

# KIC 004645833

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004645833-01	OBS	No	0.743481	131.822090	76.0	1.578	12.2	12.4	0.69	5345	0.72	1618.86
004645833-02	OBS	4783.01	0.743492	132.187390	72.4	1.542	10.6	12.0	0.69	5345	0.70	1618.83

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004645833-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
004645833-02	OBS	FP	0.00	1	0	1	0	MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

**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.

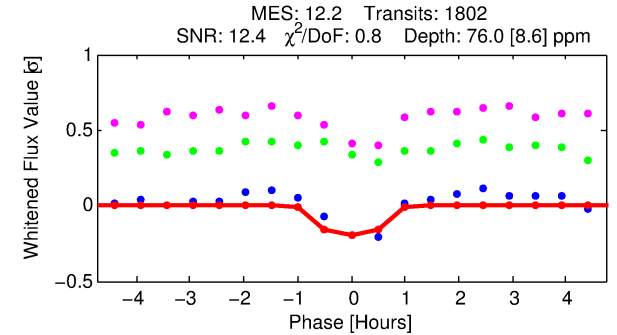
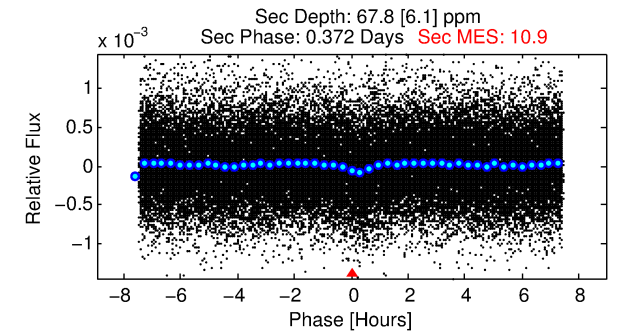
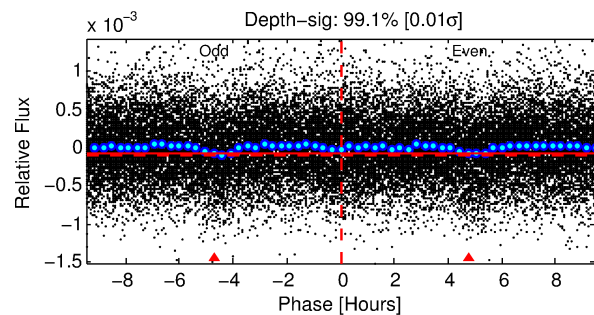
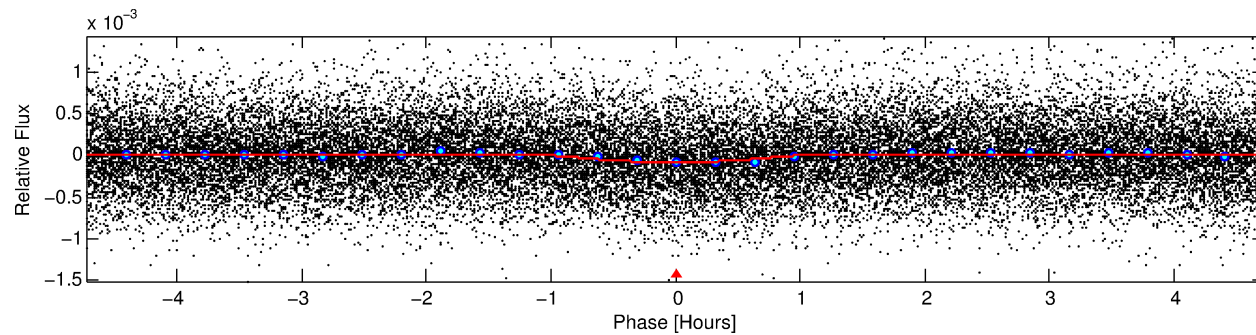
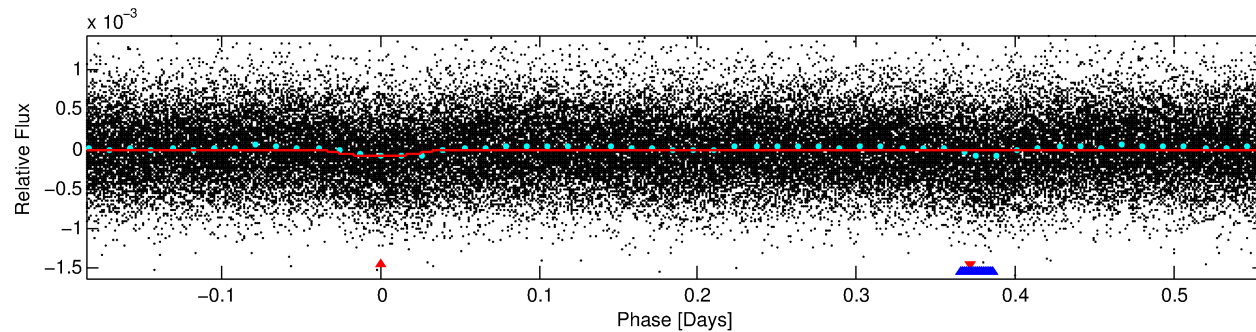
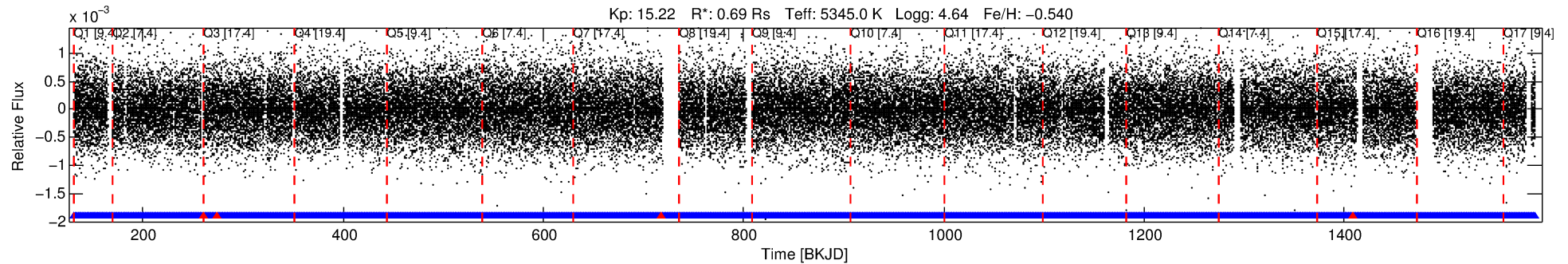
## Ephemeris Match Information For 004645833-01

No Significant Match Found

# DV One-Page Summary

KIC: 4645833 Candidate: 1 of 2 Period: 0.743 d

KOI: K04783 Corr: No Ephemeris Match



## DV Fit Results:

Period = 0.74348 [0.00001] d  
Epoch = 131.8221 [0.0019] BKJD  
Rp/R\* = 0.0096 [0.0060]  
a/R\* = 1.88 [3.86]  
b = 0.90 [0.61]  
Seff = 1618.86 [338.94]  
Teq = 1617 [85] K  
Rp = 0.72 [0.46] Re  
a = 0.0146 [0.0018] AU  
Ag = 15.37 [19.46] [0.74σ]  
Teffp = 4951 [1560] K [2.13σ]

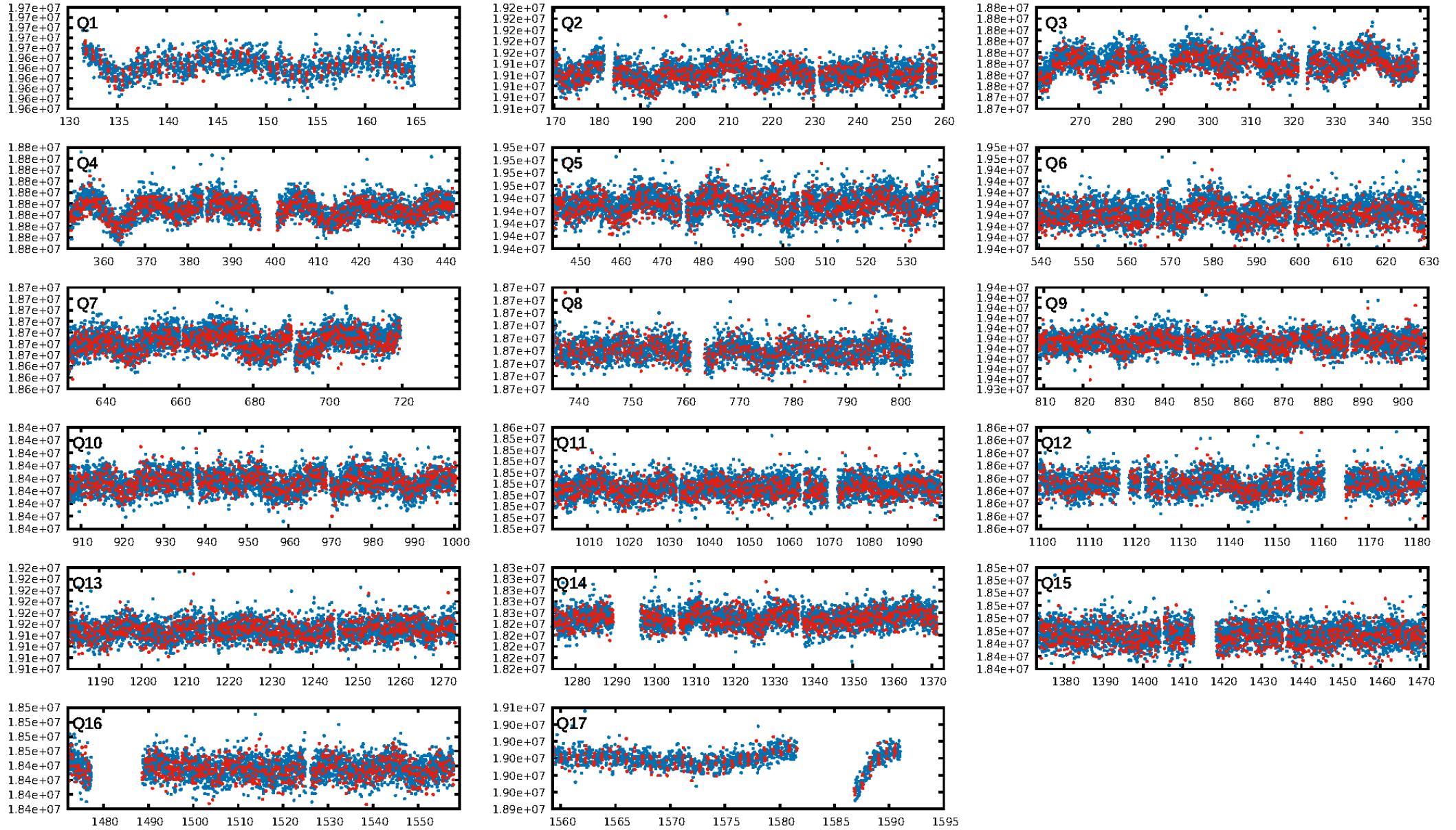
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.16e-34  
RollingBand-fgt: 1.00 [1715/1720]  
GhostDiagnostic-chr: -0.353  
Centroid-sig: 0.0%  
Centroid-so: 5.507 arcsec [5.13σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 08:12:53 Z

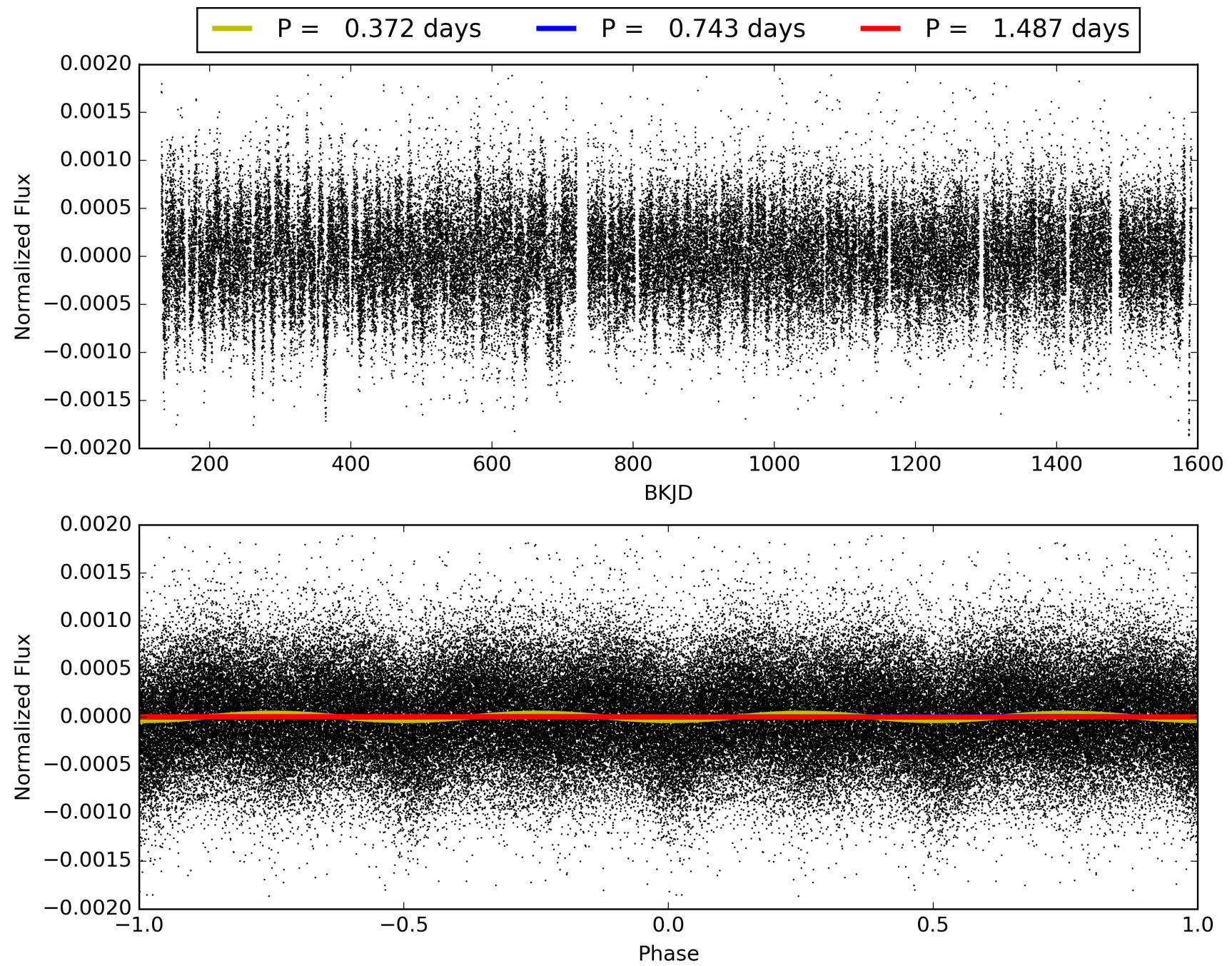
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004645833-01, PDC Light Curves



