

# KIC 006116172

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006116172-01	OBS	No	5.267689	136.308765	195.2	8.902	12.3	13.5	1.86	6967	3.09	1562.16
006116172-02	OBS	No	5.267756	131.657434	226.5	6.000	10.3	-1.0	1.86	6967	2.83	1562.13
006116172-03	OBS	No	1.259762	131.845504	62.5	13.226	8.8	10.4	1.86	6967	1.49	10523.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006116172-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006116172-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_NOFITS
006116172-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS

**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.

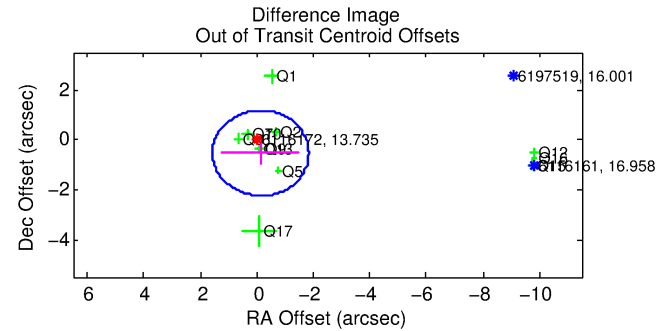
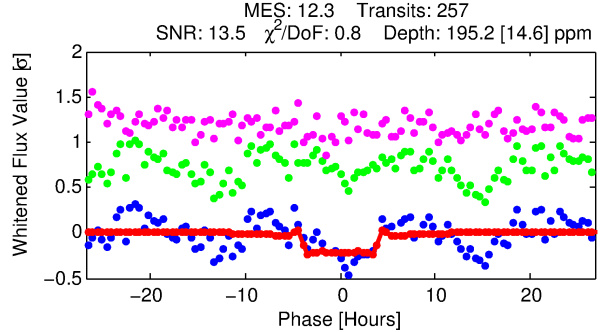
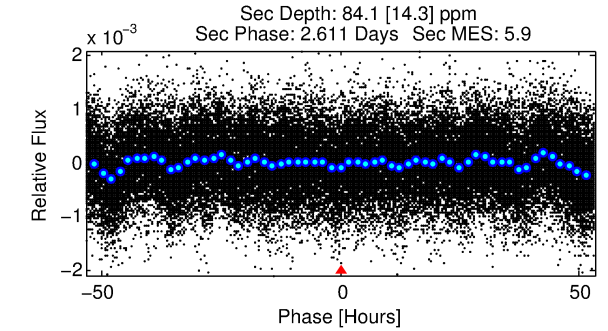
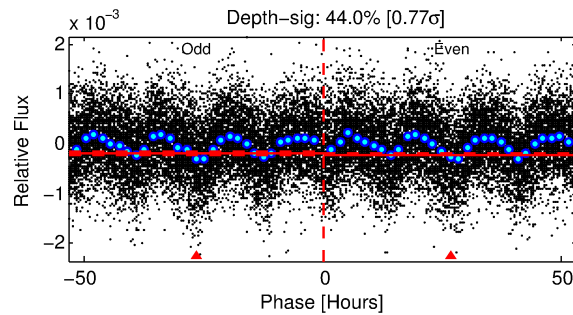
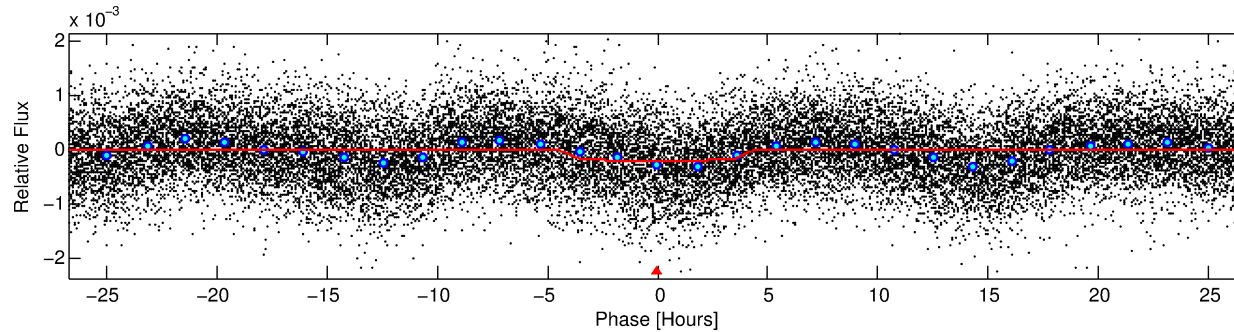
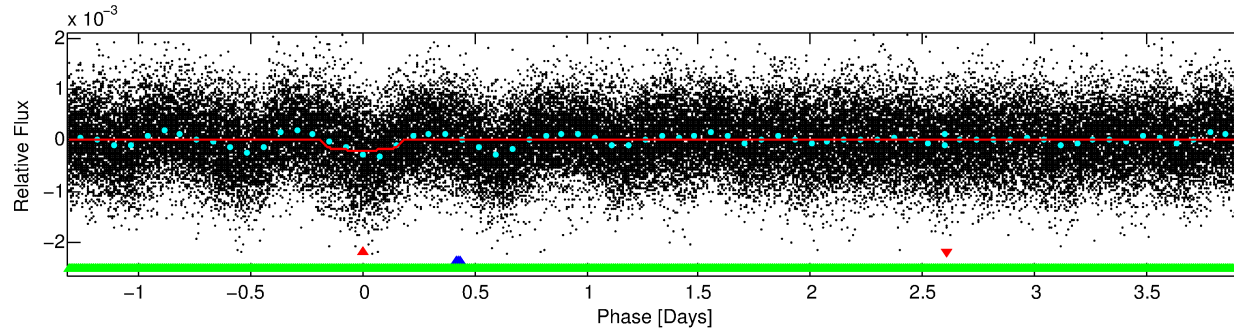
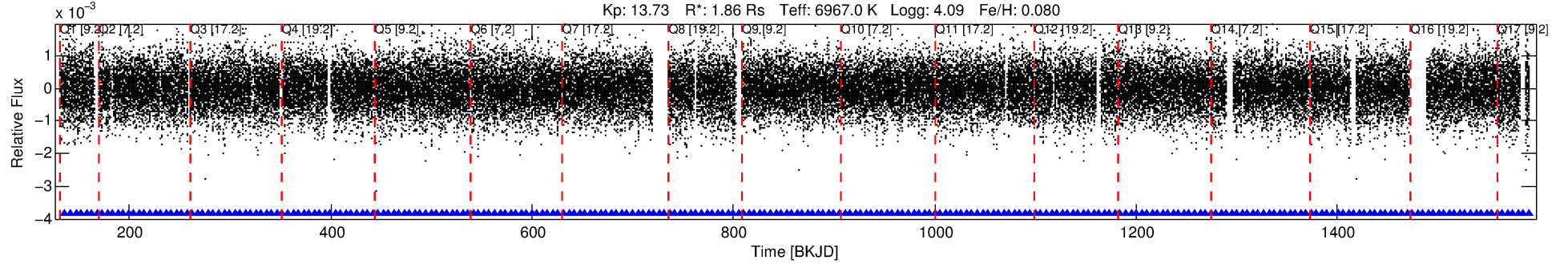
Ephemeris Match Information For 006116172-01

No Significant Match Found

# DV One-Page Summary

KIC: 6116172 Candidate: 1 of 3 Period: 5.268 d  
KOI: K06142 Corr: No Ephemeris Match

Kp: 13.73 R\*: 1.86 Rs Teff: 6967.0 K Logg: 4.09 Fe/H: 0.080



## DV Fit Results:

Period = 5.26769 [0.00005] d  
Epoch = 136.3088 [0.0062] BKJD  
Rp/R\* = 0.0152 [0.0008]  
a/R\* = 2.12 [0.38]  
b = 0.92 [0.04]  
Seff = 1562.16 [614.91]  
Teff = 1603 [158] K  
Rp = 3.09 [0.97] Re  
a = 0.0685 [0.0169] AU  
Ag = 22.69 [9.05] [2.40σ]  
Teffp = 5409 [376] K [9.33σ]

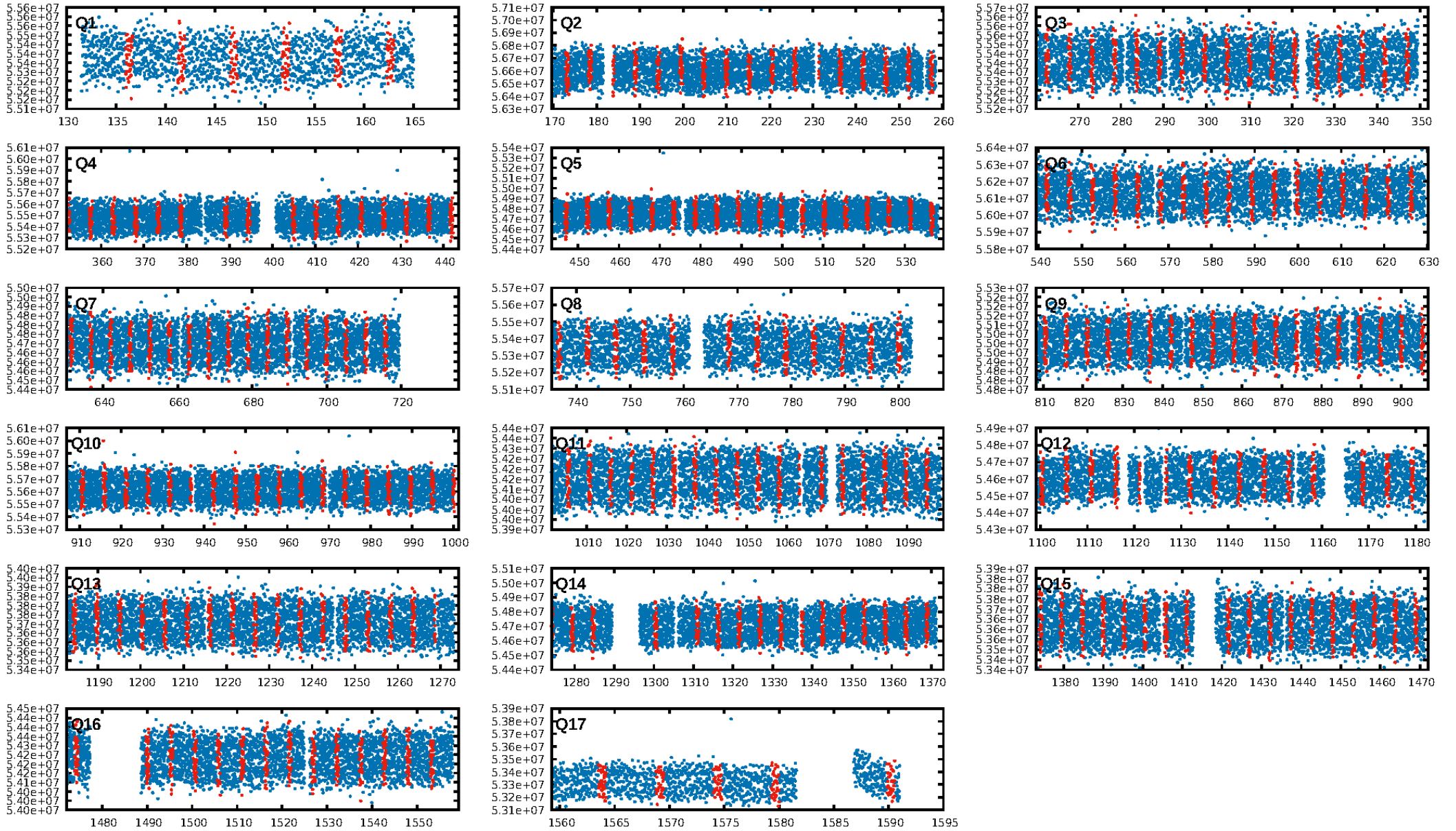
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.03σ]  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [246/246]  
GhostDiagnostic-chr: 3.182  
Centroid-sig: 0.0%  
Centroid-so: 0.708 arcsec [1.28σ]  
OotOffset-rm: 0.556 arcsec [0.98σ]  
KicOffset-rm: 0.566 arcsec [0.94σ]  
OotOffset-st: 2/3/2/5 [12]  
KicOffset-st: 2/3/2/5 [12]  
DiffImageQuality-fgm: 0.83 [10/12]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 07:14:11 Z

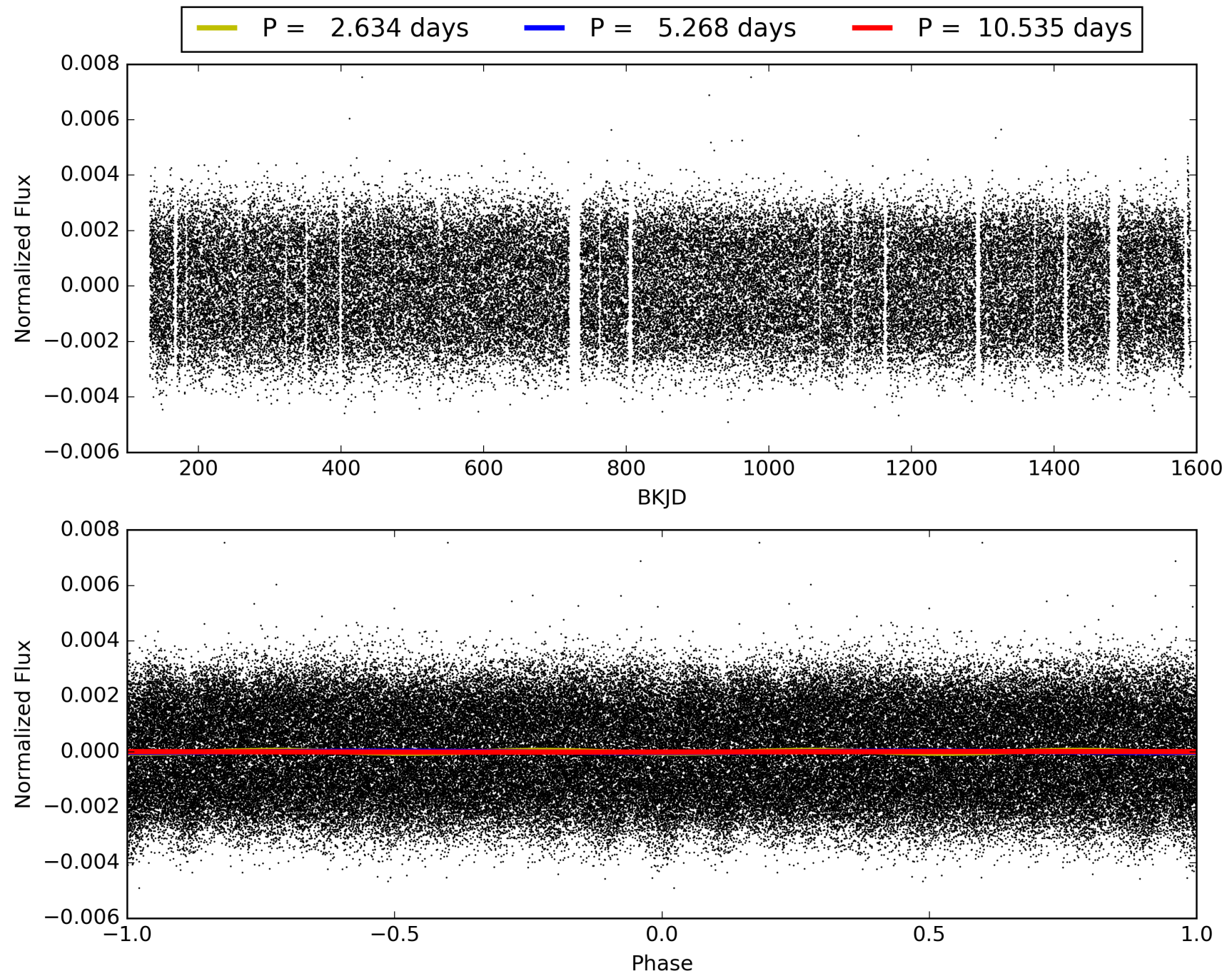
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006116172-01, PDC Light Curves





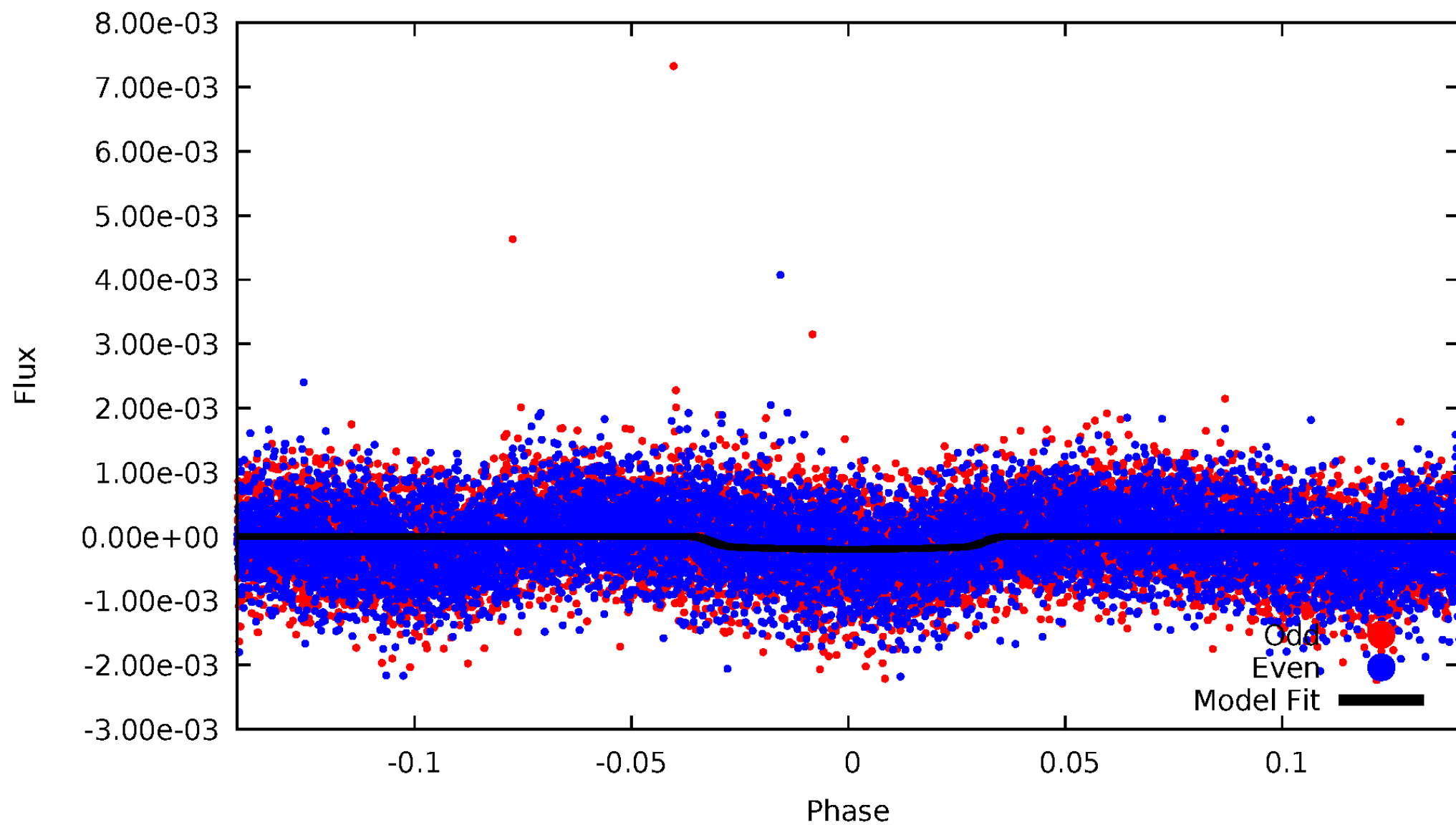
TCE 006116172-01





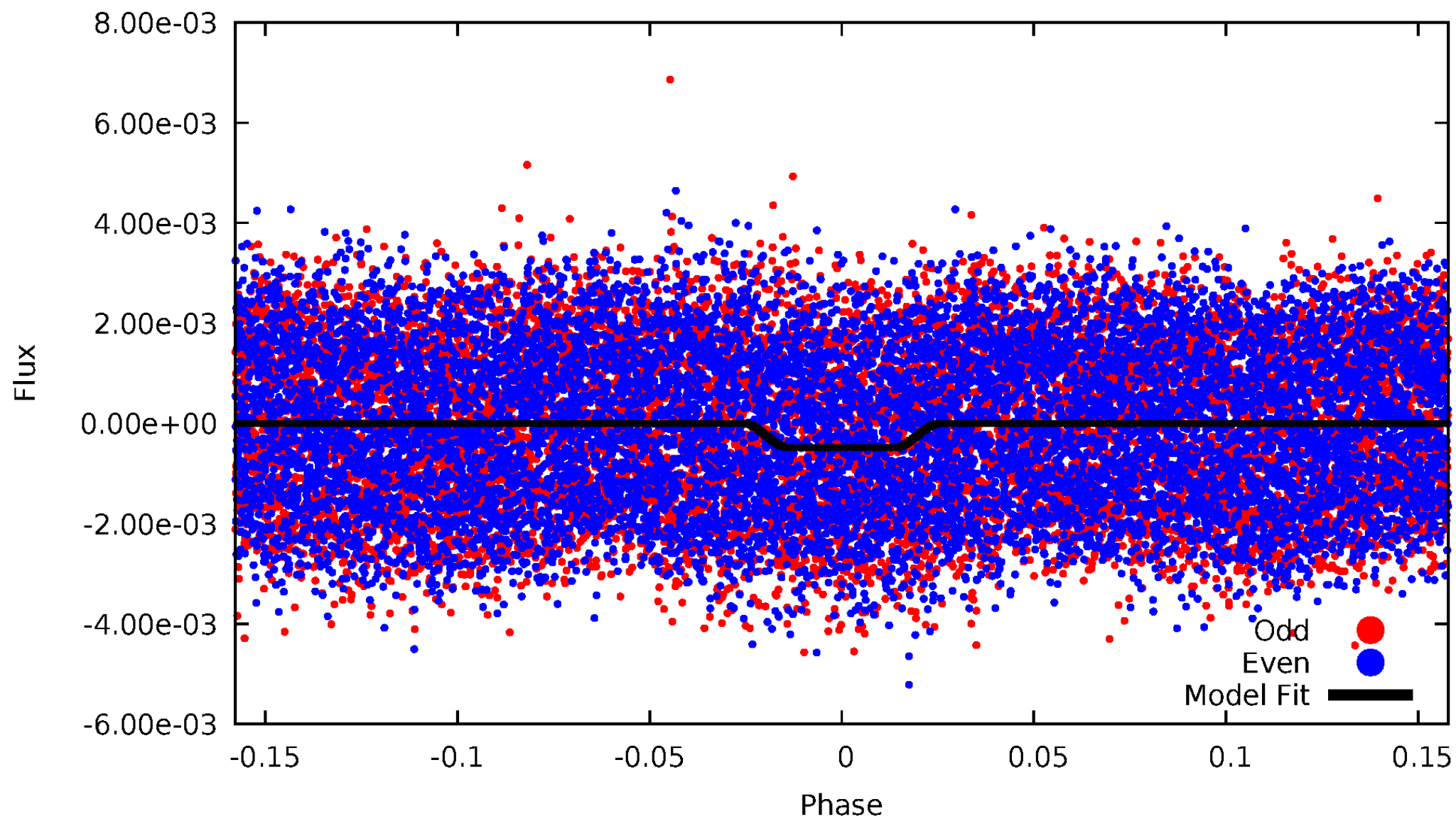
# DV Odd/Even

TCE 006116172-01

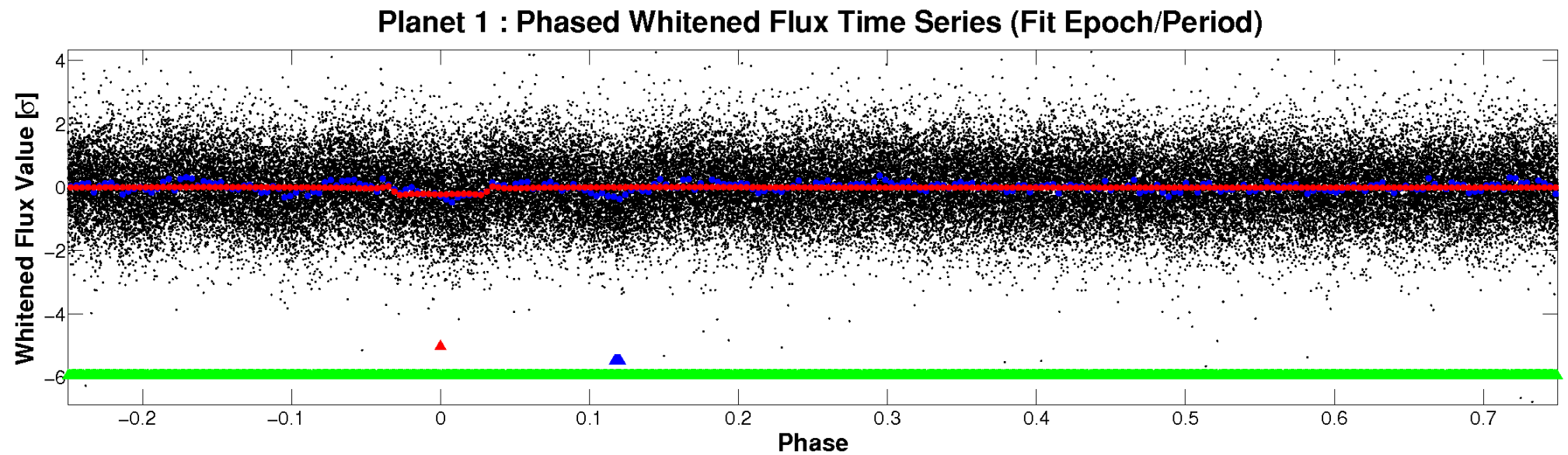
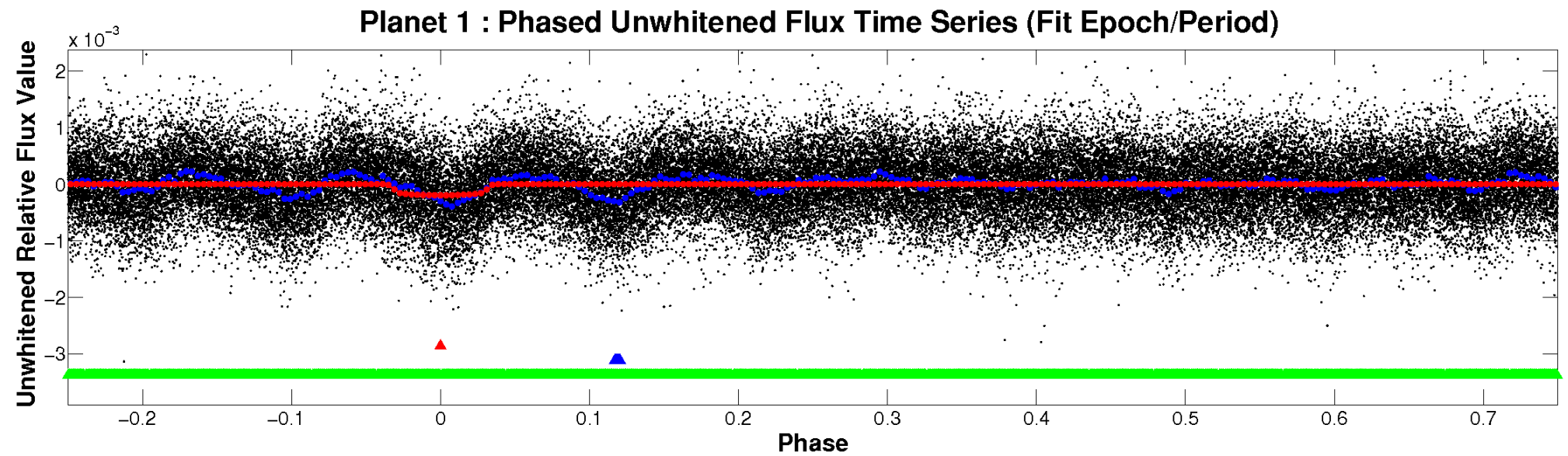


