

# KIC 001996679

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001996679-01	OBS	0147.01	145.562666	146.058111	2868.6	5.426	49.3	62.1	1.09	6148	9.74	5.34
001996679-02	OBS	No	291.105325	275.983670	402.2	6.137	10.9	11.3	1.09	6148	2.33	2.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001996679-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
001996679-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

**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.

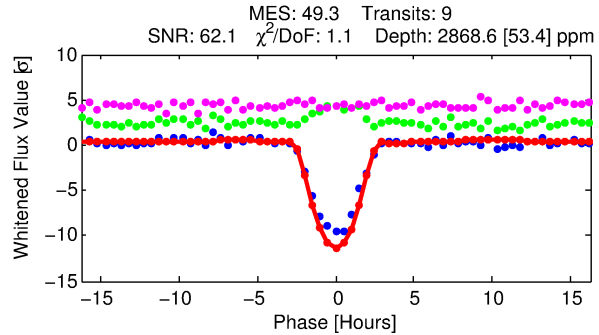
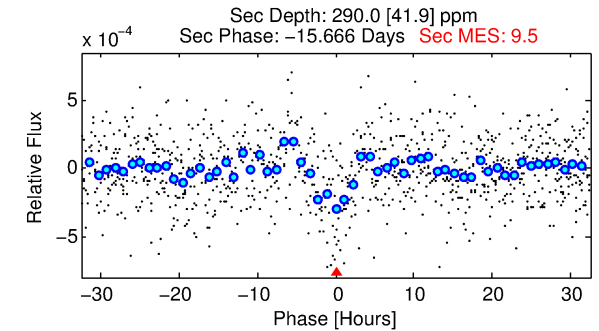
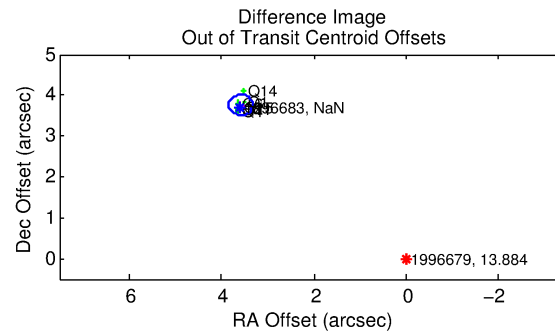
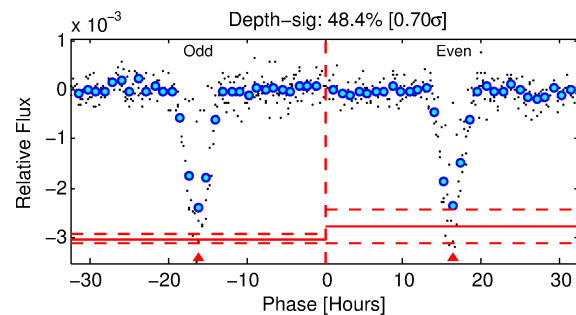
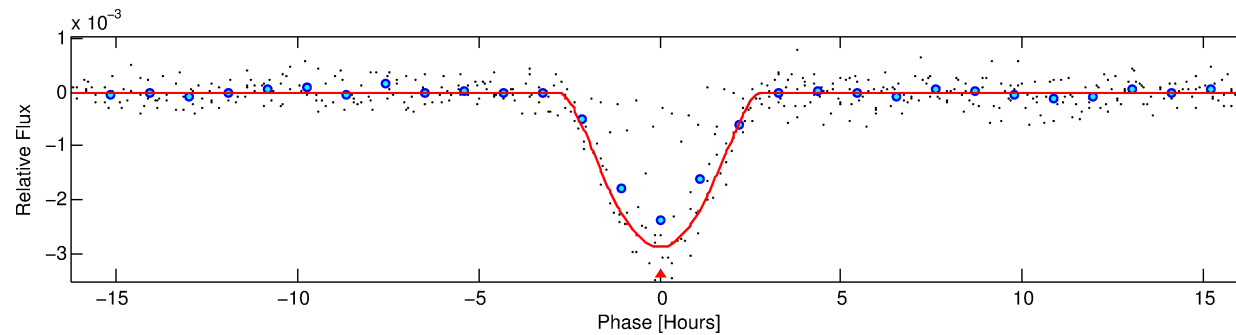
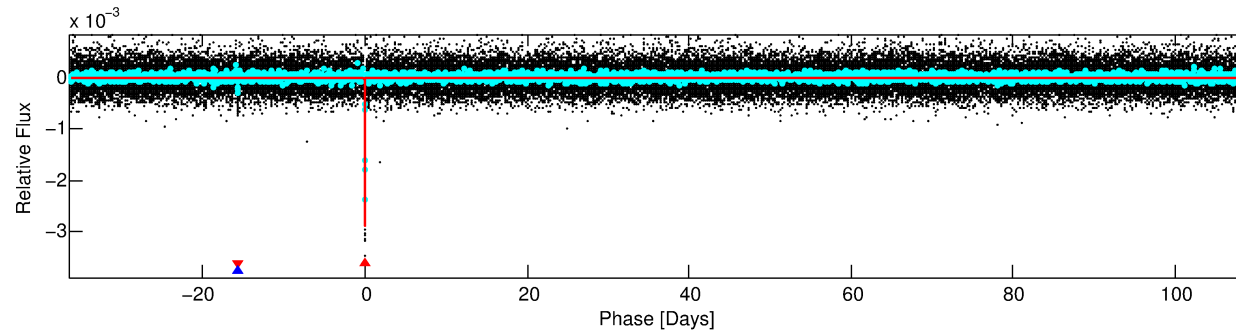
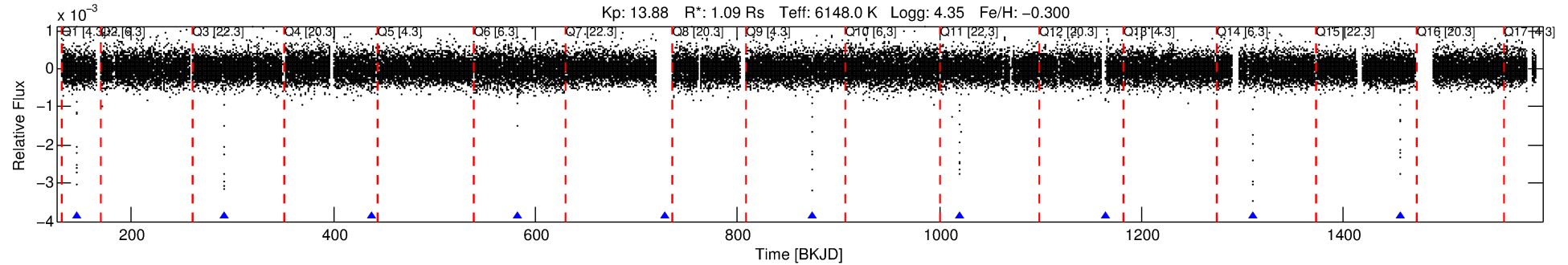
## Ephemeris Match Information For 001996679-01

No Significant Match Found

# DV One-Page Summary

KIC: 1996679 Candidate: 1 of 2 Period: 145.563 d  
KOI: K00147.01 Corr: 0.966

Kp: 13.88 R\*: 1.09 Rs Teff: 6148.0 K Logg: 4.35 Fe/H: -0.300



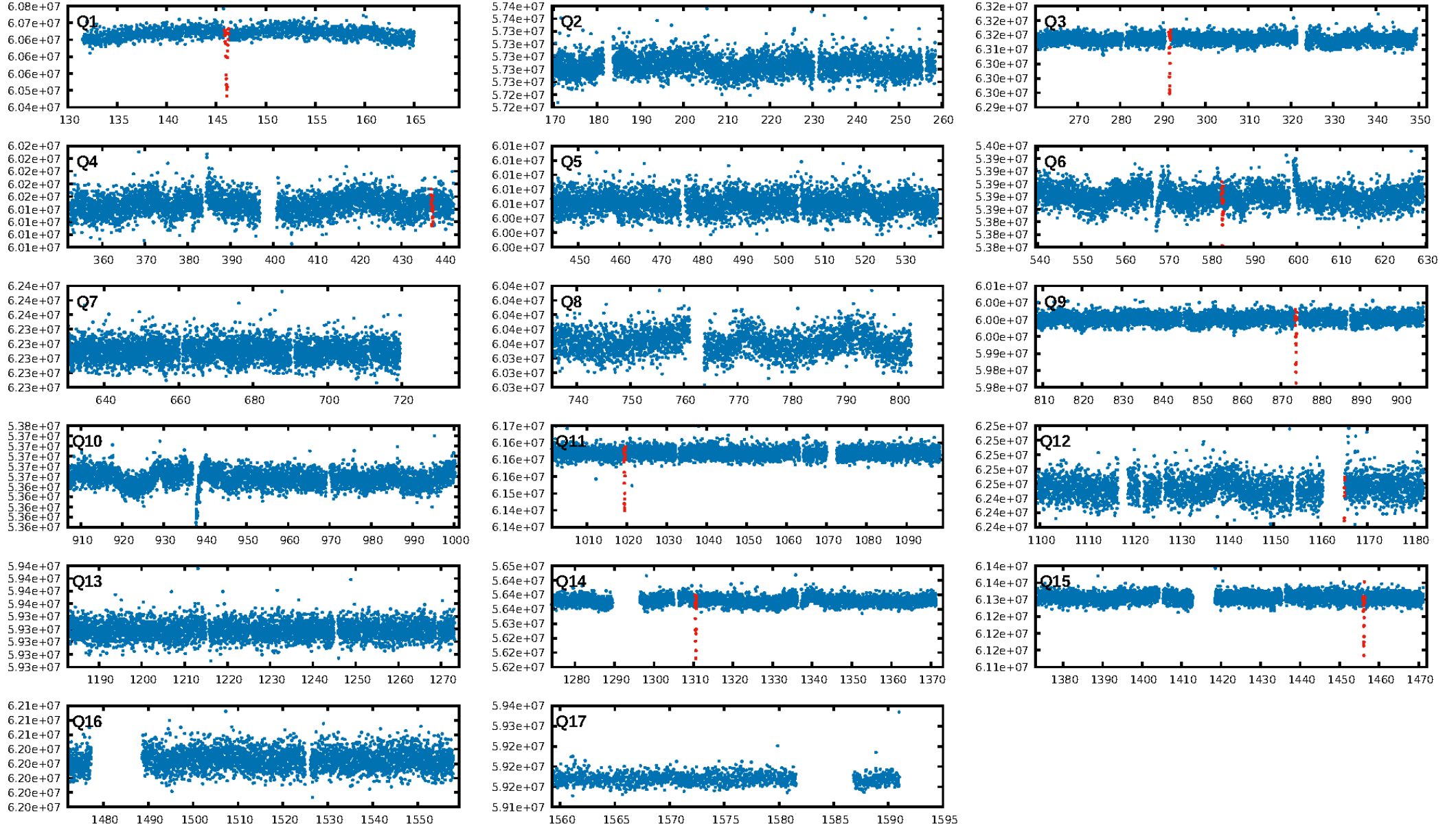
## DV Fit Results:

Period = 145.56267 [0.00037] d  
Epoch = 146.0581 [0.0020] BKJD  
Rp/R\* = 0.0815 [0.0365]  
a/R\* = 91.05 [10.40]  
b = 0.99 [0.06]  
Seff = 5.34 [2.03]  
Teq = 388 [37] K  
Rp = 9.74 [5.26] Re  
a = 0.5362 [0.1336] AU  
Ag = 483.56 [471.51] [1.02σ]  
Teff = 2810 [644] K [3.75σ]

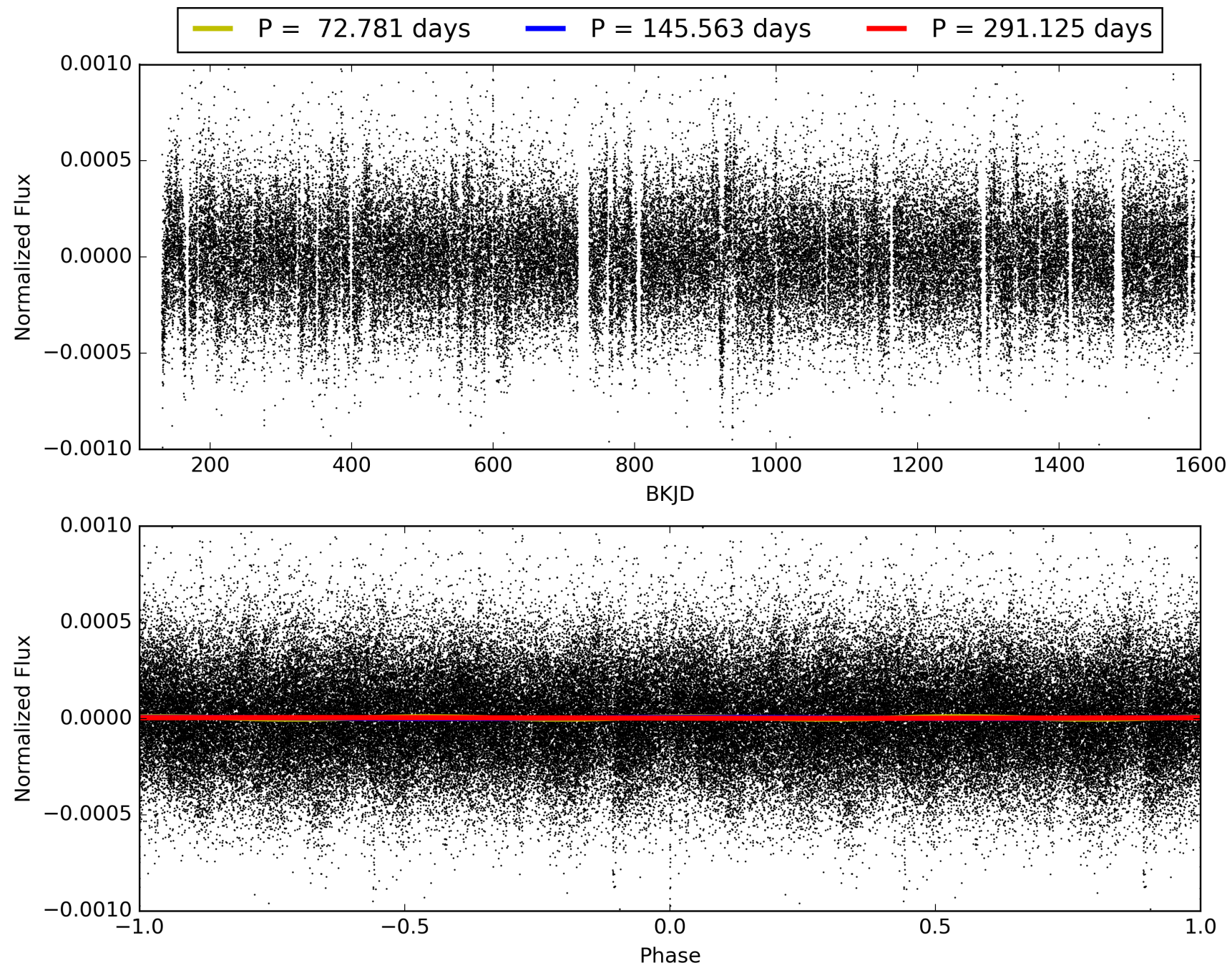
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [426.42σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGoF-sig: 96.4%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 0.3345  
Centroid-sig: 0.0%  
Centroid-so: 5.735 arcsec [34.11σ]  
OotOffset-rm: 5.193 arcsec [61.58σ]  
KicOffset-rm: 5.206 arcsec [70.78σ]  
OotOffset-st: 2/2/1/1 [6]  
KicOffset-st: 2/2/1/1 [6]  
DiffImageQuality-fgm: 1.00 [6/6]  
DiffImageOverlap-fno: 1.00 [6/6]

