

# KIC 006784170

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006784170-01	OBS	No	1.399223	132.466533	41.6	8.136	7.7	5.1	2.34	7272	1.75	17703.20
006784170-02	OBS	No	1.399089	131.671487	372.7	14.348	16.3	21.0	2.34	7272	5.34	17705.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006784170-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
006784170-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—SAME_NTL_PERIOD

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

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

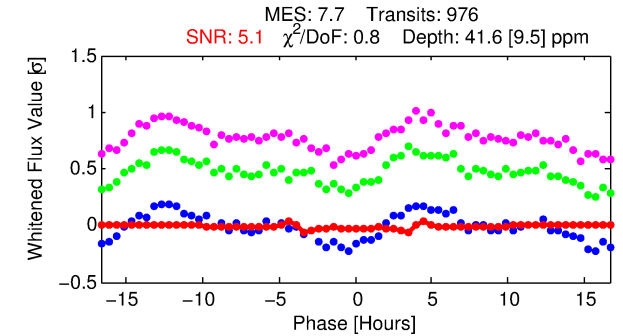
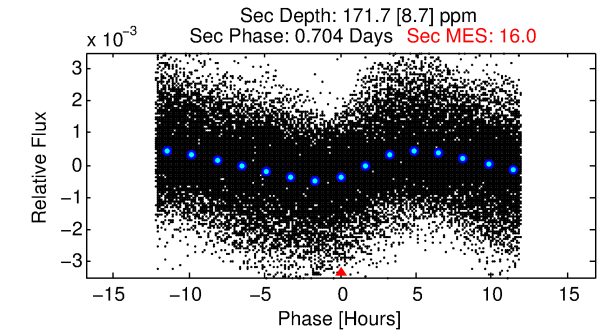
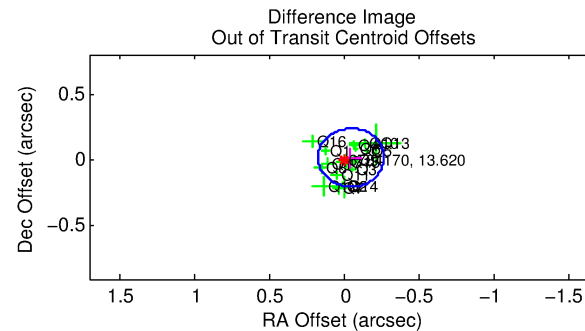
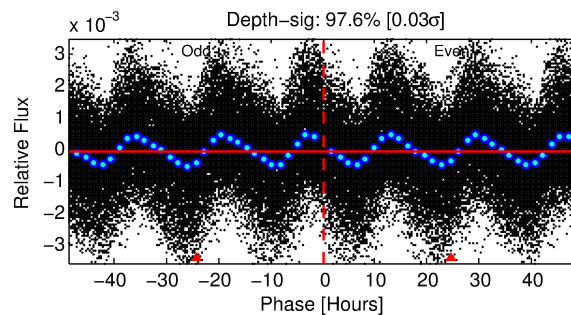
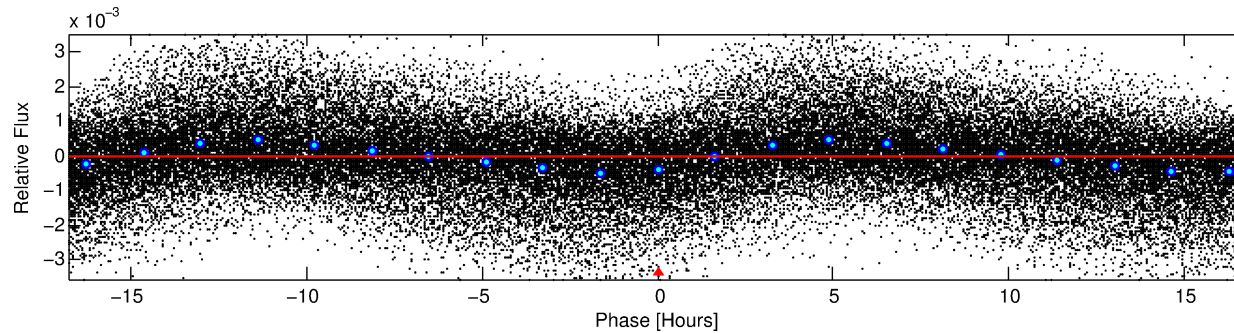
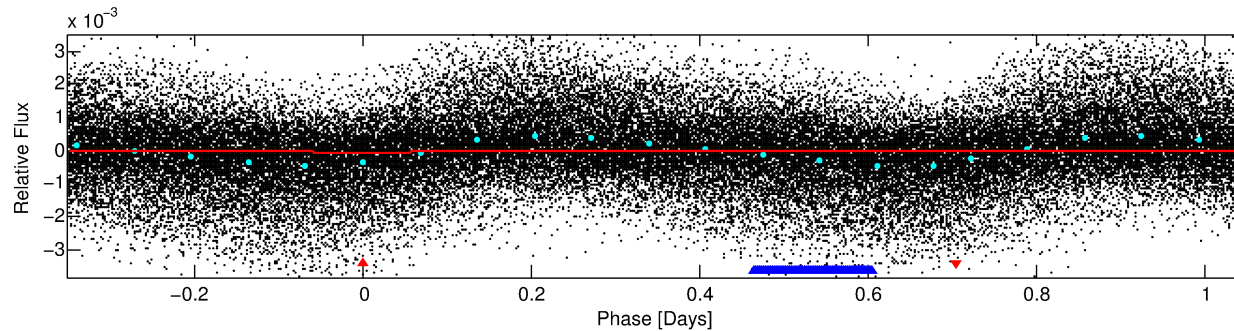
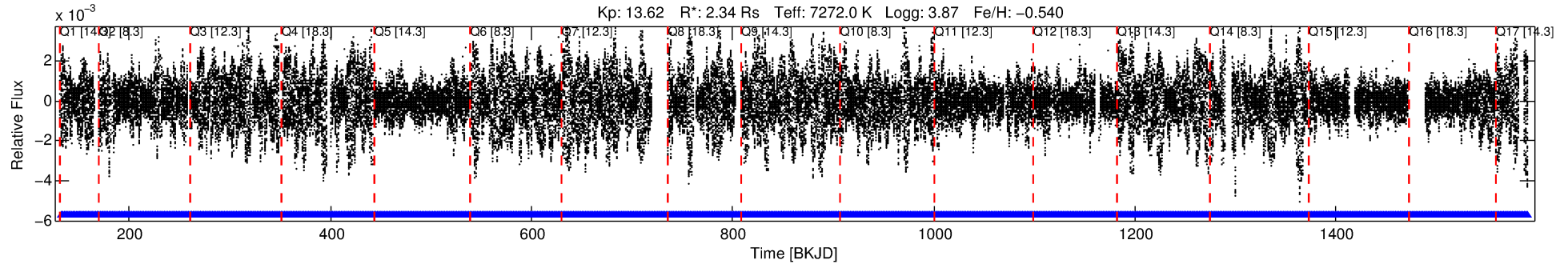
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006784170-01

No Significant Match Found

# DV One-Page Summary

KIC: 6784170 Candidate: 1 of 2 Period: 1.399 d



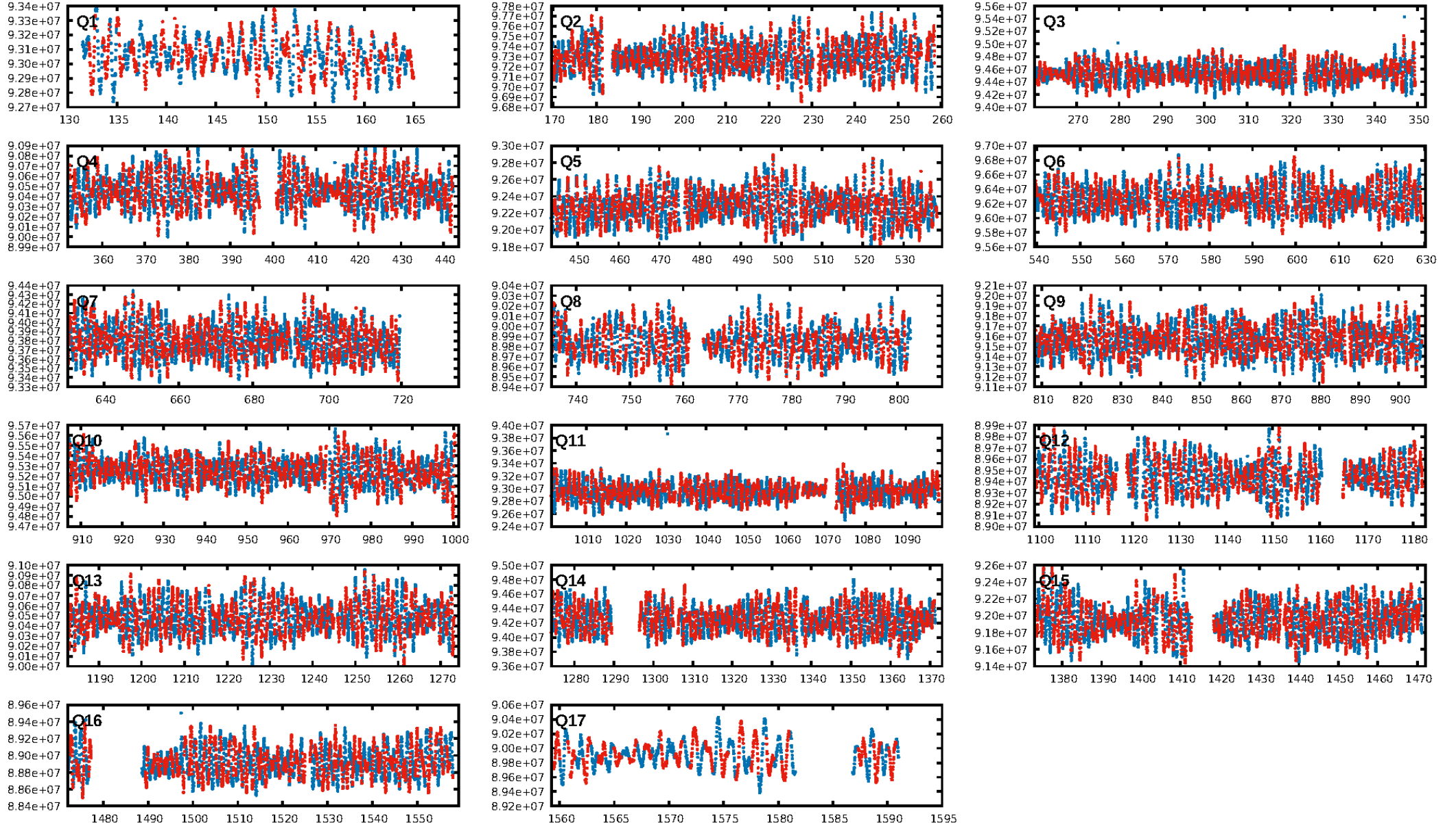
## DV Fit Results:

Period = 1.39922 [0.00002] d  
Epoch = 132.4665 [0.0034] BKJD  
Rp/R\* = 0.0068 [0.0013]  
a/R\* = 1.11 [0.17]  
b = 0.90 [0.17]  
Seff = 17703.20 [12215.07]  
Teff = 2941 [507] K  
Rp = 1.75 [0.85] Re  
a = 0.0279 [0.0118] AU  
Ag = 23.95 [18.36] [1.25 $\sigma$ ]  
Teffp = 10061 [1033] K [6.19 $\sigma$ ]

## DV Diagnostic Results:

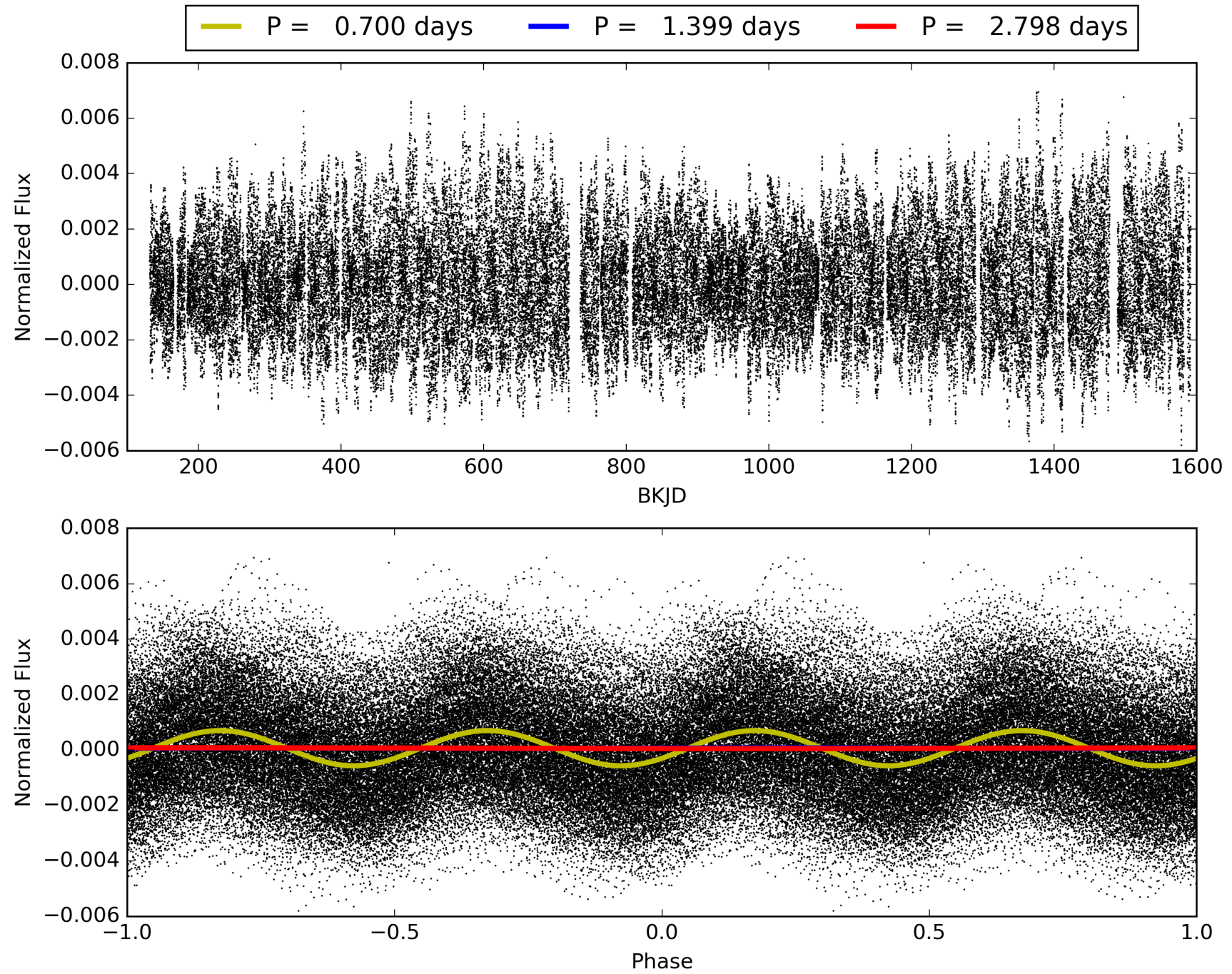
ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [933/933]  
GhostDiagnostic-chr: 0.9168  
Centroid-sig: 0.0%  
Centroid-so: 1.674 arcsec [3.57 $\sigma$ ]  
OotOffset-rm: 0.052 arcsec [0.70 $\sigma$ ]  
KicOffset-rm: 0.109 arcsec [1.53 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 006784170-01, PDC Light Curves



