

# KIC 006029239

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006029239-01	OBS	0304.01	8.512037	132.349716	596.3	2.305	116.8	115.5	0.88	5767	2.46	117.30
006029239-02	OBS	0304.02	5.518295	136.573218	27.7	3.630	7.6	7.3	0.88	5767	0.54	209.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006029239-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006029239-02	OBS	PC	0.79	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.

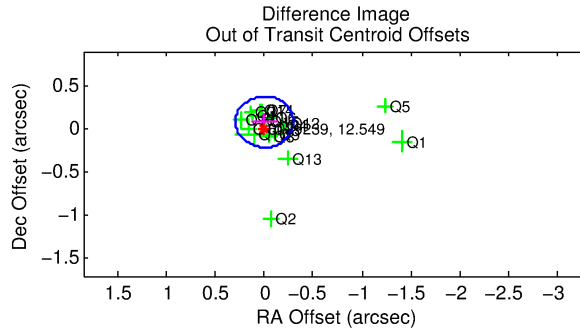
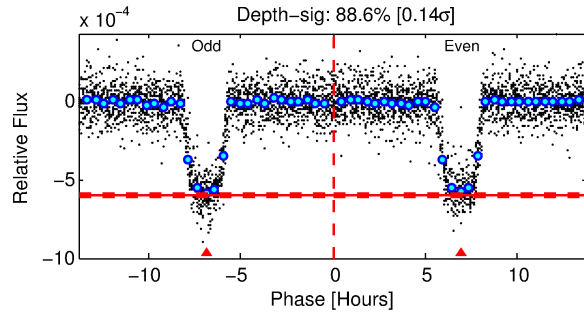
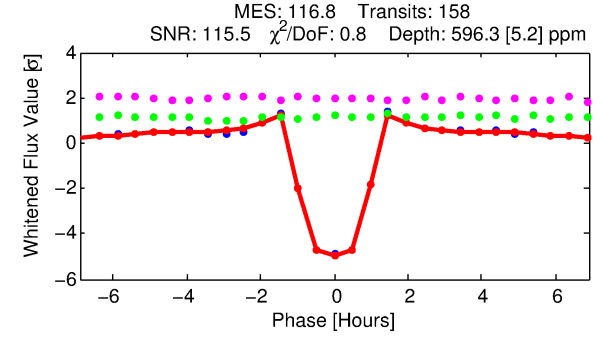
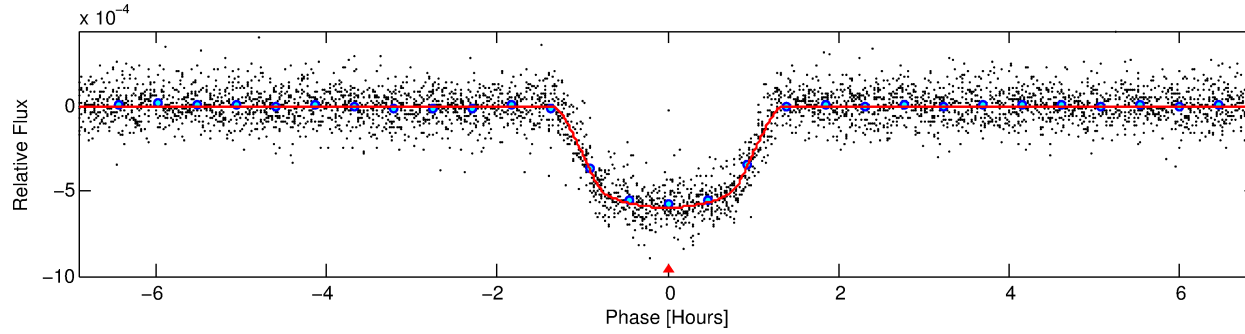
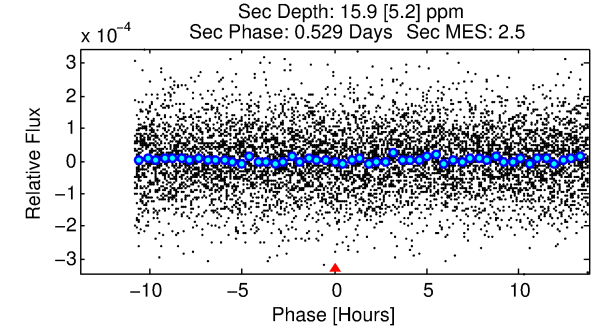
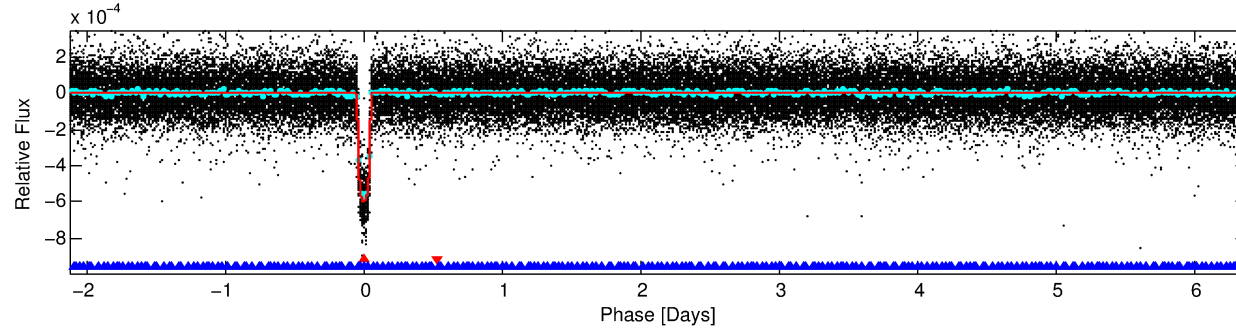
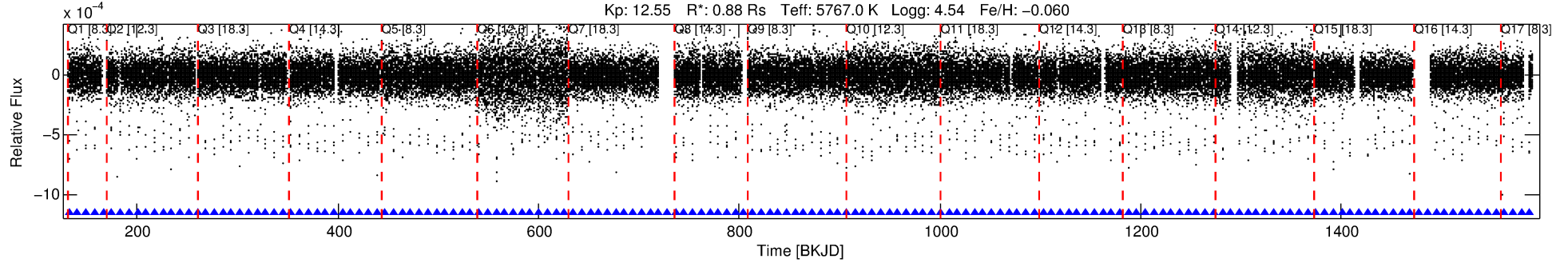
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006029239-01

No Significant Match Found

# DV One-Page Summary

KIC: 6029239 Candidate: 1 of 2 Period: 8.512 d  
KOI: K00304.01 Corr: 0.975



## DV Fit Results:

Period = 8.51204 [0.00000] d  
Epoch = 132.3497 [0.0004] BKJD  
Rp/R\* = 0.0255 [0.0012]  
a/R\* = 16.36 [3.57]  
b = 0.85 [0.07]  
Seff = 117.30 [26.14]  
Teq = 839 [47] K  
Rp = 2.45 [0.36] Re  
a = 0.0810 [0.0106] AU  
Ag = 9.55 [3.77] [2.27σ]  
Teffp = 2281 [199] K [7.06σ]

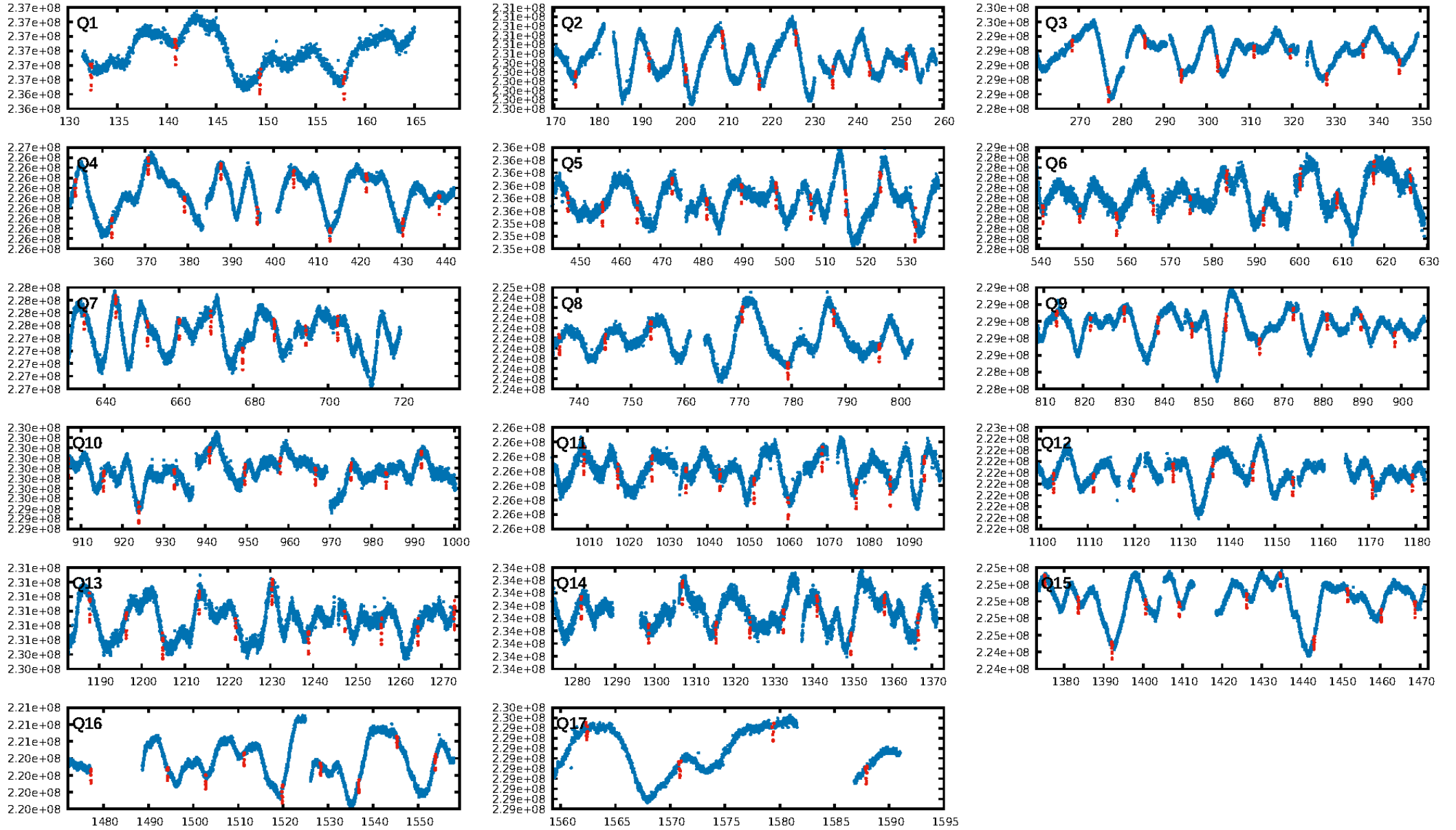
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [16.71σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [150/150]  
GhostDiagnostic-chr: 3.751  
Centroid-sig: 0.8%  
Centroid-so: 0.292 arcsec [4.34σ]  
OotOffset-rm: 0.084 arcsec [0.85σ]  
KicOffset-rm: 0.190 arcsec [1.86σ]  
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]

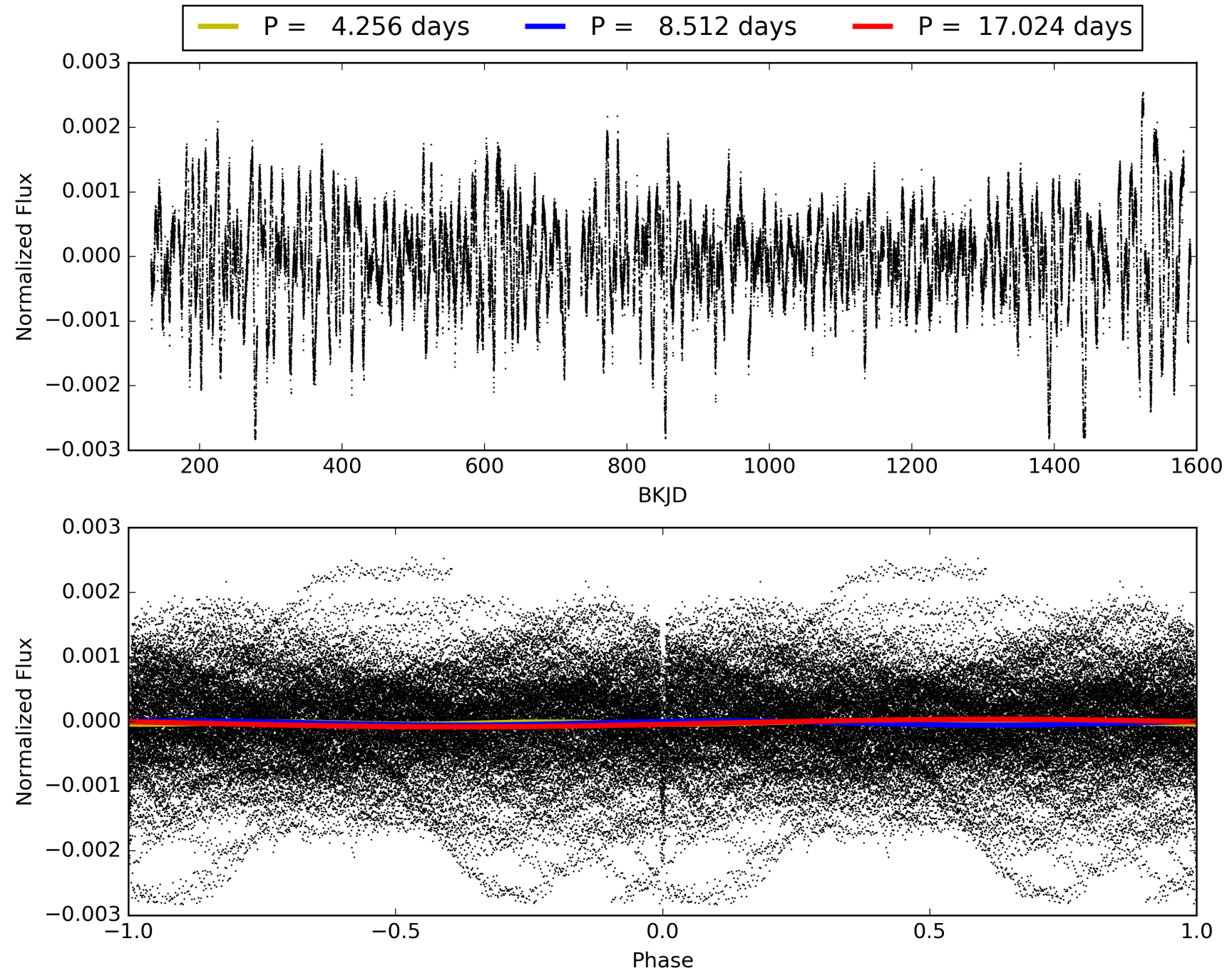
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:46:05 Z

