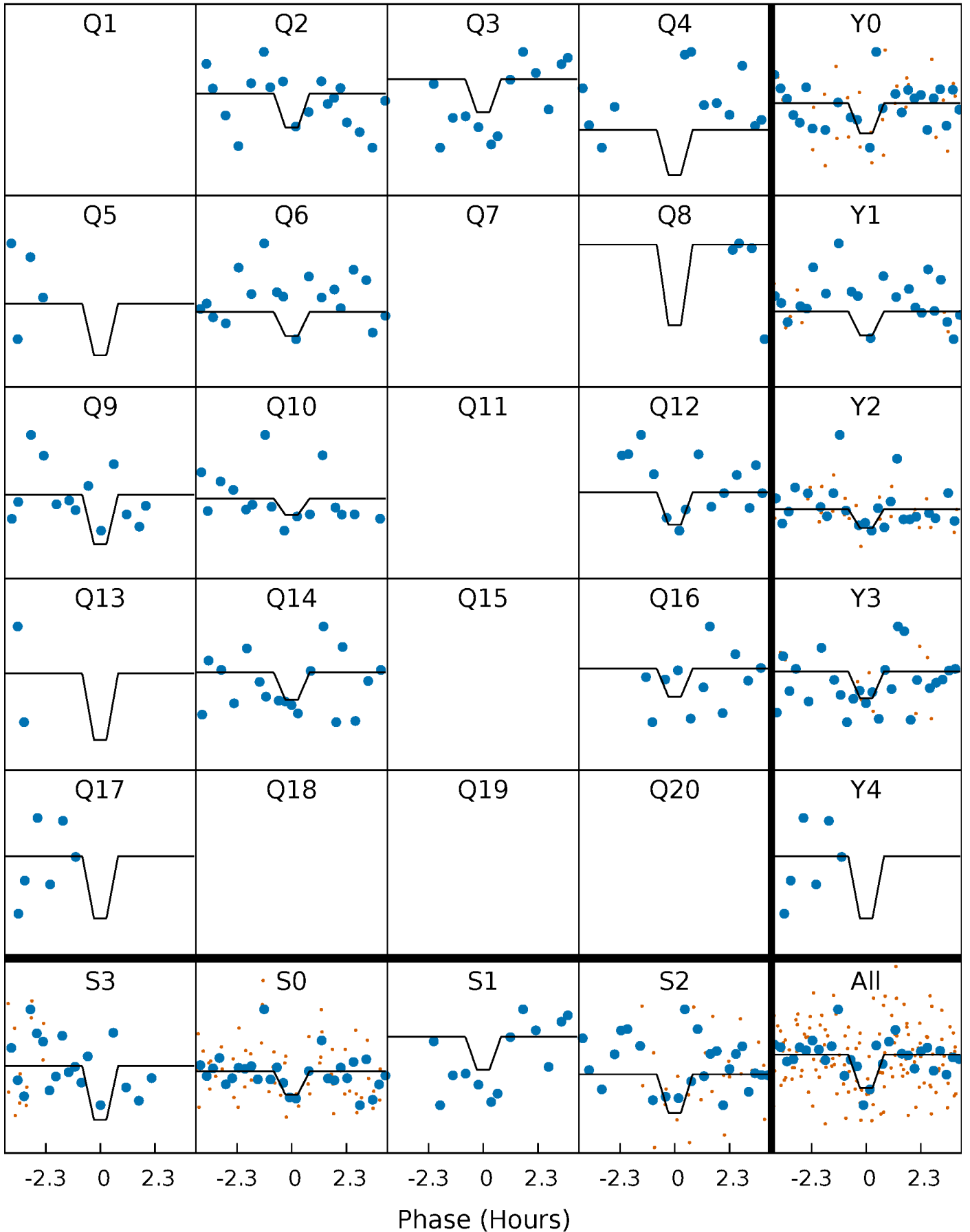
# DV Quarter-Phased Transit Curves

TCE 009791622-02 P= 35.198661 Days  $T_0=158.309992$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009791622-02 P= 35.198755 Days  $T_0=158.310941$  (BKJD)