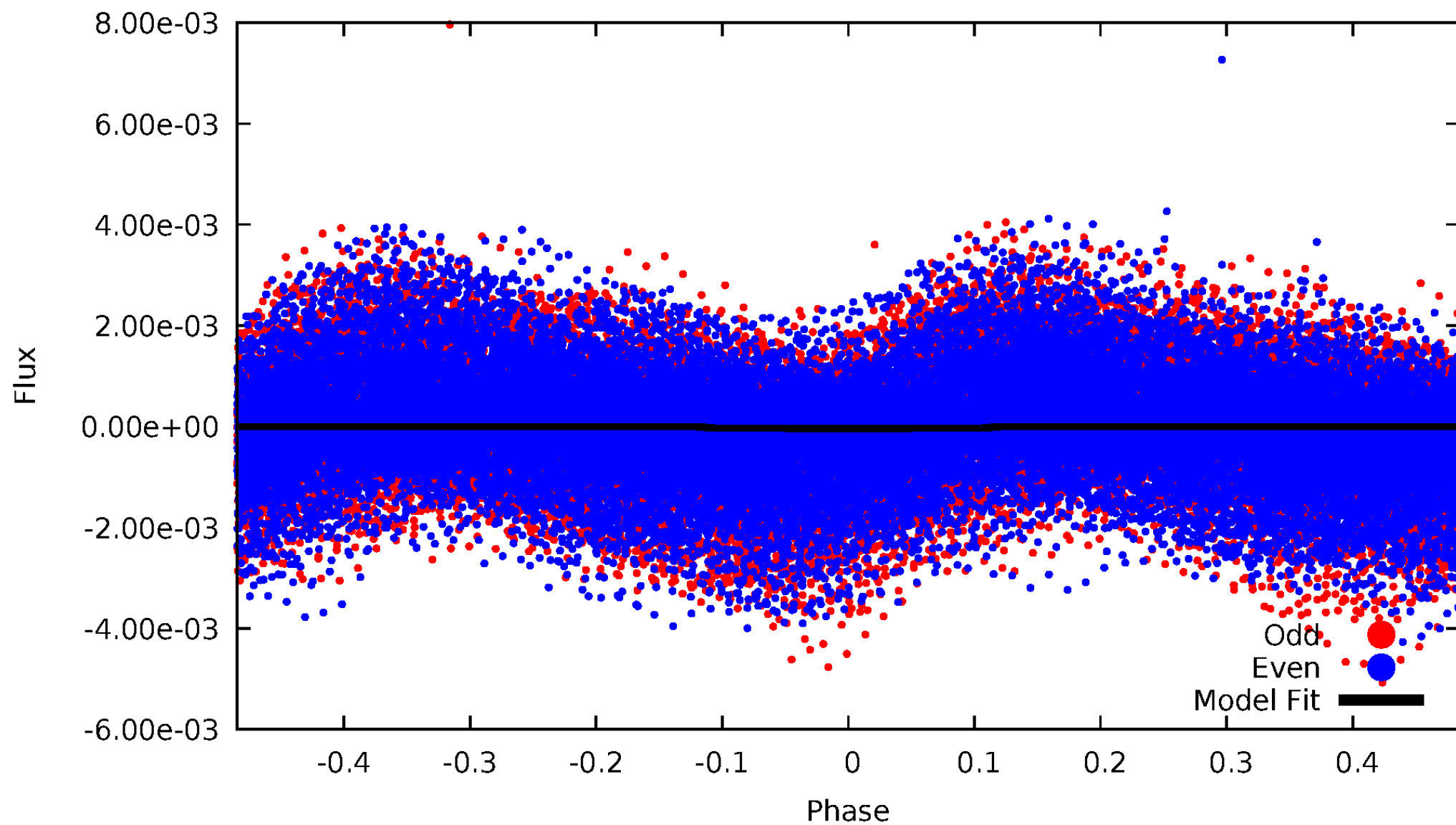


TCE 006784170-01



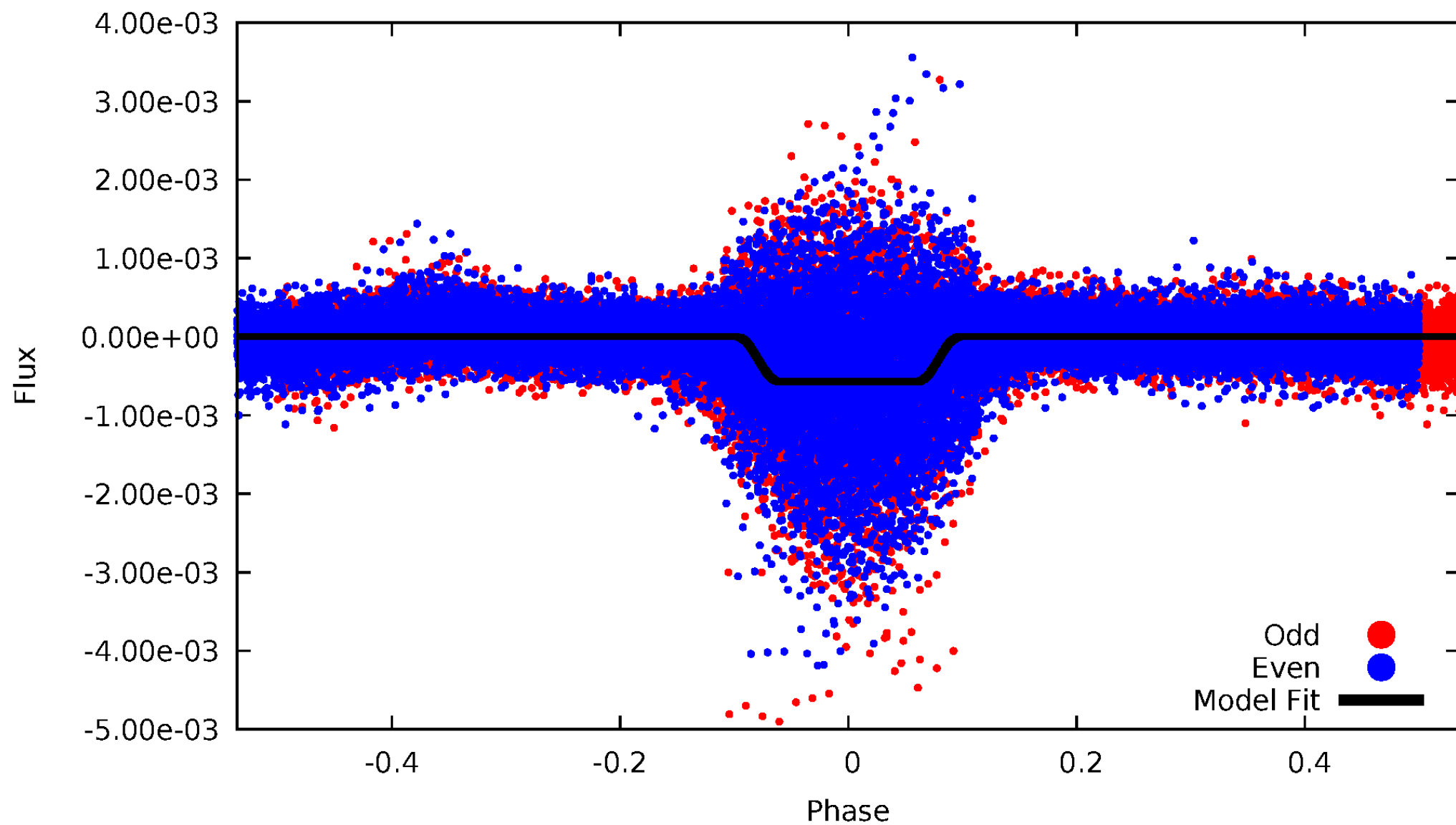
# DV Odd/Even

TCE 006784170-01

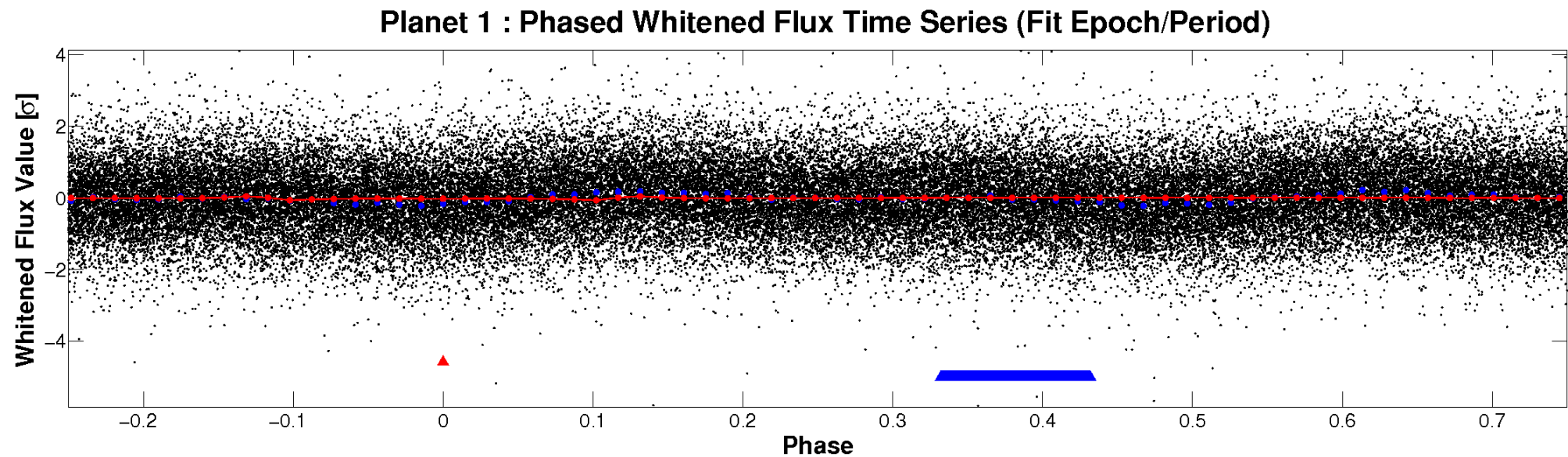
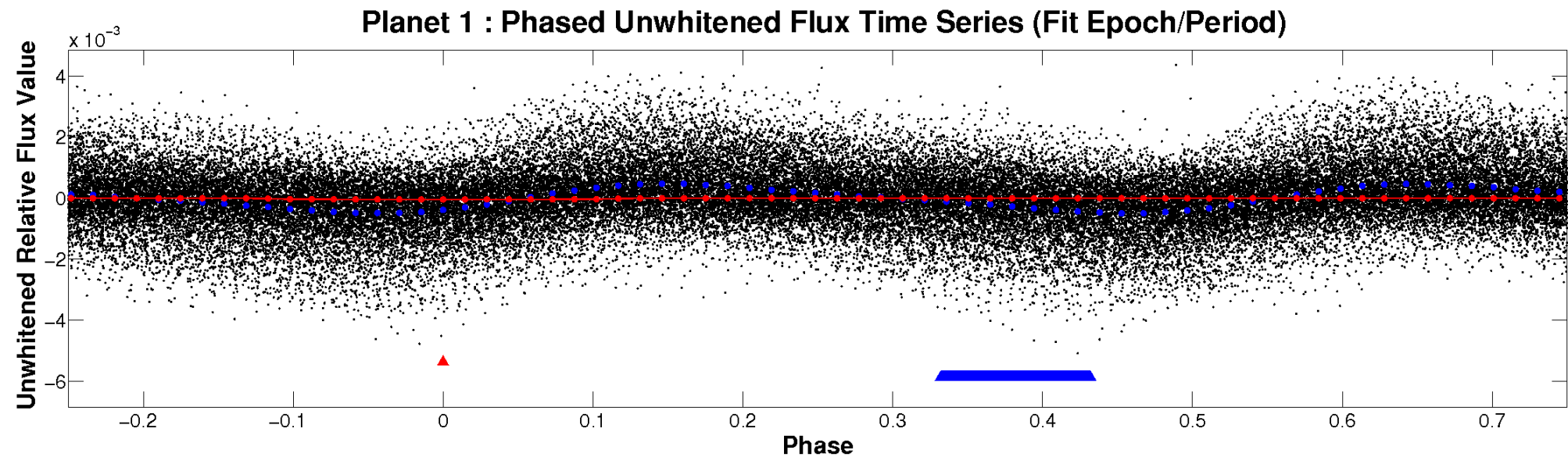


# ALT Odd/Even

TCE 006784170-01



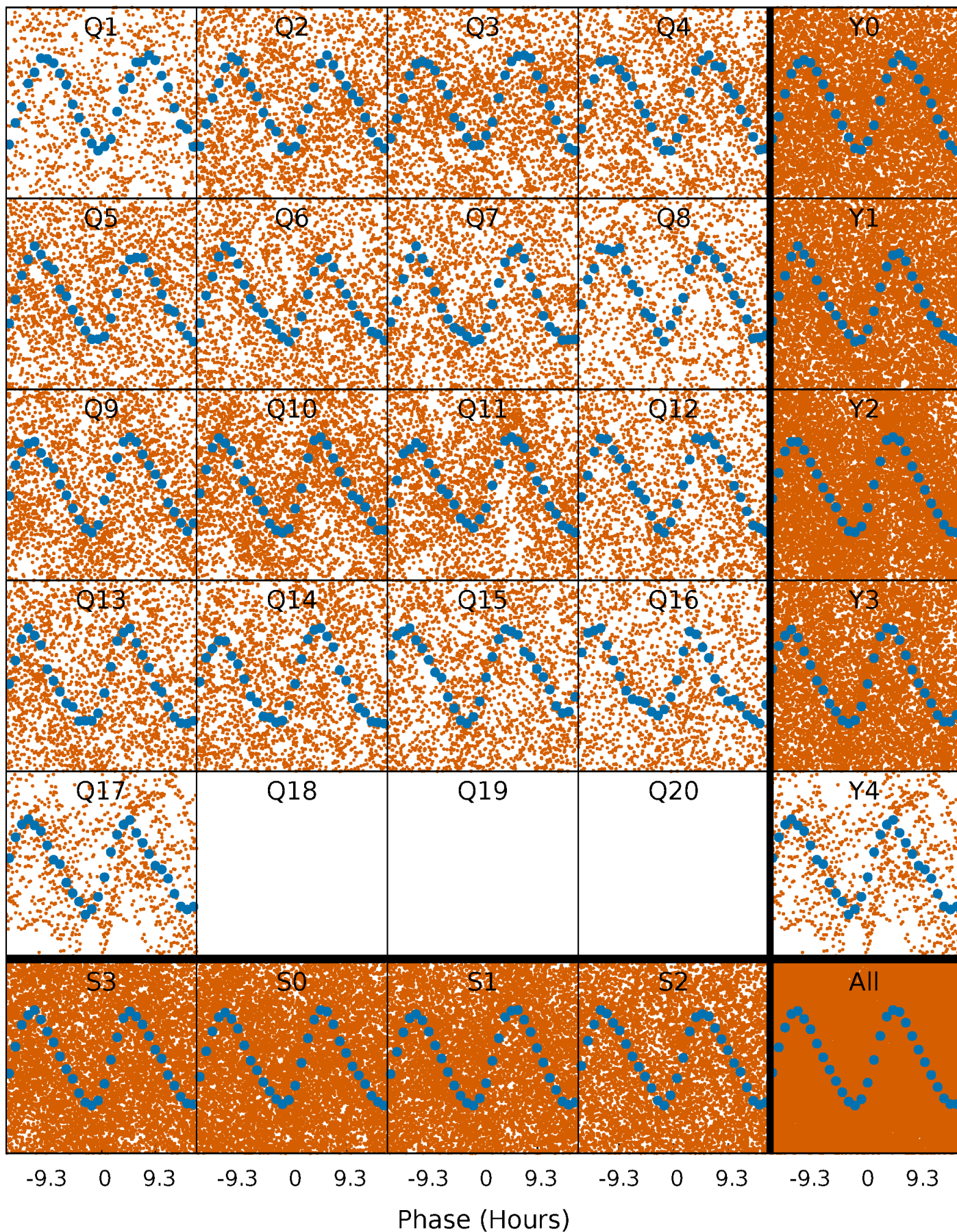
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

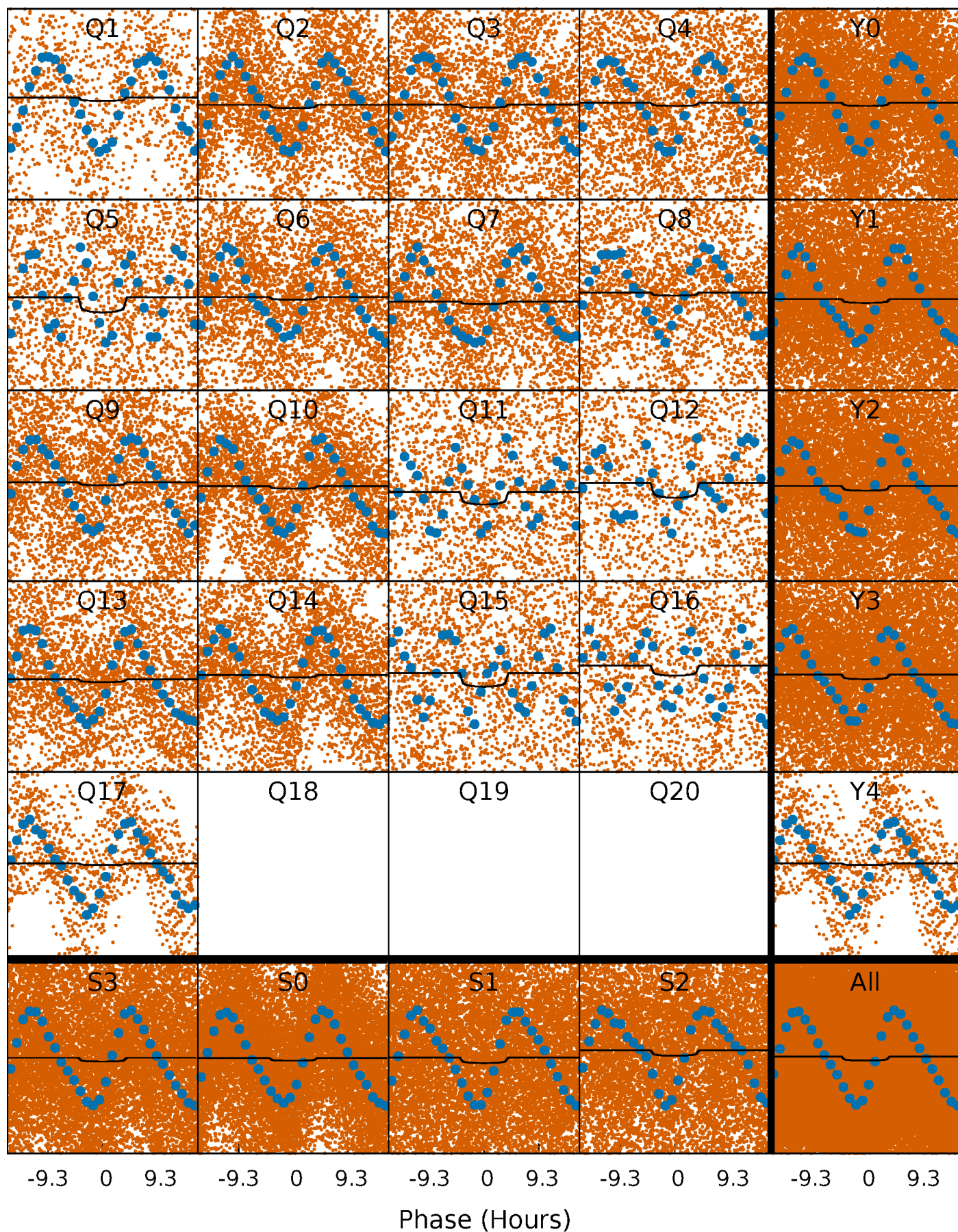
TCE 006784170-01   P= 1.399223 Days    $T_0=132.466533$  (BKJD)





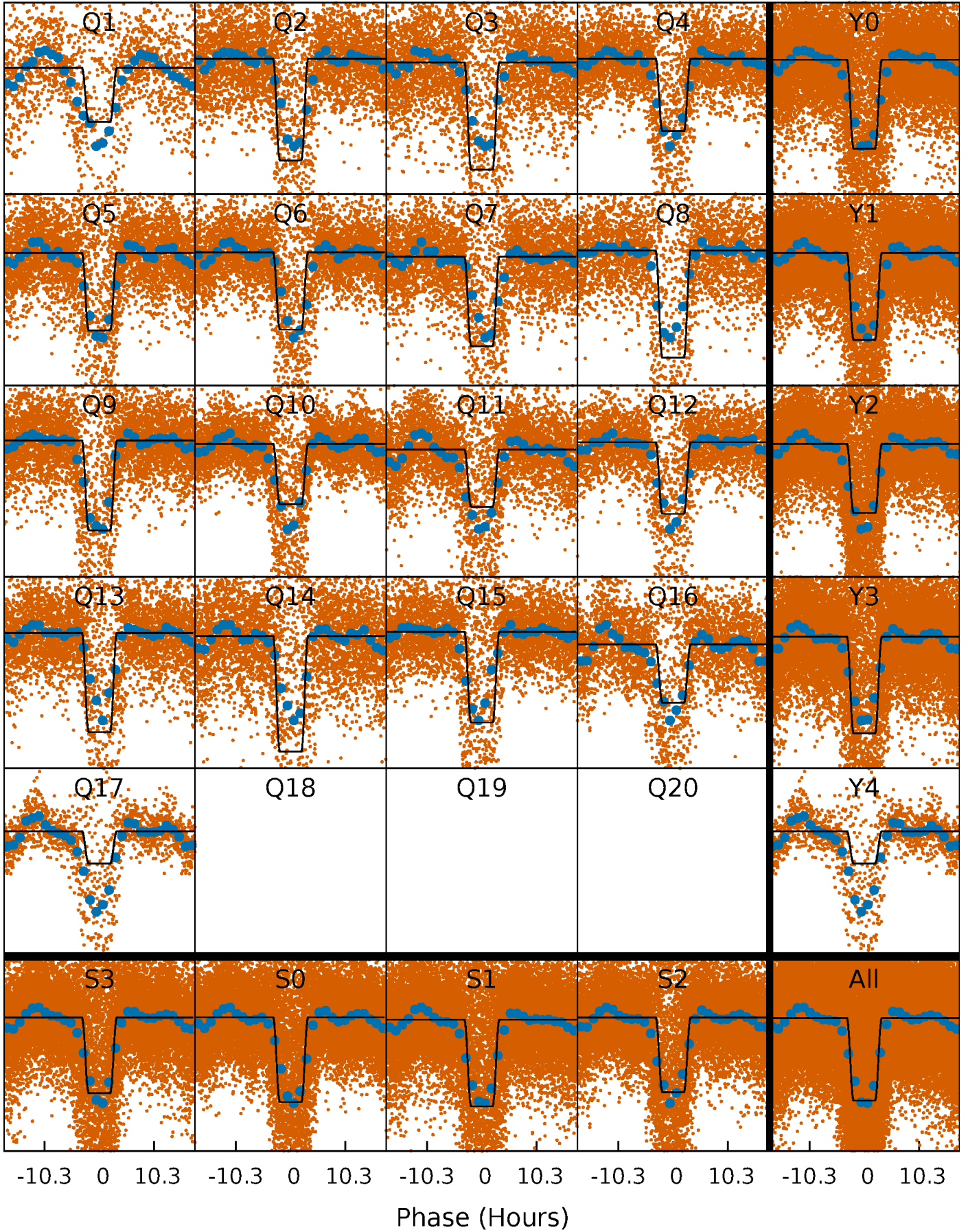
# DV Quarter-Phased Transit Curves

TCE 006784170-01 P= 1.399223 Days  $T_0=132.466533$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

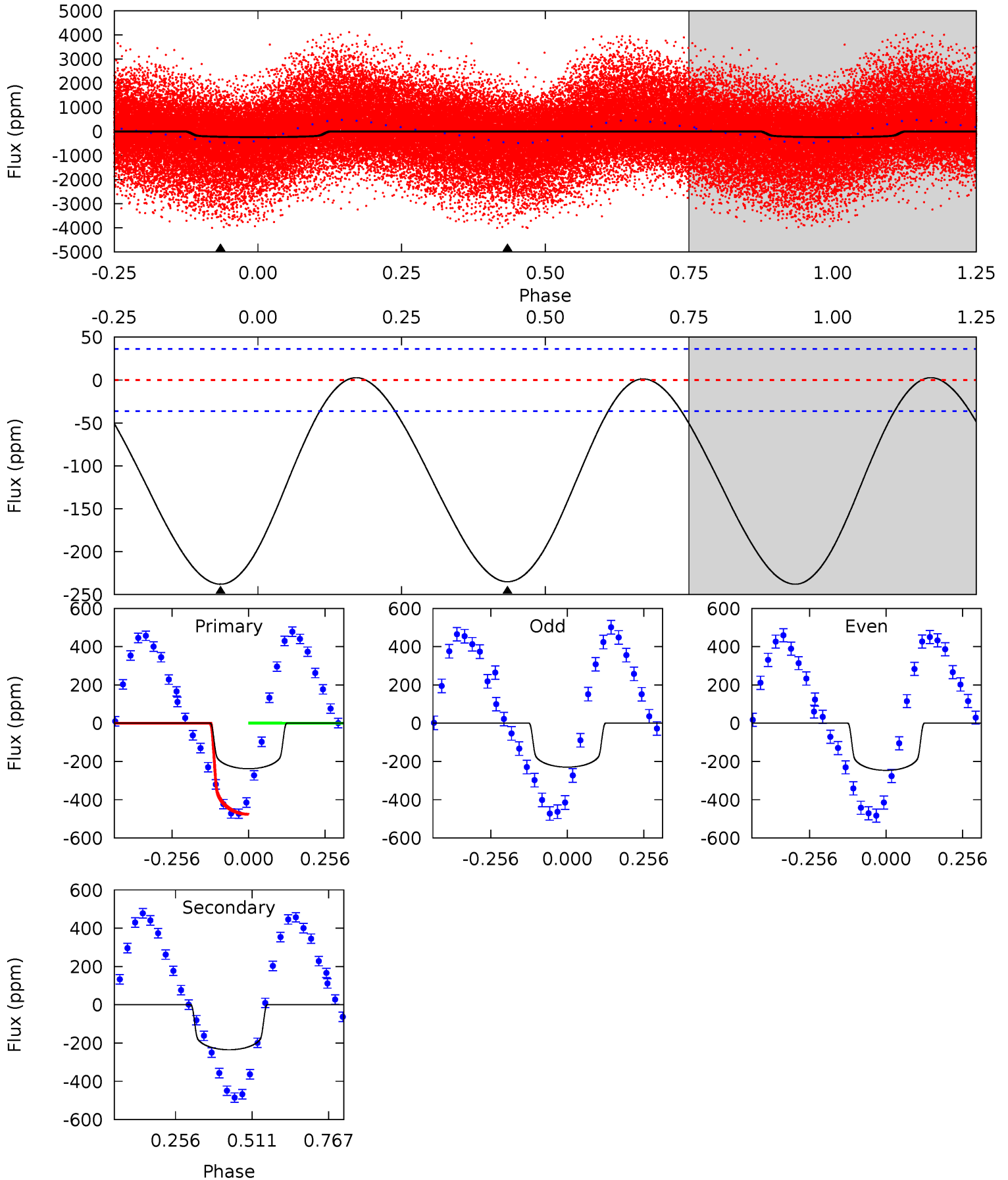
TCE 006784170-01 P= 1.399162 Days  $T_0=132.468930$  (BKJD)



# DV Model-Shift Uniqueness Test

006784170-01, P = 1.399223 Days, E = 131.067310 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
28.6	28.3	0	0	4.36	1.14	0.51	28.6	28.6	28.3	28.3	1.03	1.74	0.01	30.6

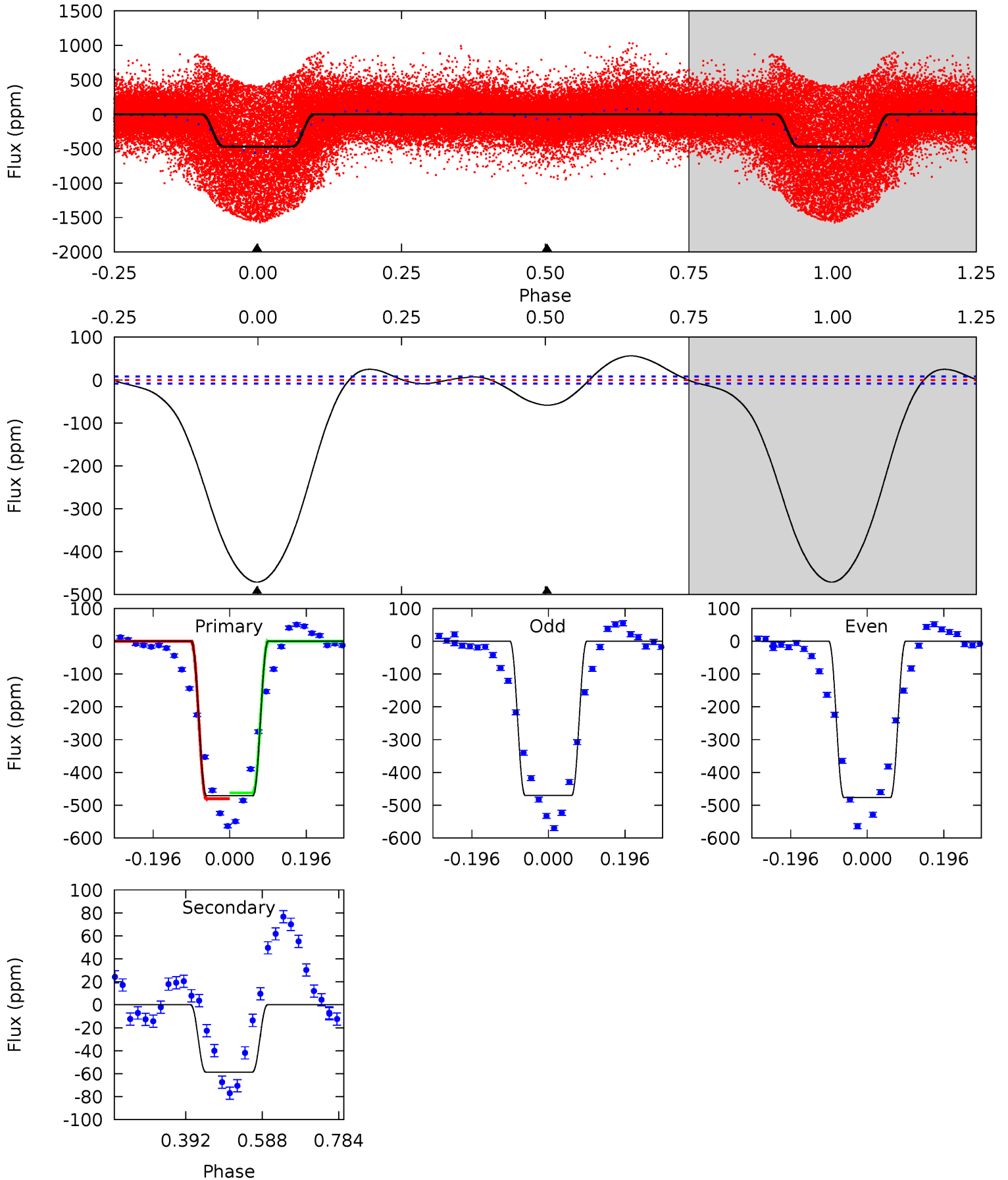




# Alt Model-Shift Uniqueness Test

006784170-01, P = 1.399162 Days, E = 131.069768 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
244.0	30.4	0	0	4.42	1.29	7.28	244.0	244.0	30.4	30.4	1.62	1.07	0.11	4.54