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

# TCE 006029239-01, PDC Light Curves

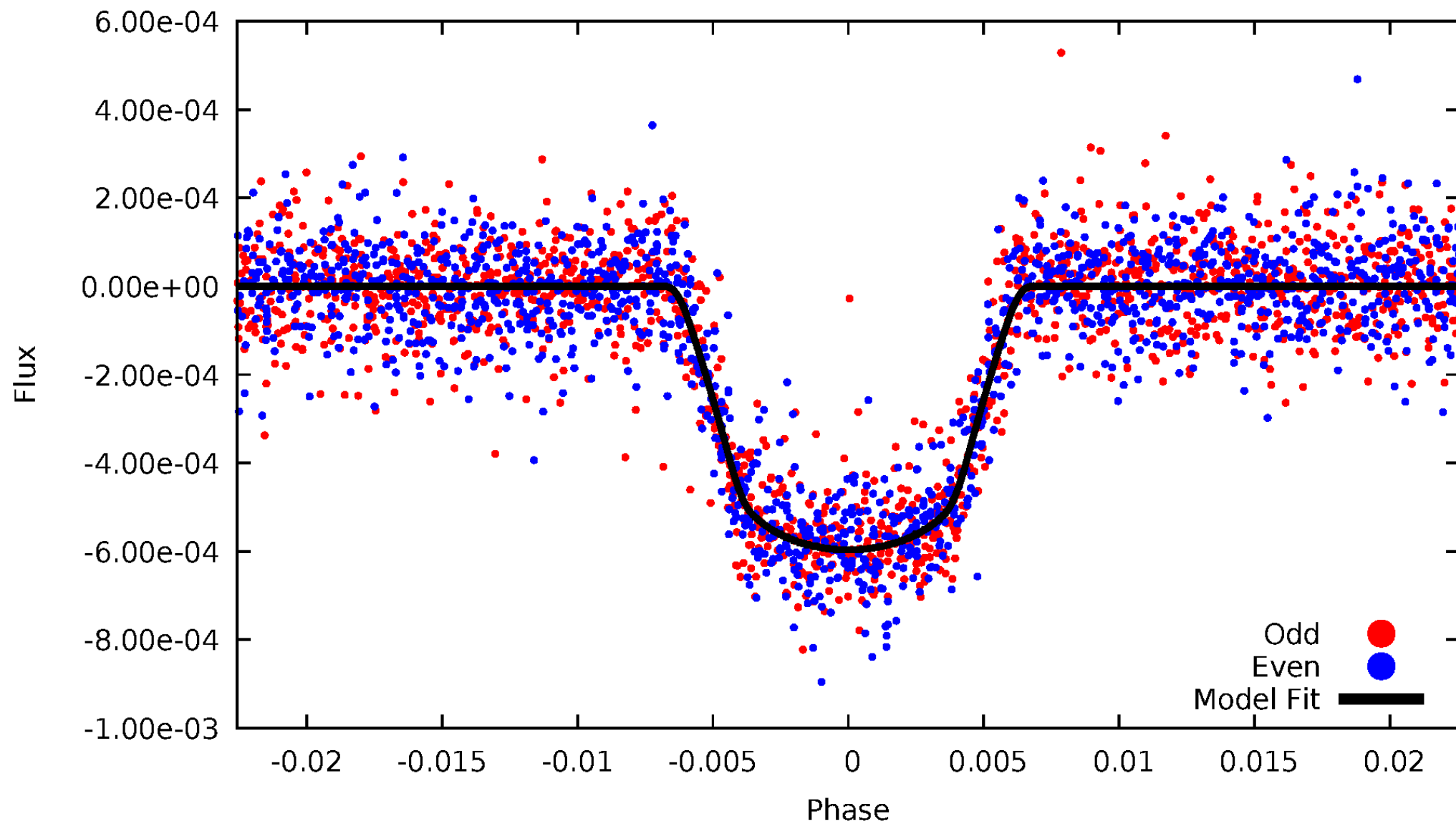


TCE 006029239-01



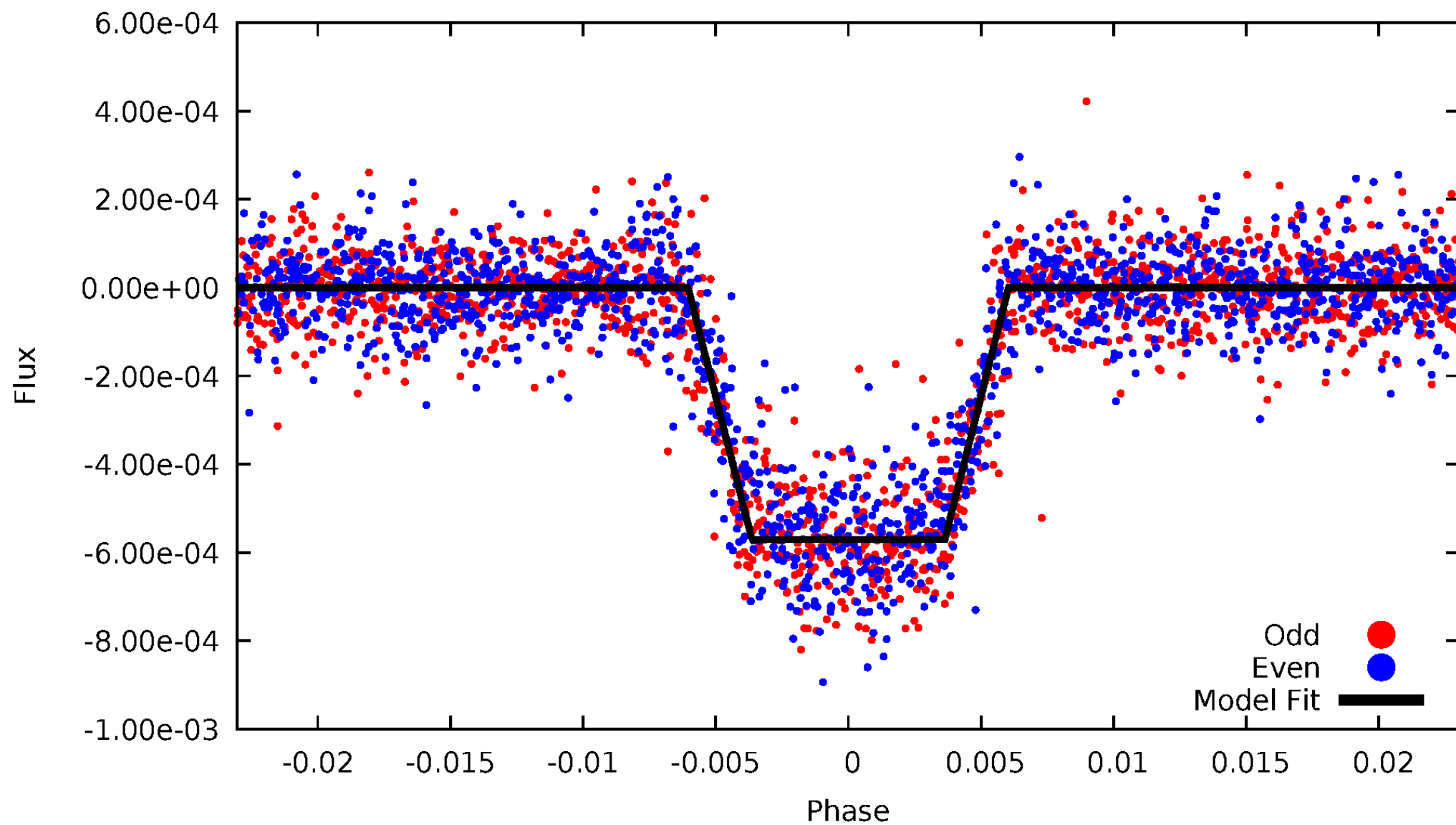
# DV Odd/Even

TCE 006029239-01



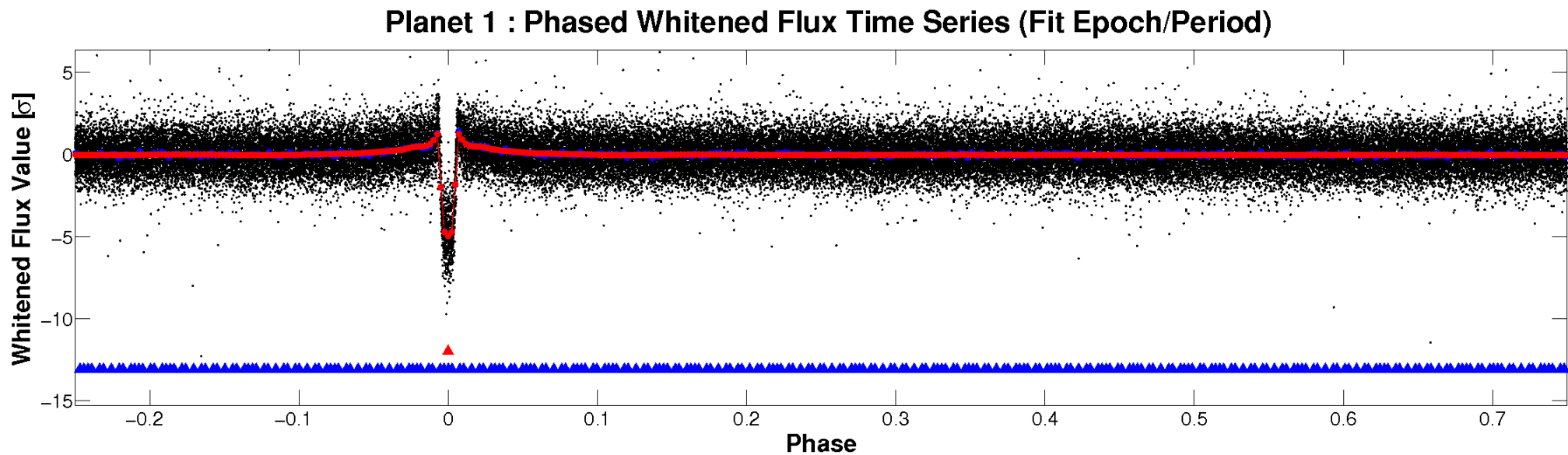
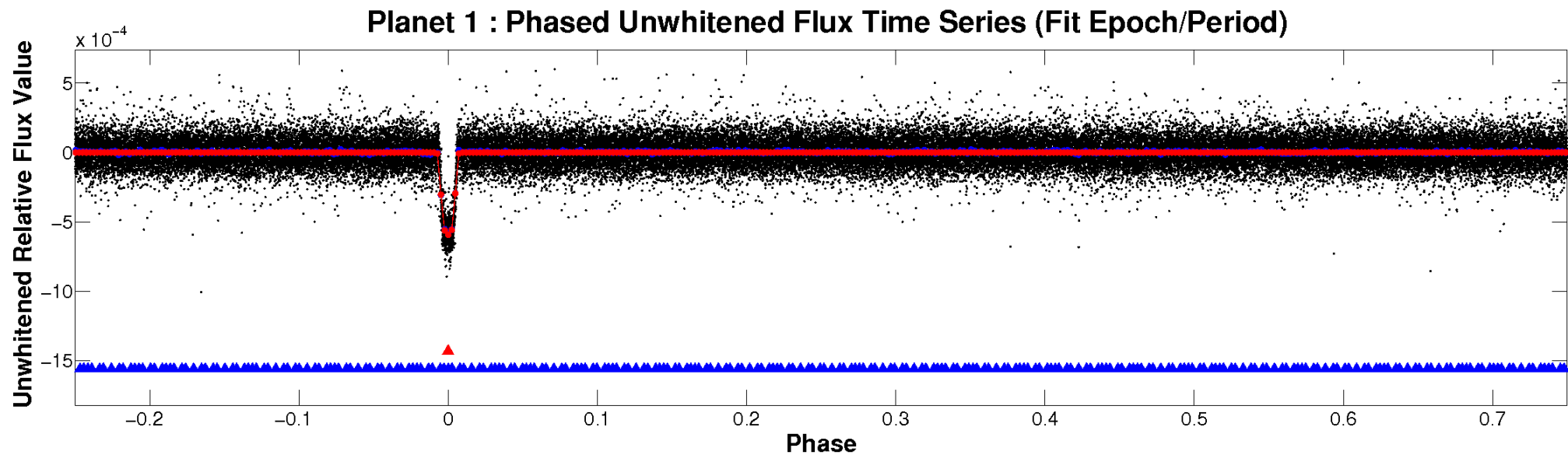
# ALT Odd/Even

TCE 006029239-01



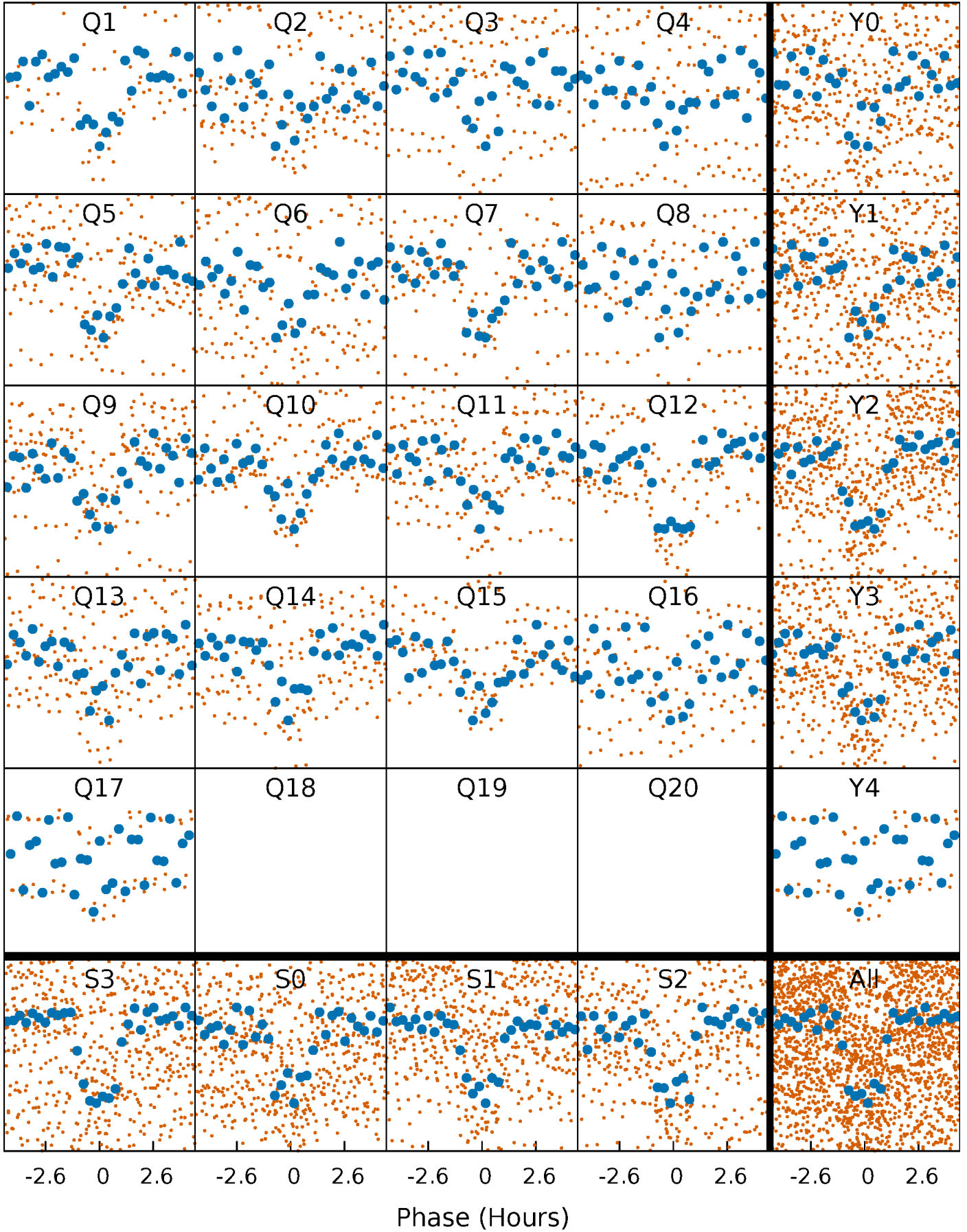


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

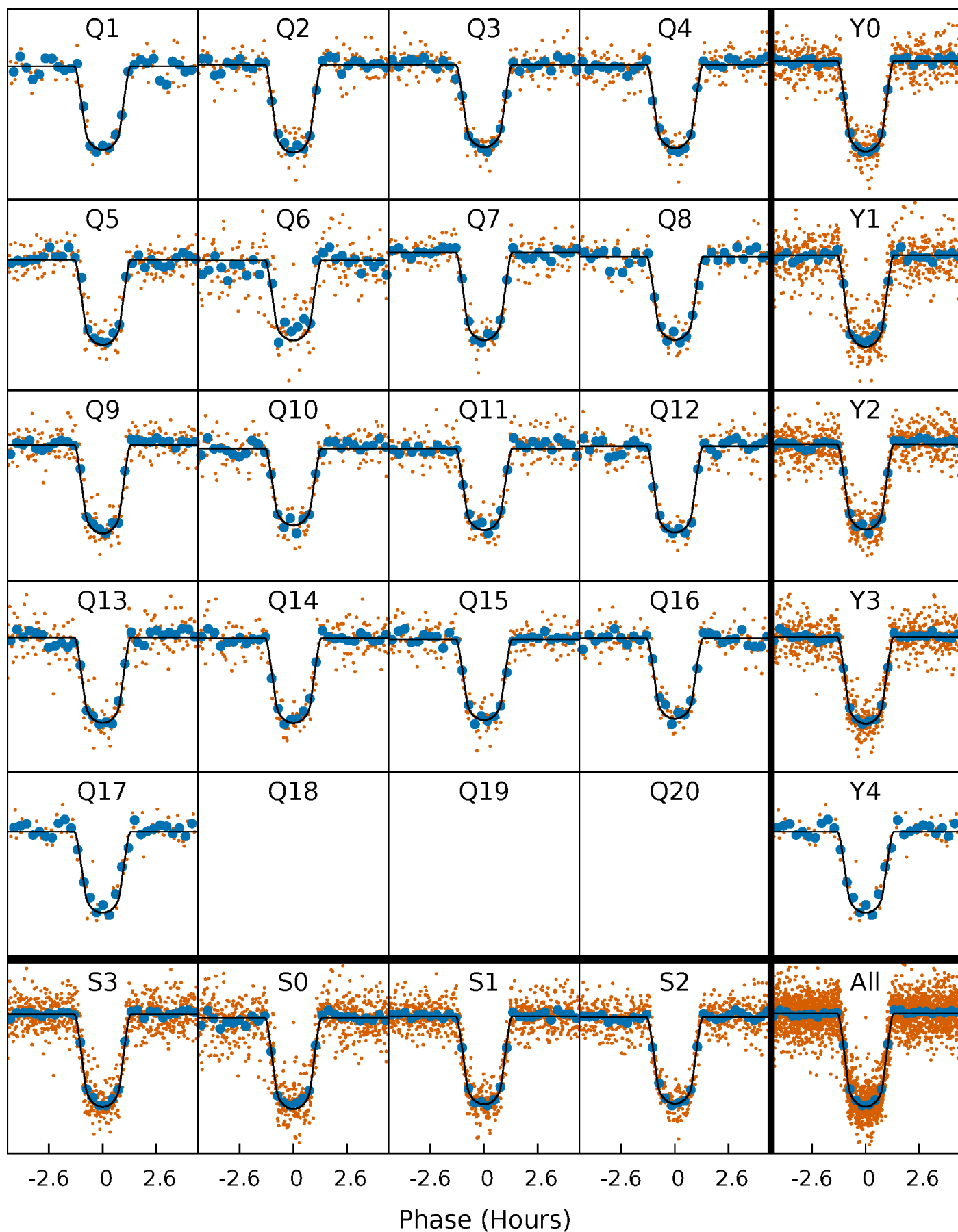
TCE 006029239-01   P= 8.512037 Days    $T_0=132.349716$  (BKJD)





