

# KIC 012115810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012115810-01	OBS	No	0.625421	131.665985	3.3	2.973	7.8	1.4	1.74	6785	0.37	22390.48
012115810-02	OBS	No	318.734057	280.219583	398.6	10.819	8.3	8.2	1.74	6785	3.72	5.50
012115810-03	OBS	No	148.089413	133.466041	286.7	5.223	7.8	7.0	1.74	6785	3.17	15.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012115810-01	OBS	FP	0.00	1	0	0	0	LPP_DV
012115810-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_DIFFS
012115810-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_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.

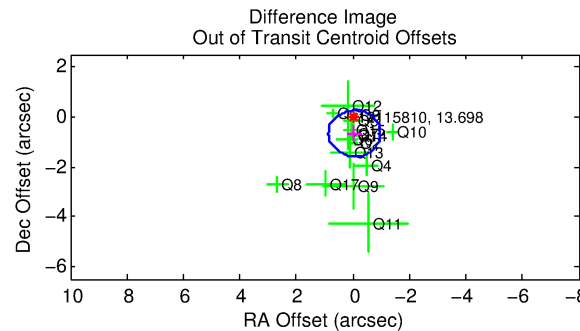
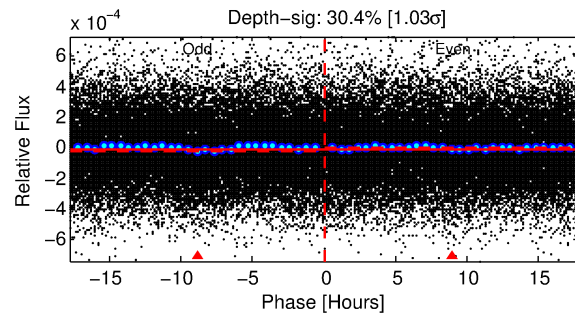
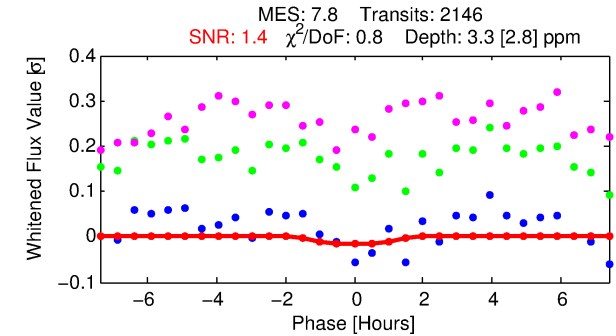
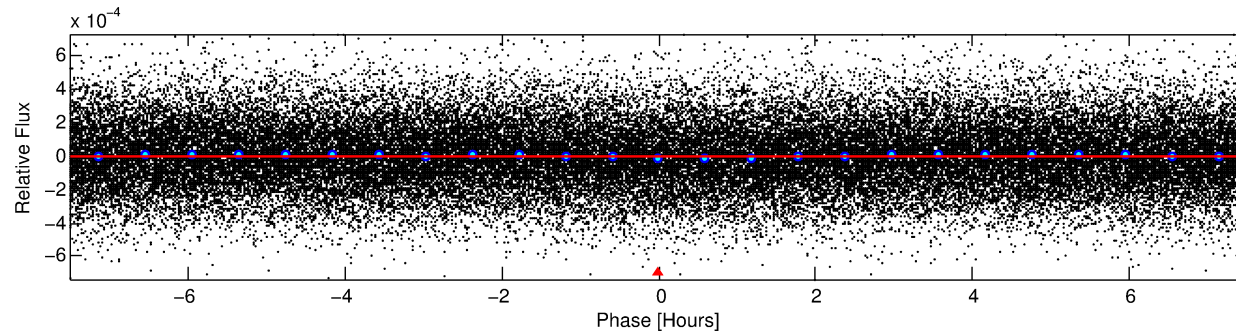
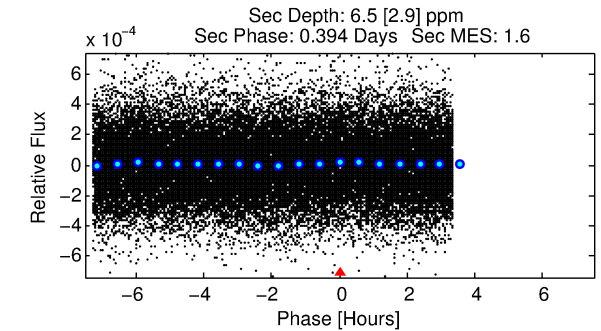
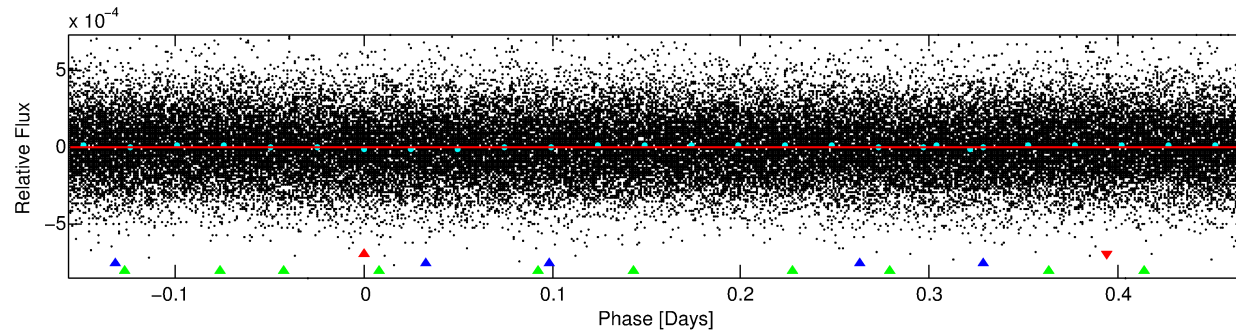
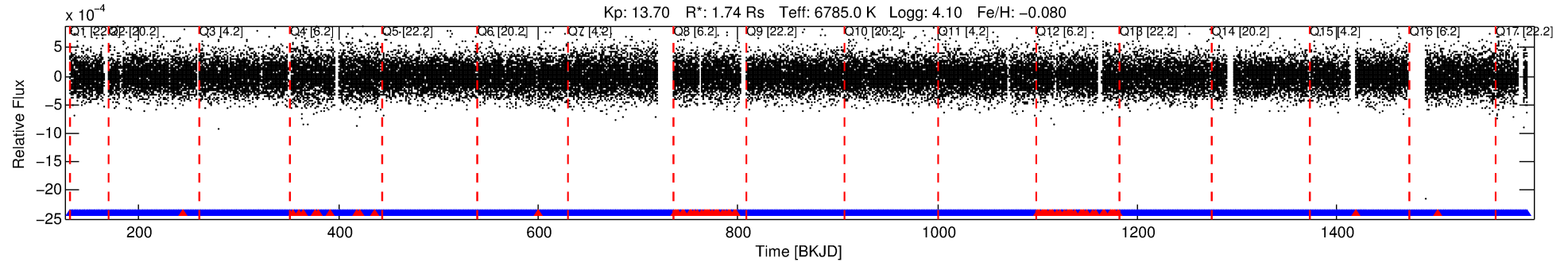
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012115810-01

No Significant Match Found

# DV One-Page Summary

KIC: 12115810 Candidate: 1 of 3 Period: 0.625 d



## DV Fit Results:

Period = 0.62542 [0.00007] d  
Epoch = 131.6660 [0.0219] BKJD  
Rp/R\* = 0.0019 [0.0016]  
a/R\* = 1.17 [1.42]  
b = 0.90 [0.94]  
Seff = 22390.48 [5520.77]  
Teq = 3119 [192] K  
Rp = 0.37 [0.31] Re  
a = 0.0160 [0.0025] AU  
Ag = 6.86 [12.04] [0.49σ]  
Teffp = 7805 [3394] K [1.38σ]

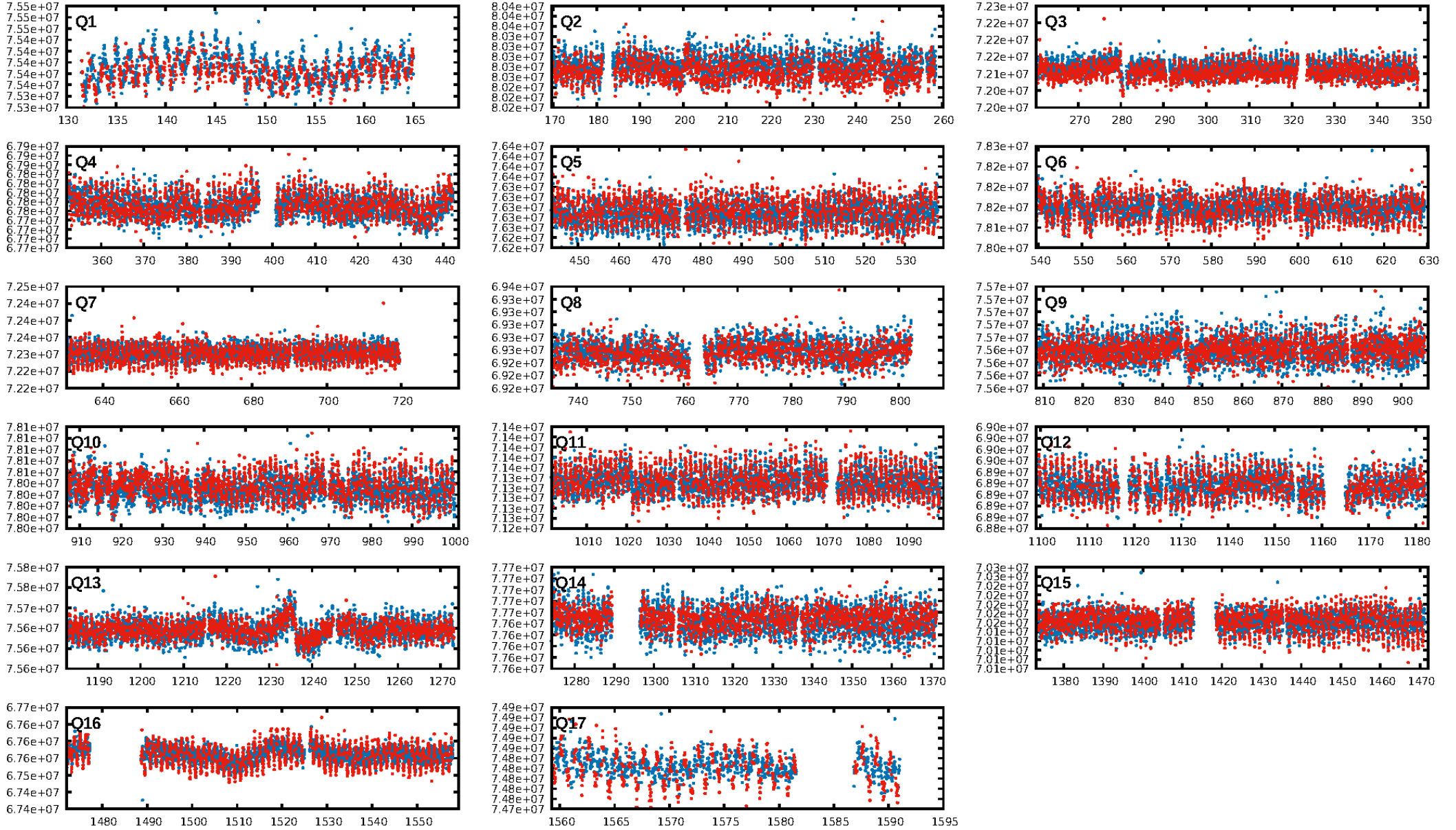
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [588.90σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.80e-14  
RollingBand-fgt: 0.96 [1969/2049]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.670 arcsec [2.17σ]  
KicOffset-rm: 0.799 arcsec [2.60σ]  
OotOffset-st: 4/4/3/5 [16]  
KicOffset-st: 4/4/3/5 [16]  
DiffImageQuality-fgm: 0.38 [6/16]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:59:25 Z

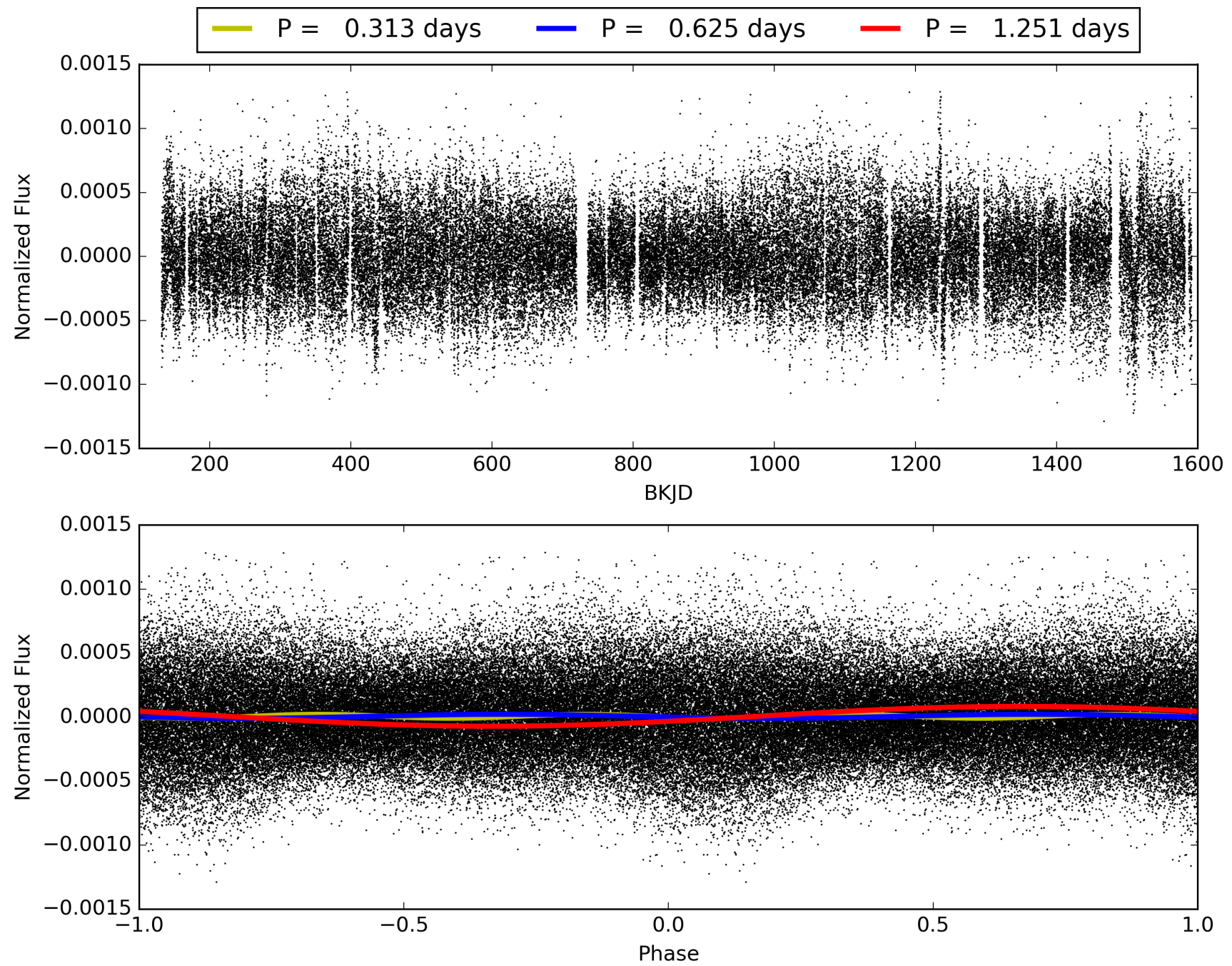
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 012115810-01, PDC Light Curves





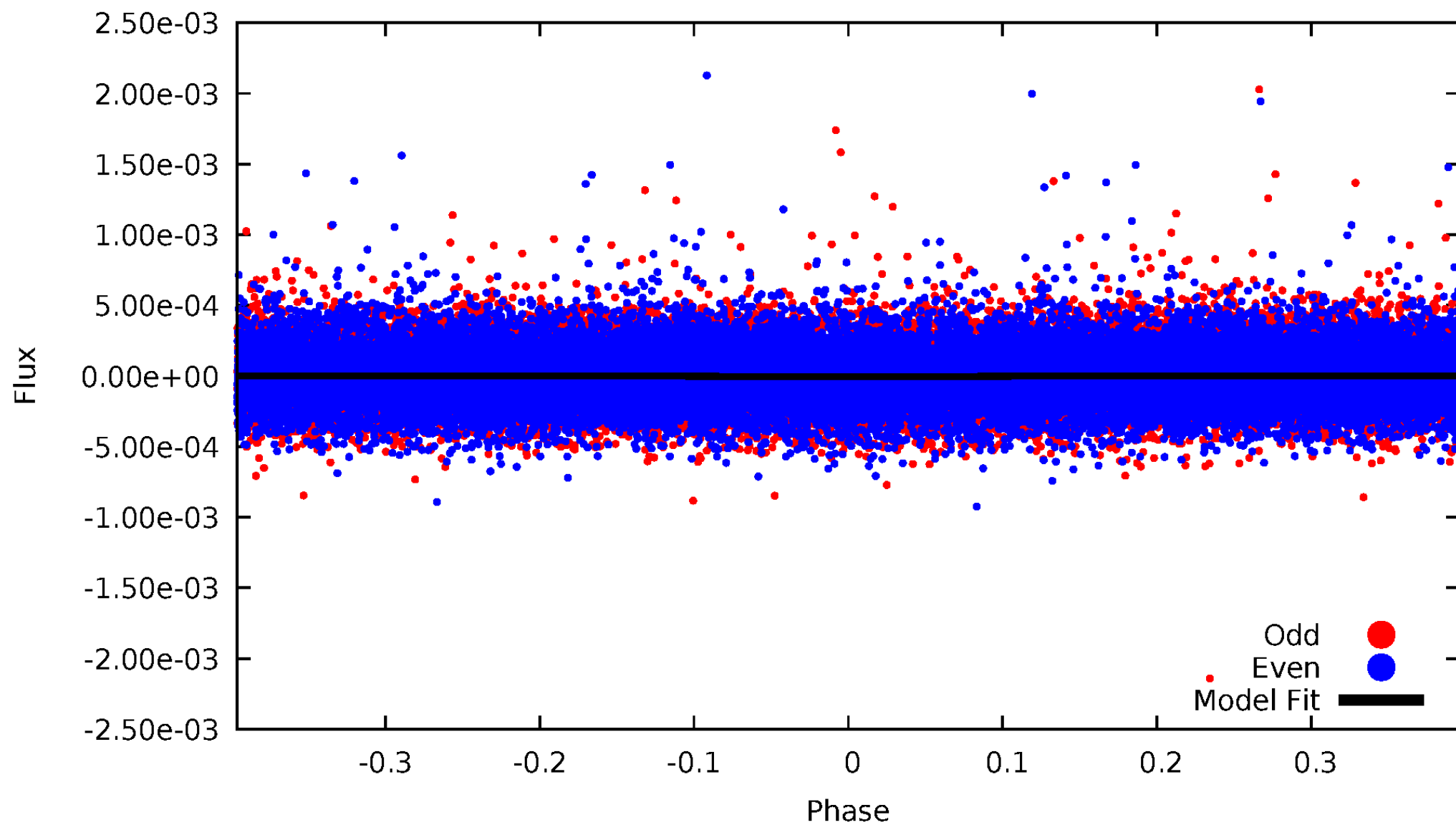
TCE 012115810-01





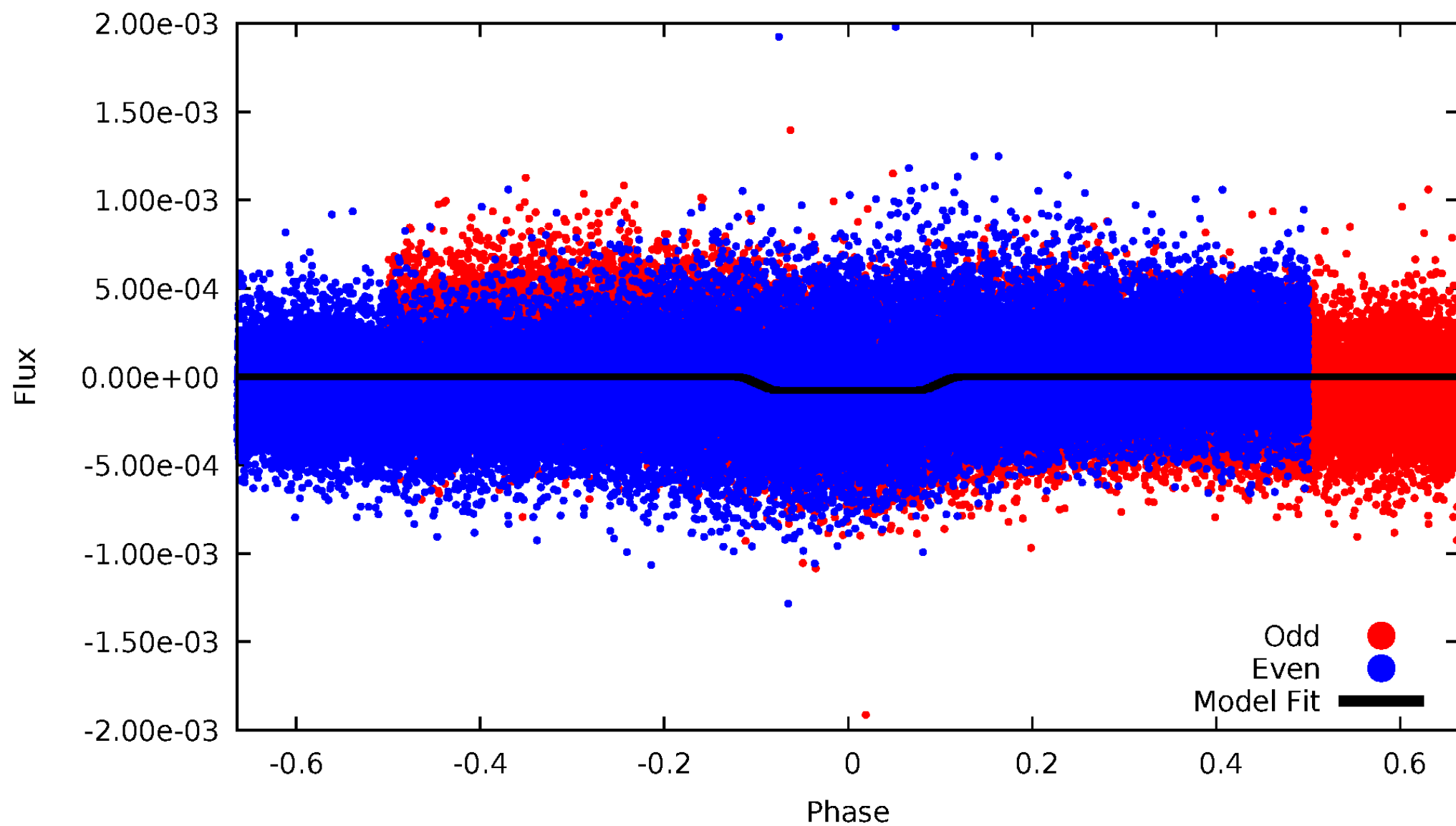
# DV Odd/Even

TCE 012115810-01

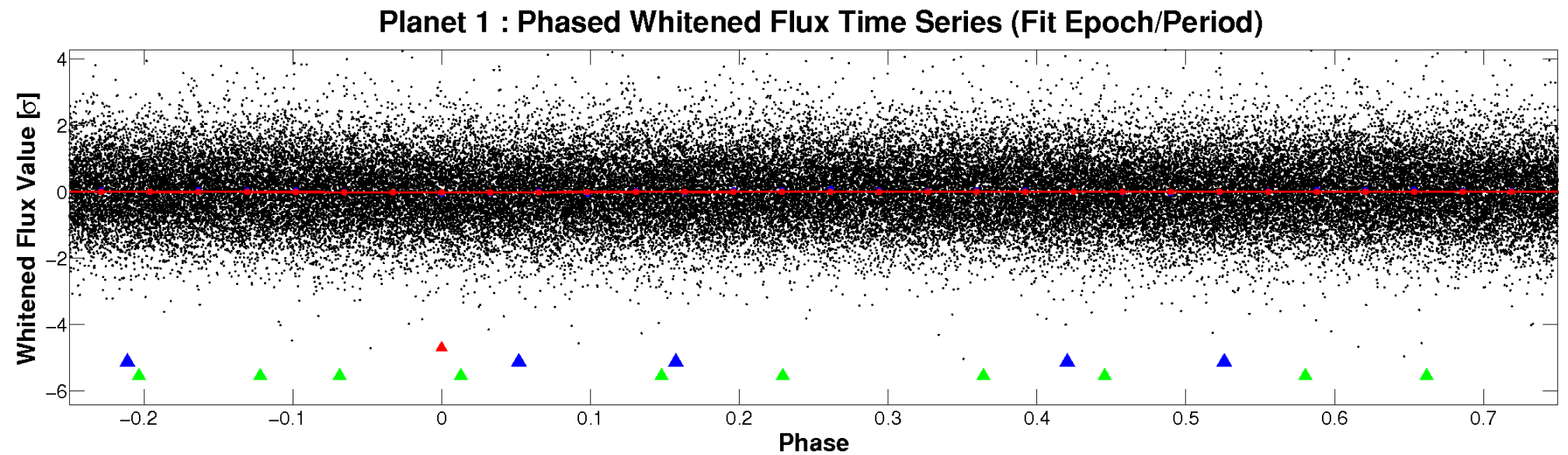
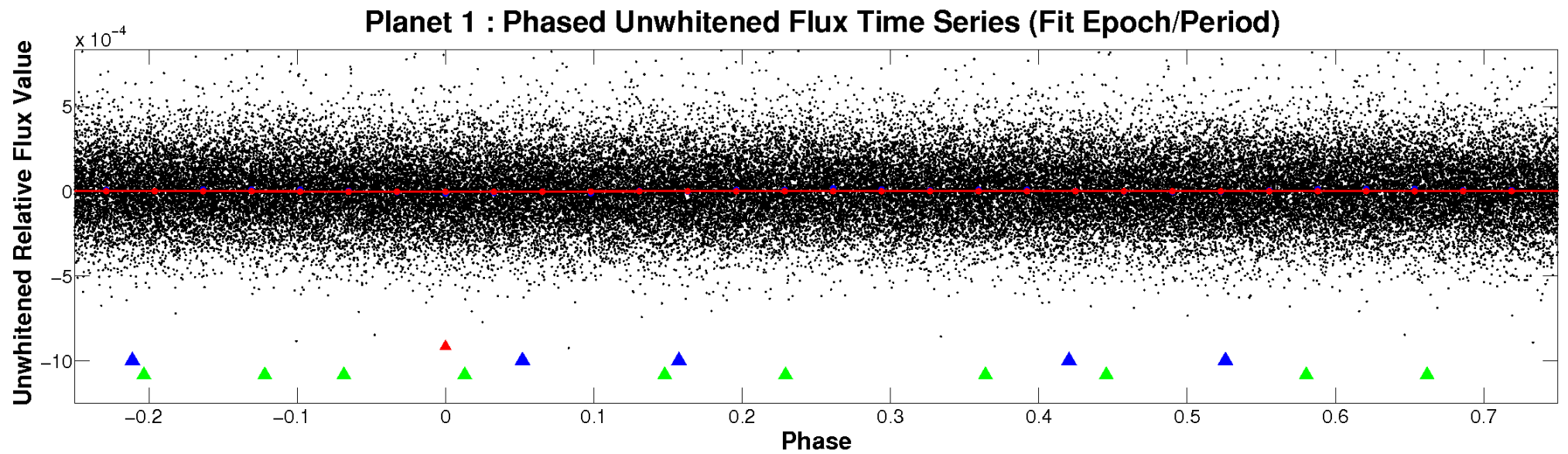