# ALT Odd/Even

TCE 006116172-01



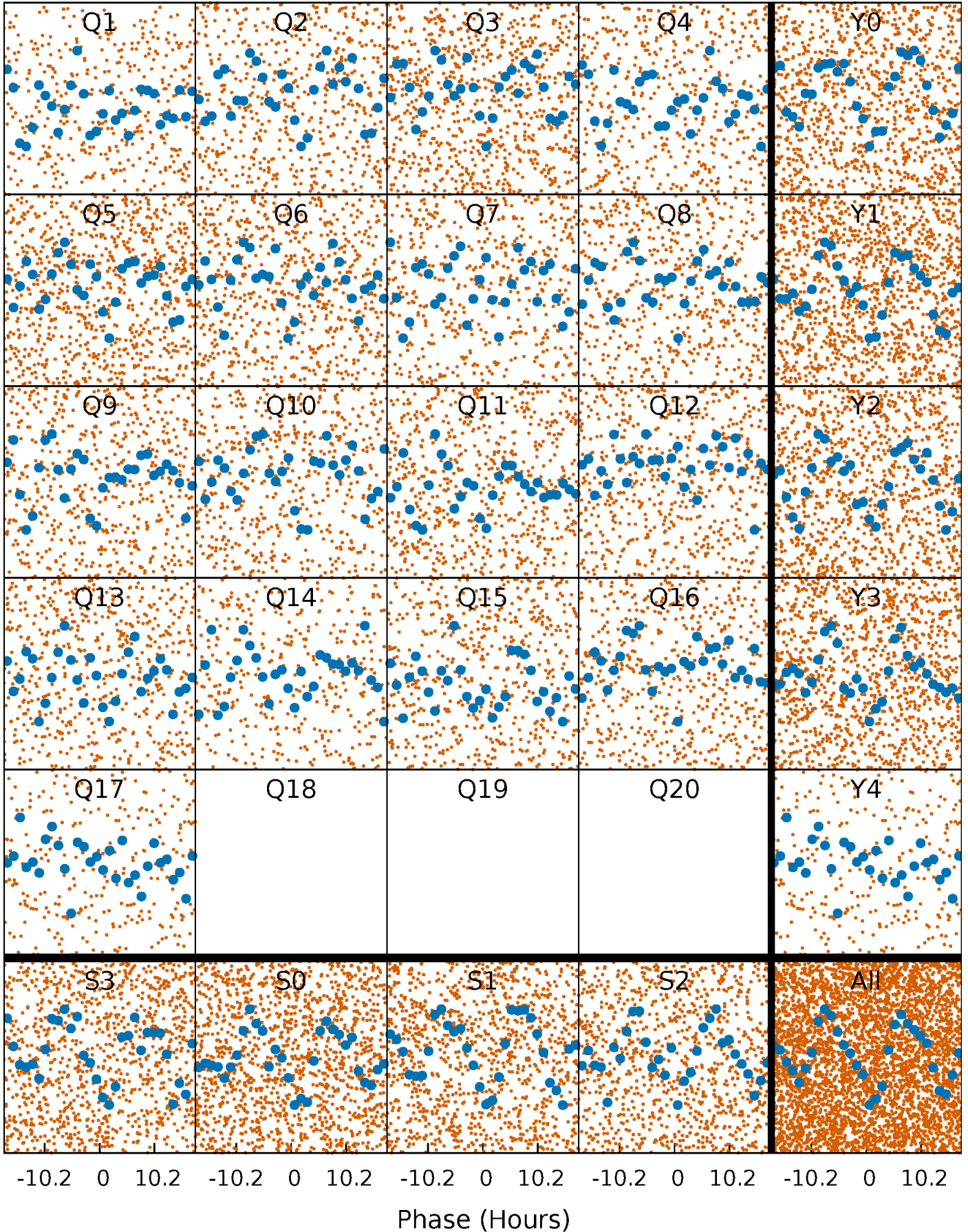
# Non-Whitened Vs. Whitened Light Curve





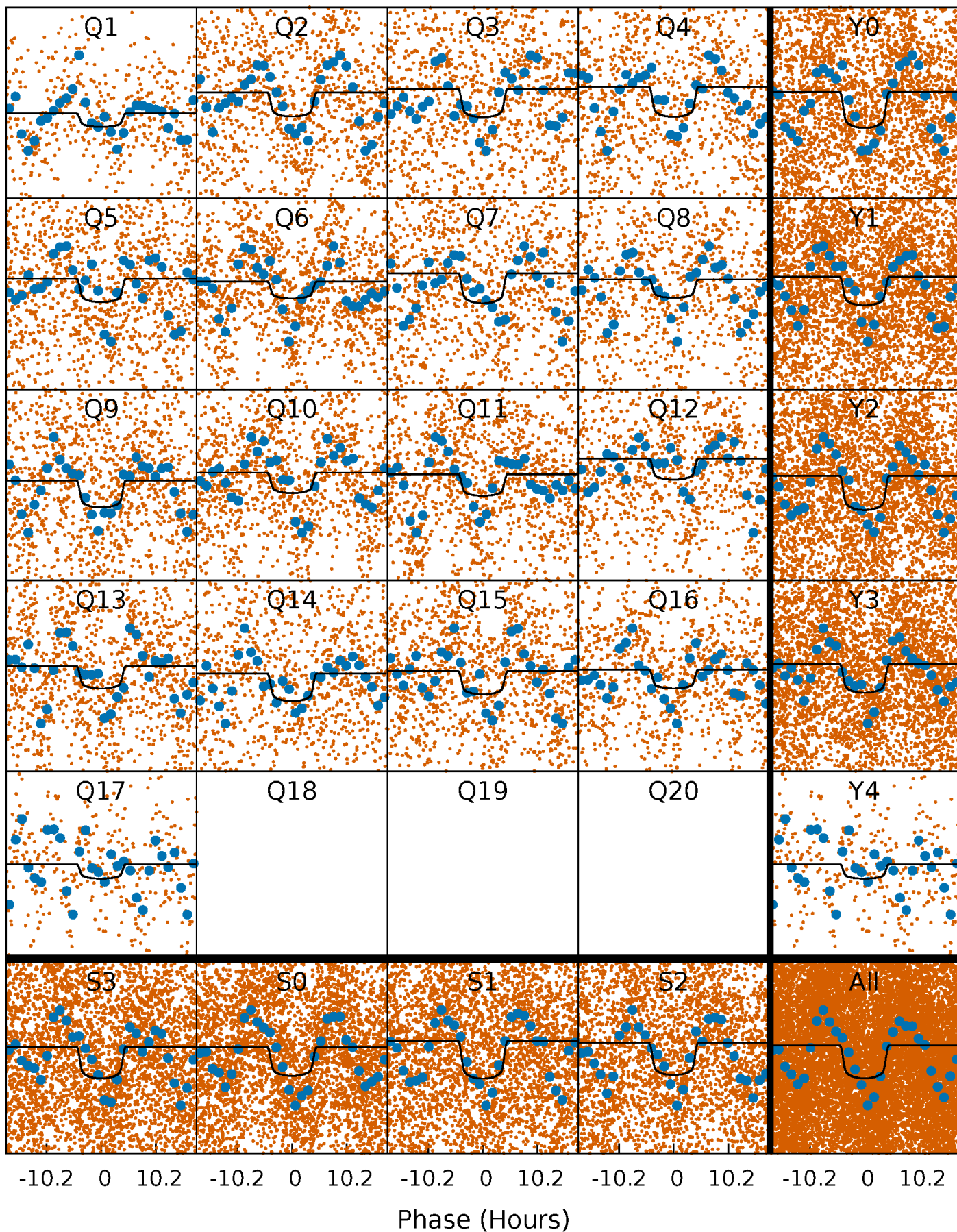
# PDC Quarter-Phased Transit Curves

TCE 006116172-01 P= 5.267689 Days  $T_0=136.308765$  (BKJD)



# DV Quarter-Phased Transit Curves

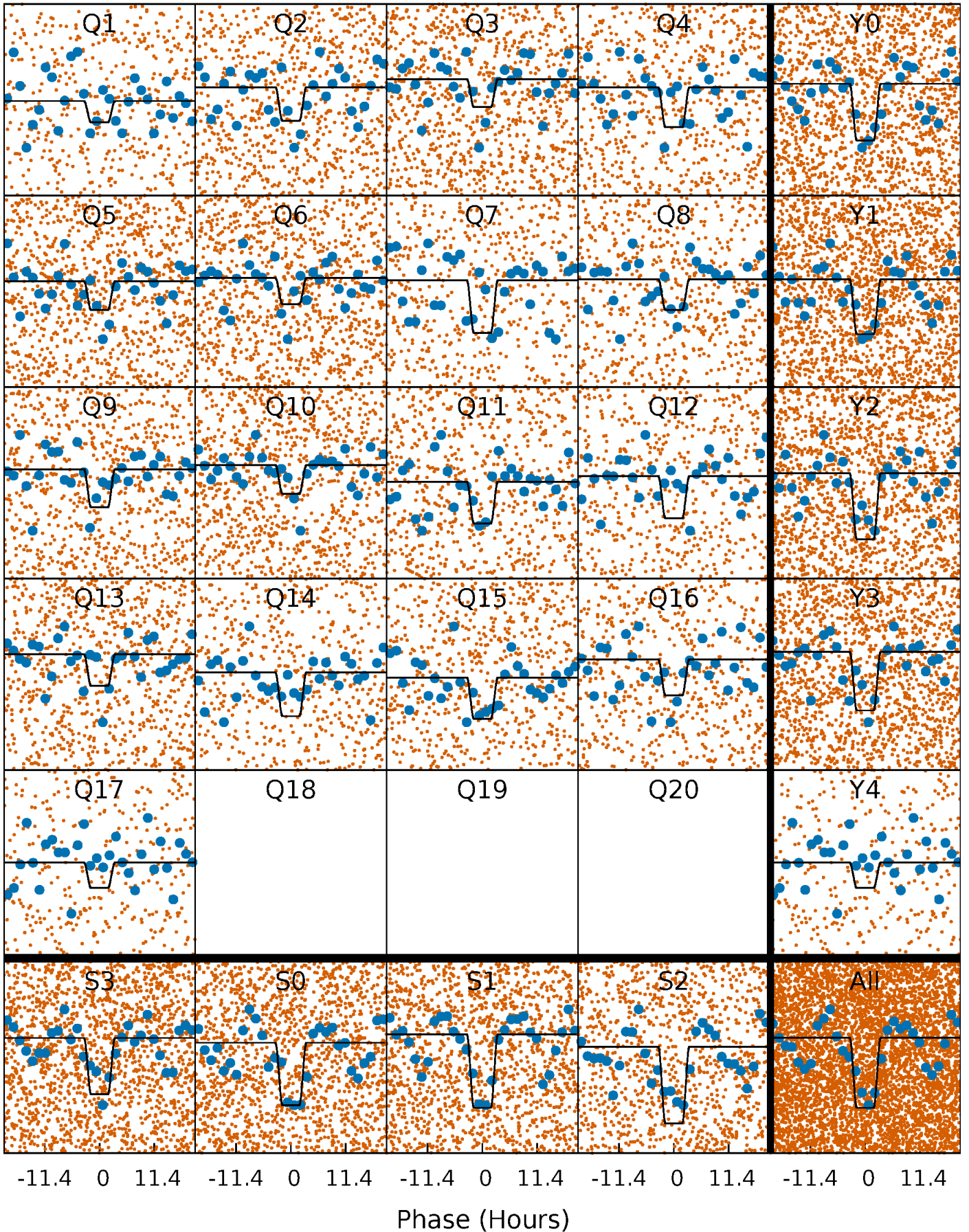
TCE 006116172-01 P= 5.267689 Days  $T_0=136.308765$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 006116172-01 P= 5.267672 Days  $T_0=136.334684$  (BKJD)

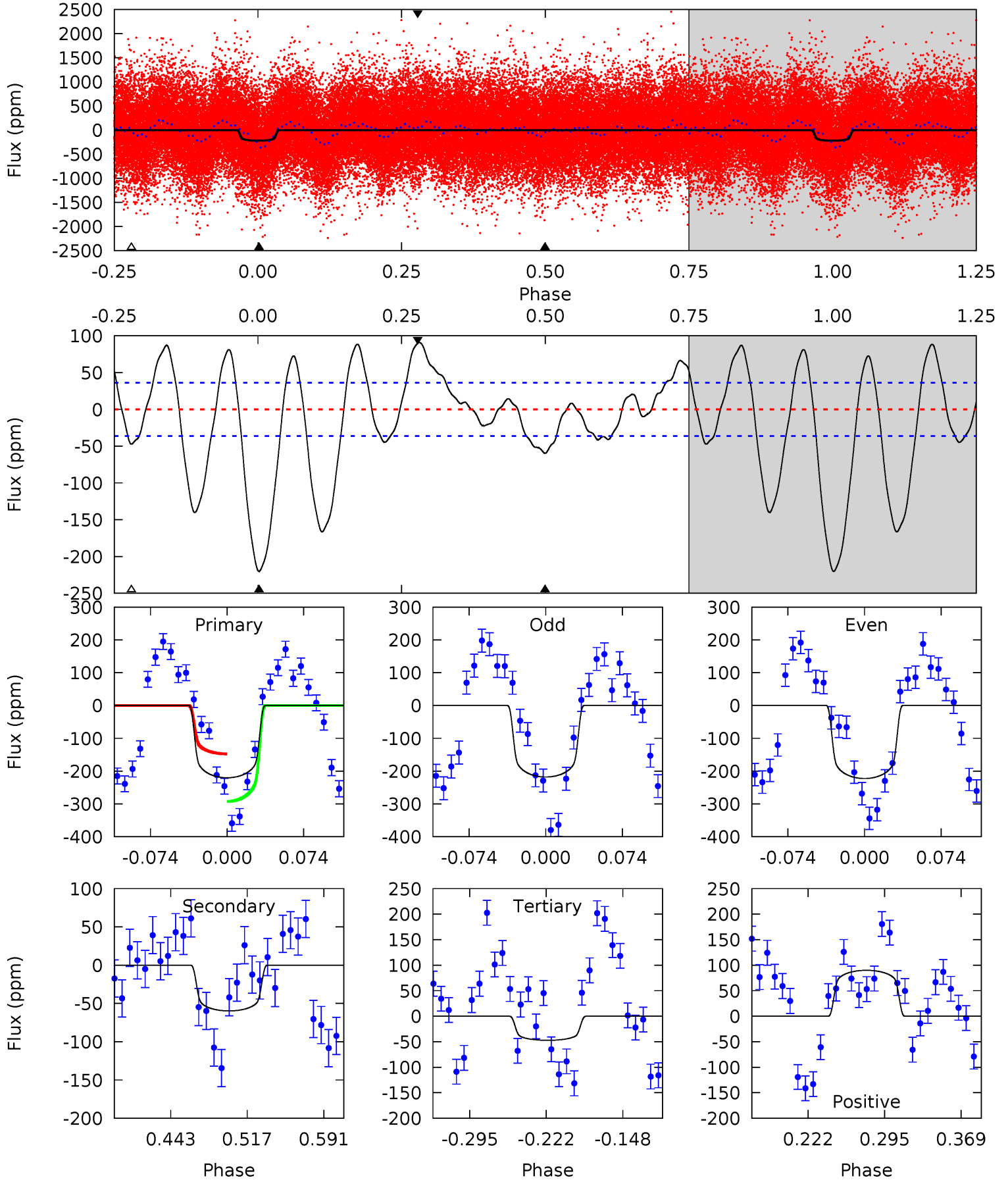




# DV Model-Shift Uniqueness Test

006116172-01, P = 5.267689 Days, E = 131.041076 Days

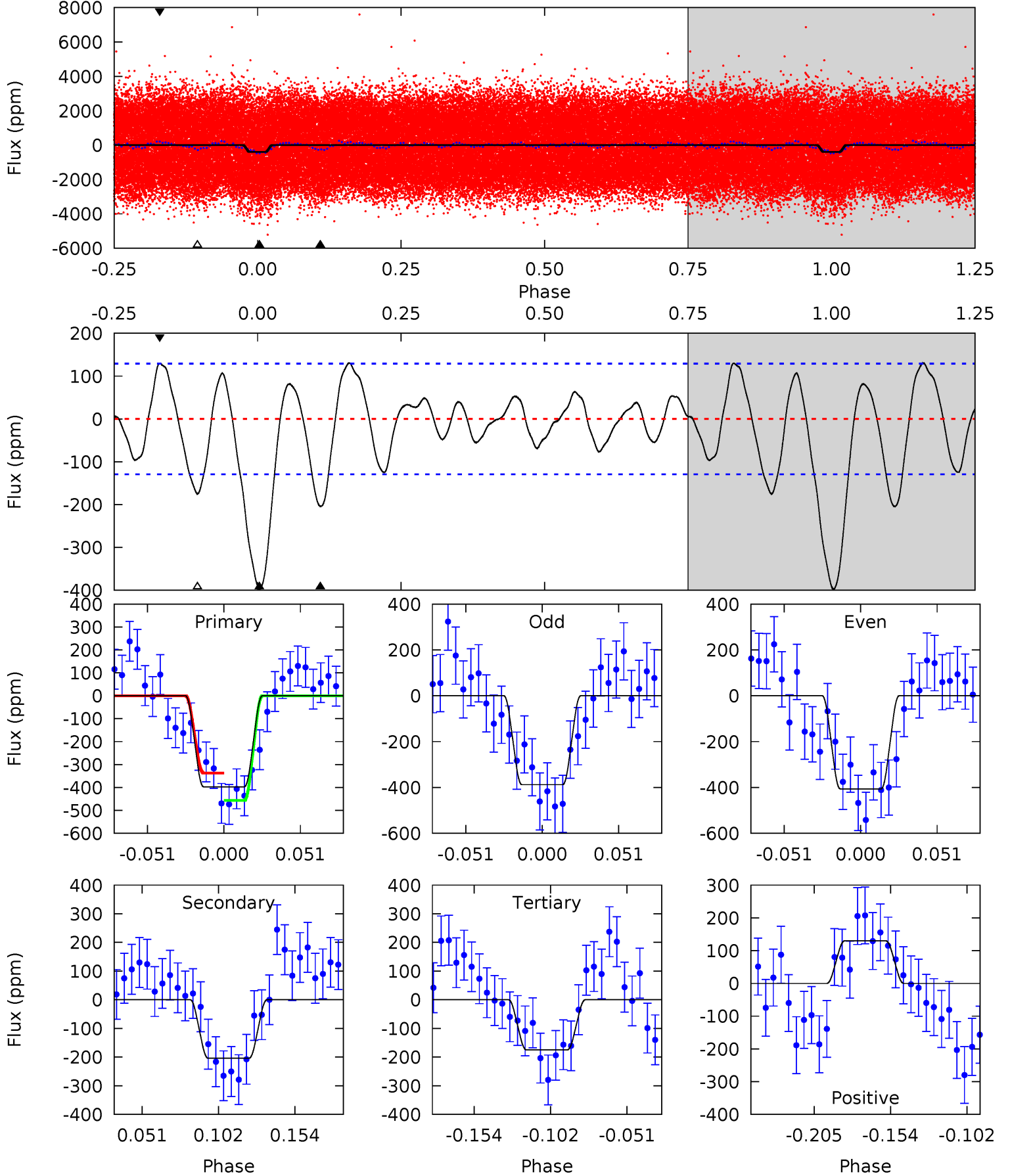
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.2	7.64	6.04	11.5	4.63	1.79	7.67	22.1	16.7	1.60	-3.86	0.29	1.10	0.29	9.32



# Alt Model-Shift Uniqueness Test

006116172-01, P = 5.267672 Days, E = 131.067012 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
14.4	7.42	6.36	4.73	4.70	1.95	2.22	8.08	9.71	1.06	2.69	0.34	0.97	0.25	2.18



### Stellar Parameters For KIC 006116172

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6967^{+194}_{-333}$	$4.086^{+0.162}_{-0.180}$	$0.080^{+0.200}_{-0.350}$	$1.863^{+0.573}_{-0.417}$	$1.541^{+0.196}_{-0.269}$	$0.336^{+0.319}_{-0.162}$
	+3%/-5%	+4%/-4%	+250%/-438%	+31%/-22%	+13%/-17%	+95%/-48%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 006116172-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-60 \pm 8$	$3.09^{+0.56}_{-0.43}$	$2229^{+206}_{-154}$	$4972^{+241}_{-224}$	$16^{+6}_{-4}$
Alt.	$-204 \pm 28$	$4.47^{+0.77}_{-0.60}$	$2244^{+164}_{-171}$	$5557^{+271}_{-301}$	$25^{+9}_{-7}$

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



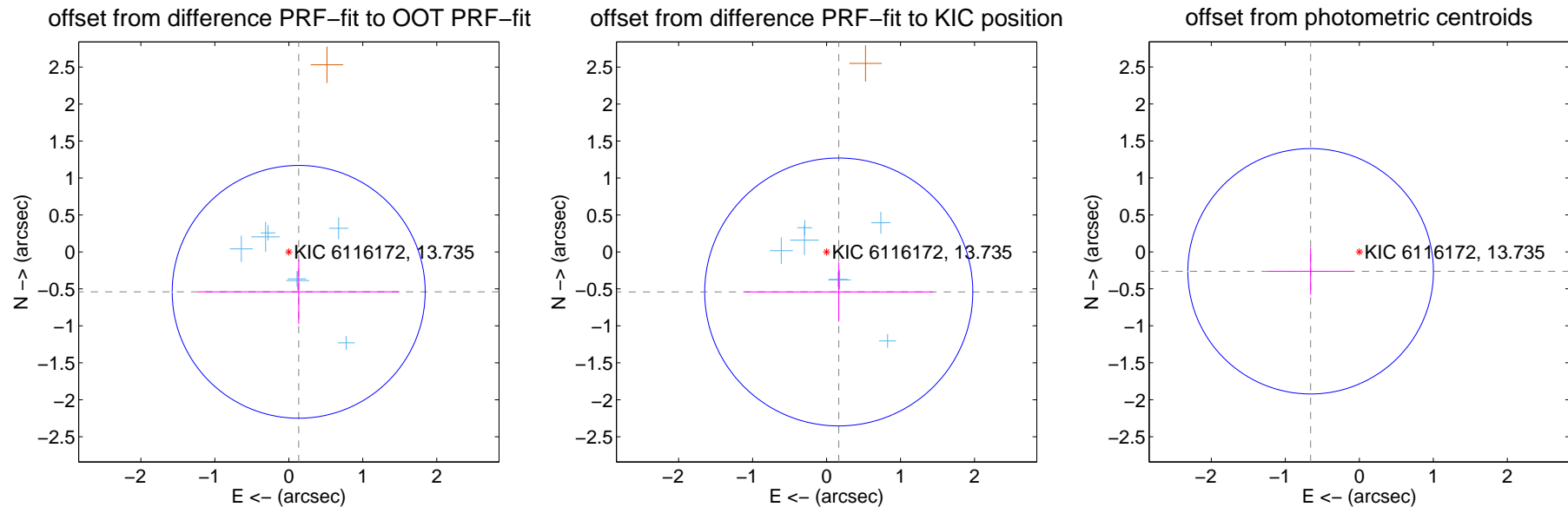
## DV Centroid Data

Supplemental centroid analysis for 006116172-01. Kepler magnitude: 13.73. Transit SNR 13.47

There are 10 quarters with good PRF difference image offsets

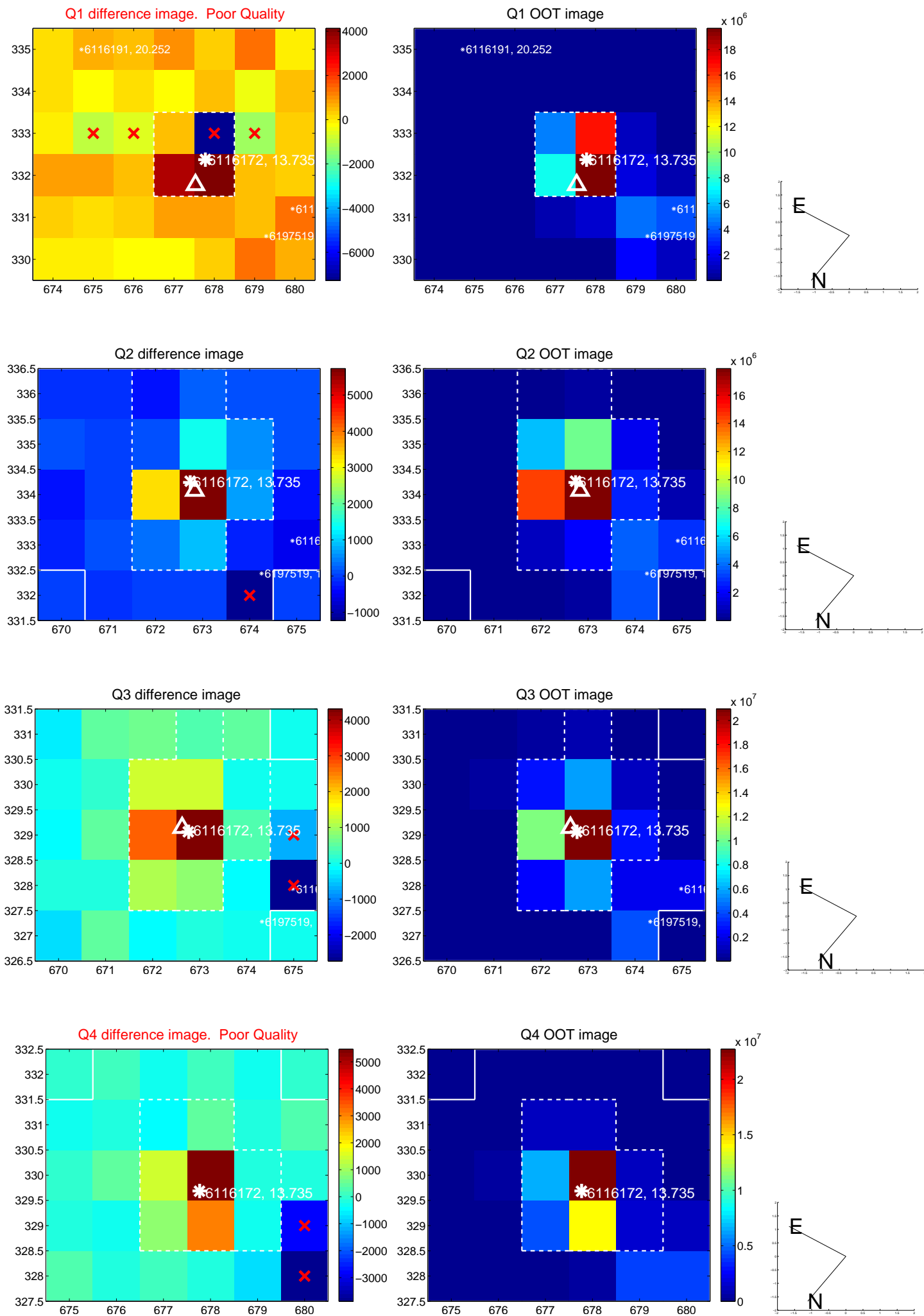
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.556 \pm 0.570$	0.98	$-0.133 \pm 1.360$	$-0.540 \pm 0.434$
PRF-fit source offset from KIC position	$0.566 \pm 0.604$	0.94	$-0.164 \pm 1.273$	$-0.542 \pm 0.401$
photometric centroid source offset	$0.71 \pm 0.55$	1.28	$0.66 \pm 0.58$	$-0.26 \pm 0.32$