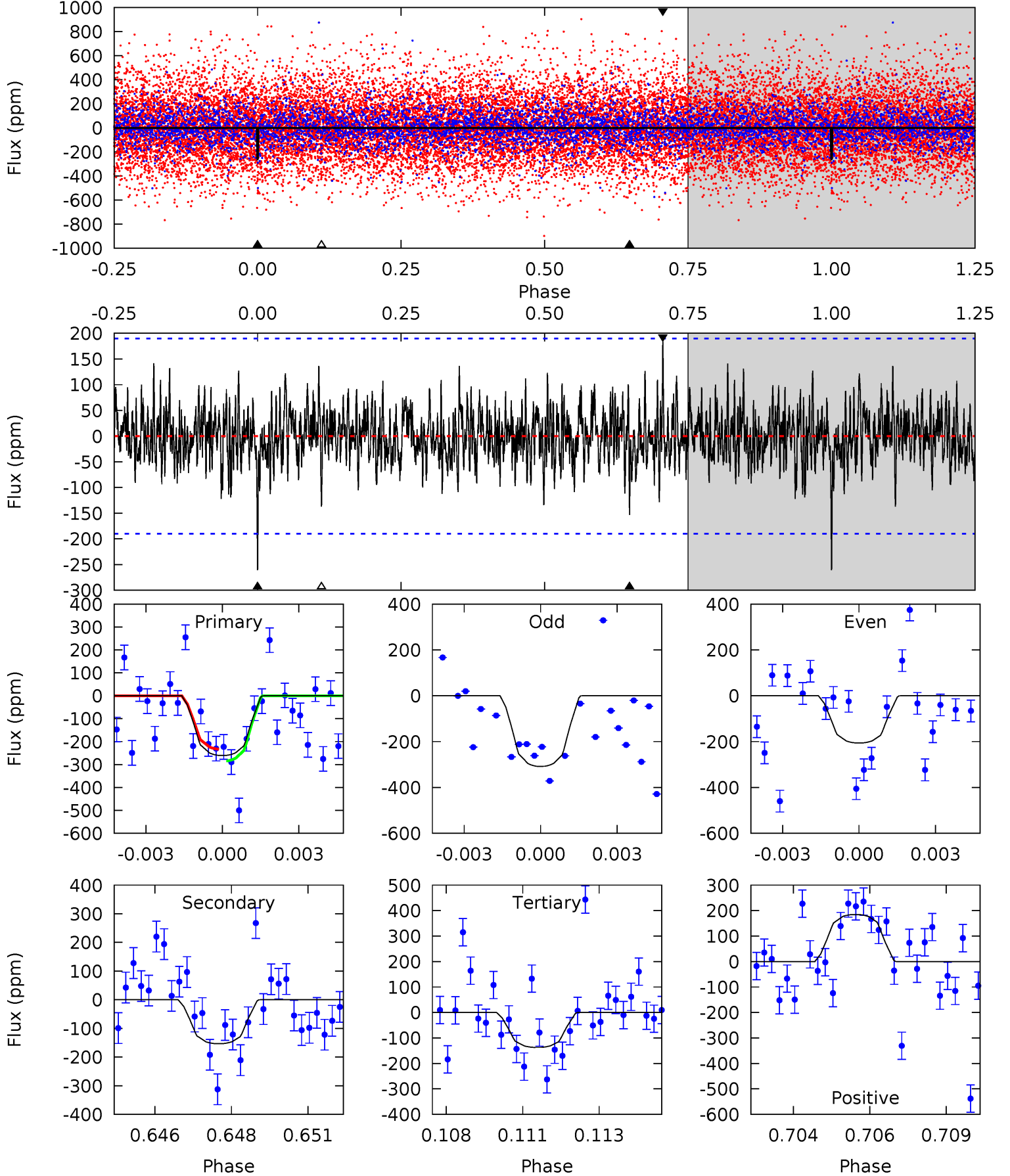




# DV Model-Shift Uniqueness Test

009791622-02, P = 35.198661 Days, E = 123.111331 Days

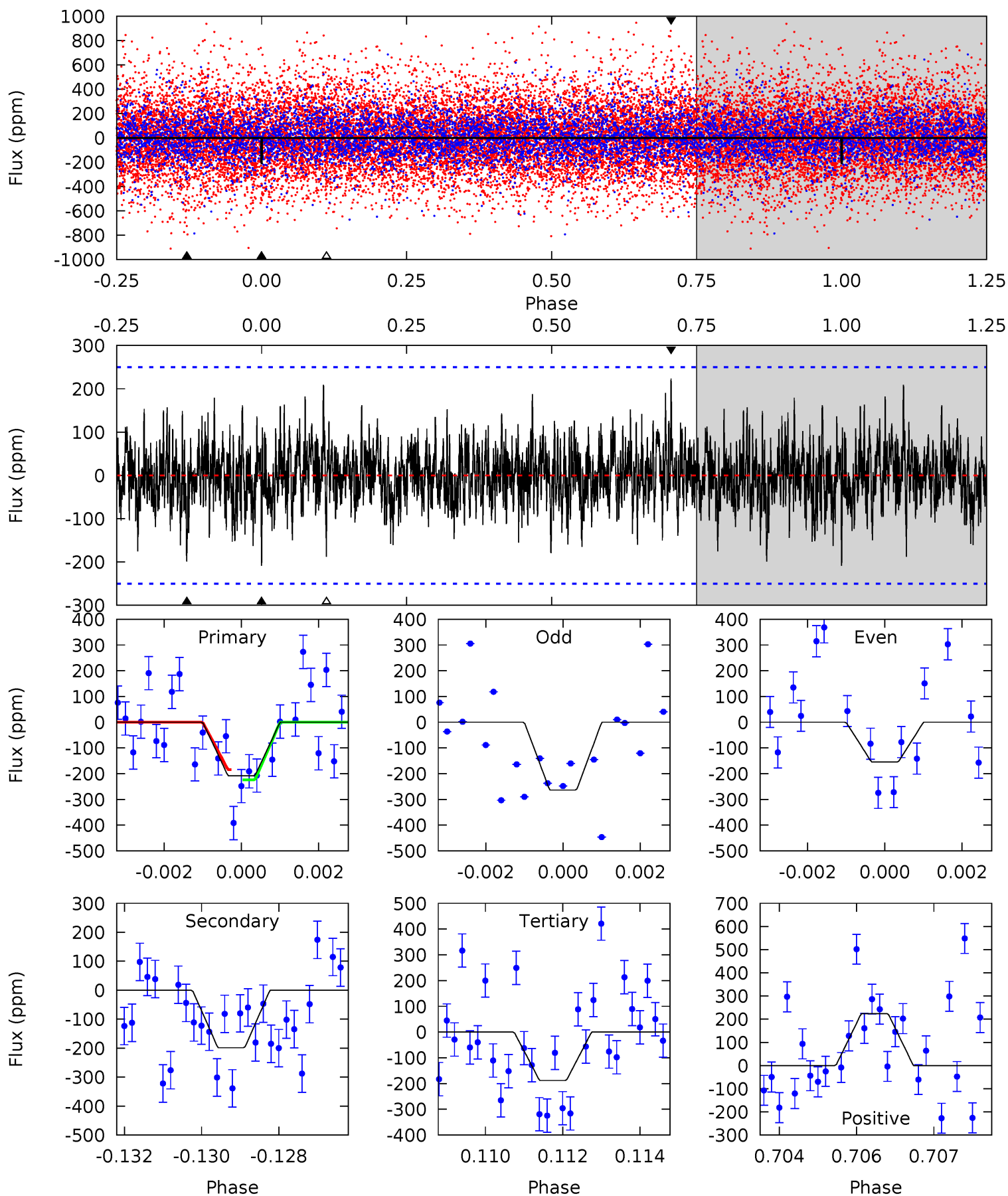
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.24	4.26	3.81	5.13	5.28	3.01	1.22	3.43	2.11	0.45	-0.87	1.46	0.87	0.41	0.71



# Alt Model-Shift Uniqueness Test

009791622-02, P = 35.198755 Days, E = 123.112186 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
4.45	4.25	4.02	4.79	5.35	3.13	1.21	0.43	-0.34	0.23	-0.54	1.19	0.80	0.52	0.41



### Stellar Parameters For KIC 009791622

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5604^{+169}_{-152}$	$4.086^{+0.420}_{-0.180}$	$-0.180^{+0.300}_{-0.250}$	$1.413^{+0.435}_{-0.531}$	$0.889^{+0.114}_{-0.085}$	$0.444^{+1.467}_{-0.205}$
	+3%/-3%	+10%/-4%	+167%/-139%	+31%/-38%	+13%/-10%	+331%/-46%
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 009791622-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-153 \pm 36$	$3.75^{+3.68}_{-2.50}$	$901^{+80}_{-95}$	$4133^{+2559}_{-802}$	$240^{+2141}_{-181}$
Alt.	$-199 \pm 47$	$3.78^{+3.63}_{-2.50}$	$899^{+86}_{-101}$	$4302^{+2620}_{-862}$	$304^{+2228}_{-224}$

