

# KIC 010875007

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010875007-01	OBS	4149.01	9.547088	140.148901	136.8	5.255	13.9	14.7	1.23	6274	1.72	232.80
010875007-02	OBS	4149.02	14.708788	133.844427	131.3	5.361	10.6	11.3	1.23	6274	1.68	130.83

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010875007-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT
010875007-02	OBS	PC	0.99	0	0	0	0	NO_COMMENT

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

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

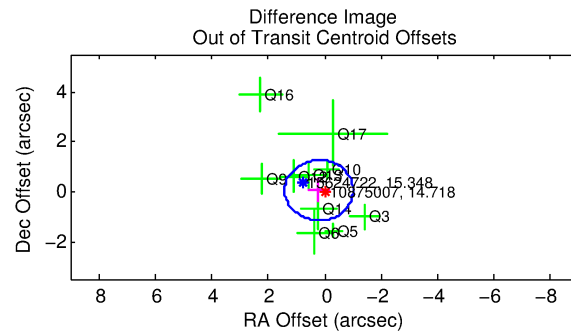
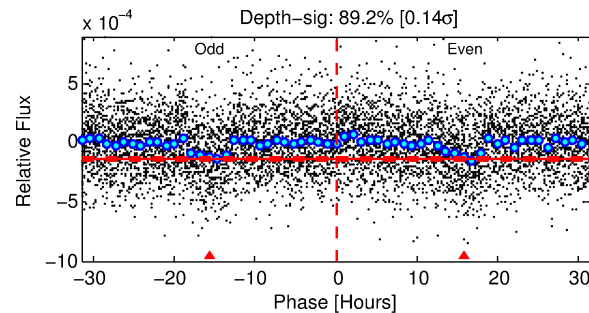
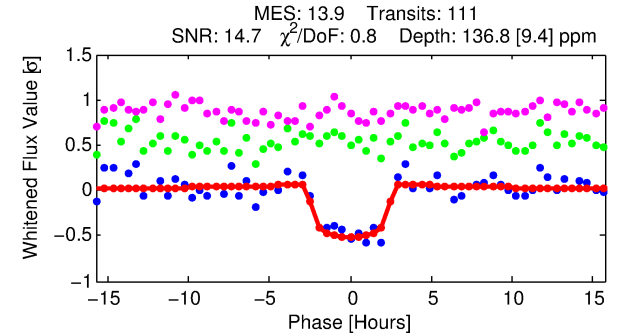
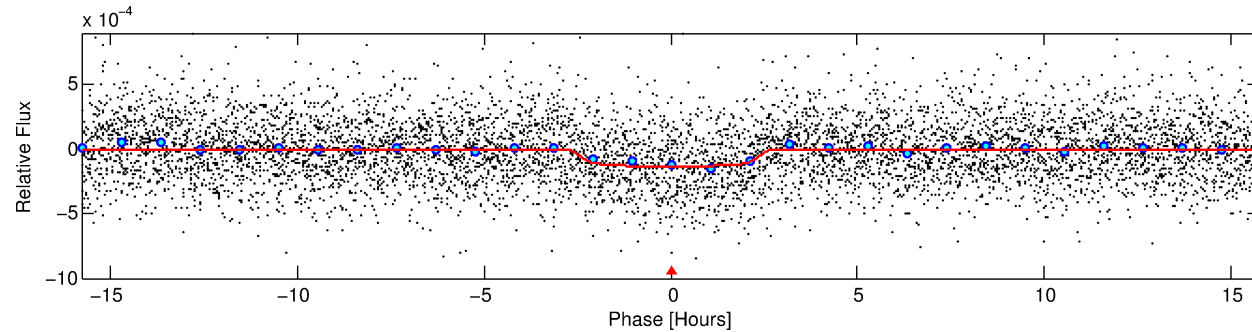
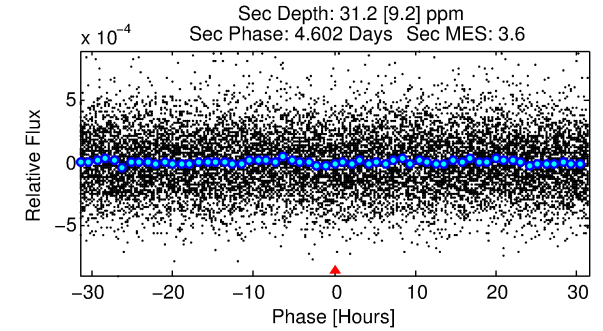
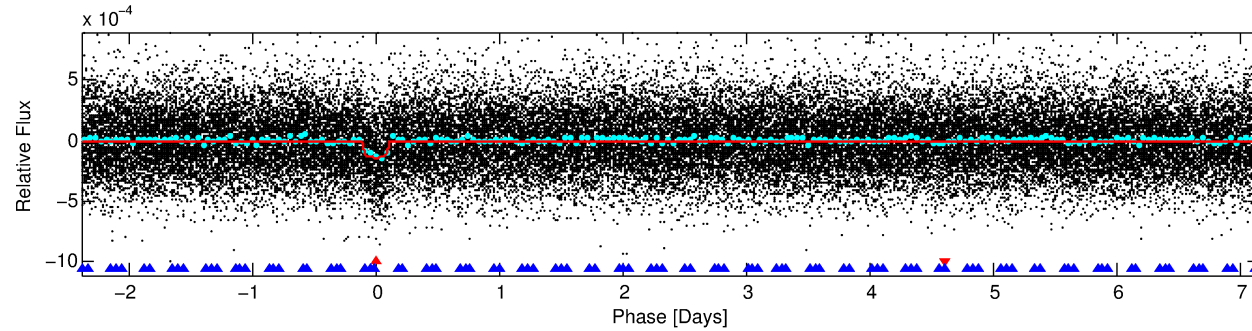
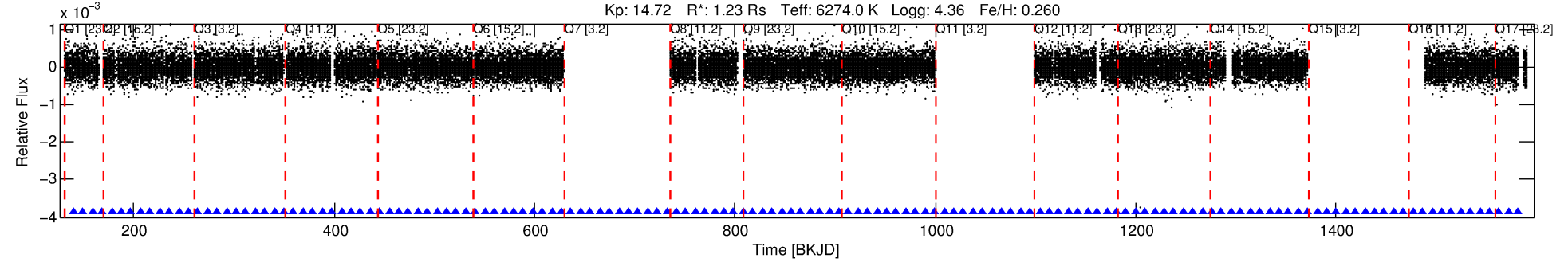
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010875007-01

No Significant Match Found

# DV One-Page Summary

KIC: 10875007 Candidate: 1 of 2 Period: 9.547 d  
KOI: K04149.01 Corr: 0.955



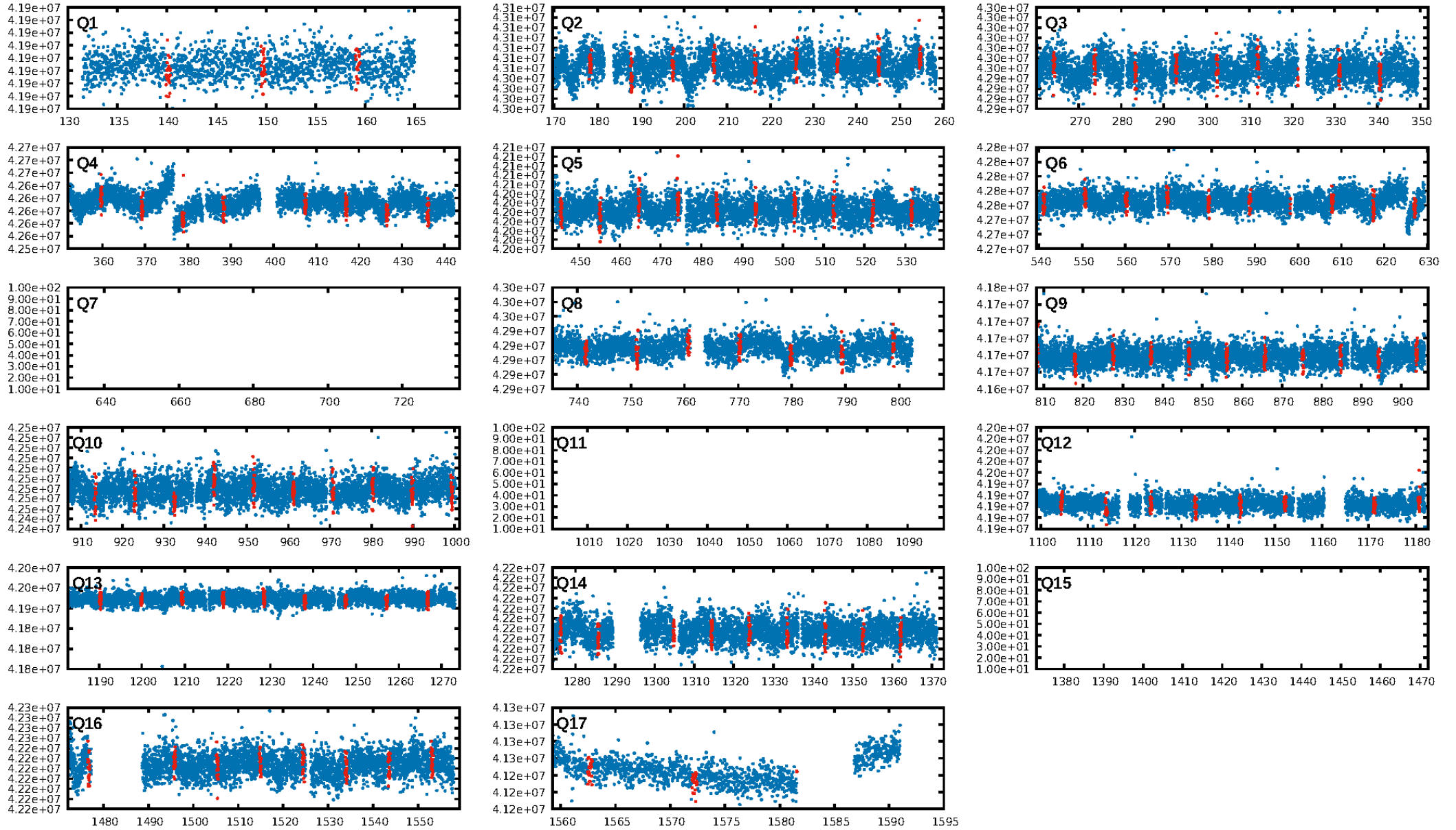
## DV Fit Results:

Period = 9.54709 [0.00007] d  
Epoch = 140.1489 [0.0057] BKJD  
Rp/R\* = 0.0128 [0.0023]  
a/R\* = 6.10 [5.63]  
b = 0.91 [0.17]  
Seff = 232.80 [101.04]  
Teq = 996 [108] K  
Rp = 1.72 [0.67] Re  
a = 0.0951 [0.0270] AU  
Ag = 52.42 [32.49] [1.58σ]  
Teffp = 4144 [511] K [6.02σ]

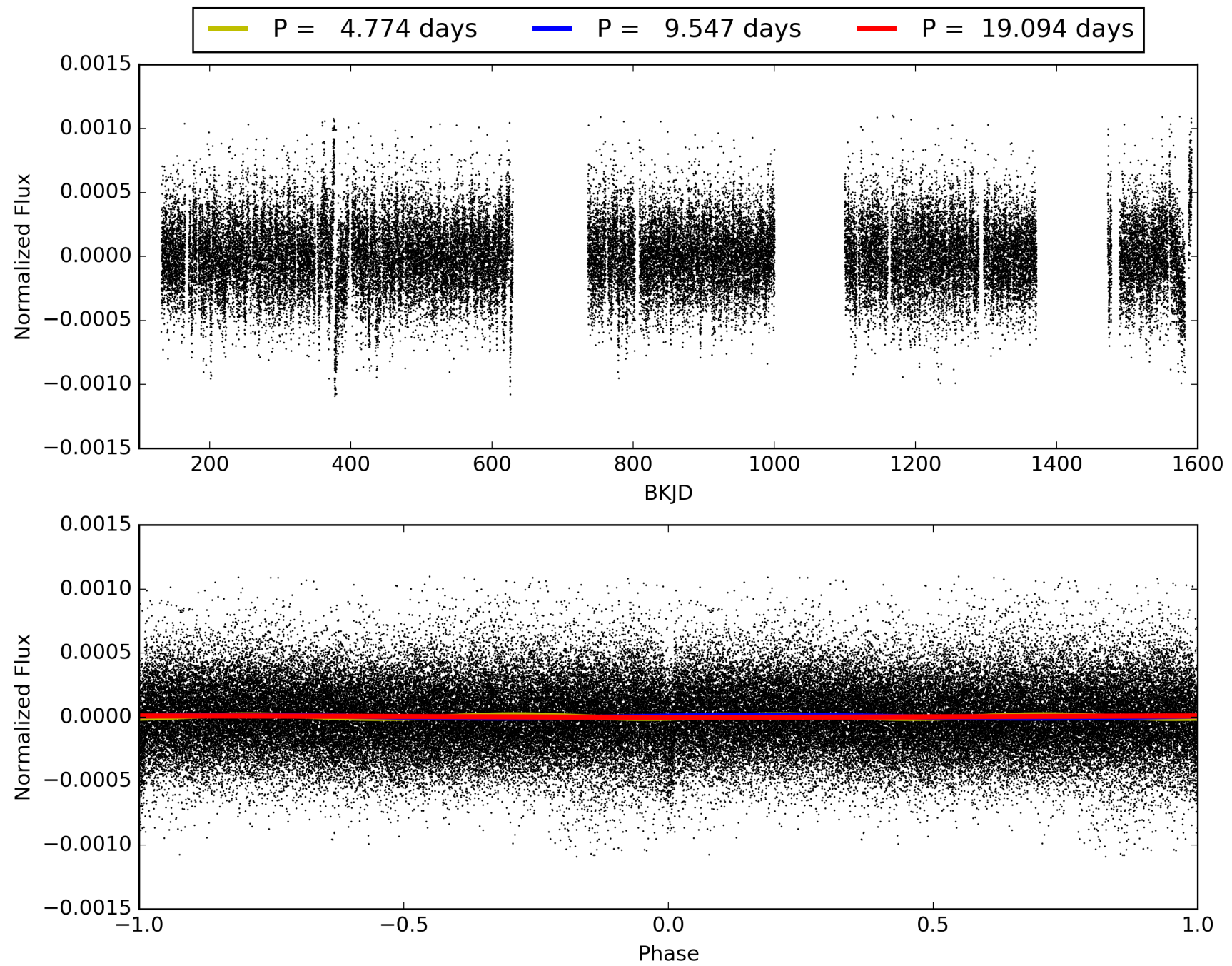
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [16.50σ]  
ModelChiSquare2-sig: 99.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.99e-42  
RollingBand-fgt: 1.00 [106/106]  
GhostDiagnostic-chr: 4.537  
Centroid-sig: 93.9%  
Centroid-so: 0.128 arcsec [0.15σ]  
OotOffset-rm: 0.212 arcsec [0.53σ]  
OotOffset-st: 3/1/2/4 [10]  
KicOffset-rm: 0.259 arcsec [0.51σ]  
KicOffset-st: 3/1/2/4 [10]  
DiffImageQuality-fgm: 0.70 [7/10]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 010875007-01, PDC Light Curves

