

# KIC 010710755

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010710755-01	OBS	6080.01	4.816611	133.763620	80863.0	3.850	2409.3	3093.7	0.90	5796	26.44	287.87
010710755-02	OBS	No	2.408302	133.765136	2537.5	3.708	139.9	139.4	0.90	5796	5.29	725.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010710755-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
010710755-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

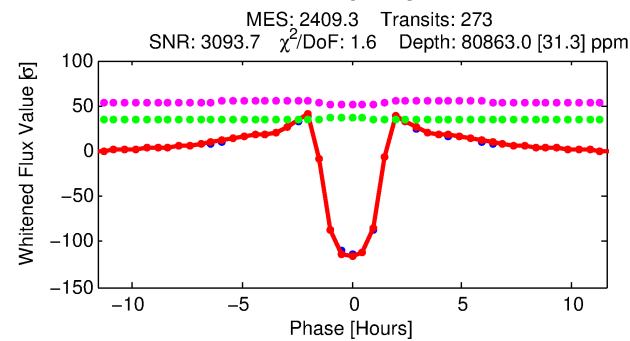
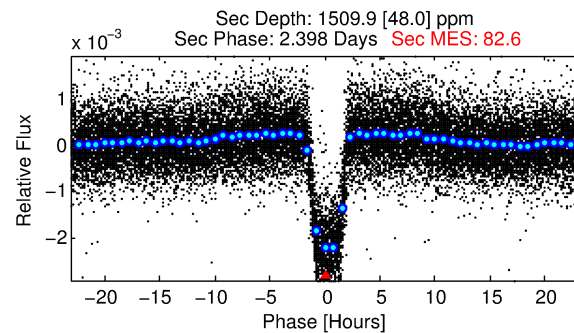
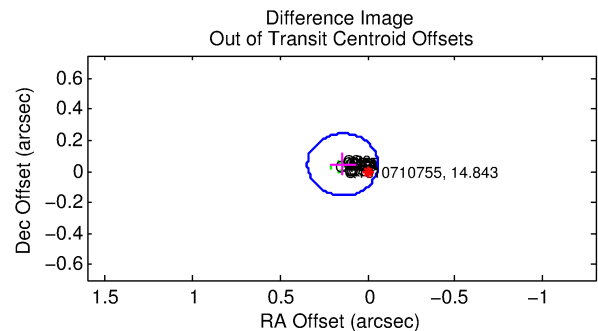
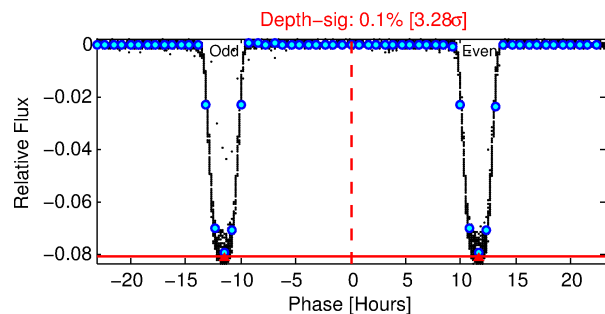
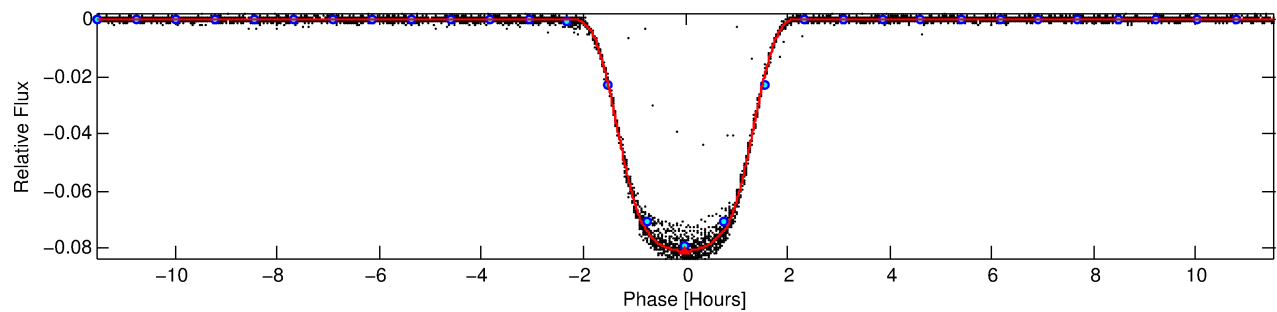
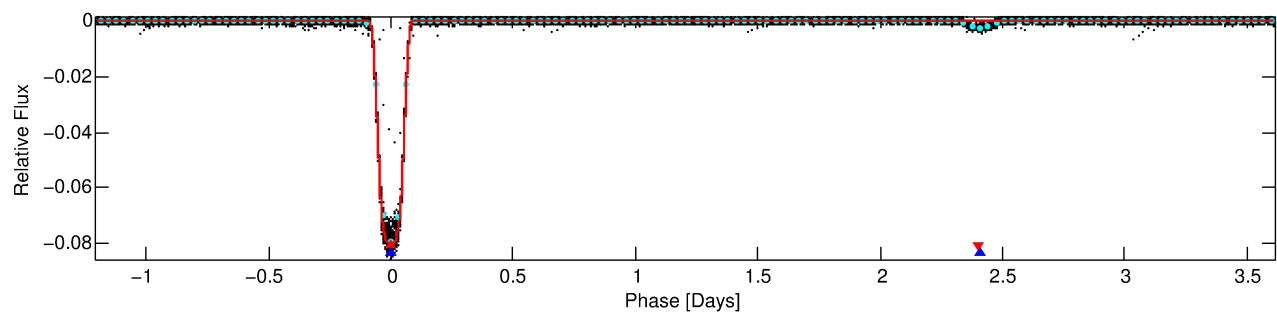
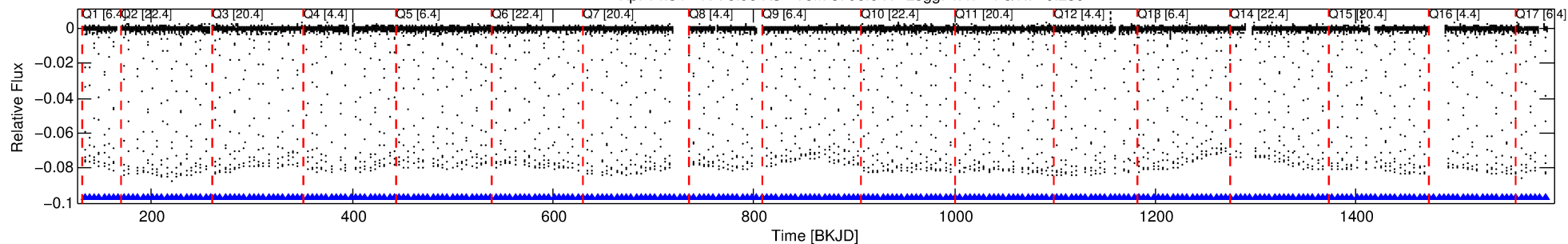
## Ephemeris Match Information For 010710755-01

No Significant Match Found

# DV One-Page Summary

KIC: 10710755 Candidate: 1 of 2 Period: 4.817 d  
KOI: K06080.01 Corr: 0.997

Kp: 14.84 R\*: 0.90 Rs Teff: 5796.0 K Logg: 4.47 Fe/H: -0.280



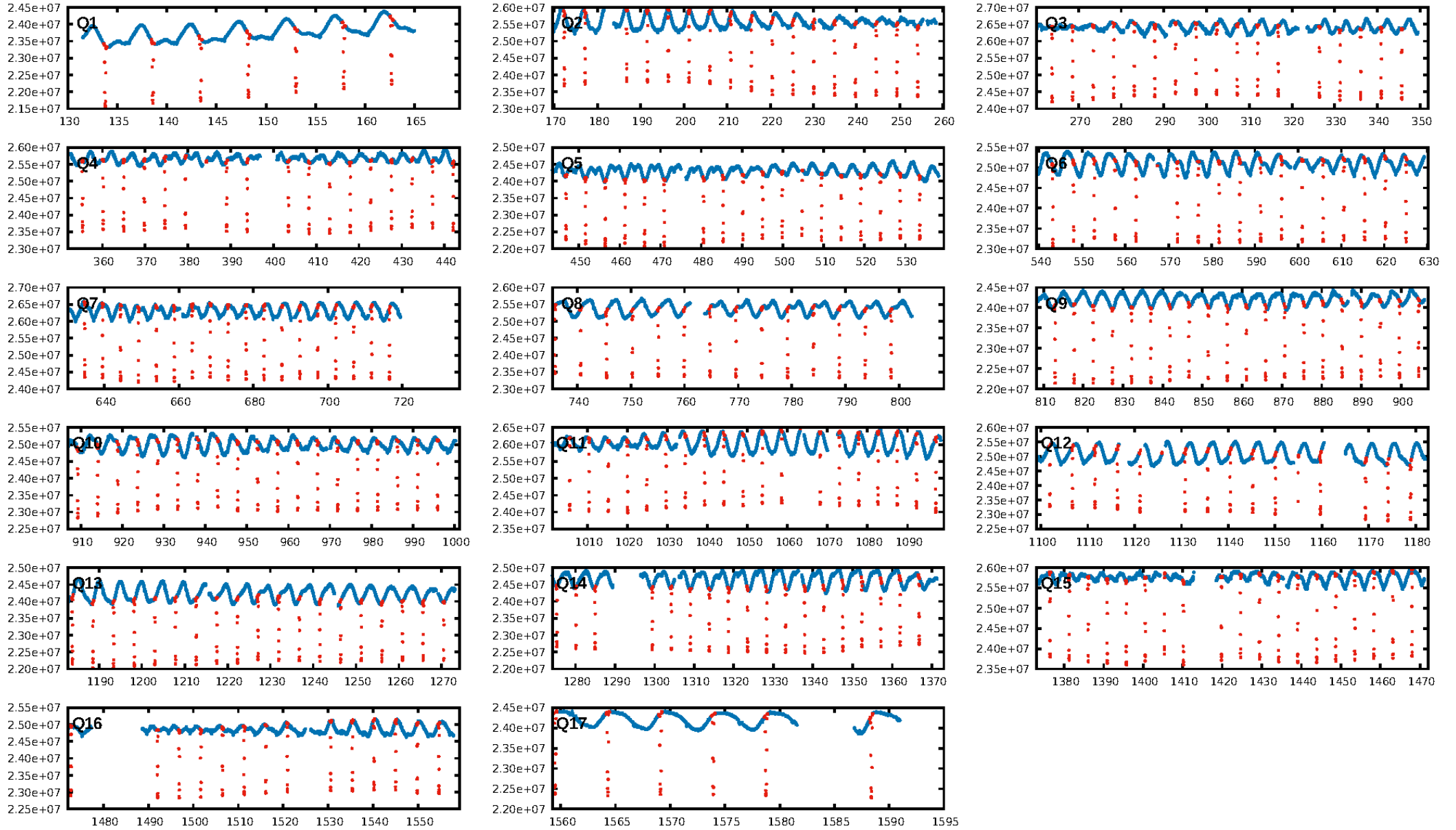
## DV Fit Results:

Period = 4.81661 [0.00000] d  
Epoch = 133.7636 [0.0000] BKJD  
Rp/R\* = 0.2680 [0.0001]  
a/R\* = 11.27 [0.01]  
b = 0.47 [0.00]  
Seff = 287.87 [99.93]  
Teq = 1050 [91] K  
Rp = 26.44 [6.93] Re  
a = 0.0536 [0.0120] AU  
Ag = 3.41 [1.13] [2.13σ]  
Teffp = 2207 [63] K [10.46σ]

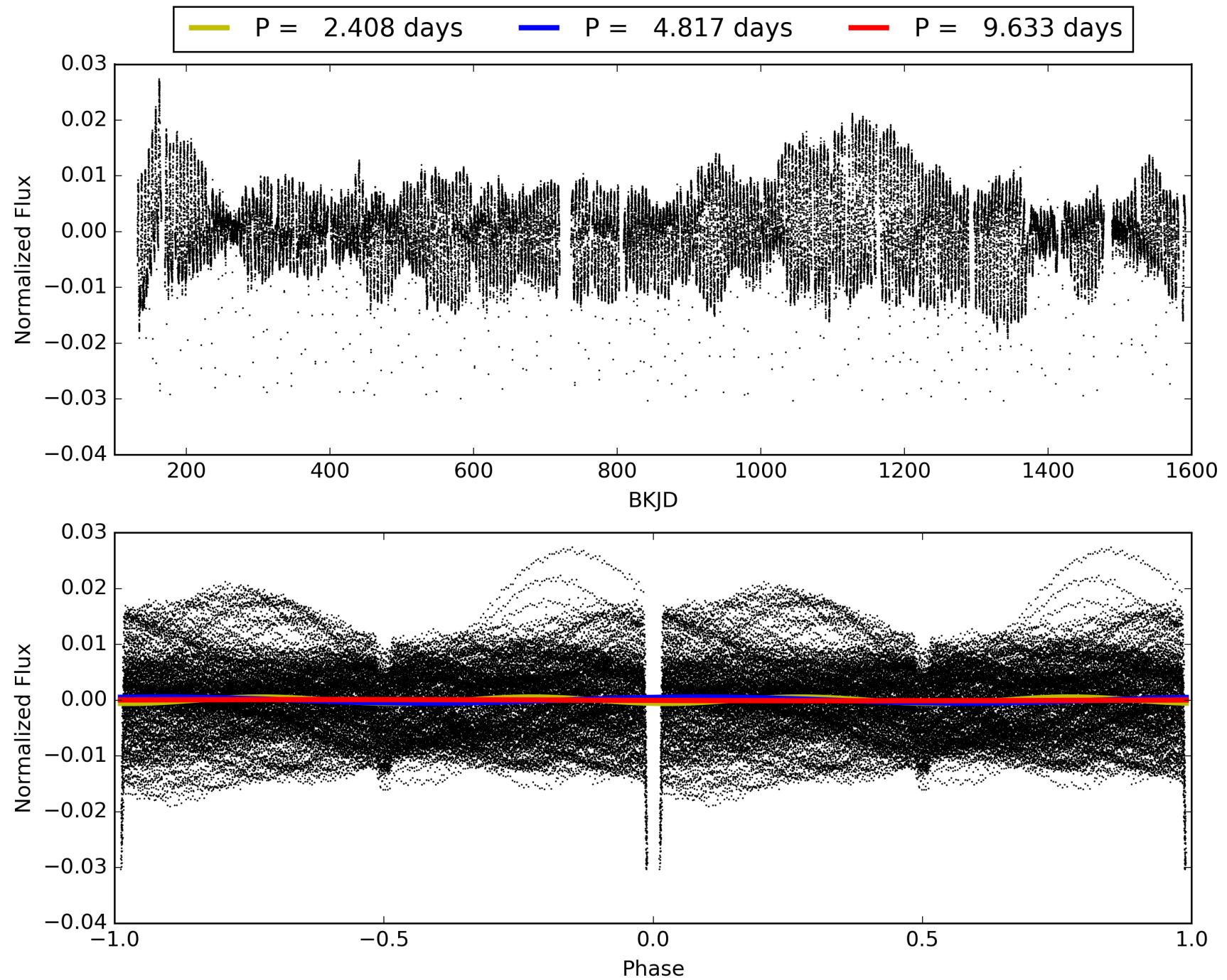
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [10.81σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [260/260]  
GhostDiagnostic-chr: 1.959  
Centroid-sig: 0.0%  
Centroid-so: 0.434 arcsec [142.62σ]  
OotOffset-rm: 0.149 arcsec [2.22σ]  
KicOffset-rm: 0.199 arcsec [2.90σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 010710755-01, PDC Light Curves

