

# KIC 011909839

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011909839-01	OBS	0779.01	10.405998	135.573446	14548.6	6.538	691.2	696.2	0.92	5746	11.29	114.05
011909839-02	OBS	No	5.203001	135.839067	292.9	7.918	15.1	15.4	0.92	5746	1.99	287.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011909839-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
011909839-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

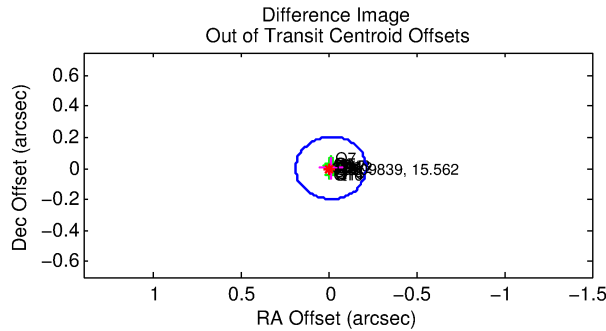
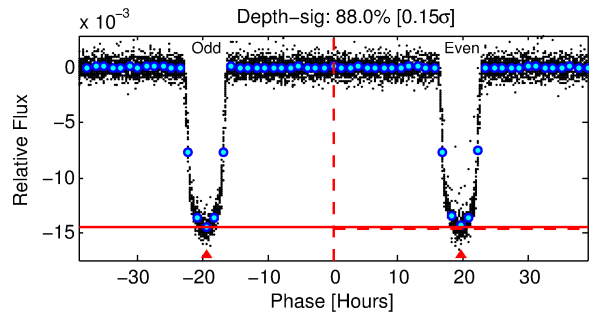
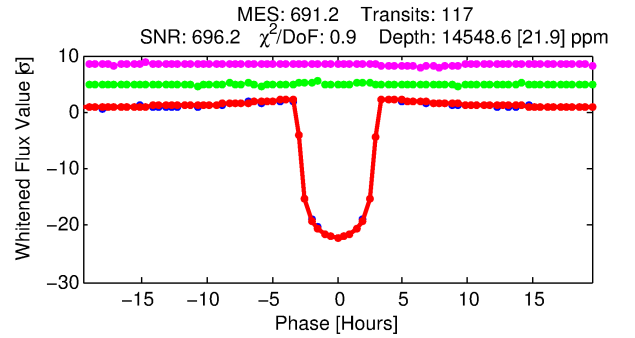
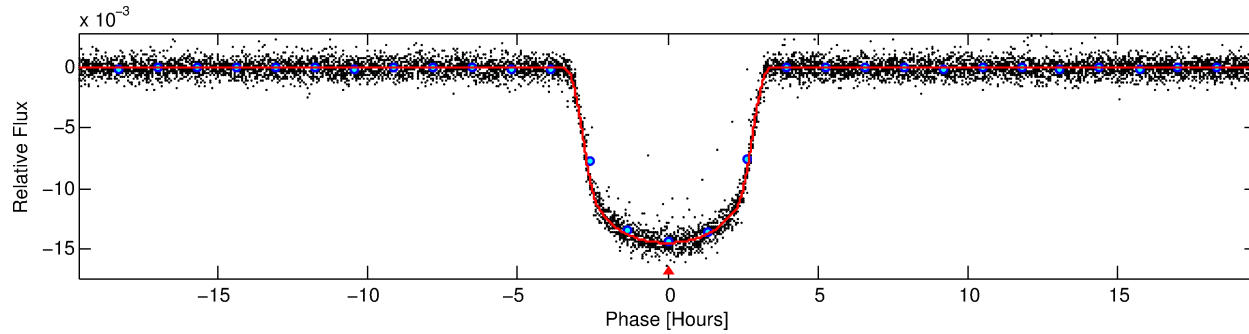
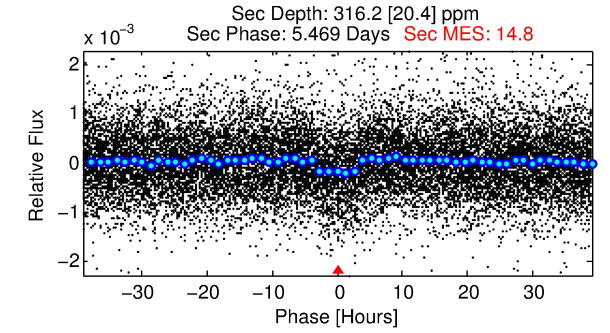
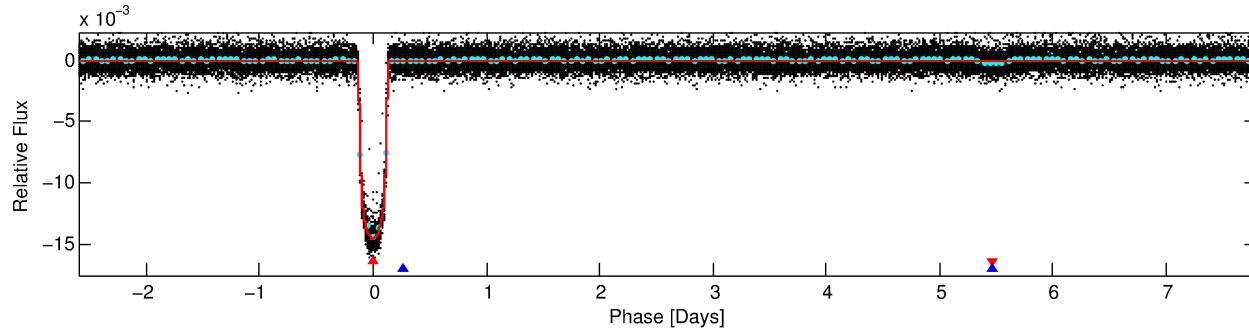
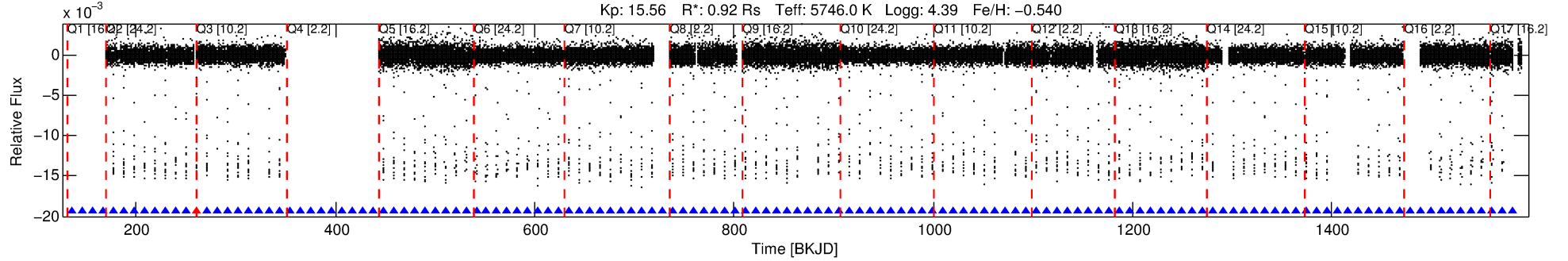
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011909839-01

No Significant Match Found

# DV One-Page Summary

KIC: 11909839 Candidate: 1 of 2 Period: 10.406 d  
KOI: K00779.01 Corr: 0.980



## DV Fit Results:

Period = 10.40600 [0.00000] d  
Epoch = 135.5734 [0.0002] BKJD  
Rp/R\* = 0.1120 [0.0003]  
a/R\* = 12.70 [0.14]  
b = 0.39 [0.02]  
Seff = 114.05 [42.23]  
Teq = 833 [77] K  
Rp = 11.30 [2.95] Re  
a = 0.0855 [0.0197] AU  
Ag = 9.97 [3.55] [2.53 $\sigma$ ]  
Teffp = 2289 [78] K [13.25 $\sigma$ ]

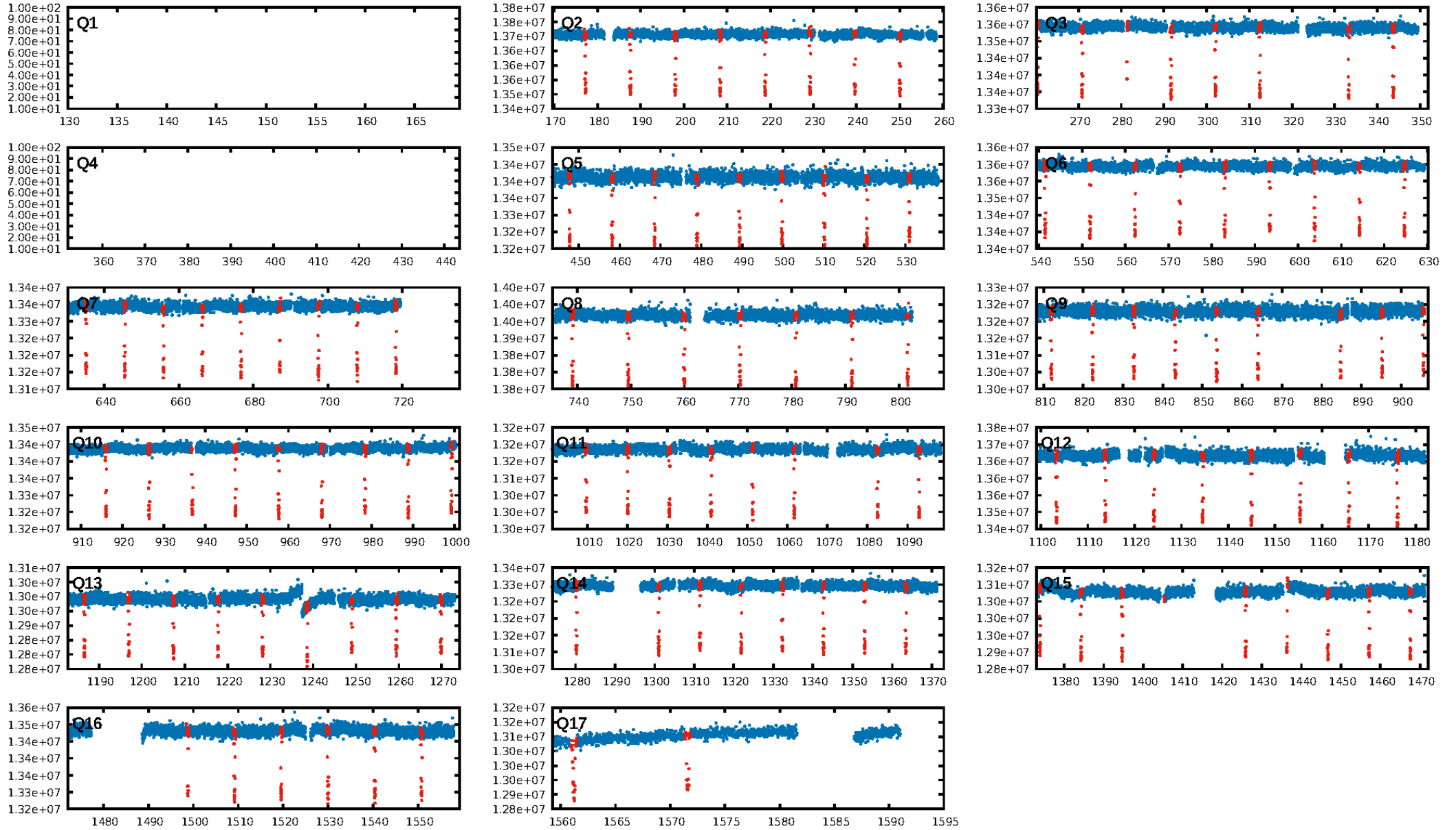
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [12.16 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [114/115]  
GhostDiagnostic-chr: 3.022  
Centroid-sig: 55.3%  
Centroid-so: 0.209 arcsec [11.64 $\sigma$ ]  
OotOffset-rm: 0.012 arcsec [0.18 $\sigma$ ]  
KicOffset-rm: 0.101 arcsec [1.46 $\sigma$ ]  
OotOffset-st: 4/4/3/4 [15]  
KicOffset-st: 4/4/3/4 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 0.00 [0/15]

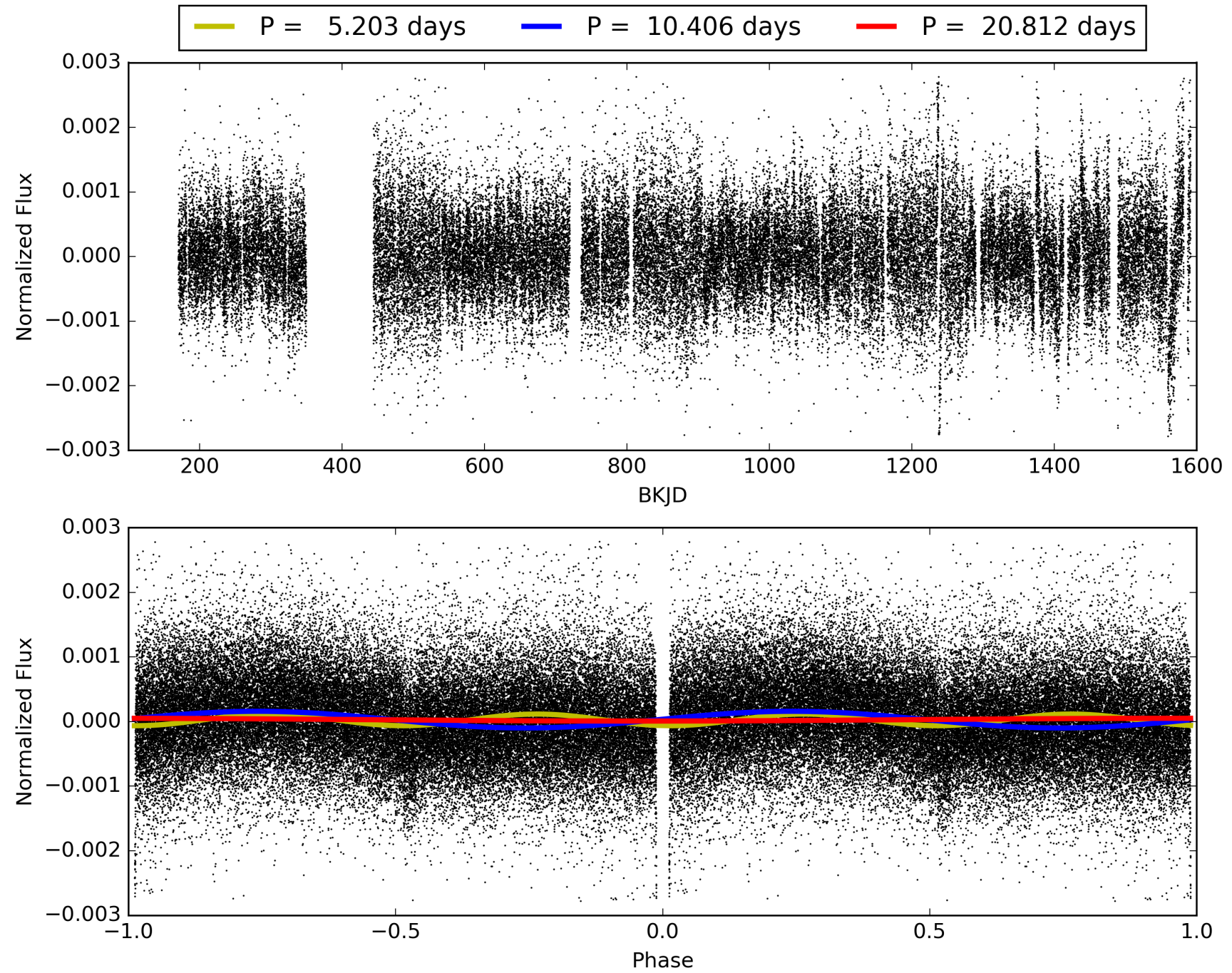
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:20:24 Z