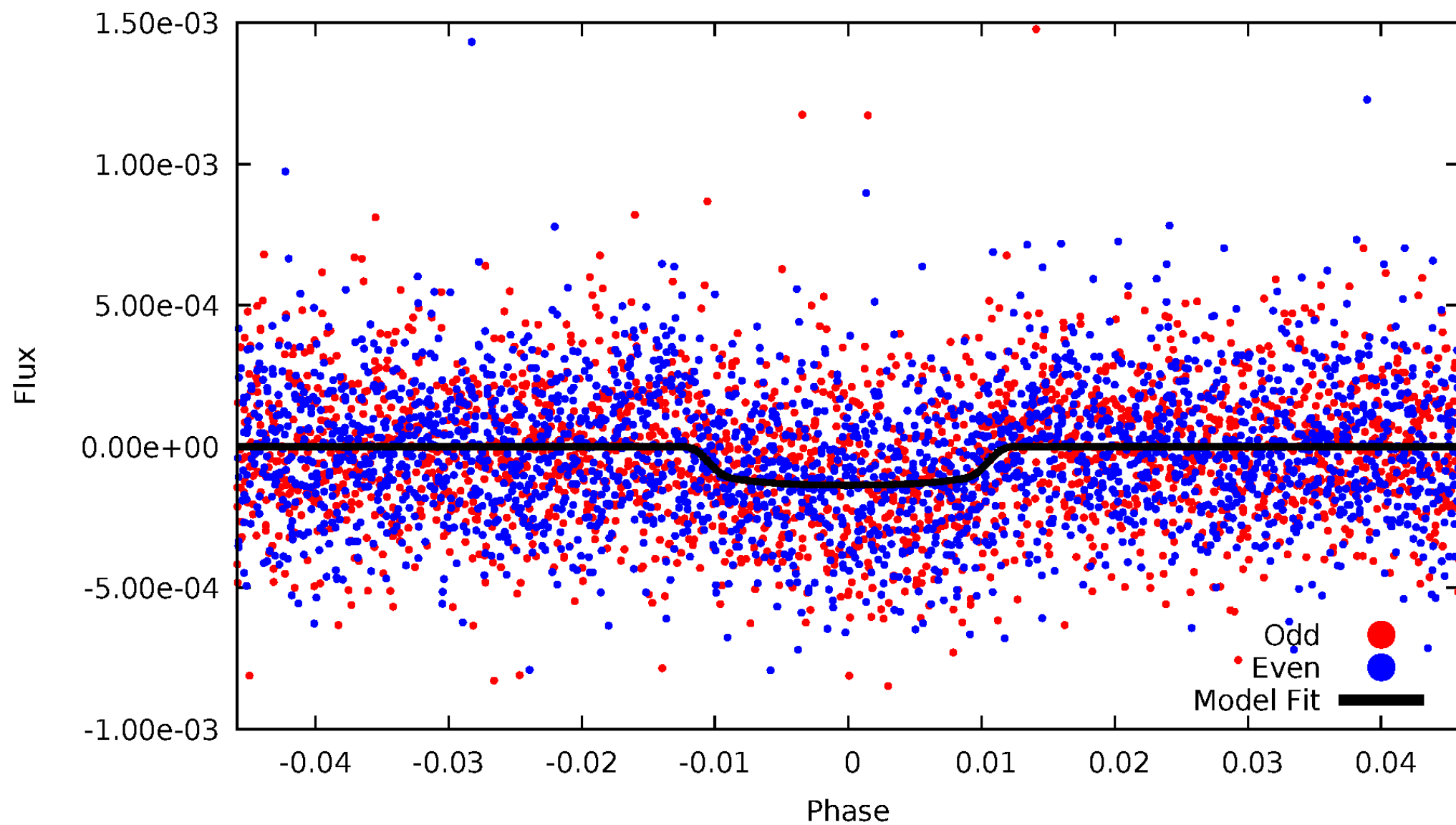


TCE 010875007-01



# DV Odd/Even

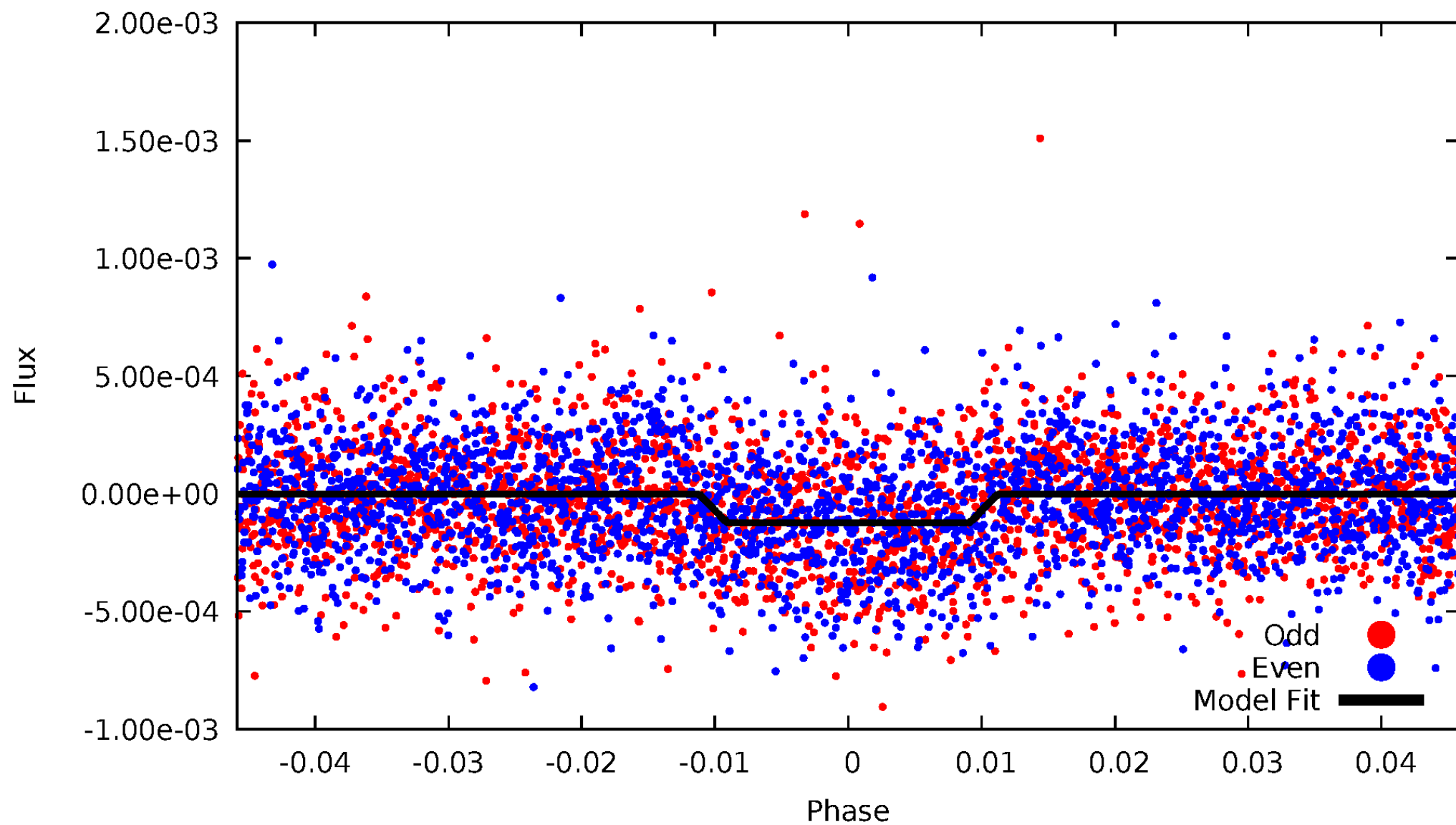
TCE 010875007-01





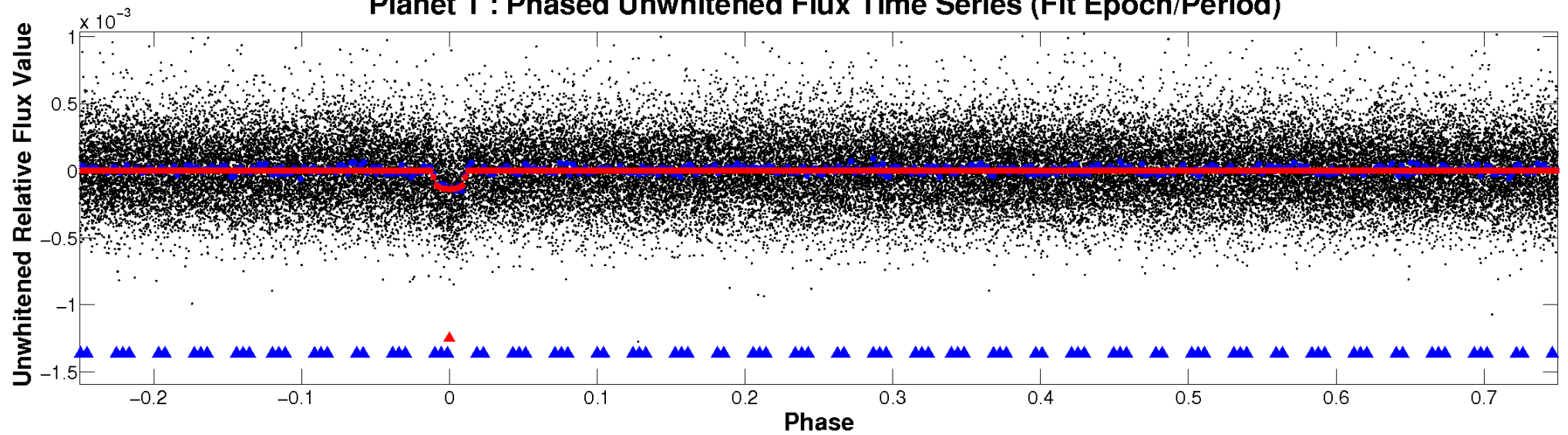
# ALT Odd/Even

TCE 010875007-01

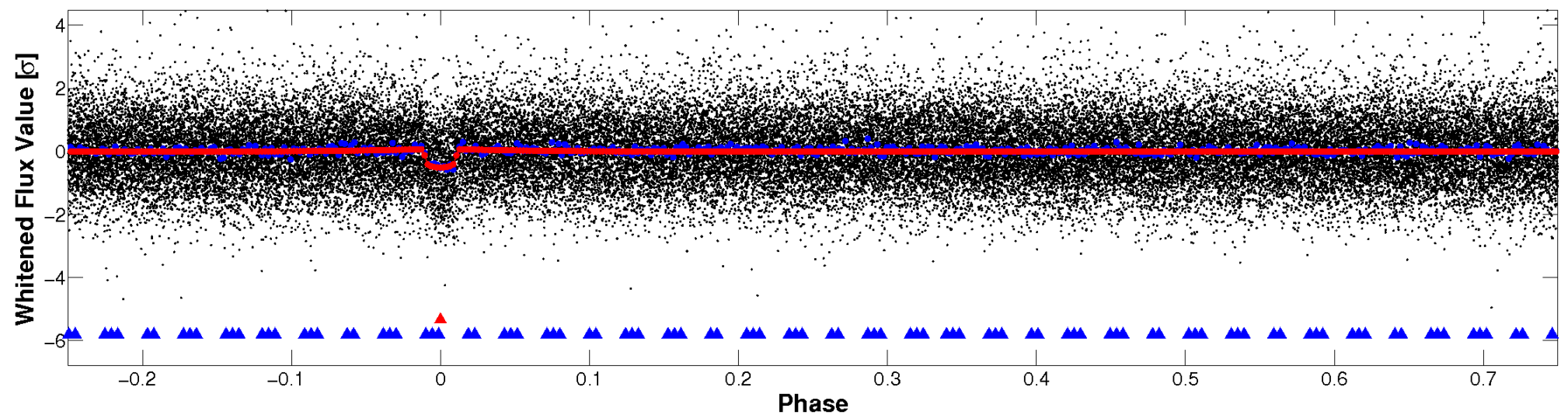


# Non-Whitened Vs. Whitened Light Curve

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

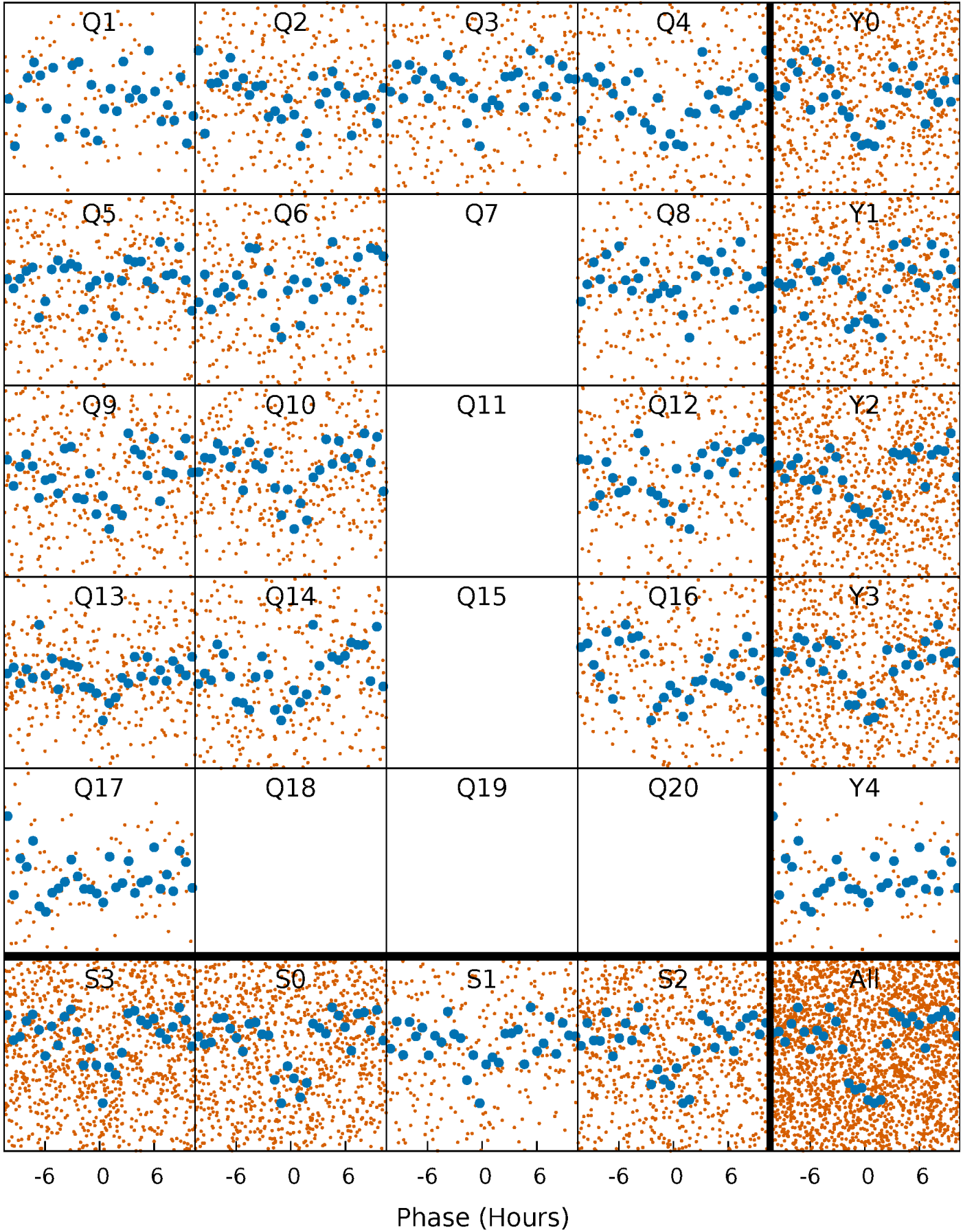


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

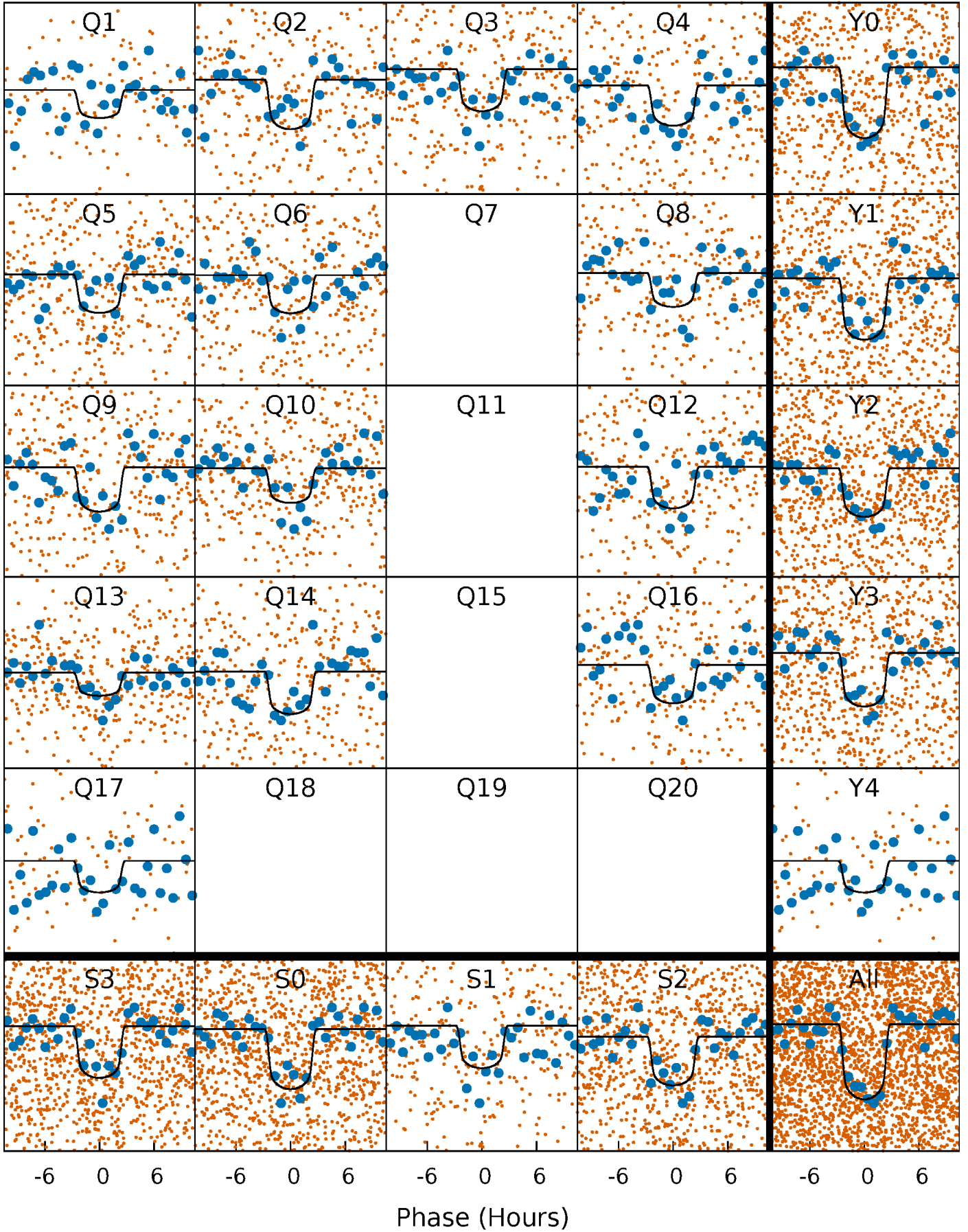
TCE 010875007-01 P= 9.547088 Days  $T_0=140.148901$  (BKJD)





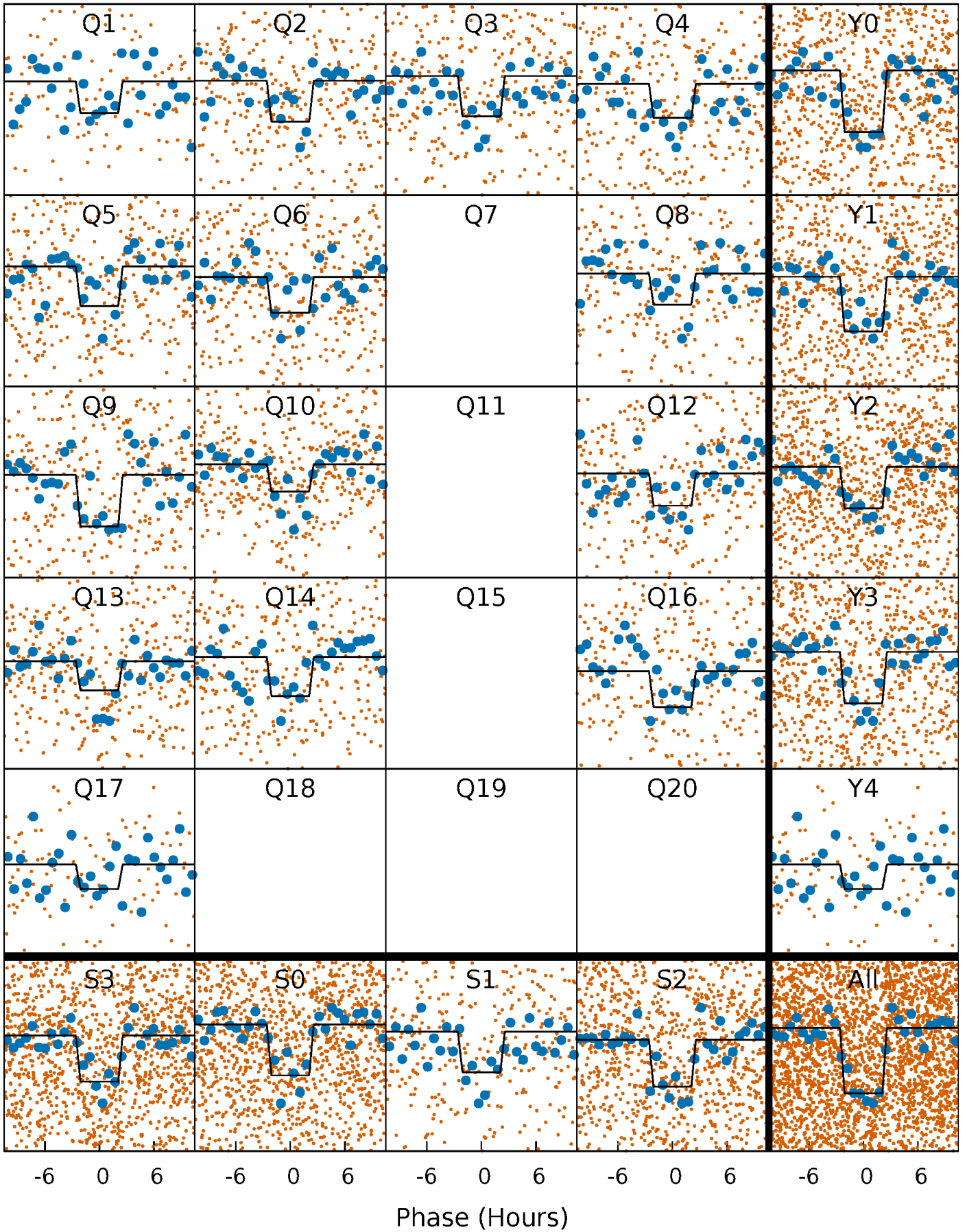
# DV Quarter-Phased Transit Curves

TCE 010875007-01   P= 9.547088 Days    $T_0=140.148901$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

