

# KIC 008430887

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008430887-01	OBS	No	312.418163	281.413868	150.2	20.425	13.5	9.7	1.03	5821	1.38	1.41
008430887-02	OBS	No	521.710837	409.600712	96.5	12.856	7.2	7.0	1.03	5821	1.17	0.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008430887-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008430887-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_TER_DV—CENT_KIC_POS

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

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

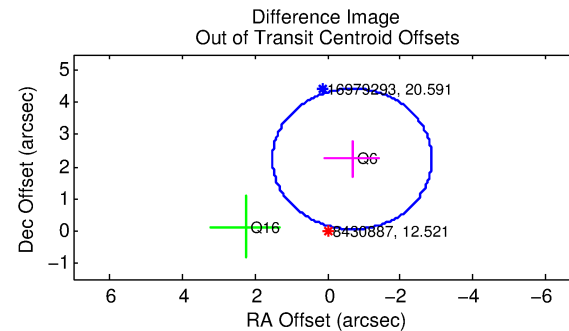
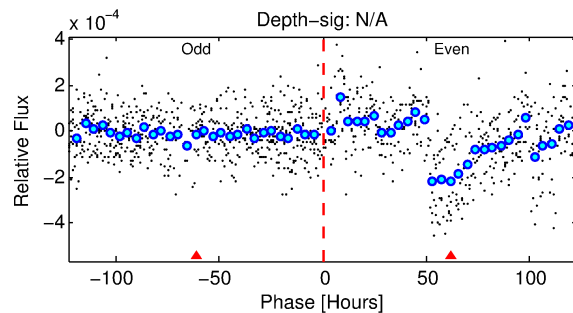
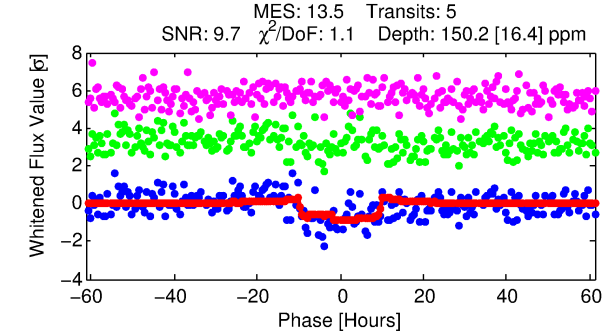
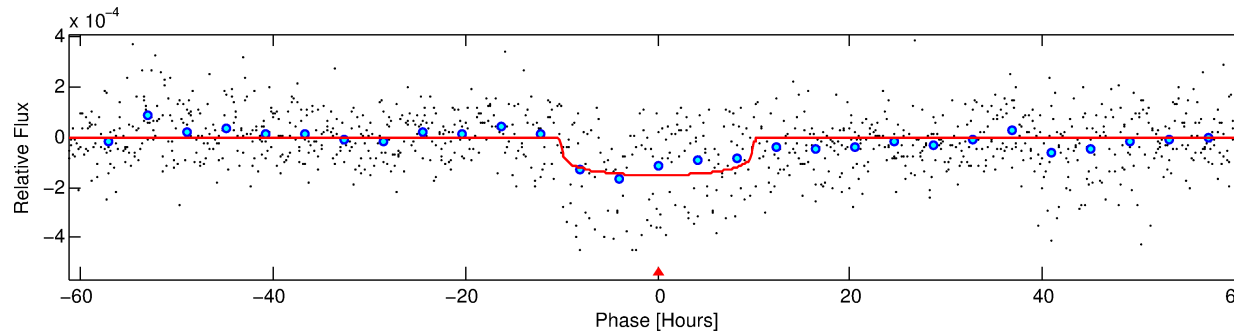
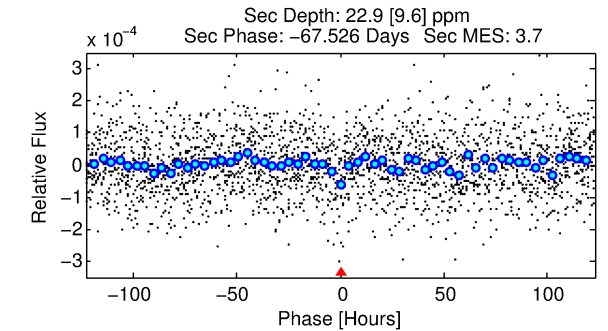
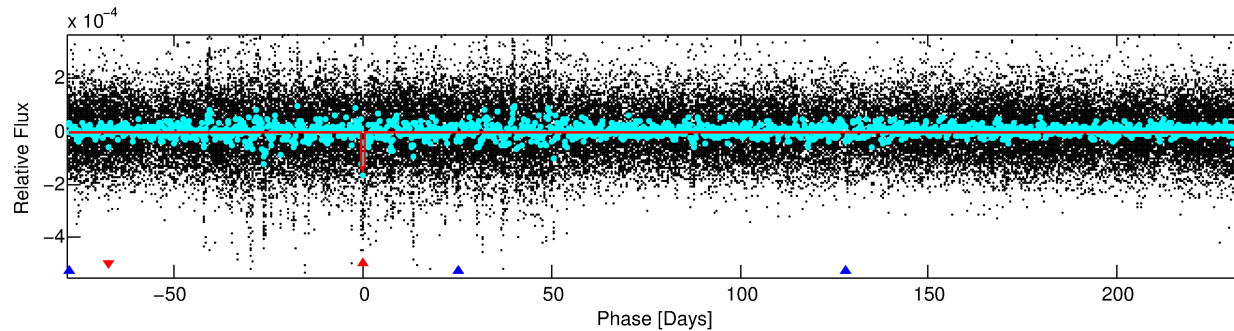
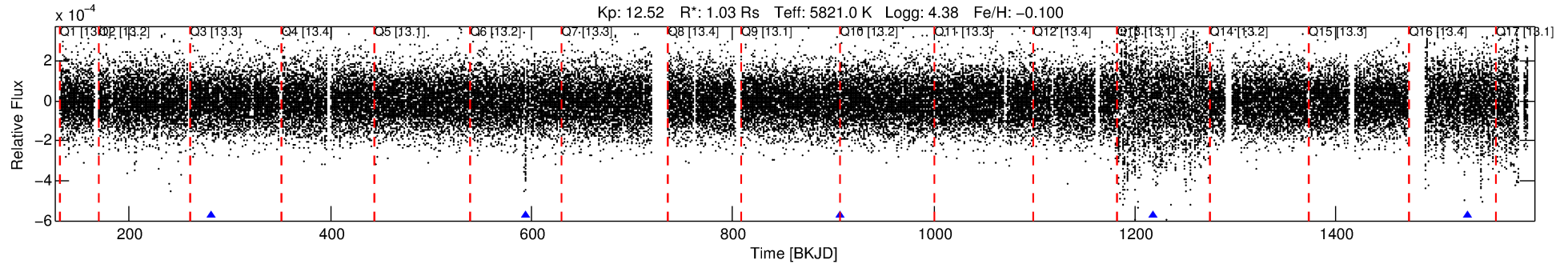
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008430887-01

No Significant Match Found

# DV One-Page Summary

KIC: 8430887 Candidate: 1 of 2 Period: 312.418 d



## DV Fit Results:

Period = 312.41816 [0.00773] d  
Epoch = 281.4139 [0.0196] BKJD  
Rp/R\* = 0.0122 [0.0025]  
a/R\* = 79.63 [70.76]  
b = 0.75 [0.52]  
Seff = 1.41 [0.39]  
Teq = 278 [19] K  
Rp = 1.38 [0.40] Re  
a = 0.8842 [0.1538] AU  
Ag = 5201.20 [3294.61] [1.58σ]  
Teffp = 3646 [539] K [6.25σ]

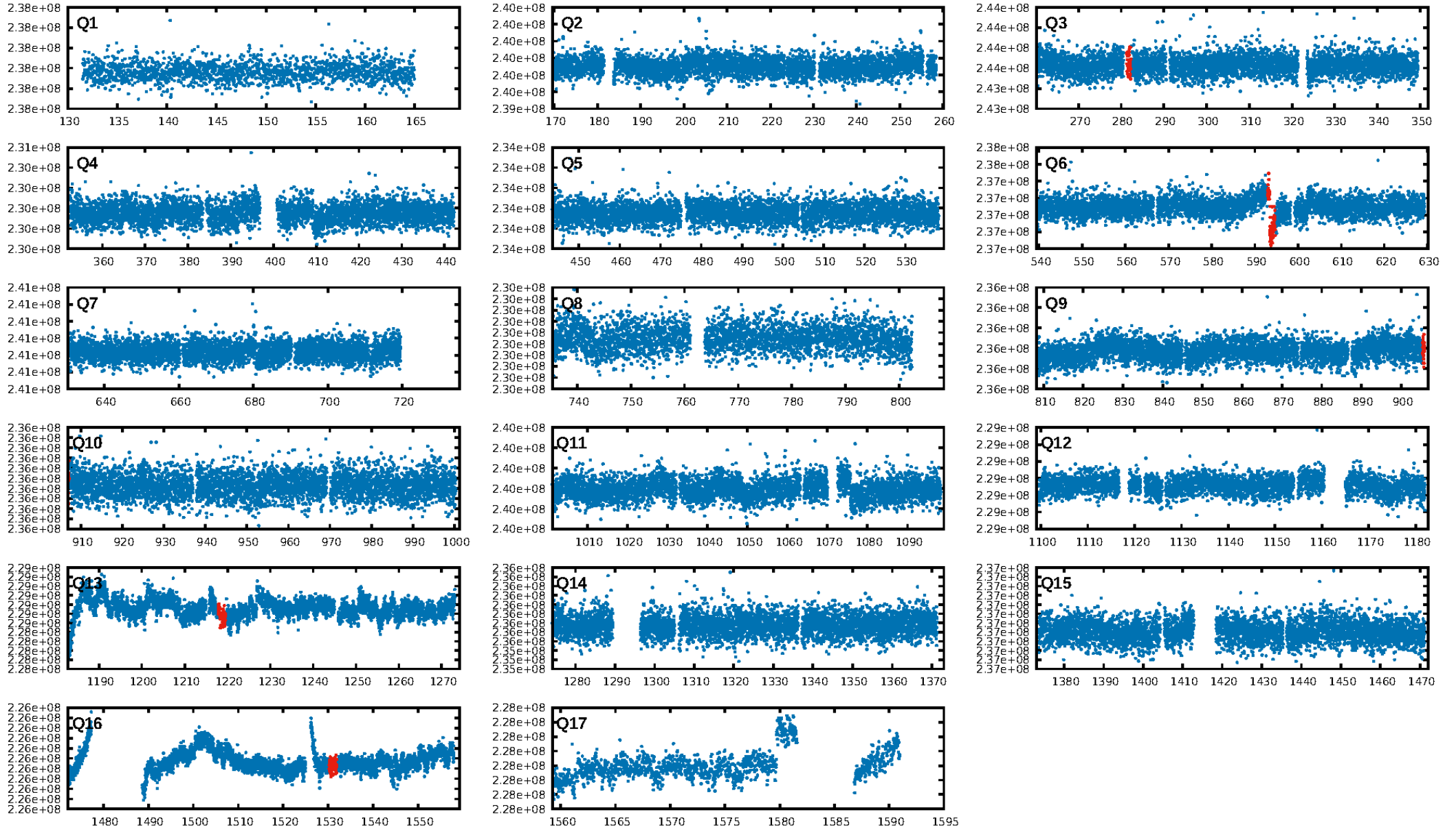
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [208.13σ]  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 98.9%  
Bootstrap-pfa: 8.30e-28  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 2.522  
Centroid-sig: 5.8%  
Centroid-so: 1.253 arcsec [1.32σ]  
**OotOffset-rm: 2.337 arcsec [3.20σ]**  
**KicOffset-rm: 2.515 arcsec [3.31σ]**  
OotOffset-st: 1/0/1/0 [2]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [2/2]

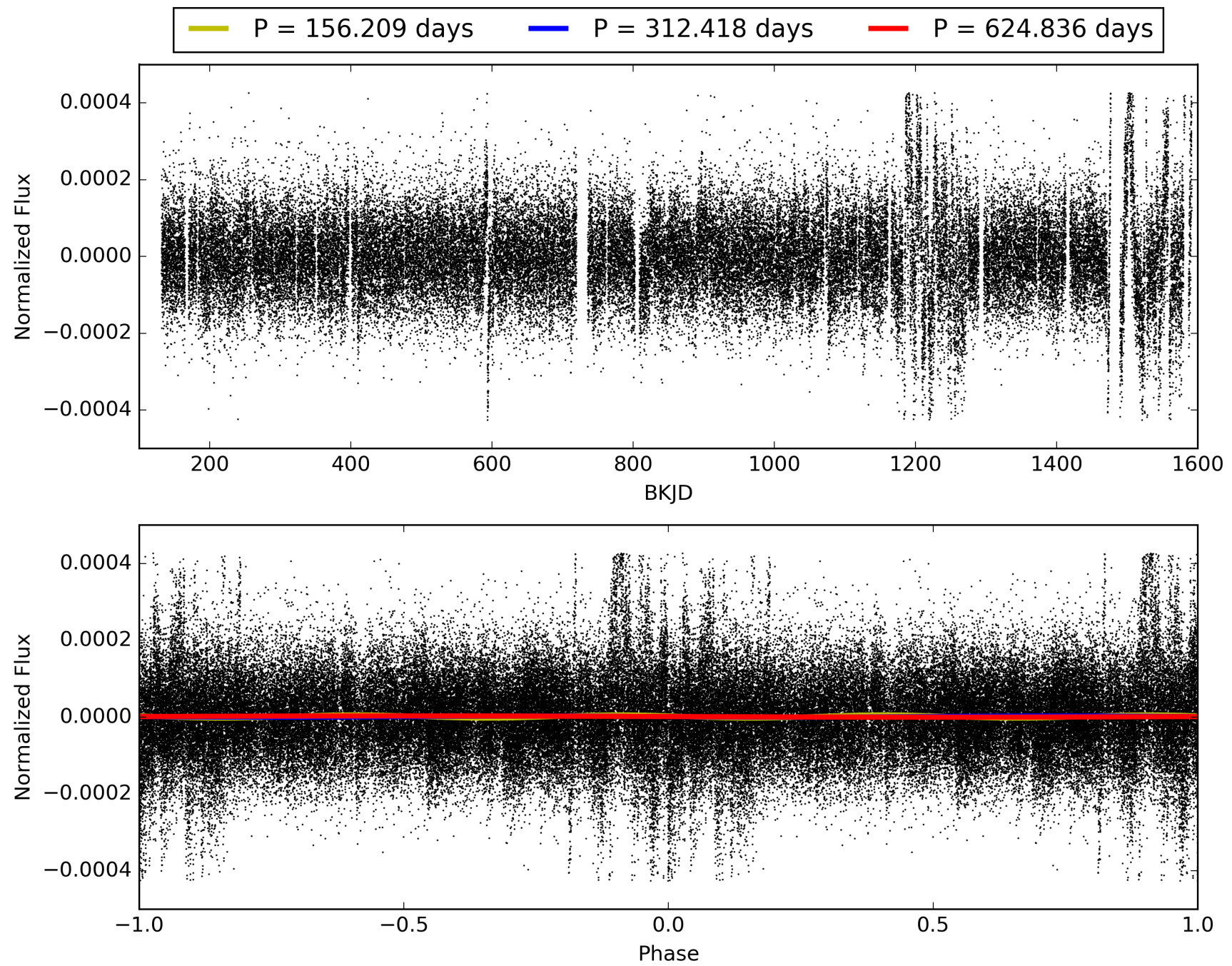
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:09:45 Z