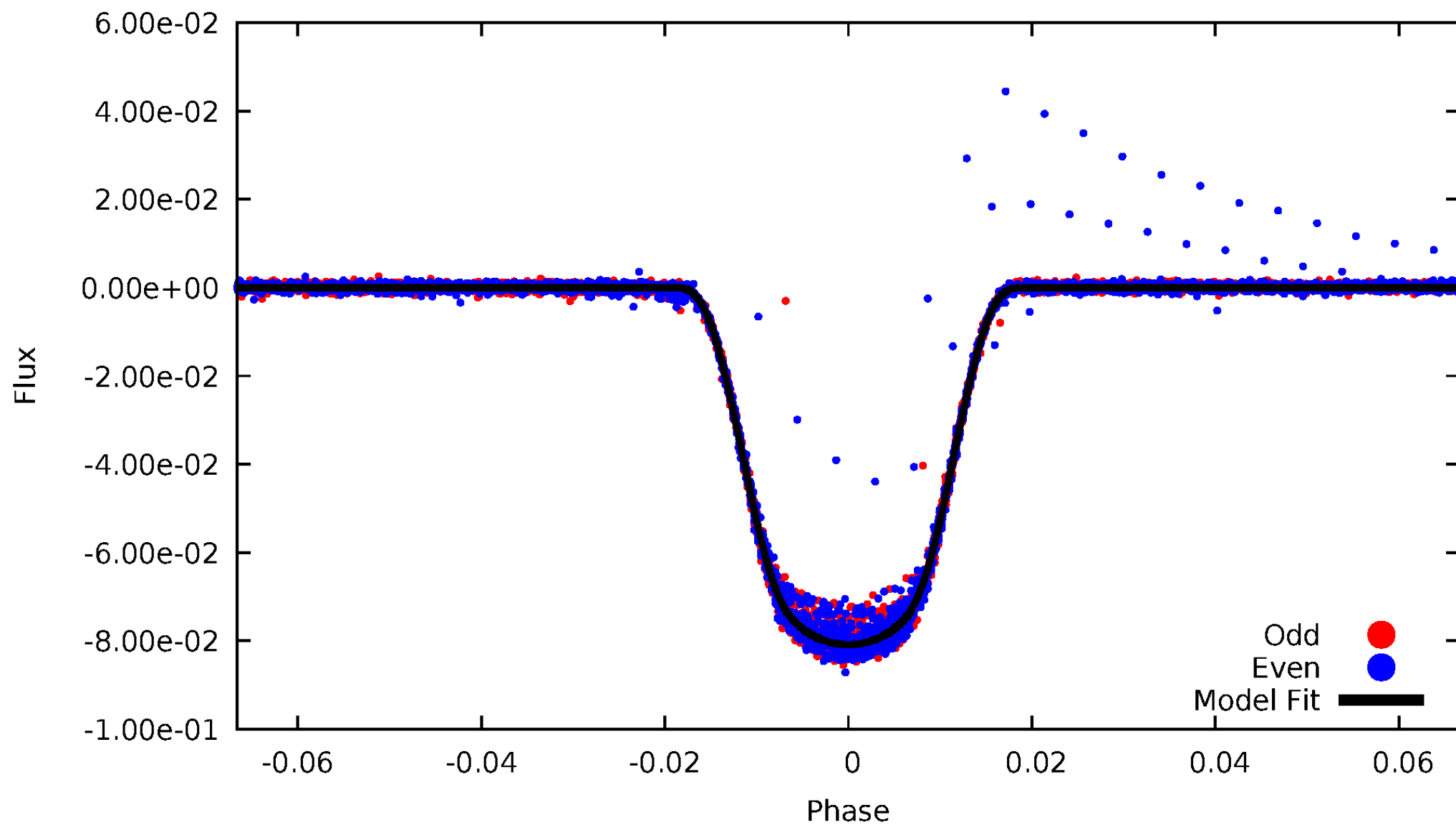


TCE 010710755-01



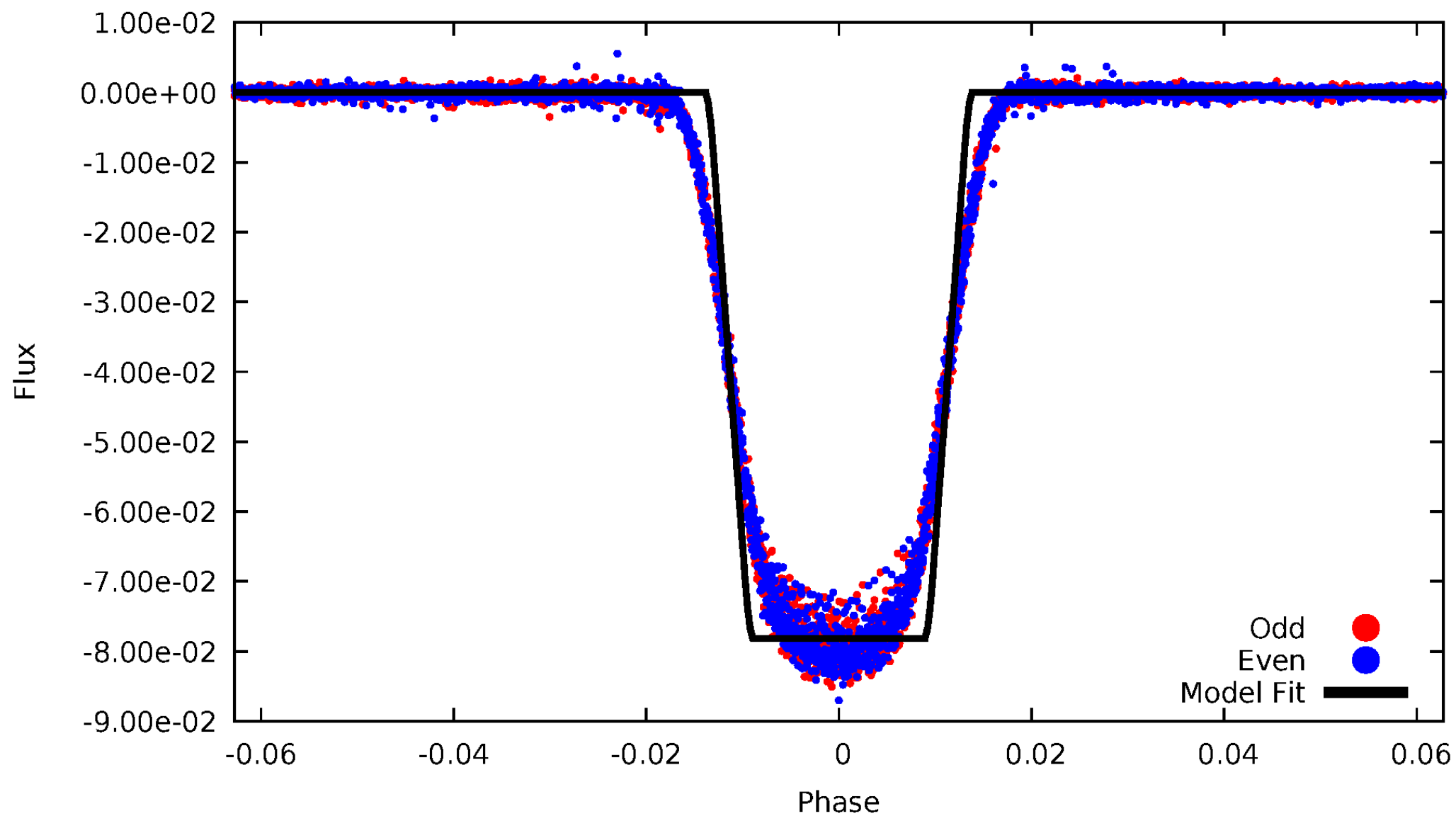
# DV Odd/Even

TCE 010710755-01



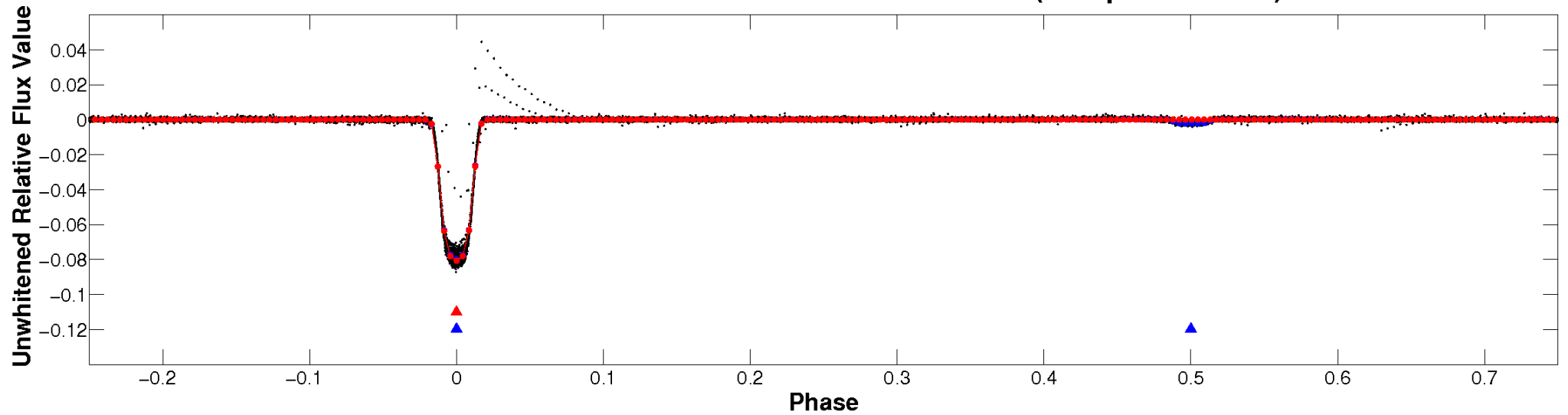
# ALT Odd/Even

TCE 010710755-01

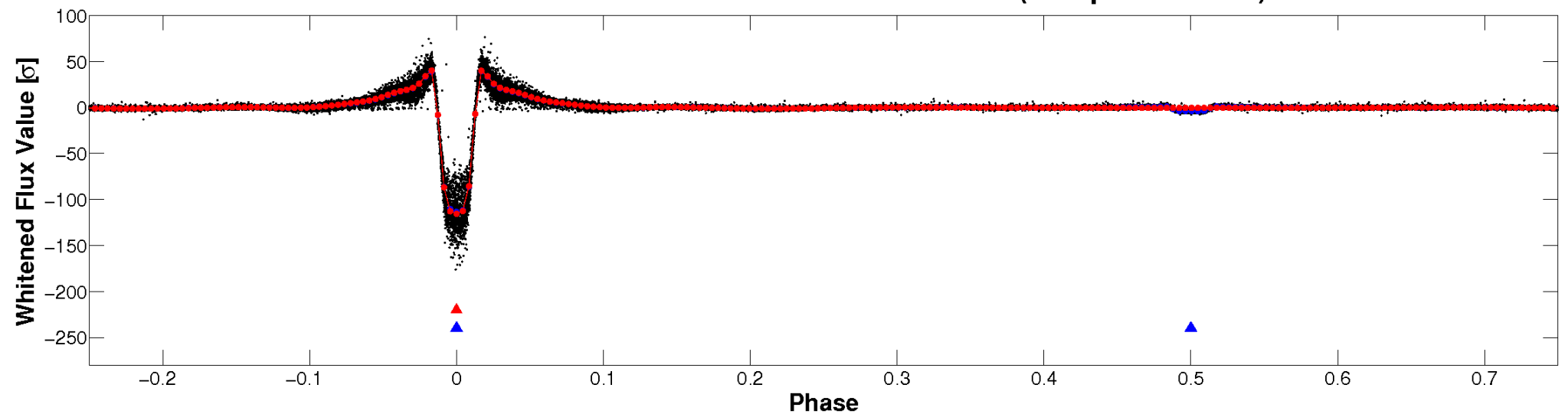


# Non-Whitened Vs. Whitened Light Curve

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

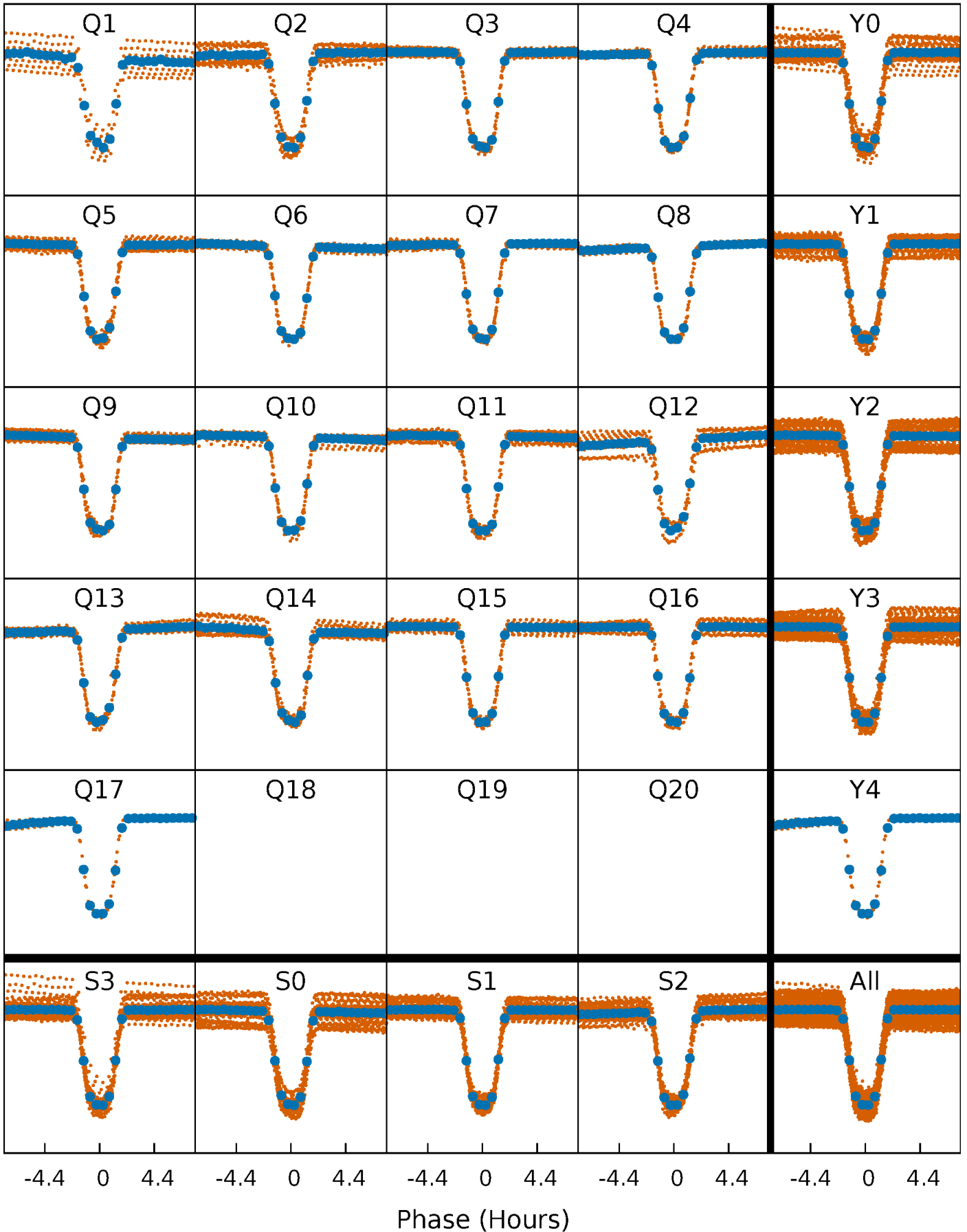


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

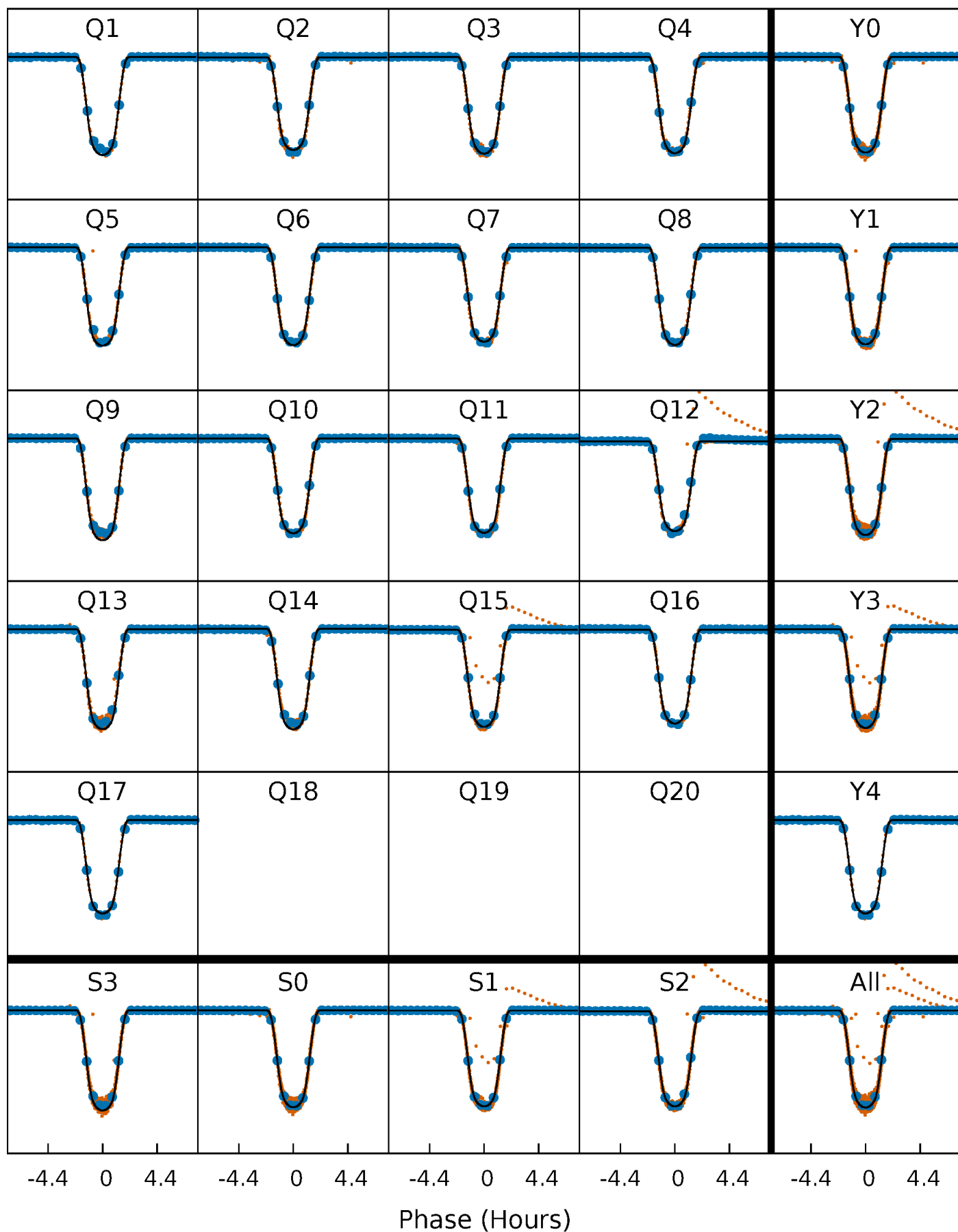
TCE 010710755-01 P= 4.816611 Days  $T_0=133.763620$  (BKJD)





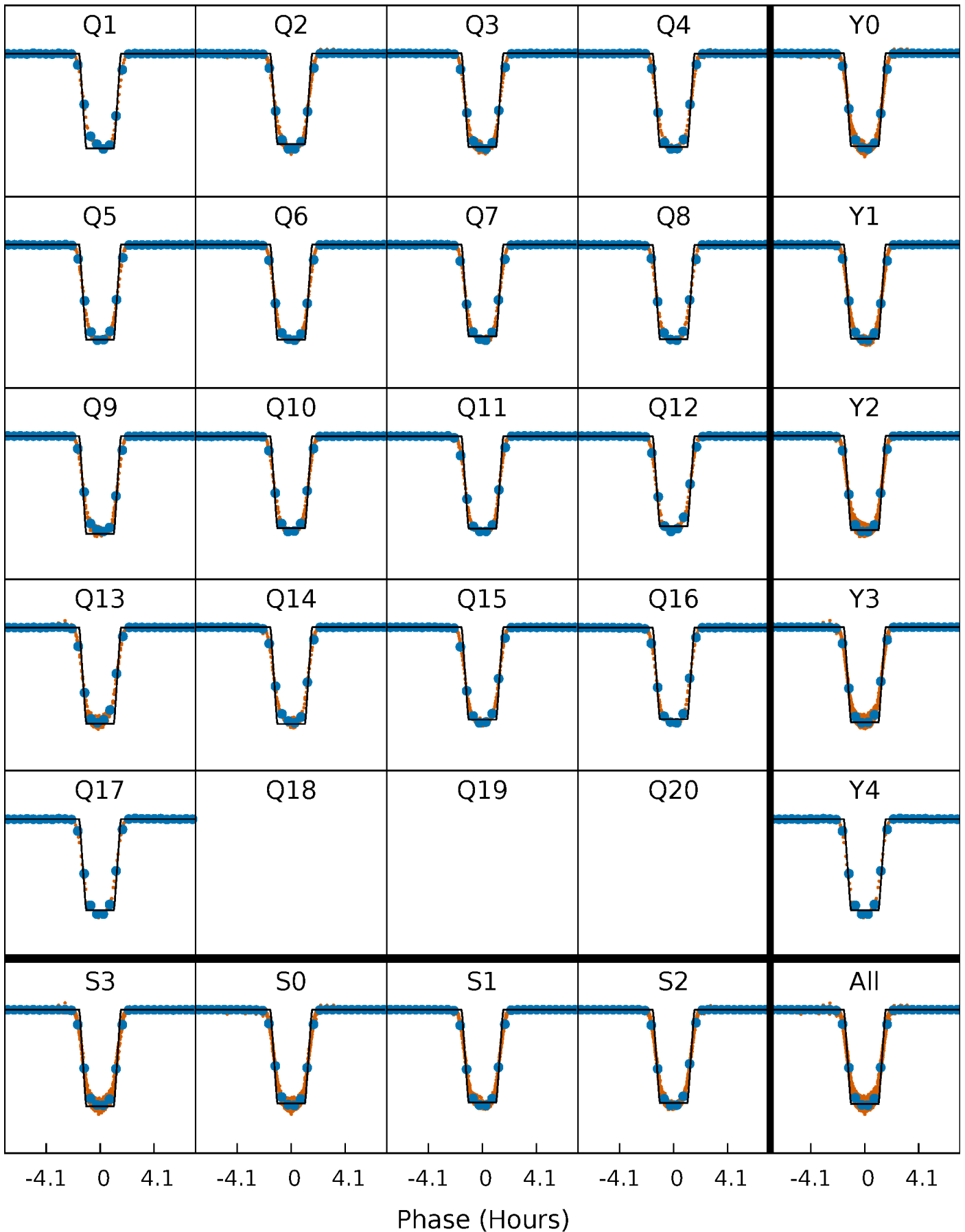
# DV Quarter-Phased Transit Curves

TCE 010710755-01 P= 4.816611 Days  $T_0=133.763620$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

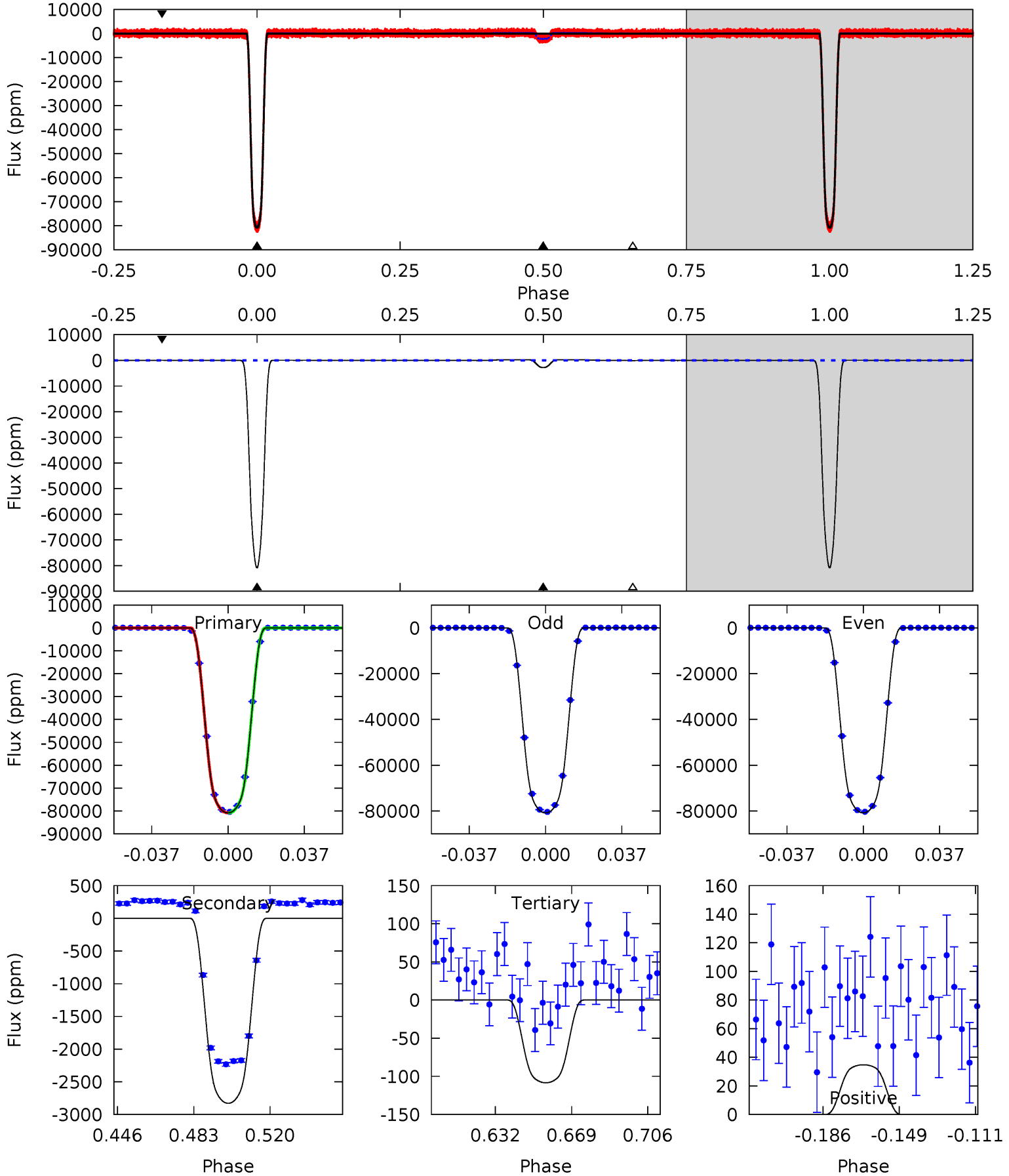
TCE 010710755-01 P= 4.816622 Days  $T_0=133.761934$  (BKJD)