# TCE 001996679-01, PDC Light Curves

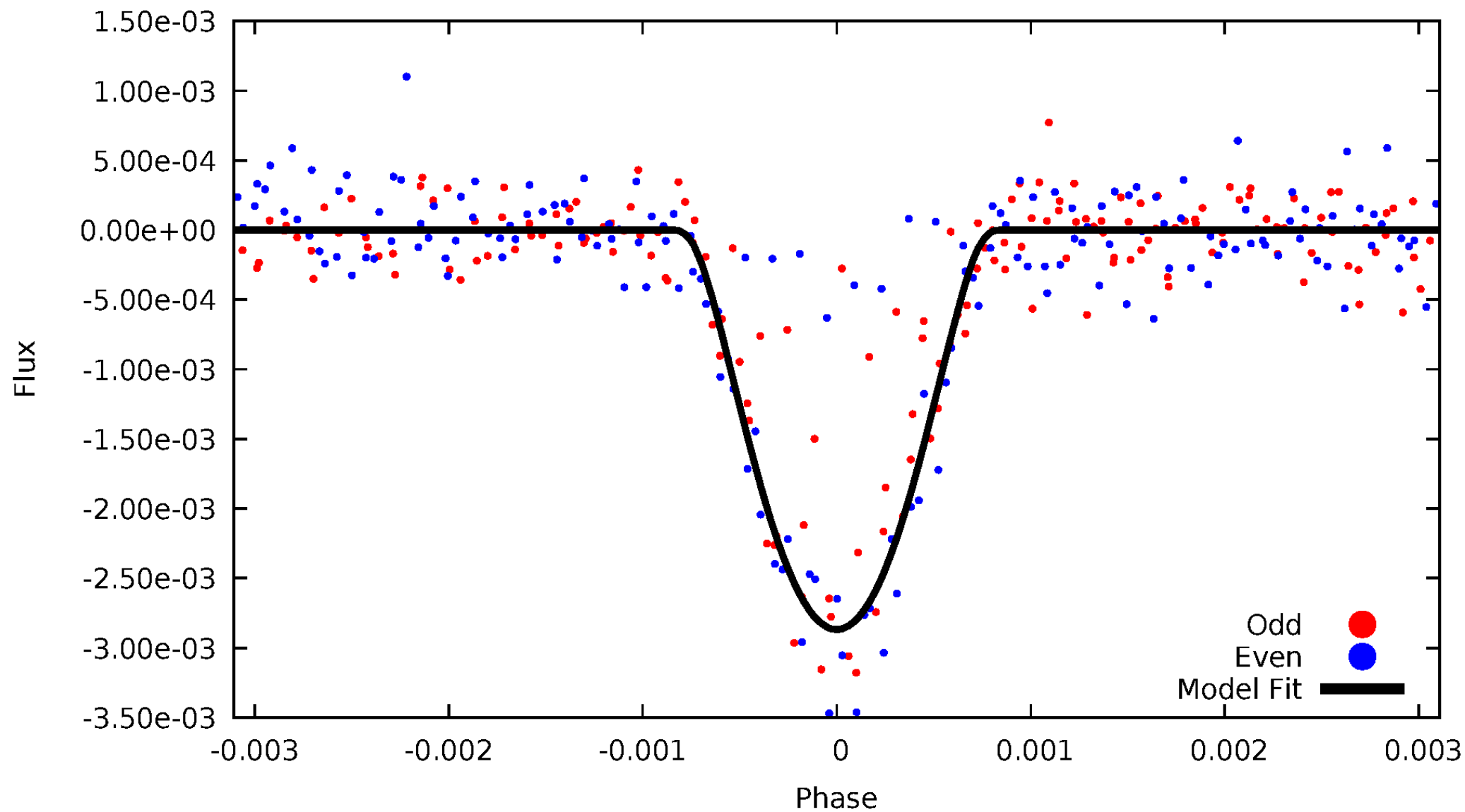


TCE 001996679-01



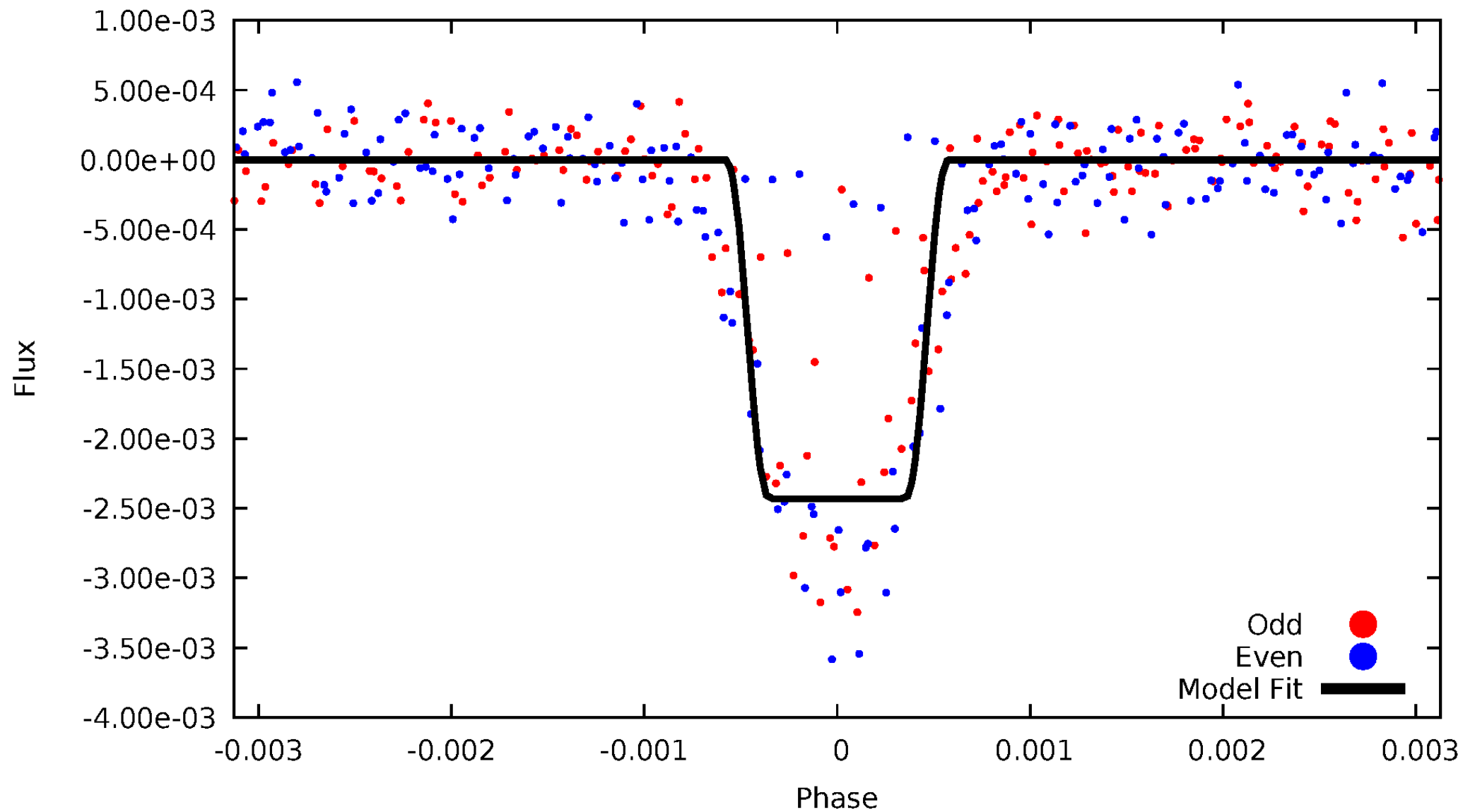
# DV Odd/Even

TCE 001996679-01



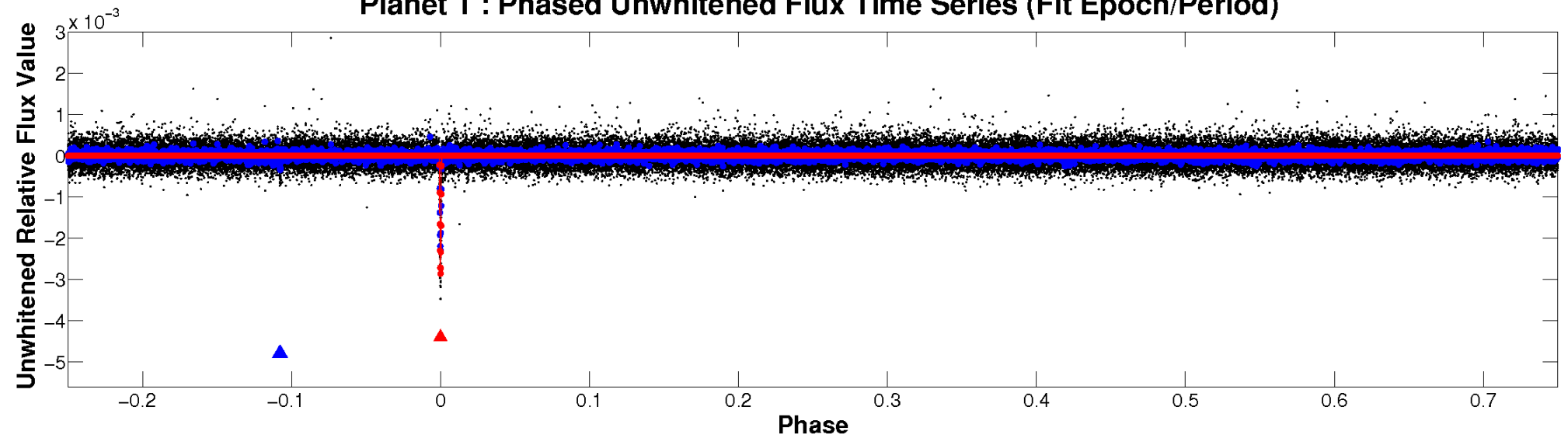
# ALT Odd/Even

TCE 001996679-01

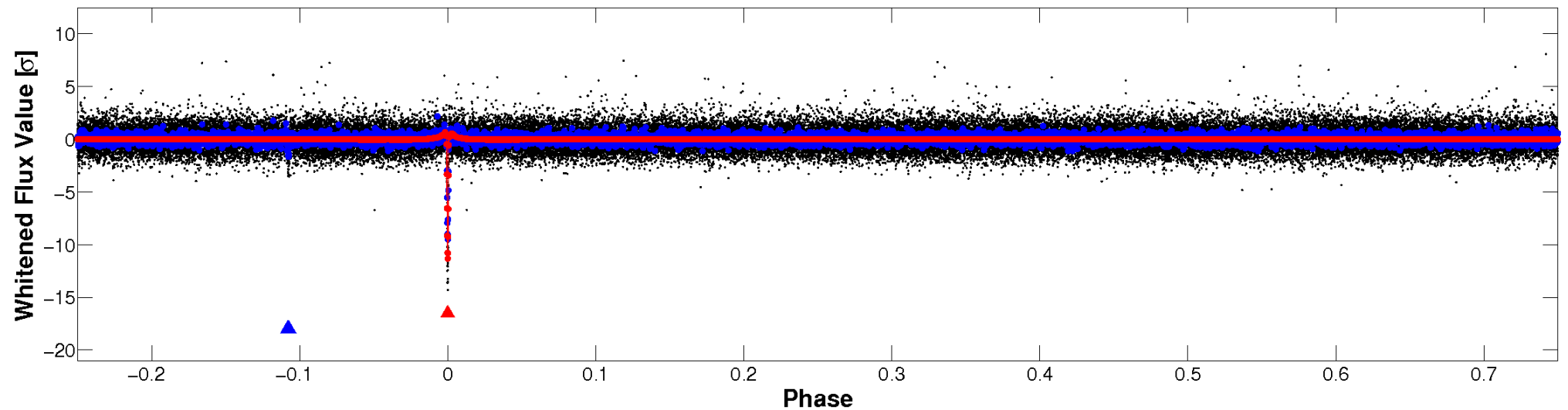


# Non-Whitened Vs. Whitened Light Curve

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



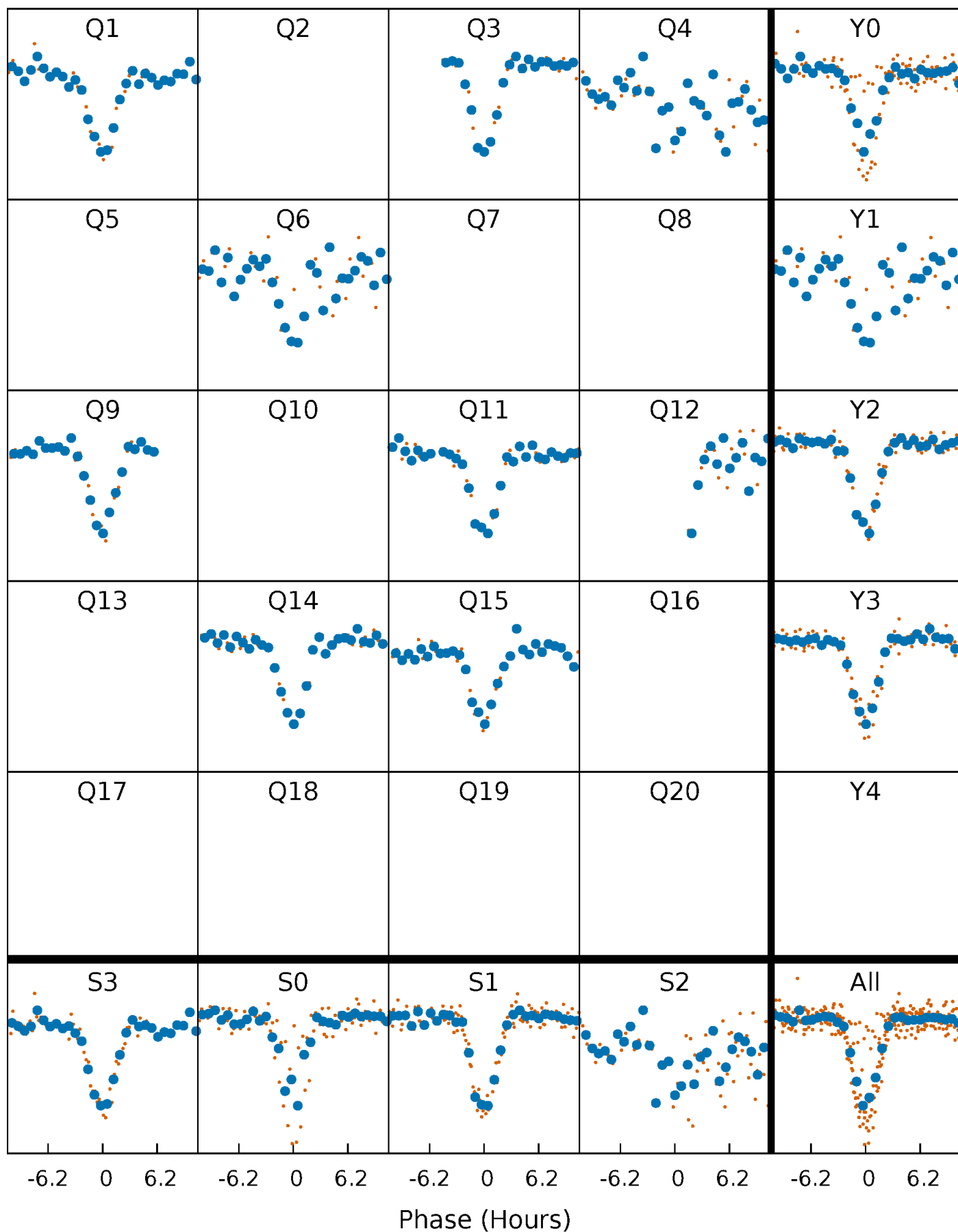
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

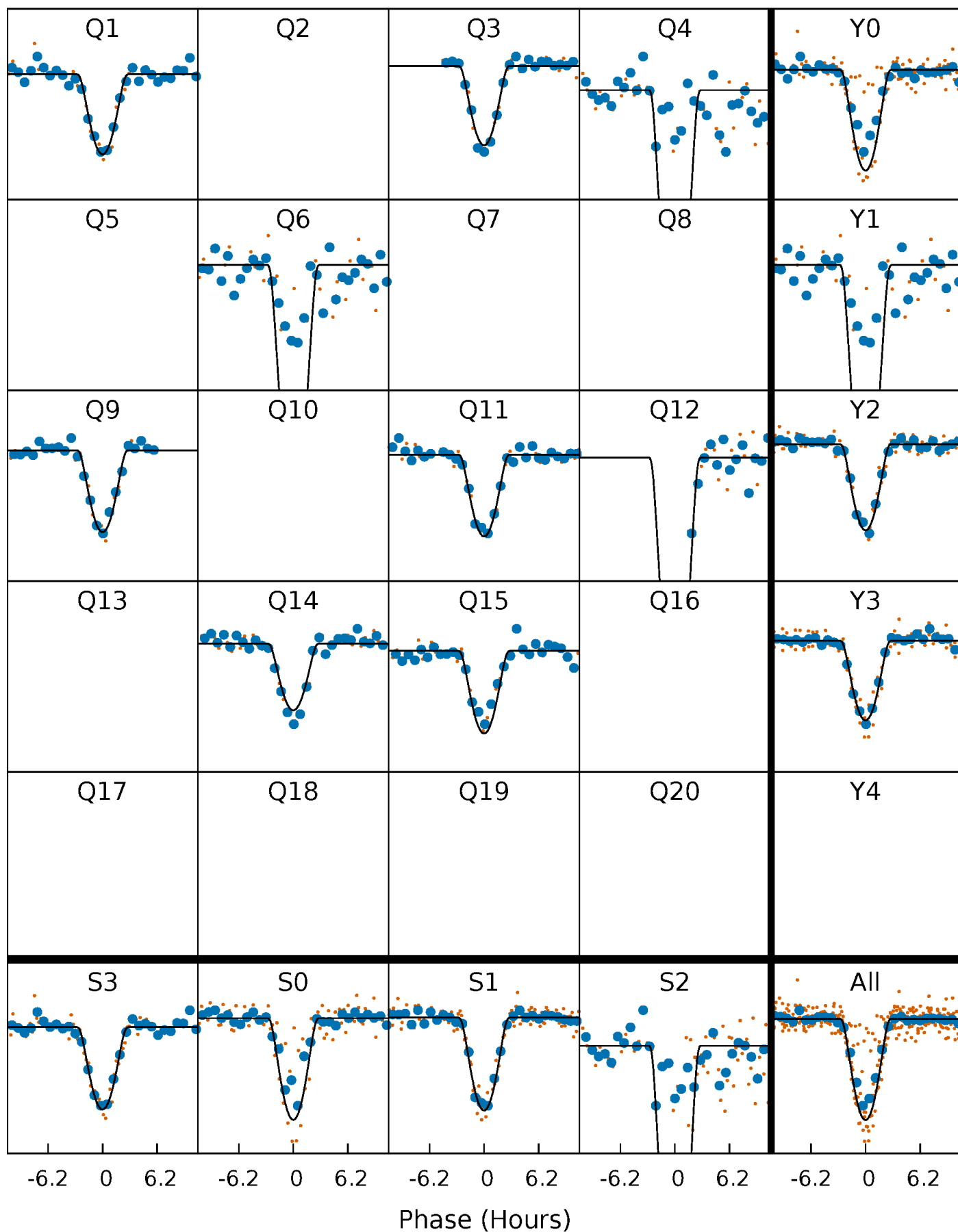
TCE 001996679-01 P=145.562666 Days  $T_0=146.058110$  (BKJD)





