

# KIC 004928235

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004928235-01	OBS	No	1.227053	132.624395	71.8	8.481	9.8	10.8	0.83	5564	0.71	1294.40
004928235-02	OBS	No	36.221746	134.127996	697.5	2.352	8.3	7.5	0.83	5564	2.44	14.19

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004928235-01	OBS	FP	0.00	1	0	0	0	LPP_DV
004928235-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

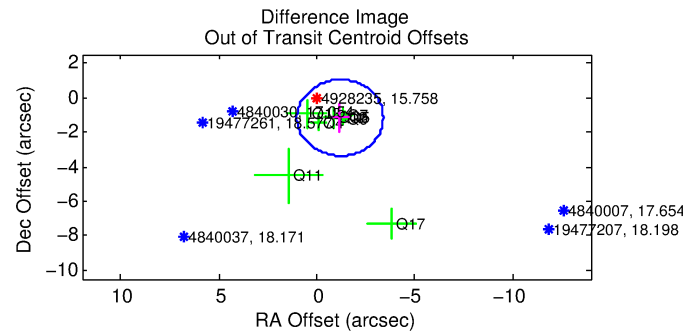
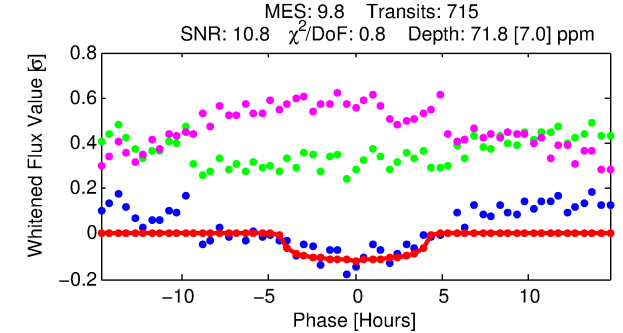
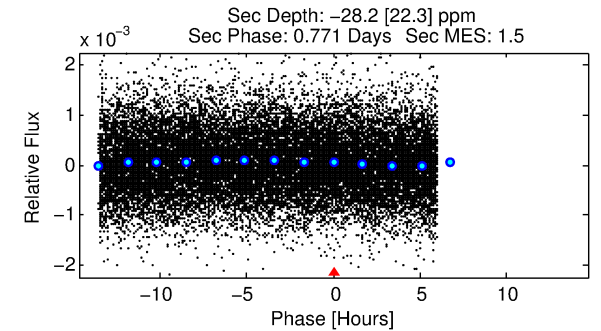
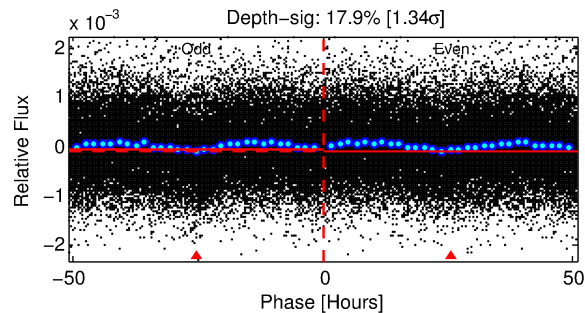
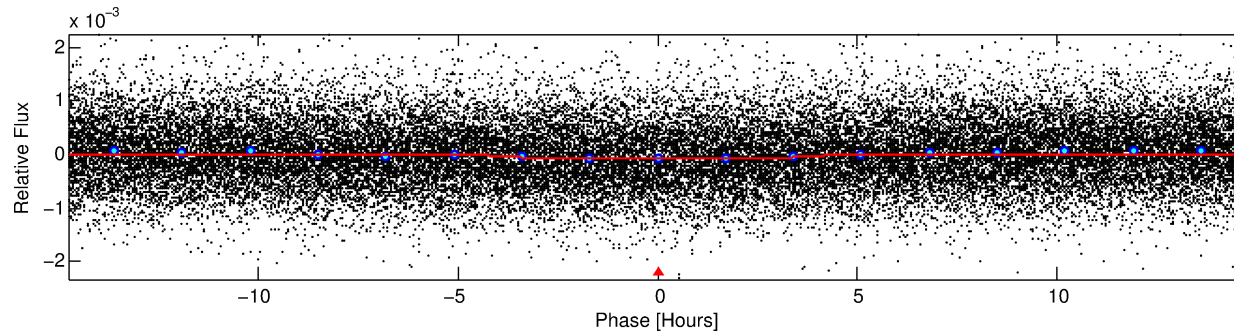
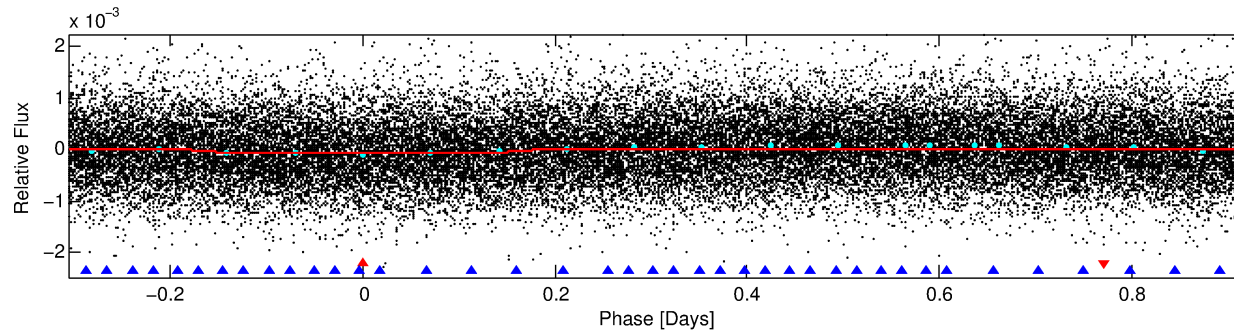
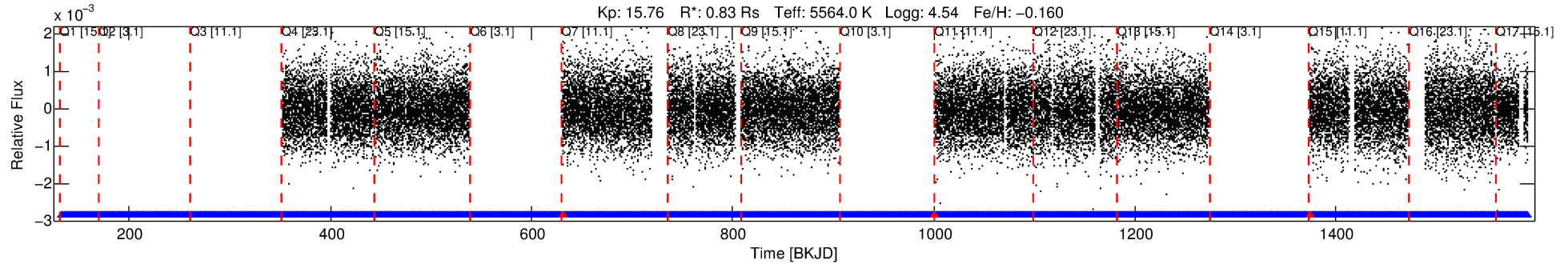
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004928235-01

No Significant Match Found

# DV One-Page Summary

KIC: 4928235 Candidate: 1 of 2 Period: 1.227 d



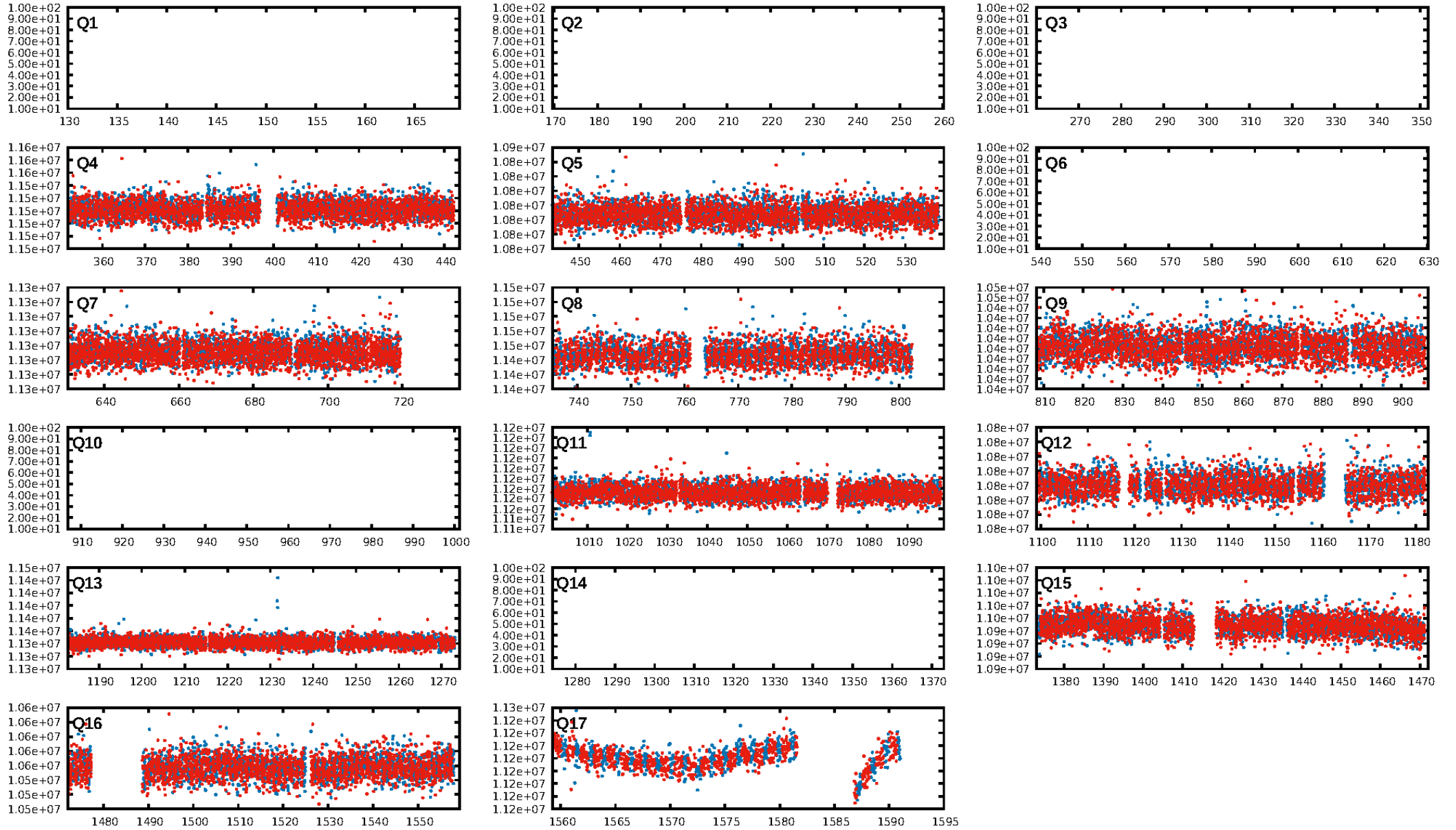
## DV Fit Results:

Period = 1.22705 [0.00002] d  
Epoch = 132.6244 [0.0085] BKJD  
Rp/R\* = 0.0079 [0.0100]  
a/R\* = 1.23 [2.24]  
b = 0.45 [9.60]  
Seff = 1294.40 [411.87]  
Teq = 1529 [122] K  
Rp = 0.72 [0.93] Re  
a = 0.0215 [0.0043] AU  
Ag = N/A  
Teffp = N/A

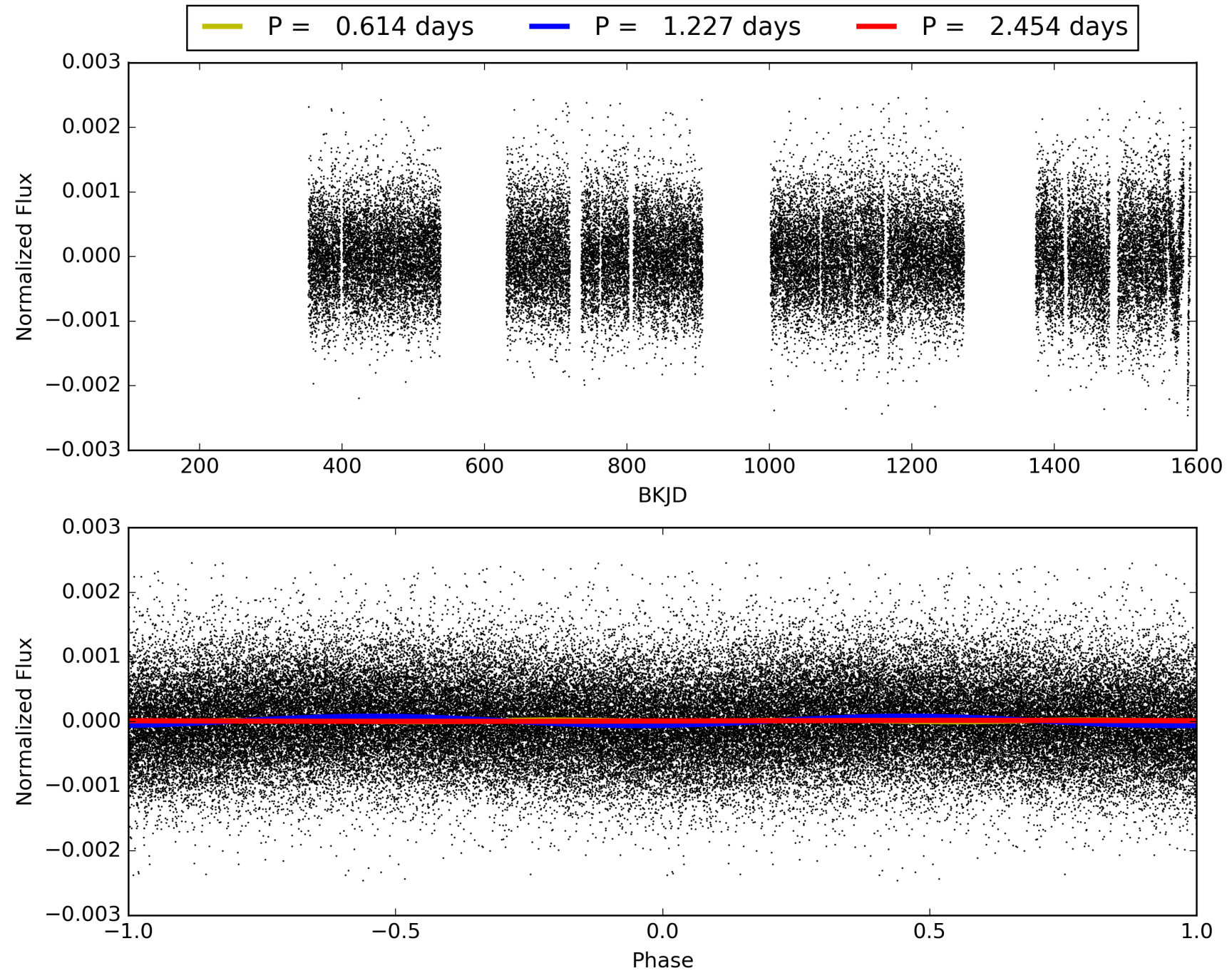
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [95.43 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.94e-20  
RollingBand-fgt: 1.00 [690/693]  
**GhostDiagnostic-chr: 0.8795**  
Centroid-sig: N/A  
Centroid-so: 3.201 arcsec [2.66 $\sigma$ ]  
OotOffset-rm: 1.667 arcsec [2.27 $\sigma$ ]  
KicOffset-rm: 1.296 arcsec [1.82 $\sigma$ ]  
OotOffset-st: 0/2/2/4 [8]  
KicOffset-st: 0/2/2/4 [8]  
DiffImageQuality-fgm: 0.75 [6/8]  
DiffImageOverlap-fno: 1.00 [11/11]

