

# KIC 008890150

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008890150-01	OBS	2650.01	34.989837	144.207425	580.7	4.275	10.1	10.8	0.52	3765	1.30	1.71
008890150-02	OBS	2650.02	7.054264	136.194014	348.7	1.711	9.0	10.1	0.52	3765	1.17	14.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008890150-01	OBS	PC	0.98	0	0	0	0	NO_COMMENT
008890150-02	OBS	PC	0.98	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.

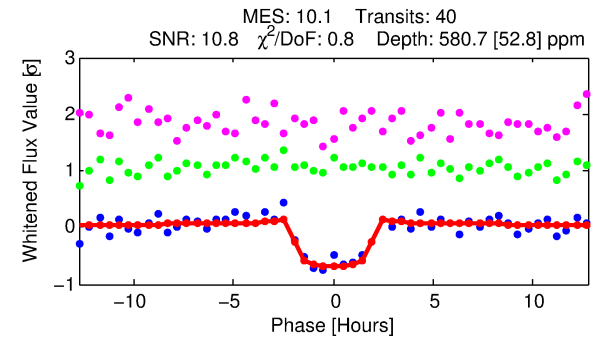
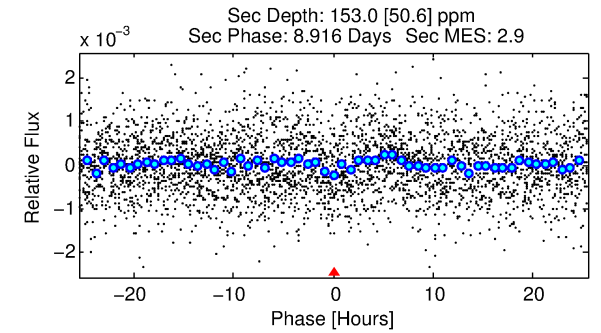
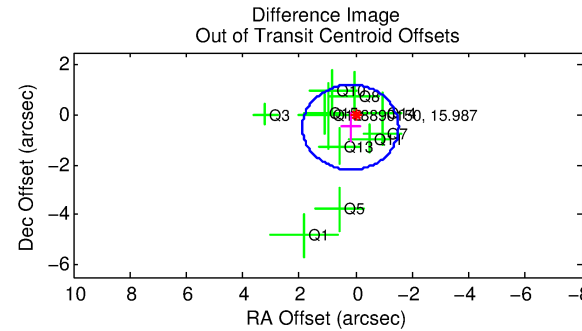
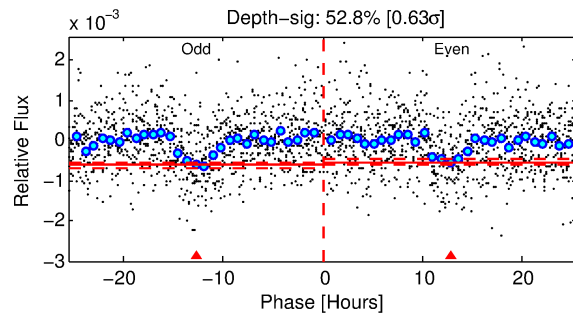
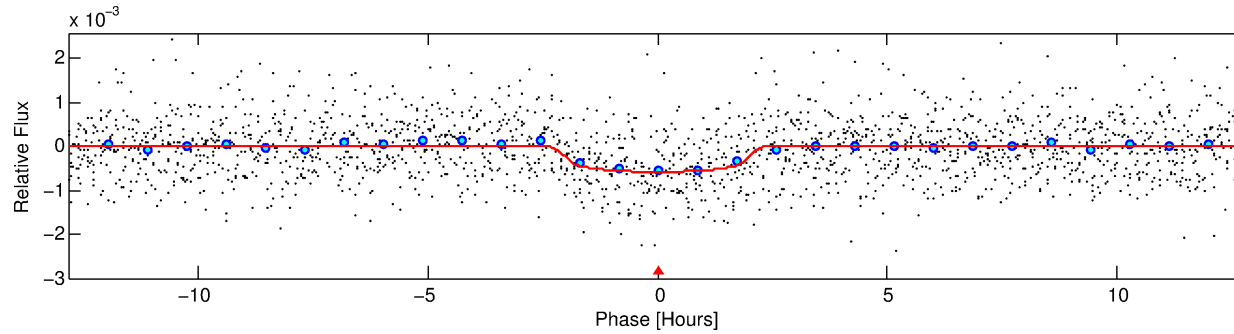
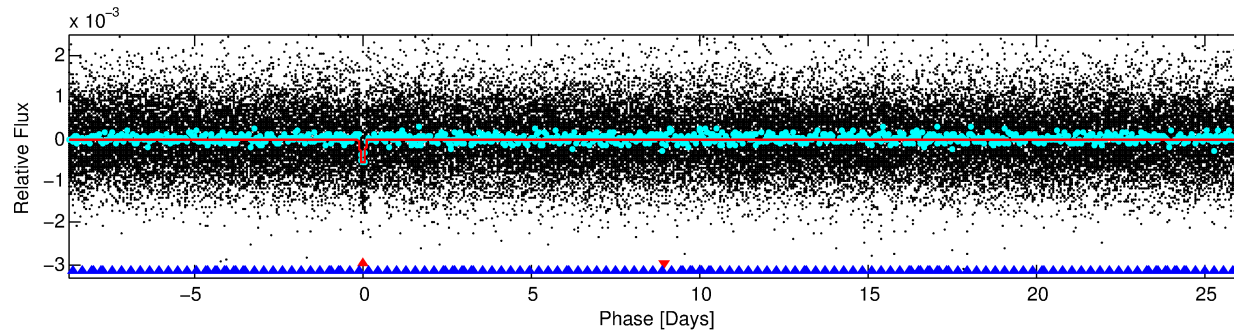
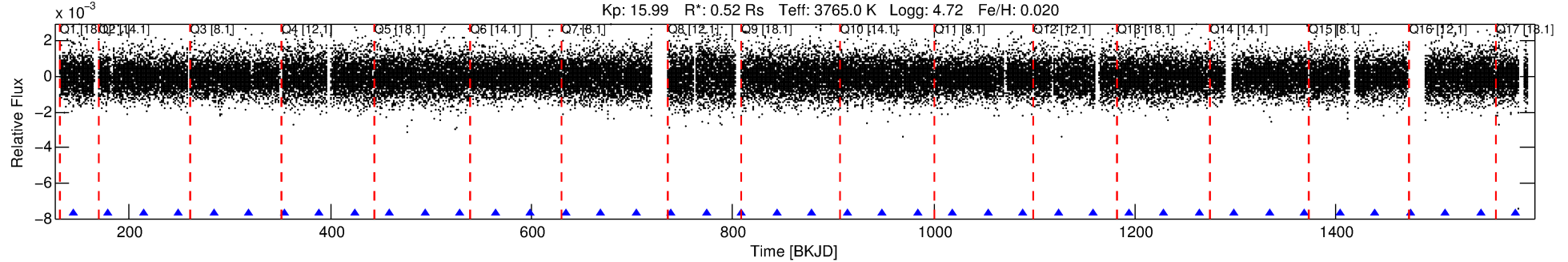
## Ephemeris Match Information For 008890150-01

No Significant Match Found

# DV One-Page Summary

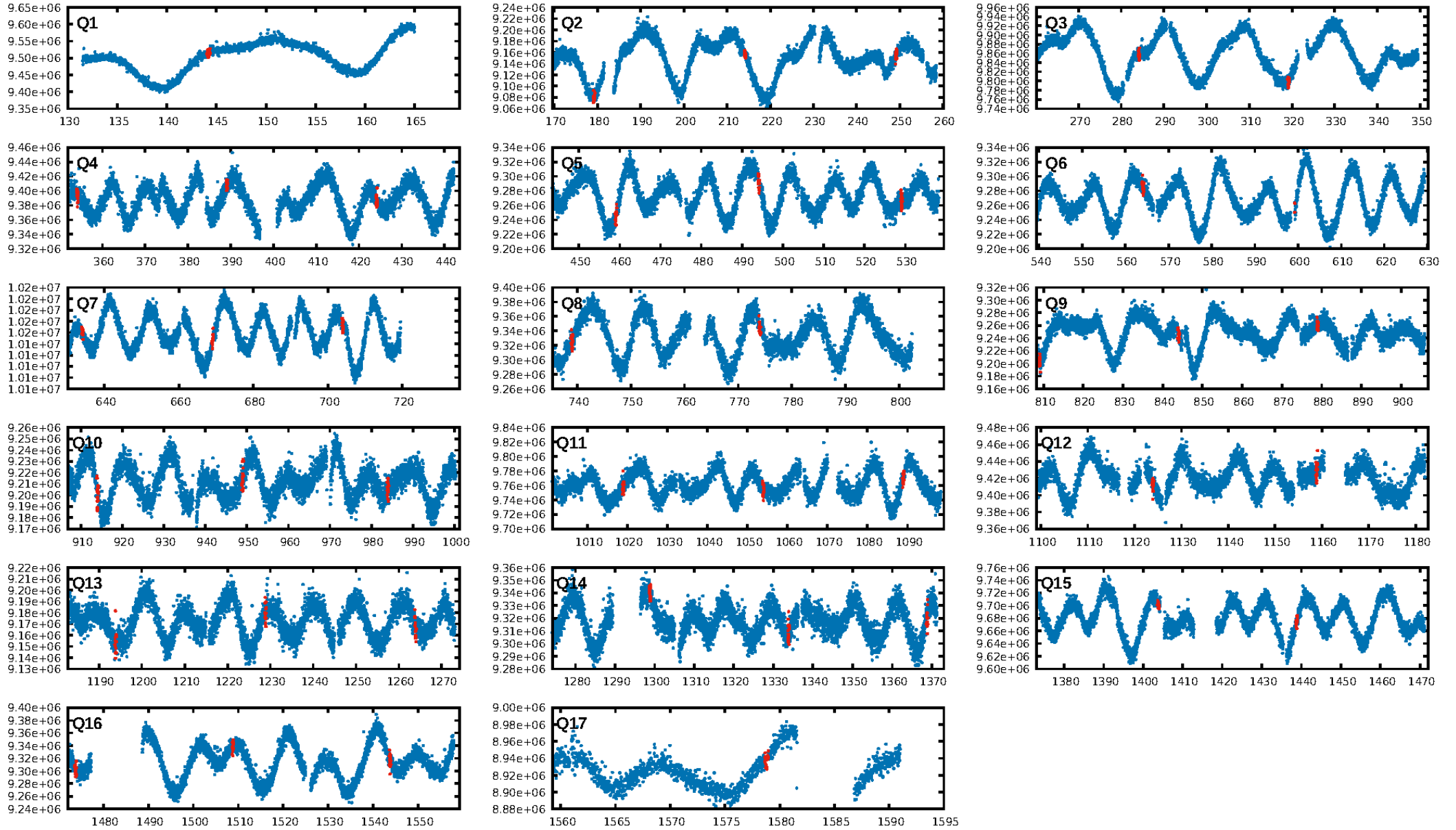
KIC: 8890150 Candidate: 1 of 2 Period: 34.990 d  
KOI: K02650.01 Name: Kepler-395c Corr: 0.949

Kp: 15.99 R\*: 0.52 Rs Teff: 3765.0 K Logg: 4.72 Fe/H: 0.020

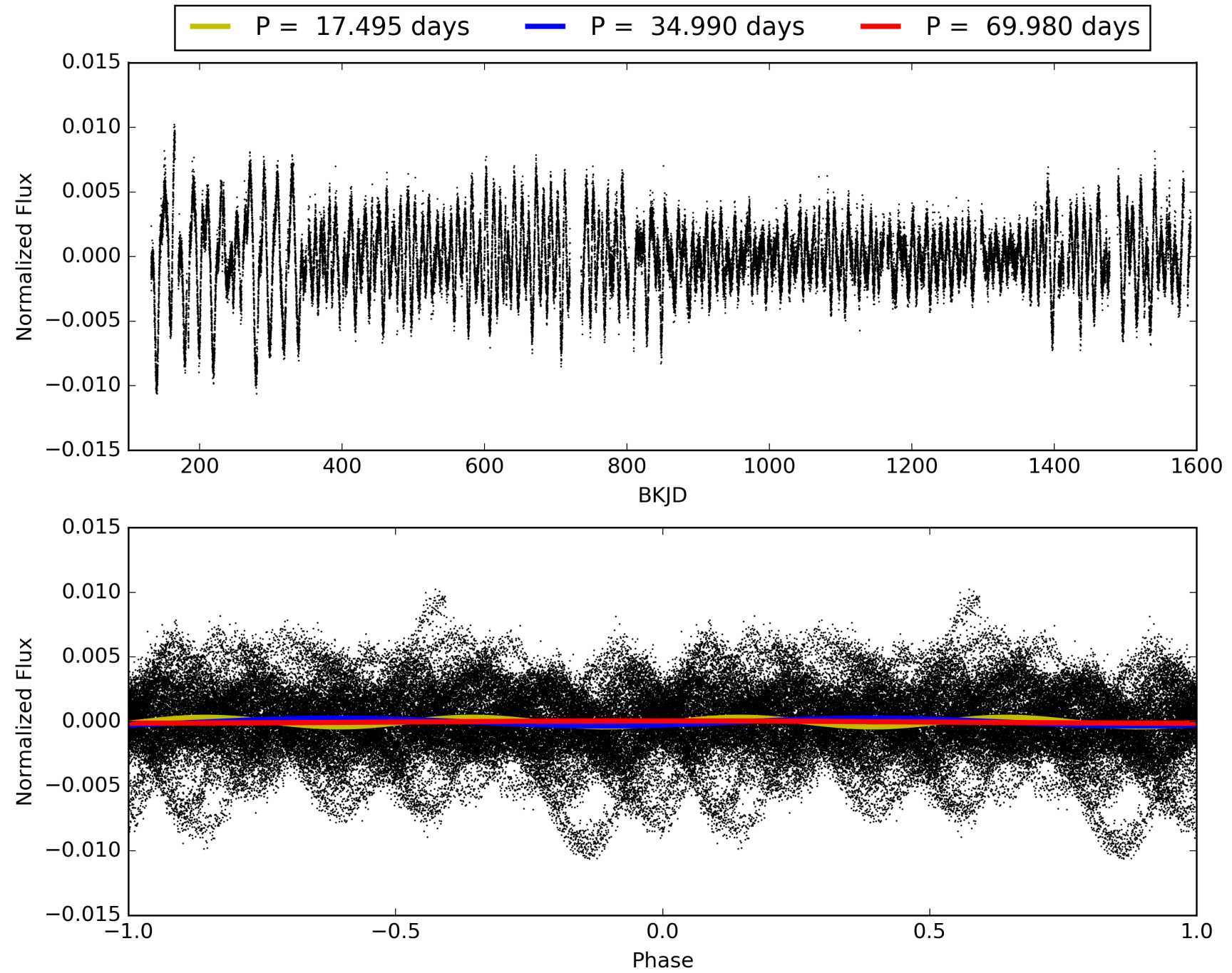


DV Fit Results:	DV Diagnostic Results:
Period = 34.98984 [0.00030] d	ShortPeriod-sig: 100.0% [145.61σ]
Epoch = 144.2074 [0.0073] BKJD	LongPeriod-sig: N/A
Rp/R* = 0.0229 [0.0255]	ModelChiSquare2-sig: 85.8%
a/R* = 52.28 [244.04]	ModelChiSquareGof-sig: 100.0%
b = 0.59 [5.21]	Bootstrap-pfa: 5.93e-22
Seff = 1.71 [0.22]	RollingBand-fgt: 1.00 [38/38]
Teq = 292 [10] K	GhostDiagnostic-chr: -3.27
Rp = 1.30 [1.46] Re	Centroid-sig: 21.6%
a = 0.1690 [0.0120] AU	Centroid-so: 1.167 arcsec [1.15σ]
Ag = 1422.75 [3212.44] [0.44σ]	OotOffset-rm: 0.533 arcsec [0.94σ]
Teffp = 2769 [1563] K [1.59σ]	KicOffset-rm: 0.473 arcsec [1.09σ]
	OotOffset-st: 2/4/2/3 [11]
	KicOffset-st: 2/4/2/3 [11]
	DiffImageQuality-fgm: 0.64 [7/11]
	DiffImageOverlap-fno: 0.94 [16/17]