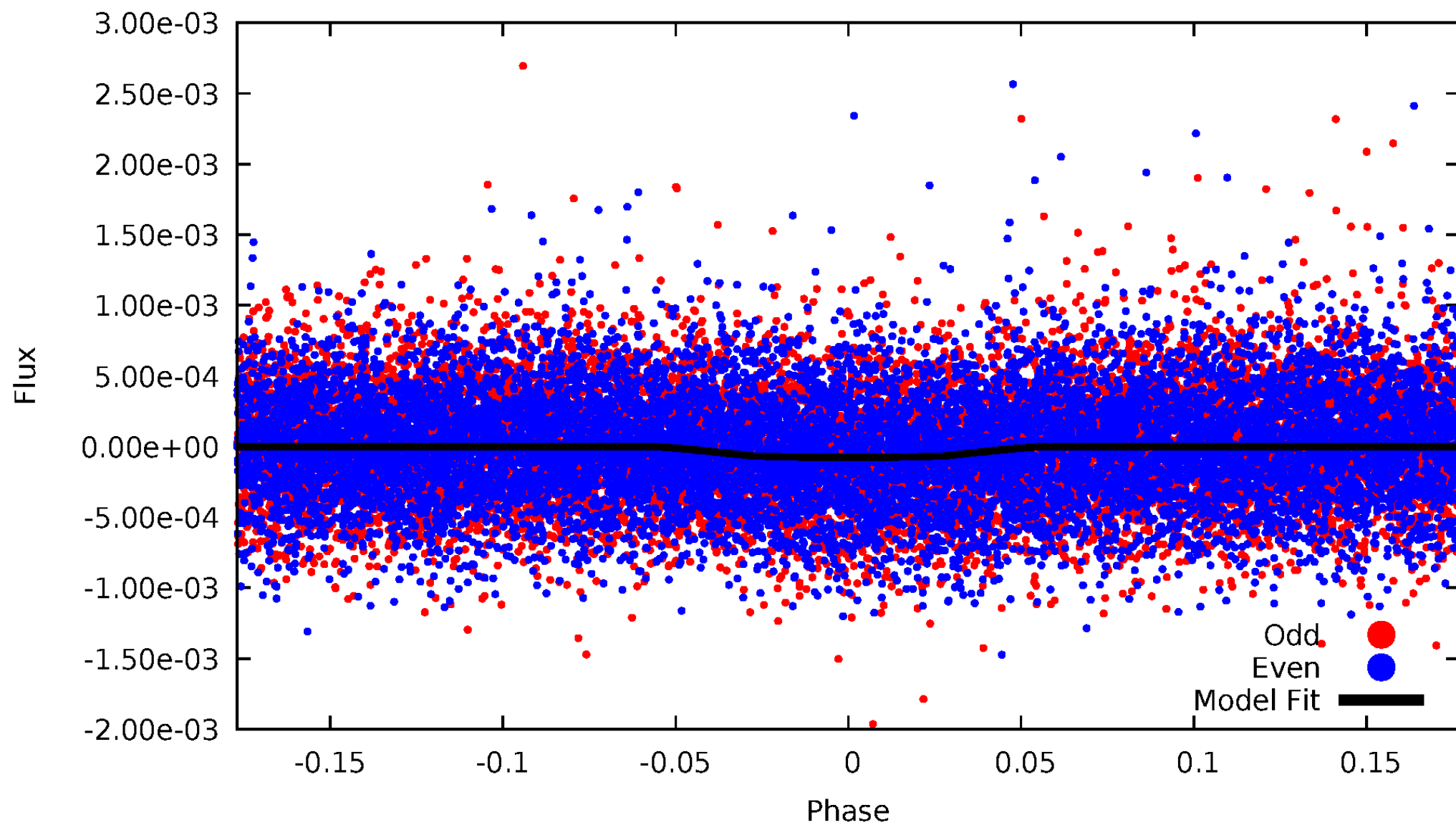


TCE 004645833-01



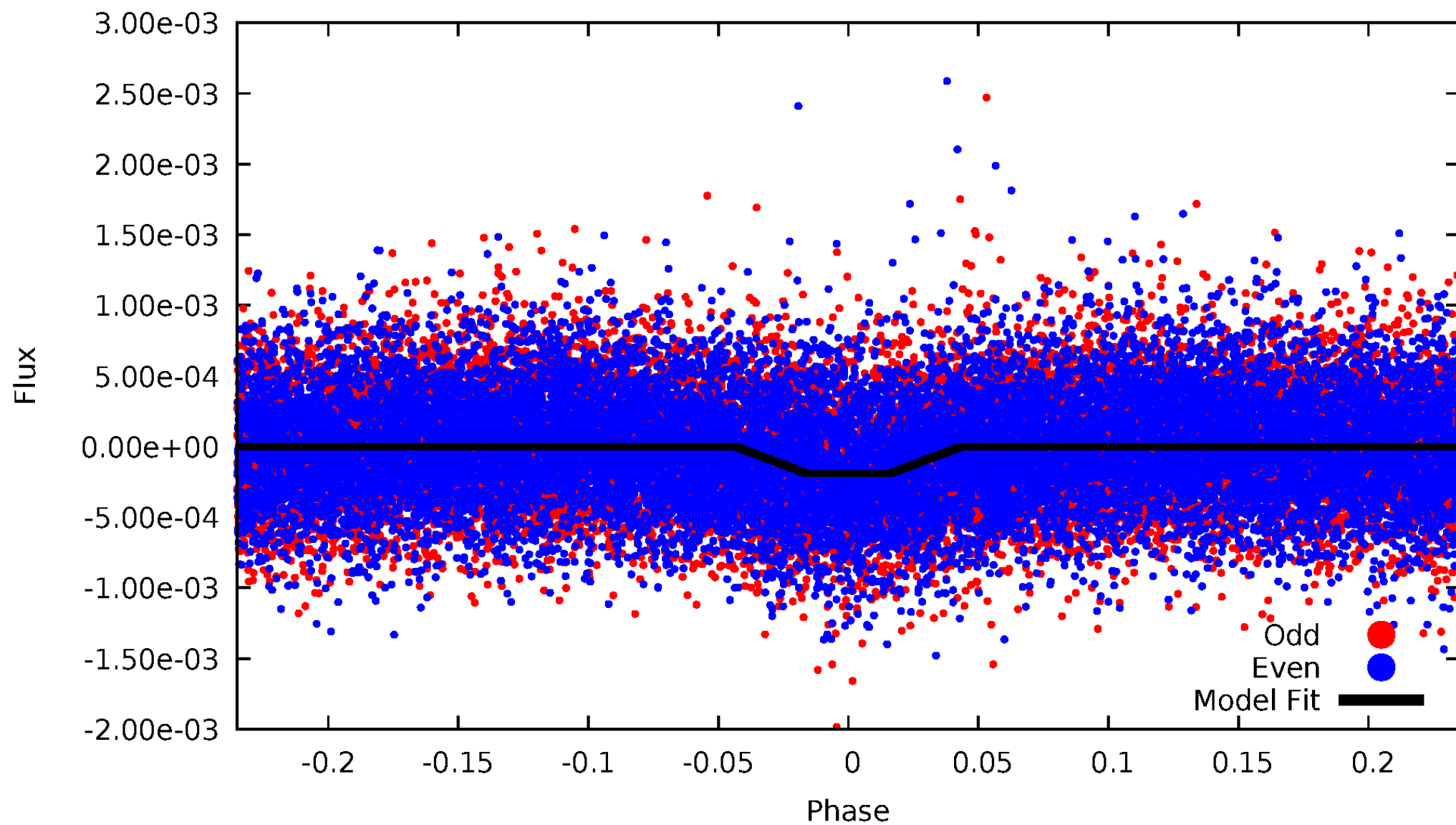
# DV Odd/Even

TCE 004645833-01



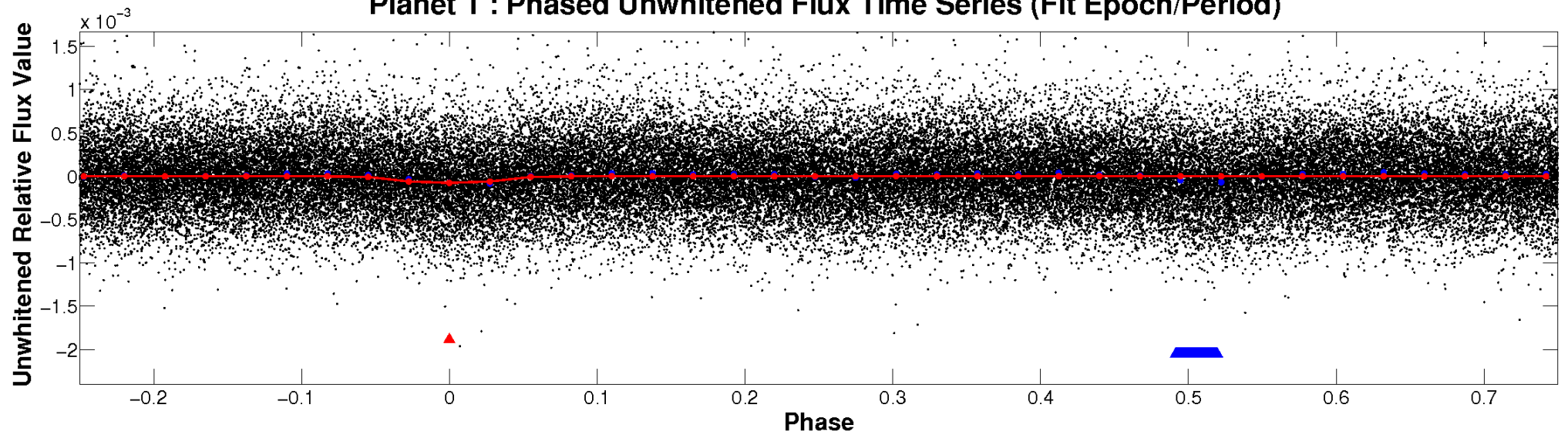
# ALT Odd/Even

TCE 004645833-01

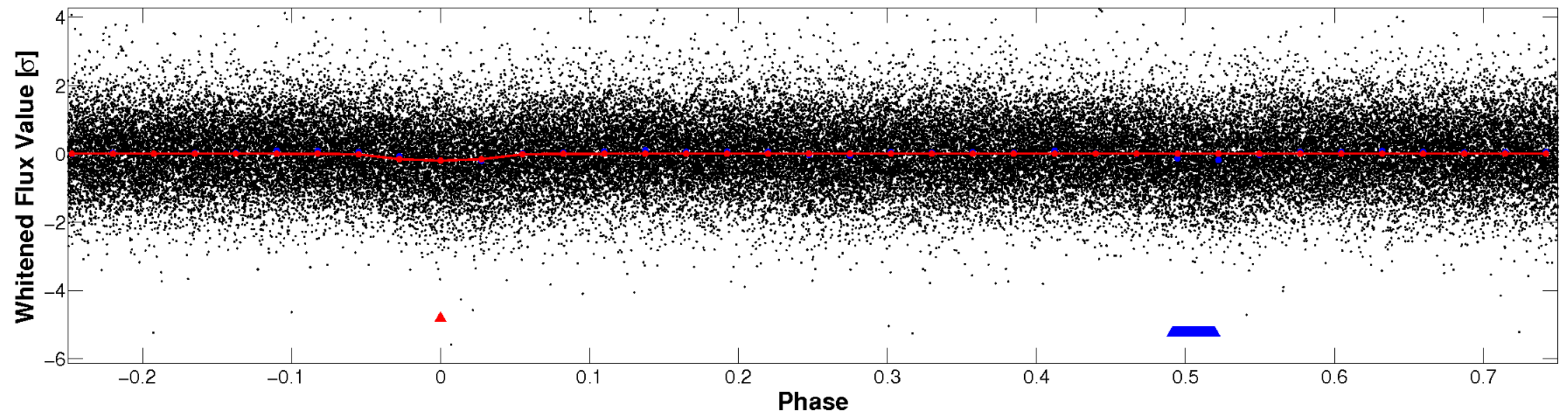


# Non-Whitened Vs. Whitened Light Curve

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



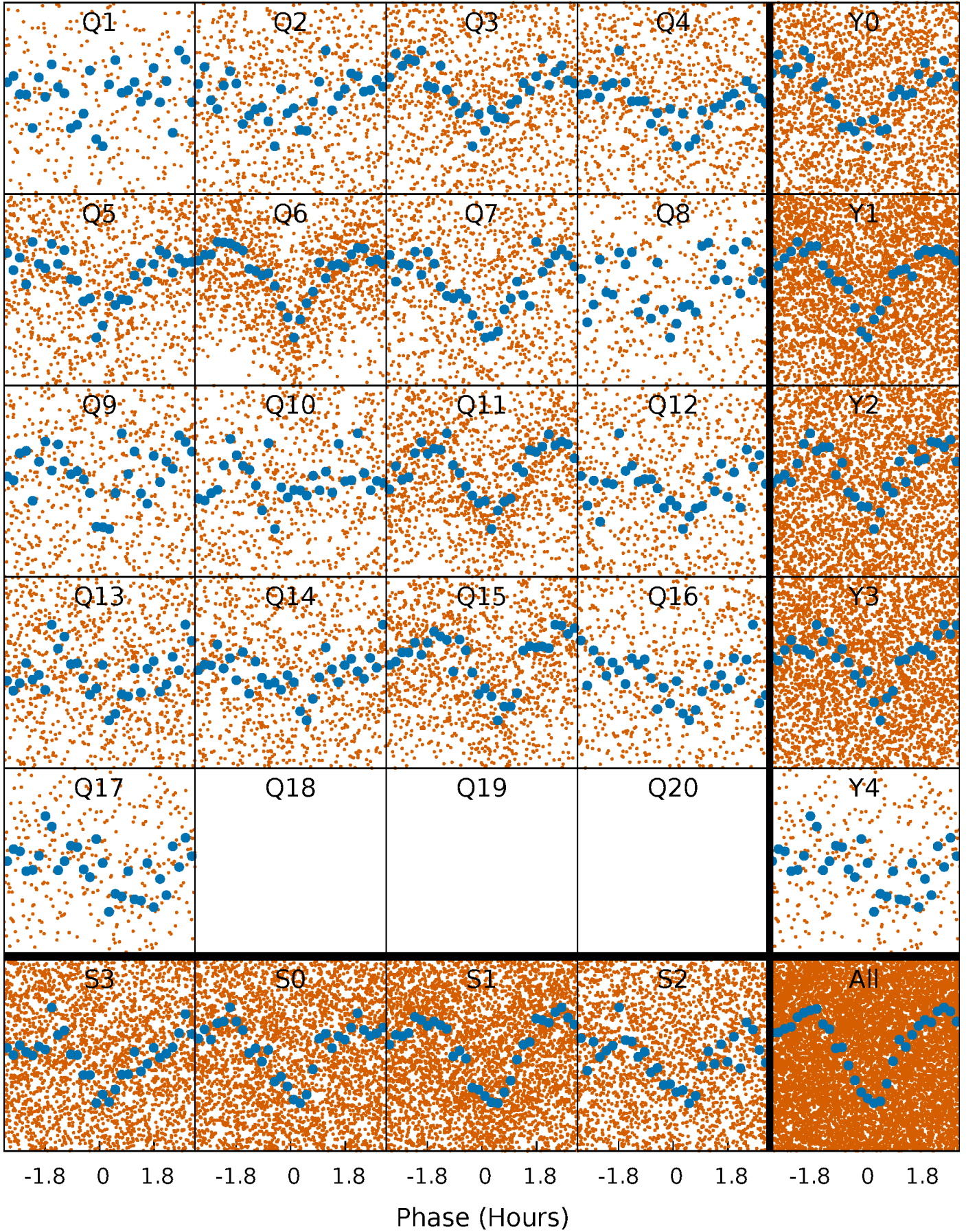
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

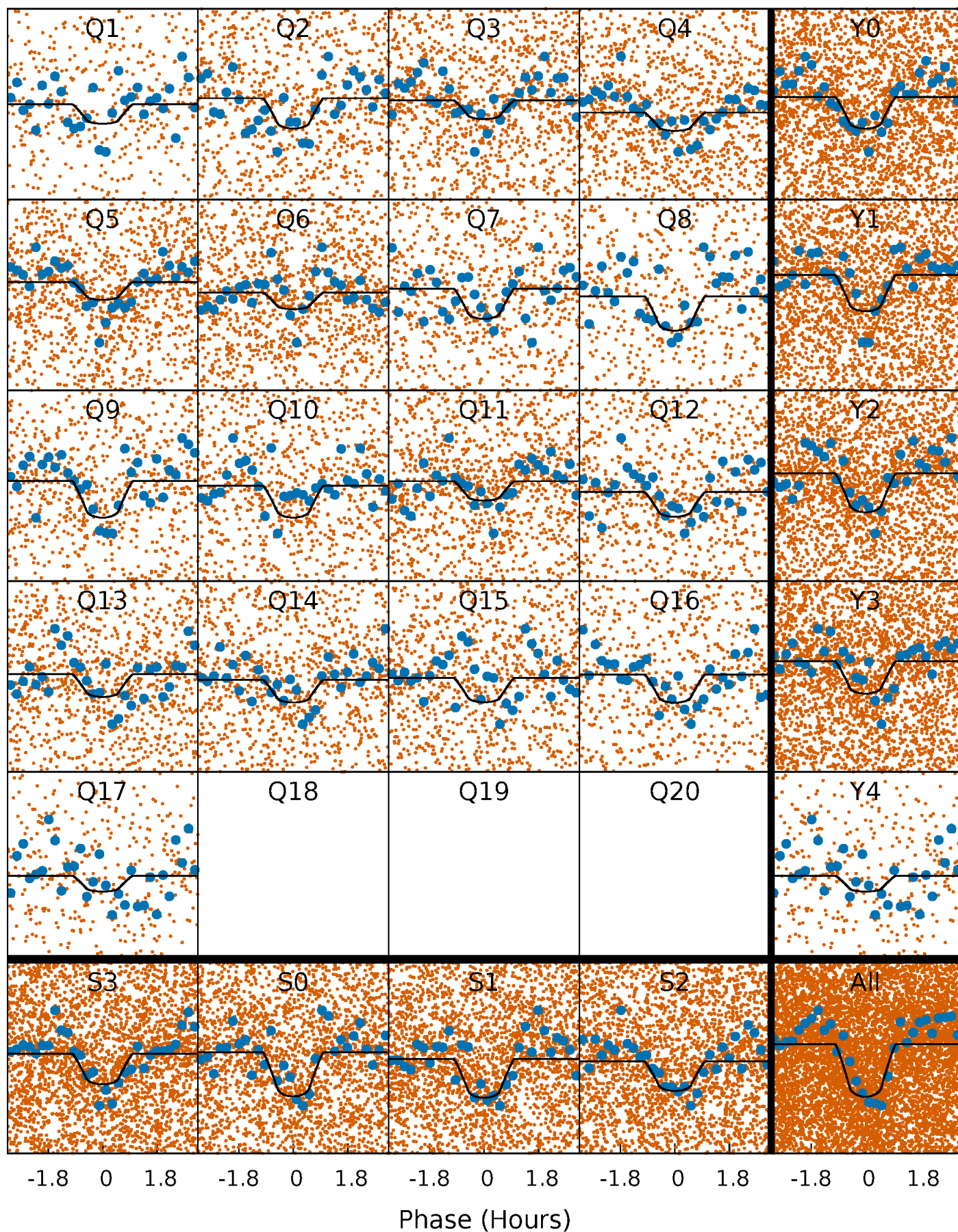
TCE 004645833-01   P= 0.743481 Days    $T_0=131.822090$  (BKJD)





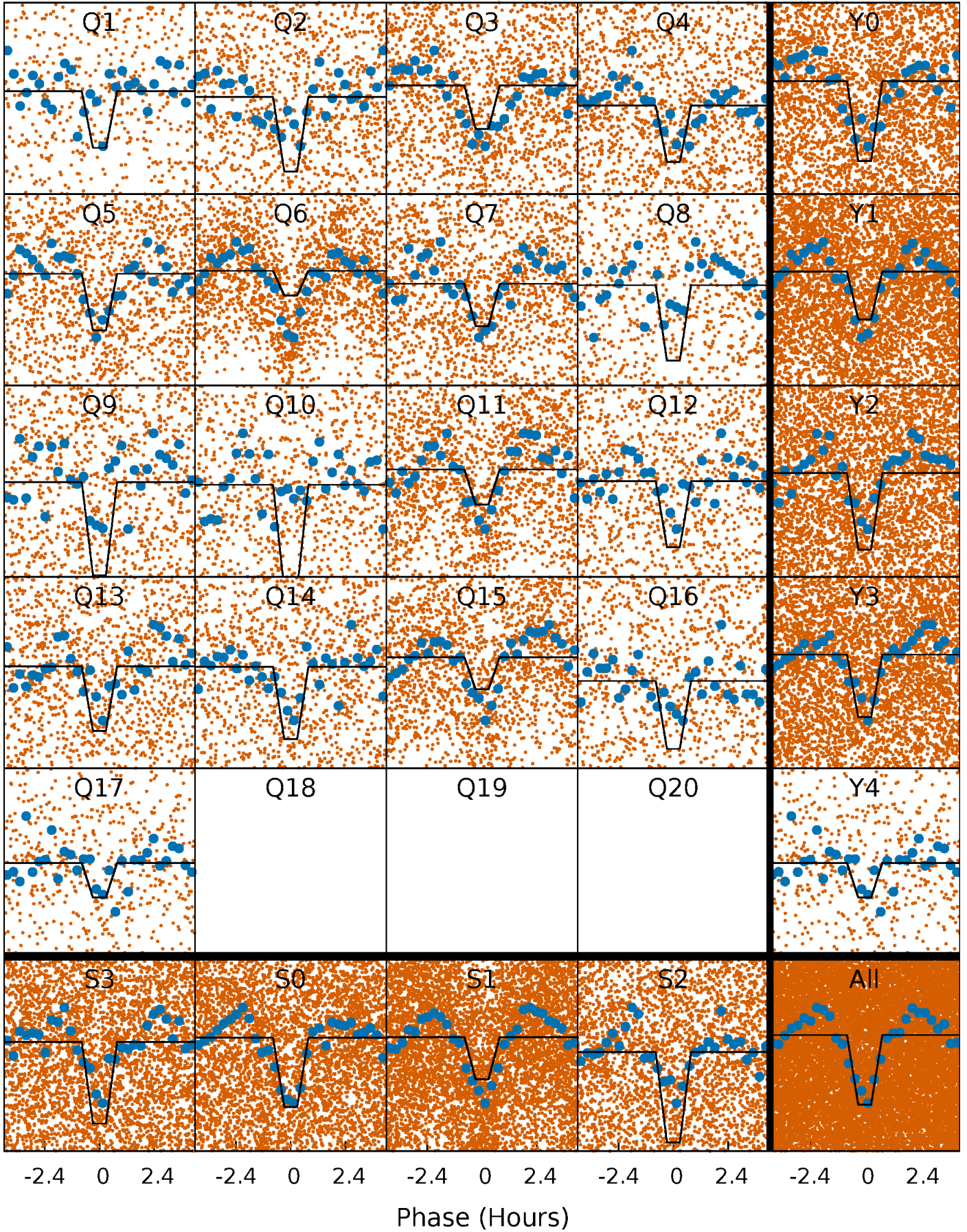
# DV Quarter-Phased Transit Curves

TCE 004645833-01 P= 0.743481 Days  $T_0=131.822090$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004645833-01 P= 0.743494 Days  $T_0=131.818714$  (BKJD)

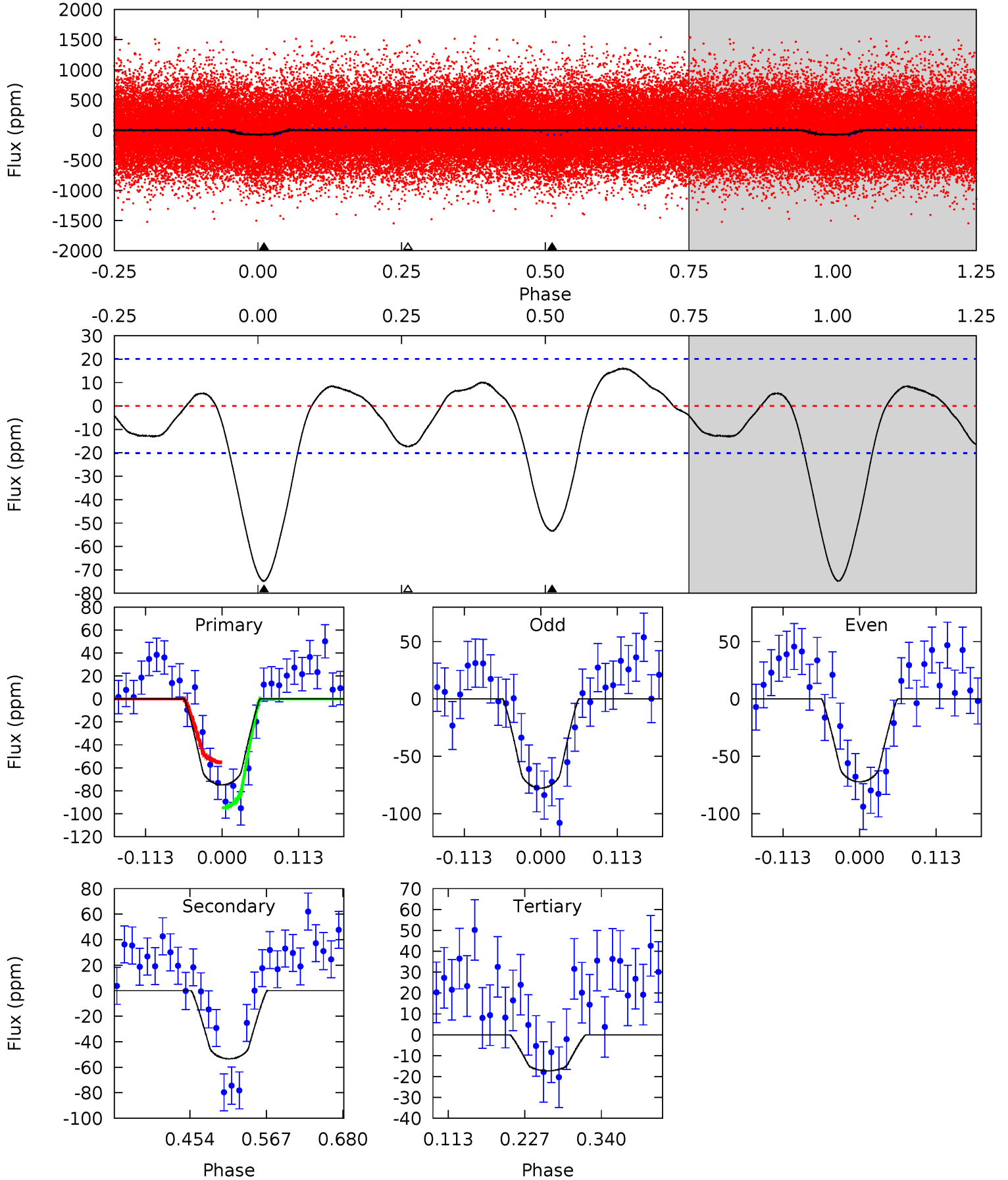




# DV Model-Shift Uniqueness Test

004645833-01, P = 0.743481 Days, E = 131.078609 Days

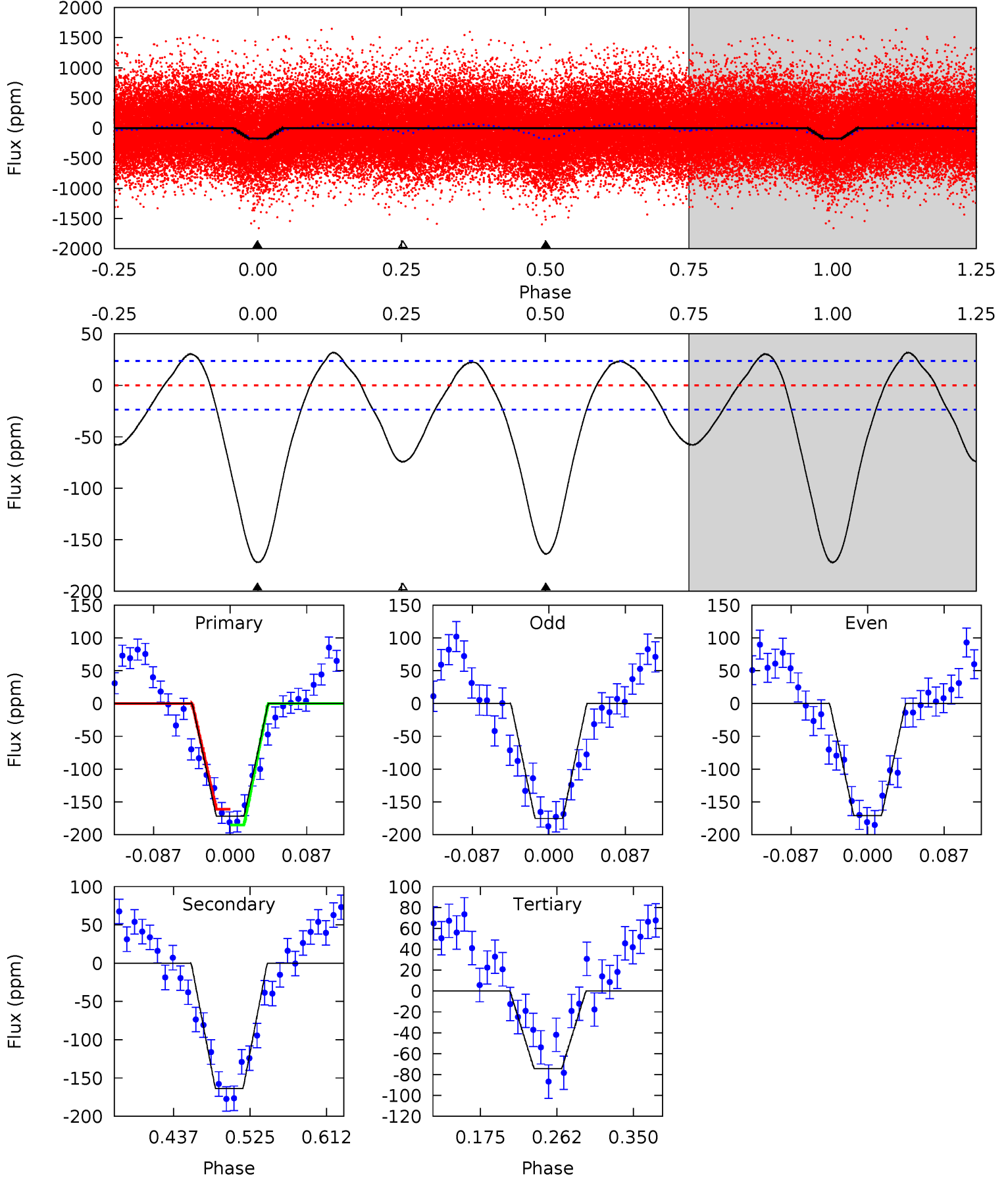
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.8	12.0	3.89	0	4.54	1.58	2.11	13.0	16.8	8.13	12.0	0.62	0.98	0.18	4.51