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

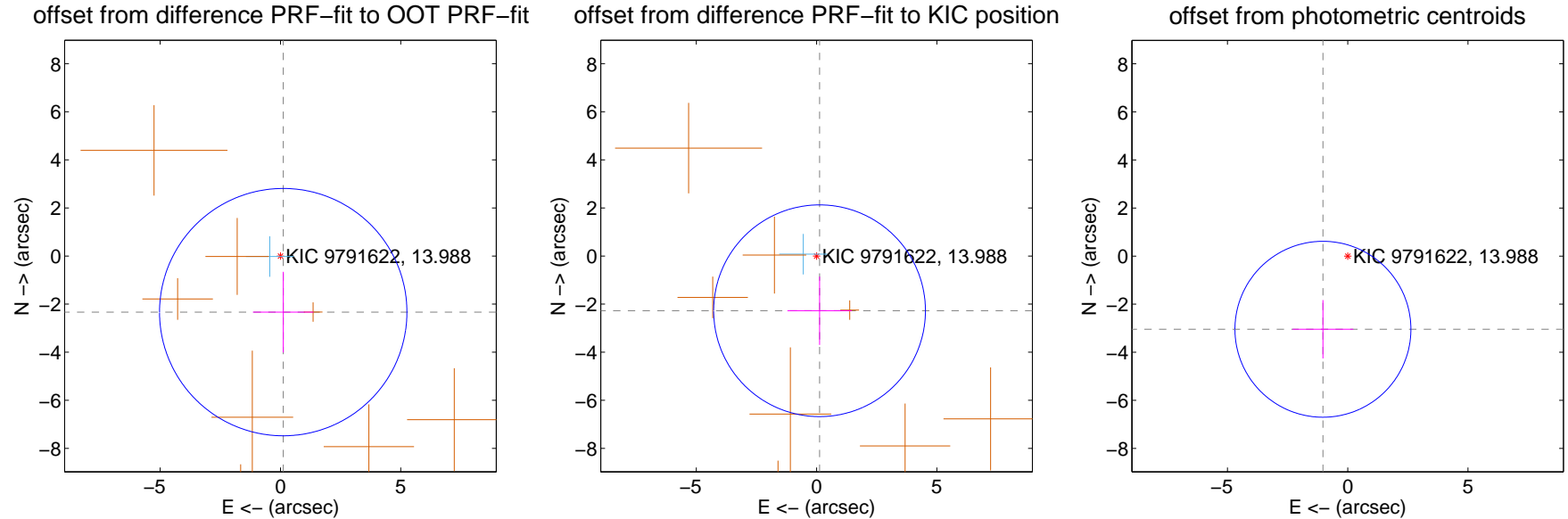
## DV Centroid Data

Supplemental centroid analysis for 009791622-02. Kepler magnitude: 13.99. Transit SNR 6.97

There are 1 quarters with good PRF difference image offsets

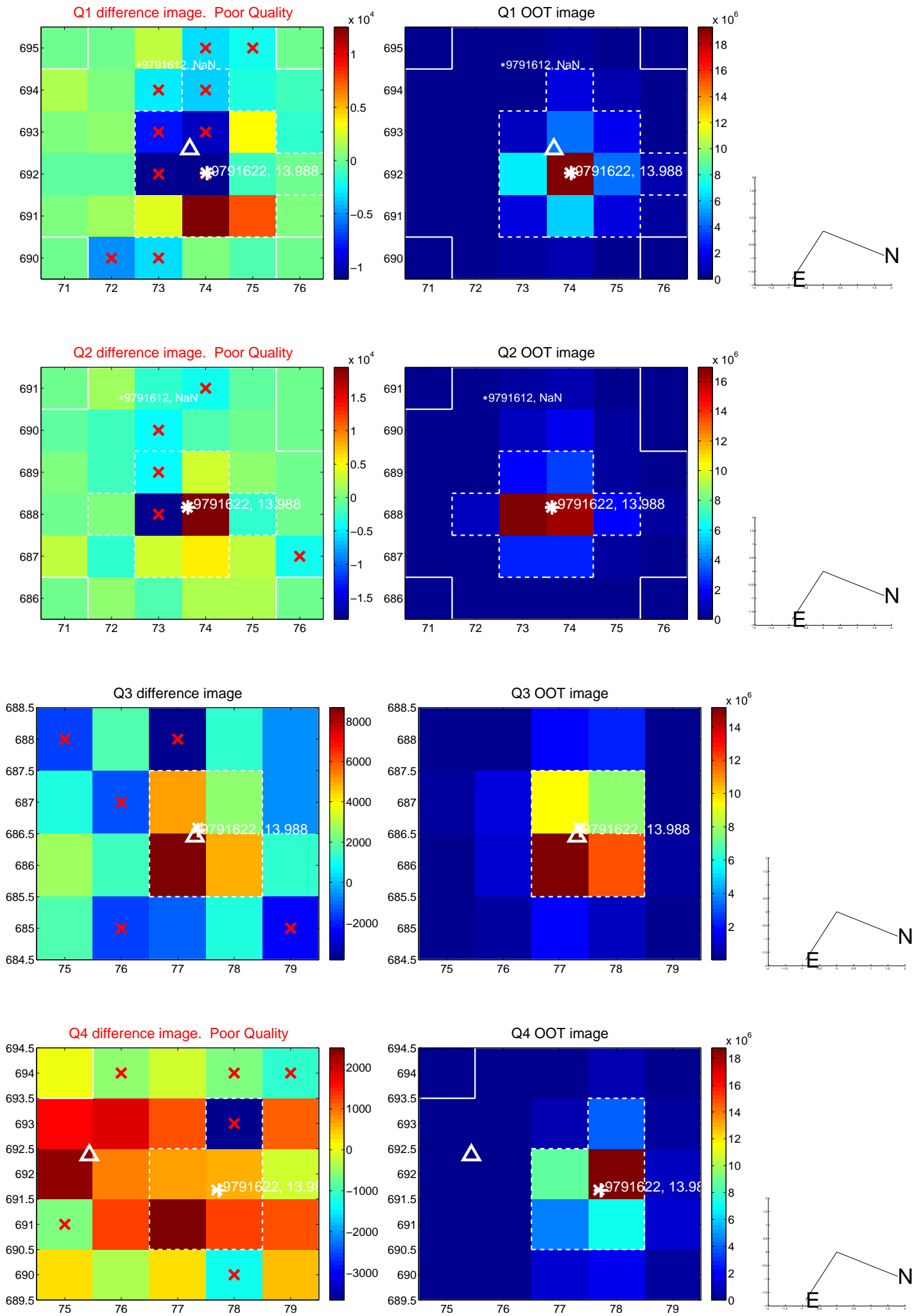
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.336 \pm 1.714$	1.36	$-0.115 \pm 1.259$	$-2.333 \pm 1.678$
PRF-fit source offset from KIC position	$2.279 \pm 1.467$	1.55	$-0.123 \pm 1.338$	$-2.275 \pm 1.422$
photometric centroid source offset	$3.21 \pm 1.22$	2.64	$1.03 \pm 1.26$	$-3.04 \pm 1.21$