# TCE 008890150-01, PDC Light Curves

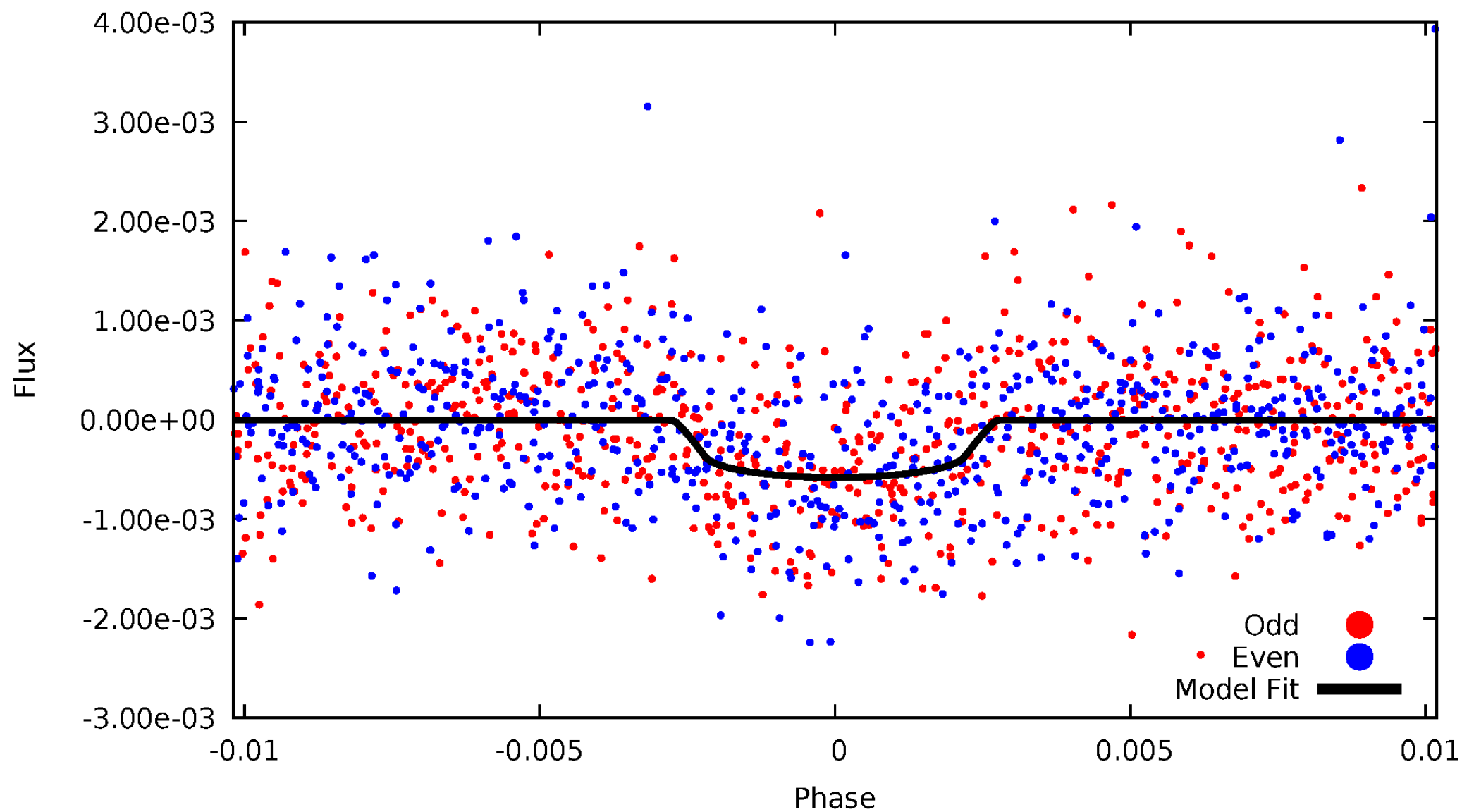


TCE 008890150-01



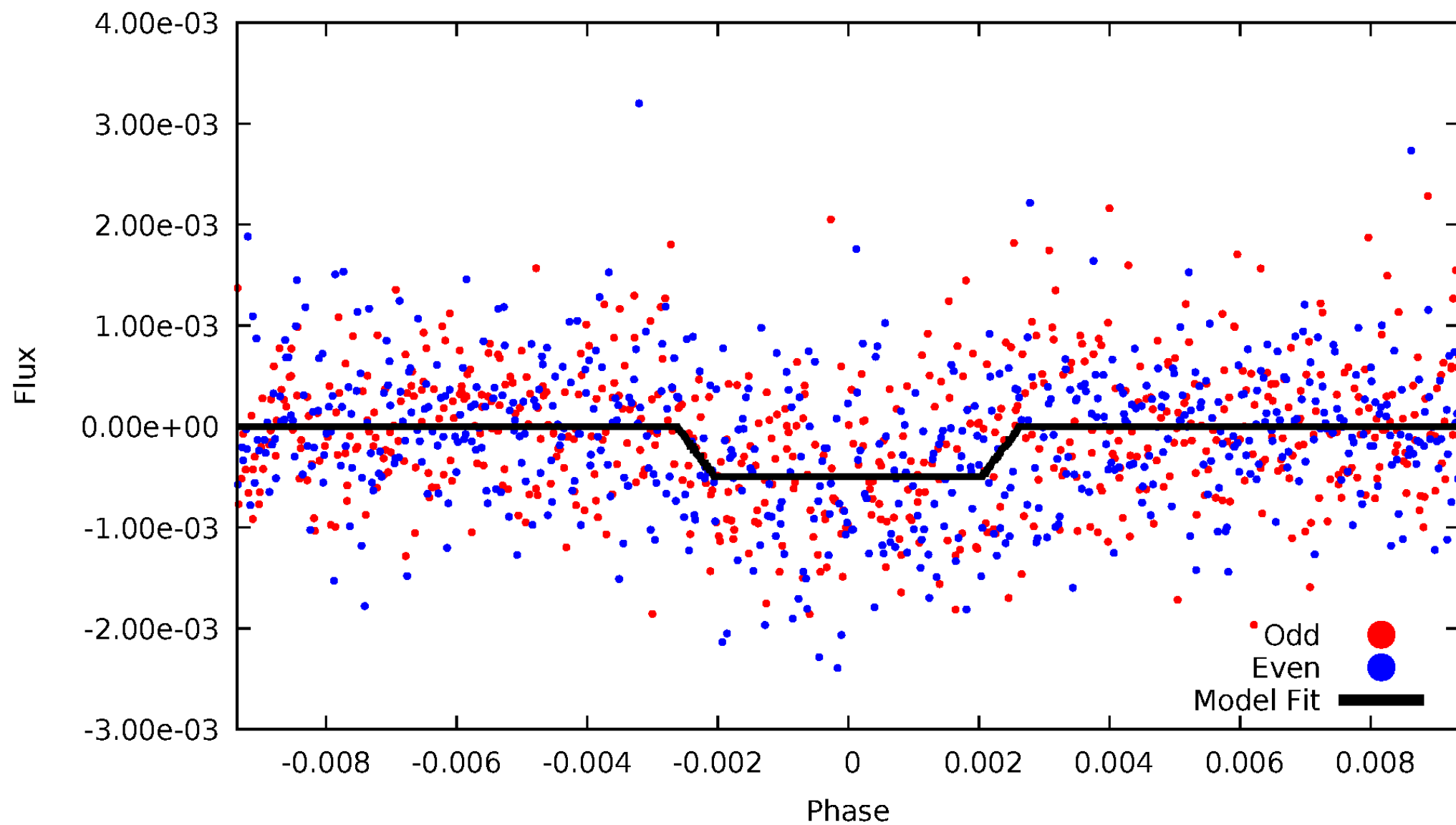
# DV Odd/Even

TCE 008890150-01



# ALT Odd/Even

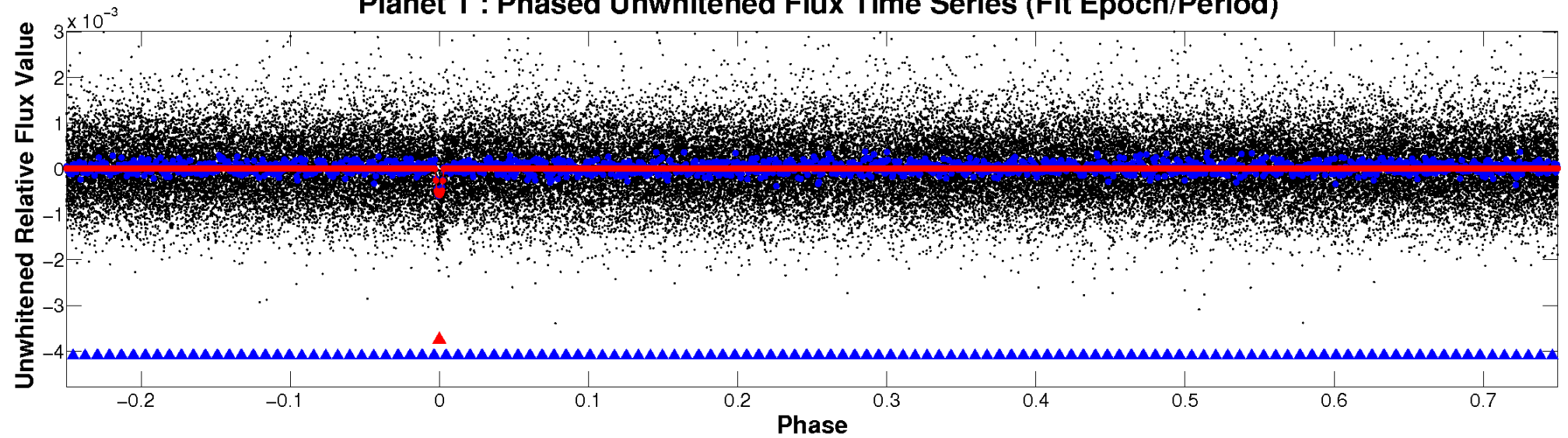
TCE 008890150-01



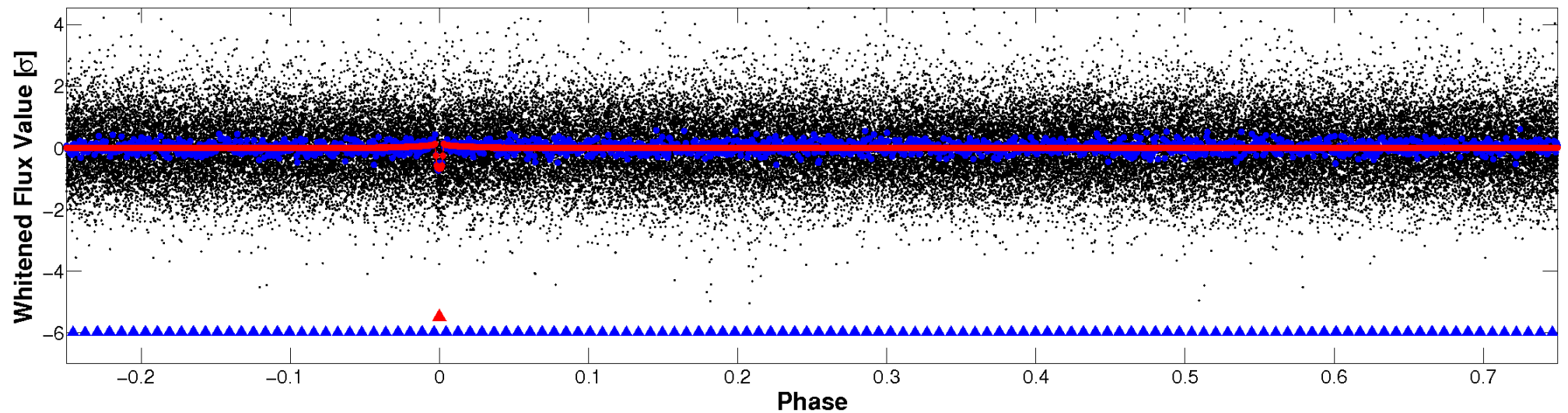


# Non-Whitened Vs. Whitened Light Curve

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

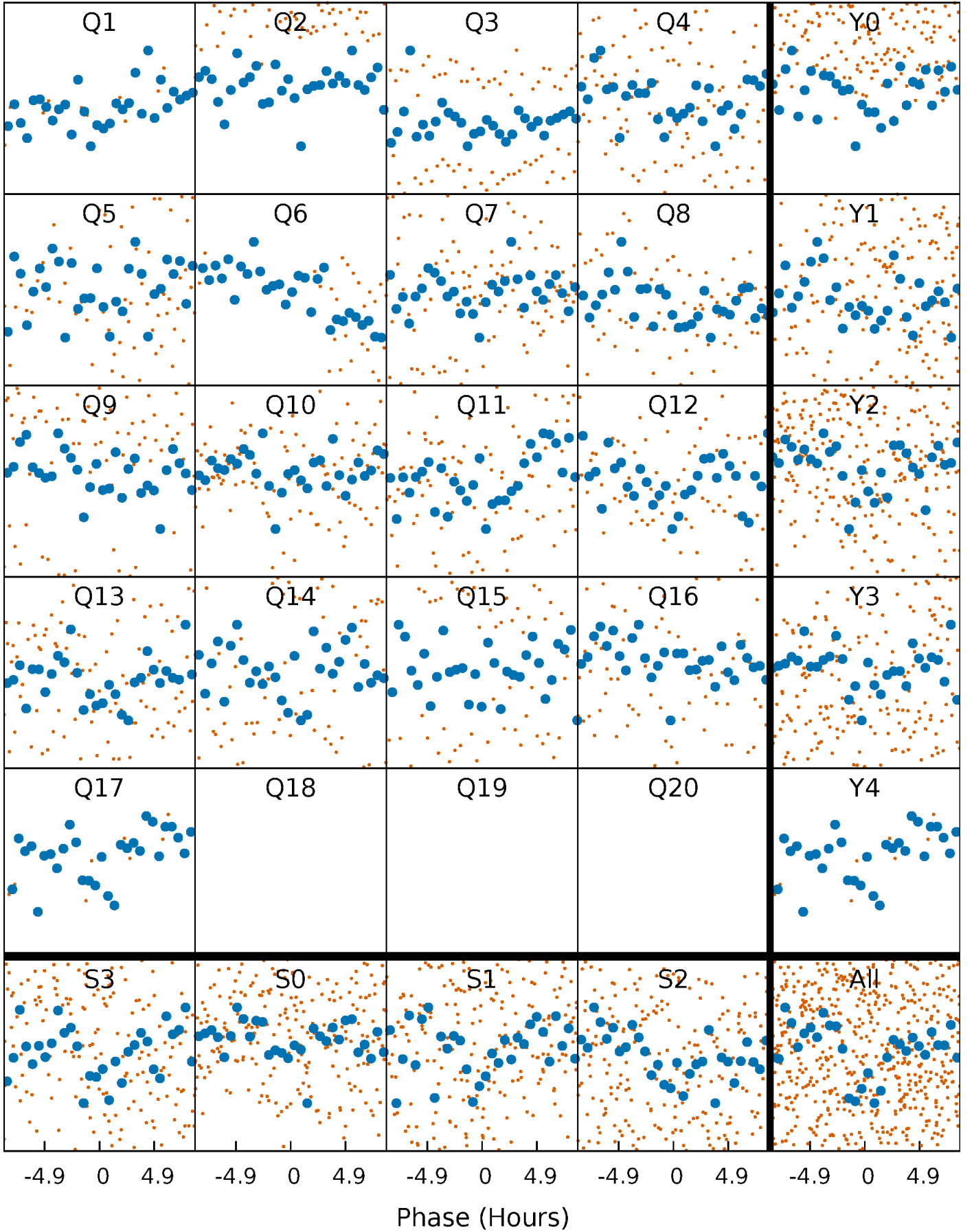


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

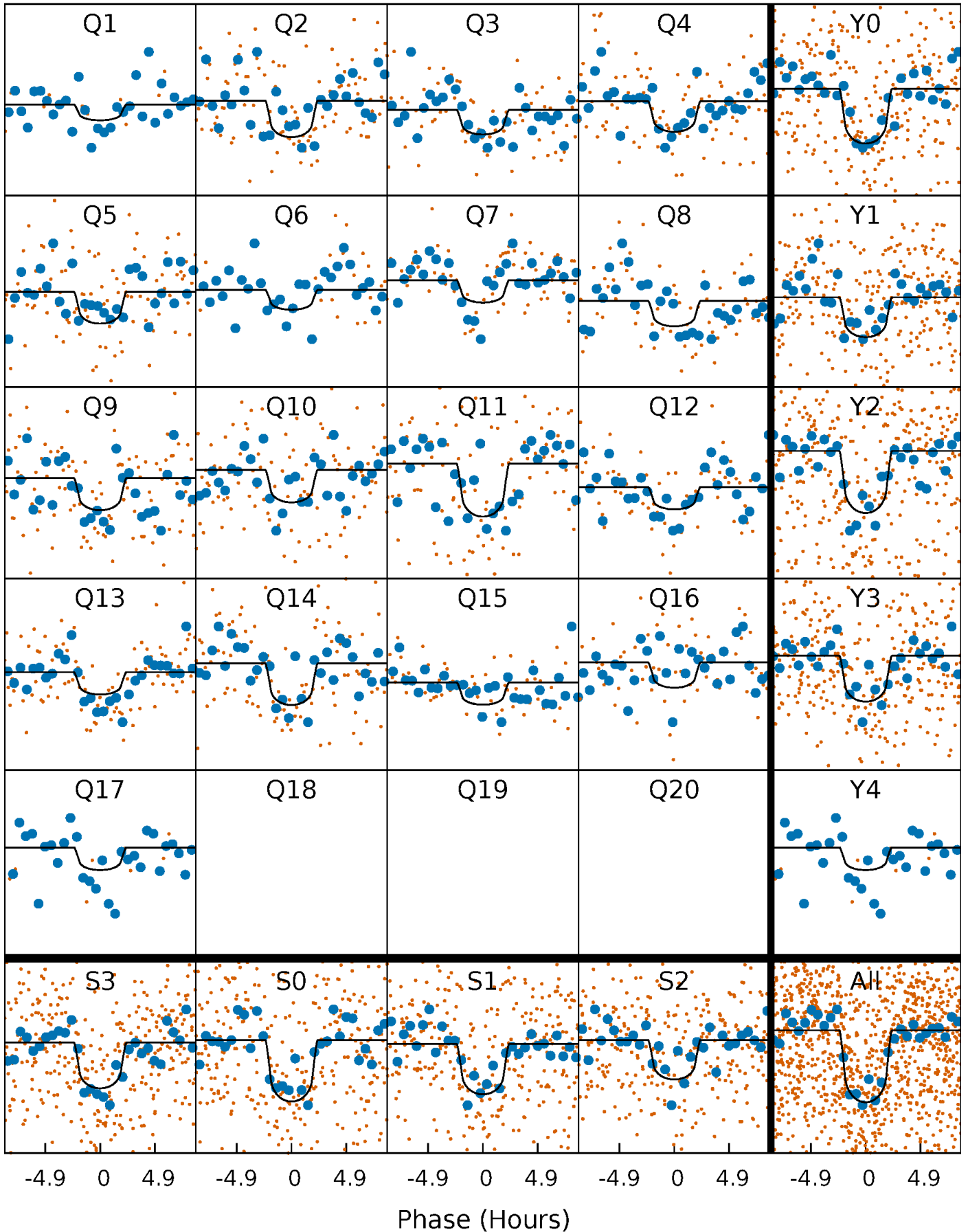
TCE 008890150-01 P= 34.989837 Days  $T_0=144.207425$  (BKJD)





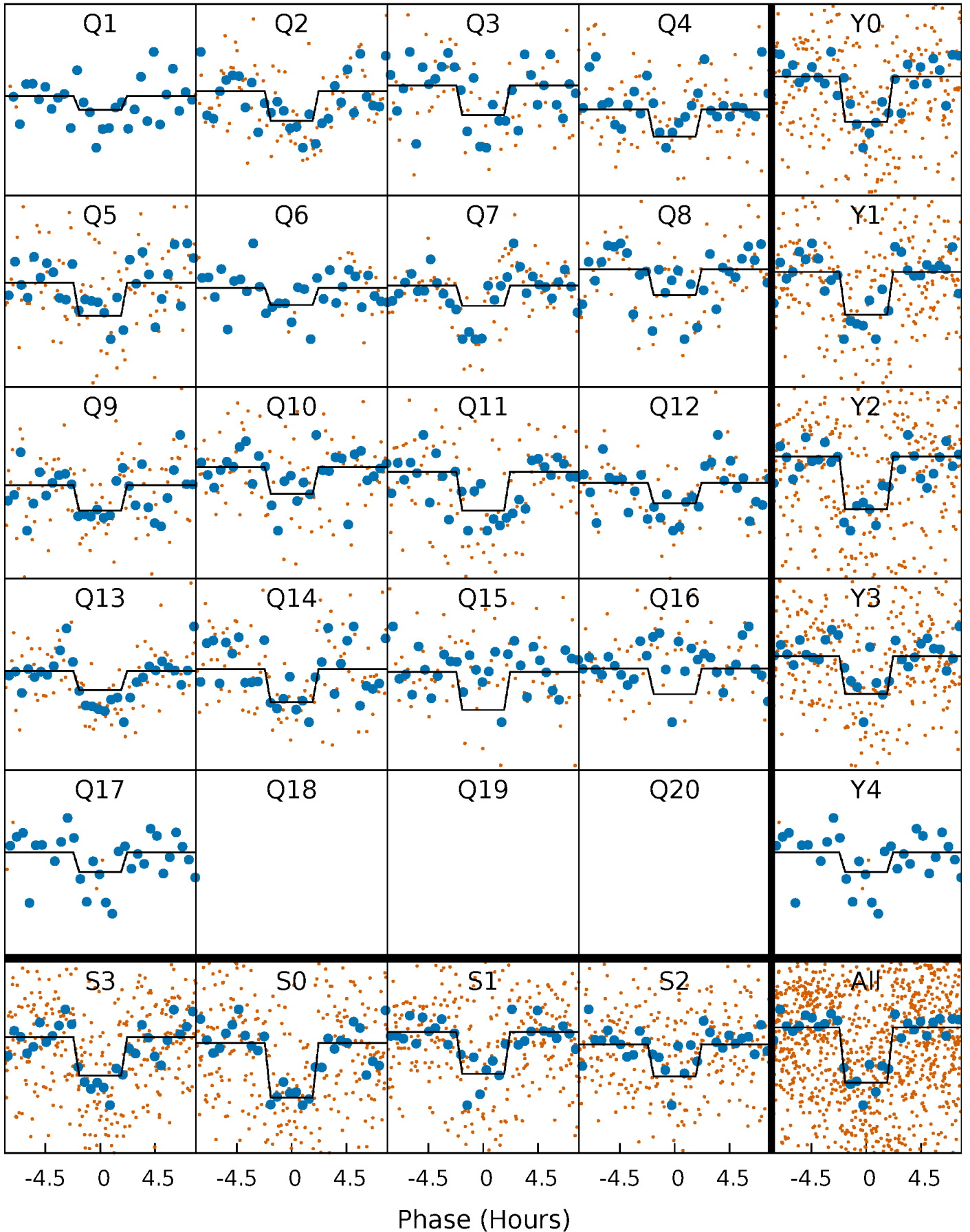
# DV Quarter-Phased Transit Curves

TCE 008890150-01 P= 34.989837 Days  $T_0=144.207425$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

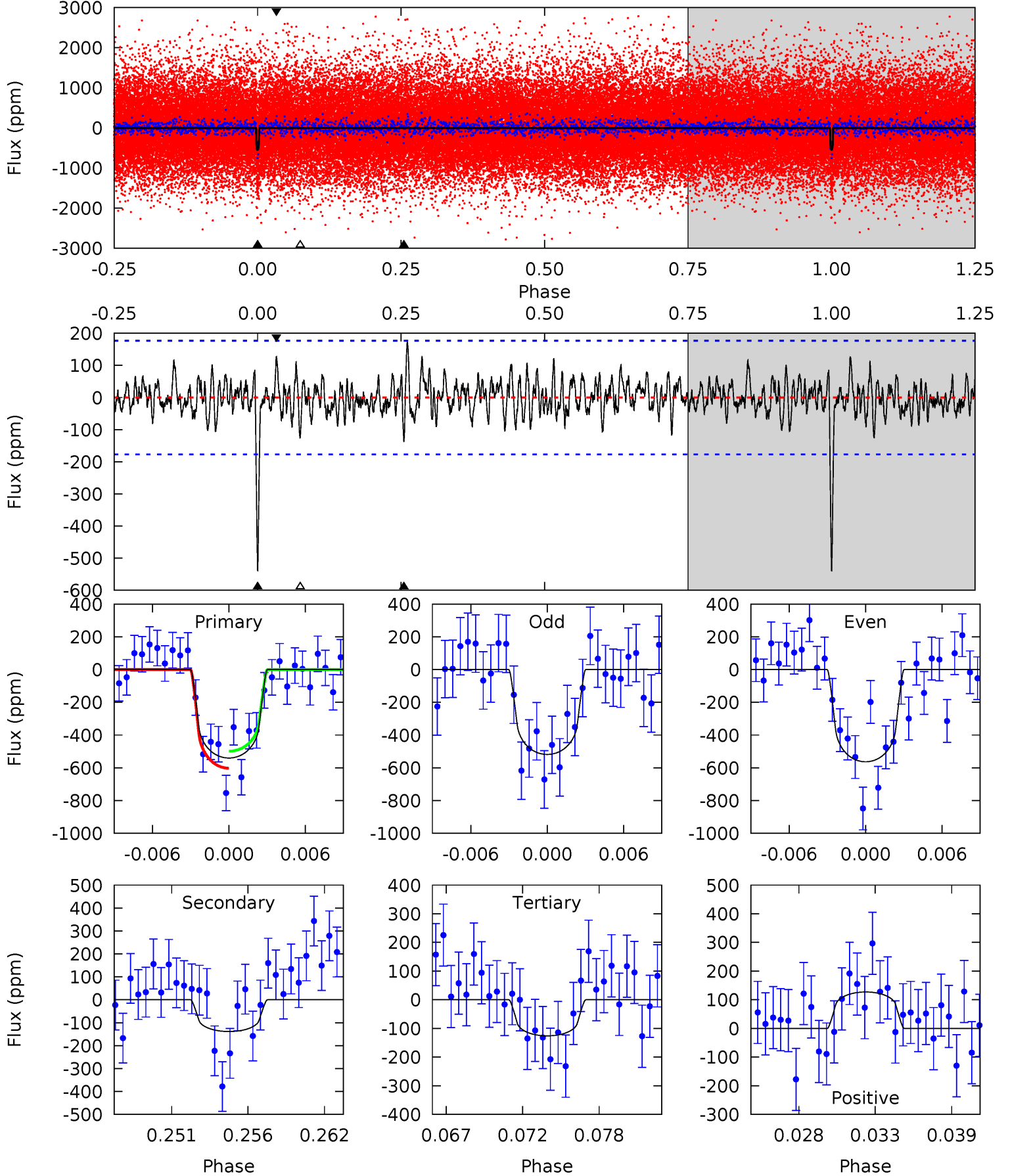
TCE 008890150-01 P= 34.990013 Days  $T_0=144.203393$  (BKJD)