# DV Model-Shift Uniqueness Test

010710755-01, P = 4.816611 Days, E = 128.947009 Days

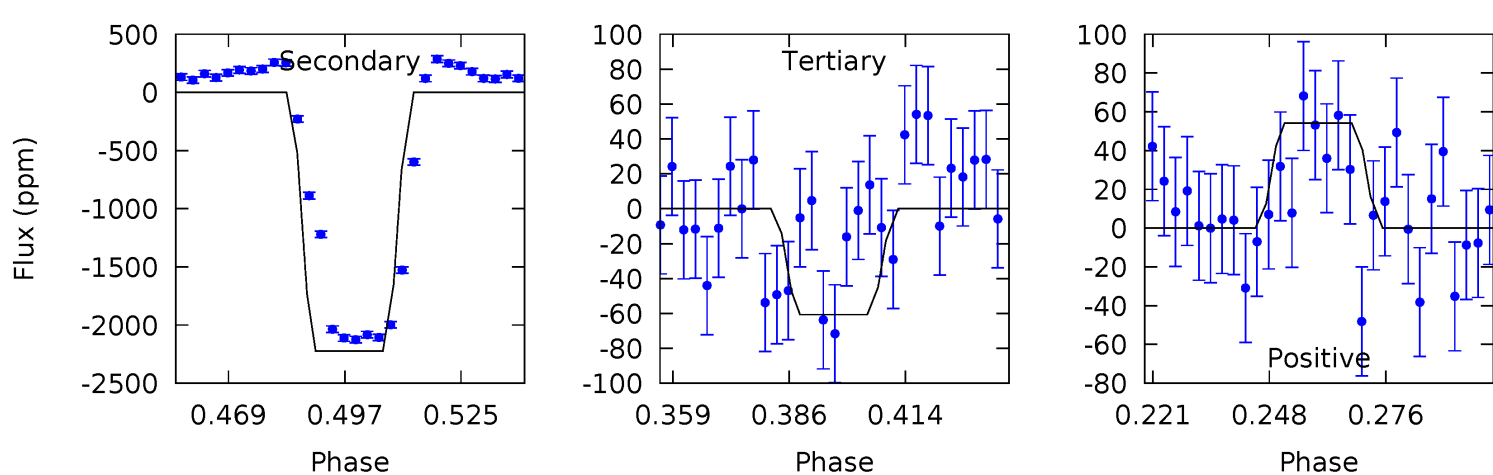
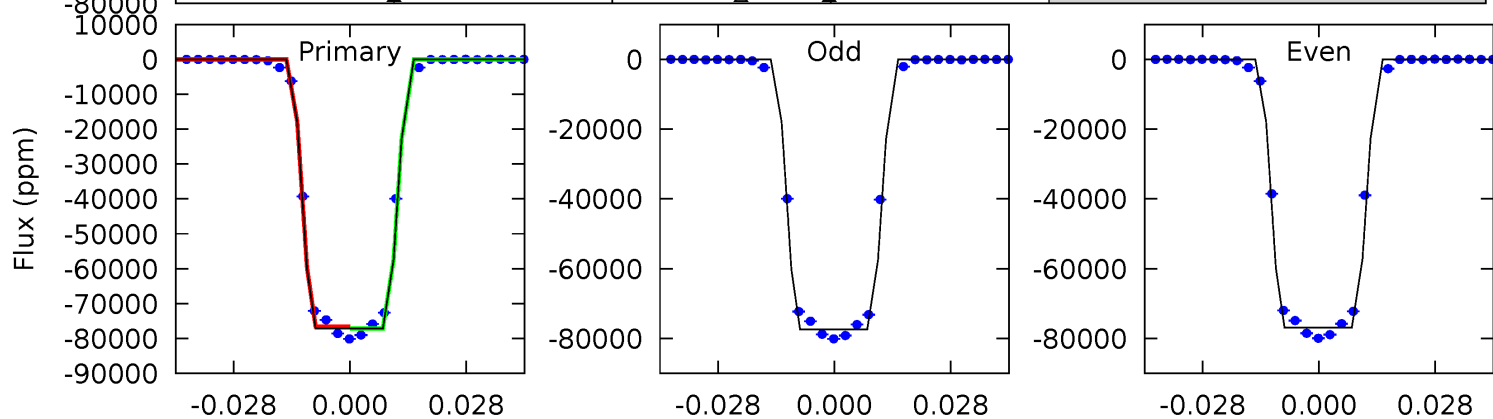
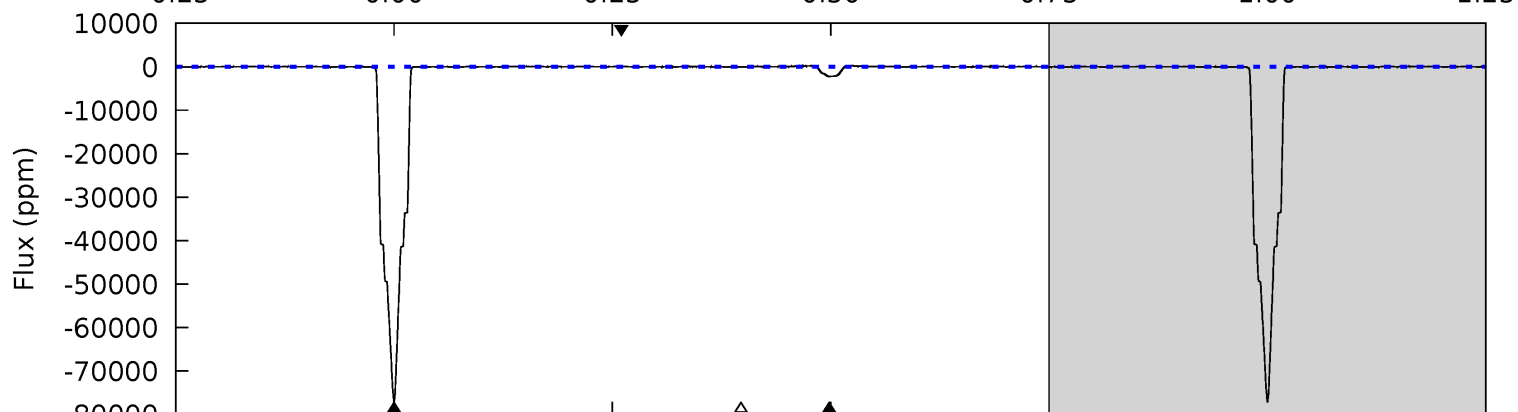
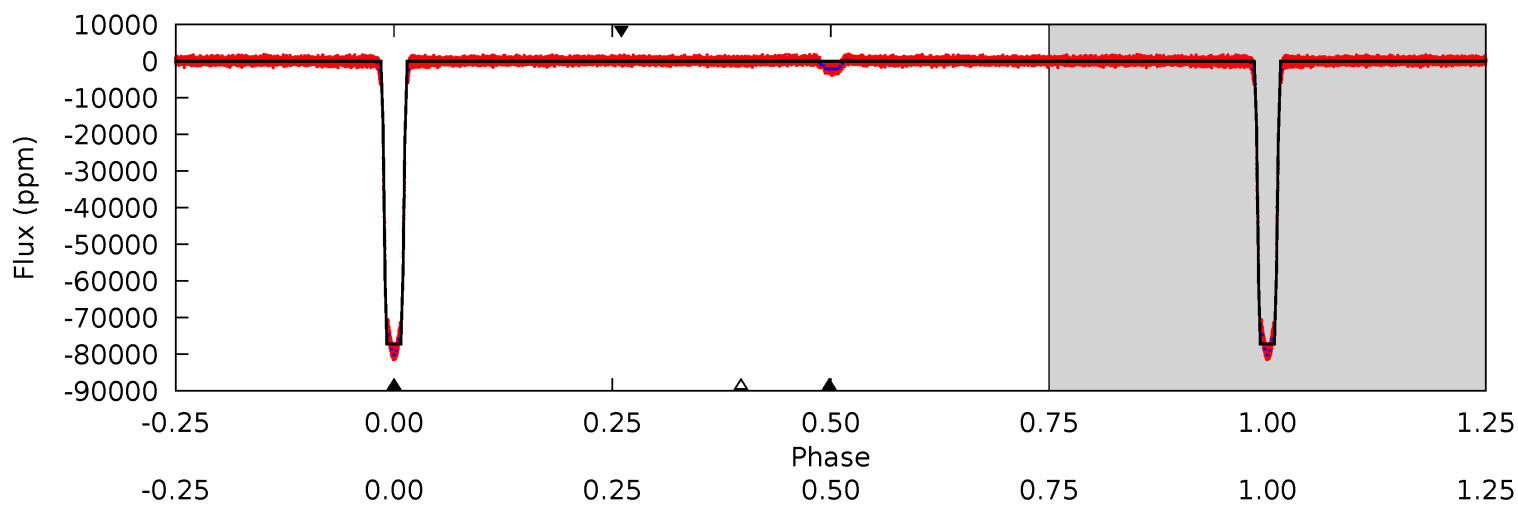
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6992	244.6	9.38	3.01	4.77	2.08	6.32	6982	6989	235.2	241.6	0.64	0.99	0.00	0



# Alt Model-Shift Uniqueness Test

010710755-01, P = 4.816622 Days, E = 128.945312 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
4486	129.2	3.53	3.15	4.83	2.20	1.99	4483	4483	125.7	126.1	11.8	1.00	0.00	15.0



### Stellar Parameters For KIC 010710755

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5796^{+143}_{-158}$	$4.472^{+0.091}_{-0.182}$	$-0.280^{+0.300}_{-0.300}$	$0.904^{+0.237}_{-0.110}$	$0.885^{+0.110}_{-0.080}$	$1.687^{+0.677}_{-0.784}$
	+2%/-3%	+2%/-4%	+107%/-107%	+26%/-12%	+12%/-9%	+40%/-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 010710755-01 / KOI 6080.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2829 \pm 12$	$26.77^{+3.77}_{-1.97}$	$1475^{+98}_{-68}$	$3156^{+45}_{-56}$	$6.245^{+1.000}_{-1.356}$
Alt.	$-2224 \pm 17$	$27.61^{+4.41}_{-1.77}$	$1479^{+94}_{-70}$	$3006^{+45}_{-49}$	$4.539^{+0.684}_{-1.024}$

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

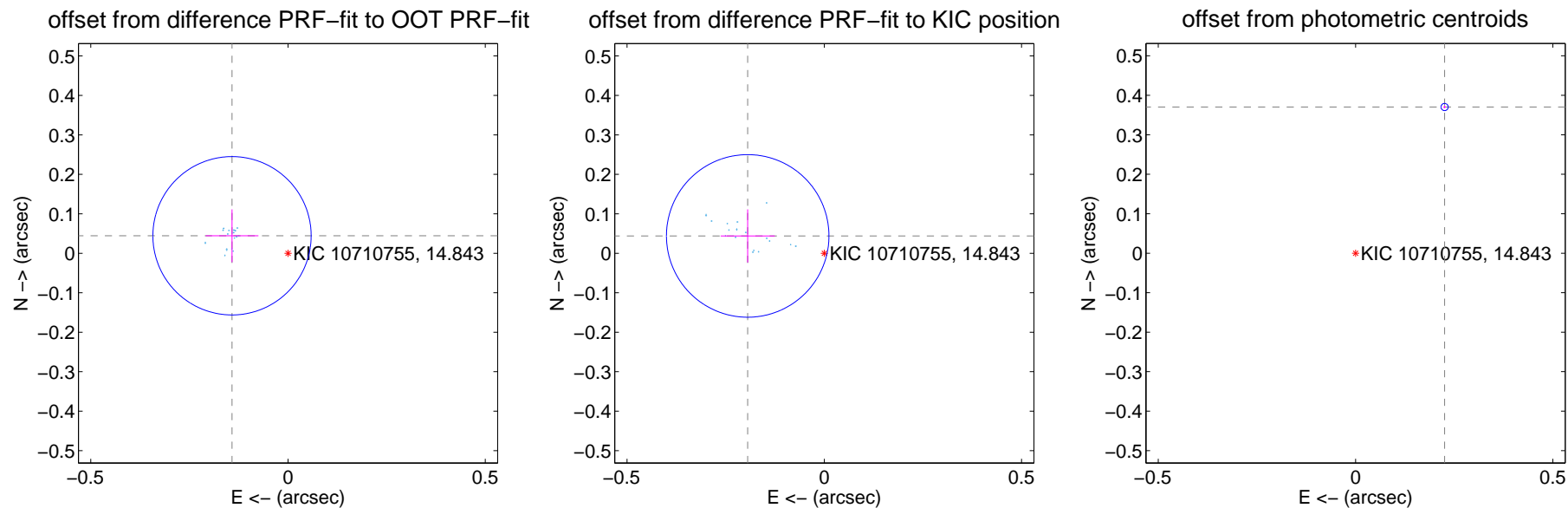
## DV Centroid Data

Supplemental centroid analysis for 010710755-01. Kepler magnitude: 14.84. Transit SNR 3093.67

There are 17 quarters with good PRF difference image offsets

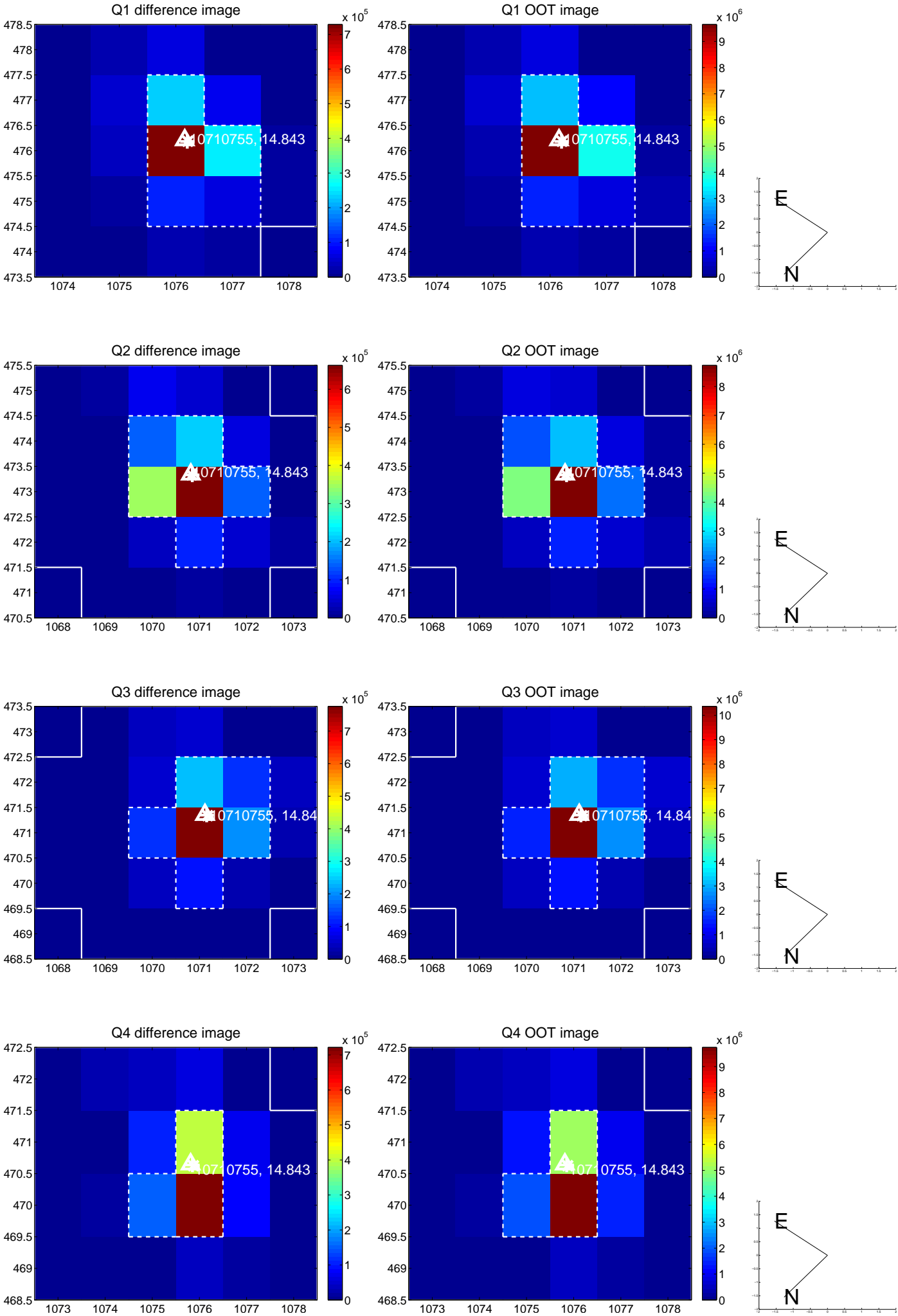
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.149 \pm 0.067$	2.22	$0.142 \pm 0.067$	$0.044 \pm 0.067$
PRF-fit source offset from KIC position	$0.199 \pm 0.069$	2.90	$0.194 \pm 0.069$	$0.044 \pm 0.067$
photometric centroid source offset	$0.43 \pm 0.00$	142.62	$-0.23 \pm 0.00$	$0.37 \pm 0.00$

