

# KIC 003730390

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003730390-01	OBS	No	3.048857	132.567402	22.3	9.675	8.1	6.3	5.96	6564	3.15	21477.01
003730390-02	OBS	No	5.081831	135.565642	37.2	14.489	7.9	8.3	5.96	6564	4.16	10867.50
003730390-03	OBS	No	370.983572	427.124181	392.4	4.462	7.5	8.4	5.96	6564	12.84	35.62
003730390-05	OBS	No	175.992278	232.931048	320.5	3.254	7.2	7.8	5.96	6564	12.03	96.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003730390-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-03	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003730390-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

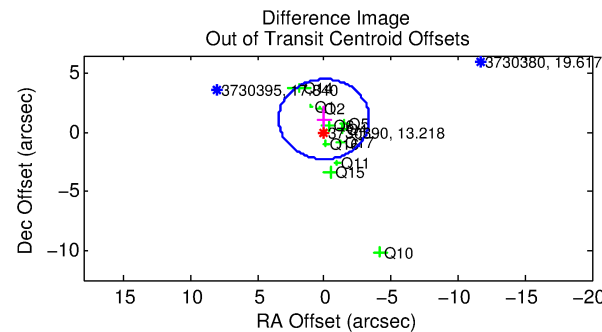
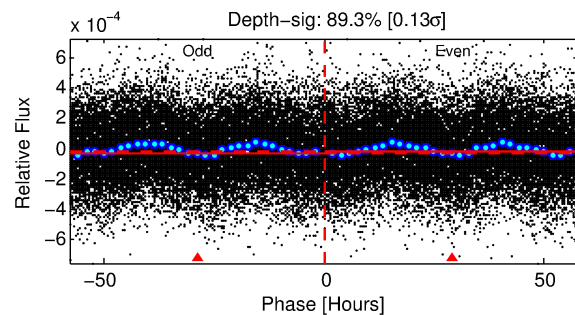
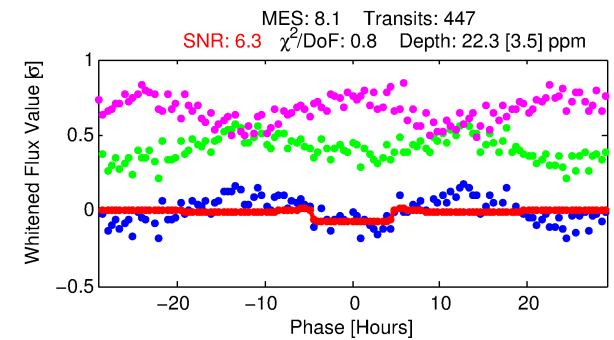
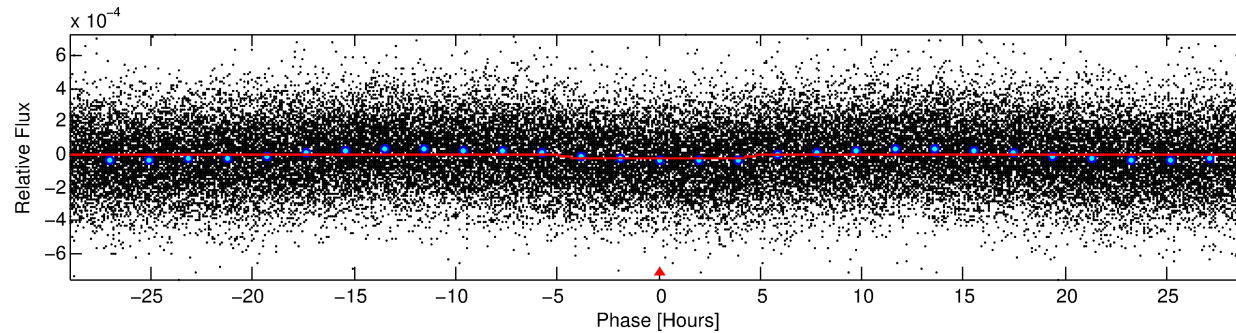
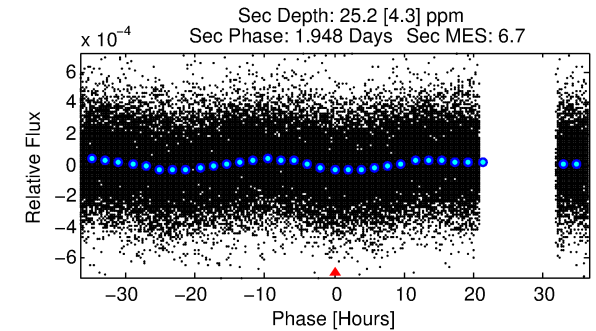
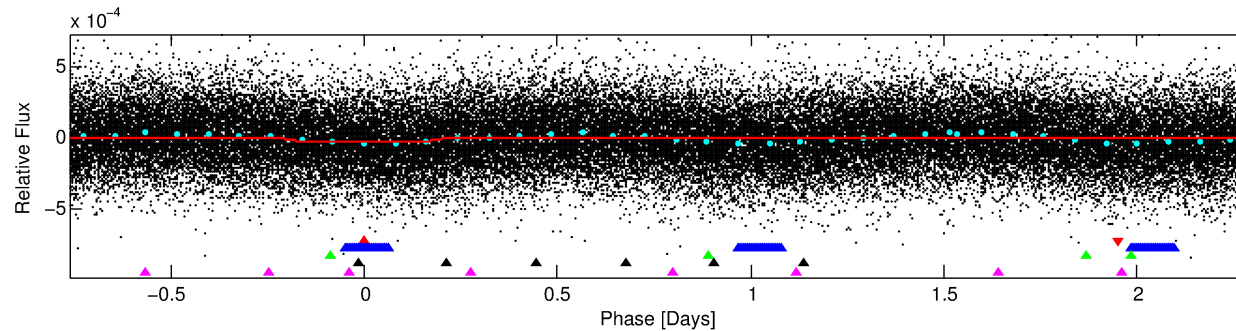
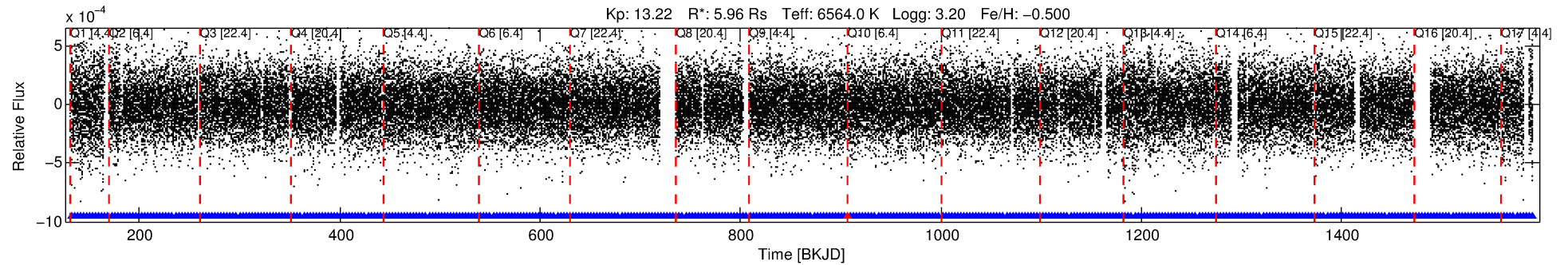
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003730390-01

No Significant Match Found

# DV One-Page Summary

KIC: 3730390 Candidate: 1 of 5 Period: 3.049 d



## DV Fit Results:

Period = 3.04886 [0.00005] d  
Epoch = 132.5674 [0.0097] BKJD  
Rp/R\* = 0.0048 [0.0015]  
a/R\* = 1.63 [1.84]  
b = 0.83 [0.68]  
Seff = 21477.01 [17349.00]  
Teq = 3087 [623] K  
Rp = 3.15 [1.93] Re  
a = 0.0524 [0.0263] AU  
Ag = 3.85 [3.98] [0.71σ]  
Teffp = 6684 [1117] K [2.81σ]

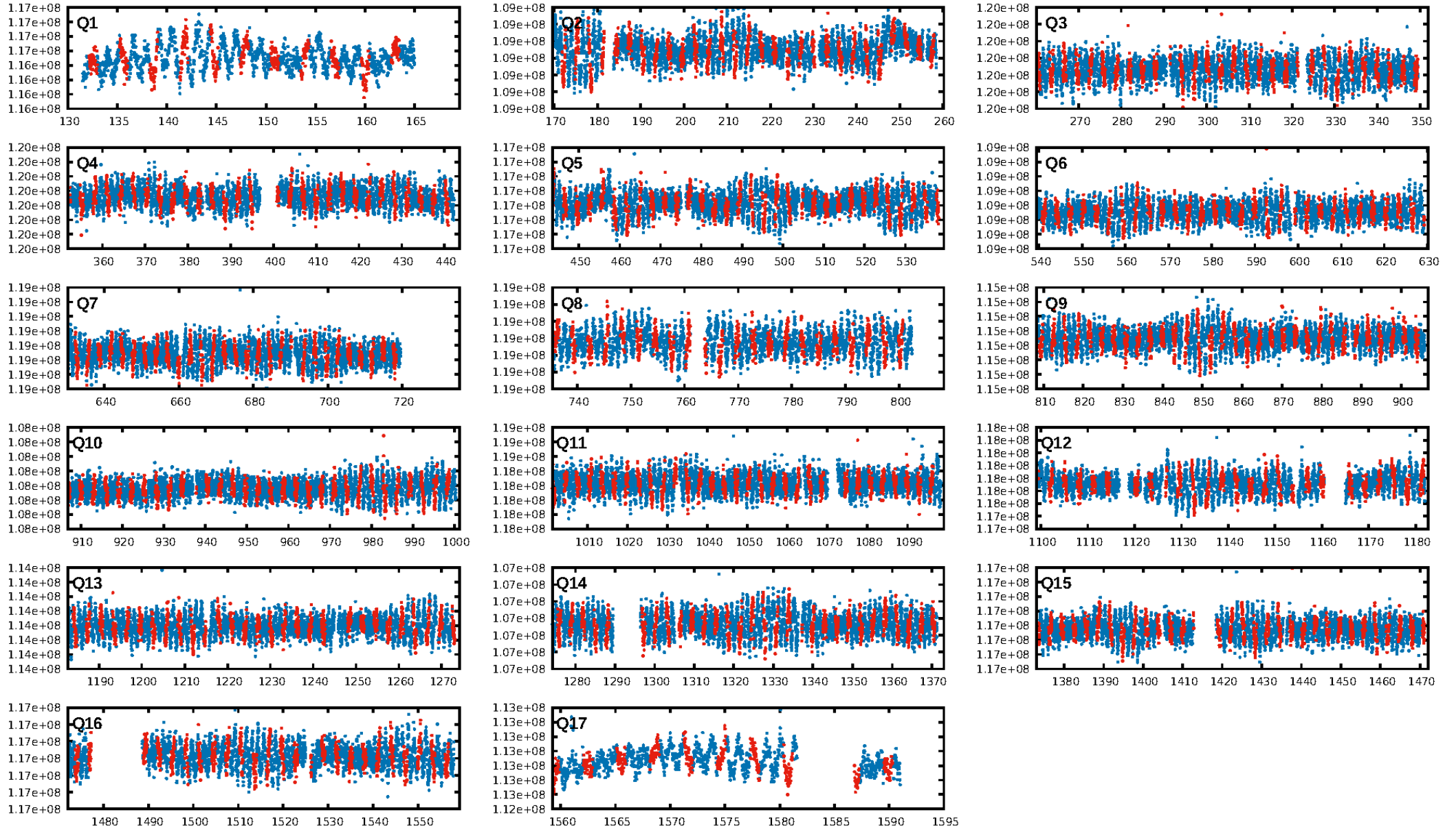
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 99.5% [2.80σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 1.55e-11**  
RollingBand-fgt: 1.00 [425/426]  
GhostDiagnostic-chr: 1.642  
**Centroid-sig: 0.0%**  
Centroid-so: 1.735 arcsec [0.95σ]  
OotOffset-rm: 1.100 arcsec [0.98σ]  
KicOffset-rm: 0.801 arcsec [0.78σ]  
OotOffset-st: 4/2/2/3 [11]  
KicOffset-st: 4/2/2/3 [11]  
DiffImageQuality-fgm: 0.45 [5/11]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:33:48 Z

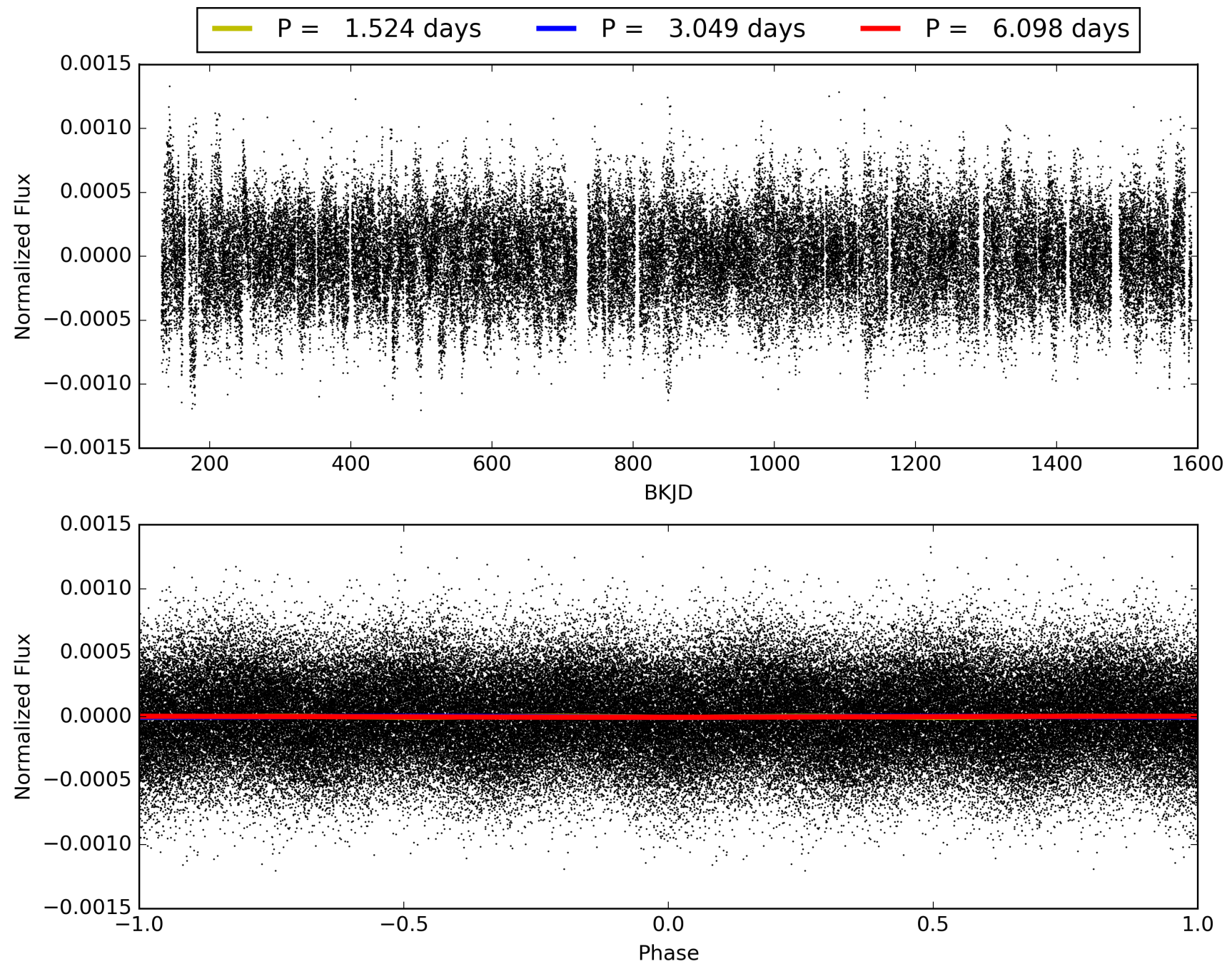
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003730390-01, PDC Light Curves





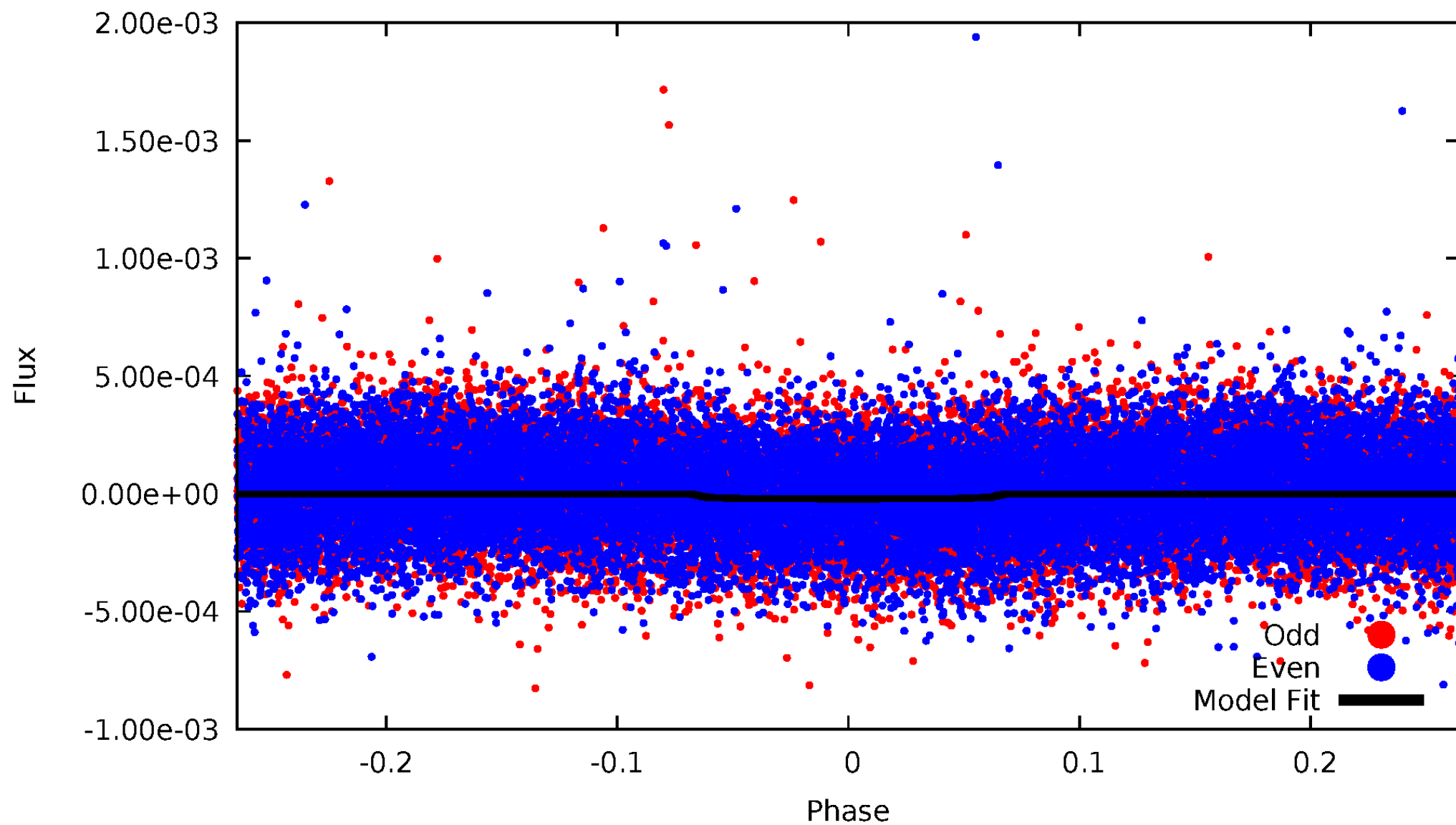
TCE 003730390-01





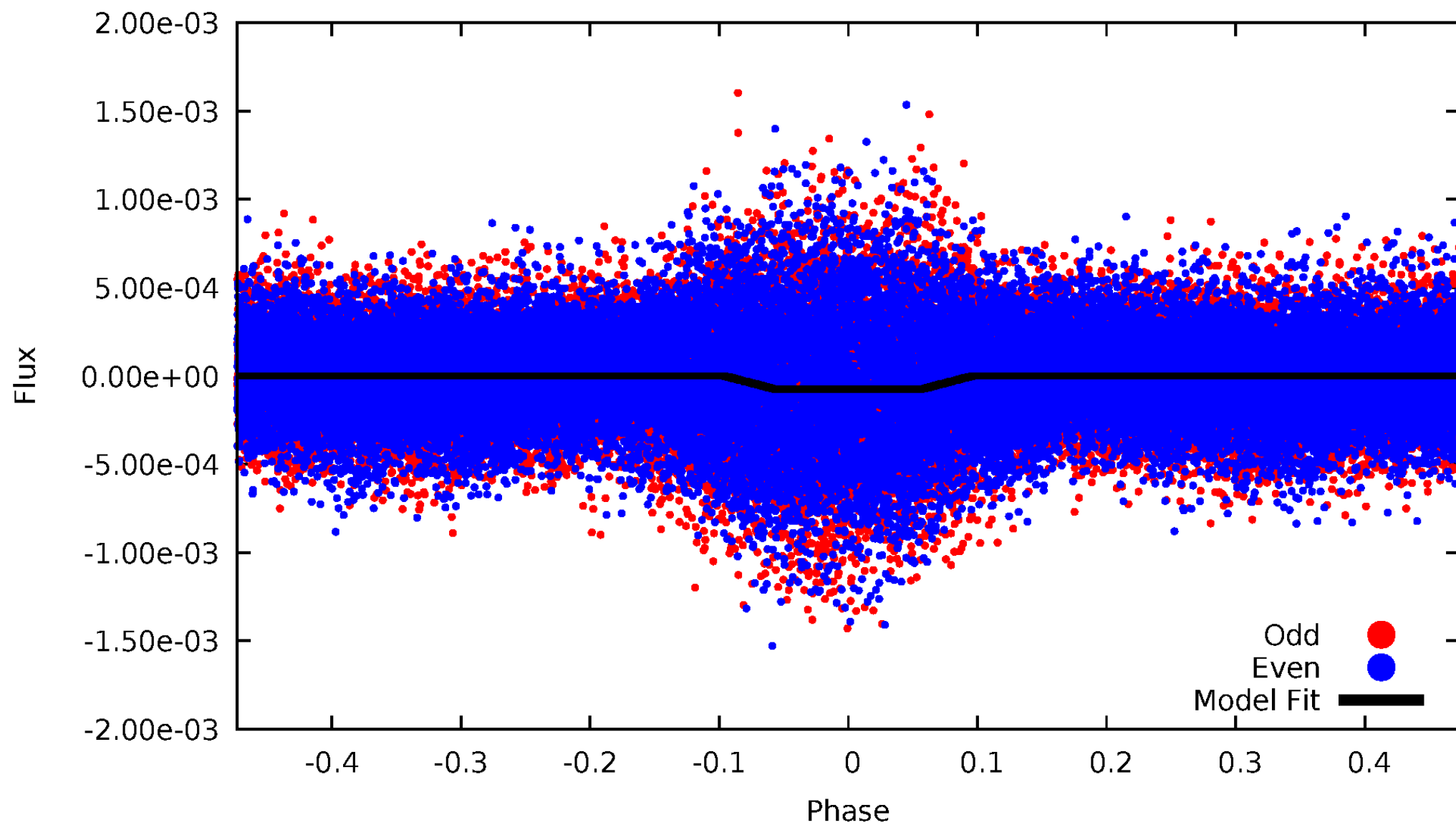
# DV Odd/Even

TCE 003730390-01

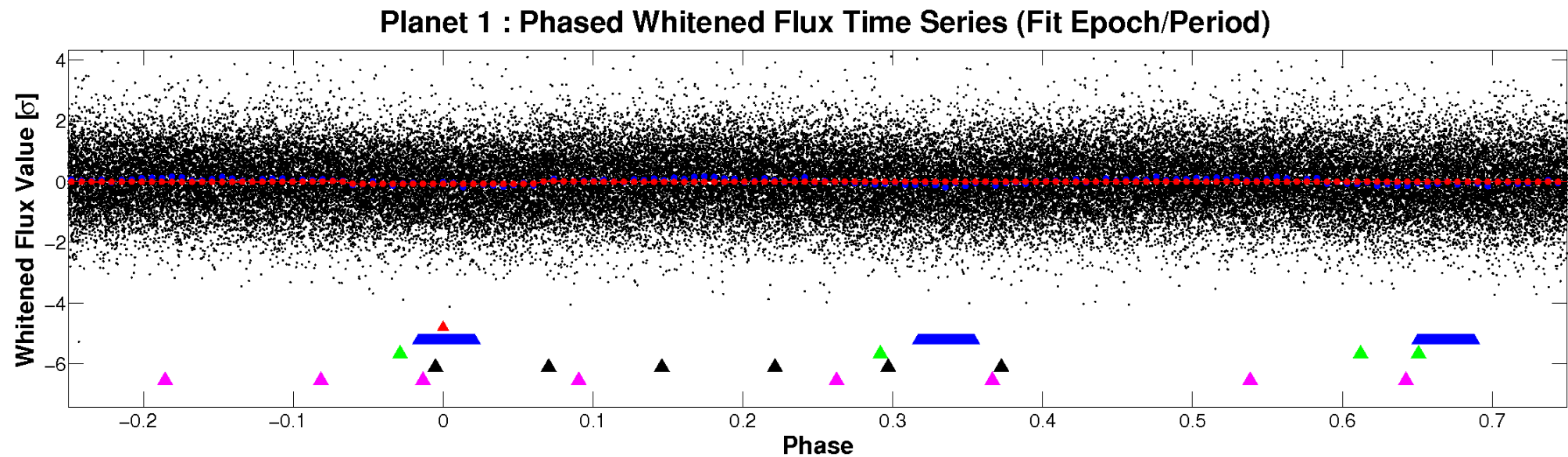
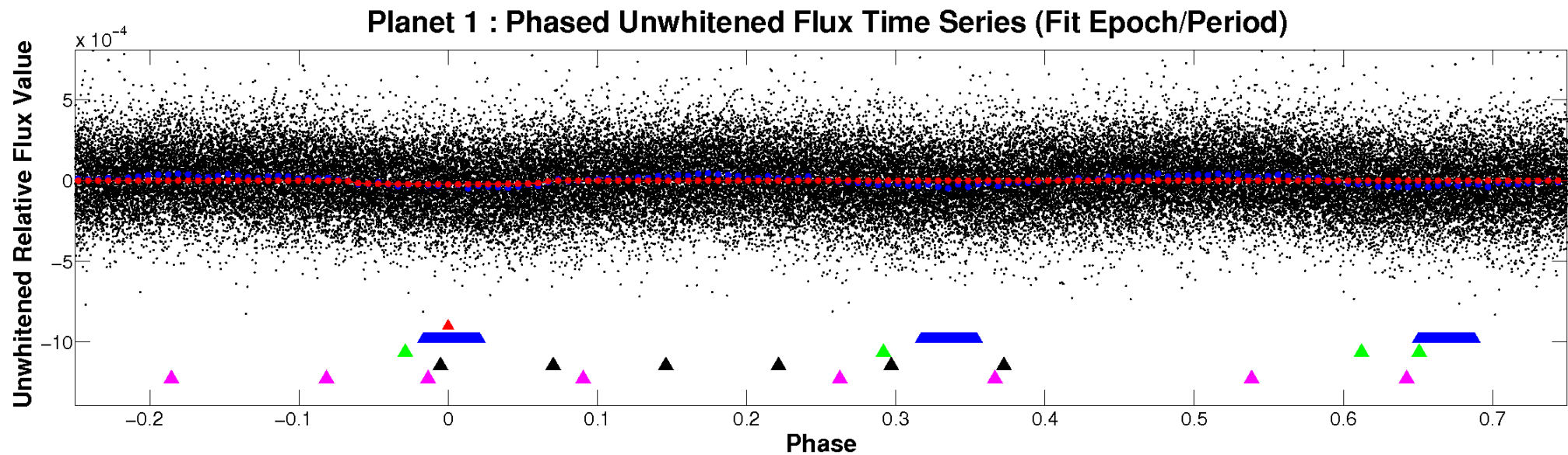


# ALT Odd/Even

TCE 003730390-01



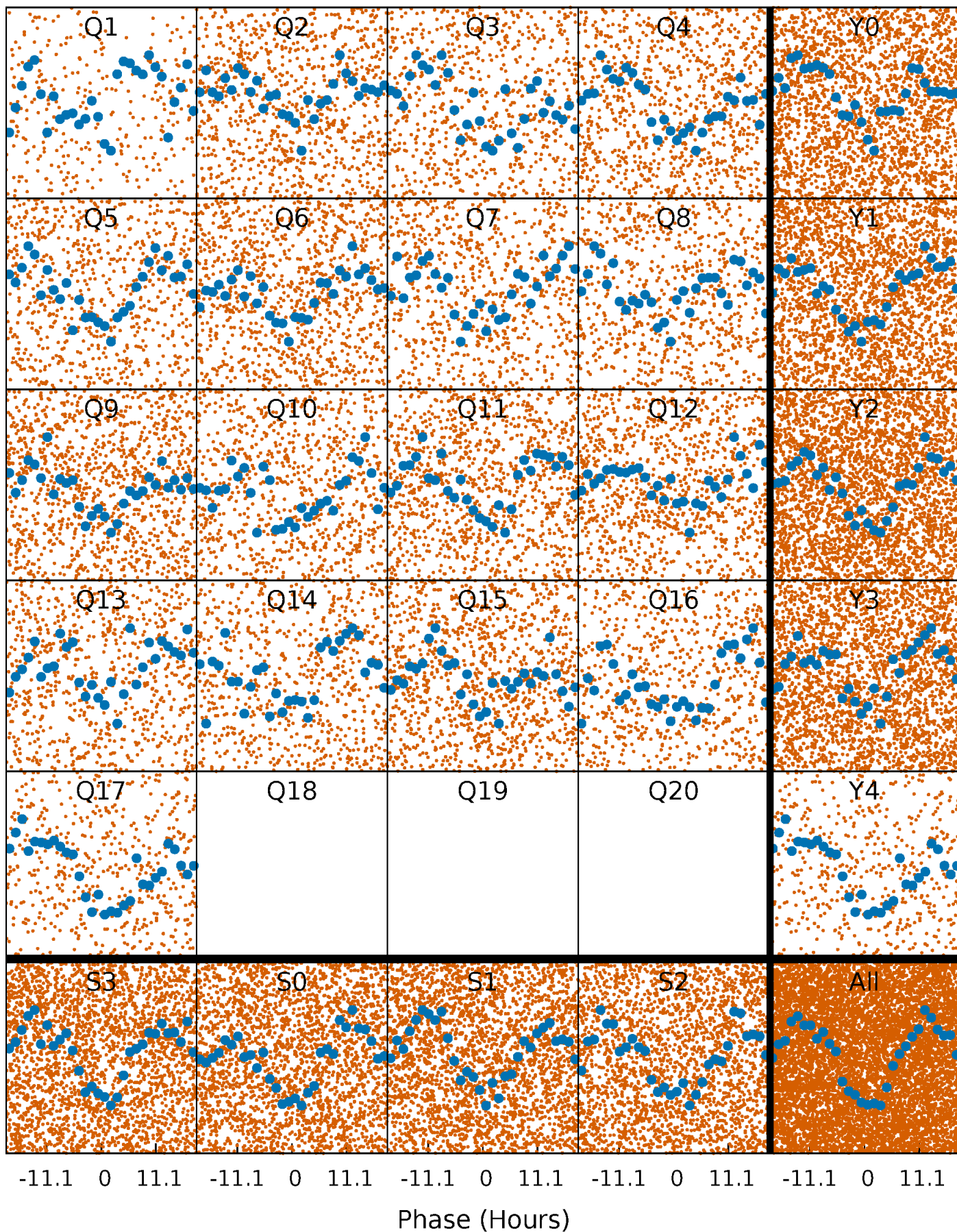
# Non-Whitened Vs. Whitened Light Curve





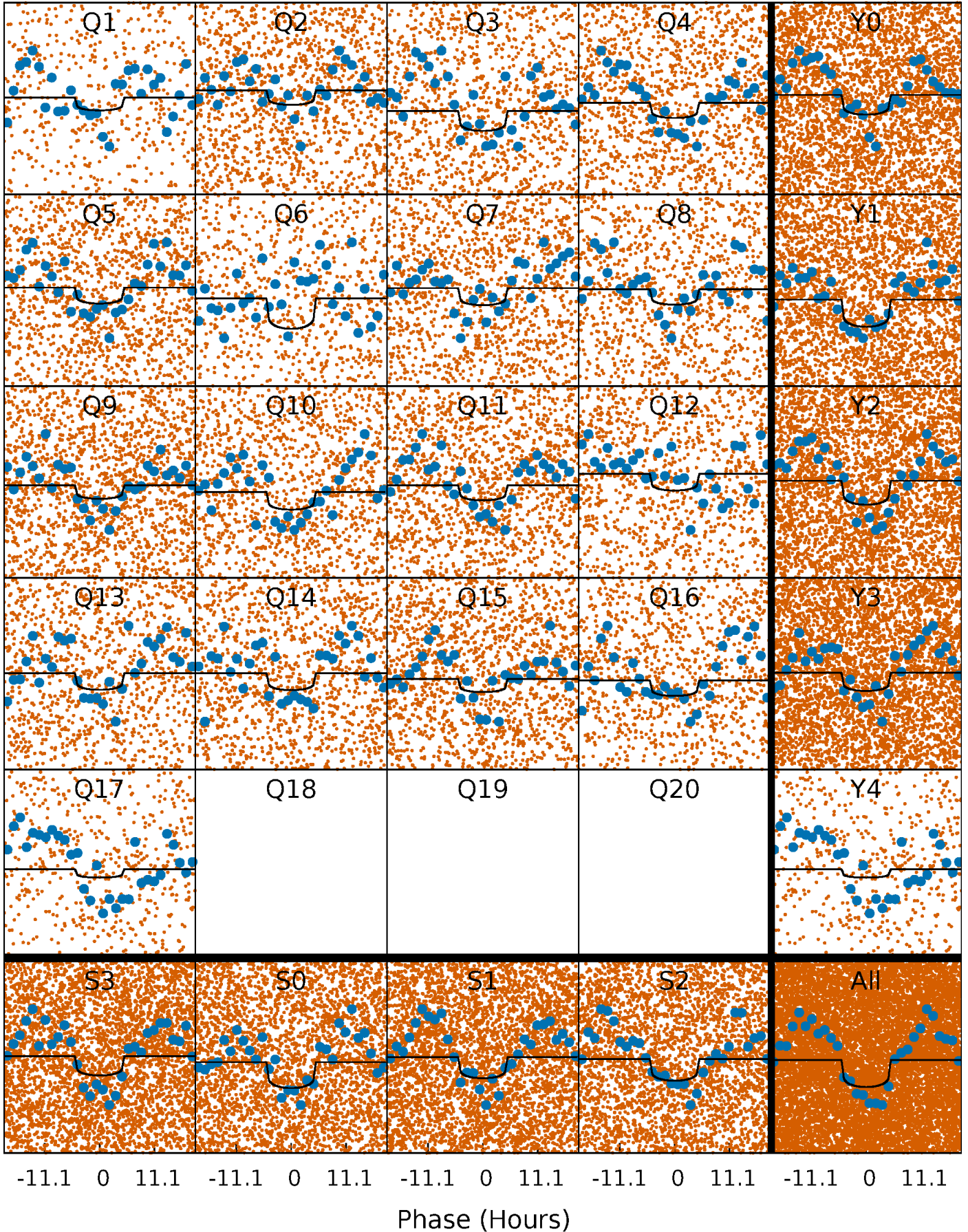
# PDC Quarter-Phased Transit Curves

TCE 003730390-01 P= 3.048857 Days  $T_0=132.567402$  (BKJD)



# DV Quarter-Phased Transit Curves

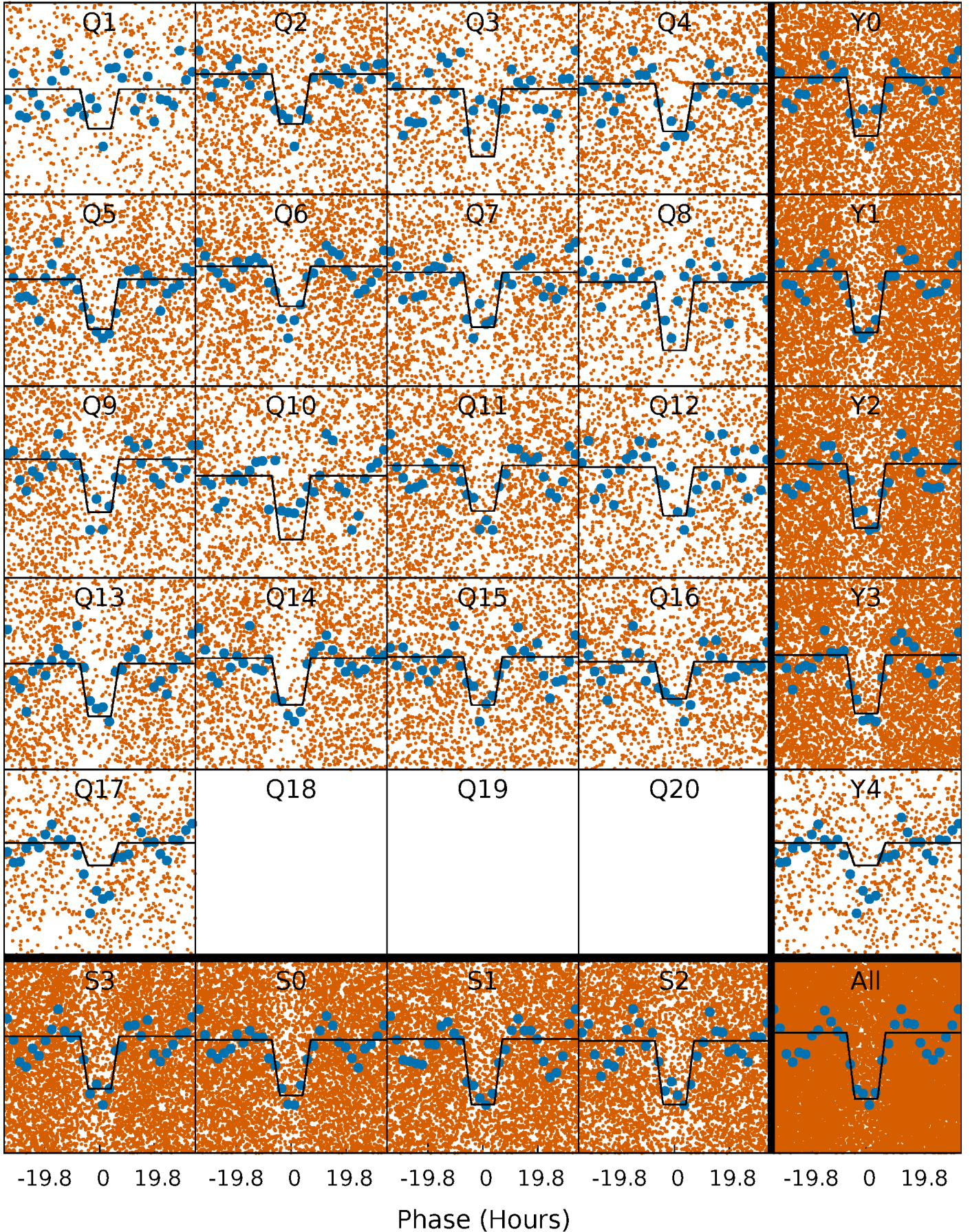
TCE 003730390-01 P= 3.048857 Days  $T_0=132.567402$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 003730390-01 P= 3.048910 Days  $T_0=132.576082$  (BKJD)