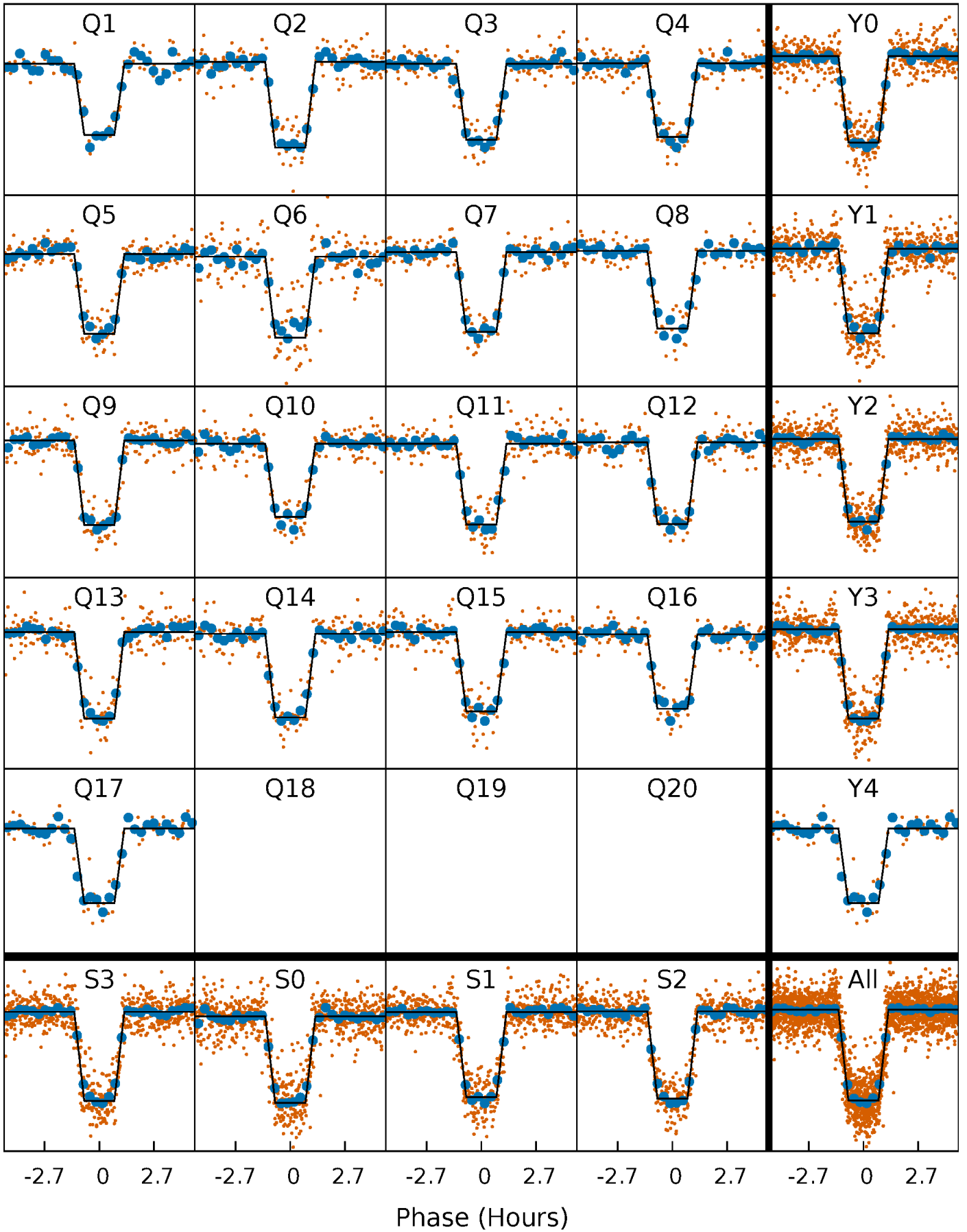
# DV Quarter-Phased Transit Curves

TCE 006029239-01 P= 8.512037 Days  $T_0=132.349716$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

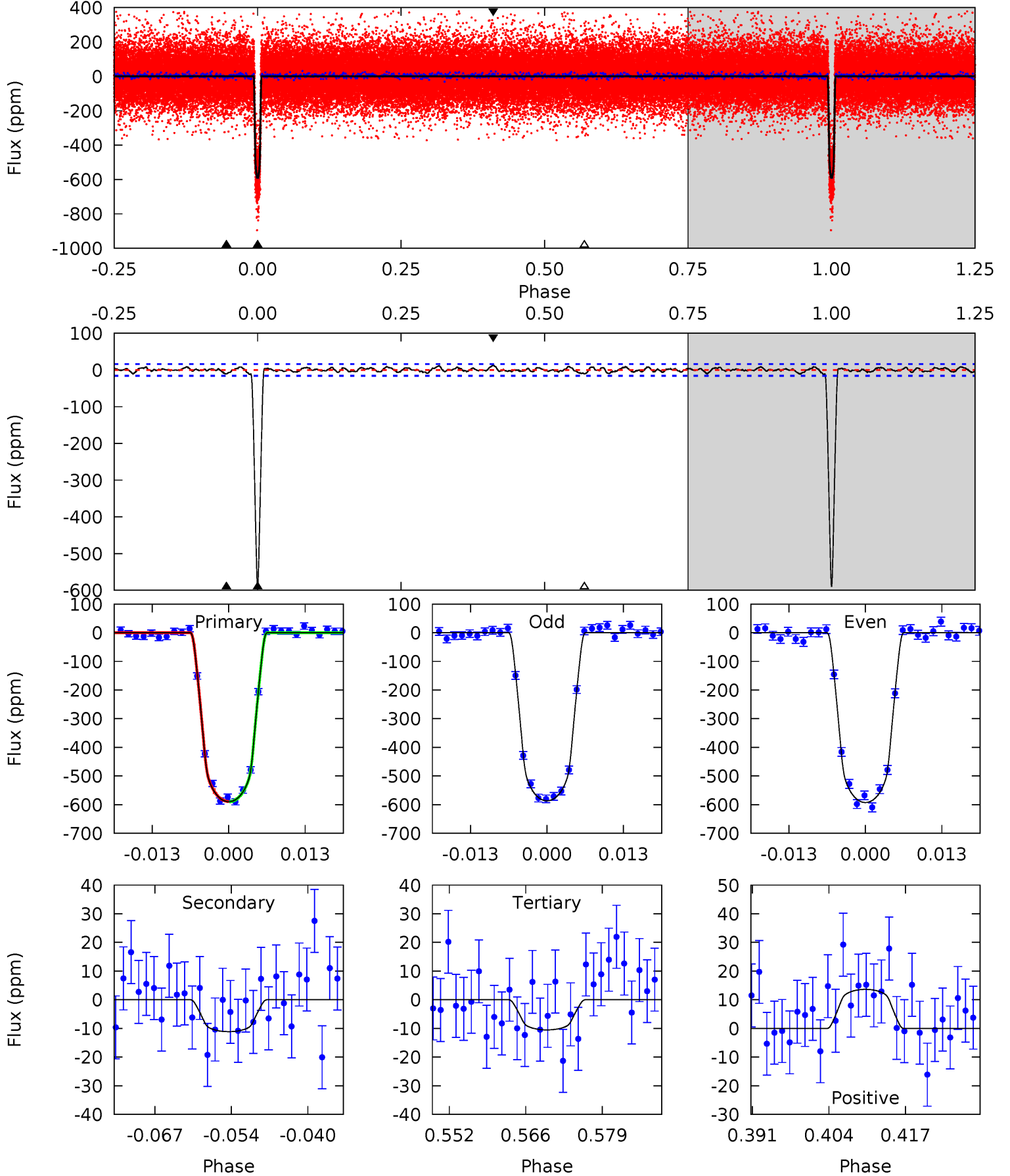
TCE 006029239-01 P= 8.512049 Days  $T_0=132.348768$  (BKJD)



# DV Model-Shift Uniqueness Test

006029239-01, P = 8.512037 Days, E = 123.837679 Days

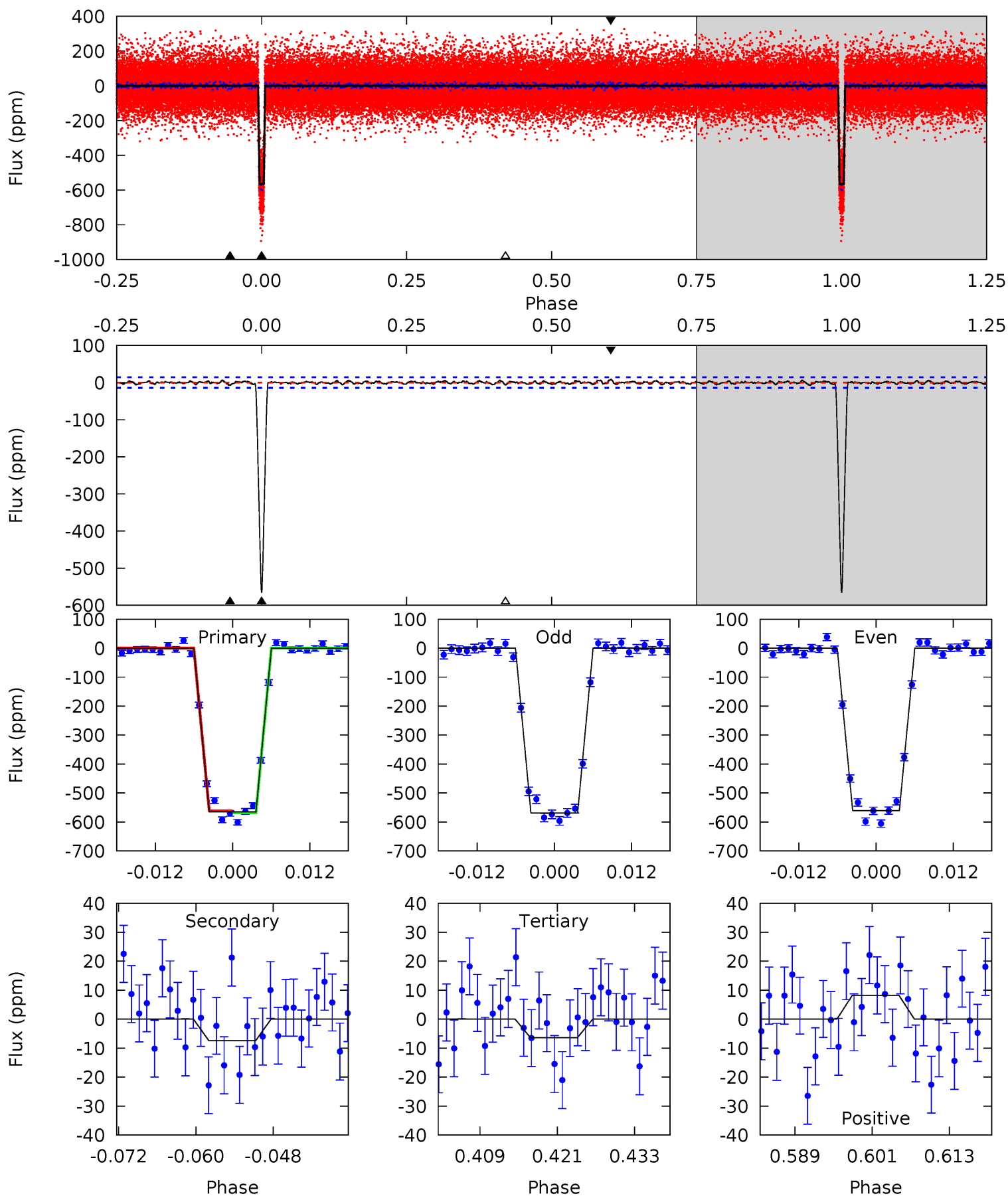
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
184.5	3.48	3.29	4.26	4.97	2.47	1.33	181.2	180.2	0.19	-0.78	0.97	0.99	0.02	0.19



# Alt Model-Shift Uniqueness Test

006029239-01, P = 8.512049 Days, E = 123.836719 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
196.0	2.58	2.22	2.85	4.99	2.51	0.87	193.7	193.1	0.36	-0.27	1.42	1.00	0.01	1.11



### Stellar Parameters For KIC 006029239

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$5767^{+92}_{-126}$	$4.538^{+0.021}_{-0.119}$	$-0.060^{+0.150}_{-0.150}$	$0.881^{+0.123}_{-0.044}$	$0.979^{+0.048}_{-0.089}$	$2.017^{+0.204}_{-0.646}$
	+2%/-2%	+0%/-3%	+250%/-250%	+14%/-5%	+5%/-9%	+10%/-32%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 006029239-01 / KOI 0304.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-11 \pm 3$	$2.53^{+0.24}_{-0.18}$	$1188^{+45}_{-33}$	$2787^{+118}_{-124}$	$5.982^{+2.060}_{-1.651}$
Alt.	$-7 \pm 3$	$2.35^{+0.20}_{-0.18}$	$1188^{+44}_{-31}$	$2690^{+136}_{-171}$	$4.661^{+2.087}_{-1.837}$

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

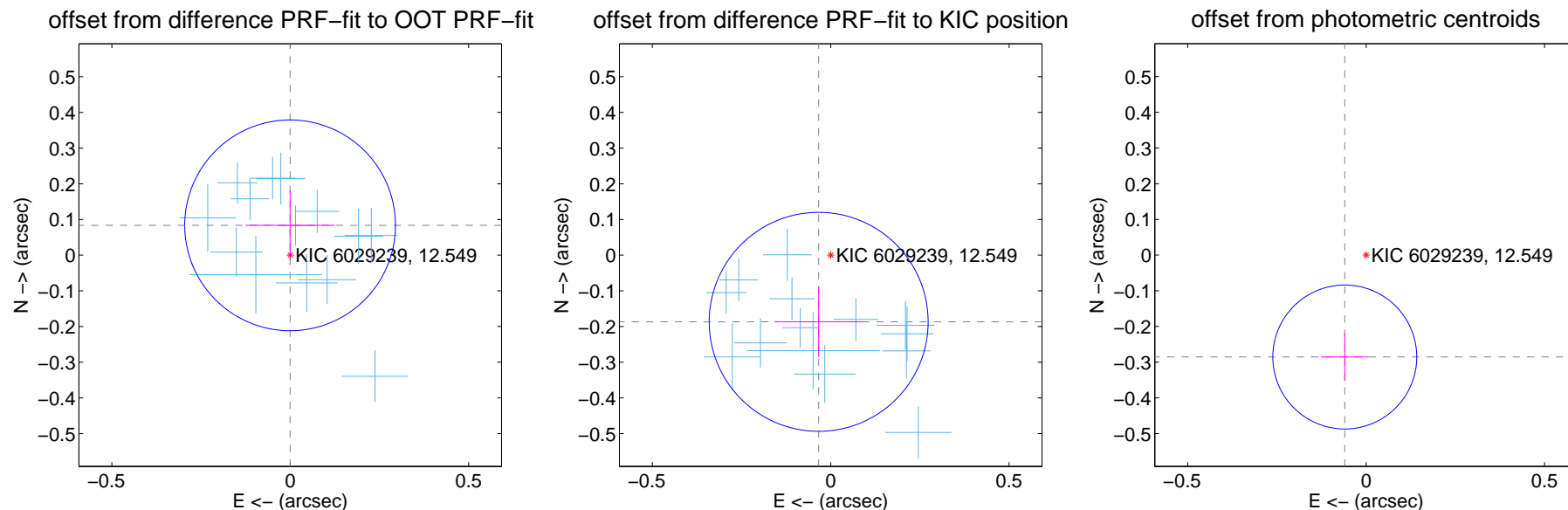
## DV Centroid Data

Supplemental centroid analysis for 006029239-01. Kepler magnitude: 12.55. Transit SNR 115.54

There are 17 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

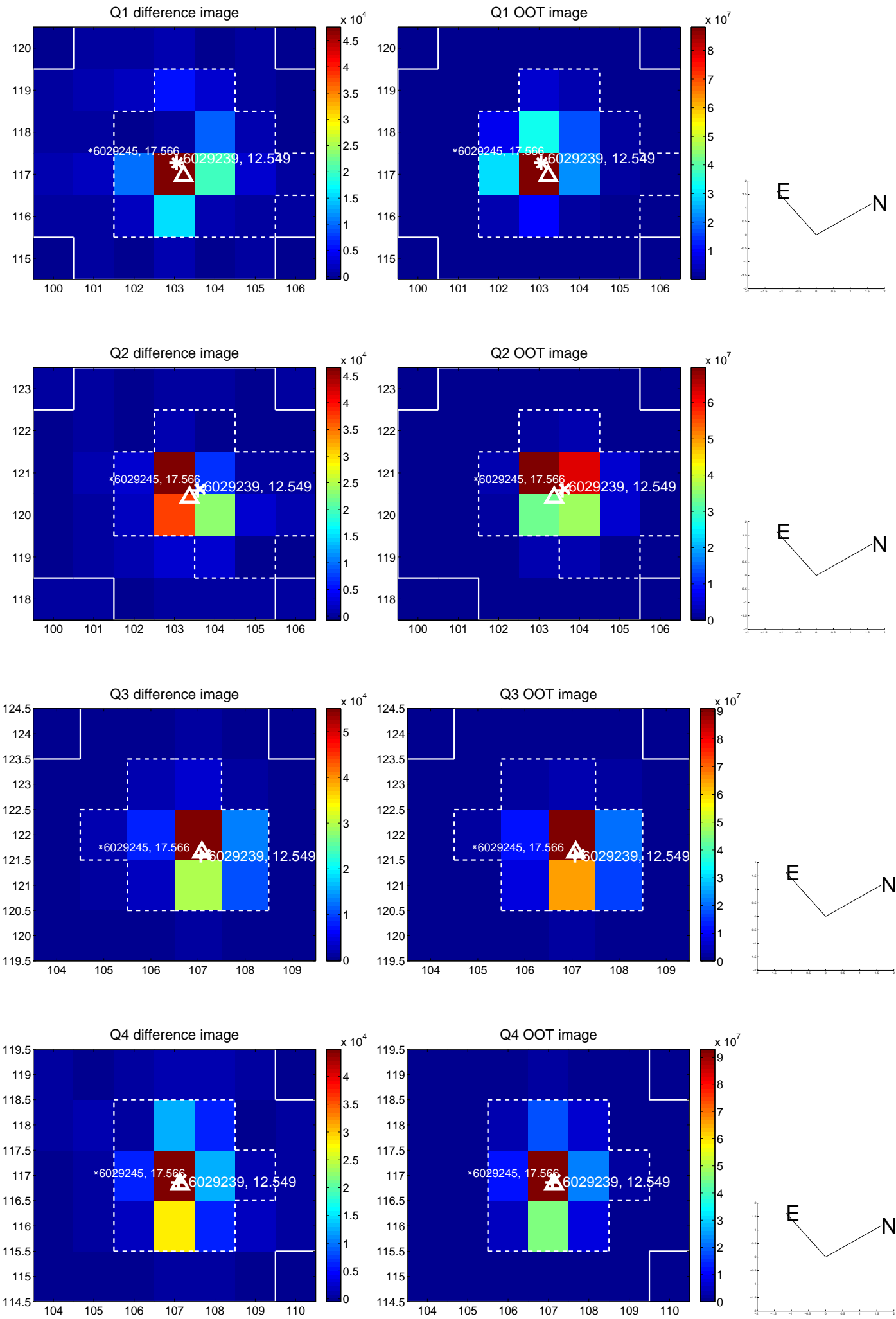
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.084 \pm 0.098$	0.85	$0.000 \pm 0.125$	$0.084 \pm 0.098$
PRF-fit source offset from KIC position	$0.190 \pm 0.102$	1.86	$0.034 \pm 0.124$	$-0.187 \pm 0.099$
photometric centroid source offset	$0.29 \pm 0.07$	4.34	$0.06 \pm 0.07$	$-0.29 \pm 0.07$



