

# KIC 002855026

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002855026-01	OBS	No	1.307171	132.226196	1202.8	1.387	9.1	10.5	2.02	7675	8.20	16403.93
002855026-02	OBS	No	1.307179	131.869821	697.6	4.647	8.5	7.7	2.02	7675	6.17	16403.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002855026-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002855026-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—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.

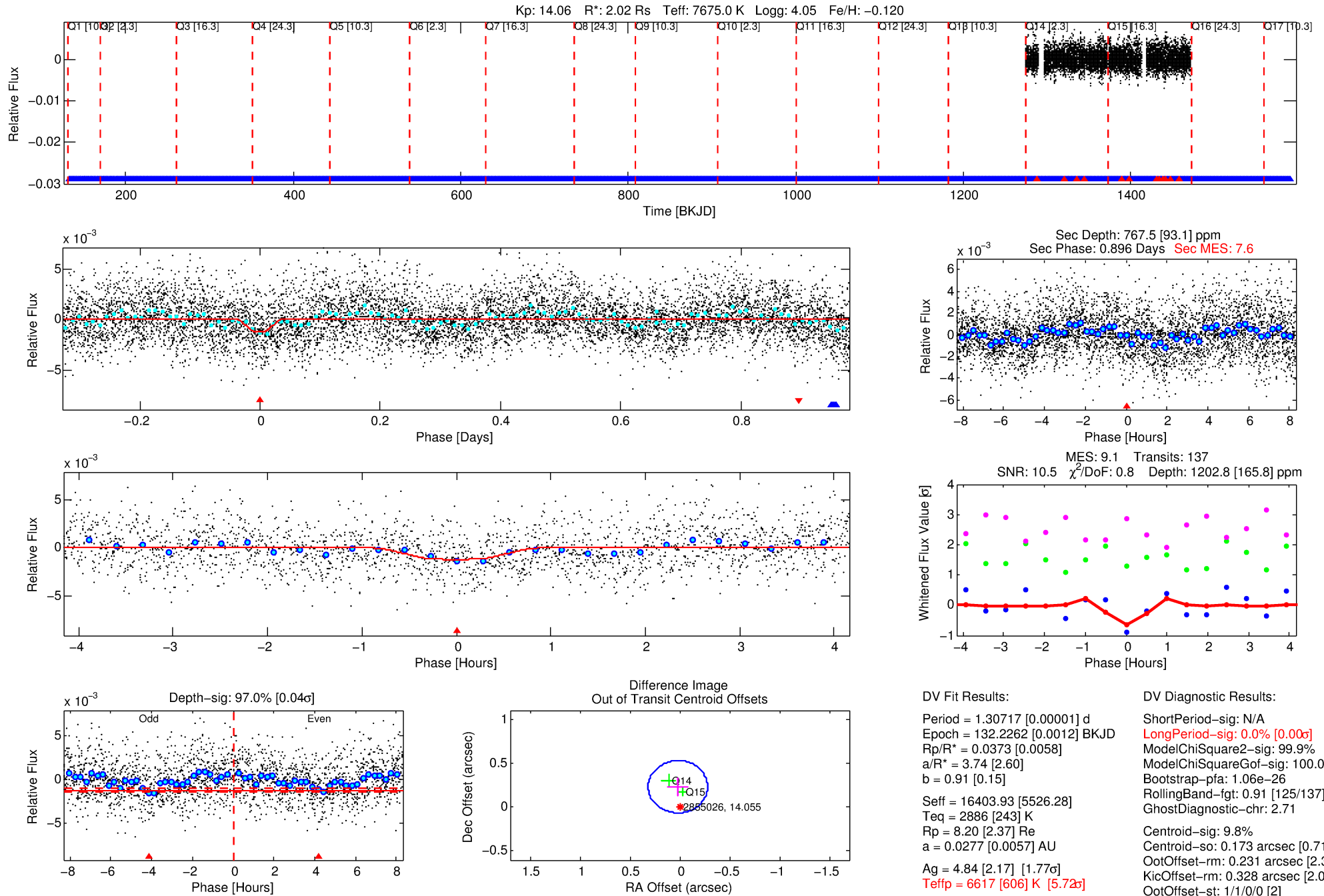
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002855026-01

No Significant Match Found

# DV One-Page Summary

KIC: 2855026 Candidate: 1 of 2 Period: 1.307 d



## DV Fit Results:

Period = 1.30717 [0.00001] d  
Epoch = 132.2262 [0.0012] BKJD  
Rp/R\* = 0.0373 [0.0058]  
a/R\* = 3.74 [2.60]  
b = 0.91 [0.15]  
Seff = 16403.93 [5526.28]  
Teq = 2886 [243] K  
Rp = 8.20 [2.37] Re  
a = 0.0277 [0.0057] AU  
Ag = 4.84 [2.17] [1.77σ]  
Teffp = 6617 [606] K [5.72σ]

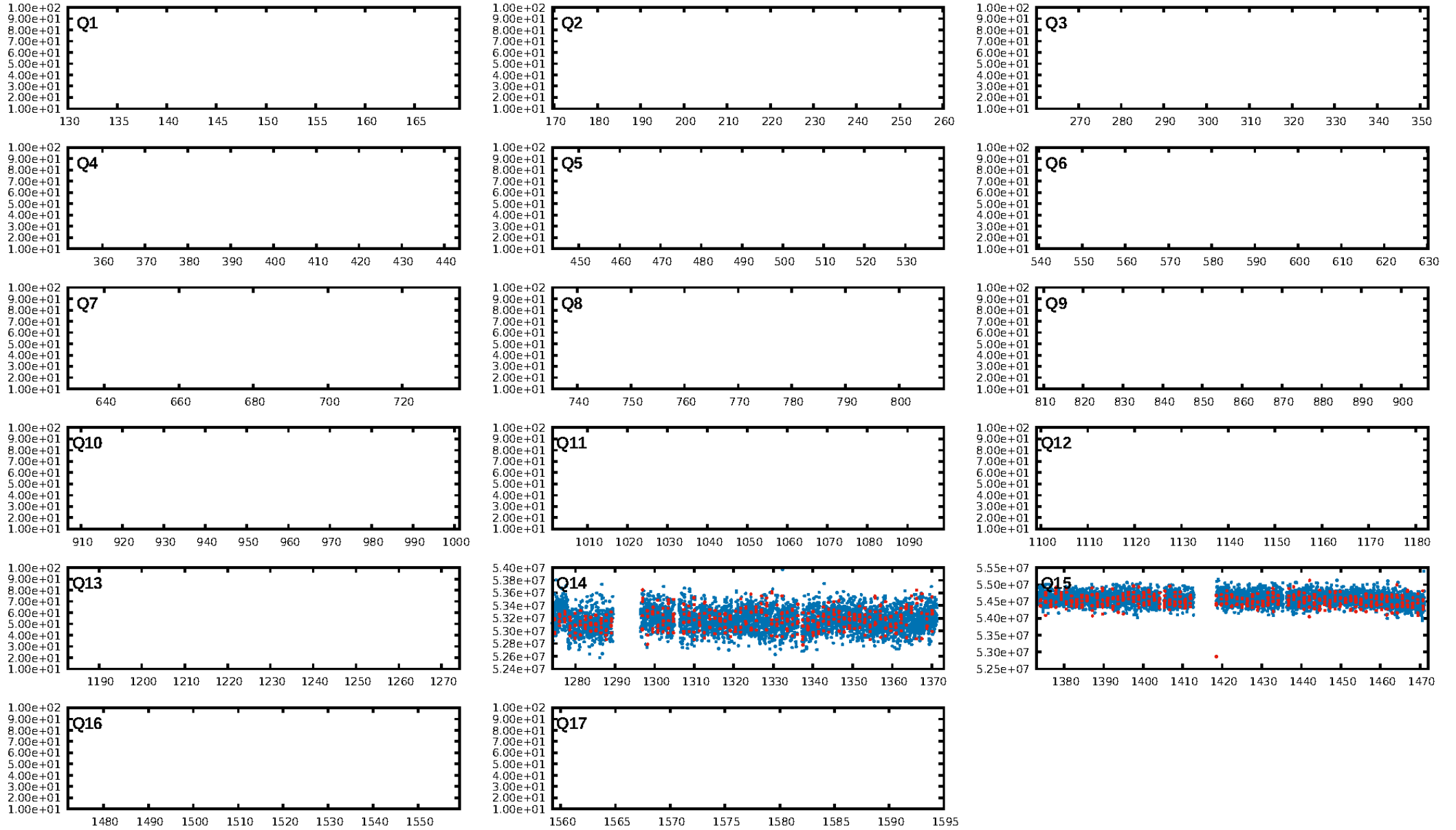
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.06e-26  
RollingBand-fgt: 0.91 [125/137]  
GhostDiagnostic-chr: 2.71  
Centroid-sig: 9.8%  
Centroid-so: 0.173 arcsec [0.71σ]  
OotOffset-rm: 0.231 arcsec [2.33σ]  
KicOffset-rm: 0.328 arcsec [2.02σ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

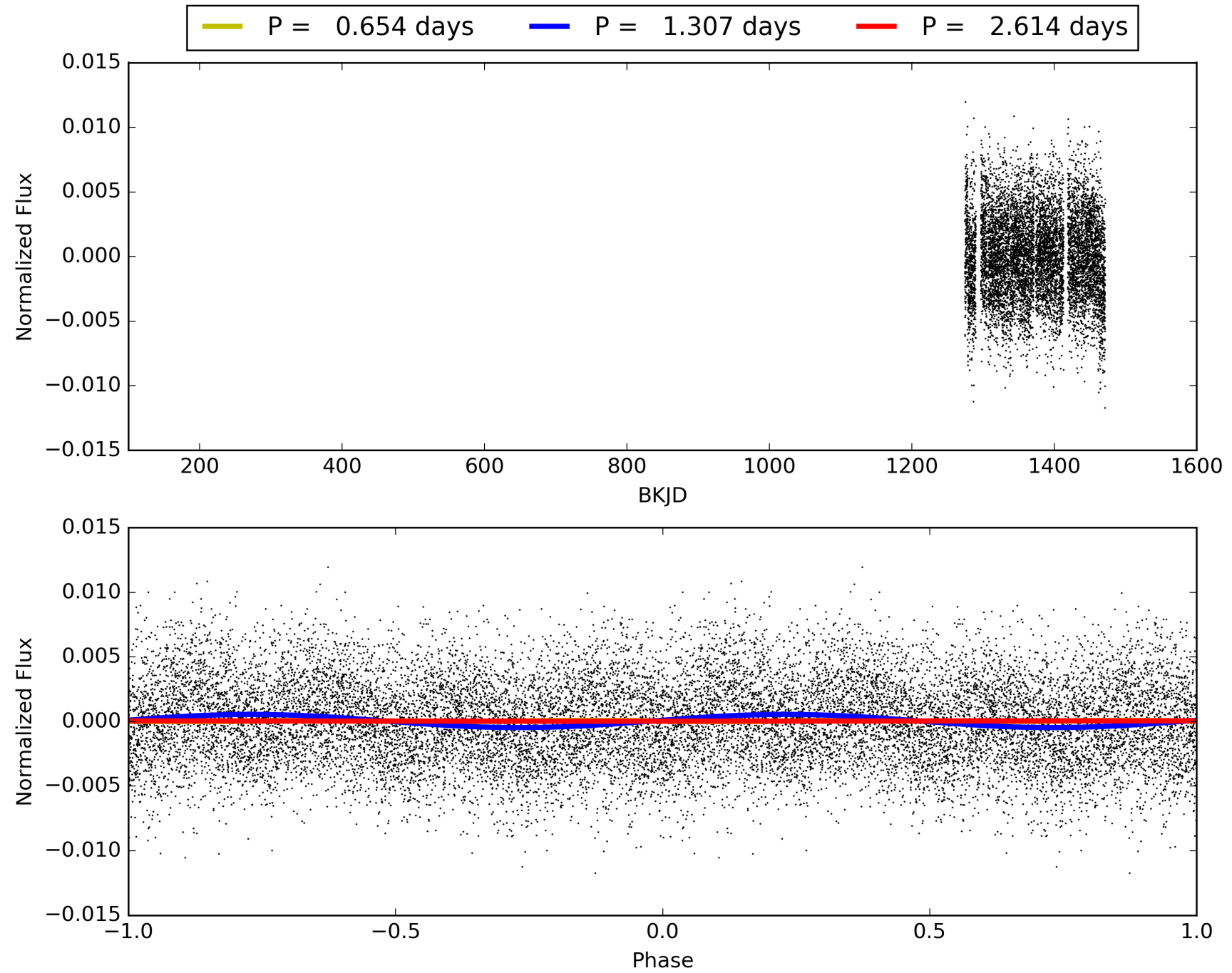
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 15:44:50 Z

