

# KIC 012835232

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012835232-01	OBS	No	373.139862	463.682331	2637.8	5.596	11.4	6.1	0.49	3744	2.66	0.07
012835232-02	OBS	No	309.078219	281.169378	3329.9	4.758	10.3	8.5	0.49	3744	3.46	0.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012835232-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
012835232-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

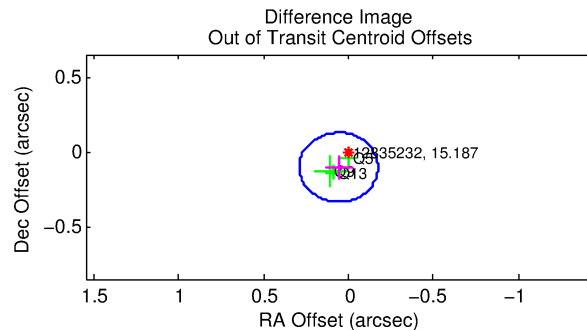
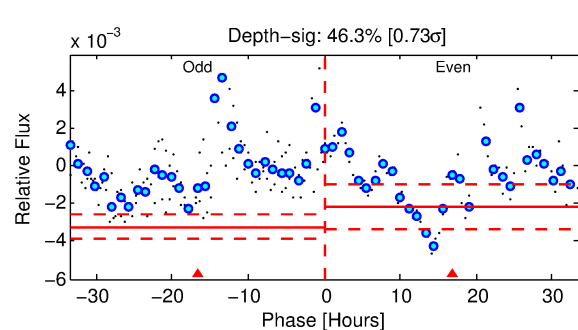
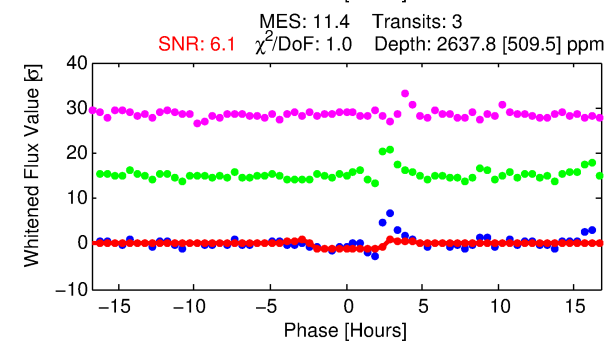
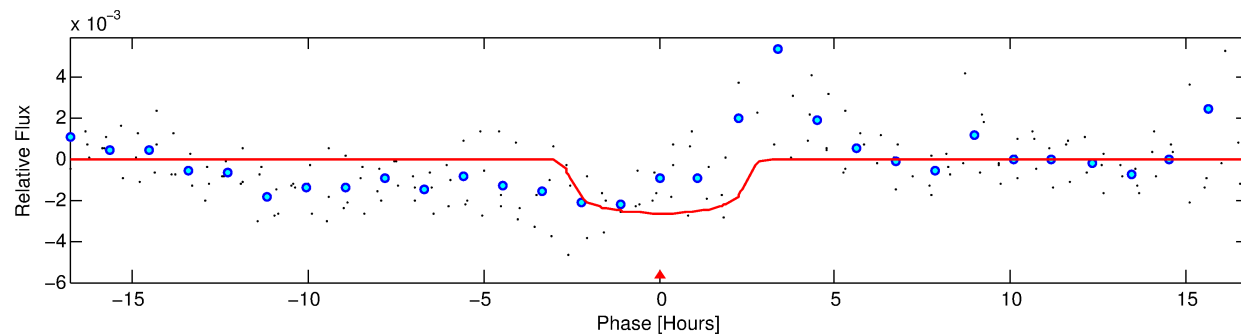
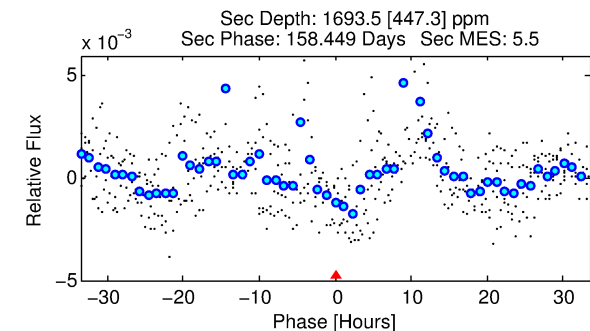
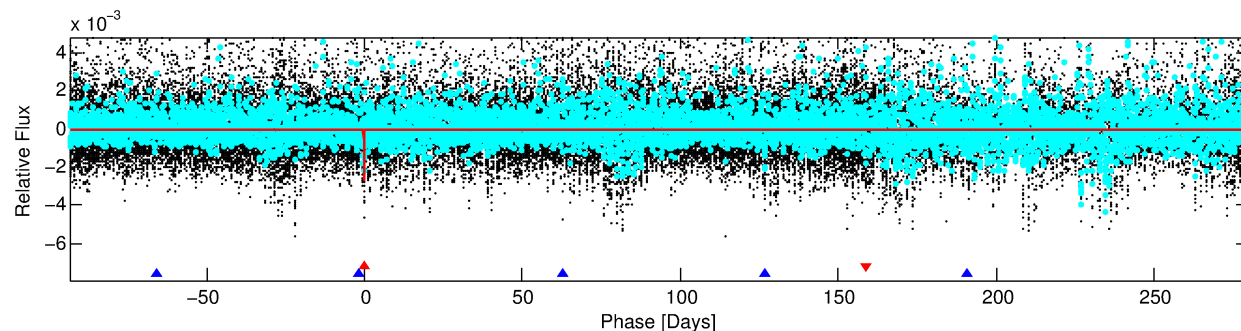
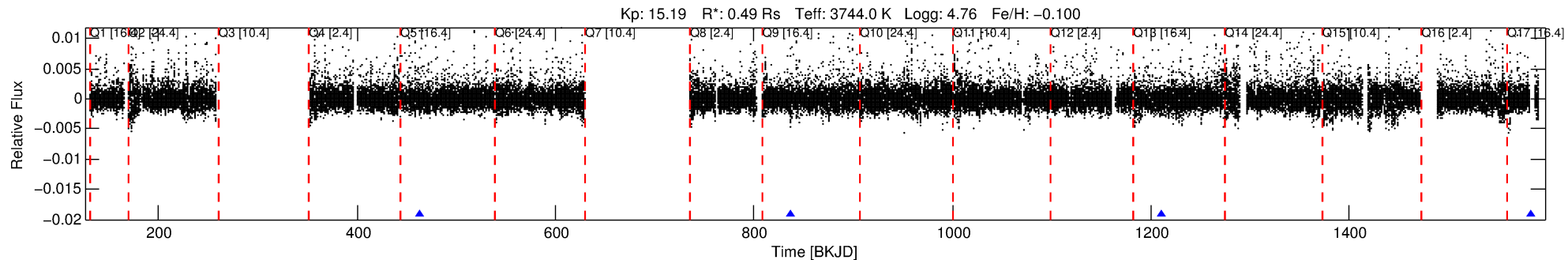
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012835232-01

No Significant Match Found

# DV One-Page Summary

KIC: 12835232 Candidate: 1 of 2 Period: 373.140 d



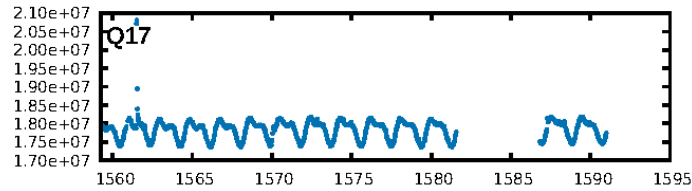
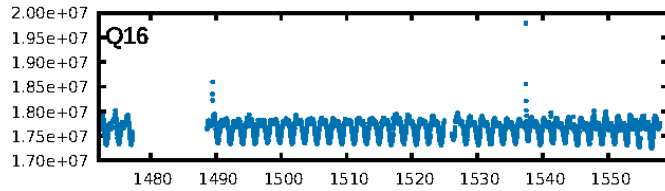
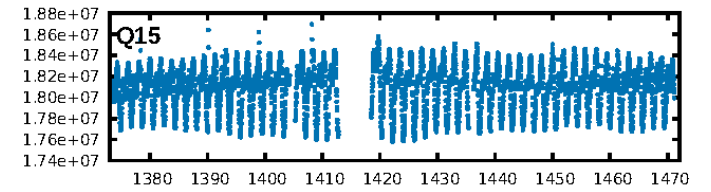
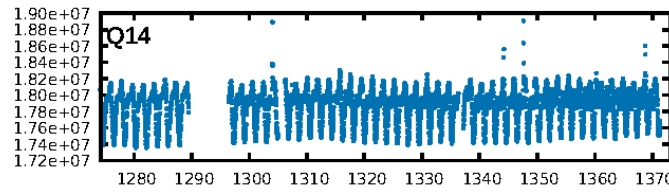
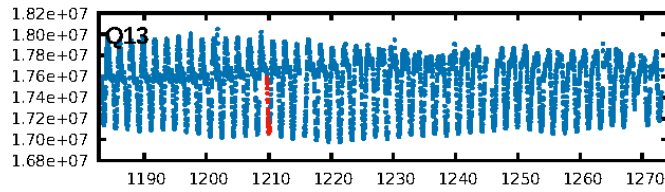
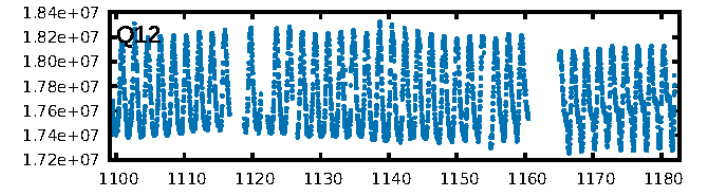
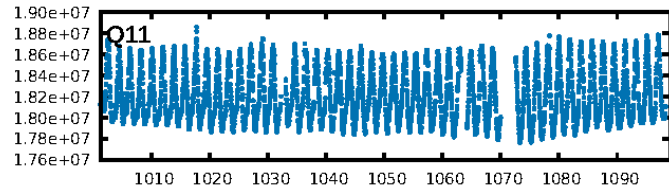
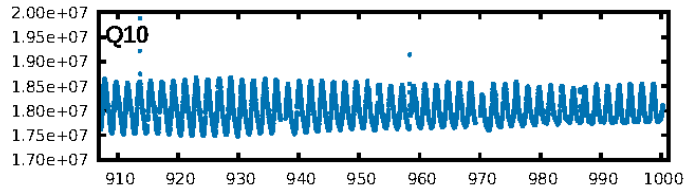
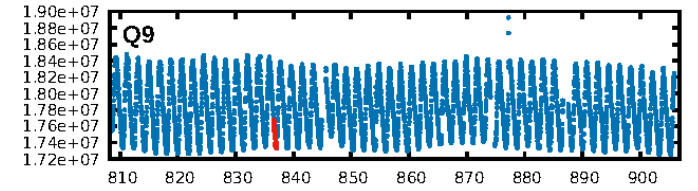
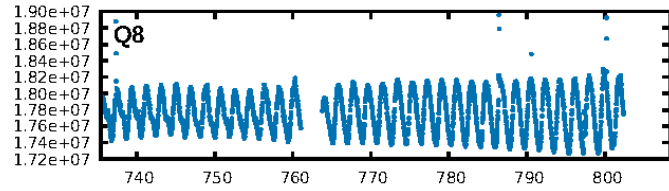
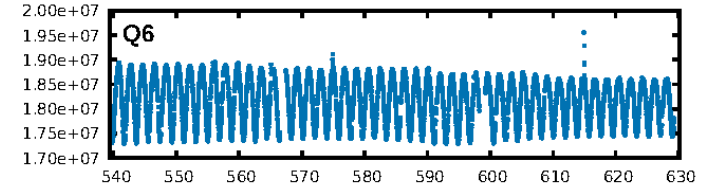
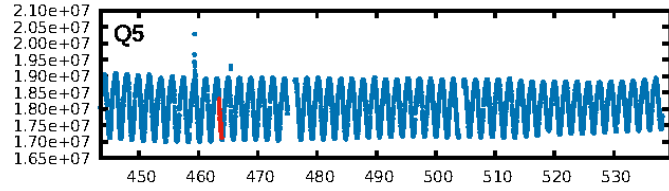
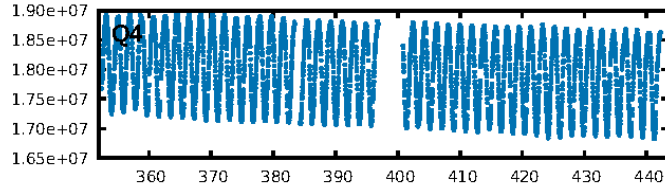
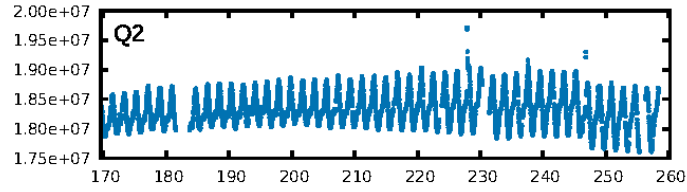
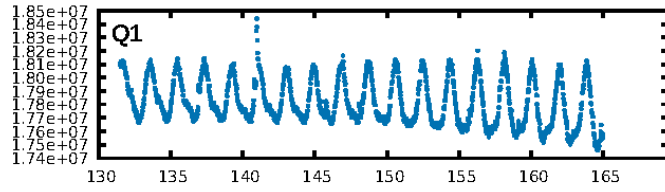
## DV Fit Results:

Period = 373.13986 [0.00671] d  
Epoch = 463.6823 [0.0091] BKJD  
Rp/R\* = 0.0499 [0.0145]  
a/R\* = 407.95 [459.03]  
b = 0.68 [0.89]  
Seff = 0.06 [0.01]  
Teq = 129 [3] K  
Rp = 2.66 [0.79] Re  
a = 0.8046 [0.0444] AU  
Ag = 85445.53 [54812.99] [1.56σ]  
Teff = 3400 [545] K [6.00σ]

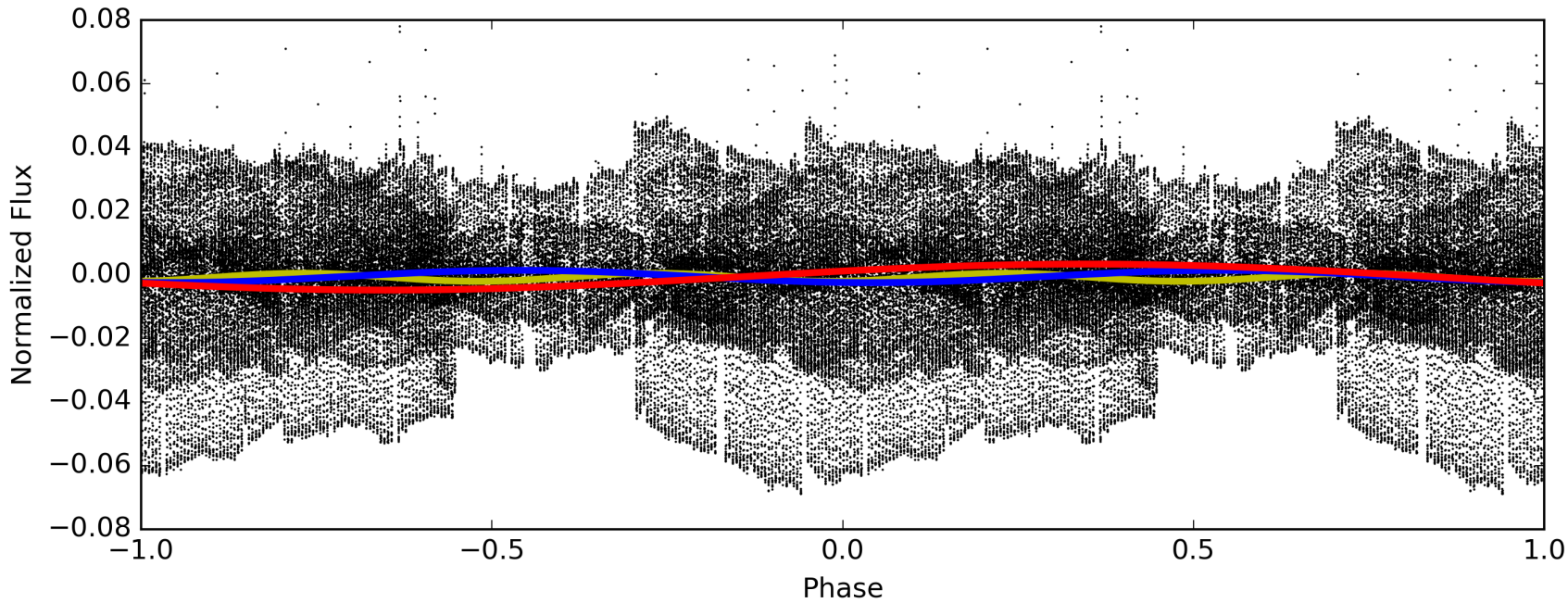
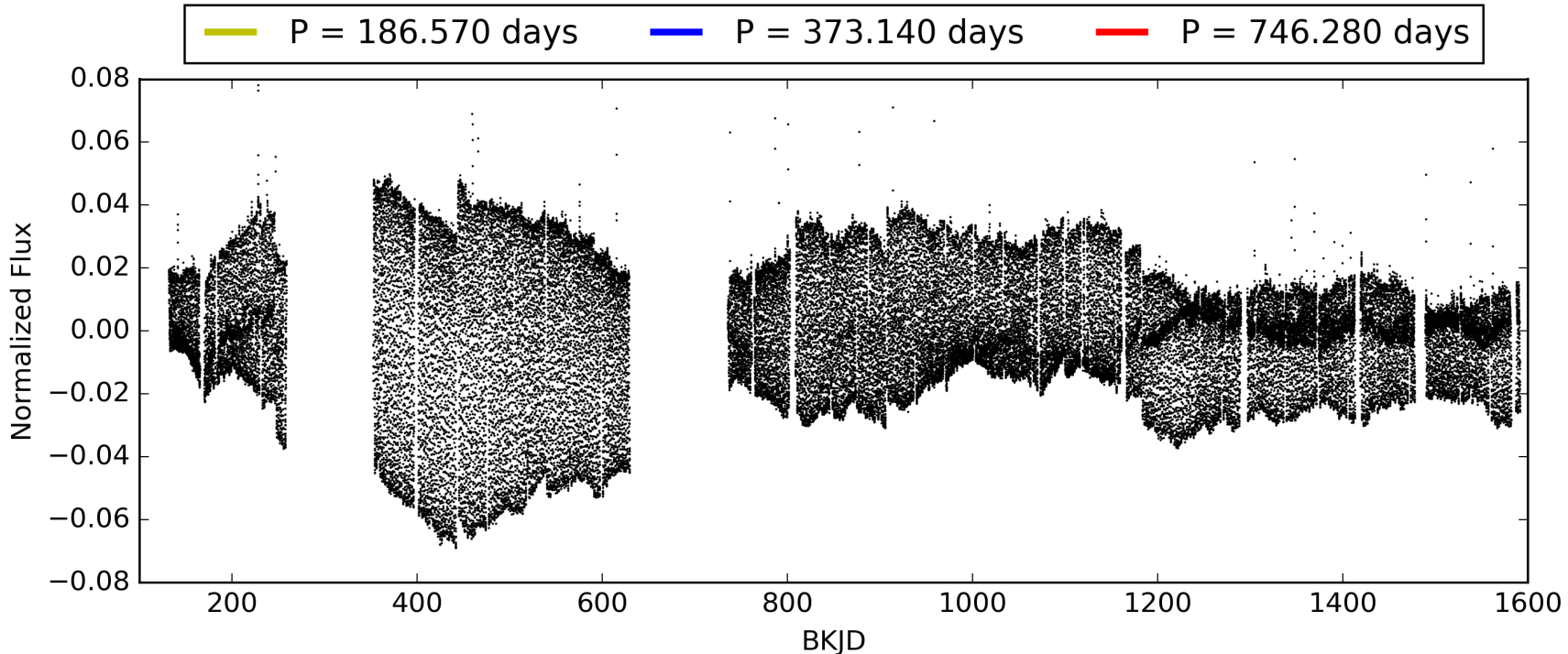
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [209.31σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 68.8%  
ModelChiSquareGof-sig: 86.1%  
**Bootstrap-pfa: 2.56e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.855  
Centroid-sig: 22.6%  
Centroid-so: 1.160 arcsec [1.38σ]  
OotOffset-rm: 0.120 arcsec [1.56σ]  
OotOffset-st: 0/0/0/3 [3]  
**KicOffset-rm: 0.311 arcsec [4.01σ]**  
KicOffset-st: 0/0/0/3 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 012835232-01, PDC Light Curves