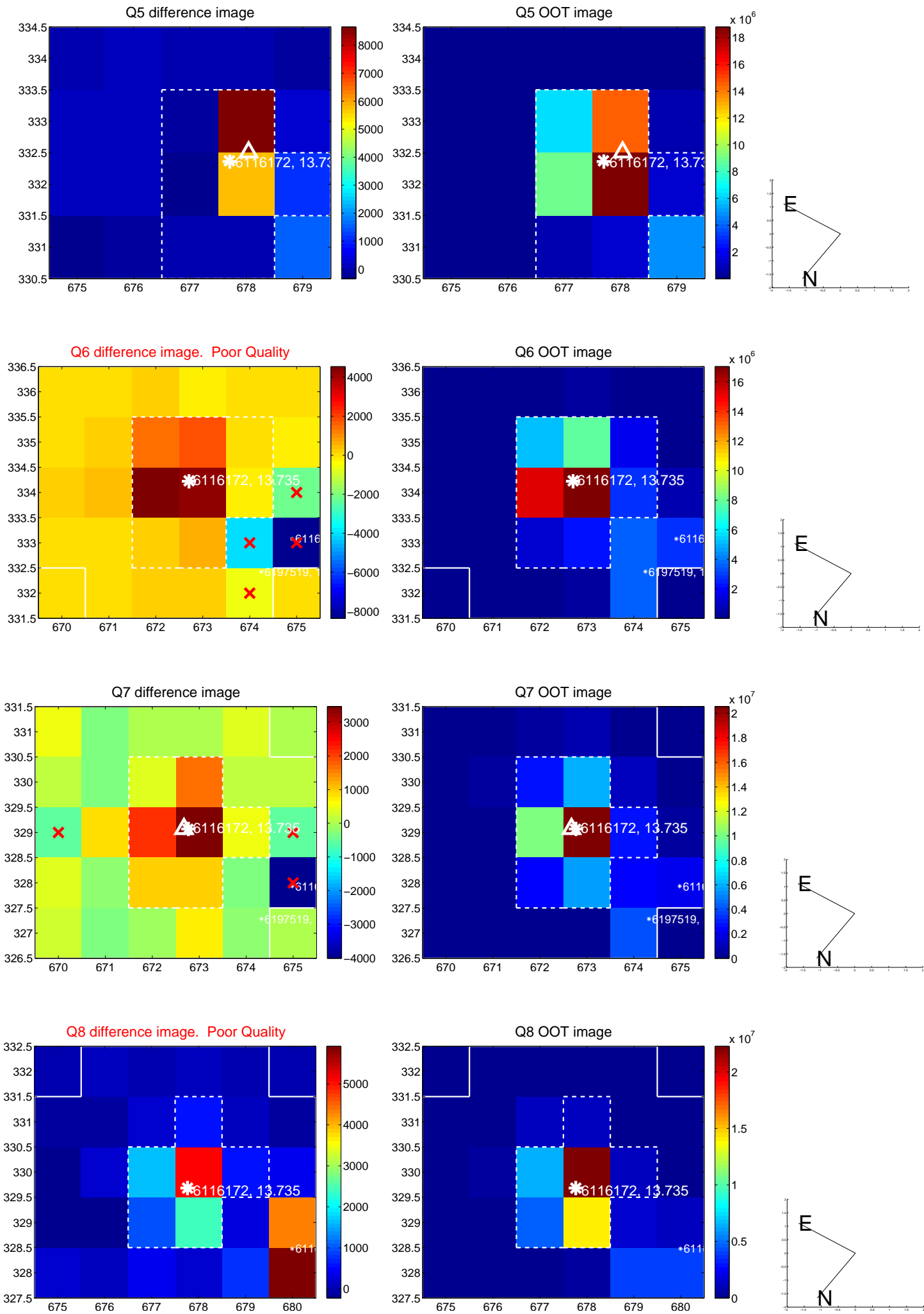


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

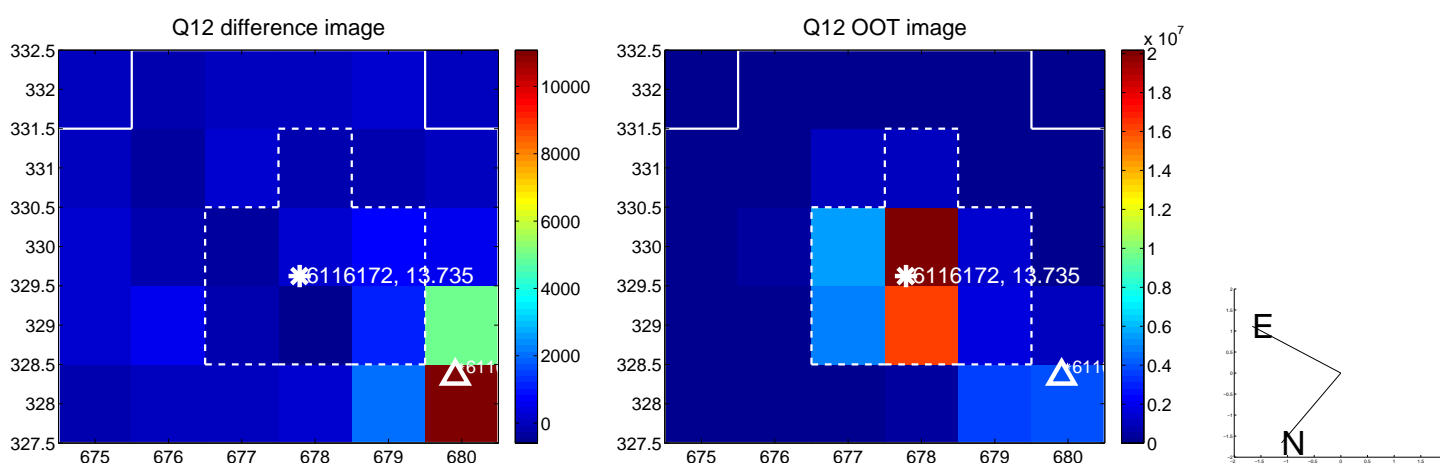
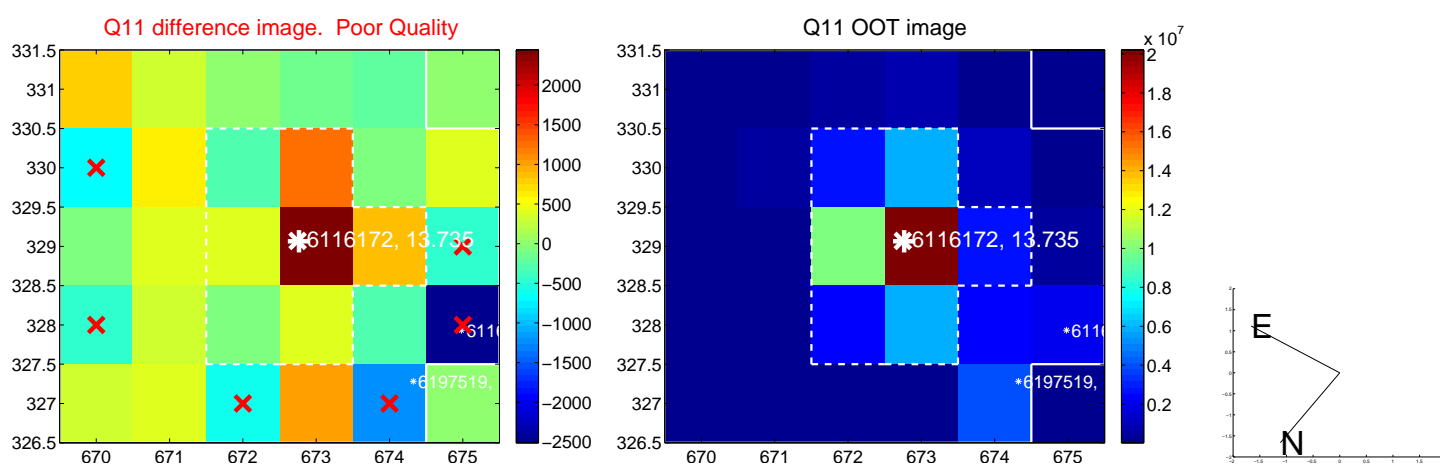
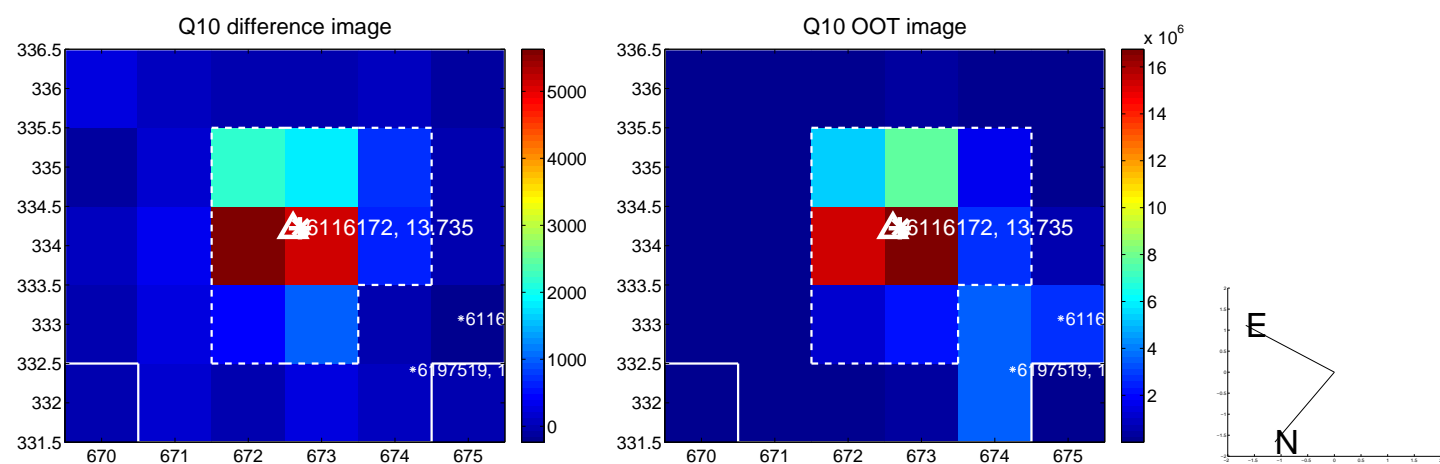
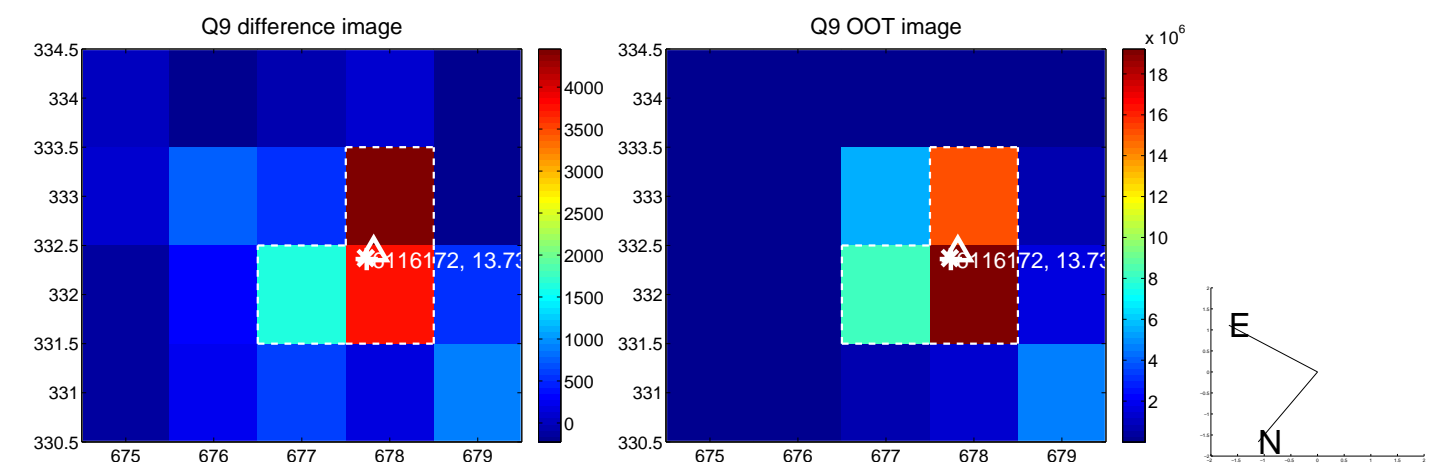


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

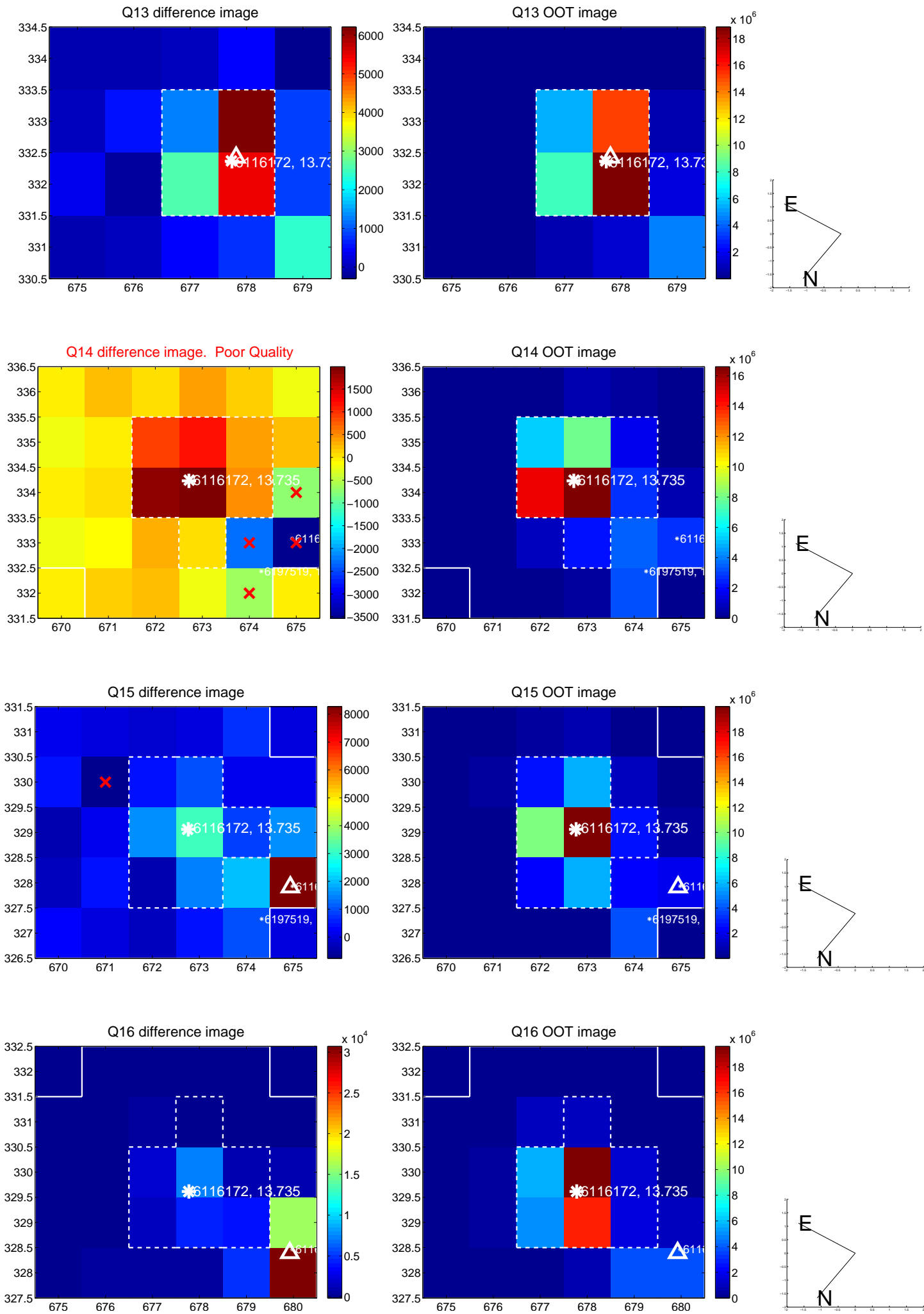




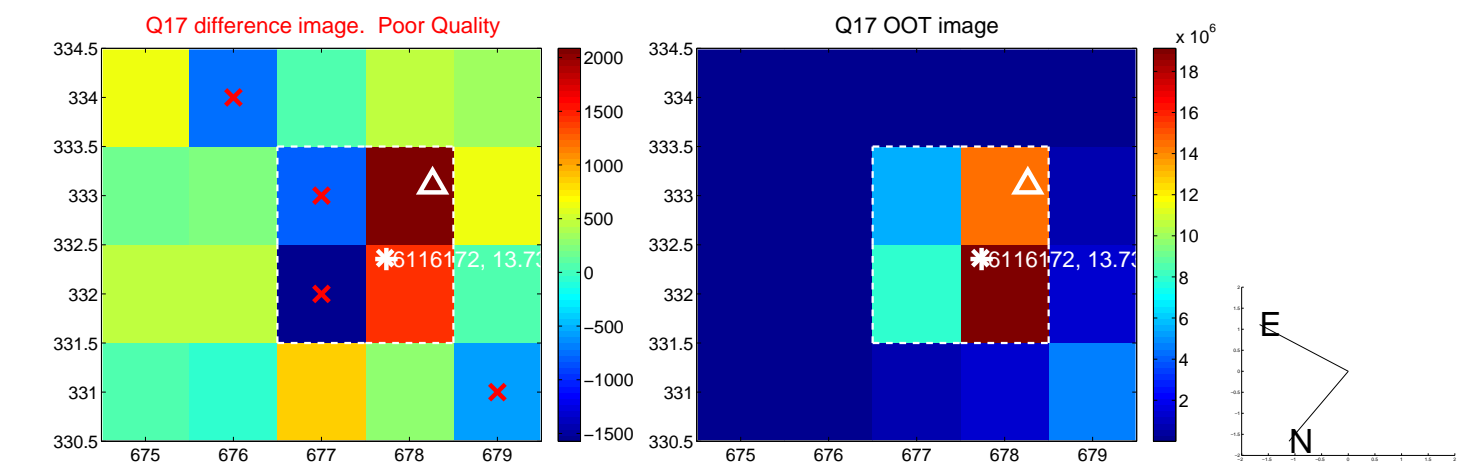
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



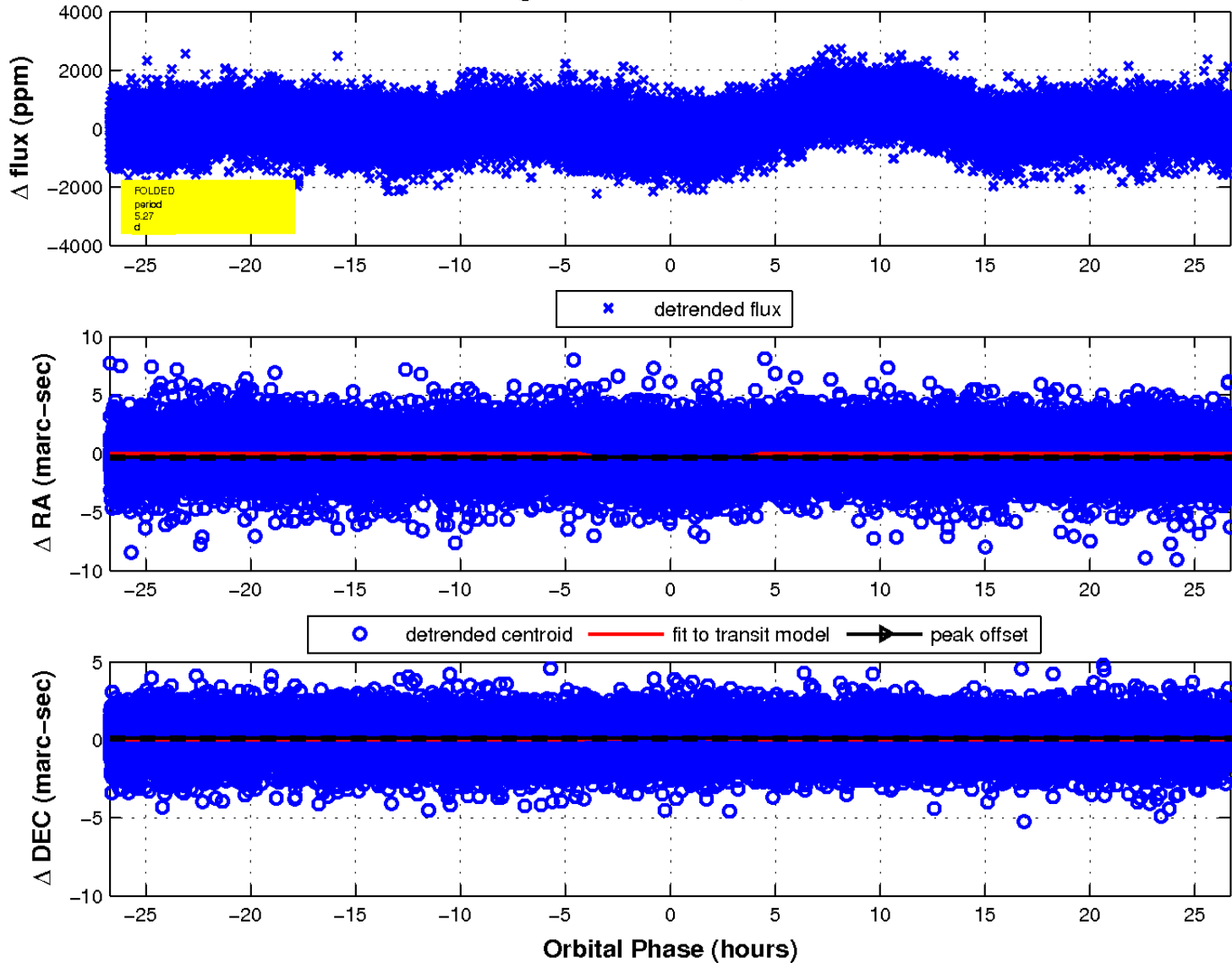
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

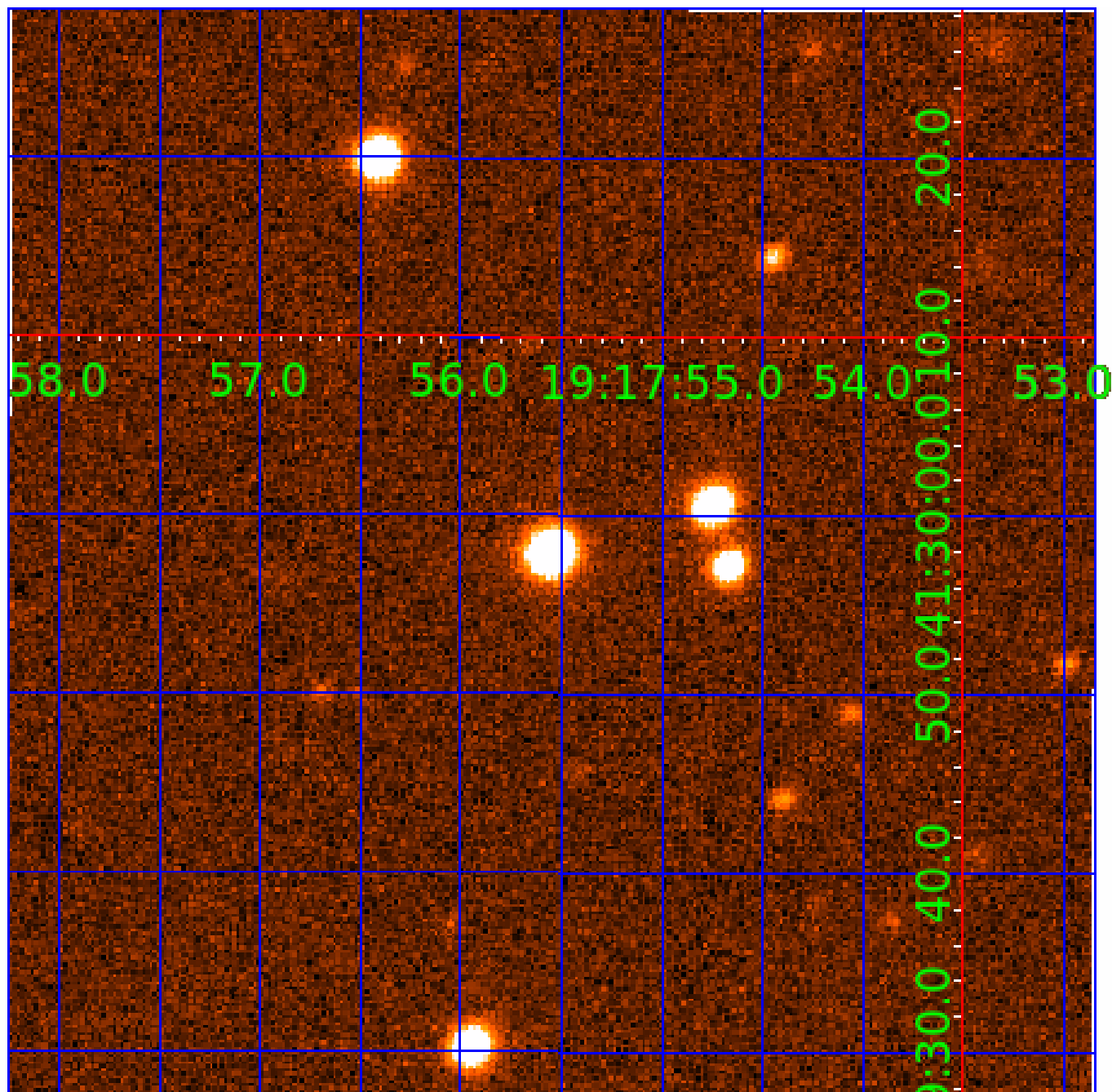


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination



# KIC 006116172

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006116172-01	OBS	No	5.267689	136.308765	195.2	8.902	12.3	13.5	1.86	6967	3.09	1562.16
006116172-02	OBS	No	5.267756	131.657434	226.5	6.000	10.3	-1.0	1.86	6967	2.83	1562.13
006116172-03	OBS	No	1.259762	131.845504	62.5	13.226	8.8	10.4	1.86	6967	1.49	10523.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006116172-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006116172-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_NOFITS
006116172-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS

**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.

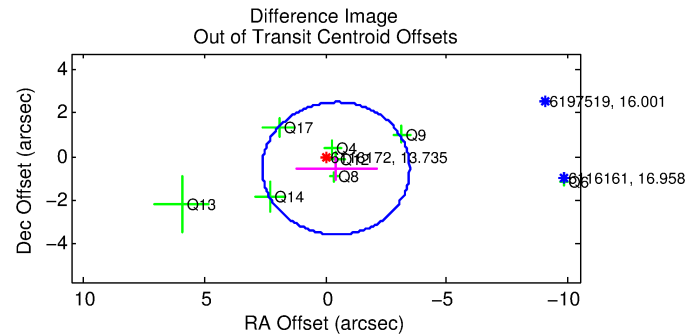
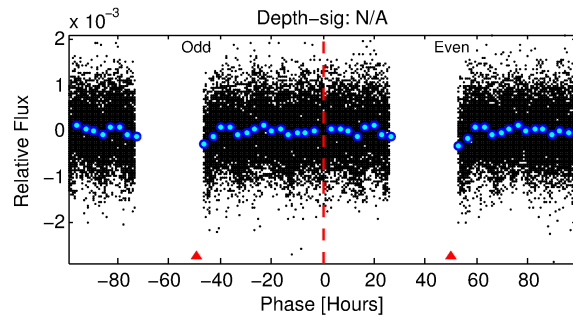
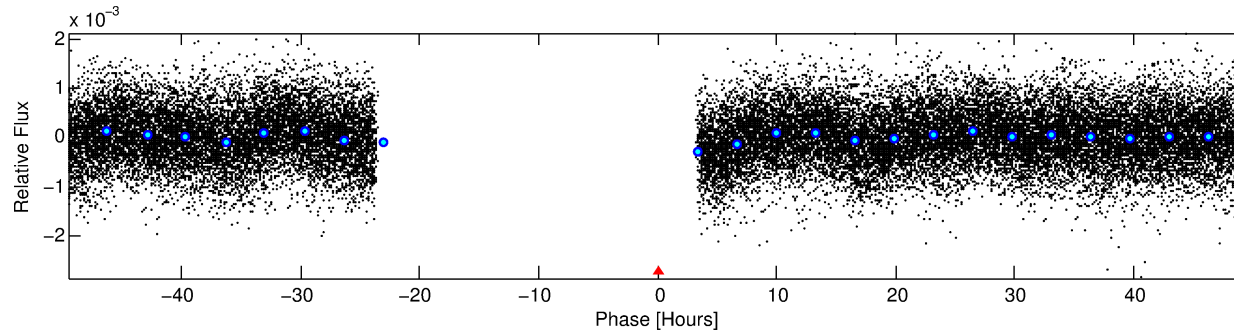
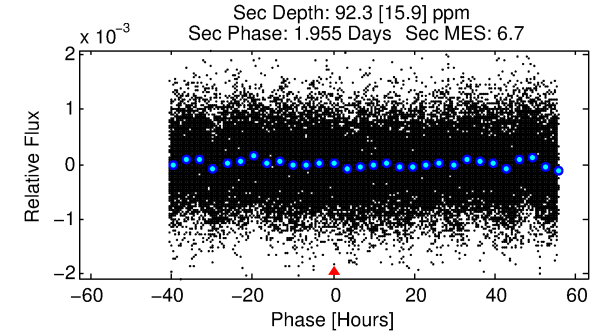
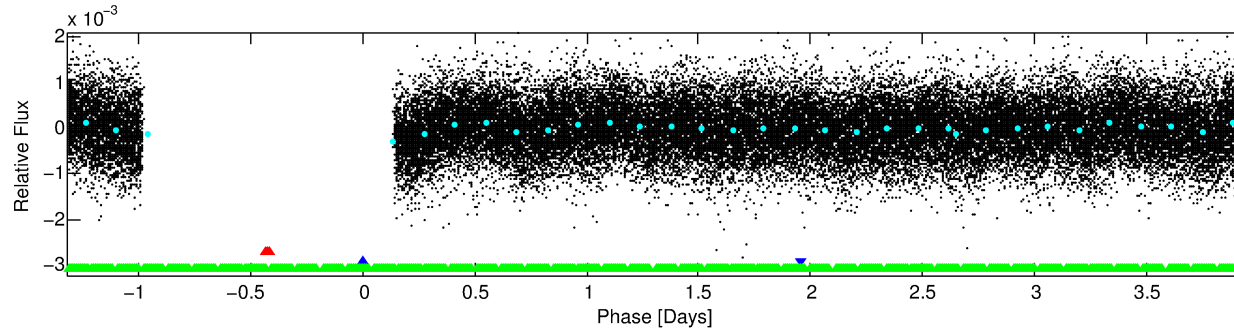
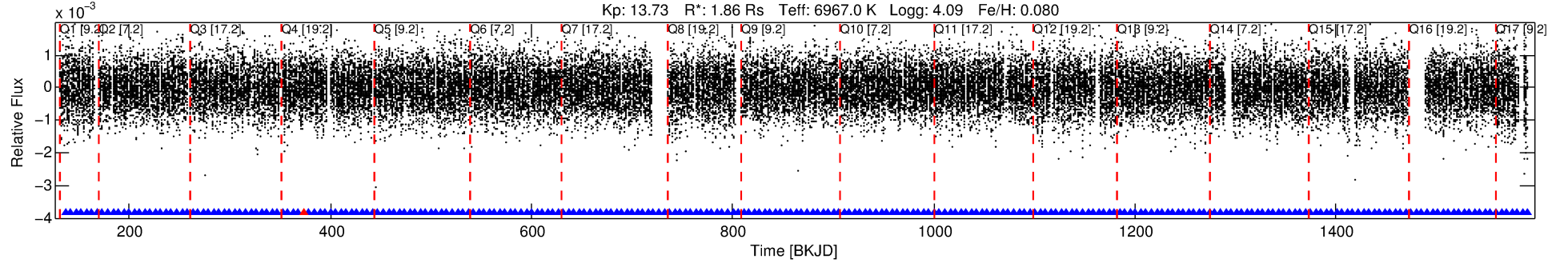
## Ephemeris Match Information For 006116172-02

