

# KIC 012013615

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012013615-01	OBS	7505.01	4.101407	134.426182	311077.7	4.500	26640.7	-1.0	1.64	6060	77.43	1196.65
012013615-02	OBS	No	4.101330	134.899768	1.5	14.022	772.6	0.1	1.64	6060	0.21	1196.68
012013615-03	OBS	No	262.336330	198.067553	1158.5	9.987	14.4	10.7	1.64	6060	6.69	4.68
012013615-04	OBS	No	500.633854	449.272867	922.5	7.196	10.7	7.9	1.64	6060	5.31	1.98
012013615-05	OBS	No	294.004093	240.248463	1526.4	8.915	12.0	8.9	1.64	6060	12.18	4.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012013615-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_ALT—CENT_NOFITS
012013615-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS
012013615-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
012013615-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
012013615-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—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.

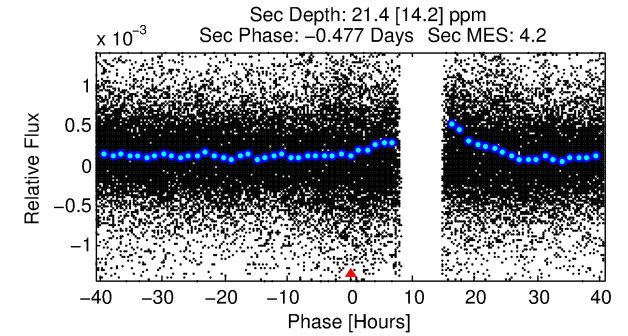
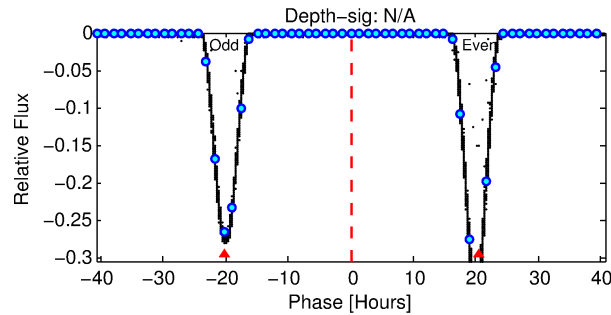
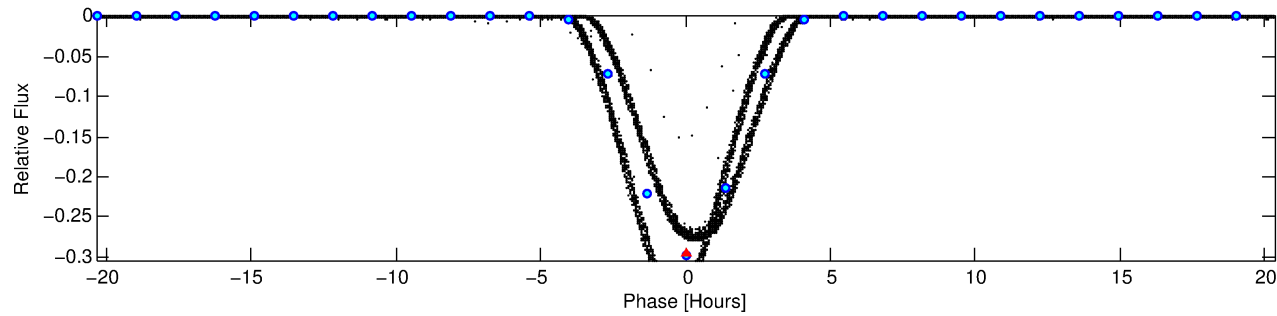
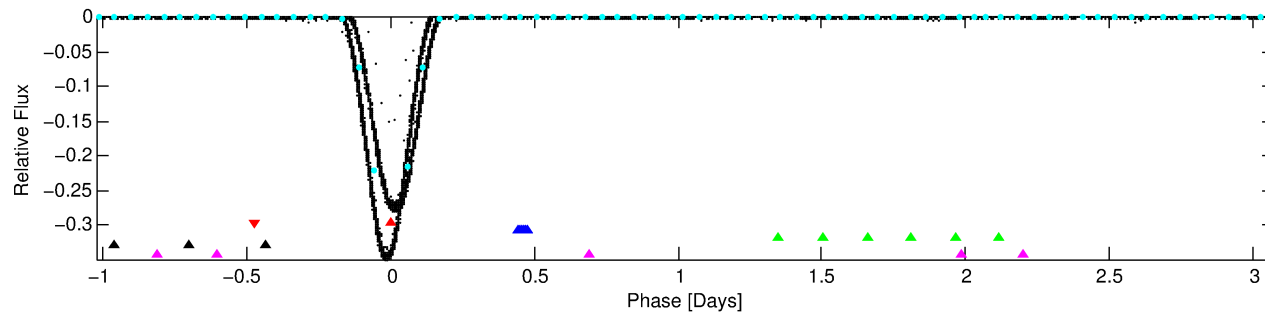
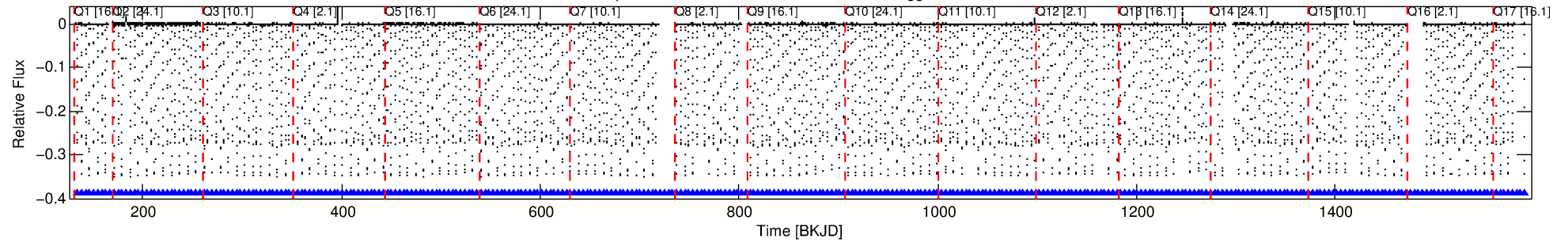
Ephemeris Match Information For 012013615-01

No Significant Match Found

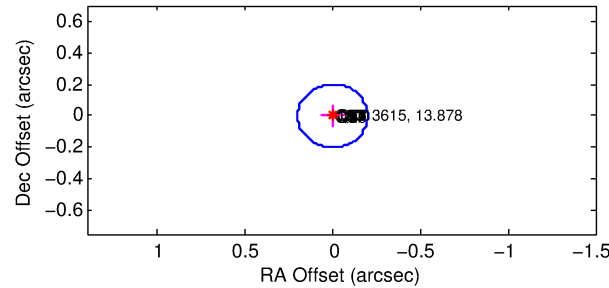
# DV One-Page Summary

KIC: 12013615 Candidate: 1 of 5 Period: 4.101 d  
KOI: K07505.01 Corr: 0.787

Kp: 13.88 R\*: 1.64 Rs Teff: 6060.0 K Logg: 4.06 Fe/H: -0.020



Difference Image  
Out of Transit Centroid Offsets



## TPS TCE Results:

Period = 4.10141 d  
Epoch = 134.4262 BKJD

DV fit results are unavailable

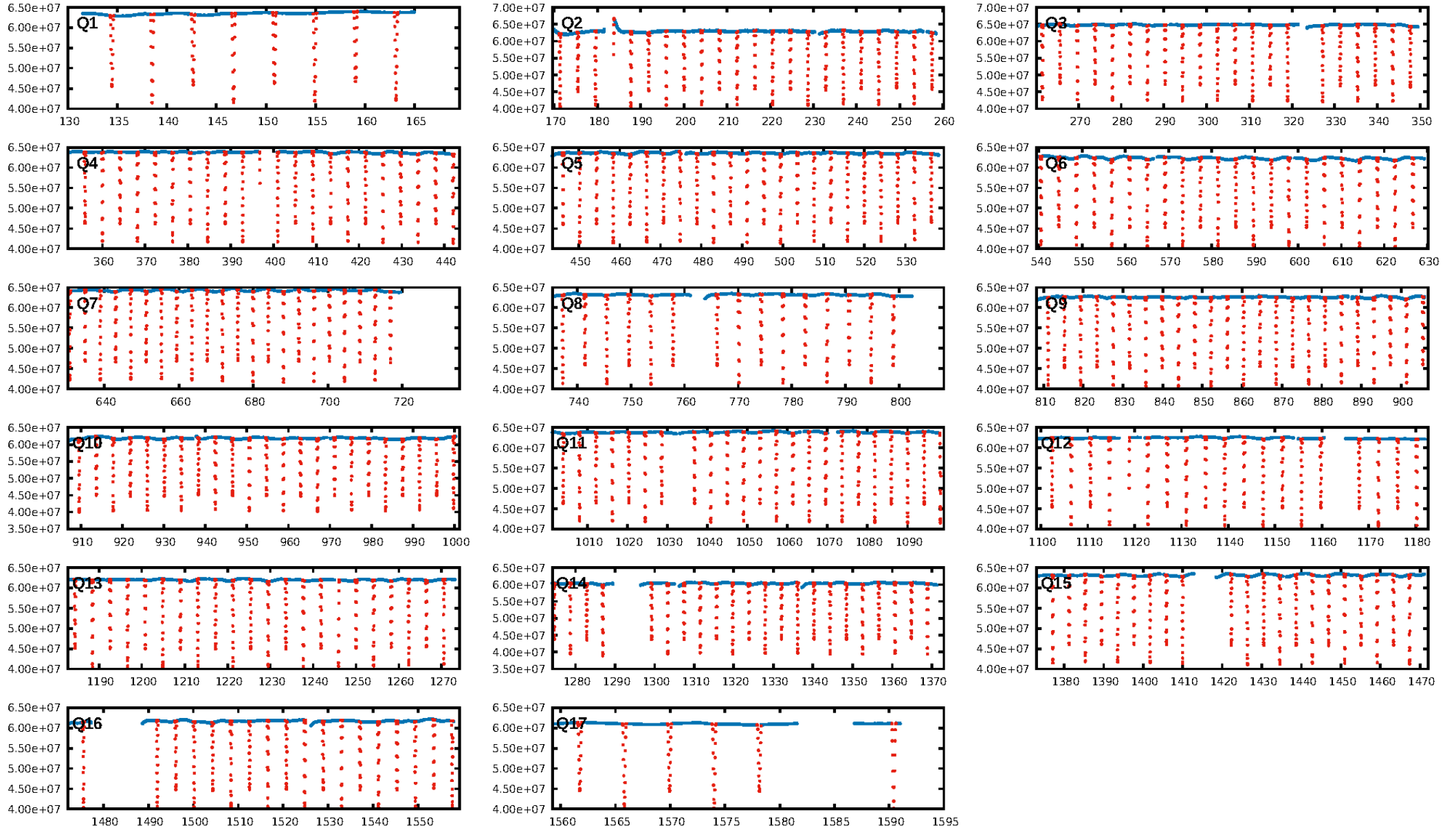
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: 100.0% [565.80 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [318/318]  
GhostDiagnostic-chr: 1.314  
Centroid-sig: N/A  
Centroid-so: 0.131 arcsec [373.91 $\sigma$ ]  
OotOffset-rm: 0.001 arcsec [0.01 $\sigma$ ]  
KicOffset-rm: 0.077 arcsec [1.12 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

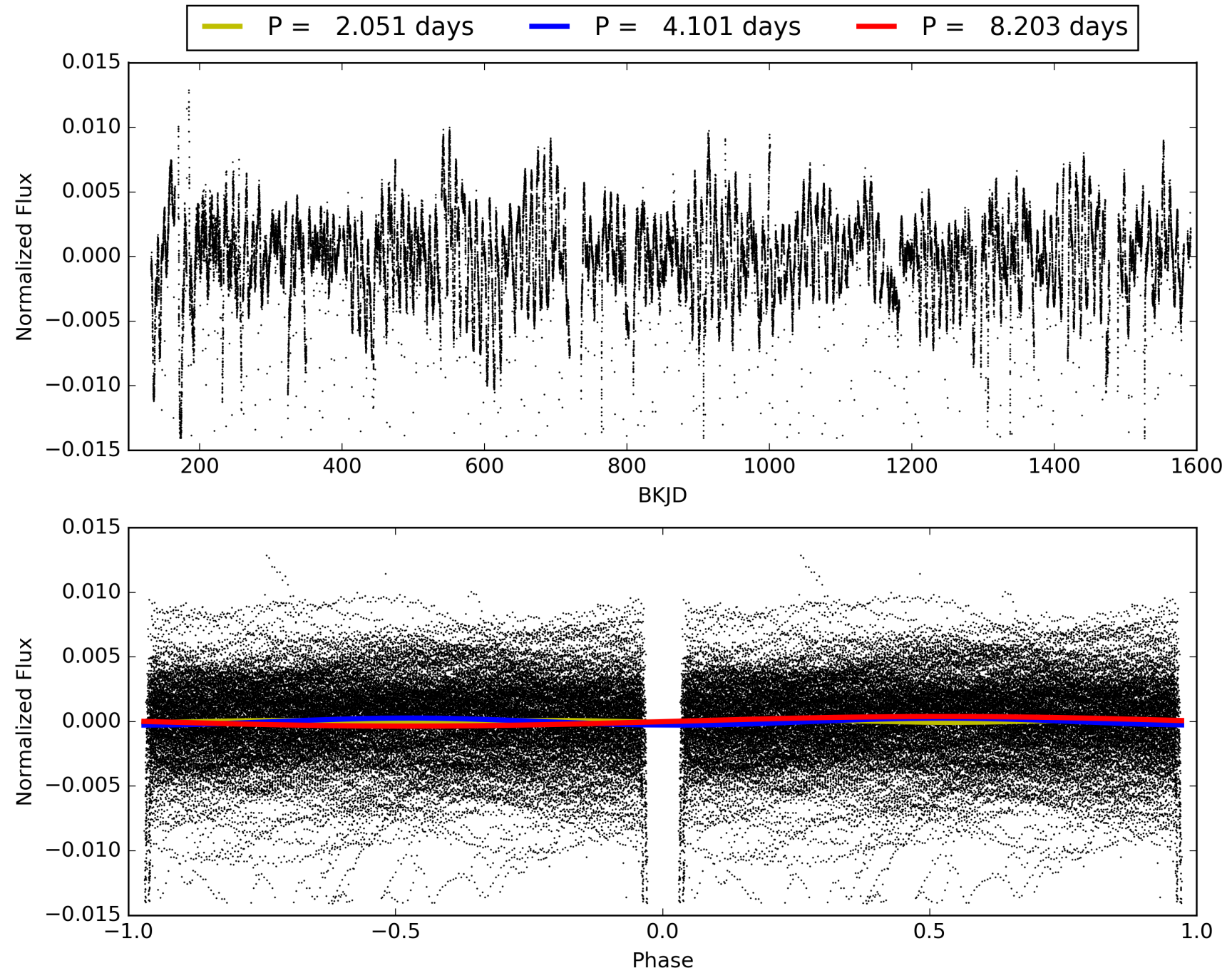
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:07:28 Z

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

# TCE 012013615-01, PDC Light Curves



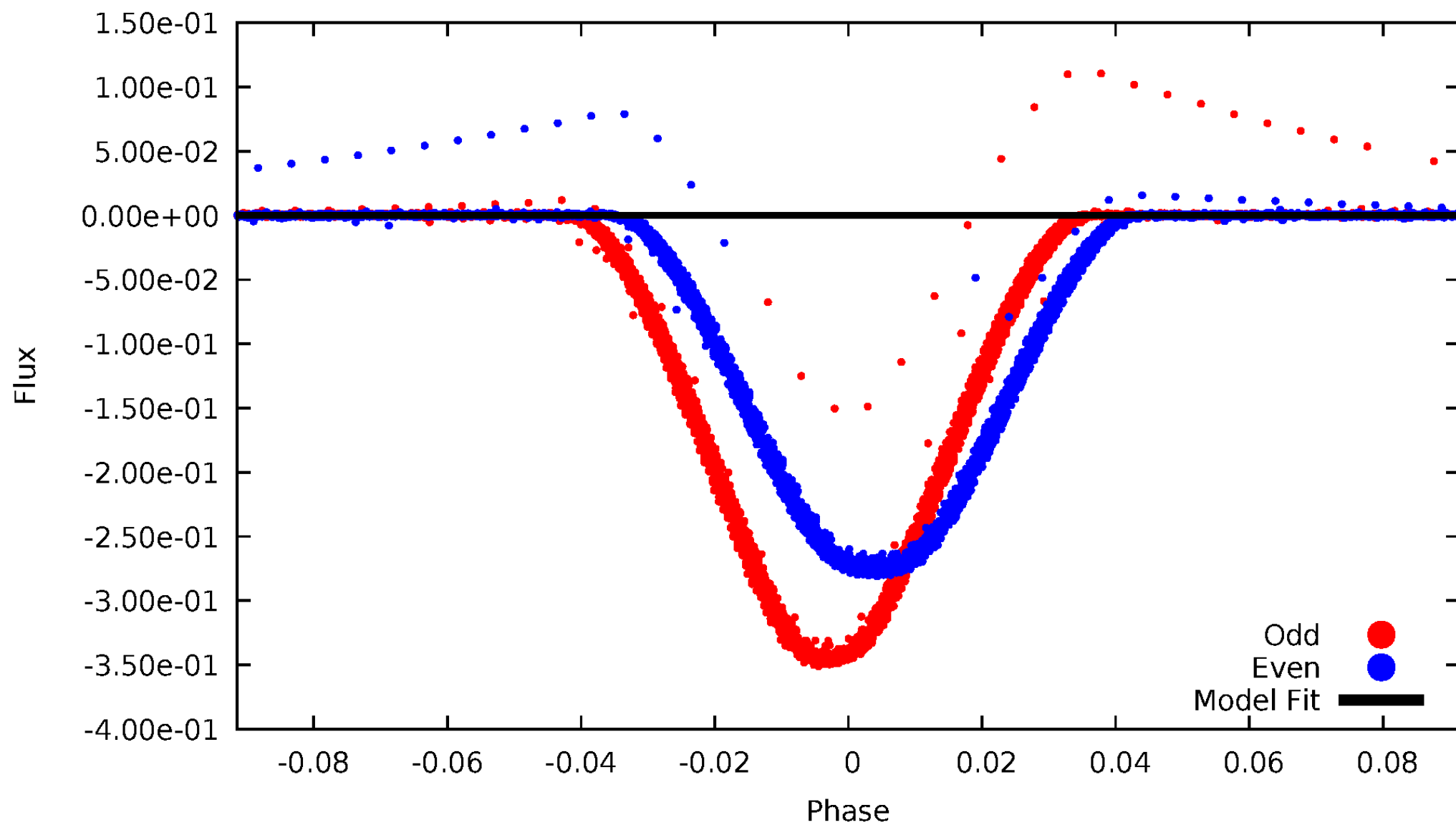
TCE 012013615-01





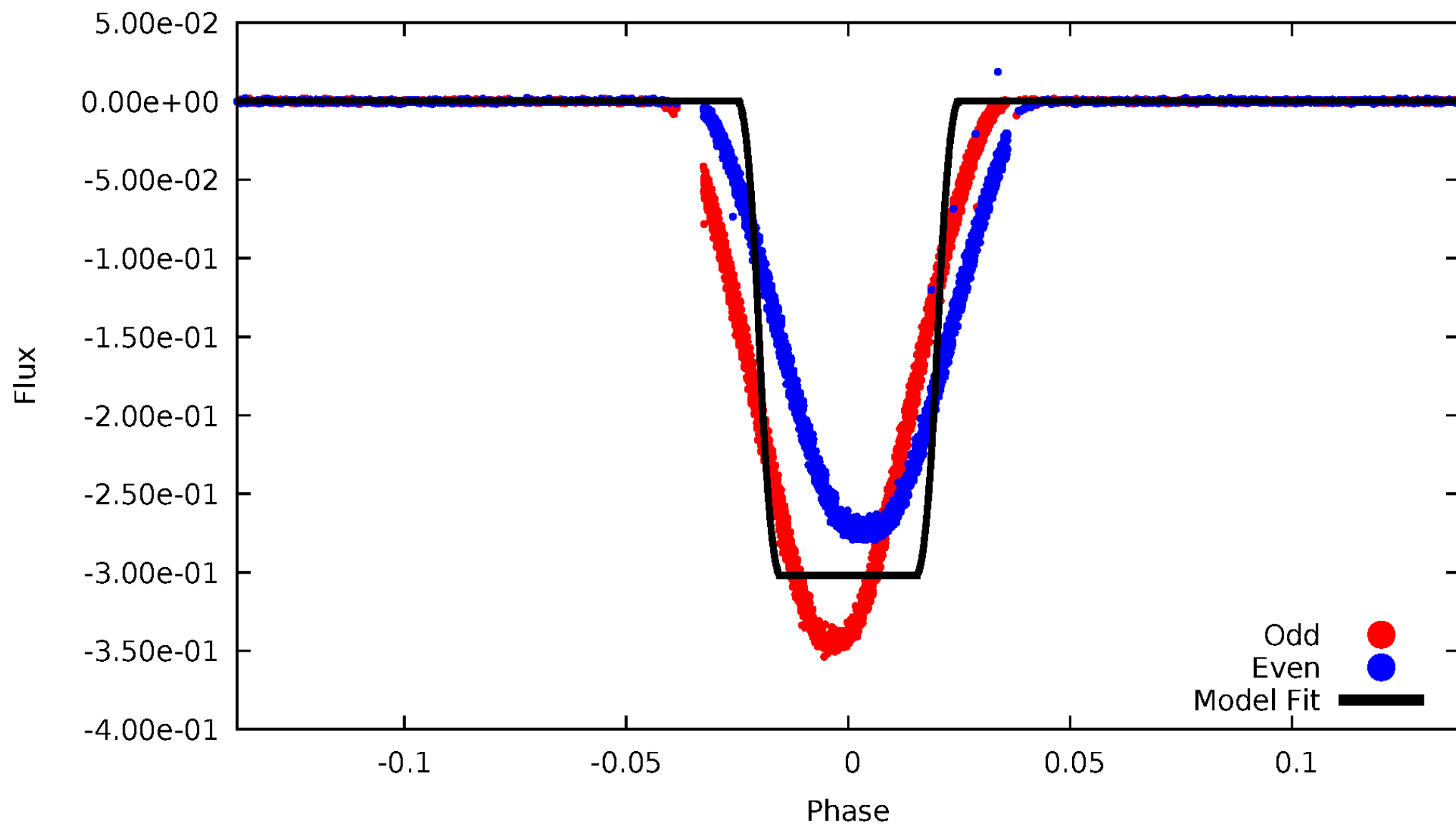
# DV Odd/Even

TCE 012013615-01



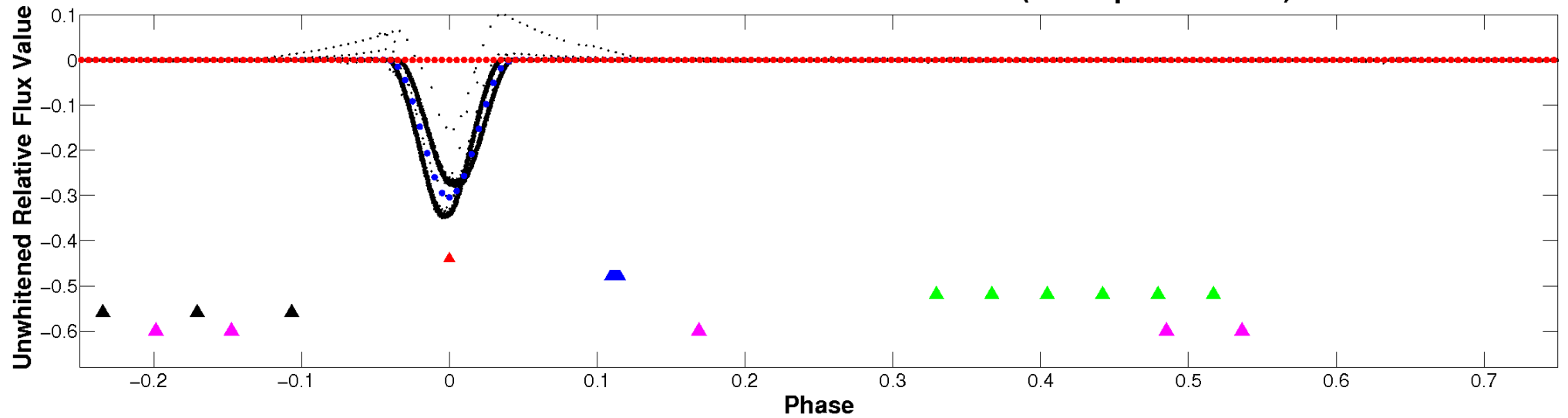
# ALT Odd/Even

TCE 012013615-01



# Non-Whitened Vs. Whitened Light Curve

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

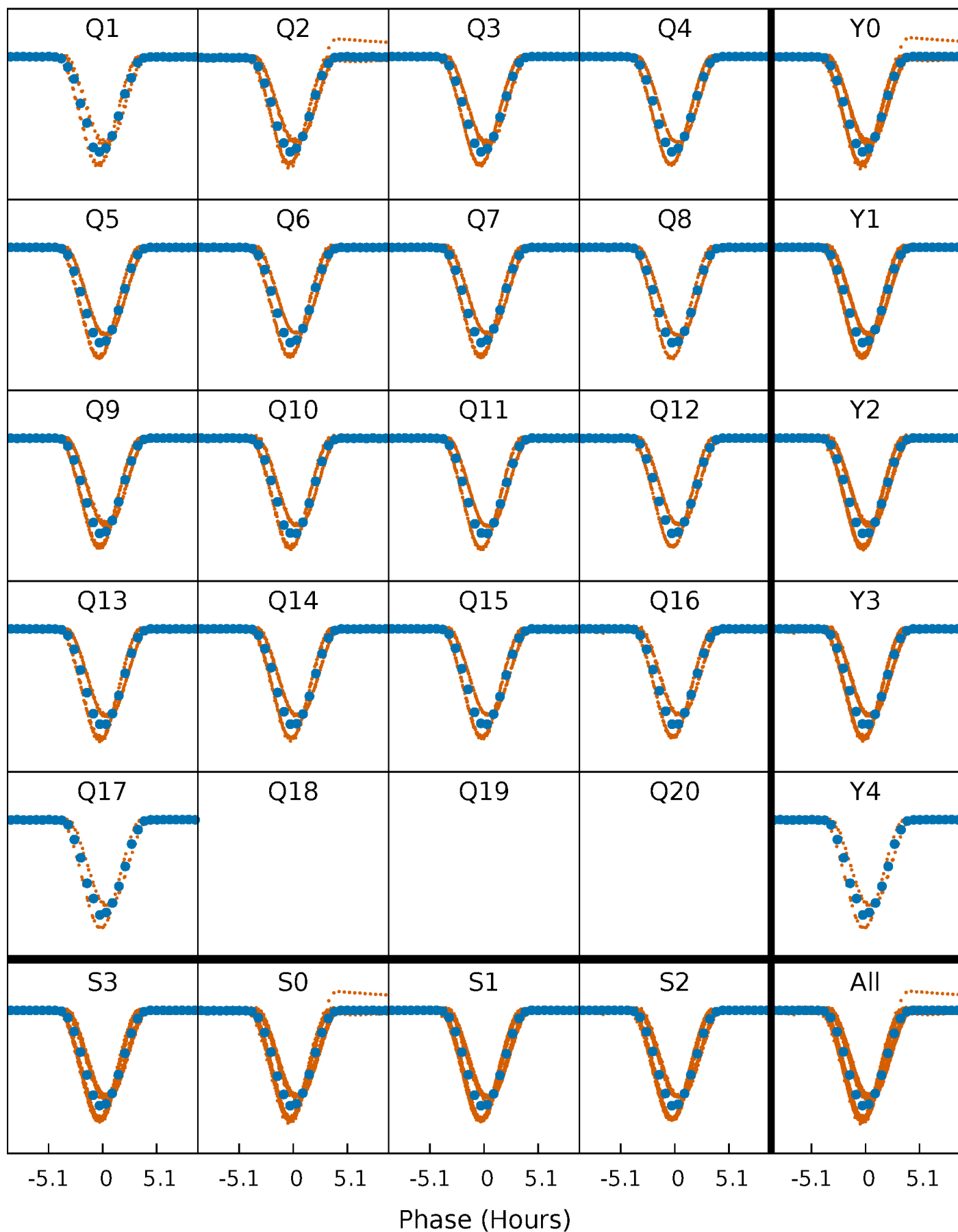


**Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



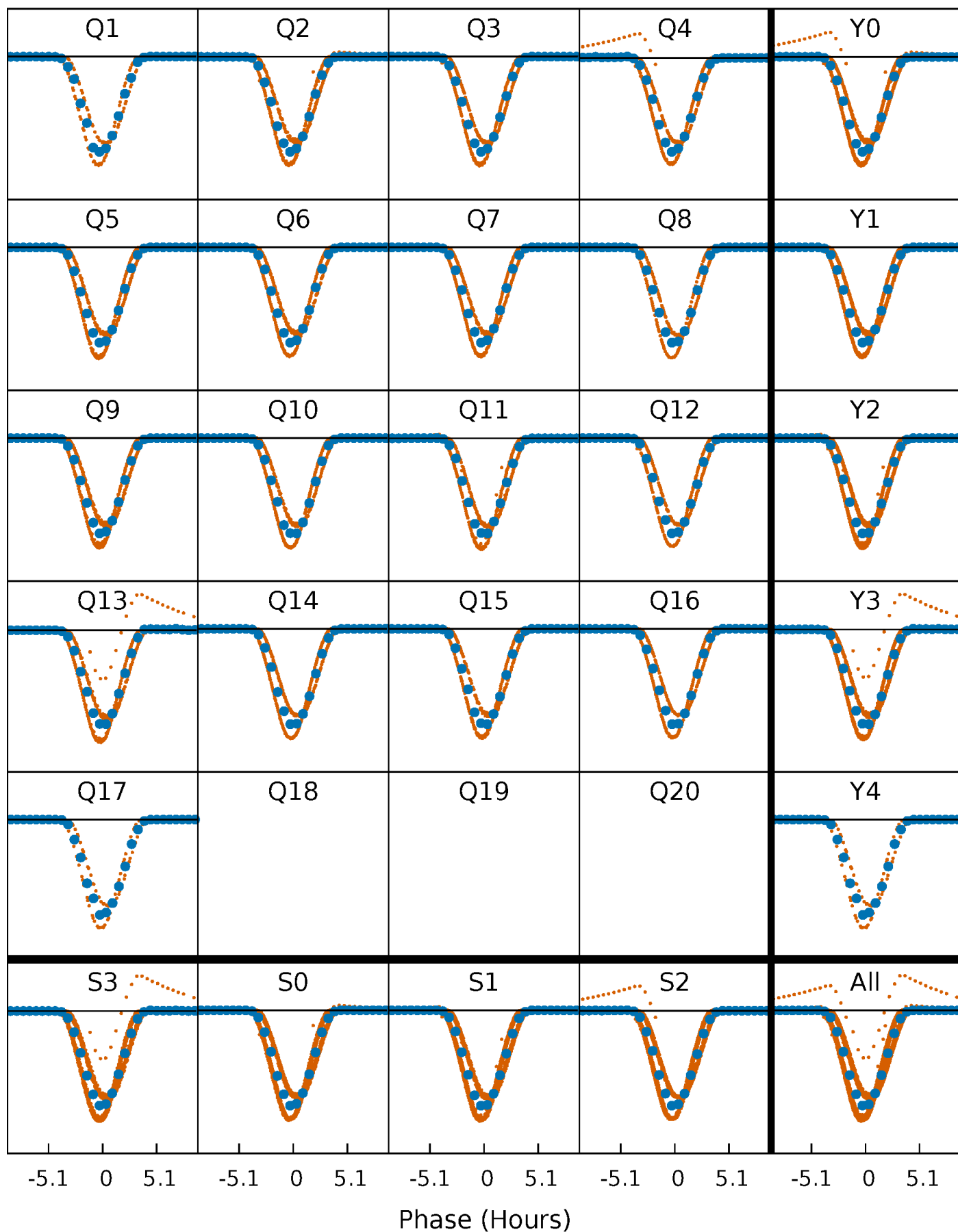
# PDC Quarter-Phased Transit Curves

TCE 012013615-01 P= 4.101407 Days  $T_0=134.426182$  (BKJD)



# DV Quarter-Phased Transit Curves

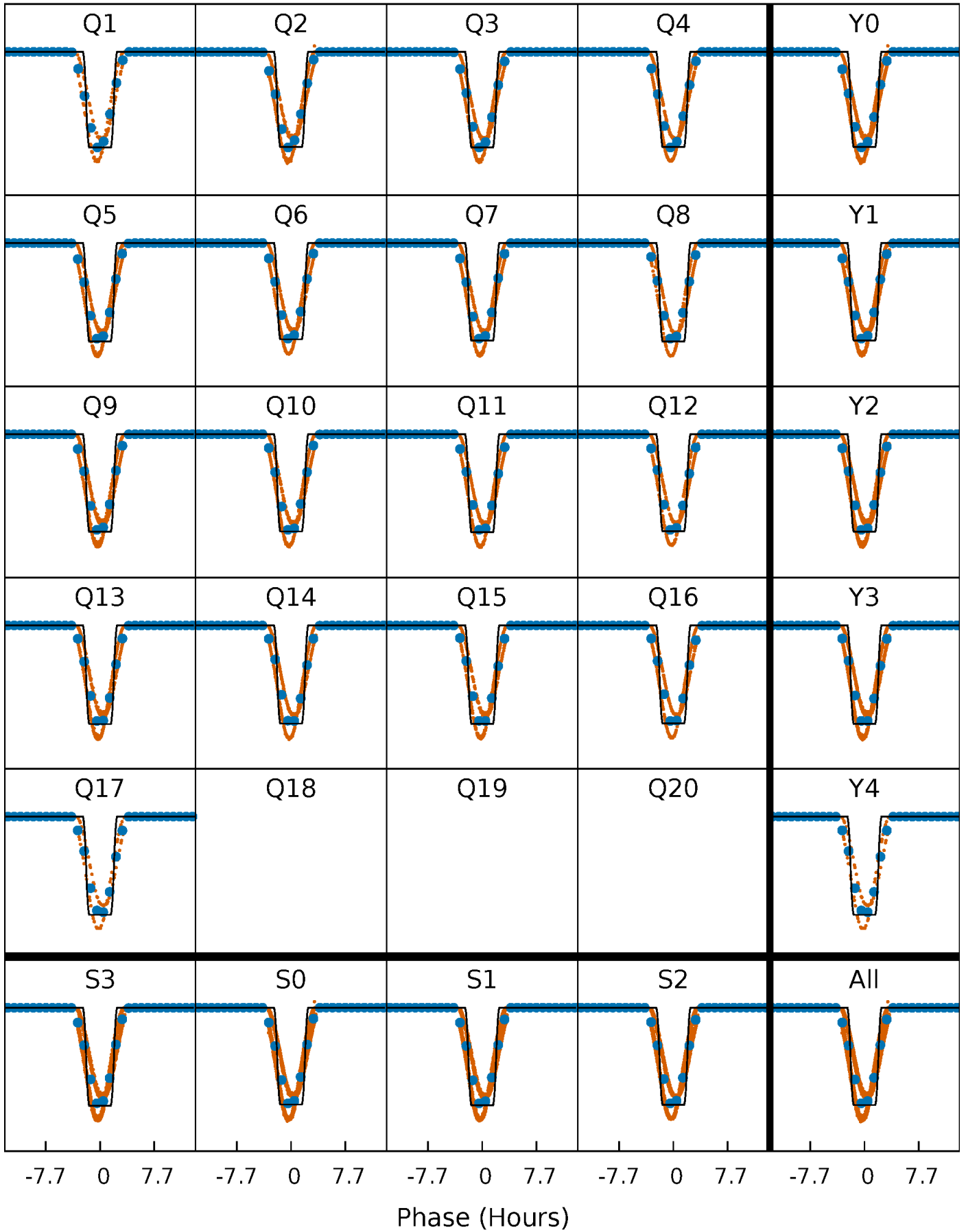
TCE 012013615-01 P= 4.101407 Days  $T_0=134.426182$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

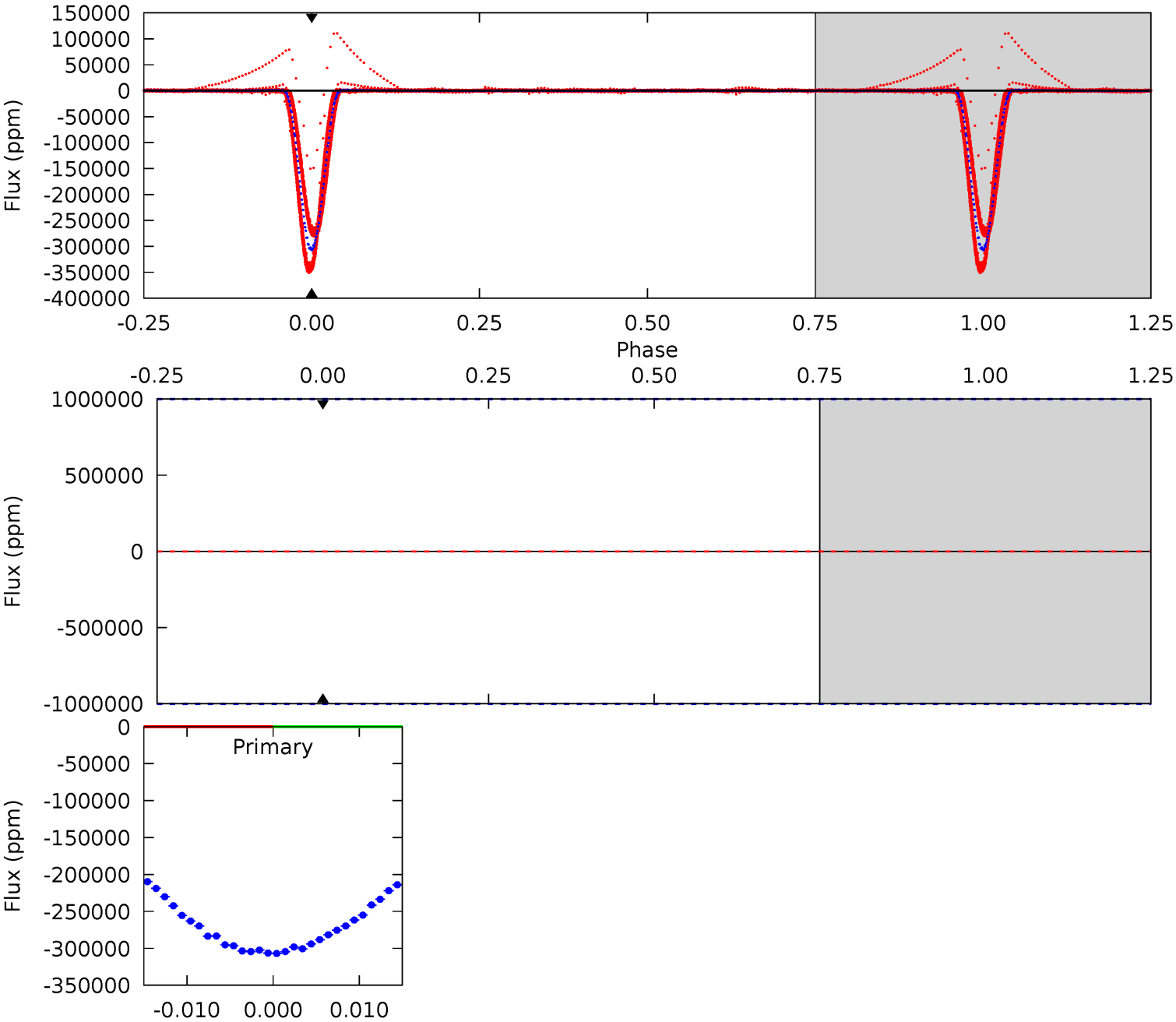
TCE 012013615-01 P= 4.101407 Days  $T_0=134.427457$  (BKJD)