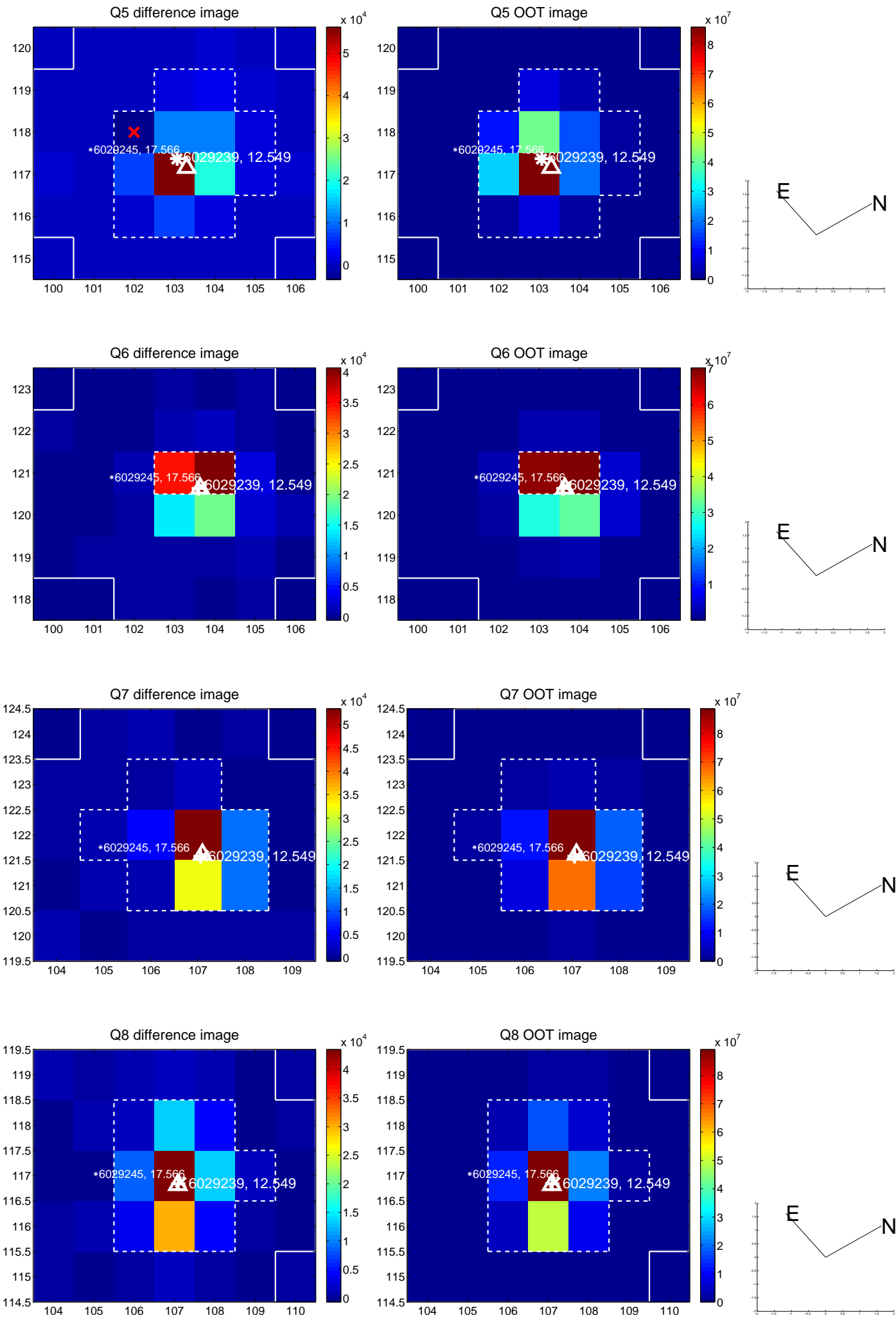
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



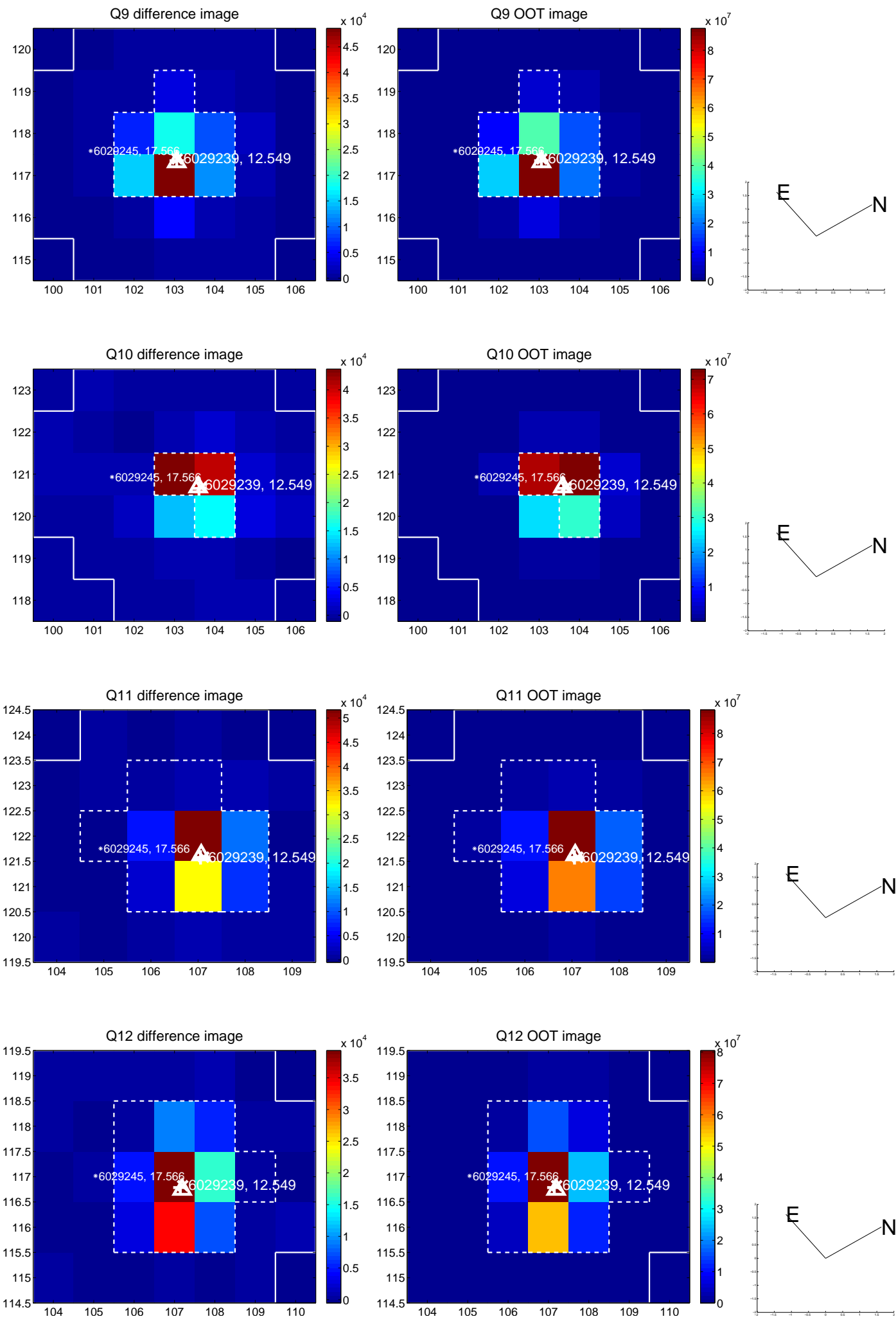
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



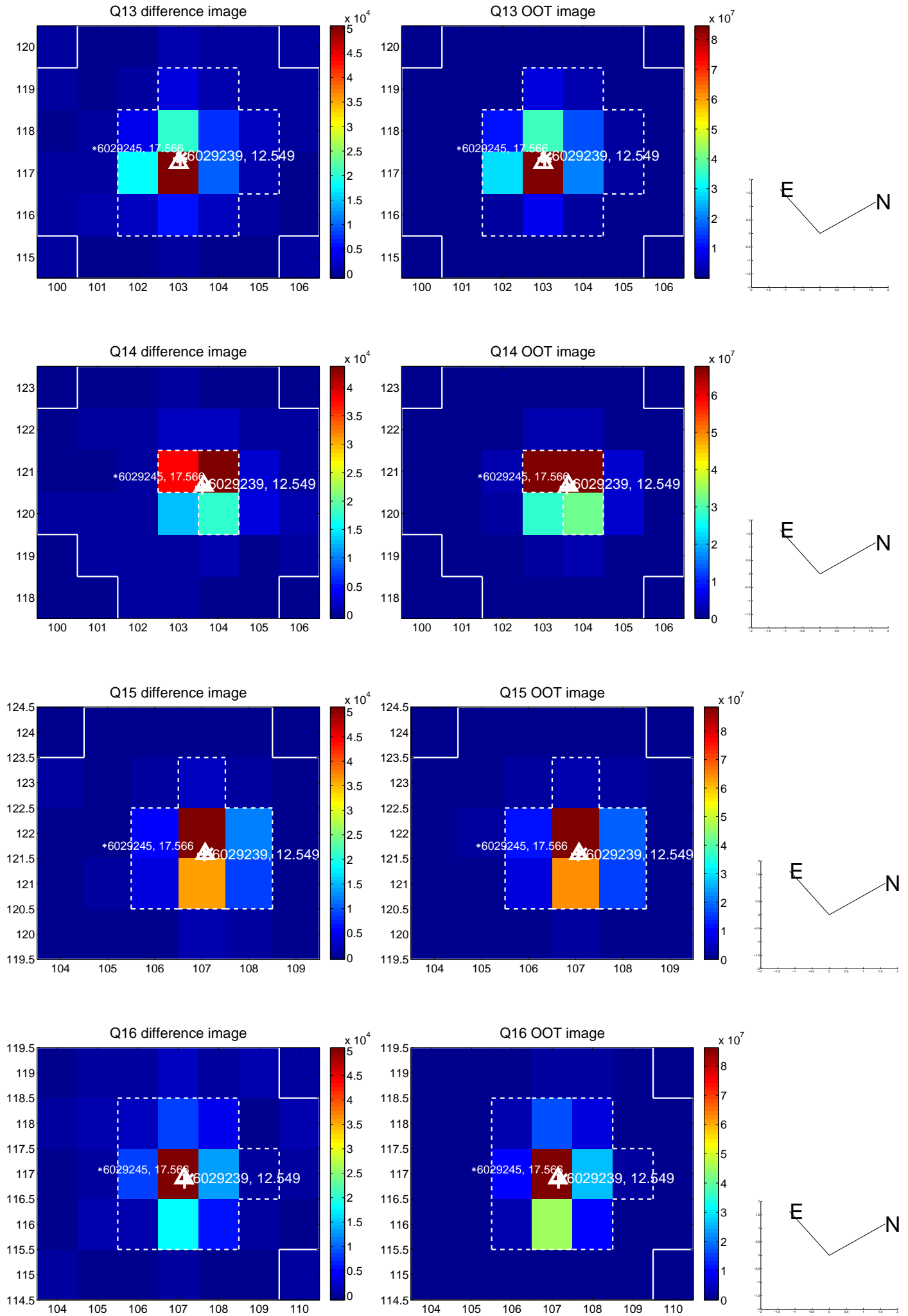
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



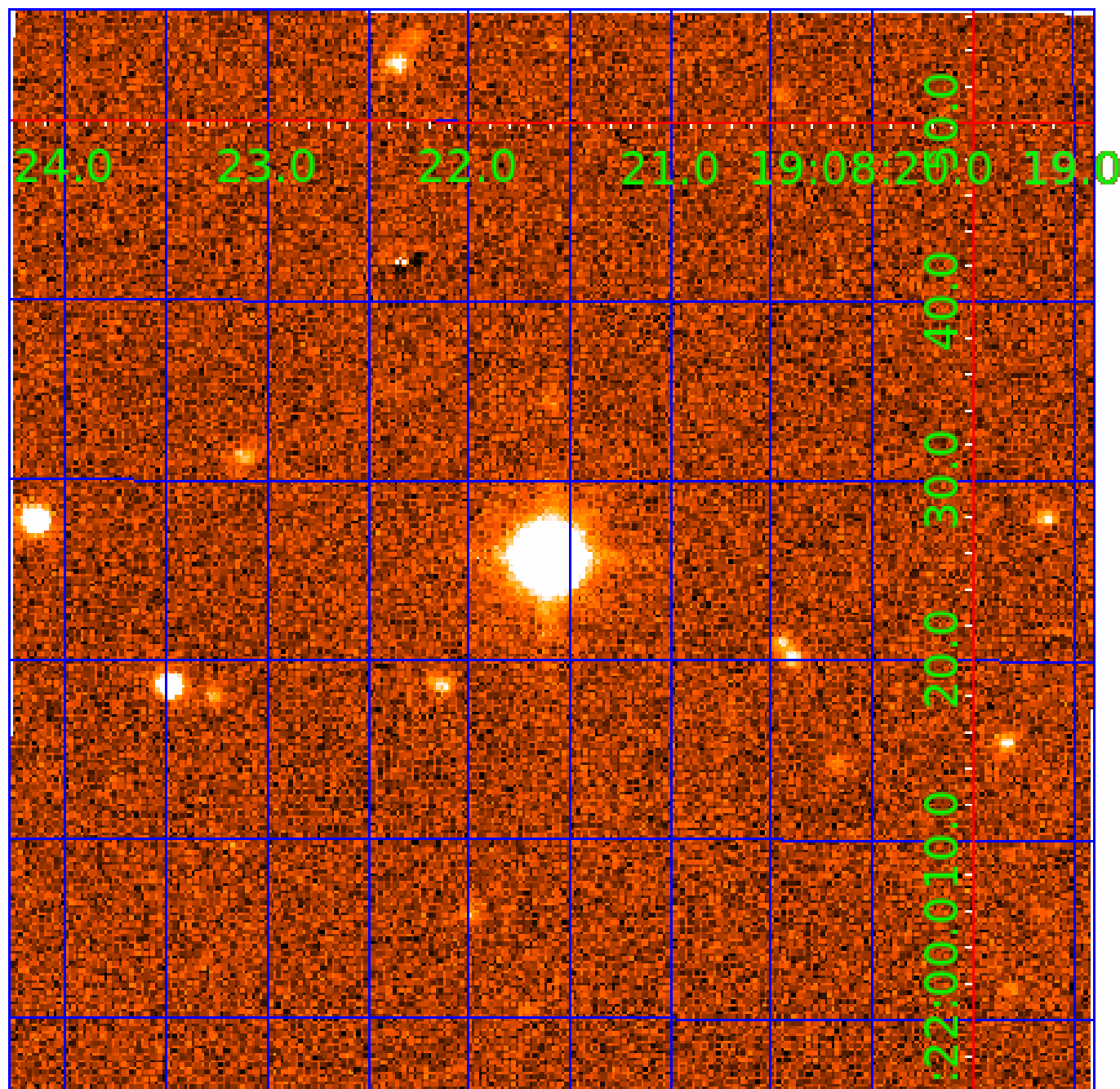
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination





# KIC 006029239

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006029239-01	OBS	0304.01	8.512037	132.349716	596.3	2.305	116.8	115.5	0.88	5767	2.46	117.30
006029239-02	OBS	0304.02	5.518295	136.573218	27.7	3.630	7.6	7.3	0.88	5767	0.54	209.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006029239-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006029239-02	OBS	PC	0.79	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.