# TCE 004928235-01, PDC Light Curves

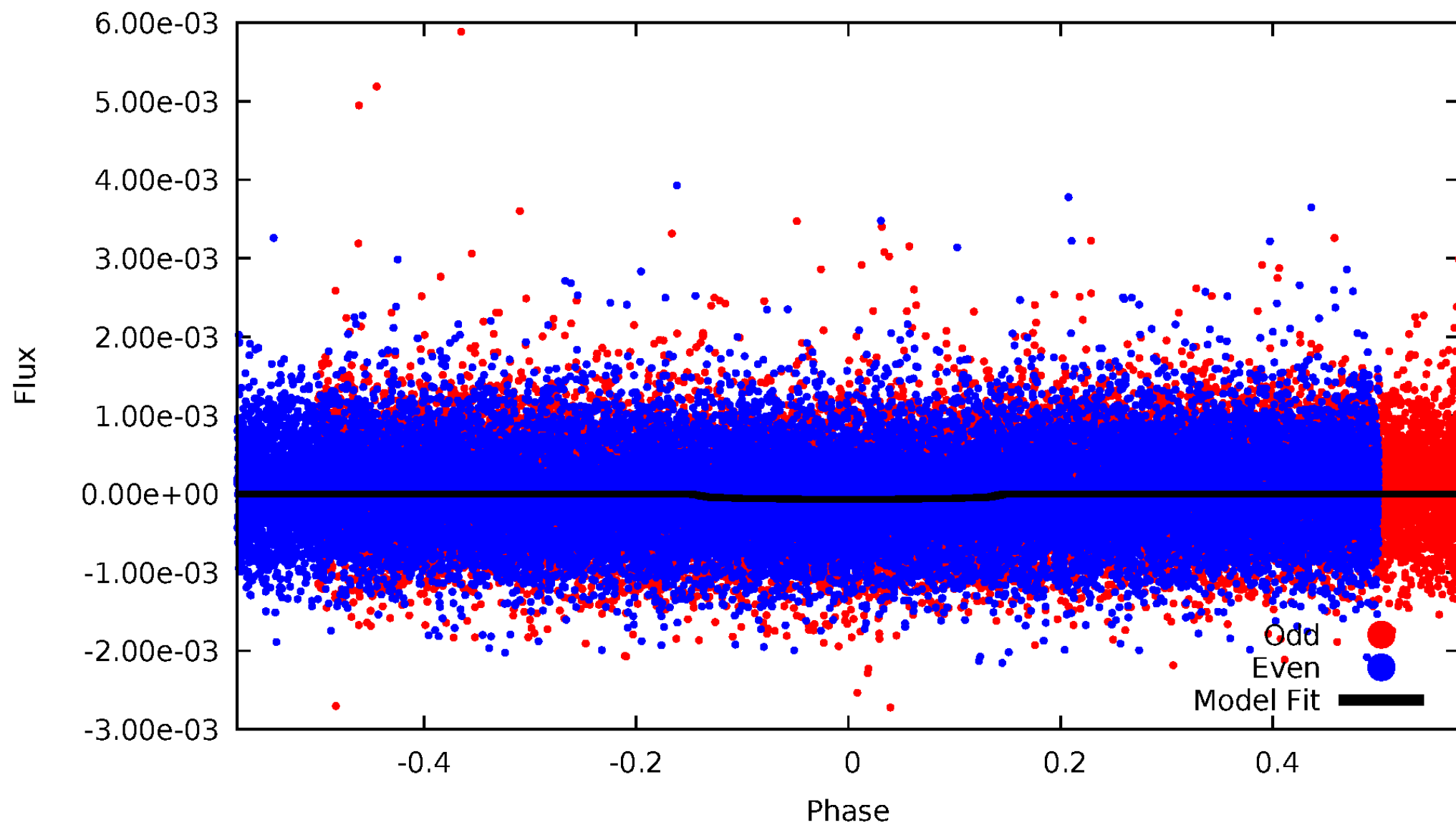


TCE 004928235-01



# DV Odd/Even

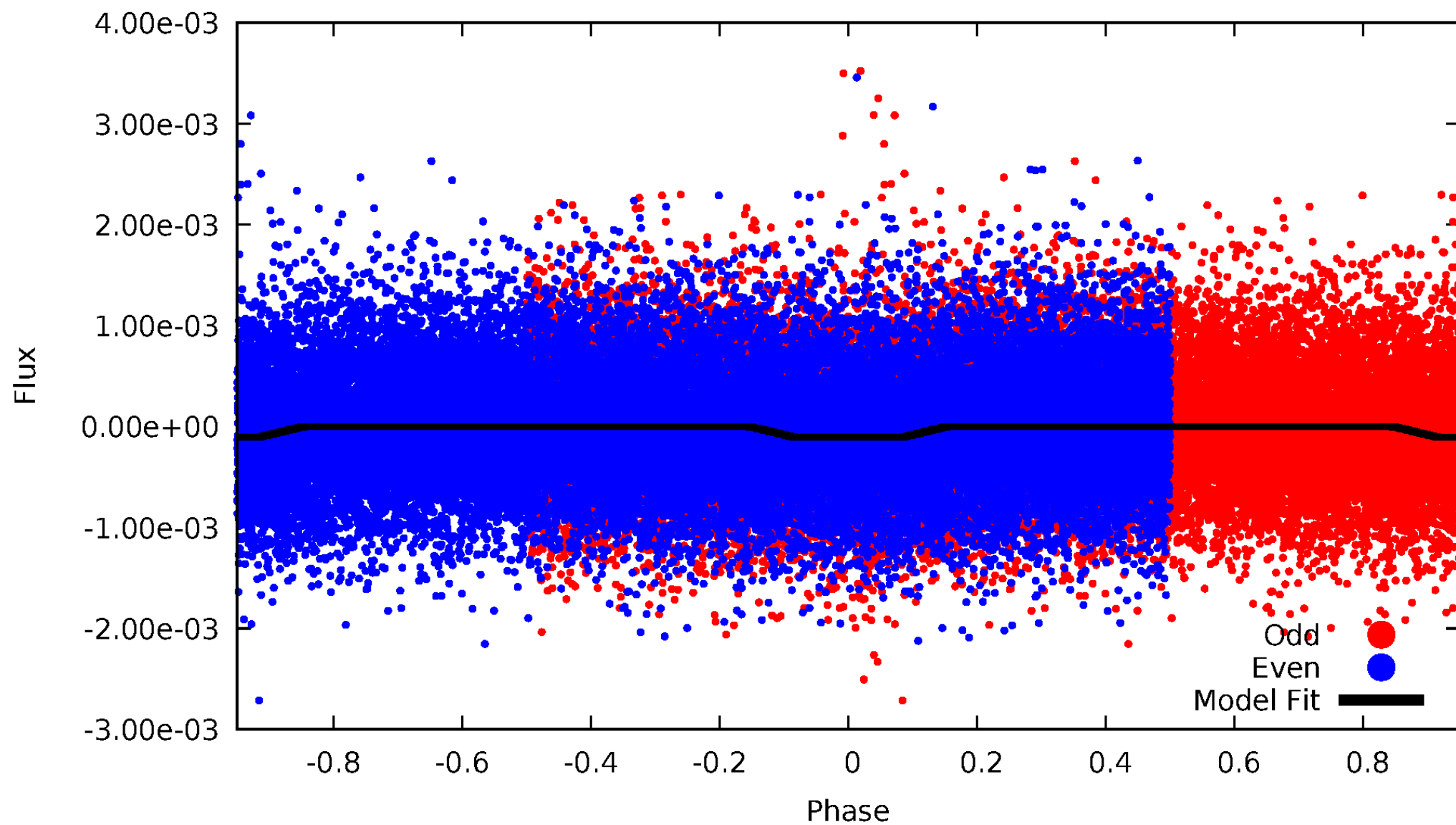
TCE 004928235-01





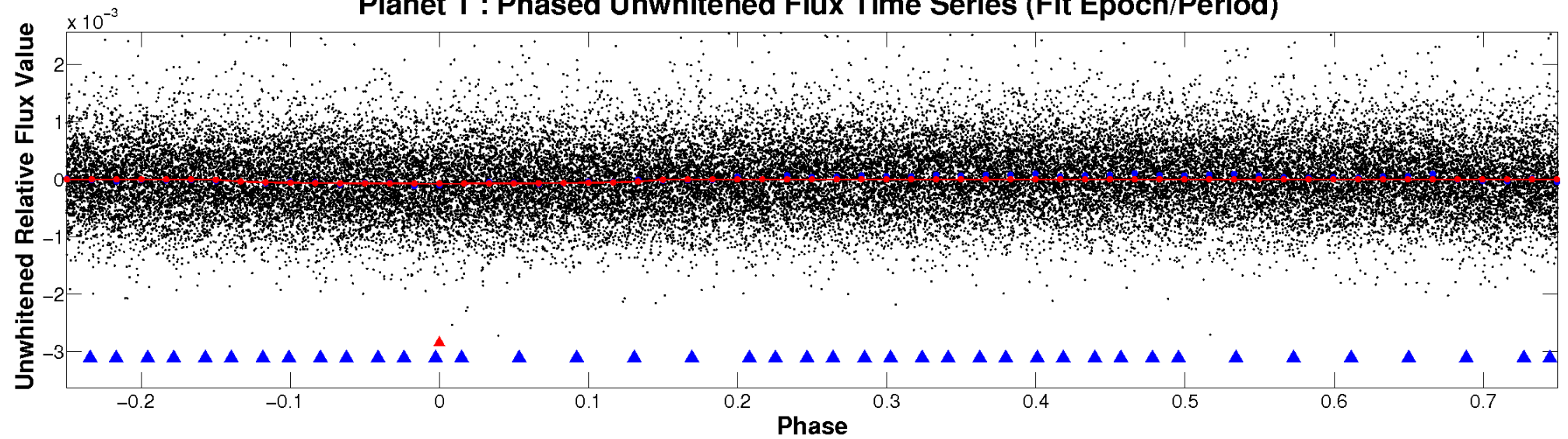
# ALT Odd/Even

TCE 004928235-01

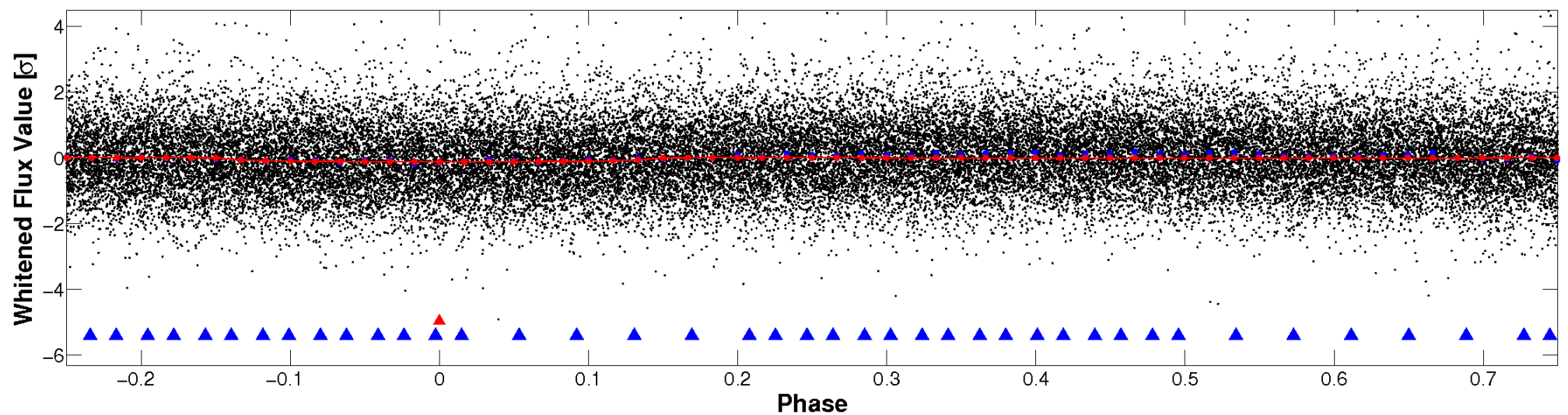


# Non-Whitened Vs. Whitened Light Curve

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

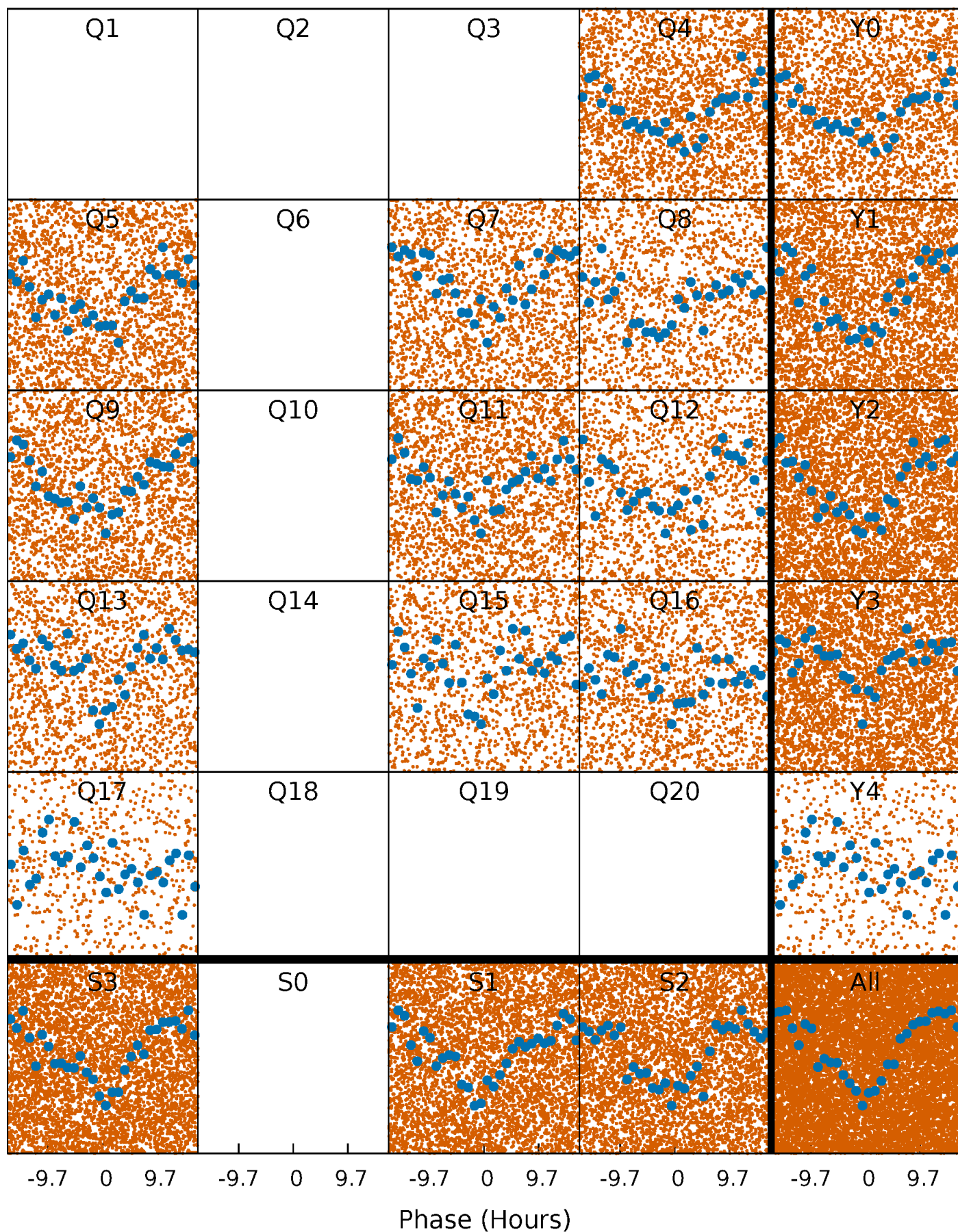


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

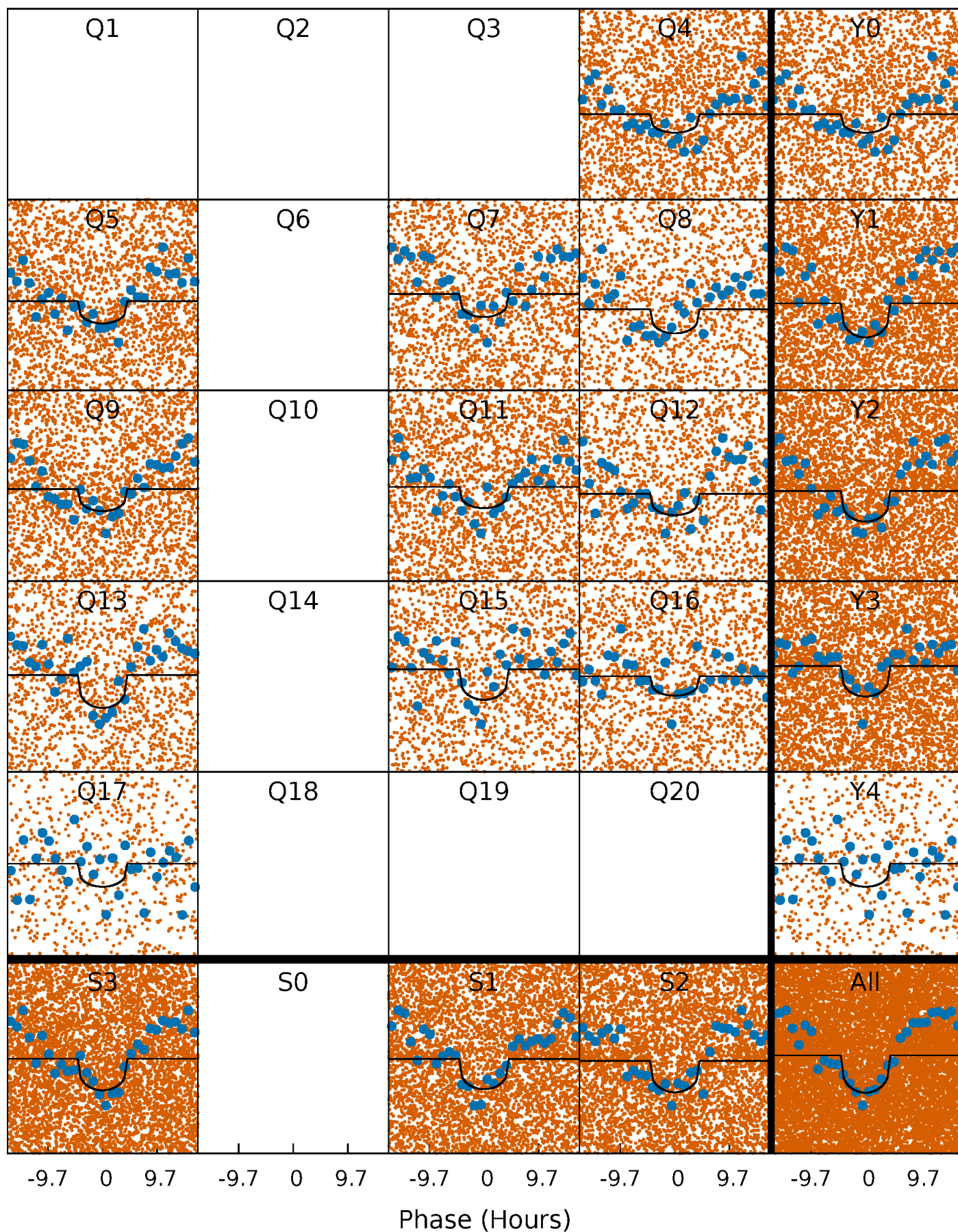
TCE 004928235-01 P= 1.227053 Days  $T_0=132.624395$  (BKJD)





