

# KIC 008461529

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008461529-01	OBS	No	0.899080	132.366410	167.3	4.266	15.9	16.2	2.34	6507	3.66	22451.70
008461529-02	OBS	No	1.348450	132.347799	225.6	1.791	8.0	8.9	2.34	6507	4.12	13077.78

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008461529-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT
008461529-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT

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

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

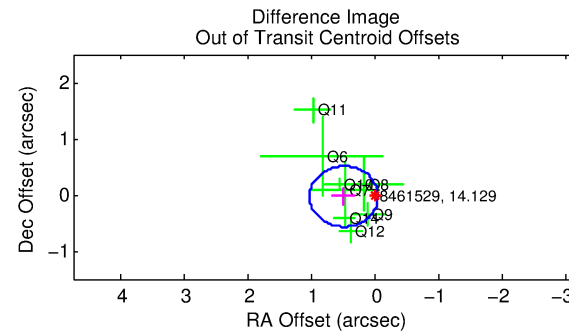
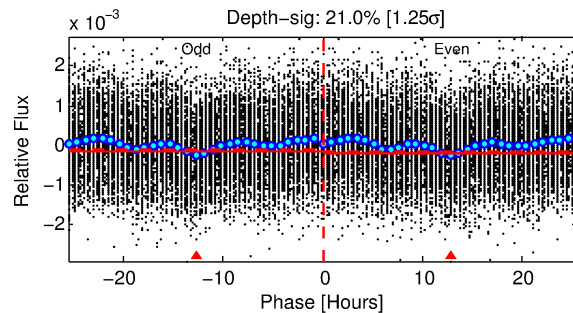
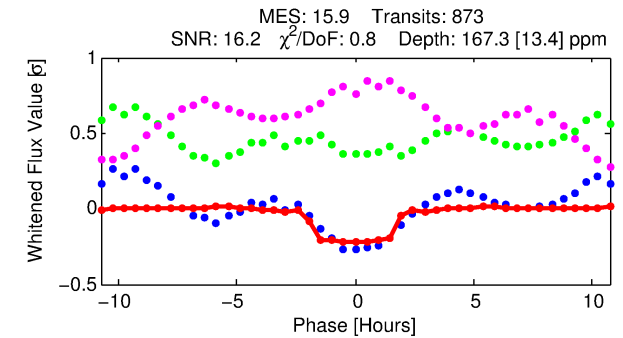
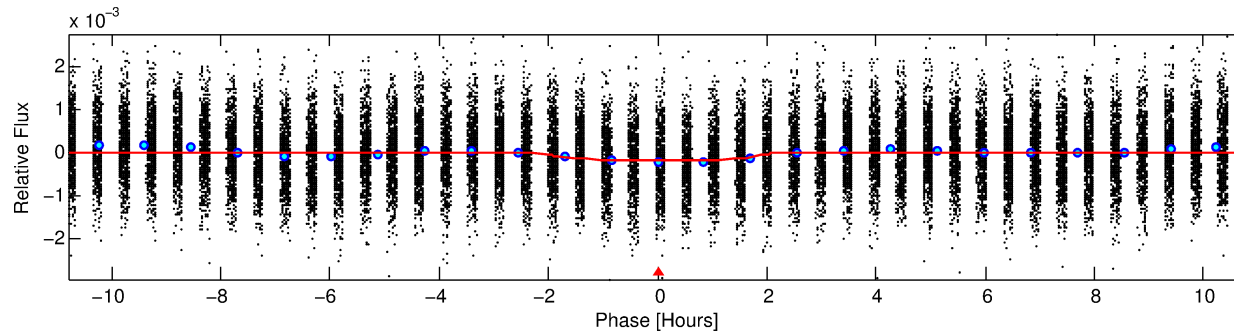
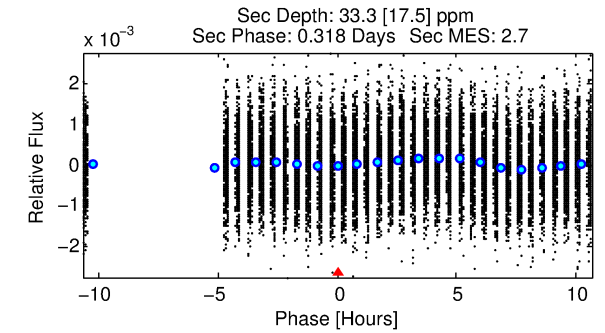
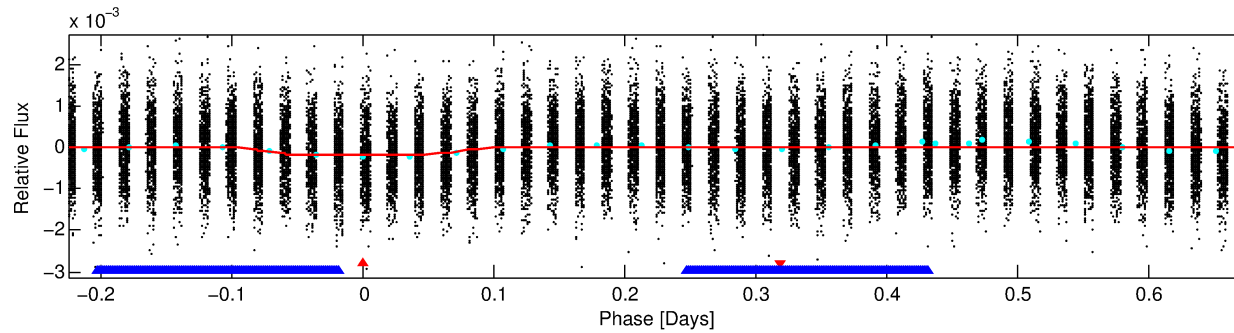
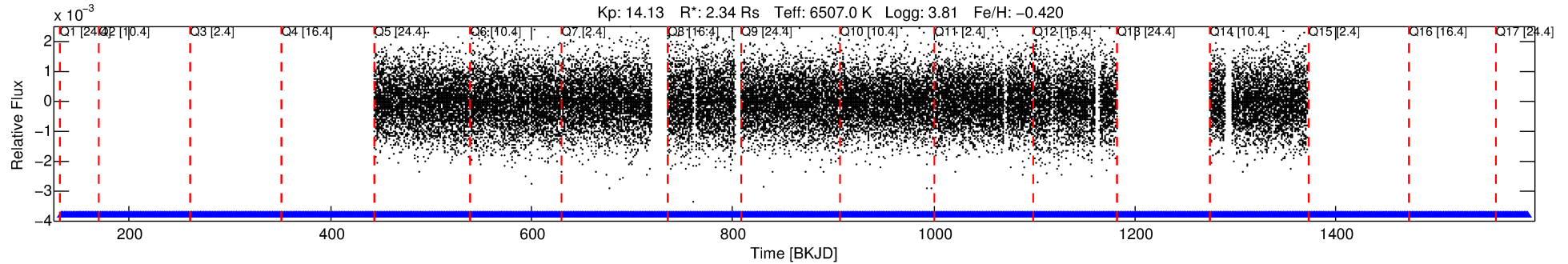
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008461529-01

No Significant Match Found

# DV One-Page Summary

KIC: 8461529 Candidate: 1 of 2 Period: 0.899 d



## DV Fit Results:

Period = 0.89908 [0.00001] d  
Epoch = 132.3664 [0.0033] BKJD  
Rp/R\* = 0.0143 [0.0019]  
a/R\* = 1.15 [0.19]  
b = 0.94 [0.09]  
Seff = 22451.70 [18624.74]  
Teq = 3121 [647] K  
Rp = 3.66 [1.86] Re  
a = 0.0198 [0.0098] AU  
Ag = 0.53 [0.54] [-0.87σ]  
Teffp = 4125 [622] K [1.12σ]

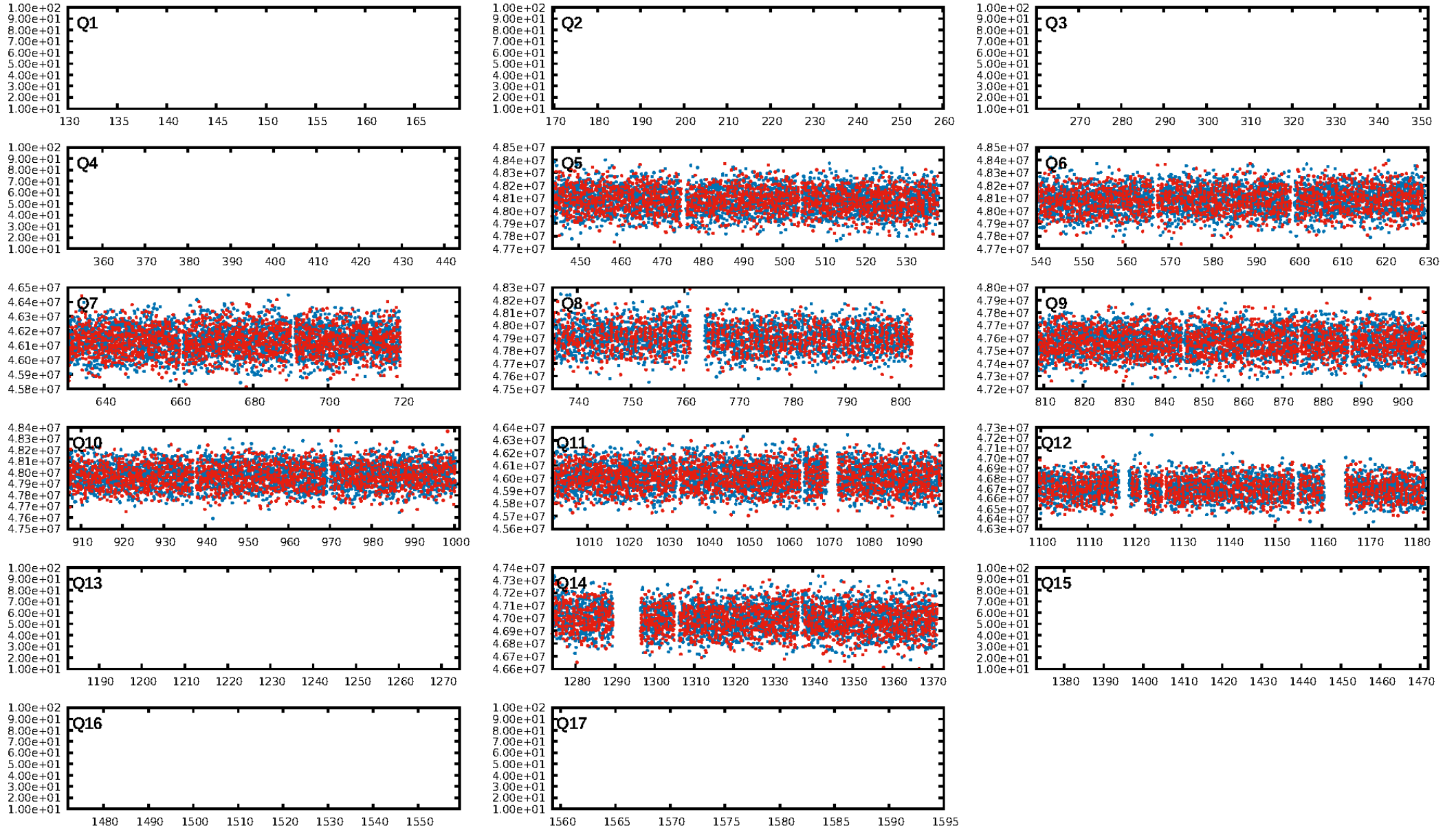
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 98.0% [2.33σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.60e-61  
RollingBand-fgt: 1.00 [873/873]  
GhostDiagnostic-chr: 2.481  
Centroid-sig: 0.1%  
Centroid-so: 0.684 arcsec [2.07σ]  
OotOffset-rm: 0.496 arcsec [2.76σ]  
KicOffset-rm: 0.372 arcsec [2.08σ]  
OotOffset-st: 3/2/2/1 [8]  
KicOffset-st: 3/2/2/1 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [9/9]

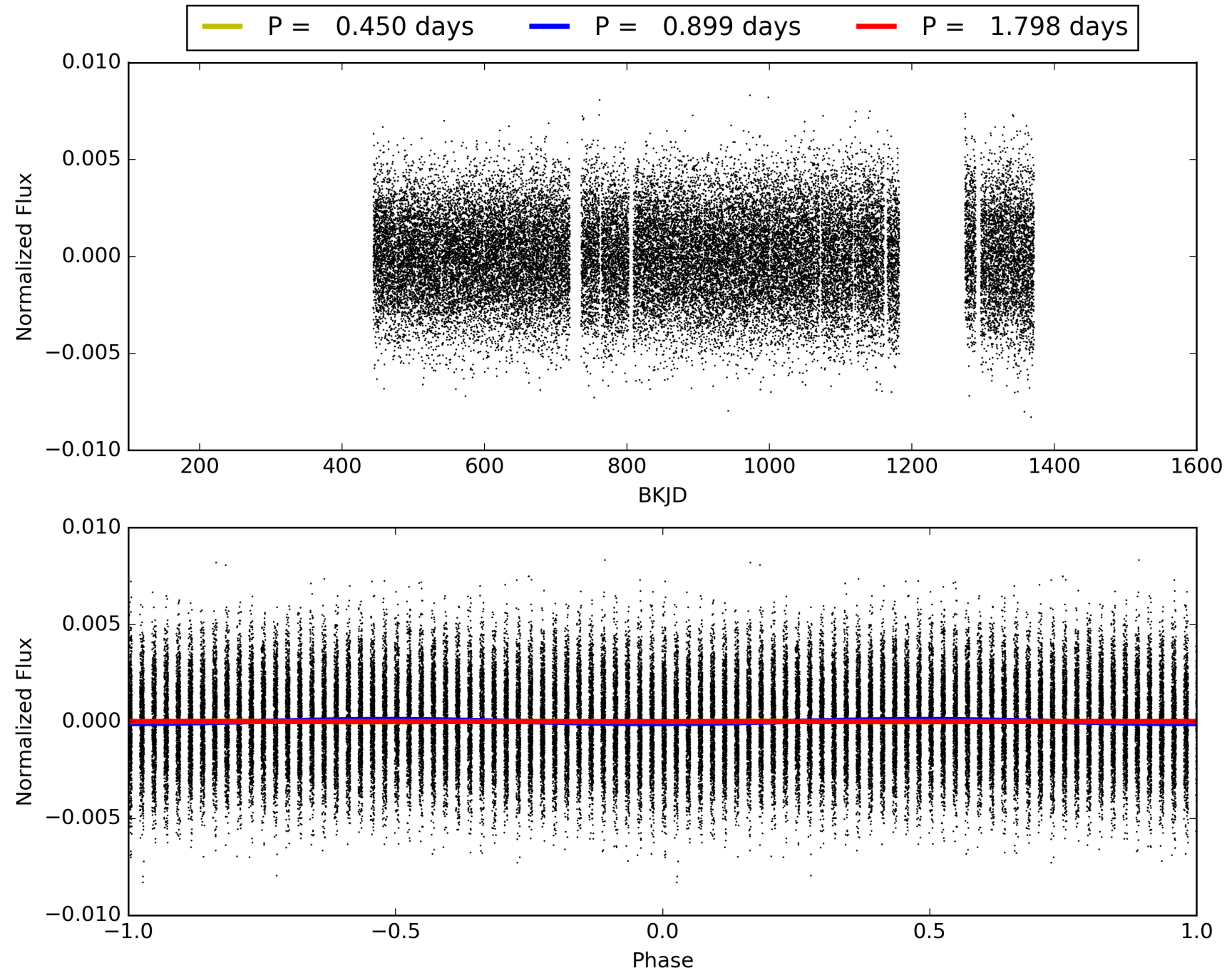
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 13:57:55 Z

