

# KIC 008487805

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008487805-01	OBS	4206.01	1.061913	131.733915	78.9	2.607	16.1	14.8	0.75	5325	0.80	1105.17
008487805-02	OBS	No	0.530939	131.743686	34.2	4.063	10.1	8.2	0.75	5325	0.45	2784.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008487805-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—HALO_GHOST—EPHEM_MATCH
008487805-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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.

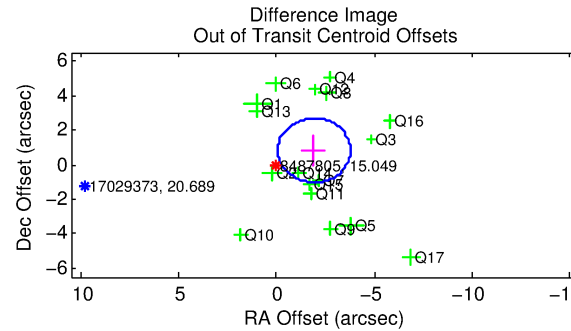
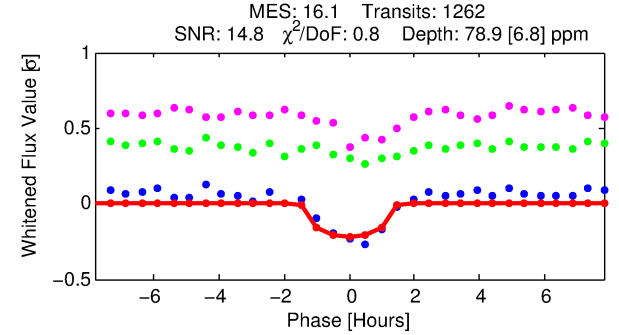
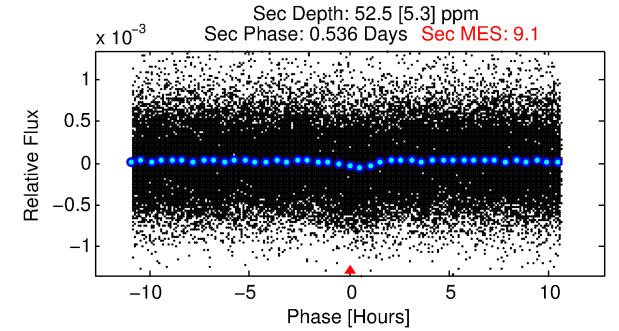
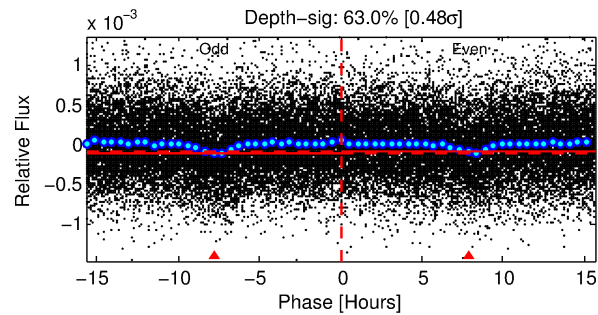
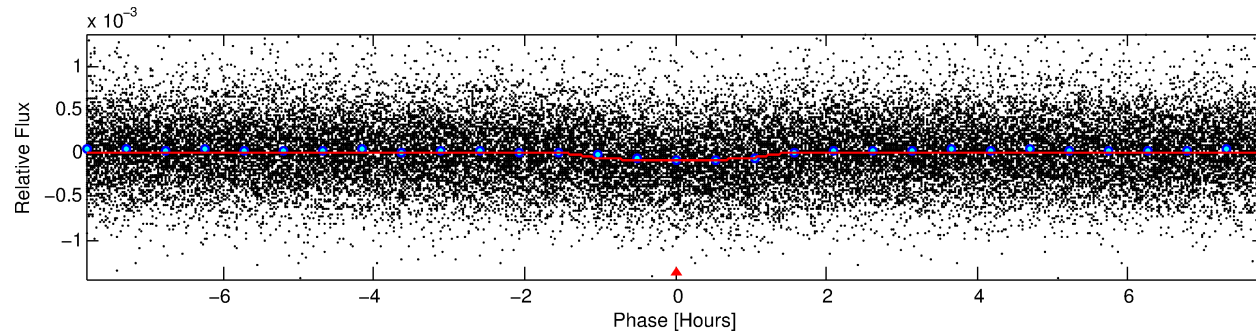
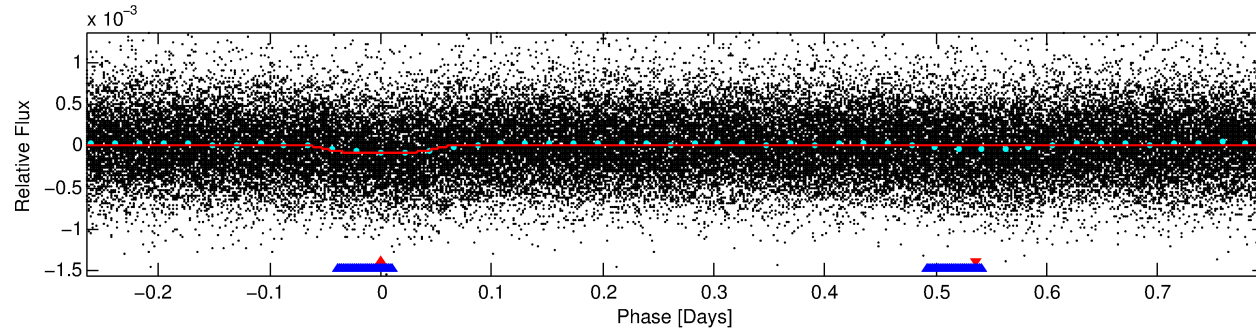
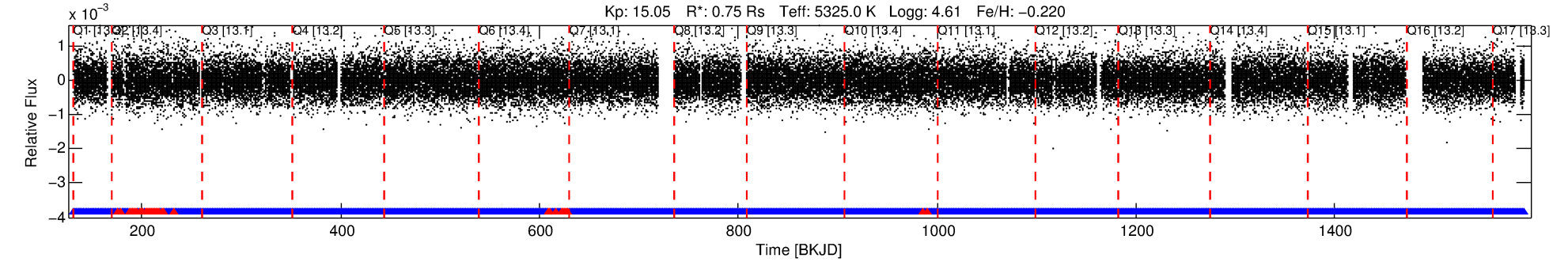
## Ephemeris Match Information For 008487805-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
008487805-01	8487805	008552540-01	8552540	1:1	154.7	16	35	10.29	15.05	5884.00	Direct-PRF	0	2.04	1.04

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 8487805 Candidate: 1 of 2 Period: 1.062 d  
KOI: K04206 Corr: No Ephemeris Match



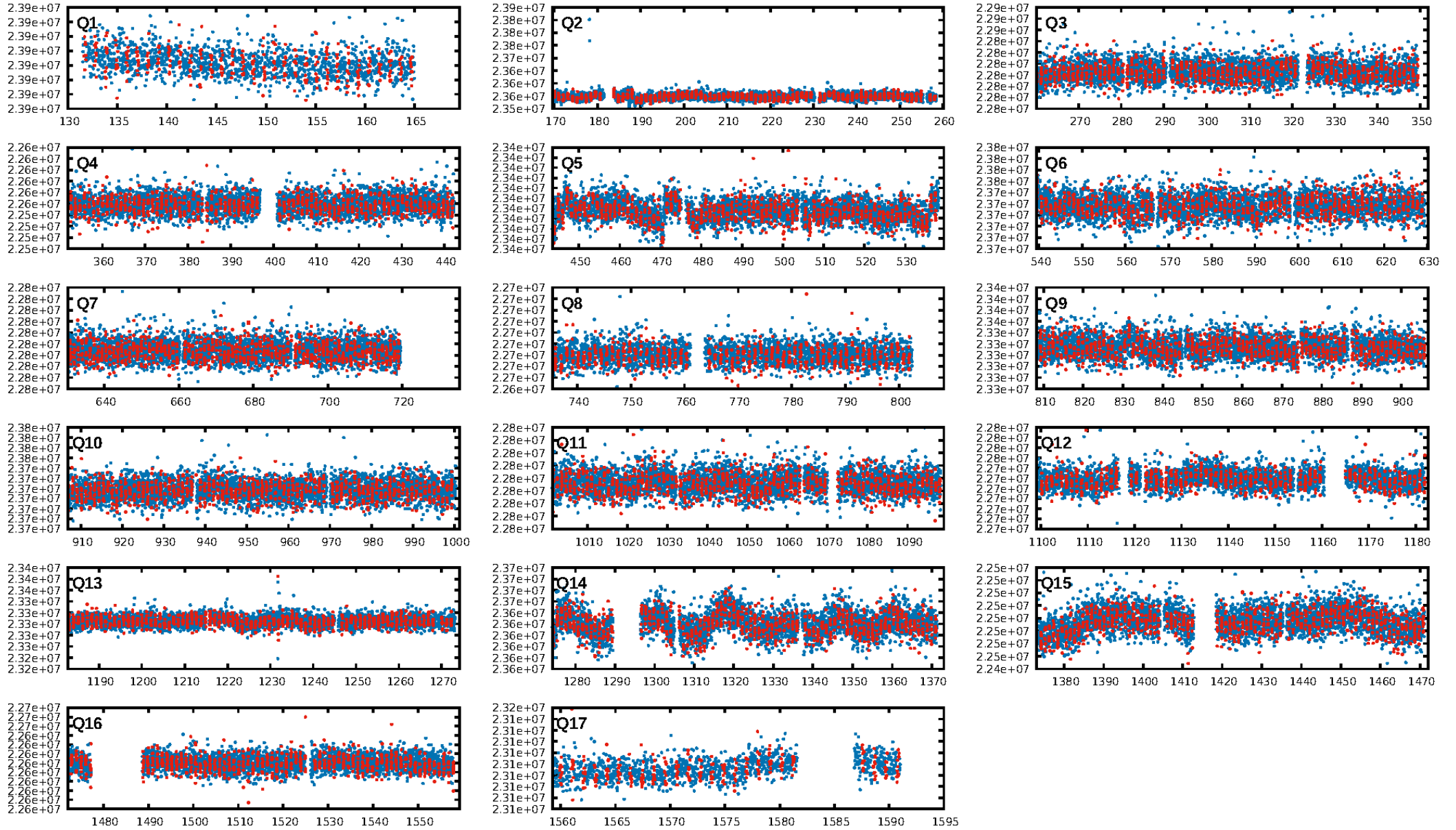
## DV Fit Results:

Period = 1.06191 [0.00001] d  
Epoch = 131.7339 [0.0024] BKJD  
Rp/R\* = 0.0098 [0.0052]  
a/R\* = 1.71 [2.60]  
b = 0.90 [0.50]  
Seff = 1105.17 [238.38]  
Teff = 1470 [79] K  
Rp = 0.80 [0.44] Re  
a = 0.0191 [0.0024] AU  
Ag = 16.48 [17.67] [0.88 $\sigma$ ]  
Teffp = 4580 [1218] K [2.55 $\sigma$ ]

## DV Diagnostic Results:

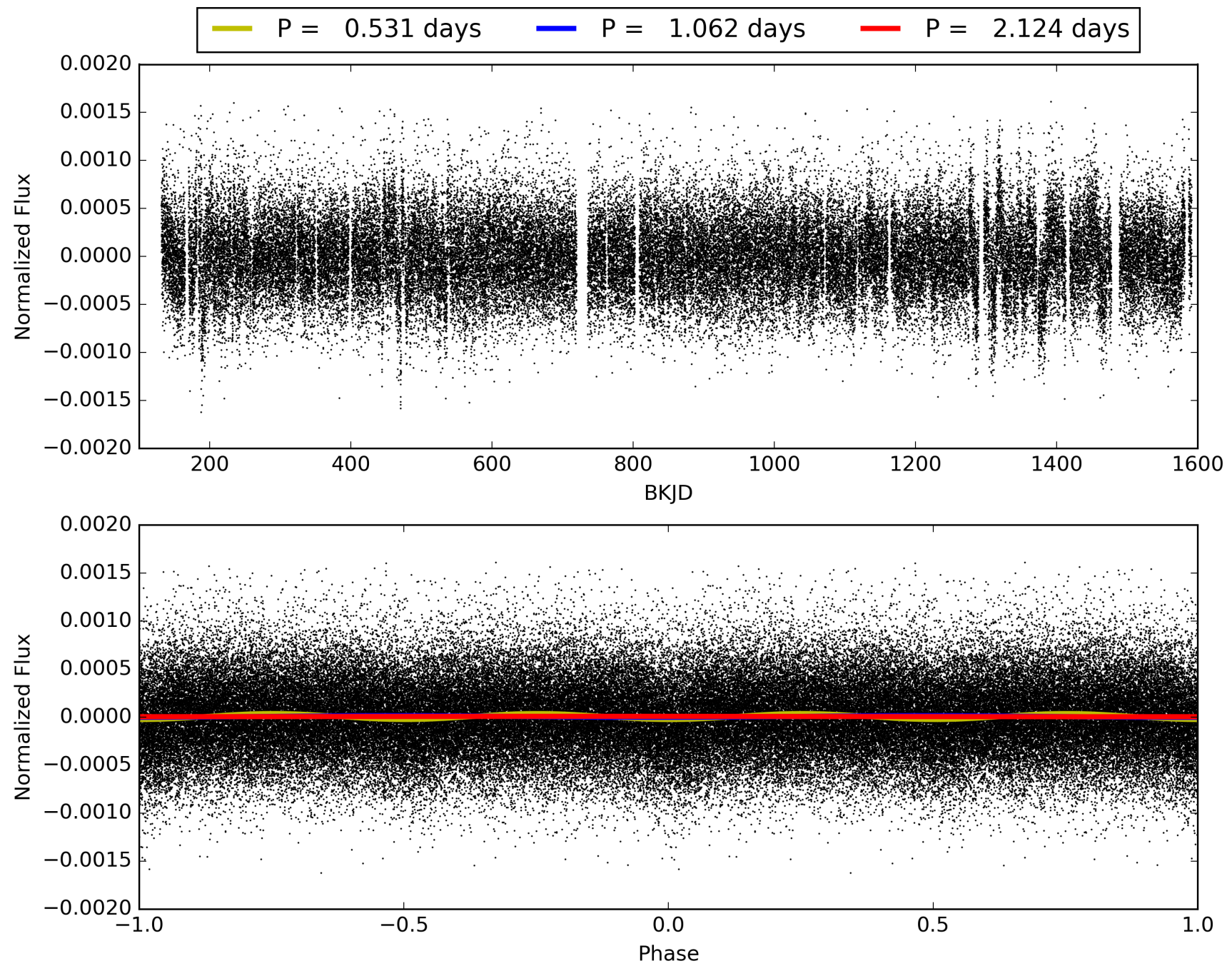
ShortPeriod-sig: 99.2% [2.64 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.15e-31  
RollingBand-fgt: 0.96 [1161/1205]  
GhostDiagnostic-chr: -0.06161  
Centroid-sig: 0.0%  
Centroid-so: 4.096 arcsec [3.18 $\sigma$ ]  
OotOffset-rm: 2.083 arcsec [3.37 $\sigma$ ]  
KicOffset-rm: 2.043 arcsec [3.37 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.06 [1/17]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 008487805-01, PDC Light Curves