### Stellar Parameters For KIC 006784170

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7272^{+230}_{-307}$	$3.867^{+0.390}_{-0.104}$	$-0.540^{+0.250}_{-0.300}$	$2.342^{+0.450}_{-1.049}$	$1.472^{+0.188}_{-0.323}$	$0.162^{+0.583}_{-0.050}$
	+3%/-4%	+10%/-3%	+46%/-56%	+19%/-45%	+13%/-22%	+361%/-31%
Source	KIC0	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 006784170-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-235 \pm 8$	$1.64^{+0.43}_{-0.46}$	$4013^{+294}_{-439}$	$12780^{+2748}_{-1883}$	$37^{+32}_{-13}$
Alt.	$-59 \pm 2$	$5.80^{+0.95}_{-1.29}$	$3976^{+316}_{-476}$	$3918^{+200}_{-231}$	$0.743^{+0.436}_{-0.181}$

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

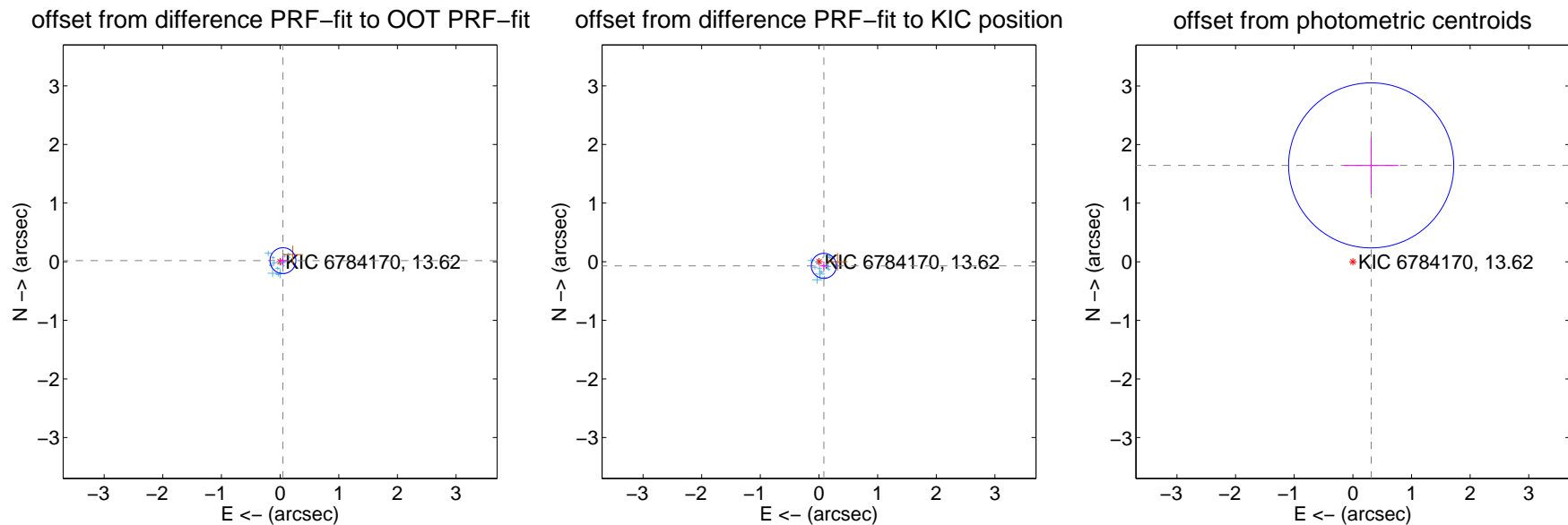
## DV Centroid Data

Supplemental centroid analysis for 006784170-01. Kepler magnitude: 13.62. Transit SNR 5.11

There are 16 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

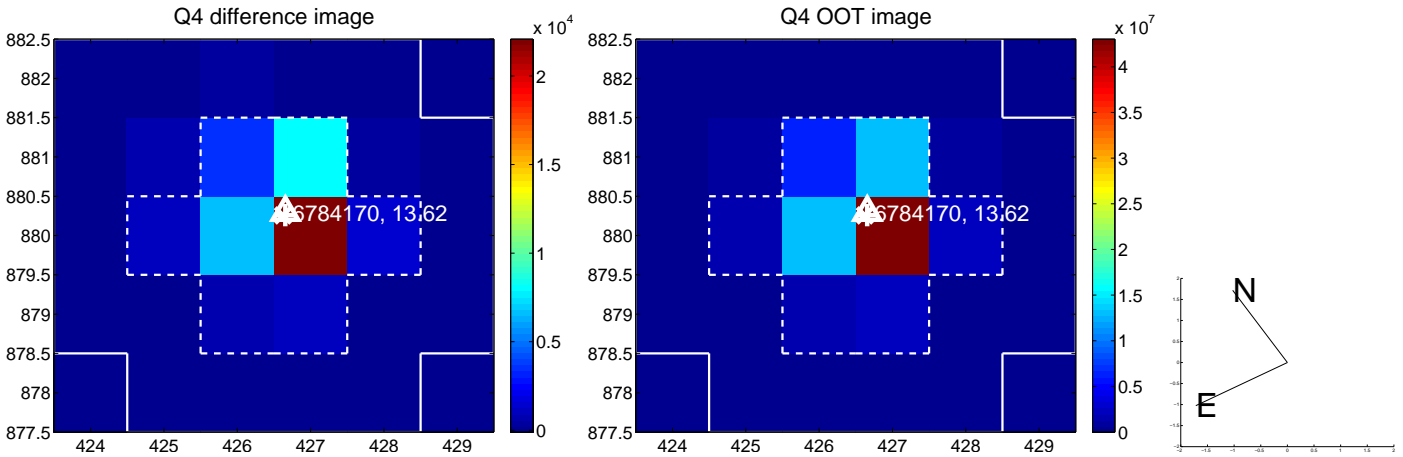
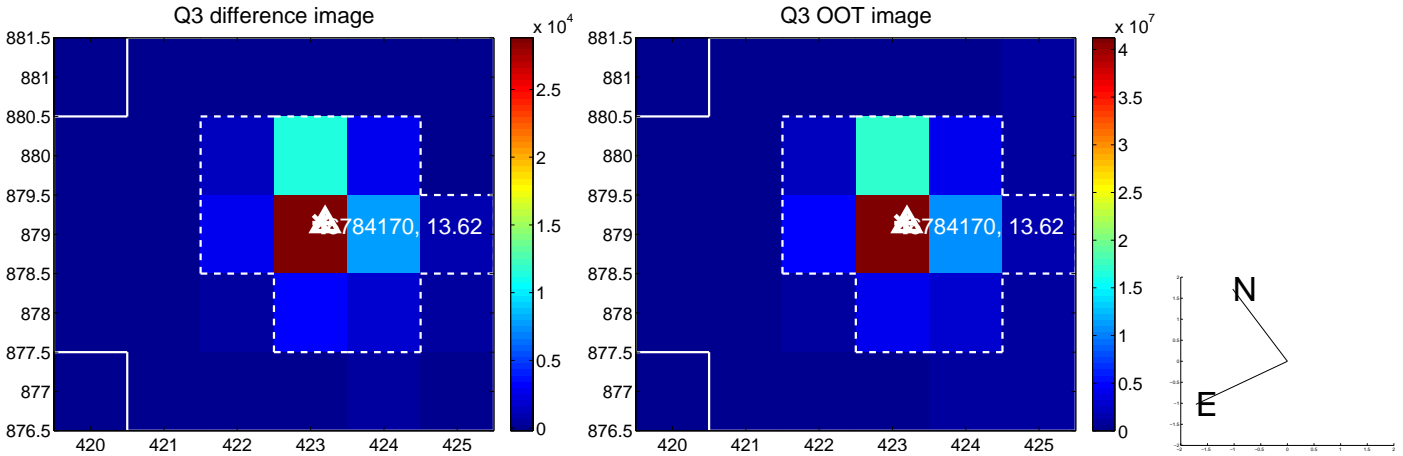
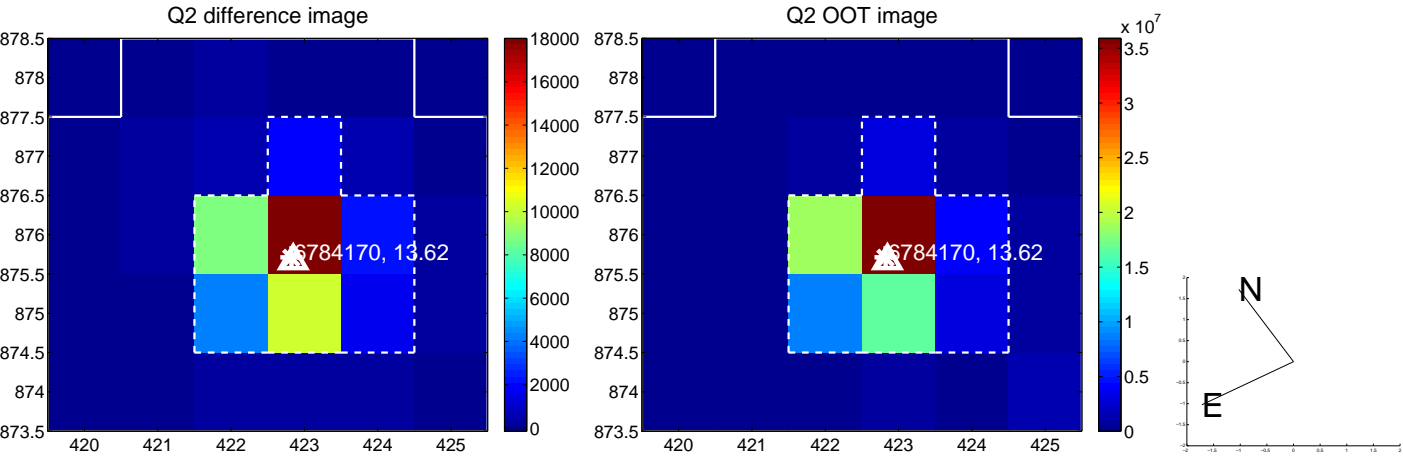
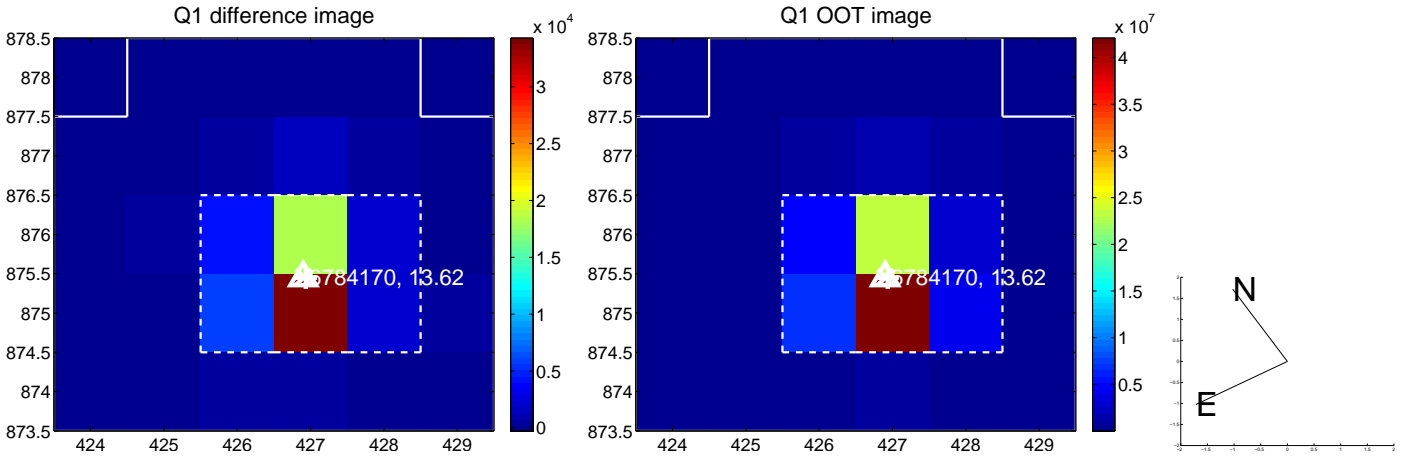
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.052 \pm 0.074$	0.70	$-0.048 \pm 0.072$	$0.018 \pm 0.073$
PRF-fit source offset from KIC position	$0.109 \pm 0.071$	1.53	$-0.083 \pm 0.070$	$-0.071 \pm 0.073$
photometric centroid source offset	$1.67 \pm 0.47$	3.57	$-0.31 \pm 0.47$	$1.64 \pm 0.47$



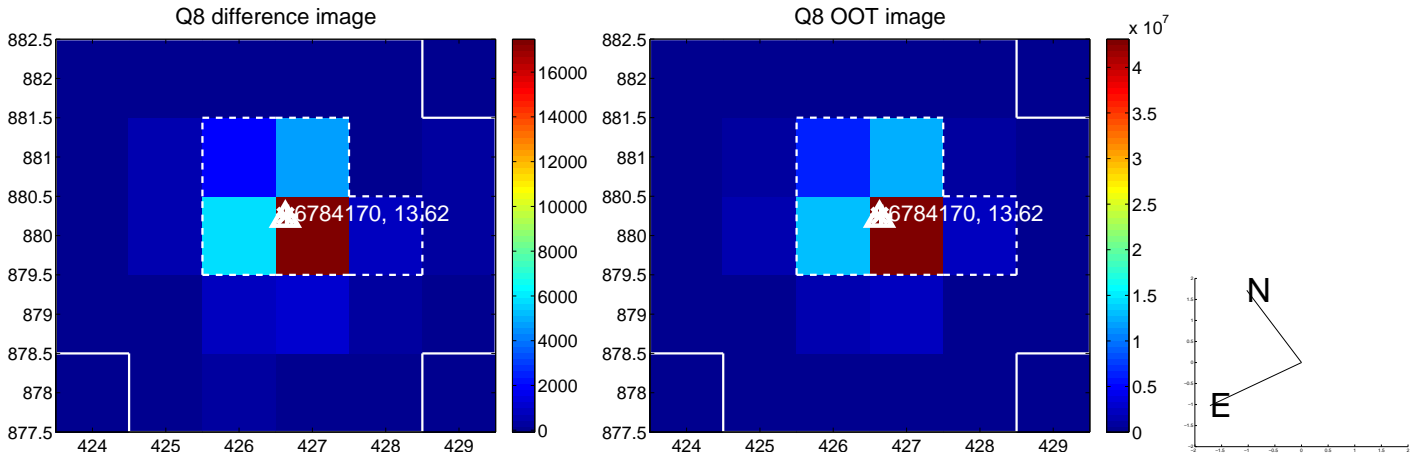
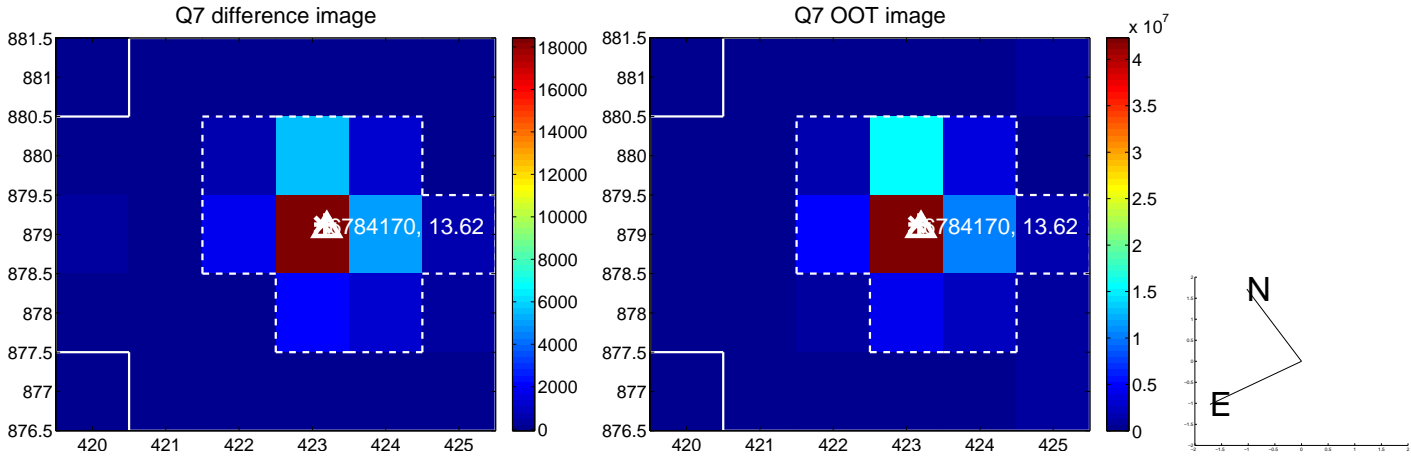
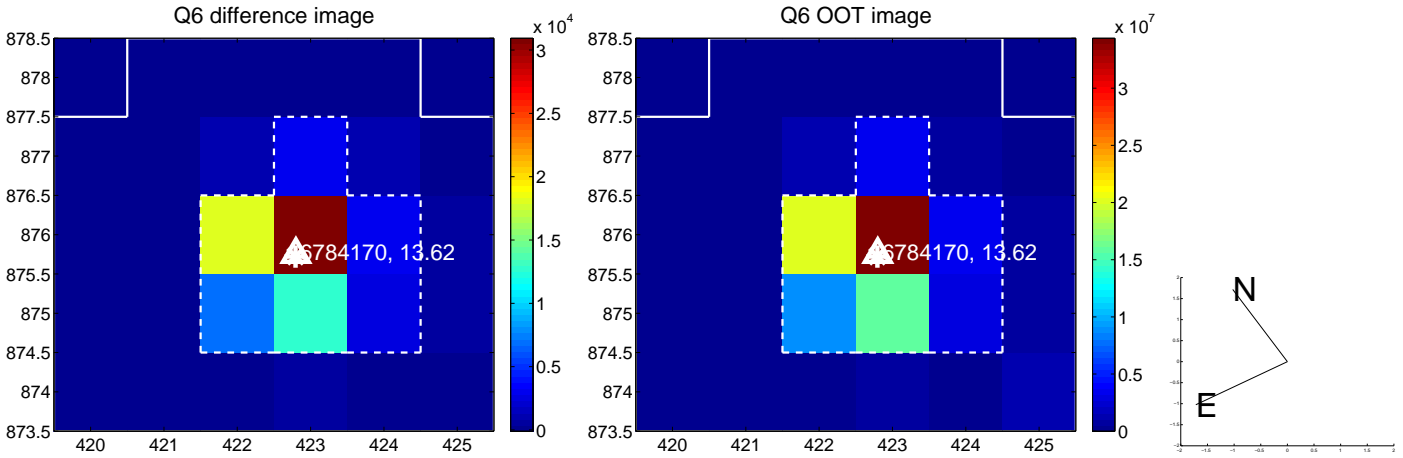
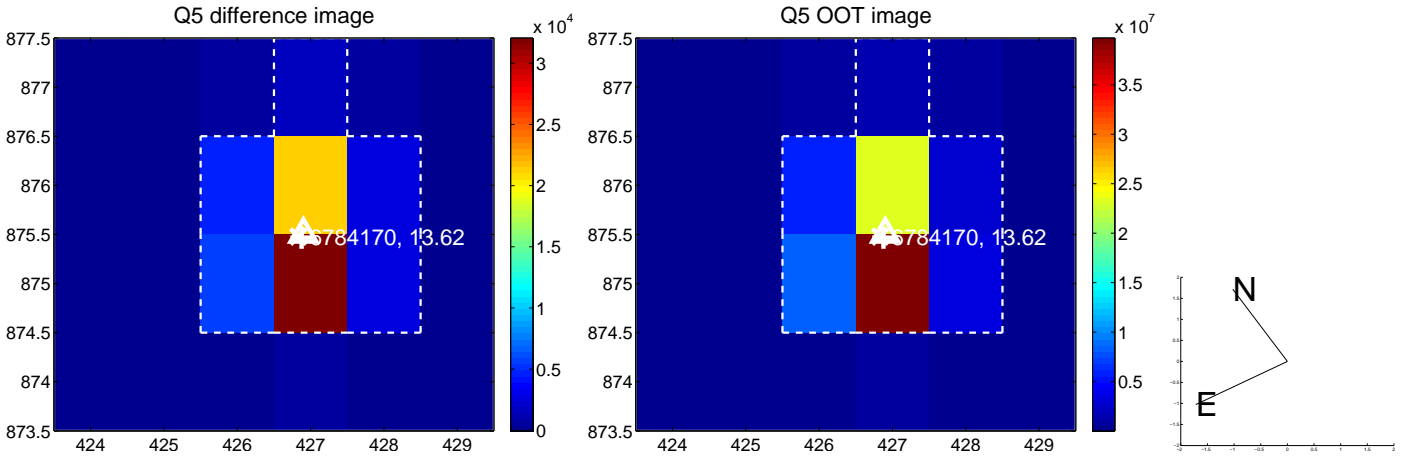
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