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

# TCE 011909839-01, PDC Light Curves

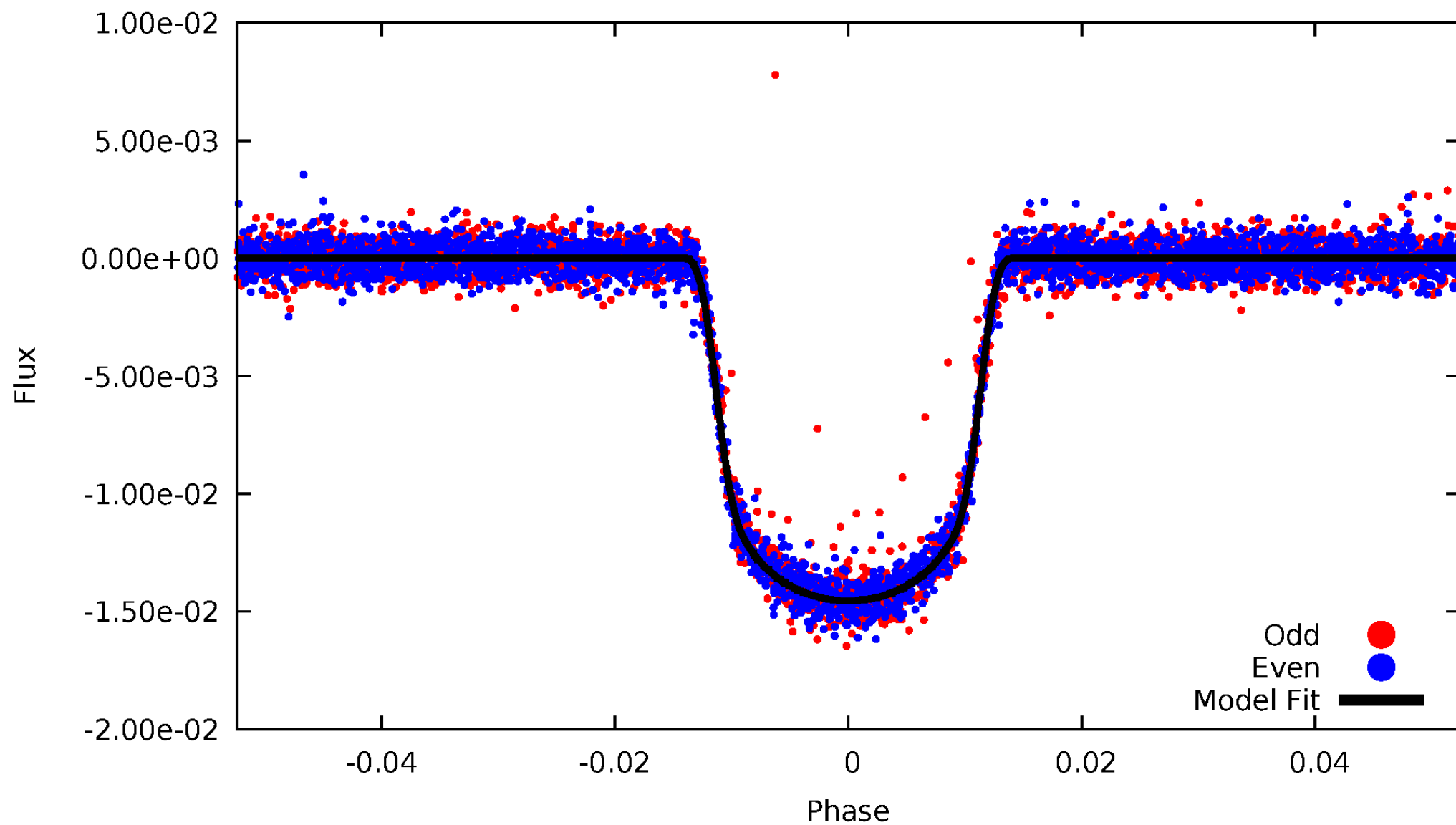


TCE 011909839-01



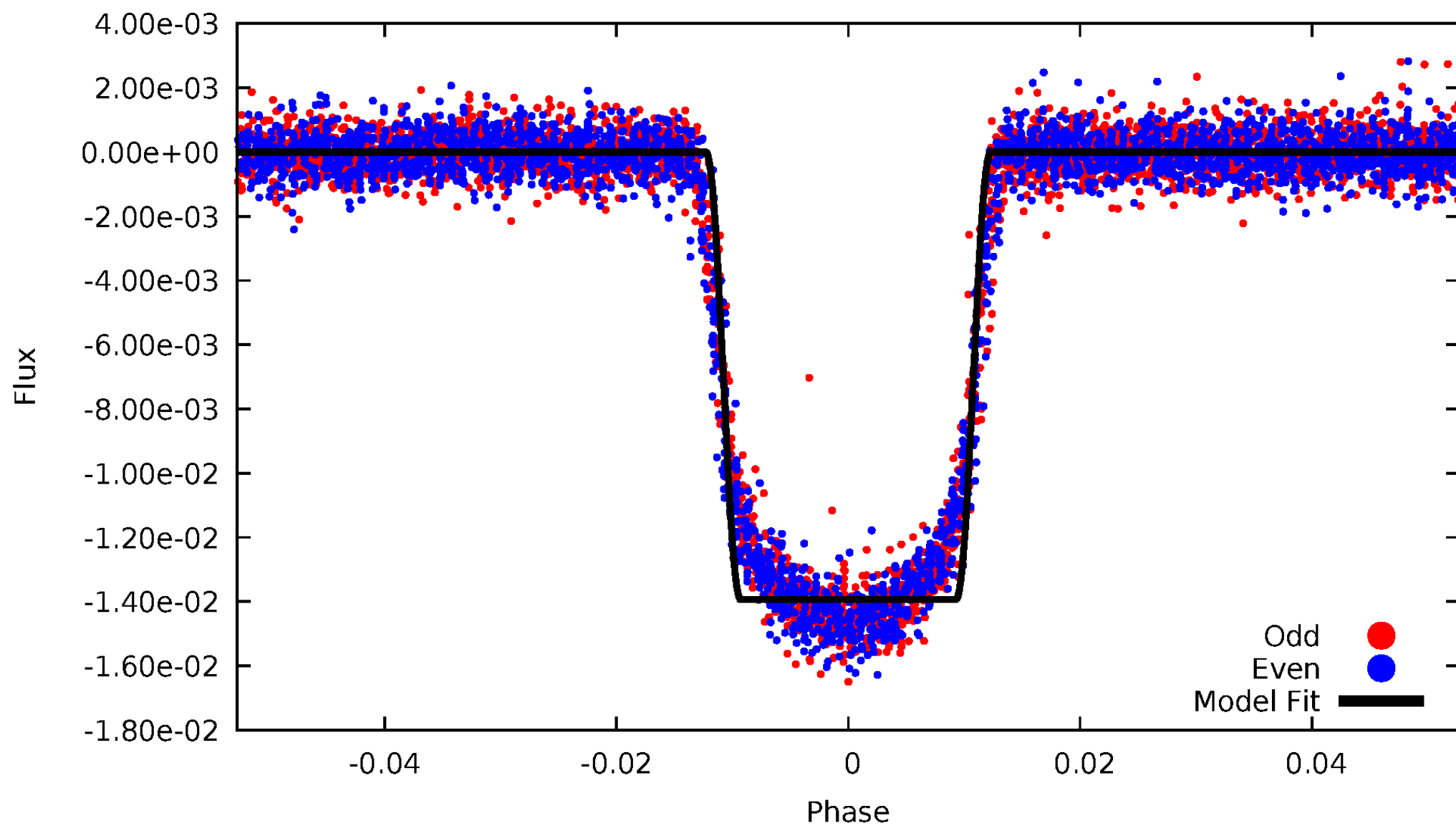
# DV Odd/Even

TCE 011909839-01



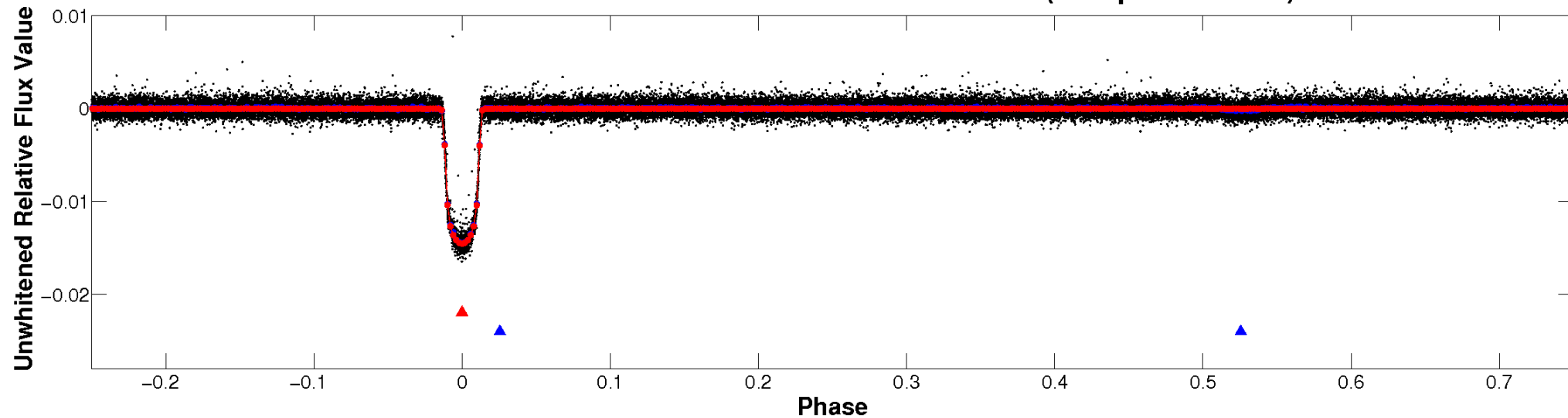
# ALT Odd/Even

TCE 011909839-01

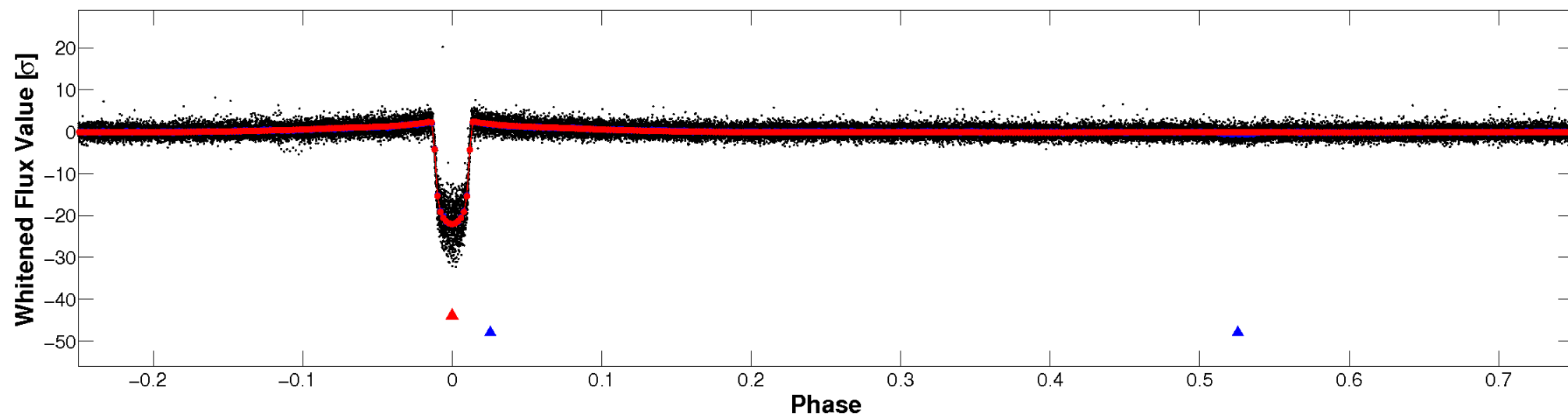


# Non-Whitened Vs. Whitened Light Curve

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



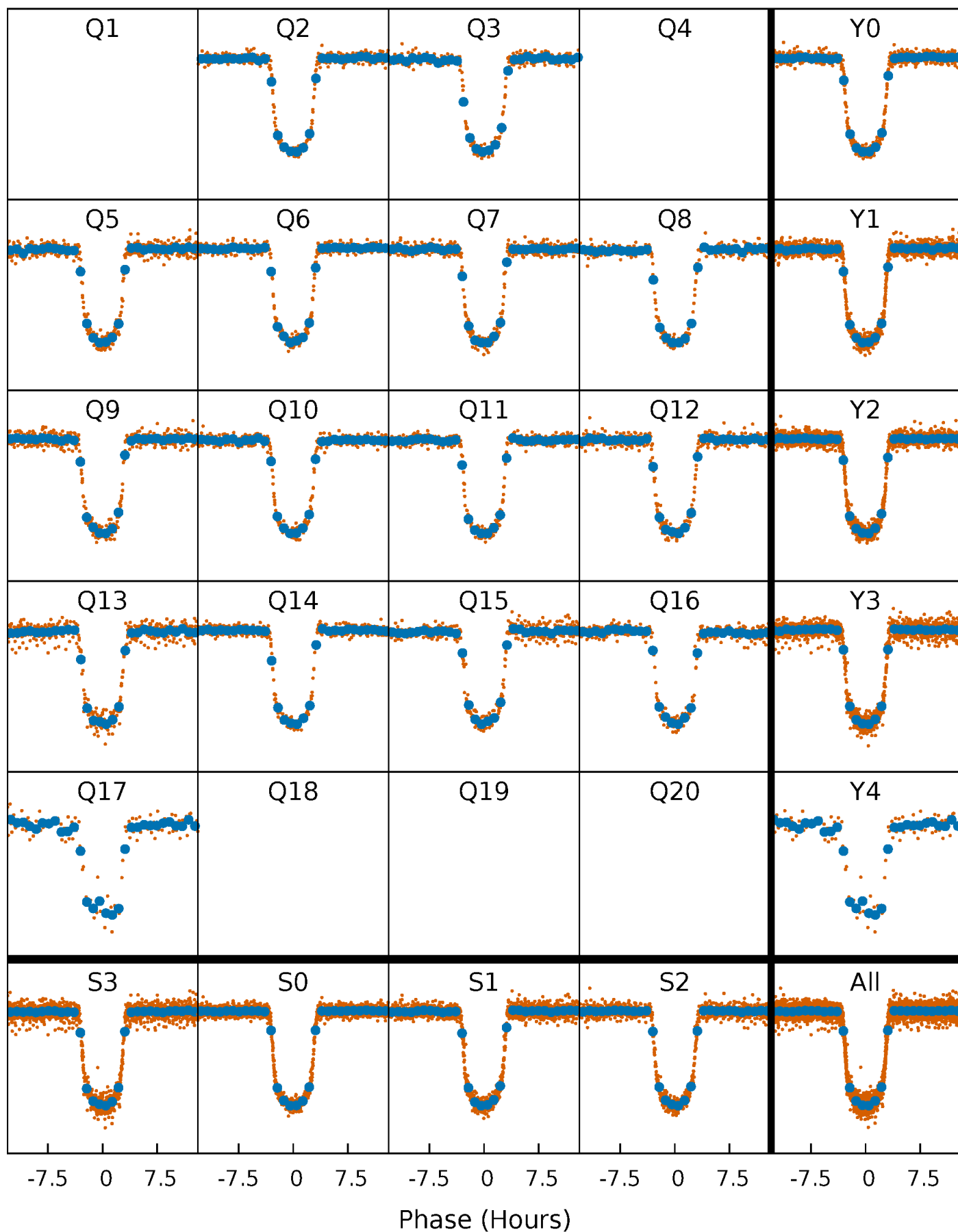
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

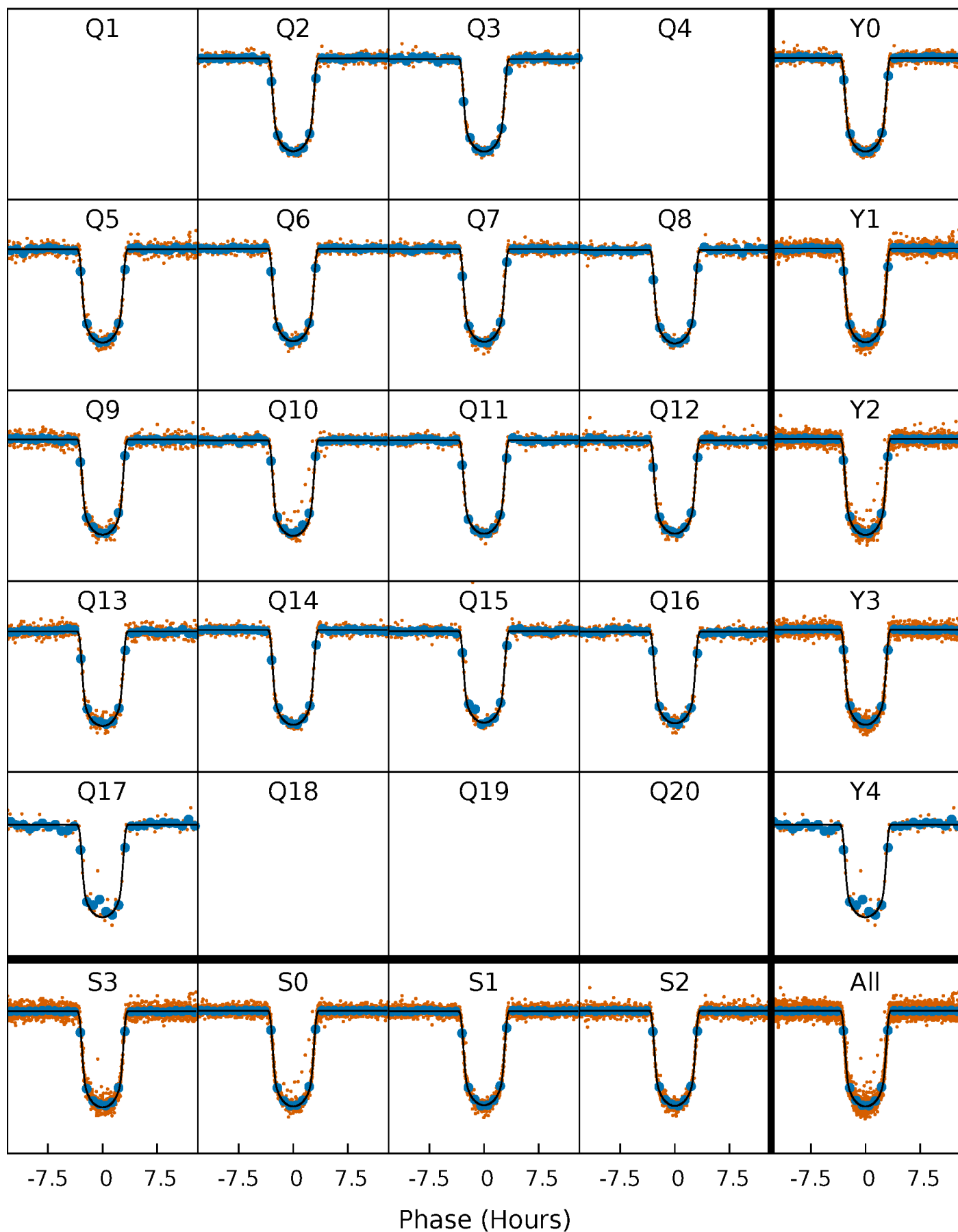
TCE 011909839-01 P= 10.405998 Days  $T_0=135.573446$  (BKJD)





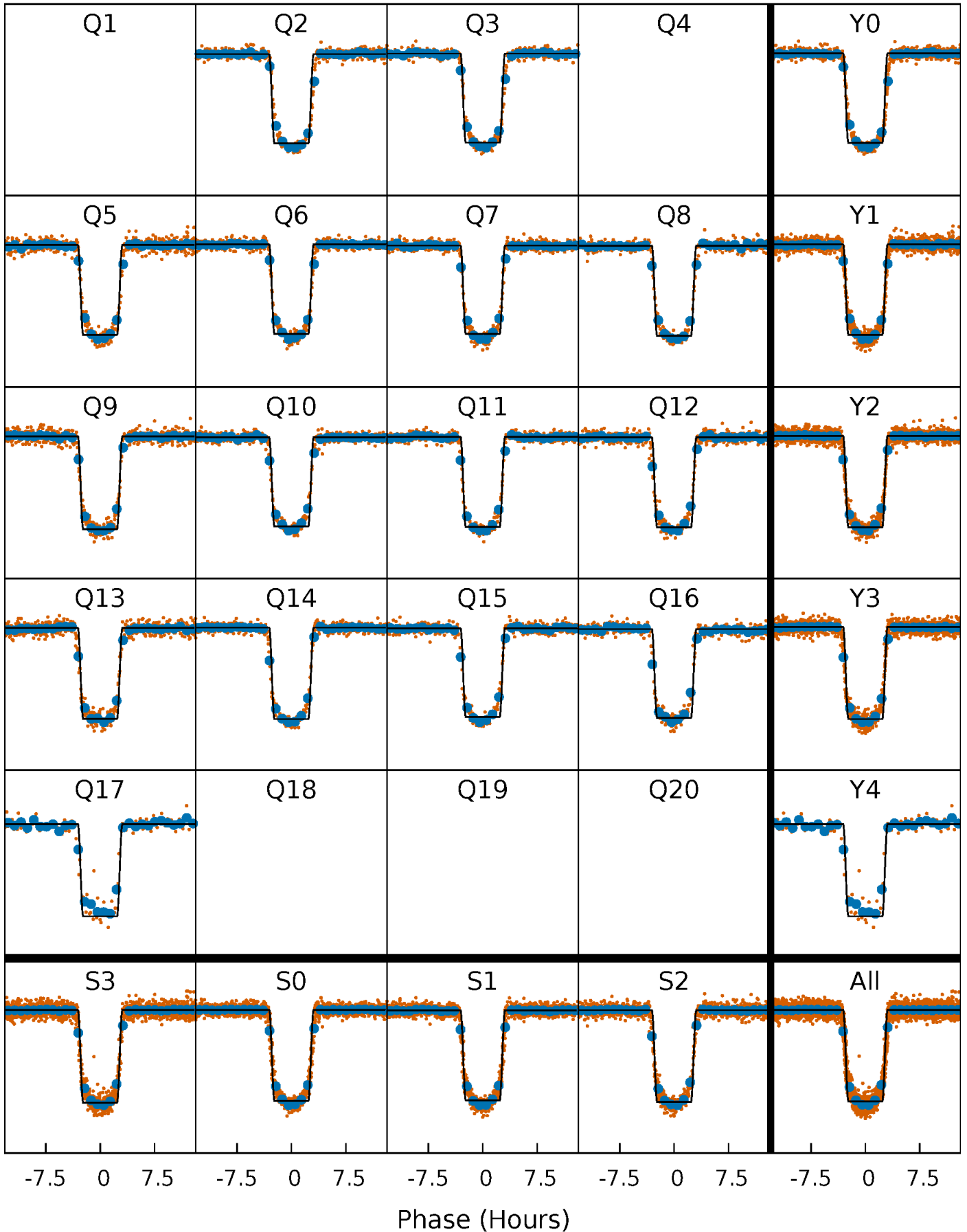
# DV Quarter-Phased Transit Curves

TCE 011909839-01 P= 10.405998 Days  $T_0=135.573446$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

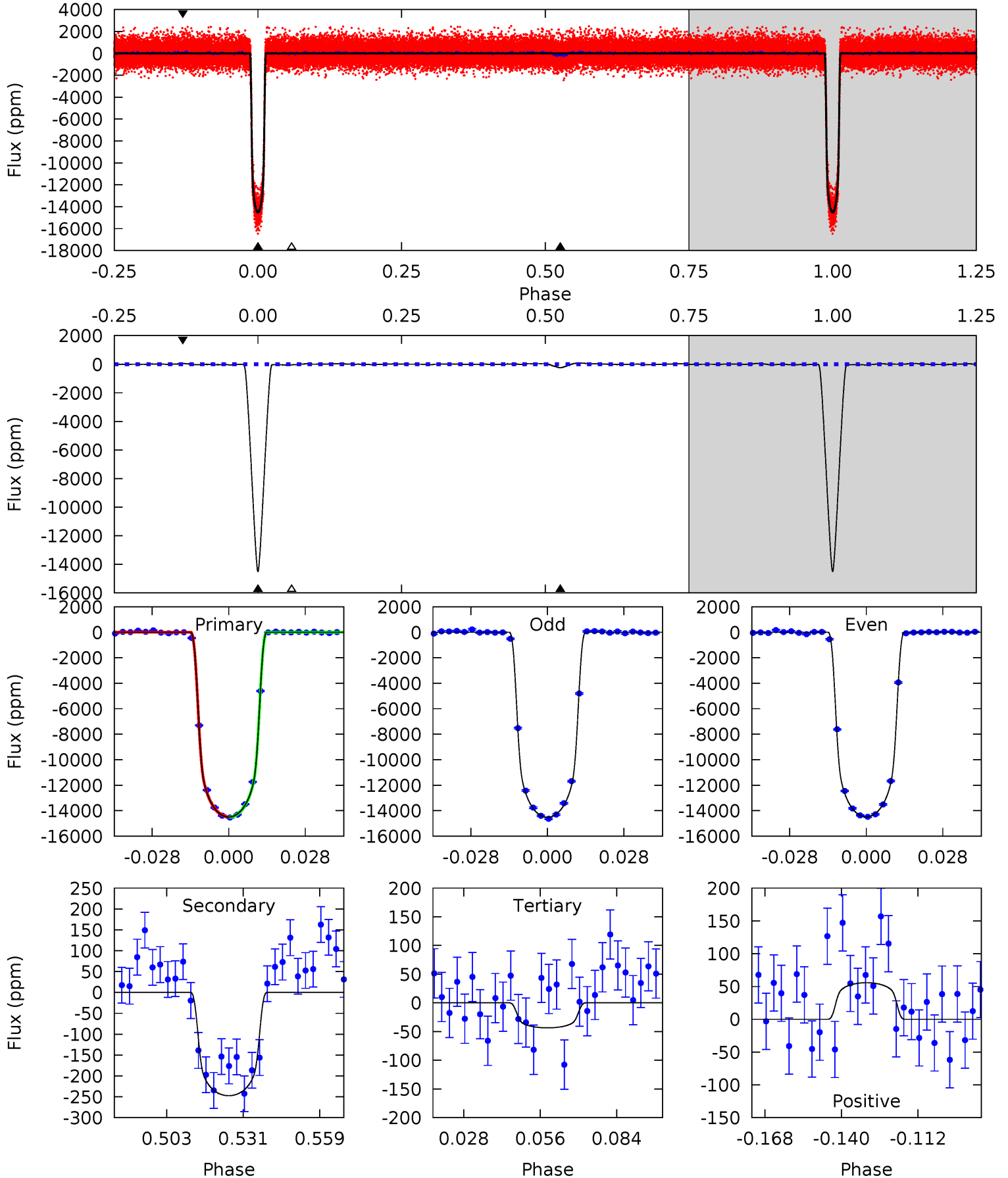
TCE 011909839-01     $P = 10.406110$  Days     $T_0 = 135.565715$  (BKJD)