# ALT Odd/Even

TCE 012115810-01



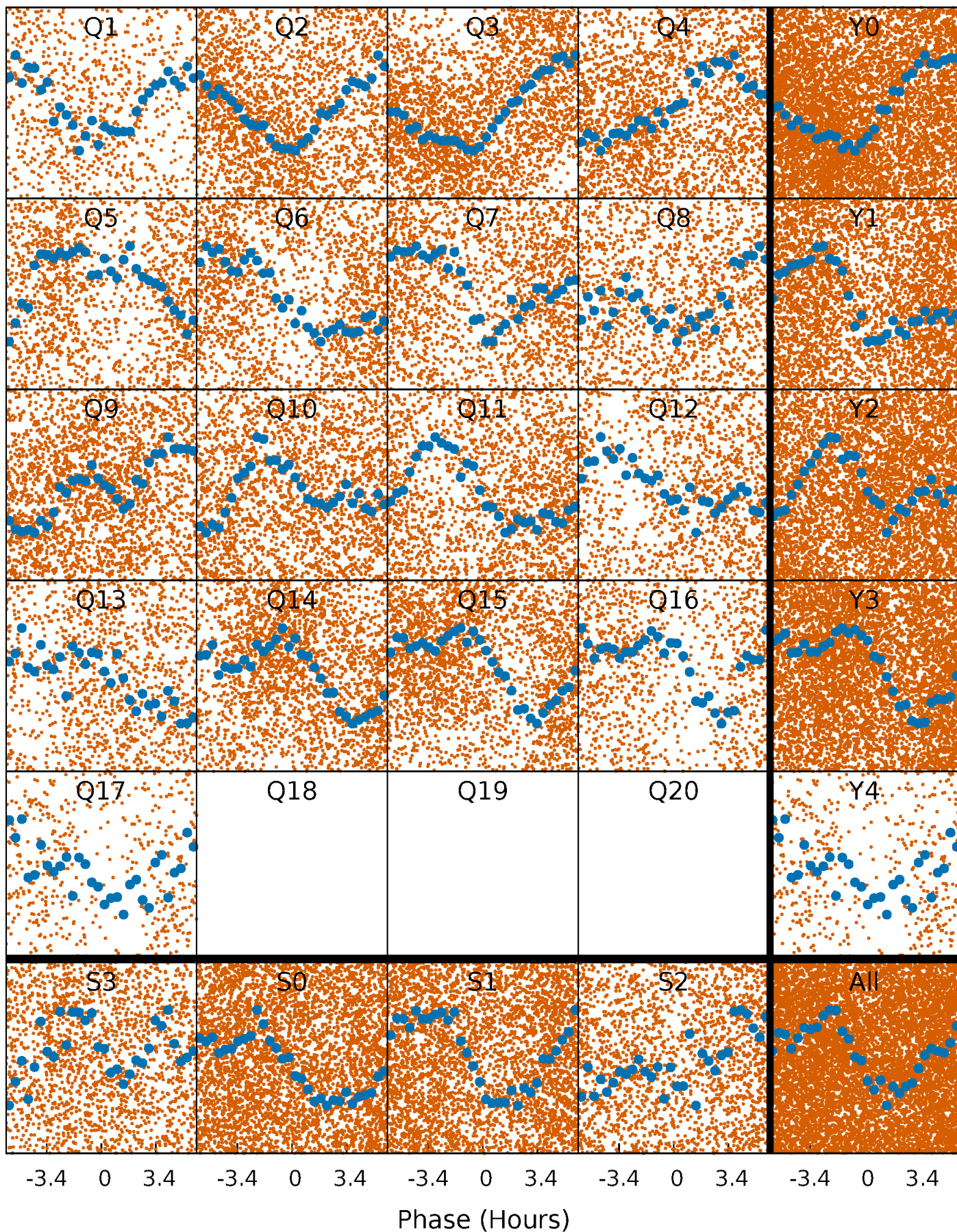
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

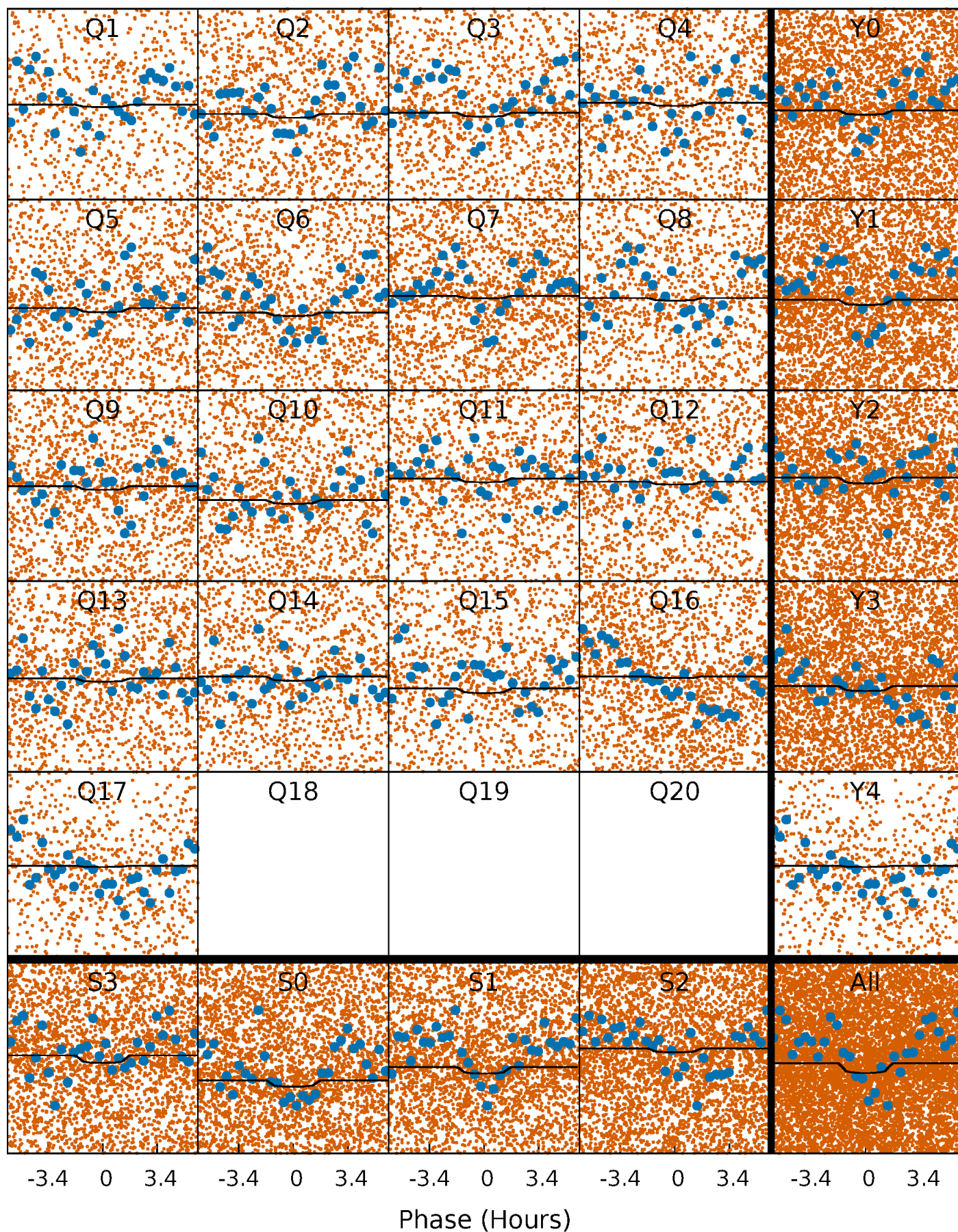
TCE 012115810-01 P= 0.625421 Days  $T_0=131.665985$  (BKJD)





# DV Quarter-Phased Transit Curves

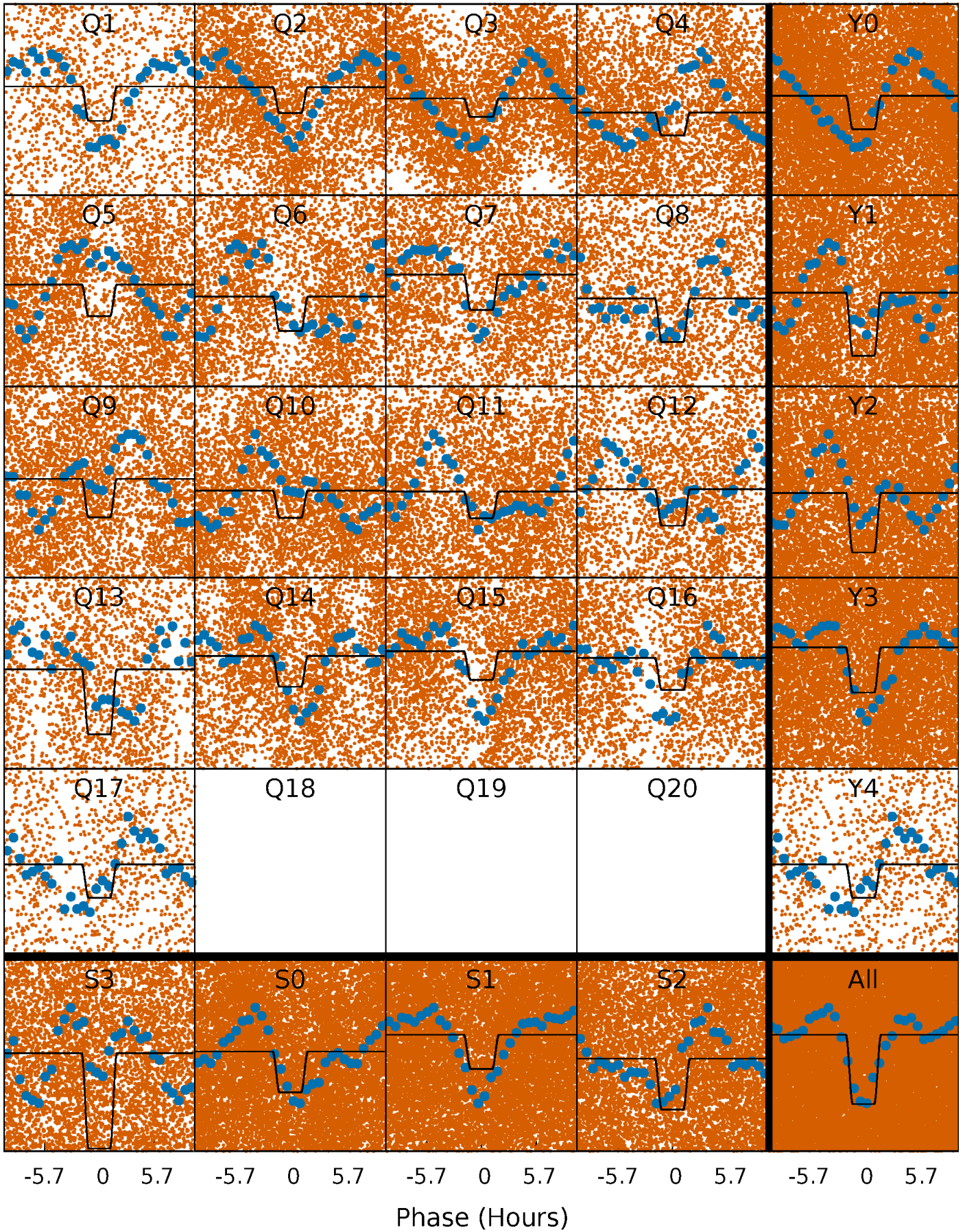
TCE 012115810-01 P= 0.625421 Days  $T_0=131.665985$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 012115810-01 P= 0.625495 Days  $T_0=131.638615$  (BKJD)

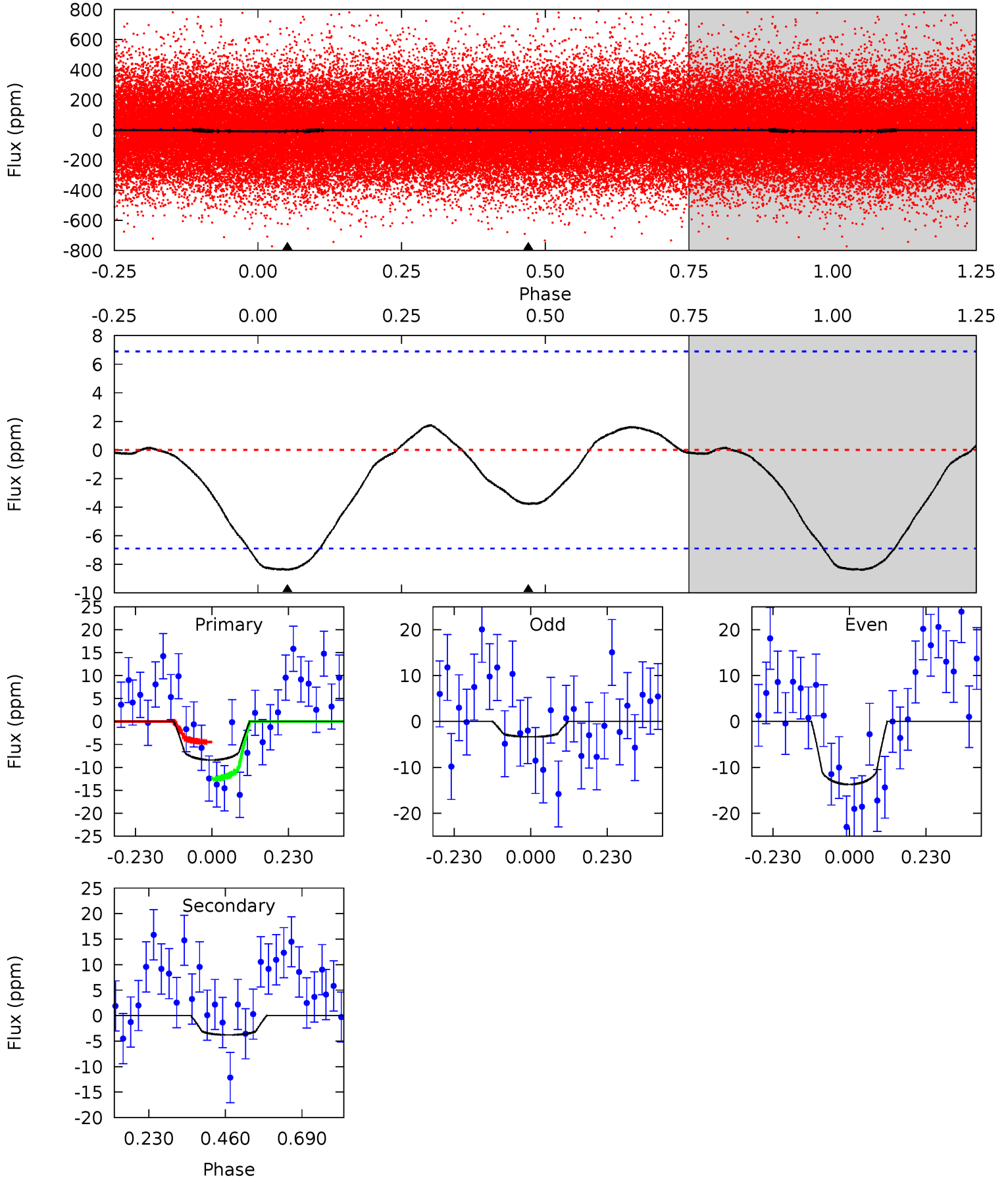




# DV Model-Shift Uniqueness Test

012115810-01, P = 0.625421 Days, E = 131.040564 Days

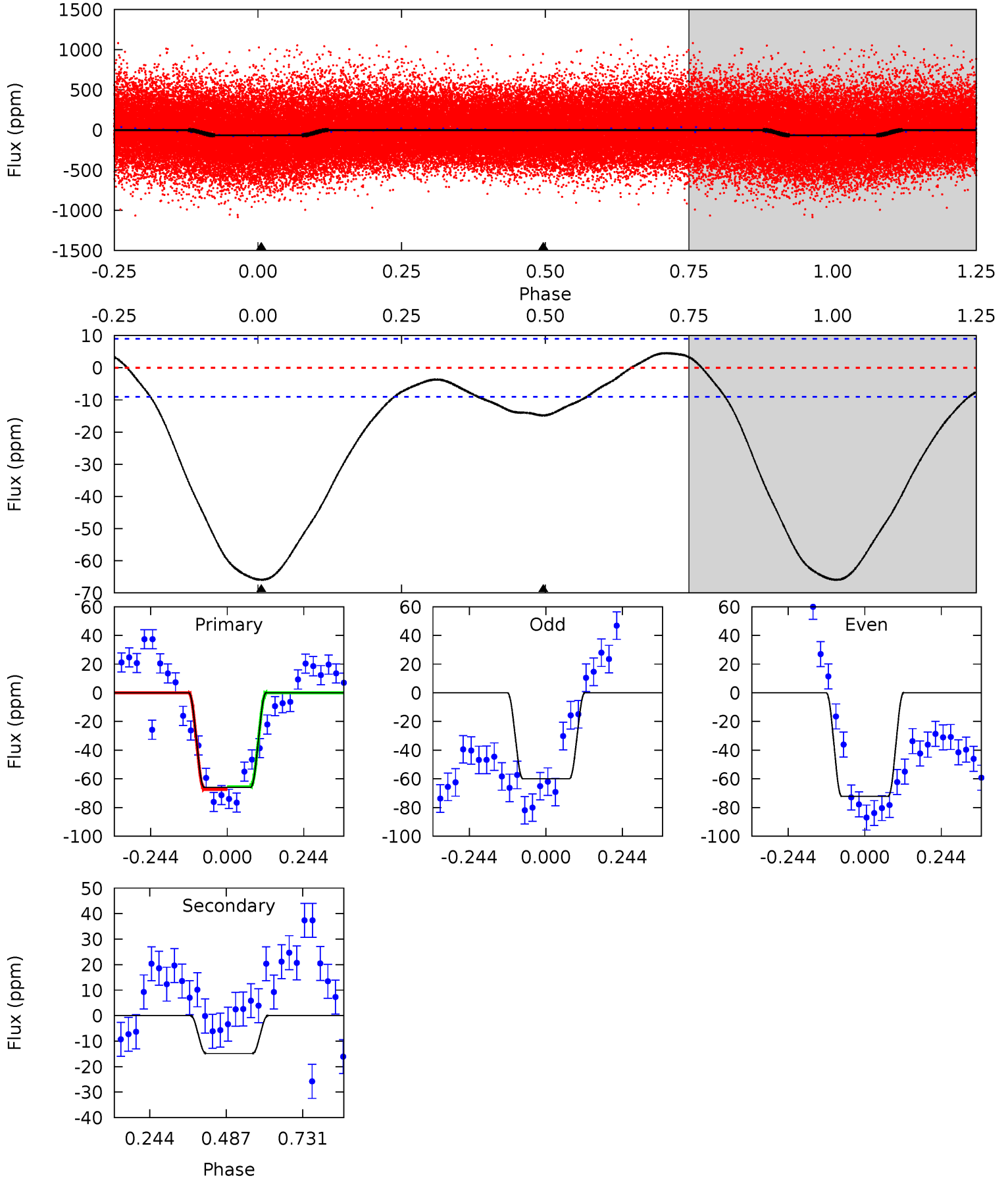
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.34	2.41	0	0	4.39	1.20	0.22	5.34	5.34	2.41	2.41	3.32	0.88	0.17	2.55



# Alt Model-Shift Uniqueness Test

012115810-01, P = 0.625495 Days, E = 131.013120 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
32.0	7.21	0	0	4.37	1.17	2.53	32.0	32.0	7.21	7.21	2.72	0.98	0.06	0.48



### Stellar Parameters For KIC 012115810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6785^{+81}_{-81}$	$4.104^{+0.138}_{-0.112}$	$-0.080^{+0.150}_{-0.150}$	$1.741^{+0.274}_{-0.305}$	$1.410^{+0.103}_{-0.115}$	$0.377^{+0.247}_{-0.127}$
	+1%/-1%	+3%/-3%	+188%/-188%	+16%/-18%	+7%/-8%	+66%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 012115810-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-4 \pm 2$	$0.41^{+0.31}_{-0.25}$	$4356^{+214}_{-202}$	$6182^{+5612}_{-1678}$	$3.244^{+17.493}_{-2.283}$
Alt.	$-15 \pm 2$	$1.66^{+0.33}_{-0.34}$	$4357^{+184}_{-199}$	$4203^{+559}_{-482}$	$0.762^{+0.476}_{-0.248}$

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



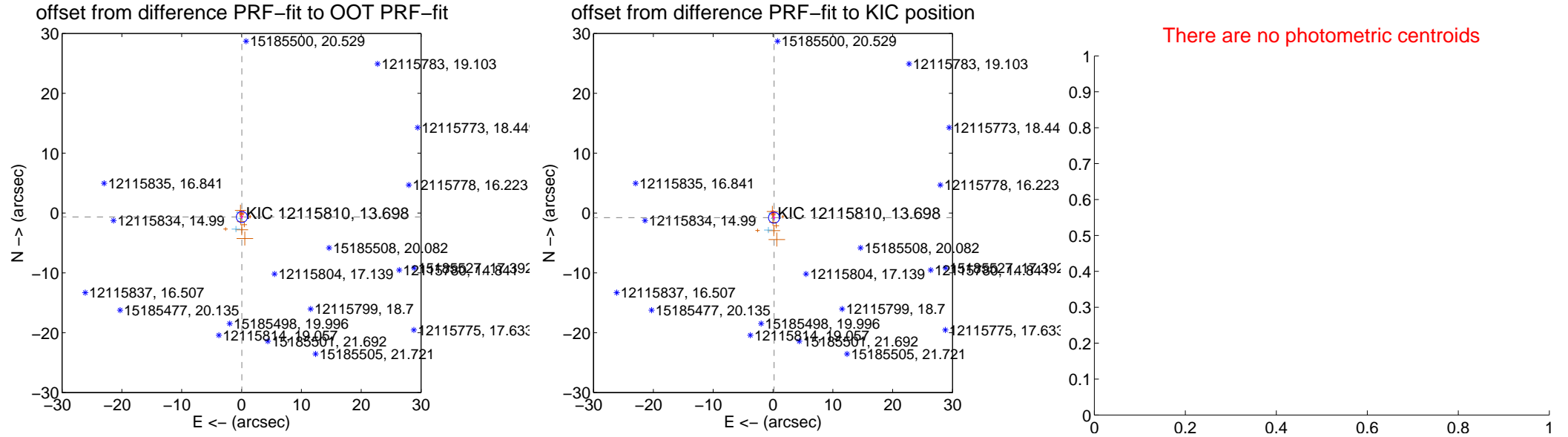
## DV Centroid Data

Supplemental centroid analysis for 012115810-01. Kepler magnitude: 13.70. Transit SNR 1.44

There are 6 quarters with good PRF difference image offsets

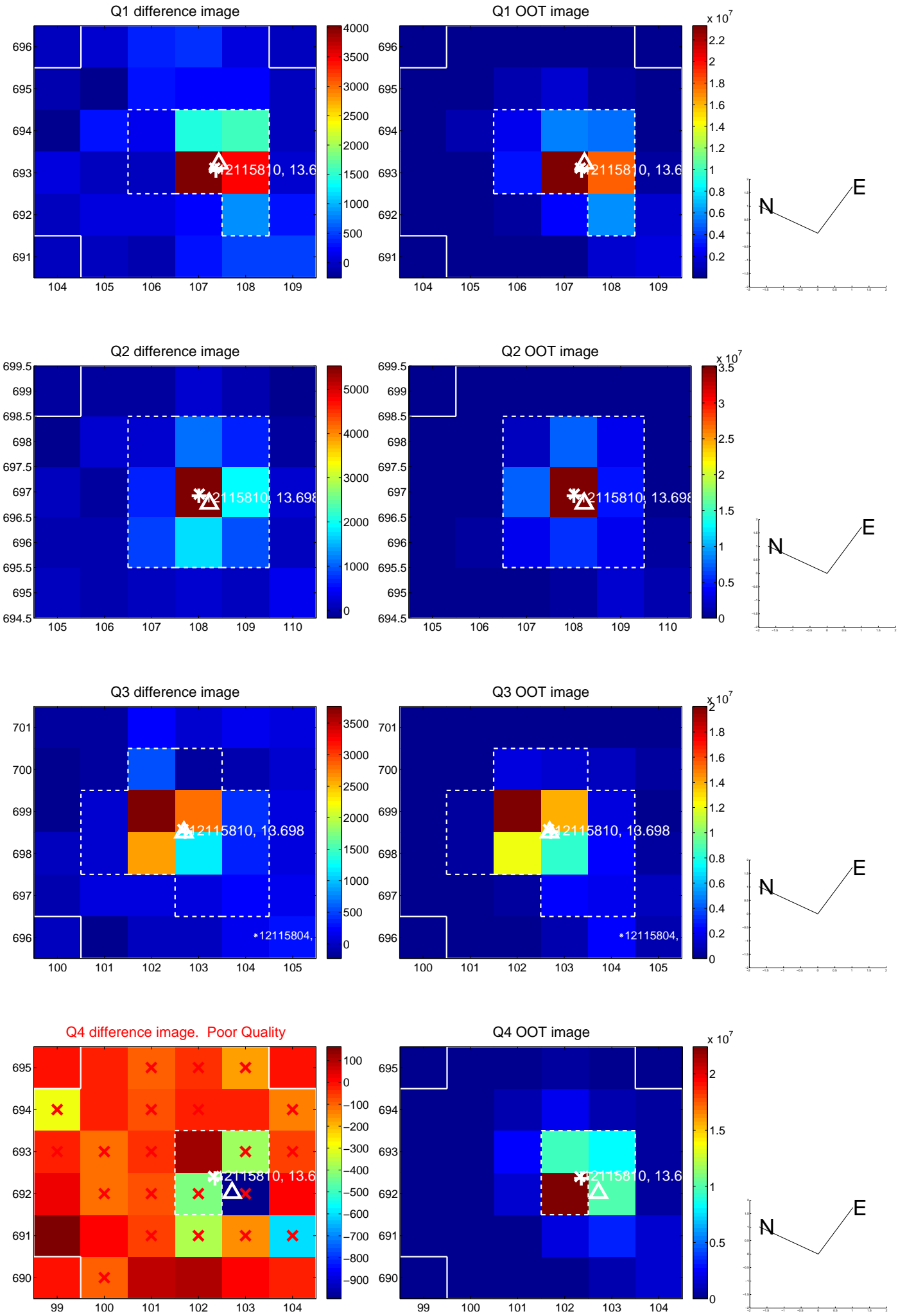
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.670 \pm 0.308$	2.17	$-0.056 \pm 0.220$	$-0.667 \pm 0.312$
PRF-fit source offset from KIC position	$0.799 \pm 0.308$	2.60	$-0.171 \pm 0.227$	$-0.780 \pm 0.328$
photometric centroid source offset	—	—	—	—