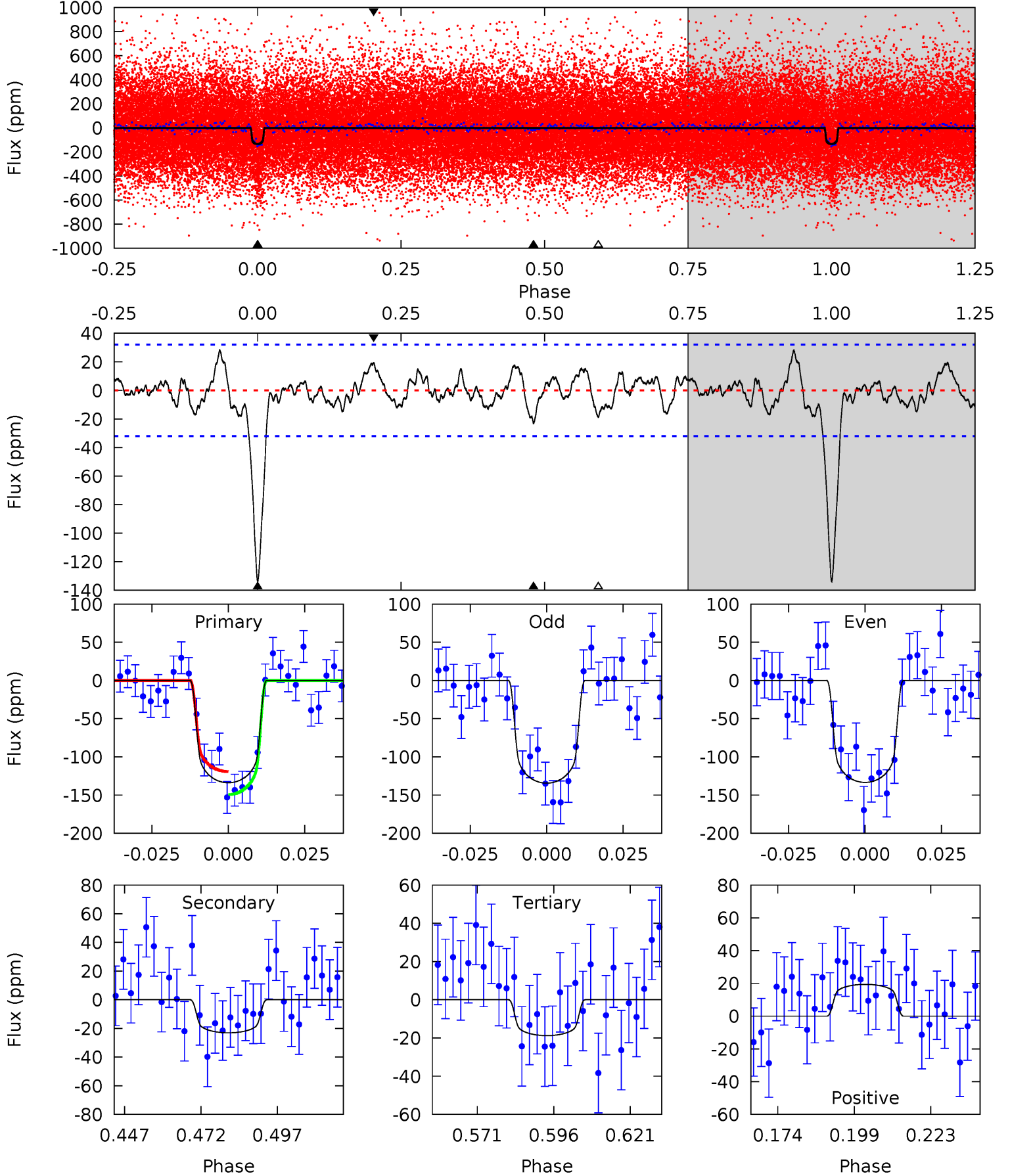
TCE 010875007-01 P= 9.547192 Days  $T_0=140.143451$  (BKJD)



# DV Model-Shift Uniqueness Test

010875007-01, P = 9.547088 Days, E = 130.601813 Days

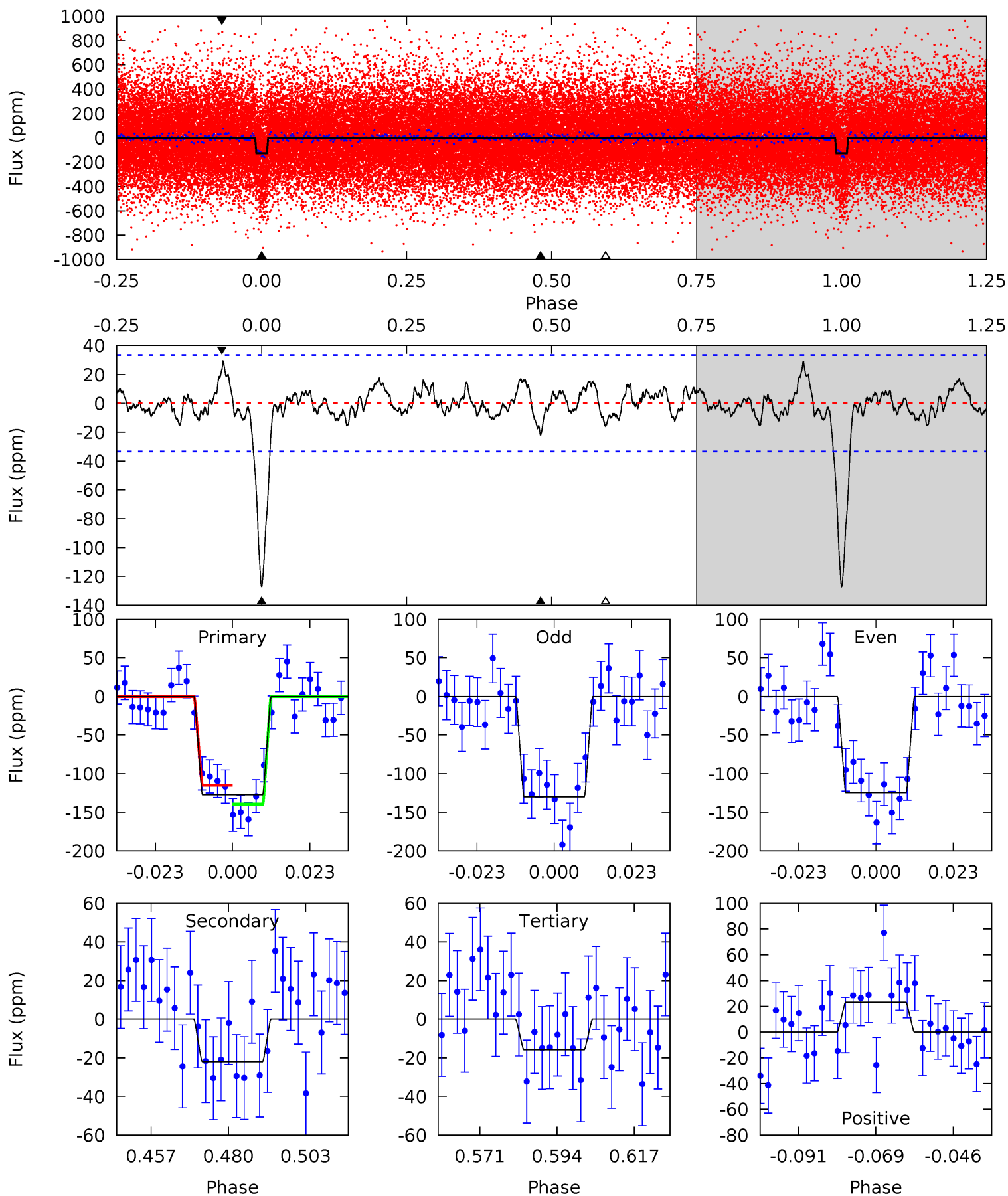
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.3	3.49	2.84	2.94	4.85	2.24	1.30	17.4	17.3	0.65	0.55	0.07	0.96	0.17	2.28



# Alt Model-Shift Uniqueness Test

010875007-01, P = 9.547192 Days, E = 130.596259 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
18.5	3.21	2.30	3.37	4.87	2.28	1.14	16.2	15.2	0.90	-0.16	0.38	0.96	0.19	1.77



### Stellar Parameters For KIC 010875007

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6274^{+177}_{-243}$	$4.357^{+0.073}_{-0.218}$	$0.260^{+0.150}_{-0.300}$	$1.232^{+0.423}_{-0.141}$	$1.261^{+0.163}_{-0.182}$	$0.950^{+0.360}_{-0.498}$
	+3%/-4%	+2%/-5%	+58%/-115%	+34%/-11%	+13%/-14%	+38%/-52%
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 010875007-01 / KOI 4149.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-23 \pm 7$	$1.77^{+0.47}_{-0.33}$	$1409^{+109}_{-71}$	$4099^{+384}_{-359}$	$35^{+22}_{-15}$
Alt.	$-22 \pm 7$	$1.56^{+0.43}_{-0.39}$	$1414^{+116}_{-80}$	$4267^{+498}_{-411}$	$42^{+38}_{-18}$

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



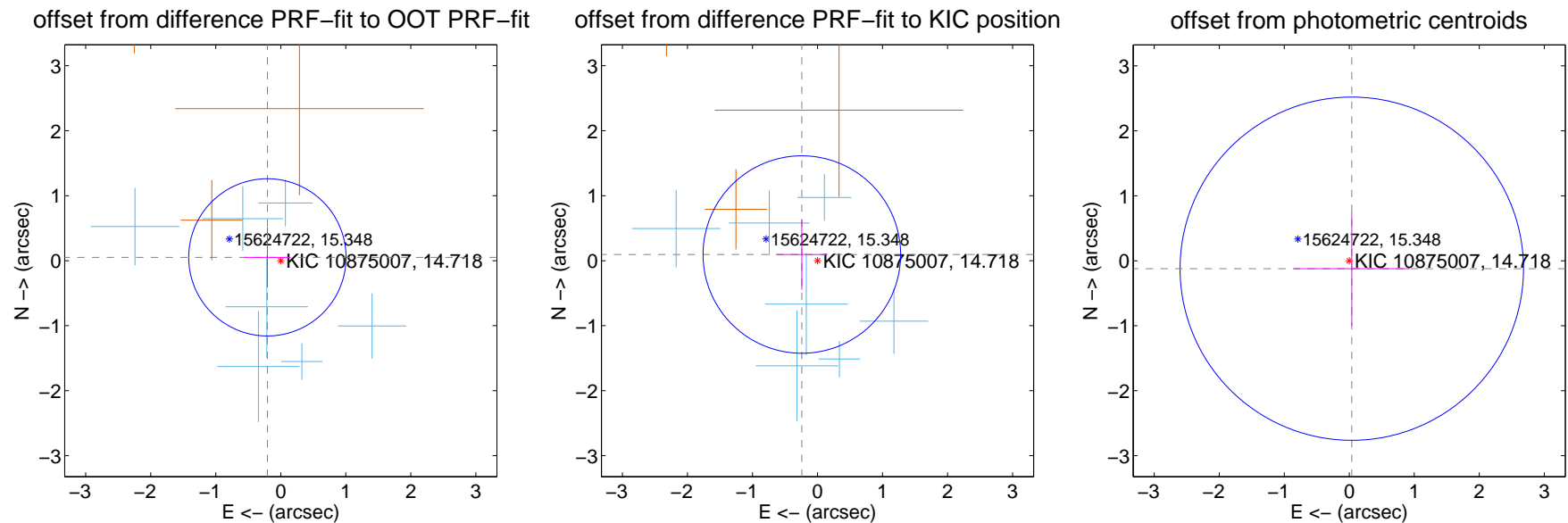
## DV Centroid Data

Supplemental centroid analysis for 010875007-01. Kepler magnitude: 14.72. Transit SNR 14.67

There are 7 quarters with good PRF difference image offsets

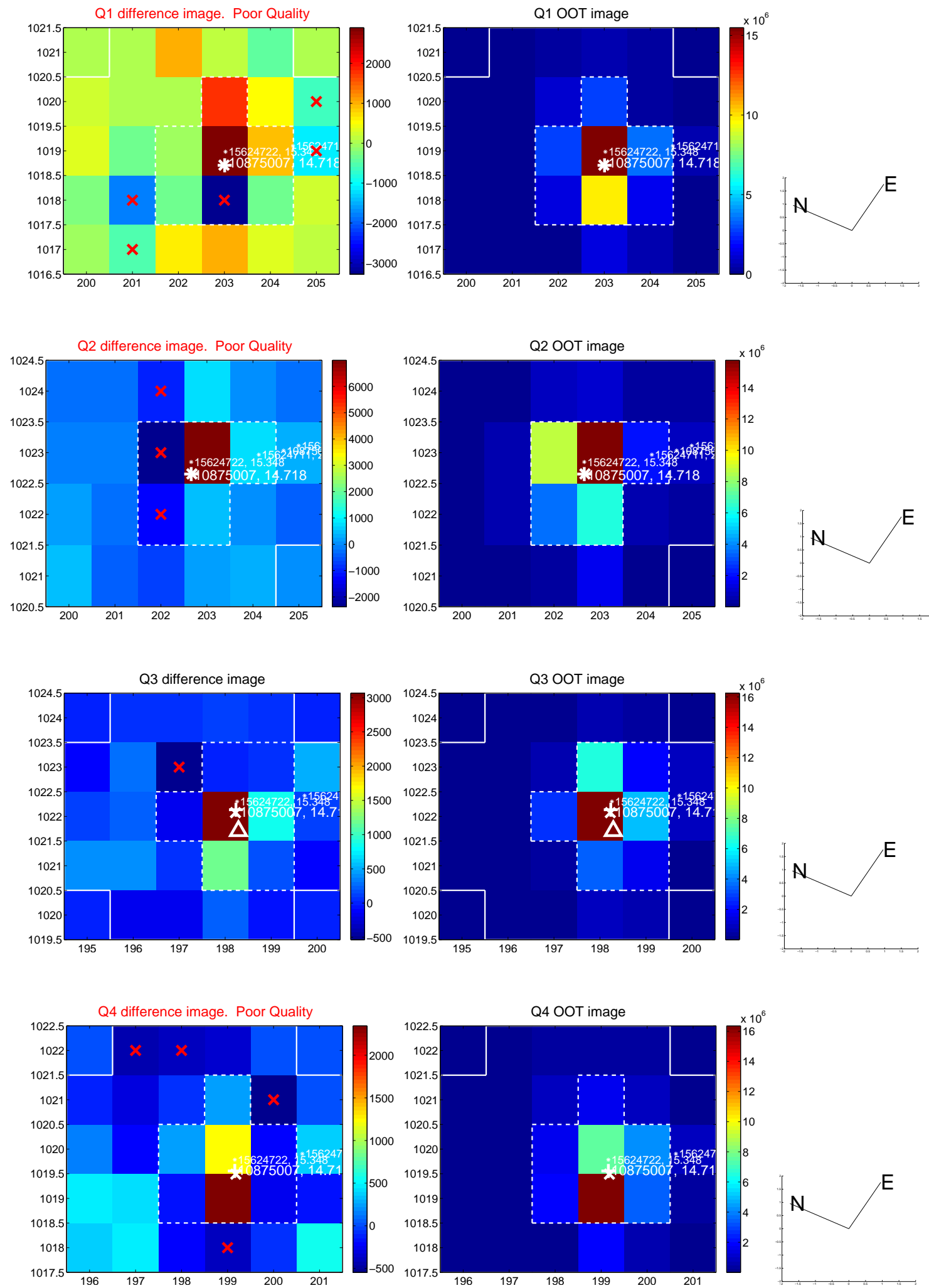
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.212 \pm 0.403$	0.53	$0.206 \pm 0.352$	$0.051 \pm 0.462$
PRF-fit source offset from KIC position	$0.259 \pm 0.506$	0.51	$0.241 \pm 0.387$	$0.095 \pm 0.540$
photometric centroid source offset	$0.13 \pm 0.88$	0.15	$-0.04 \pm 0.89$	$-0.12 \pm 0.88$

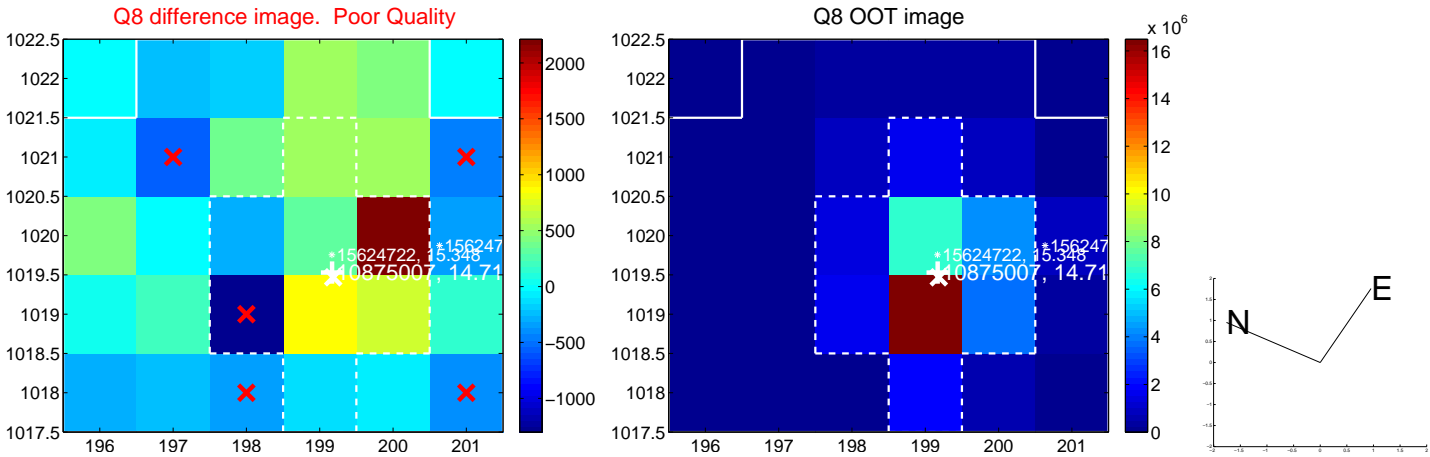
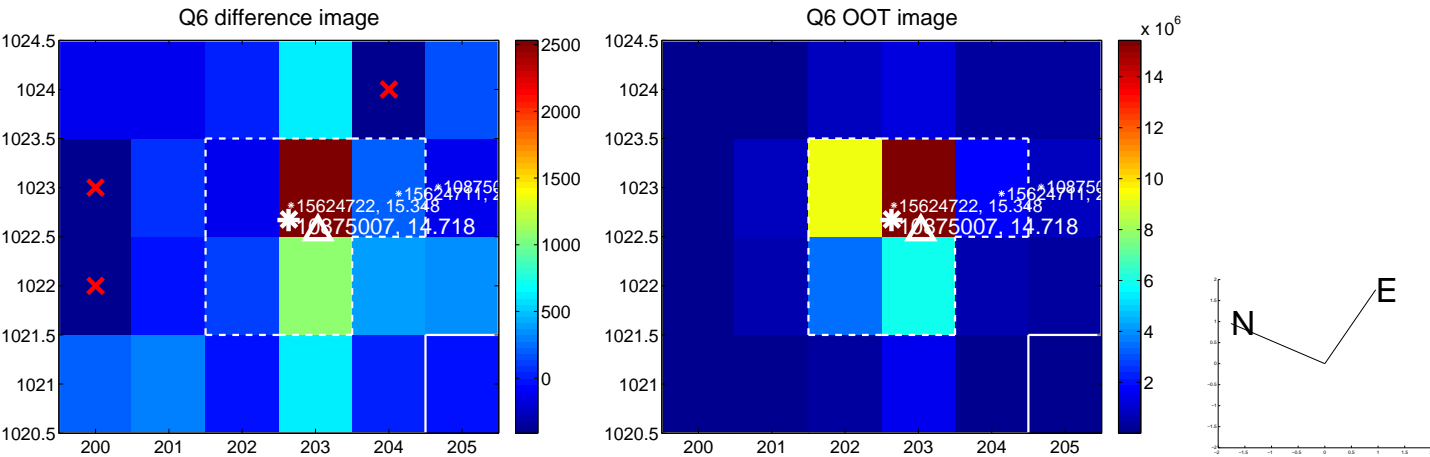
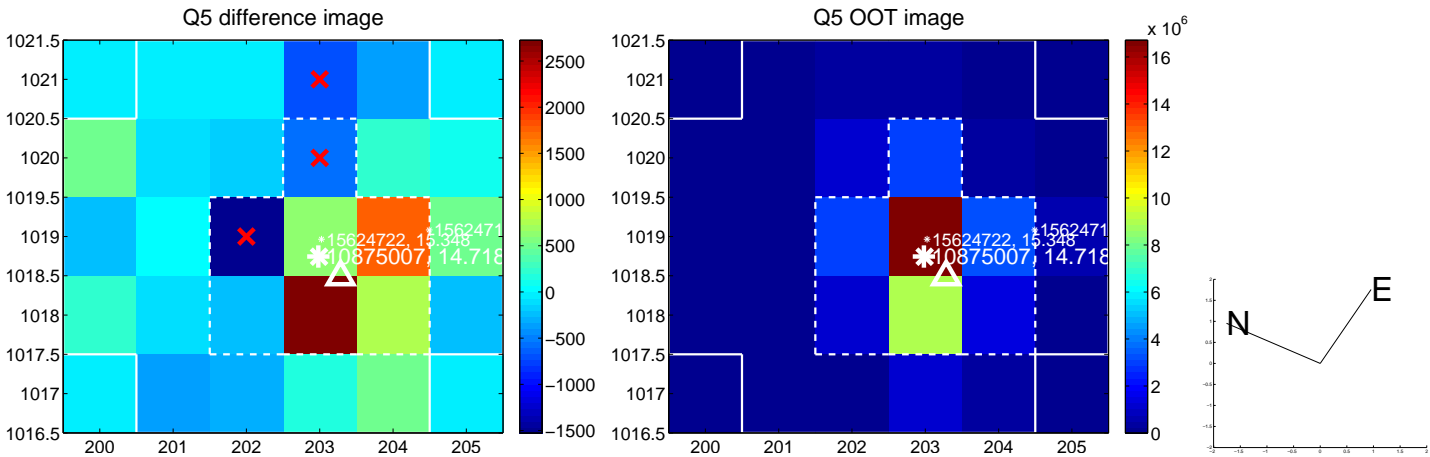