# DV Model-Shift Uniqueness Test

012013615-01, P = 4.101407 Days, E = 130.324775 Days

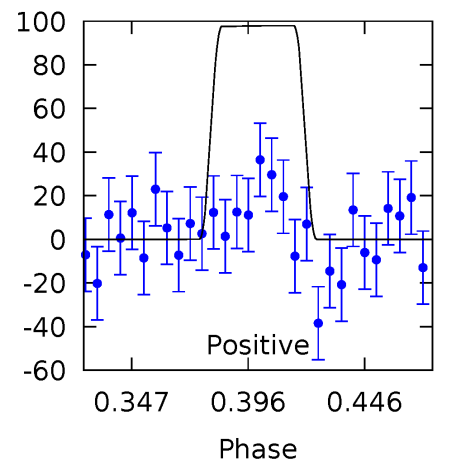
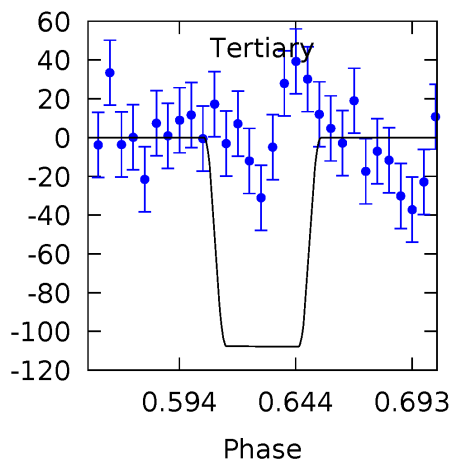
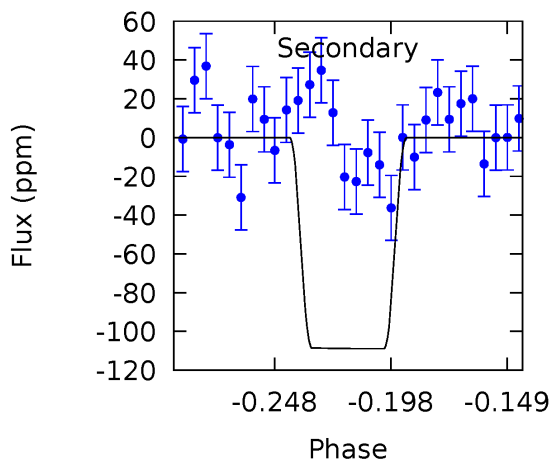
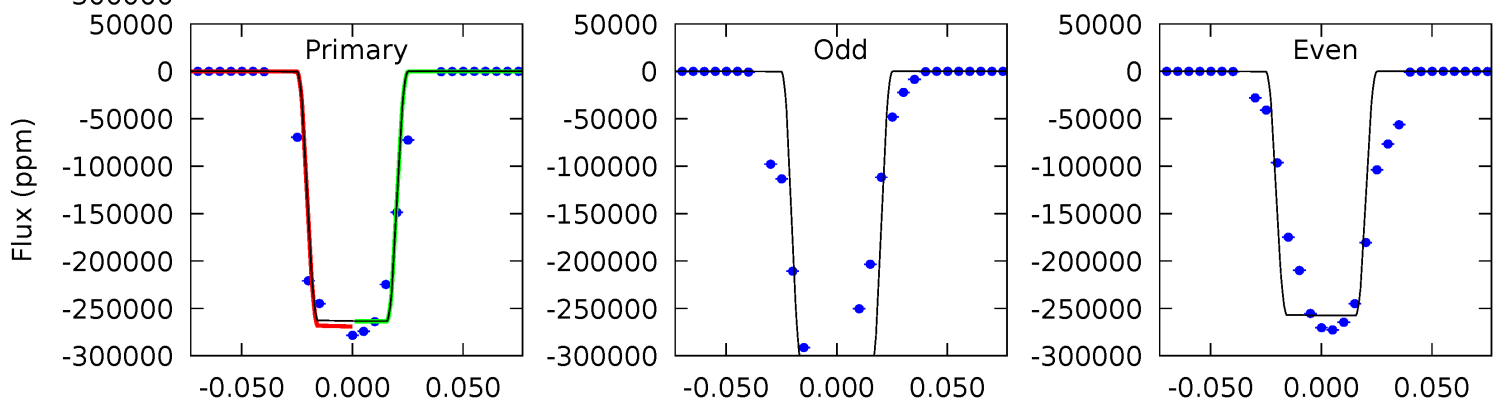
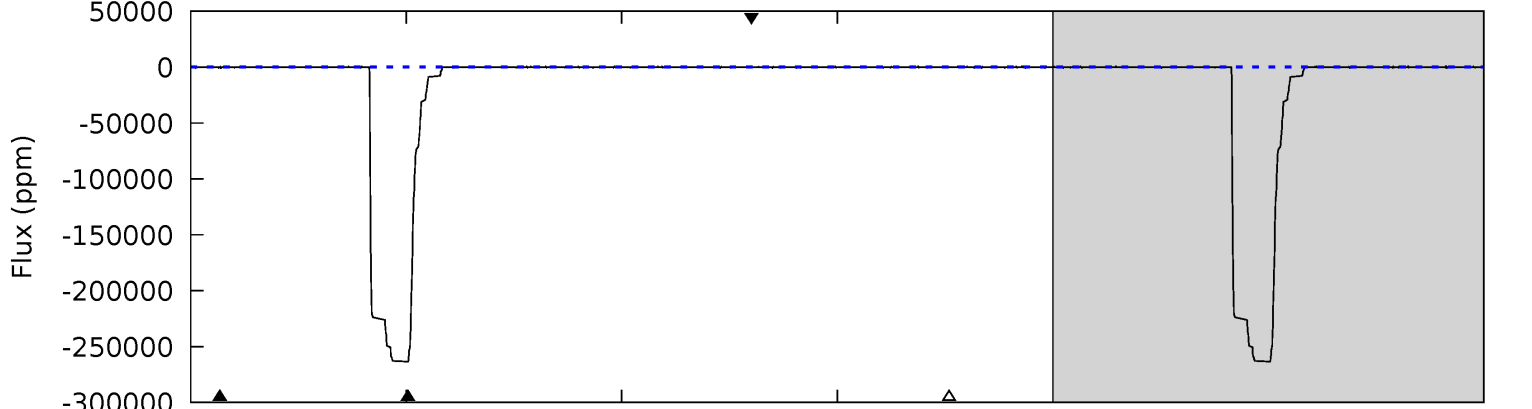
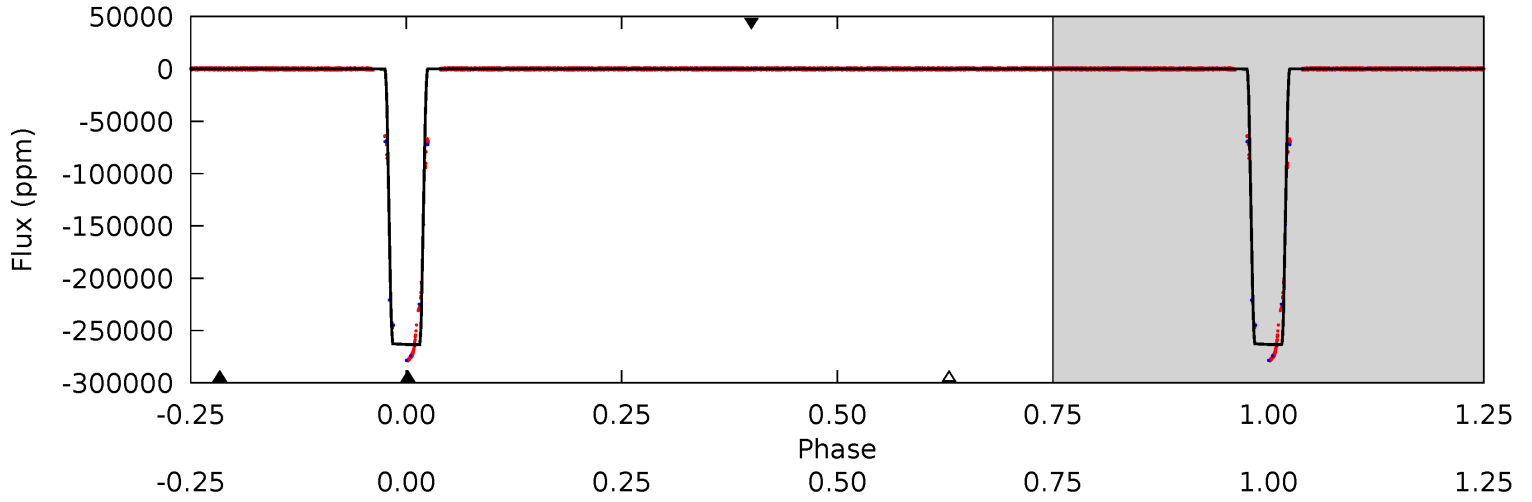
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

012013615-01, P = 4.101407 Days, E = 130.326050 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
10023	4.14	4.10	3.73	4.71	1.96	1.12	10019	10019	0.04	0.42	1800	0.96	0.00	0



### Stellar Parameters For KIC 012013615

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6060^{+184}_{-202}$	$4.059^{+0.329}_{-0.141}$	$-0.020^{+0.250}_{-0.300}$	$1.643^{+0.450}_{-0.550}$	$1.129^{+0.174}_{-0.174}$	$0.358^{+0.825}_{-0.140}$
	+3%/-3%	+8%/-3%	+1250%/-1500%	+27%/-33%	+15%/-15%	+230%/-39%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 012013615-01 / KOI 7505.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$73.54^{+23.02}_{-22.13}$	$2060^{+152}_{-188}$	$-3064^{+8665}_{-2190}$	$-0.786^{+37.998}_{-26.393}$
Alt.	$-109 \pm 26$	$92.69^{+23.56}_{-23.76}$	$2043^{+154}_{-199}$	$-2501^{+135}_{-95}$	$0.019^{+0.015}_{-0.008}$

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

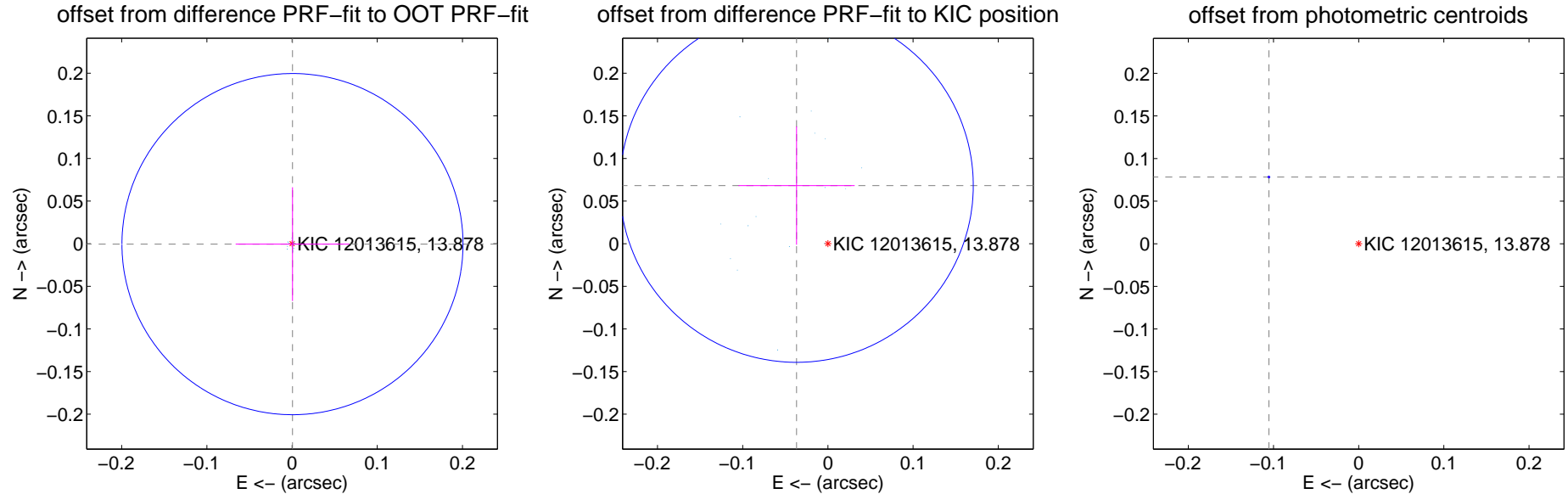
## DV Centroid Data

Supplemental centroid analysis for 012013615-01. Kepler magnitude: 13.88. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

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

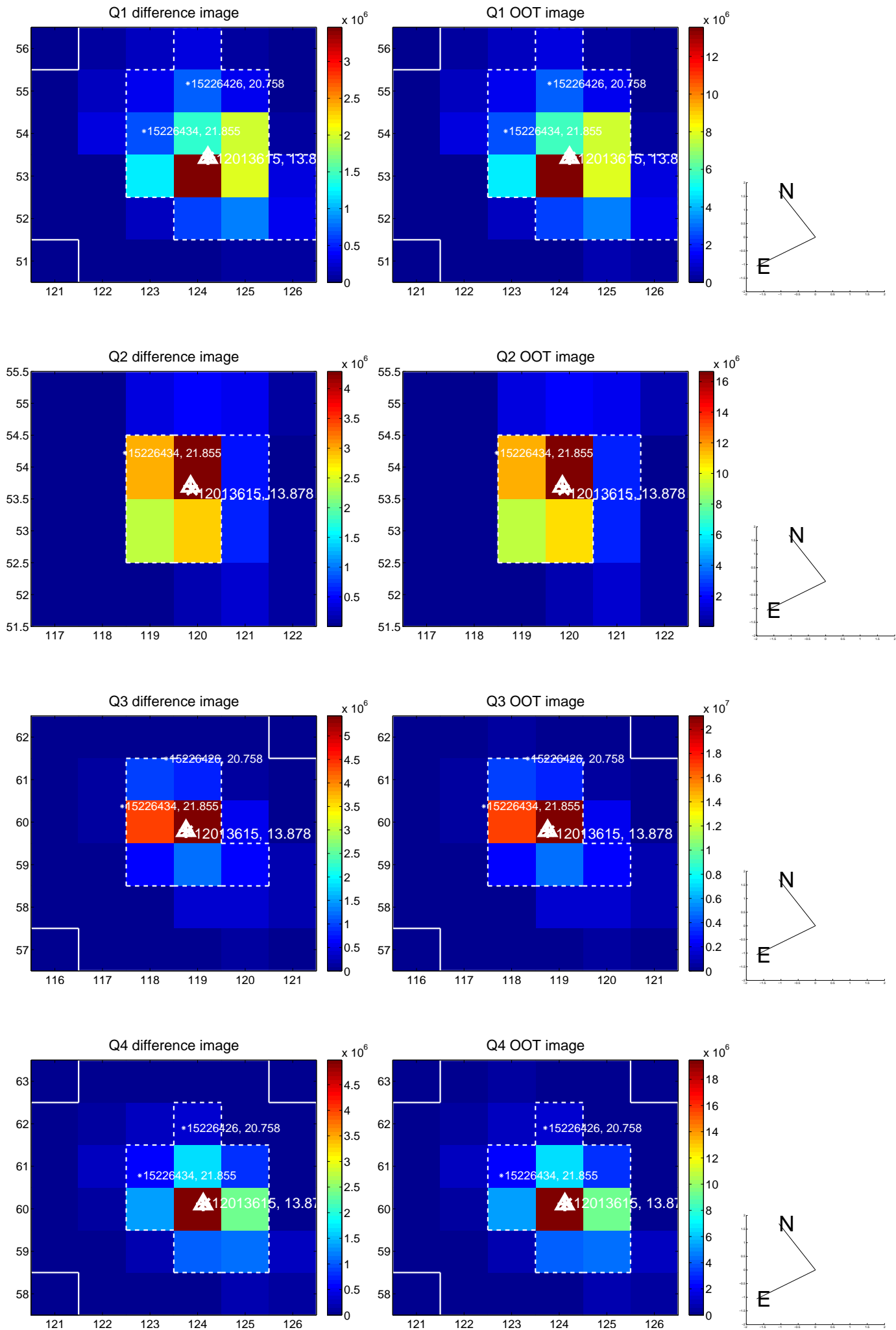
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.001 \pm 0.067$	0.01	$-0.000 \pm 0.067$	$-0.001 \pm 0.067$
PRF-fit source offset from KIC position	$0.077 \pm 0.069$	1.12	$0.037 \pm 0.068$	$0.068 \pm 0.069$
photometric centroid source offset	$0.13 \pm 0.00$	<b>373.91</b>	$0.11 \pm 0.00$	$0.08 \pm 0.00$



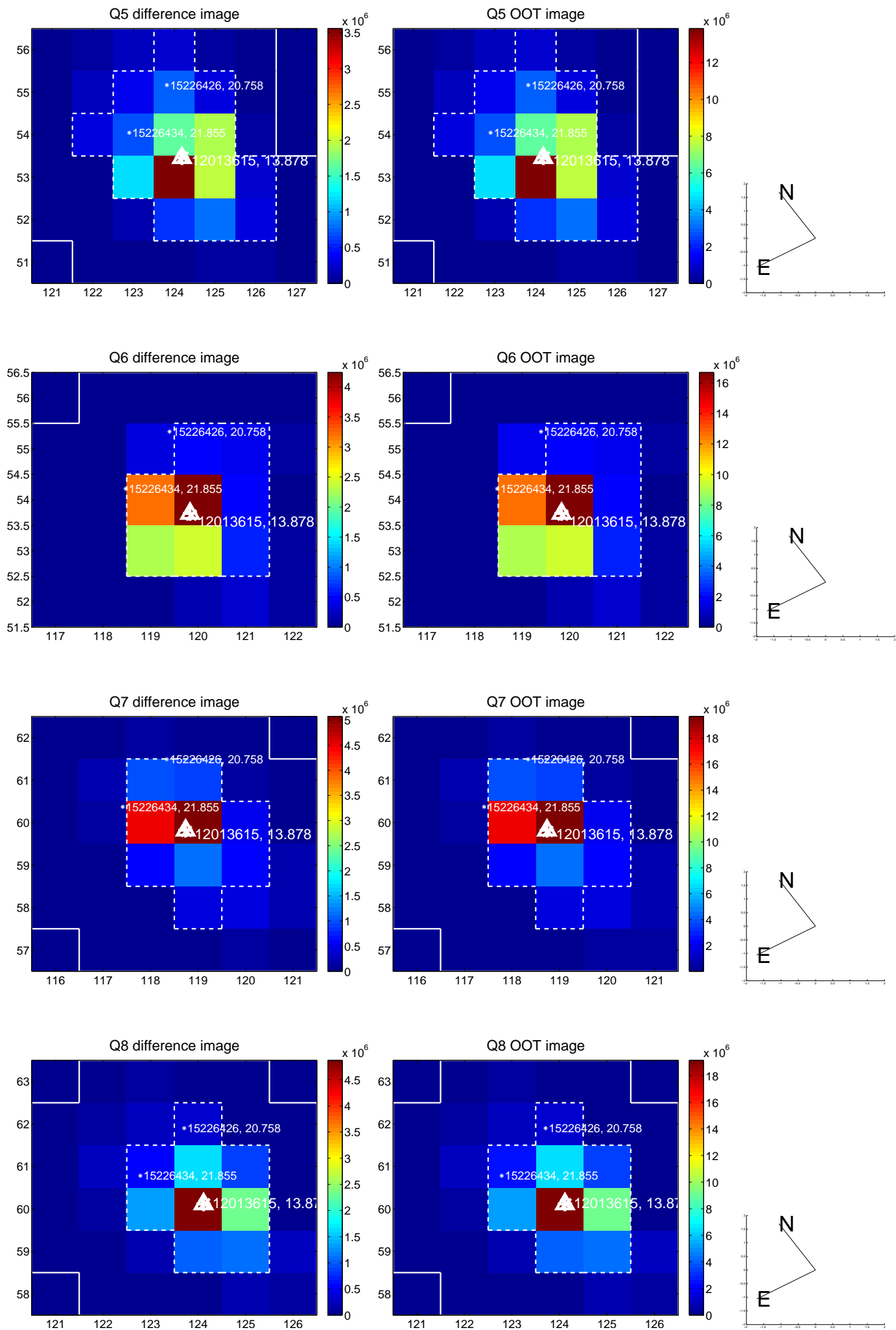
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



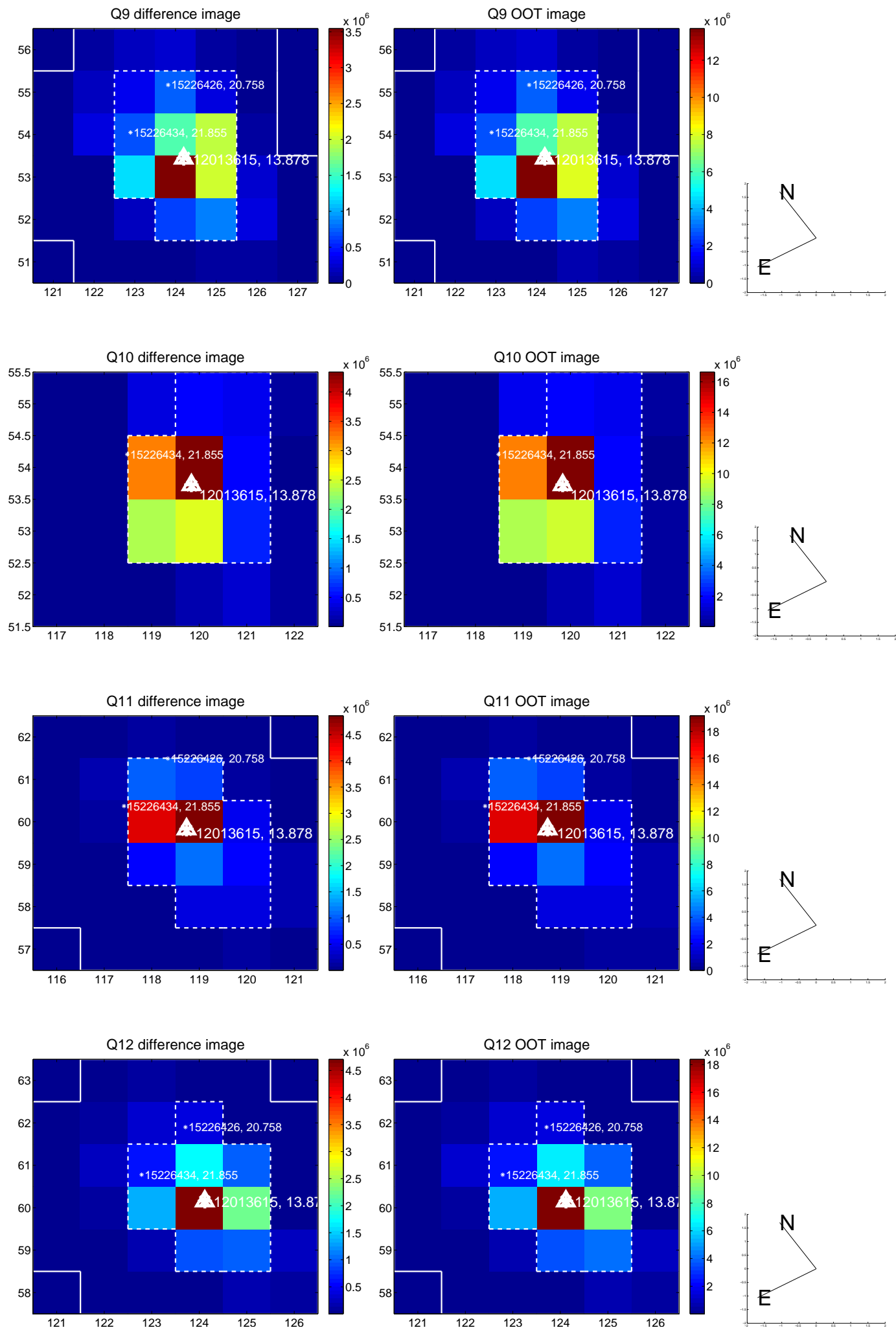
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



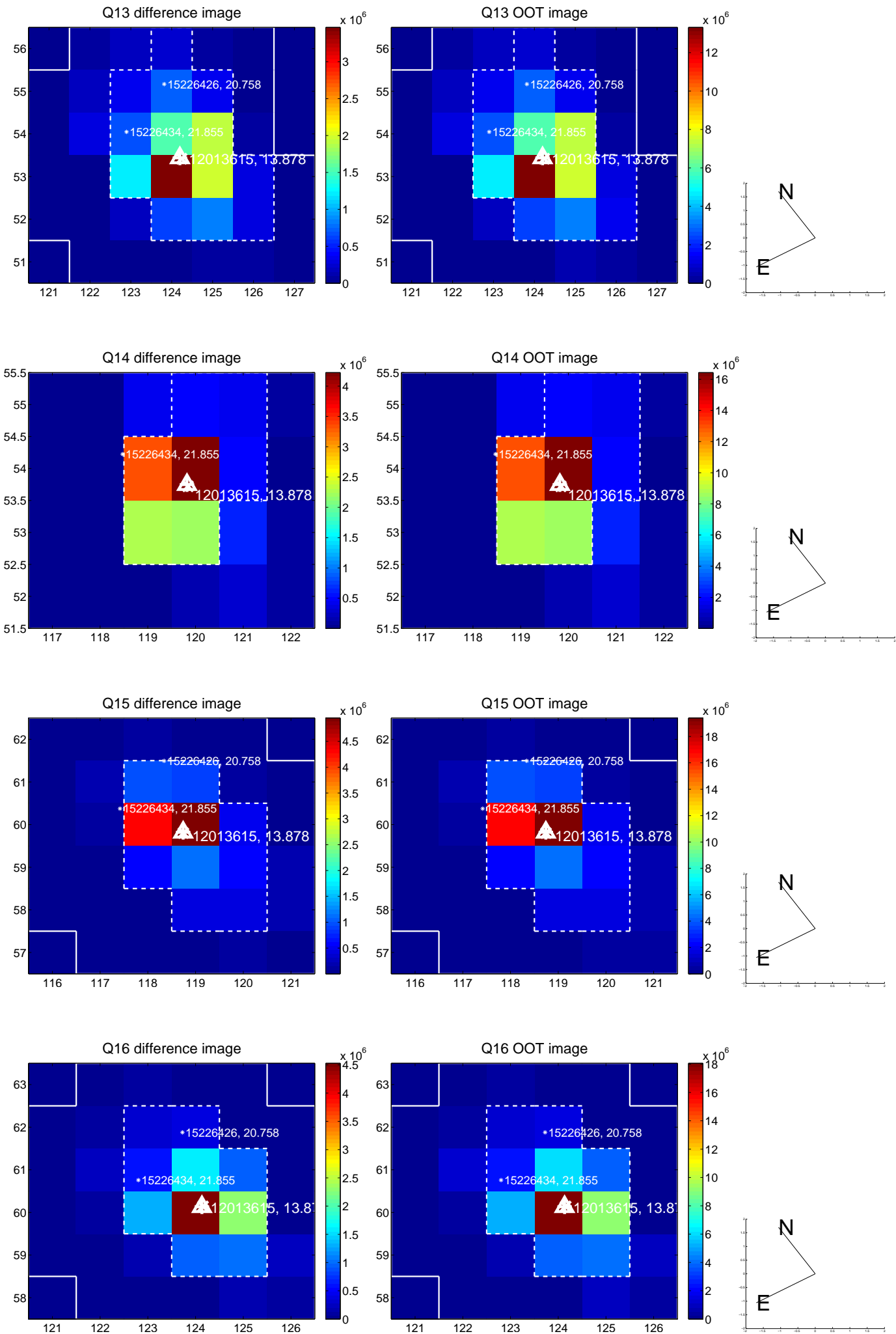
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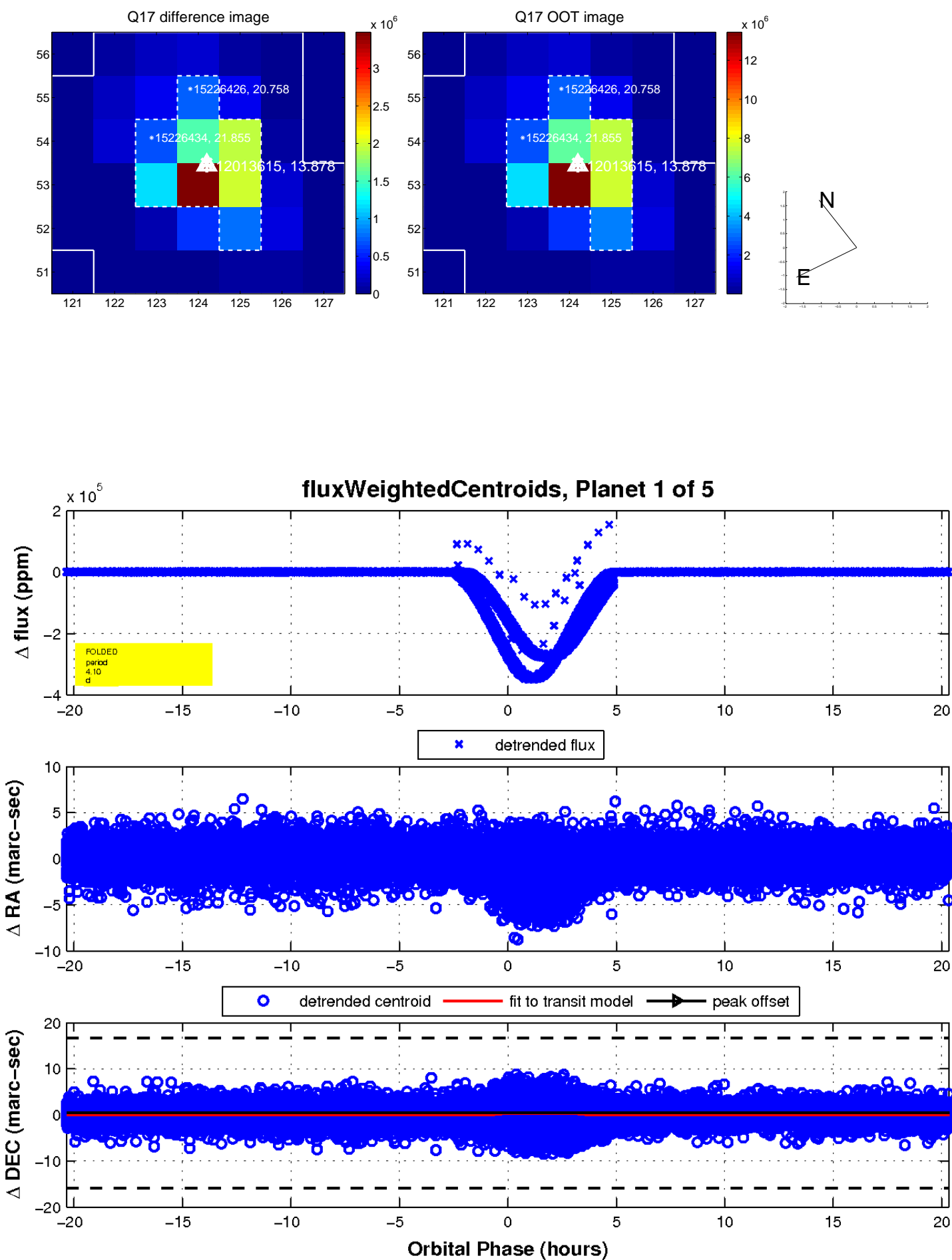
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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





Declination

# KIC 012013615

## 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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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012013615-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_ALT—CENT_NOFITS
012013615-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS
012013615-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
012013615-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
012013615-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—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.

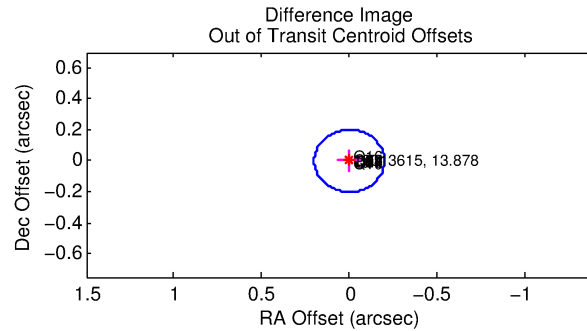
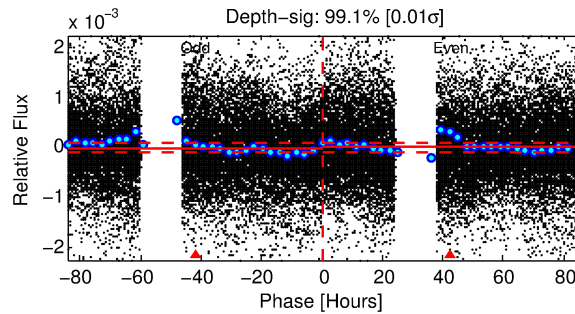
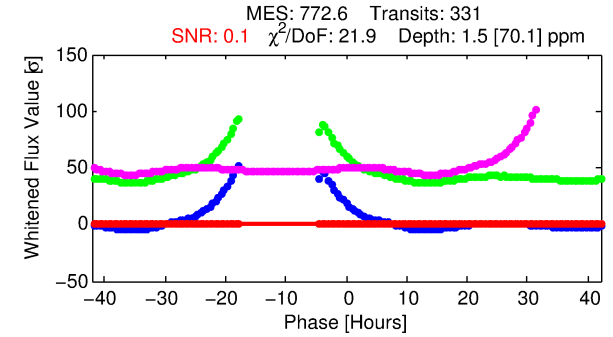
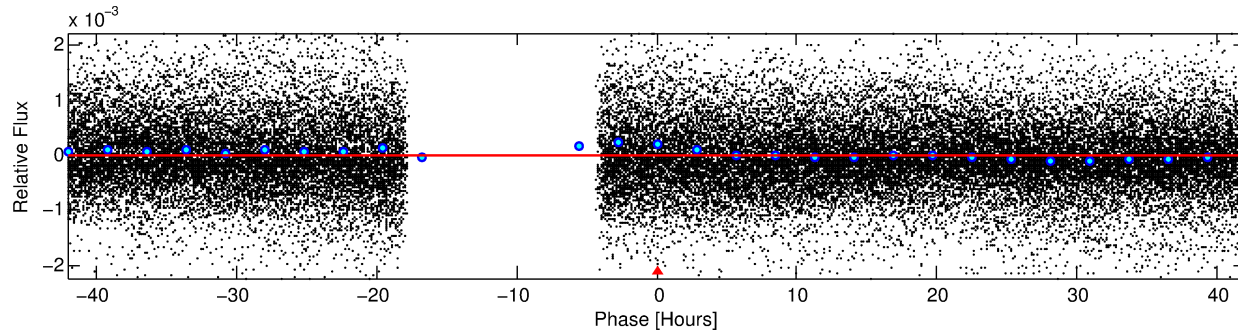
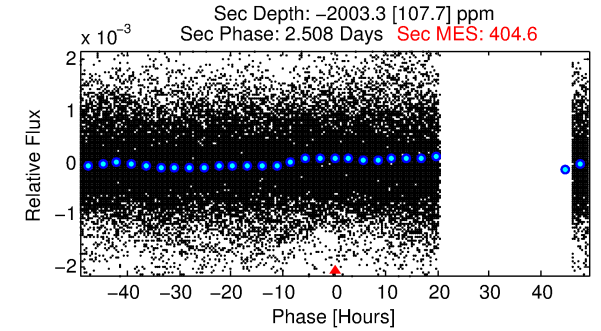
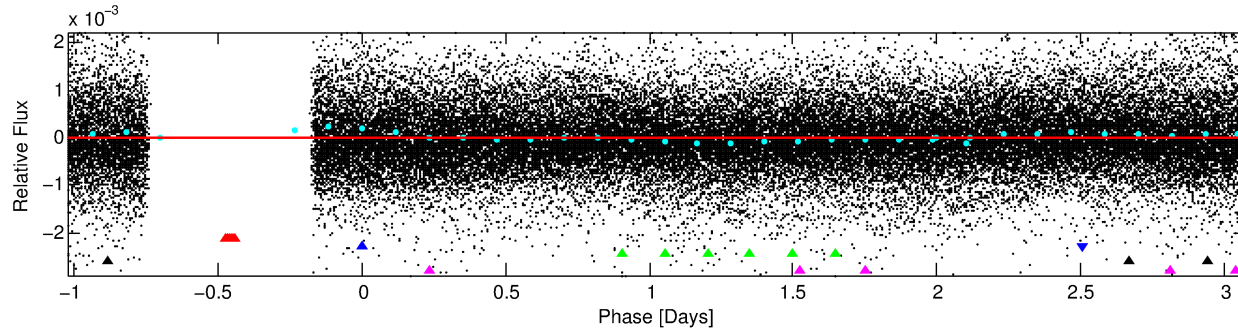
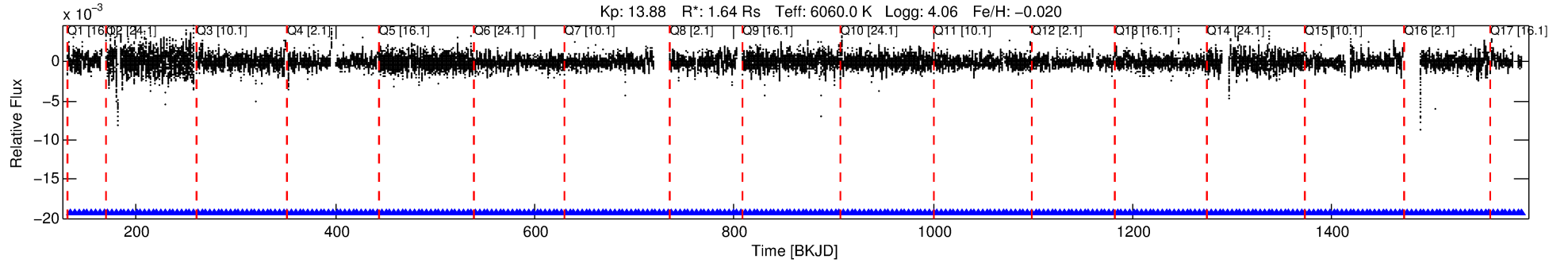
## Ephemeris Match Information For 012013615-02

No Significant Match Found

# DV One-Page Summary

KIC: 12013615 Candidate: 2 of 5 Period: 4.101 d

KOI: K07505 Corr: No Ephemeris Match



## DV Fit Results:

Period = 4.10133 [0.01512] d  
Epoch = 134.8998 [4.2972] BKJD  
Rp/R\* = 0.0012 [0.0304]  
a/R\* = 1.80 [58.52]  
b = 0.70 [33.82]  
Seff = 1196.68 [679.76]  
Teff = 1500 [213] K  
Rp = 0.21 [5.44] Re  
a = 0.0522 [0.0176] AU  
Ag = N/A  
Teffp = N/A

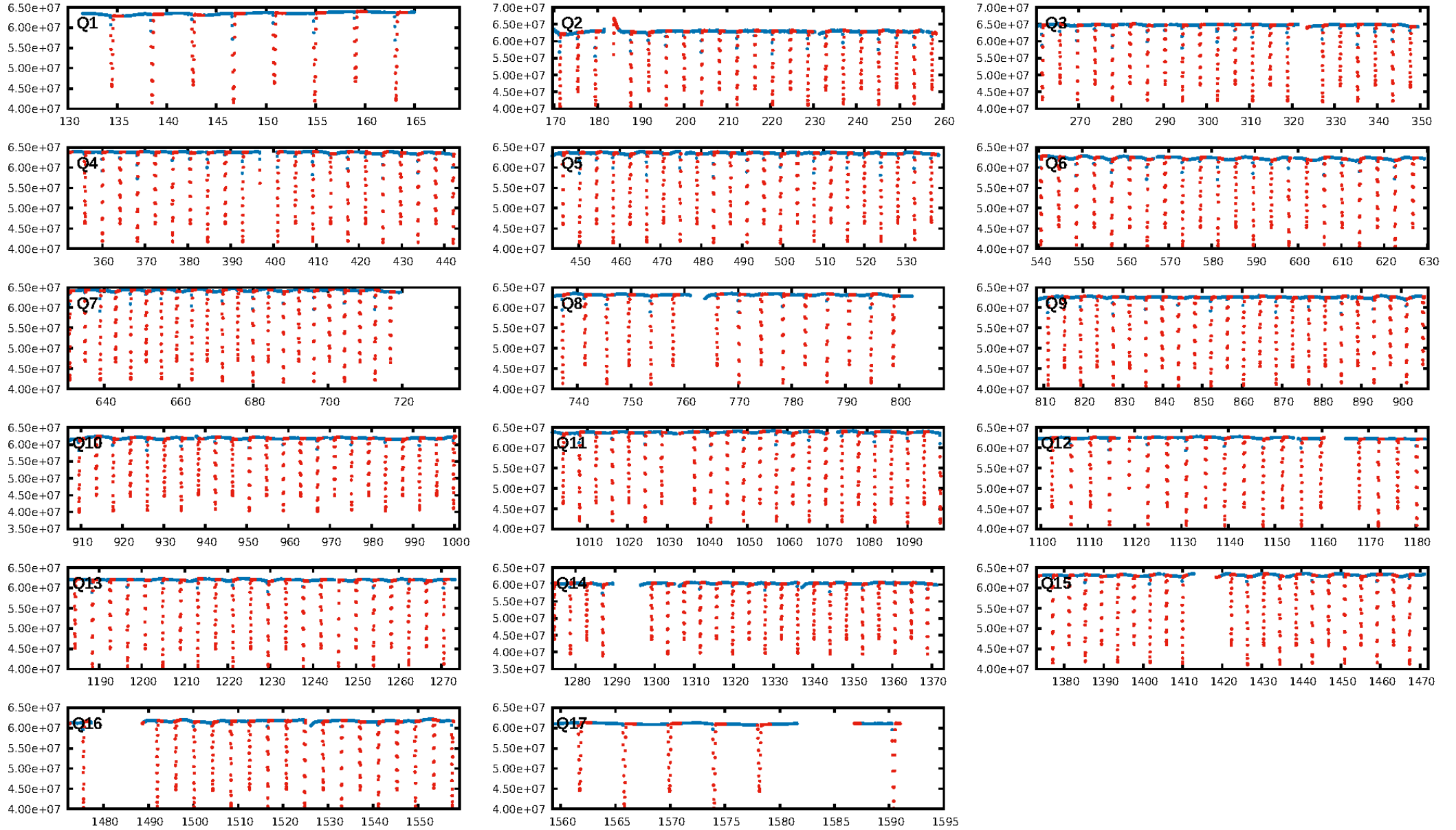
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [316/316]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.001 arcsec [0.02 $\sigma$ ]  
KicOffset-rm: 0.080 arcsec [1.16 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

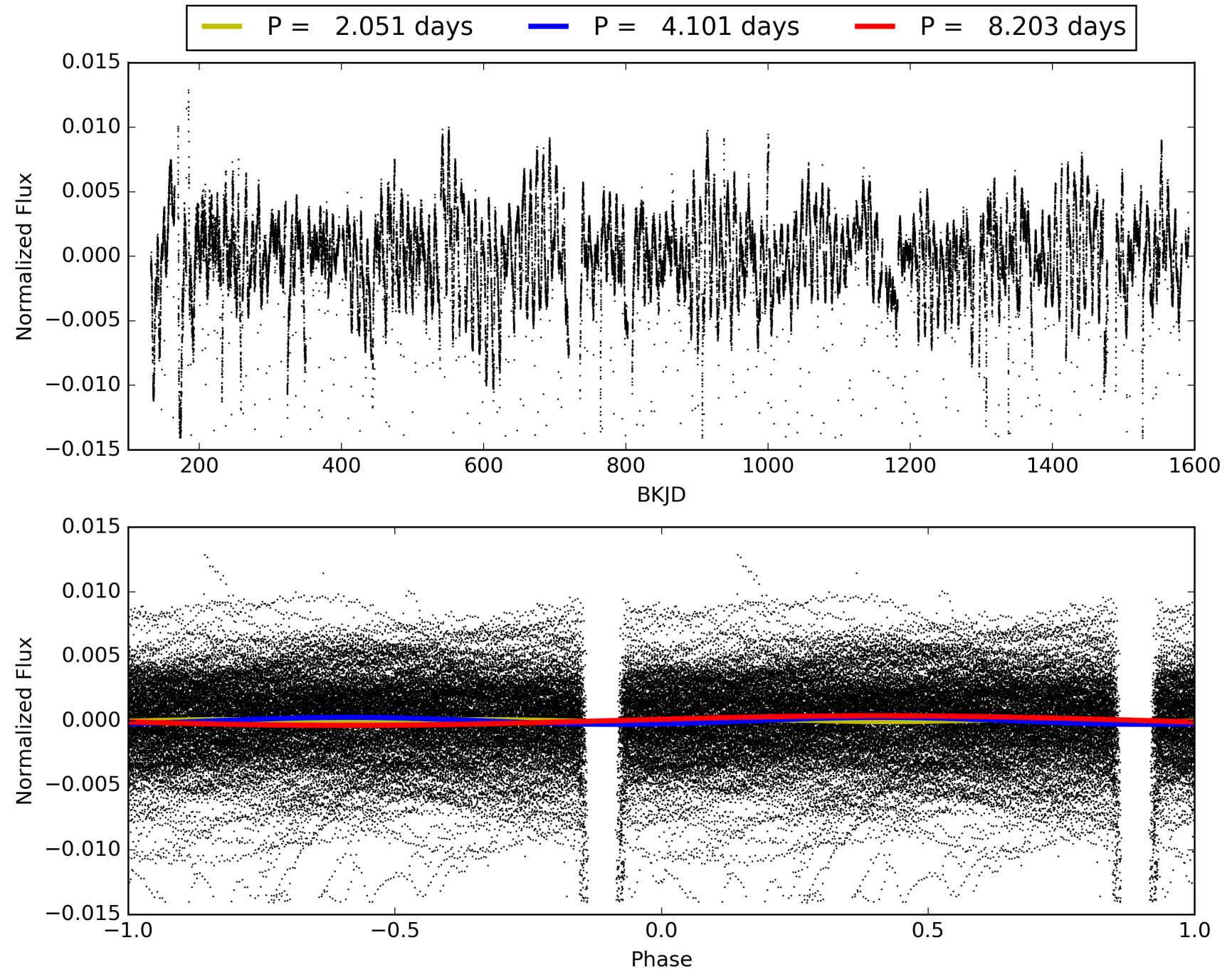
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:07:35 Z