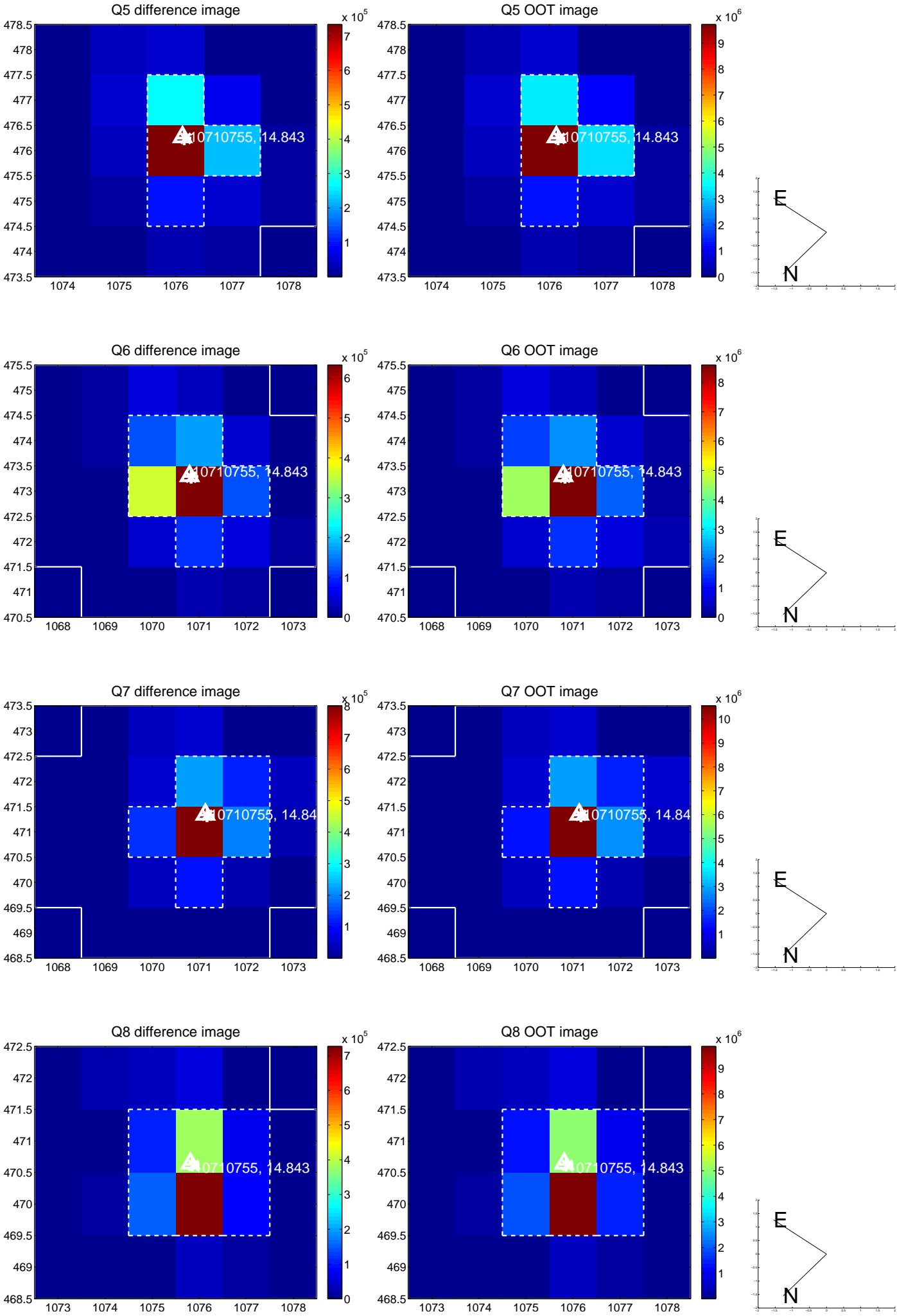


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

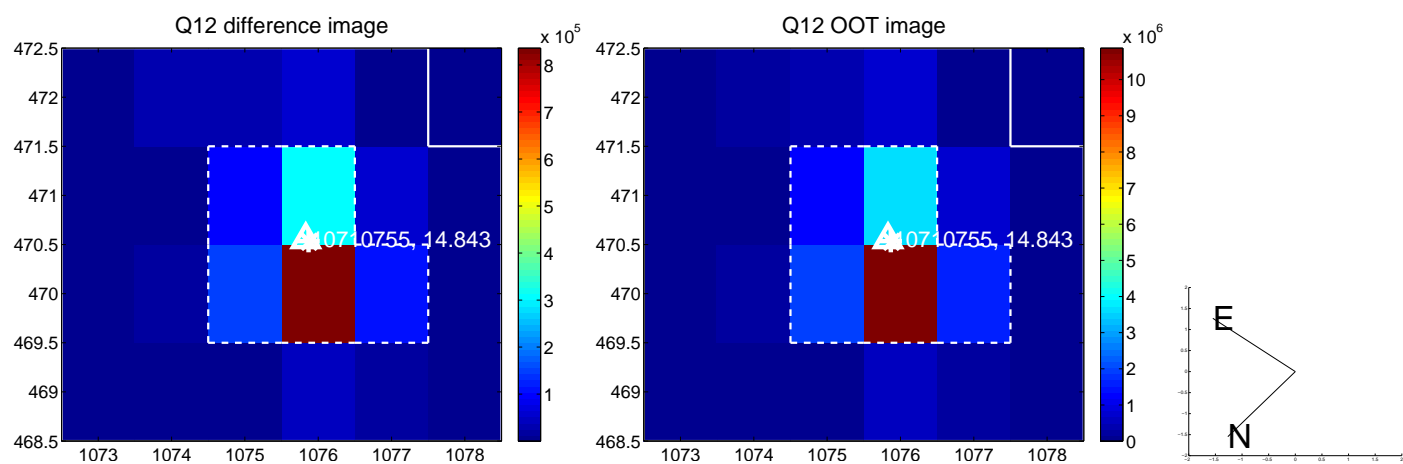
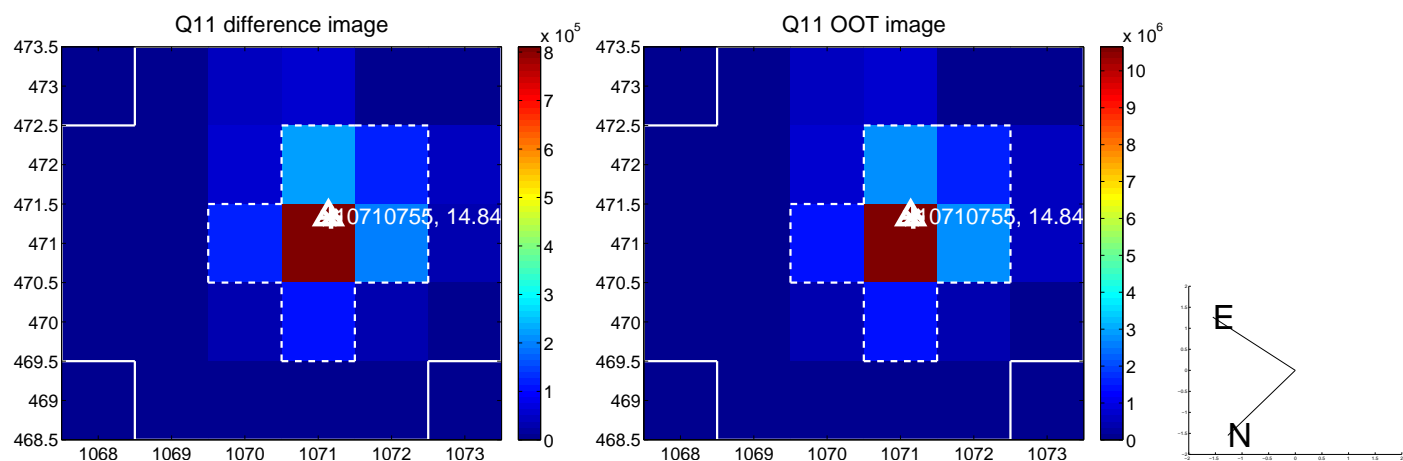
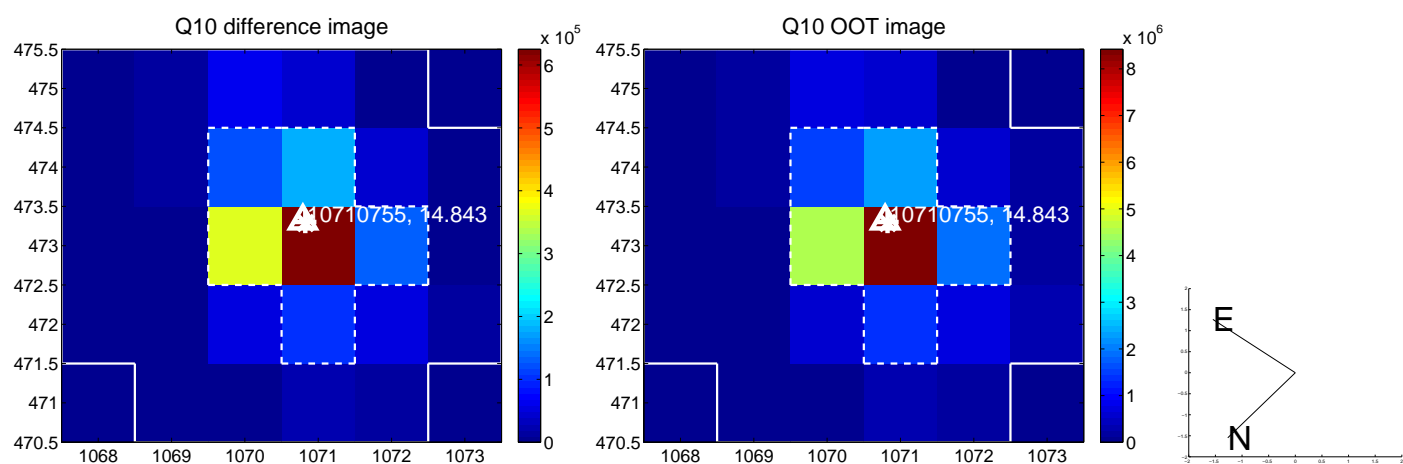
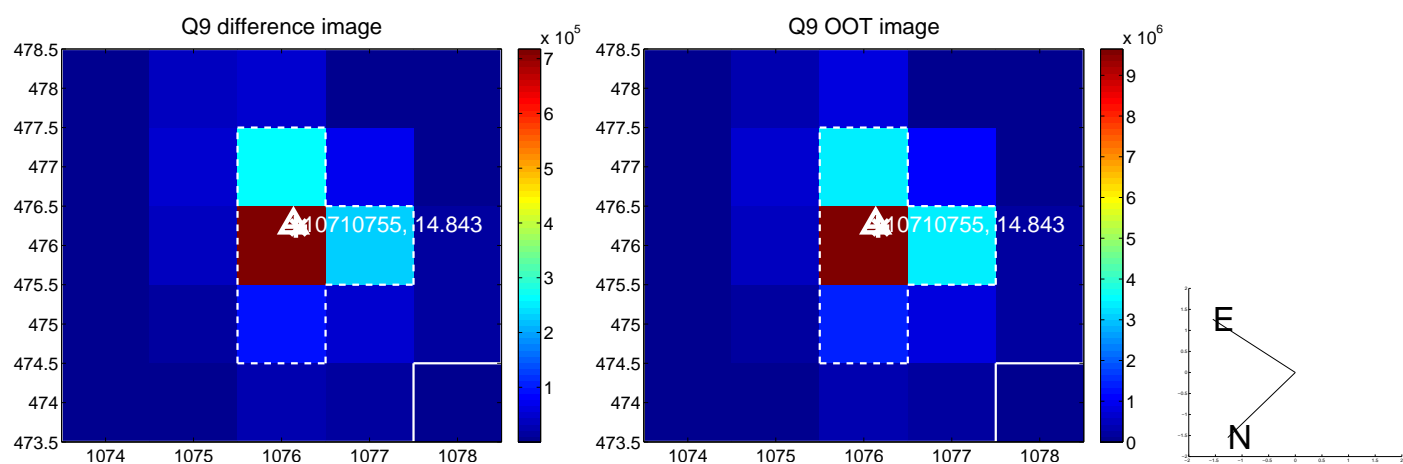


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

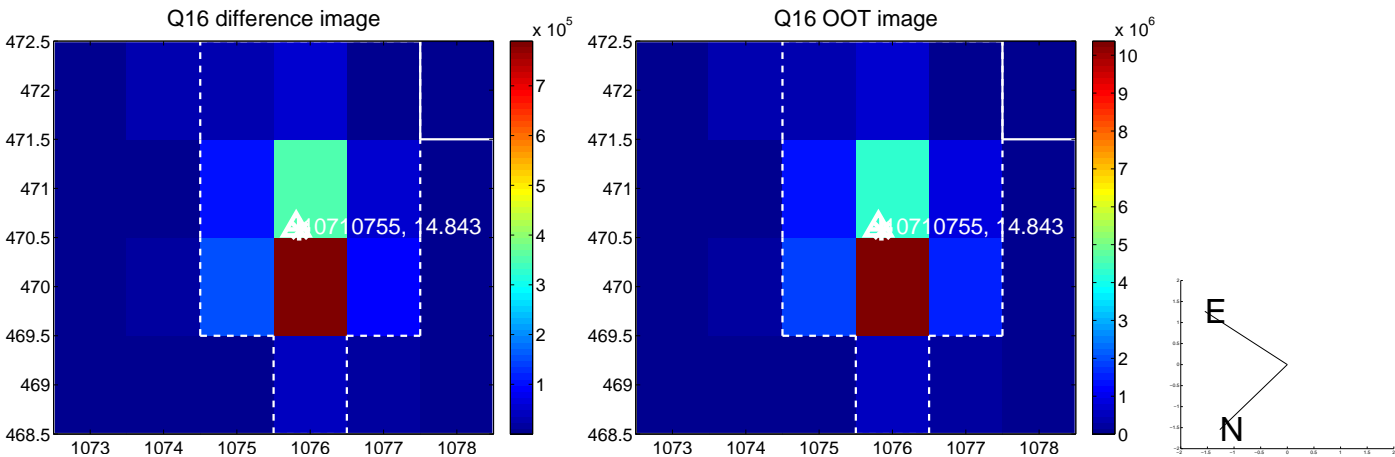
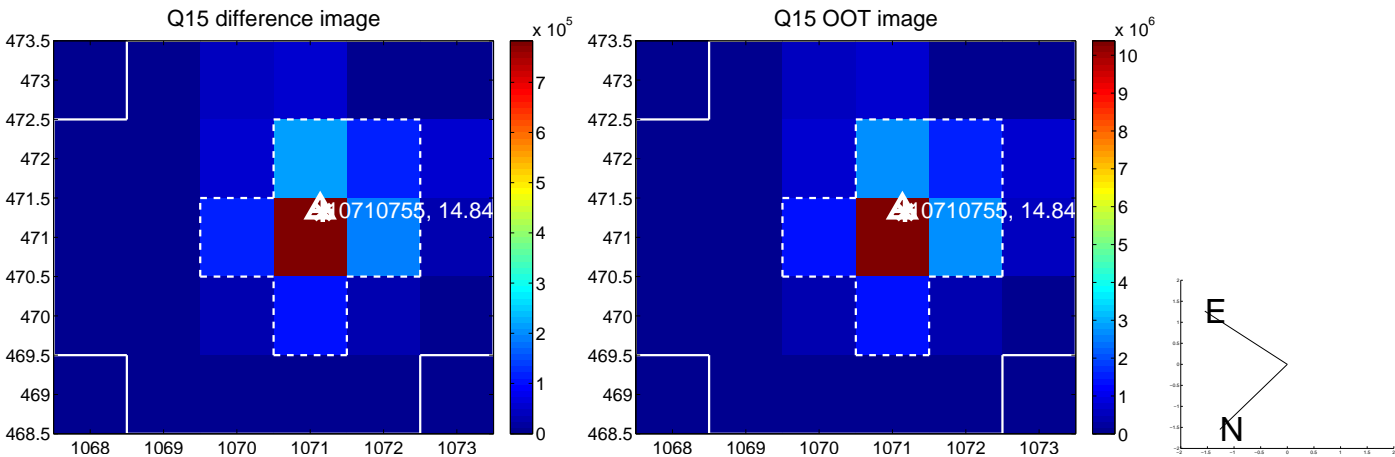
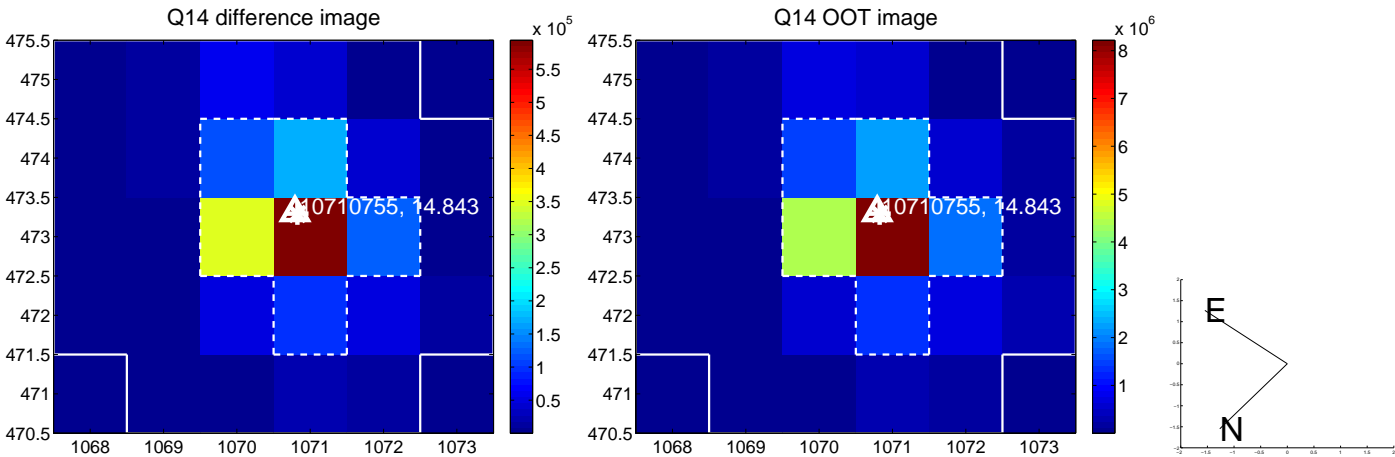
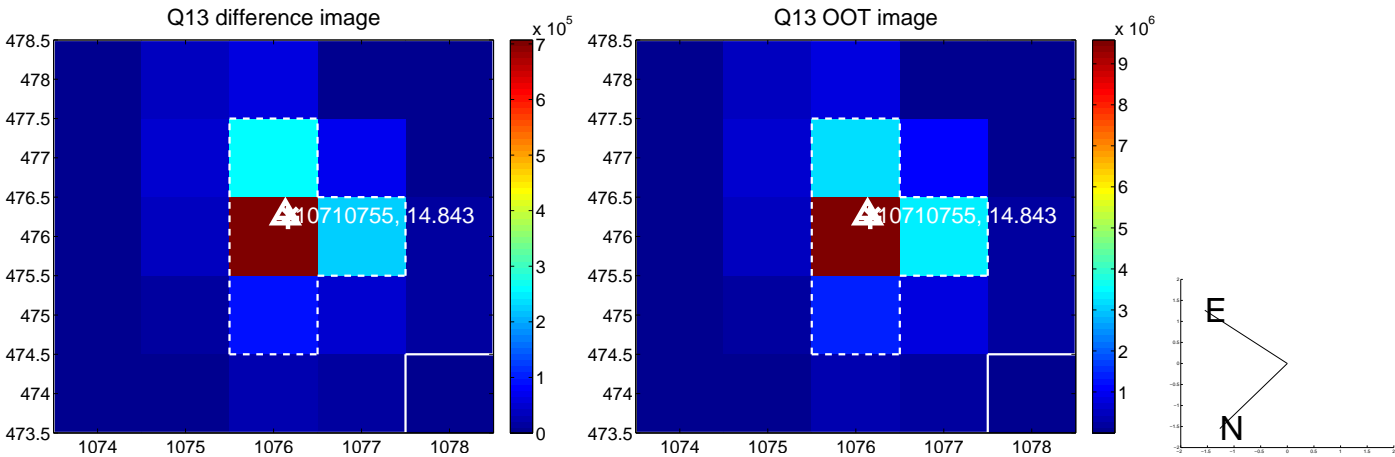




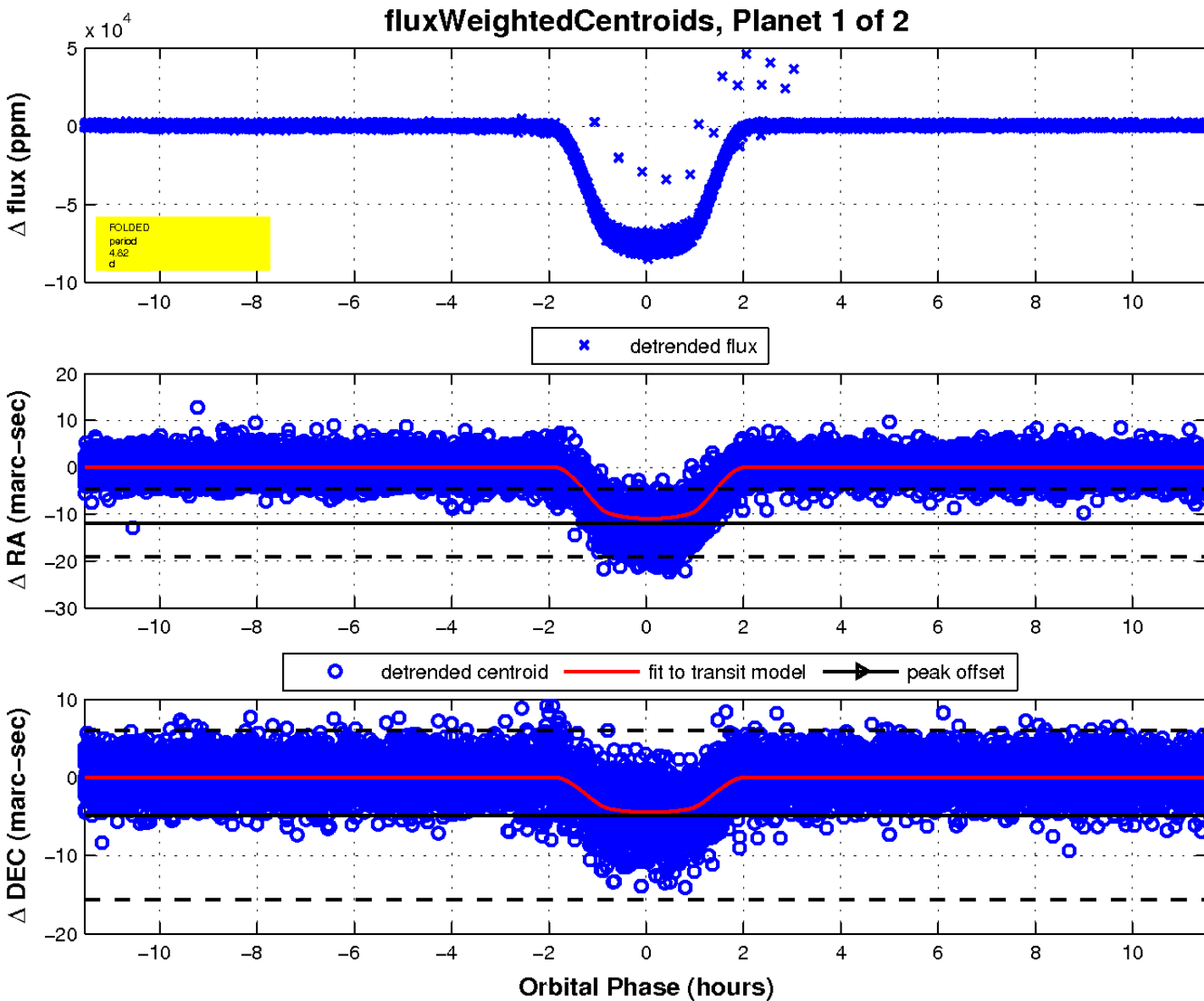
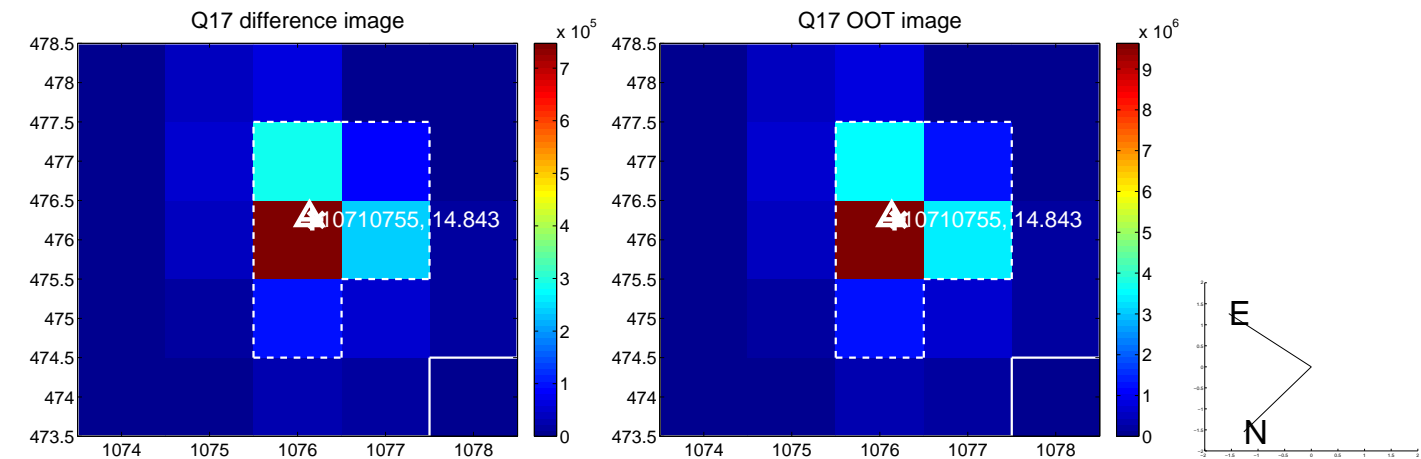
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