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

# TCE 002855026-01, PDC Light Curves

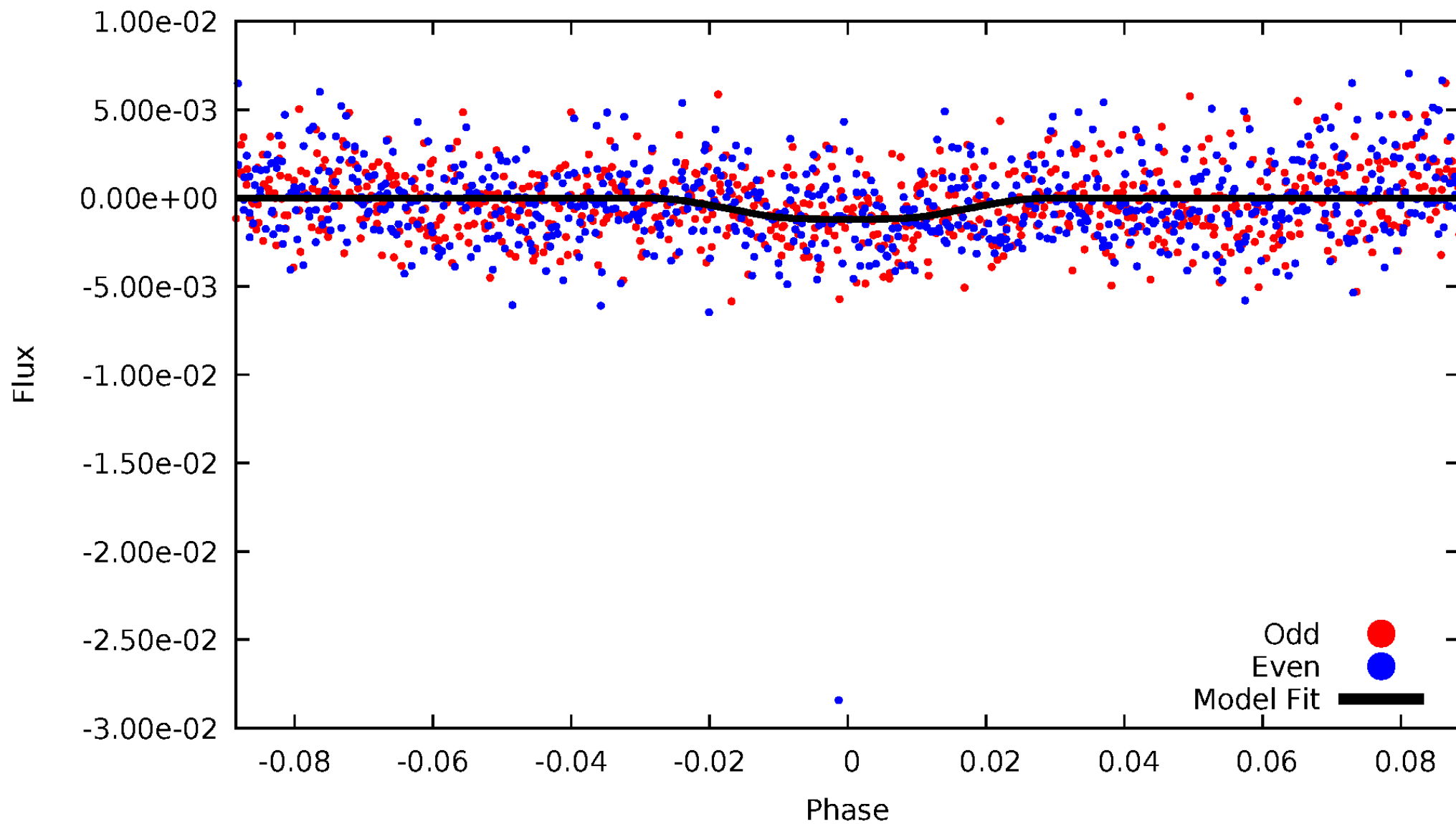


# TCE 002855026-01



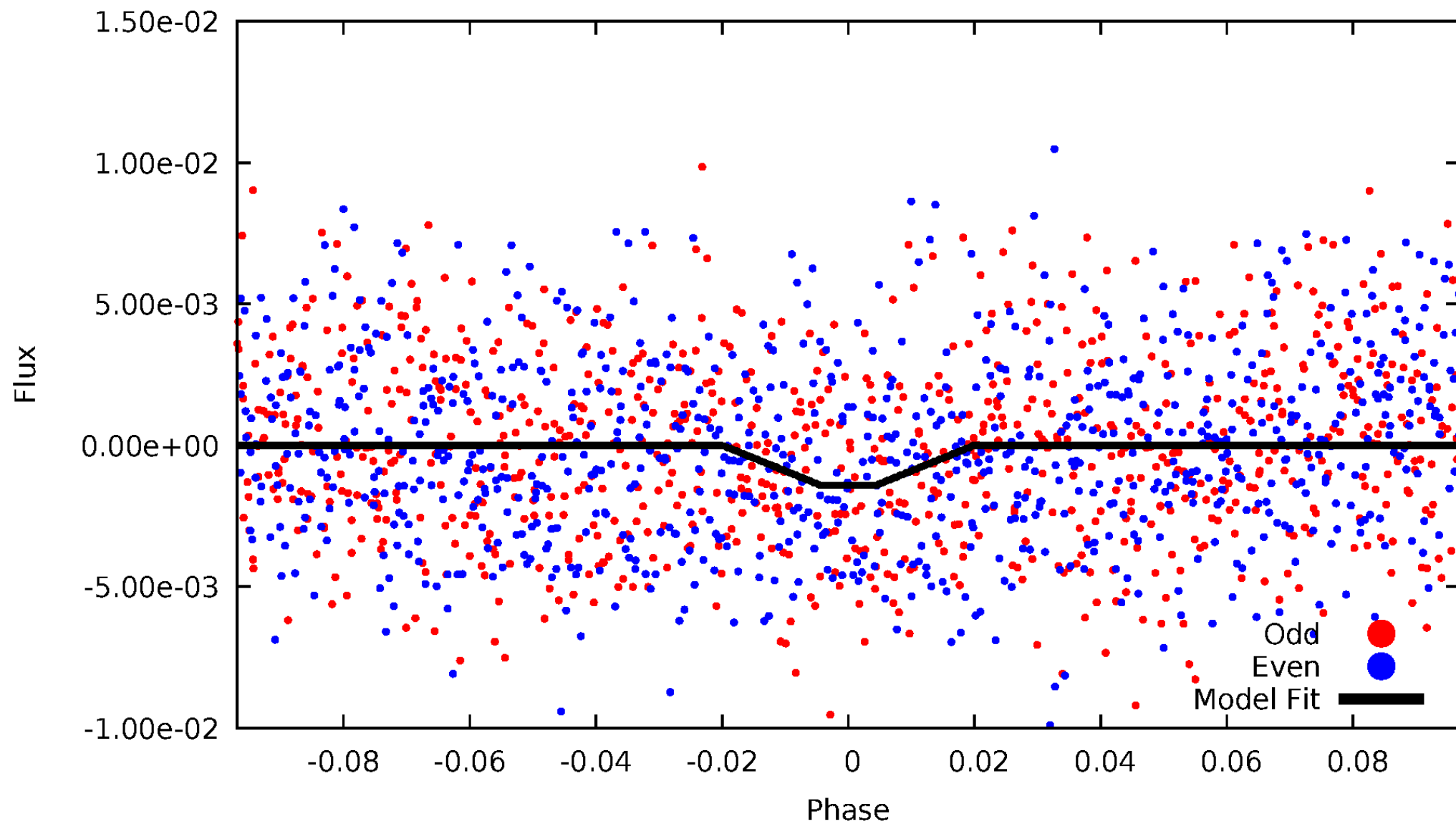
# DV Odd/Even

TCE 002855026-01



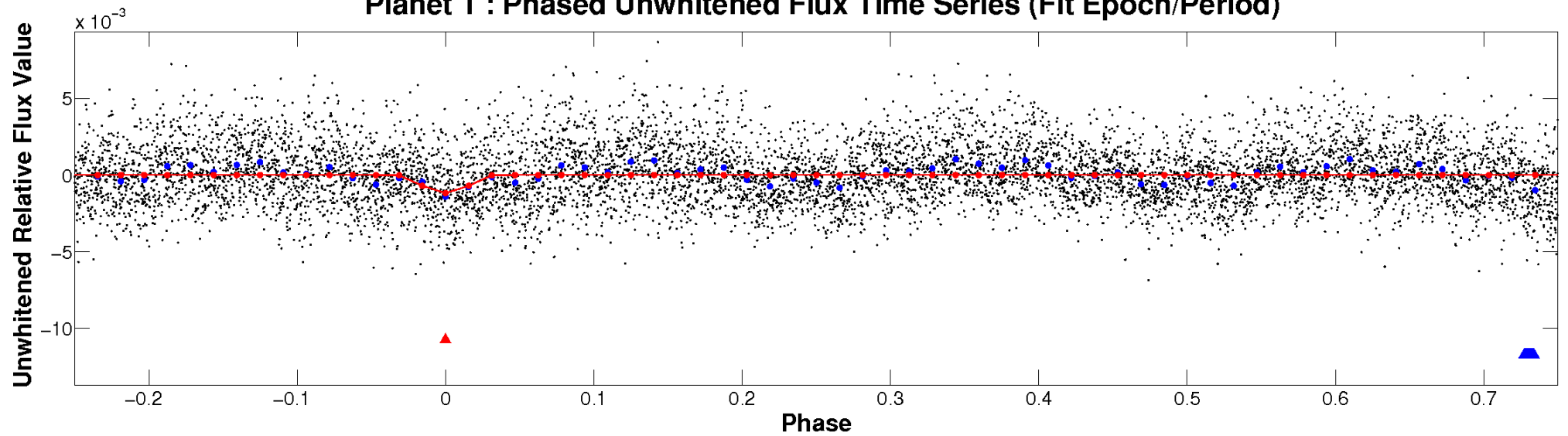
# ALT Odd/Even

TCE 002855026-01

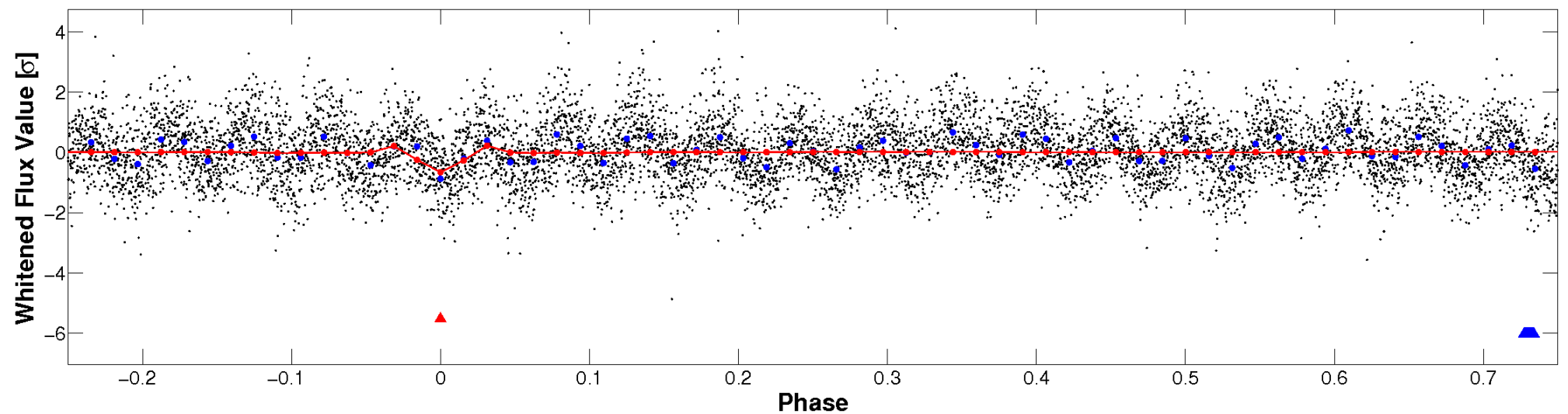


# Non-Whitened Vs. Whitened Light Curve

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

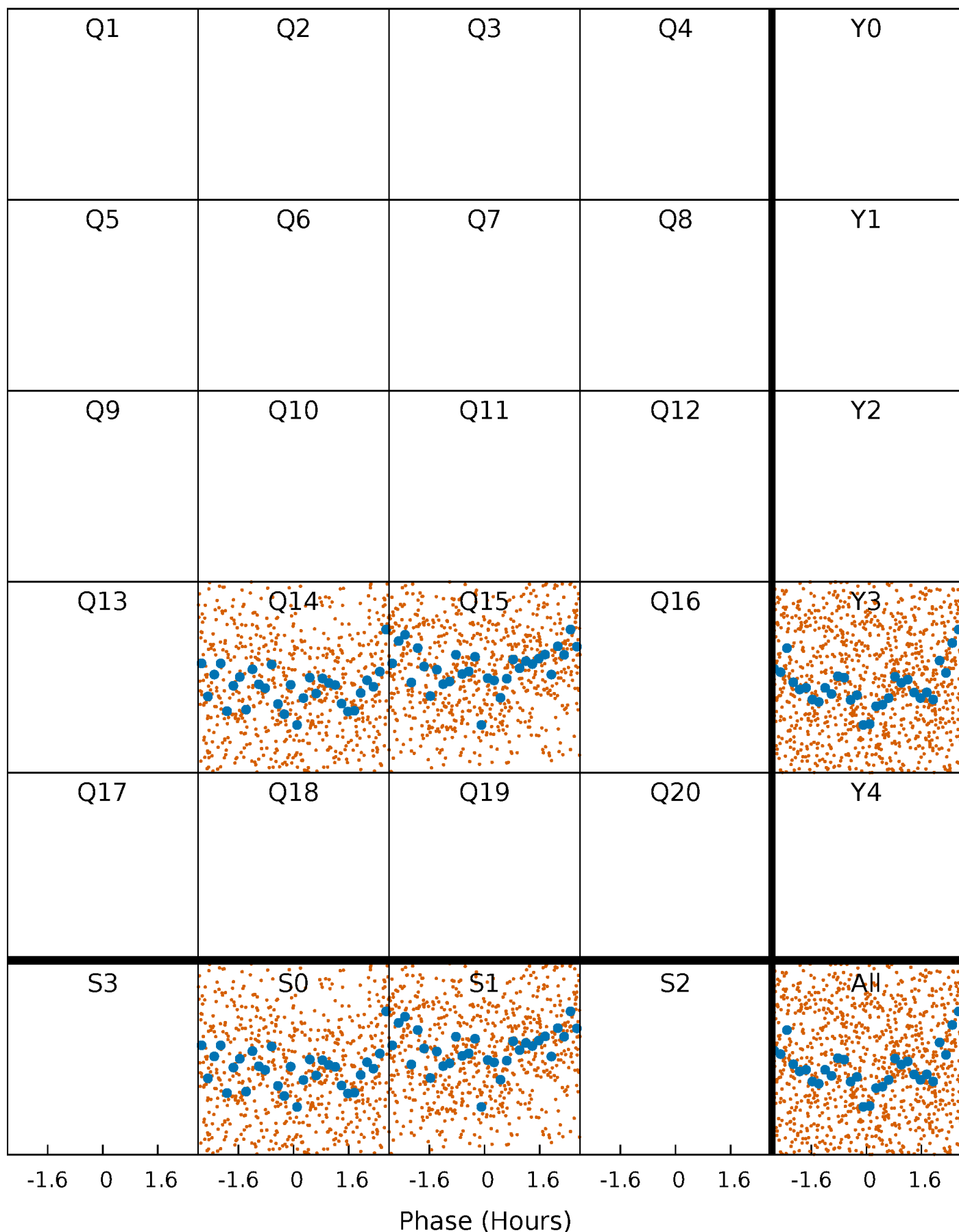


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 002855026-01 P= 1.307171 Days  $T_0=132.226196$  (BKJD)