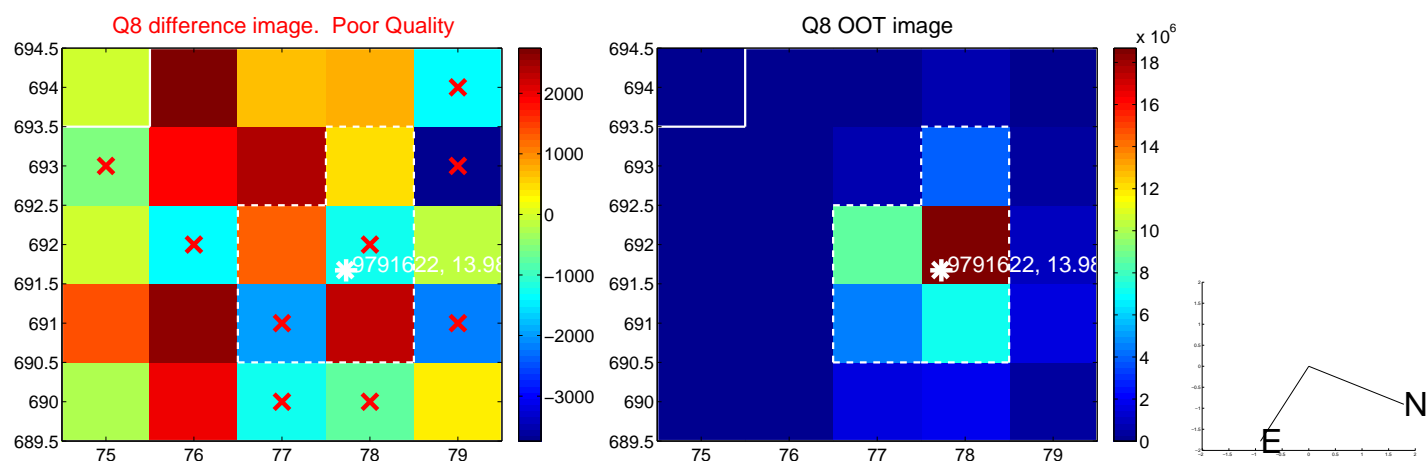
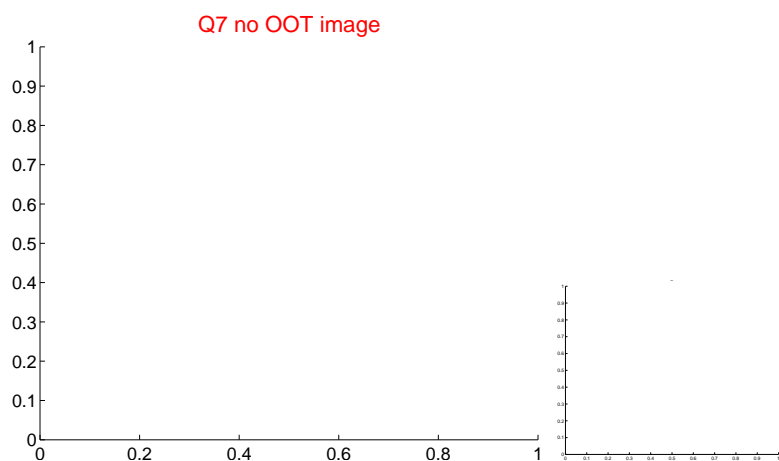
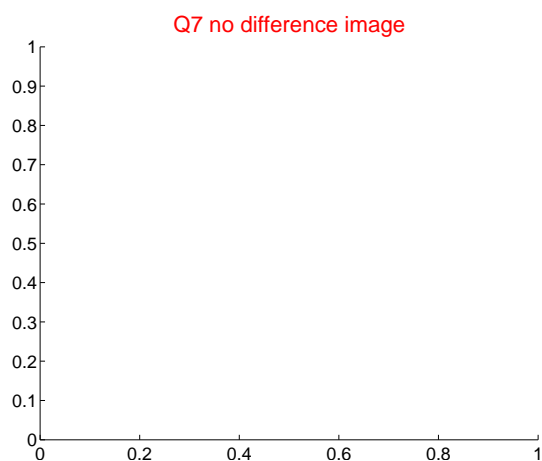
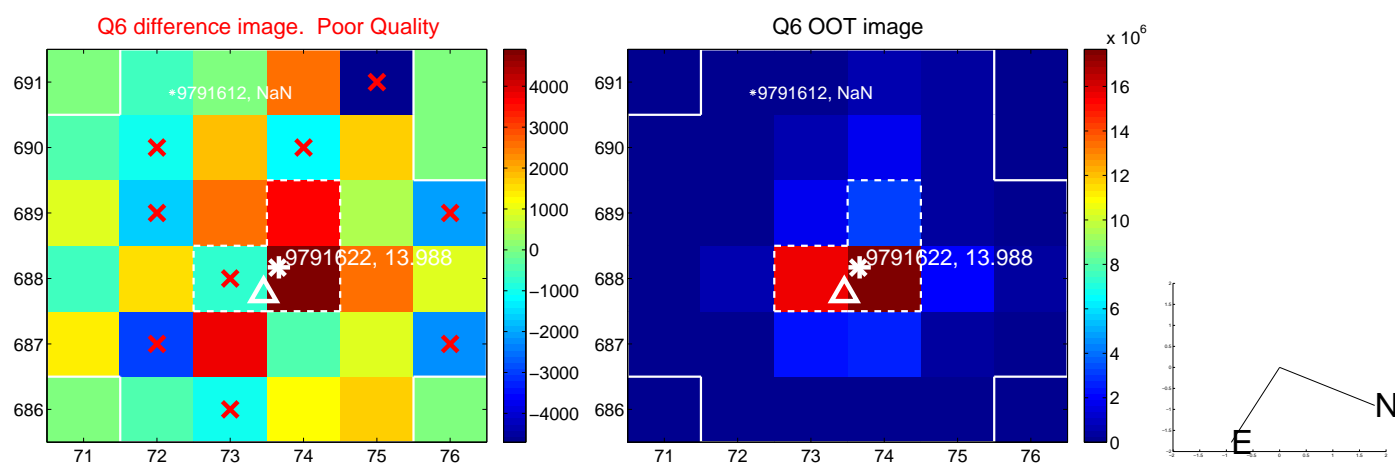
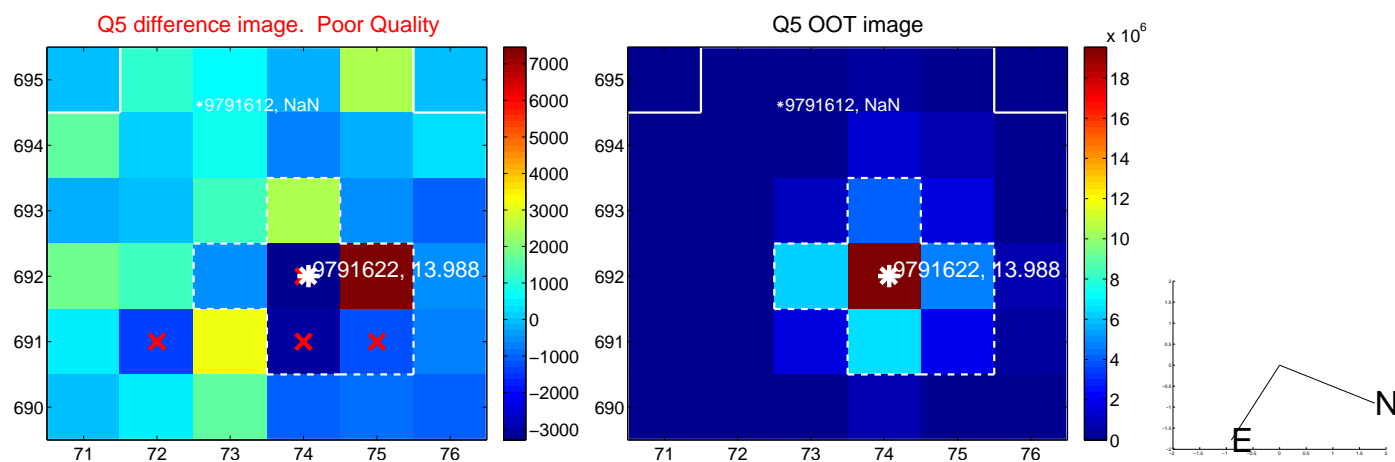