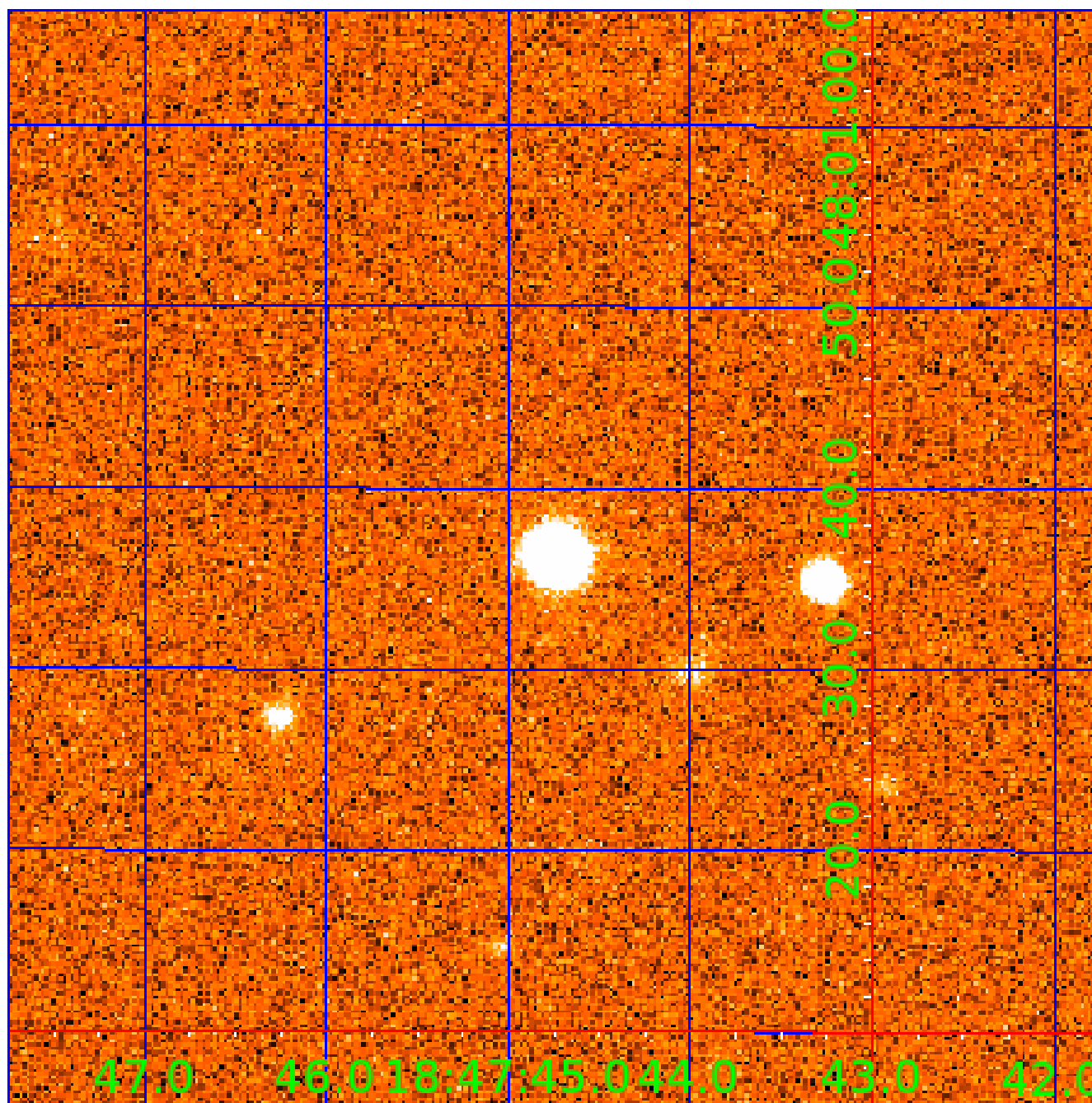


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010710755

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010710755-01	OBS	6080.01	4.816611	133.763620	80863.0	3.850	2409.3	3093.7	0.90	5796	26.44	287.87
010710755-02	OBS	No	2.408302	133.765136	2537.5	3.708	139.9	139.4	0.90	5796	5.29	725.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010710755-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
010710755-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

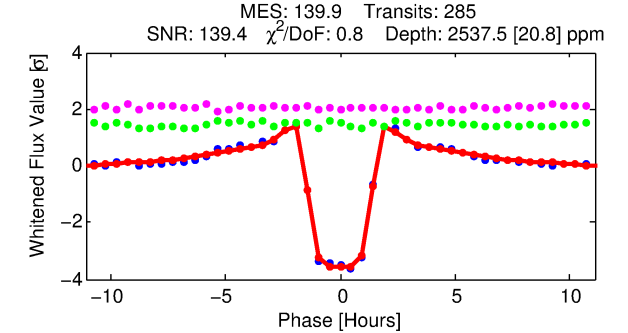
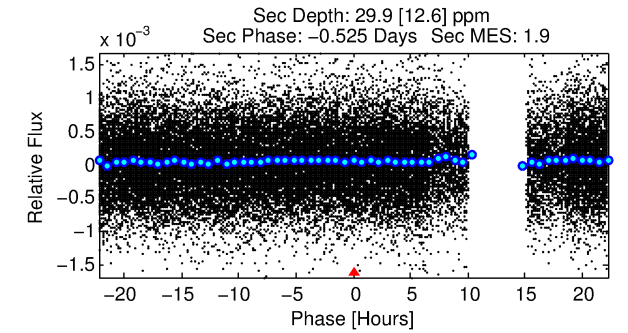
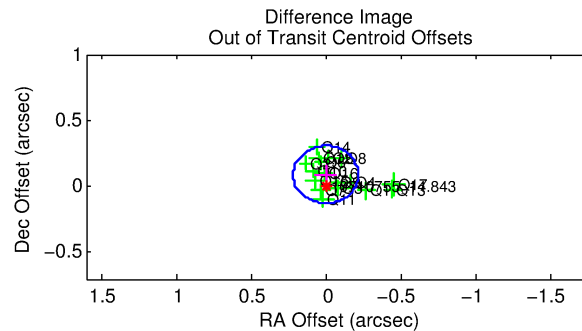
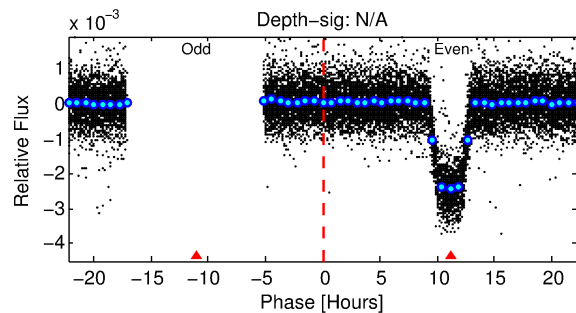
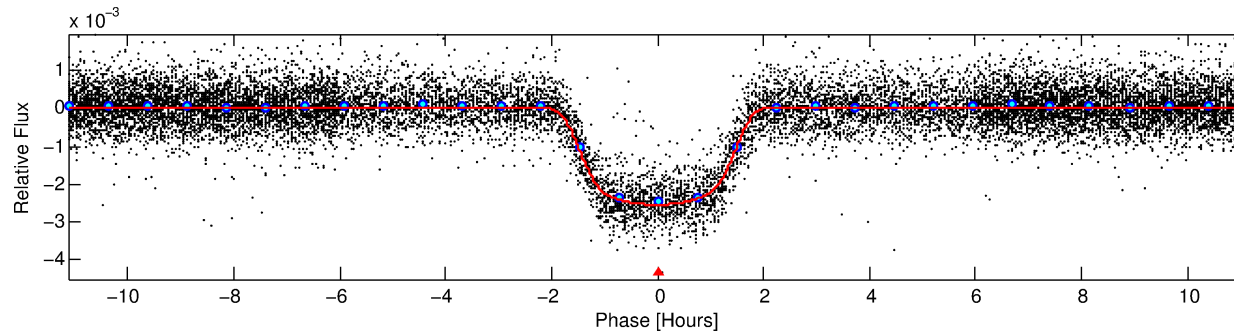
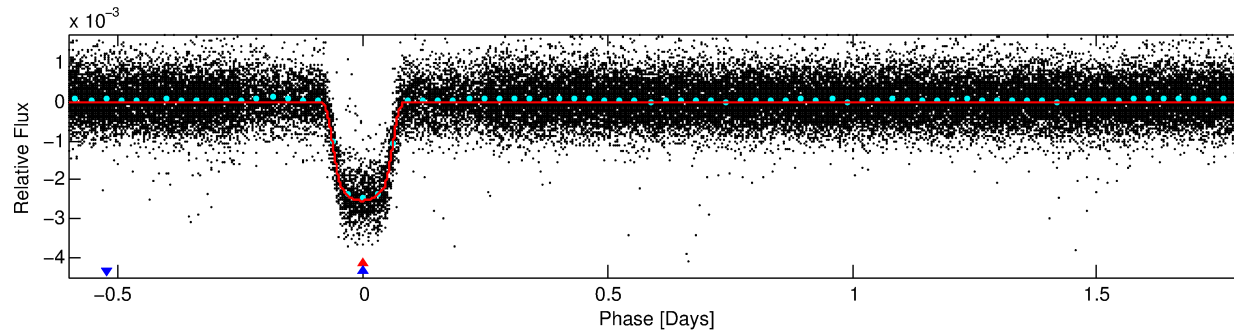
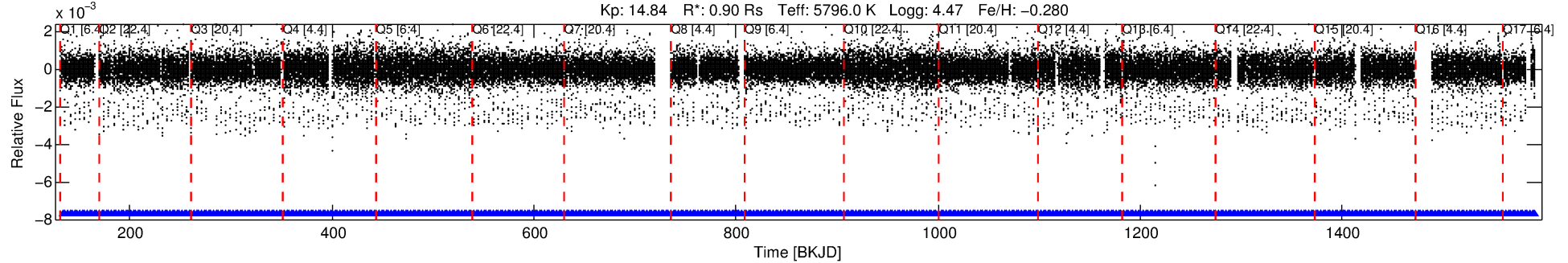
## Ephemeris Match Information For 010710755-02

No Significant Match Found

# DV One-Page Summary

KIC: 10710755 Candidate: 2 of 2 Period: 2.408 d  
KOI: K06080 Corr: No Ephemeris Match

Kp: 14.84 R\*: 0.90 Rs Teff: 5796.0 K Logg: 4.47 Fe/H: -0.280



## DV Fit Results:

Period = 2.40830 [0.00000] d  
Epoch = 133.7651 [0.0003] BKJD  
Rp/R\* = 0.0536 [0.0004]  
a/R\* = 3.06 [0.07]  
b = 0.88 [0.01]  
Seff = 725.39 [251.80]  
Teq = 1323 [115] K  
Rp = 5.29 [1.39] Re  
a = 0.0338 [0.0076] AU  
Ag = 0.67 [0.36] [-0.92σ]  
Teffp = 1850 [201] K [2.27σ]

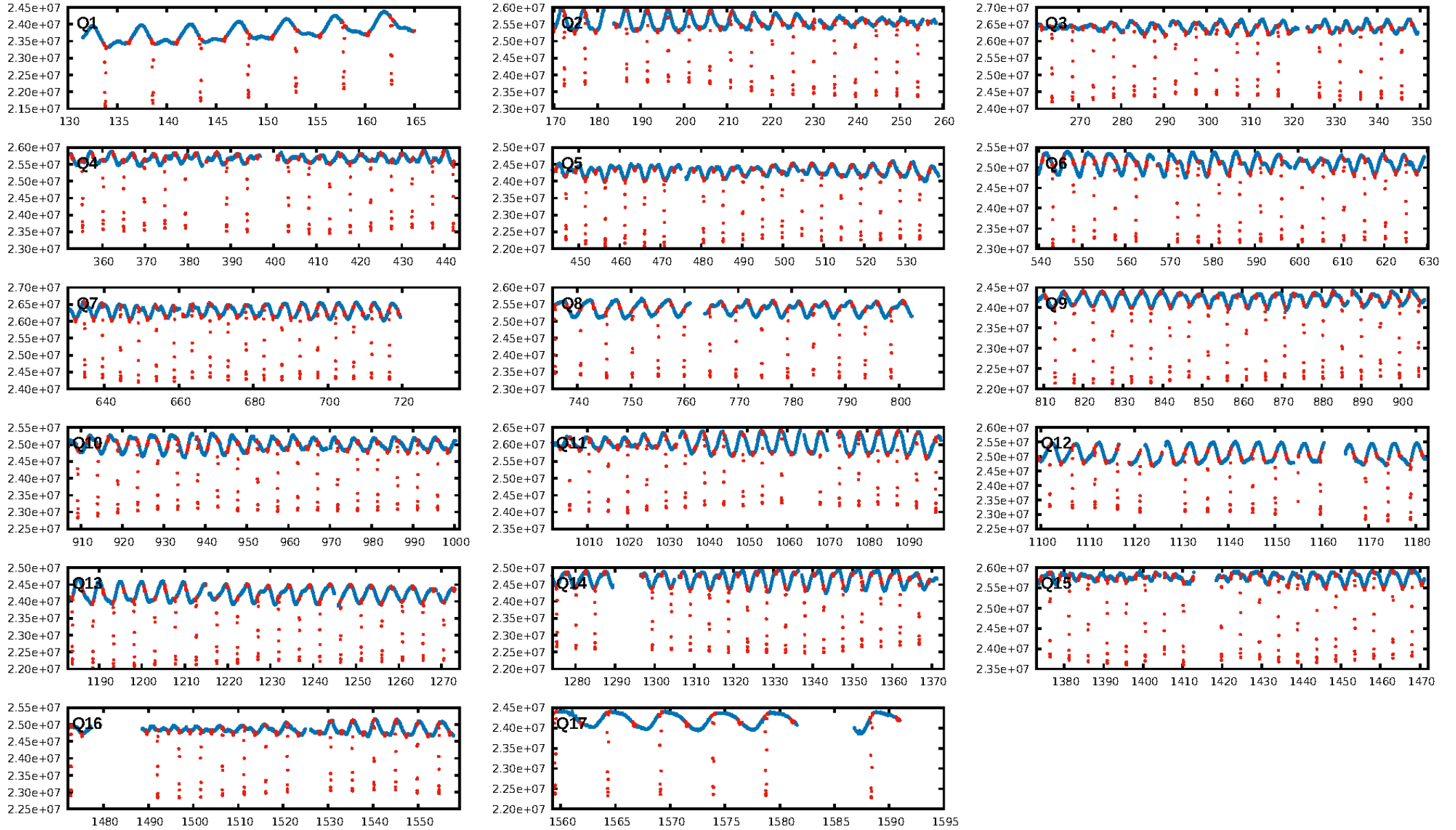
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [10.81σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [273/273]  
GhostDiagnostic-chr: 2.089  
Centroid-sig: 0.2%  
Centroid-so: 0.493 arcsec [7.74σ]  
OotOffset-rm: 0.090 arcsec [1.23σ]  
KicOffset-rm: 0.114 arcsec [1.52σ]  
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: 01-Feb-2016 18:08:08 Z

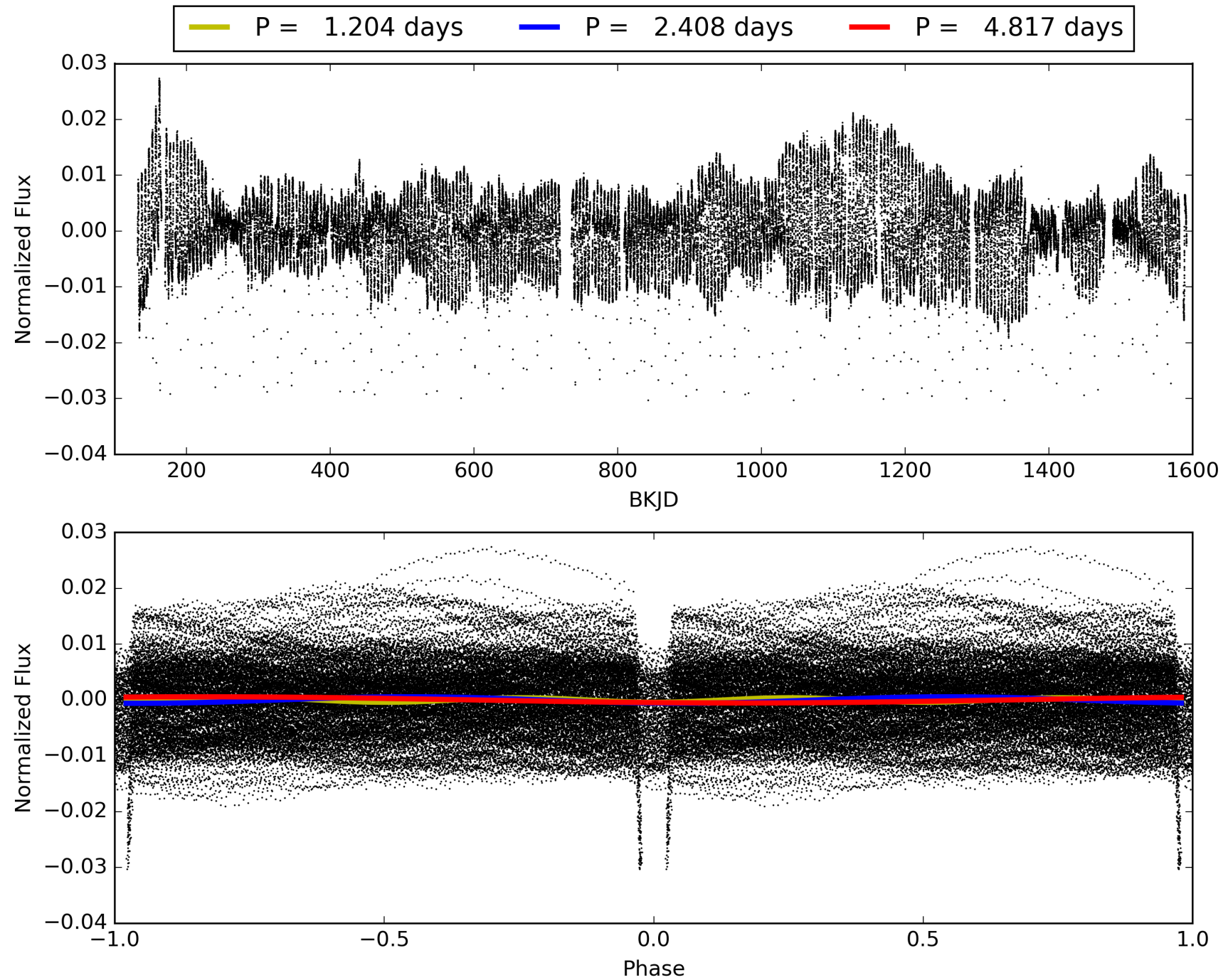
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010710755-02, PDC Light Curves