# Alt Model-Shift Uniqueness Test

004645833-01, P = 0.743494 Days, E = 131.075220 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
33.5	31.9	14.5	0	4.59	1.71	6.10	19.0	33.5	17.4	31.9	0.41	0.99	0.16	2.35





### Stellar Parameters For KIC 004645833

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5345^{+160}_{-160}$	$4.639^{+0.036}_{-0.090}$	$-0.540^{+0.300}_{-0.300}$	$0.686^{+0.105}_{-0.052}$	$0.747^{+0.079}_{-0.064}$	$3.264^{+0.533}_{-0.911}$
	+3%/-3%	+1%/-2%	+56%/-56%	+15%/-8%	+11%/-9%	+16%/-28%
Source	PHO1	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 004645833-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-53 \pm 4$	$0.75^{+0.44}_{-0.41}$	$2287^{+92}_{-87}$	$4712^{+2128}_{-803}$	$11^{+44}_{-7}$
Alt.	$-164 \pm 5$	$1.04^{+0.45}_{-0.44}$	$2291^{+88}_{-89}$	$5201^{+1630}_{-722}$	$18^{+36}_{-9}$

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

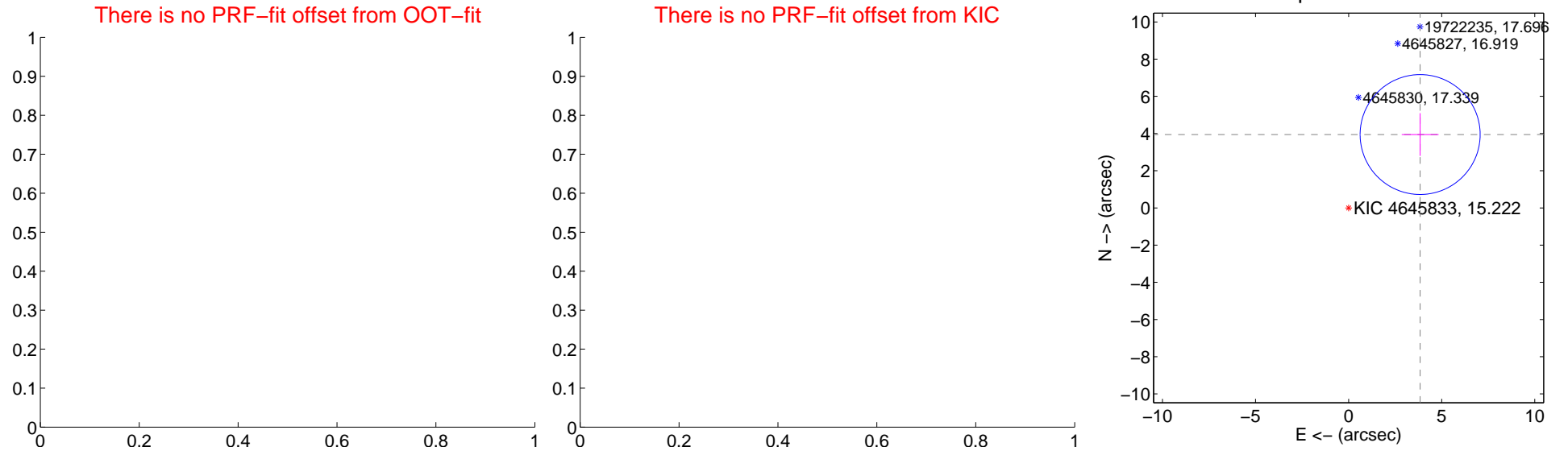
## DV Centroid Data

Supplemental centroid analysis for 004645833-01. Kepler magnitude: 15.22. Transit SNR 12.35

There are 0 quarters with good PRF difference image offsets

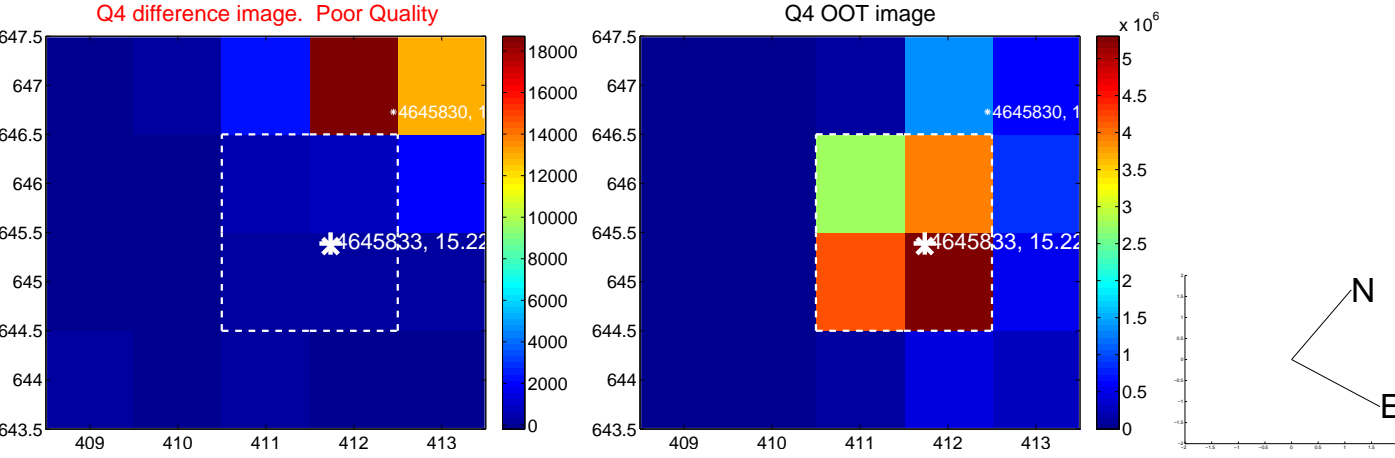
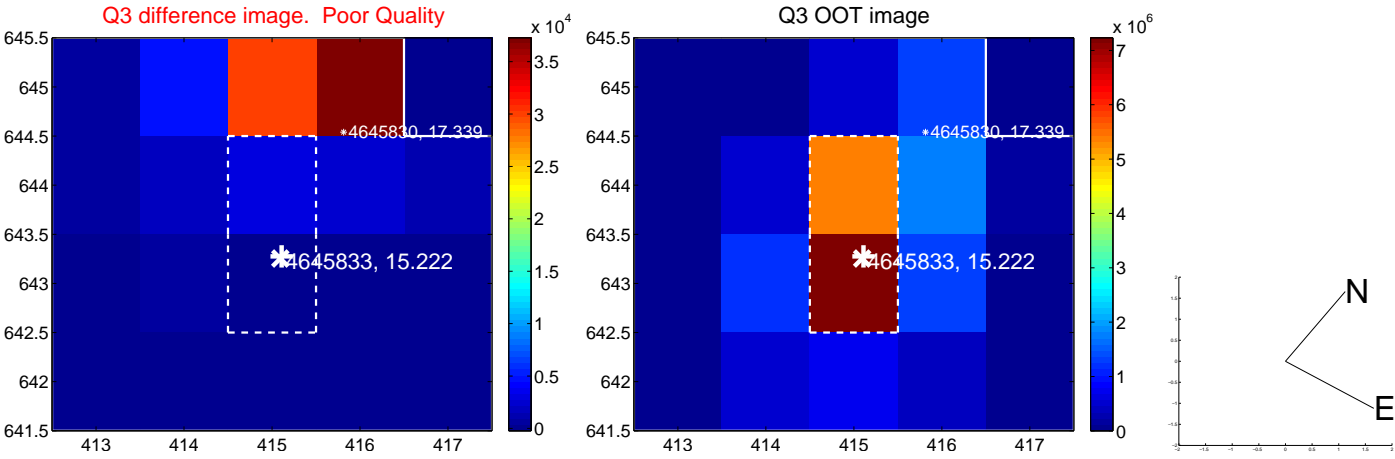
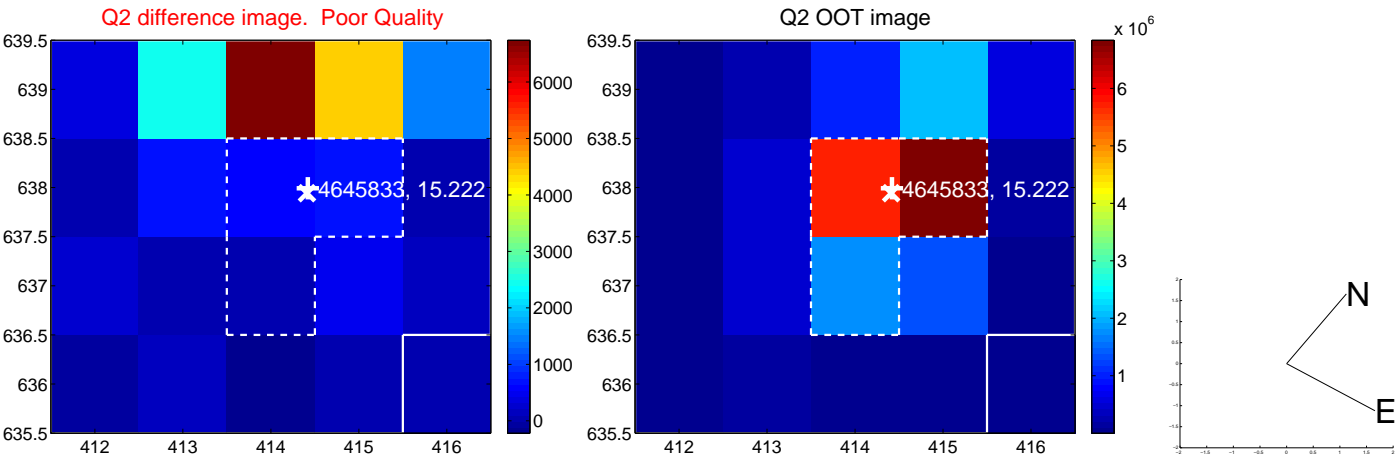
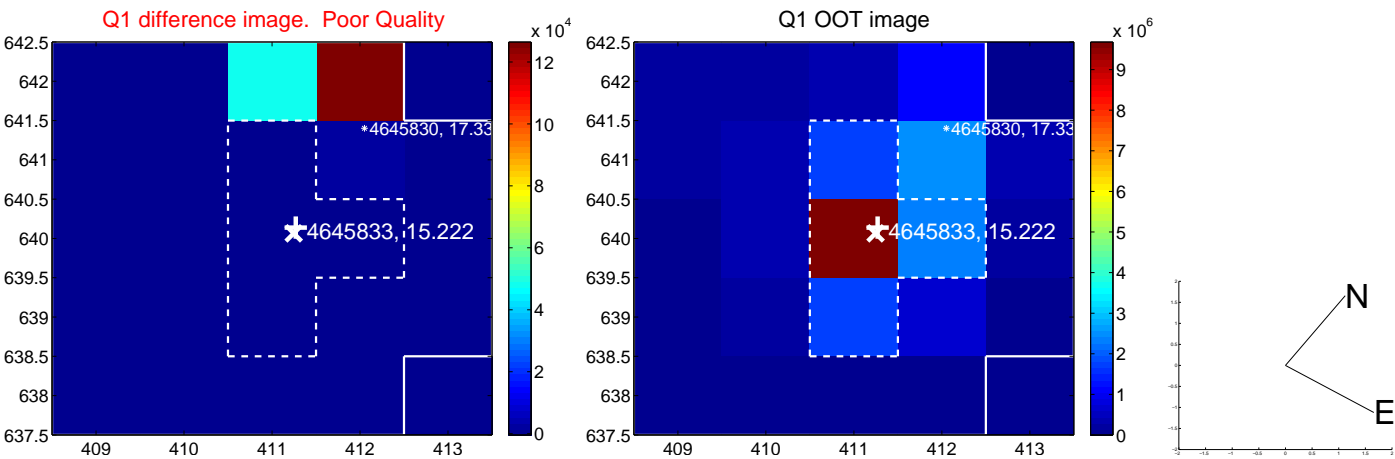
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$5.51 \pm 1.07$	5.13	$-3.84 \pm 0.99$	$3.95 \pm 1.15$

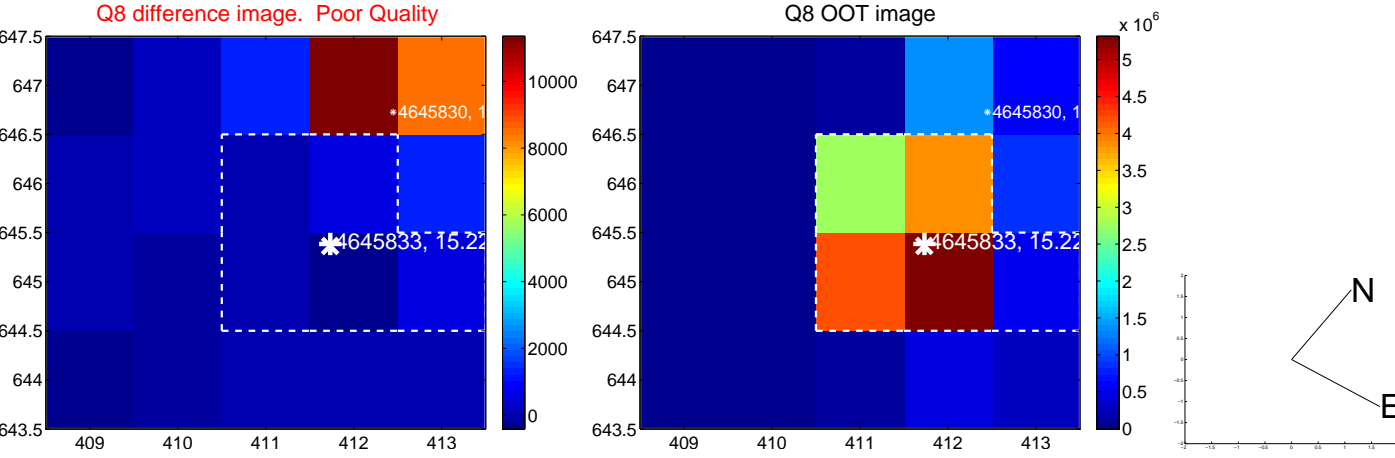
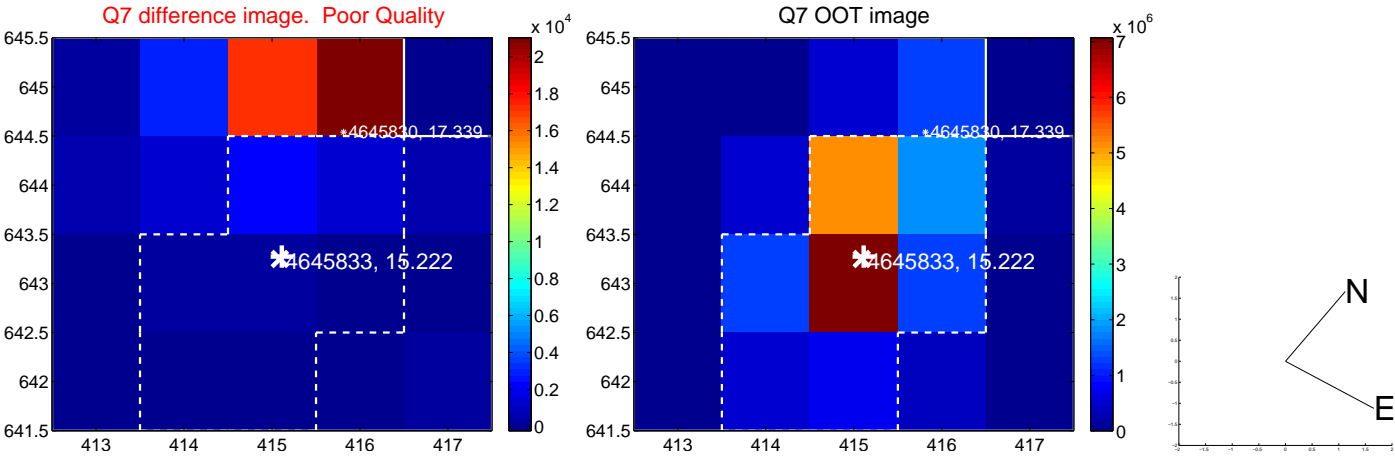
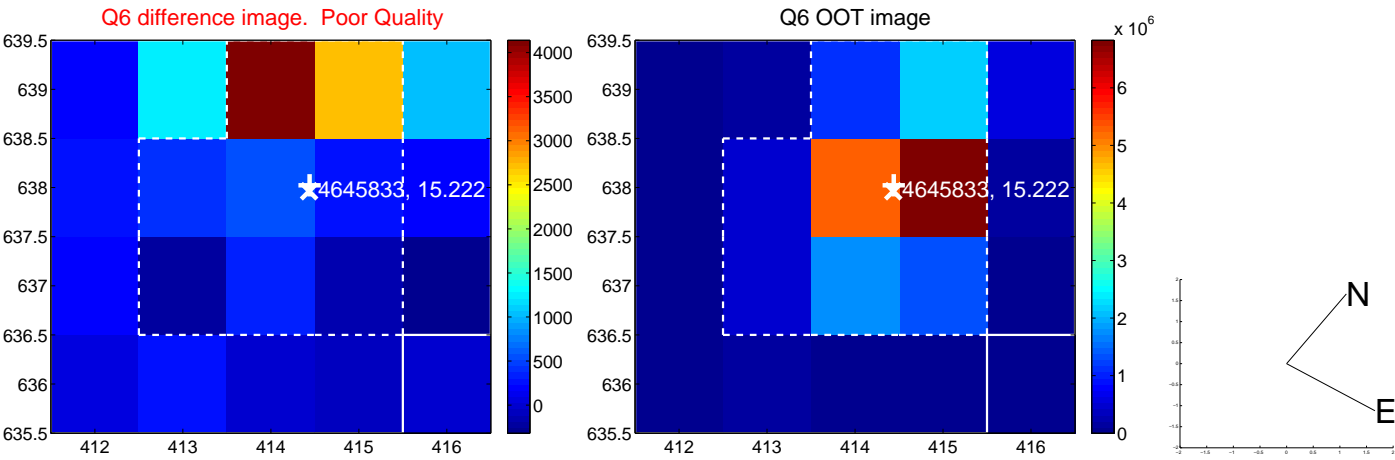
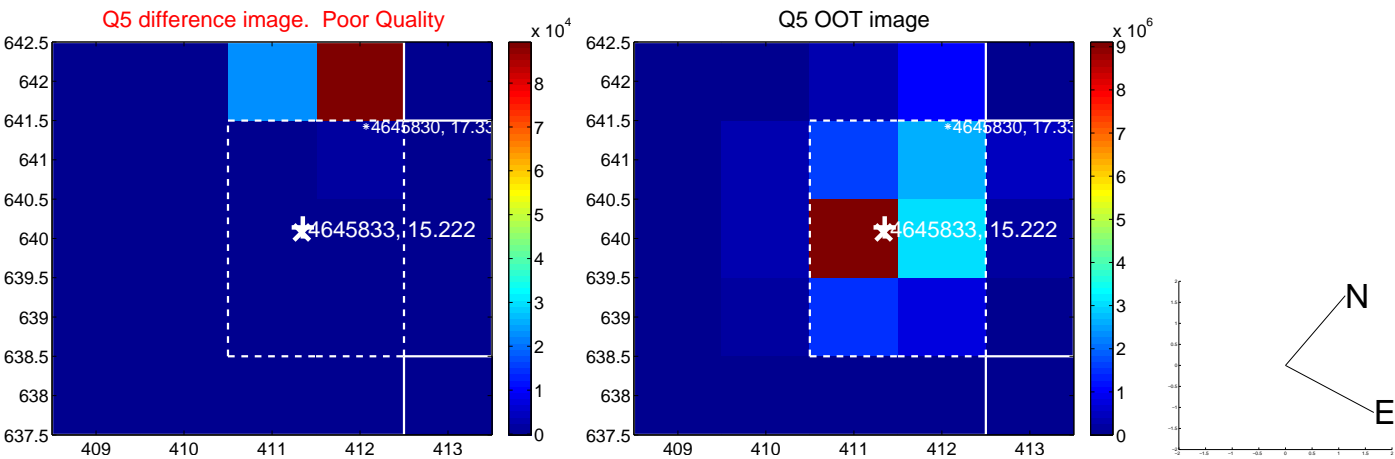