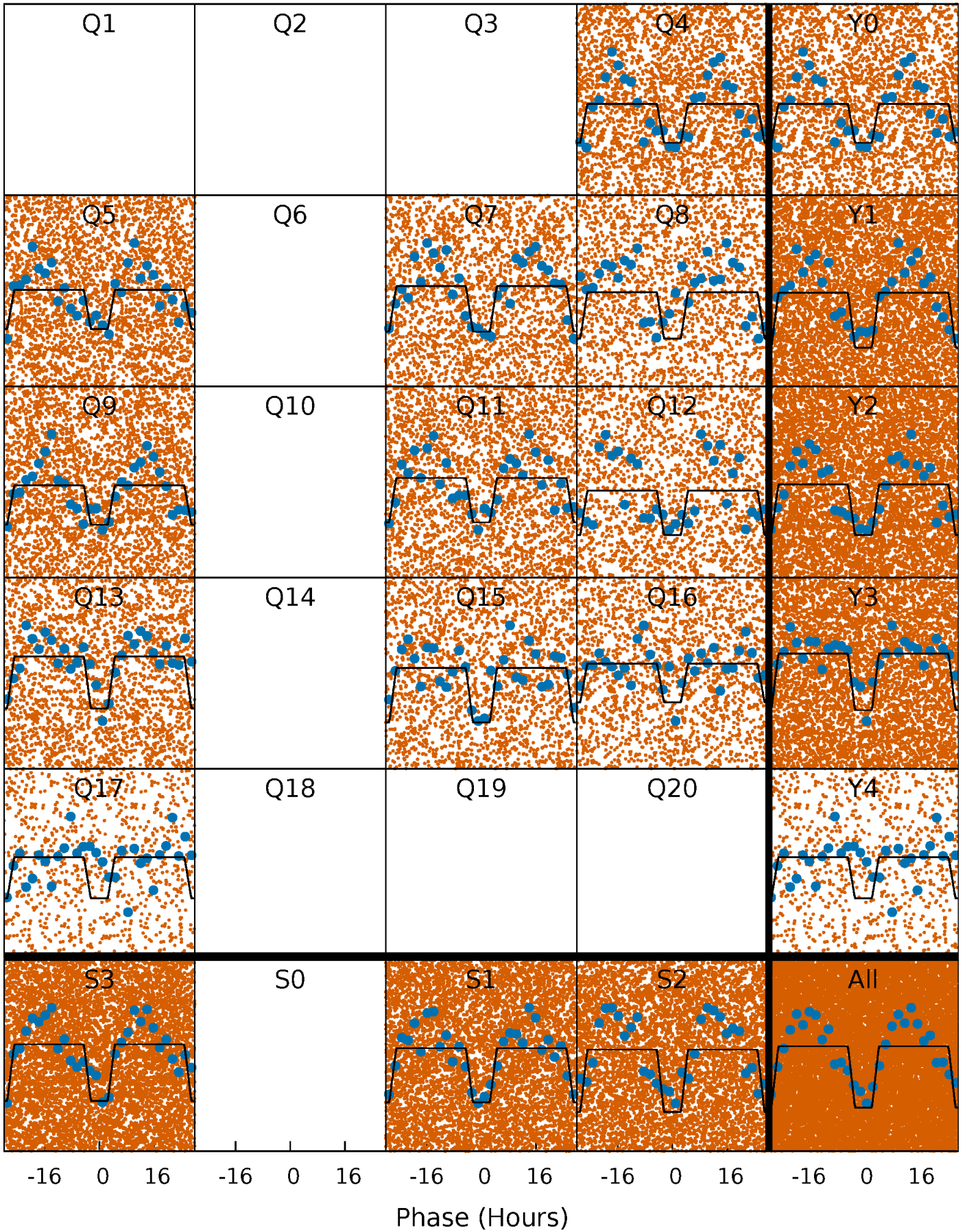
# DV Quarter-Phased Transit Curves

TCE 004928235-01 P= 1.227053 Days  $T_0=132.624395$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

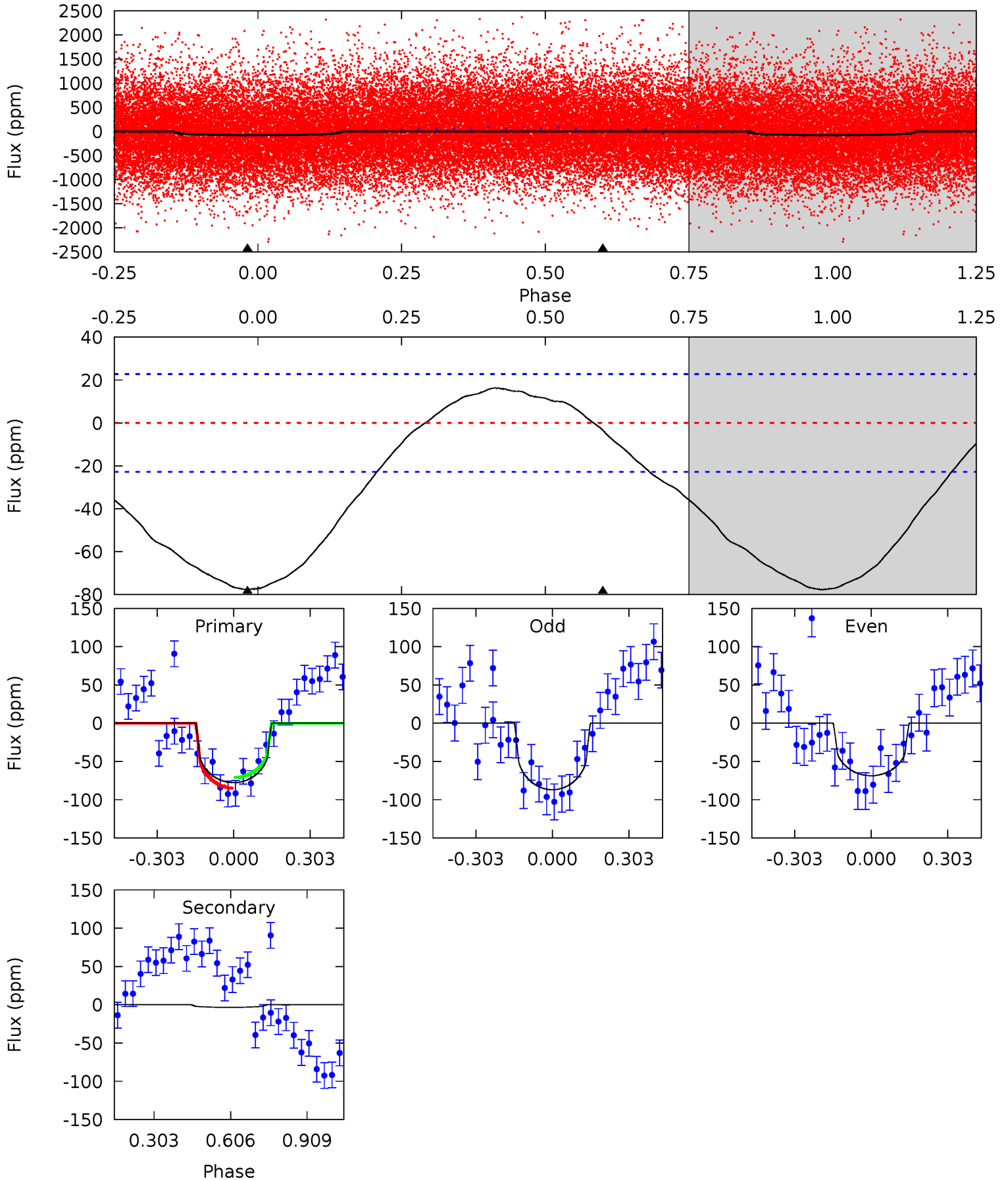
TCE 004928235-01 P= 1.226975 Days  $T_0=132.660783$  (BKJD)



# DV Model-Shift Uniqueness Test

004928235-01, P = 1.227053 Days, E = 132.624395 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
14.8	0.64	0	0	4.33	1.03	1.16	14.8	14.8	0.64	0.64	1.74	0.90	0.17	1.35

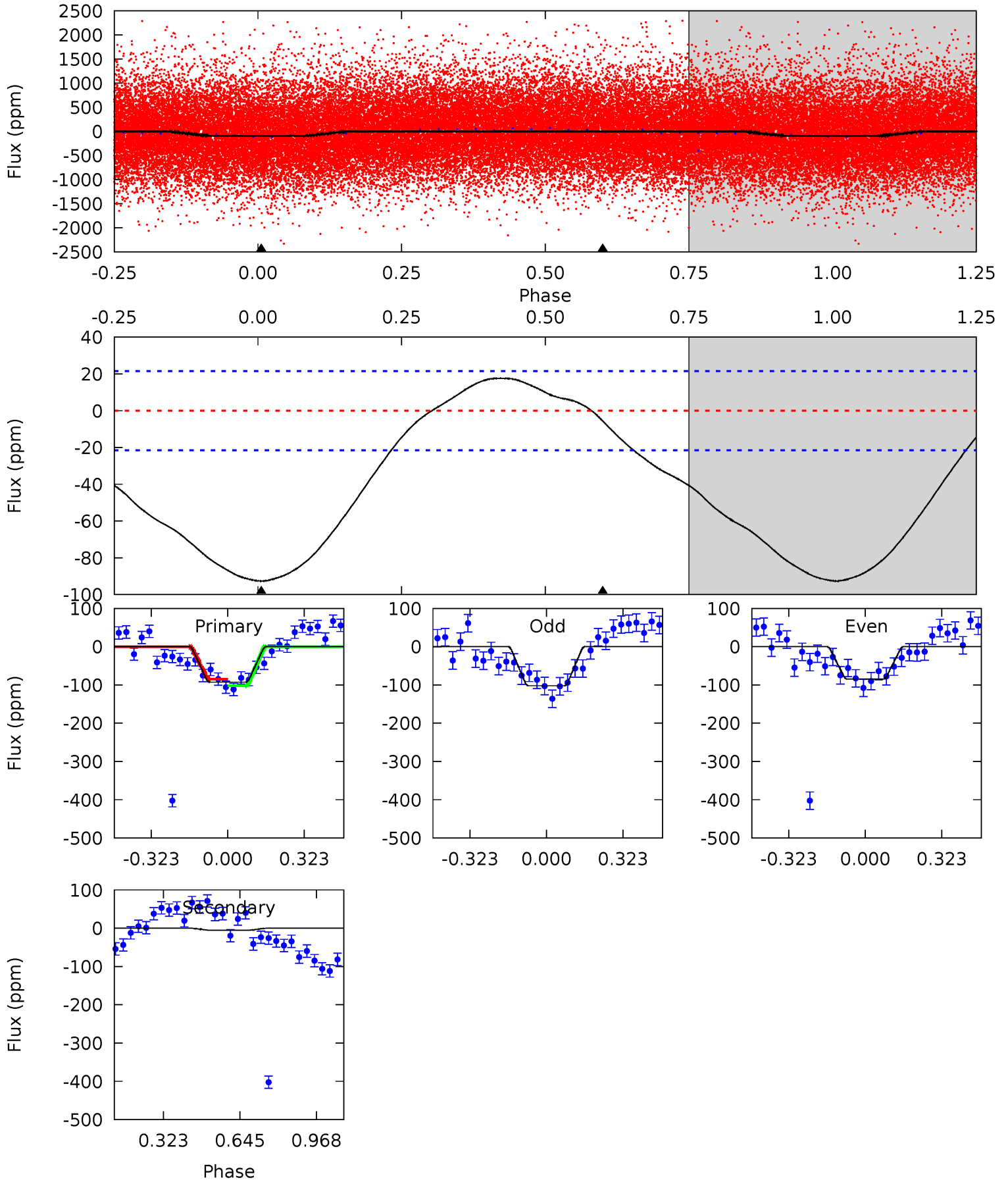




# Alt Model-Shift Uniqueness Test

004928235-01, P = 1.226975 Days, E = 132.660783 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
18.6	1.13	0	0	4.31	0.99	1.30	18.6	18.6	1.13	1.13	1.73	0.87	0.16	1.71





### Stellar Parameters For KIC 004928235

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5564^{+182}_{-182}$	$4.539^{+0.053}_{-0.158}$	$-0.160^{+0.300}_{-0.300}$	$0.834^{+0.199}_{-0.085}$	$0.877^{+0.102}_{-0.092}$	$2.130^{+0.582}_{-0.918}$
	+3%/-3%	+1%/-3%	+188%/-188%	+24%/-10%	+12%/-10%	+27%/-43%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 004928235-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-3 \pm 5$	$1.04^{+0.82}_{-0.70}$	$2172^{+133}_{-101}$	$2532^{+1525}_{-5394}$	$0.552^{+5.061}_{-0.865}$
Alt.	$-6 \pm 5$	$1.16^{+0.90}_{-0.67}$	$2178^{+134}_{-107}$	$2814^{+1244}_{-5372}$	$0.815^{+5.213}_{-0.755}$

$T_{max}$  = 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

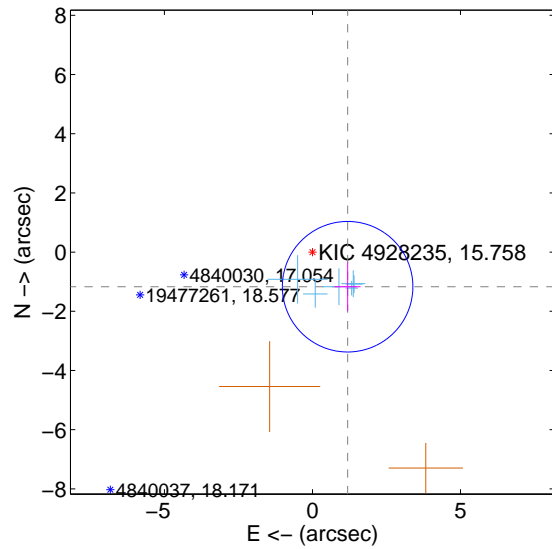
Supplemental centroid analysis for 004928235-01. Kepler magnitude: 15.76. Transit SNR 10.79

There are 6 quarters with good PRF difference image offsets

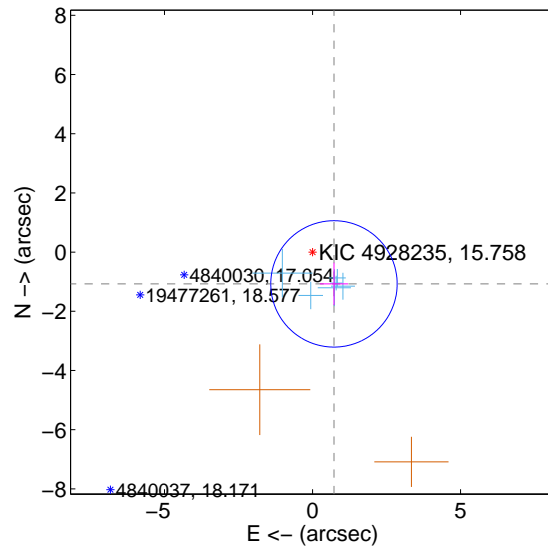
The direct PRF centroid is offset from the target star catalog position by about 0.53 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.667 \pm 0.735$	2.27	$-1.188 \pm 0.439$	$-1.170 \pm 0.821$
PRF-fit source offset from KIC position	$1.296 \pm 0.711$	1.82	$-0.724 \pm 0.476$	$-1.074 \pm 0.716$
photometric centroid source offset	$3.20 \pm 1.20$	2.66	$-3.20 \pm 1.20$	$-0.12 \pm 1.04$

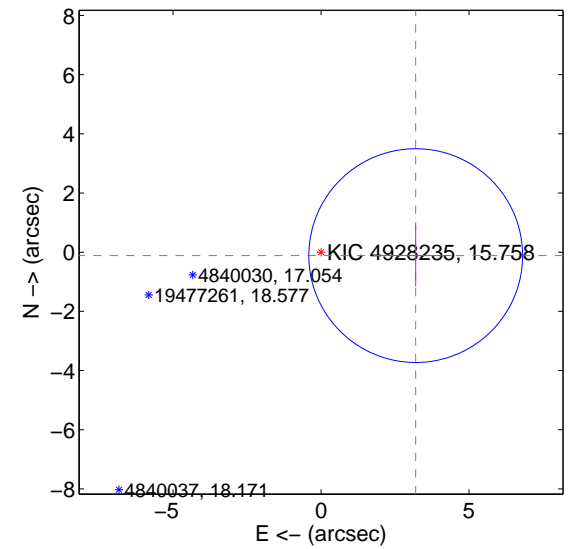
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