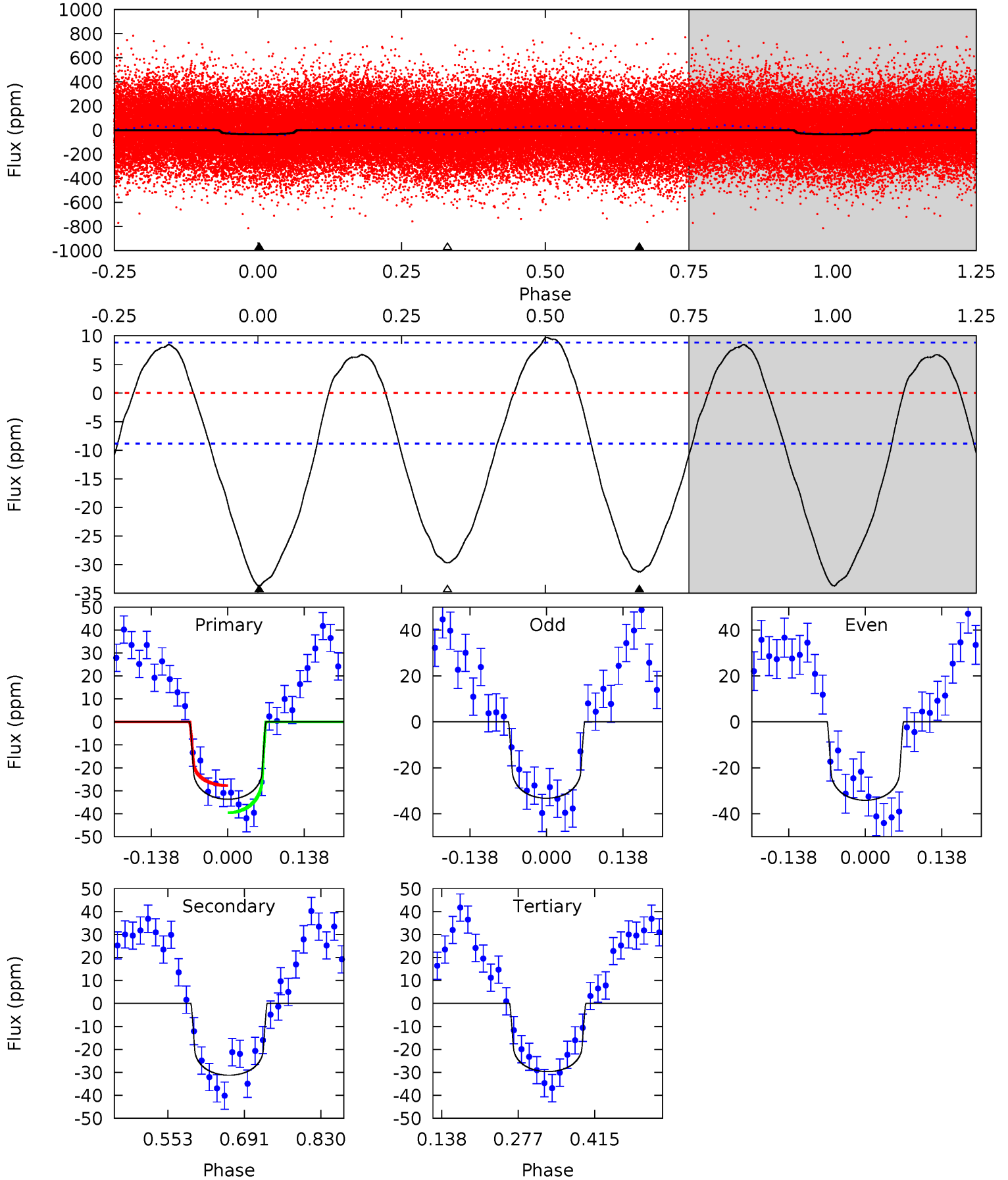




# DV Model-Shift Uniqueness Test

003730390-01, P = 3.048857 Days, E = 129.518545 Days

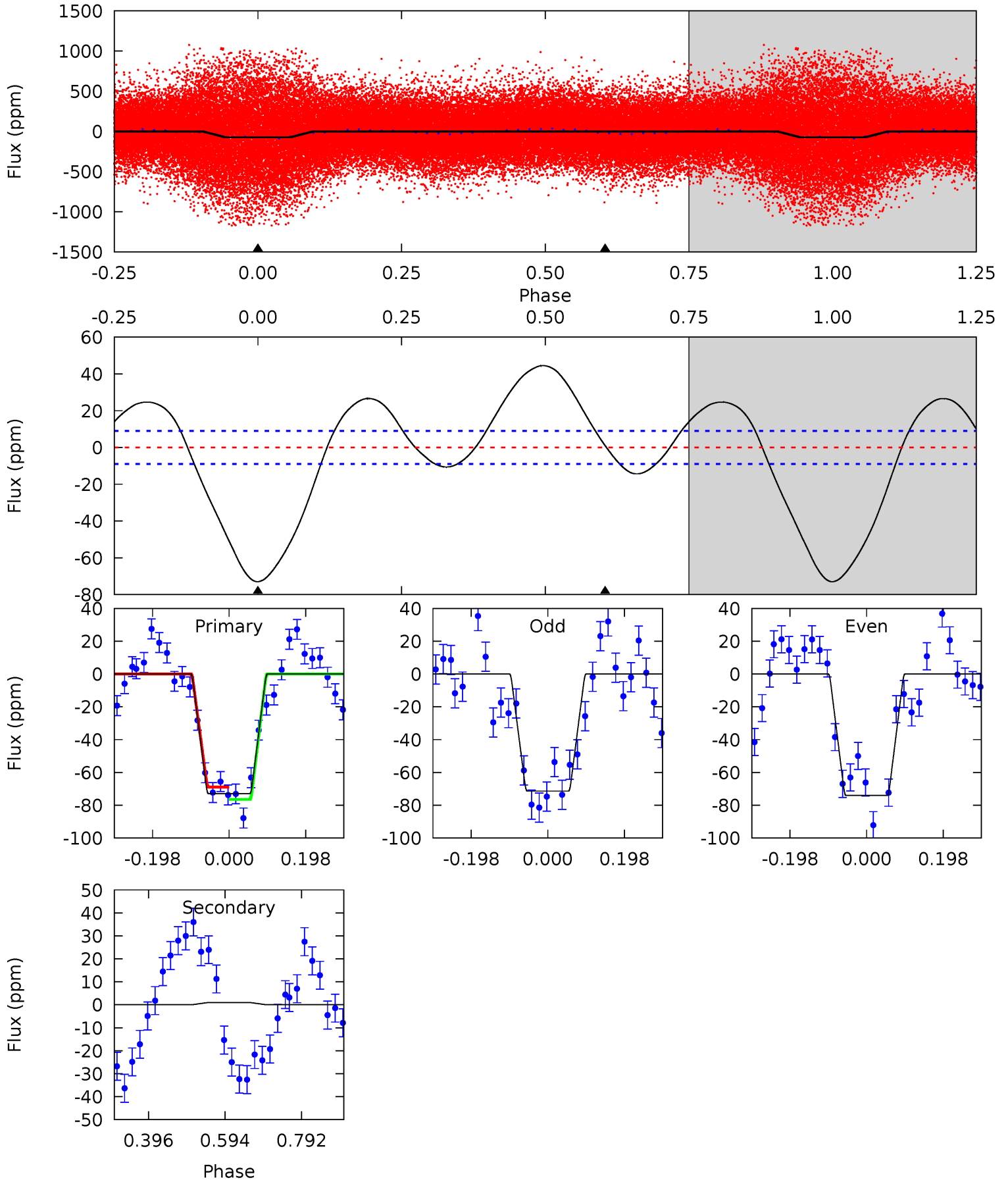
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.2	15.9	15.1	0	4.50	1.48	7.03	2.06	17.2	0.81	15.9	0.23	0.92	0.22	3.02



# Alt Model-Shift Uniqueness Test

003730390-01, P = 3.048910 Days, E = 129.527172 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
36.0	-0.46	0	0	4.42	1.29	5.86	36.0	36.0	-0.46	-0.46	0.65	1.17	0.38	1.89



### Stellar Parameters For KIC 003730390

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6564^{+176}_{-196}$	$3.203^{+0.468}_{-0.078}$	$-0.500^{+0.350}_{-0.400}$	$5.955^{+1.249}_{-3.122}$	$2.064^{+0.077}_{-0.659}$	$0.014^{+0.064}_{-0.005}$
	+3%/-3%	+15%/-2%	+70%/-80%	+21%/-52%	+4%/-32%	+465%/-33%
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 003730390-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-31 \pm 2$	$2.65^{+1.09}_{-1.05}$	$4114^{+335}_{-494}$	$7090^{+1846}_{-1070}$	$6.483^{+10.069}_{-3.175}$
Alt.	$1 \pm 2$	$4.77^{+1.49}_{-1.32}$	$4095^{+341}_{-503}$	$-3861^{+403}_{-282}$	$-0.054^{+0.124}_{-0.168}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$



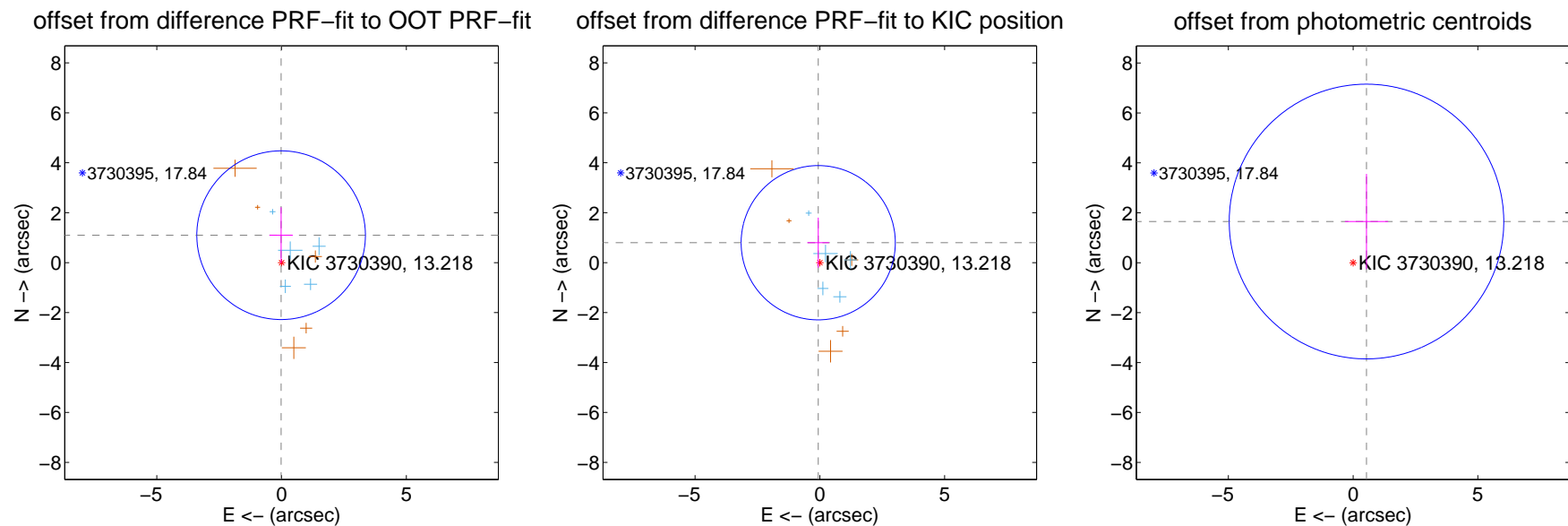
## DV Centroid Data

Supplemental centroid analysis for 003730390-01. Kepler magnitude: 13.22. Transit SNR 6.27

There are 5 quarters with good PRF difference image offsets

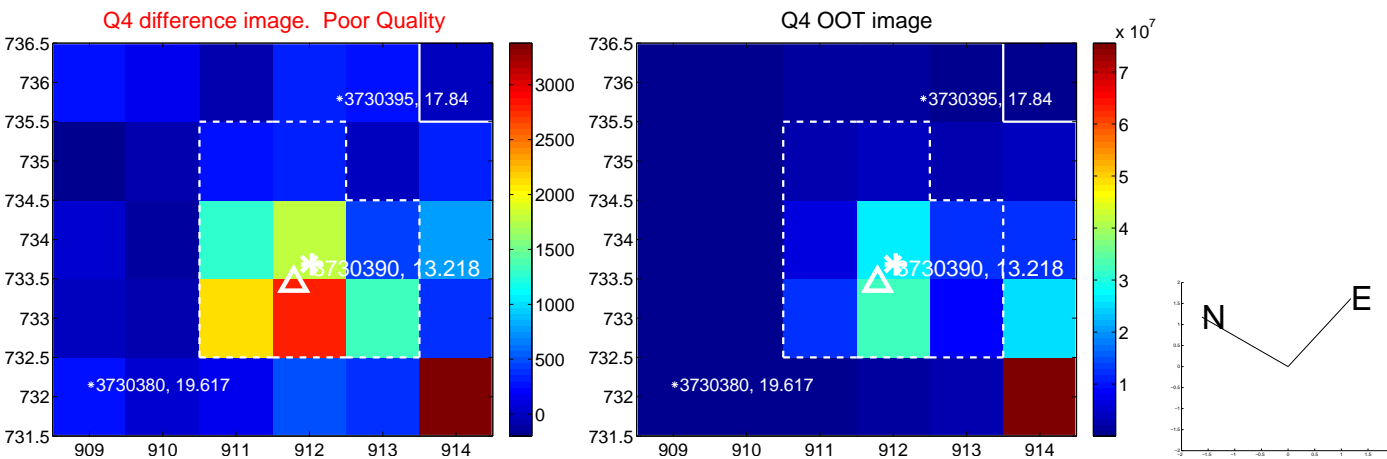
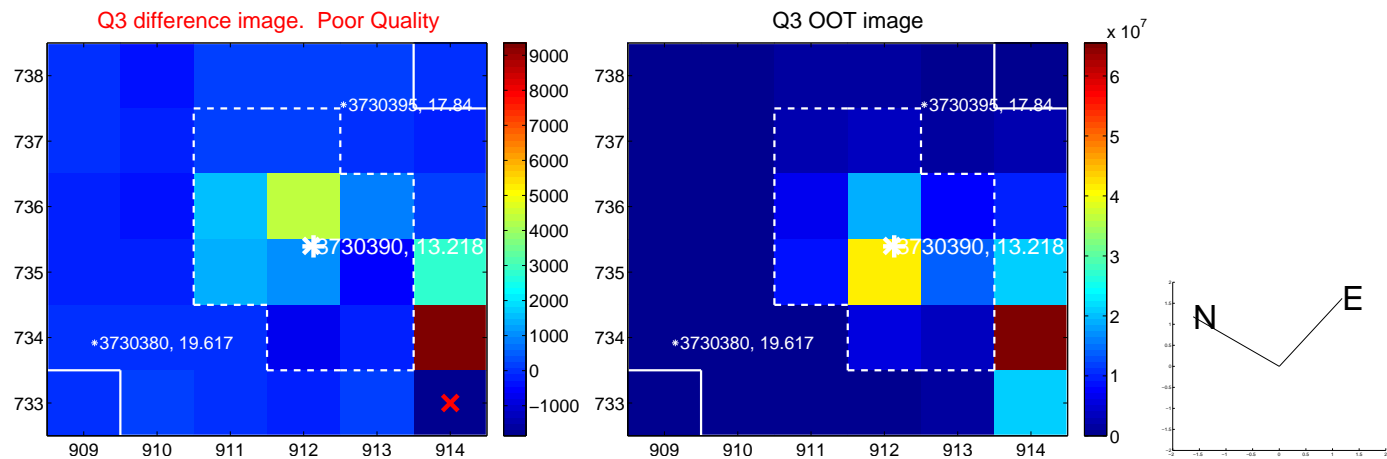
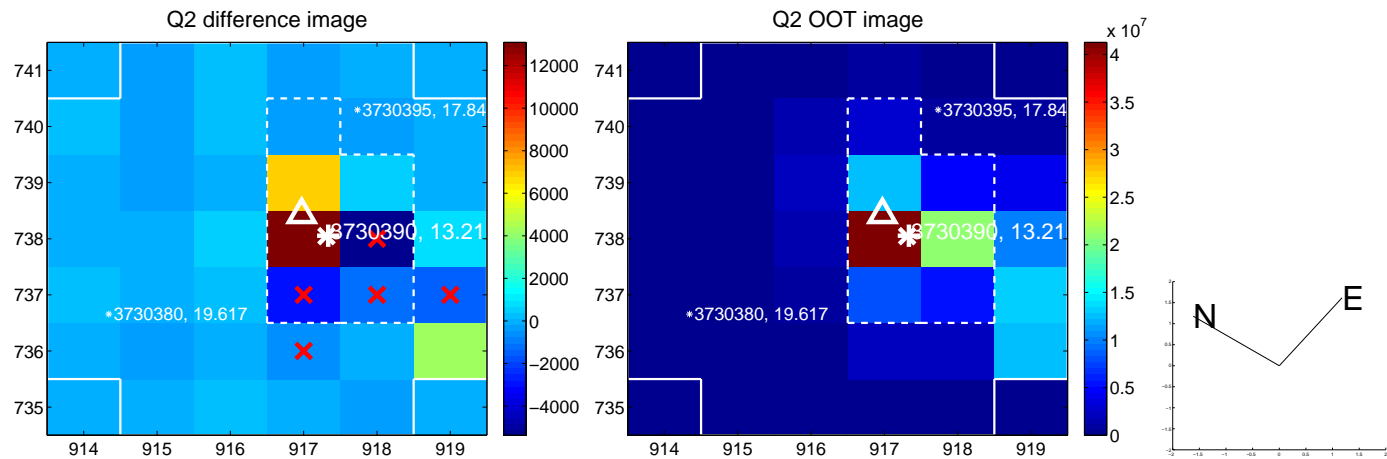
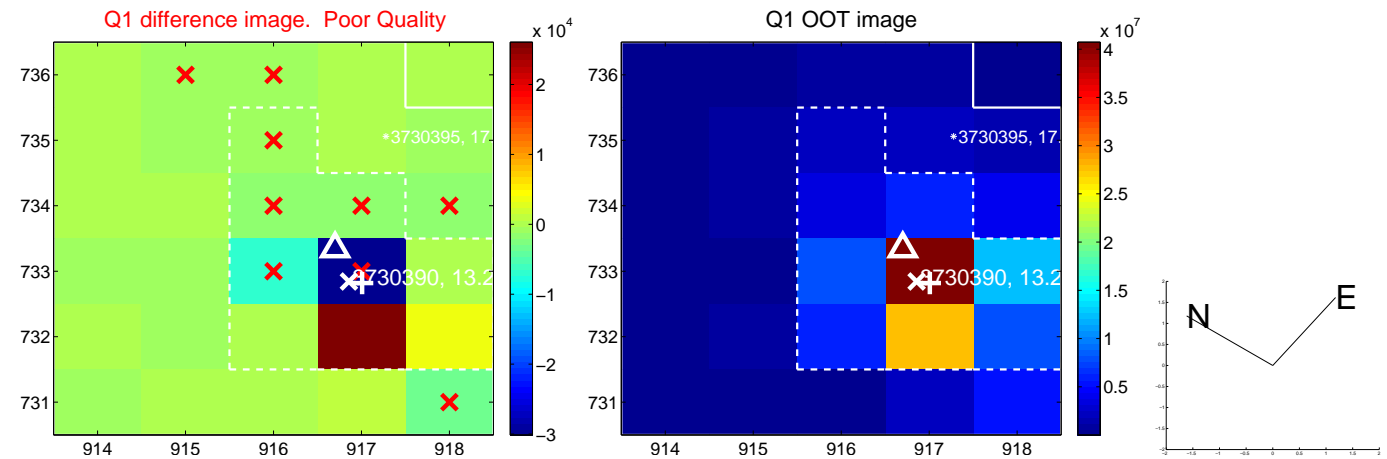
The direct PRF centroid is offset from the target star catalog position by about 0.61 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.100 \pm 1.126$	0.98	$0.019 \pm 0.470$	$1.100 \pm 1.119$
PRF-fit source offset from KIC position	$0.801 \pm 1.030$	0.78	$0.065 \pm 0.437$	$0.798 \pm 1.003$
photometric centroid source offset	$1.73 \pm 1.83$	0.95	$-0.54 \pm 0.87$	$1.65 \pm 1.91$

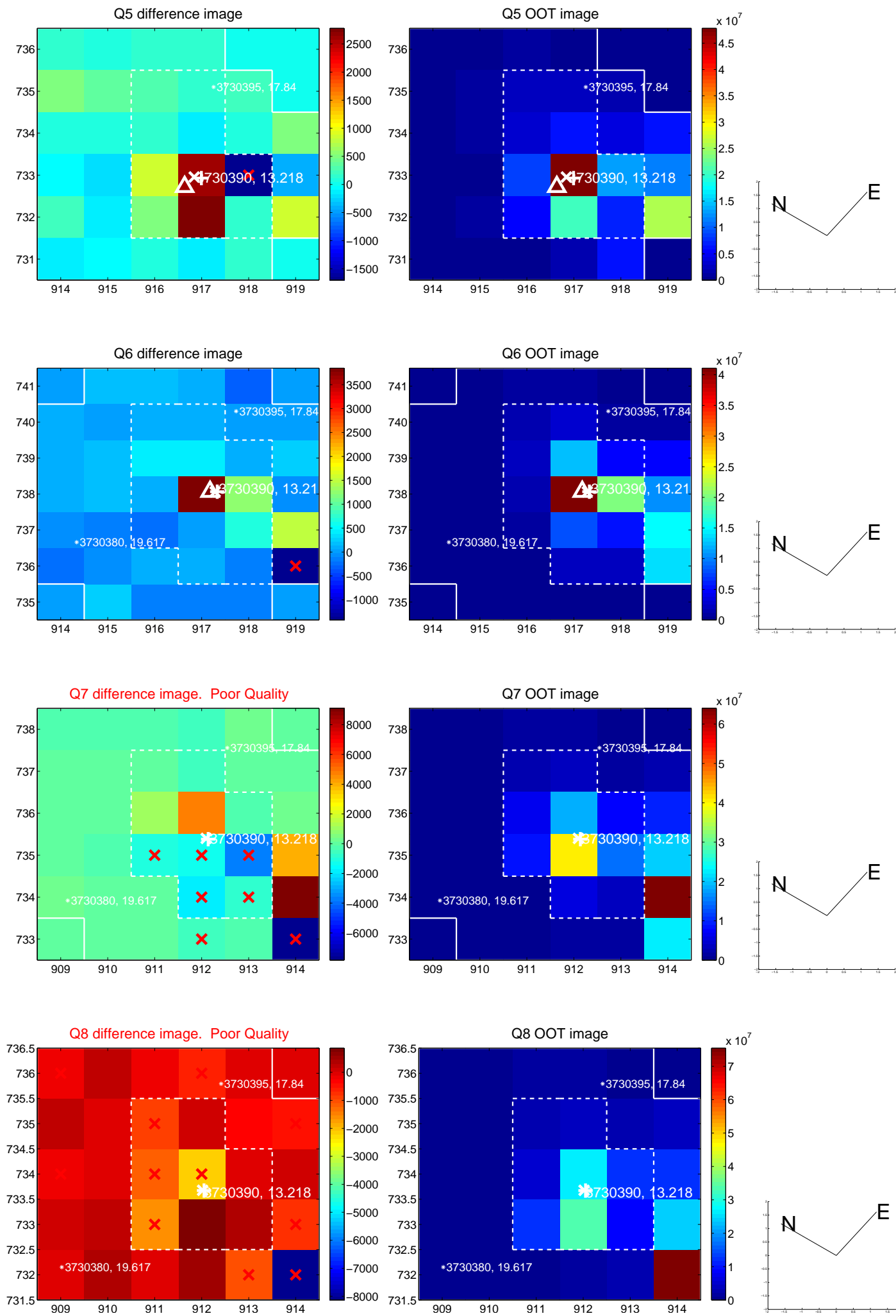


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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

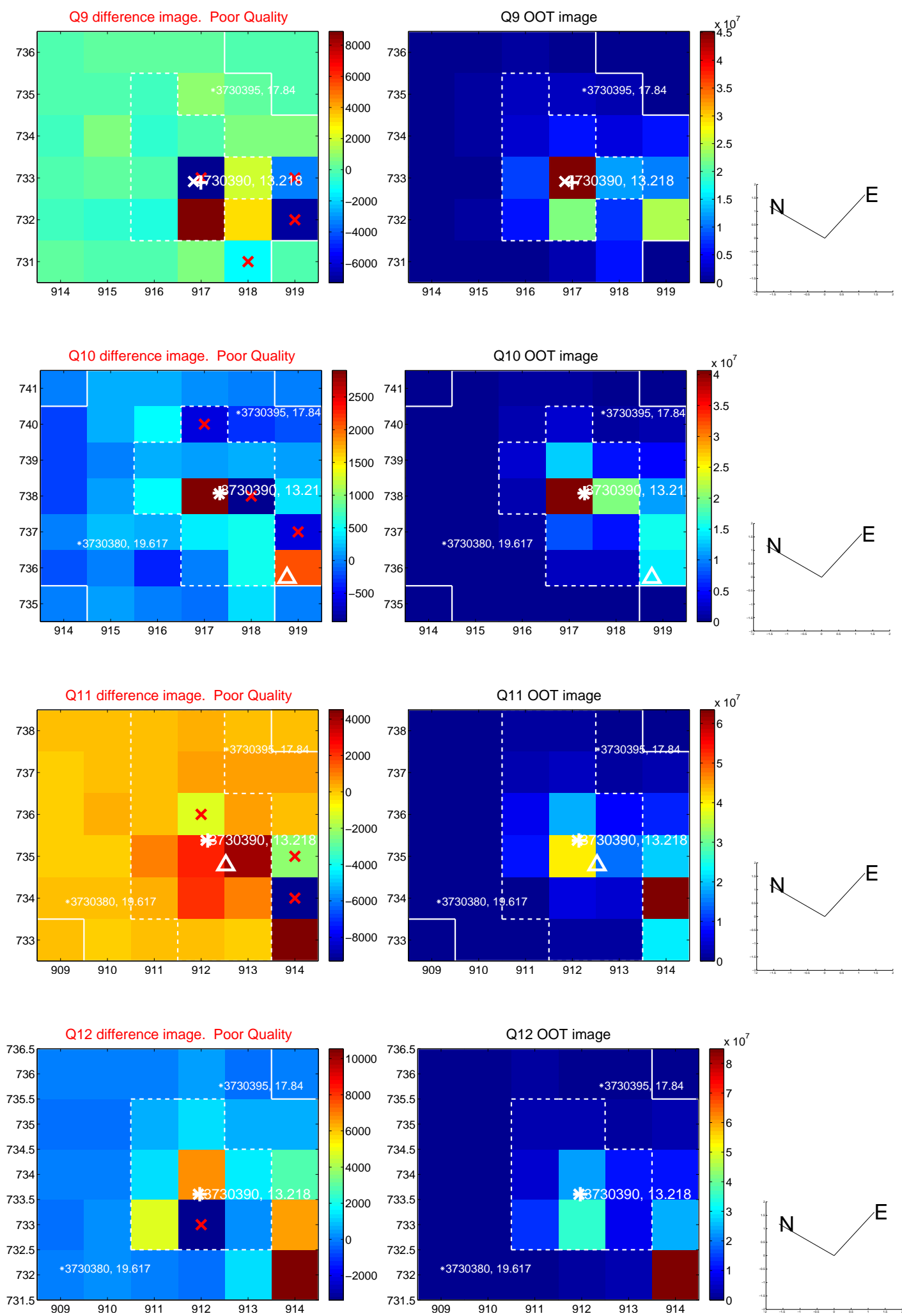


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

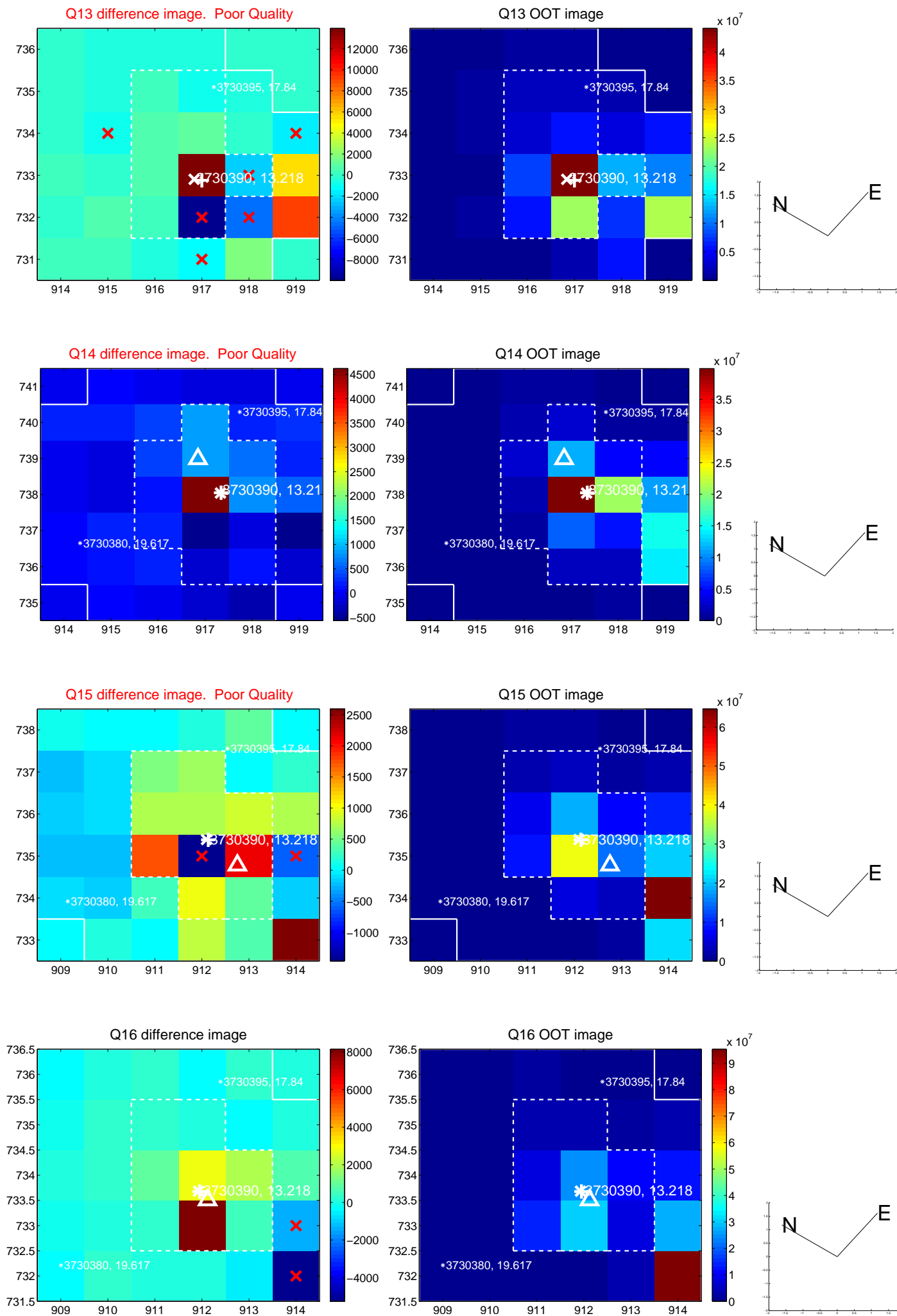




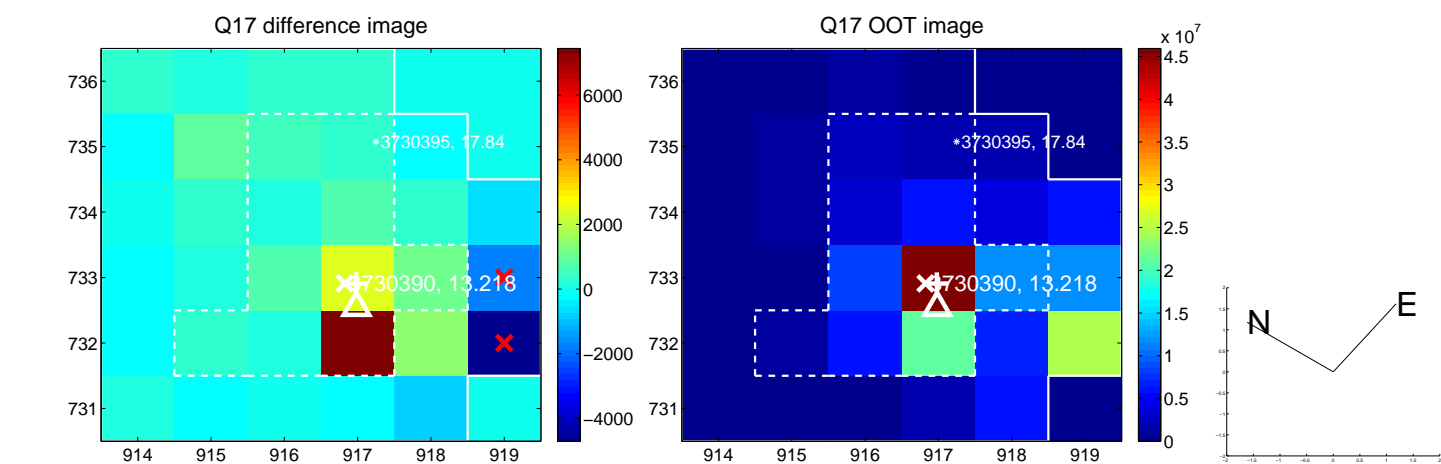
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



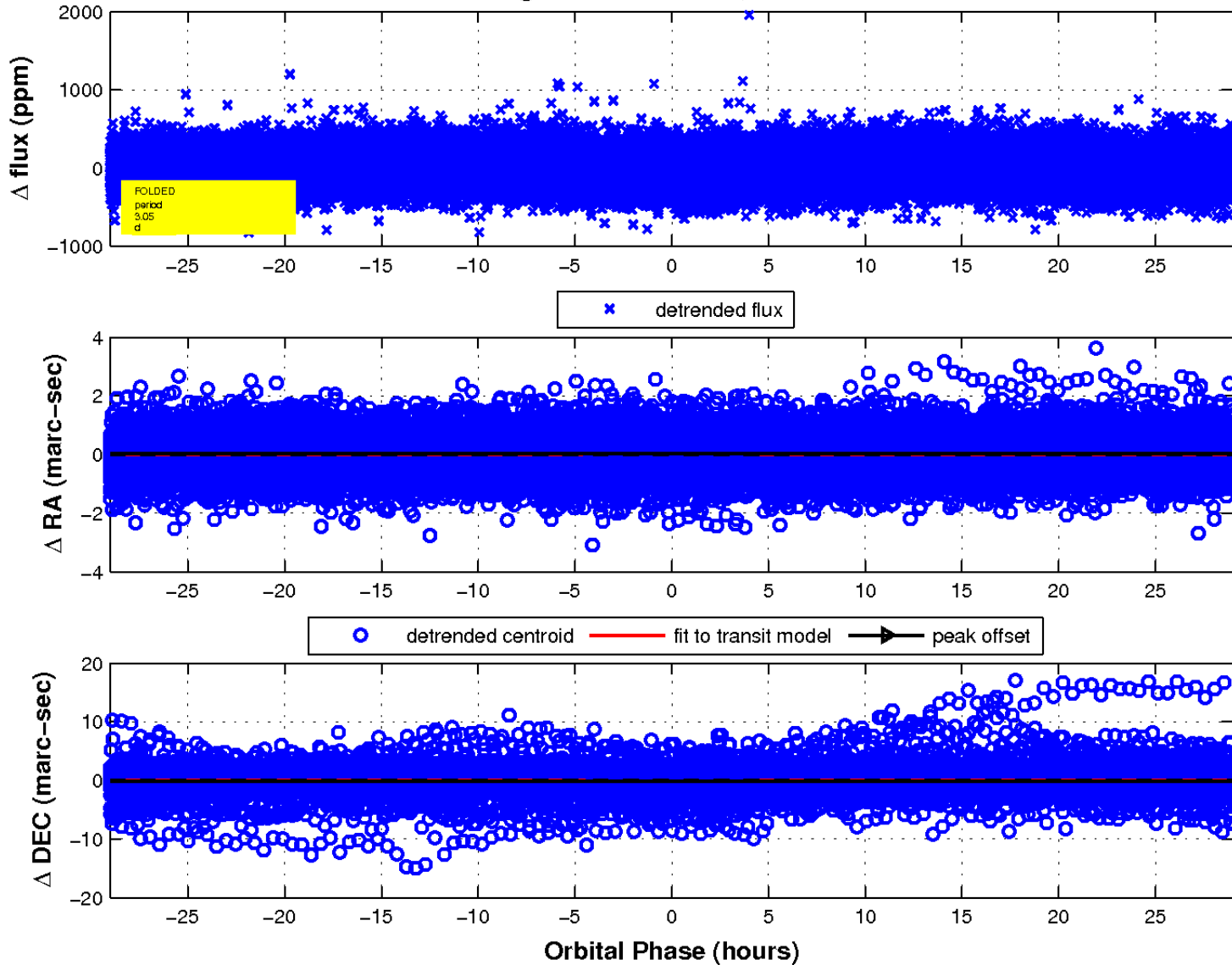
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