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

# TCE 008430887-01, PDC Light Curves

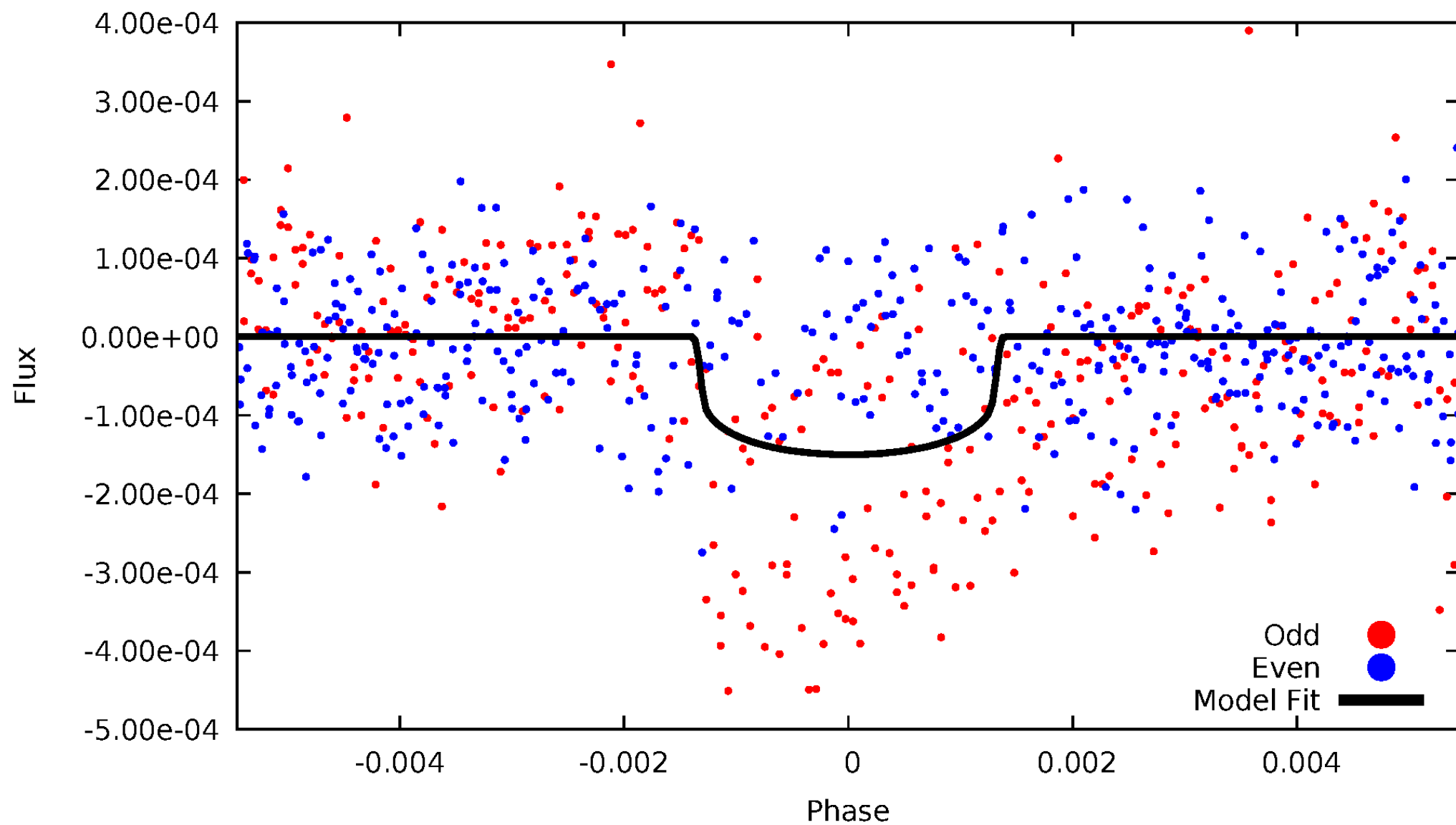


TCE 008430887-01



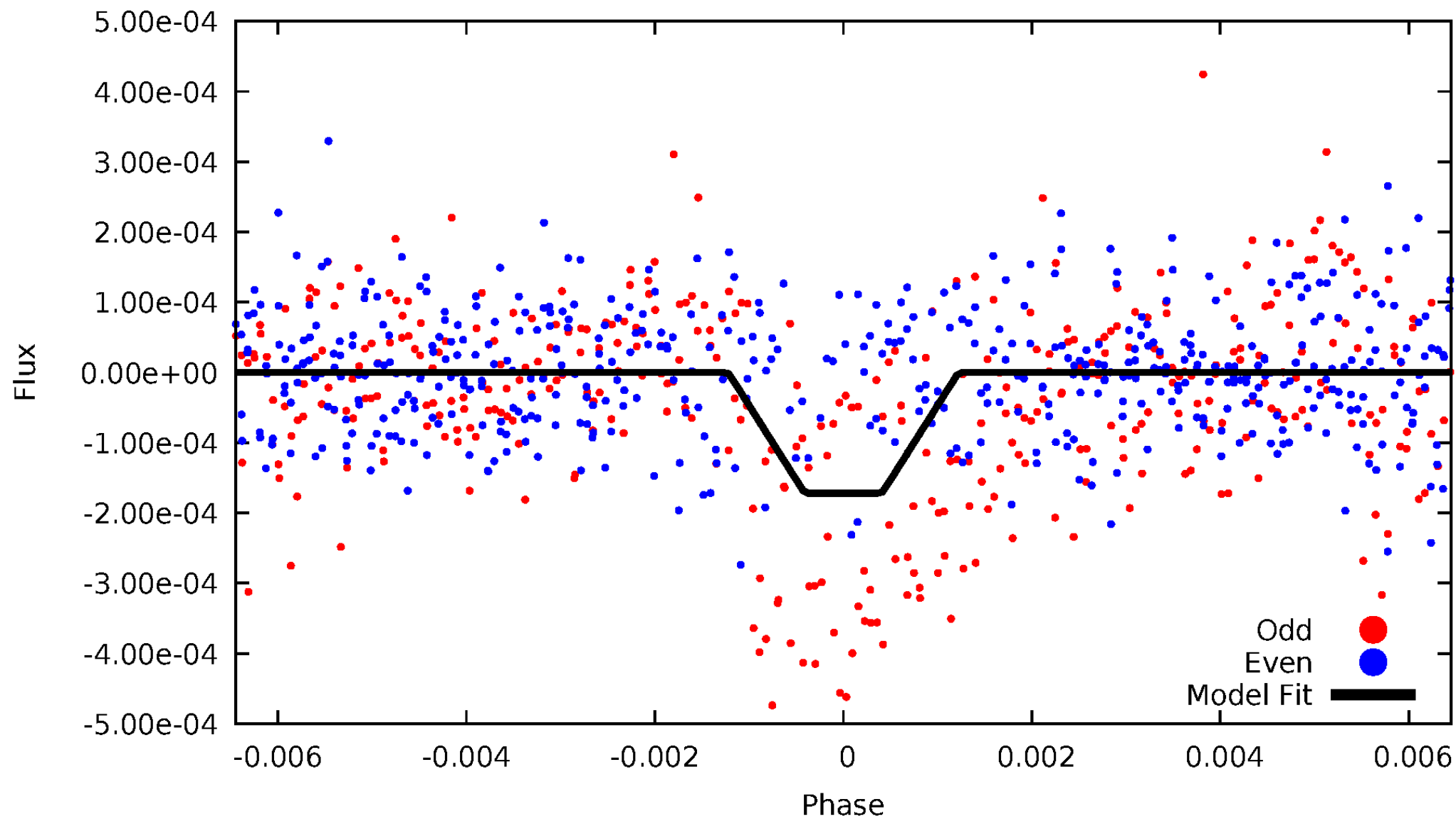
# DV Odd/Even

TCE 008430887-01



# ALT Odd/Even

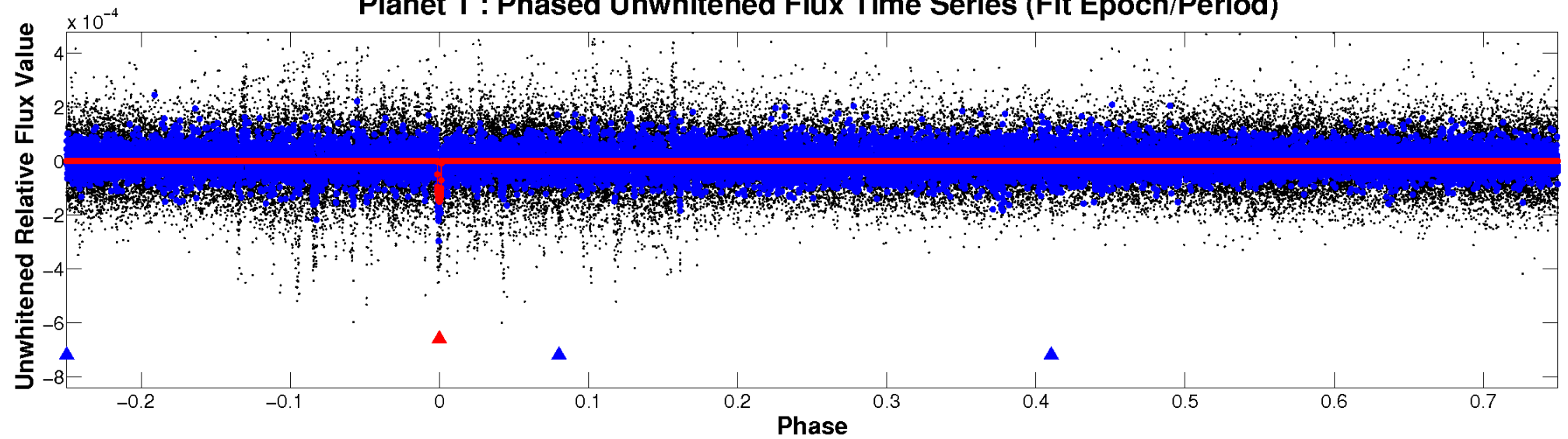
TCE 008430887-01



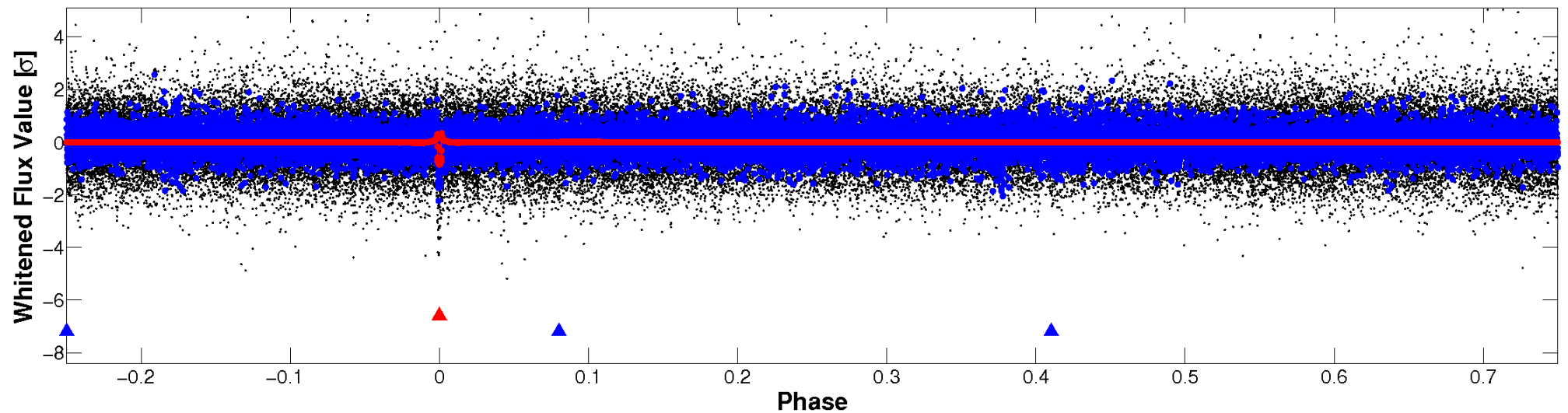


# Non-Whitened Vs. Whitened Light Curve

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

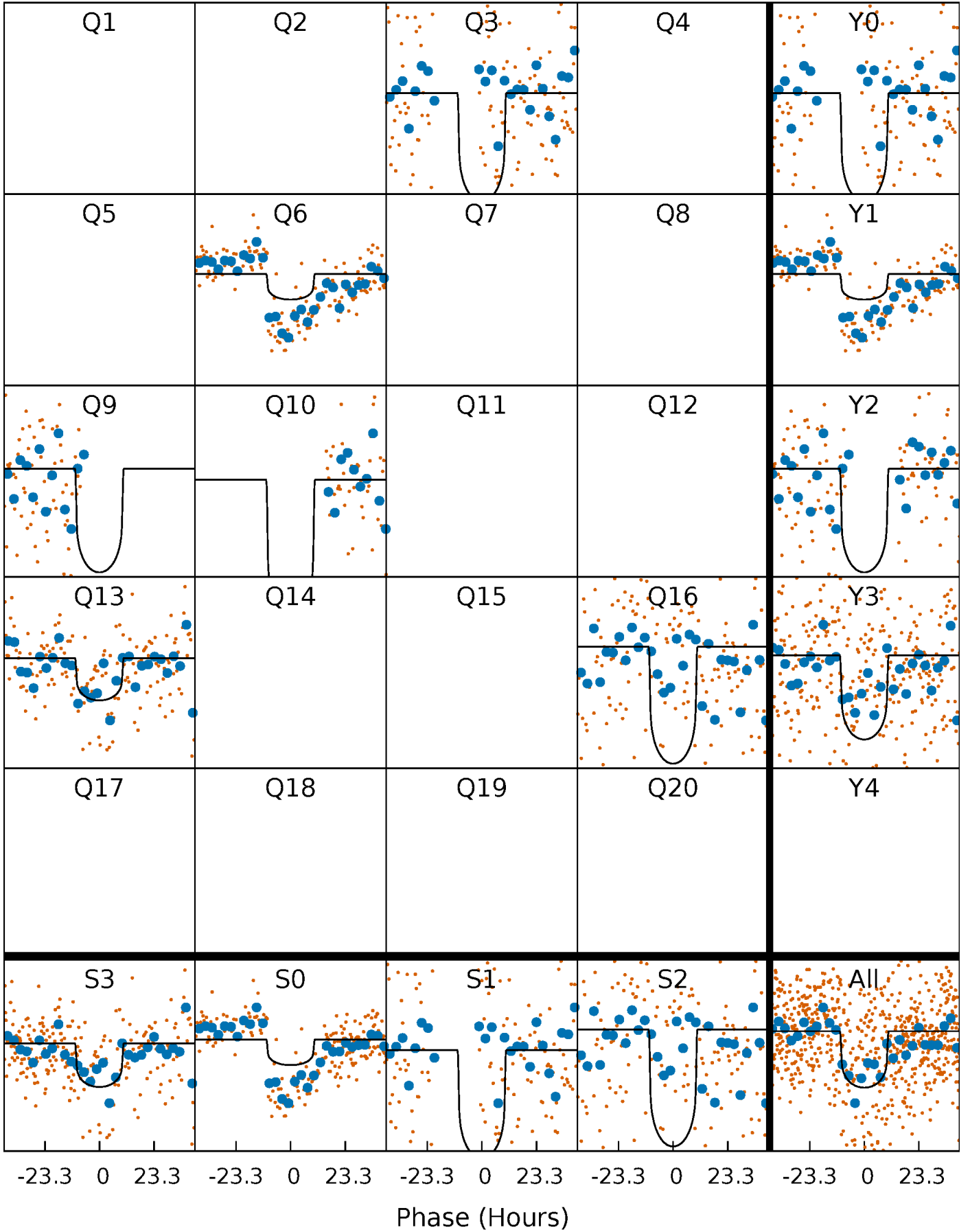
TCE 008430887-01 P=312.418163 Days  $T_0=281.413868$  (BKJD)