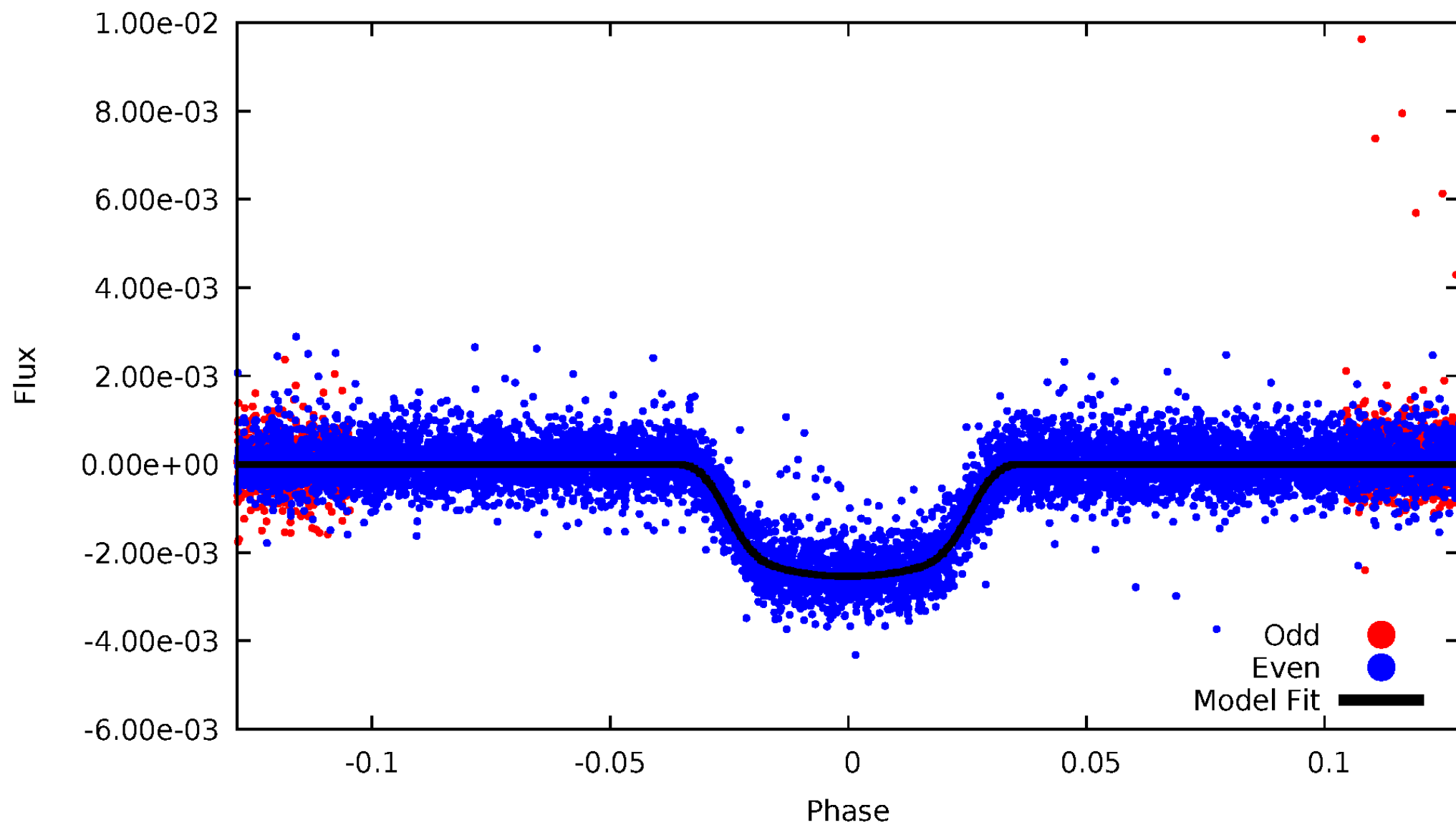
TCE 010710755-02





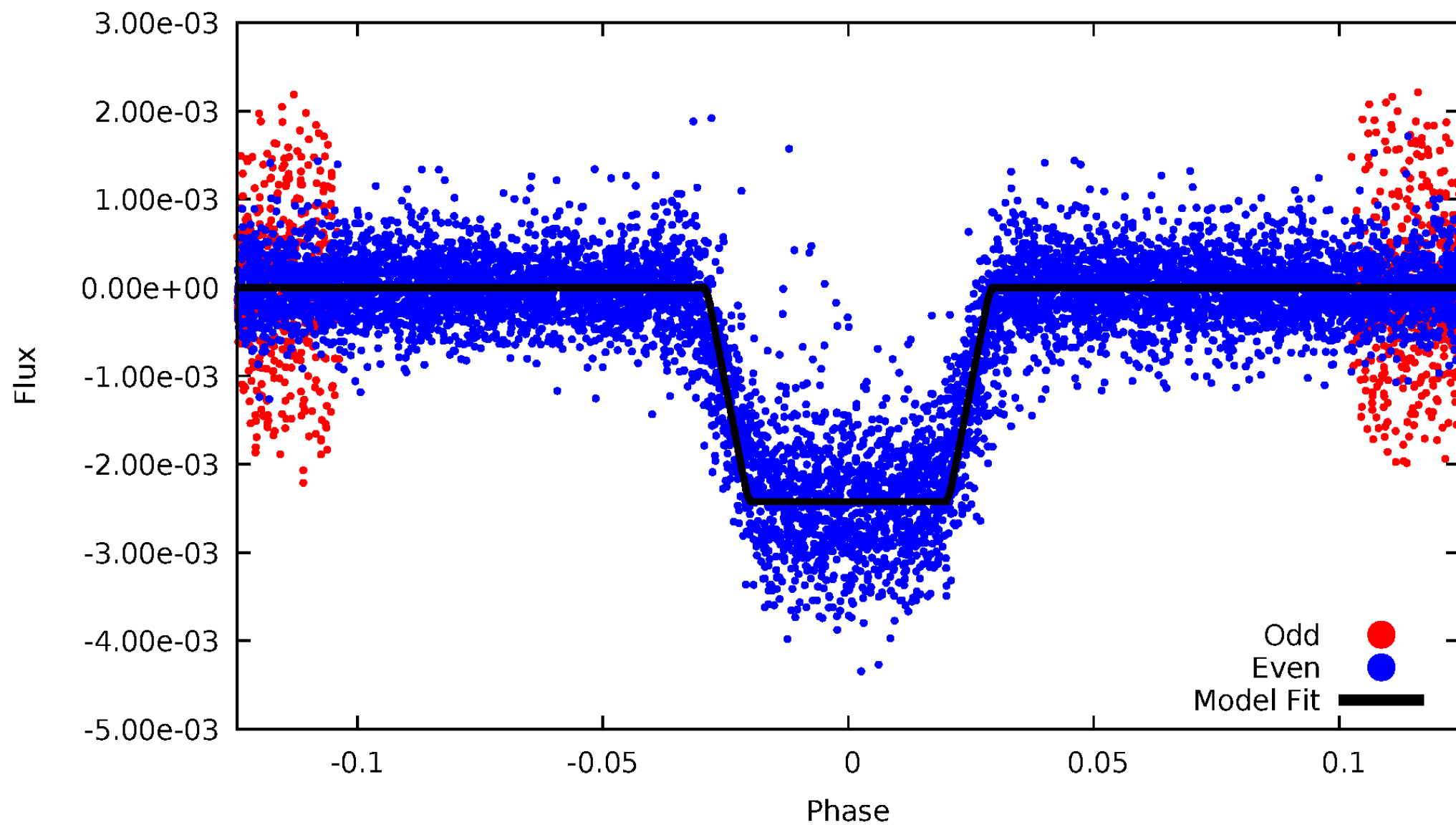
# DV Odd/Even

TCE 010710755-02



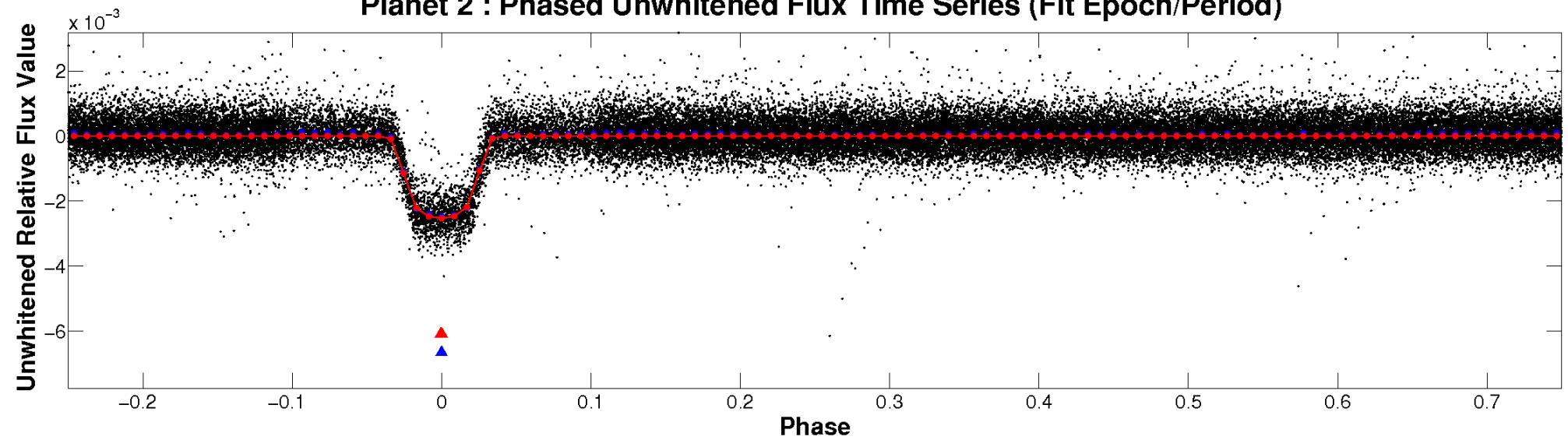
# ALT Odd/Even

TCE 010710755-02

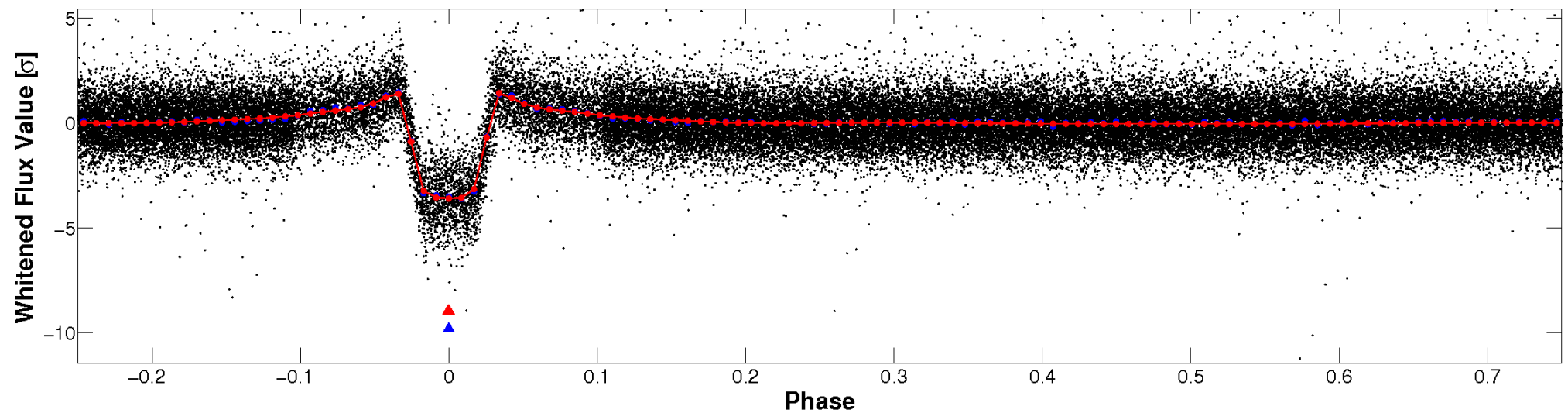


# Non-Whitened Vs. Whitened Light Curve

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

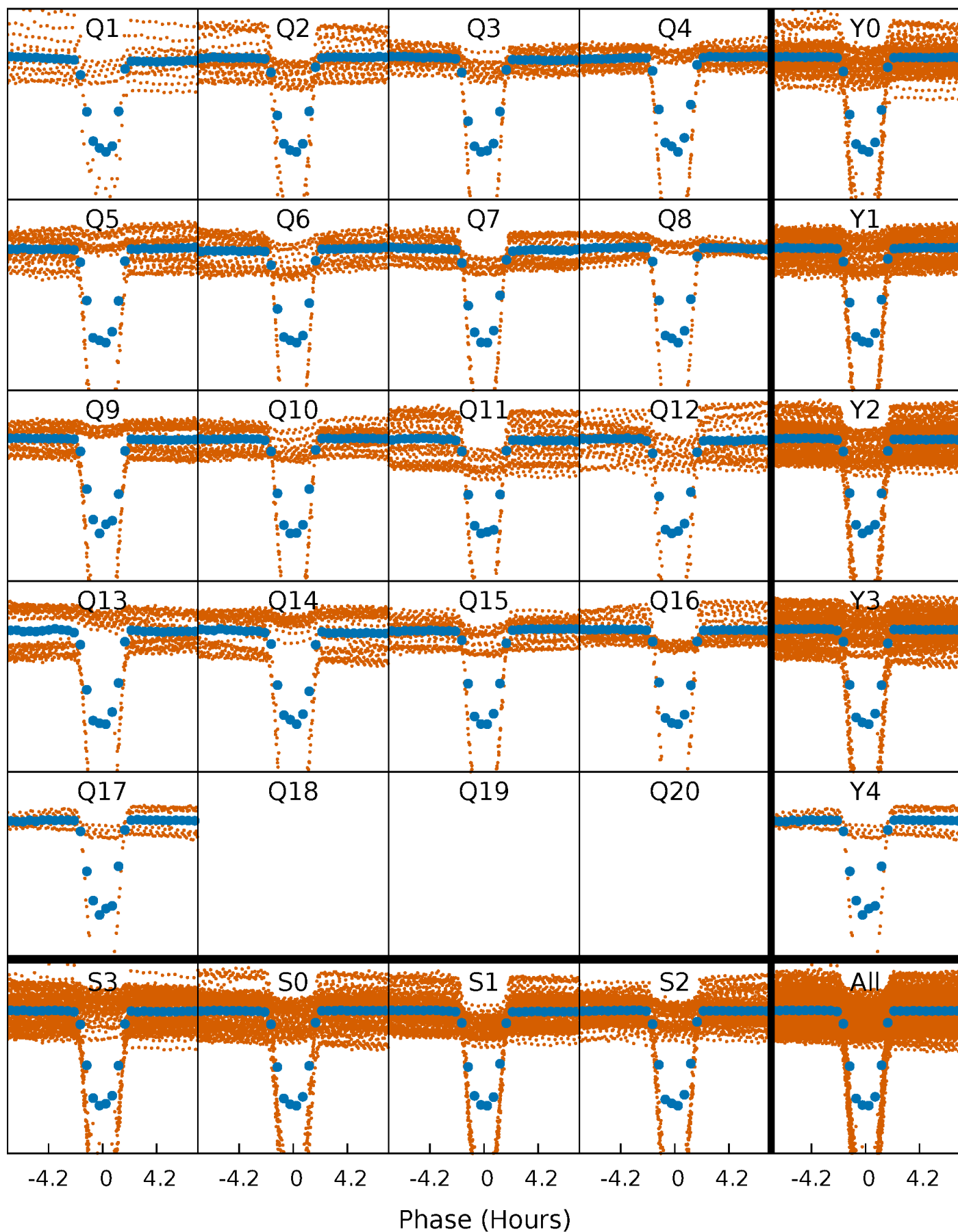


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



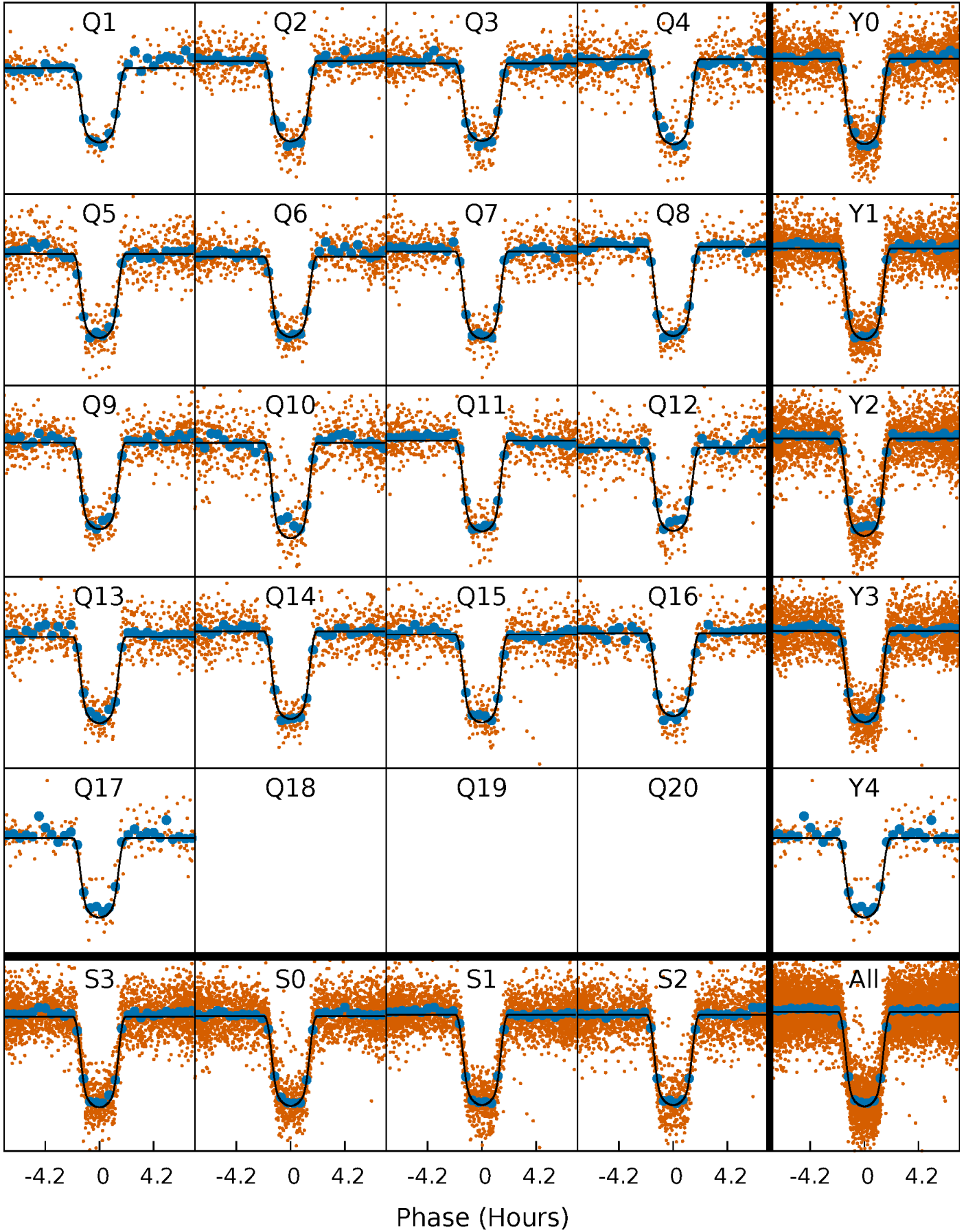
# PDC Quarter-Phased Transit Curves

TCE 010710755-02 P= 2.408302 Days  $T_0=133.765136$  (BKJD)