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

# TCE 008461529-01, PDC Light Curves

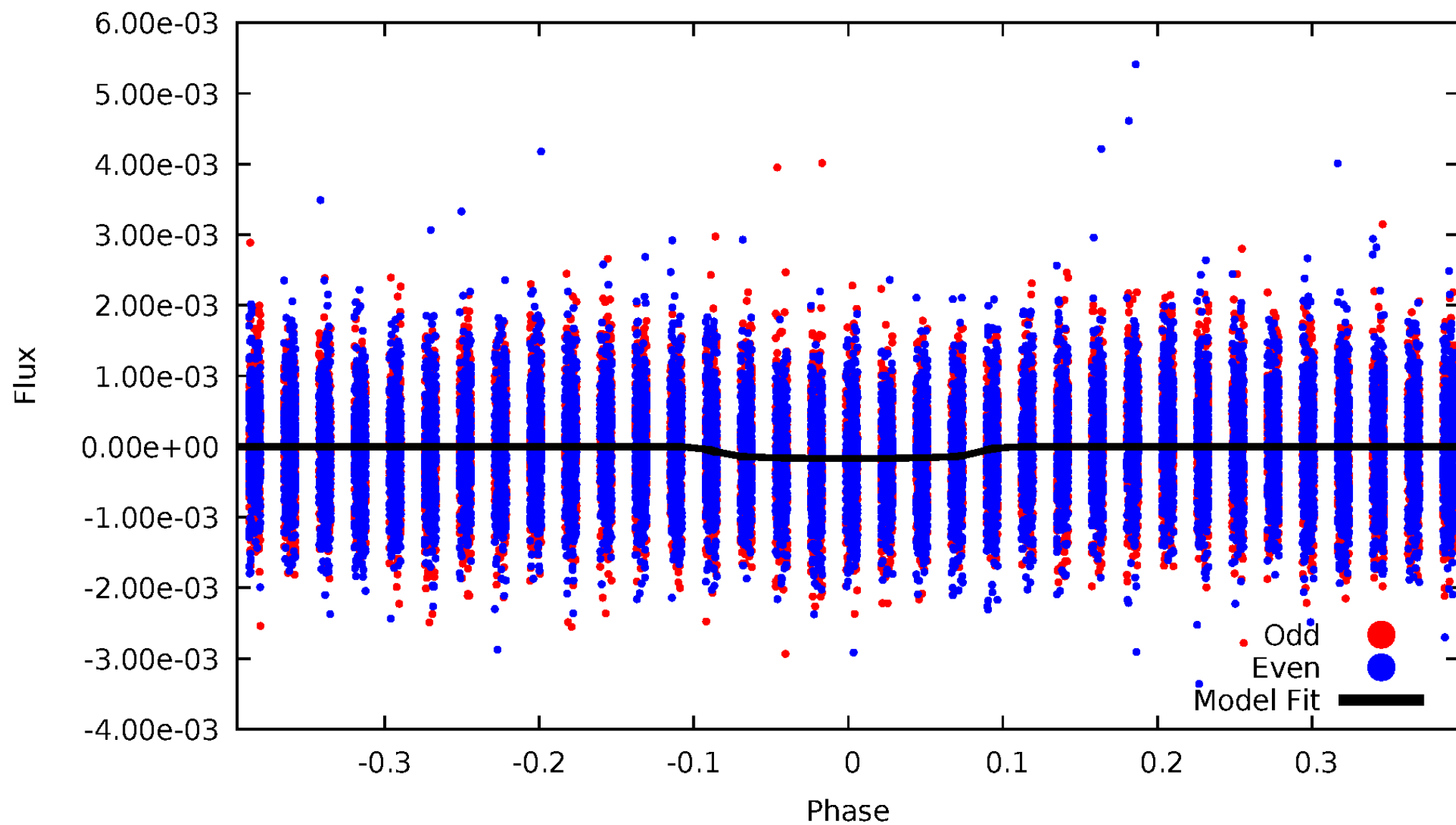


TCE 008461529-01



# DV Odd/Even

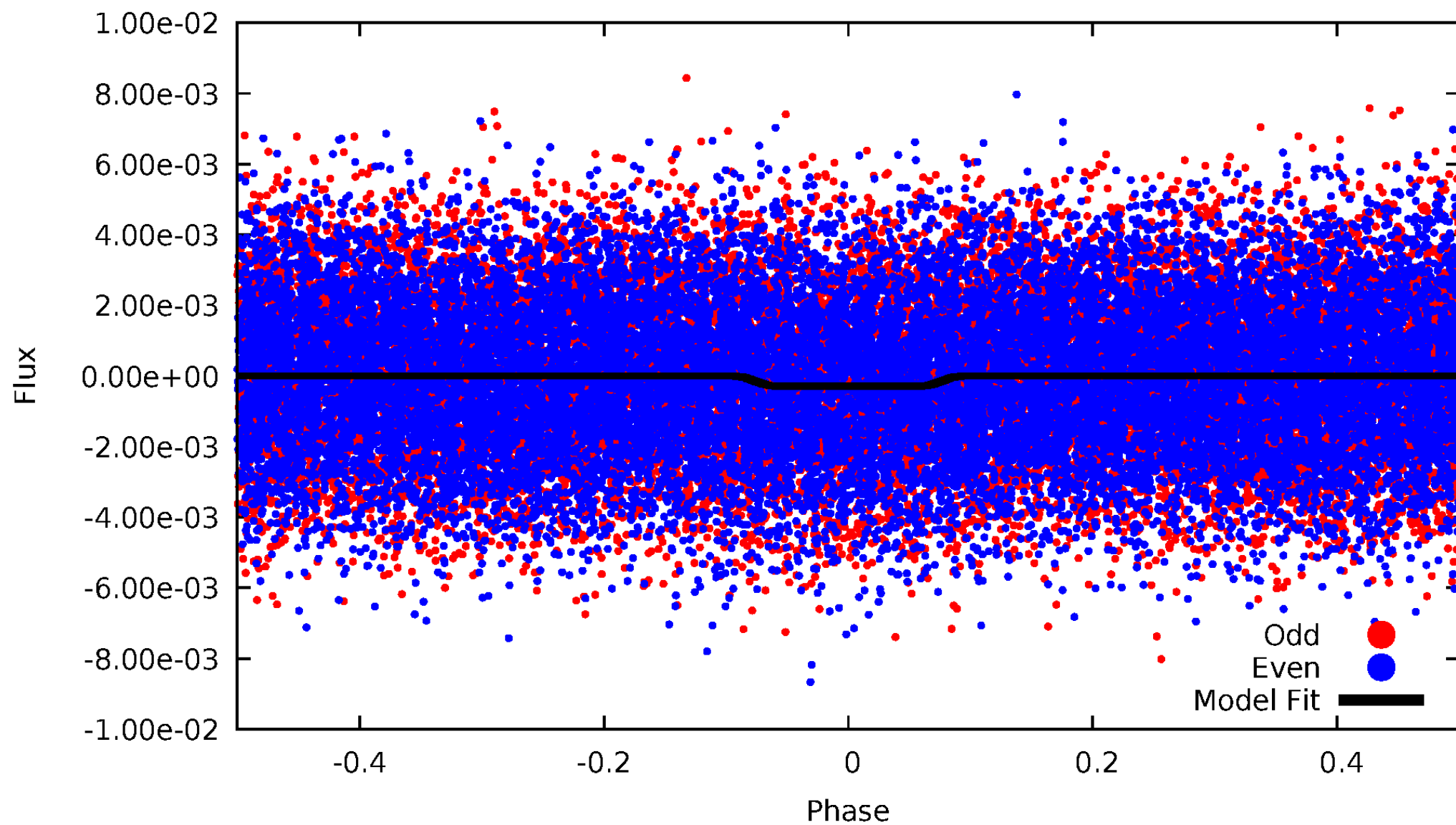
TCE 008461529-01





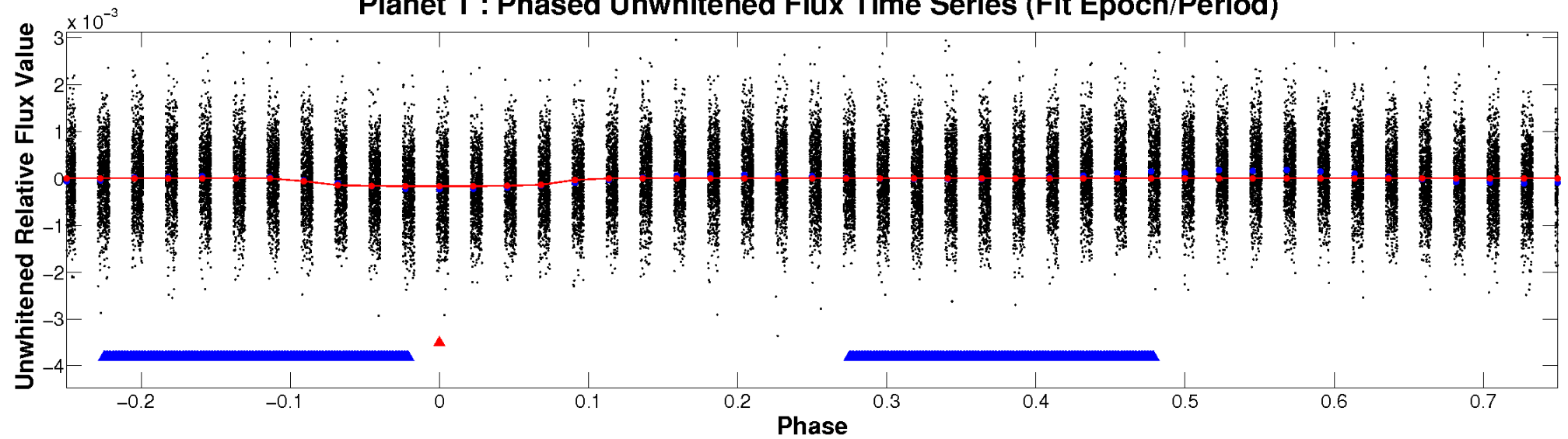
# ALT Odd/Even

TCE 008461529-01

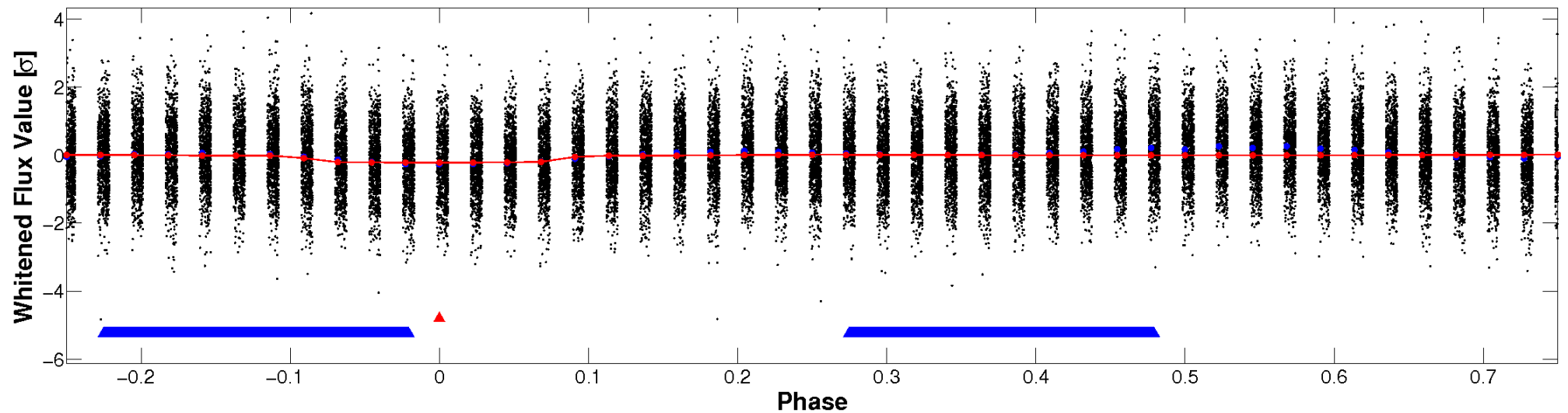


# Non-Whitened Vs. Whitened Light Curve

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

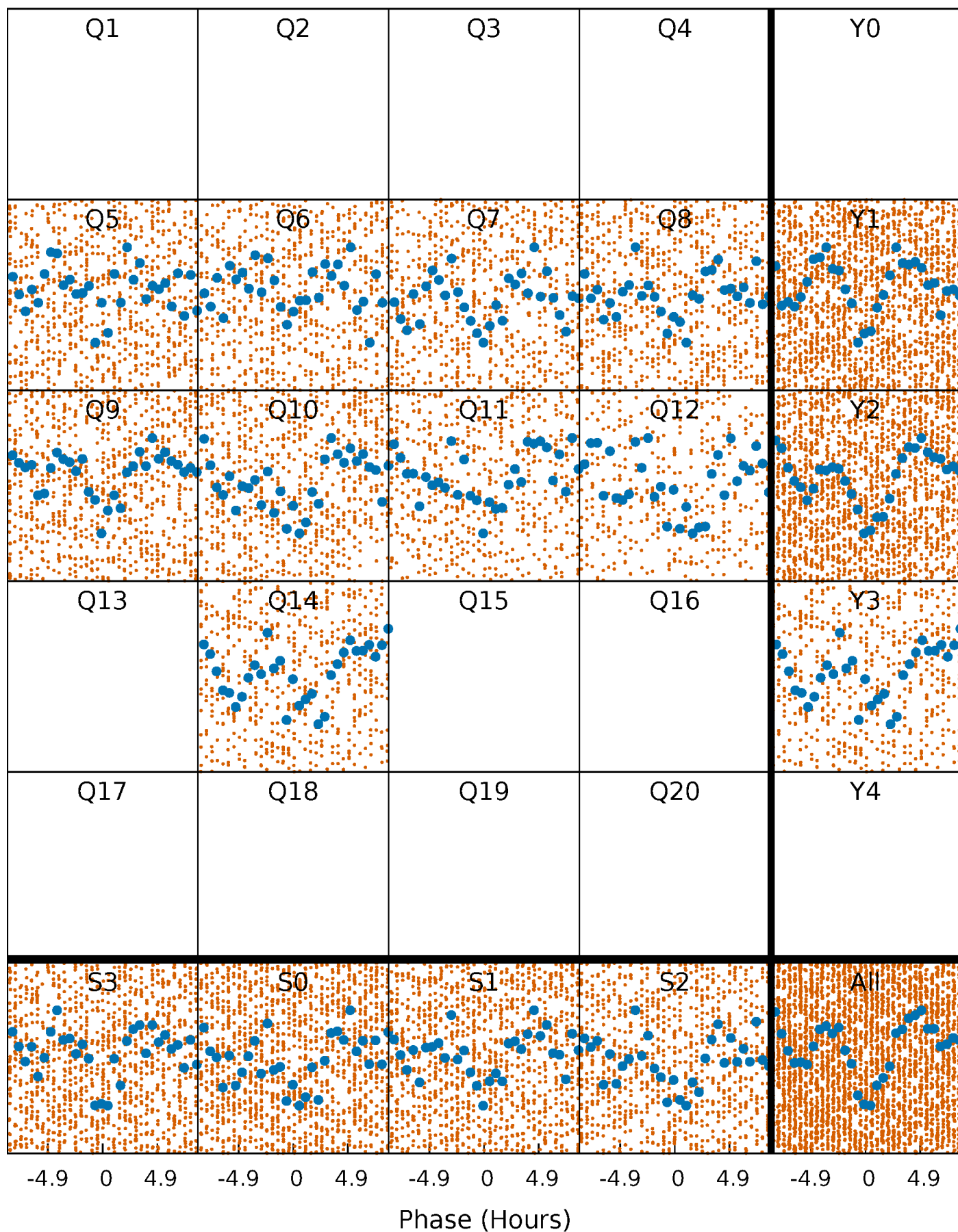


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

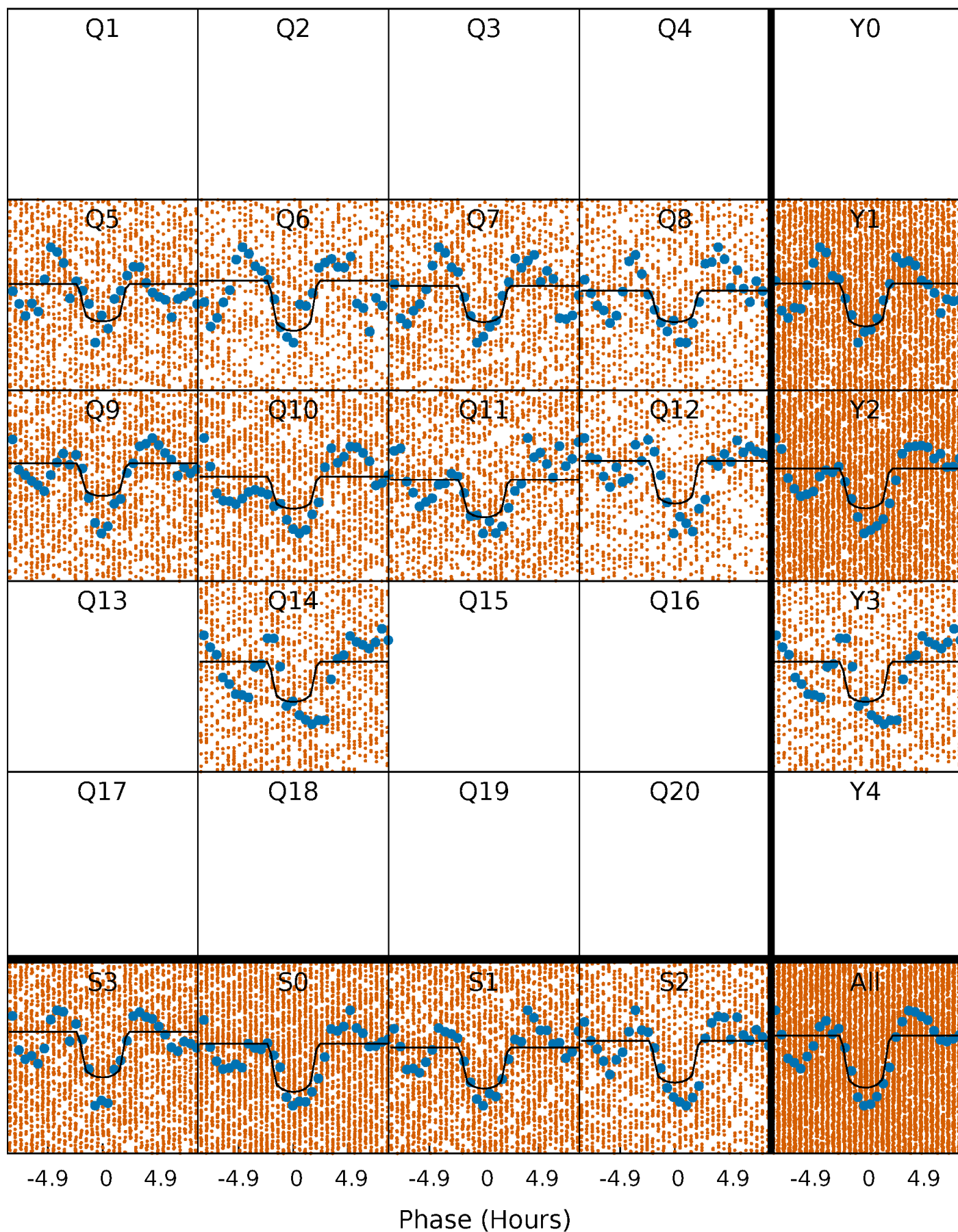
TCE 008461529-01 P= 0.899080 Days  $T_0=132.366410$  (BKJD)