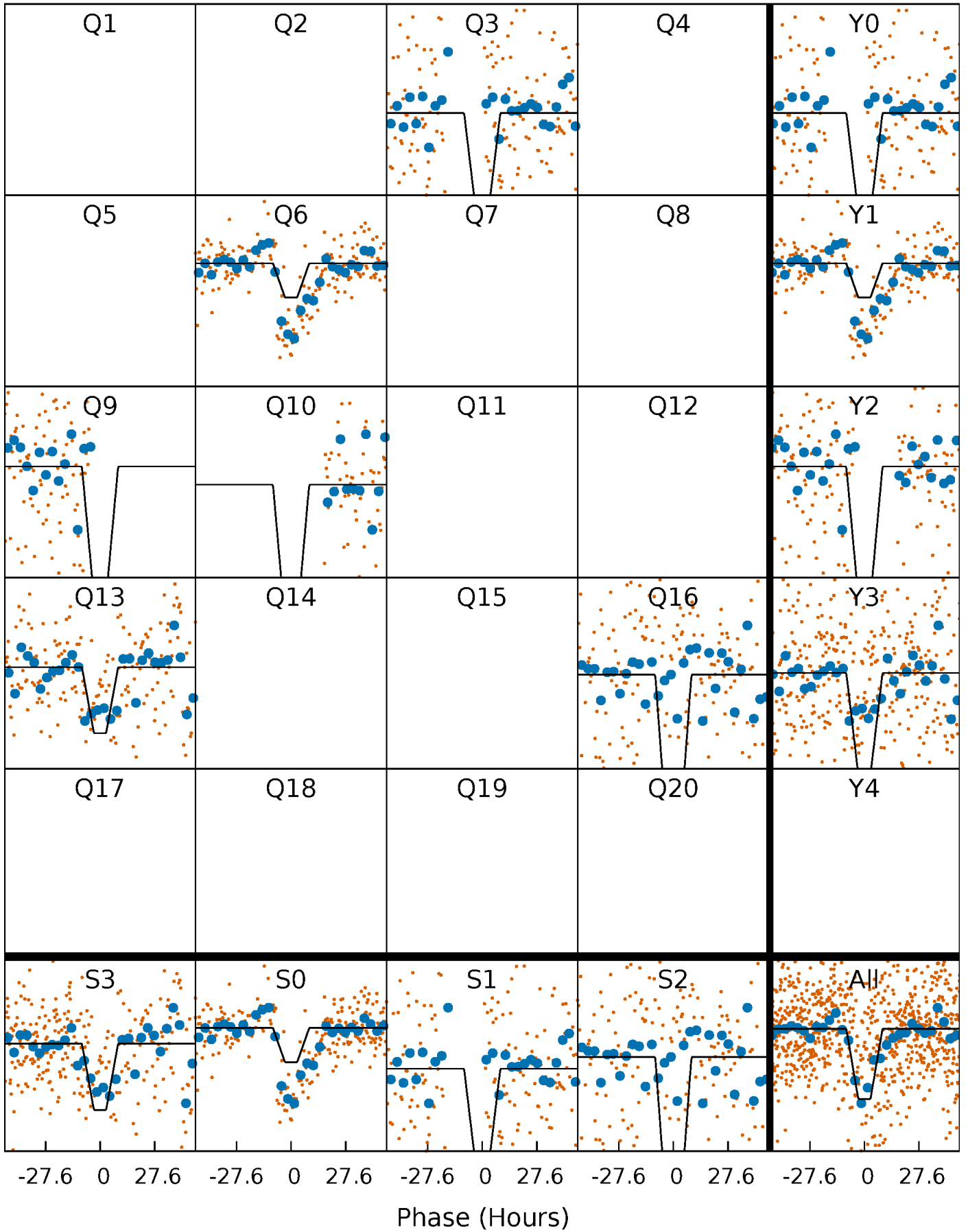
# DV Quarter-Phased Transit Curves

TCE 008430887-01     $P=312.418163$  Days     $T_0=281.413868$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

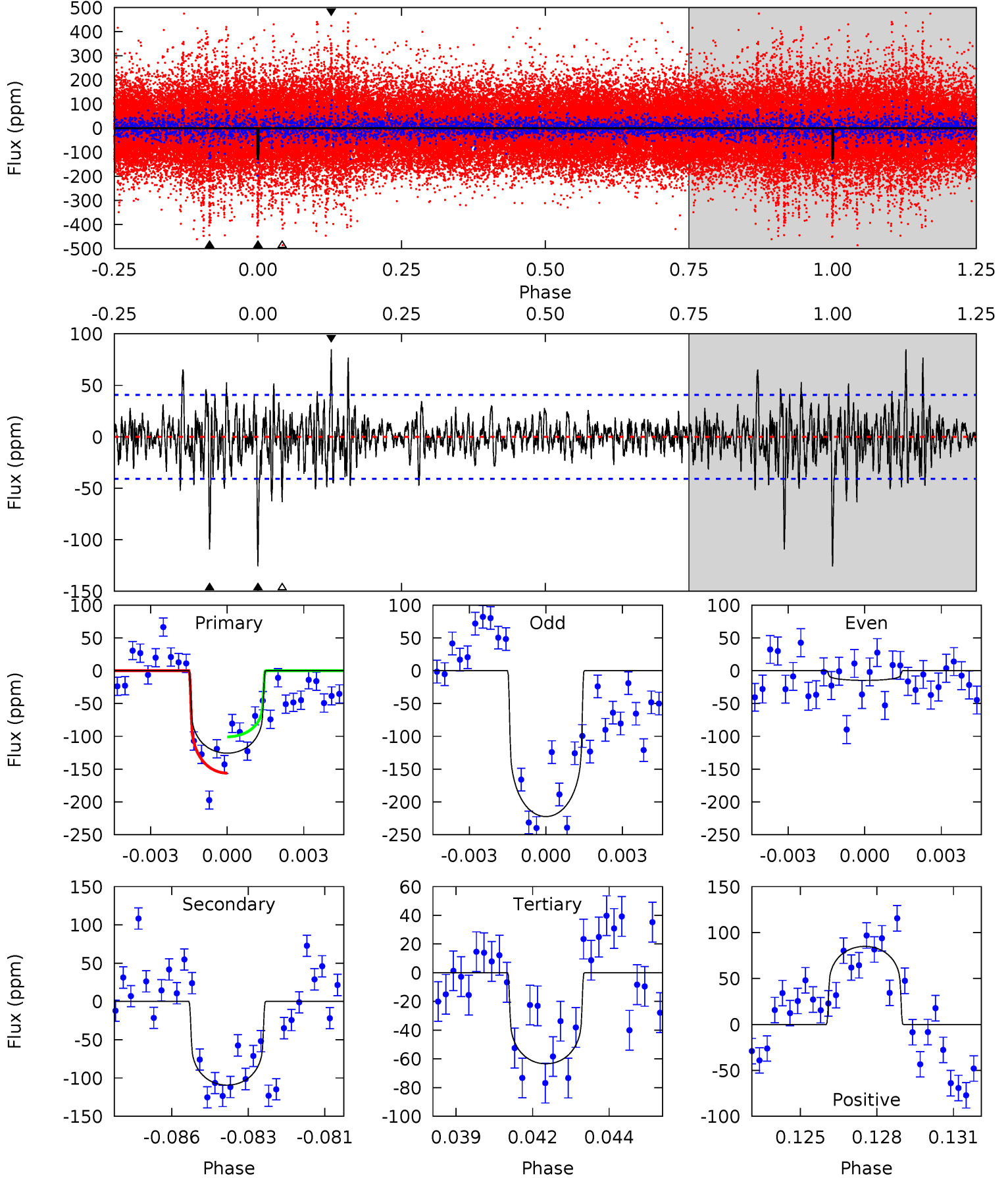
TCE 008430887-01 P=312.429132 Days  $T_0=281.304195$  (BKJD)



# DV Model-Shift Uniqueness Test

008430887-01, P = 312.418163 Days, E = 281.413868 Days

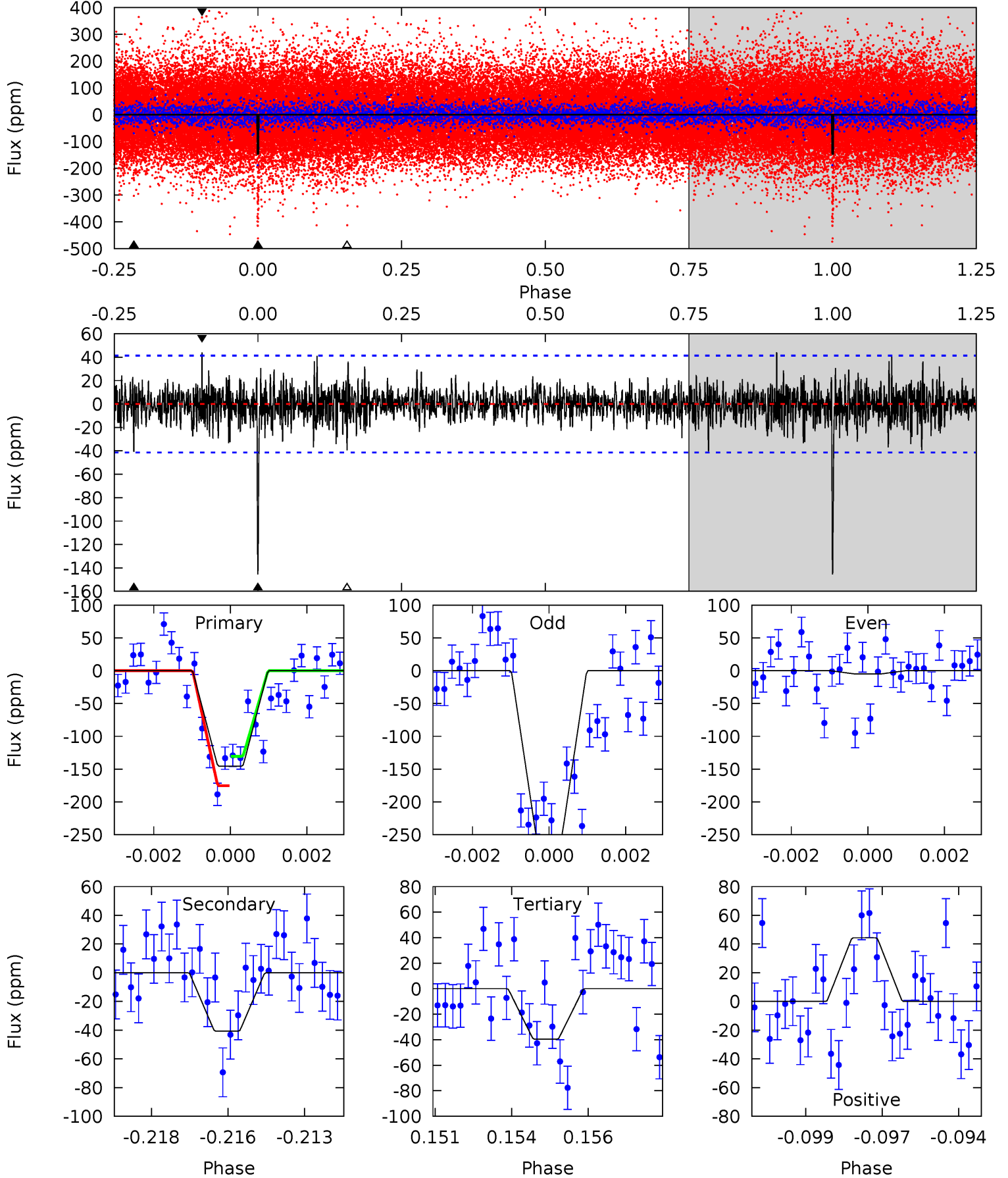
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.2	14.1	8.19	11.0	5.27	2.99	2.04	8.05	5.27	5.92	3.14	13.3	3.58	0.40	3.55



# Alt Model-Shift Uniqueness Test

008430887-01, P = 312.429132 Days, E = 281.304195 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	5.20	5.05	5.66	5.29	3.03	1.25	13.5	12.9	0.15	-0.46	16.0	4.02	0.23	2.86



### Stellar Parameters For KIC 008430887

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5821^{+146}_{-161}$	$4.384^{+0.112}_{-0.138}$	$-0.100^{+0.300}_{-0.300}$	$1.034^{+0.214}_{-0.143}$	$0.944^{+0.117}_{-0.095}$	$1.204^{+0.603}_{-0.472}$
	+3%/-3%	+3%/-3%	+300%/-300%	+21%/-14%	+12%/-10%	+50%/-39%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008430887-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-109 \pm 8$	$1.40^{+0.33}_{-0.31}$	$389^{+22}_{-18}$	$5406^{+656}_{-467}$	$24236^{+15882}_{-8709}$
Alt.	$-41 \pm 8$	$1.48^{+0.33}_{-0.28}$	$390^{+23}_{-21}$	$4293^{+403}_{-324}$	$7940^{+4702}_{-3002}$

$T_{max}$  = 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

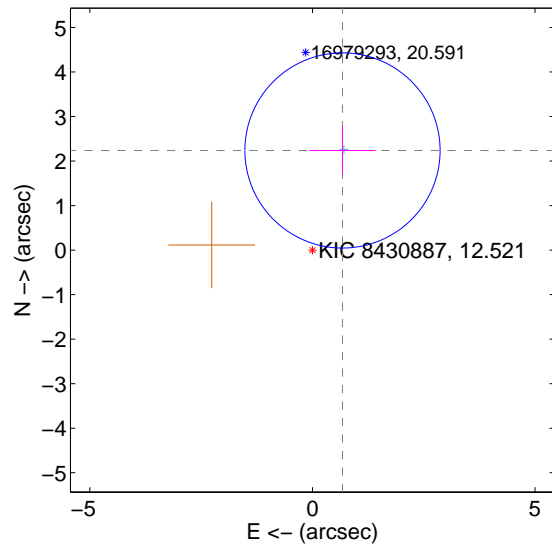
Supplemental centroid analysis for 008430887-01. Kepler magnitude: 12.52. Transit SNR 9.68

There are 1 quarters with good PRF difference image offsets

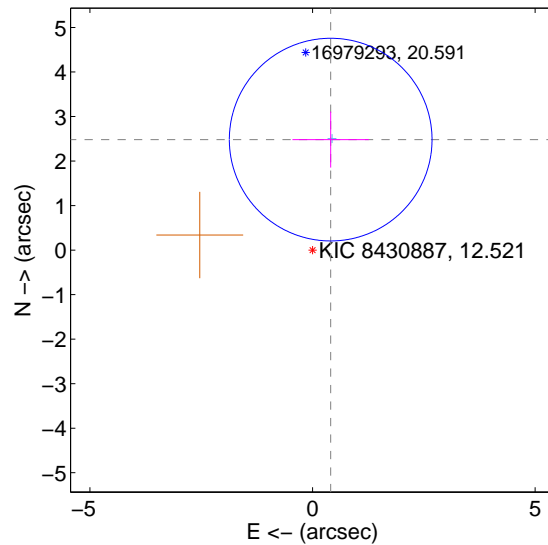
The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.337 \pm 0.731$	3.20	$-0.675 \pm 0.745$	$2.238 \pm 0.540$
PRF-fit source offset from KIC position	$2.515 \pm 0.759$	3.31	$-0.408 \pm 0.860$	$2.481 \pm 0.629$
photometric centroid source offset	$1.25 \pm 0.95$	1.32	$0.80 \pm 0.90$	$-0.96 \pm 0.99$

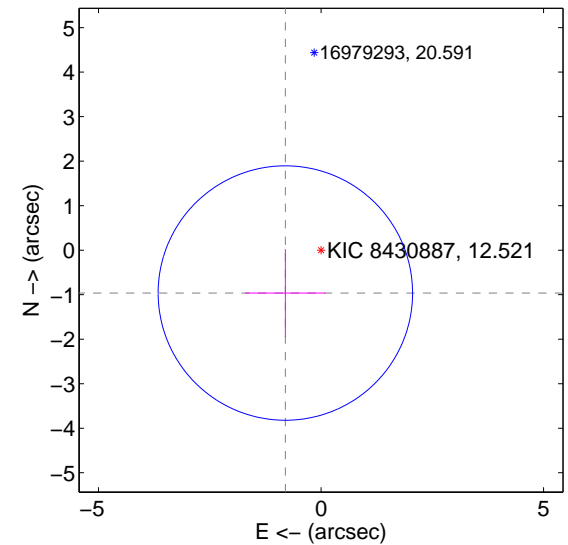
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