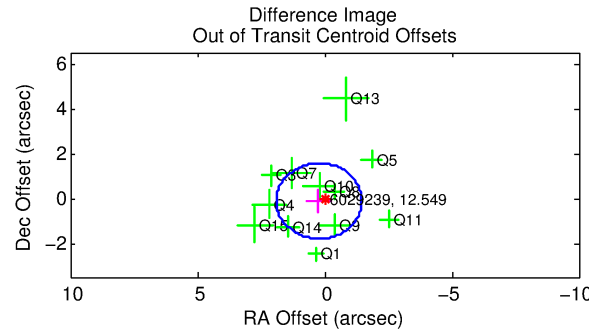
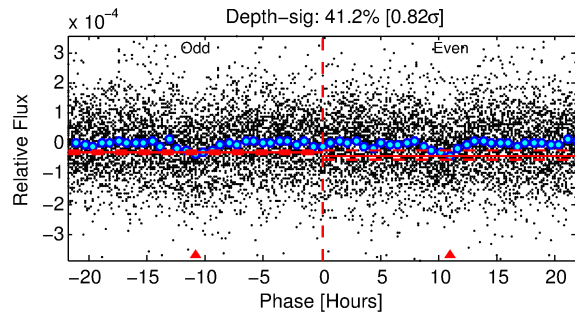
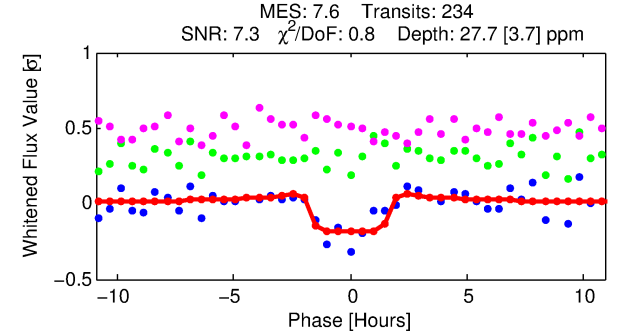
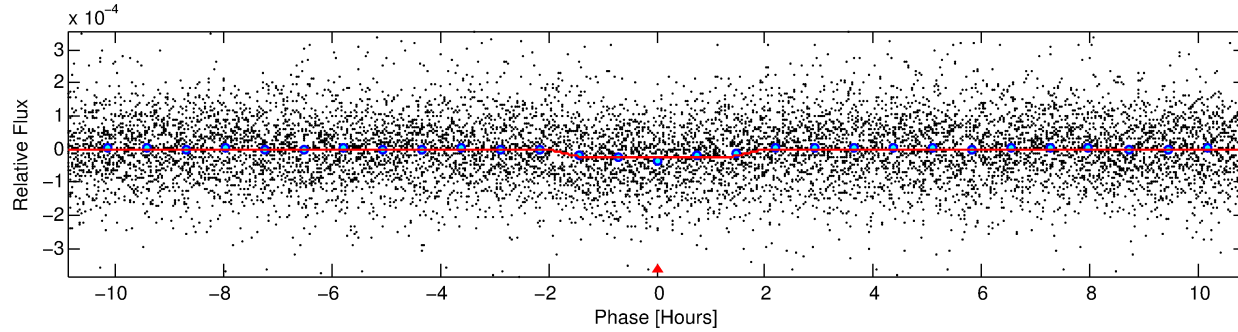
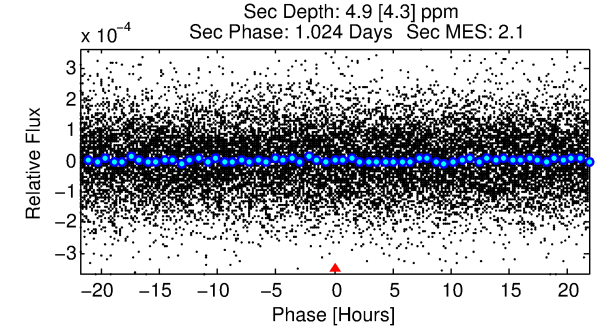
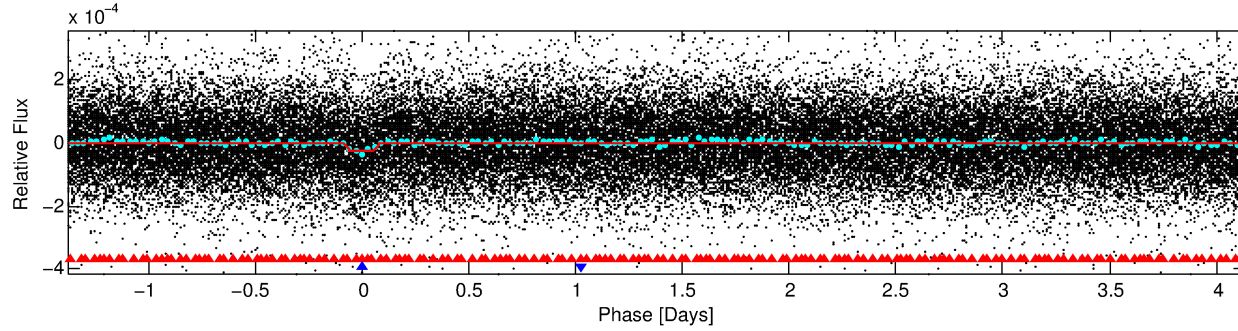
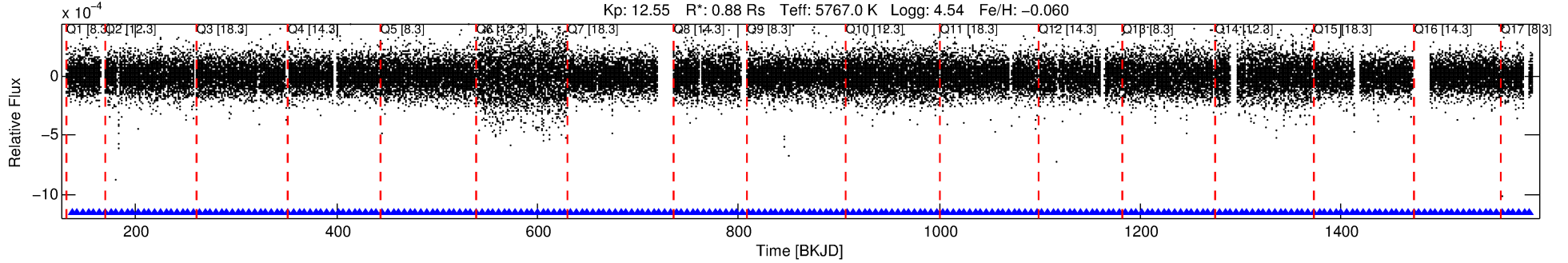
## Ephemeris Match Information For 006029239-02

No Significant Match Found

# DV One-Page Summary

KIC: 6029239 Candidate: 2 of 2 Period: 5.518 d

KOI: K00304.02 Corr: 0.797



## DV Fit Results:

Period = 5.51829 [0.00005] d  
Epoch = 136.5732 [0.0061] BKJD  
Rp/R\* = 0.0056 [0.0021]  
a/R\* = 5.68 [9.77]  
b = 0.88 [0.45]  
Seff = 209.06 [46.59]  
Teq = 970 [54] K  
Rp = 0.54 [0.22] Re  
a = 0.0607 [0.0079] AU  
Ag = 34.08 [39.58] [0.84 $\sigma$ ]  
Teffp = 3622 [1038] K [2.55 $\sigma$ ]

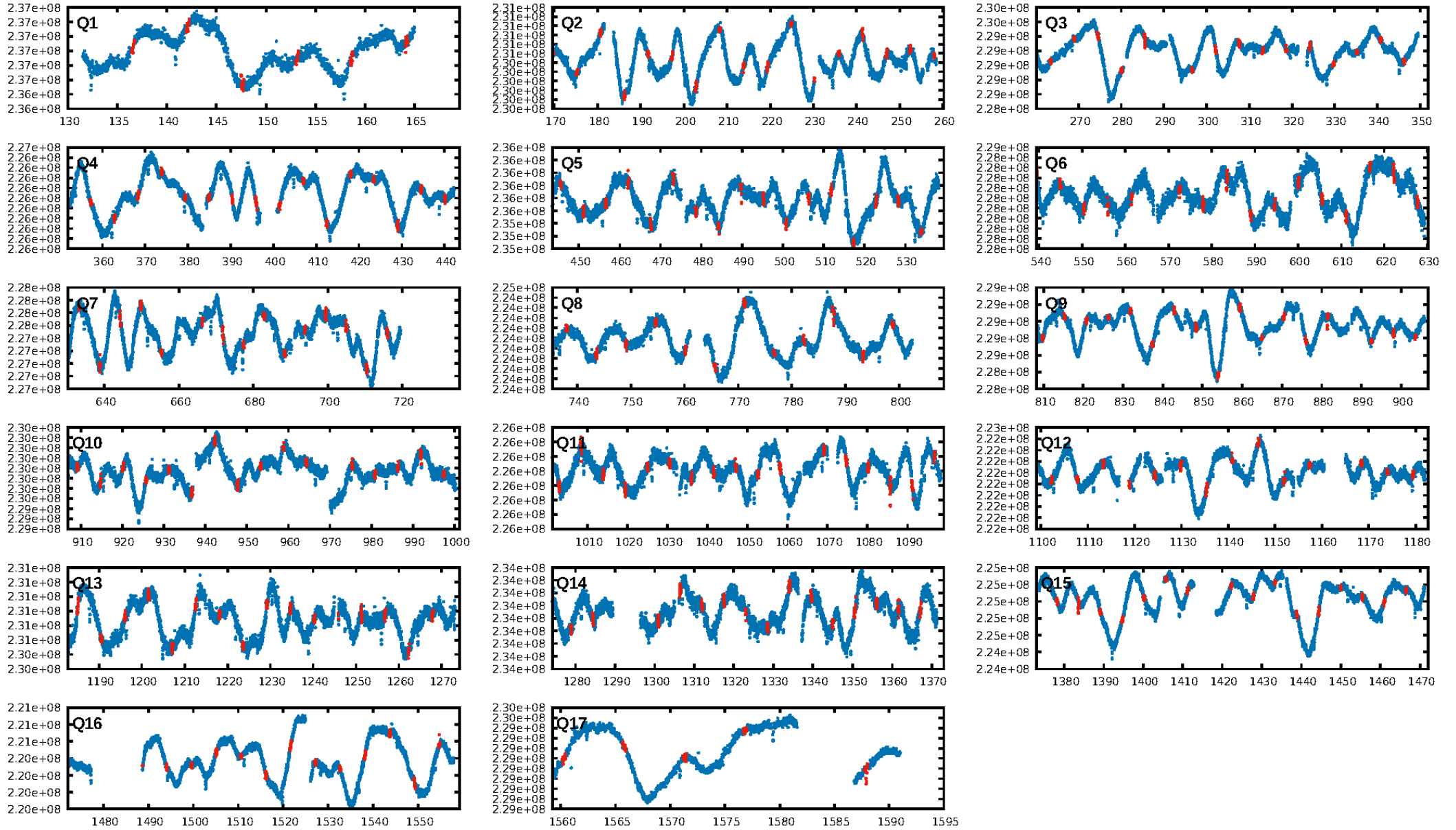
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [16.71 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.27e-13  
RollingBand-fgt: 1.00 [224/224]  
GhostDiagnostic-chr: -2.801  
Centroid-sig: 24.8%  
Centroid-so: 1.312 arcsec [1.39 $\sigma$ ]  
OotOffset-rm: 0.259 arcsec [0.46 $\sigma$ ]  
OotOffset-st: 2/4/2/4 [12]  
KicOffset-rm: 0.463 arcsec [0.84 $\sigma$ ]  
KicOffset-st: 2/4/2/4 [12]  
DiffImageQuality-fgm: 0.92 [11/12]  
DiffImageOverlap-fno: 1.00 [17/17]

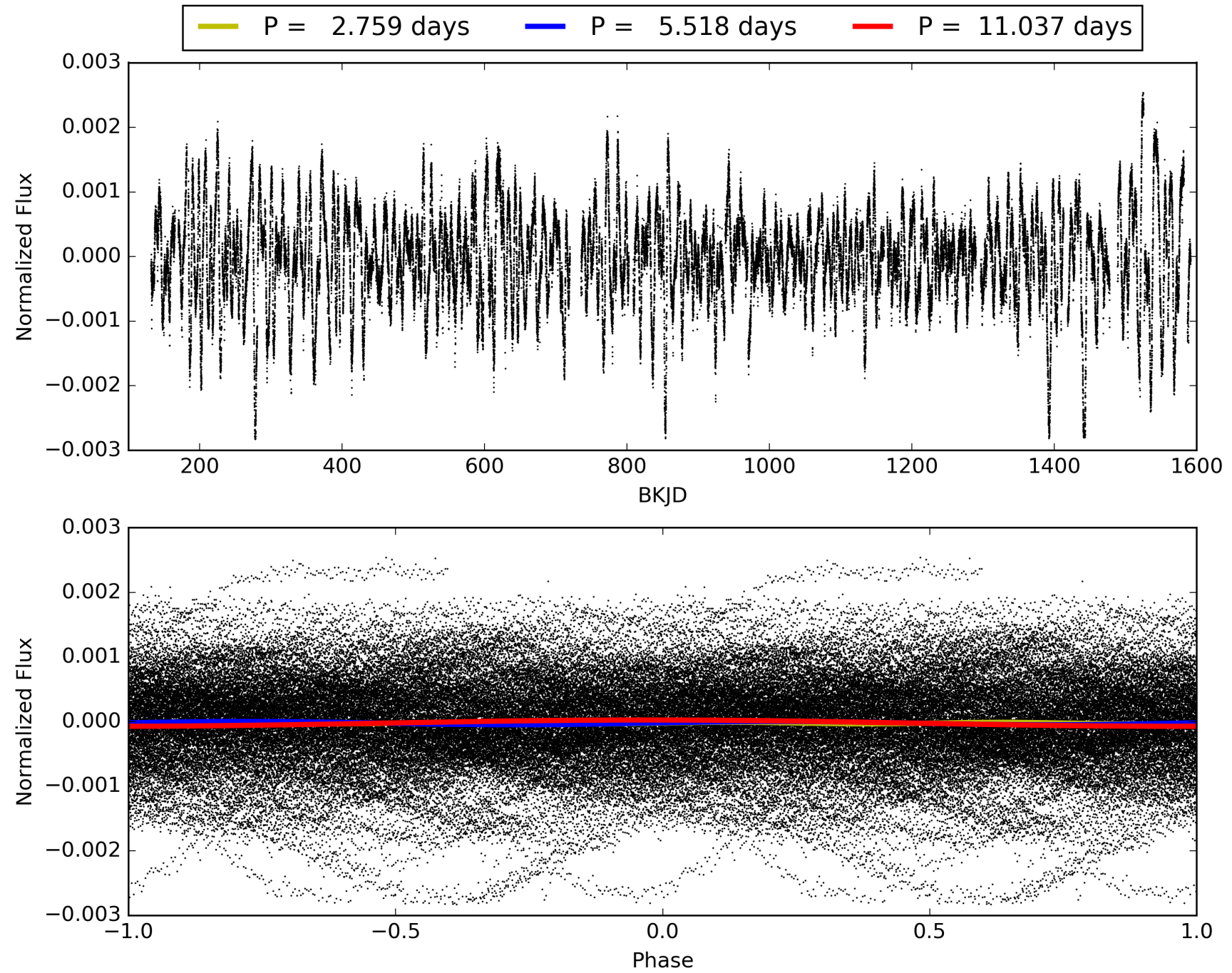
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:46:16 Z