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

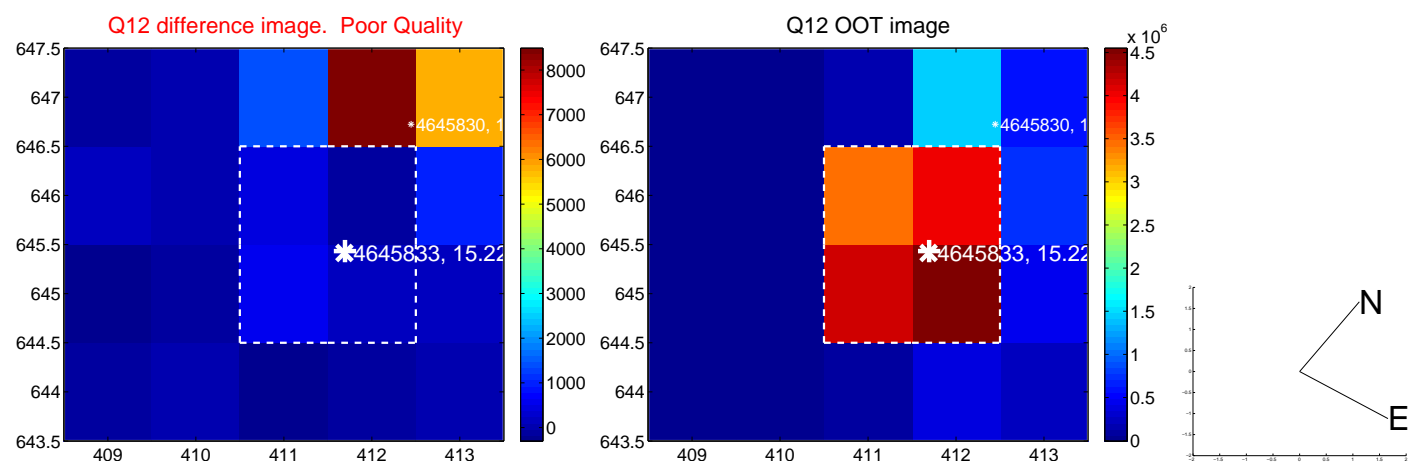
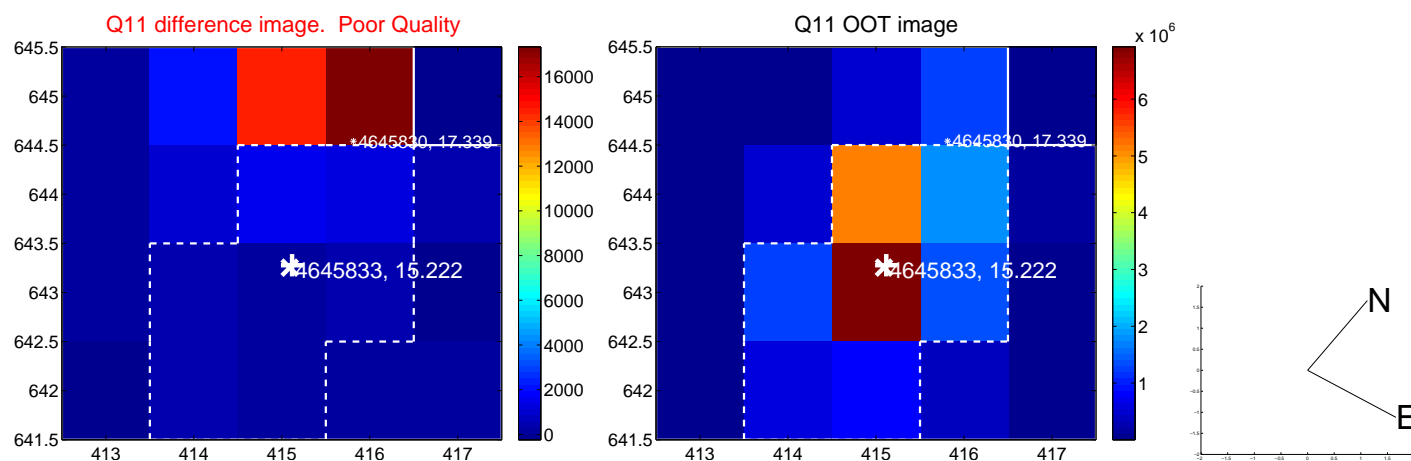
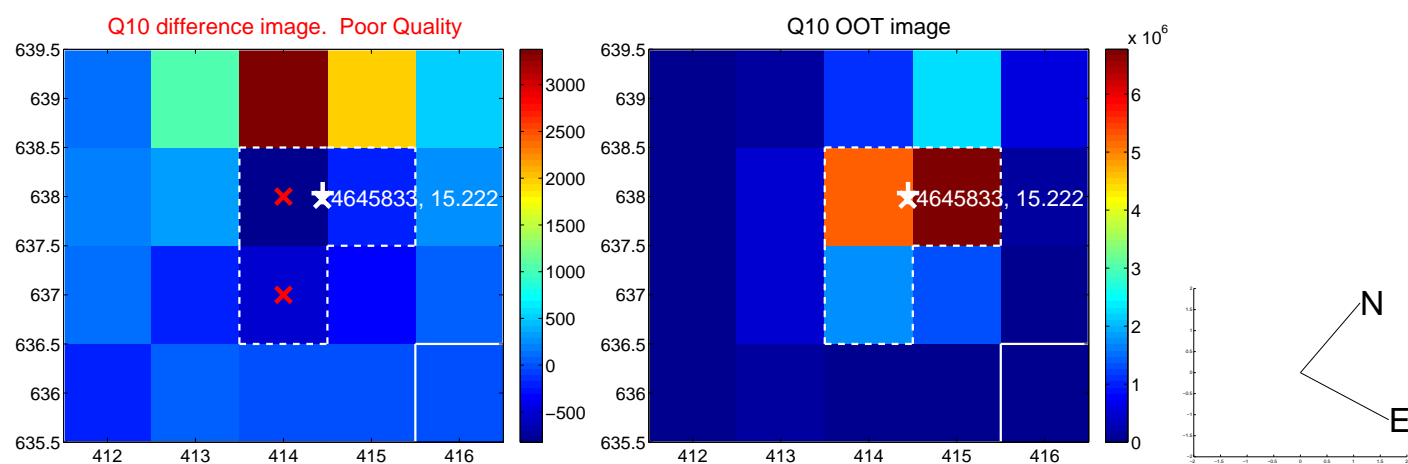
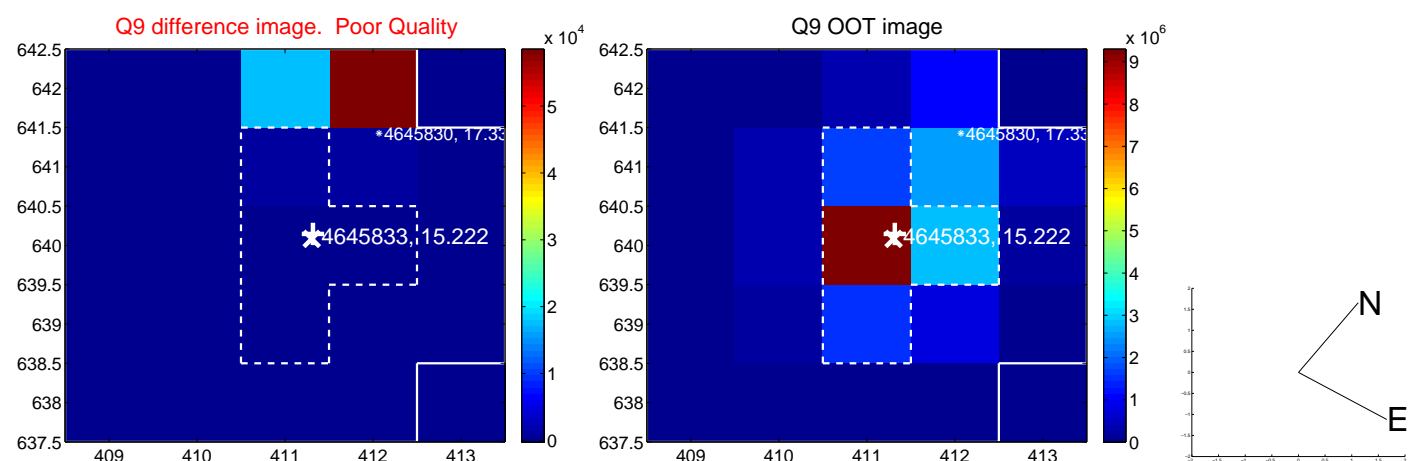


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

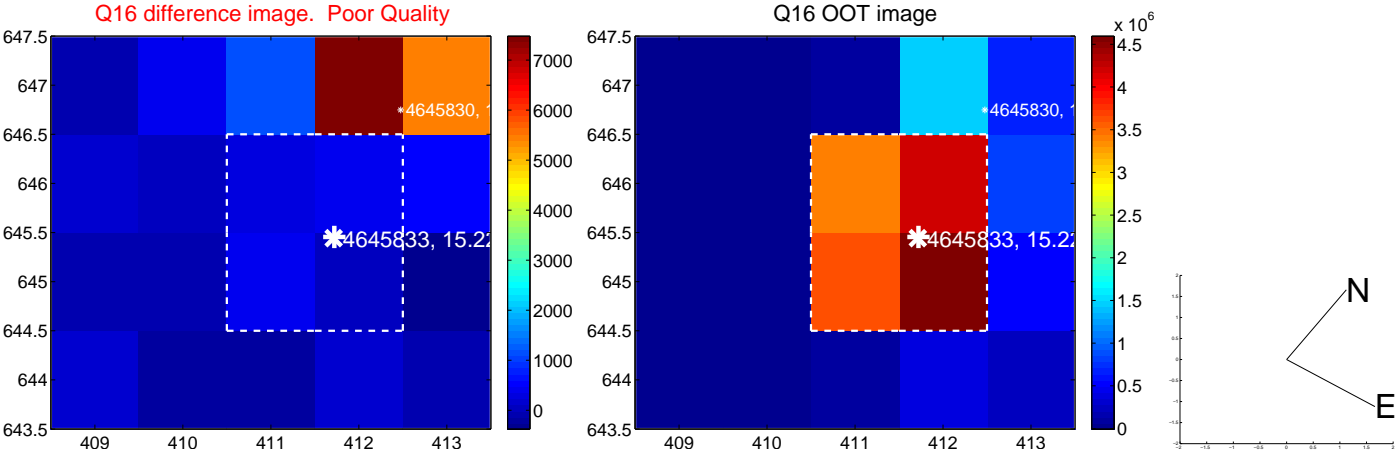
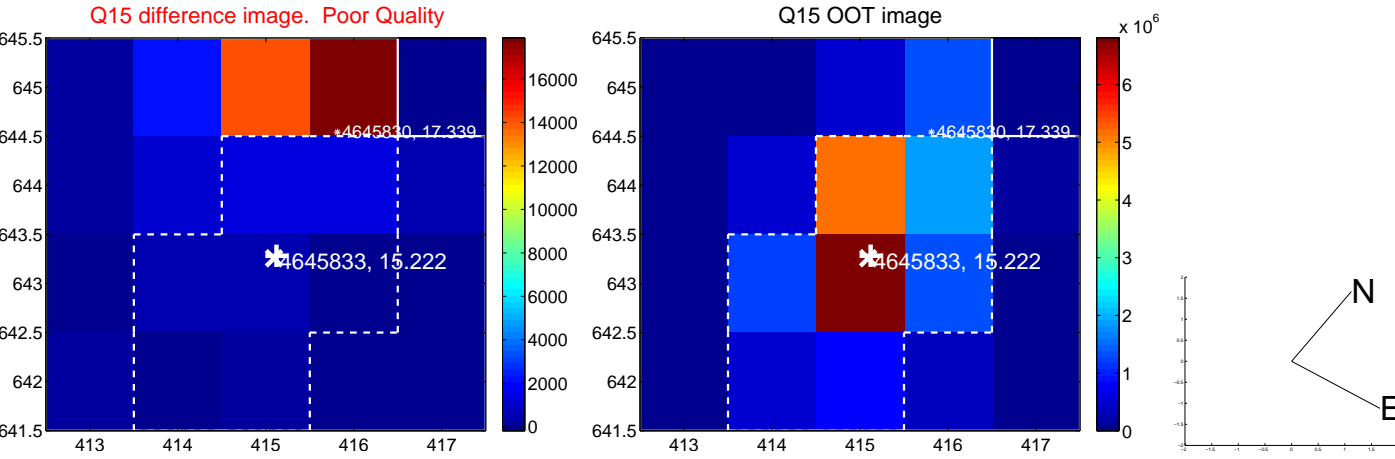
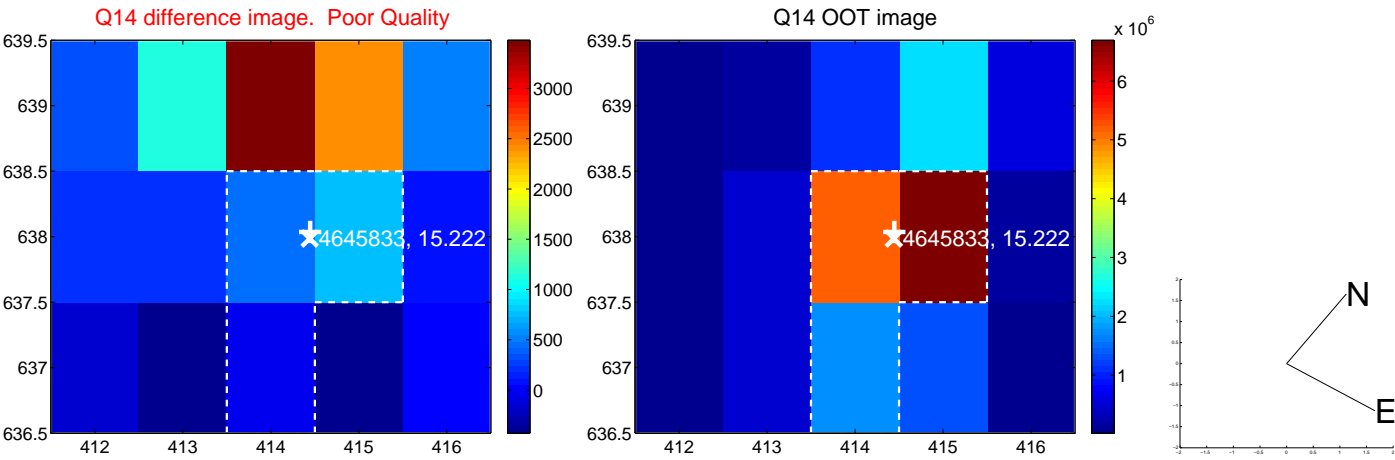
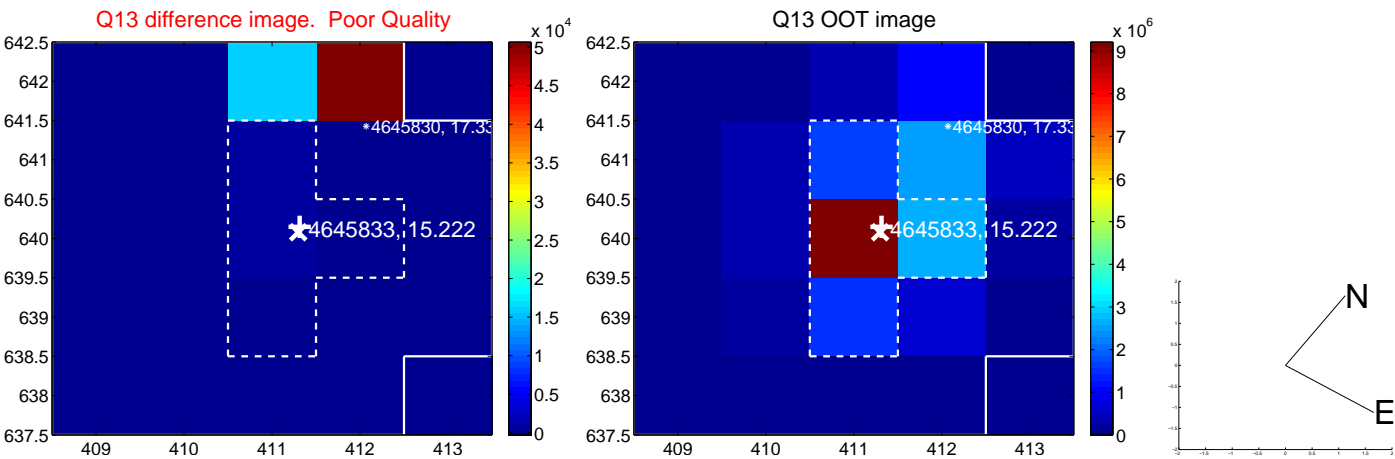




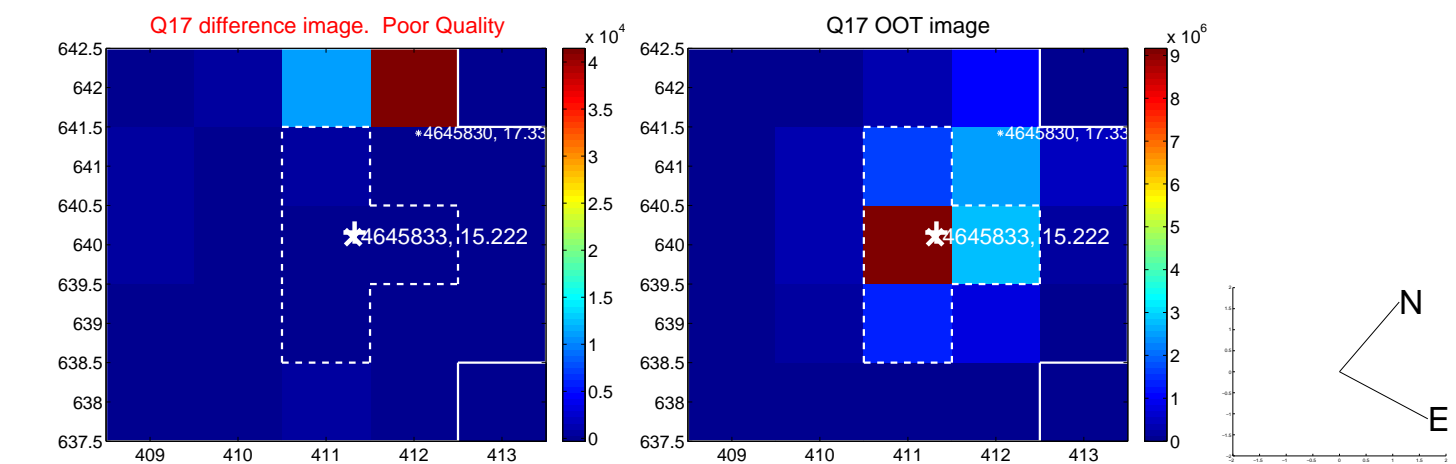
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



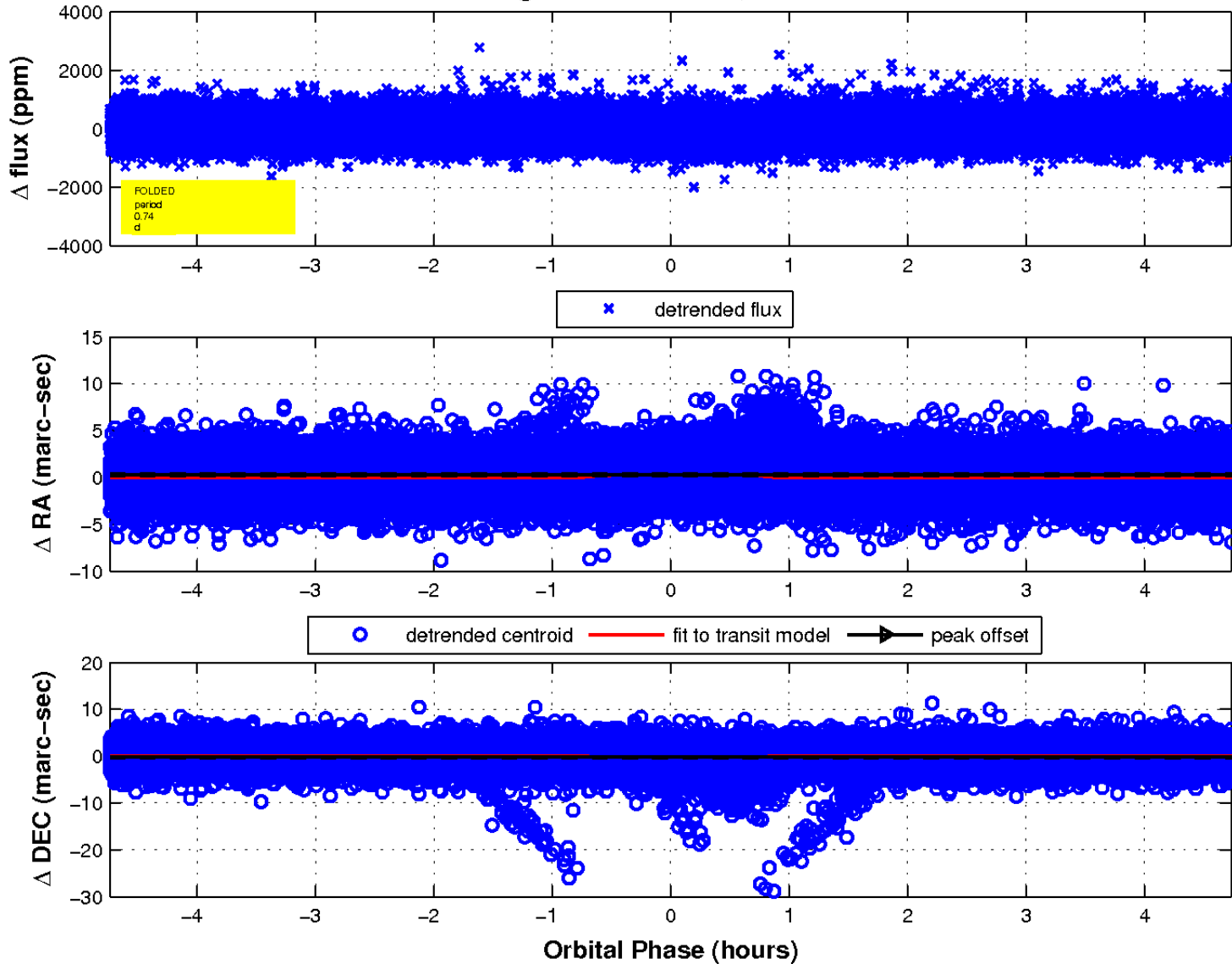
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

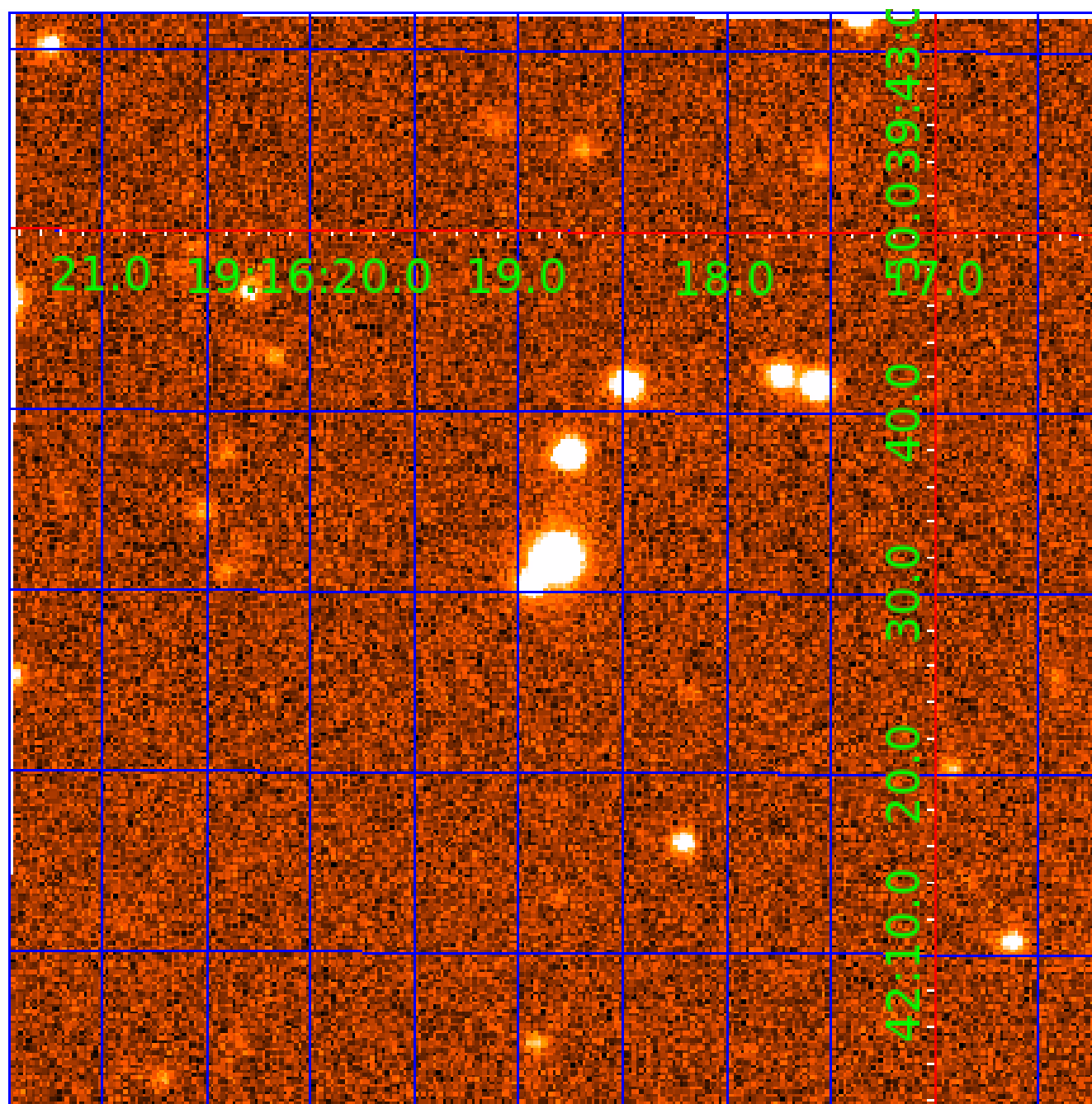


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 004645833

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004645833-01	OBS	No	0.743481	131.822090	76.0	1.578	12.2	12.4	0.69	5345	0.72	1618.86
004645833-02	OBS	4783.01	0.743492	132.187390	72.4	1.542	10.6	12.0	0.69	5345	0.70	1618.83