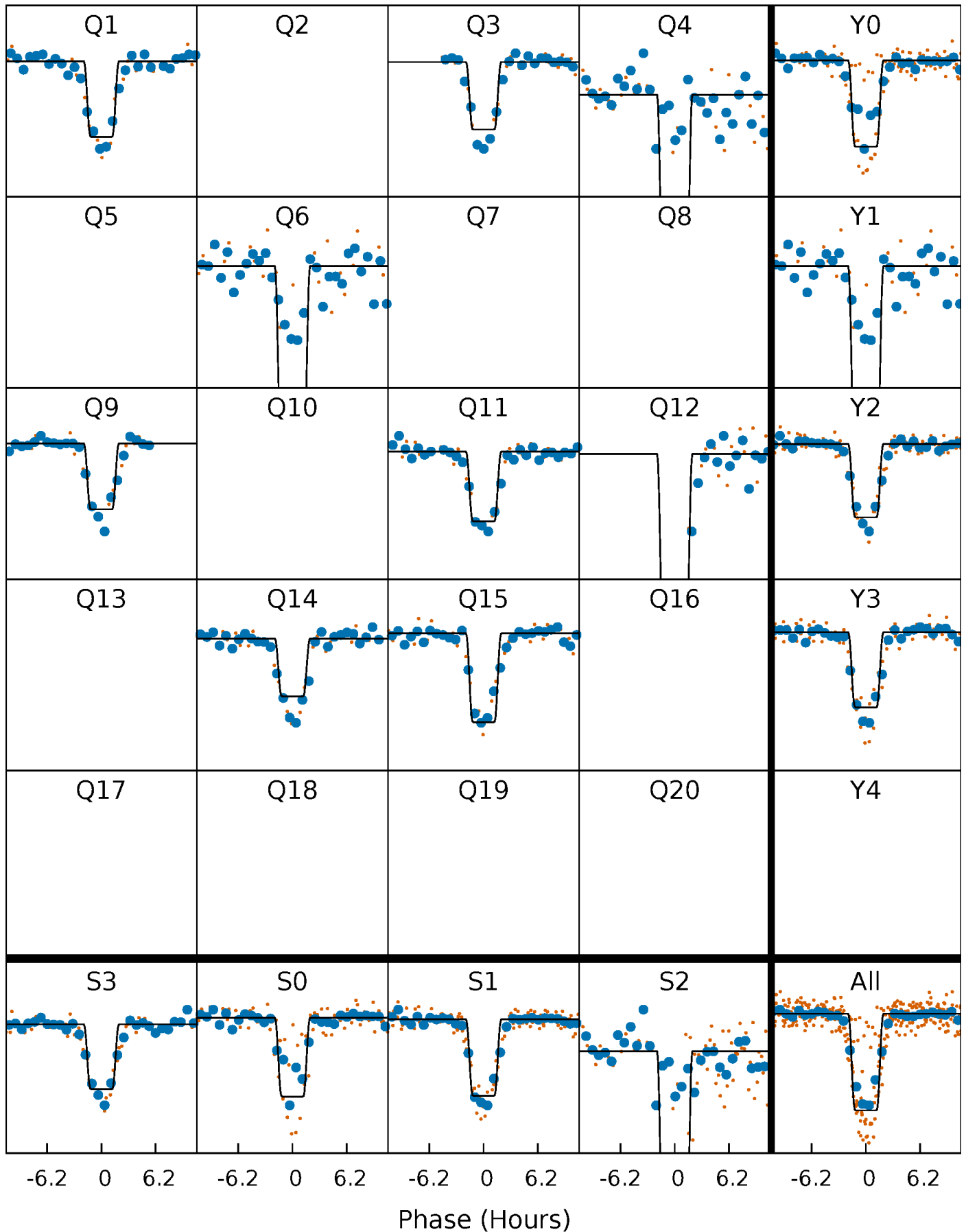
# DV Quarter-Phased Transit Curves

TCE 001996679-01 P=145.562666 Days  $T_0=146.058110$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

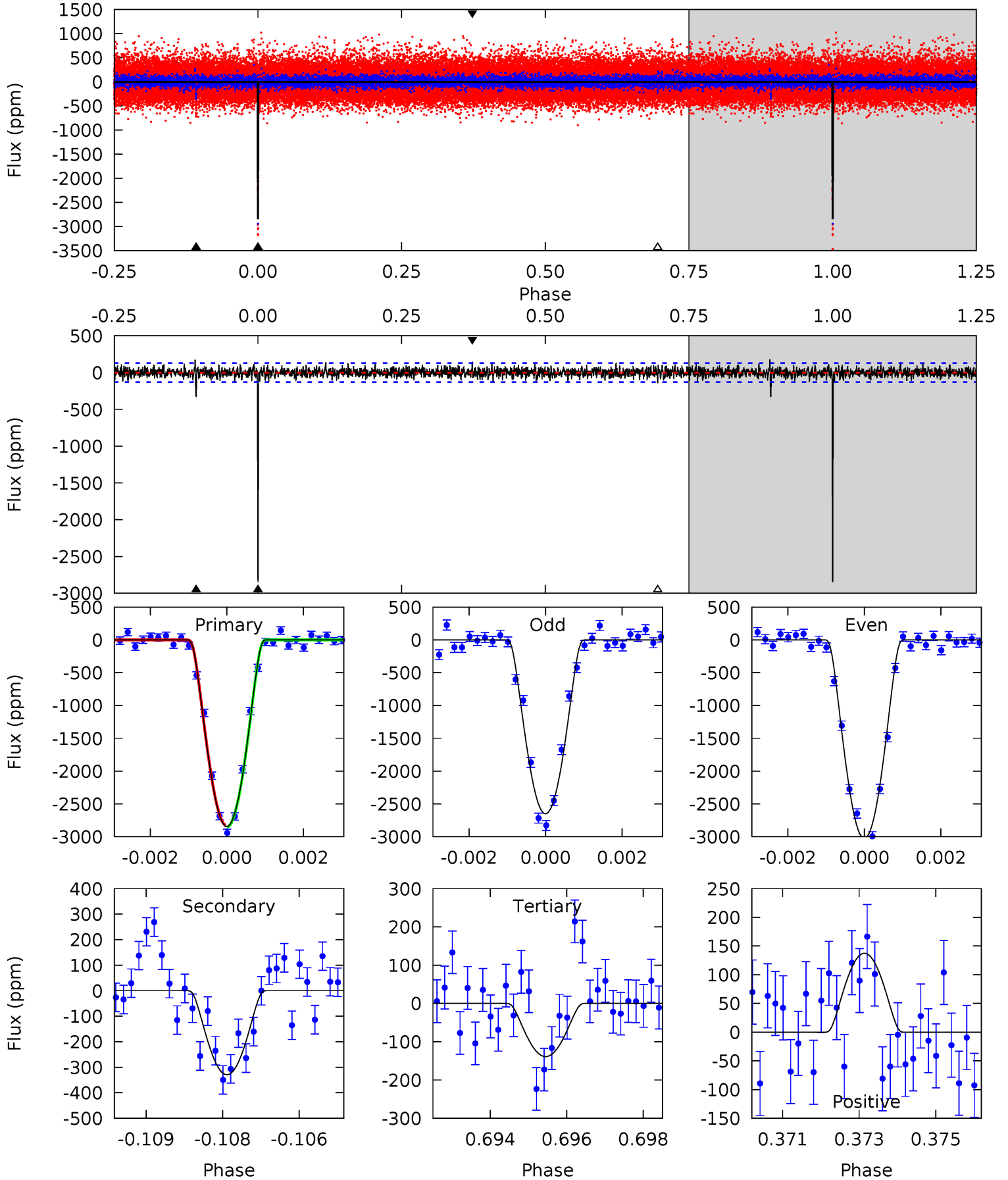
TCE 001996679-01 P=145.562265 Days  $T_0=146.059659$  (BKJD)



# DV Model-Shift Uniqueness Test

001996679-01,  $P = 145.562666$  Days,  $E = 0.495444$  Days

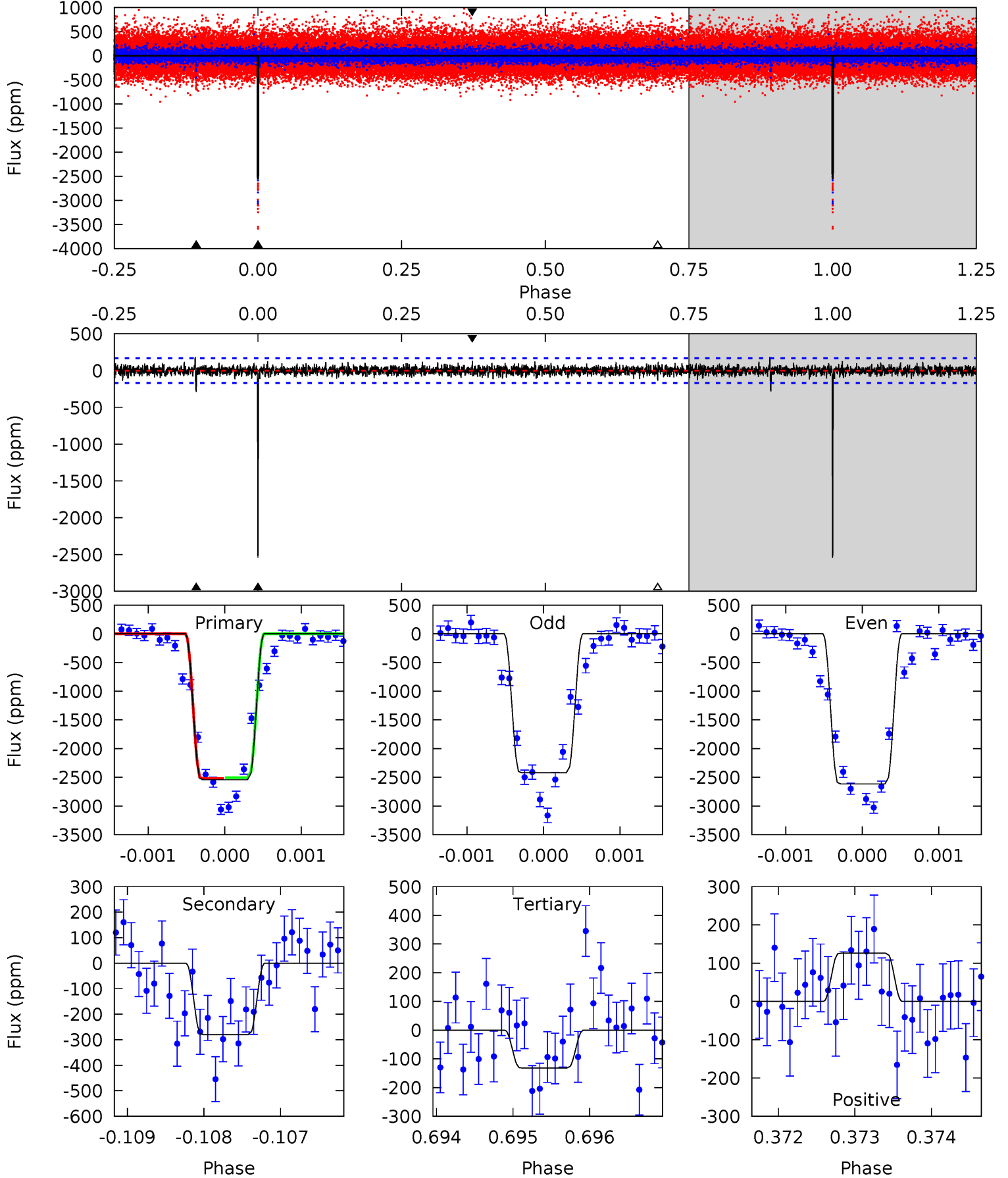
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
118.0	13.7	5.76	5.70	5.36	3.15	1.63	112.3	112.3	7.90	7.96	7.84	0.82	0.06	0.52



# Alt Model-Shift Uniqueness Test

001996679-01,  $P = 145.562265$  Days,  $E = 0.497394$  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
82.3	9.07	4.27	4.08	5.43	3.26	1.14	78.0	78.2	4.80	4.98	3.11	0.83	0.07	0.31



### Stellar Parameters For KIC 001996679

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6148^{+165}_{-202}$	$4.346^{+0.128}_{-0.192}$	$-0.300^{+0.300}_{-0.300}$	$1.095^{+0.330}_{-0.178}$	$0.969^{+0.153}_{-0.114}$	$1.040^{+0.619}_{-0.522}$
	+3%/-3%	+3%/-4%	+100%/-100%	+30%/-16%	+16%/-12%	+60%/-50%
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 001996679-01 / KOI 0147.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-329 \pm 24$	$10.35^{+4.84}_{-4.66}$	$547^{+43}_{-33}$	$3384^{+699}_{-350}$	$481^{+1070}_{-264}$
Alt.	$-280 \pm 31$	$6.76^{+4.47}_{-4.04}$	$545^{+40}_{-32}$	$3776^{+1464}_{-547}$	$1002^{+4644}_{-652}$

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

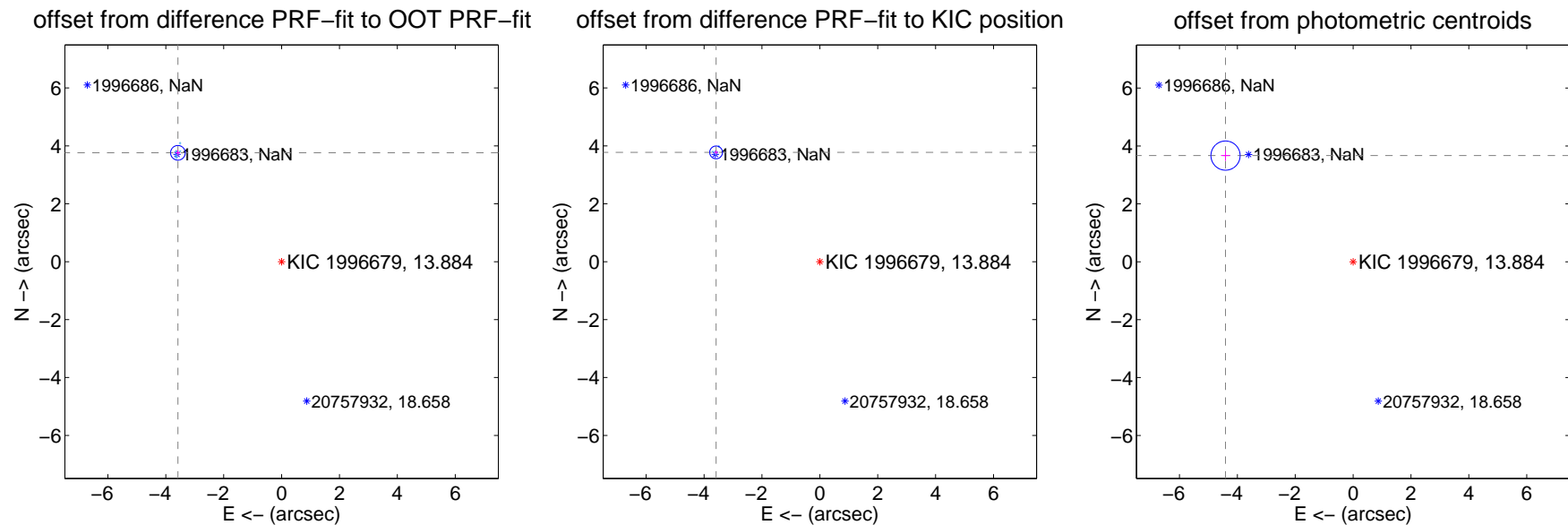
## DV Centroid Data

Supplemental centroid analysis for 001996679-01. Kepler magnitude: 13.88. Transit SNR 62.07