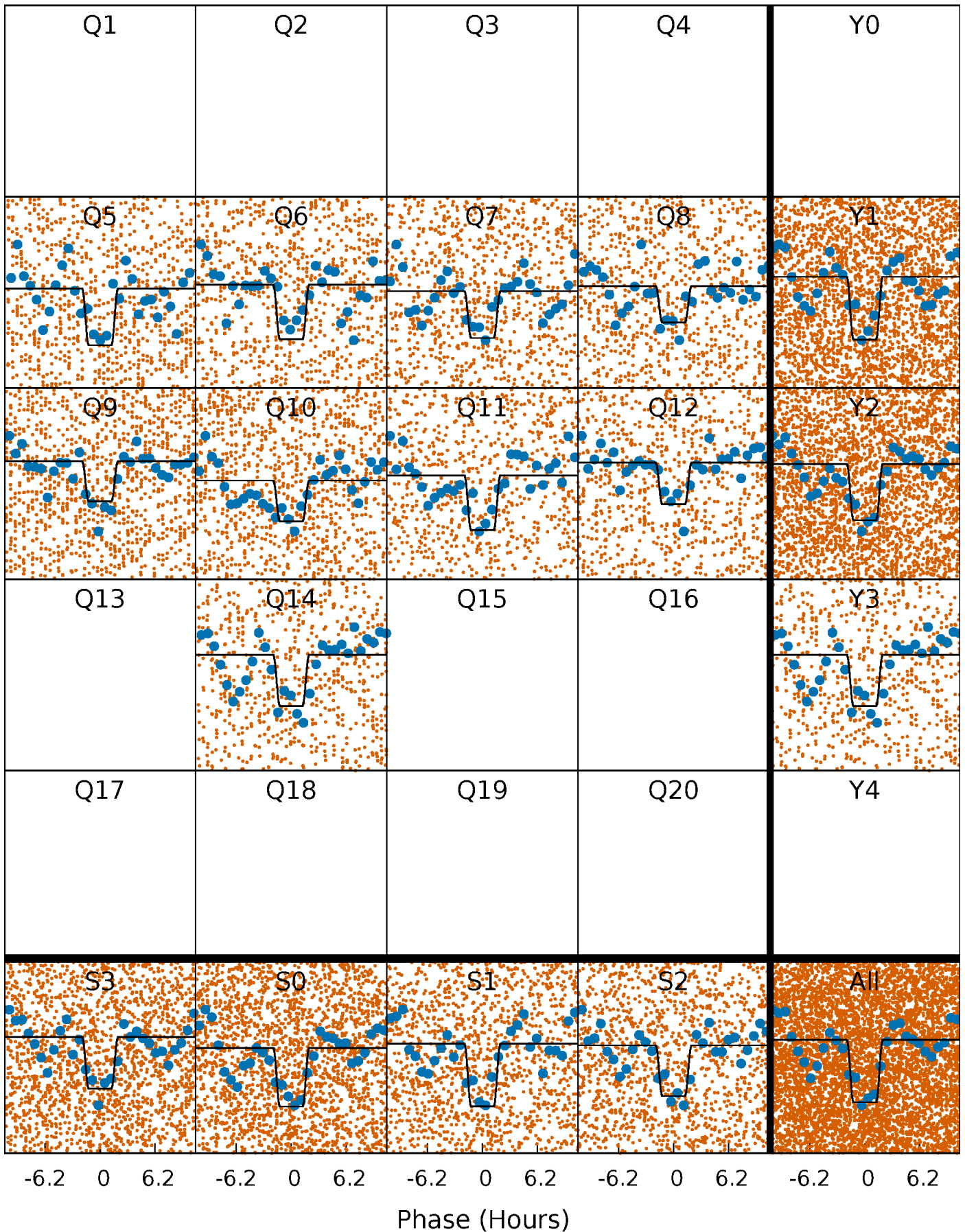
# DV Quarter-Phased Transit Curves

TCE 008461529-01 P= 0.899080 Days  $T_0=132.366410$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

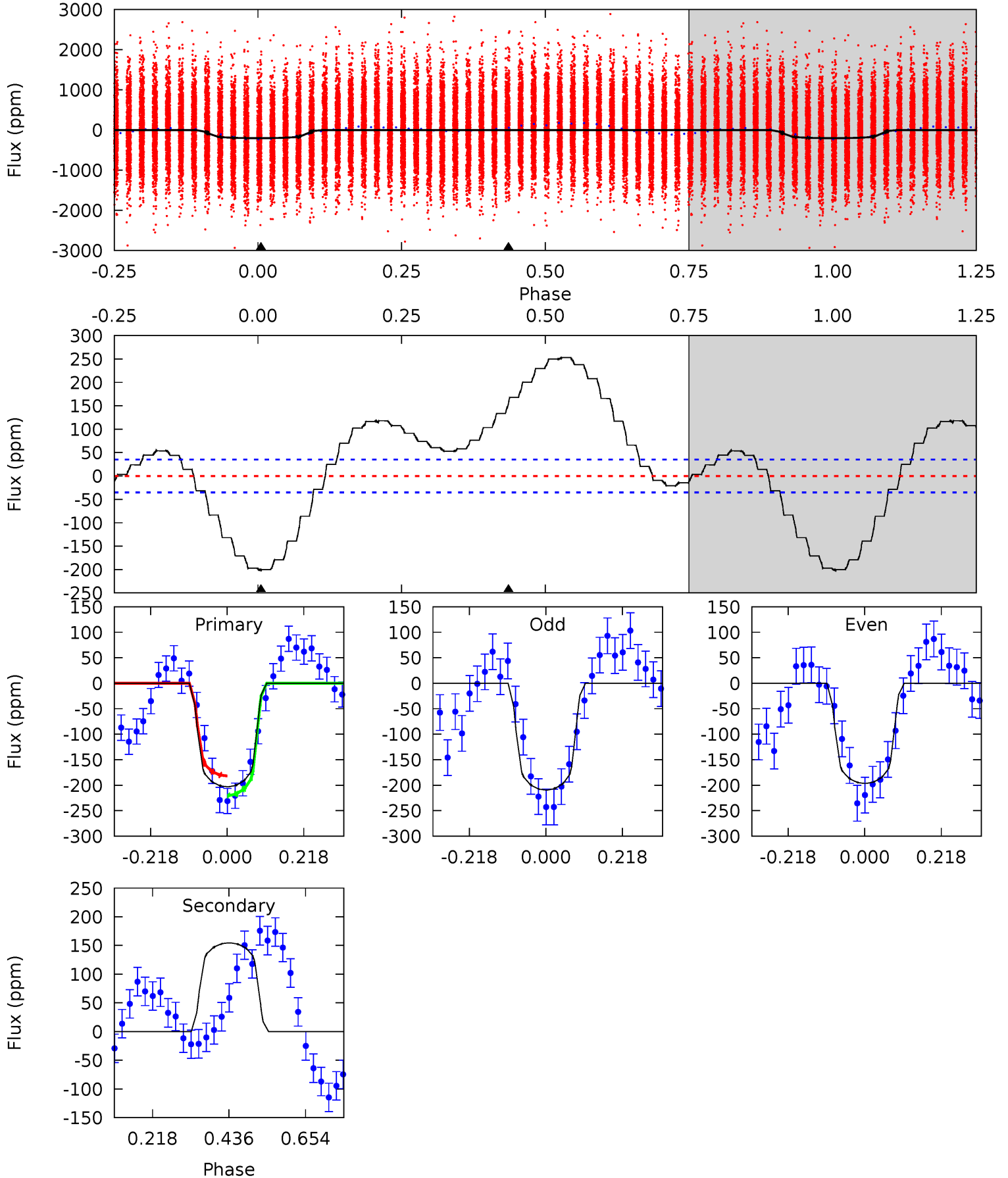
TCE 008461529-01 P= 0.899149 Days  $T_0=132.323432$  (BKJD)



# DV Model-Shift Uniqueness Test

008461529-01, P = 0.899080 Days, E = 132.366410 Days

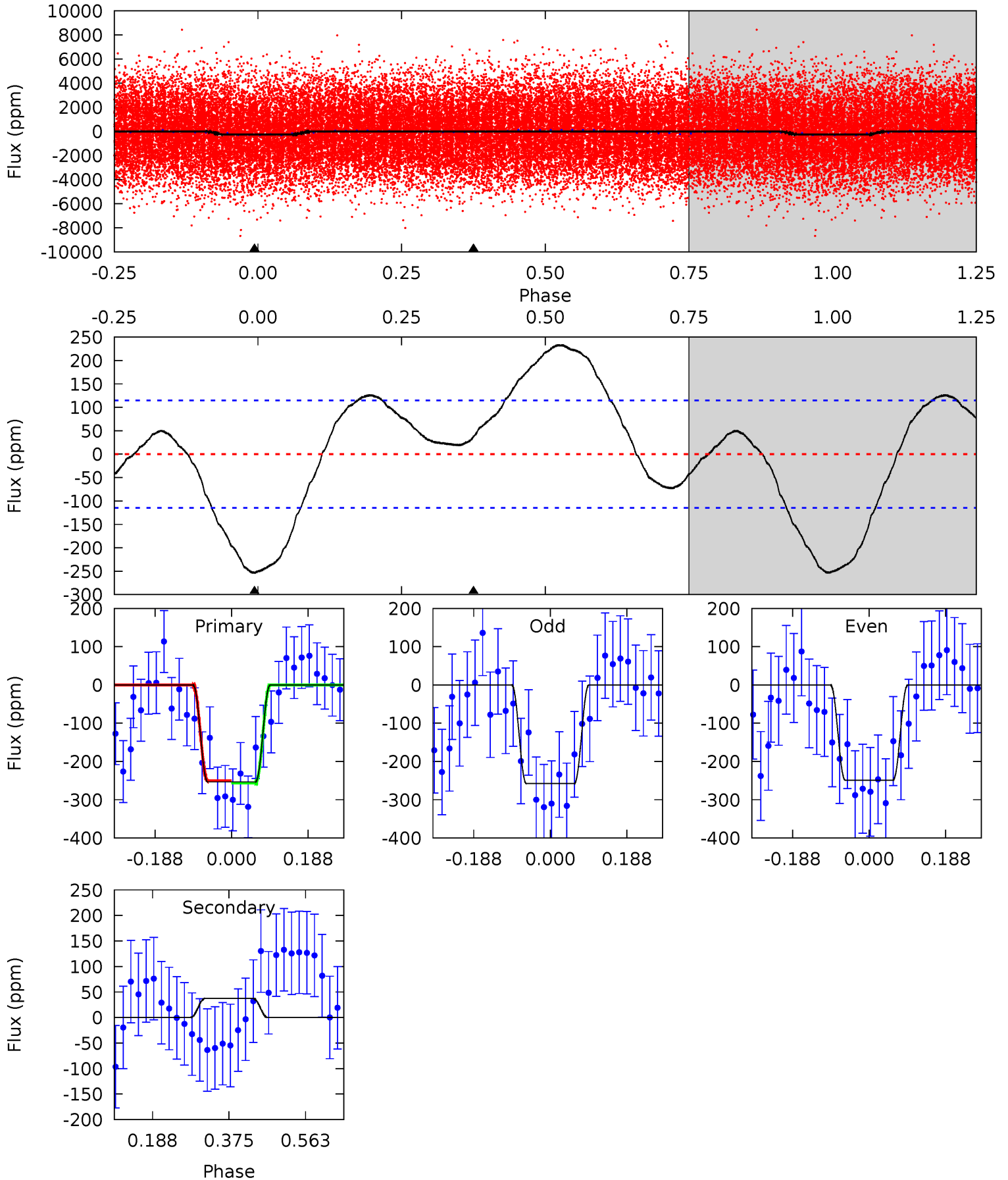
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.5	-19.4	0	0	4.40	1.23	2.73	25.5	25.5	-19.4	-19.4	0.82	1.01	0.56	2.43



# Alt Model-Shift Uniqueness Test

008461529-01, P = 0.899149 Days, E = 132.323432 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
9.77	-1.44	0	0	4.43	1.32	3.44	9.77	9.77	-1.44	-1.44	0.18	1.01	0.48	0.11



### Stellar Parameters For KIC 008461529

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6507^{+182}_{-228}$	$3.806^{+0.488}_{-0.122}$	$-0.420^{+0.300}_{-0.300}$	$2.338^{+0.492}_{-1.149}$	$1.276^{+0.187}_{-0.303}$	$0.141^{+0.707}_{-0.051}$
	+3%/-4%	+13%/-3%	+71%/-71%	+21%/-49%	+15%/-24%	+502%/-36%
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 008461529-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$155 \pm 8$	$3.43^{+0.82}_{-0.87}$	$4232^{+360}_{-507}$	$-6169^{+353}_{-444}$	$-2.804^{+0.921}_{-2.066}$
Alt.	$37 \pm 26$	$4.00^{+0.90}_{-1.00}$	$4234^{+352}_{-527}$	$-4538^{+530}_{-431}$	$-0.477^{+0.357}_{-0.556}$

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



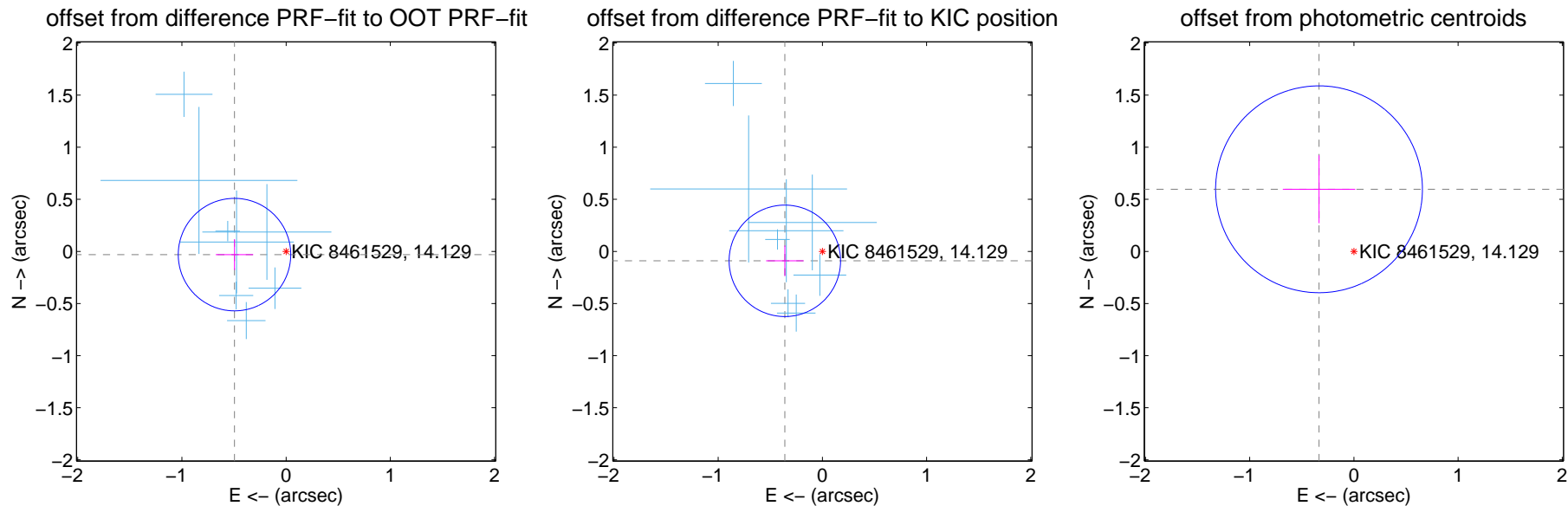
## DV Centroid Data

Supplemental centroid analysis for 008461529-01. Kepler magnitude: 14.13. Transit SNR 16.17

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.496 \pm 0.180$	2.76	$0.495 \pm 0.180$	$-0.031 \pm 0.147$
PRF-fit source offset from KIC position	$0.372 \pm 0.178$	2.08	$0.360 \pm 0.180$	$-0.090 \pm 0.147$
photometric centroid source offset	$0.68 \pm 0.33$	2.07	$0.33 \pm 0.35$	$0.60 \pm 0.33$

