

# KIC 005390672

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005390672-01	OBS	No	4.115710	131.602683	22.1	19.440	11.4	8.4	2.93	6643	1.46	4576.51
005390672-02	OBS	No	4.115507	132.640813	52.2	31.771	13.0	14.7	2.93	6643	2.16	4576.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005390672-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
005390672-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

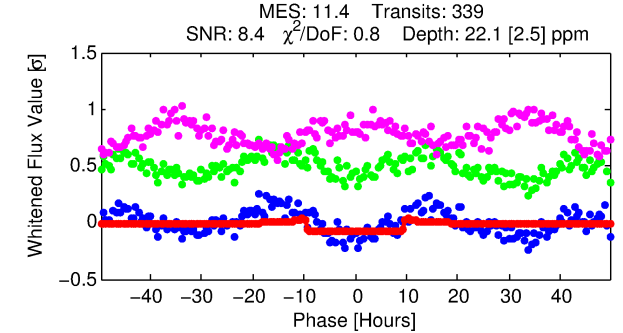
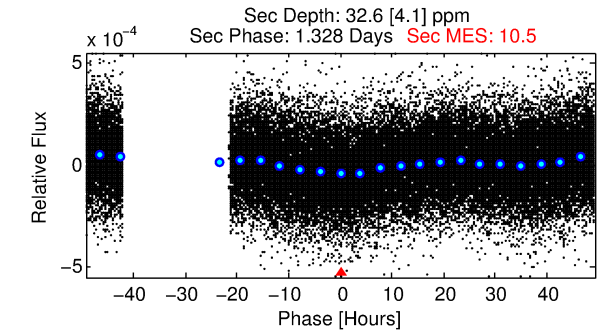
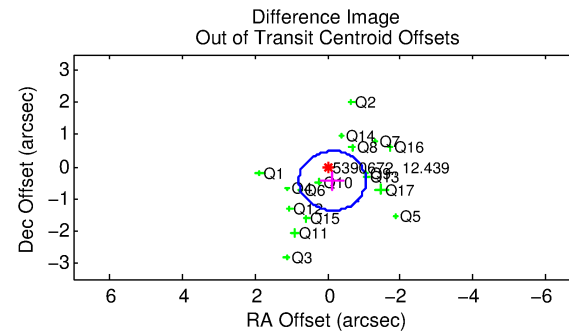
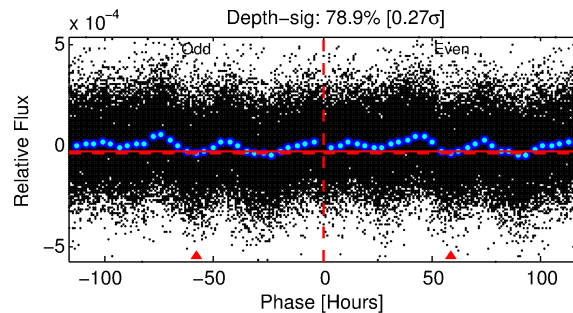
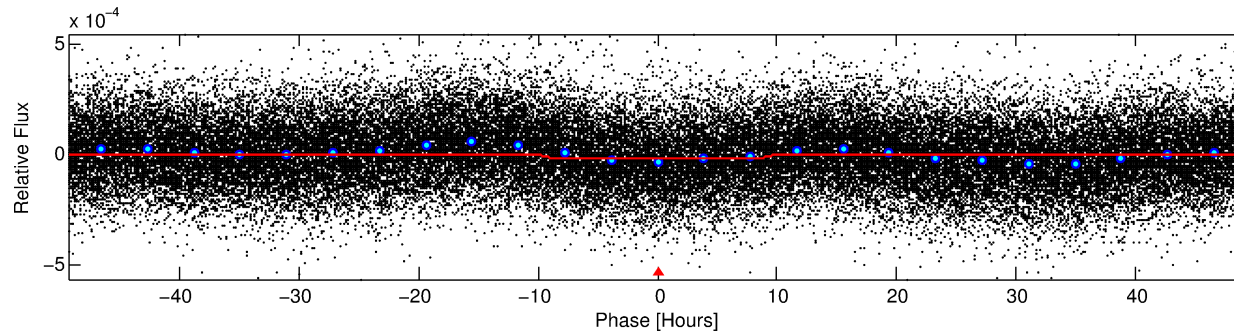
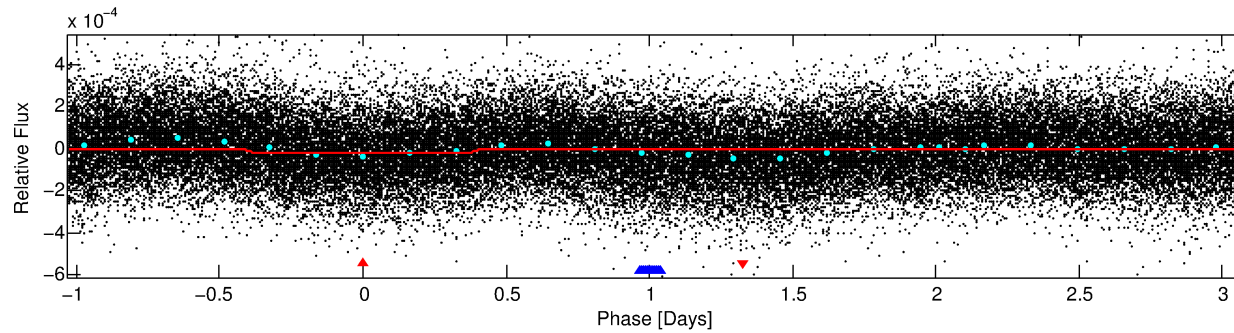
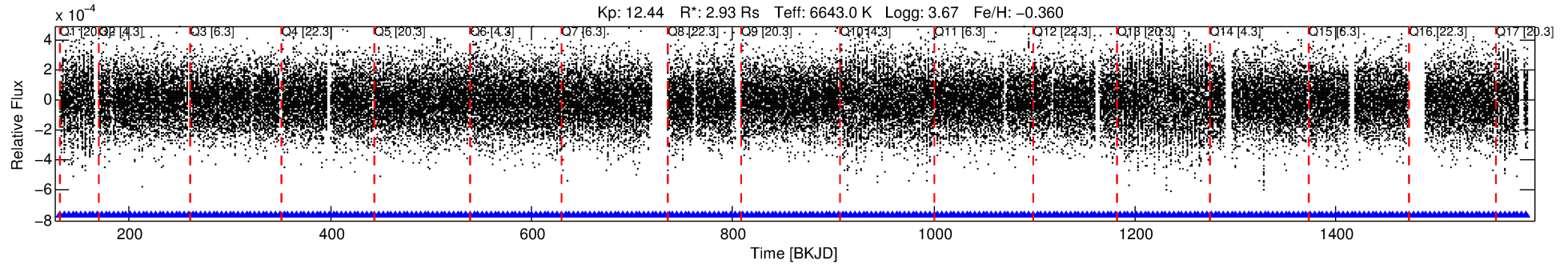
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005390672-01

No Significant Match Found

# DV One-Page Summary

KIC: 5390672 Candidate: 1 of 2 Period: 4.116 d



## DV Fit Results:

Period = 4.11571 [0.00006] d  
Epoch = 131.6027 [0.0100] BKJD  
Rp/R\* = 0.0046 [0.0012]  
a/R\* = 1.48 [1.13]  
b = 0.65 [1.28]  
Seff = 4576.51 [2640.22]  
Teq = 2097 [302] K  
Rp = 1.46 [0.66] Re  
a = 0.0572 [0.0203] AU  
Ag = 27.70 [21.22] [1.26 $\sigma$ ]  
Teffp = 7439 [1000] K [5.11 $\sigma$ ]

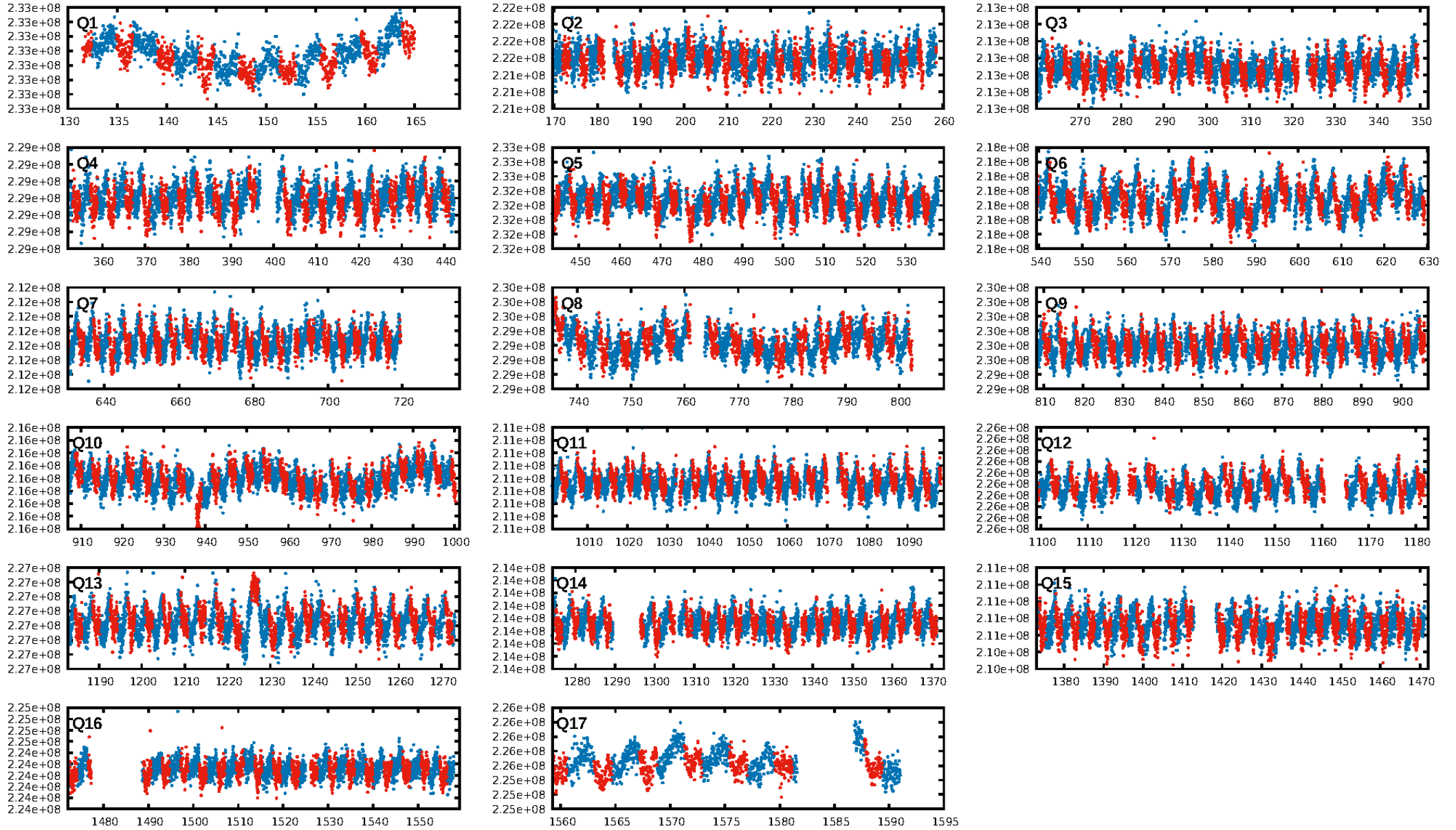
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [323/323]  
GhostDiagnostic-chr: 3.292  
Centroid-sig: 0.5%  
Centroid-so: 1.248 arcsec [1.46 $\sigma$ ]  
OotOffset-rm: 0.459 arcsec [1.49 $\sigma$ ]  
KicOffset-rm: 0.499 arcsec [1.63 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

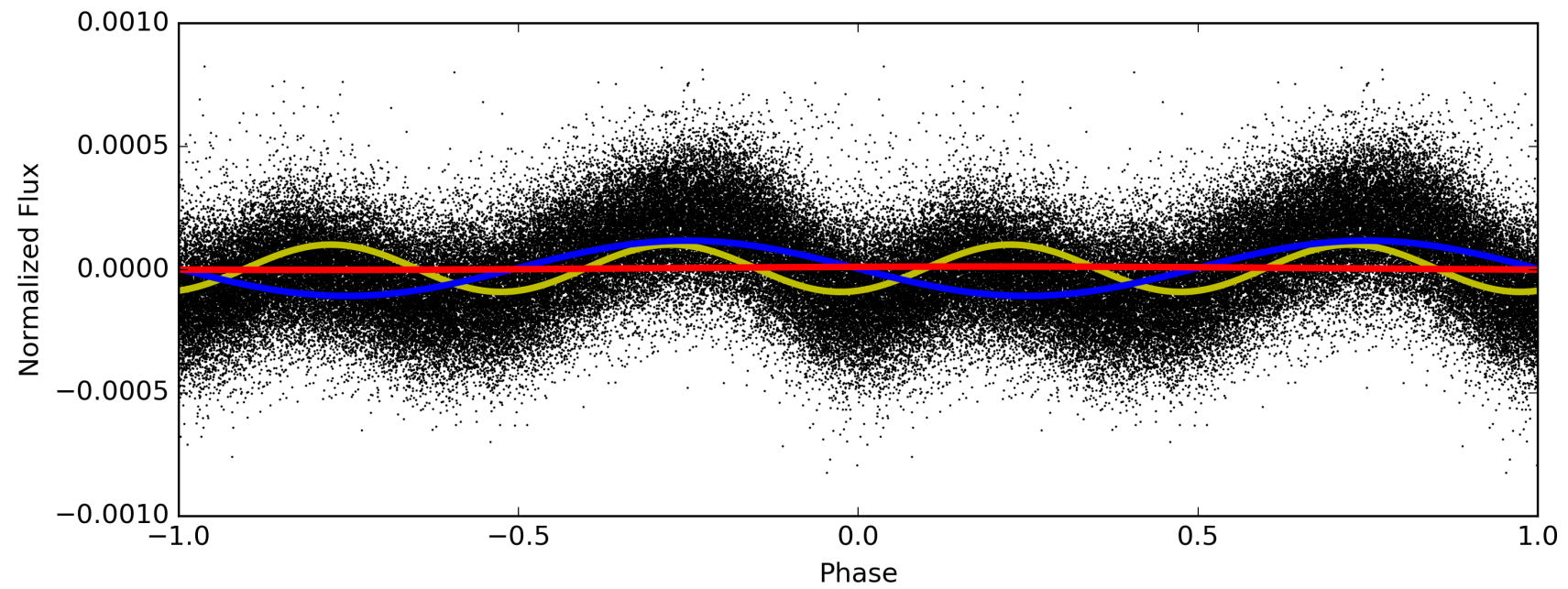
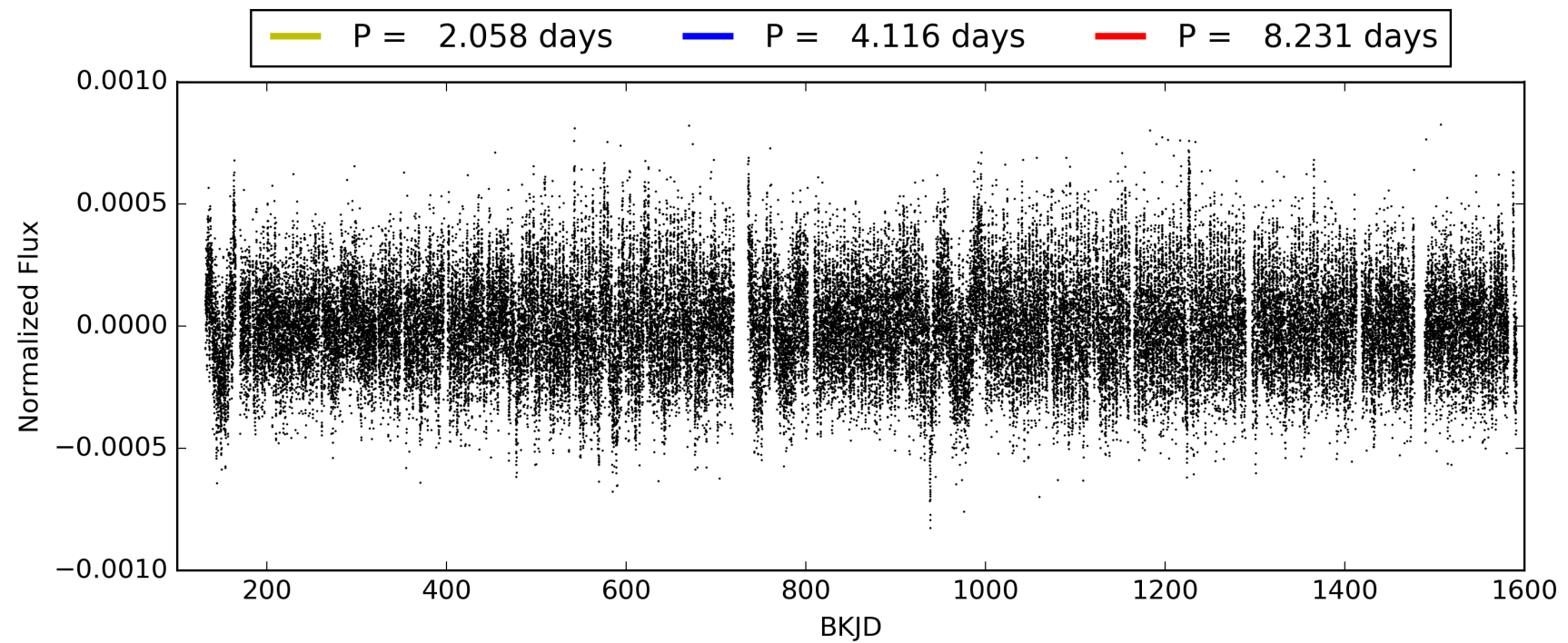
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:44:02 Z