There are 6 quarters with good PRF difference image offsets

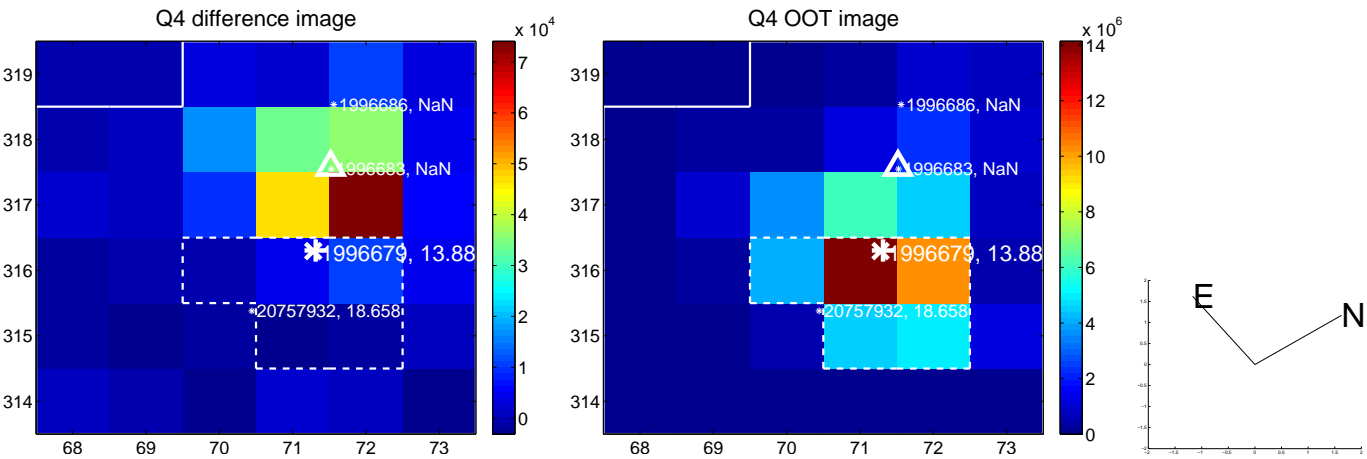
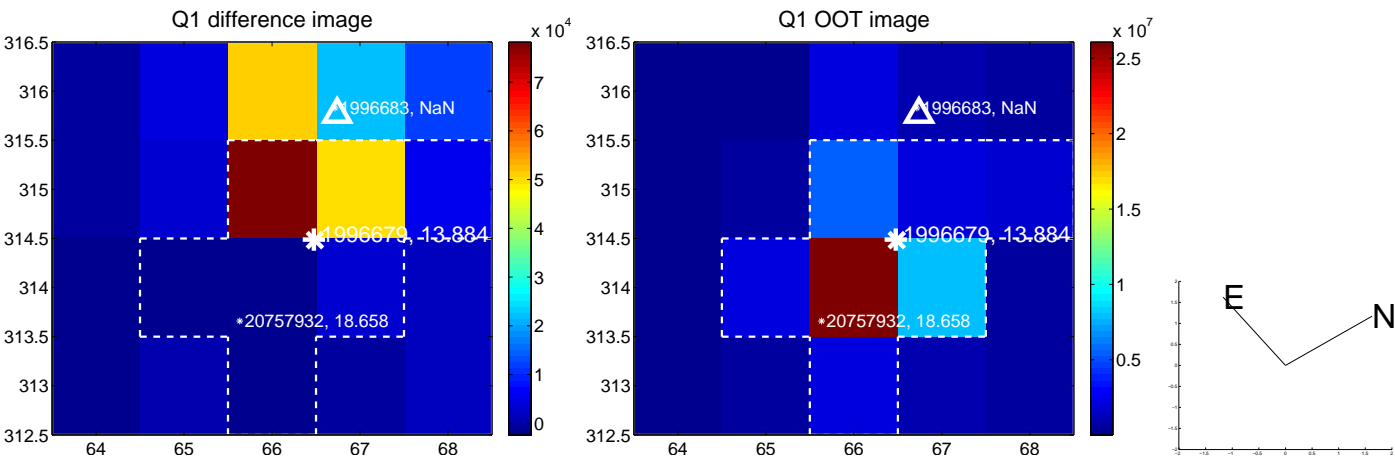
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.193 \pm 0.084$	61.58	$3.582 \pm 0.074$	$3.760 \pm 0.093$
PRF-fit source offset from KIC position	$5.206 \pm 0.074$	70.78	$3.585 \pm 0.076$	$3.775 \pm 0.071$
photometric centroid source offset	$5.74 \pm 0.17$	34.11	$4.41 \pm 0.16$	$3.67 \pm 0.18$



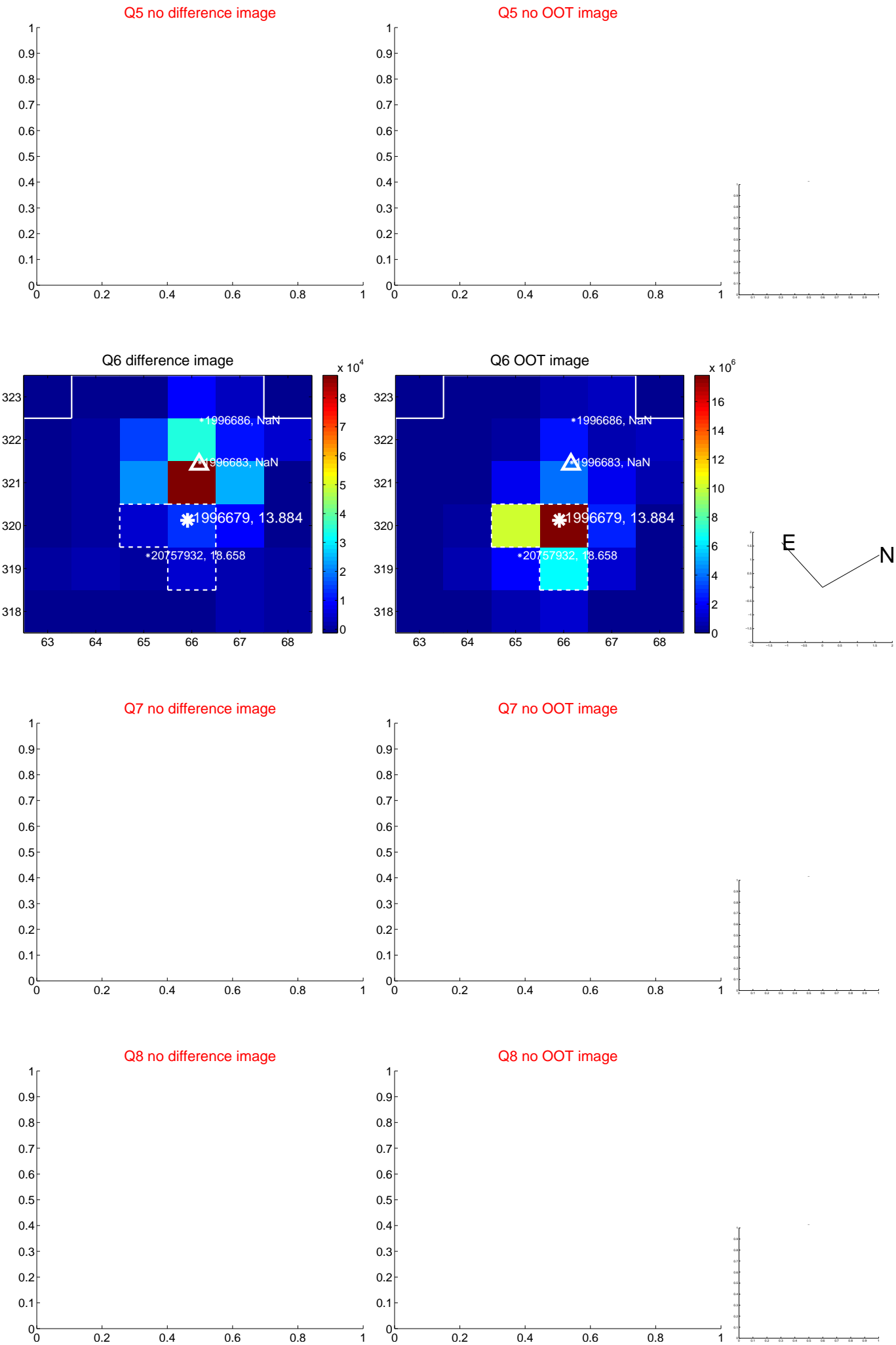
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

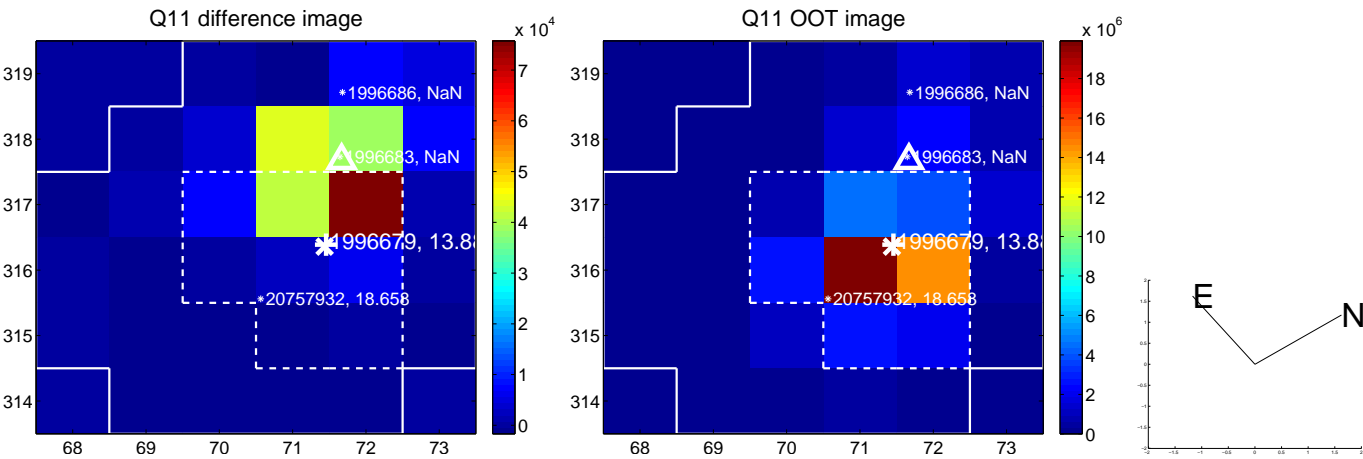




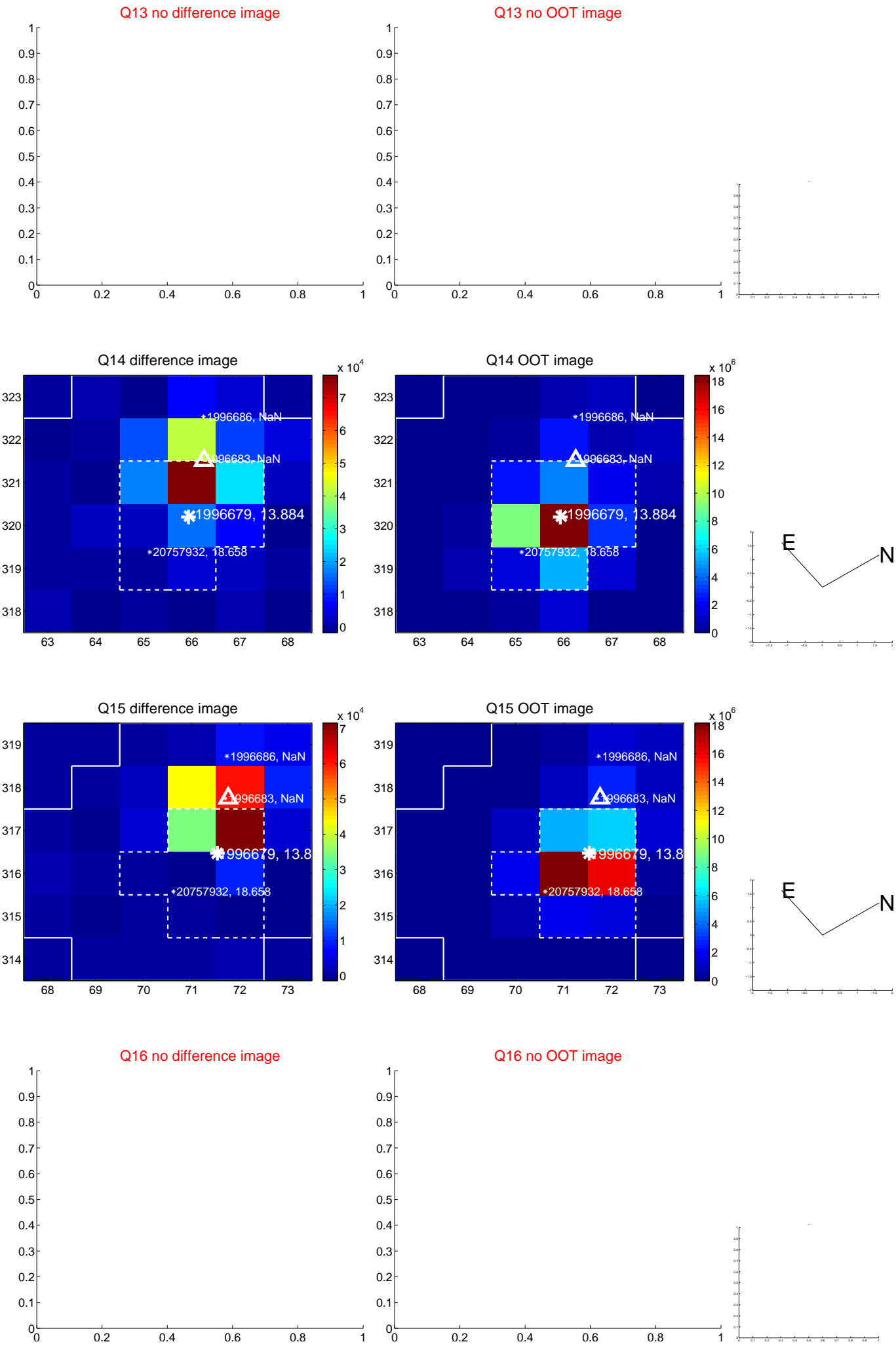
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



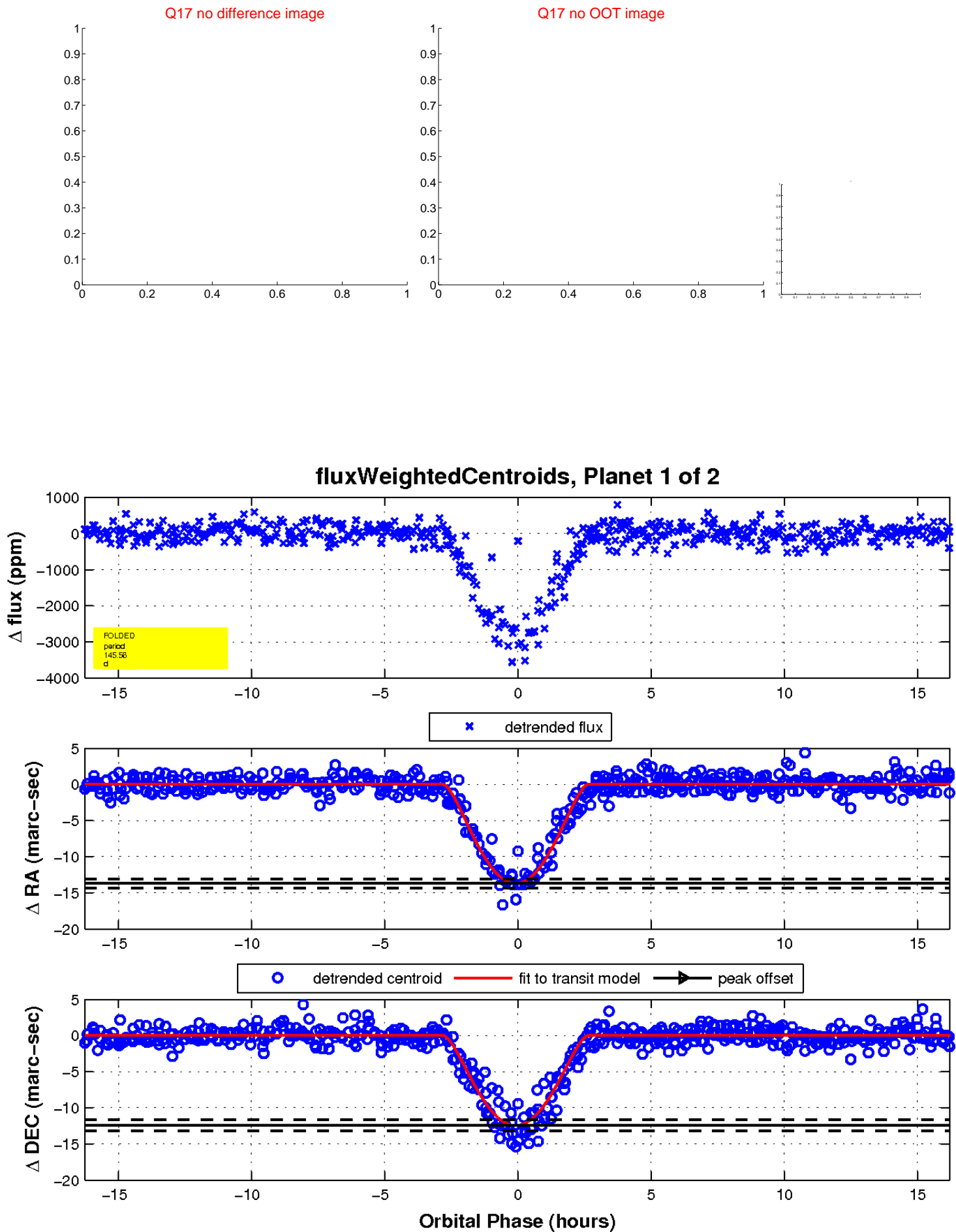
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