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

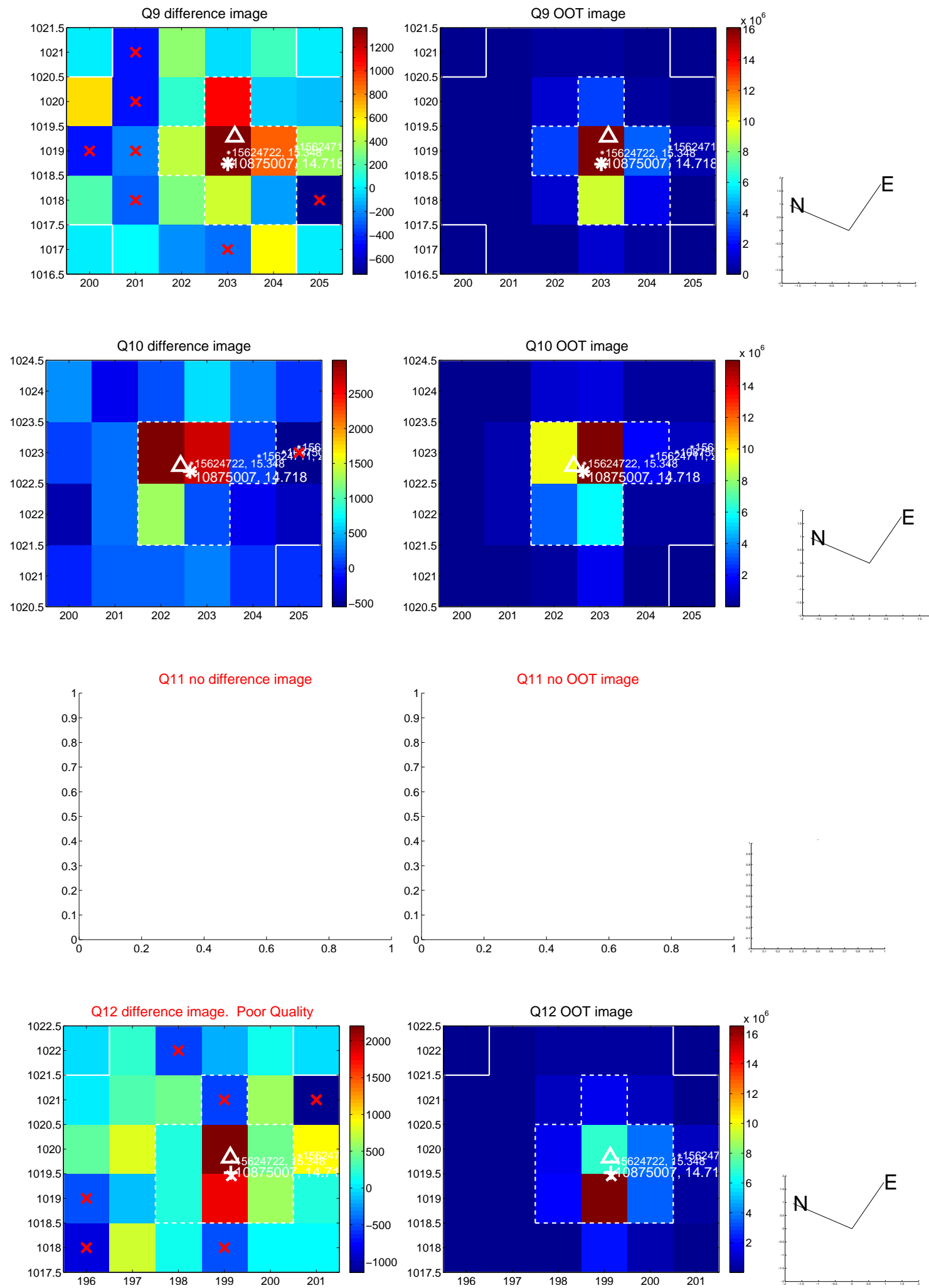
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



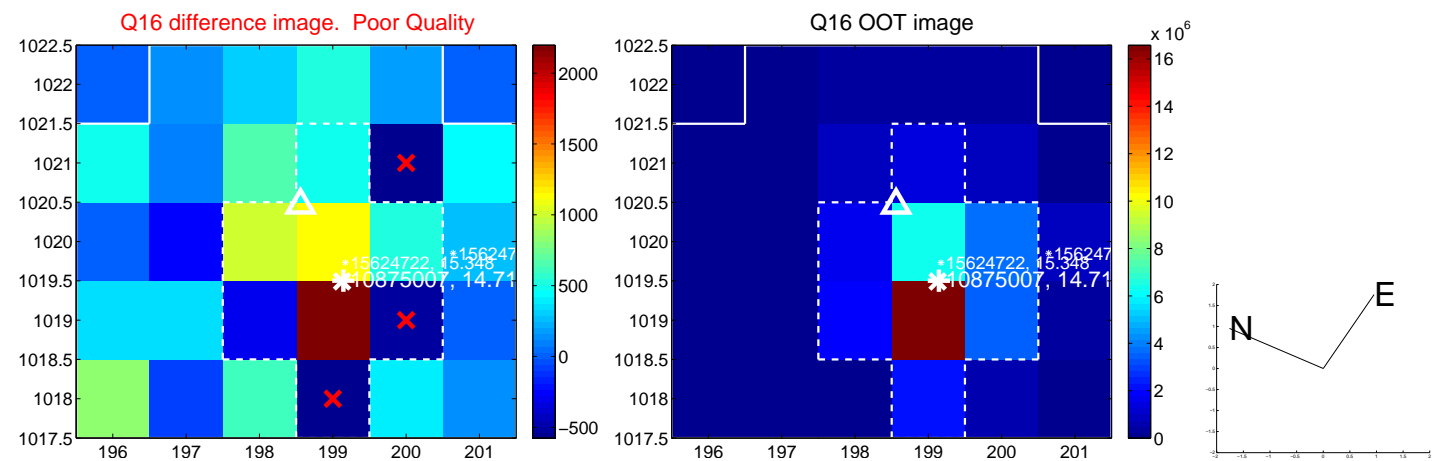
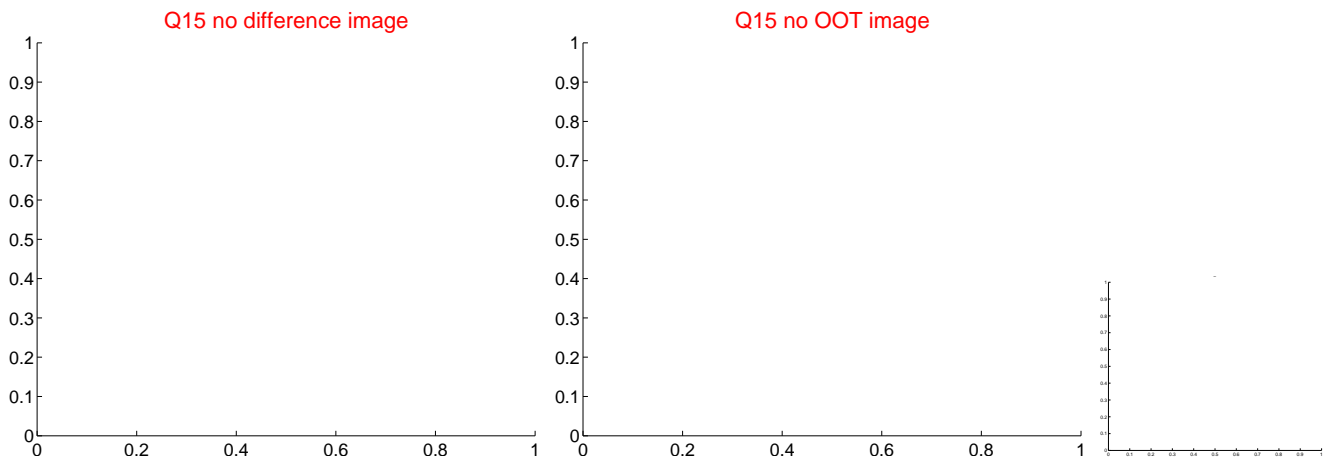
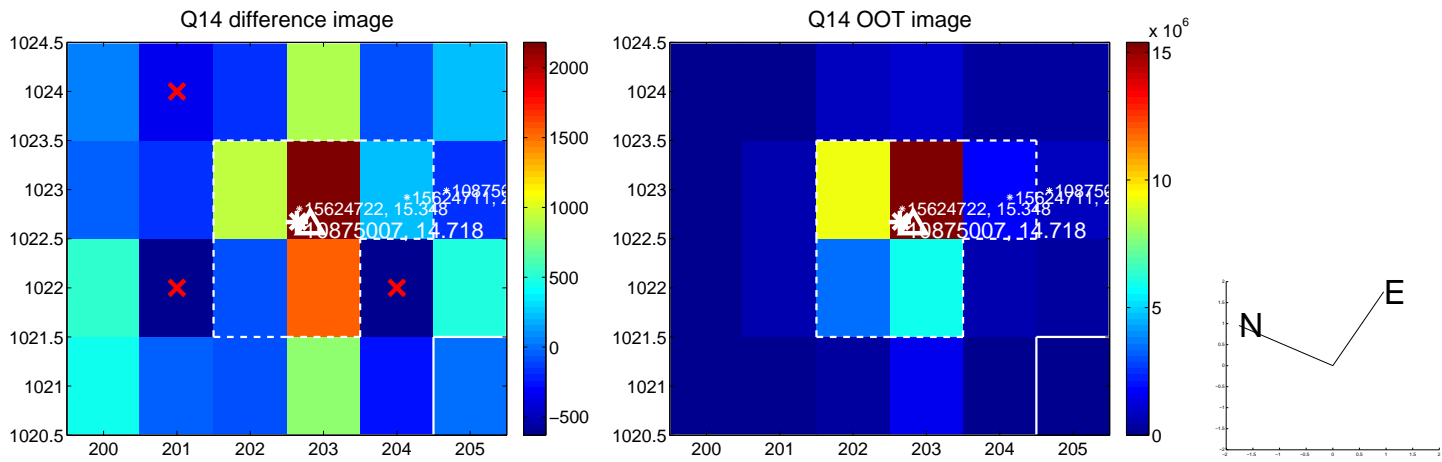
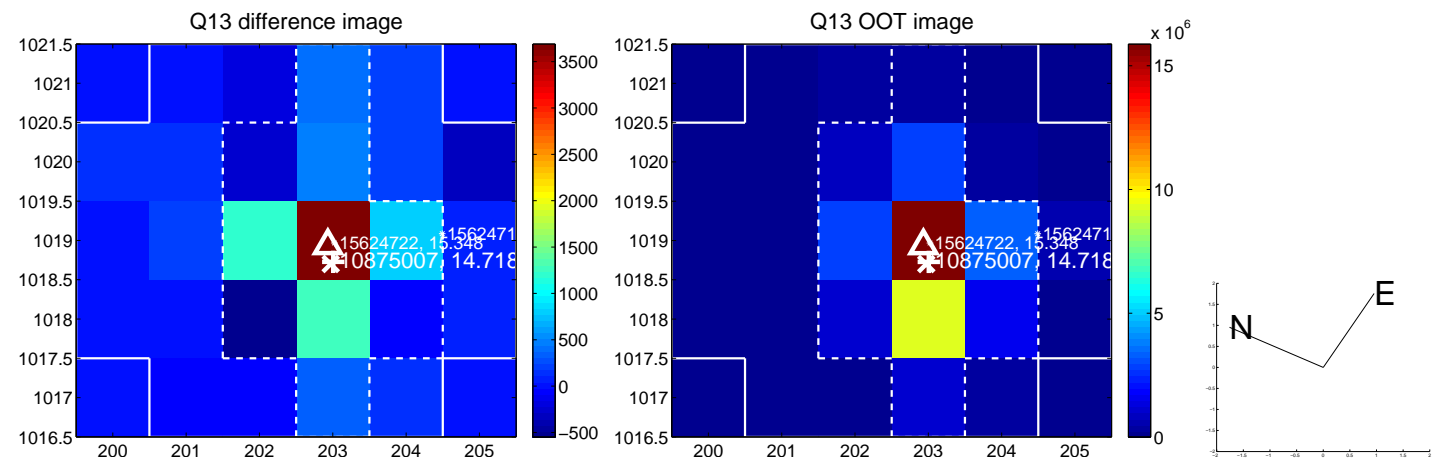
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

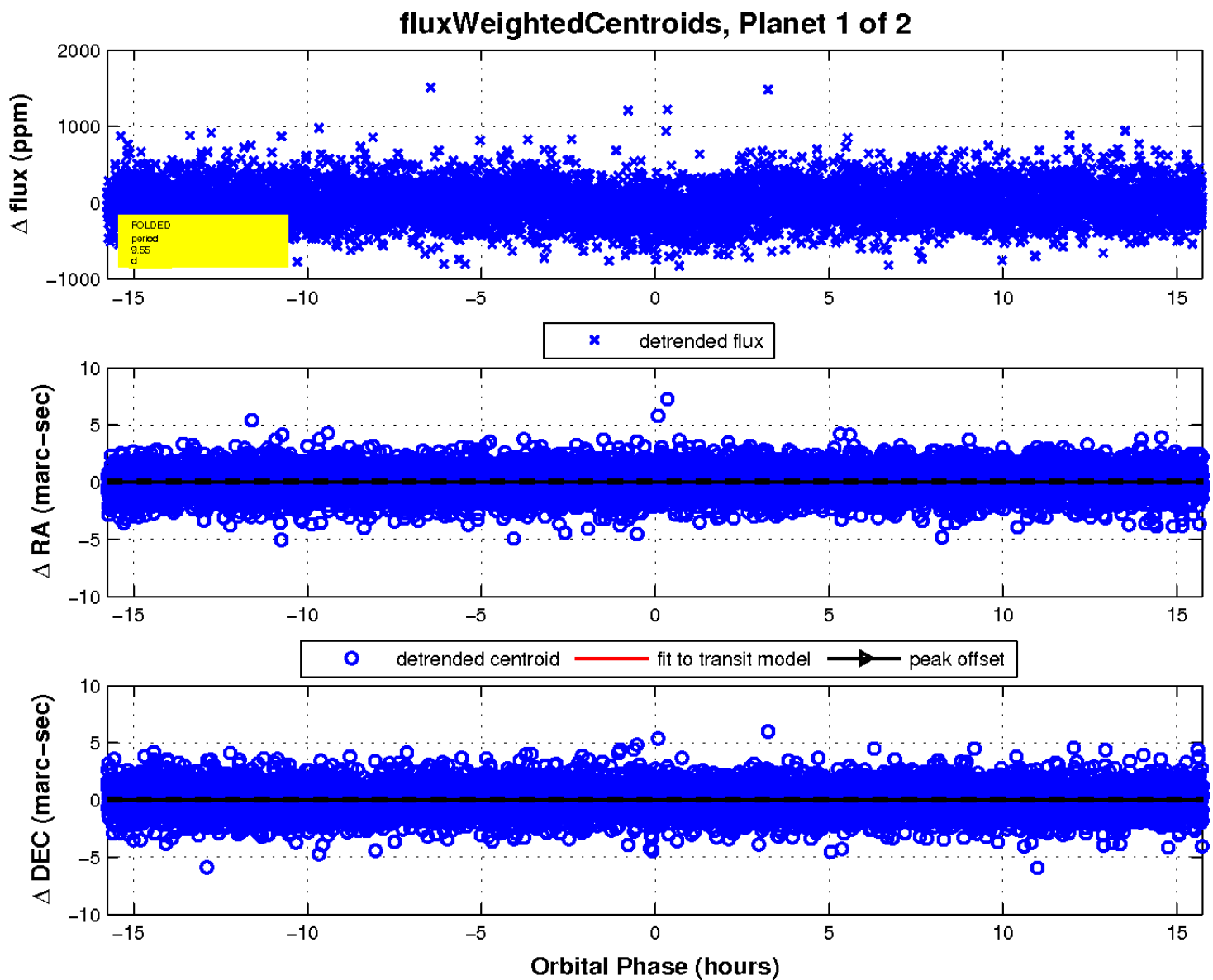
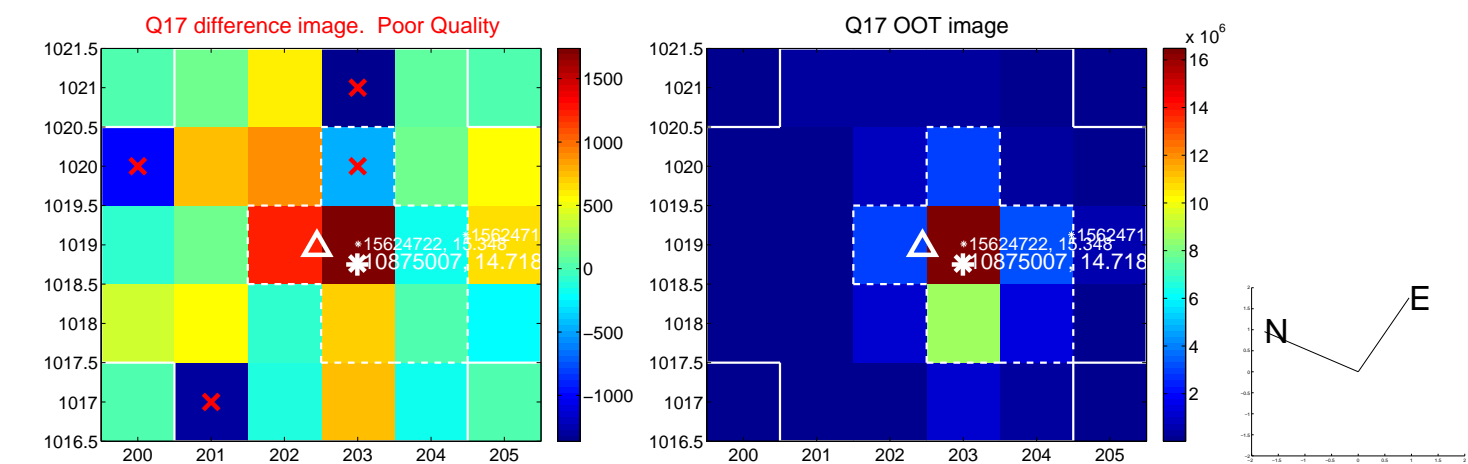