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

# TCE 005390672-01, PDC Light Curves



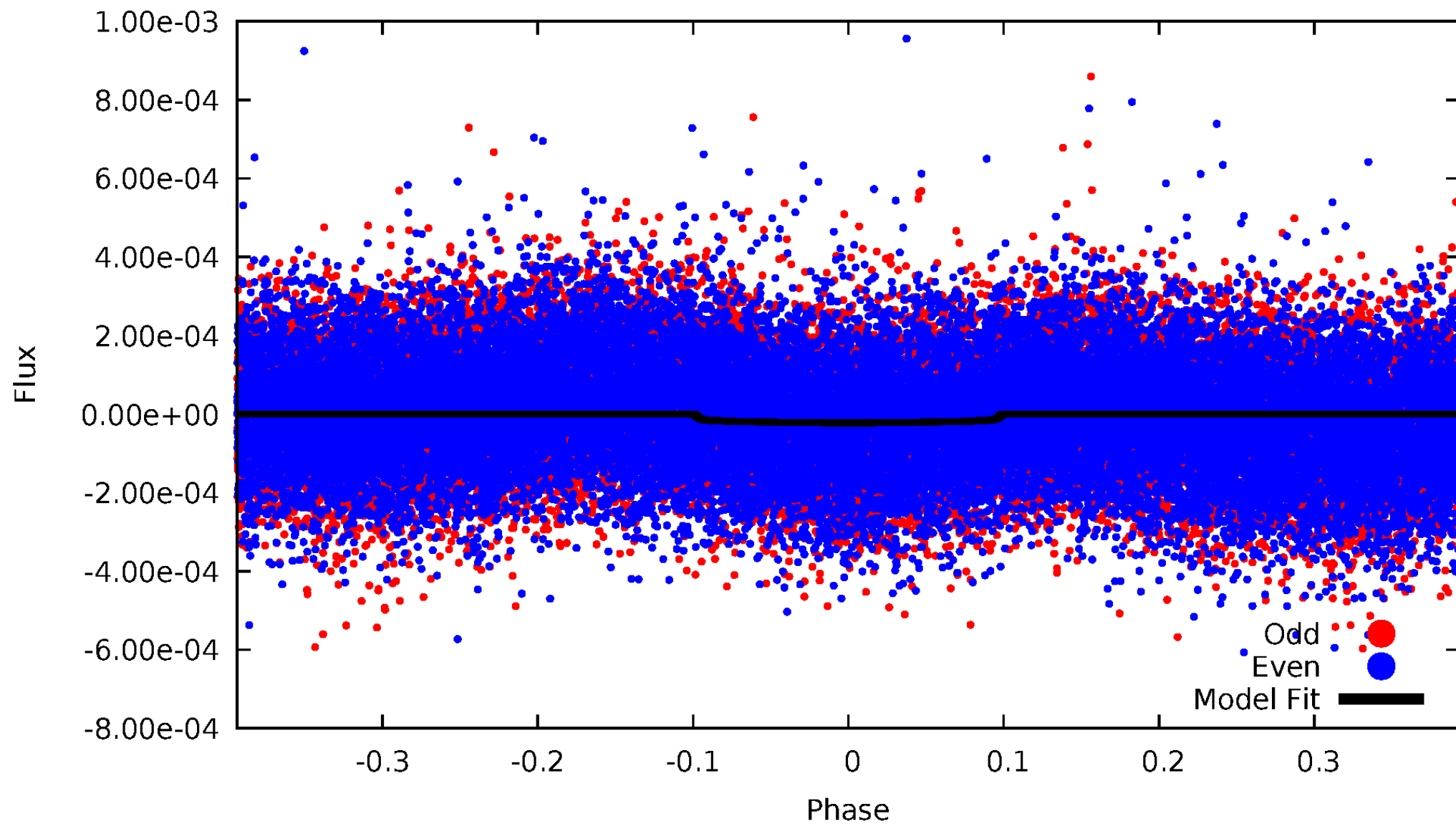
TCE 005390672-01





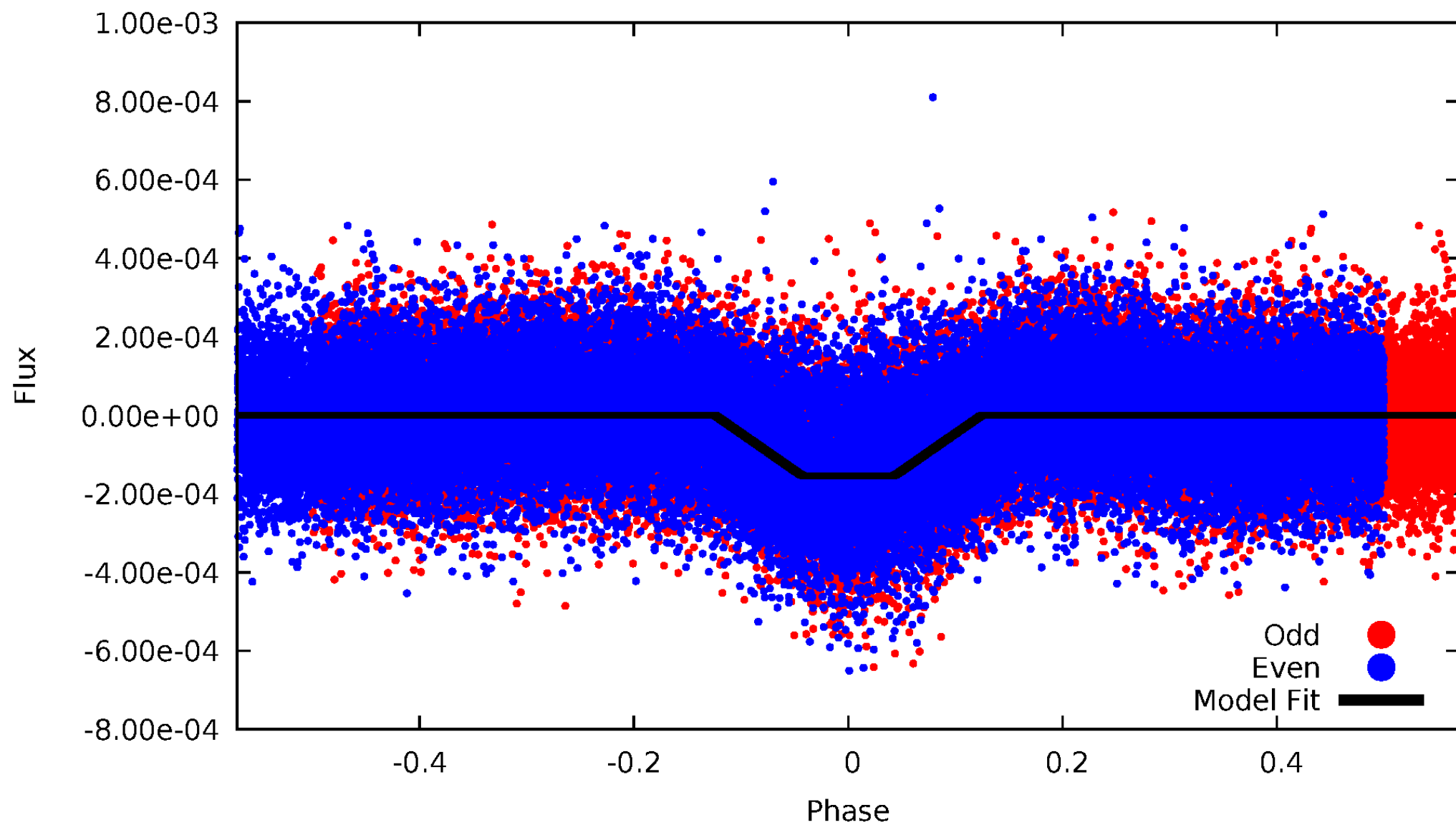
# DV Odd/Even

TCE 005390672-01



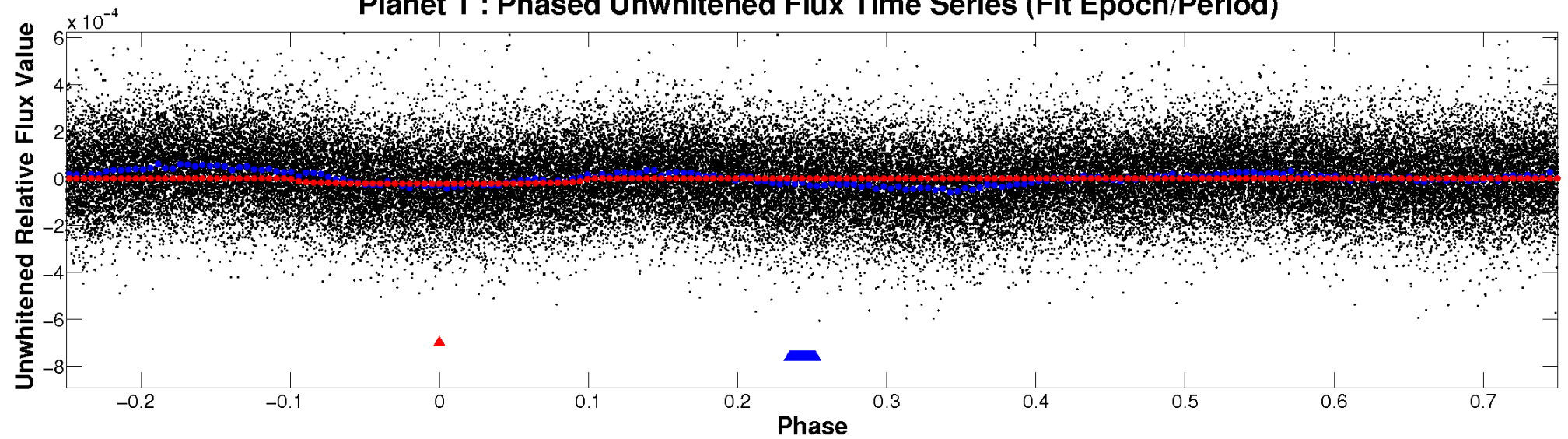
# ALT Odd/Even

TCE 005390672-01

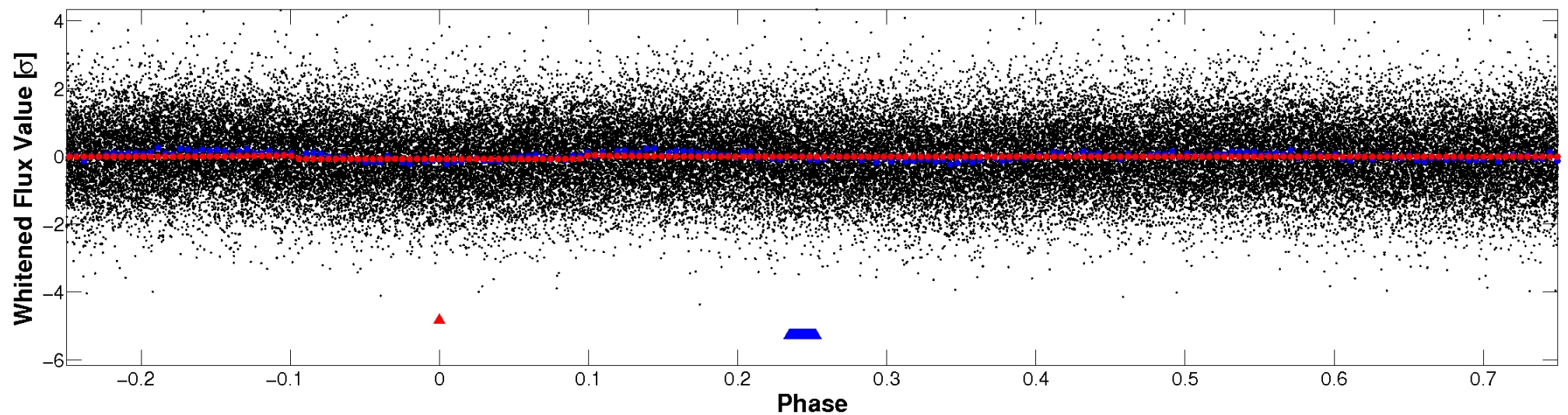


# Non-Whitened Vs. Whitened Light Curve

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

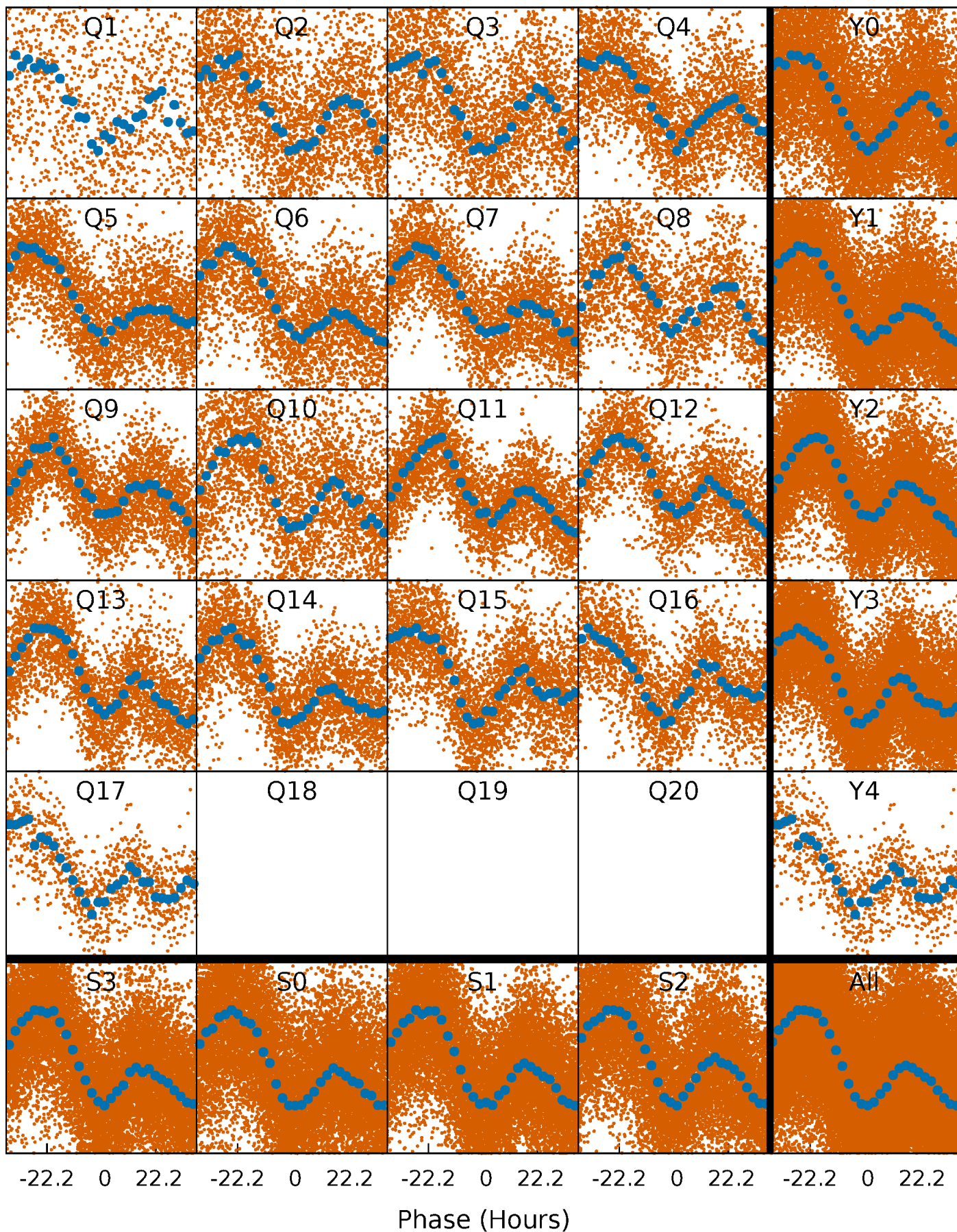


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

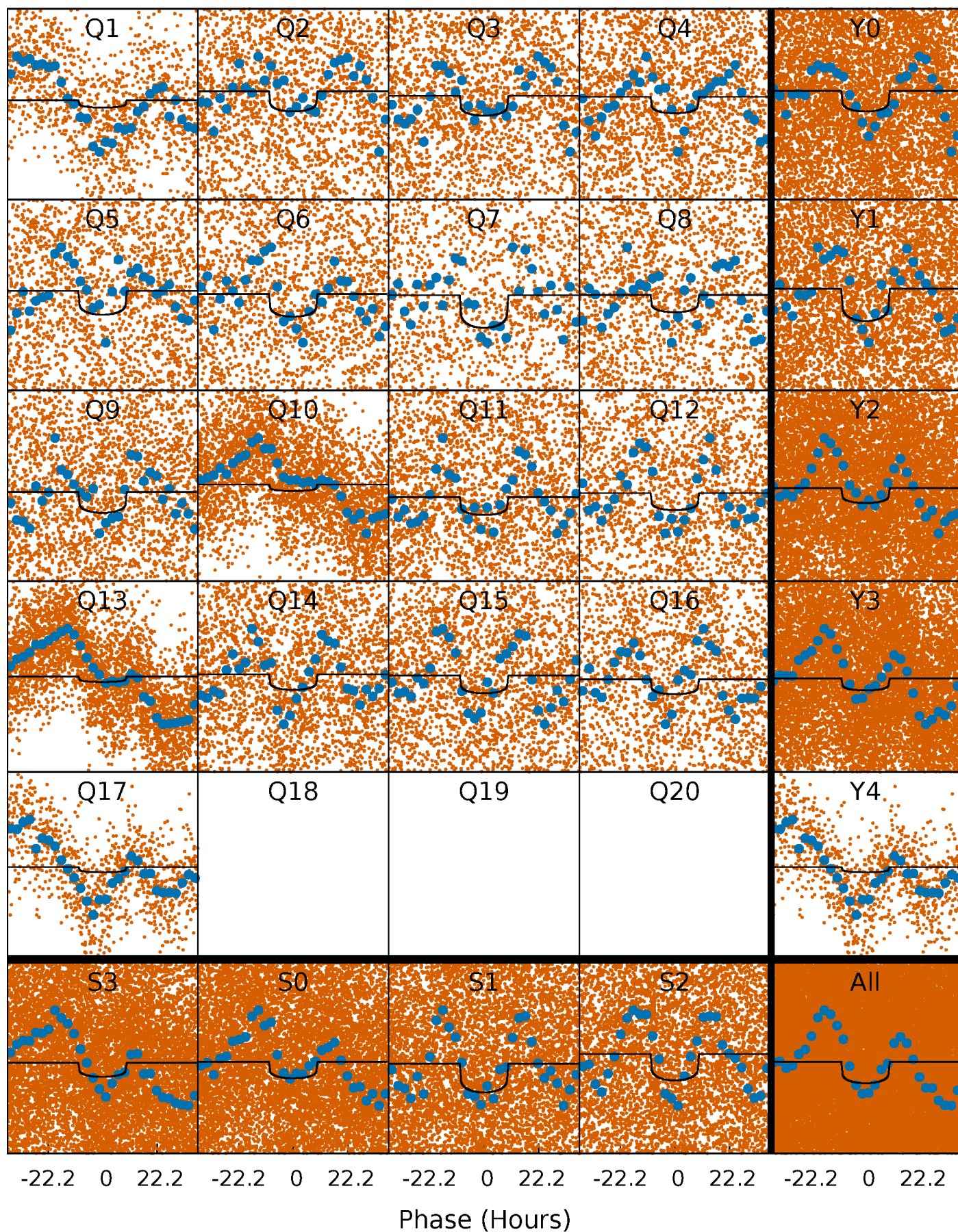
TCE 005390672-01 P= 4.115710 Days  $T_0=131.602683$  (BKJD)





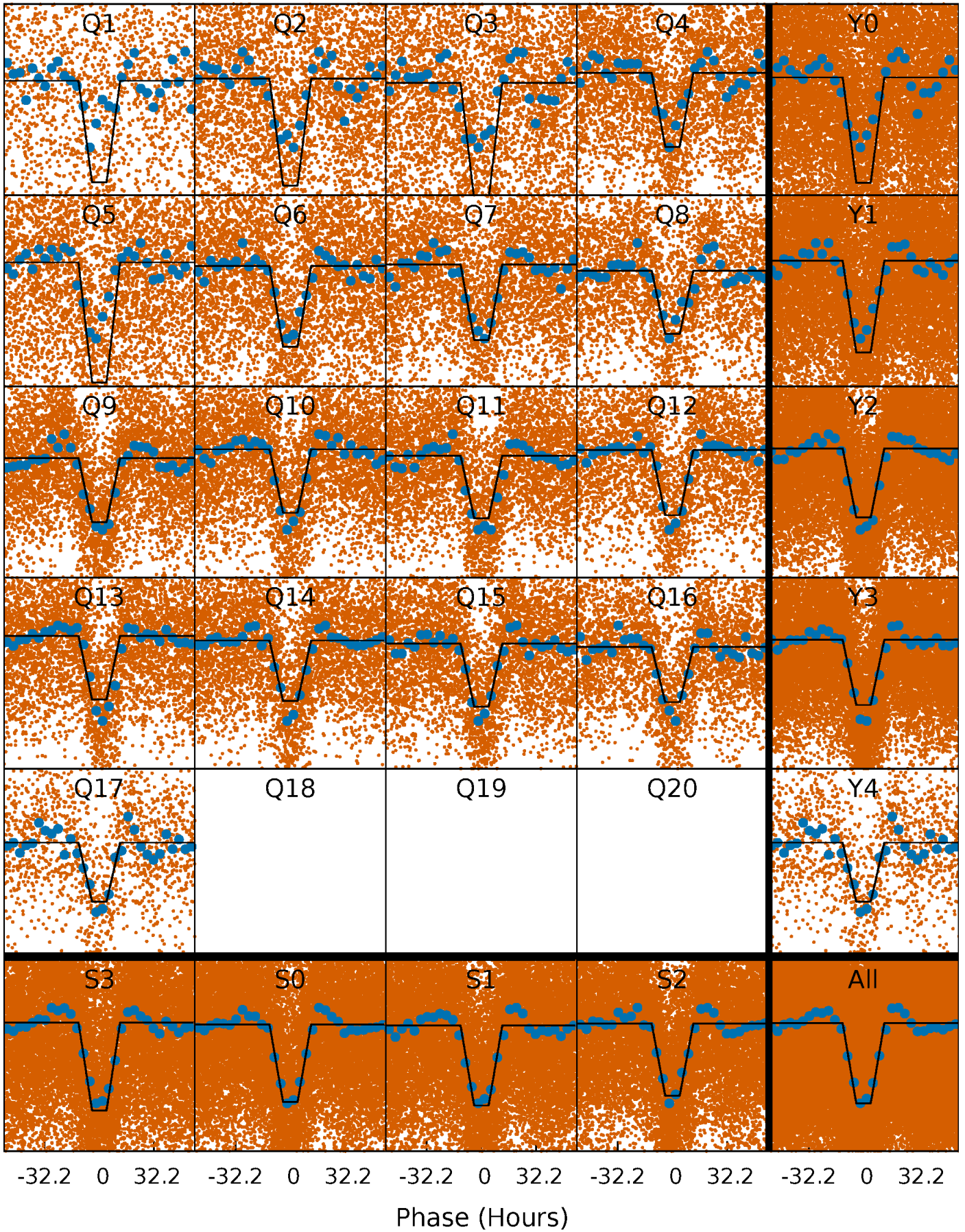
# DV Quarter-Phased Transit Curves

TCE 005390672-01 P= 4.115710 Days  $T_0=131.602683$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005390672-01 P= 4.114636 Days  $T_0=131.790555$  (BKJD)