# DV Model-Shift Uniqueness Test

008890150-01, P = 34.989837 Days, E = 109.217588 Days

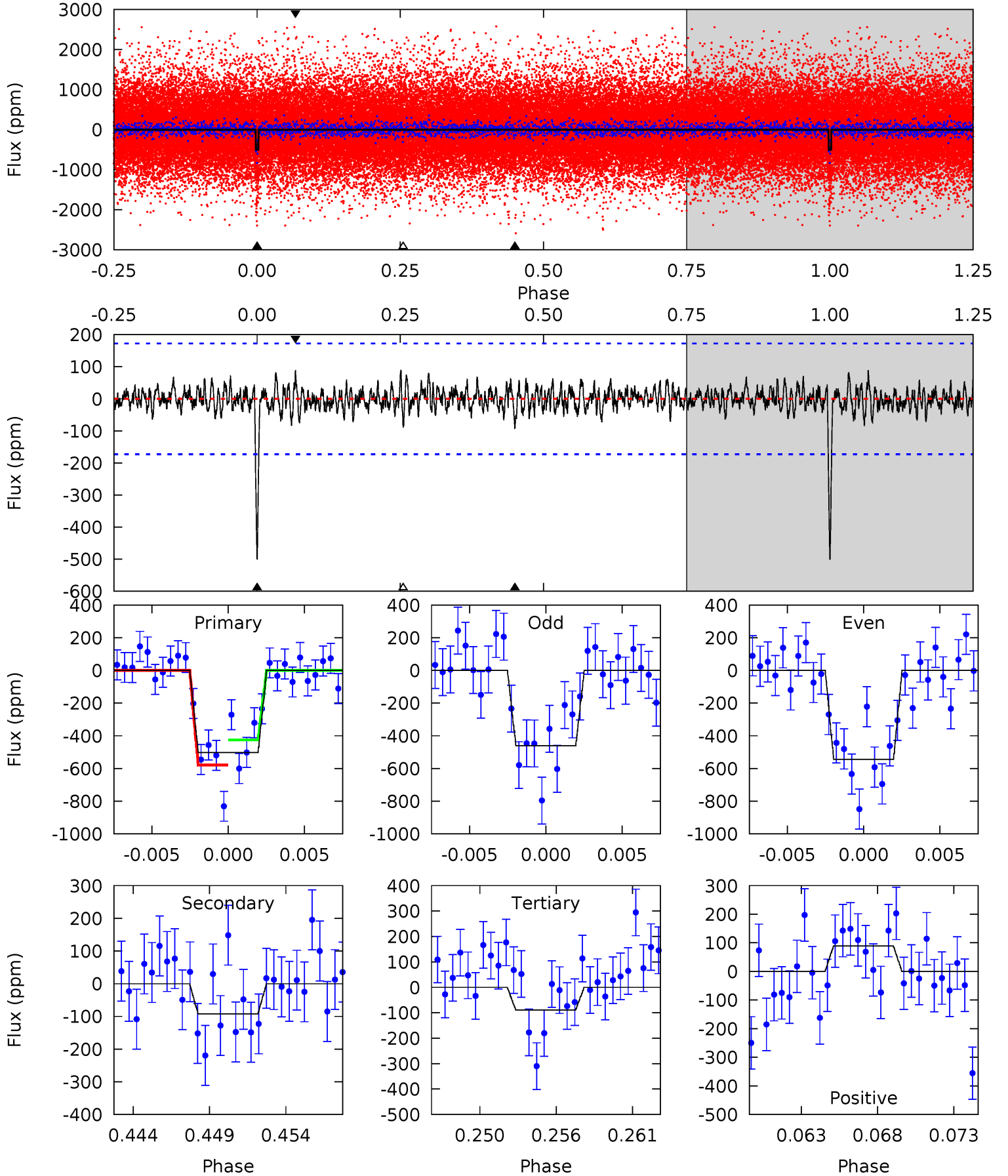
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.7	4.02	3.66	3.69	5.14	2.77	1.25	12.0	12.0	0.37	0.33	0.65	0.96	0.24	1.51



# Alt Model-Shift Uniqueness Test

008890150-01, P = 34.990013 Days, E = 109.213380 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
14.9	2.75	2.65	2.66	5.15	2.79	0.82	12.3	12.3	0.10	0.09	1.24	0.99	0.15	2.29



### Stellar Parameters For KIC 008890150

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3765^{+75}_{-83}$	$4.725^{+0.049}_{-0.021}$	$0.020^{+0.150}_{-0.150}$	$0.521^{+0.029}_{-0.047}$	$0.526^{+0.035}_{-0.042}$	$5.225^{+1.216}_{-0.519}$
	+2%/-2%	+1%/-0%	+750%/-750%	+6%/-9%	+7%/-8%	+23%/-10%
Source	SPE70	SPE60	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 008890150-01 / KOI 2650.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-139 \pm 34$	$1.54^{+1.36}_{-0.97}$	$405^{+10}_{-10}$	$2895^{+1061}_{-431}$	$890^{+5915}_{-645}$
Alt.	$-92 \pm 34$	$1.62^{+1.32}_{-1.01}$	$405^{+10}_{-11}$	$2699^{+953}_{-384}$	$510^{+3559}_{-363}$

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

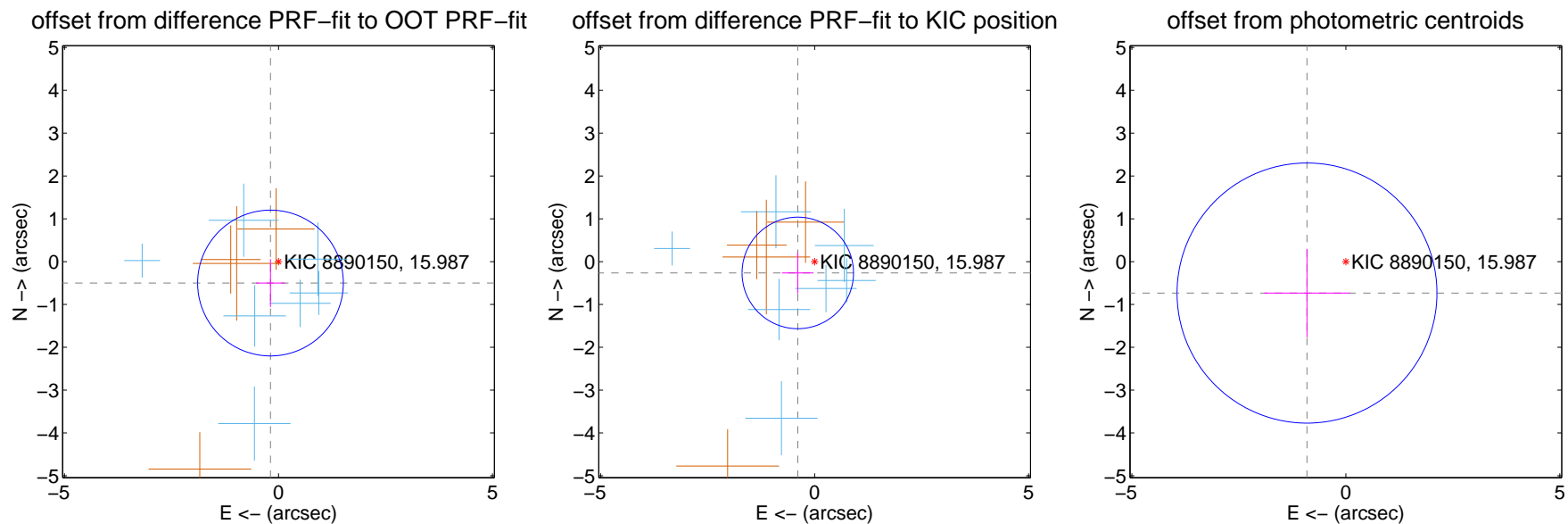
## DV Centroid Data

Supplemental centroid analysis for 008890150-01. Kepler magnitude: 15.99. Transit SNR 10.84

There are 7 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.41 arcsec

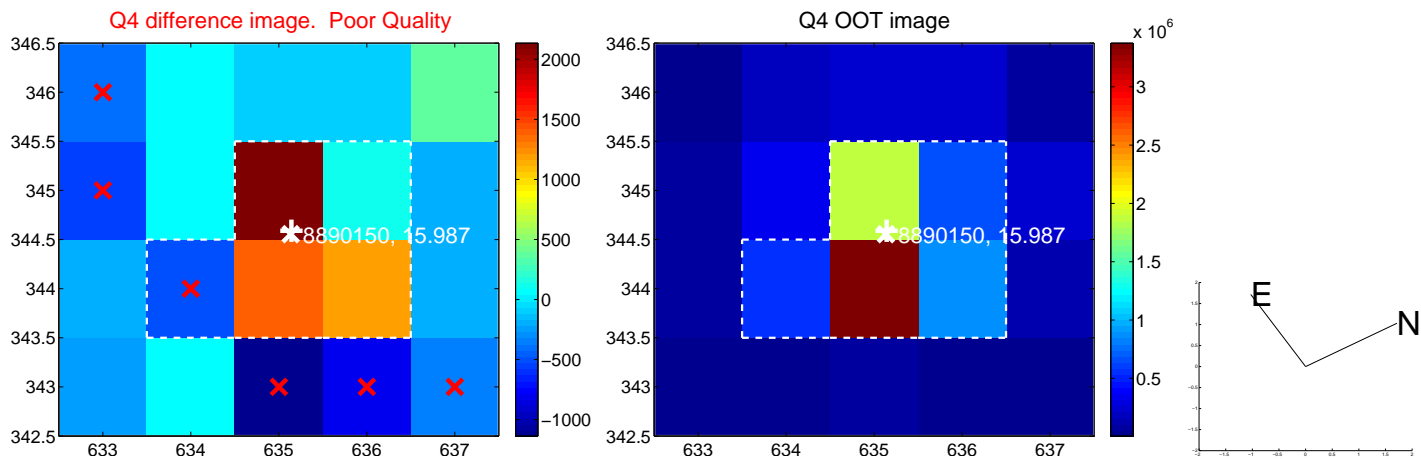
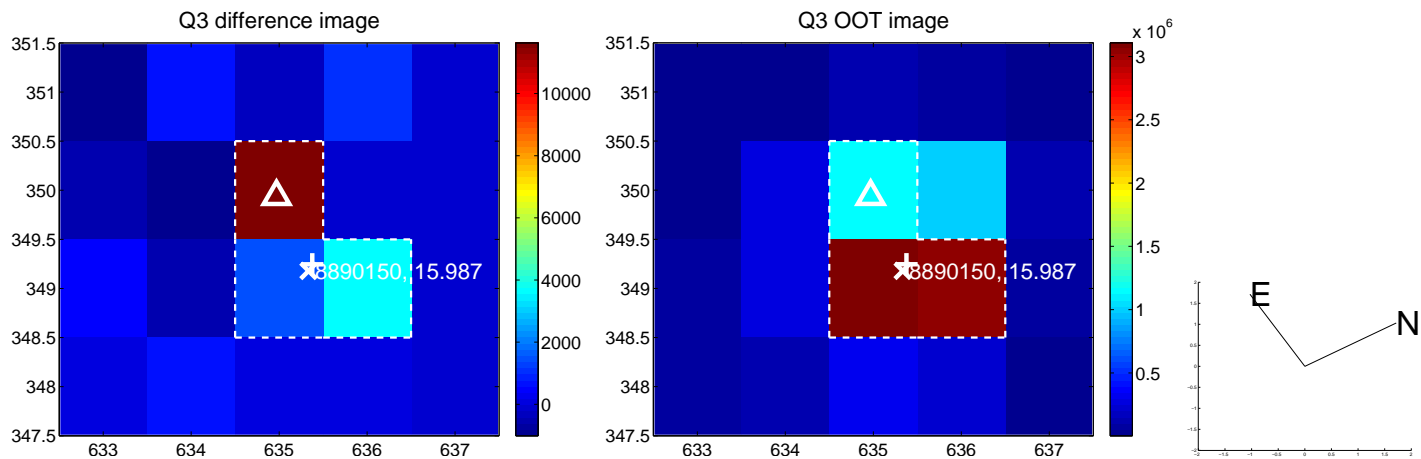
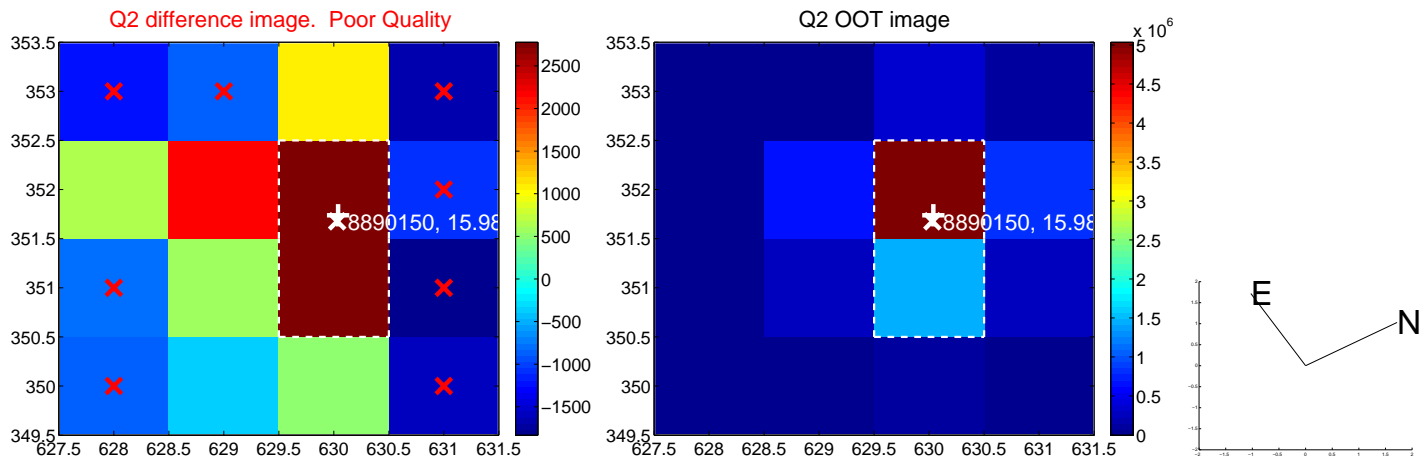
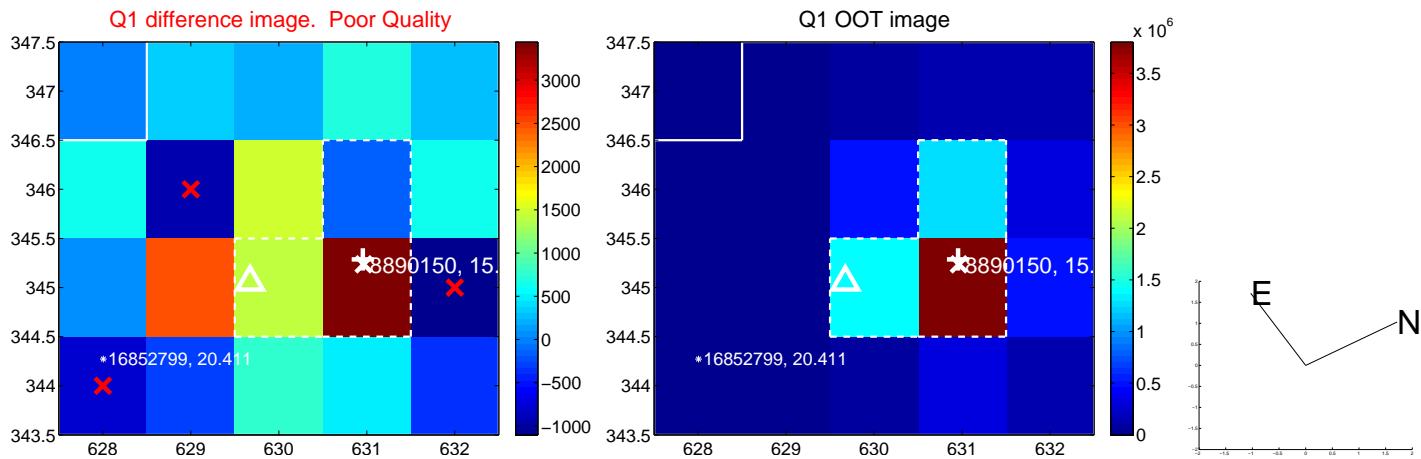
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.533 \pm 0.567$	0.94	$0.187 \pm 0.338$	$-0.499 \pm 0.559$
PRF-fit source offset from KIC position	$0.473 \pm 0.434$	1.09	$0.393 \pm 0.369$	$-0.263 \pm 0.478$
photometric centroid source offset	$1.17 \pm 1.01$	1.15	$0.91 \pm 1.00$	$-0.73 \pm 1.03$



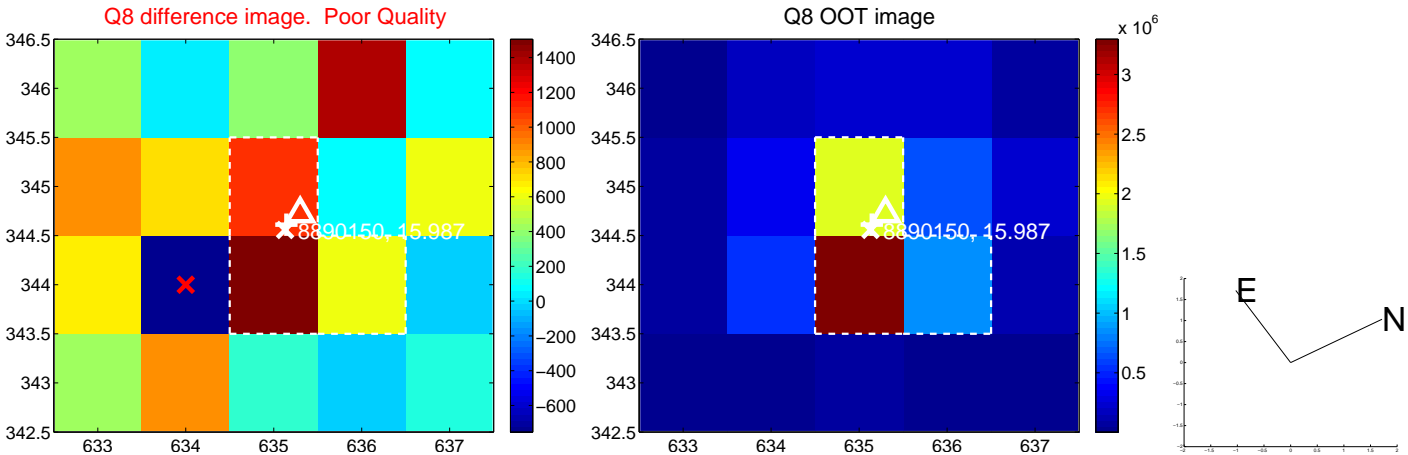
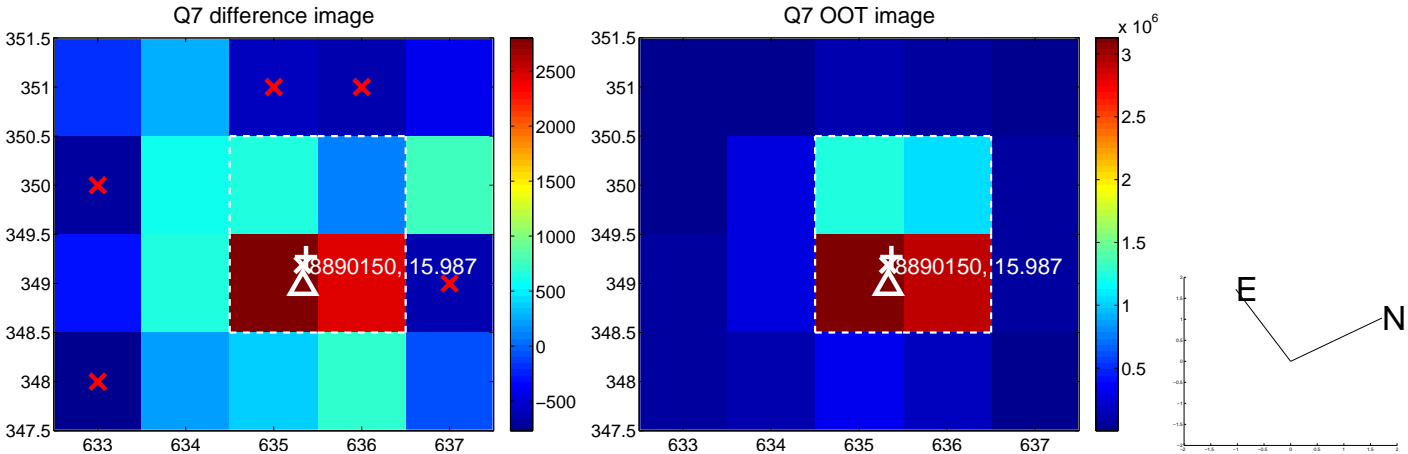
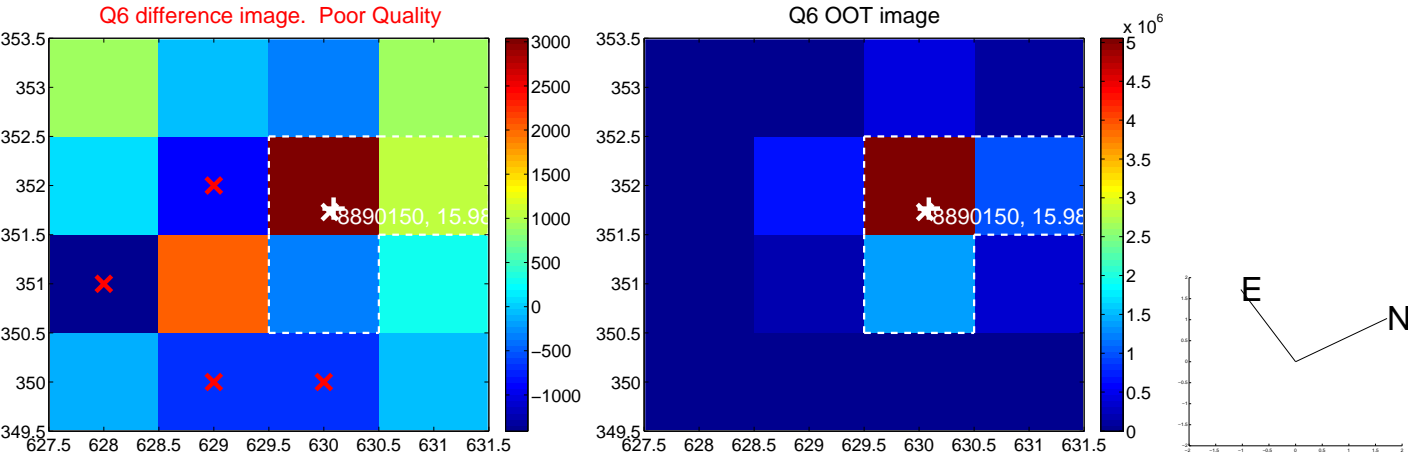
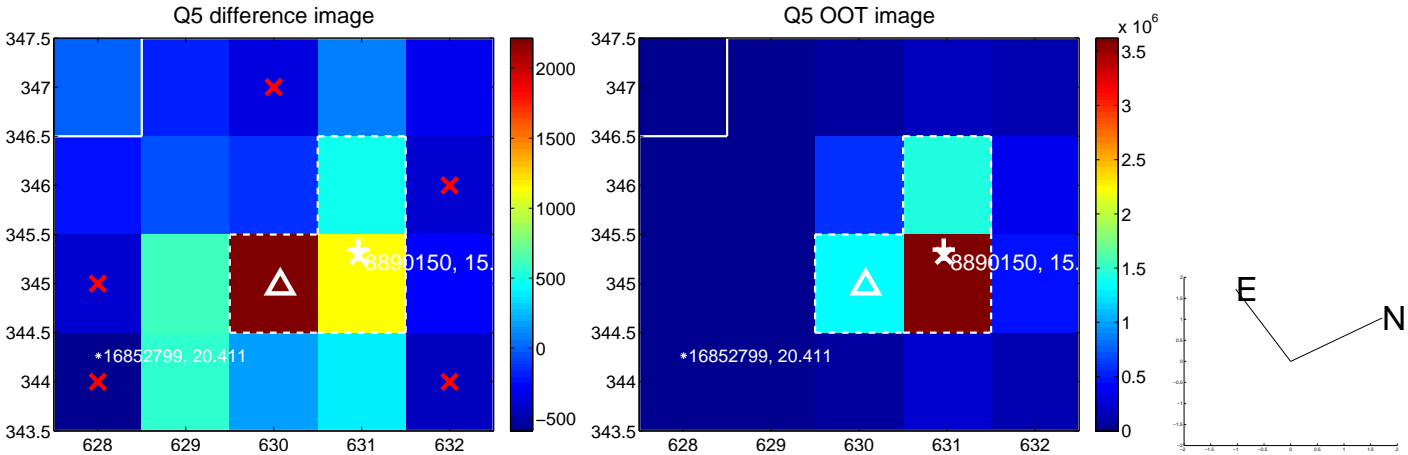
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