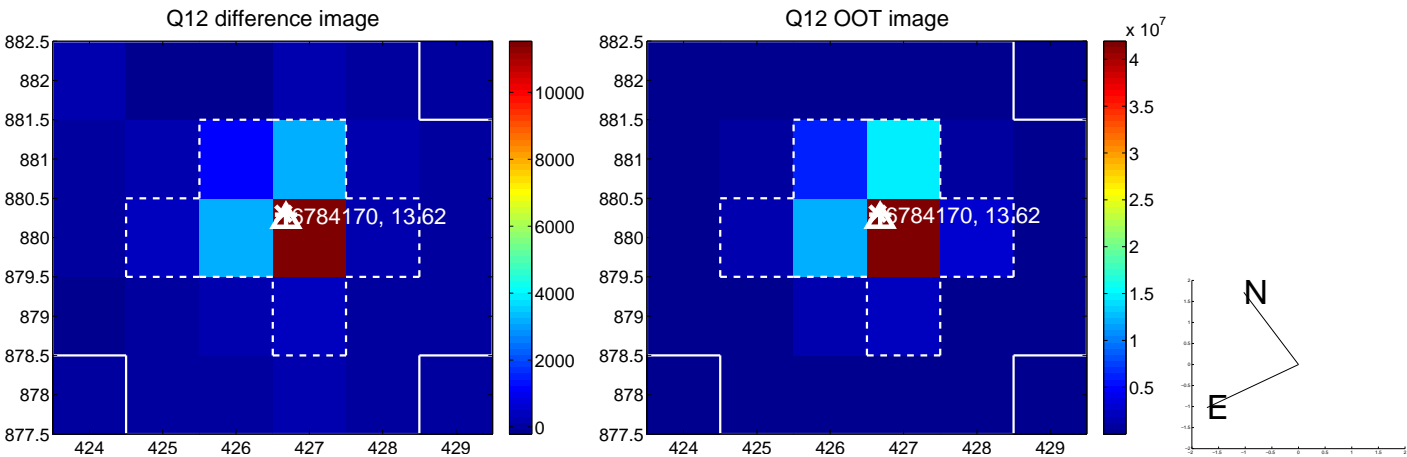
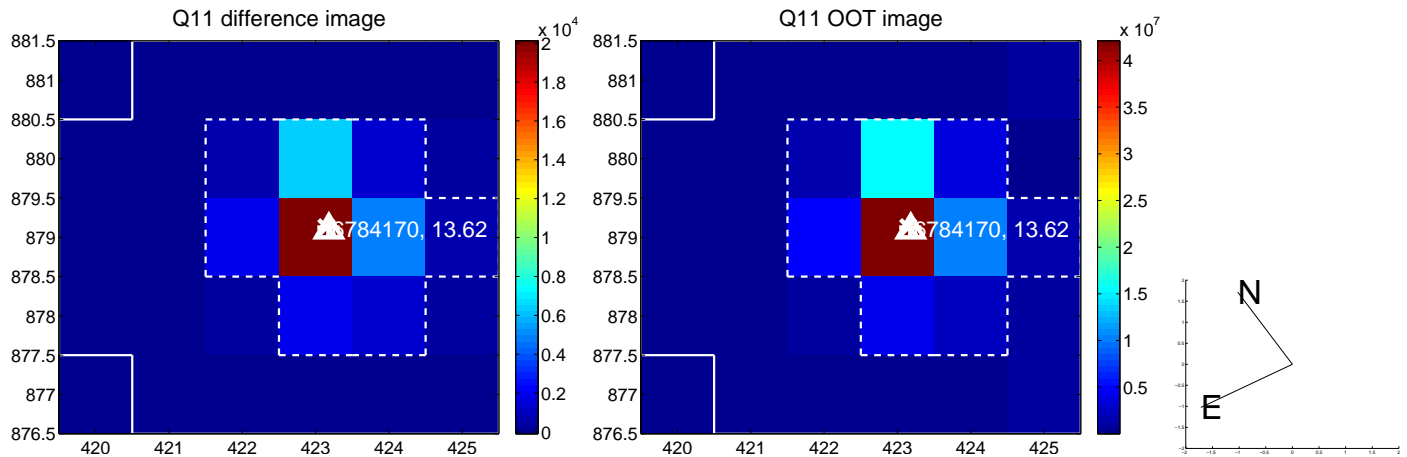
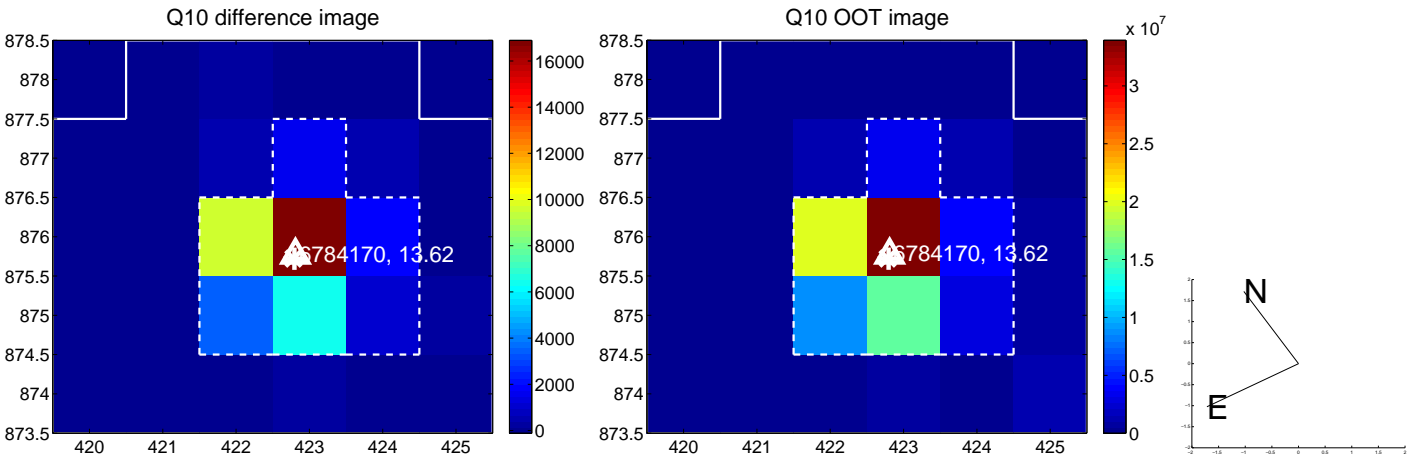
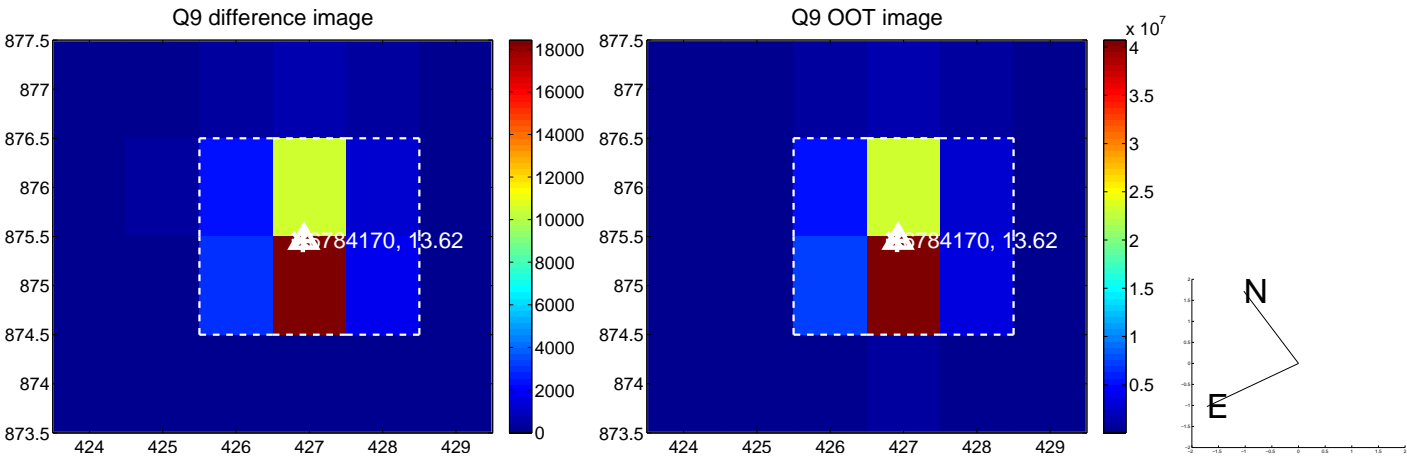
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

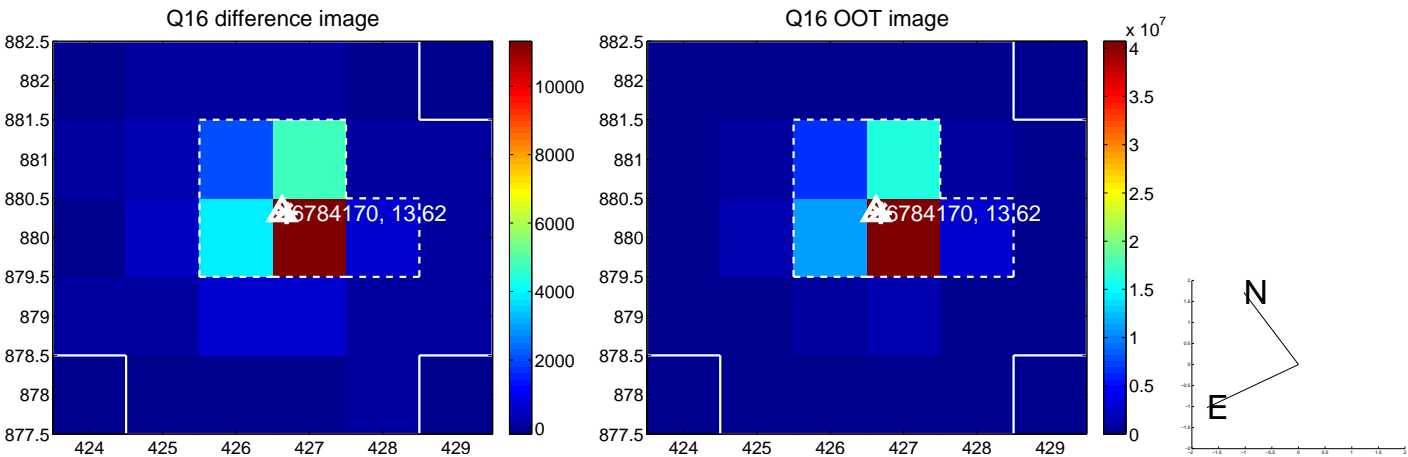
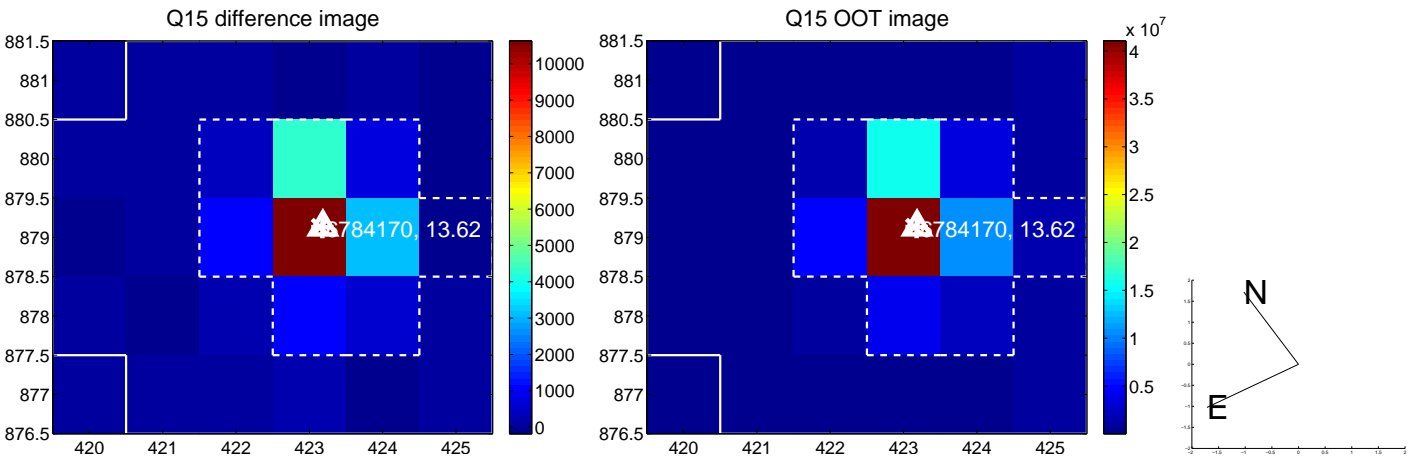
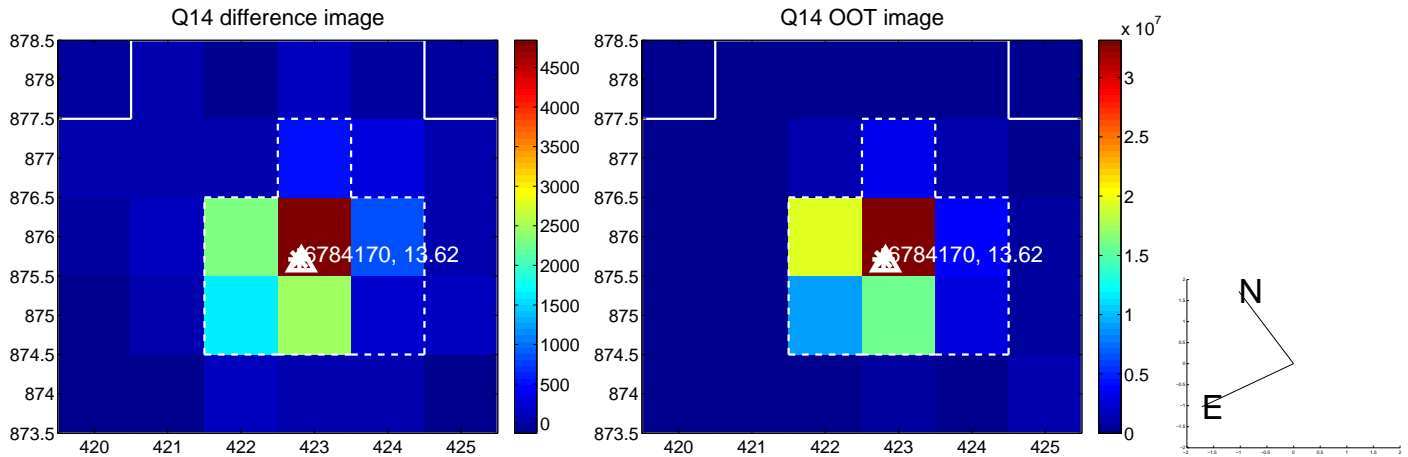
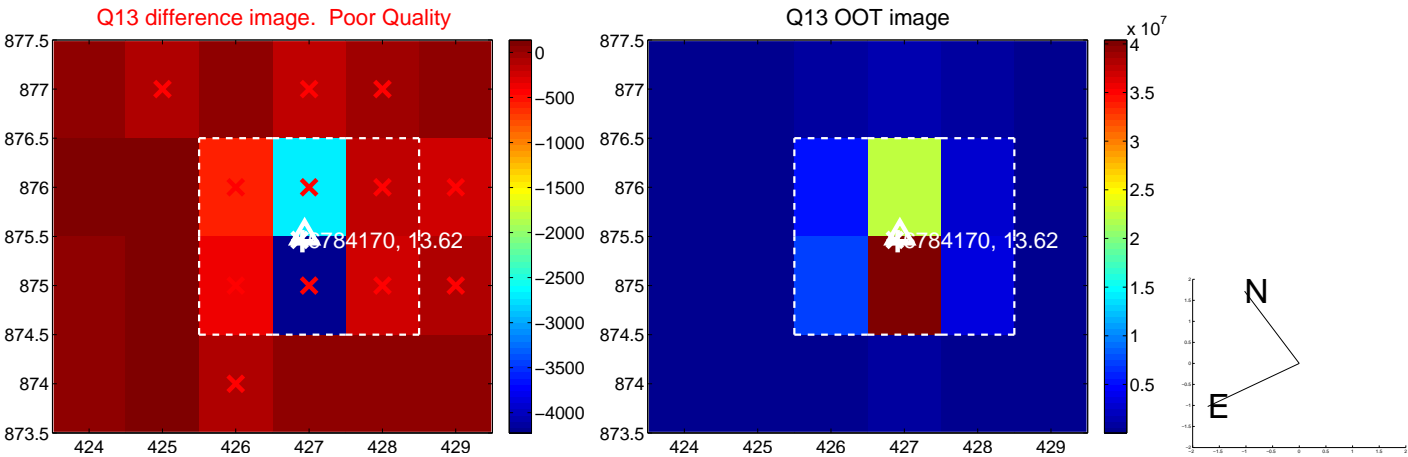


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

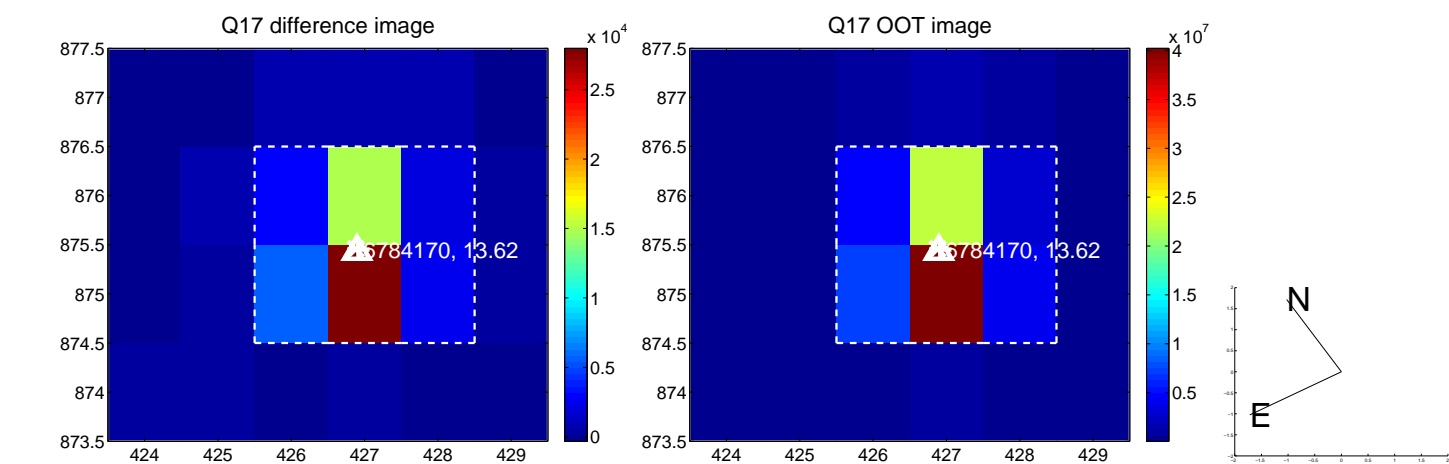




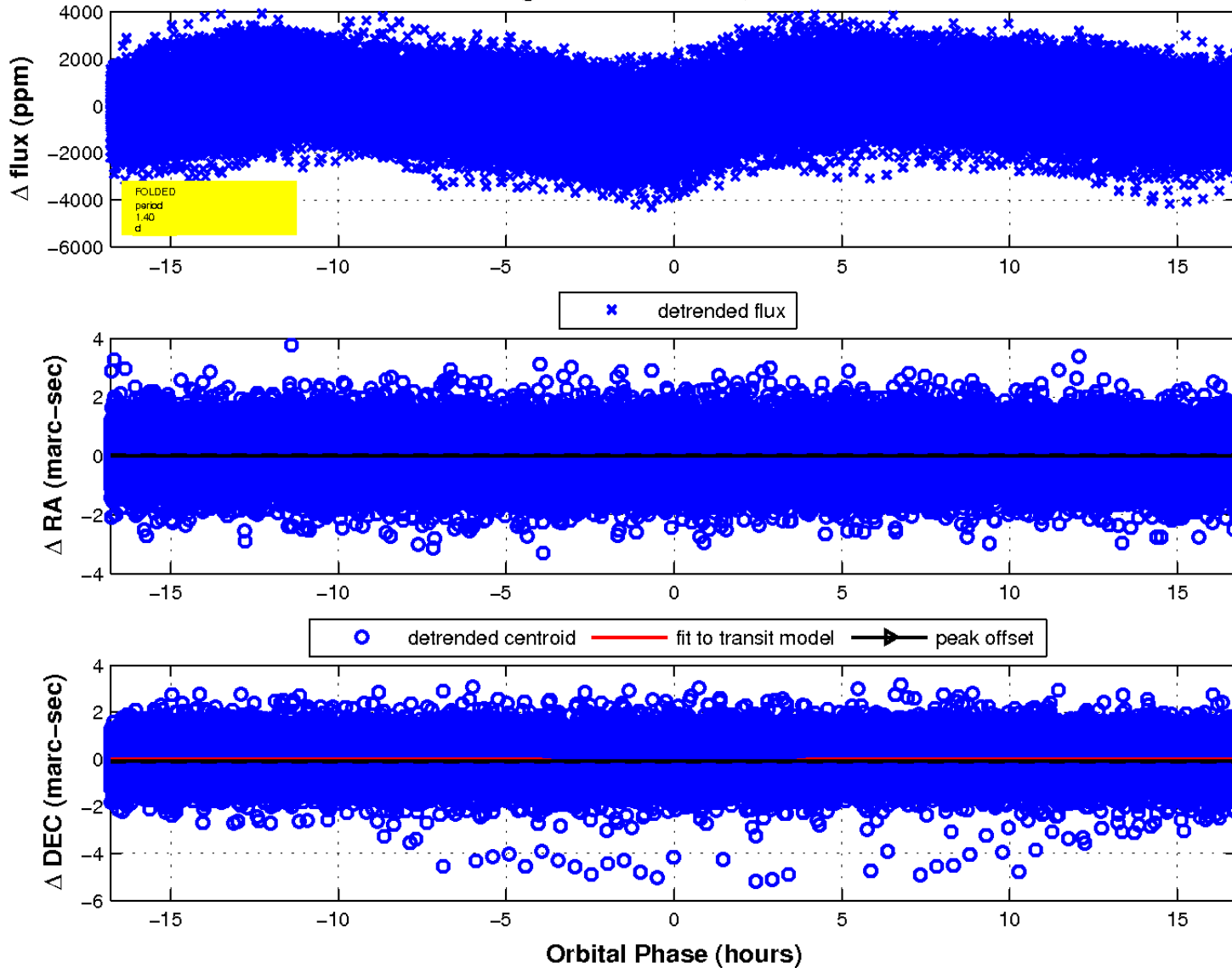
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