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

# TCE 006029239-02, PDC Light Curves

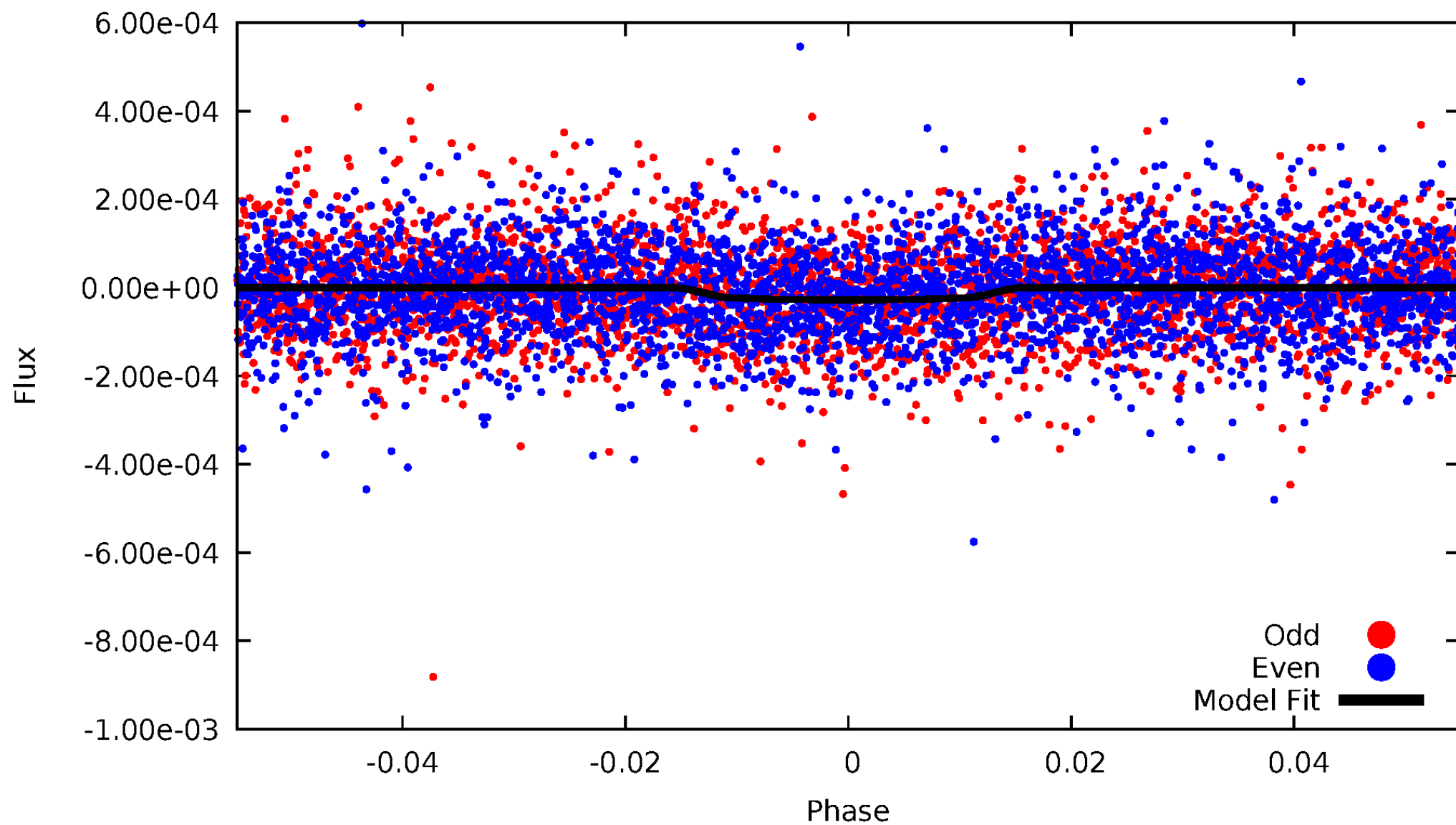


TCE 006029239-02



# DV Odd/Even

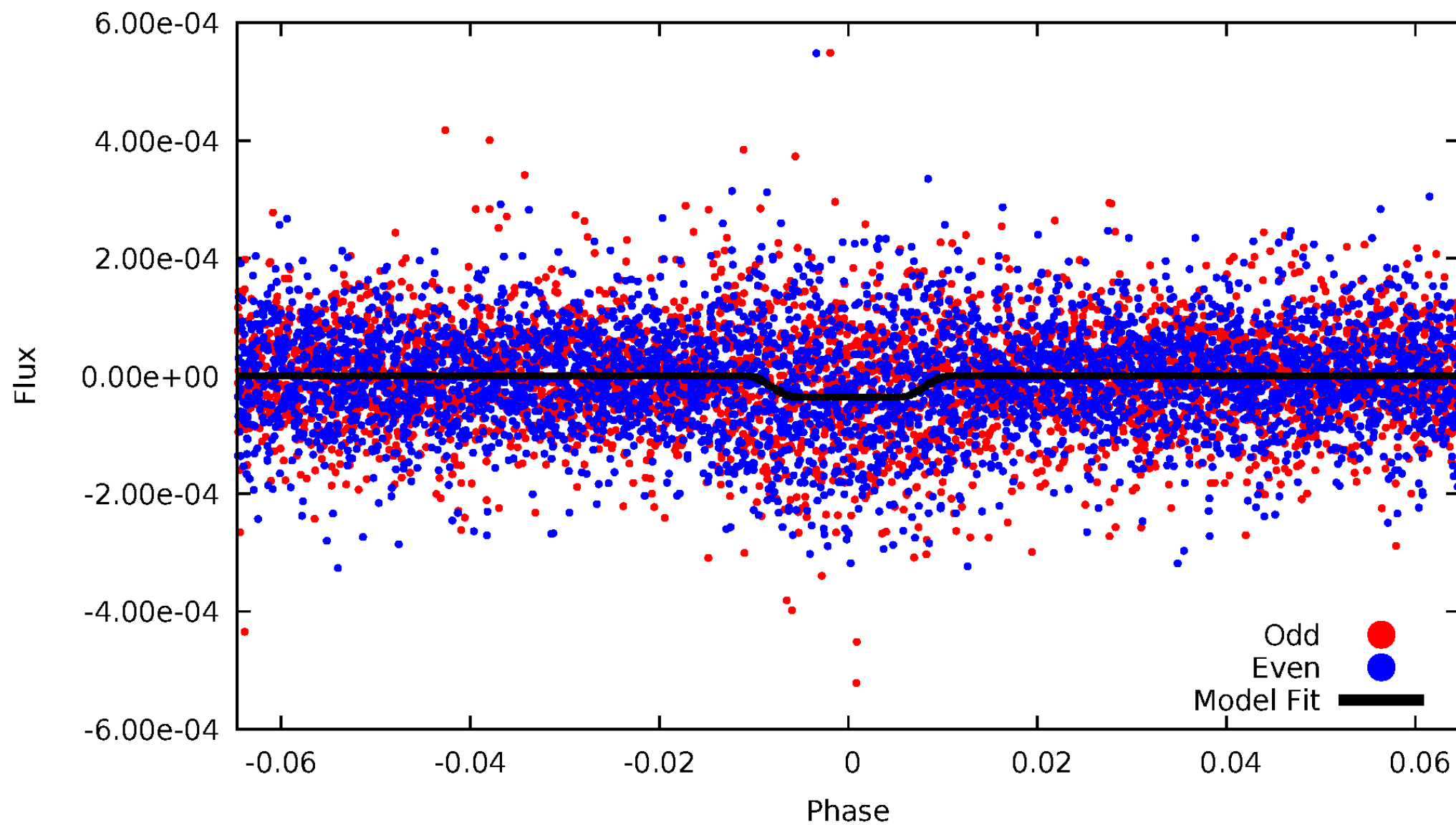
TCE 006029239-02





# ALT Odd/Even

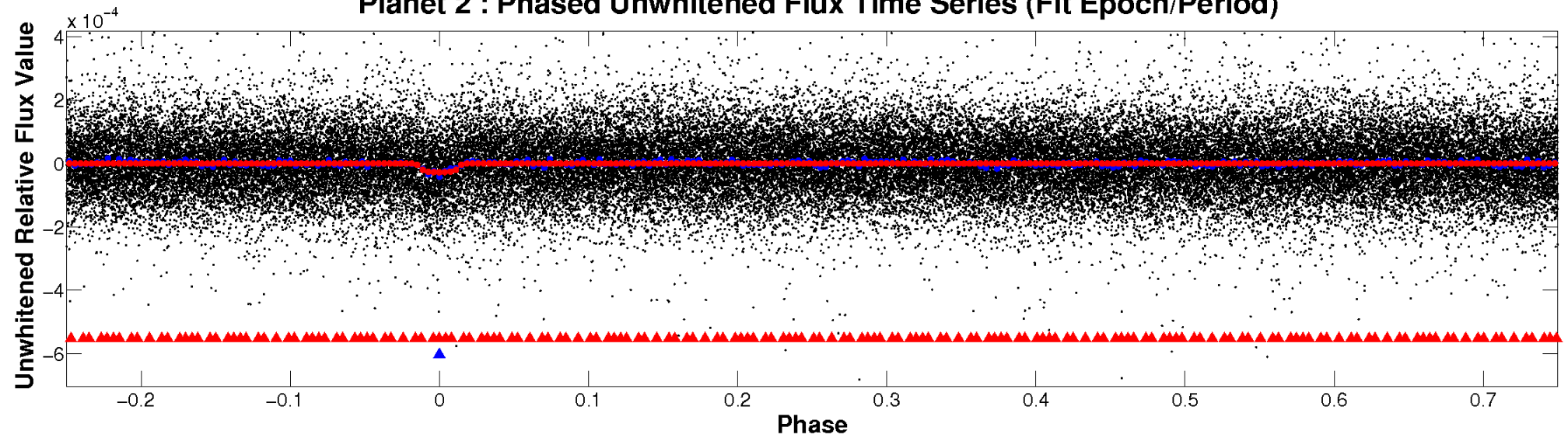
TCE 006029239-02



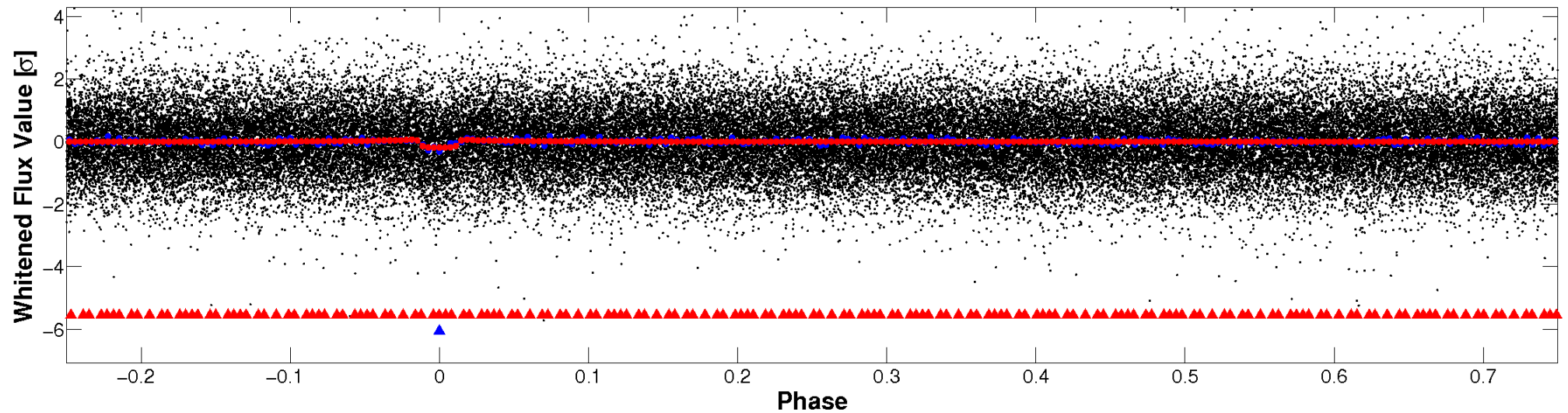


# Non-Whitened Vs. Whitened Light Curve

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

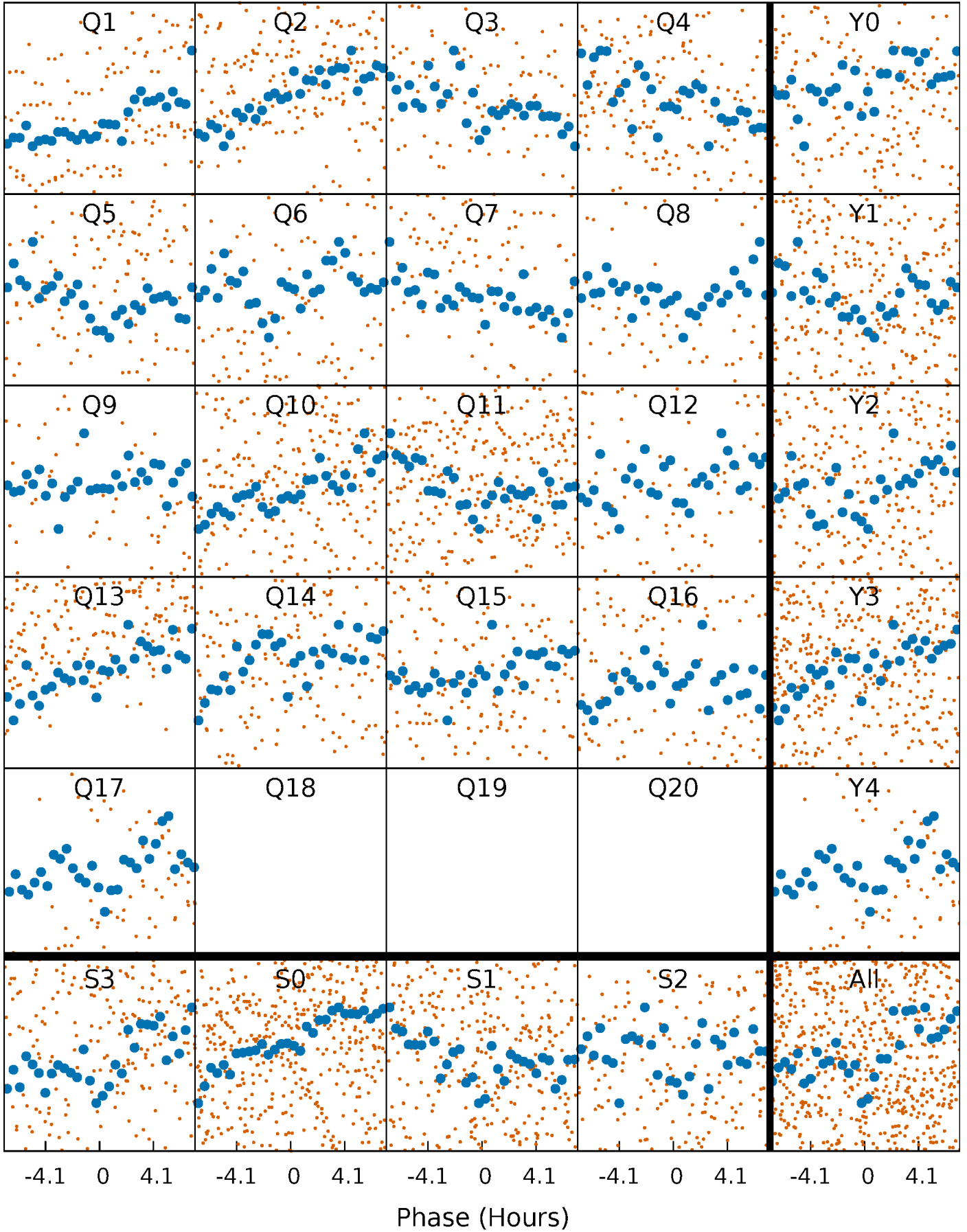


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



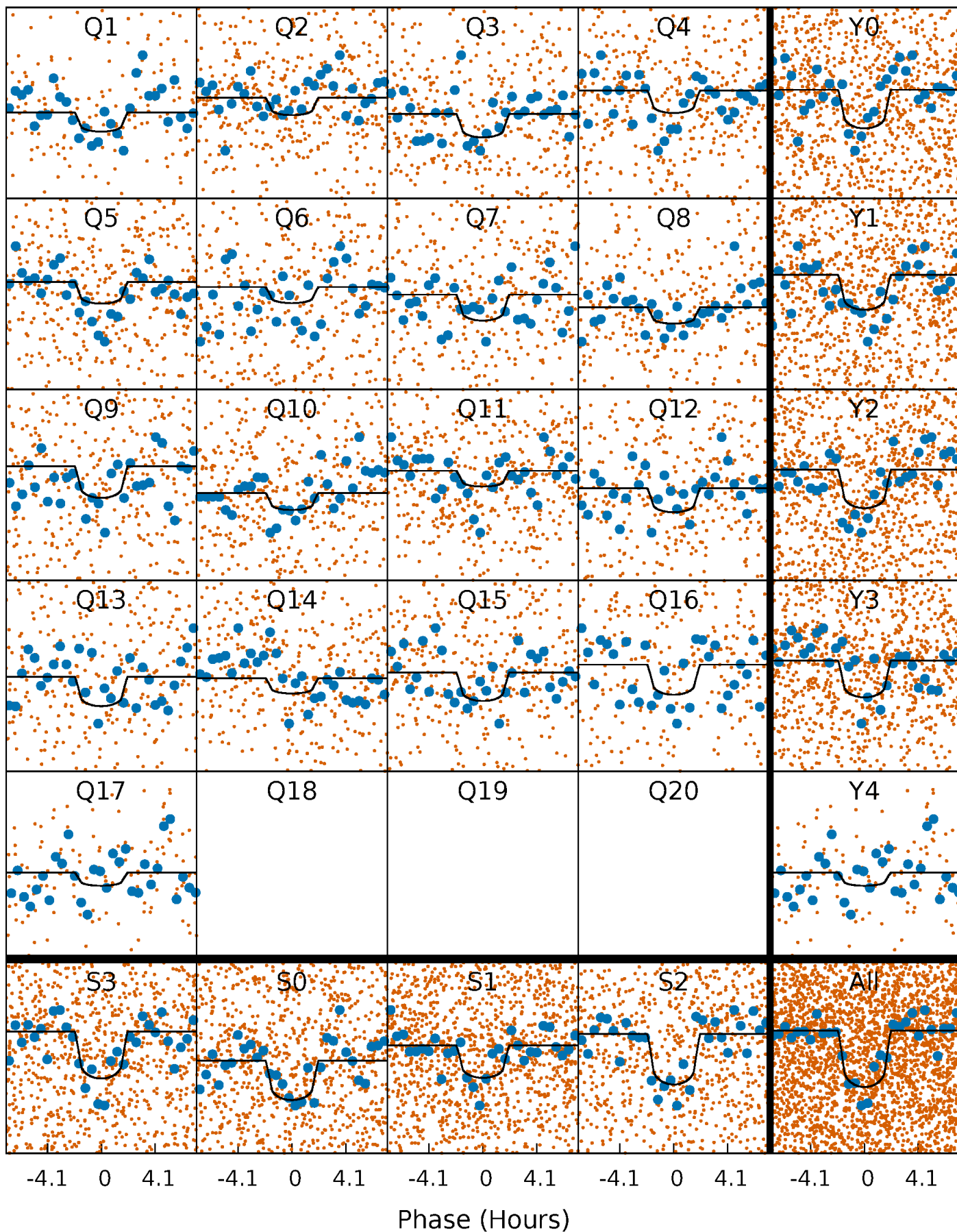
# PDC Quarter-Phased Transit Curves

TCE 006029239-02   P= 5.518295 Days    $T_0=136.573218$  (BKJD)