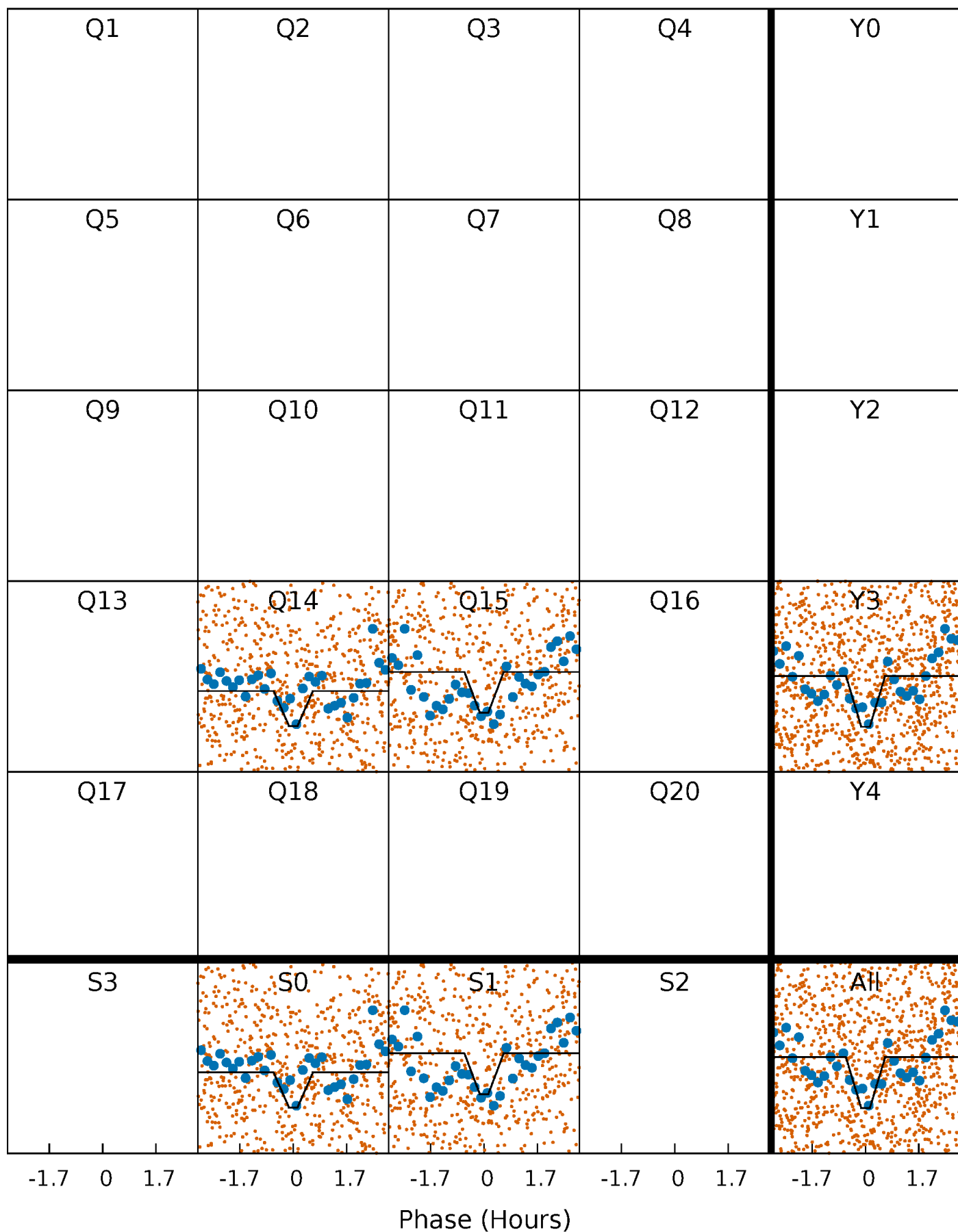
# DV Quarter-Phased Transit Curves

TCE 002855026-01   P= 1.307171 Days    $T_0=132.226196$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

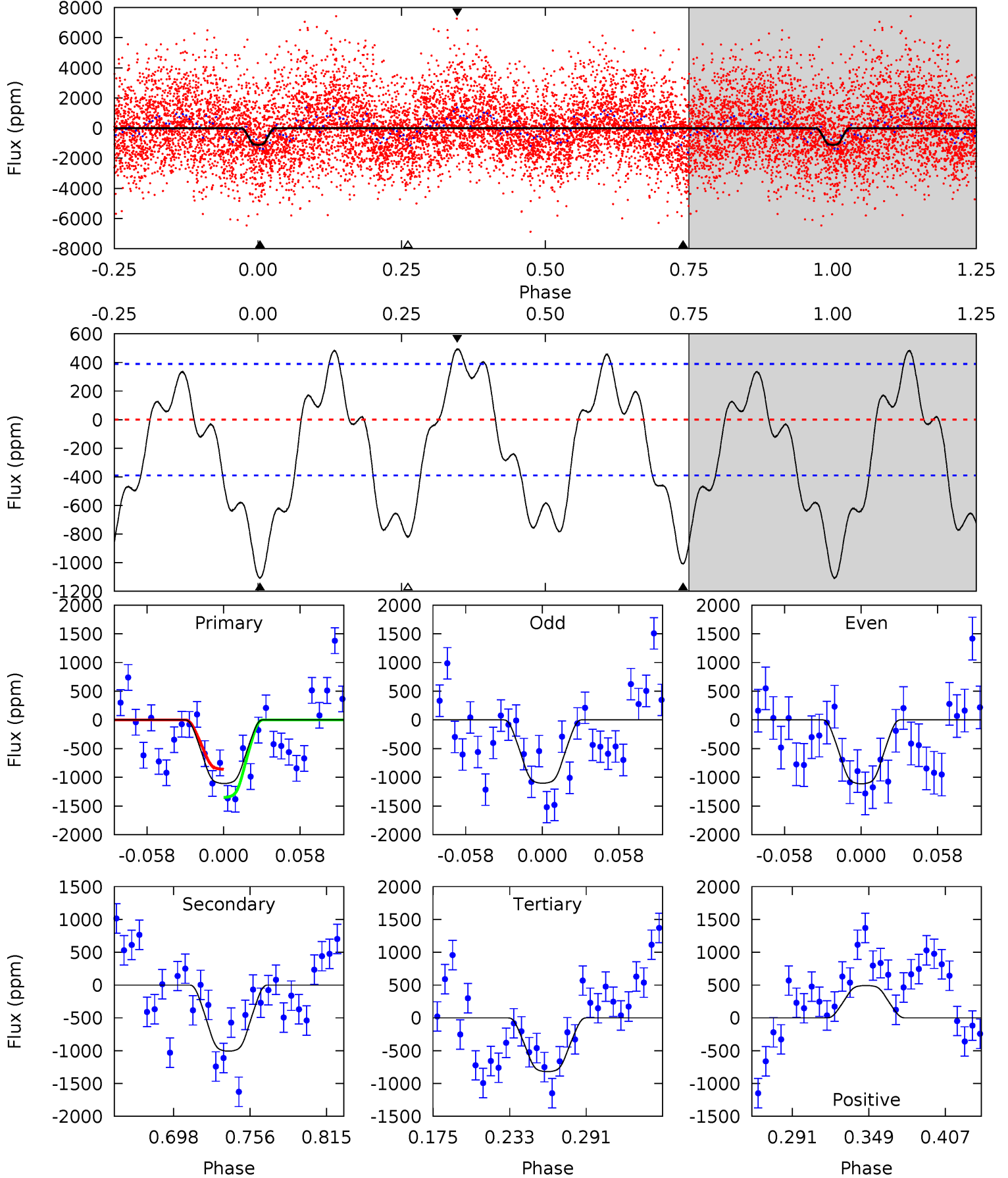
TCE 002855026-01 P= 1.307177 Days  $T_0=132.225936$  (BKJD)



# DV Model-Shift Uniqueness Test

002855026-01, P = 1.307171 Days, E = 132.226196 Days

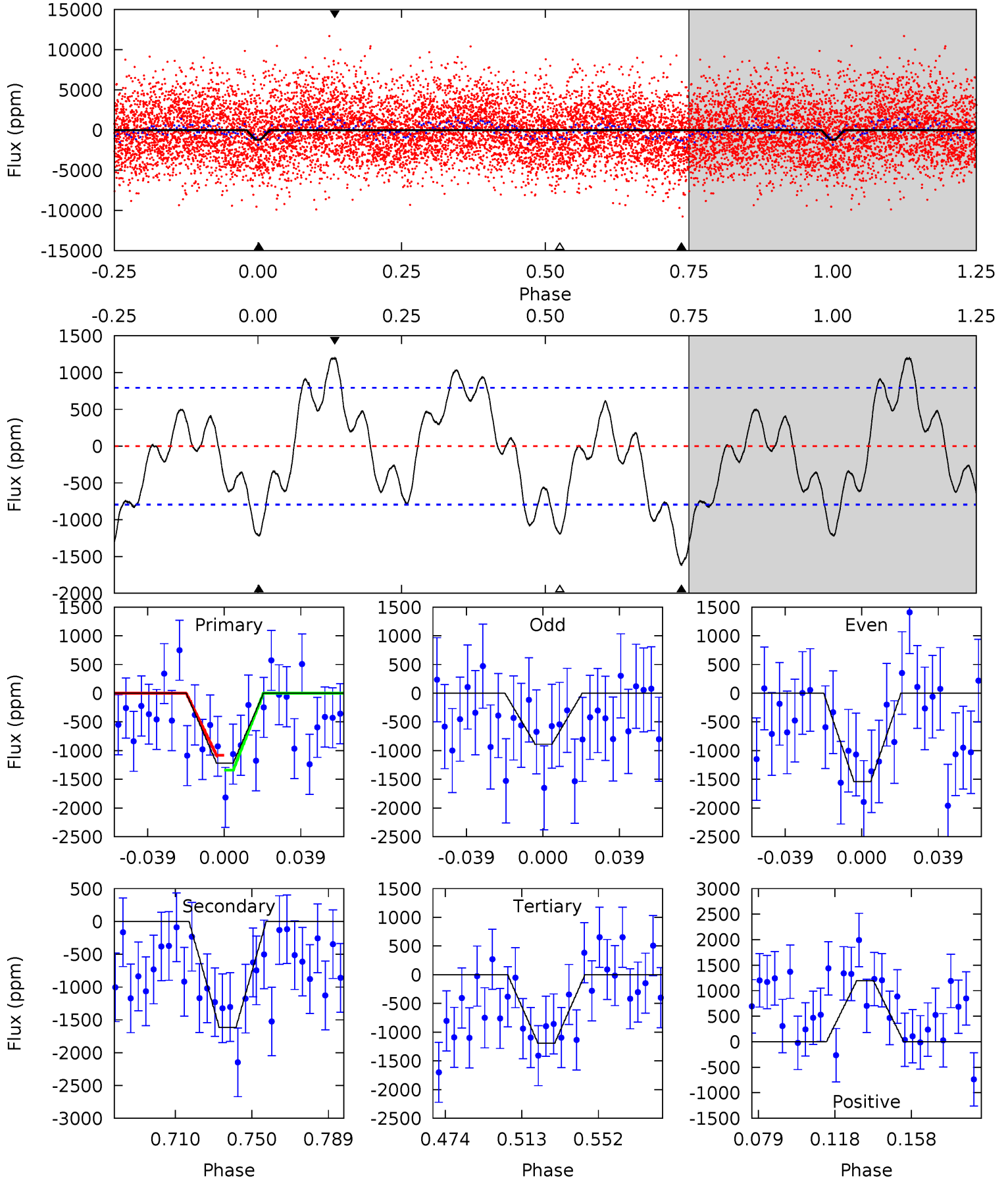
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	12.1	9.84	5.91	4.68	1.89	4.45	3.46	7.39	2.25	6.18	0.06	0.97	0.31	2.93



# Alt Model-Shift Uniqueness Test

002855026-01, P = 1.307177 Days, E = 132.225936 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
7.28	9.68	7.14	7.16	4.76	2.06	3.41	0.14	0.12	2.54	2.52	1.95	0.76	0.43	0.78



### Stellar Parameters For KIC 002855026

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7675^{+237}_{-290}$	$4.051^{+0.165}_{-0.165}$	$-0.120^{+0.200}_{-0.300}$	$2.015^{+0.492}_{-0.492}$	$1.665^{+0.210}_{-0.257}$	$0.287^{+0.286}_{-0.124}$
	+3%/-4%	+4%/-4%	+167%/-250%	+24%/-24%	+13%/-15%	+100%/-43%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 002855026-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1008 \pm 83$	$8.30^{+1.72}_{-1.53}$	$4072^{+257}_{-280}$	$6910^{+796}_{-598}$	$6.215^{+3.073}_{-1.988}$
Alt.	$-1616 \pm 167$	$8.26^{+1.89}_{-1.52}$	$4041^{+286}_{-282}$	$7902^{+1003}_{-731}$	$9.968^{+5.126}_{-3.387}$