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004645833-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
004645833-02	OBS	FP	0.00	1	0	1	0	MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

**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.

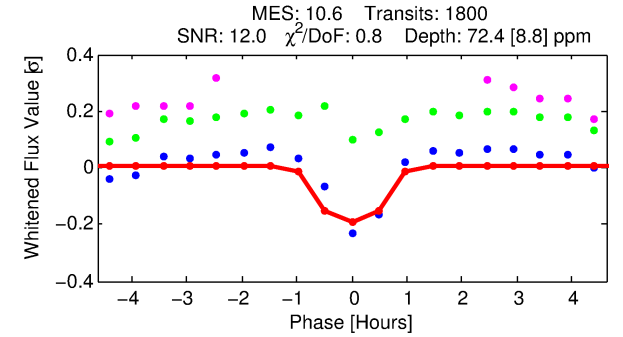
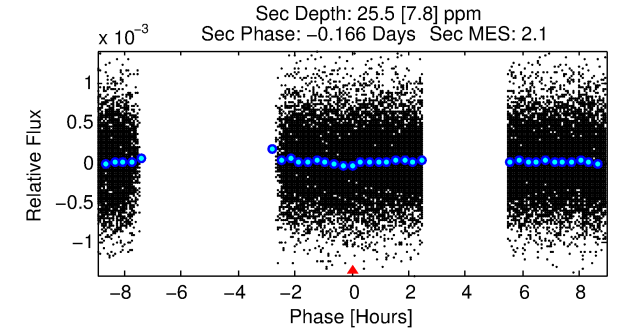
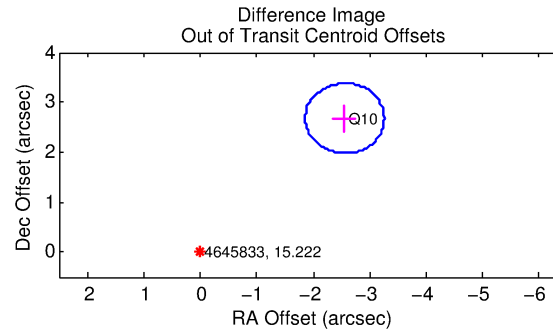
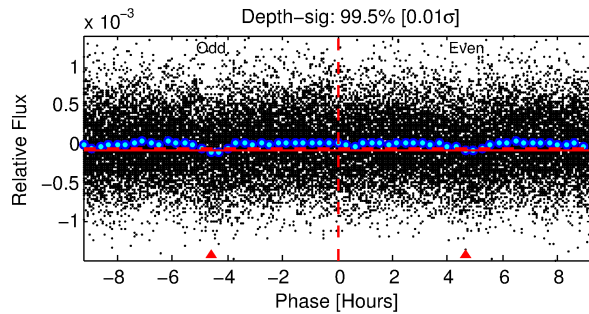
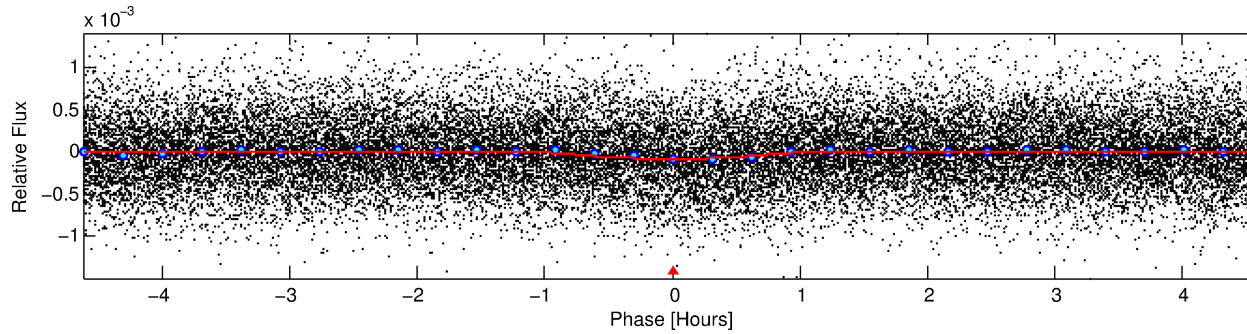
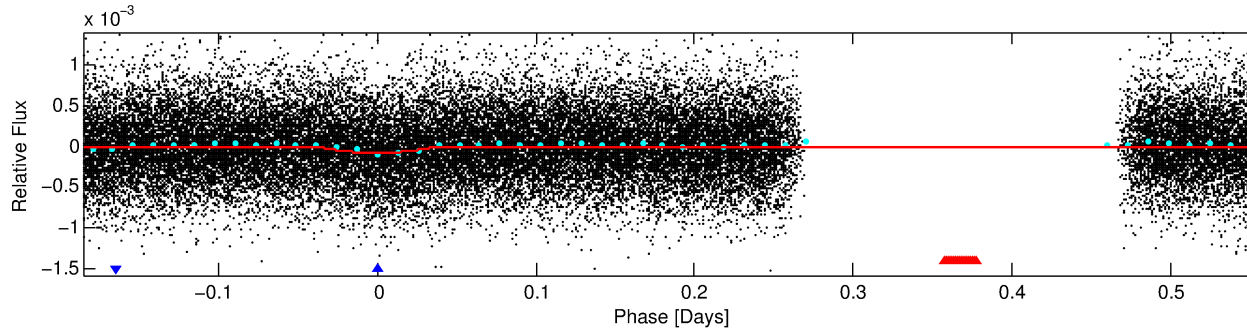
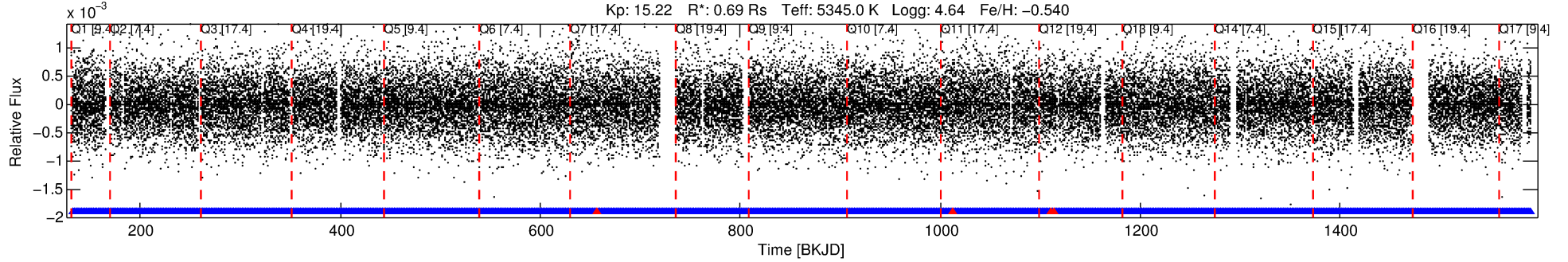
## Ephemeris Match Information For 004645833-02

No Significant Match Found

# DV One-Page Summary

KIC: 4645833 Candidate: 2 of 2 Period: 0.743 d  
KOI: K04783.01 Corr: 0.931

Kp: 15.22 R\*: 0.69 Rs Teff: 5345.0 K Logg: 4.64 Fe/H: -0.540



## DV Fit Results:

Period = 0.74349 [0.00001] d  
Epoch = 132.1874 [0.0020] BKJD  
Rp/R\* = 0.0094 [0.0066]  
a/R\* = 1.92 [4.50]  
b = 0.90 [0.69]  
Seff = 1618.82 [338.94]  
Teq = 1617 [85] K  
Rp = 0.70 [0.50] Re  
a = 0.0146 [0.0018] AU  
Ag = 6.09 [8.85] [0.58σ]  
Teffp = 3929 [1421] K [1.62σ]

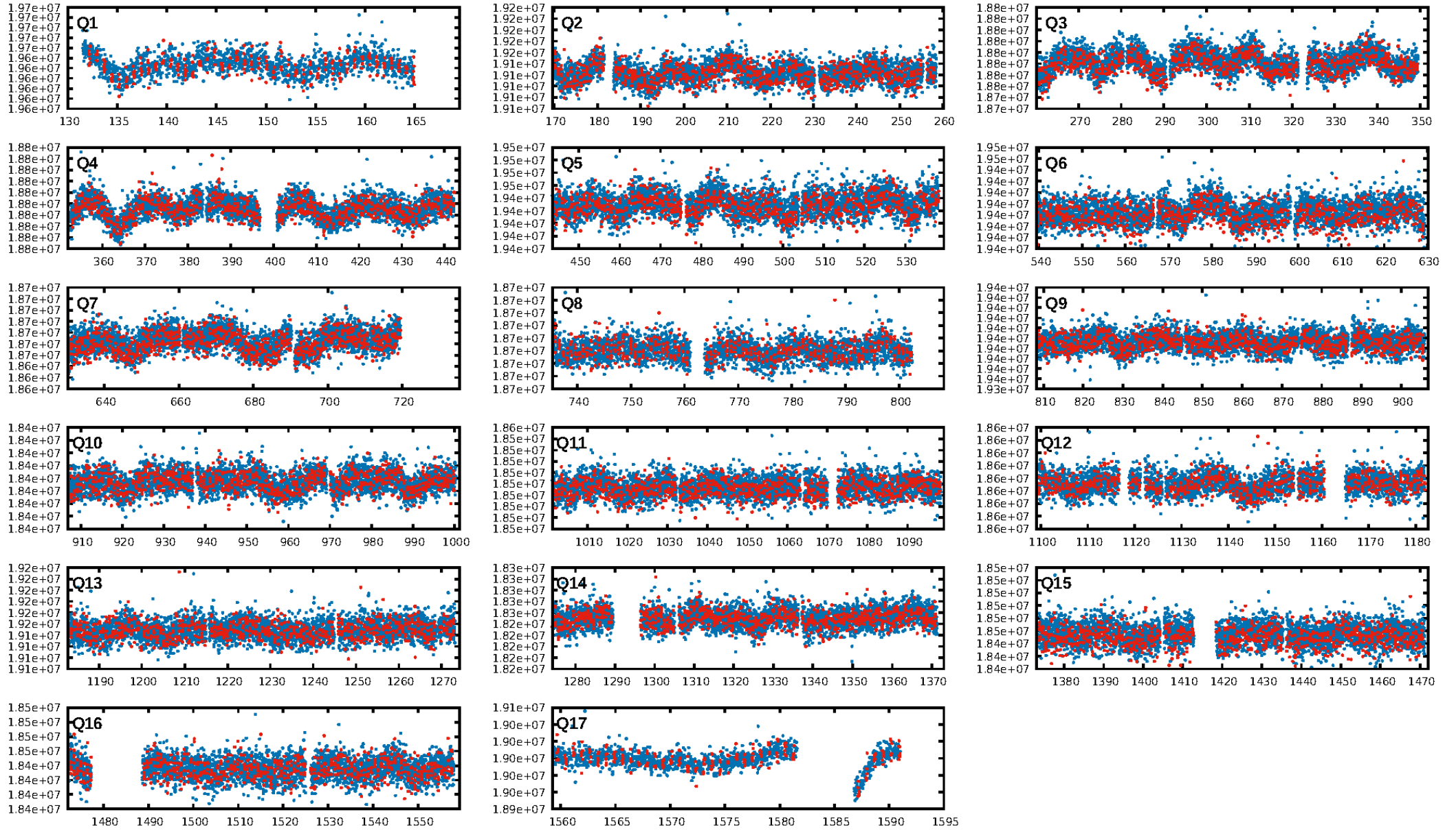
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.13e-27  
RollingBand-fgt: 1.00 [1715/1719]  
GhostDiagnostic-chr: -0.5389  
Centroid-sig: 0.0%  
Centroid-so: 7.389 arcsec [6.33σ]  
OotOffset-rm: 3.705 arcsec [15.88σ]  
KicOffset-rm: 3.949 arcsec [16.88σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 08:13:03 Z

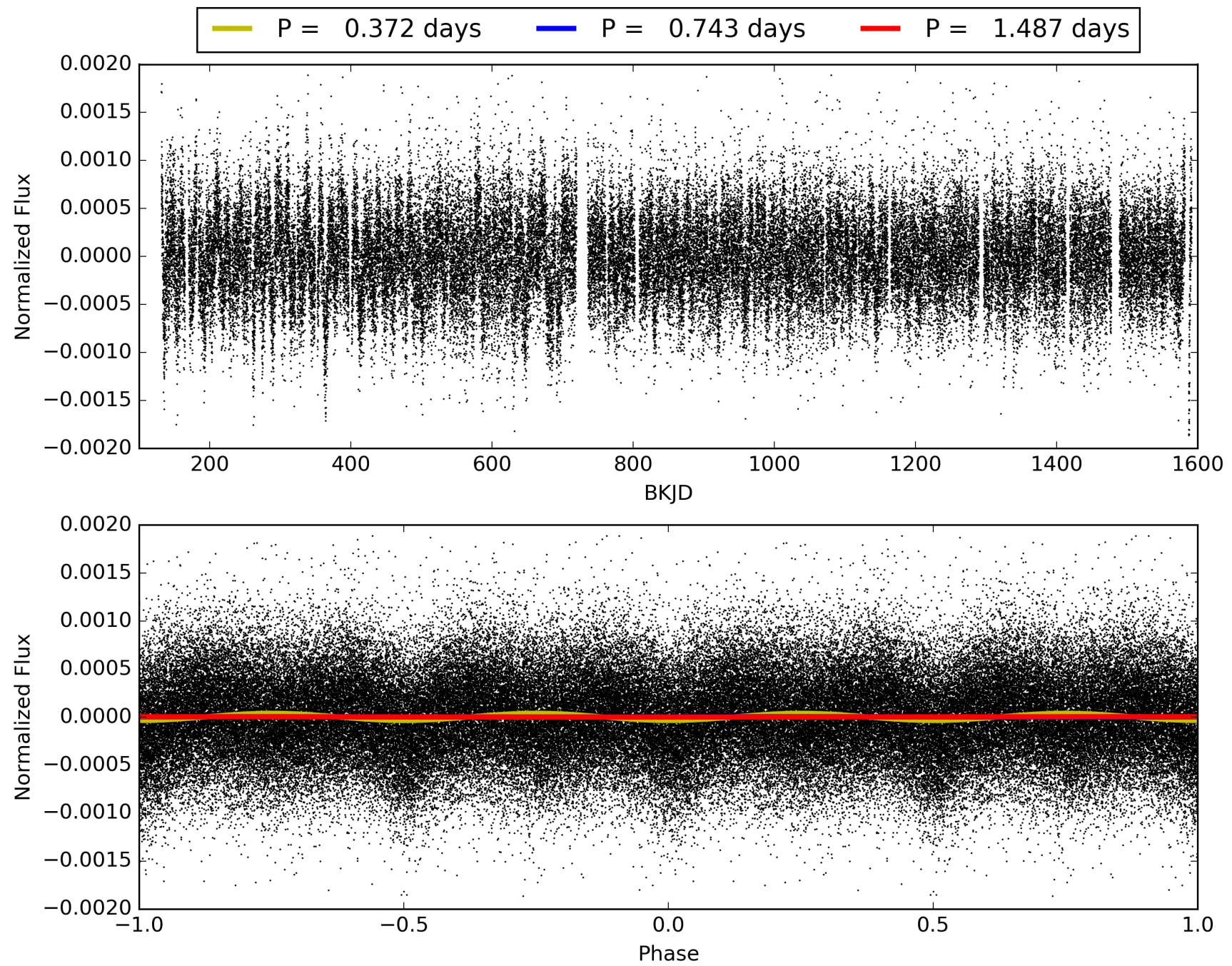
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004645833-02, PDC Light Curves





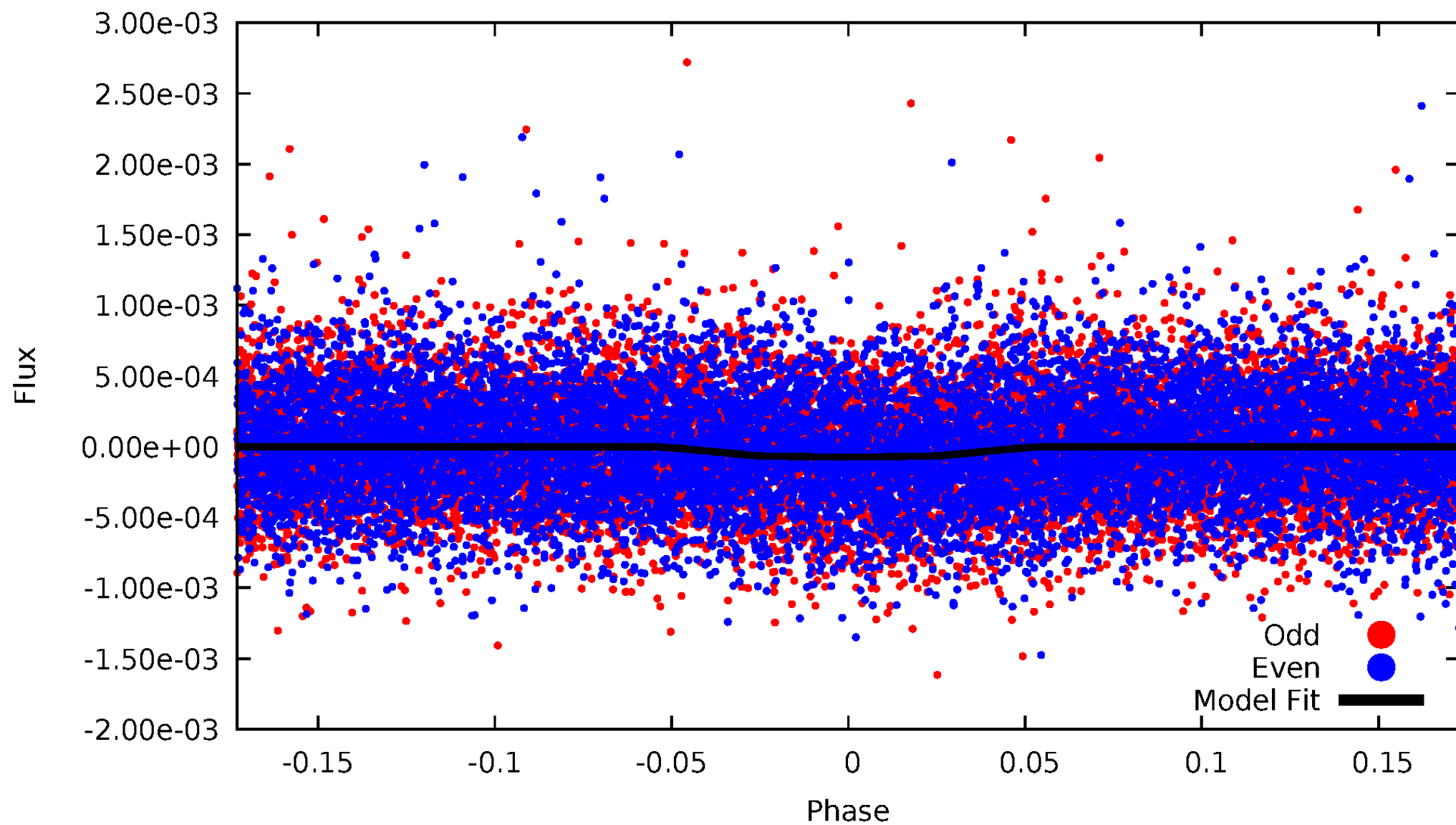
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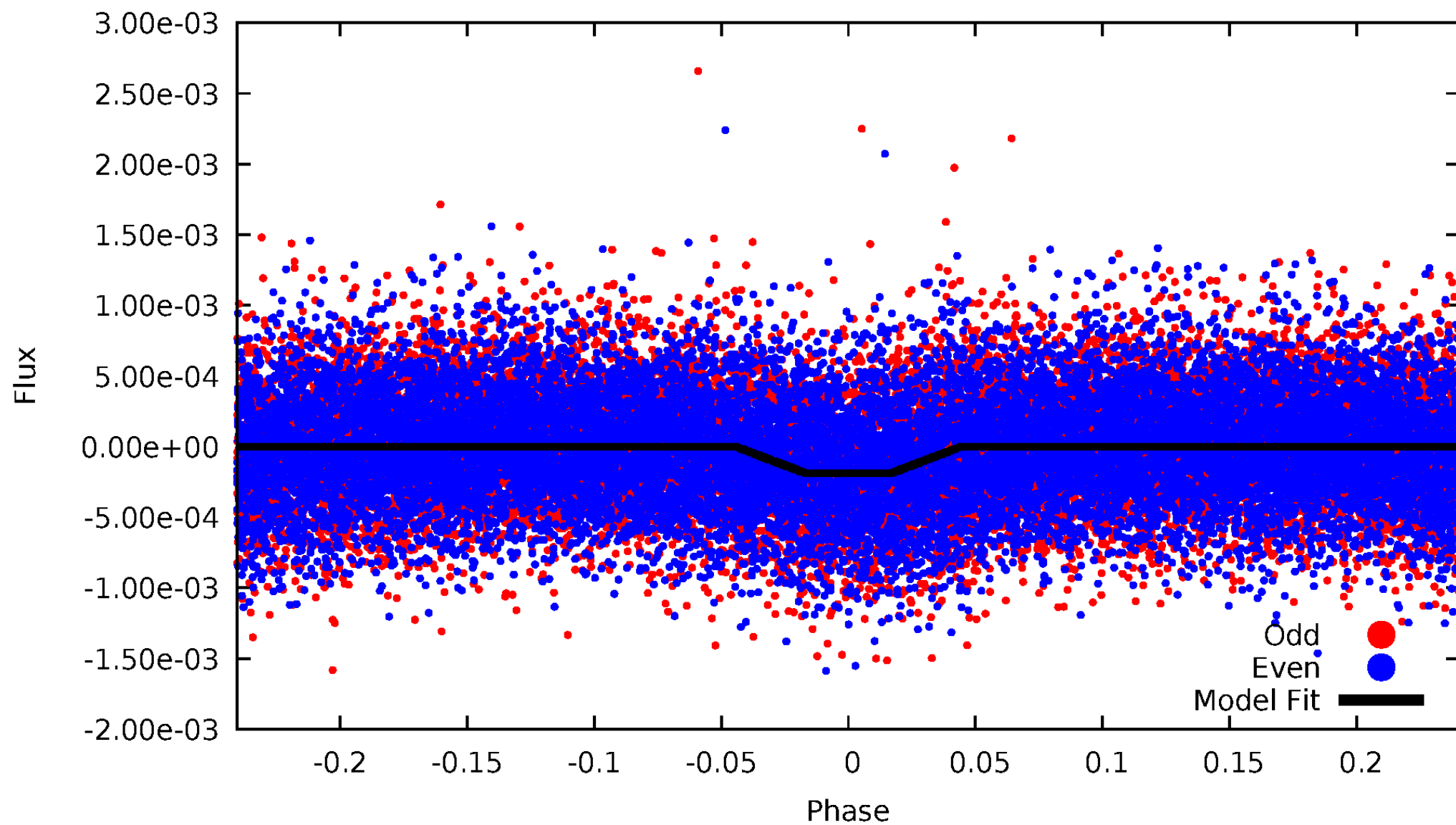
# DV Odd/Even