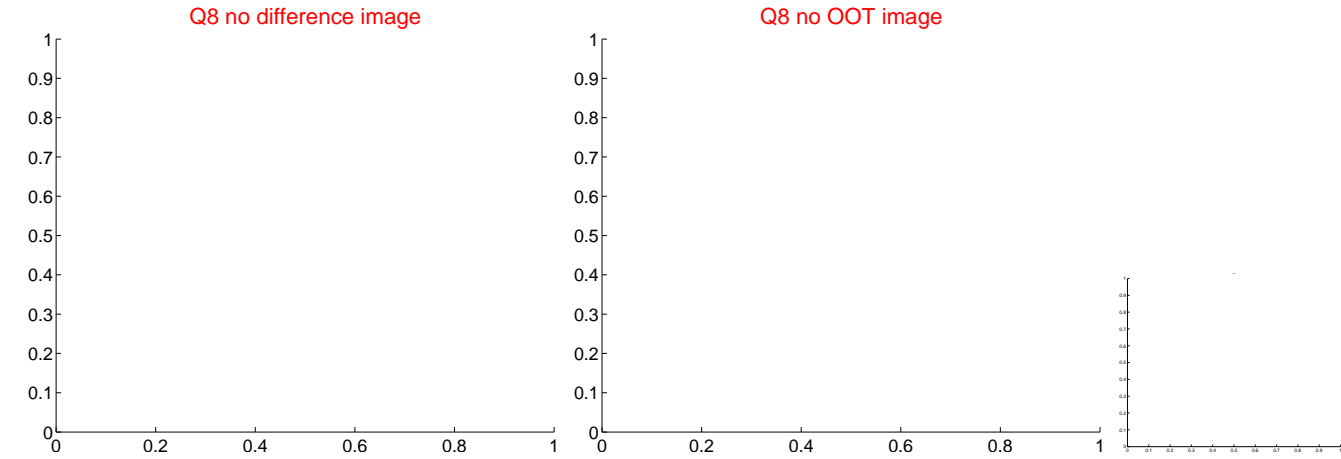
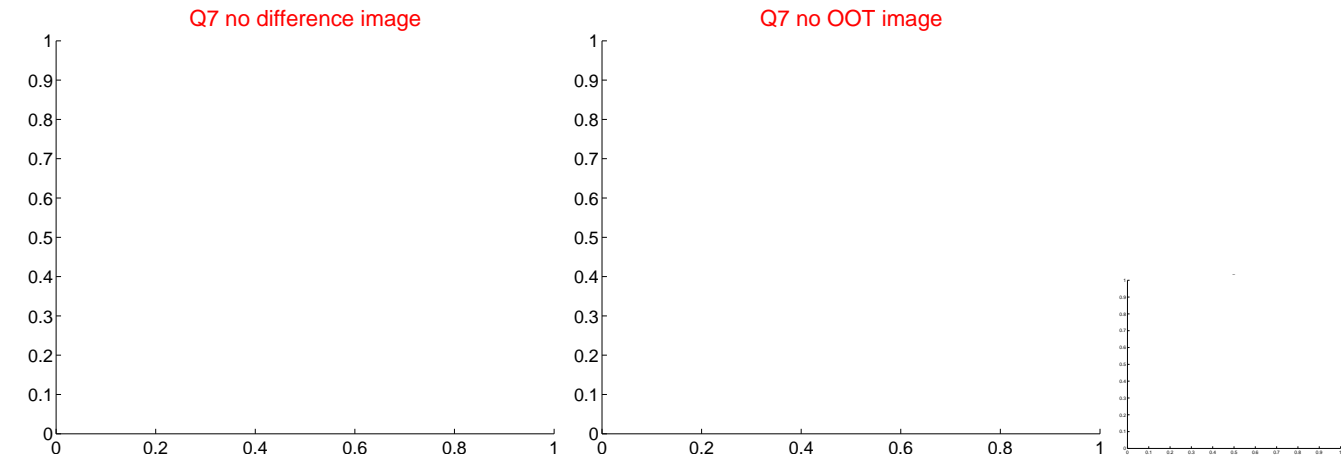
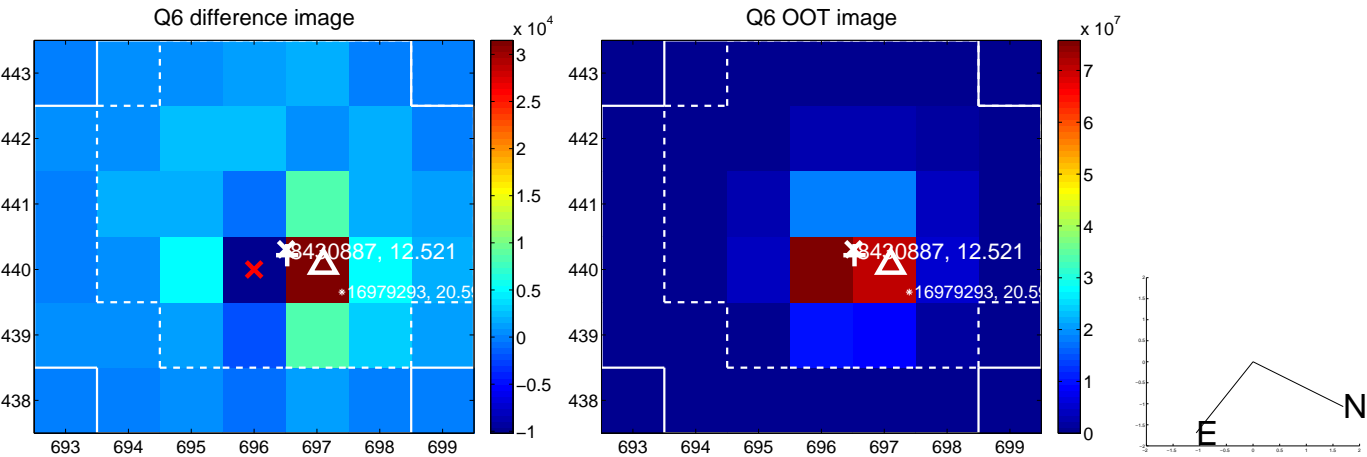
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



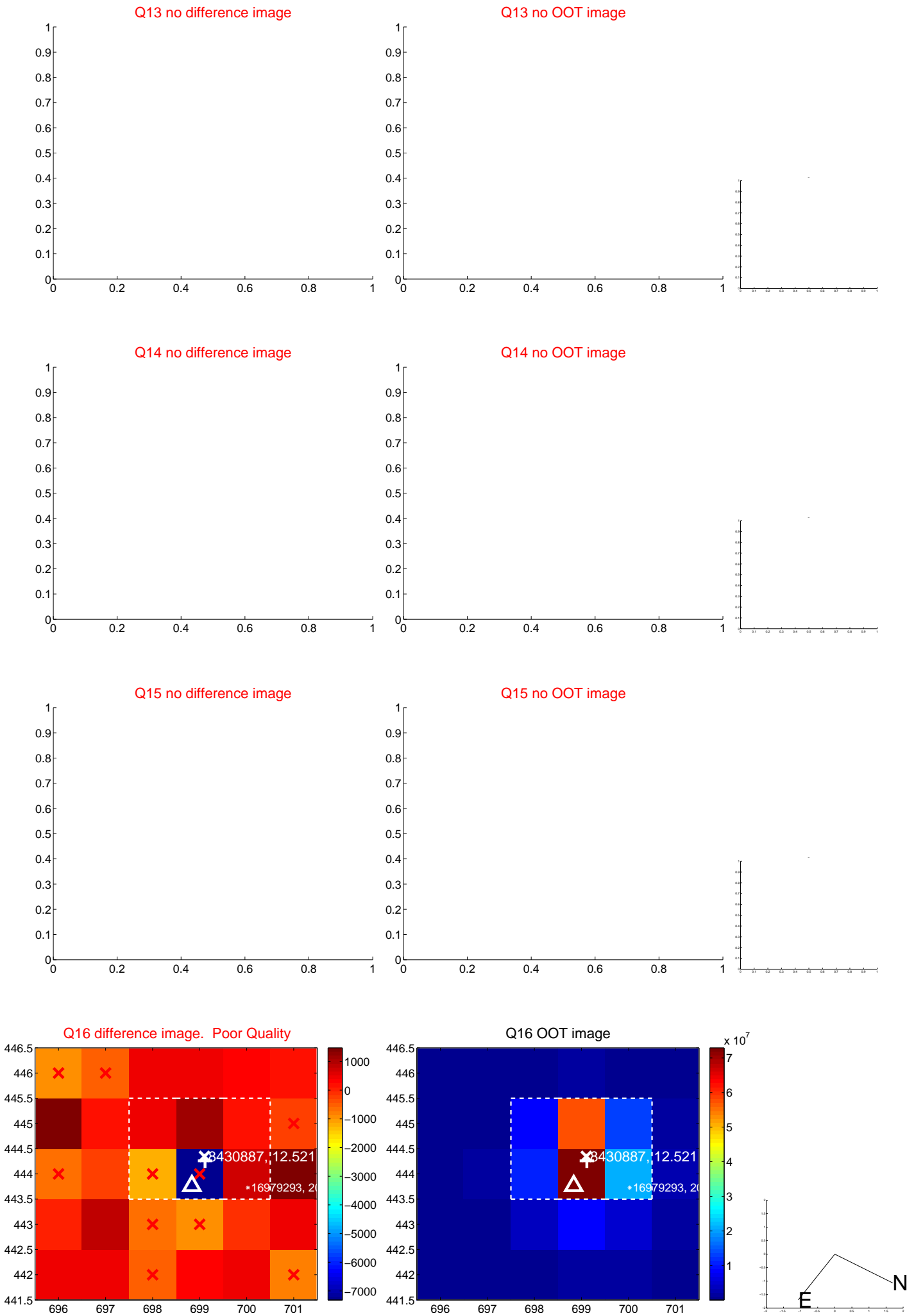
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



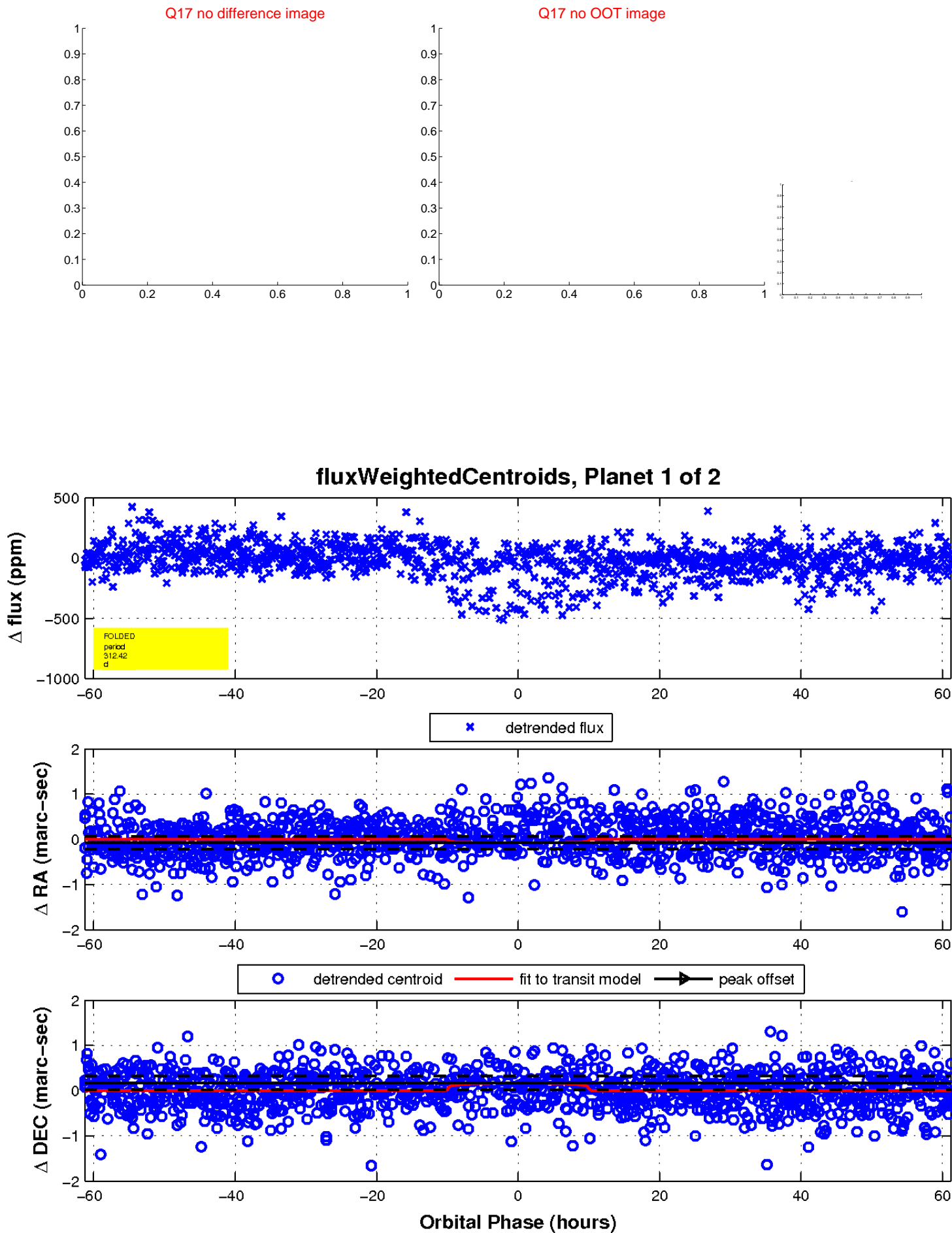
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

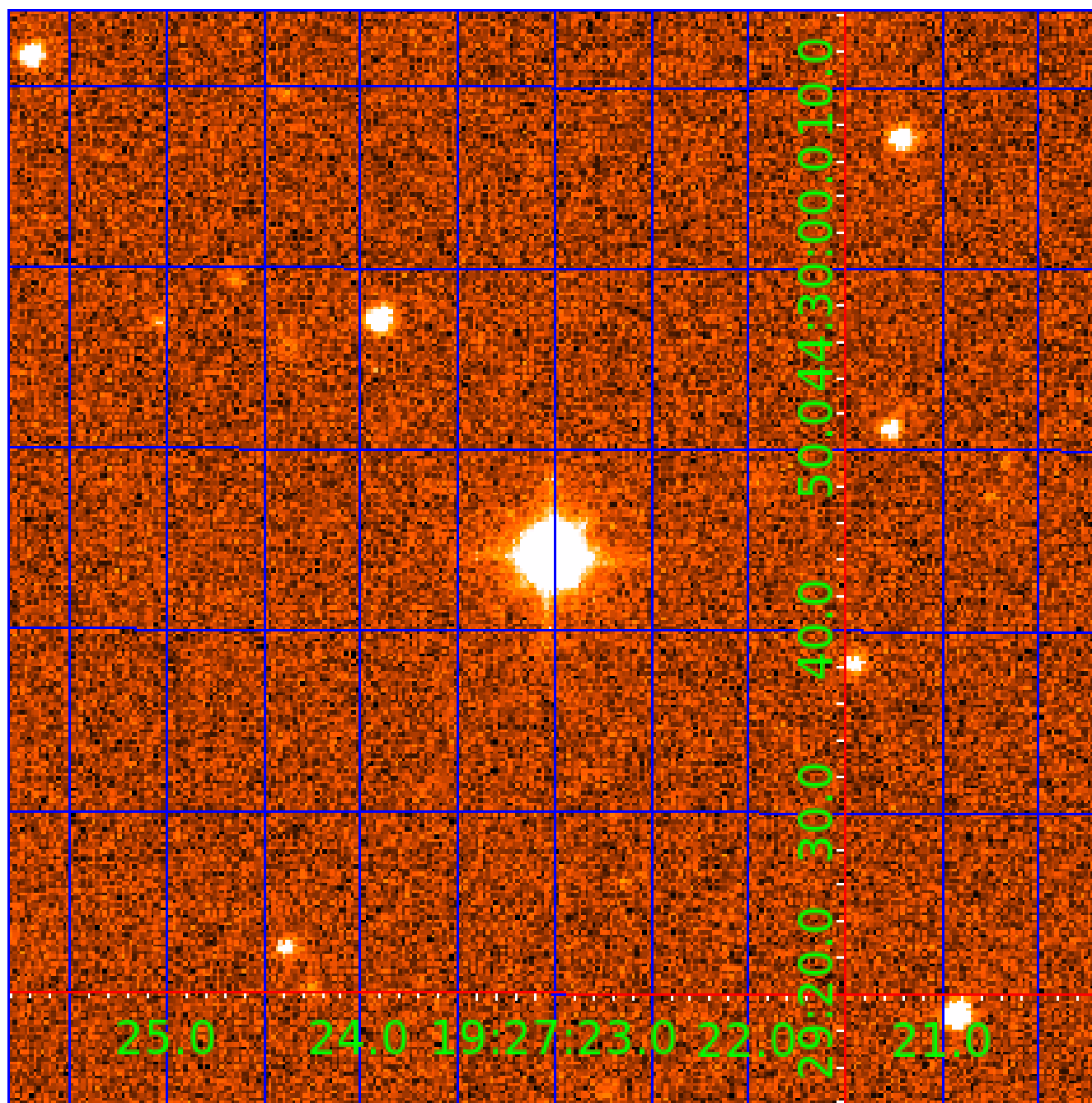


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 008430887

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008430887-01	OBS	No	312.418163	281.413868	150.2	20.425	13.5	9.7	1.03	5821	1.38	1.41
008430887-02	OBS	No	521.710837	409.600712	96.5	12.856	7.2	7.0	1.03	5821	1.17	0.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008430887-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008430887-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_TER_DV—CENT_KIC_POS