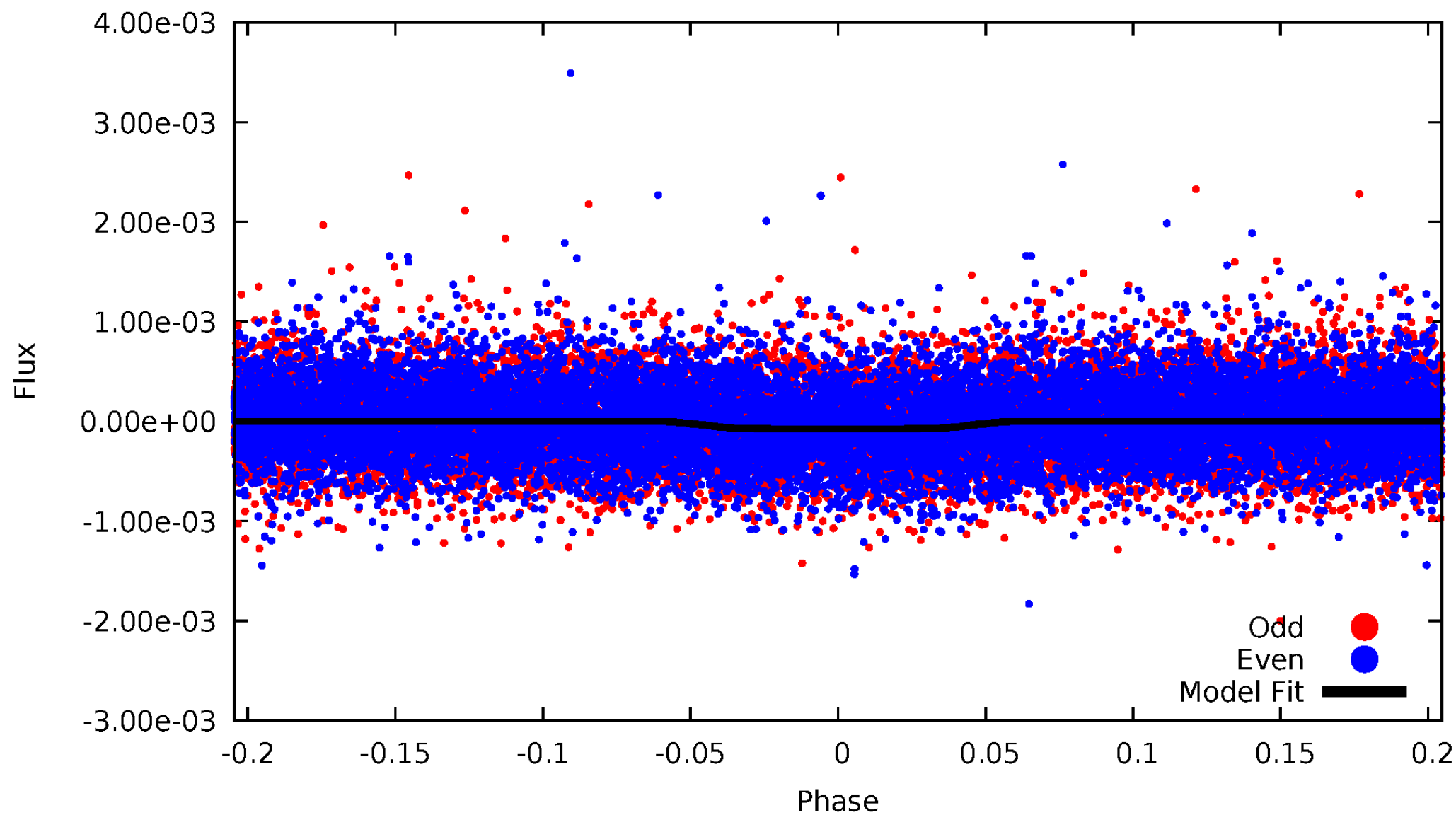


TCE 008487805-01



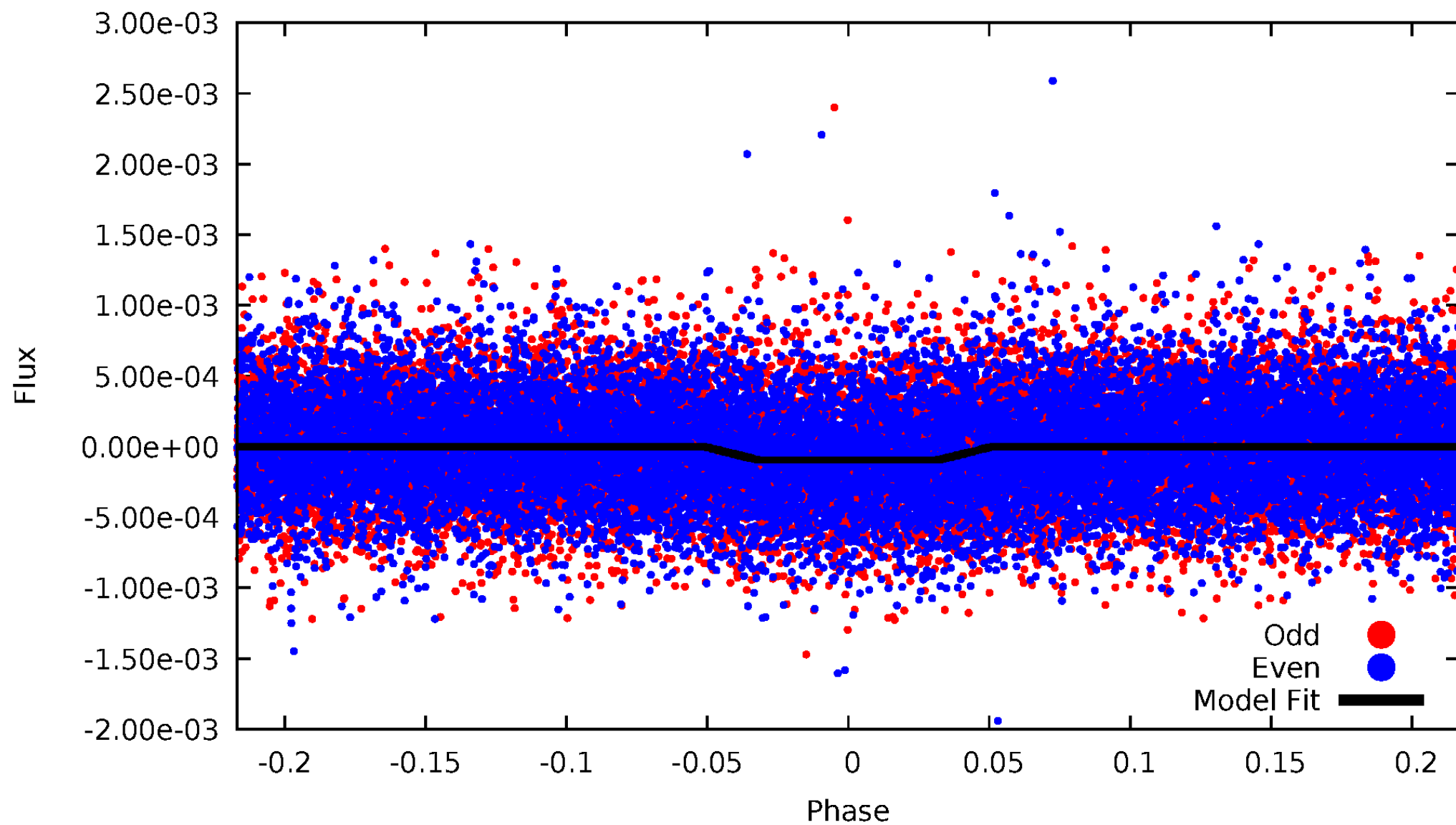
# DV Odd/Even

TCE 008487805-01



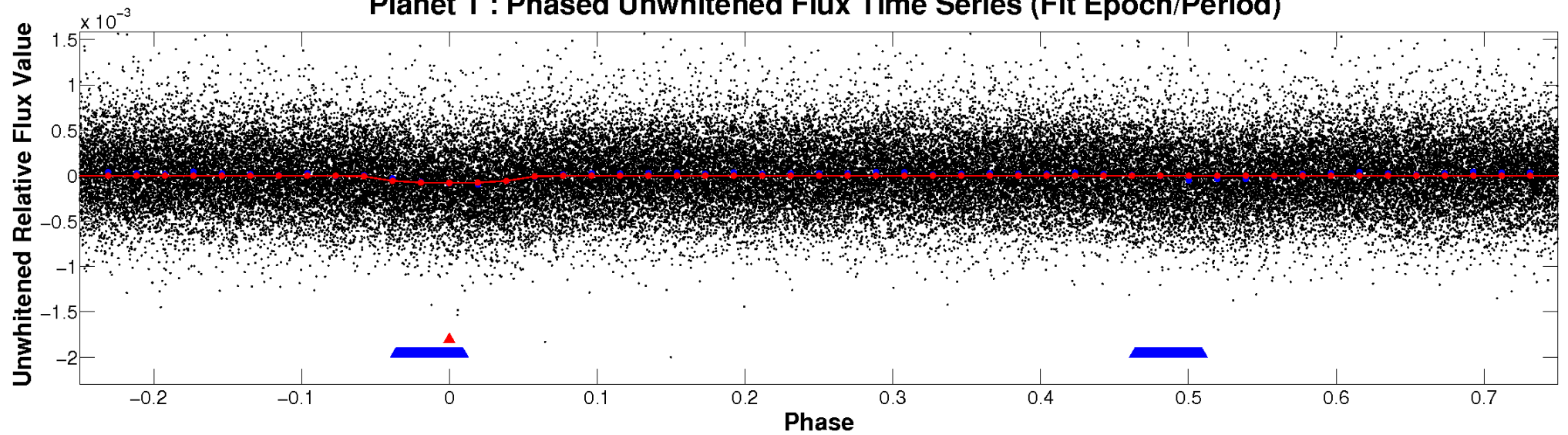
# ALT Odd/Even

TCE 008487805-01

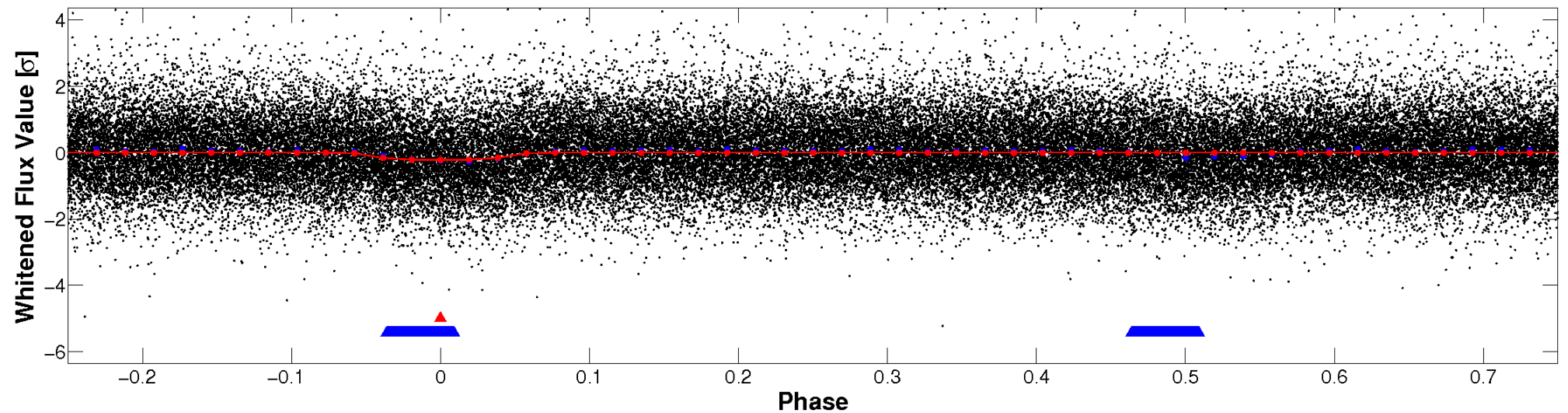


# Non-Whitened Vs. Whitened Light Curve

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



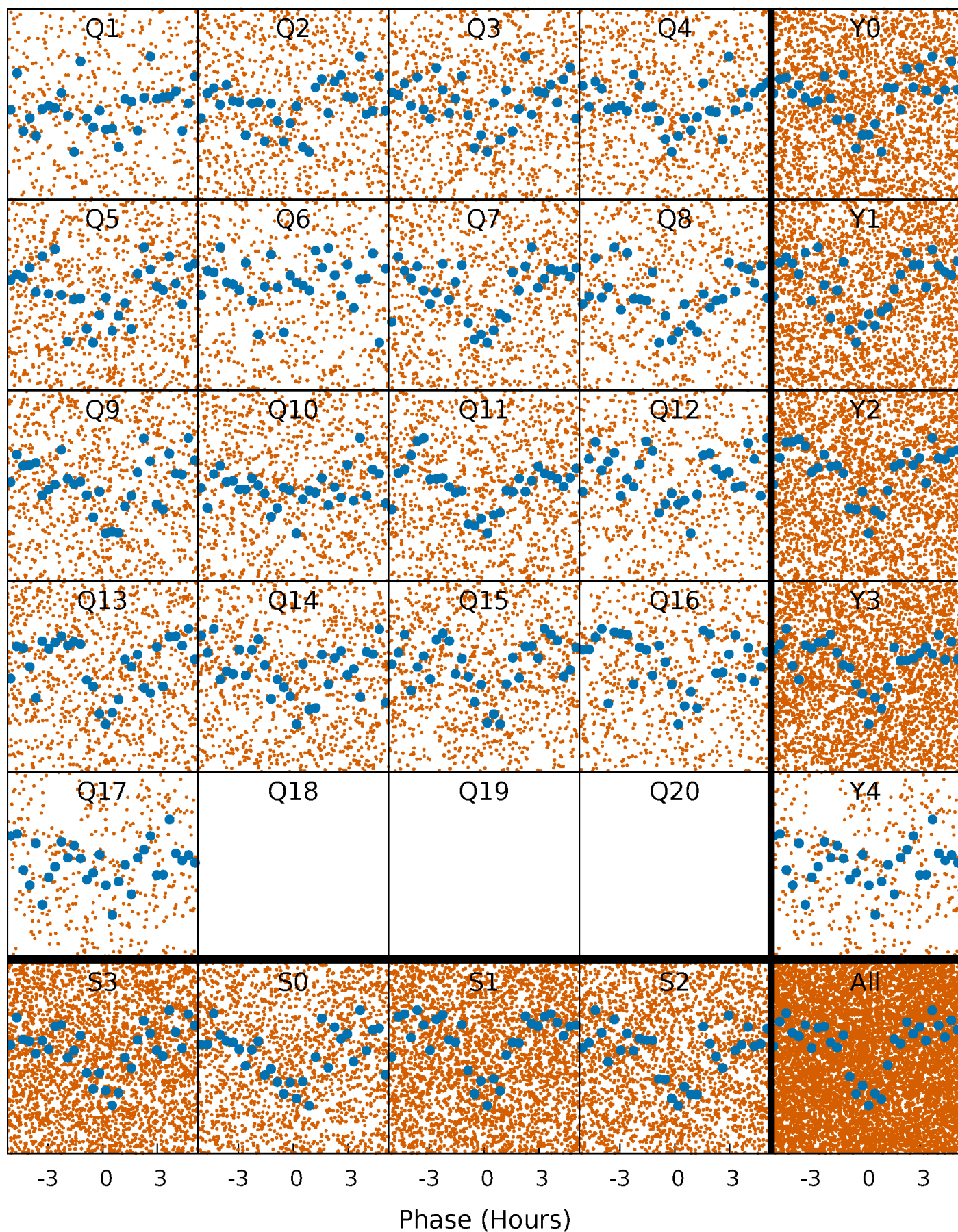
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

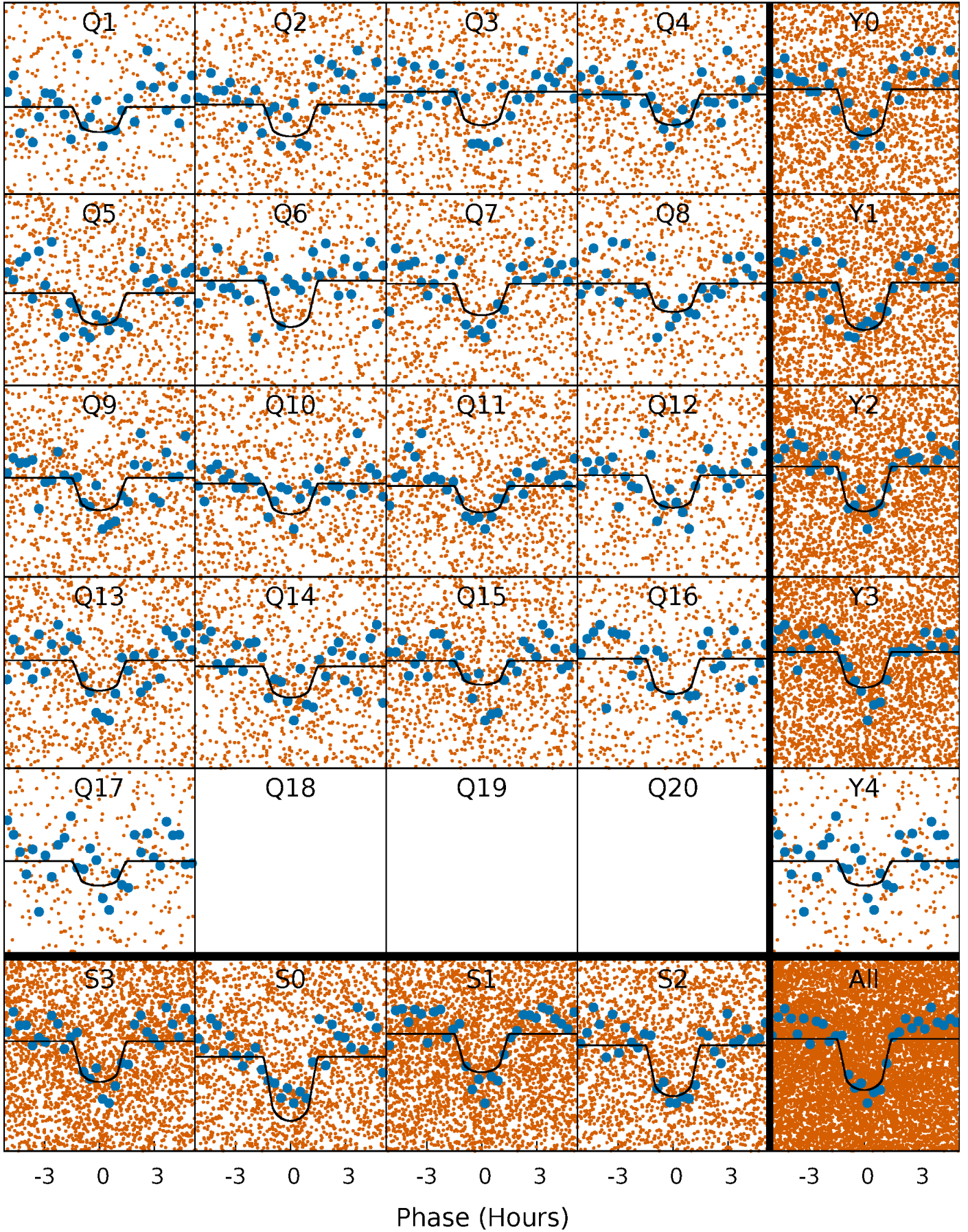
TCE 008487805-01 P= 1.061913 Days  $T_0=131.733915$  (BKJD)





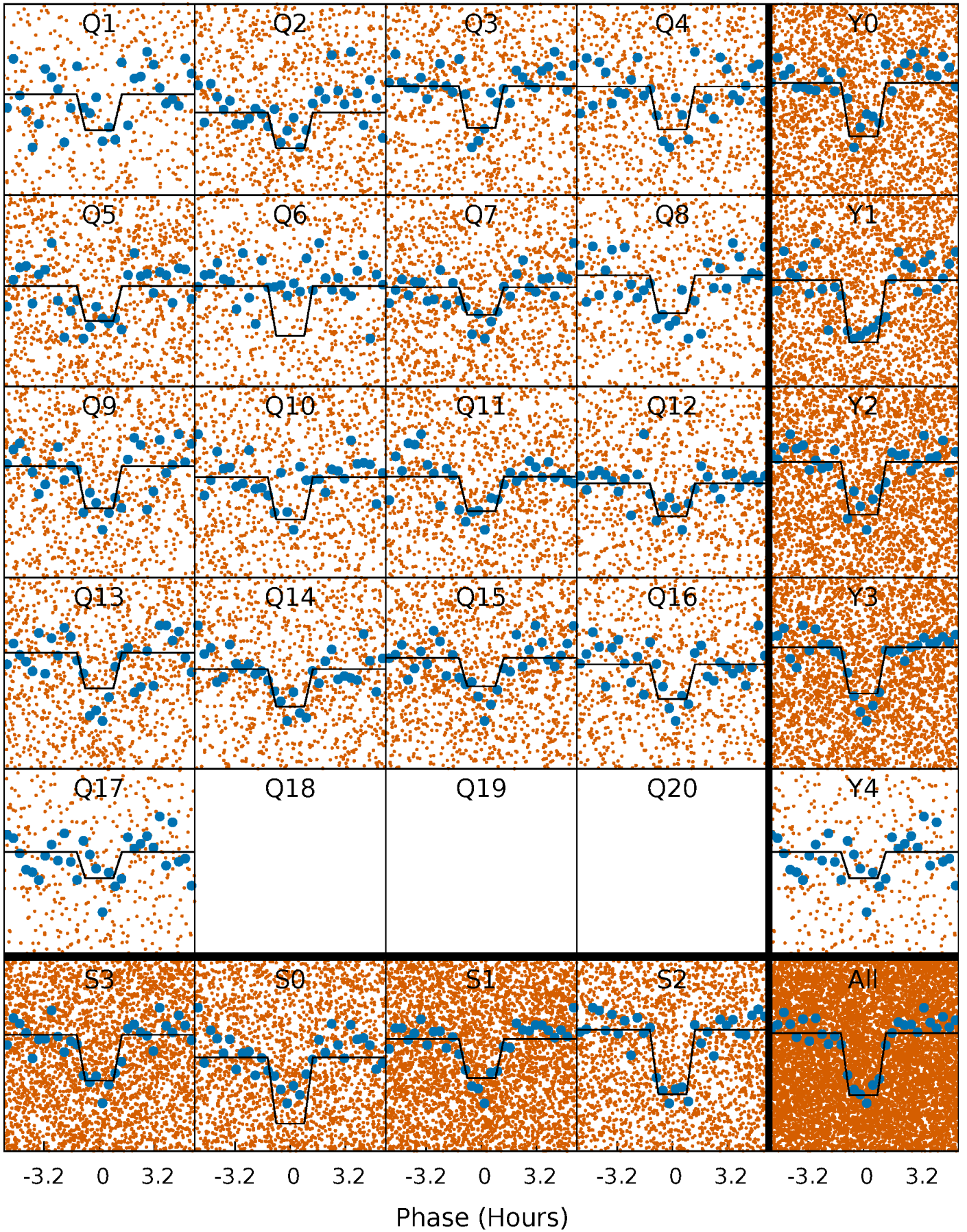
# DV Quarter-Phased Transit Curves

TCE 008487805-01 P= 1.061913 Days  $T_0=131.733915$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008487805-01 P= 1.061922 Days  $T_0=131.734782$  (BKJD)

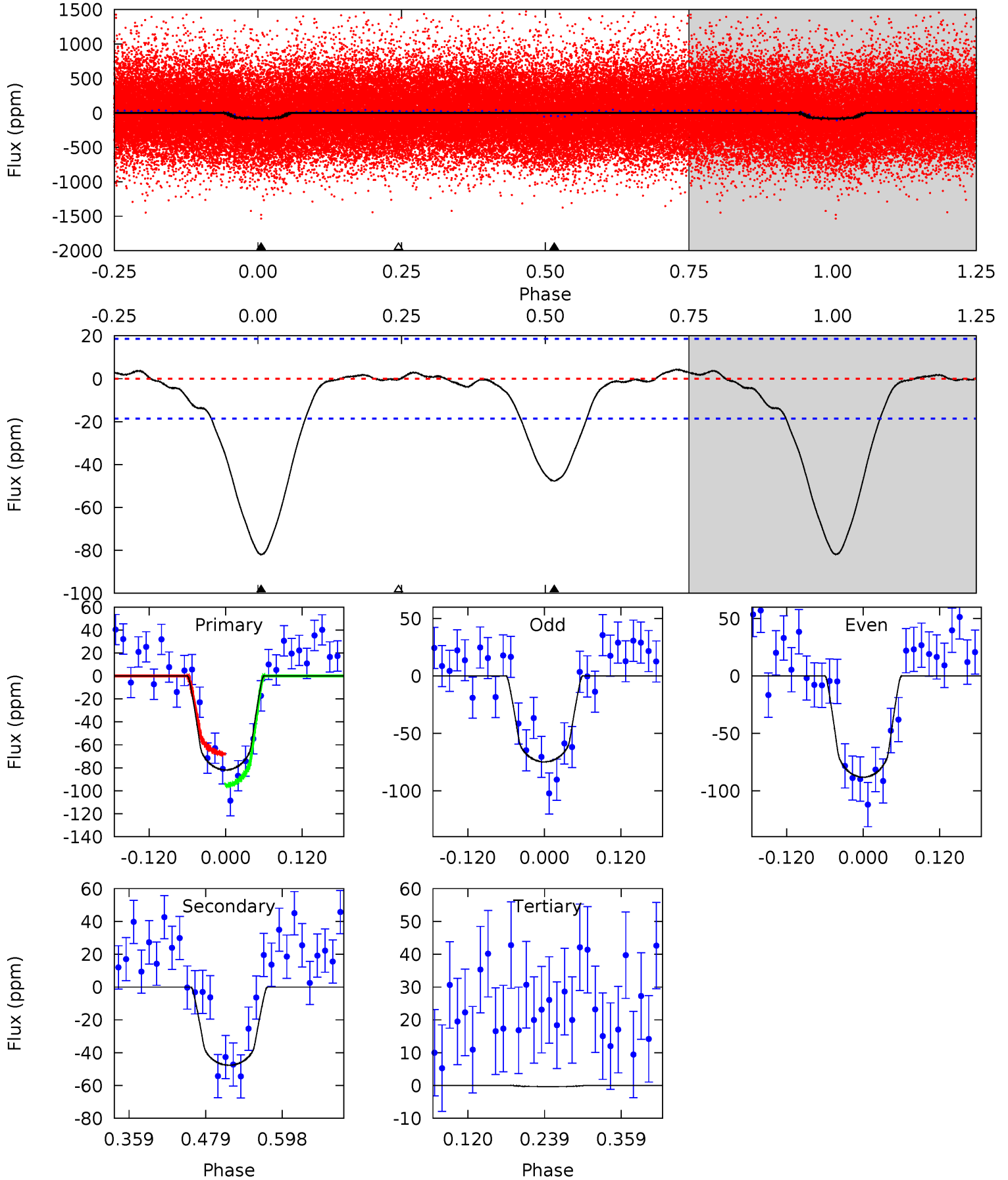




# DV Model-Shift Uniqueness Test

008487805-01, P = 1.061913 Days, E = 130.672002 Days

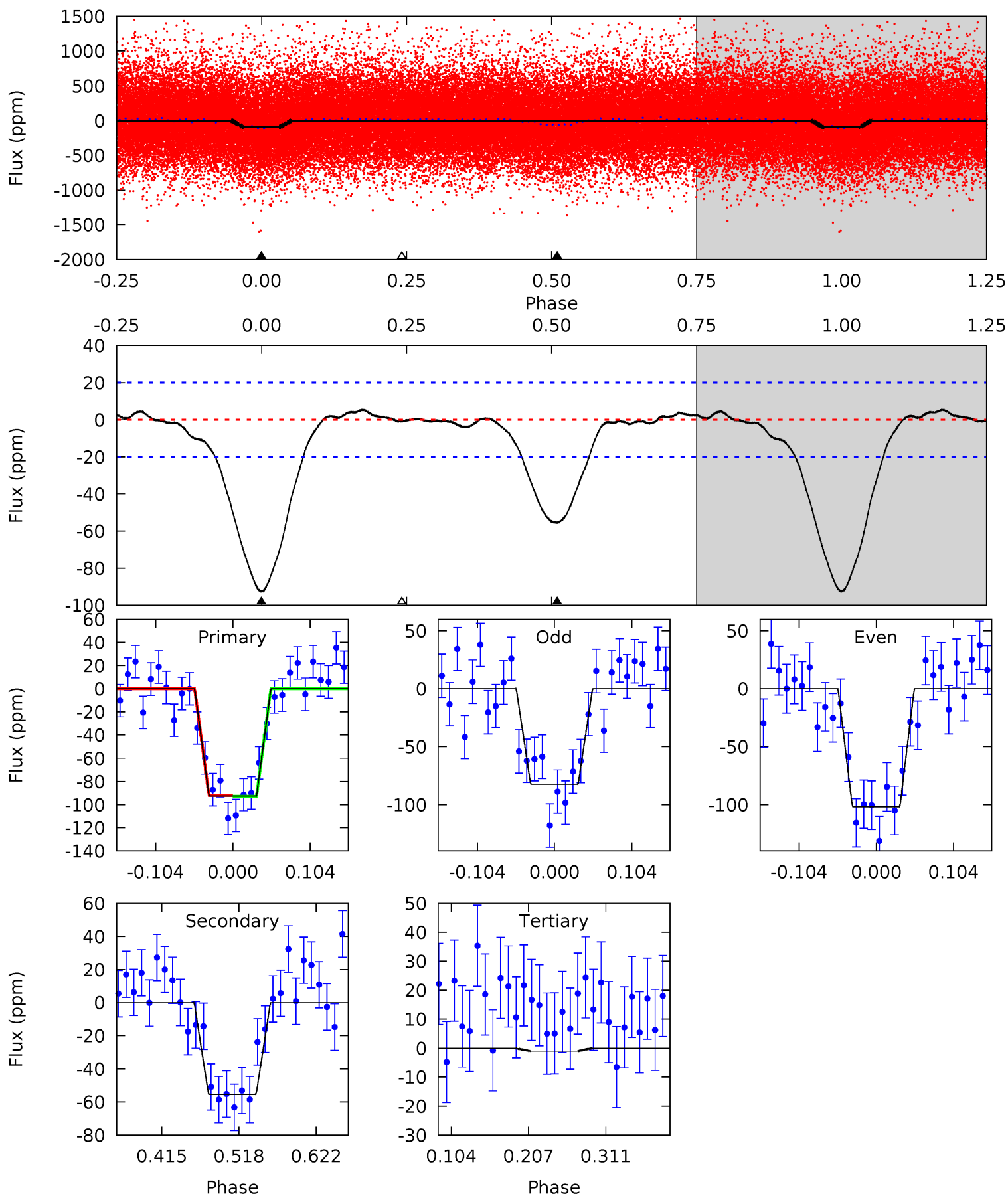
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.9	11.6	0.08	0	4.53	1.56	0.66	19.9	19.9	11.5	11.6	1.63	0.97	0.05	3.33