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

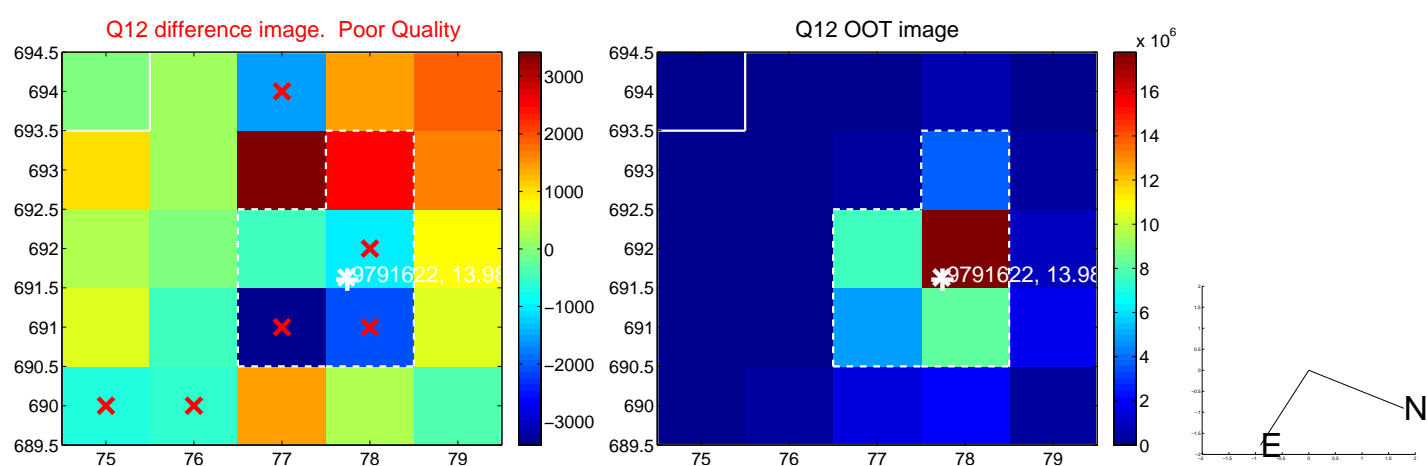
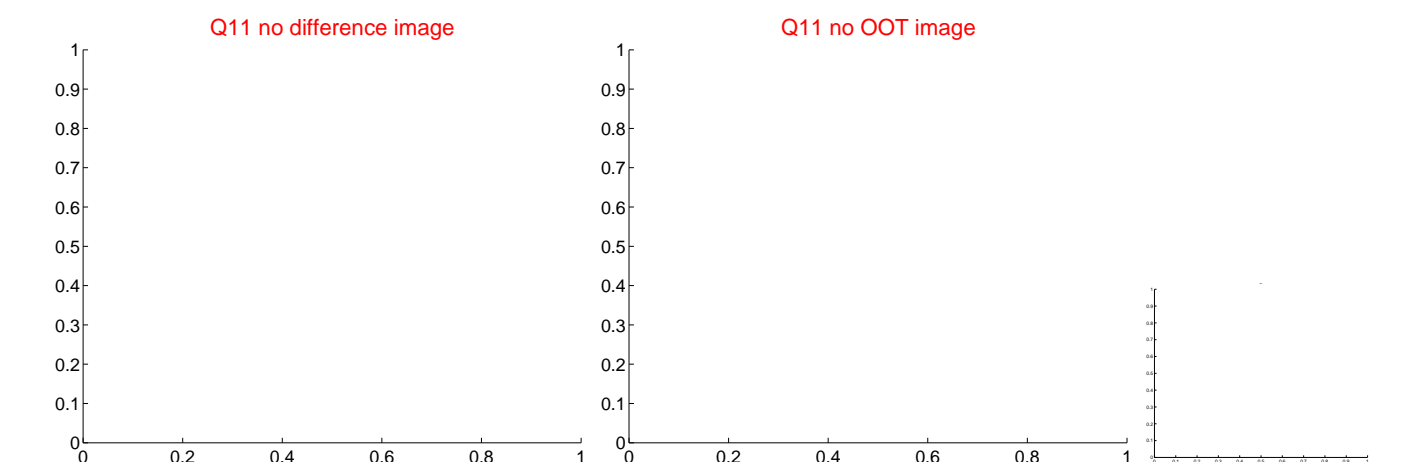
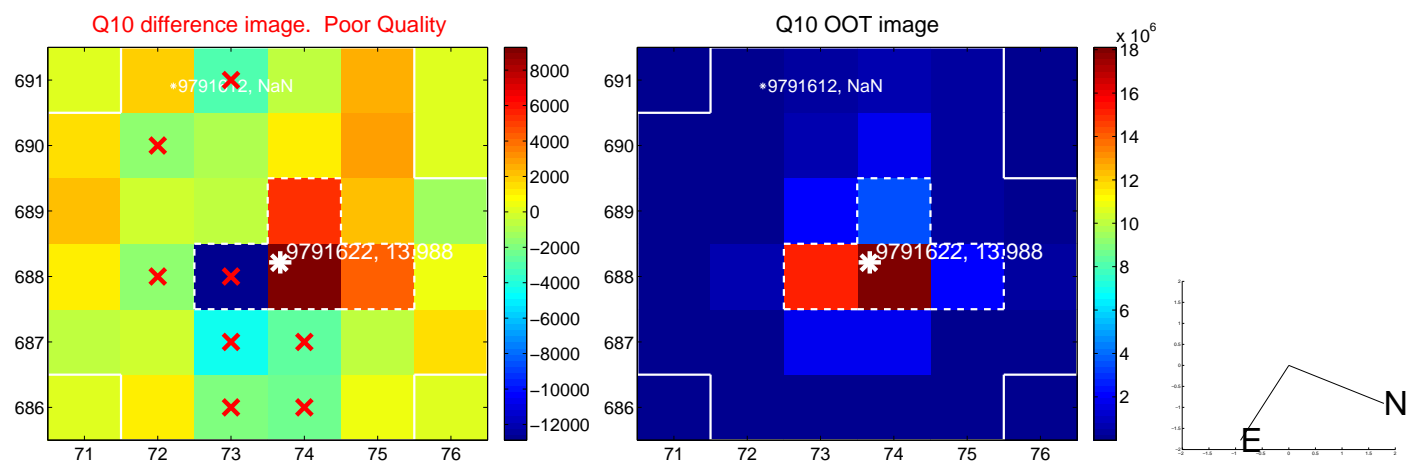
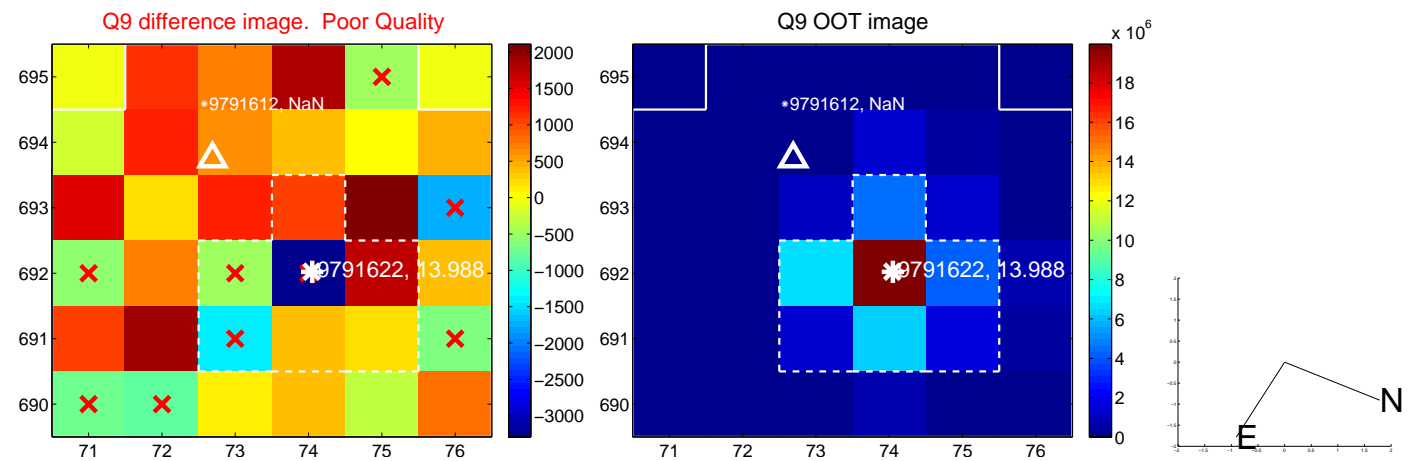