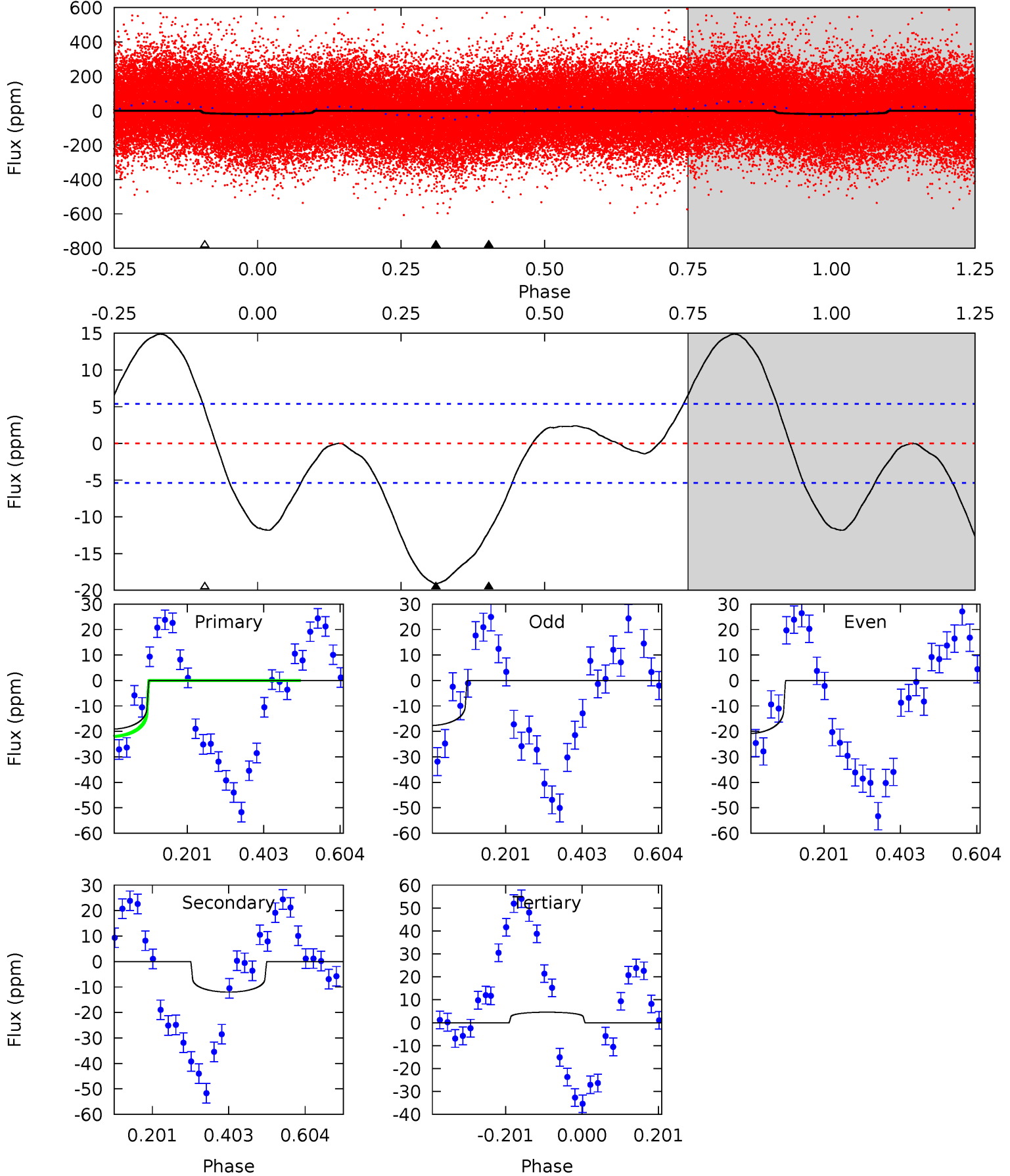




# DV Model-Shift Uniqueness Test

005390672-01, P = 4.115710 Days, E = 127.486973 Days

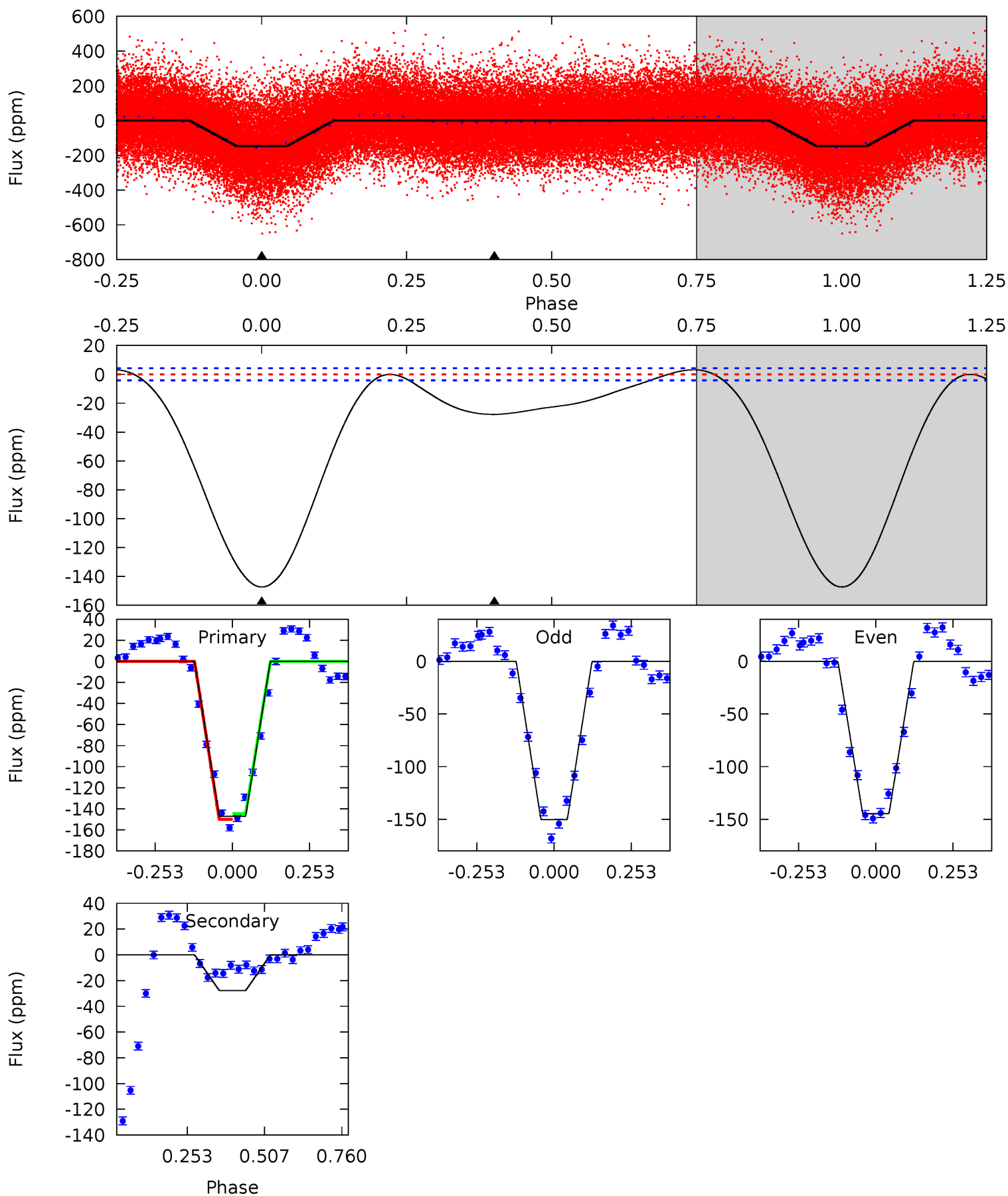
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.7	9.83	-3.76	0	4.42	1.28	6.80	19.4	15.7	13.6	9.83	1.29	1.23	0.44	2.26



# Alt Model-Shift Uniqueness Test

005390672-01, P = 4.114636 Days, E = 127.675919 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
152.7	28.8	0	0	4.37	1.14	3.34	152.7	152.7	28.8	28.8	2.91	0.99	0.02	2.87





### Stellar Parameters For KIC 005390672

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6643^{+180}_{-220}$	$3.673^{+0.328}_{-0.082}$	$-0.360^{+0.350}_{-0.250}$	$2.932^{+0.468}_{-1.093}$	$1.477^{+0.251}_{-0.306}$	$0.083^{+0.198}_{-0.022}$
	+3%/-3%	+9%/-2%	+97%/-69%	+16%/-37%	+17%/-21%	+240%/-26%
Source	PHO1	FLK73	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 005390672-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-12 \pm 1$	$1.38^{+0.43}_{-0.41}$	$2866^{+163}_{-268}$	$5686^{+1030}_{-557}$	$11^{+13}_{-5}$
Alt.	$-28 \pm 1$	$3.79^{+0.66}_{-0.84}$	$2844^{+190}_{-254}$	$4433^{+209}_{-211}$	$3.632^{+1.870}_{-0.965}$

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

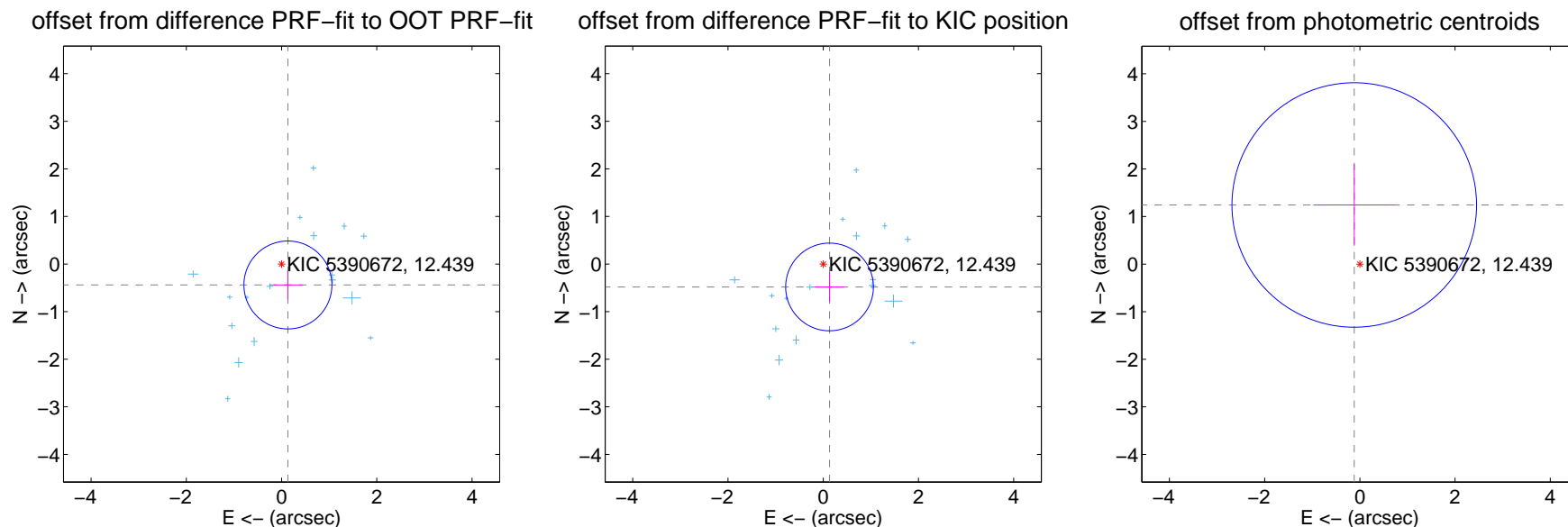
## DV Centroid Data

Supplemental centroid analysis for 005390672-01. Kepler magnitude: 12.44. Transit SNR 8.44

There are 17 quarters with good PRF difference image offsets

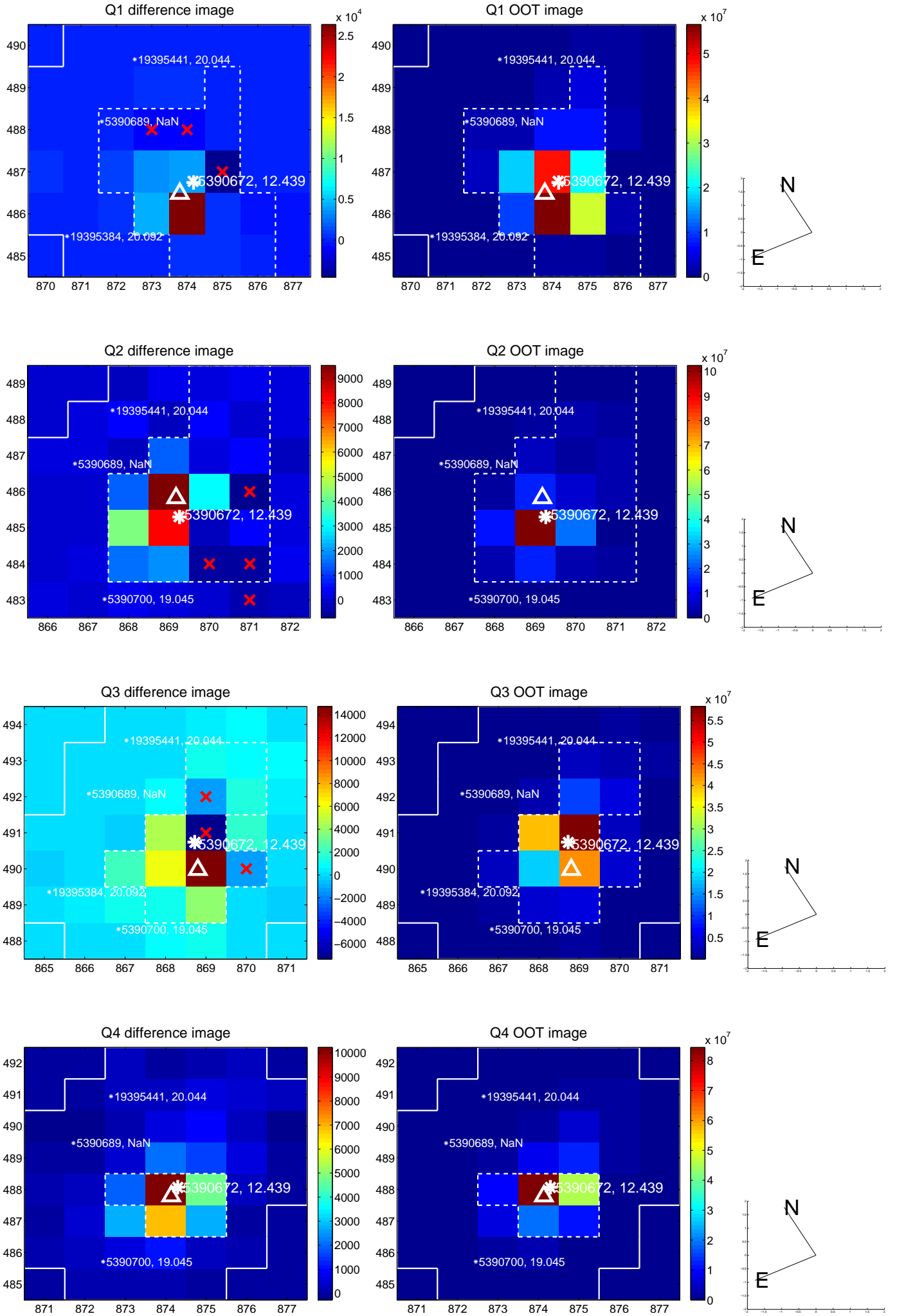
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.459 \pm 0.308$	1.49	$-0.133 \pm 0.303$	$-0.440 \pm 0.308$
PRF-fit source offset from KIC position	$0.499 \pm 0.307$	1.63	$-0.132 \pm 0.306$	$-0.481 \pm 0.307$
photometric centroid source offset	$1.25 \pm 0.86$	1.46	$0.12 \pm 0.85$	$1.24 \pm 0.86$