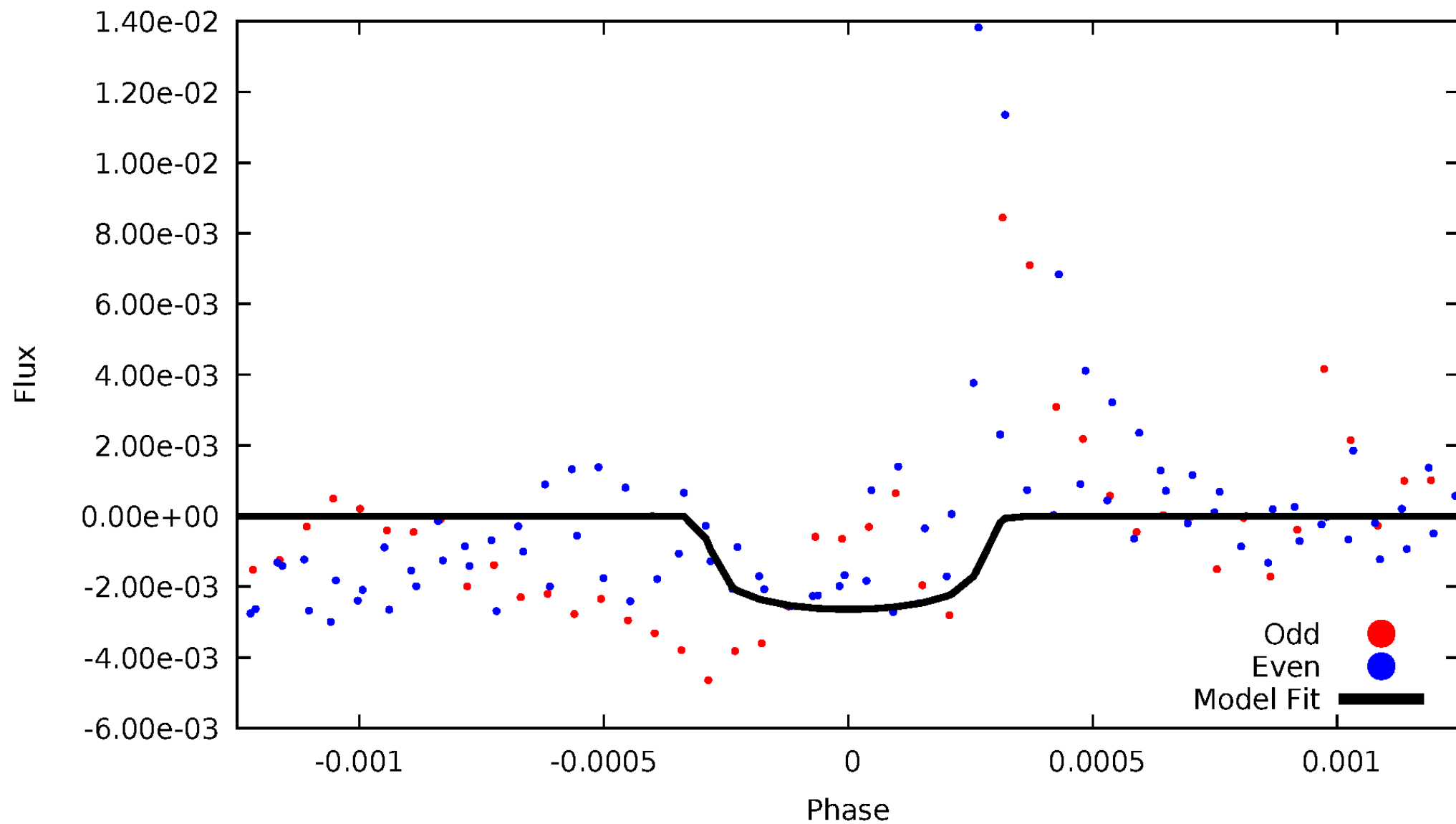


TCE 012835232-01



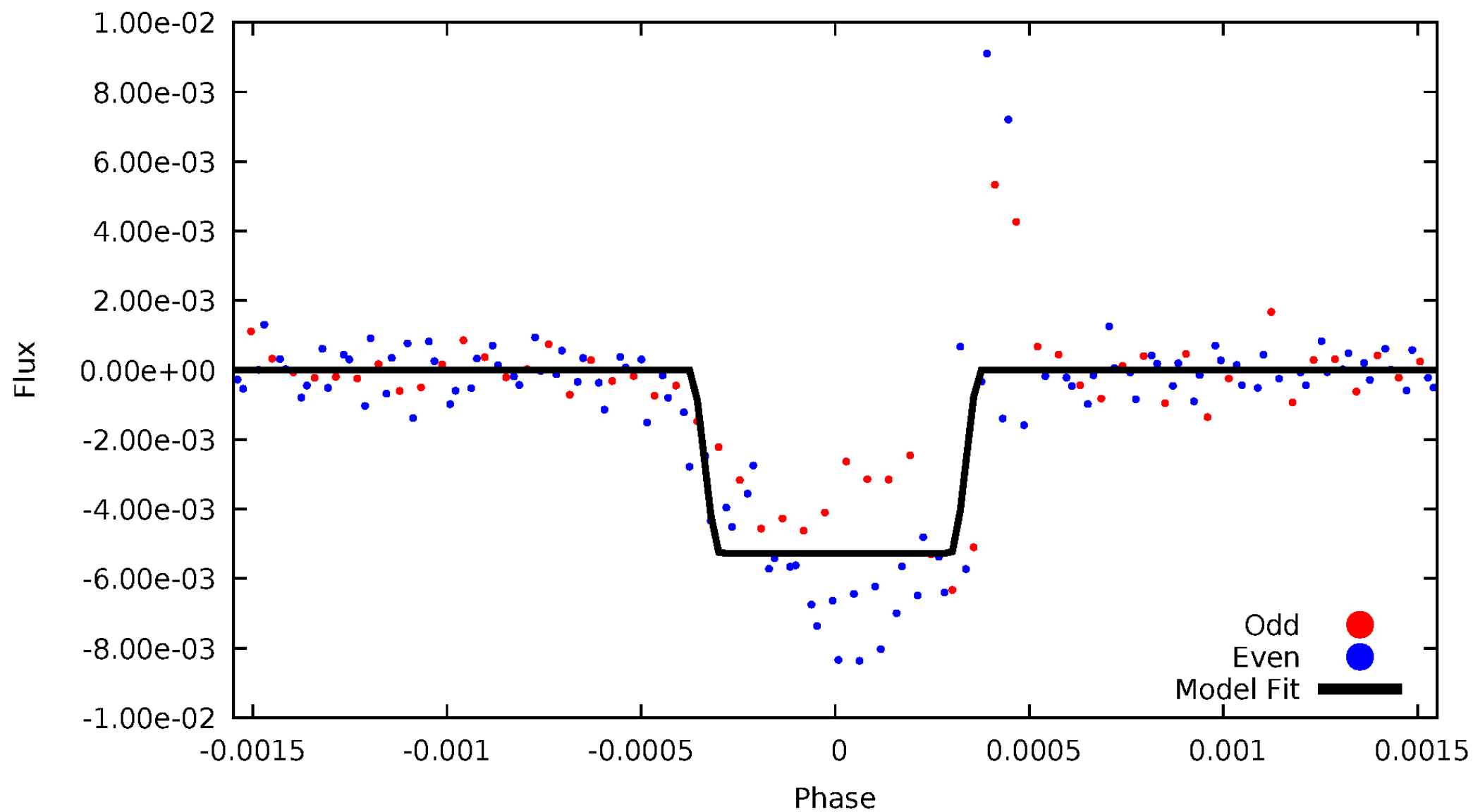
# DV Odd/Even

TCE 012835232-01

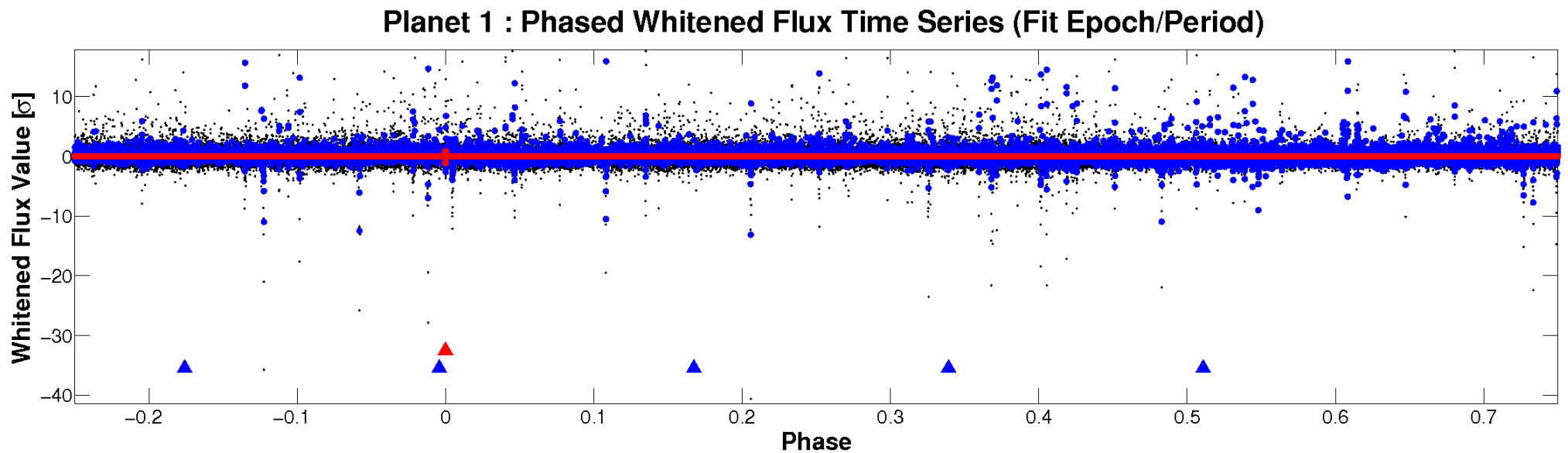
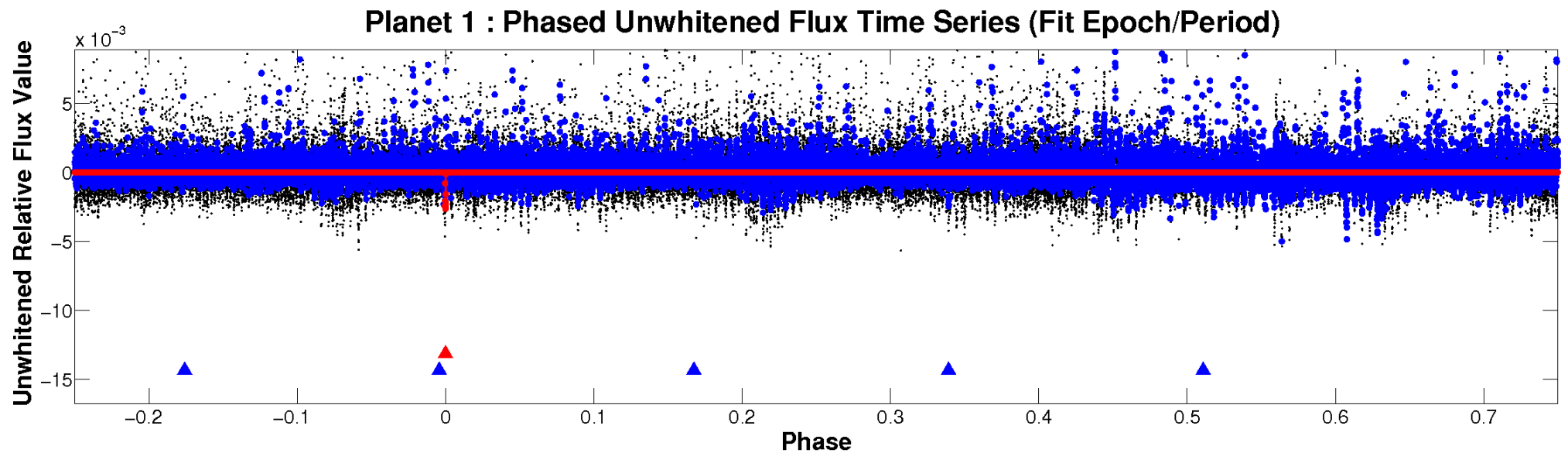


# ALT Odd/Even

TCE 012835232-01



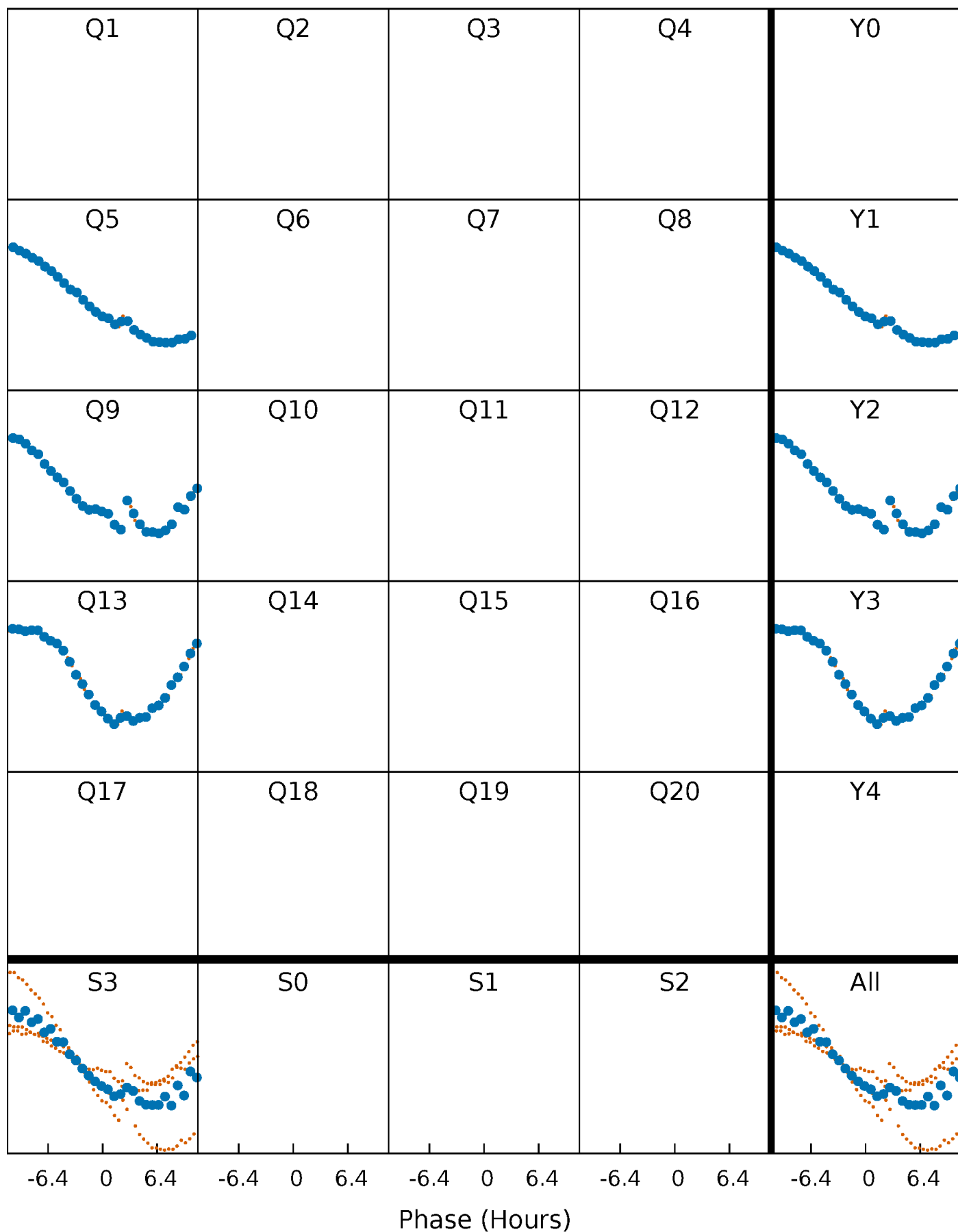
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

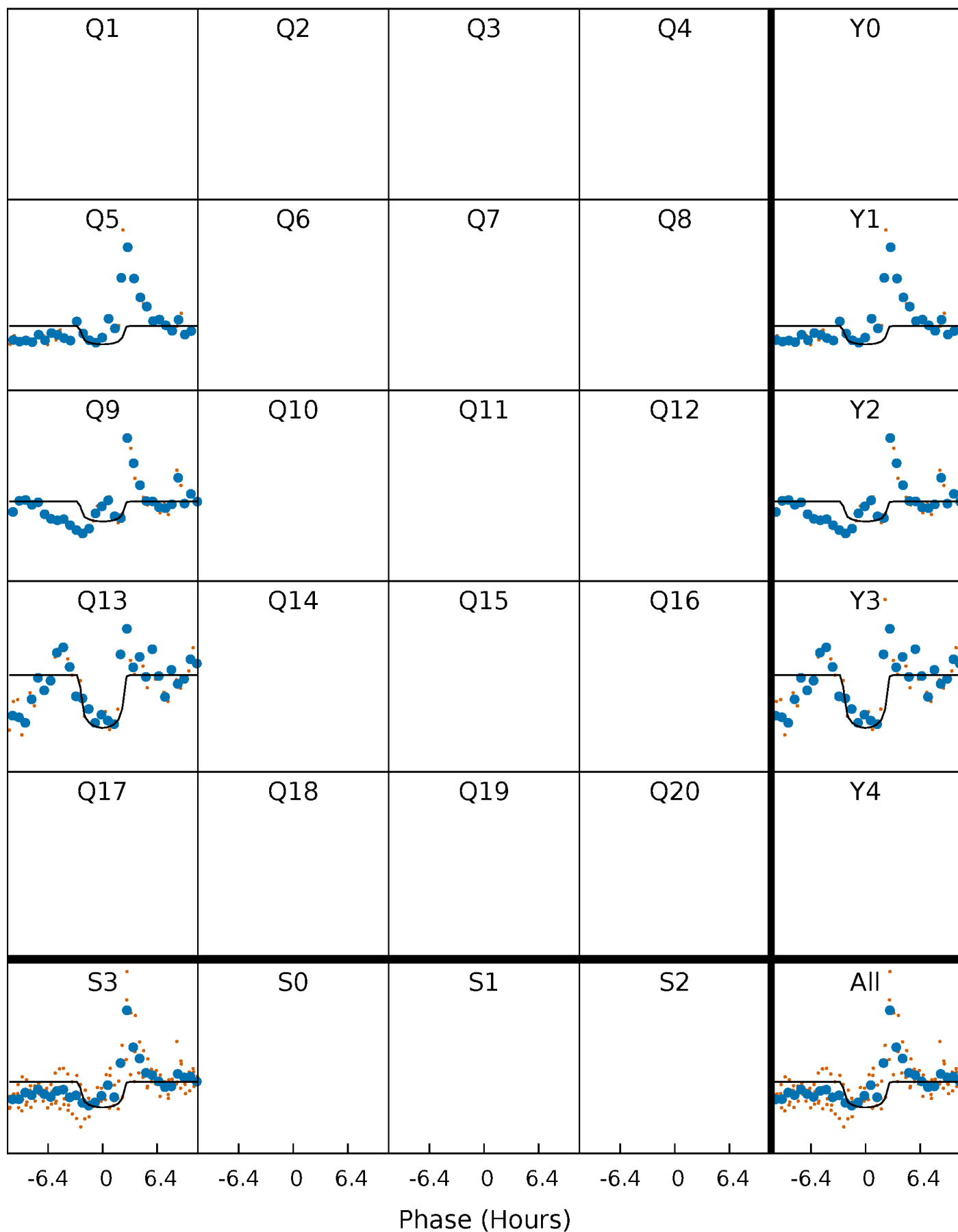
TCE 012835232-01 P=373.139862 Days  $T_0=463.682331$  (BKJD)