# DV Quarter-Phased Transit Curves

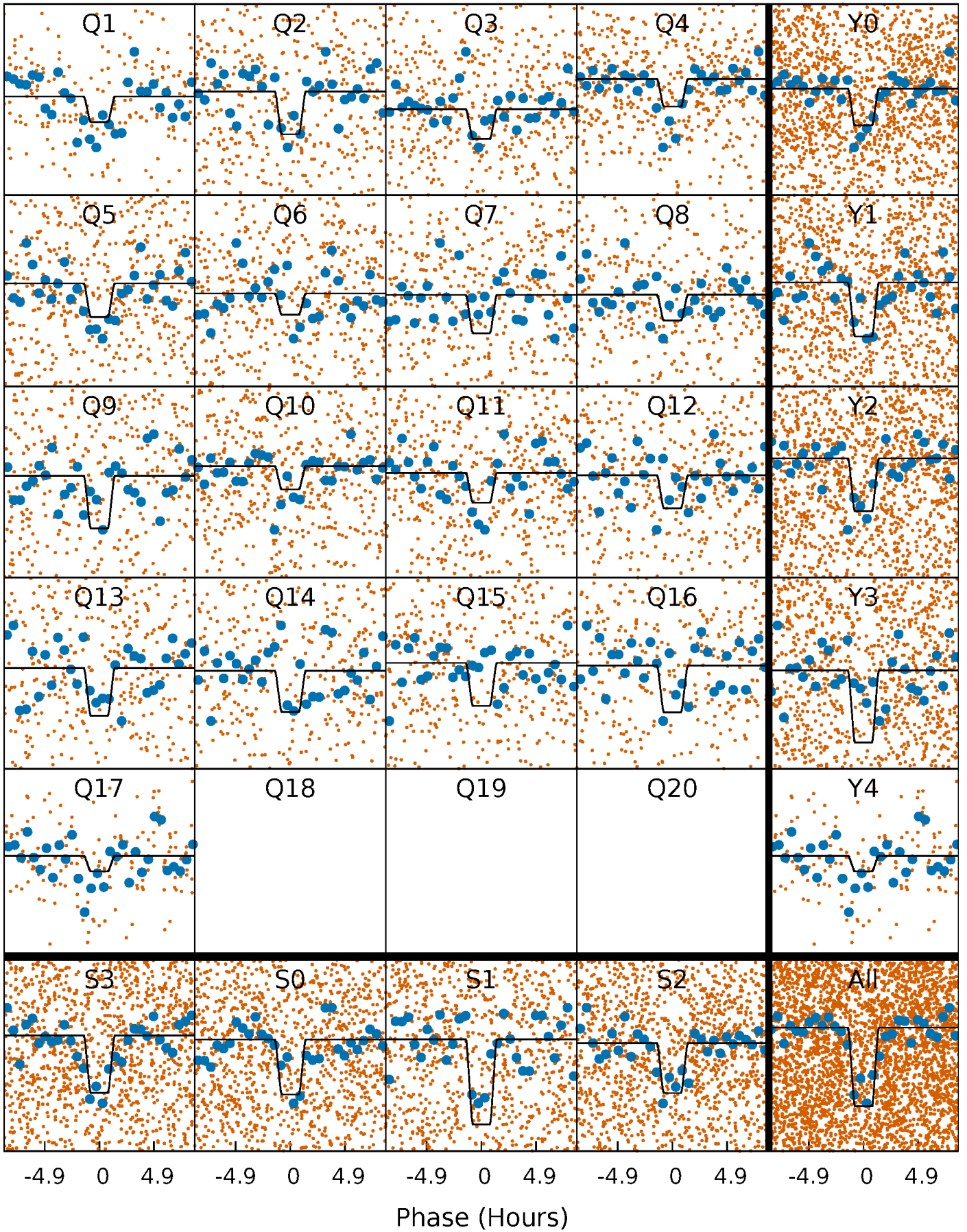
TCE 006029239-02 P= 5.518295 Days  $T_0=136.573218$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

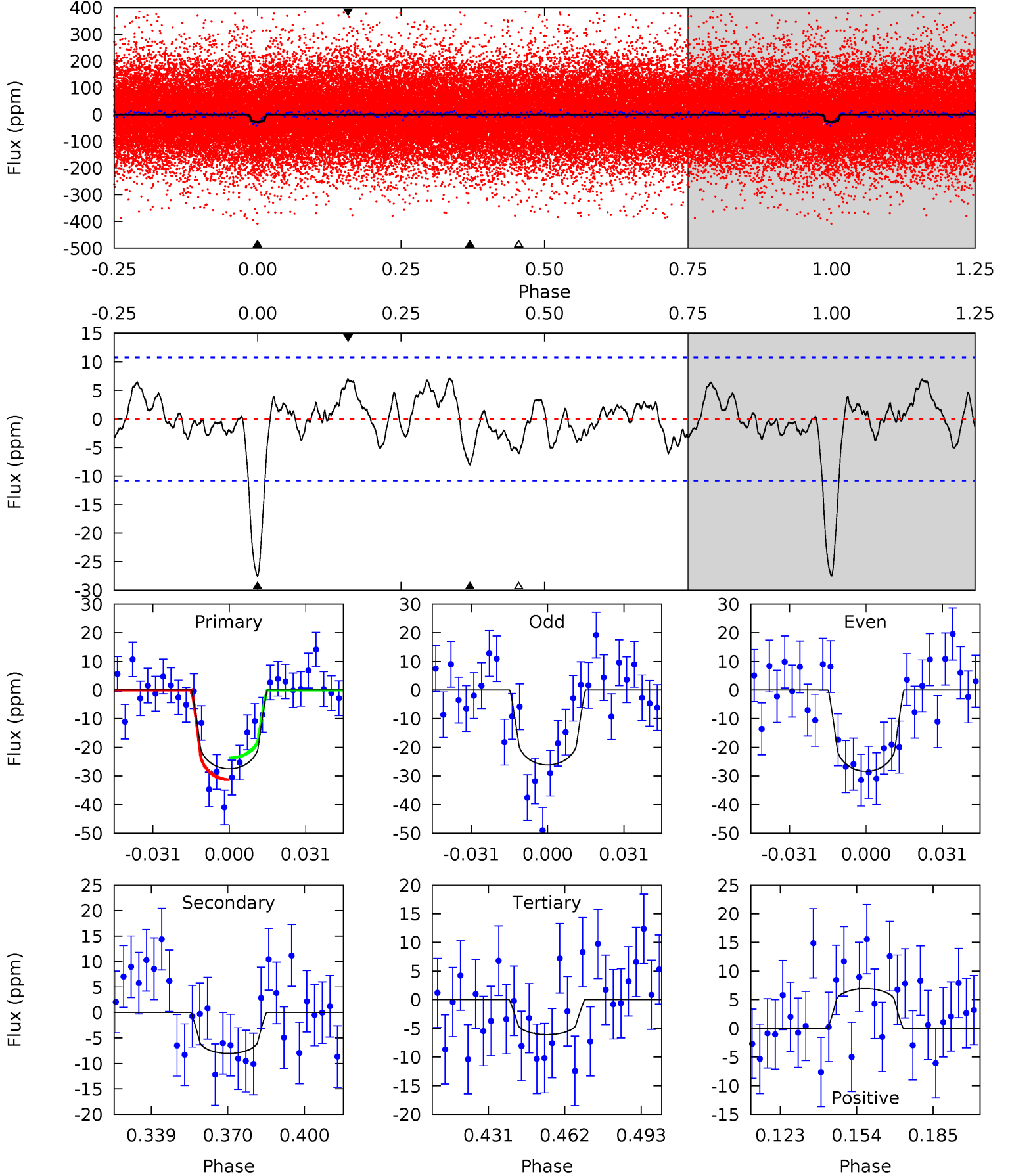
TCE 006029239-02 P= 5.518308 Days  $T_0=136.564681$  (BKJD)



# DV Model-Shift Uniqueness Test

006029239-02, P = 5.518295 Days, E = 131.054923 Days

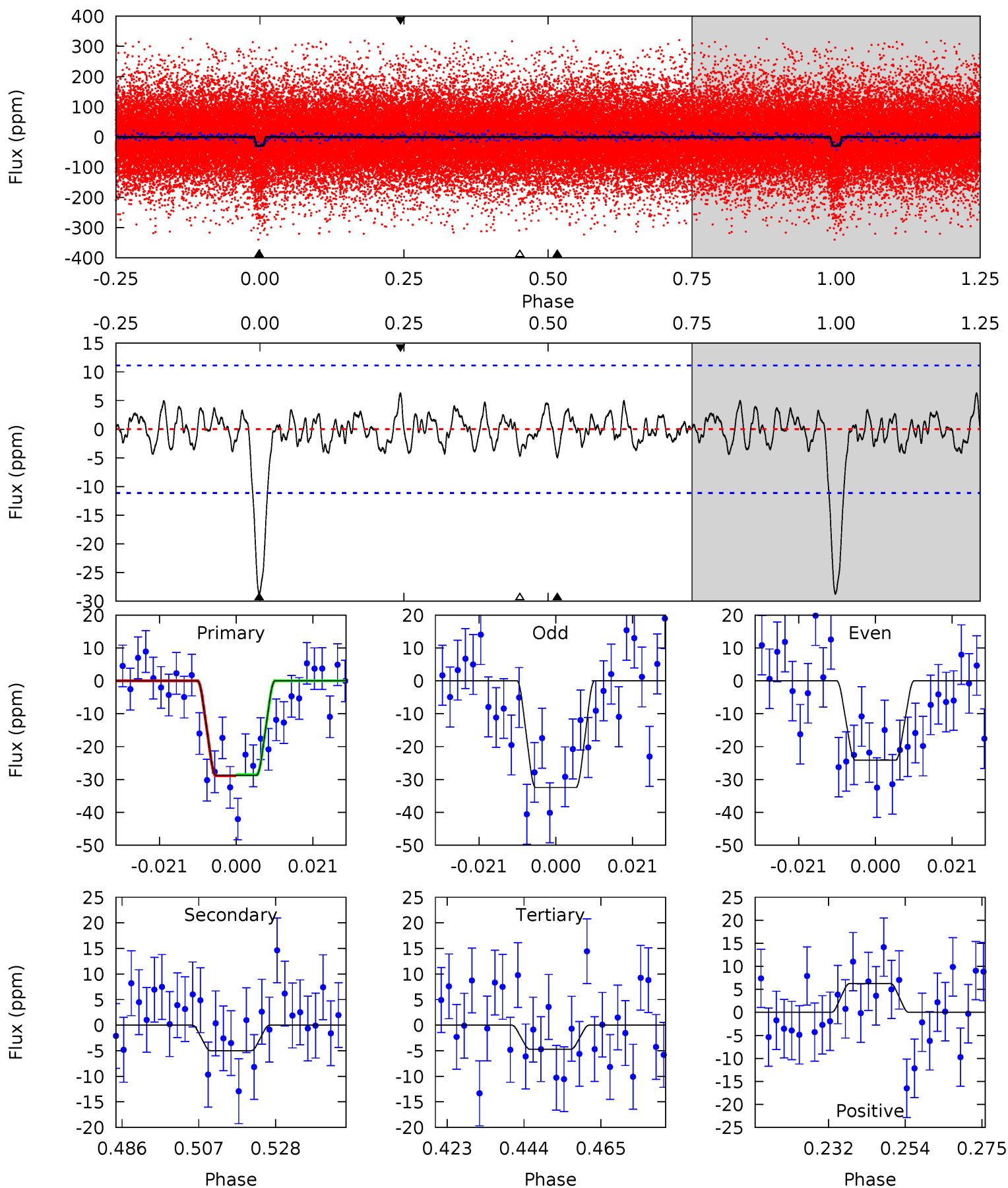
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	3.58	2.71	3.09	4.81	2.16	1.33	9.55	9.16	0.87	0.49	0.50	1.03	0.20	1.70



# Alt Model-Shift Uniqueness Test

006029239-02, P = 5.518308 Days, E = 131.046373 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
12.6	2.19	2.07	2.75	4.88	2.31	0.91	10.5	9.84	0.12	-0.56	1.83	0.95	0.18	0.07



### Stellar Parameters For KIC 006029239

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5767^{+92}_{-126}$	$4.538^{+0.021}_{-0.119}$	$-0.060^{+0.150}_{-0.150}$	$0.881^{+0.123}_{-0.044}$	$0.979^{+0.048}_{-0.089}$	$2.017^{+0.204}_{-0.646}$
	+2%/-2%	+0%/-3%	+250%/-250%	+14%/-5%	+5%/-9%	+10%/-32%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 006029239-02 / KOI 0304.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-8 \pm 2$	$0.55^{+0.22}_{-0.21}$	$1374^{+52}_{-42}$	$4302^{+951}_{-542}$	$52^{+79}_{-28}$
Alt.	$-5 \pm 2$	$0.59^{+0.23}_{-0.20}$	$1375^{+51}_{-41}$	$3846^{+684}_{-515}$	$28^{+42}_{-16}$

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



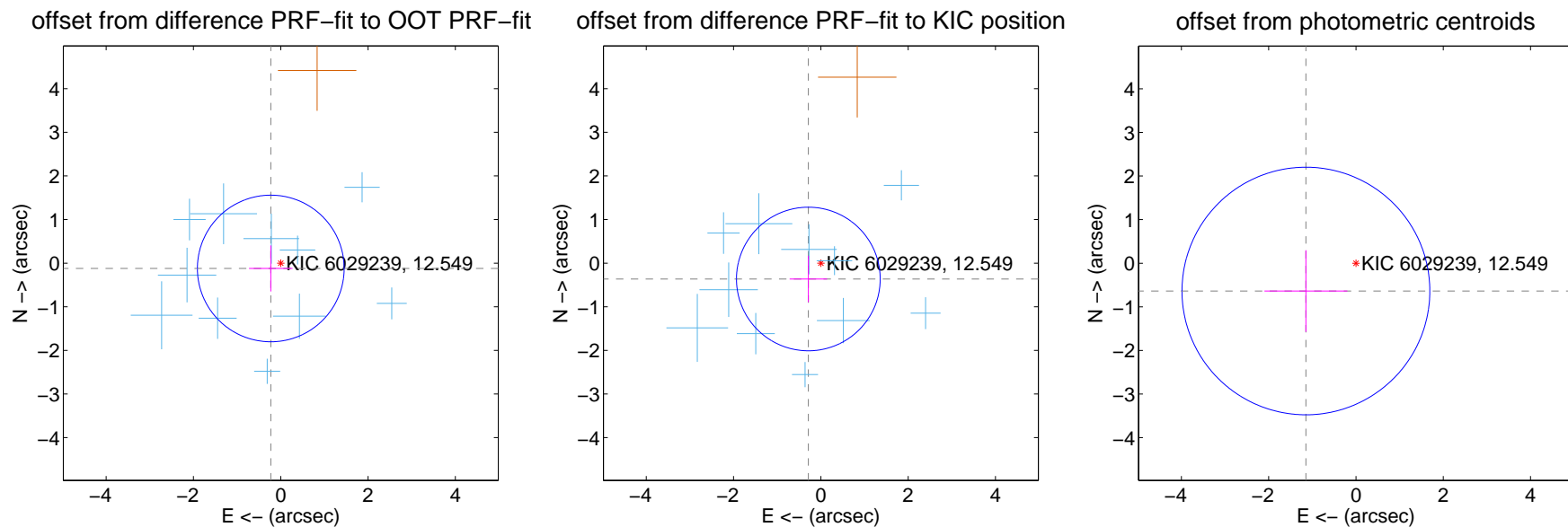
## DV Centroid Data

Supplemental centroid analysis for 006029239-02. Kepler magnitude: 12.55. Transit SNR 7.33

There are 11 quarters with good PRF difference image offsets

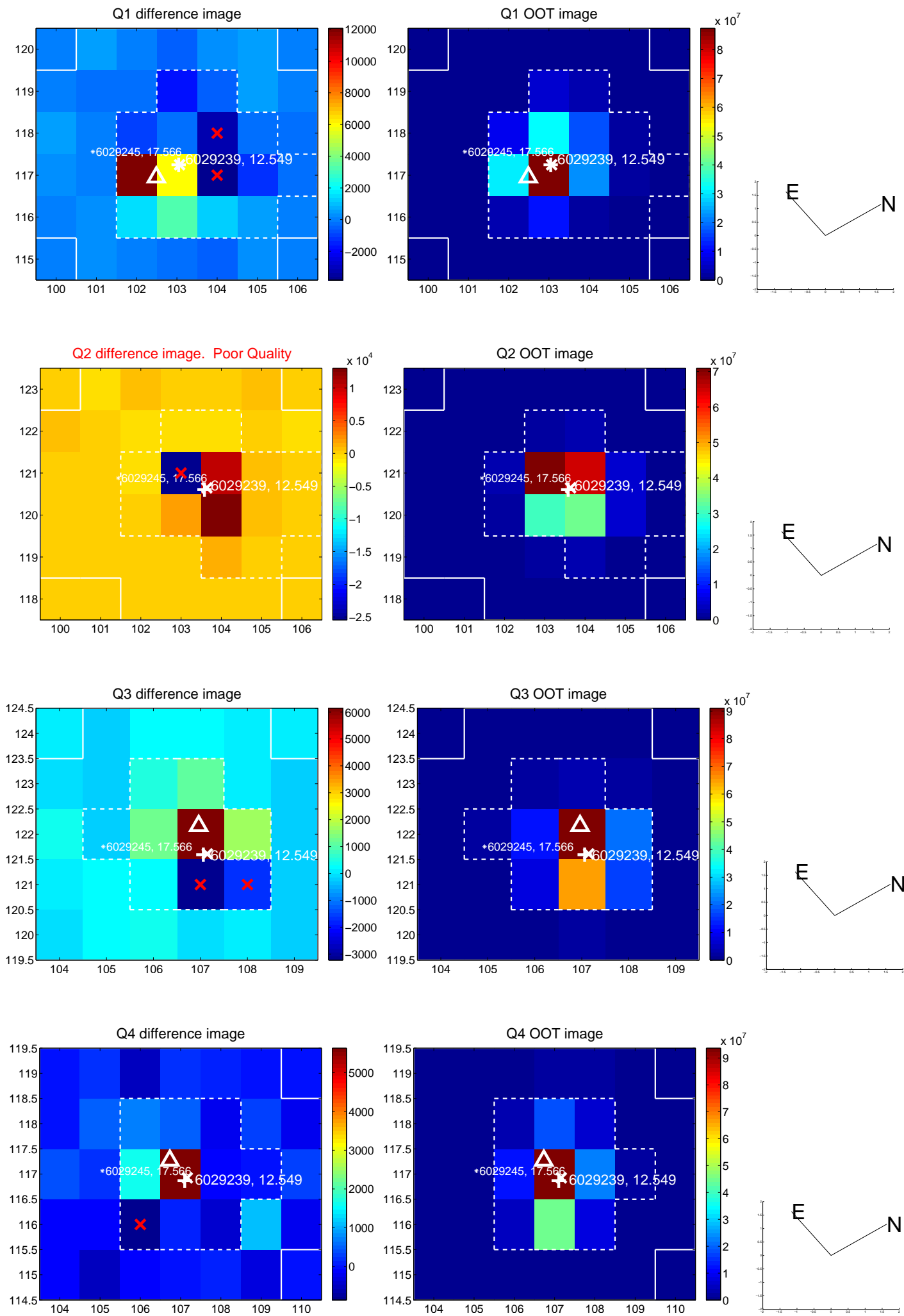
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.259 \pm 0.560$	0.46	$0.229 \pm 0.500$	$-0.122 \pm 0.528$
PRF-fit source offset from KIC position	$0.463 \pm 0.549$	0.84	$0.287 \pm 0.430$	$-0.364 \pm 0.532$
photometric centroid source offset	$1.31 \pm 0.95$	1.39	$1.15 \pm 0.95$	$-0.64 \pm 0.94$