# DV Model-Shift Uniqueness Test

011909839-01, P = 10.405998 Days, E = 135.573446 Days

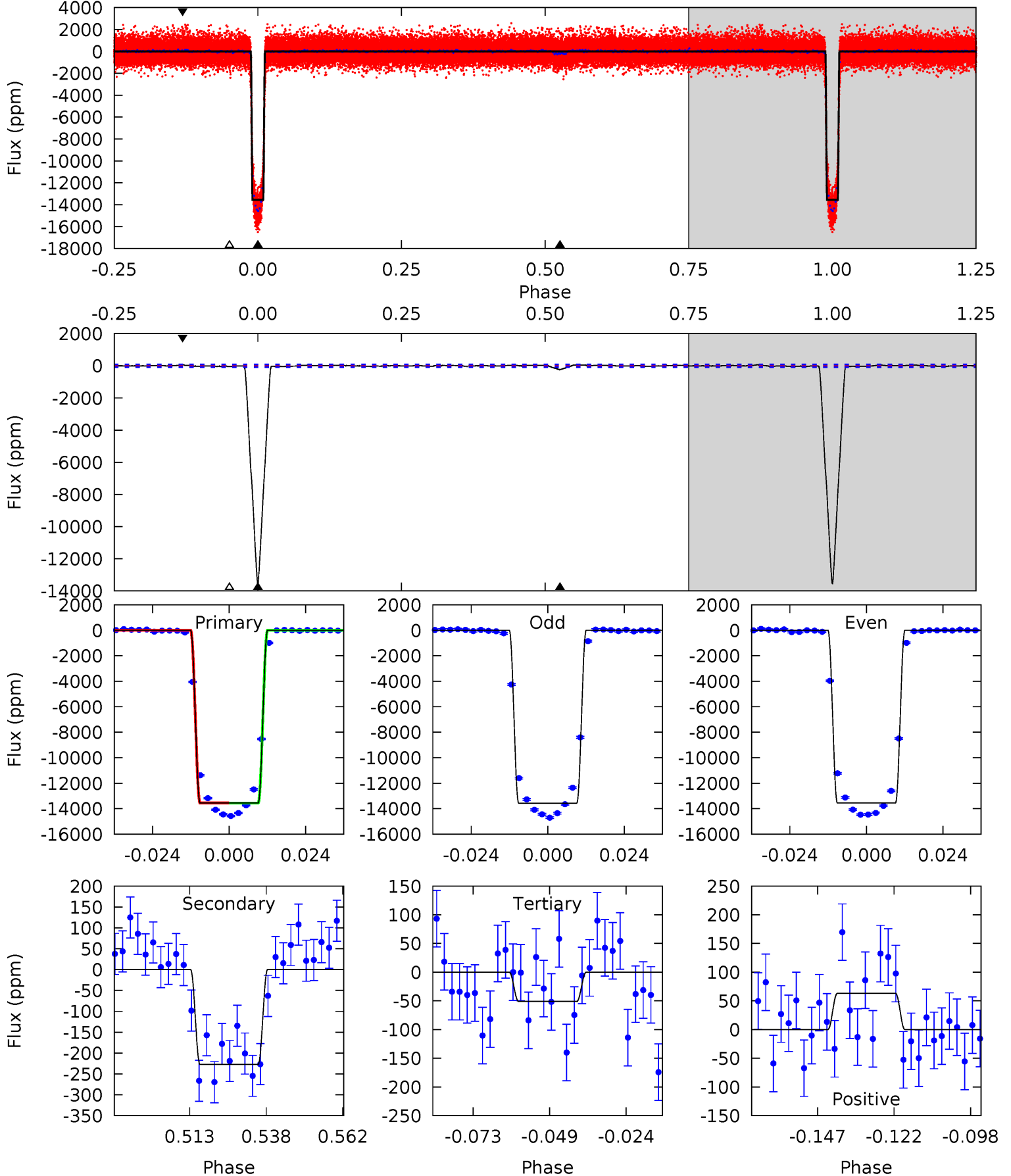
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
973.8	16.6	2.92	3.74	4.83	2.20	1.51	970.9	970.1	13.7	12.9	1.24	0.99	0.00	1.25



# Alt Model-Shift Uniqueness Test

011909839-01, P = 10.406110 Days, E = 135.565715 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
837.5	14.1	3.15	3.91	4.85	2.25	1.26	834.4	833.6	10.9	10.2	0.43	1.00	0.00	0.16



### Stellar Parameters For KIC 011909839

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5746^{+173}_{-173}$	$4.393^{+0.180}_{-0.198}$	$-0.540^{+0.300}_{-0.300}$	$0.924^{+0.241}_{-0.160}$	$0.770^{+0.118}_{-0.047}$	$1.373^{+1.087}_{-0.664}$
	+3%/-3%	+4%/-5%	+56%/-56%	+26%/-17%	+15%/-6%	+79%/-48%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011909839-01 / KOI 0779.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-247 \pm 15$	$11.34^{+1.80}_{-1.24}$	$1160^{+93}_{-69}$	$2852^{+58}_{-56}$	$7.901^{+2.211}_{-1.909}$
Alt.	$-227 \pm 16$	$11.98^{+1.97}_{-1.37}$	$1168^{+83}_{-77}$	$2777^{+55}_{-56}$	$6.393^{+1.926}_{-1.607}$

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

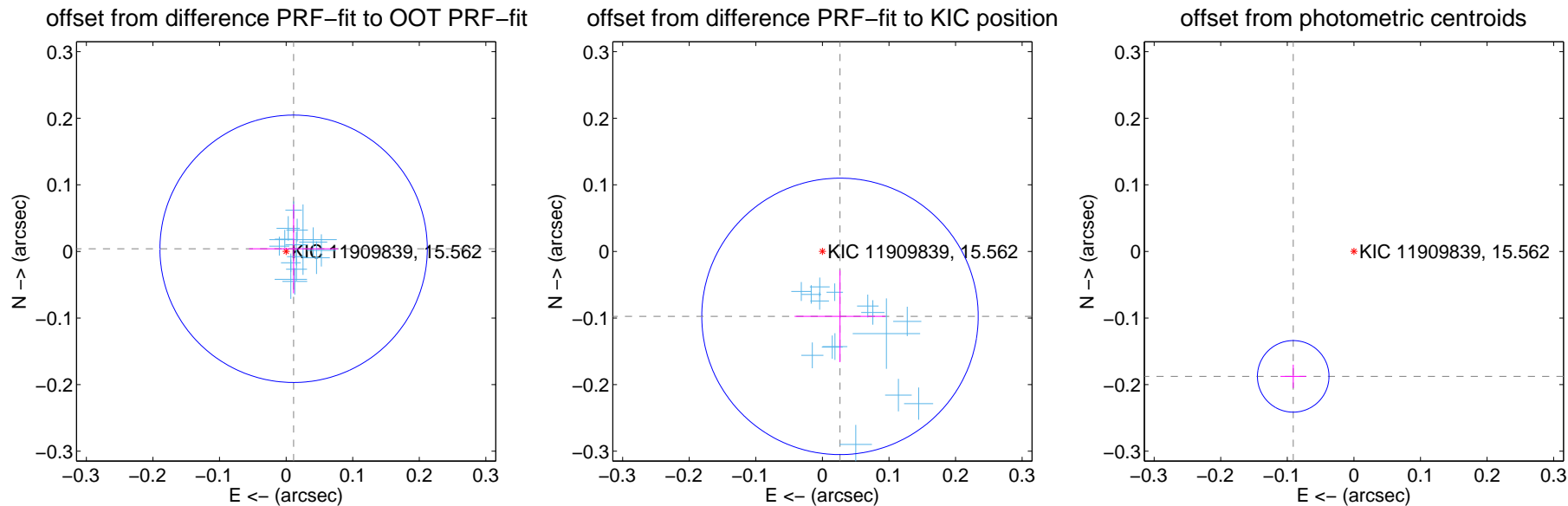
## DV Centroid Data

Supplemental centroid analysis for 011909839-01. Kepler magnitude: 15.56. Transit SNR 696.18

There are 15 quarters with good PRF difference image offsets

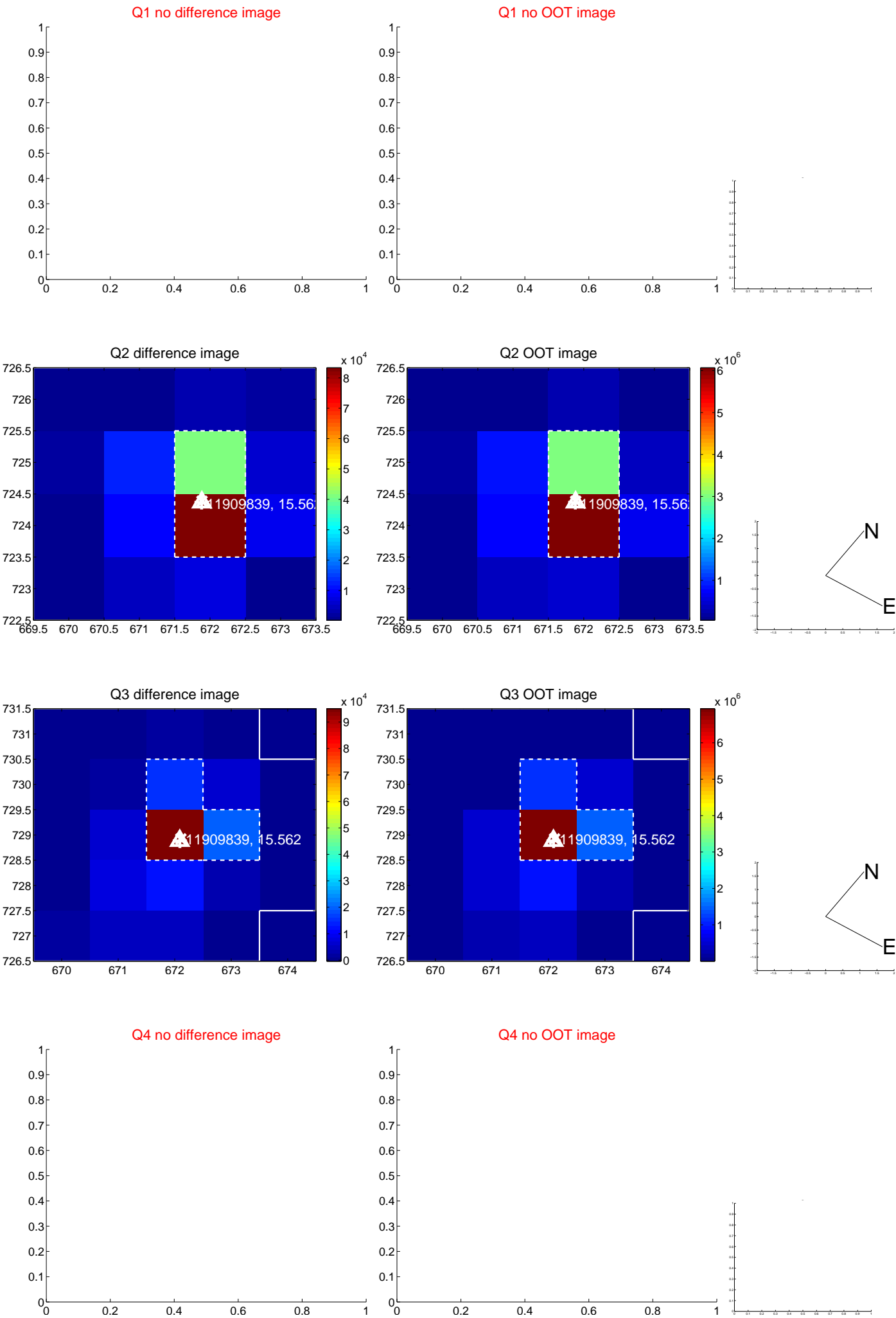
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.012 \pm 0.067$	0.18	$-0.011 \pm 0.067$	$0.004 \pm 0.067$
PRF-fit source offset from KIC position	$0.101 \pm 0.069$	1.46	$-0.026 \pm 0.068$	$-0.098 \pm 0.069$
photometric centroid source offset	$0.21 \pm 0.02$	11.64	$0.09 \pm 0.02$	$-0.19 \pm 0.02$



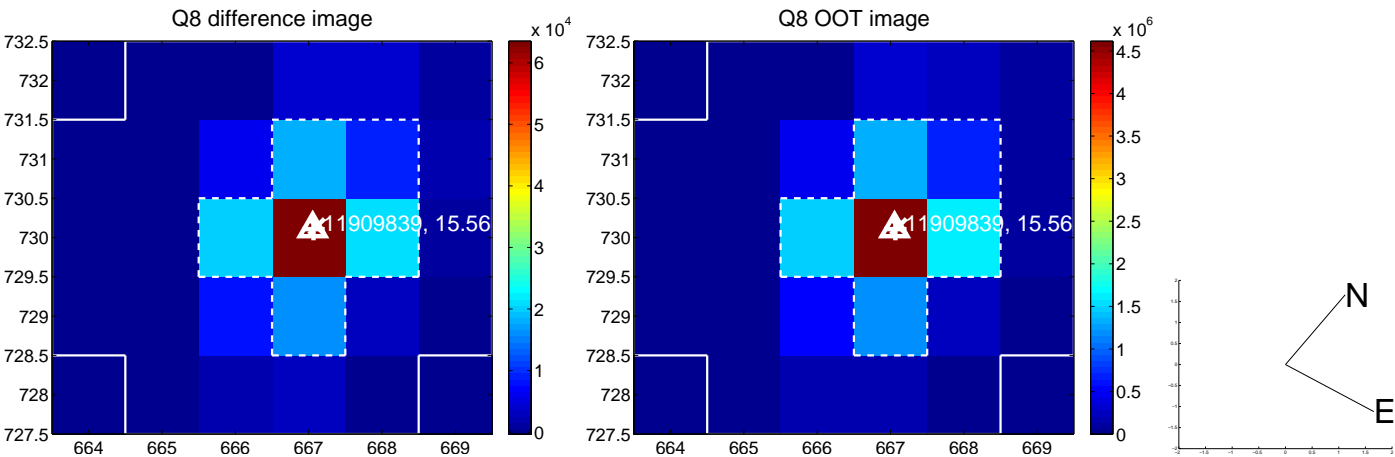
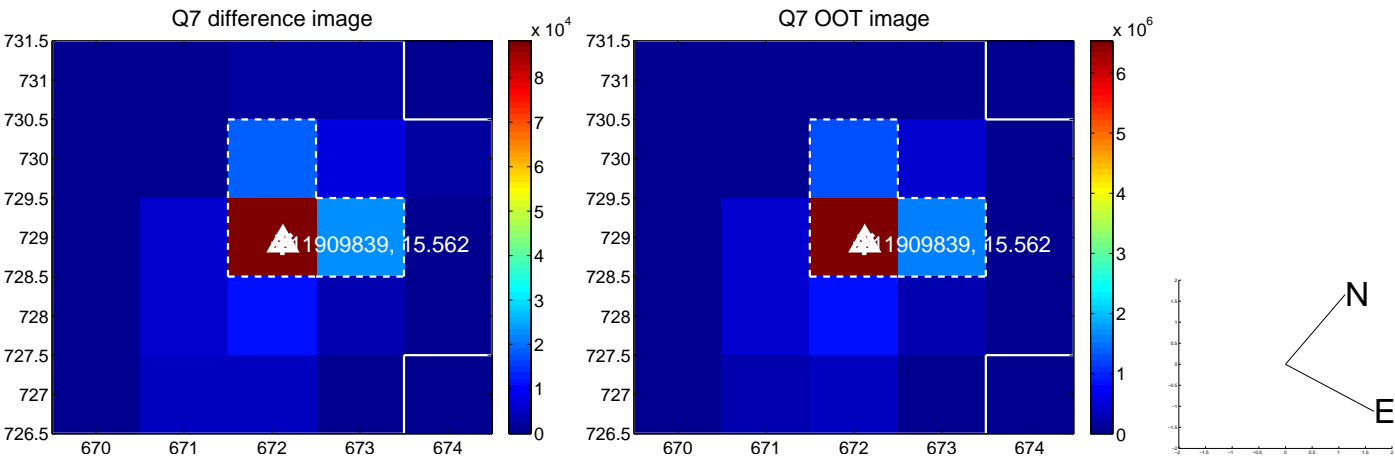
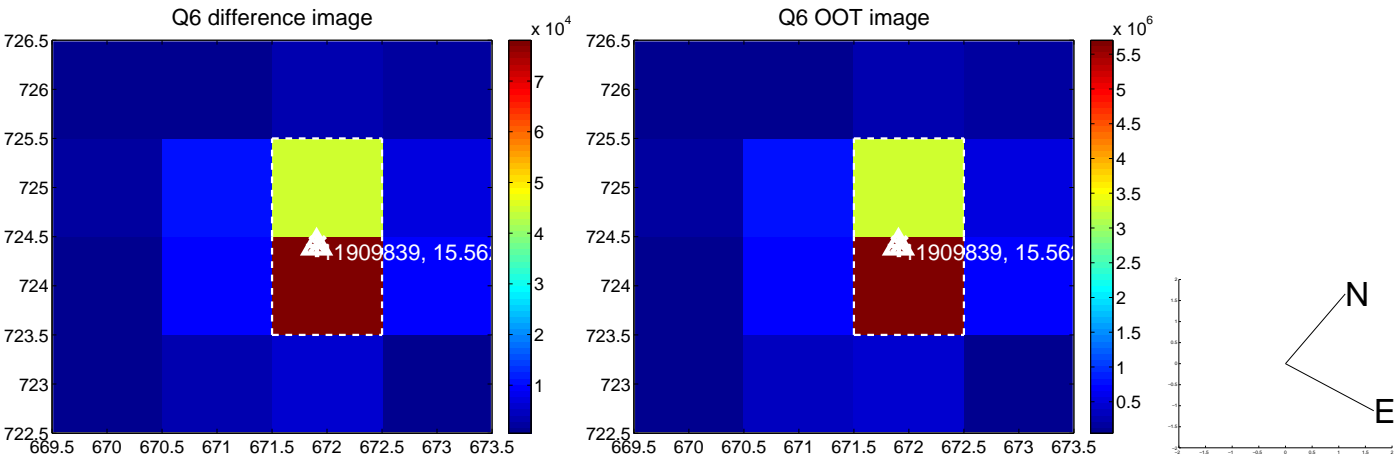
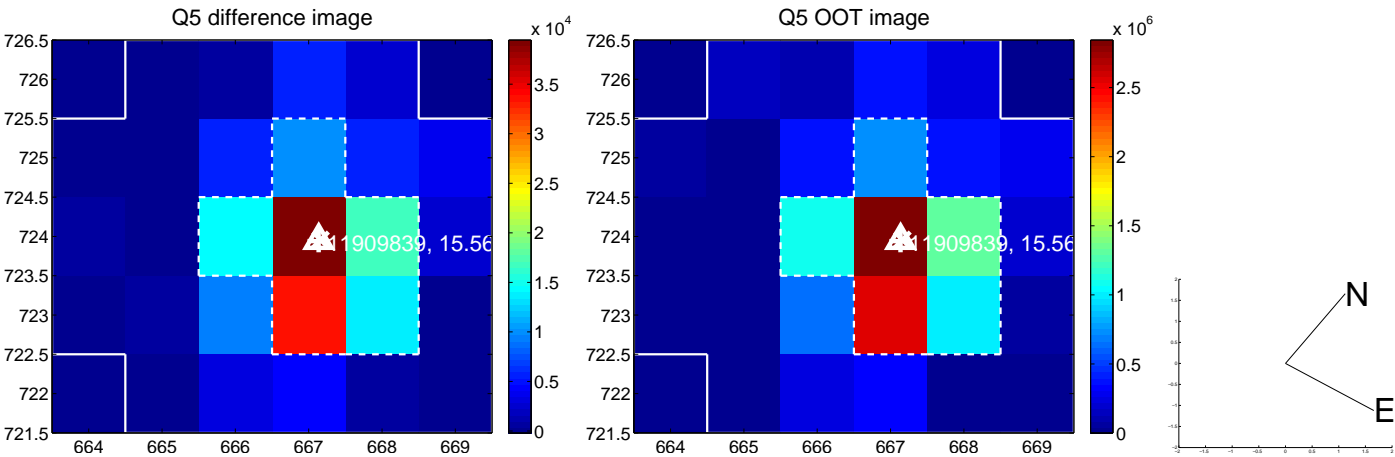
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