# Alt Model-Shift Uniqueness Test

008487805-01, P = 1.061922 Days, E = 130.672860 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
21.1	12.6	0.23	0	4.56	1.63	0.67	20.8	21.1	12.4	12.6	2.19	0.95	0.05	0.08





### Stellar Parameters For KIC 008487805

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5325^{+143}_{-159}$	$4.607^{+0.032}_{-0.097}$	$-0.220^{+0.300}_{-0.300}$	$0.750^{+0.113}_{-0.066}$	$0.840^{+0.070}_{-0.096}$	$2.803^{+0.482}_{-0.867}$
	+3%/-3%	+1%/-2%	+136%/-136%	+15%/-9%	+8%/-11%	+17%/-31%
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 008487805-01 / KOI 4206.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-48 \pm 4$	$0.85^{+0.43}_{-0.42}$	$2078^{+82}_{-73}$	$4501^{+1591}_{-649}$	$13^{+36}_{-8}$
Alt.	$-56 \pm 4$	$0.84^{+0.42}_{-0.42}$	$2082^{+87}_{-78}$	$4692^{+1731}_{-699}$	$15^{+47}_{-8}$

$T_{\text{max}}$  = 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

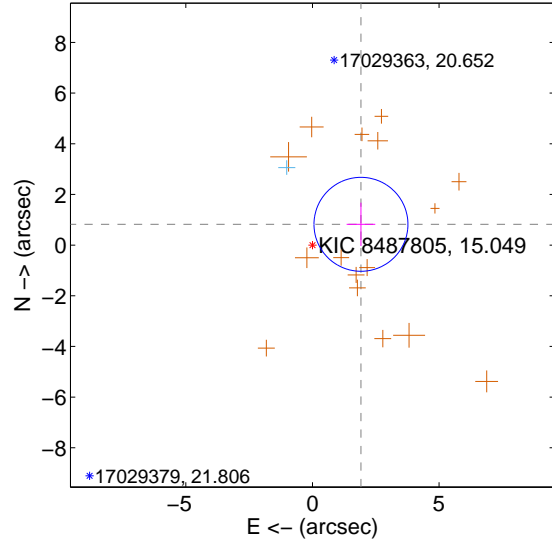
Supplemental centroid analysis for 008487805-01. Kepler magnitude: 15.05. Transit SNR 14.77

There are 1 quarters with good PRF difference image offsets

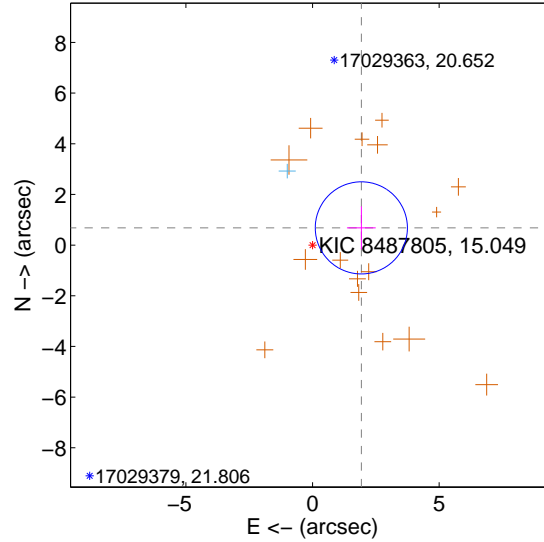
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.083 \pm 0.618$	3.37	$-1.915 \pm 0.564$	$0.821 \pm 0.854$
PRF-fit source offset from KIC position	$2.043 \pm 0.606$	3.37	$-1.927 \pm 0.568$	$0.680 \pm 0.850$
photometric centroid source offset	$4.10 \pm 1.29$	3.18	$-3.67 \pm 1.31$	$1.82 \pm 1.22$

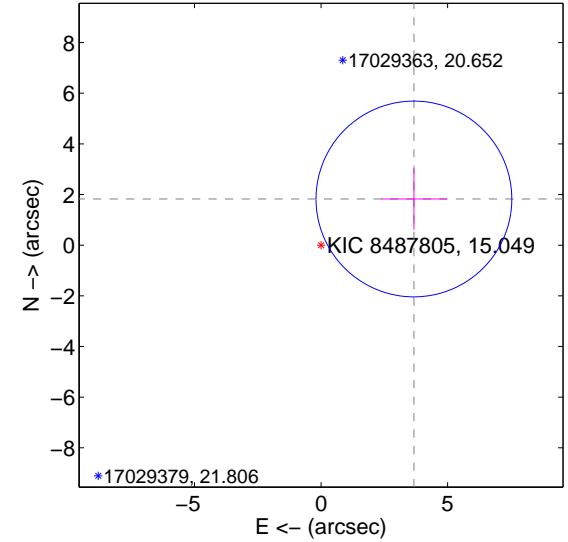
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

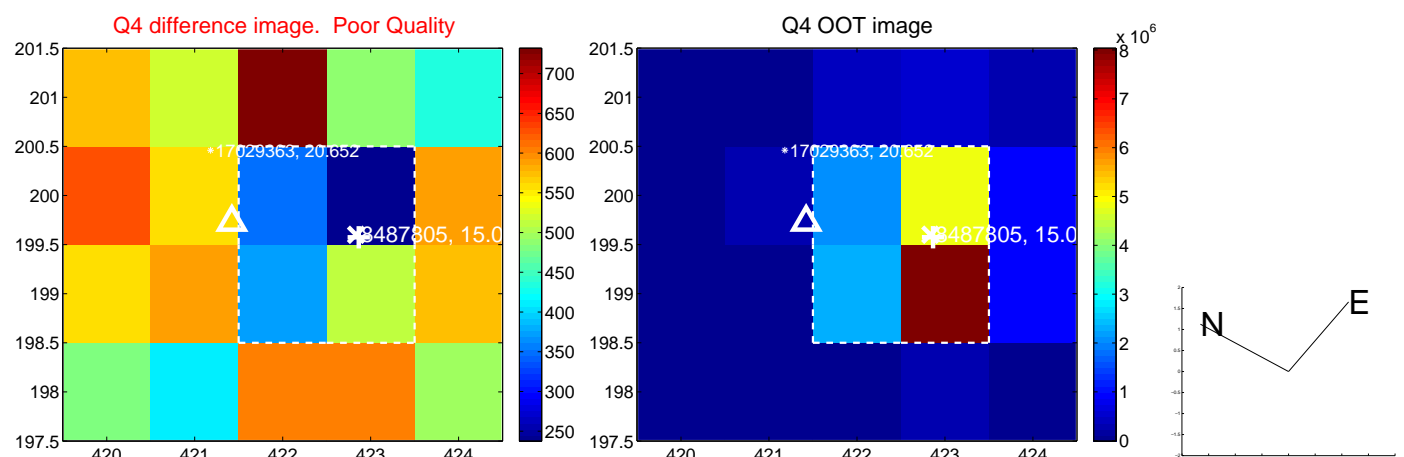
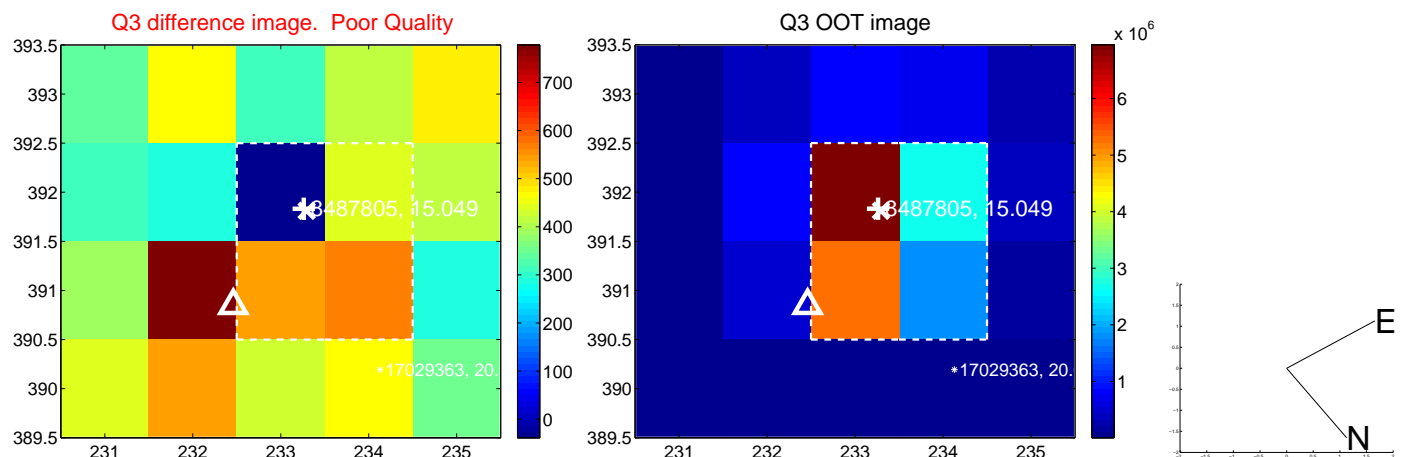
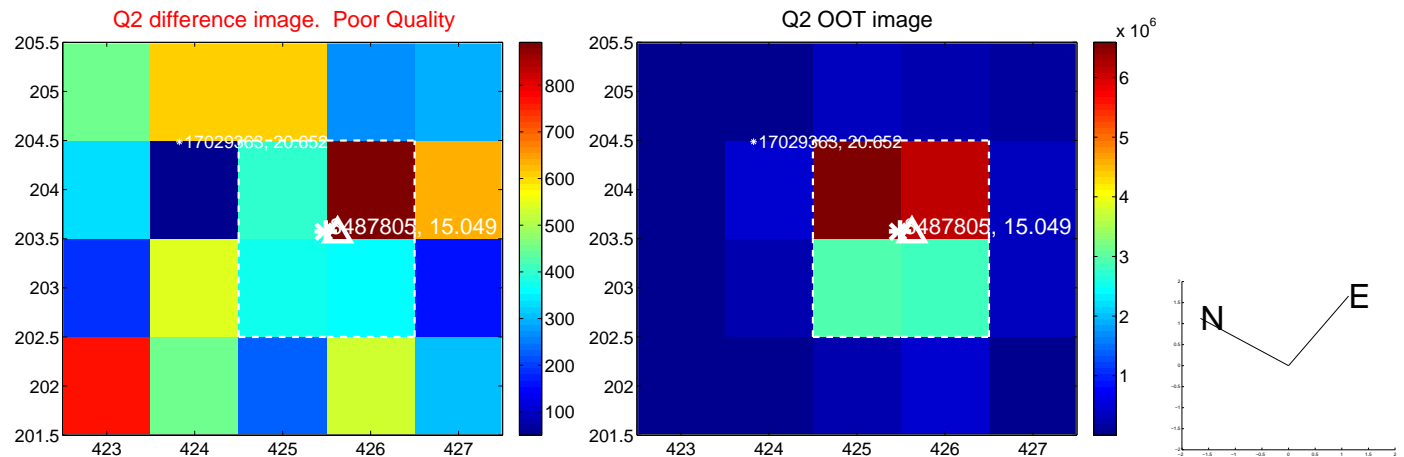
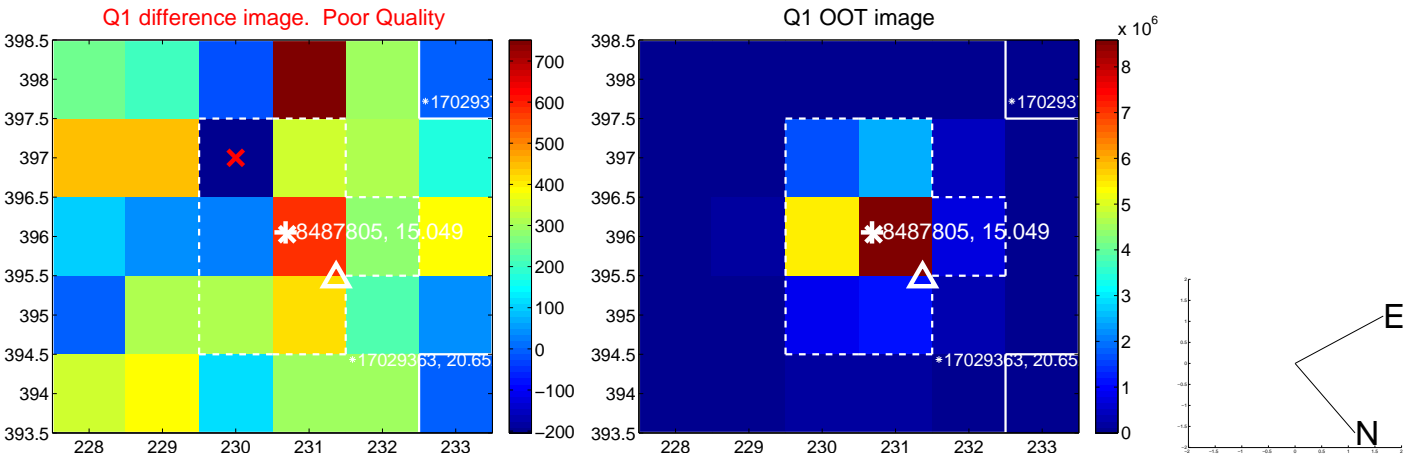


offset from photometric centroids

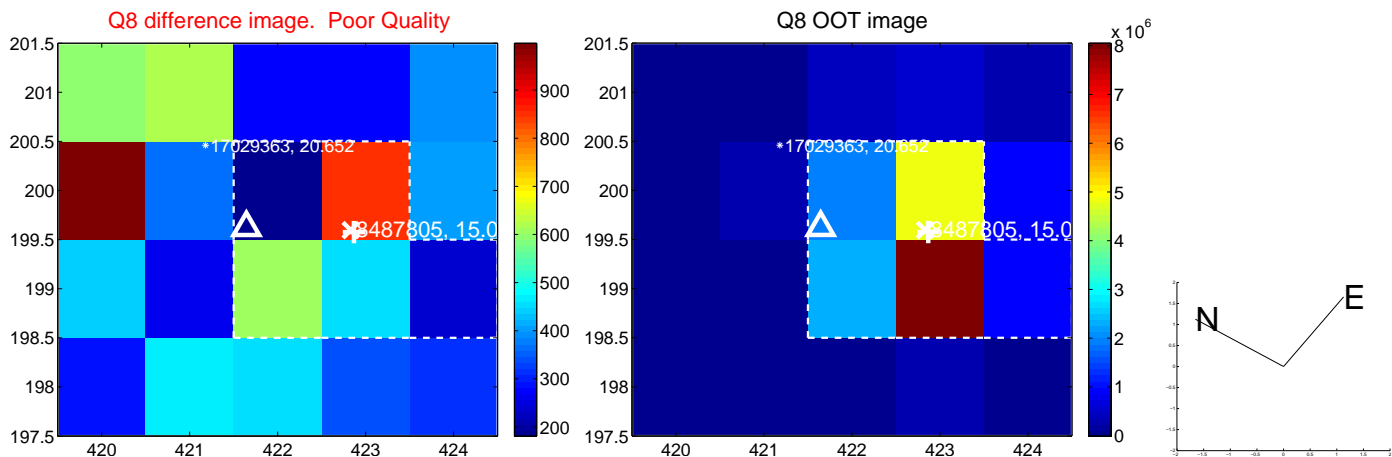
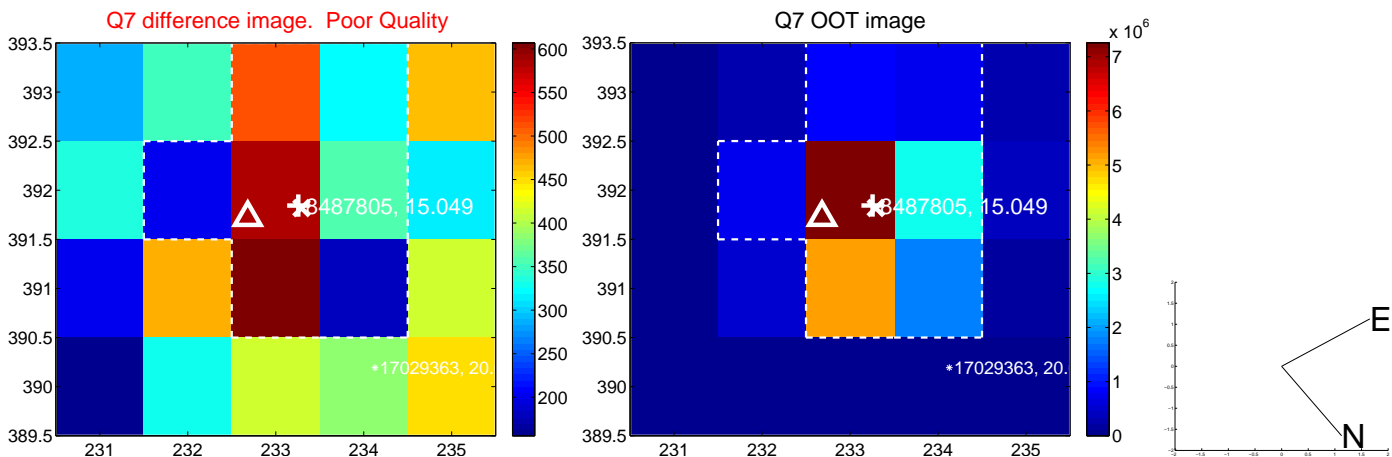
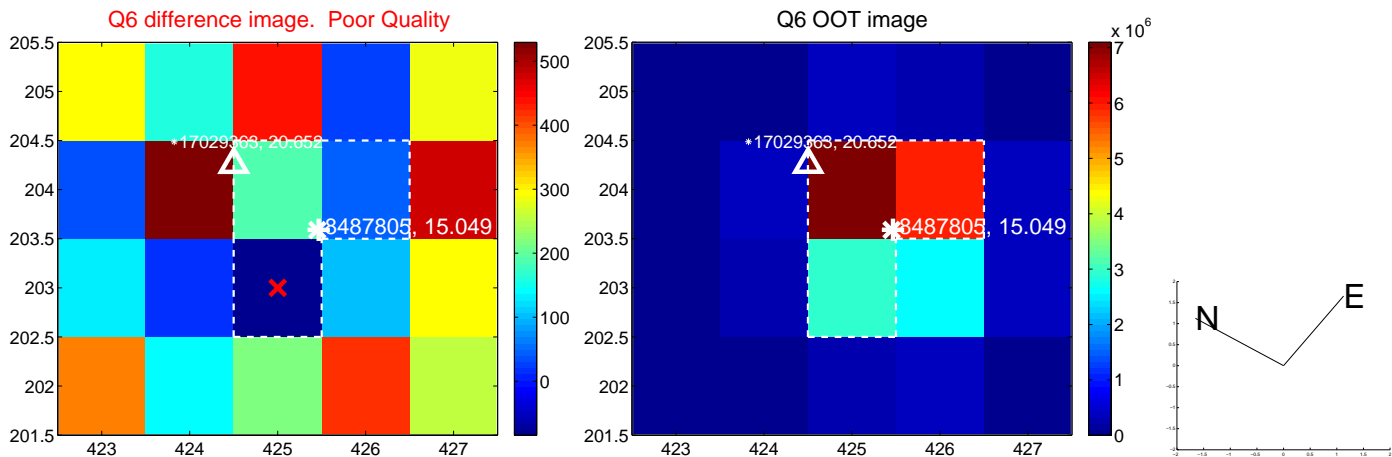
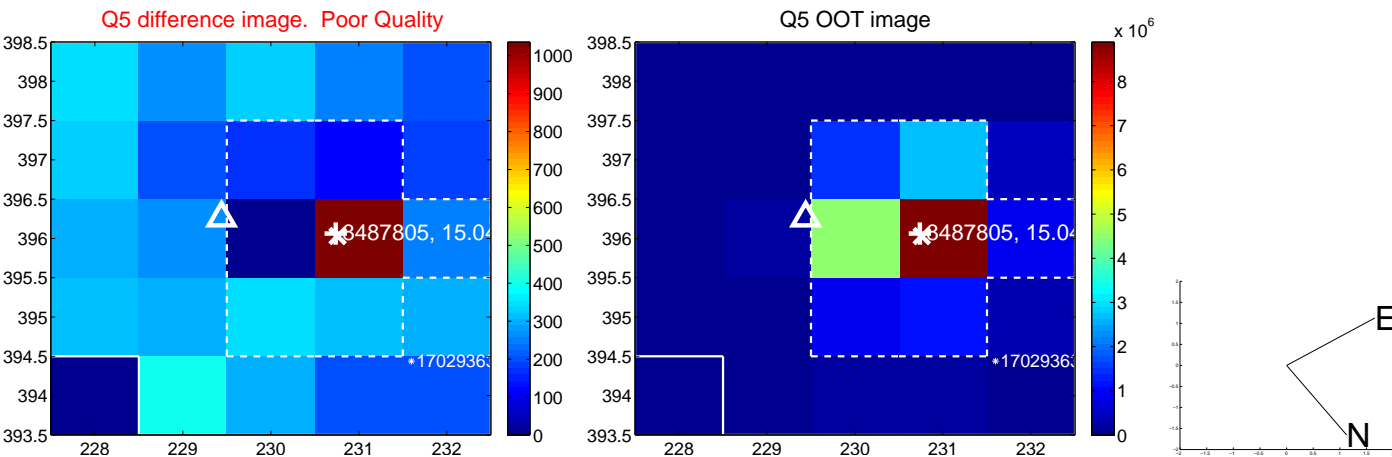