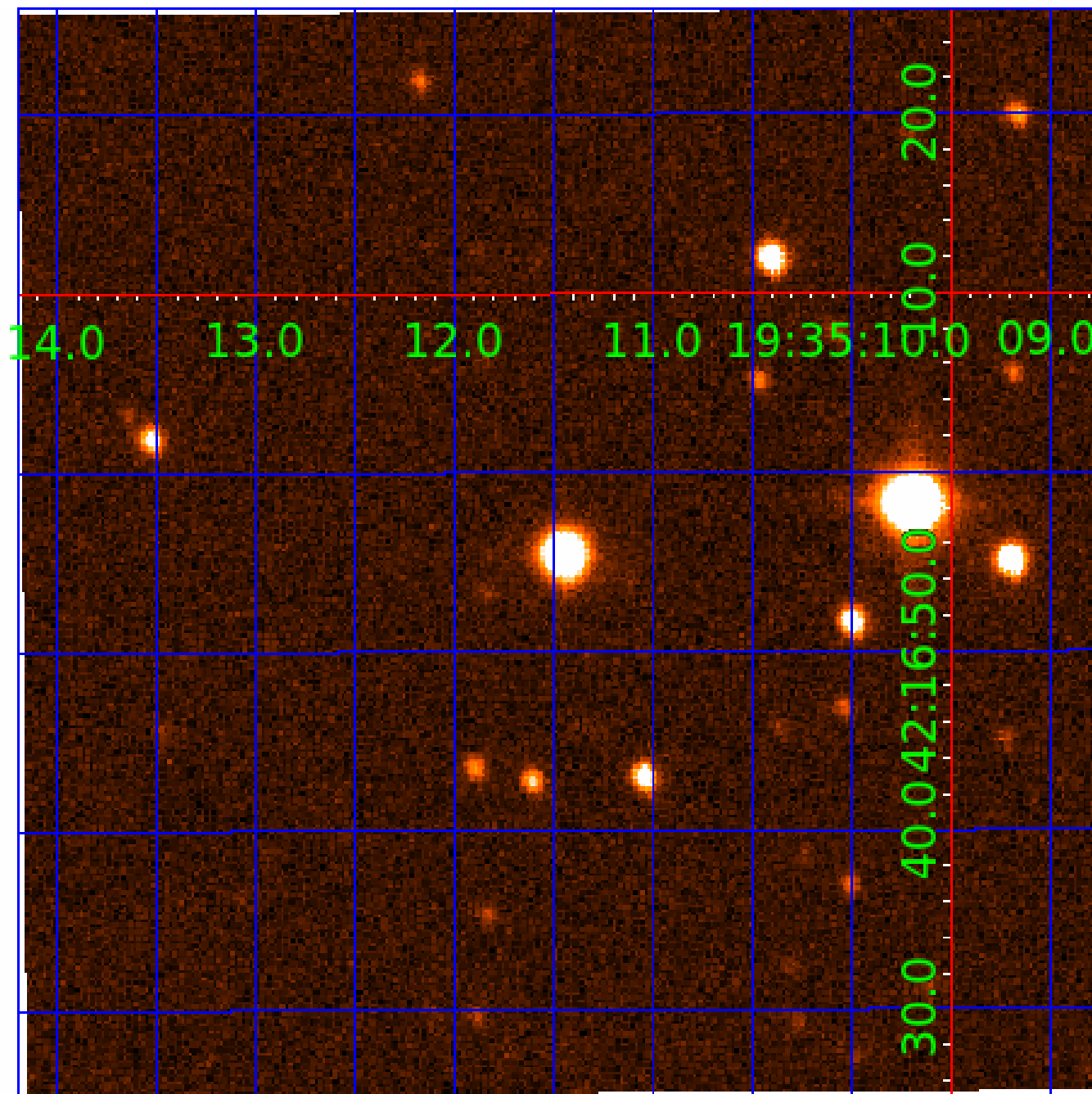


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 006784170

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006784170-01	OBS	No	1.399223	132.466533	41.6	8.136	7.7	5.1	2.34	7272	1.75	17703.20
006784170-02	OBS	No	1.399089	131.671487	372.7	14.348	16.3	21.0	2.34	7272	5.34	17705.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006784170-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
006784170-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—SAME_NTL_PERIOD

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

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

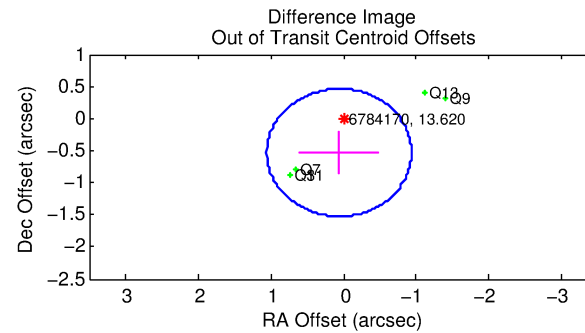
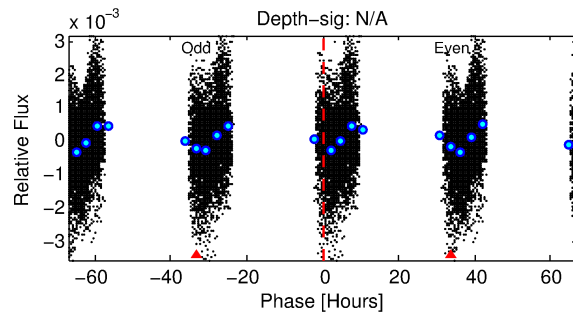
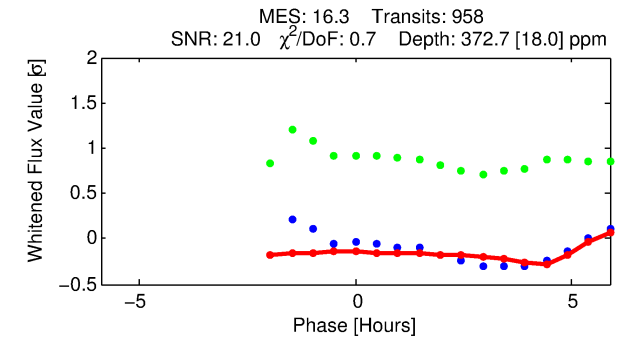
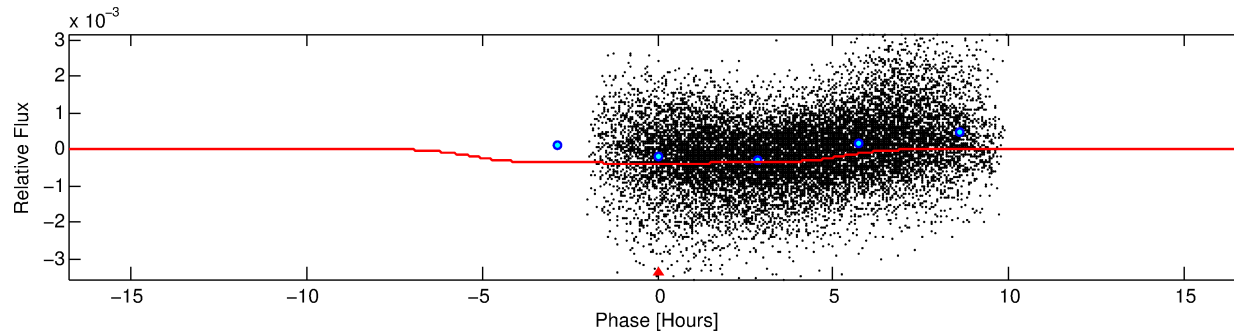
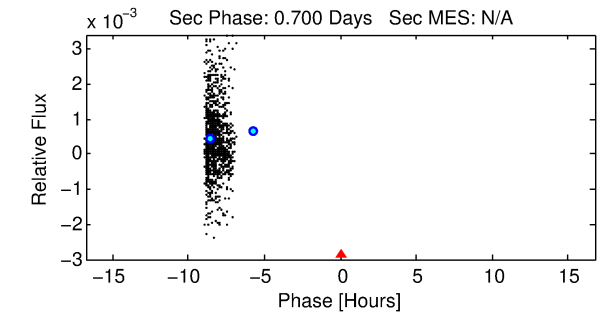
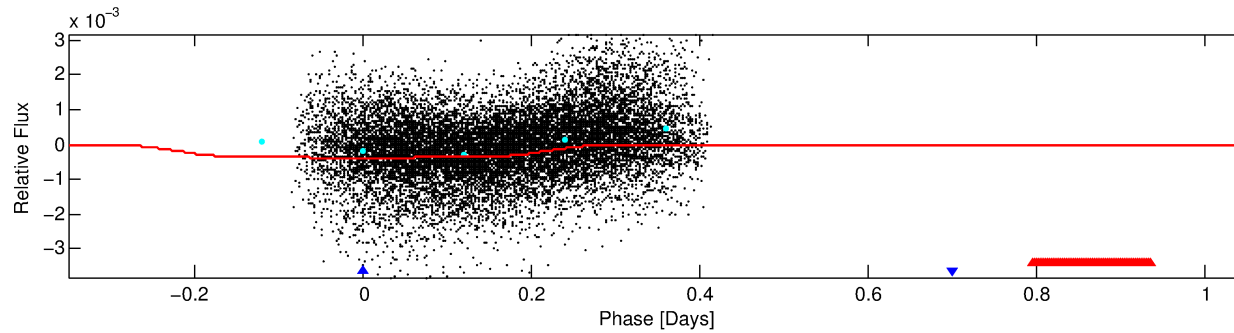
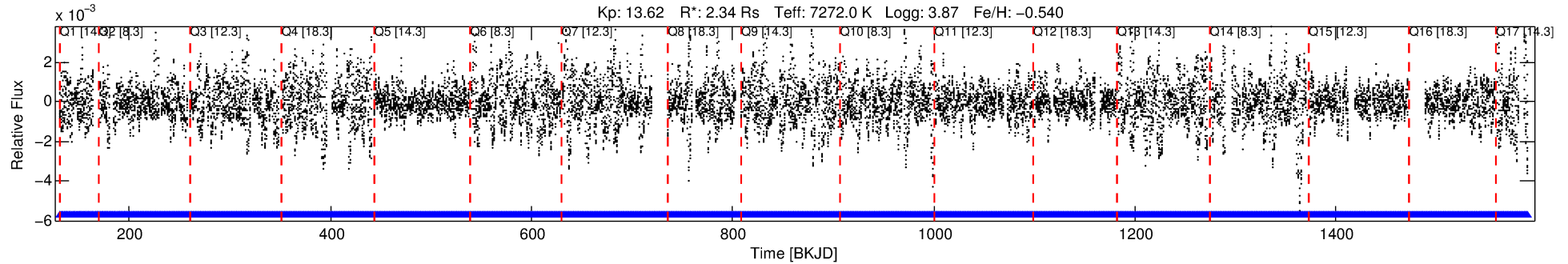
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006784170-02

No Significant Match Found

# DV One-Page Summary

KIC: 6784170 Candidate: 2 of 2 Period: 1.399 d



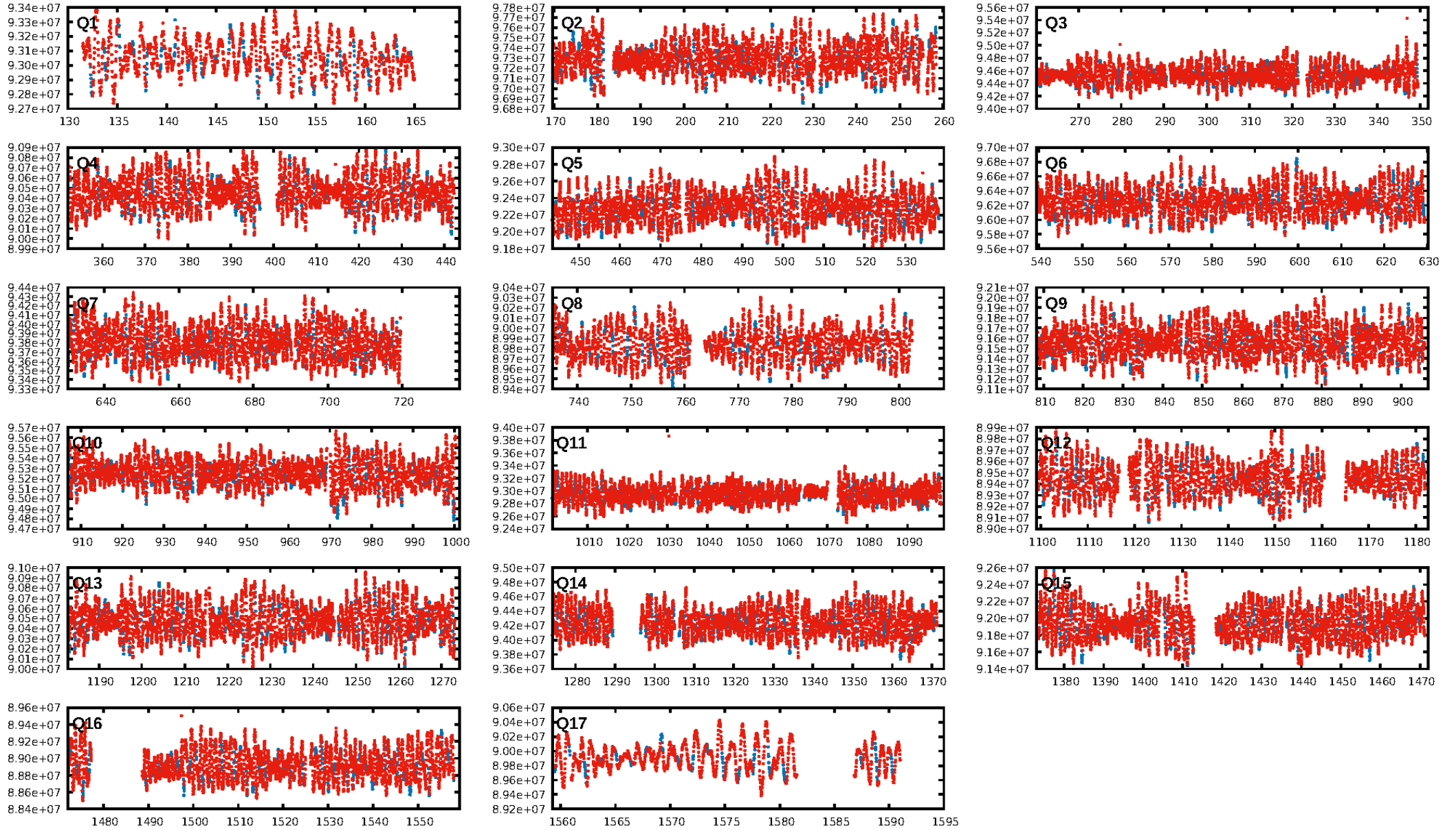
## DV Fit Results:

Period = 1.39909 [0.00001] d  
Epoch = 131.6715 [0.0166] BKJD  
Rp/R\* = 0.0209 [0.0005]  
a/R\* = 1.03 [0.01]  
b = 0.92 [0.01]  
Seff = 17705.46 [12216.63]  
Teq = 2941 [507] K  
Rp = 5.34 [2.40] Re  
a = 0.0279 [0.0118] AU

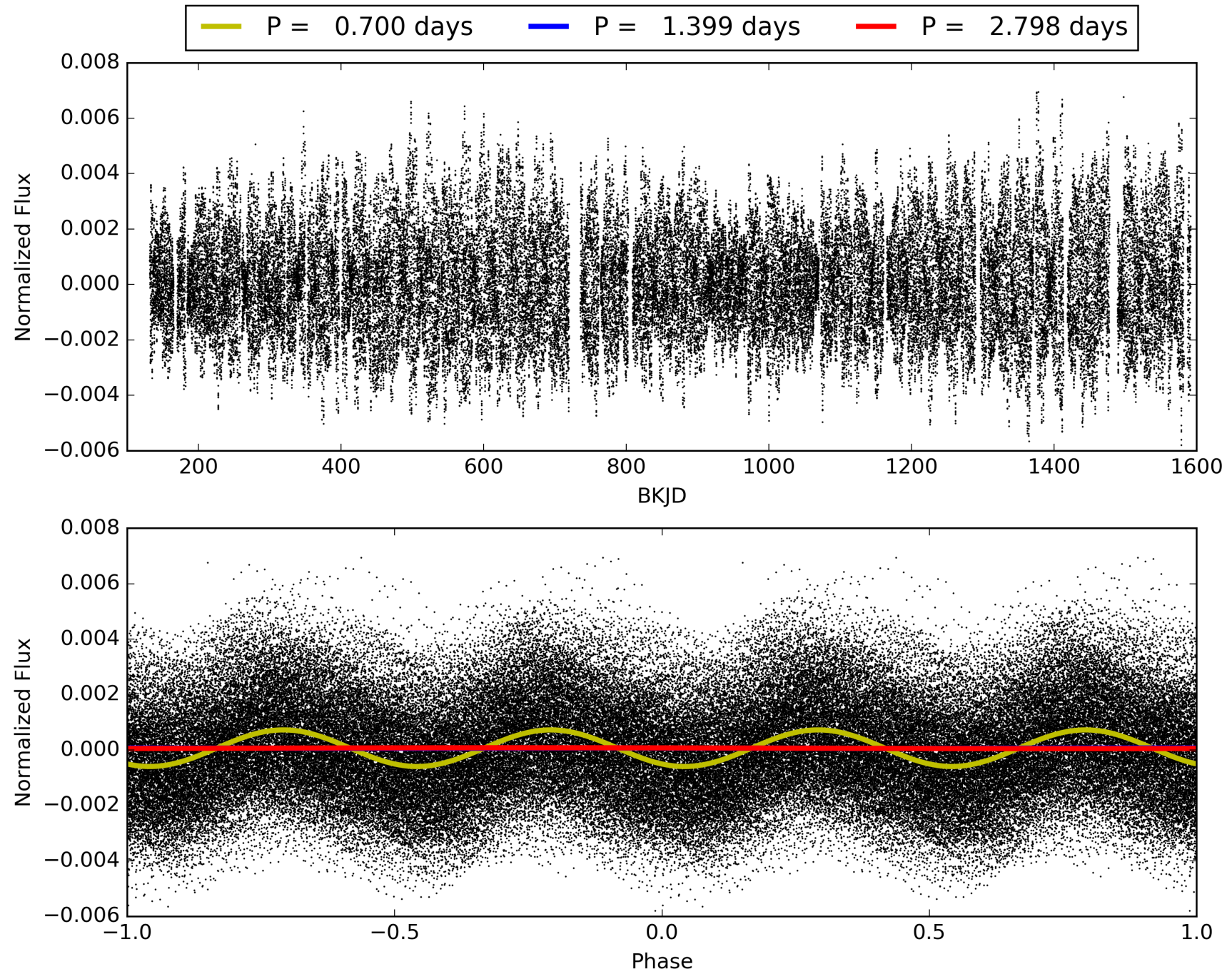
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [914/914]  
GhostDiagnostic-chr: 1.358  
Centroid-sig: 12.9%  
Centroid-so: 0.201 arcsec [4.46σ]  
OotOffset-rm: 0.535 arcsec [1.62σ]  
KicOffset-rm: 0.607 arcsec [1.91σ]  
OotOffset-st: 0/3/0/2 [5]  
KicOffset-st: 0/3/0/2 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 006784170-02, PDC Light Curves