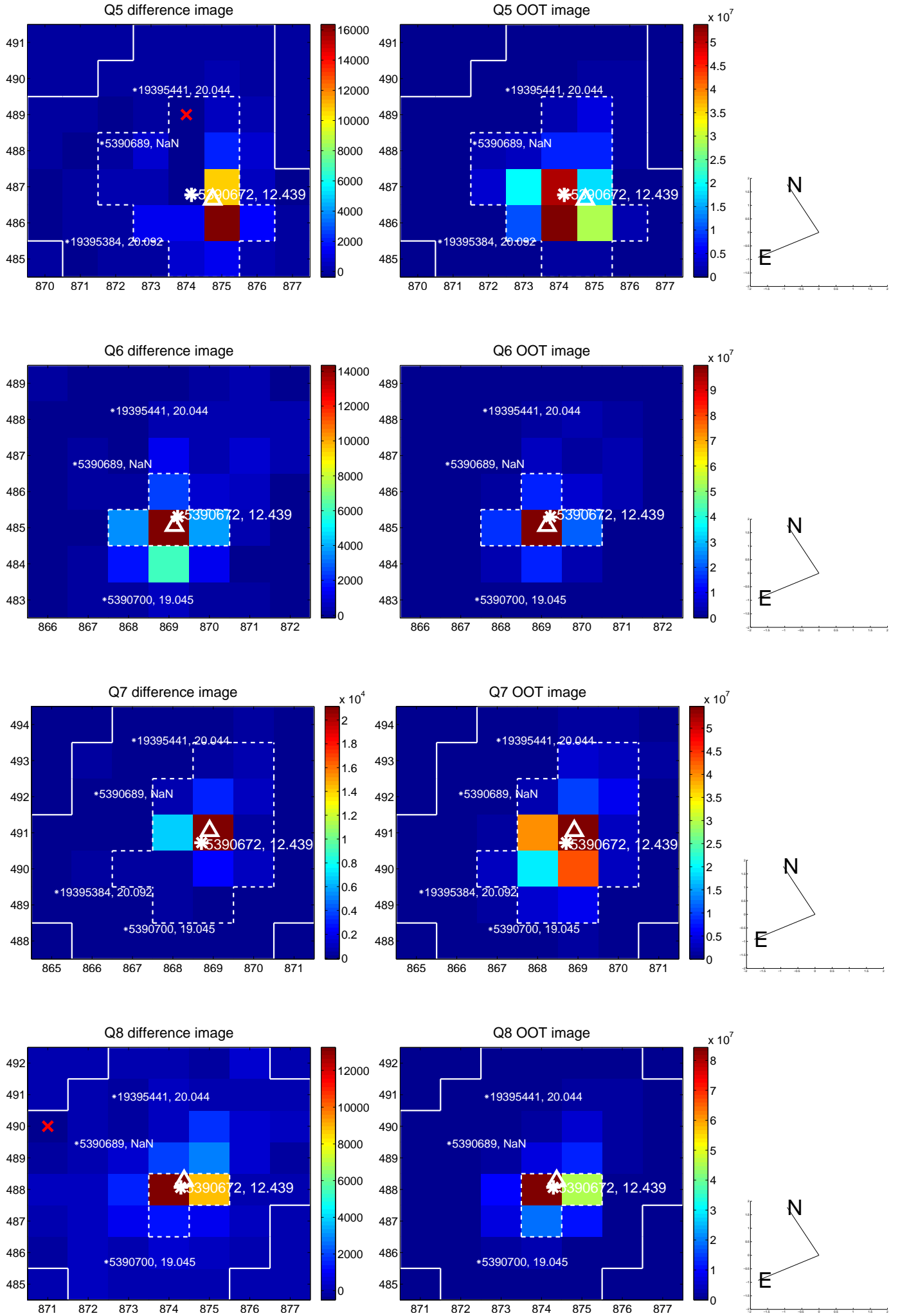


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

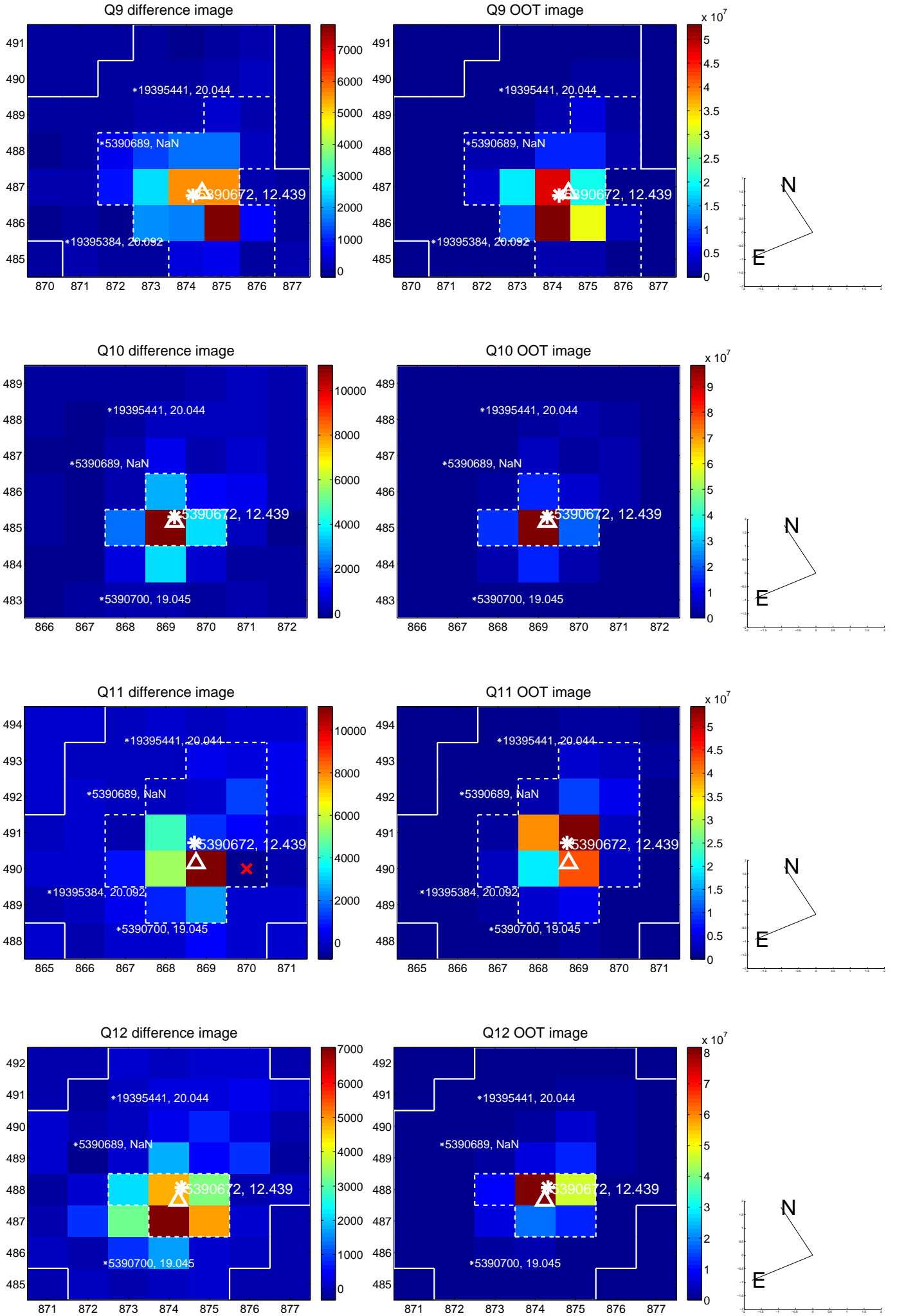


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

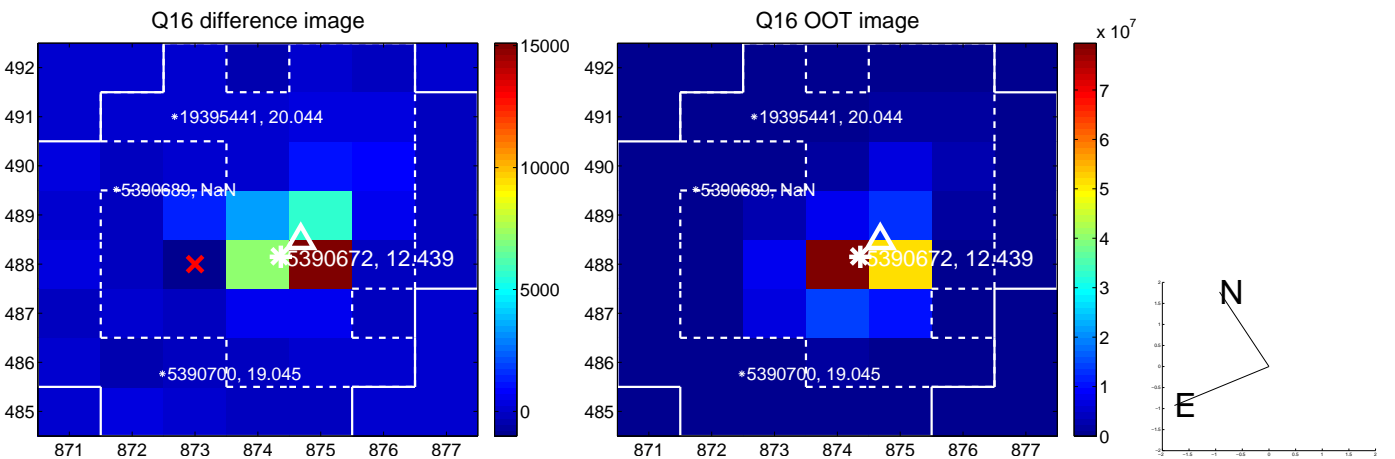
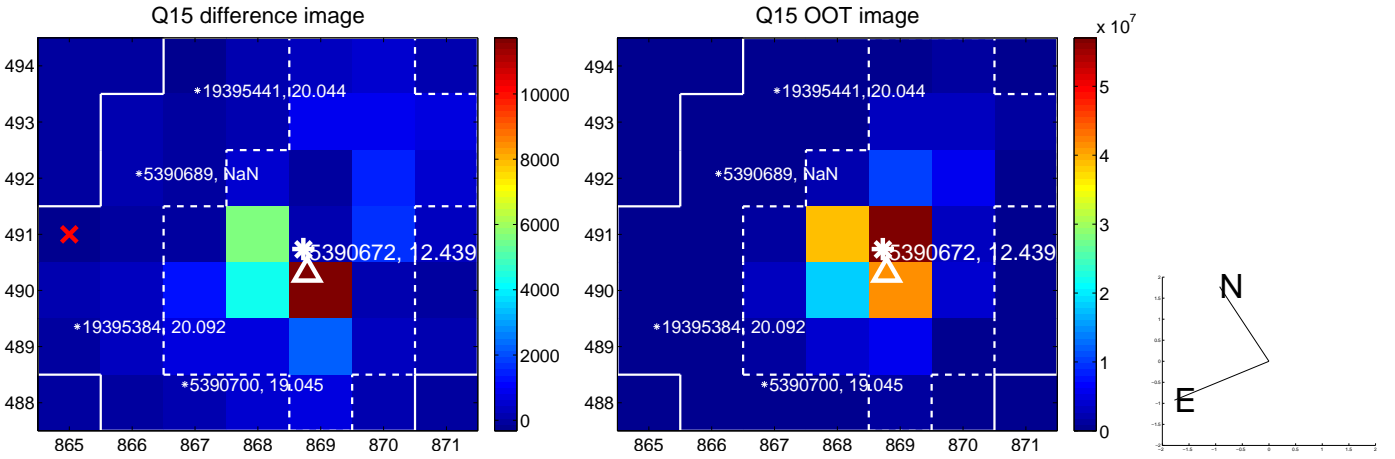
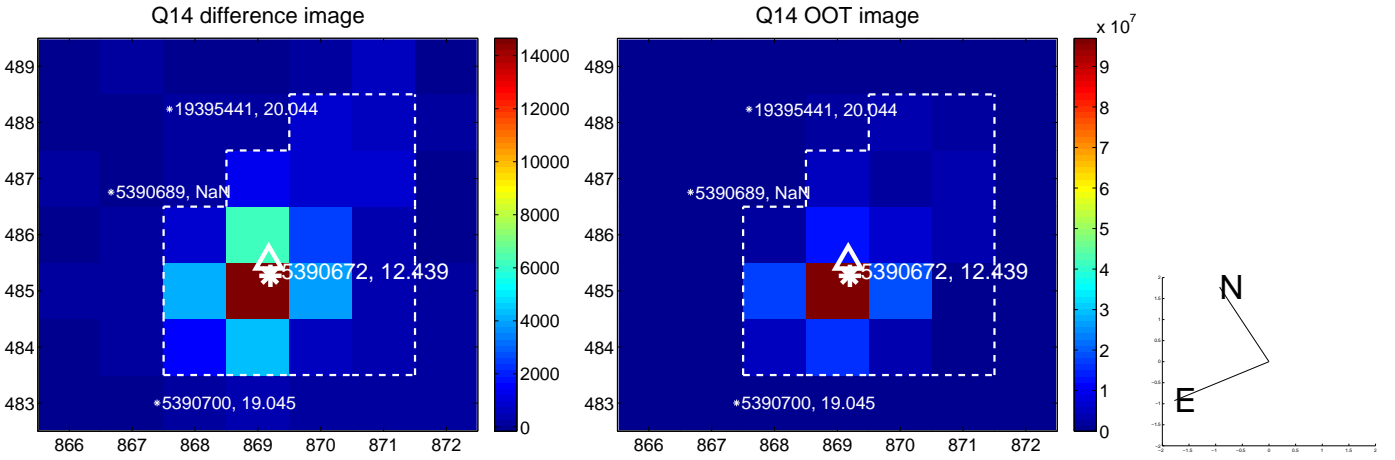
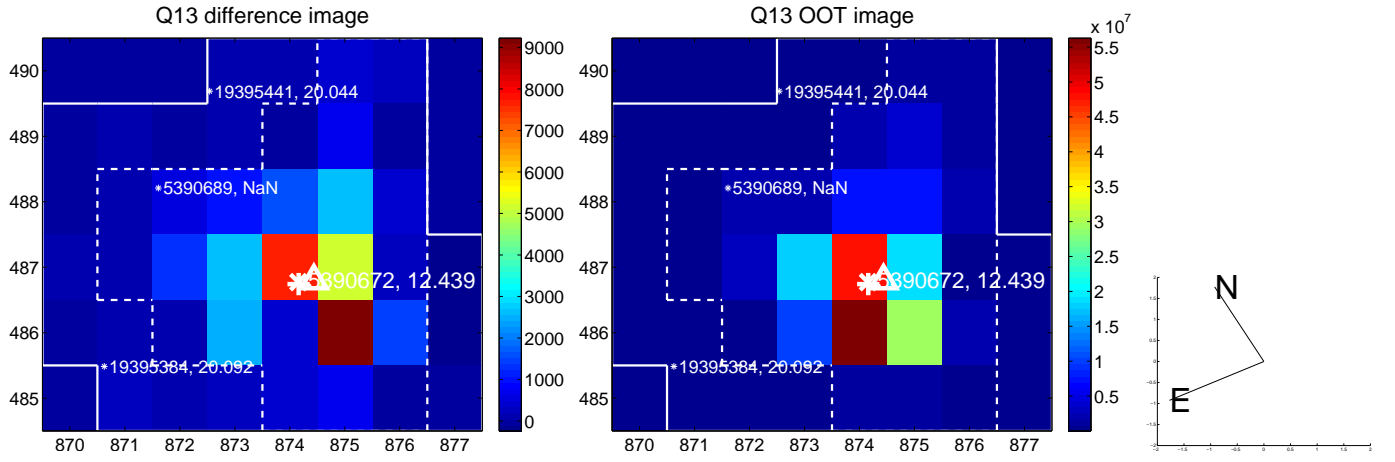




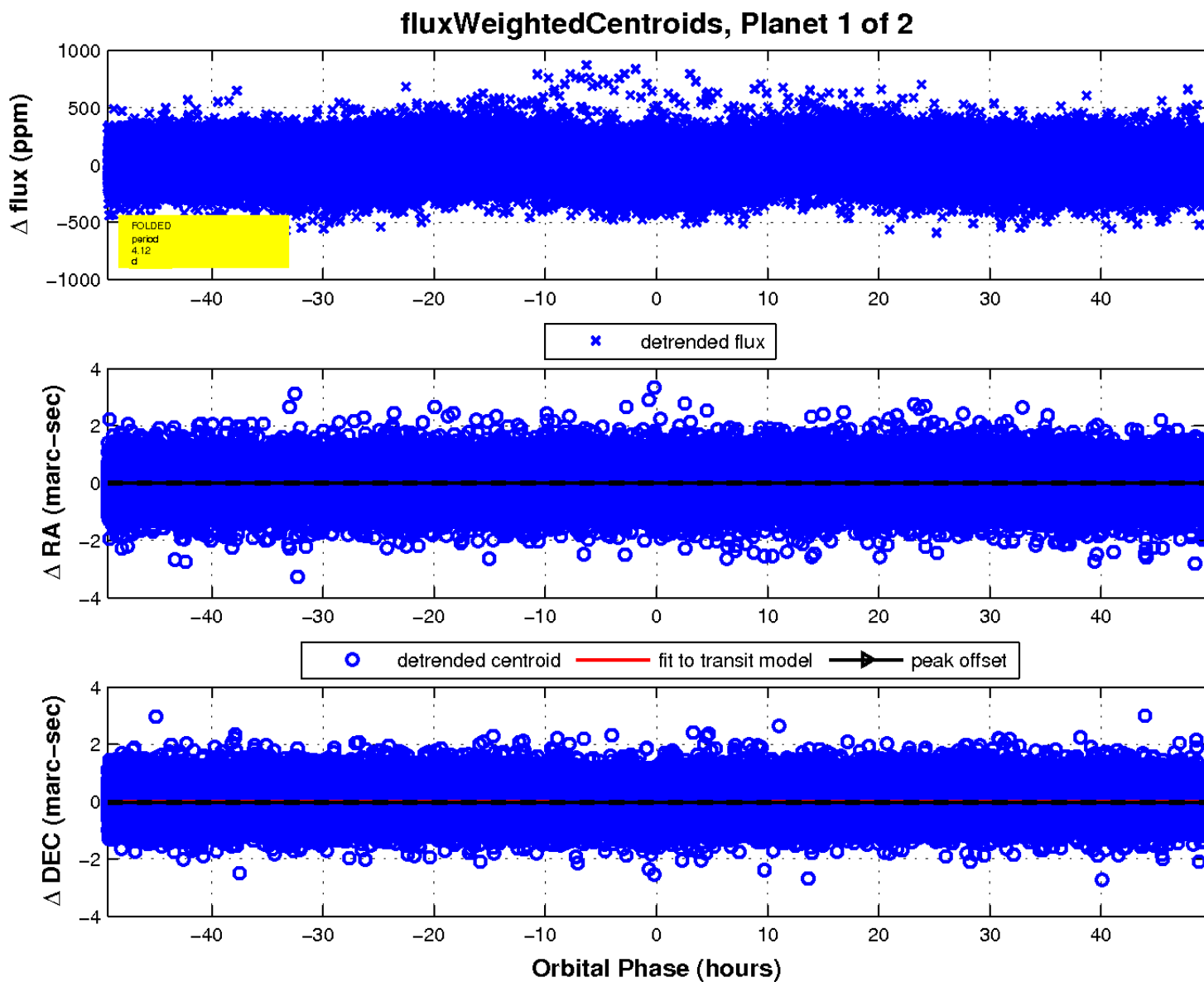
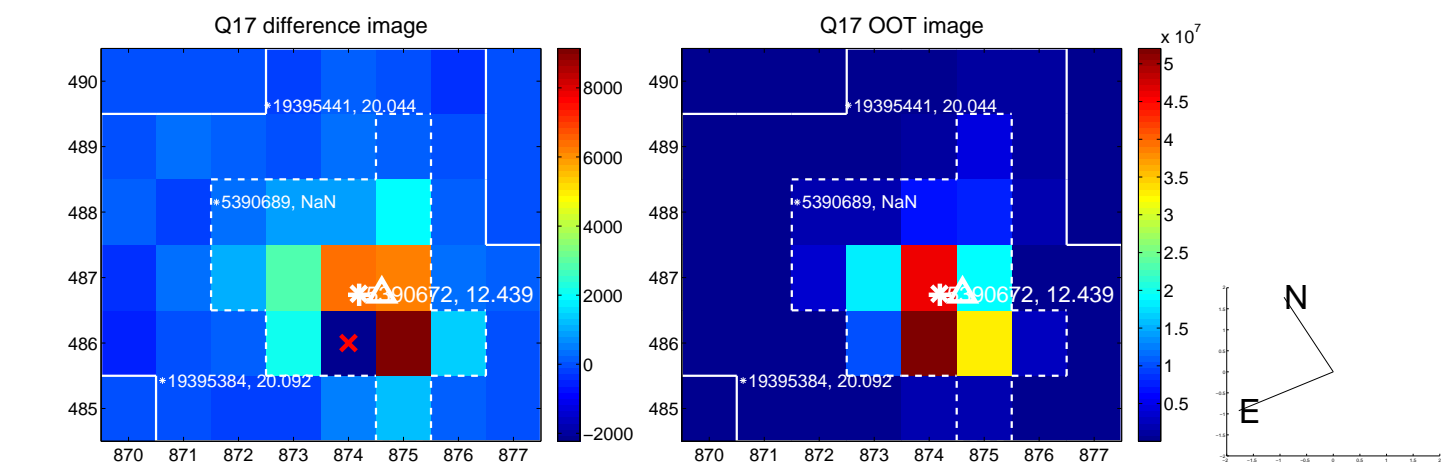
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

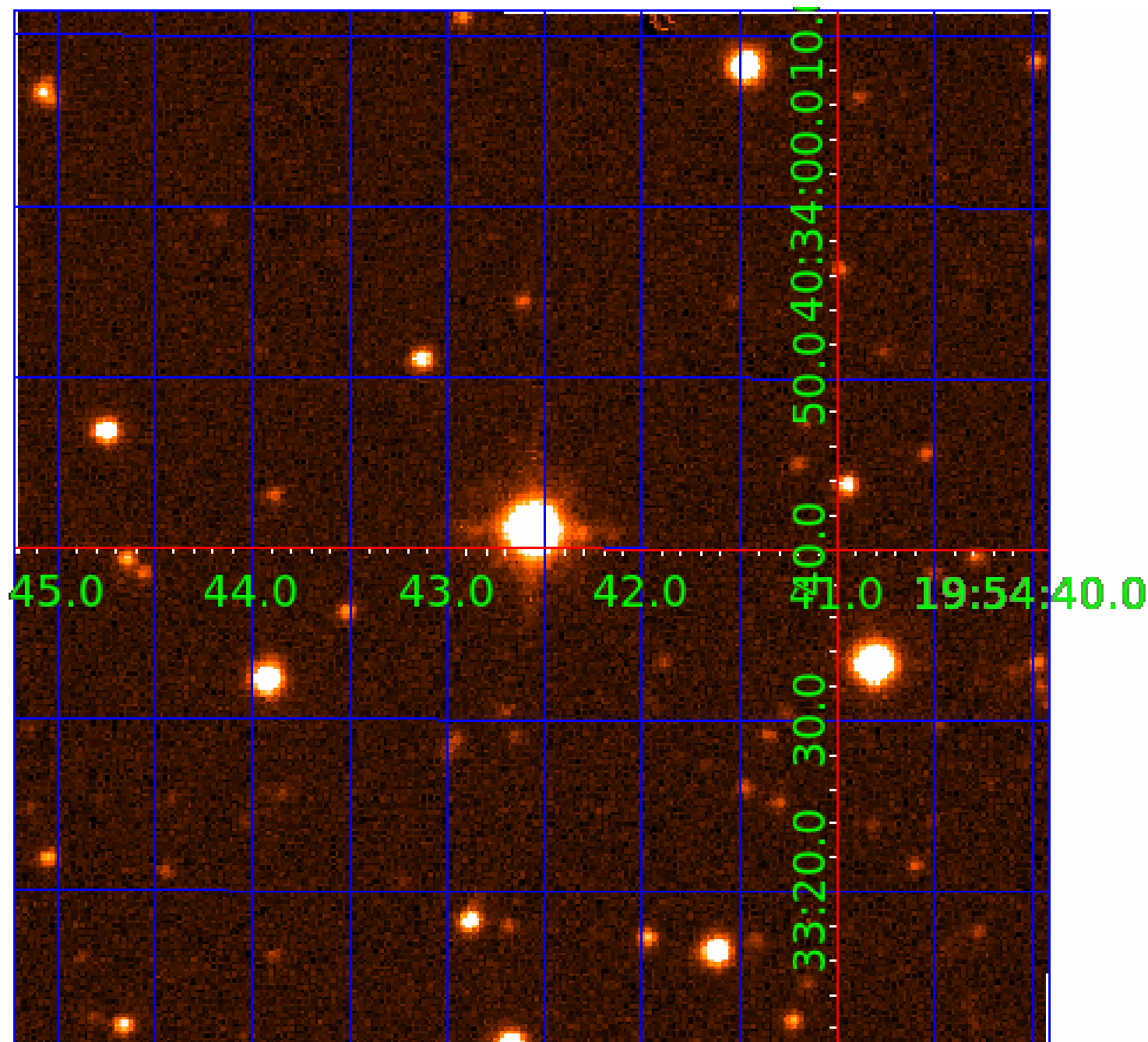


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 005390672

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005390672-01	OBS	No	4.115710	131.602683	22.1	19.440	11.4	8.4	2.93	6643	1.46	4576.51
005390672-02	OBS	No	4.115507	132.640813	52.2	31.771	13.0	14.7	2.93	6643	2.16	4576.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005390672-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
005390672-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

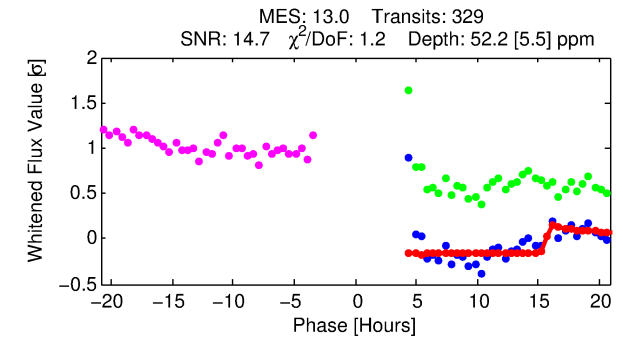
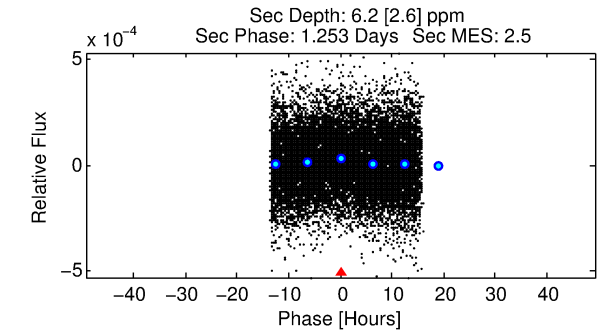
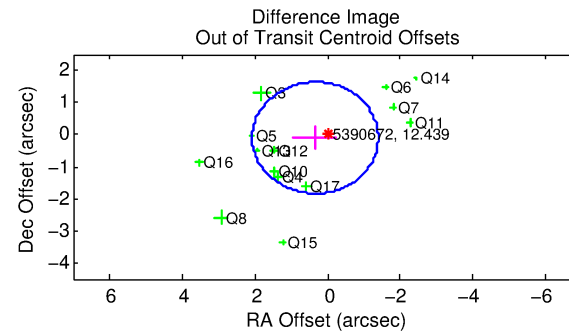
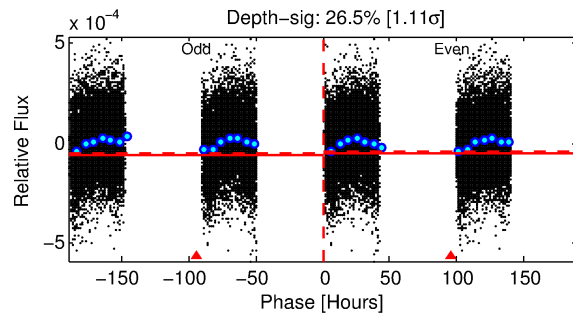
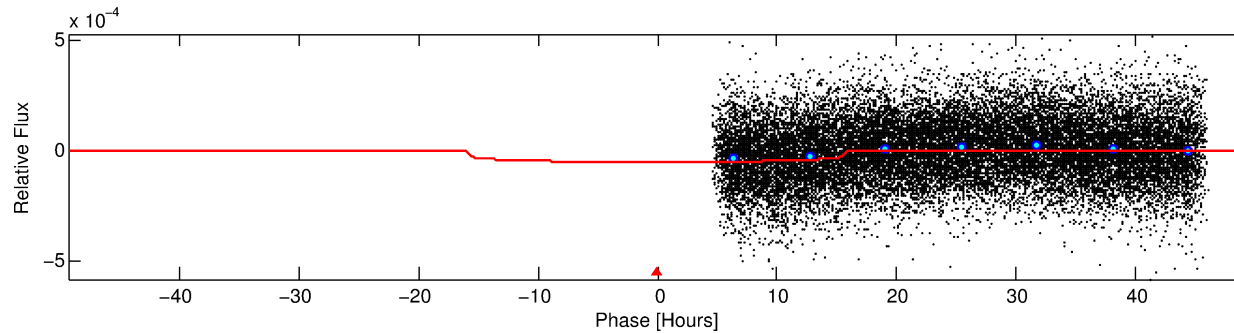
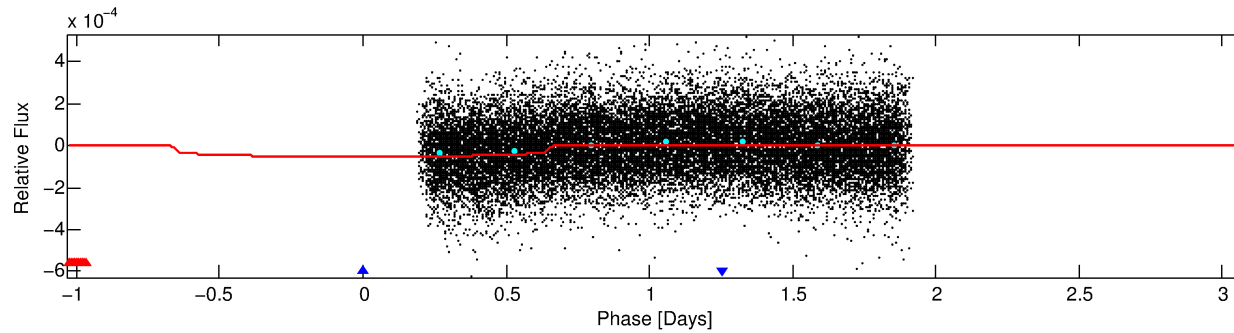
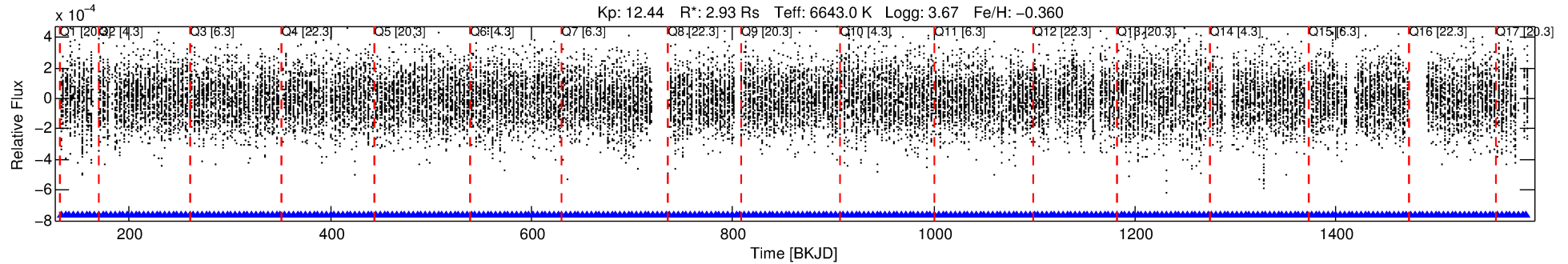
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005390672-02