TCE 004645833-02



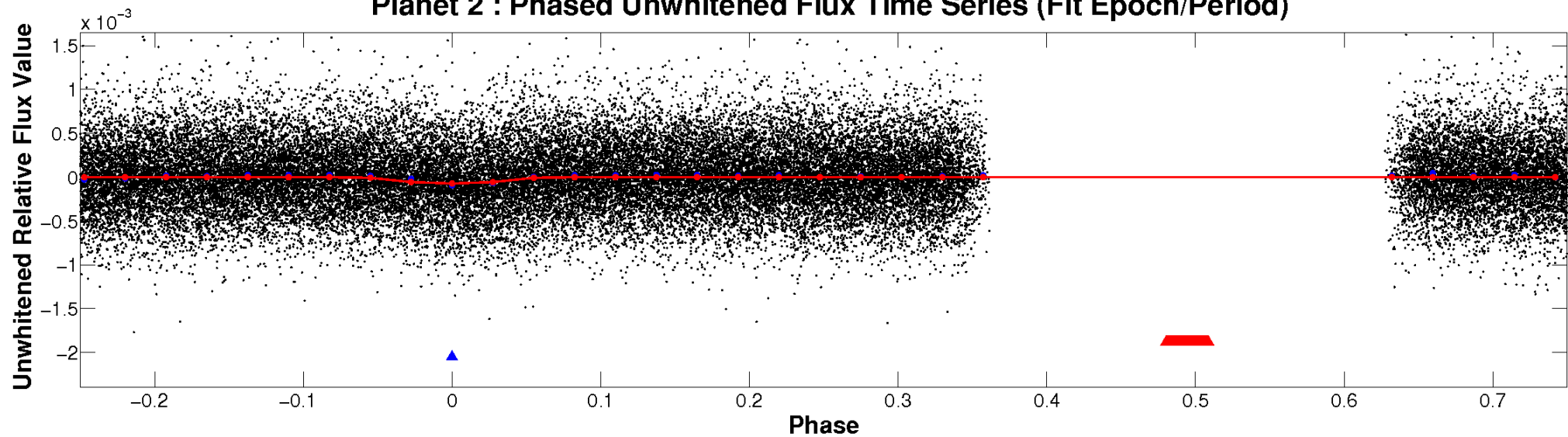
# ALT Odd/Even

TCE 004645833-02

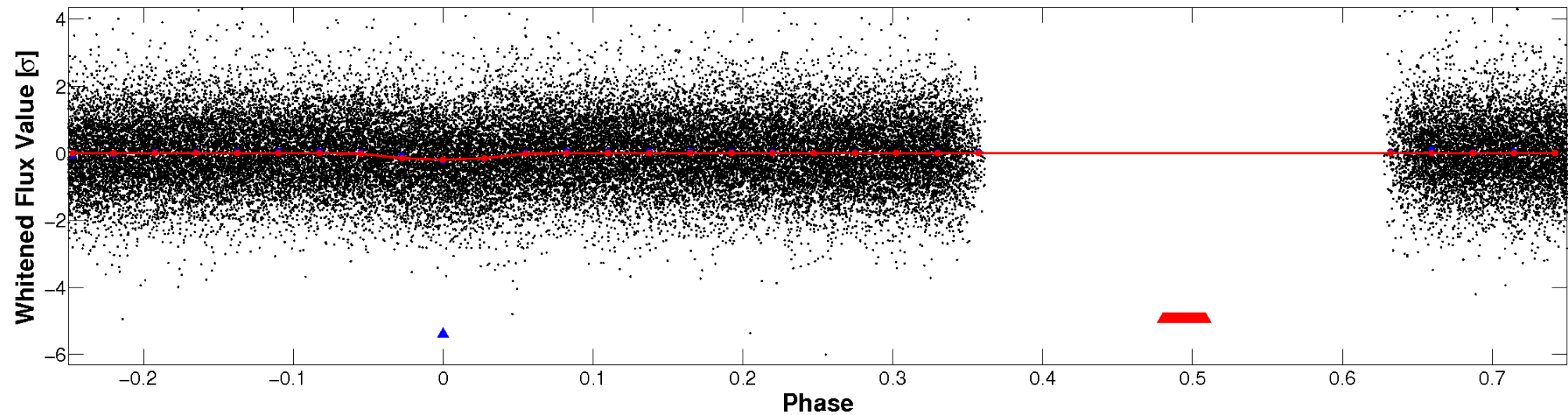


# Non-Whitened Vs. Whitened Light Curve

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

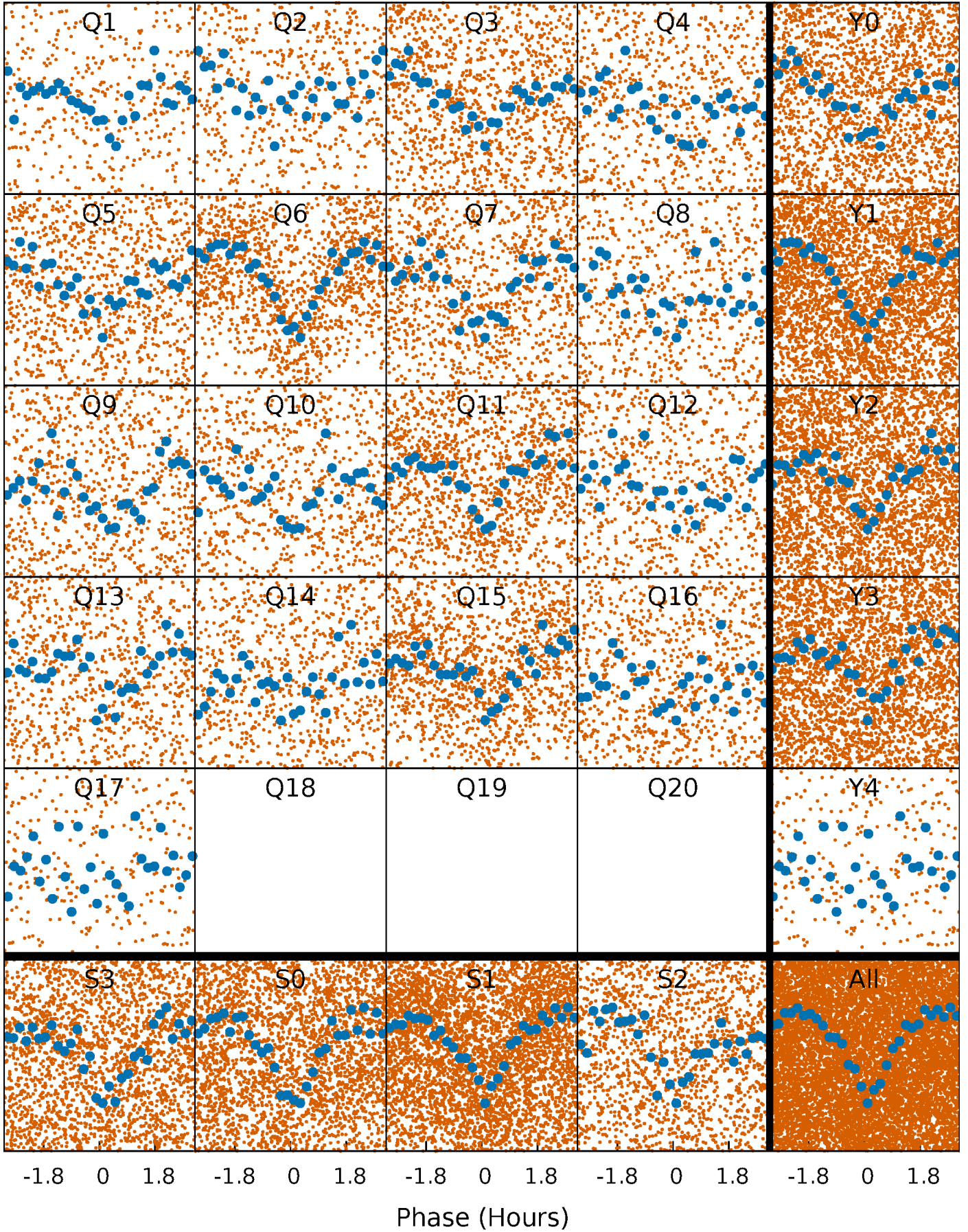


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

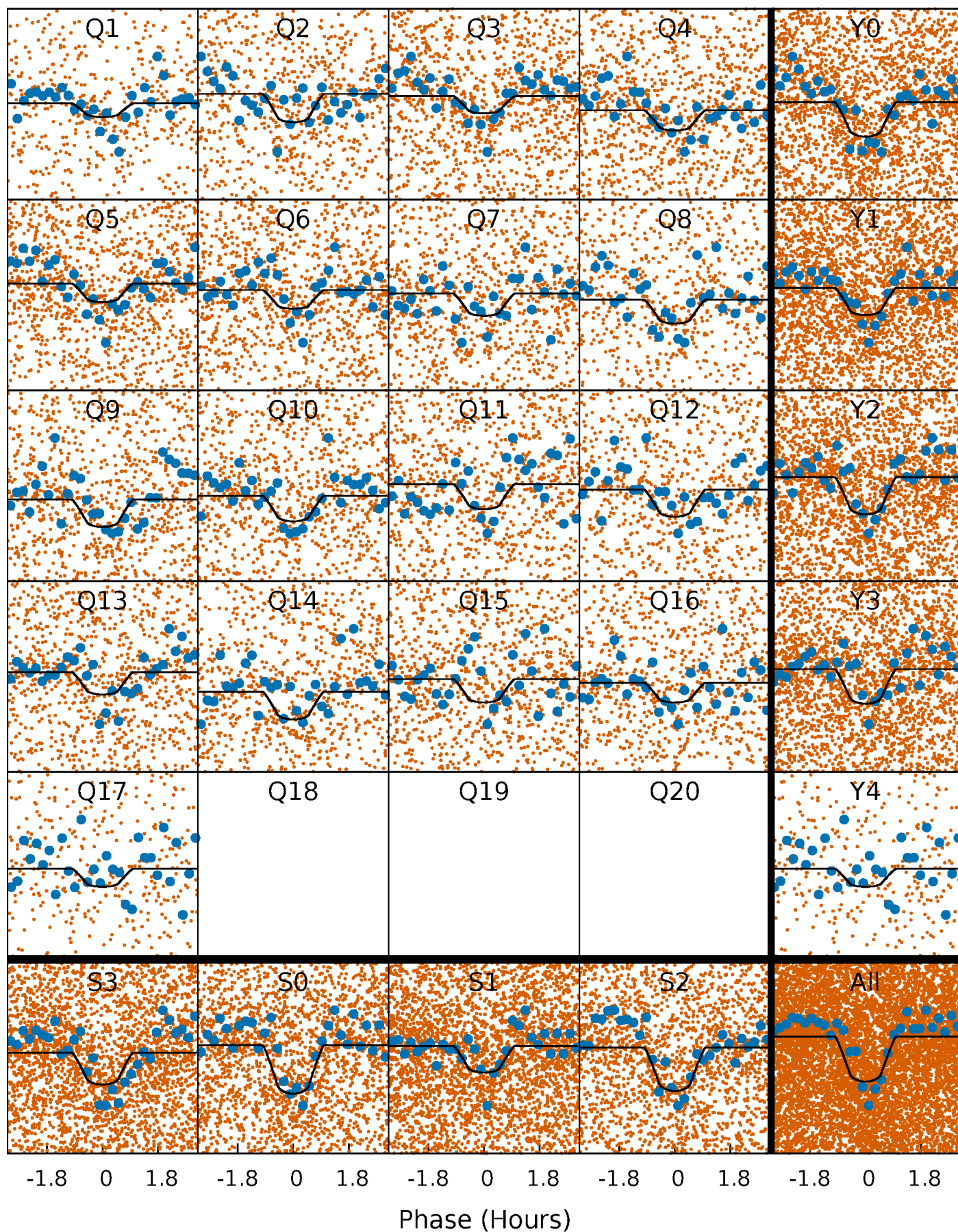
TCE 004645833-02 P= 0.743492 Days  $T_0=132.187390$  (BKJD)





# DV Quarter-Phased Transit Curves

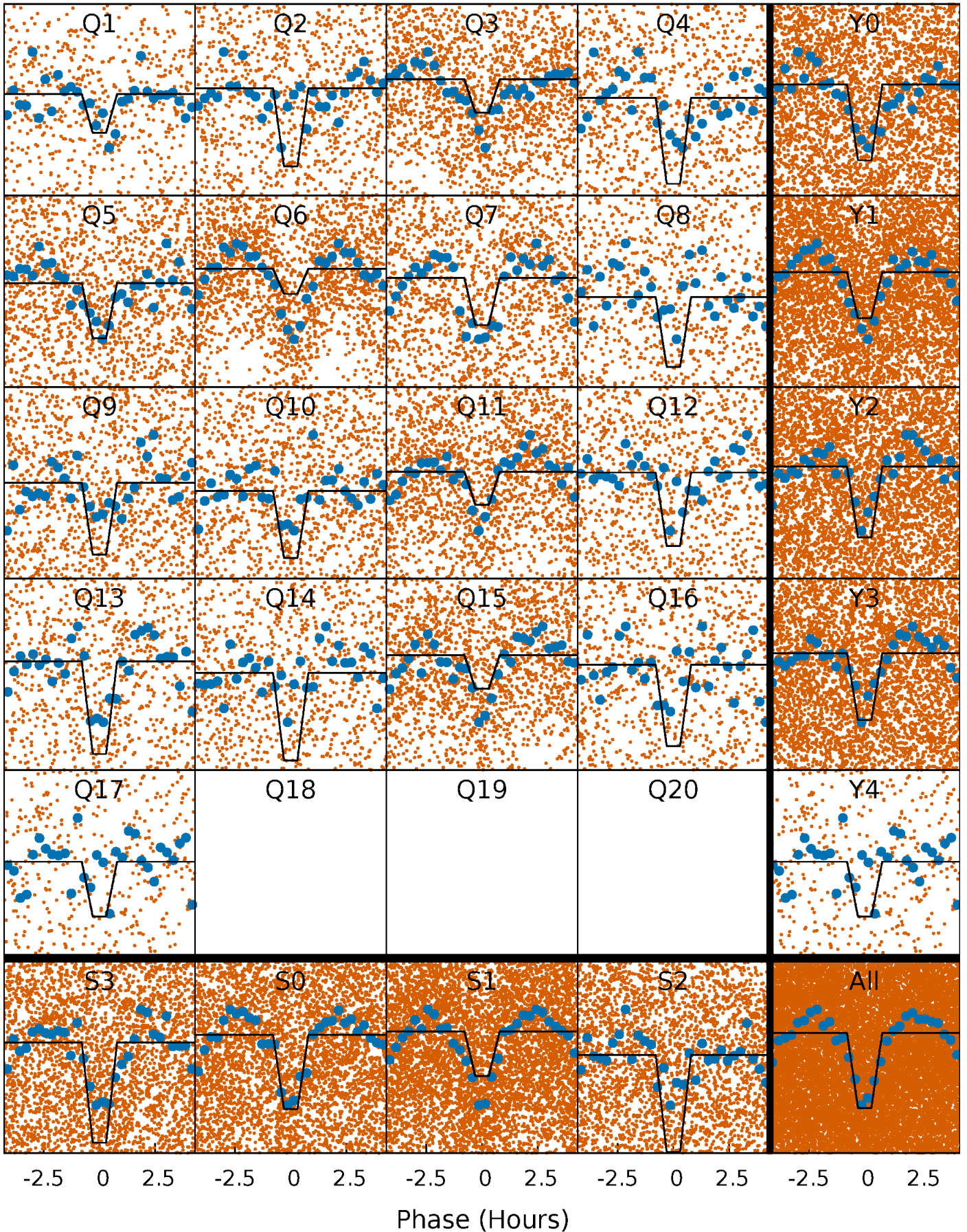
TCE 004645833-02   P= 0.743492 Days    $T_0=132.187390$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

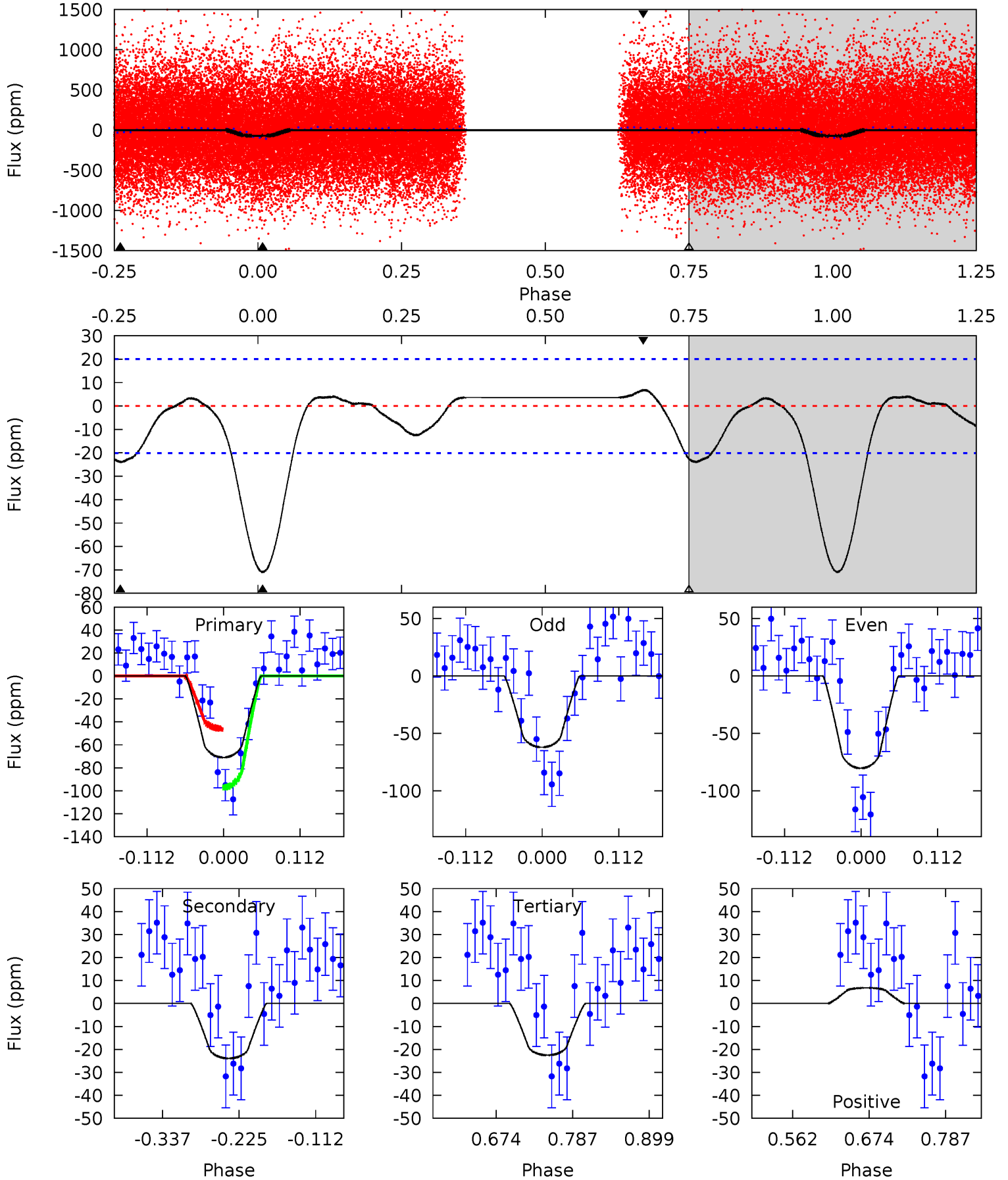
TCE 004645833-02   P= 0.743500 Days    $T_0=132.184876$  (BKJD)