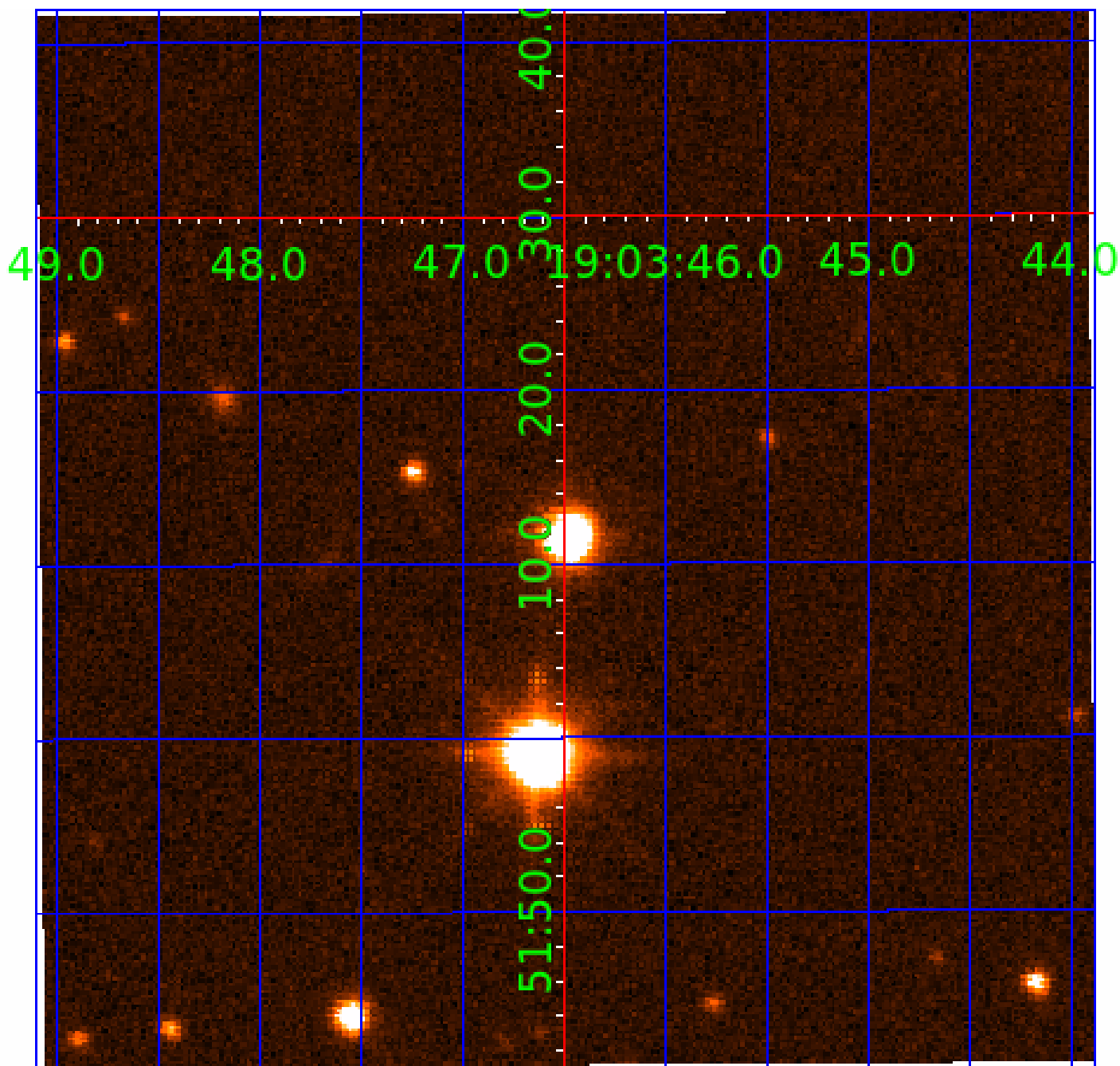


fluxWeightedCentroids, Planet 1 of 5



UKIRT Image

Declination



# KIC 003730390

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003730390-01	OBS	No	3.048857	132.567402	22.3	9.675	8.1	6.3	5.96	6564	3.15	21477.01
003730390-02	OBS	No	5.081831	135.565642	37.2	14.489	7.9	8.3	5.96	6564	4.16	10867.50
003730390-03	OBS	No	370.983572	427.124181	392.4	4.462	7.5	8.4	5.96	6564	12.84	35.62
003730390-05	OBS	No	175.992278	232.931048	320.5	3.254	7.2	7.8	5.96	6564	12.03	96.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003730390-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-03	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003730390-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

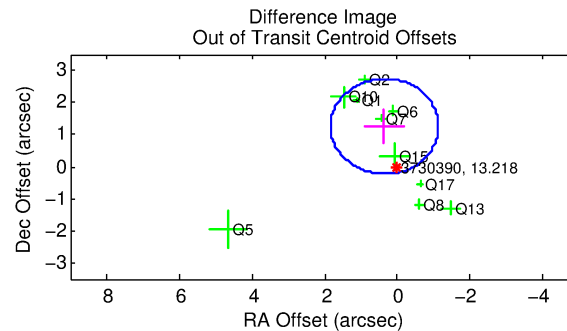
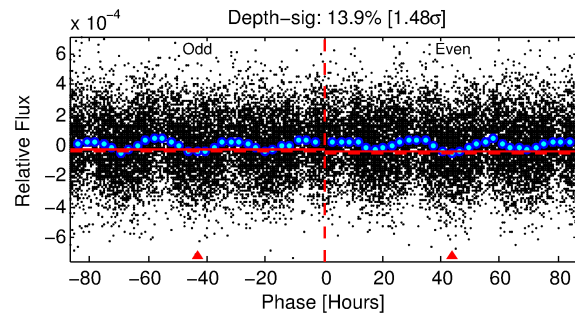
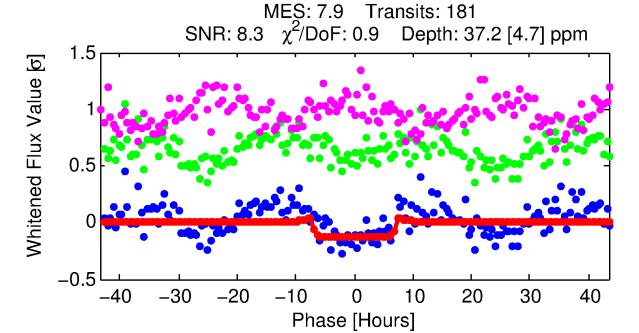
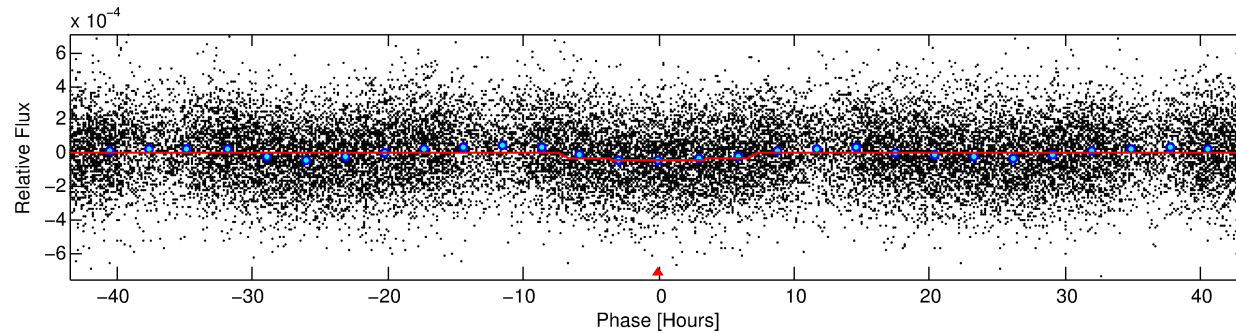
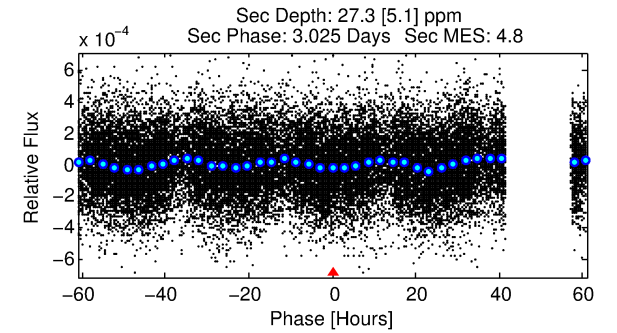
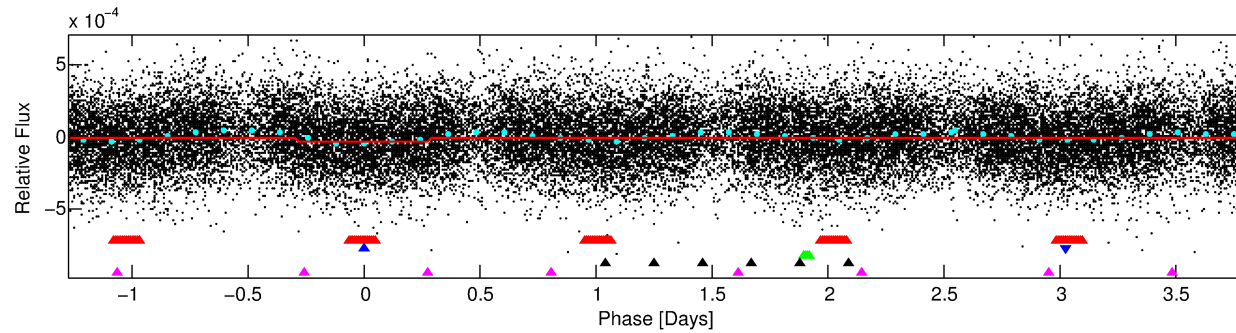
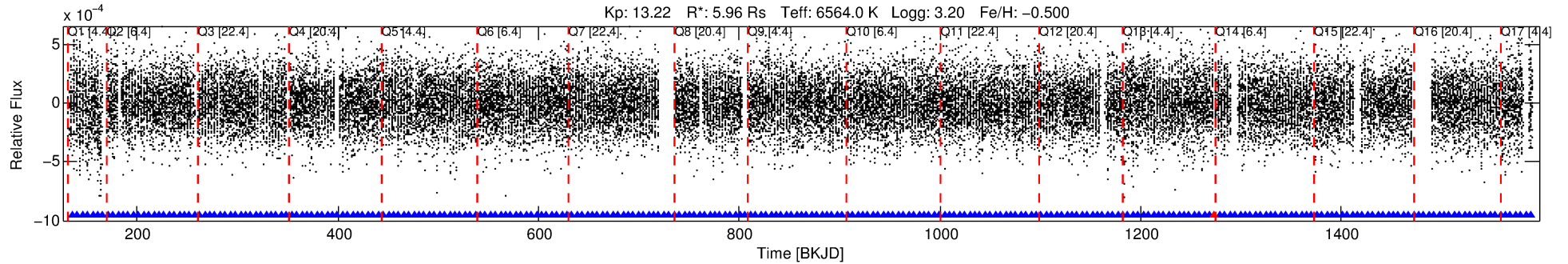
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003730390-02

No Significant Match Found

# DV One-Page Summary

KIC: 3730390 Candidate: 2 of 5 Period: 5.082 d



## DV Fit Results:

Period = 5.08183 [0.00010] d  
Epoch = 135.5656 [0.0131] BKJD  
Rp/R\* = 0.0064 [0.0012]  
a/R\* = 1.62 [1.03]  
b = 0.87 [0.28]  
Seff = 10867.50 [8778.70]  
Teq = 2604 [526] K  
Rp = 4.16 [2.31] Re  
a = 0.0737 [0.0369] AU  
Ag = 4.71 [4.24] [0.88σ]  
Teffp = 5930 [637] K [4.03σ]

## DV Diagnostic Results:

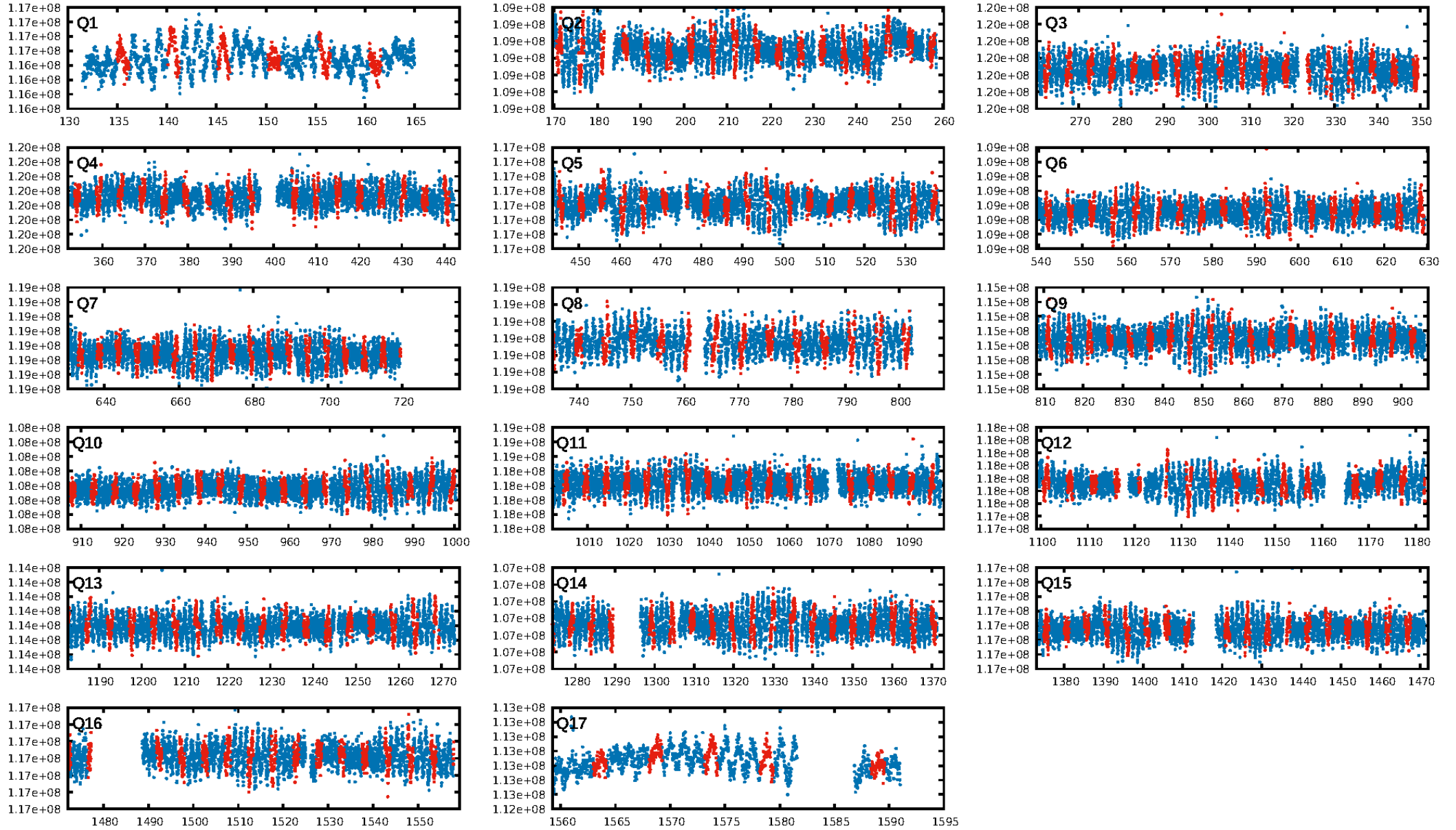
ShortPeriod-sig: 99.5% [2.80σ]  
LongPeriod-sig: 100.0% [276.21σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 6.41e-10**  
RollingBand-fgt: 0.99 [172/173]  
GhostDiagnostic-chr: -1.252  
**Centroid-sig: 0.0%**  
Centroid-so: 0.657 arcsec [0.87σ]  
OotOffset-rm: 1.304 arcsec [2.63σ]  
KicOffset-rm: 1.051 arcsec [2.22σ]  
OotOffset-st: 3/2/1/4 [10]  
KicOffset-st: 3/2/1/4 [10]  
DiffImageQuality-fgm: 0.60 [6/10]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:34:00 Z

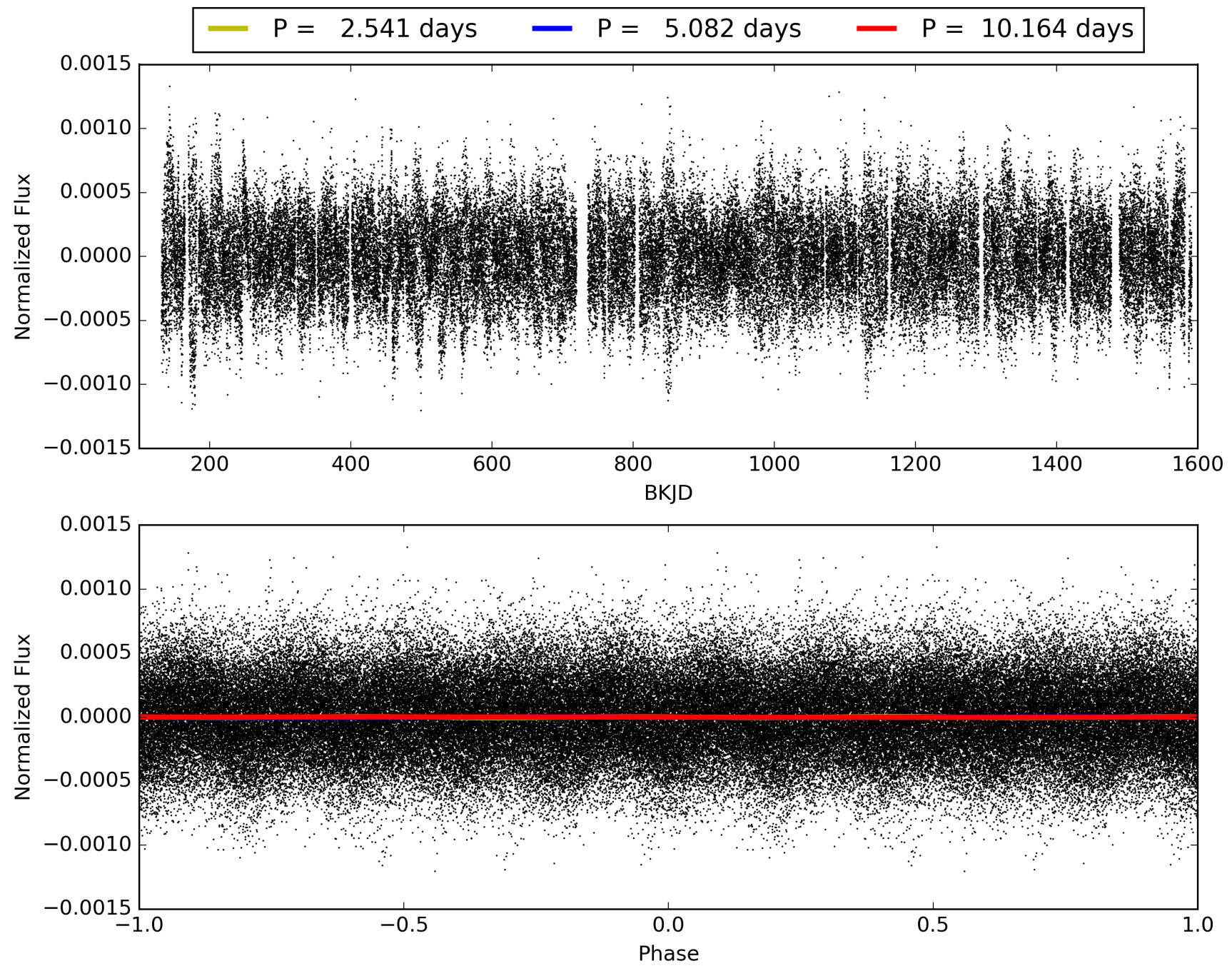
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 003730390-02, PDC Light Curves

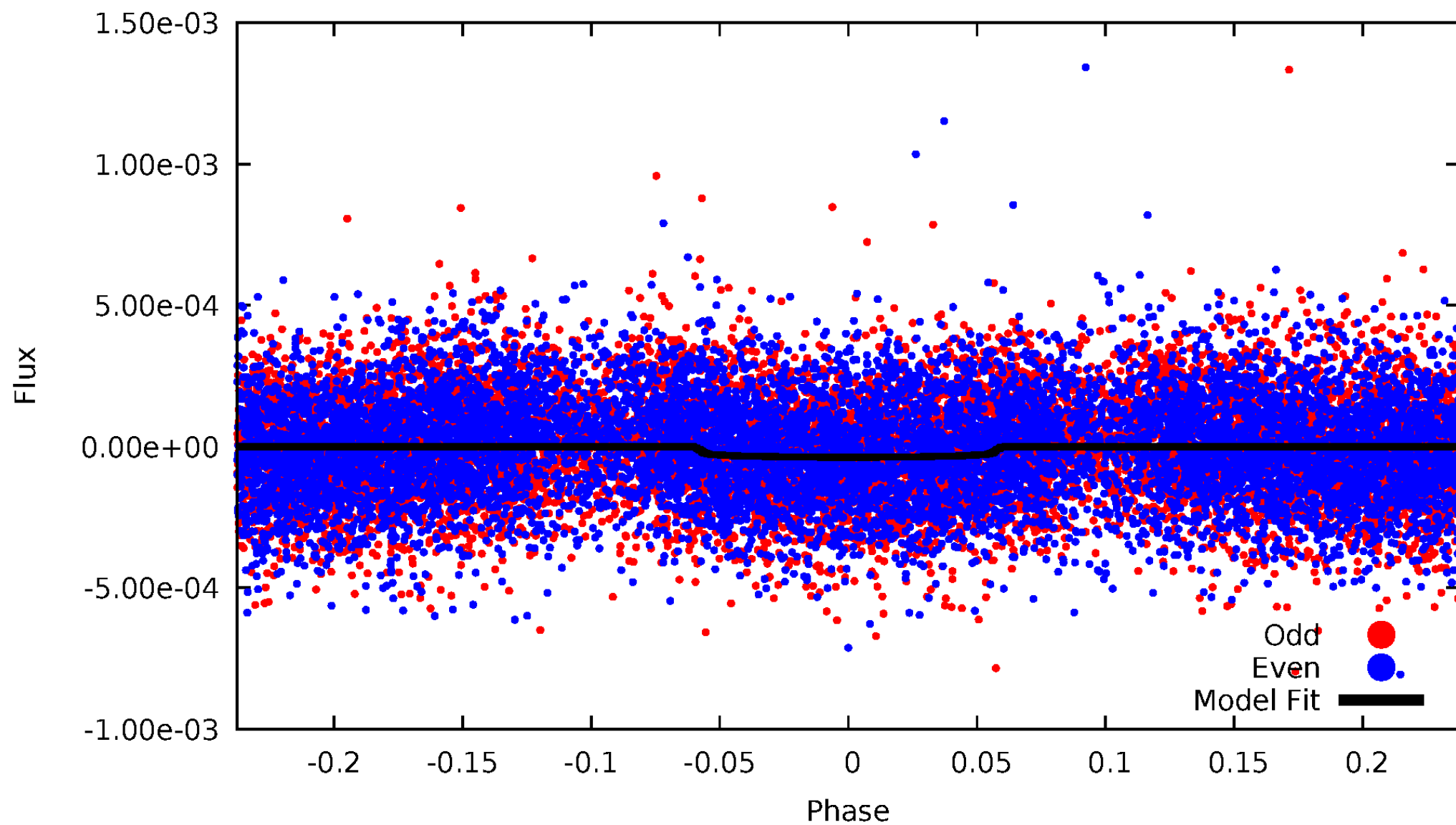


TCE 003730390-02



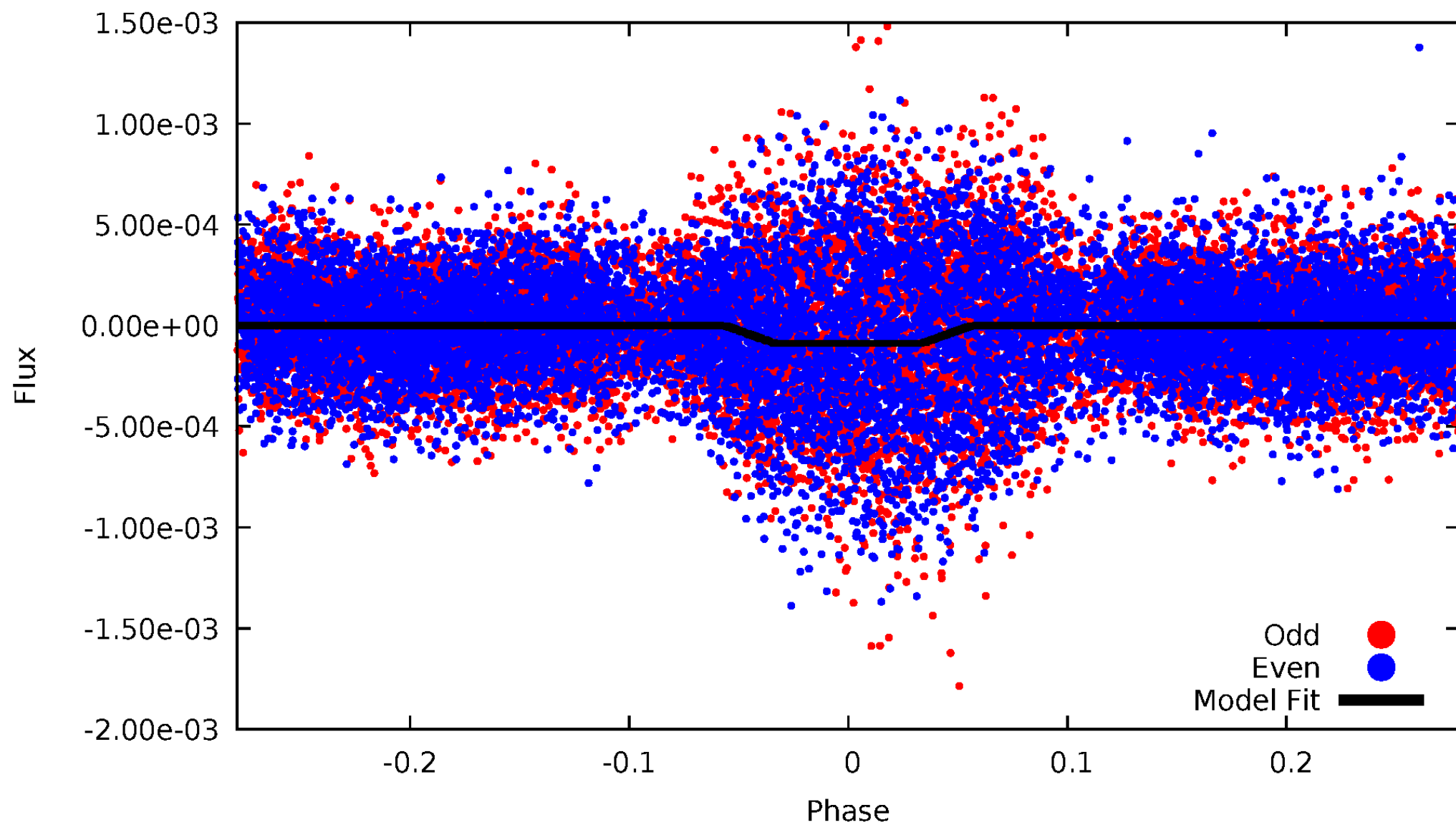
# DV Odd/Even

TCE 003730390-02



# ALT Odd/Even

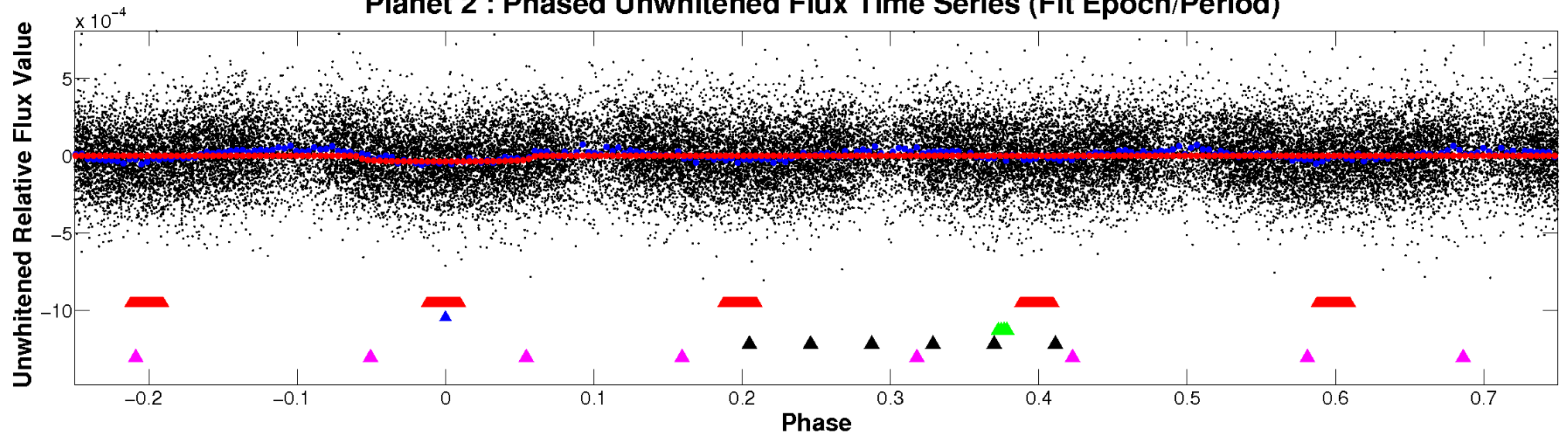
TCE 003730390-02



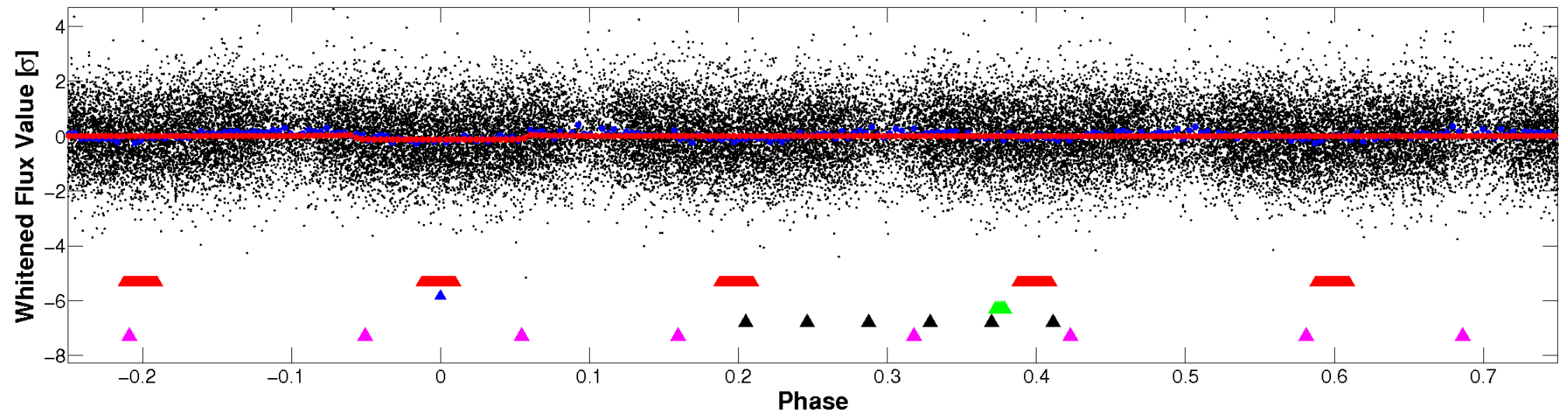


# Non-Whitened Vs. Whitened Light Curve

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

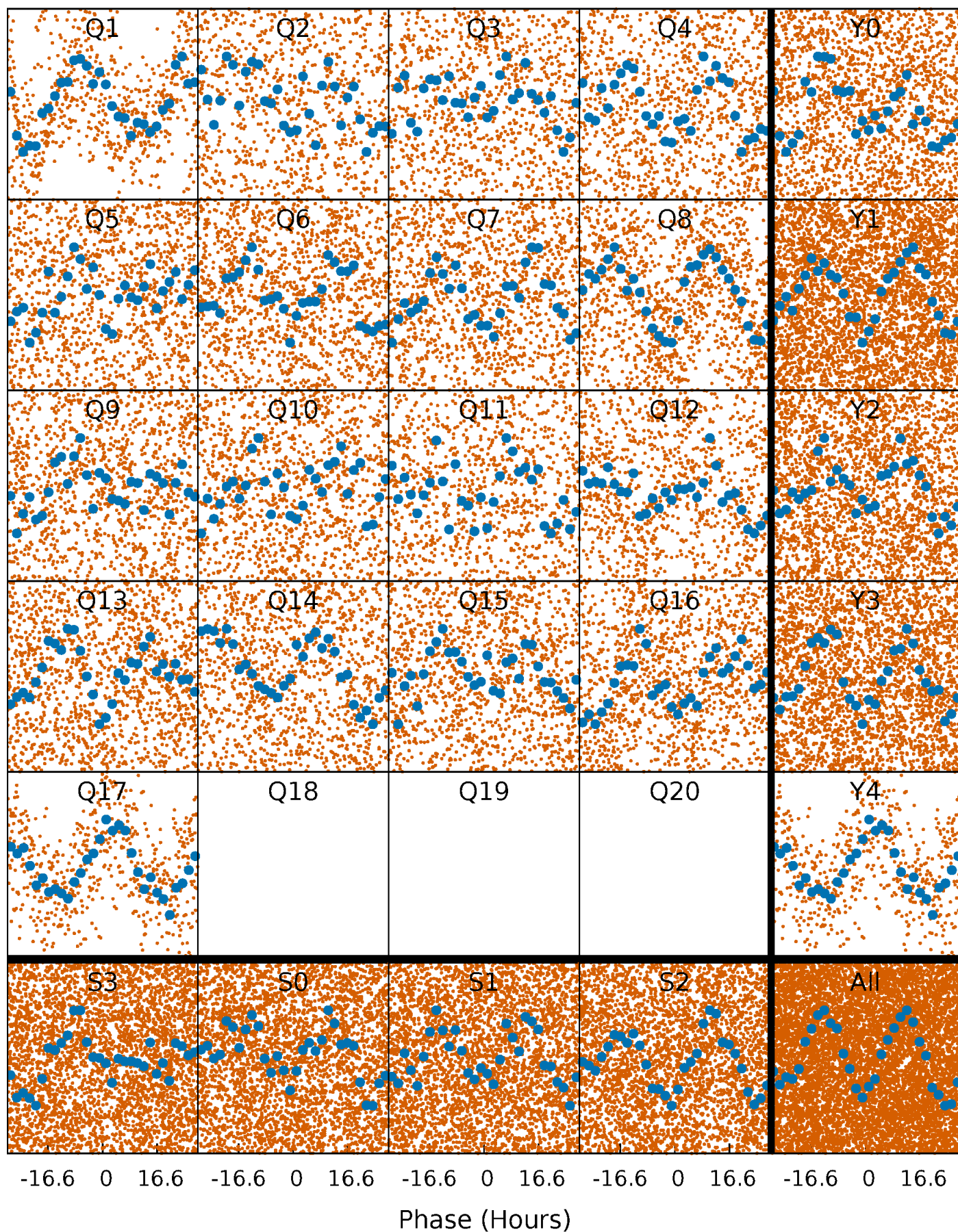


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

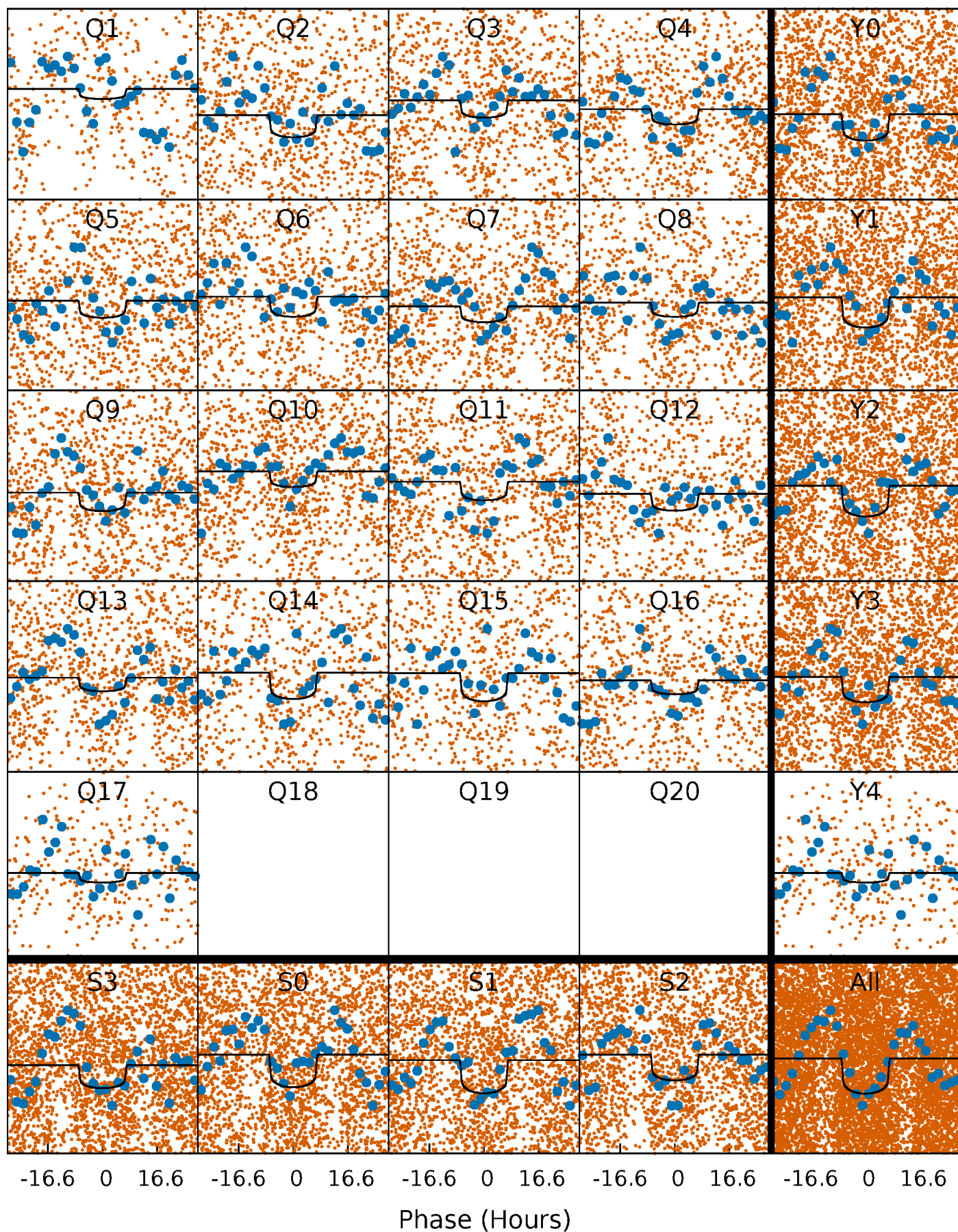
TCE 003730390-02   P= 5.081831 Days    $T_0=135.565642$  (BKJD)