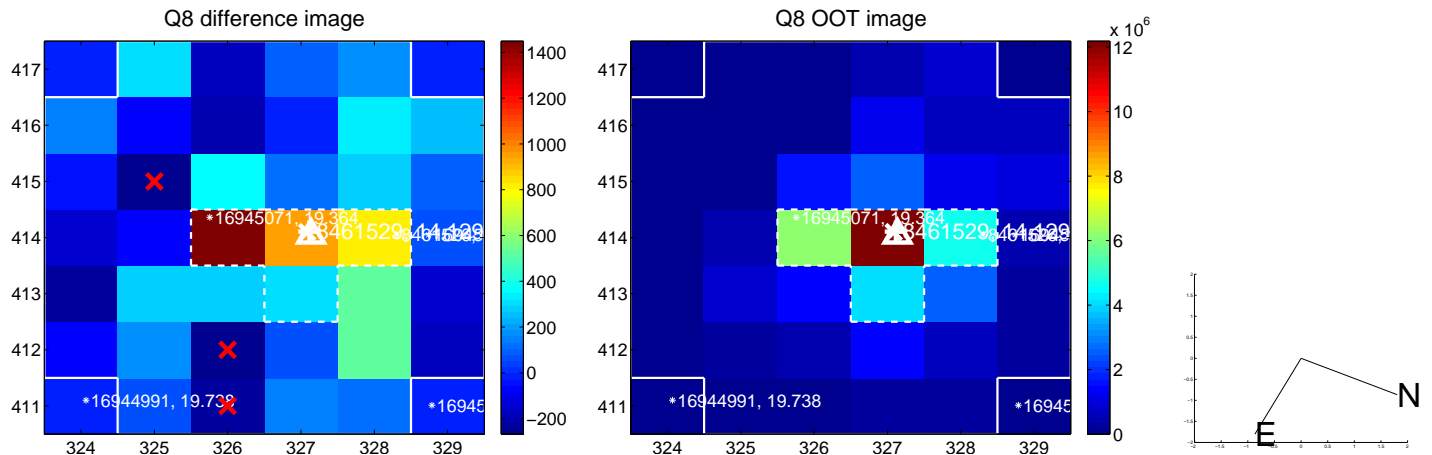
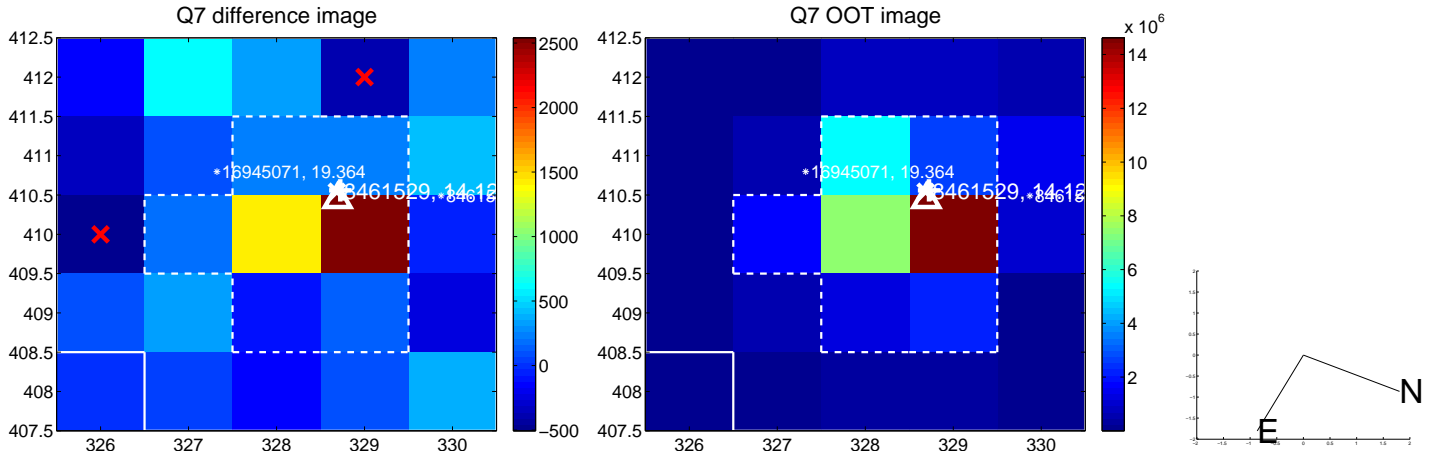
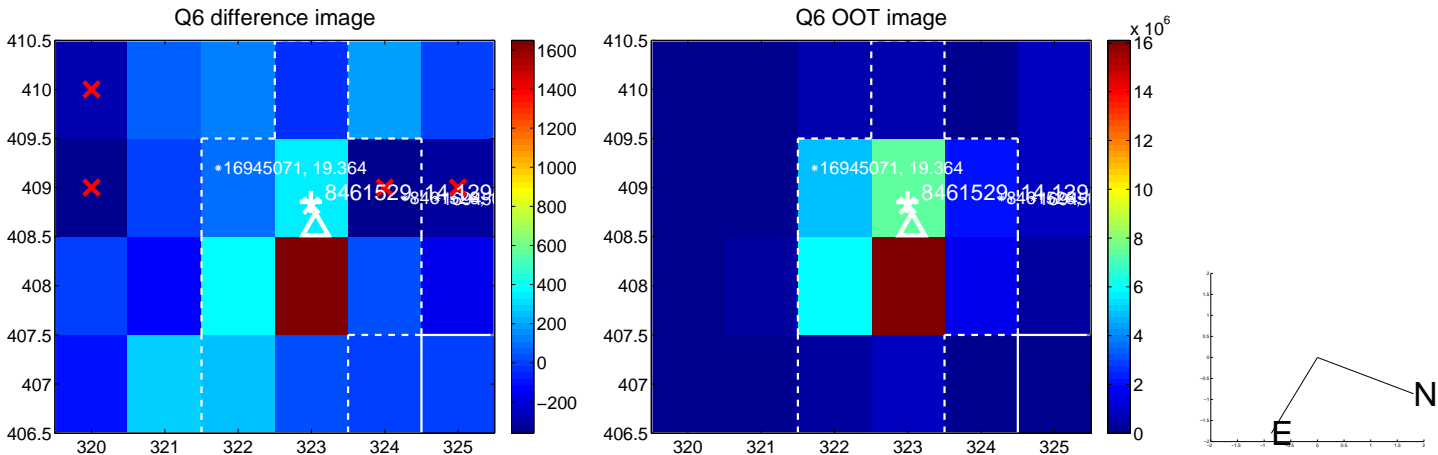
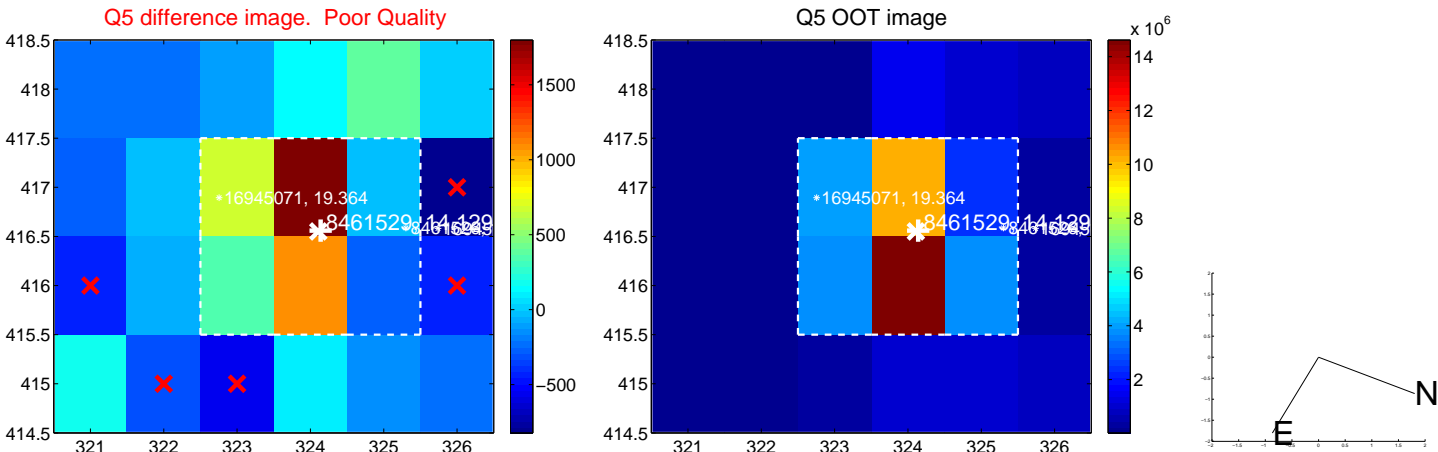


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

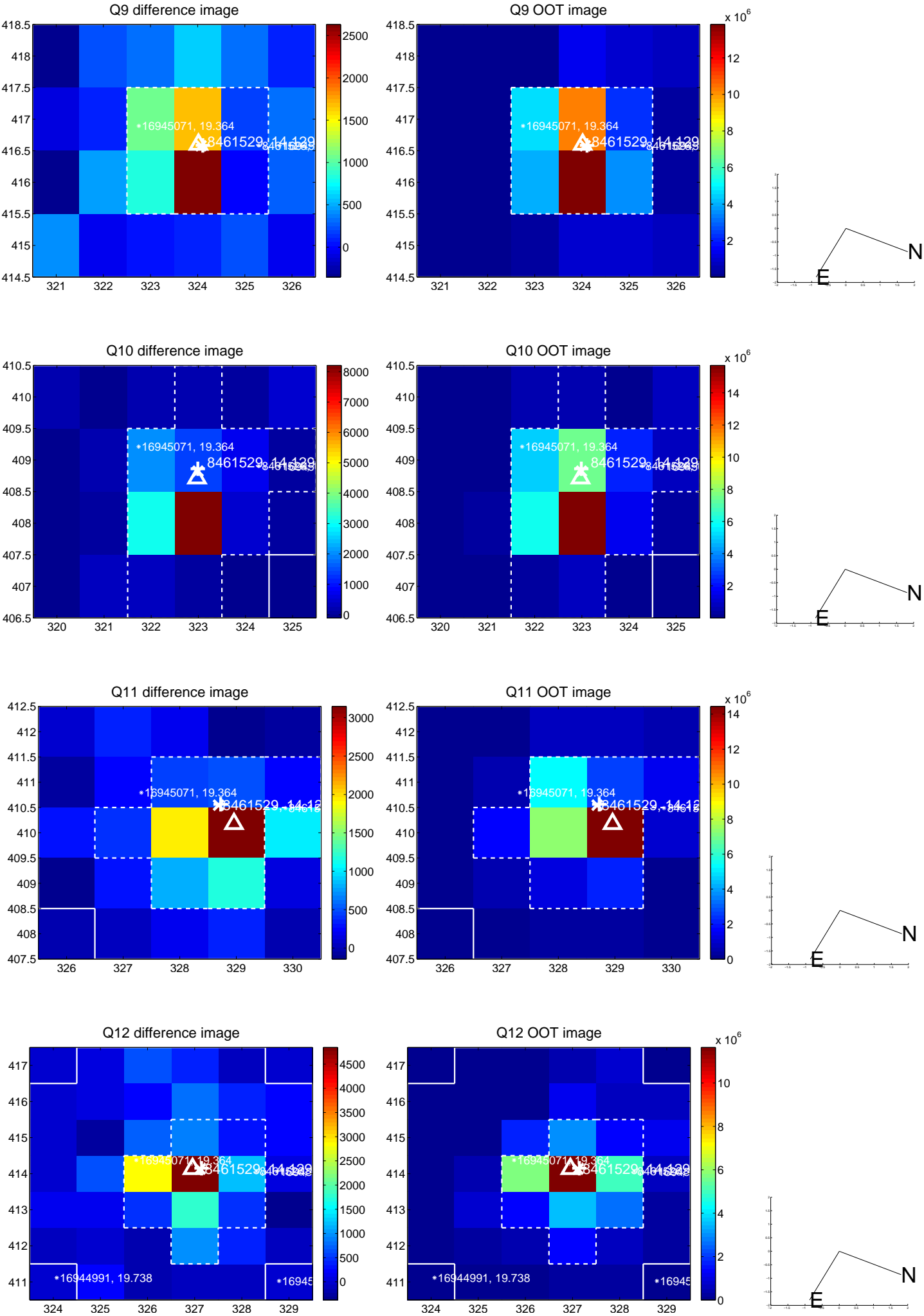
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

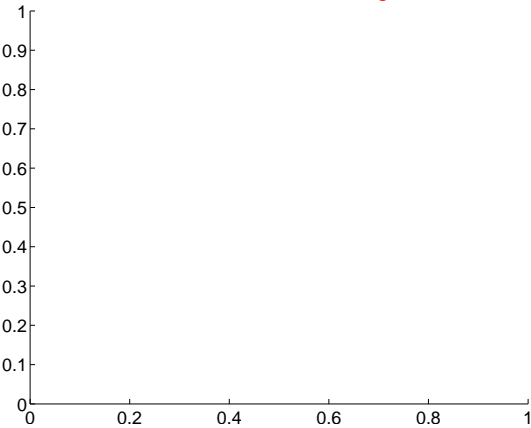


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

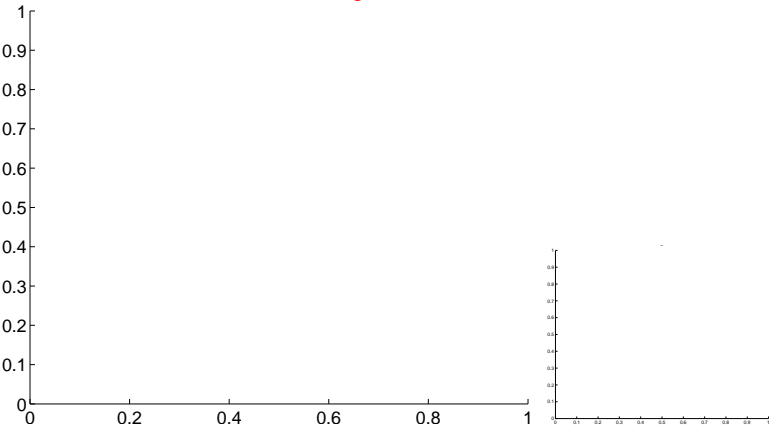


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

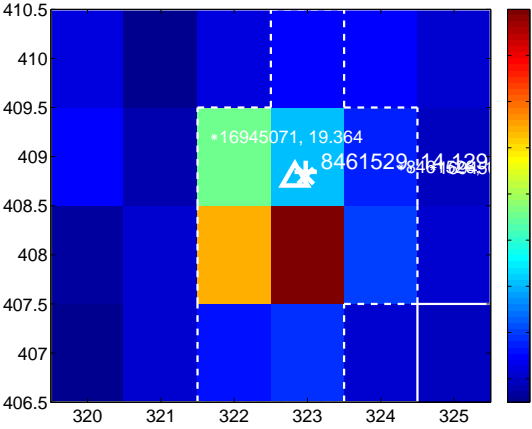
Q13 no difference image



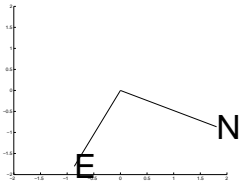
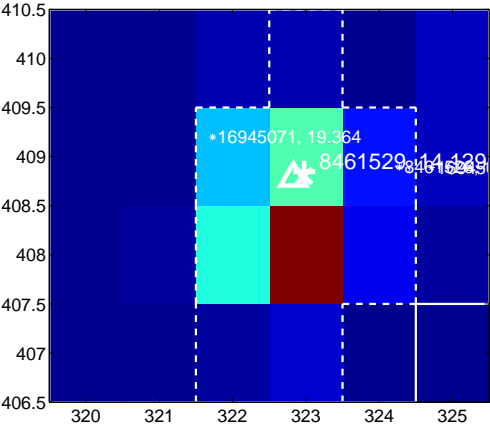
Q13 no OOT image