No Significant Match Found

# DV One-Page Summary

KIC: 5390672 Candidate: 2 of 2 Period: 4.116 d



## DV Fit Results:

Period = 4.11551 [0.00005] d  
Epoch = 132.6408 [0.0568] BKJD  
Rp/R\* = 0.0068 [0.0031]  
a/R\* = 1.17 [0.84]  
b = 0.37 [6.09]  
Seff = 4576.81 [2640.40]  
Teq = 2097 [302] K  
Rp = 2.16 [1.27] Re  
a = 0.0572 [0.0203] AU  
Ag = 2.39 [2.74] [0.51 $\sigma$ ]  
Teff = 4032 [1016] K [1.83 $\sigma$ ]

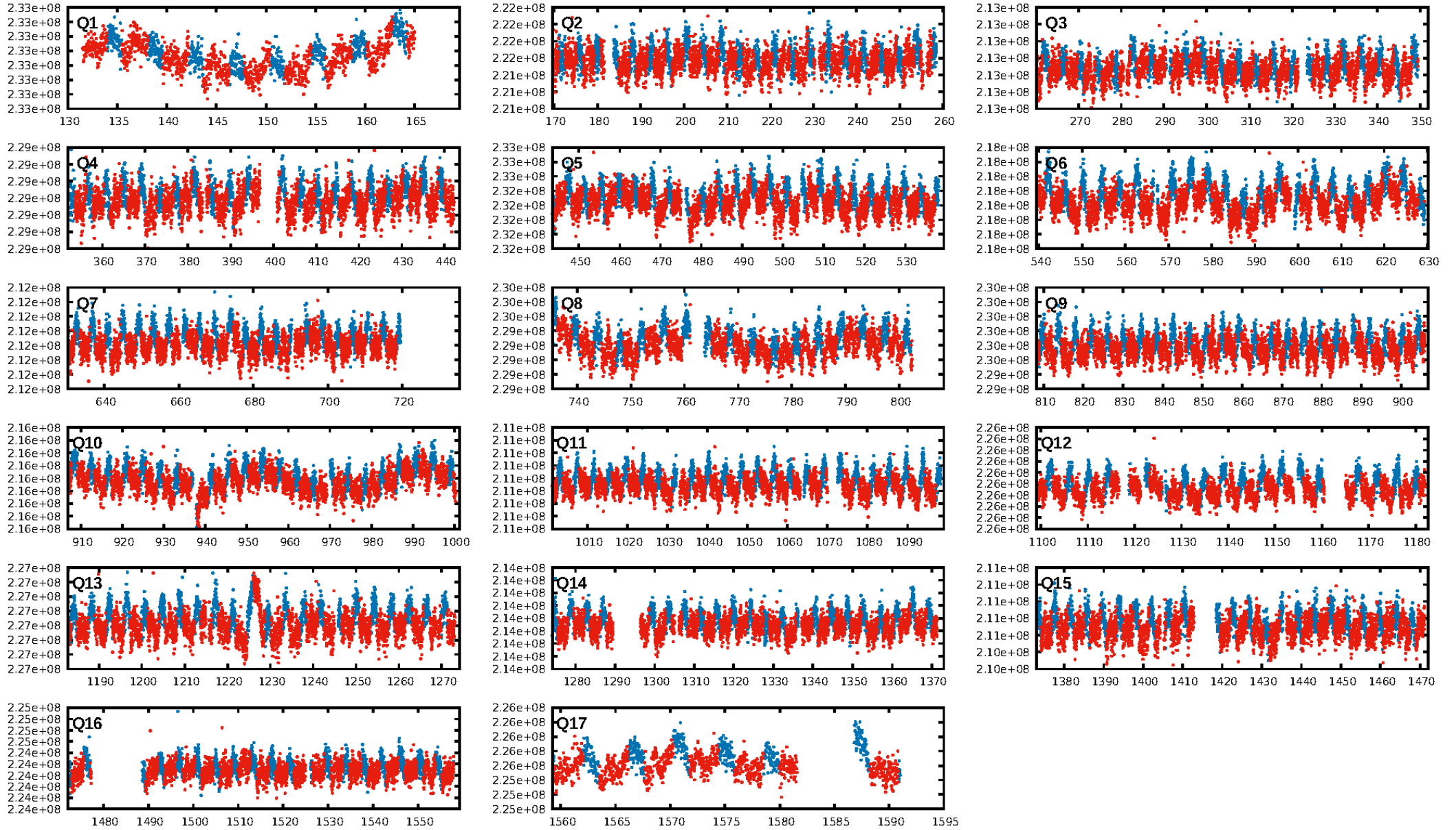
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [314/314]  
GhostDiagnostic-chr: 1.726  
Centroid-sig: 15.1%  
Centroid-so: 0.409 arcsec [1.33 $\sigma$ ]  
OotOffset-rm: 0.353 arcsec [0.61 $\sigma$ ]  
KicOffset-rm: 0.414 arcsec [0.74 $\sigma$ ]  
OotOffset-st: 3/4/4/3 [14]  
KicOffset-st: 3/4/4/3 [14]  
DiffImageQuality-fgm: 0.71 [10/14]  
DiffImageOverlap-fno: 0.00 [0/17]

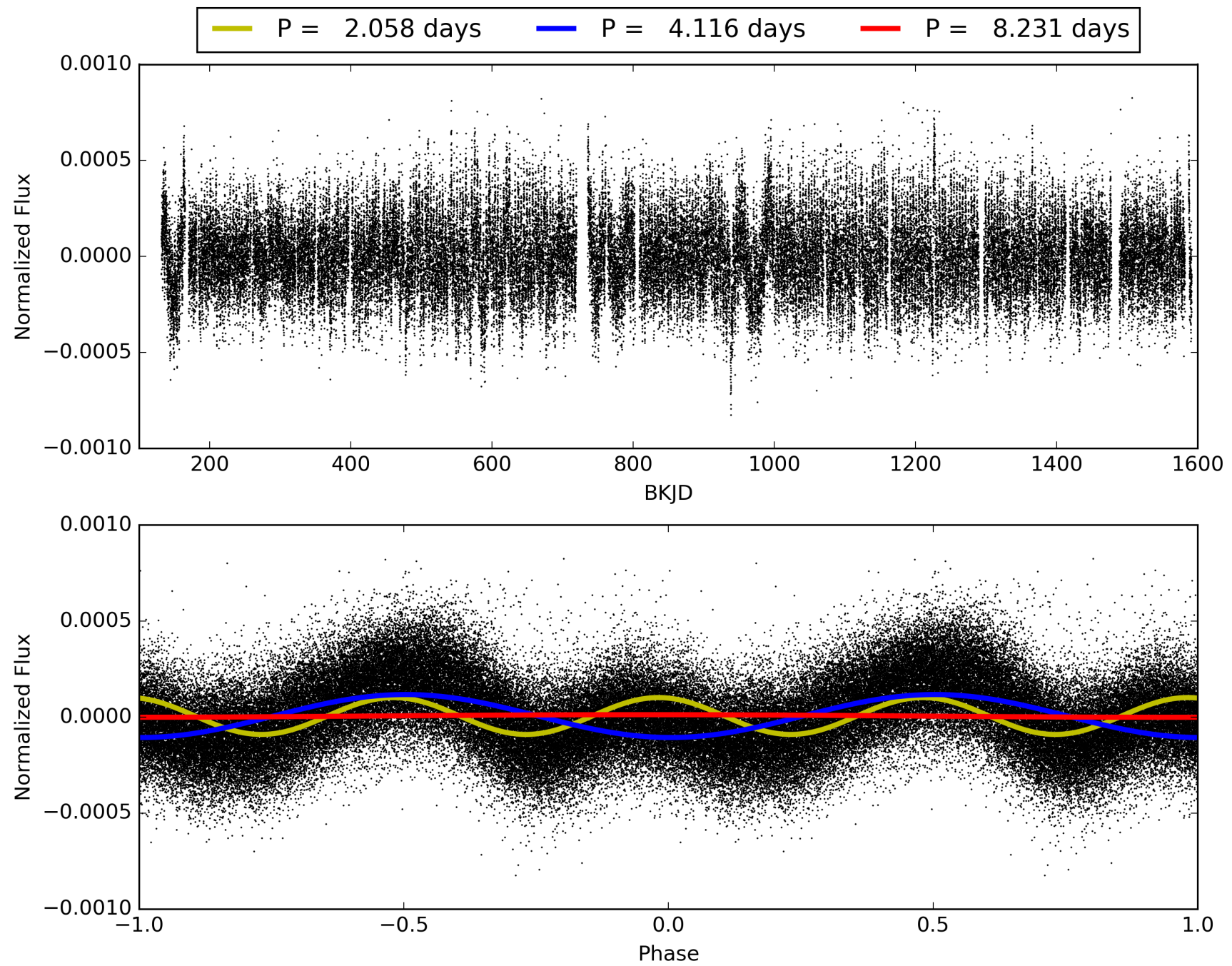
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:44:17 Z