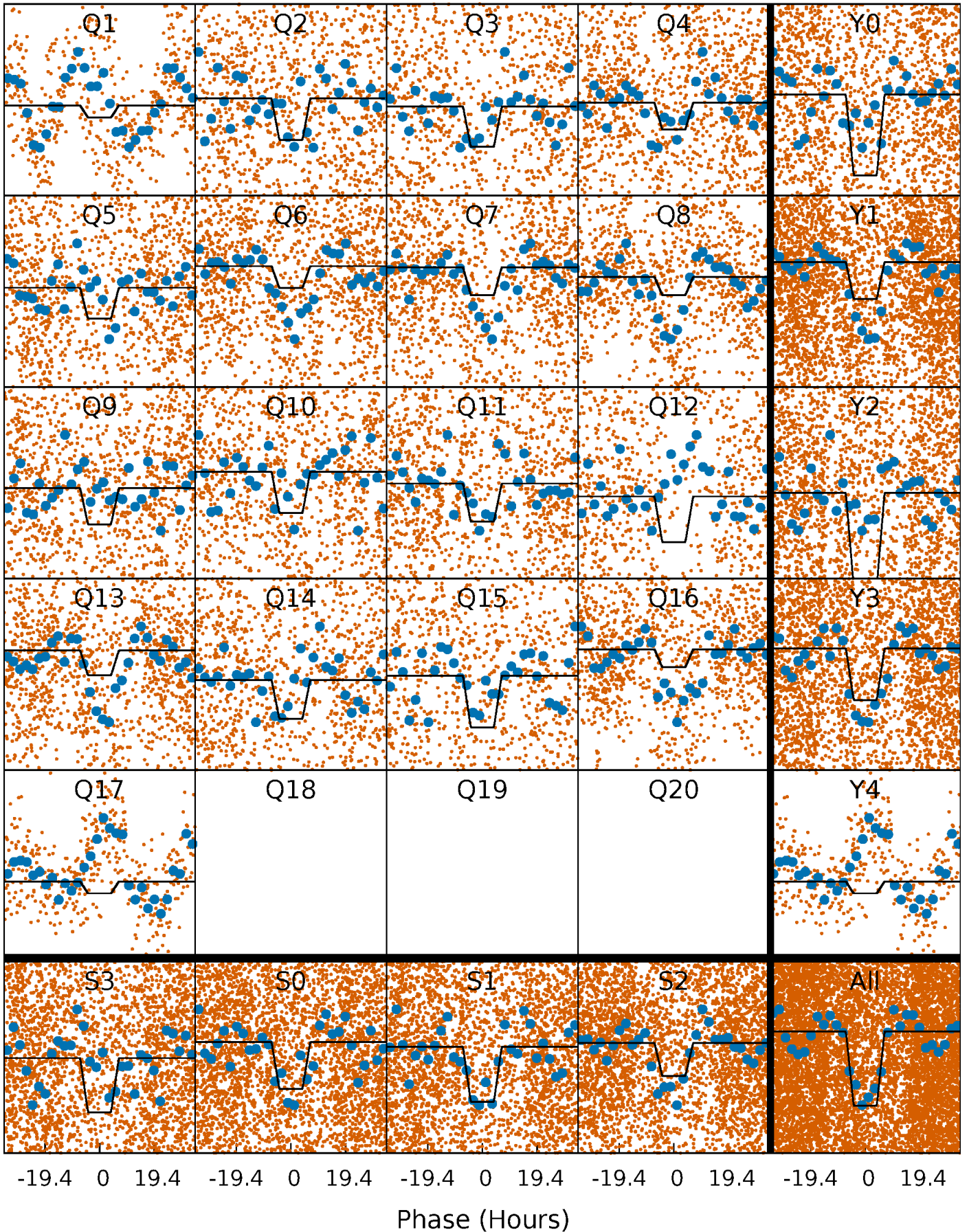
# DV Quarter-Phased Transit Curves

TCE 003730390-02    P= 5.081831 Days     $T_0=135.565642$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003730390-02 P= 5.081893 Days  $T_0=135.508141$  (BKJD)

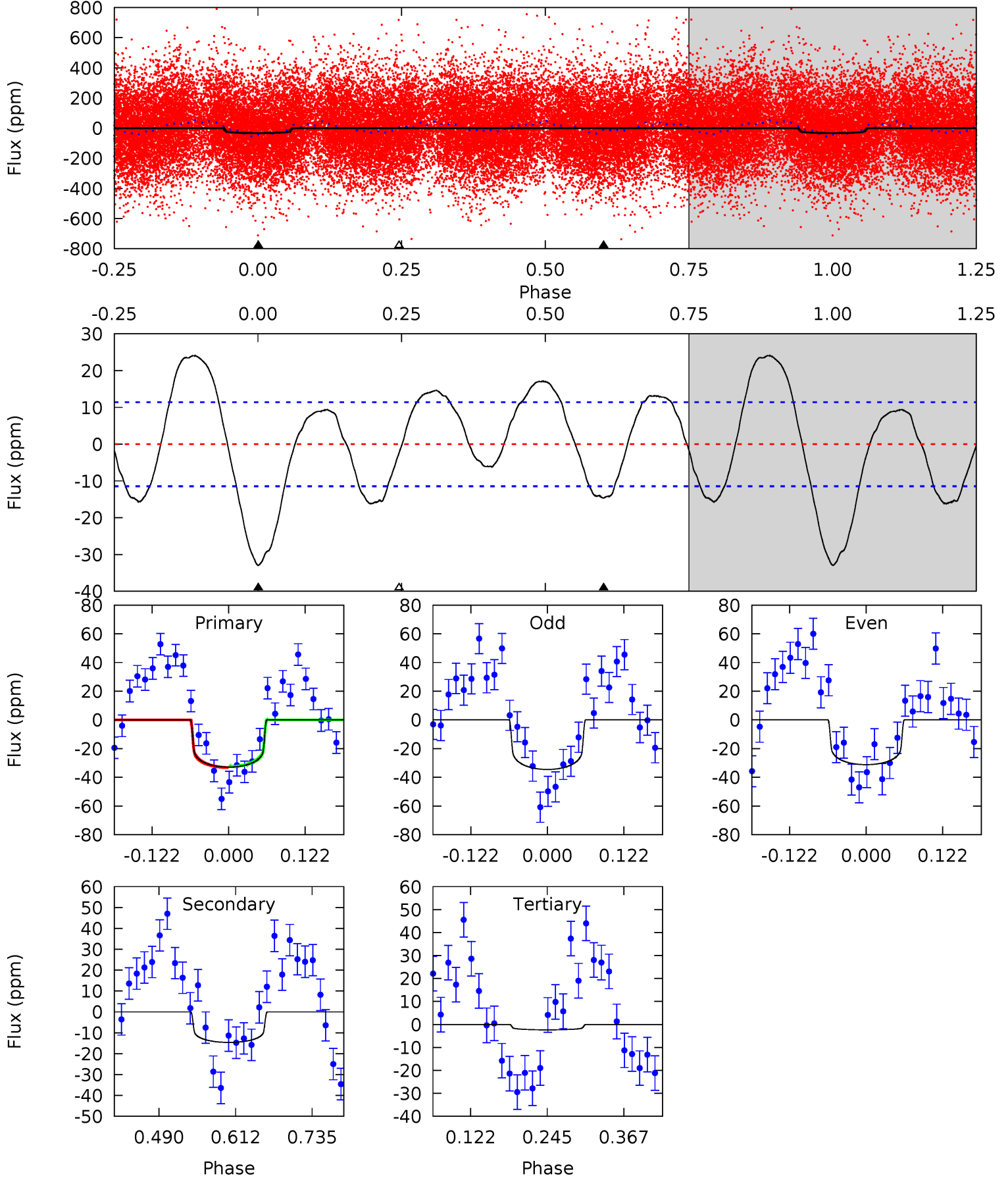




# DV Model-Shift Uniqueness Test

003730390-02, P = 5.081831 Days, E = 130.483811 Days

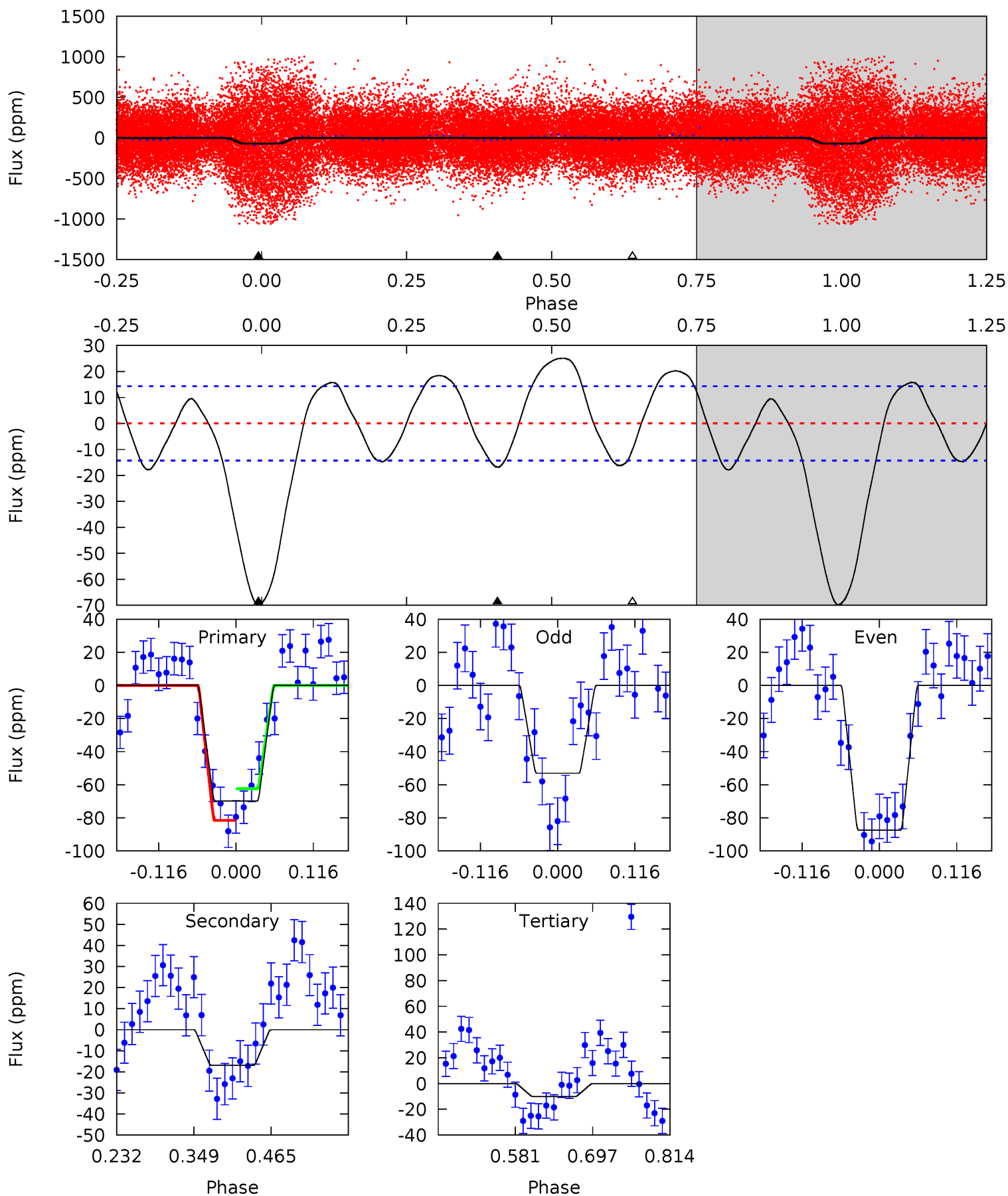
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.0	5.78	0.93	0	4.52	1.54	4.20	12.1	13.0	4.85	5.78	0.66	1.01	0.42	0.12



# Alt Model-Shift Uniqueness Test

003730390-02, P = 5.081893 Days, E = 130.426248 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
22.1	5.34	3.19	0	4.53	1.57	3.84	18.9	22.1	2.16	5.34	5.43	1.50	0.26	3.02



### Stellar Parameters For KIC 003730390

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6564^{+176}_{-196}$	$3.203^{+0.468}_{-0.078}$	$-0.500^{+0.350}_{-0.400}$	$5.955^{+1.249}_{-3.122}$	$2.064^{+0.077}_{-0.659}$	$0.014^{+0.064}_{-0.005}$
	+3%/-3%	+15%/-2%	+70%/-80%	+21%/-52%	+4%/-32%	+465%/-33%
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 003730390-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-15 \pm 3$	$3.60^{+0.96}_{-1.09}$	$3456^{+279}_{-436}$	$5004^{+549}_{-472}$	$3.137^{+3.186}_{-1.213}$
Alt.	$-17 \pm 3$	$5.32^{+1.35}_{-1.33}$	$3478^{+265}_{-429}$	$4365^{+319}_{-338}$	$1.696^{+1.429}_{-0.595}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

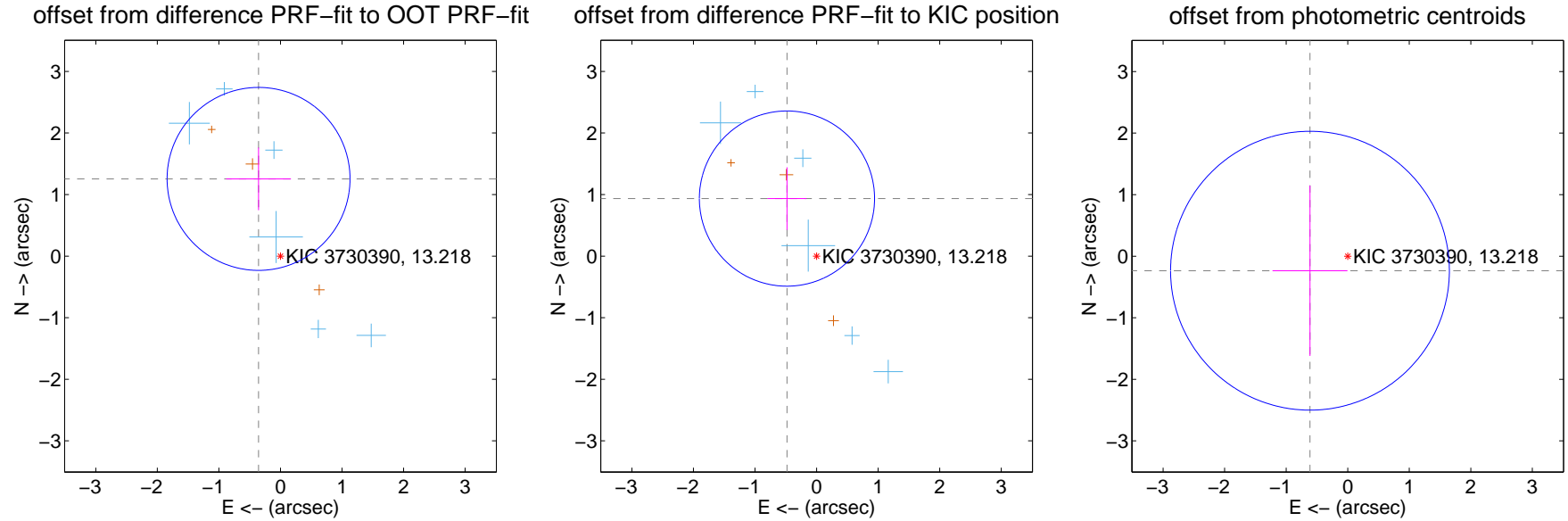
## DV Centroid Data

Supplemental centroid analysis for 003730390-02. Kepler magnitude: 13.22. Transit SNR 8.27

There are 6 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.61 arcsec

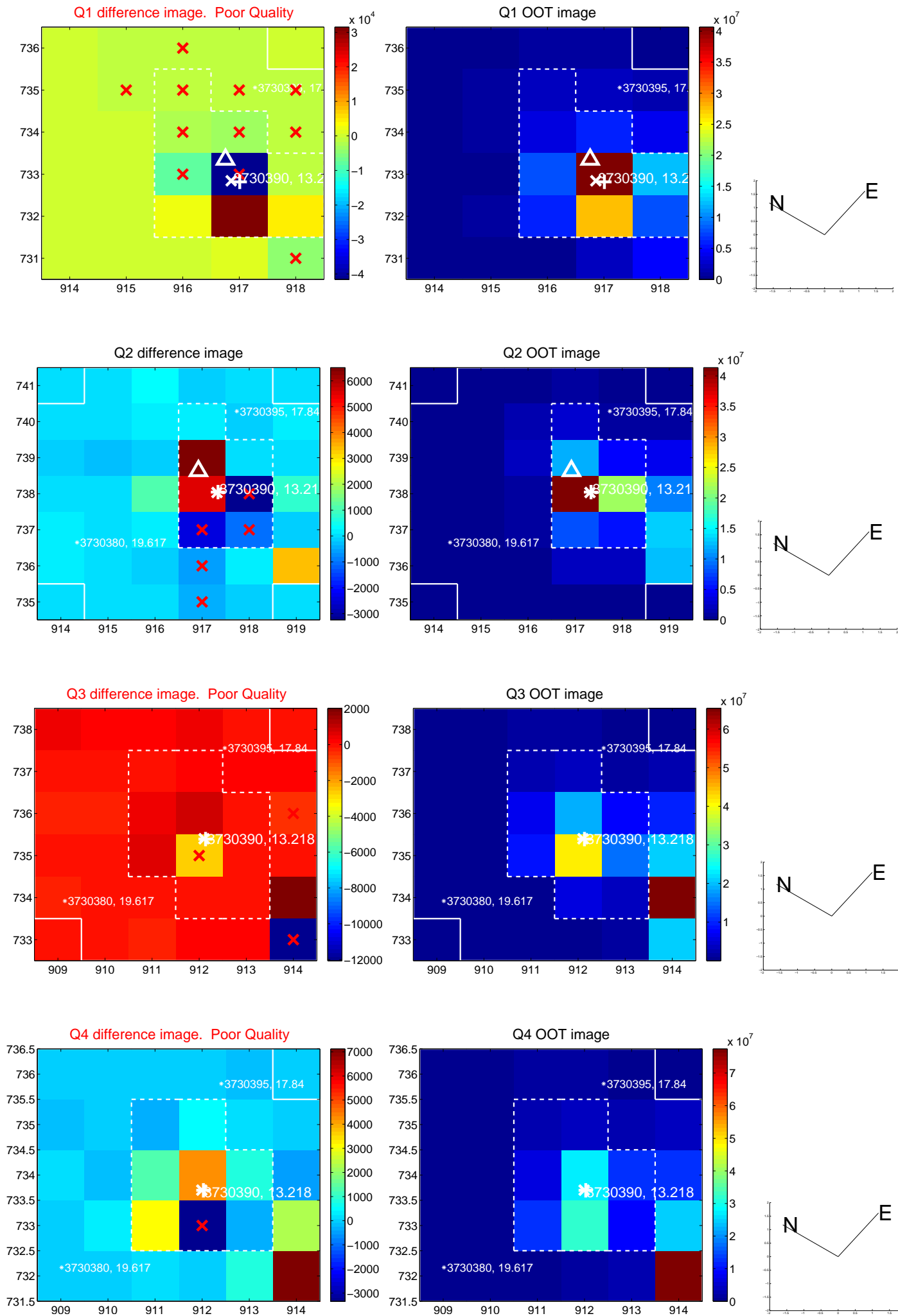
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.304 \pm 0.495$	2.63	$0.356 \pm 0.526$	$1.254 \pm 0.509$
PRF-fit source offset from KIC position	$1.051 \pm 0.474$	2.22	$0.481 \pm 0.316$	$0.935 \pm 0.508$
photometric centroid source offset	$0.66 \pm 0.76$	0.87	$0.61 \pm 0.61$	$-0.24 \pm 1.38$



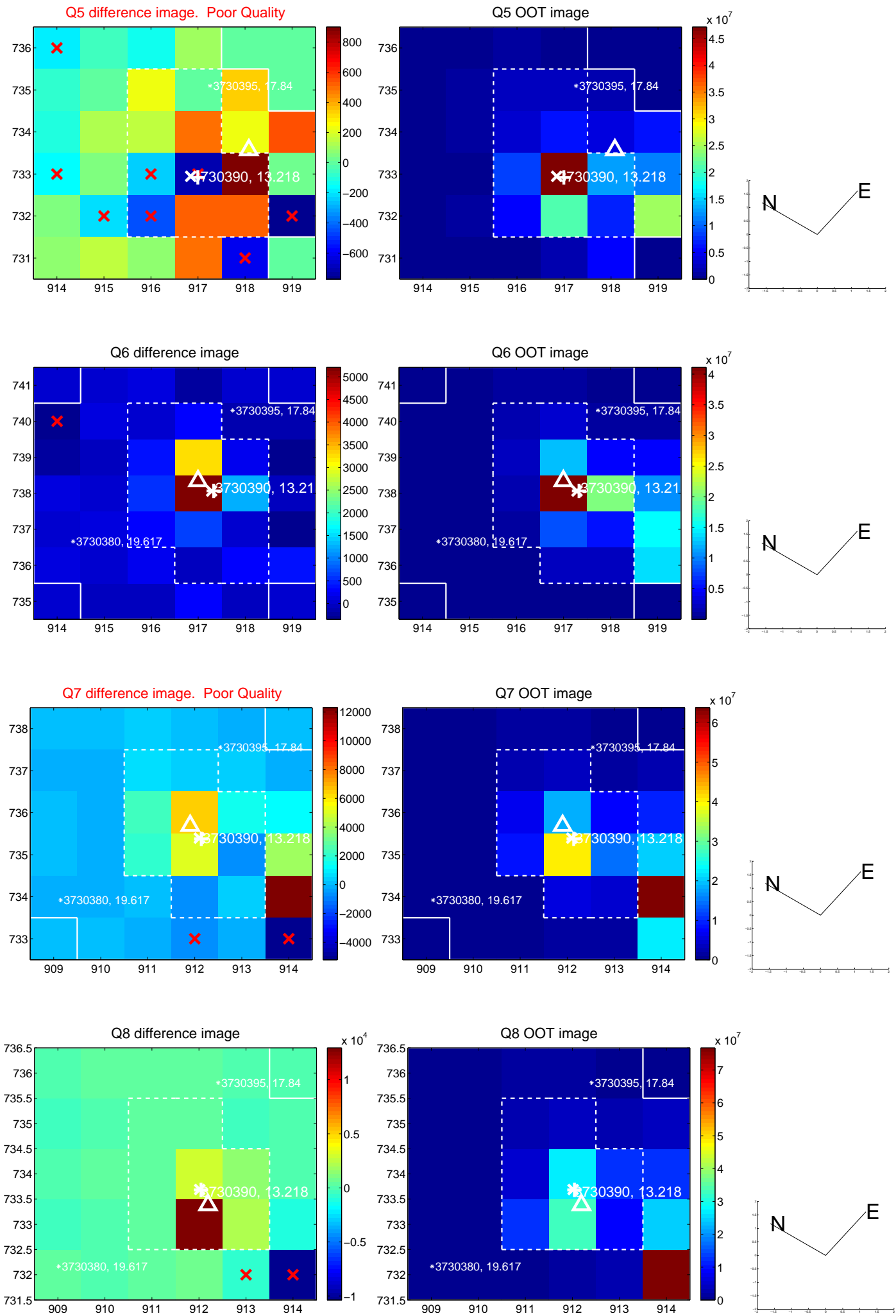
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



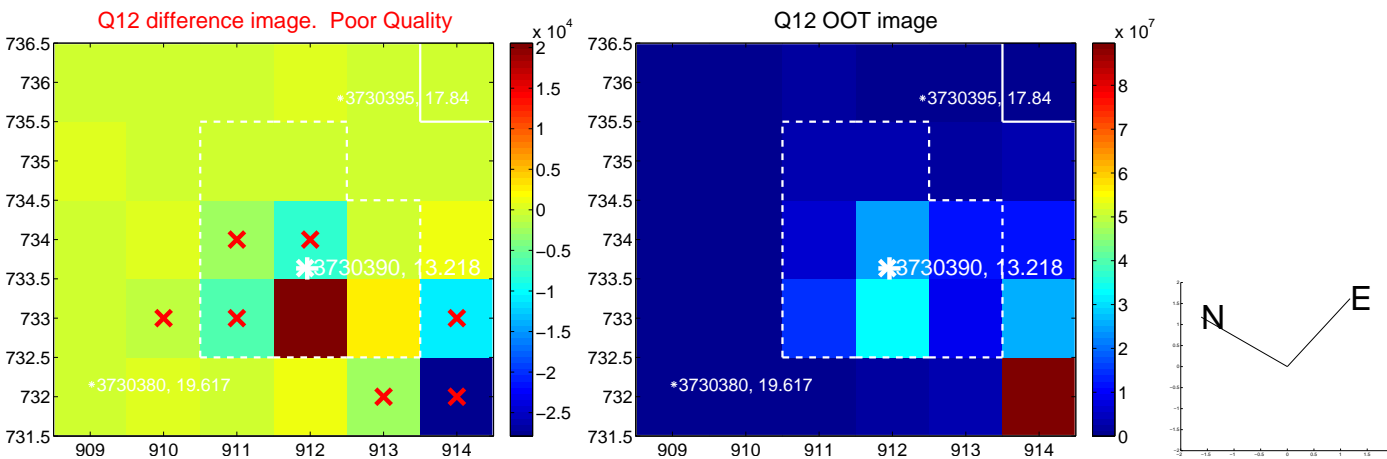
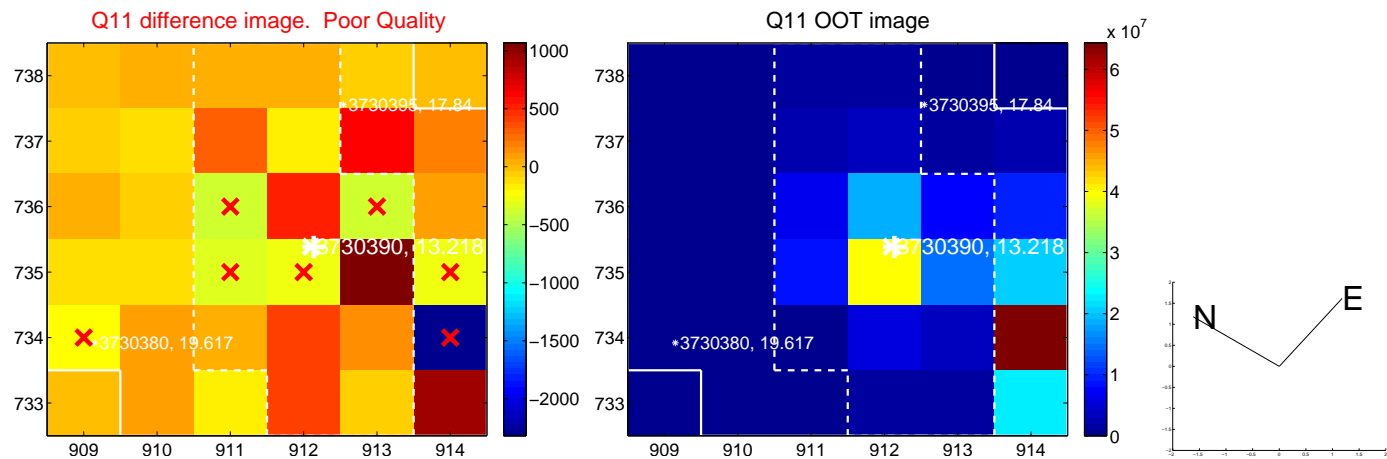
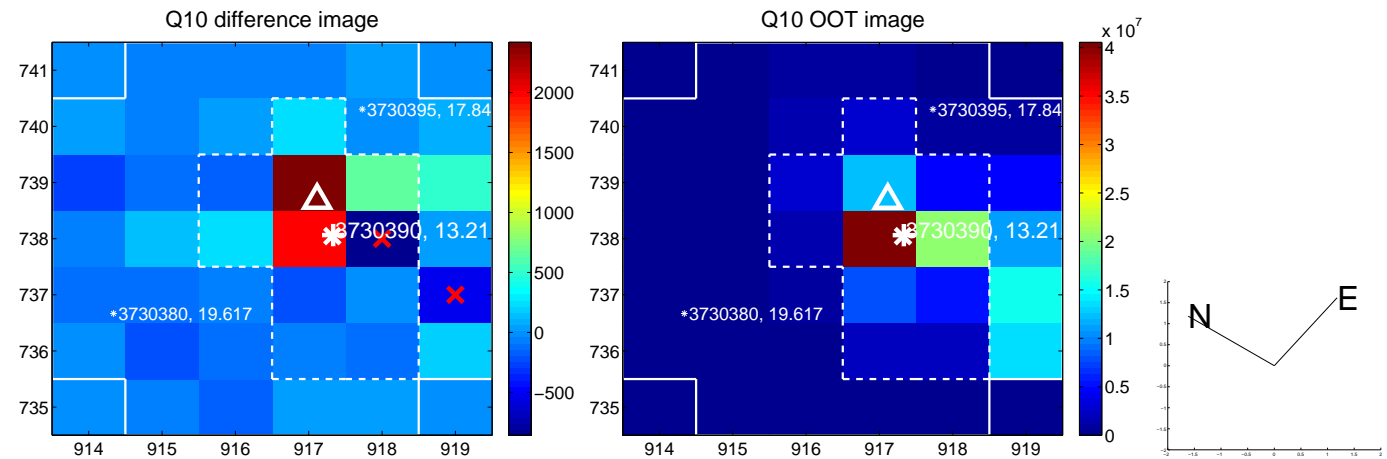
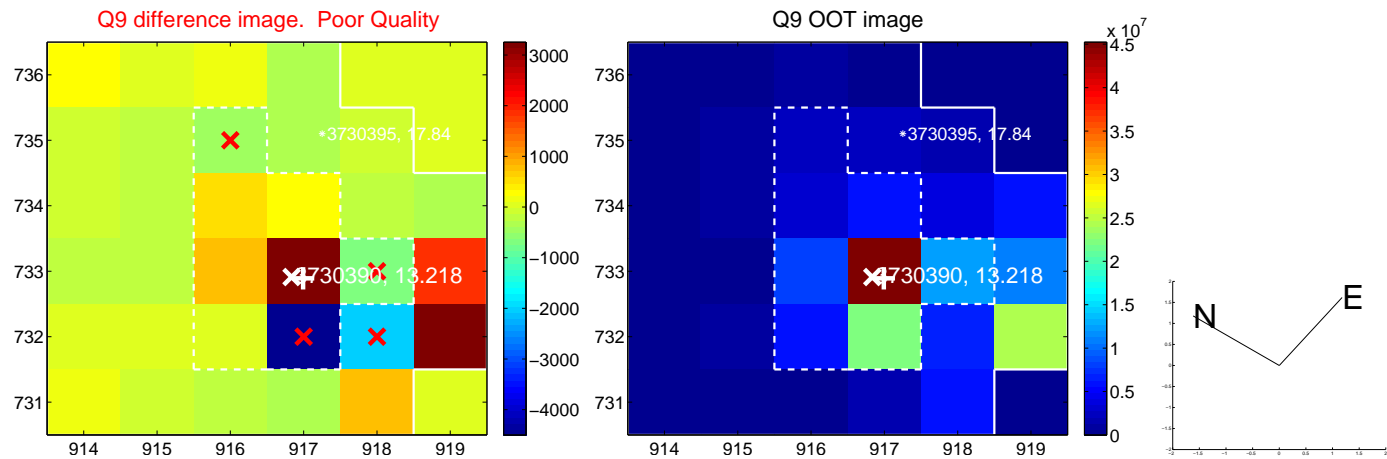
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



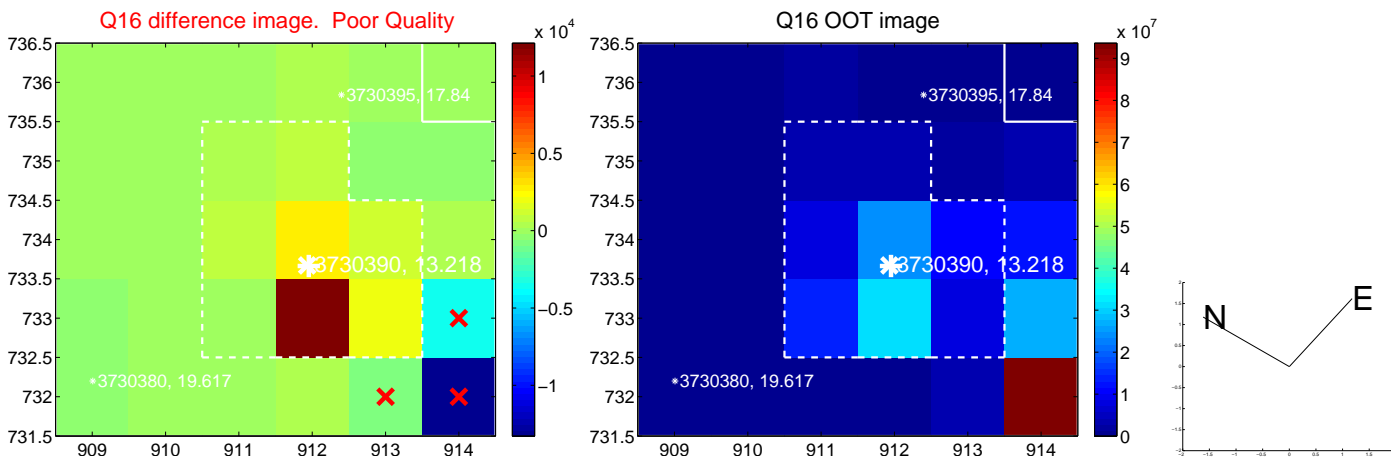
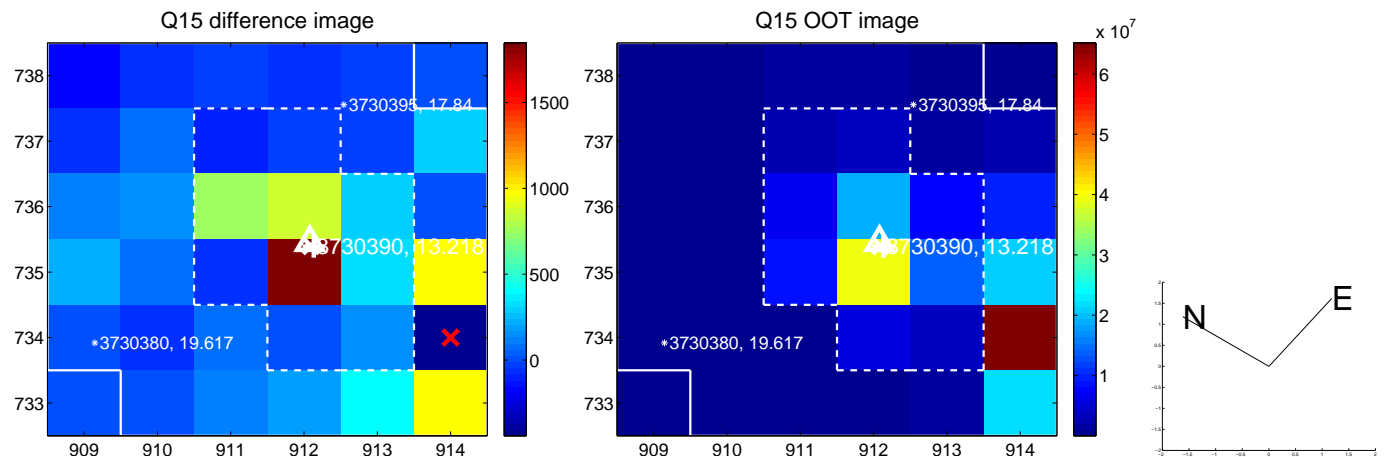
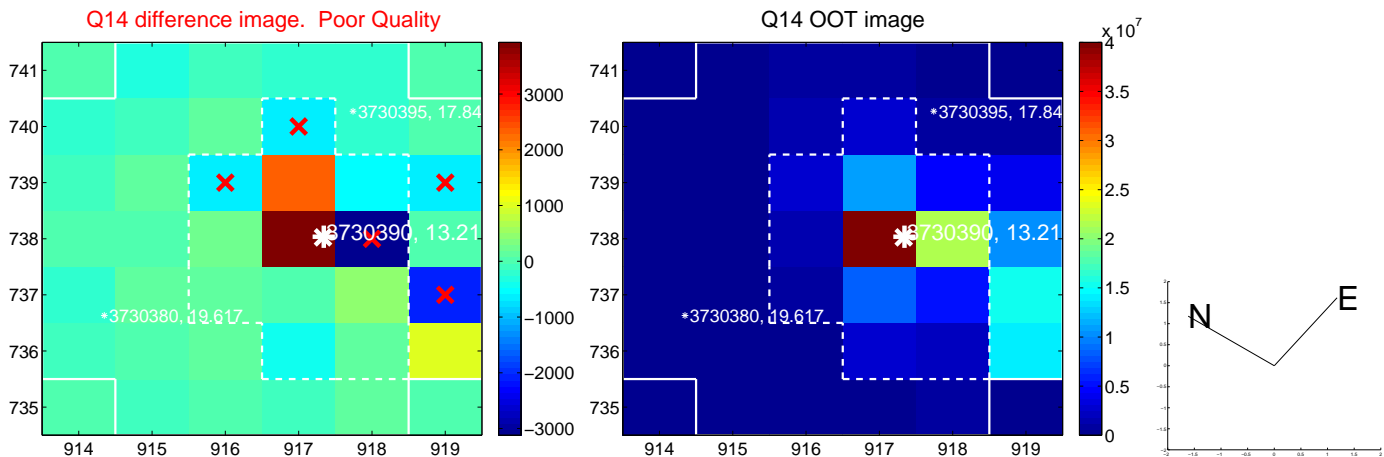
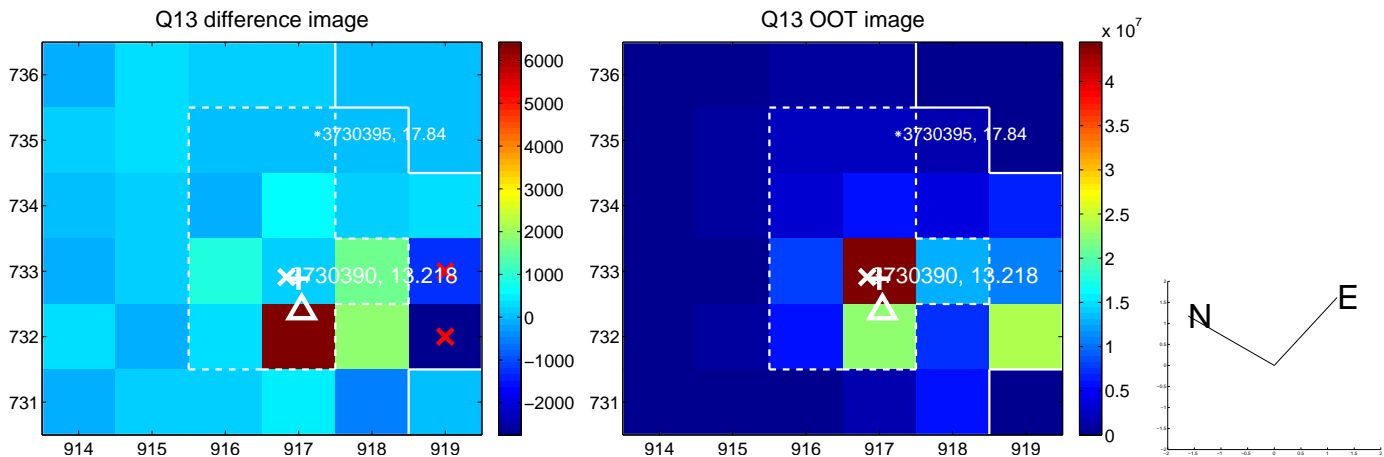
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