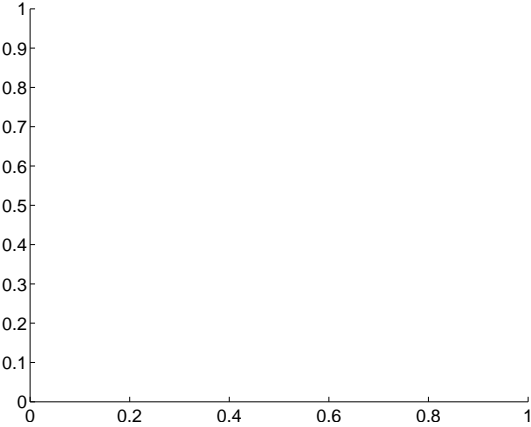
Q14 difference image



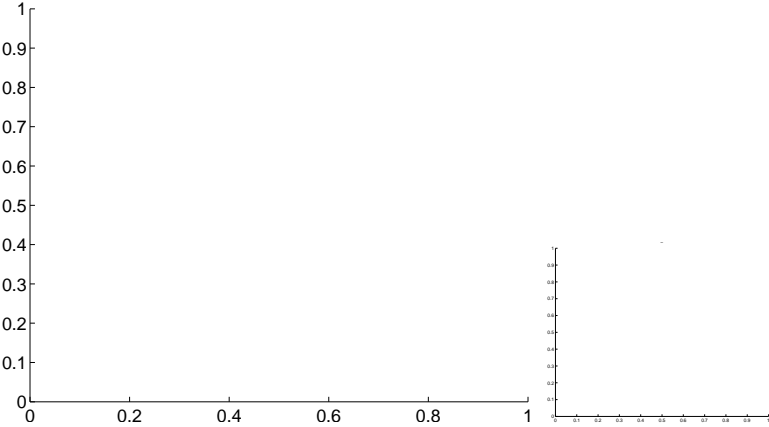
Q14 OOT image



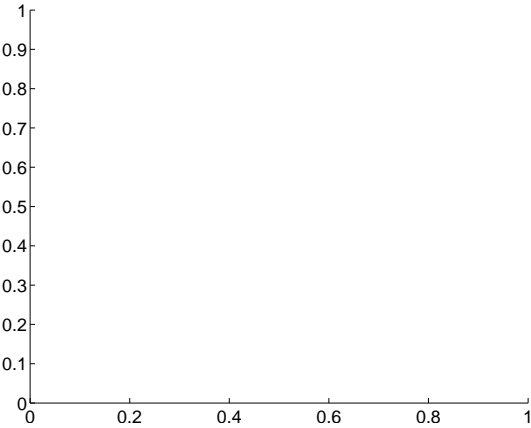
Q15 no difference image



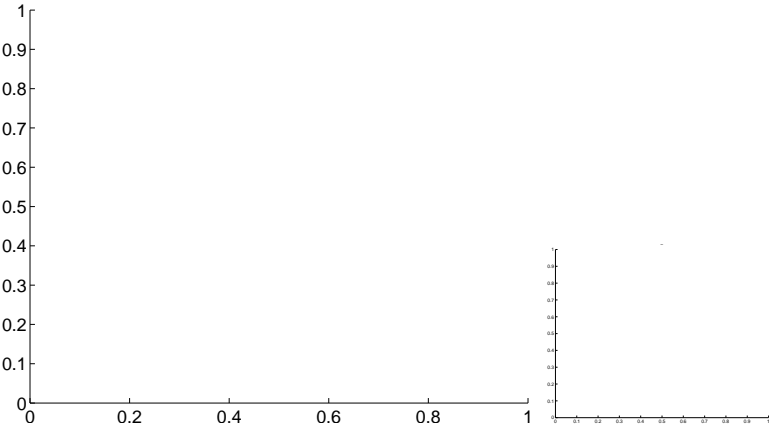
Q15 no OOT image



Q16 no difference image

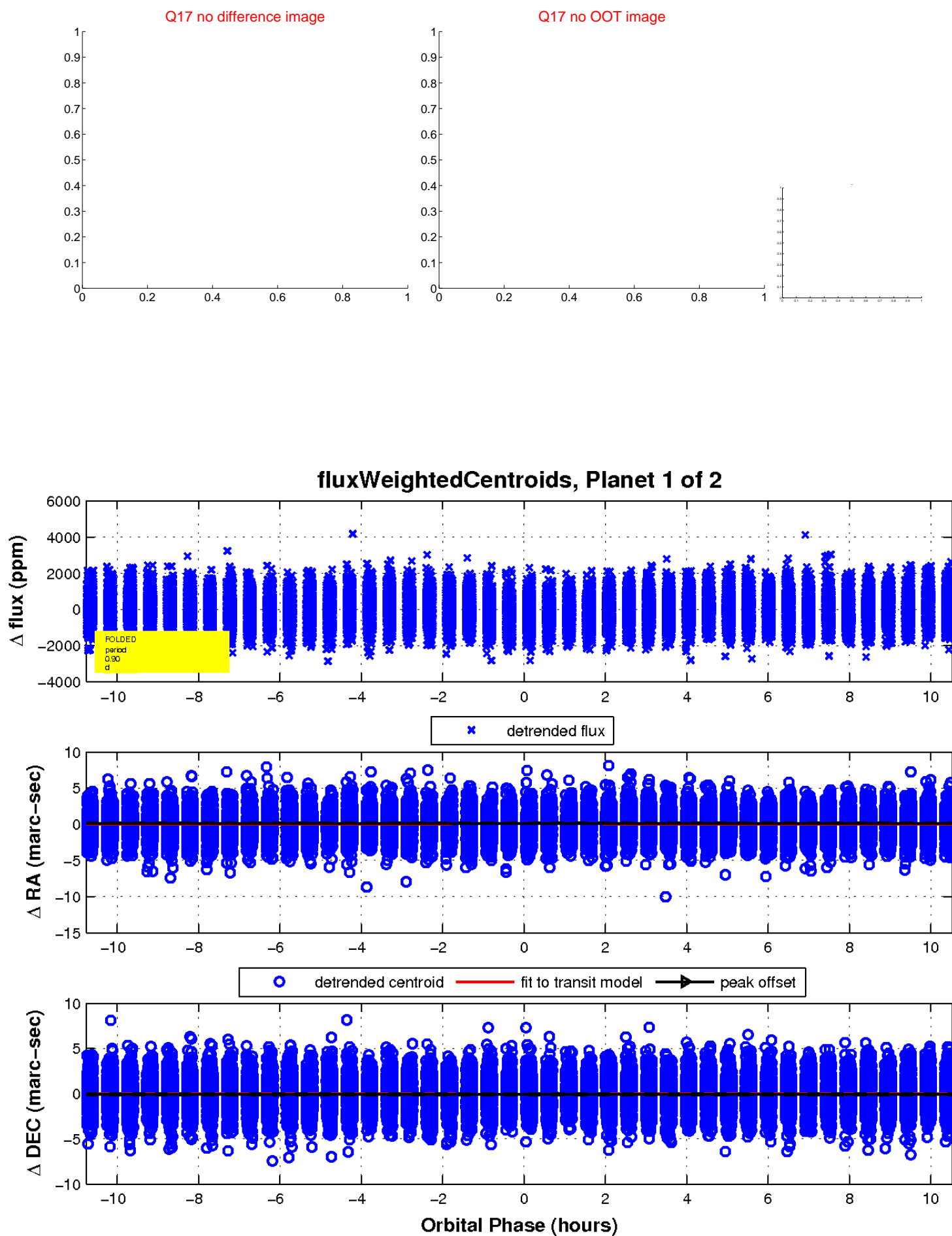


Q16 no OOT image



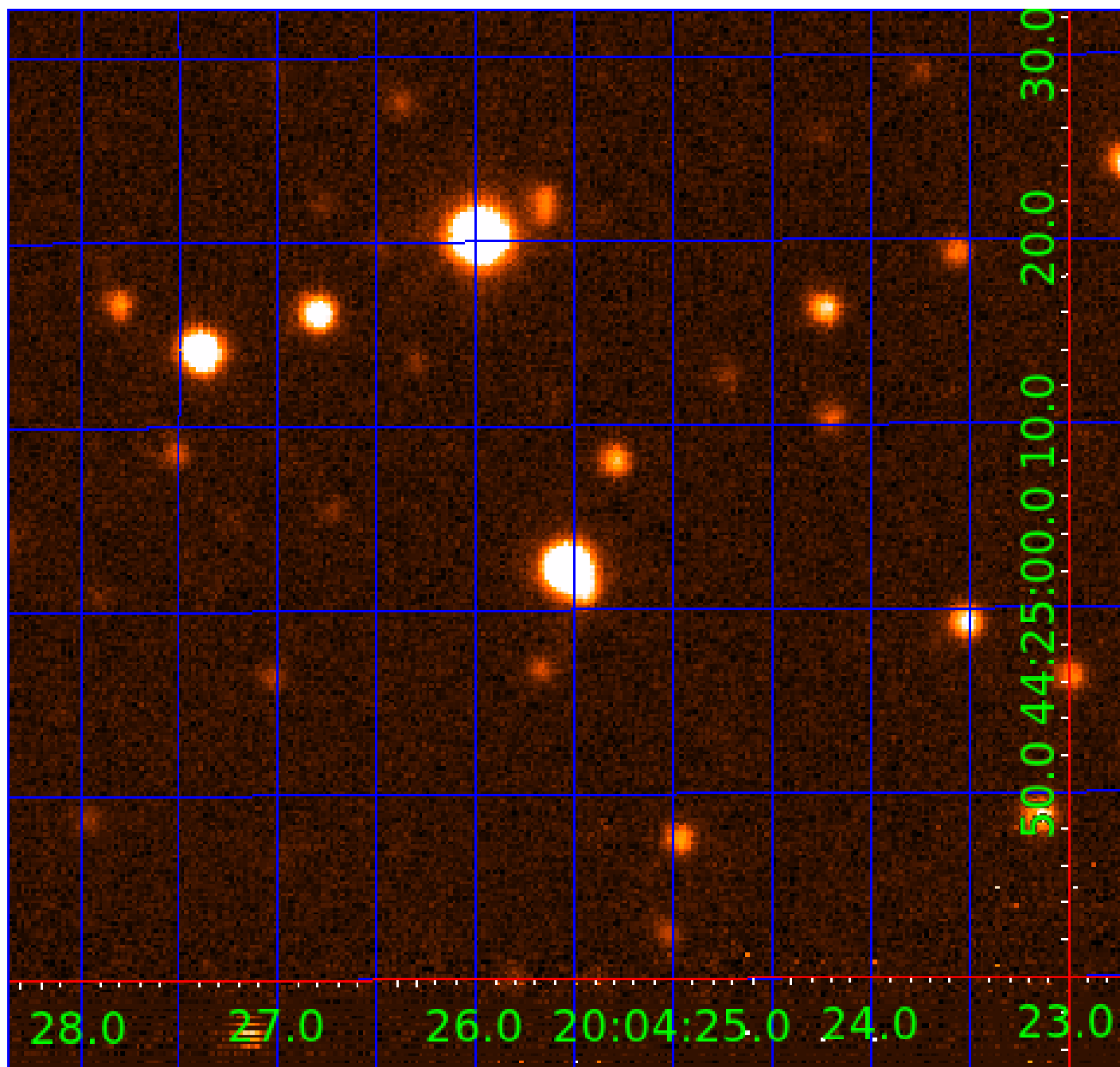


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008461529

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008461529-01	OBS	No	0.899080	132.366410	167.3	4.266	15.9	16.2	2.34	6507	3.66	22451.70
008461529-02	OBS	No	1.348450	132.347799	225.6	1.791	8.0	8.9	2.34	6507	4.12	13077.78

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008461529-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT
008461529-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT

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

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

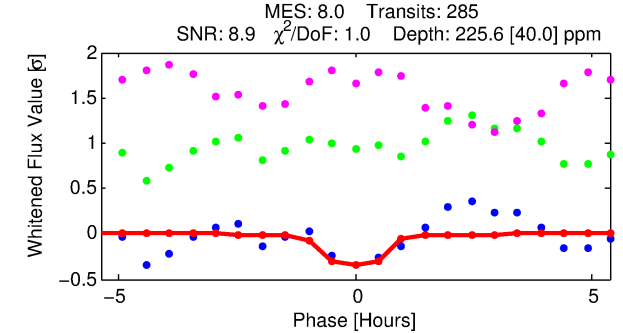
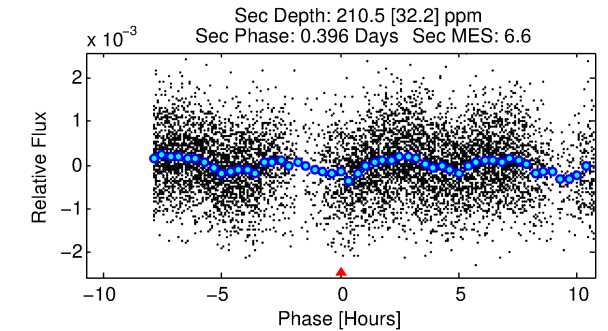
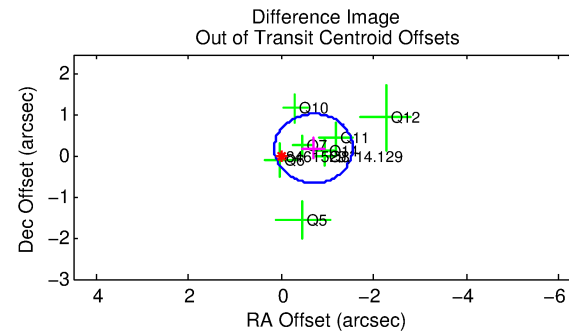
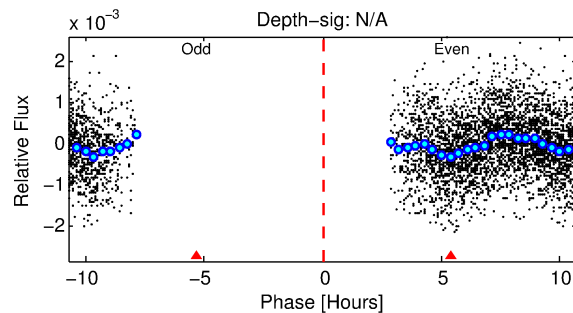
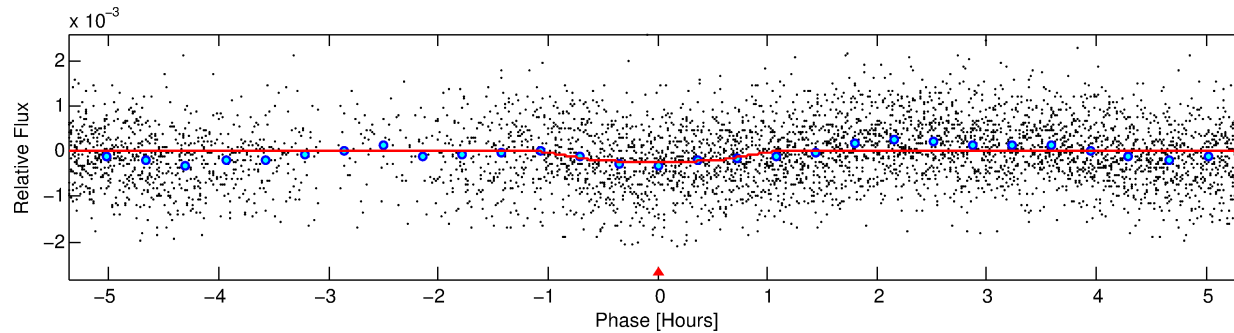
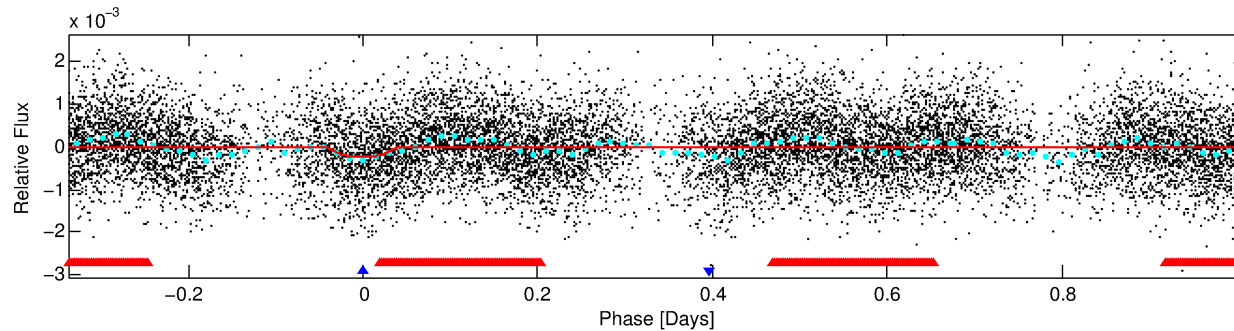
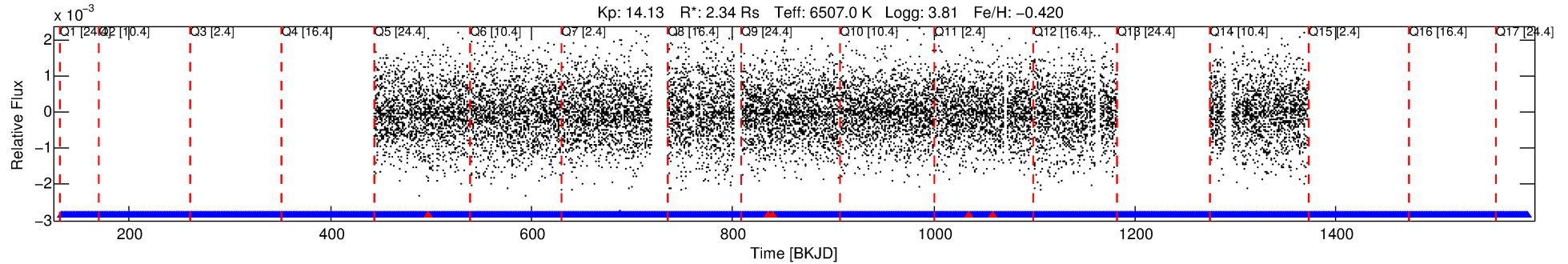
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008461529-02

No Significant Match Found

# DV One-Page Summary

KIC: 8461529 Candidate: 2 of 2 Period: 1.348 d



## DV Fit Results:

Period = 1.34845 [0.00001] d  
Epoch = 132.3478 [0.0034] BKJD  
Rp/R\* = 0.0161 [0.0116]  
a/R\* = 2.84 [10.34]  
b = 0.90 [0.86]  
Seff = 13077.78 [10848.63]  
Teff = 2727 [566] K  
Rp = 4.12 [3.58] Re  
a = 0.0259 [0.0129] AU  
Ag = 4.59 [7.62] [0.47σ]  
Teffp = 6170 [2240] K [1.49σ]

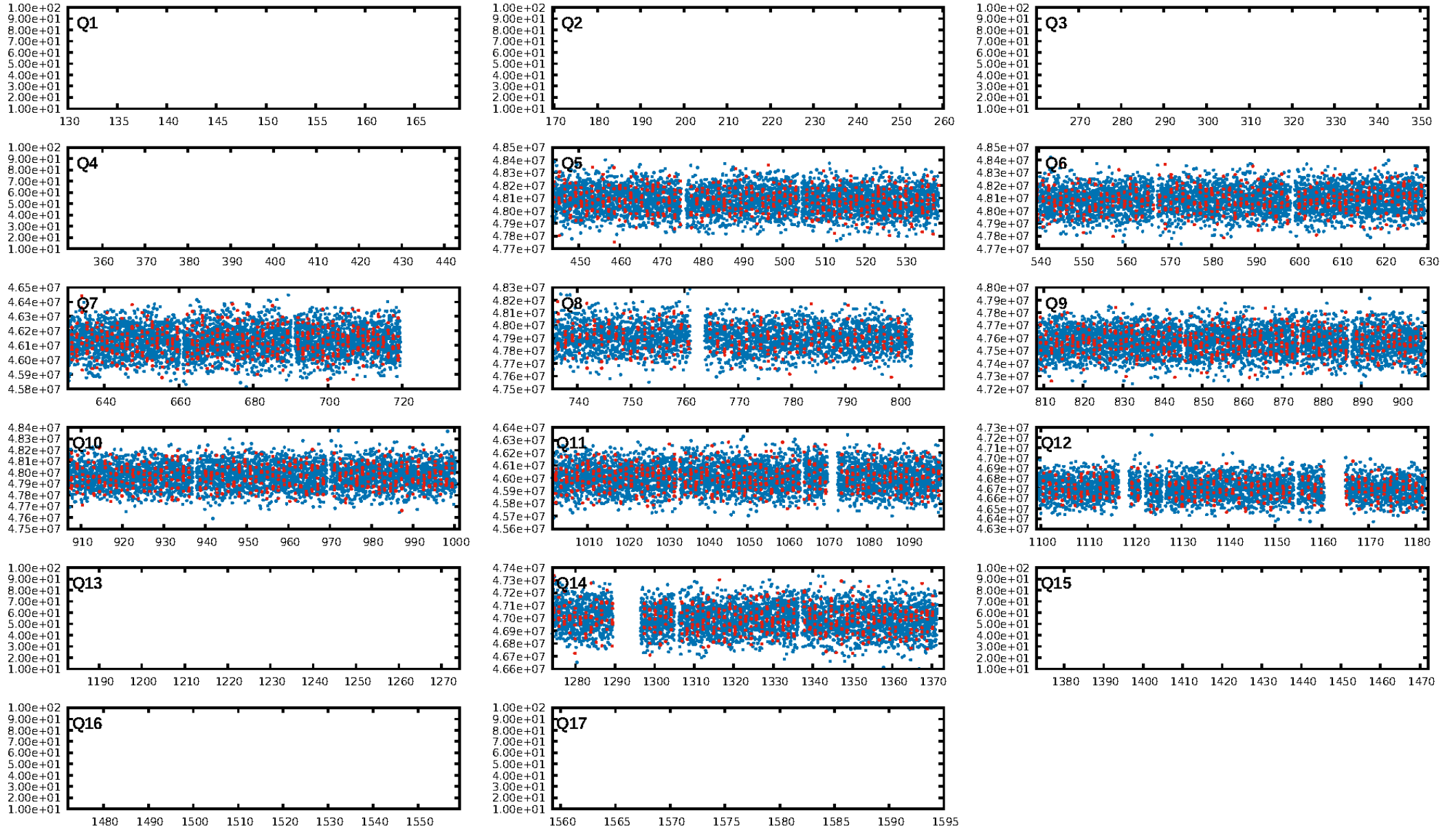
## DV Diagnostic Results:

ShortPeriod-sig: 98.0% [2.33σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.45e-18  
RollingBand-fgt: 0.98 [280/285]  
GhostDiagnostic-chr: 13.07  
Centroid-sig: 0.2%  
Centroid-so: 2.313 arcsec [4.89σ]  
OotOffset-rm: 0.722 arcsec [2.56σ]  
KicOffset-rm: 0.819 arcsec [2.70σ]  
OotOffset-st: 3/2/2/1 [8]  
KicOffset-st: 3/2/2/1 [8]  
DiffImageQuality-fgm: 0.88 [7/8]  
DiffImageOverlap-fno: 0.67 [6/9]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 13:58:03 Z