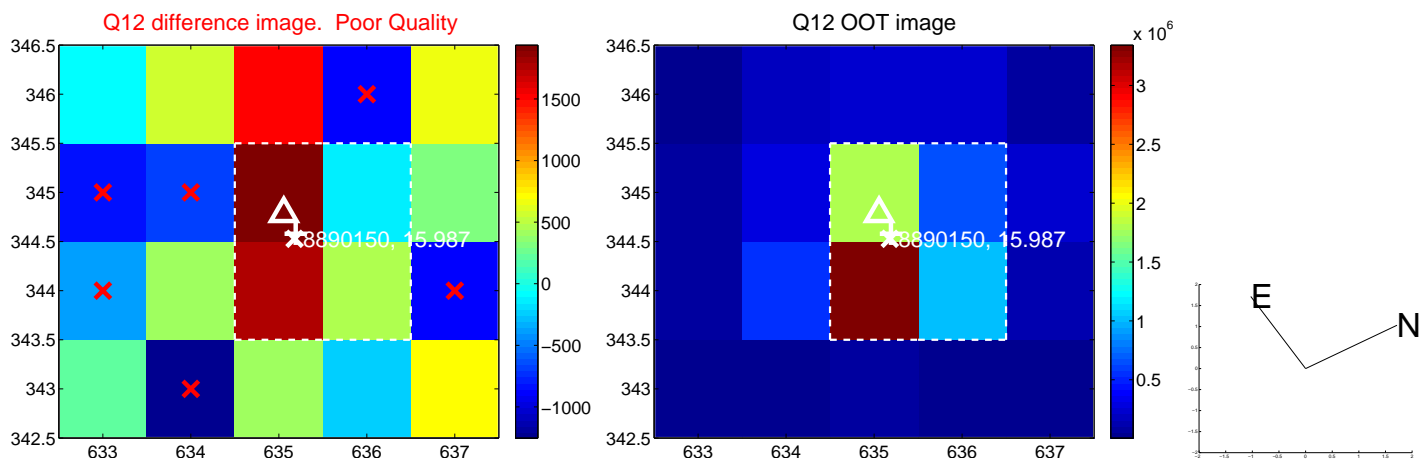
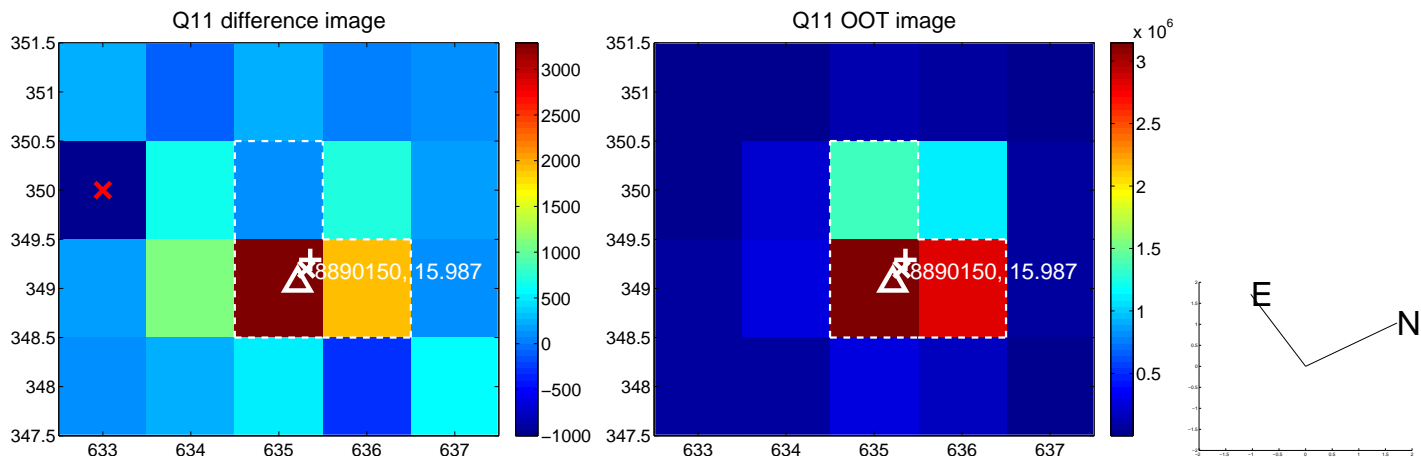
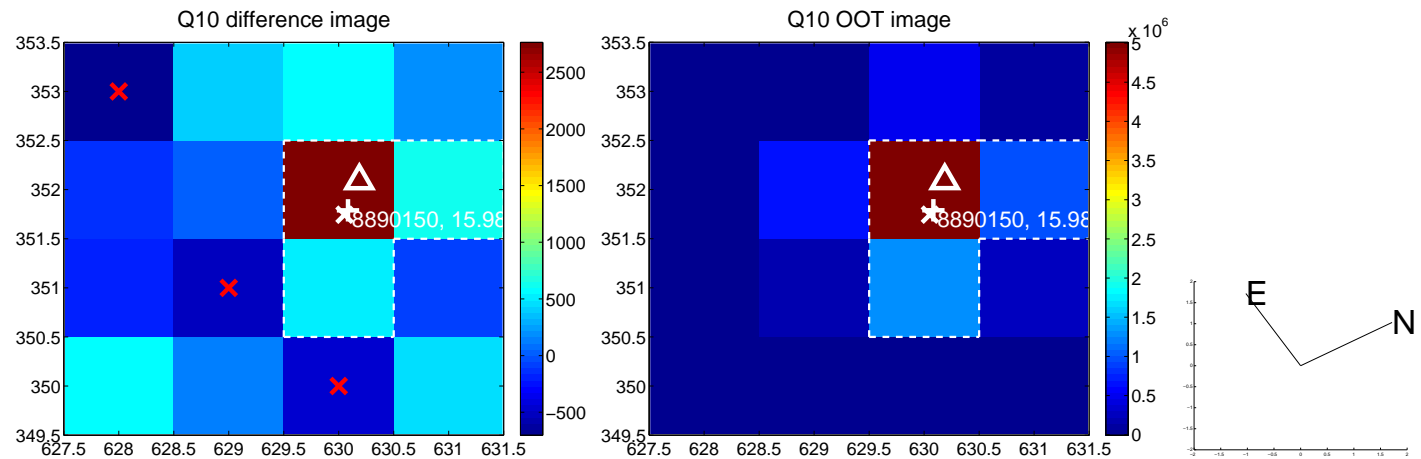
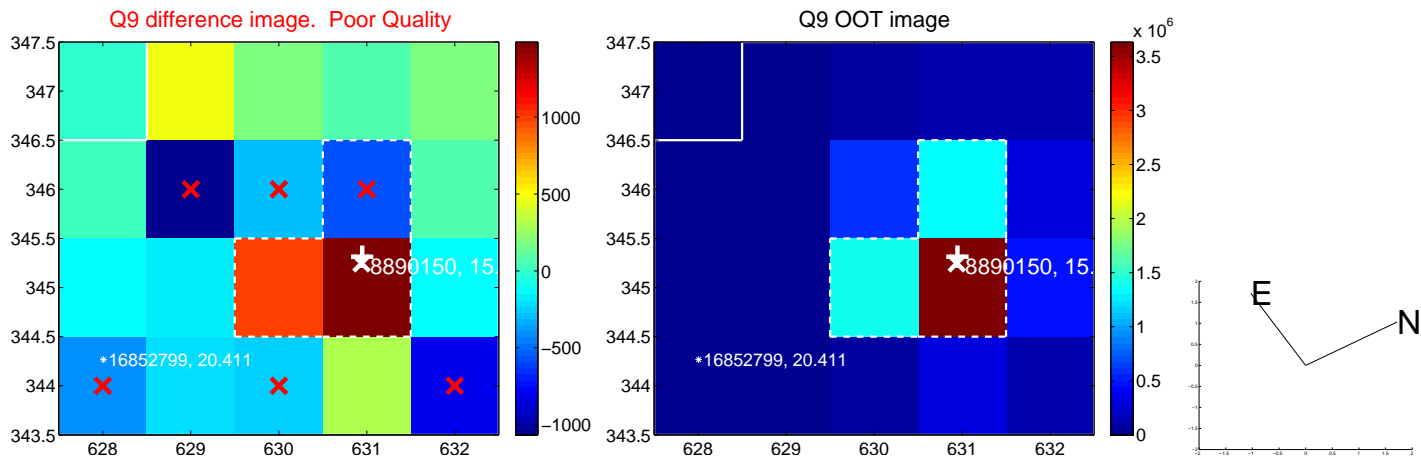
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



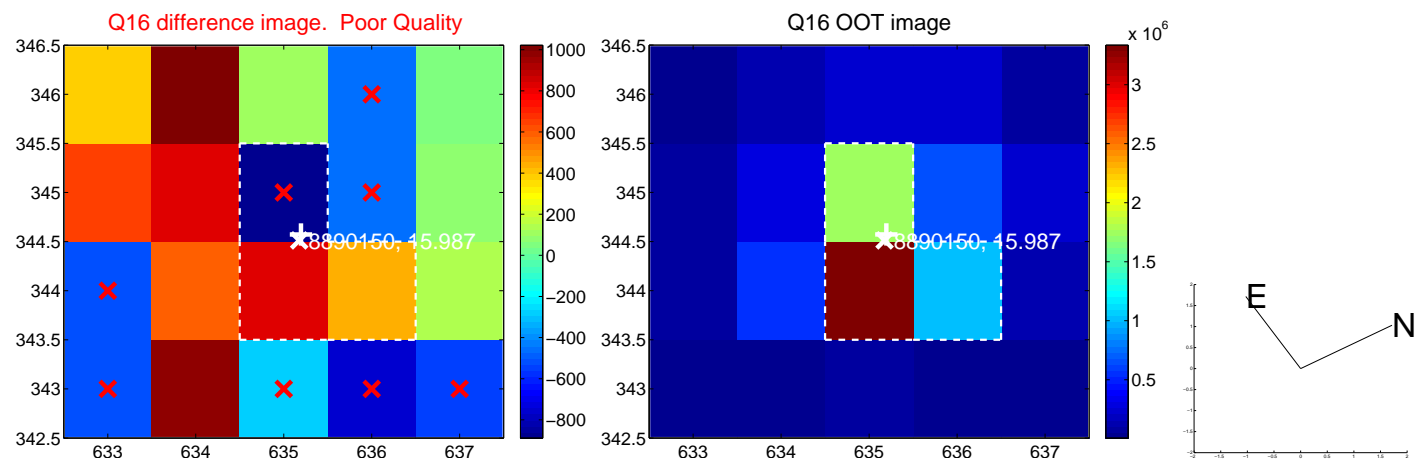
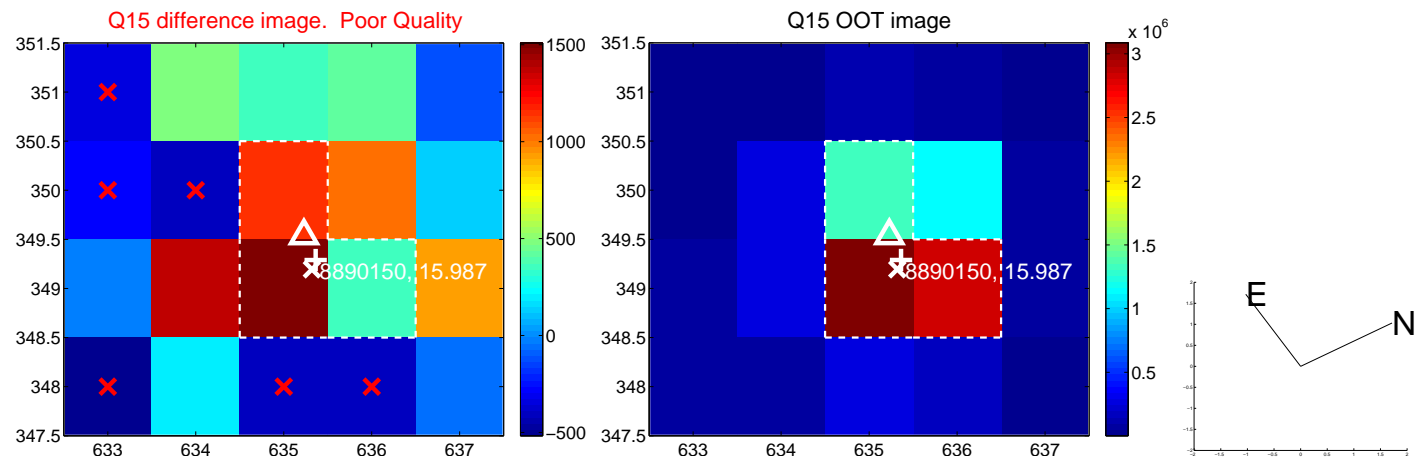
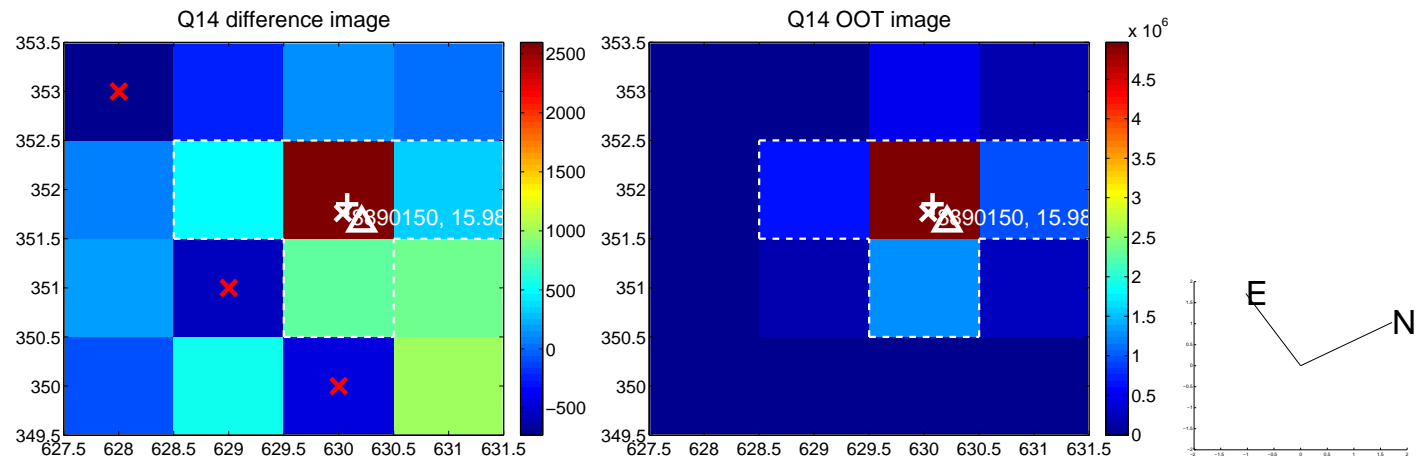
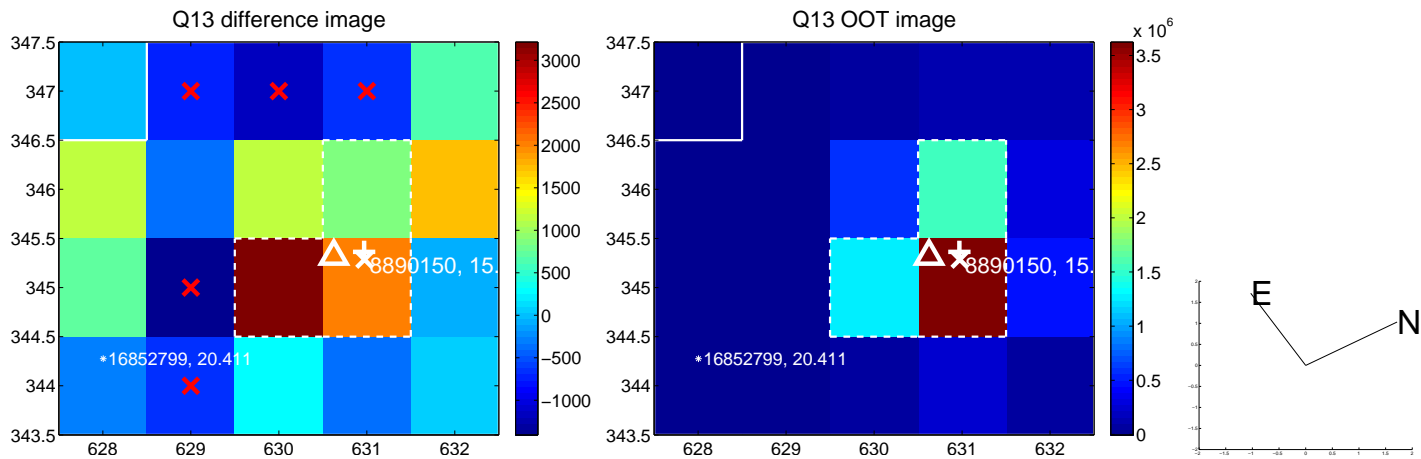
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