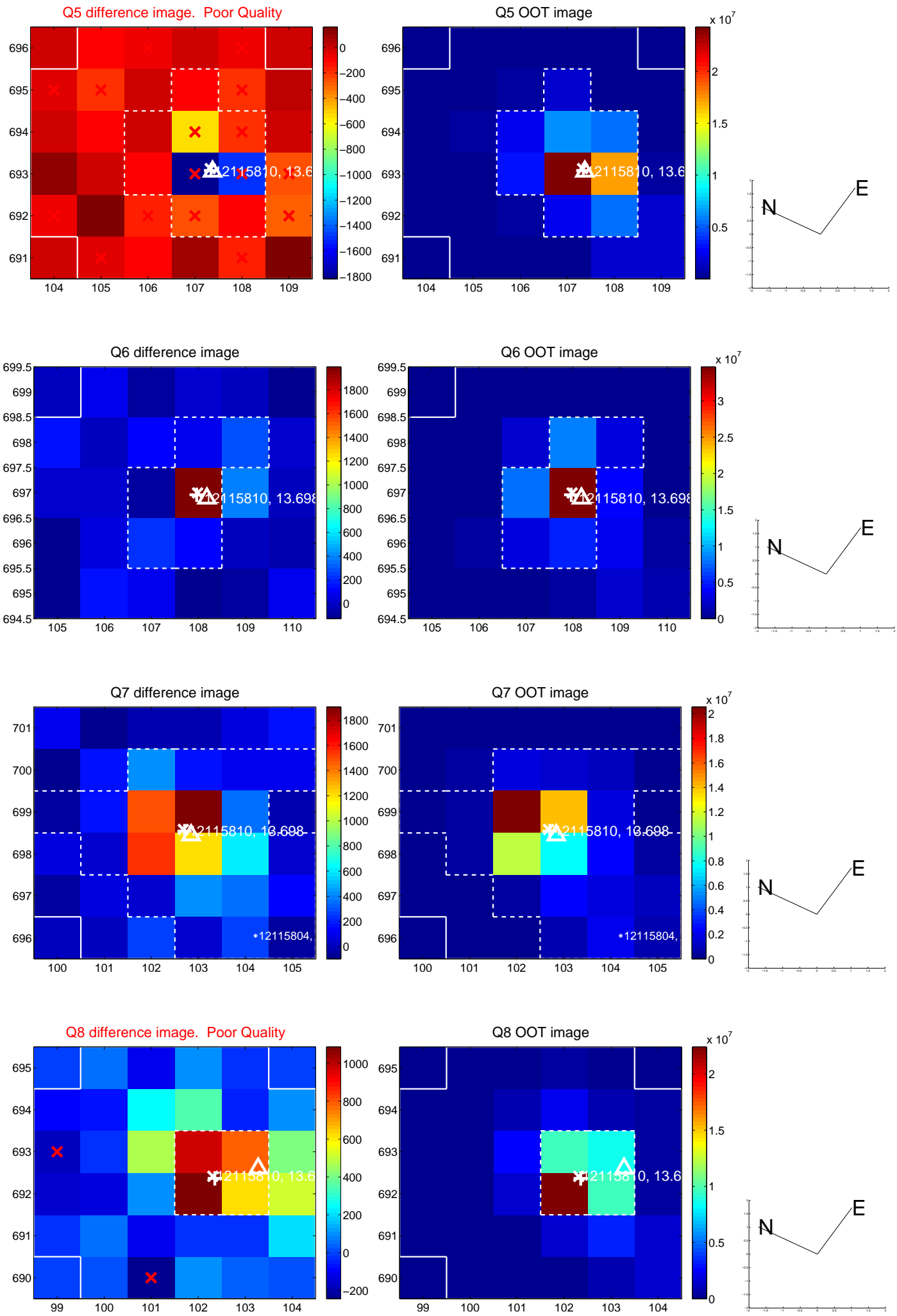


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

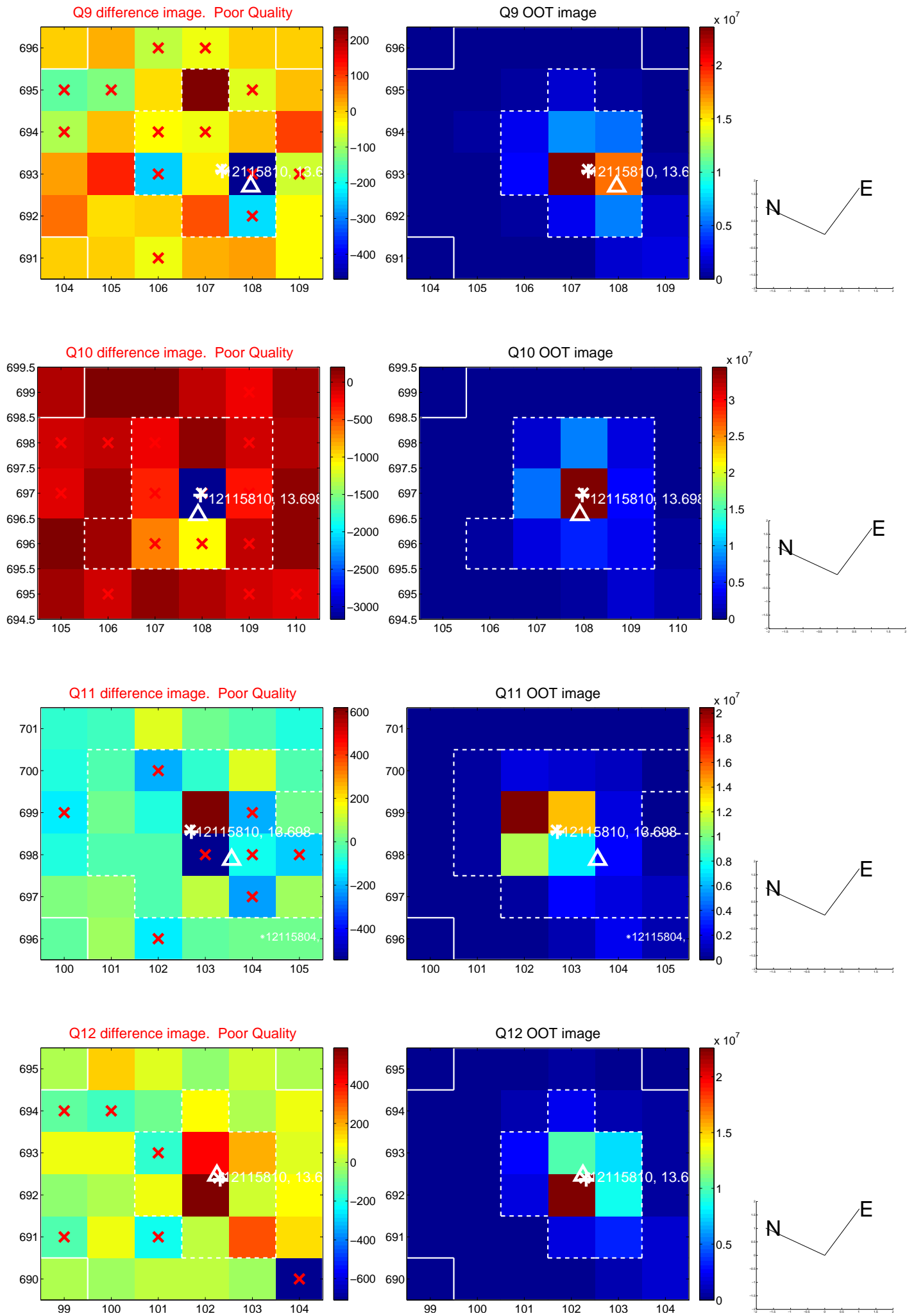


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

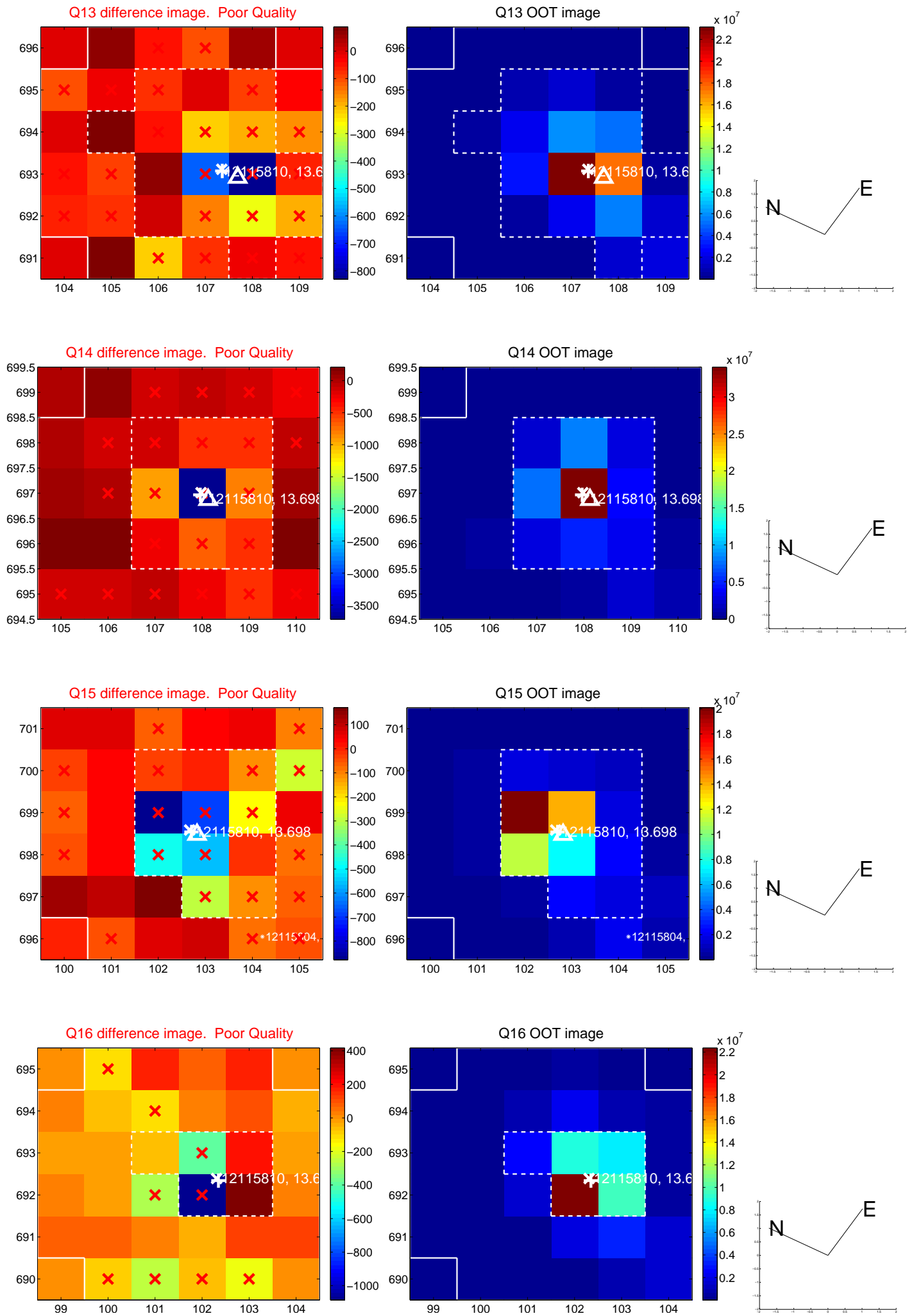




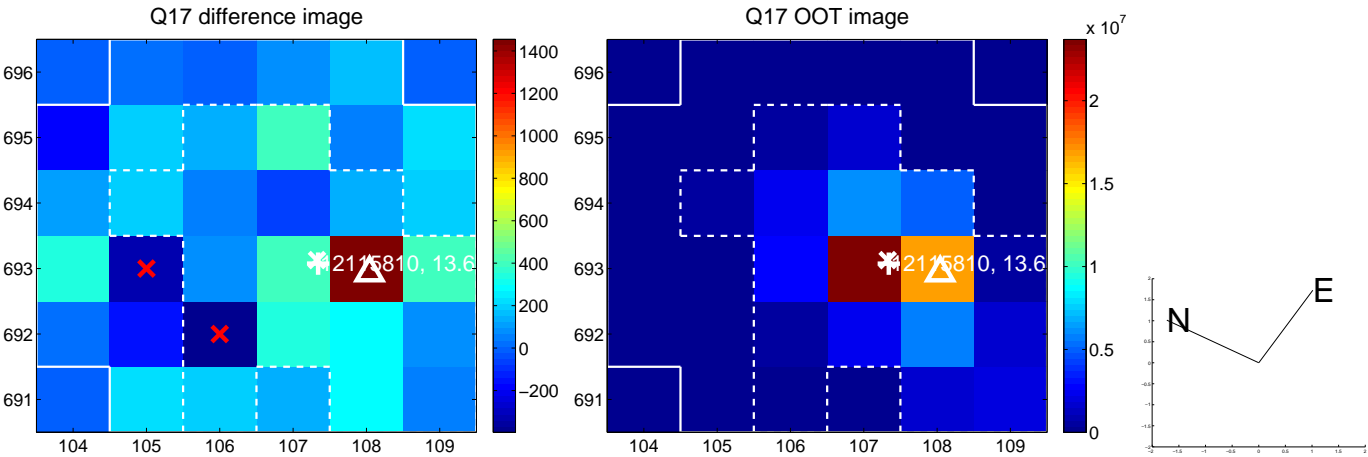
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



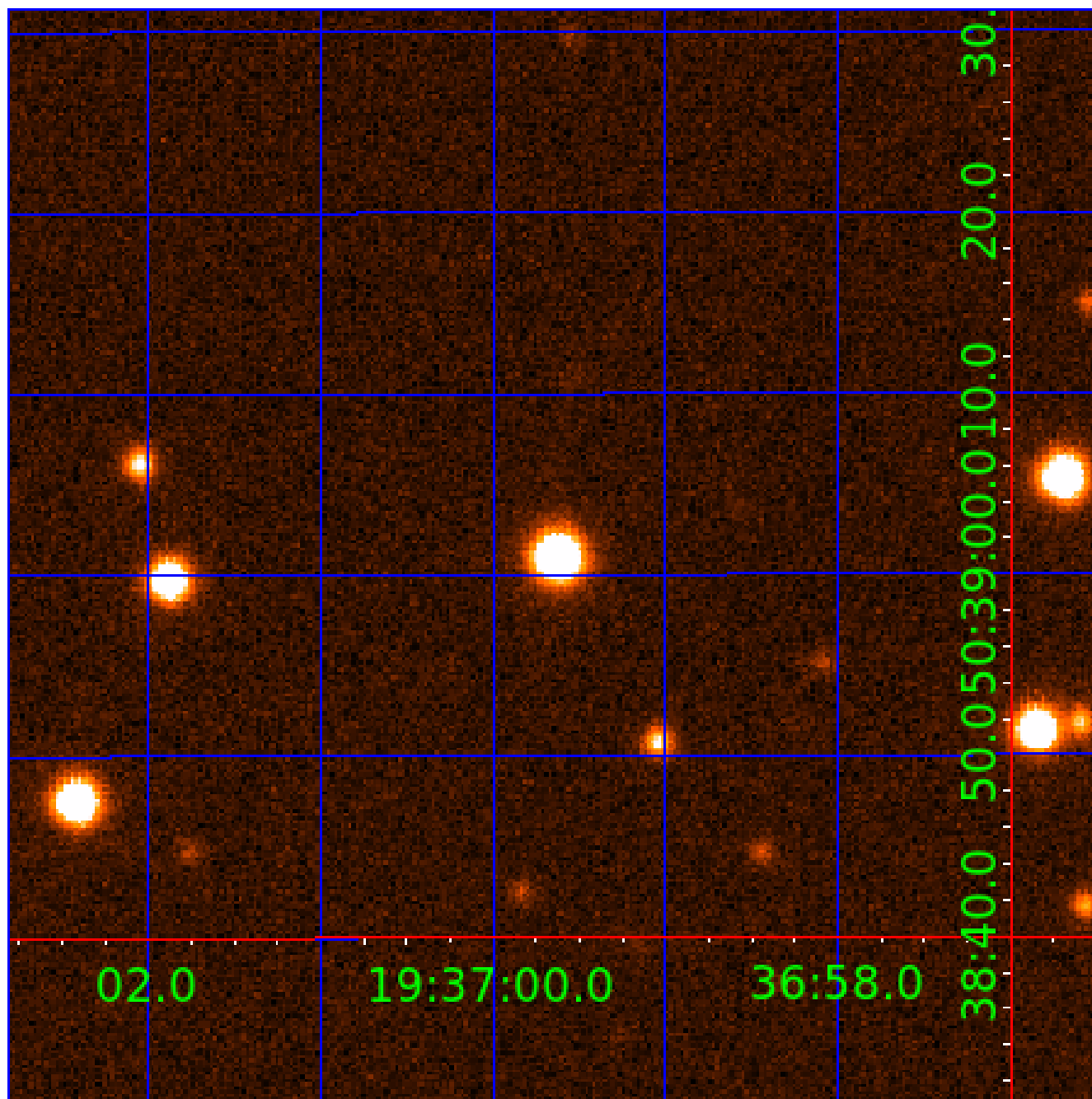
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

# UKIRT Image

Declination





# KIC 012115810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012115810-01	OBS	No	0.625421	131.665985	3.3	2.973	7.8	1.4	1.74	6785	0.37	22390.48
012115810-02	OBS	No	318.734057	280.219583	398.6	10.819	8.3	8.2	1.74	6785	3.72	5.50
012115810-03	OBS	No	148.089413	133.466041	286.7	5.223	7.8	7.0	1.74	6785	3.17	15.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012115810-01	OBS	FP	0.00	1	0	0	0	LPP_DV
012115810-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_DIFFS
012115810-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_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.

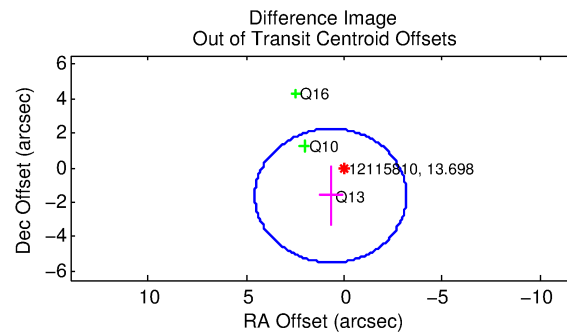
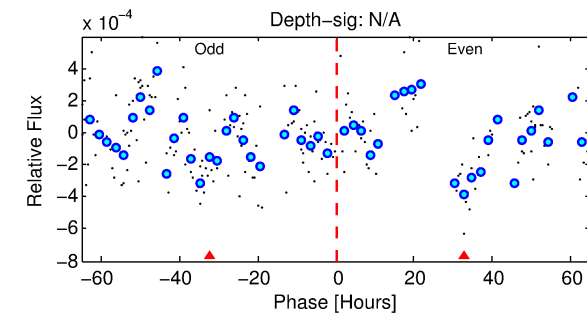
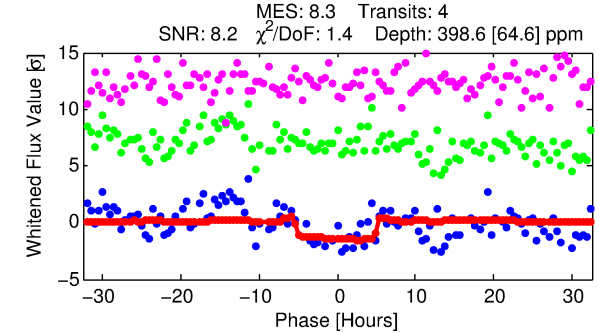
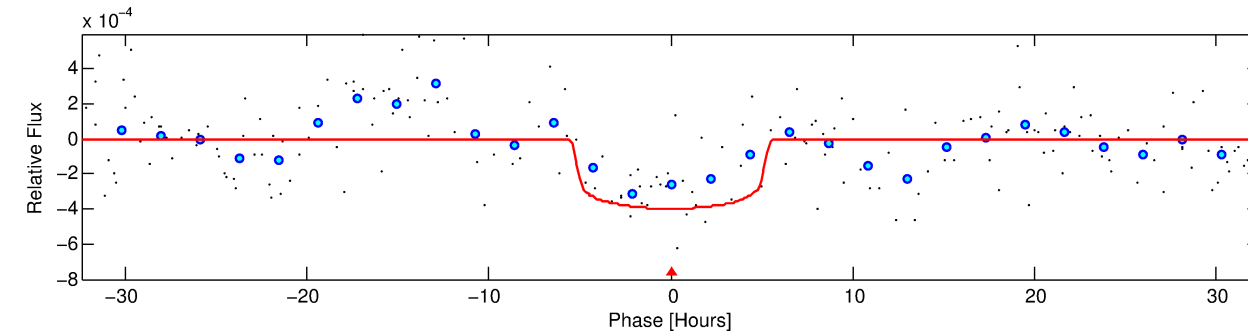
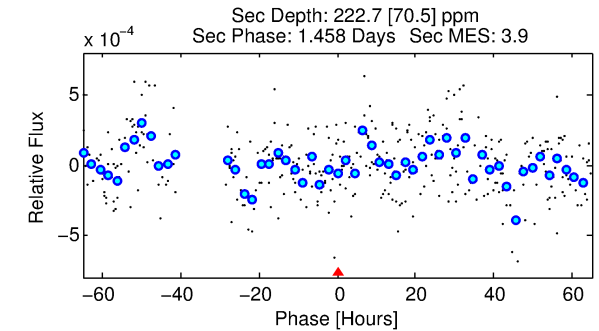
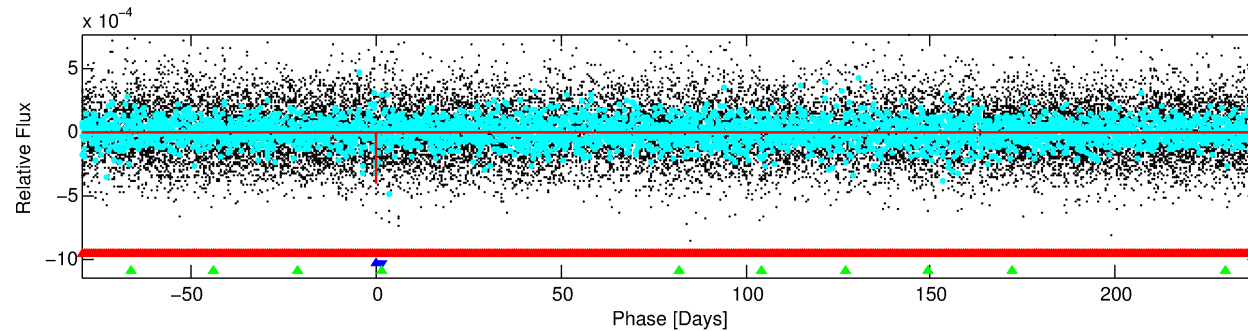
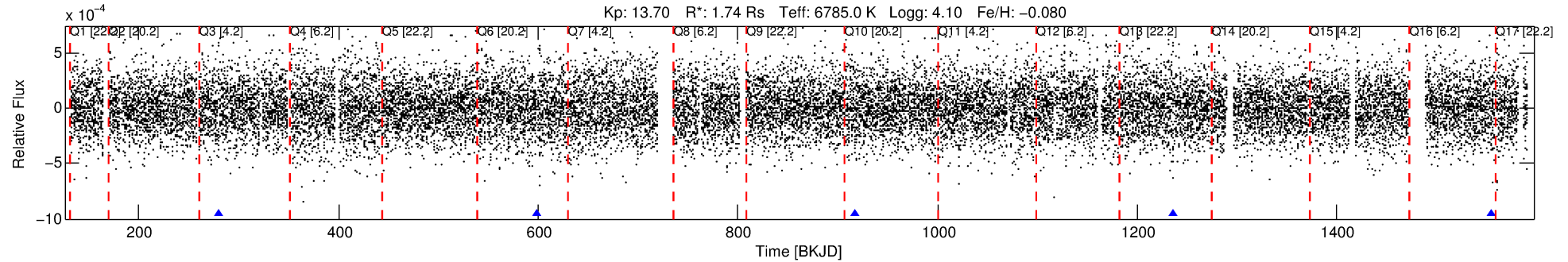
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012115810-02

No Significant Match Found

# DV One-Page Summary

KIC: 12115810 Candidate: 2 of 3 Period: 318.734 d



## DV Fit Results:

Period = 318.73406 [0.04014] d  
Epoch = 280.2196 [0.1242] BKJD  
Rp/R\* = 0.0196 [0.0165]  
a/R\* = 166.94 [783.70]  
b = 0.70 [3.54]  
Seff = 5.50 [1.36]  
Teq = 391 [24] K  
Rp = 3.72 [3.20] Re  
a = 1.0229 [0.1613] AU  
Ag = 9257.25 [16021.04] [0.58σ]  
Teffp = 5922 [2538] K [2.18σ]

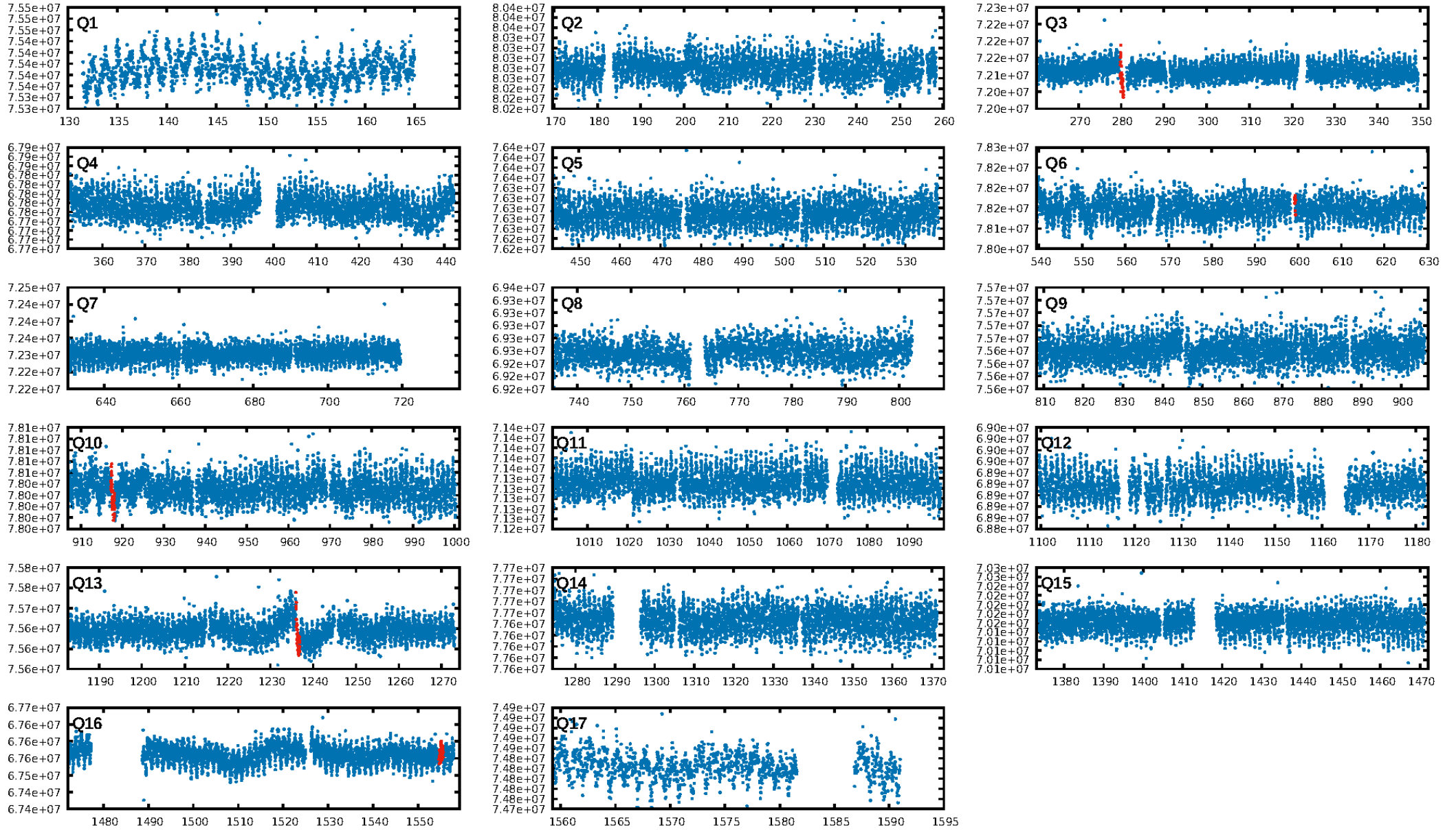
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [340.89σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.2%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 4.35e-11**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -7.681  
Centroid-sig: 1.3%  
Centroid-so: 2.074 arcsec [1.91σ]  
OotOffset-rm: 1.764 arcsec [1.37σ]  
KicOffset-rm: 1.823 arcsec [1.32σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
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DiffImageOverlap-fno: 0.00 [0/3]