No Significant Match Found

# DV One-Page Summary

KIC: 6116172 Candidate: 2 of 3 Period: 5.268 d  
KOI: K06142 Corr: No Ephemeris Match

Kp: 13.73 R\*: 1.86 Rs Teff: 6967.0 K Logg: 4.09 Fe/H: 0.080



## TPS TCE Results:

Period = 5.26776 d  
Epoch = 131.6574 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

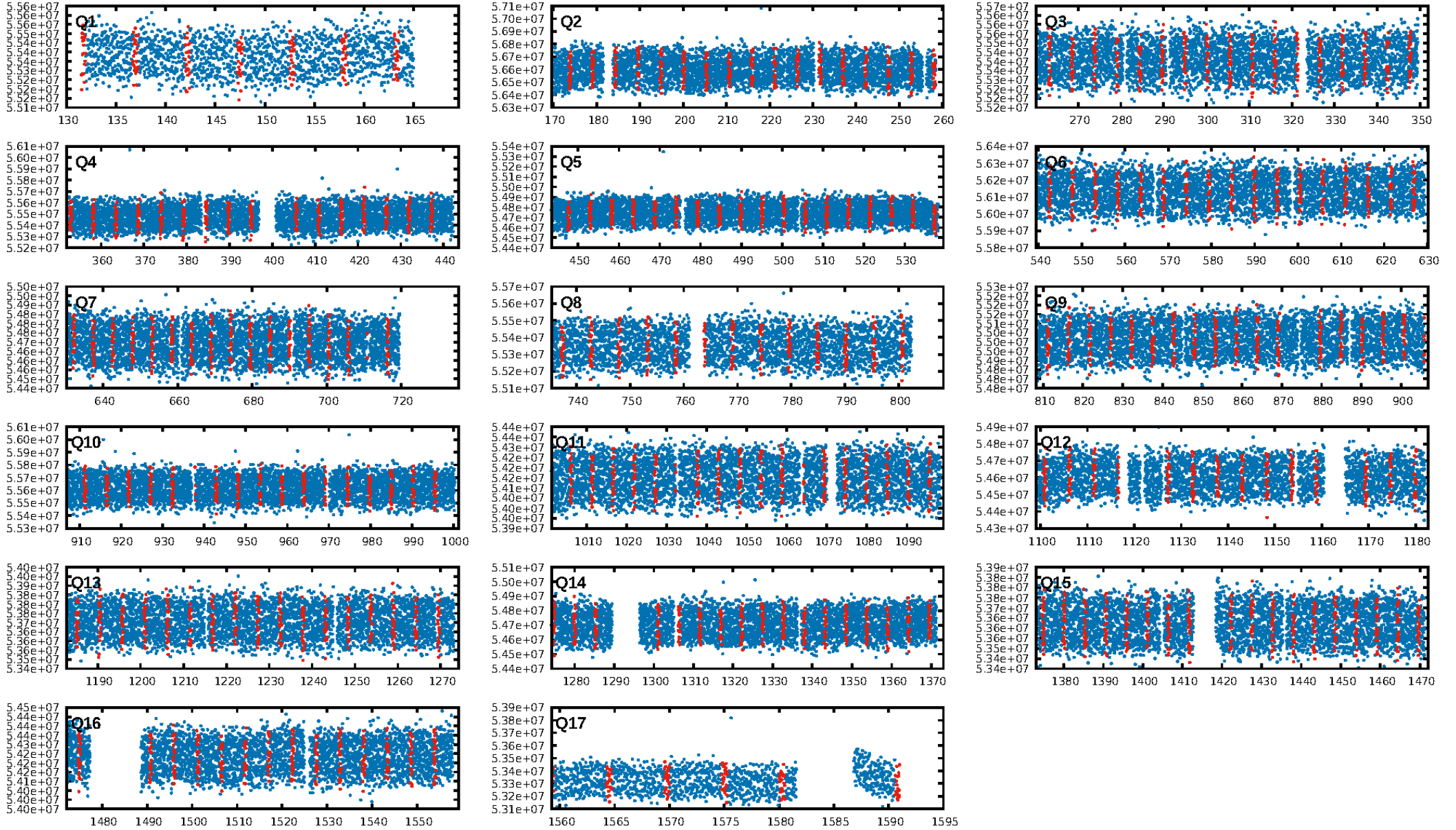
ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [242/243]  
GhostDiagnostic-chr: 9.548  
Centroid-sig: 2.9%  
Centroid-so: 0.830 arcsec [5.55σ]  
OotOffset-rm: 0.687 arcsec [0.68σ]  
KicOffset-rm: 0.685 arcsec [0.71σ]  
OotOffset-st: 2/0/3/3 [8]  
KicOffset-st: 2/0/3/3 [8]  
DiffImageQuality-fgm: 0.38 [3/8]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 07:14:21 Z

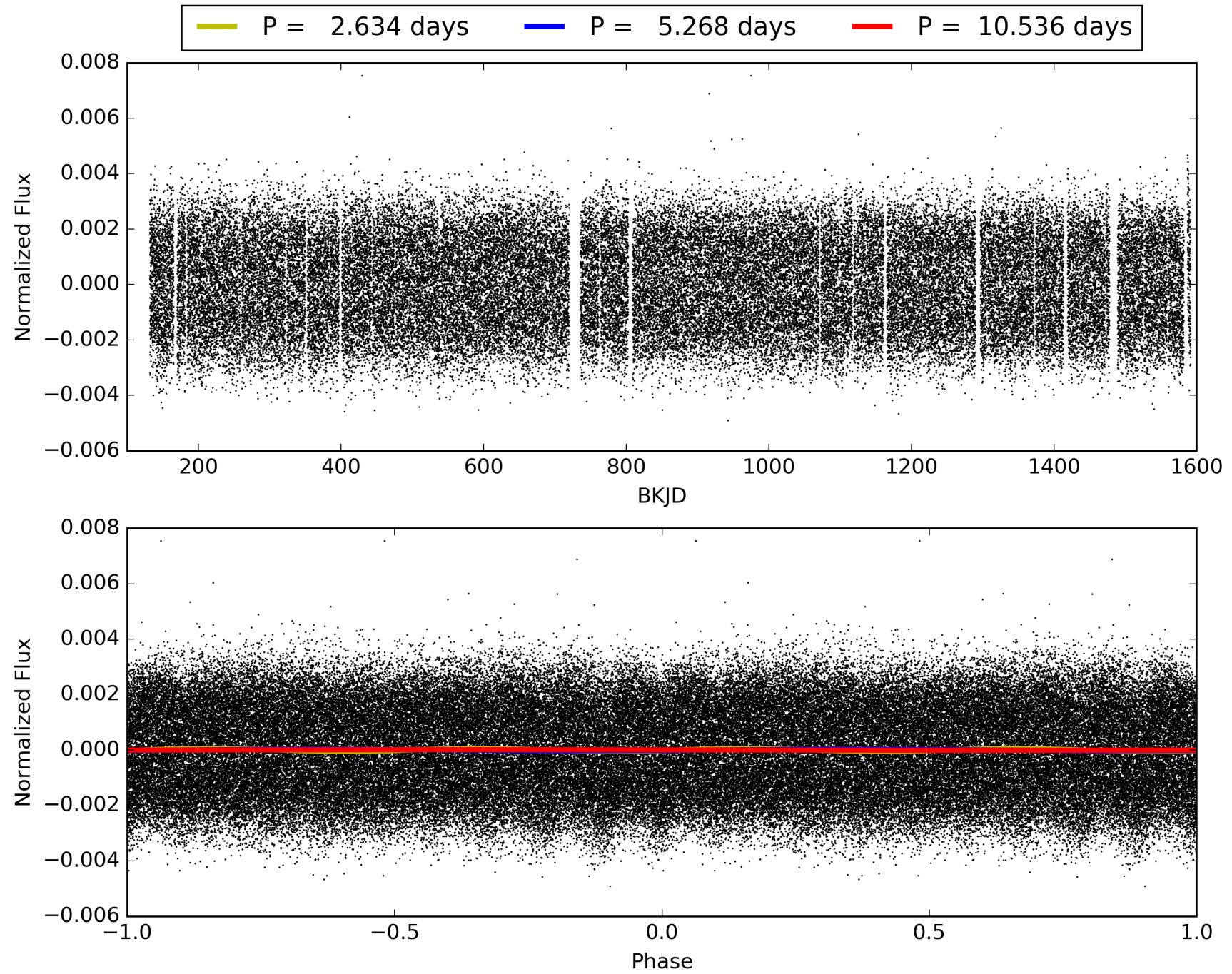
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006116172-02, PDC Light Curves

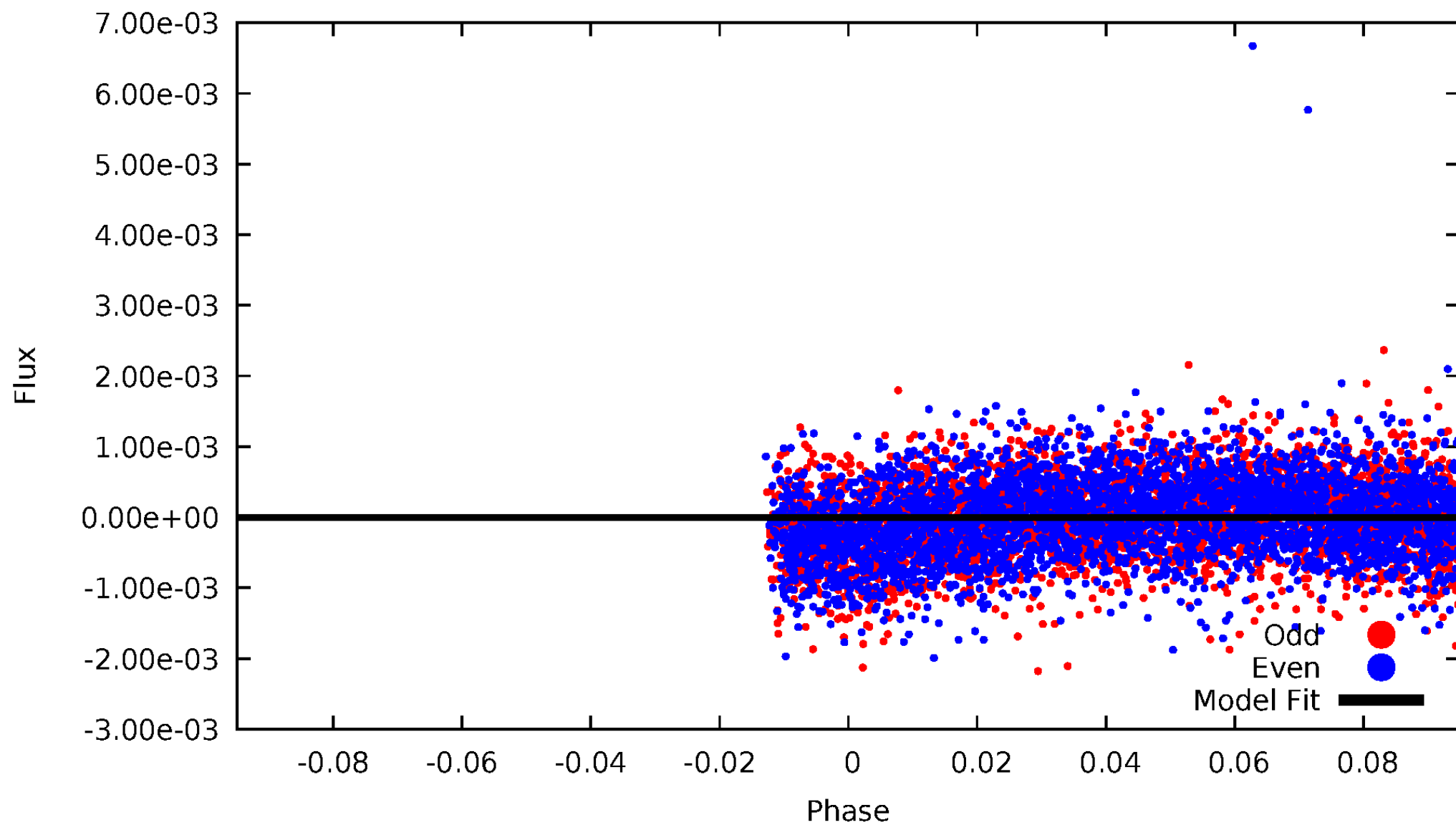


TCE 006116172-02



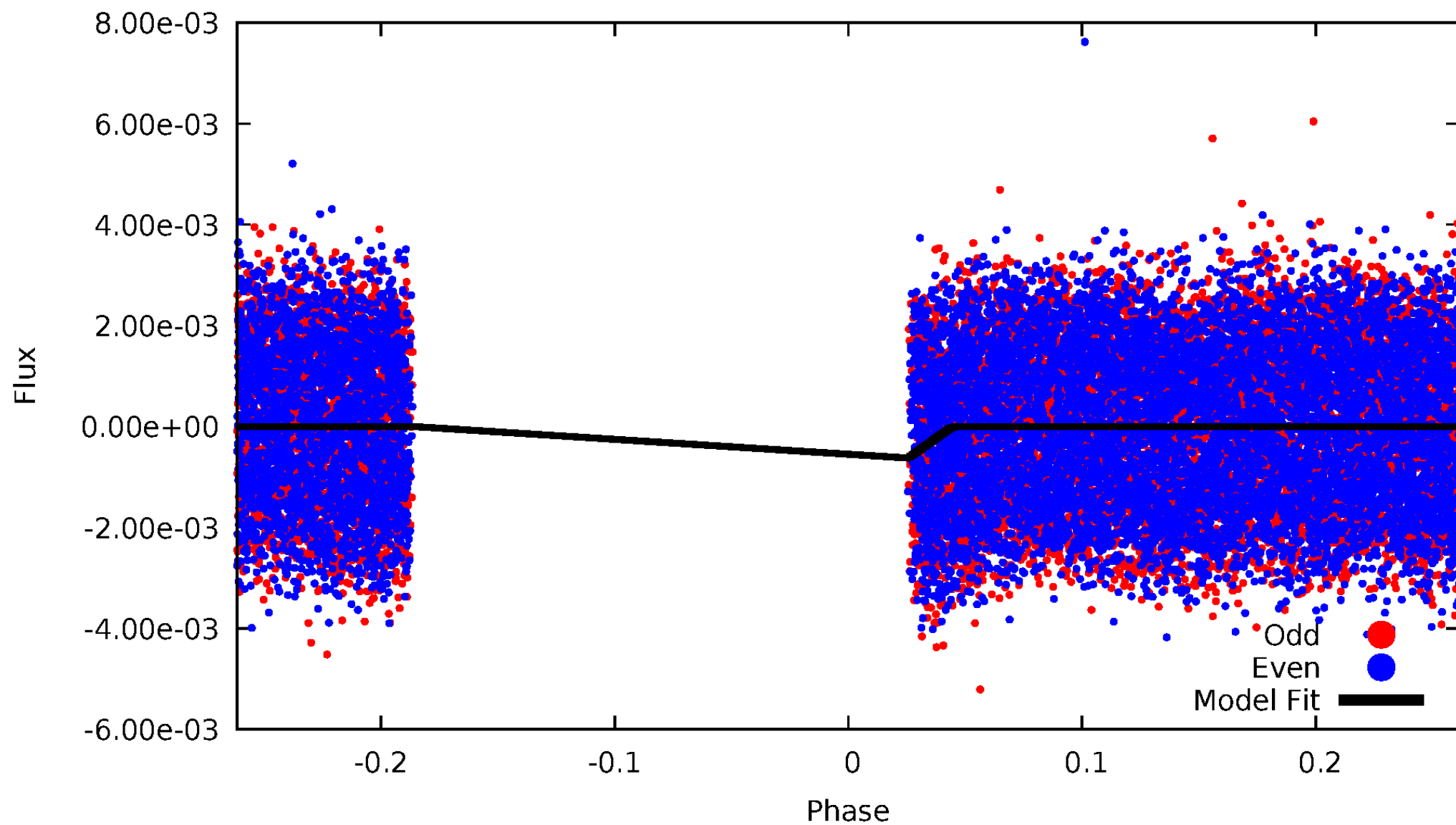
# DV Odd/Even

TCE 006116172-02



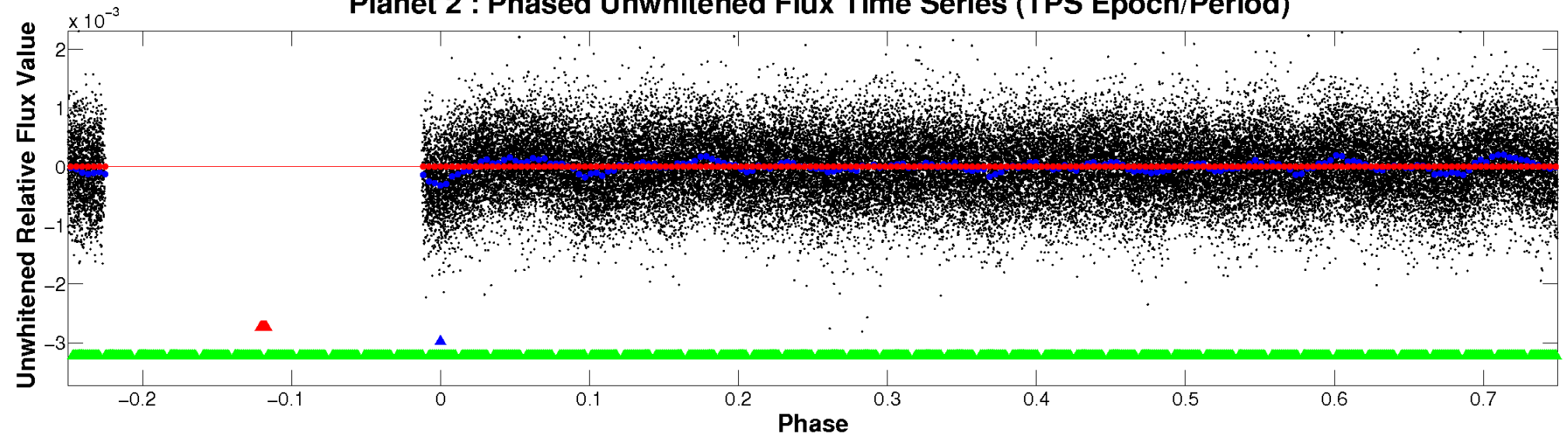
# ALT Odd/Even

TCE 006116172-02

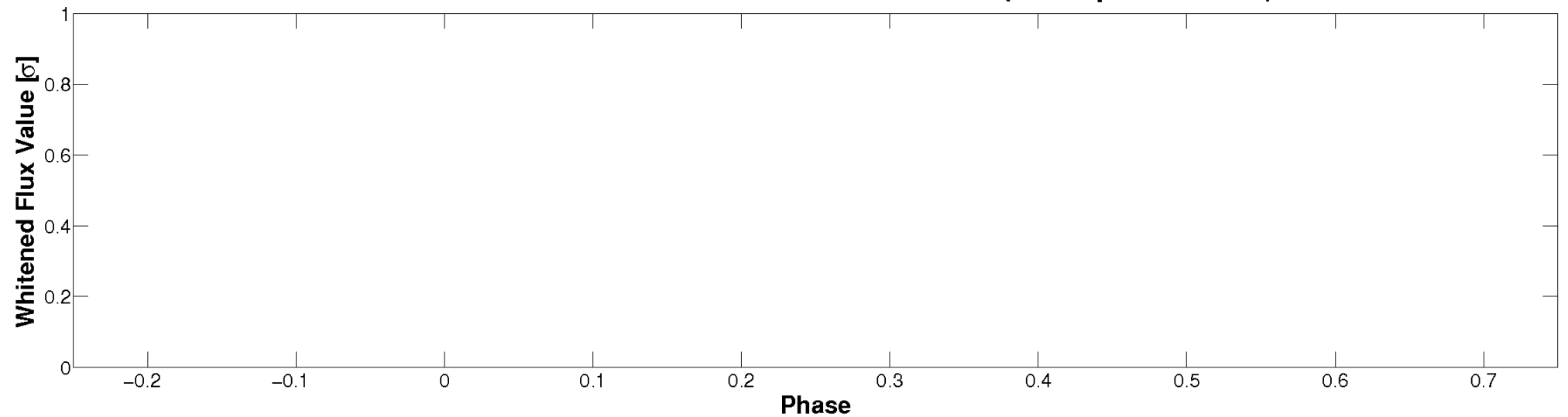


# Non-Whitened Vs. Whitened Light Curve

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



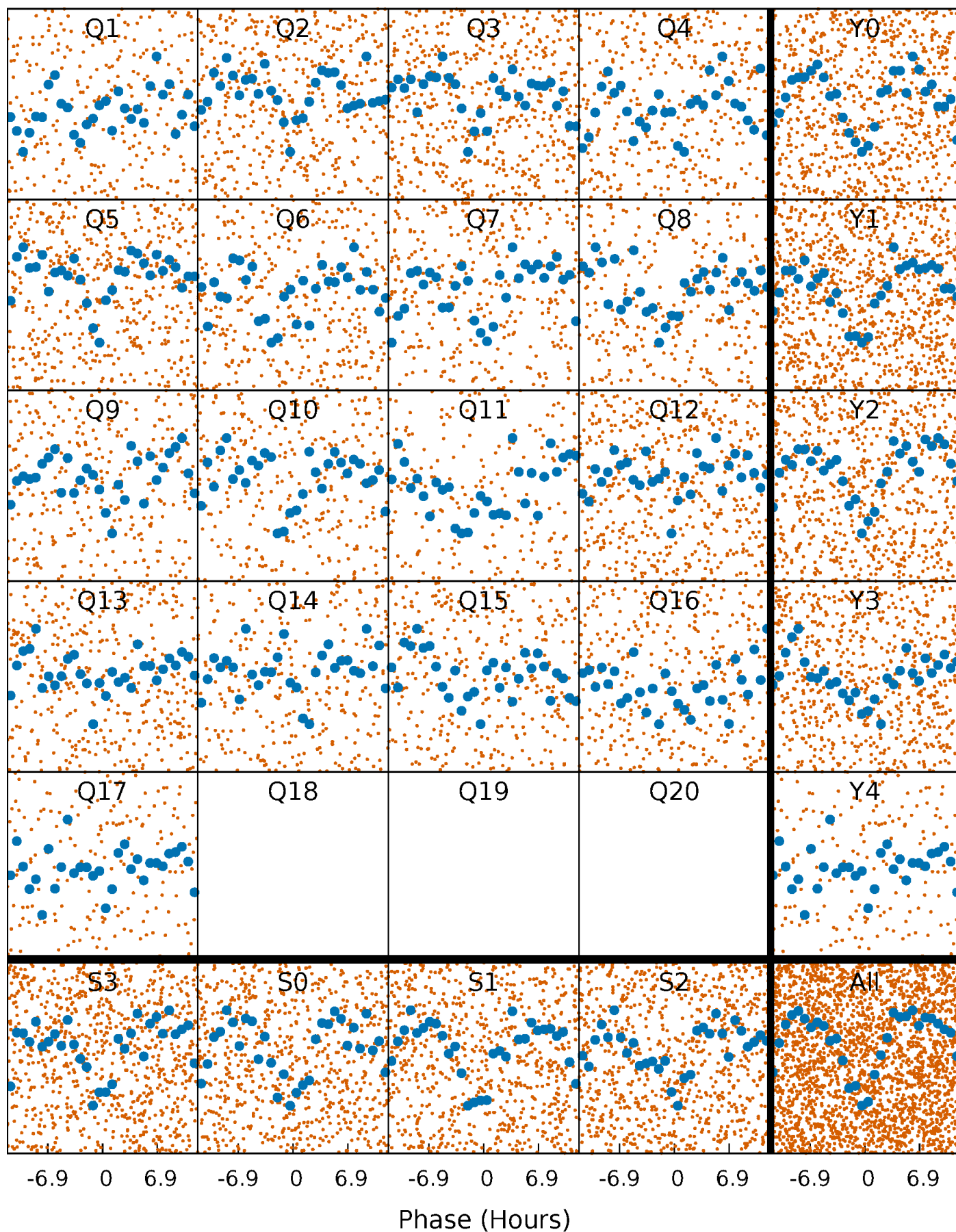
**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**





## PDC Quarter-Phased Transit Curves

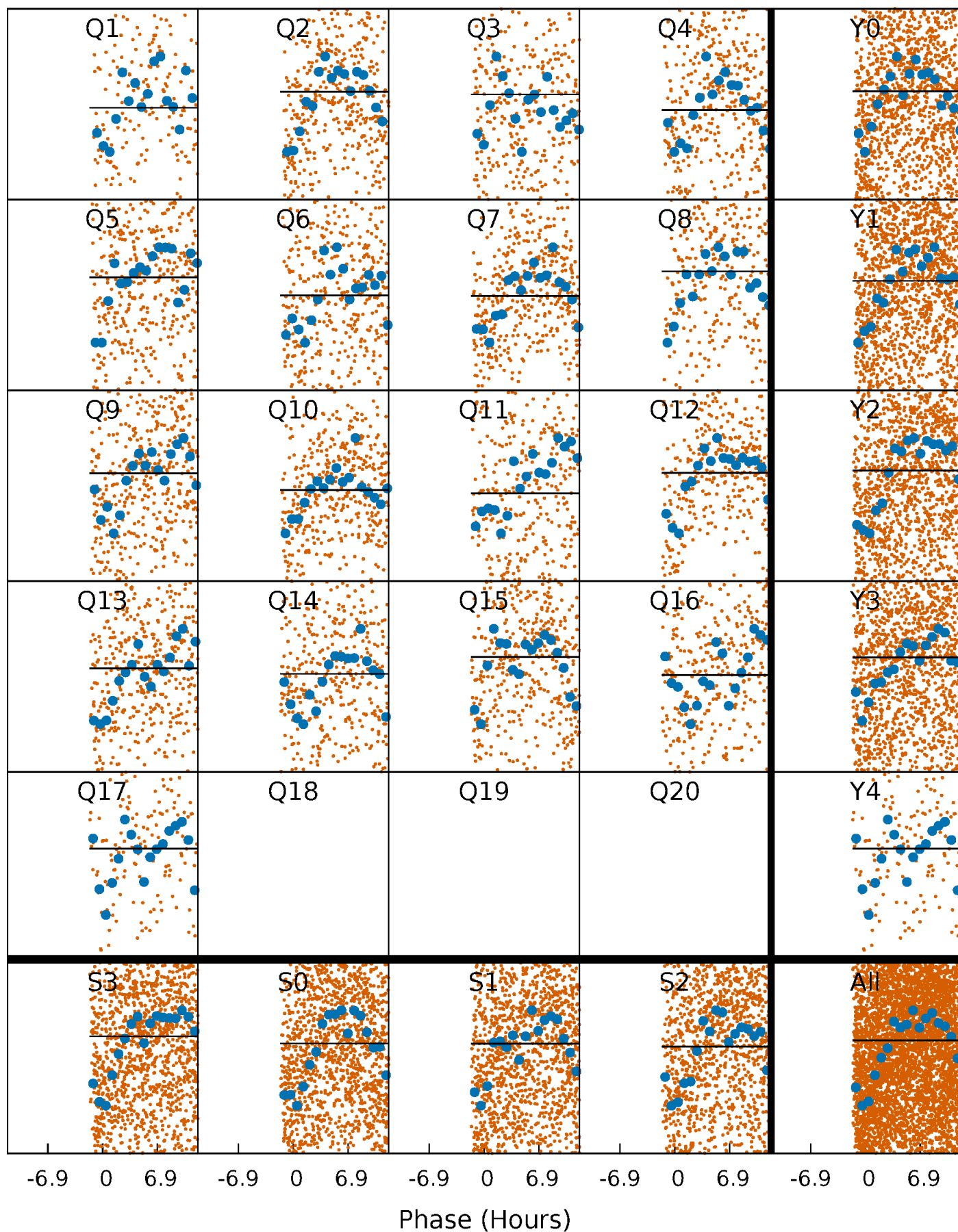
TCE 006116172-02    P= 5.267756 Days     $T_0=131.657434$  (BKJD)