# DV Model-Shift Uniqueness Test

004645833-02, P = 0.743492 Days, E = 131.443898 Days

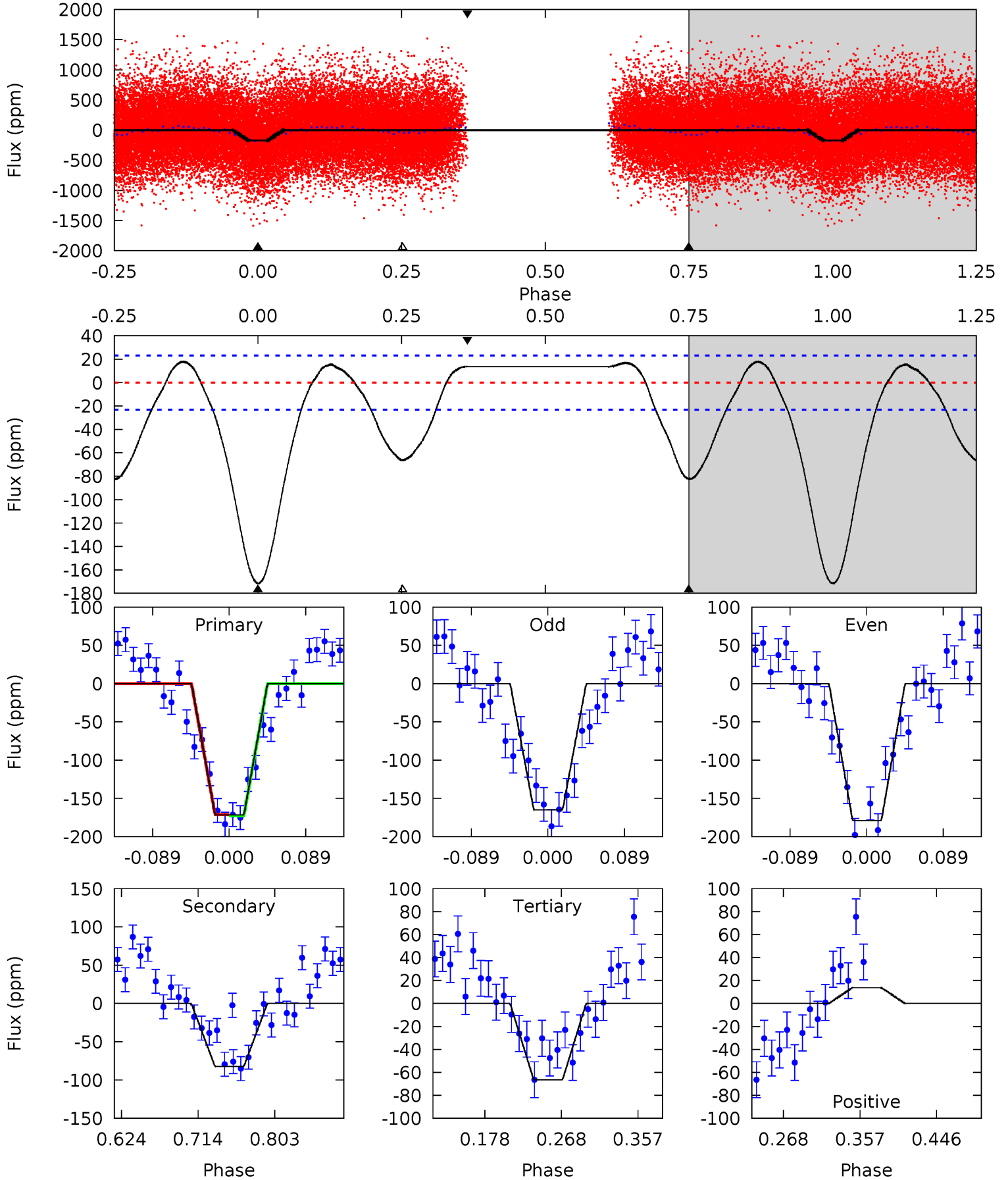
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.0	5.41	5.10	1.54	4.54	1.59	1.55	11.0	14.5	0.32	3.87	2.07	0.93	0.09	5.74



# Alt Model-Shift Uniqueness Test

004645833-02, P = 0.743500 Days, E = 131.441376 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
34.0	16.3	13.2	2.72	4.59	1.70	5.67	20.8	31.3	3.16	13.6	1.35	1.04	0.09	0.17



### Stellar Parameters For KIC 004645833

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5345^{+160}_{-160}$	$4.639^{+0.036}_{-0.090}$	$-0.540^{+0.300}_{-0.300}$	$0.686^{+0.105}_{-0.052}$	$0.747^{+0.079}_{-0.064}$	$3.264^{+0.533}_{-0.911}$
	+3%/-3%	+1%/-2%	+56%/-56%	+15%/-8%	+11%/-9%	+16%/-28%
Source	PHO1	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 004645833-02 / KOI 4783.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-24 \pm 4$	$0.77^{+0.53}_{-0.42}$	$2284^{+86}_{-81}$	$3957^{+1681}_{-706}$	$4.637^{+19.539}_{-2.990}$
Alt.	$-82 \pm 5$	$1.08^{+0.51}_{-0.47}$	$2281^{+97}_{-90}$	$4407^{+1300}_{-609}$	$8.399^{+16.860}_{-4.593}$

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

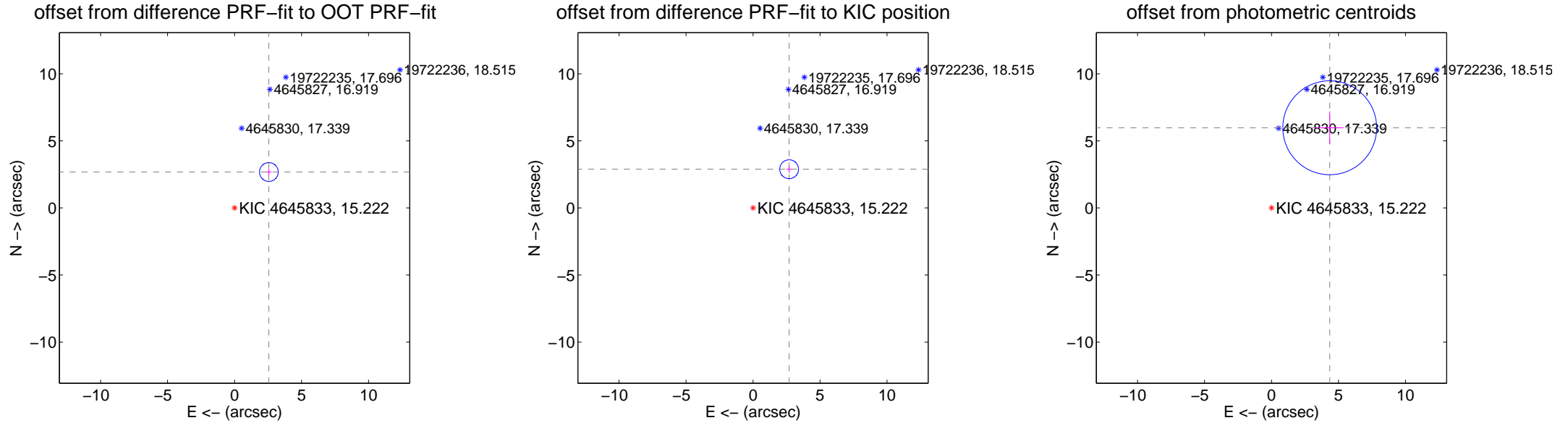
## DV Centroid Data

Supplemental centroid analysis for 004645833-02. Kepler magnitude: 15.22. Transit SNR 12.02

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

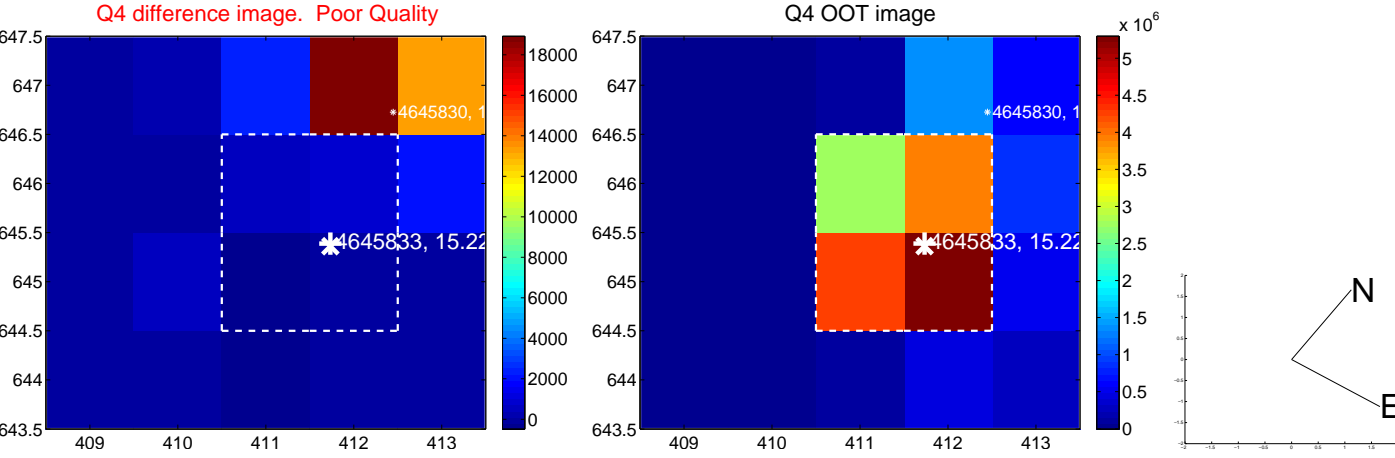
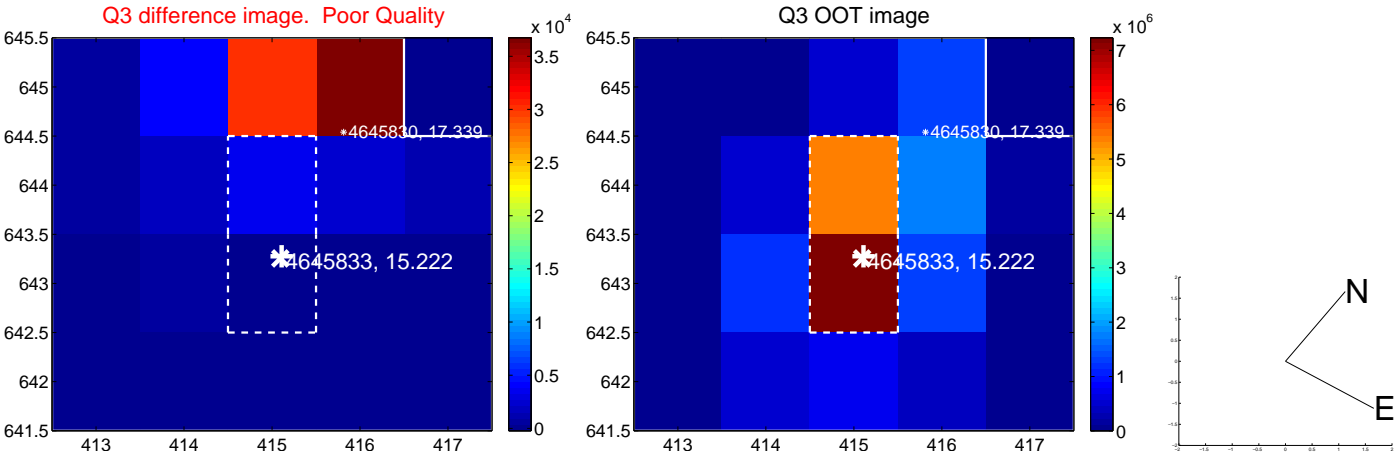
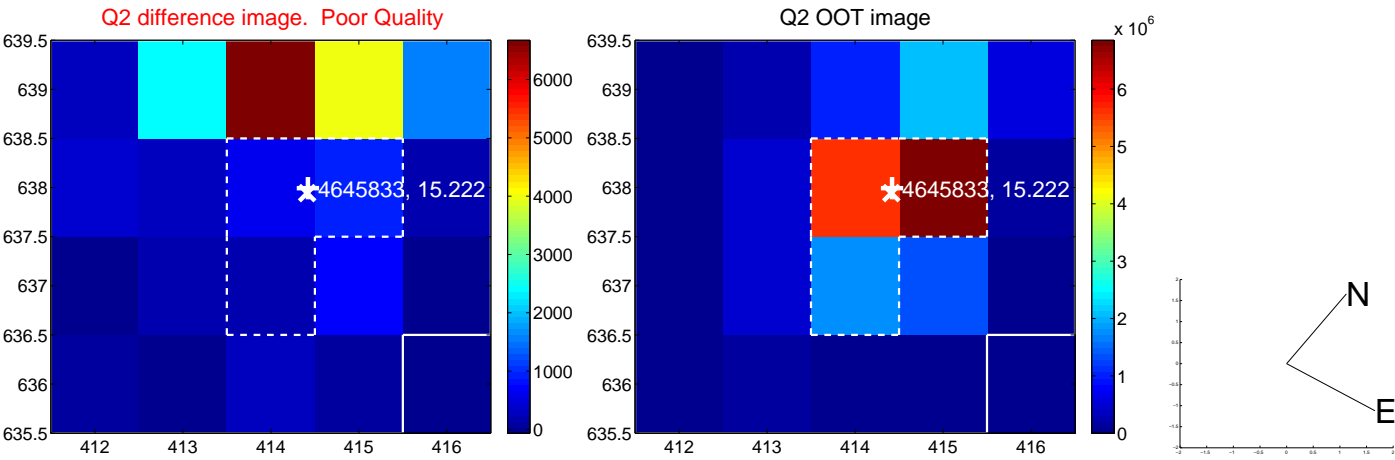
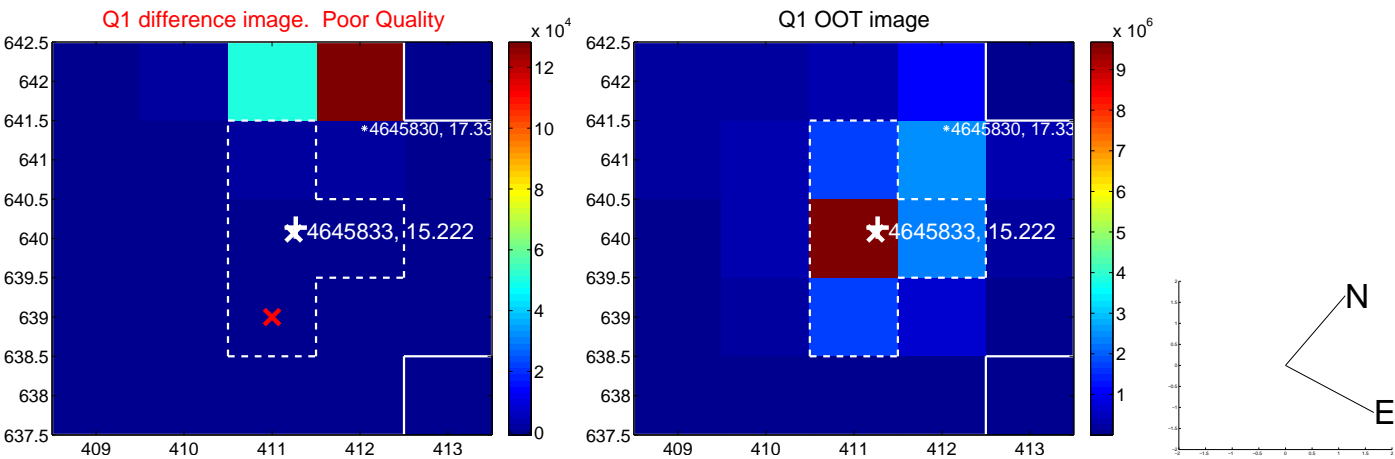
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	3.705 $\pm$ 0.233	15.88	-2.559 $\pm$ 0.199	2.679 $\pm$ 0.261
PRF-fit source offset from KIC position	3.949 $\pm$ 0.234	16.88	-2.693 $\pm$ 0.199	2.888 $\pm$ 0.261
photometric centroid source offset	7.39 $\pm$ 1.17	6.33	-4.34 $\pm$ 1.05	5.98 $\pm$ 1.22



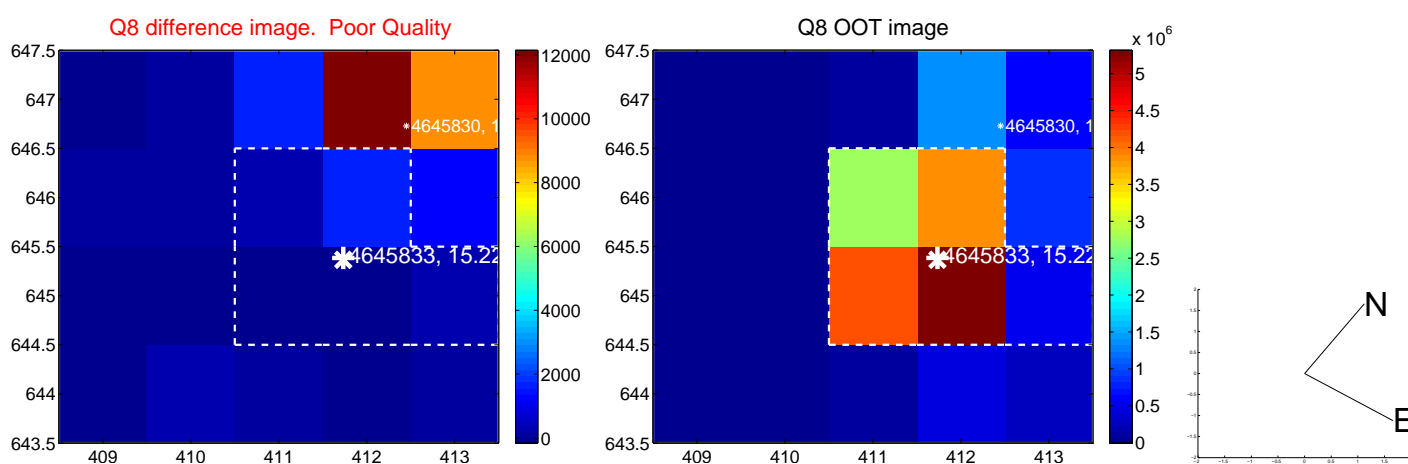
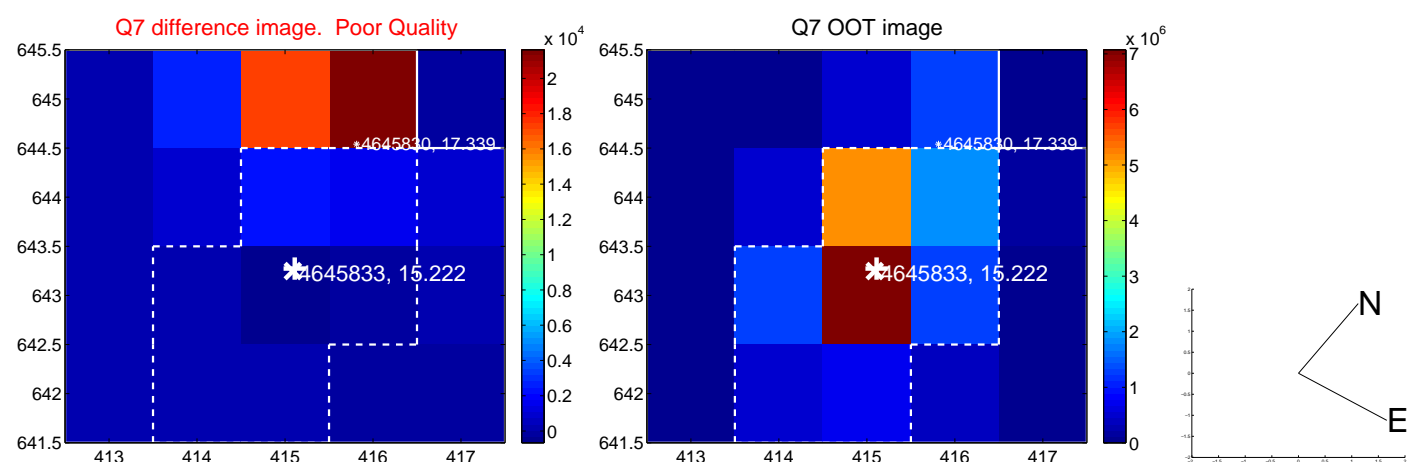
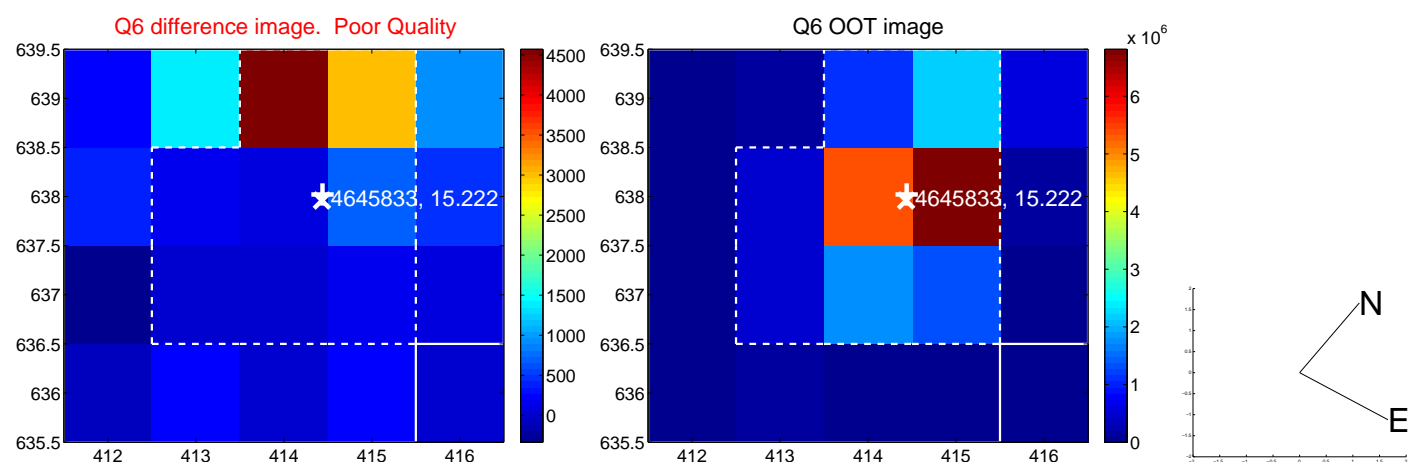
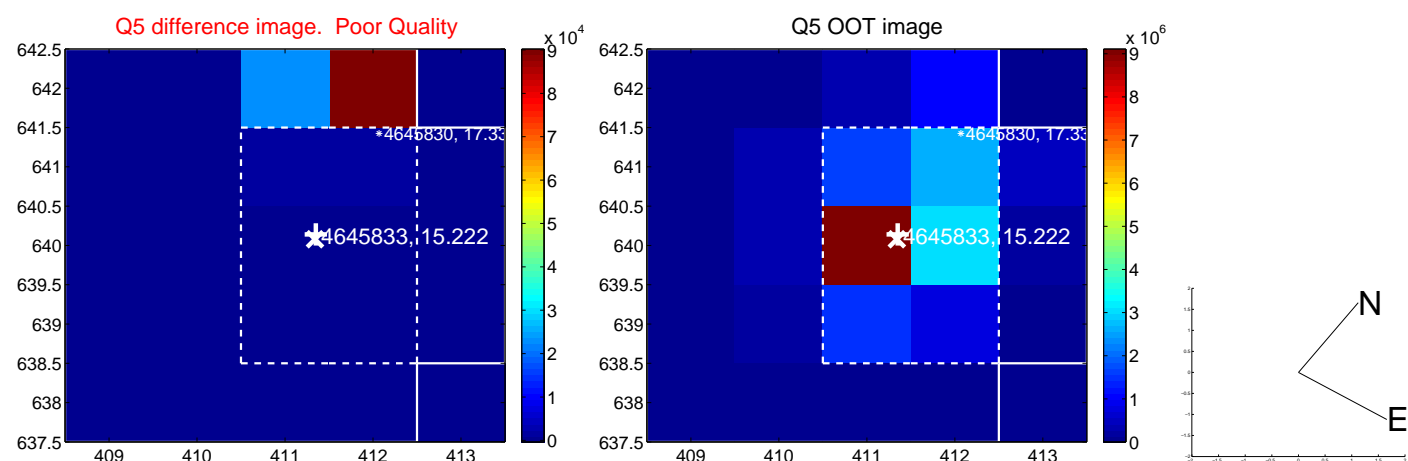
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