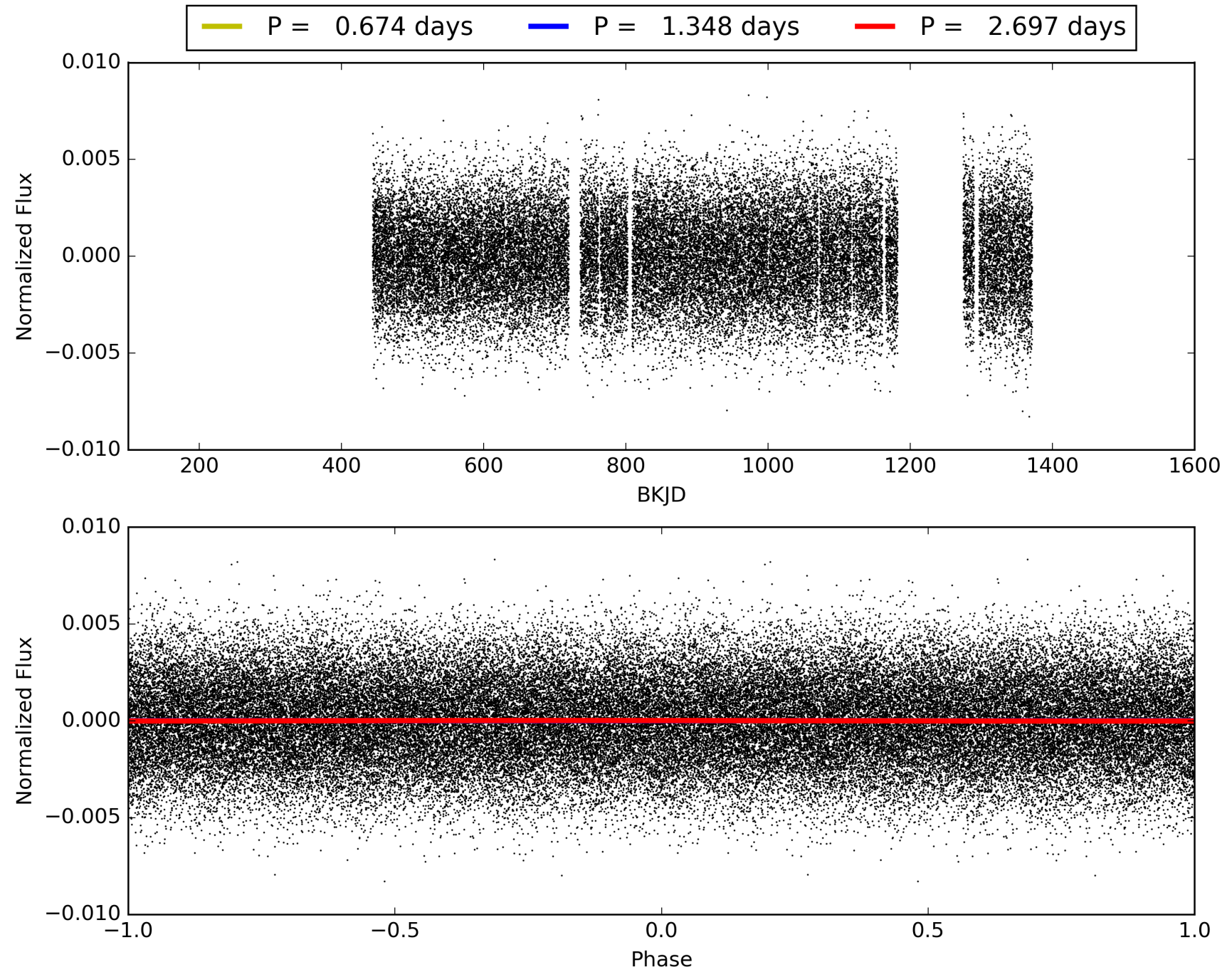
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008461529-02, PDC Light Curves