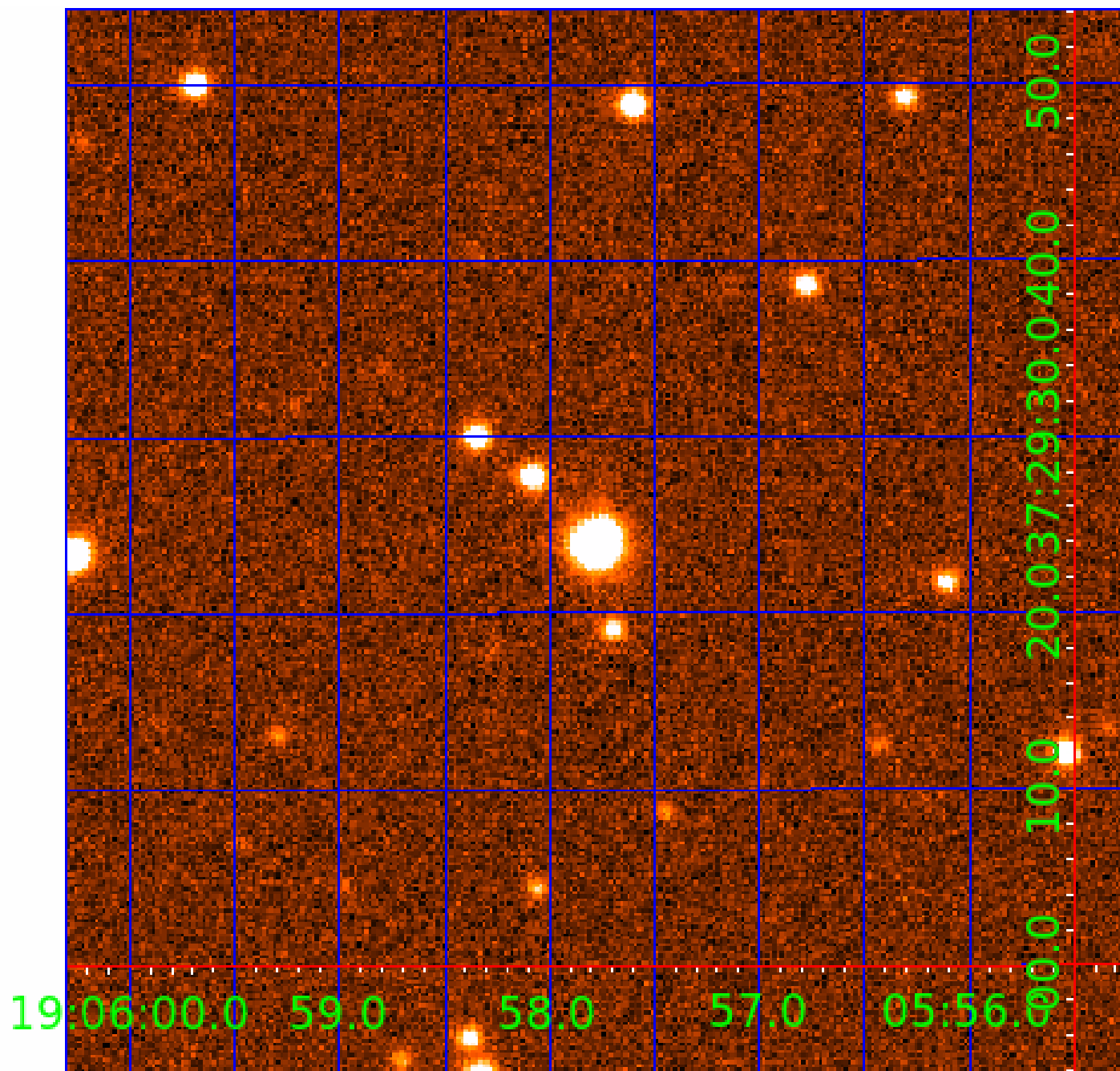


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 001996679

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001996679-01	OBS	0147.01	145.562666	146.058111	2868.6	5.426	49.3	62.1	1.09	6148	9.74	5.34
001996679-02	OBS	No	291.105325	275.983670	402.2	6.137	10.9	11.3	1.09	6148	2.33	2.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001996679-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
001996679-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

**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.

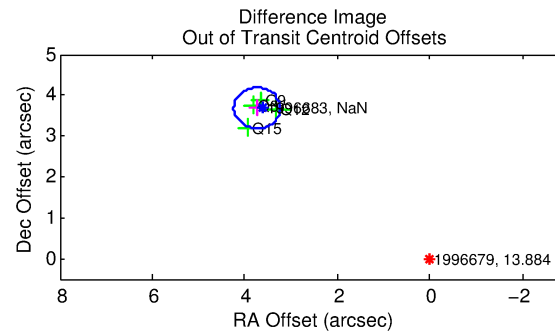
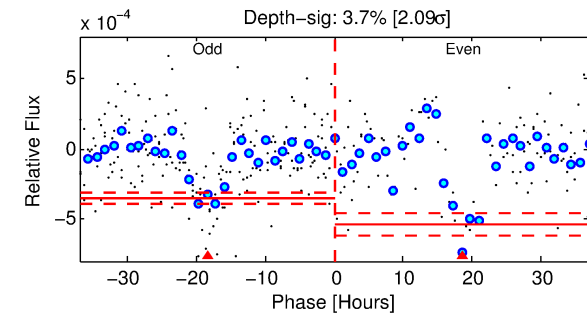
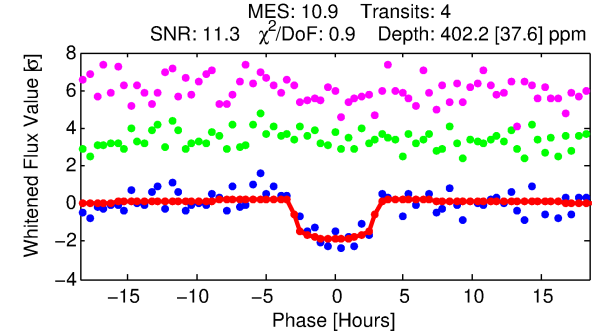
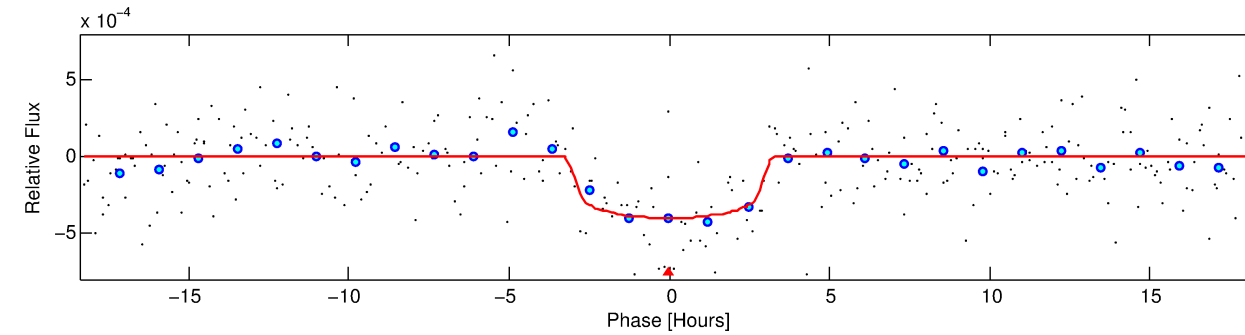
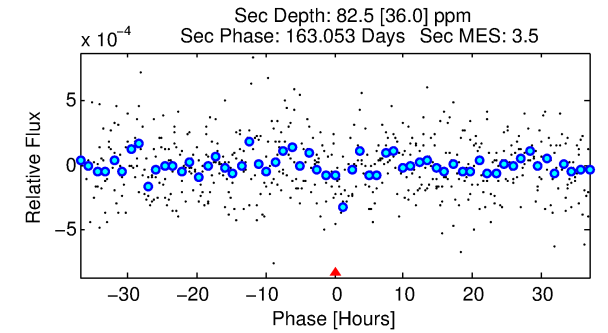
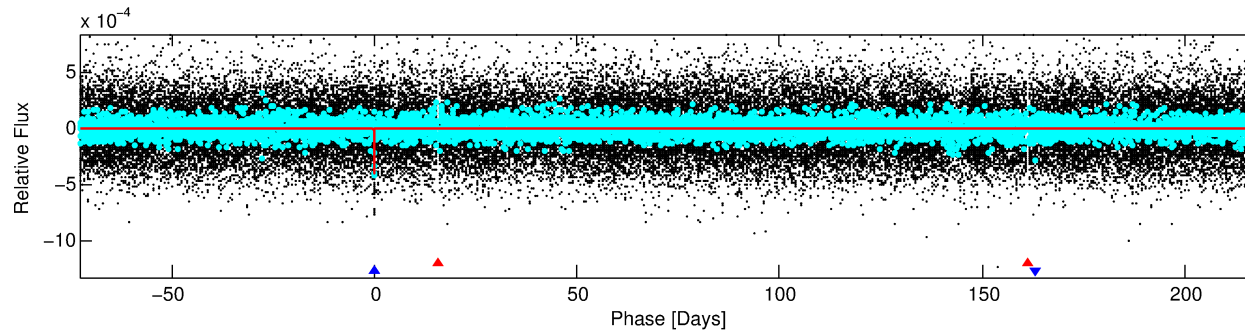
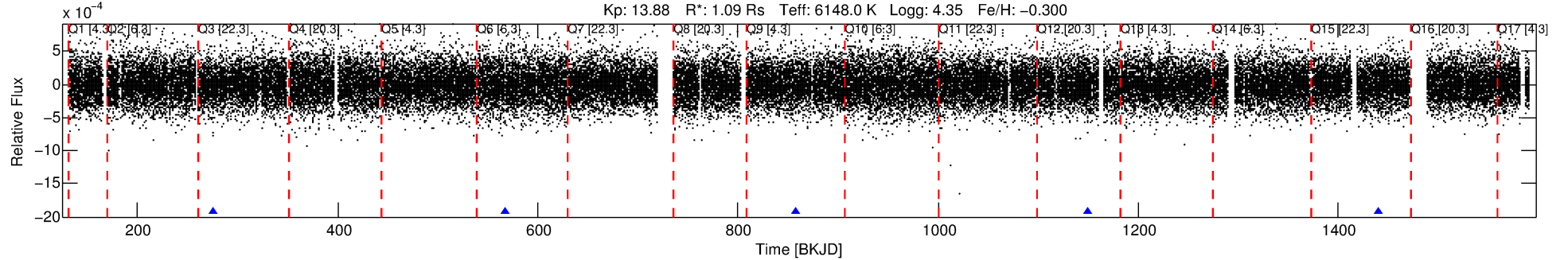
## Ephemeris Match Information For 001996679-02

No Significant Match Found

# DV One-Page Summary

KIC: 1996679 Candidate: 2 of 2 Period: 291.105 d  
KOI: K00147 Corr: No Ephemeris Match

Kp: 13.88 R\*: 1.09 Rs Teff: 6148.0 K Logg: 4.35 Fe/H: -0.300



## DV Fit Results:

Period = 291.10532 [0.00382] d  
Epoch = 275.9837 [0.0104] BKJD  
Rp/R\* = 0.0195 [0.0258]  
a/R\* = 279.77 [1904.47]  
b = 0.67 [5.74]  
Seff = 2.12 [0.81]  
Teq = 308 [29] K  
Rp = 2.33 [3.16] Re  
a = 0.8512 [0.2121] AU  
Ag = 6066.47 [16397.20] [0.37σ]  
Teffp = 4198 [2815] K [1.38σ]

## DV Diagnostic Results:

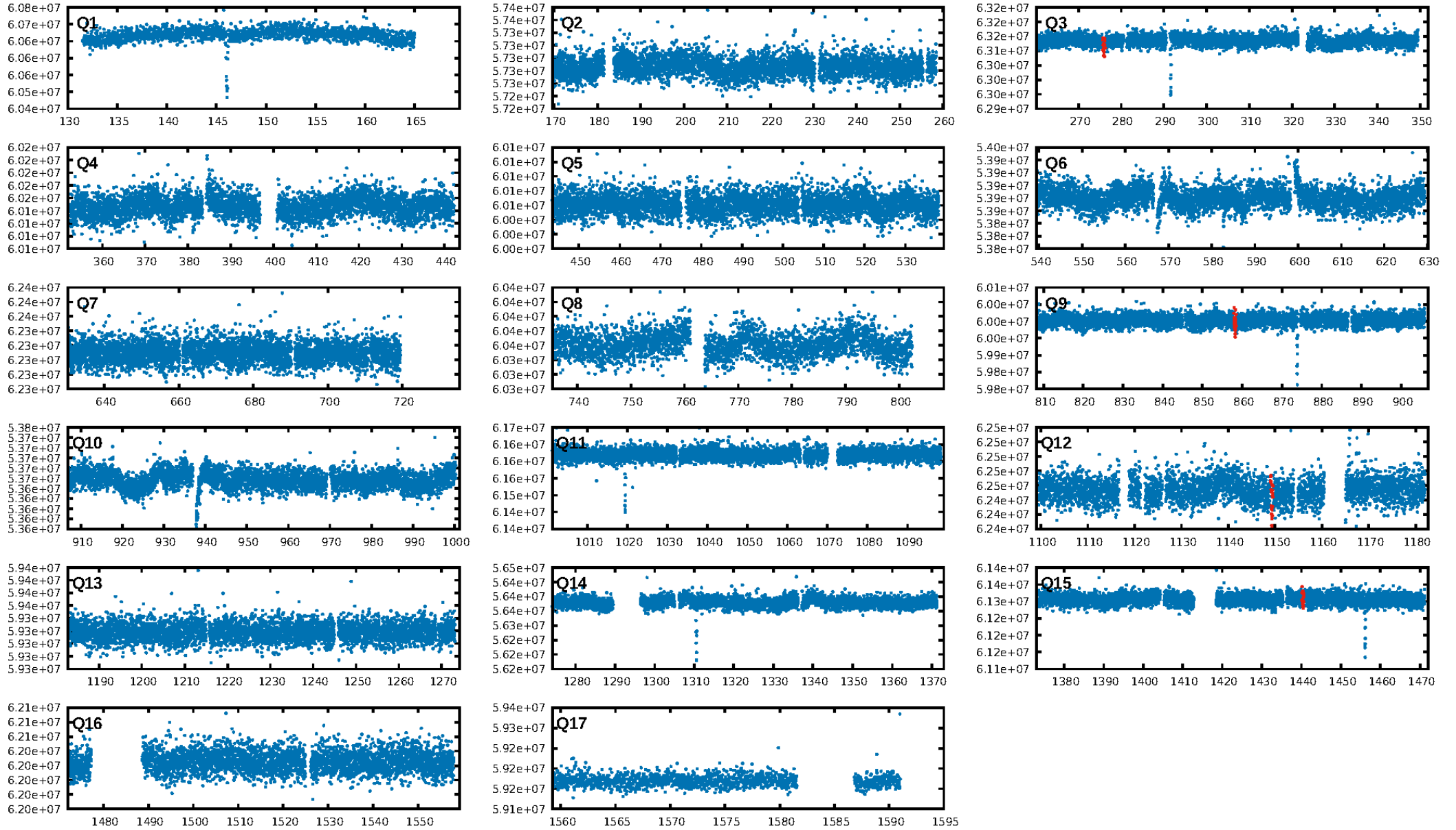
ShortPeriod-sig: 100.0% [426.42σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 13.3%  
ModelChiSquareGof-sig: 98.7%  
Bootstrap-pfa: 8.61e-27  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -17.75  
Centroid-sig: 0.0%  
Centroid-so: 4.616 arcsec [3.51σ]  
OotOffset-rm: 5.251 arcsec [31.44σ]  
KicOffset-rm: 5.411 arcsec [40.24σ]  
OotOffset-st: 0/2/1/1 [4]  
KicOffset-st: 0/2/1/1 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:31:12 Z

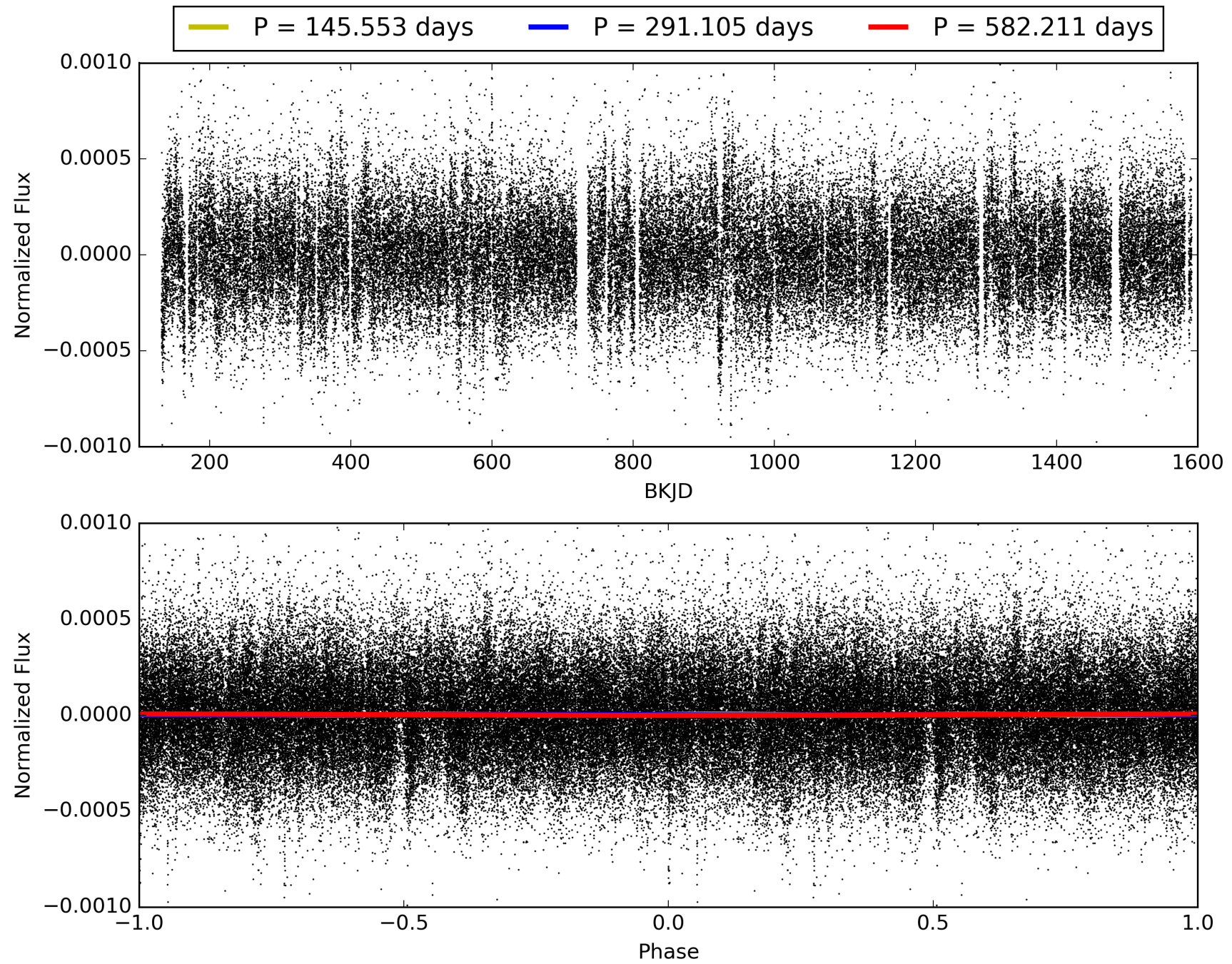
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 001996679-02, PDC Light Curves