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

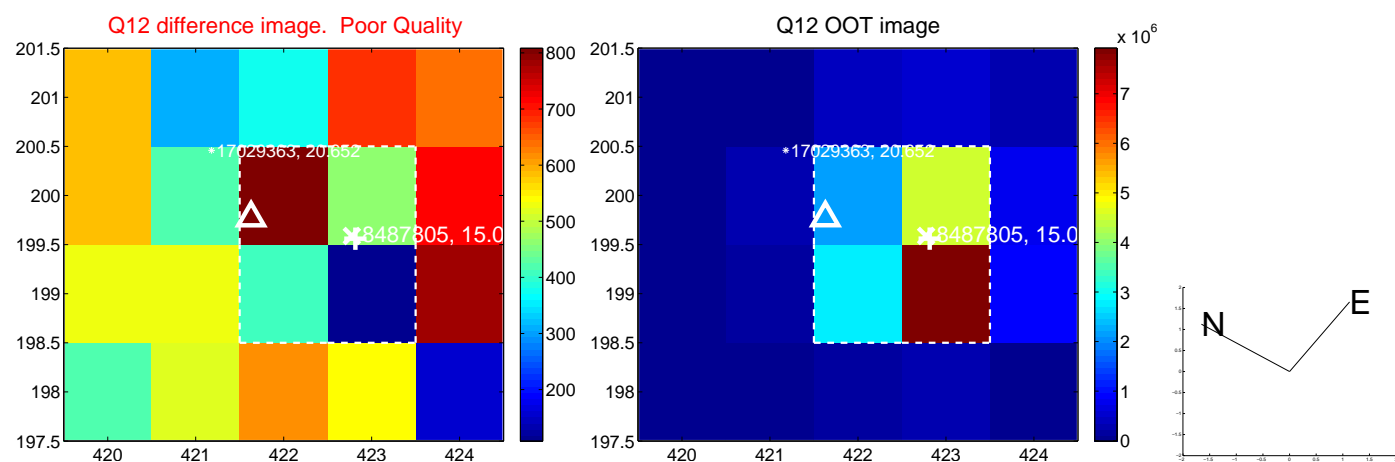
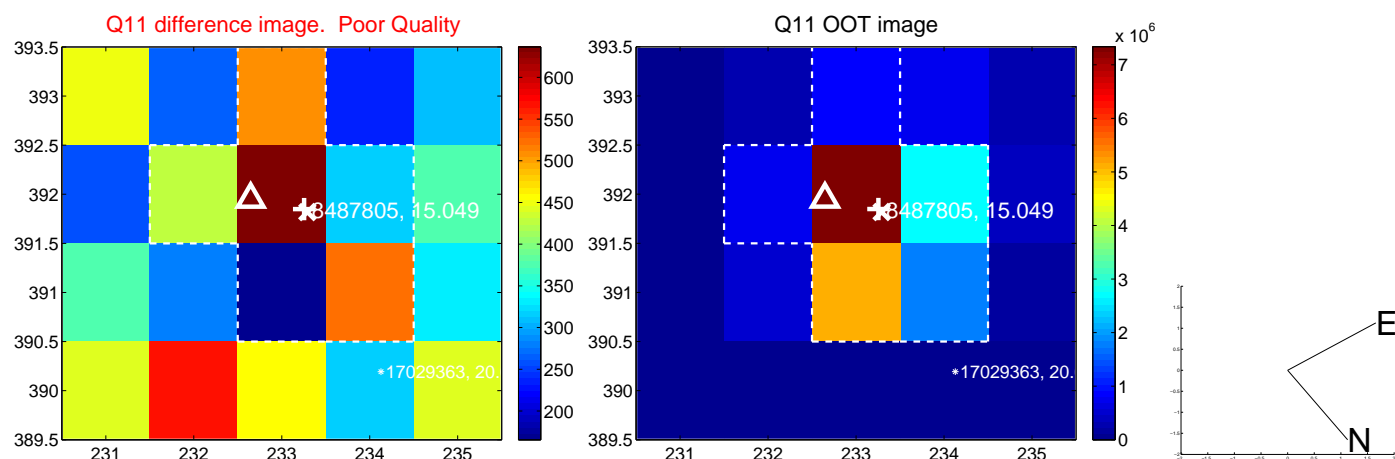
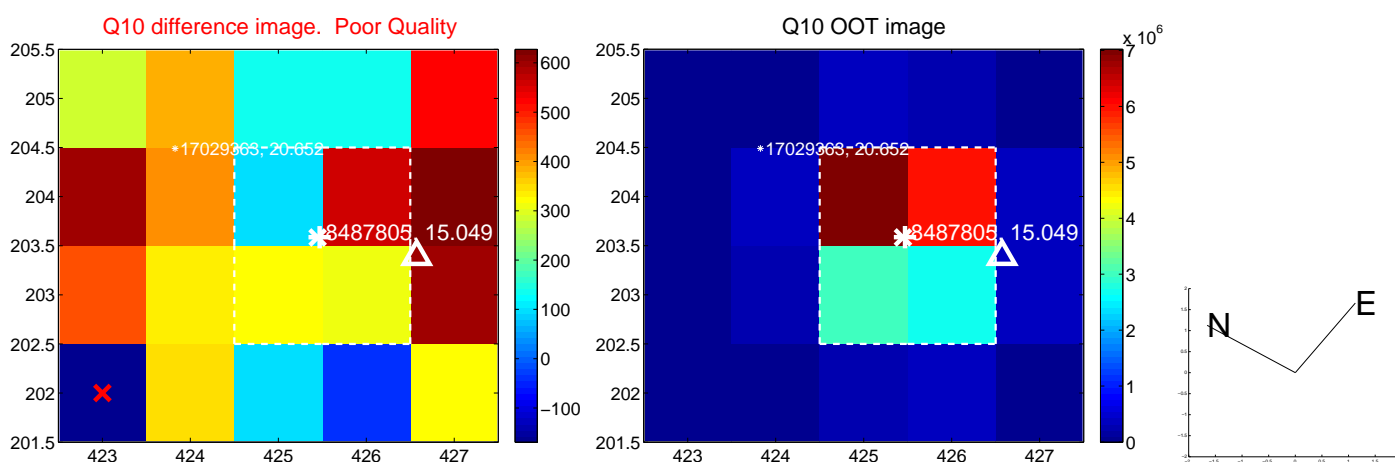
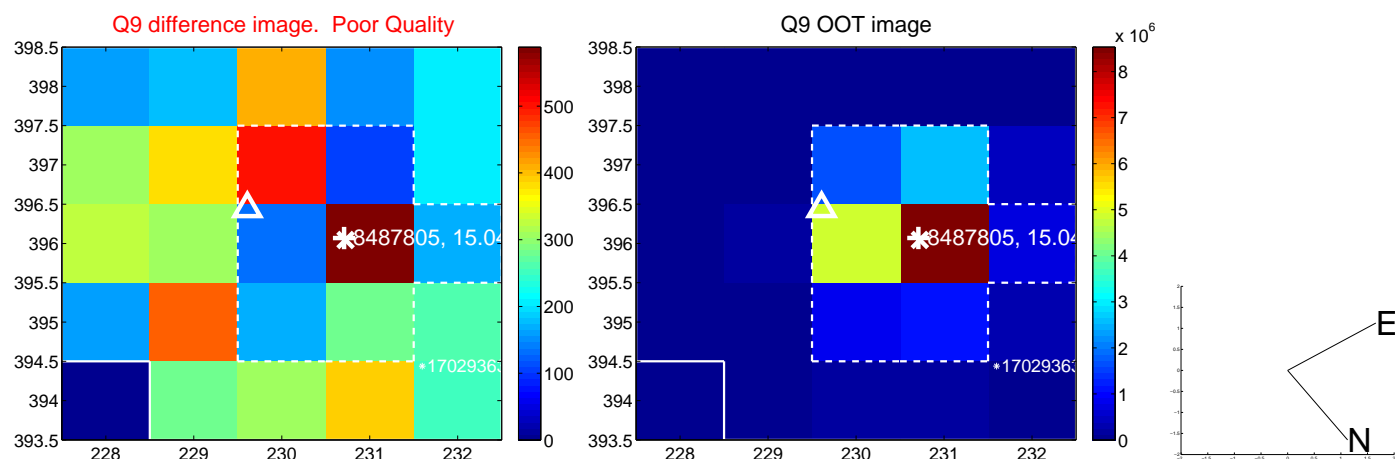


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

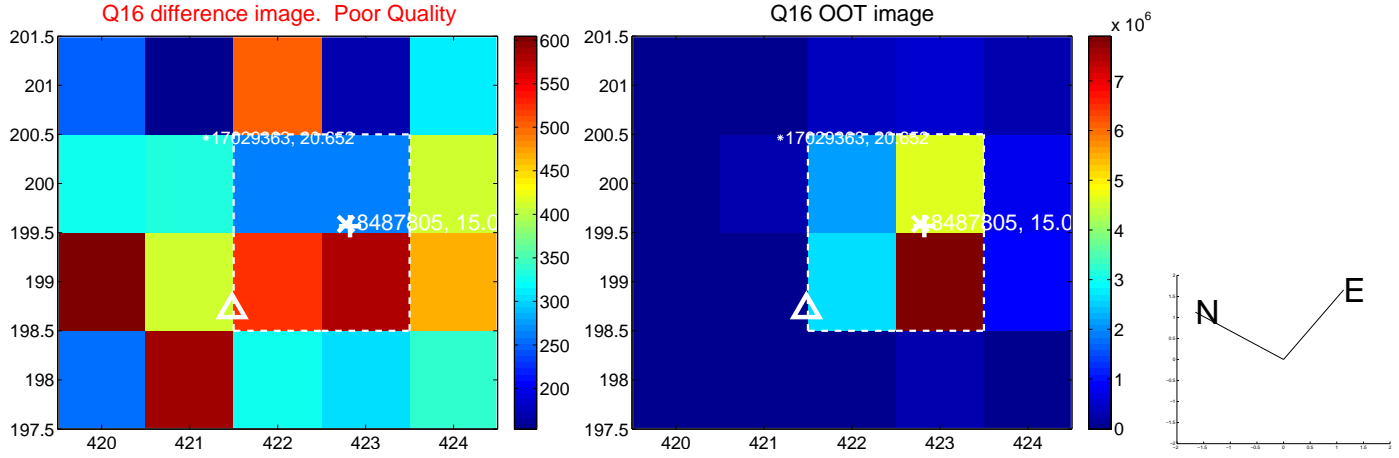
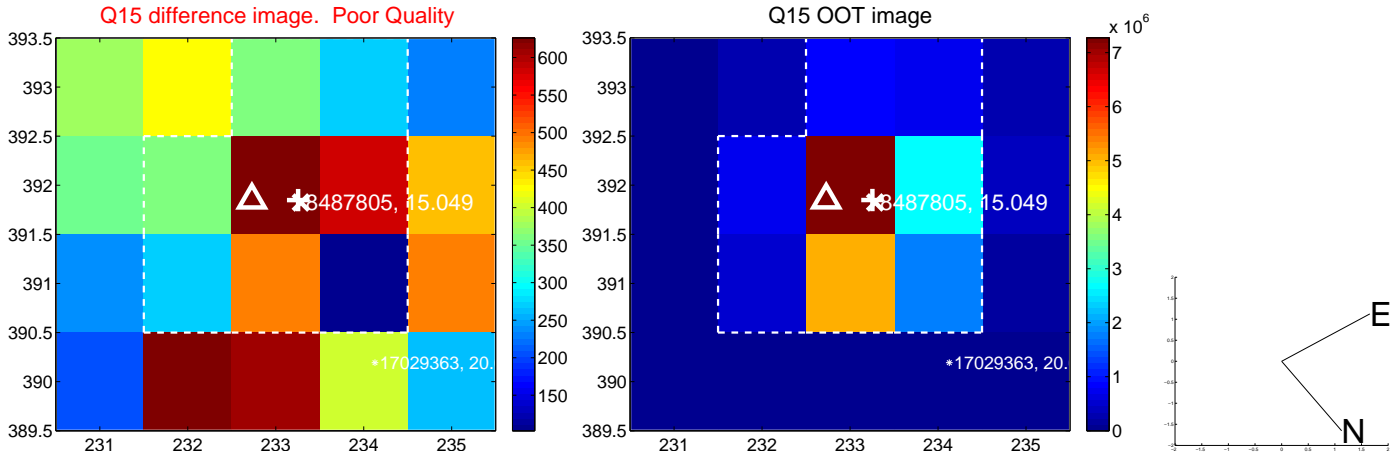
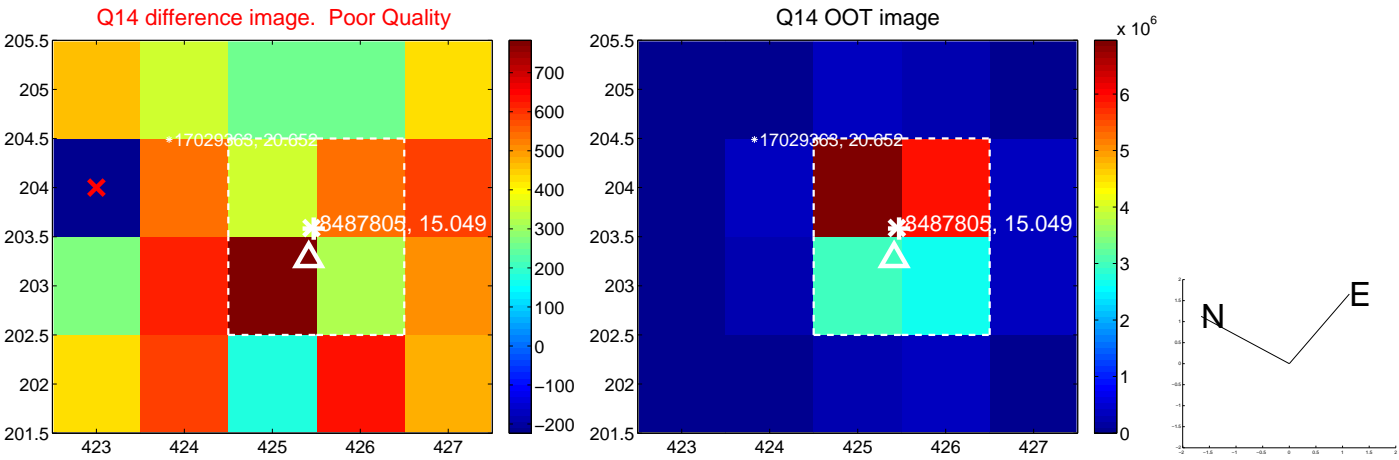
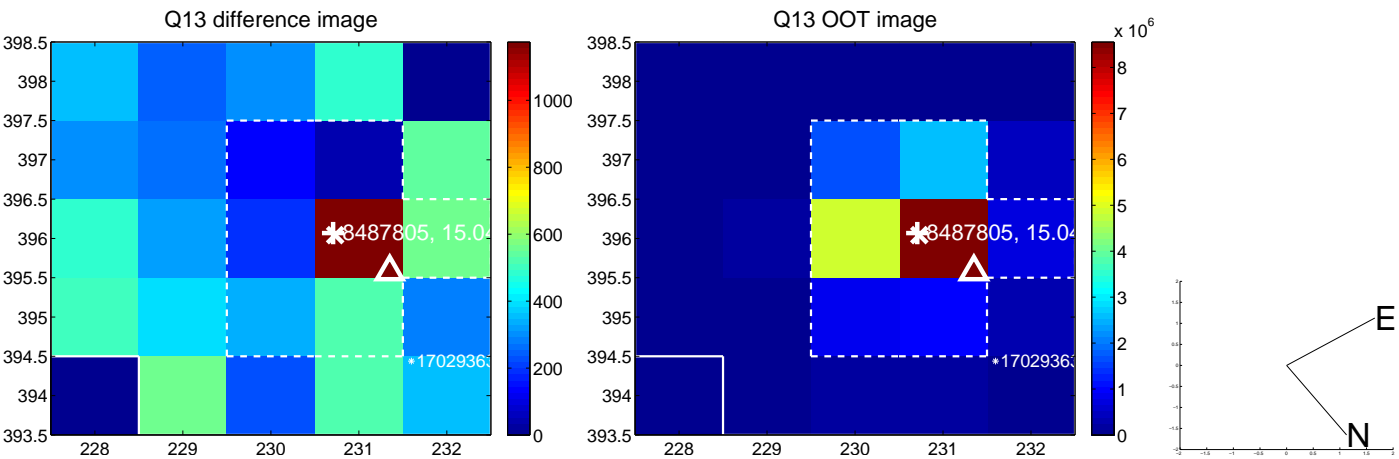




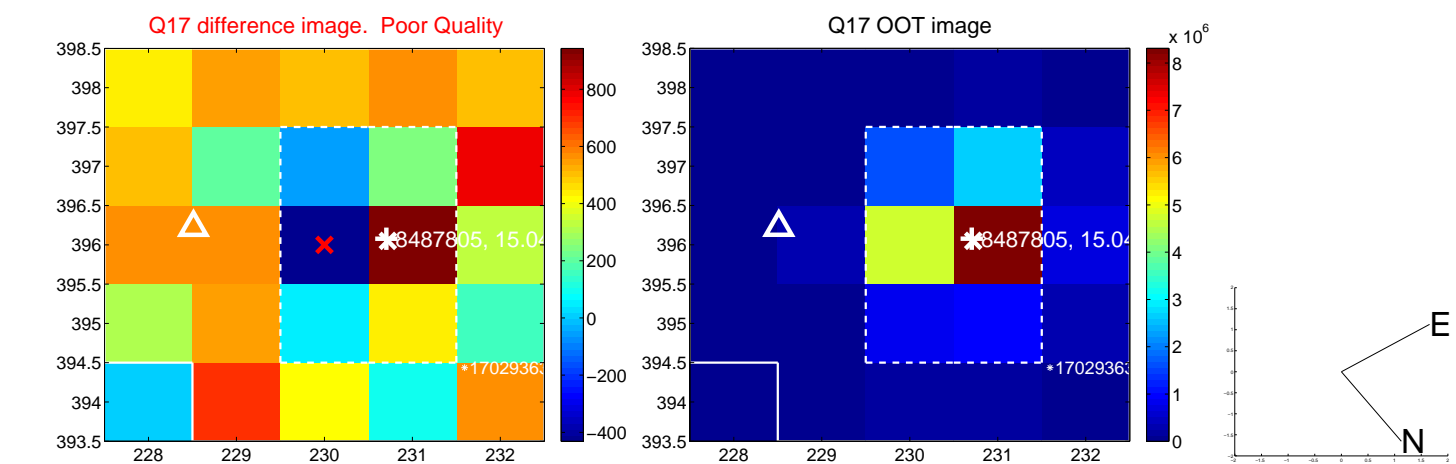
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