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



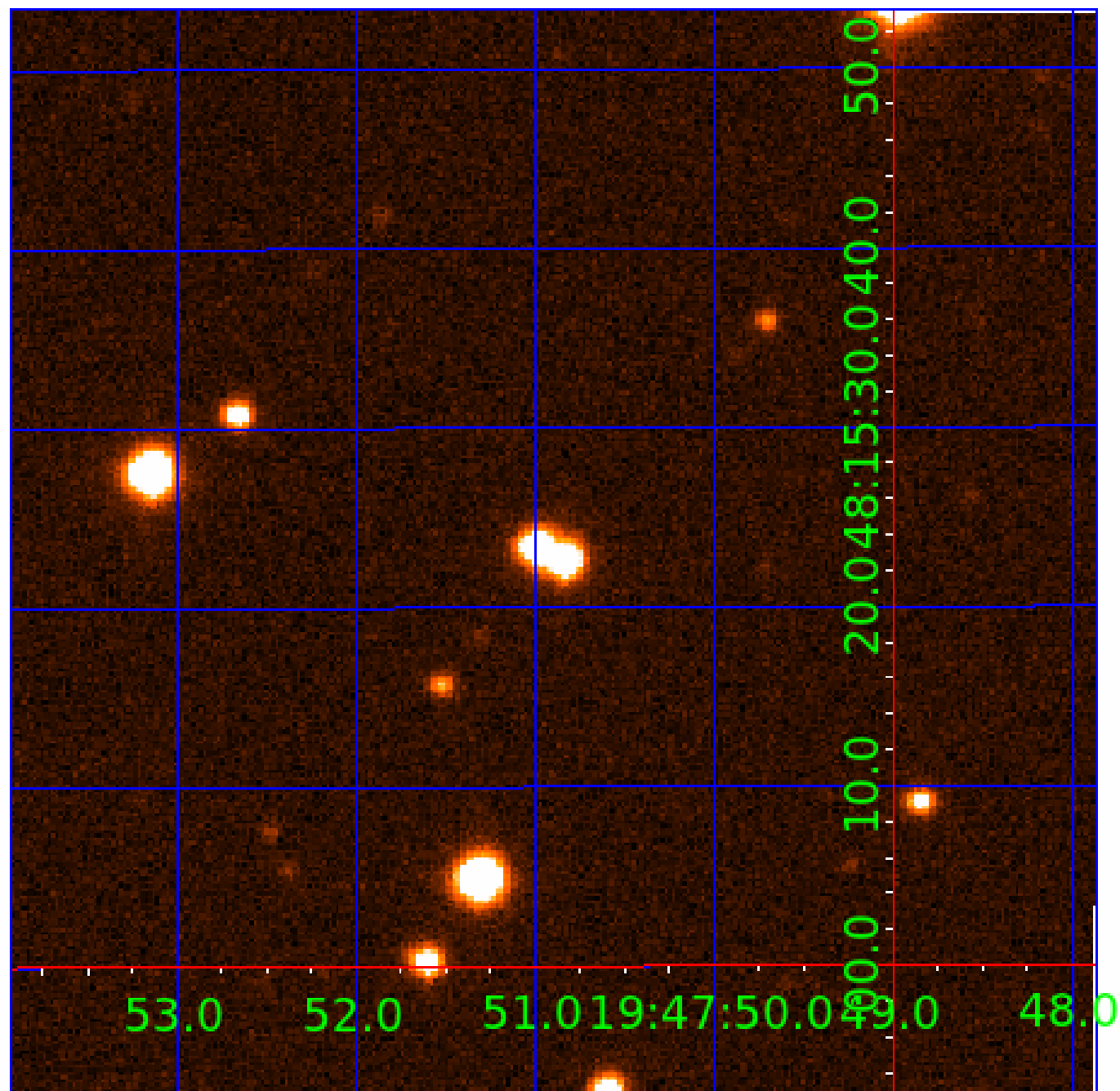


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010875007

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010875007-01	OBS	4149.01	9.547088	140.148901	136.8	5.255	13.9	14.7	1.23	6274	1.72	232.80
010875007-02	OBS	4149.02	14.708788	133.844427	131.3	5.361	10.6	11.3	1.23	6274	1.68	130.83

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010875007-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT
010875007-02	OBS	PC	0.99	0	0	0	0	NO_COMMENT

**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.

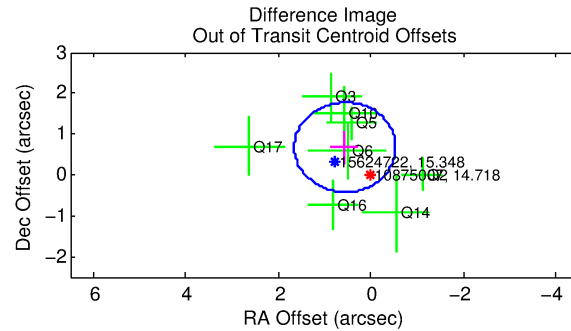
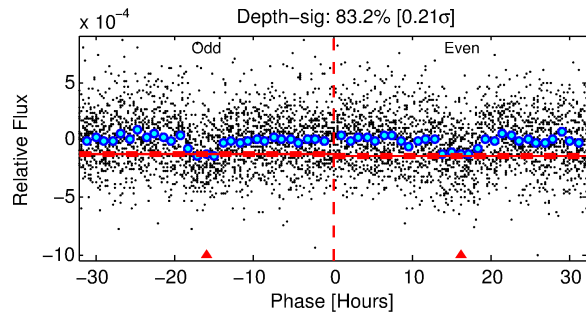
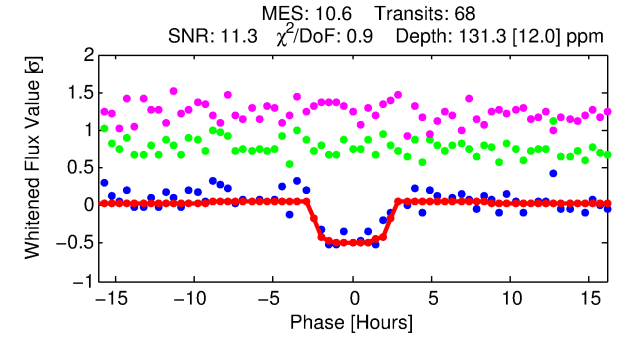
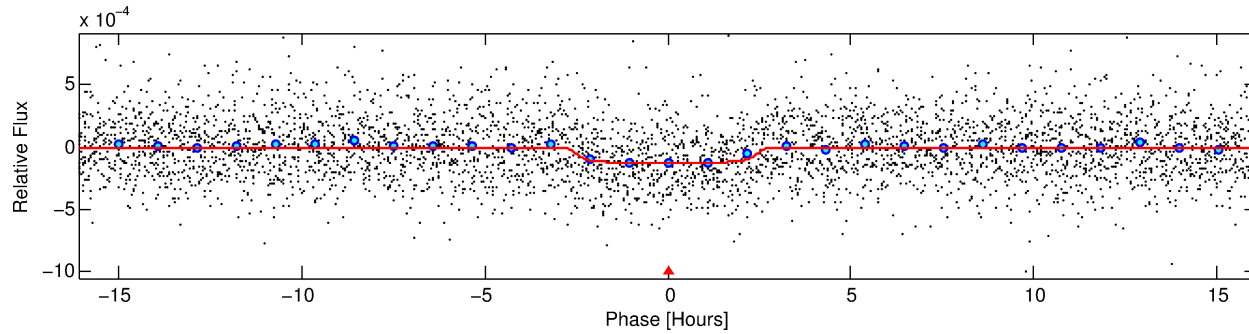
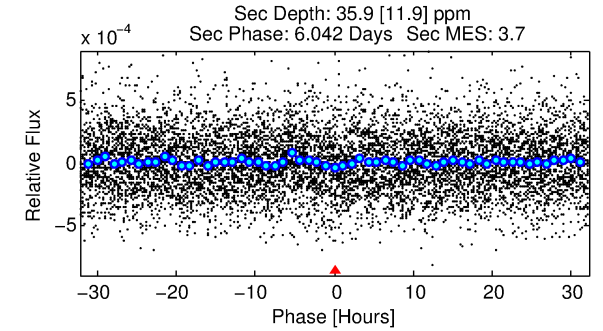
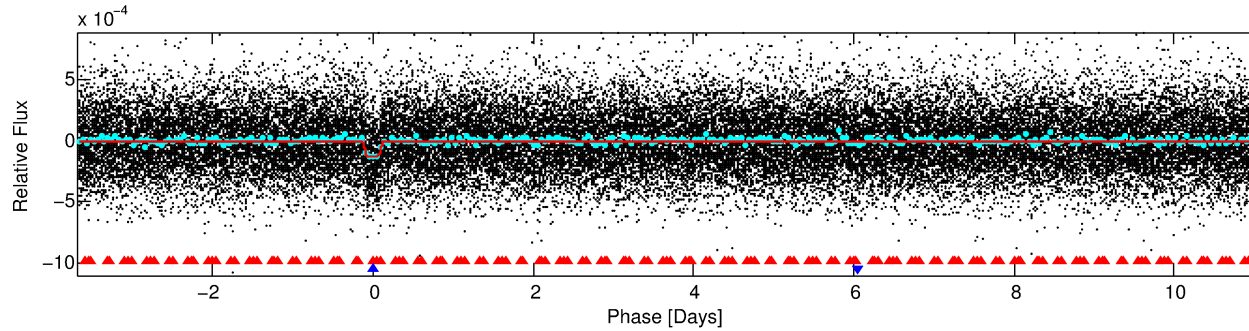
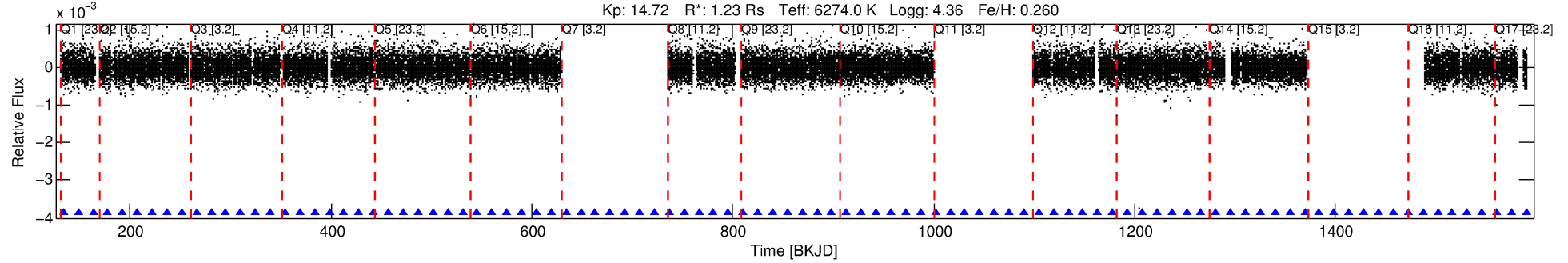
## Ephemeris Match Information For 010875007-02

No Significant Match Found

# DV One-Page Summary

KIC: 10875007 Candidate: 2 of 2 Period: 14.709 d  
KOI: K04149.02 Corr: 0.965

Kp: 14.72 R\*: 1.23 Rs Teff: 6274.0 K Logg: 4.36 Fe/H: 0.260



## DV Fit Results:

Period = 14.70879 [0.00015] d  
Epoch = 133.8444 [0.0082] BKJD  
Rp/R\* = 0.0125 [0.0032]  
a/R\* = 9.34 [12.14]  
b = 0.91 [0.25]  
Seff = 130.83 [56.78]  
Teq = 862 [94] K  
Rp = 1.68 [0.72] Re  
a = 0.1269 [0.0360] AU  
Ag = 112.93 [82.35] [1.36σ]  
Teffp = 4347 [680] K [5.08σ]

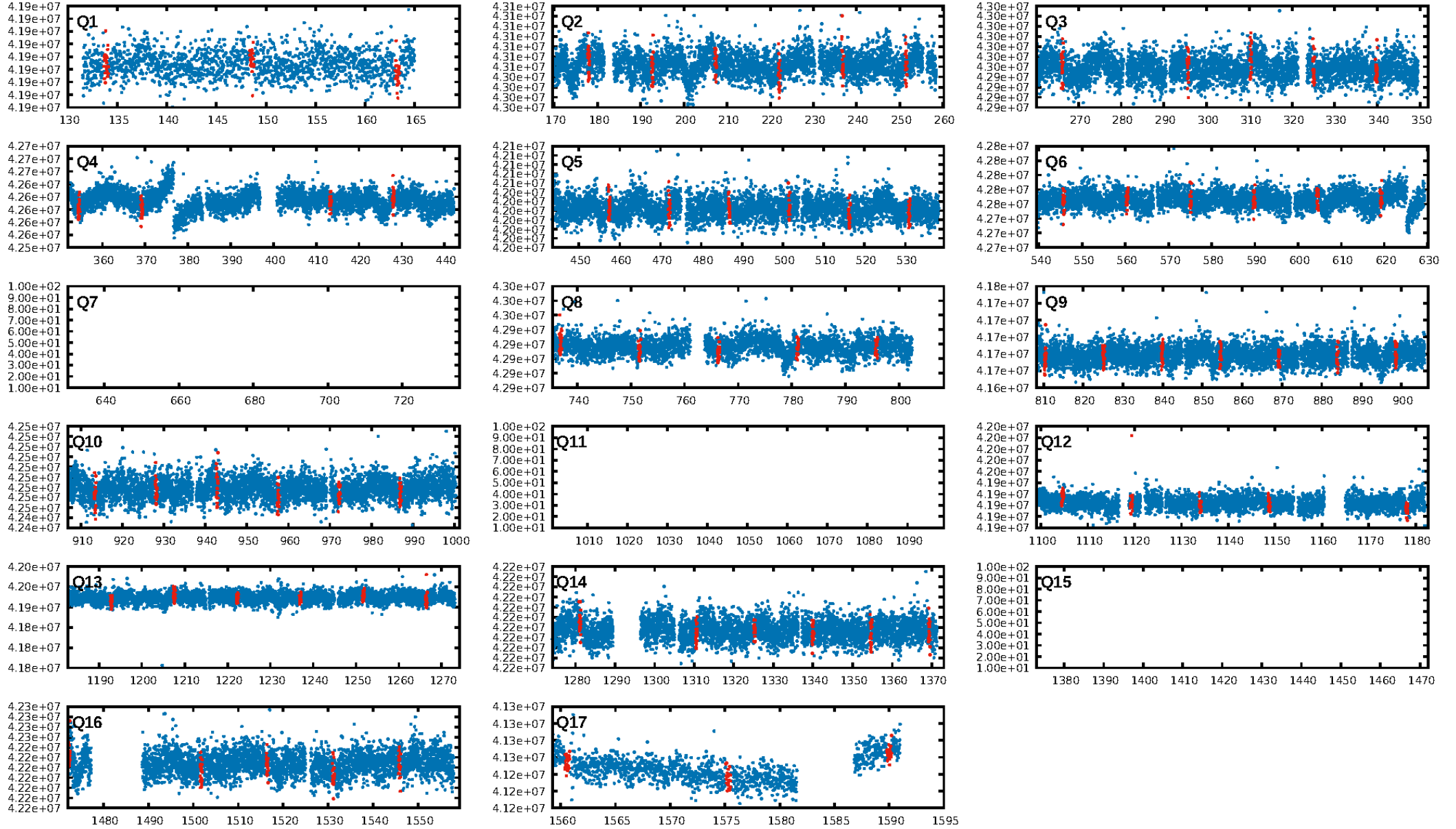
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [16.50σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 96.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.35e-25  
RollingBand-fgt: 1.00 [62/62]  
GhostDiagnostic-chr: 3.024  
Centroid-sig: 68.5%  
Centroid-so: 1.005 arcsec [0.90σ]  
OotOffset-rm: 0.878 arcsec [2.40σ]  
OotOffset-st: 4/1/1/2 [8]  
KicOffset-rm: 0.959 arcsec [2.35σ]  
KicOffset-st: 4/1/1/2 [8]  
DiffImageQuality-fgm: 0.62 [5/8]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 06:40:24 Z