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

# TCE 012013615-02, PDC Light Curves



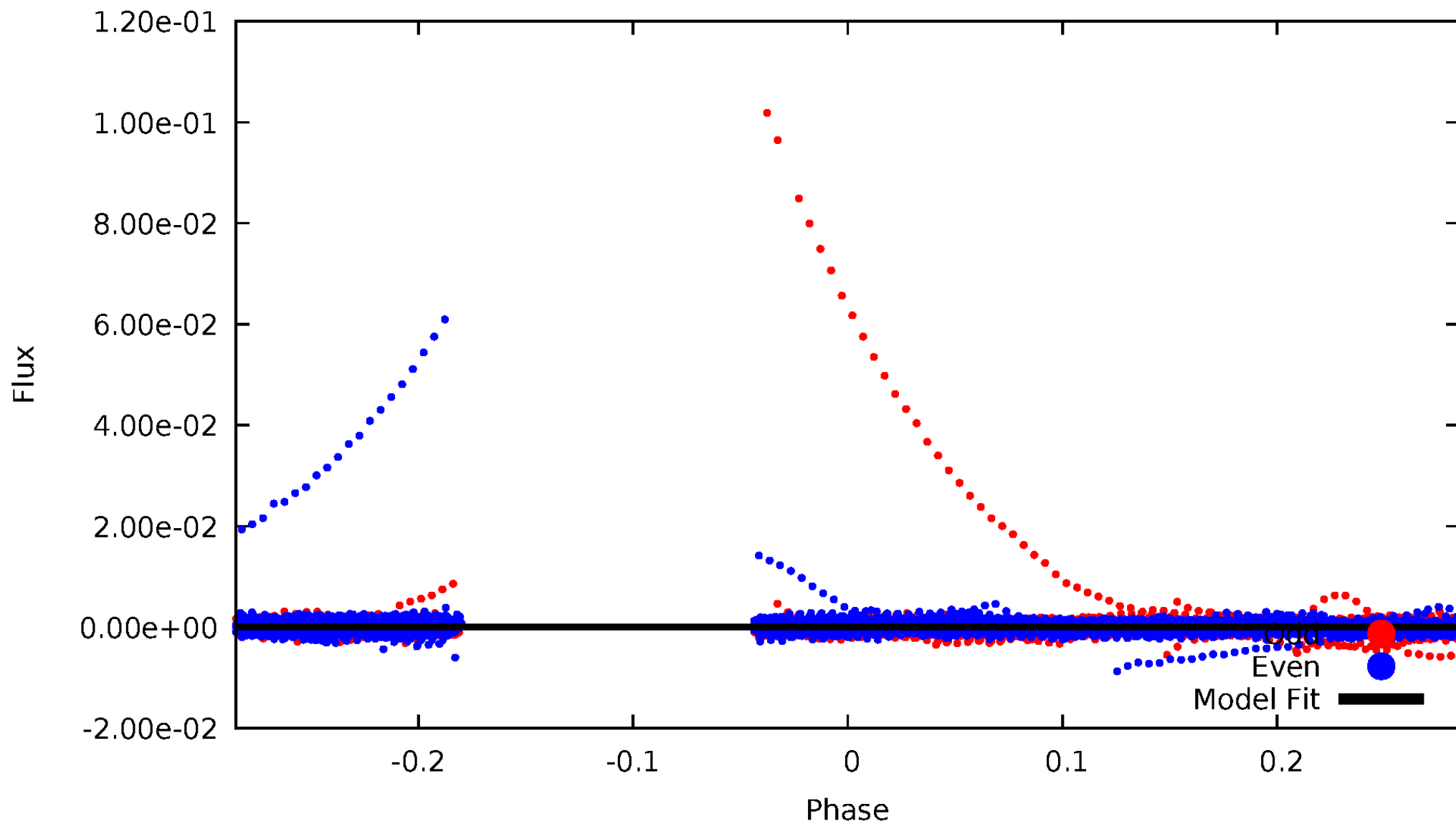
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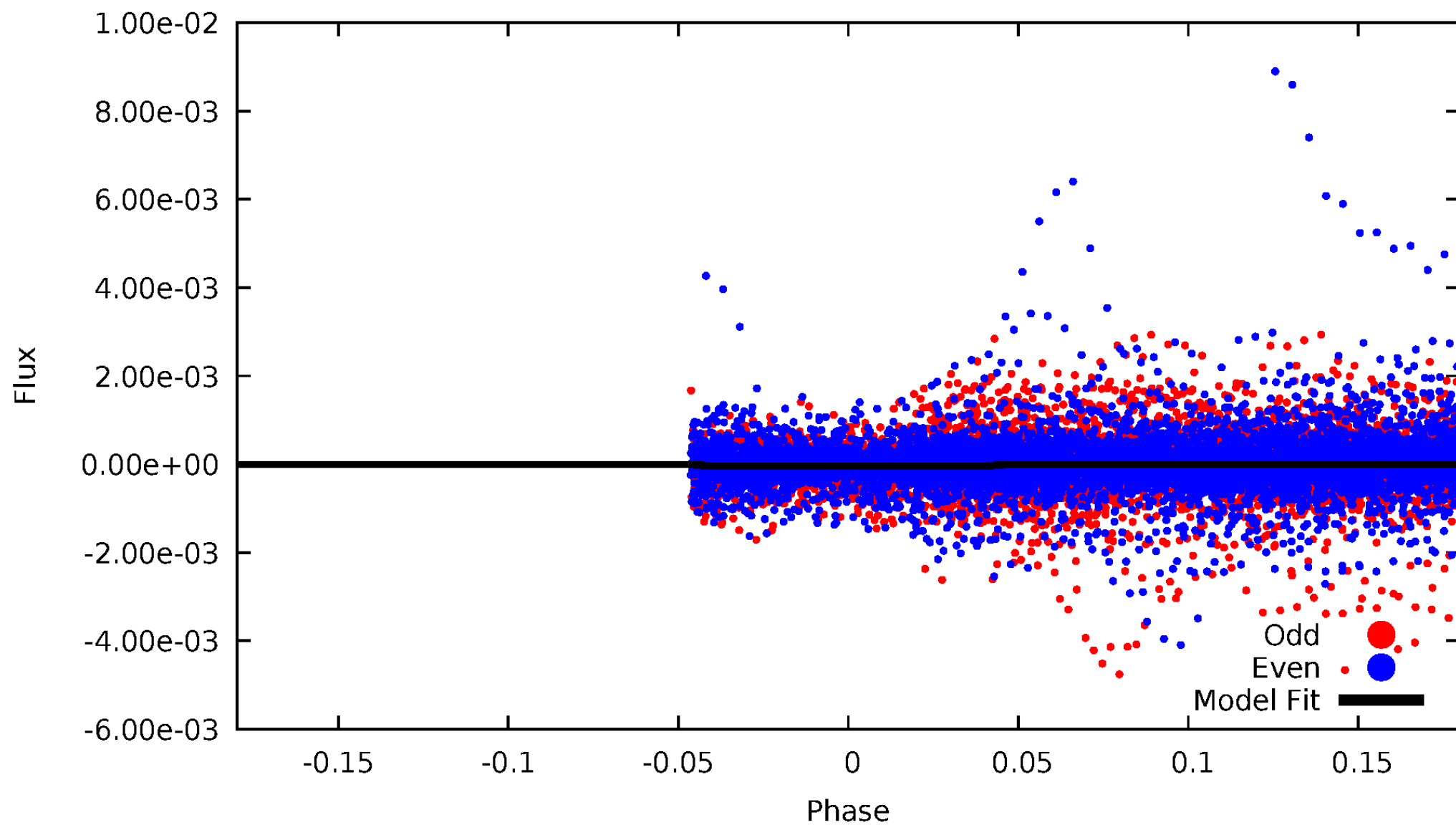
# DV Odd/Even

TCE 012013615-02



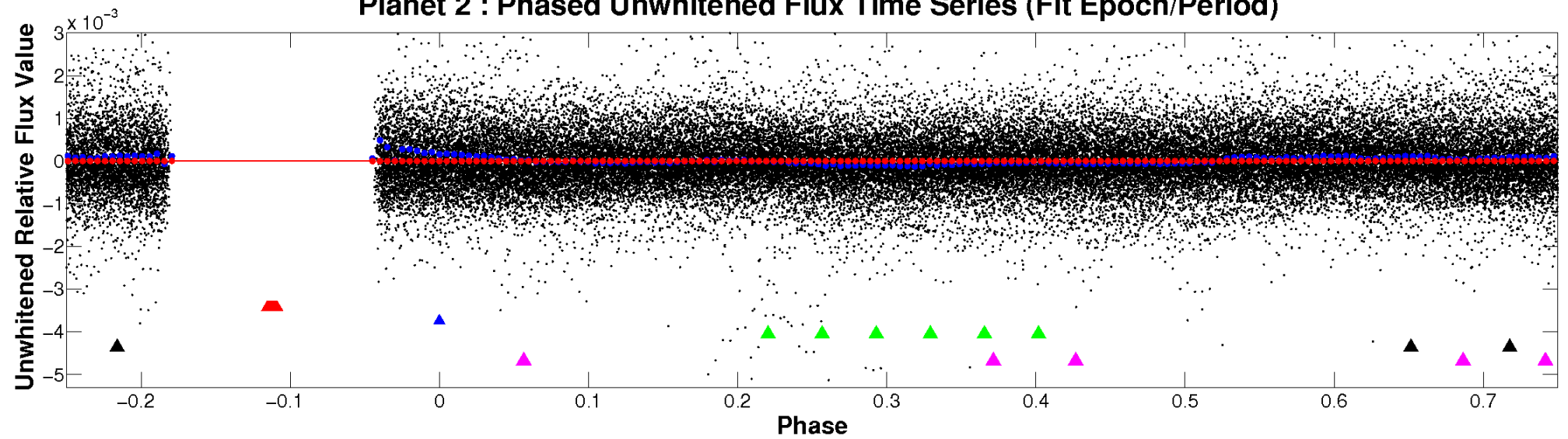
# ALT Odd/Even

TCE 012013615-02

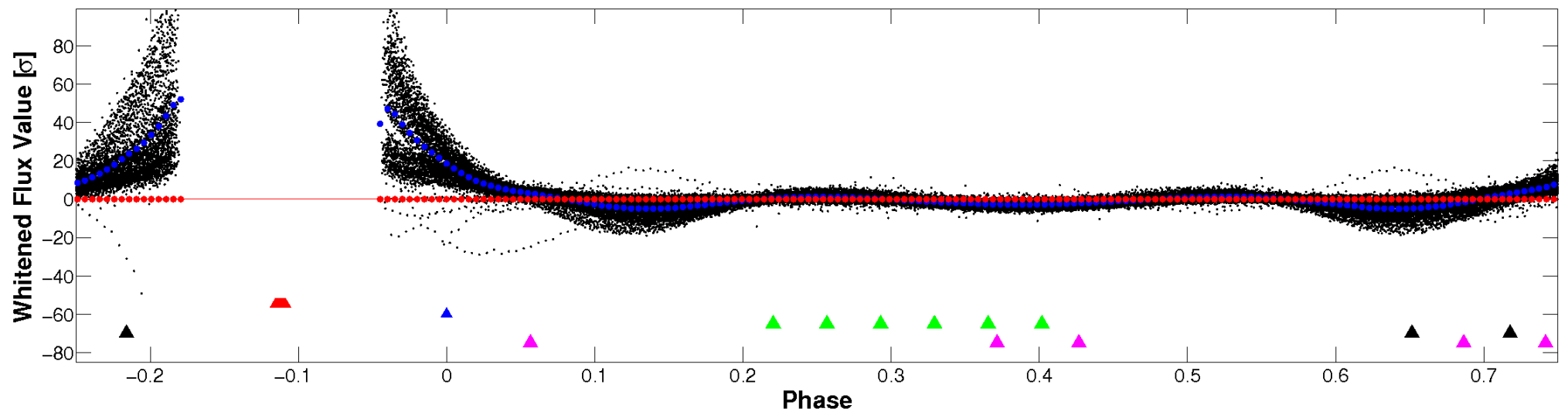


# Non-Whitened Vs. Whitened Light Curve

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

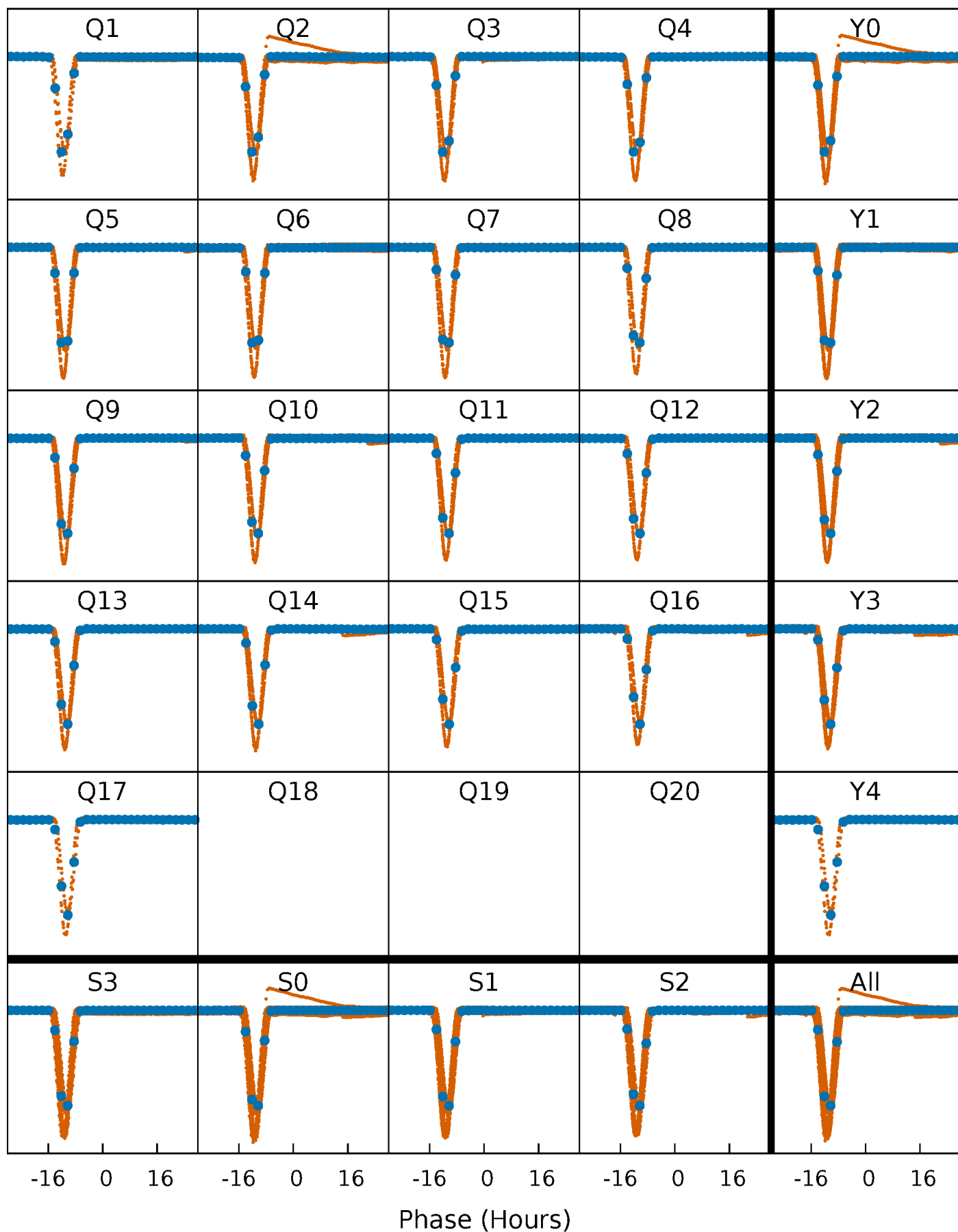


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



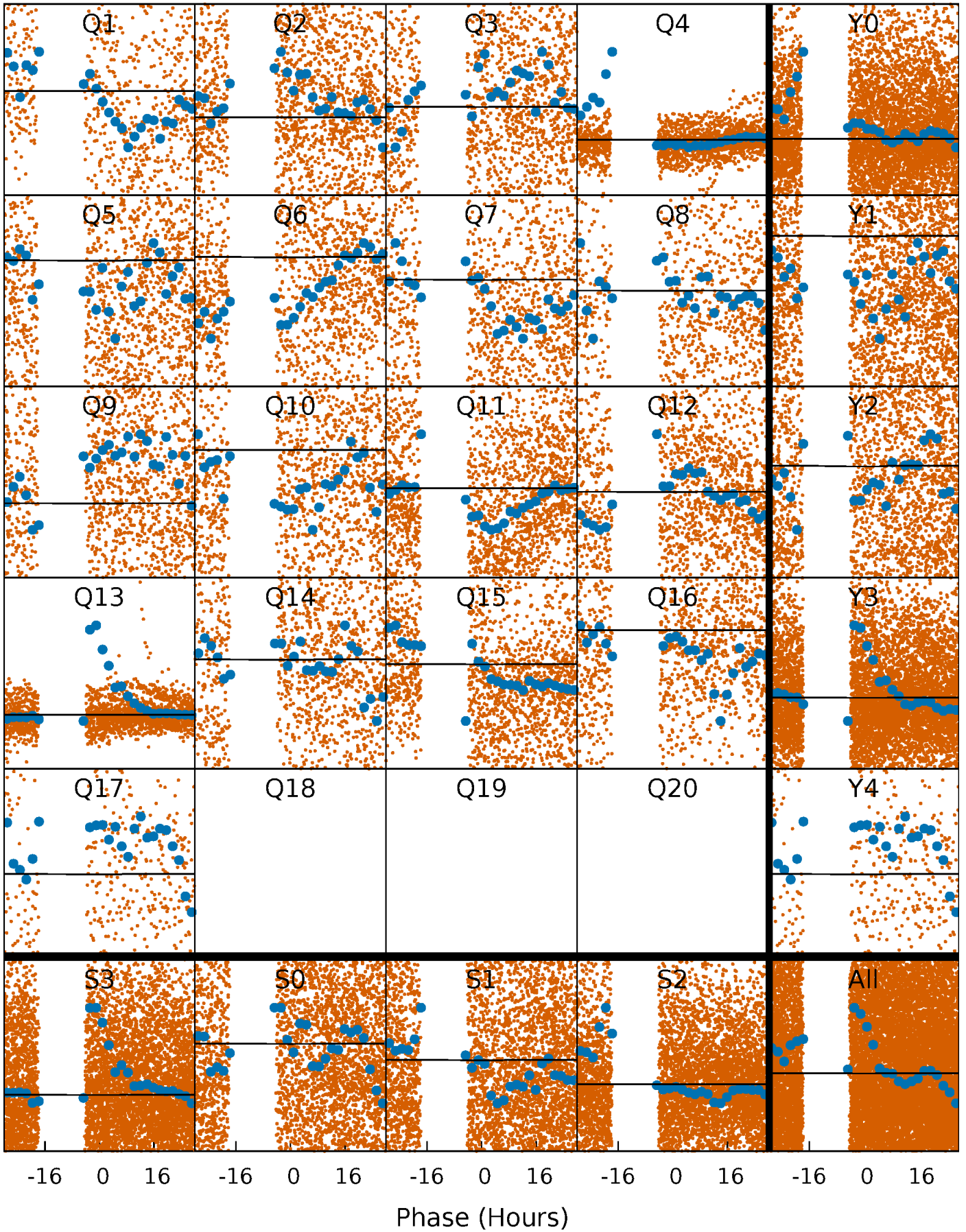
# PDC Quarter-Phased Transit Curves

TCE 012013615-02 P= 4.101330 Days  $T_0=134.899768$  (BKJD)



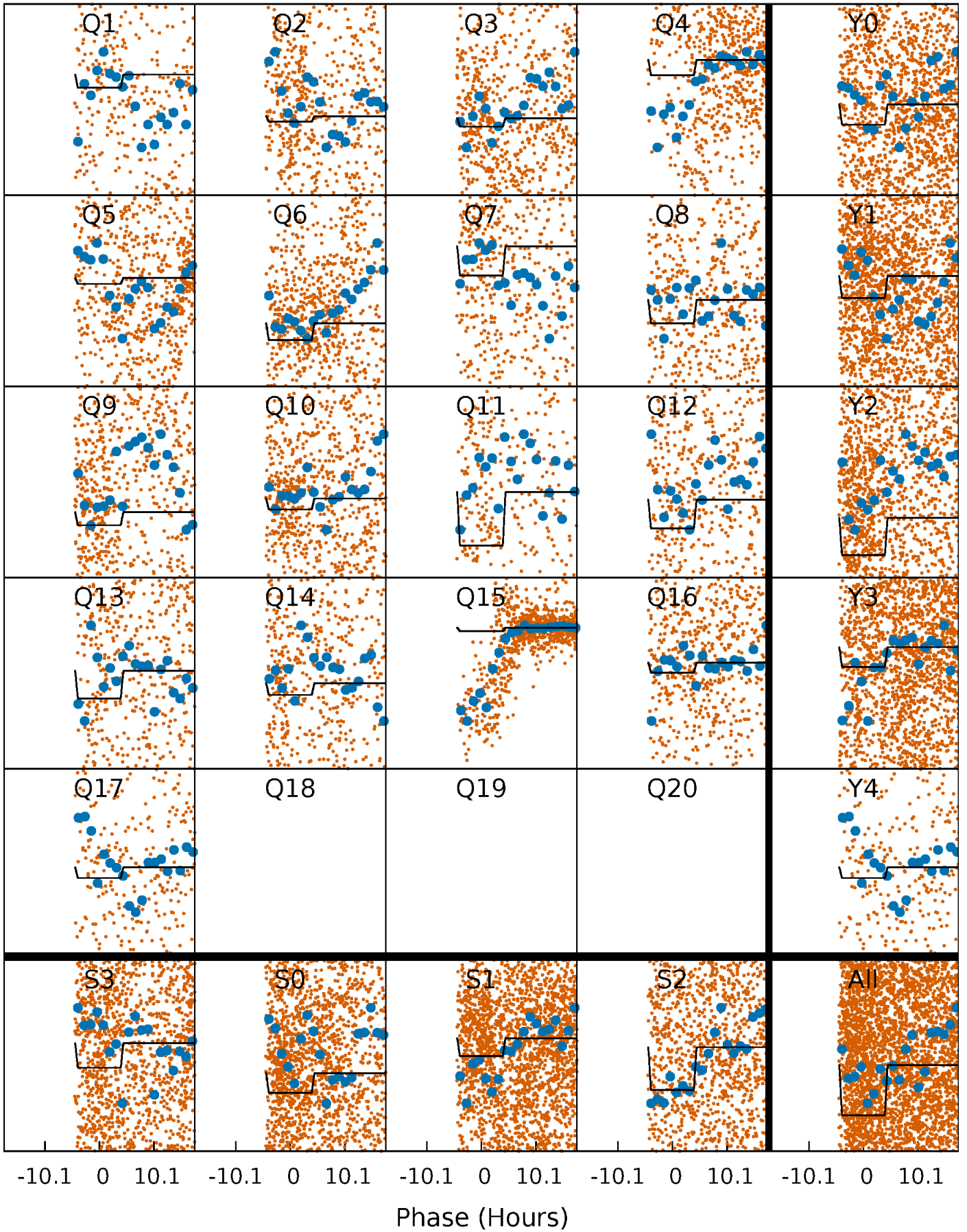
# DV Quarter-Phased Transit Curves

TCE 012013615-02 P= 4.101330 Days  $T_0=134.899768$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 012013615-02 P= 4.101392 Days  $T_0=134.909080$  (BKJD)

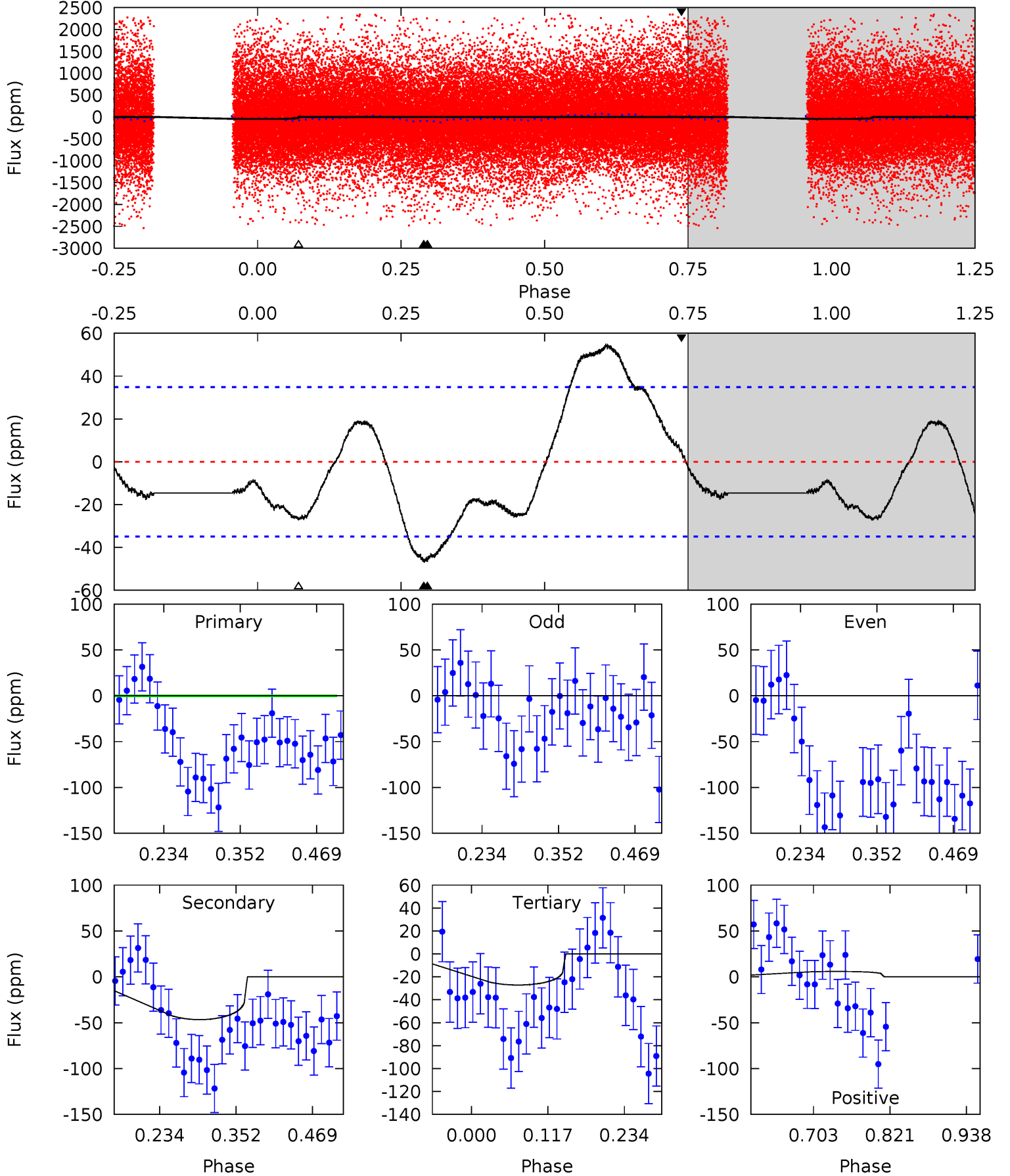




# DV Model-Shift Uniqueness Test

012013615-02, P = 4.101330 Days, E = 130.798438 Days

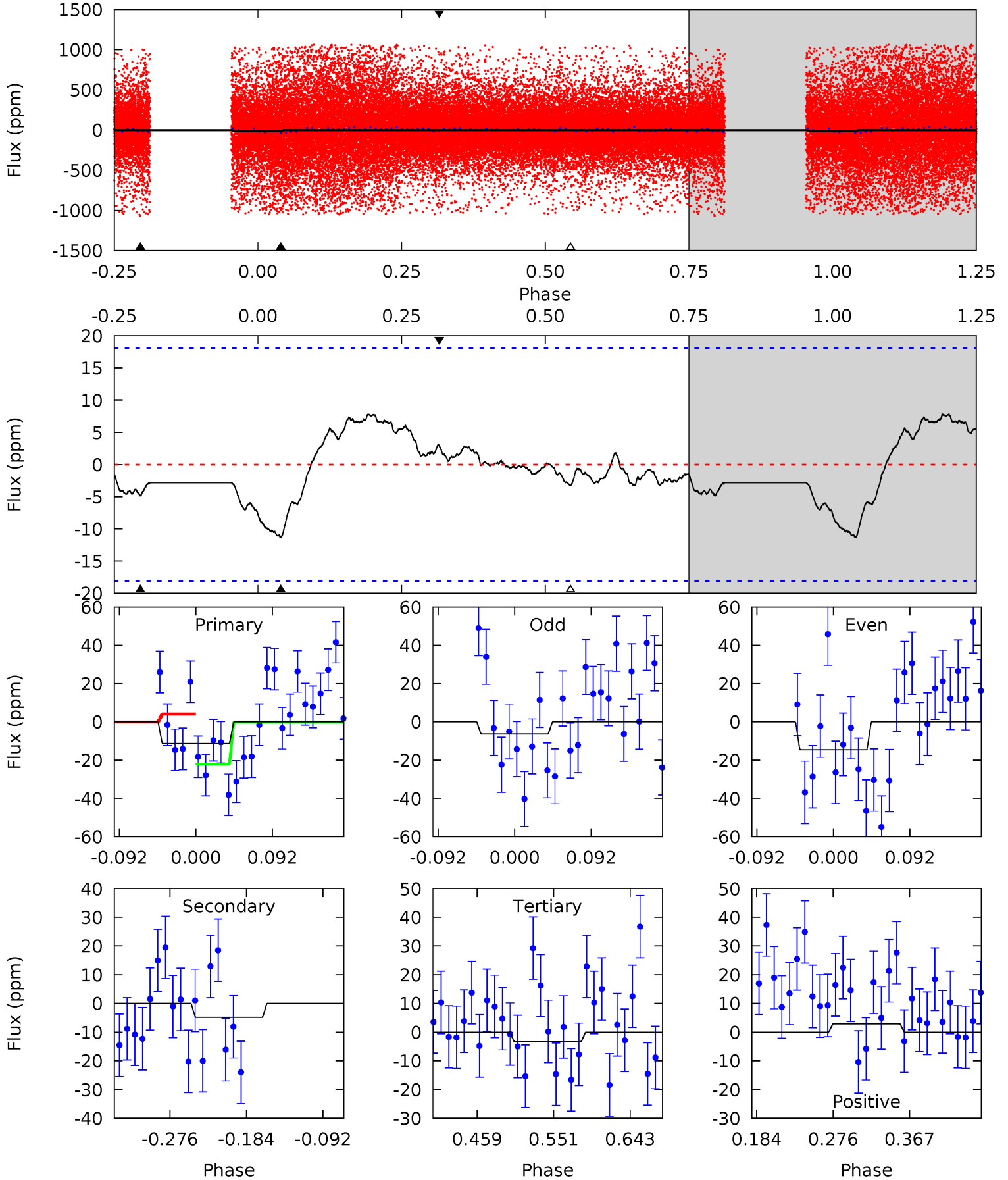
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.08	6.06	3.53	0.77	4.53	1.57	3.30	2.56	5.32	2.53	5.29	6.31	-1.36	0.54	1.25



# Alt Model-Shift Uniqueness Test

012013615-02, P = 4.101392 Days, E = 130.807688 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
2.87	1.23	0.83	0.74	4.58	1.69	0.80	2.04	2.14	0.40	0.49	1.03	17.1	0.41	2.19





### Stellar Parameters For KIC 012013615

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6060^{+184}_{-202}$	$4.059^{+0.329}_{-0.141}$	$-0.020^{+0.250}_{-0.300}$	$1.643^{+0.450}_{-0.550}$	$1.129^{+0.174}_{-0.174}$	$0.358^{+0.825}_{-0.140}$
	+3%/-3%	+8%/-3%	+1250%/-1500%	+27%/-33%	+15%/-15%	+230%/-39%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 012013615-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-47 \pm 8$	$3.32^{+4.17}_{-2.10}$	$2054^{+156}_{-209}$	$3831^{+2009}_{-894}$	$6.040^{+46.046}_{-4.755}$
Alt.	$-5 \pm 4$	$4.02^{+4.14}_{-2.76}$	$2058^{+152}_{-200}$	$2089^{+1525}_{-4609}$	$0.368^{+4.115}_{-0.327}$

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

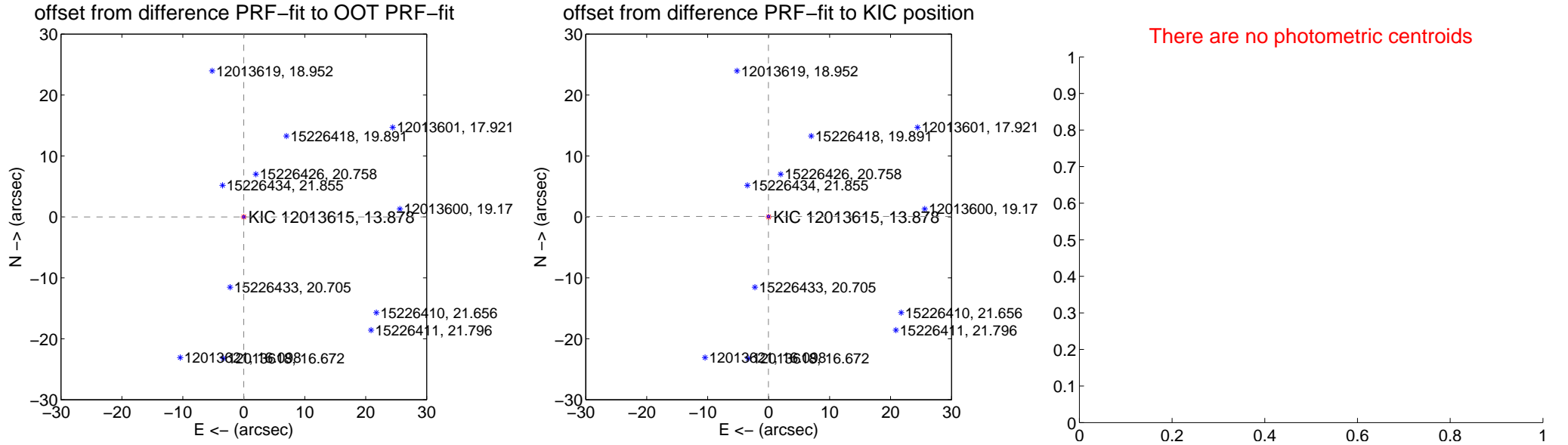
## DV Centroid Data

Supplemental centroid analysis for 012013615-02. Kepler magnitude: 13.88. Transit SNR 0.10

There are 0 quarters with good PRF difference image offsets

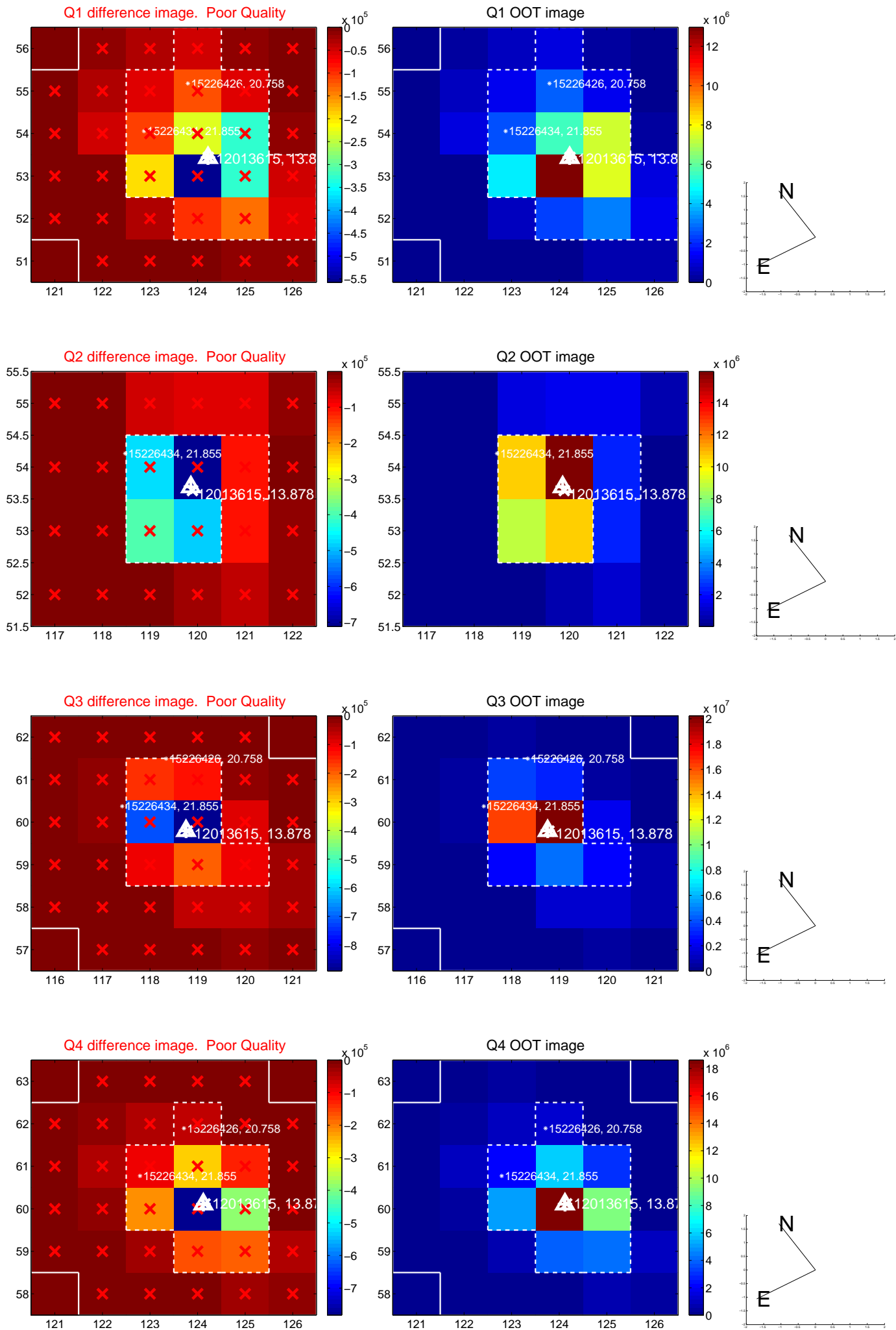
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.001 \pm 0.067$	0.02	$0.001 \pm 0.067$	$-0.000 \pm 0.067$
PRF-fit source offset from KIC position	$0.080 \pm 0.069$	1.16	$0.031 \pm 0.068$	$0.073 \pm 0.070$
photometric centroid source offset	—	—	—	—

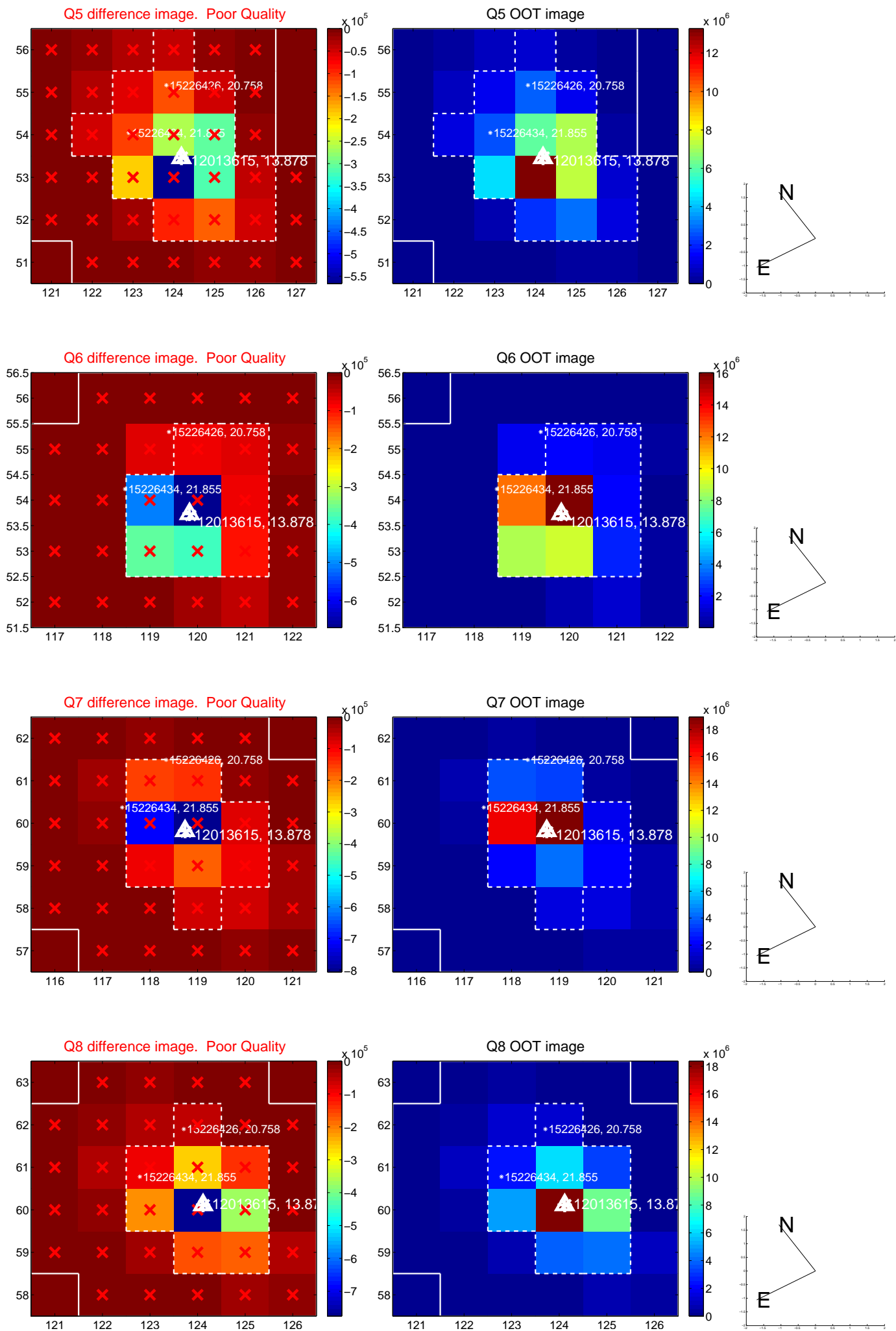


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

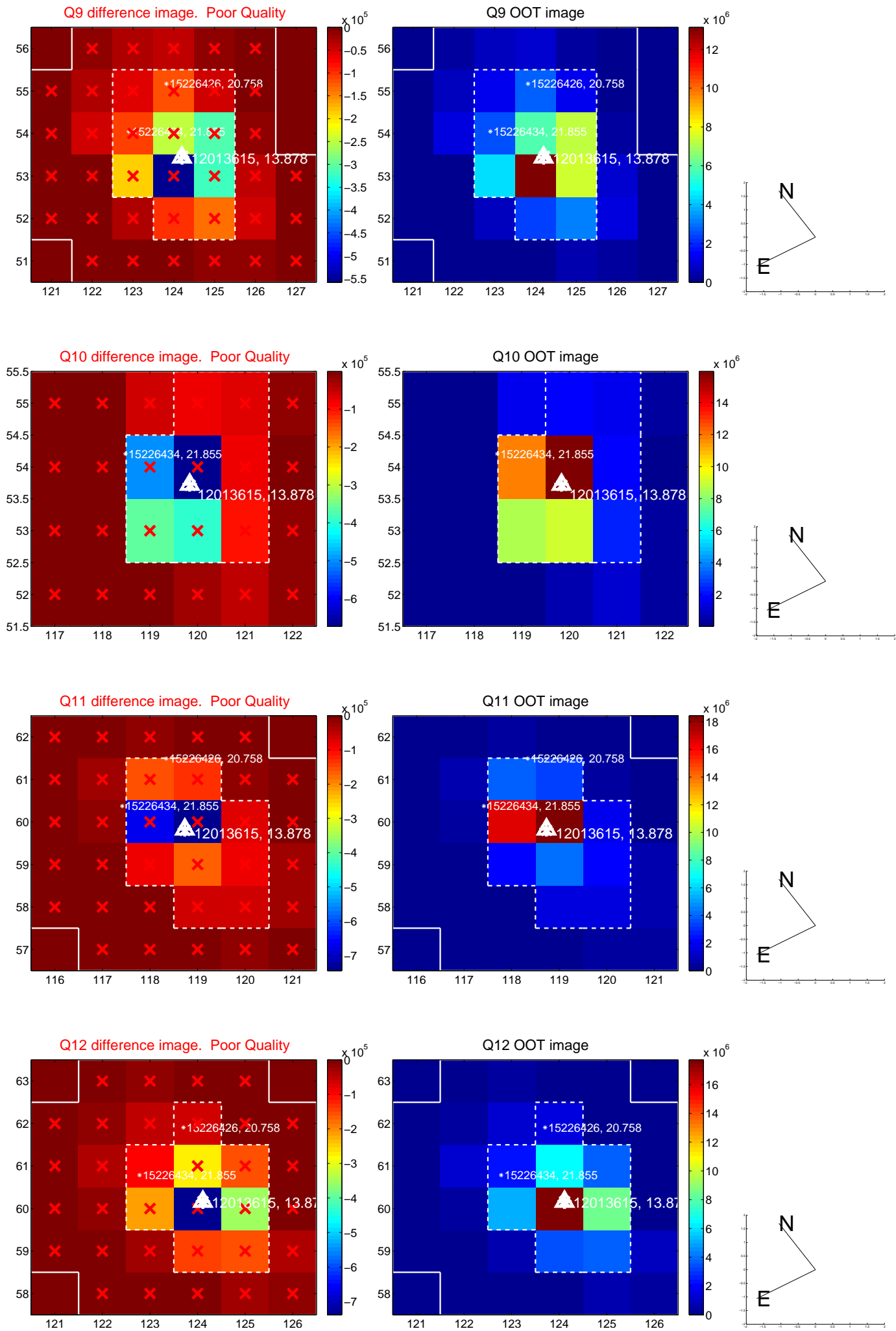
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