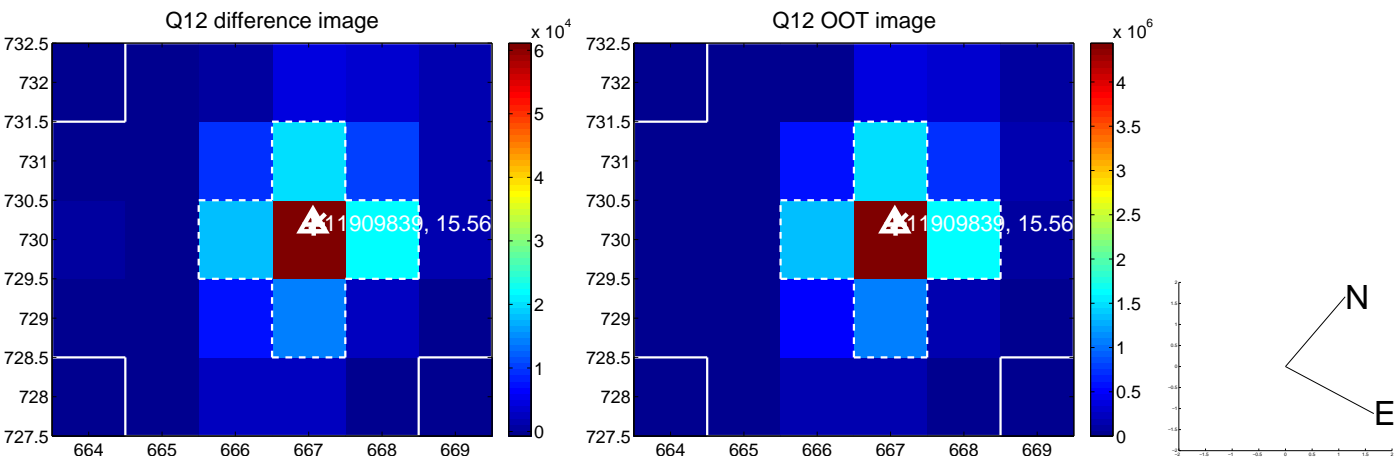
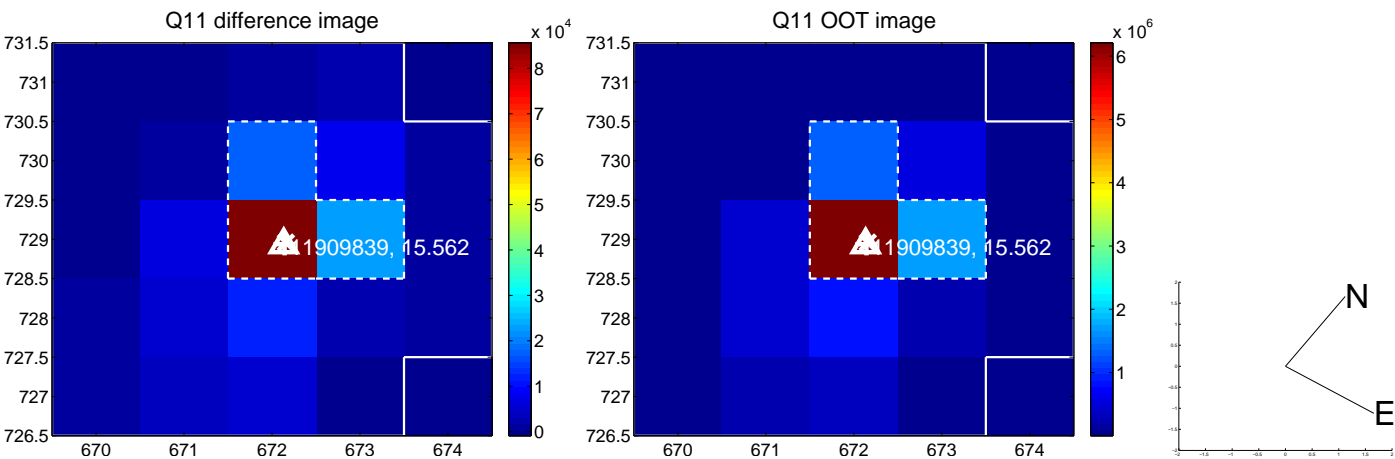
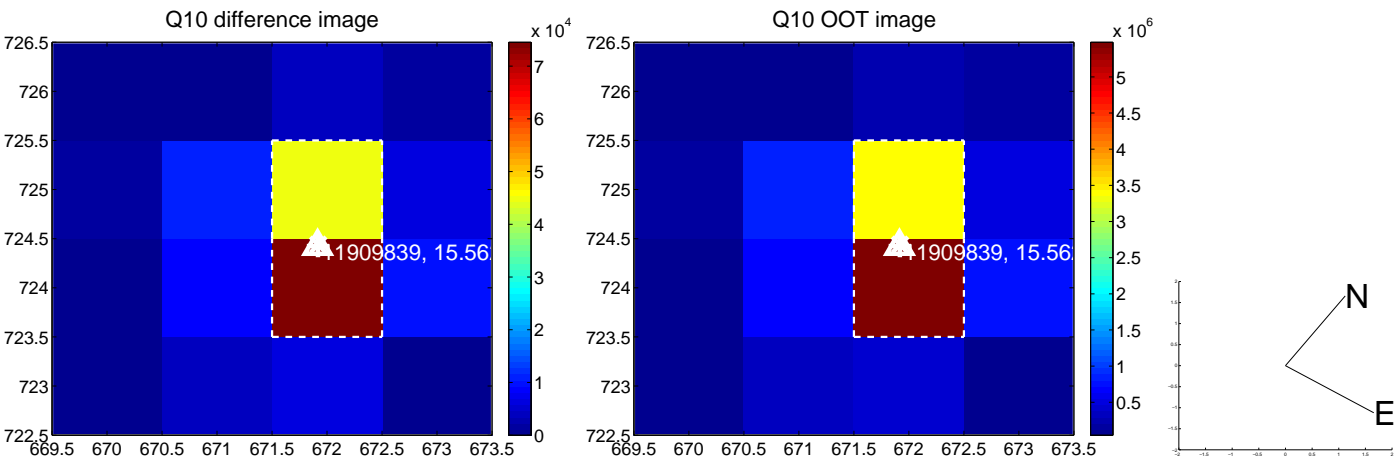
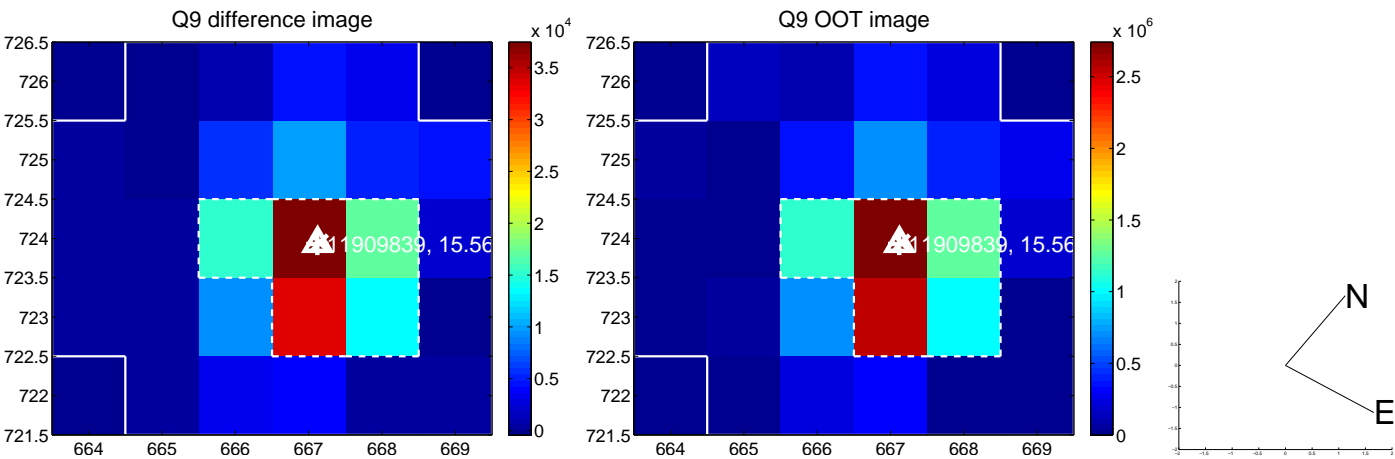




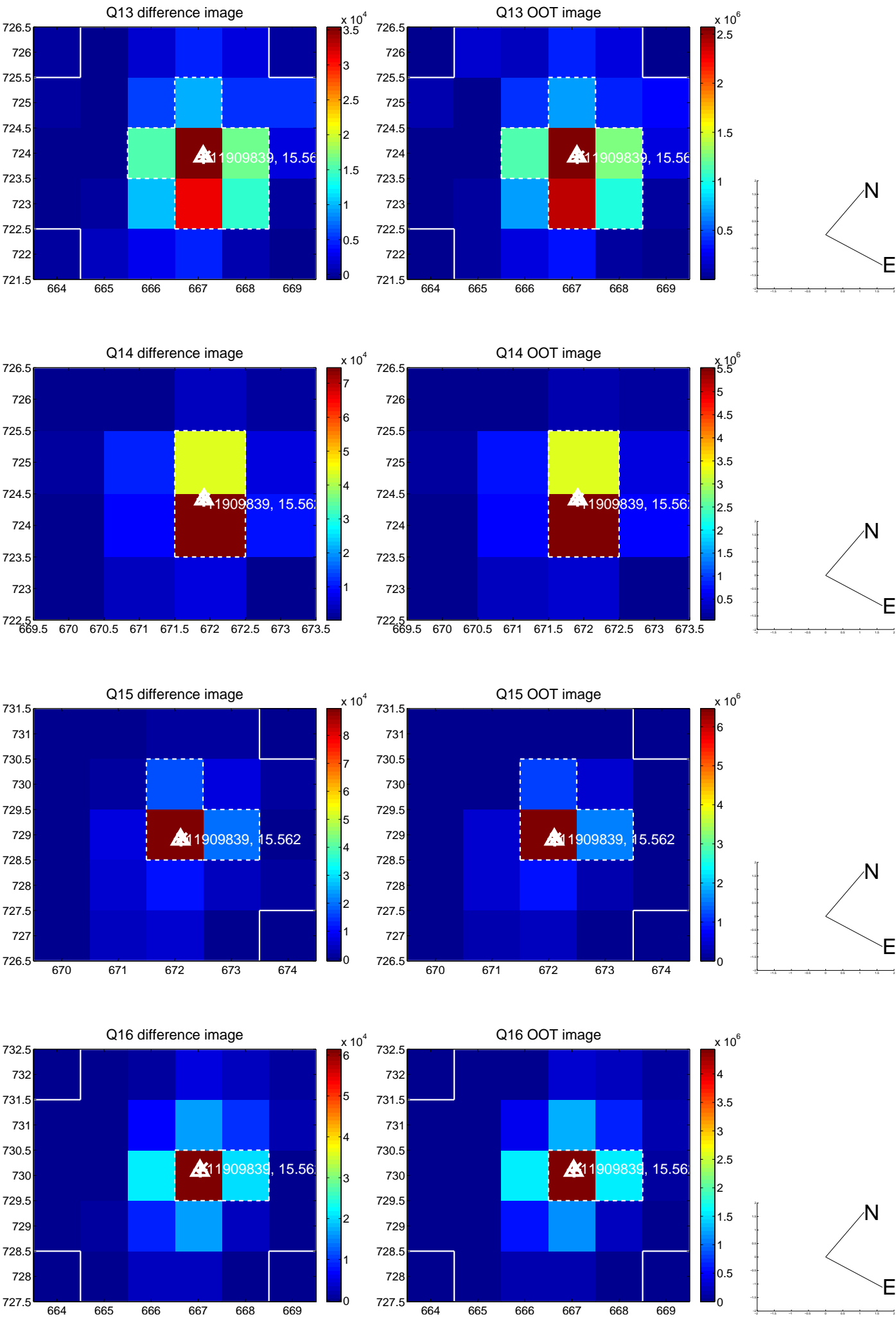
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



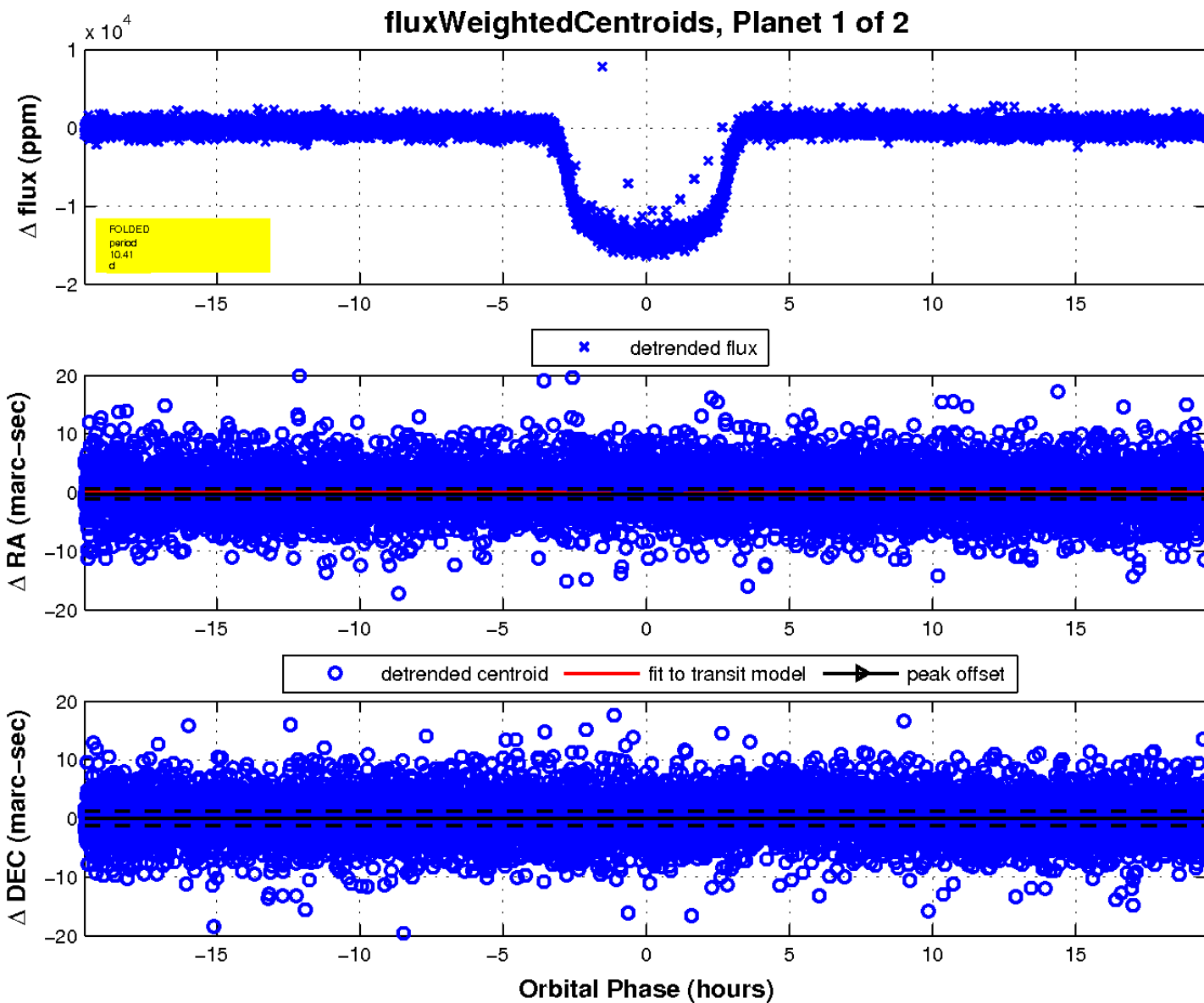
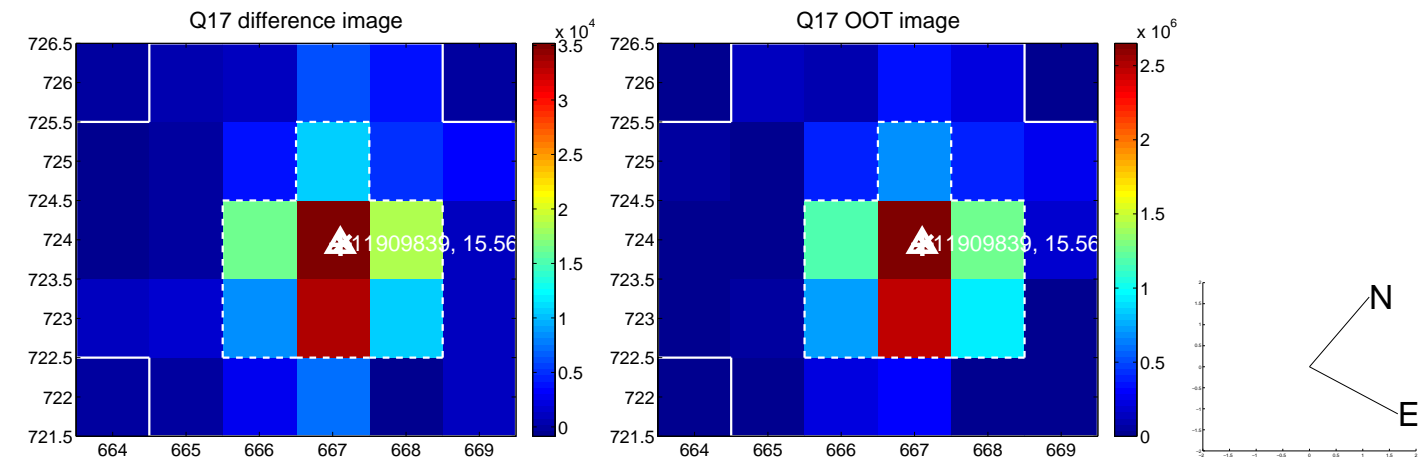
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

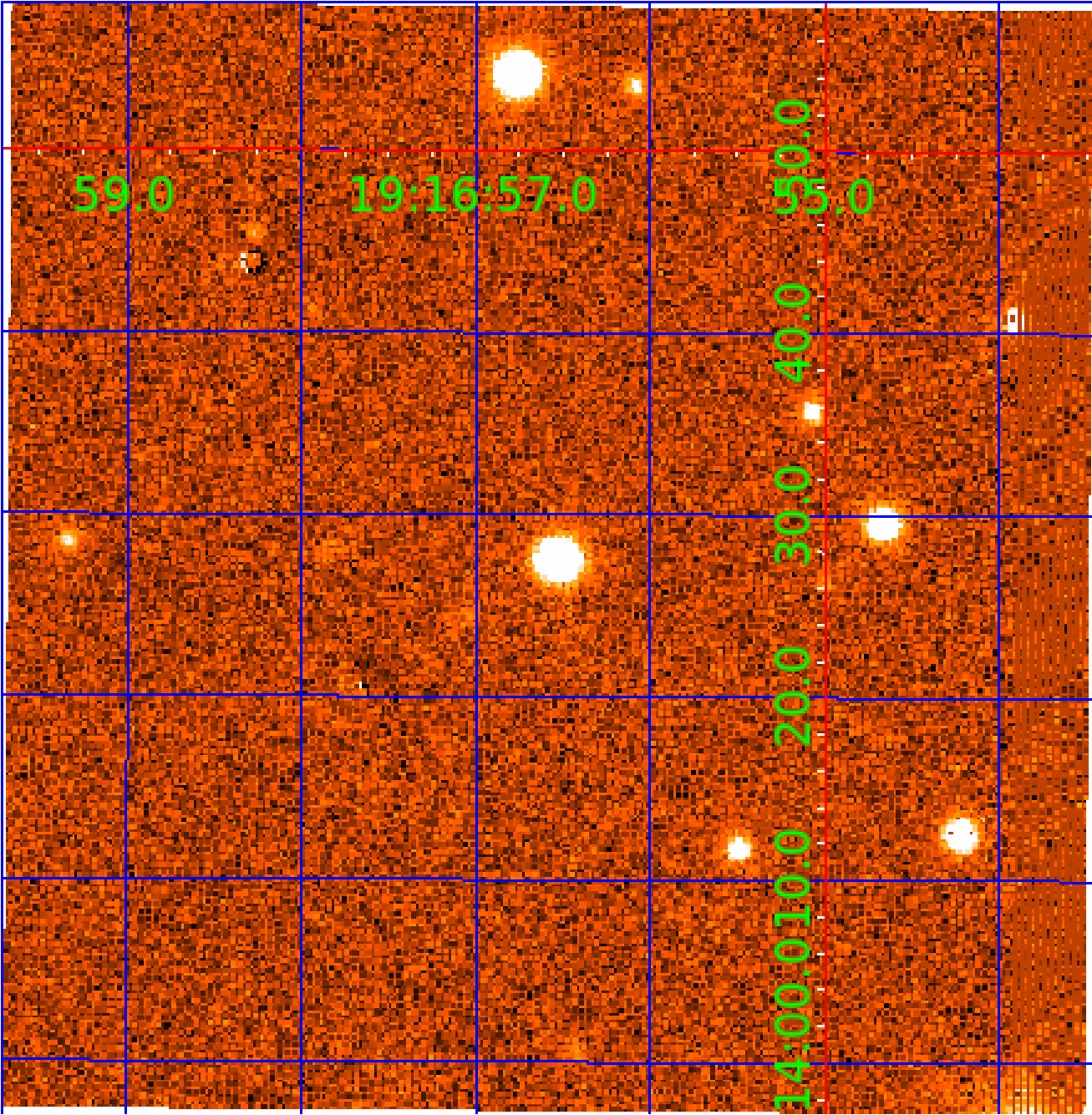


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011909839

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011909839-01	OBS	0779.01	10.405998	135.573446	14548.6	6.538	691.2	696.2	0.92	5746	11.29	114.05
011909839-02	OBS	No	5.203001	135.839067	292.9	7.918	15.1	15.4	0.92	5746	1.99	287.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011909839-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
011909839-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