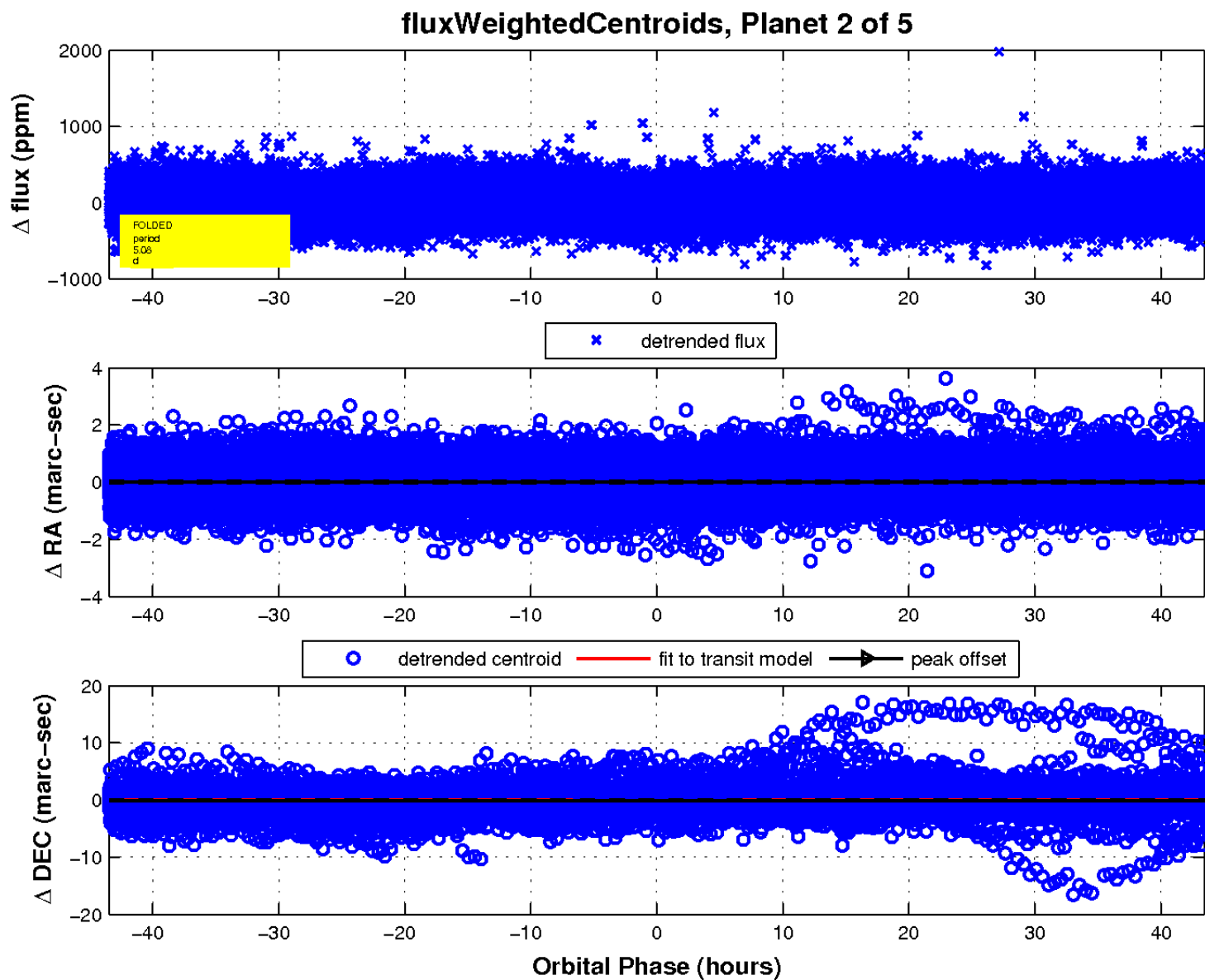
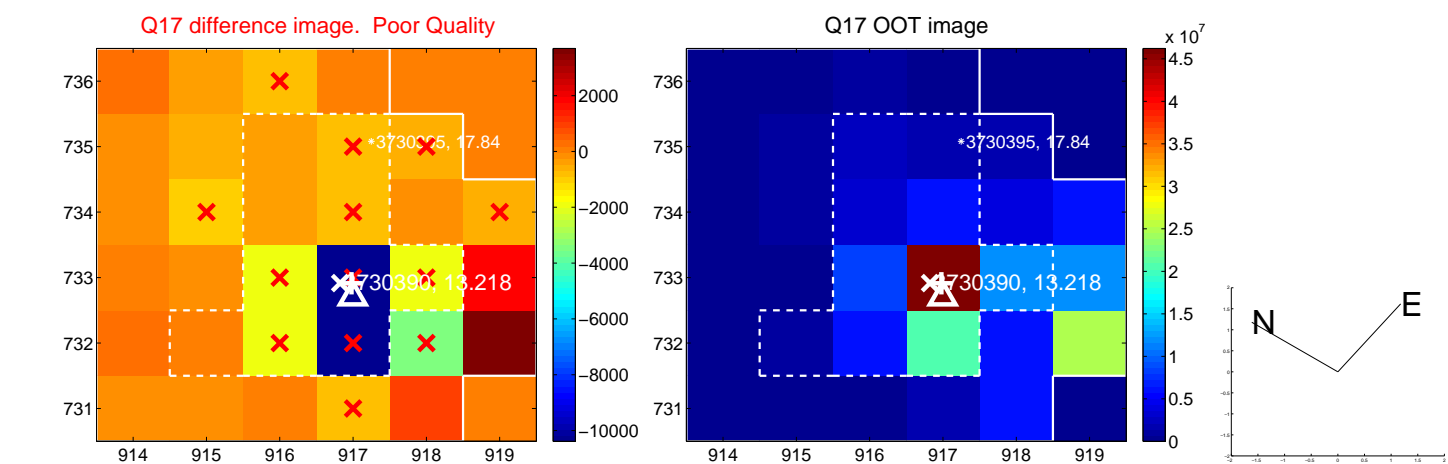
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



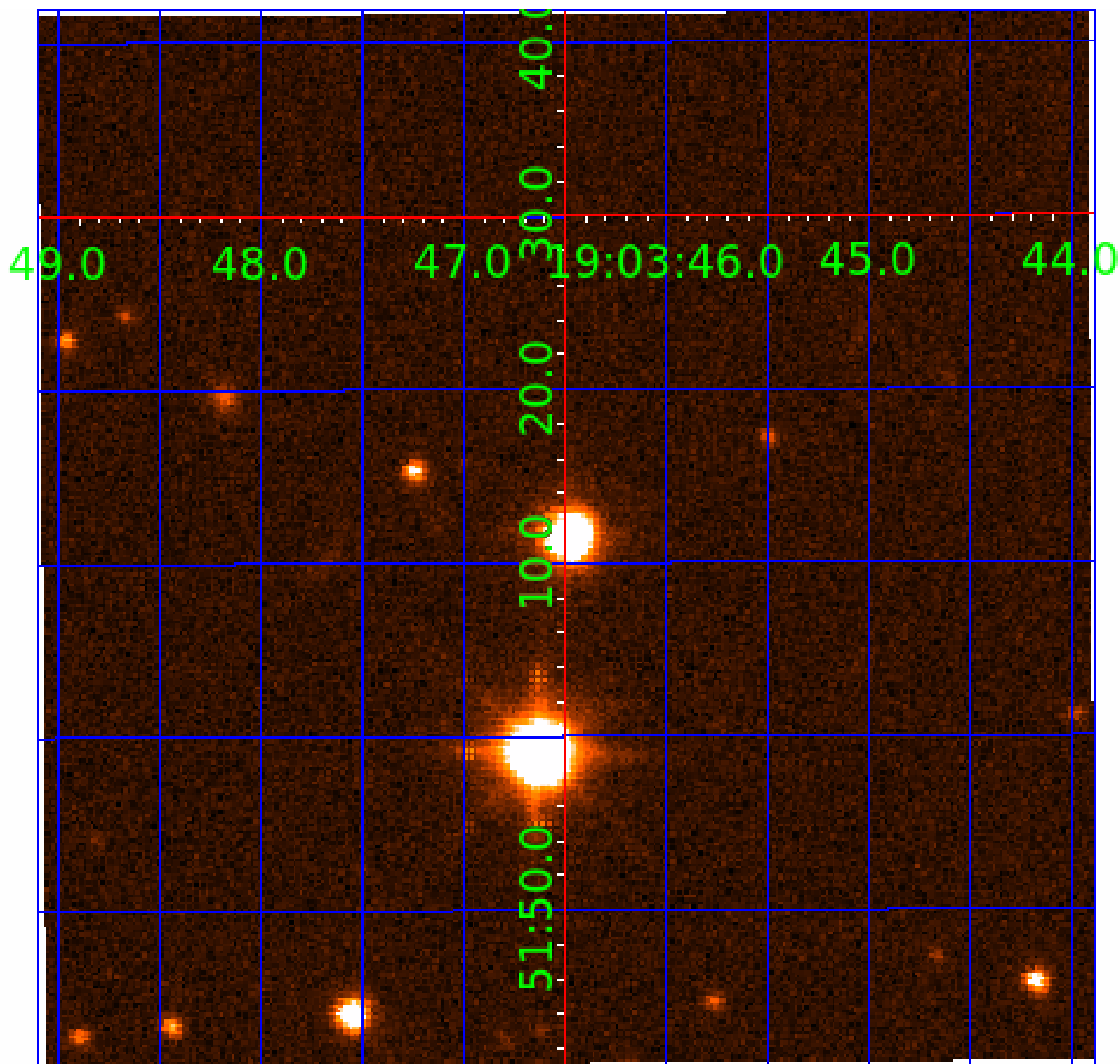
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 003730390

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003730390-01	OBS	No	3.048857	132.567402	22.3	9.675	8.1	6.3	5.96	6564	3.15	21477.01
003730390-02	OBS	No	5.081831	135.565642	37.2	14.489	7.9	8.3	5.96	6564	4.16	10867.50
003730390-03	OBS	No	370.983572	427.124181	392.4	4.462	7.5	8.4	5.96	6564	12.84	35.62
003730390-05	OBS	No	175.992278	232.931048	320.5	3.254	7.2	7.8	5.96	6564	12.03	96.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003730390-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-03	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003730390-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

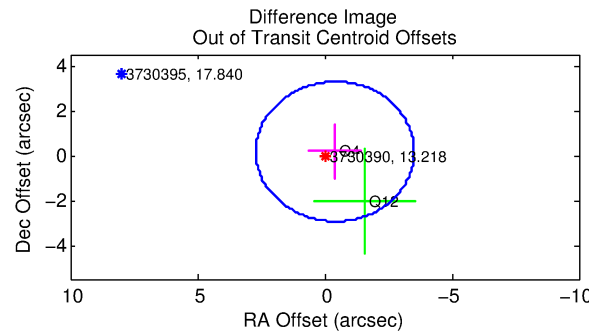
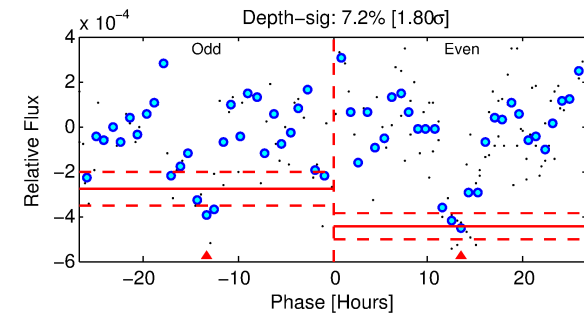
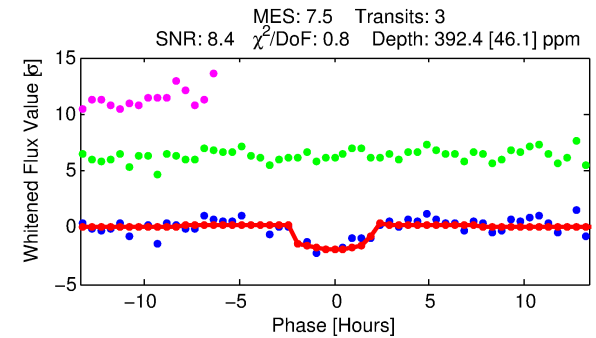
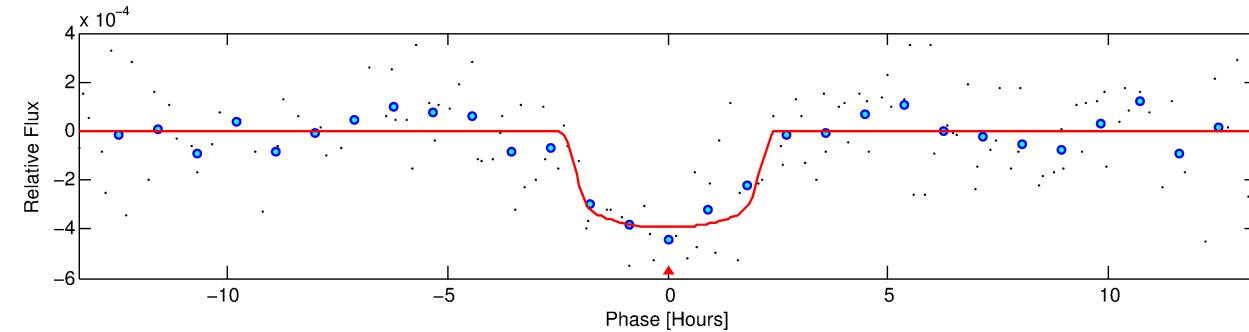
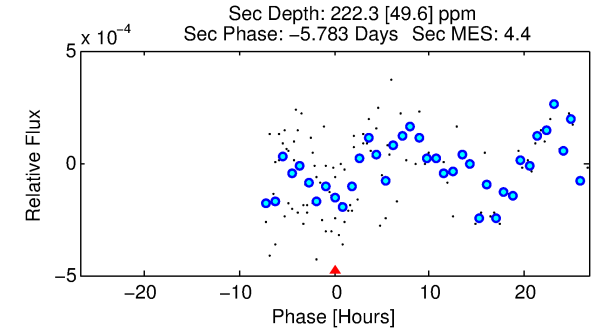
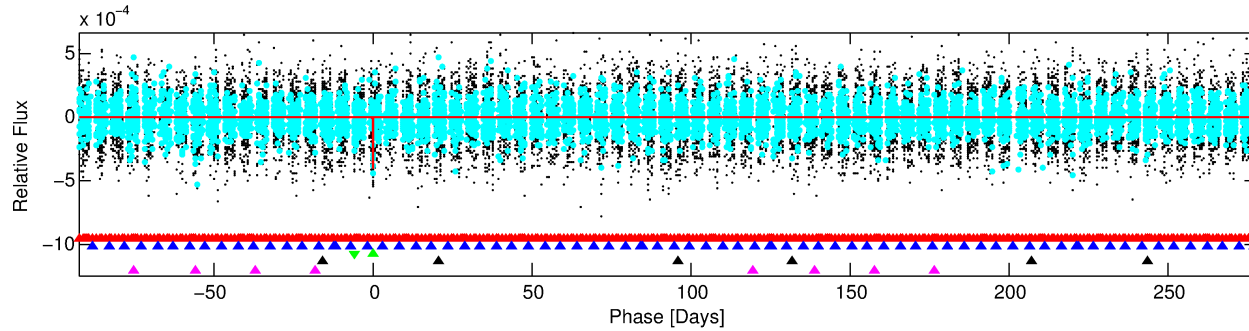
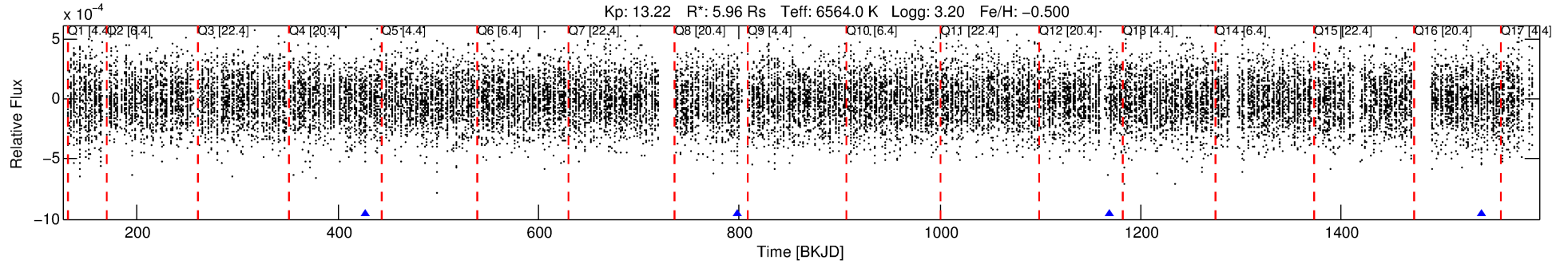
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003730390-03

No Significant Match Found

# DV One-Page Summary

KIC: 3730390 Candidate: 3 of 5 Period: 370.984 d



## DV Fit Results:

Period = 370.98357 [0.00386] d  
Epoch = 427.1242 [0.0071] BKJD  
Rp/R\* = 0.0198 [0.0098]  
a/R\* = 433.58 [1210.46]  
b = 0.76 [1.58]  
Seff = 35.62 [28.77]  
Teq = 623 [126] K  
Rp = 12.84 [9.28] Re  
a = 1.2868 [0.6449] AU  
Ag = 1228.74 [1591.96] [0.77 $\sigma$ ]  
Teffp = 5702 [1464] K [3.46 $\sigma$ ]

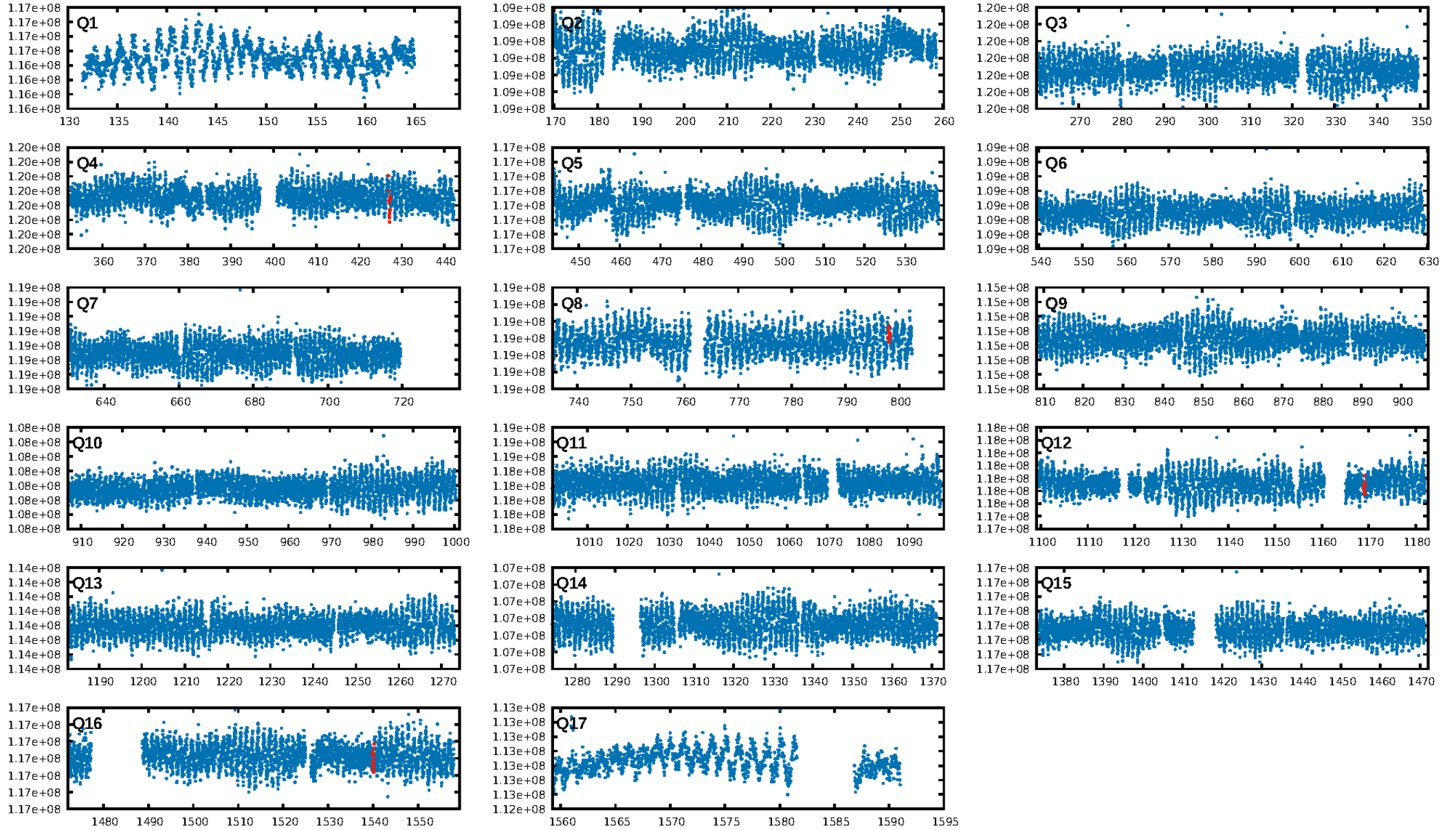
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [114.45 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 18.9%  
ModelChiSquareGof-sig: 99.3%  
**Bootstrap-pfa: 4.72e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.472  
Centroid-sig: 2.1%  
Centroid-so: 4.529 arcsec [2.99 $\sigma$ ]  
OotOffset-rm: 0.443 arcsec [0.43 $\sigma$ ]  
OotOffset-st: 0/0/2/0 [2]  
KicOffset-rm: 0.387 arcsec [0.38 $\sigma$ ]  
KicOffset-st: 0/0/2/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.75 [3/4]

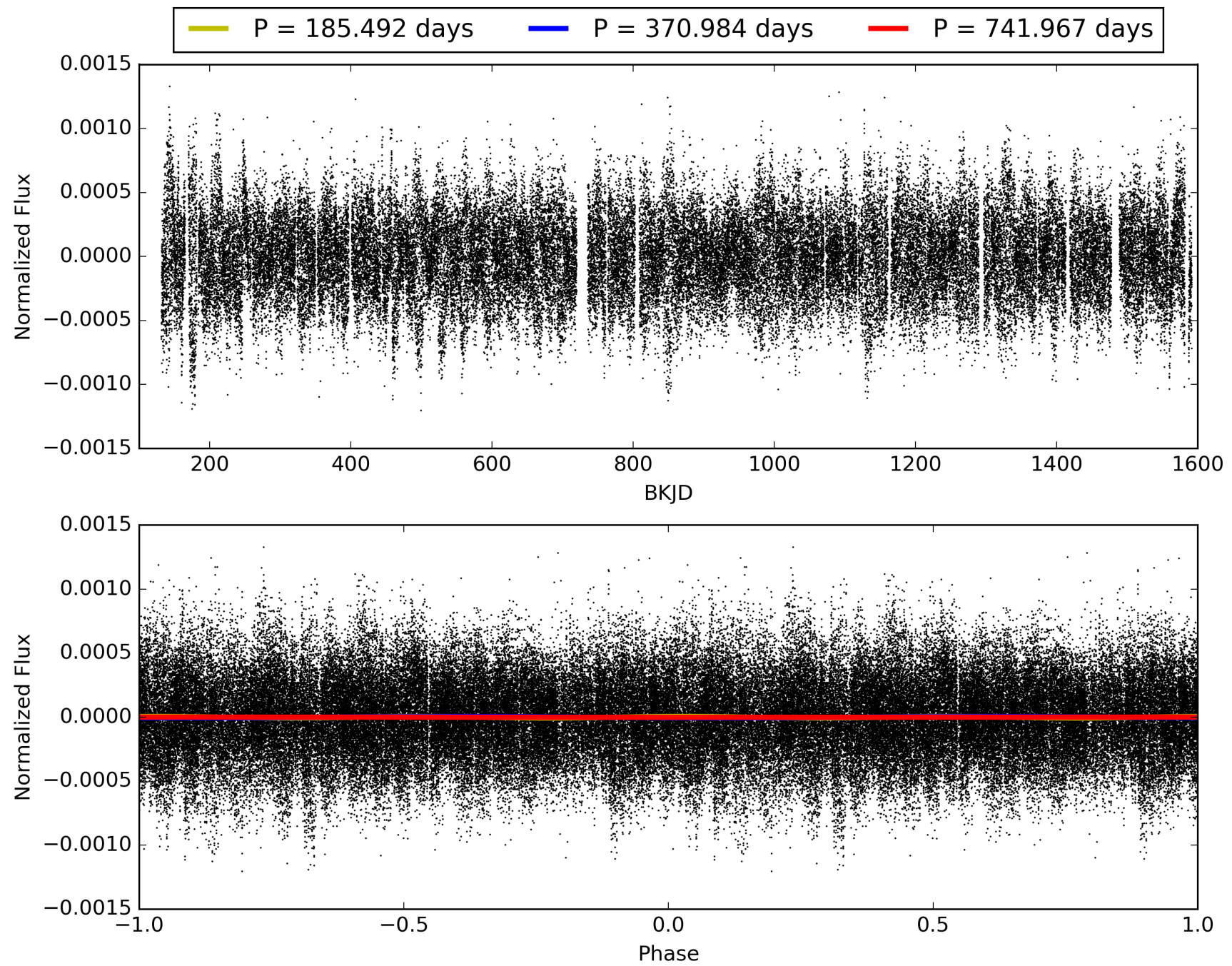
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:34:11 Z

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

# TCE 003730390-03, PDC Light Curves



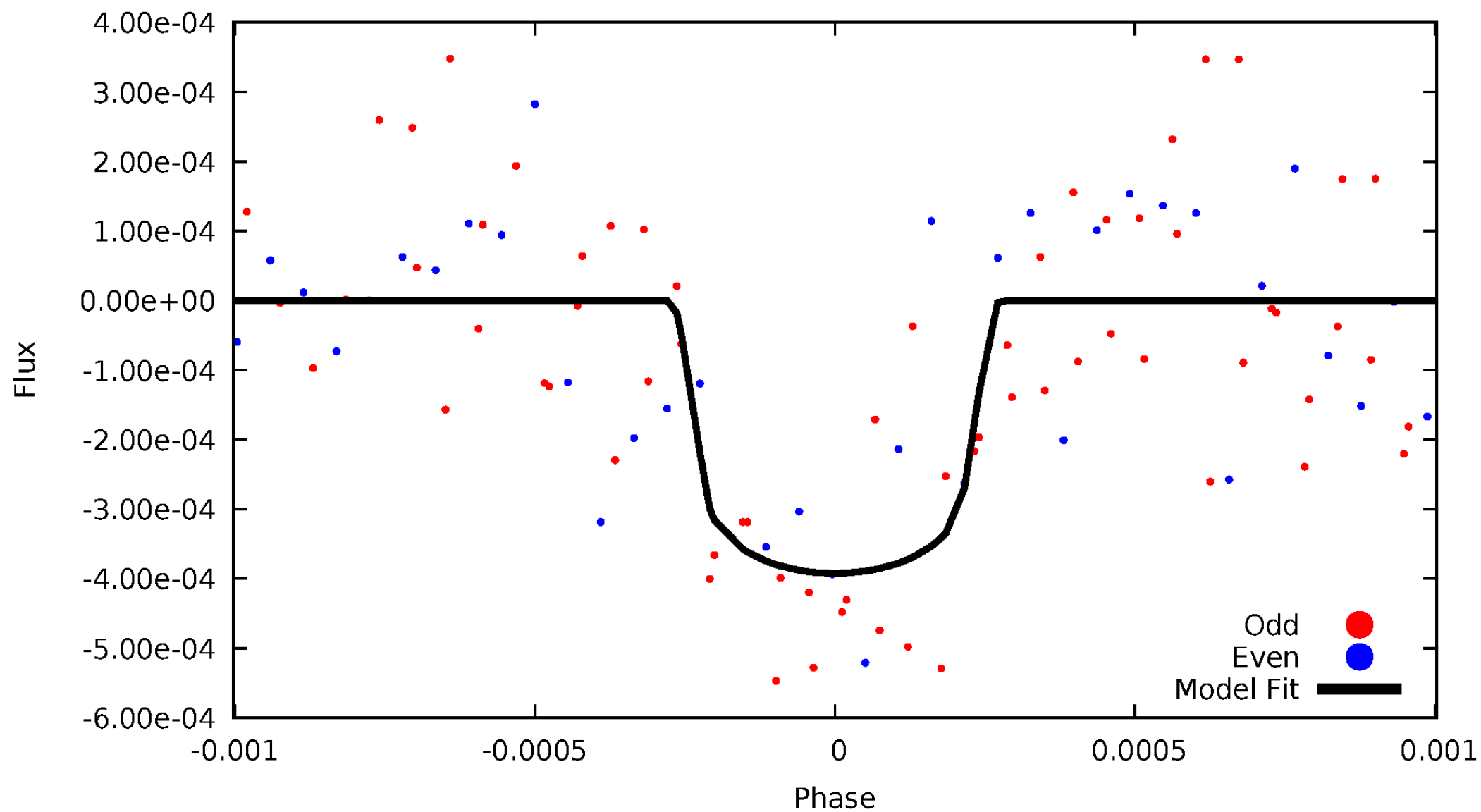
TCE 003730390-03





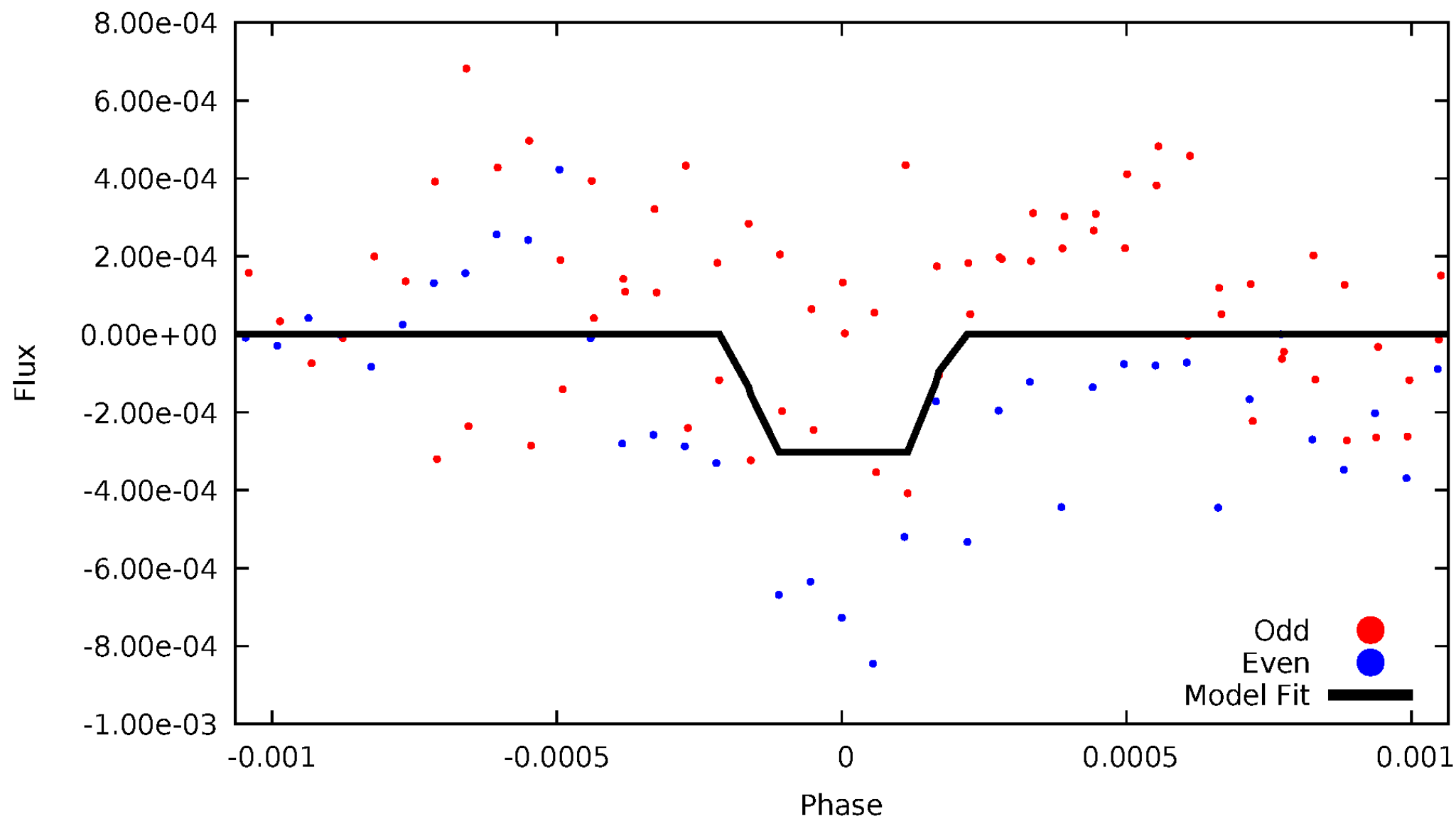
DV Odd/Even

TCE 003730390-03



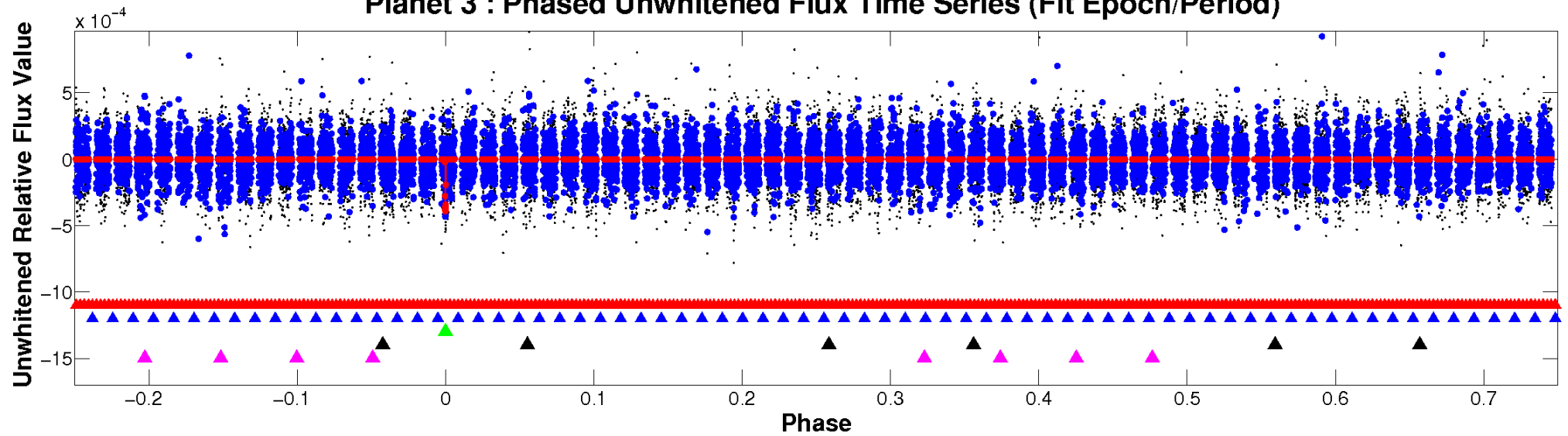
# ALT Odd/Even

TCE 003730390-03

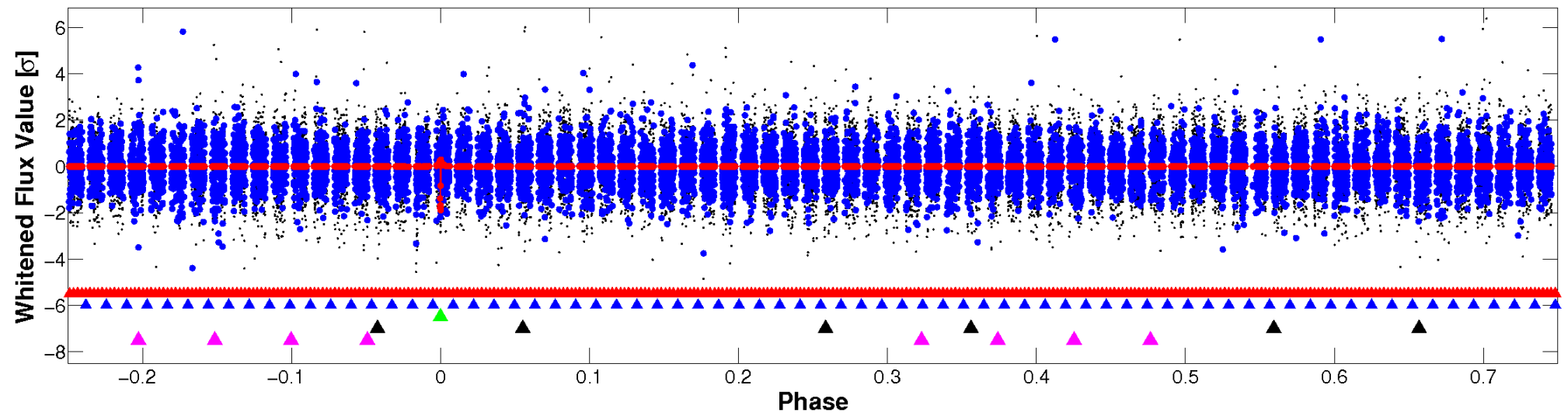


# Non-Whitened Vs. Whitened Light Curve

## Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



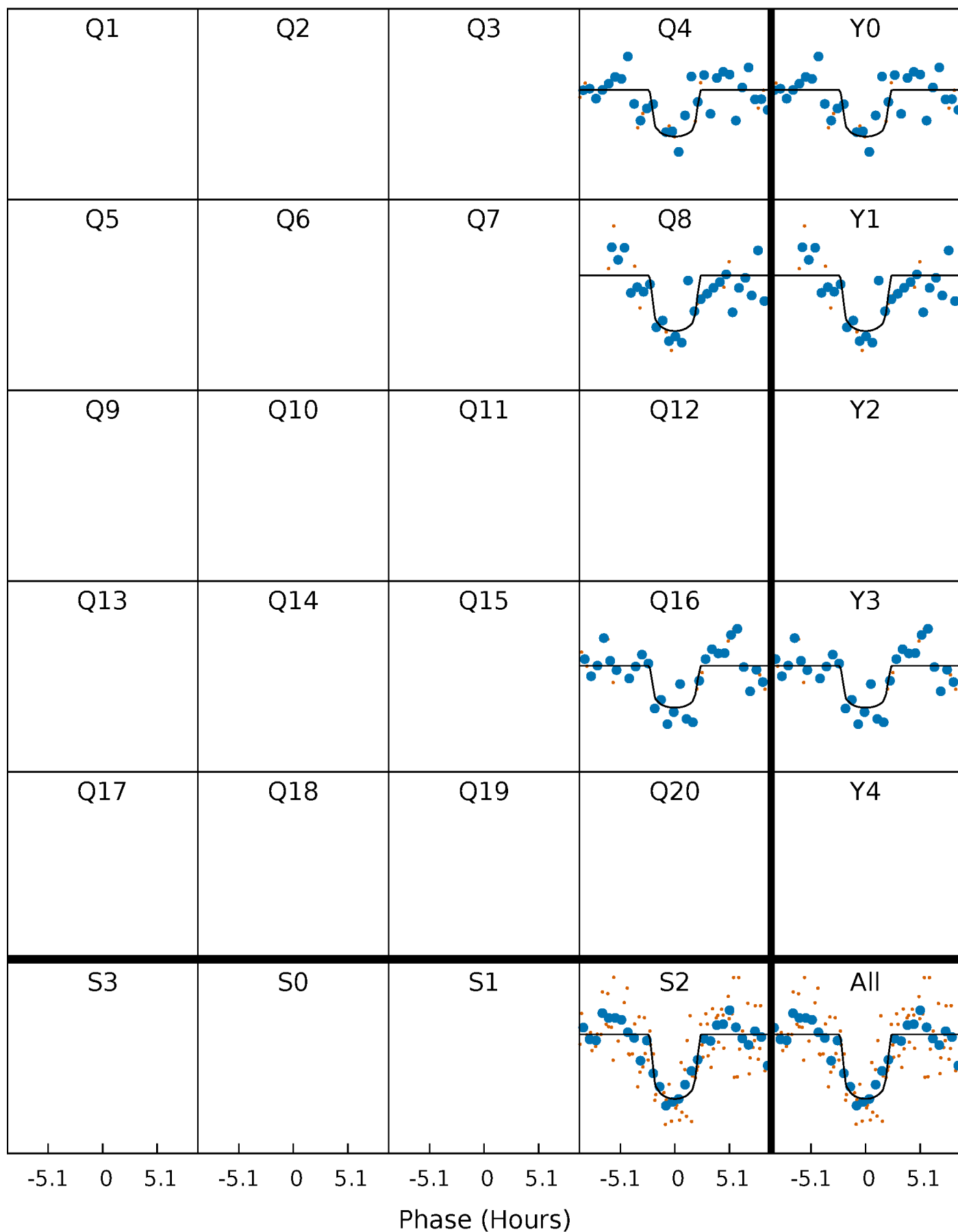
# PDC Quarter-Phased Transit Curves

TCE 003730390-03     $P=370.983572$  Days     $T_0=427.124181$  (BKJD)