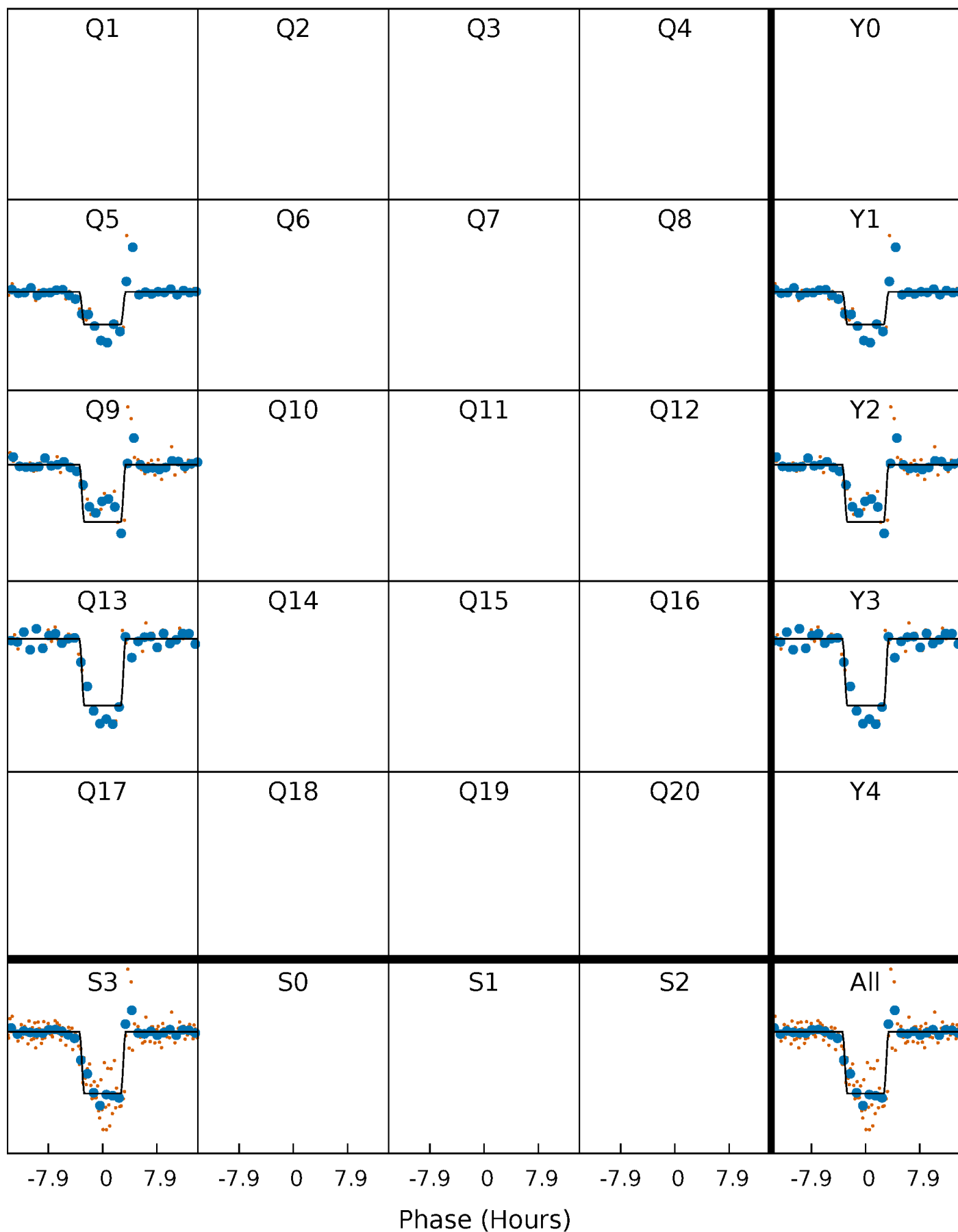
# DV Quarter-Phased Transit Curves

TCE 012835232-01     $P=373.139862$  Days     $T_0=463.682331$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

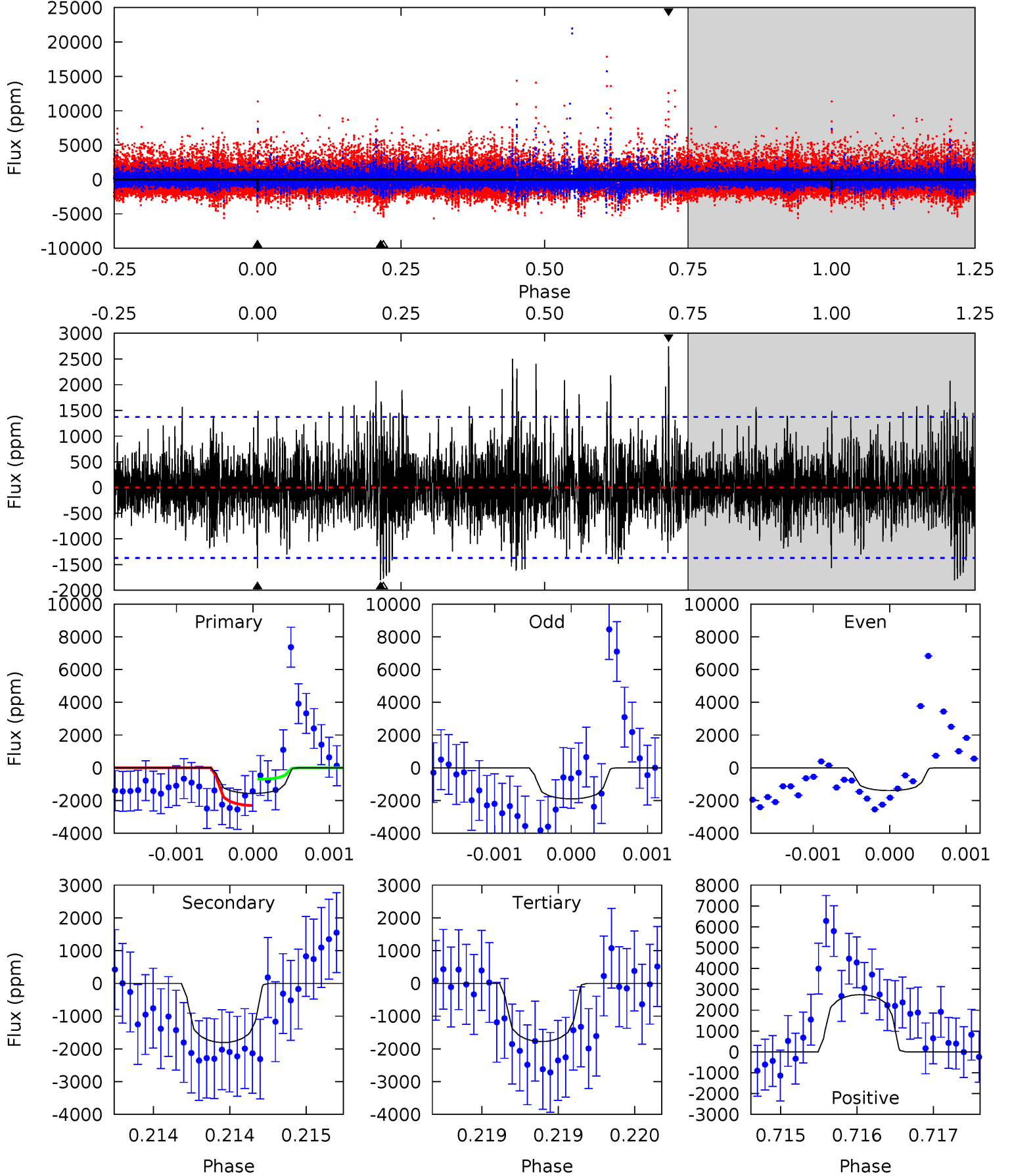
TCE 012835232-01 P=373.150862 Days  $T_0=463.635660$  (BKJD)



# DV Model-Shift Uniqueness Test

012835232-01,  $P = 373.139862$  Days,  $E = 90.542469$  Days

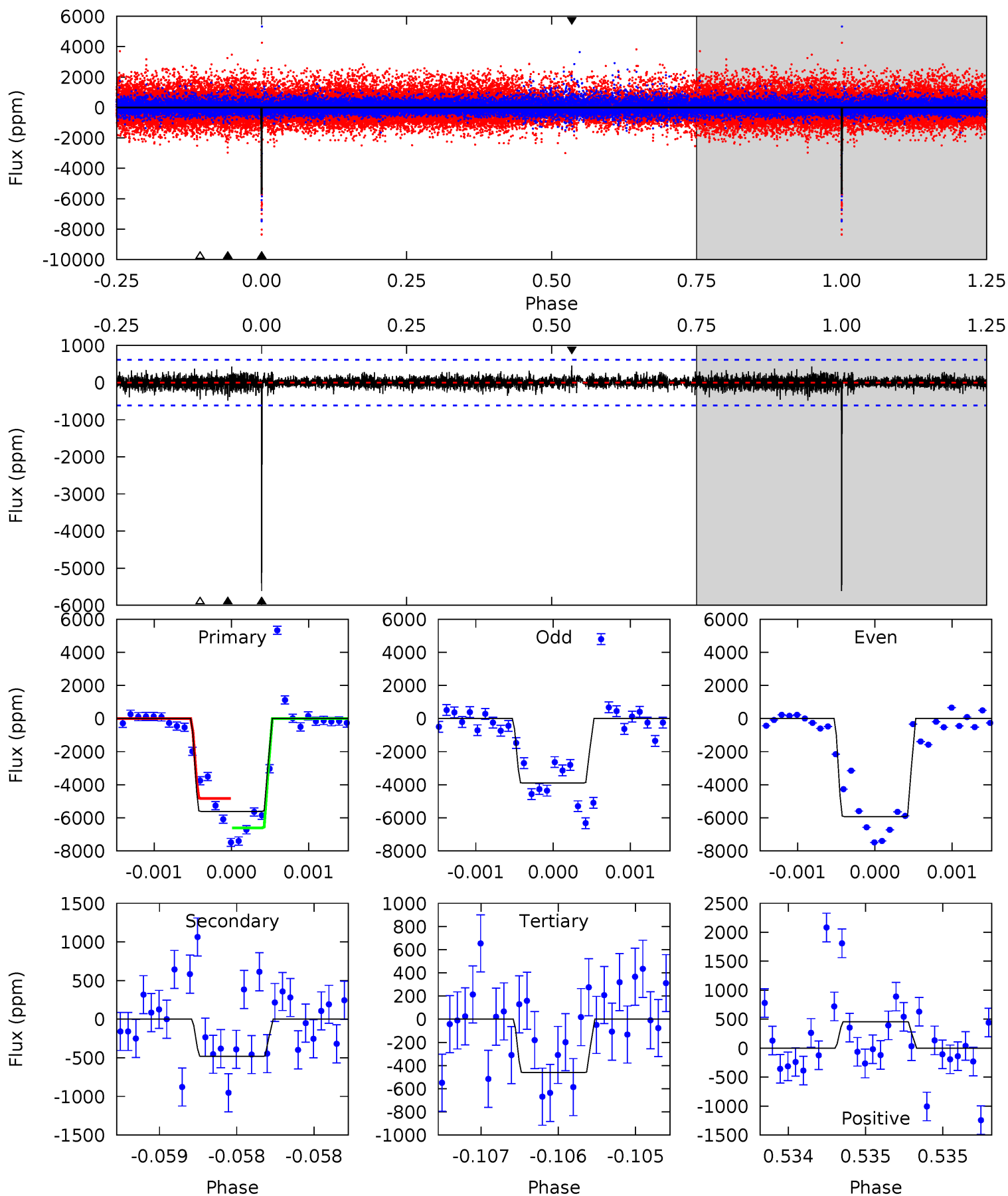
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.32	7.29	7.18	11.1	5.54	3.43	1.92	-0.86	-4.76	0.12	-3.79	0.85	0.67	0.60	3.26



# Alt Model-Shift Uniqueness Test

012835232-01, P = 373.150862 Days, E = 90.484798 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
50.3	4.31	4.13	4.09	5.51	3.38	0.82	46.2	46.2	0.18	0.22	8.67	0.95	0.08	7.98



### Stellar Parameters For KIC 012835232

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3744^{+67}_{-67}$	$4.759^{+0.036}_{-0.024}$	$-0.100^{+0.100}_{-0.100}$	$0.488^{+0.026}_{-0.035}$	$0.499^{+0.027}_{-0.030}$	$6.043^{+0.997}_{-0.635}$
	+2%/-2%	+1%/-1%	+100%/-100%	+5%/-7%	+5%/-6%	+16%/-11%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 012835232-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1806 \pm 248$	$2.71^{+0.74}_{-0.76}$	$179^{+4}_{-4}$	$3521^{+430}_{-277}$	$86566^{+83963}_{-34014}$
Alt.	$-481 \pm 112$	$3.91^{+0.72}_{-0.83}$	$179^{+4}_{-4}$	$2639^{+179}_{-141}$	$11425^{+7457}_{-4108}$

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

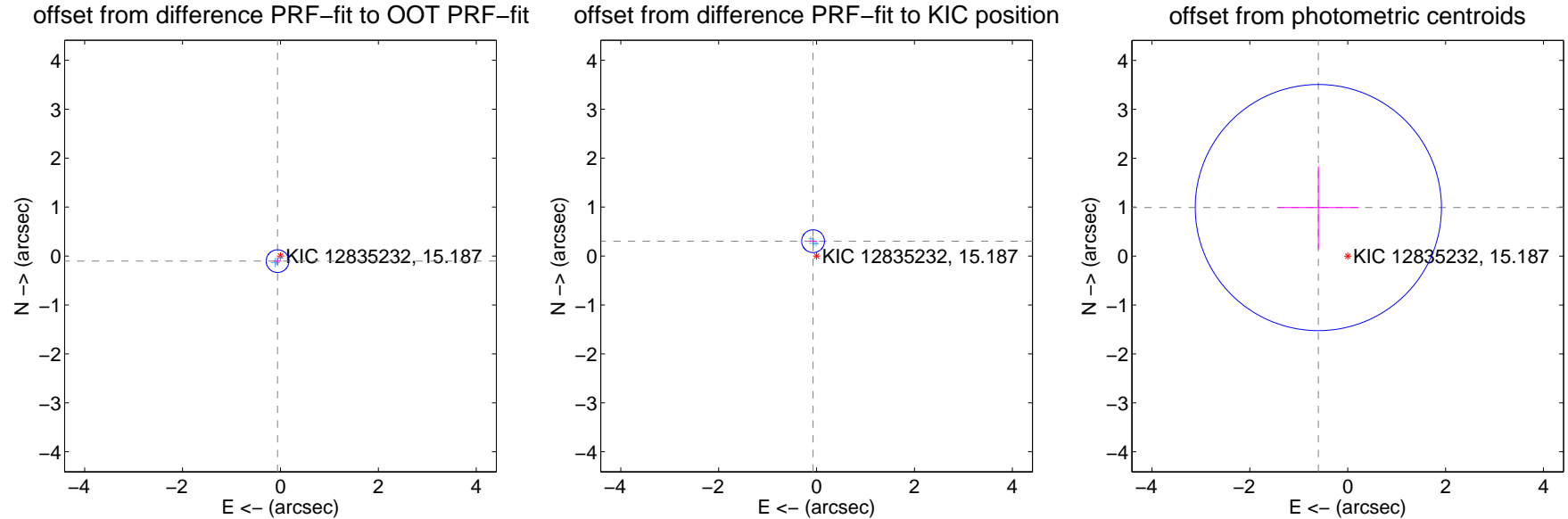
## DV Centroid Data

Supplemental centroid analysis for 012835232-01. Kepler magnitude: 15.19. Transit SNR 6.08

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.50 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.120 \pm 0.077$	1.56	$0.060 \pm 0.077$	$-0.104 \pm 0.077$
PRF-fit source offset from KIC position	<b><math>0.311 \pm 0.078</math></b>	<b>4.01</b>	$0.071 \pm 0.077$	$0.303 \pm 0.078$
photometric centroid source offset	$1.16 \pm 0.84$	1.38	$0.60 \pm 0.83$	$0.99 \pm 0.84$