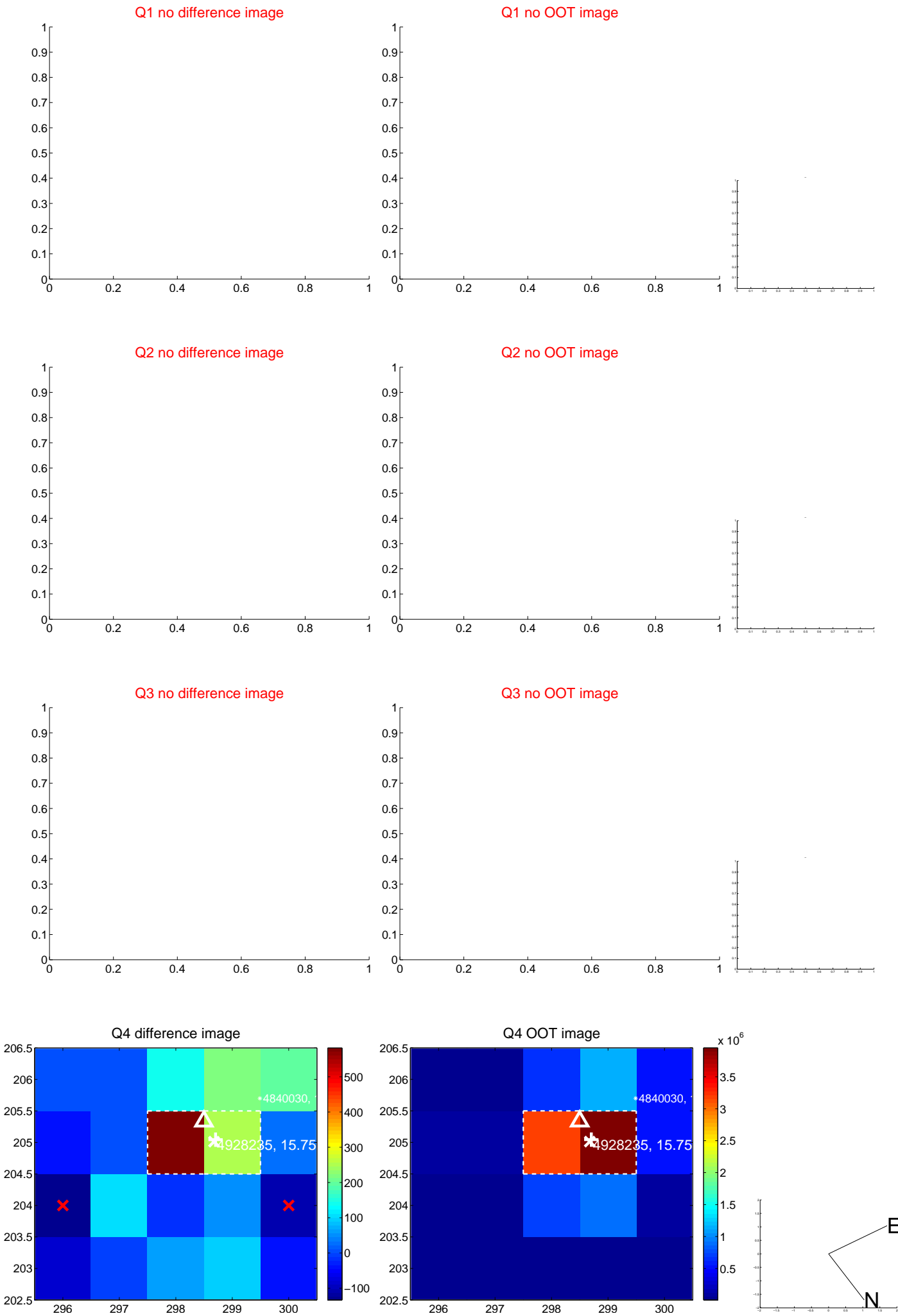


offset from photometric centroids

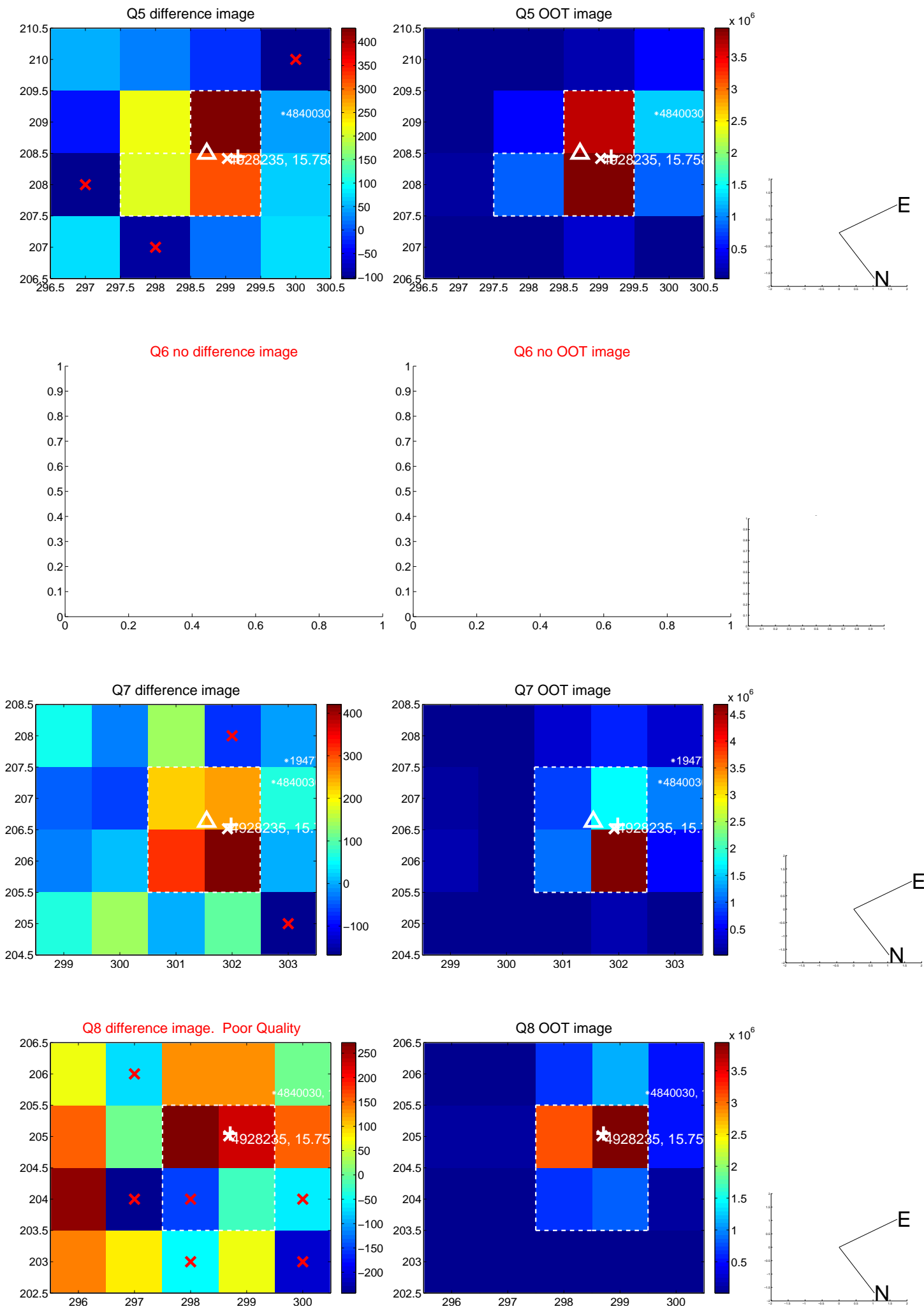


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

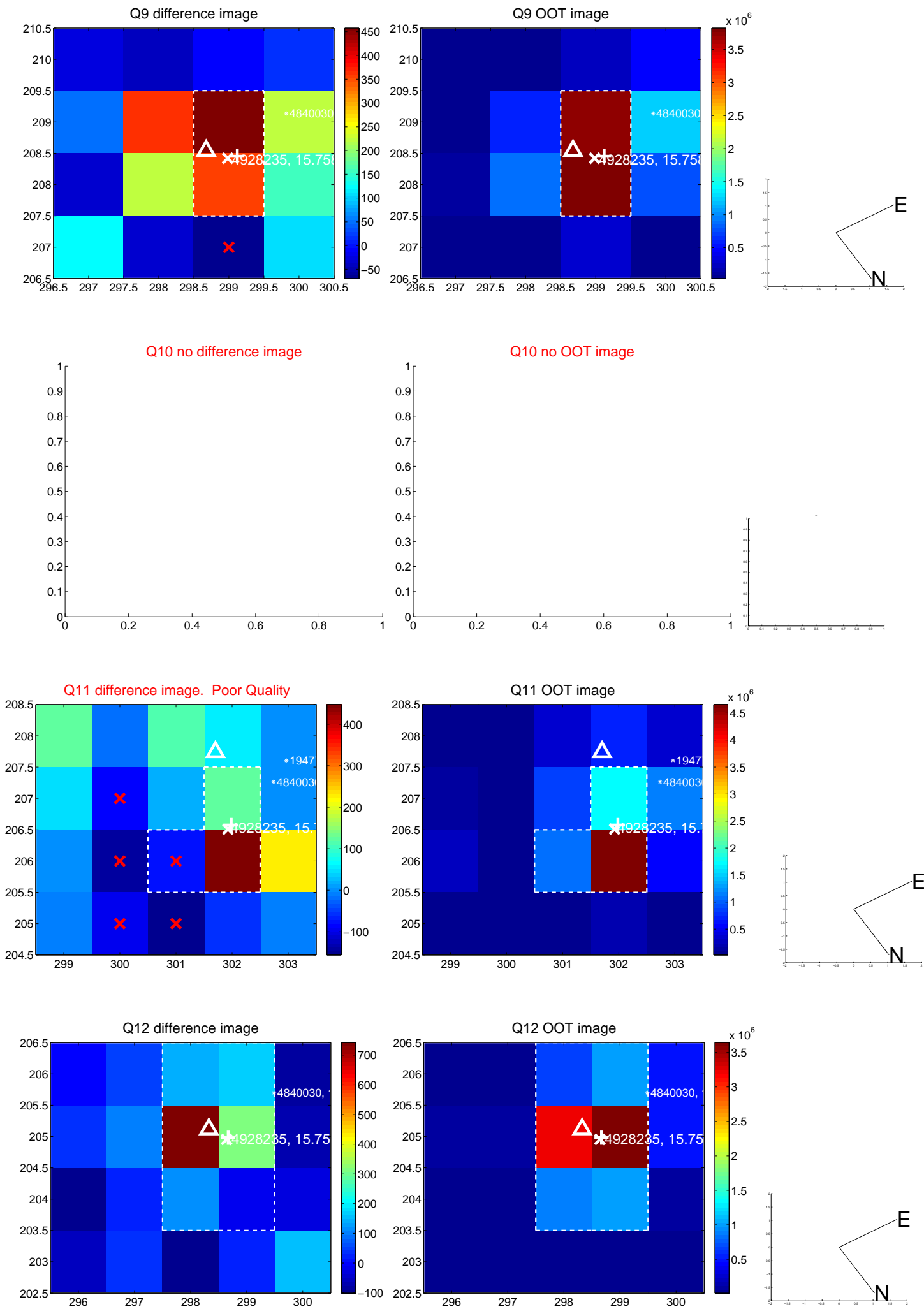


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

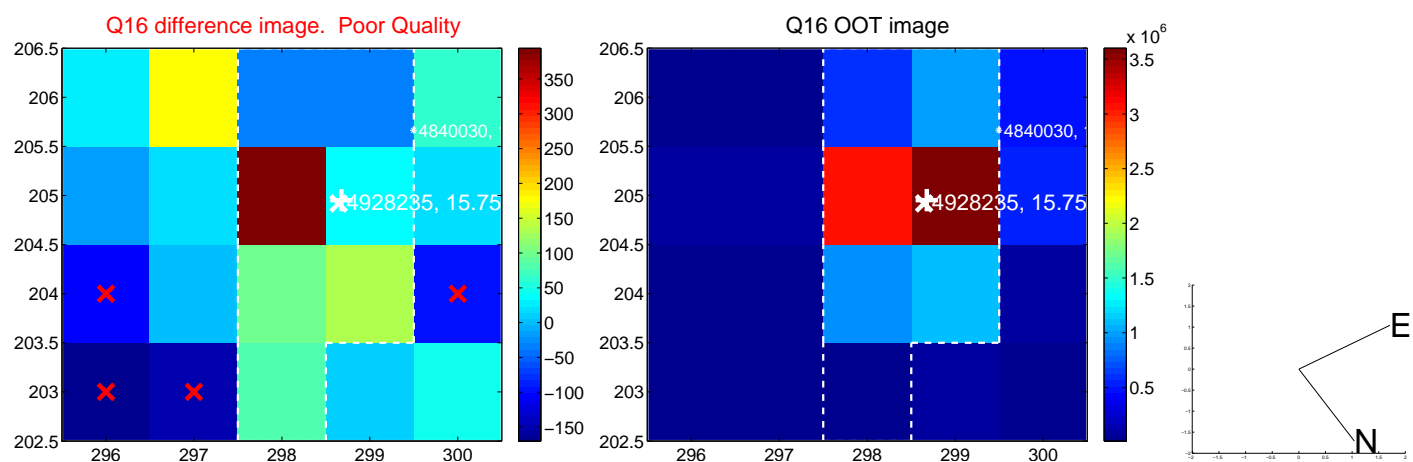
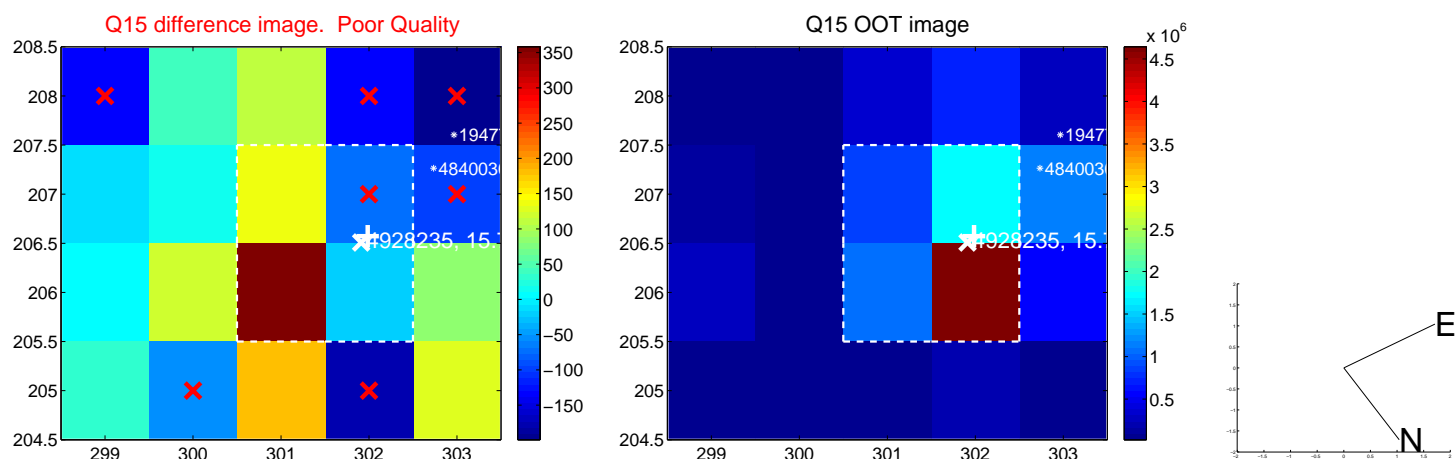
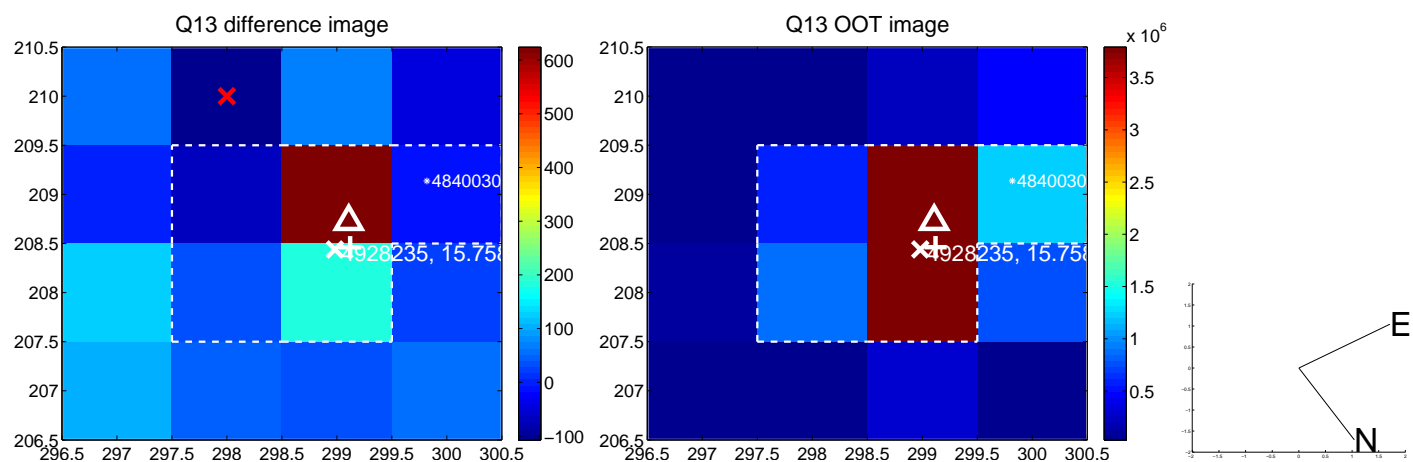