# DV Quarter-Phased Transit Curves

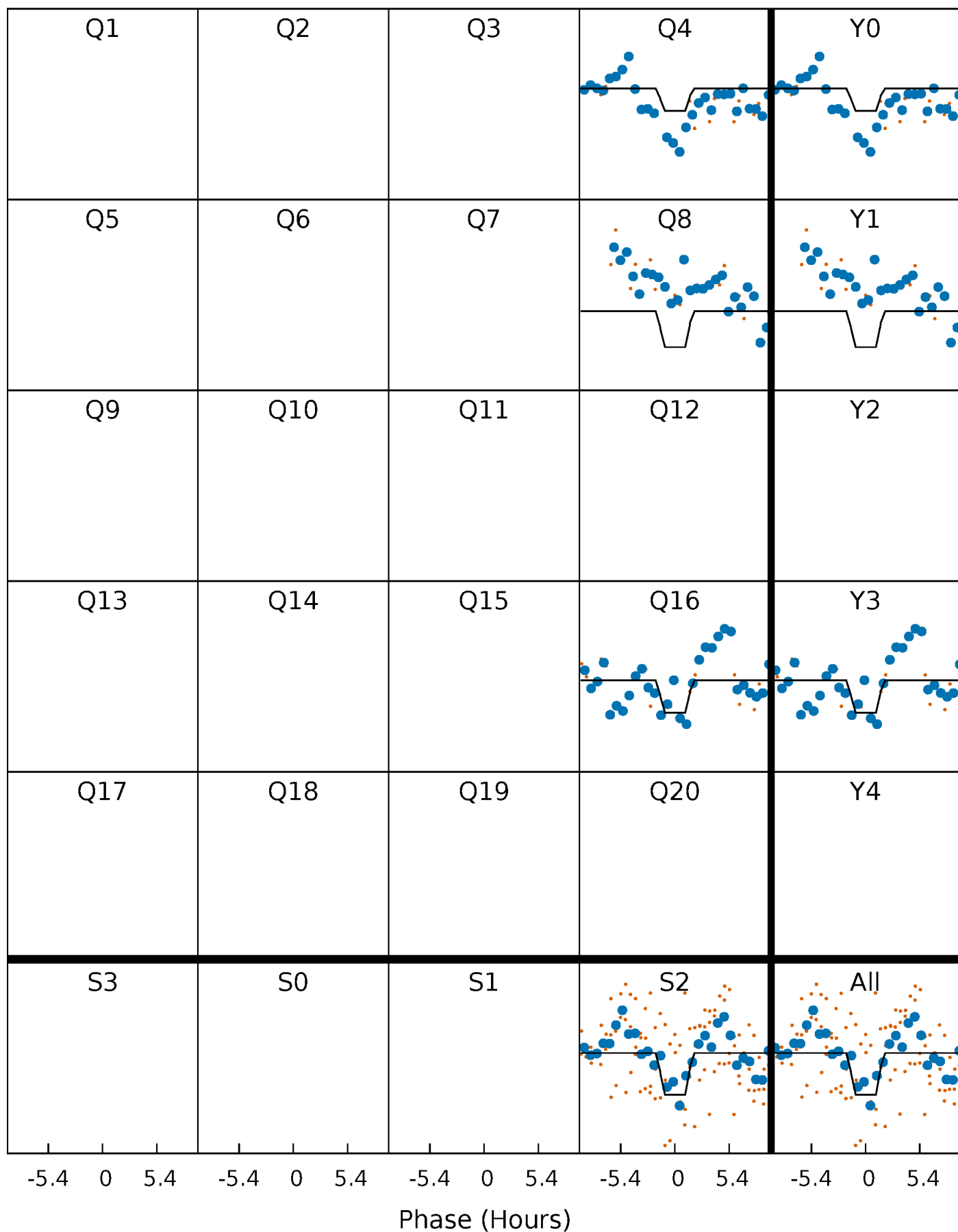
TCE 003730390-03     $P=370.983572$  Days     $T_0=427.124181$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

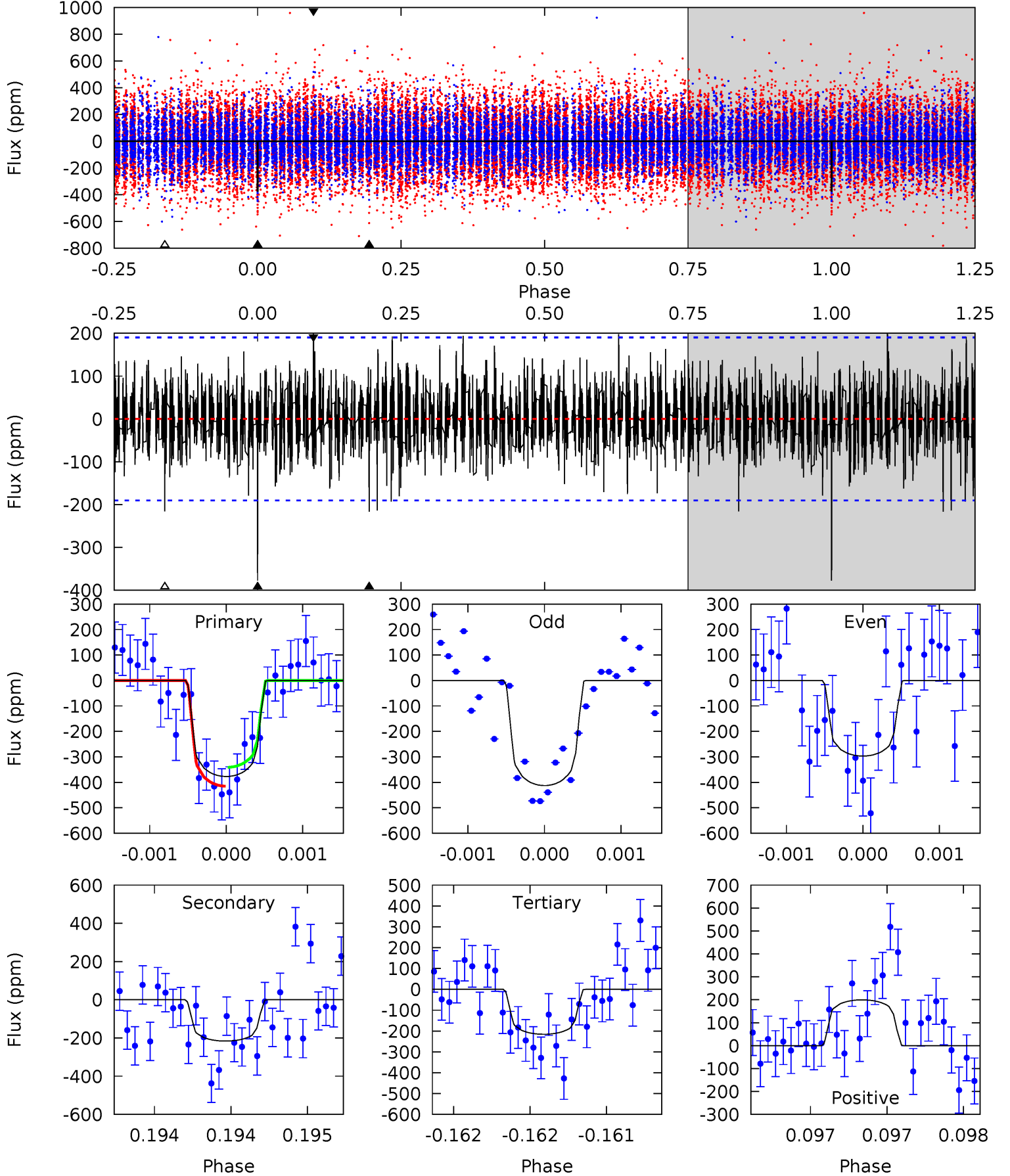
TCE 003730390-03     $P=370.991715$  Days     $T_0=427.122519$  (BKJD)



# DV Model-Shift Uniqueness Test

003730390-03,  $P = 370.983572$  Days,  $E = 56.140609$  Days

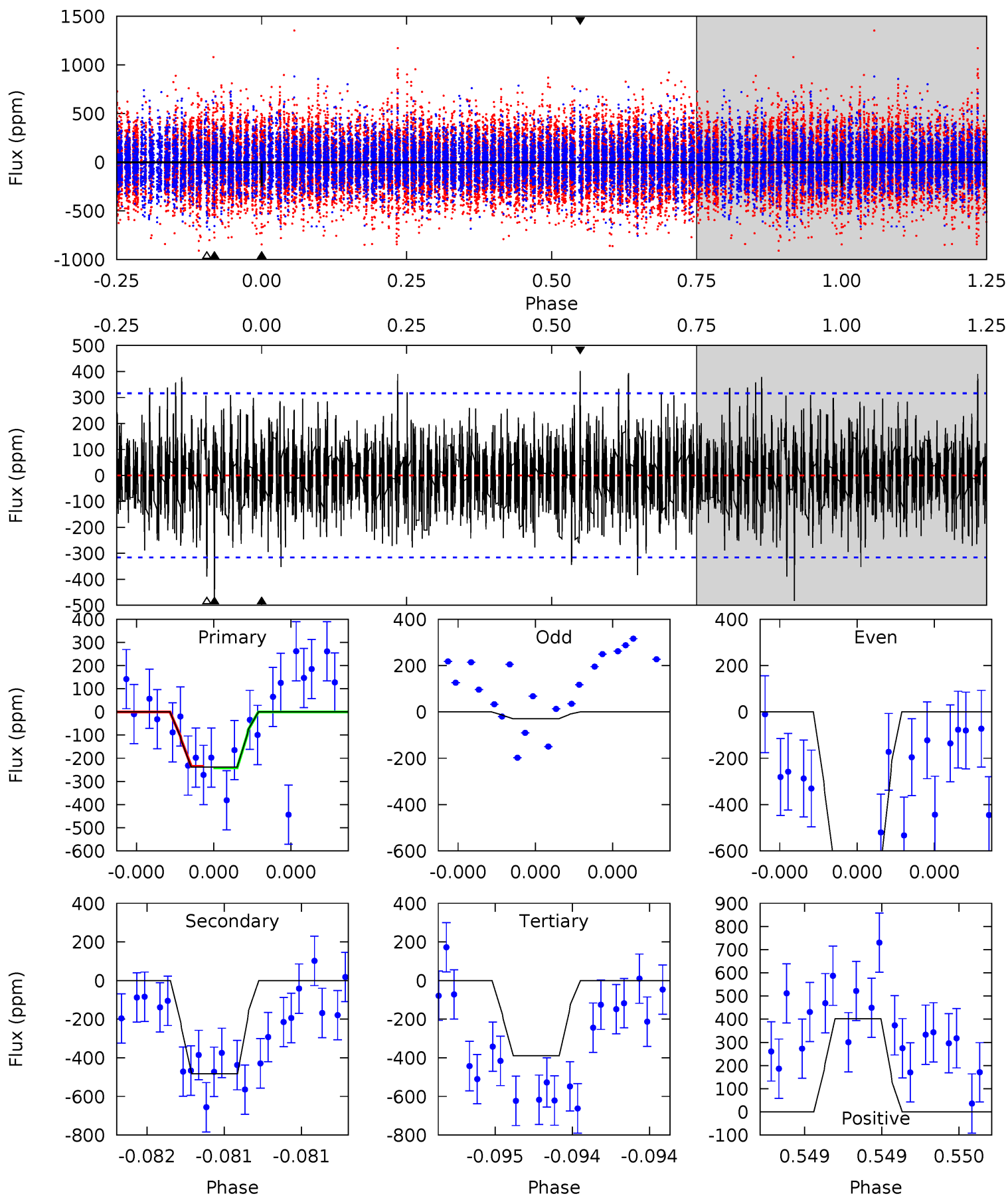
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	6.32	6.31	5.84	5.56	3.47	1.66	4.72	5.19	0.02	0.49	1.57	0.98	0.35	1.08



# Alt Model-Shift Uniqueness Test

003730390-03, P = 370.991715 Days, E = 56.130804 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
4.24	8.59	6.94	7.16	5.62	3.55	1.85	-2.69	-2.92	1.66	1.43	5.66	0.93	0.45	0.05



### Stellar Parameters For KIC 003730390

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6564^{+176}_{-196}$	$3.203^{+0.468}_{-0.078}$	$-0.500^{+0.350}_{-0.400}$	$5.955^{+1.249}_{-3.122}$	$2.064^{+0.077}_{-0.659}$	$0.014^{+0.064}_{-0.005}$
	+3%/-3%	+15%/-2%	+70%/-80%	+21%/-52%	+4%/-32%	+465%/-33%
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 003730390-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-216 \pm 34$	$10.69^{+6.57}_{-5.20}$	$834^{+64}_{-99}$	$5693^{+2364}_{-909}$	$1632^{+4452}_{-992}$
Alt.	$-482 \pm 56$	$9.90^{+6.95}_{-5.46}$	$835^{+61}_{-116}$	$7298^{+4456}_{-1542}$	$4267^{+15269}_{-2790}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

## DV Centroid Data

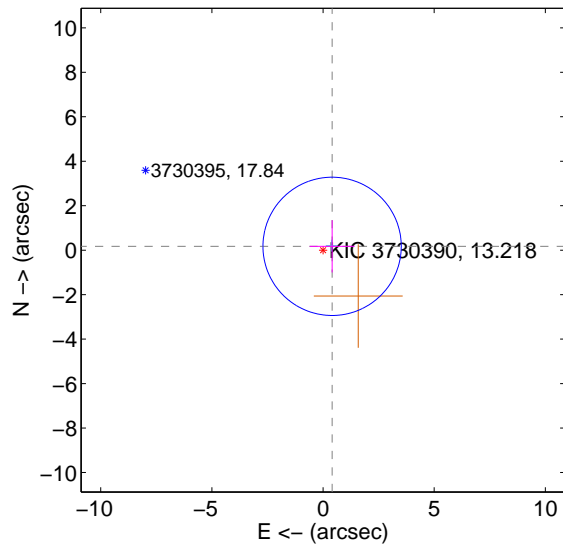
Supplemental centroid analysis for 003730390-03. Kepler magnitude: 13.22. Transit SNR 8.39

There are 1 quarters with good PRF difference image offsets

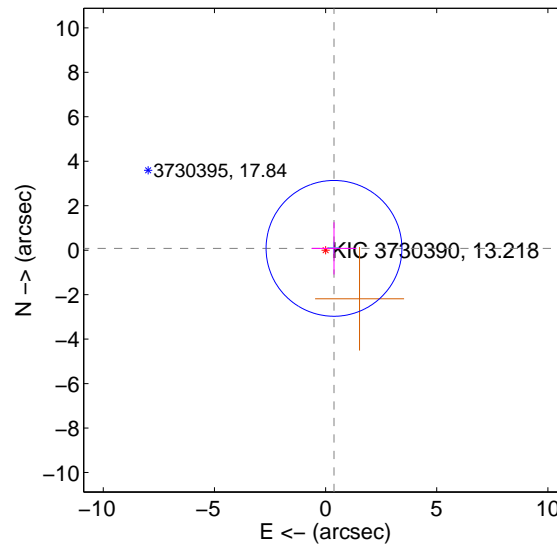
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.443 \pm 1.037$	0.43	$-0.408 \pm 1.010$	$0.172 \pm 1.174$
PRF-fit source offset from KIC position	$0.387 \pm 1.018$	0.38	$-0.378 \pm 1.010$	$0.081 \pm 1.174$
photometric centroid source offset	$4.53 \pm 1.51$	2.99	$-0.30 \pm 0.53$	$-4.52 \pm 1.52$

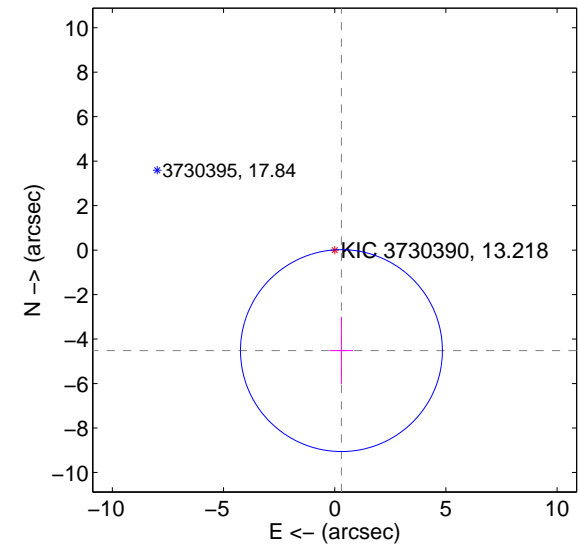
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



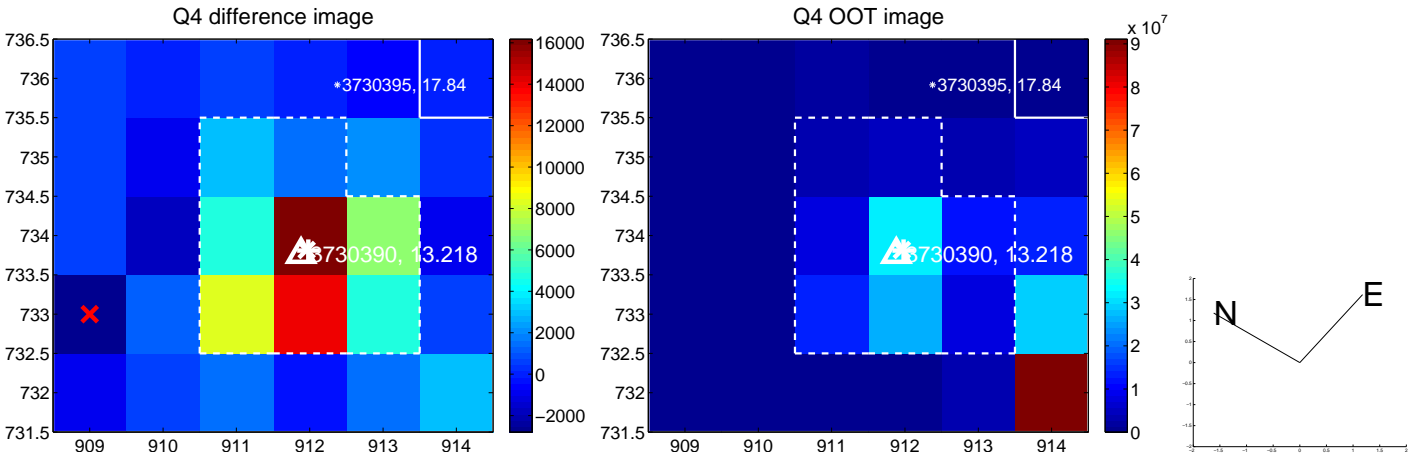
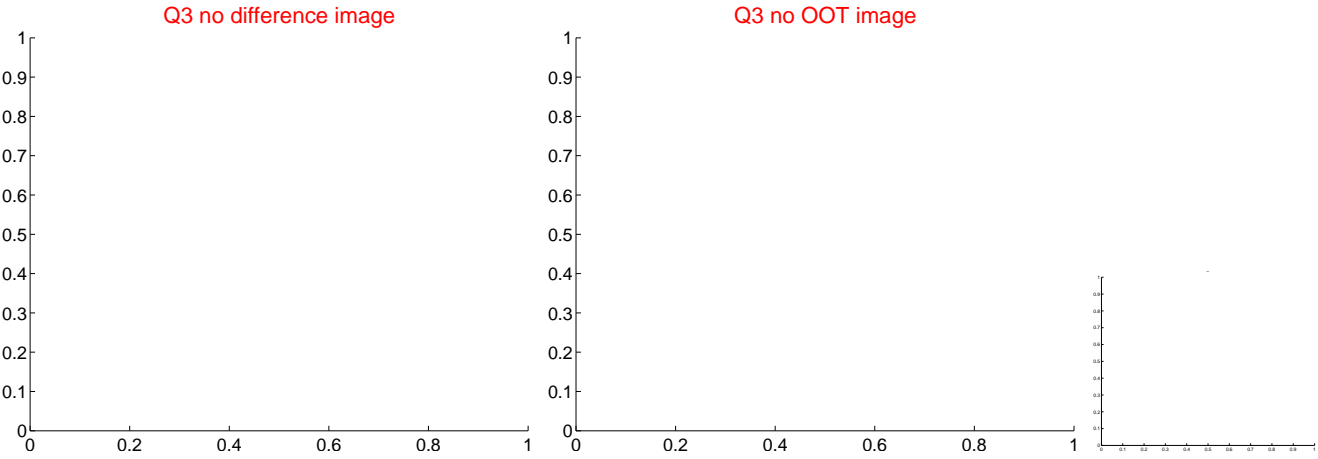
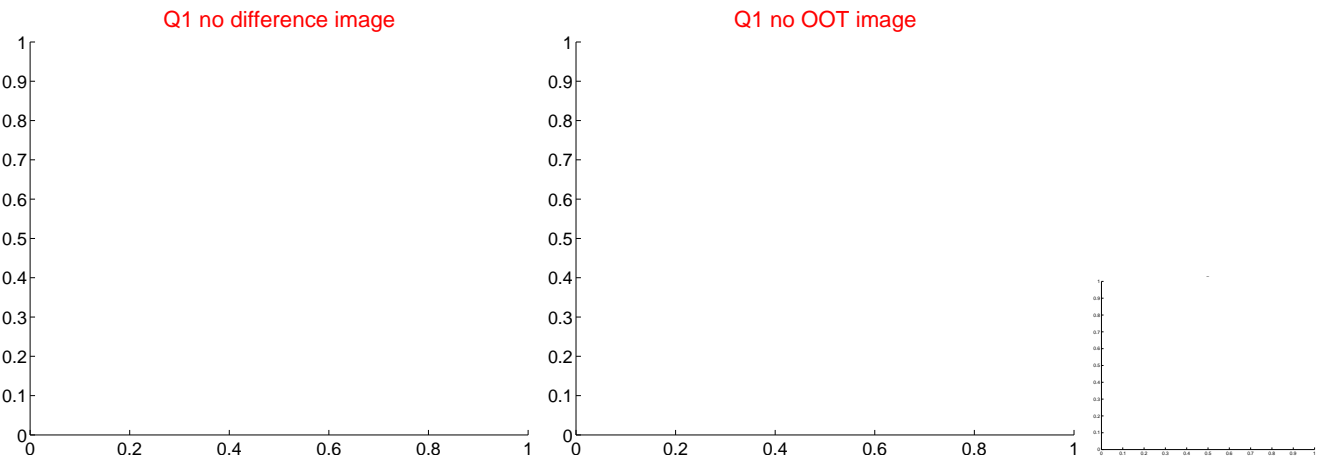
offset from photometric centroids



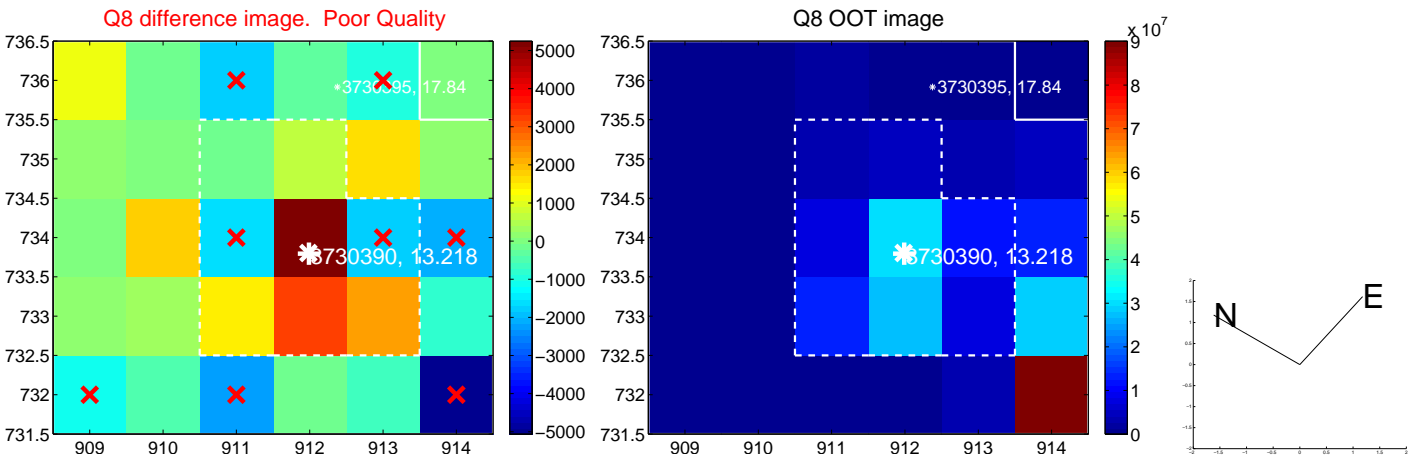
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



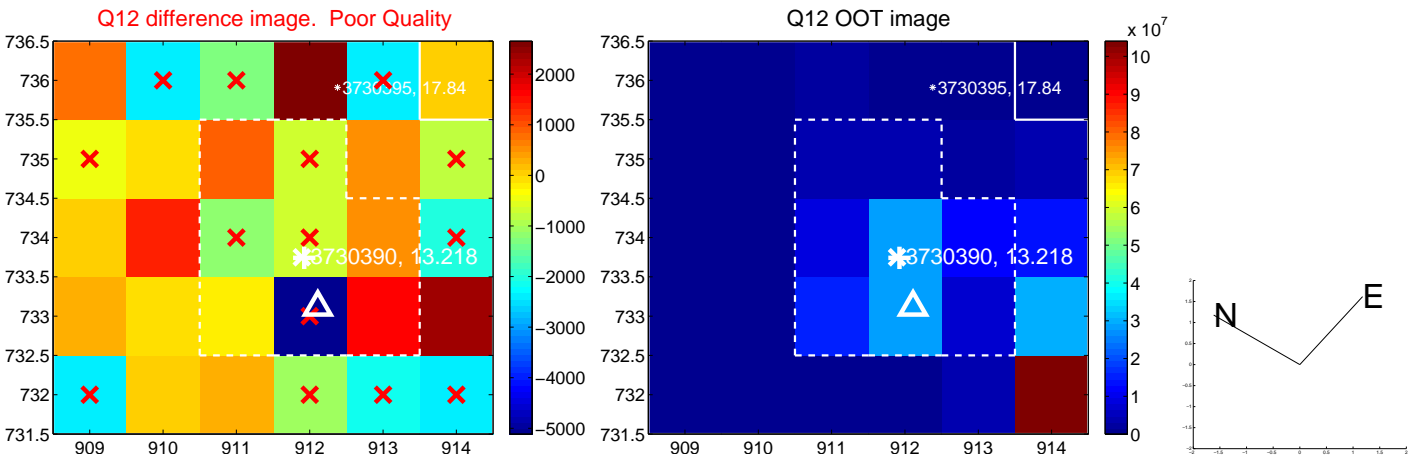
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



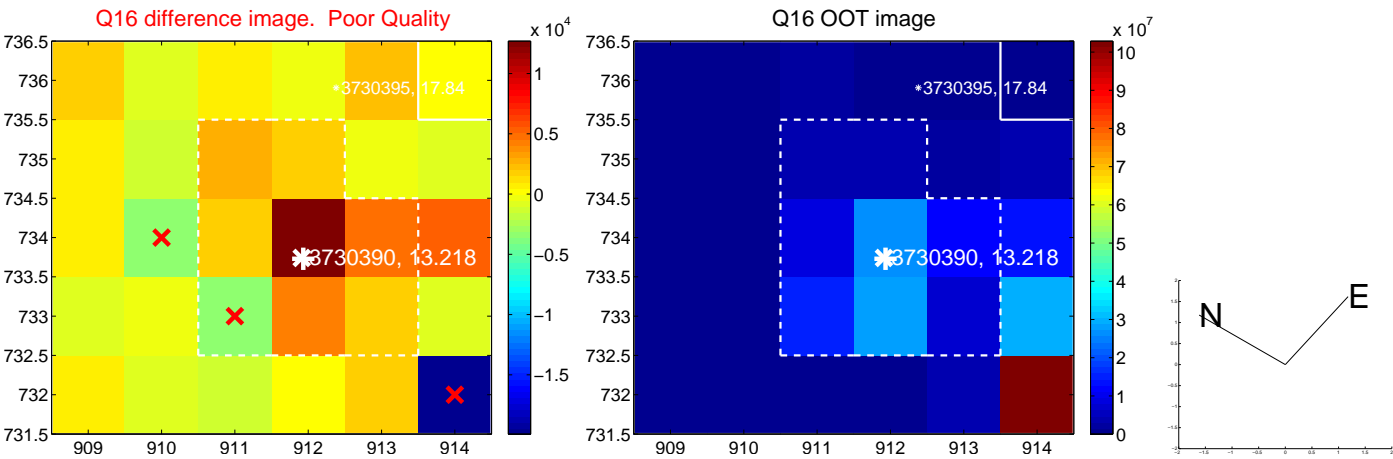
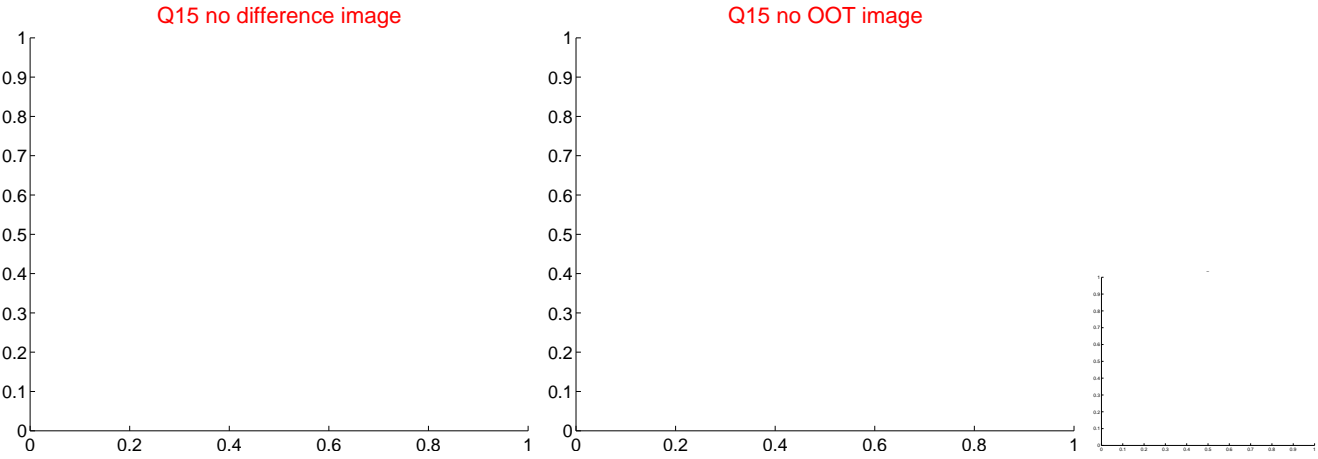
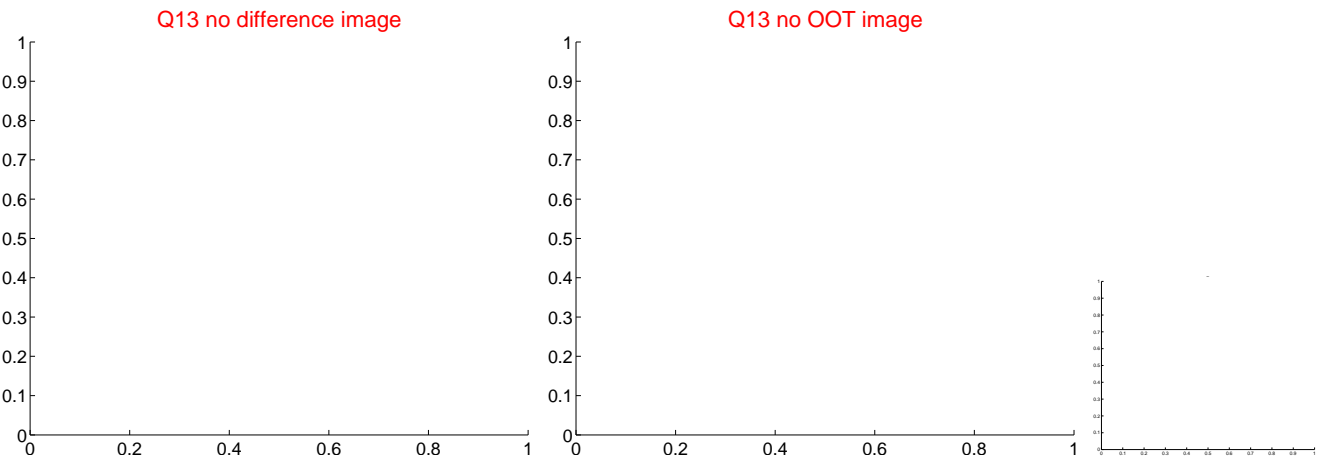
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



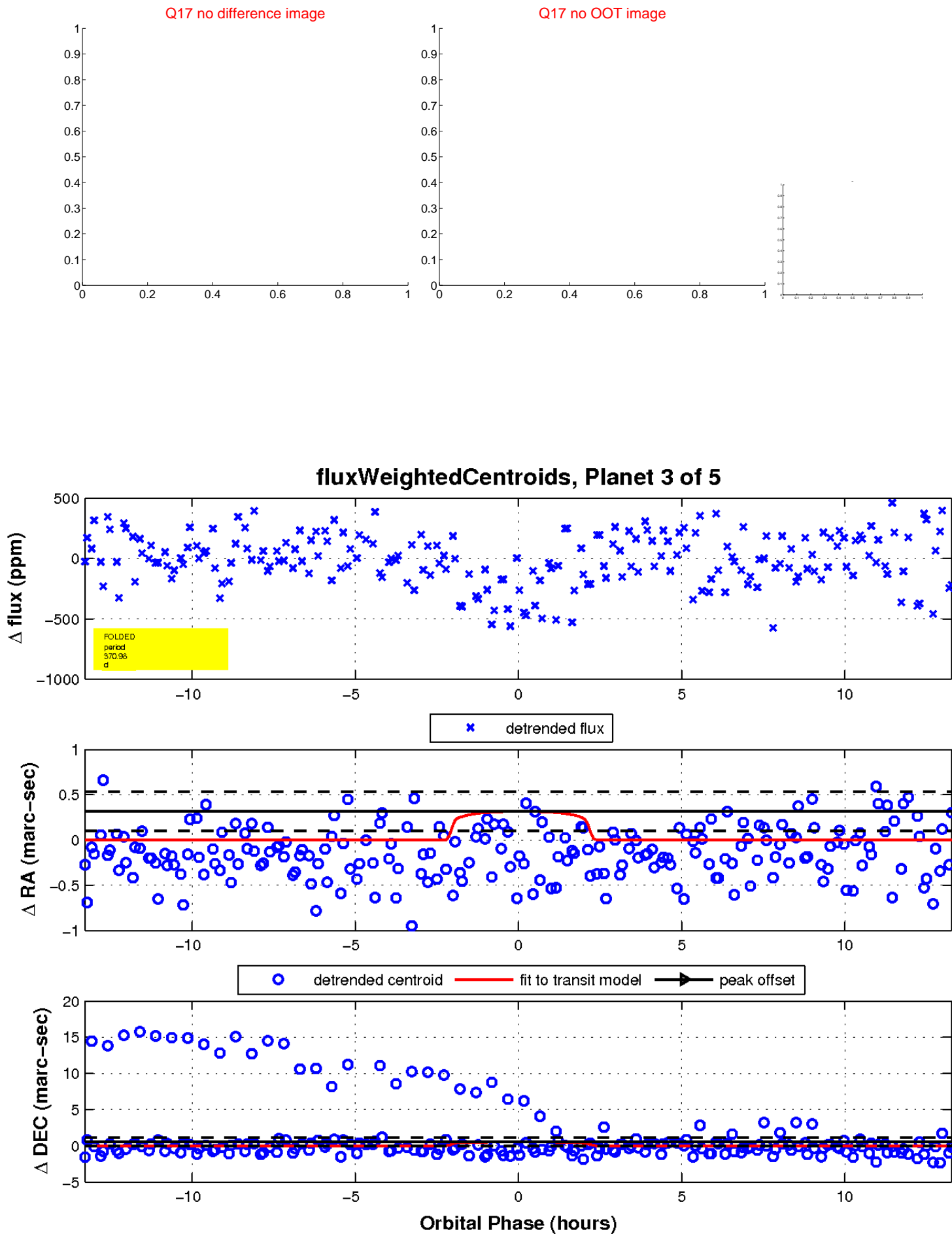
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