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

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

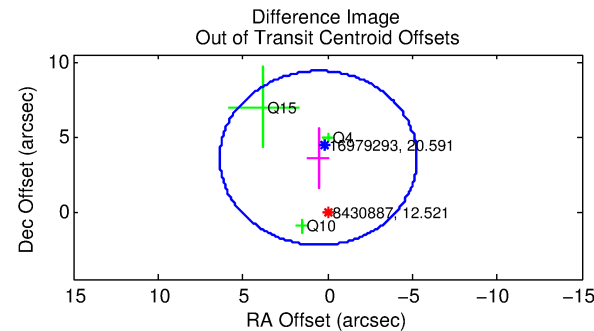
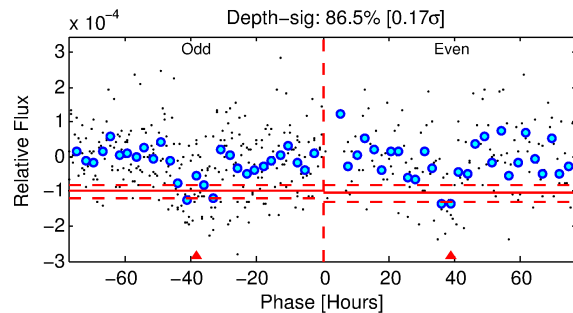
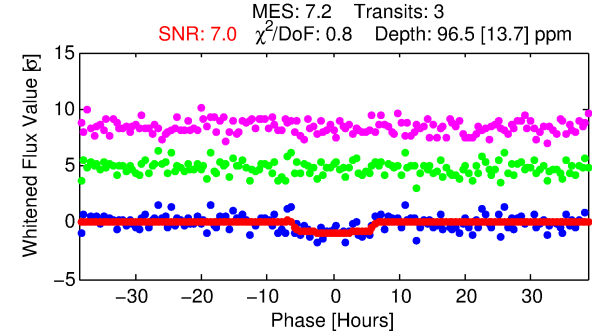
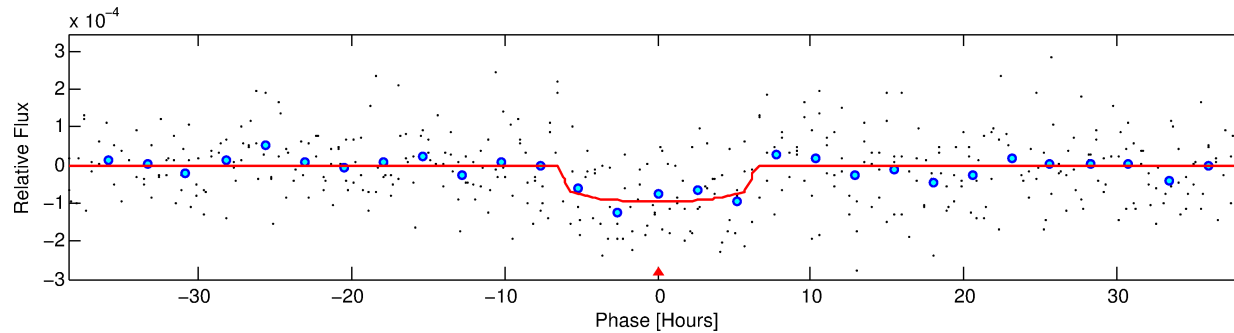
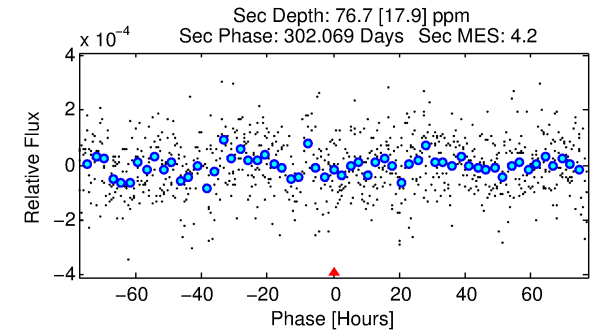
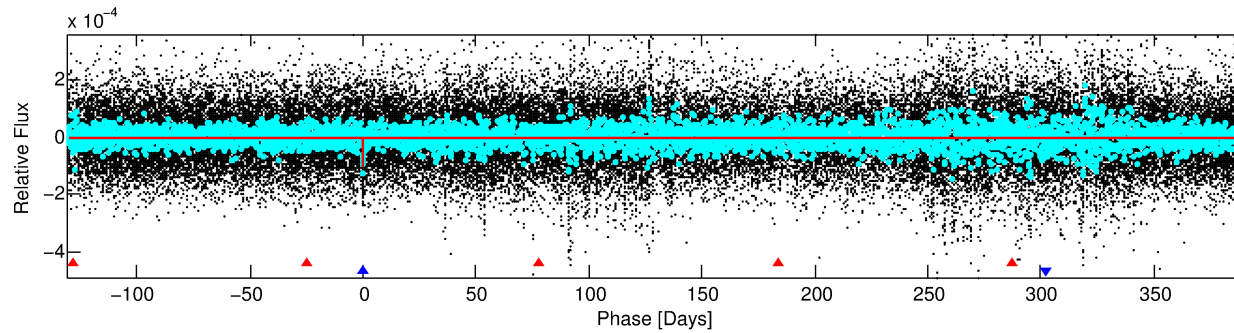
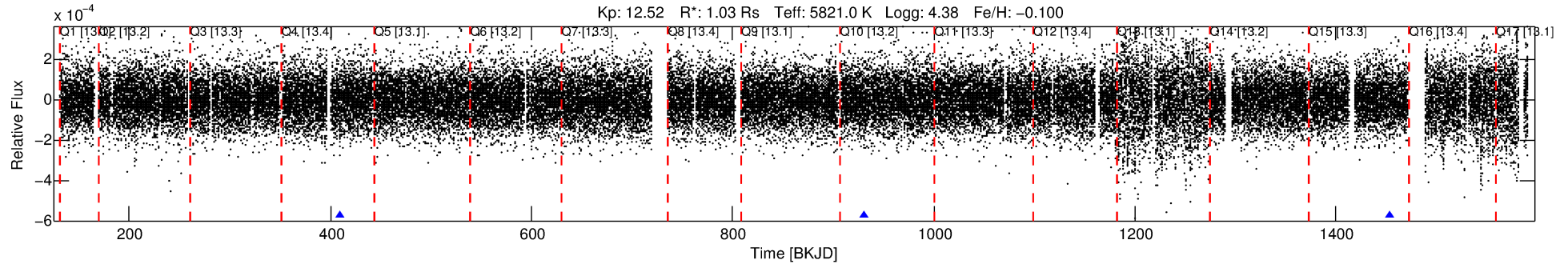
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008430887-02

No Significant Match Found

# DV One-Page Summary

KIC: 8430887 Candidate: 2 of 2 Period: 521.711 d



## DV Fit Results:

Period = 521.71084 [0.01861] d  
Epoch = 409.6007 [0.0197] BKJD  
Rp/R\* = 0.0104 [0.0071]  
a/R\* = 162.49 [547.06]  
b = 0.86 [1.00]  
Seff = 0.71 [0.20]  
Teq = 234 [16] K  
Rp = 1.17 [0.84] Re  
a = 1.2445 [0.2165] AU  
Ag = 47884.43 [67701.72] [0.71σ]  
Teffp = 5354 [1868] K [2.74σ]

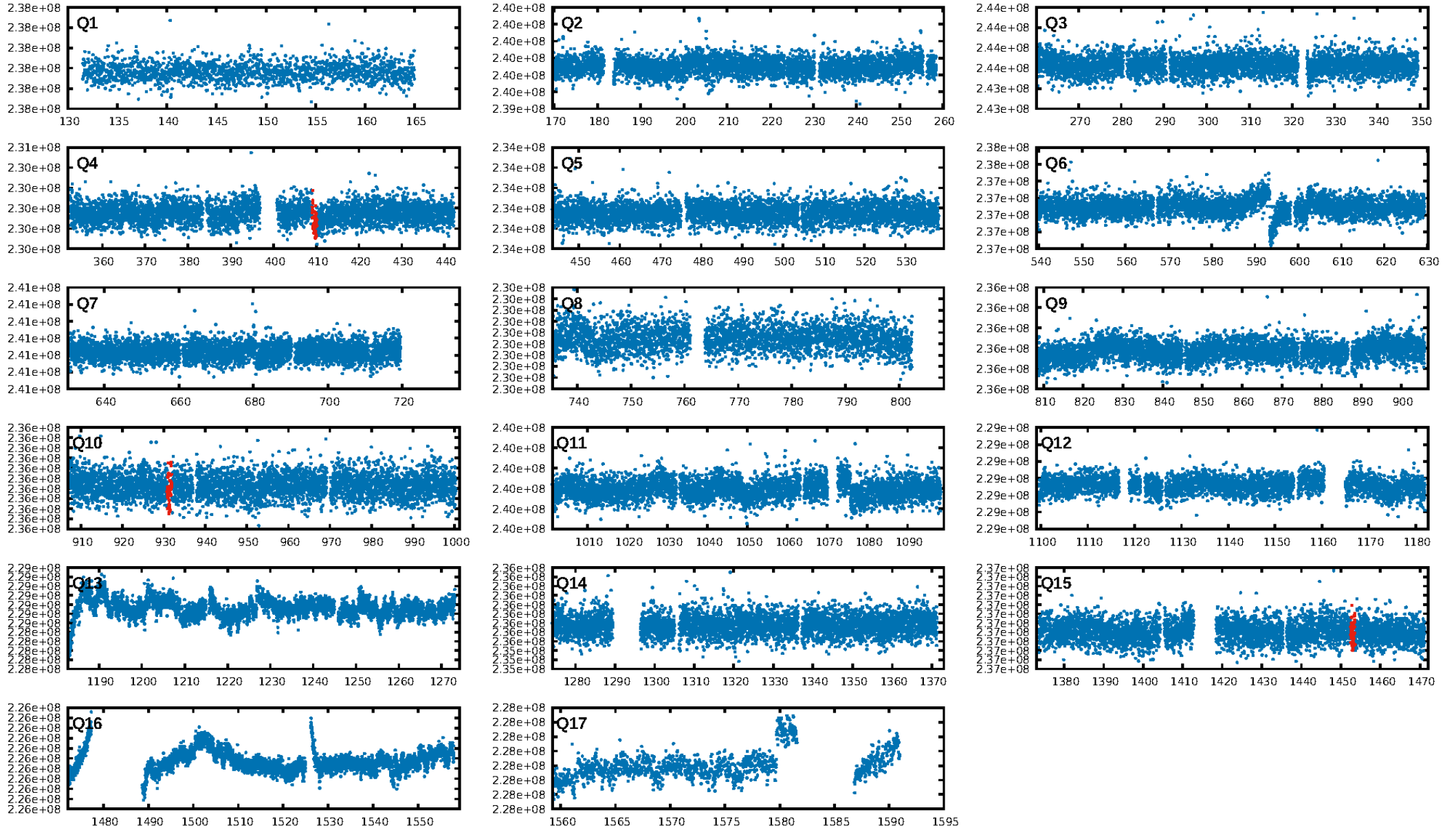
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [208.13σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 24.8%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: 1.97e-09  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 5.741  
Centroid-sig: 66.8%  
Centroid-so: 0.886 arcsec [0.43σ]  
OotOffset-rm: 3.616 arcsec [1.86σ]  
KicOffset-rm: 3.871 arcsec [1.78σ]  
OotOffset-st: 1/1/1/0 [3]  
KicOffset-st: 1/1/1/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

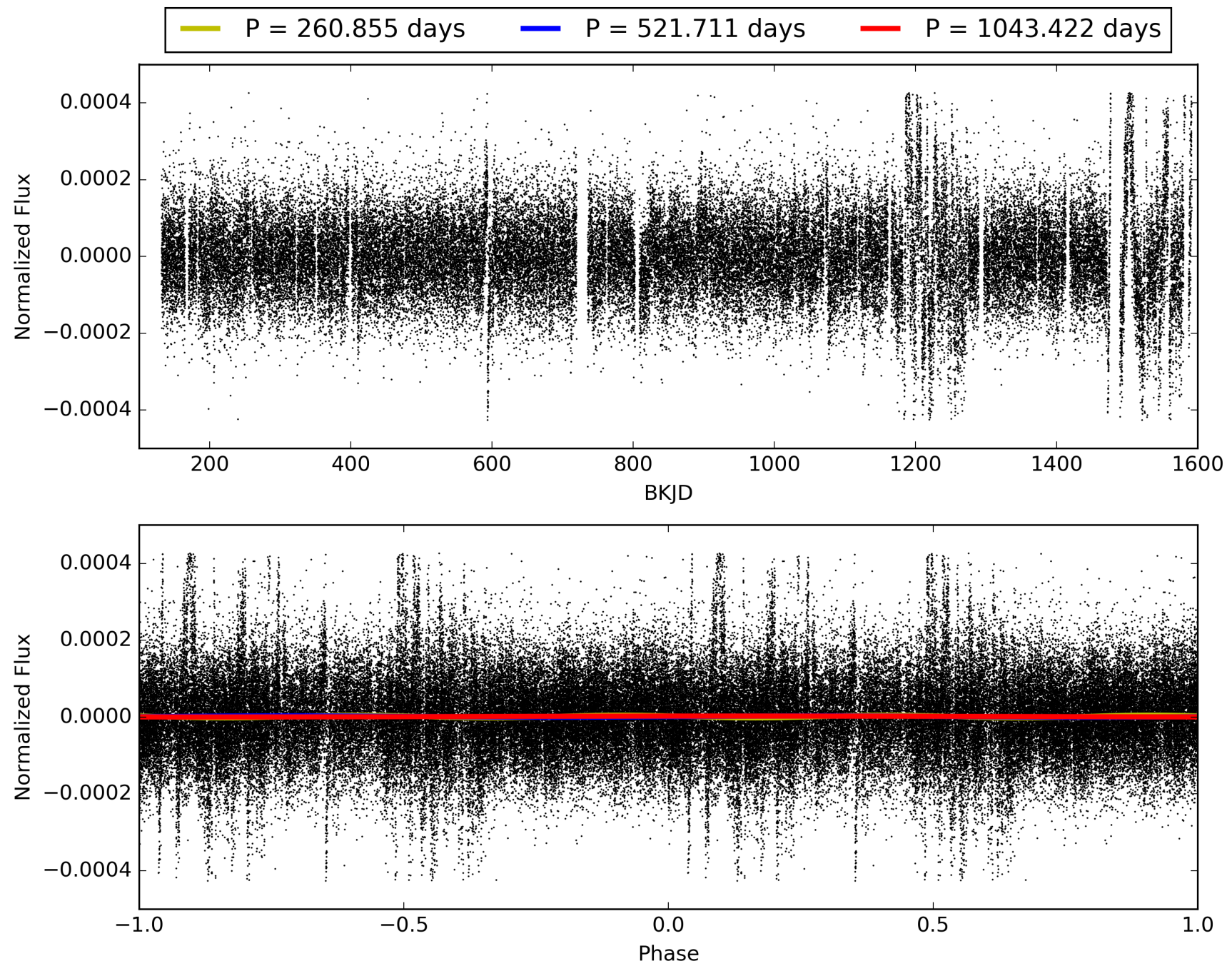
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:09:55 Z