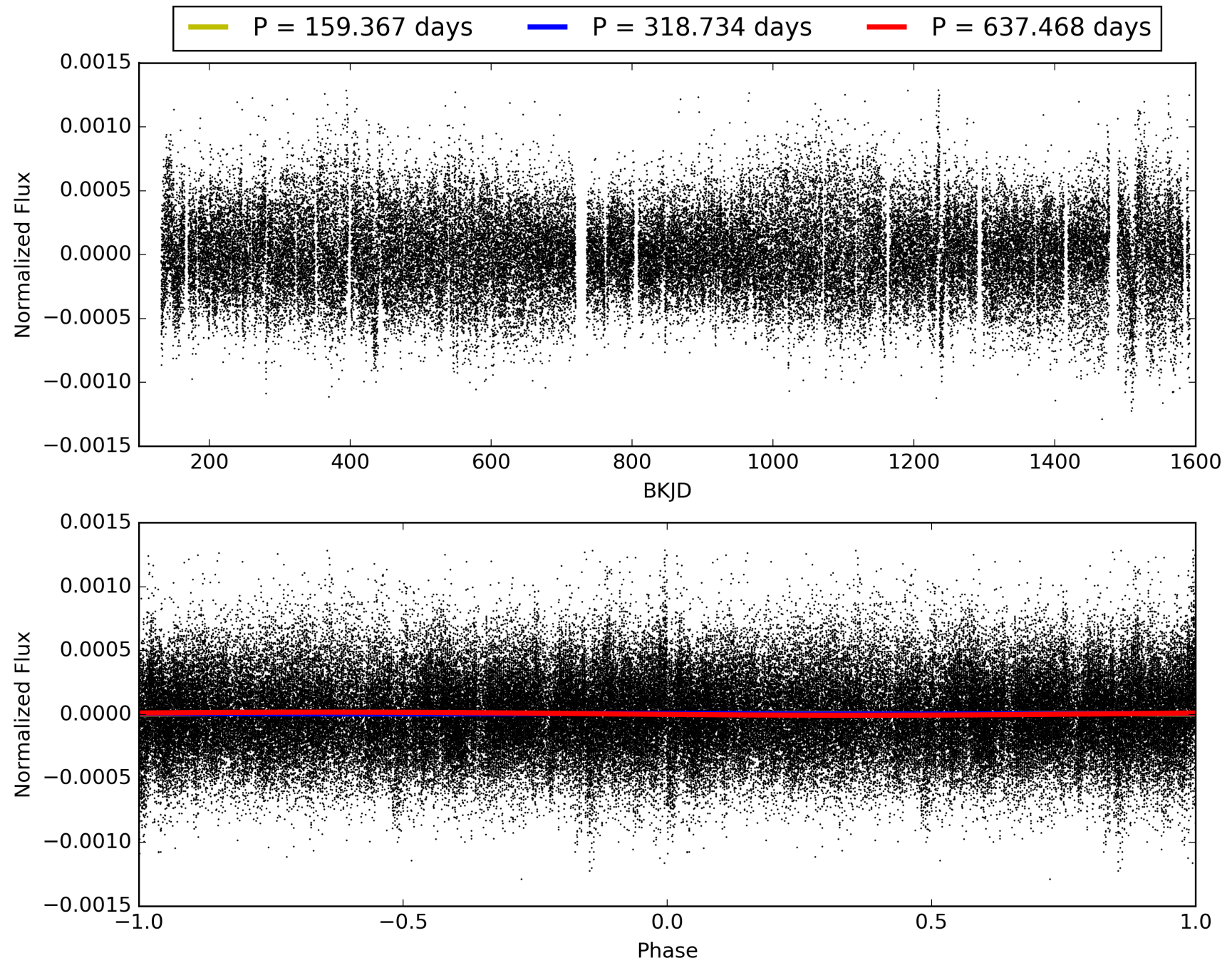
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:59:36 Z

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

# TCE 012115810-02, PDC Light Curves



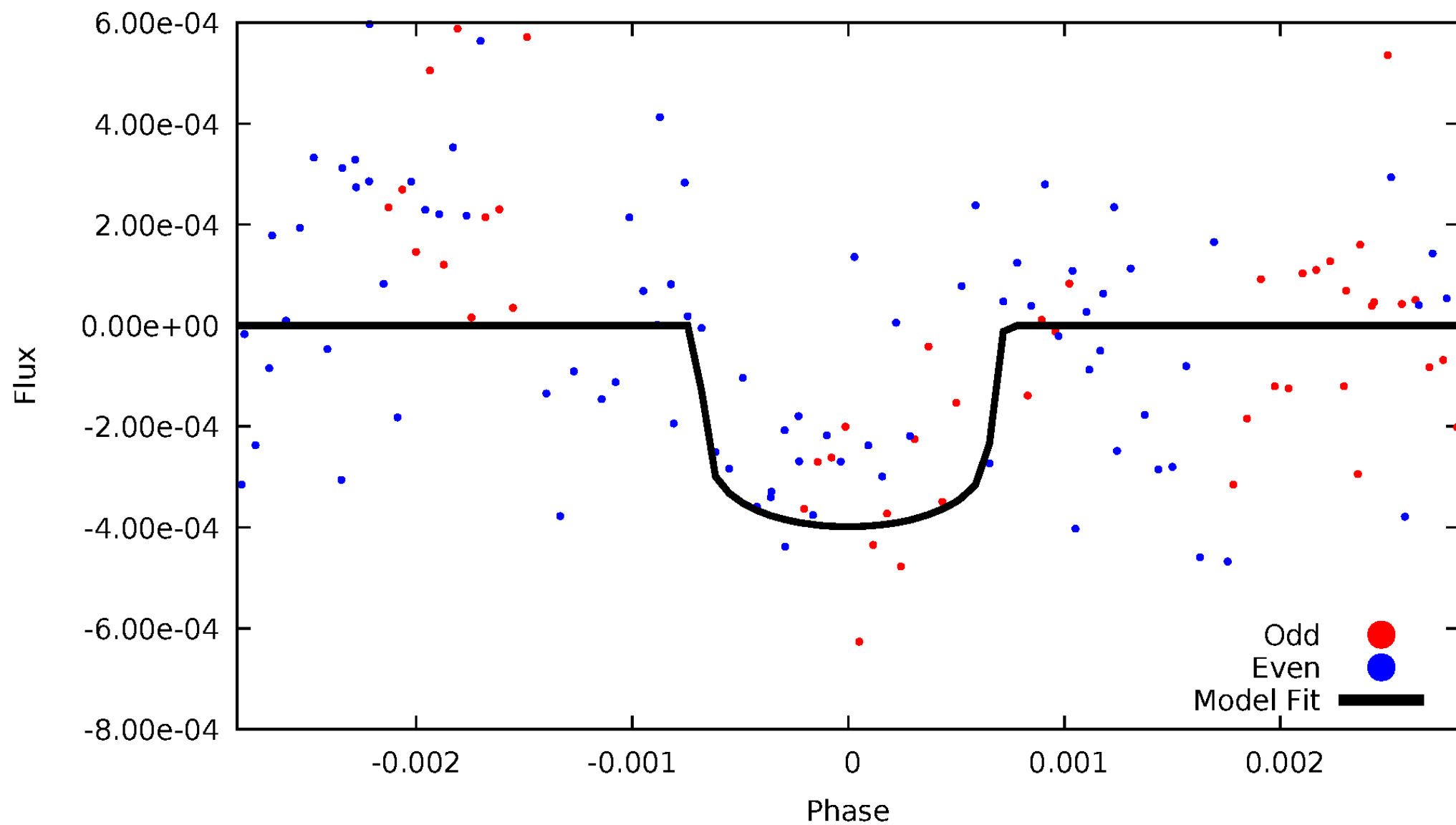
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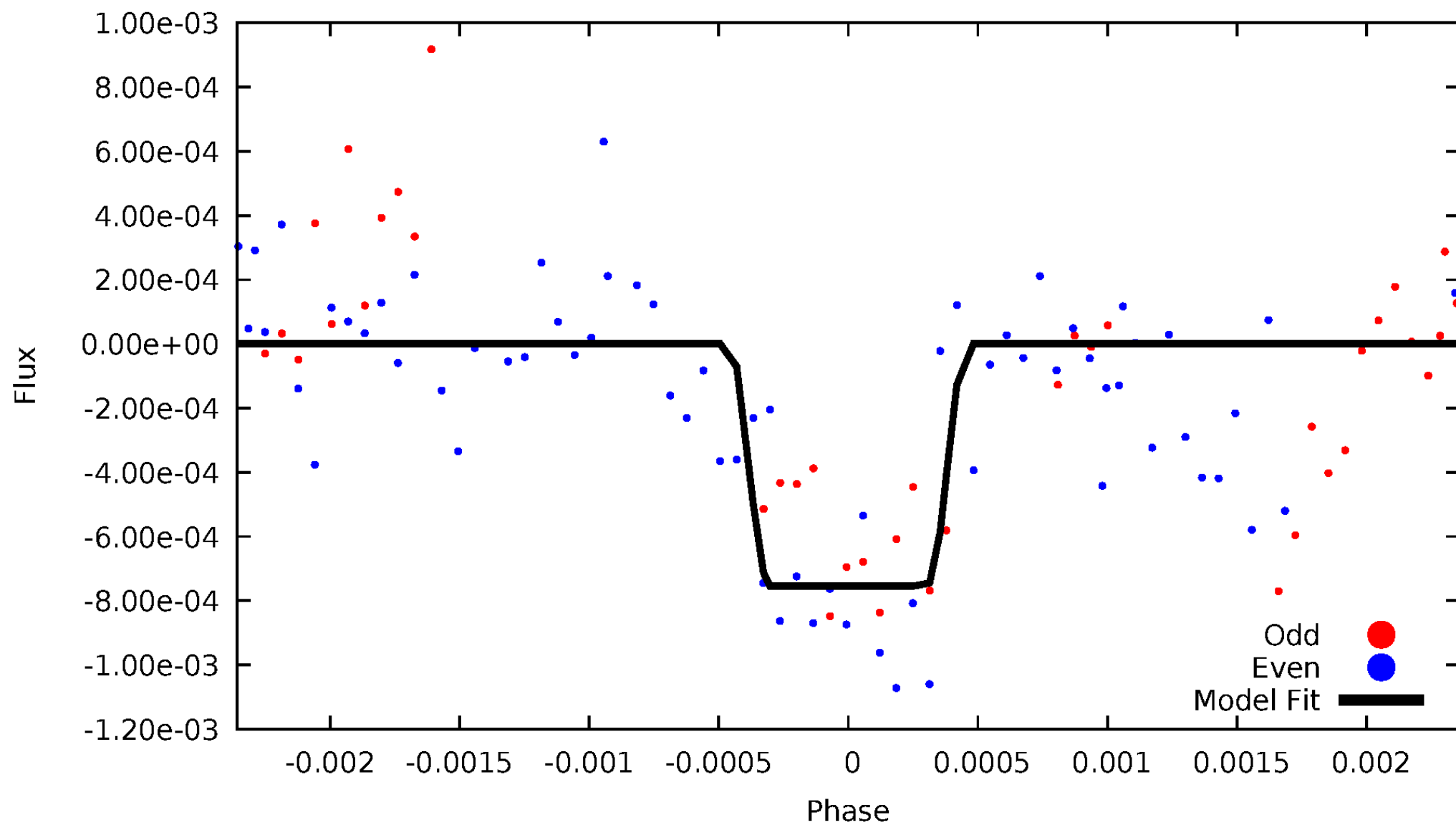
# DV Odd/Even

TCE 012115810-02



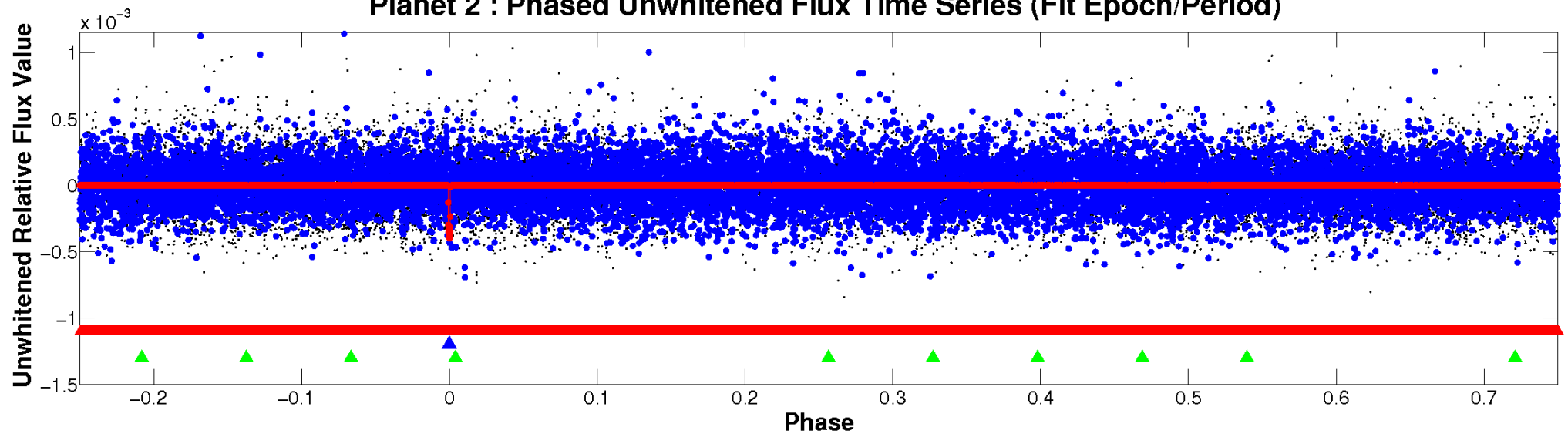
# ALT Odd/Even

TCE 012115810-02

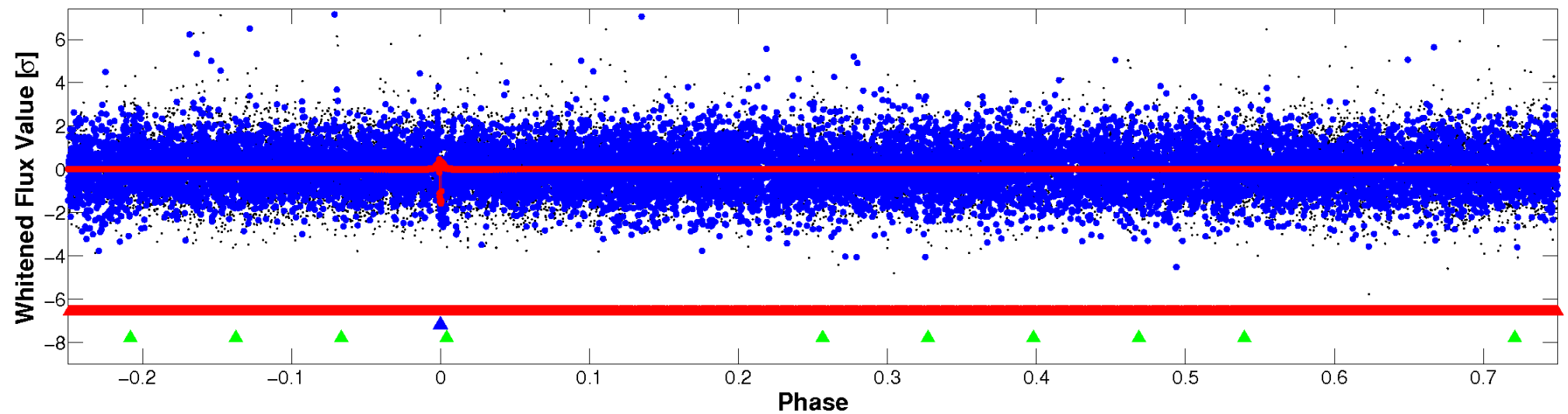


# Non-Whitened Vs. Whitened Light Curve

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

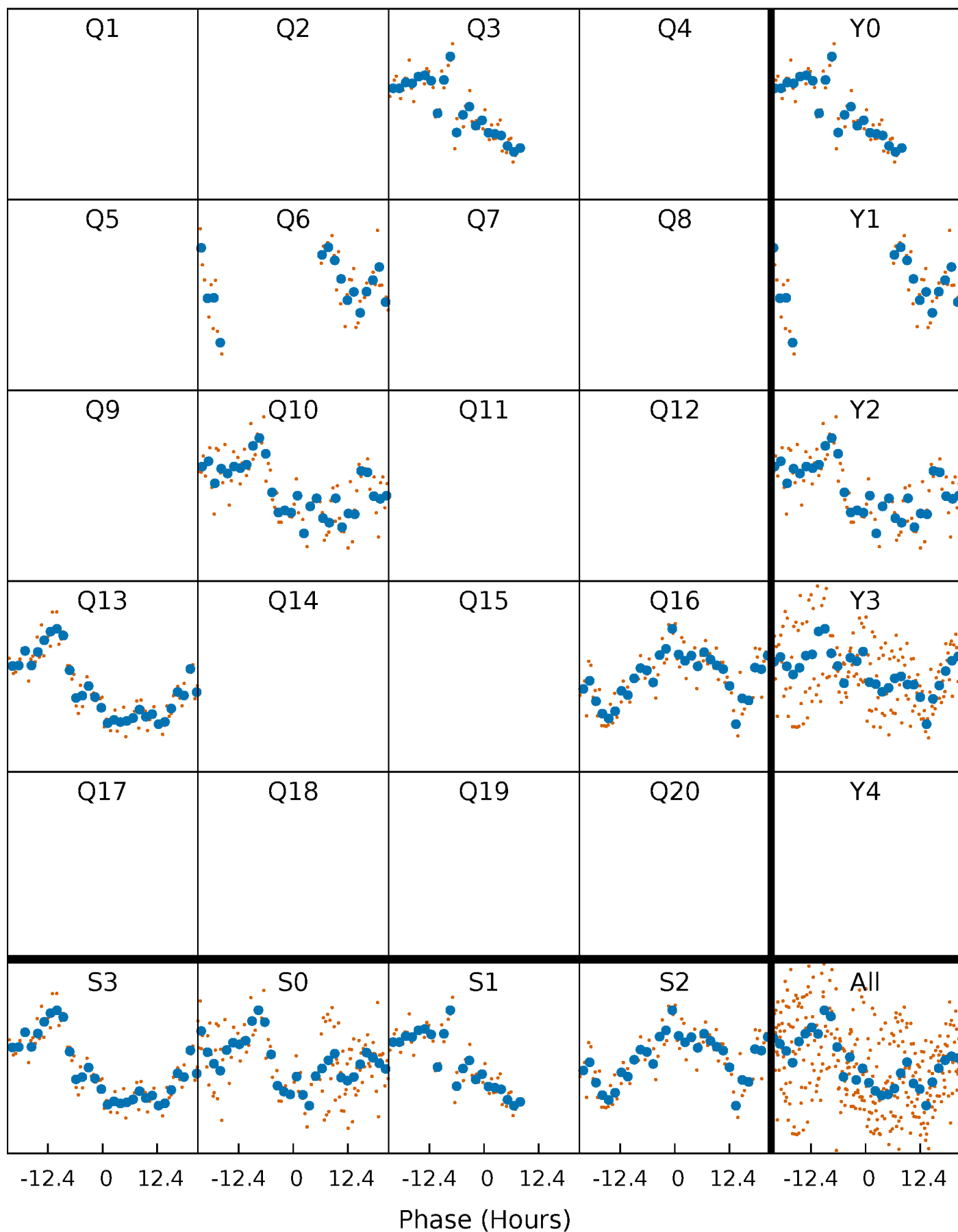


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

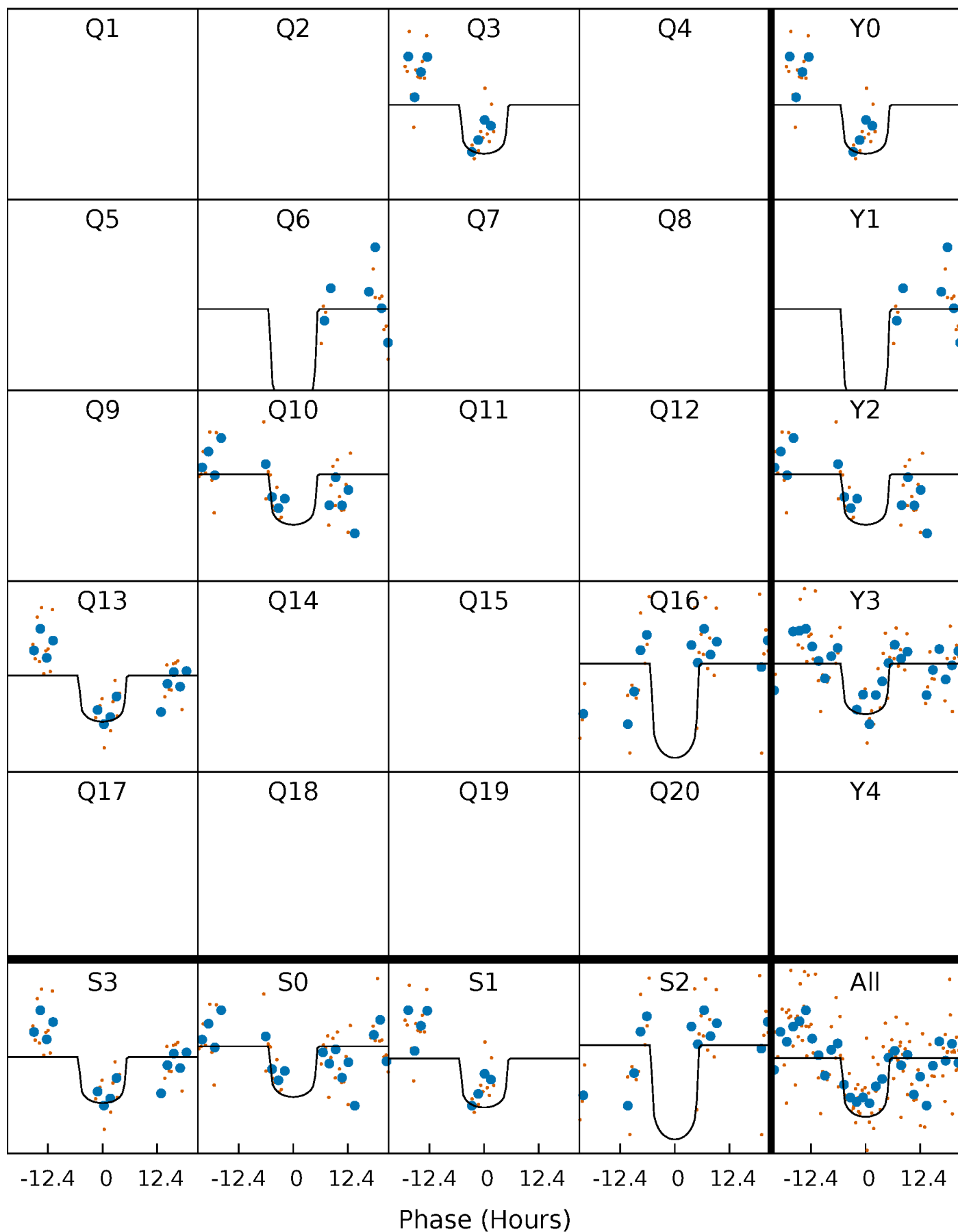
TCE 012115810-02 P=318.734057 Days  $T_0=280.219583$  (BKJD)





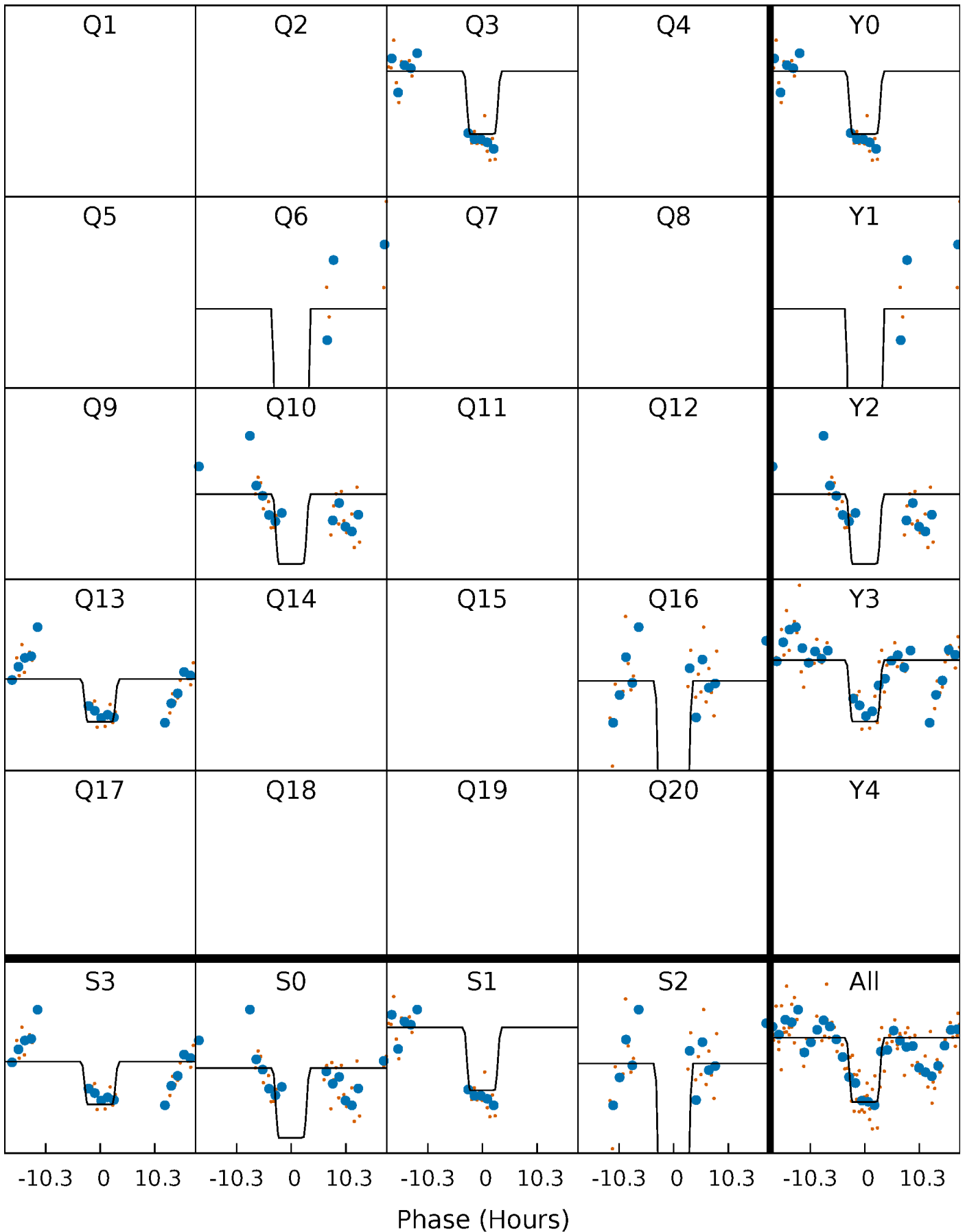
# DV Quarter-Phased Transit Curves

TCE 012115810-02 P=318.734057 Days  $T_0=280.219583$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