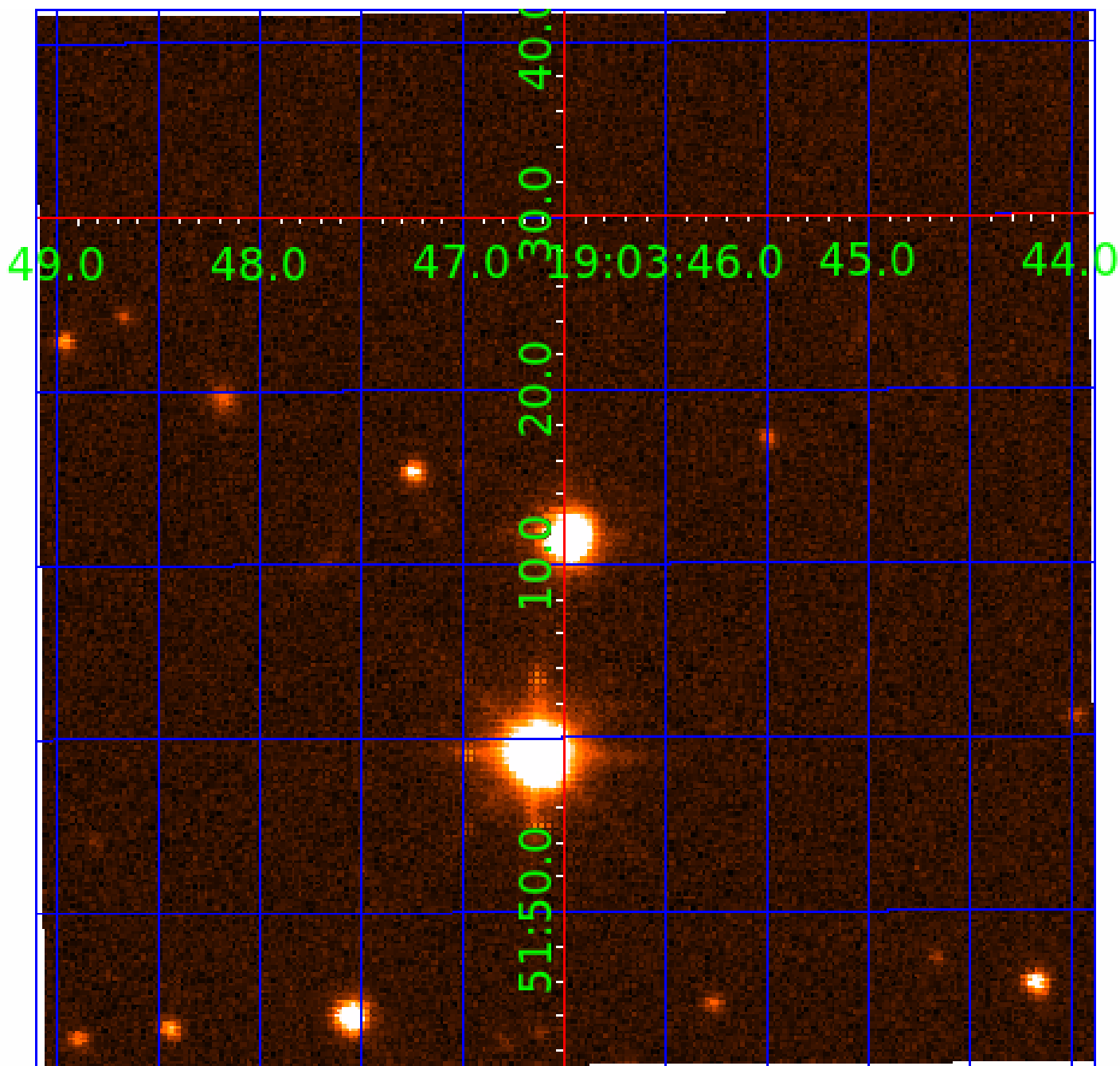
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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# KIC 003730390

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003730390-01	OBS	No	3.048857	132.567402	22.3	9.675	8.1	6.3	5.96	6564	3.15	21477.01
003730390-02	OBS	No	5.081831	135.565642	37.2	14.489	7.9	8.3	5.96	6564	4.16	10867.50
003730390-03	OBS	No	370.983572	427.124181	392.4	4.462	7.5	8.4	5.96	6564	12.84	35.62
003730390-05	OBS	No	175.992278	232.931048	320.5	3.254	7.2	7.8	5.96	6564	12.03	96.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003730390-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003730390-03	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003730390-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

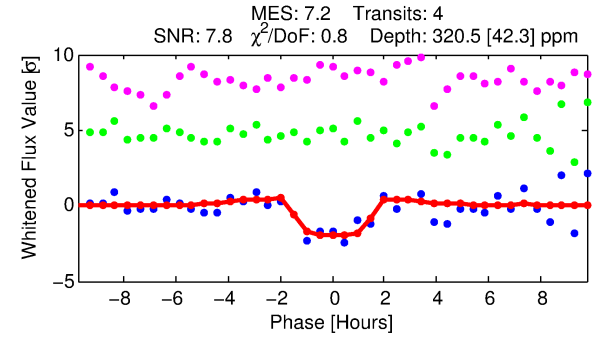
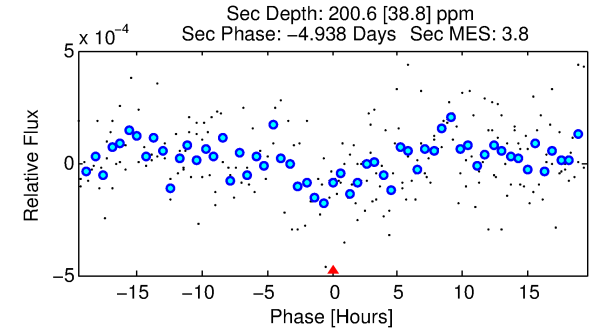
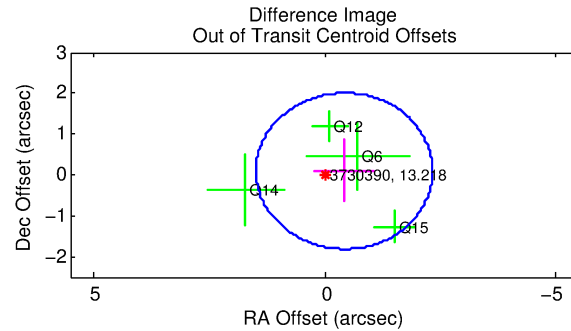
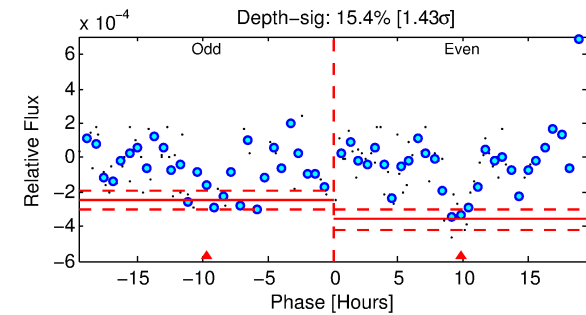
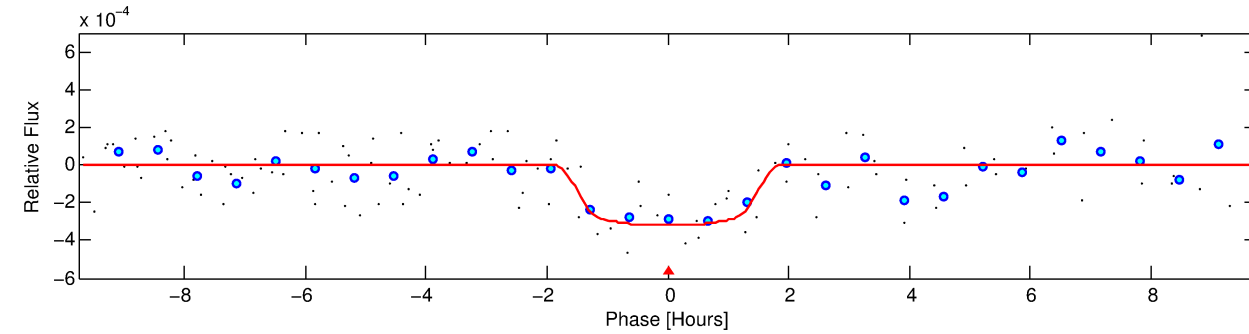
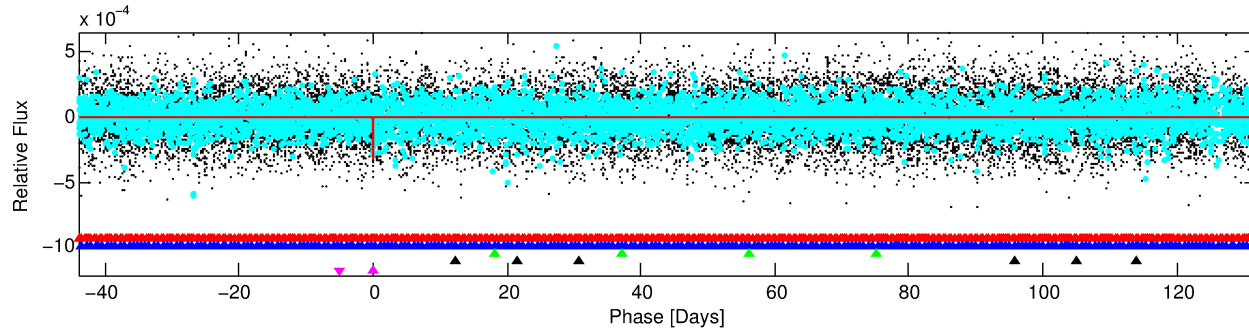
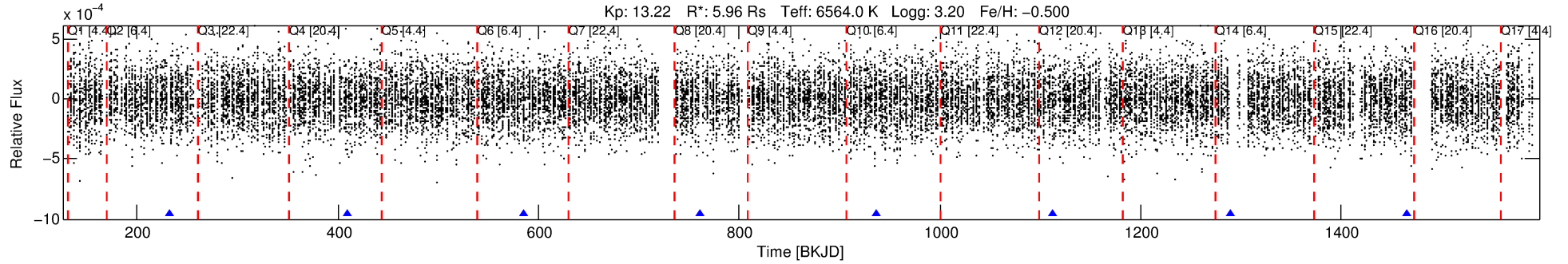
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003730390-05

No Significant Match Found

# DV One-Page Summary

KIC: 3730390 Candidate: 5 of 5 Period: 175.992 d



## DV Fit Results:

Period = 175.99228 [0.00234] d  
Epoch = 232.9310 [0.0085] BKJD  
Rp/R\* = 0.0185 [0.0141]  
a/R\* = 233.16 [1029.03]  
b = 0.85 [1.48]  
Seff = 96.27 [77.77]  
Teq = 799 [161] K  
Rp = 12.03 [11.15] Re  
a = 0.7827 [0.3923] AU  
Ag = 467.29 [811.07] [0.57 $\sigma$ ]  
Teffp = 5742 [2218] K [2.22 $\sigma$ ]

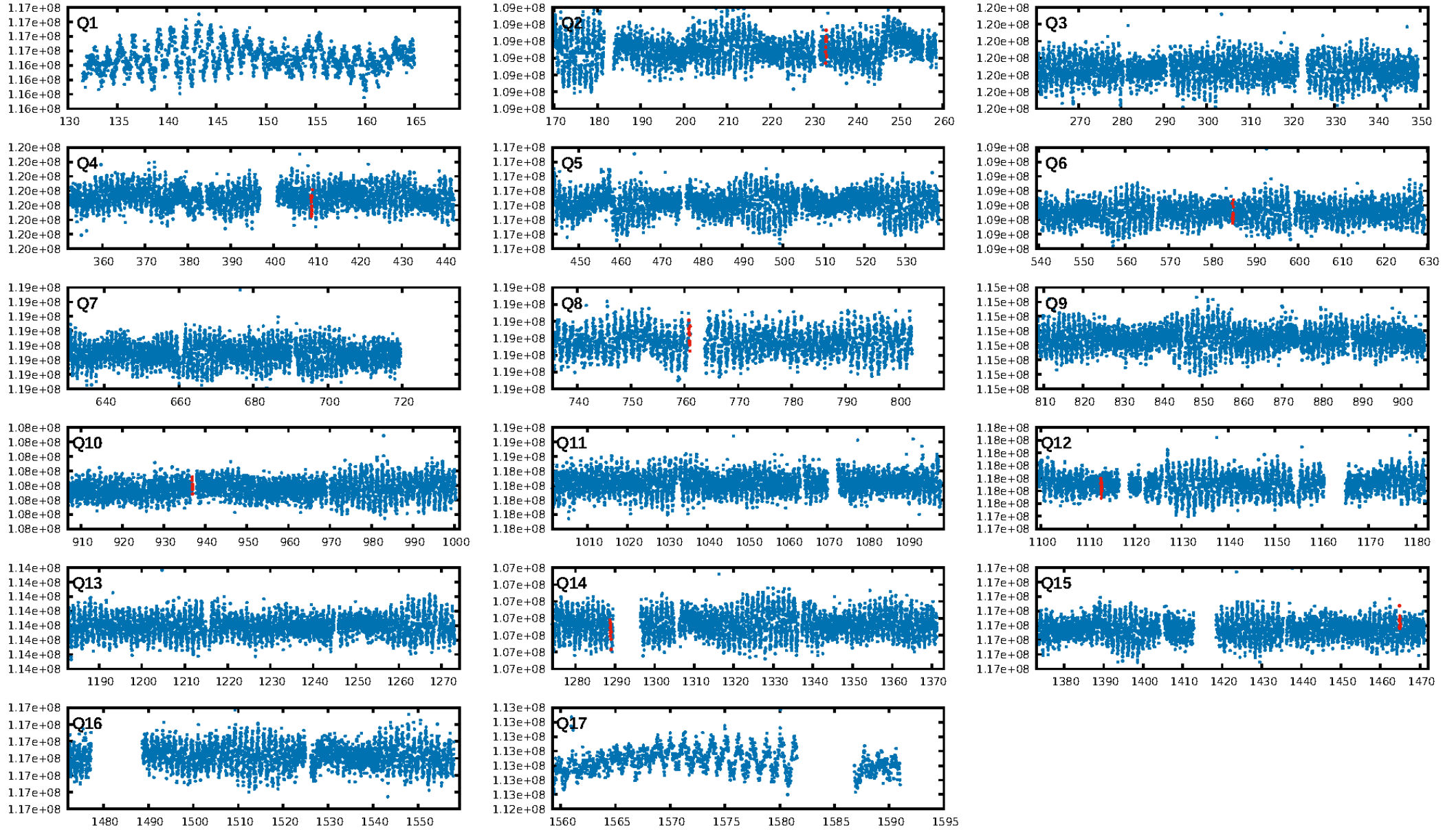
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [276.21 $\sigma$ ]  
LongPeriod-sig: 100.0% [86.26 $\sigma$ ]  
ModelChiSquare2-sig: 57.0%  
ModelChiSquareGof-sig: 99.8%  
**Bootstrap-pfa: 1.39e-08**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: -0.8714**  
Centroid-sig: 46.0%  
**Centroid-so: 3.985 arcsec [3.03 $\sigma$ ]**  
OotOffset-rm: 0.435 arcsec [0.68 $\sigma$ ]  
OotOffset-st: 2/1/1/0 [4]  
KicOffset-rm: 0.344 arcsec [0.54 $\sigma$ ]  
KicOffset-st: 2/1/1/0 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 0.50 [3/6]

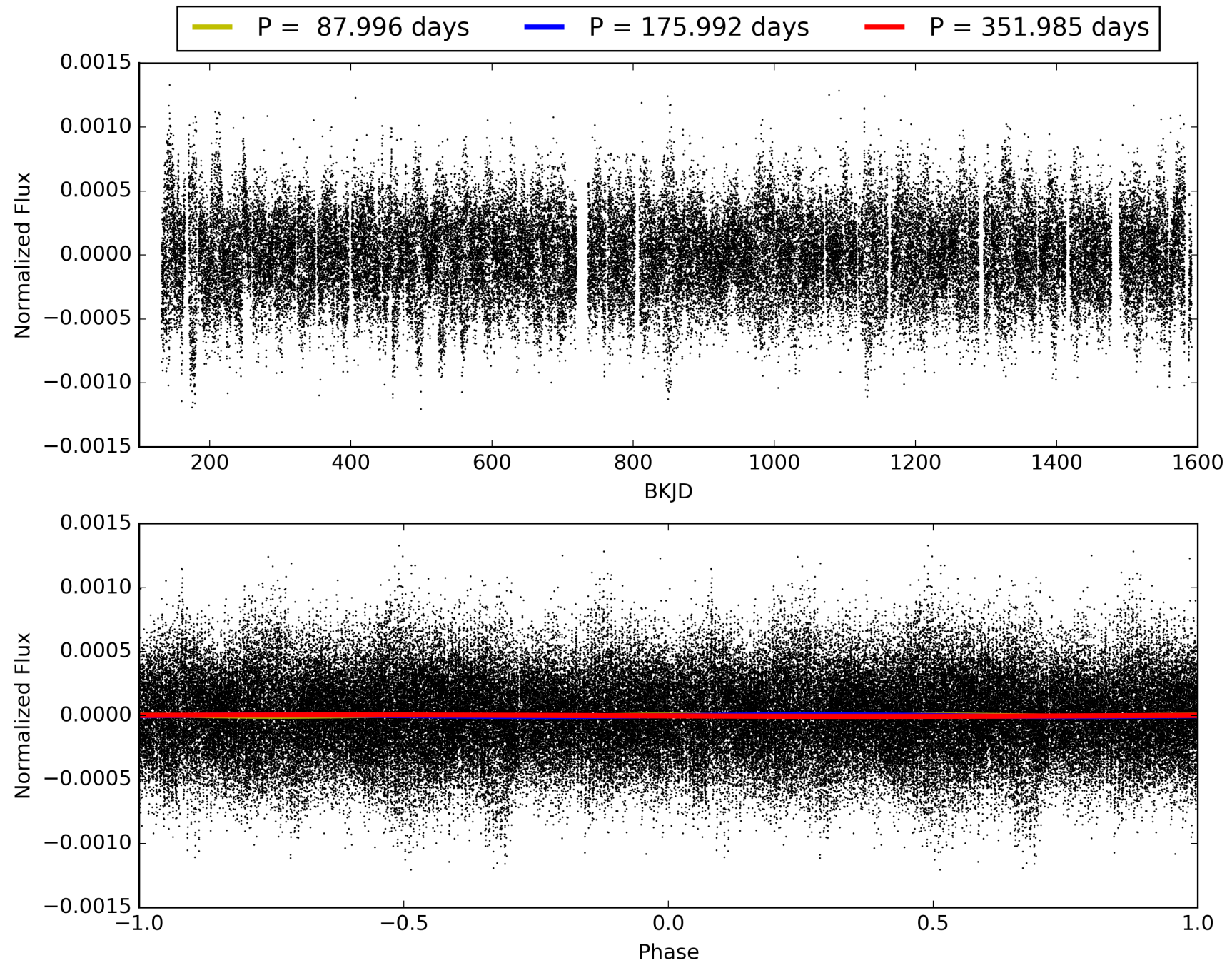
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:34:22 Z

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

# TCE 003730390-05, PDC Light Curves



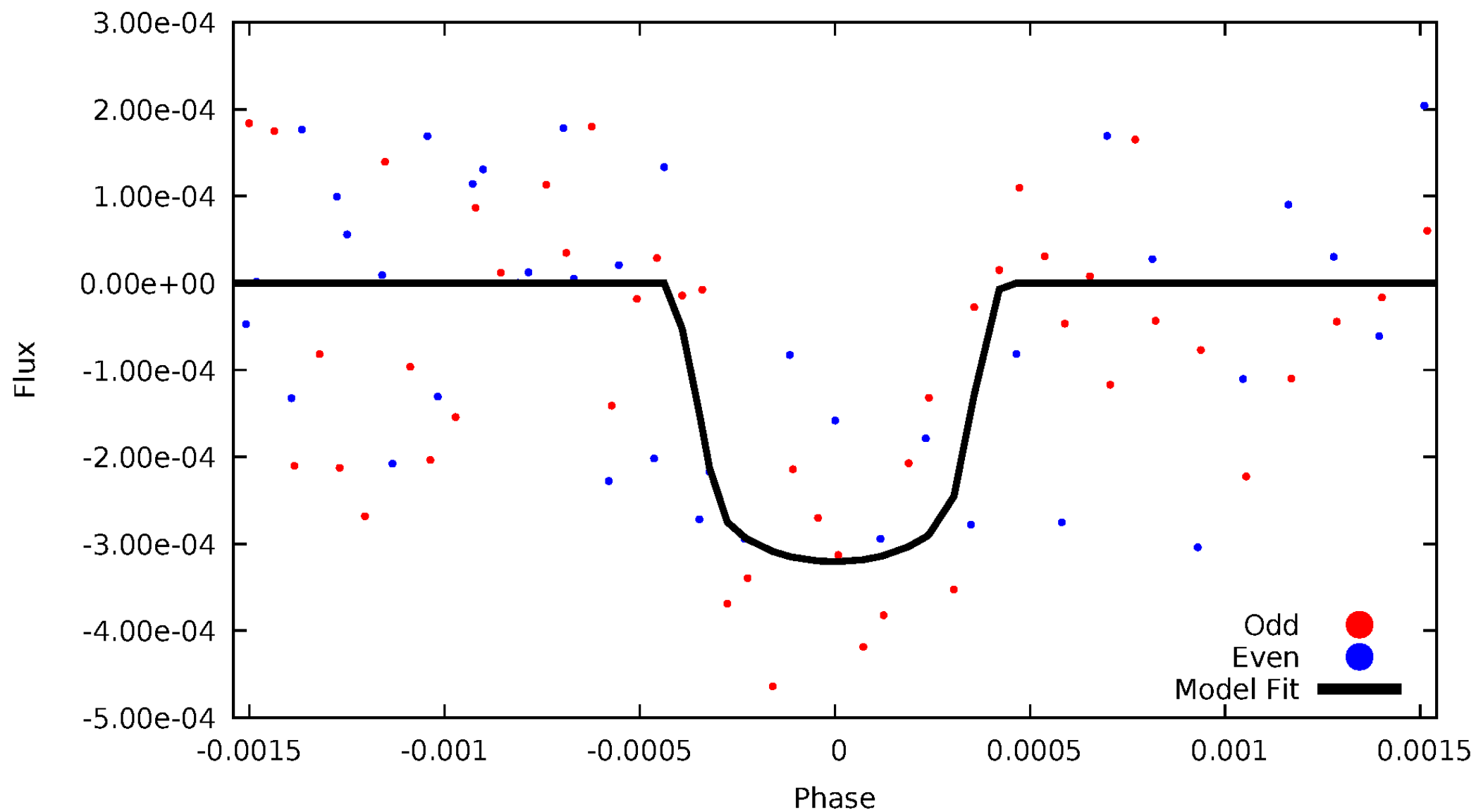
TCE 003730390-05





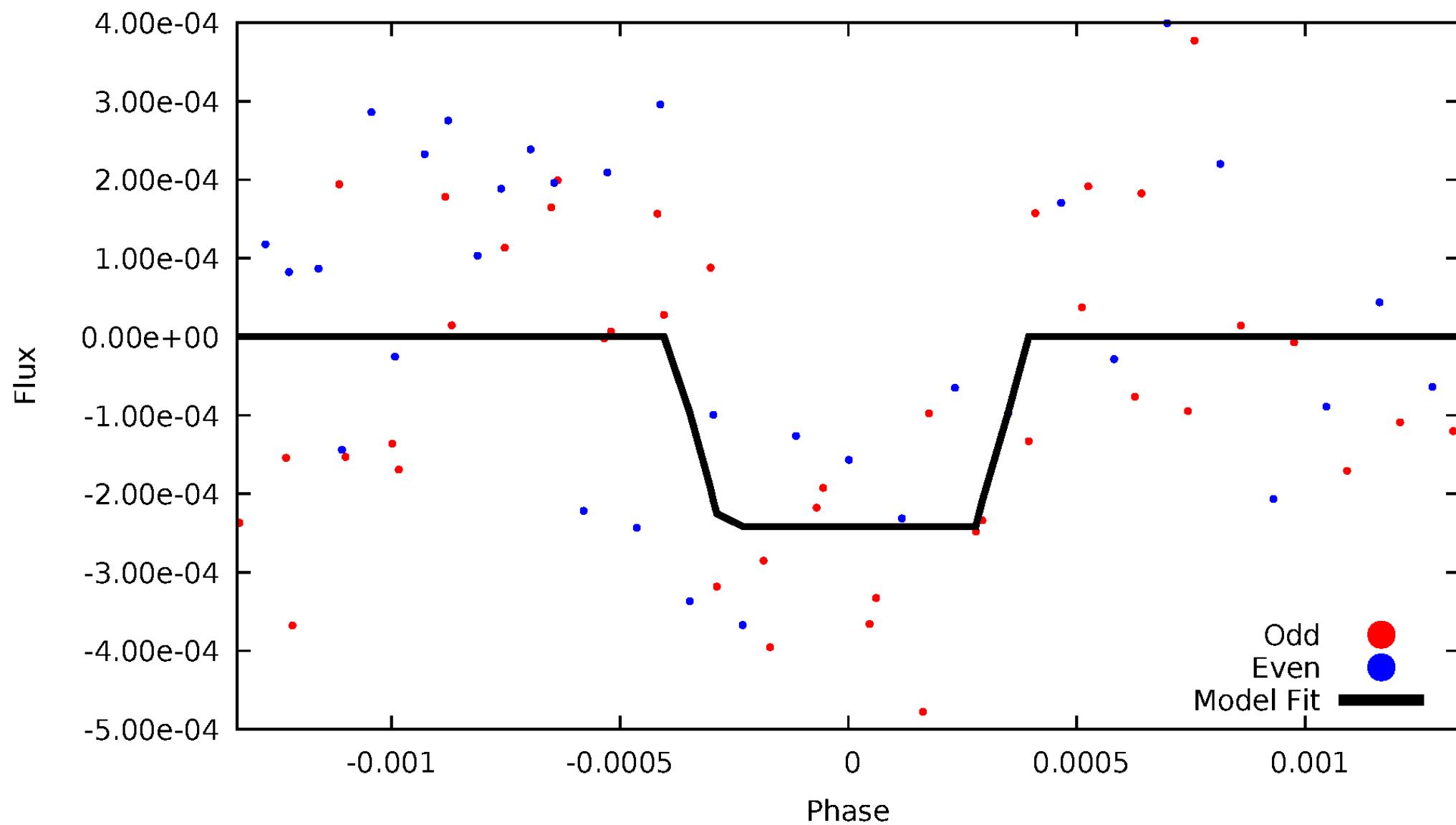
# DV Odd/Even

TCE 003730390-05



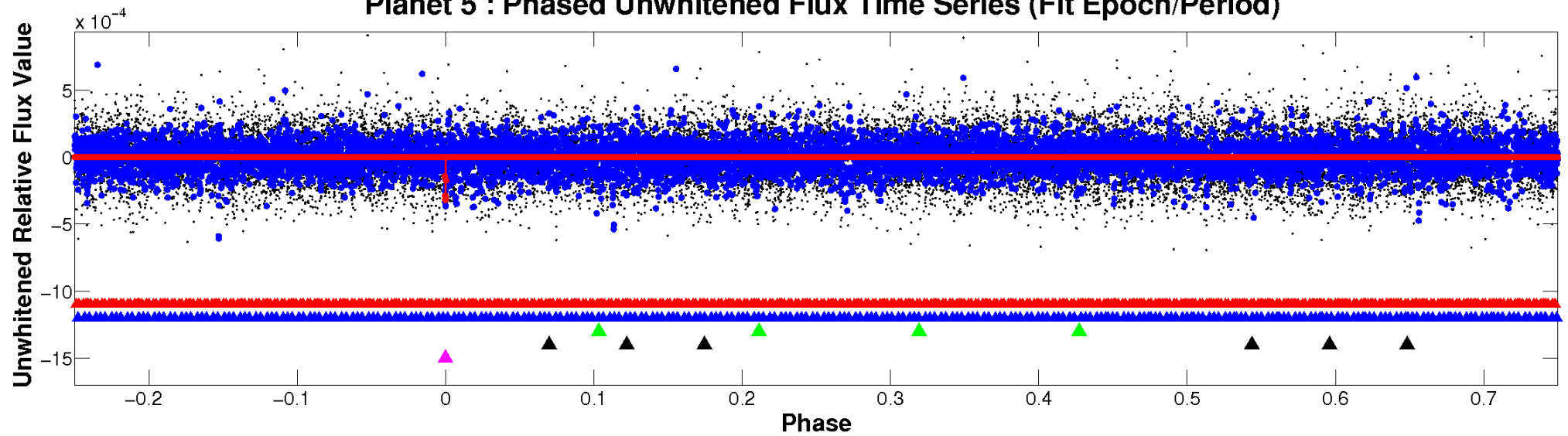
# ALT Odd/Even

TCE 003730390-05

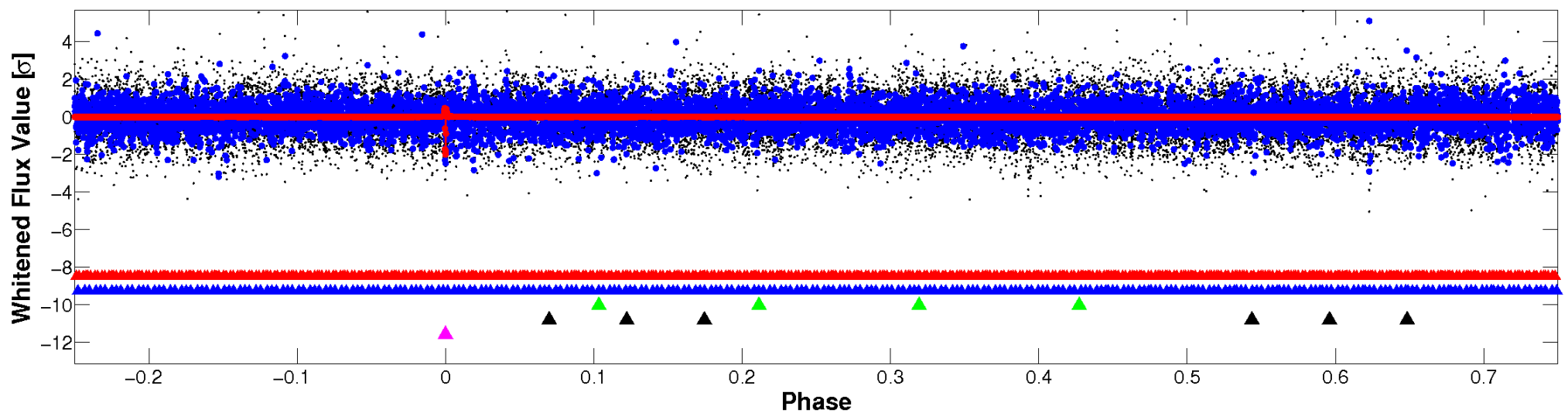


# Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

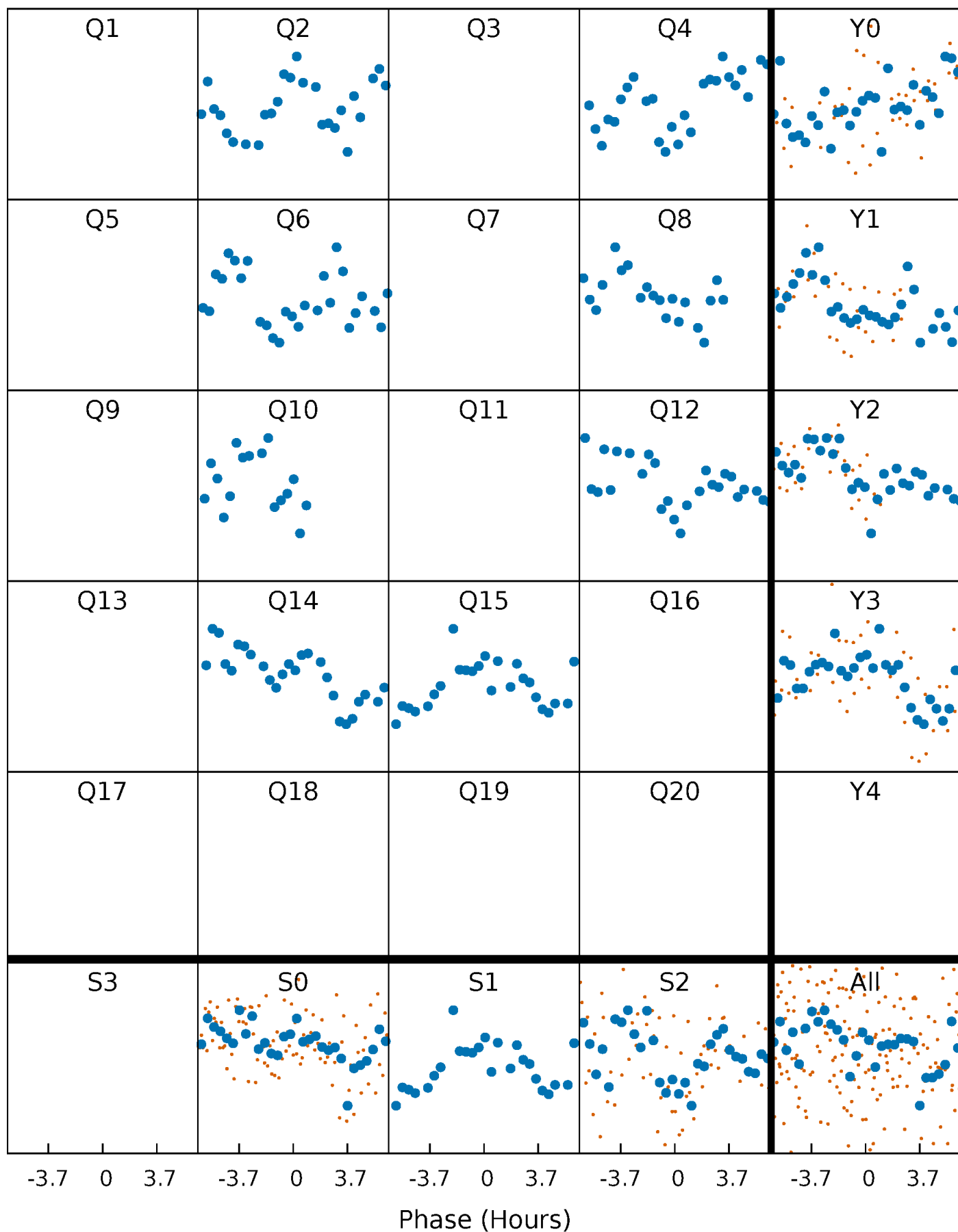


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



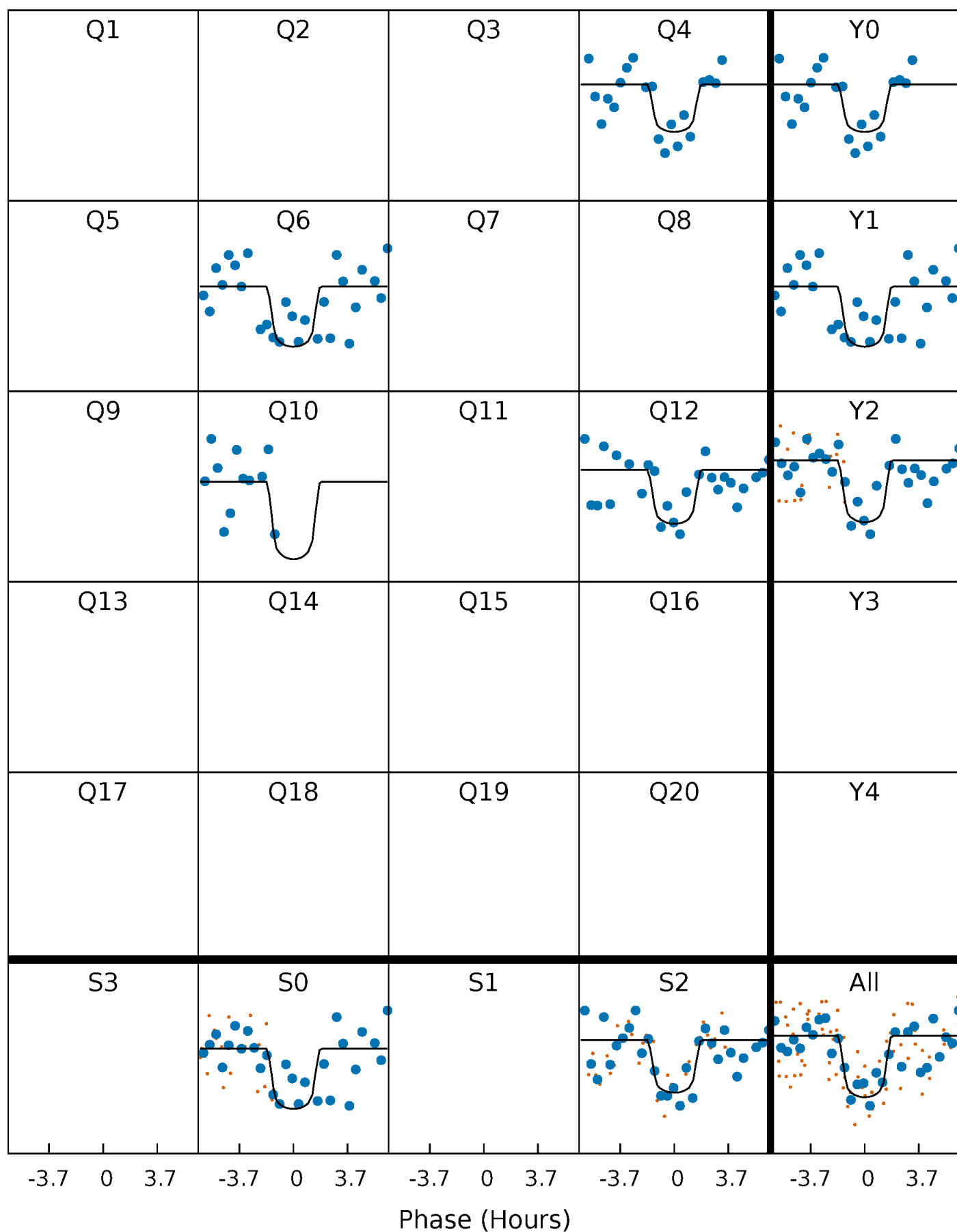
# PDC Quarter-Phased Transit Curves

TCE 003730390-05     $P=175.992278$  Days     $T_0=232.931048$  (BKJD)