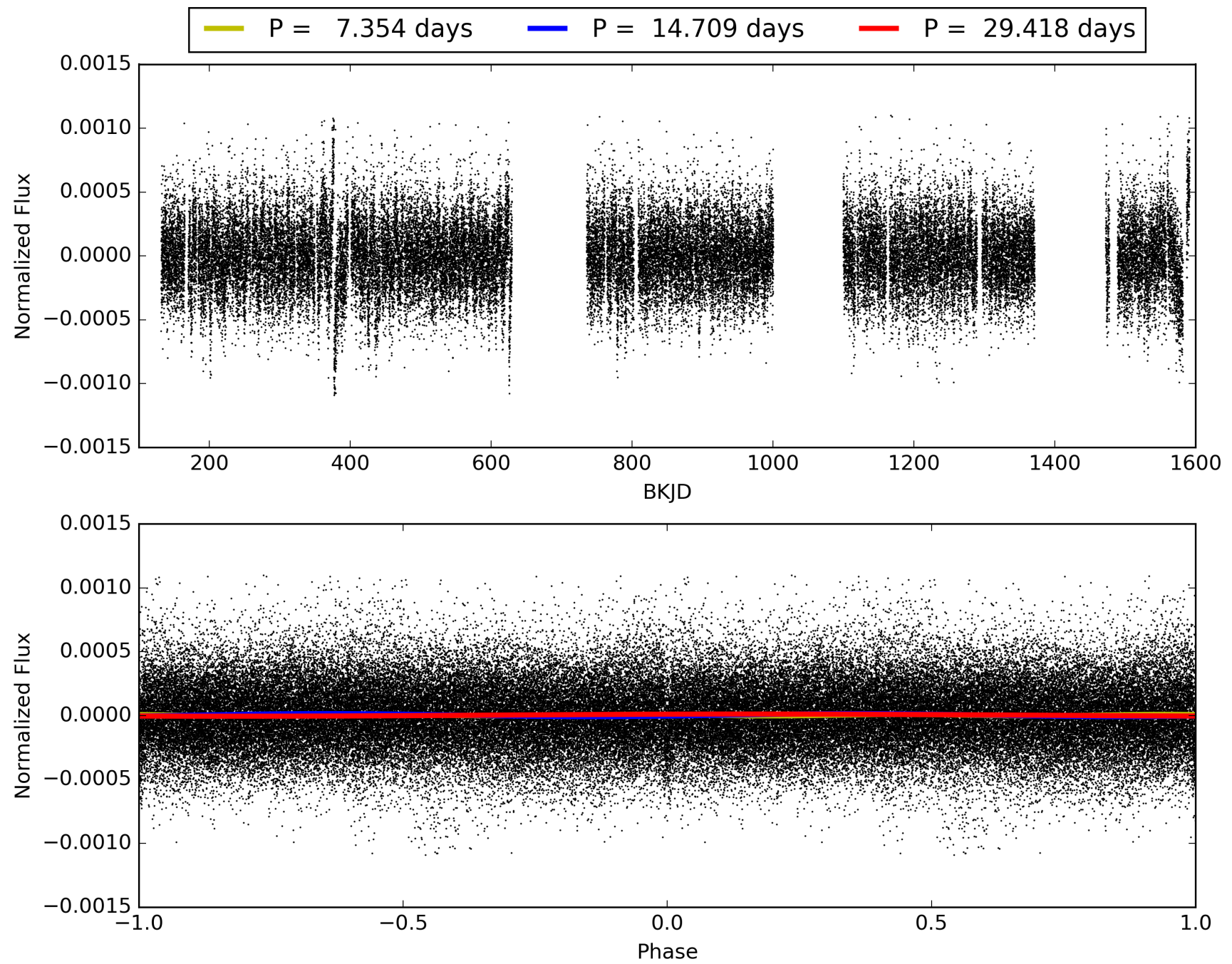
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010875007-02, PDC Light Curves



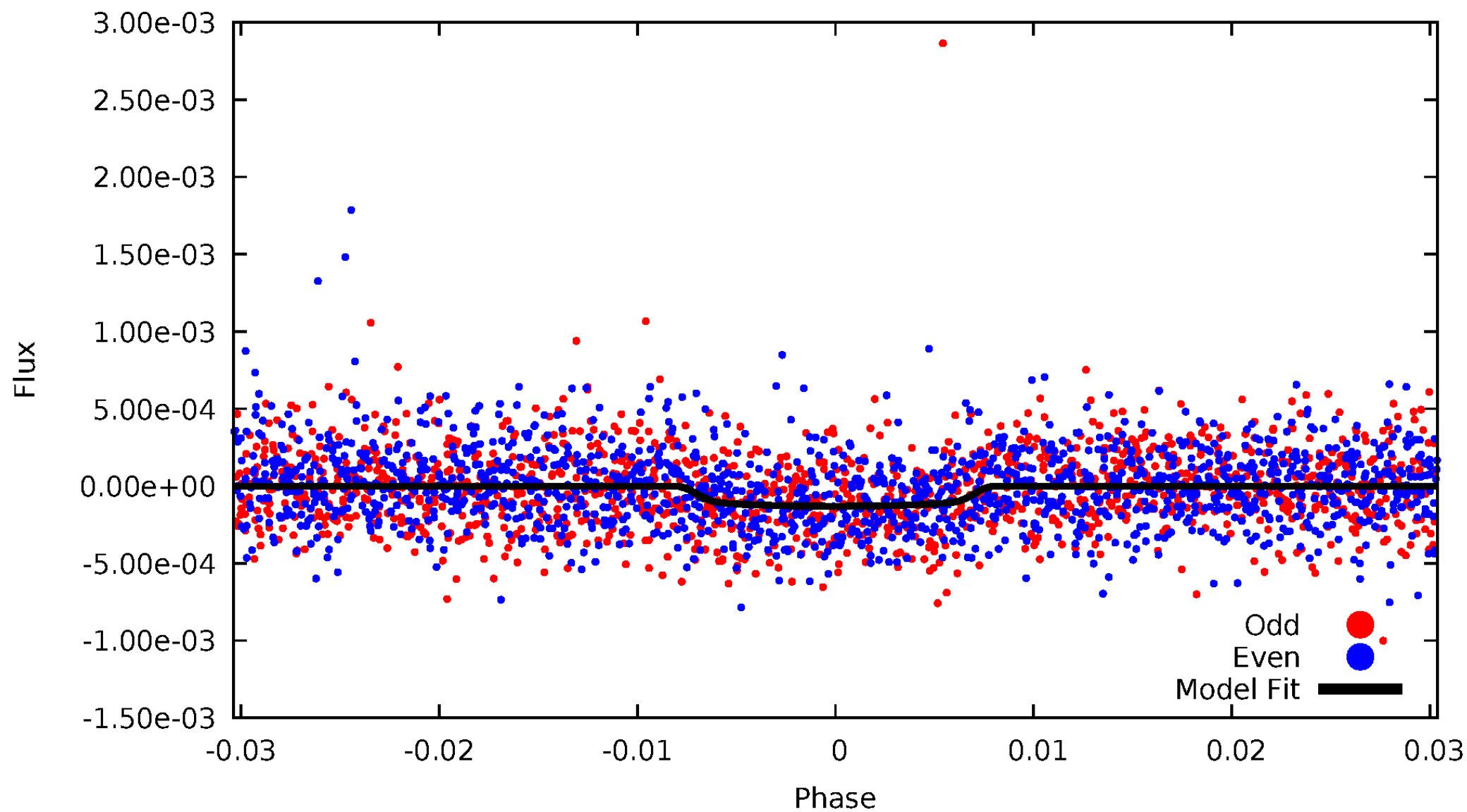


# TCE 010875007-02



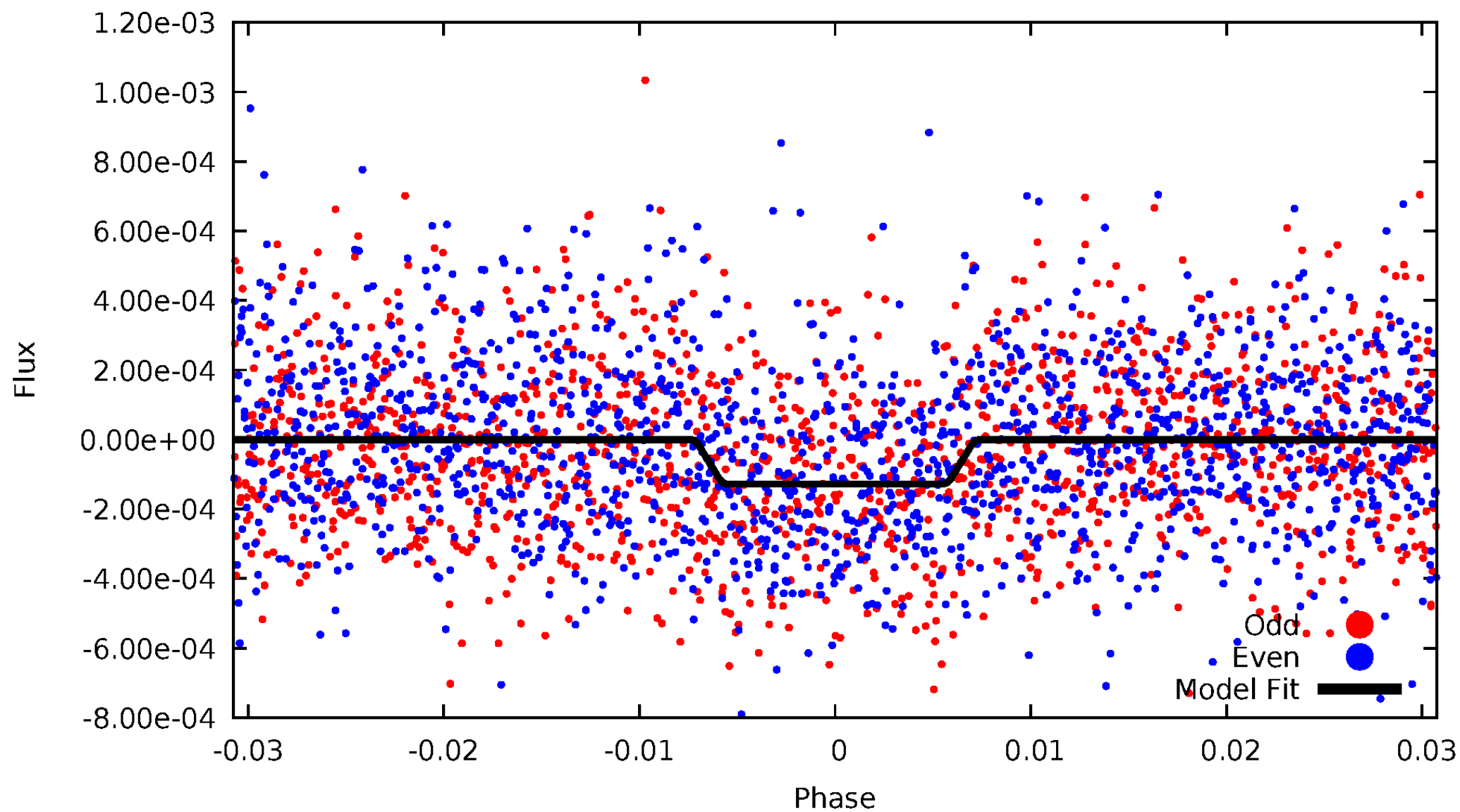
# DV Odd/Even

TCE 010875007-02



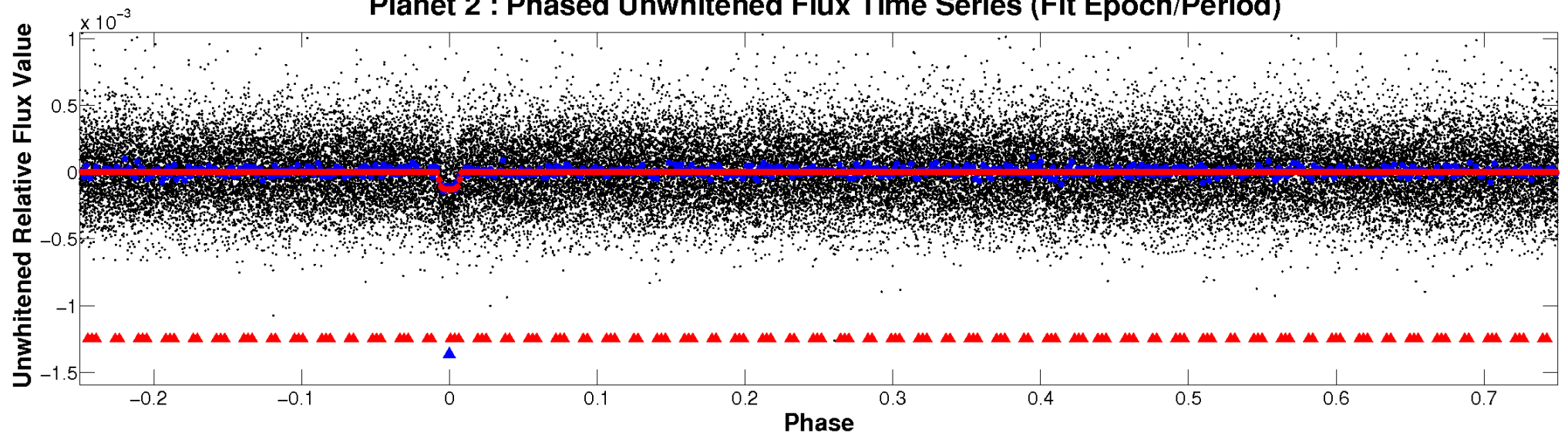
# ALT Odd/Even

TCE 010875007-02

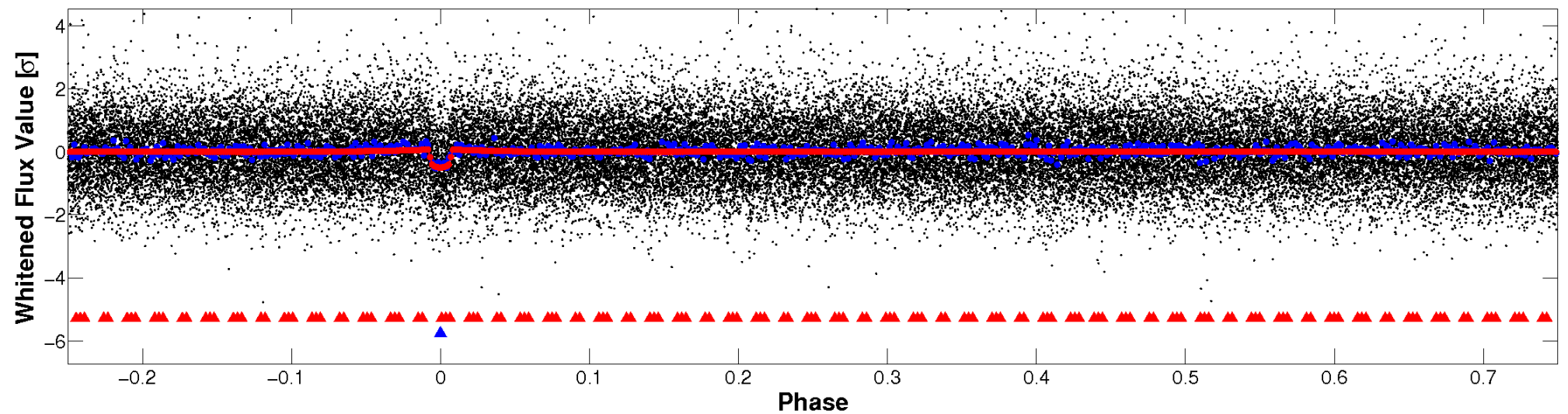


# Non-Whitened Vs. Whitened Light Curve

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

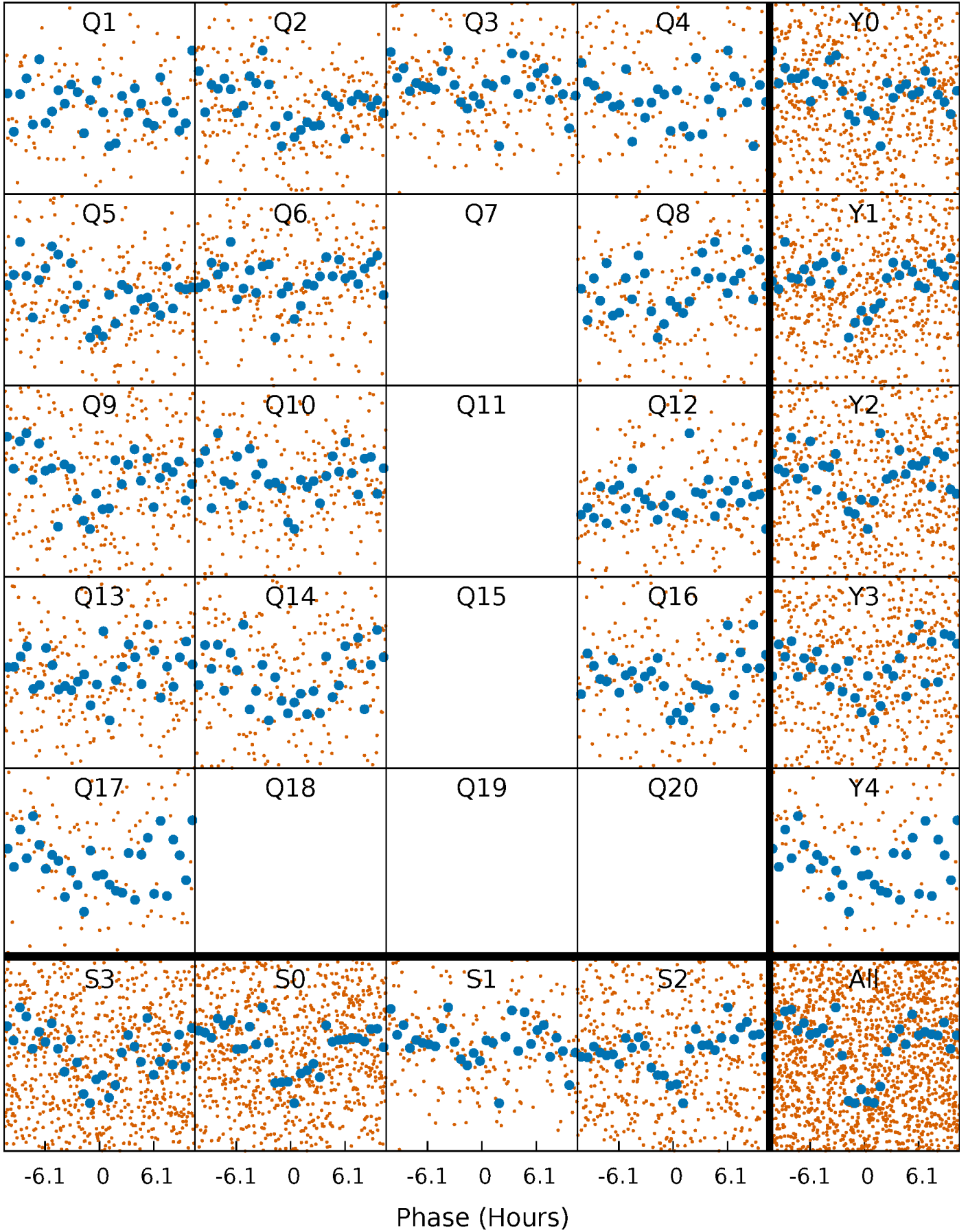


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

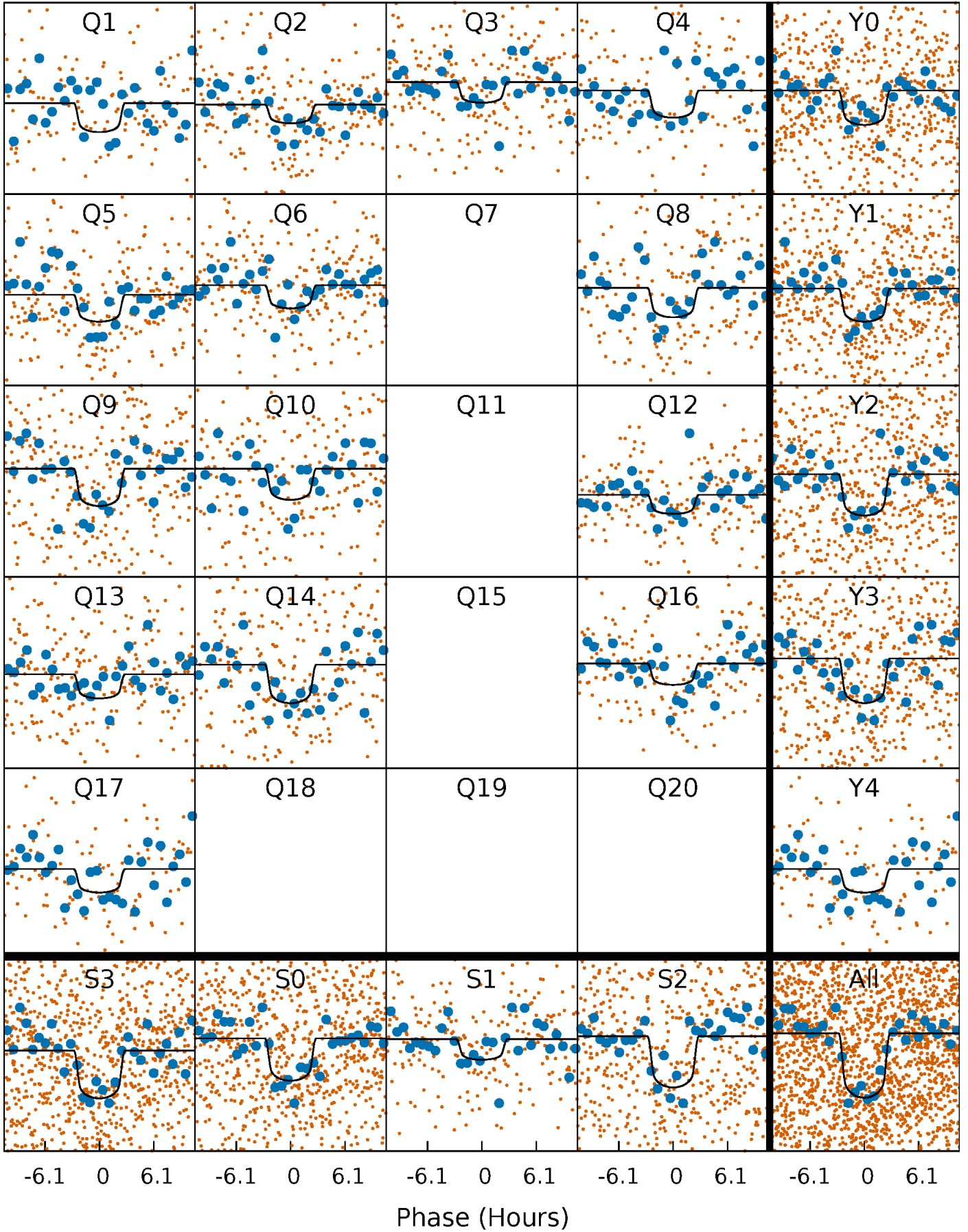
TCE 010875007-02 P= 14.708788 Days  $T_0=133.844427$  (BKJD)