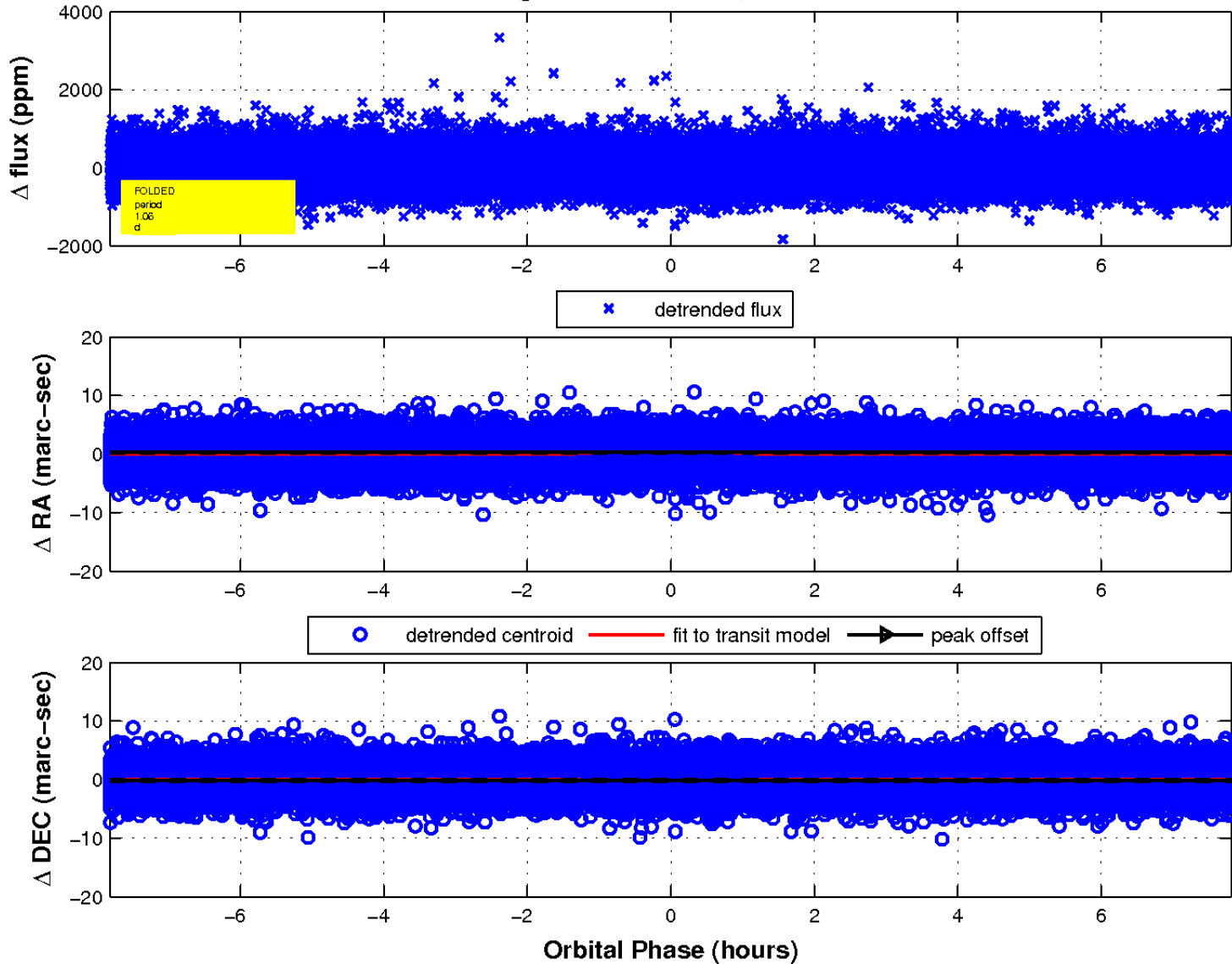
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

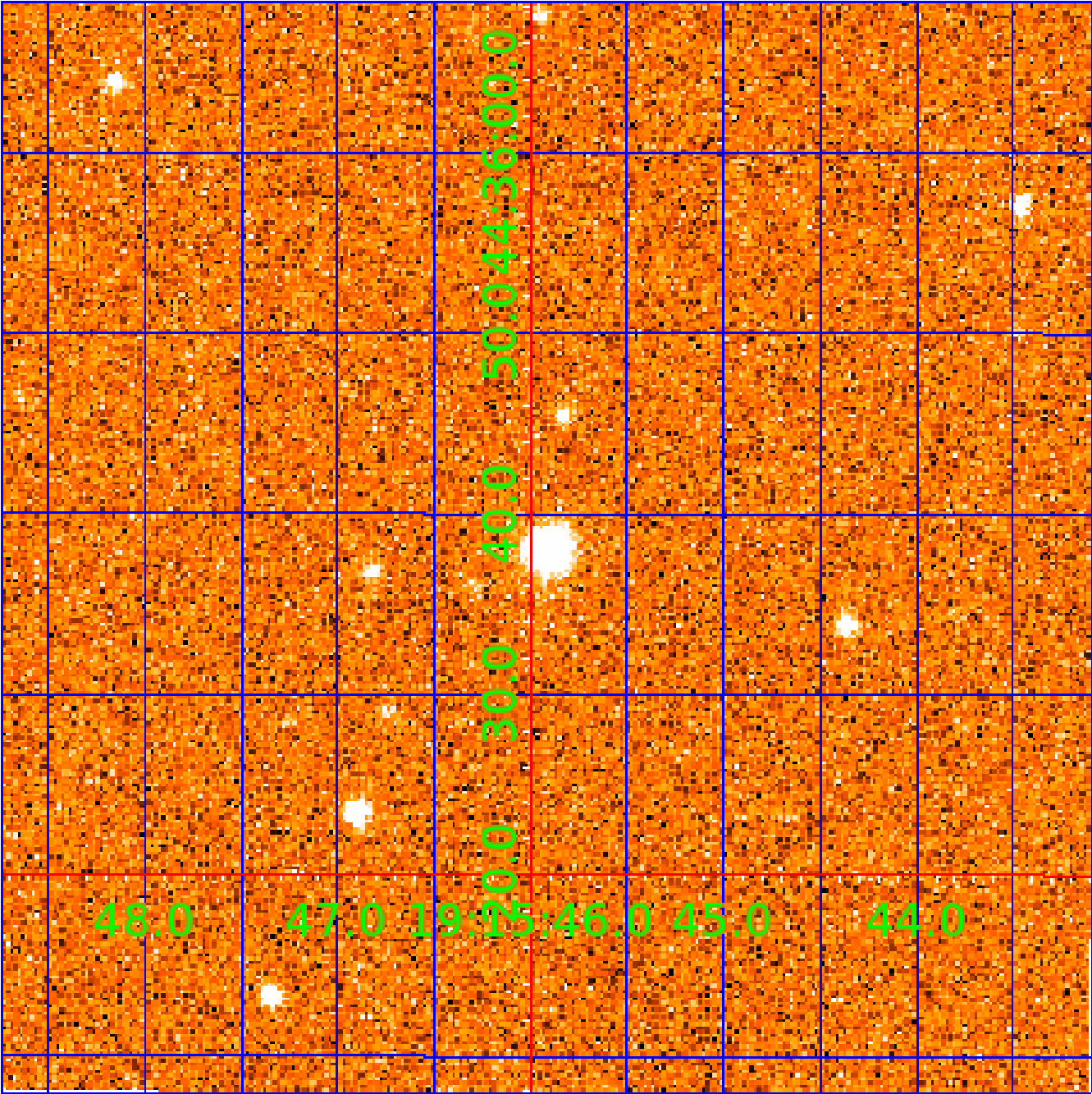


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 008487805

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008487805-01	OBS	4206.01	1.061913	131.733915	78.9	2.607	16.1	14.8	0.75	5325	0.80	1105.17
008487805-02	OBS	No	0.530939	131.743686	34.2	4.063	10.1	8.2	0.75	5325	0.45	2784.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008487805-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—HALO_GHOST—EPHEM_MATCH
008487805-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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.

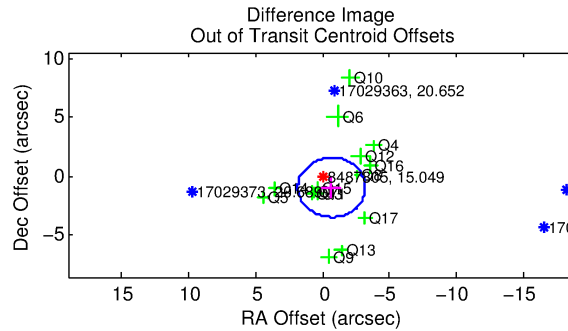
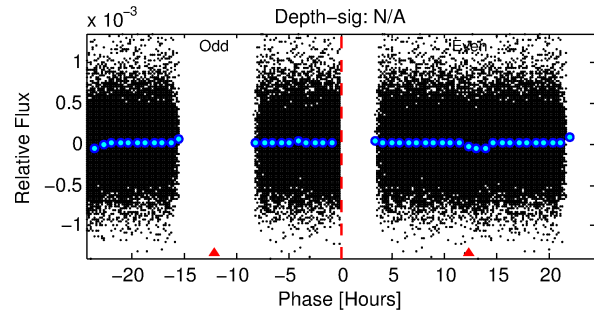
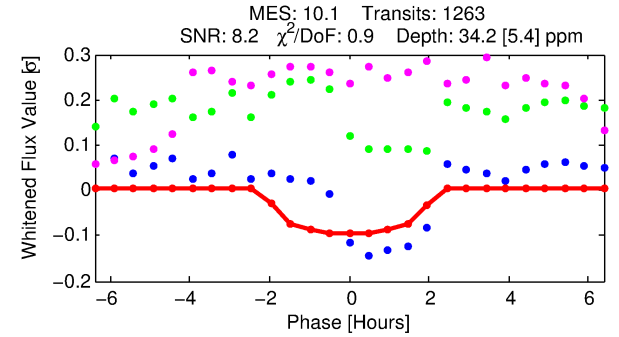
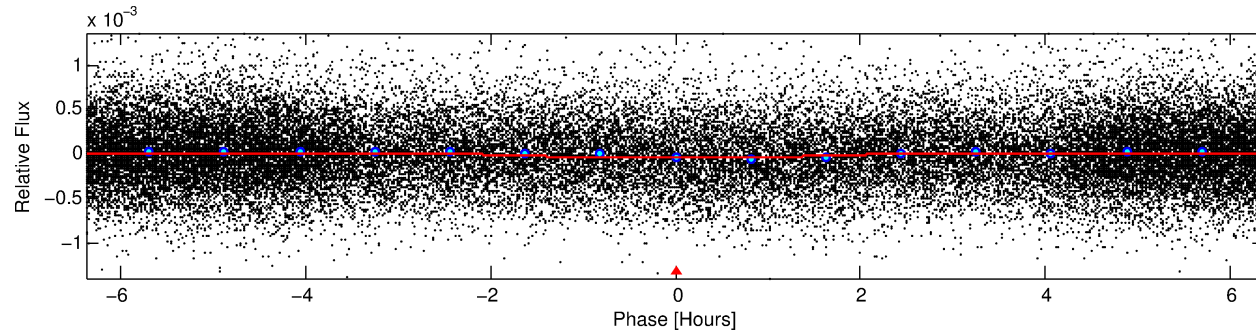
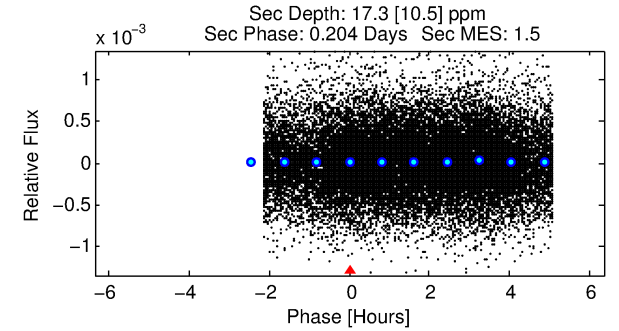
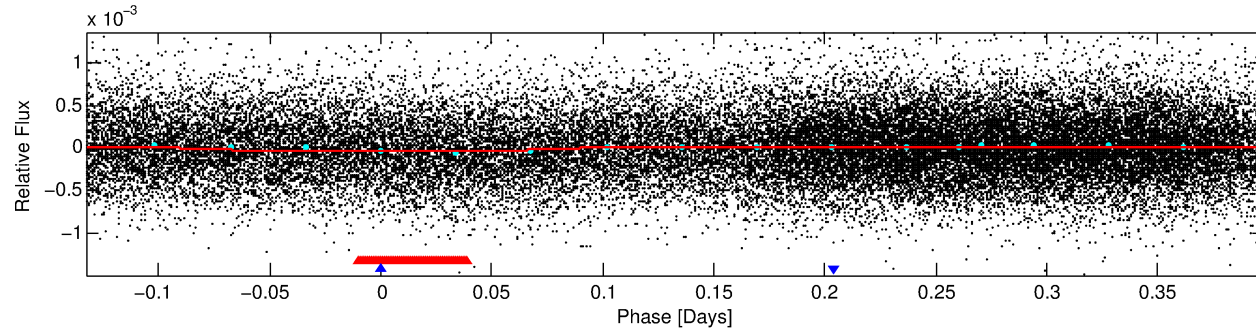
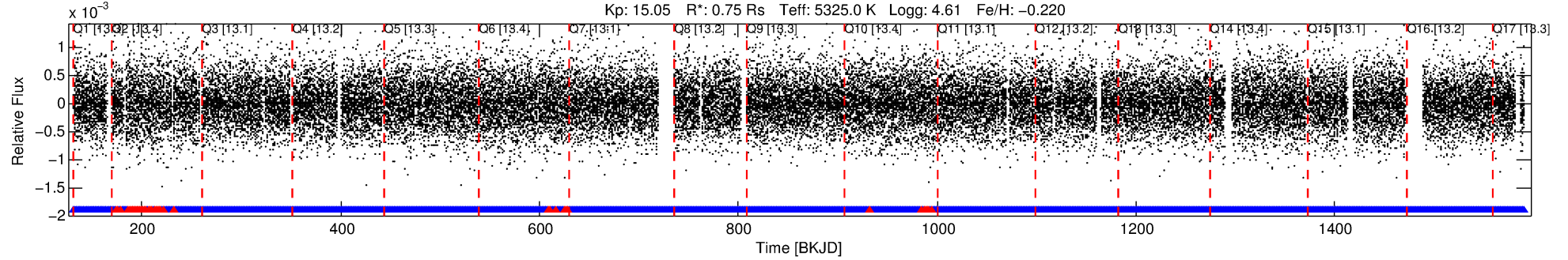
## Ephemeris Match Information For 008487805-02

No Significant Match Found

# DV One-Page Summary

KIC: 8487805 Candidate: 2 of 2 Period: 0.531 d

KOI: K04206 Corr: No Ephemeris Match



## DV Fit Results:

Period = 0.53094 [0.00001] d  
Epoch = 131.7437 [0.0063] BKJD  
Rp/R\* = 0.0054 [0.0082]  
a/R\* = 1.15 [1.62]  
b = 0.50 [9.02]  
Seff = 2784.97 [600.71]  
Teff = 1852 [100] K  
Rp = 0.45 [0.68] Re  
a = 0.0121 [0.0015] AU  
Ag = 7.00 [21.60] [0.28σ]  
Teffp = 4658 [3592] K [0.78σ]

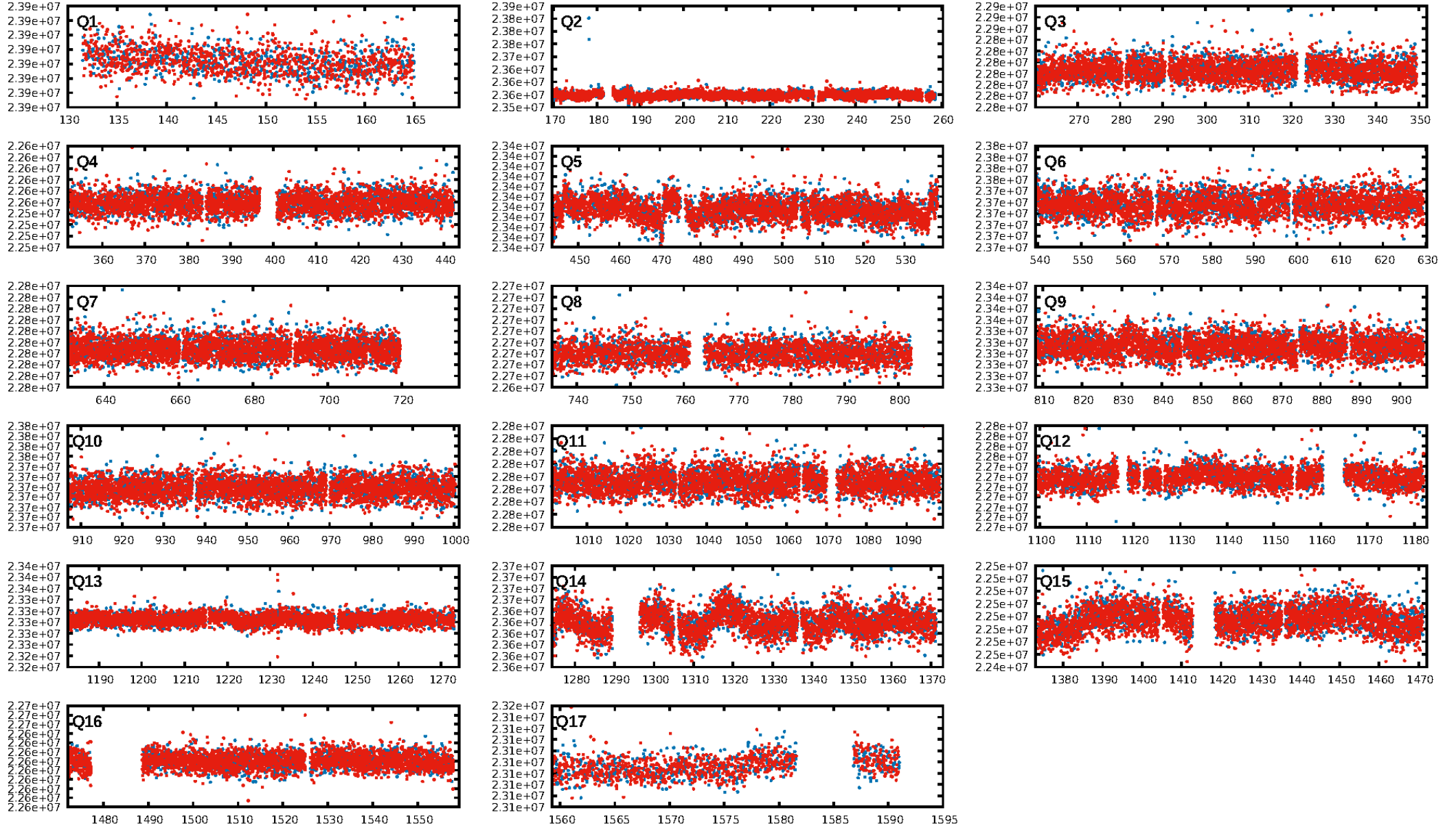
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 99.2% [2.64σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 8.59e-09**  
RollingBand-fgt: 0.96 [1160/1207]  
GhostDiagnostic-chr: -5.361  
Centroid-sig: 32.2%  
Centroid-so: 1.159 arcsec [0.69σ]  
OotOffset-rm: 1.150 arcsec [1.37σ]  
KicOffset-rm: 1.295 arcsec [1.53σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 0.33 [5/15]  
DiffImageOverlap-fno: 1.00 [17/17]

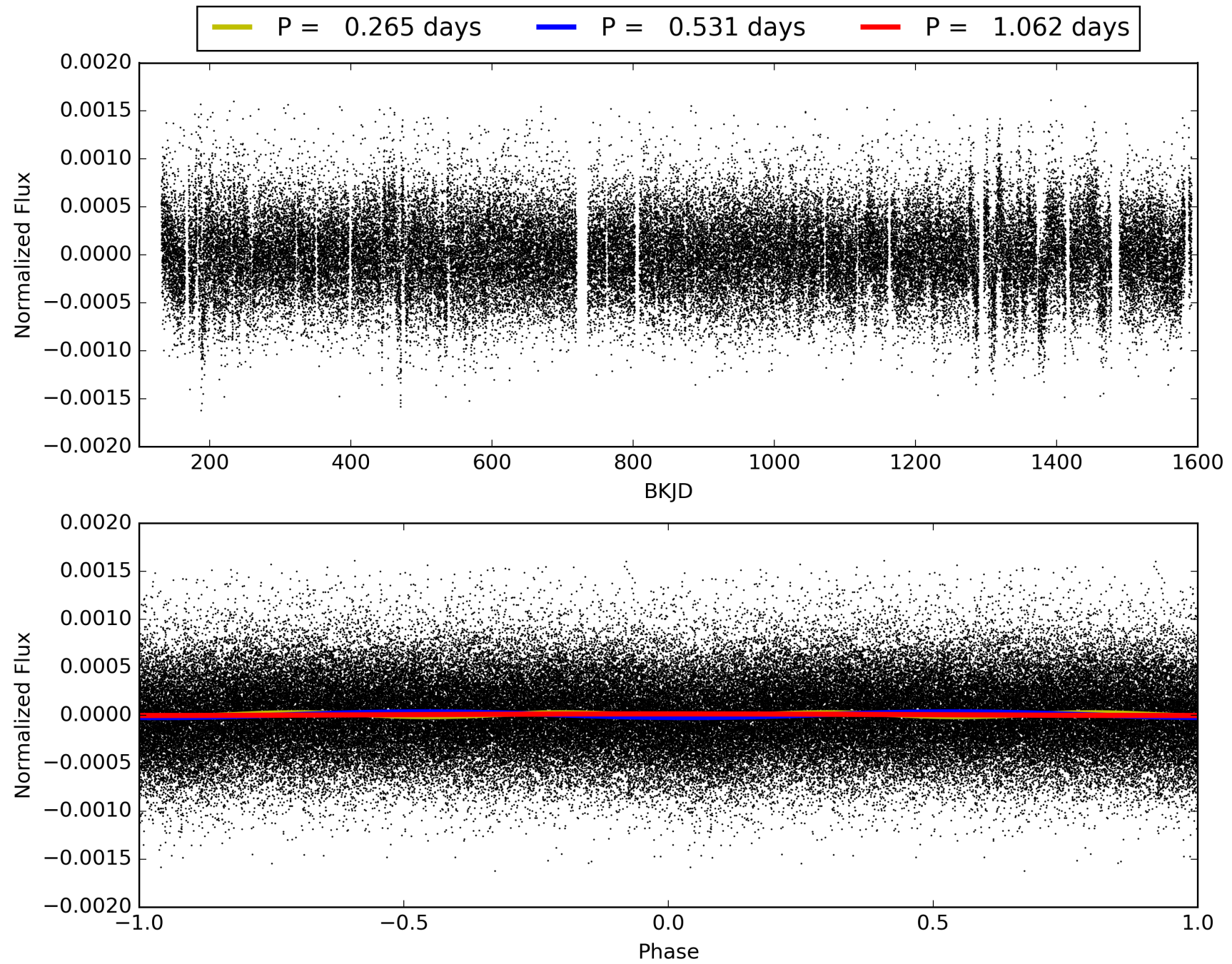
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:32:37 Z