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

# TCE 008430887-02, PDC Light Curves

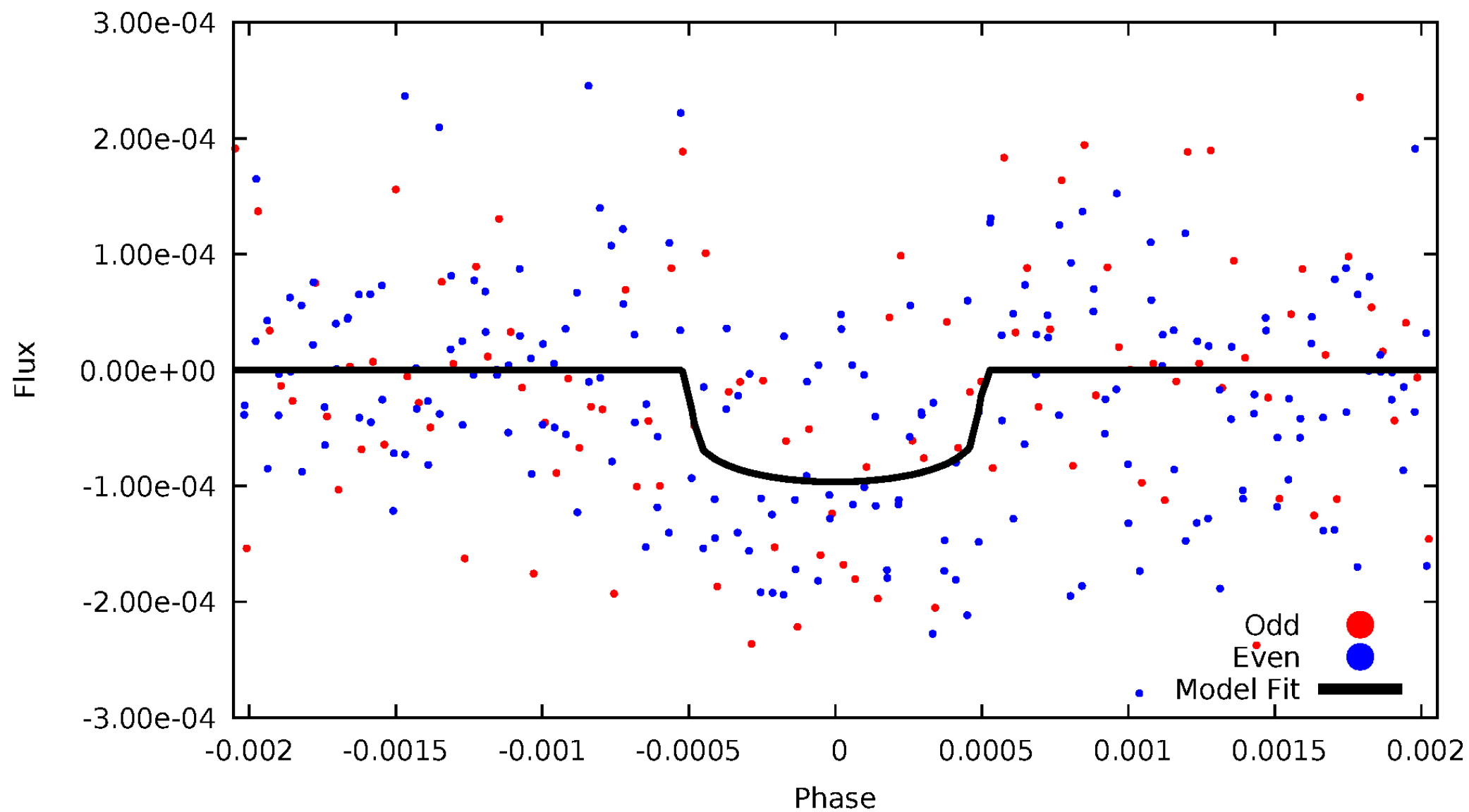


TCE 008430887-02



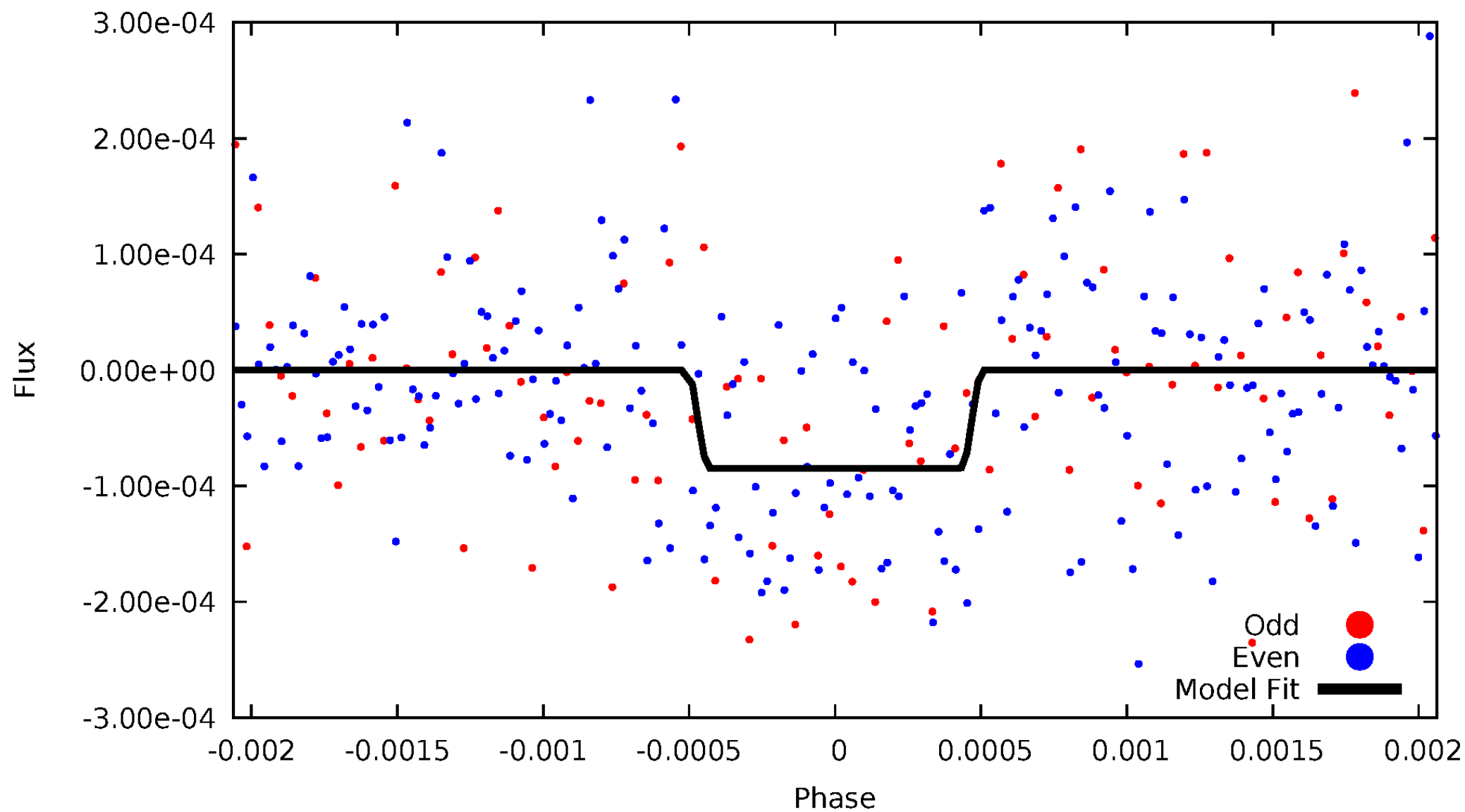
# DV Odd/Even

TCE 008430887-02



# ALT Odd/Even

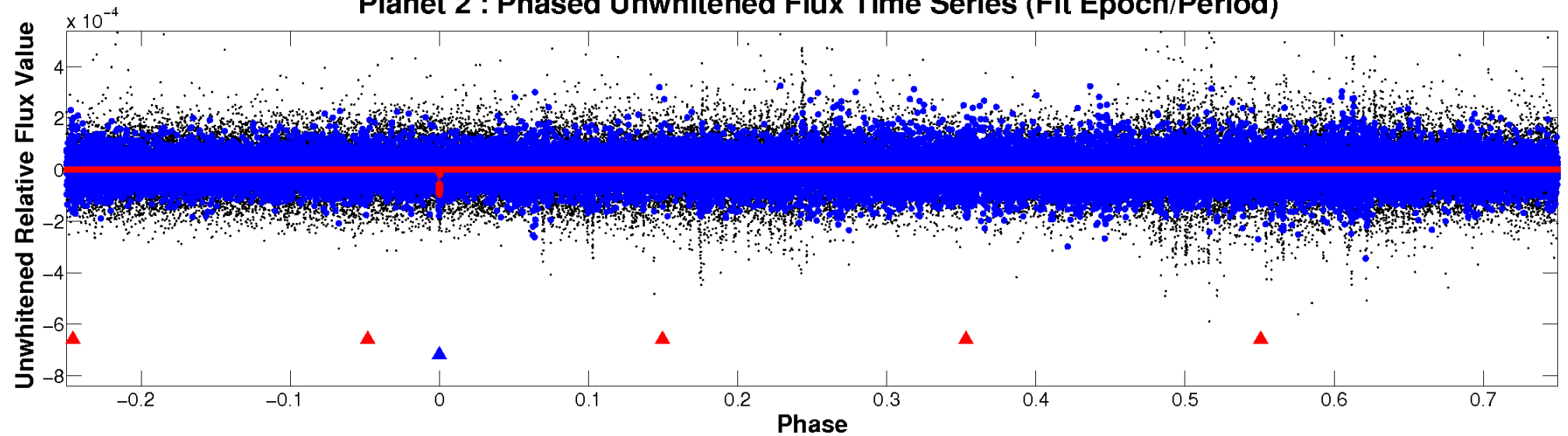
TCE 008430887-02



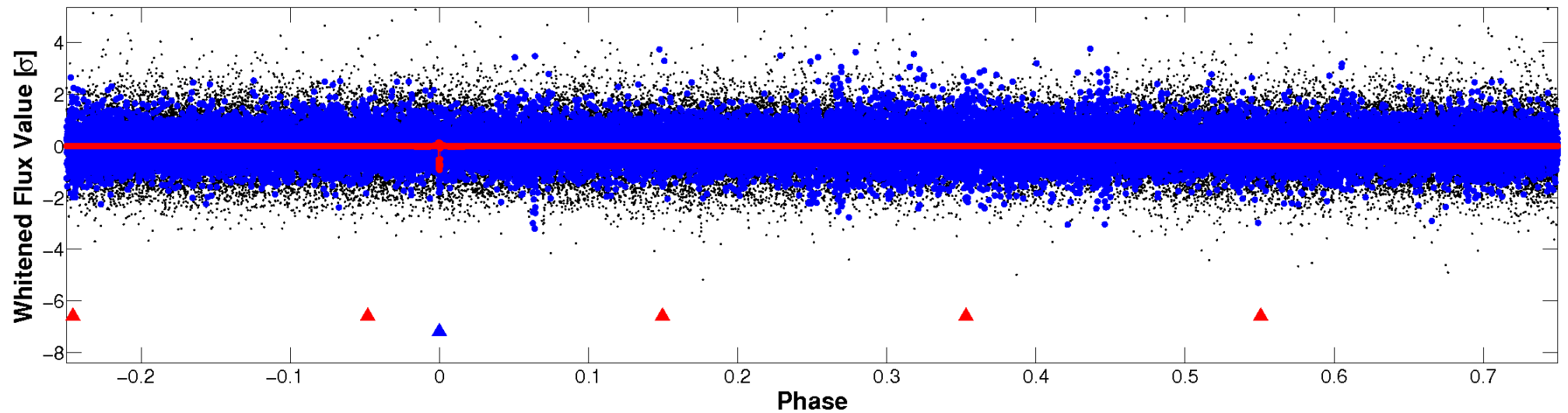


# Non-Whitened Vs. Whitened Light Curve

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

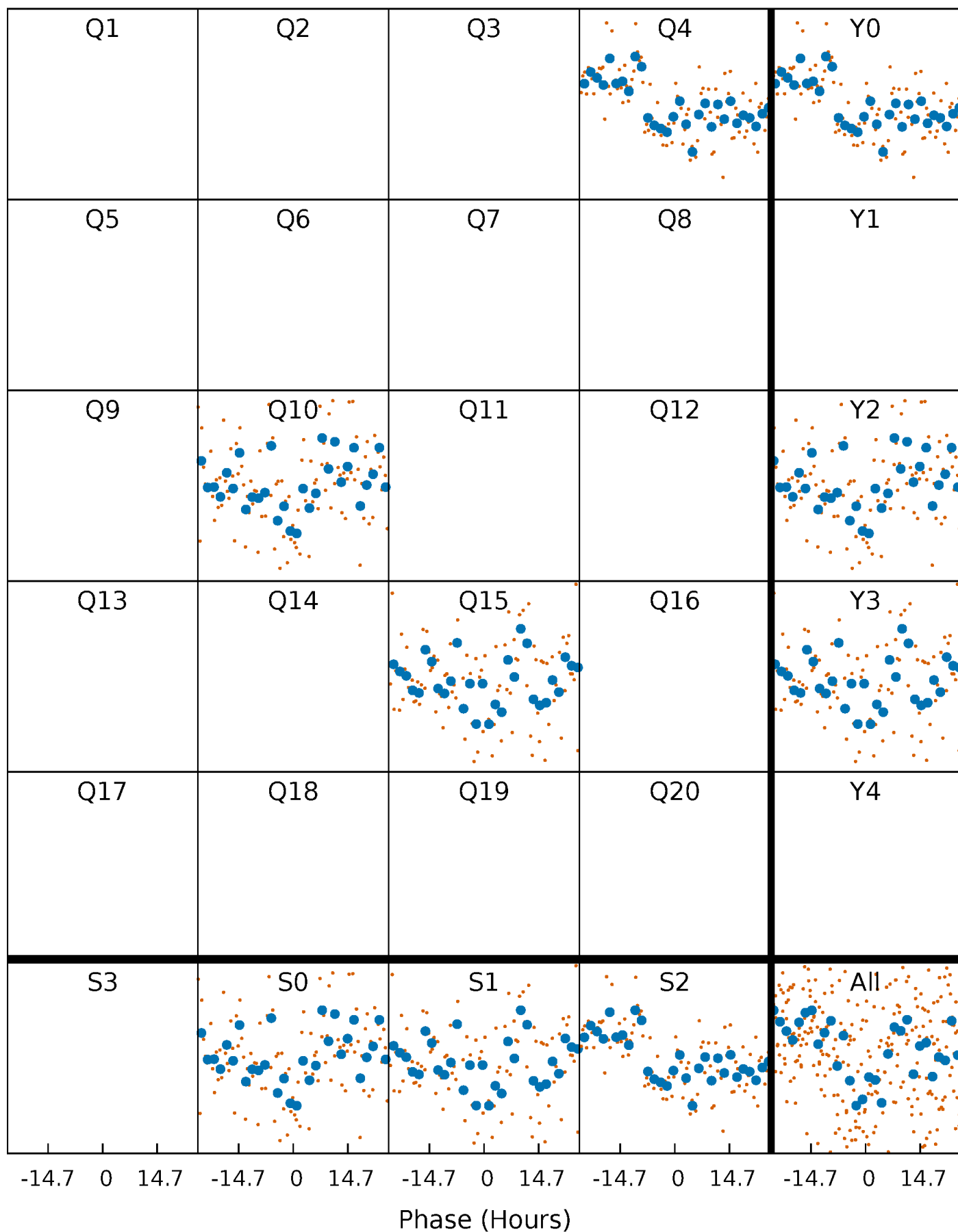


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



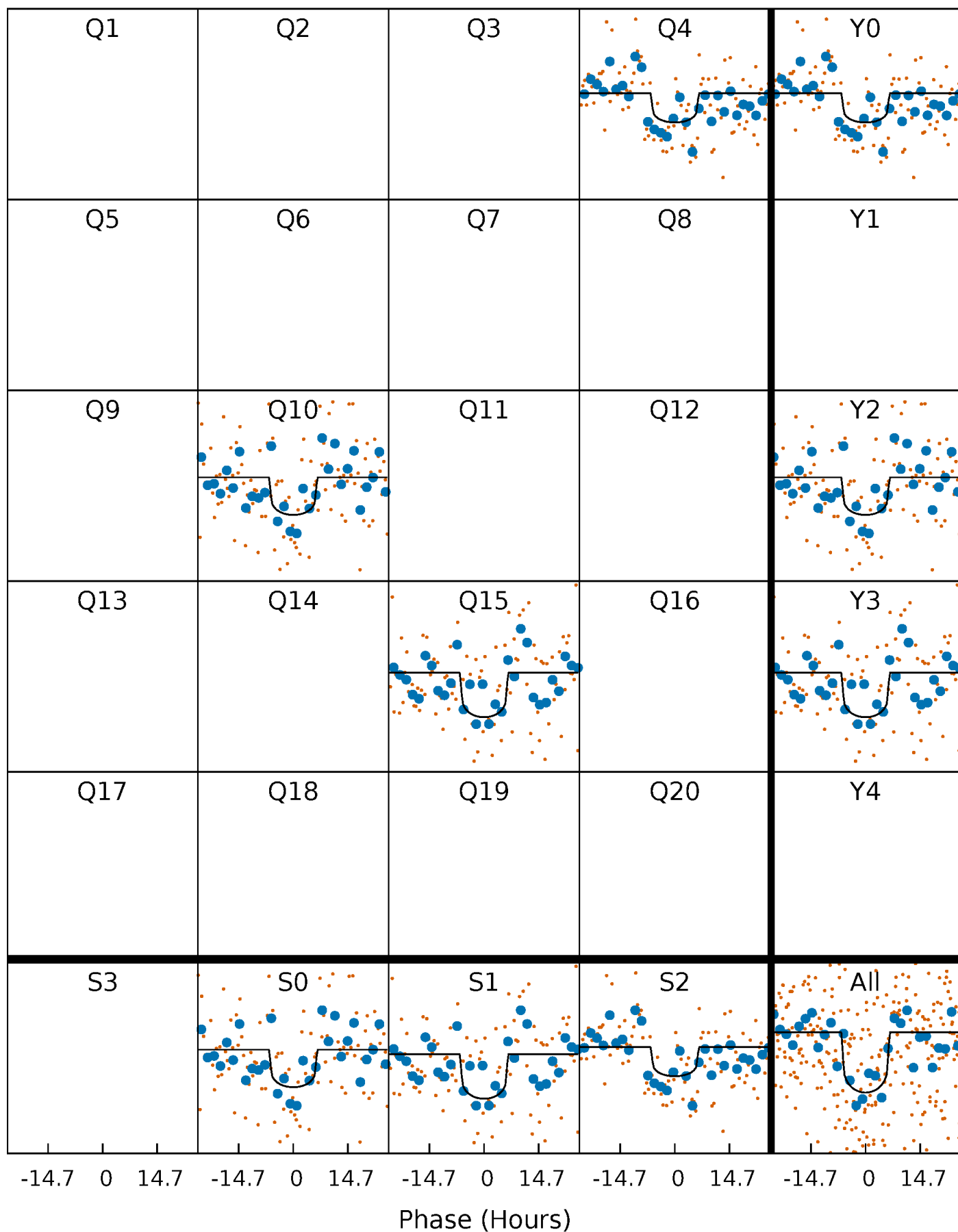
# PDC Quarter-Phased Transit Curves

TCE 008430887-02     $P=521.710837$  Days     $T_0=409.600712$  (BKJD)



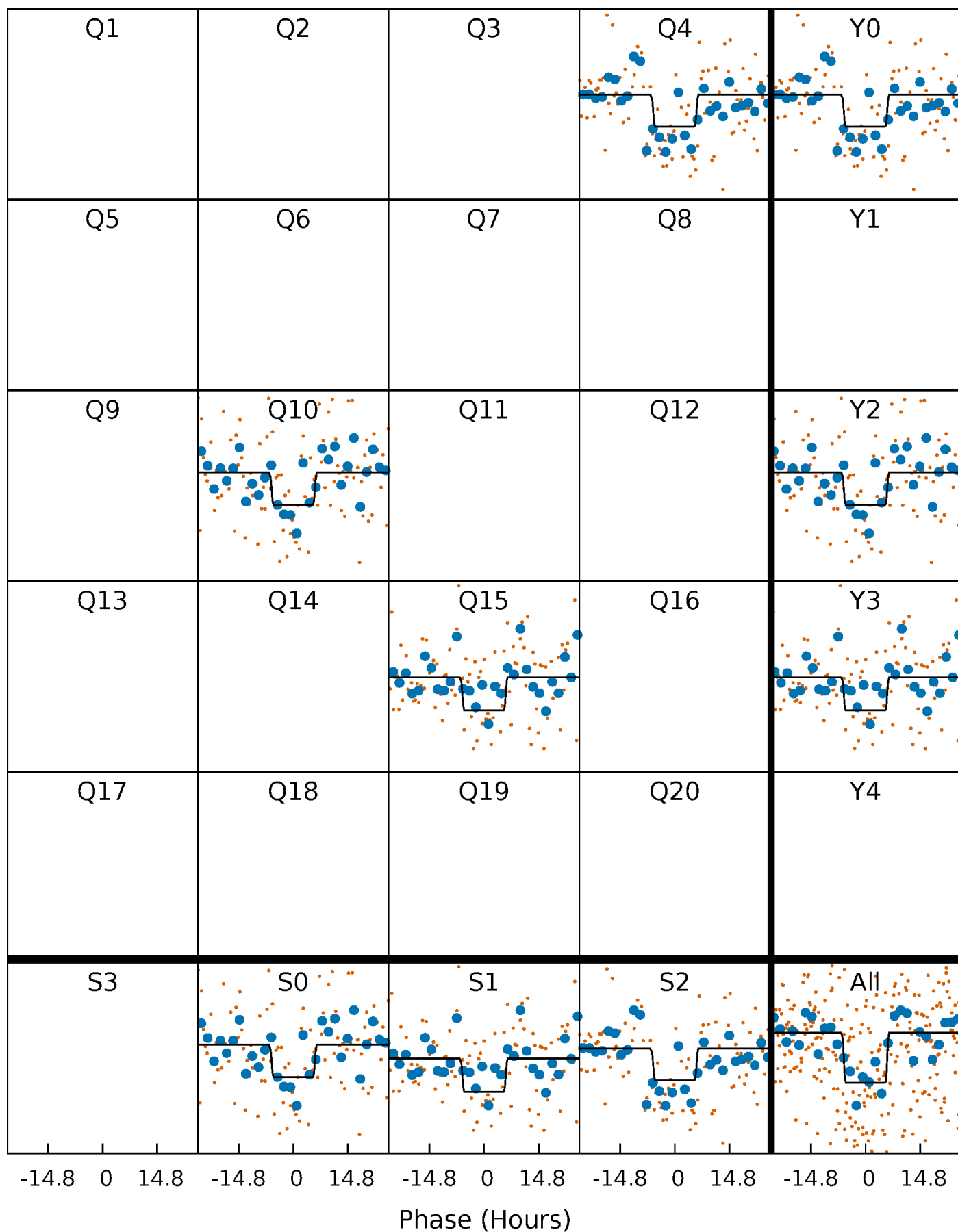
# DV Quarter-Phased Transit Curves

TCE 008430887-02 P=521.710837 Days  $T_0=409.600712$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

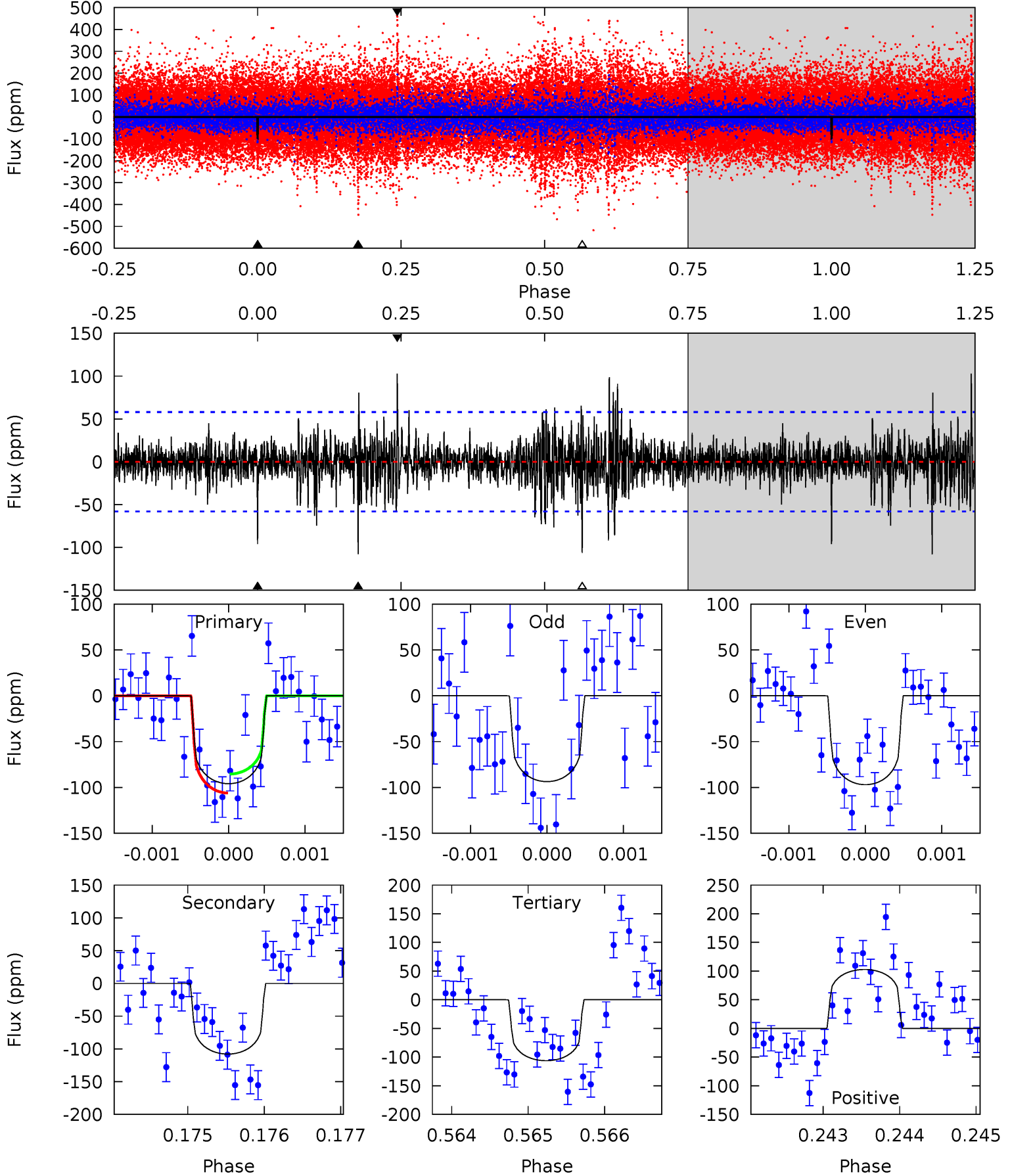
TCE 008430887-02 P=521.716465 Days  $T_0=409.599149$  (BKJD)



# DV Model-Shift Uniqueness Test

008430887-02, P = 521.710837 Days, E = 409.600712 Days

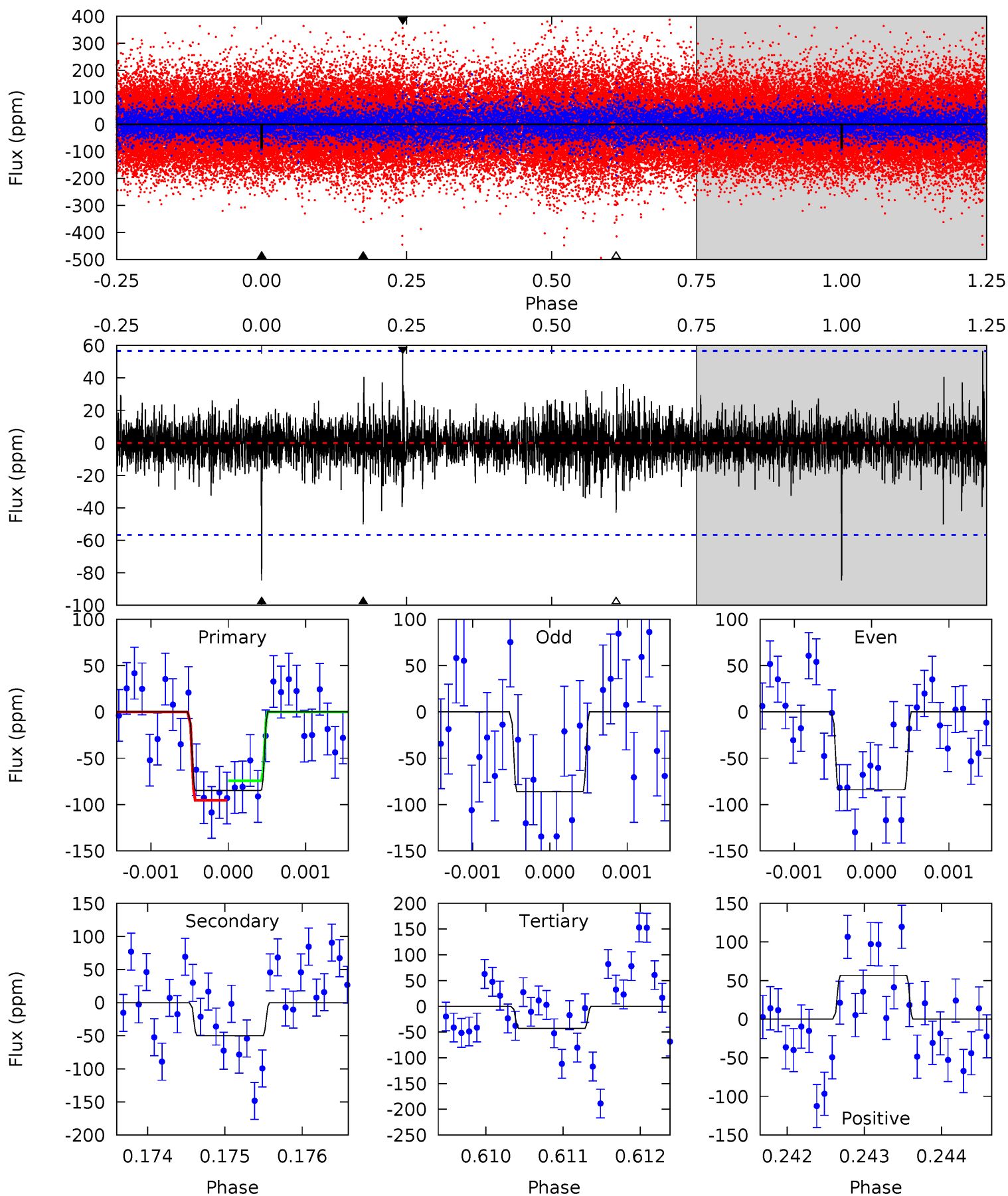