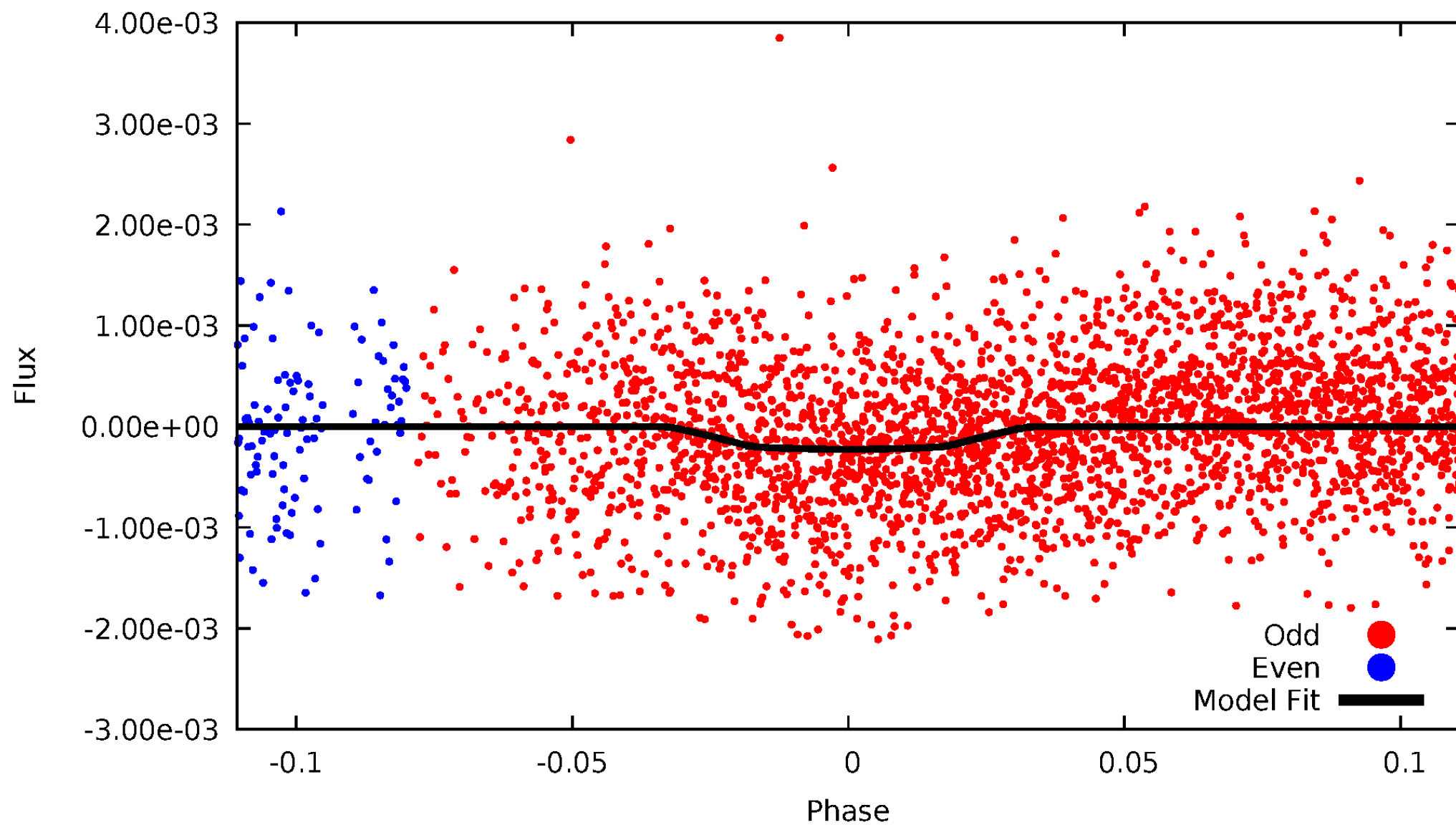


TCE 008461529-02



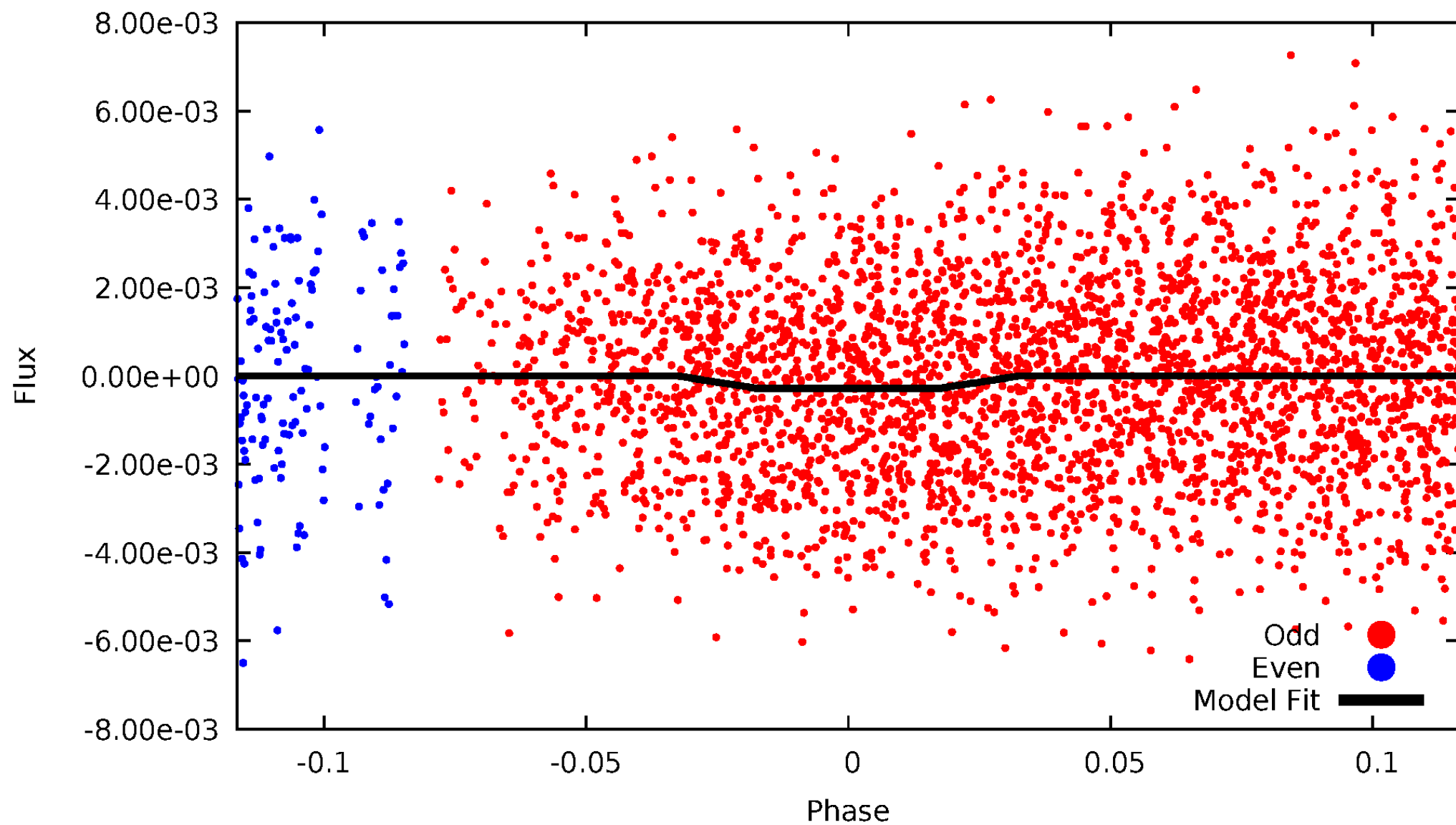
# DV Odd/Even

TCE 008461529-02



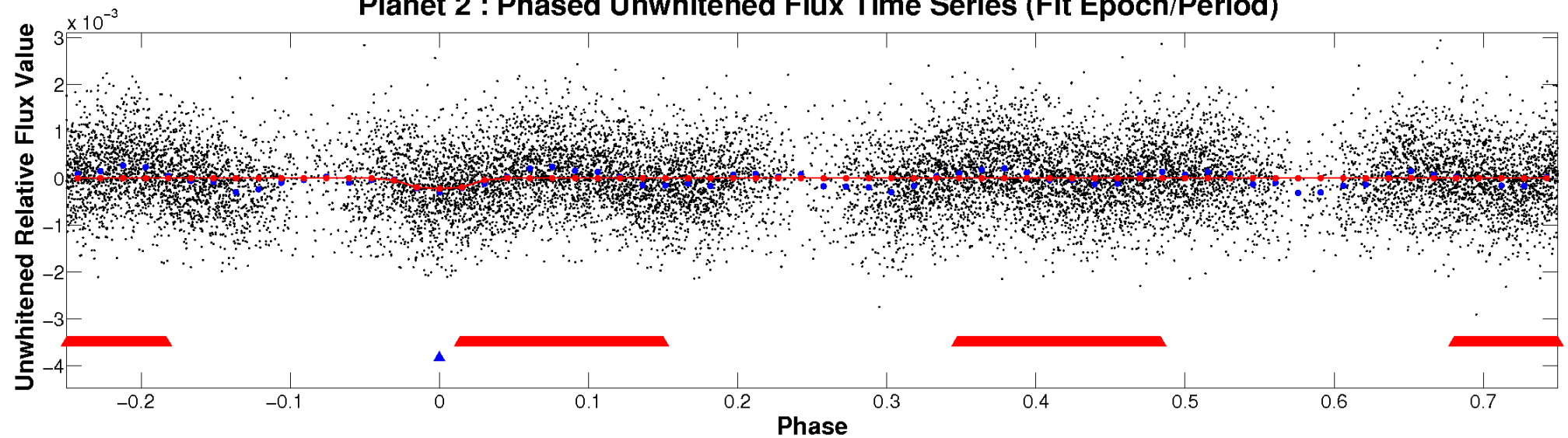
# ALT Odd/Even

TCE 008461529-02

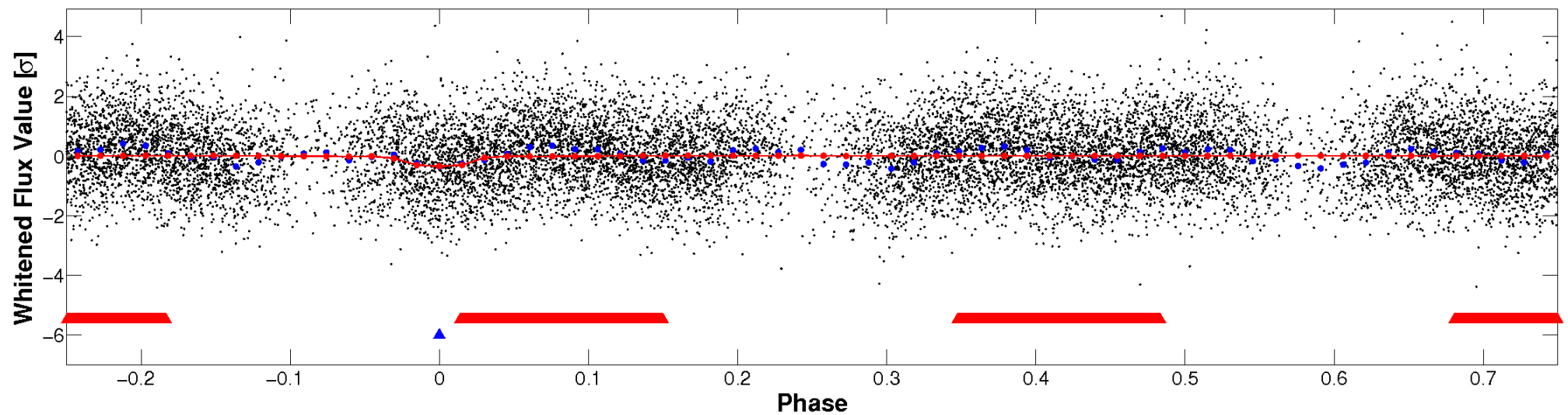


# Non-Whitened Vs. Whitened Light Curve

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

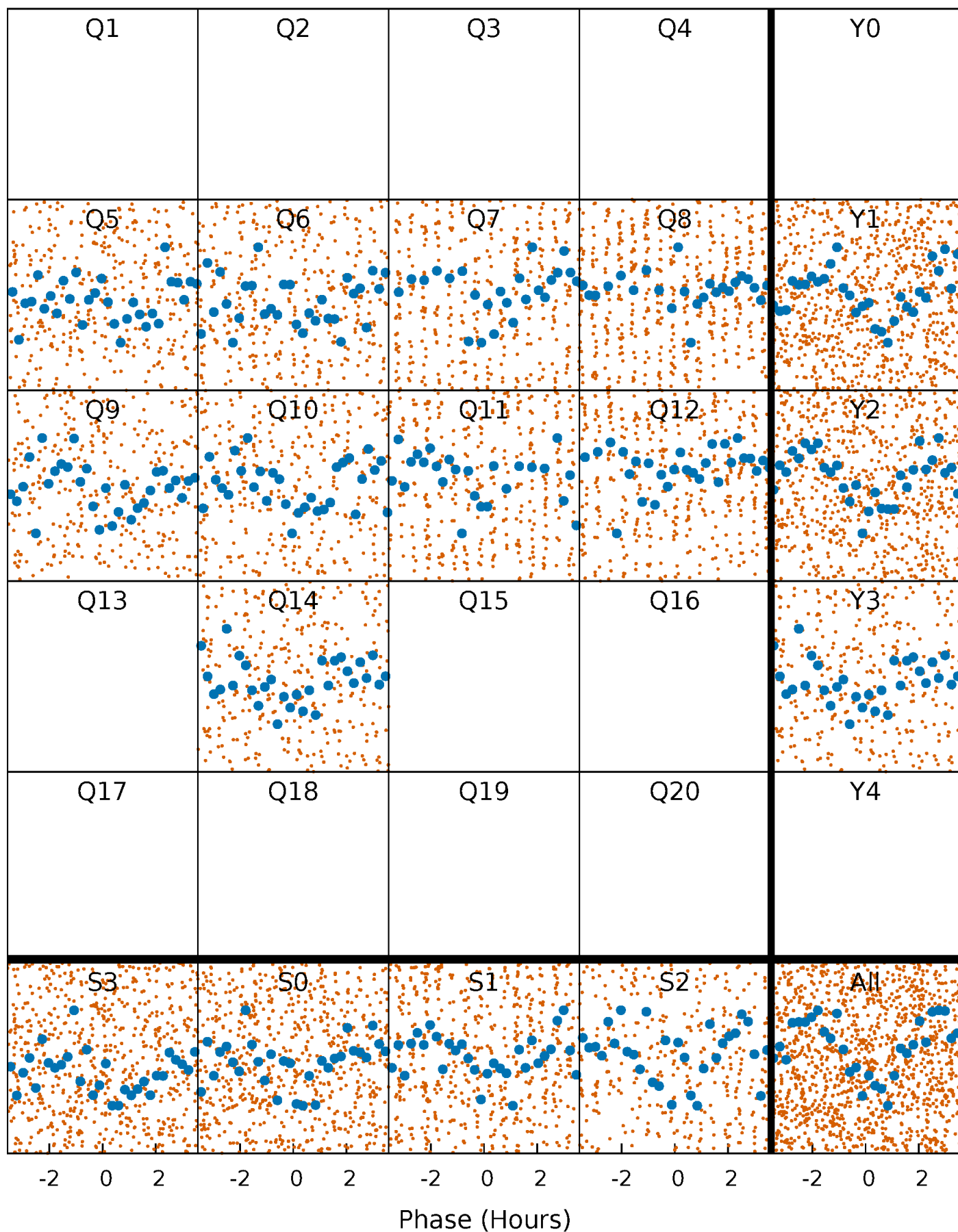


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

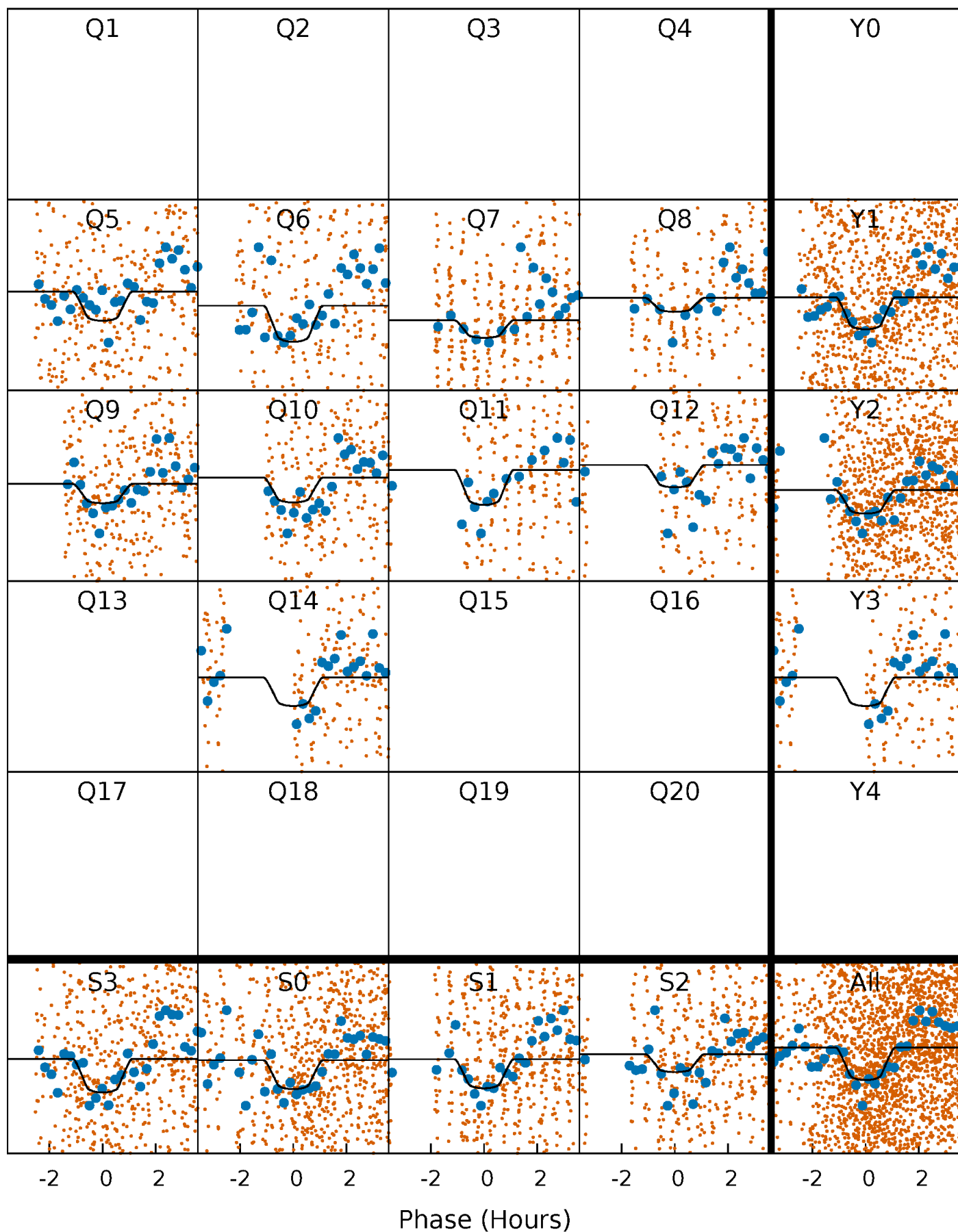
TCE 008461529-02   P= 1.348450 Days    $T_0=132.347799$  (BKJD)





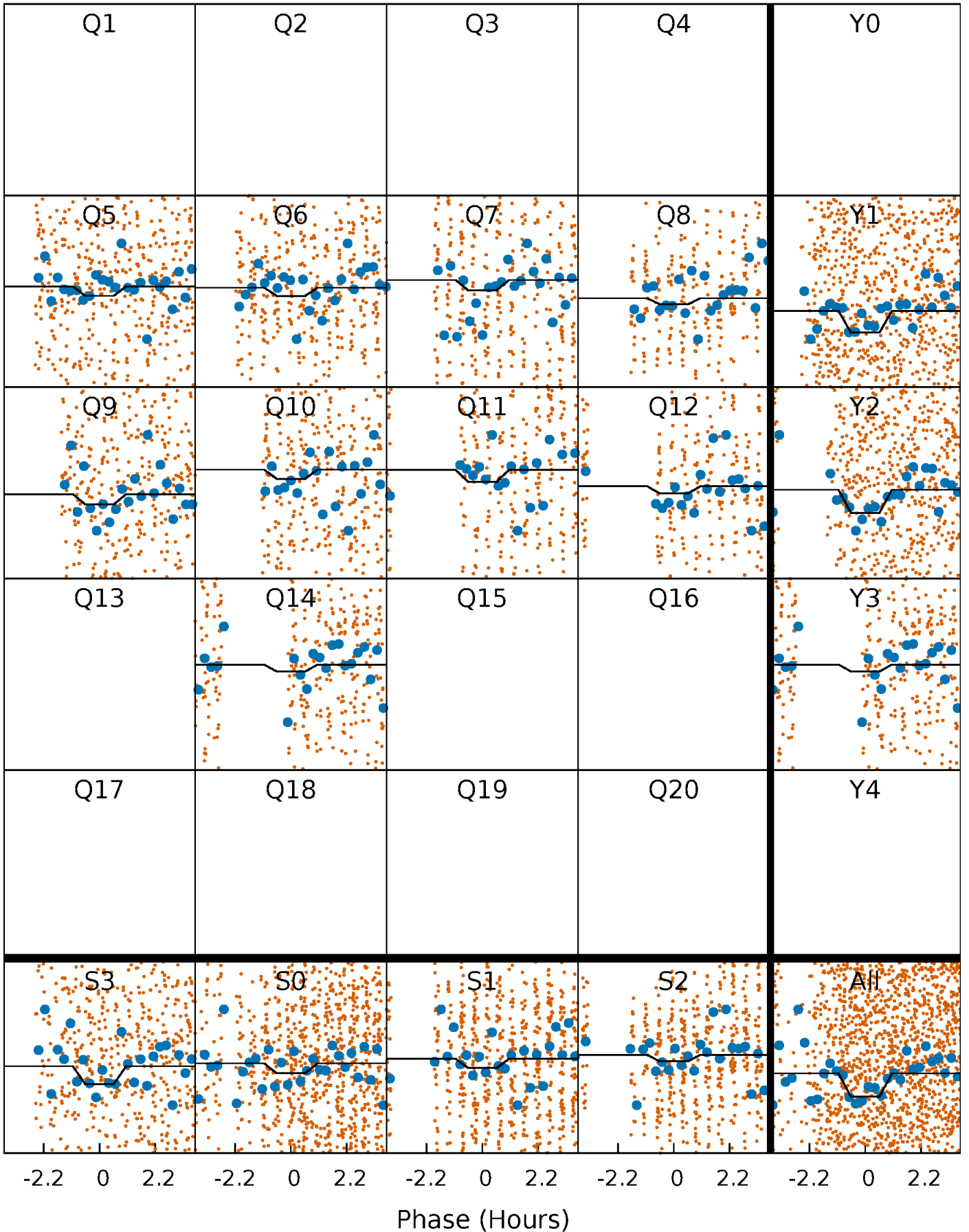
# DV Quarter-Phased Transit Curves

TCE 008461529-02   P= 1.348450 Days    $T_0=132.347799$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

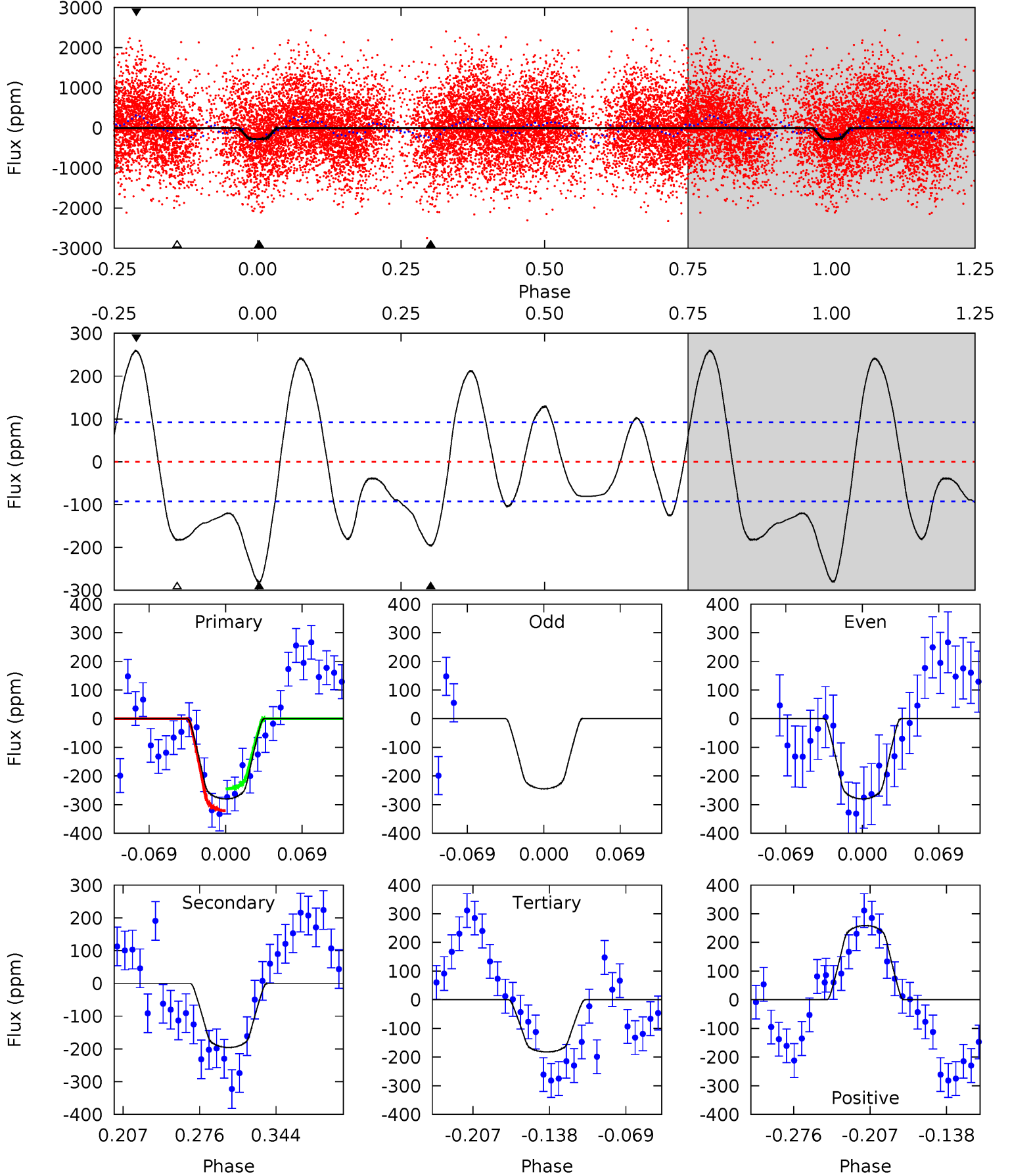
TCE 008461529-02   P= 1.348459 Days    $T_0=132.346050$  (BKJD)



# DV Model-Shift Uniqueness Test

008461529-02, P = 1.348450 Days, E = 132.347799 Days

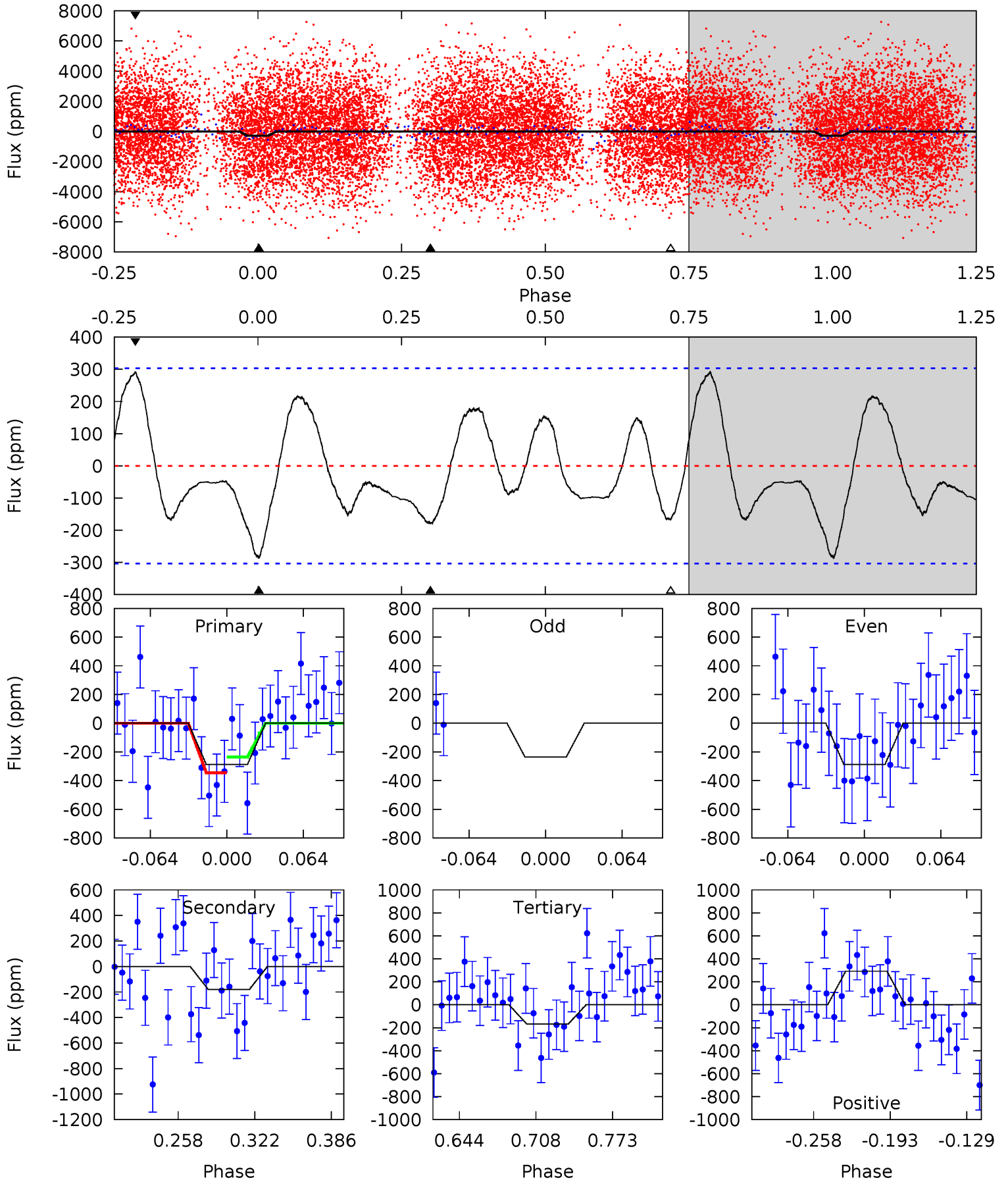
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.1	9.84	9.16	13.0	4.64	1.82	6.25	4.93	1.07	0.68	-3.18	1.04	0.99	0.48	1.91



# Alt Model-Shift Uniqueness Test

008461529-02, P = 1.348459 Days, E = 132.346050 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
4.40	2.76	2.59	4.49	4.66	1.85	1.92	1.81	-0.09	0.17	-1.73	0.46	1.03	0.51	0.84



### Stellar Parameters For KIC 008461529

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6507^{+182}_{-228}$	$3.806^{+0.488}_{-0.122}$	$-0.420^{+0.300}_{-0.300}$	$2.338^{+0.492}_{-1.149}$	$1.276^{+0.187}_{-0.303}$	$0.141^{+0.707}_{-0.051}$
	+3%/-4%	+13%/-3%	+71%/-71%	+21%/-49%	+15%/-24%	+502%/-36%
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 008461529-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-196 \pm 20$	$3.90^{+2.77}_{-2.20}$	$3710^{+262}_{-450}$	$5743^{+3911}_{-1244}$	$4.818^{+20.413}_{-3.191}$
Alt.	$-180 \pm 65$	$4.06^{+2.93}_{-2.16}$	$3718^{+270}_{-431}$	$5432^{+3241}_{-1223}$	$3.746^{+15.427}_{-2.540}$

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

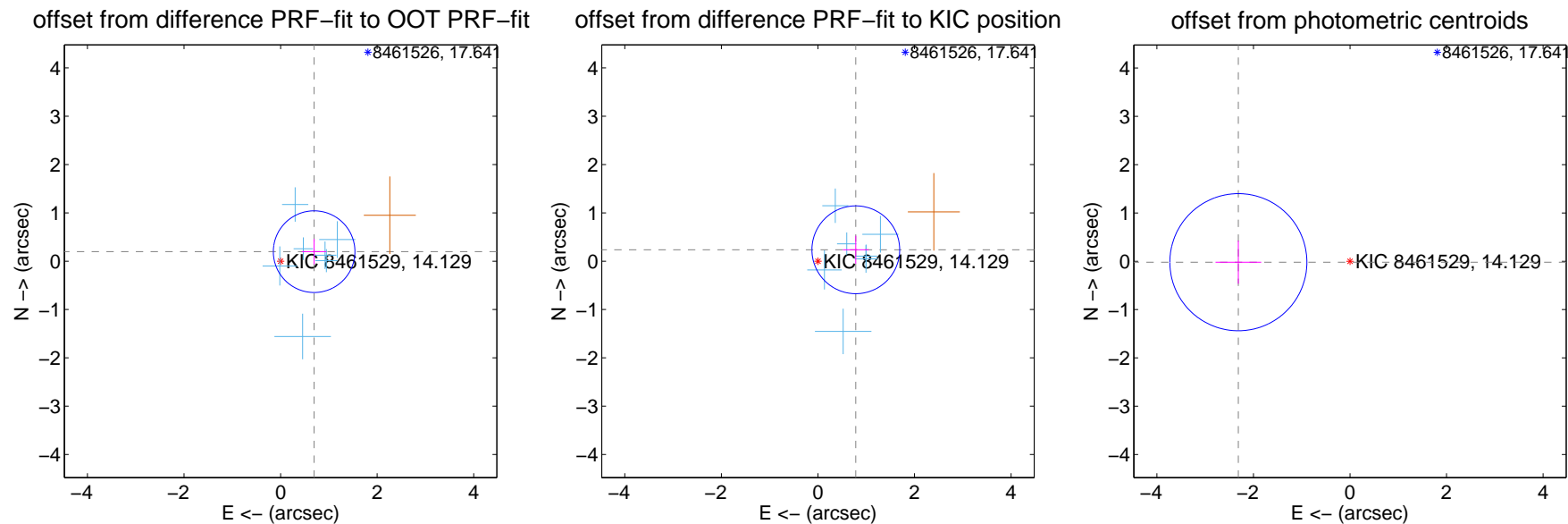
## DV Centroid Data

Supplemental centroid analysis for 008461529-02. Kepler magnitude: 14.13. Transit SNR 8.93

There are 7 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.722 \pm 0.282$	2.56	$-0.695 \pm 0.254$	$0.197 \pm 0.264$
PRF-fit source offset from KIC position	$0.819 \pm 0.303$	2.70	$-0.784 \pm 0.270$	$0.236 \pm 0.290$
photometric centroid source offset	$2.31 \pm 0.47$	4.89	$2.31 \pm 0.47$	$-0.02 \pm 0.45$



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.