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

# TCE 008487805-02, PDC Light Curves



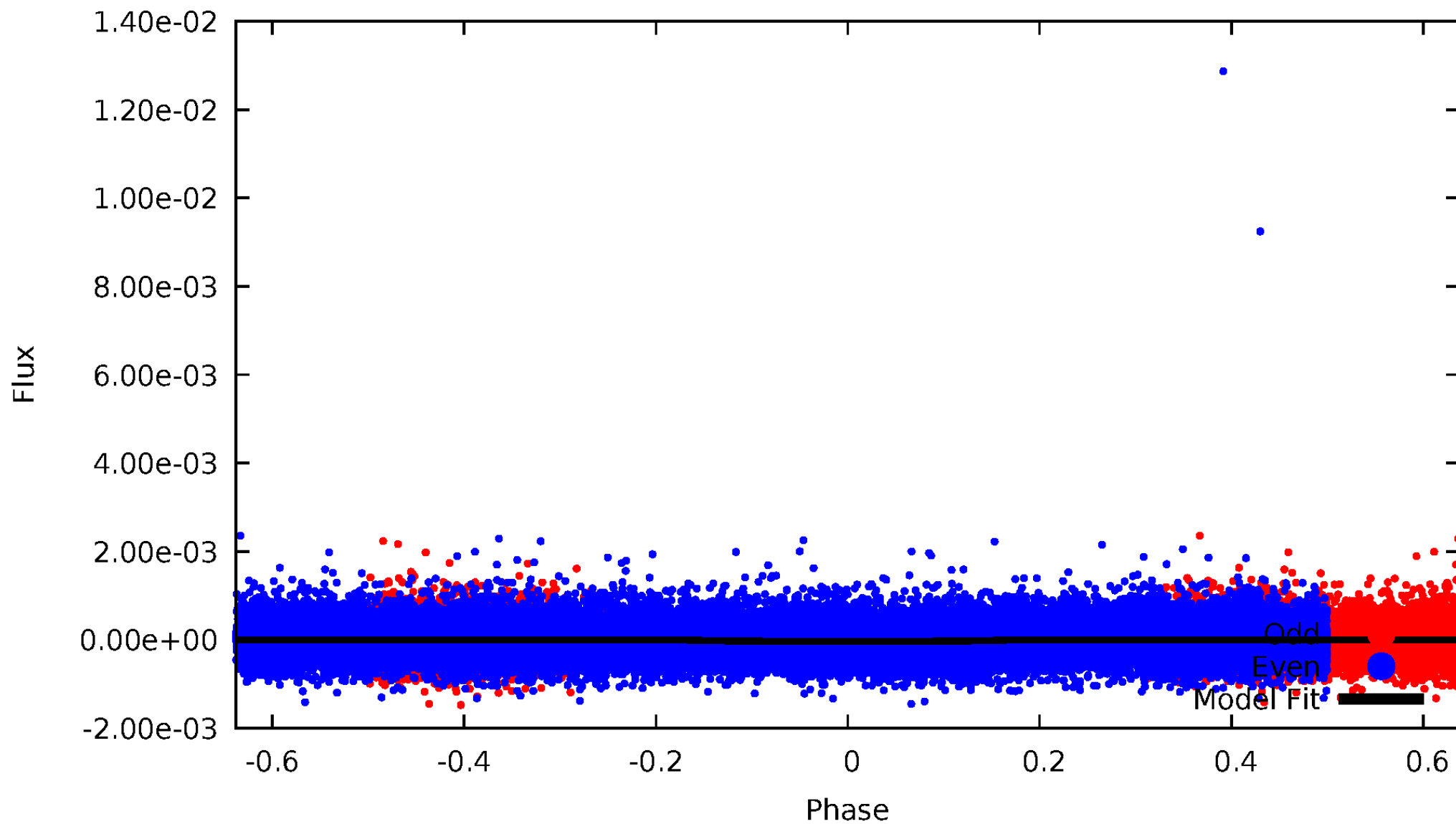
TCE 008487805-02





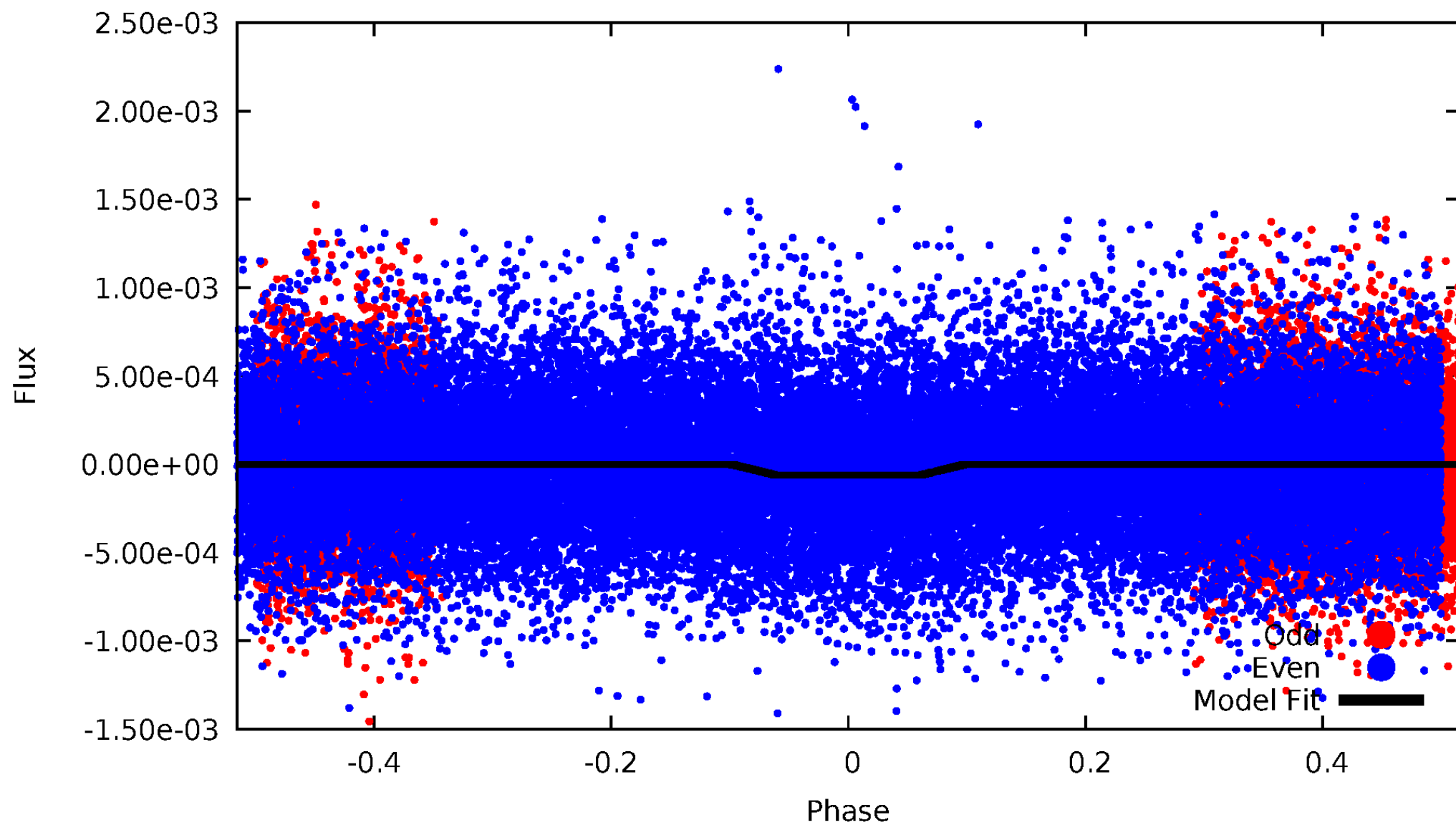
# DV Odd/Even

TCE 008487805-02



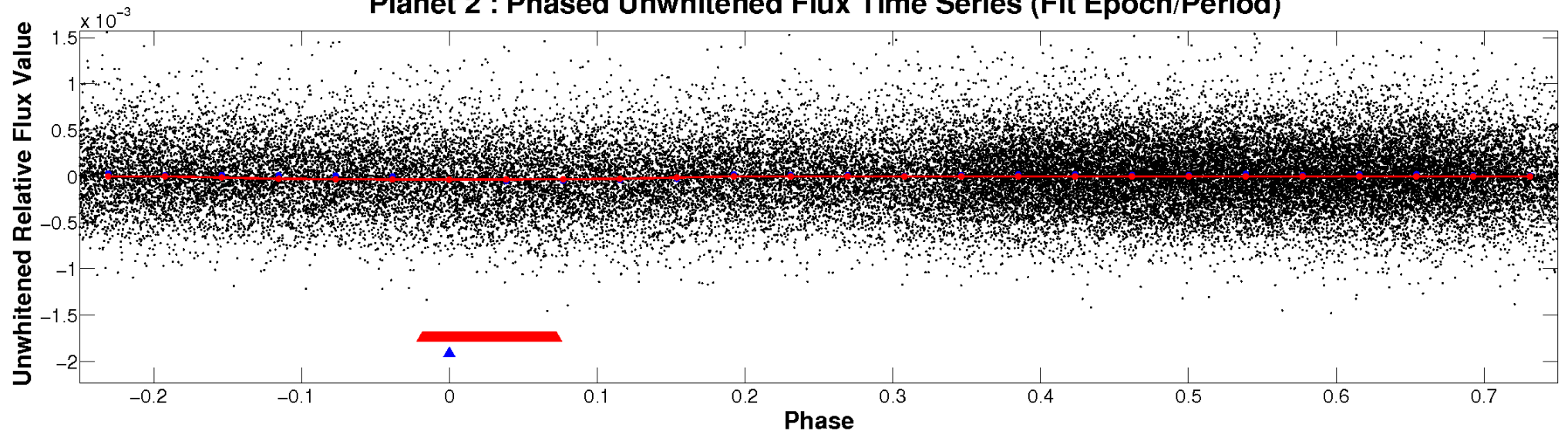
# ALT Odd/Even

TCE 008487805-02

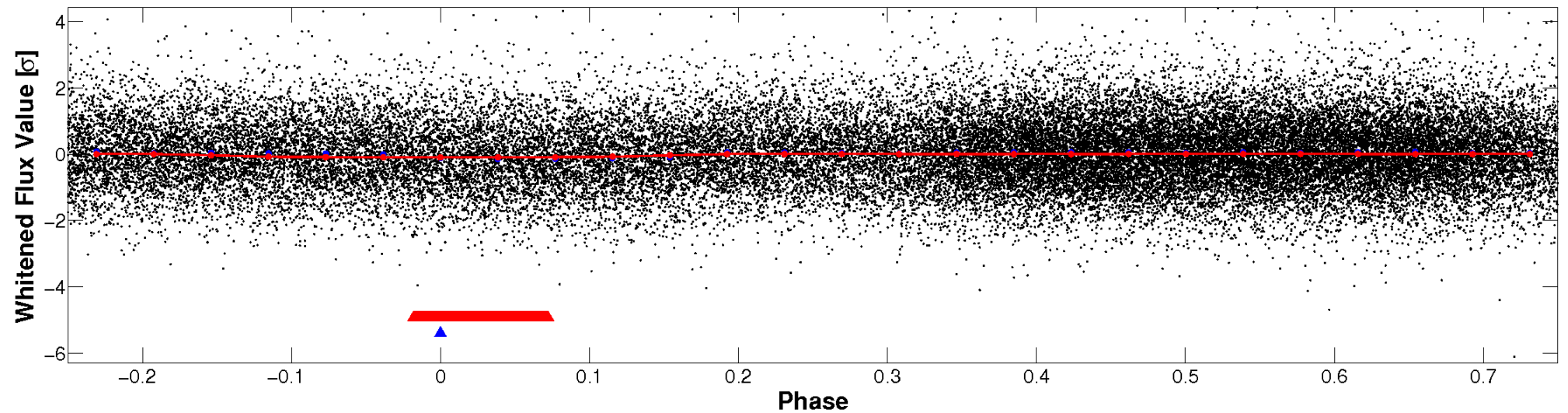


# Non-Whitened Vs. Whitened Light Curve

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

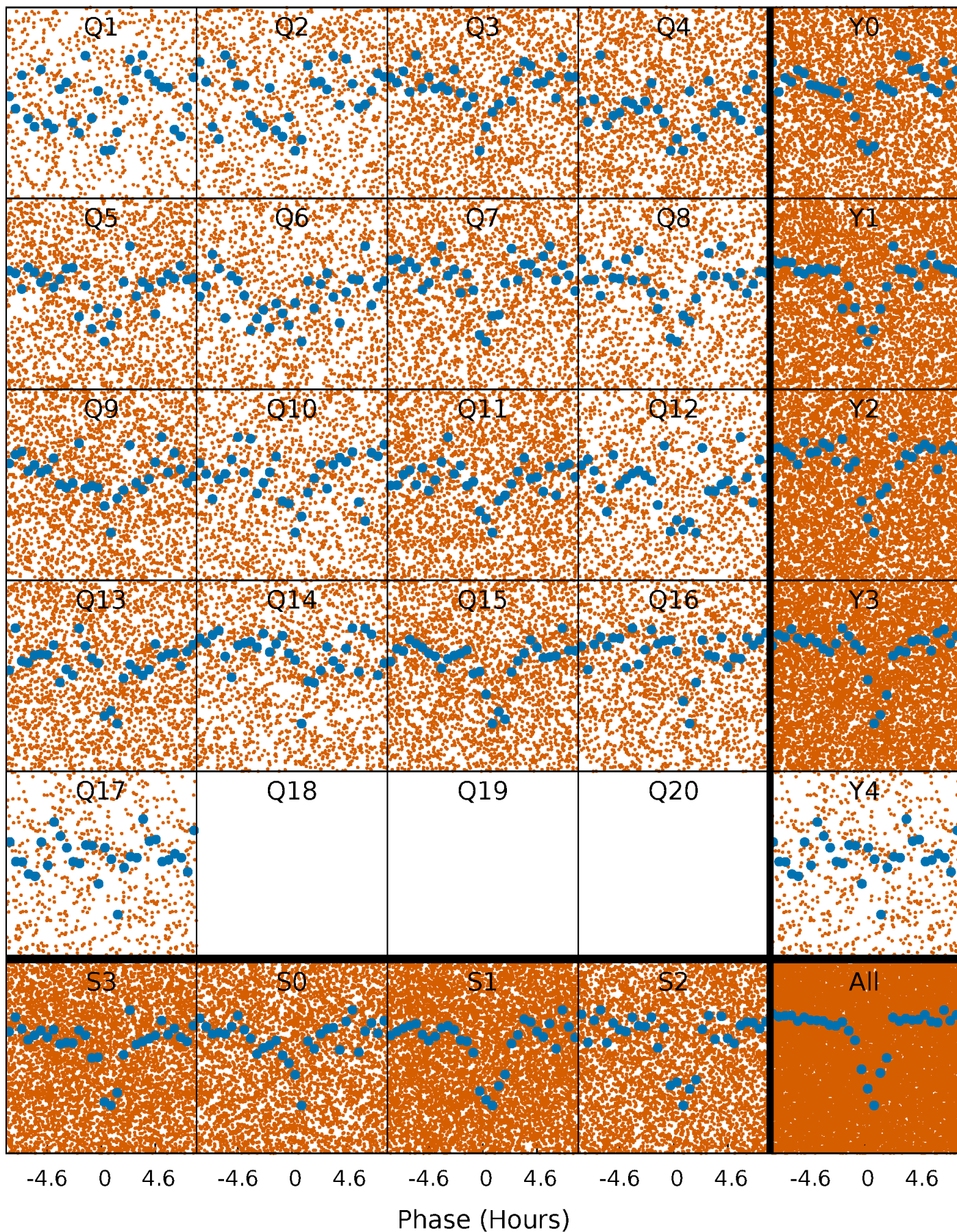


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

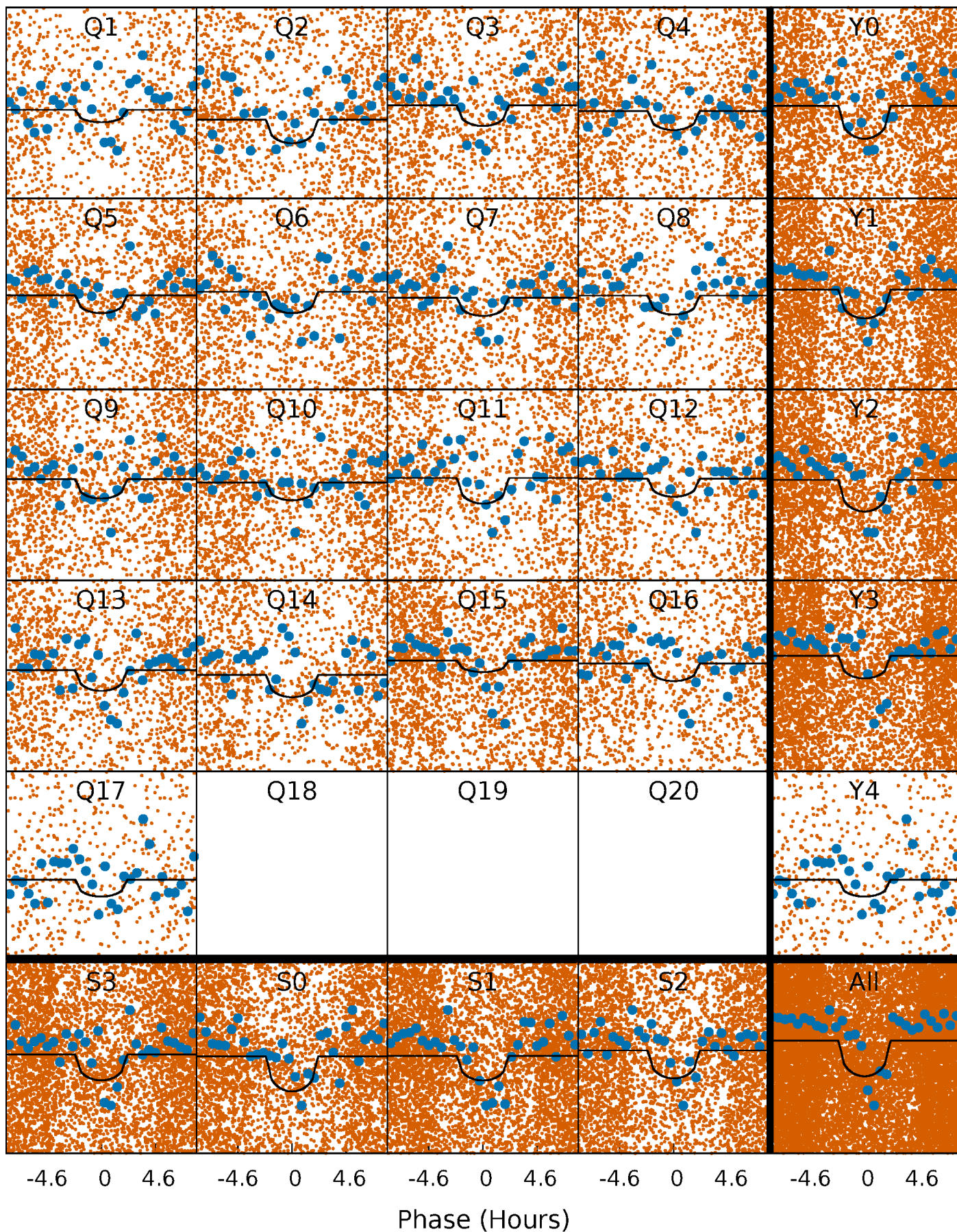
TCE 008487805-02 P= 0.530939 Days  $T_0=131.743686$  (BKJD)





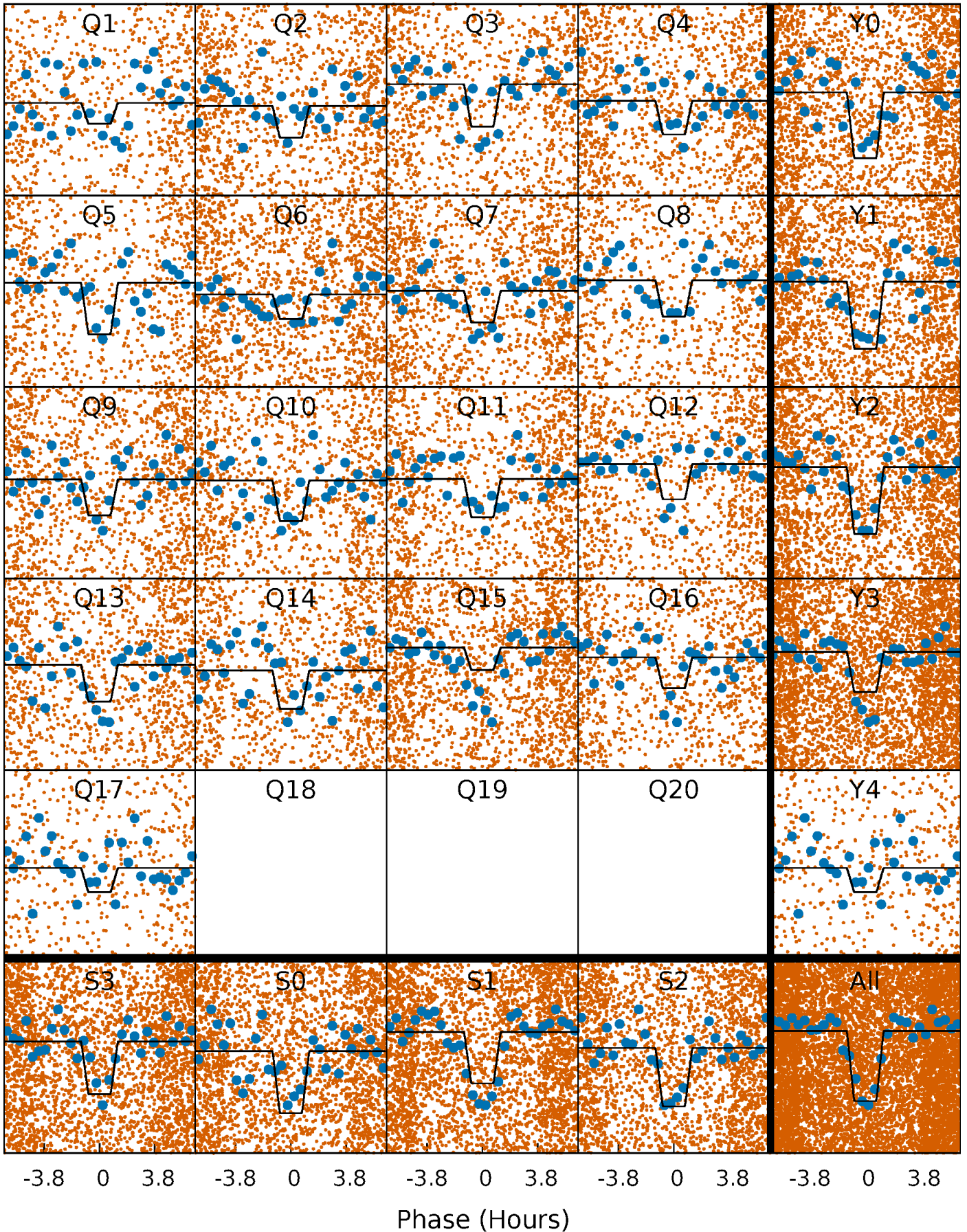
# DV Quarter-Phased Transit Curves

TCE 008487805-02   P= 0.530939 Days    $T_0=131.743686$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008487805-02 P= 0.530962 Days  $T_0=131.740152$  (BKJD)