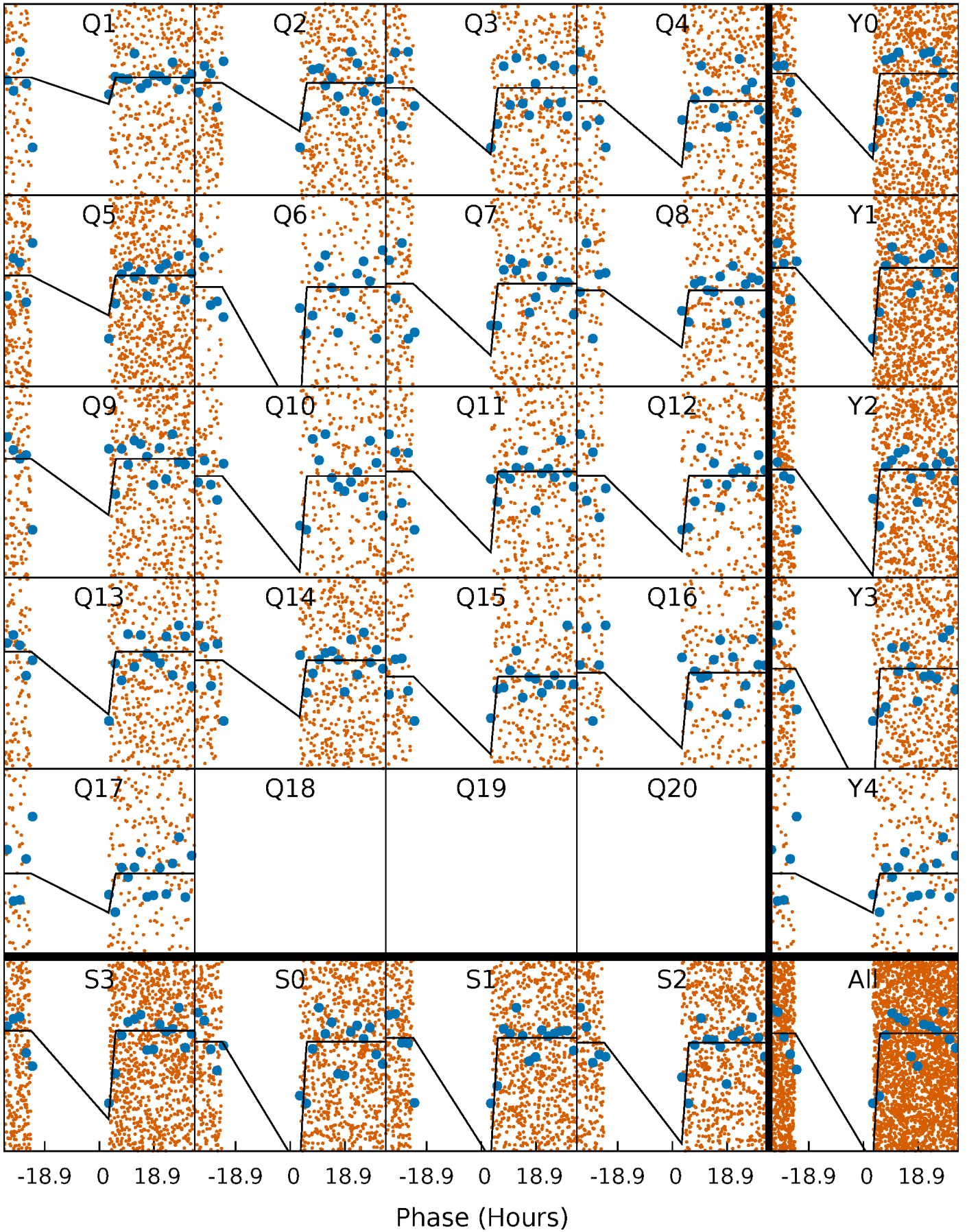
# DV Quarter-Phased Transit Curves

TCE 006116172-02   P= 5.267756 Days    $T_0=131.657434$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

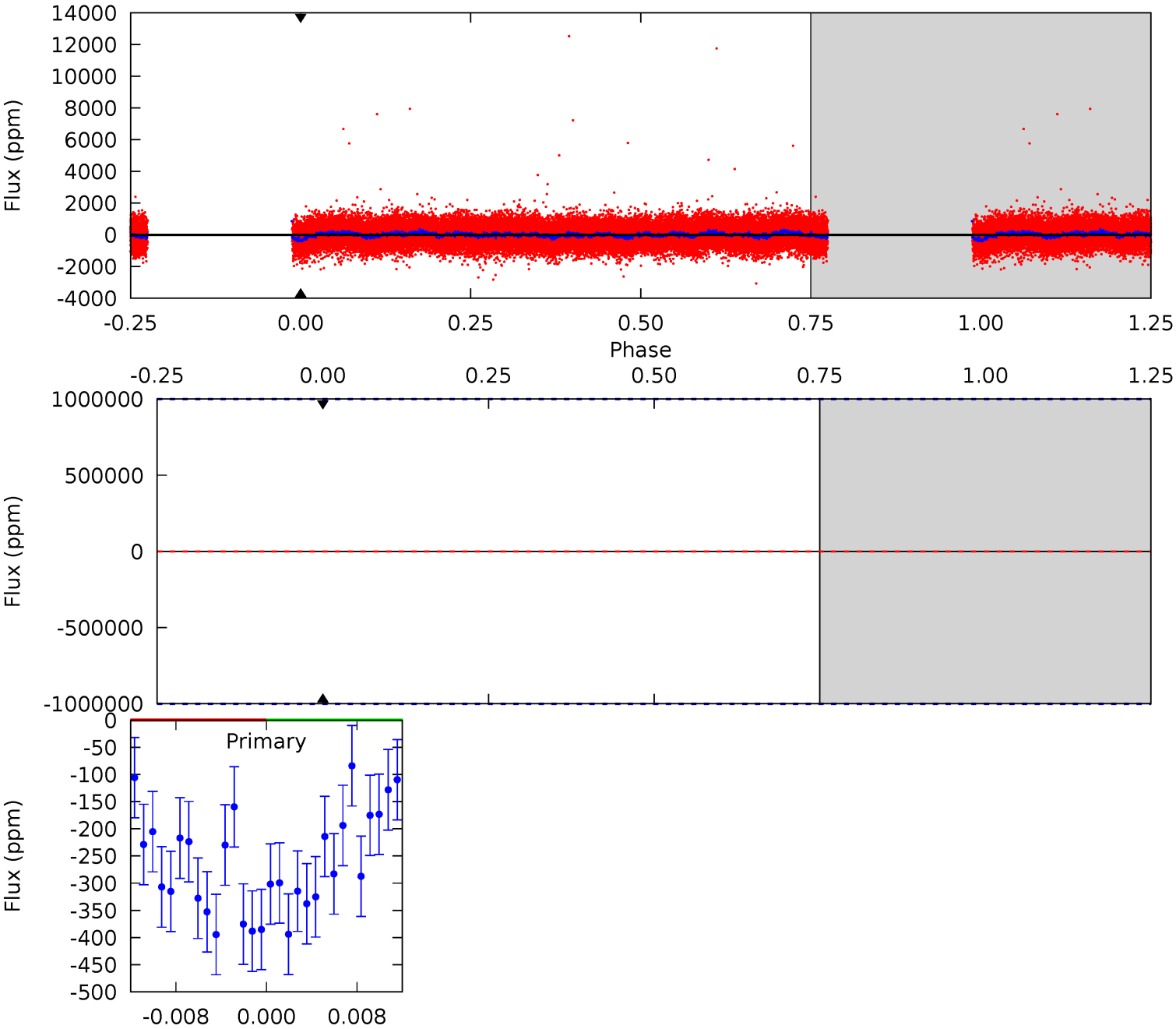
TCE 006116172-02 P= 5.267756 Days  $T_0=136.722840$  (BKJD)



DV Model-Shift Uniqueness Test

006116172-02, P = 5.267756 Days, E = 126.389678 Days

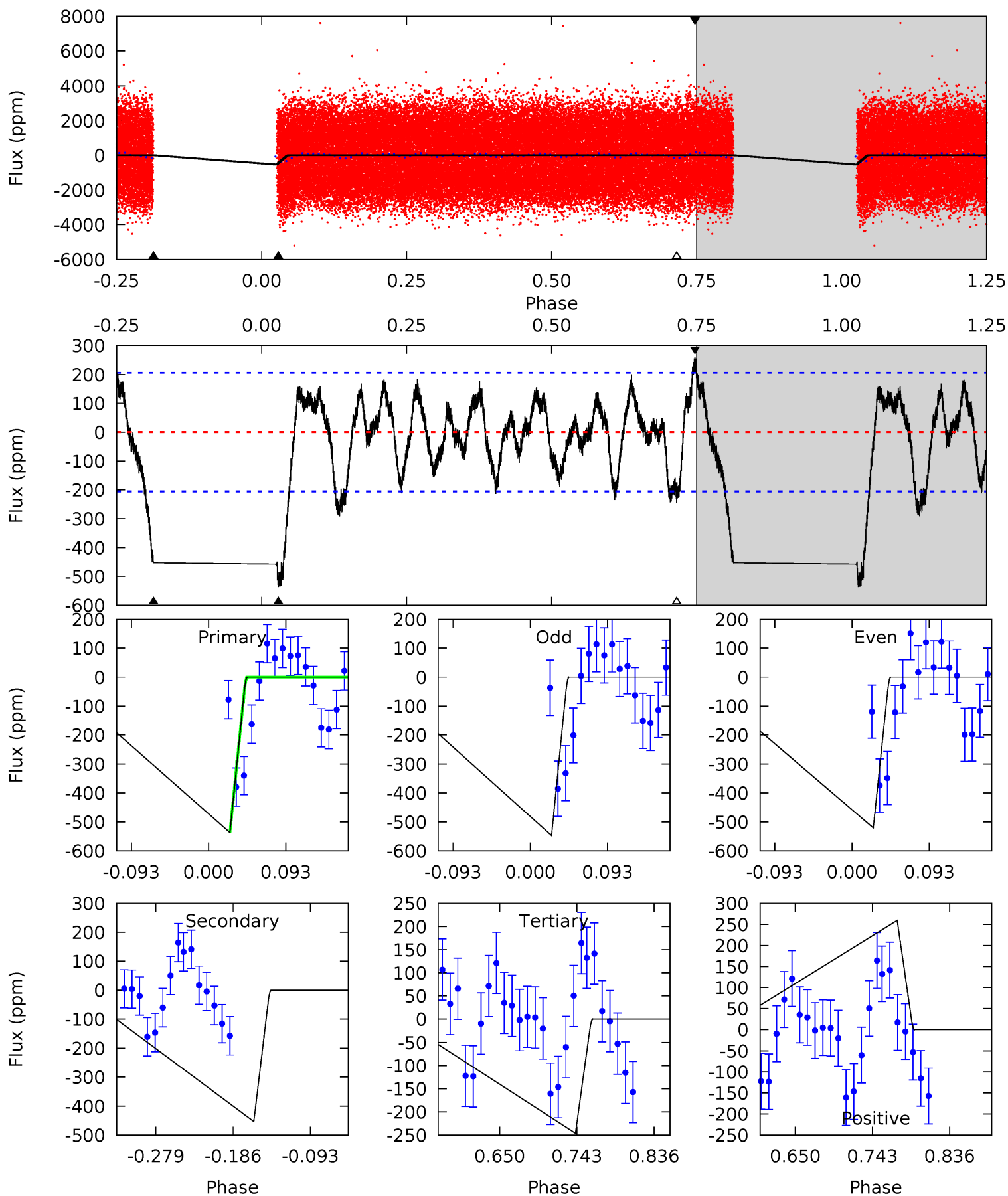
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

006116172-02, P = 5.267756 Days, E = 131.455084 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
11.9	10.1	5.48	5.78	4.58	1.68	2.30	6.47	6.17	4.62	4.32	0.29	0.96	0.33	0





### Stellar Parameters For KIC 006116172

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6967^{+194}_{-333}$	$4.086^{+0.162}_{-0.180}$	$0.080^{+0.200}_{-0.350}$	$1.863^{+0.573}_{-0.417}$	$1.541^{+0.196}_{-0.269}$	$0.336^{+0.319}_{-0.162}$
	+3%/-5%	+4%/-4%	+250%/-438%	+31%/-22%	+13%/-17%	+95%/-48%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 006116172-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$14.44^{+16.57}_{-10.67}$	$2229^{+197}_{-165}$	$5126^{+34913}_{-42534}$	$19^{+2794}_{-2347}$
Alt.	$-453 \pm 45$	$16.32^{+17.43}_{-11.57}$	$2230^{+173}_{-164}$	$3818^{+2618}_{-853}$	$4.237^{+48.160}_{-3.223}$

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

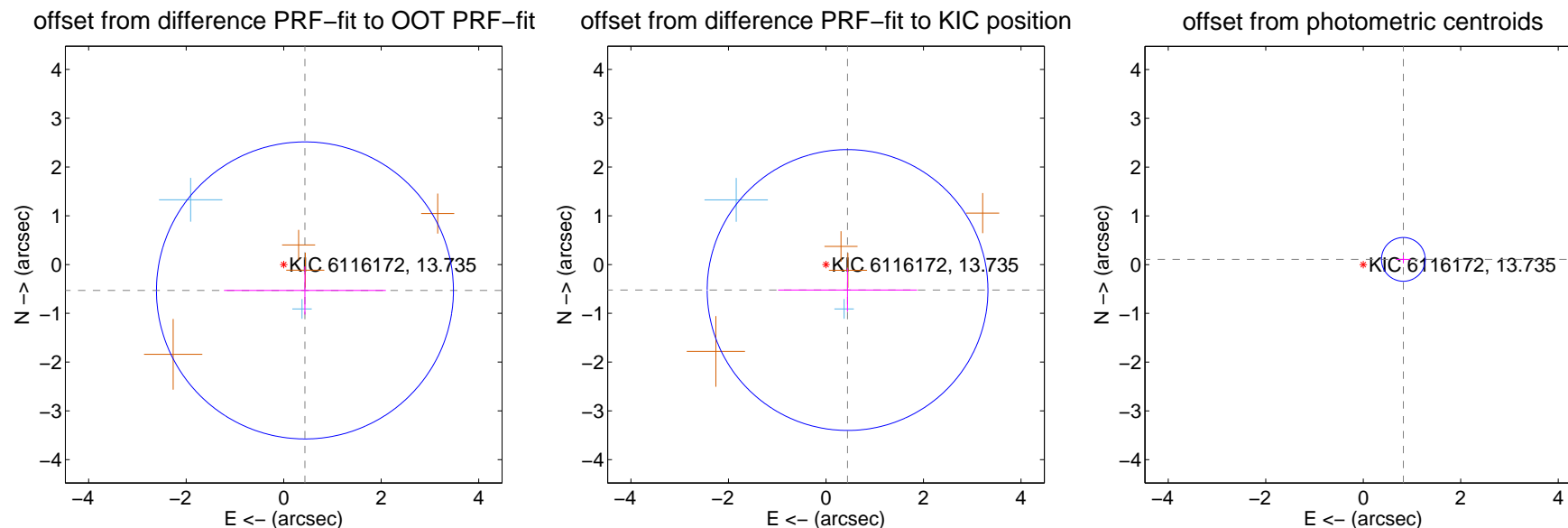
## DV Centroid Data

Supplemental centroid analysis for 006116172-02. Kepler magnitude: 13.73. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

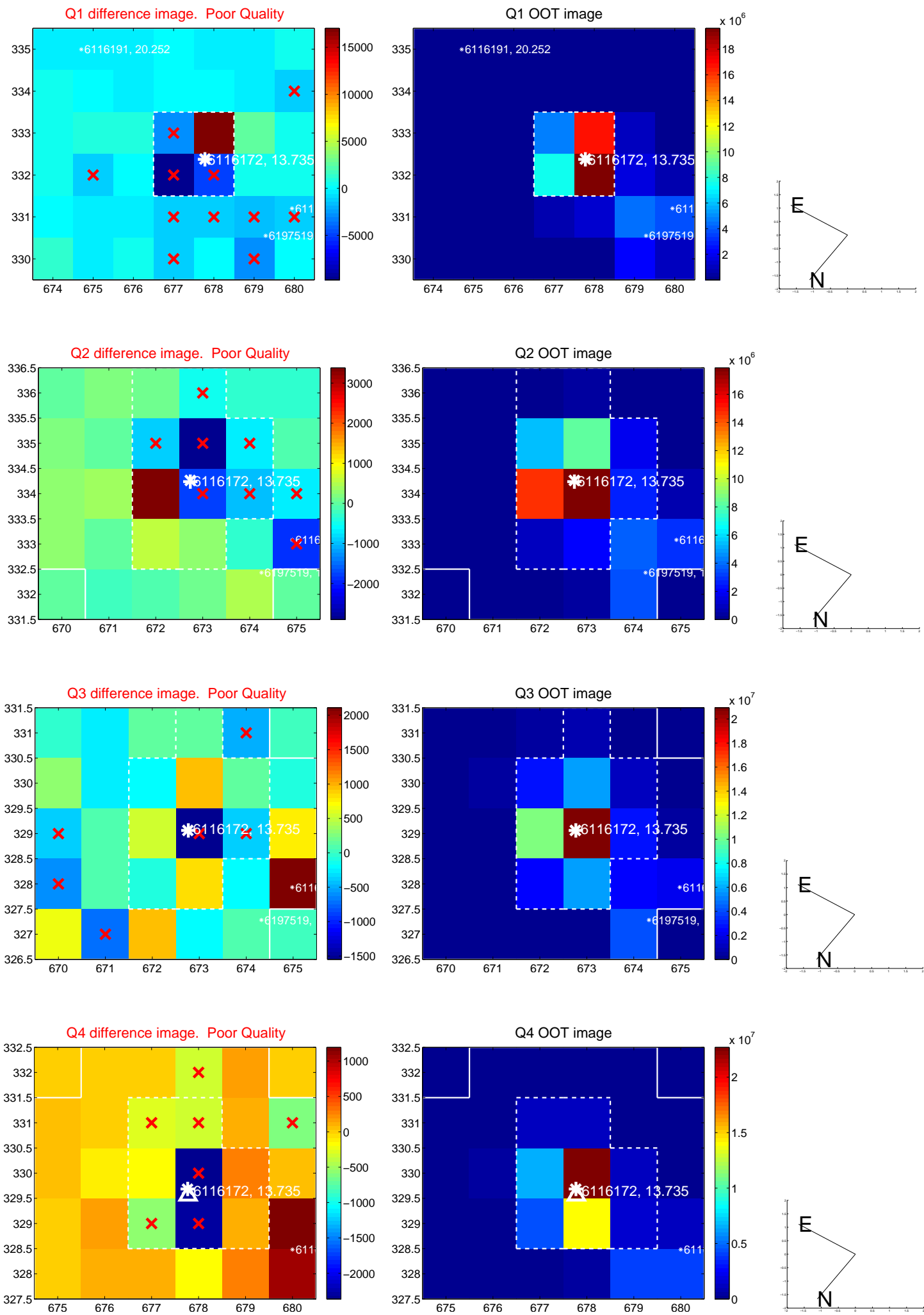
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.687 \pm 1.015$	0.68	$-0.436 \pm 1.659$	$-0.530 \pm 0.494$
PRF-fit source offset from KIC position	$0.685 \pm 0.960$	0.71	$-0.443 \pm 1.425$	$-0.522 \pm 0.442$
photometric centroid source offset	$0.83 \pm 0.15$	5.55	$-0.82 \pm 0.15$	$0.11 \pm 0.08$