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

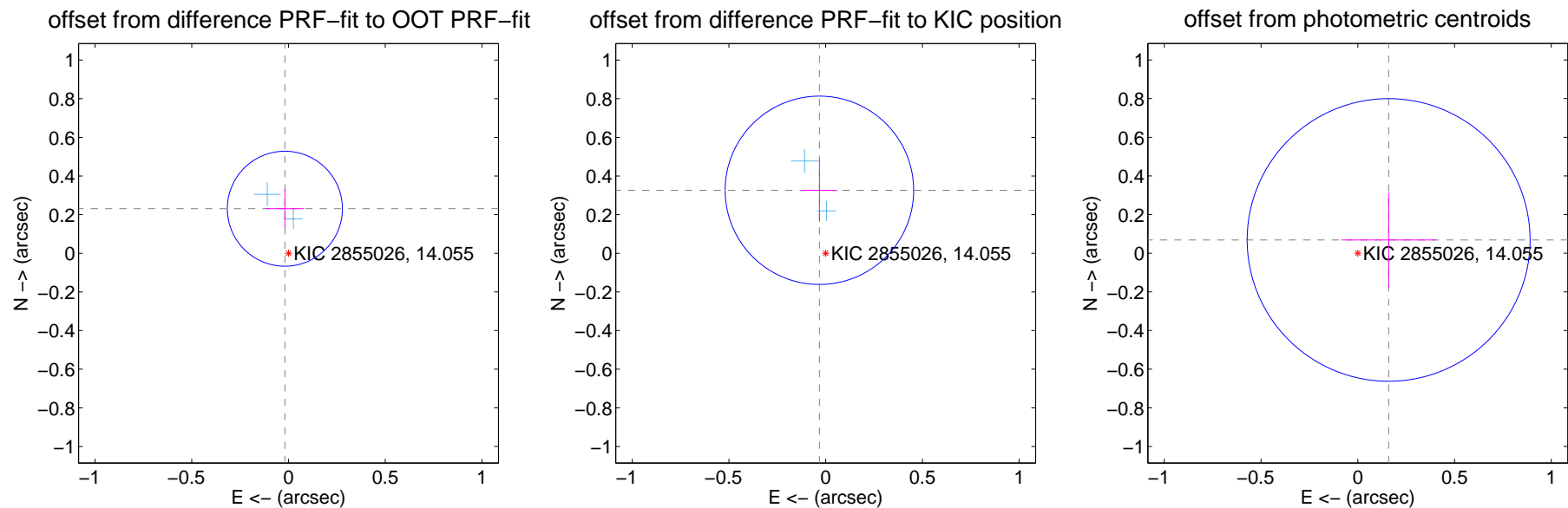
## DV Centroid Data

Supplemental centroid analysis for 002855026-01. Kepler magnitude: 14.05. Transit SNR 10.53

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.231 \pm 0.099$	2.33	$0.019 \pm 0.100$	$0.231 \pm 0.099$
PRF-fit source offset from KIC position	$0.328 \pm 0.162$	2.02	$0.032 \pm 0.091$	$0.326 \pm 0.163$
photometric centroid source offset	$0.17 \pm 0.24$	0.71	$-0.16 \pm 0.24$	$0.07 \pm 0.24$



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.

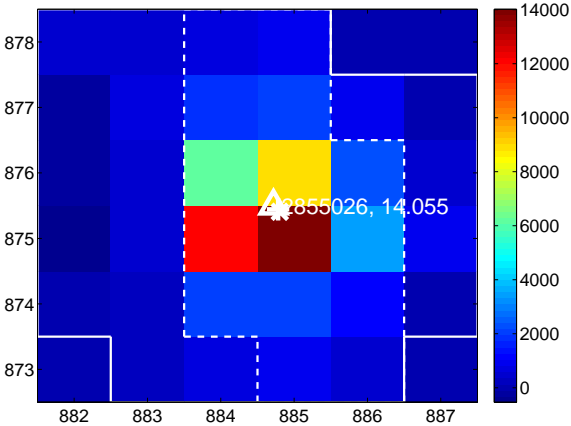
Q13 no difference image



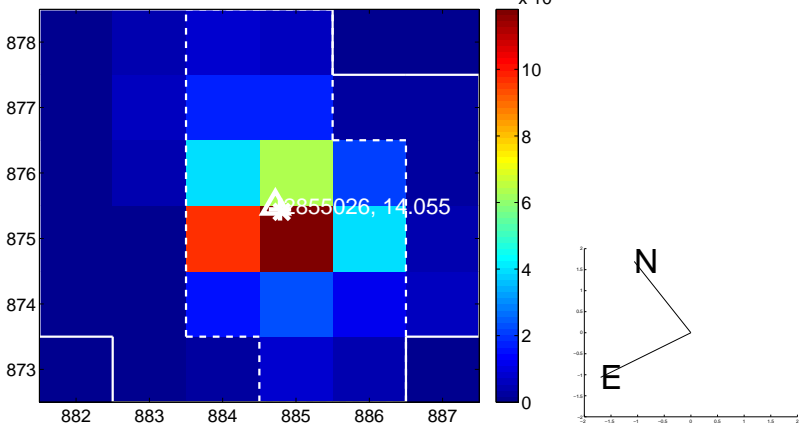
Q13 no OOT image



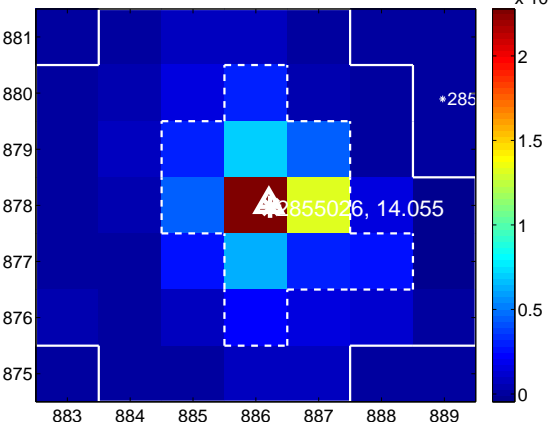
Q14 difference image



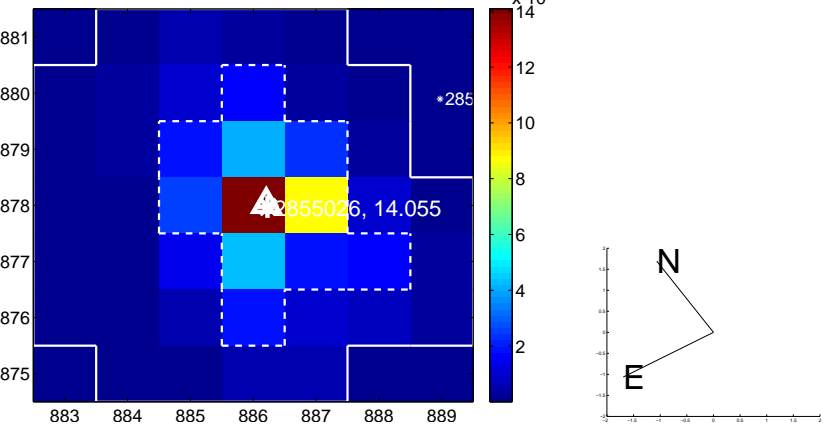
Q14 OOT image



Q15 difference image



Q15 OOT image



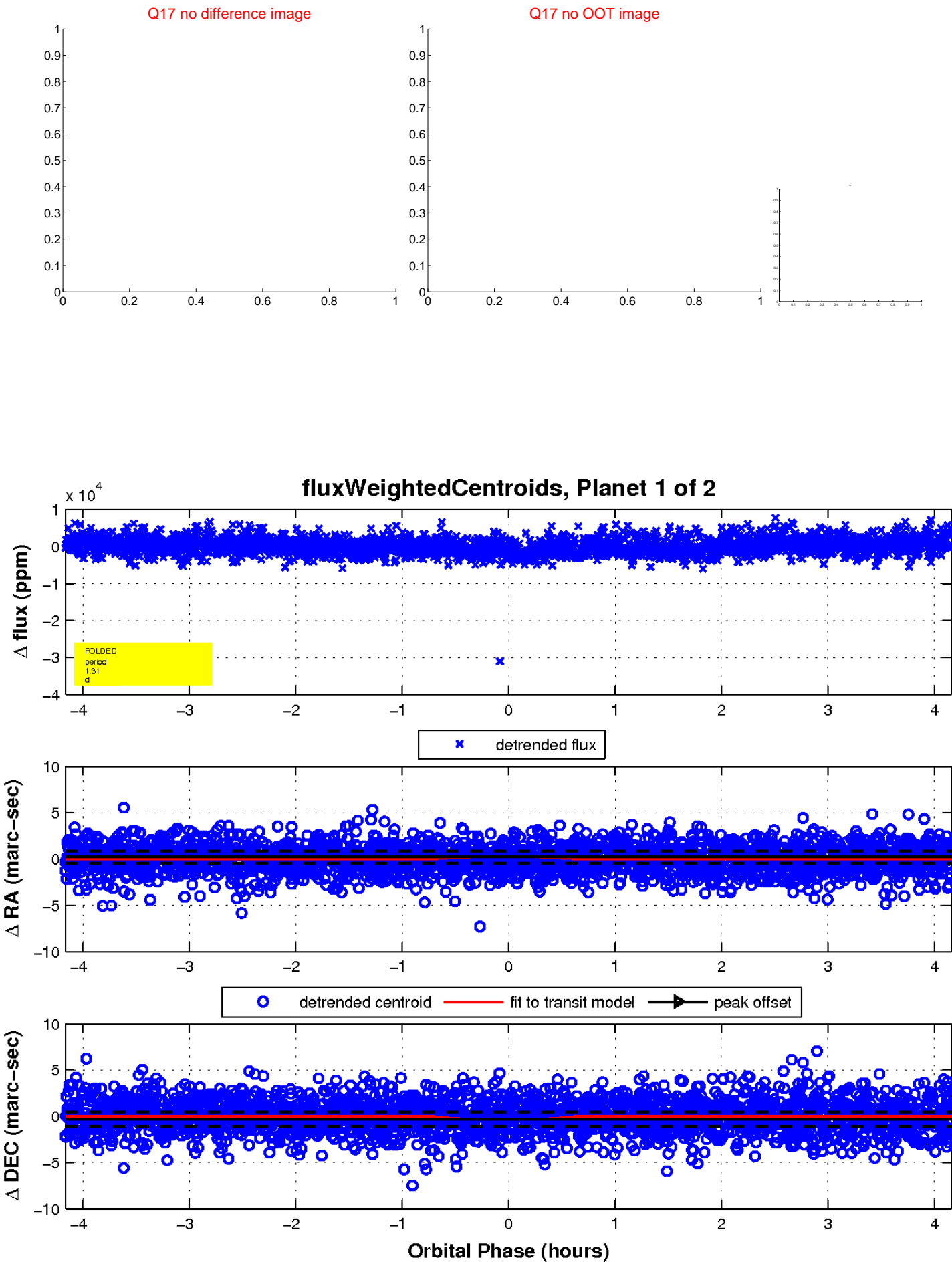
Q16 no difference image



Q16 no OOT image

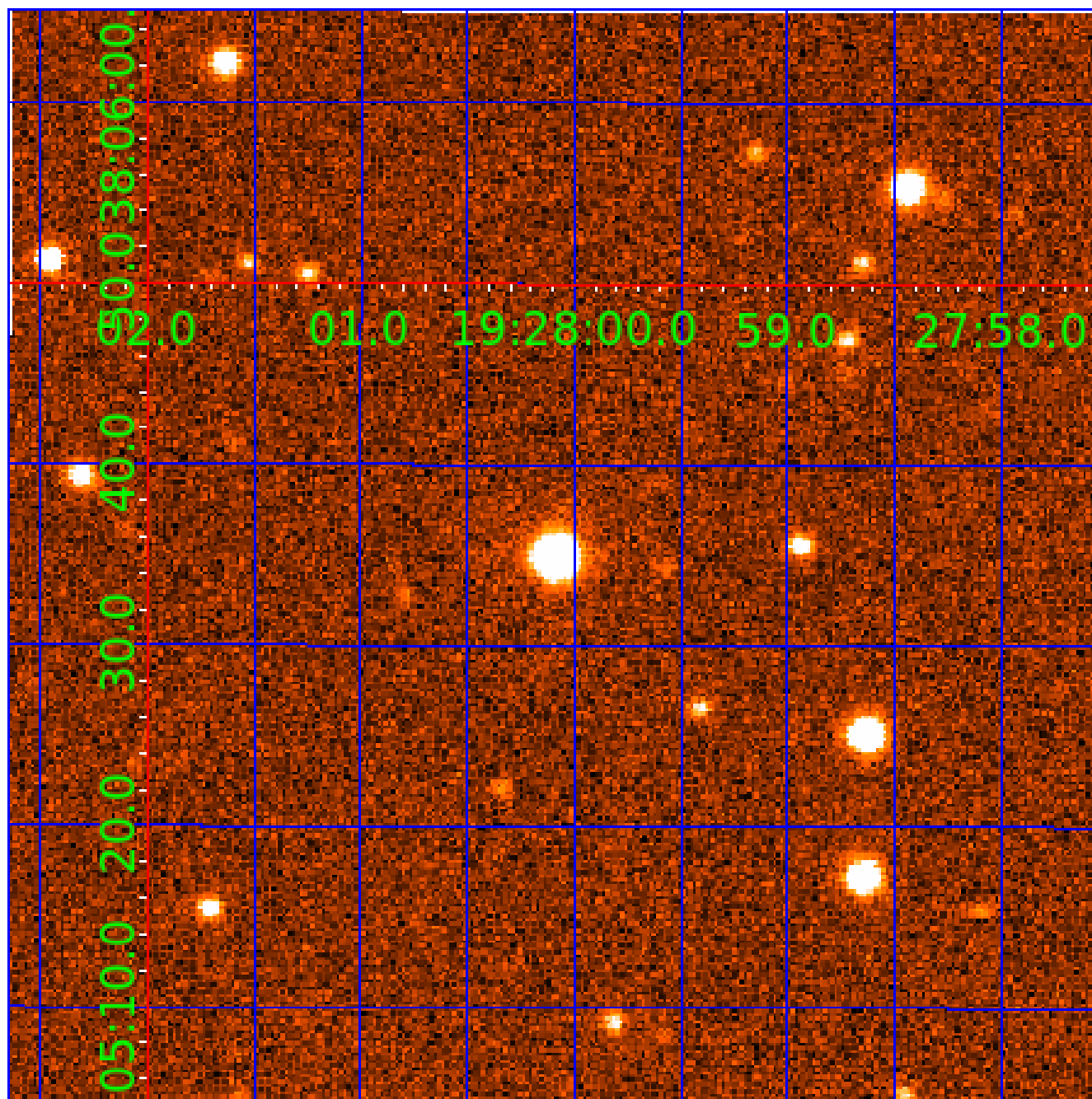


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 002855026

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002855026-01	OBS	No	1.307171	132.226196	1202.8	1.387	9.1	10.5	2.02	7675	8.20	16403.93
002855026-02	OBS	No	1.307179	131.869821	697.6	4.647	8.5	7.7	2.02	7675	6.17	16403.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002855026-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002855026-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—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.