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



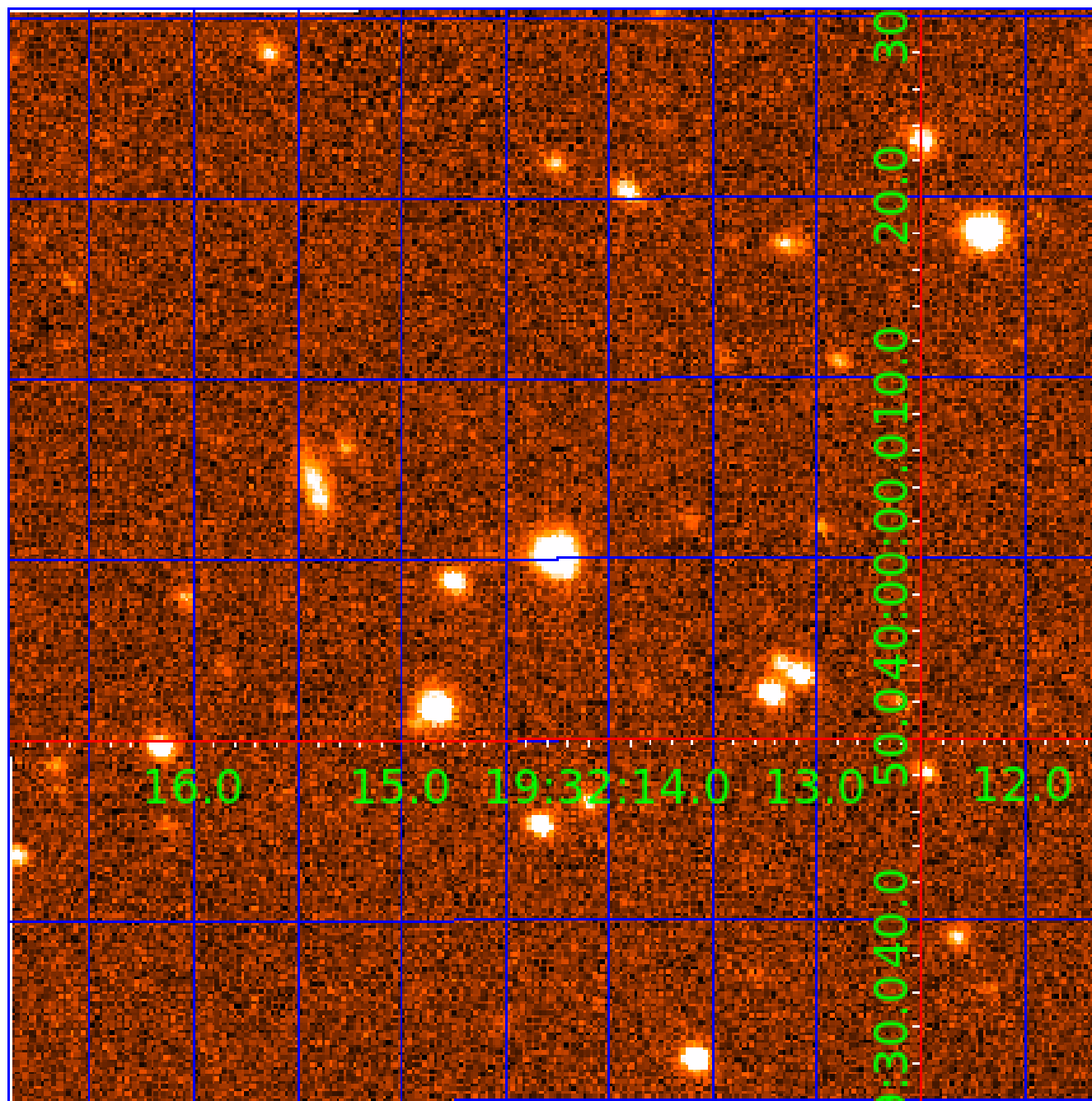
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





# UKIRT Image

Declination





# KIC 004928235

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004928235-01	OBS	No	1.227053	132.624395	71.8	8.481	9.8	10.8	0.83	5564	0.71	1294.40
004928235-02	OBS	No	36.221746	134.127996	697.5	2.352	8.3	7.5	0.83	5564	2.44	14.19

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004928235-01	OBS	FP	0.00	1	0	0	0	LPP_DV
004928235-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

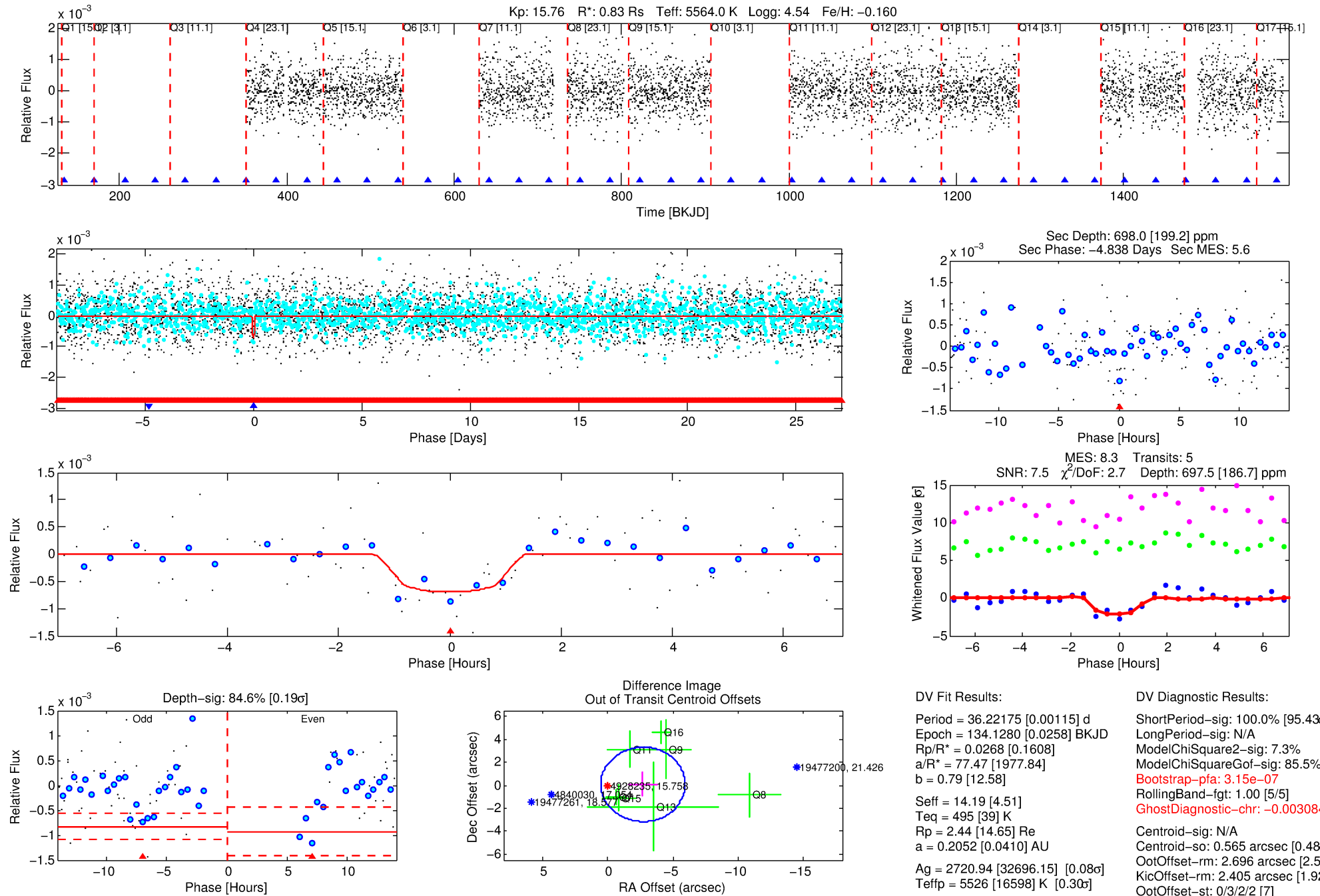
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004928235-02

No Significant Match Found

# DV One-Page Summary

KIC: 4928235 Candidate: 2 of 2 Period: 36.222 d



## DV Fit Results:

Period = 36.22175 [0.00115] d  
Epoch = 134.1280 [0.0258] BKJD  
Rp/R\* = 0.0268 [0.1608]  
a/R\* = 77.47 [1977.84]  
b = 0.79 [12.58]  
Seff = 14.19 [4.51]  
Teq = 495 [39] K  
Rp = 2.44 [14.65] Re  
a = 0.2052 [0.0410] AU  
Ag = 2720.94 [32696.15] [0.08 $\sigma$ ]  
Teffp = 5526 [16598] K [0.30 $\sigma$ ]

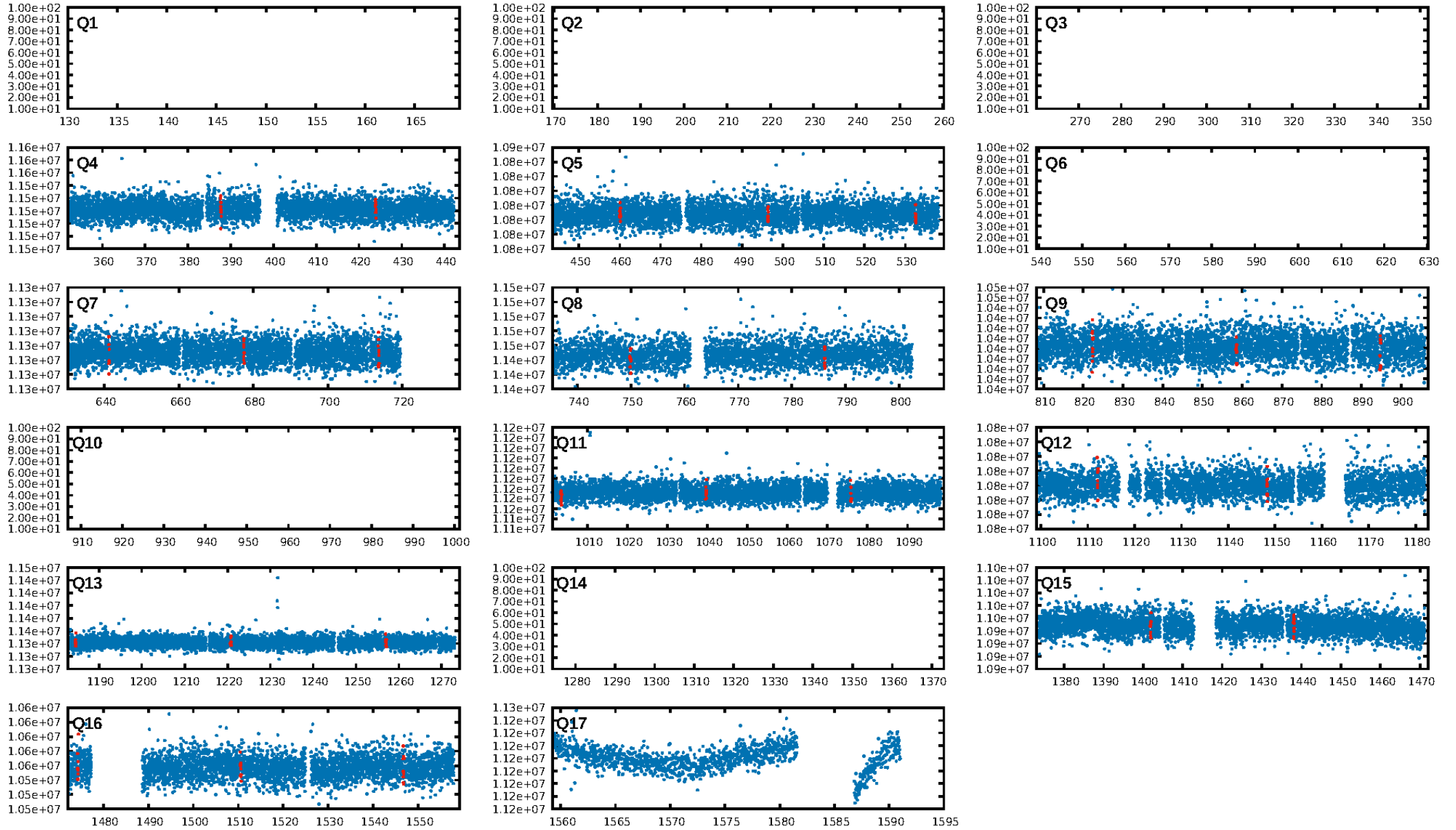
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [95.43 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 7.3%  
ModelChiSquareGof-sig: 85.5%  
**Bootstrap-pfa: 3.15e-07**  
RollingBand-fgt: 1.00 [5/5]  
**GhostDiagnostic-chr: -0.003084**  
Centroid-sig: N/A  
Centroid-so: 0.565 arcsec [0.48 $\sigma$ ]  
OotOffset-rm: 2.696 arcsec [2.50 $\sigma$ ]  
OotOffset-st: 0/3/2/2 [7]  
KicOffset-rm: 2.405 arcsec [1.92 $\sigma$ ]  
KicOffset-st: 0/3/2/2 [7]  
DiffImageQuality-fgm: 0.14 [1/7]  
DiffImageOverlap-fno: 0.70 [7/10]

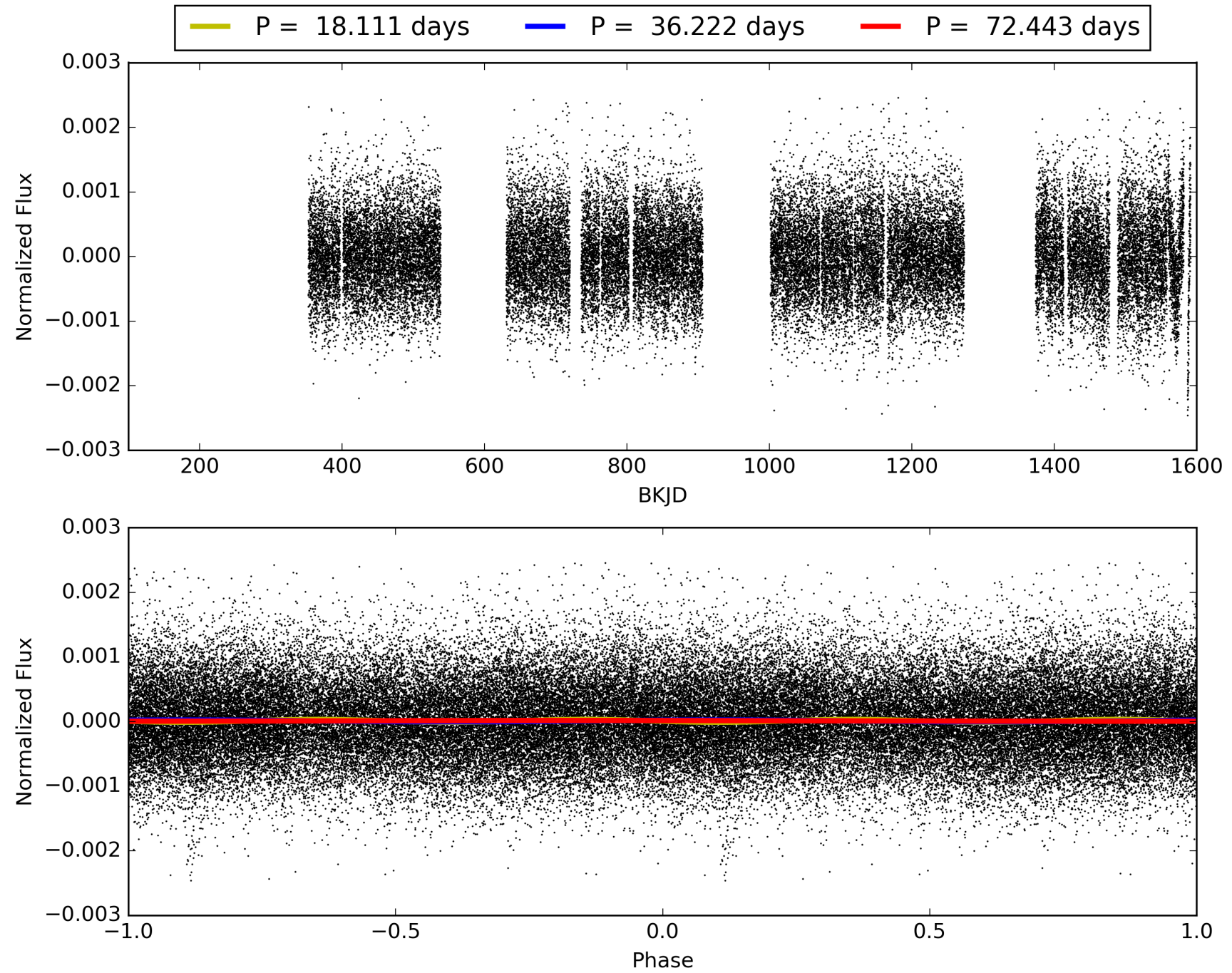
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:51:02 Z