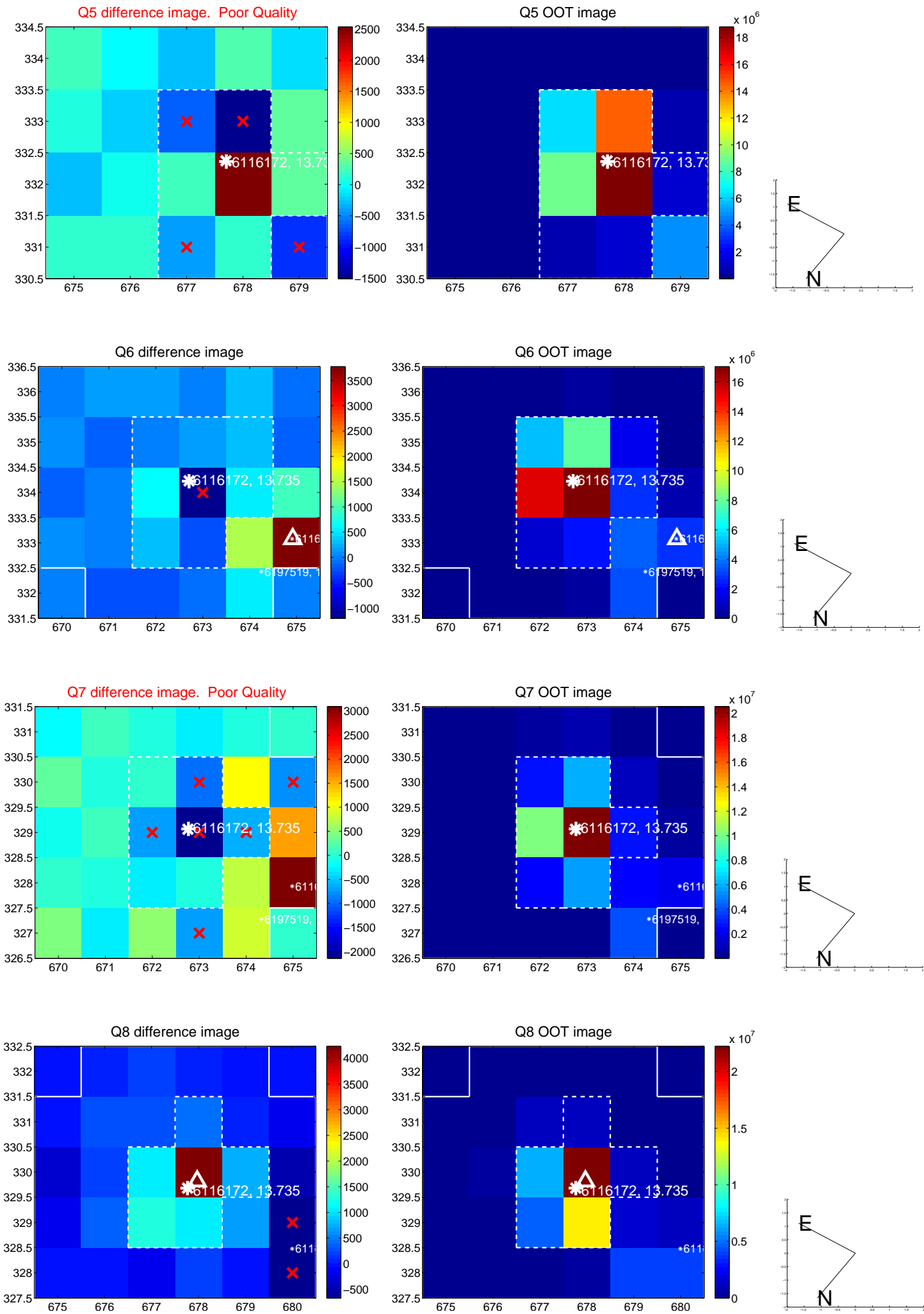


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

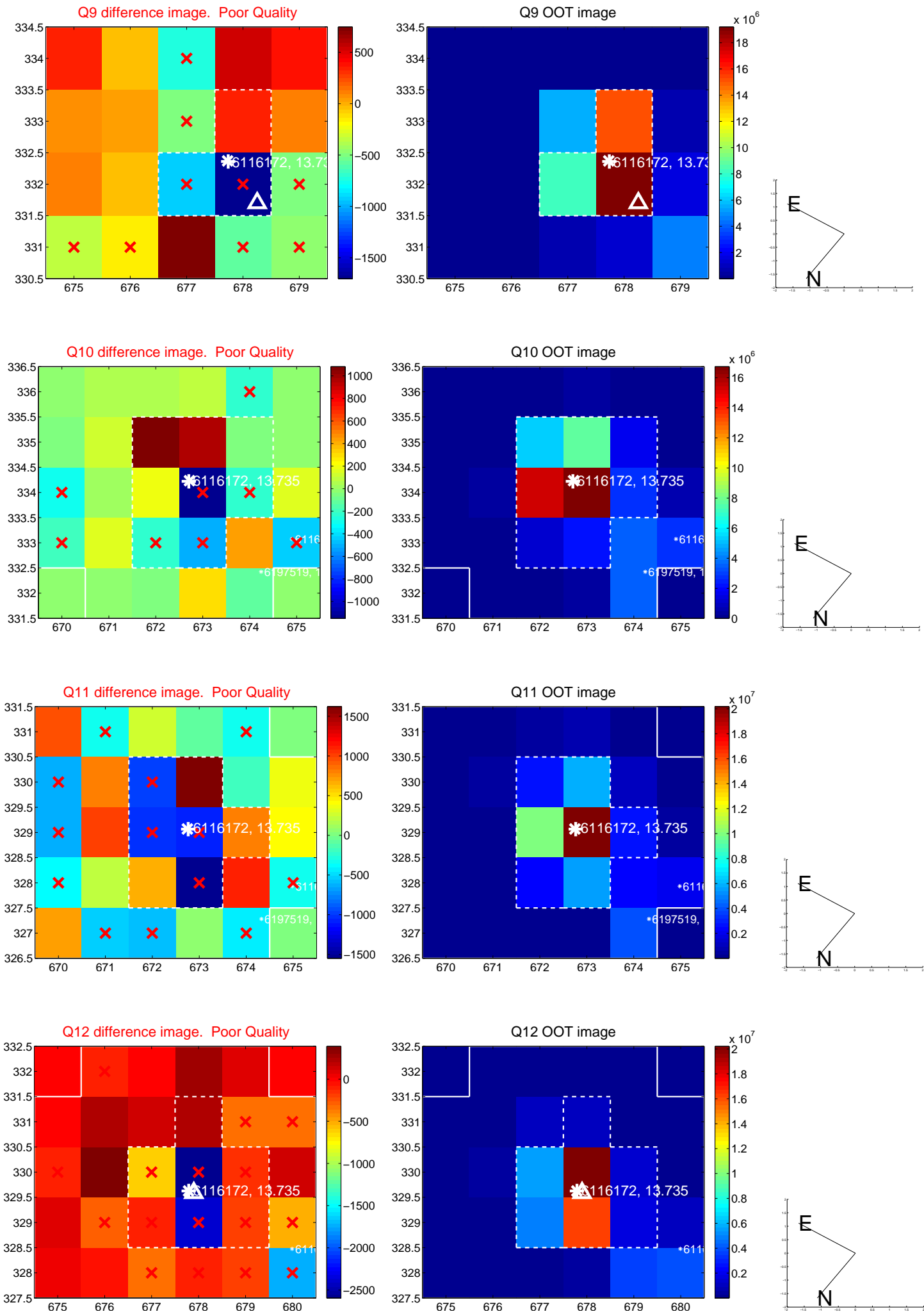


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

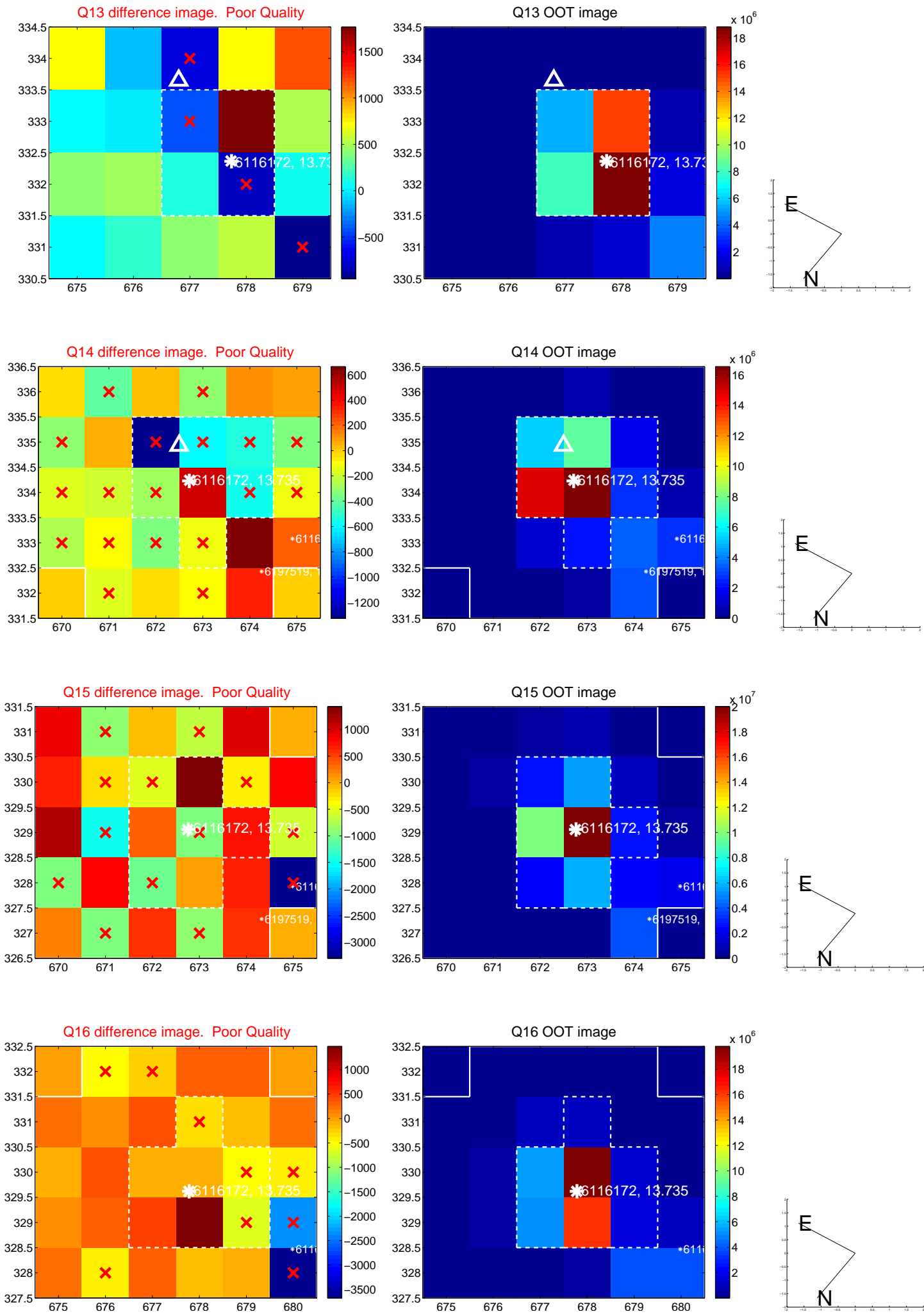




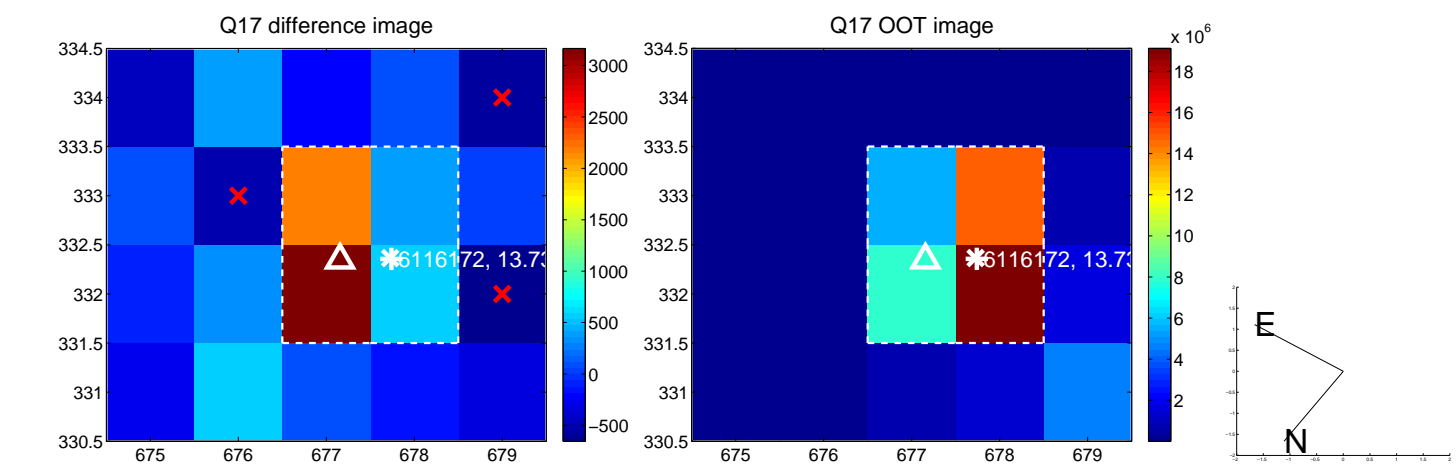
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



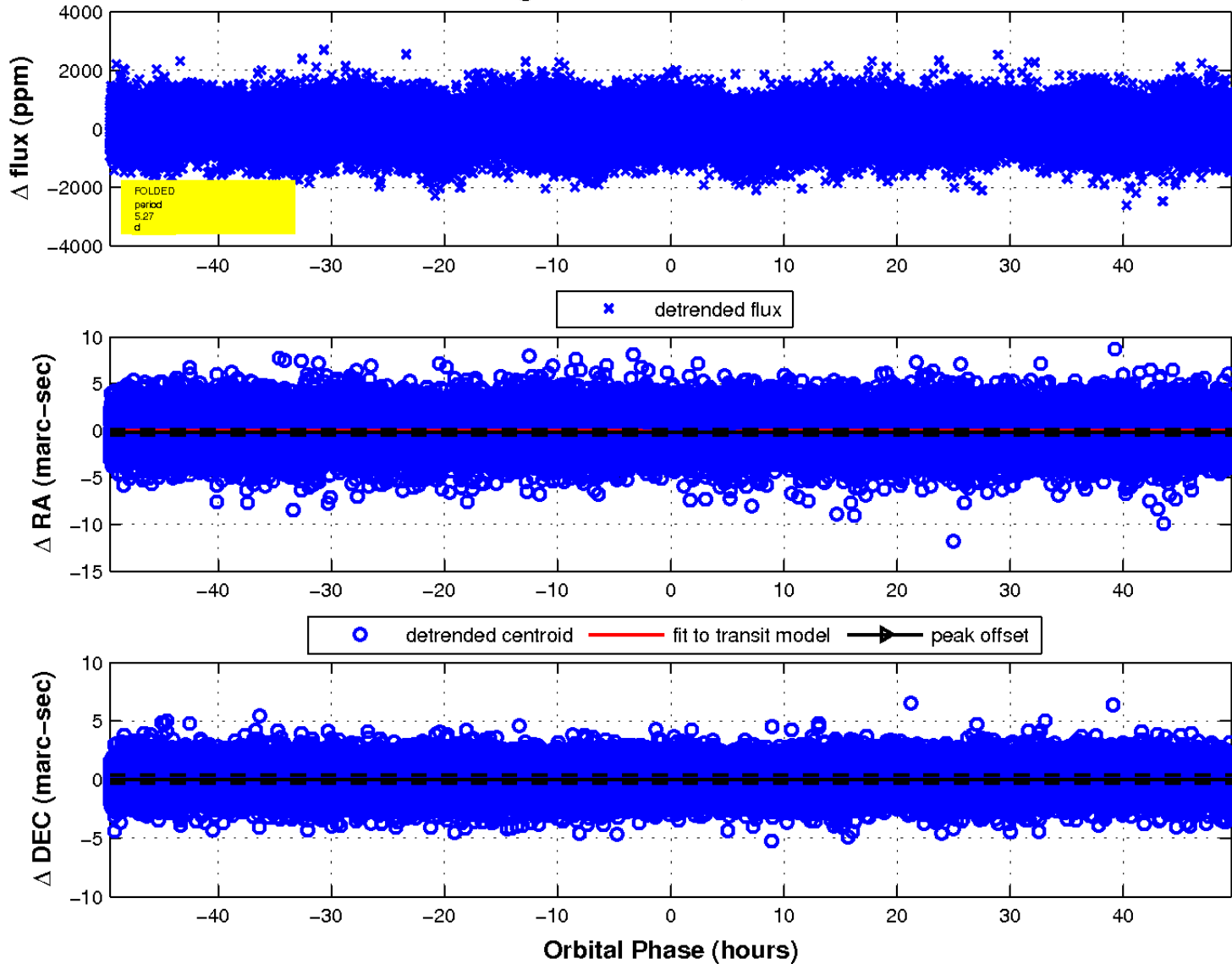
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

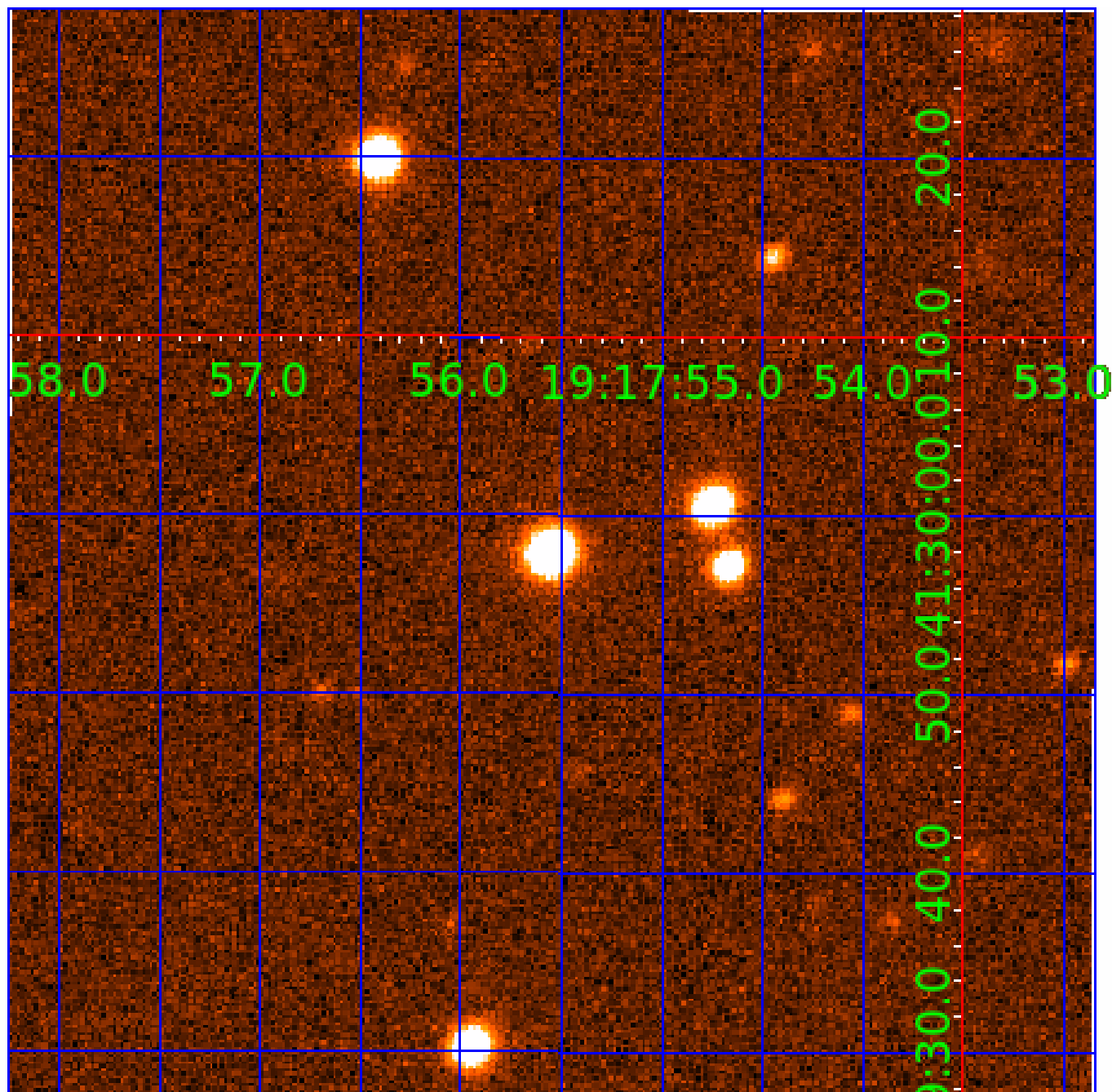


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 006116172

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006116172-01	OBS	No	5.267689	136.308765	195.2	8.902	12.3	13.5	1.86	6967	3.09	1562.16
006116172-02	OBS	No	5.267756	131.657434	226.5	6.000	10.3	-1.0	1.86	6967	2.83	1562.13
006116172-03	OBS	No	1.259762	131.845504	62.5	13.226	8.8	10.4	1.86	6967	1.49	10523.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006116172-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006116172-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_NOFITS
006116172-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS

**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.

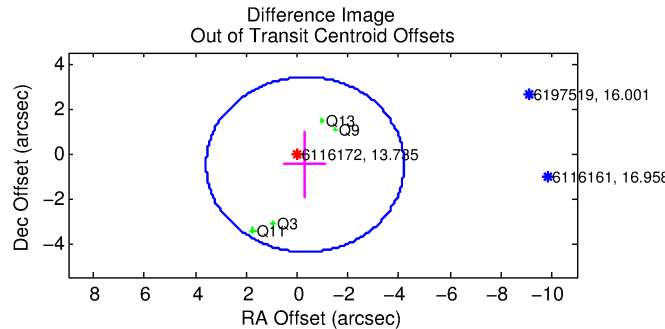
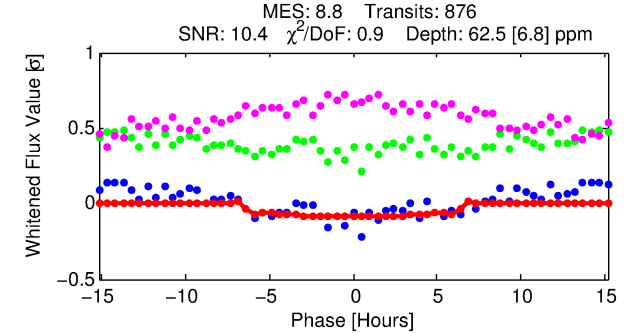
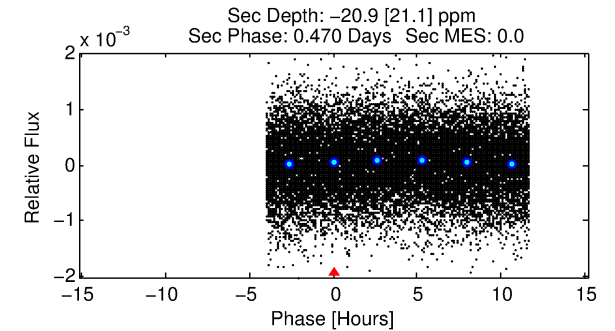
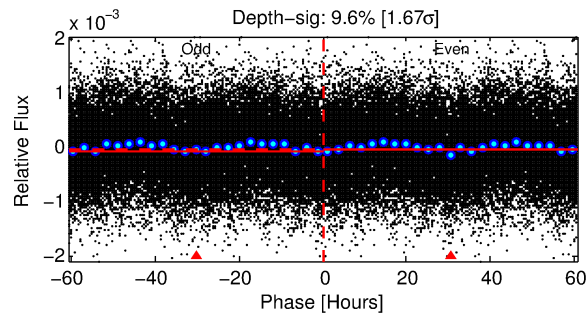
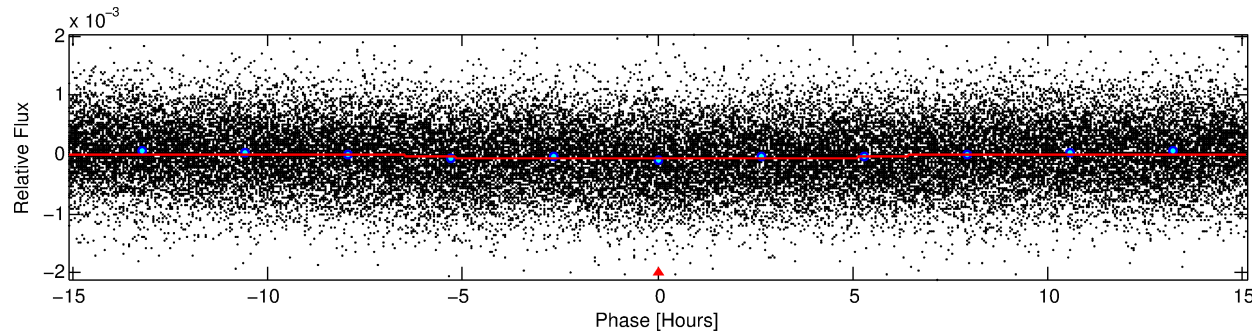
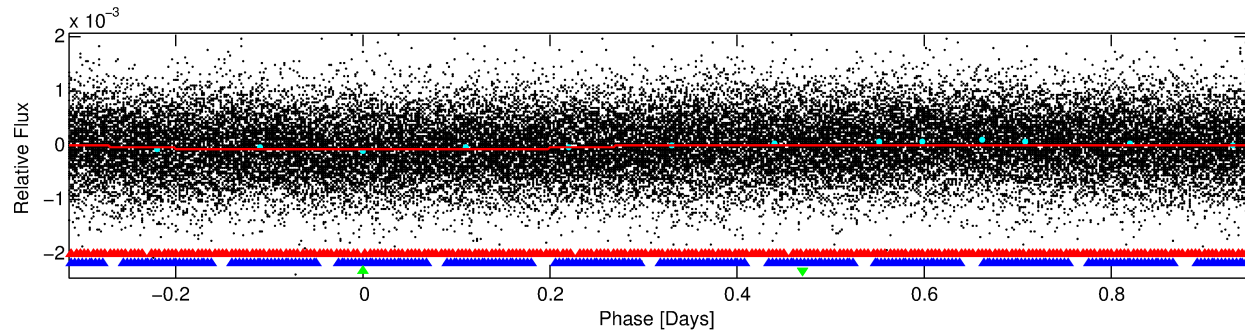
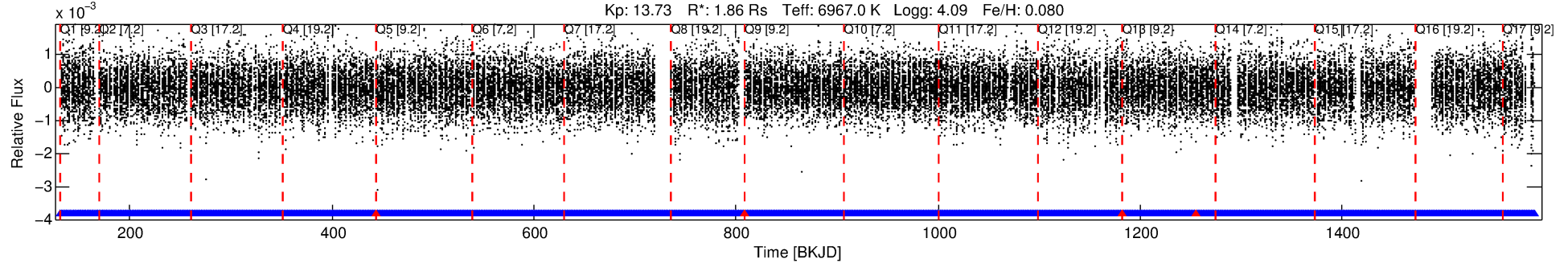
Ephemeris Match Information For 006116172-03

No Significant Match Found

# DV One-Page Summary

KIC: 6116172 Candidate: 3 of 3 Period: 1.260 d  
KOI: K06142 Corr: No Ephemeris Match

Kp: 13.73 R\*: 1.86 Rs Teff: 6967.0 K Logg: 4.09 Fe/H: 0.080



## DV Fit Results:

Period = 1.25976 [0.00003] d  
Epoch = 131.8455 [0.0072] BKJD  
Rp/R\* = 0.0073 [0.0040]  
a/R\* = 1.03 [0.16]  
b = 0.00 [682.37]  
Seff = 10523.69 [4142.43]  
Teq = 2583 [254] K  
Rp = 1.49 [0.93] Re  
a = 0.0264 [0.0065] AU  
Ag = N/A  
Teffp = N/A

## DV Diagnostic Results:

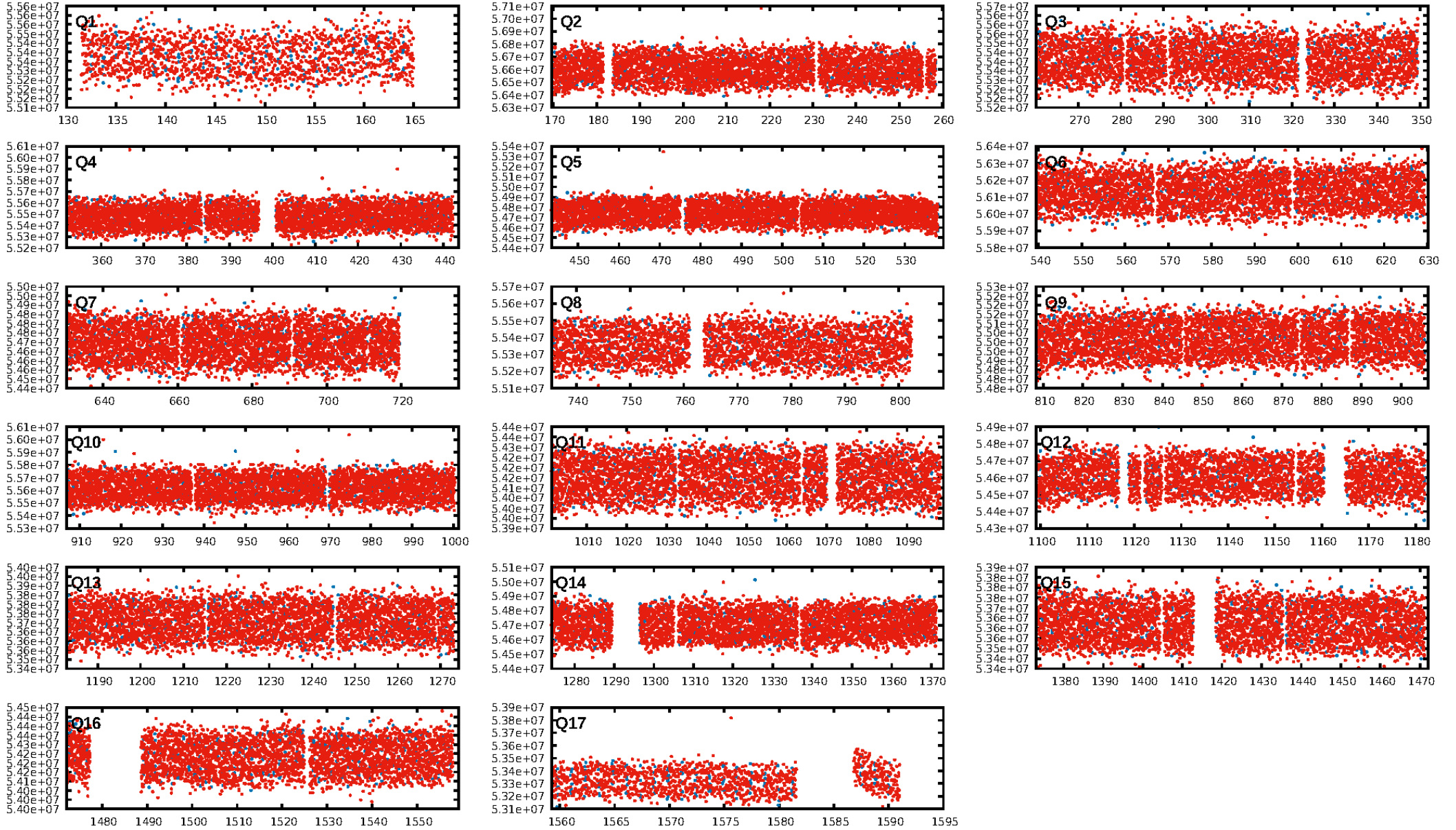
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [6.03 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [832/836]  
GhostDiagnostic-chr: 3.73  
Centroid-sig: 0.0%  
Centroid-so: 0.904 arcsec [2.26 $\sigma$ ]  
OotOffset-rm: 0.591 arcsec [0.46 $\sigma$ ]  
KicOffset-rm: 0.623 arcsec [0.49 $\sigma$ ]  
OotOffset-st: 0/2/0/2 [4]  
KicOffset-st: 0/2/0/2 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 07:14:35 Z

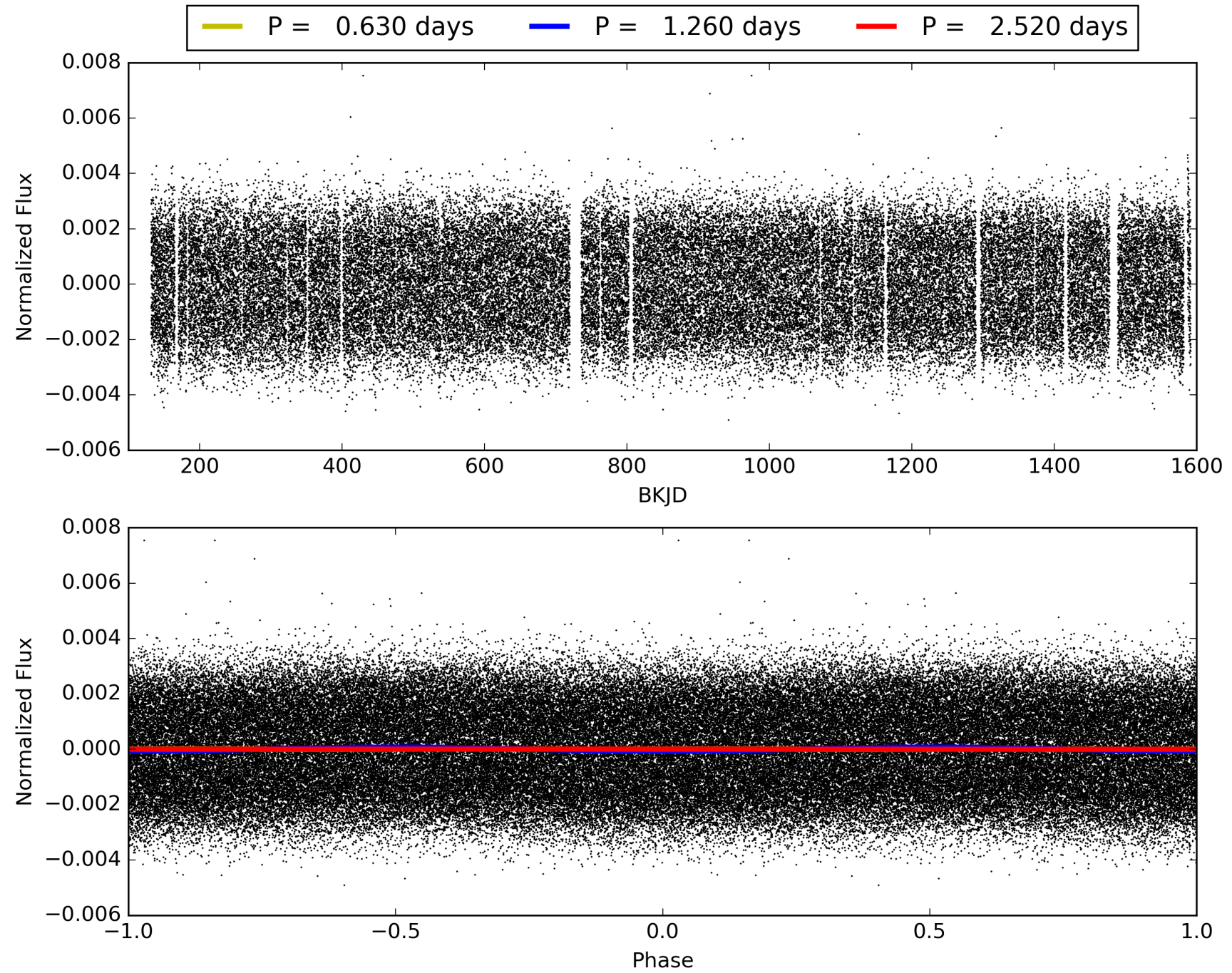
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006116172-03, PDC Light Curves