# DV Quarter-Phased Transit Curves

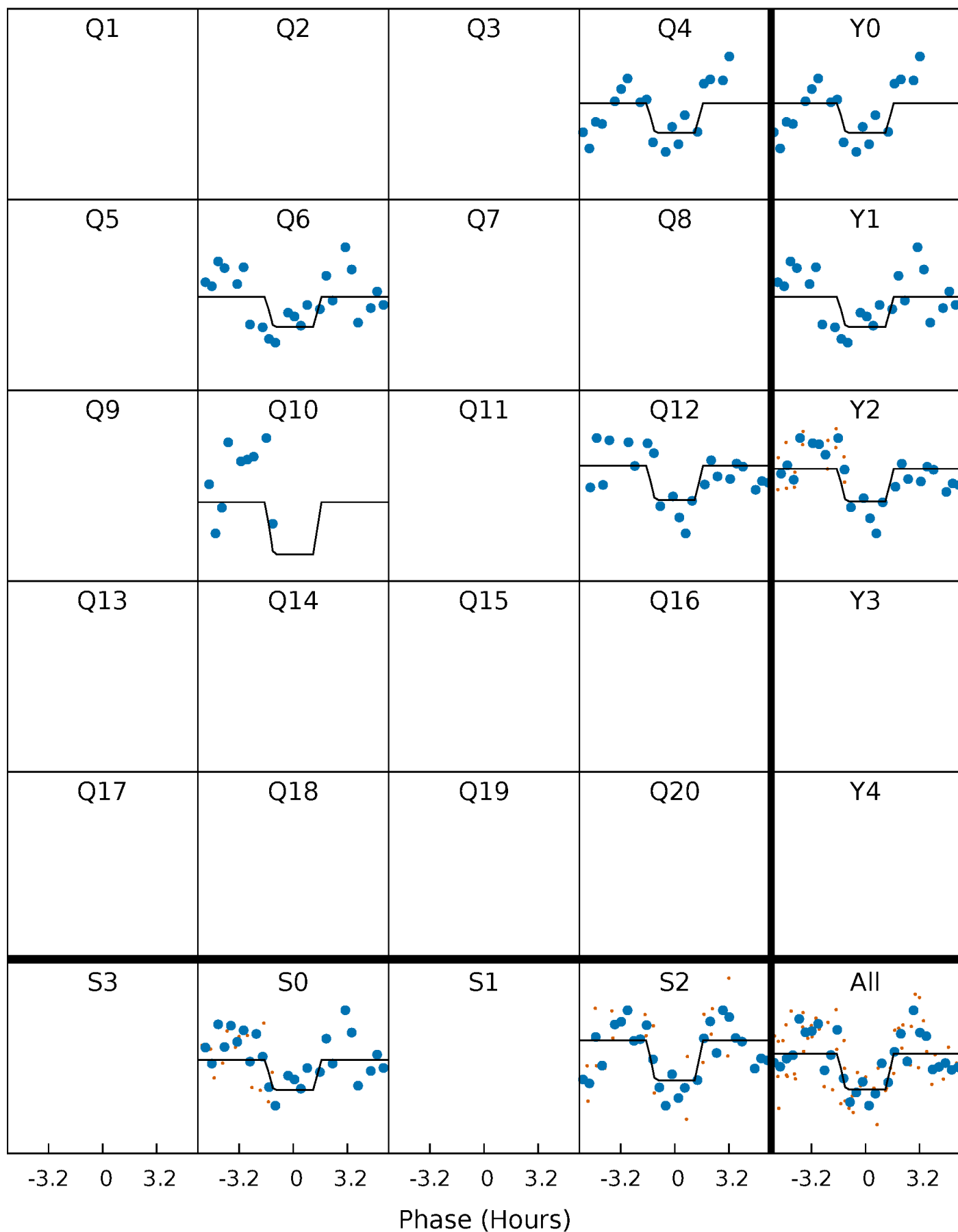
TCE 003730390-05     $P=175.992278$  Days     $T_0=232.931048$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

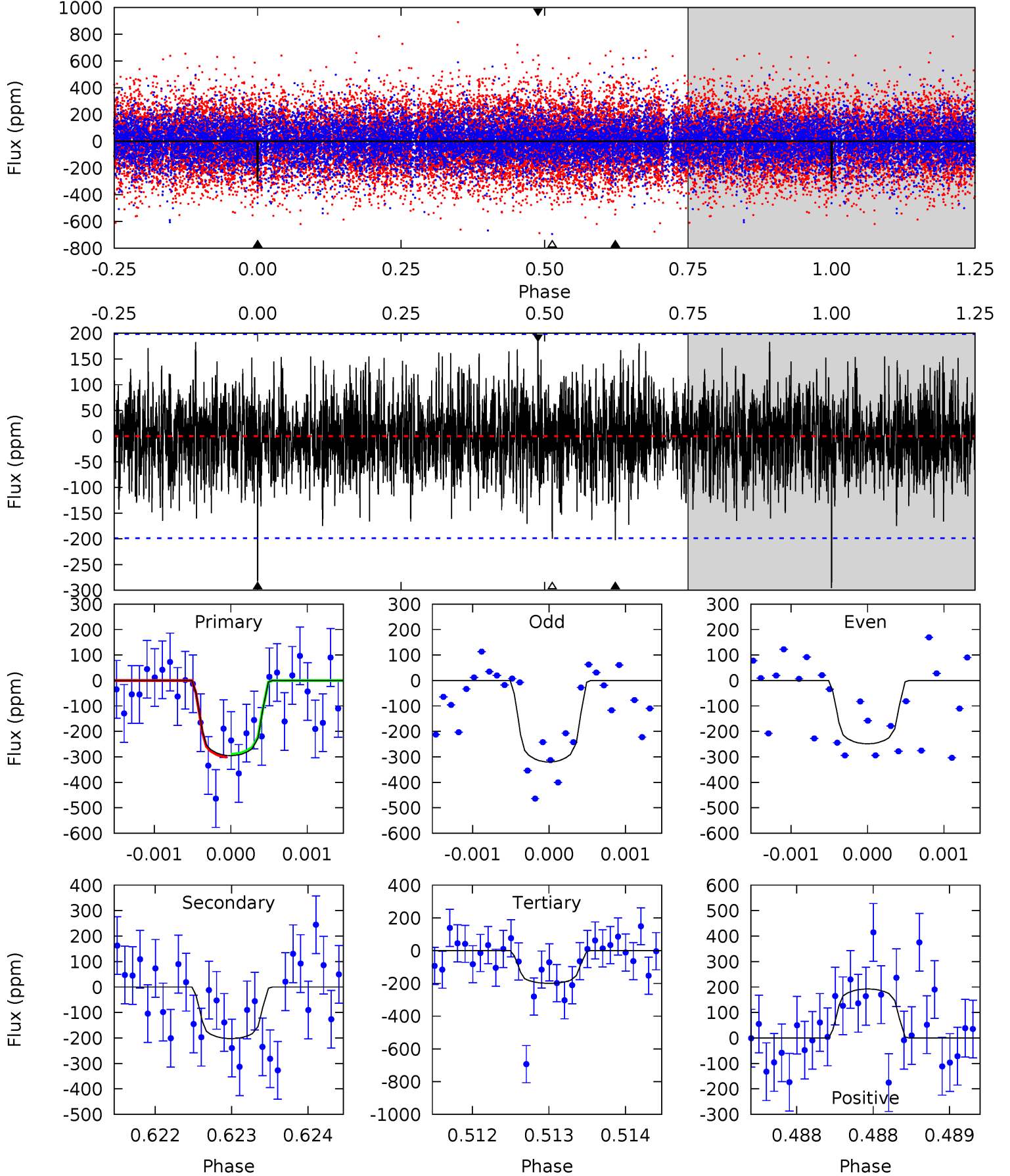
TCE 003730390-05     $P=175.990065$  Days     $T_0=232.935378$  (BKJD)



# DV Model-Shift Uniqueness Test

003730390-05,  $P = 175.992278$  Days,  $E = 56.938770$  Days

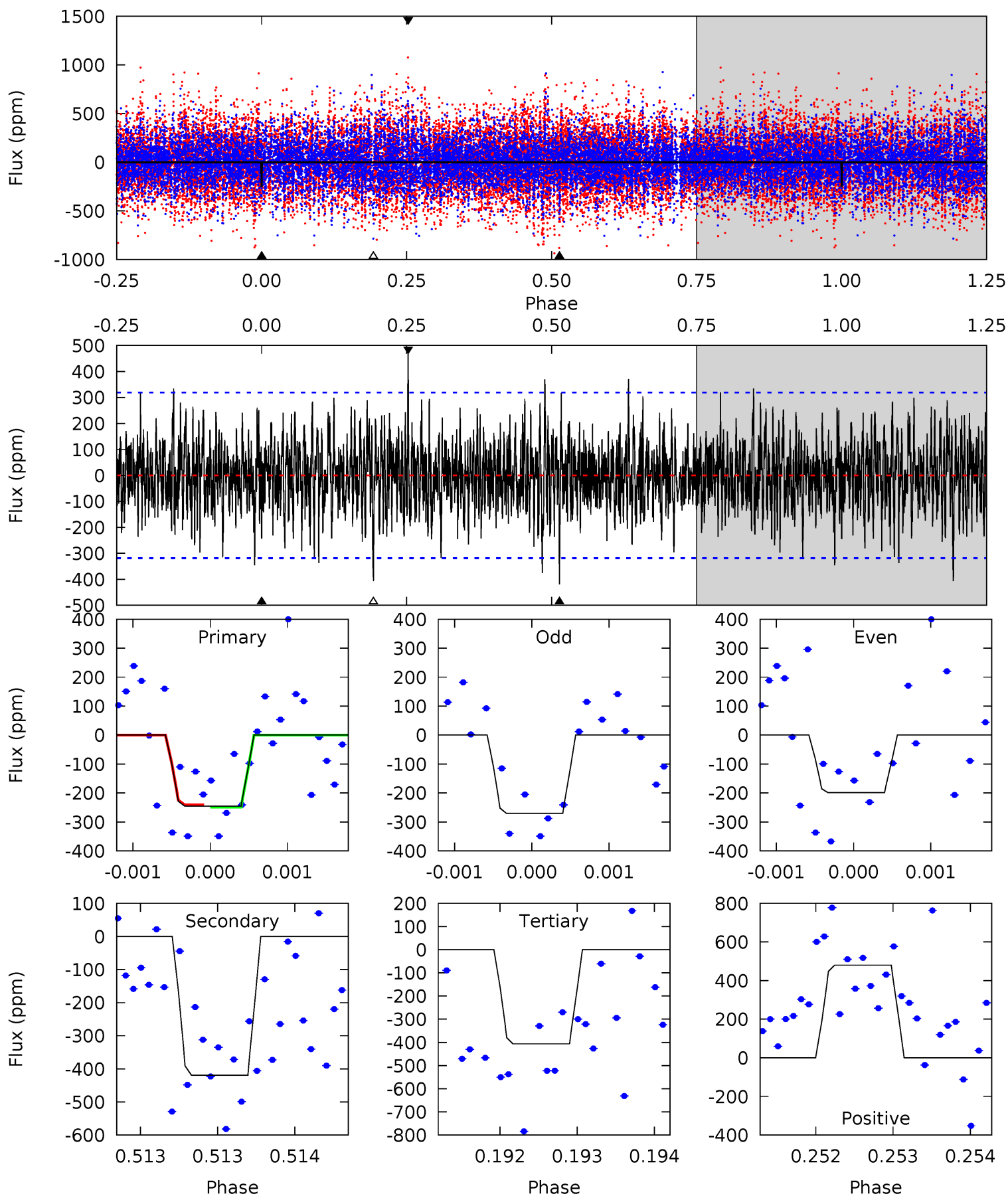
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.14	5.58	5.51	5.31	5.48	3.33	1.54	2.64	2.84	0.07	0.28	0.95	1.02	0.39	0.16



# Alt Model-Shift Uniqueness Test

003730390-05, P = 175.990065 Days, E = 56.945313 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
4.24	7.24	7.03	8.30	5.52	3.39	1.79	-2.79	-4.06	0.22	-1.05	0.60	0.93	0.53	0.06



### Stellar Parameters For KIC 003730390

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6564^{+176}_{-196}$	$3.203^{+0.468}_{-0.078}$	$-0.500^{+0.350}_{-0.400}$	$5.955^{+1.249}_{-3.122}$	$2.064^{+0.077}_{-0.659}$	$0.014^{+0.064}_{-0.005}$
	+3%/-3%	+15%/-2%	+70%/-80%	+21%/-52%	+4%/-32%	+465%/-33%
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 003730390-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-202 \pm 36$	$10.60^{+8.37}_{-6.10}$	$1064^{+84}_{-137}$	$5596^{+3055}_{-1126}$	$569^{+2671}_{-385}$
Alt.	$-419 \pm 58$	$9.91^{+8.20}_{-6.35}$	$1065^{+84}_{-130}$	$7068^{+7214}_{-1792}$	$1413^{+9488}_{-995}$

$T_{max}$  = 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

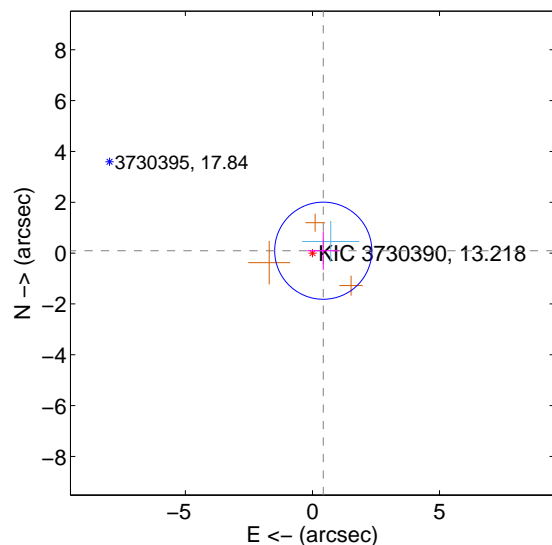
Supplemental centroid analysis for 003730390-05. Kepler magnitude: 13.22. Transit SNR 7.82

There are 1 quarters with good PRF difference image offsets

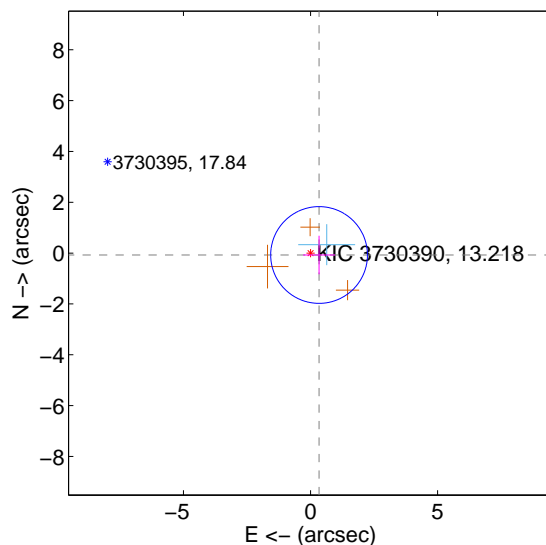
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.435 \pm 0.637$	0.68	$-0.425 \pm 0.630$	$0.094 \pm 0.753$
PRF-fit source offset from KIC position	$0.344 \pm 0.634$	0.54	$-0.336 \pm 0.628$	$-0.074 \pm 0.756$
photometric centroid source offset	$3.99 \pm 1.32$	3.03	$0.46 \pm 0.66$	$-3.96 \pm 1.32$

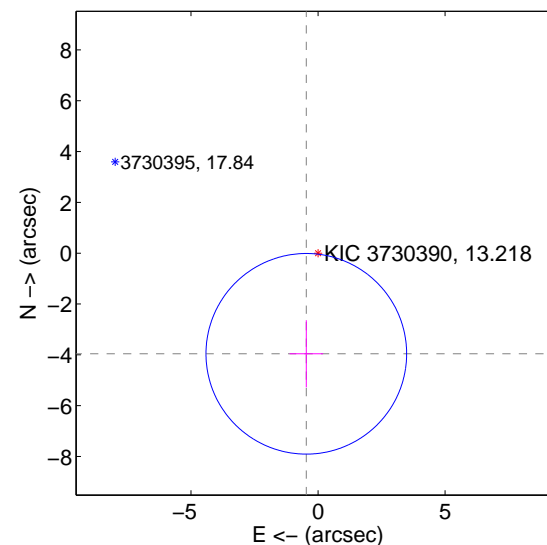
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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.

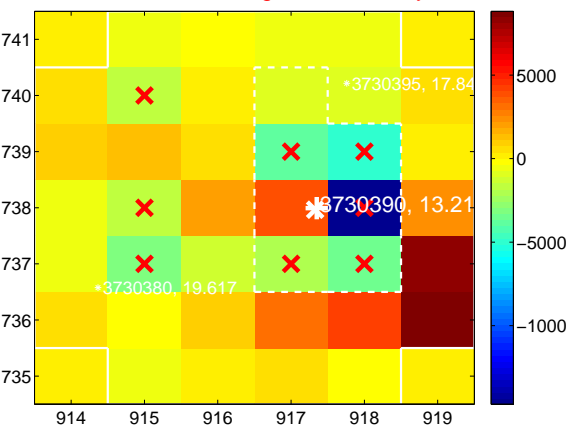
Q1 no difference image



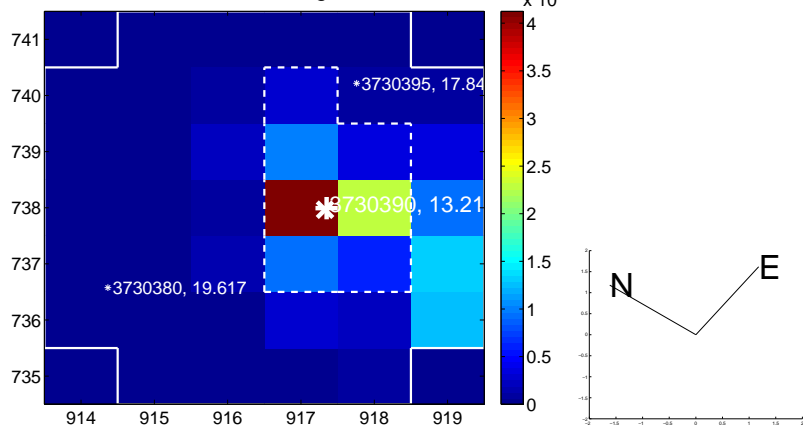
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



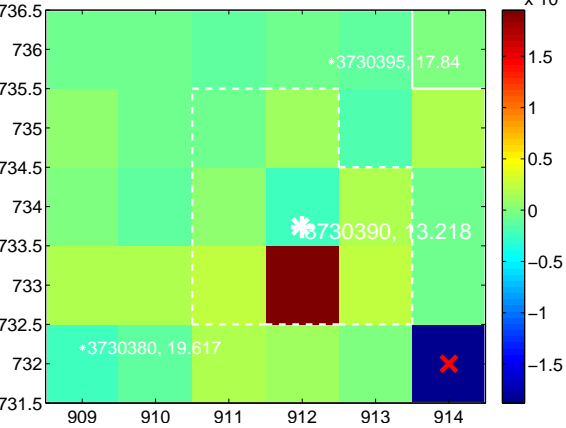
Q3 no difference image



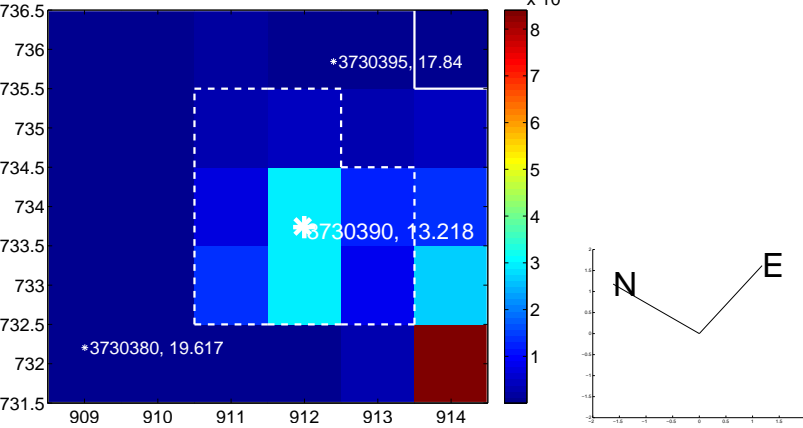
Q3 no OOT image



Q4 difference image. Poor Quality

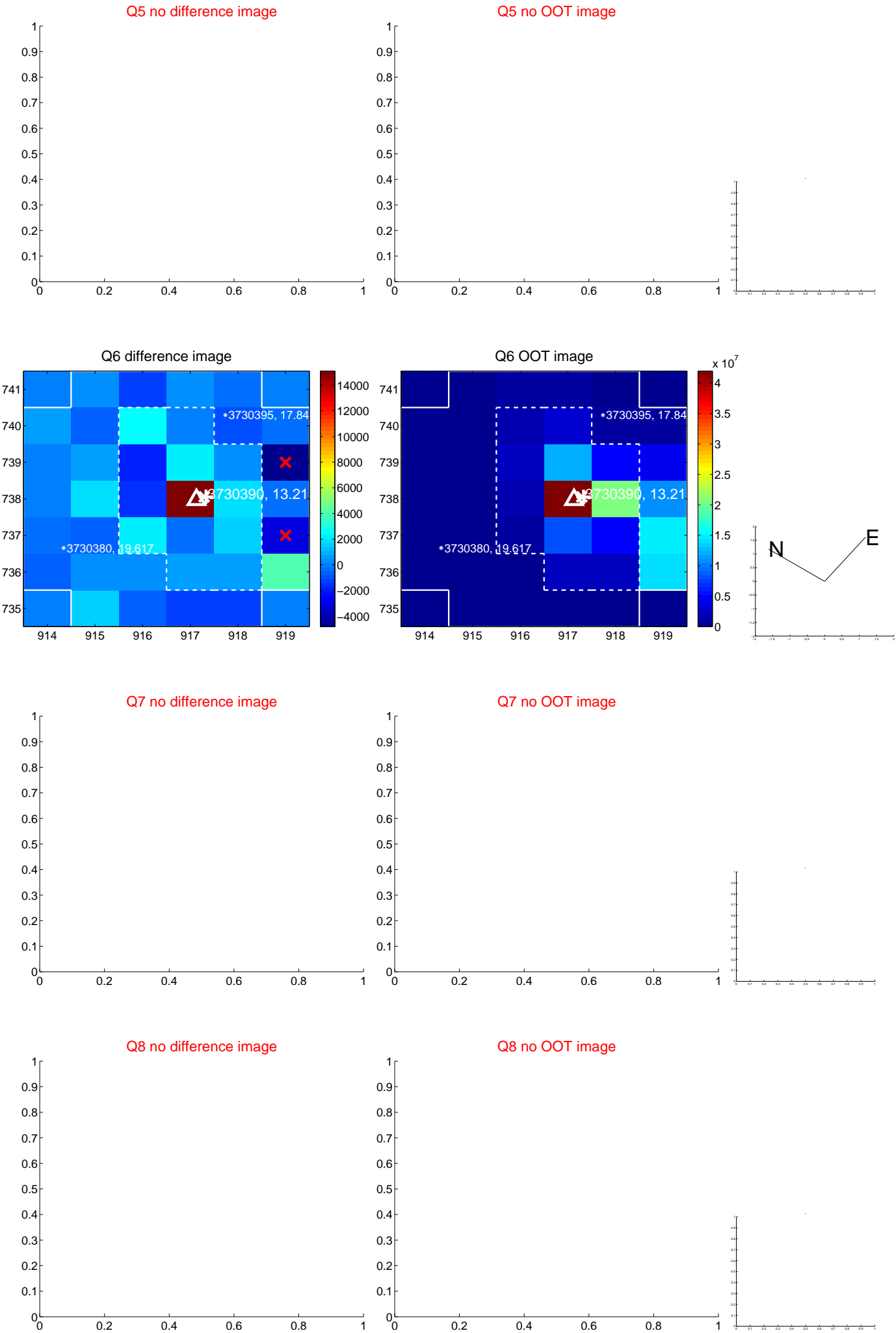


Q4 OOT image

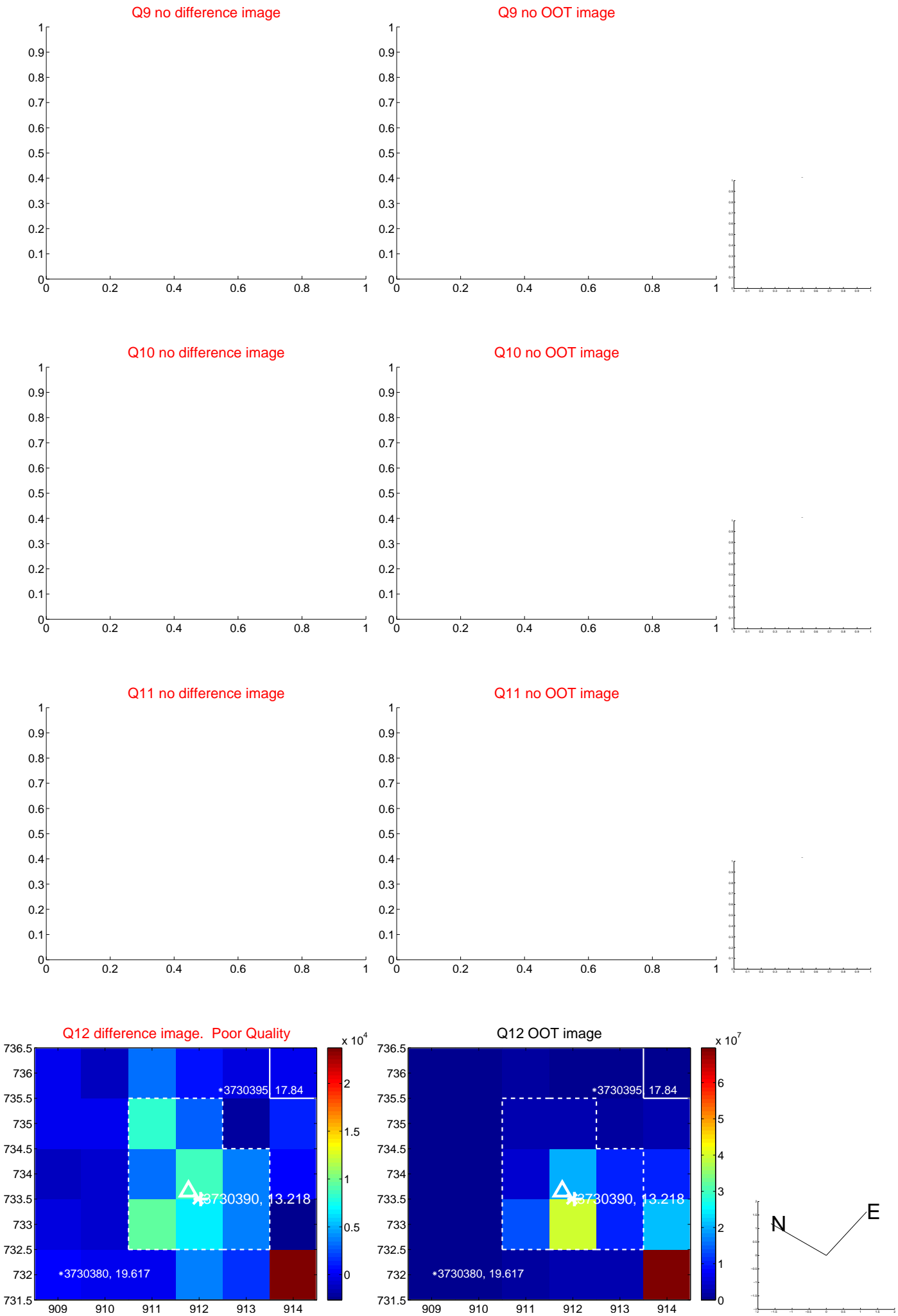




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

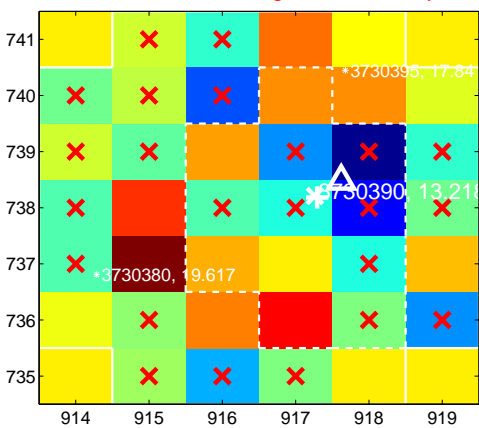
Q13 no difference image



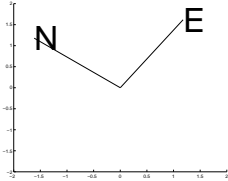
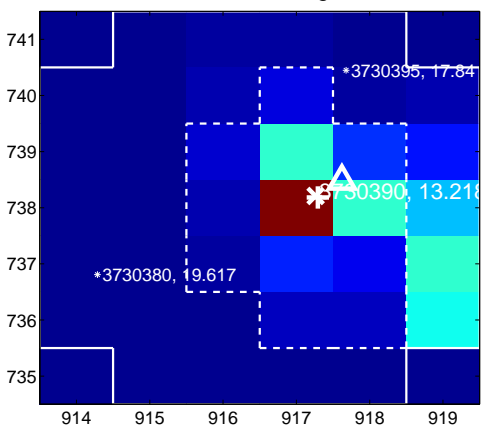
Q13 no OOT image



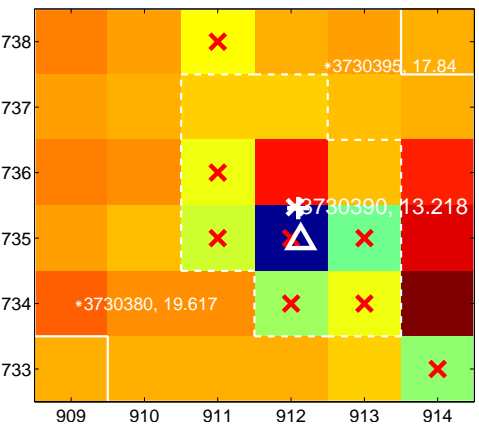
Q14 difference image. Poor Quality



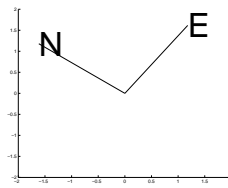
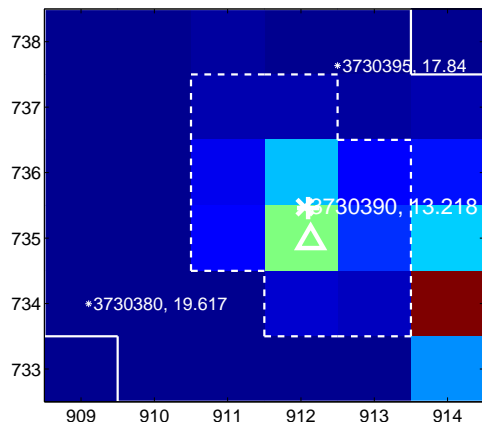
Q14 OOT image



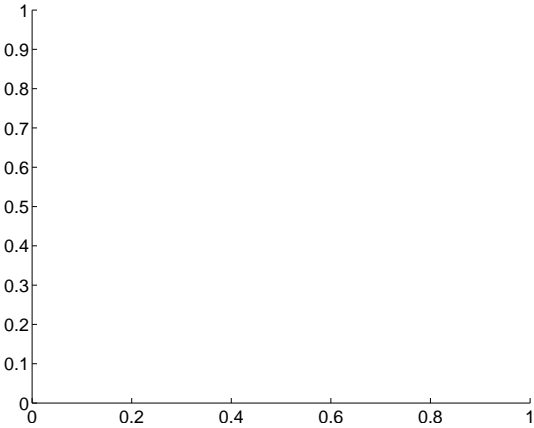
Q15 difference image. Poor Quality



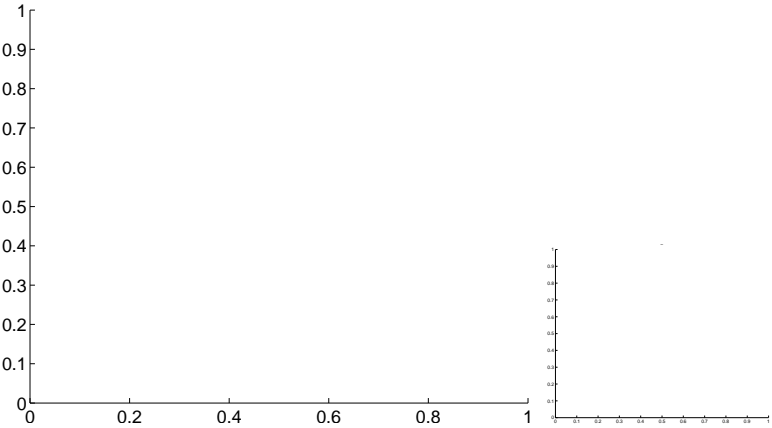
Q15 OOT image



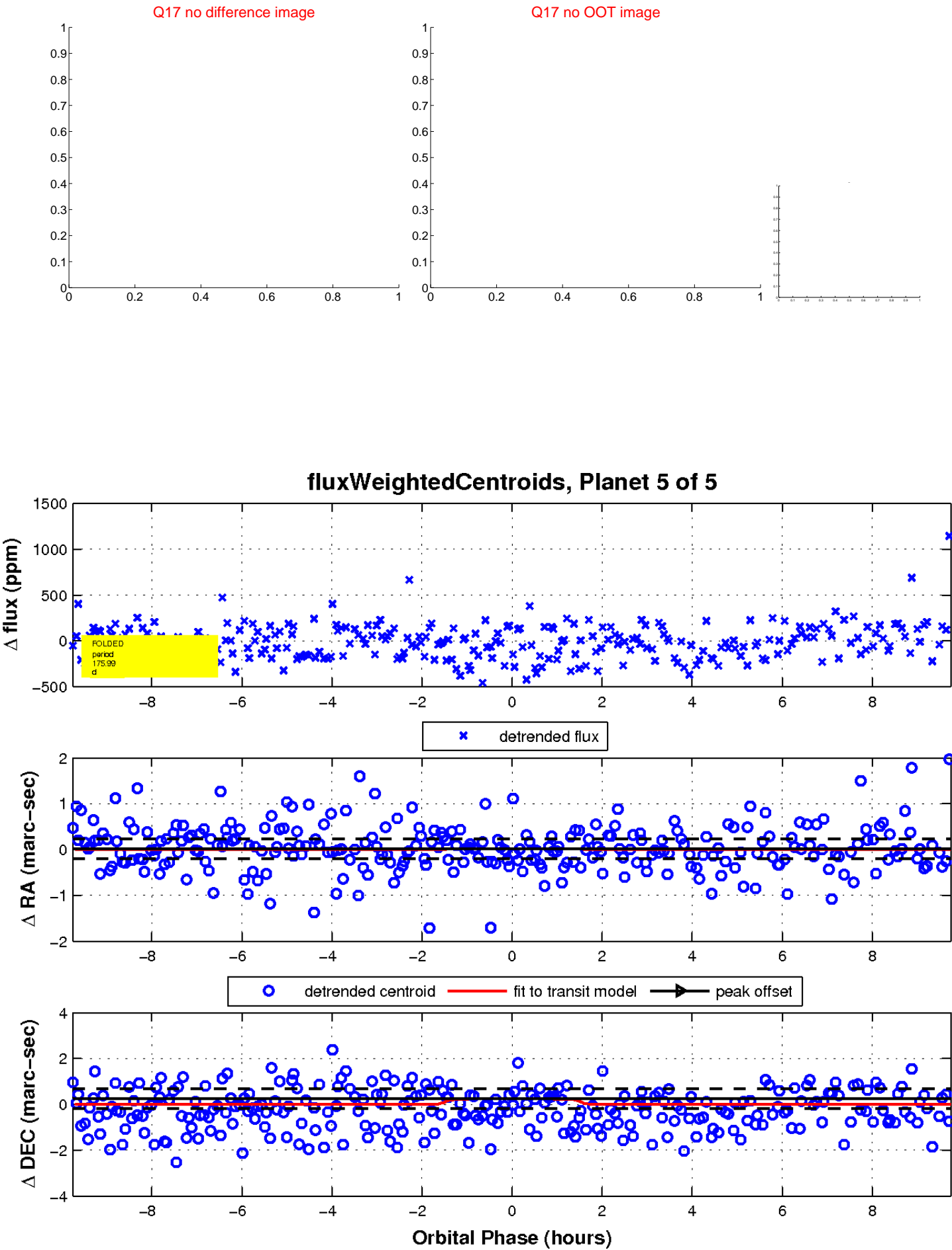
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