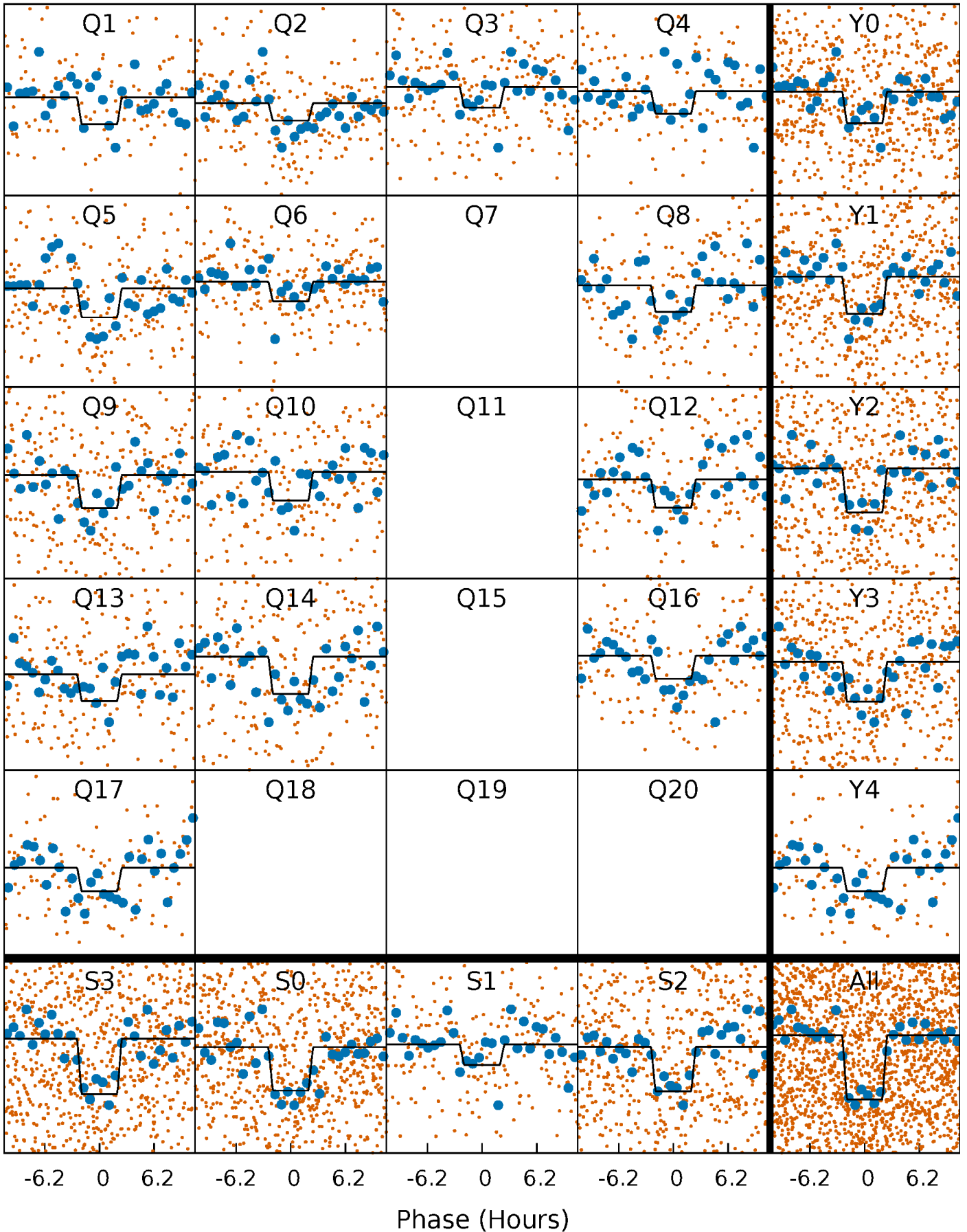
# DV Quarter-Phased Transit Curves

TCE 010875007-02   P= 14.708788 Days    $T_0=133.844427$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

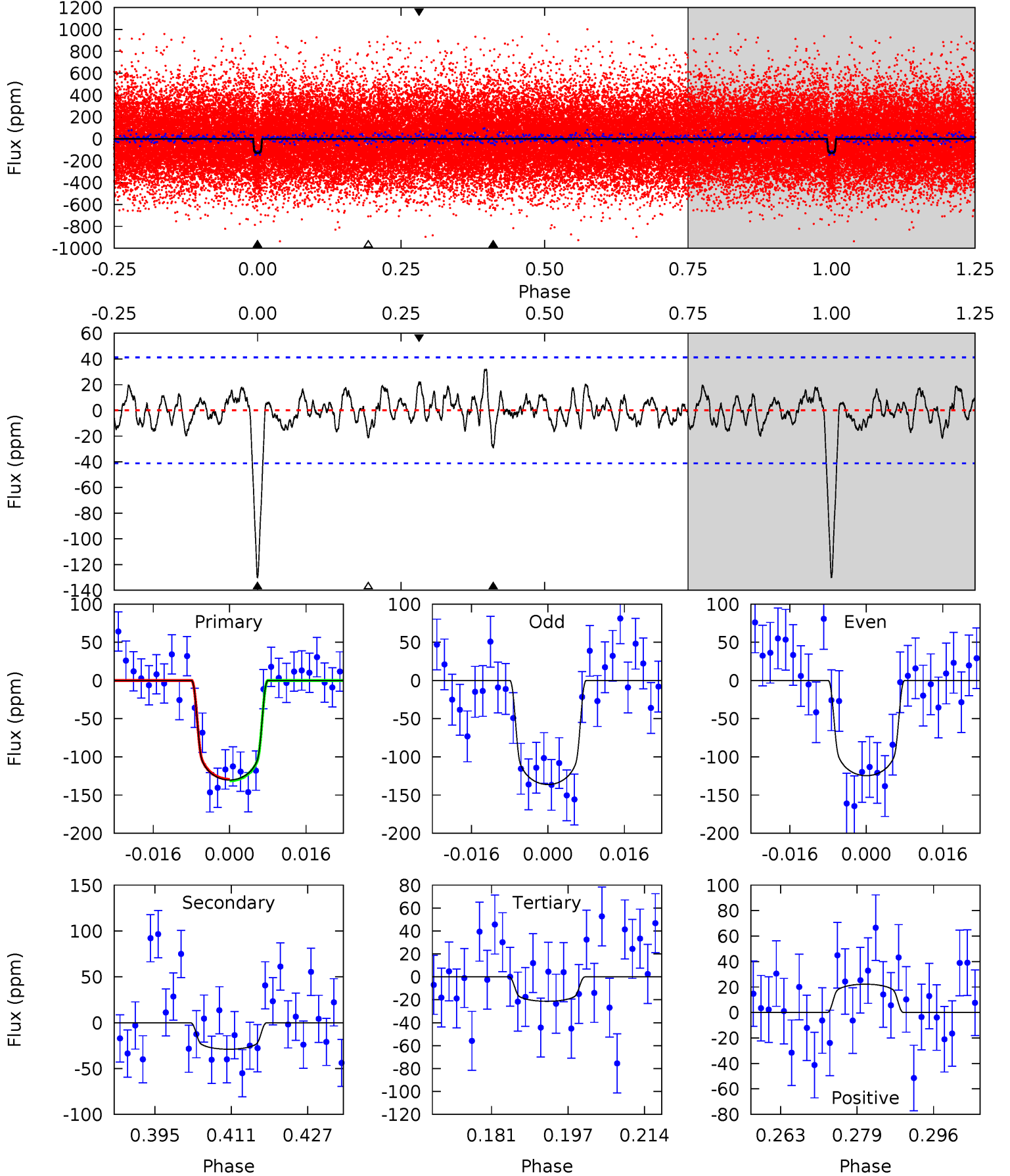
TCE 010875007-02   P= 14.708710 Days    $T_0=133.846979$  (BKJD)



# DV Model-Shift Uniqueness Test

010875007-02, P = 14.708788 Days, E = 119.135639 Days

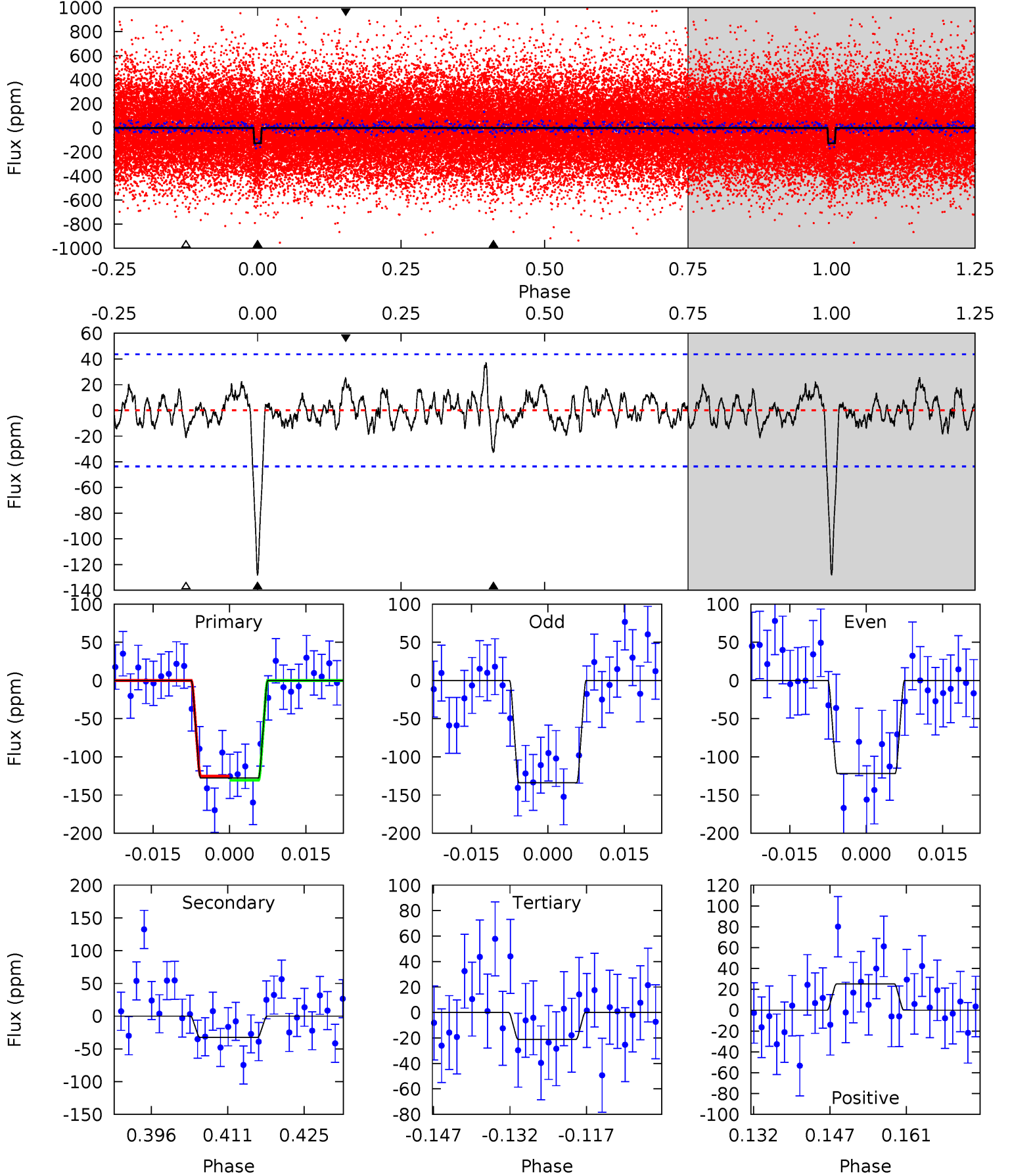
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.6	3.47	2.55	2.66	4.93	2.40	1.02	13.0	12.9	0.91	0.81	0.69	0.94	0.20	0.11



# Alt Model-Shift Uniqueness Test

010875007-02, P = 14.708710 Days, E = 119.138269 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
14.5	3.68	2.40	2.86	4.95	2.44	1.03	12.1	11.7	1.28	0.82	0.68	1.05	0.22	0.31



### Stellar Parameters For KIC 010875007

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6274^{+177}_{-243}$	$4.357^{+0.073}_{-0.218}$	$0.260^{+0.150}_{-0.300}$	$1.232^{+0.423}_{-0.141}$	$1.261^{+0.163}_{-0.182}$	$0.950^{+0.360}_{-0.498}$
	+3%/-4%	+2%/-5%	+58%/-115%	+34%/-11%	+13%/-14%	+38%/-52%
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 010875007-02 / KOI 4149.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-29 \pm 8$	$1.70^{+0.49}_{-0.47}$	$1222^{+99}_{-66}$	$4368^{+611}_{-469}$	$86^{+87}_{-40}$
Alt.	$-32 \pm 9$	$1.55^{+0.56}_{-0.44}$	$1221^{+106}_{-64}$	$4604^{+688}_{-511}$	$116^{+106}_{-58}$

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

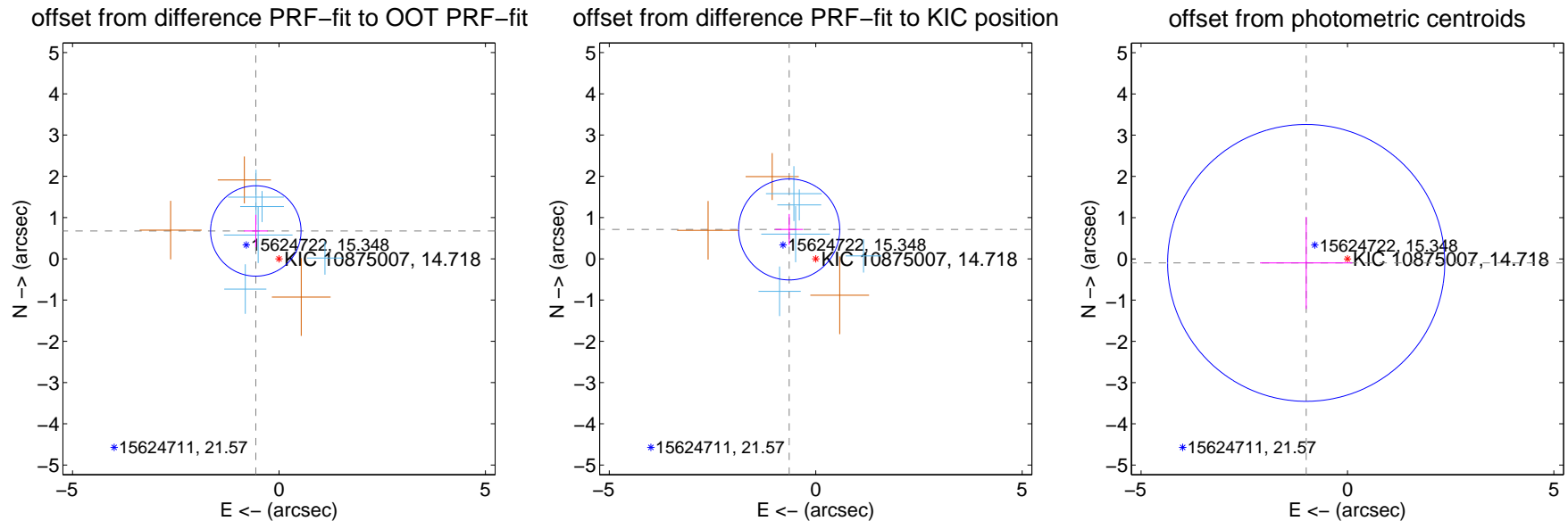
## DV Centroid Data

Supplemental centroid analysis for 010875007-02. Kepler magnitude: 14.72. Transit SNR 11.28