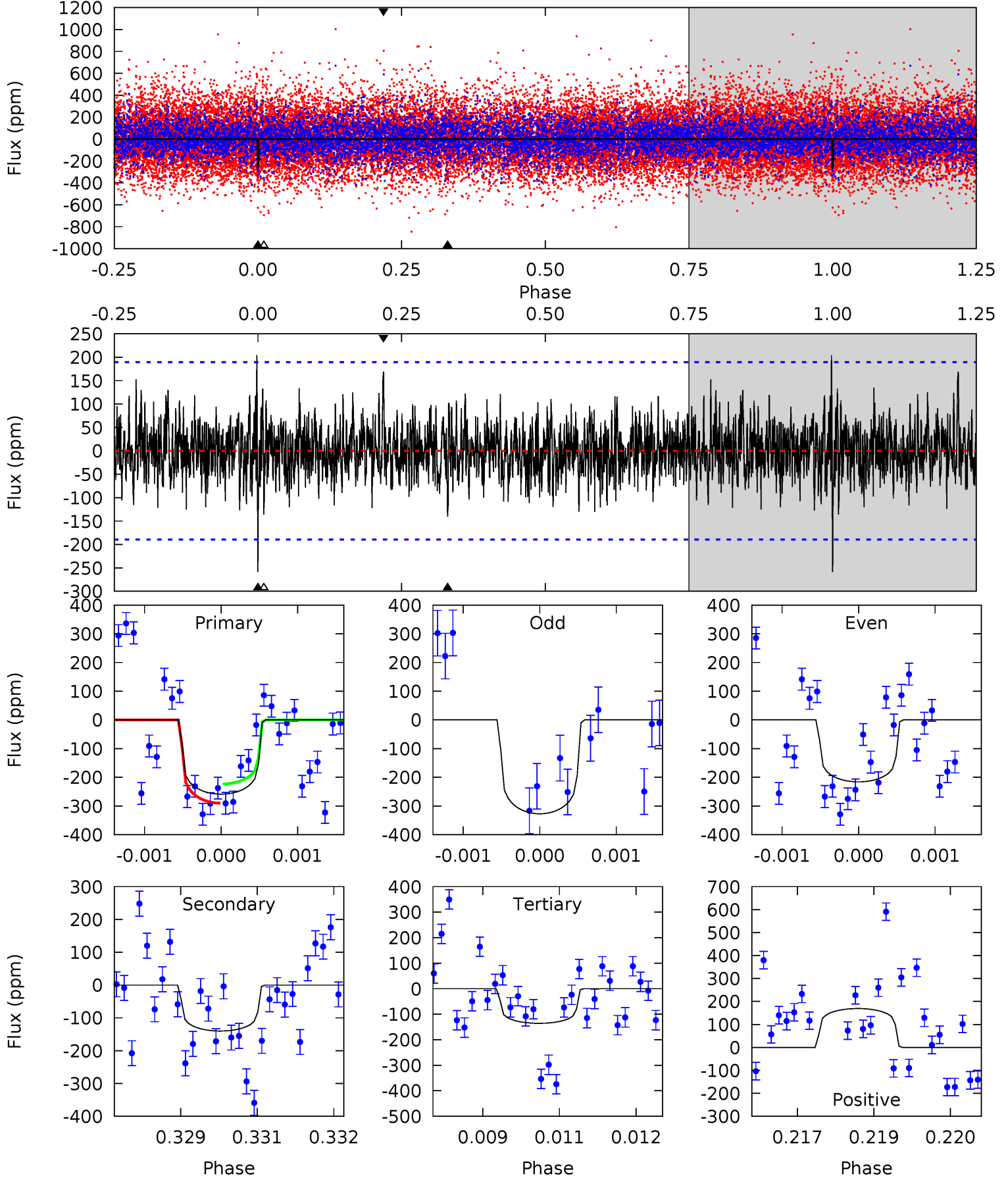
TCE 012115810-02 P=318.749914 Days  $T_0=280.210615$  (BKJD)



# DV Model-Shift Uniqueness Test

012115810-02, P = 318.734057 Days, E = 280.219583 Days

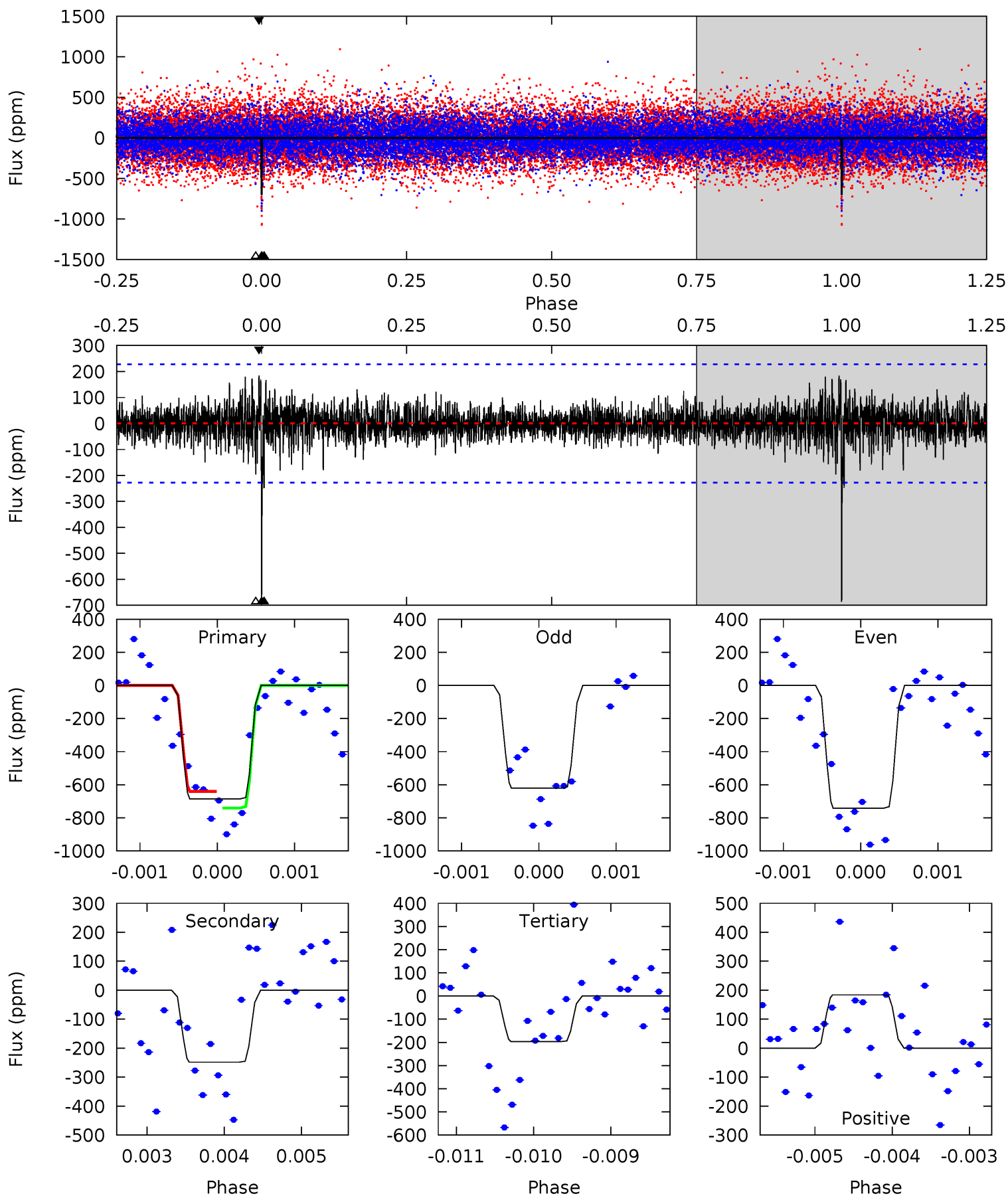
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.38	3.99	3.87	4.82	5.40	3.21	1.27	3.50	2.55	0.12	-0.83	1.56	0.77	0.44	0.95



# Alt Model-Shift Uniqueness Test

012115810-02, P = 318.749914 Days, E = 280.210615 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
16.5	5.98	4.73	4.42	5.48	3.34	1.04	11.8	12.1	1.25	1.56	1.45	0.97	0.21	1.21





### Stellar Parameters For KIC 012115810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6785^{+81}_{-81}$	$4.104^{+0.138}_{-0.112}$	$-0.080^{+0.150}_{-0.150}$	$1.741^{+0.274}_{-0.305}$	$1.410^{+0.103}_{-0.115}$	$0.377^{+0.247}_{-0.127}$
	+1%/-1%	+3%/-3%	+188%/-188%	+16%/-18%	+7%/-8%	+66%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 012115810-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-140 \pm 35$	$4.27^{+2.99}_{-2.61}$	$547^{+24}_{-26}$	$4938^{+3213}_{-849}$	$4271^{+25898}_{-2745}$
Alt.	$-248 \pm 42$	$5.34^{+3.27}_{-2.75}$	$546^{+24}_{-25}$	$5104^{+2126}_{-877}$	$4981^{+16145}_{-3184}$

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

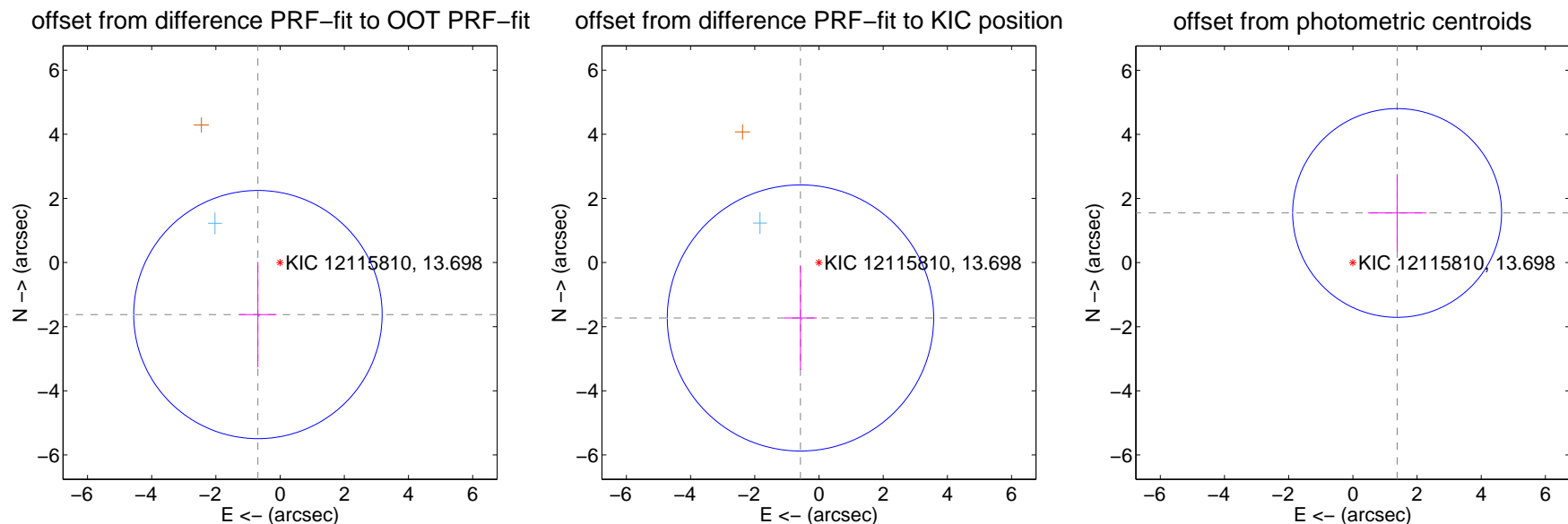
## DV Centroid Data

Supplemental centroid analysis for 012115810-02. Kepler magnitude: 13.70. Transit SNR 8.17

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.764 \pm 1.290$	1.37	$0.691 \pm 0.580$	$-1.623 \pm 1.644$
PRF-fit source offset from KIC position	$1.823 \pm 1.383$	1.32	$0.577 \pm 0.504$	$-1.729 \pm 1.622$
photometric centroid source offset	$2.07 \pm 1.09$	1.91	$-1.38 \pm 0.90$	$1.55 \pm 1.21$



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.

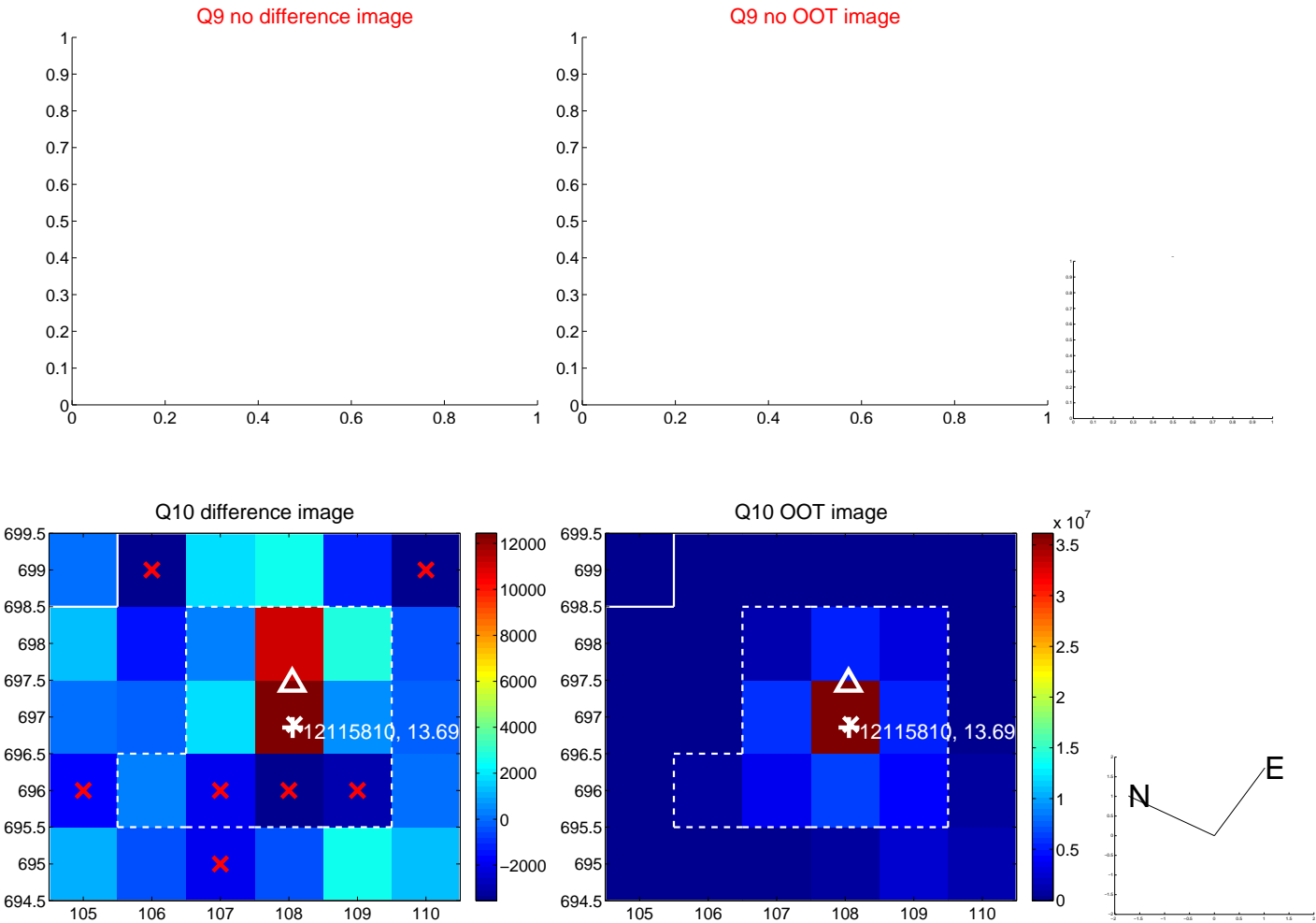
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

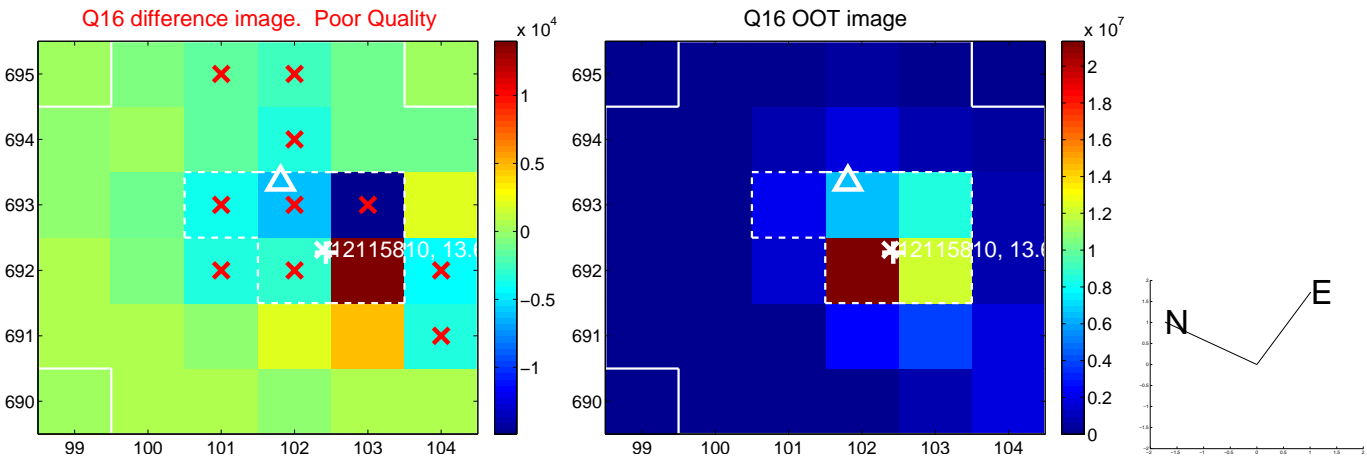
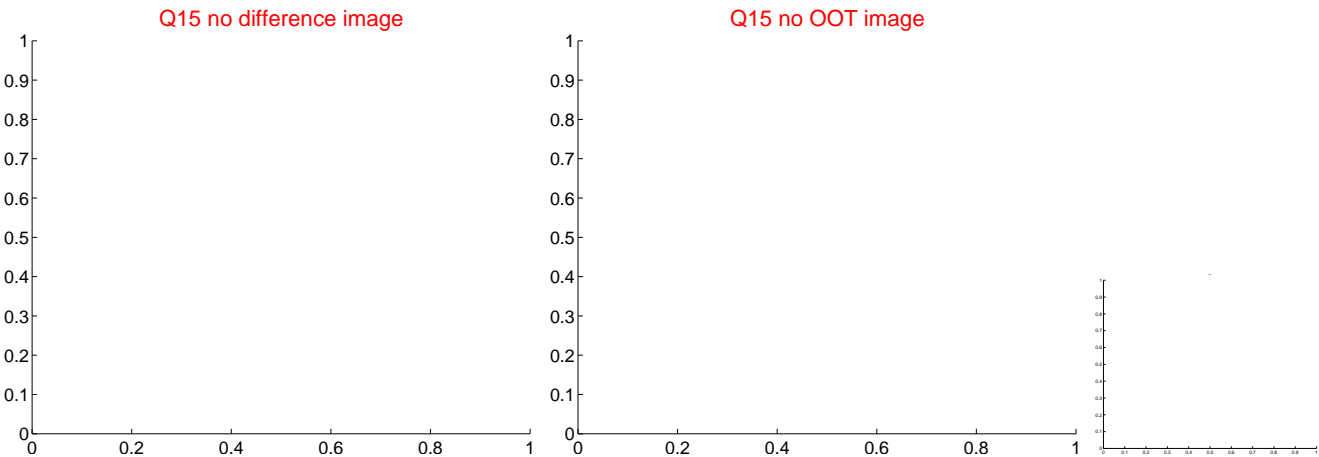
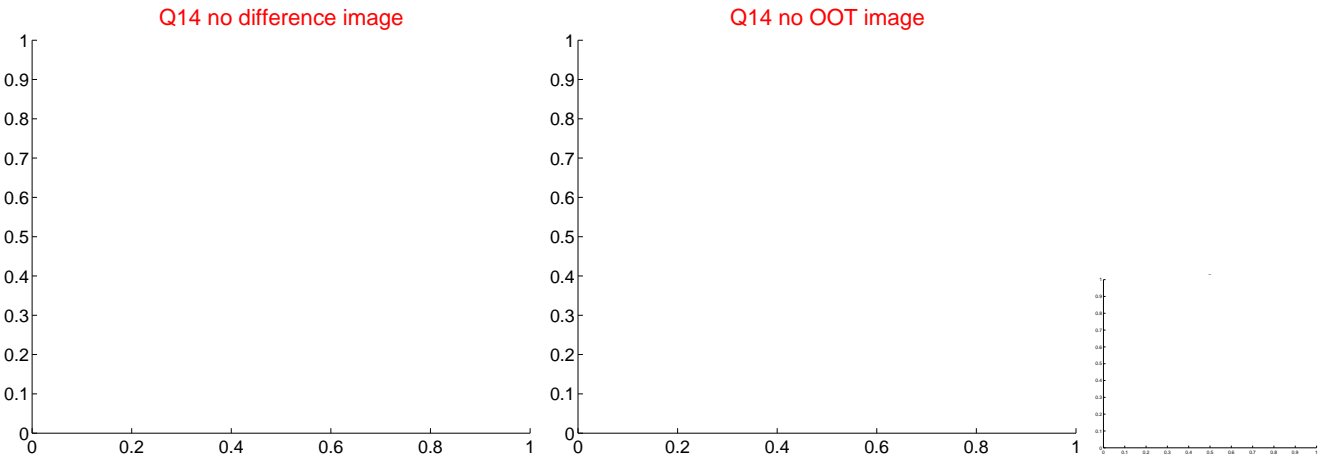
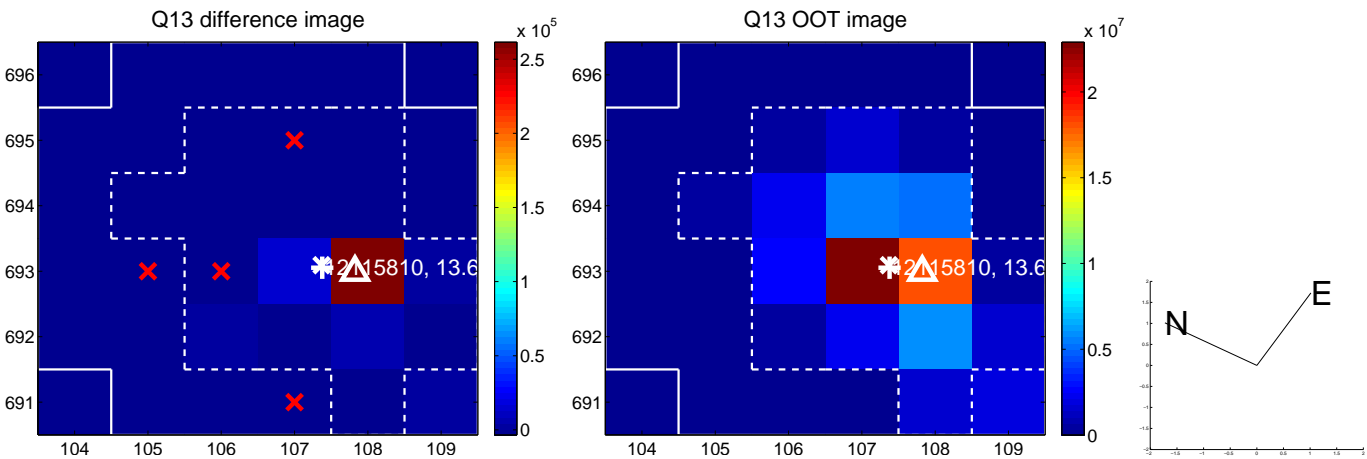