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

# TCE 004928235-02, PDC Light Curves



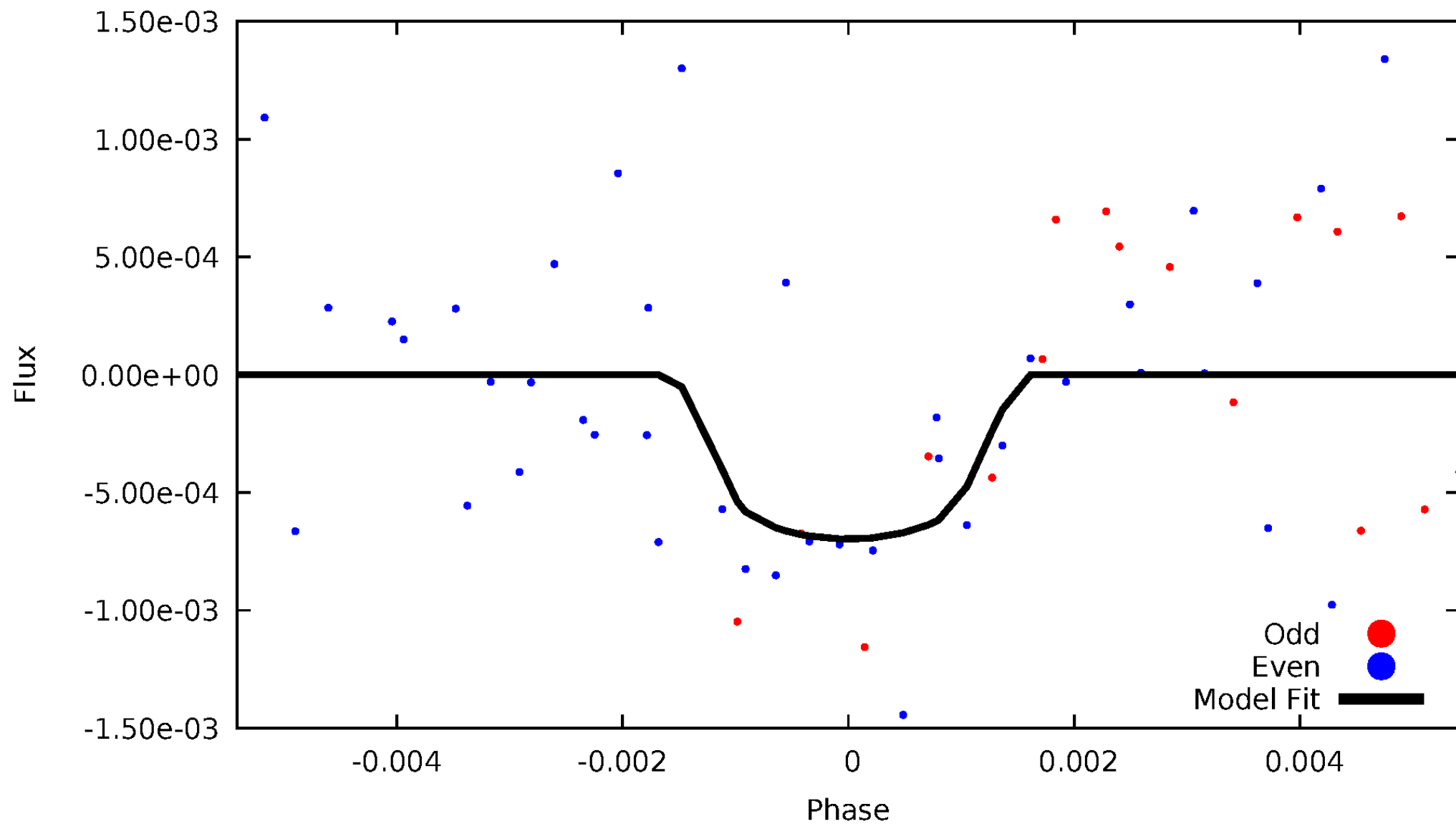
TCE 004928235-02





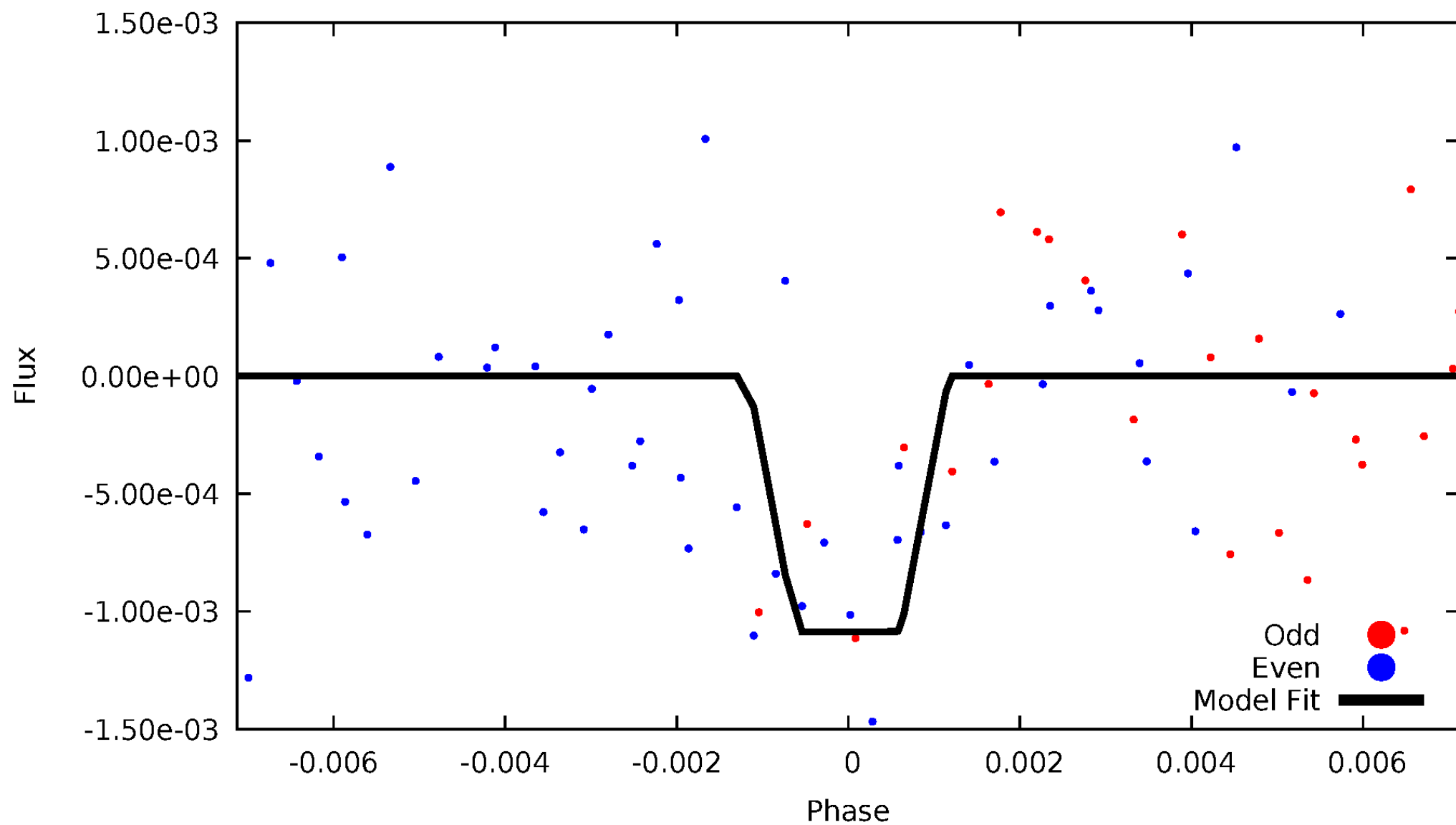
# DV Odd/Even

TCE 004928235-02



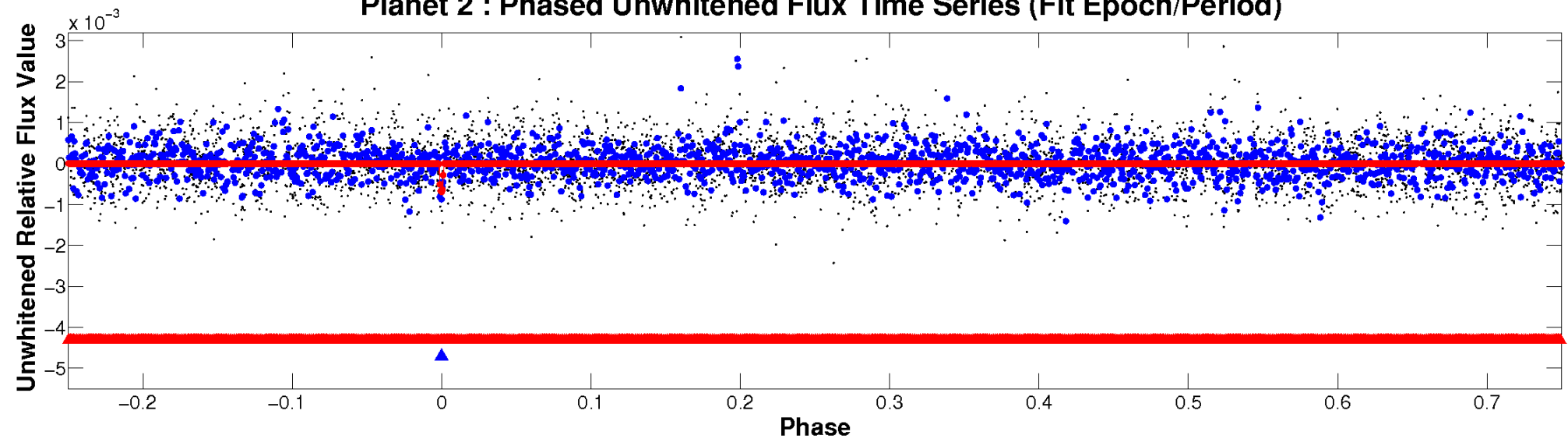
# ALT Odd/Even

TCE 004928235-02

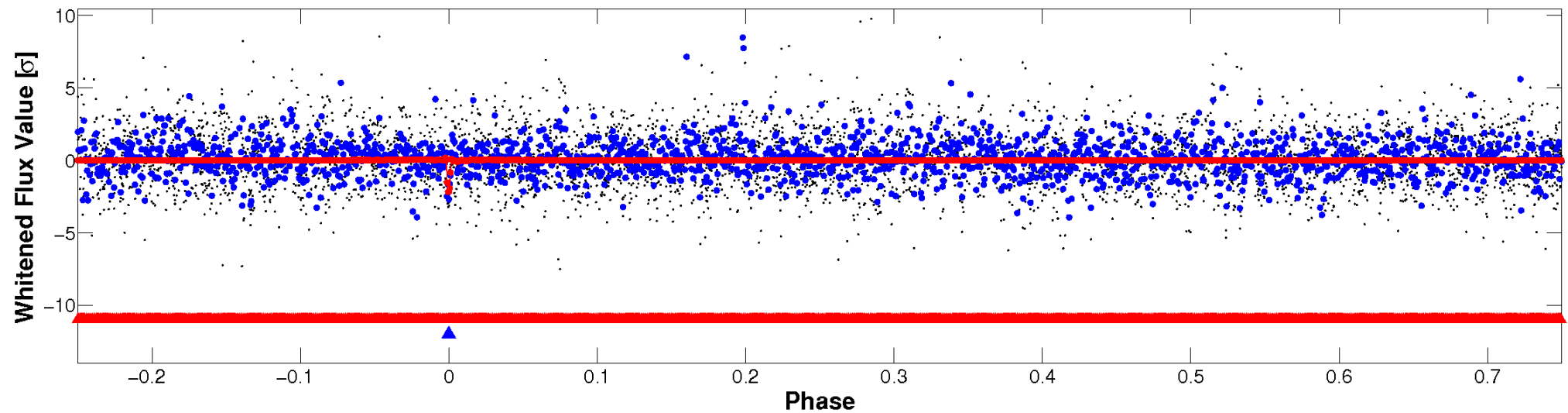


# Non-Whitened Vs. Whitened Light Curve

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

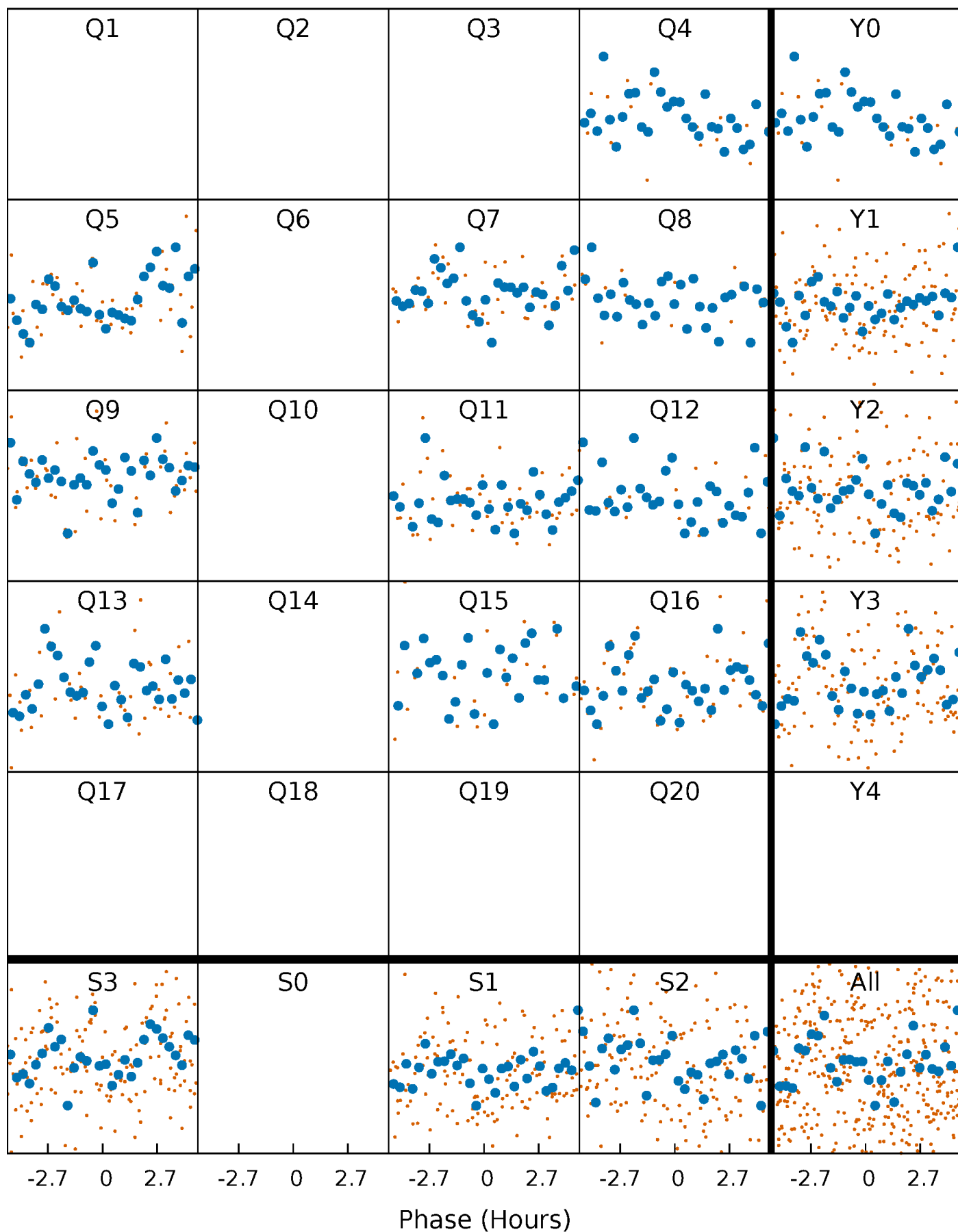


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



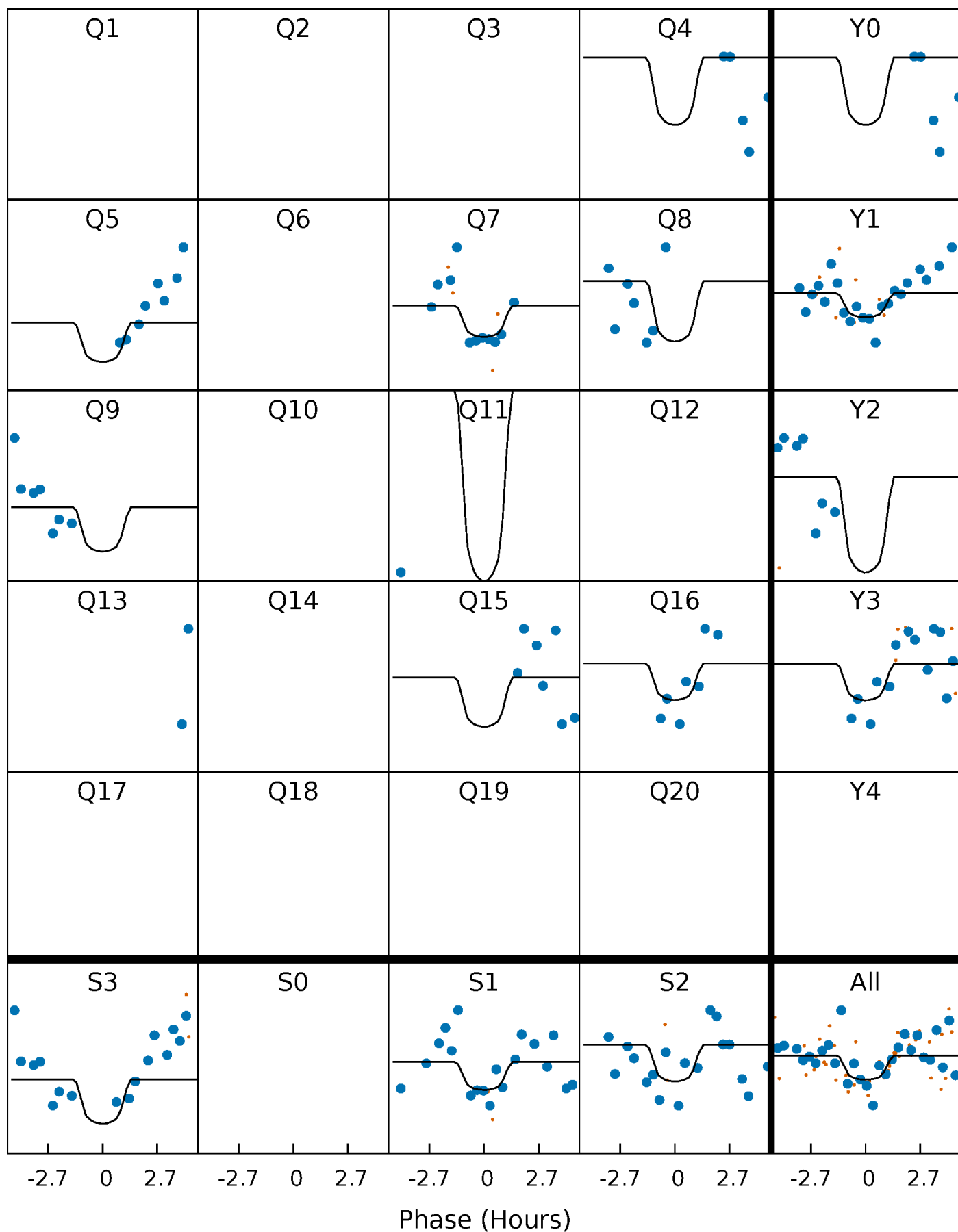
# PDC Quarter-Phased Transit Curves

TCE 004928235-02   P= 36.221746 Days    $T_0=134.127996$  (BKJD)