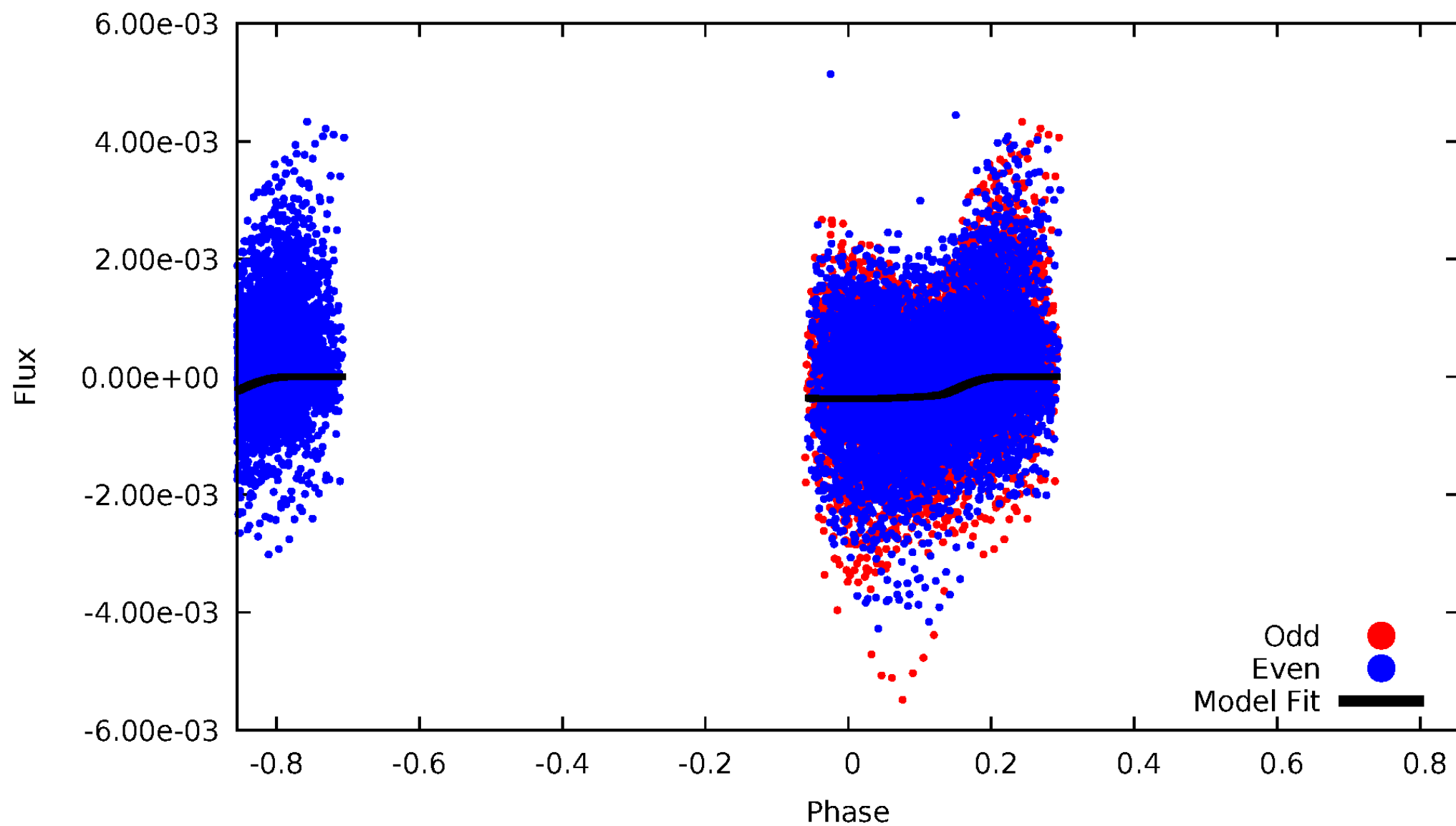
TCE 006784170-02





# DV Odd/Even

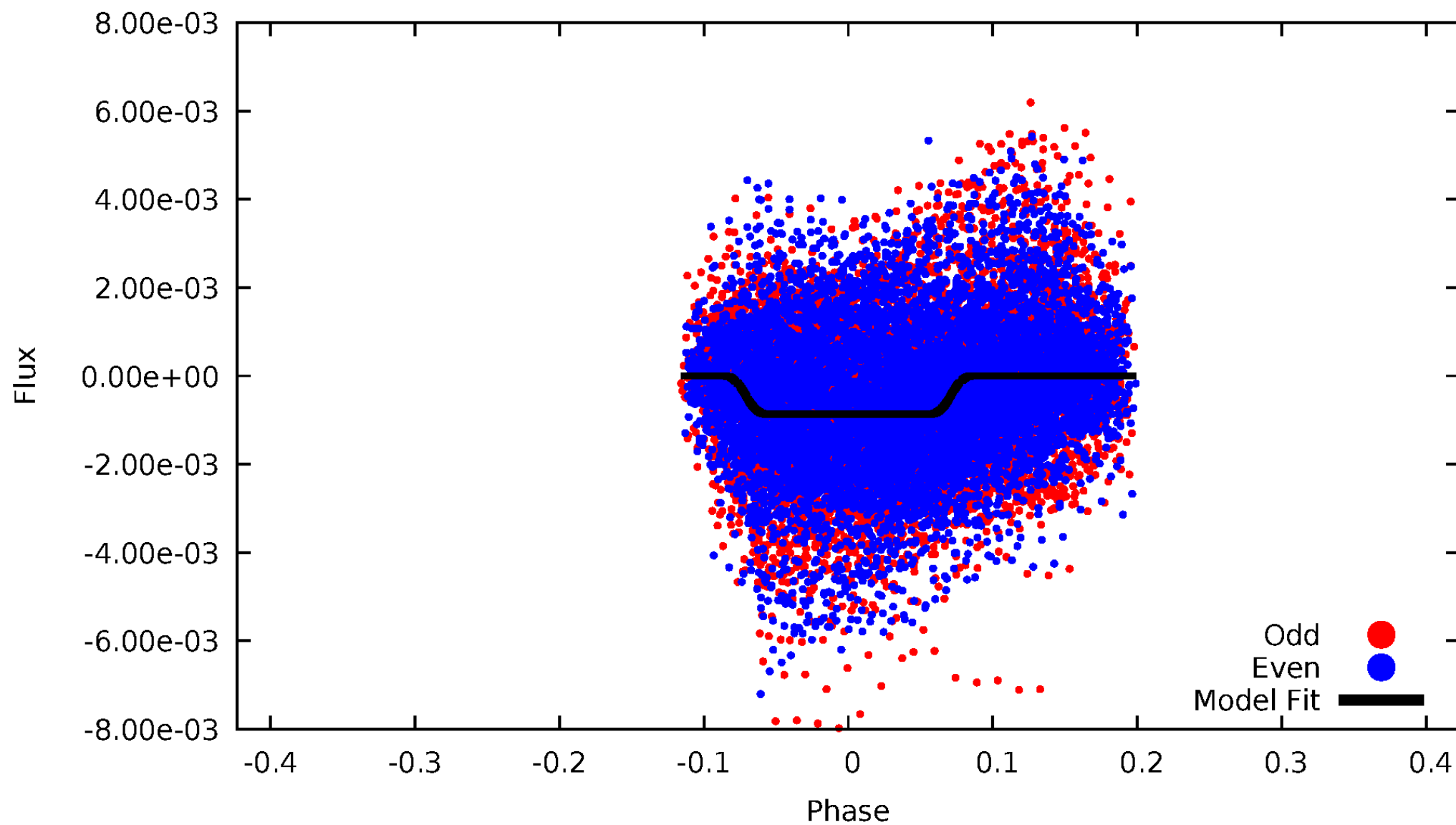
TCE 006784170-02





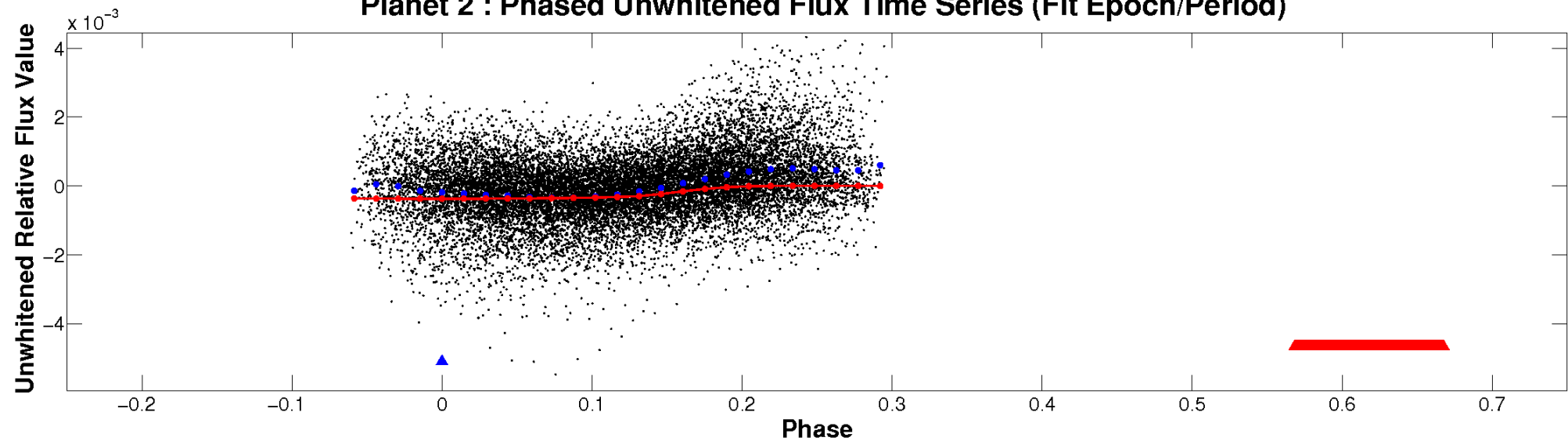
# ALT Odd/Even

TCE 006784170-02

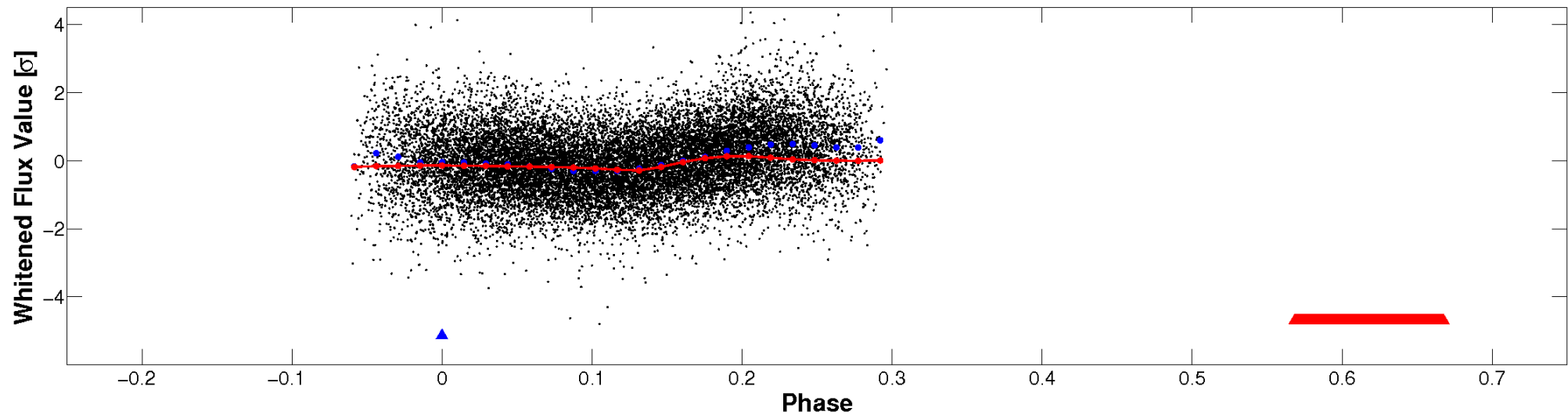


# Non-Whitened Vs. Whitened Light Curve

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

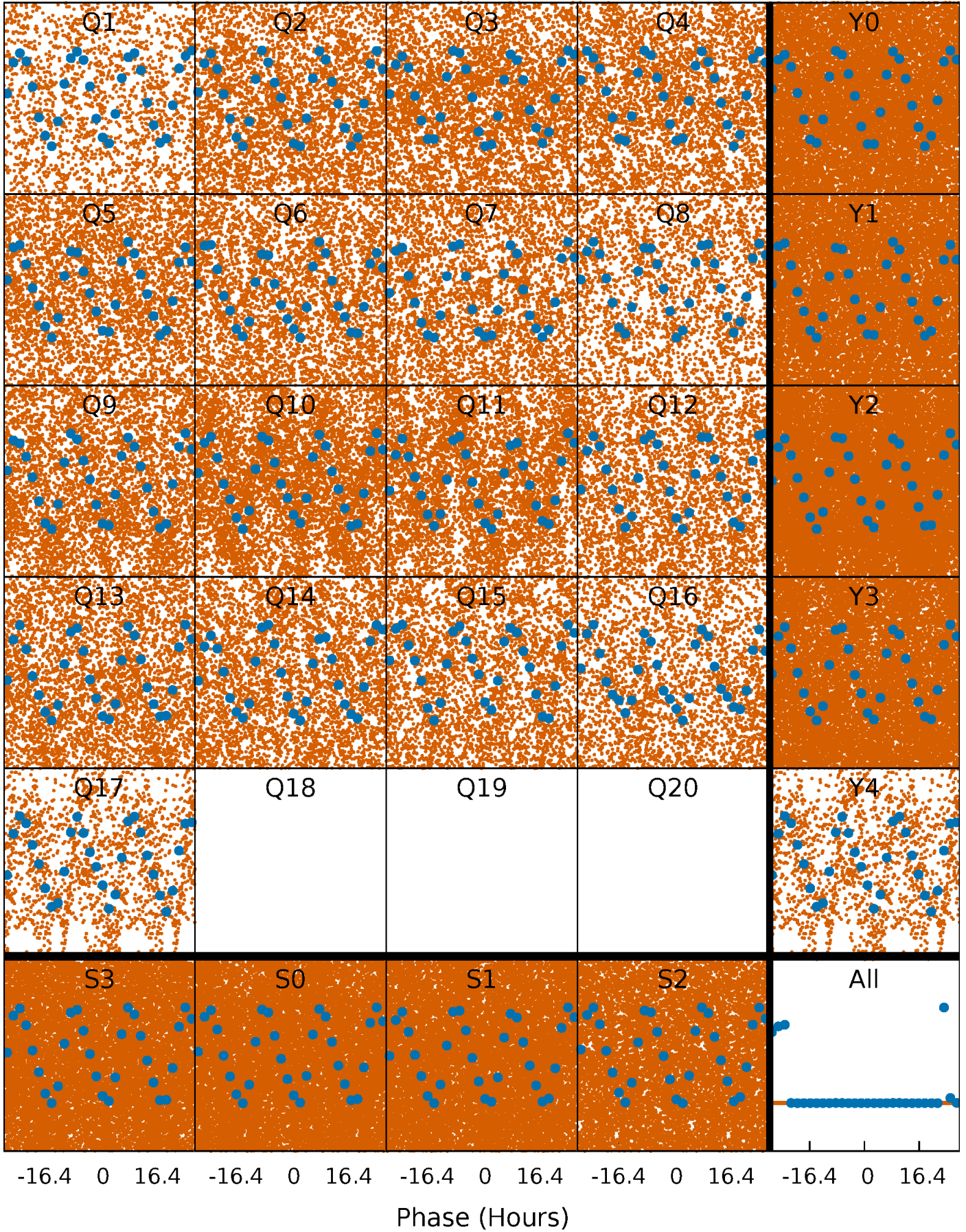


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



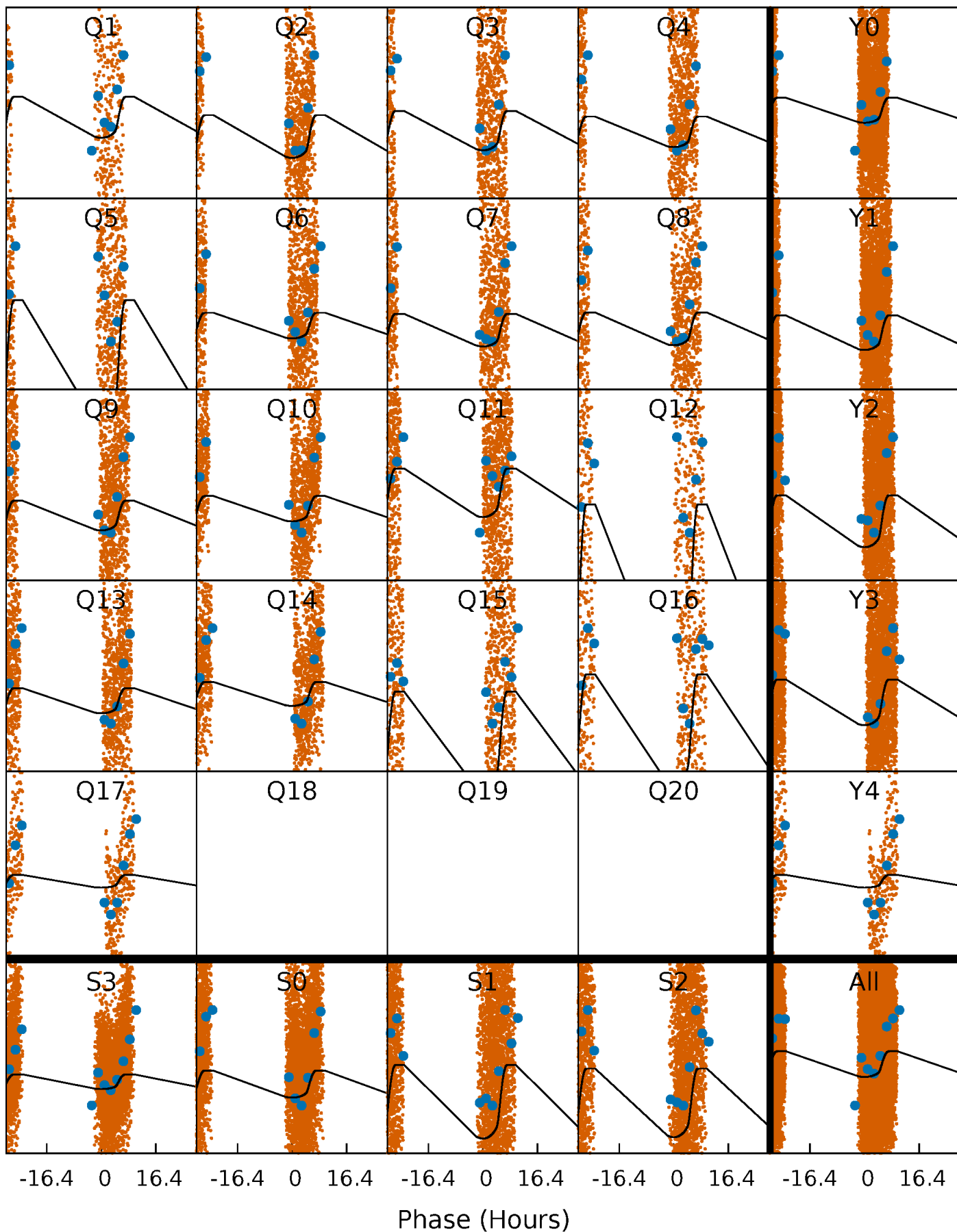
# PDC Quarter-Phased Transit Curves

TCE 006784170-02   P= 1.399089 Days    $T_0=131.671487$  (BKJD)



# DV Quarter-Phased Transit Curves

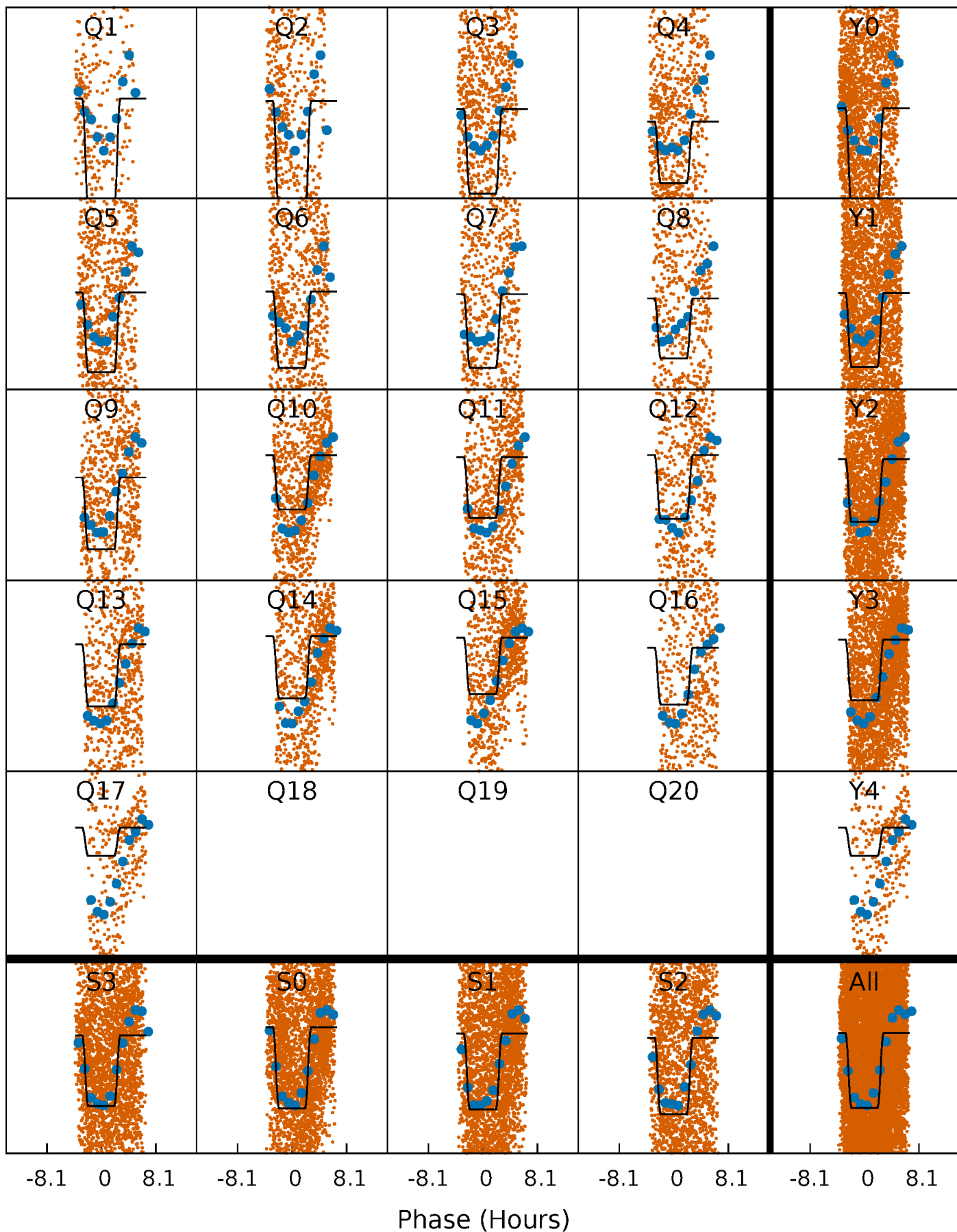
TCE 006784170-02   P= 1.399089 Days    $T_0=131.671487$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 006784170-02 P= 1.399146 Days  $T_0=131.748706$  (BKJD)

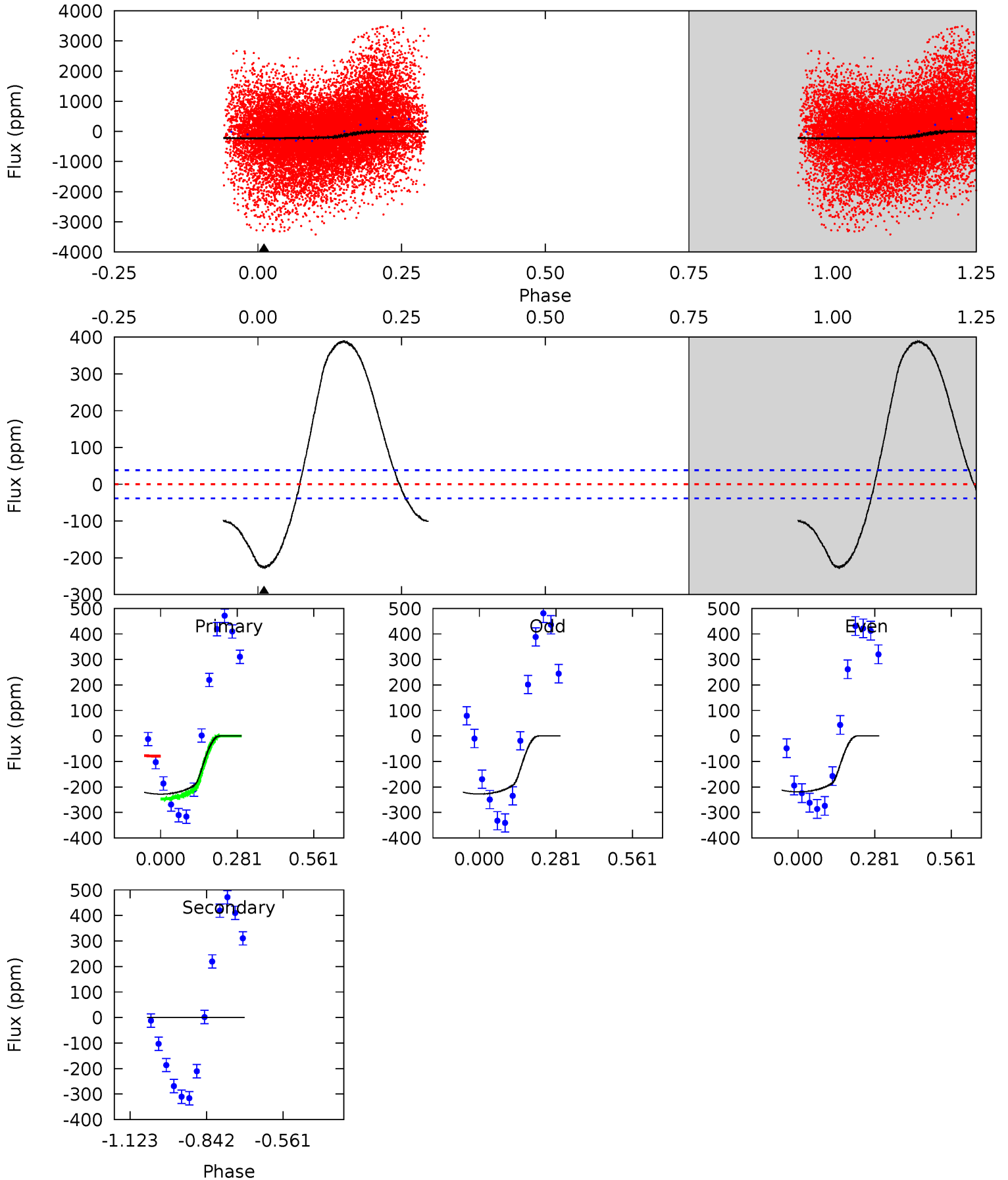




# DV Model-Shift Uniqueness Test

006784170-02, P = 1.399089 Days, E = 130.272398 Days

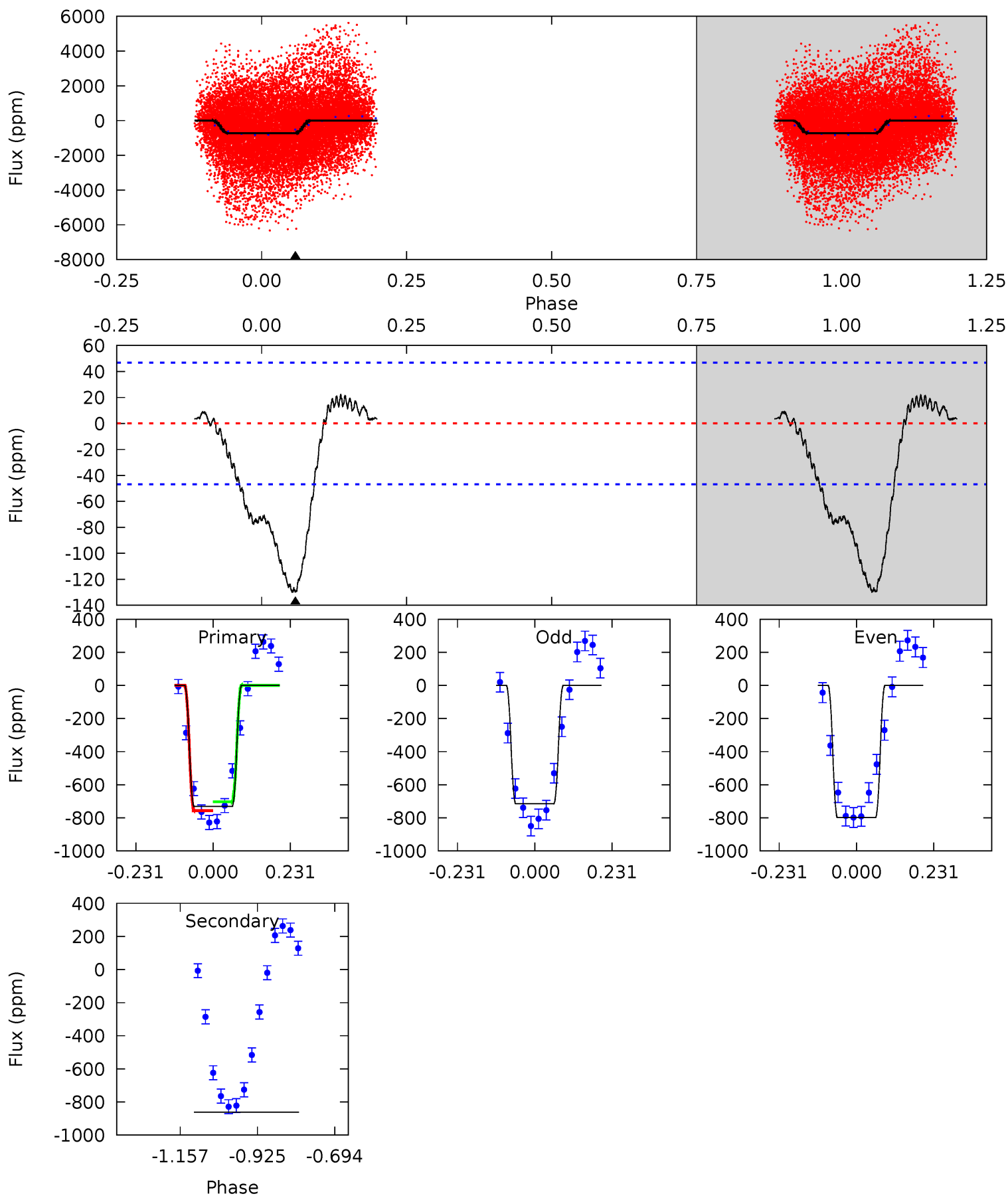
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.8	0	0	0	4.34	1.08	6.76	25.8	25.8	0	0	0.48	1.32	0.63	5.80