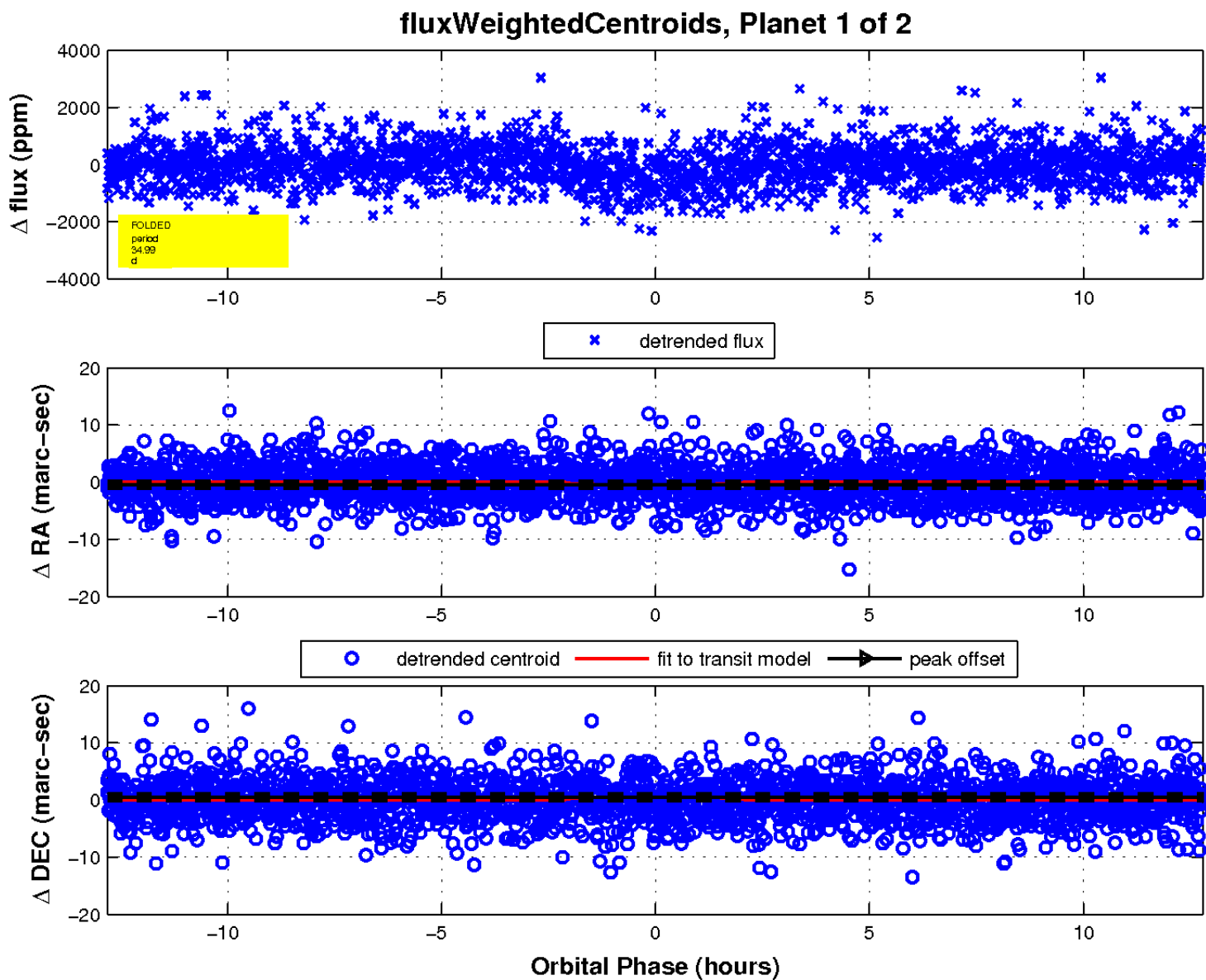
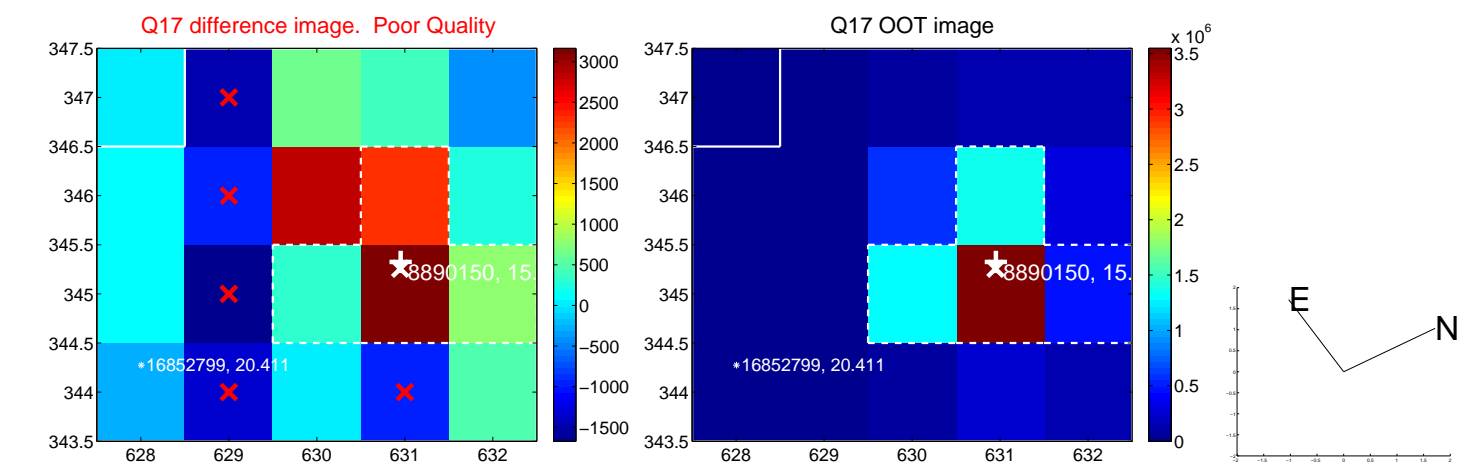
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

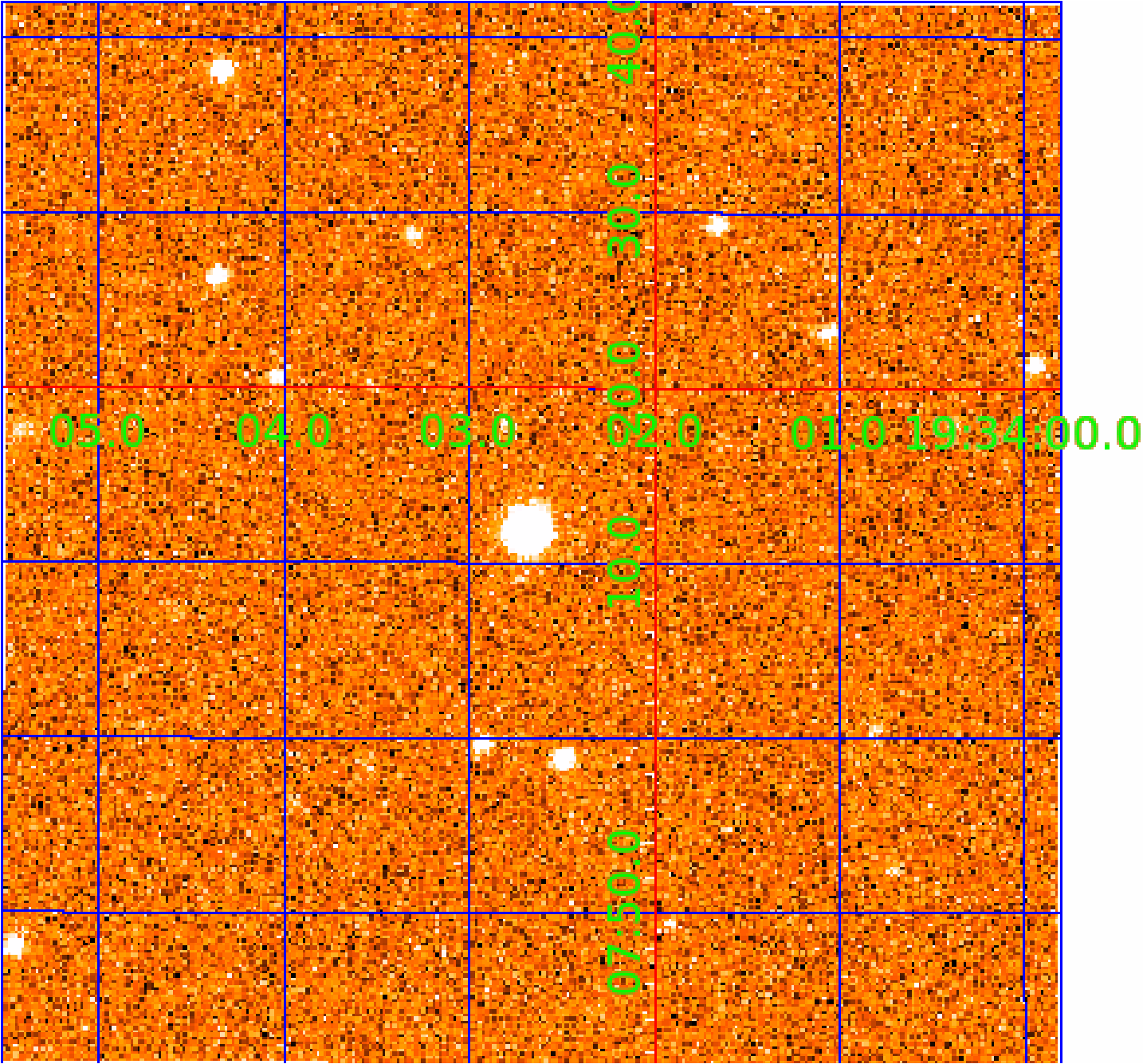


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 008890150

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008890150-01	OBS	2650.01	34.989837	144.207425	580.7	4.275	10.1	10.8	0.52	3765	1.30	1.71
008890150-02	OBS	2650.02	7.054264	136.194014	348.7	1.711	9.0	10.1	0.52	3765	1.17	14.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008890150-01	OBS	PC	0.98	0	0	0	0	NO_COMMENT
008890150-02	OBS	PC	0.98	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.

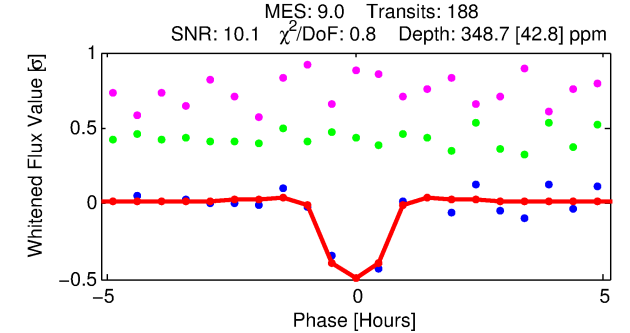
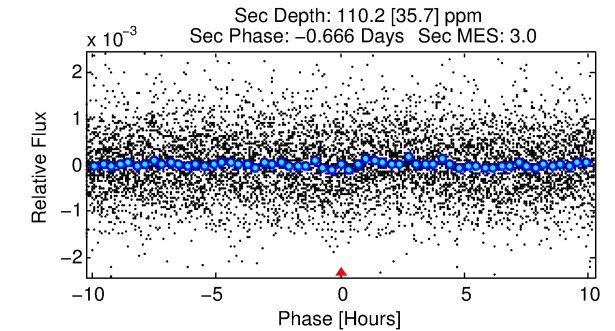
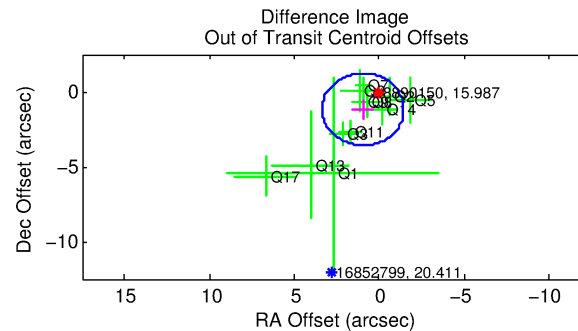
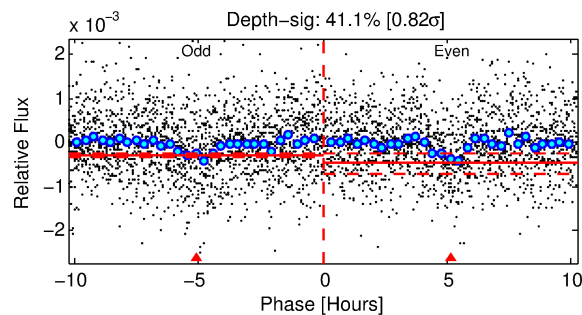
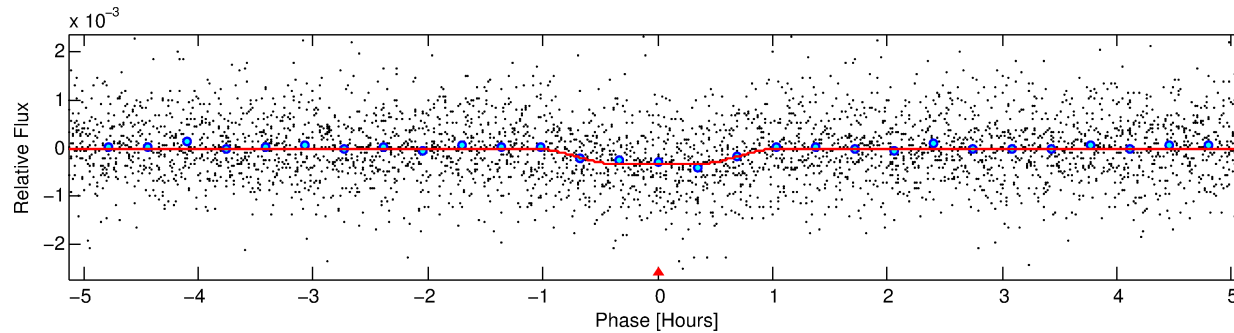
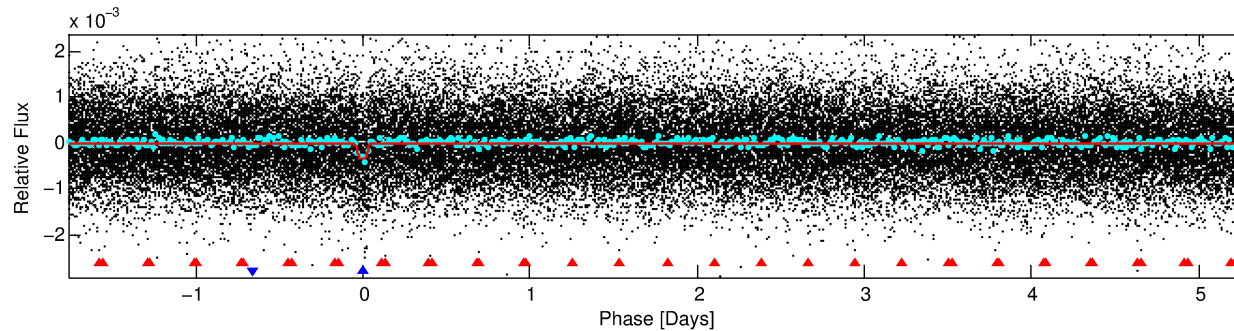
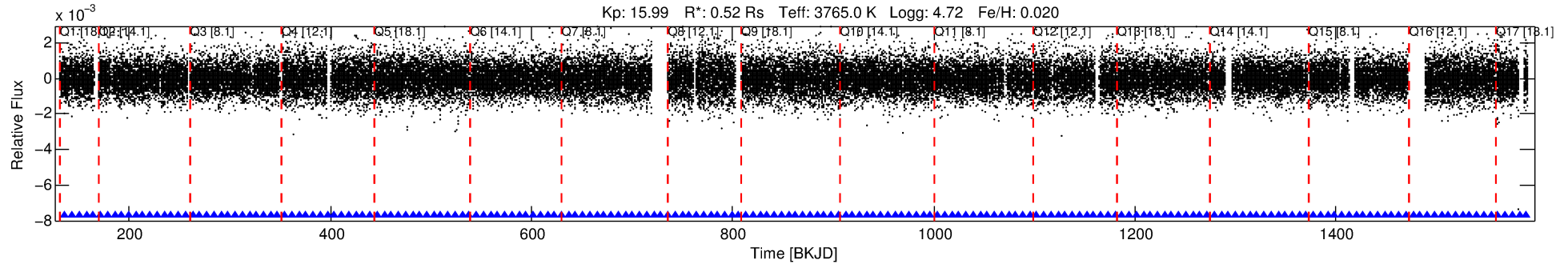
## Ephemeris Match Information For 008890150-02

No Significant Match Found

# DV One-Page Summary

KIC: 8890150 Candidate: 2 of 2 Period: 7.054 d  
KOI: K02650.02 Name: Kepler-395b Corr: 0.977

Kp: 15.99 R\*: 0.52 Rs Teff: 3765.0 K Logg: 4.72 Fe/H: 0.020



## DV Fit Results:

Period = 7.05426 [0.00004] d  
Epoch = 136.1940 [0.0037] BKJD  
Rp/R\* = 0.0206 [0.0128]  
a/R\* = 14.83 [39.51]  
b = 0.91 [0.54]  
Seff = 14.47 [1.89]  
Teq = 497 [16] K  
Rp = 1.17 [0.73] Re  
a = 0.0581 [0.0041] AU  
Ag = 148.64 [190.80] [0.77σ]  
Teffp = 2685 [861] K [2.54σ]

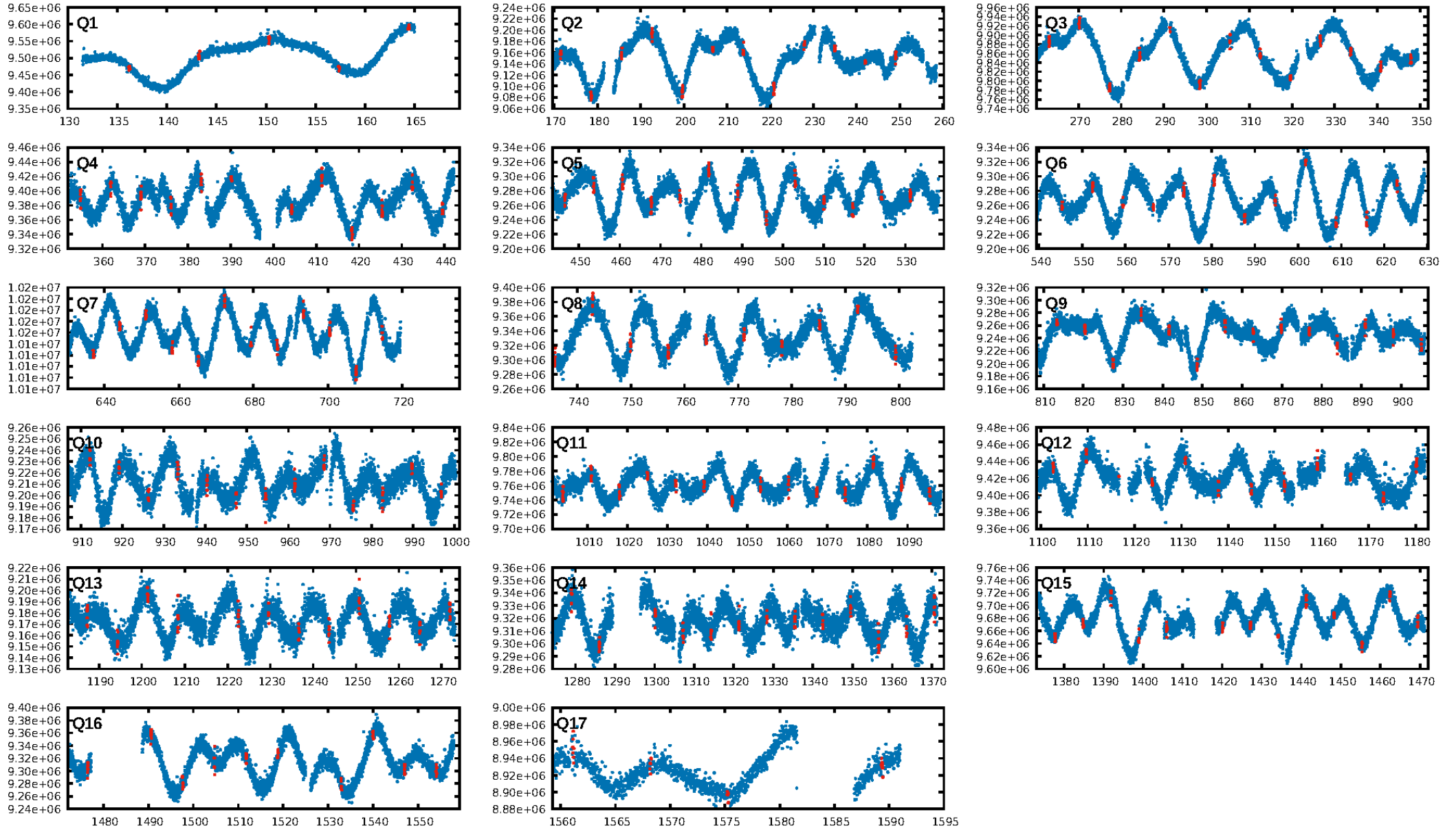
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [145.61σ]  
ModelChiSquare2-sig: 99.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.61e-18  
RollingBand-fgt: 1.00 [179/179]  
GhostDiagnostic-chr: 3.072  
Centroid-sig: 16.2%  
Centroid-so: 1.688 arcsec [1.33σ]  
OotOffset-rm: 1.503 arcsec [1.87σ]  
KicOffset-rm: 1.516 arcsec [1.76σ]  
OotOffset-st: 3/3/1/5 [12]  
KicOffset-st: 3/3/1/5 [12]  
DiffImageQuality-fgm: 0.58 [7/12]  
DiffImageOverlap-fno: 1.00 [17/17]