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

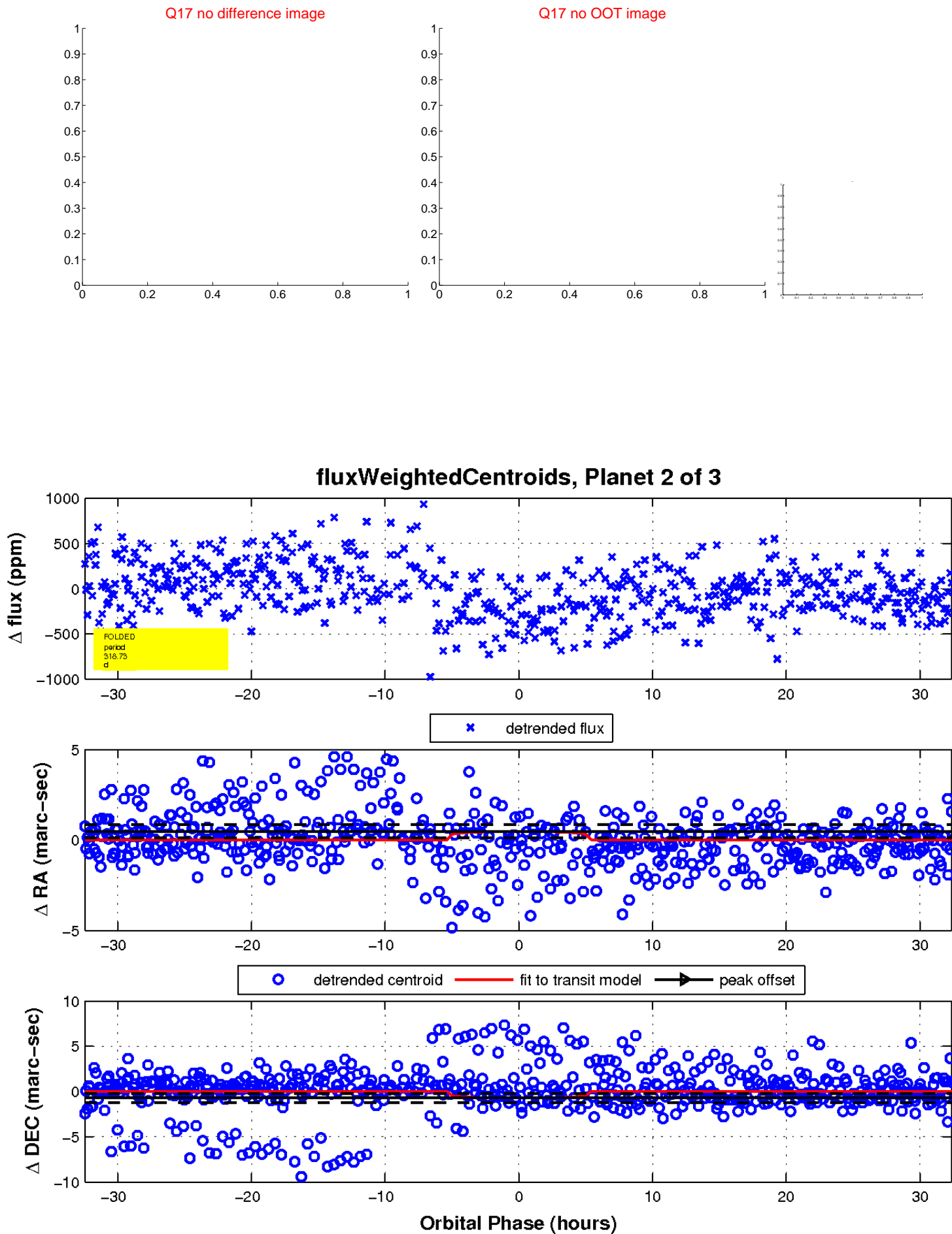




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

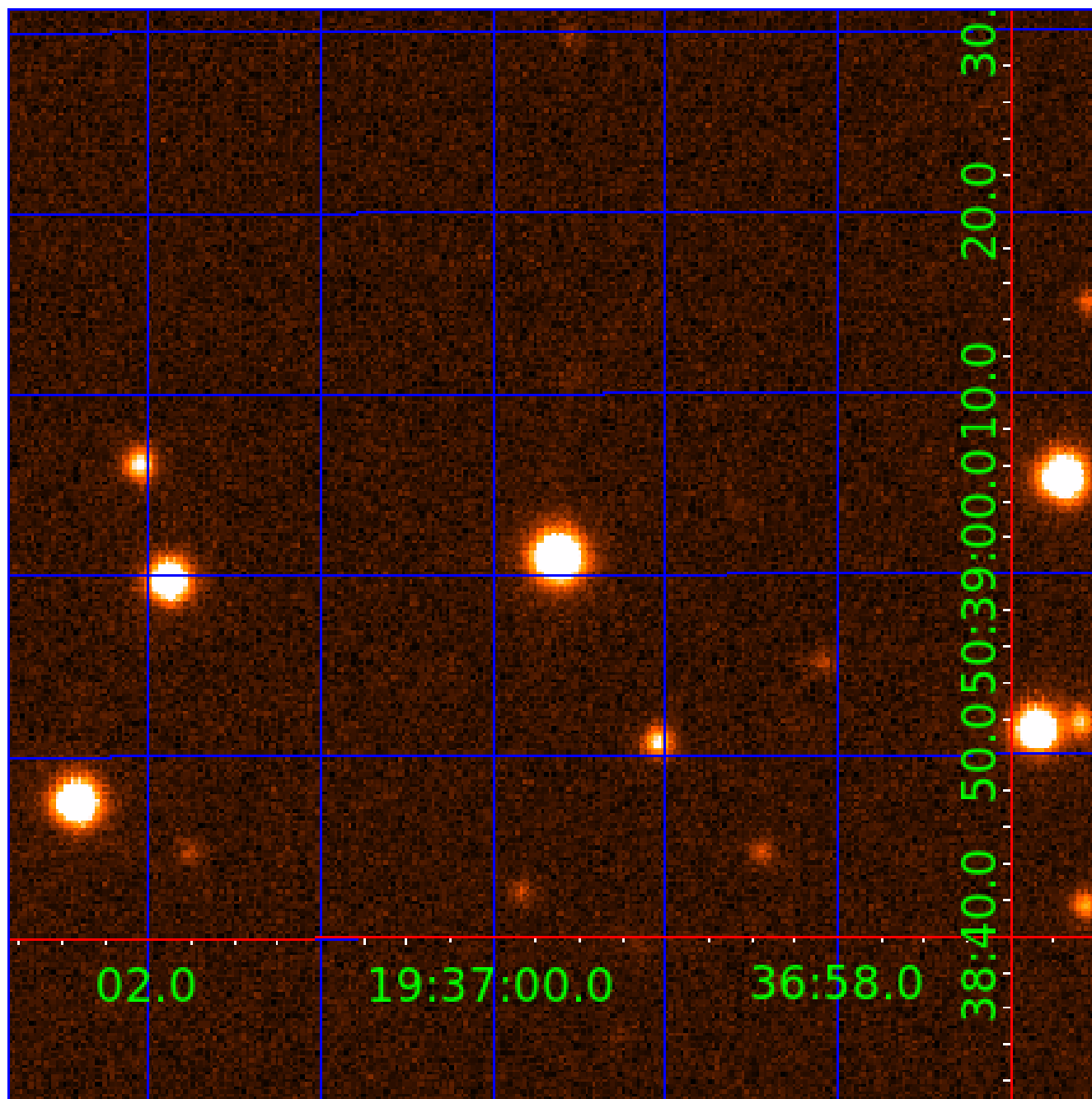


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 012115810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012115810-01	OBS	No	0.625421	131.665985	3.3	2.973	7.8	1.4	1.74	6785	0.37	22390.48
012115810-02	OBS	No	318.734057	280.219583	398.6	10.819	8.3	8.2	1.74	6785	3.72	5.50
012115810-03	OBS	No	148.089413	133.466041	286.7	5.223	7.8	7.0	1.74	6785	3.17	15.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012115810-01	OBS	FP	0.00	1	0	0	0	LPP_DV
012115810-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_DIFFS
012115810-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_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.

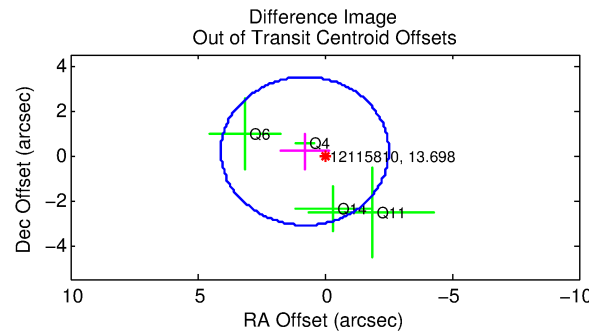
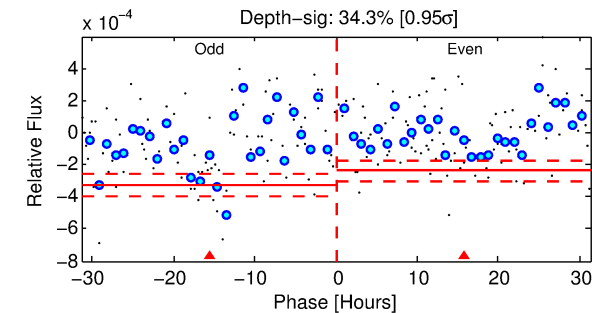
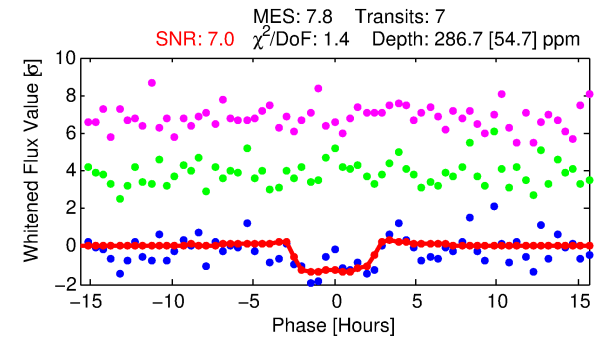
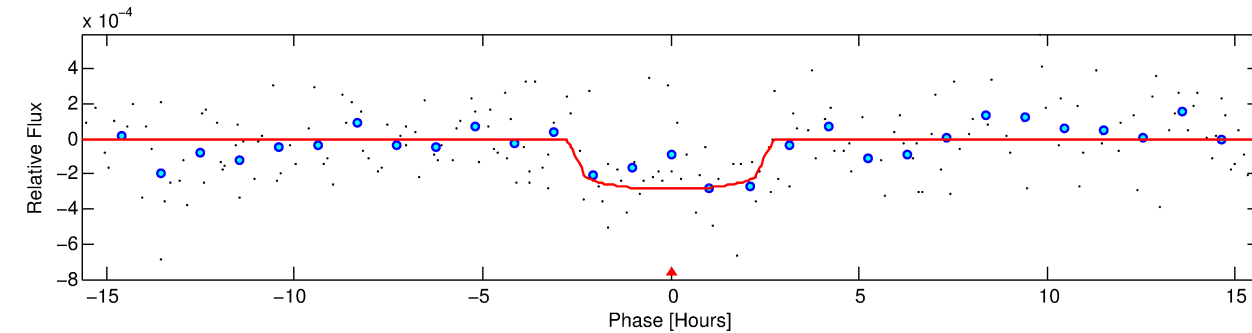
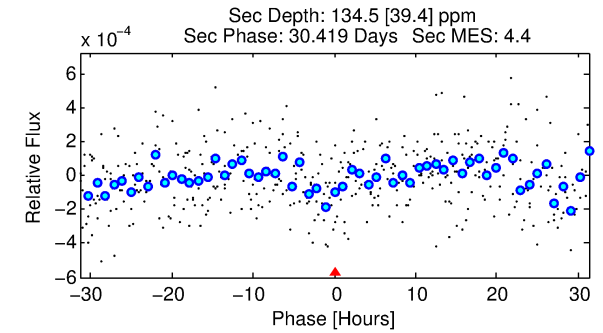
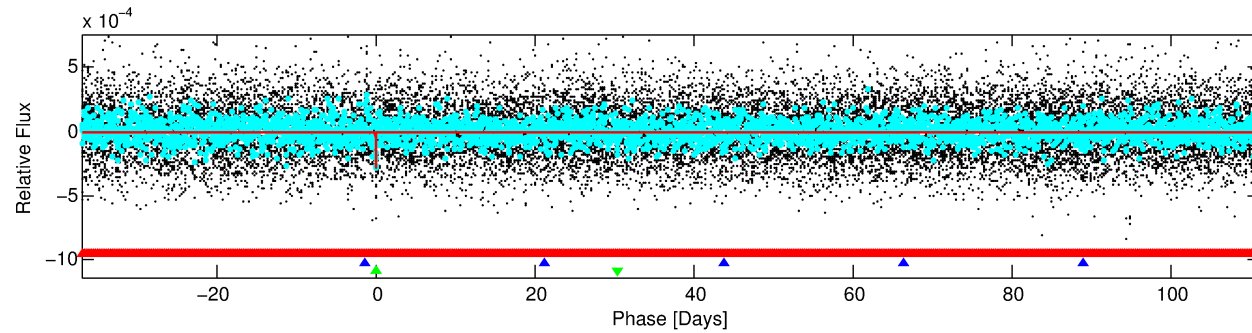
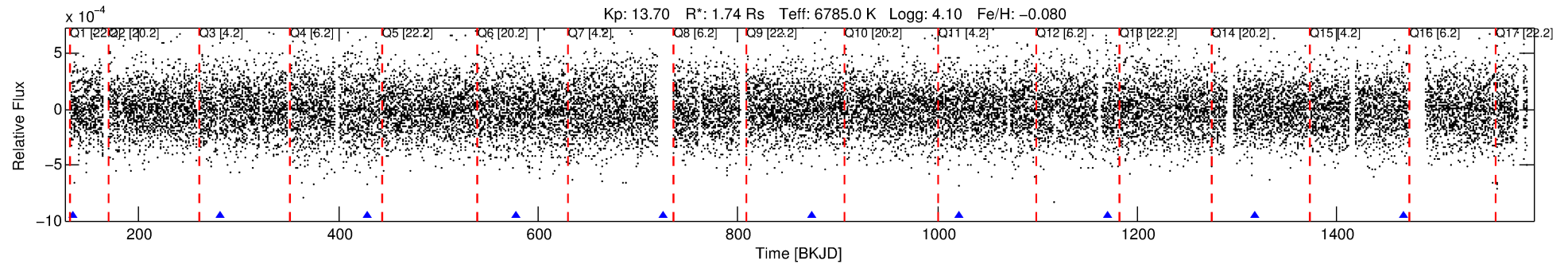
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012115810-03

No Significant Match Found

# DV One-Page Summary

KIC: 12115810 Candidate: 3 of 3 Period: 148.089 d



## DV Fit Results:

Period = 148.08941 [0.00406] d  
Epoch = 133.4660 [0.0200] BKJD  
Rp/R\* = 0.0167 [0.0194]  
a/R\* = 155.82 [1022.13]  
b = 0.72 [4.48]  
Seff = 15.28 [3.77]  
Teq = 504 [31] K  
Rp = 3.17 [3.73] Re  
a = 0.6136 [0.0968] AU  
Ag = 2769.19 [6529.97] [0.42σ]  
Teffp = 5655 [3317] K [1.55σ]

## DV Diagnostic Results:

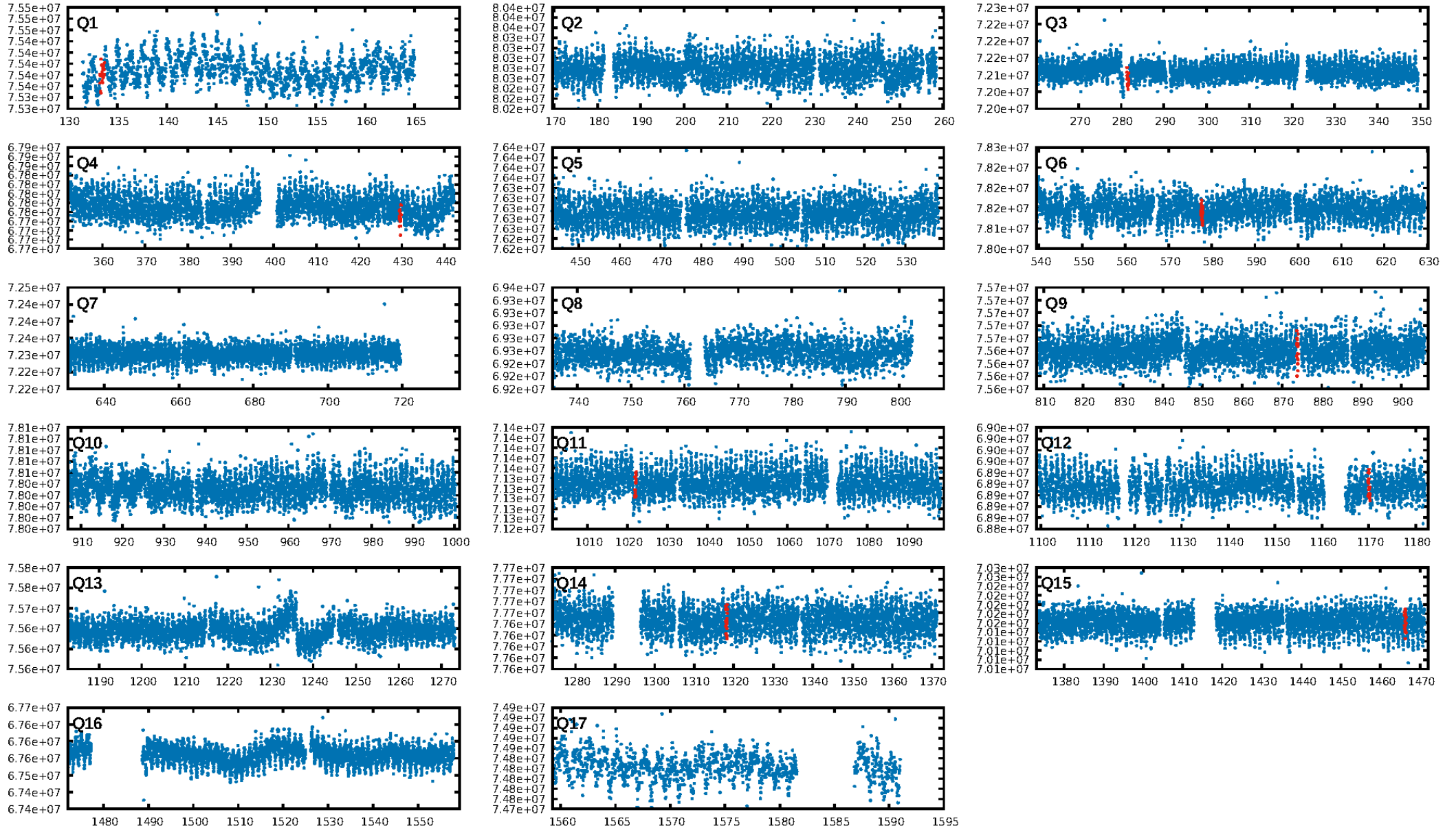
ShortPeriod-sig: 100.0% [588.90σ]  
LongPeriod-sig: 100.0% [340.89σ]  
ModelChiSquare2-sig: 1.4%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.23e-10**  
RollingBand-fgt: 1.00 [7/7]  
**GhostDiagnostic-chr: -1.007**  
Centroid-sig: 68.6%  
Centroid-so: 0.817 arcsec [0.73σ]  
OotOffset-rm: 0.803 arcsec [0.73σ]  
KicOffset-rm: 0.703 arcsec [0.87σ]  
OotOffset-st: 2/1/1/0 [4]  
KicOffset-st: 2/1/1/0 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 0.00 [0/7]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:59:42 Z

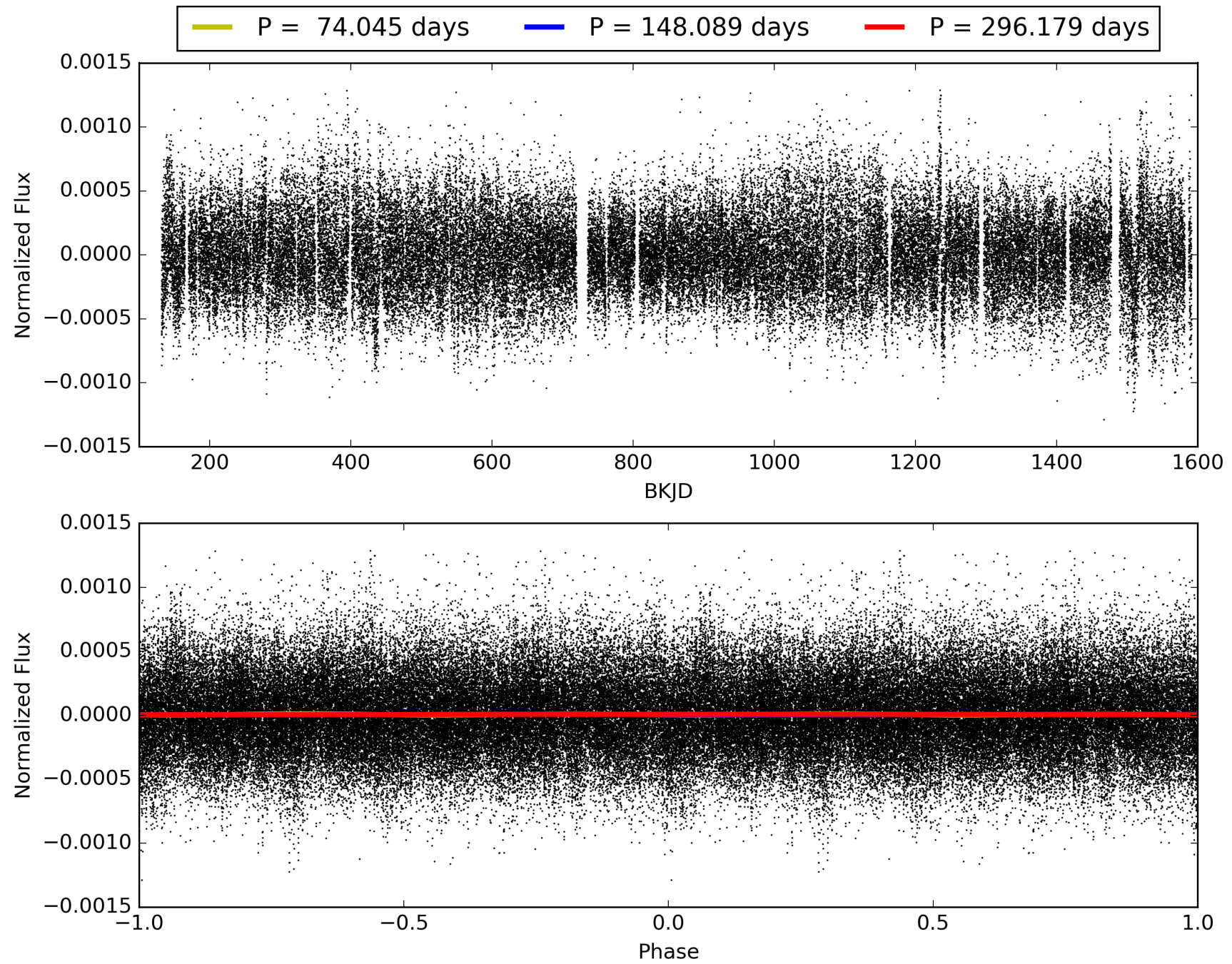
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 012115810-03, PDC Light Curves