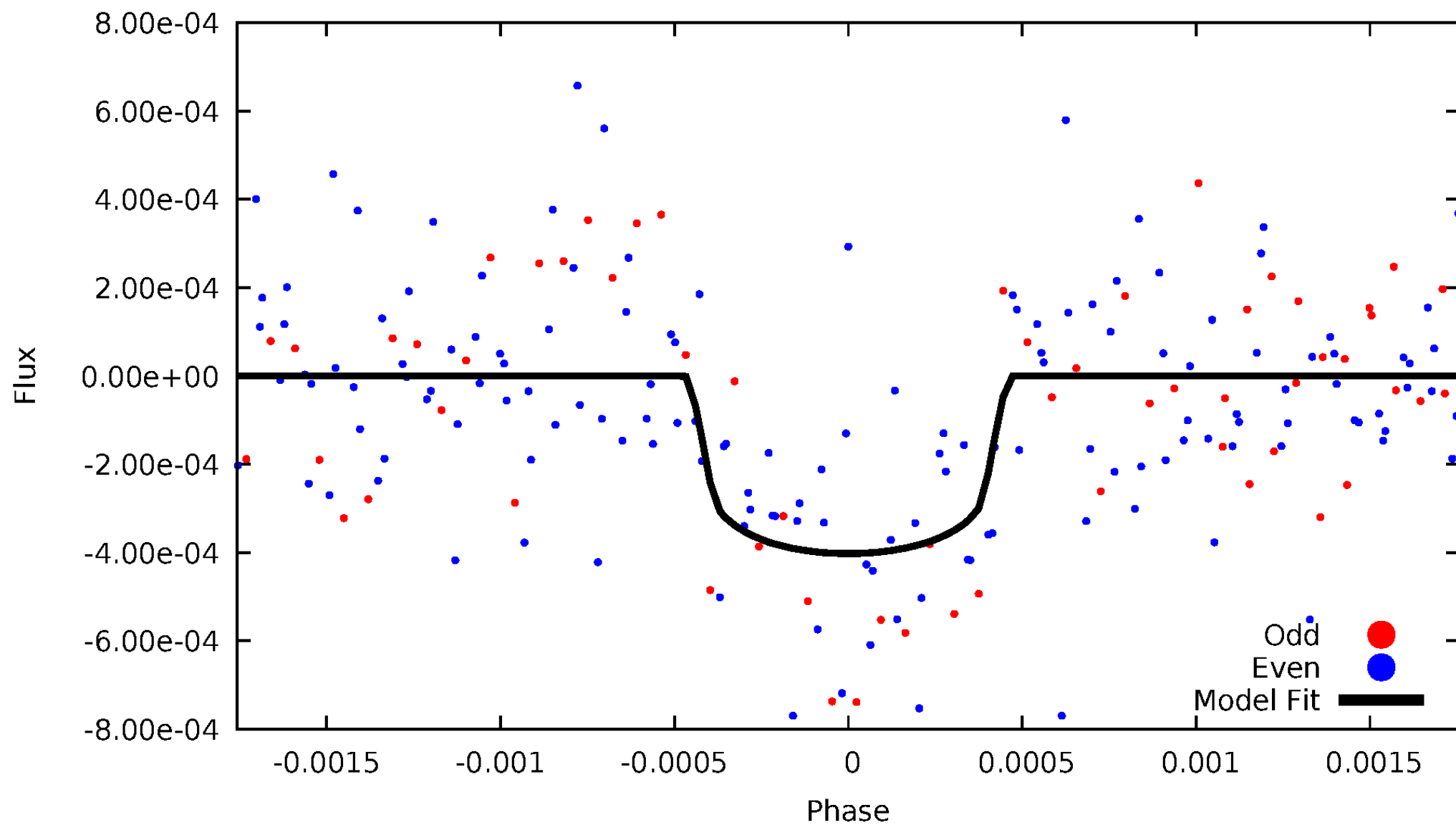


TCE 001996679-02



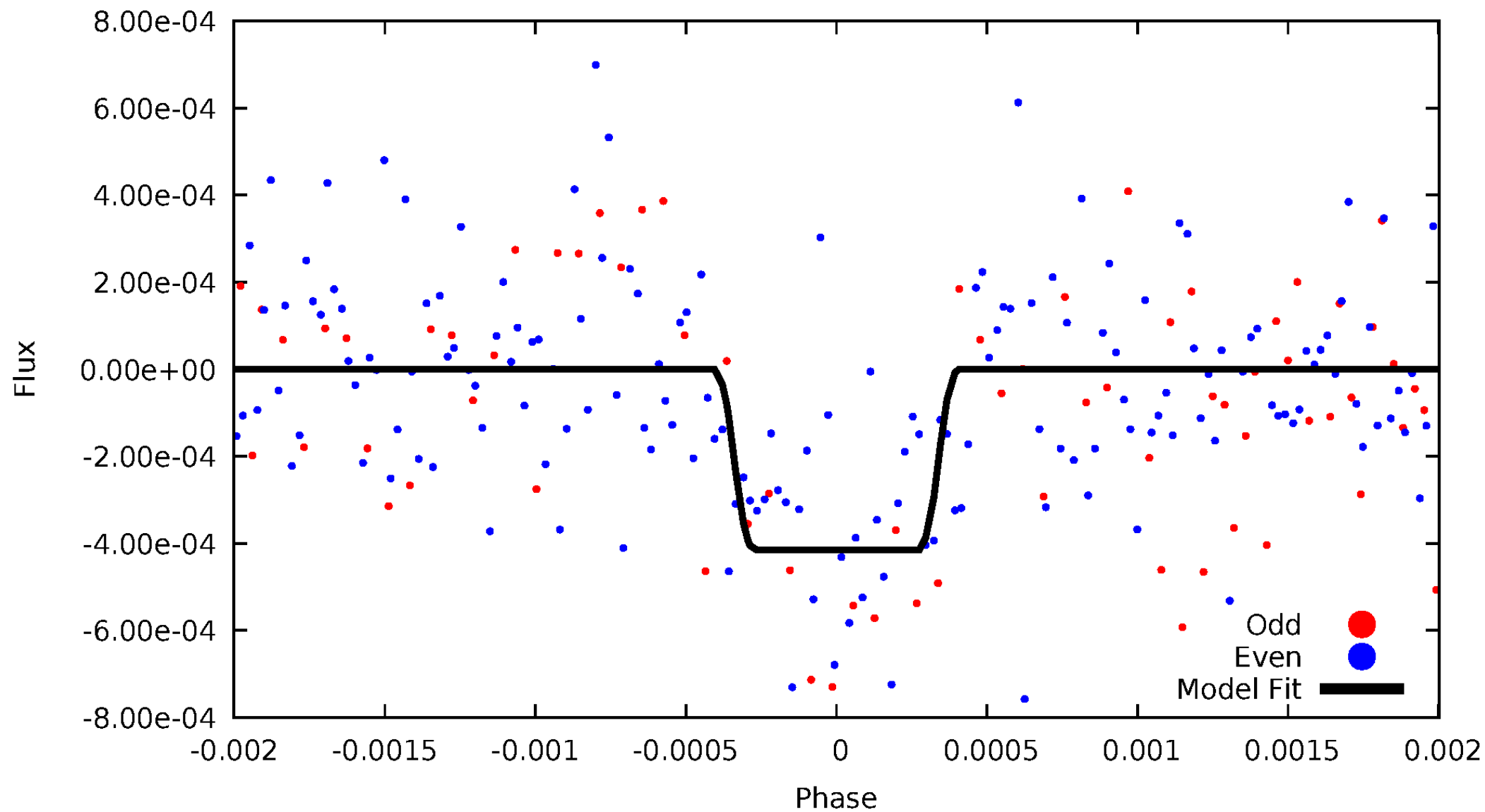
# DV Odd/Even

TCE 001996679-02



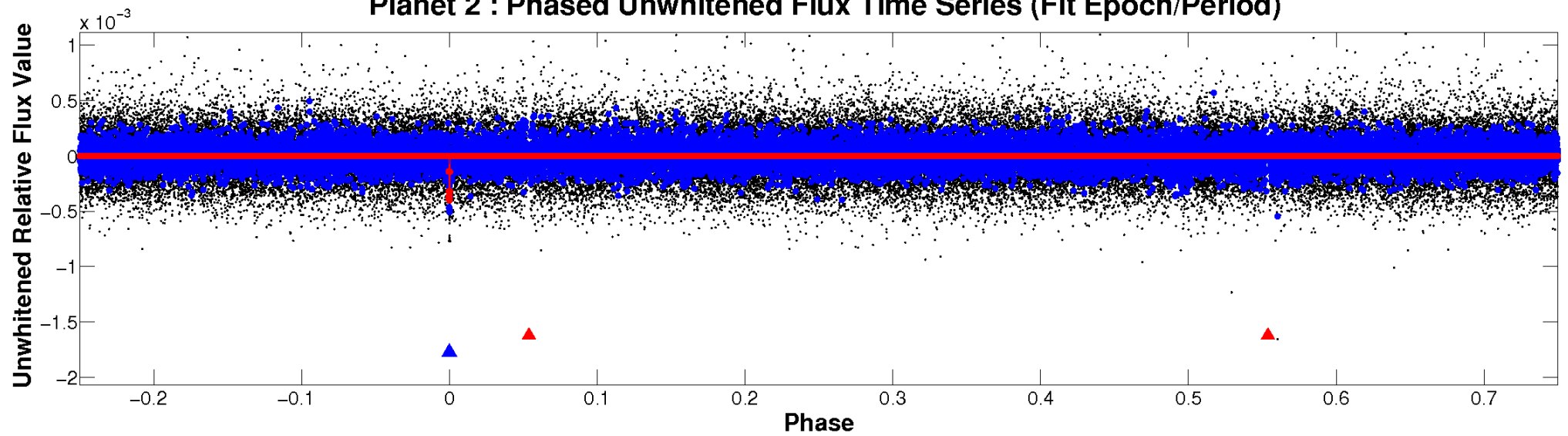
# ALT Odd/Even

TCE 001996679-02

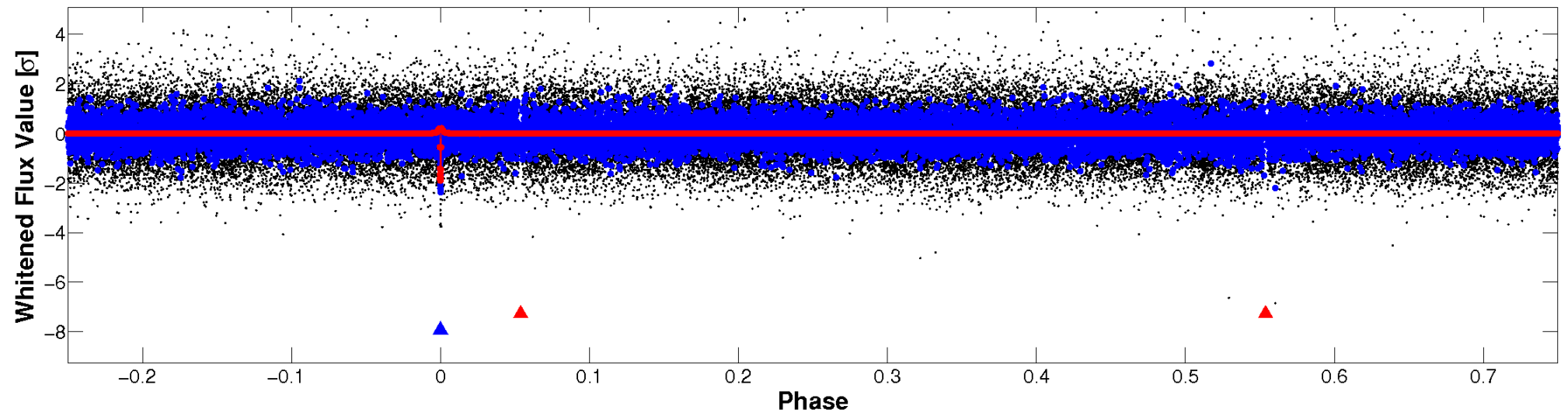


# Non-Whitened Vs. Whitened Light Curve

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

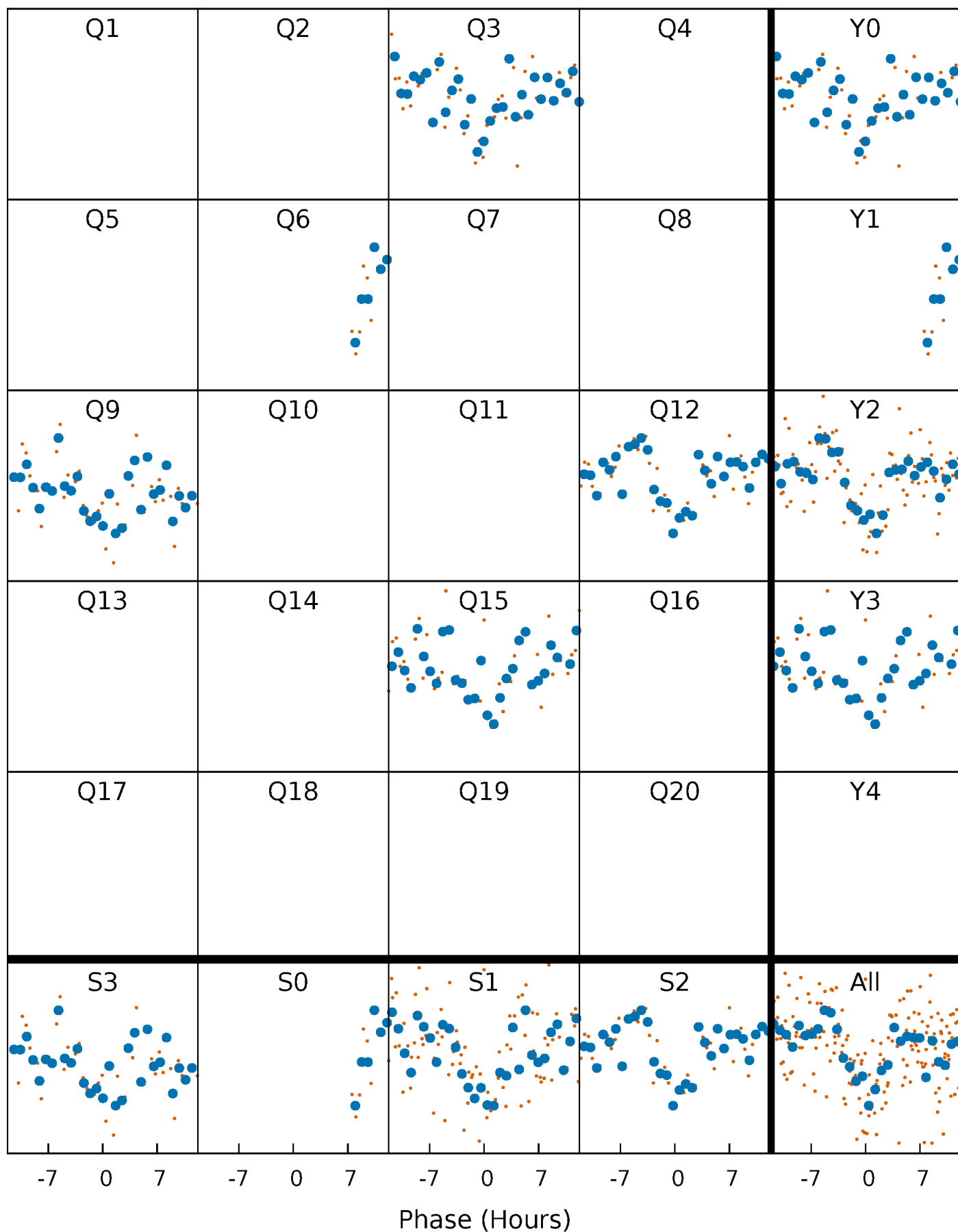


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



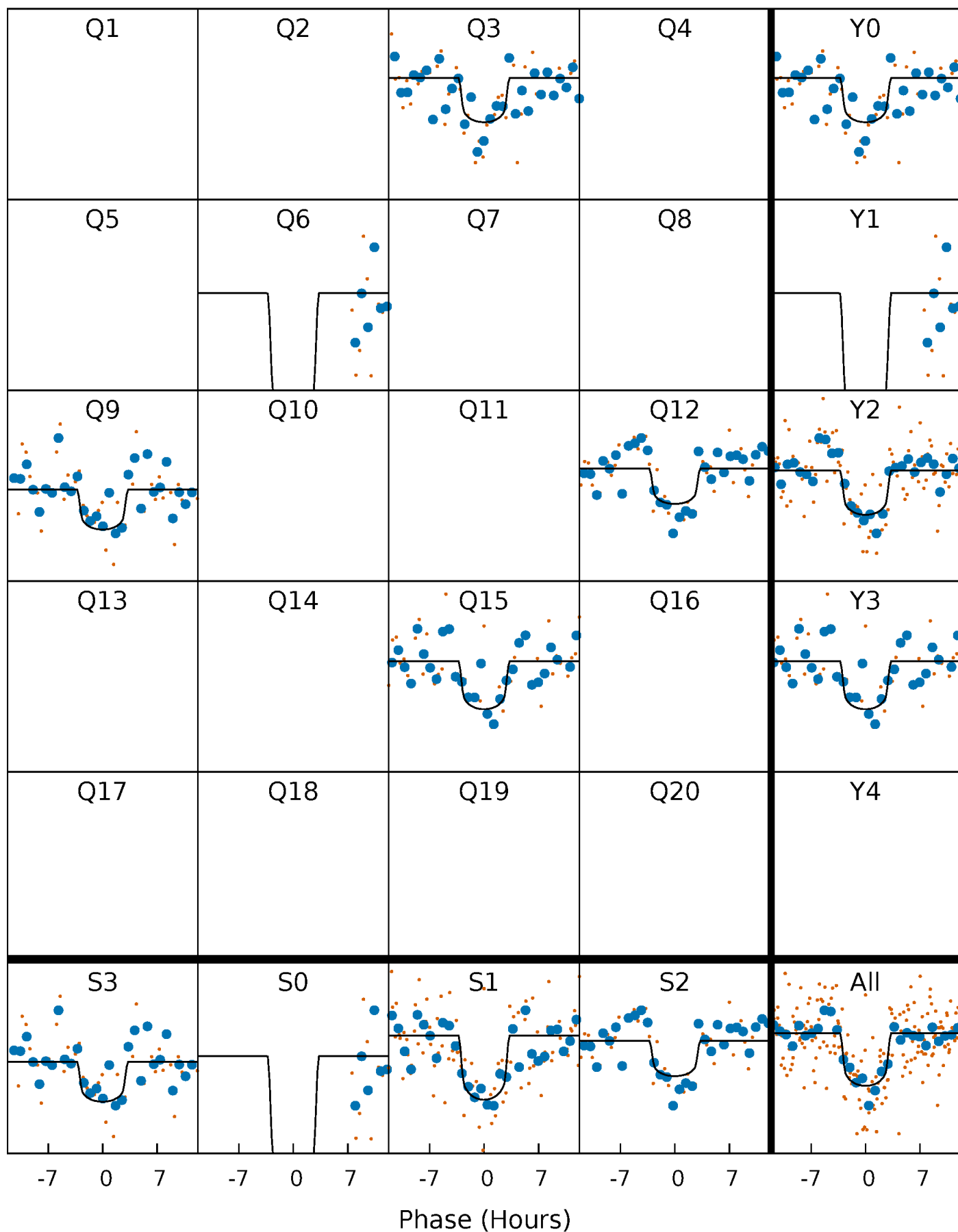
# PDC Quarter-Phased Transit Curves

TCE 001996679-02 P=291.105324 Days  $T_0=275.983670$  (BKJD)



# DV Quarter-Phased Transit Curves

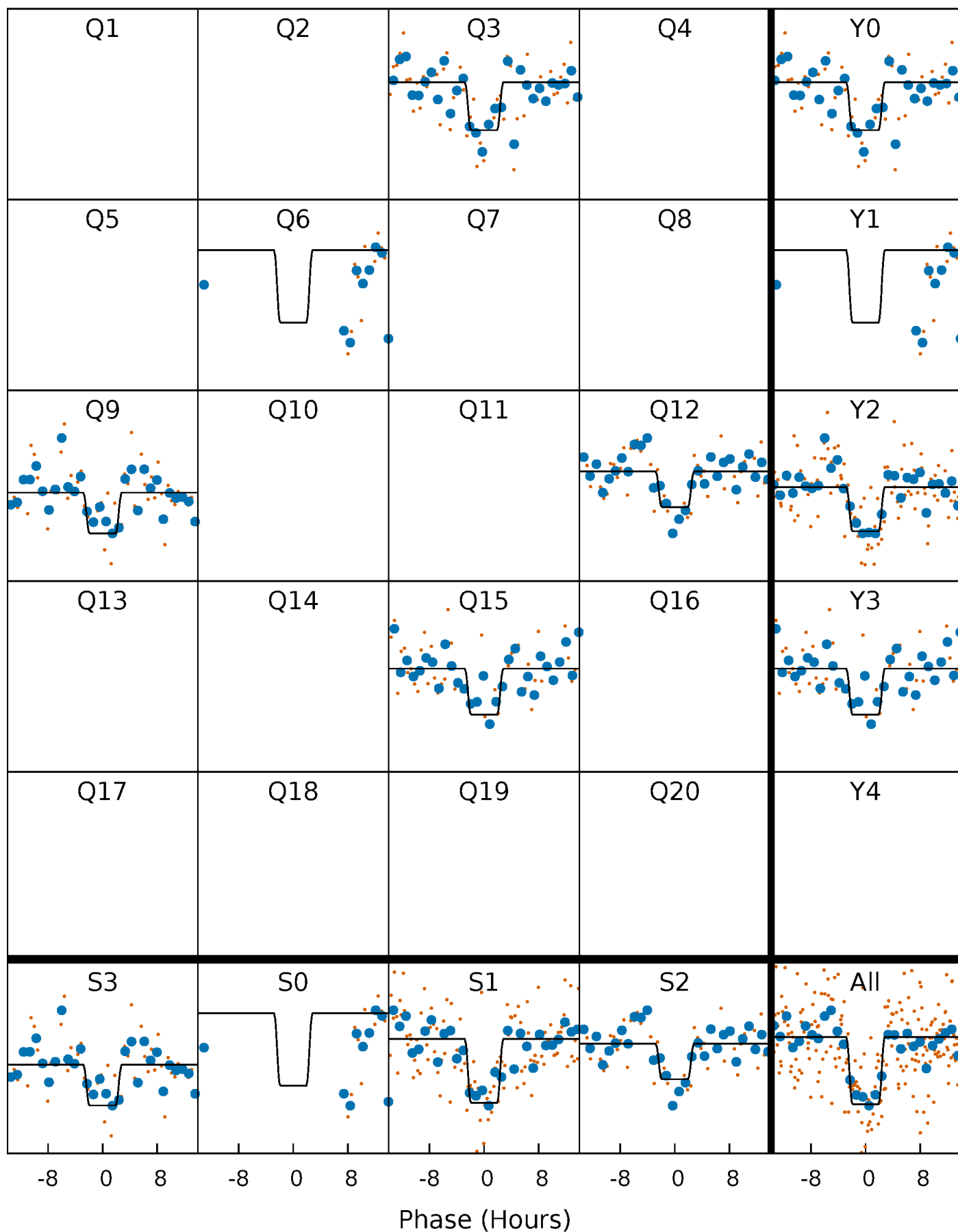
TCE 001996679-02     $P=291.105324$  Days     $T_0=275.983670$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

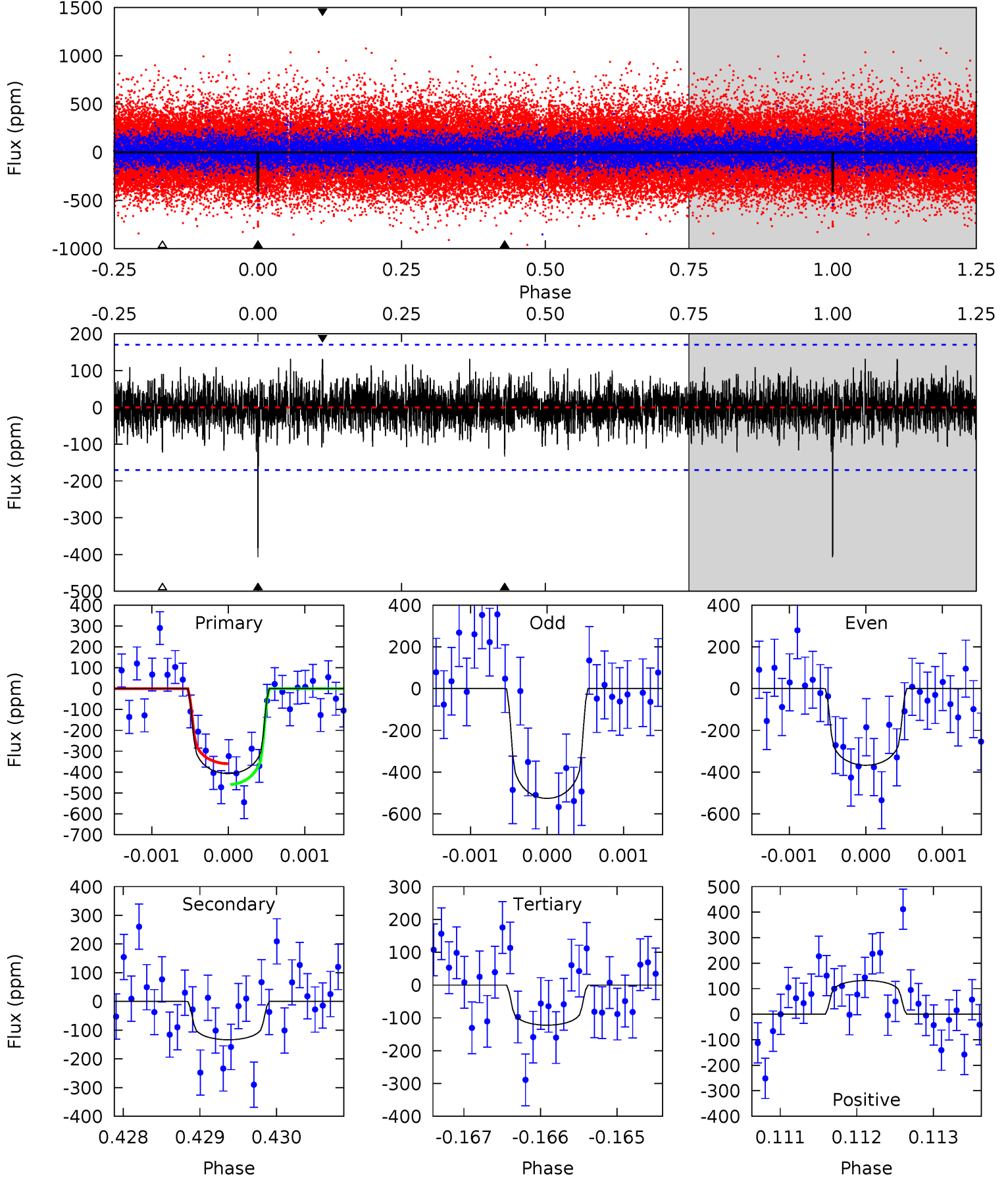
TCE 001996679-02 P=291.110118 Days  $T_0=275.980154$  (BKJD)



# DV Model-Shift Uniqueness Test

001996679-02, P = 291.105324 Days, E = 275.983670 Days