# Alt Model-Shift Uniqueness Test

006784170-02, P = 1.399146 Days, E = 130.349560 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
12.2	0	0	0	4.39	1.20	0.67	12.2	12.2	0	0	0.70	0	0.15	2.77



### Stellar Parameters For KIC 006784170

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7272^{+230}_{-307}$	$3.867^{+0.390}_{-0.104}$	$-0.540^{+0.250}_{-0.300}$	$2.342^{+0.450}_{-1.049}$	$1.472^{+0.188}_{-0.323}$	$0.162^{+0.583}_{-0.050}$
	+3%/-4%	+10%/-3%	+46%/-56%	+19%/-45%	+13%/-22%	+361%/-31%
Source	KIC0	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 006784170-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 9$	$5.23^{+0.64}_{-1.22}$	$4020^{+278}_{-465}$	$-3651^{+466}_{-306}$	$0.003^{+0.148}_{-0.147}$
Alt.	$0 \pm 11$	$7.29^{+0.89}_{-1.65}$	$4009^{+295}_{-460}$	$-3664^{+336}_{-254}$	$-0.001^{+0.099}_{-0.100}$

$T_{max}$  = 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

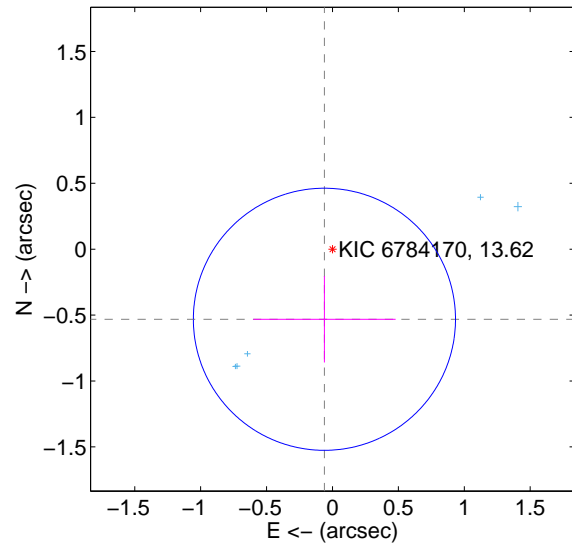
Supplemental centroid analysis for 006784170-02. Kepler magnitude: 13.62. Transit SNR 21.01

There are 5 quarters with good PRF difference image offsets

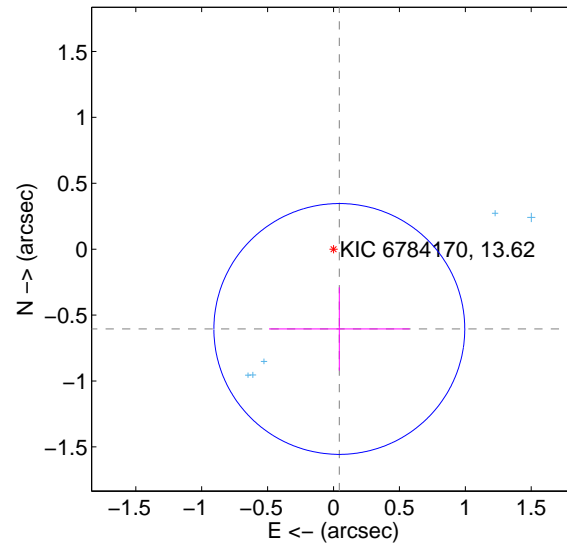
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.535 \pm 0.331$	1.62	$0.061 \pm 0.540$	$-0.532 \pm 0.328$
PRF-fit source offset from KIC position	$0.607 \pm 0.317$	1.91	$-0.044 \pm 0.534$	$-0.605 \pm 0.316$
photometric centroid source offset	$0.20 \pm 0.05$	4.46	$-0.11 \pm 0.05$	$-0.17 \pm 0.05$

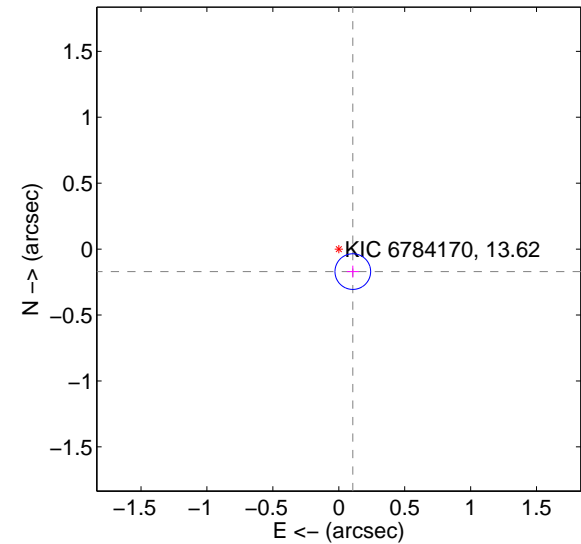
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

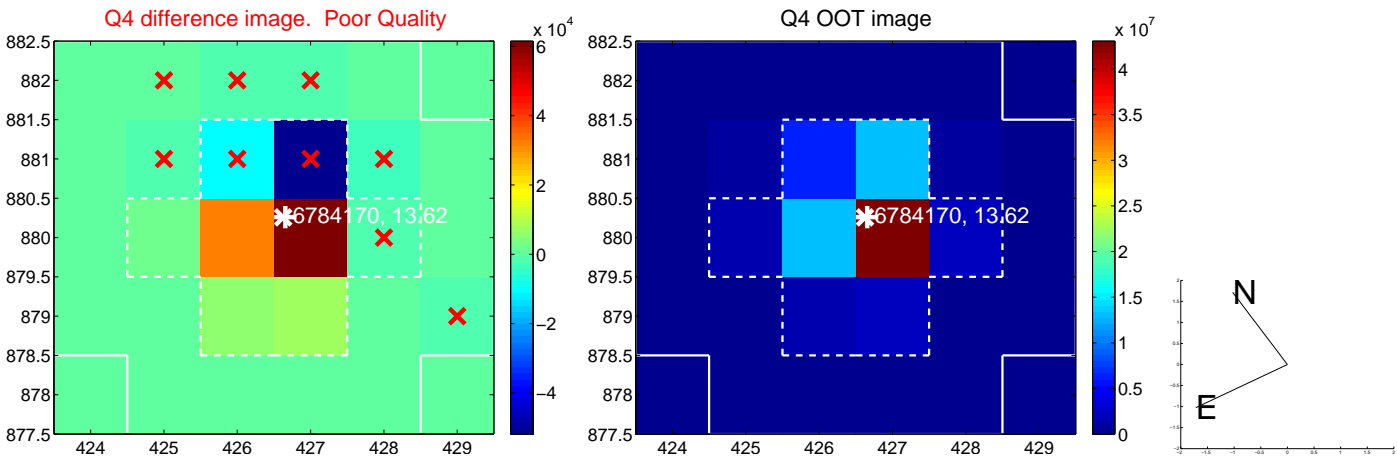
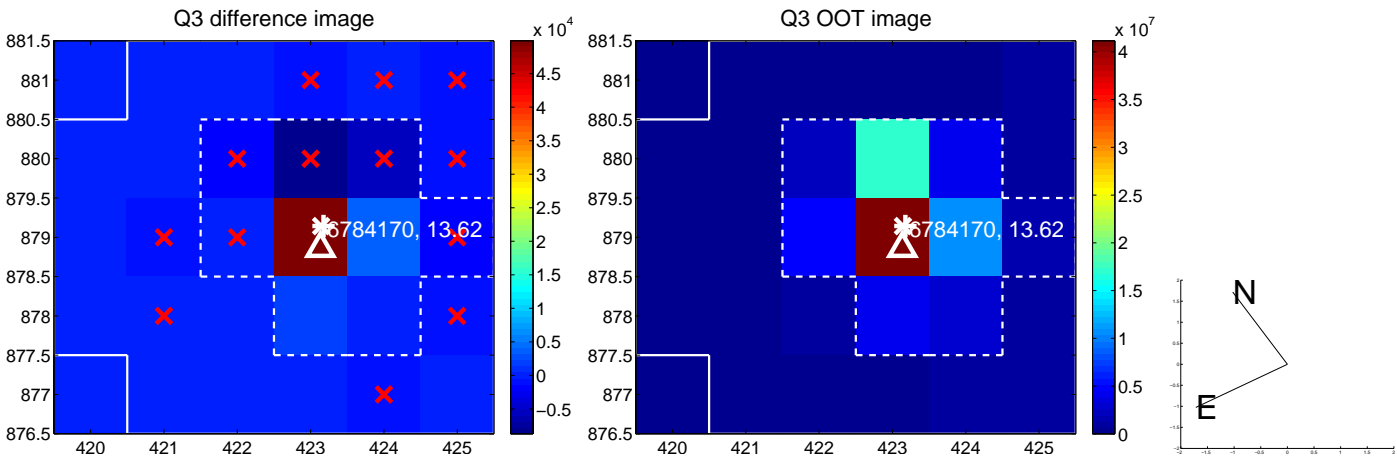
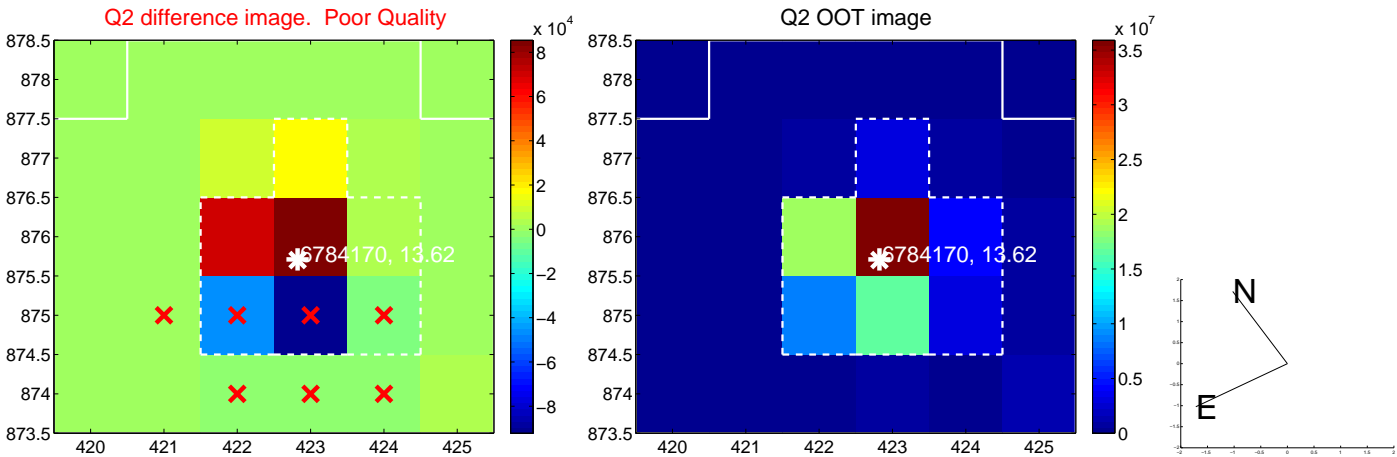
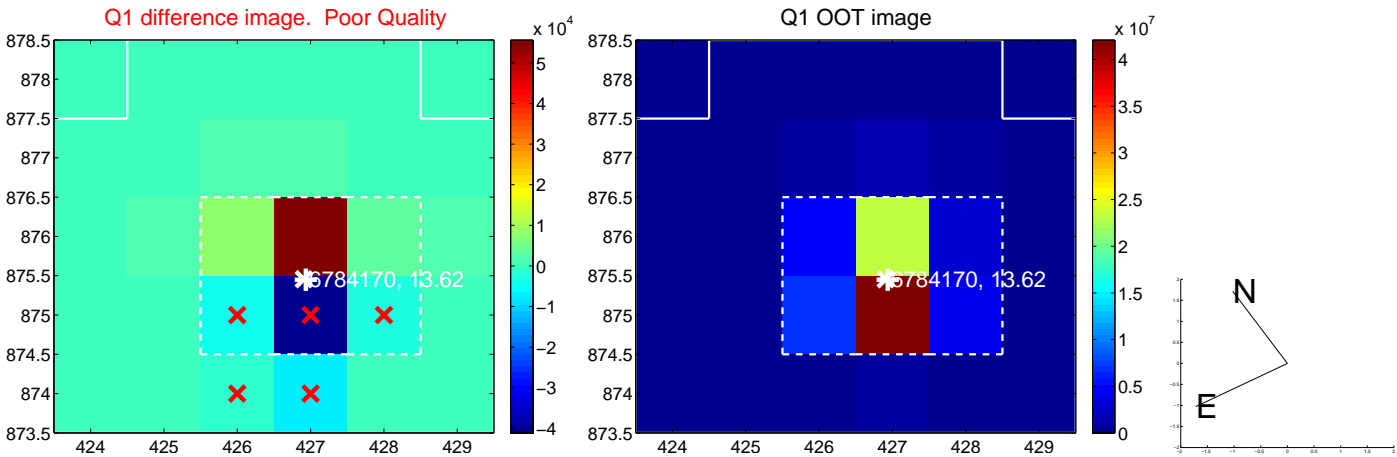


offset from photometric centroids



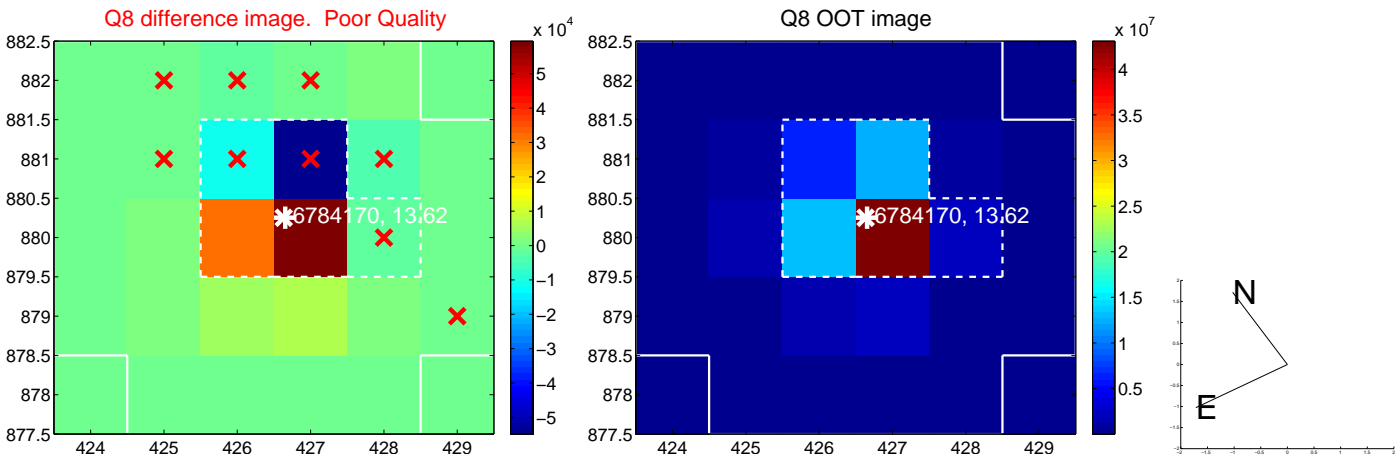
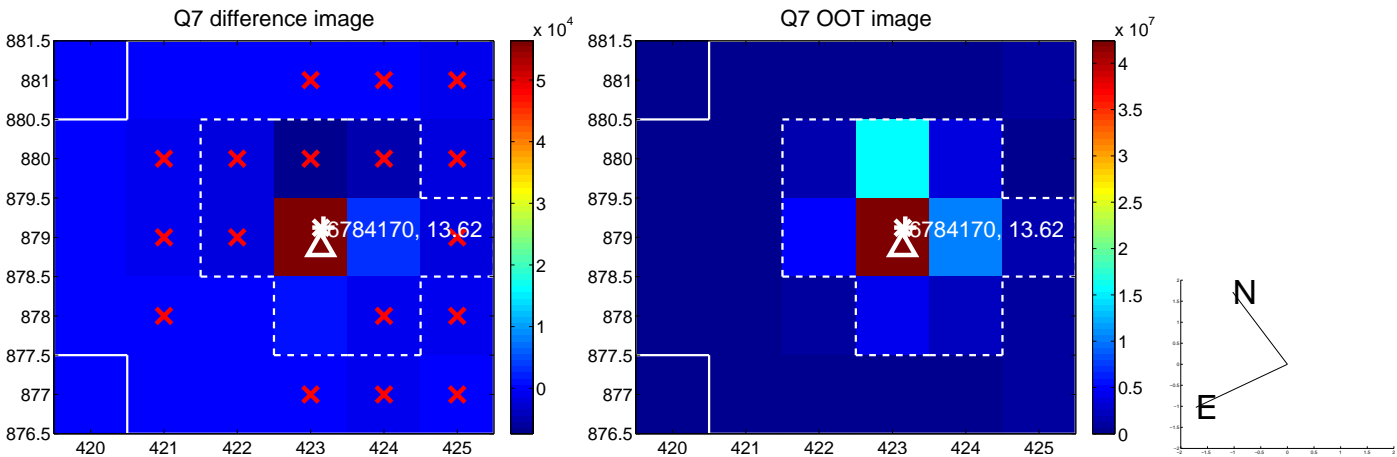
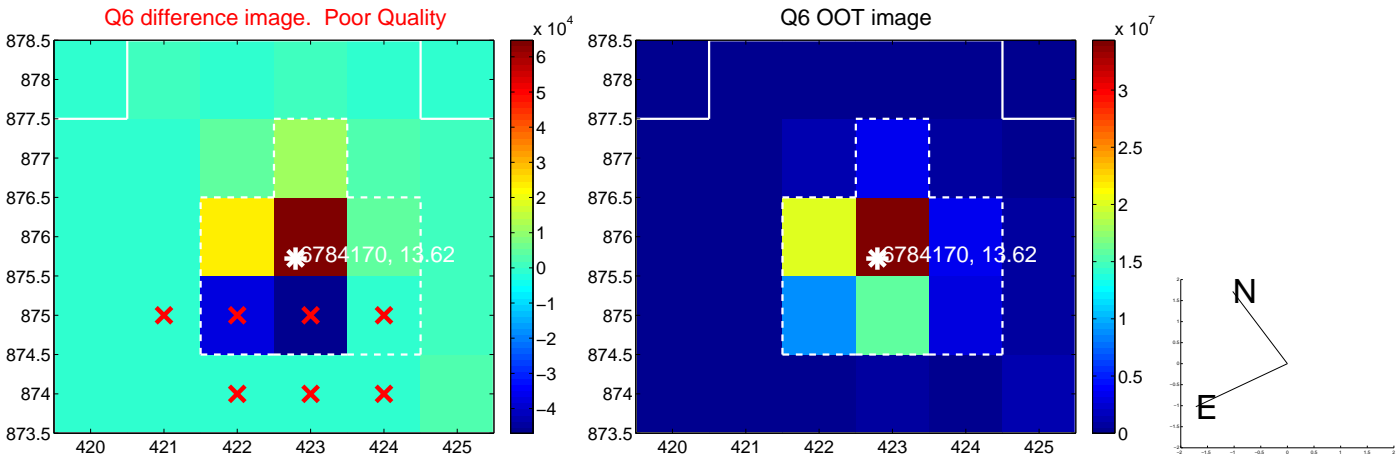
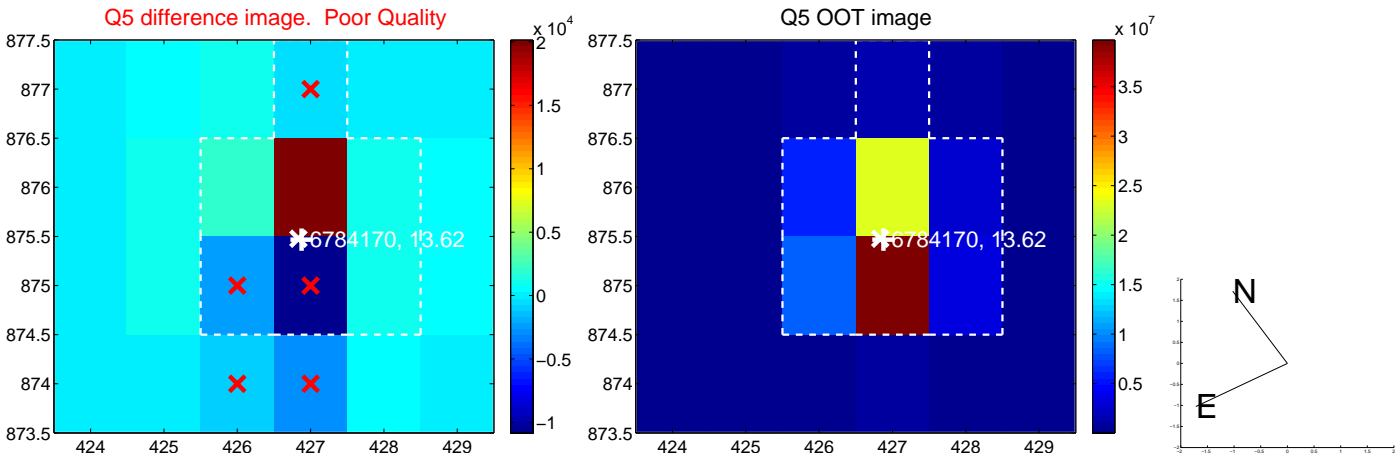
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