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

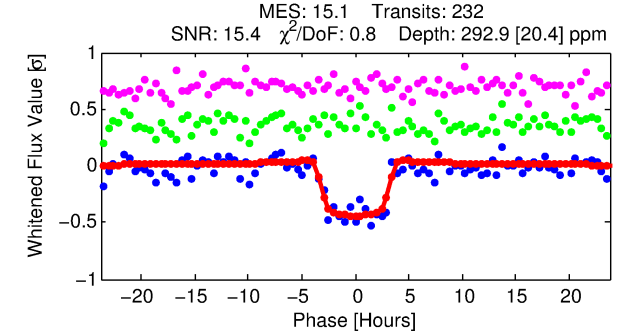
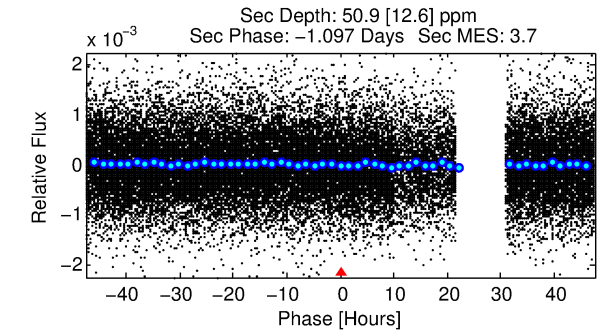
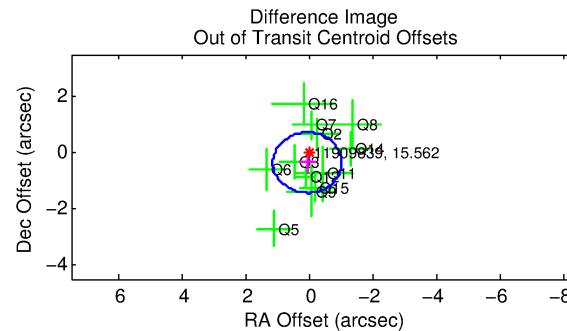
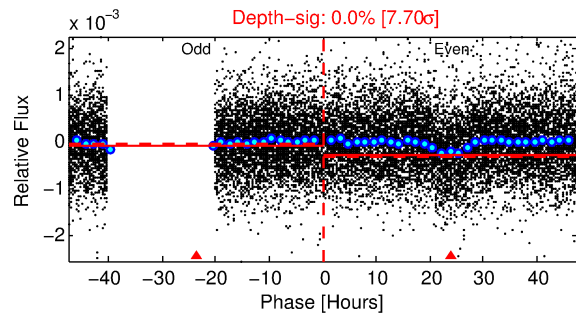
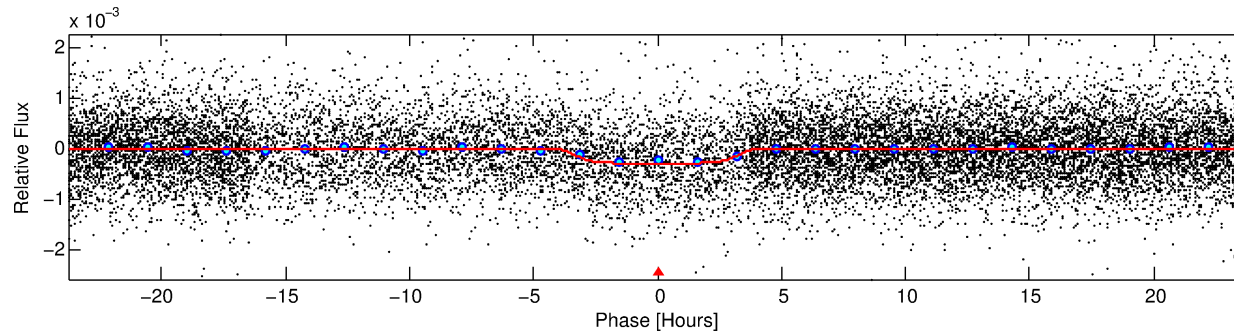
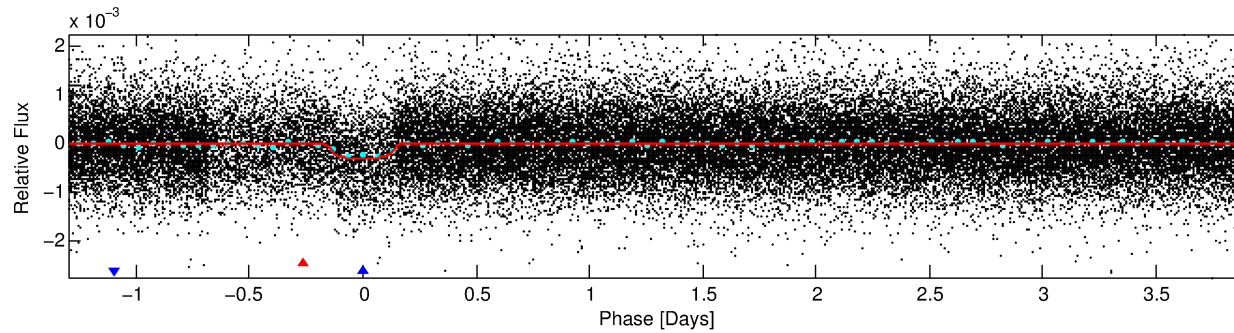
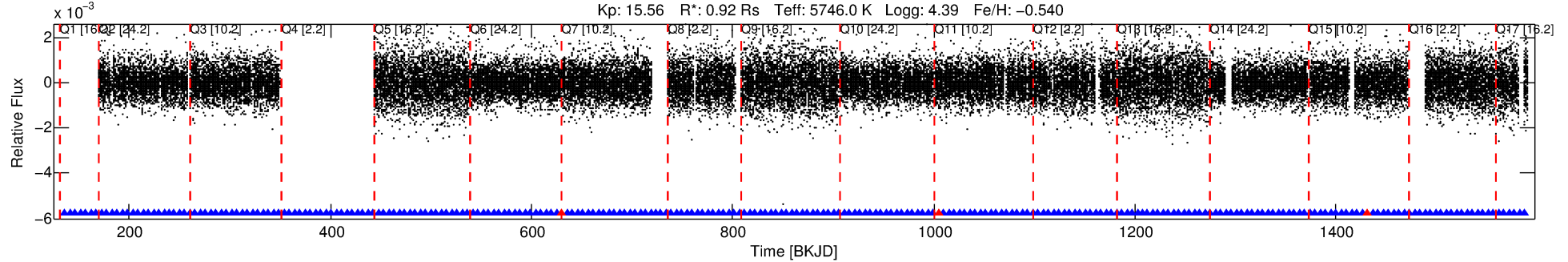
## Ephemeris Match Information For 011909839-02

No Significant Match Found

# DV One-Page Summary

KIC: 11909839 Candidate: 2 of 2 Period: 5.203 d  
KOI: K00779 Corr: No Ephemeris Match

Kp: 15.56 R\*: 0.92 Rs Teff: 5746.0 K Logg: 4.39 Fe/H: -0.540



## DV Fit Results:

Period = 5.20300 [0.00006] d  
Epoch = 135.8391 [0.0096] BKJD  
Rp/R\* = 0.0197 [0.0012]  
a/R\* = 2.10 [0.40]  
b = 0.95 [0.03]  
Seff = 287.39 [106.42]  
Teq = 1050 [97] K  
Rp = 1.99 [0.53] Re  
a = 0.0539 [0.0124] AU  
Ag = 20.61 [9.21] [2.13σ]  
Teffp = 3459 [262] K [8.62σ]

## DV Diagnostic Results:

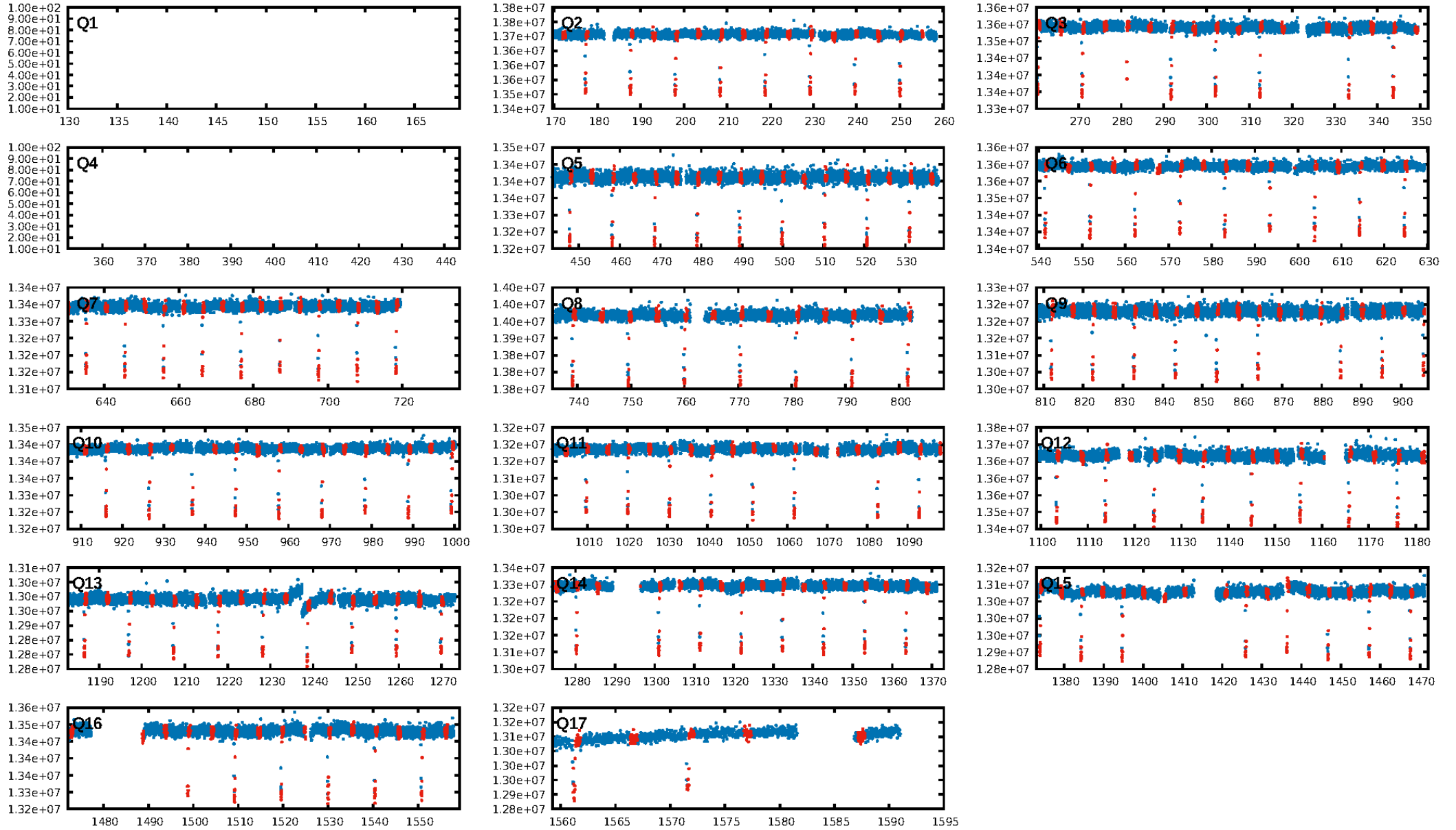
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [12.16σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.66e-52  
RollingBand-fgt: 0.99 [224/227]  
GhostDiagnostic-chr: 1.009  
Centroid-sig: 0.0%  
Centroid-so: 1.847 arcsec [3.13σ]  
OotOffset-rm: 0.365 arcsec [1.02σ]  
KicOffset-rm: 0.502 arcsec [1.38σ]  
OotOffset-st: 3/4/3/2 [12]  
KicOffset-st: 3/4/3/2 [12]  
DiffImageQuality-fgm: 0.75 [9/12]  
DiffImageOverlap-fno: 1.00 [15/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:20:31 Z

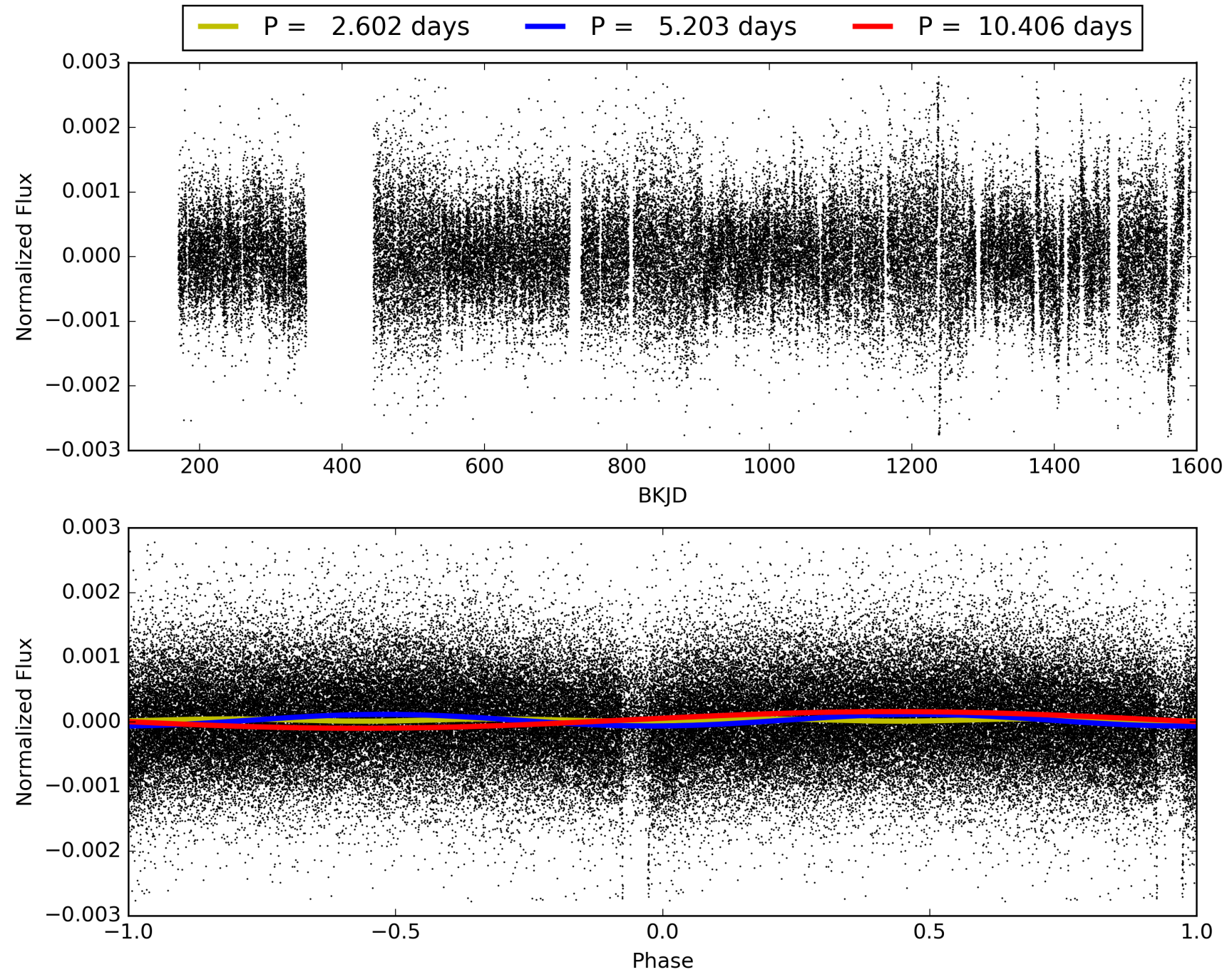
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 011909839-02, PDC Light Curves