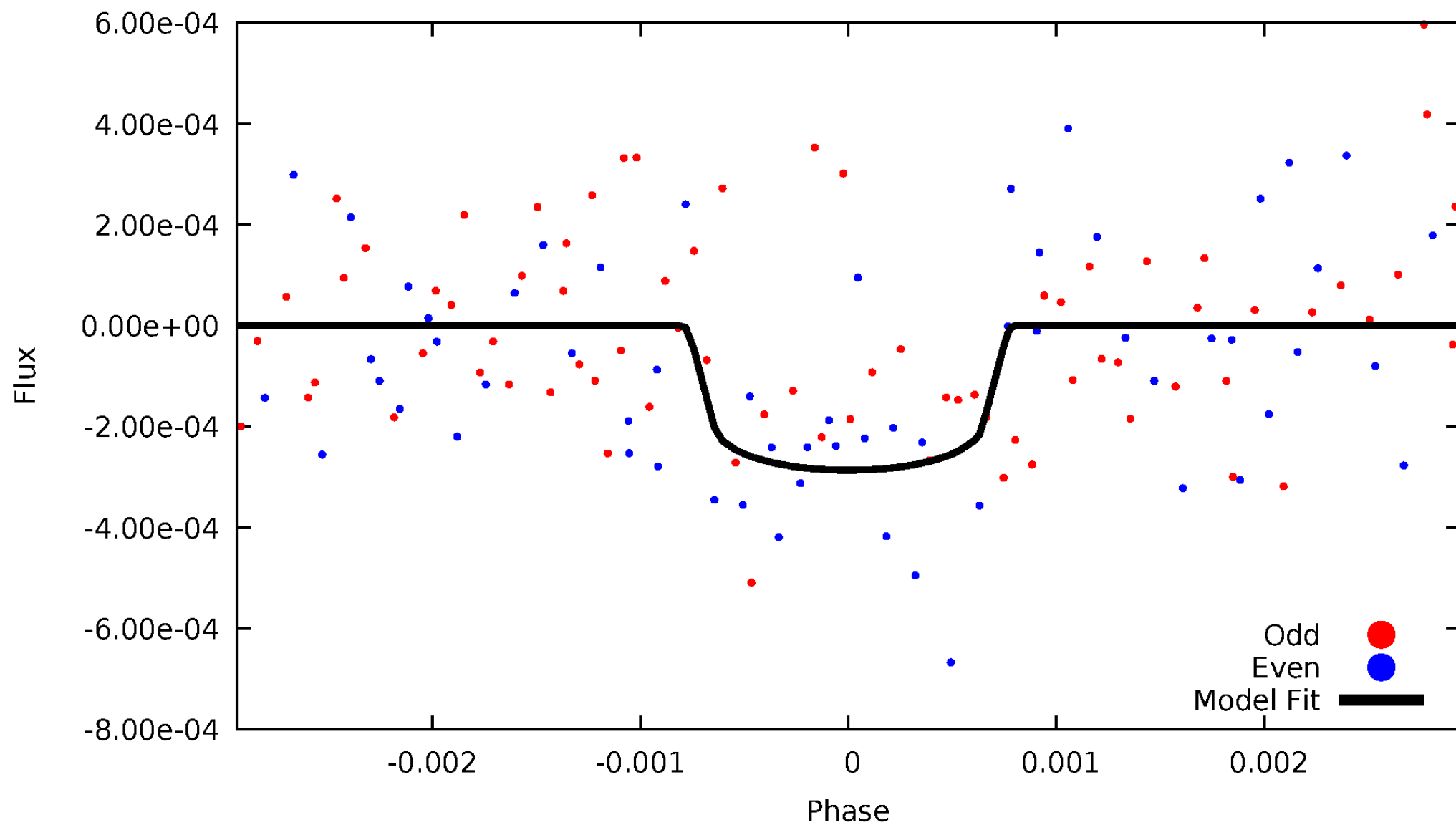


TCE 012115810-03



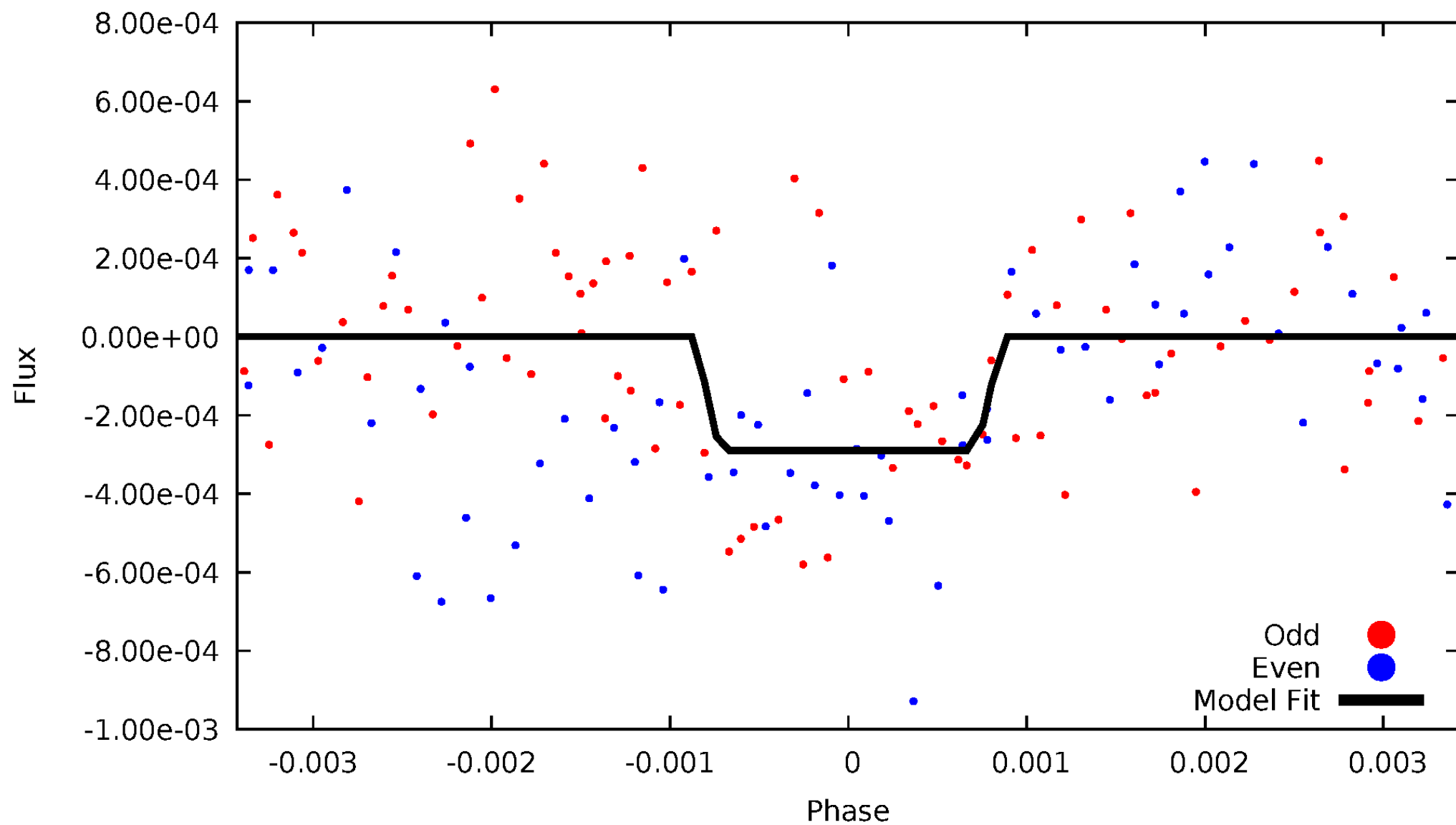
# DV Odd/Even

TCE 012115810-03



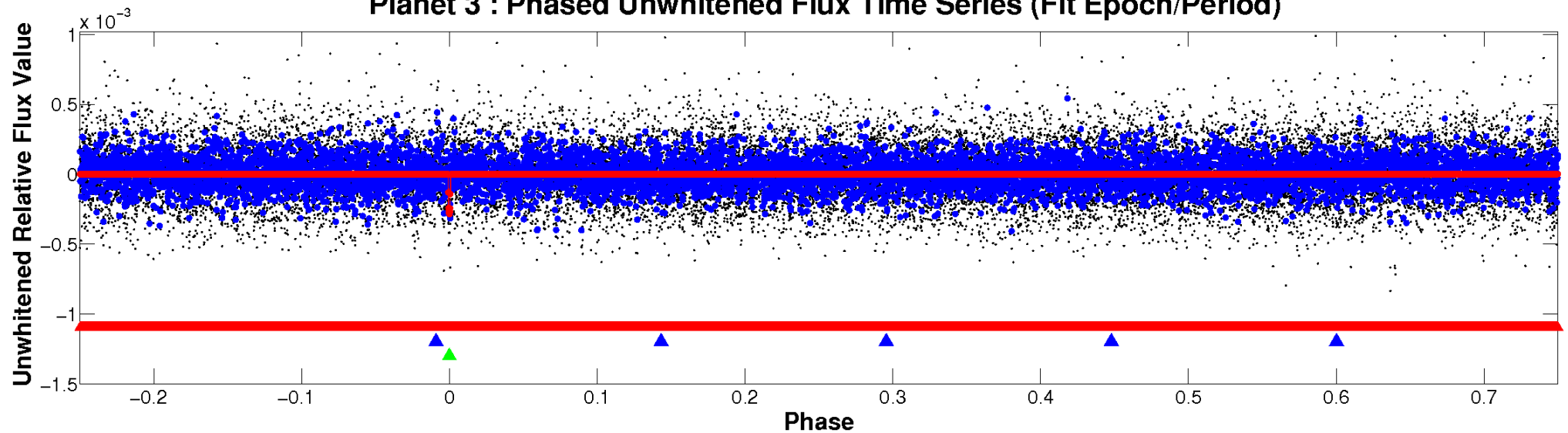
# ALT Odd/Even

TCE 012115810-03

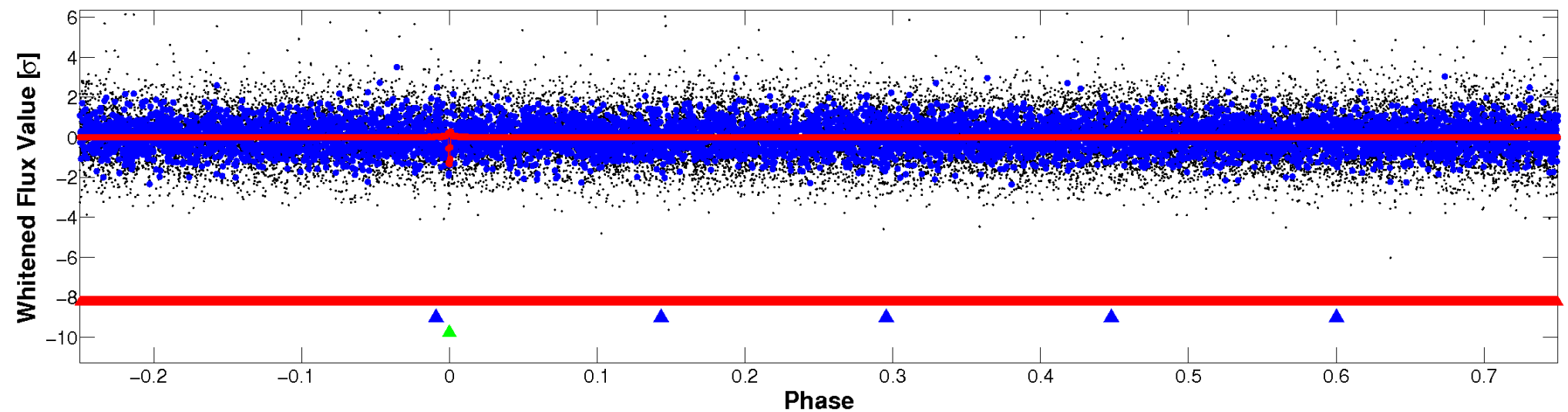


# Non-Whitened Vs. Whitened Light Curve

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



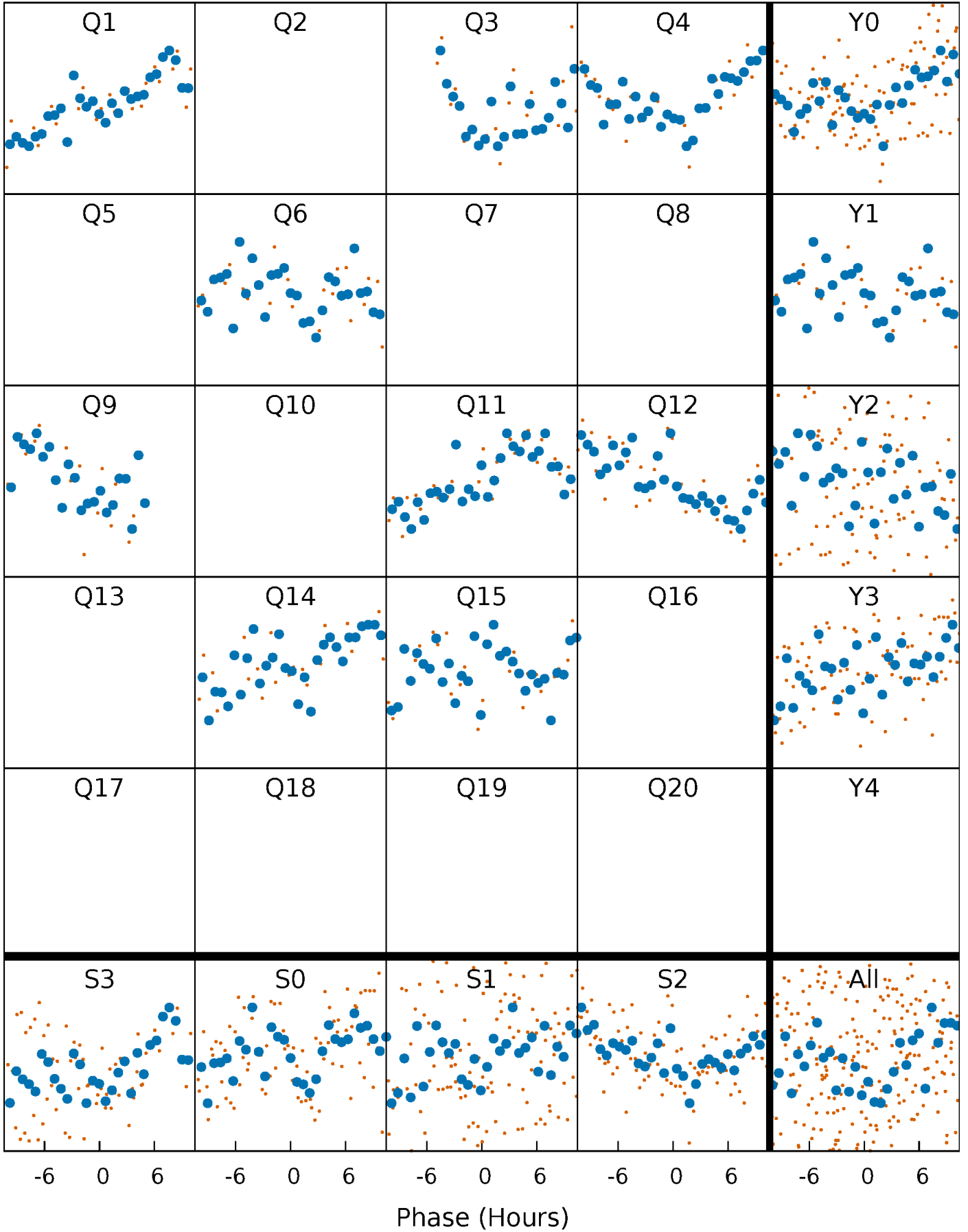
**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





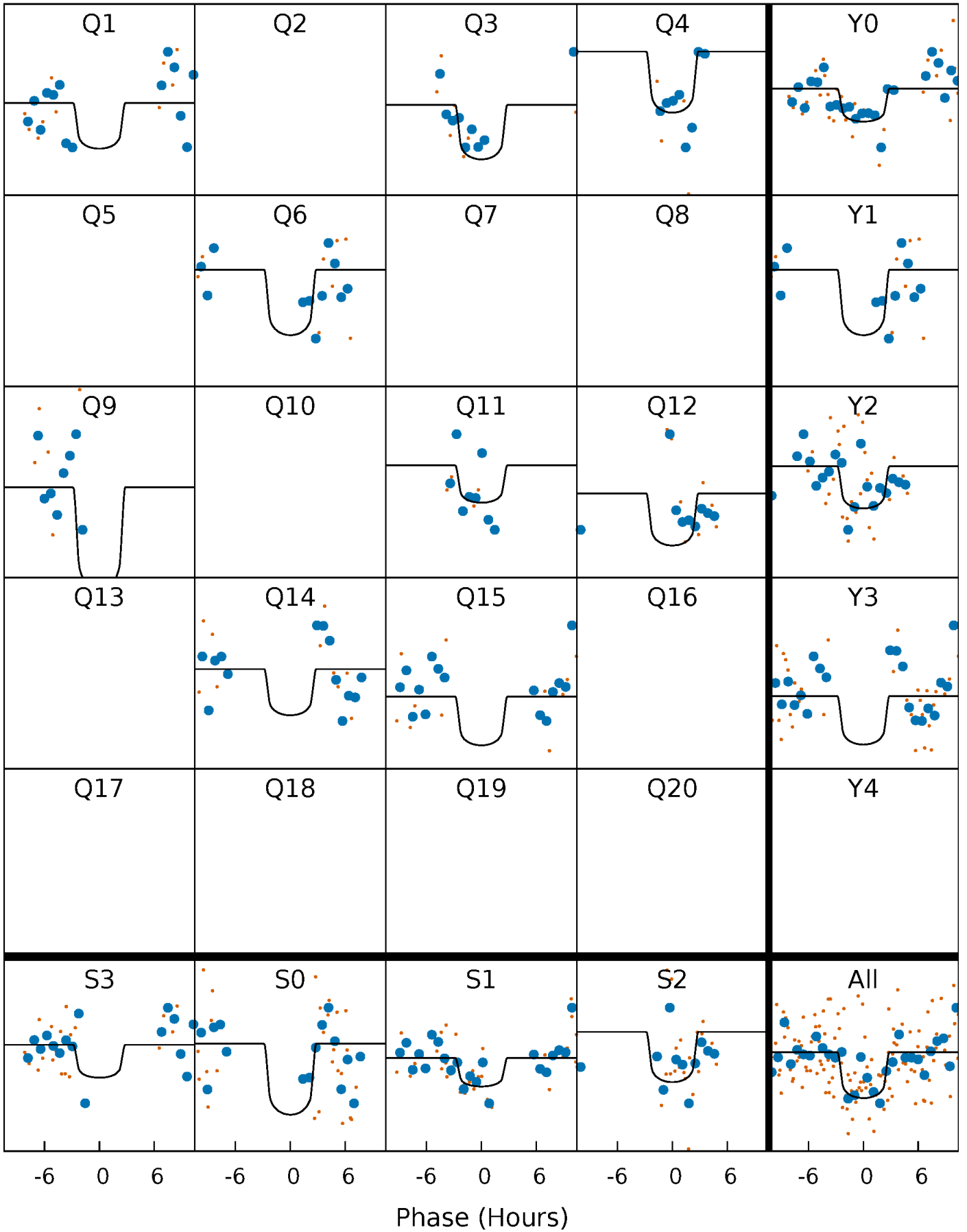
# PDC Quarter-Phased Transit Curves

TCE 012115810-03 P=148.089413 Days  $T_0=133.466041$  (BKJD)



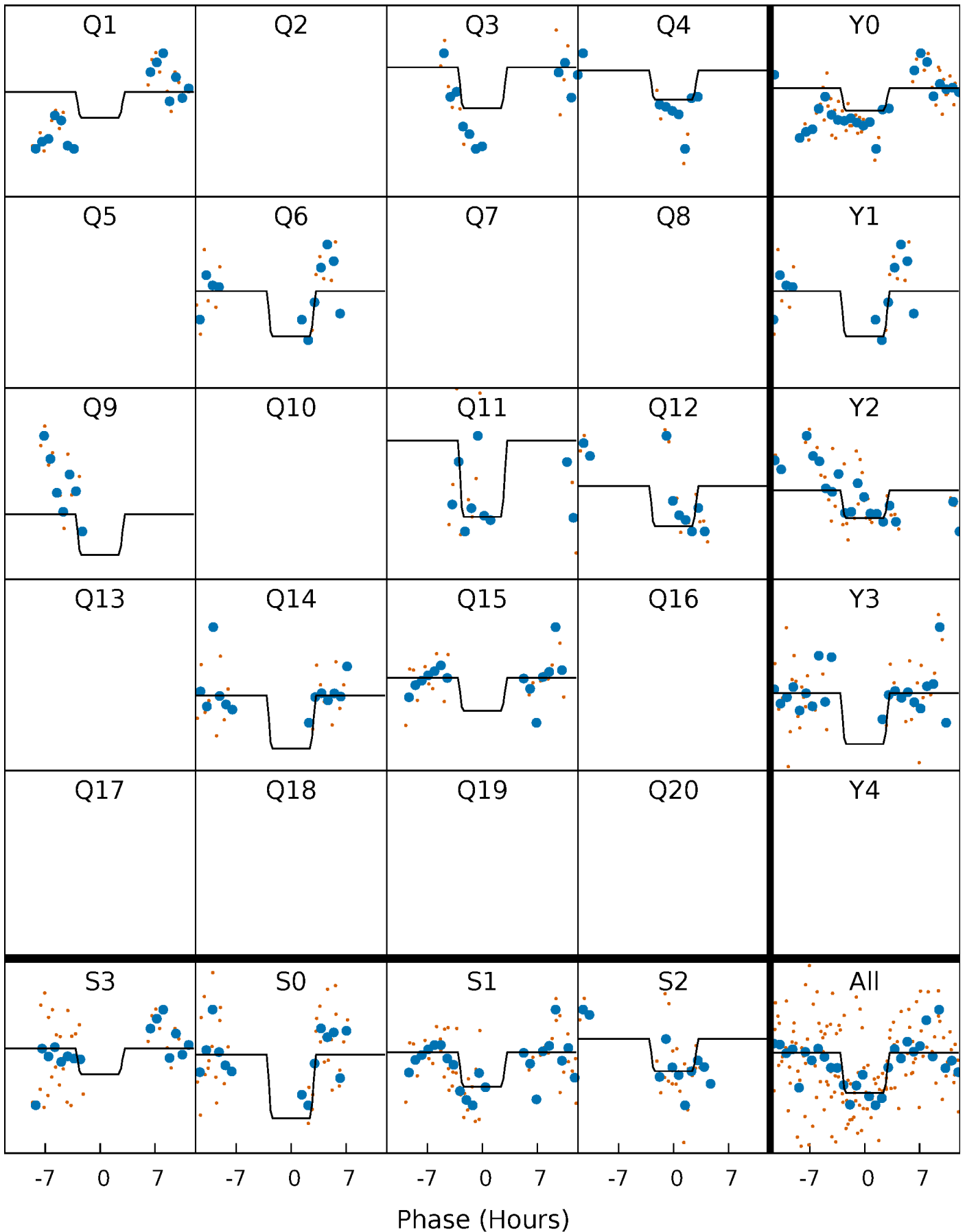
# DV Quarter-Phased Transit Curves

TCE 012115810-03 P=148.089413 Days  $T_0=133.466041$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

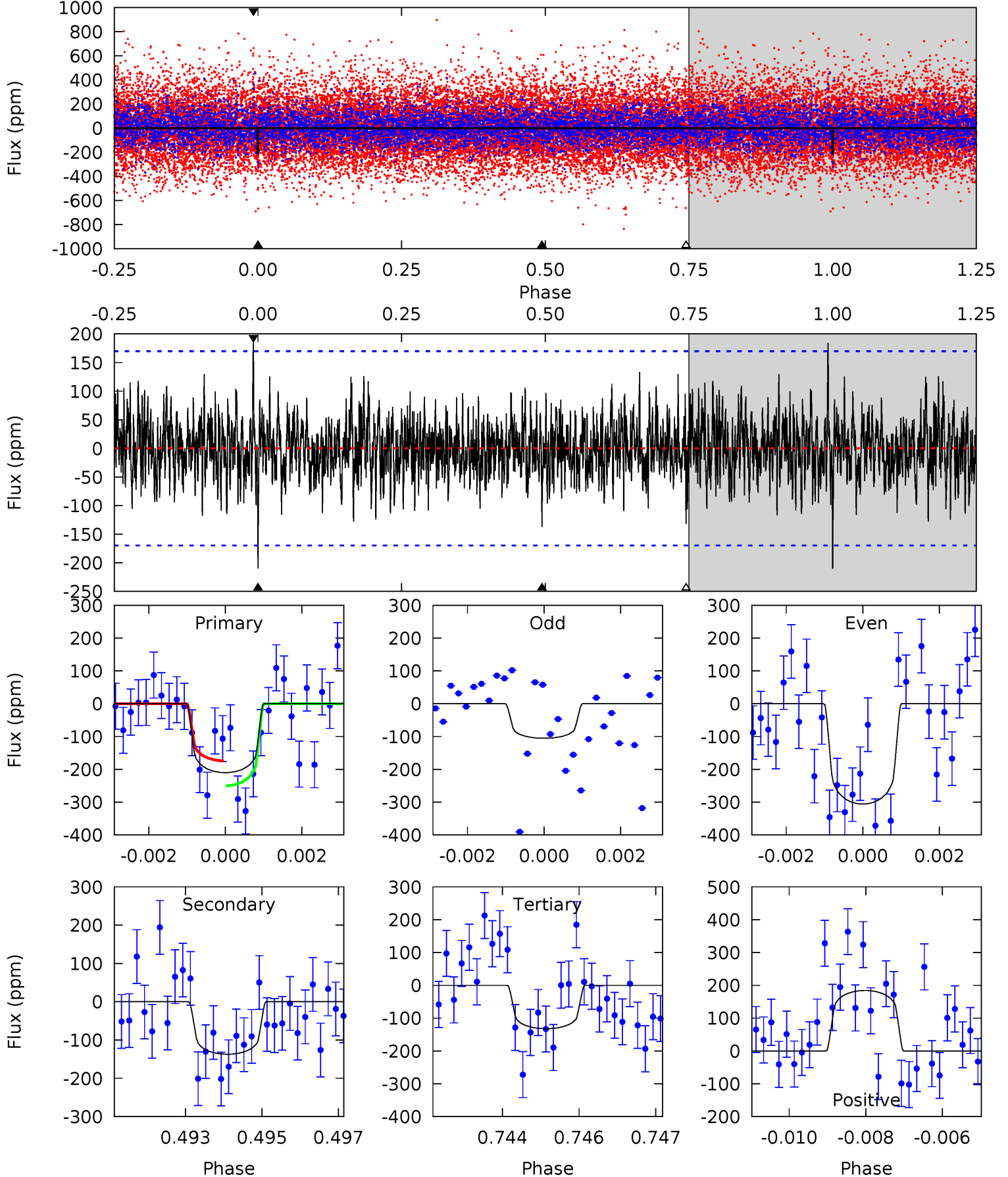
TCE 012115810-03 P=148.089780 Days  $T_0=133.484230$  (BKJD)



# DV Model-Shift Uniqueness Test

012115810-03, P = 148.089413 Days, E = 133.466041 Days

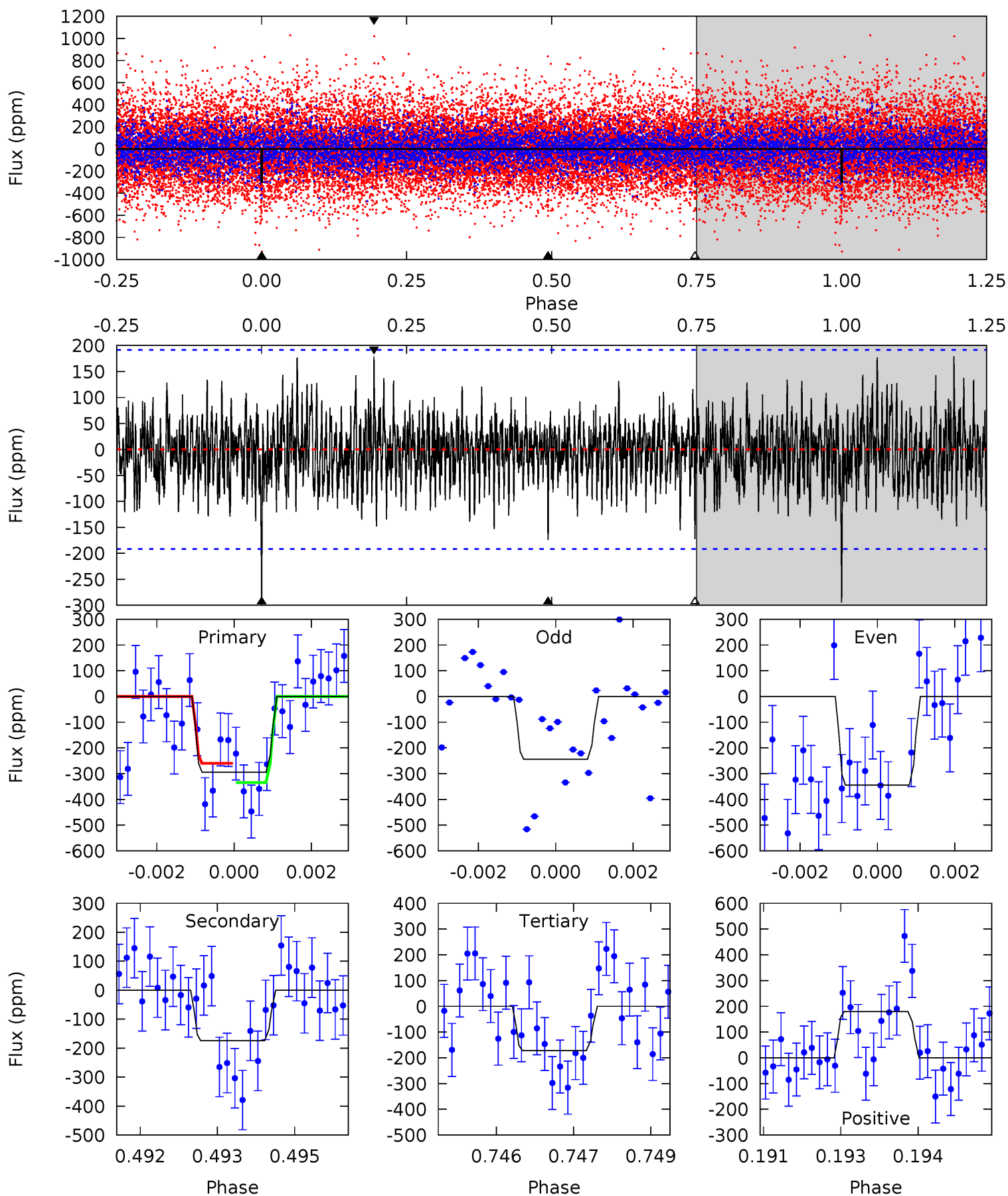
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.65	4.34	4.18	5.83	5.37	3.16	1.30	2.47	0.82	0.16	-1.49	3.21	0.97	0.47	1.21



# Alt Model-Shift Uniqueness Test

012115810-03, P = 148.089780 Days, E = 133.484230 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
8.25	4.87	4.82	5.02	5.37	3.15	1.35	3.42	3.23	0.05	-0.14	1.40	1.22	0.38	1.05



### Stellar Parameters For KIC 012115810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6785^{+81}_{-81}$	$4.104^{+0.138}_{-0.112}$	$-0.080^{+0.150}_{-0.150}$	$1.741^{+0.274}_{-0.305}$	$1.410^{+0.103}_{-0.115}$	$0.377^{+0.247}_{-0.127}$
	+1%/-1%	+3%/-3%	+188%/-188%	+16%/-18%	+7%/-8%	+66%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 012115810-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-137 \pm 32$	$4.04^{+3.28}_{-2.53}$	$705^{+26}_{-35}$	$5045^{+3451}_{-1068}$	$1768^{+10649}_{-1265}$
Alt.	$-174 \pm 36$	$4.15^{+3.24}_{-2.65}$	$705^{+31}_{-33}$	$5259^{+4148}_{-1054}$	$2015^{+14324}_{-1355}$

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



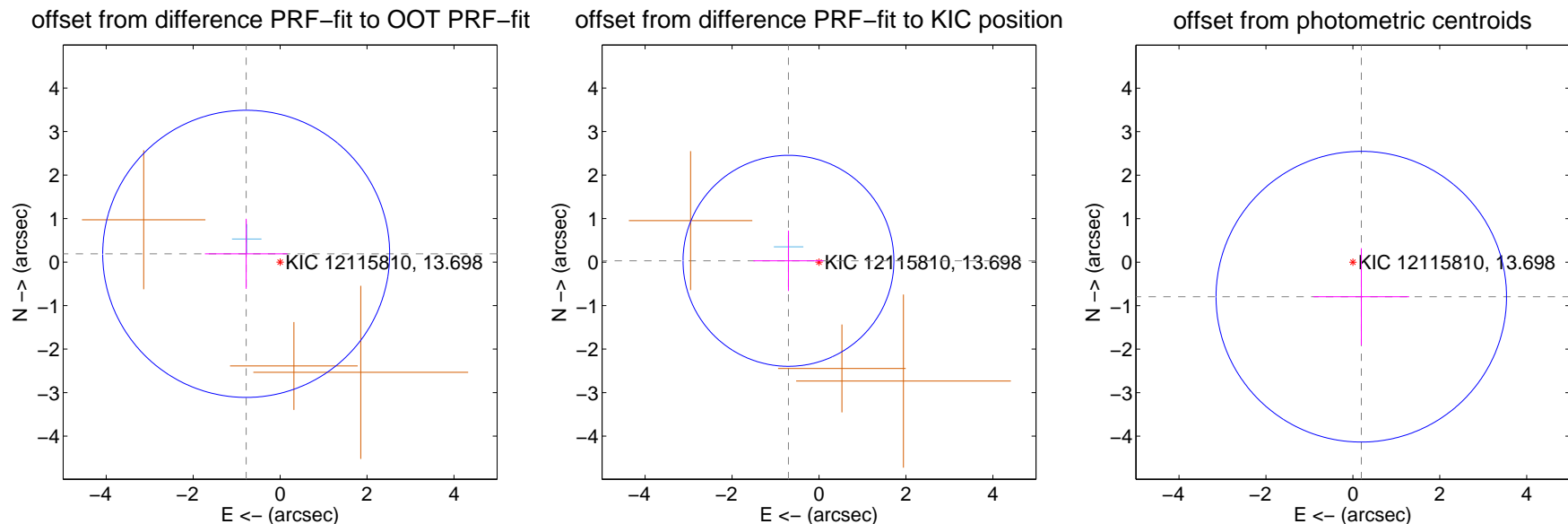
## DV Centroid Data

Supplemental centroid analysis for 012115810-03. Kepler magnitude: 13.70. Transit SNR 6.97