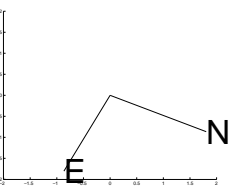
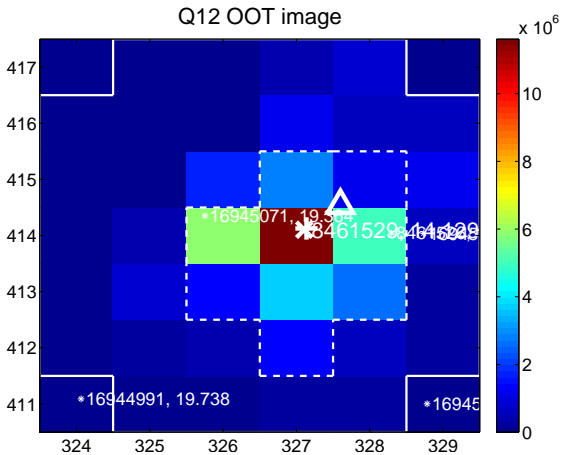
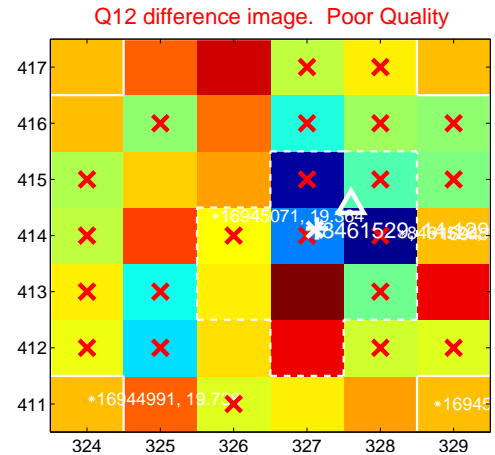
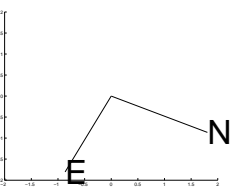
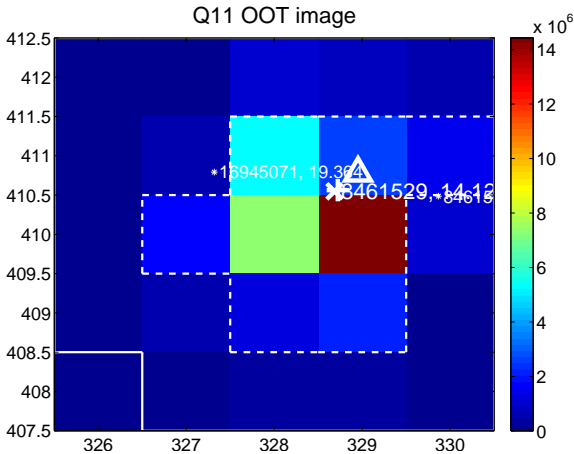
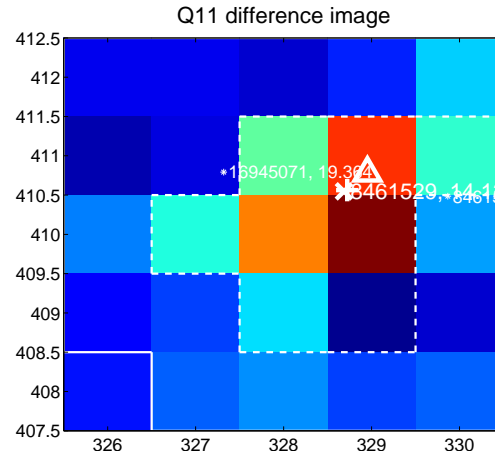
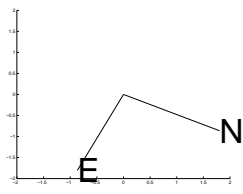
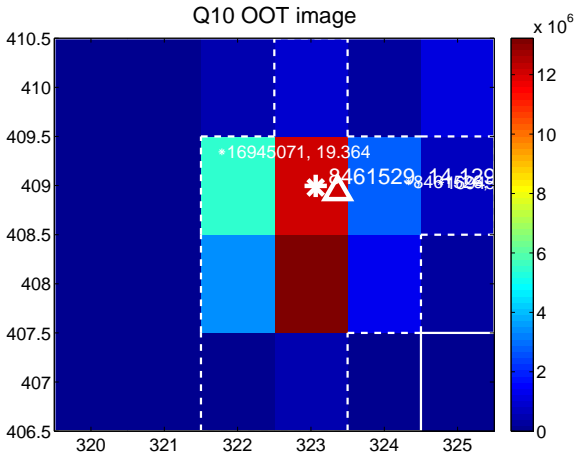
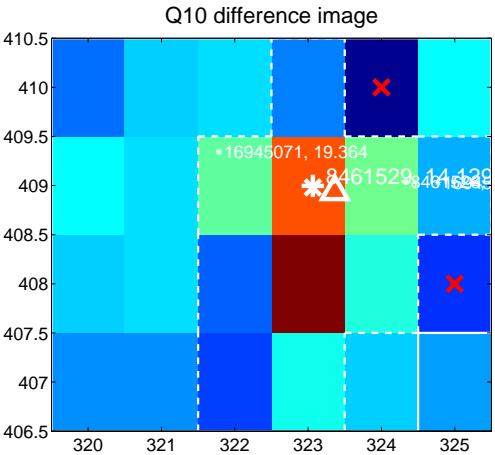
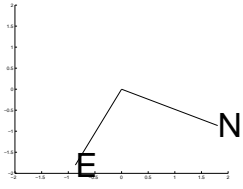
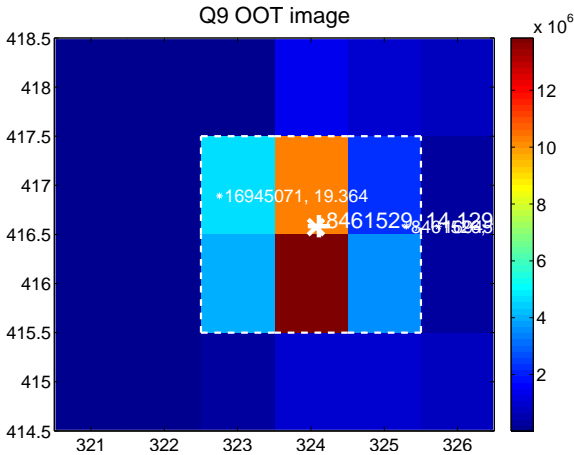
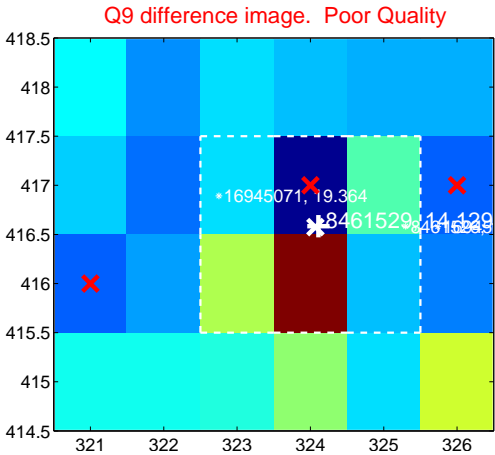
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.







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



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

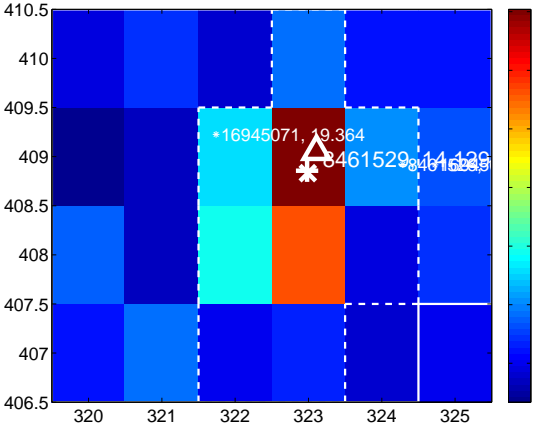
Q13 no difference image



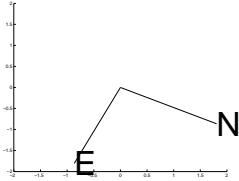
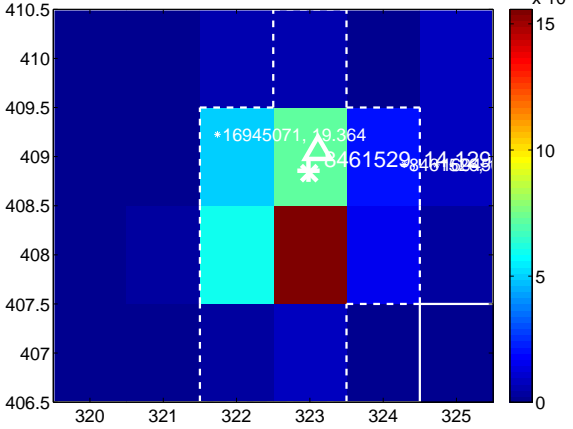
Q13 no OOT image



Q14 difference image



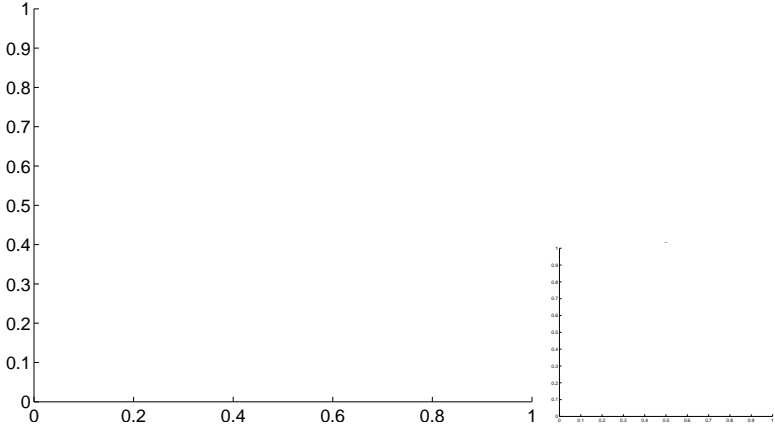
Q14 OOT image



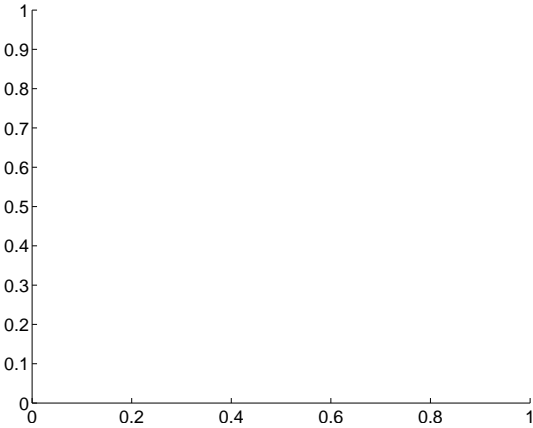
Q15 no difference image



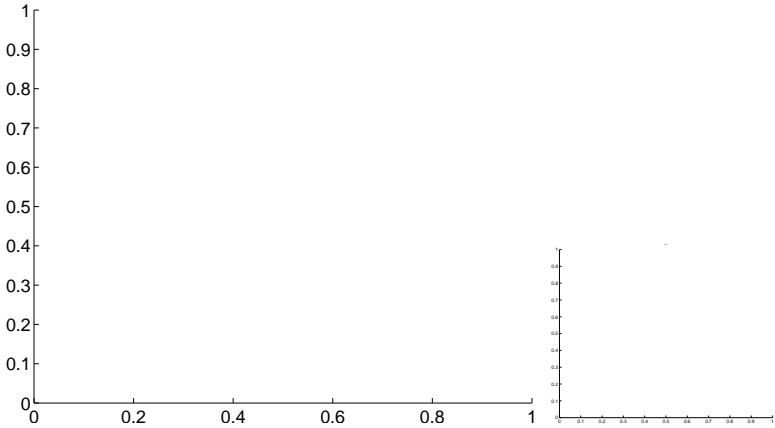
Q15 no OOT image



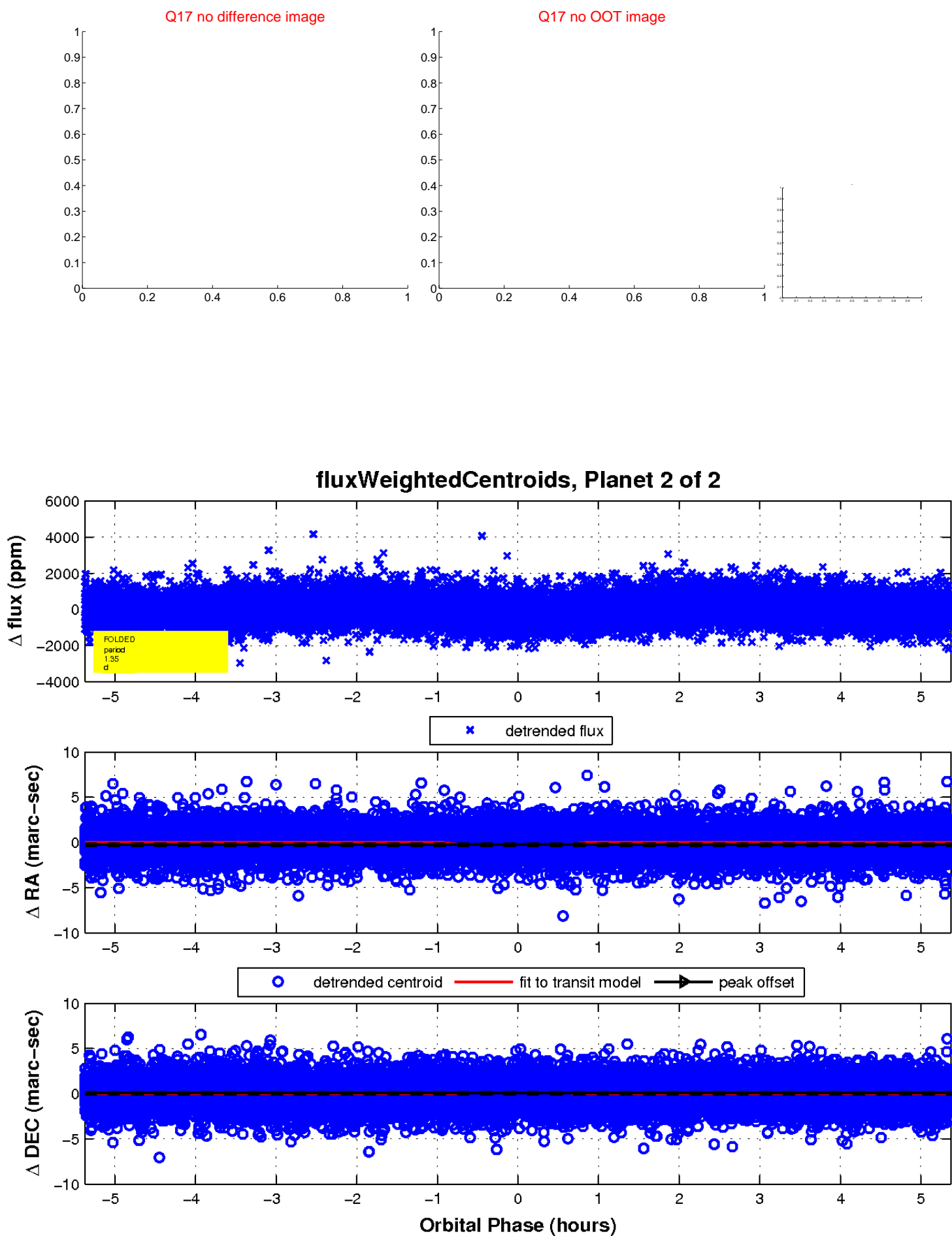
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