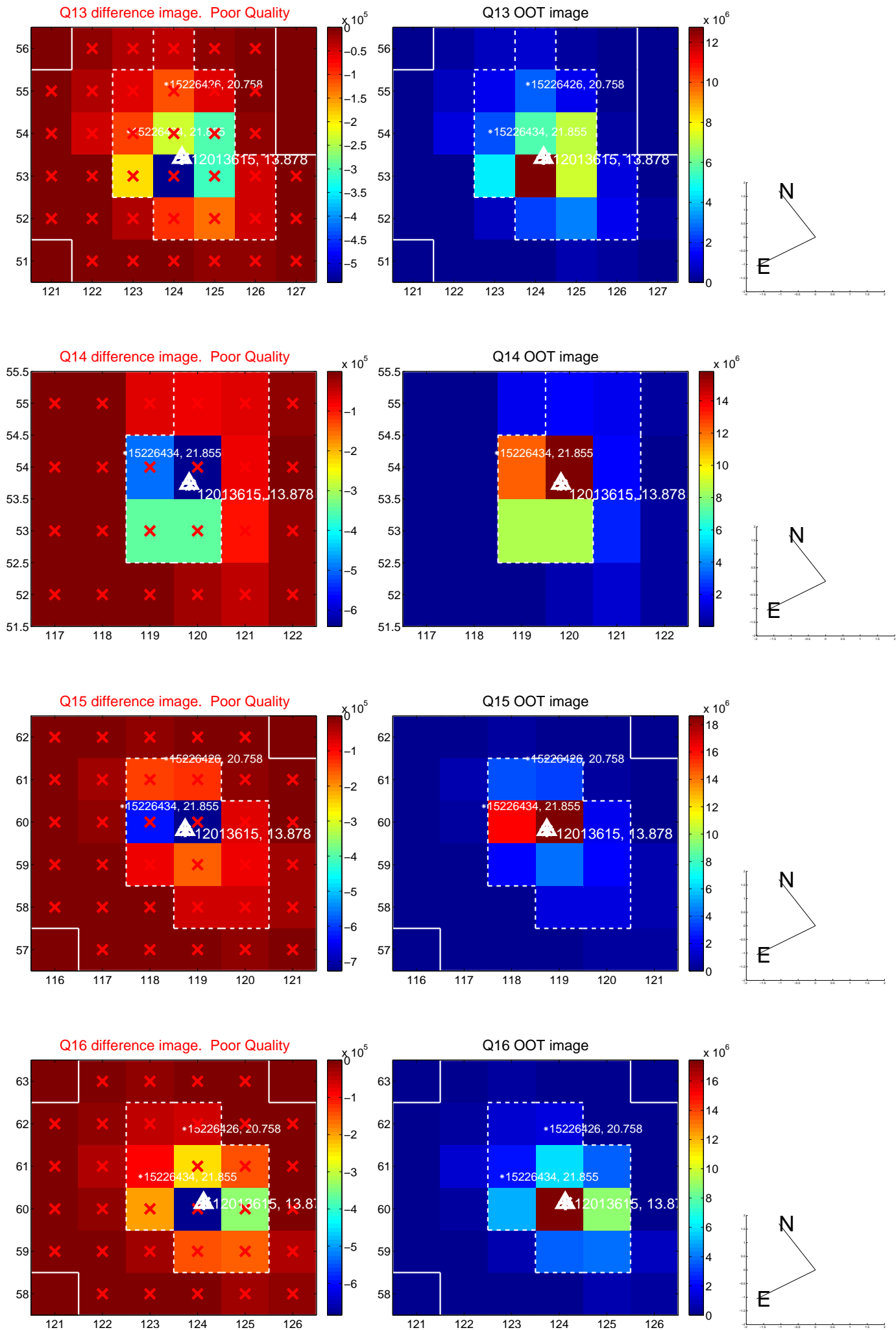
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



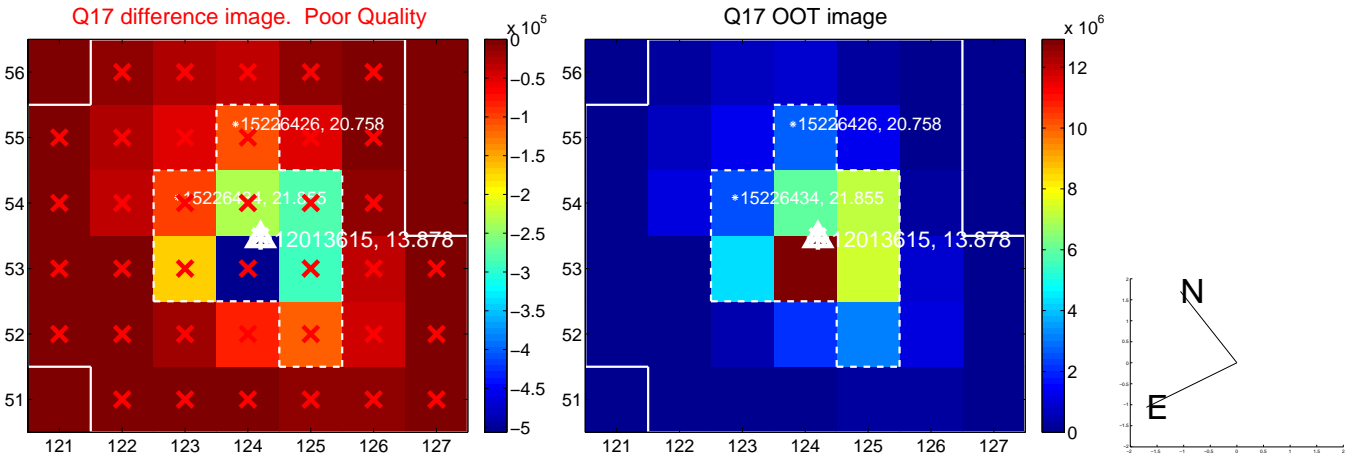
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



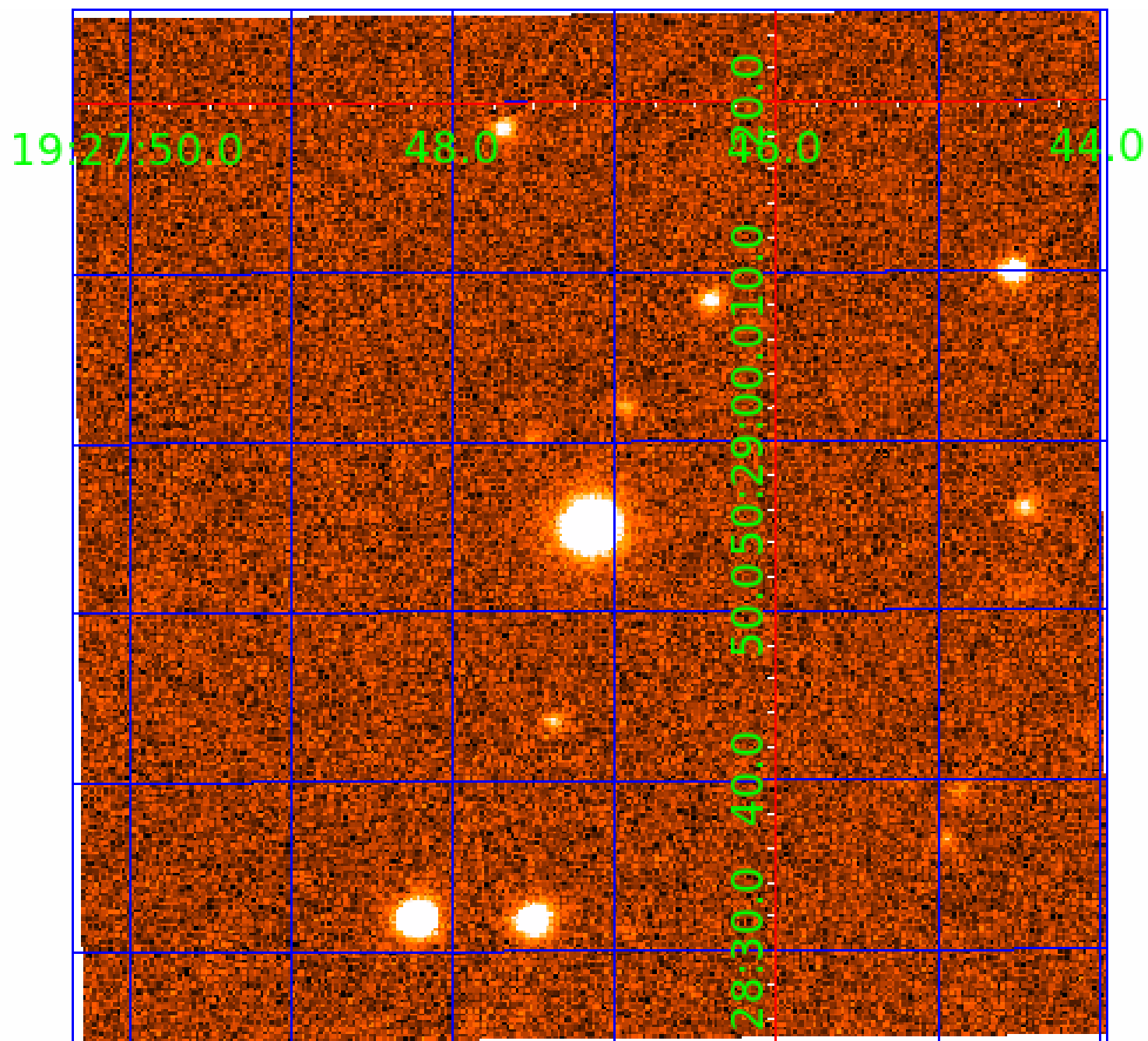
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

# UKIRT Image

Declination





# KIC 012013615

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012013615-01	OBS	7505.01	4.101407	134.426182	311077.7	4.500	26640.7	-1.0	1.64	6060	77.43	1196.65
012013615-02	OBS	No	4.101330	134.899768	1.5	14.022	772.6	0.1	1.64	6060	0.21	1196.68
012013615-03	OBS	No	262.336330	198.067553	1158.5	9.987	14.4	10.7	1.64	6060	6.69	4.68
012013615-04	OBS	No	500.633854	449.272867	922.5	7.196	10.7	7.9	1.64	6060	5.31	1.98
012013615-05	OBS	No	294.004093	240.248463	1526.4	8.915	12.0	8.9	1.64	6060	12.18	4.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012013615-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_ALT—CENT_NOFITS
012013615-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS
012013615-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
012013615-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
012013615-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—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.

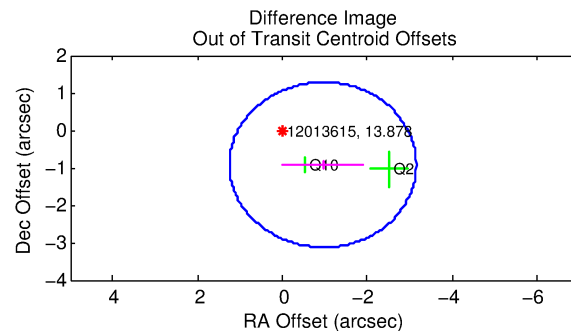
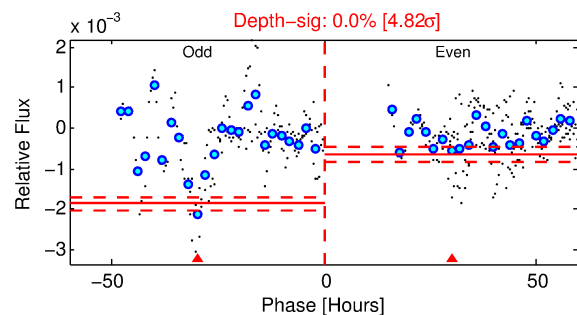
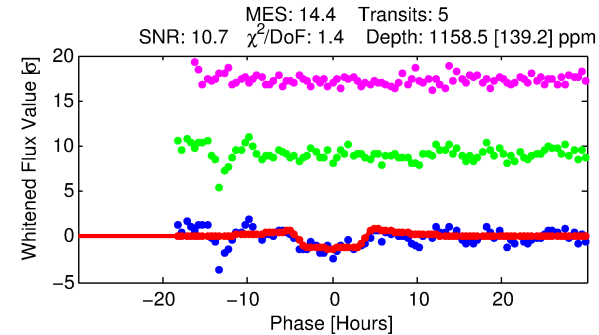
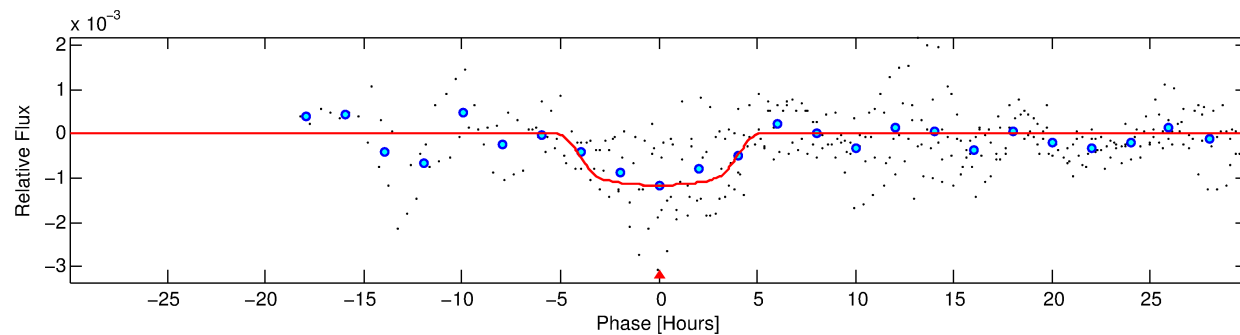
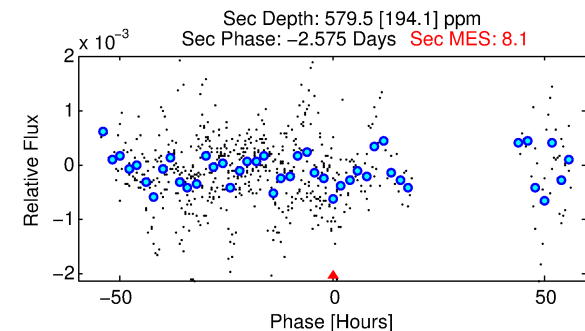
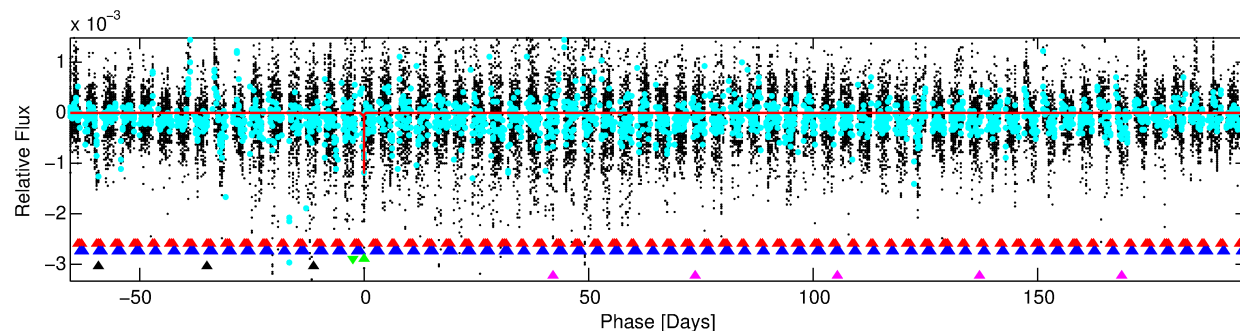
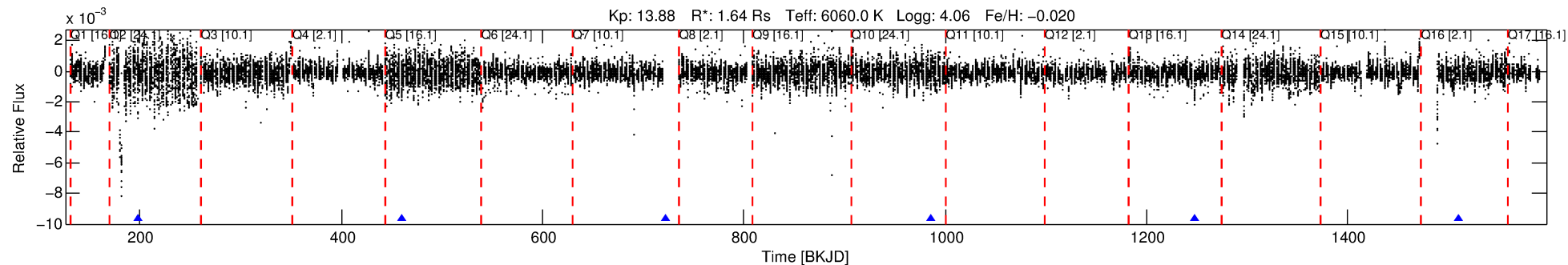
## Ephemeris Match Information For 012013615-03

No Significant Match Found

# DV One-Page Summary

KIC: 12013615 Candidate: 3 of 5 Period: 262.336 d  
KOI: K07505 Corr: No Ephemeris Match

Kp: 13.88 R\*: 1.64 Rs Teff: 6060.0 K Logg: 4.06 Fe/H: -0.020



## DV Fit Results:

Period = 262.33633 [0.00503] d  
Epoch = 198.0676 [0.0169] BKJD  
Rp/R\* = 0.0373 [0.0028]  
a/R\* = 98.65 [18.71]  
b = 0.91 [0.03]  
Seff = 4.68 [2.66]  
Teq = 375 [53] K  
Rp = 6.69 [2.29] Re  
a = 0.8350 [0.2814] AU  
Ag = 4971.08 [3295.41] [1.51σ]  
Teffp = 4869 [475] K [9.40σ]

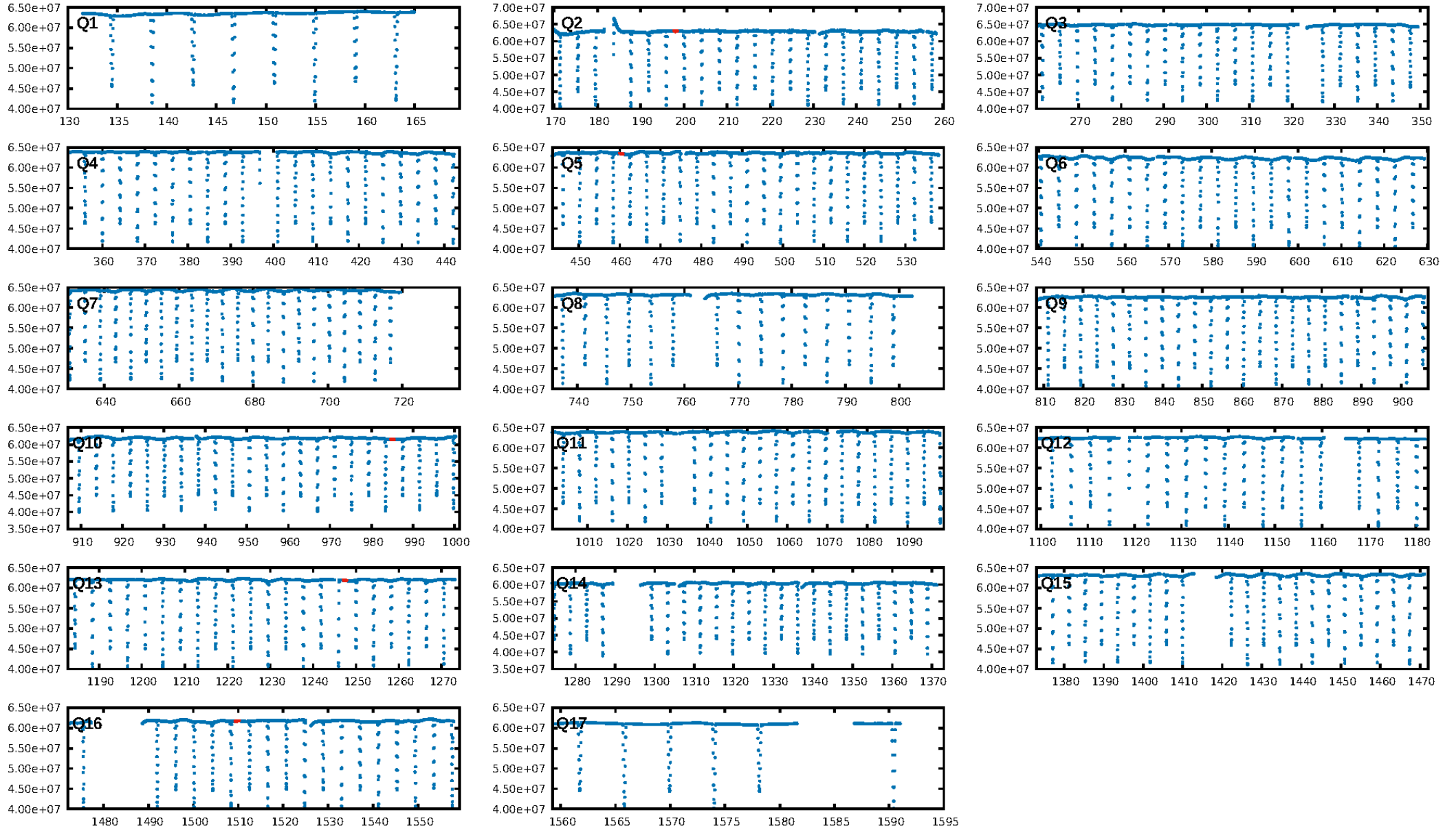
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [565.80σ]  
LongPeriod-sig: 100.0% [56.77σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 52.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.2375  
Centroid-sig: N/A  
Centroid-so: 0.974 arcsec [2.44σ]  
OotOffset-rm: 1.332 arcsec [1.81σ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-rm: 1.284 arcsec [1.74σ]  
KicOffset-st: 2/0/0/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

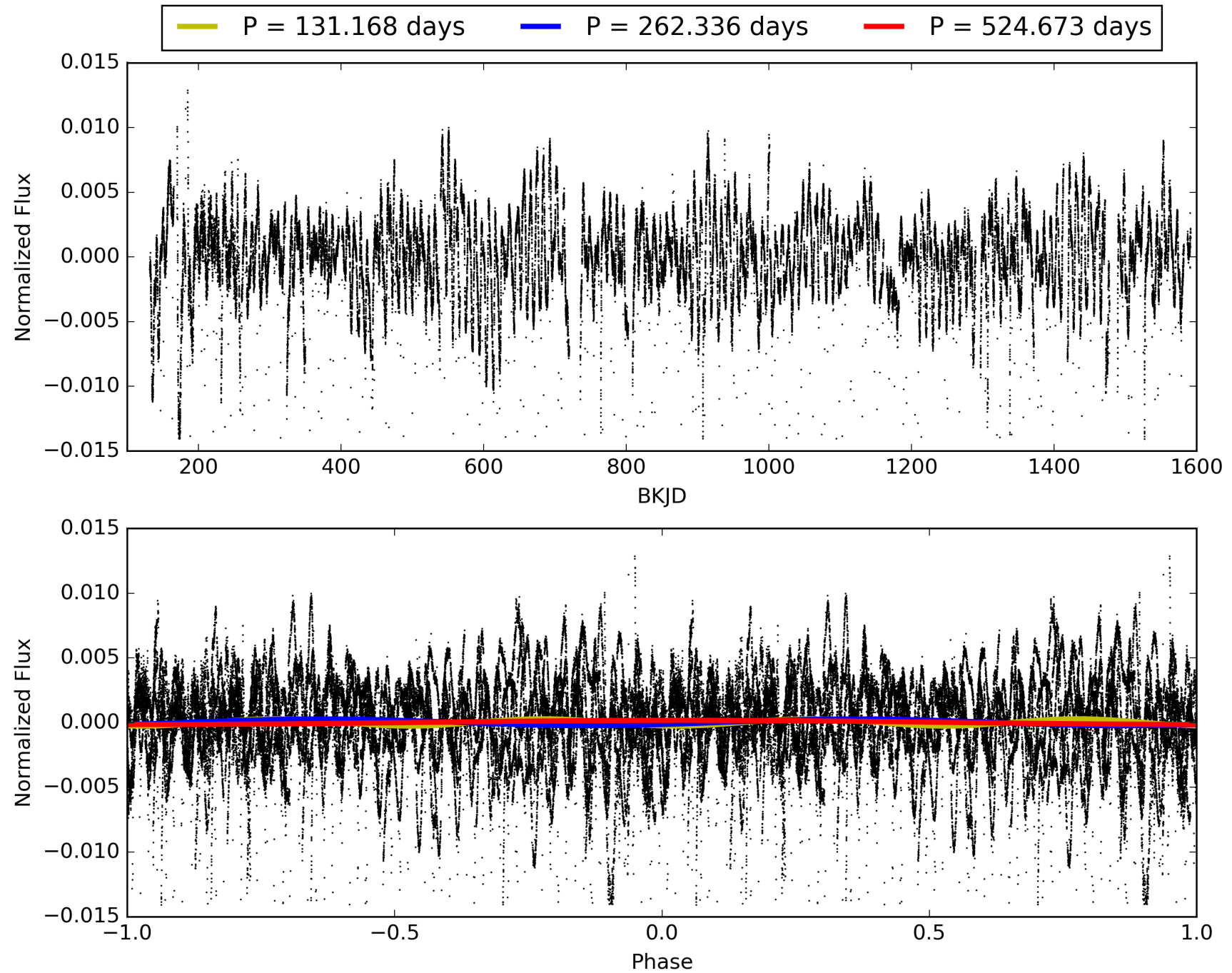
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:07:45 Z

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

# TCE 012013615-03, PDC Light Curves

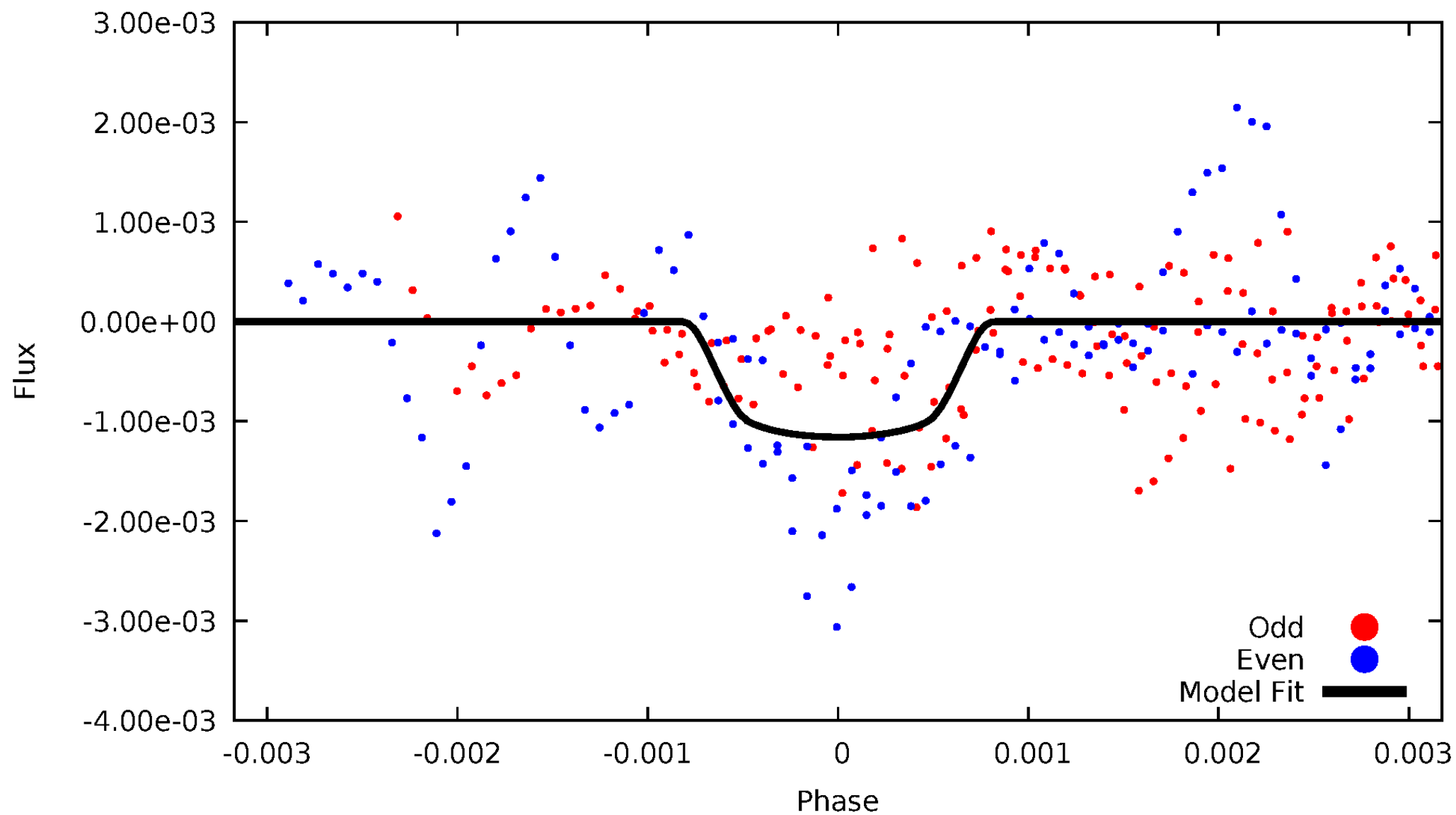


TCE 012013615-03



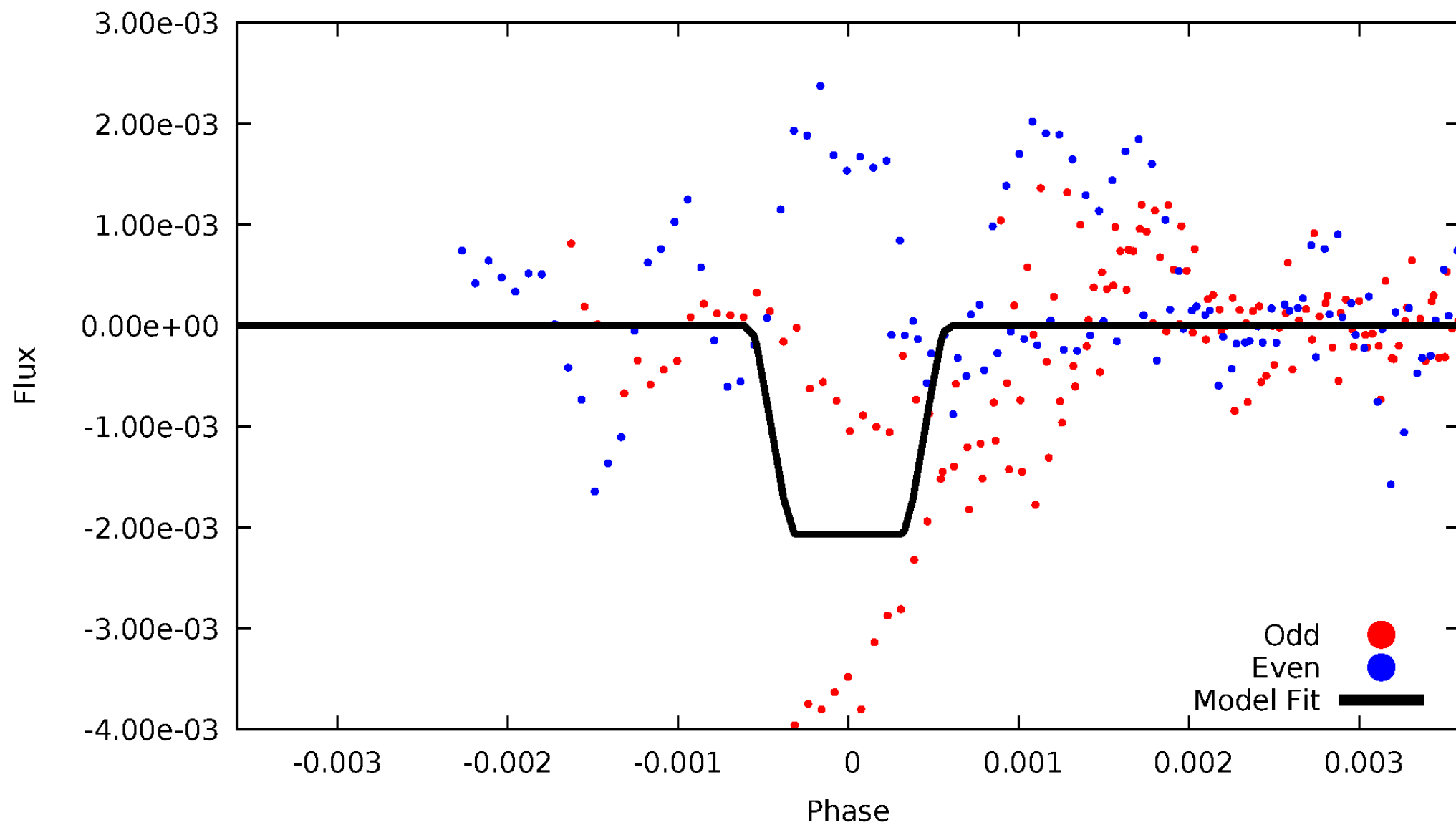
# DV Odd/Even

TCE 012013615-03



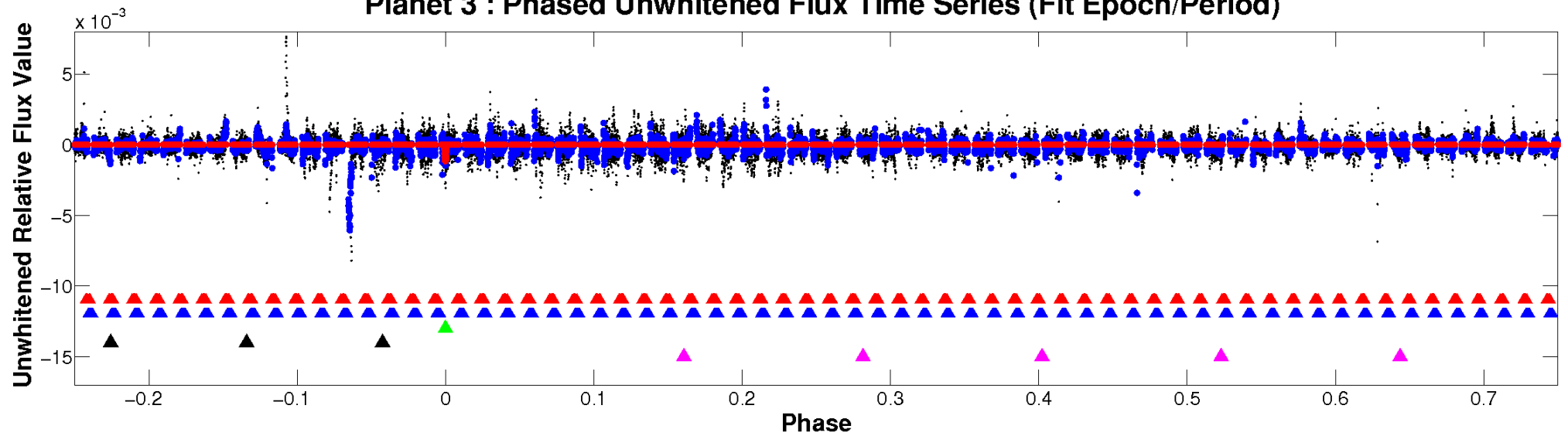
# ALT Odd/Even

TCE 012013615-03

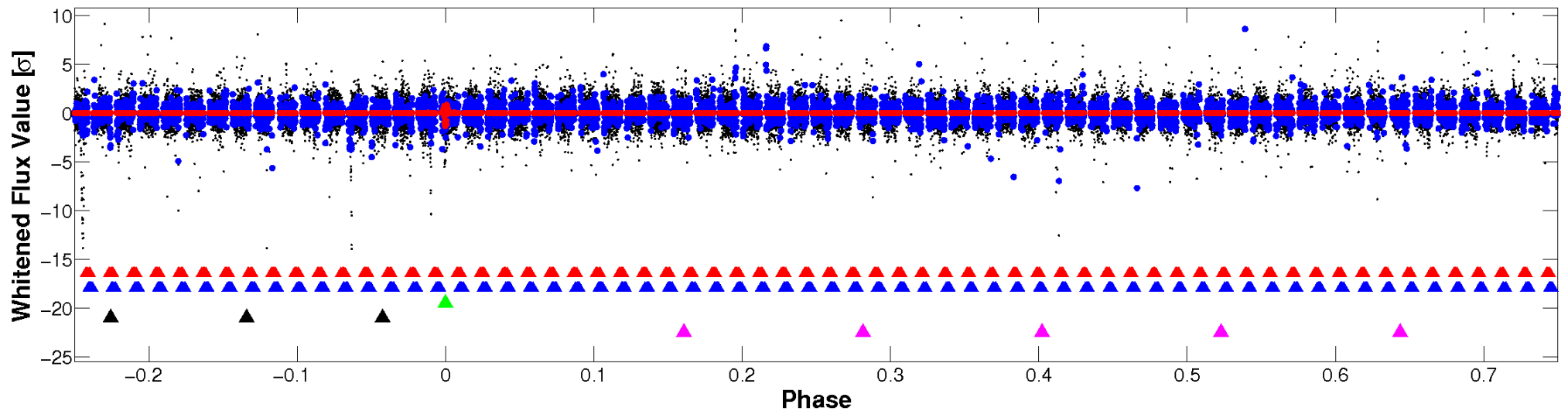


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

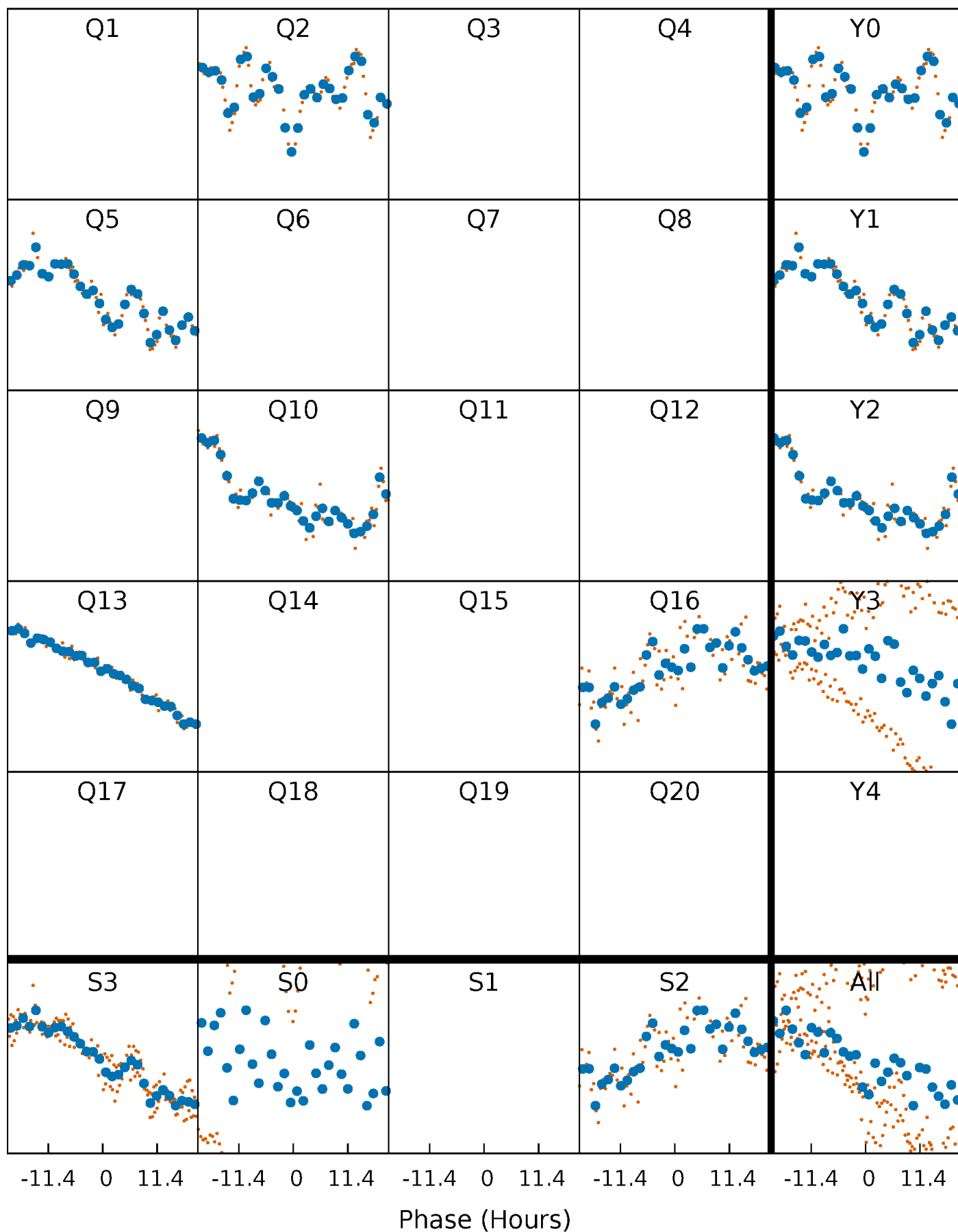


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

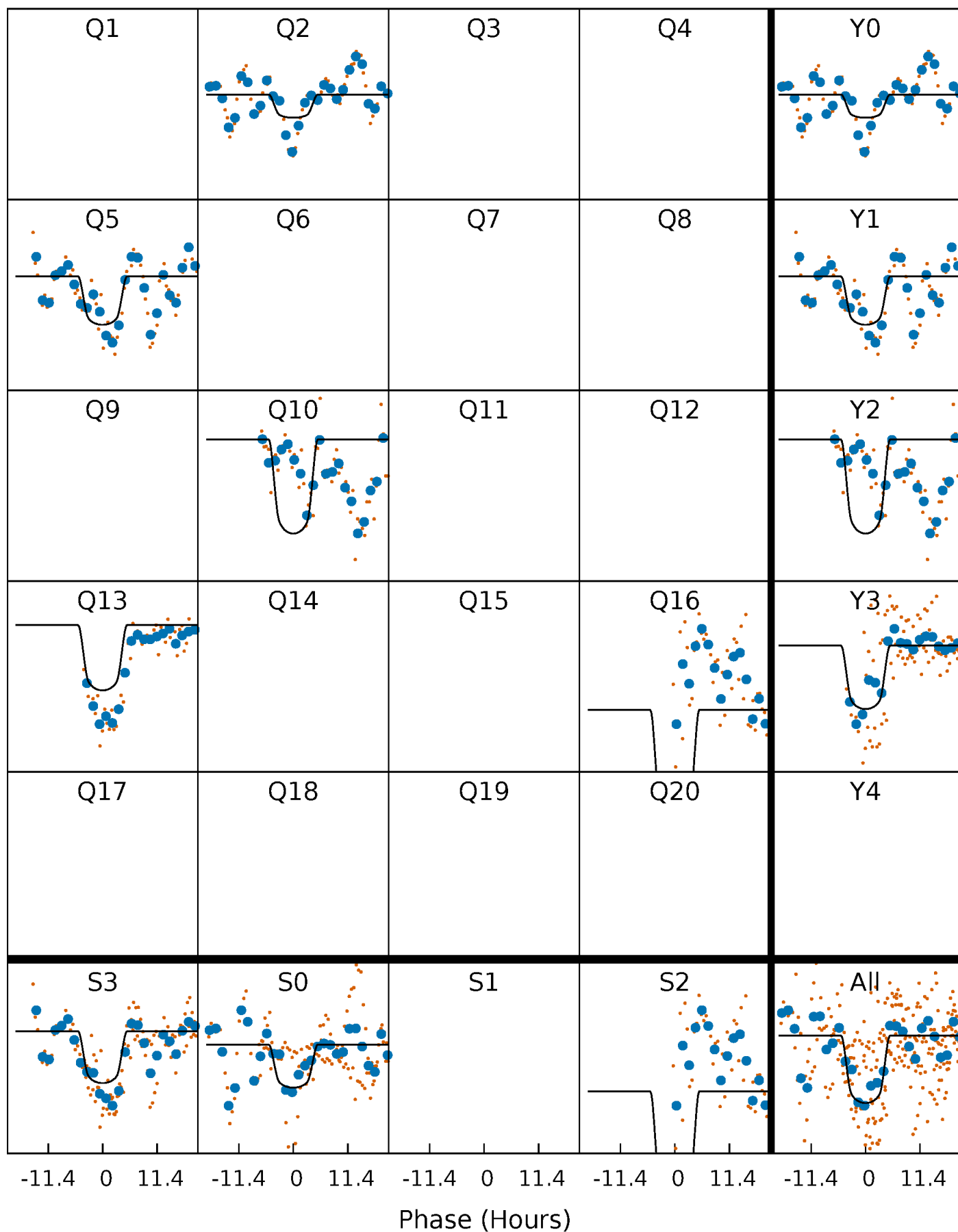
TCE 012013615-03 P=262.336330 Days  $T_0=198.067553$  (BKJD)