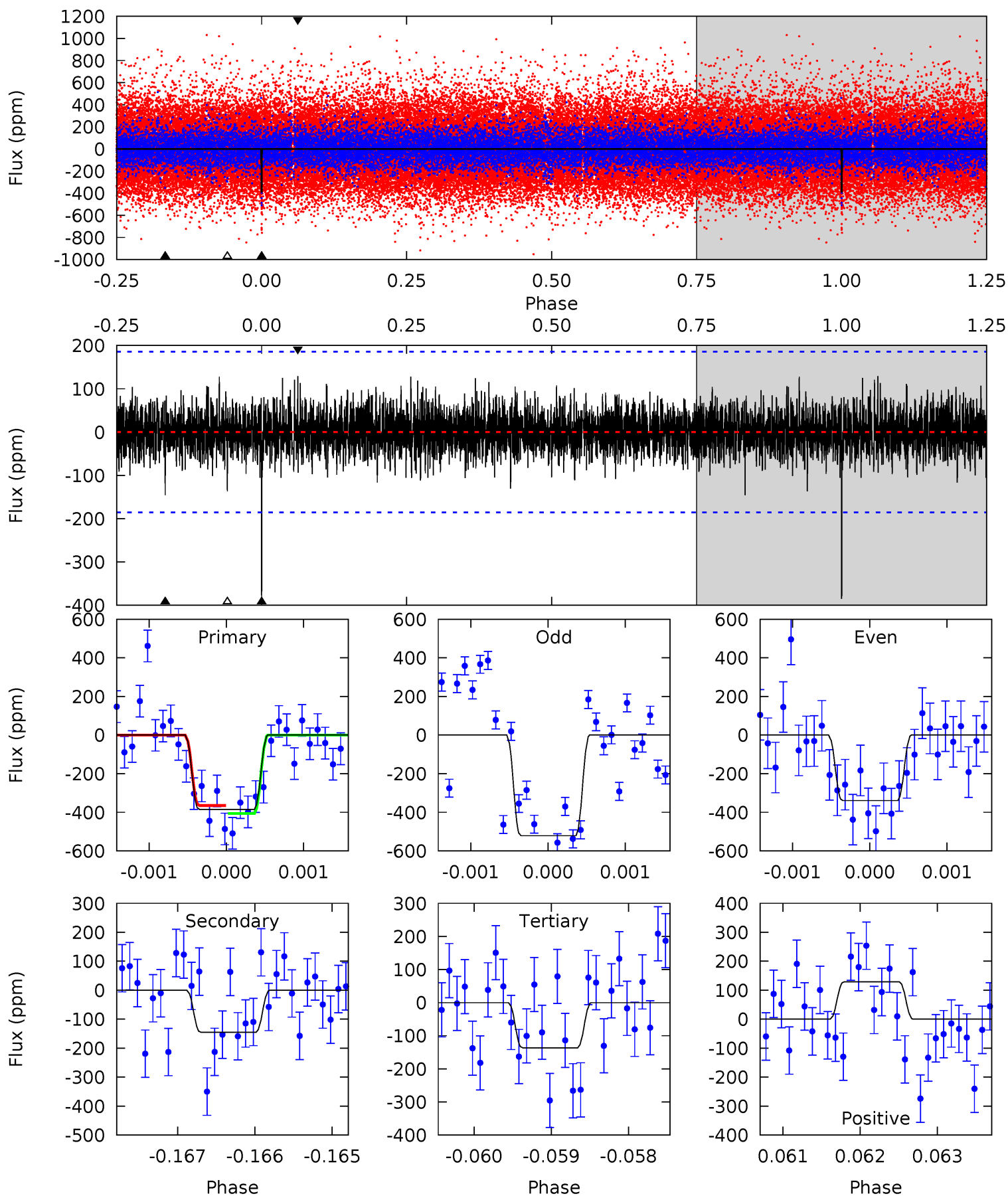
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	4.29	3.93	4.24	5.47	3.32	1.14	9.16	8.85	0.36	0.05	2.21	1.04	0.24	1.61



# Alt Model-Shift Uniqueness Test

001996679-02, P = 291.110118 Days, E = 275.980154 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
11.4	4.31	4.04	3.83	5.50	3.37	1.05	7.37	7.58	0.27	0.48	2.32	1.08	0.25	0.61



### Stellar Parameters For KIC 001996679

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6148^{+165}_{-202}$	$4.346^{+0.128}_{-0.192}$	$-0.300^{+0.300}_{-0.300}$	$1.095^{+0.330}_{-0.178}$	$0.969^{+0.153}_{-0.114}$	$1.040^{+0.619}_{-0.522}$
	+3%/-3%	+3%/-4%	+100%/-100%	+30%/-16%	+16%/-12%	+60%/-50%
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 001996679-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-133 \pm 31$	$3.33^{+2.95}_{-2.28}$	$432^{+32}_{-24}$	$4205^{+2809}_{-785}$	$4582^{+39915}_{-3281}$
Alt.	$-145 \pm 34$	$3.33^{+2.81}_{-2.02}$	$432^{+32}_{-24}$	$4263^{+2271}_{-793}$	$5042^{+26136}_{-3577}$