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.99	10.1	9.97	9.64	5.44	3.27	1.75	-0.98	-0.65	0.15	0.48	0.15	1.02	0.49	0.97



# Alt Model-Shift Uniqueness Test

008430887-02, P = 521.716465 Days, E = 409.599149 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
8.15	4.81	4.13	5.45	5.45	3.29	0.88	4.02	2.70	0.68	-0.64	0.10	0.98	0.40	1.00





### Stellar Parameters For KIC 008430887

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5821^{+146}_{-161}$	$4.384^{+0.112}_{-0.138}$	$-0.100^{+0.300}_{-0.300}$	$1.034^{+0.214}_{-0.143}$	$0.944^{+0.117}_{-0.095}$	$1.204^{+0.603}_{-0.472}$
	+3%/-3%	+3%/-3%	+300%/-300%	+21%/-14%	+12%/-10%	+50%/-39%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008430887-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-108 \pm 11$	$1.20^{+0.81}_{-0.65}$	$327^{+20}_{-16}$	$5778^{+2991}_{-1170}$	$63864^{+226519}_{-41444}$
Alt.	$-50 \pm 10$	$1.09^{+0.76}_{-0.66}$	$328^{+18}_{-17}$	$5013^{+3117}_{-922}$	$35552^{+192488}_{-23485}$

$T_{max}$  = 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

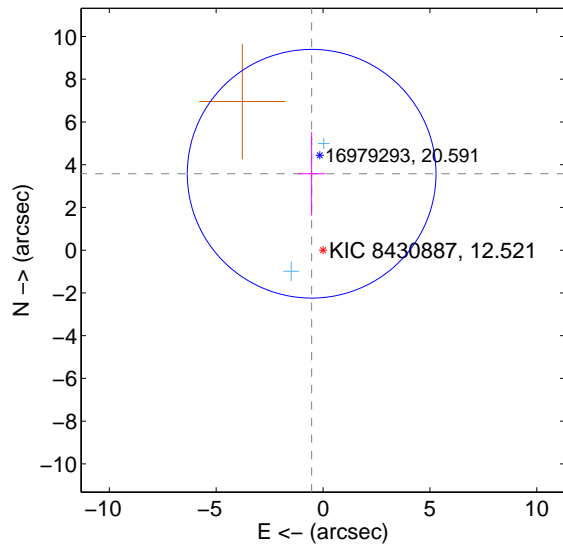
Supplemental centroid analysis for 008430887-02. Kepler magnitude: 12.52. Transit SNR 6.97