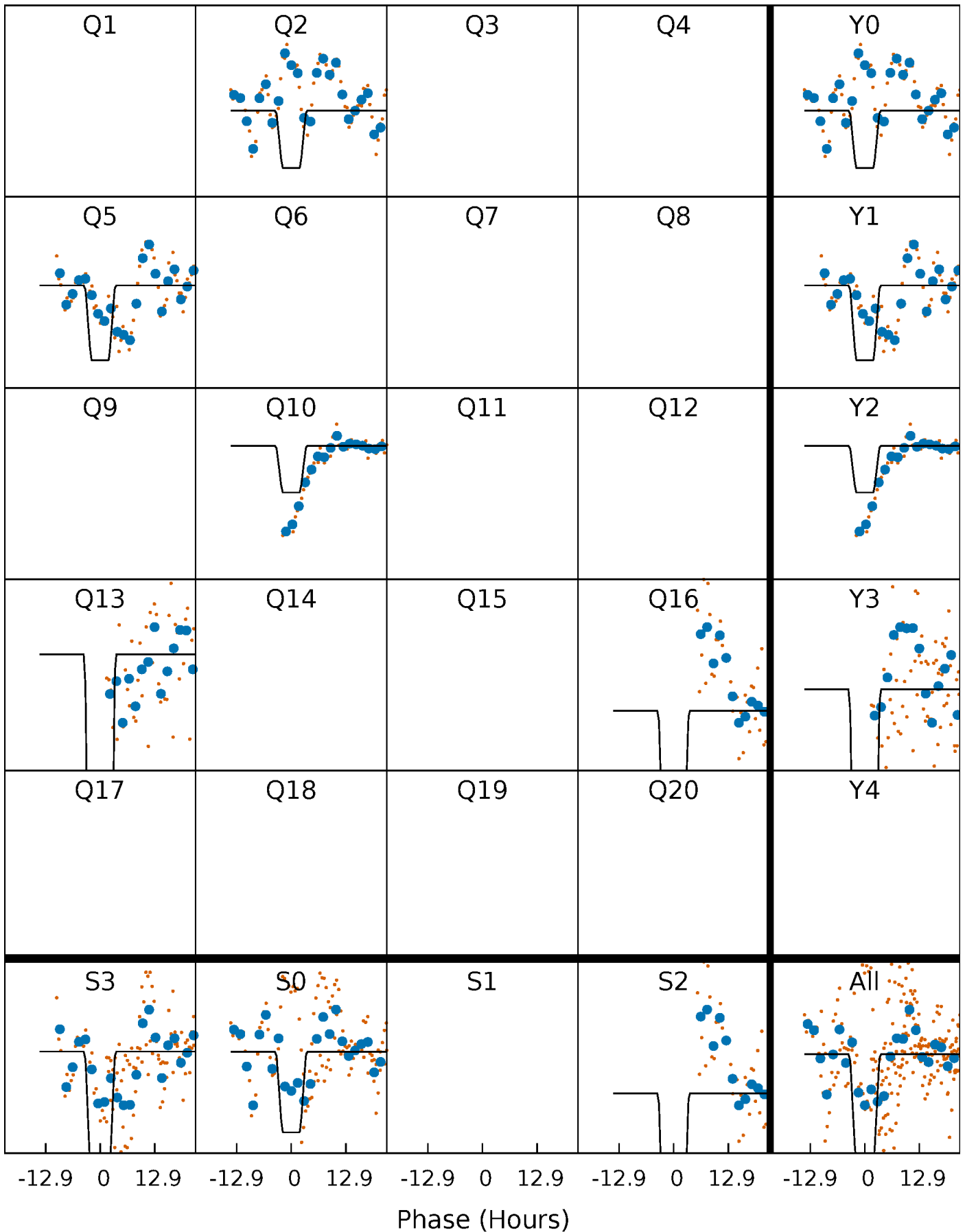
# DV Quarter-Phased Transit Curves

TCE 012013615-03 P=262.336330 Days  $T_0=198.067553$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

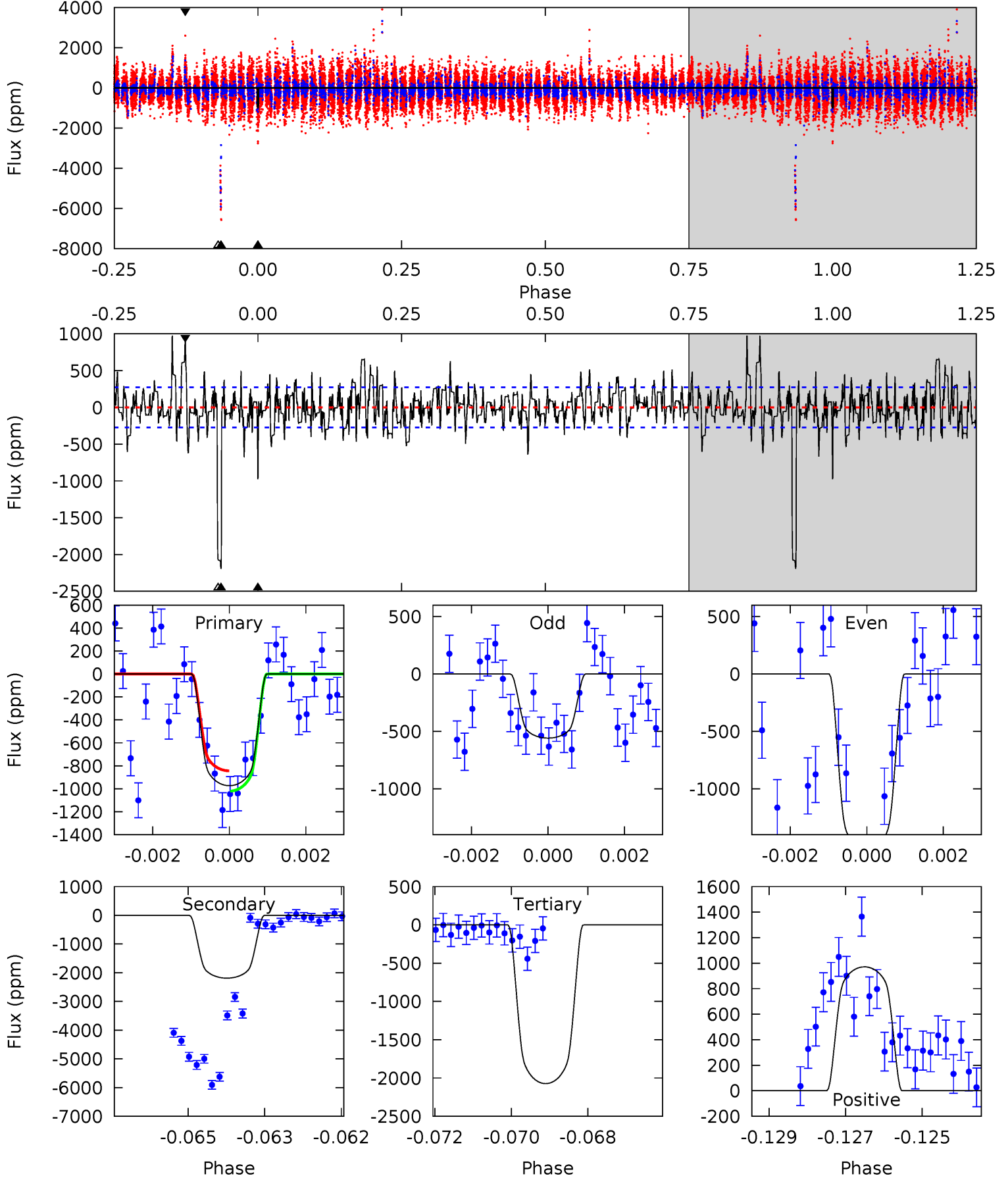
TCE 012013615-03 P=262.319232 Days  $T_0=197.904581$  (BKJD)



# DV Model-Shift Uniqueness Test

012013615-03, P = 262.336330 Days, E = 198.067553 Days

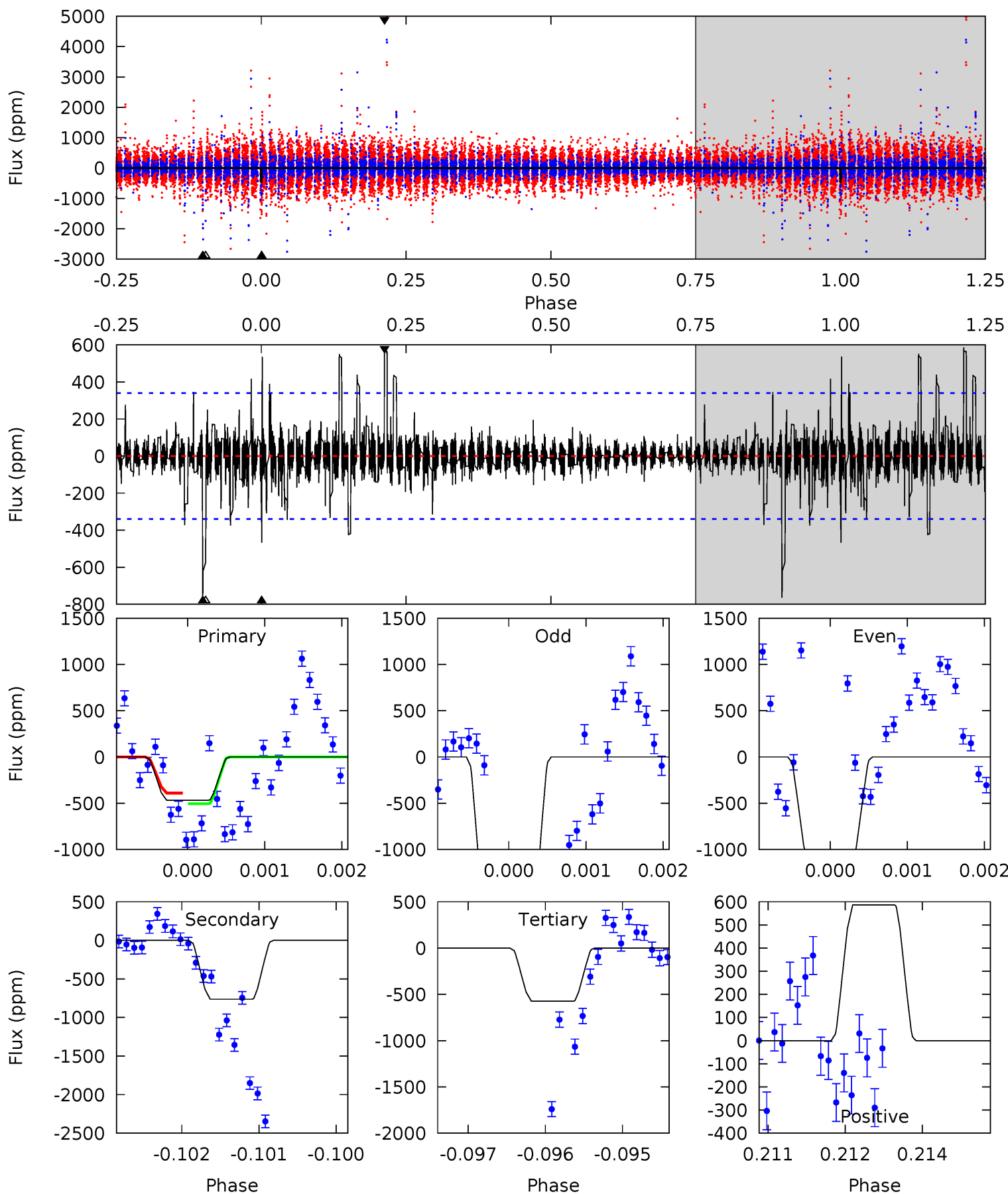
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.1	42.9	40.7	19.1	5.36	3.14	3.94	-21.6	0.04	2.25	23.9	9.28	0.75	0.31	1.73



# Alt Model-Shift Uniqueness Test

012013615-03, P = 262.319232 Days, E = 197.904581 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
7.46	12.2	9.18	9.38	5.43	3.26	1.00	-1.72	-1.91	3.03	2.83	8.08	1.69	0.43	0



### Stellar Parameters For KIC 012013615

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6060^{+184}_{-202}$	$4.059^{+0.329}_{-0.141}$	$-0.020^{+0.250}_{-0.300}$	$1.643^{+0.450}_{-0.550}$	$1.129^{+0.174}_{-0.174}$	$0.358^{+0.825}_{-0.140}$
	+3%/-3%	+8%/-3%	+1250%/-1500%	+27%/-33%	+15%/-15%	+230%/-39%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 012013615-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2188 \pm 51$	$6.46^{+1.22}_{-1.27}$	$515^{+40}_{-50}$	$6821^{+405}_{-368}$	$20168^{+10678}_{-5461}$
Alt.	$-764 \pm 63$	$7.82^{+1.48}_{-1.43}$	$511^{+44}_{-45}$	$4840^{+206}_{-196}$	$4851^{+2183}_{-1344}$

$T_{\text{max}}$  = 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

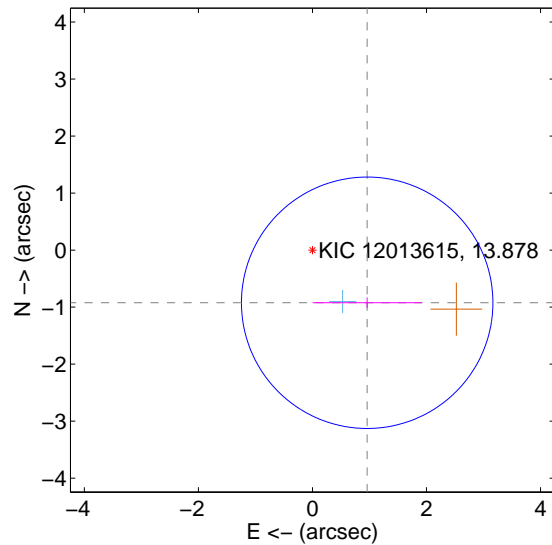
Supplemental centroid analysis for 012013615-03. Kepler magnitude: 13.88. Transit SNR 10.66

There are 1 quarters with good PRF difference image offsets

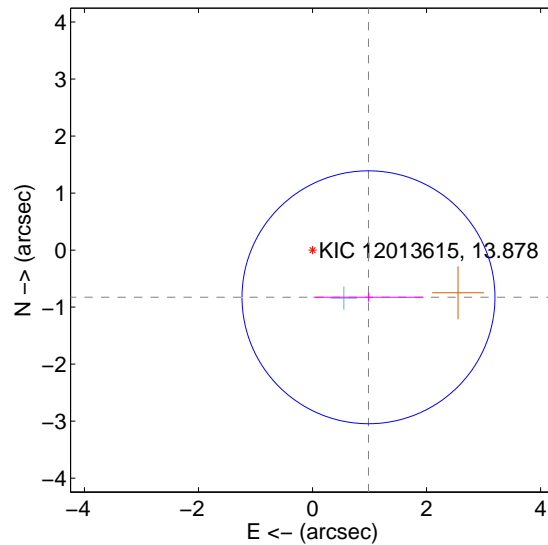
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.332 \pm 0.735$	1.81	$-0.960 \pm 0.957$	$-0.923 \pm 0.092$
PRF-fit source offset from KIC position	$1.284 \pm 0.739$	1.74	$-0.981 \pm 0.965$	$-0.827 \pm 0.078$
photometric centroid source offset	$0.97 \pm 0.40$	2.44	$0.62 \pm 0.38$	$-0.75 \pm 0.41$

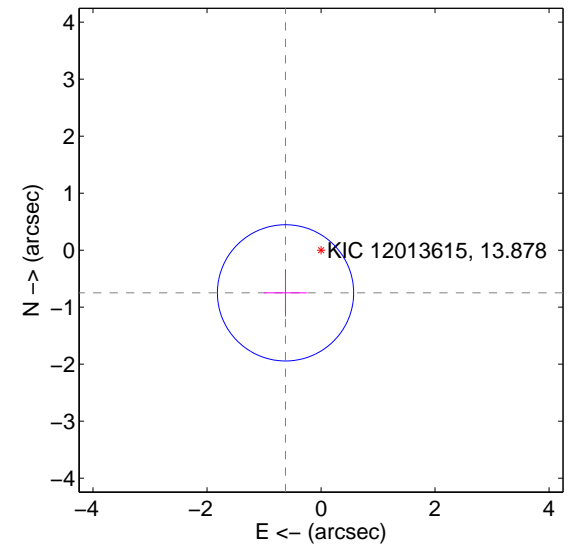
offset from difference PRF-fit to OOT PRF-fit



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.

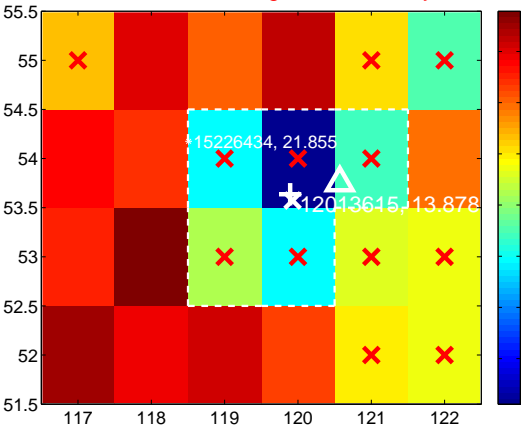
Q1 no difference image



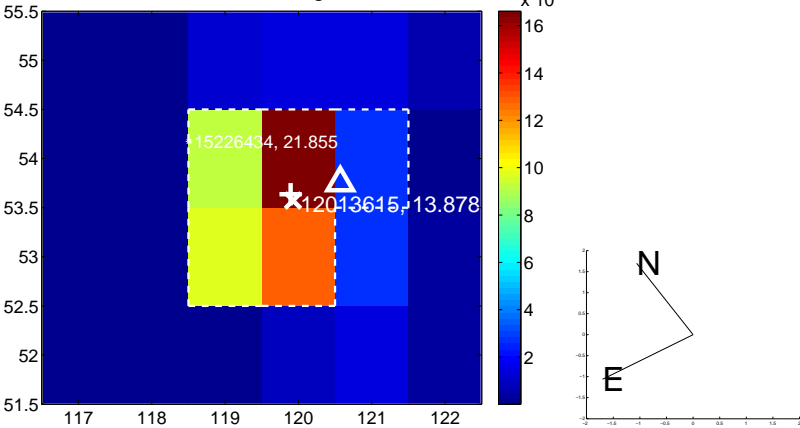
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



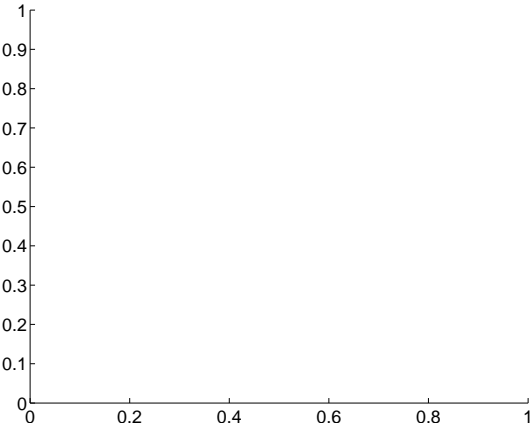
Q3 no difference image



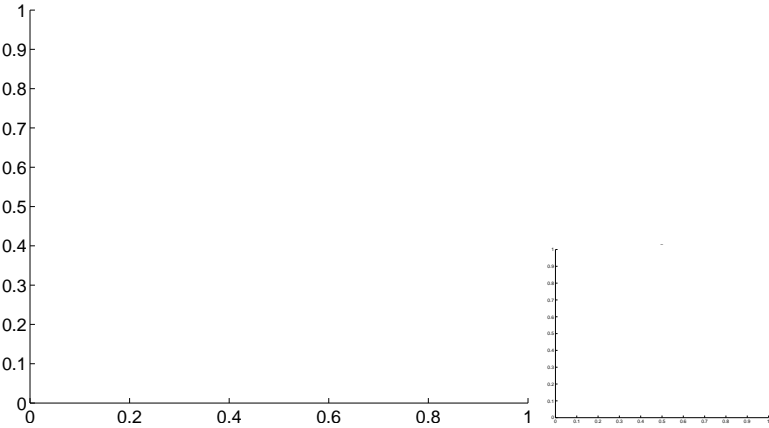
Q3 no OOT image



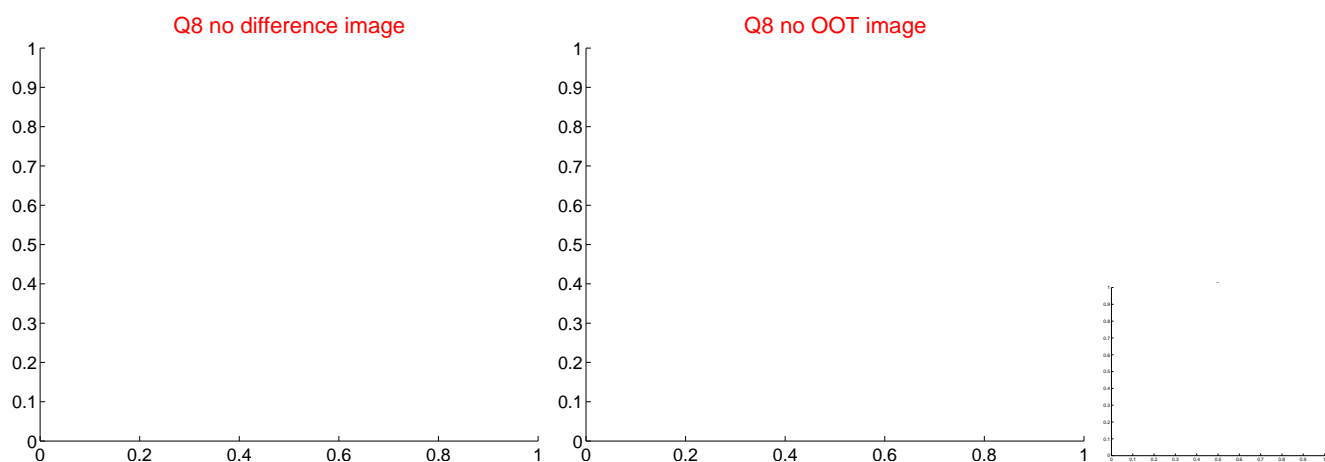
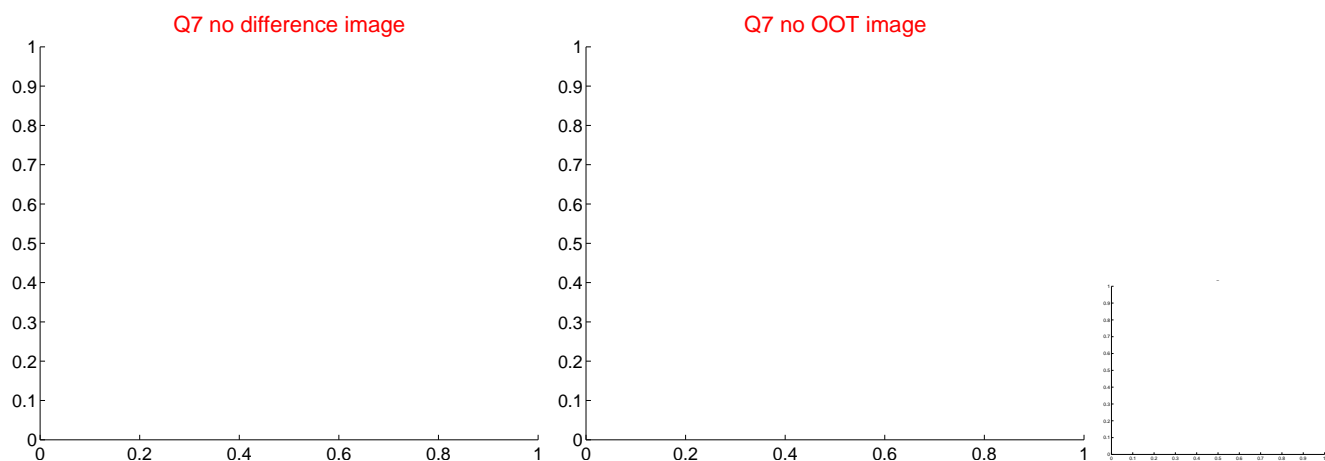
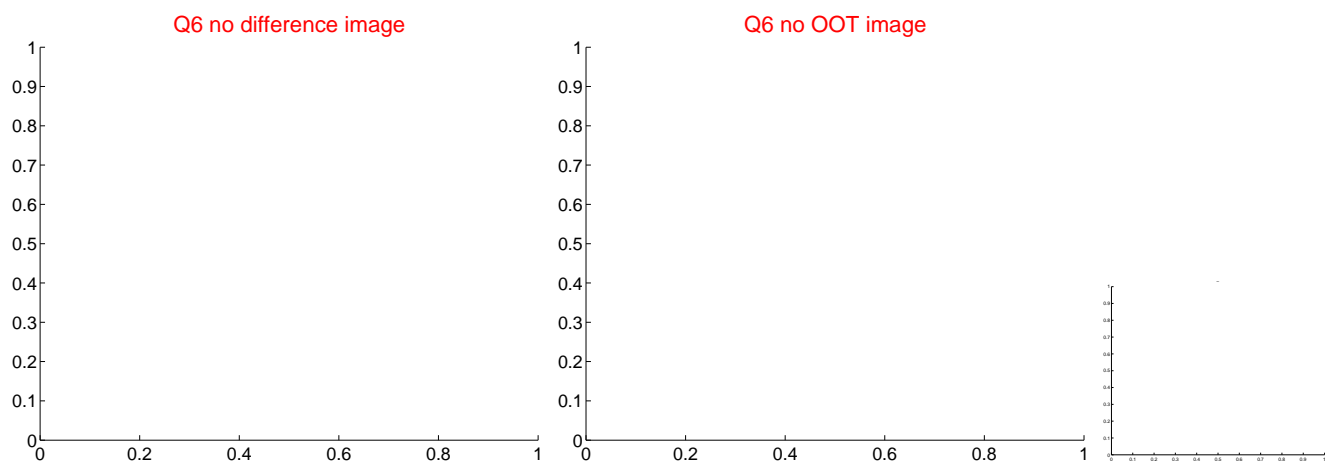
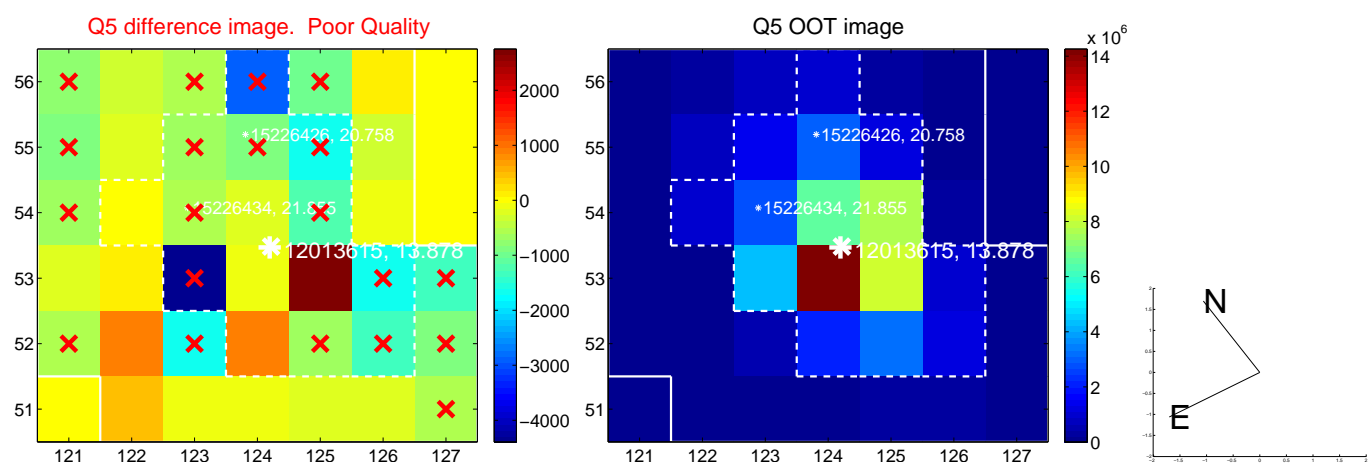
Q4 no difference image



Q4 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.

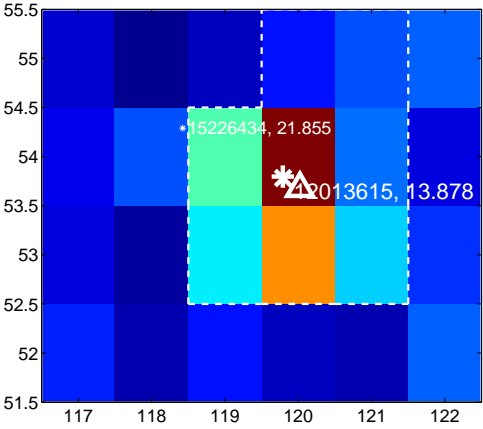
Q9 no difference image



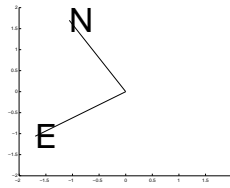
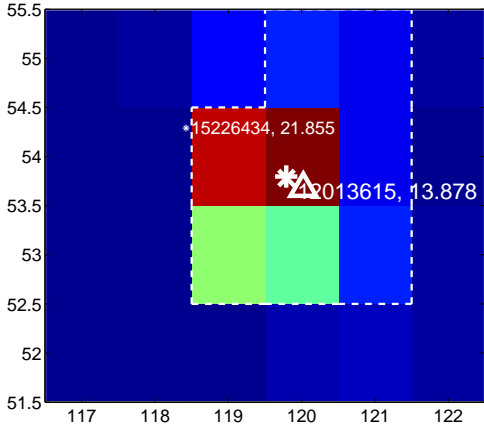
Q9 no OOT image



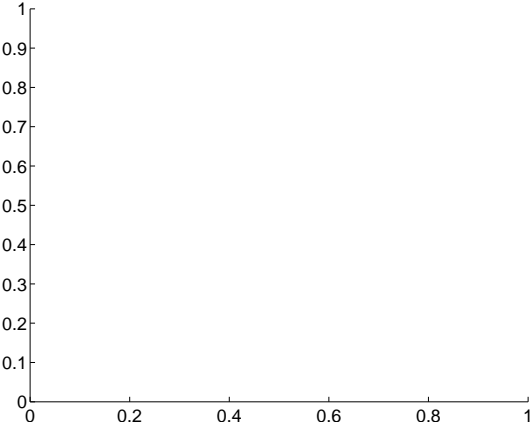
Q10 difference image



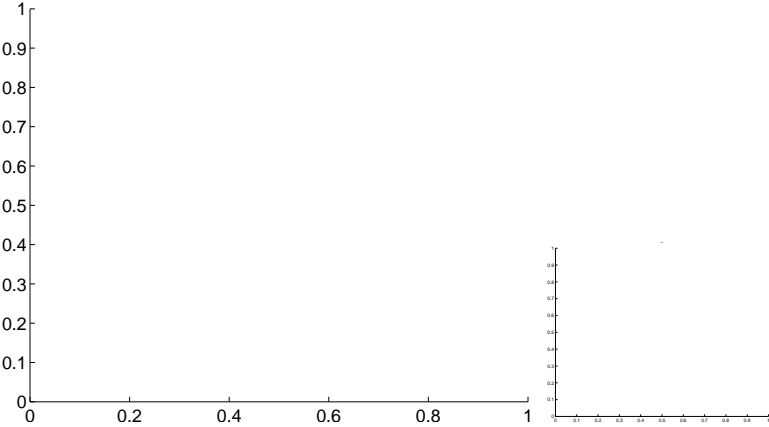
Q10 OOT image



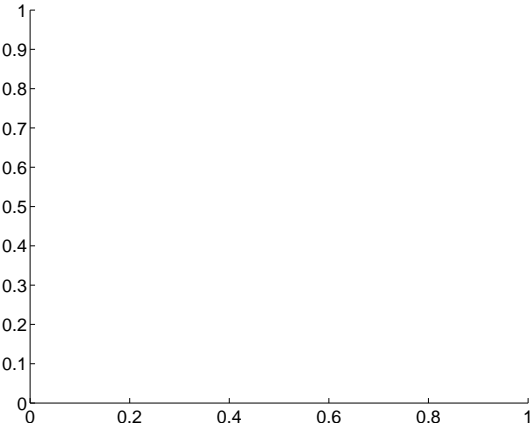
Q11 no difference image



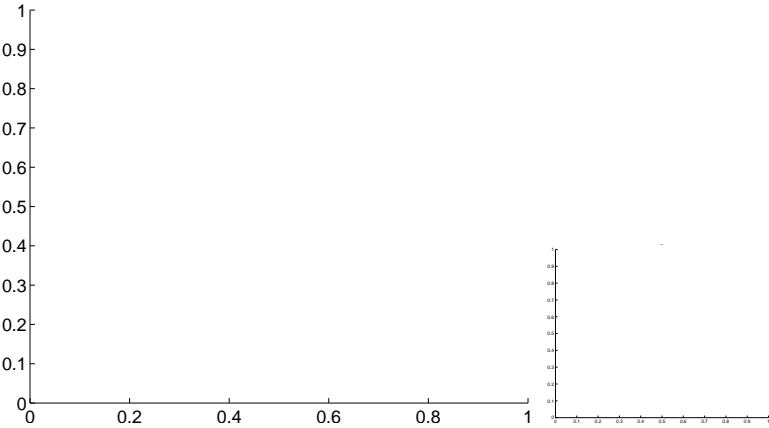
Q11 no OOT image



Q12 no difference image



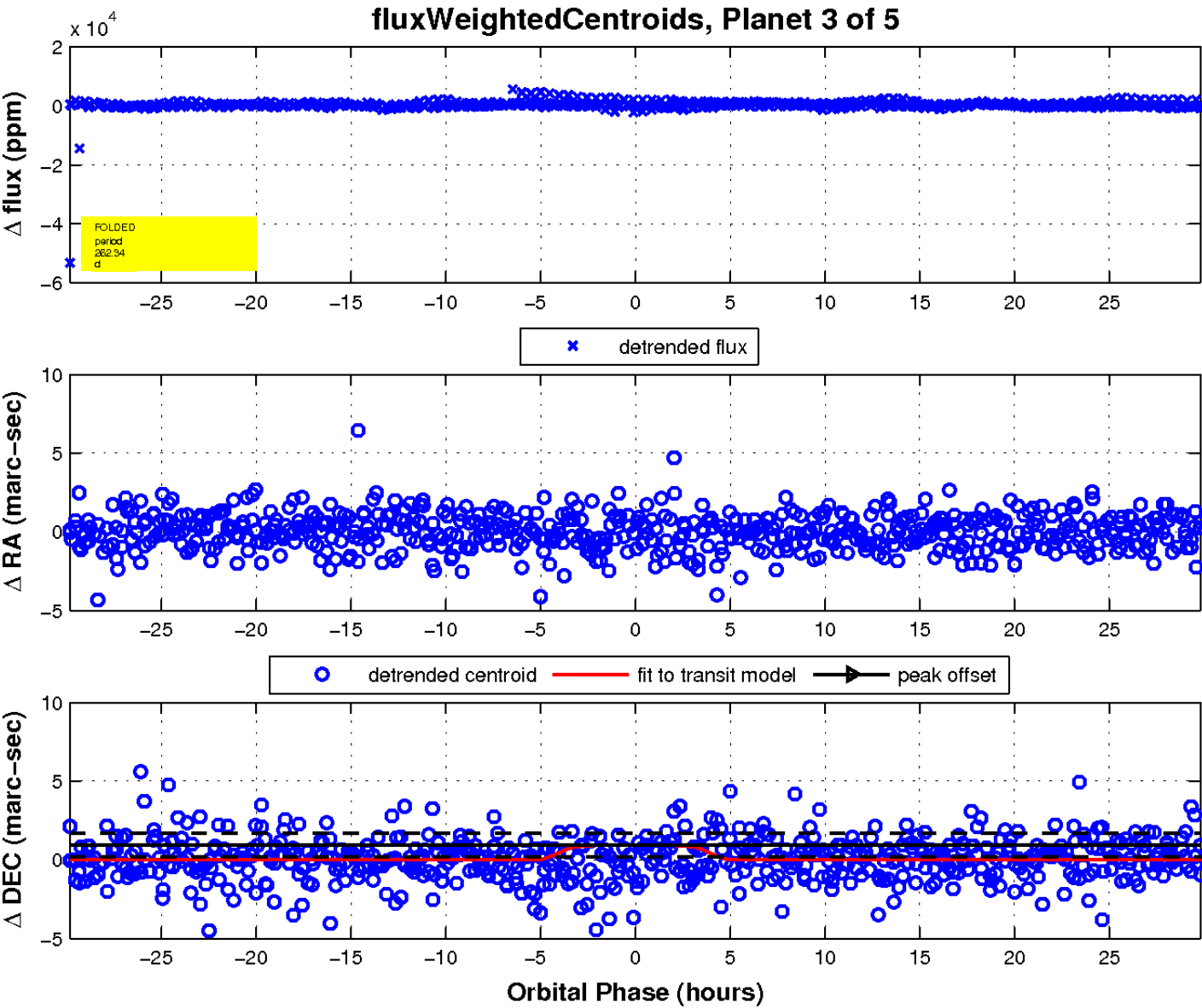
Q12 no OOT image



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

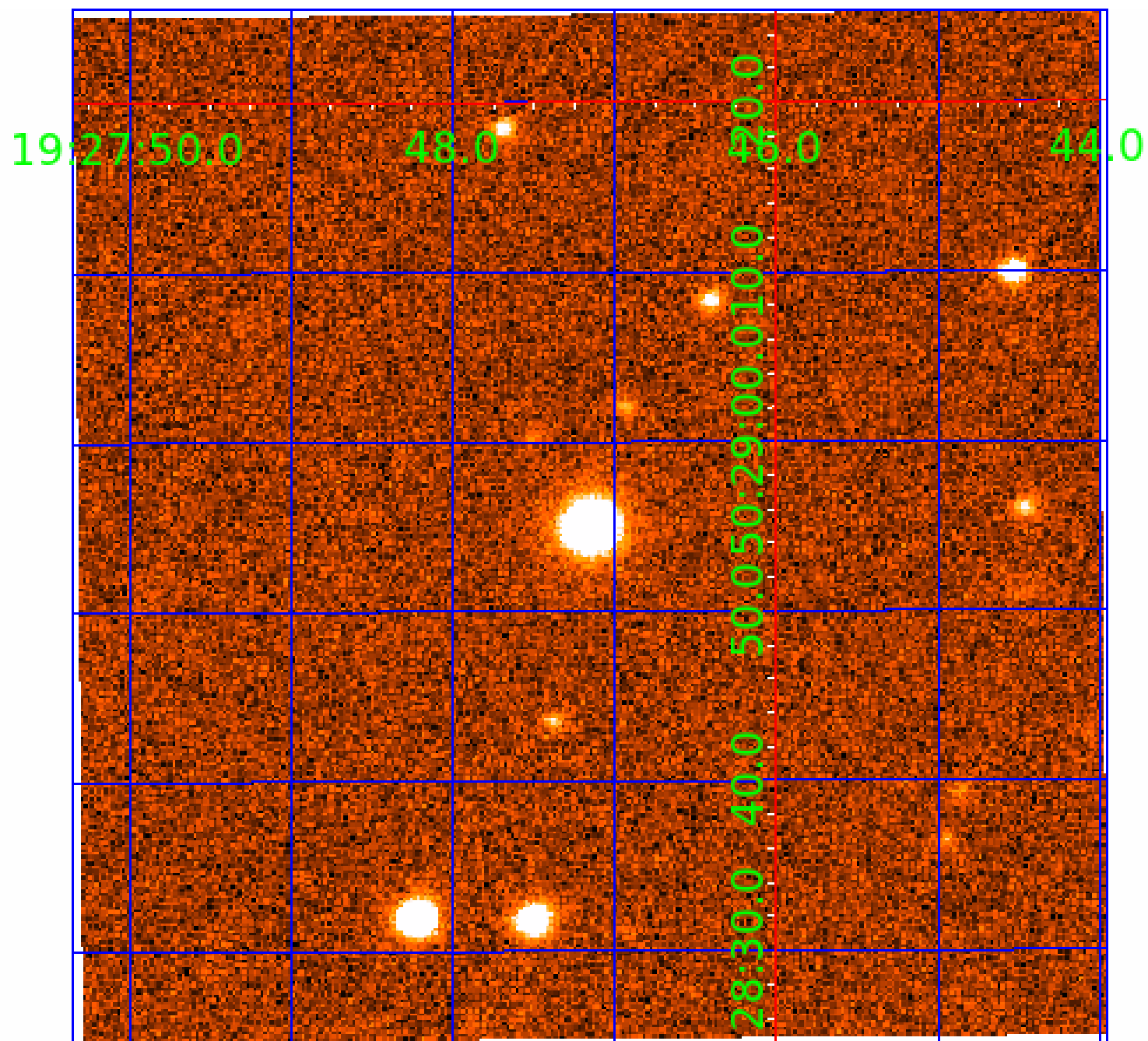


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 012013615

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012013615-01	OBS	7505.01	4.101407	134.426182	311077.7	4.500	26640.7	-1.0	1.64	6060	77.43	1196.65
012013615-02	OBS	No	4.101330	134.899768	1.5	14.022	772.6	0.1	1.64	6060	0.21	1196.68
012013615-03	OBS	No	262.336330	198.067553	1158.5	9.987	14.4	10.7	1.64	6060	6.69	4.68
012013615-04	OBS	No	500.633854	449.272867	922.5	7.196	10.7	7.9	1.64	6060	5.31	1.98
012013615-05	OBS	No	294.004093	240.248463	1526.4	8.915	12.0	8.9	1.64	6060	12.18	4.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012013615-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_ALT—CENT_NOFITS
012013615-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS
012013615-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
012013615-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
012013615-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—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.