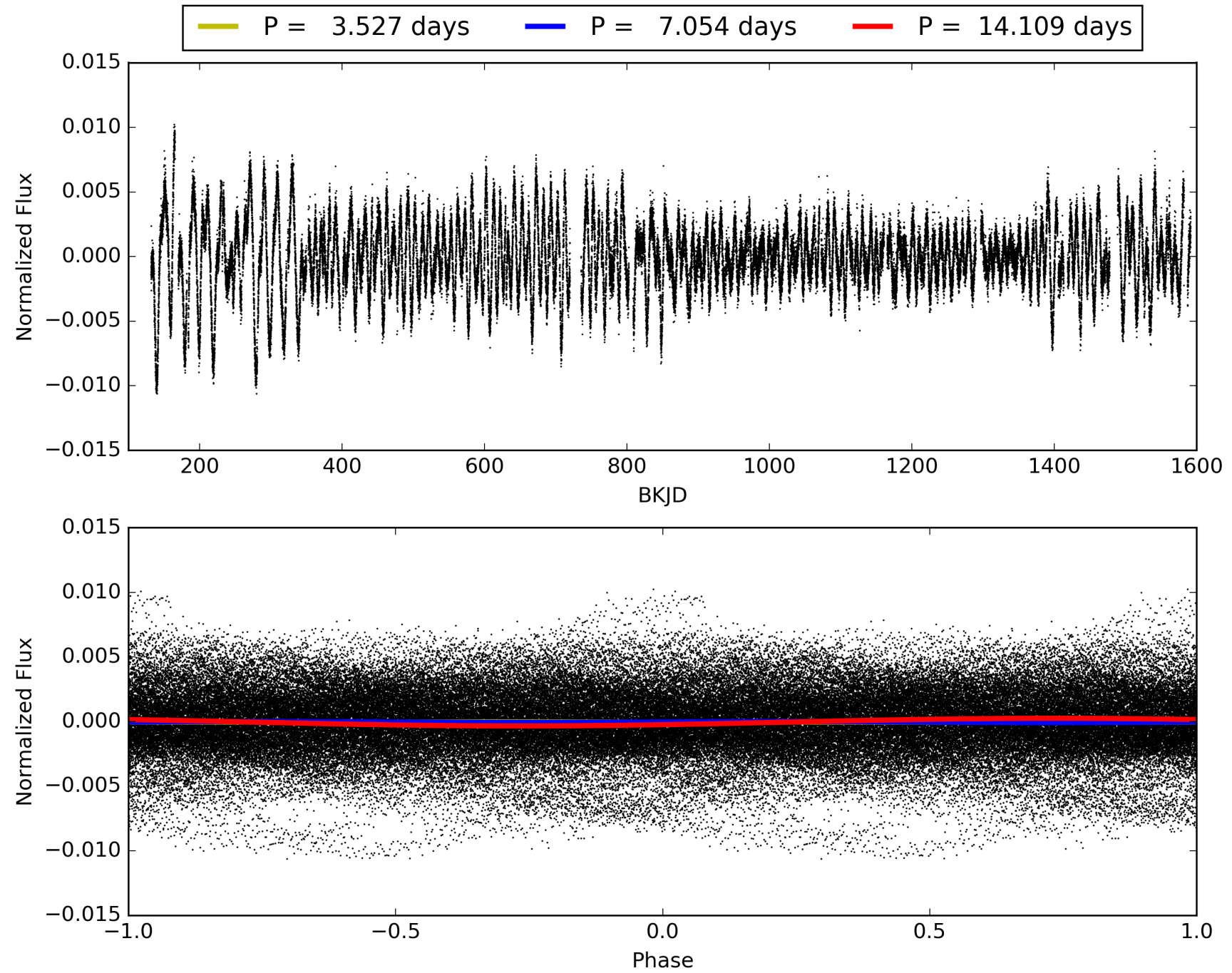
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:14:00 Z

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

# TCE 008890150-02, PDC Light Curves

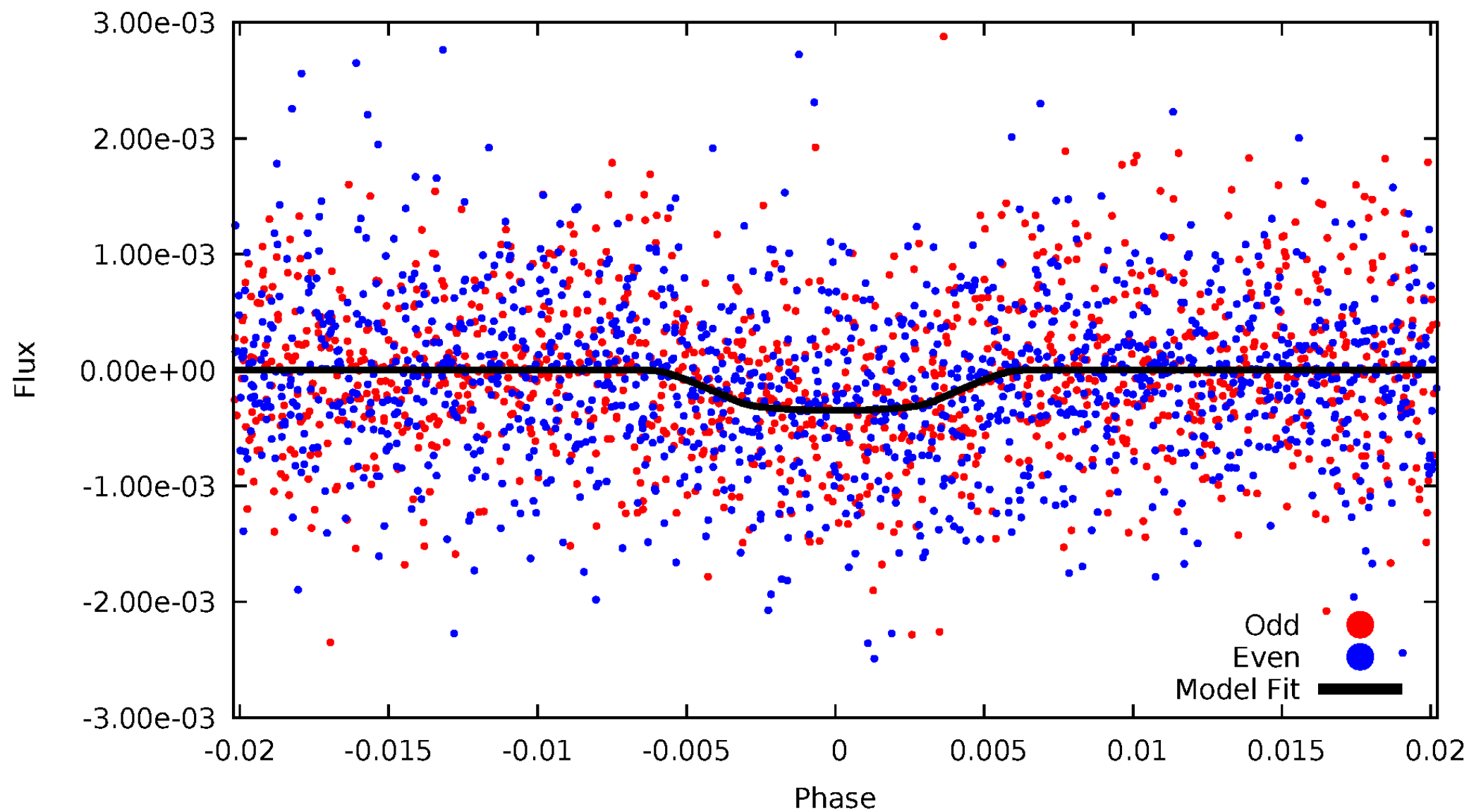


# TCE 008890150-02



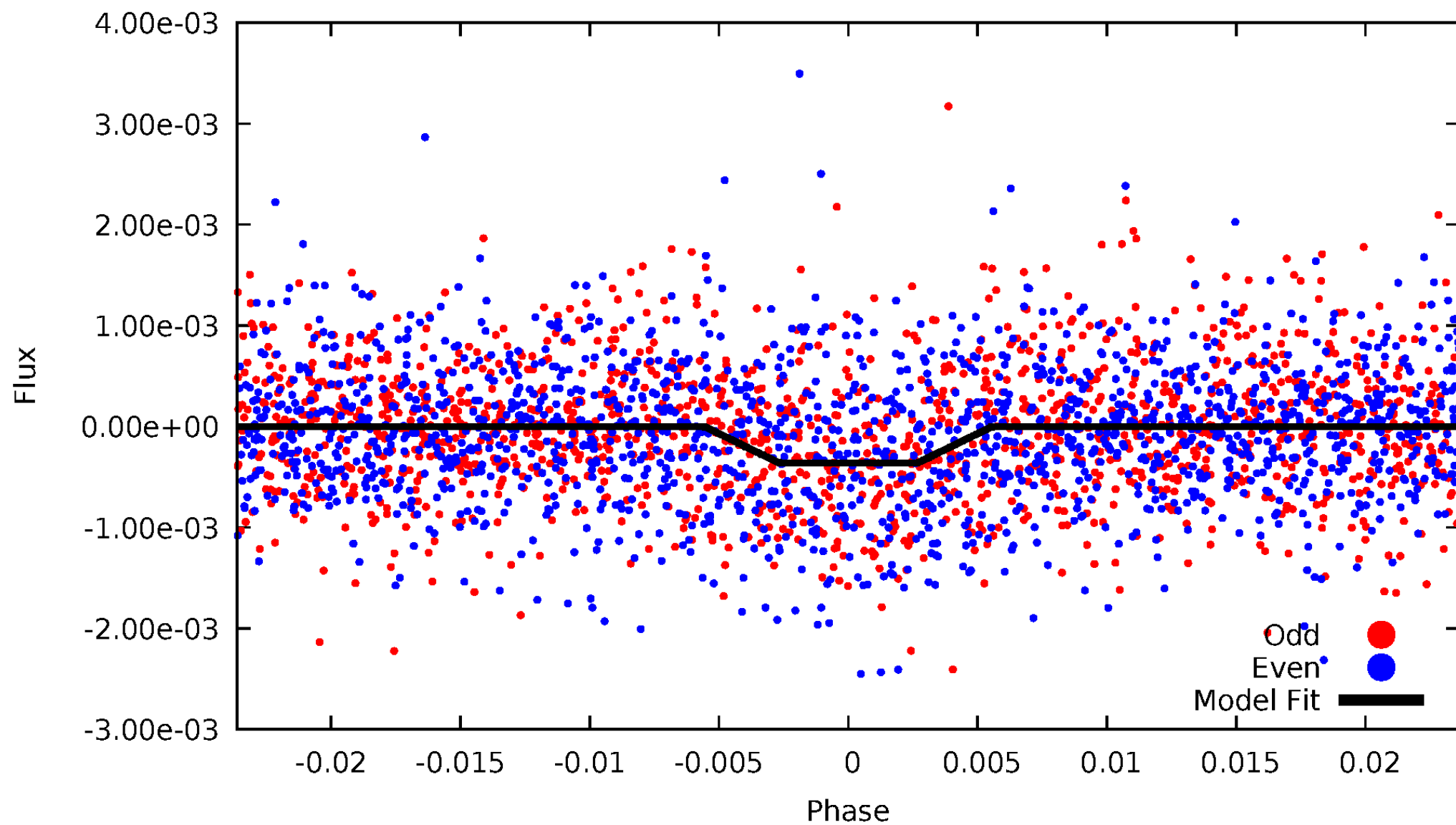
# DV Odd/Even

TCE 008890150-02



# ALT Odd/Even

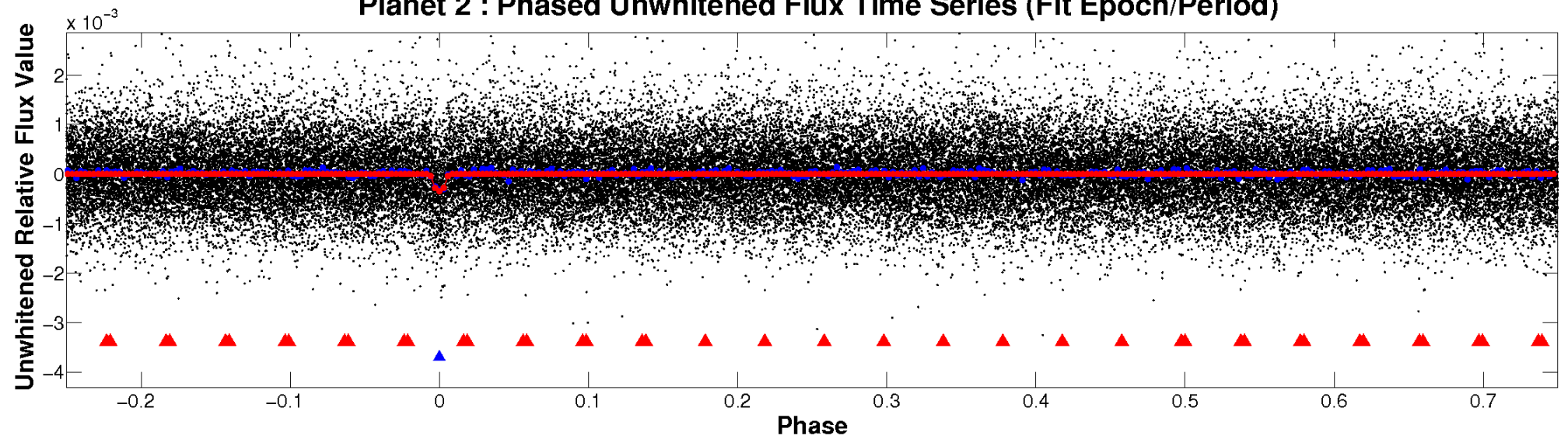
TCE 008890150-02



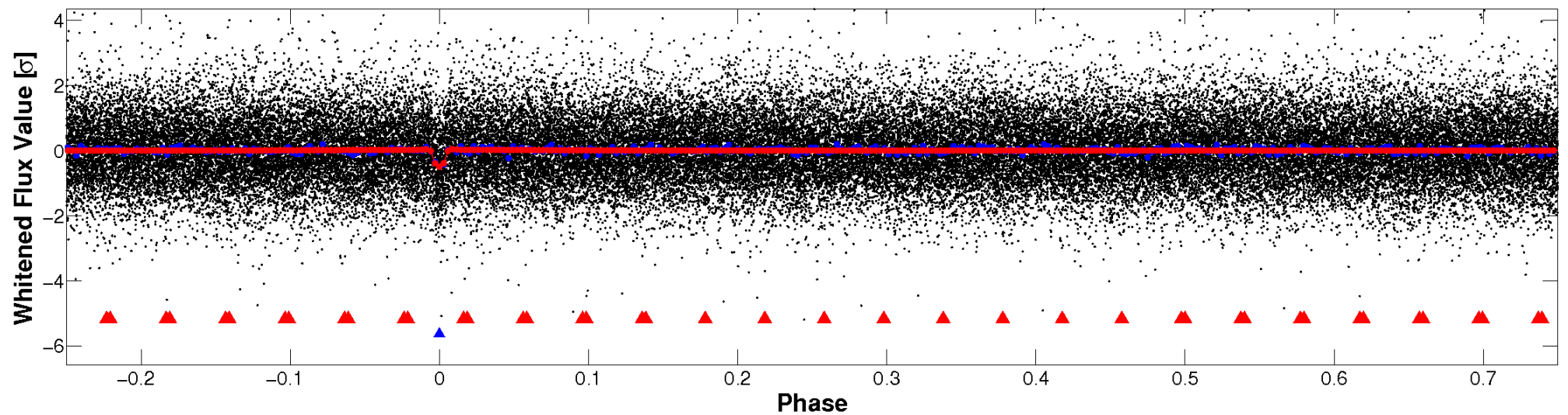


# Non-Whitened Vs. Whitened Light Curve

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

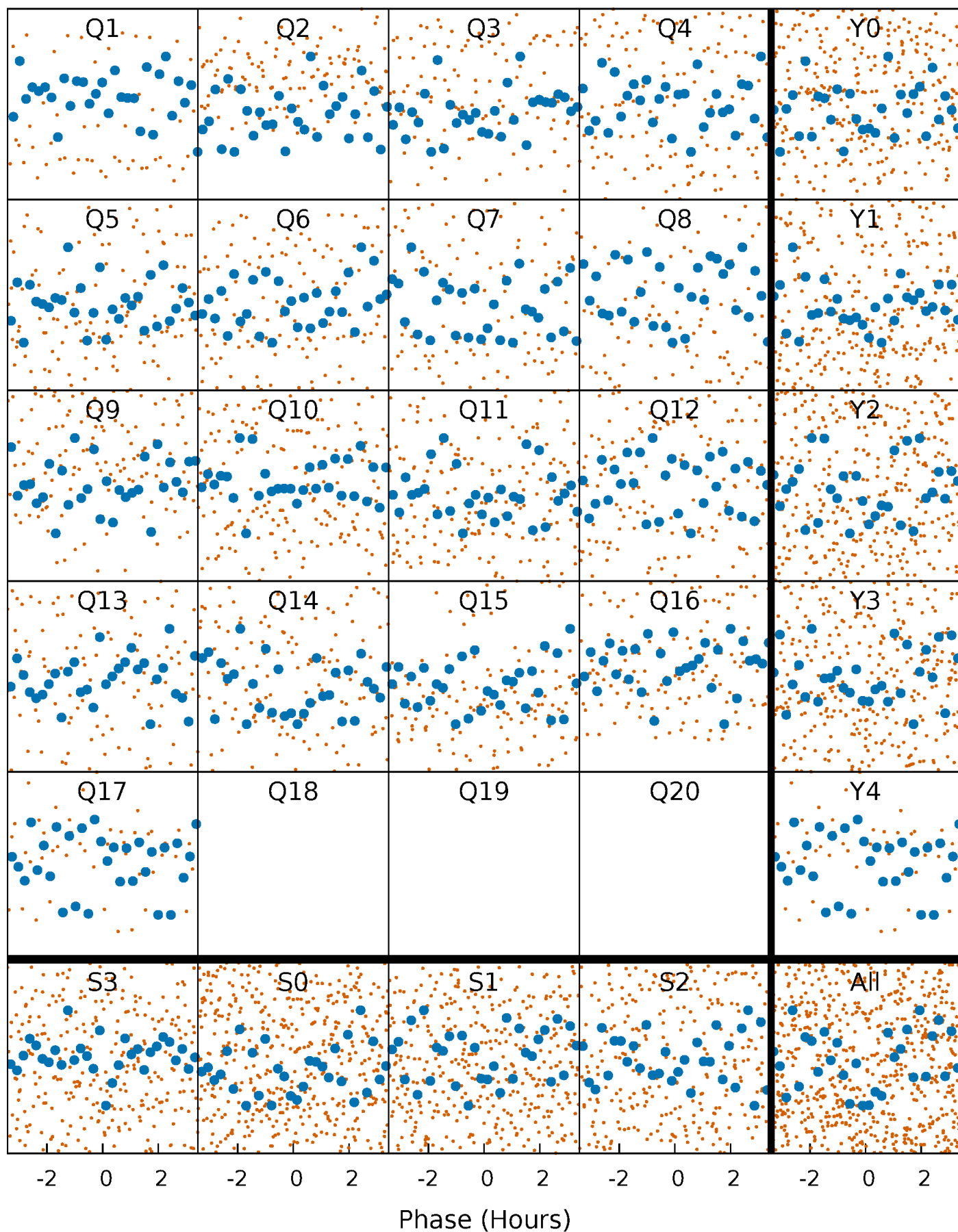


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



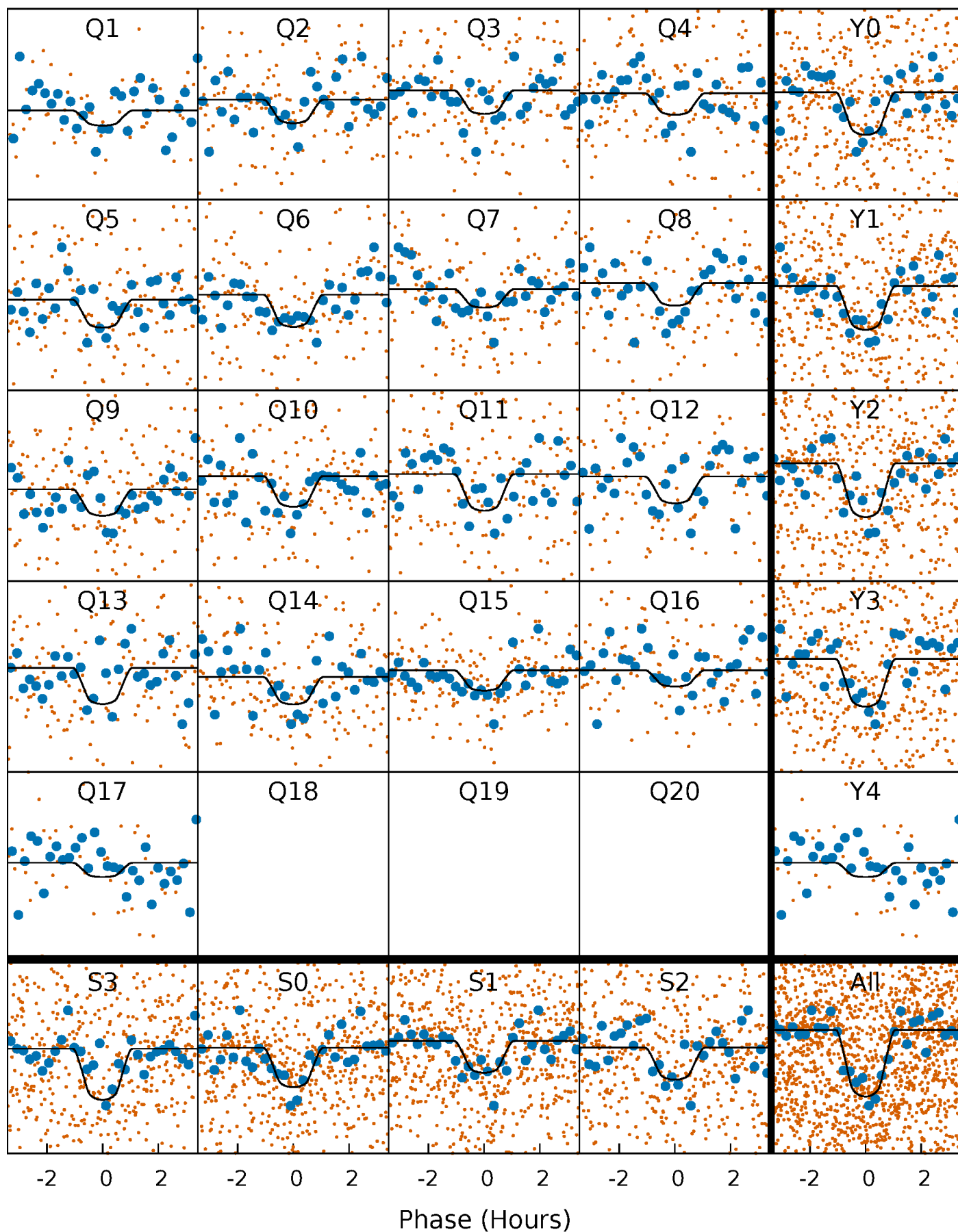
# PDC Quarter-Phased Transit Curves

TCE 008890150-02   P= 7.054264 Days    $T_0=136.194014$  (BKJD)