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

# TCE 005390672-02, PDC Light Curves



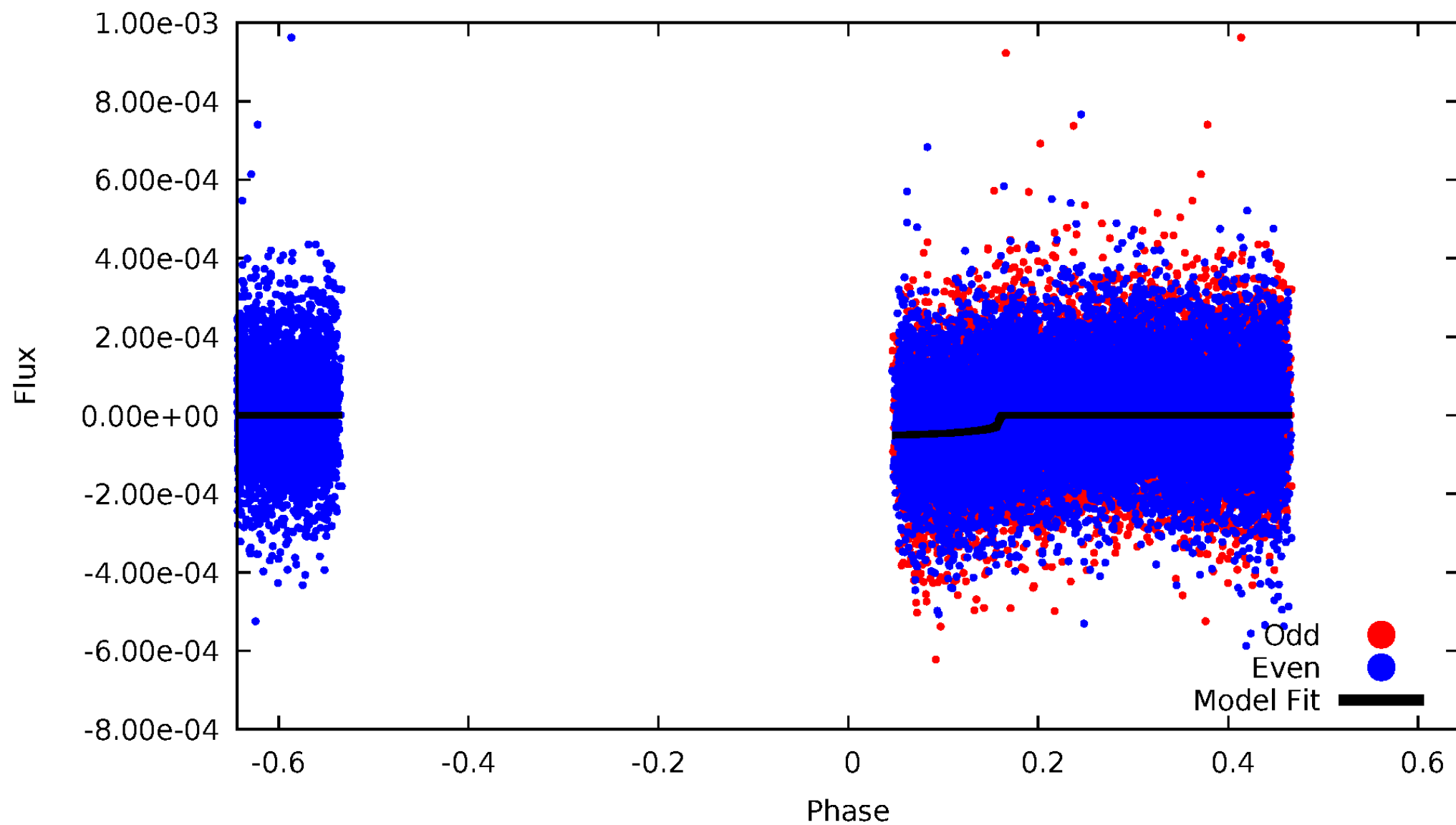
TCE 005390672-02





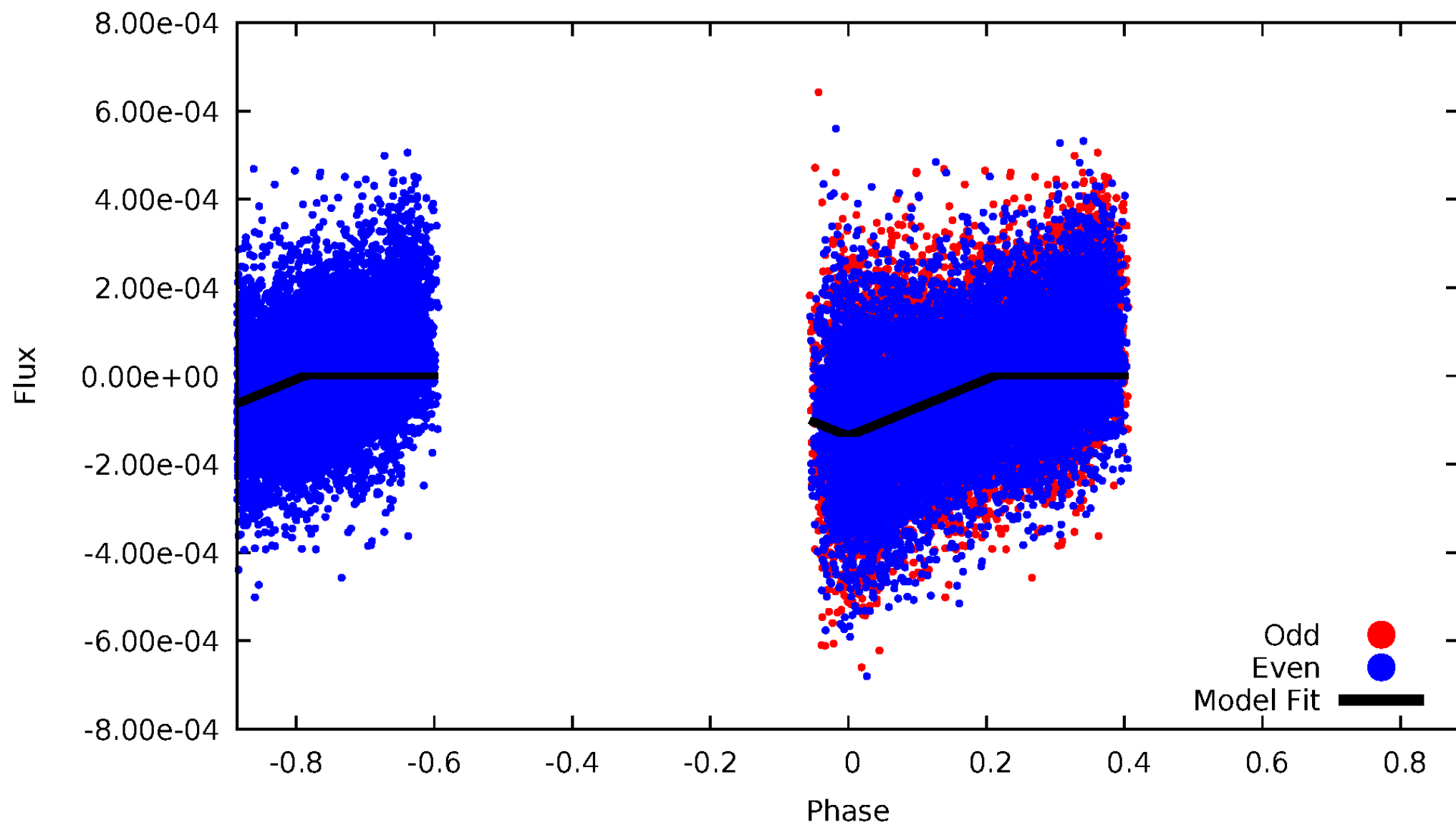
# DV Odd/Even

TCE 005390672-02



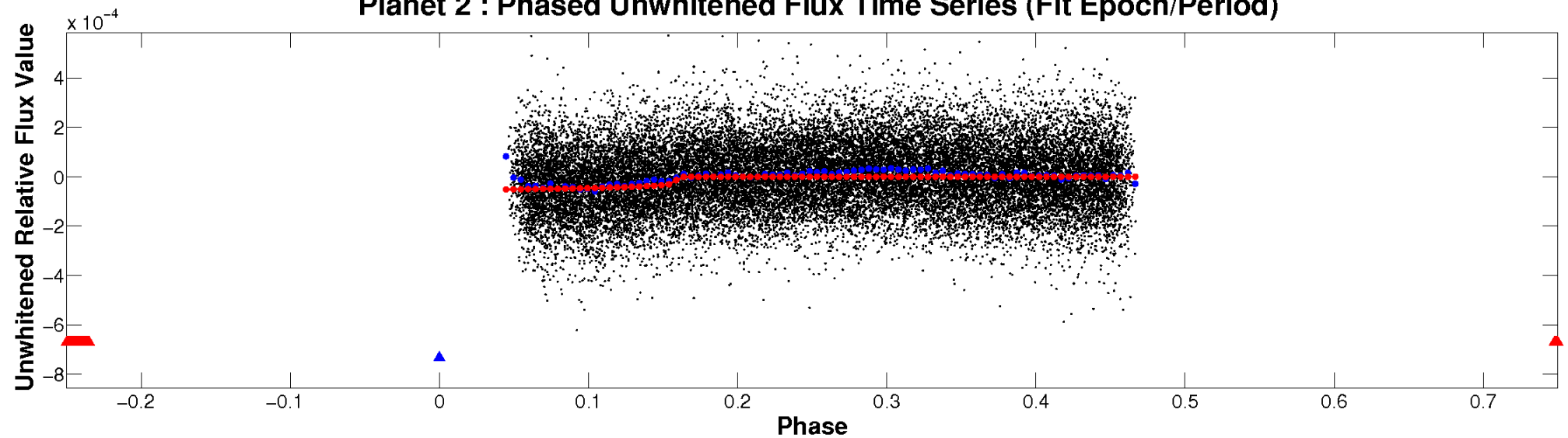
# ALT Odd/Even

TCE 005390672-02

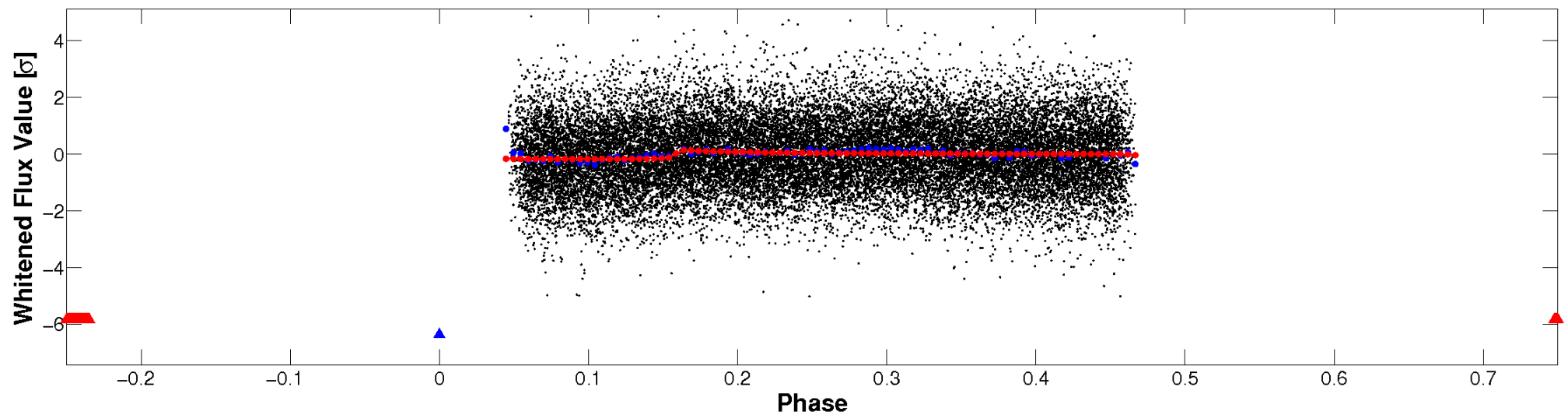


# Non-Whitened Vs. Whitened Light Curve

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

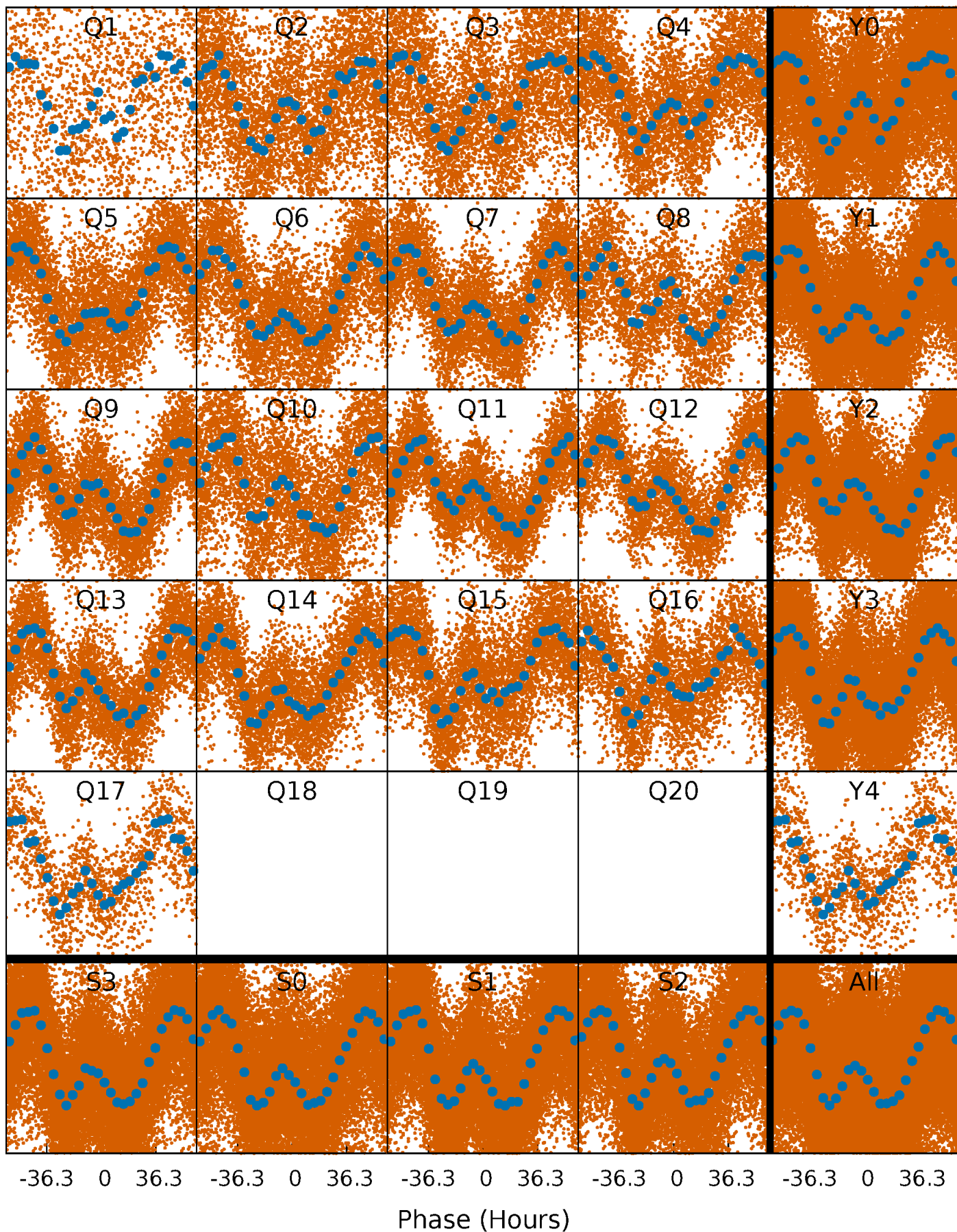


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



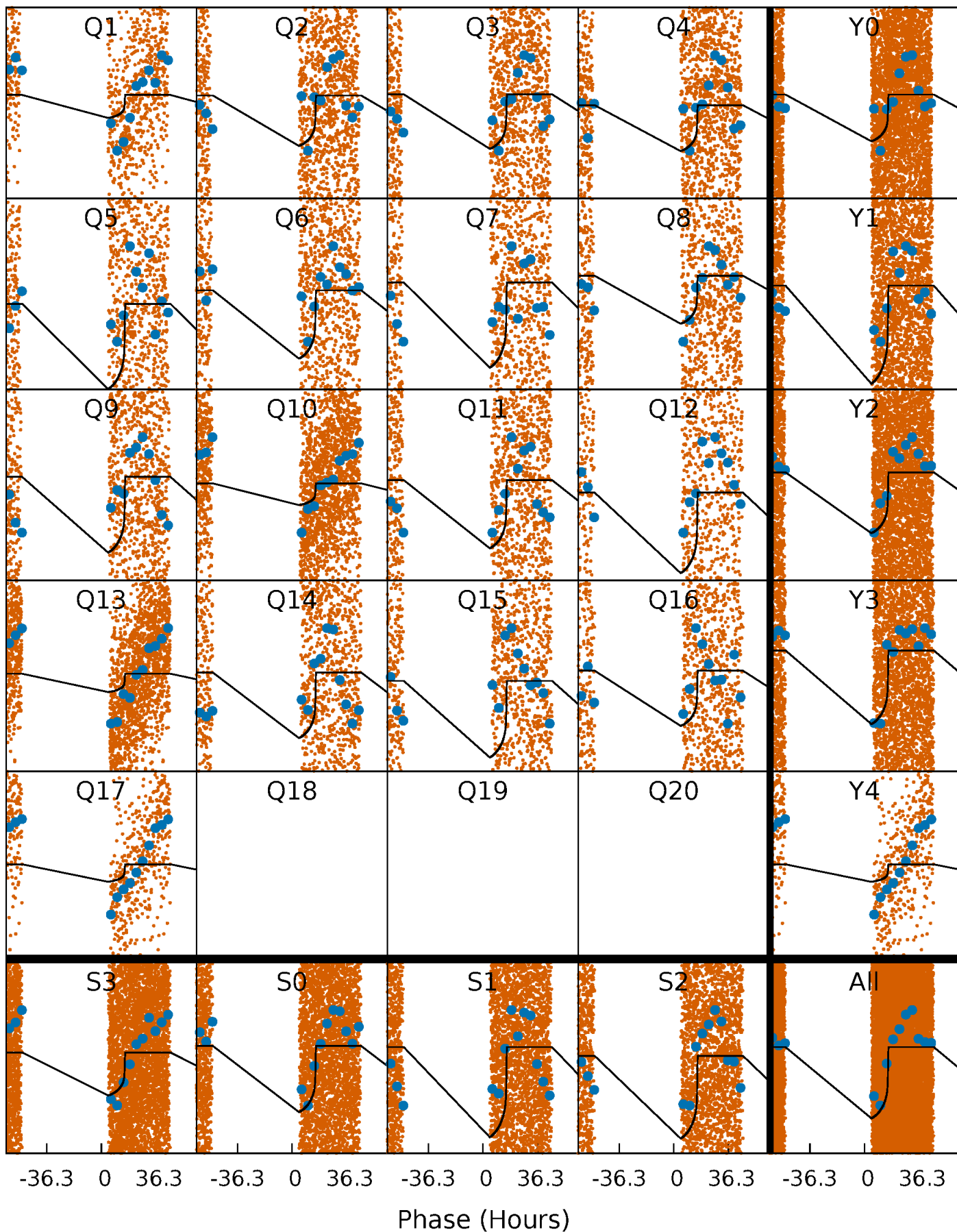
# PDC Quarter-Phased Transit Curves

TCE 005390672-02   P= 4.115507 Days    $T_0=132.640813$  (BKJD)



# DV Quarter-Phased Transit Curves

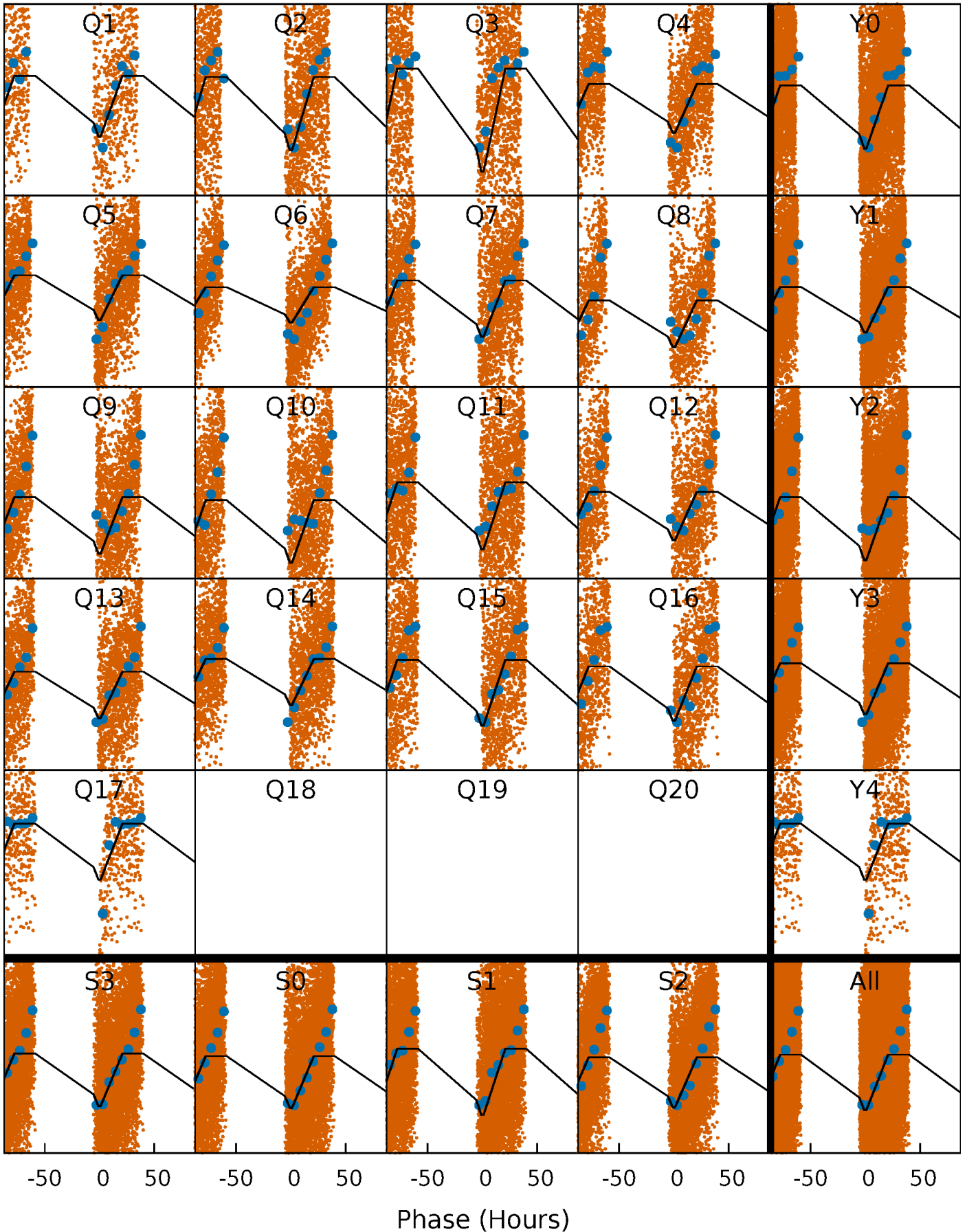
TCE 005390672-02 P= 4.115507 Days  $T_0=132.640813$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

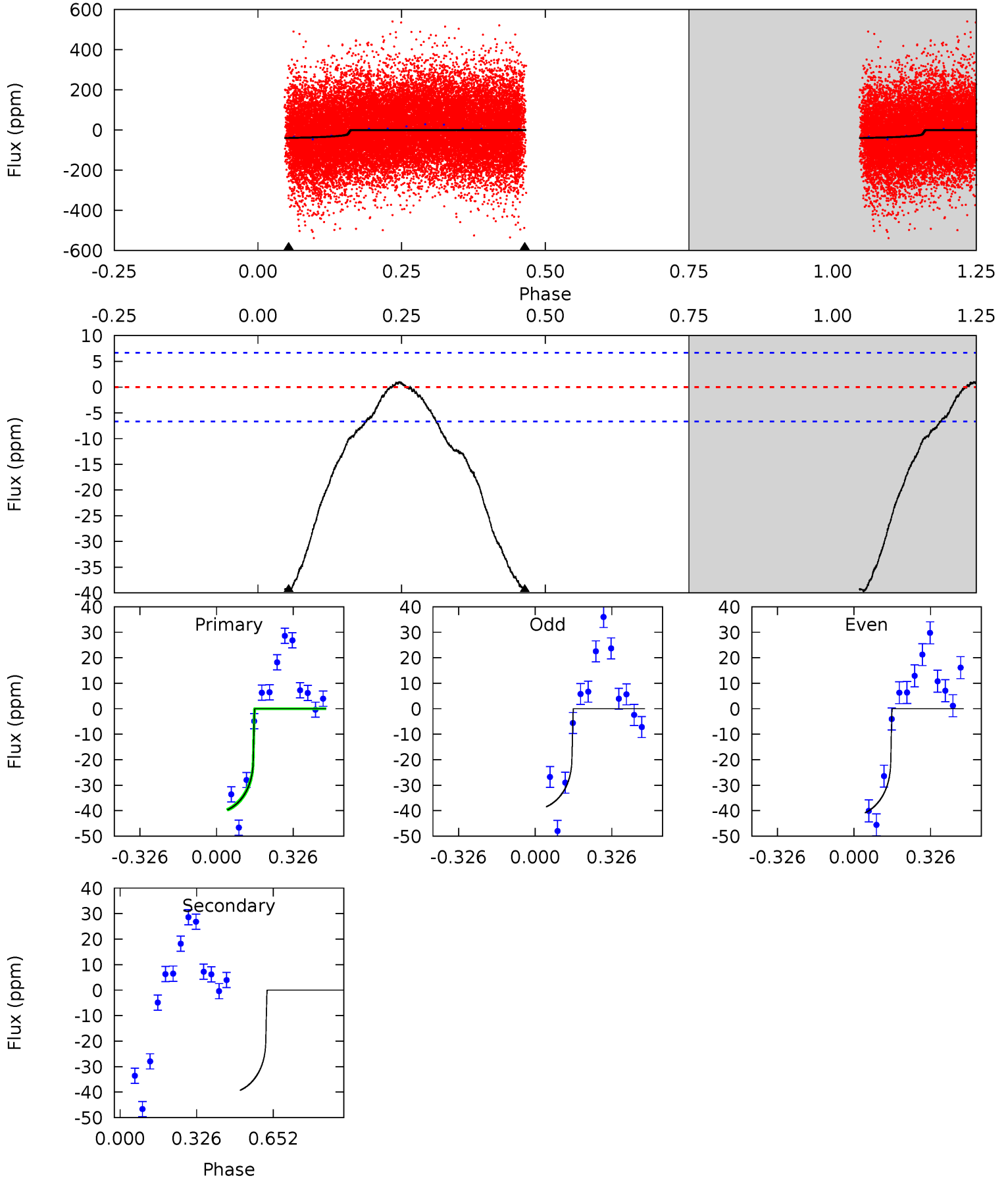
TCE 005390672-02   P= 4.115016 Days    $T_0=133.061941$  (BKJD)



# DV Model-Shift Uniqueness Test

005390672-02, P = 4.115507 Days, E = 132.640813 Days

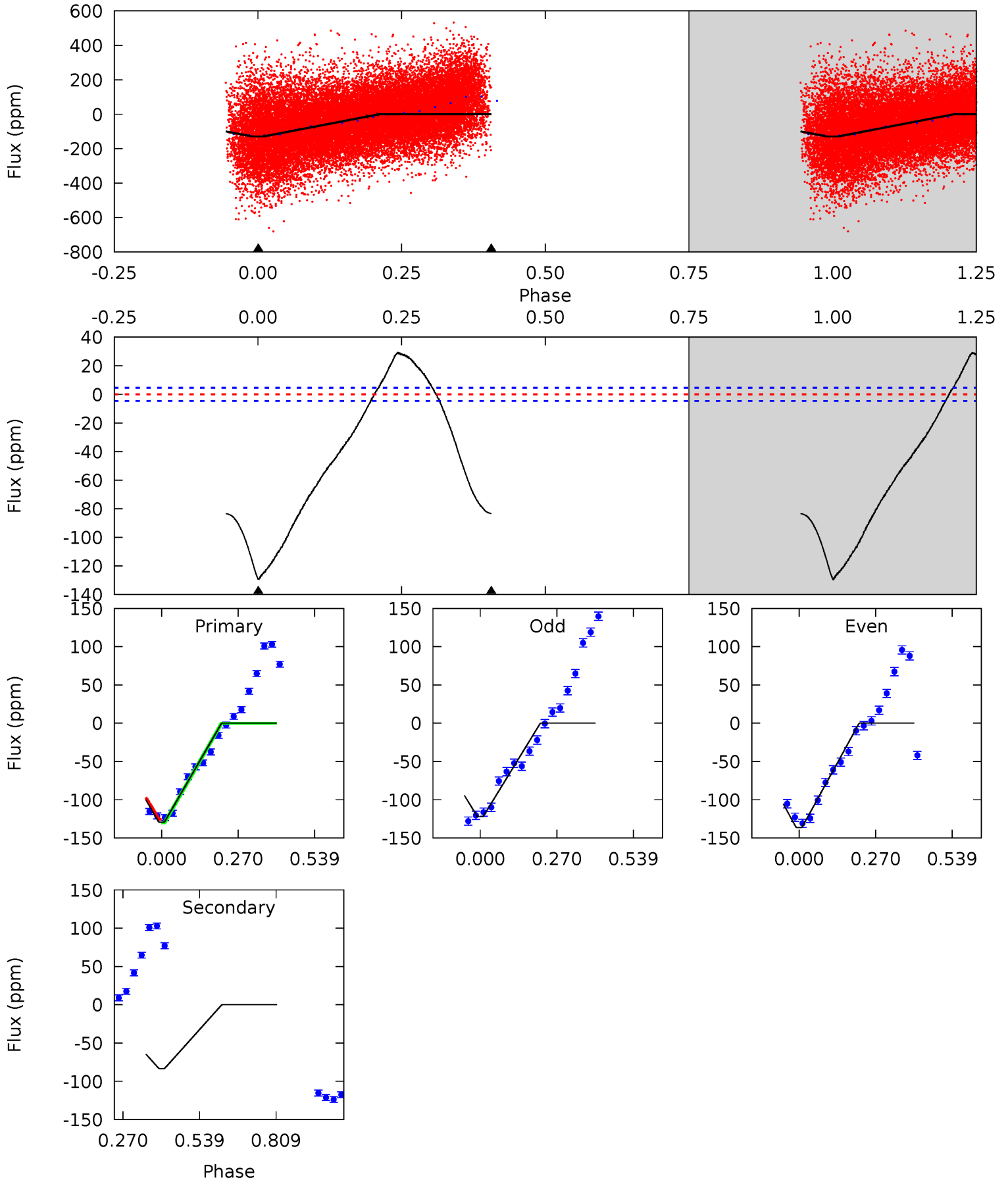
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.6	25.4	0	0	4.31	0.98	0.50	25.6	25.6	25.4	25.4	0.76	1.08	0.03	0