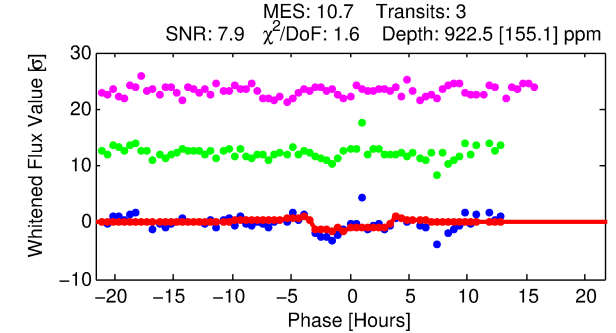
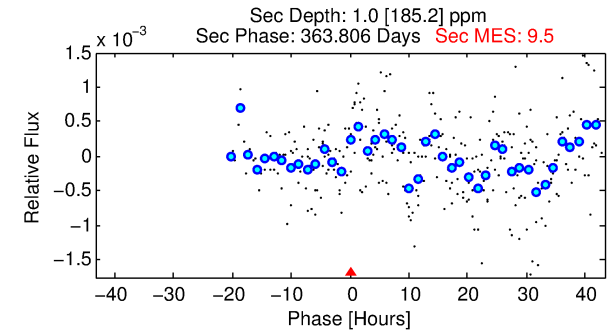
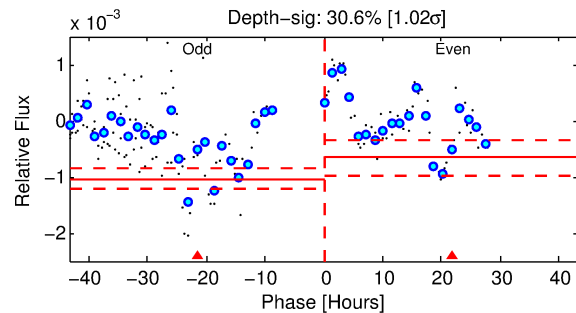
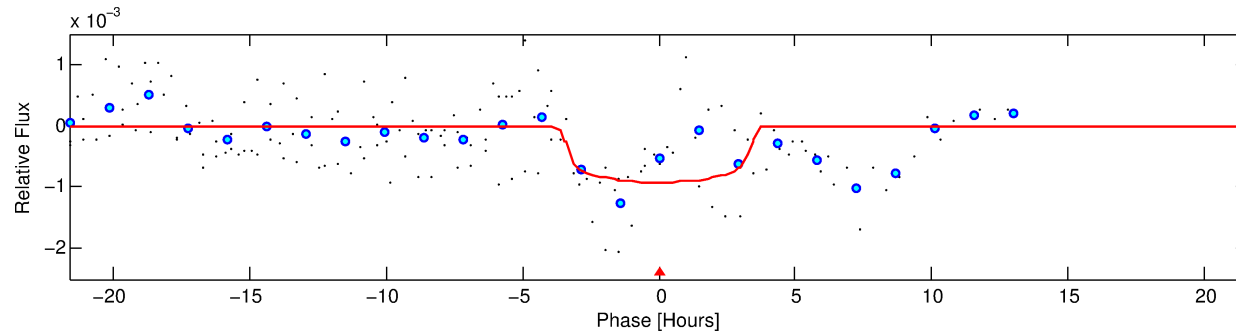
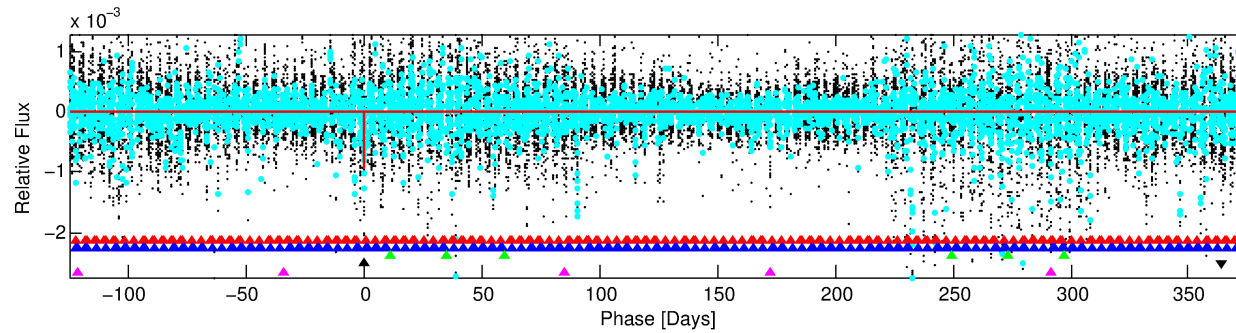
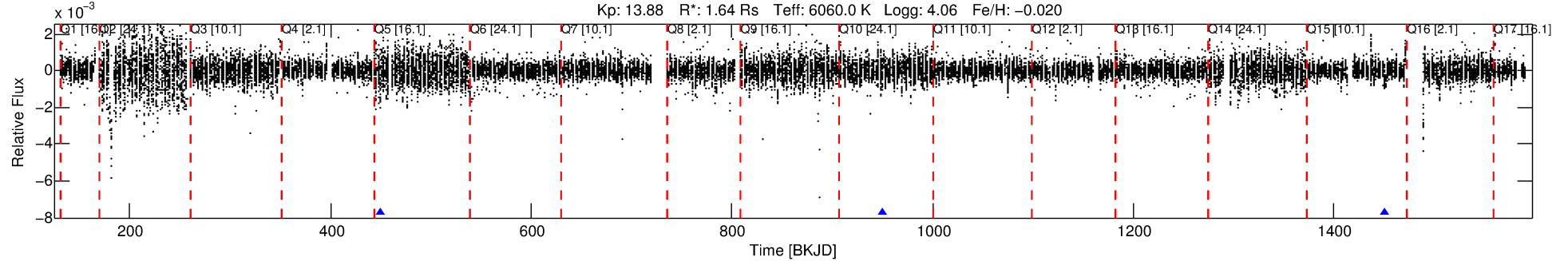
Ephemeris Match Information For 012013615-04

No Significant Match Found

# DV One-Page Summary

KIC: 12013615 Candidate: 4 of 5 Period: 500.634 d  
KOI: K07505 Corr: No Ephemeris Match

Kp: 13.88 R\*: 1.64 Rs Teff: 6060.0 K Logg: 4.06 Fe/H: -0.020



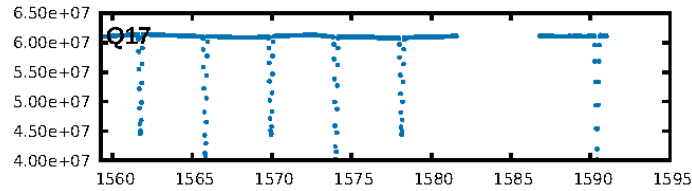
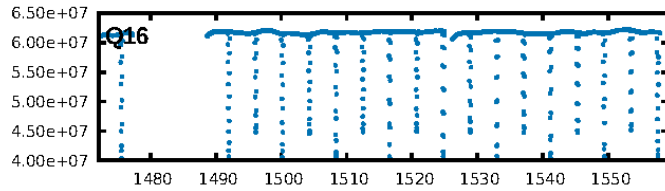
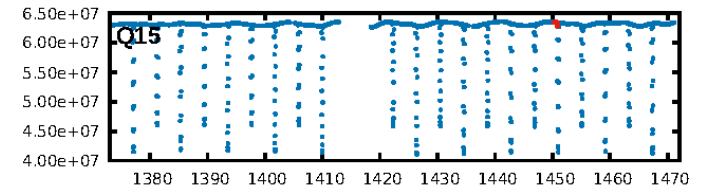
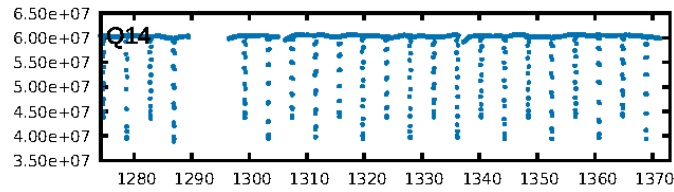
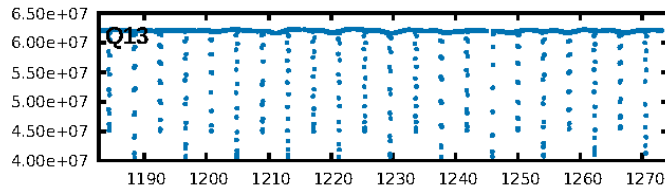
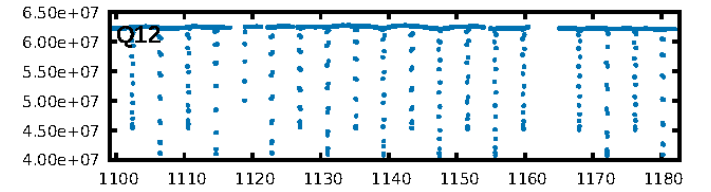
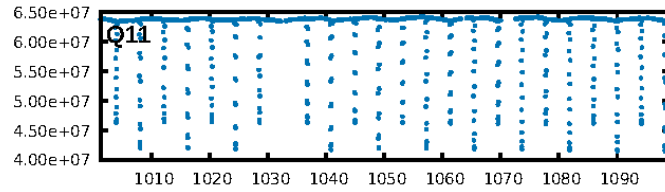
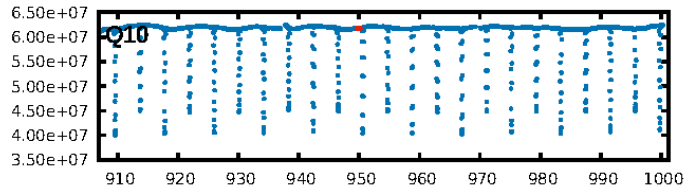
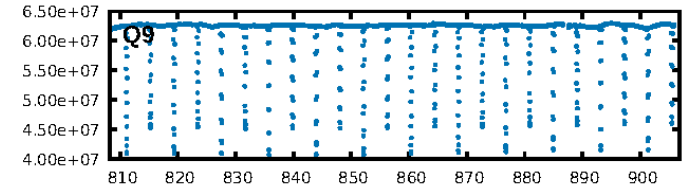
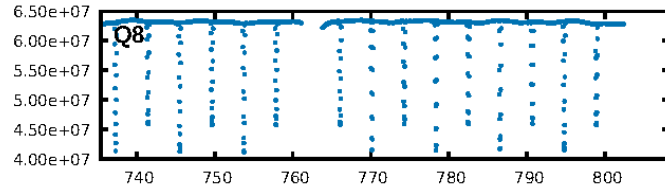
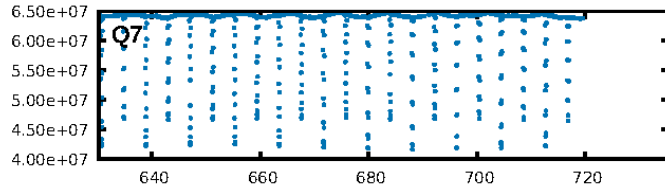
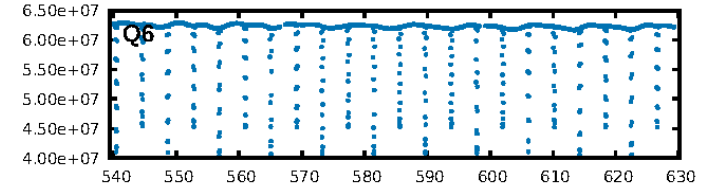
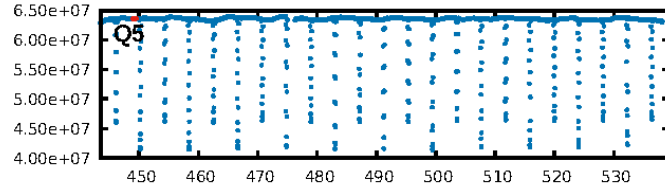
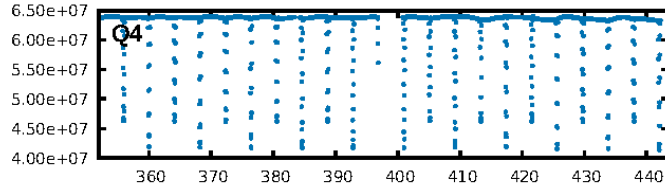
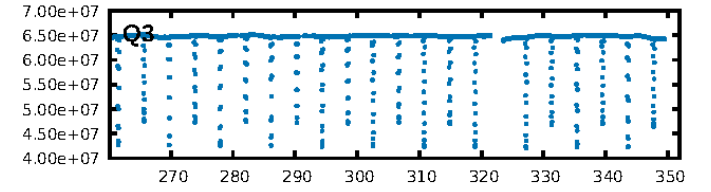
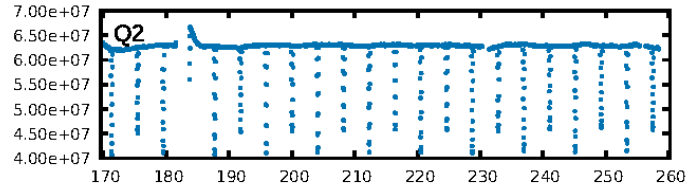
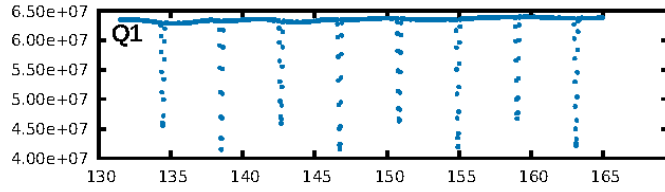
## DV Fit Results:

Period = 500.63385 [0.00816] d  
Epoch = 449.2729 [0.0102] BKJD  
Rp/R\* = 0.0296 [0.0136]  
a/R\* = 408.60 [871.26]  
b = 0.68 [1.66]  
Seff = 1.98 [1.12]  
Teq = 302 [43] K  
Rp = 5.31 [3.01] Re  
a = 1.2847 [0.4329] AU  
Ag = 30.84 [5963.19] [0.01σ]  
Teffp = 1102 [53247] K [0.02σ]

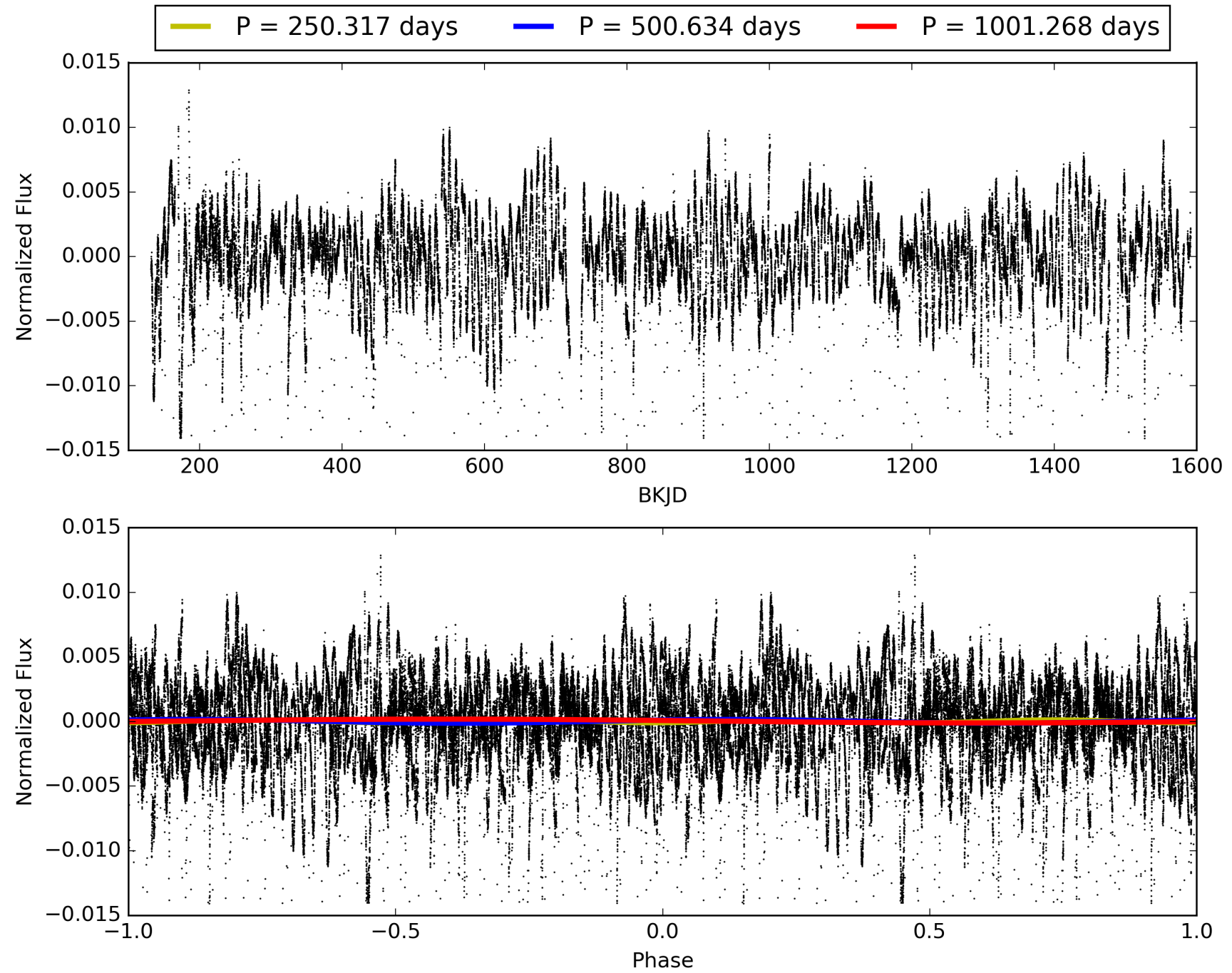
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [432.84σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.9%  
ModelChiSquareGof-sig: 79.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.5694**  
Centroid-sig: N/A  
Centroid-so: 0.877 arcsec [1.32σ]  
OotOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-rm: N/A  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.50 [1/2]

# TCE 012013615-04, PDC Light Curves



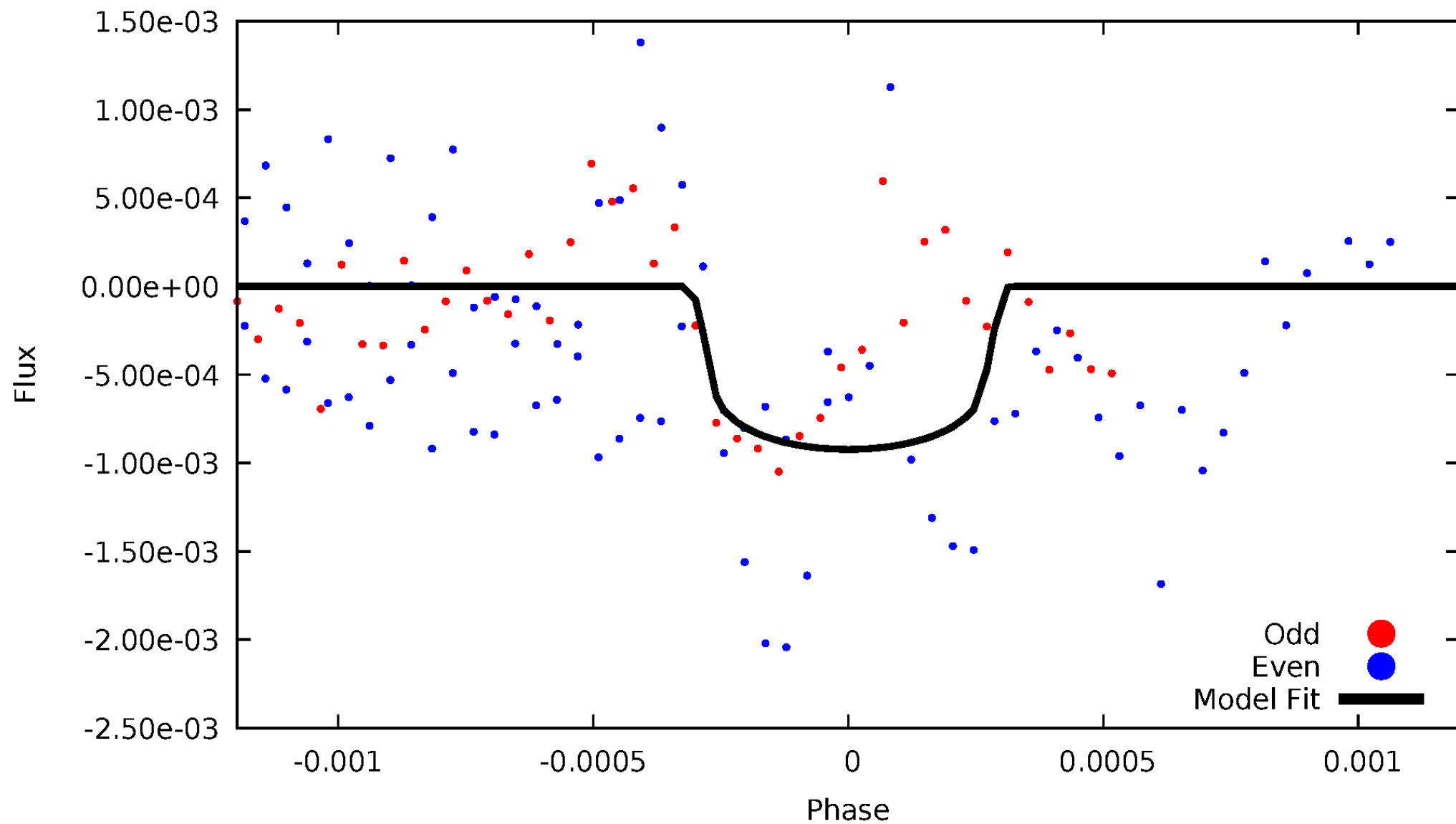
# TCE 012013615-04





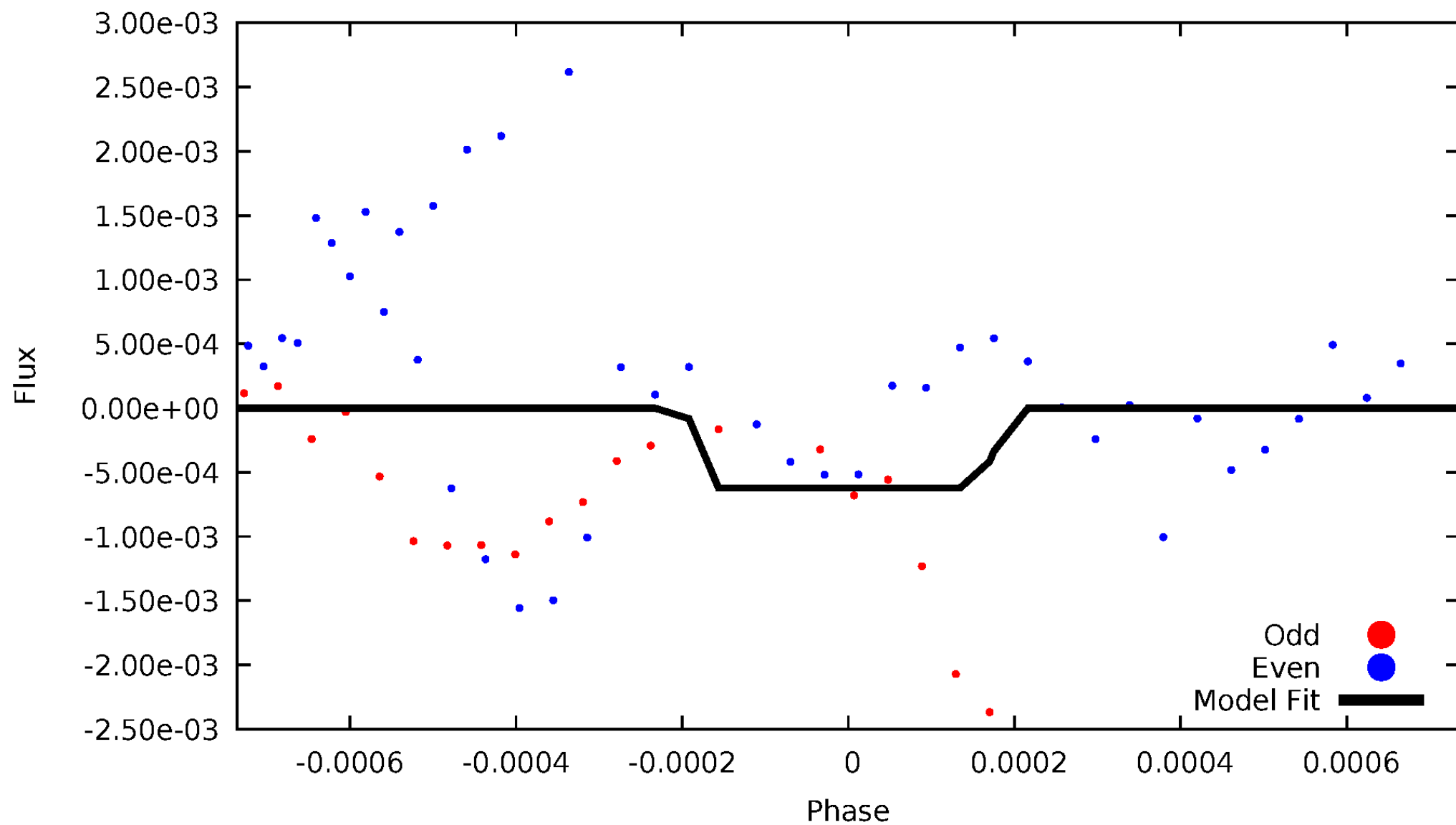
# DV Odd/Even

TCE 012013615-04



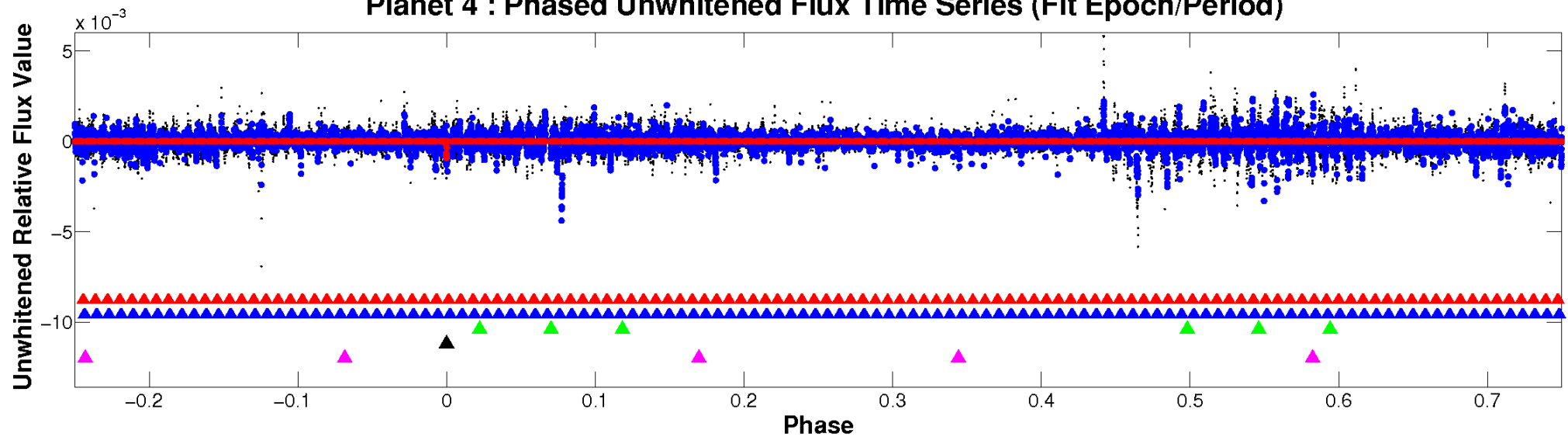
# ALT Odd/Even

TCE 012013615-04

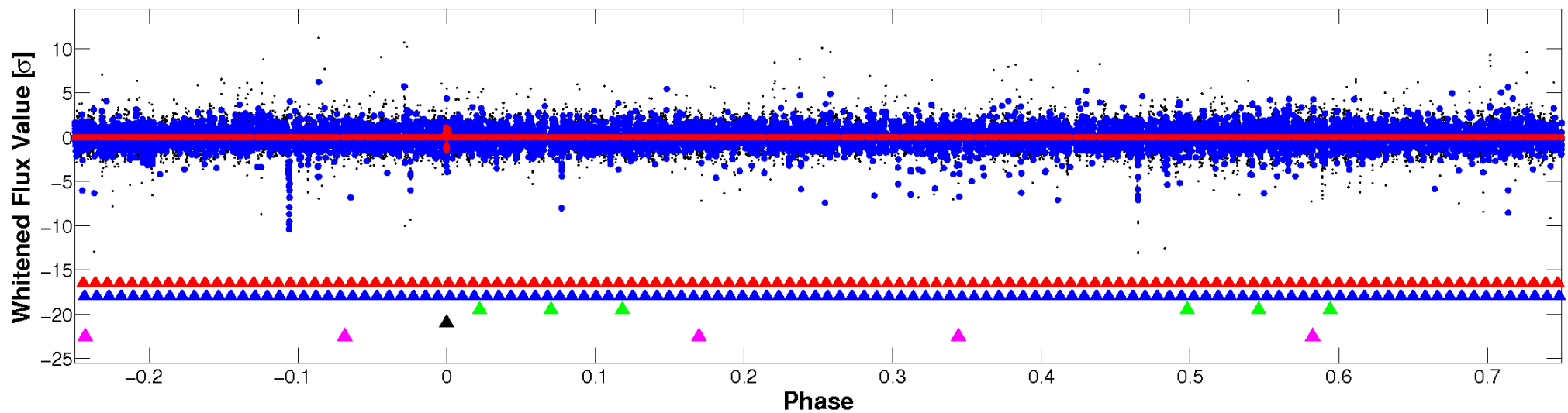


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

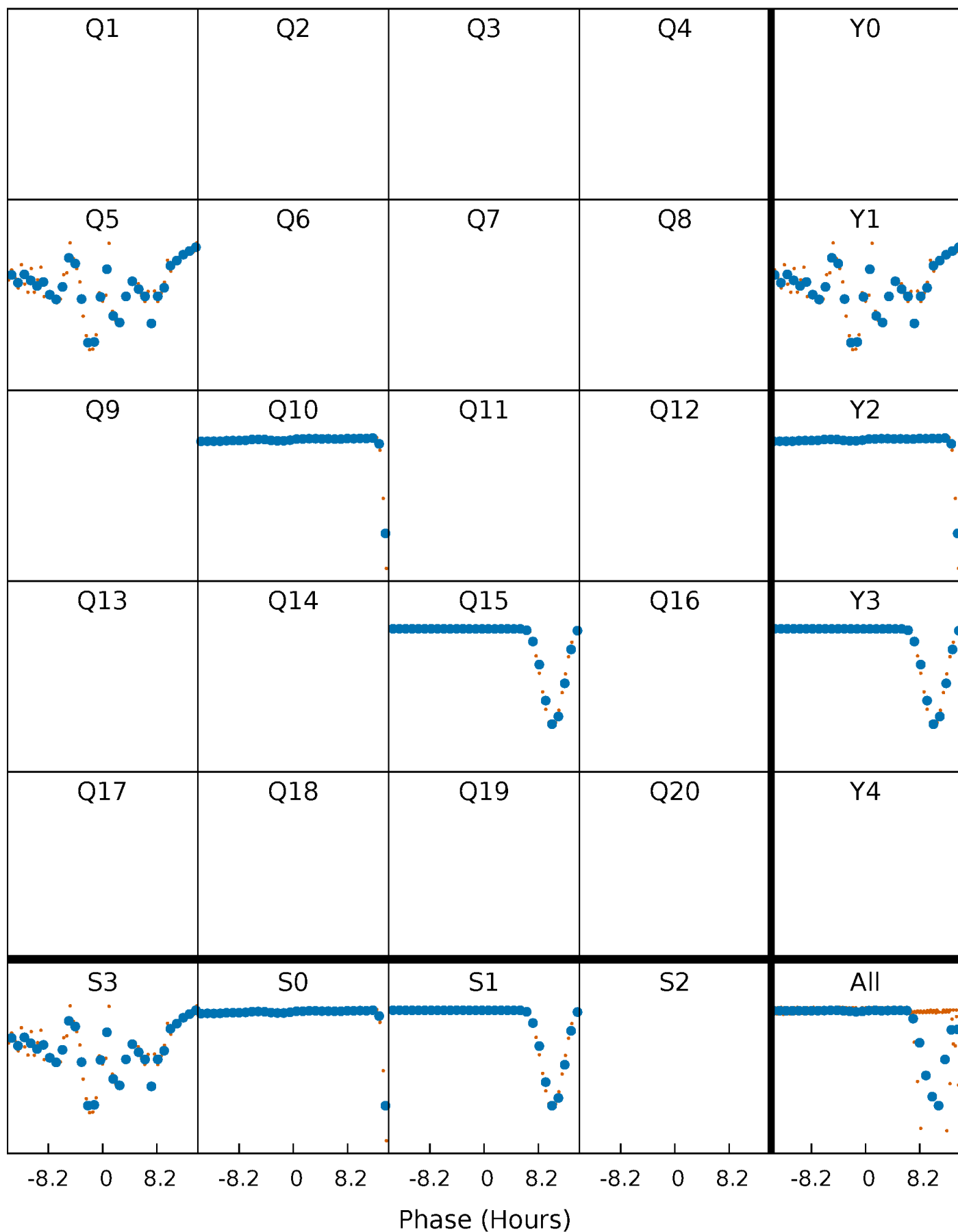


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



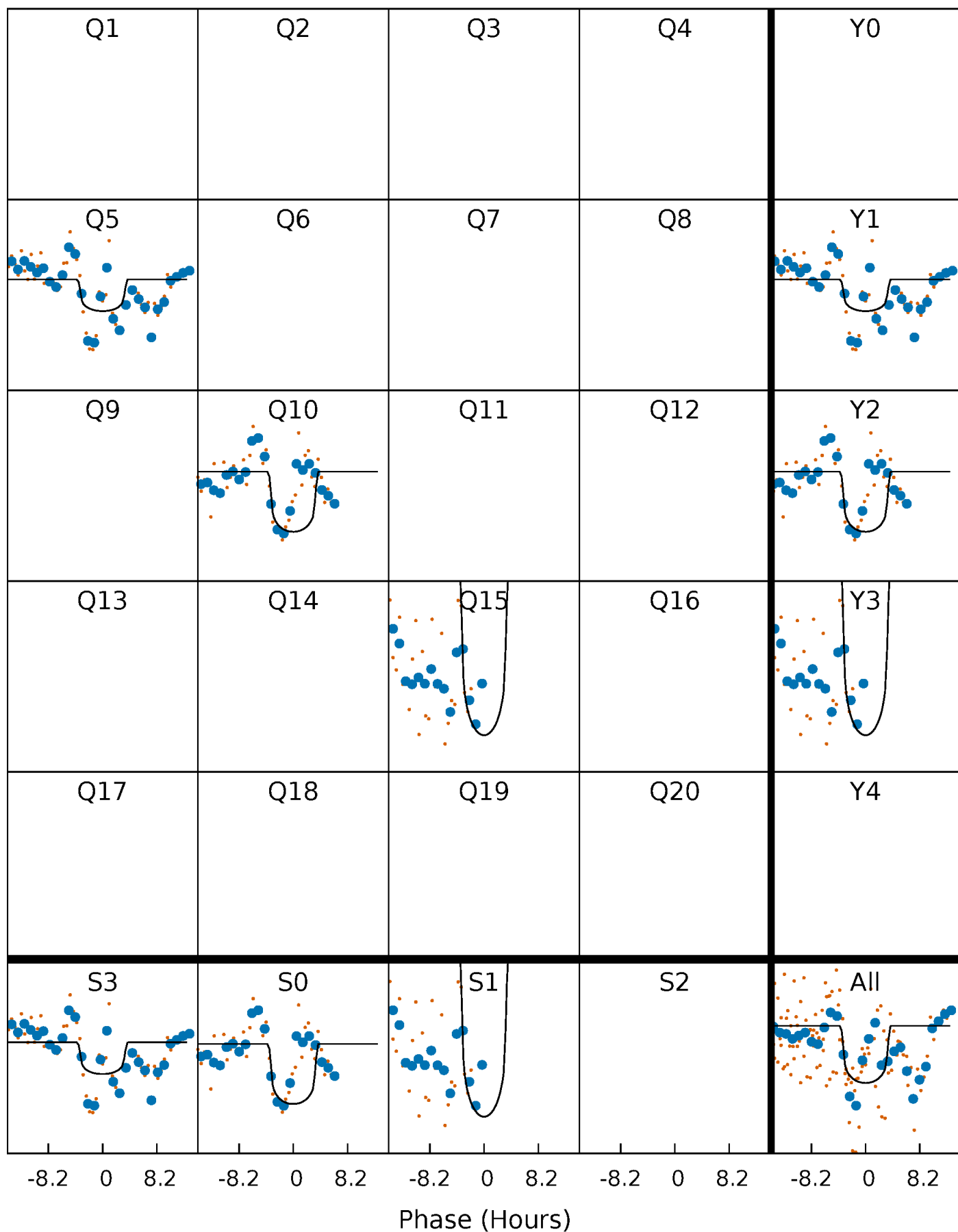
# PDC Quarter-Phased Transit Curves

TCE 012013615-04 P=500.633854 Days  $T_0=449.272867$  (BKJD)



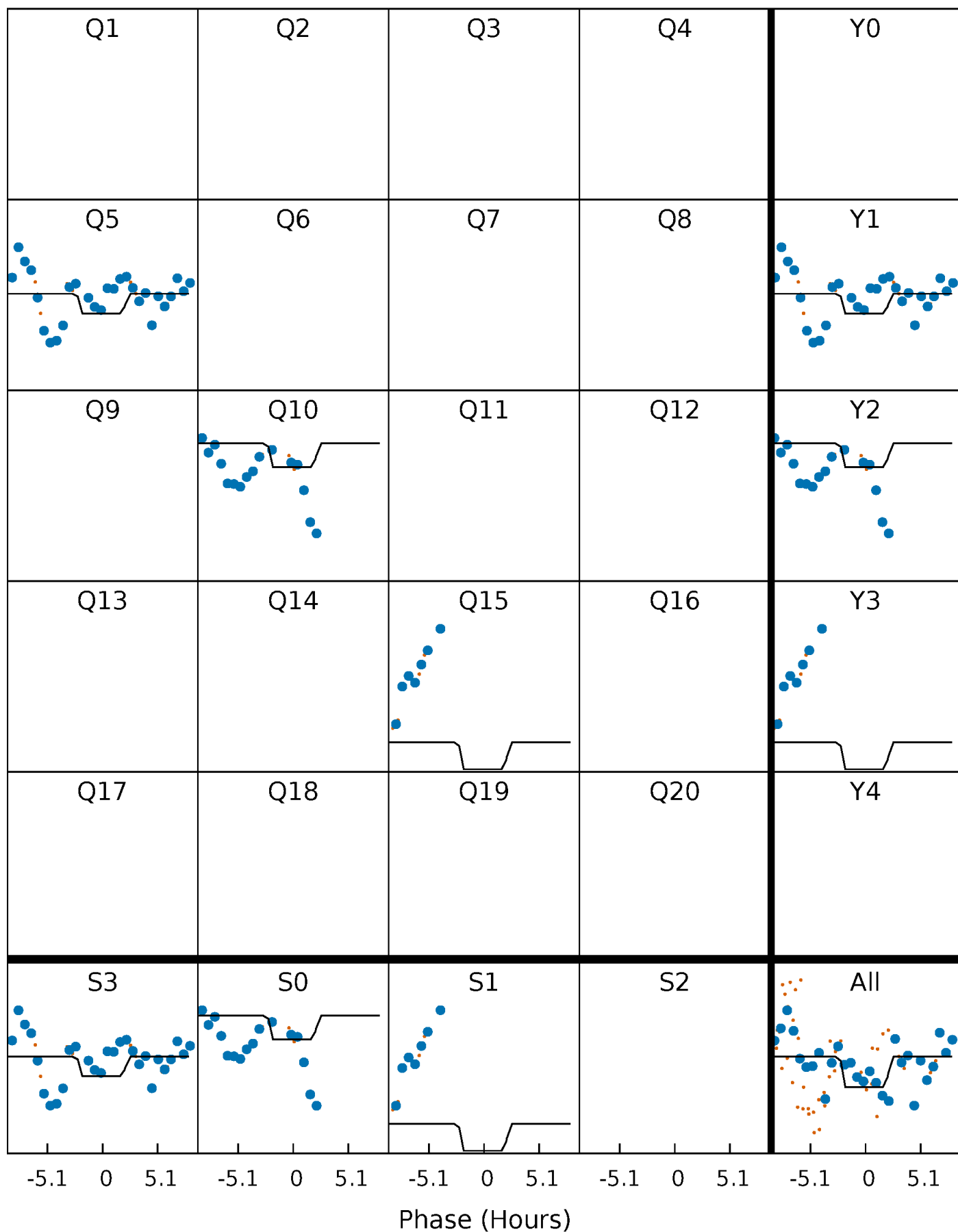
# DV Quarter-Phased Transit Curves

TCE 012013615-04 P=500.633854 Days  $T_0=449.272867$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

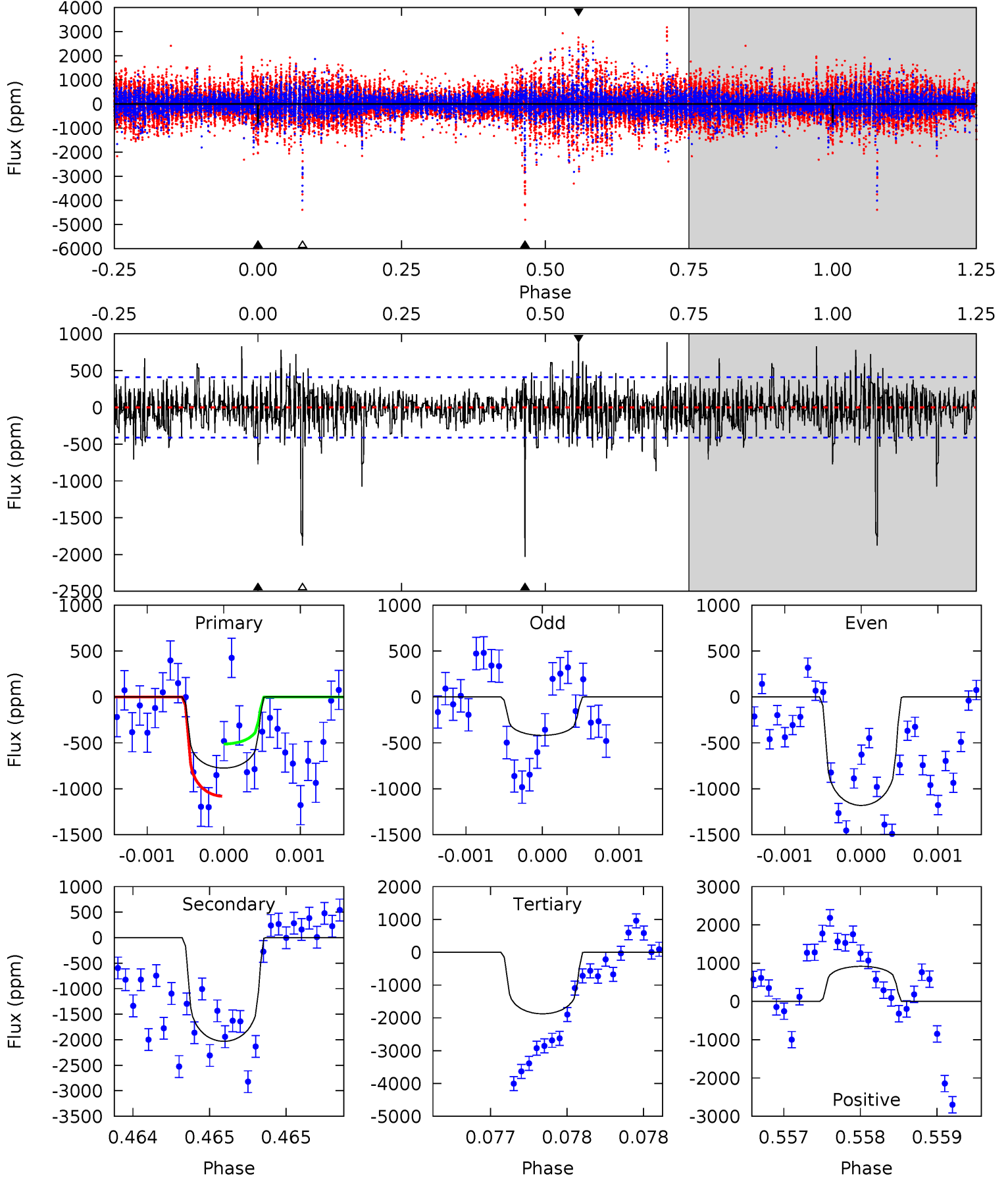
TCE 012013615-04 P=500.649465 Days  $T_0=449.389827$  (BKJD)