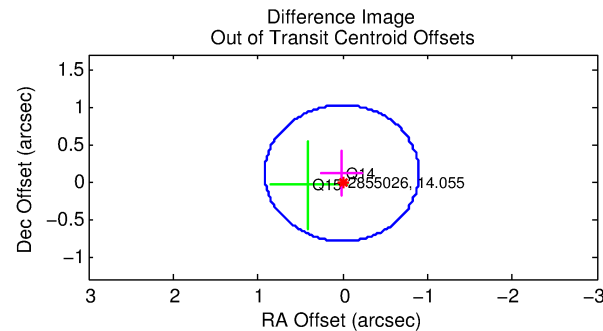
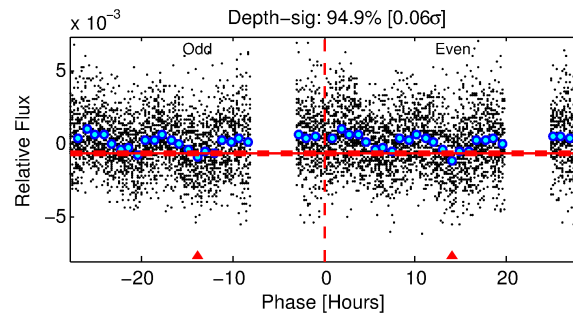
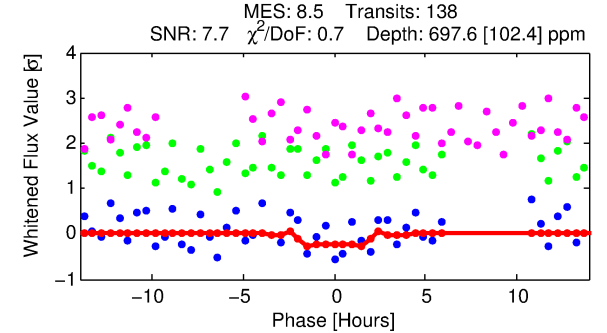
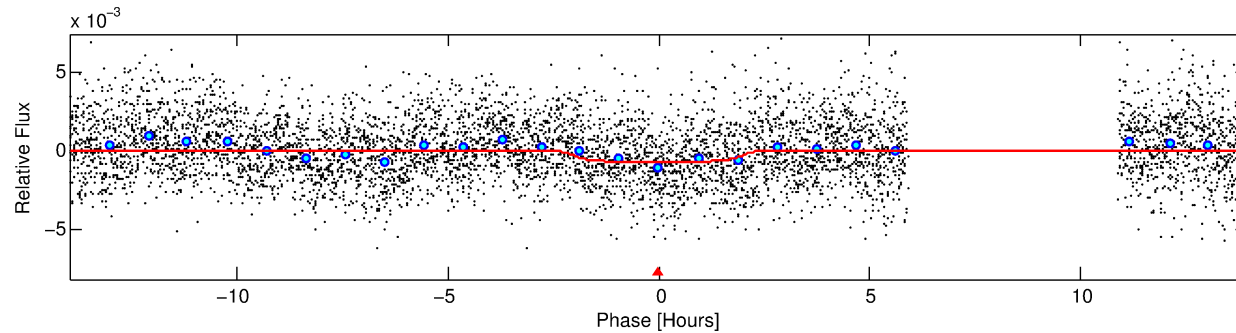
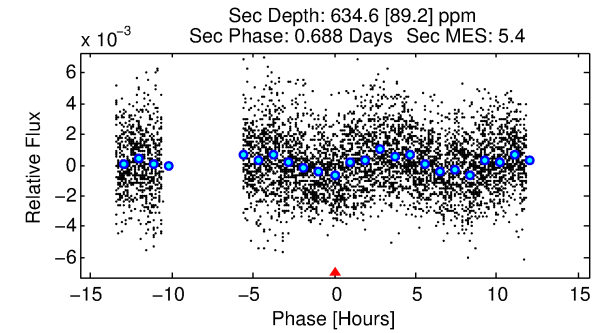
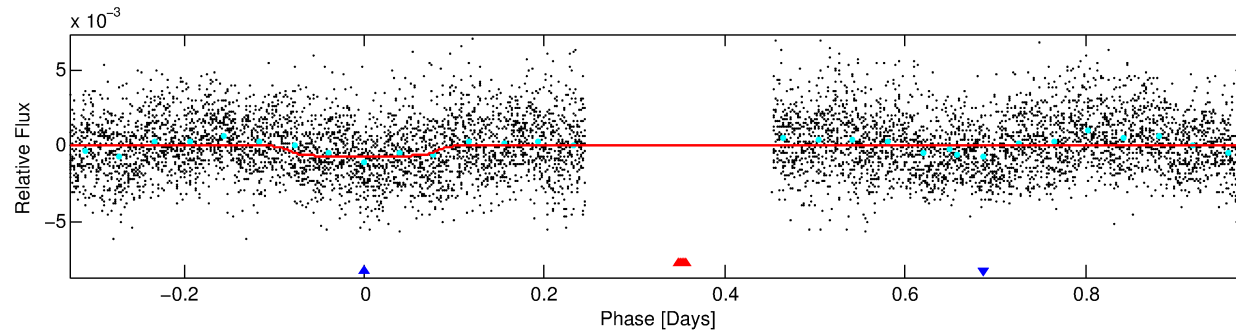
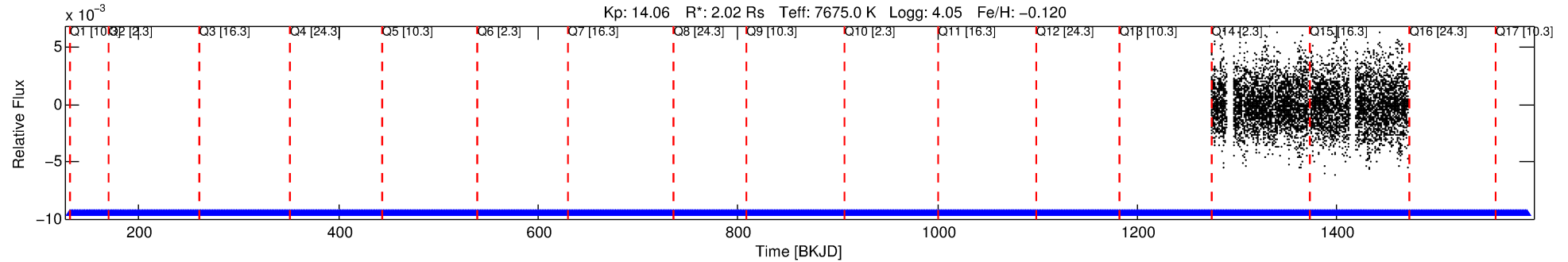
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002855026-02

No Significant Match Found

# DV One-Page Summary

KIC: 2855026 Candidate: 2 of 2 Period: 1.307 d



## DV Fit Results:

Period = 1.30718 [0.00001] d  
Epoch = 131.8698 [0.0035] BKJD  
Rp/R\* = 0.0281 [0.0026]  
a/R\* = 1.43 [0.23]  
b = 0.90 [0.07]  
Seff = 16403.80 [5526.24]  
Teq = 2886 [243] K  
Rp = 6.17 [1.61] Re  
a = 0.0277 [0.0057] AU  
Ag = 7.05 [2.69] [2.25σ]  
Teffp = 7271 [506] K [7.81σ]

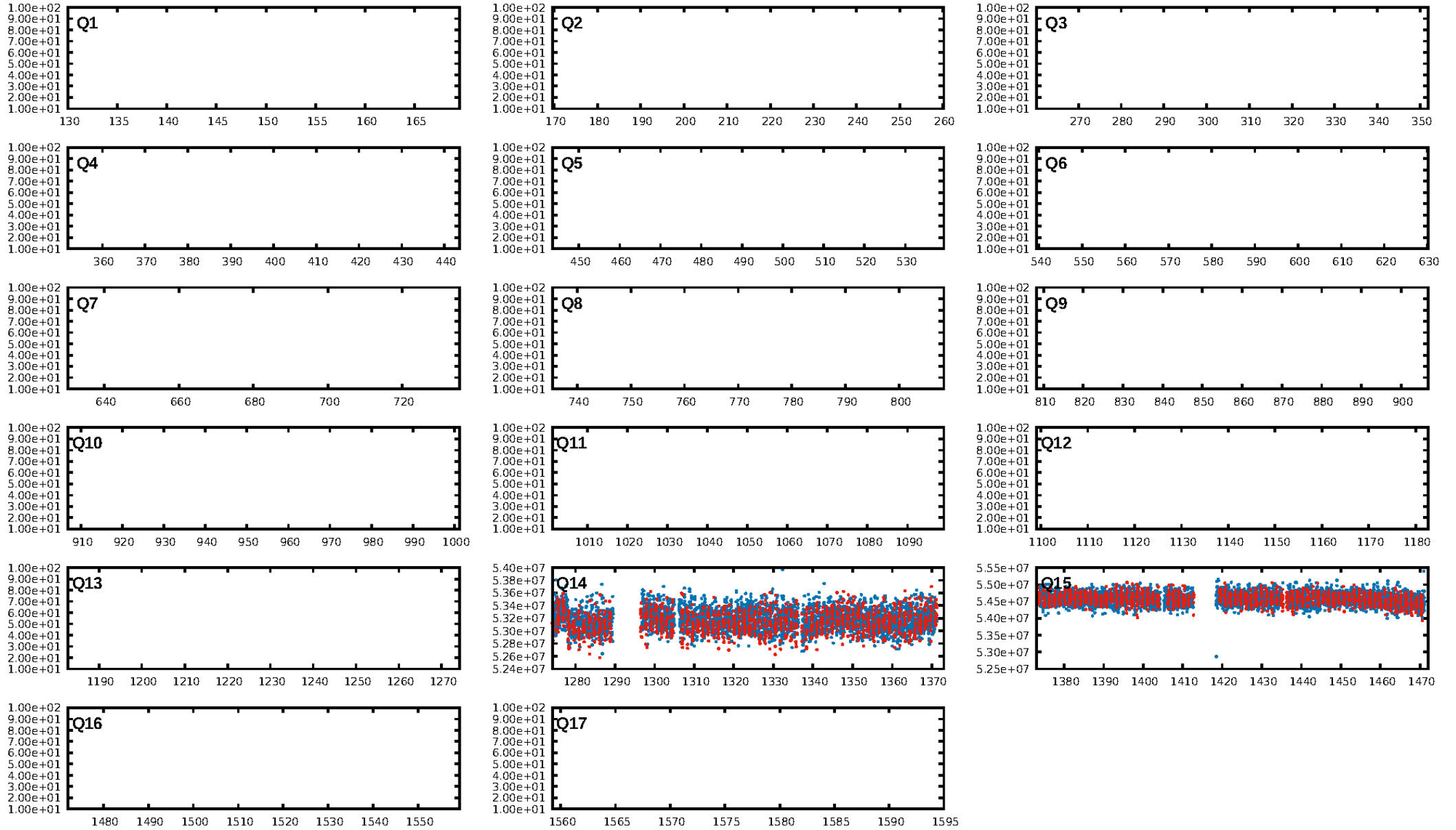
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.43e-24  
RollingBand-fgt: 1.00 [138/138]  
GhostDiagnostic-chr: 1.754  
Centroid-sig: 8.2%  
Centroid-so: 0.230 arcsec [1.01σ]  
OotOffset-rm: 0.114 arcsec [0.38σ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-rm: 0.265 arcsec [0.87σ]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/2]

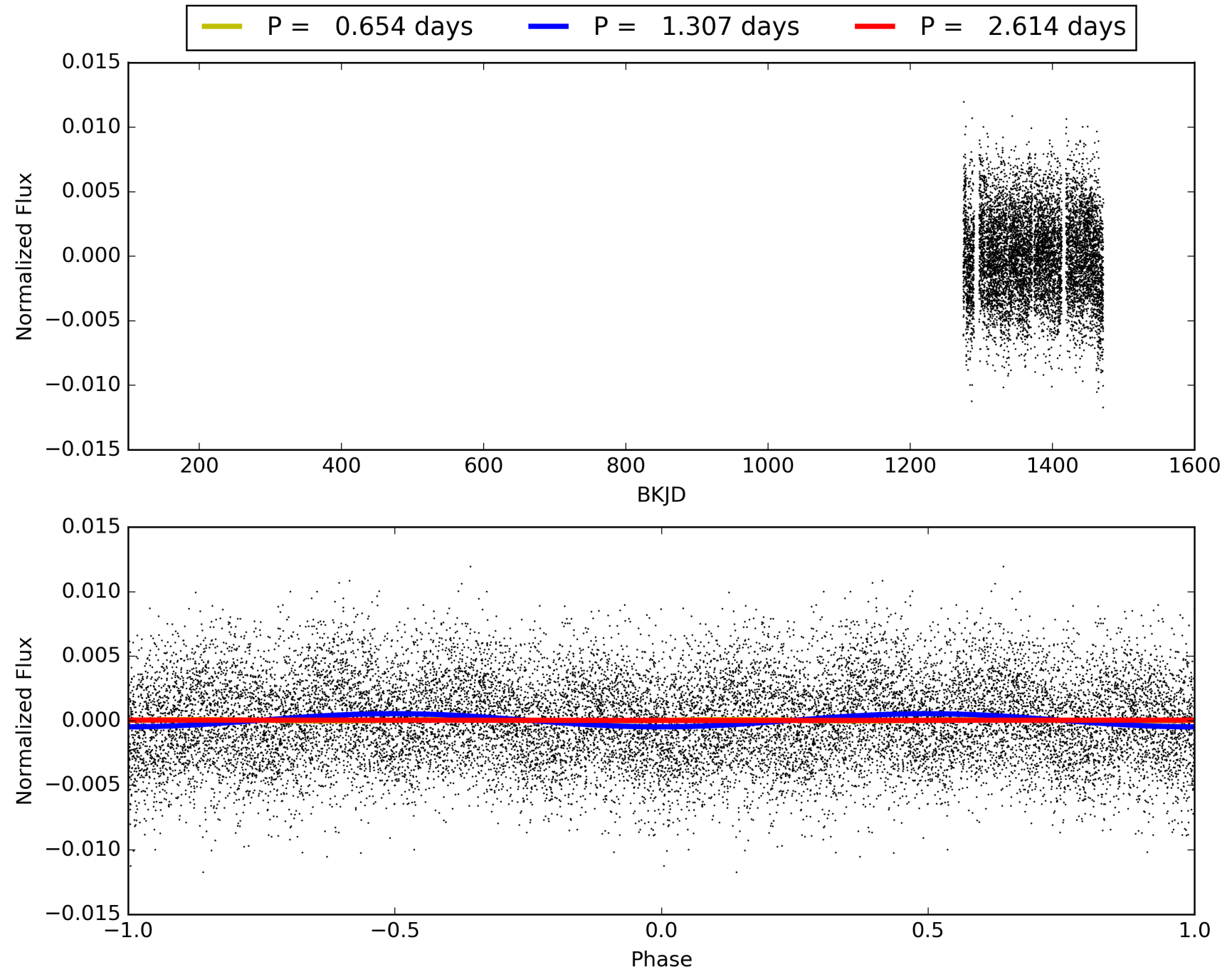
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 15:44:56 Z