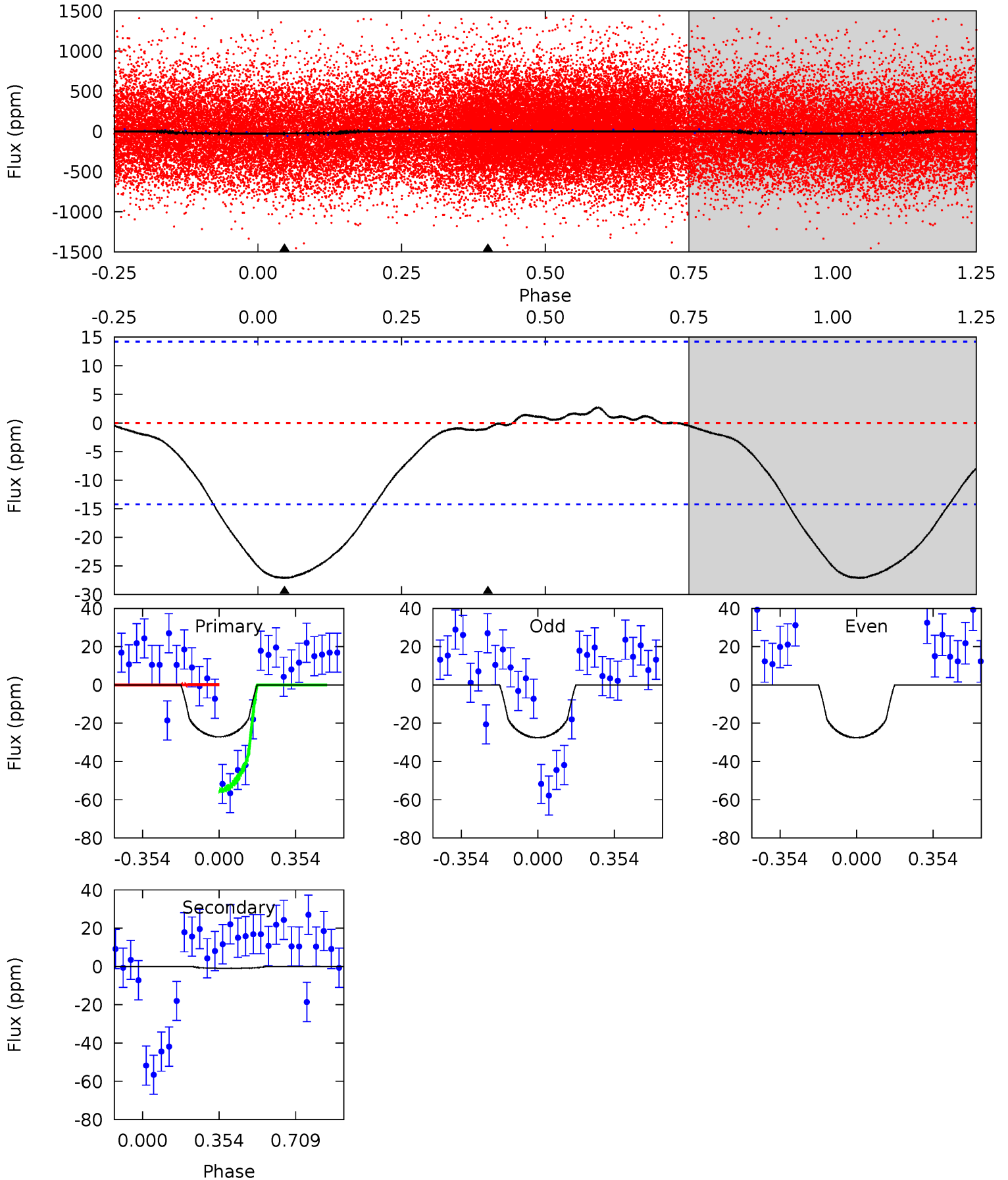




# DV Model-Shift Uniqueness Test

008487805-02, P = 0.530939 Days, E = 131.212747 Days

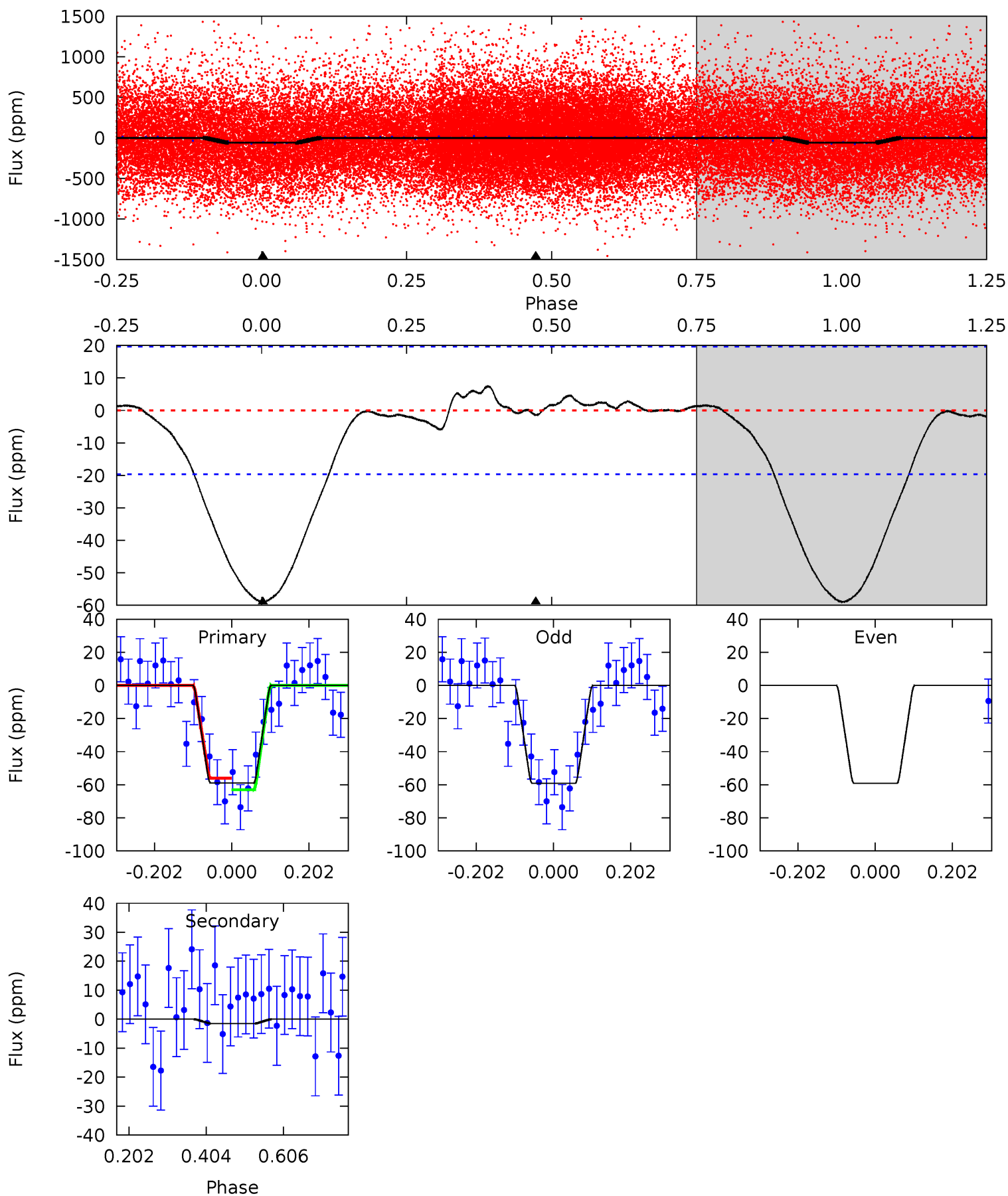
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.17	0.28	0	0	4.29	0.93	0.20	8.17	8.17	0.28	0.28	0	0.80	0.09	8.30



# Alt Model-Shift Uniqueness Test

008487805-02, P = 0.530962 Days, E = 131.209190 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
13.3	0.34	0	0	4.42	1.28	0.28	13.3	13.3	0.34	0.34	0	0.97	0.11	0.79



### Stellar Parameters For KIC 008487805

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5325^{+143}_{-159}$	$4.607^{+0.032}_{-0.097}$	$-0.220^{+0.300}_{-0.300}$	$0.750^{+0.113}_{-0.066}$	$0.840^{+0.070}_{-0.096}$	$2.803^{+0.482}_{-0.867}$
	+3%/-3%	+1%/-2%	+136%/-136%	+15%/-9%	+8%/-11%	+17%/-31%
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 008487805-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1 \pm 3$	$0.71^{+0.61}_{-0.48}$	$2626^{+104}_{-104}$	$-2717^{+6184}_{-567}$	$0.092^{+1.393}_{-0.572}$
Alt.	$-2 \pm 4$	$0.85^{+0.61}_{-0.54}$	$2624^{+100}_{-103}$	$-2652^{+6145}_{-549}$	$0.121^{+1.360}_{-0.486}$

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

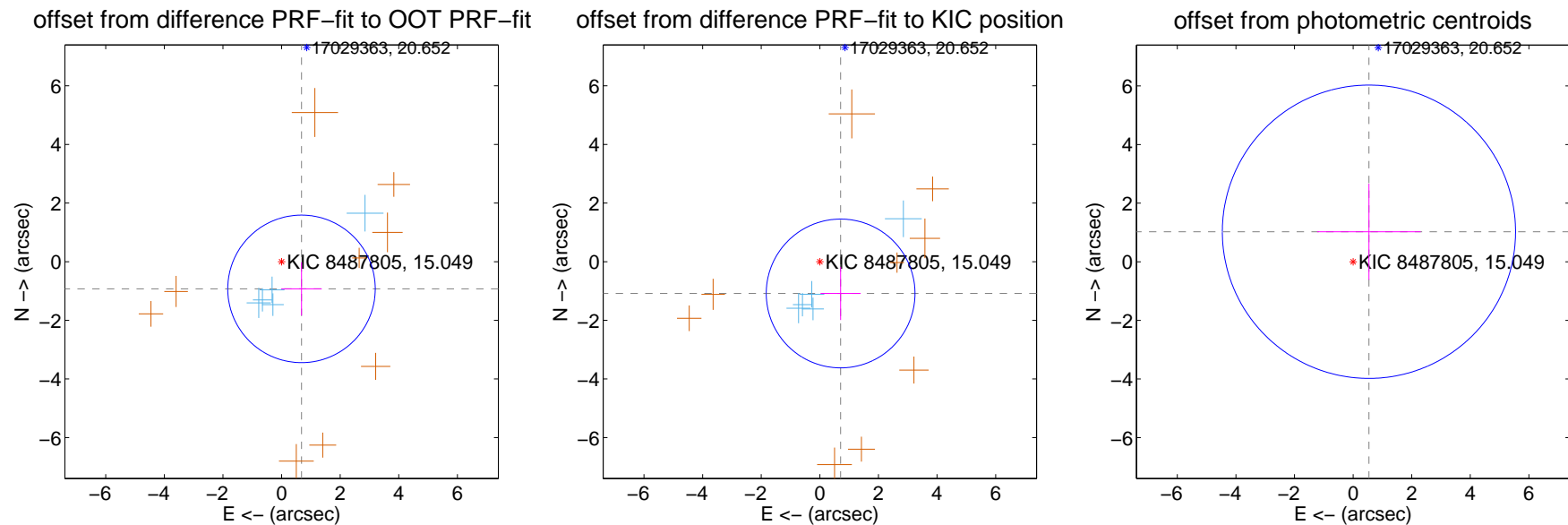
## DV Centroid Data

Supplemental centroid analysis for 008487805-02. Kepler magnitude: 15.05. Transit SNR 8.21

There are 5 quarters with good PRF difference image offsets

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

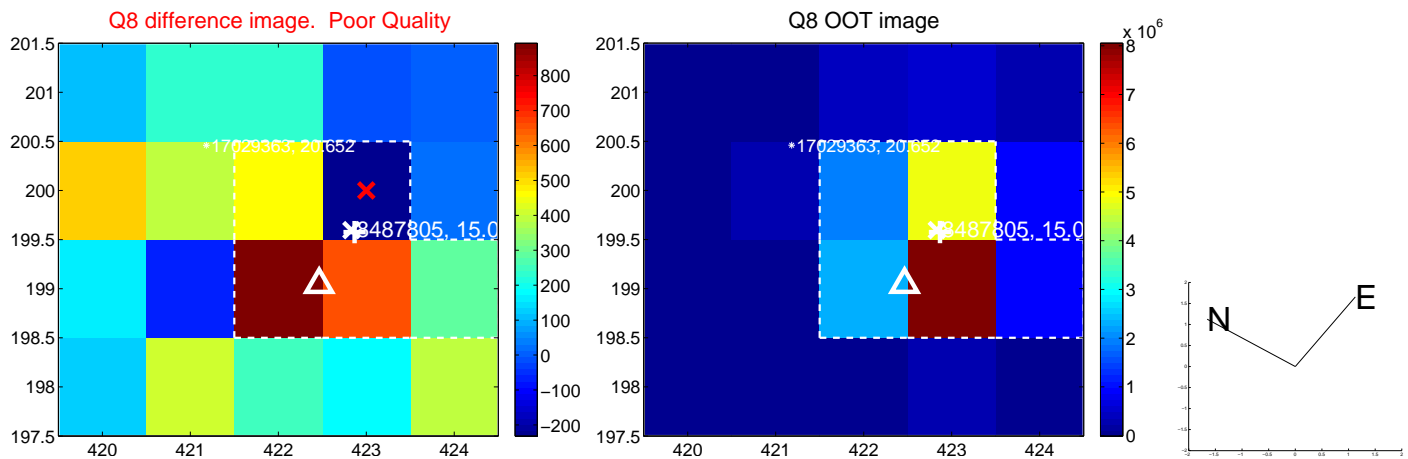
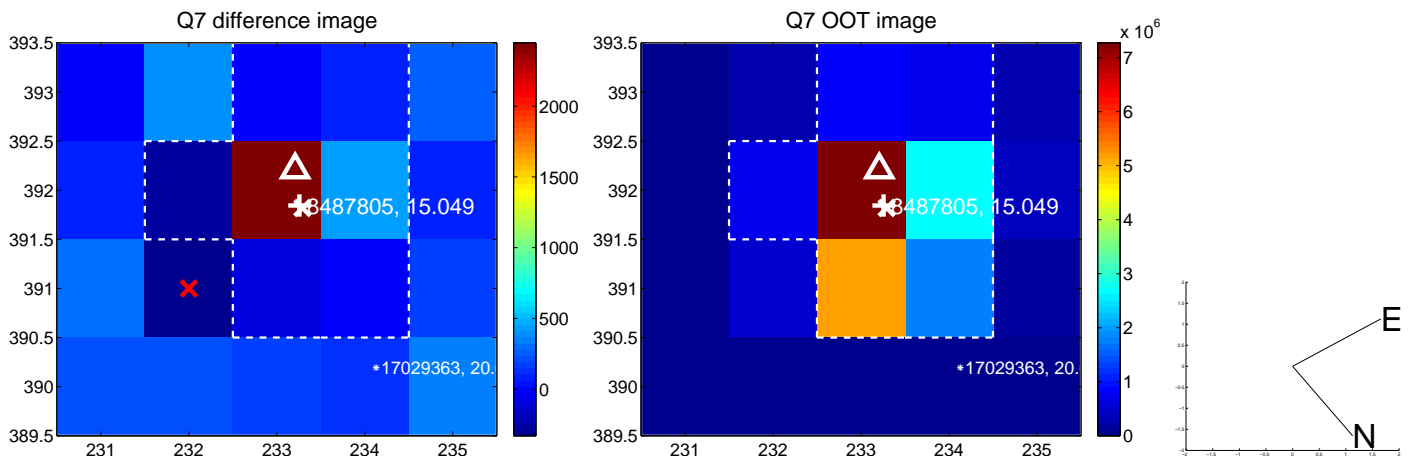
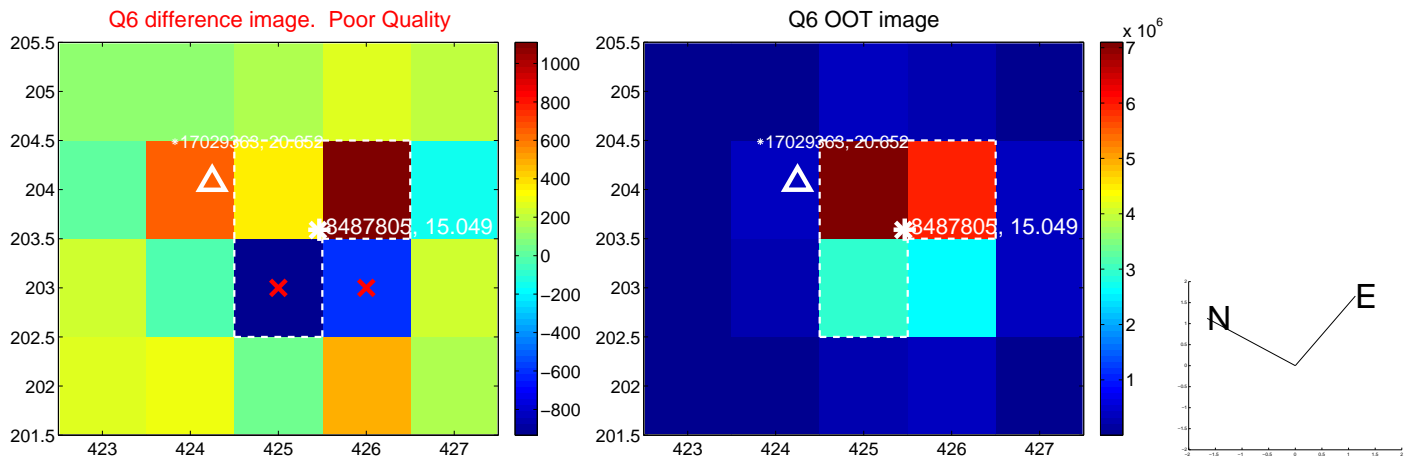
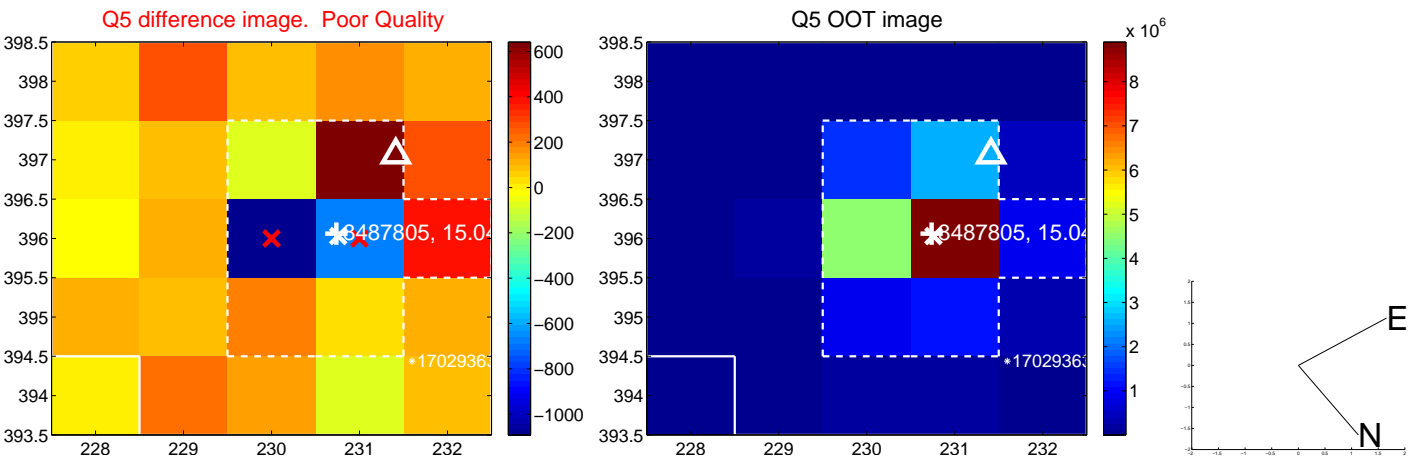
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.150 \pm 0.839$	1.37	$-0.680 \pm 0.692$	$-0.927 \pm 0.908$
PRF-fit source offset from KIC position	$1.295 \pm 0.846$	1.53	$-0.709 \pm 0.685$	$-1.084 \pm 0.906$
photometric centroid source offset	$1.16 \pm 1.67$	0.69	$-0.54 \pm 1.77$	$1.02 \pm 1.64$



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.