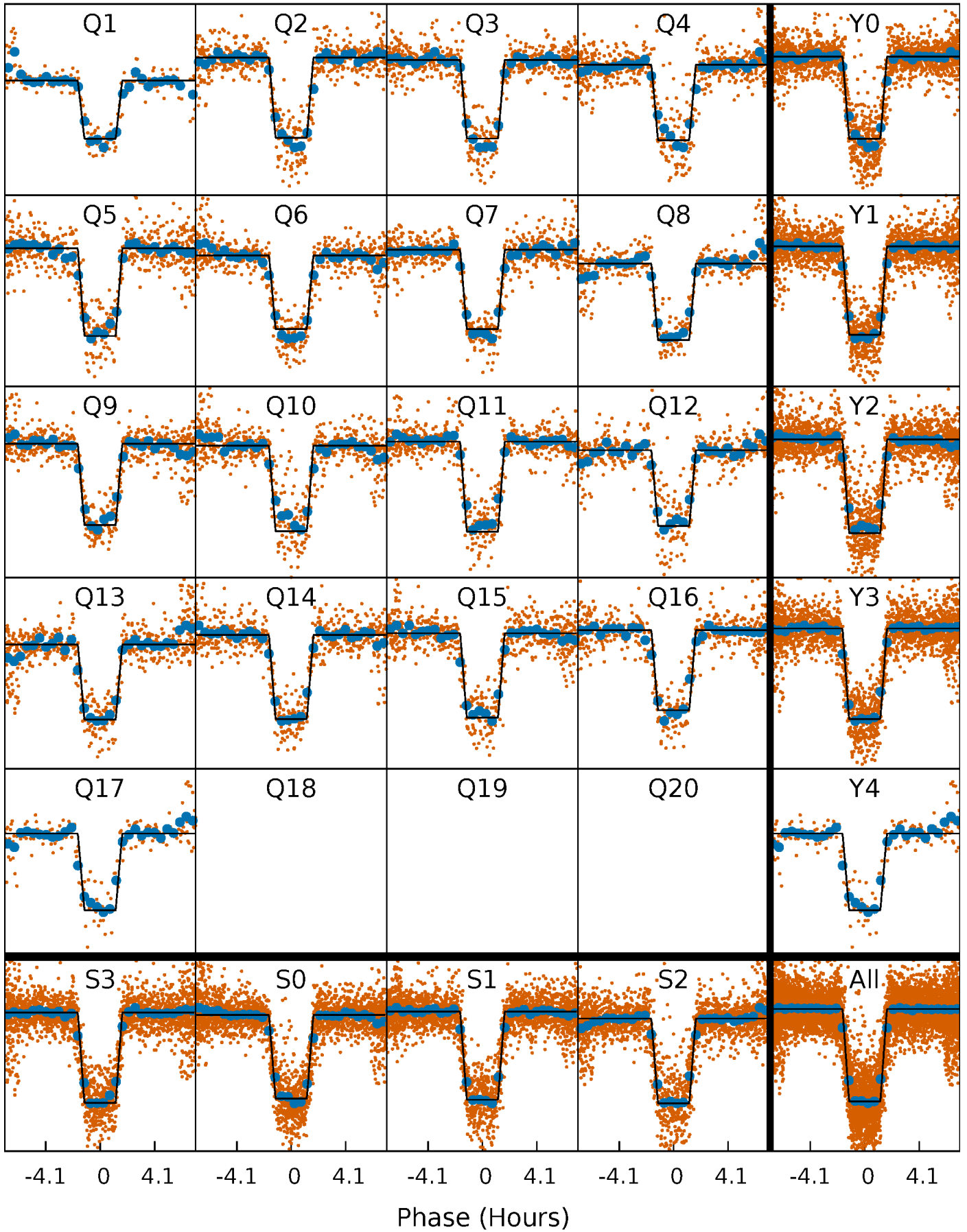
# DV Quarter-Phased Transit Curves

TCE 010710755-02 P= 2.408302 Days  $T_0=133.765136$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010710755-02 P= 2.408318 Days  $T_0=133.760797$  (BKJD)

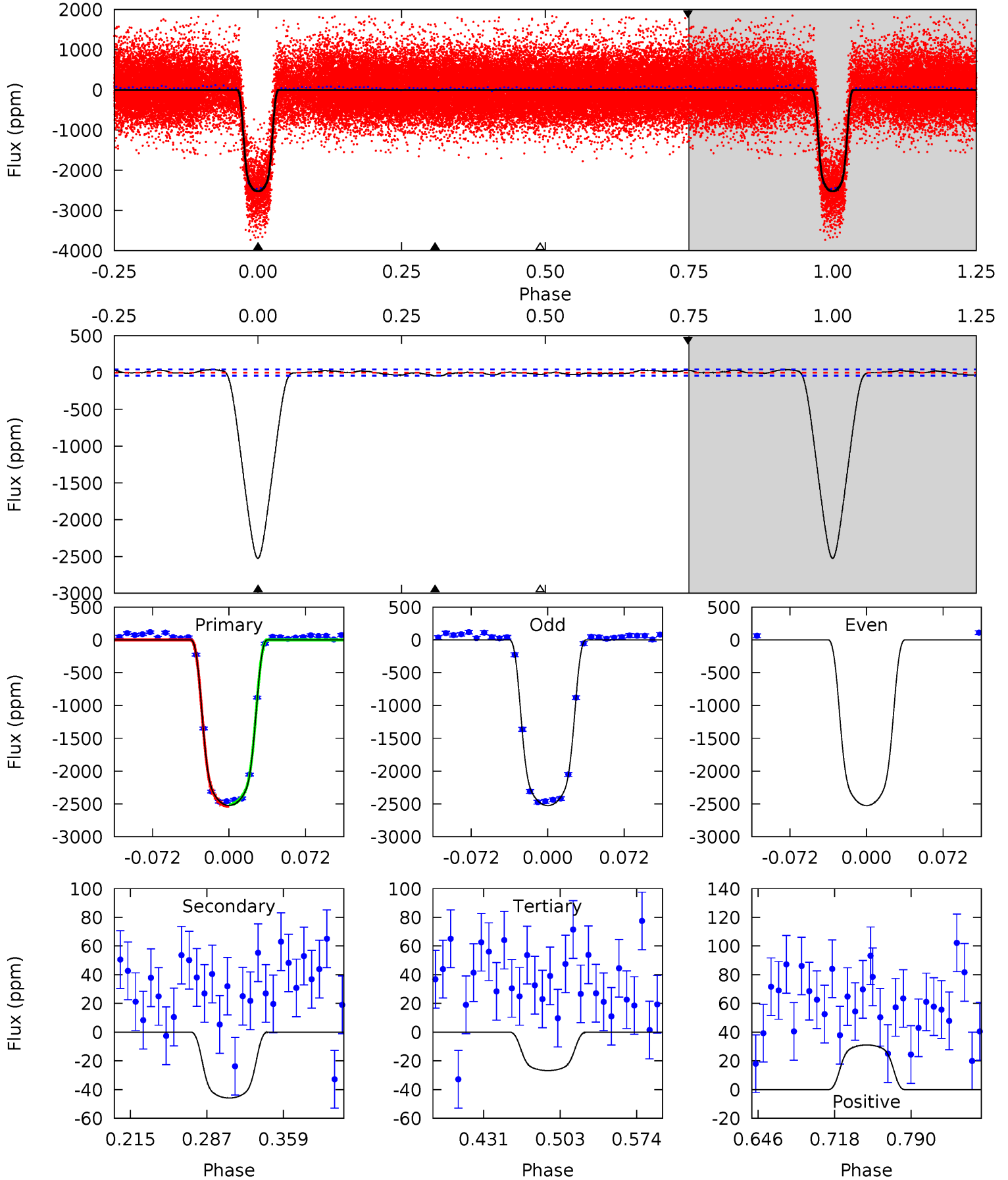




# DV Model-Shift Uniqueness Test

010710755-02, P = 2.408302 Days, E = 131.356834 Days

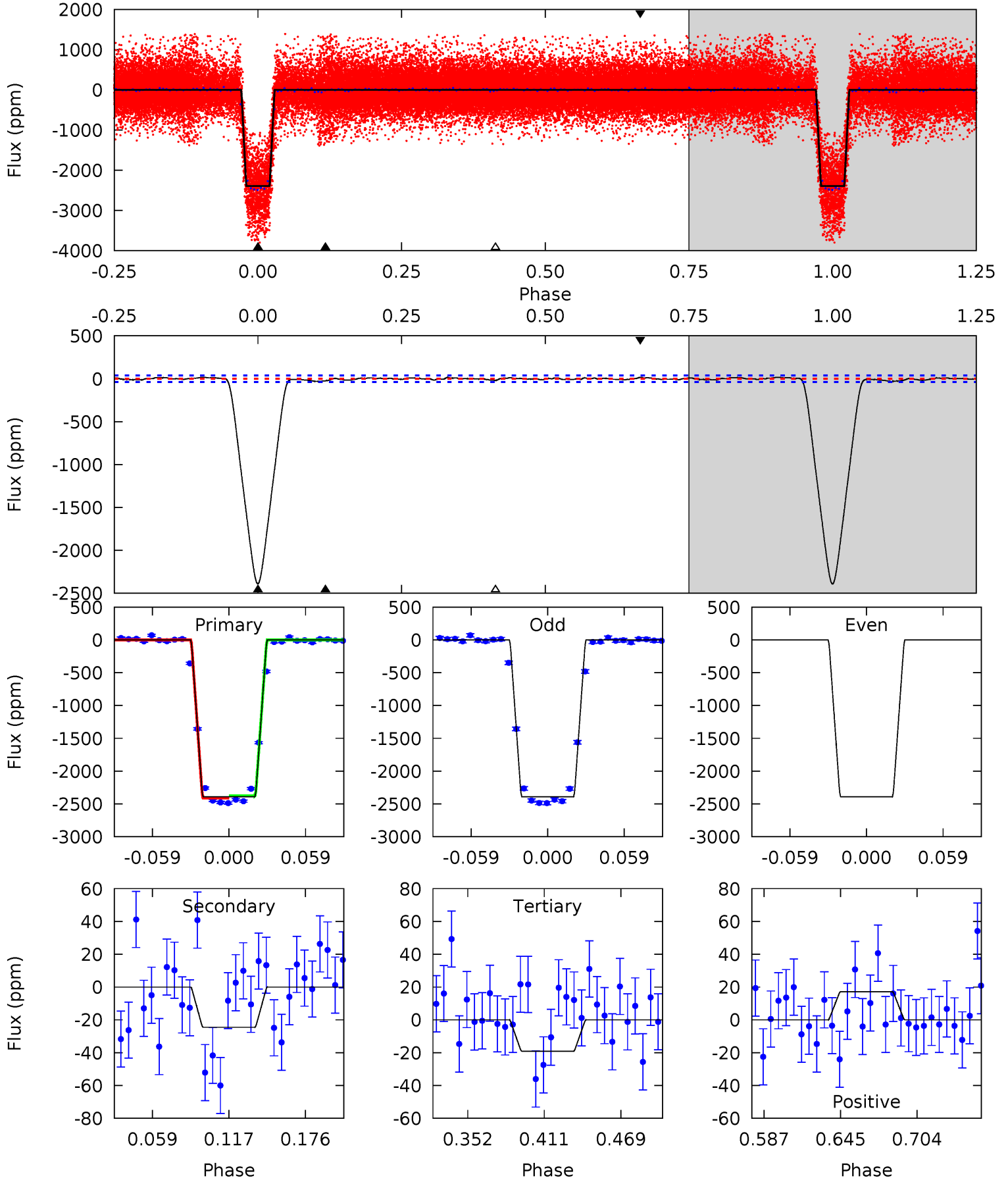
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
265.7	4.83	2.82	3.27	4.63	1.80	1.77	262.9	262.5	2.01	1.56	0	0.99	0.02	1.32



# Alt Model-Shift Uniqueness Test

010710755-02, P = 2.408318 Days, E = 131.352479 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
297.0	3.05	2.37	2.14	4.68	1.89	0.93	294.6	294.8	0.67	0.91	0	0.99	0.01	2.18





### Stellar Parameters For KIC 010710755

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5796^{+143}_{-158}$	$4.472^{+0.091}_{-0.182}$	$-0.280^{+0.300}_{-0.300}$	$0.904^{+0.237}_{-0.110}$	$0.885^{+0.110}_{-0.080}$	$1.687^{+0.677}_{-0.784}$
	+2%/-3%	+2%/-4%	+107%/-107%	+26%/-12%	+12%/-9%	+40%/-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 010710755-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-46 \pm 9$	$5.34^{+0.82}_{-0.37}$	$1864^{+128}_{-86}$	$2671^{+101}_{-136}$	$0.992^{+0.257}_{-0.292}$
Alt.	$-25 \pm 8$	$4.90^{+0.75}_{-0.36}$	$1867^{+129}_{-87}$	$2414^{+167}_{-305}$	$0.595^{+0.250}_{-0.215}$

$T_{max}$  = 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

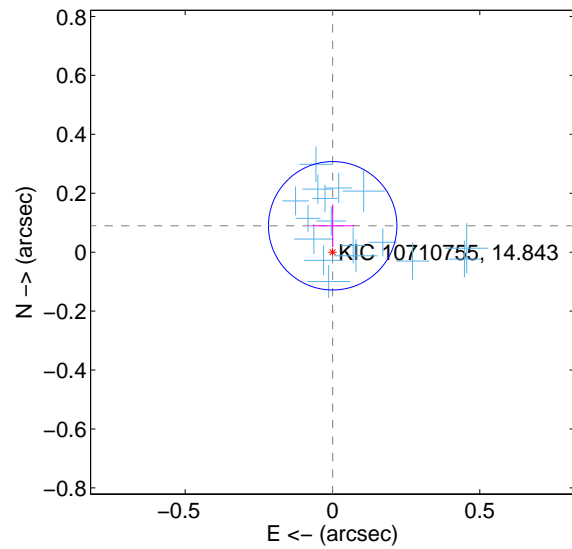
Supplemental centroid analysis for 010710755-02. Kepler magnitude: 14.84. Transit SNR 139.39

There are 17 quarters with good PRF difference image offsets

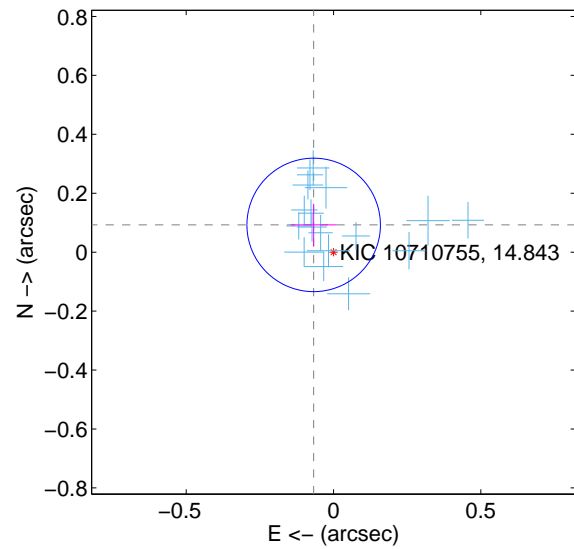
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.090 \pm 0.073$	1.23	$-0.001 \pm 0.073$	$0.090 \pm 0.073$
PRF-fit source offset from KIC position	$0.114 \pm 0.075$	1.52	$0.067 \pm 0.077$	$0.093 \pm 0.072$
photometric centroid source offset	$0.49 \pm 0.06$	7.74	$-0.29 \pm 0.07$	$0.40 \pm 0.06$

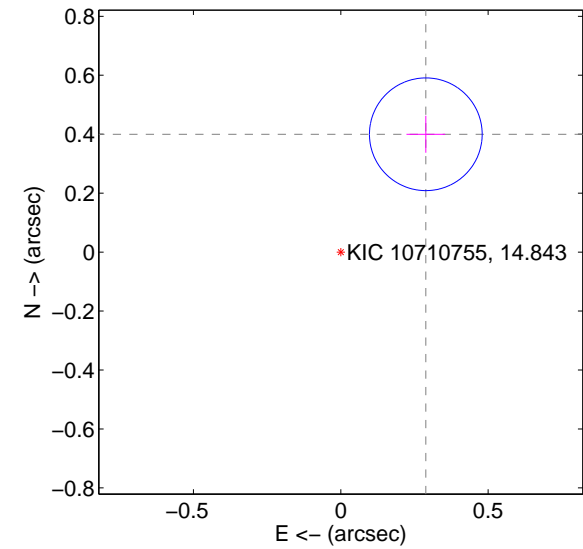
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