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

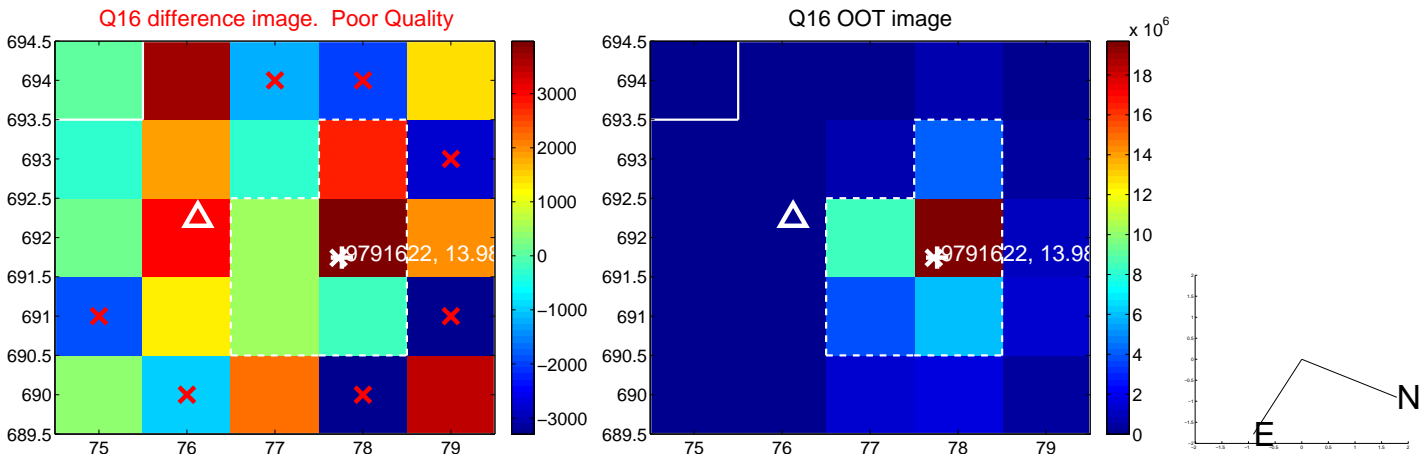
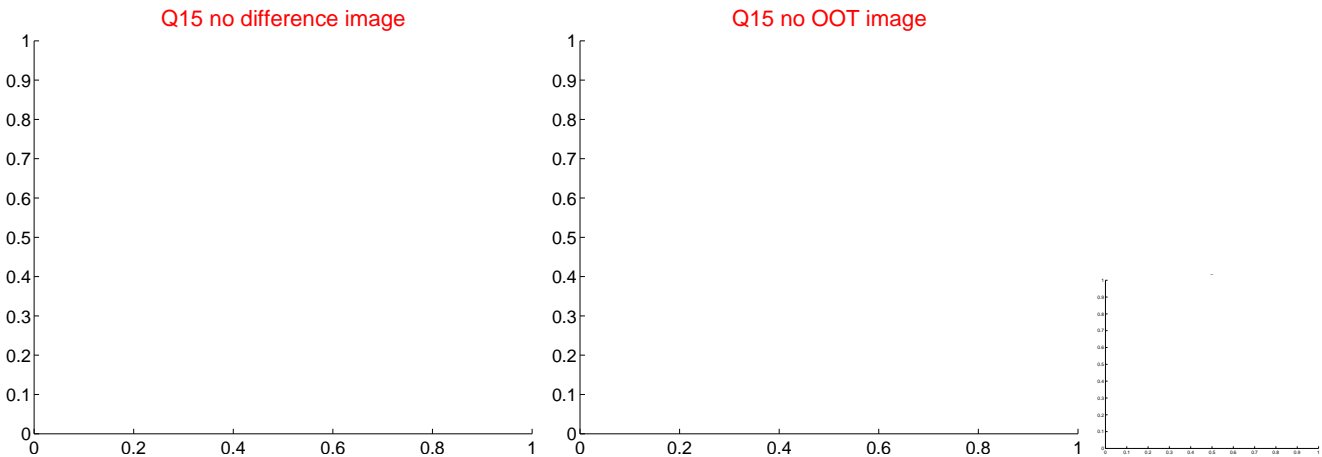
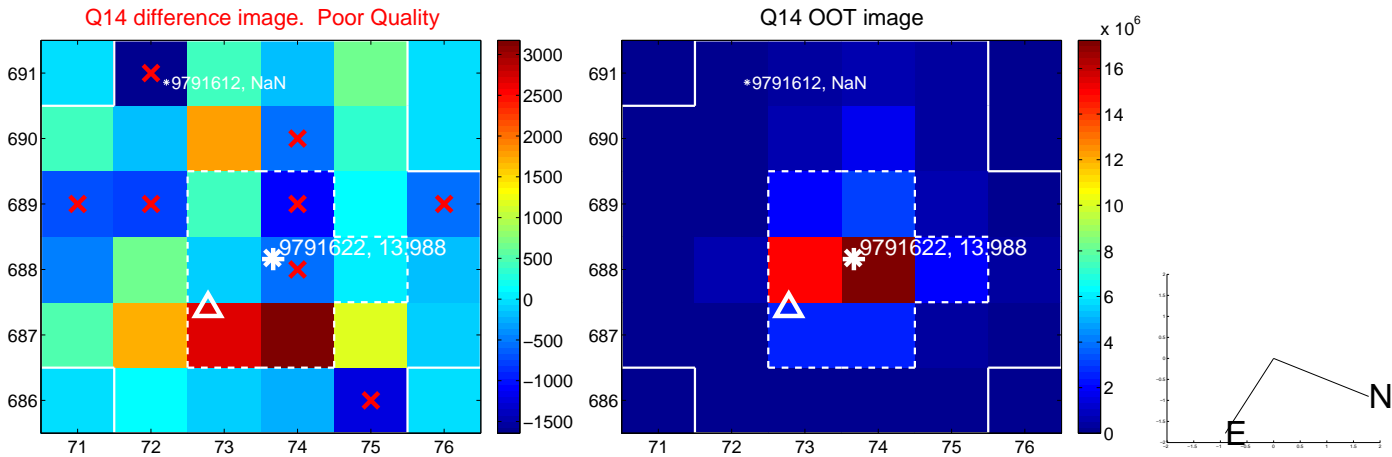
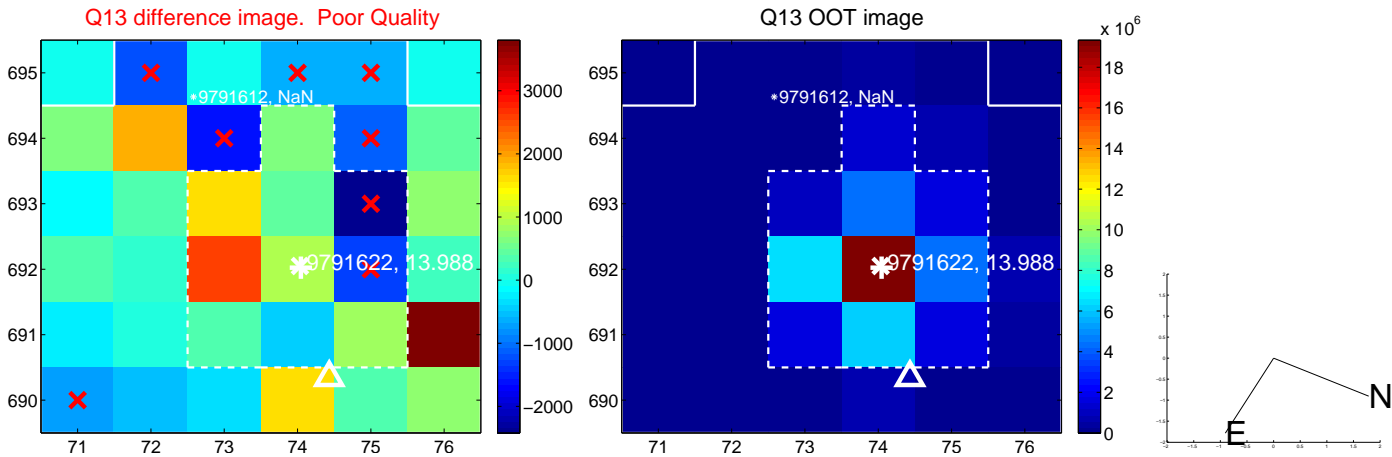