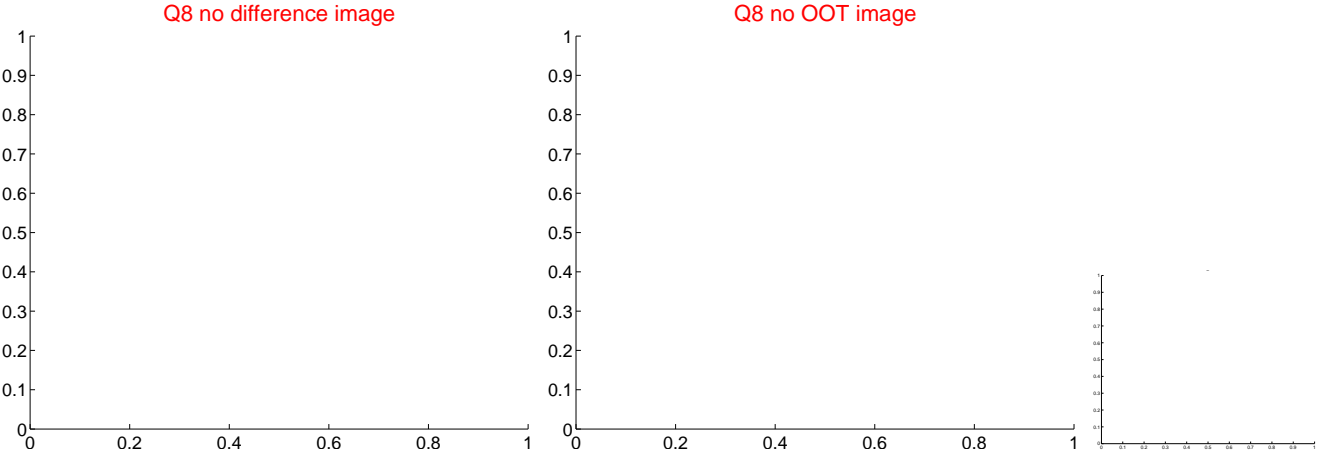
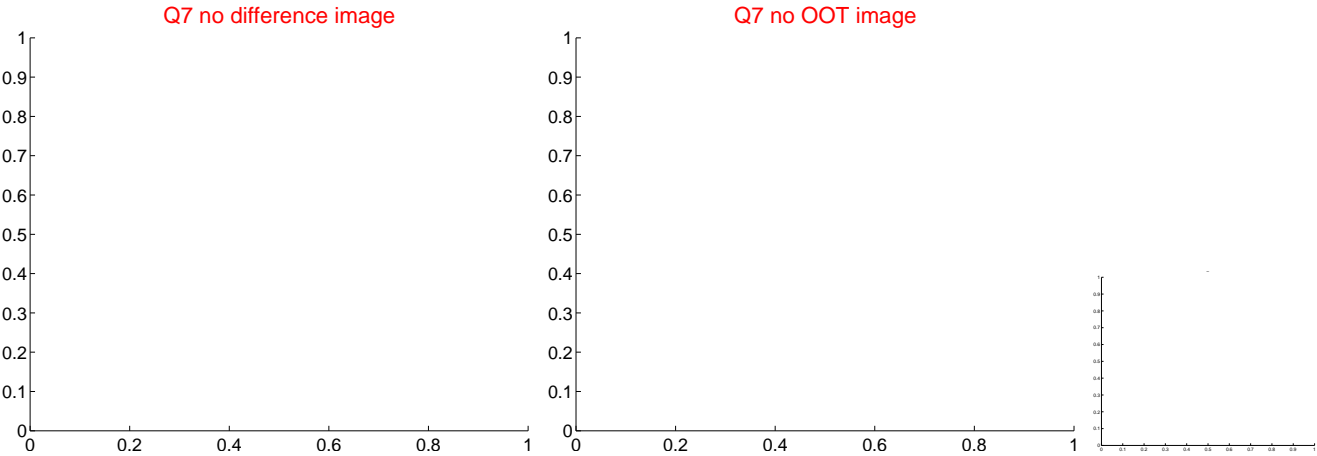
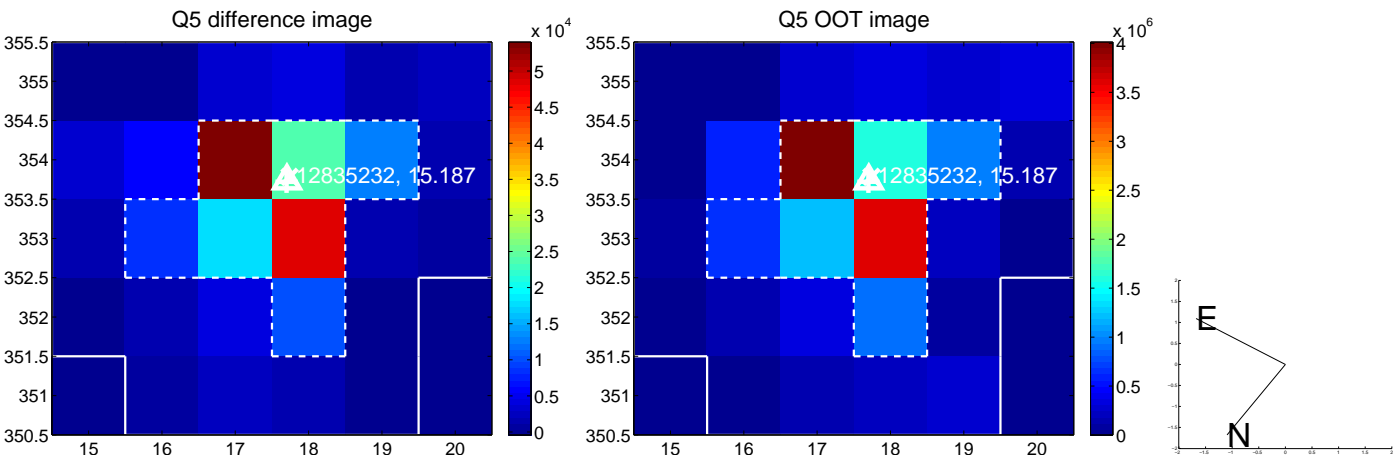
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

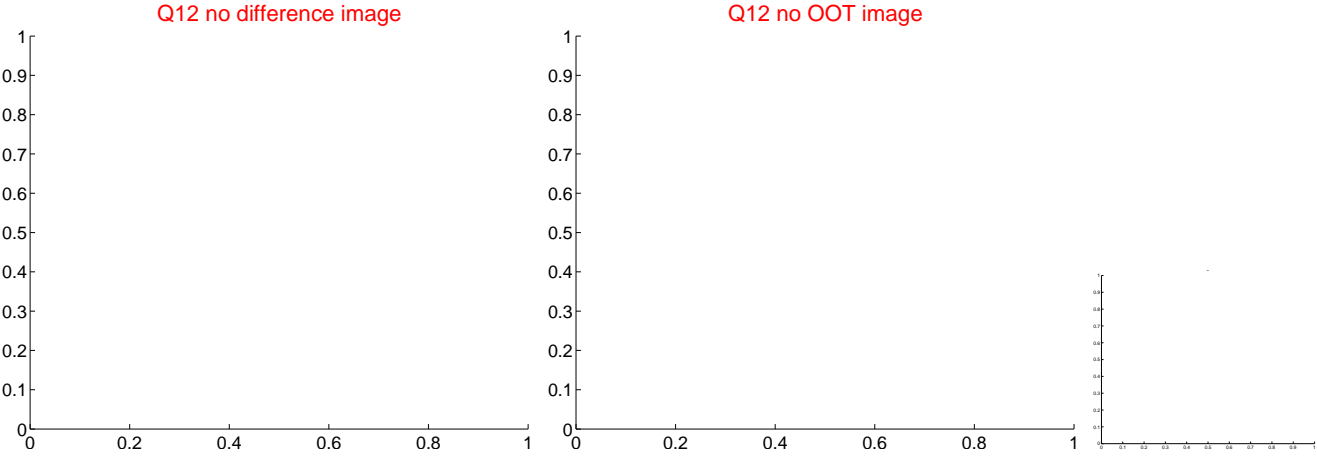
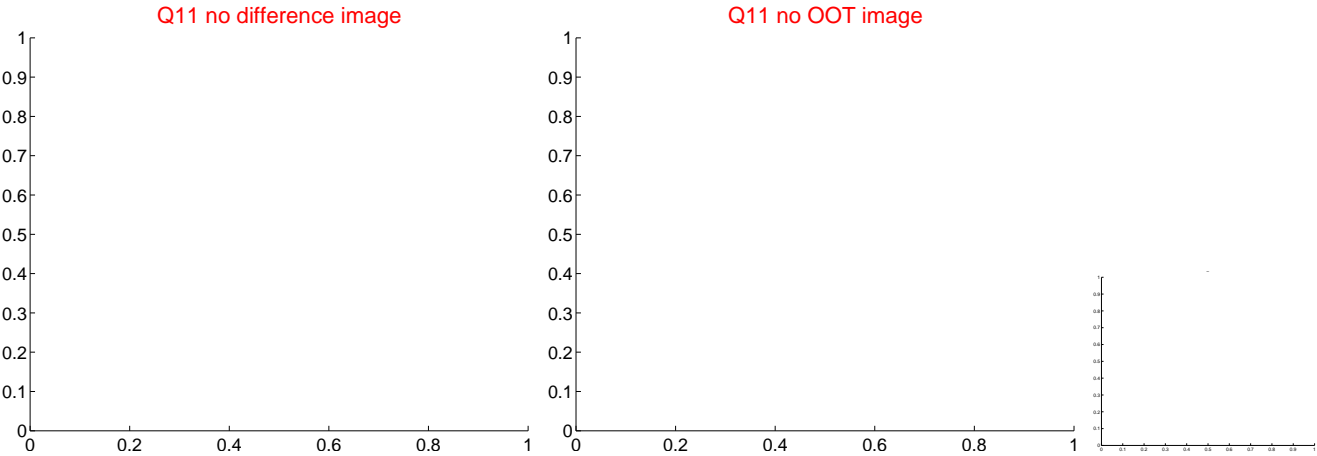
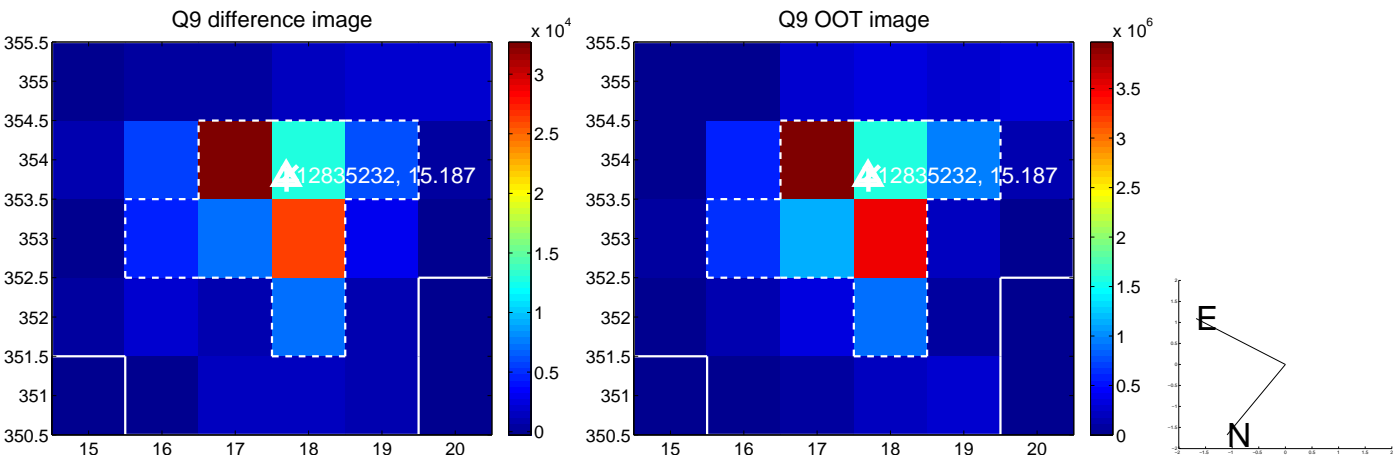




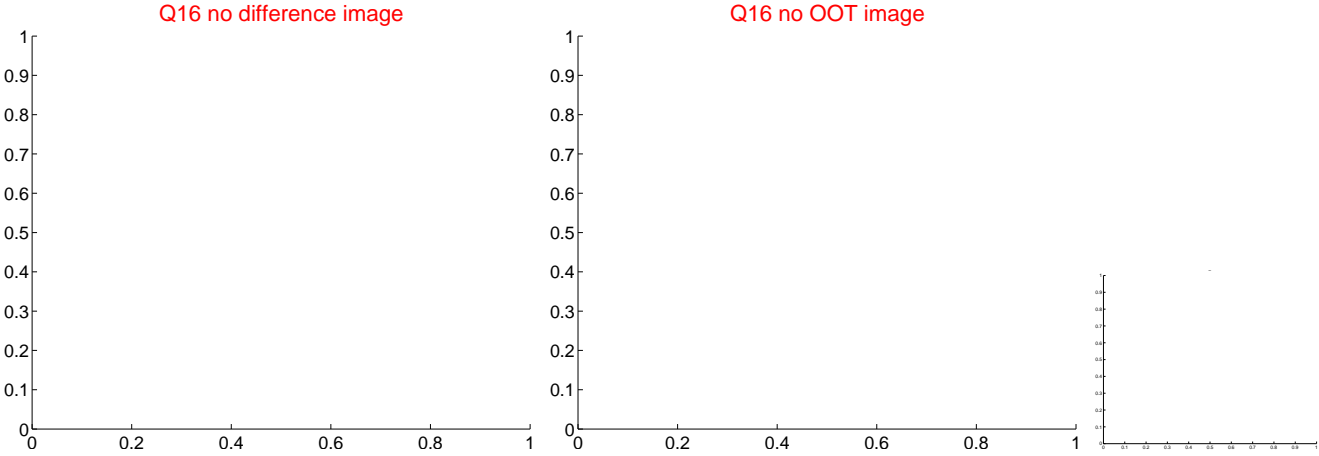
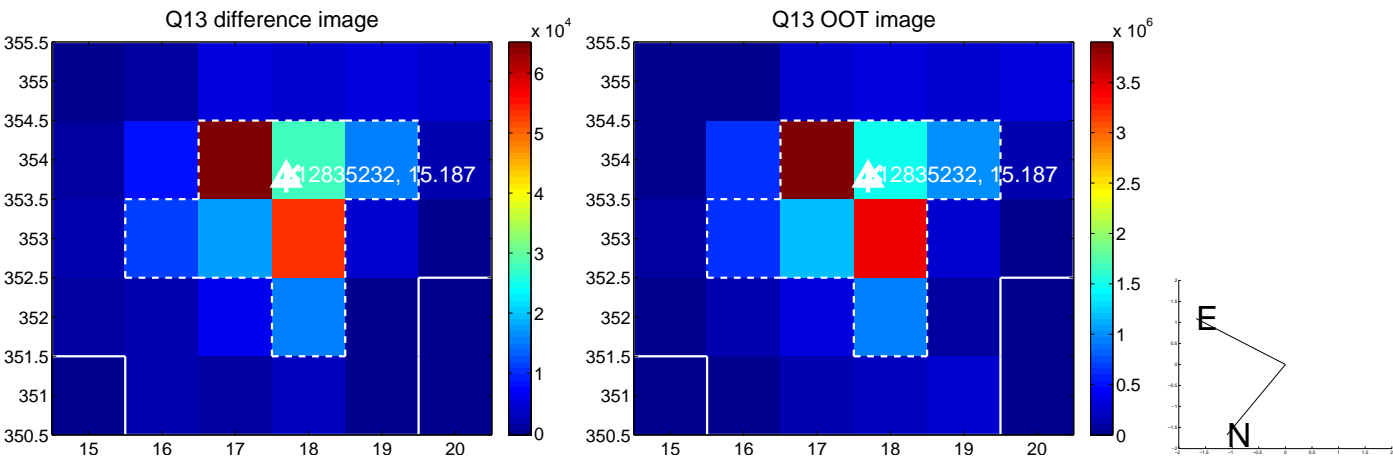
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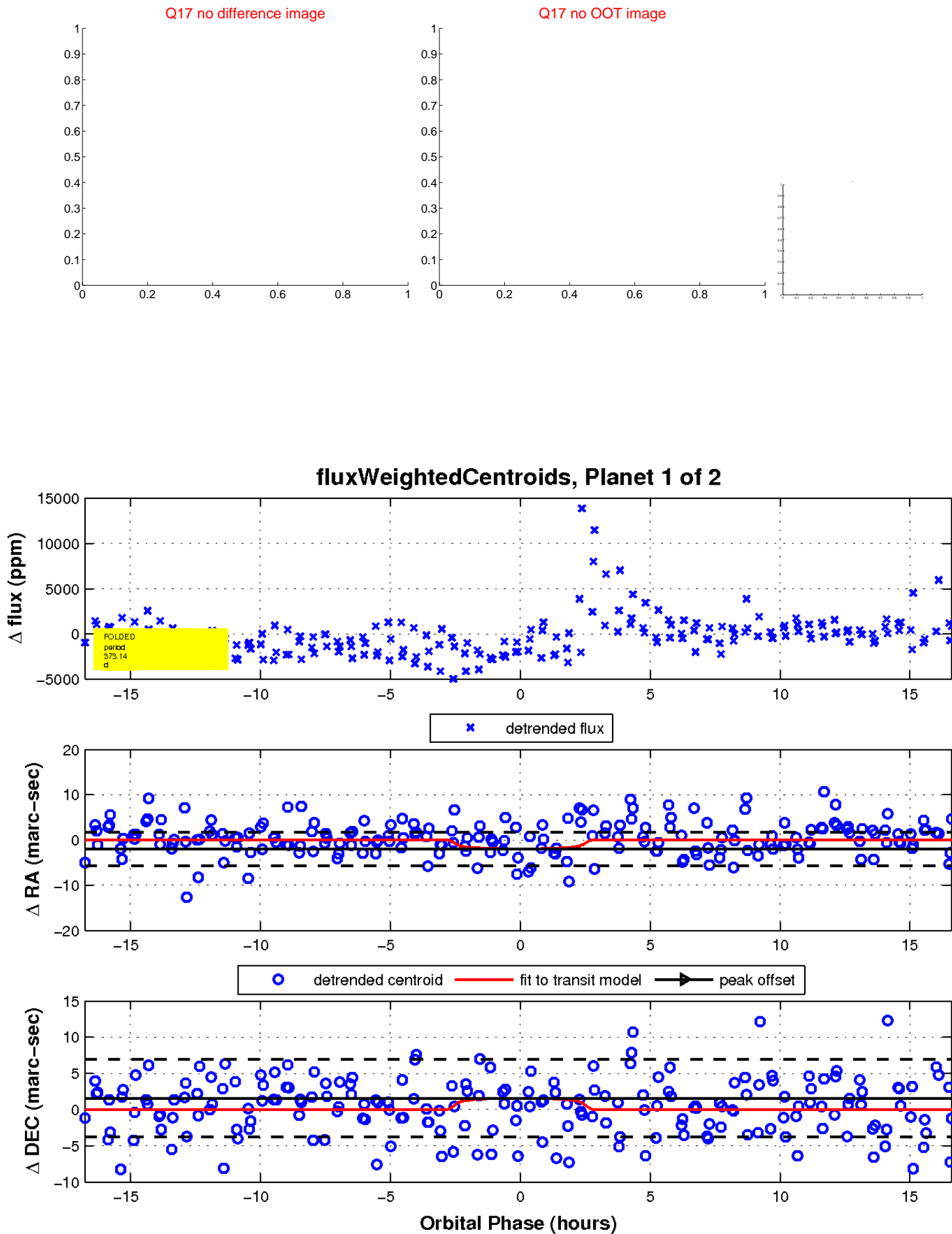
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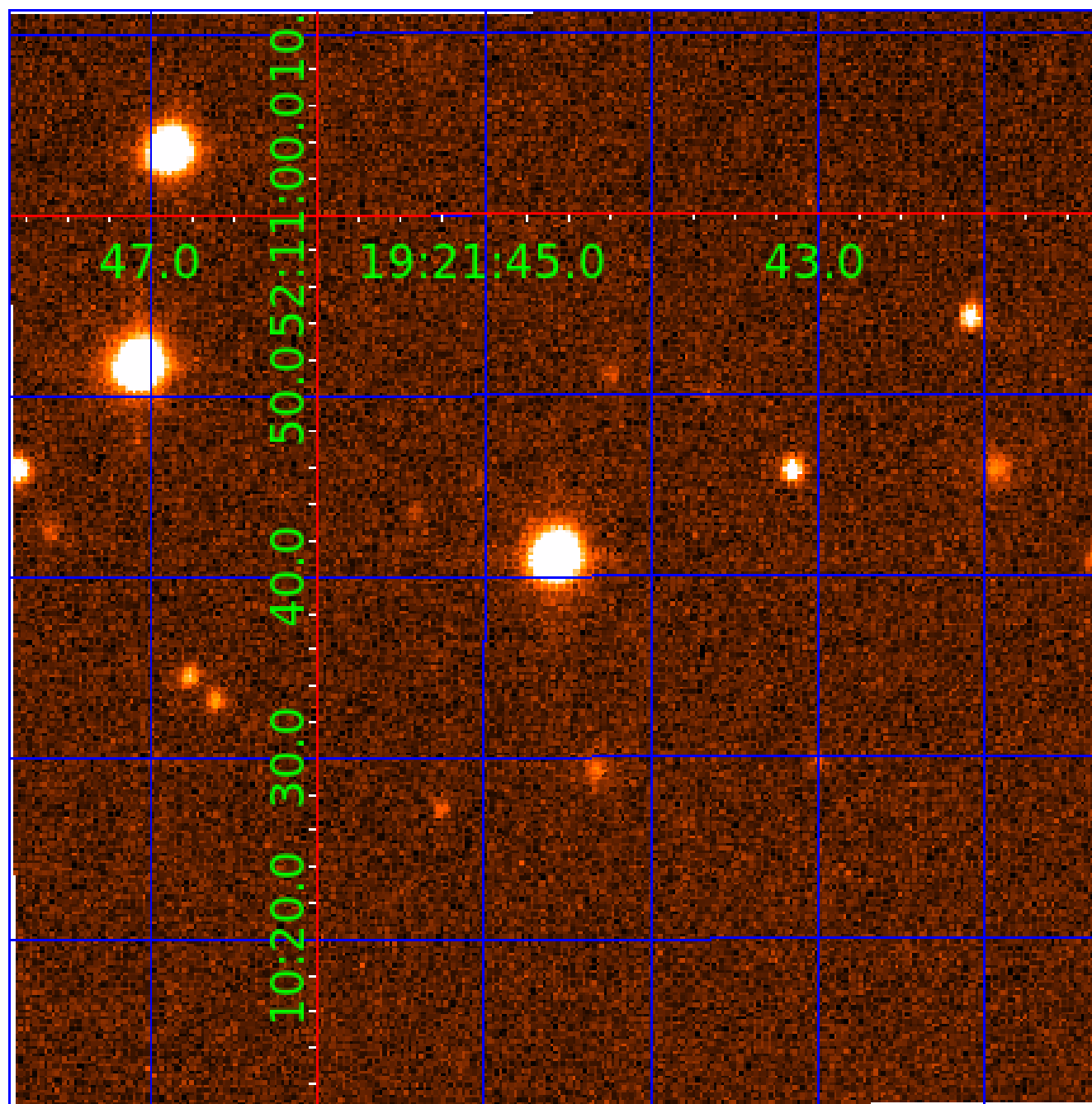