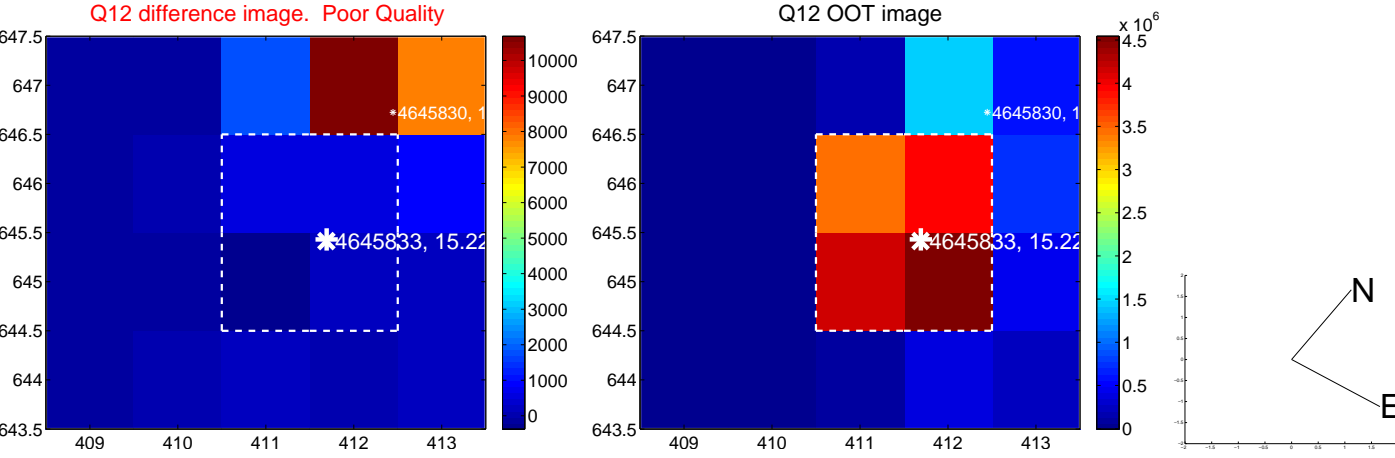
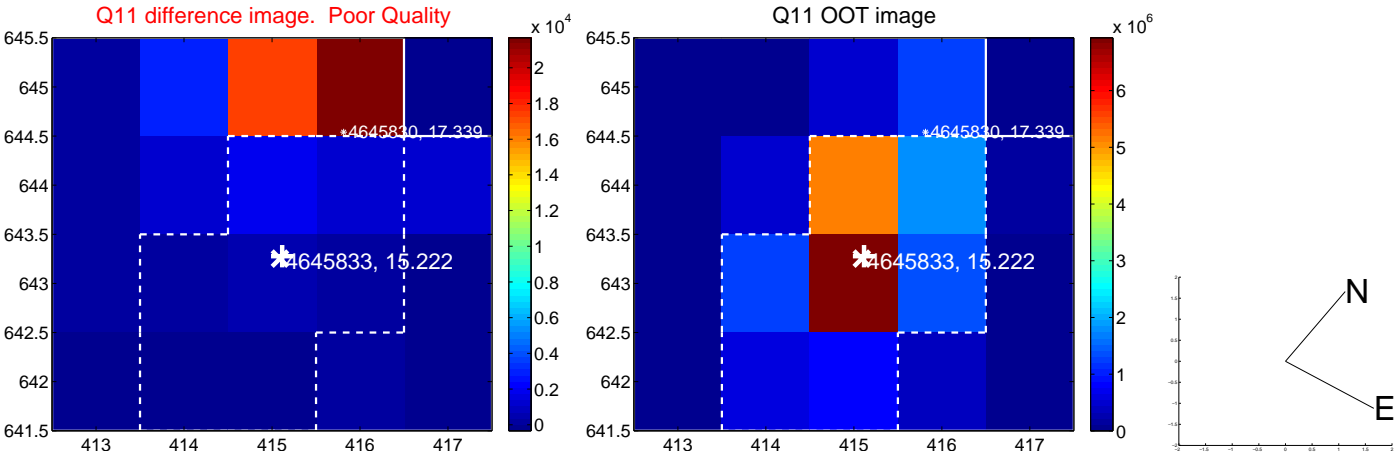
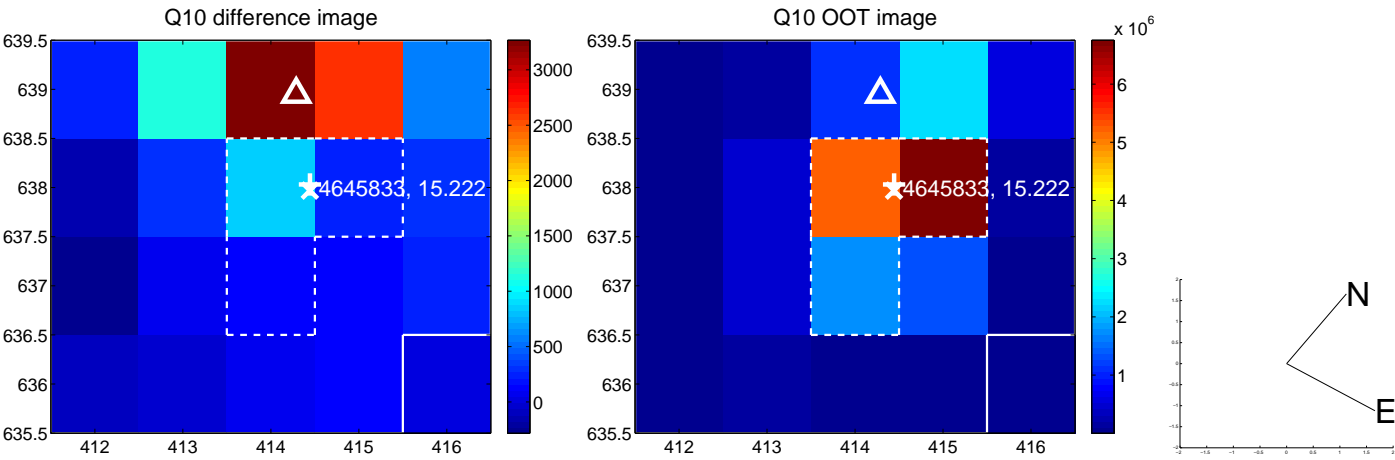
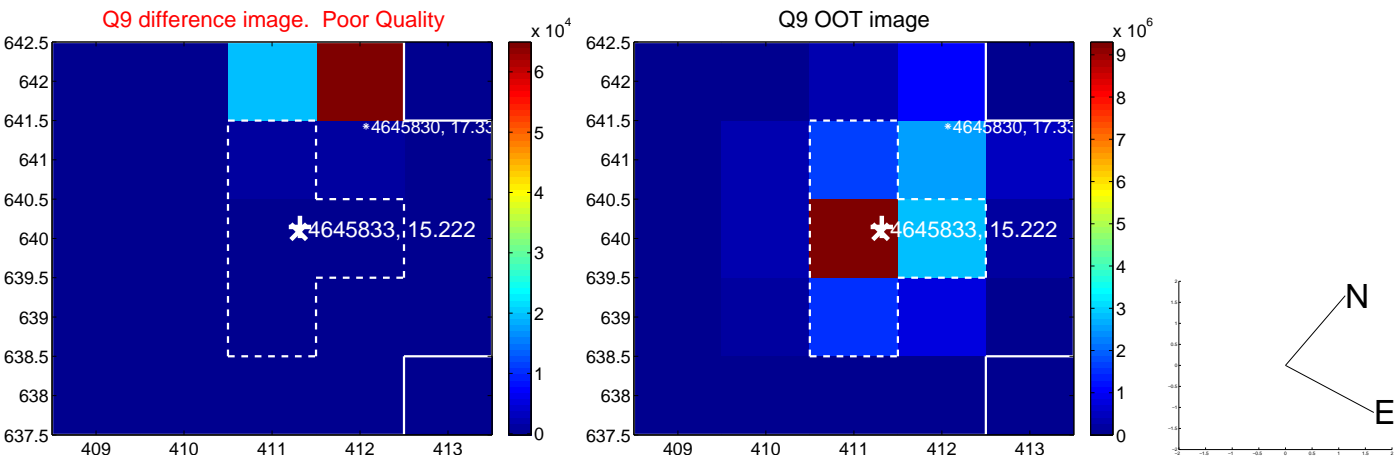
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



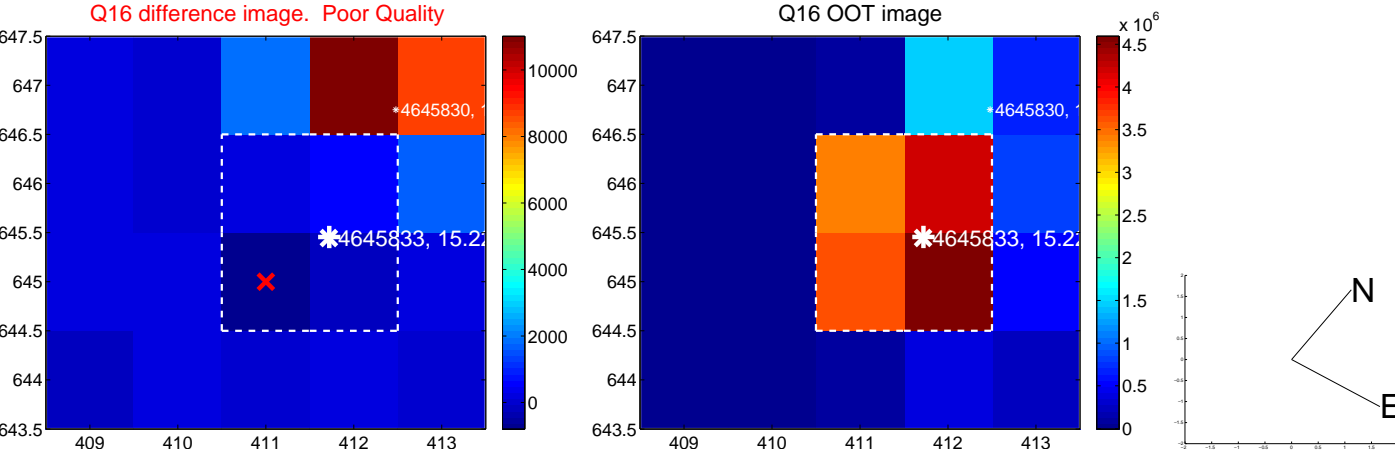
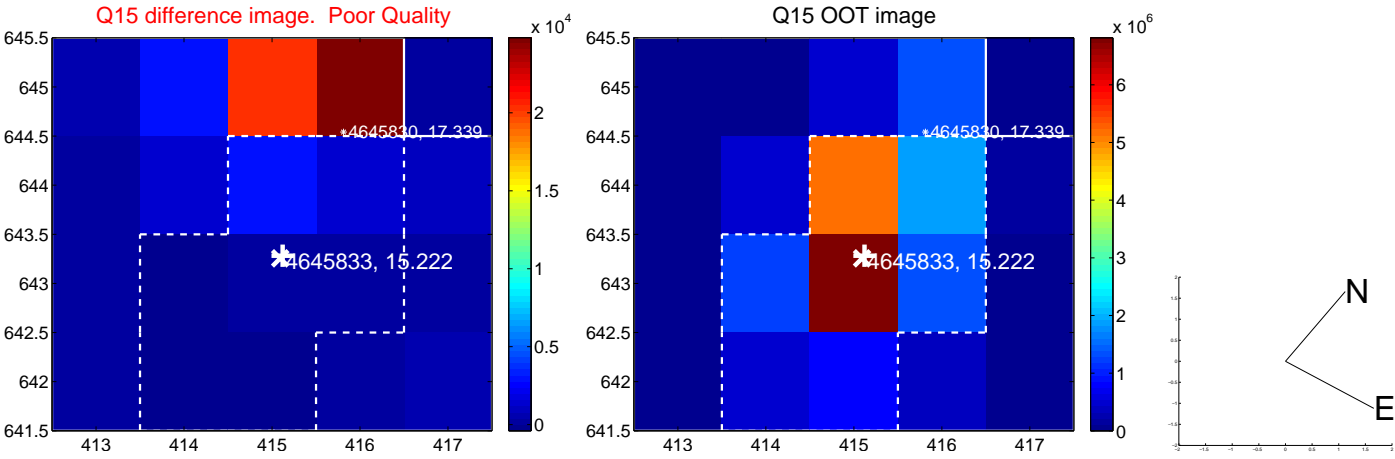
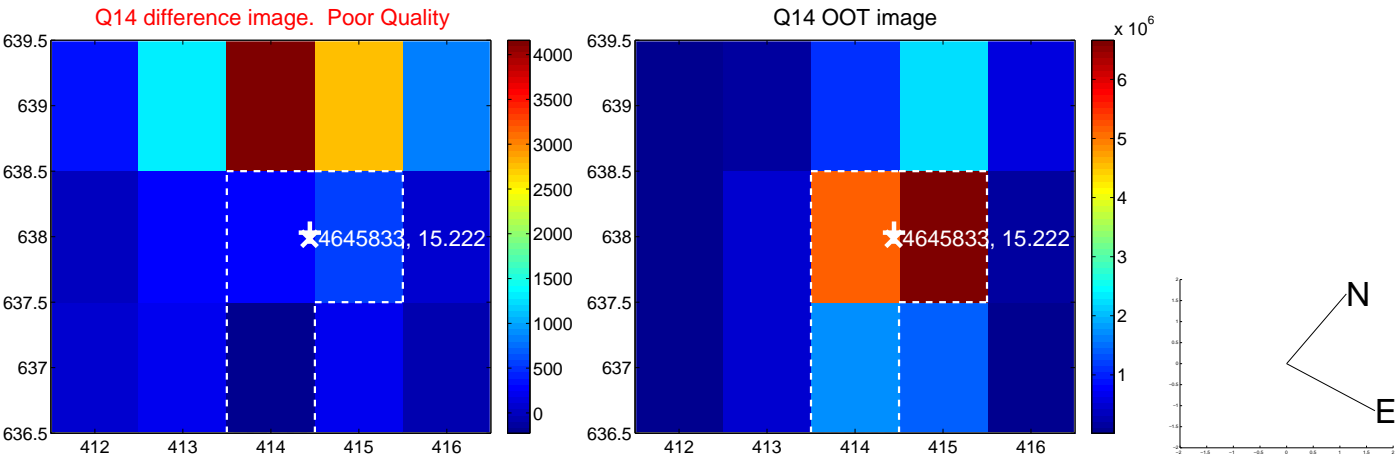
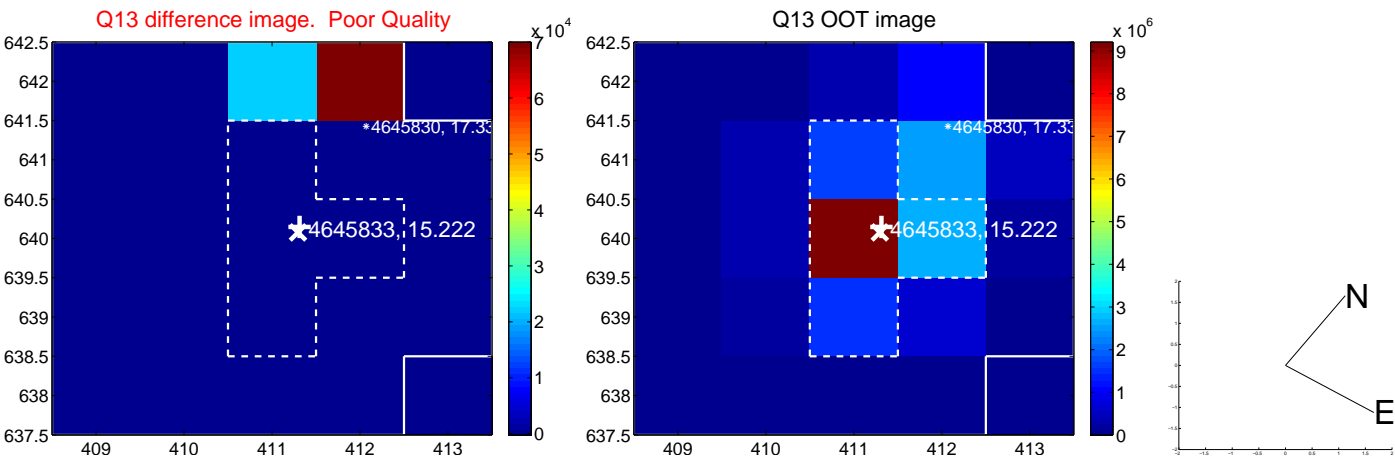
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



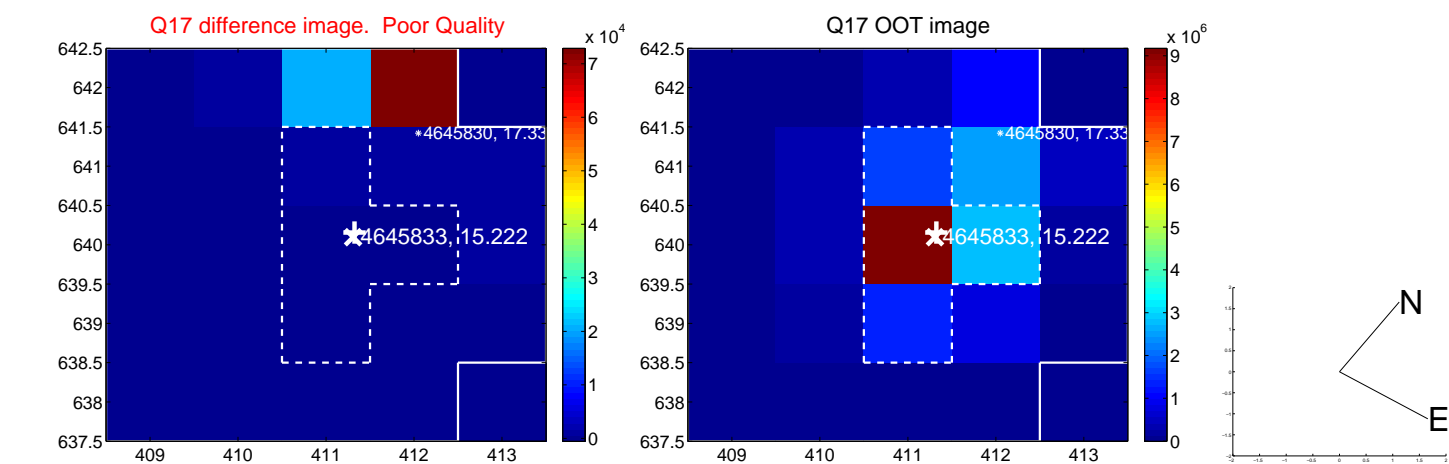
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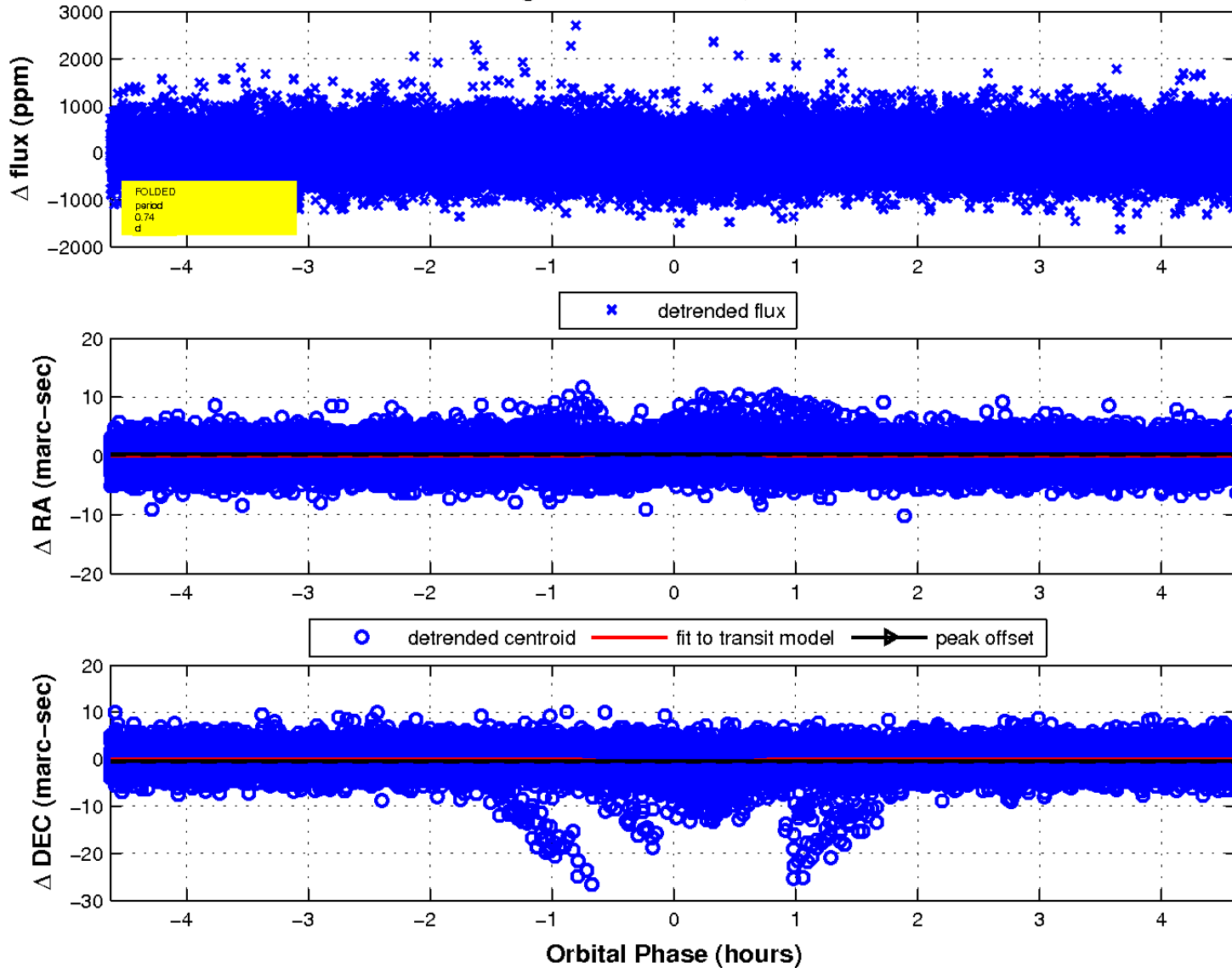
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2





UKIRT Image

Declination