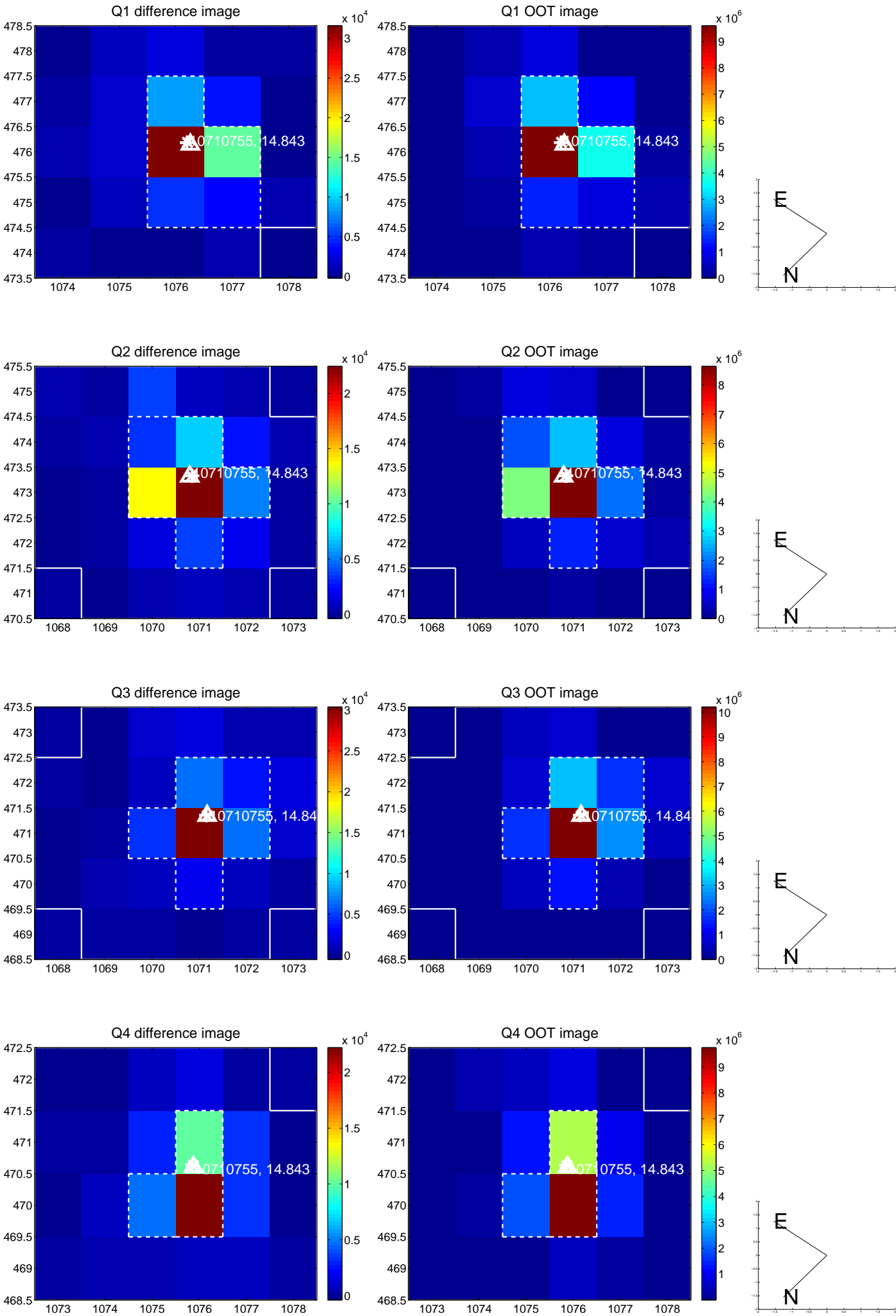


offset from photometric centroids

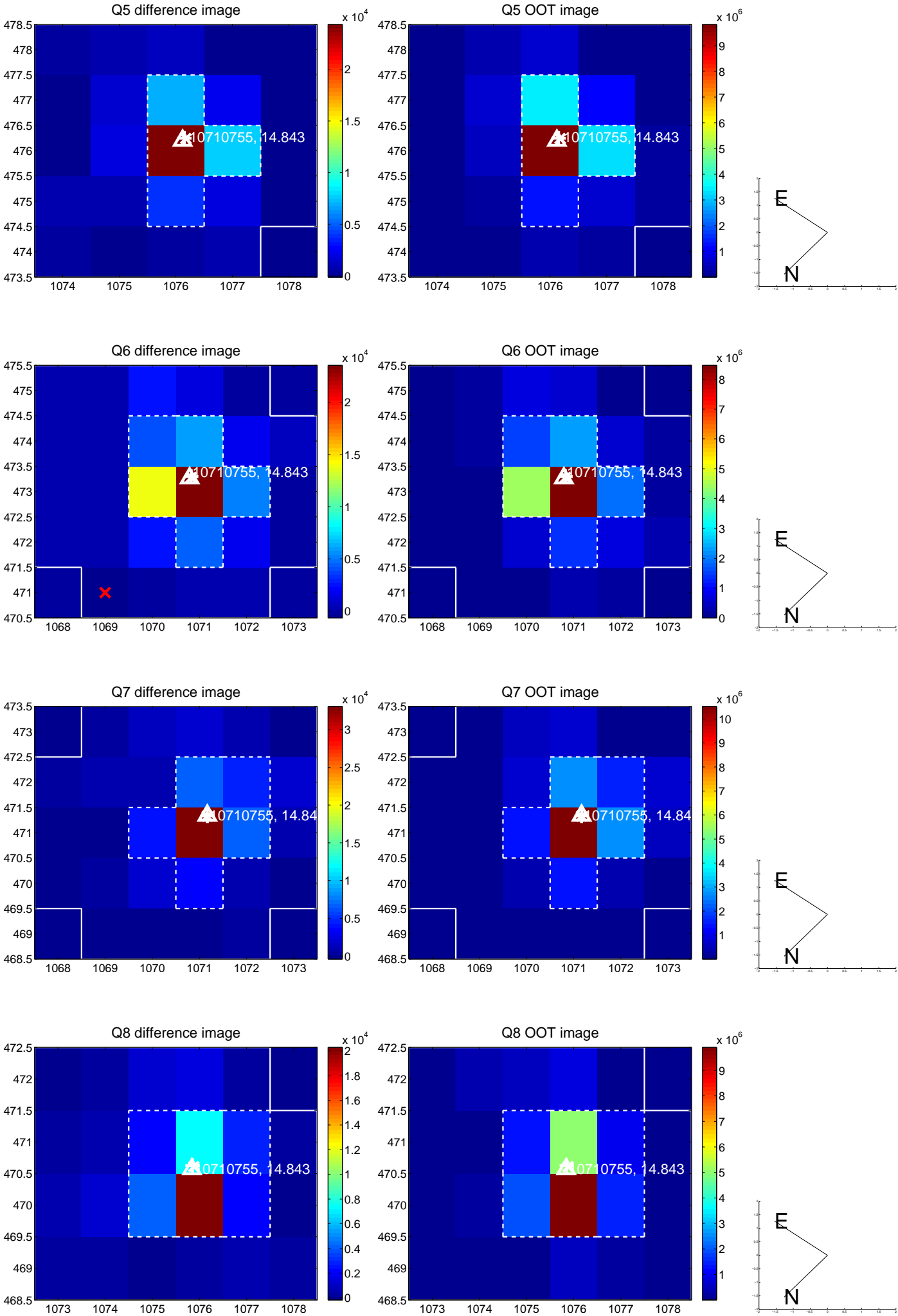


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

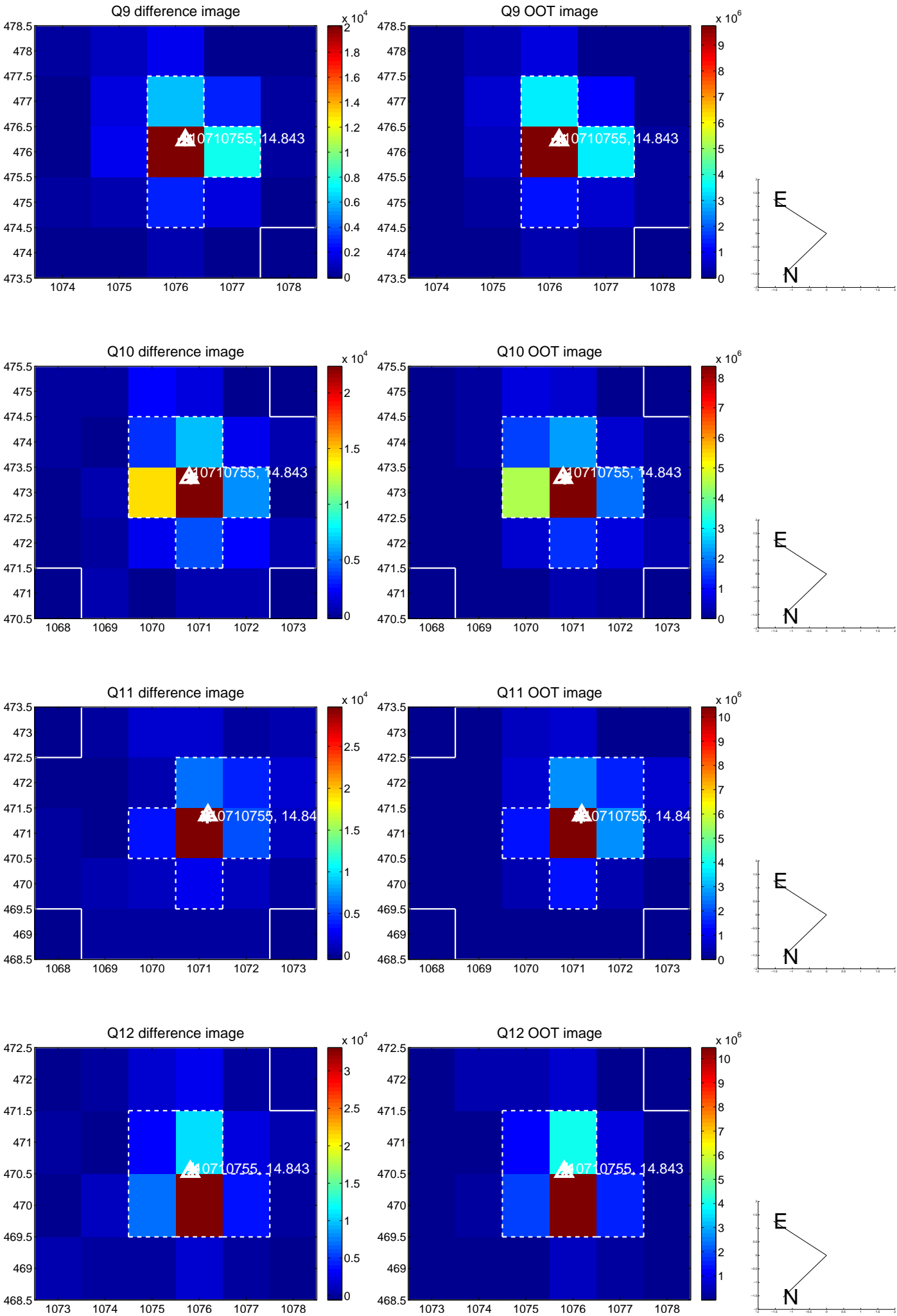
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



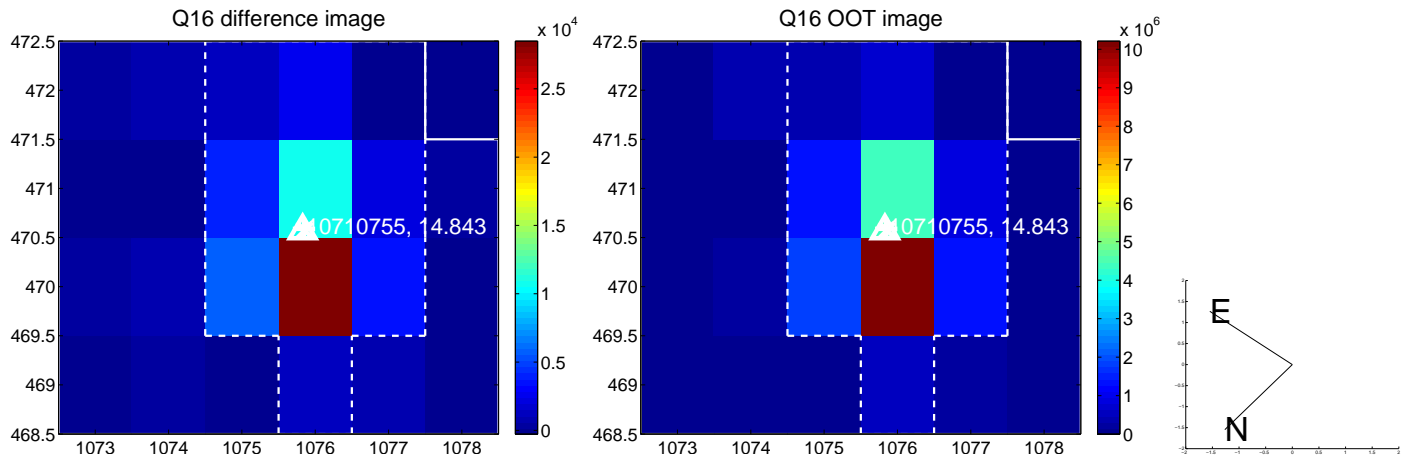
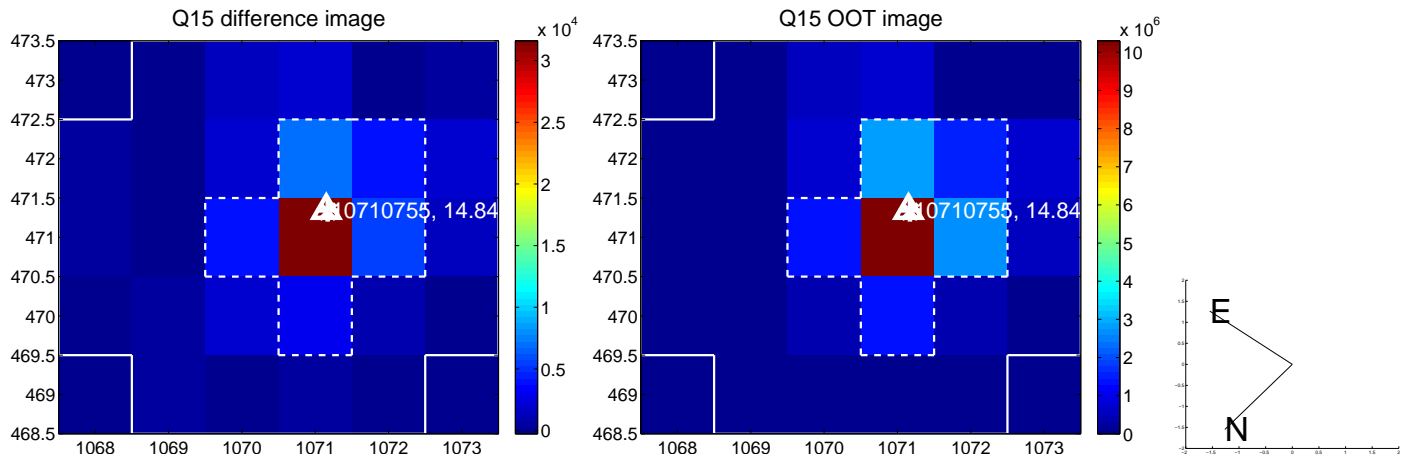
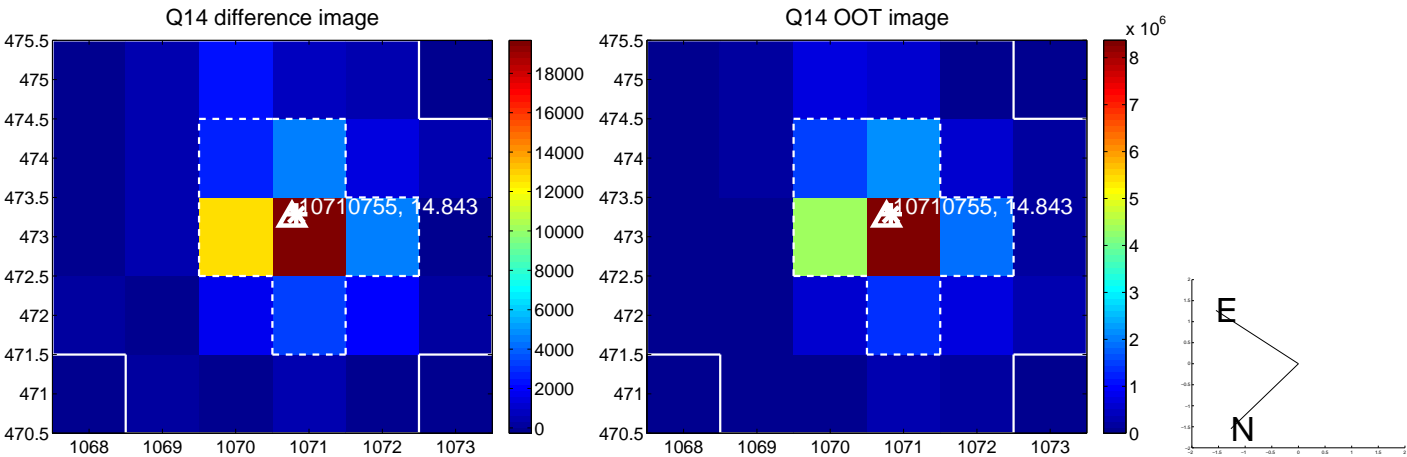
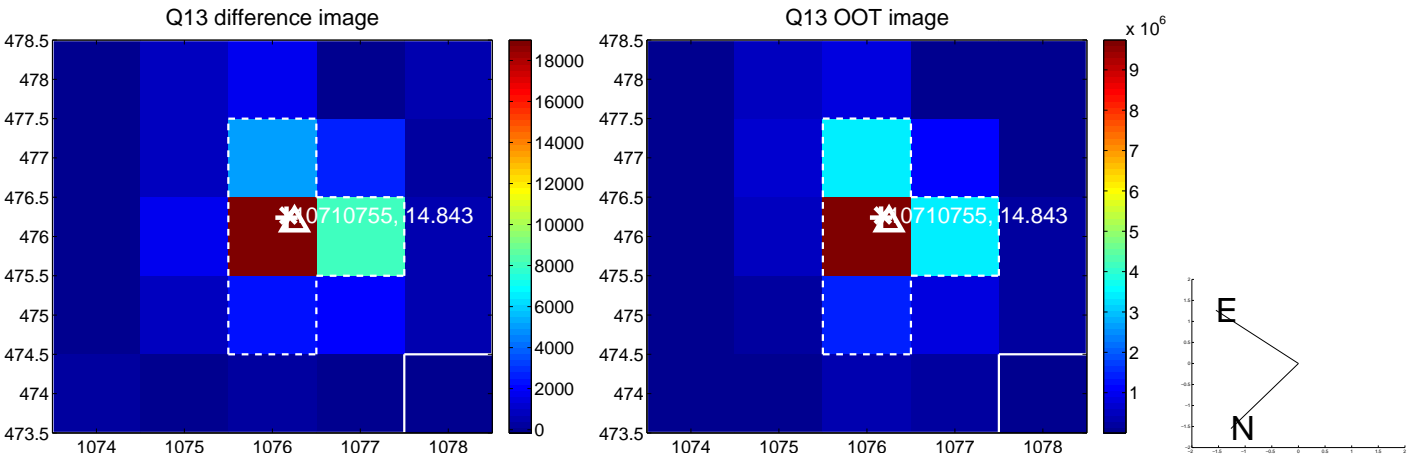
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



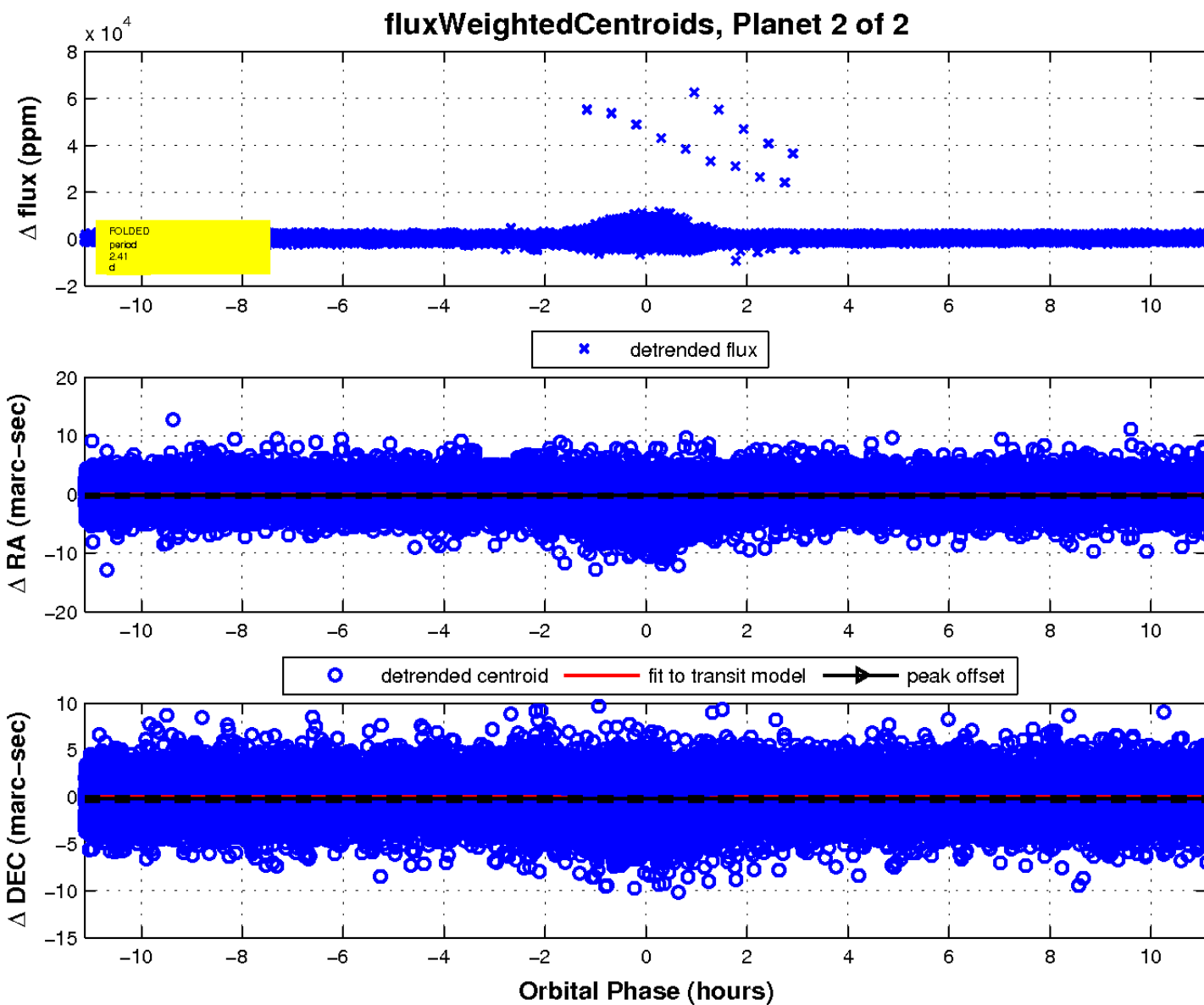
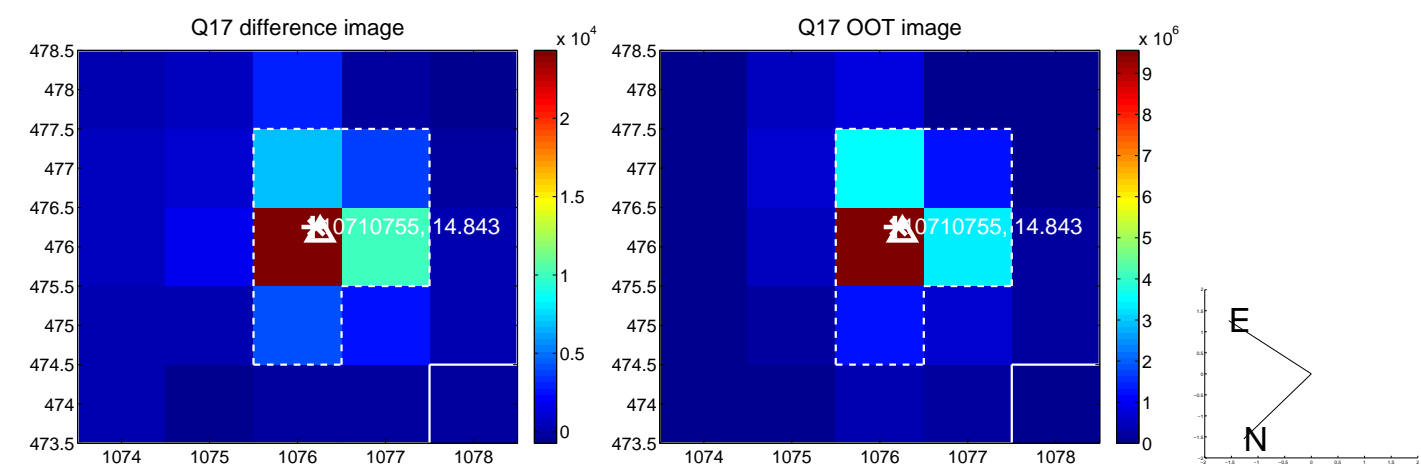
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UKIRT Image

Declination