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

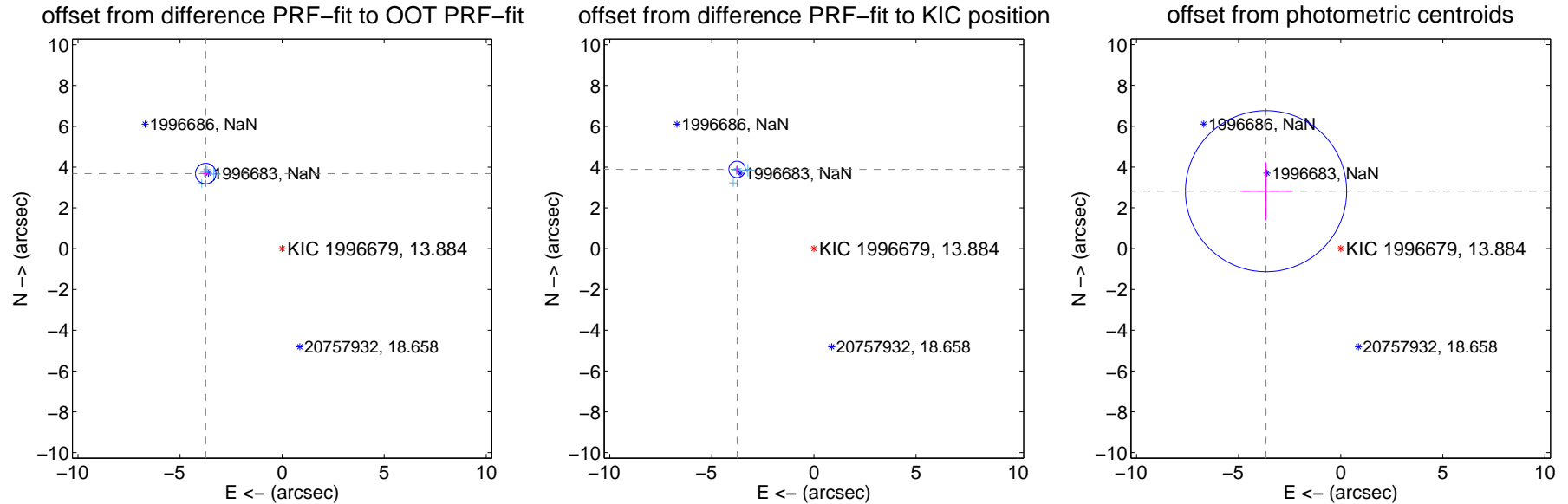
## DV Centroid Data

Supplemental centroid analysis for 001996679-02. Kepler magnitude: 13.88. Transit SNR 11.28

There are 4 quarters with good PRF difference image offsets

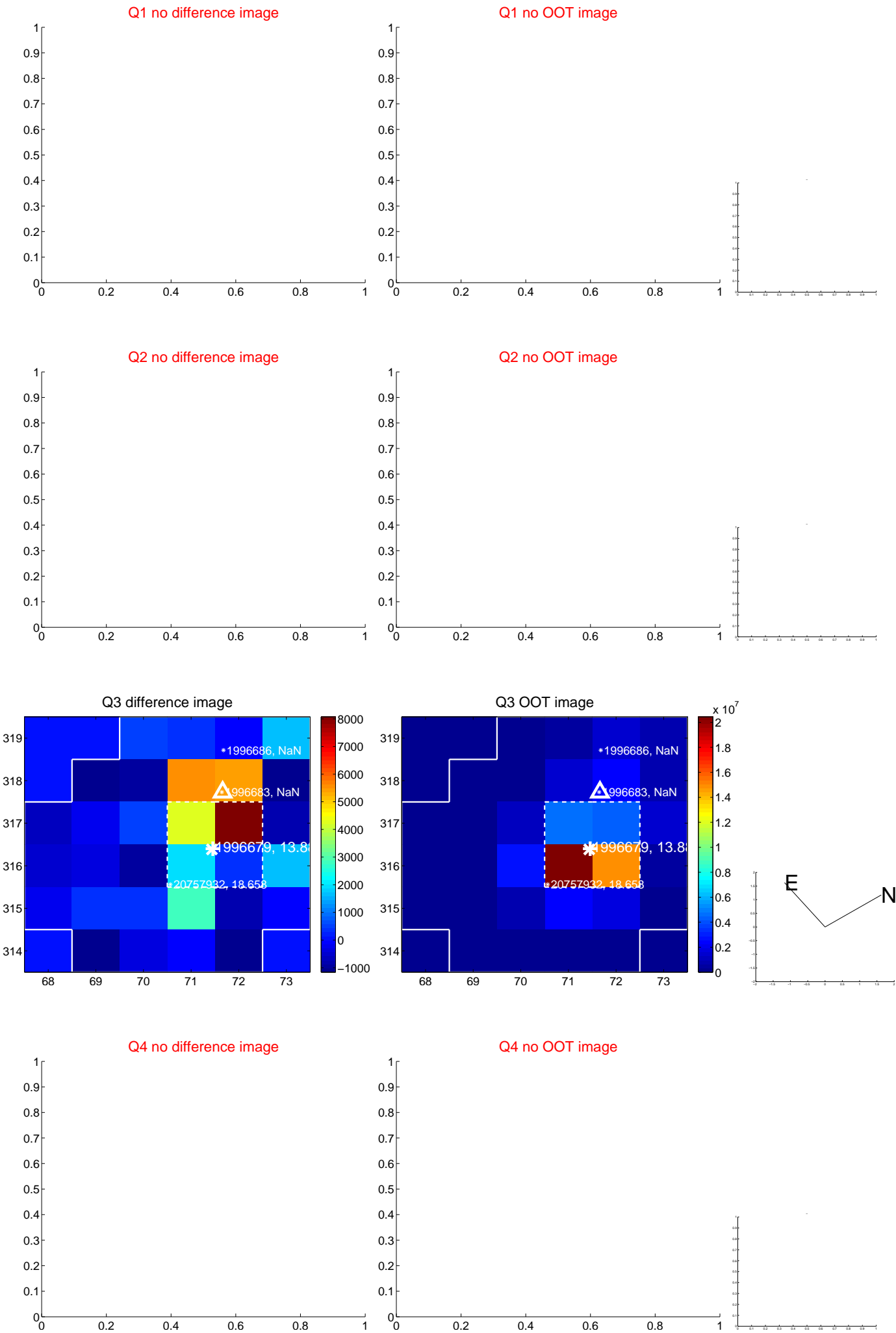
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.251 \pm 0.167$	31.44	$3.741 \pm 0.135$	$3.685 \pm 0.195$
PRF-fit source offset from KIC position	$5.411 \pm 0.134$	40.24	$3.763 \pm 0.137$	$3.888 \pm 0.132$
photometric centroid source offset	$4.62 \pm 1.32$	3.51	$3.66 \pm 1.25$	$2.82 \pm 1.42$



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.

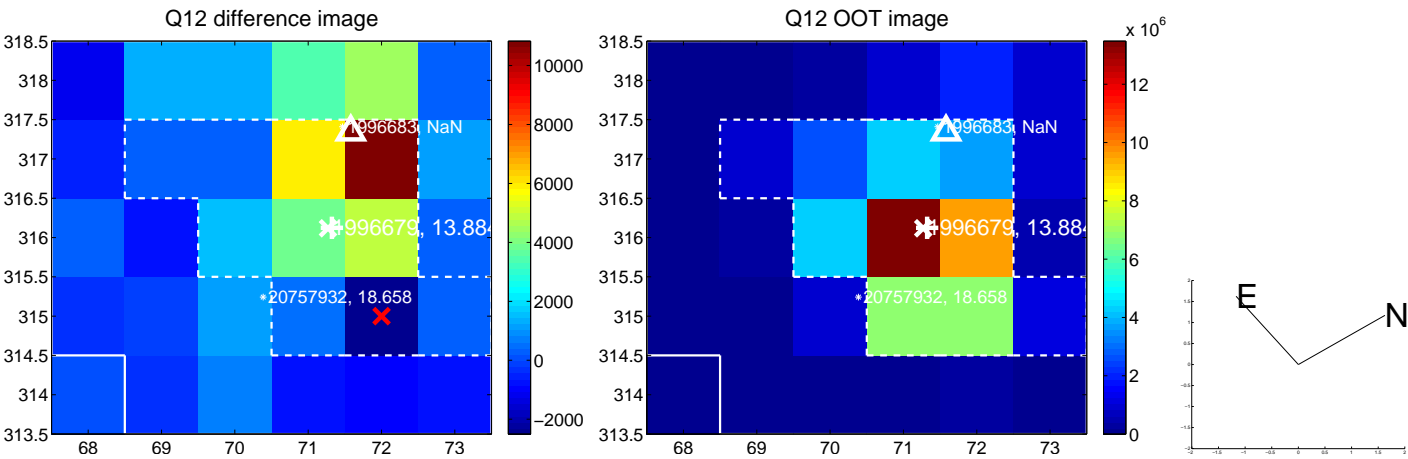
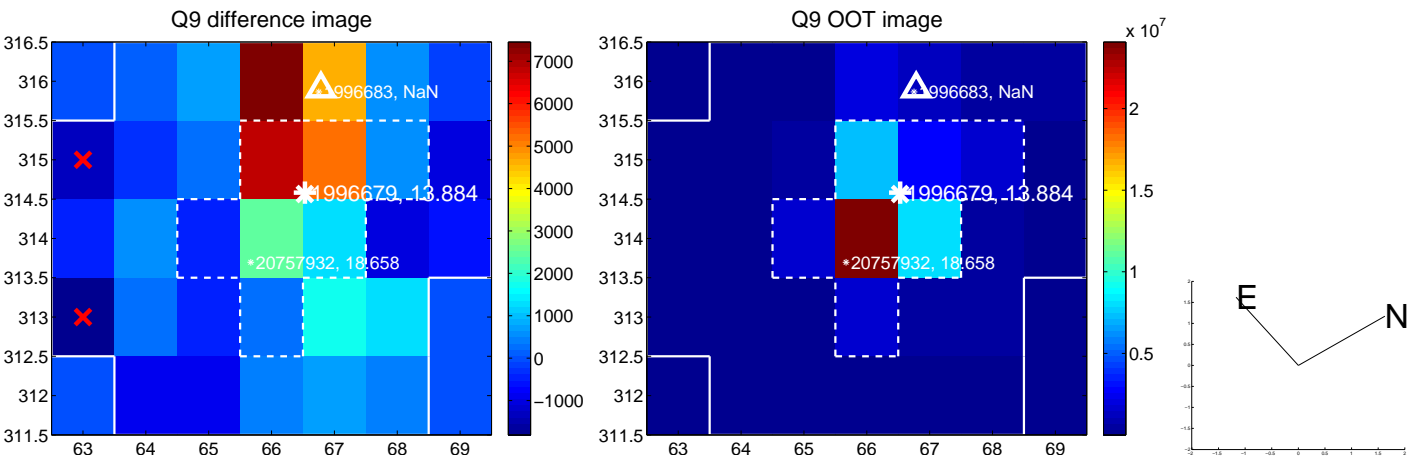


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

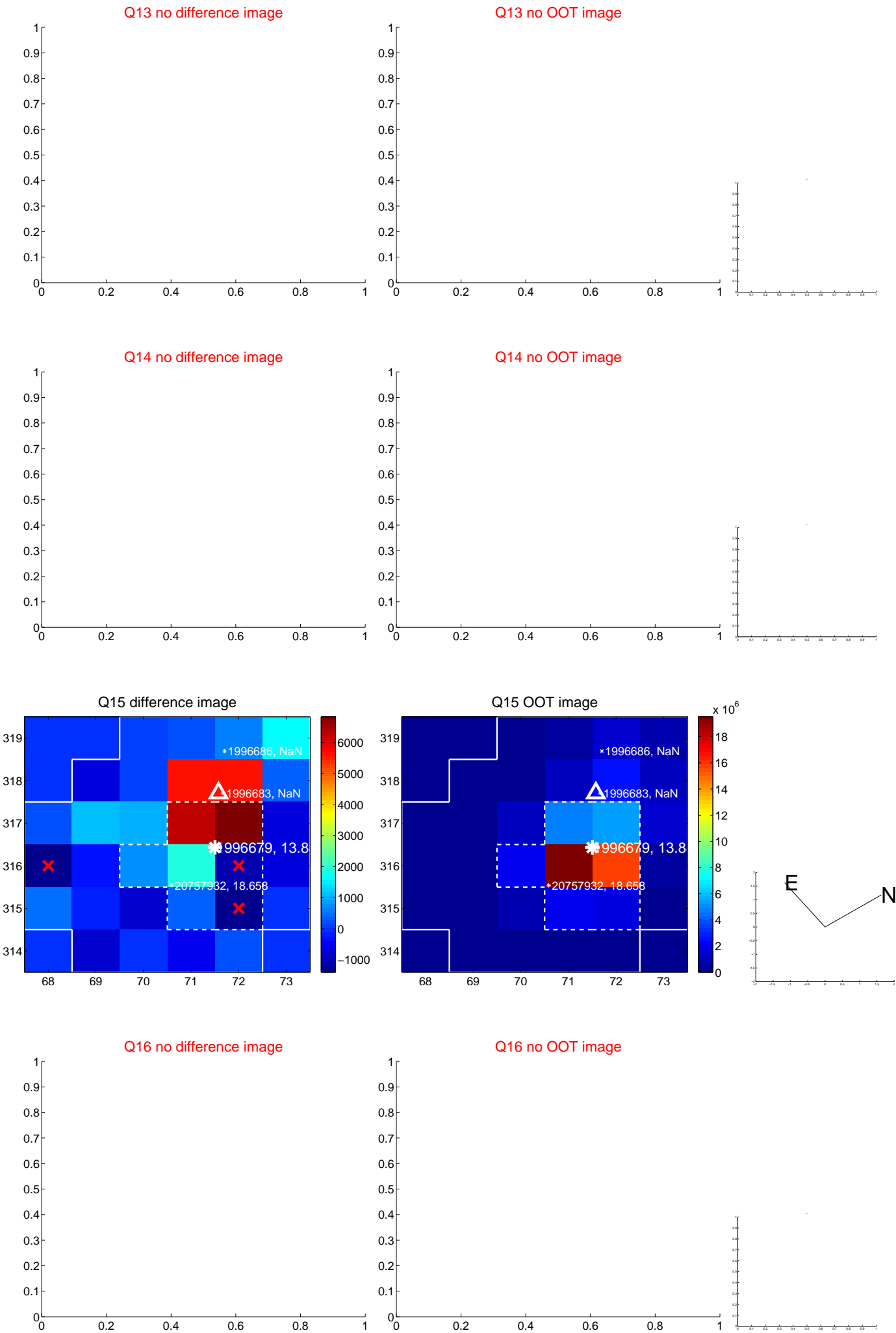




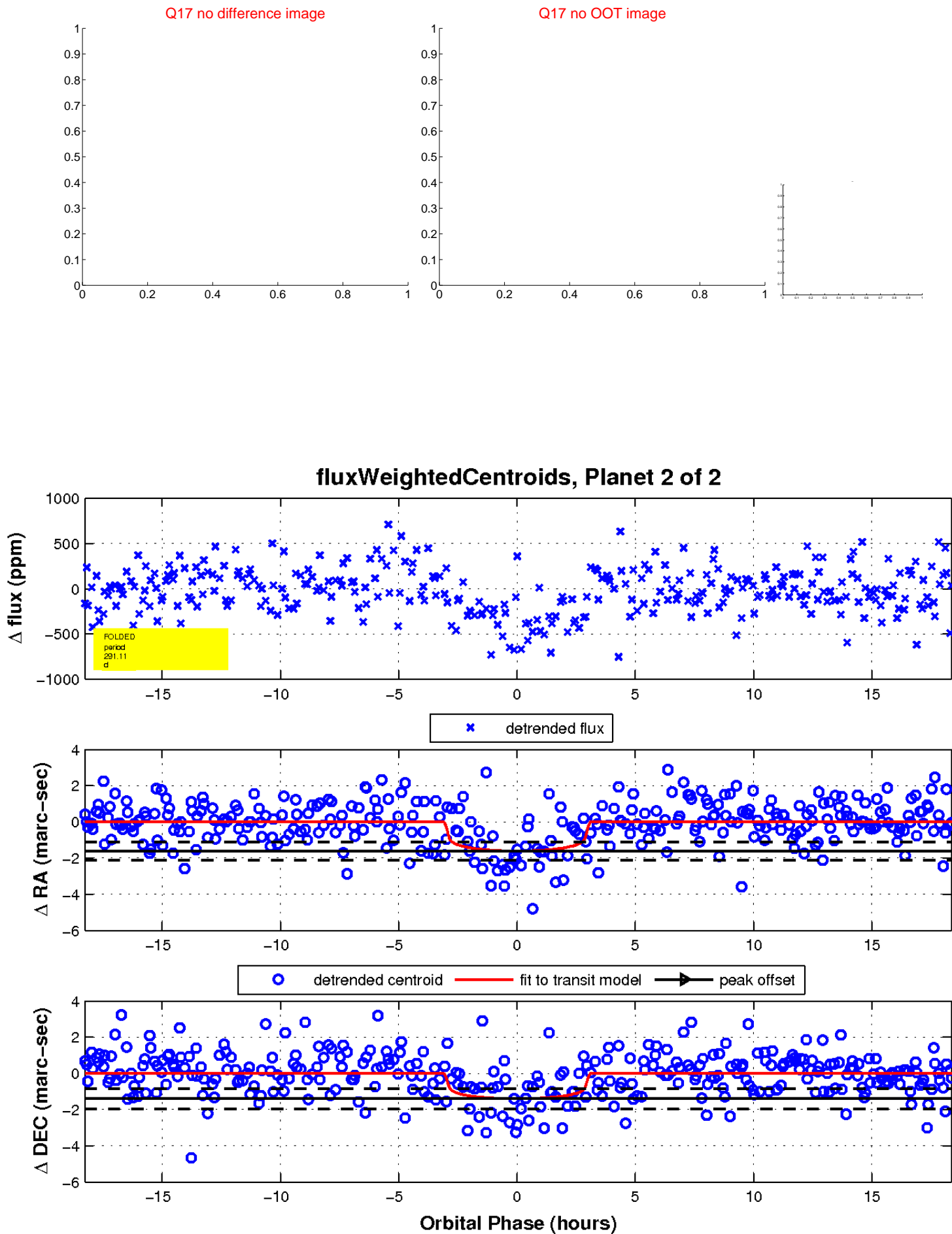
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