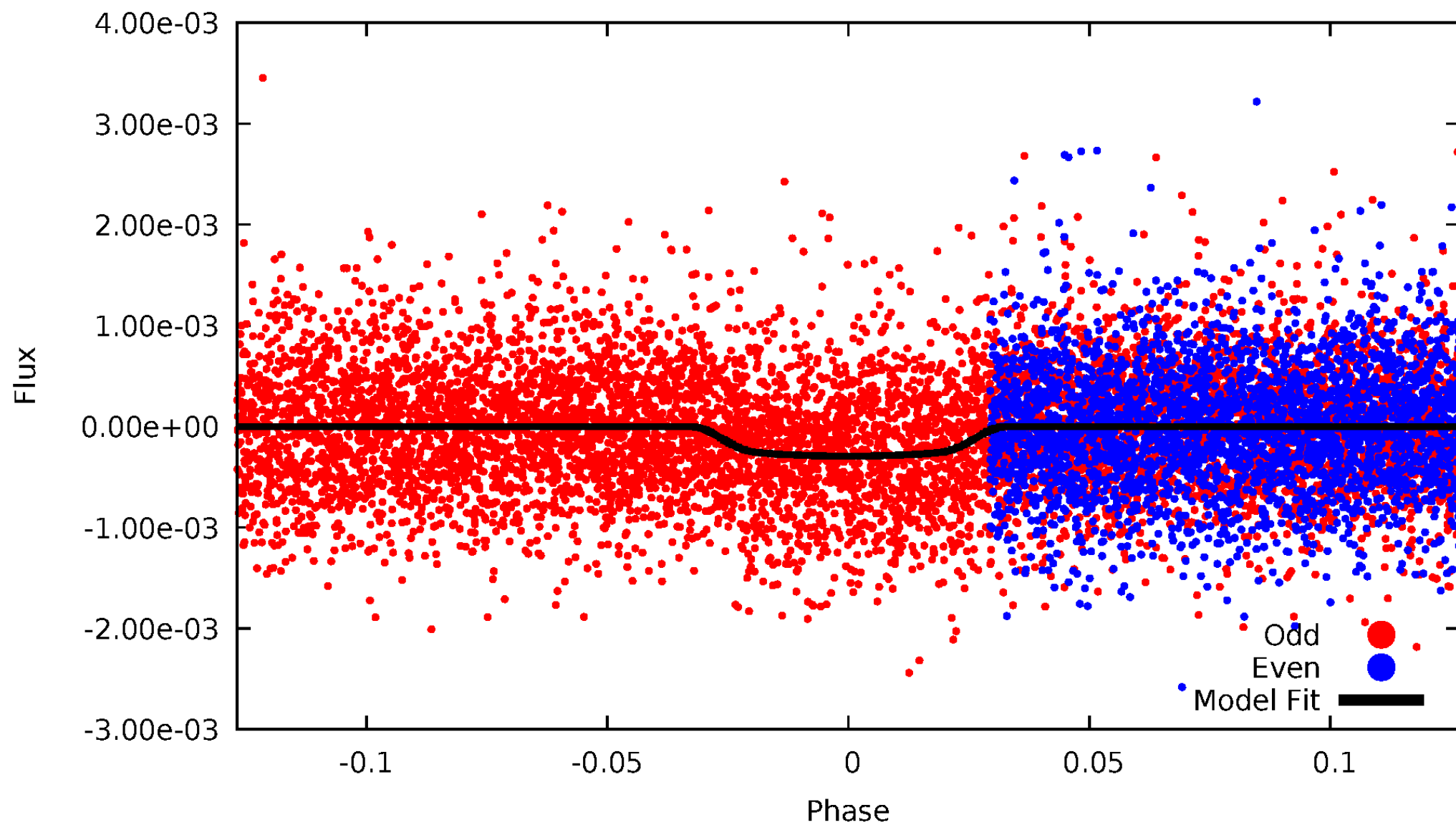


# TCE 011909839-02



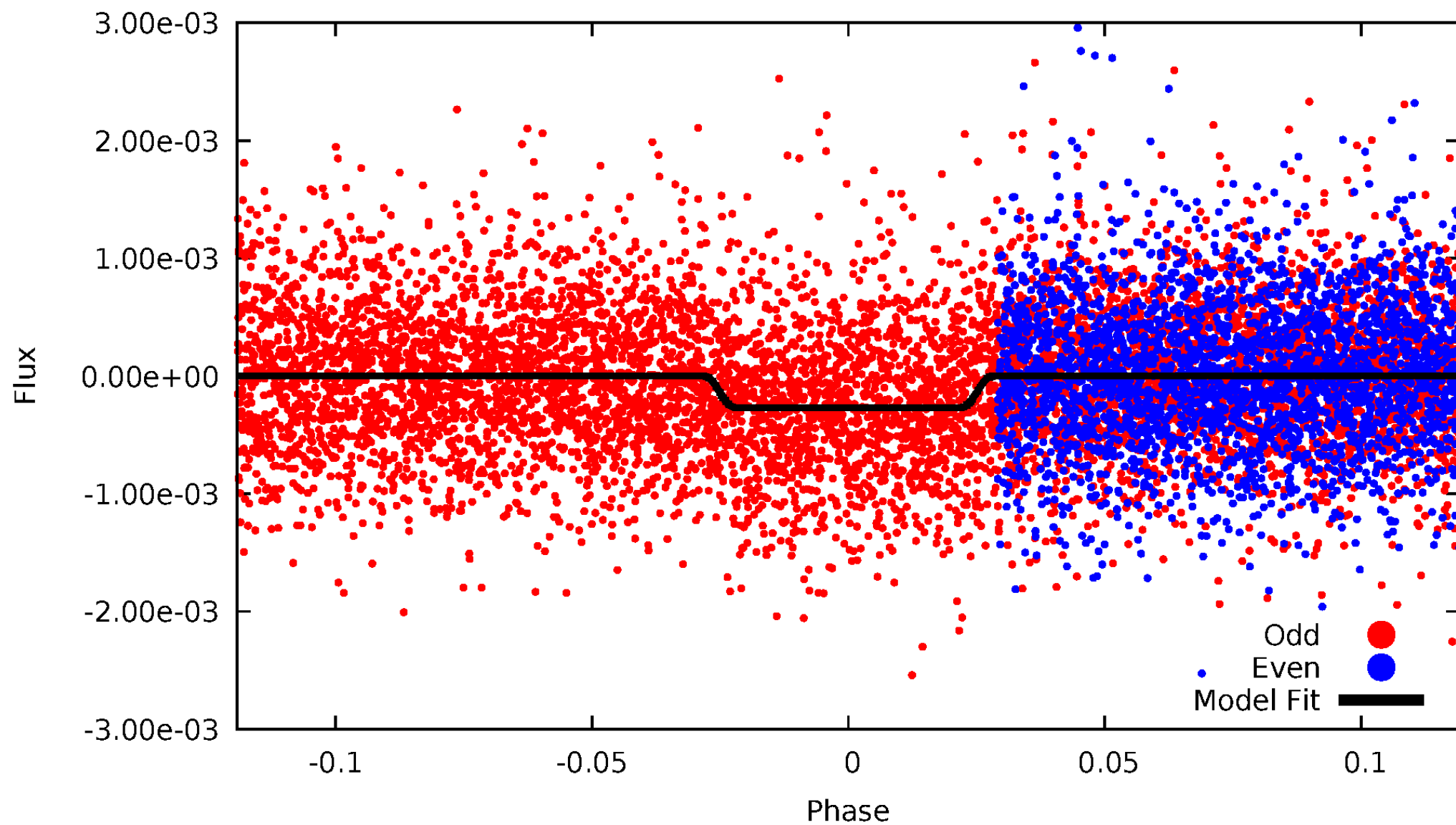
# DV Odd/Even

TCE 011909839-02



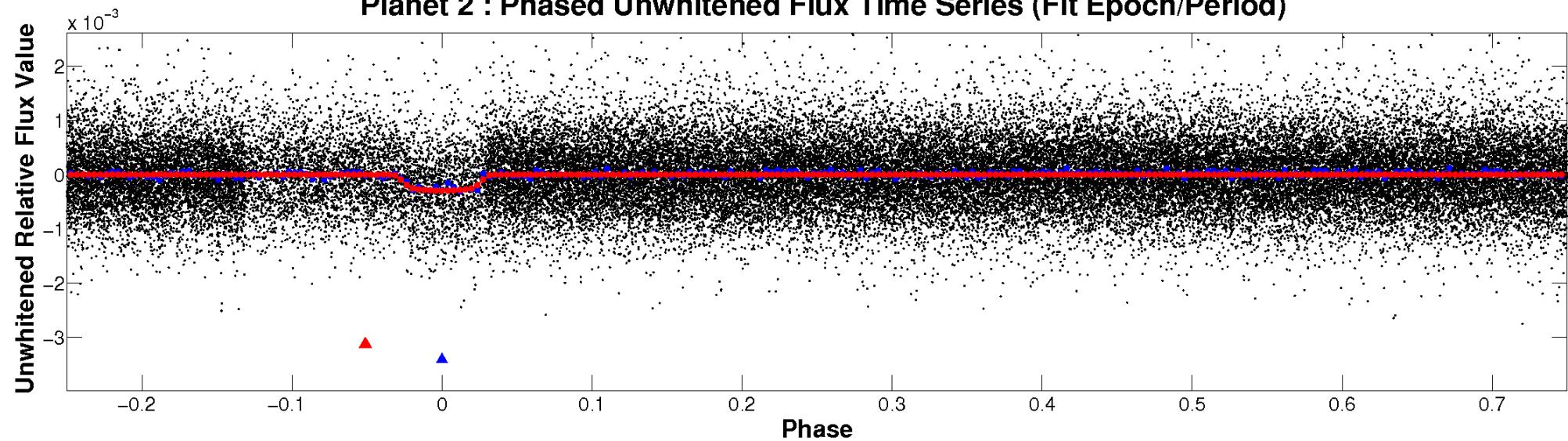
# ALT Odd/Even

TCE 011909839-02

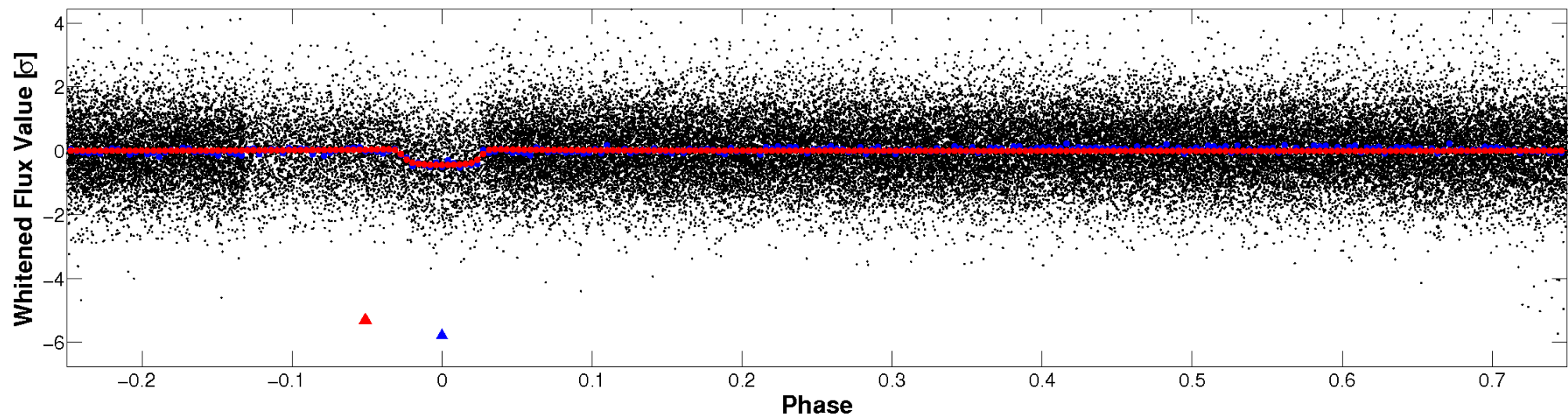


# Non-Whitened Vs. Whitened Light Curve

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



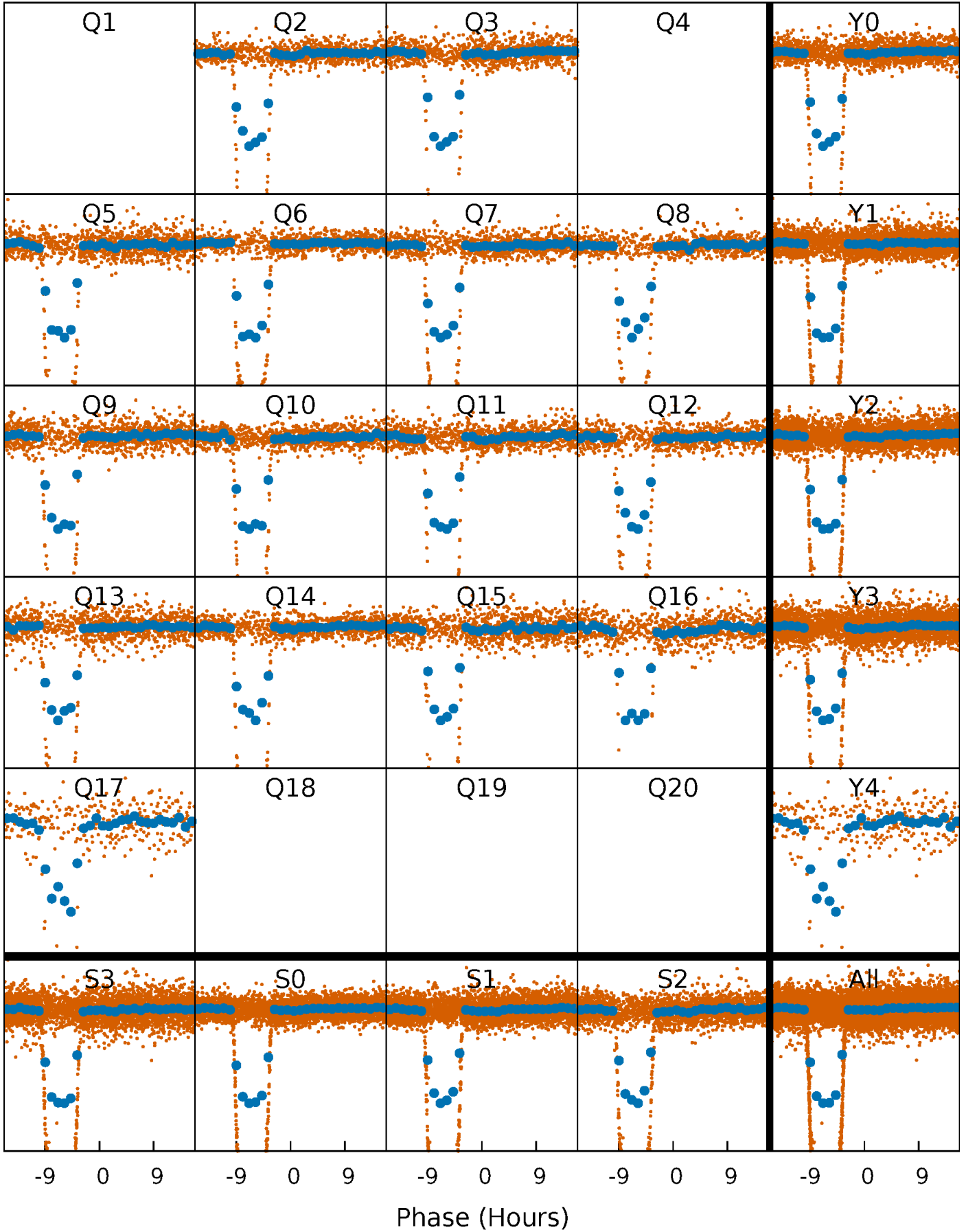
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





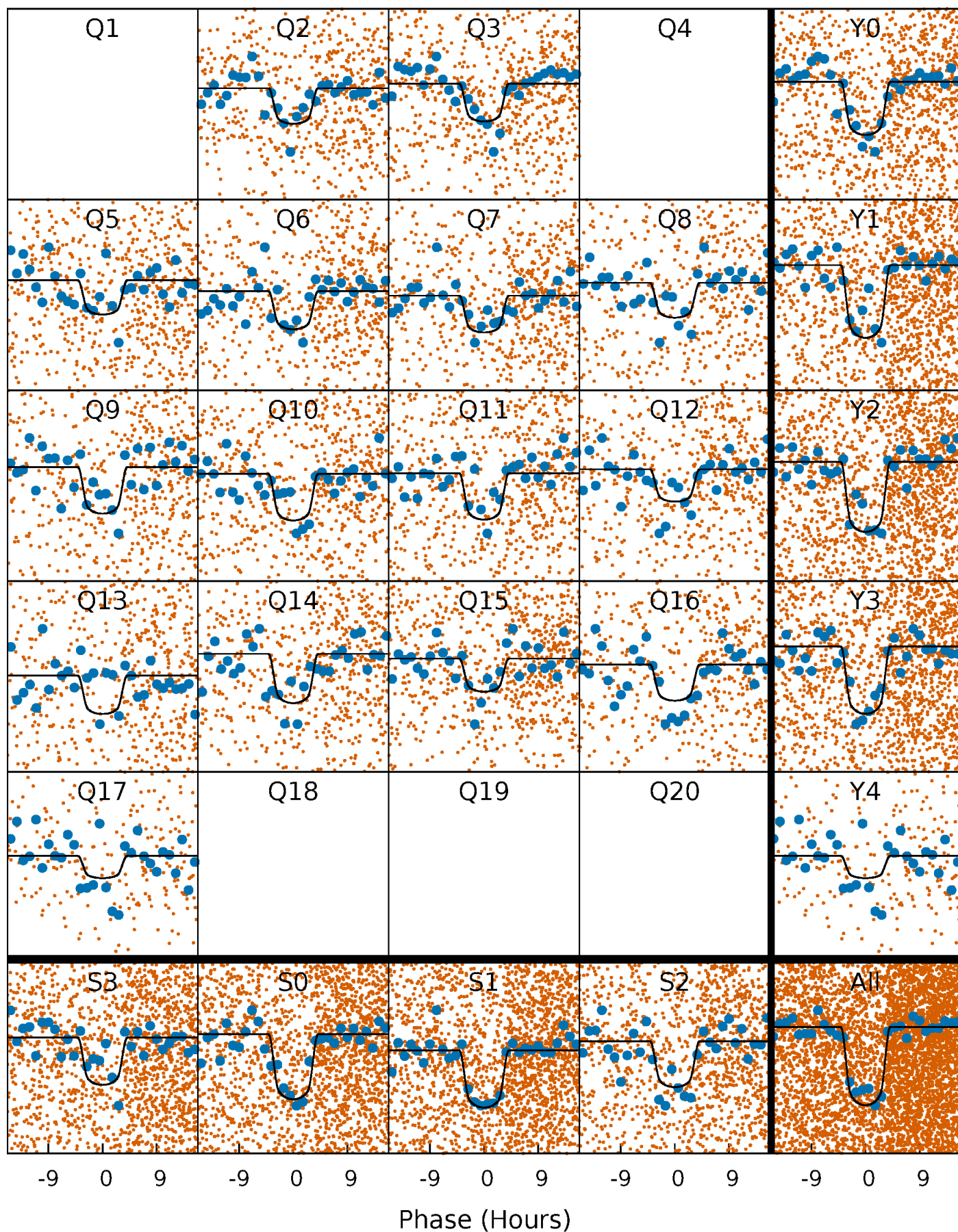
# PDC Quarter-Phased Transit Curves

TCE 011909839-02   P= 5.203001 Days    $T_0=135.839067$  (BKJD)



# DV Quarter-Phased Transit Curves

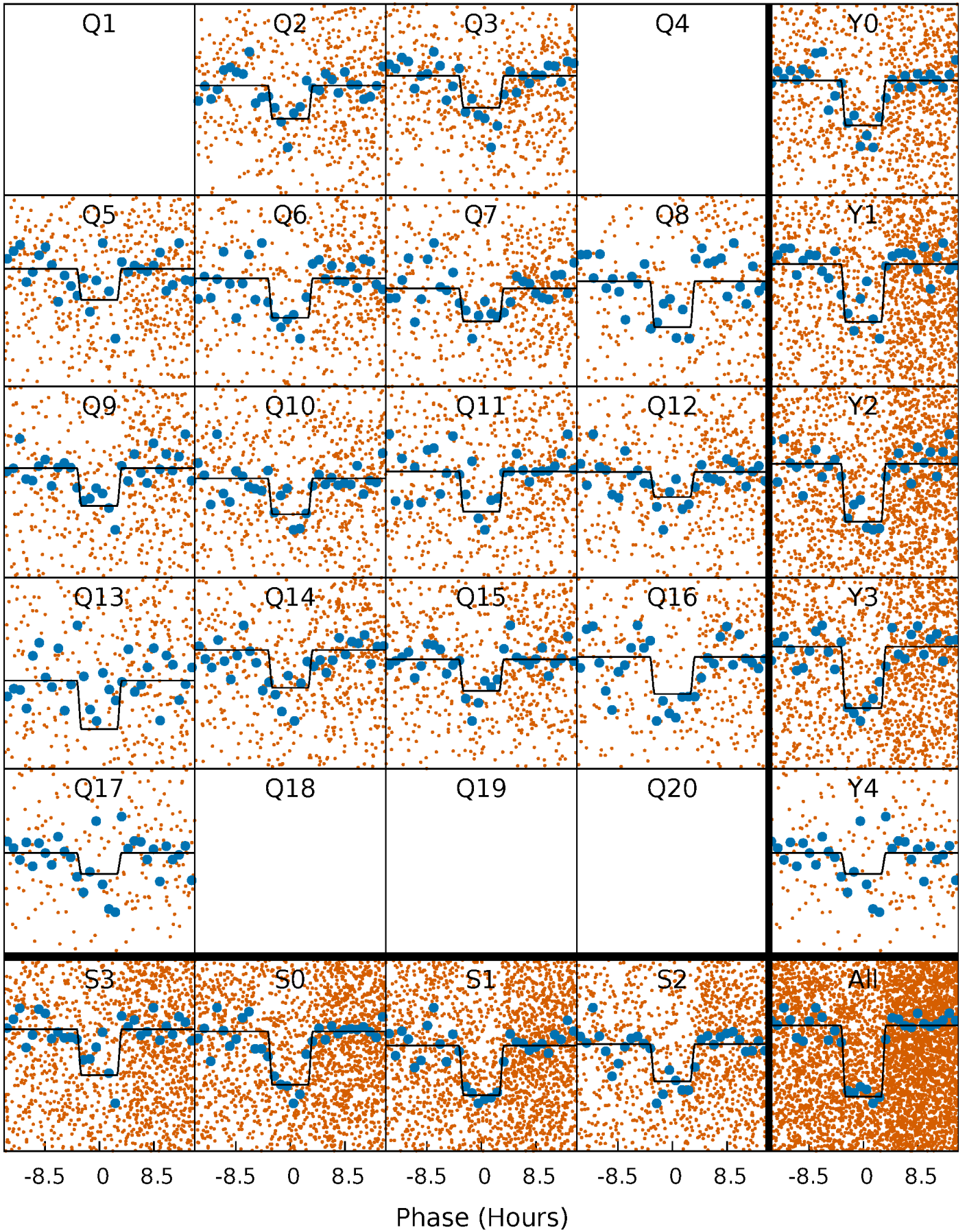
TCE 011909839-02 P= 5.203001 Days  $T_0=135.839067$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

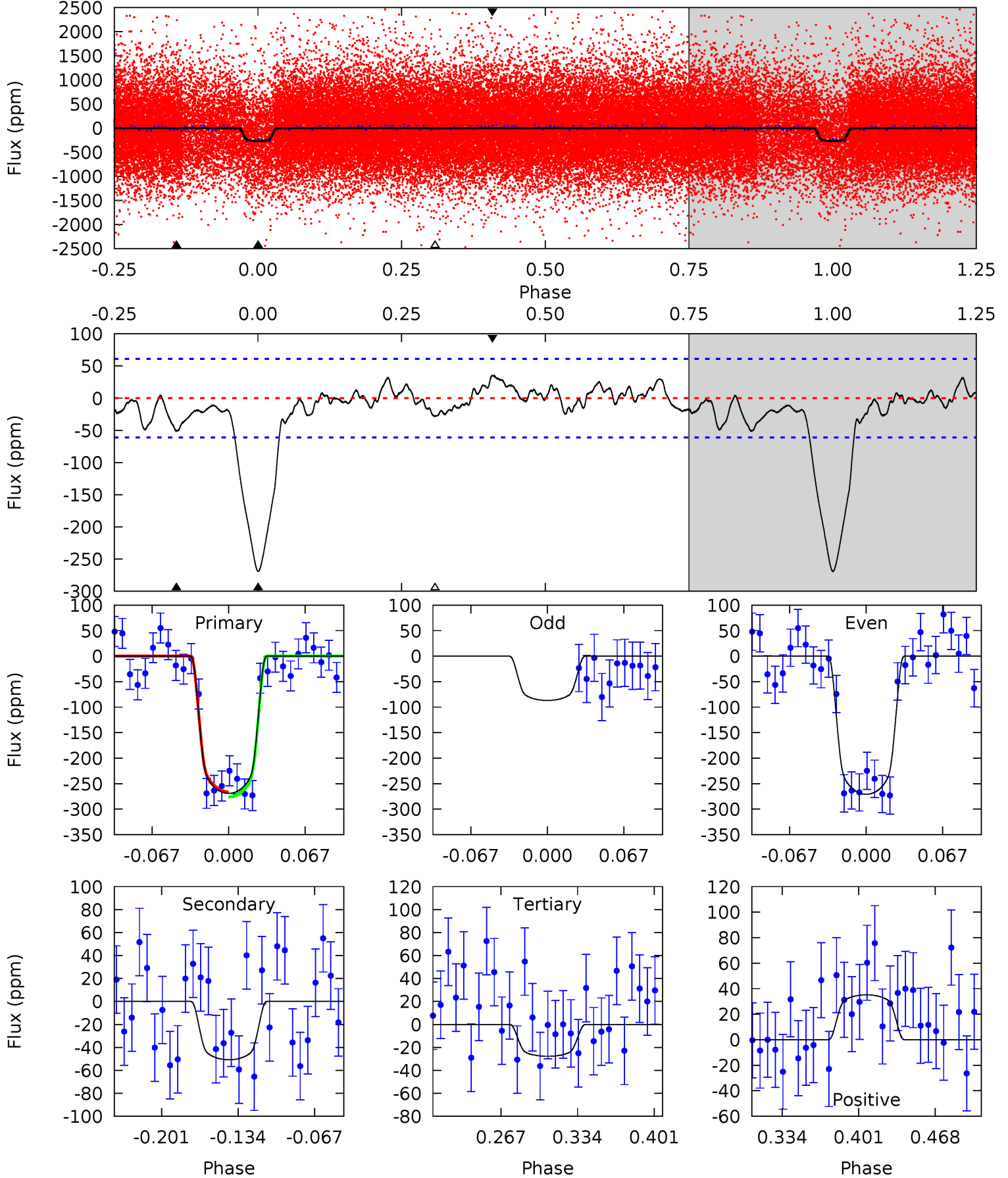
TCE 011909839-02 P= 5.203005 Days  $T_0=135.839478$  (BKJD)