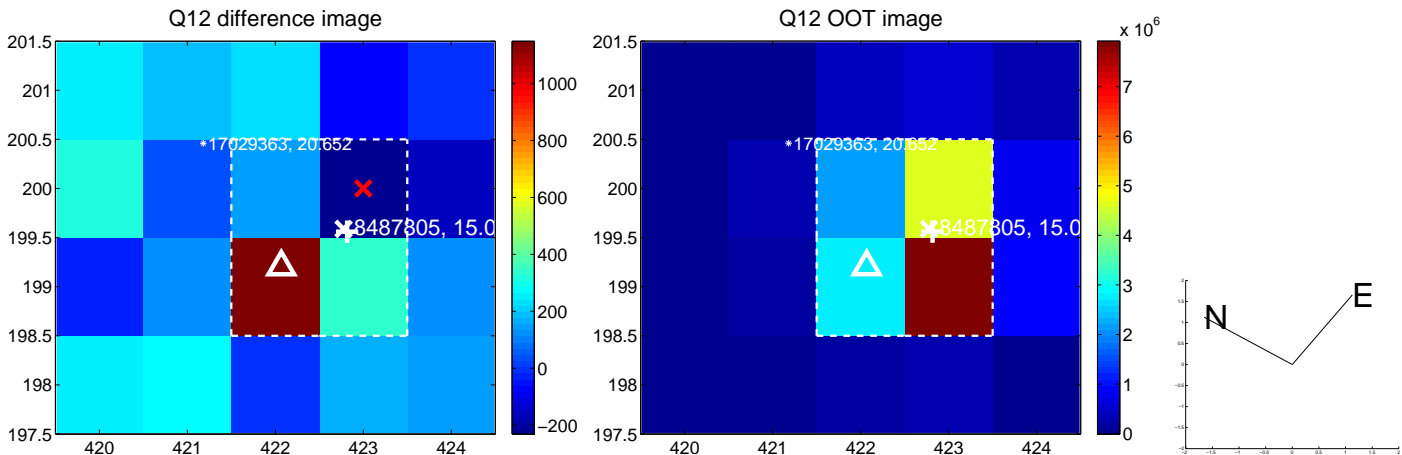
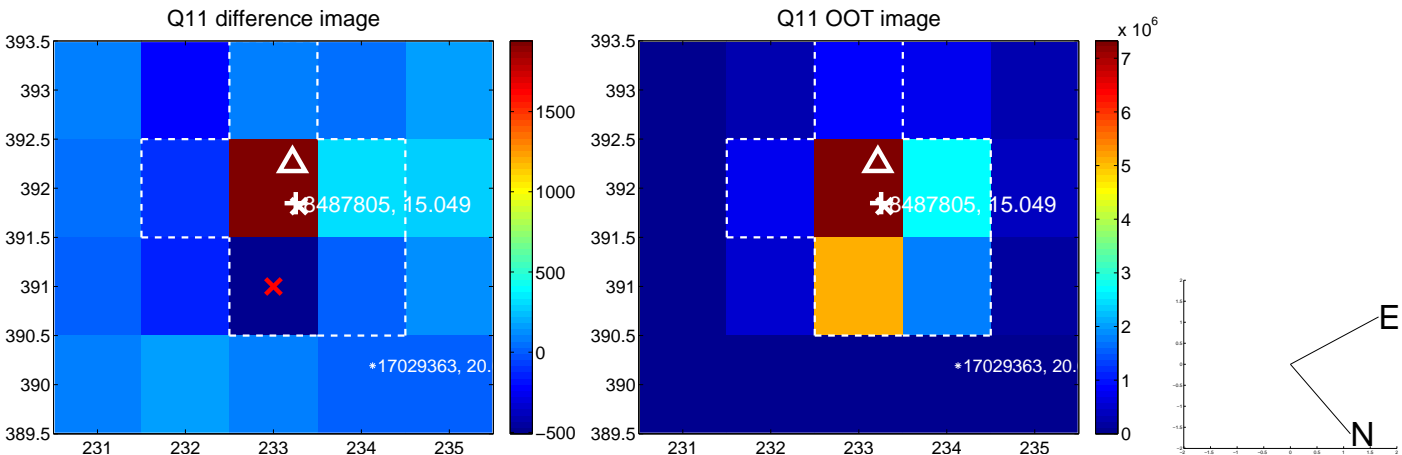
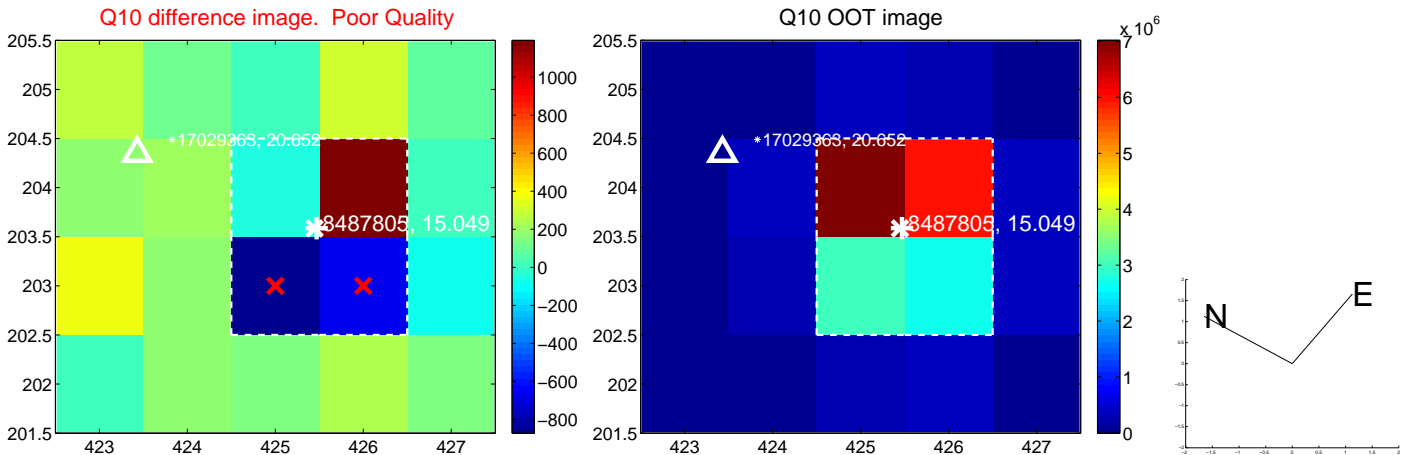
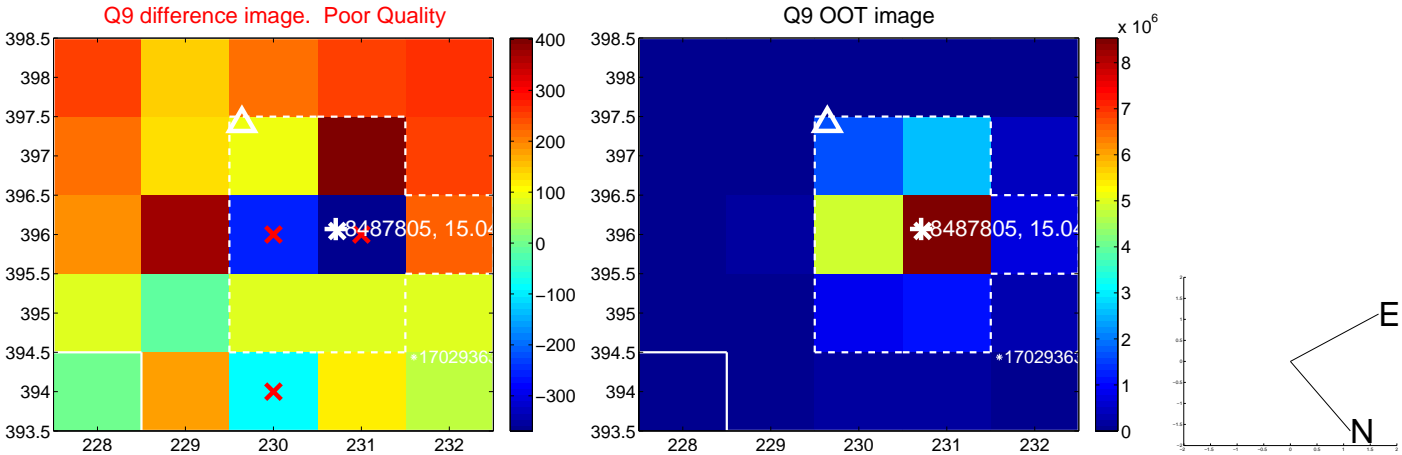


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

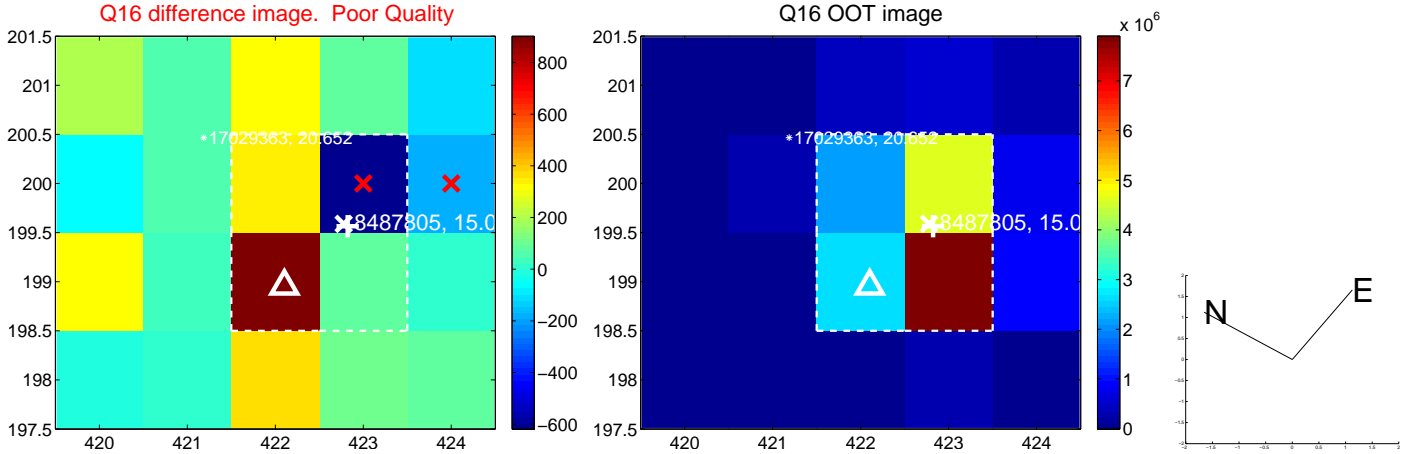
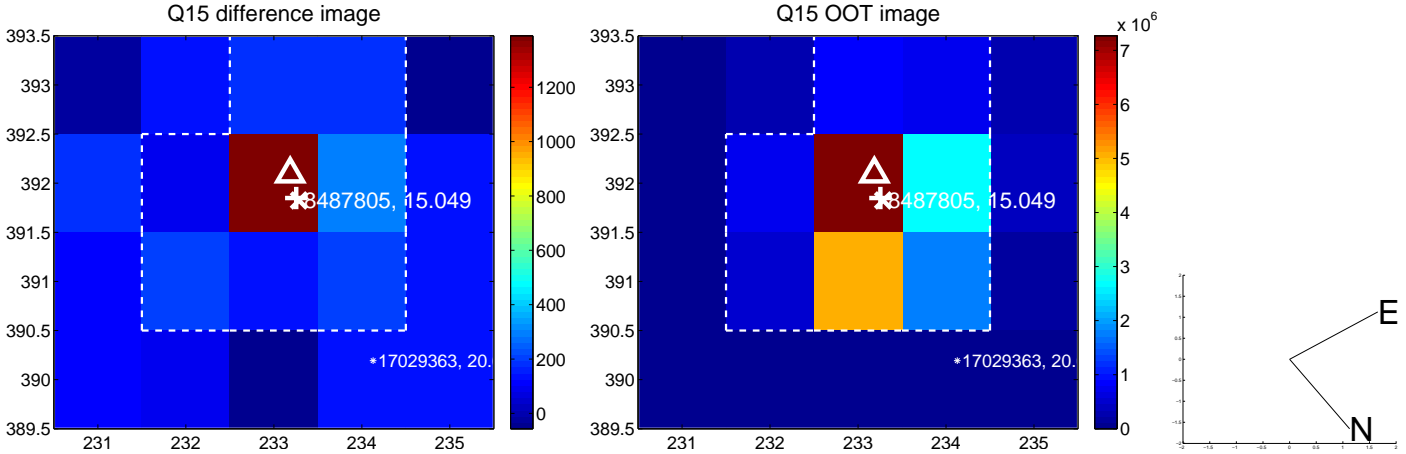
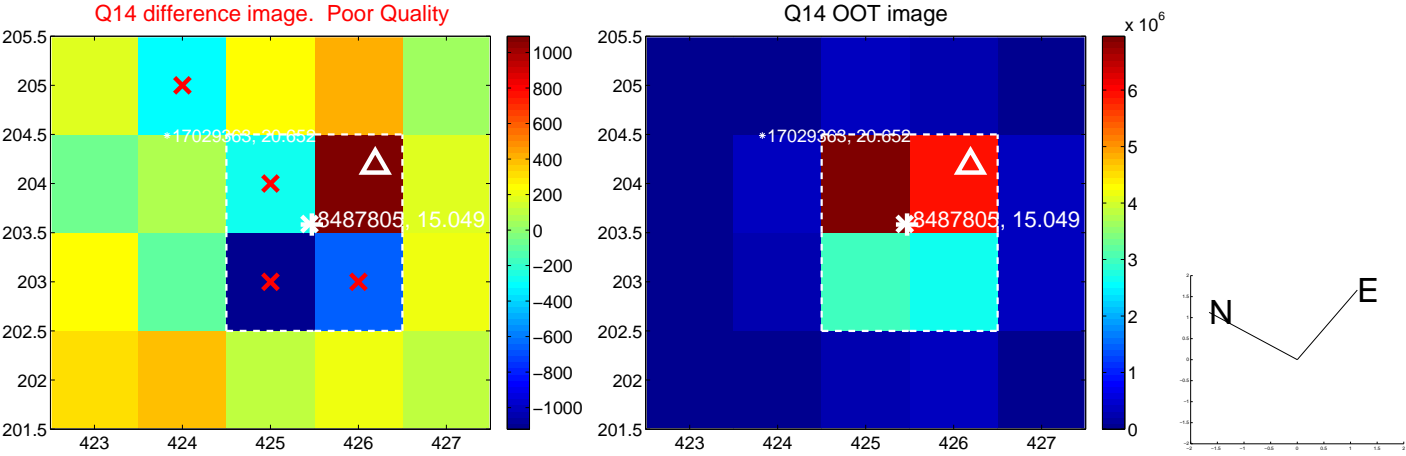
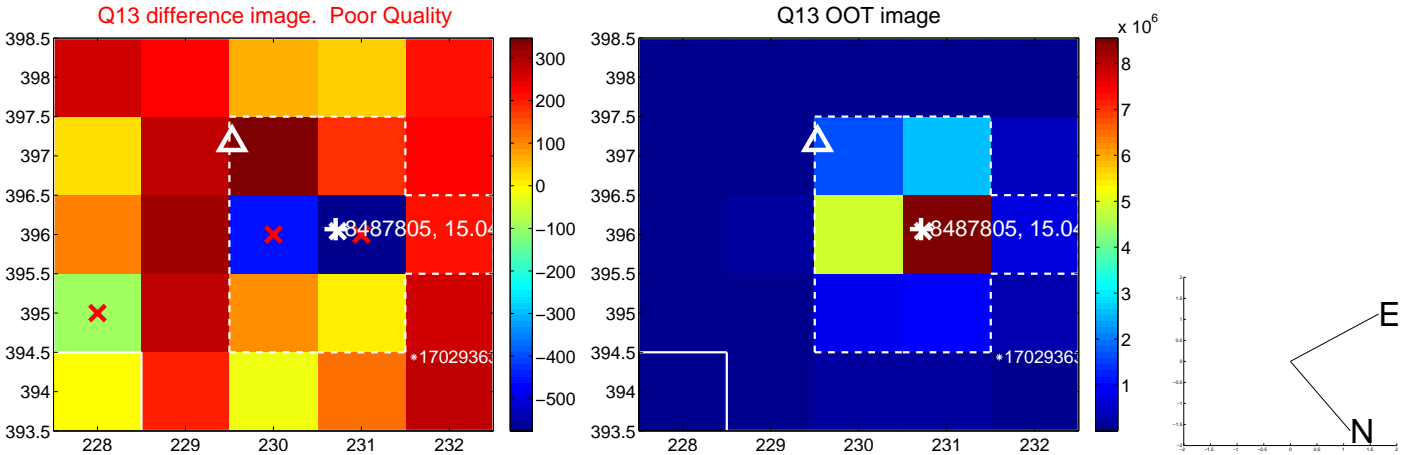




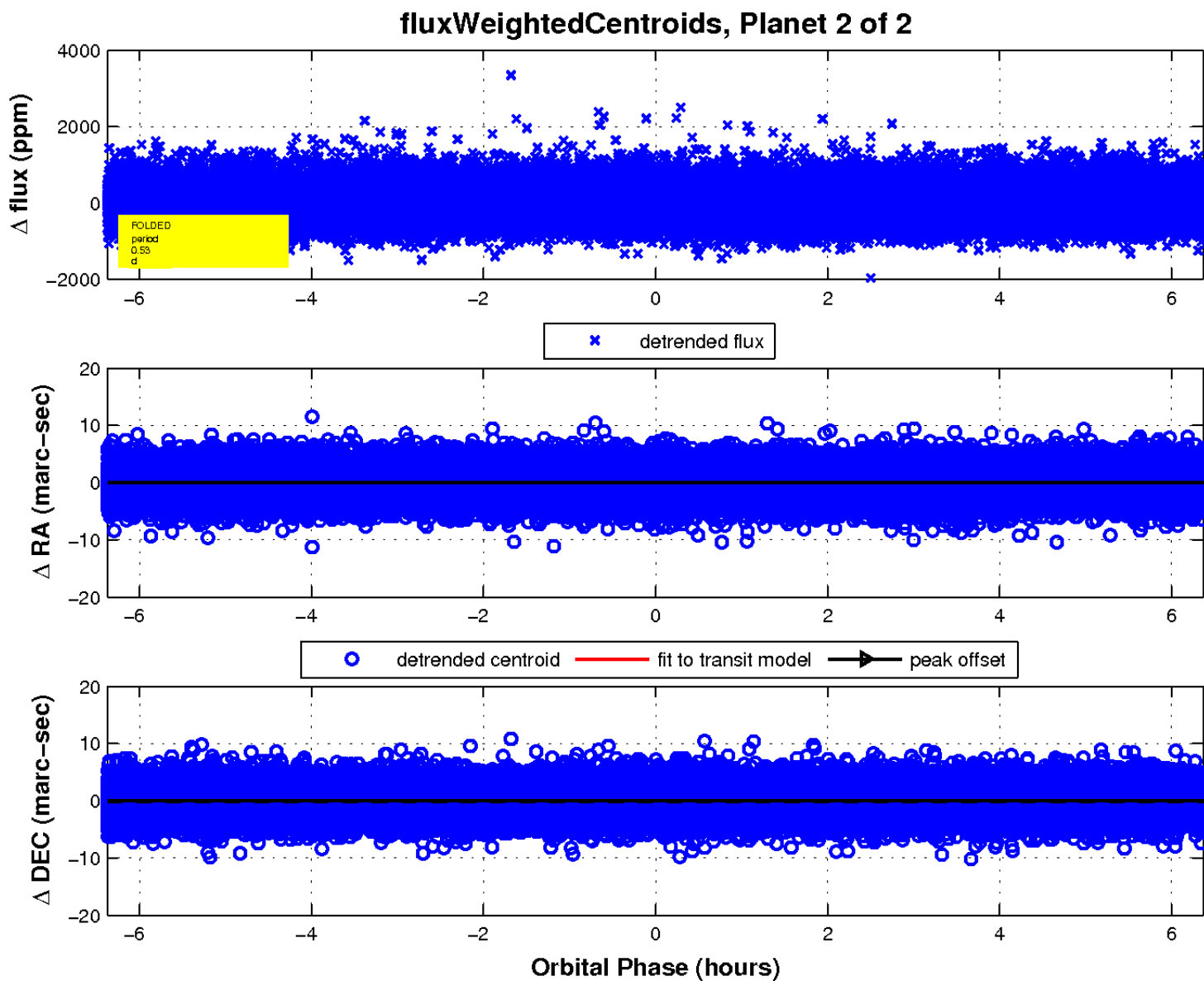
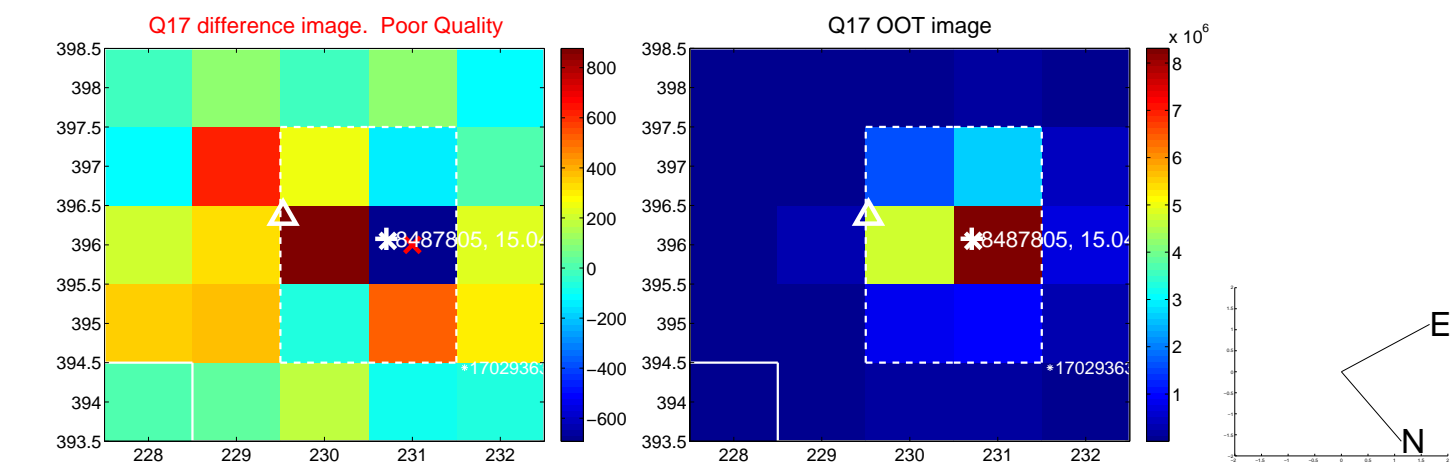
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