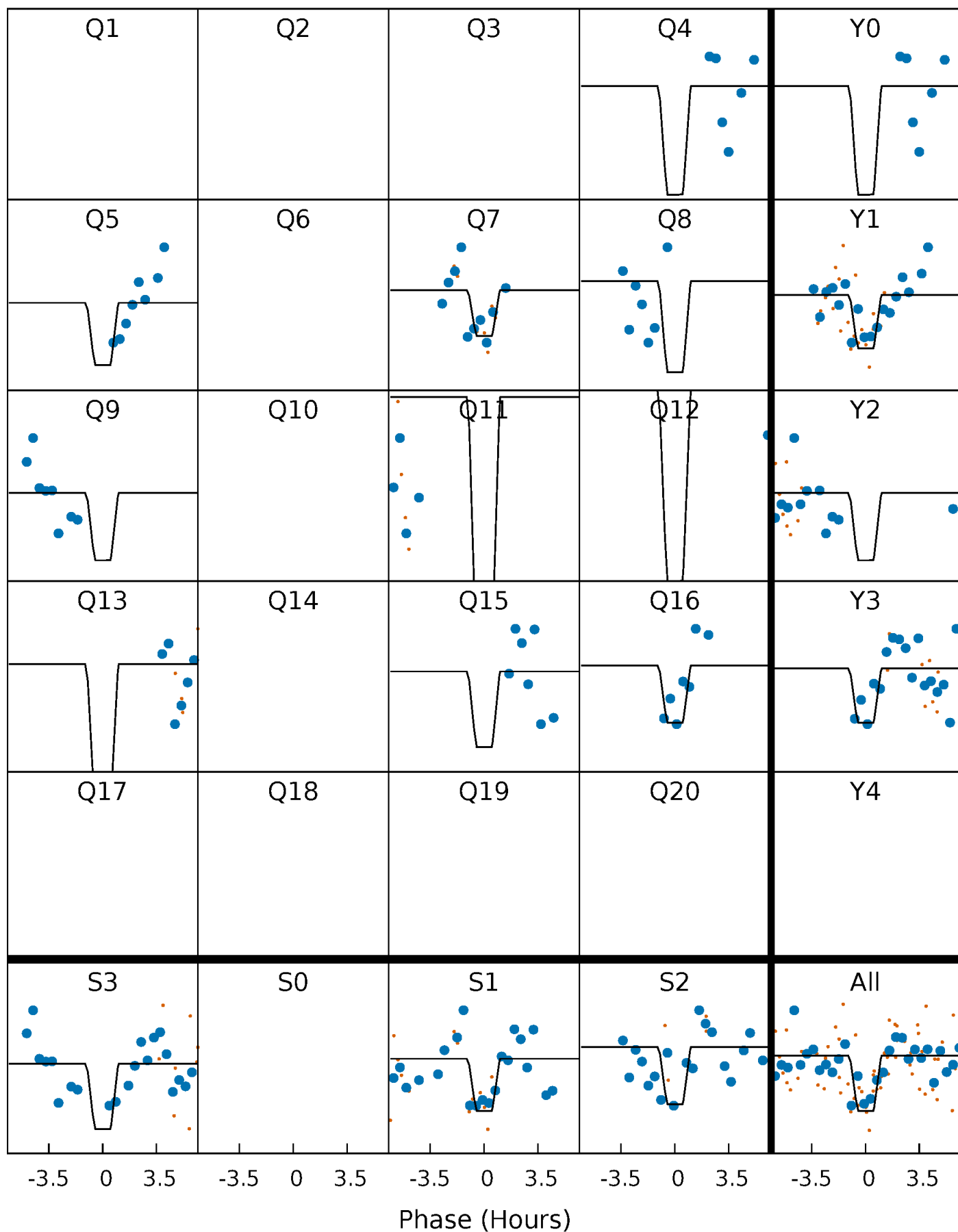
# DV Quarter-Phased Transit Curves

TCE 004928235-02    P= 36.221746 Days     $T_0=134.127996$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

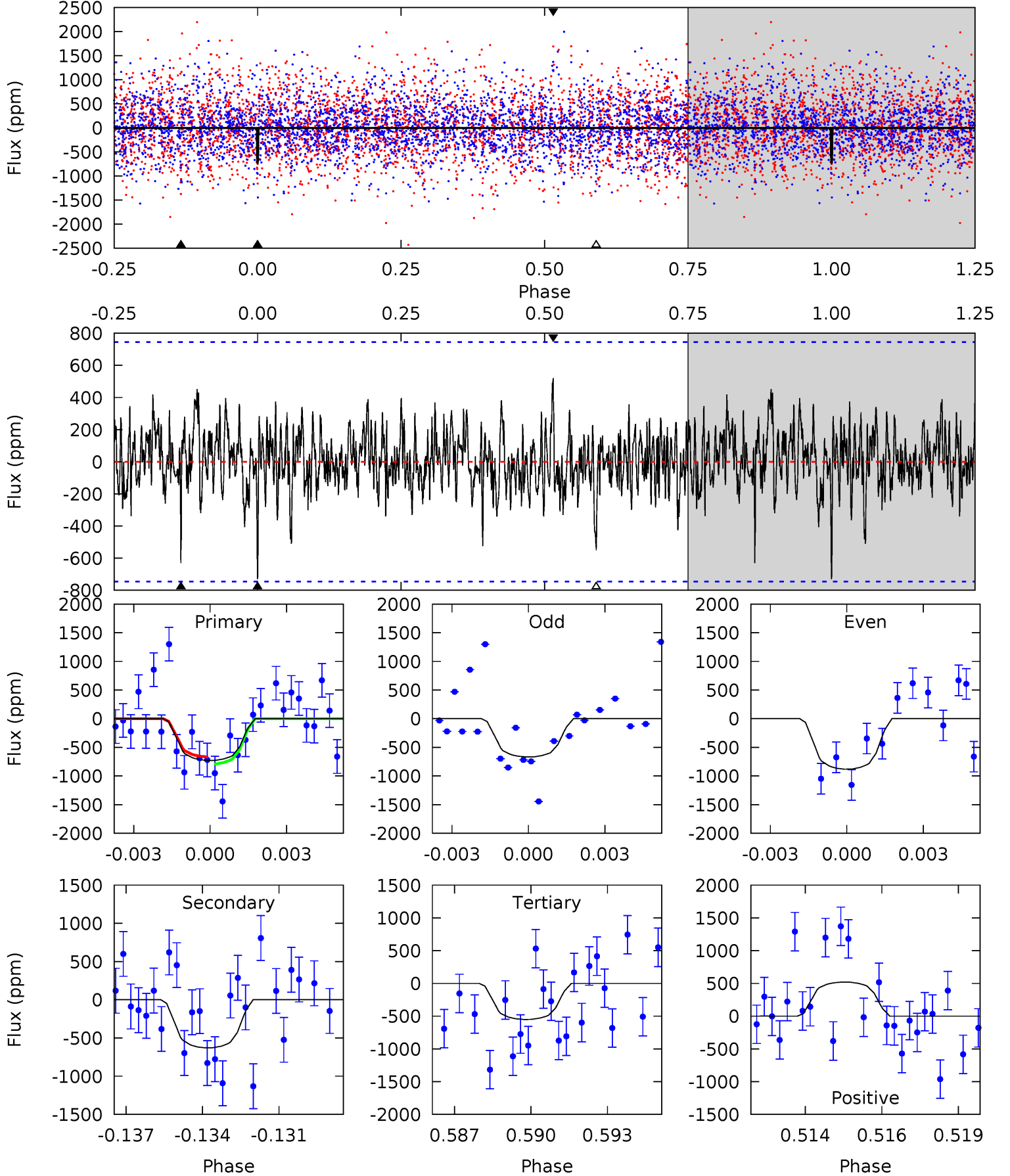
TCE 004928235-02 P= 36.221539 Days  $T_0=134.138284$  (BKJD)



# DV Model-Shift Uniqueness Test

004928235-02, P = 36.221746 Days, E = 134.127996 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
5.16	4.45	3.89	3.68	5.27	3.00	1.09	1.27	1.48	0.56	0.77	0.71	0.93	0.42	0.44

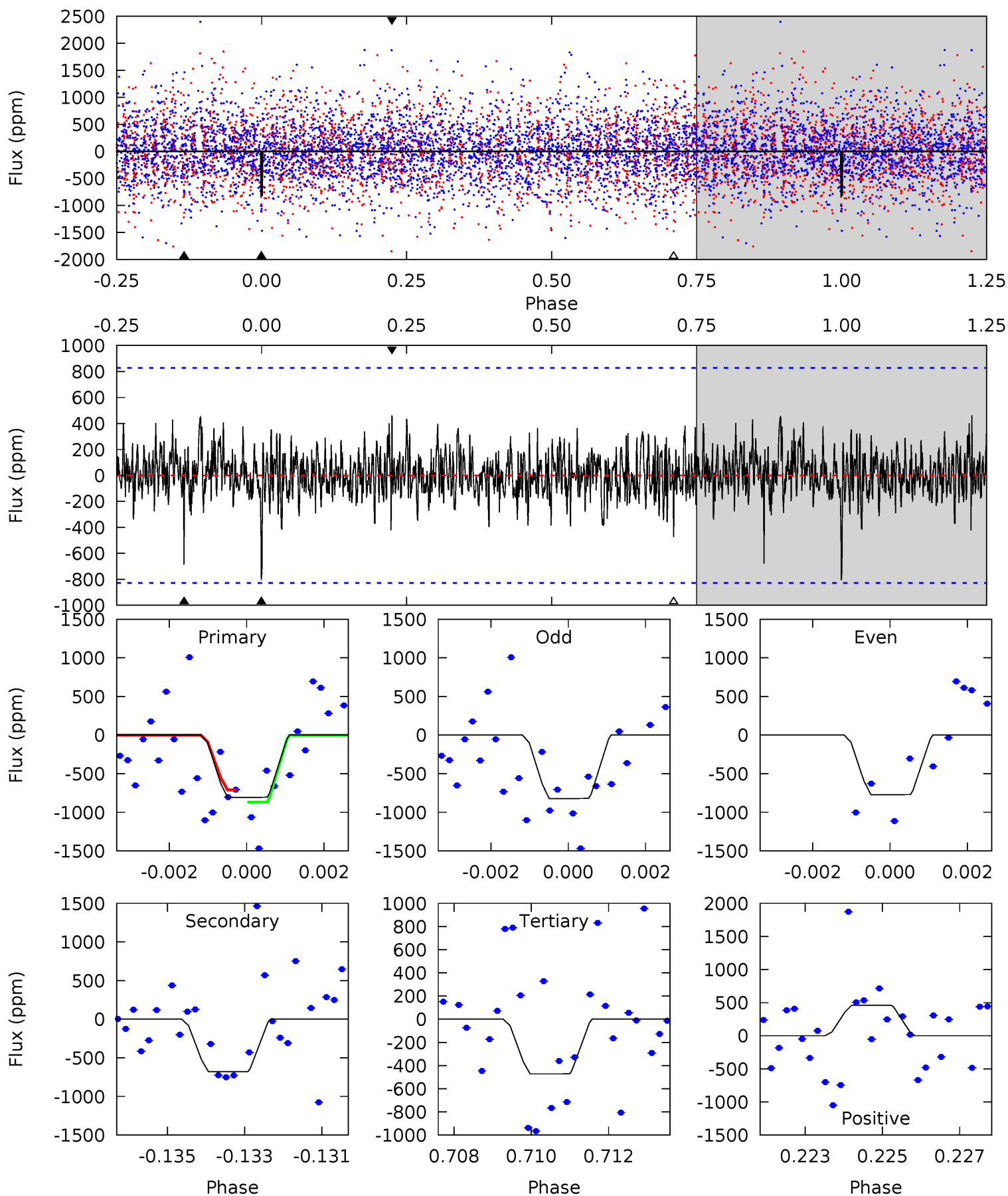




# Alt Model-Shift Uniqueness Test

004928235-02, P = 36.221539 Days, E = 134.138284 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
5.18	4.36	3.03	2.96	5.31	3.06	0.90	2.15	2.21	1.33	1.40	0.16	1.08	0.36	0.50



### Stellar Parameters For KIC 004928235

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5564^{+182}_{-182}$	$4.539^{+0.053}_{-0.158}$	$-0.160^{+0.300}_{-0.300}$	$0.834^{+0.199}_{-0.085}$	$0.877^{+0.102}_{-0.092}$	$2.130^{+0.582}_{-0.918}$
	+3%/-3%	+1%/-3%	+188%/-188%	+24%/-10%	+12%/-10%	+27%/-43%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 004928235-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-630 \pm 142$	$11.35^{+12.02}_{-8.01}$	$704^{+45}_{-34}$	$3138^{+1684}_{-569}$	$112^{+1102}_{-86}$
Alt.	$-680 \pm 156$	$11.39^{+13.03}_{-7.50}$	$703^{+45}_{-30}$	$3160^{+1426}_{-586}$	$114^{+926}_{-89}$

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

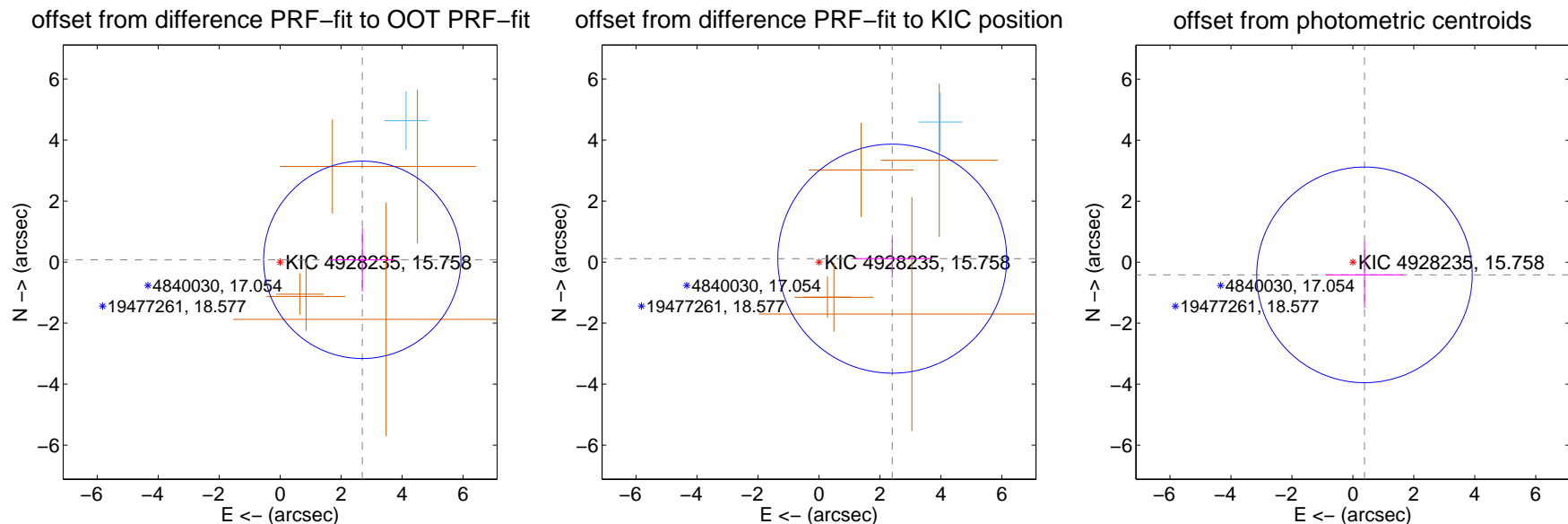
## DV Centroid Data

Supplemental centroid analysis for 004928235-02. Kepler magnitude: 15.76. Transit SNR 7.52