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UKIRT Image

Declination



# KIC 012835232

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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012835232-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS

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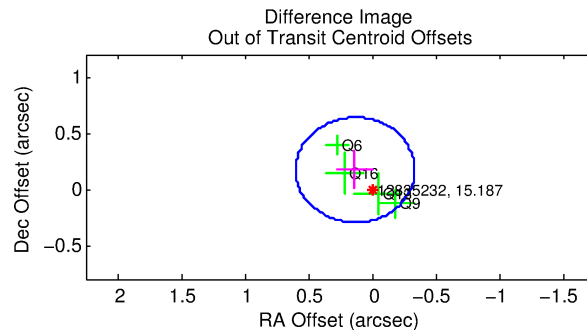
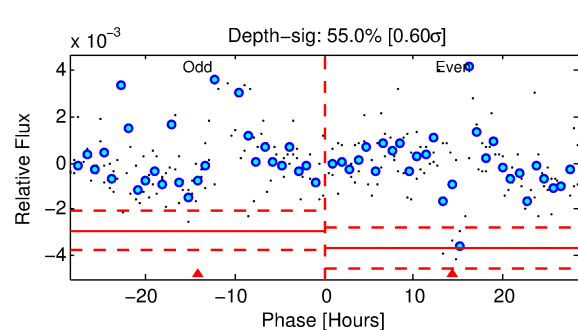
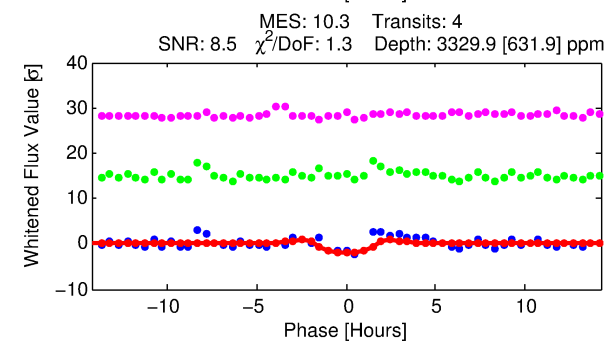
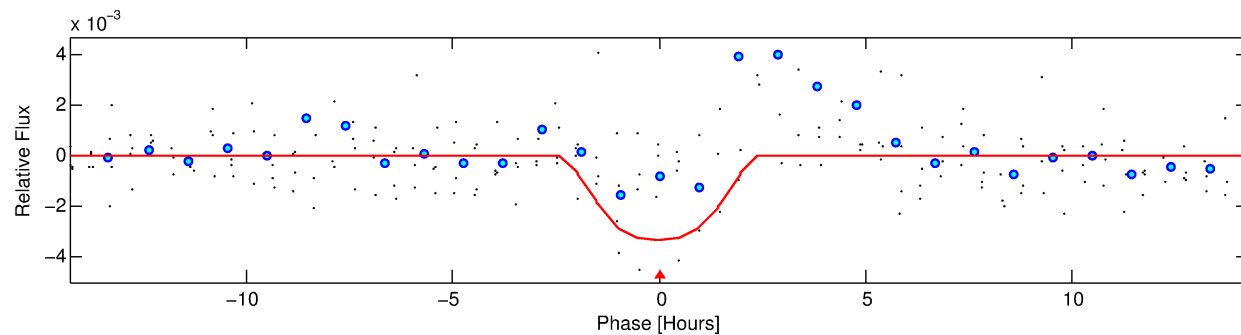
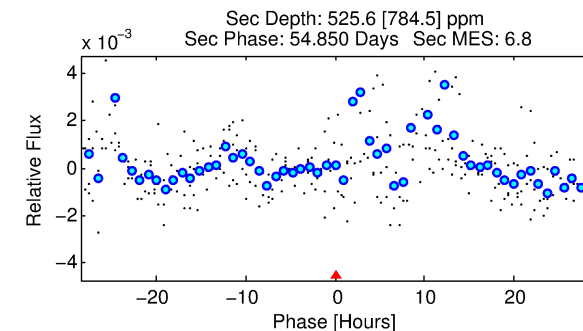
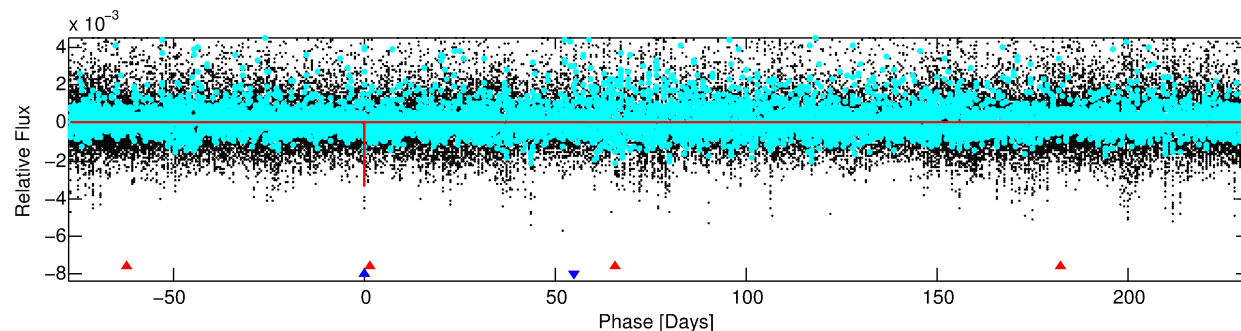
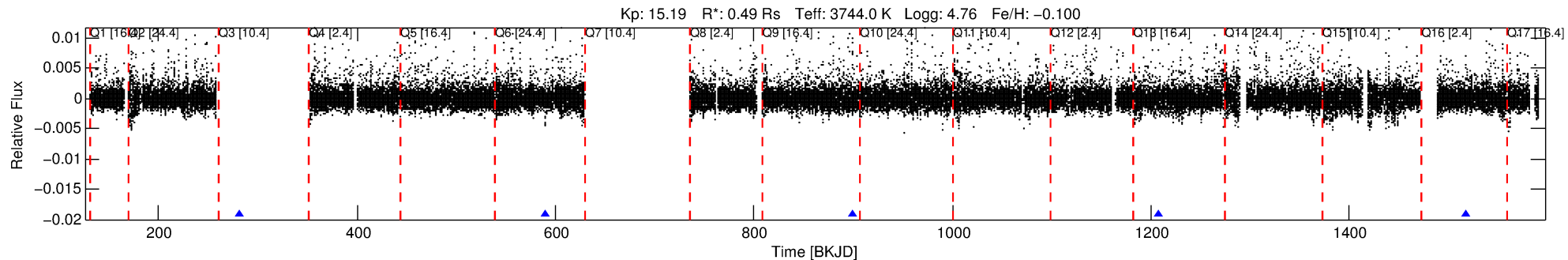
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012835232-02

No Significant Match Found

# DV One-Page Summary

KIC: 12835232 Candidate: 2 of 2 Period: 309.078 d



## DV Fit Results:

Period = 309.07822 [0.00571] d  
Epoch = 281.1694 [0.0149] BKJD  
Rp/R\* = 0.0650 [0.0085]  
a/R\* = 263.62 [55.37]  
b = 0.92 [0.04]  
Seff = 0.08 [0.01]  
Teq = 137 [4] K  
Rp = 3.46 [0.52] Re  
a = 0.7096 [0.0392] AU  
Ag = 12150.18 [18434.67] [0.66σ]  
Teff = 2223 [843] K [2.47σ]

## DV Diagnostic Results:

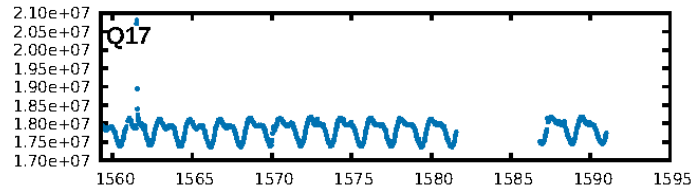
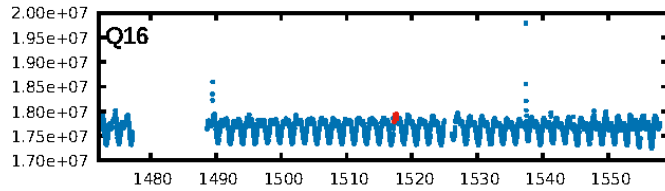
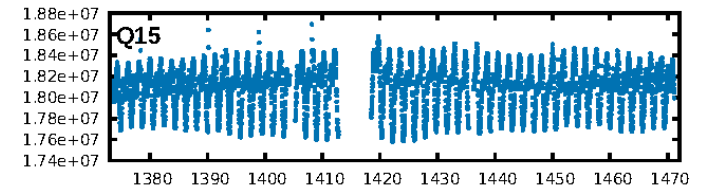
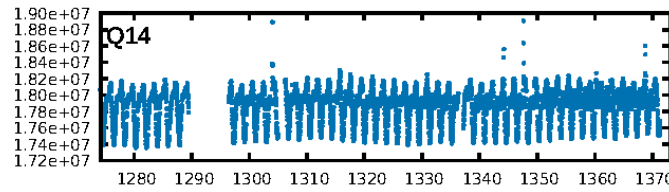
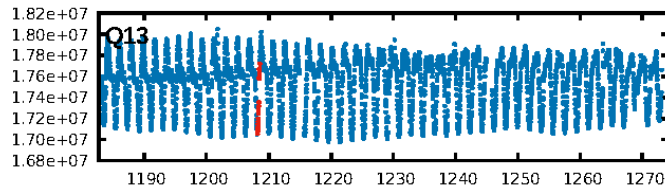
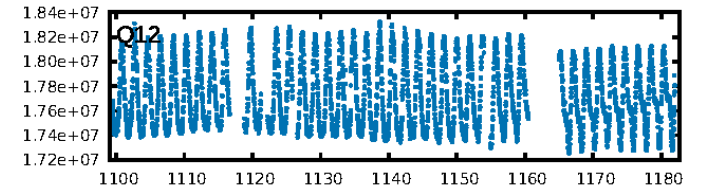
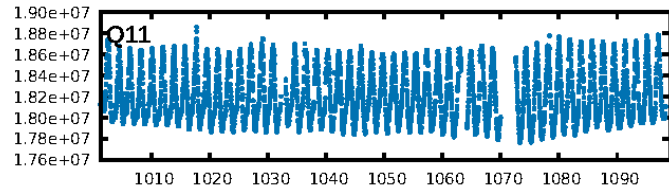
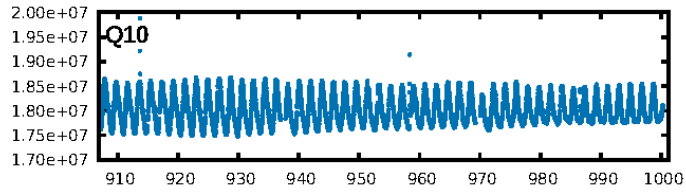
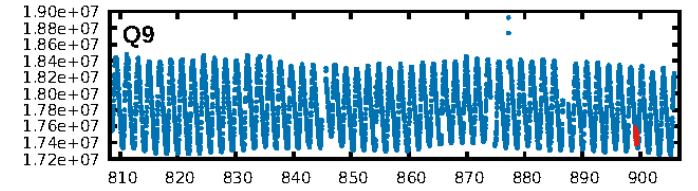
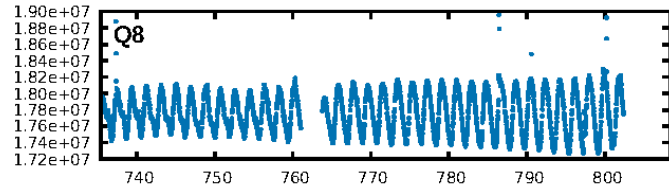
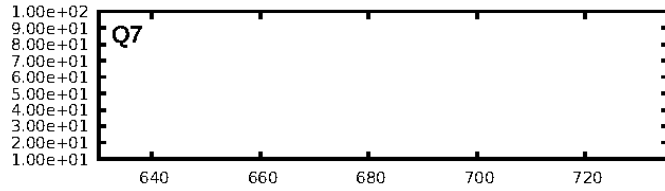
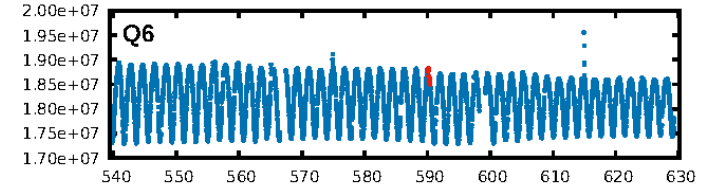
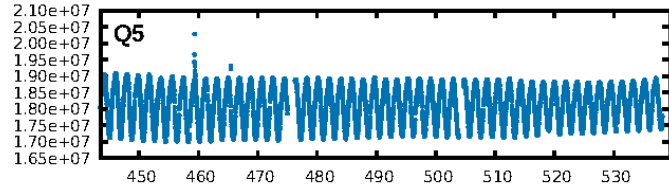
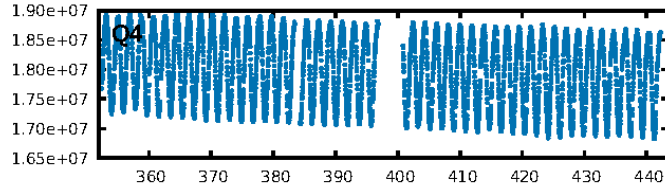
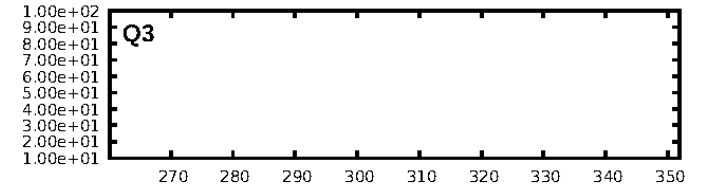
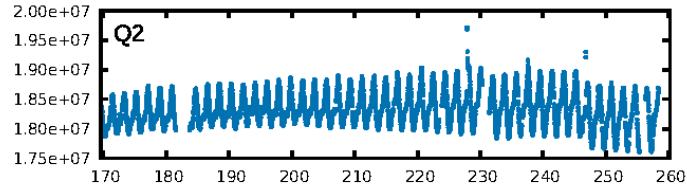
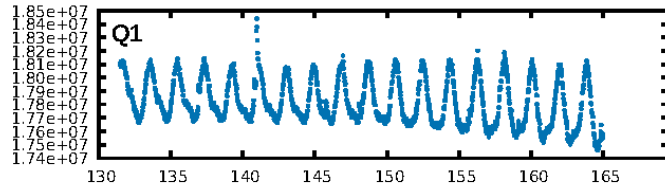
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [209.31σ]  
ModelChiSquare2-sig: 8.0%  
ModelChiSquareGof-sig: 78.6%  
**Bootstrap-pfa: 7.62e-09**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 0.3357**  
Centroid-sig: 96.6%  
Centroid-so: 1.678 arcsec [2.33σ]  
OotOffset-rm: 0.216 arcsec [1.38σ]  
**KicOffset-rm: 0.722 arcsec [3.41σ]**  
OotOffset-st: 1/0/1/2 [4]  
KicOffset-st: 1/0/1/2 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 11:26:56 Z