# Alt Model-Shift Uniqueness Test

005390672-02, P = 4.115016 Days, E = 128.946925 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
122.0	78.6	0	0	4.35	1.10	8.94	122.0	122.0	78.6	78.6	6.73	1.03	0.18	1.35



### Stellar Parameters For KIC 005390672

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6643^{+180}_{-220}$	$3.673^{+0.328}_{-0.082}$	$-0.360^{+0.350}_{-0.250}$	$2.932^{+0.468}_{-1.093}$	$1.477^{+0.251}_{-0.306}$	$0.083^{+0.198}_{-0.022}$
	+3%/-3%	+9%/-2%	+97%/-69%	+16%/-37%	+17%/-21%	+240%/-26%
Source	PHO1	FLK73	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 005390672-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-39 \pm 2$	$2.03^{+1.10}_{-0.91}$	$2872^{+177}_{-270}$	$6365^{+2582}_{-1161}$	$17^{+40}_{-10}$
Alt.	$-83 \pm 1$	$3.45^{+1.11}_{-1.12}$	$2862^{+175}_{-281}$	$5887^{+1010}_{-668}$	$13^{+14}_{-6}$

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

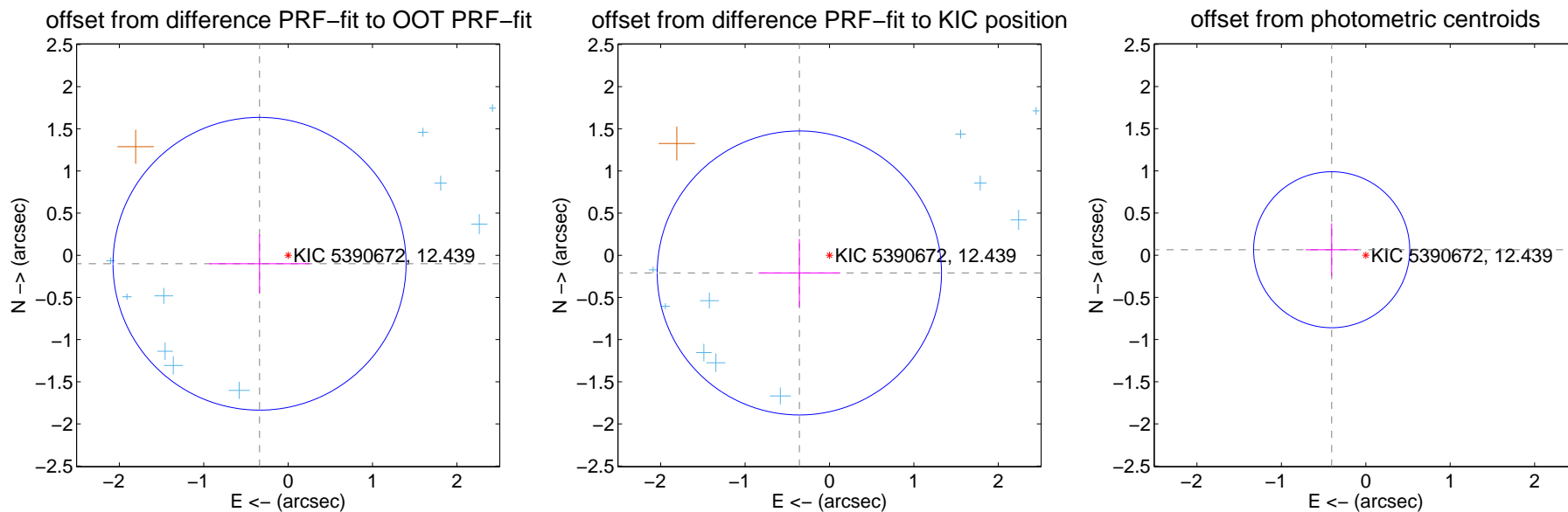
## DV Centroid Data

Supplemental centroid analysis for 005390672-02. Kepler magnitude: 12.44. Transit SNR 14.67

There are 10 quarters with good PRF difference image offsets

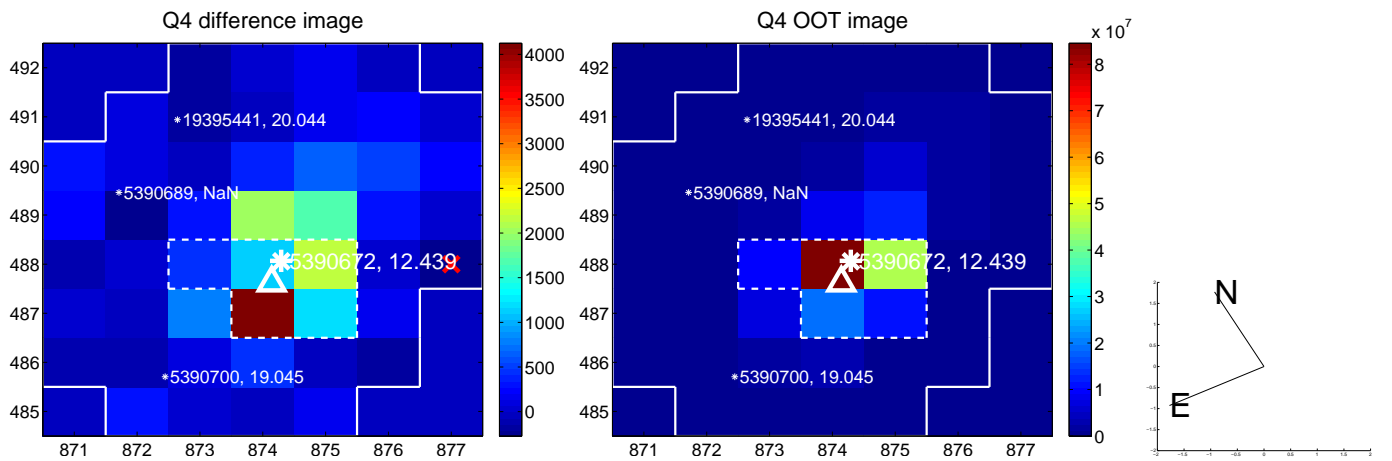
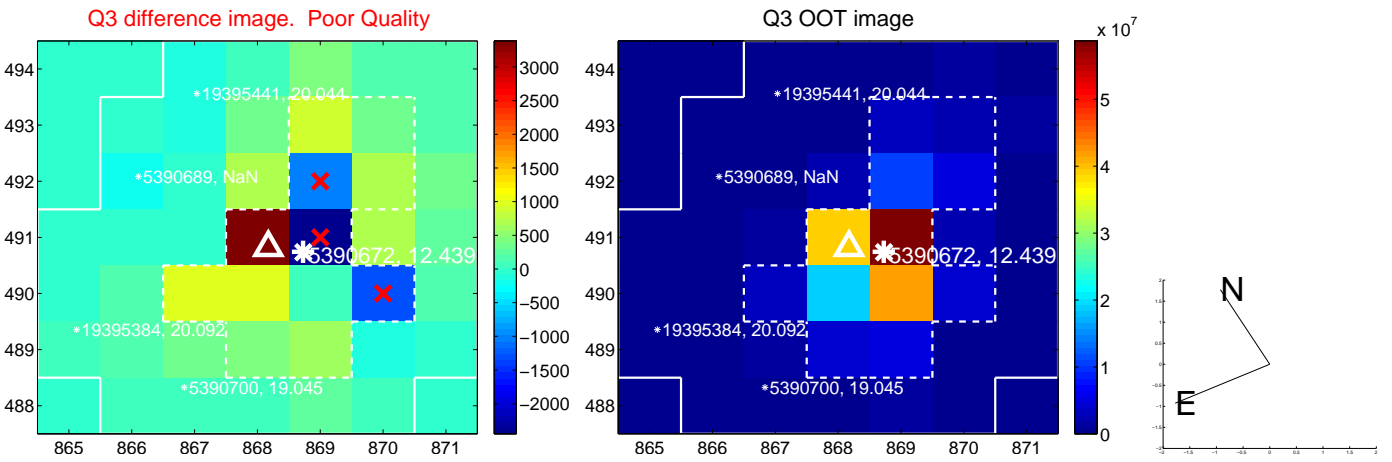
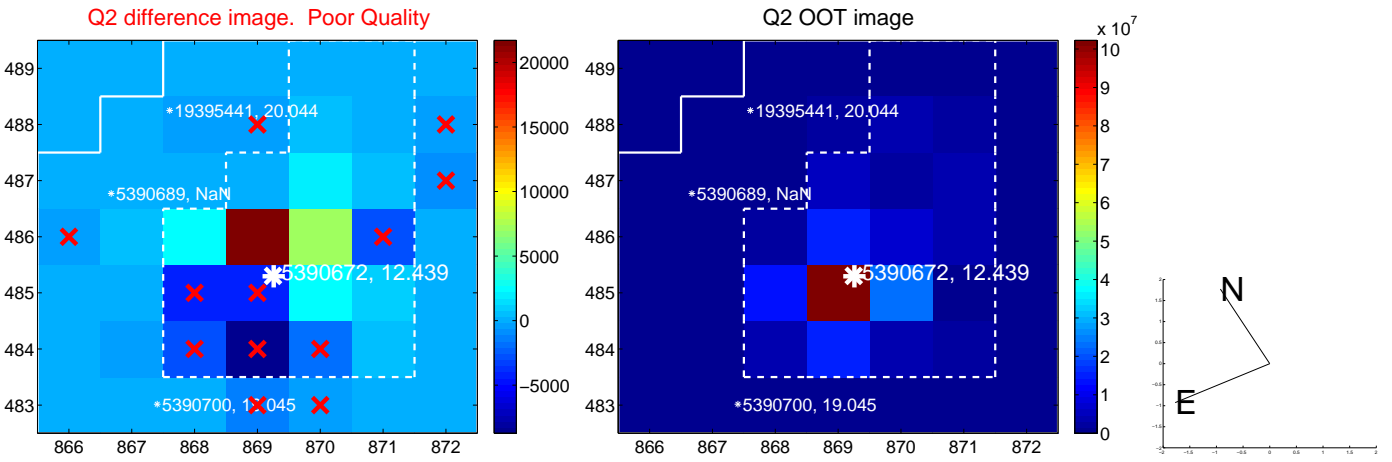
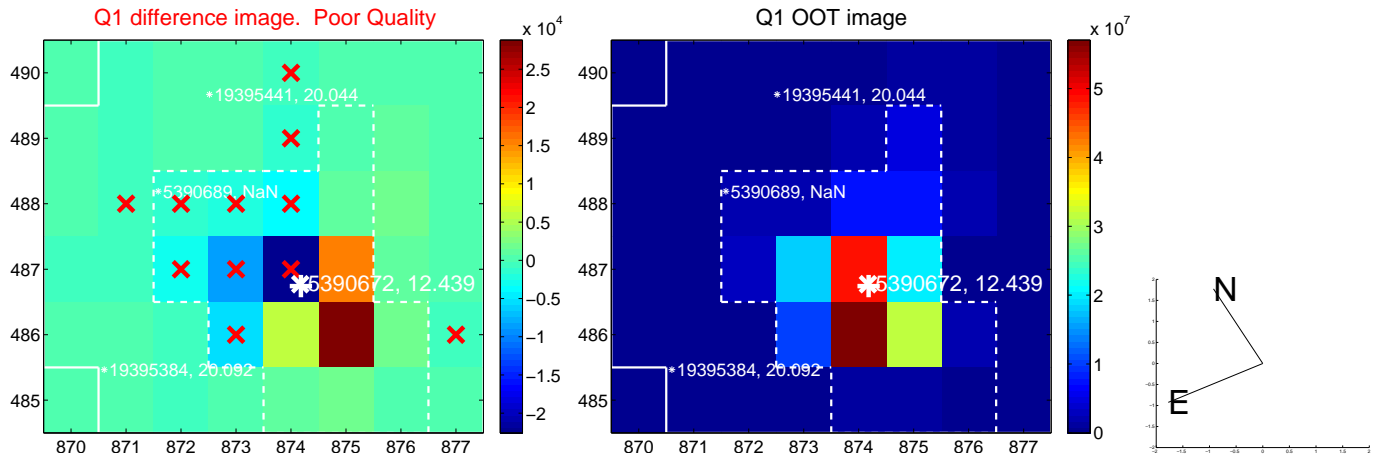
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.353 \pm 0.579$	0.61	$0.339 \pm 0.595$	$-0.101 \pm 0.347$
PRF-fit source offset from KIC position	$0.414 \pm 0.561$	0.74	$0.357 \pm 0.484$	$-0.210 \pm 0.403$
photometric centroid source offset	$0.41 \pm 0.31$	1.33	$0.40 \pm 0.31$	$0.07 \pm 0.31$



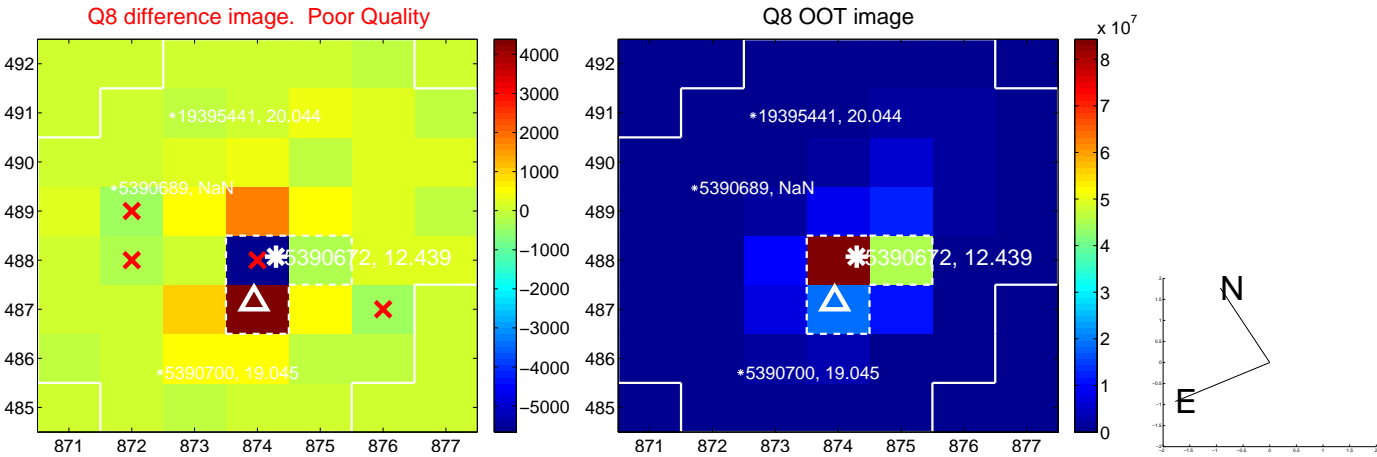
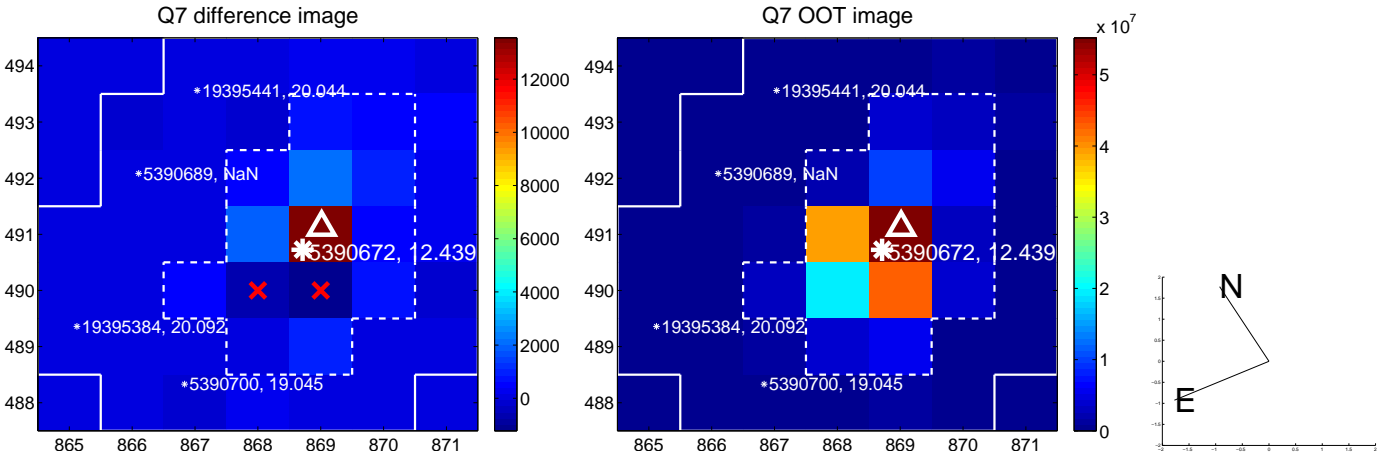
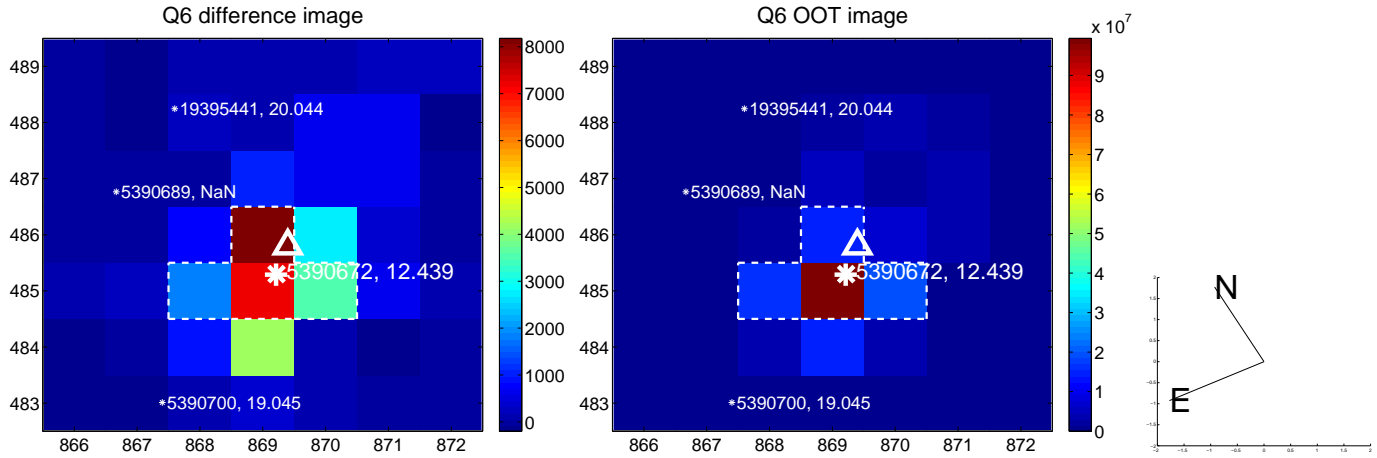
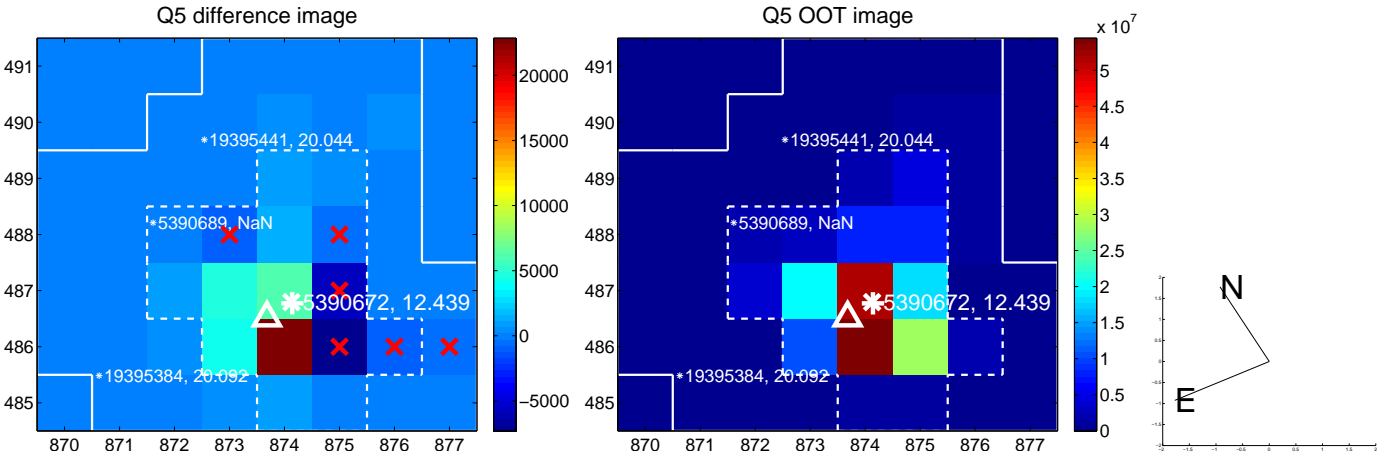
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