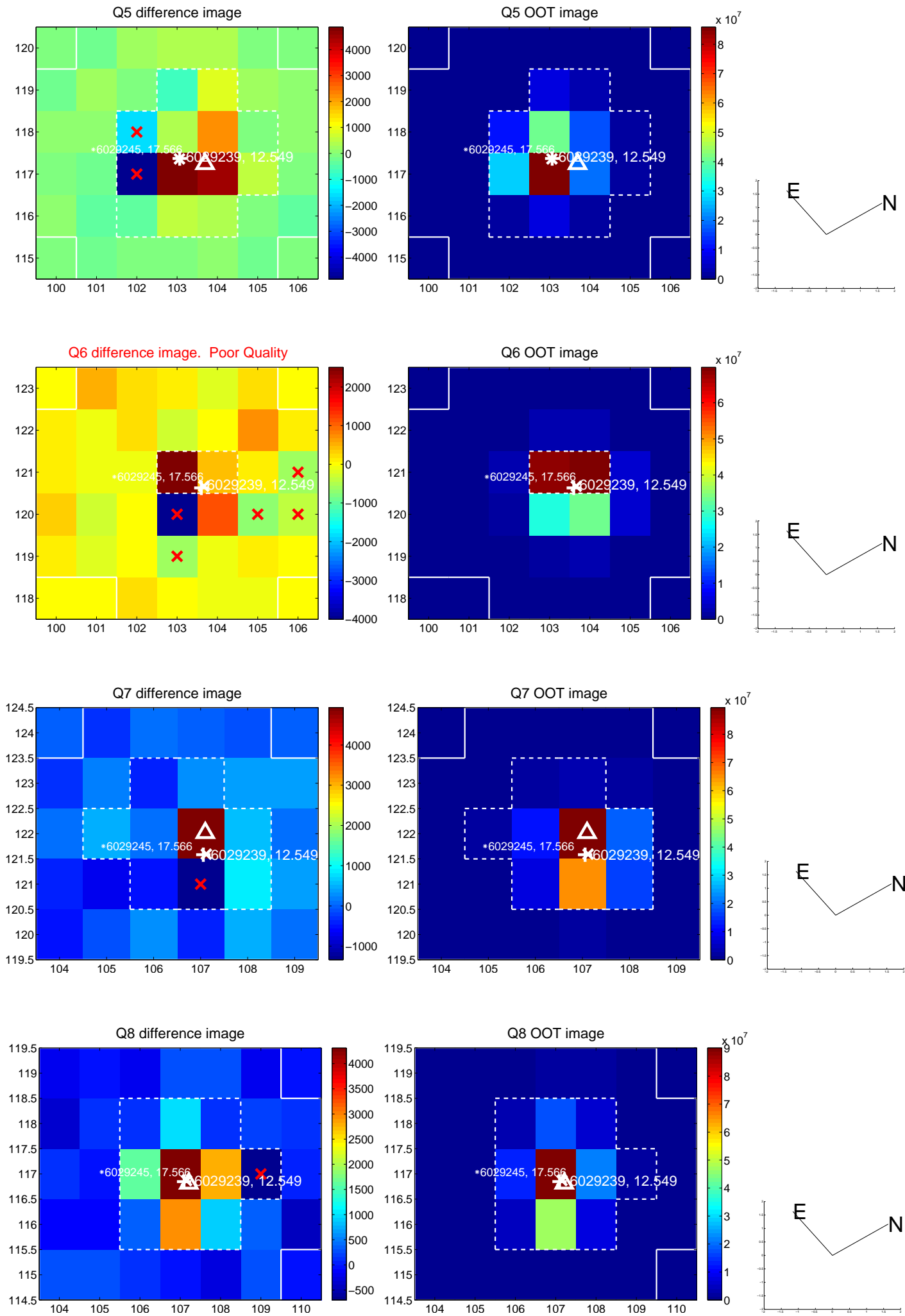


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

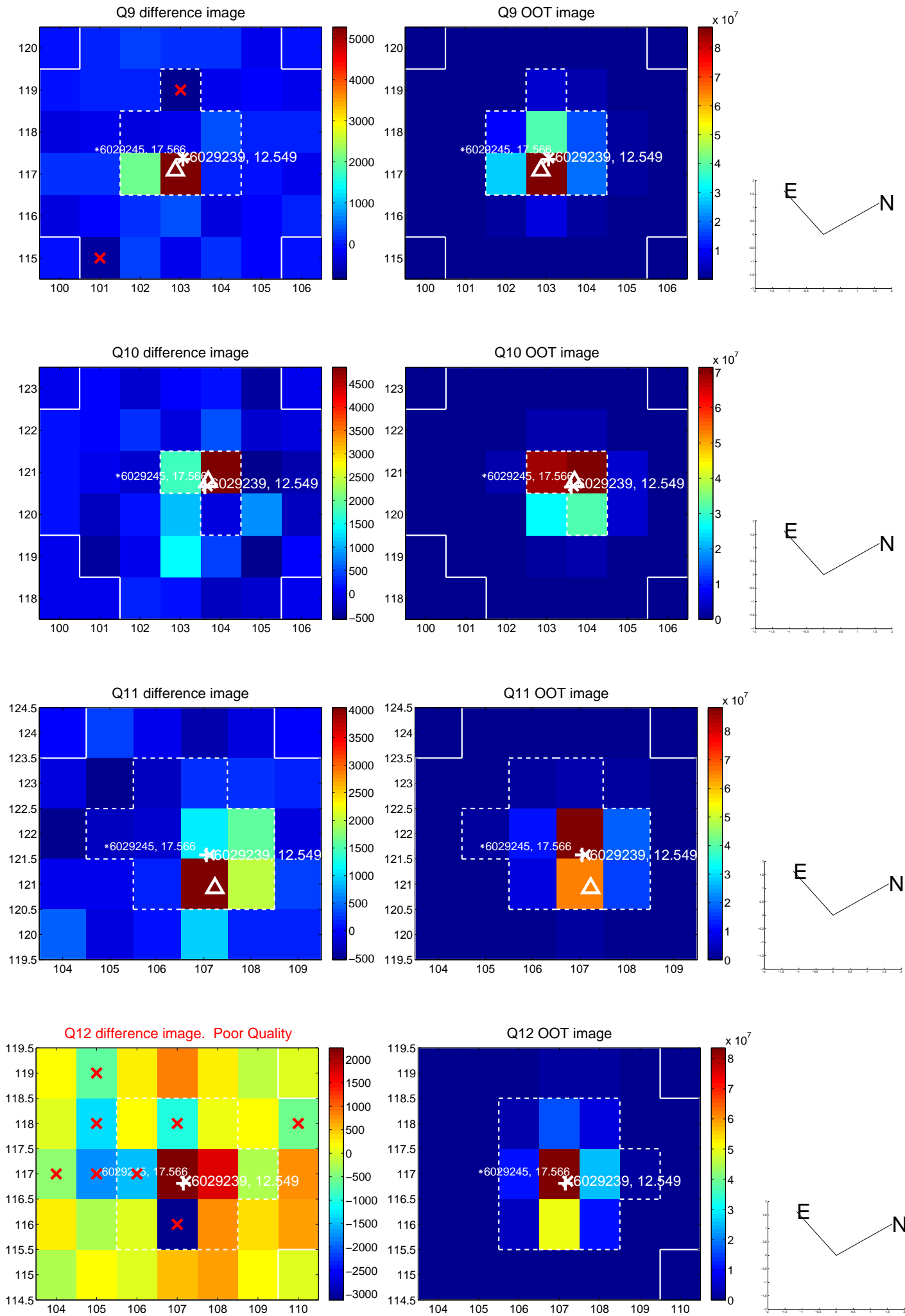
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



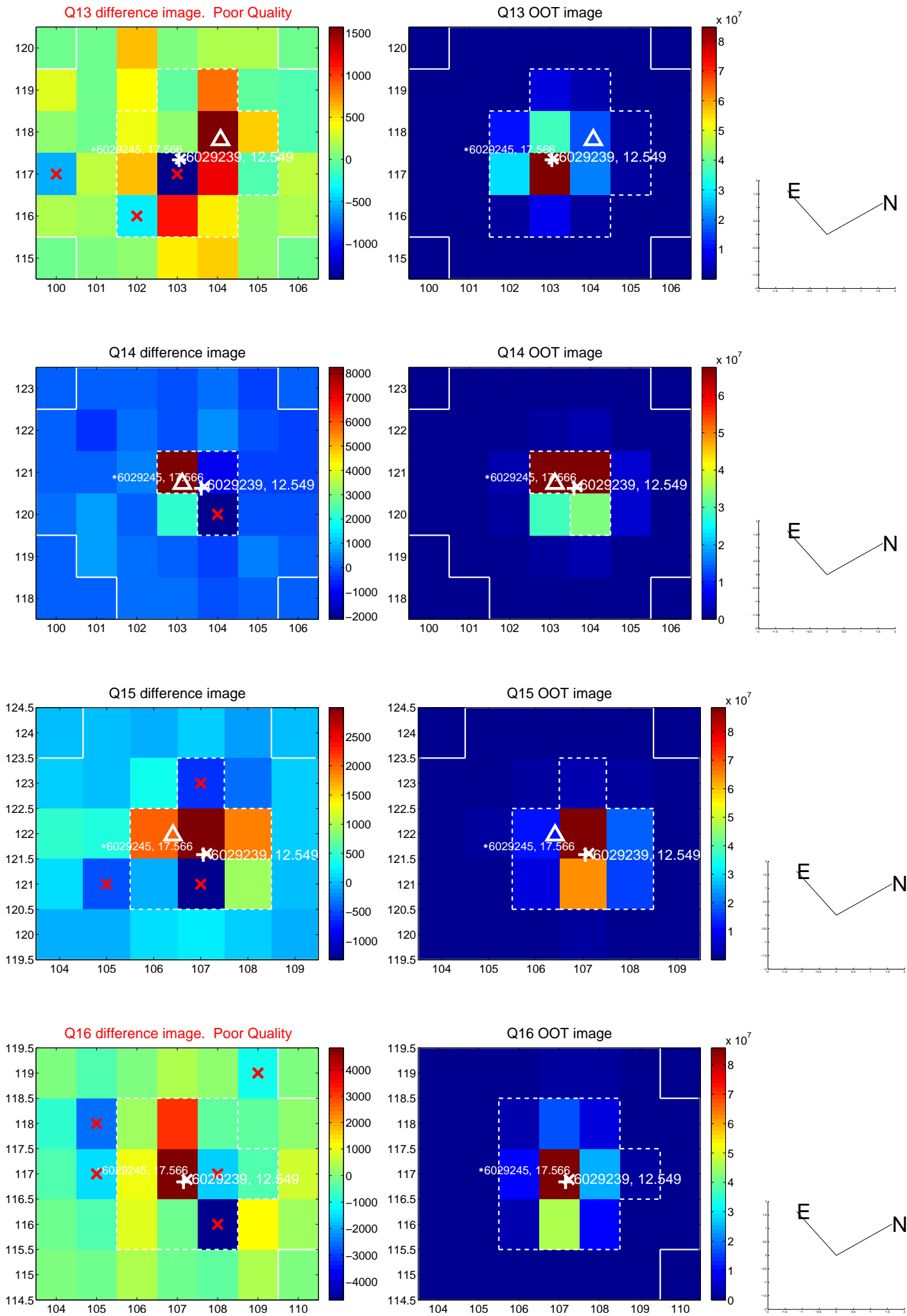
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



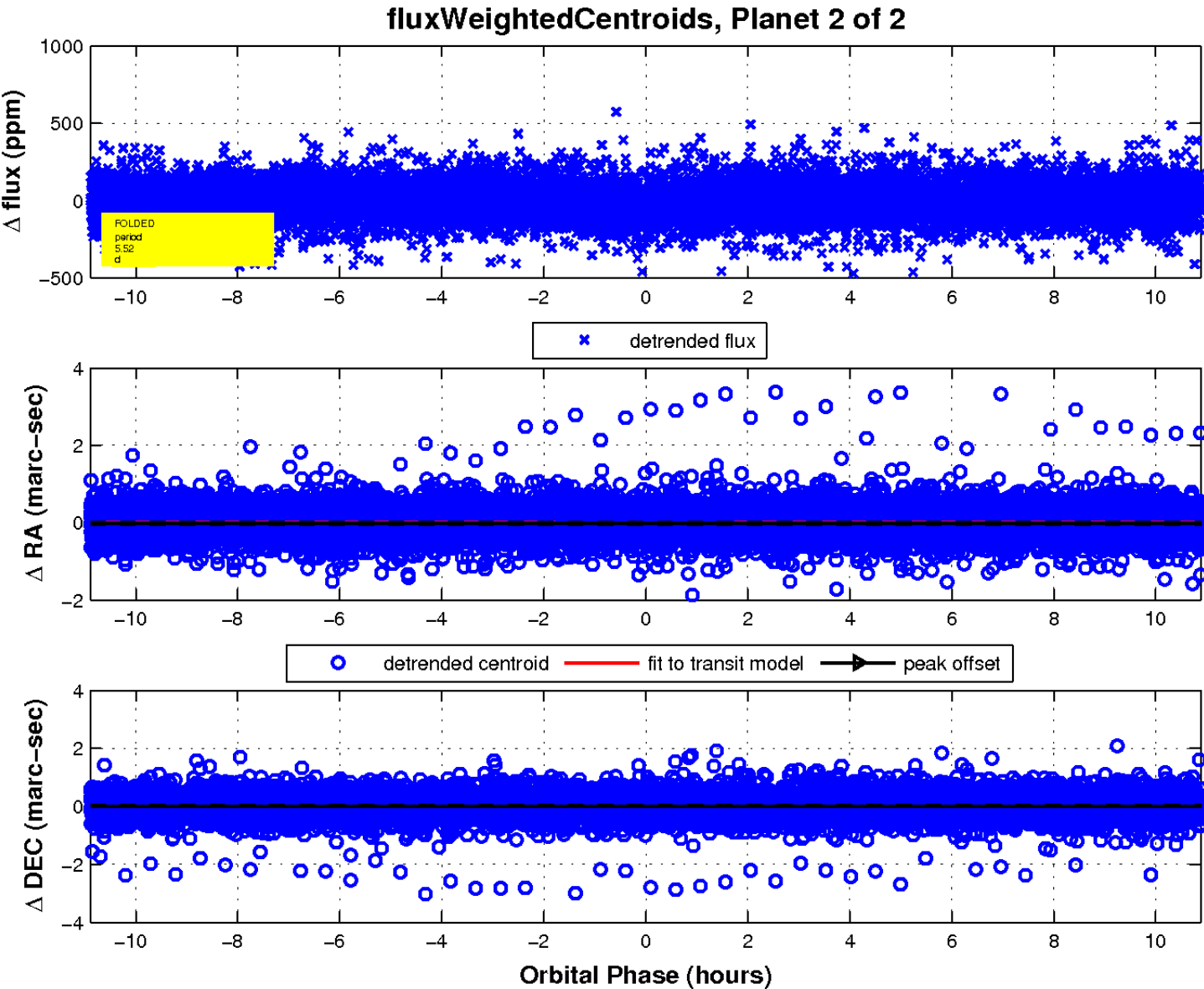
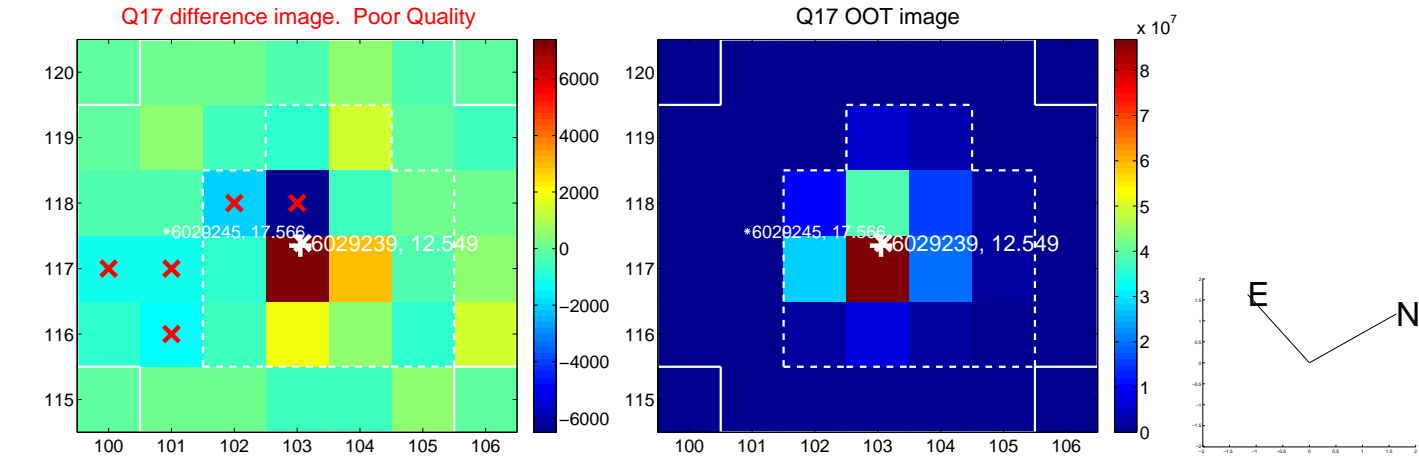
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