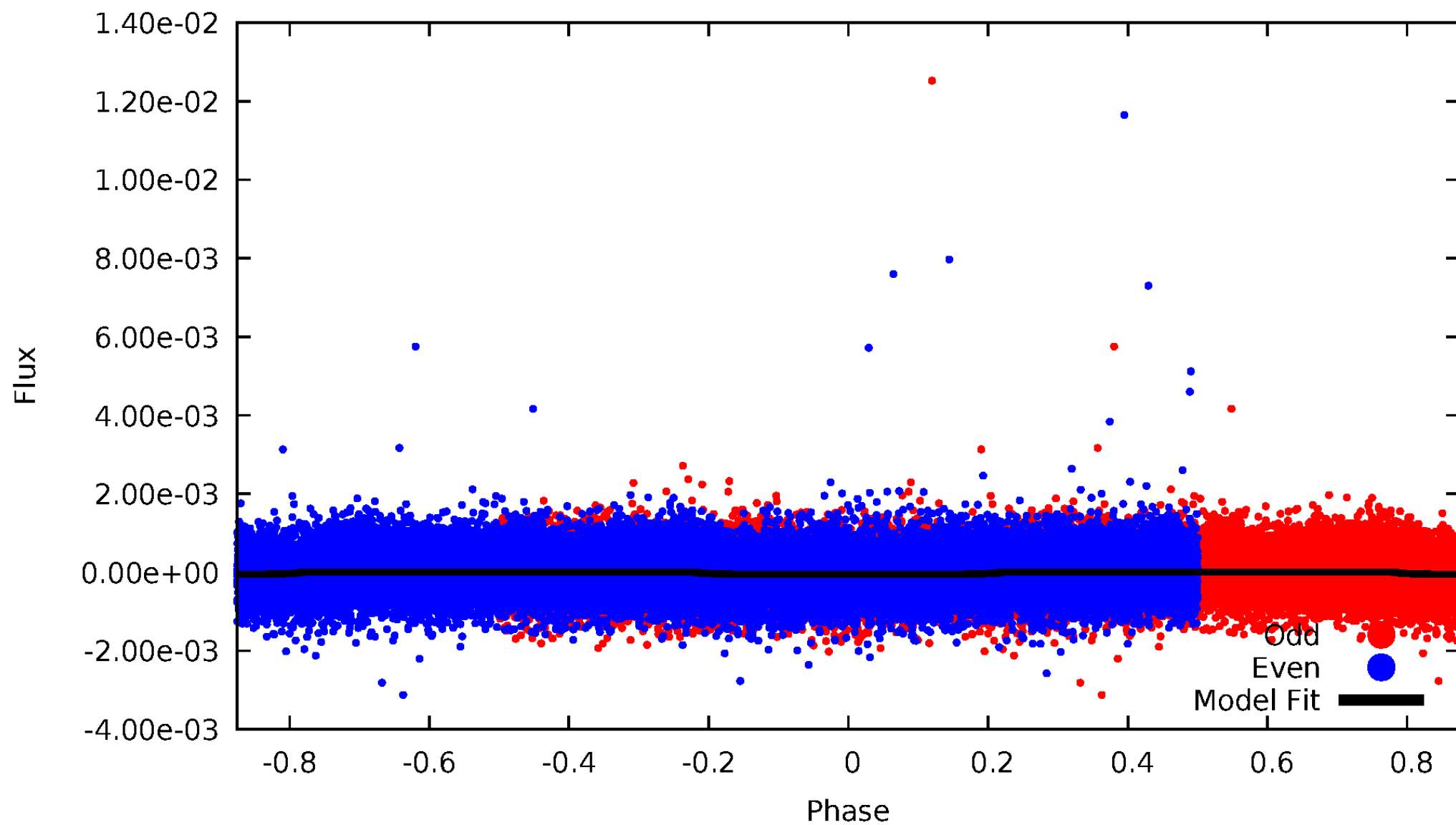


# TCE 006116172-03



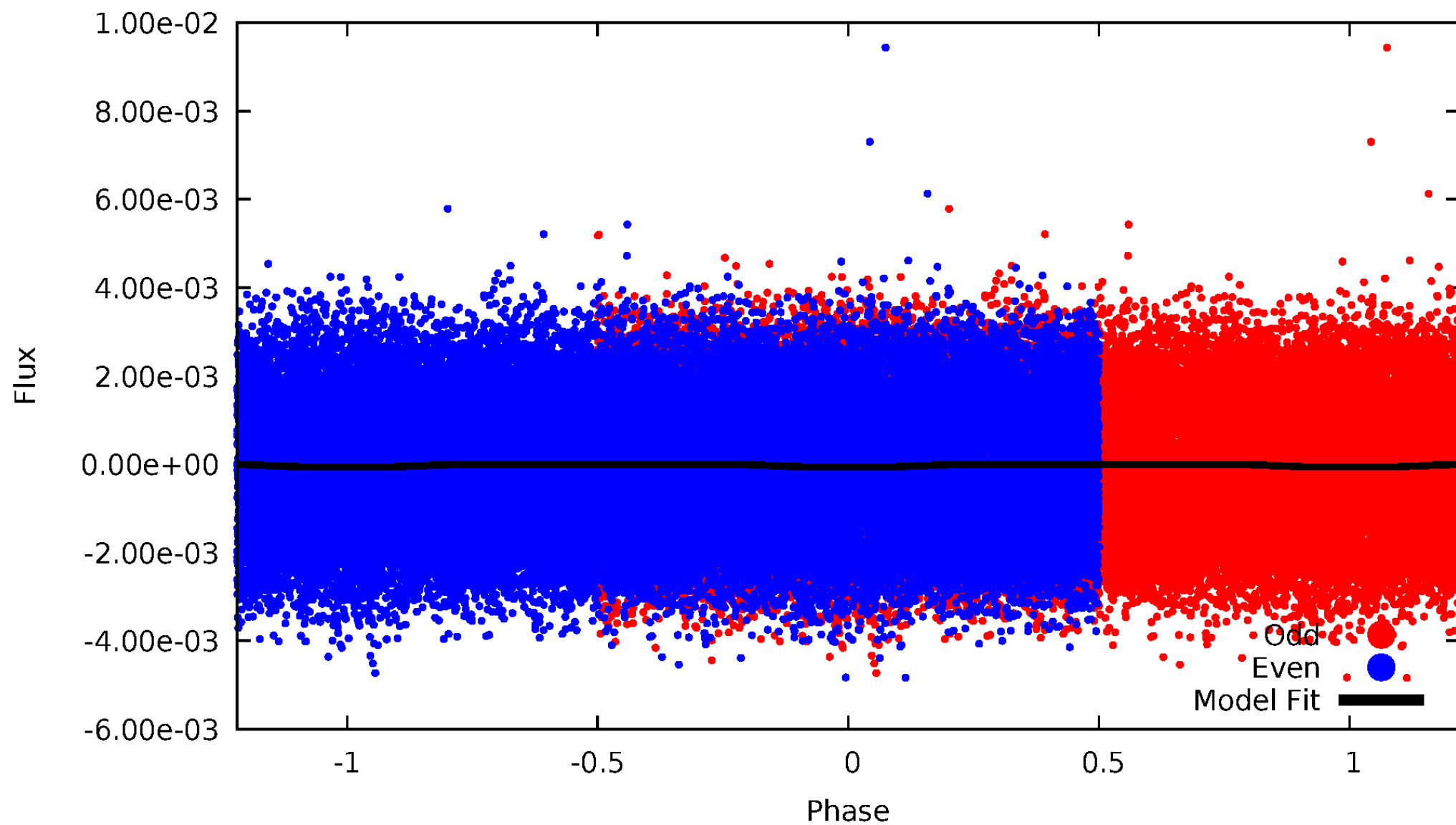
# DV Odd/Even

TCE 006116172-03



# ALT Odd/Even

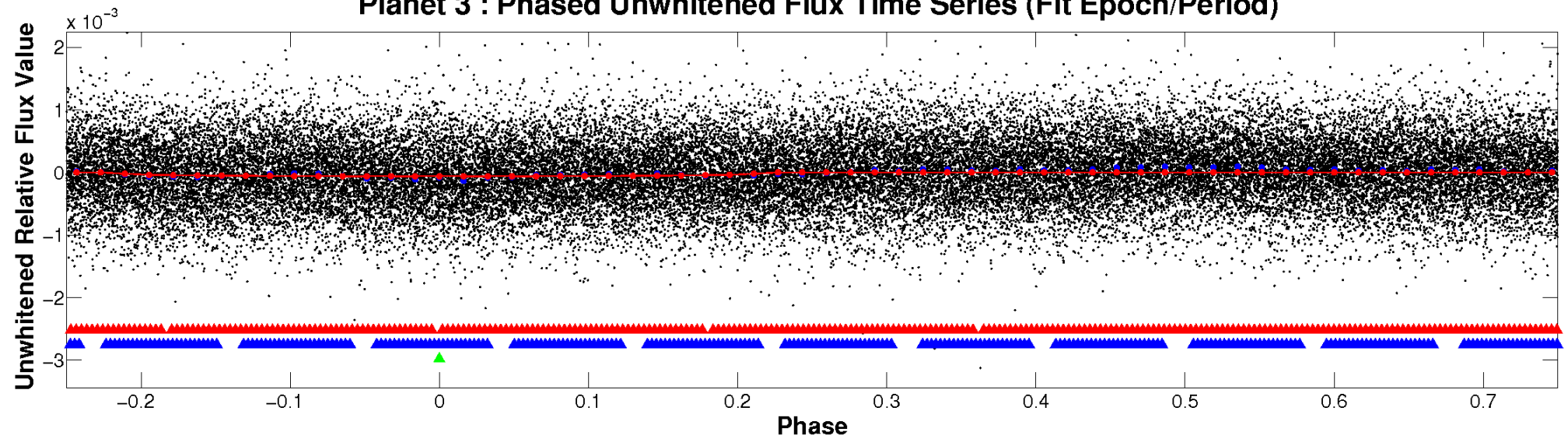
TCE 006116172-03



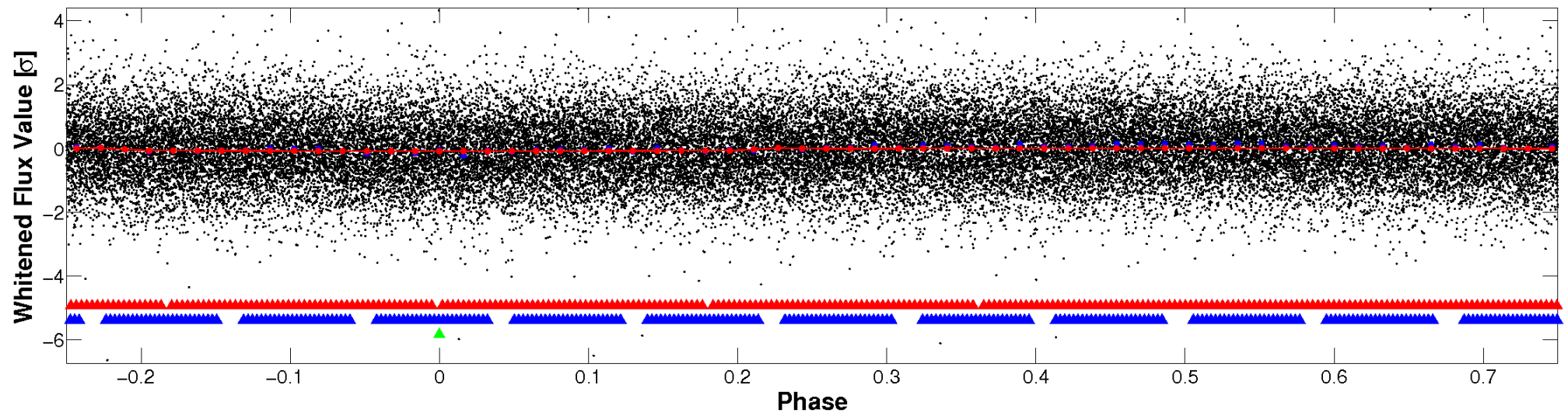


# Non-Whitened Vs. Whitened Light Curve

## Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



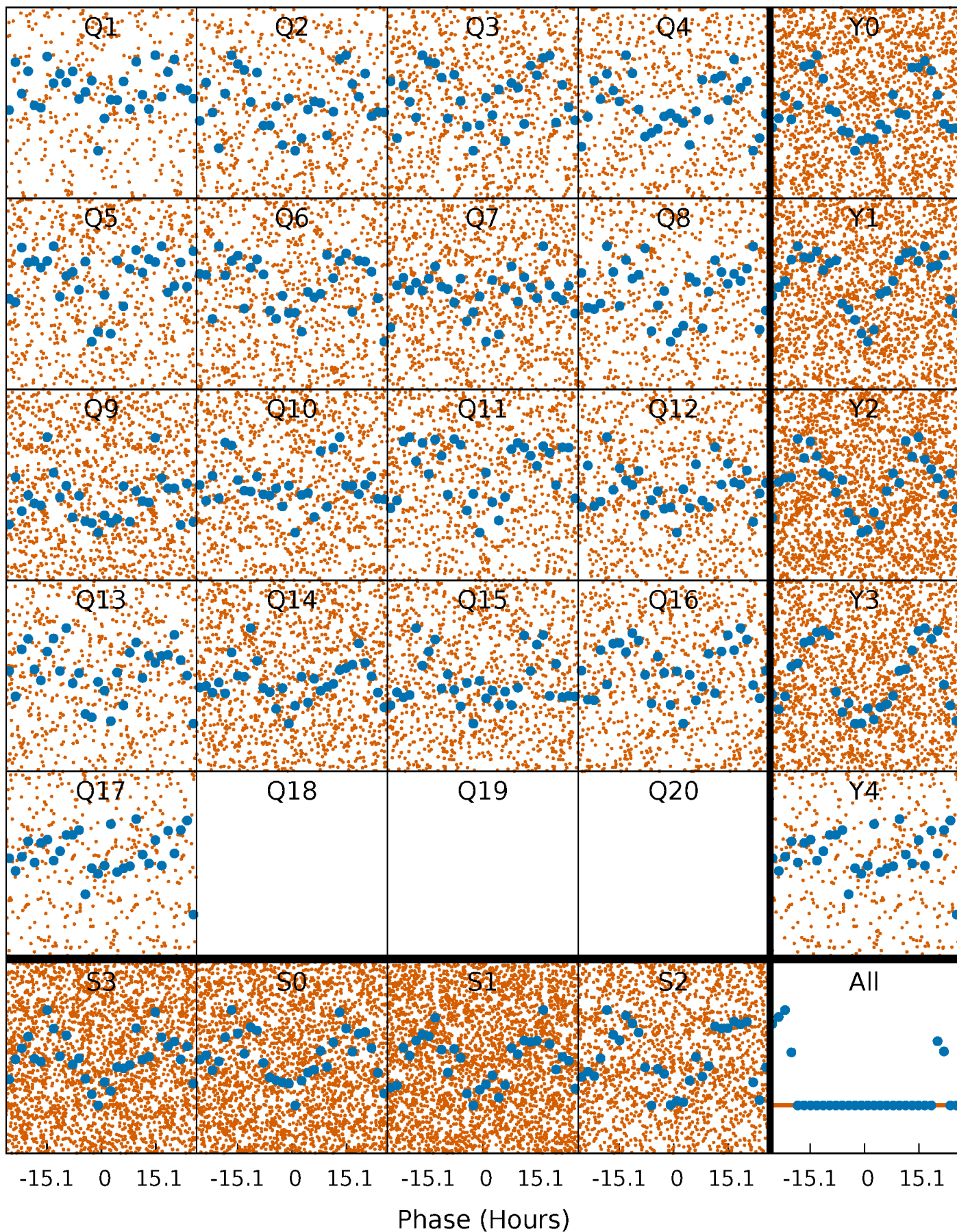
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





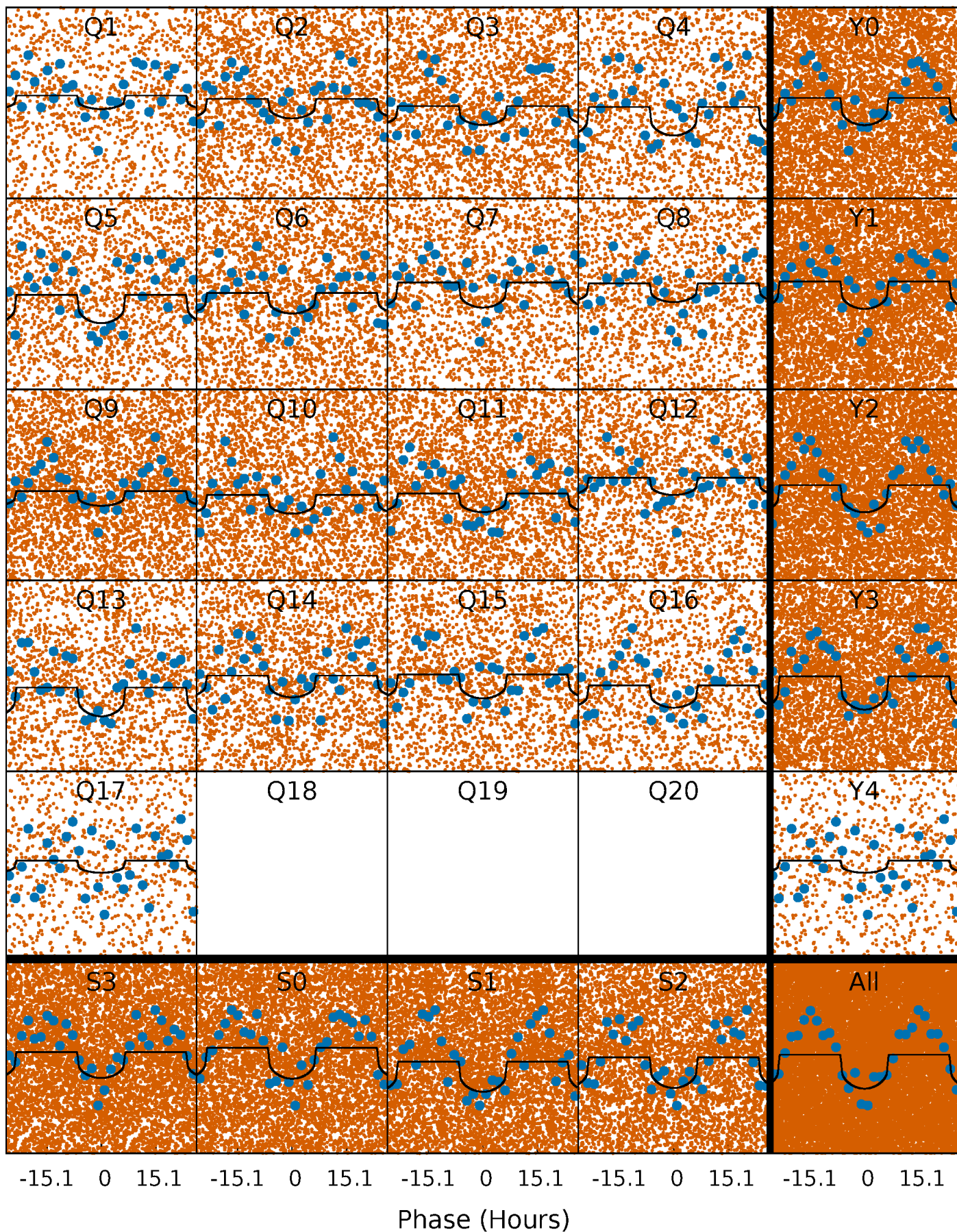
# PDC Quarter-Phased Transit Curves

TCE 006116172-03 P= 1.259762 Days  $T_0=131.845504$  (BKJD)



# DV Quarter-Phased Transit Curves

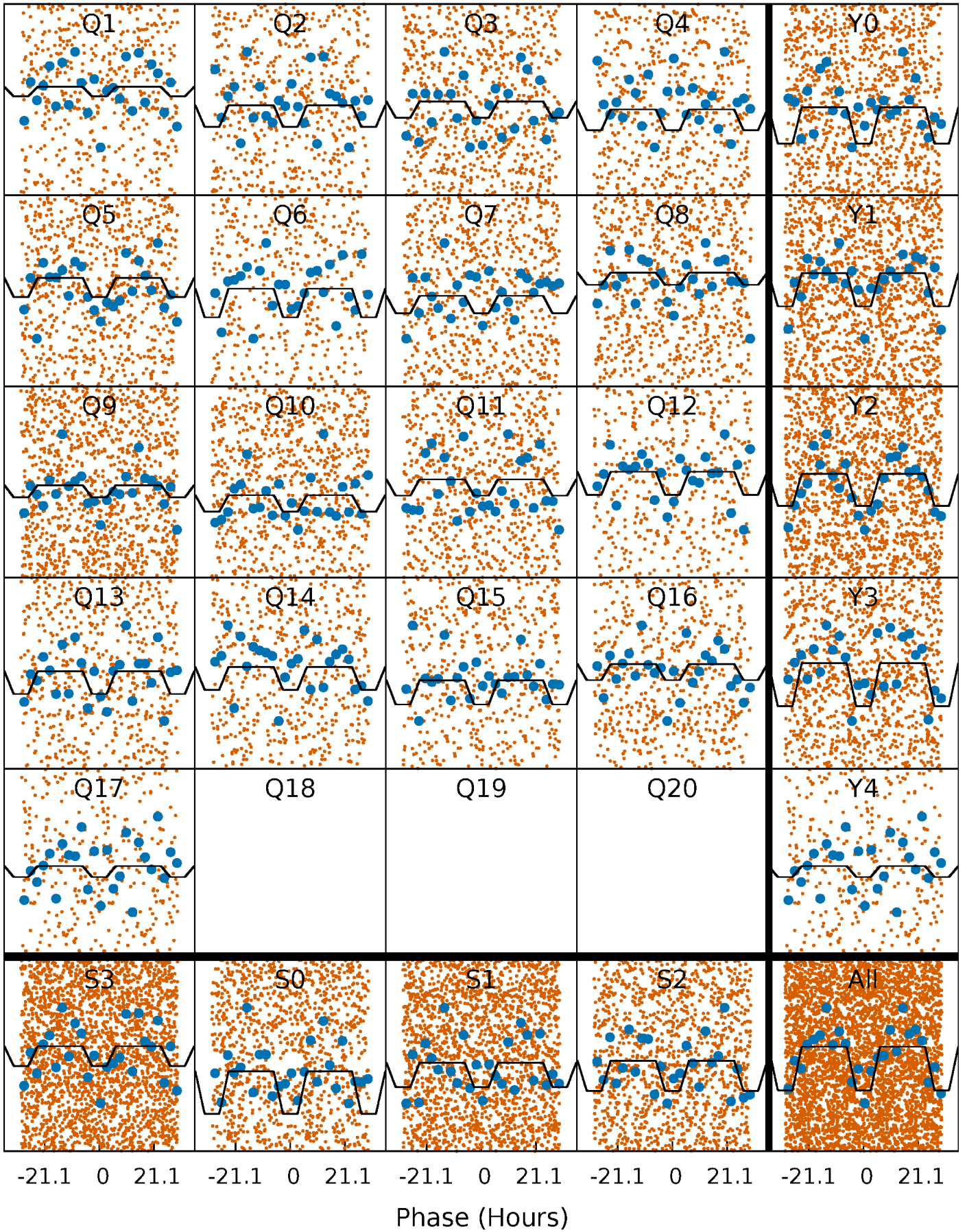
TCE 006116172-03 P= 1.259762 Days  $T_0=131.845504$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

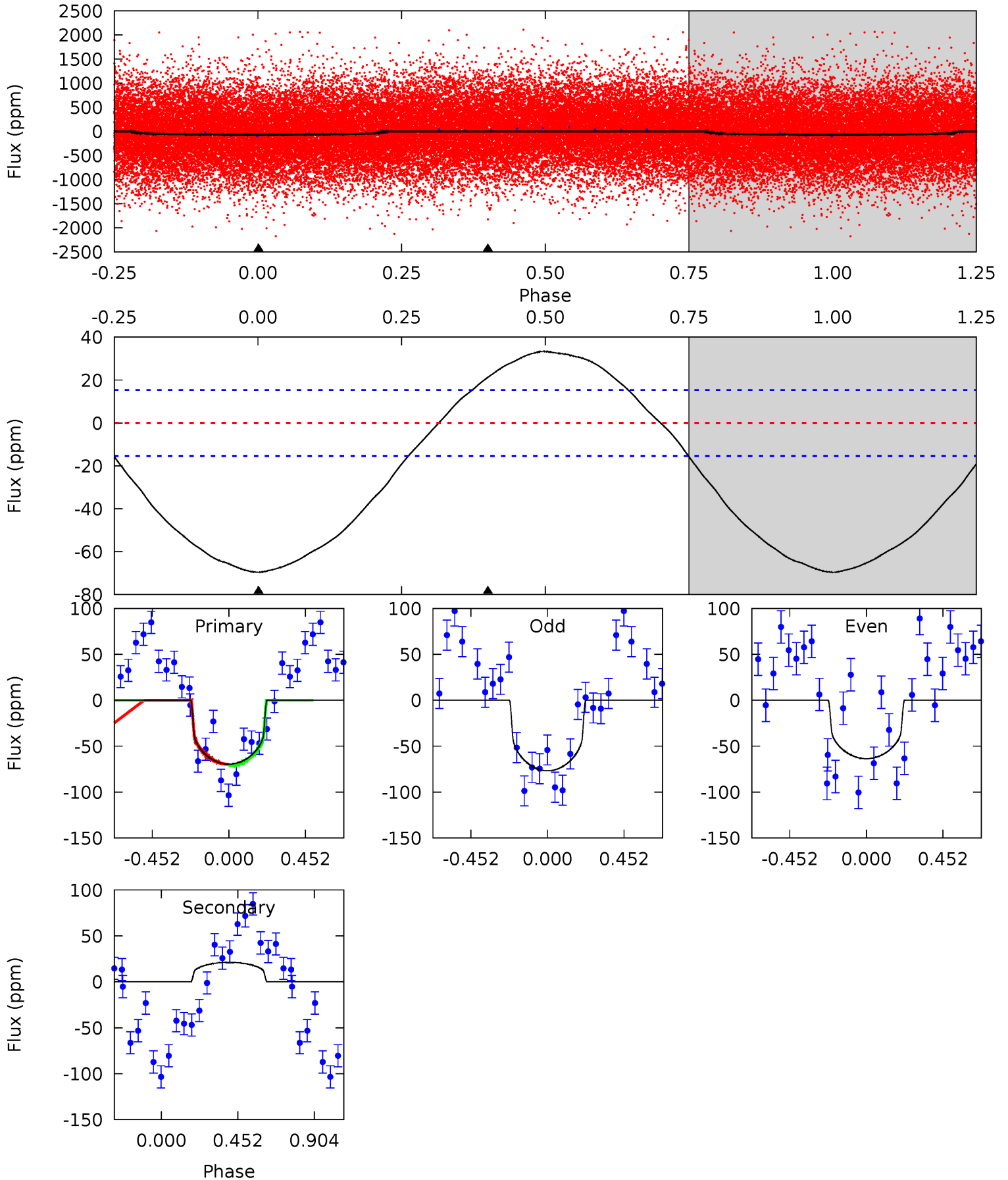
TCE 006116172-03 P= 1.259768 Days  $T_0=131.827038$  (BKJD)