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.696 \pm 1.078$	2.50	$-2.695 \pm 1.073$	$0.074 \pm 1.036$
PRF-fit source offset from KIC position	$2.405 \pm 1.251$	1.92	$-2.403 \pm 1.251$	$0.112 \pm 0.627$
photometric centroid source offset	$0.56 \pm 1.18$	0.48	$-0.38 \pm 1.29$	$-0.42 \pm 1.08$



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 no difference image



Q2 no OOT image



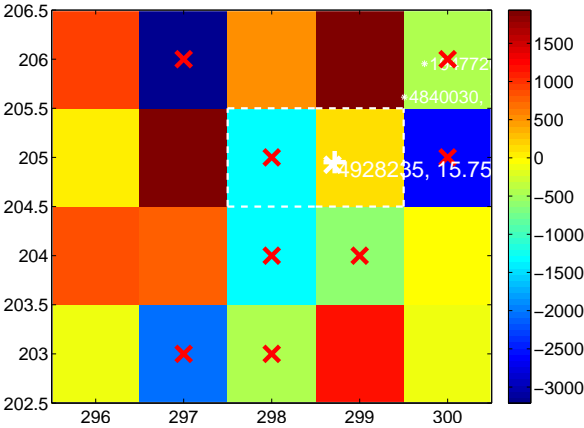
Q3 no difference image



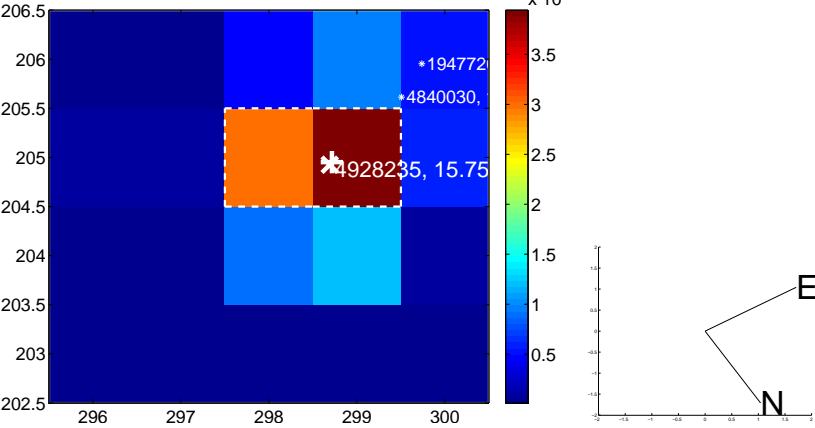
Q3 no OOT image



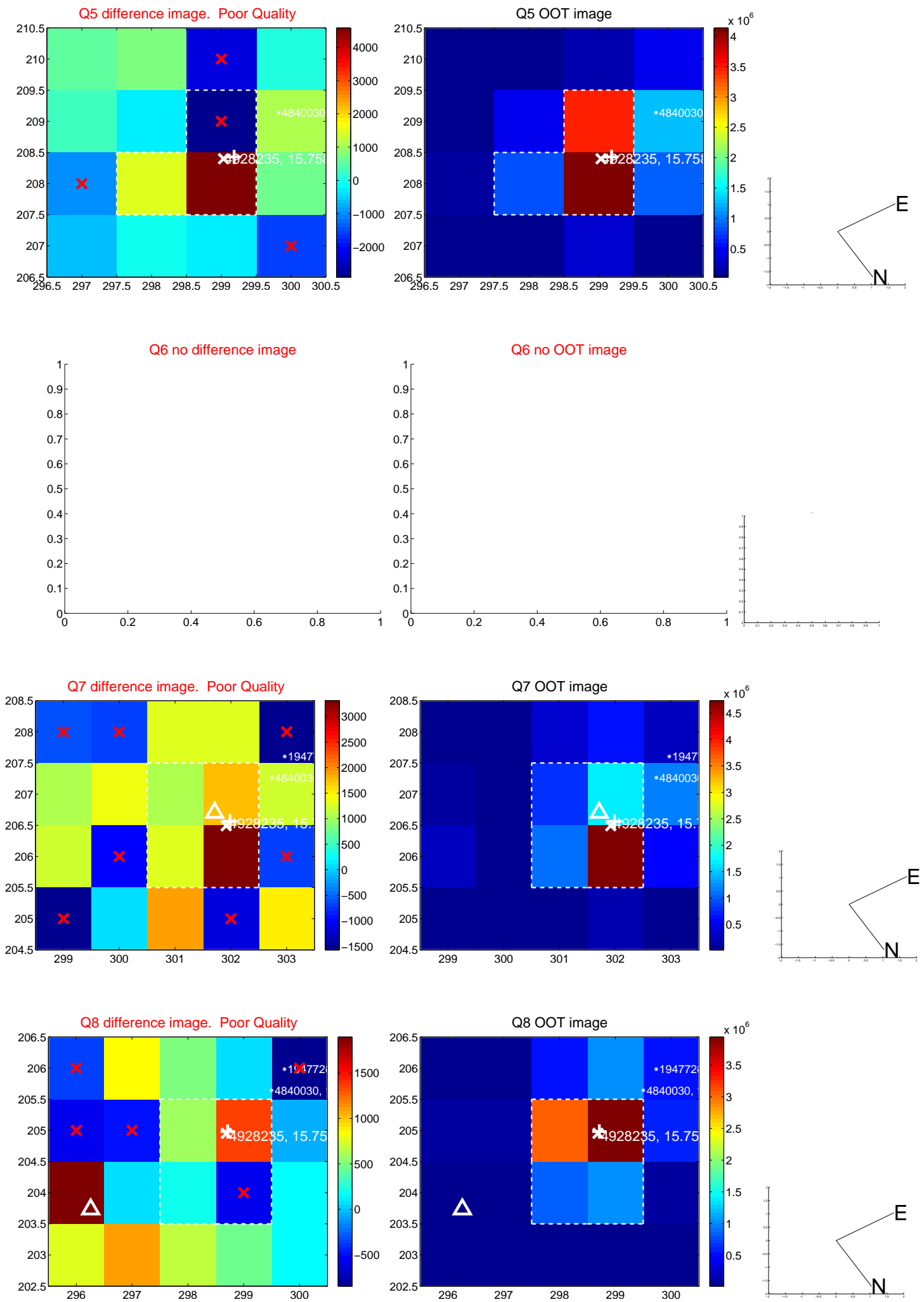
Q4 difference image. Poor Quality



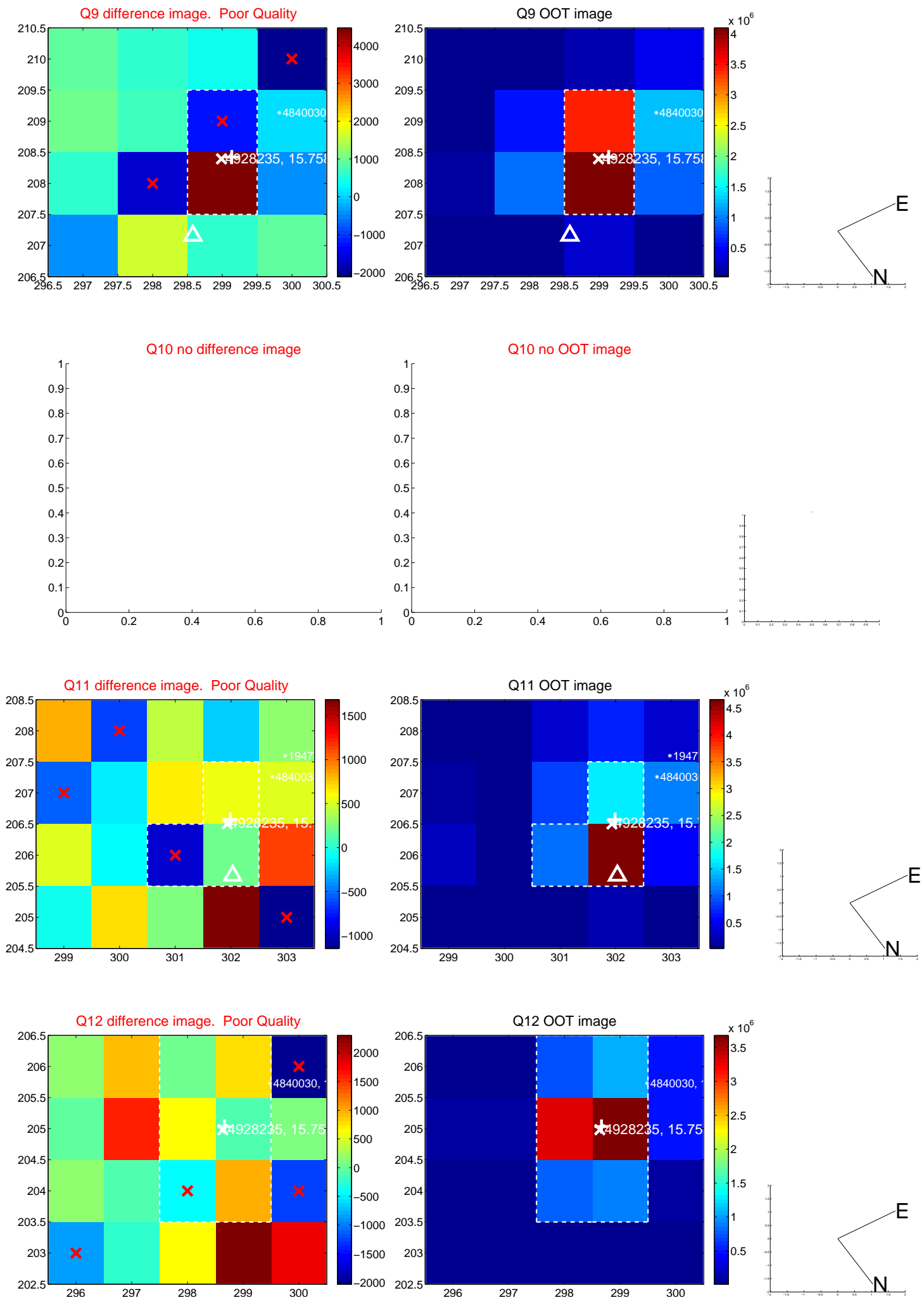
Q4 OOT image



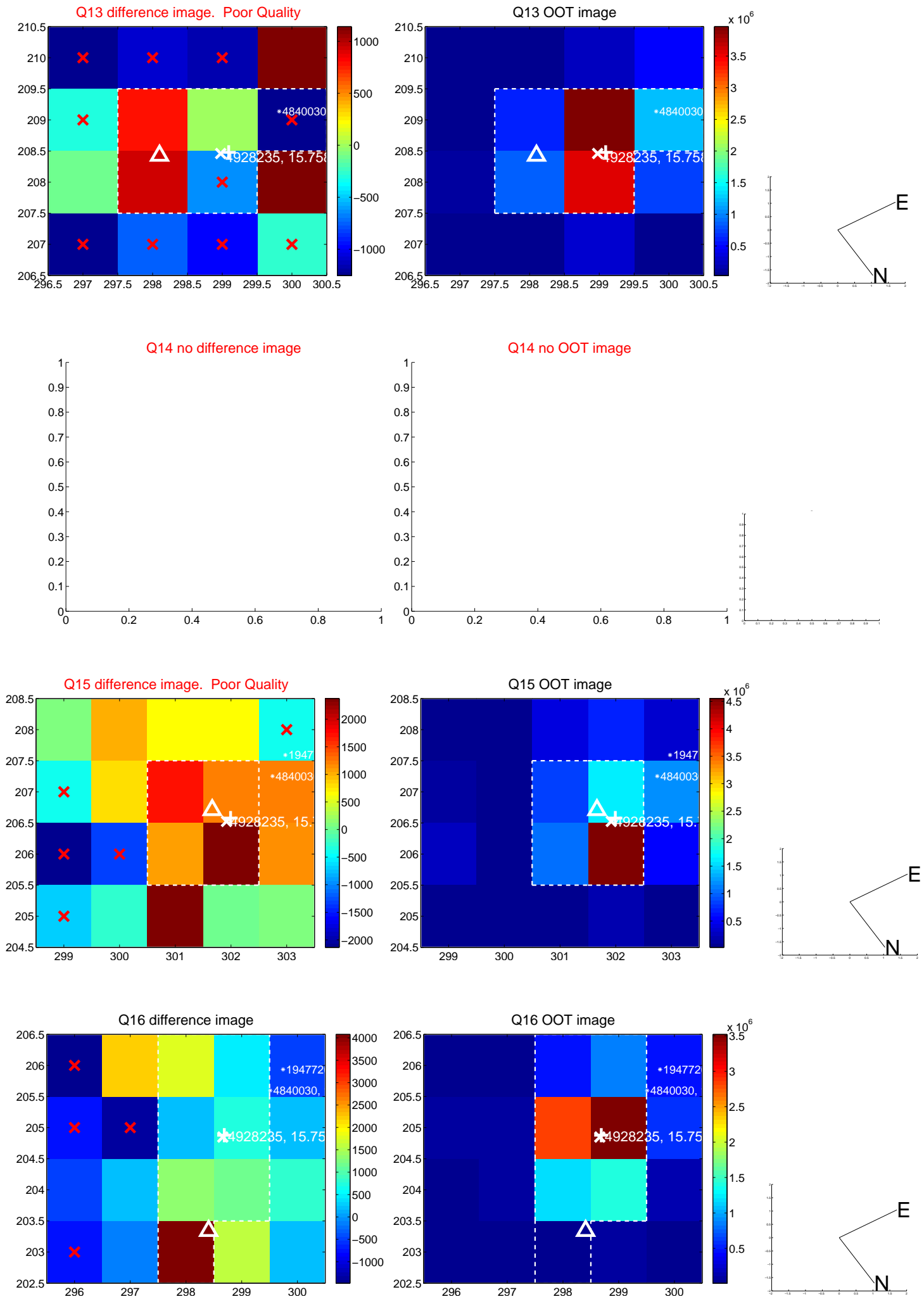
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

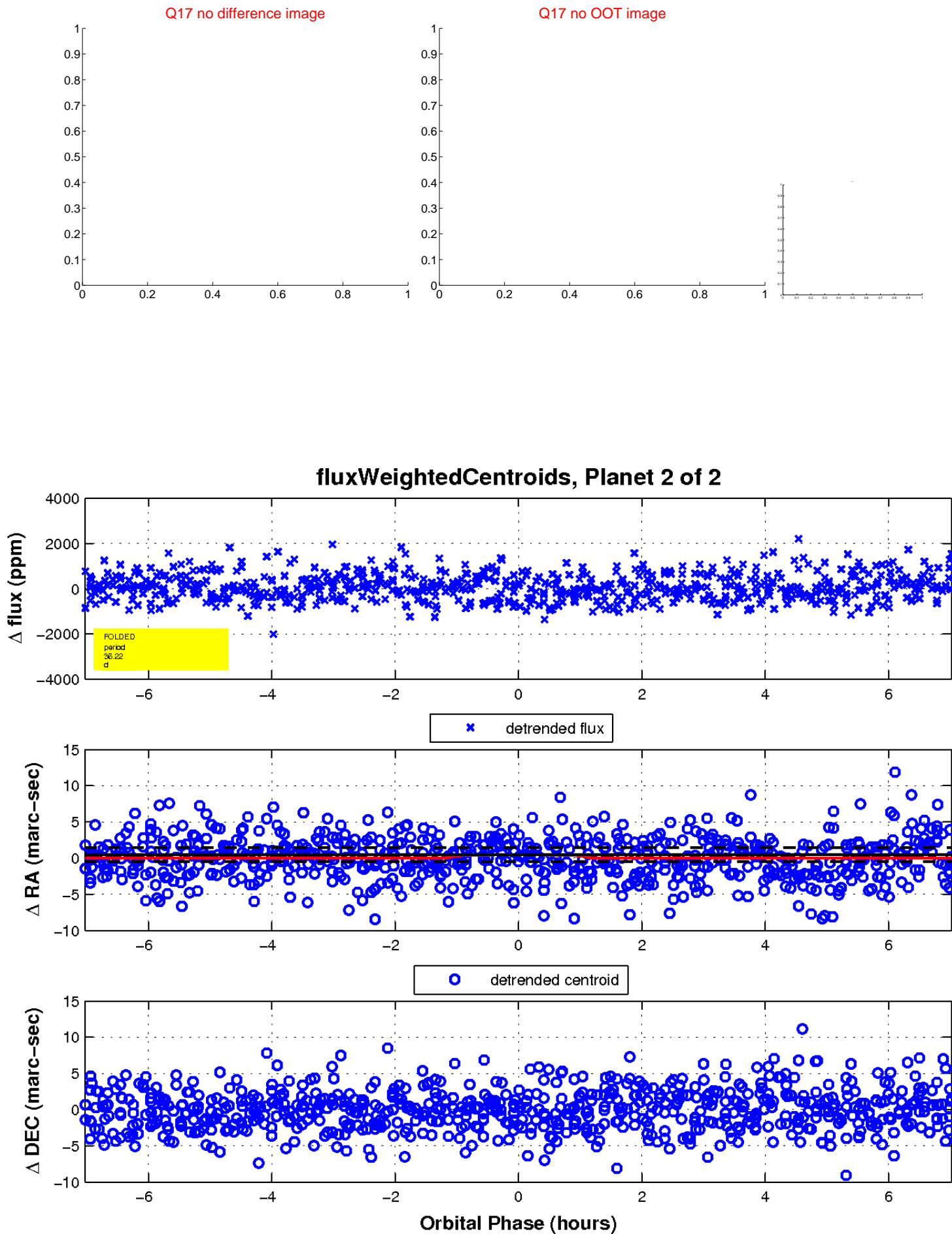


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



# UKIRT Image

Declination