There are 1 quarters with good PRF difference image offsets

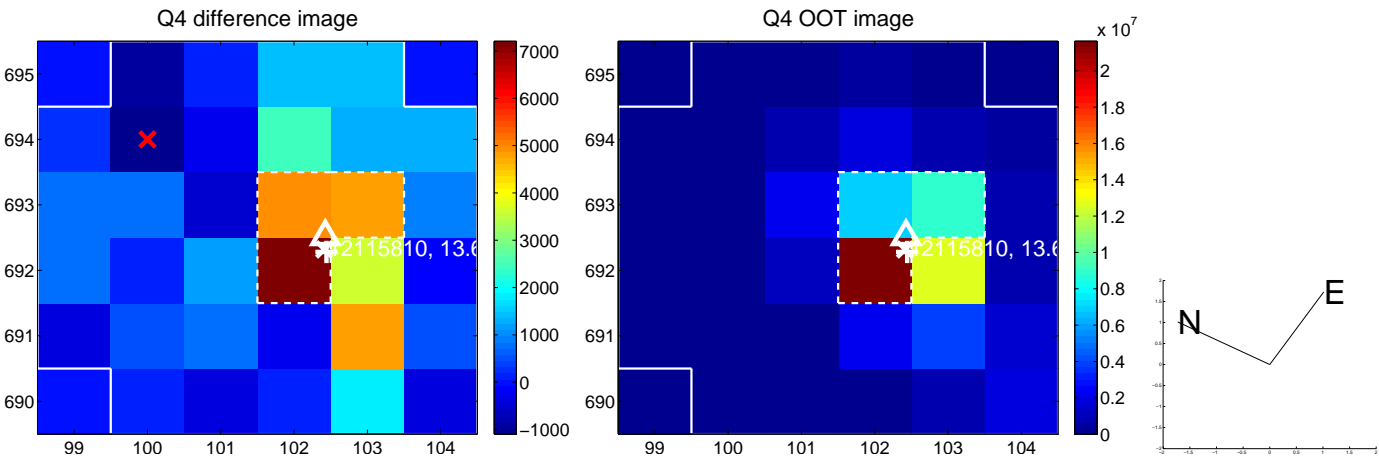
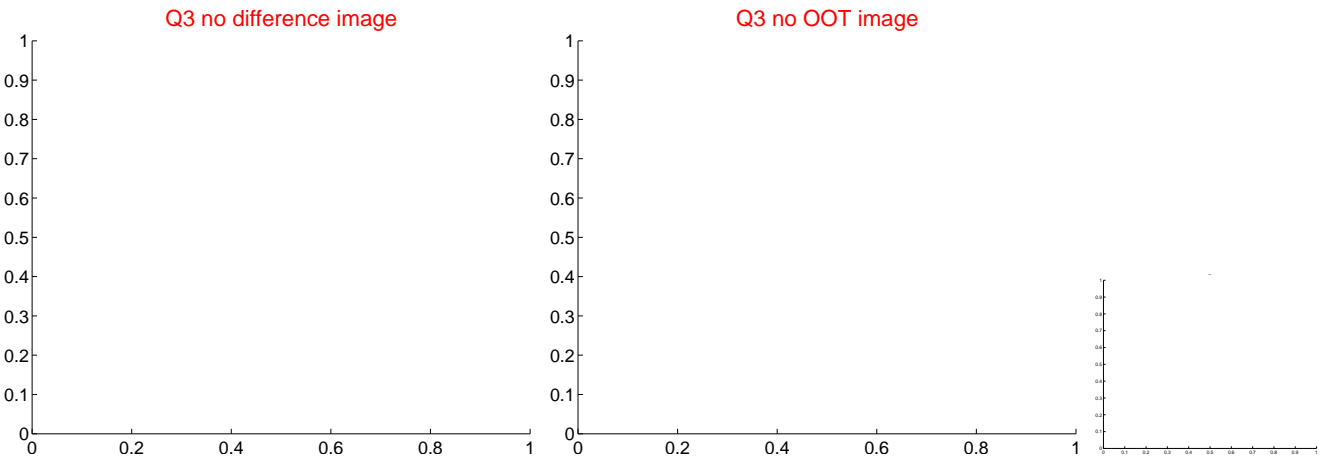
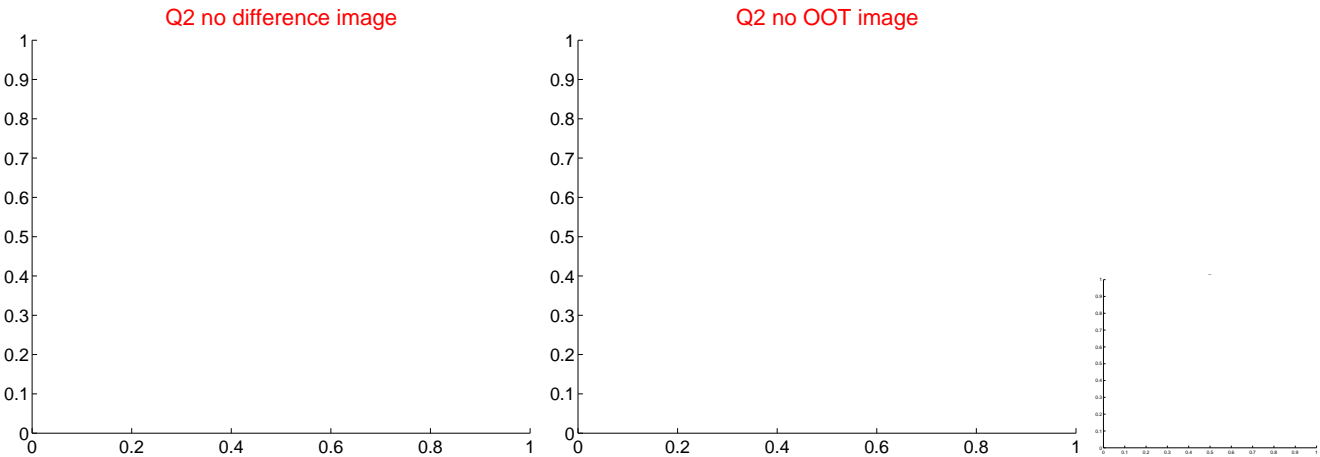
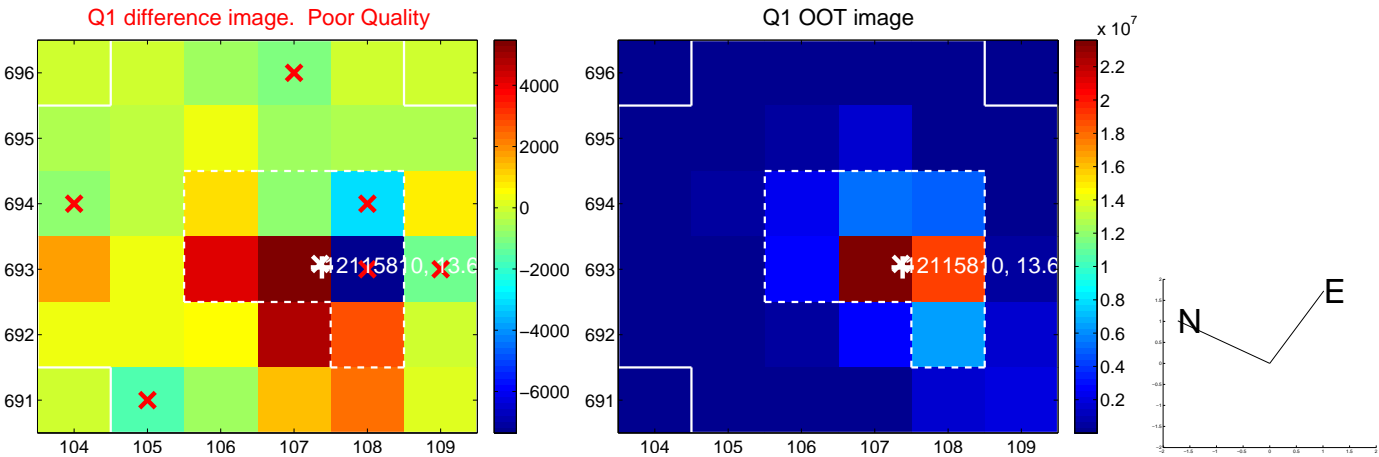
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.803 \pm 1.100$	0.73	$0.780 \pm 0.950$	$0.190 \pm 0.806$
PRF-fit source offset from KIC position	$0.703 \pm 0.808$	0.87	$0.702 \pm 0.808$	$0.029 \pm 0.695$
photometric centroid source offset	$0.82 \pm 1.11$	0.73	$-0.19 \pm 1.10$	$-0.79 \pm 1.11$

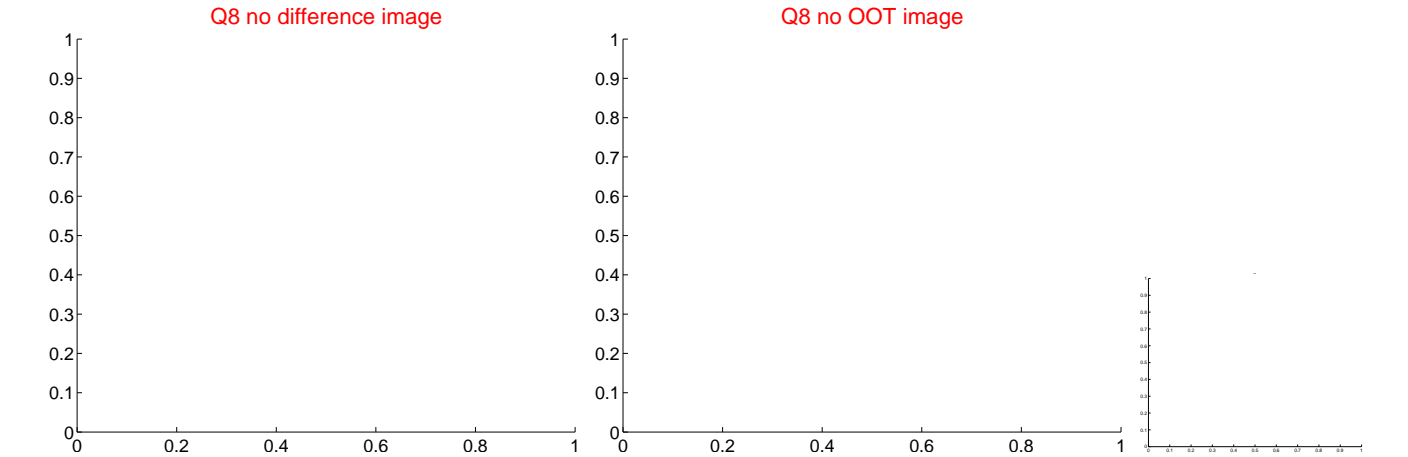
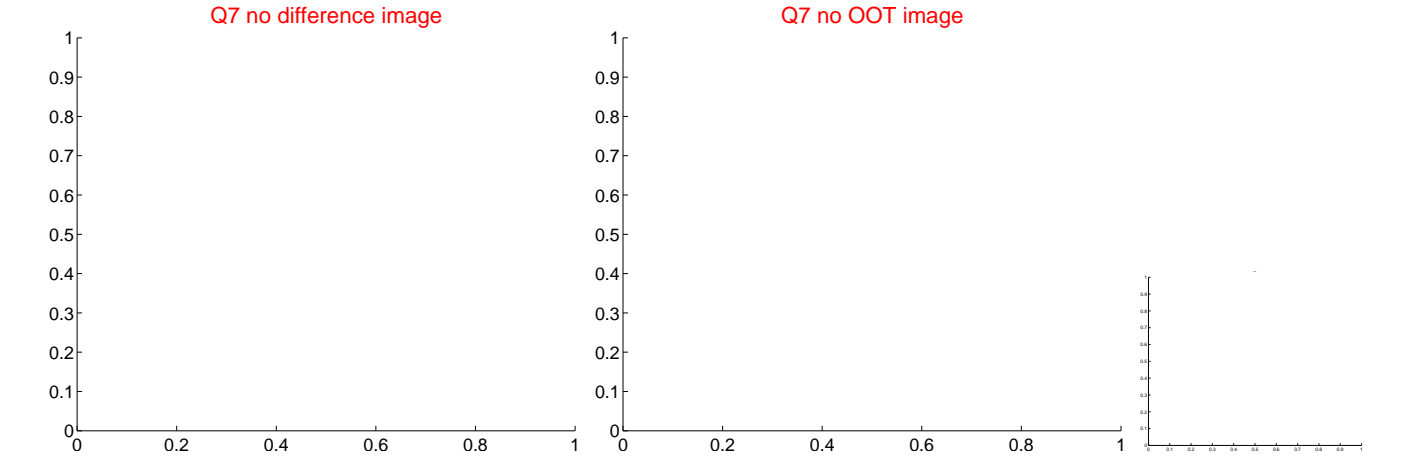
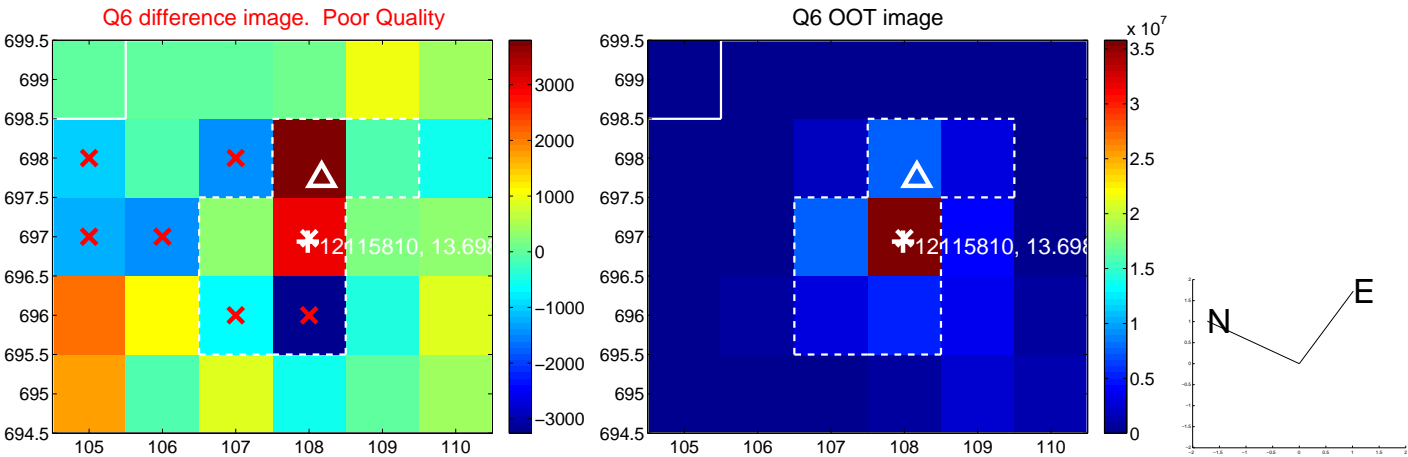
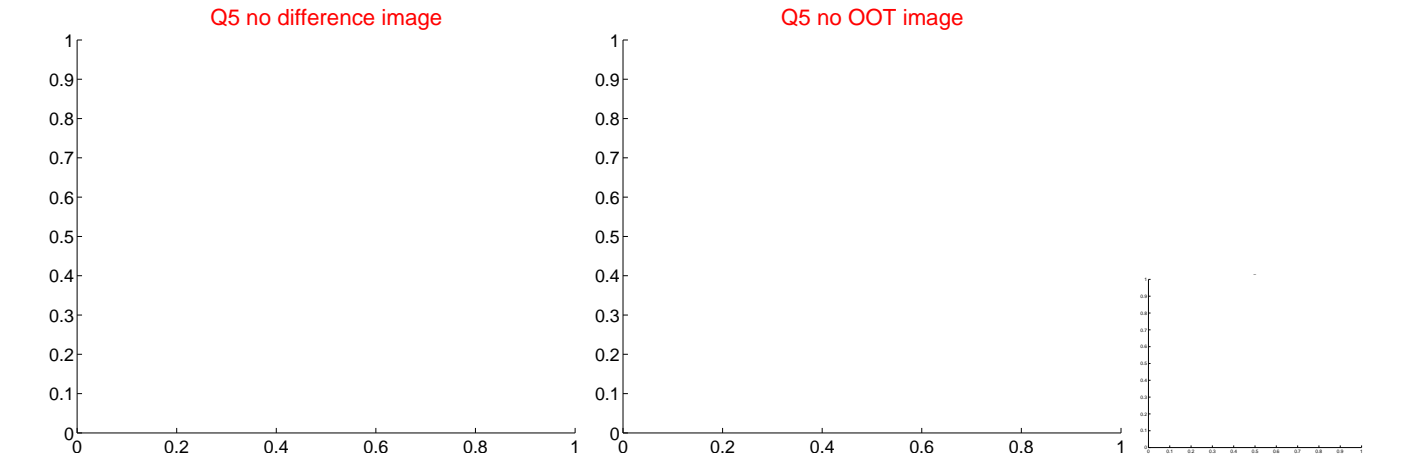


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

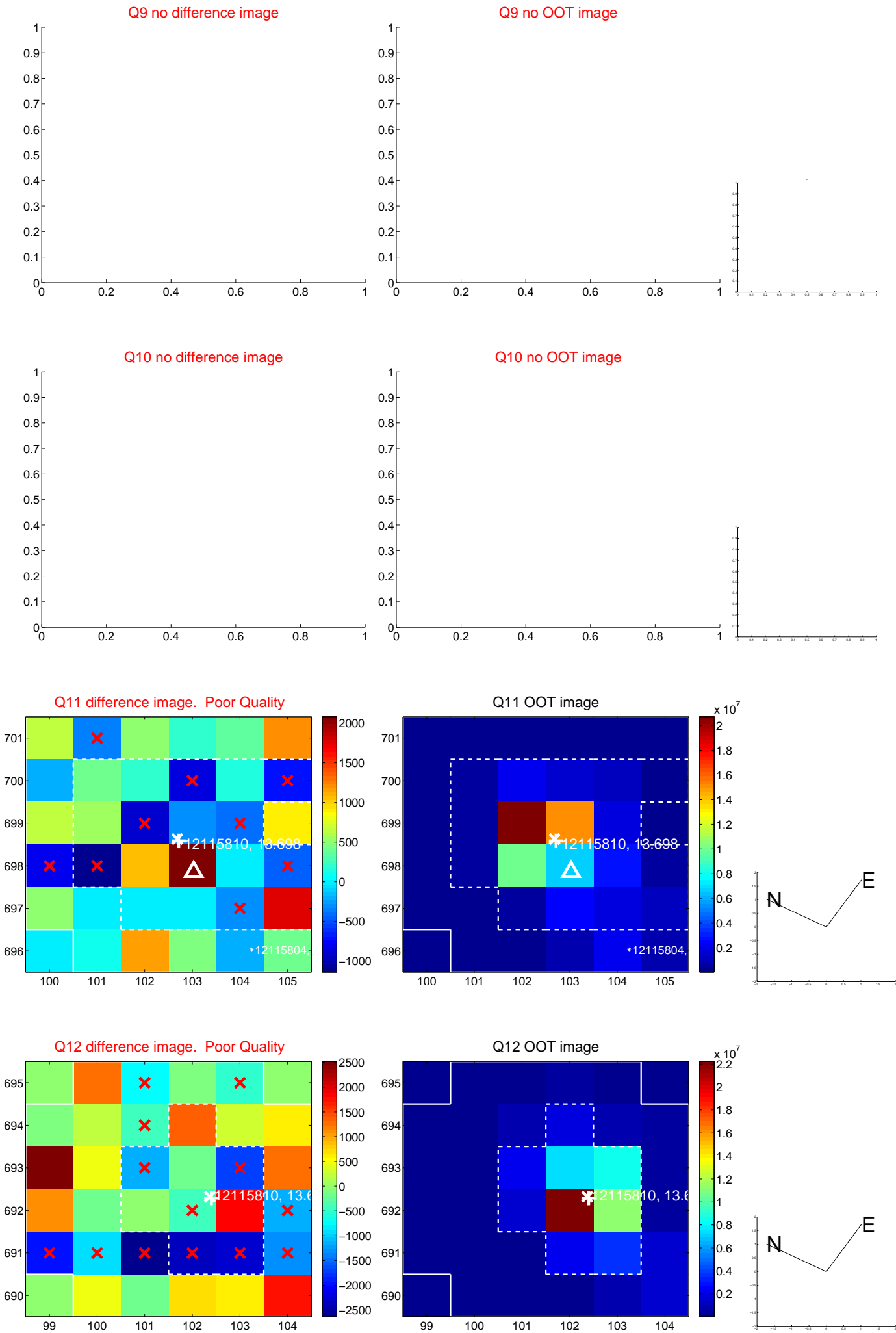
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



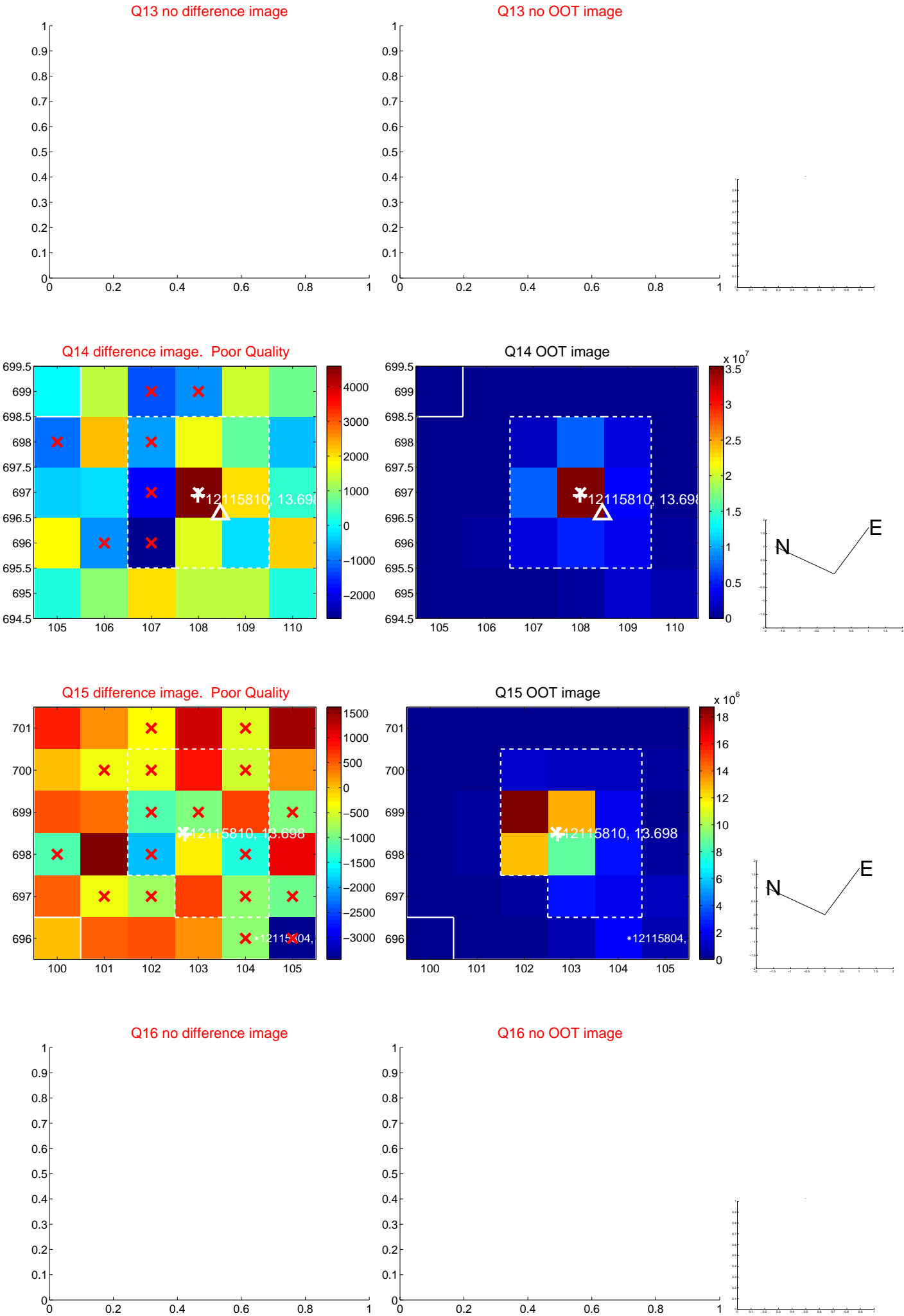
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



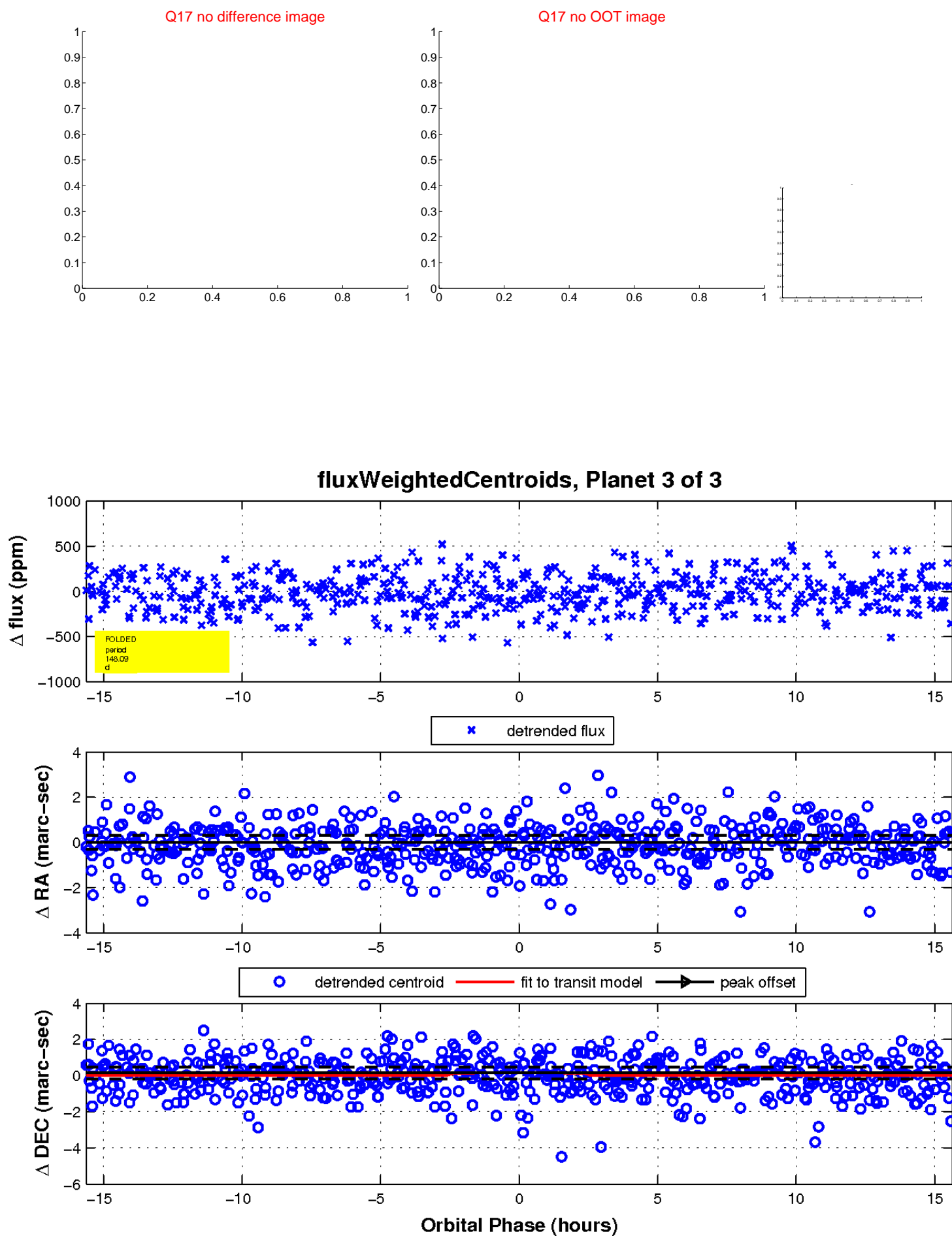
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