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

# TCE 002855026-02, PDC Light Curves



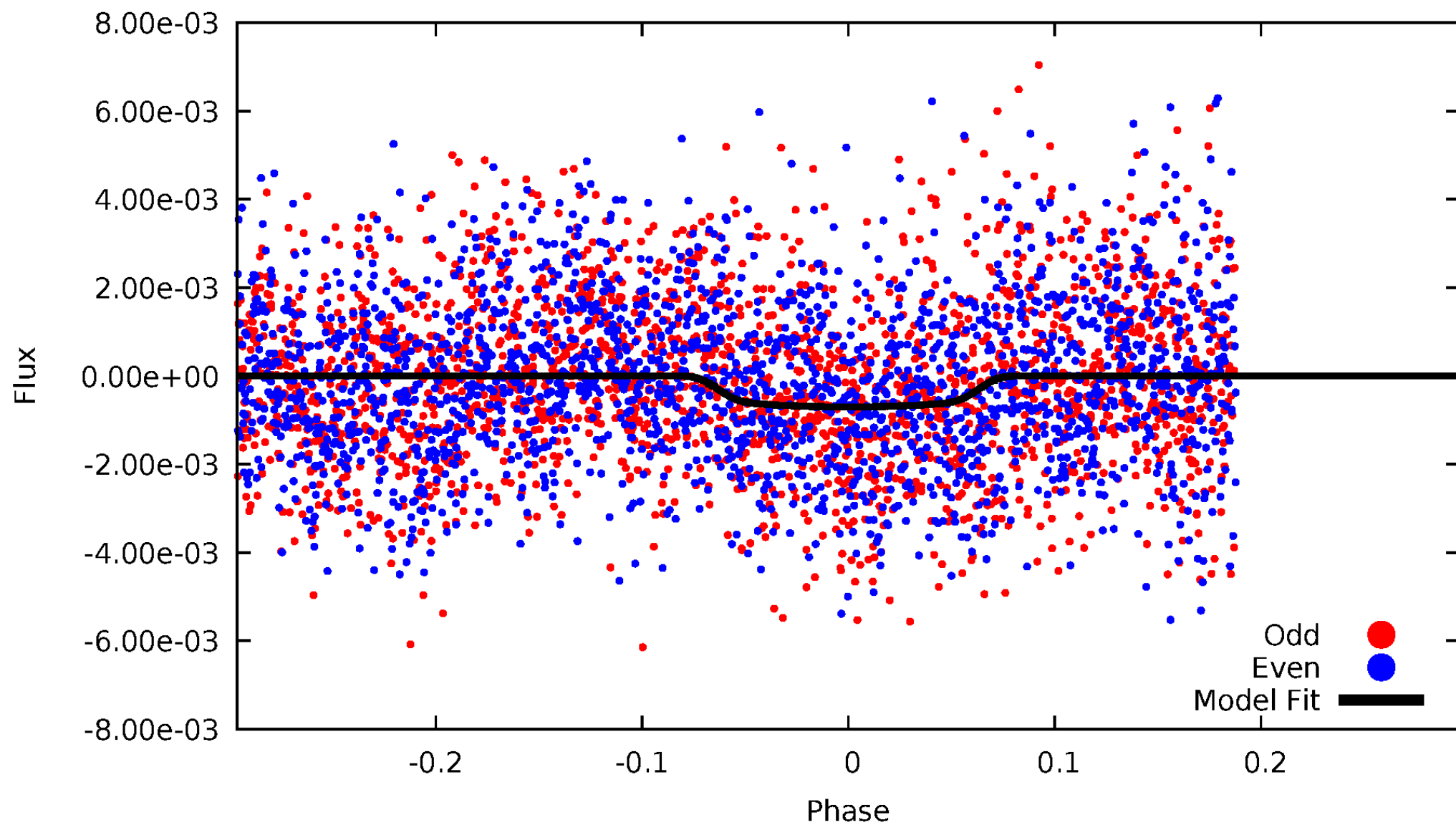
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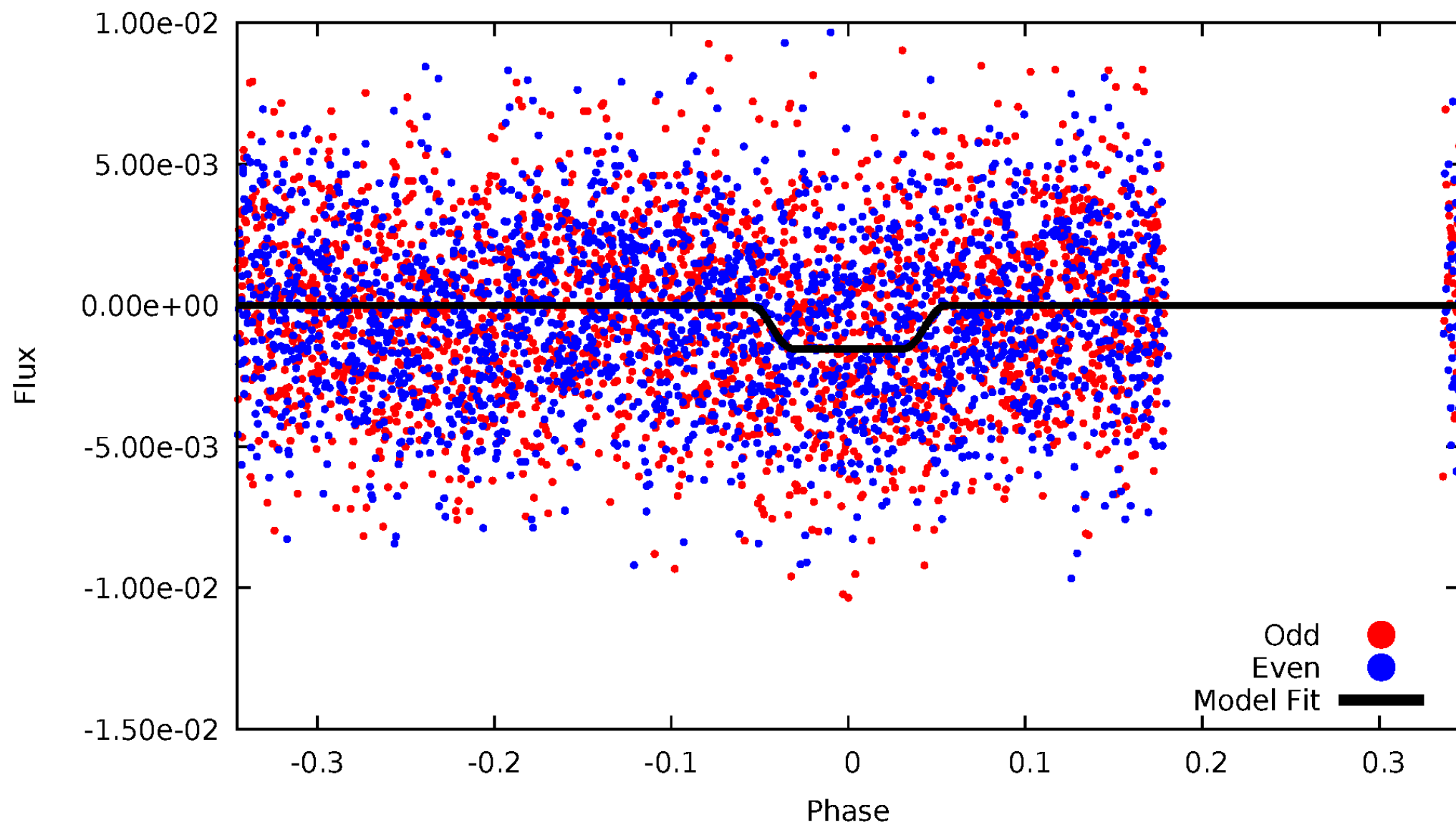
DV Odd/Even