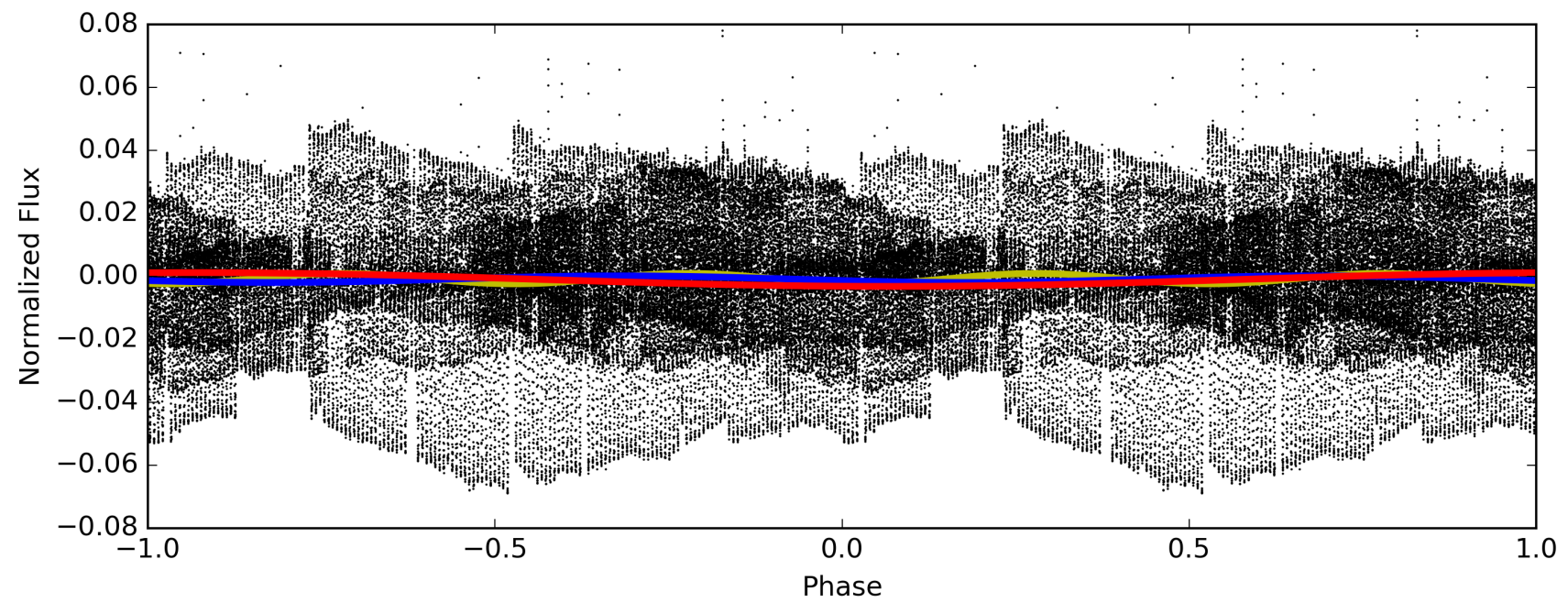
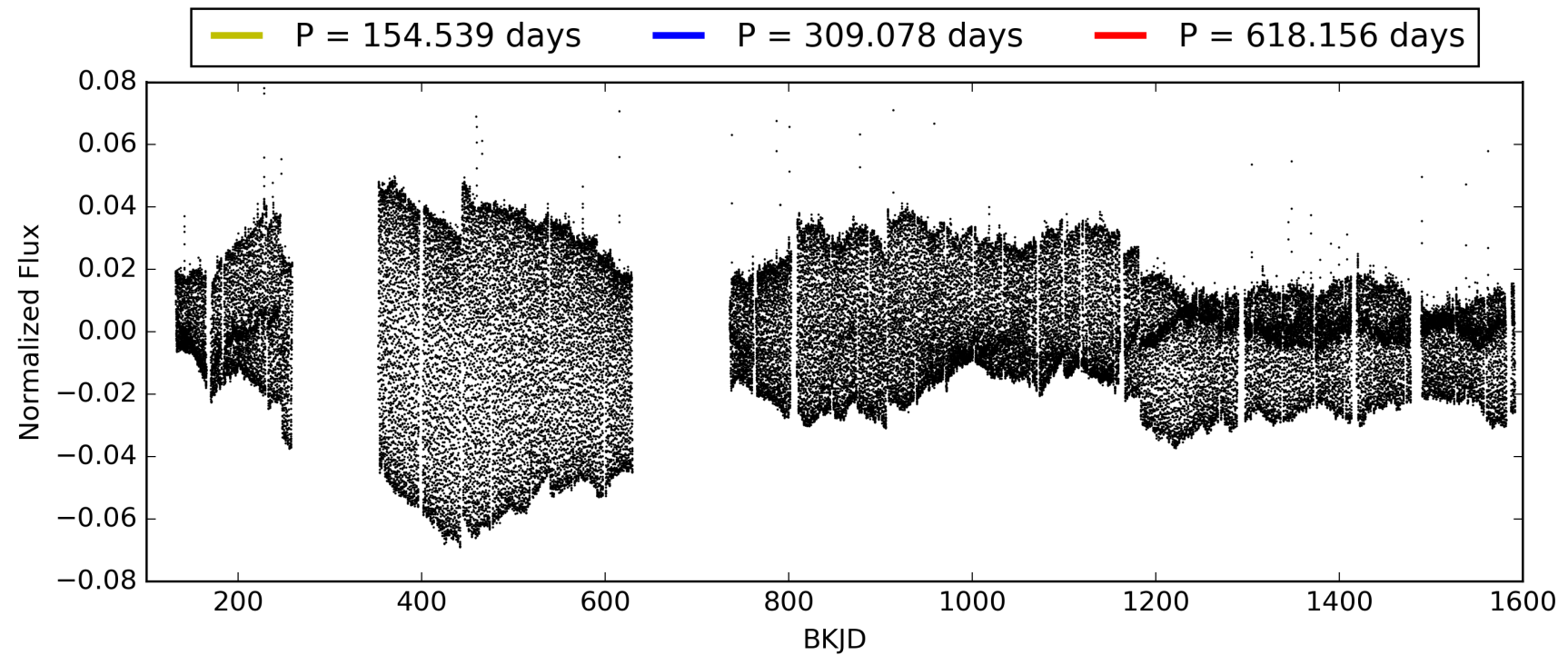
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 012835232-02, PDC Light Curves