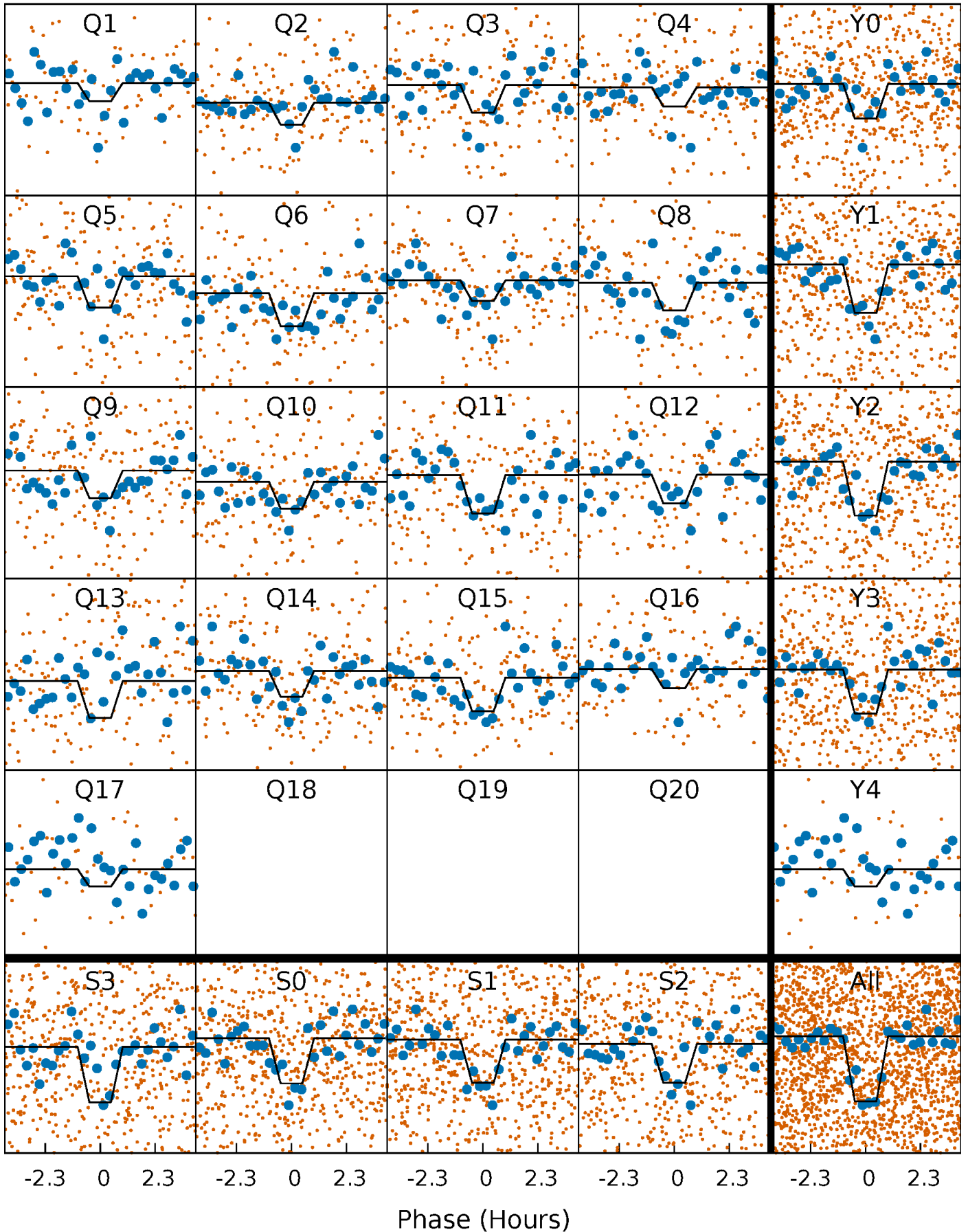
# DV Quarter-Phased Transit Curves

TCE 008890150-02     $P = 7.054264$  Days     $T_0 = 136.194014$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

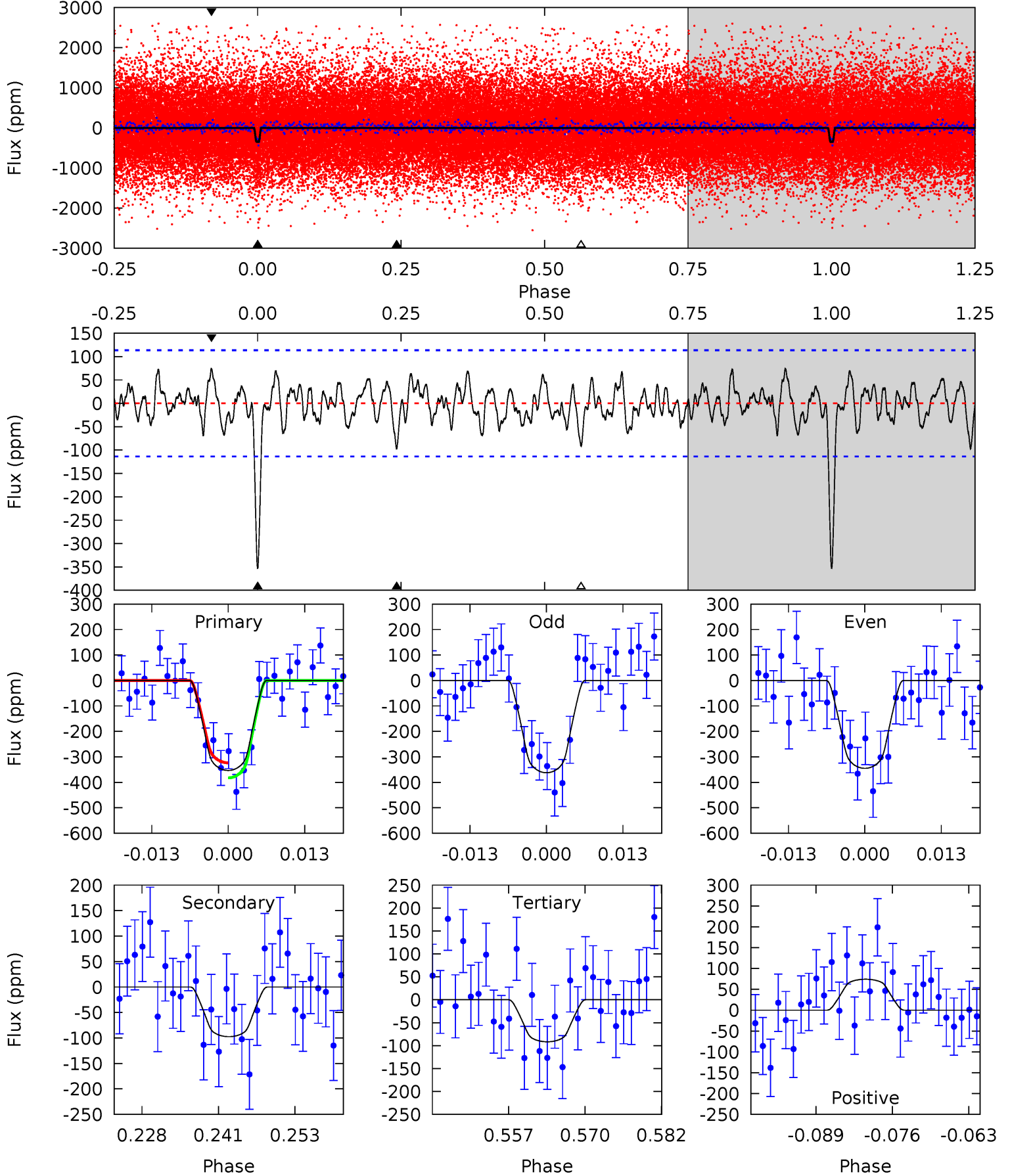
TCE 008890150-02 P= 7.054315 Days  $T_0=136.188449$  (BKJD)



# DV Model-Shift Uniqueness Test

008890150-02, P = 7.054264 Days, E = 129.139750 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
15.5	4.27	4.02	3.25	4.98	2.49	1.35	11.5	12.2	0.25	1.02	0.38	0.94	0.17	1.30

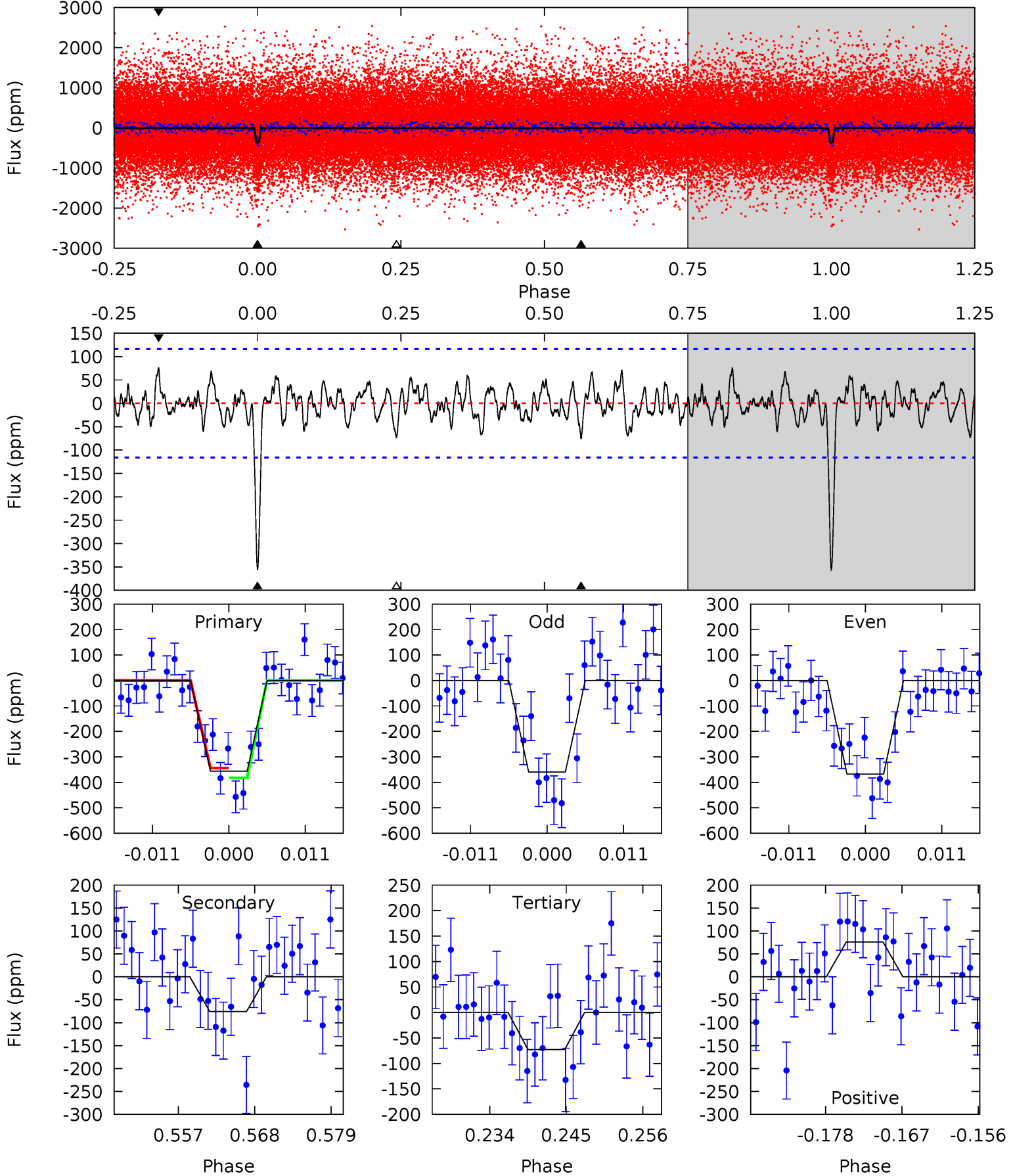




# Alt Model-Shift Uniqueness Test

008890150-02, P = 7.054315 Days, E = 129.134134 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
15.4	3.27	3.14	3.28	5.01	2.54	1.18	12.2	12.1	0.13	-0.01	0.18	0.83	0.18	0.83





### Stellar Parameters For KIC 008890150

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3765^{+75}_{-83}$	$4.725^{+0.049}_{-0.021}$	$0.020^{+0.150}_{-0.150}$	$0.521^{+0.029}_{-0.047}$	$0.526^{+0.035}_{-0.042}$	$5.225^{+1.216}_{-0.519}$
	+2%/-2%	+1%/-0%	+750%/-750%	+6%/-9%	+7%/-8%	+23%/-10%
Source	SPE70	SPE60	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 008890150-02 / KOI 2650.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-97 \pm 23$	$1.21^{+0.71}_{-0.67}$	$690^{+16}_{-19}$	$2954^{+778}_{-345}$	$119^{+454}_{-72}$
Alt.	$-76 \pm 23$	$1.17^{+0.63}_{-0.62}$	$690^{+17}_{-19}$	$2888^{+745}_{-362}$	$108^{+388}_{-70}$

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

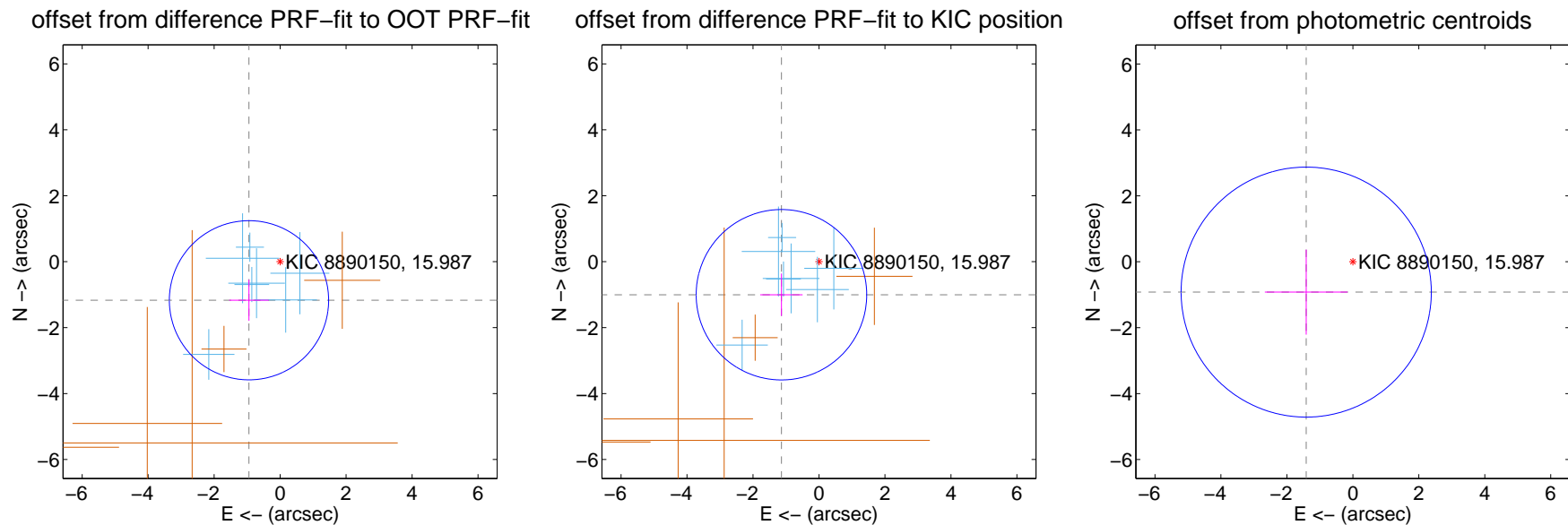
## DV Centroid Data

Supplemental centroid analysis for 008890150-02. Kepler magnitude: 15.99. Transit SNR 10.15

There are 7 quarters with good PRF difference image offsets

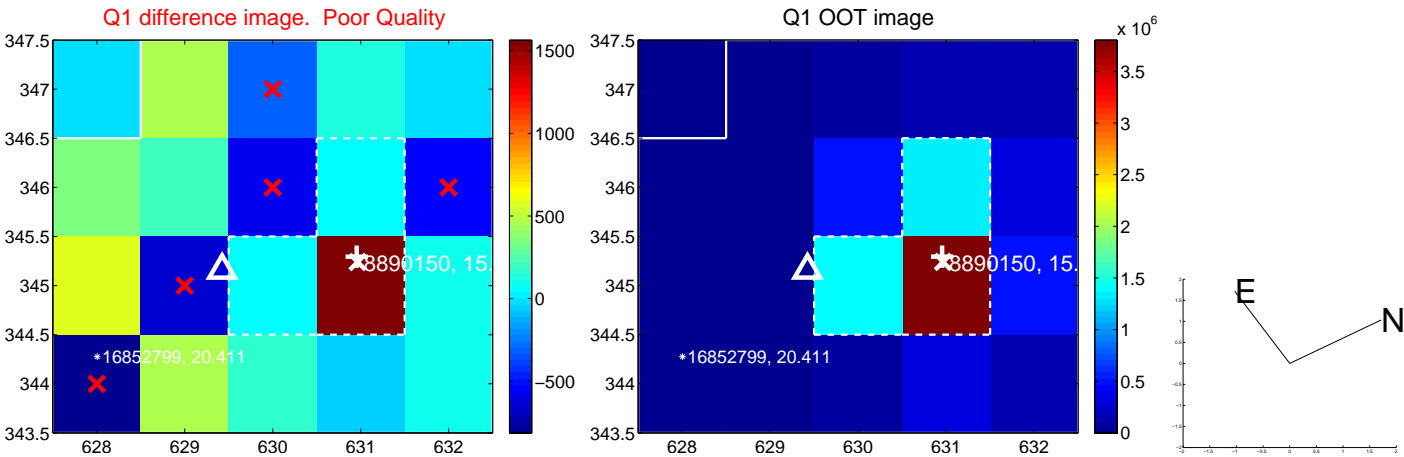
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.503 \pm 0.805$	1.87	$0.943 \pm 0.600$	$-1.170 \pm 0.623$
PRF-fit source offset from KIC position	$1.516 \pm 0.861$	1.76	$1.138 \pm 0.643$	$-1.002 \pm 0.642$
photometric centroid source offset	$1.69 \pm 1.26$	1.33	$1.41 \pm 1.25$	$-0.92 \pm 1.29$