TCE 002855026-02



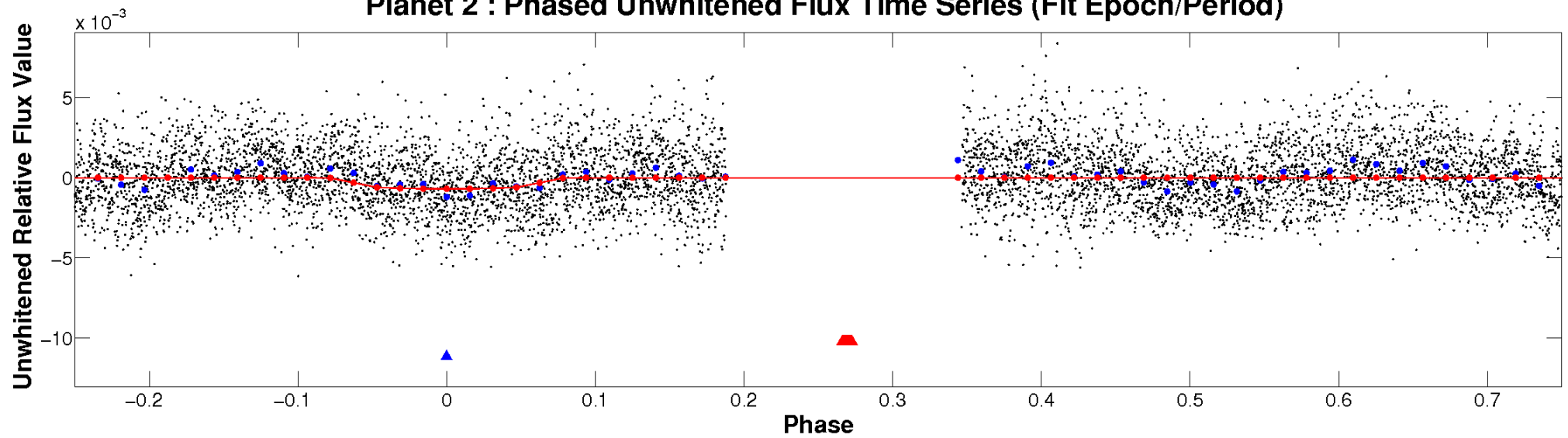
# ALT Odd/Even

TCE 002855026-02

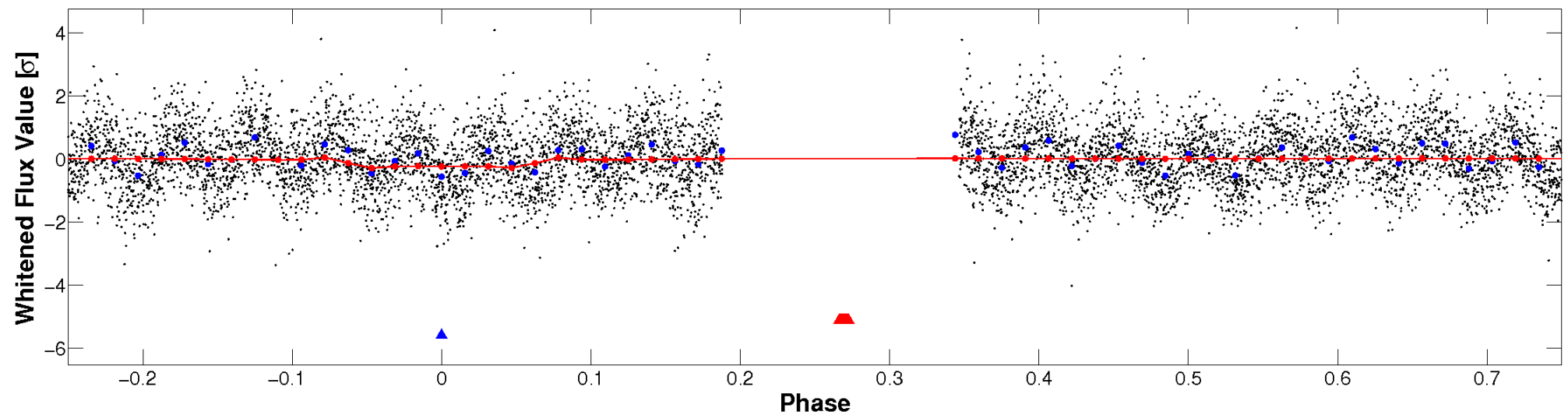


# Non-Whitened Vs. Whitened Light Curve

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

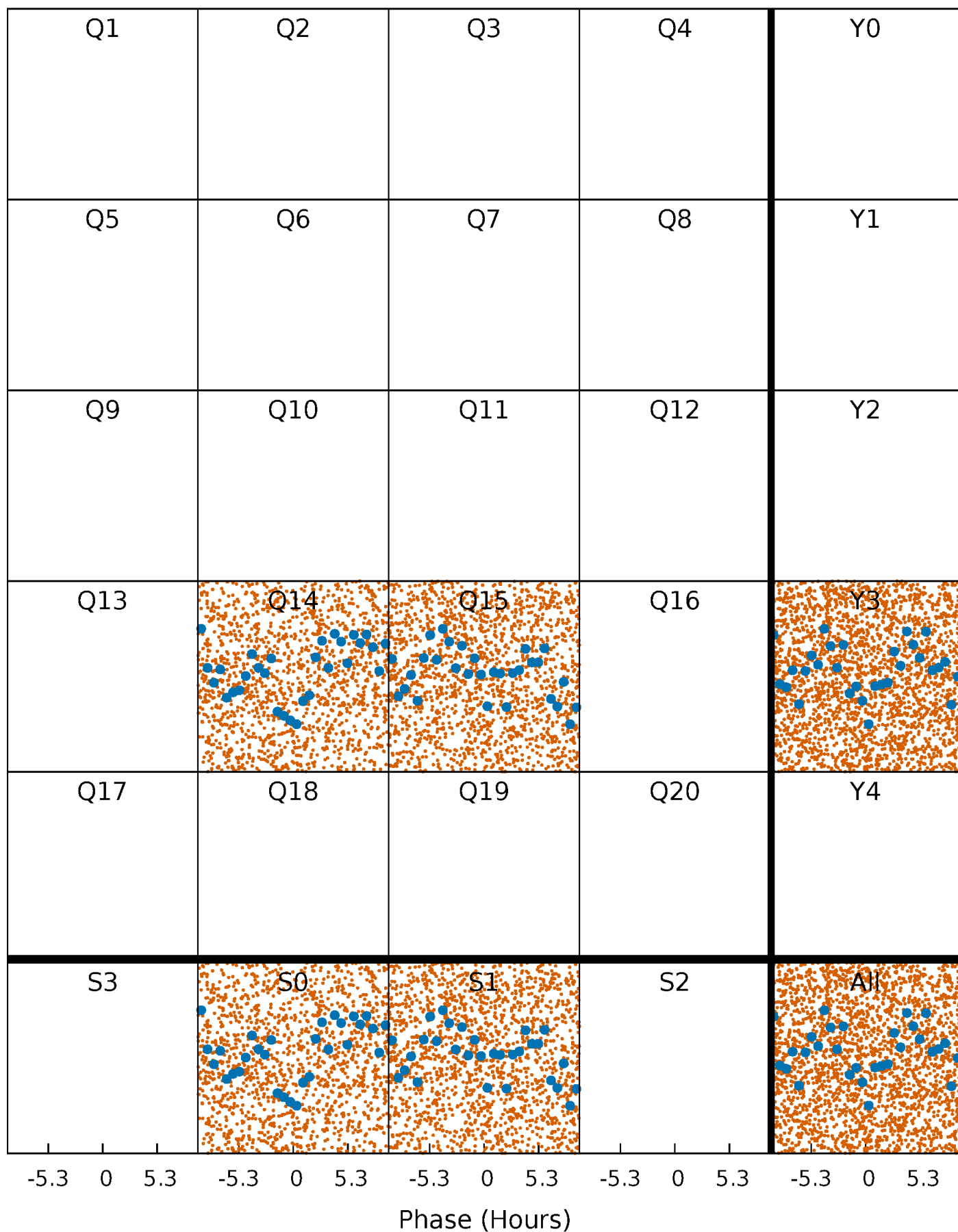


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



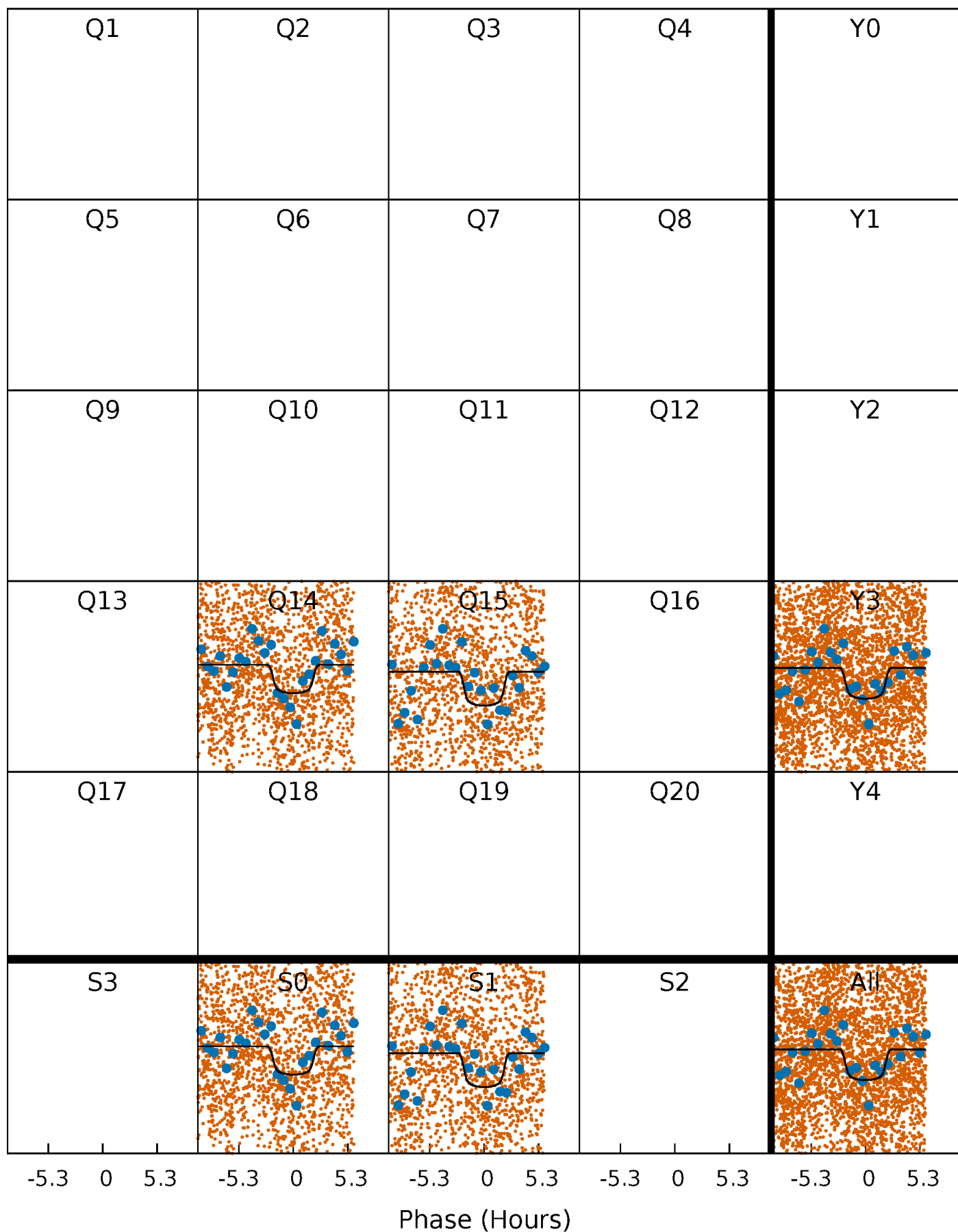
# PDC Quarter-Phased Transit Curves

TCE 002855026-02 P= 1.307179 Days  $T_0=131.869821$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 002855026-02    P= 1.307179 Days     $T_0=131.869821$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

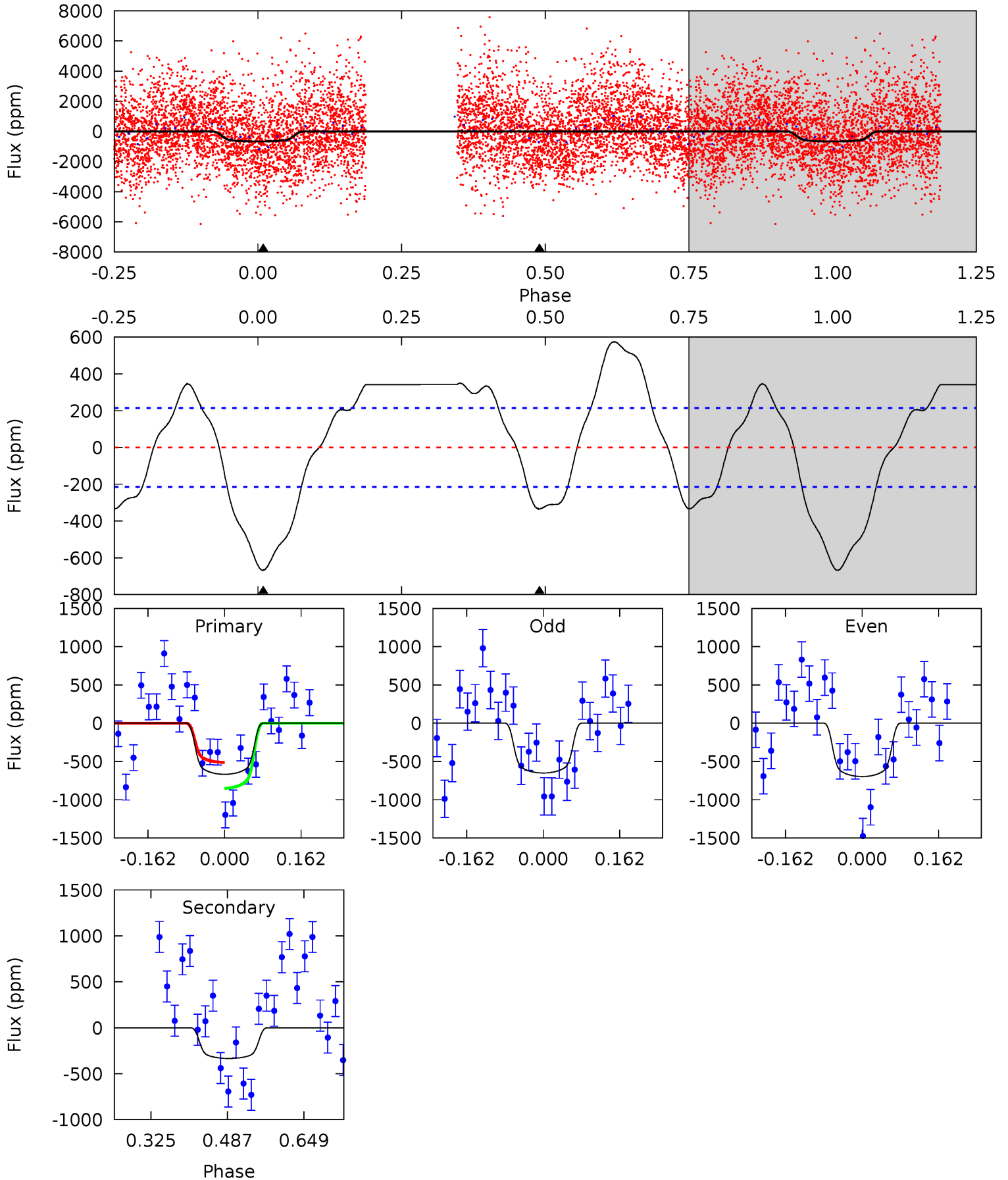
TCE 002855026-02    P= 1.307215 Days     $T_0=131.848040$  (BKJD)



# DV Model-Shift Uniqueness Test

002855026-02, P = 1.307179 Days, E = 131.869821 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
13.9	6.96	0	0	4.46	1.40	5.32	13.9	13.9	6.96	6.96	0.49	0.94	0.46	3.14

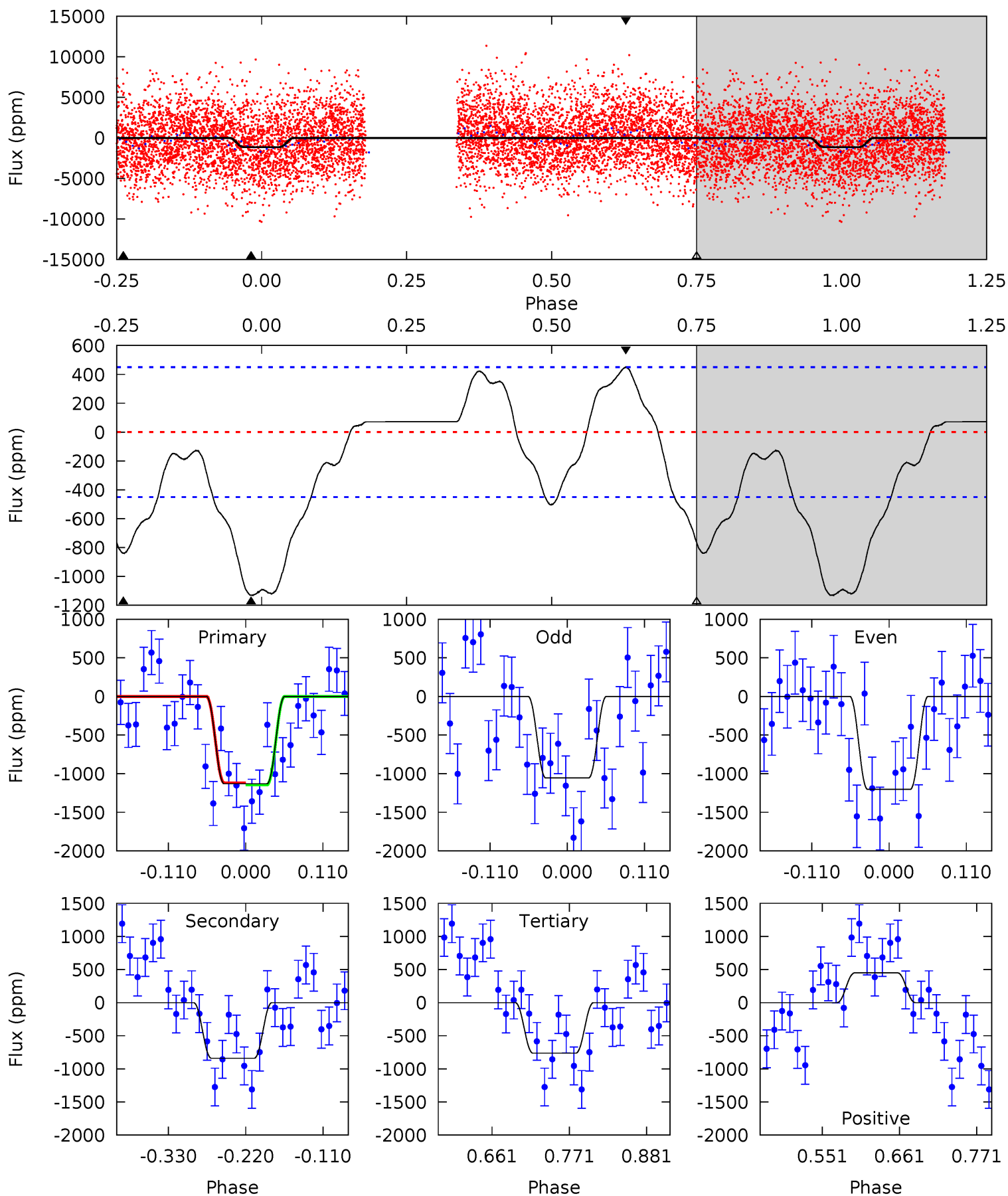




# Alt Model-Shift Uniqueness Test

002855026-02, P = 1.307215 Days, E = 131.848040 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
11.4	8.48	7.71	4.54	4.54	1.60	3.20	3.71	6.88	0.77	3.95	0.74	0.98	0.28	0.13