# DV Model-Shift Uniqueness Test

012013615-04, P = 500.633854 Days, E = 449.272867 Days

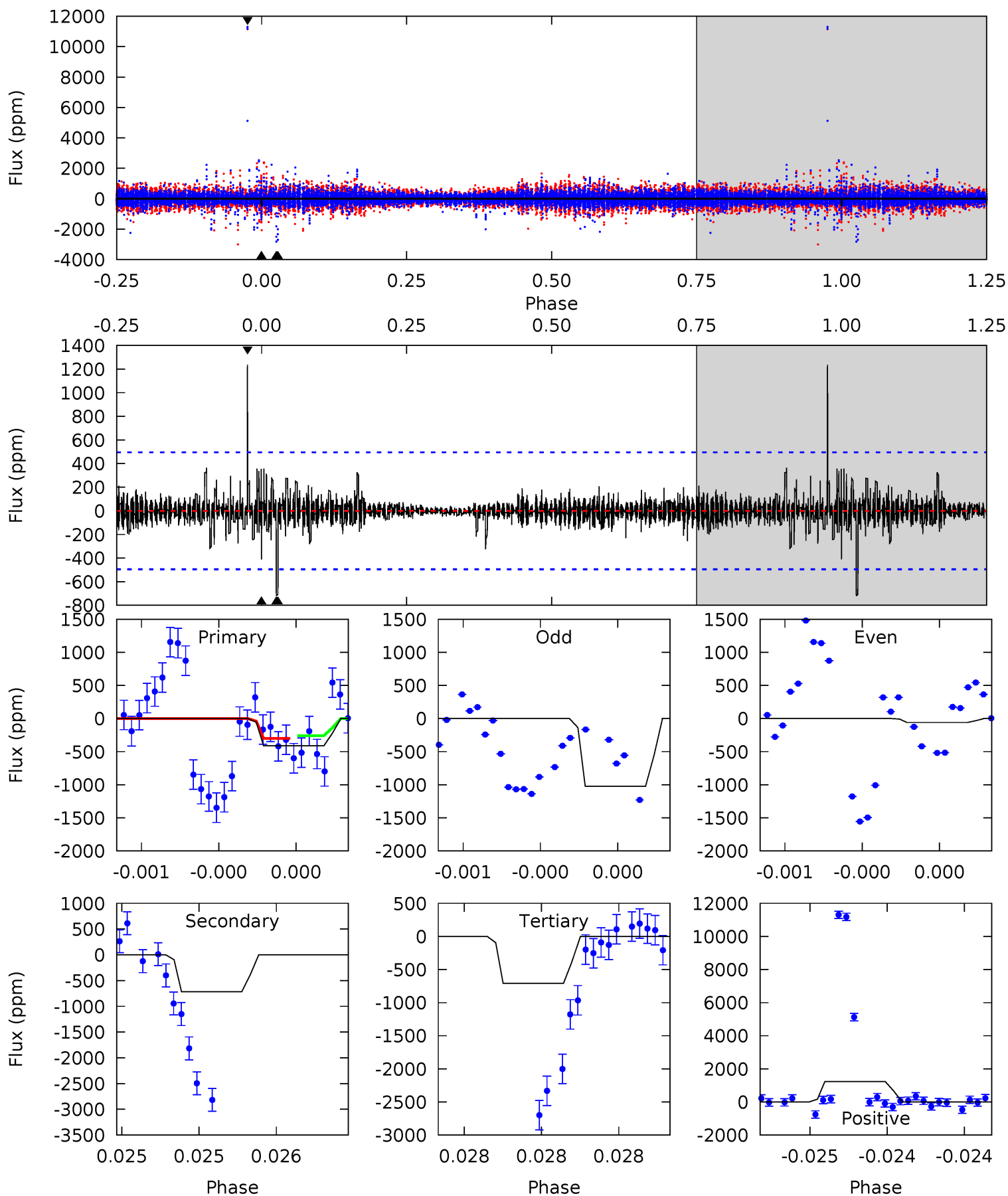
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	27.4	25.3	12.4	5.54	3.43	2.42	-14.9	-1.93	2.07	15.0	4.85	0.96	0.31	3.78



# Alt Model-Shift Uniqueness Test

012013615-04, P = 500.649465 Days, E = 449.389827 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
4.67	8.16	8.06	14.0	5.62	3.56	0.65	-3.39	-9.38	0.10	-5.89	5.22	1.00	0.63	0.21





### Stellar Parameters For KIC 012013615

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6060^{+184}_{-202}$	$4.059^{+0.329}_{-0.141}$	$-0.020^{+0.250}_{-0.300}$	$1.643^{+0.450}_{-0.550}$	$1.129^{+0.174}_{-0.174}$	$0.358^{+0.825}_{-0.140}$
	+3%/-3%	+8%/-3%	+1250%/-1500%	+27%/-33%	+15%/-15%	+230%/-39%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 012013615-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2031 \pm 74$	$4.98^{+2.63}_{-2.37}$	$414^{+33}_{-38}$	$7577^{+4171}_{-1396}$	$75107^{+196564}_{-42466}$
Alt.	$-718 \pm 88$	$4.13^{+2.49}_{-2.12}$	$415^{+32}_{-39}$	$6253^{+3253}_{-1165}$	$37011^{+121989}_{-22403}$

$T_{max}$  = 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

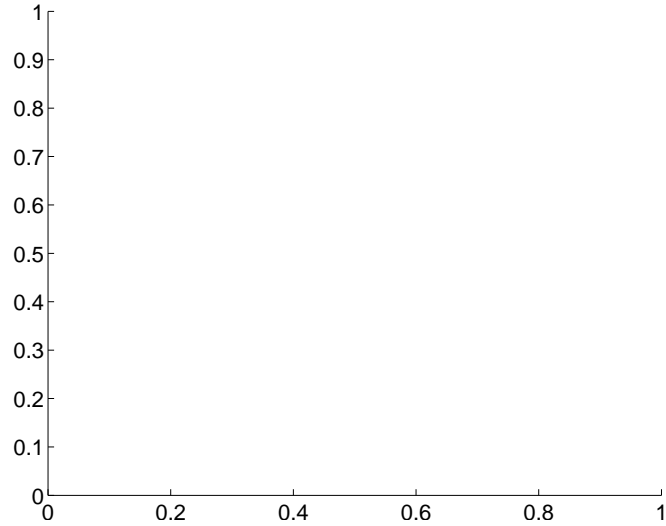
Supplemental centroid analysis for 012013615-04. Kepler magnitude: 13.88. Transit SNR 7.94

There are 0 quarters with good PRF difference image offsets

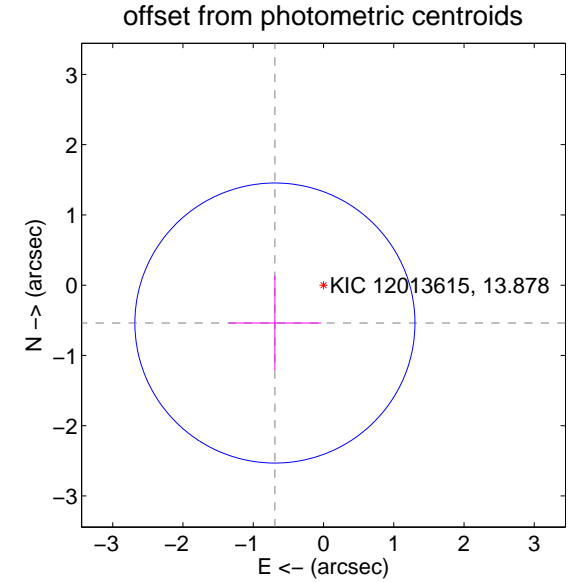
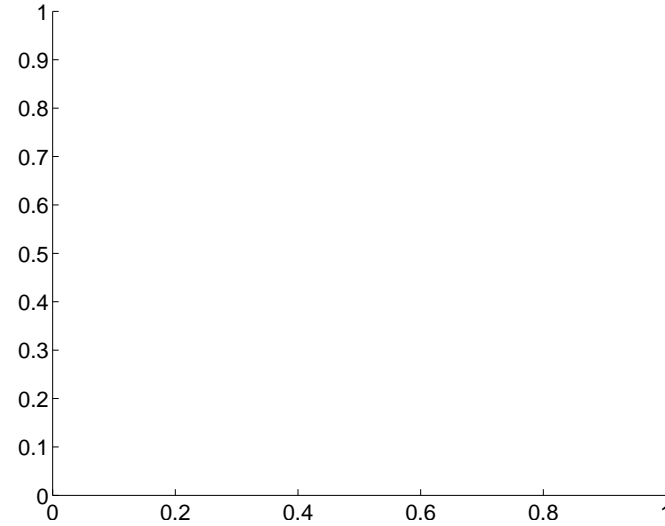
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$0.88 \pm 0.66$	1.32	$0.69 \pm 0.66$	$-0.54 \pm 0.68$

There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC

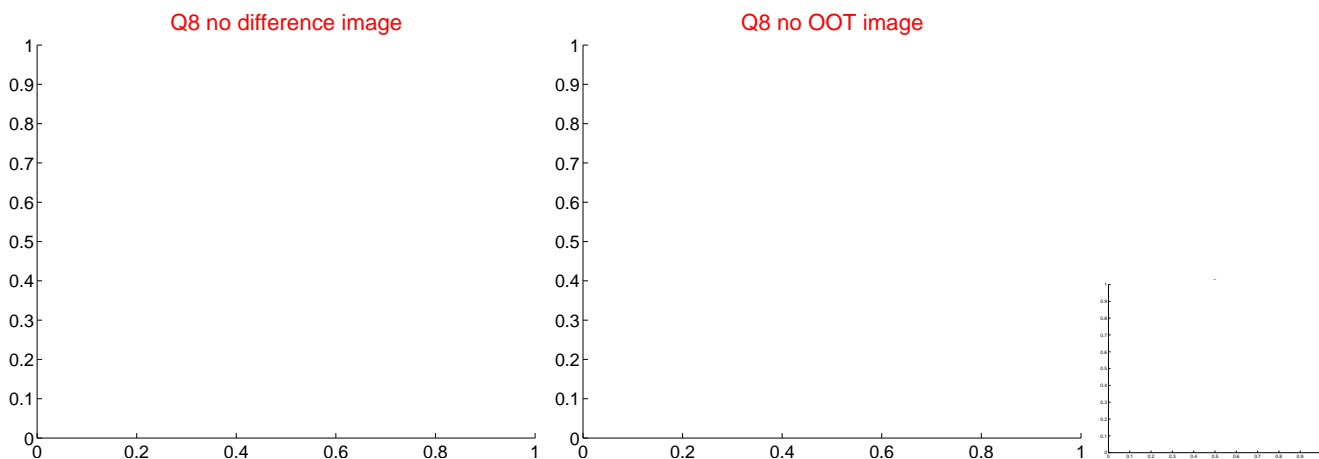
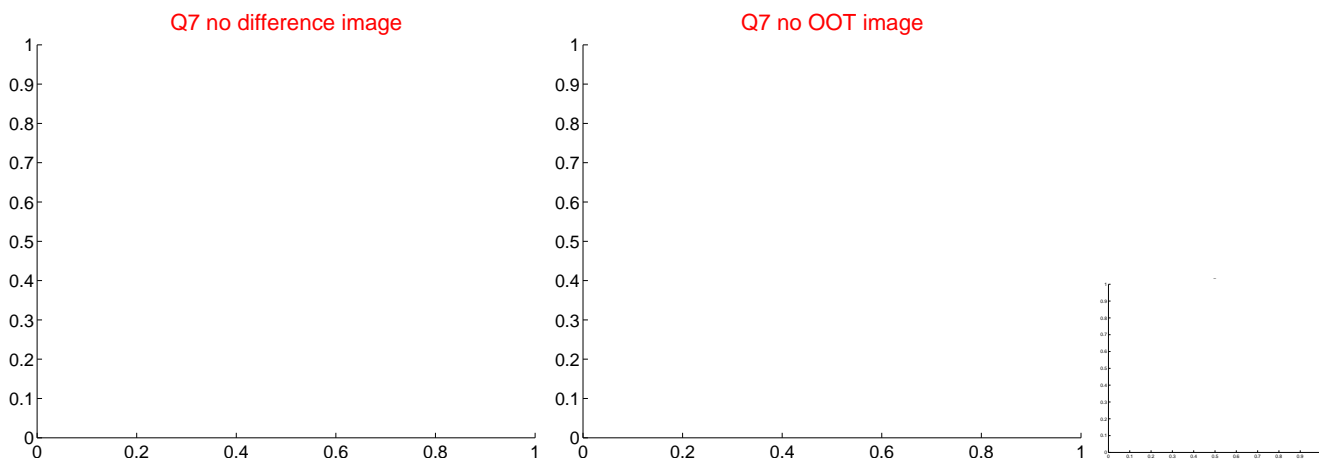
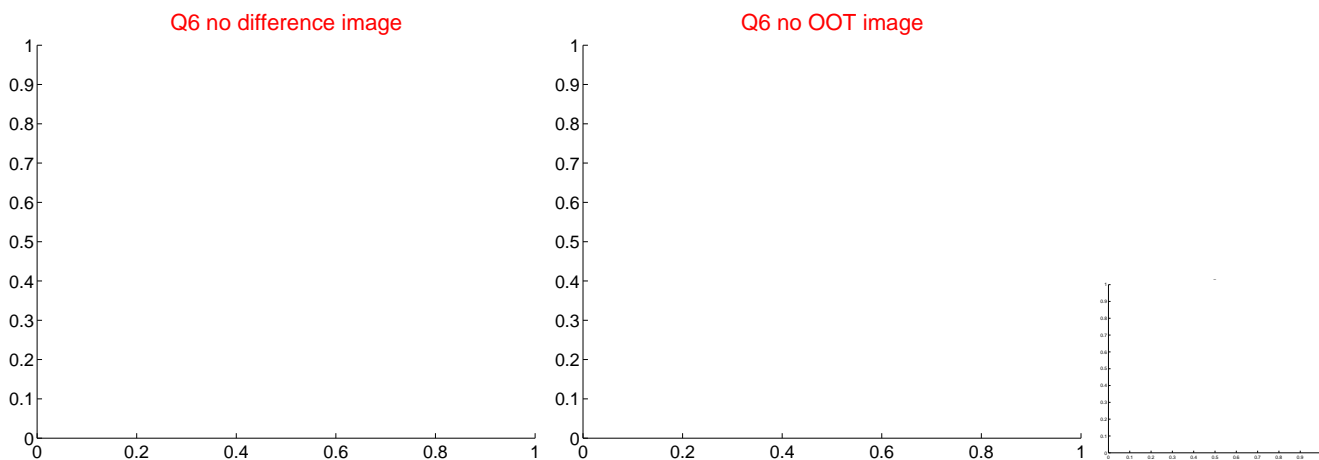
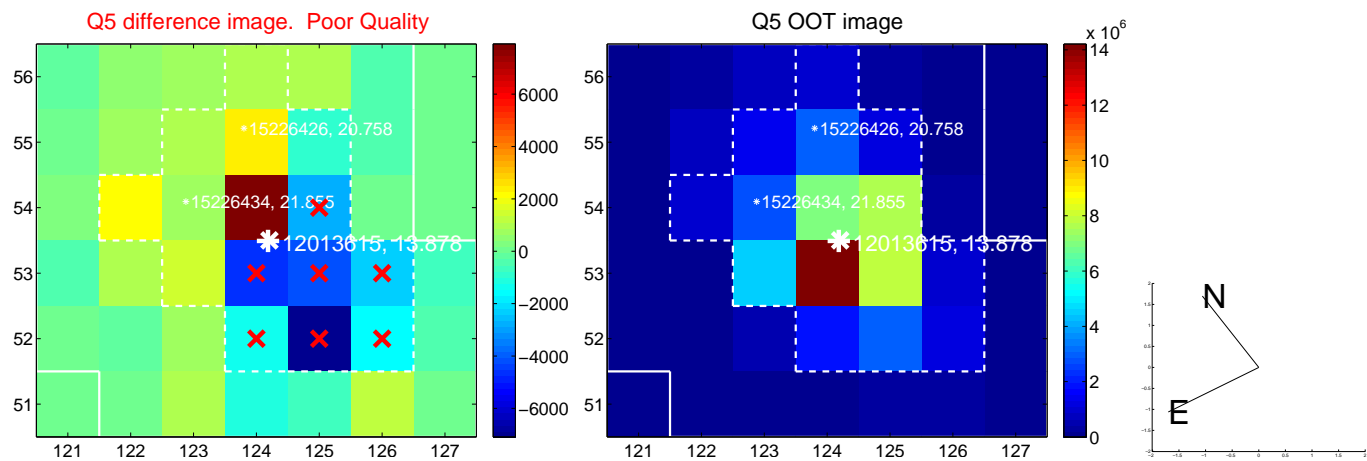


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

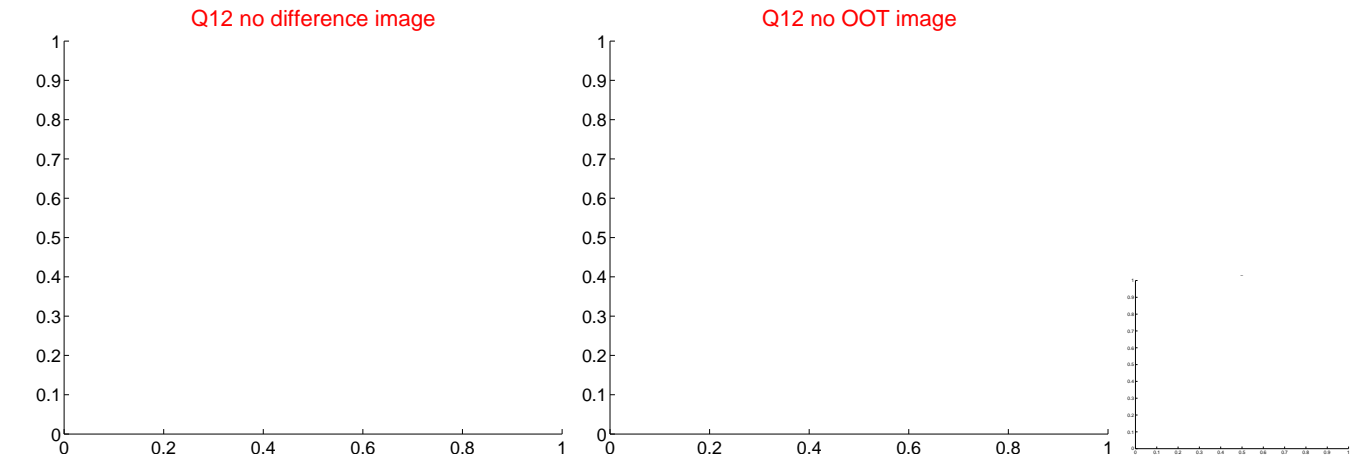
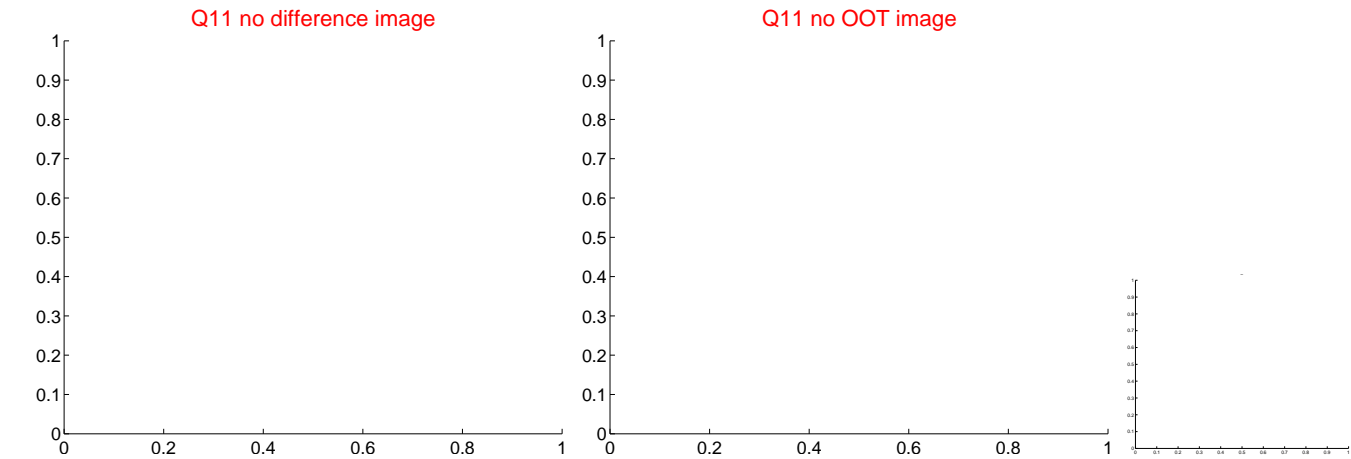
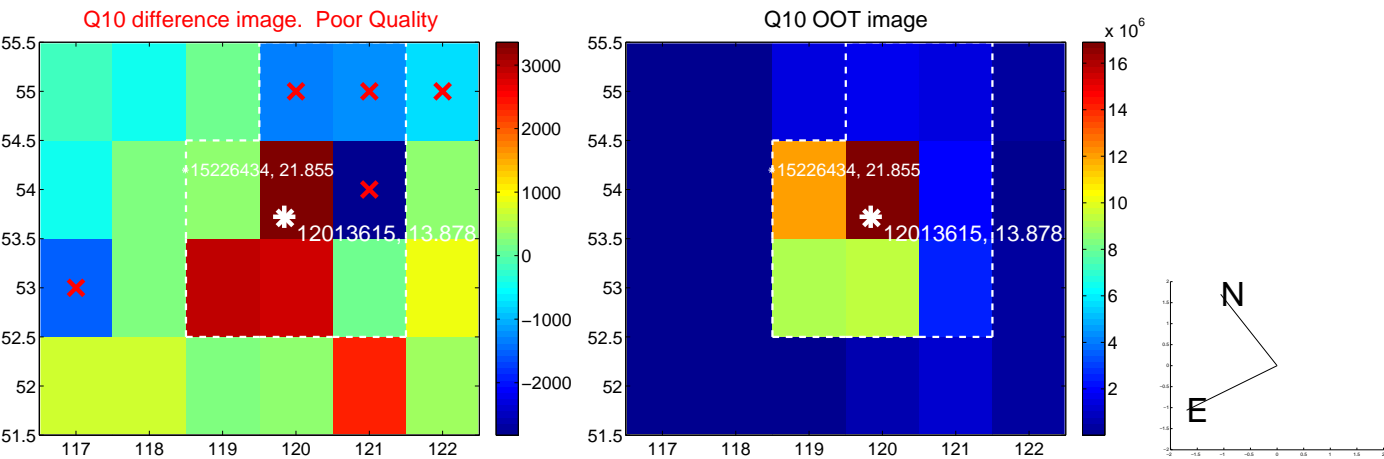
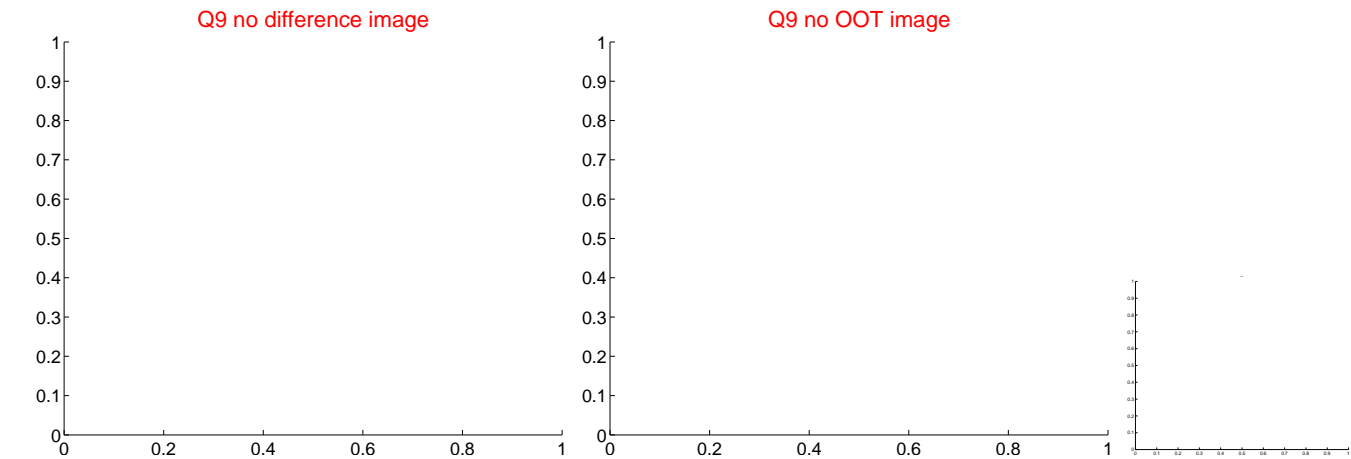
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



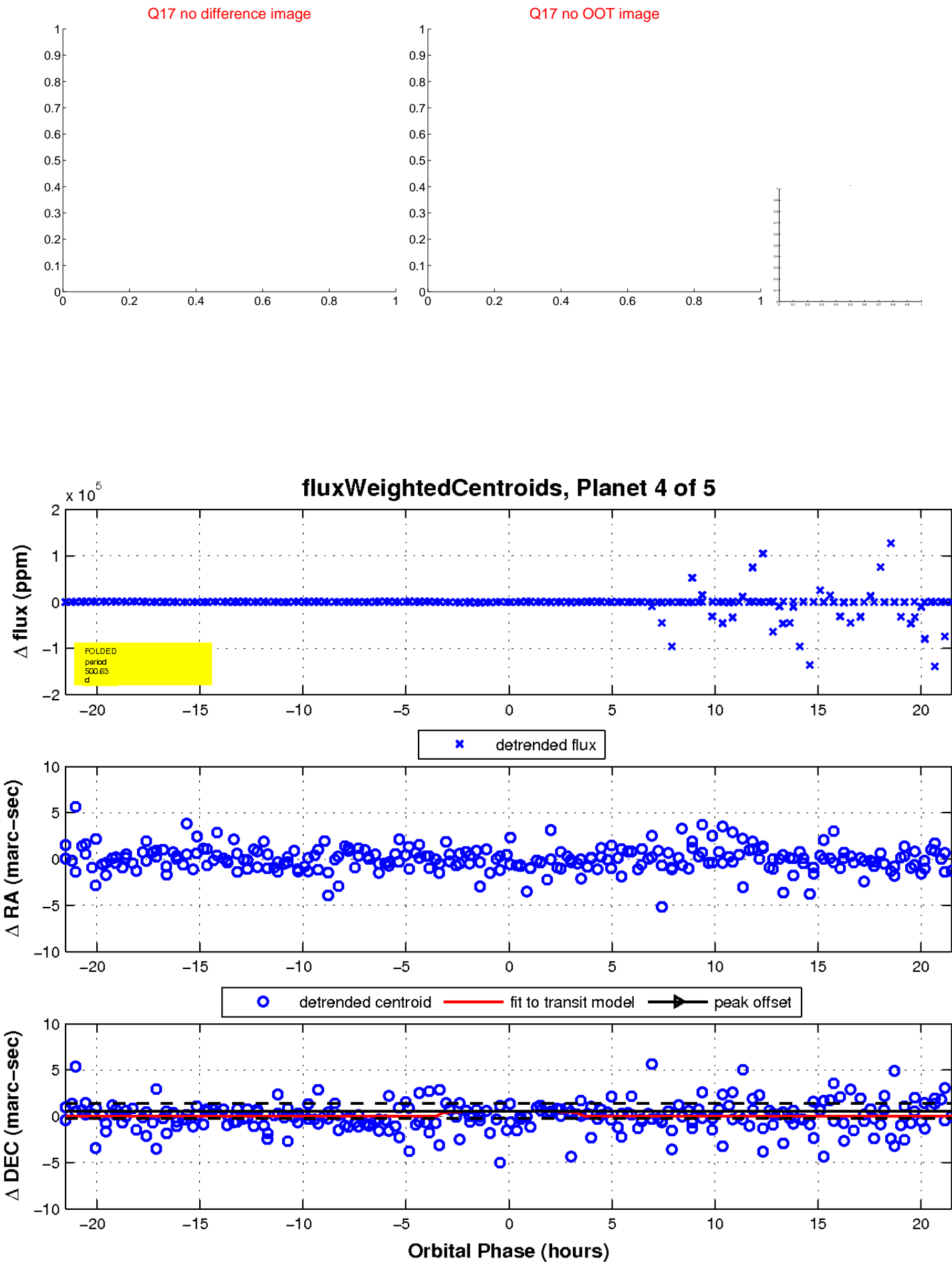
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

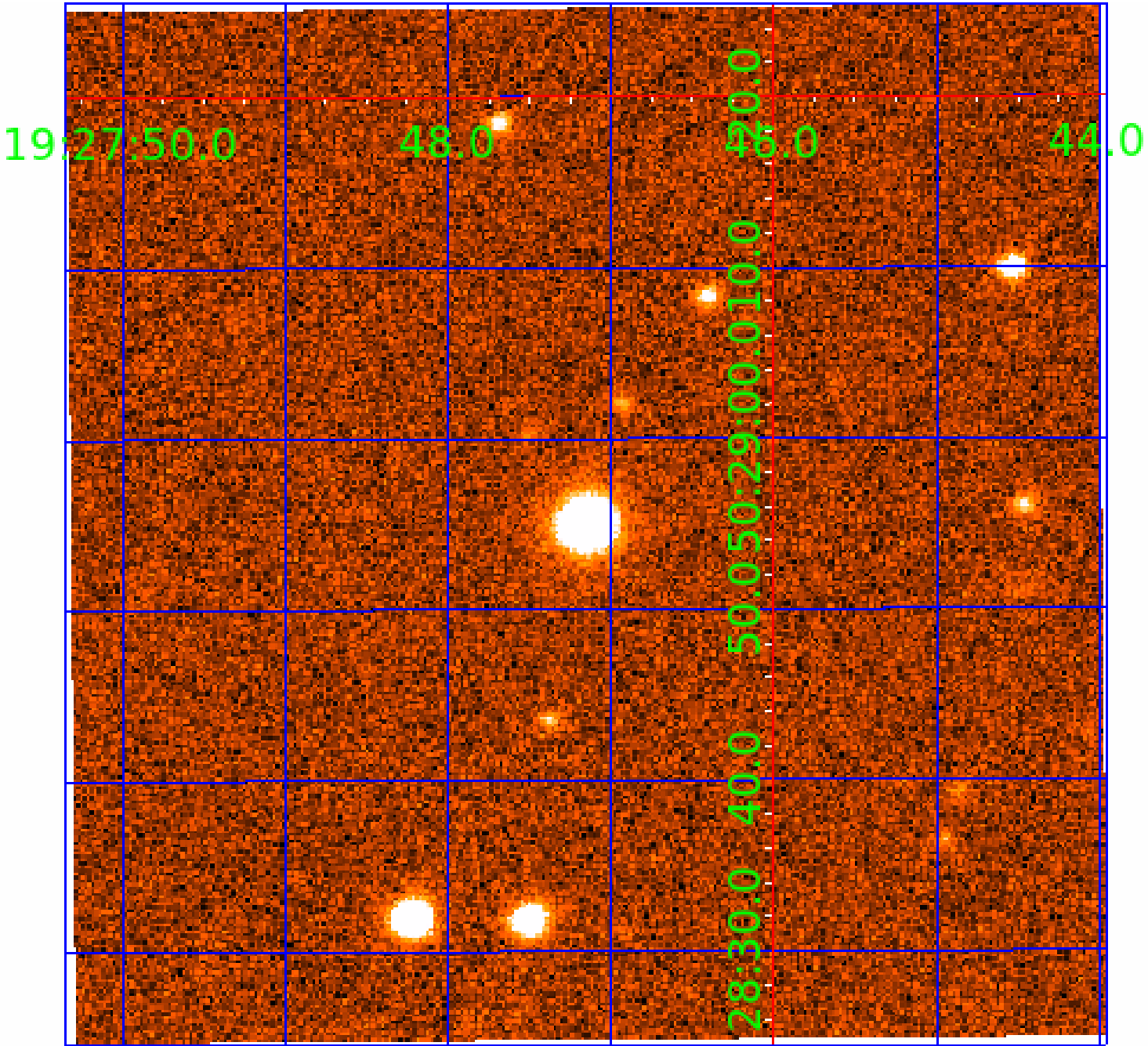


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 012013615

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012013615-01	OBS	7505.01	4.101407	134.426182	311077.7	4.500	26640.7	-1.0	1.64	6060	77.43	1196.65
012013615-02	OBS	No	4.101330	134.899768	1.5	14.022	772.6	0.1	1.64	6060	0.21	1196.68
012013615-03	OBS	No	262.336330	198.067553	1158.5	9.987	14.4	10.7	1.64	6060	6.69	4.68
012013615-04	OBS	No	500.633854	449.272867	922.5	7.196	10.7	7.9	1.64	6060	5.31	1.98
012013615-05	OBS	No	294.004093	240.248463	1526.4	8.915	12.0	8.9	1.64	6060	12.18	4.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012013615-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_ALT—CENT_NOFITS
012013615-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_FEW_DIFFS
012013615-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
012013615-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
012013615-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—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.

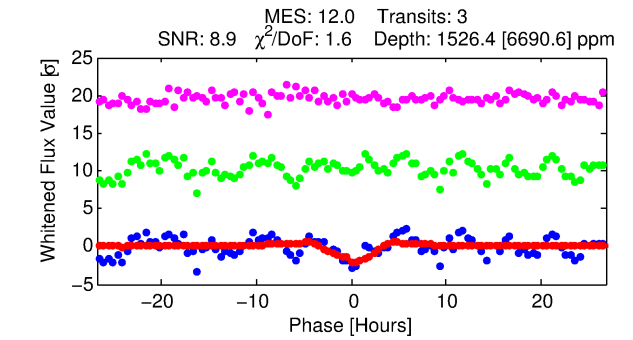
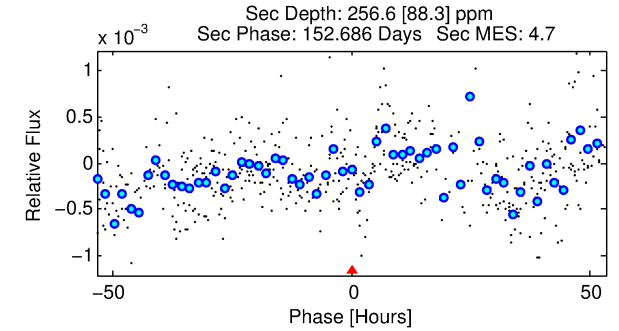
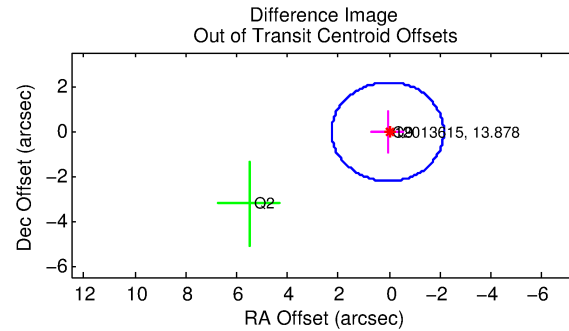
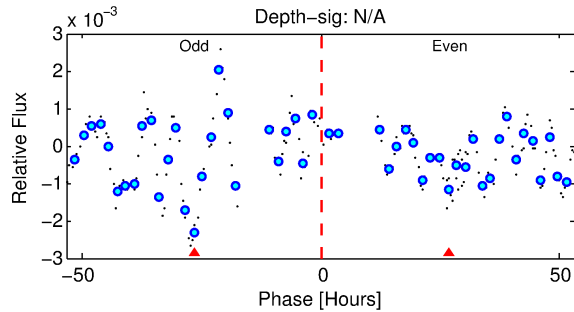
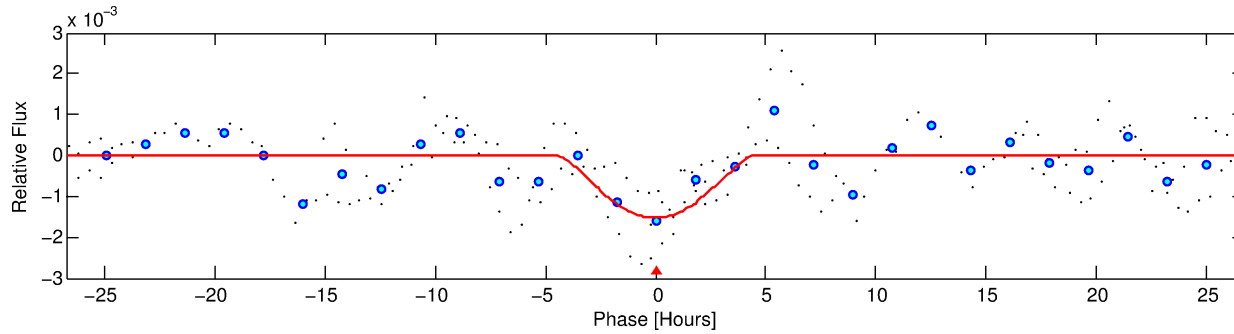
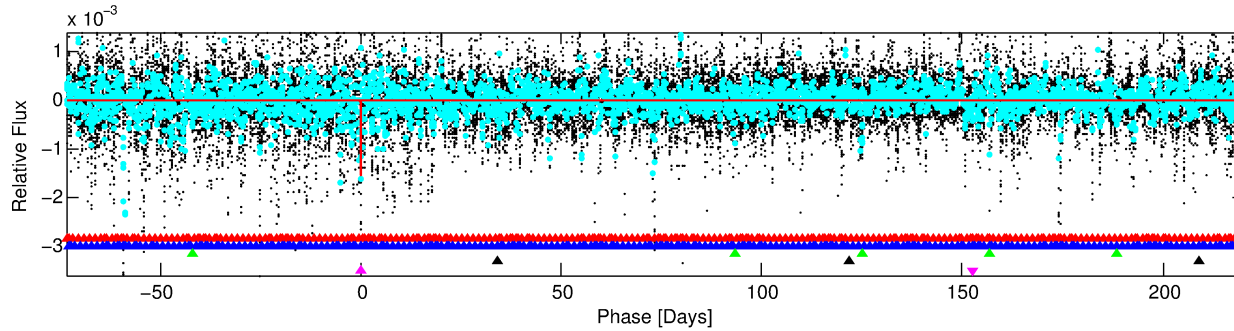
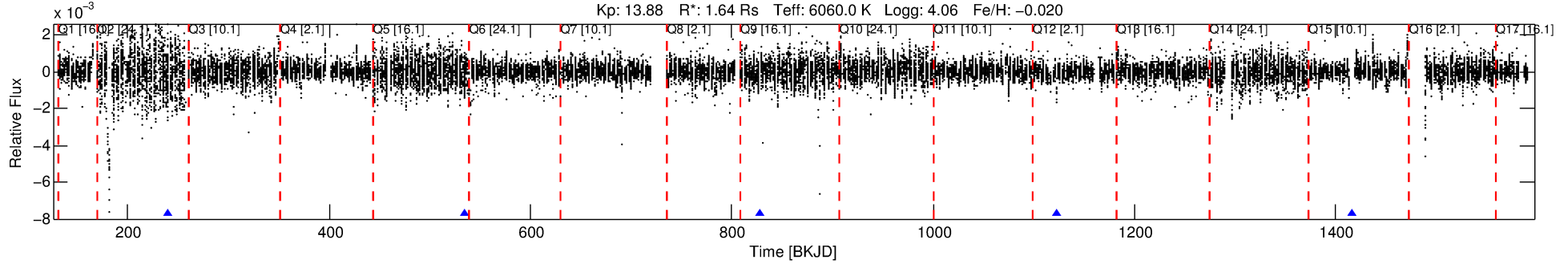
Ephemeris Match Information For 012013615-05

No Significant Match Found

# DV One-Page Summary

KIC: 12013615 Candidate: 5 of 5 Period: 294.004 d  
KOI: K07505 Corr: No Ephemeris Match

Kp: 13.88 R\*: 1.64 Rs Teff: 6060.0 K Logg: 4.06 Fe/H: -0.020



## DV Fit Results:

Period = 294.00409 [0.01163] d  
Epoch = 240.2485 [0.0220] BKJD  
Rp/R\* = 0.0679 [0.2603]  
a/R\* = 94.44 [81.97]  
b = 1.00 [0.17]  
Seff = 4.02 [2.28]  
Teq = 361 [51] K  
Rp = 12.18 [46.84] Re  
a = 0.9009 [0.3036] AU  
Ag = 772.17 [5936.90] [0.13σ]  
Teffp = 2942 [5642] K [0.46σ]

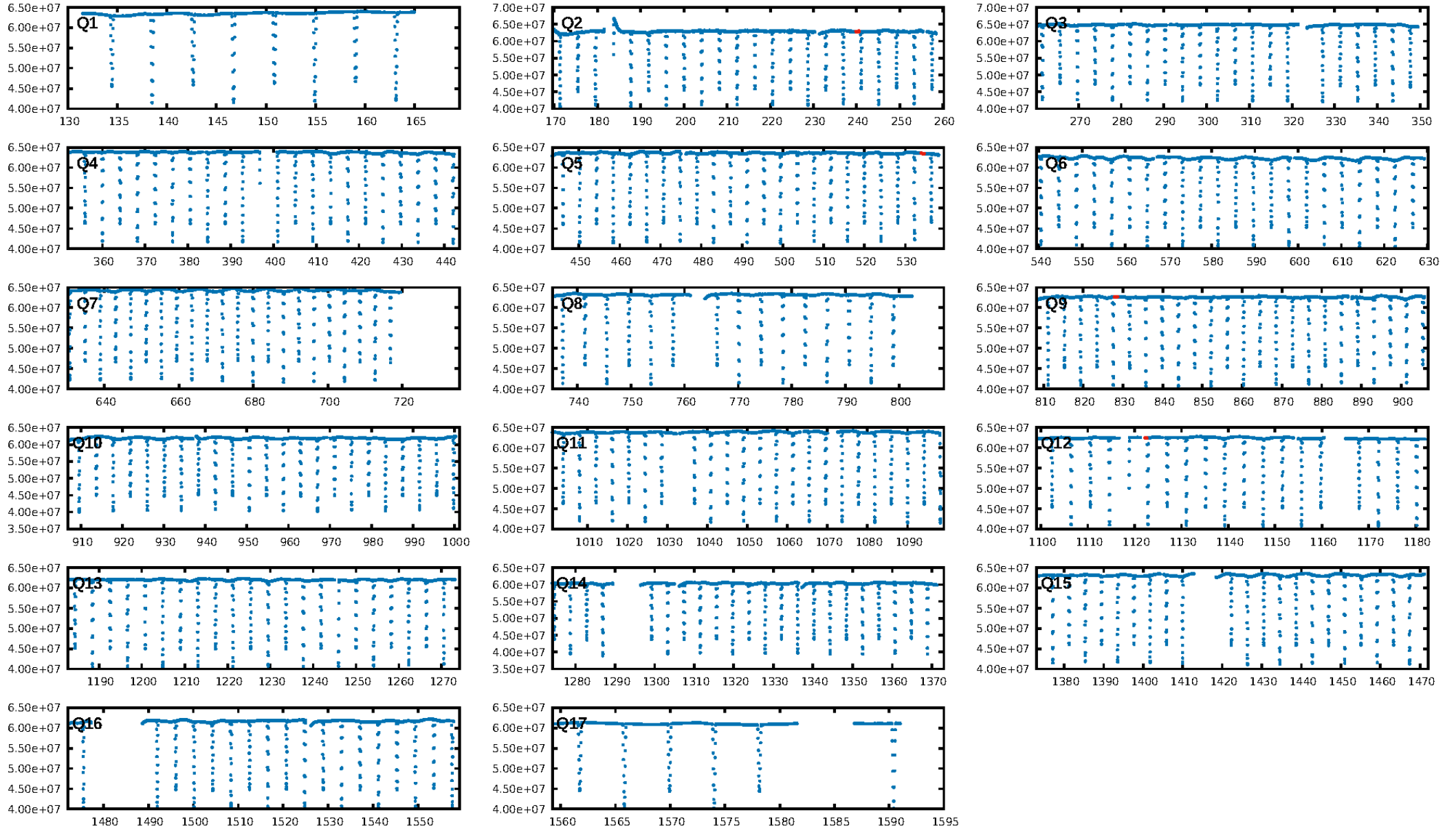
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [56.77σ]  
LongPeriod-sig: 100.0% [432.84σ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 94.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -2.805  
Centroid-sig: N/A  
Centroid-so: 1.105 arcsec [2.45σ]  
OotOffset-rm: 0.066 arcsec [0.09σ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-rm: 0.162 arcsec [0.09σ]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.33 [1/3]