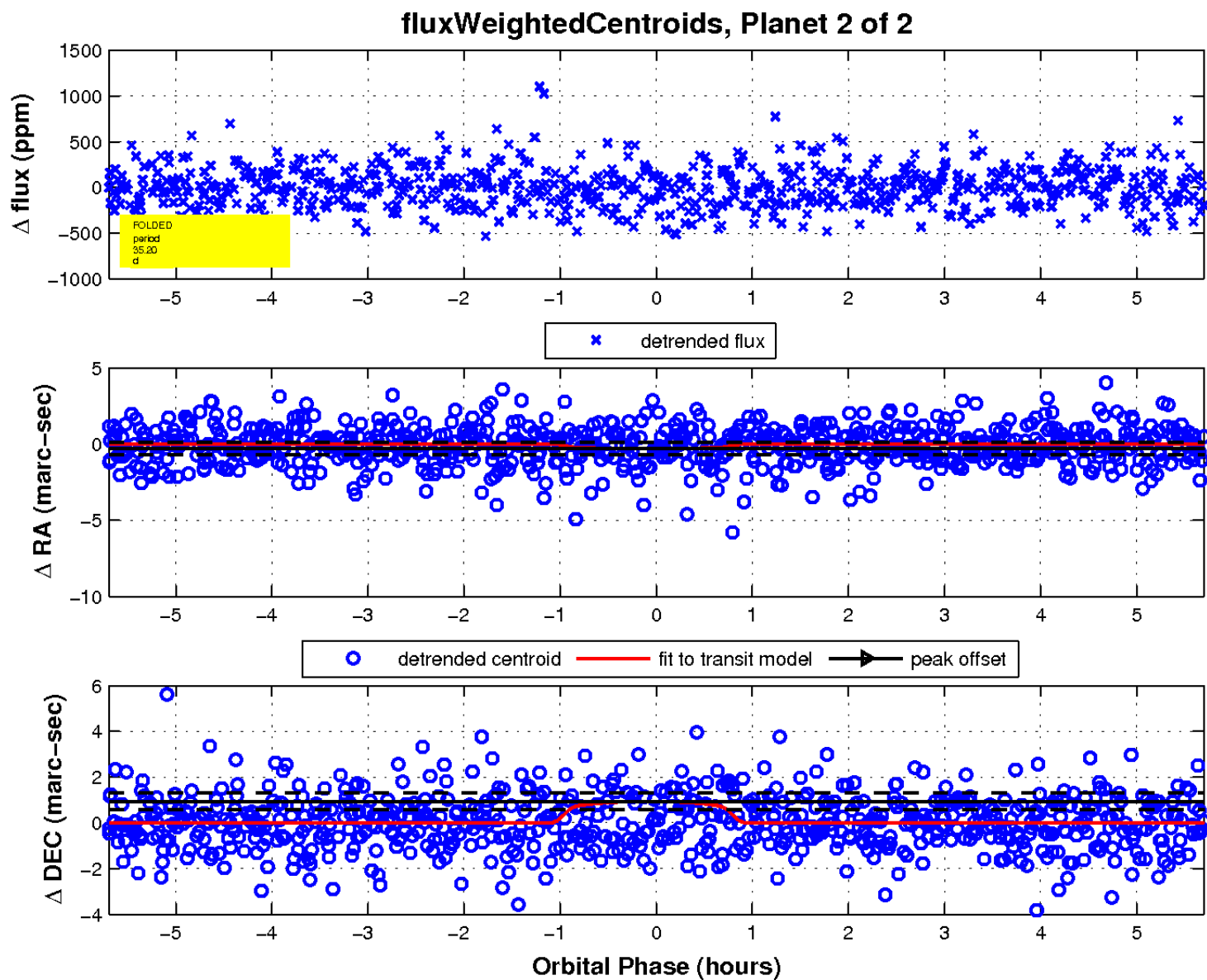
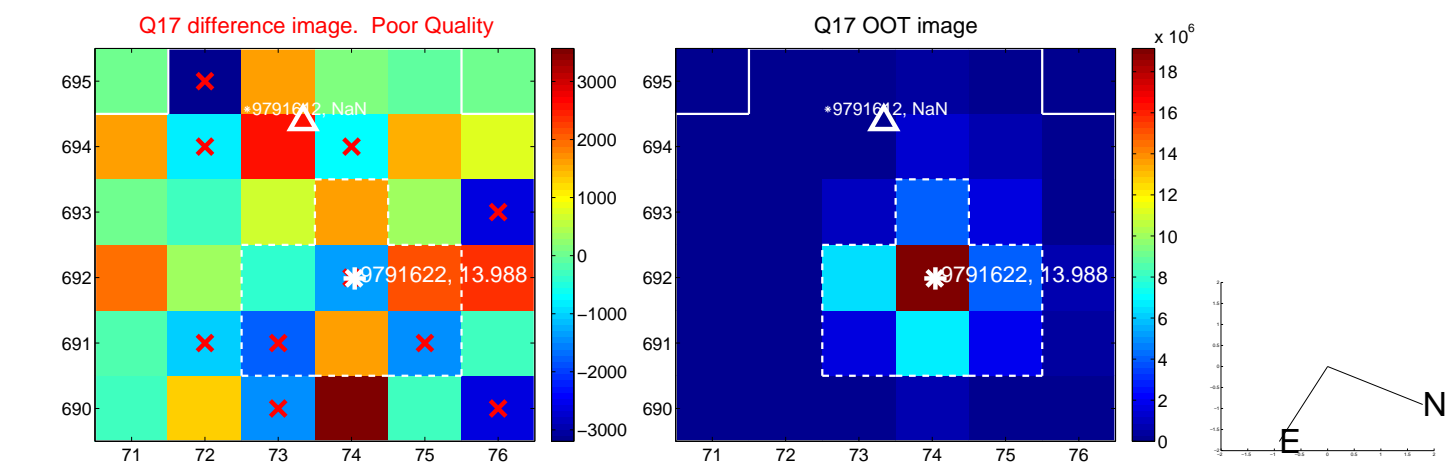
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