# DV Model-Shift Uniqueness Test

006116172-03, P = 1.259762 Days, E = 131.845504 Days

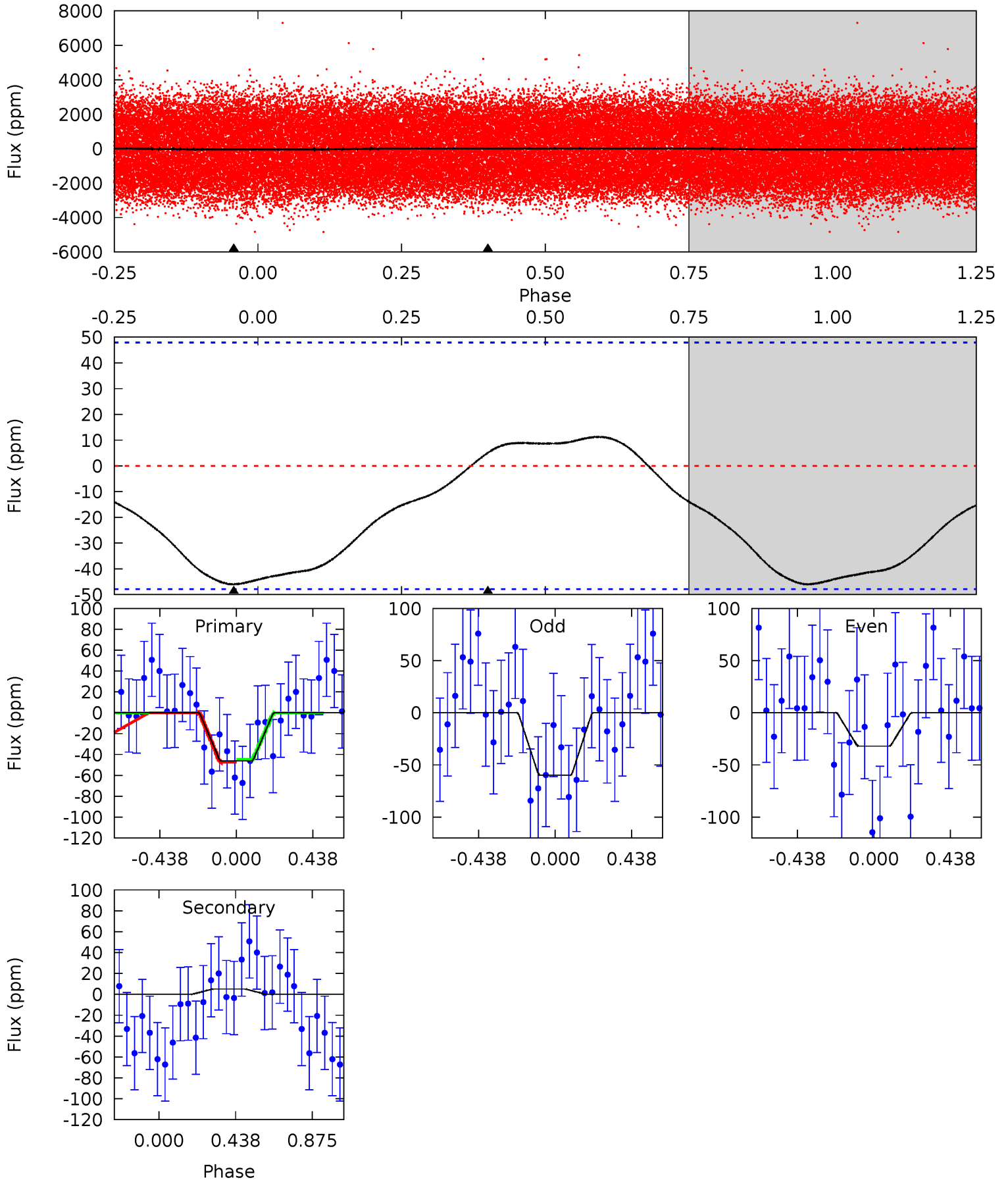
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.2	-5.86	0	0	4.24	0.75	2.35	19.2	19.2	-5.86	-5.86	1.74	0.99	0.32	0.22



# Alt Model-Shift Uniqueness Test

006116172-03, P = 1.259768 Days, E = 131.827038 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
4.08	-0.45	0	0	4.24	0.78	0.55	4.08	4.08	-0.45	-0.45	1.24	1.30	0.20	0.12





### Stellar Parameters For KIC 006116172

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6967^{+194}_{-333}$	$4.086^{+0.162}_{-0.180}$	$0.080^{+0.200}_{-0.350}$	$1.863^{+0.573}_{-0.417}$	$1.541^{+0.196}_{-0.269}$	$0.336^{+0.319}_{-0.162}$
	+3%/-5%	+4%/-4%	+250%/-438%	+31%/-22%	+13%/-17%	+95%/-48%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 006116172-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$21 \pm 4$	$1.51^{+0.89}_{-0.76}$	$3585^{+324}_{-253}$	$-5559^{+885}_{-2148}$	$-3.322^{+1.976}_{-10.984}$
Alt.	$5 \pm 11$	$1.49^{+0.92}_{-0.80}$	$3594^{+299}_{-278}$	$-4189^{+8247}_{-1621}$	$-0.574^{+1.618}_{-3.937}$

$T_{\text{max}}$  = 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

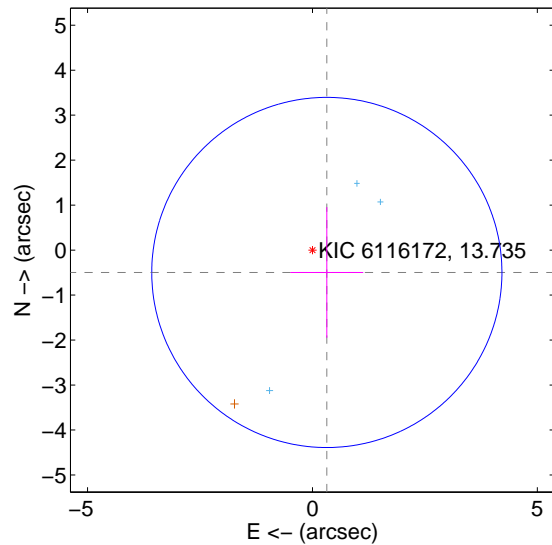
Supplemental centroid analysis for 006116172-03. Kepler magnitude: 13.73. Transit SNR 10.39

There are 3 quarters with good PRF difference image offsets

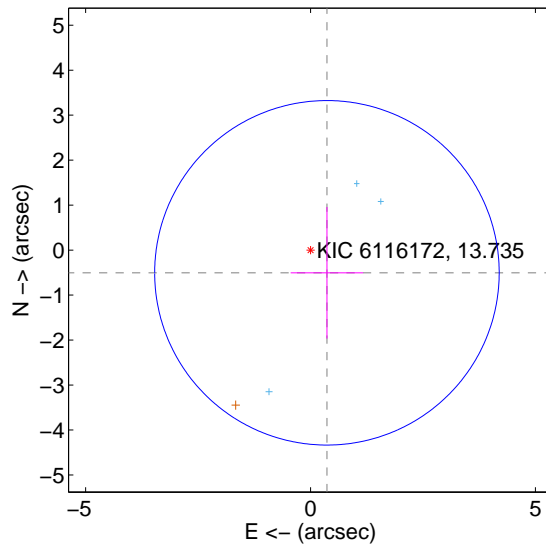
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.591 \pm 1.298$	0.46	$-0.320 \pm 0.809$	$-0.497 \pm 1.453$
PRF-fit source offset from KIC position	$0.623 \pm 1.277$	0.49	$-0.365 \pm 0.806$	$-0.505 \pm 1.463$
photometric centroid source offset	$0.90 \pm 0.40$	2.26	$-0.24 \pm 0.63$	$0.87 \pm 0.38$

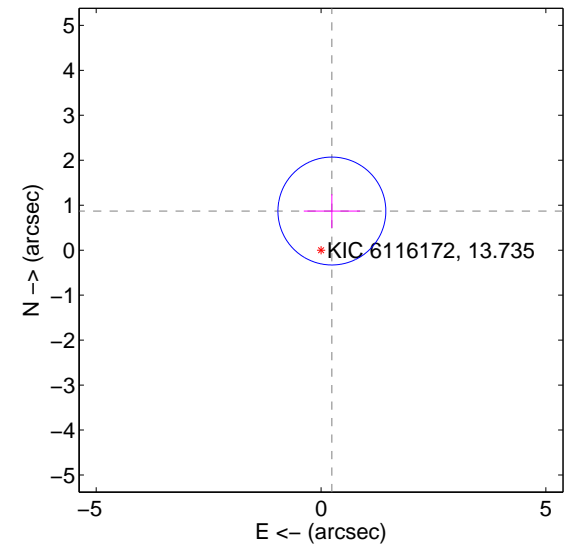
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

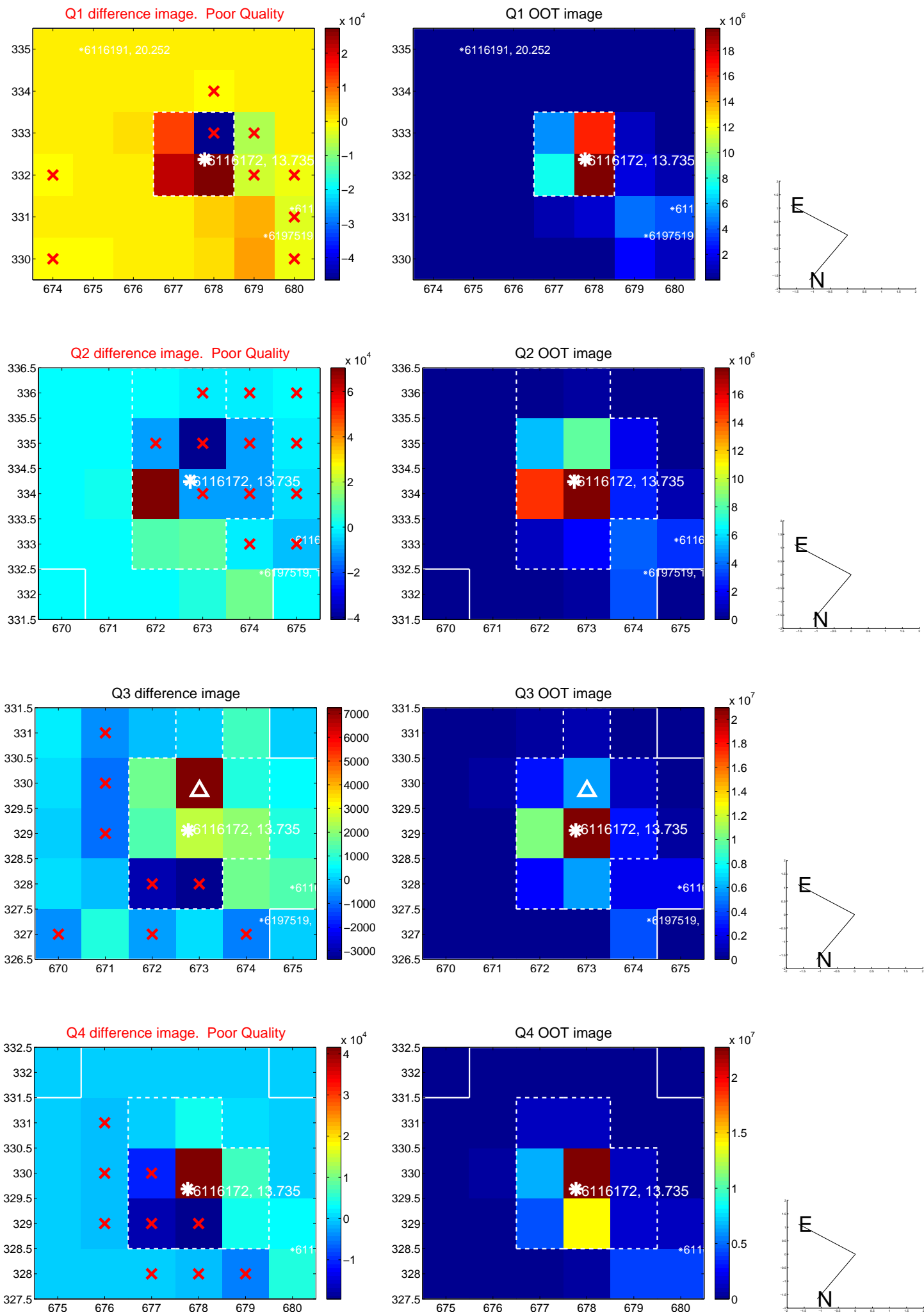


offset from photometric centroids

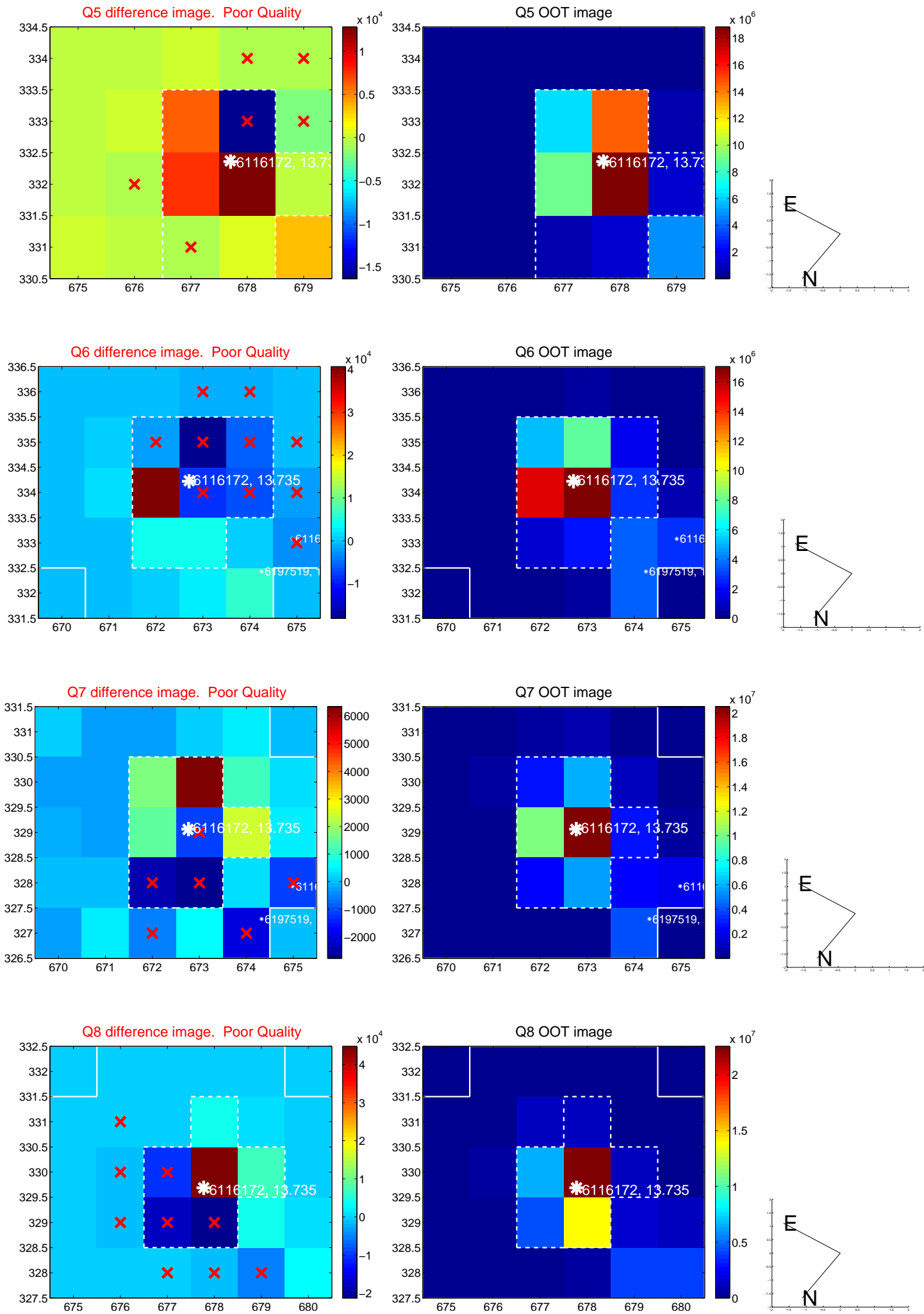


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

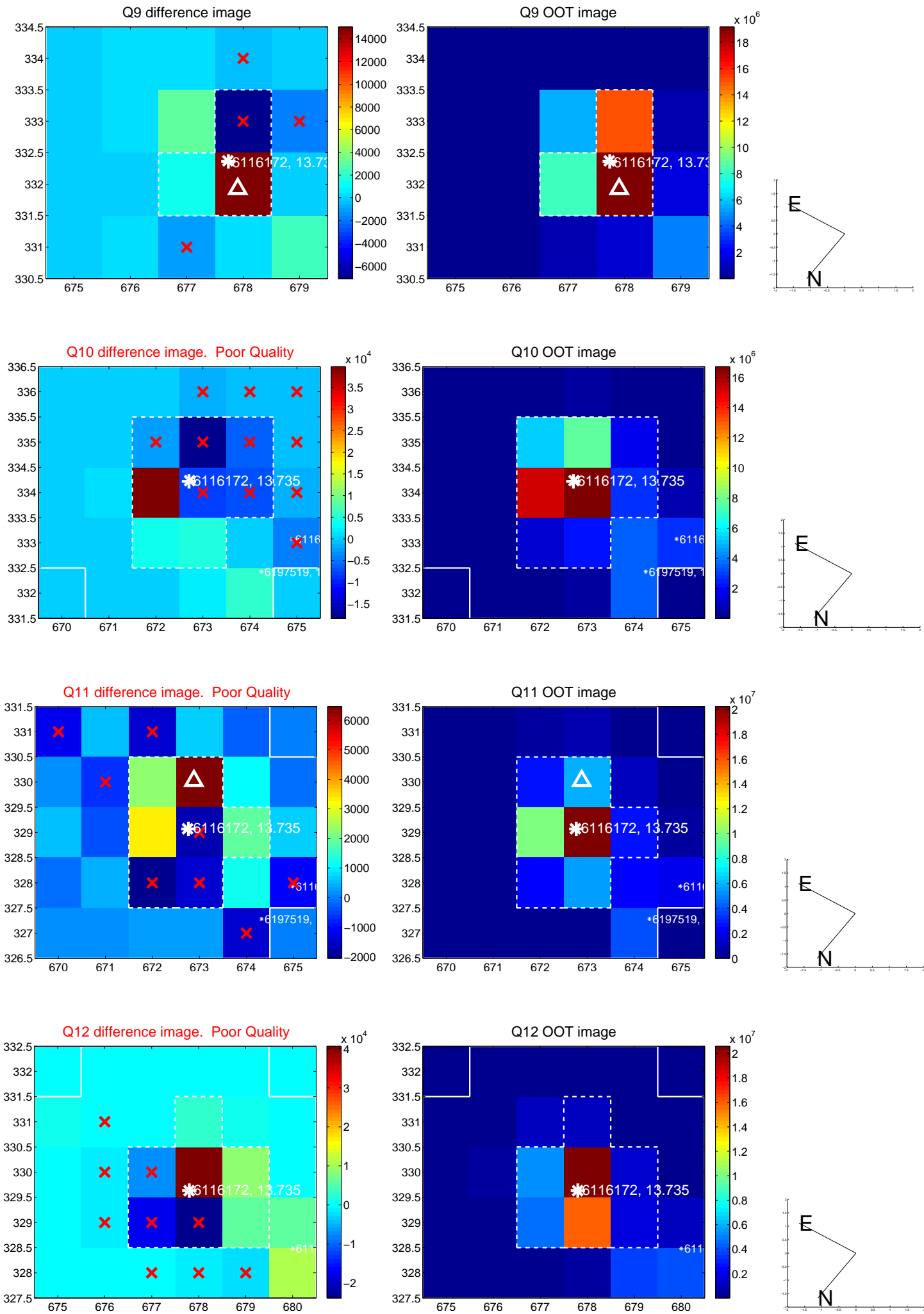
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

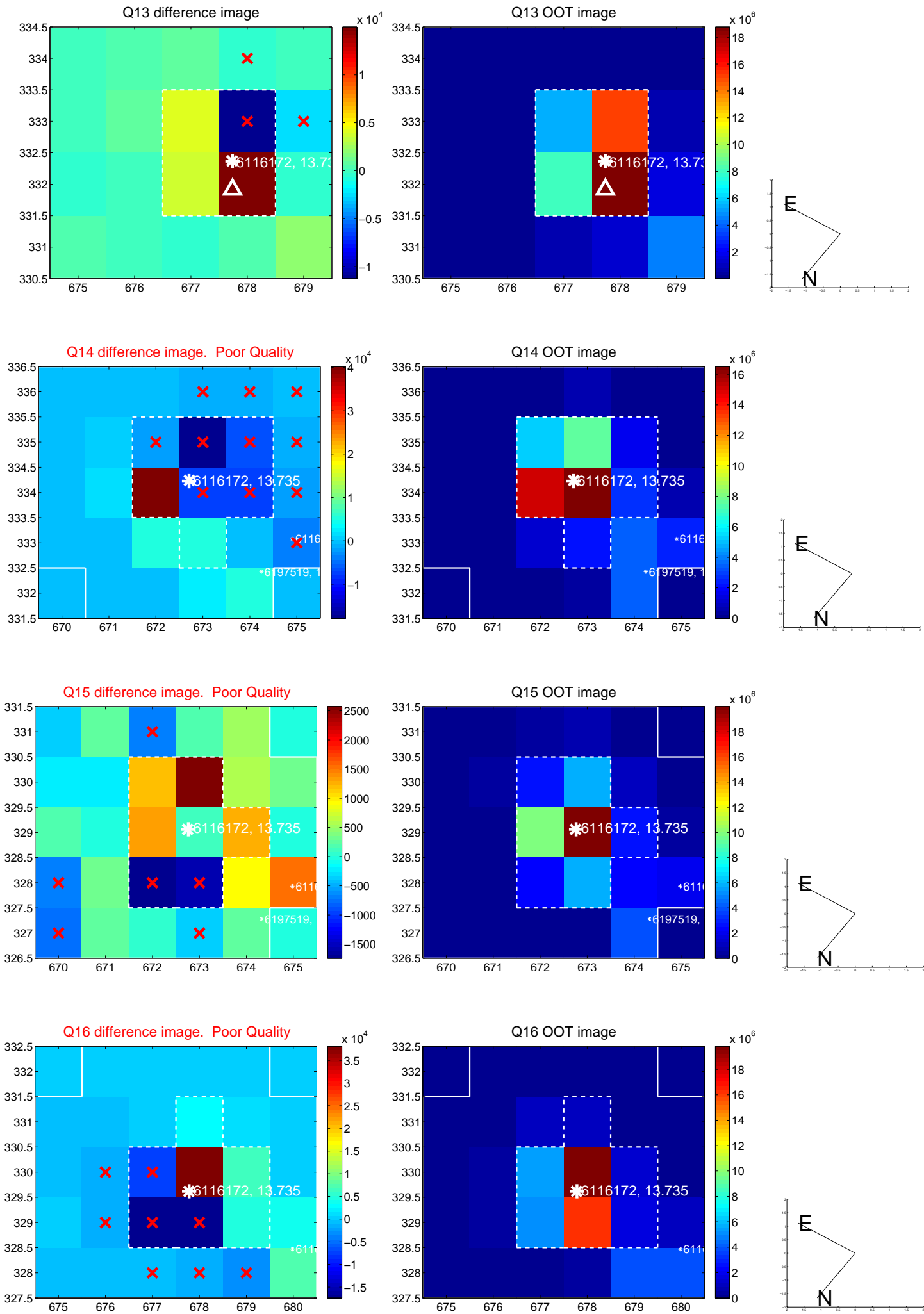


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

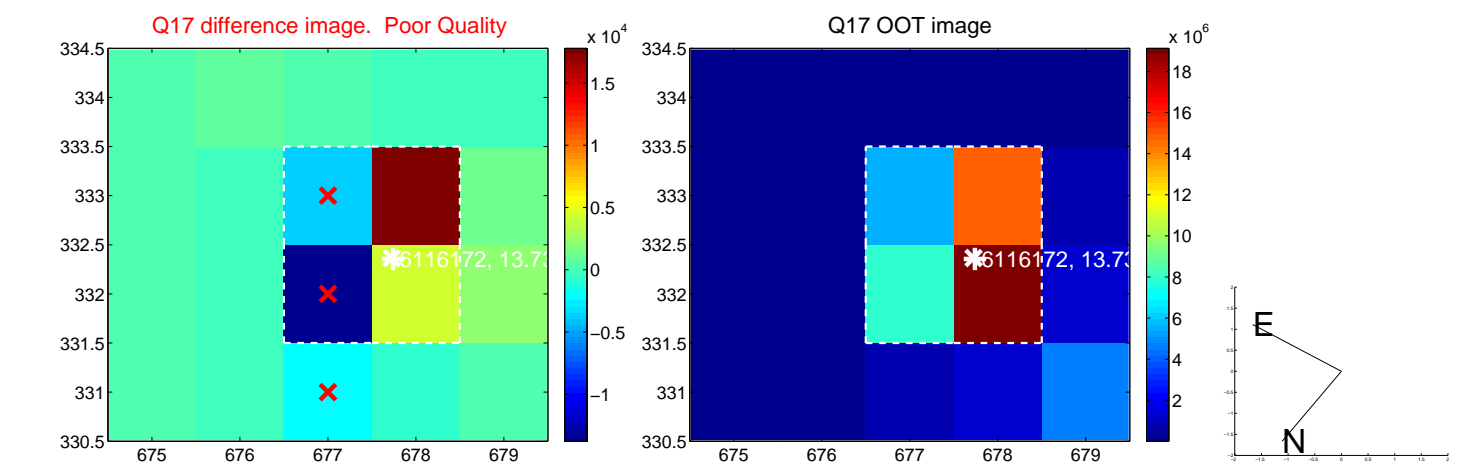




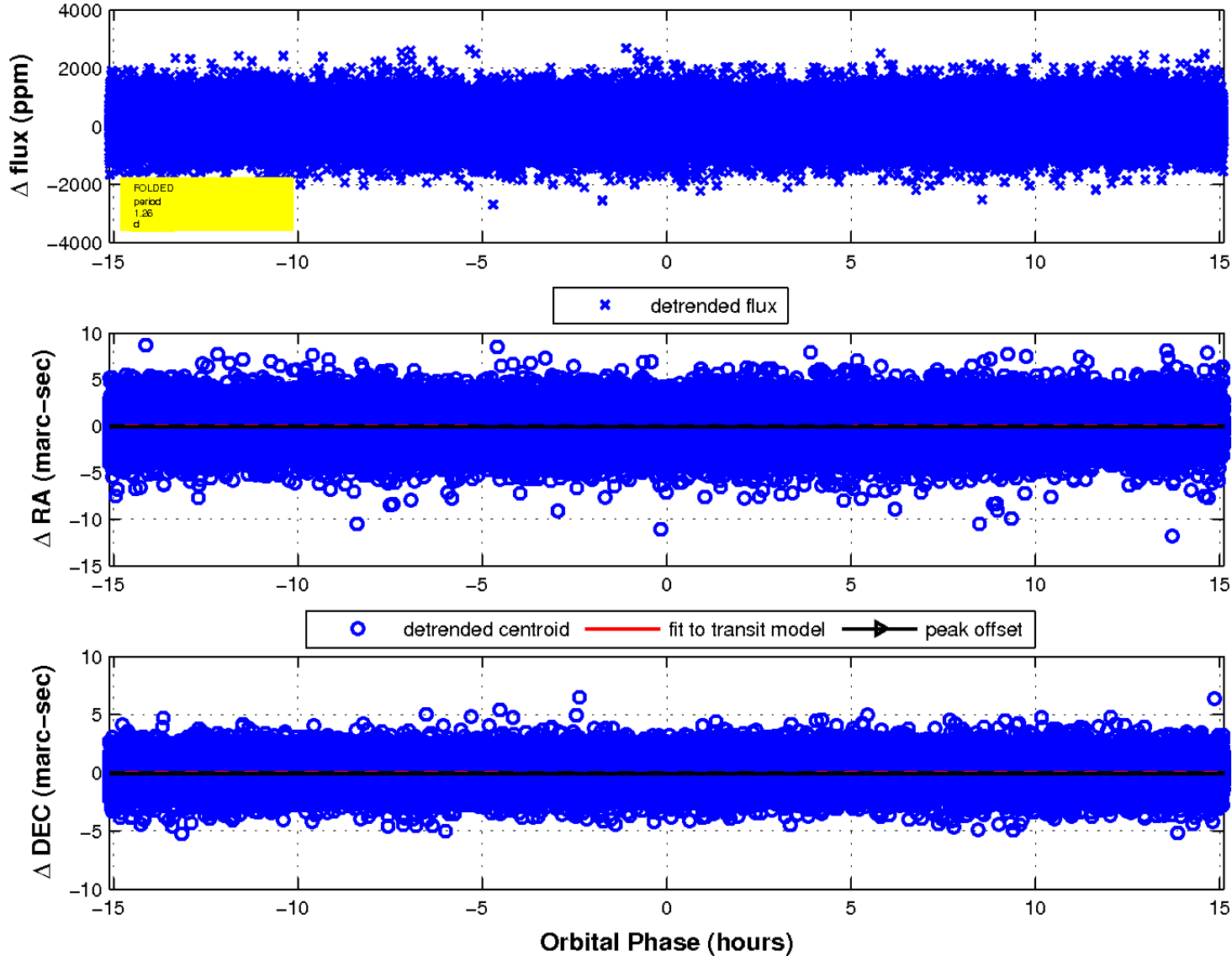
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