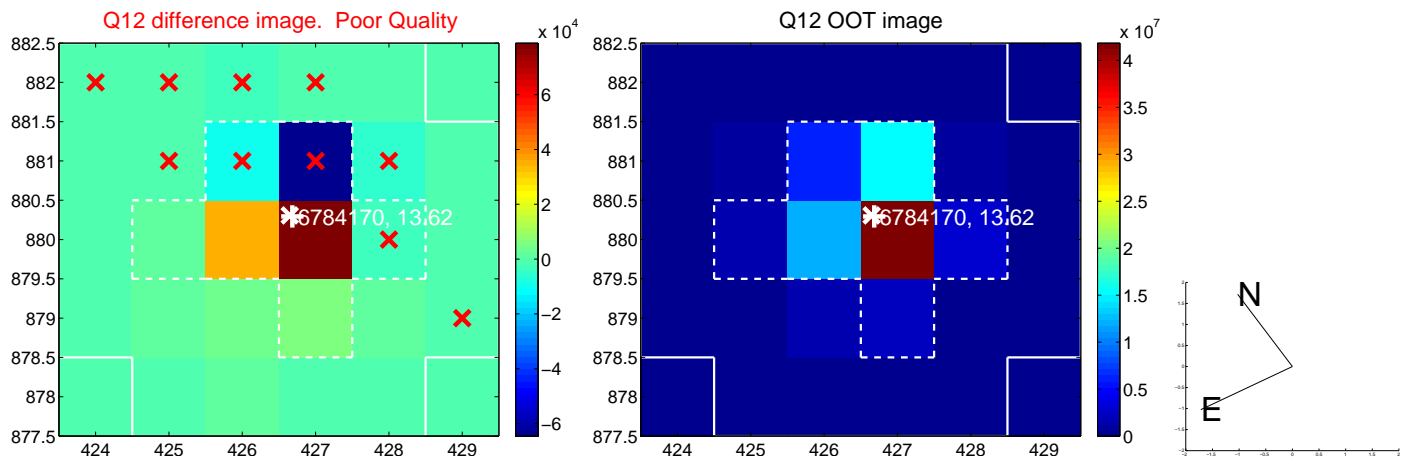
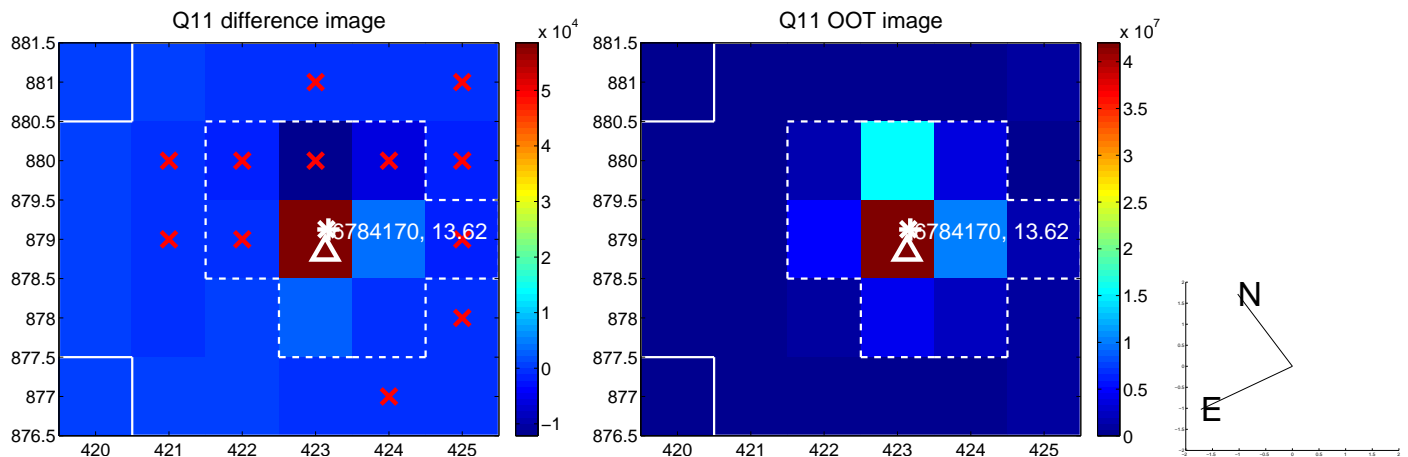
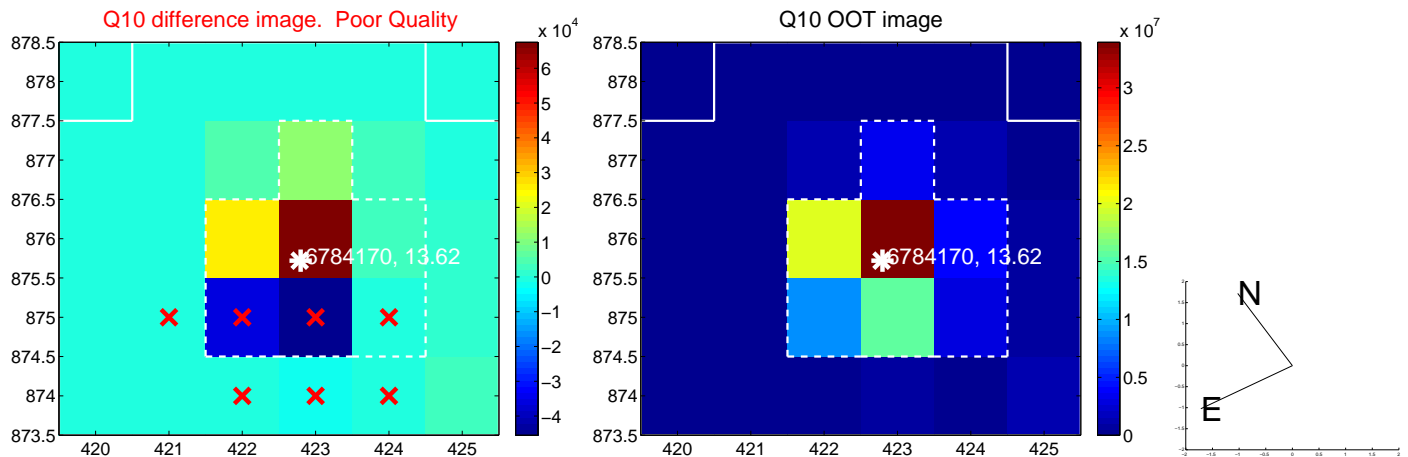
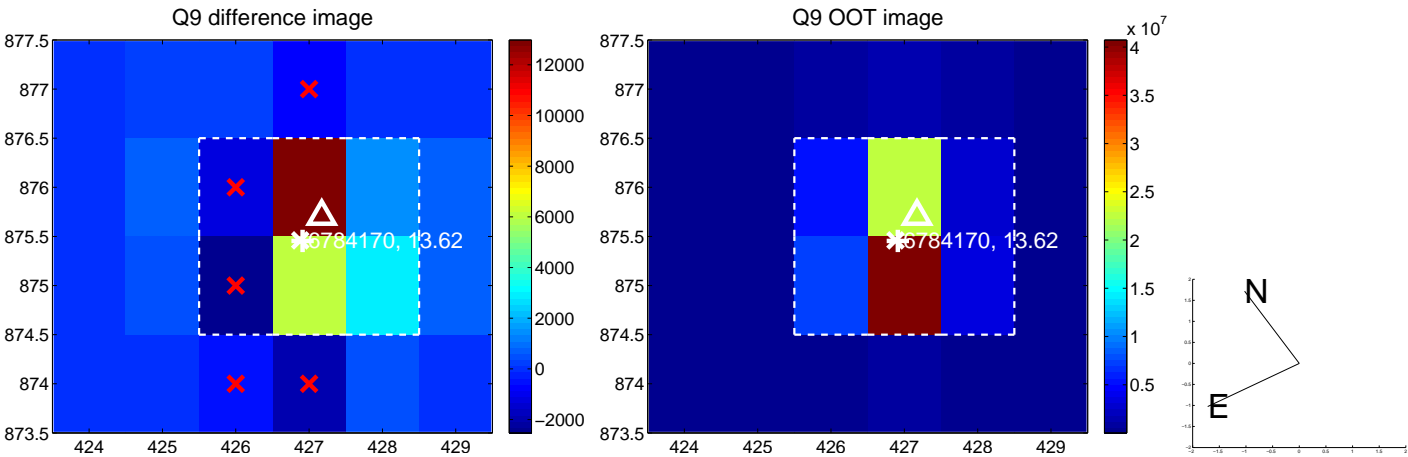




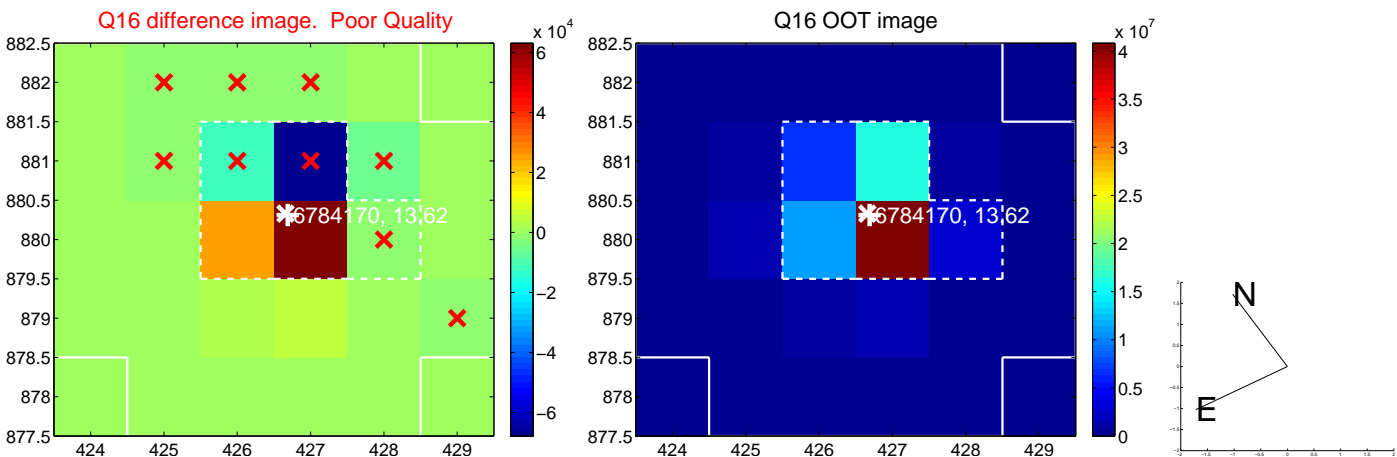
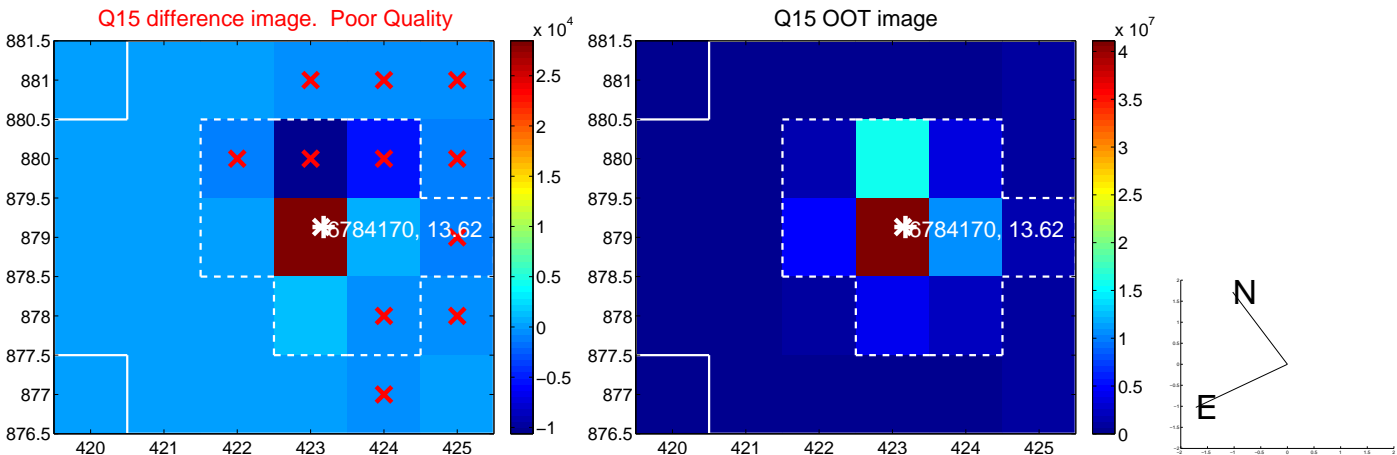
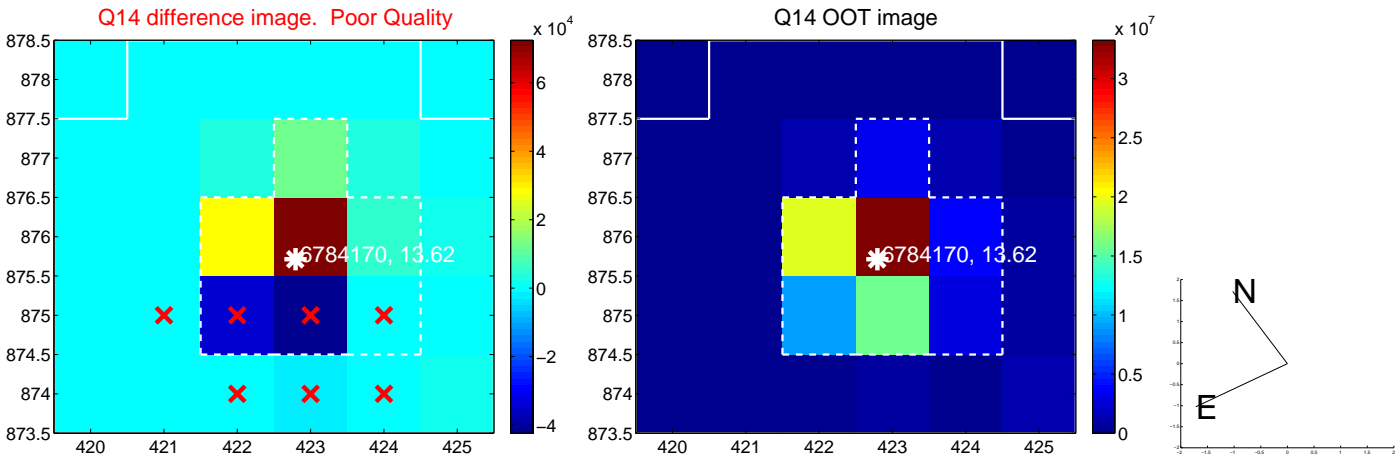
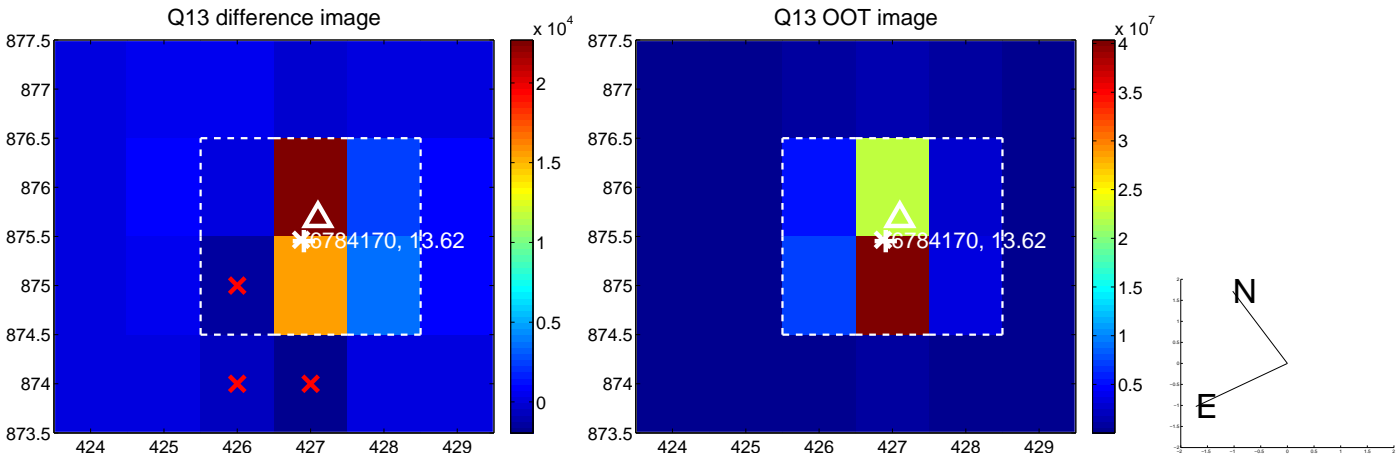
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



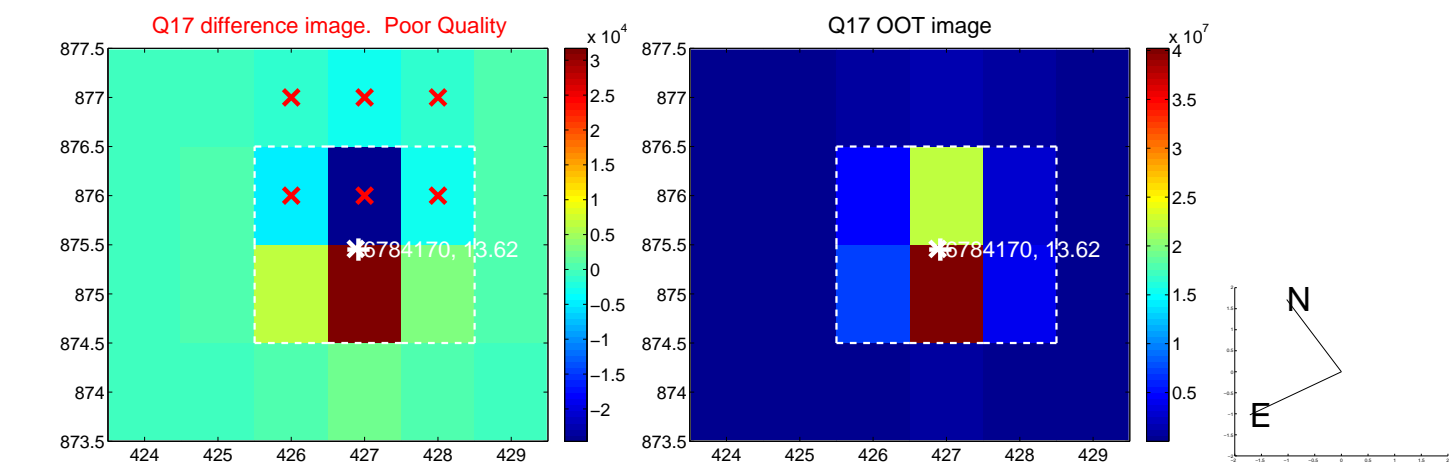
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



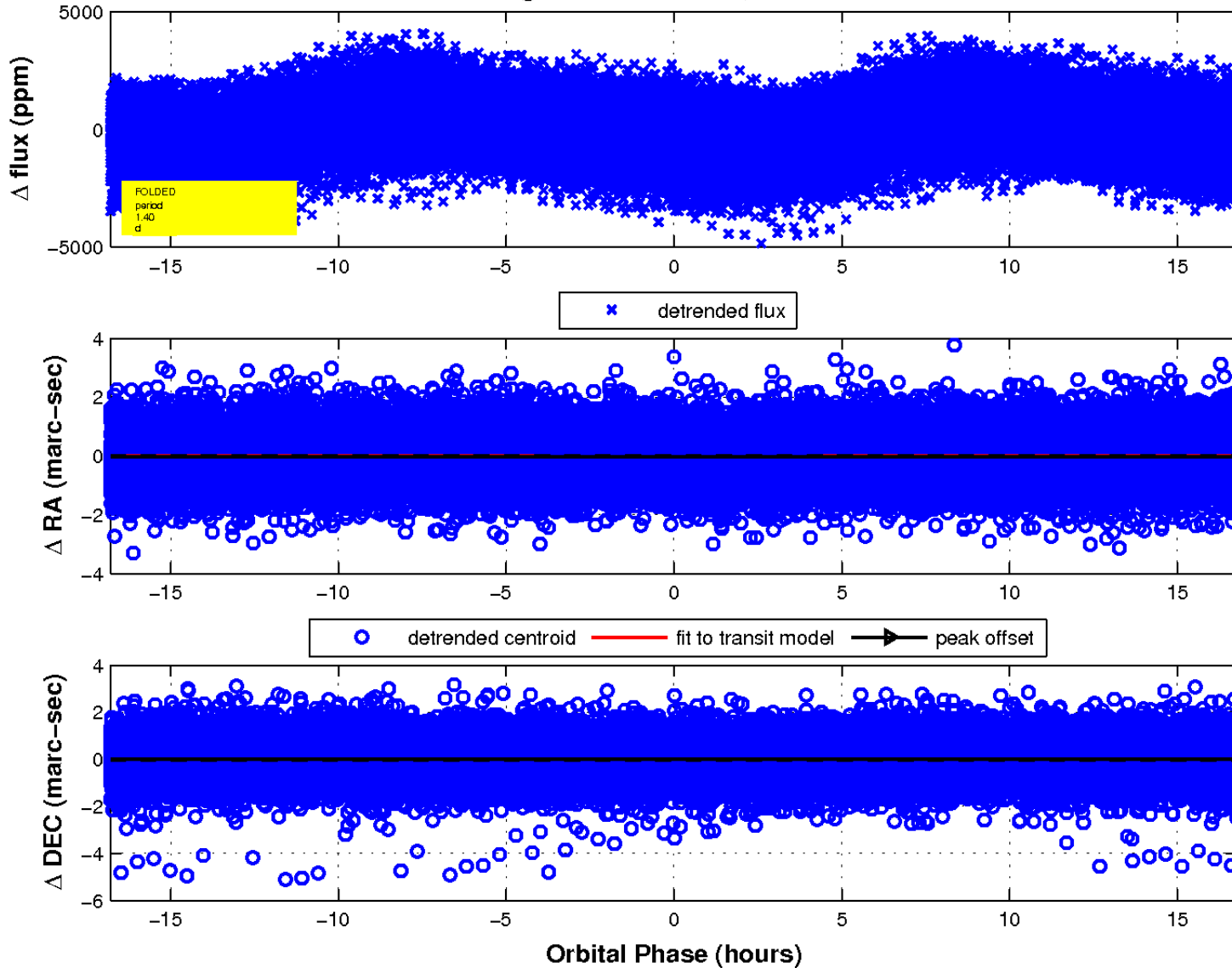
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