# DV Model-Shift Uniqueness Test

011909839-02, P = 5.203001 Days, E = 135.839067 Days

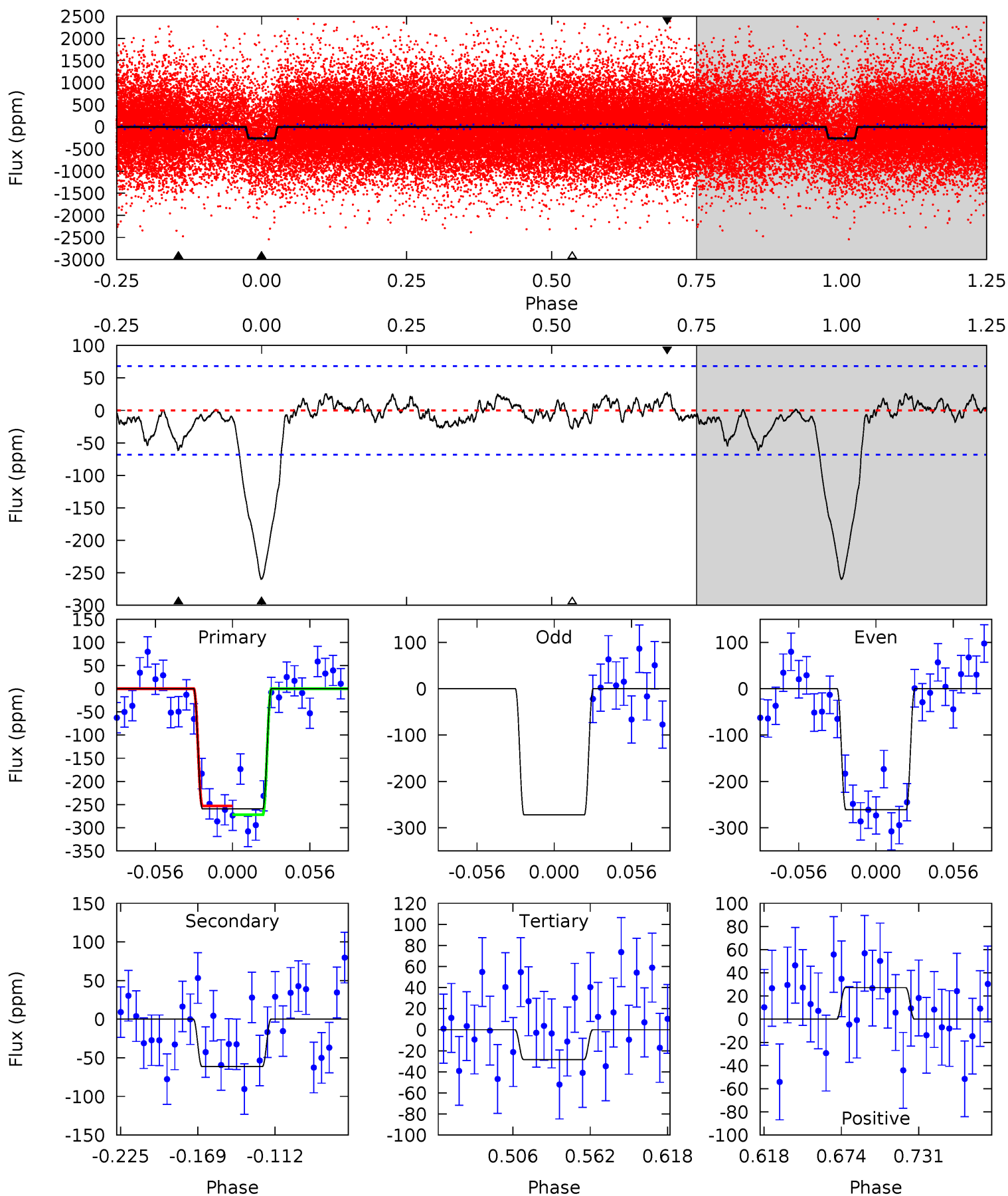
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.5	3.87	2.12	2.68	4.65	1.83	1.13	18.4	17.8	1.75	1.19	3.24	1.05	0.12	0.38



# Alt Model-Shift Uniqueness Test

011909839-02, P = 5.203005 Days, E = 135.839478 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
17.8	4.21	1.94	1.87	4.68	1.91	0.91	15.8	15.9	2.26	2.34	0.44	1.03	0.10	0.65



### Stellar Parameters For KIC 011909839

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5746^{+173}_{-173}$	$4.393^{+0.180}_{-0.198}$	$-0.540^{+0.300}_{-0.300}$	$0.924^{+0.241}_{-0.160}$	$0.770^{+0.118}_{-0.047}$	$1.373^{+1.087}_{-0.664}$
	+3%/-3%	+4%/-5%	+56%/-56%	+26%/-17%	+15%/-6%	+79%/-48%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011909839-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-51 \pm 13$	$2.02^{+0.33}_{-0.27}$	$1478^{+105}_{-103}$	$3816^{+209}_{-204}$	$20^{+9}_{-7}$
Alt.	$-61 \pm 15$	$1.66^{+0.29}_{-0.21}$	$1472^{+111}_{-102}$	$4214^{+239}_{-248}$	$35^{+15}_{-12}$

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

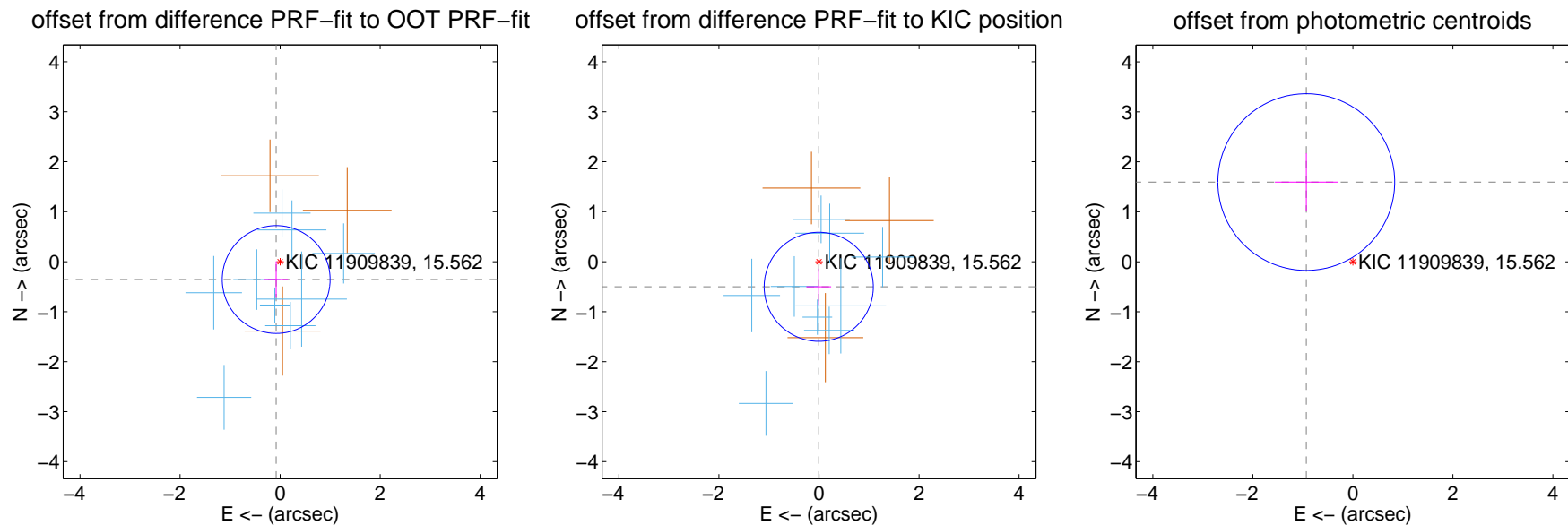
## DV Centroid Data

Supplemental centroid analysis for 011909839-02. Kepler magnitude: 15.56. Transit SNR 15.35

There are 9 quarters with good PRF difference image offsets

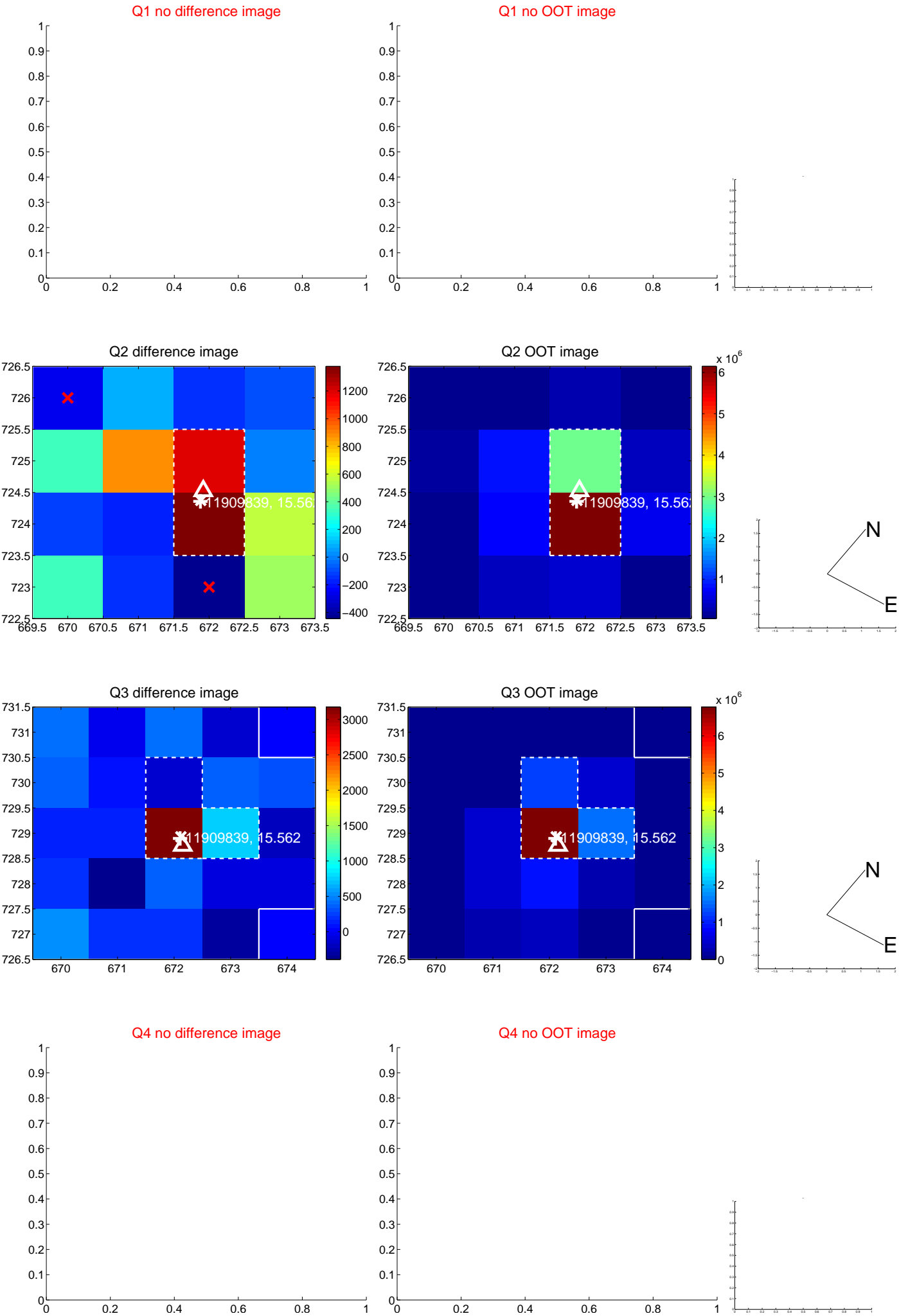
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.365 \pm 0.359$	1.02	$0.079 \pm 0.239$	$-0.357 \pm 0.364$
PRF-fit source offset from KIC position	$0.502 \pm 0.363$	1.38	$0.005 \pm 0.249$	$-0.502 \pm 0.363$
photometric centroid source offset	$1.85 \pm 0.59$	<b>3.13</b>	$0.93 \pm 0.63$	$1.59 \pm 0.58$

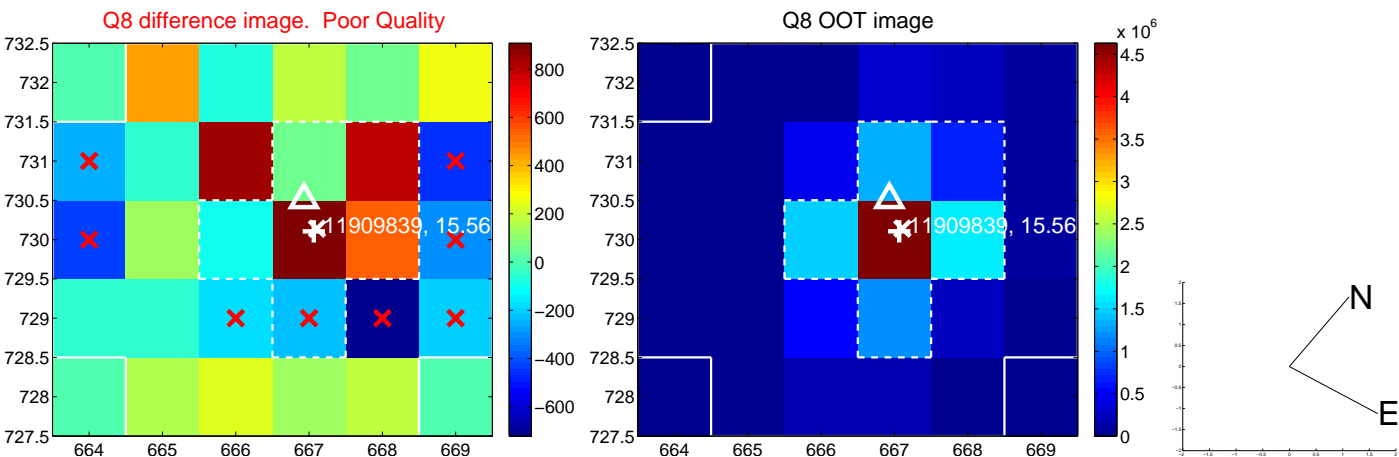
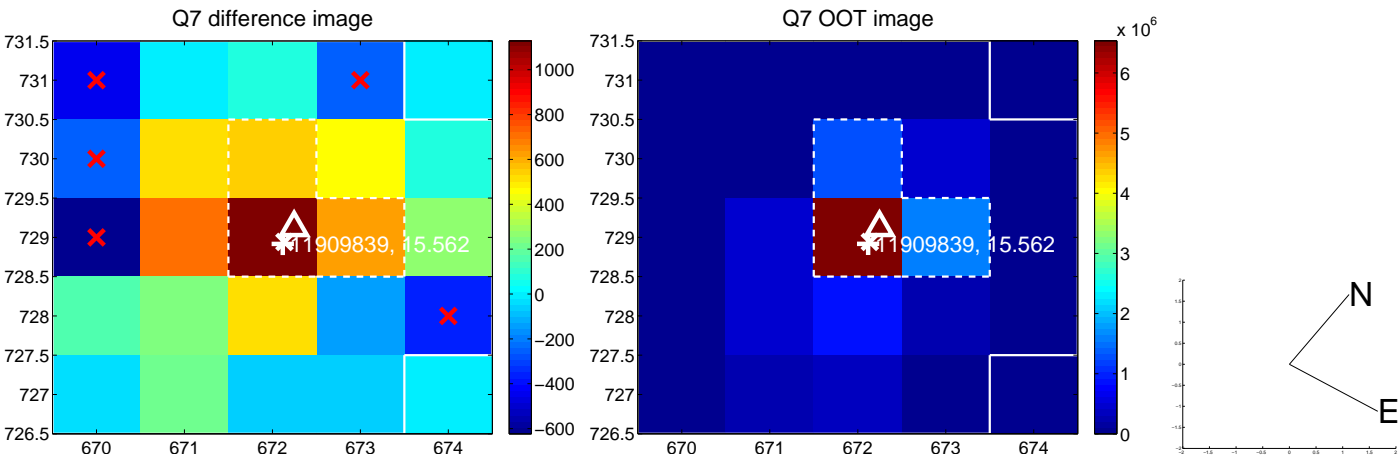
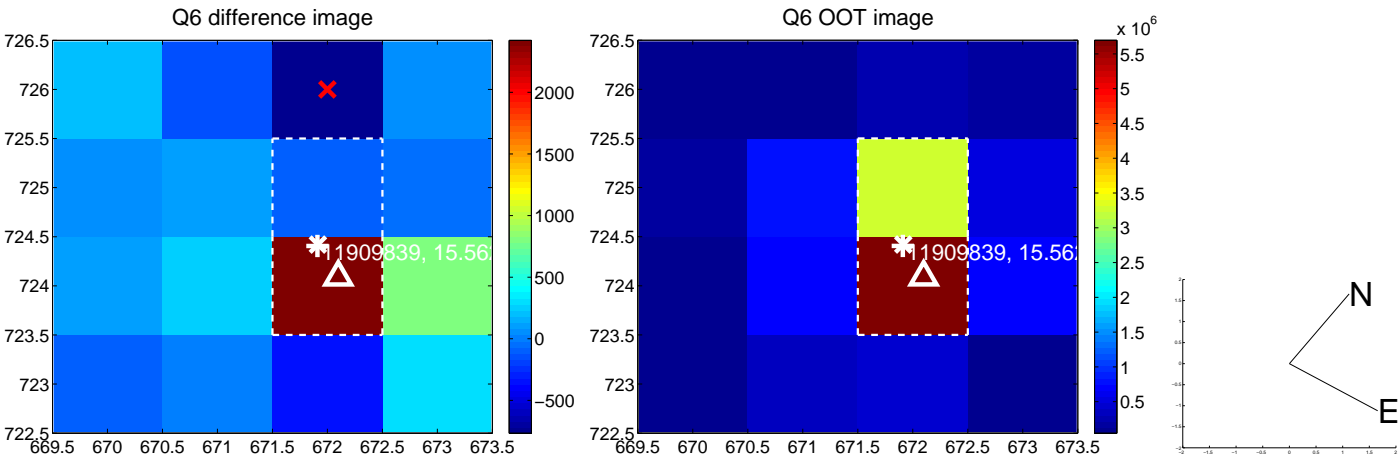
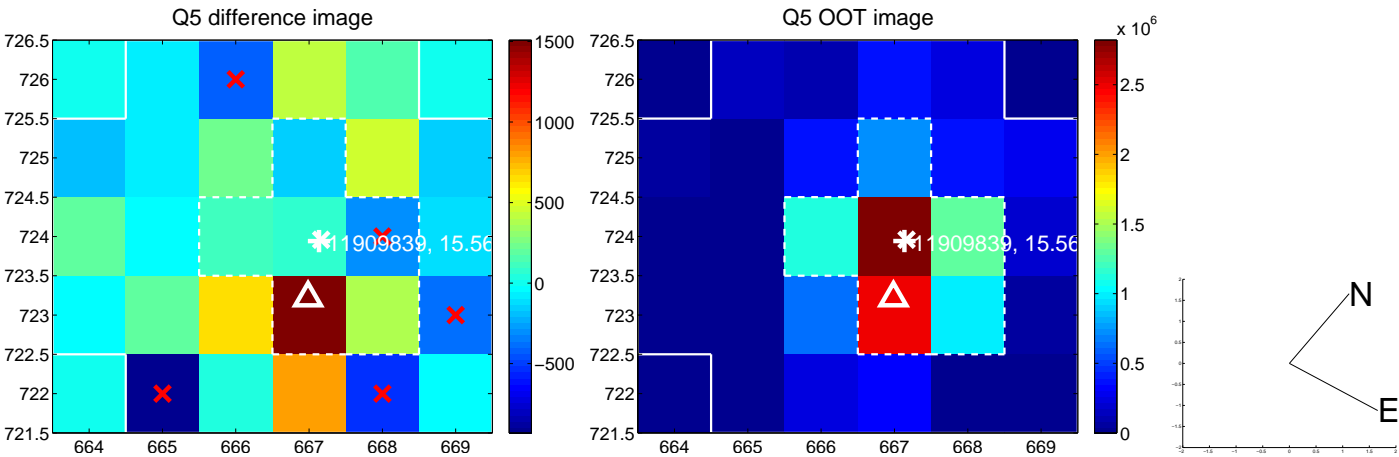