### Stellar Parameters For KIC 002855026

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7675^{+237}_{-290}$	$4.051^{+0.165}_{-0.165}$	$-0.120^{+0.200}_{-0.300}$	$2.015^{+0.492}_{-0.492}$	$1.665^{+0.210}_{-0.257}$	$0.287^{+0.286}_{-0.124}$
	+3%/-4%	+4%/-4%	+167%/-250%	+24%/-24%	+13%/-15%	+100%/-43%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 002855026-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-334 \pm 48$	$6.24^{+0.98}_{-0.95}$	$4041^{+274}_{-255}$	$5905^{+448}_{-378}$	$3.548^{+1.460}_{-0.942}$
Alt.	$-840 \pm 99$	$8.76^{+1.25}_{-1.26}$	$4018^{+291}_{-235}$	$6341^{+372}_{-374}$	$4.663^{+1.572}_{-1.156}$

$T_{\text{max}}$  = 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

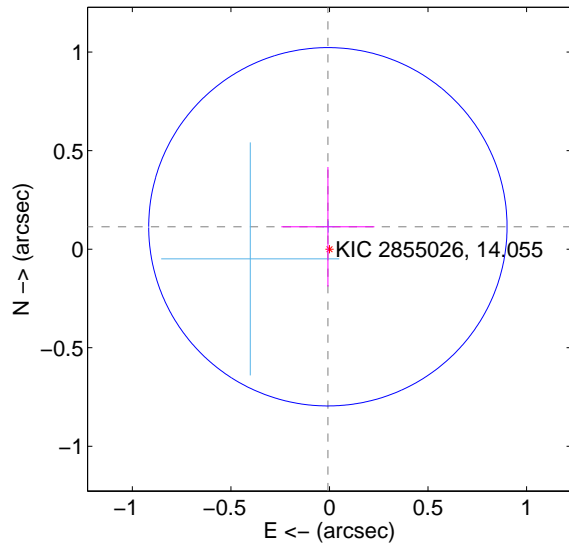
Supplemental centroid analysis for 002855026-02. Kepler magnitude: 14.05. Transit SNR 7.67

There are 2 quarters with good PRF difference image offsets

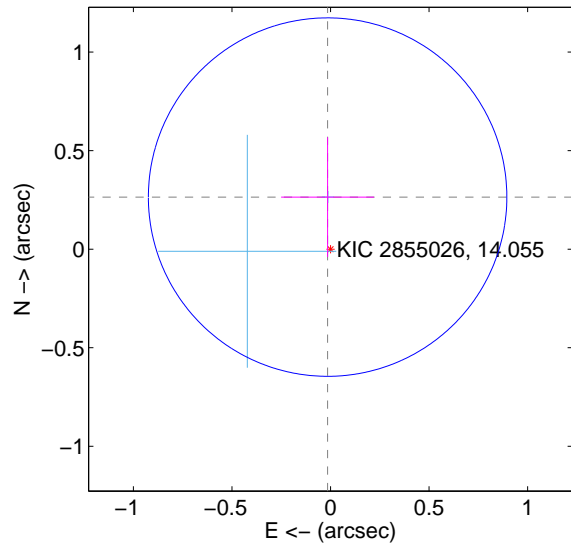
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.114 \pm 0.303$	0.38	$0.008 \pm 0.236$	$0.114 \pm 0.303$
PRF-fit source offset from KIC position	$0.265 \pm 0.303$	0.87	$0.015 \pm 0.236$	$0.264 \pm 0.303$
photometric centroid source offset	$0.23 \pm 0.23$	1.01	$0.23 \pm 0.23$	$0.02 \pm 0.23$

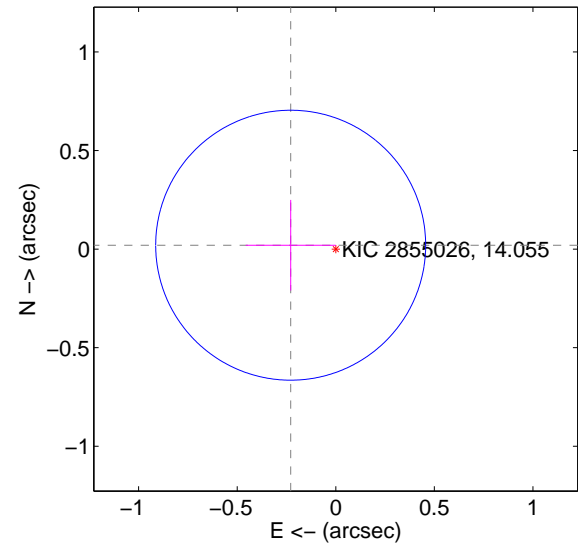
offset from difference PRF-fit to OOT PRF-fit



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.

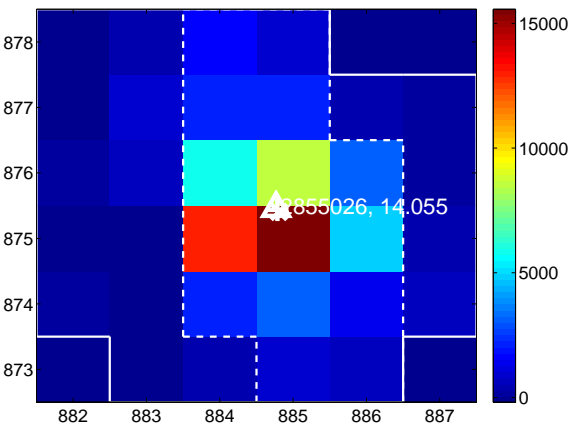
Q13 no difference image



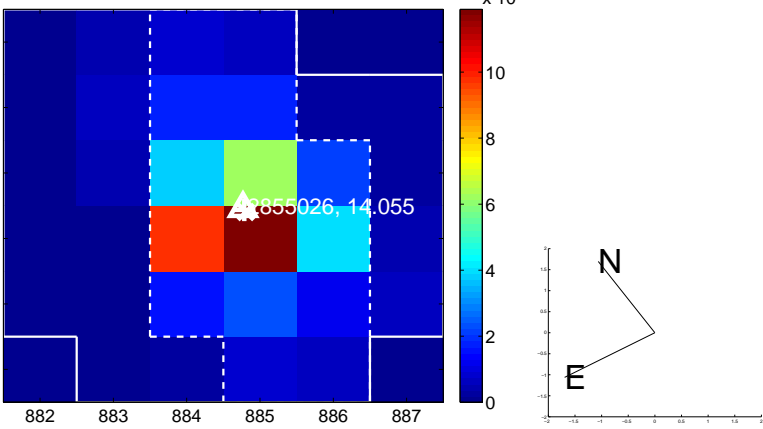
Q13 no OOT image



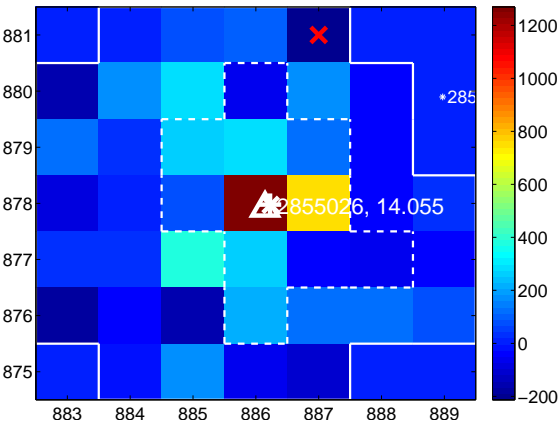
Q14 difference image



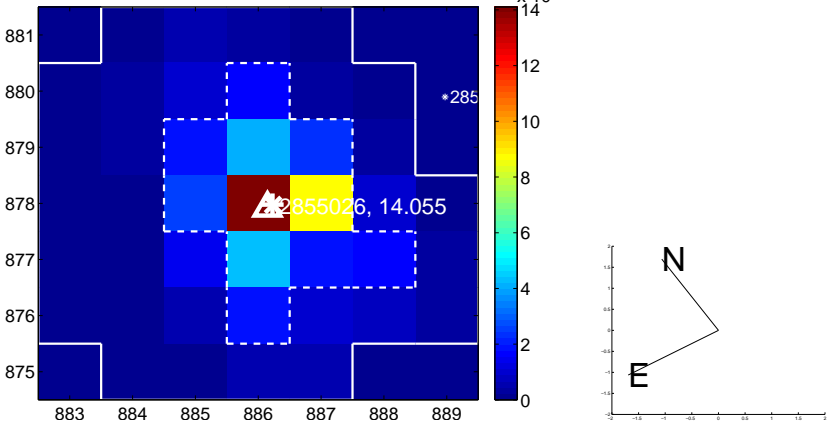
Q14 OOT image



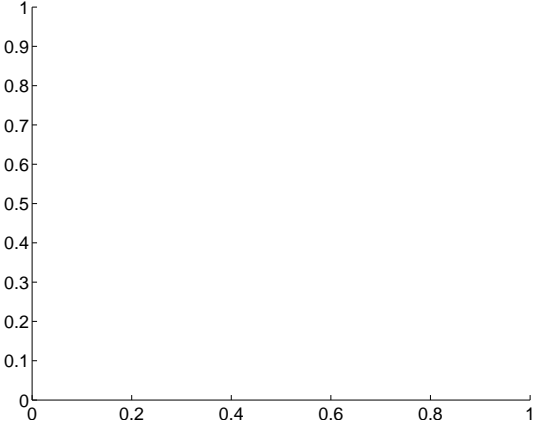
Q15 difference image



Q15 OOT image



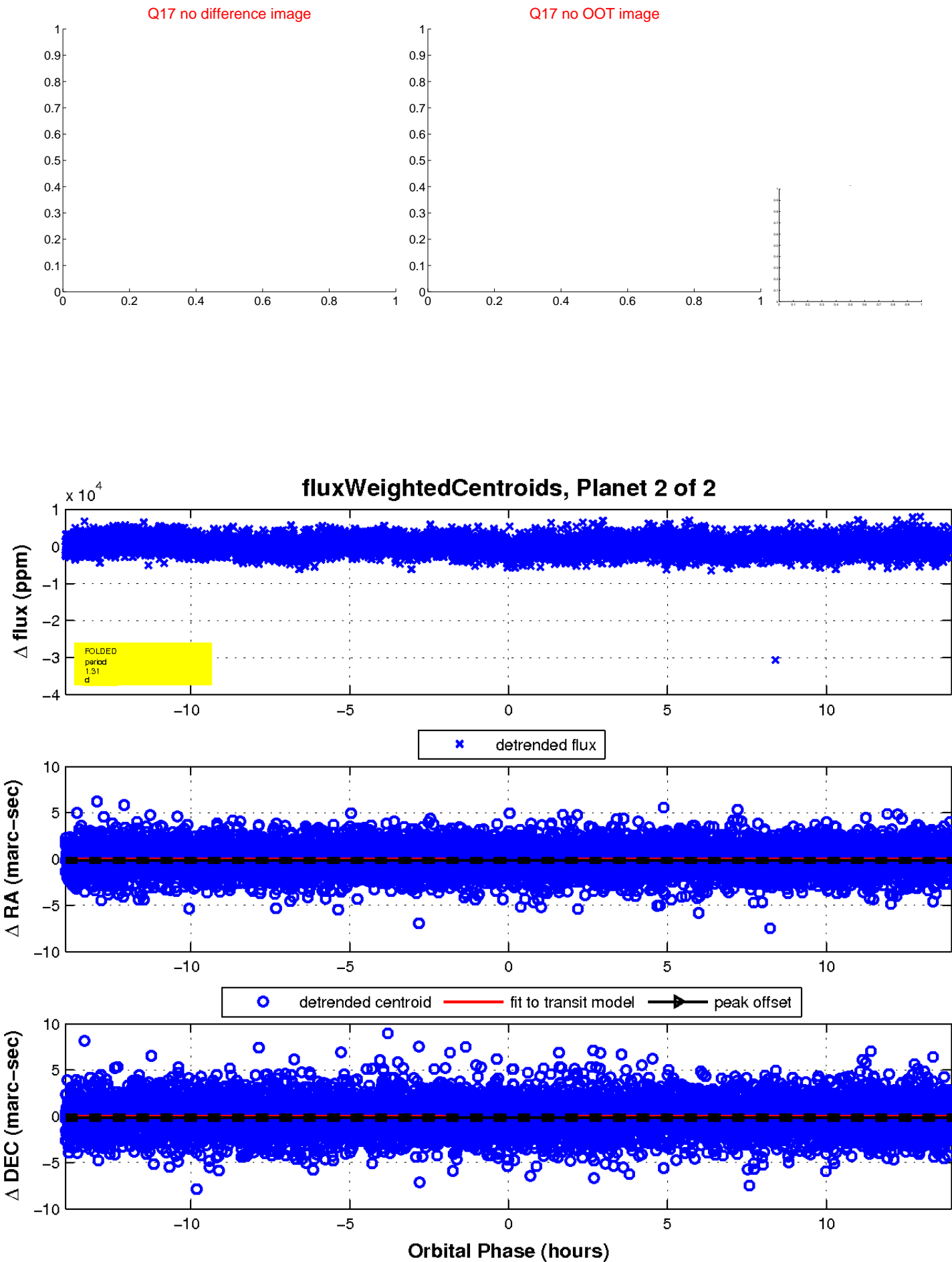
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