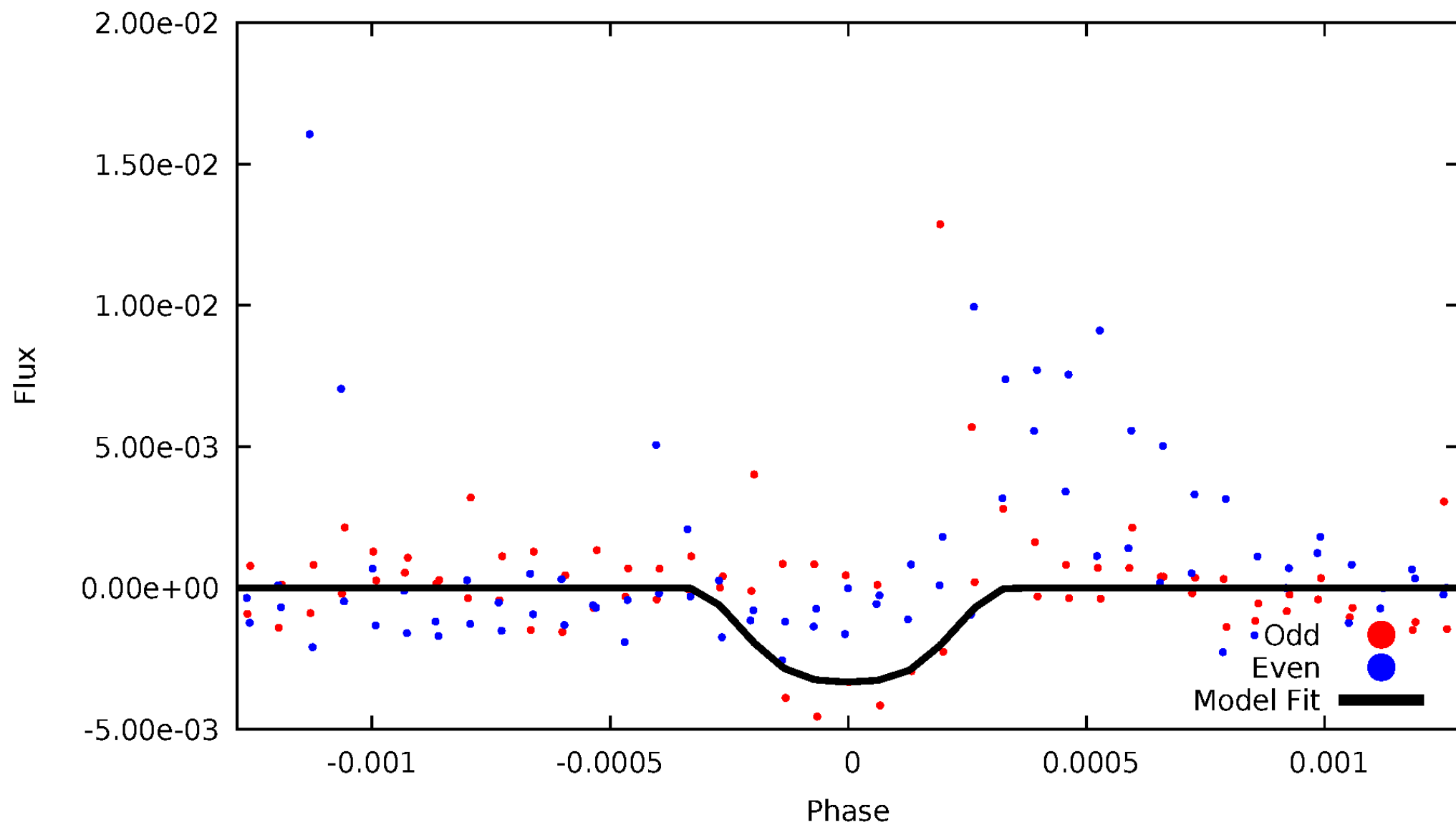


TCE 012835232-02



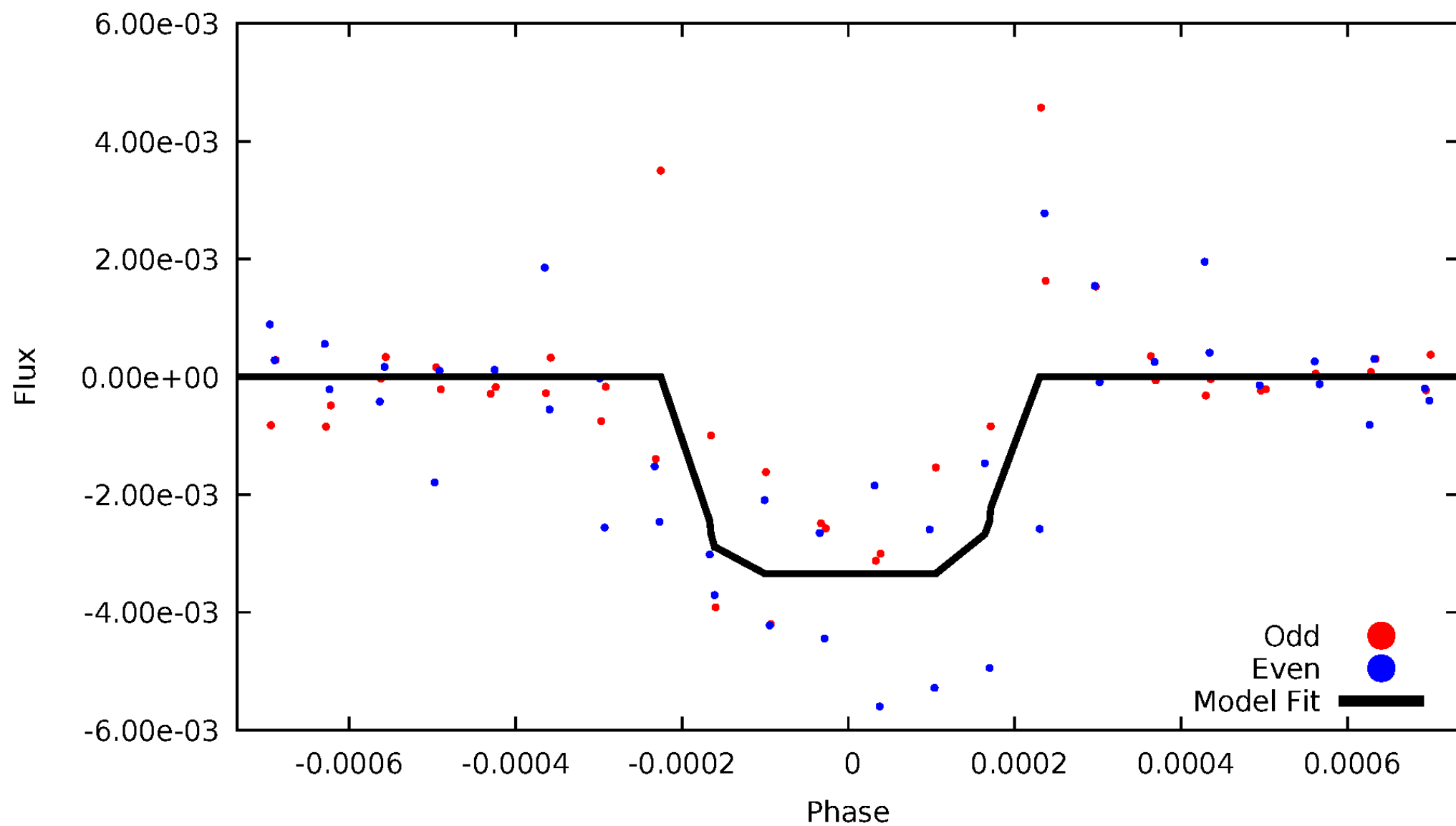
# DV Odd/Even

TCE 012835232-02



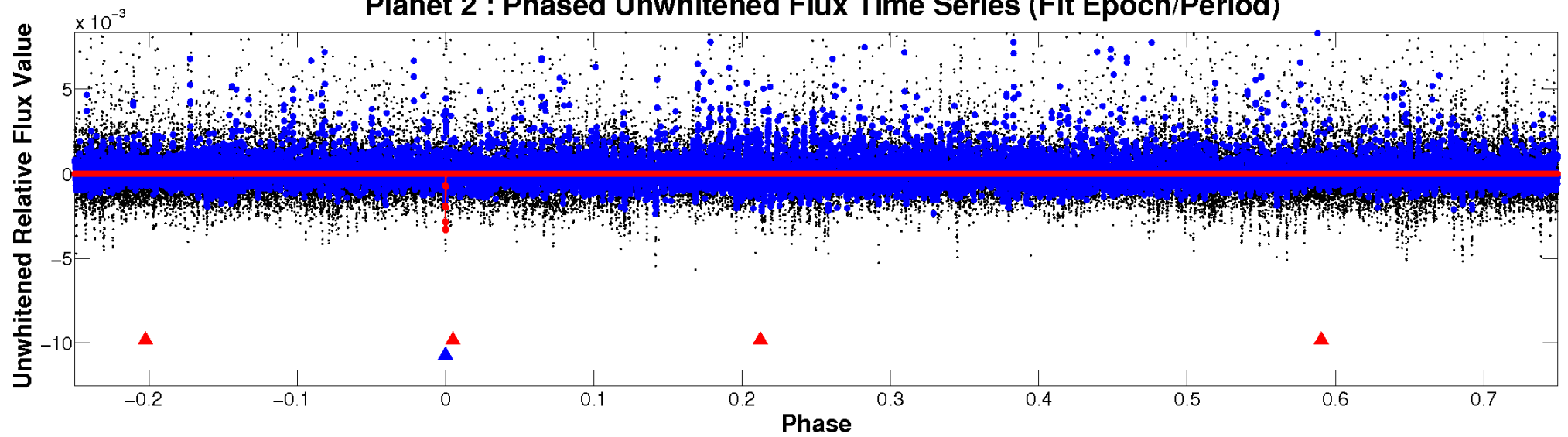
# ALT Odd/Even

TCE 012835232-02

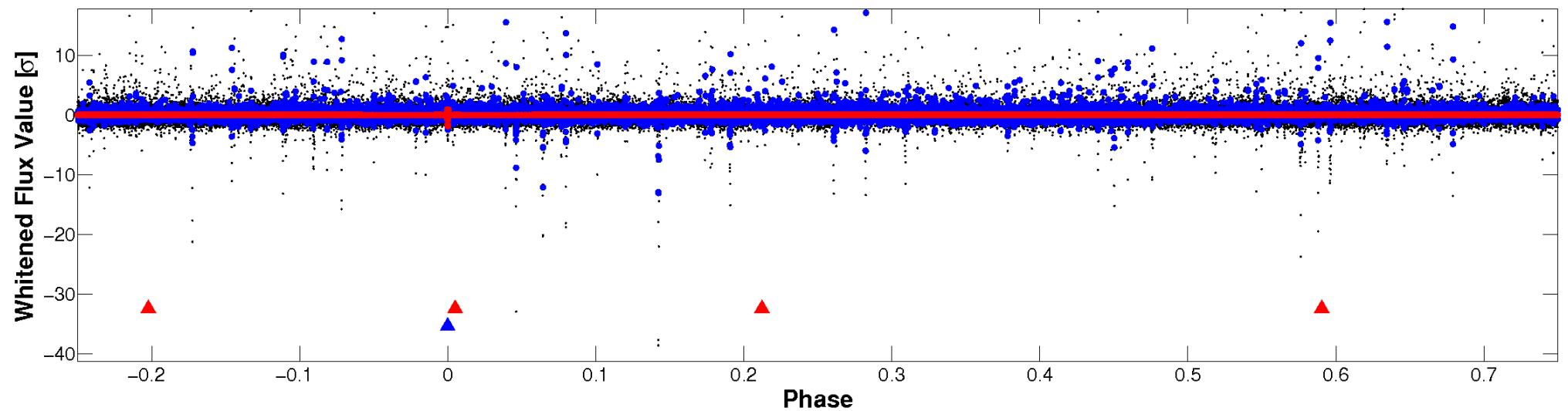


# Non-Whitened Vs. Whitened Light Curve

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

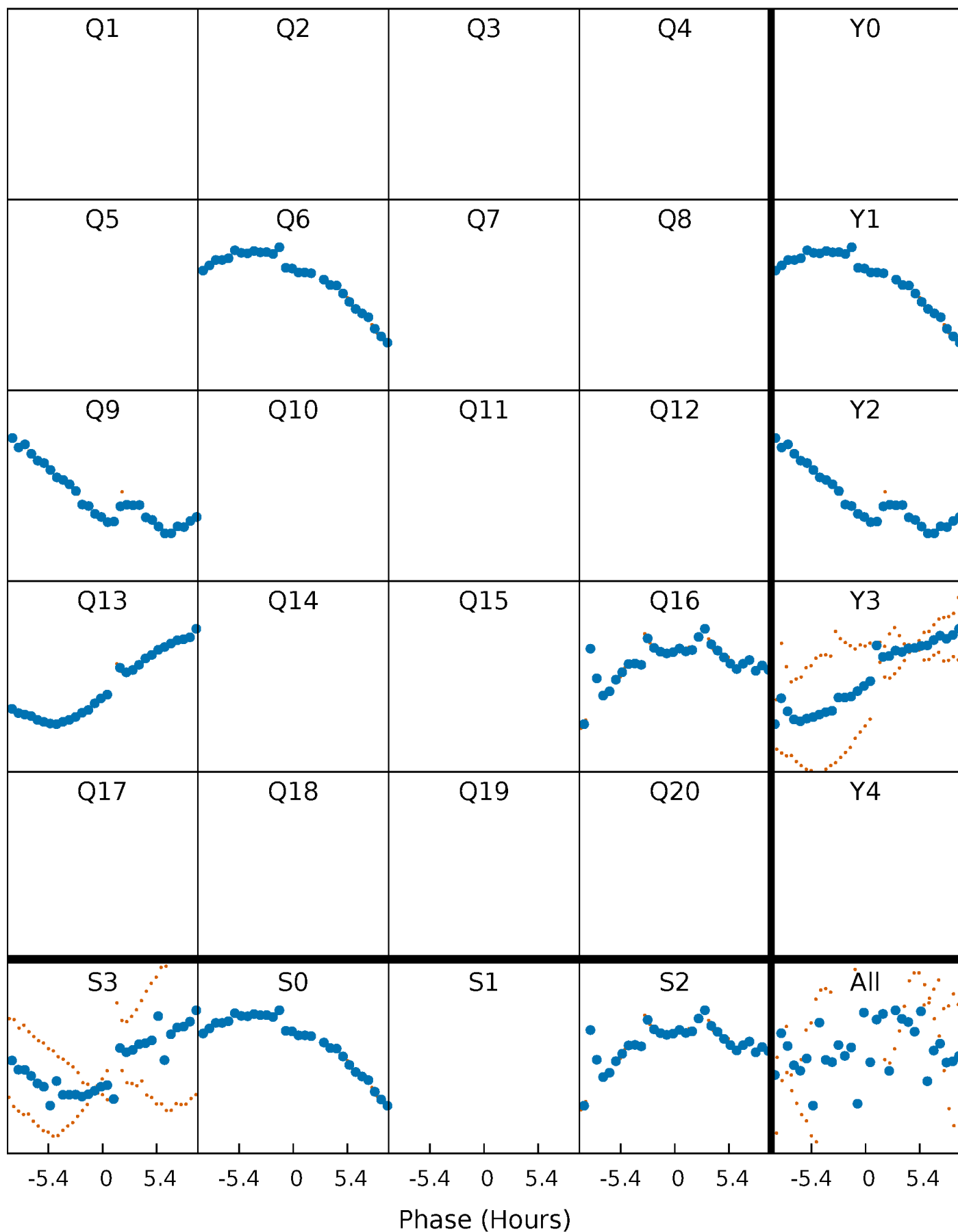


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



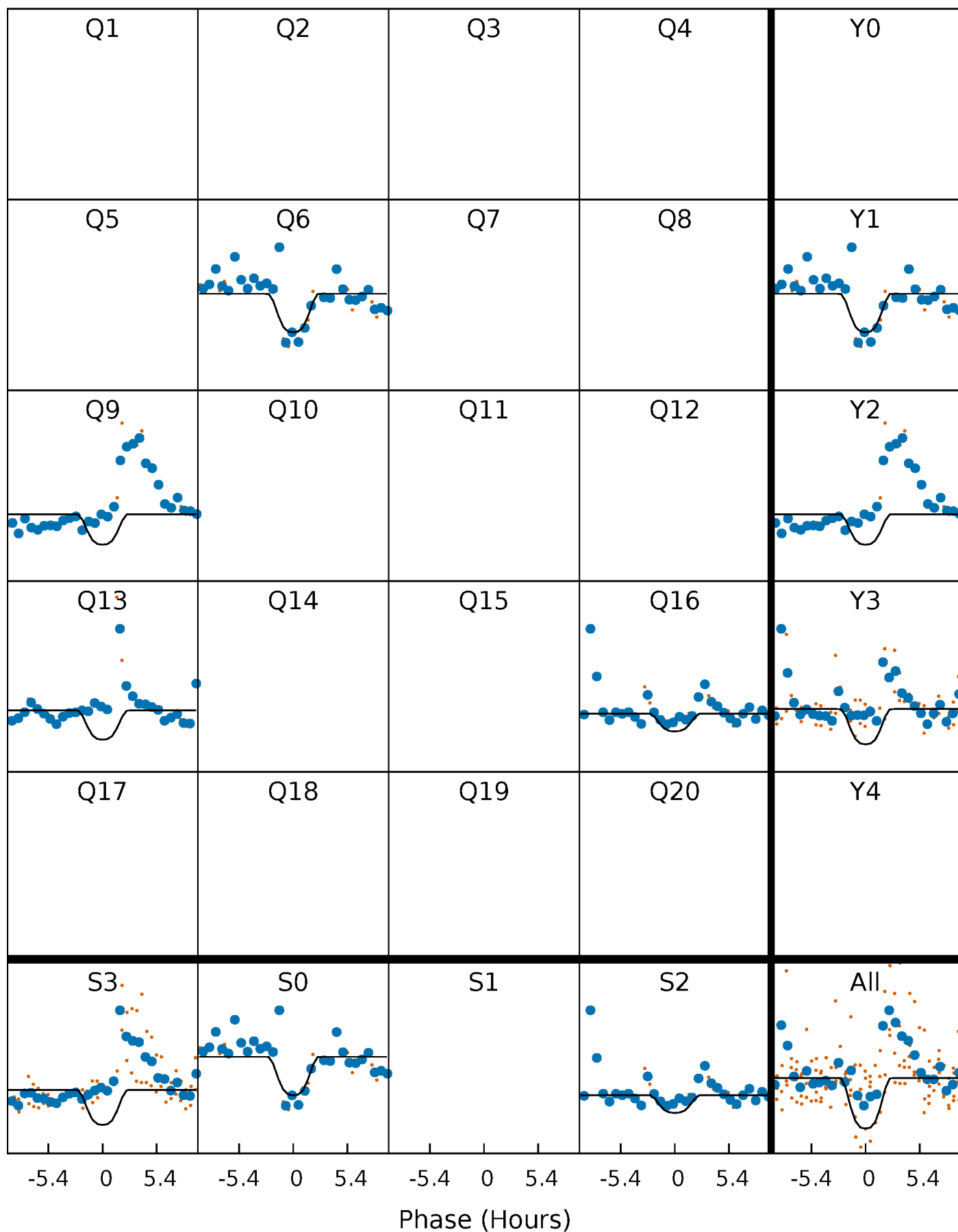
# PDC Quarter-Phased Transit Curves

TCE 012835232-02 P=309.078219 Days  $T_0=281.169378$  (BKJD)



# DV Quarter-Phased Transit Curves

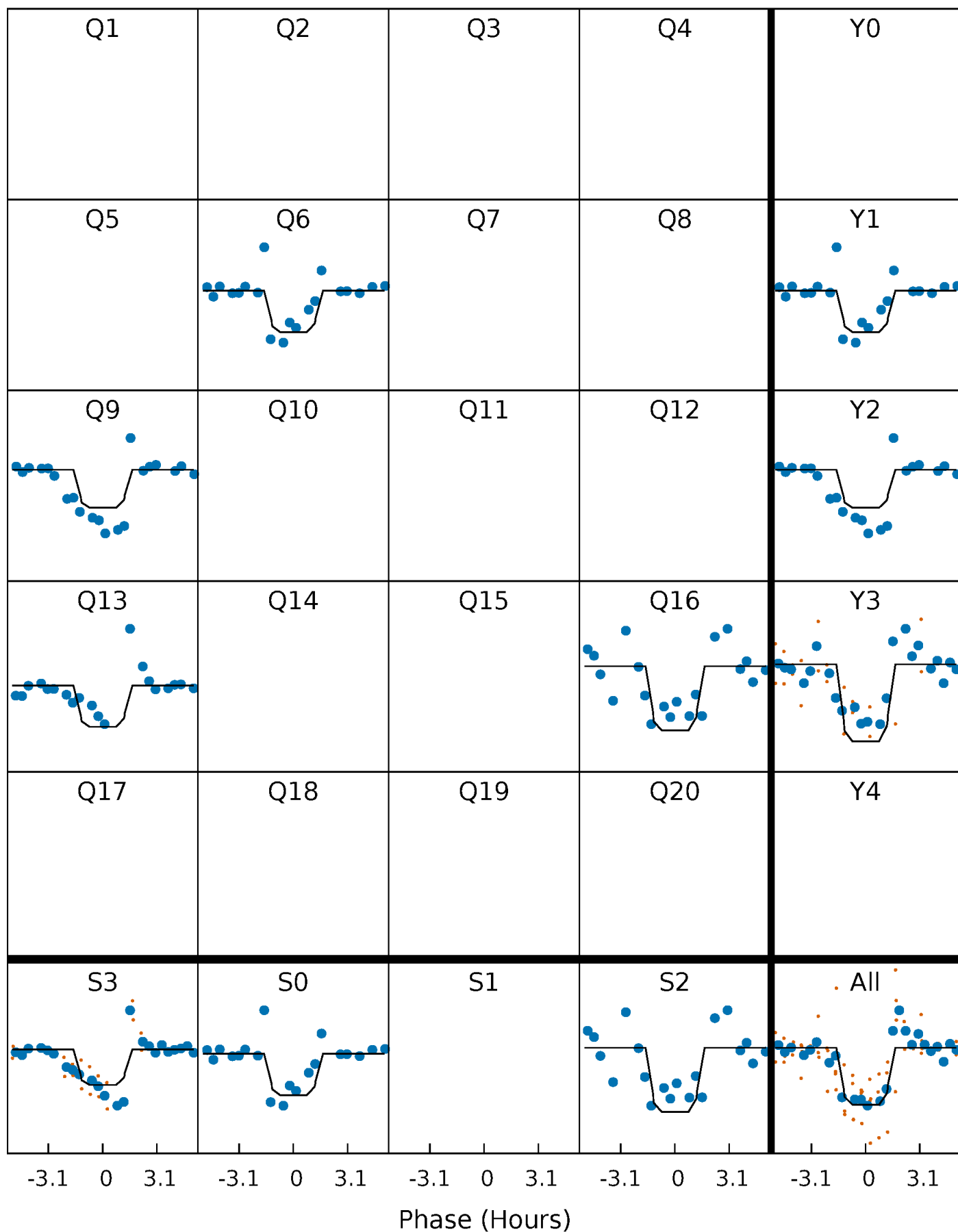
TCE 012835232-02     $P=309.078219$  Days     $T_0=281.169378$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

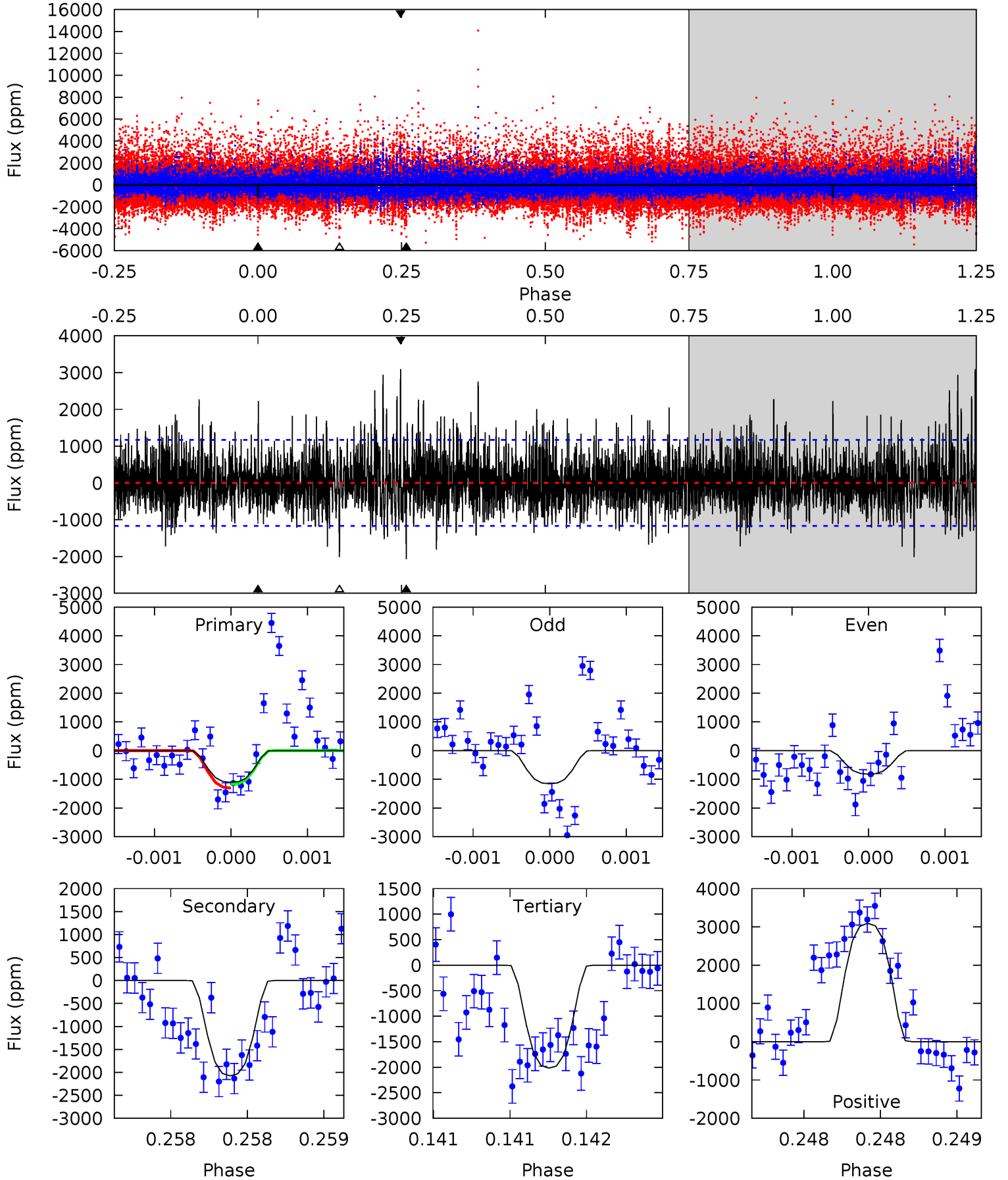
TCE 012835232-02 P=309.078173 Days  $T_0=281.178047$  (BKJD)



# DV Model-Shift Uniqueness Test

012835232-02, P = 309.078219 Days, E = 281.169378 Days

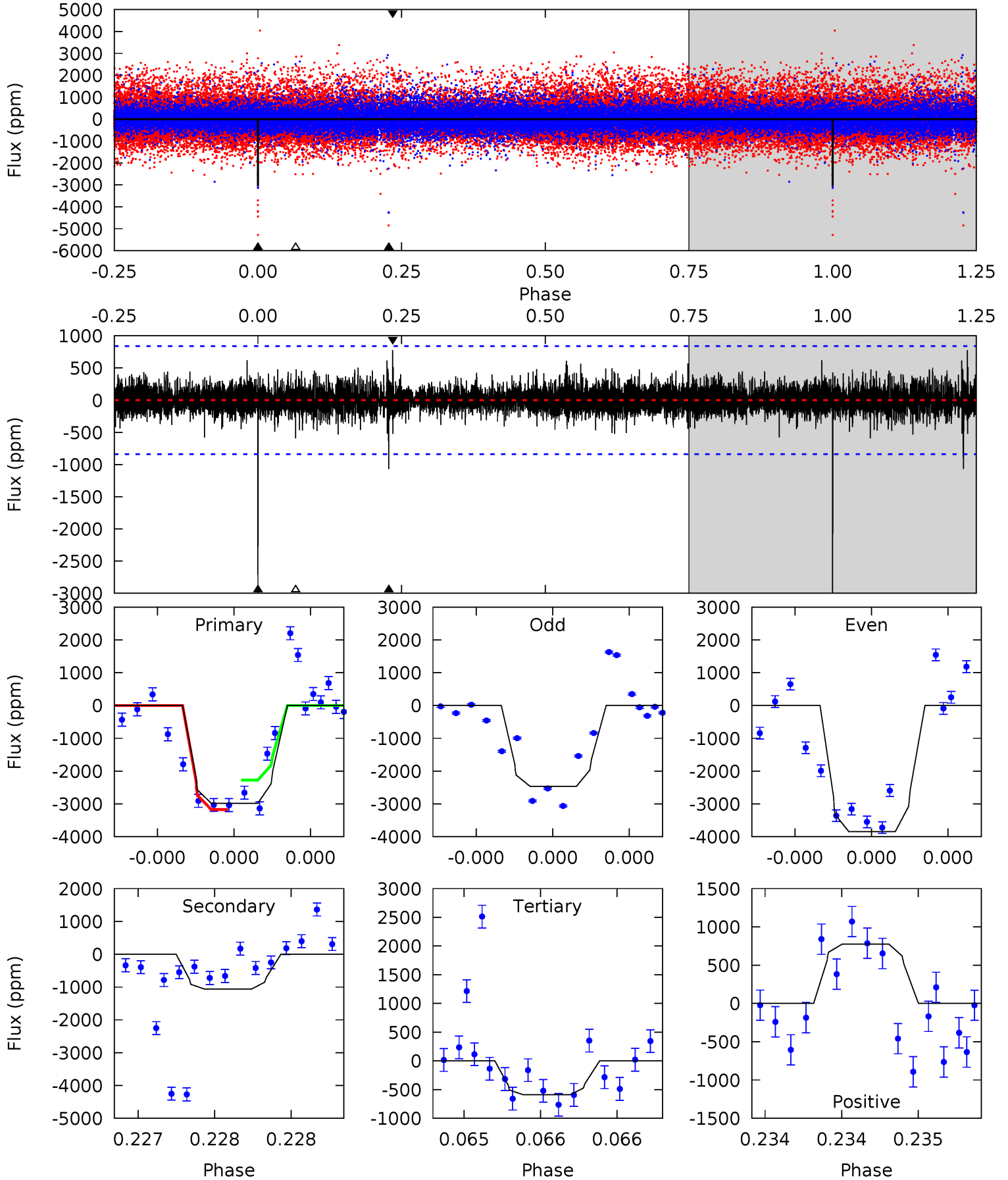
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.22	9.79	9.51	14.6	5.52	3.40	2.73	-4.30	-9.38	0.27	-4.81	0.71	0.77	0.60	0.30



# Alt Model-Shift Uniqueness Test

012835232-02, P = 309.078173 Days, E = 281.178047 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
20.1	7.16	3.97	5.21	5.64	3.58	0.88	16.1	14.9	3.19	1.95	4.64	1.17	0.21	2.84



### Stellar Parameters For KIC 012835232

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3744^{+67}_{-67}$	$4.759^{+0.036}_{-0.024}$	$-0.100^{+0.100}_{-0.100}$	$0.488^{+0.026}_{-0.035}$	$0.499^{+0.027}_{-0.030}$	$6.043^{+0.997}_{-0.635}$
	+2%/-2%	+1%/-1%	+100%/-100%	+5%/-7%	+5%/-6%	+16%/-11%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 012835232-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2073 \pm 212$	$3.46^{+0.44}_{-0.50}$	$191^{+4}_{-4}$	$3336^{+181}_{-145}$	$47971^{+17925}_{-11272}$
Alt.	$-1065 \pm 149$	$3.06^{+0.47}_{-0.48}$	$191^{+4}_{-4}$	$3140^{+181}_{-156}$	$31585^{+13746}_{-8808}$

$T_{\text{max}}$  = 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

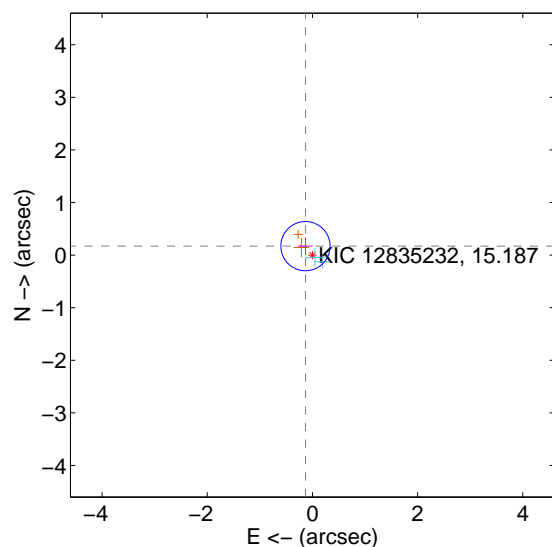
Supplemental centroid analysis for 012835232-02. Kepler magnitude: 15.19. Transit SNR 8.51

There are 2 quarters with good PRF difference image offsets

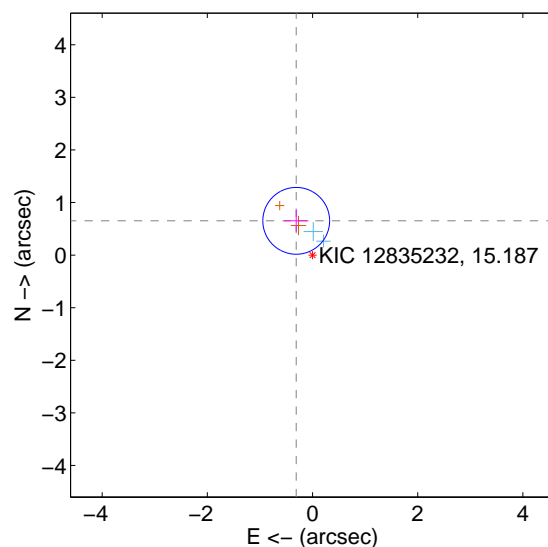
The direct PRF centroid is offset from the target star catalog position by about 0.42 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.216 \pm 0.156$	1.38	$0.133 \pm 0.139$	$0.170 \pm 0.166$
PRF-fit source offset from KIC position	<b><math>0.722 \pm 0.212</math></b>	<b>3.41</b>	$0.310 \pm 0.232$	$0.652 \pm 0.207$
photometric centroid source offset	$1.68 \pm 0.72$	2.33	$-0.27 \pm 0.72$	$1.66 \pm 0.72$

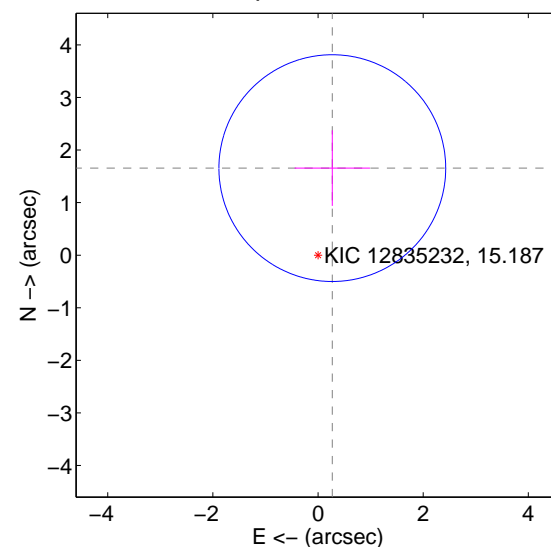
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