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

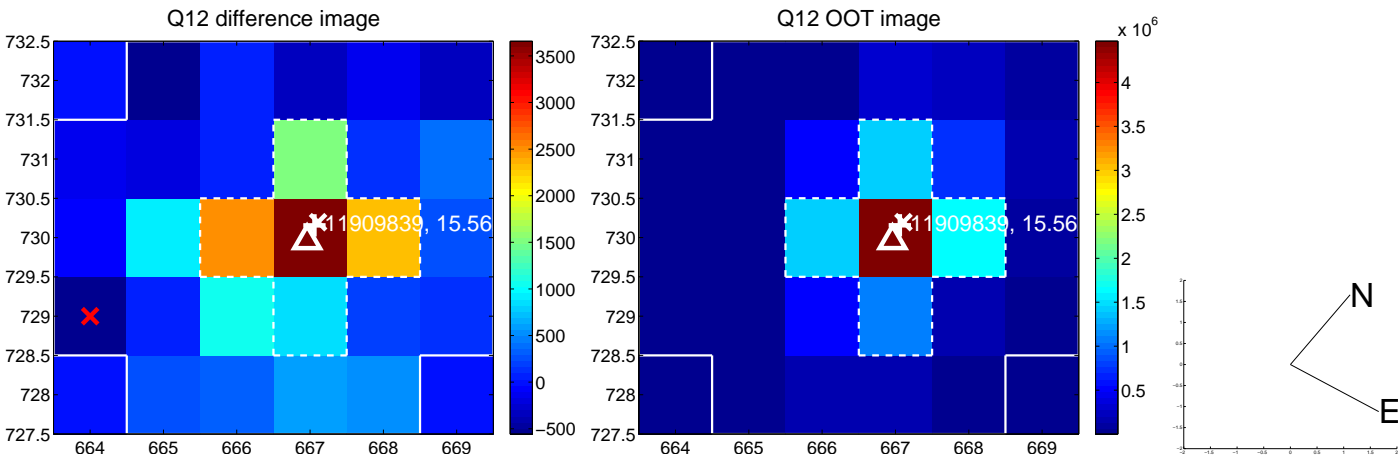
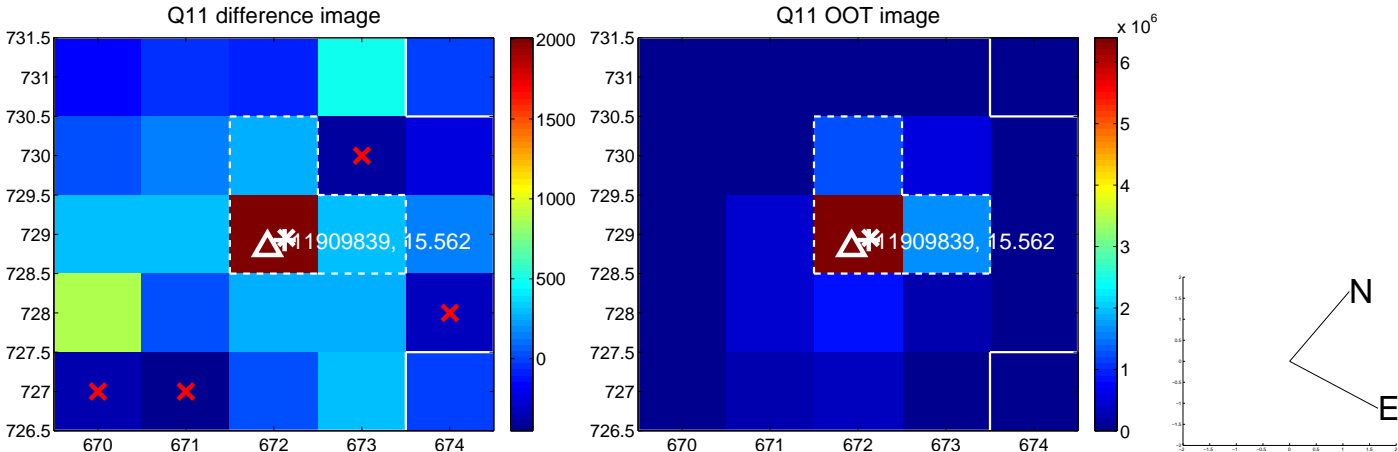
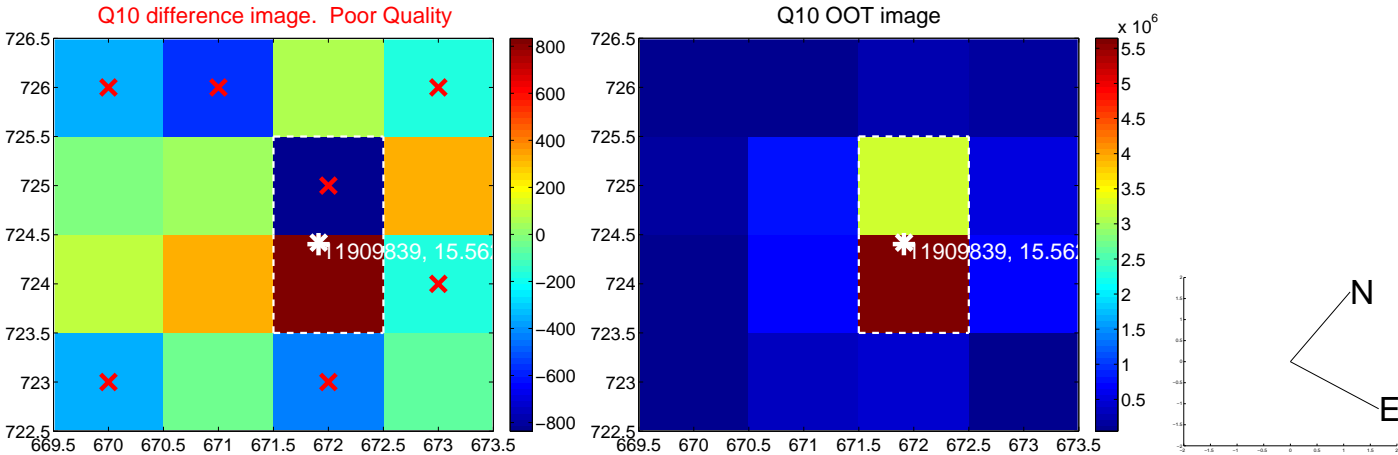
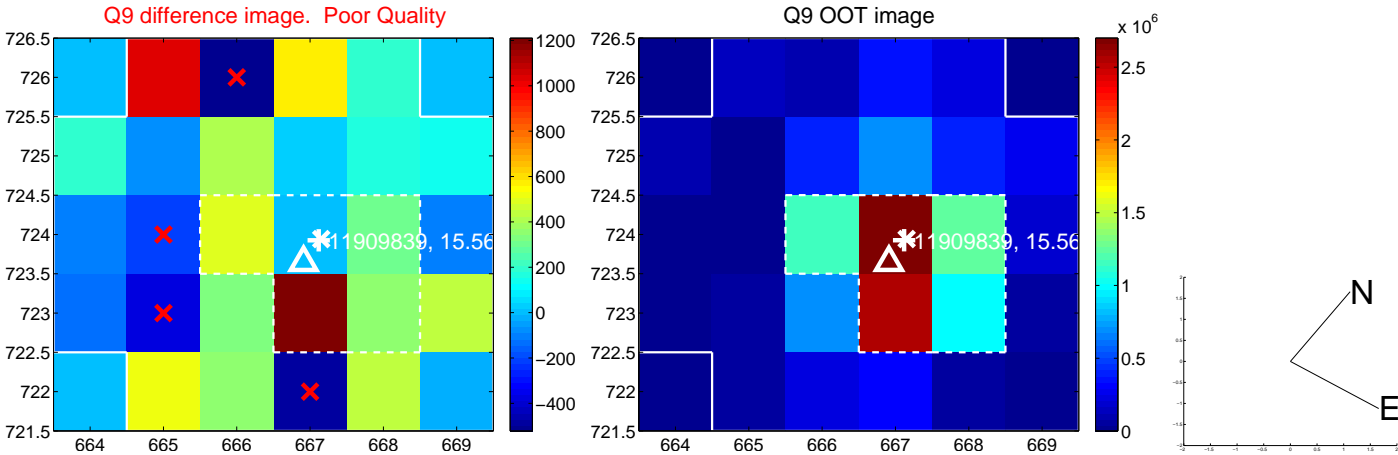
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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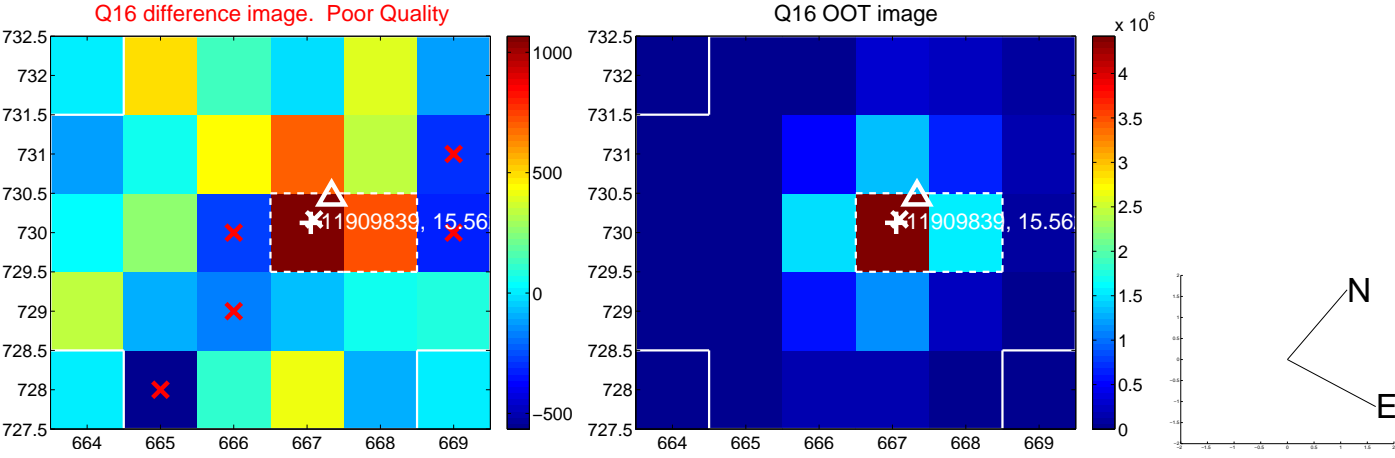
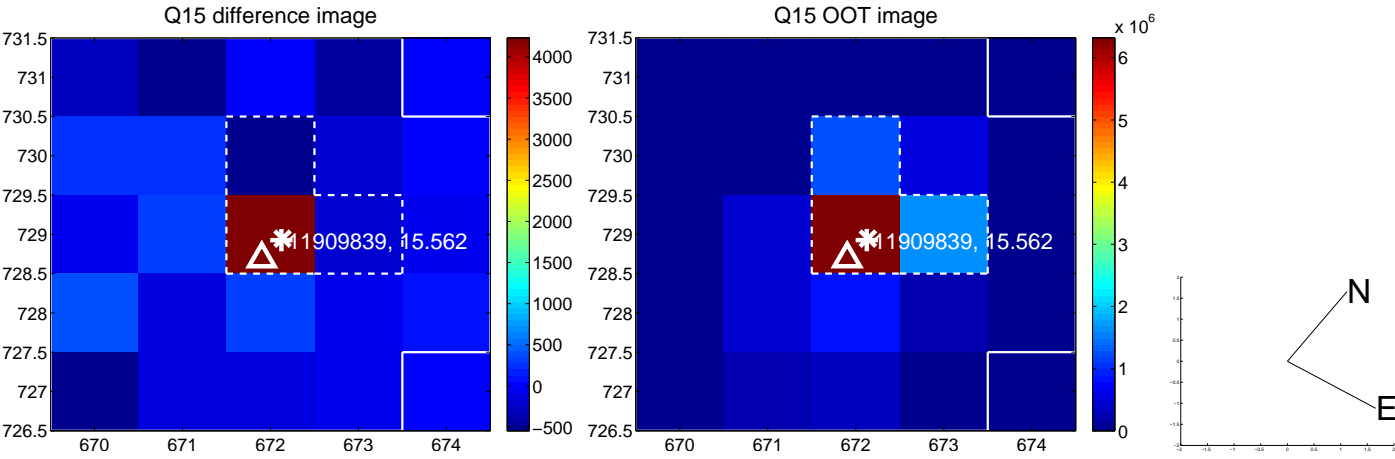
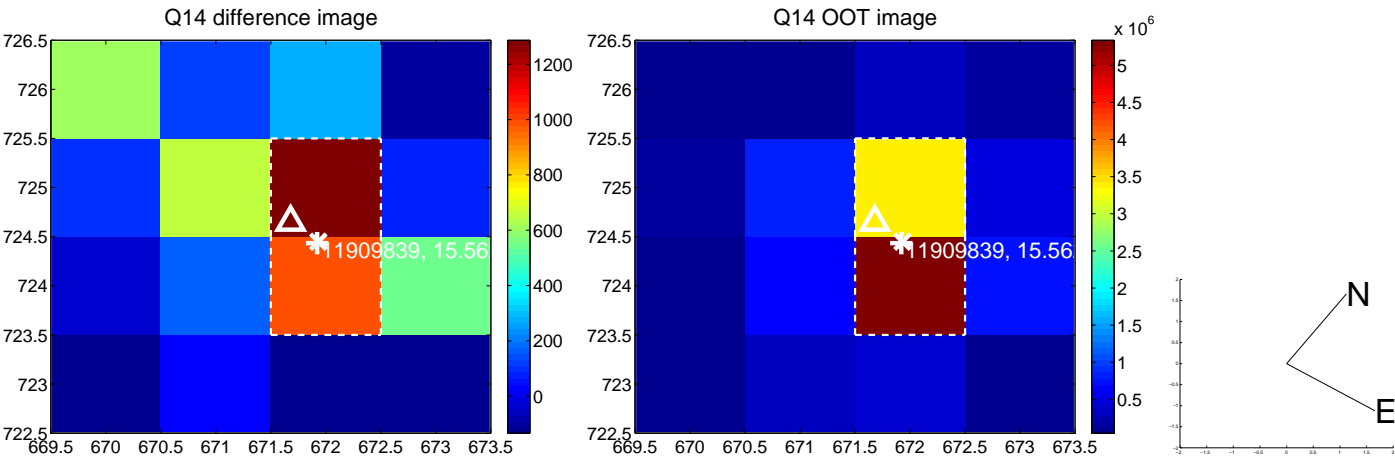
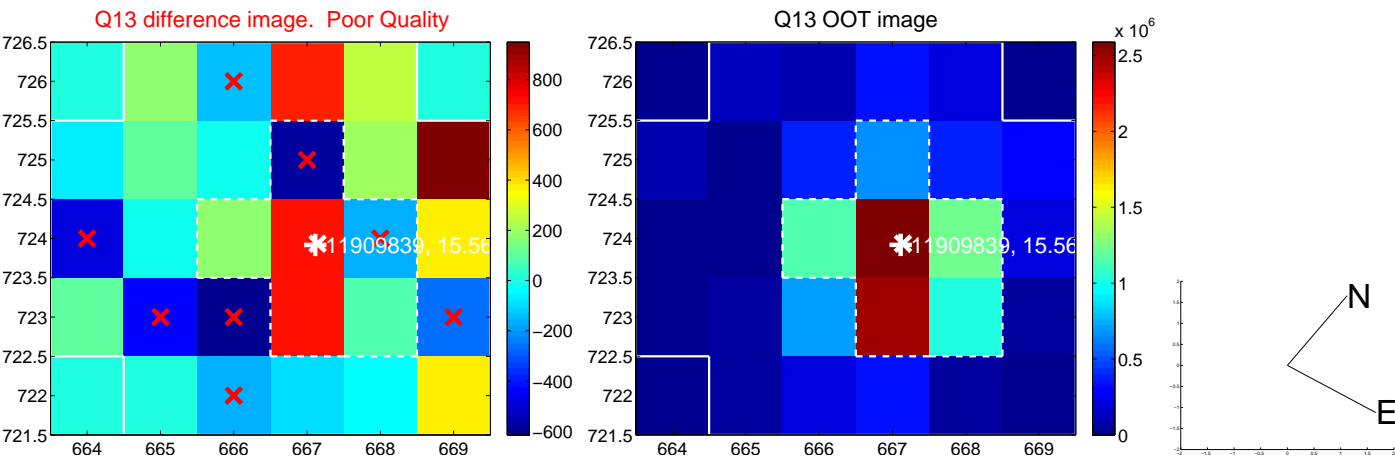


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

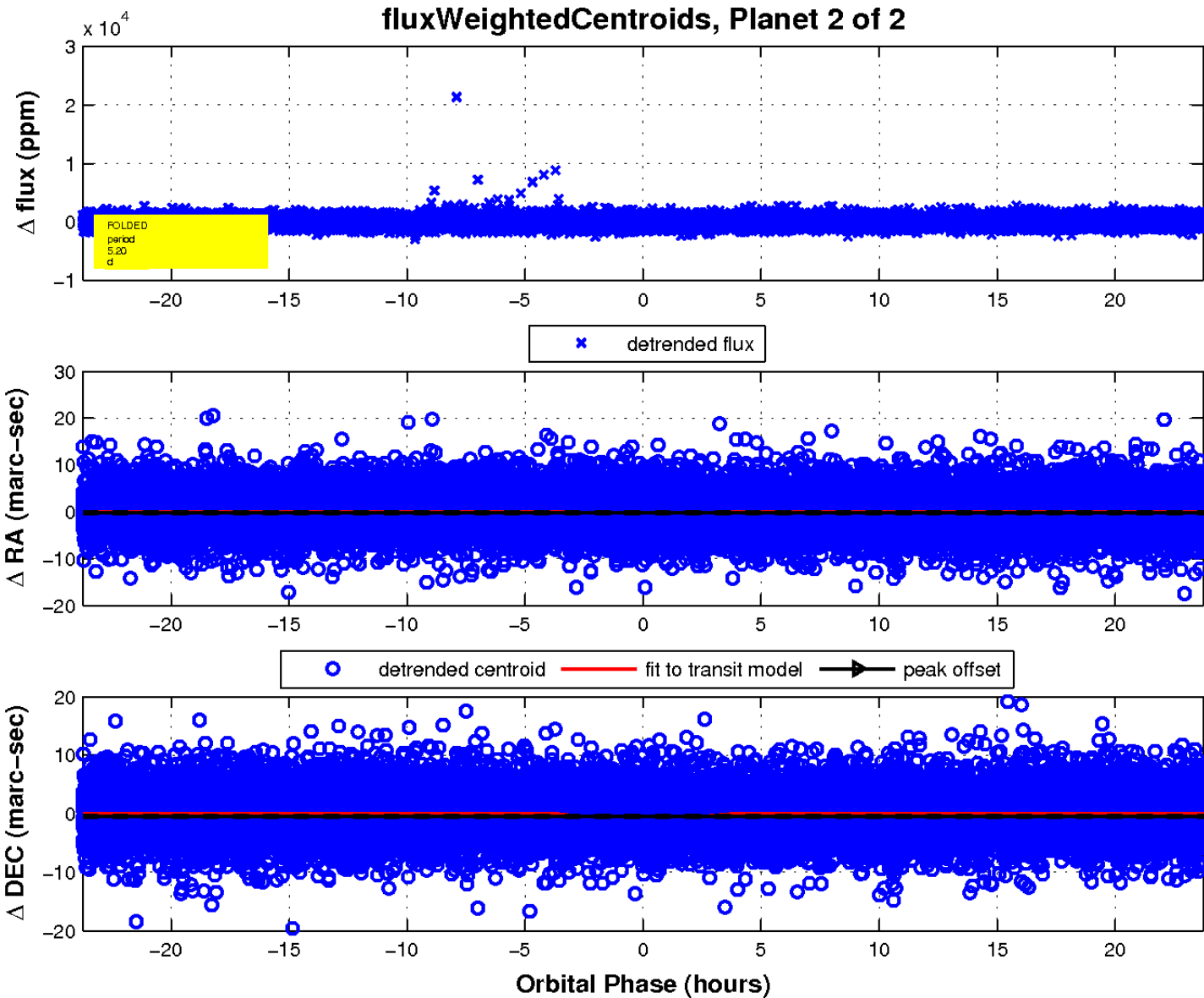
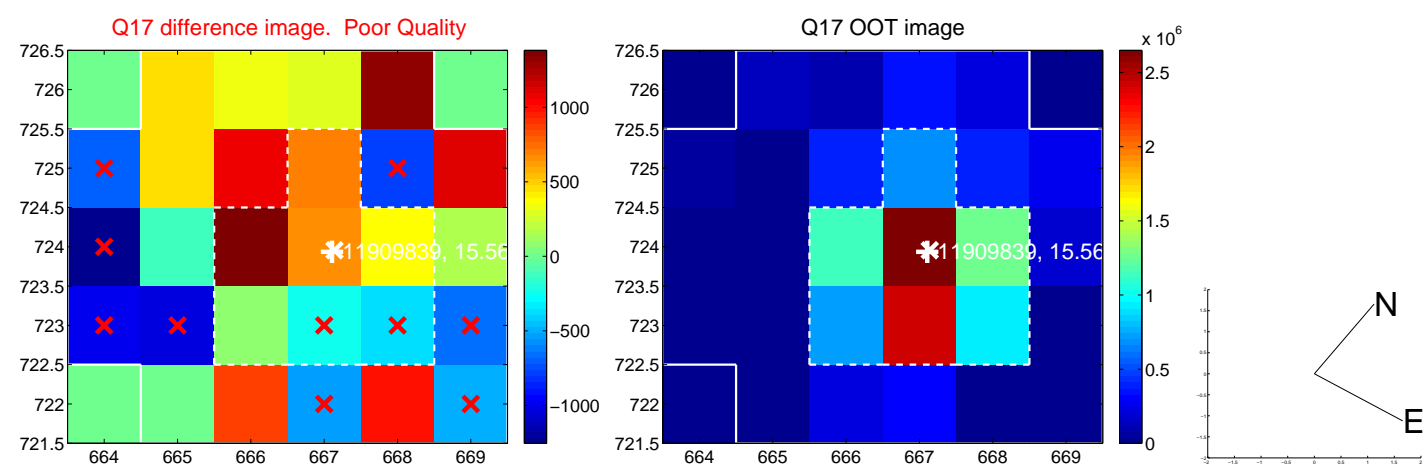




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UKIRT Image

Declination