There are 5 quarters with good PRF difference image offsets

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

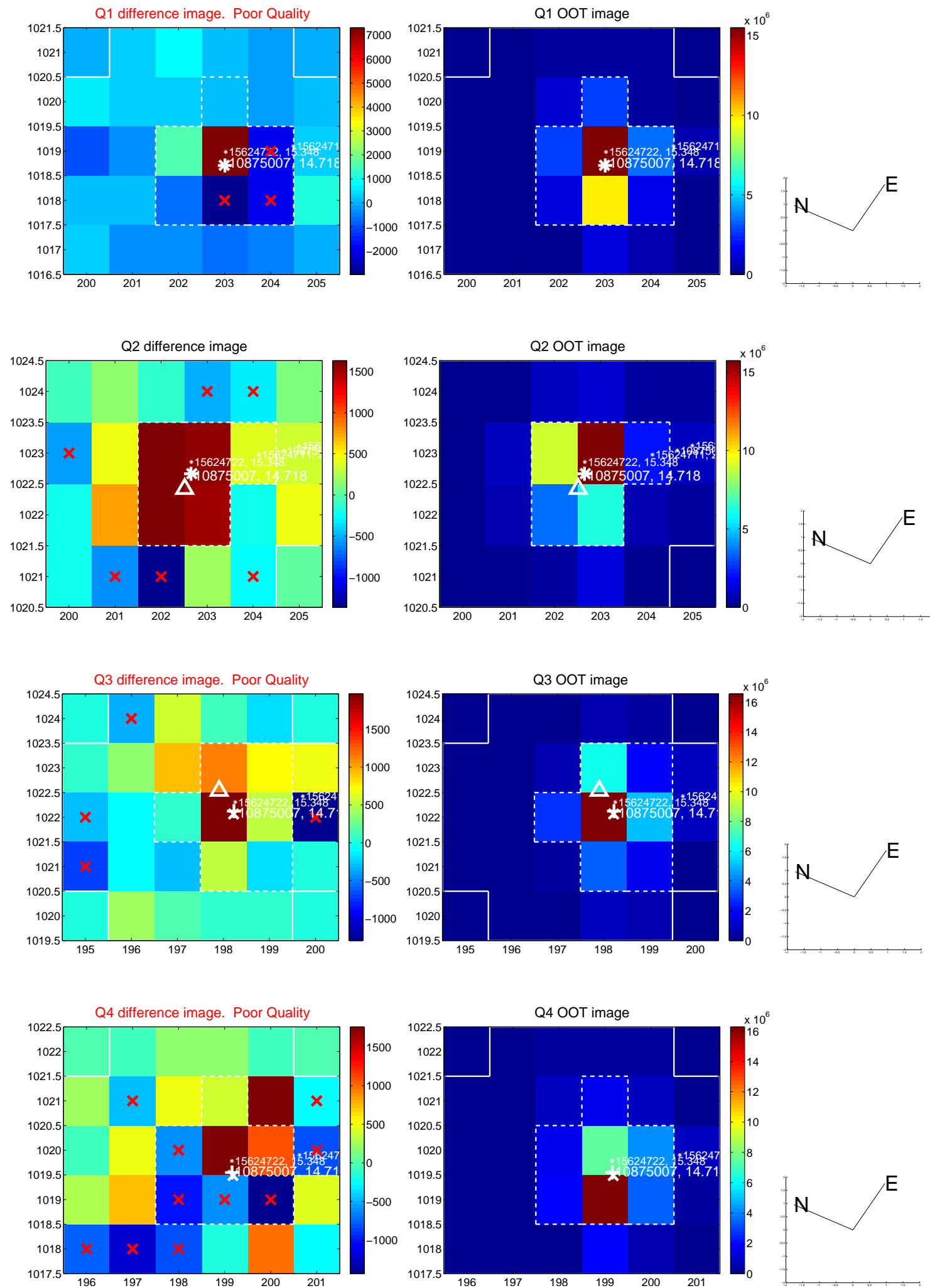
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.878 \pm 0.365$	2.40	$0.561 \pm 0.288$	$0.675 \pm 0.390$
PRF-fit source offset from KIC position	$0.959 \pm 0.408$	2.35	$0.643 \pm 0.337$	$0.712 \pm 0.375$
photometric centroid source offset	$1.00 \pm 1.12$	0.90	$1.00 \pm 1.12$	$-0.10 \pm 1.11$



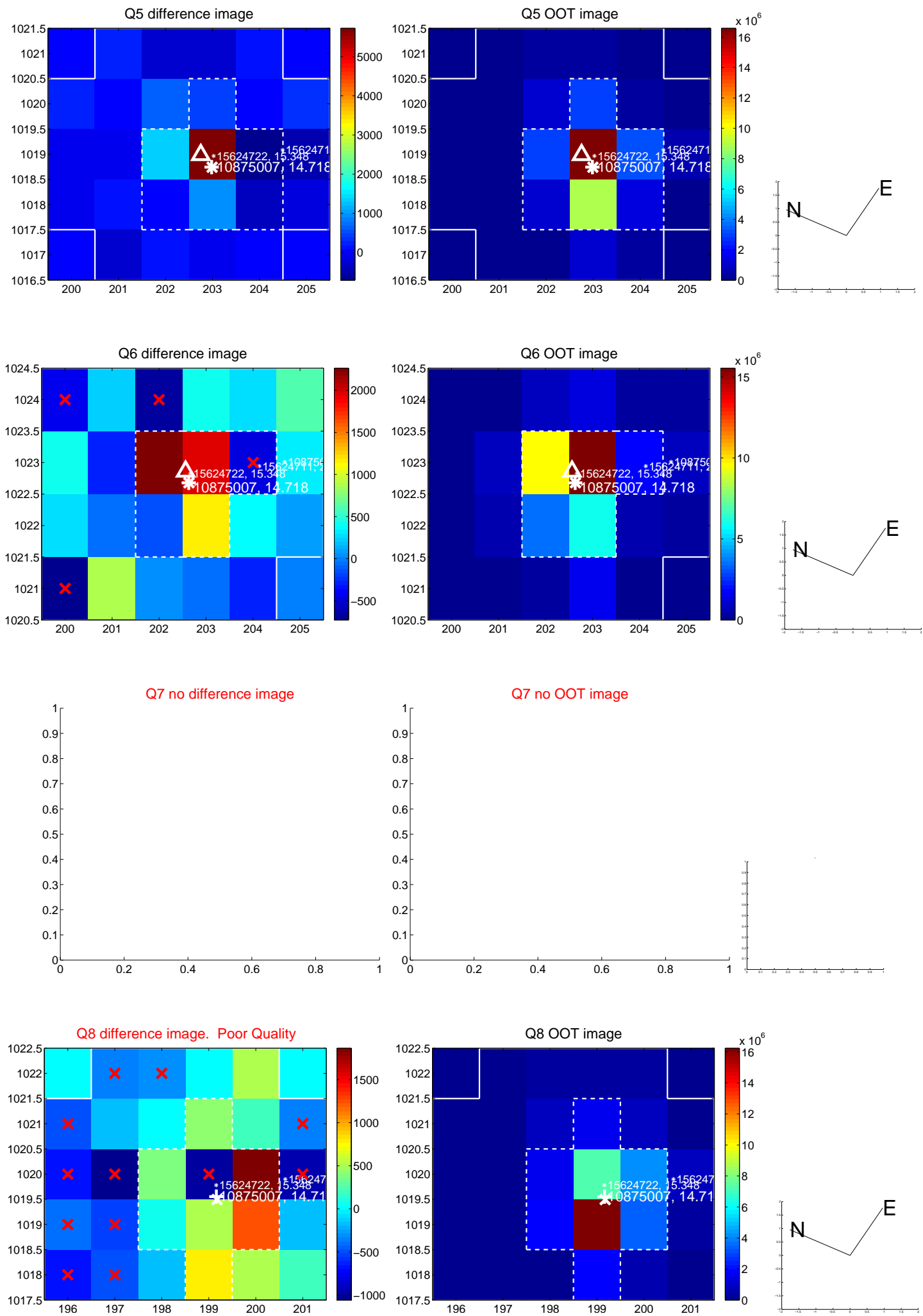
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



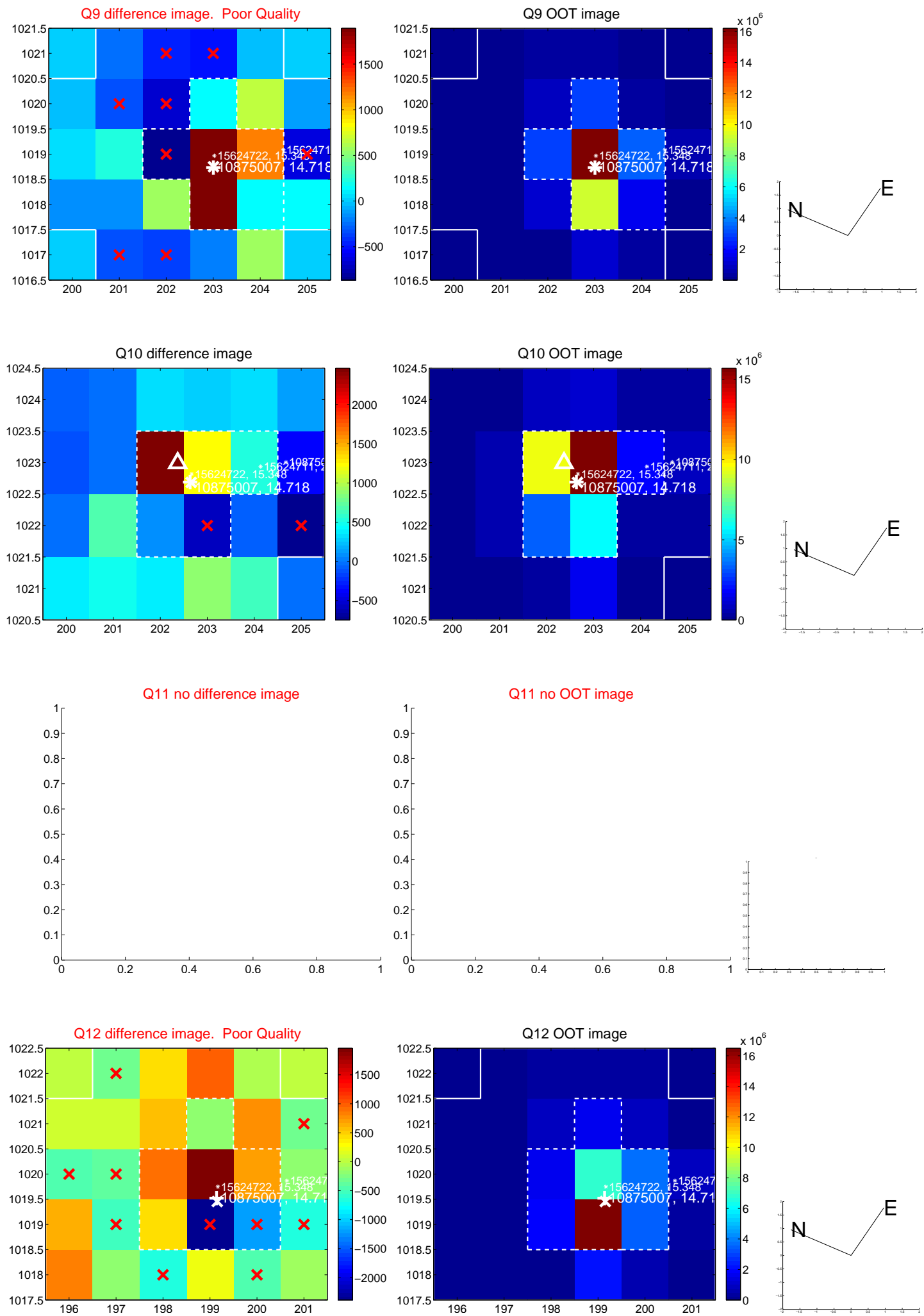
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



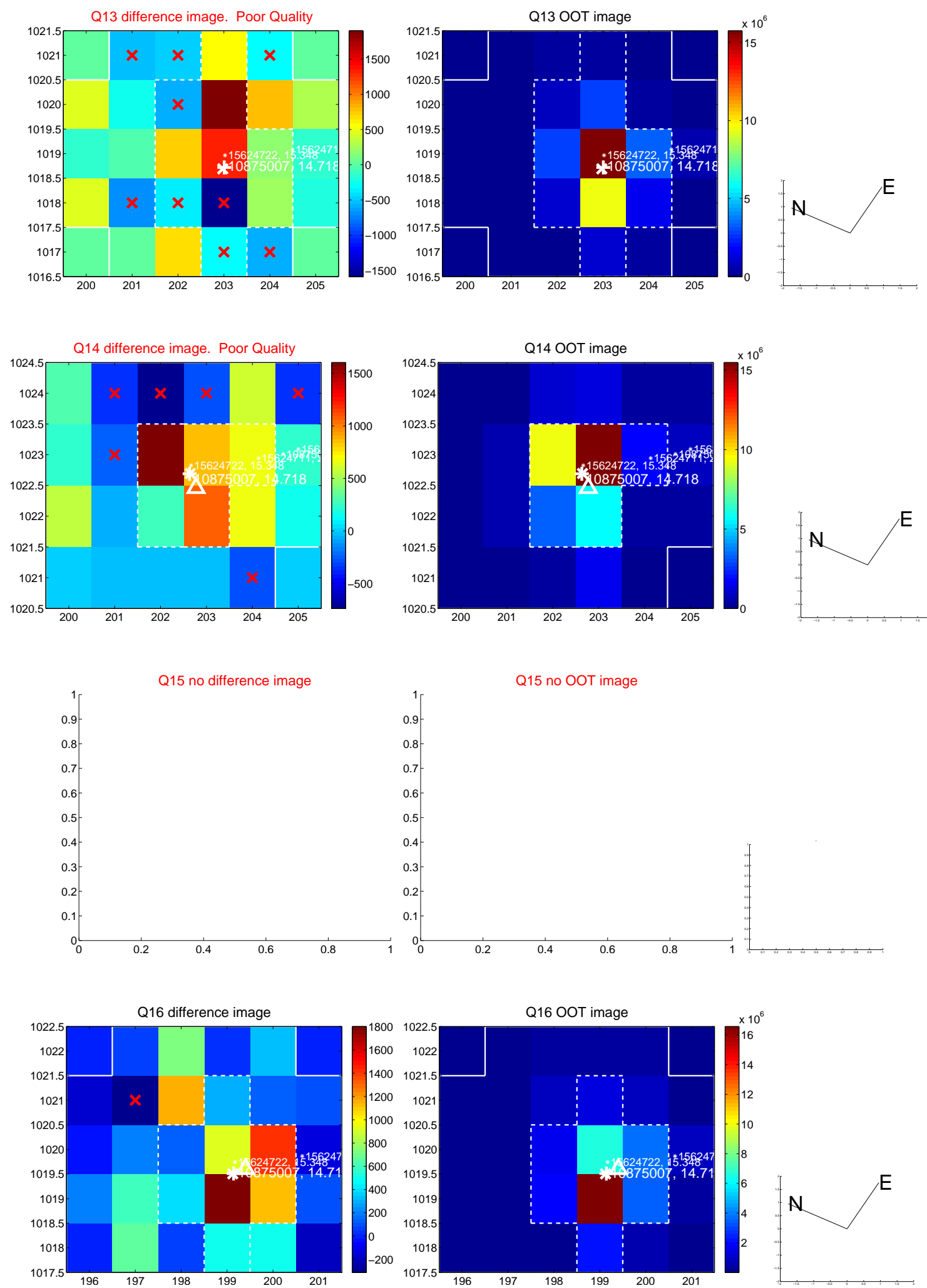
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



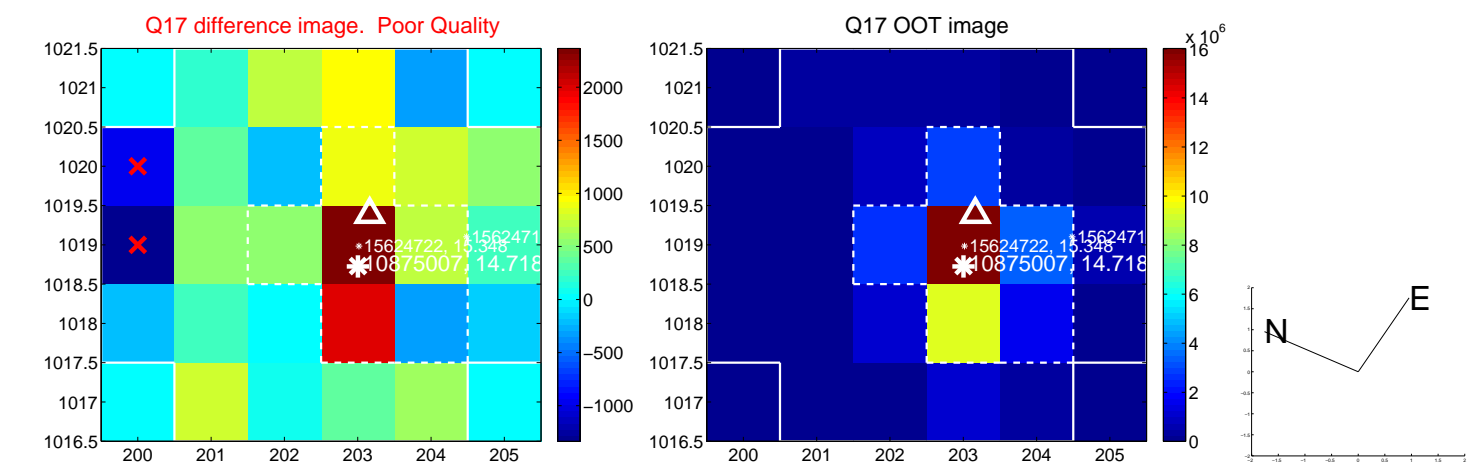
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



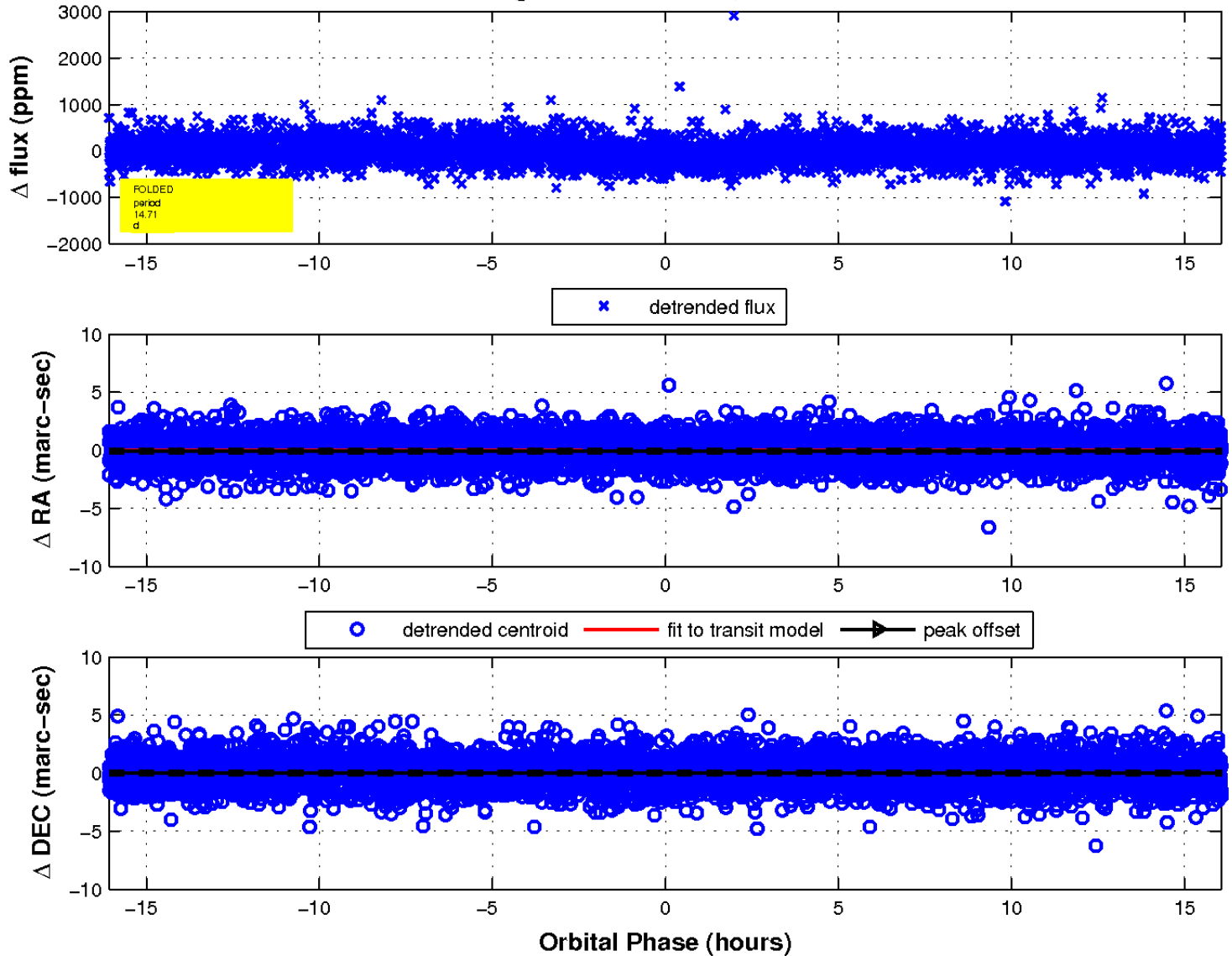
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