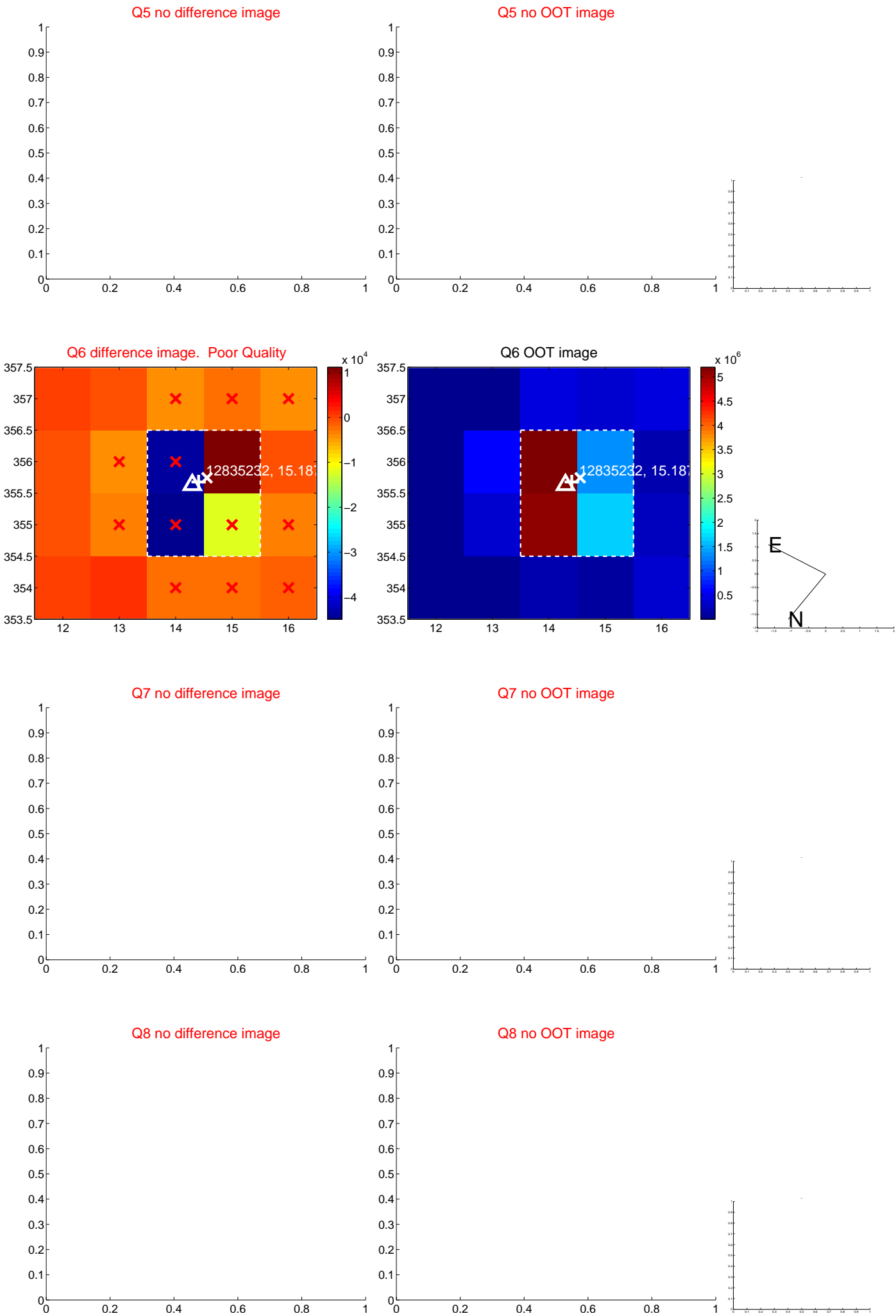


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

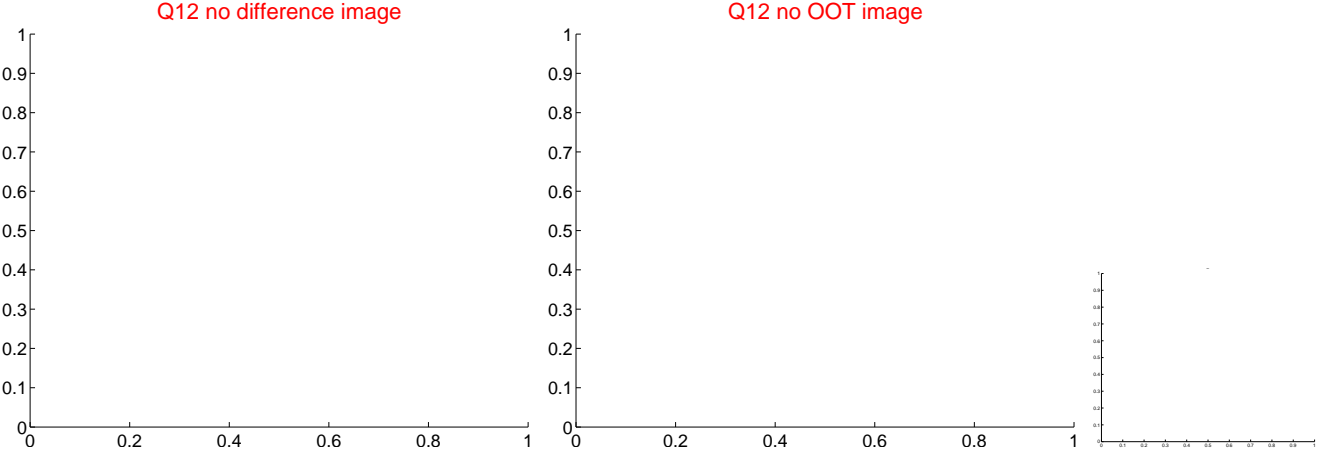
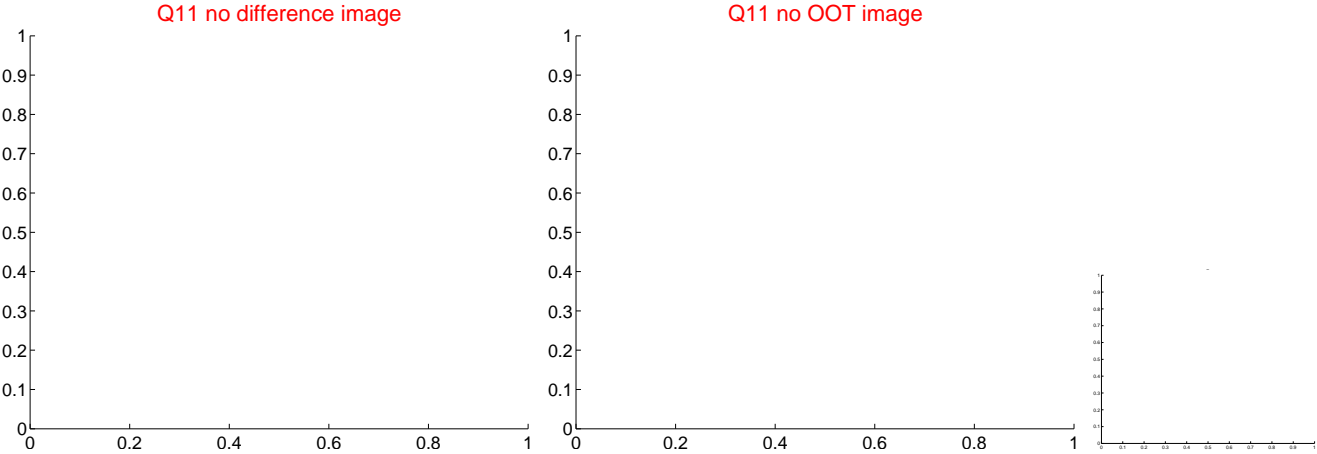
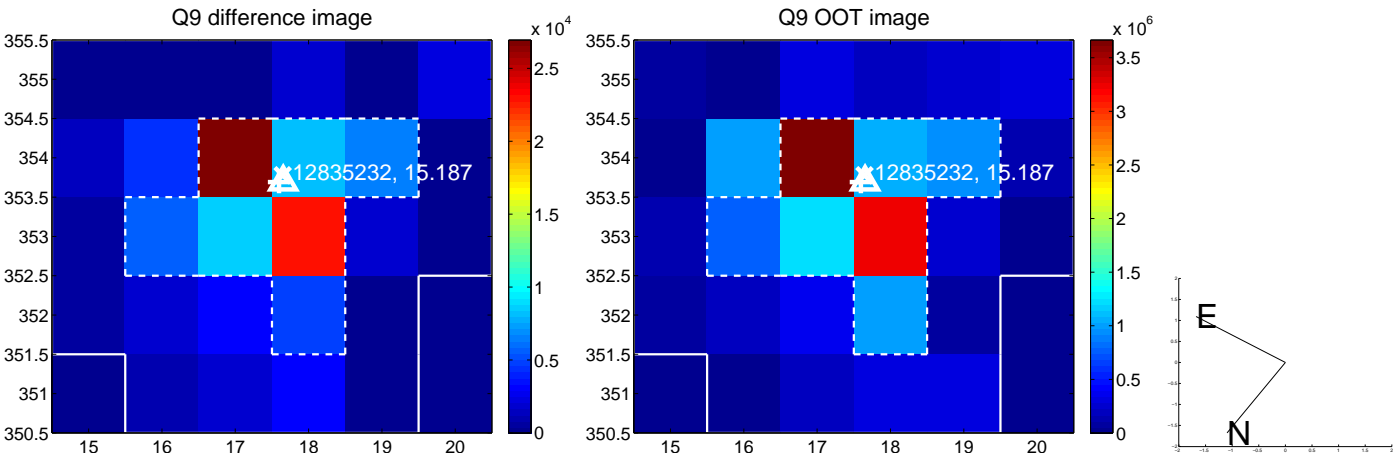


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

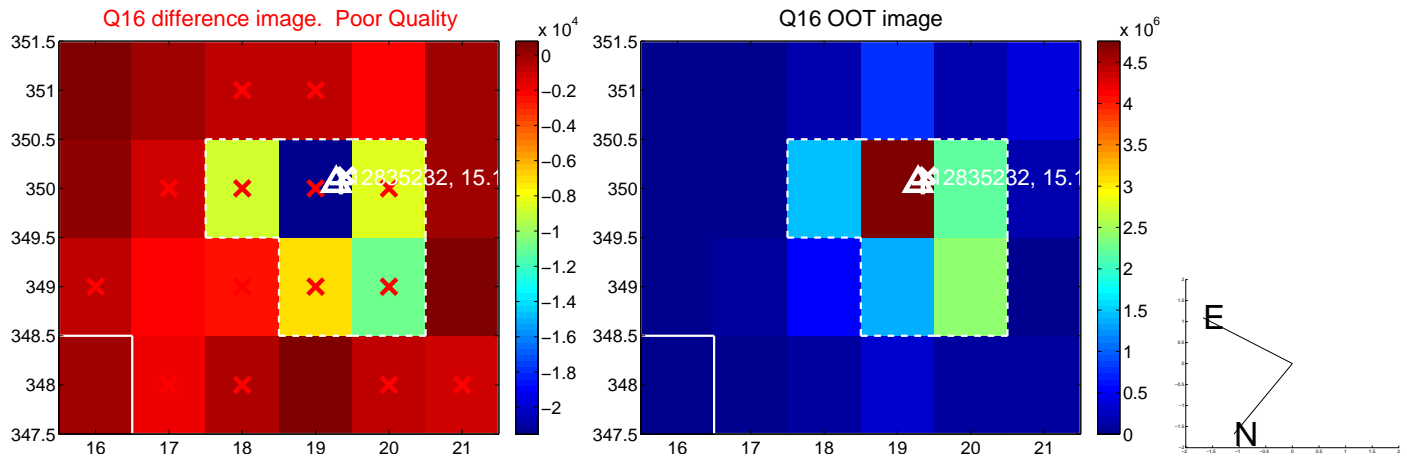
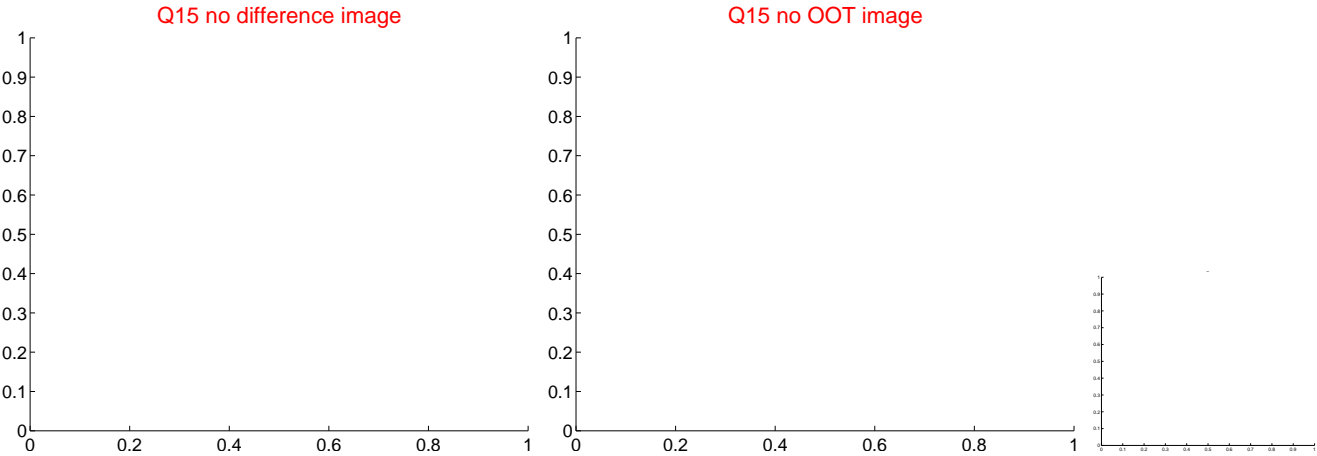
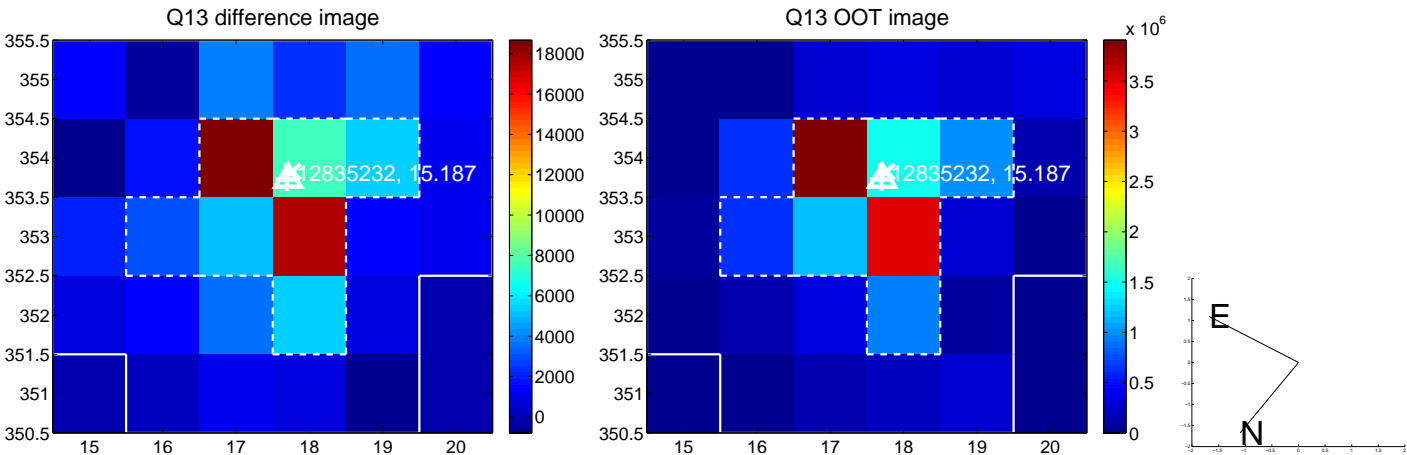




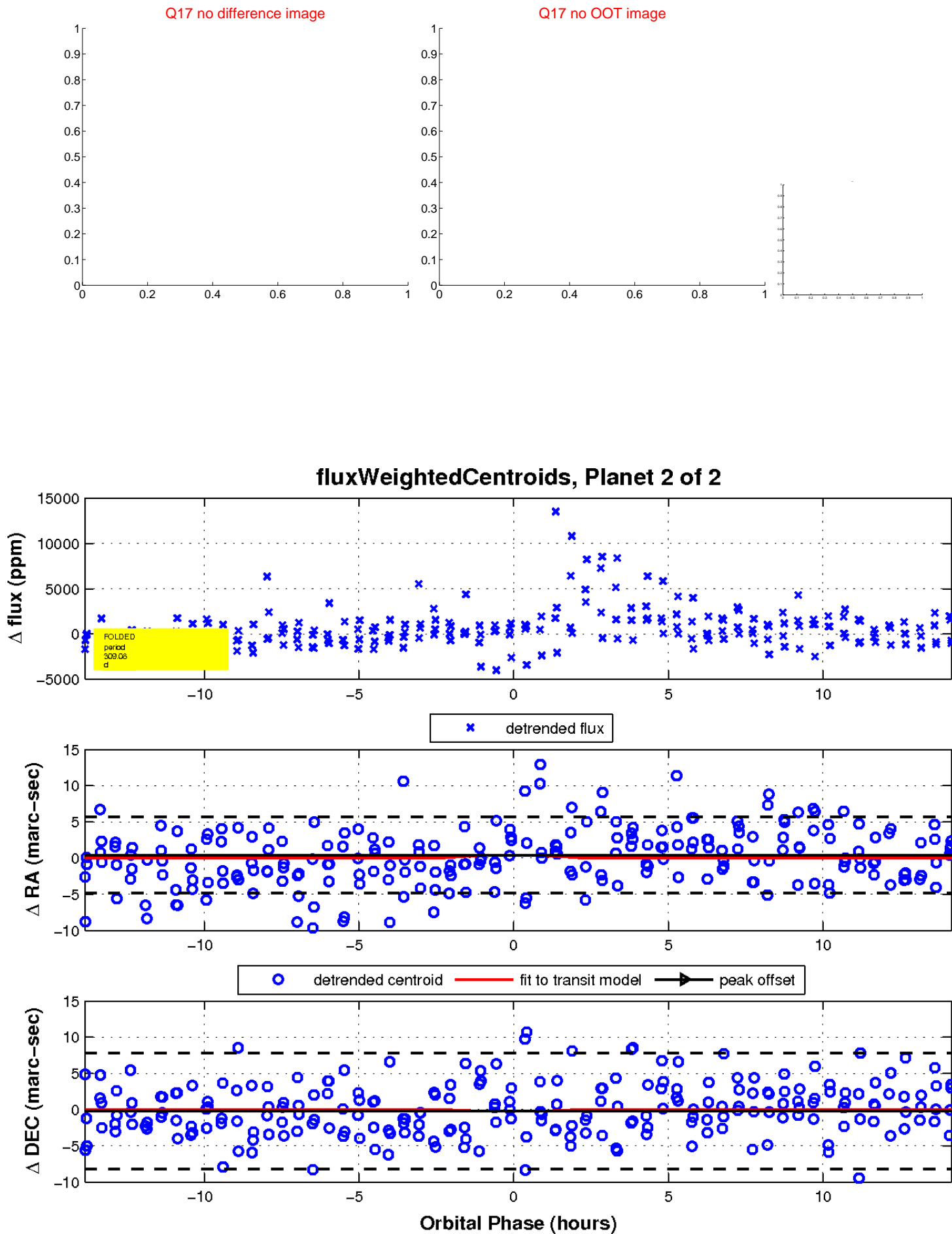
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



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



UKIRT Image

Declination