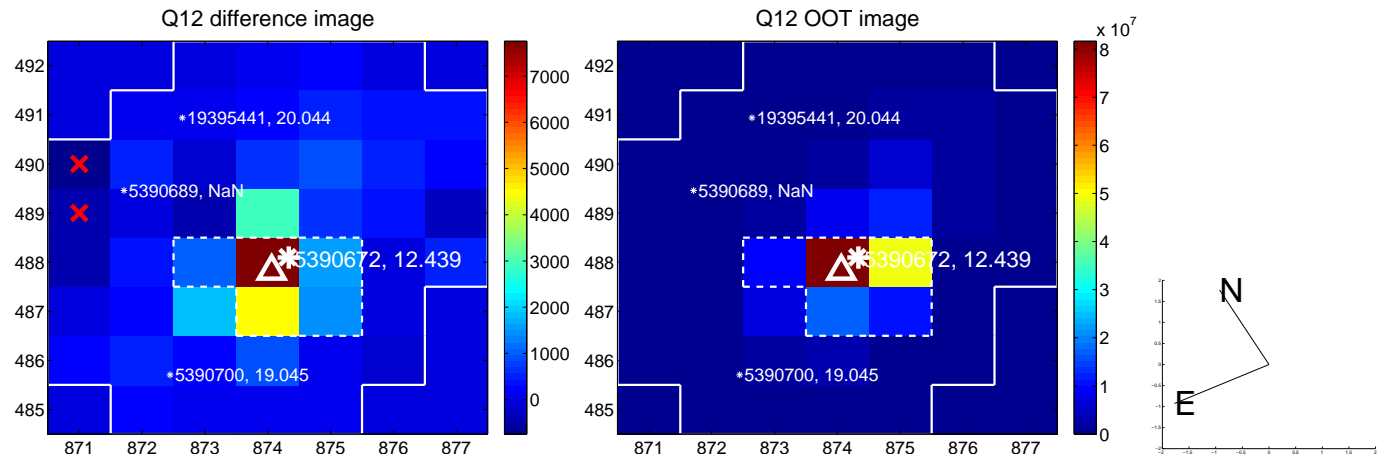
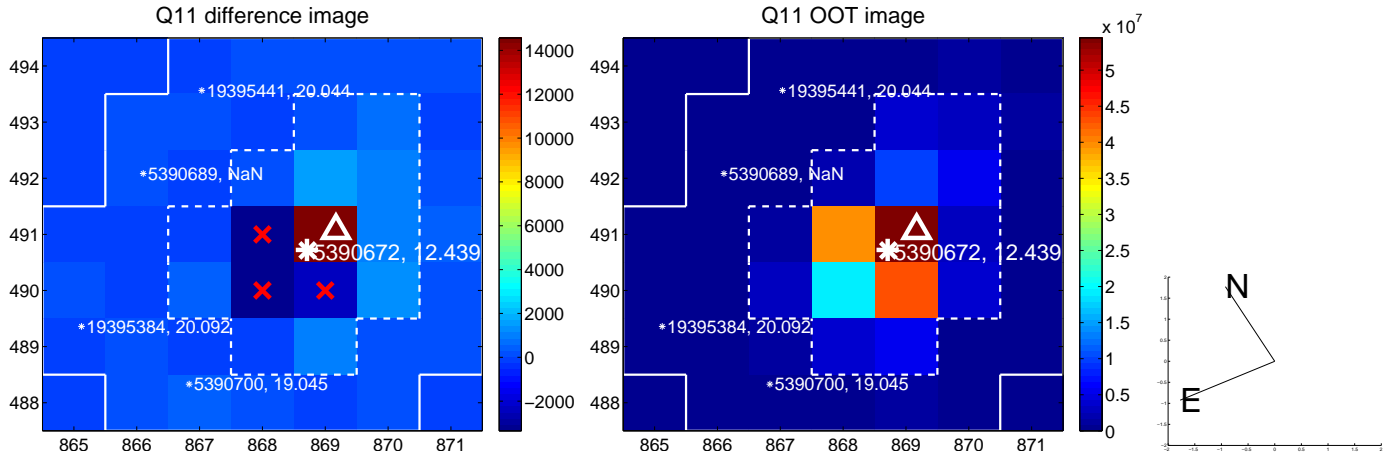
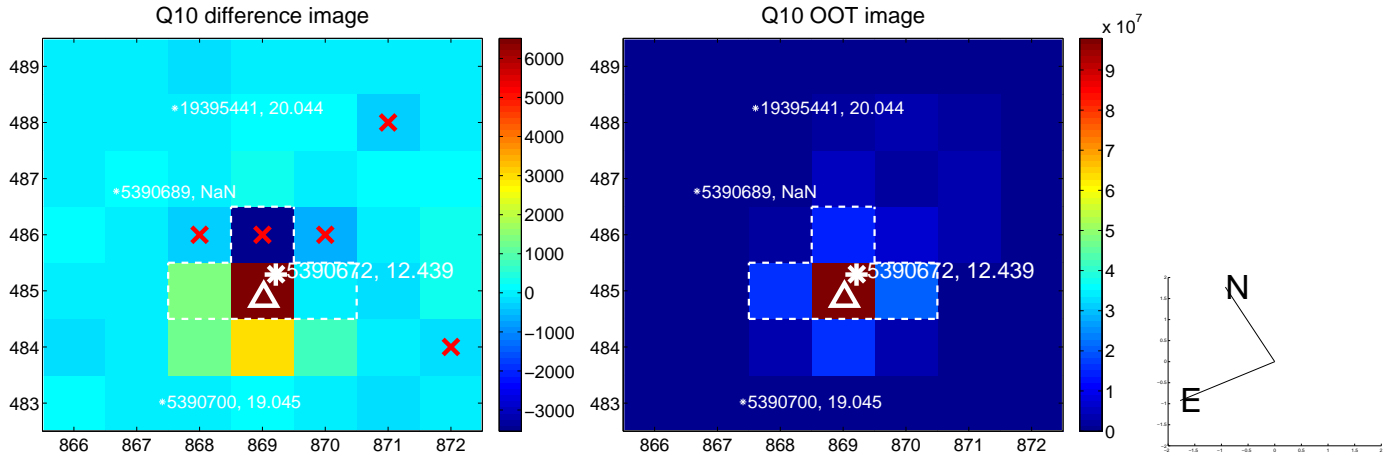
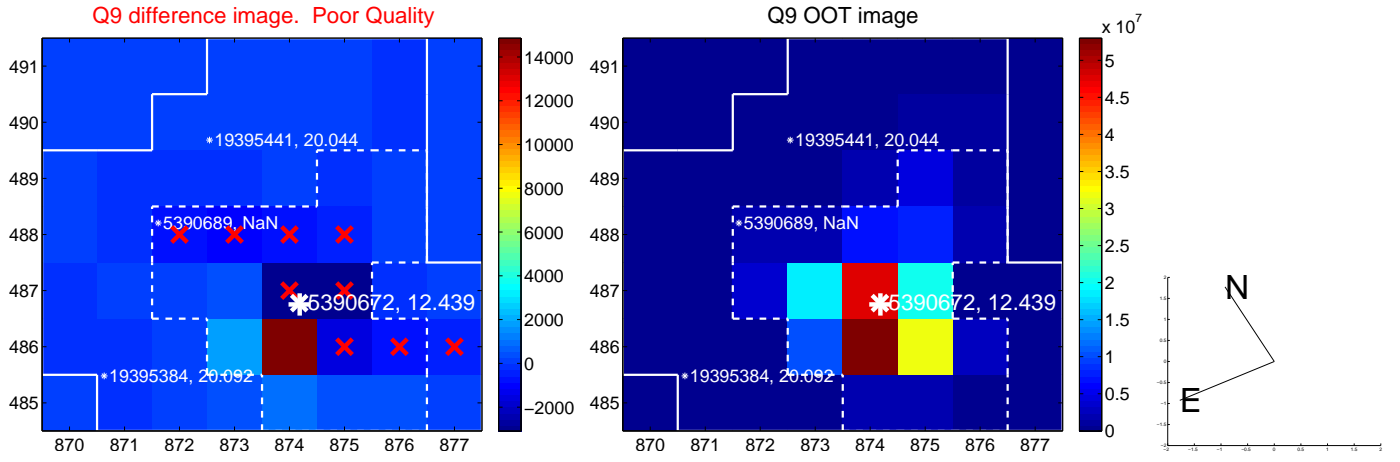




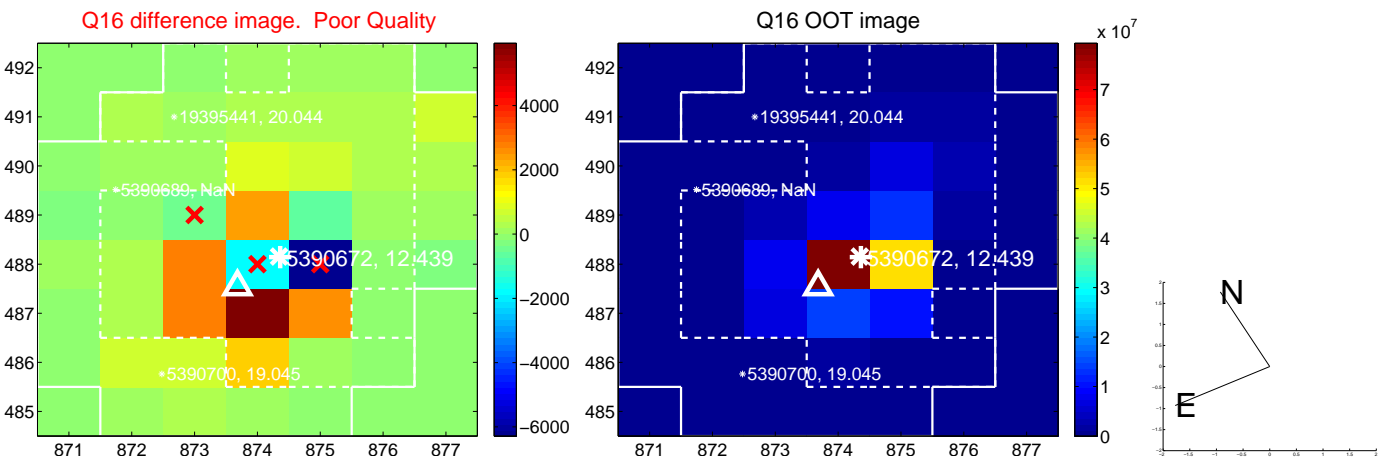
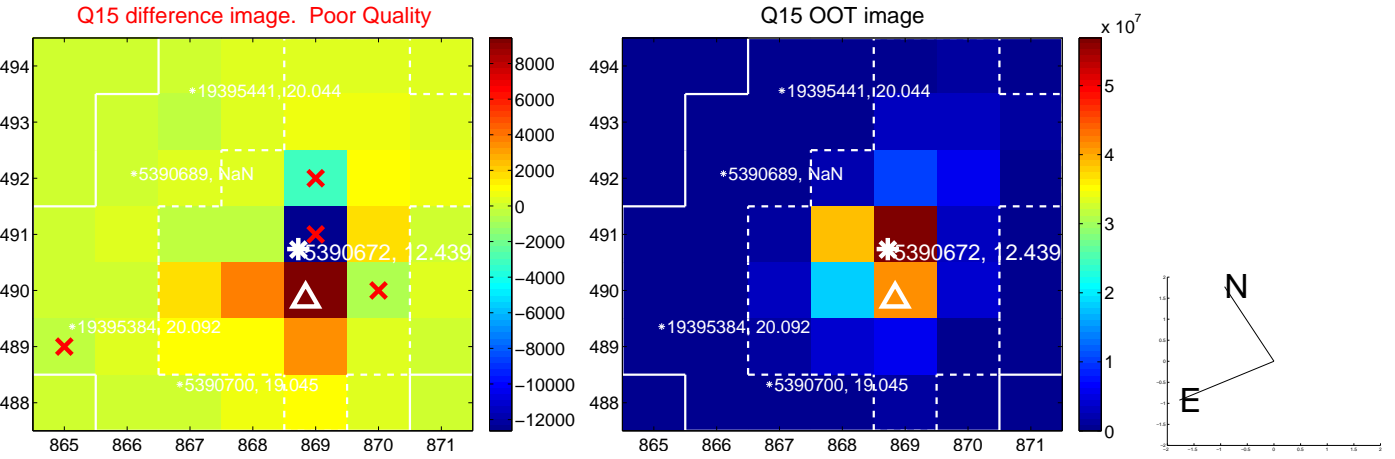
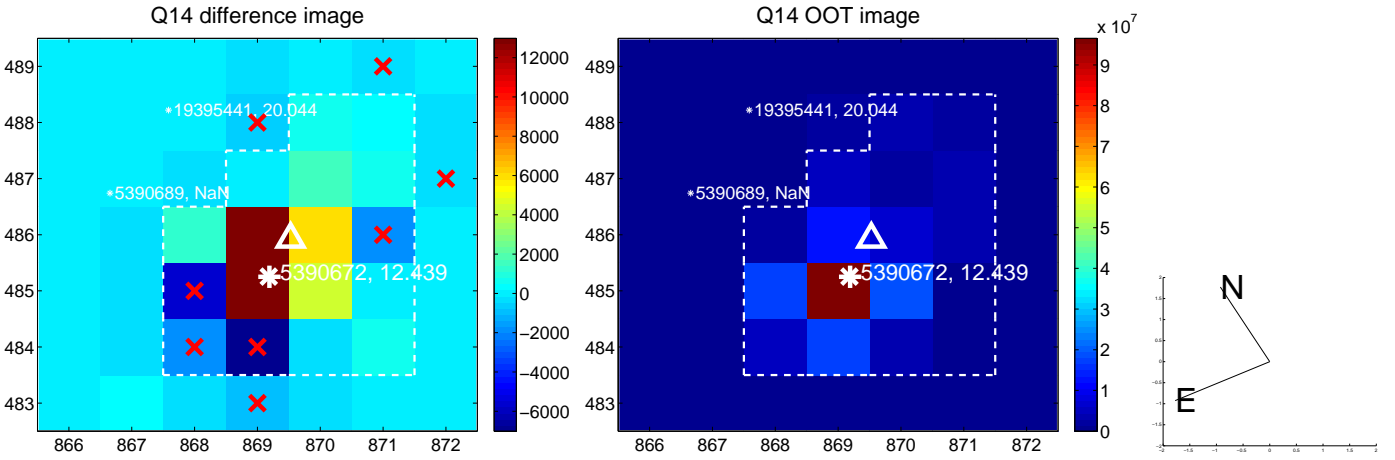
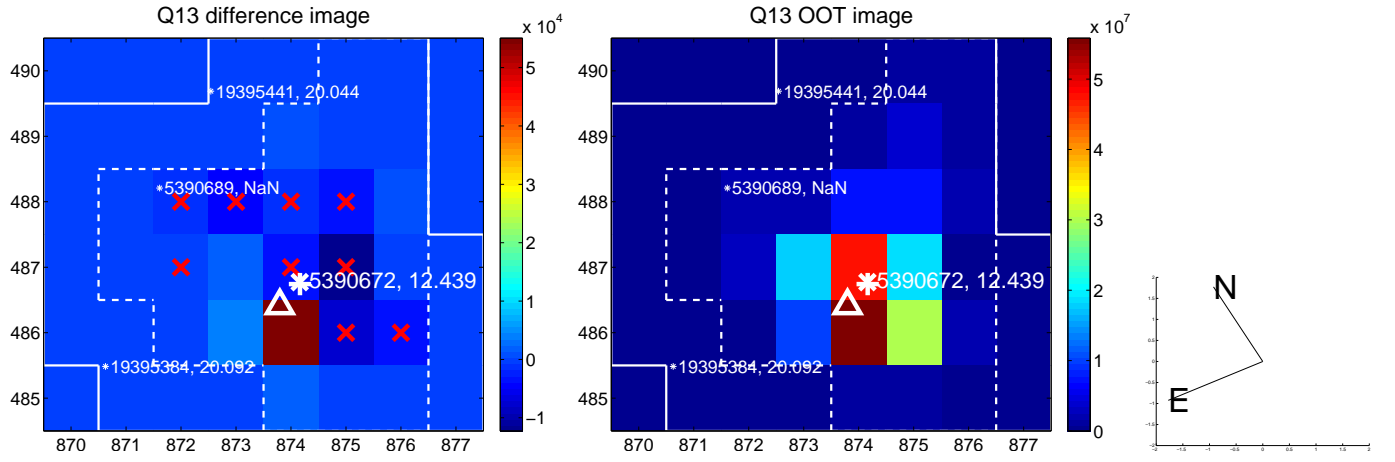
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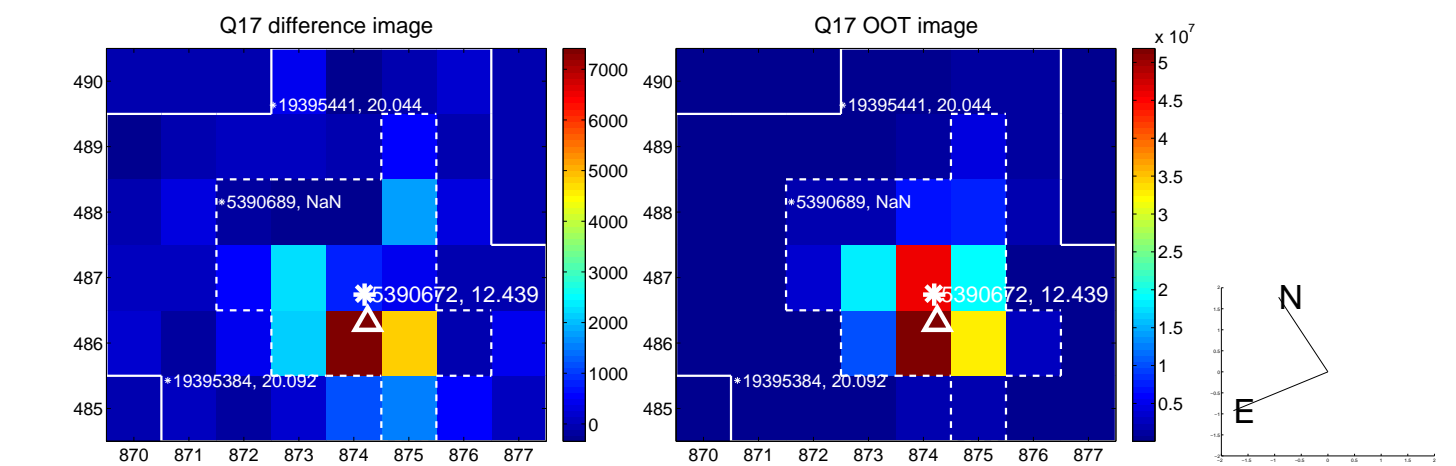
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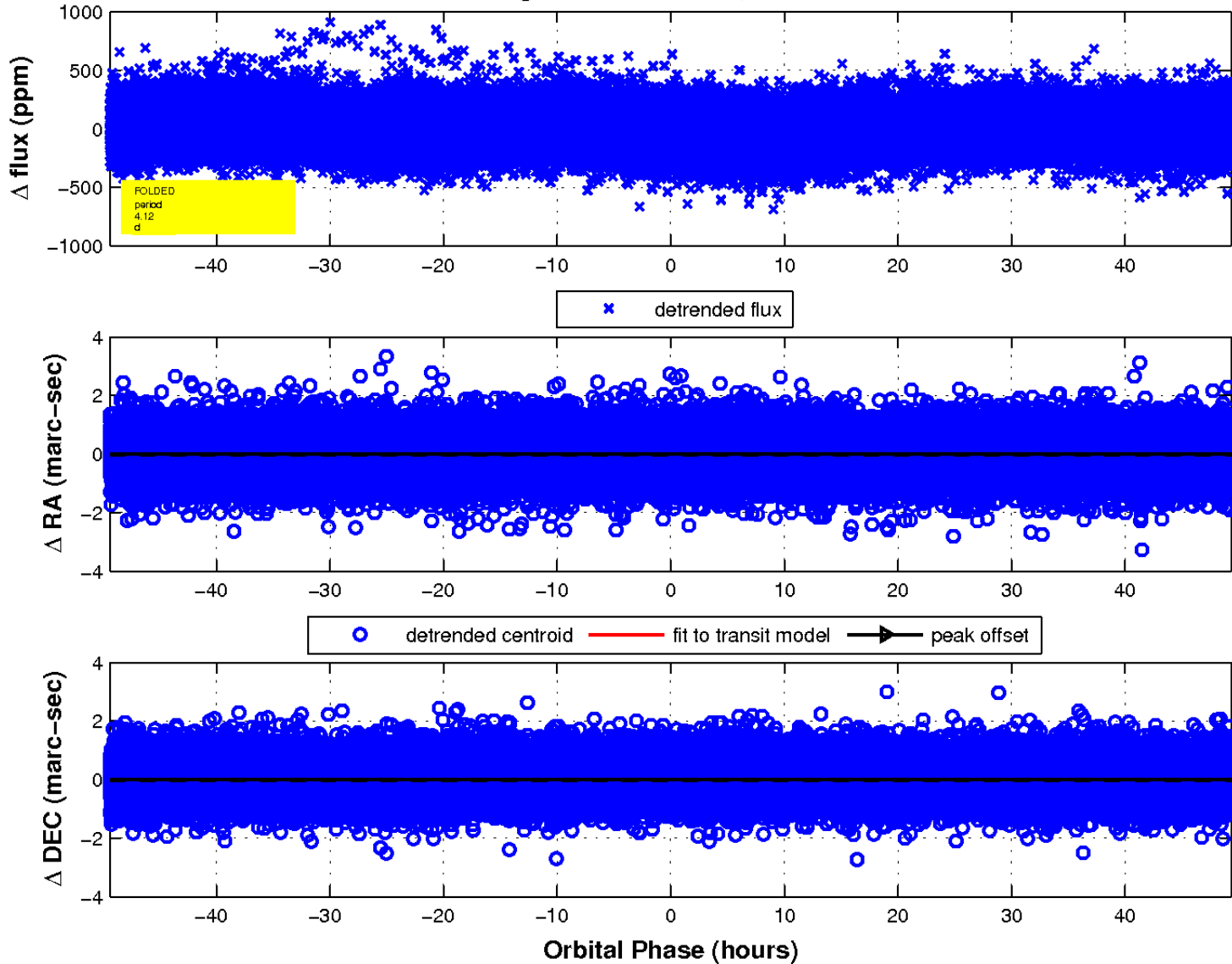
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