There are 2 quarters with good PRF difference image offsets

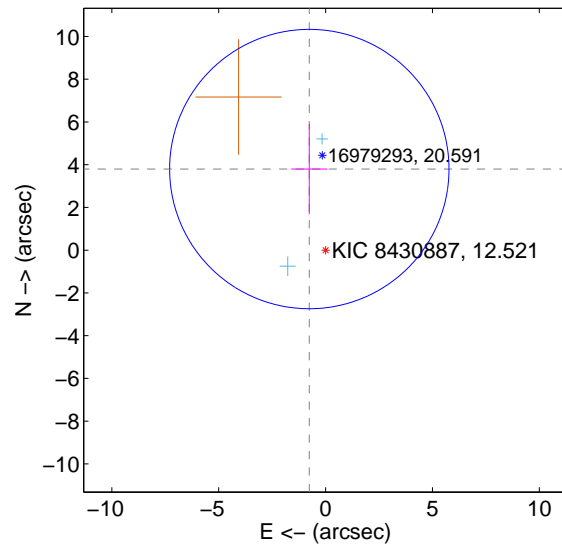
The direct PRF centroid is offset from the target star catalog position by about 0.36 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.616 \pm 1.939$	1.86	$0.533 \pm 0.633$	$3.576 \pm 1.958$
PRF-fit source offset from KIC position	$3.871 \pm 2.179$	1.78	$0.761 \pm 0.849$	$3.796 \pm 2.112$
photometric centroid source offset	$0.89 \pm 2.05$	0.43	$-0.77 \pm 2.04$	$-0.44 \pm 2.07$

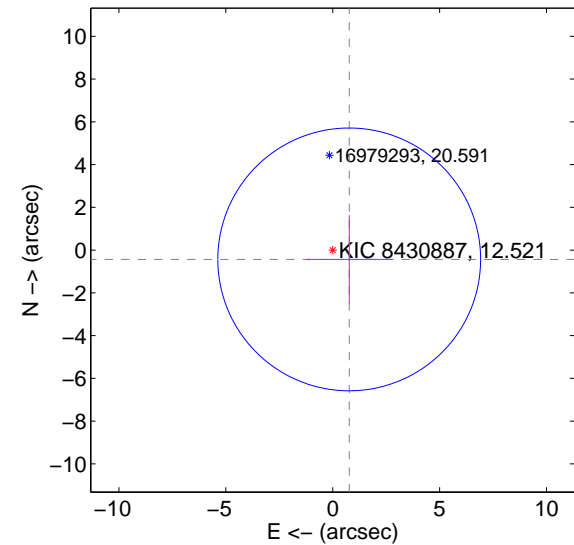
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

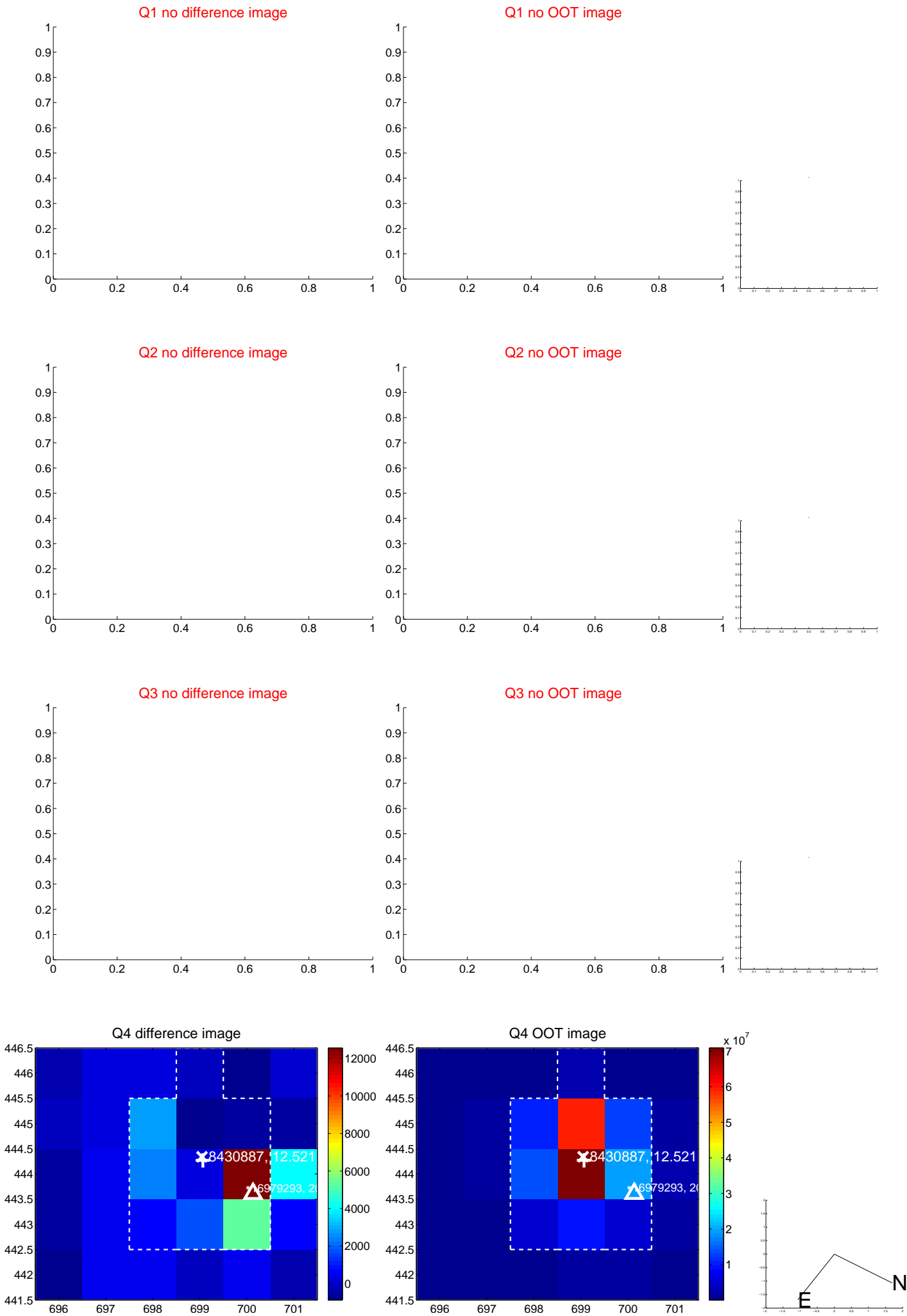


offset from photometric centroids



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.

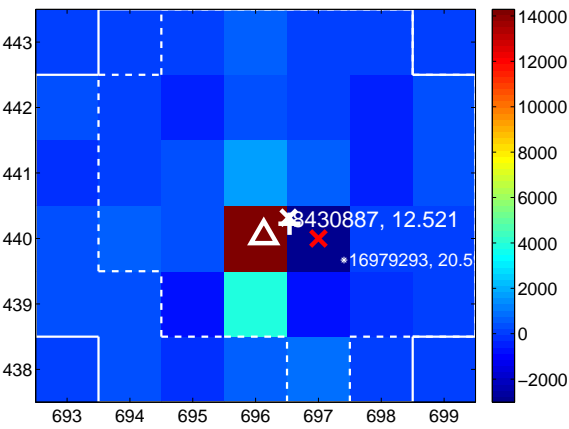
Q9 no difference image



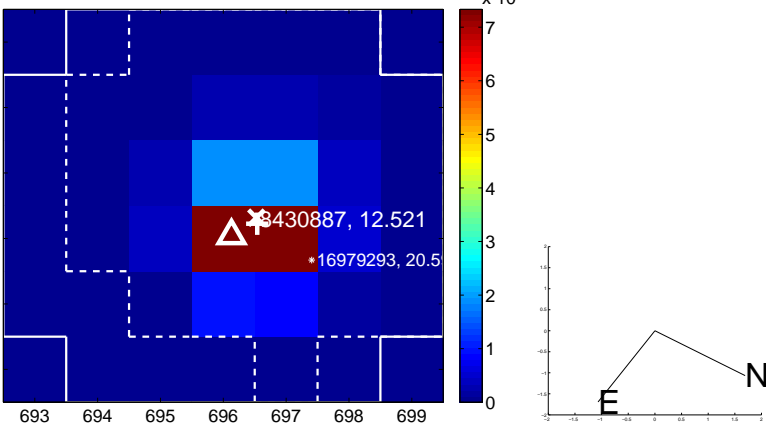
Q9 no OOT image



Q10 difference image



Q10 OOT image



Q11 no difference image



Q11 no OOT image



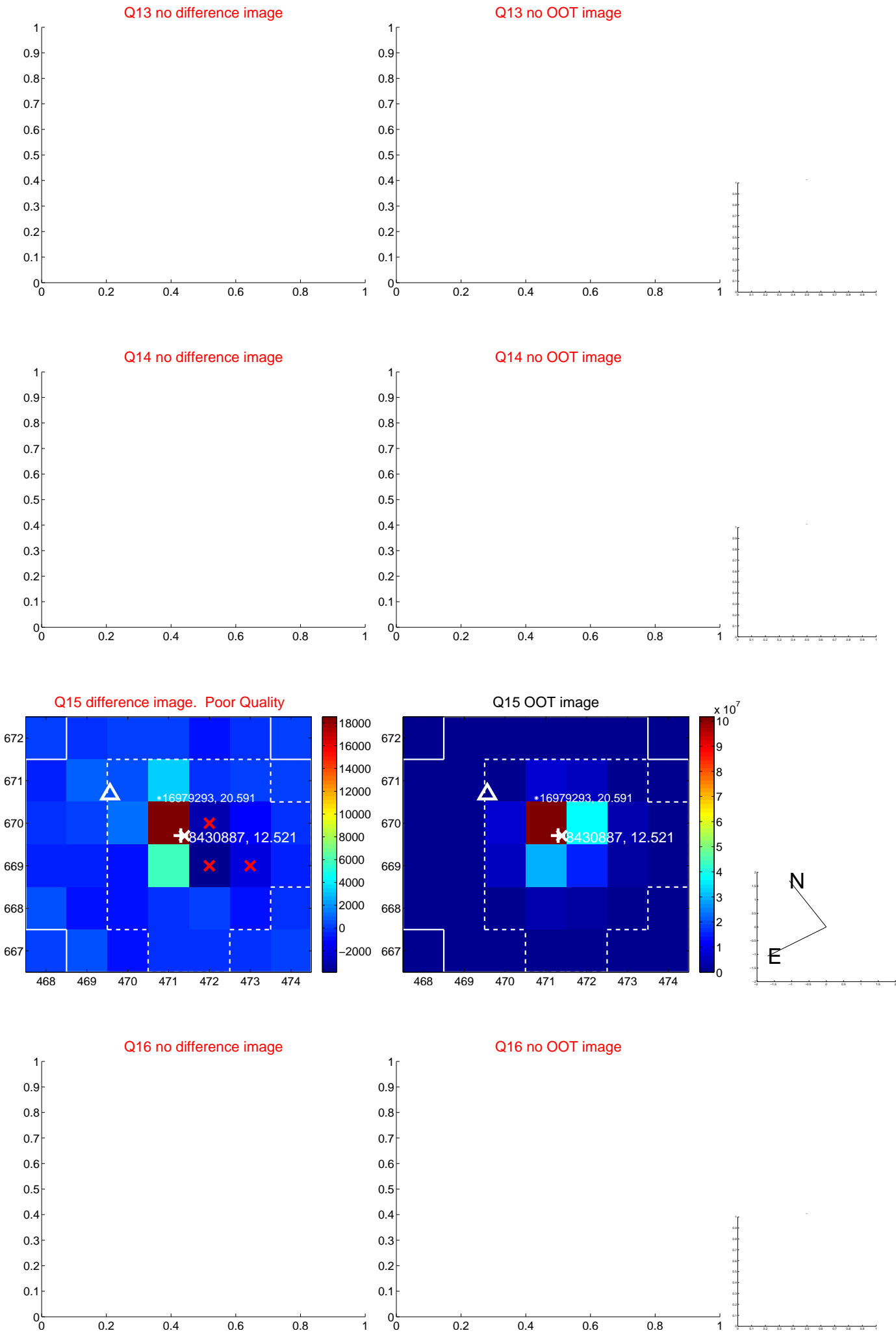
Q12 no difference image



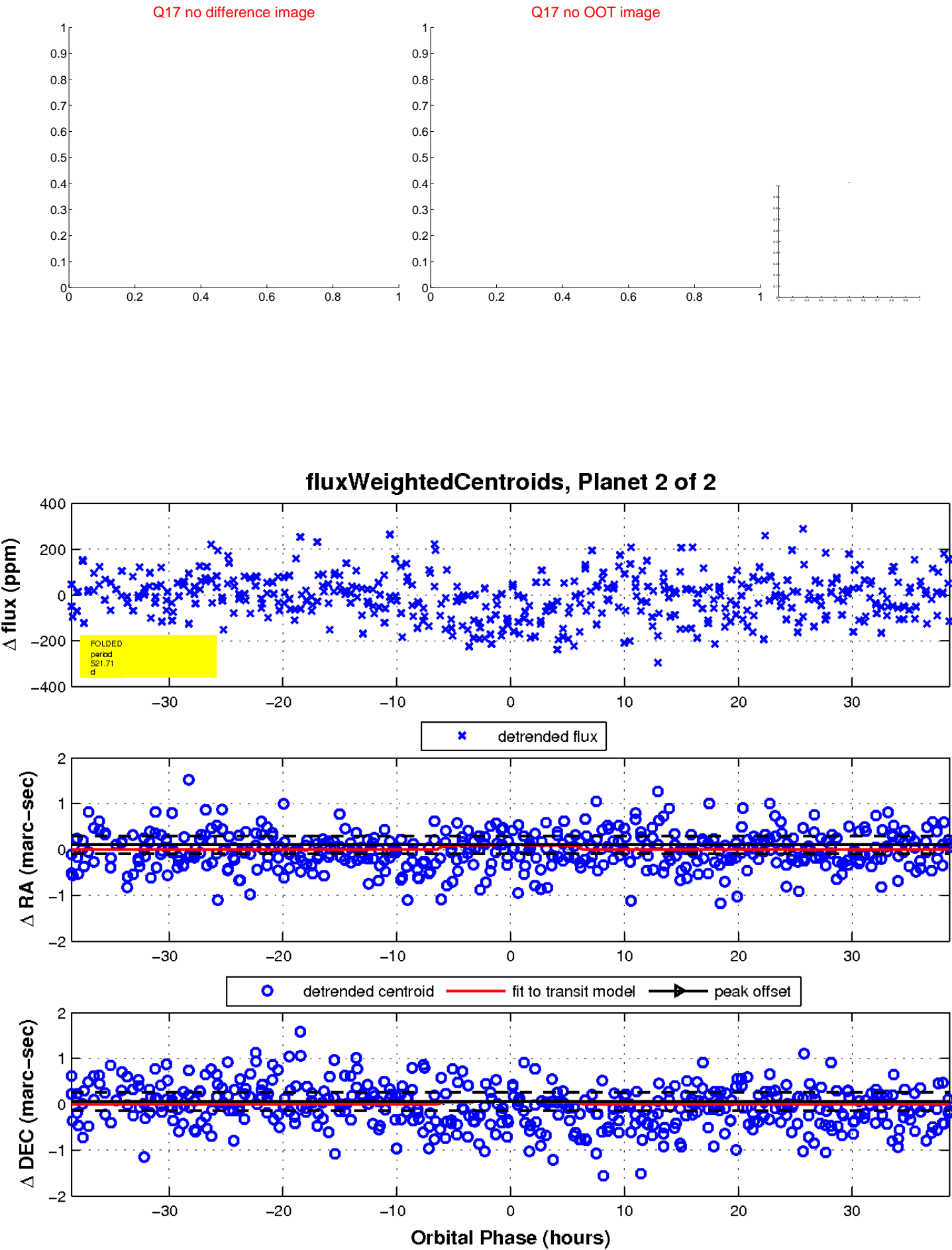
Q12 no OOT image



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.



UKIRT Image

Declination