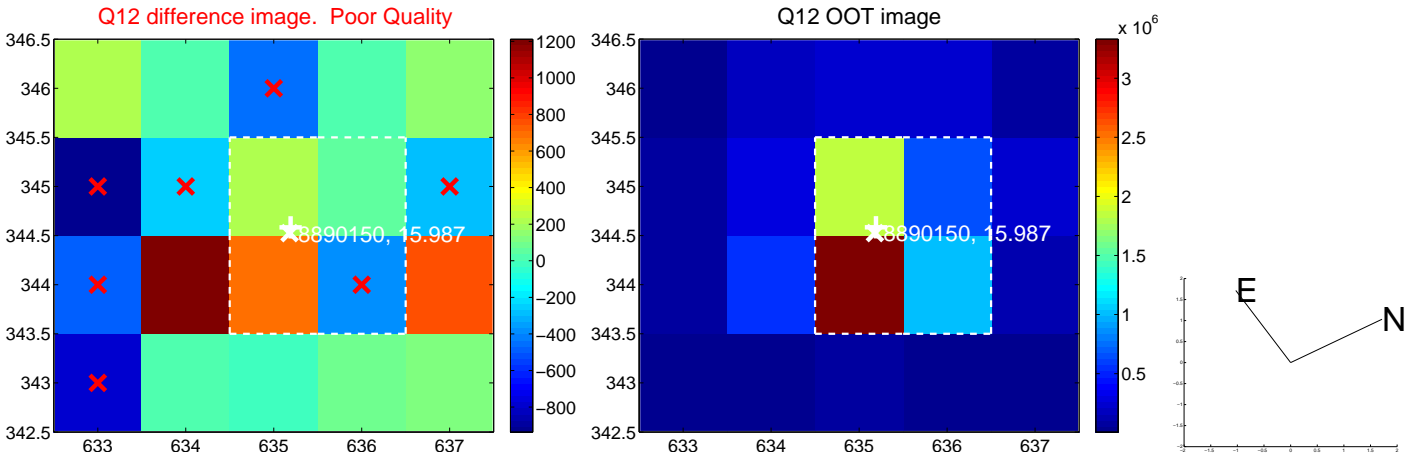
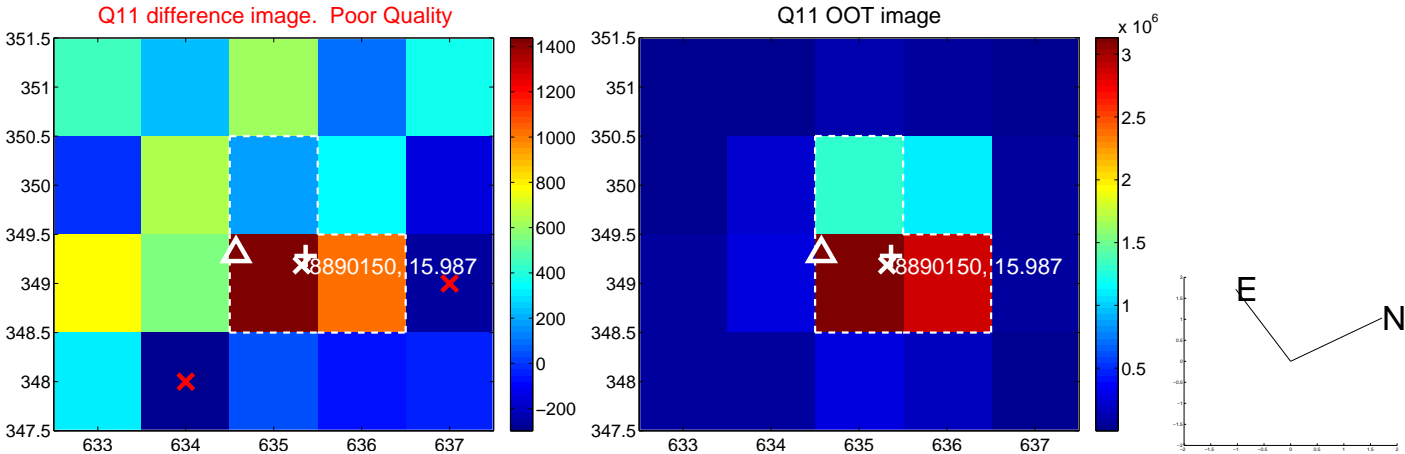
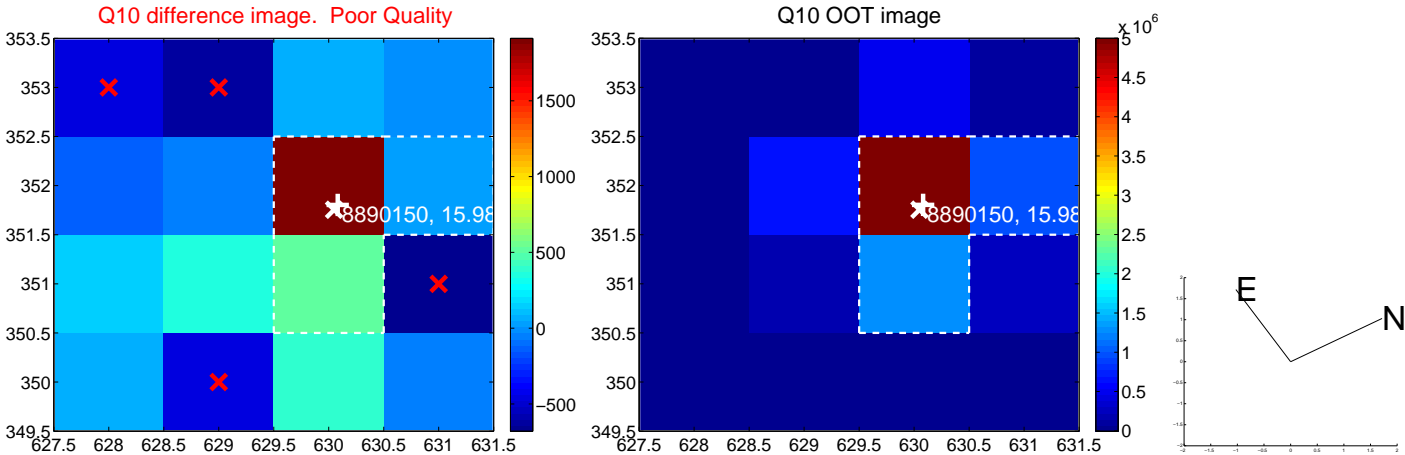
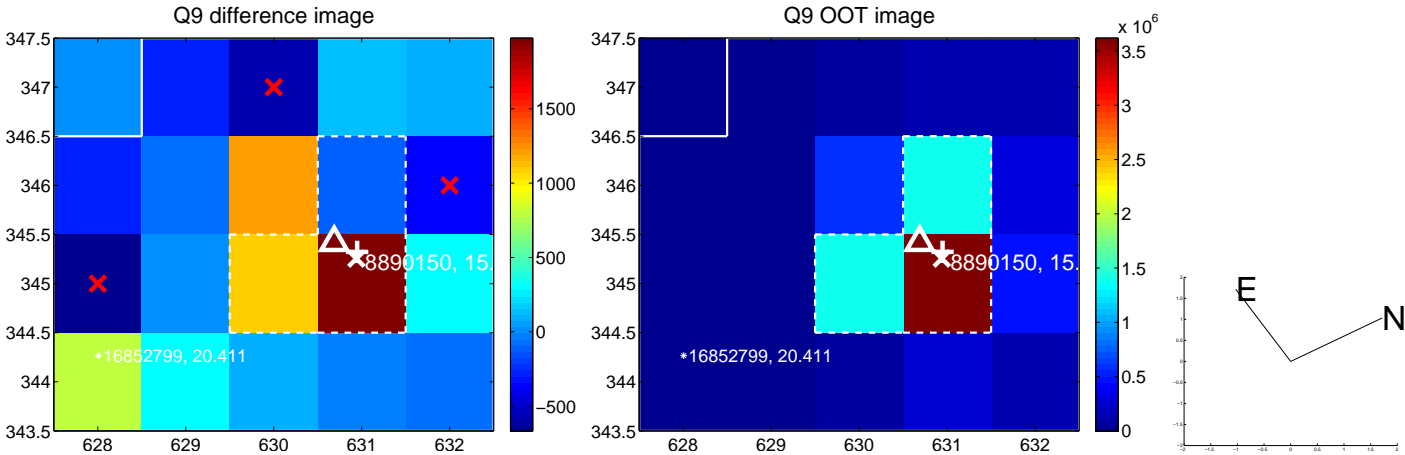
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

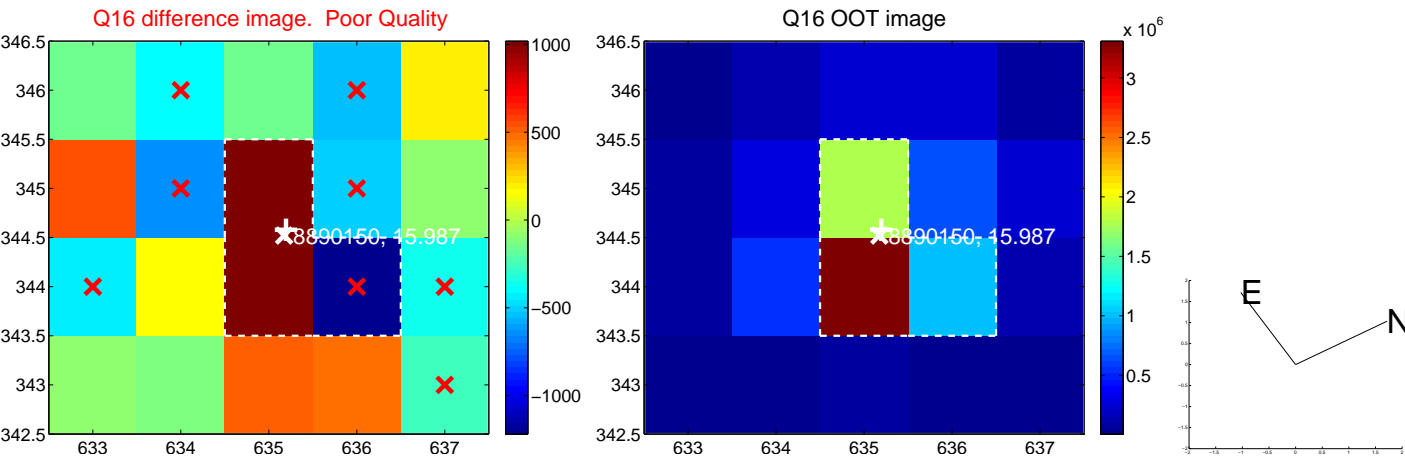
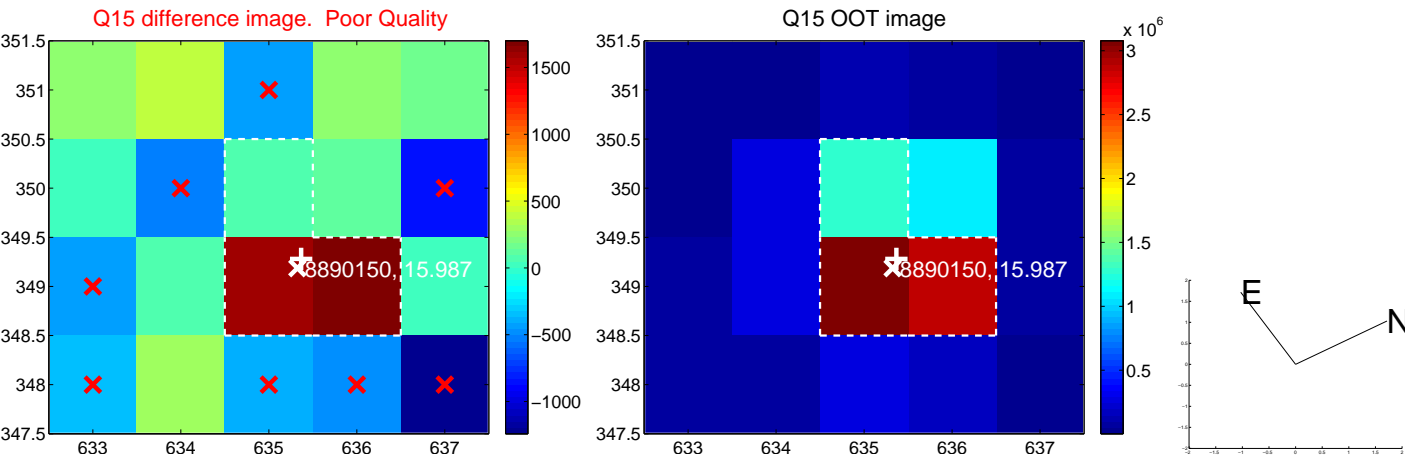
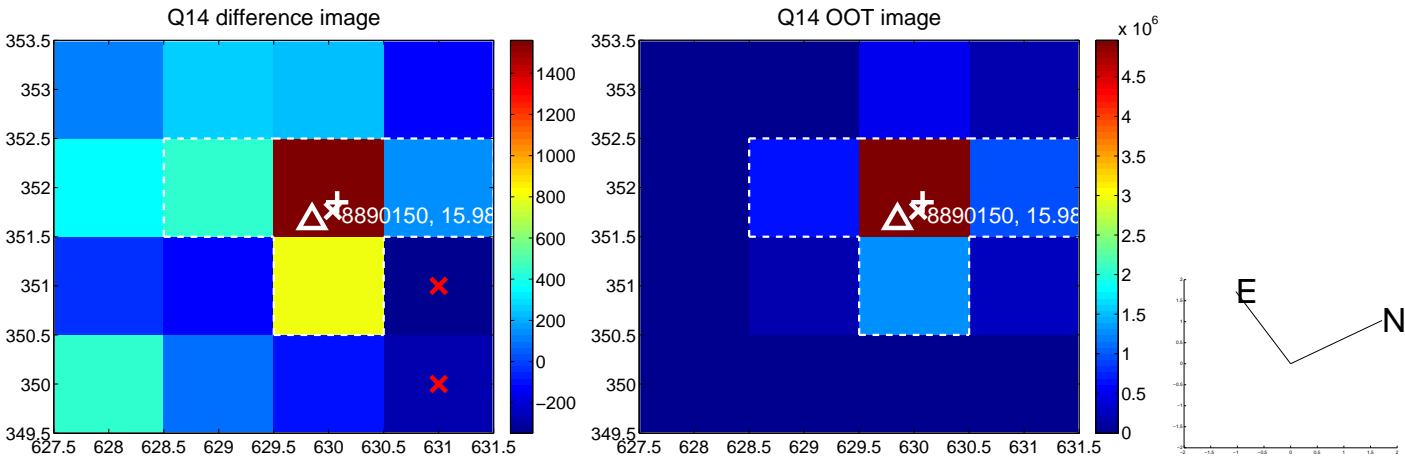
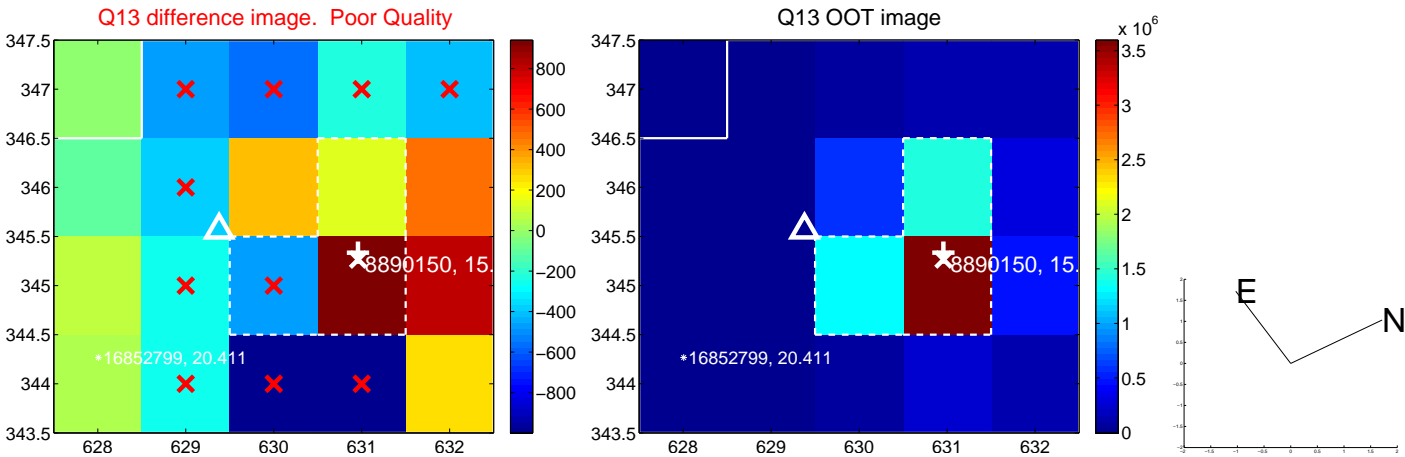




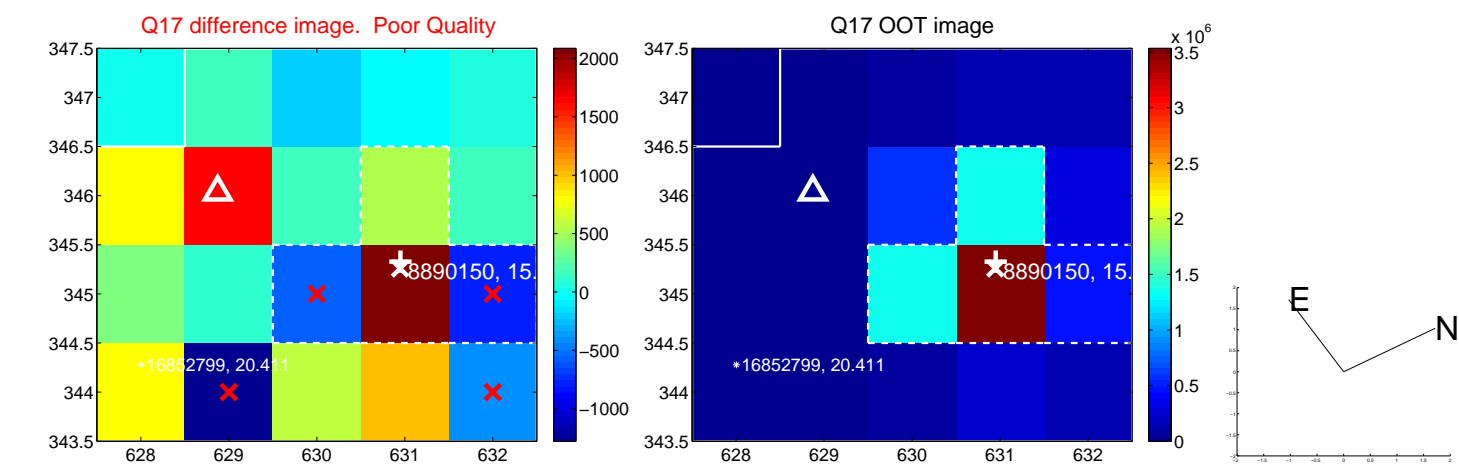
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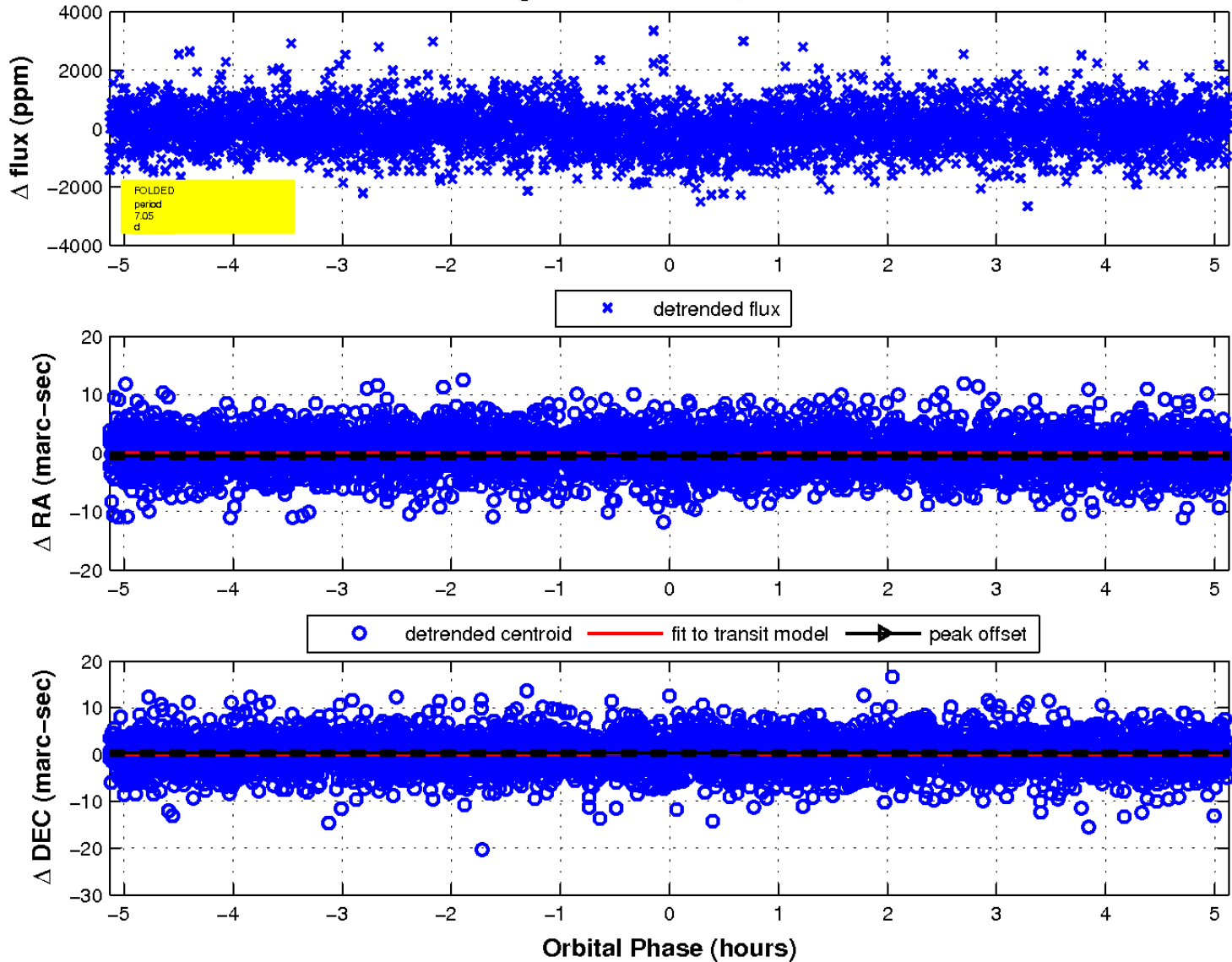
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