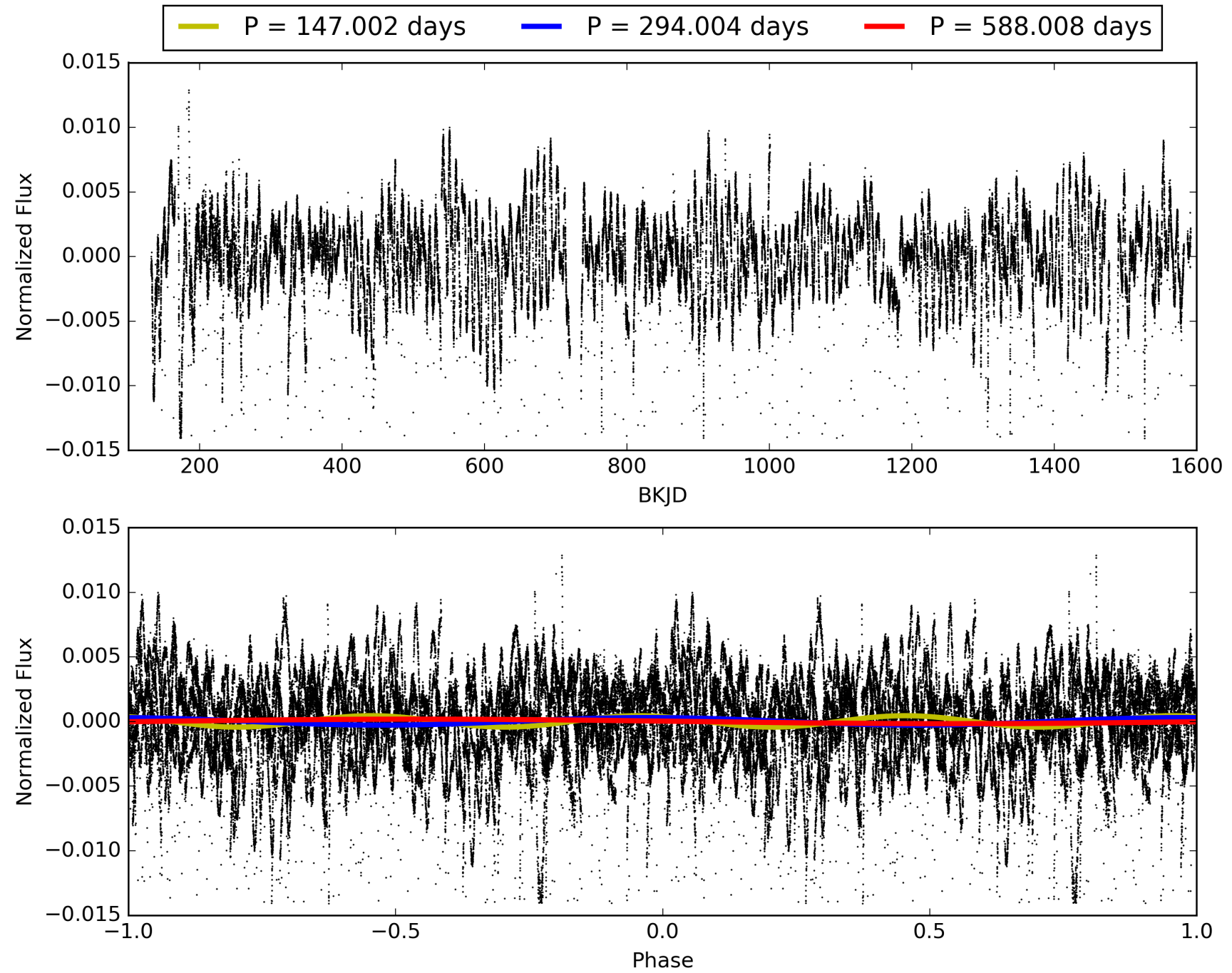
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:08:00 Z

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

# TCE 012013615-05, PDC Light Curves

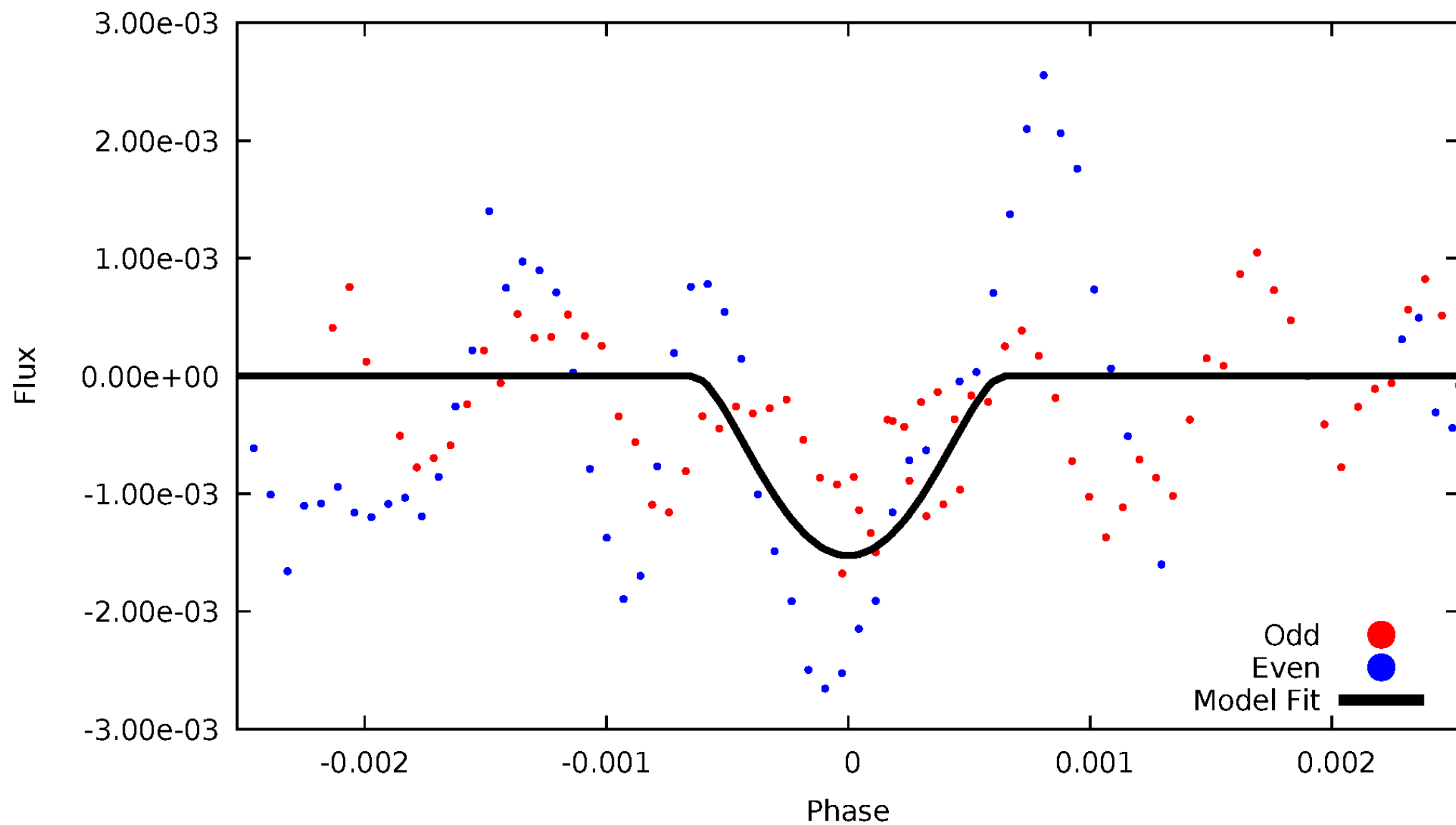


# TCE 012013615-05



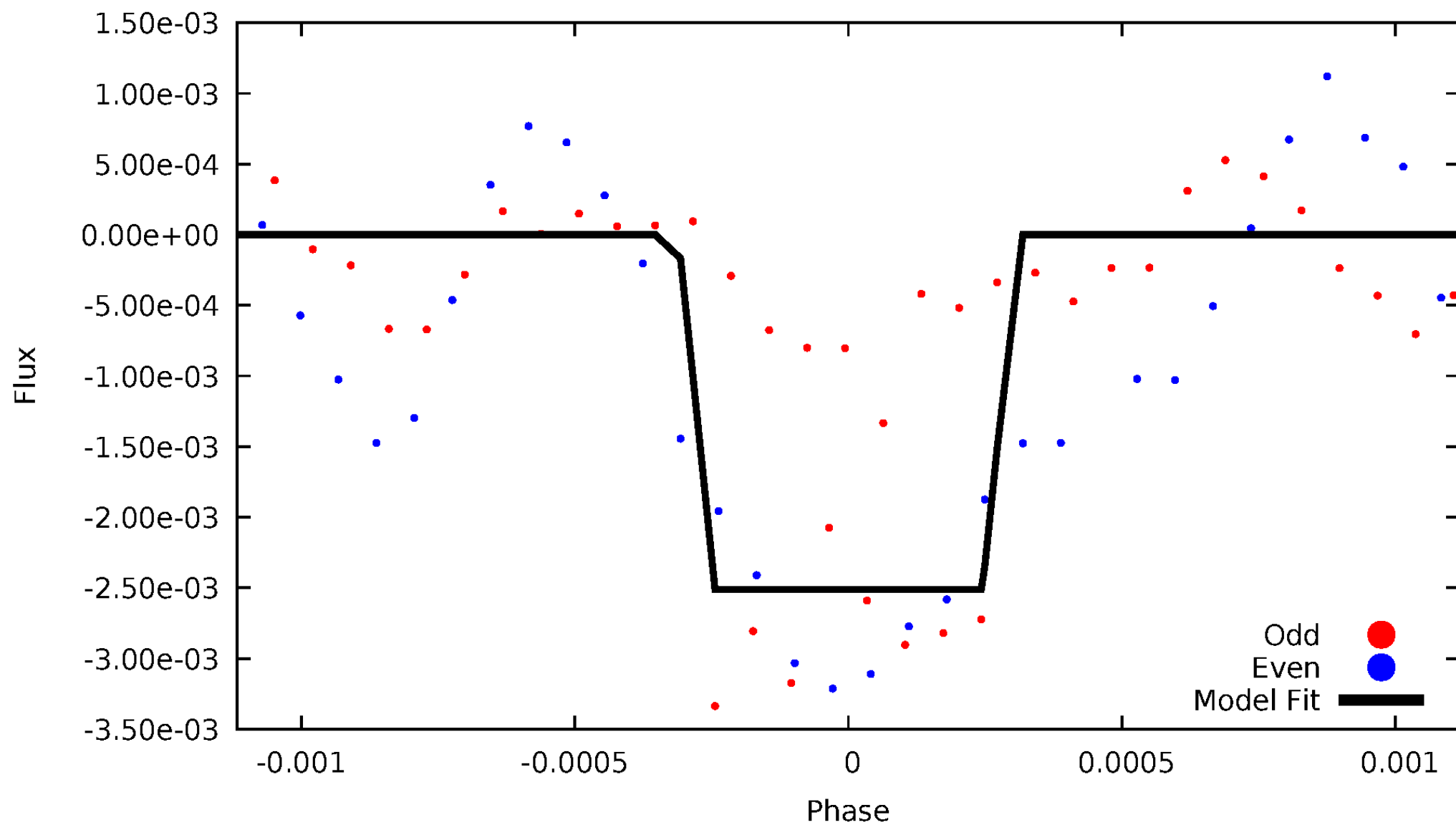
# DV Odd/Even

TCE 012013615-05



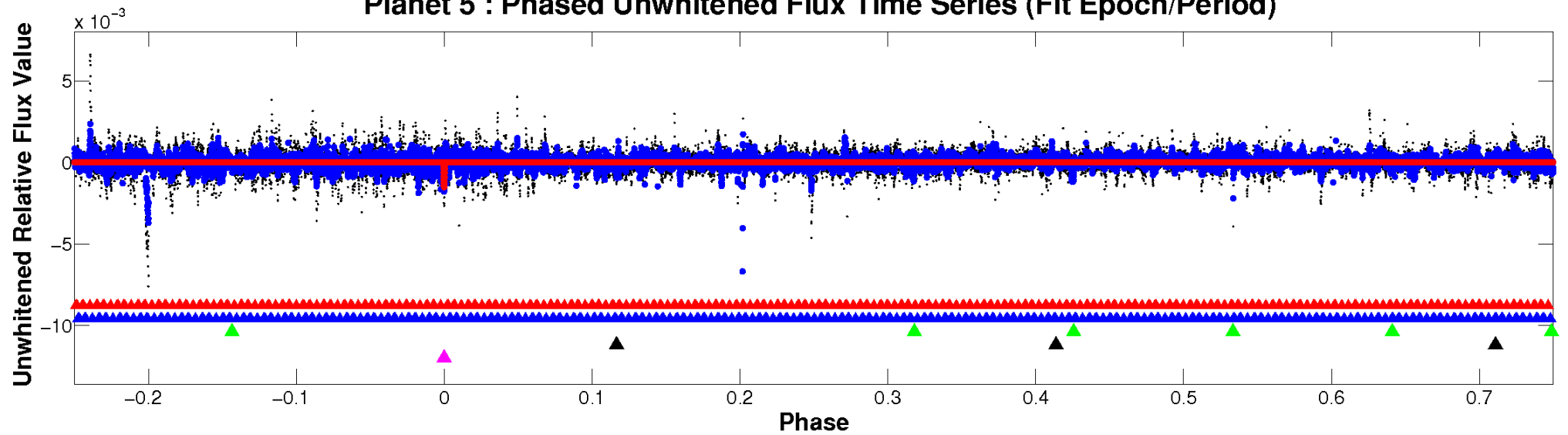
# ALT Odd/Even

TCE 012013615-05

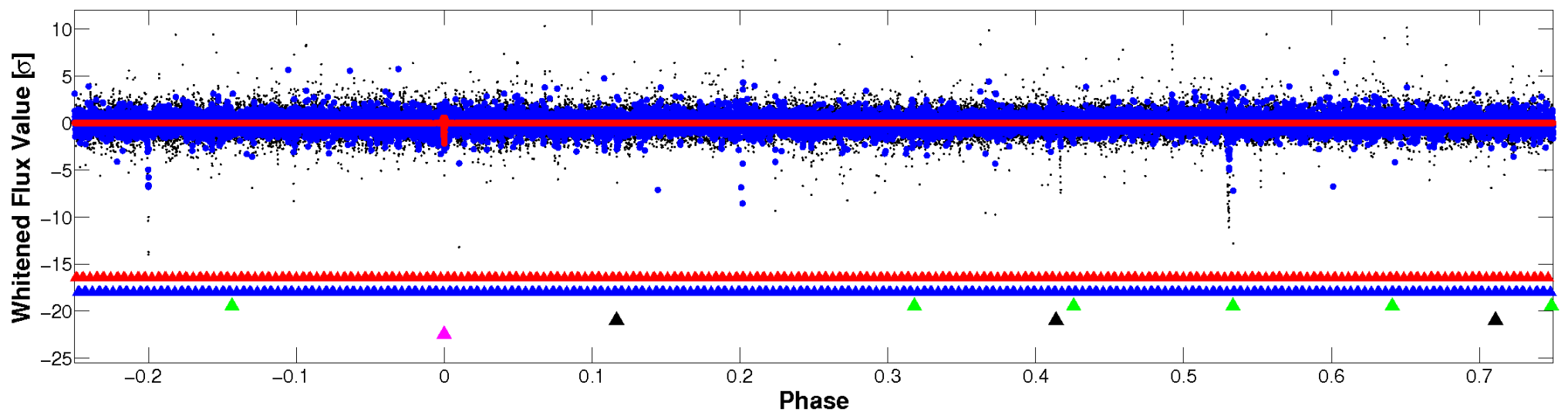


# Non-Whitened Vs. Whitened Light Curve

## Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

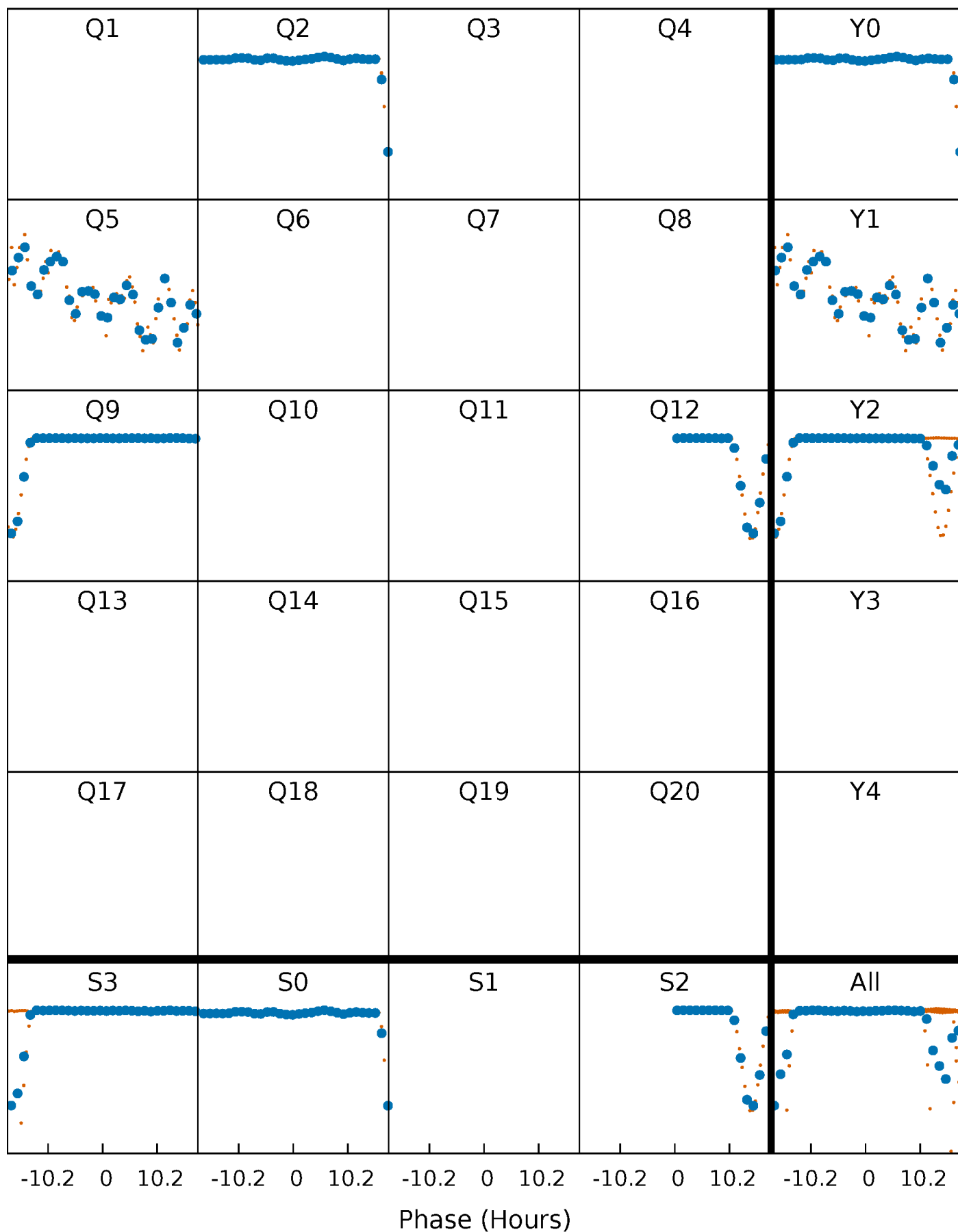


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

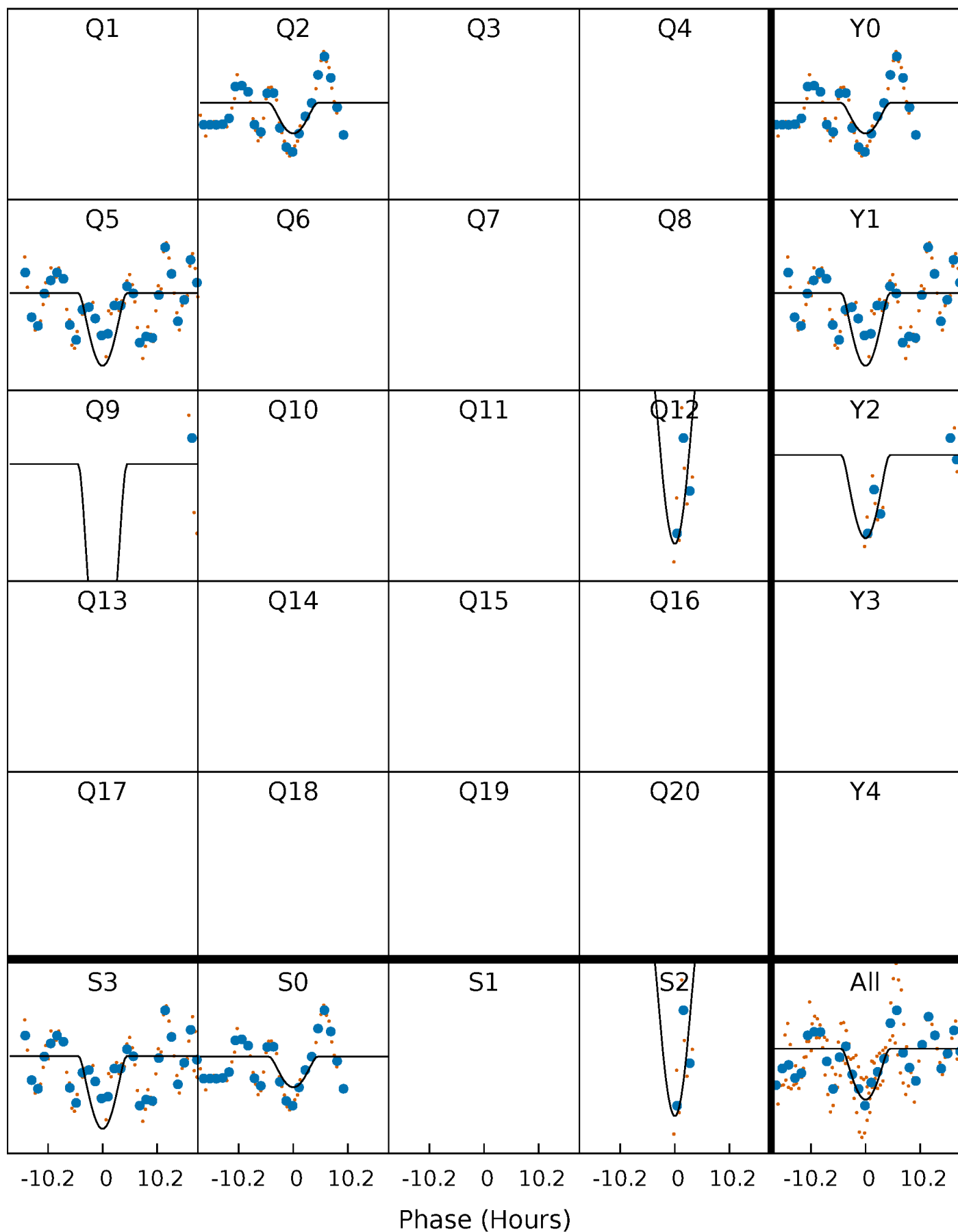
TCE 012013615-05     $P=294.004093$  Days     $T_0=240.248463$  (BKJD)





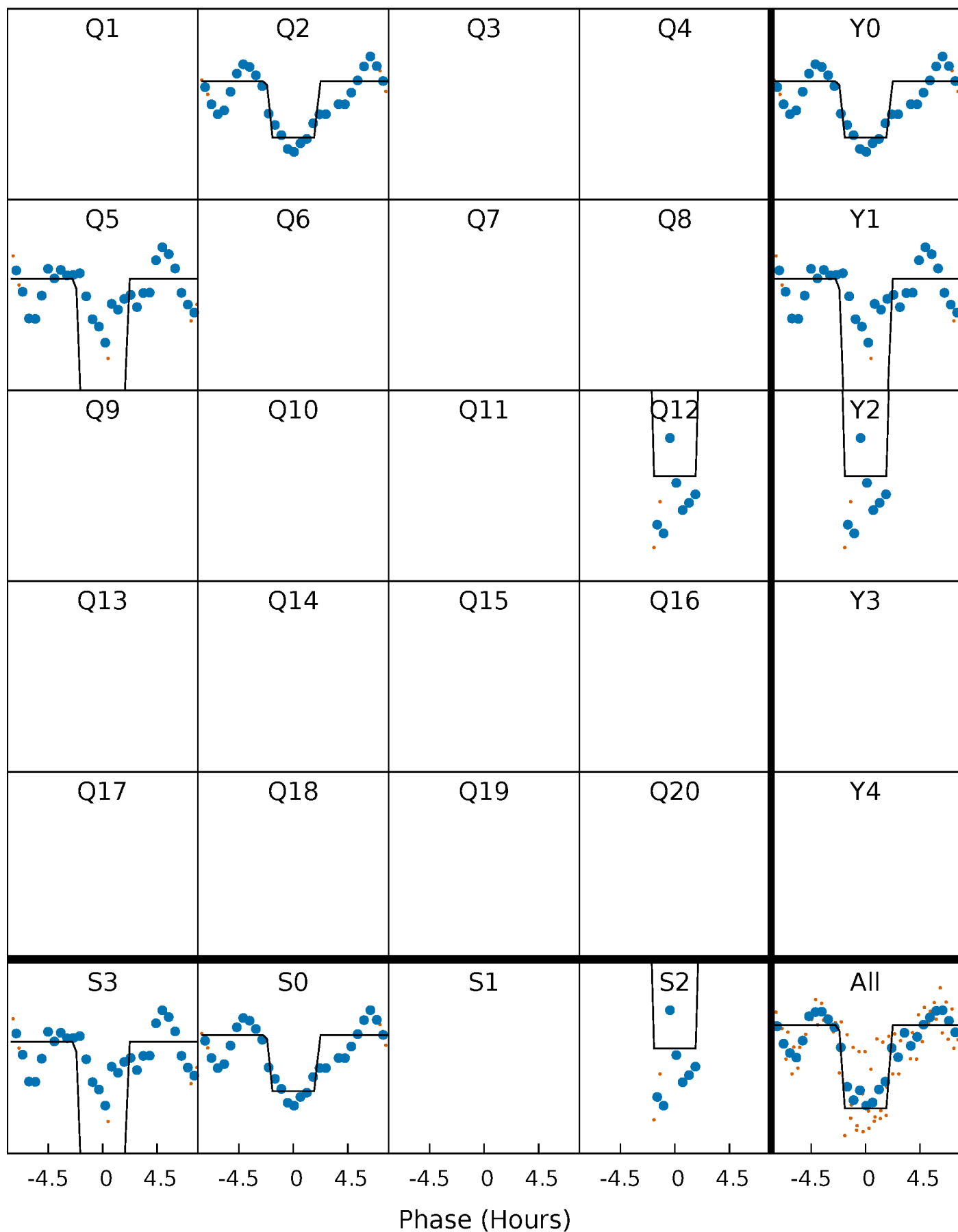
# DV Quarter-Phased Transit Curves

TCE 012013615-05     $P=294.004093$  Days     $T_0=240.248463$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

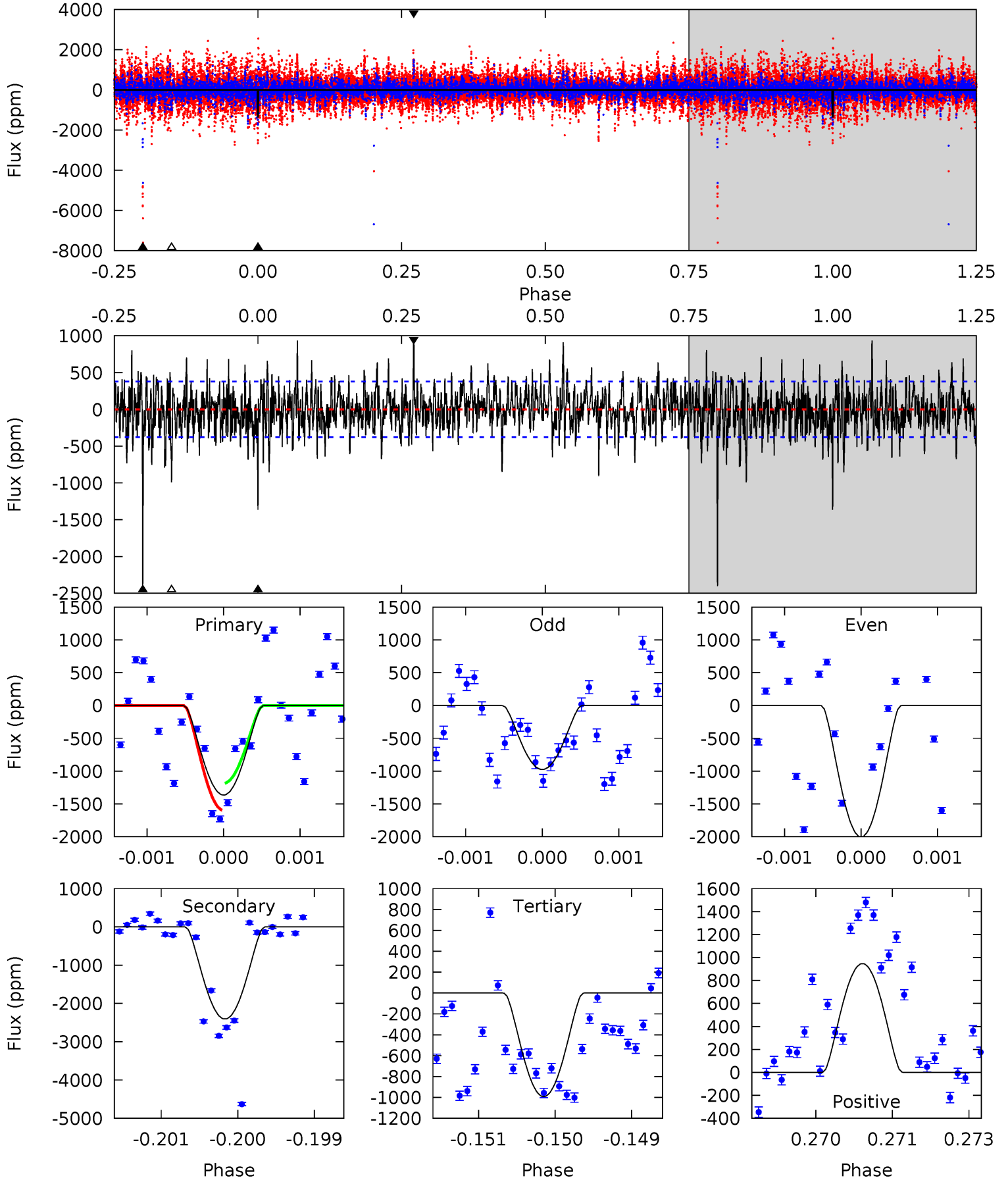
TCE 012013615-05 P=294.032117 Days  $T_0=240.228743$  (BKJD)



# DV Model-Shift Uniqueness Test

012013615-05, P = 294.004093 Days, E = 240.248463 Days

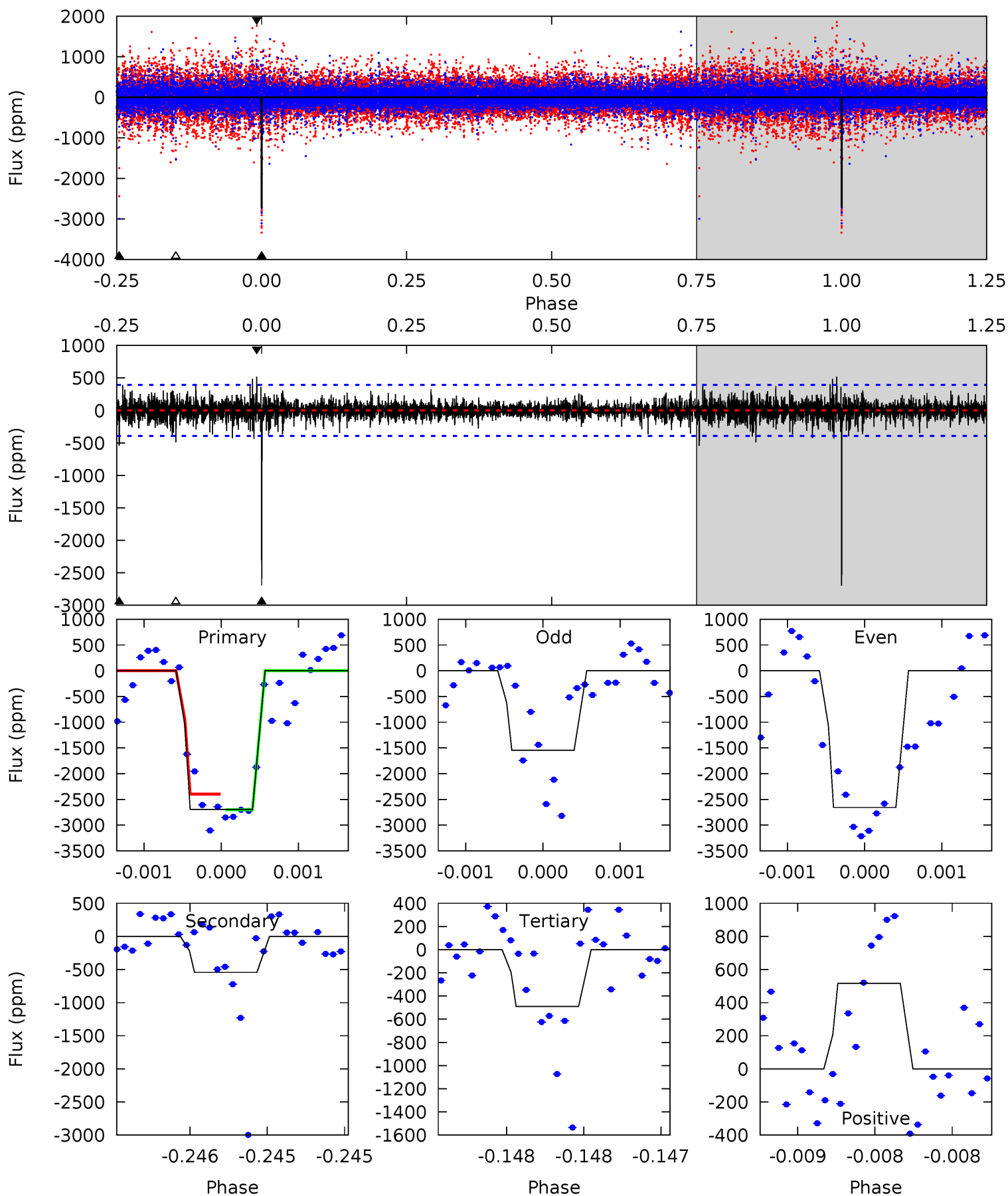
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.5	34.4	14.2	13.5	5.41	3.23	3.30	5.32	5.96	20.2	20.9	6.57	1.00	0.28	2.89



# Alt Model-Shift Uniqueness Test

012013615-05, P = 294.032117 Days, E = 240.228743 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
38.1	7.68	6.94	7.31	5.54	3.43	1.19	31.2	30.8	0.74	0.36	8.05	0.77	0.16	2.14



### Stellar Parameters For KIC 012013615

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6060^{+184}_{-202}$	$4.059^{+0.329}_{-0.141}$	$-0.020^{+0.250}_{-0.300}$	$1.643^{+0.450}_{-0.550}$	$1.129^{+0.174}_{-0.174}$	$0.358^{+0.825}_{-0.140}$
	+3%/-3%	+8%/-3%	+1250%/-1500%	+27%/-33%	+15%/-15%	+230%/-39%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 012013615-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2404 \pm 70$	$32.48^{+36.88}_{-21.96}$	$496^{+38}_{-52}$	$3524^{+1877}_{-706}$	$1030^{+9160}_{-812}$
Alt.	$-543 \pm 71$	$31.15^{+36.80}_{-22.34}$	$494^{+40}_{-48}$	$2867^{+1330}_{-513}$	$258^{+2825}_{-207}$

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

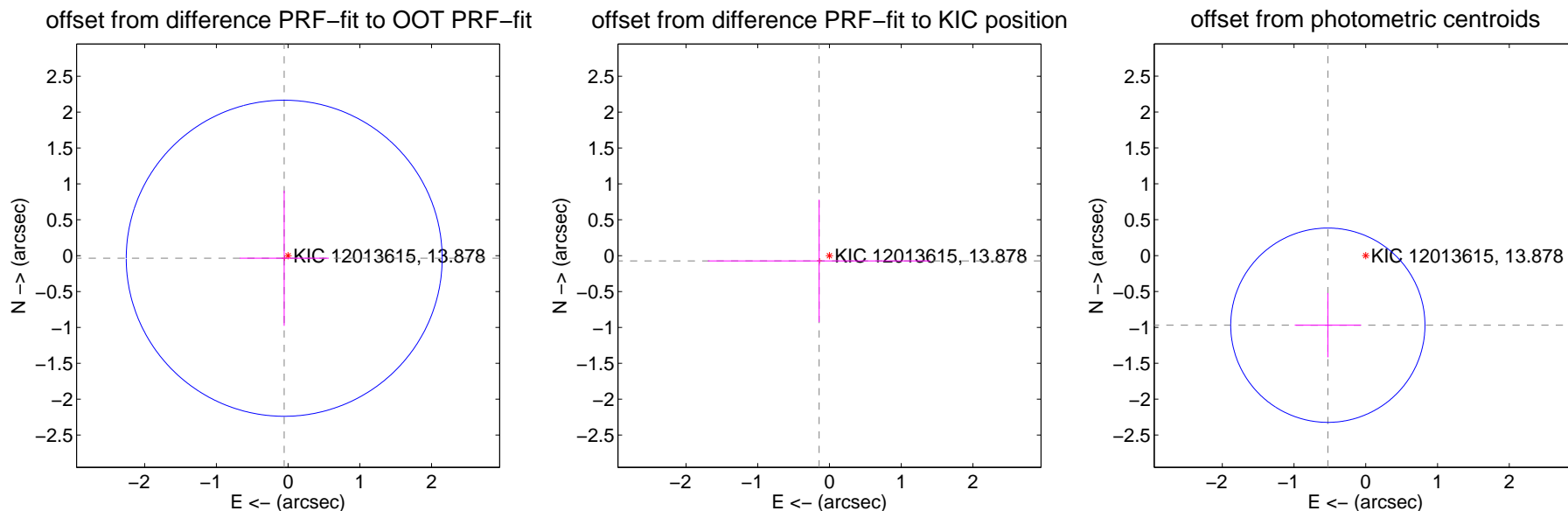
## DV Centroid Data

Supplemental centroid analysis for 012013615-05. Kepler magnitude: 13.88. Transit SNR 8.91

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.066 \pm 0.734$	0.09	$0.055 \pm 0.621$	$-0.036 \pm 0.942$
PRF-fit source offset from KIC position	$0.162 \pm 1.768$	0.09	$0.145 \pm 1.551$	$-0.073 \pm 0.853$
photometric centroid source offset	$1.10 \pm 0.45$	2.45	$0.53 \pm 0.46$	$-0.97 \pm 0.45$



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.

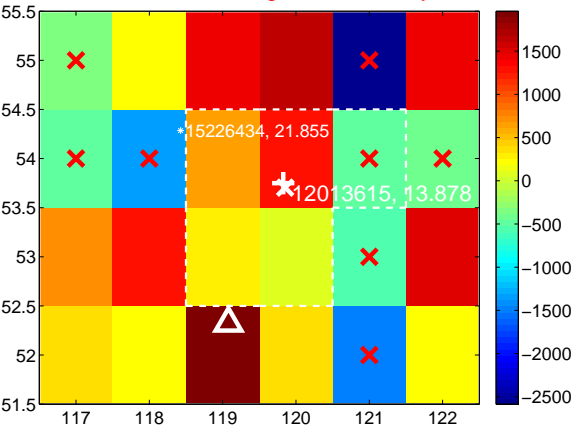
Q1 no difference image



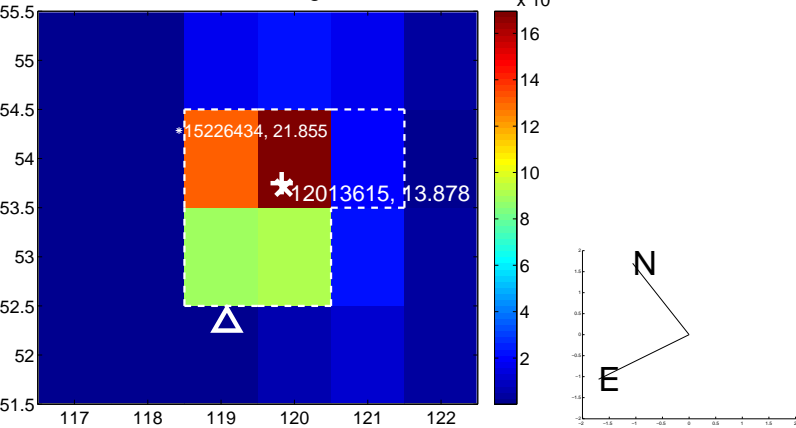
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



Q3 no OOT image



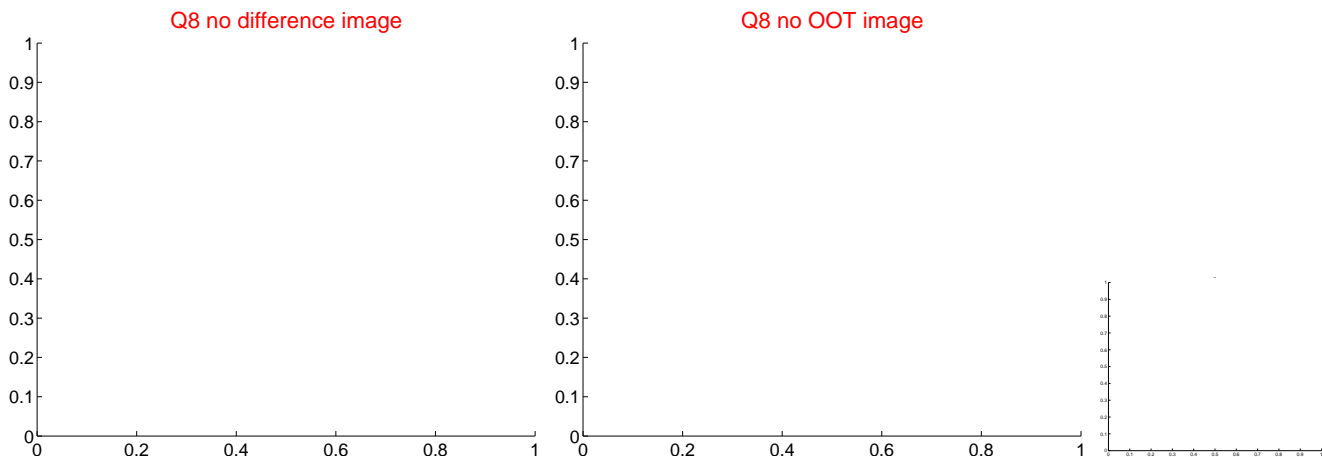
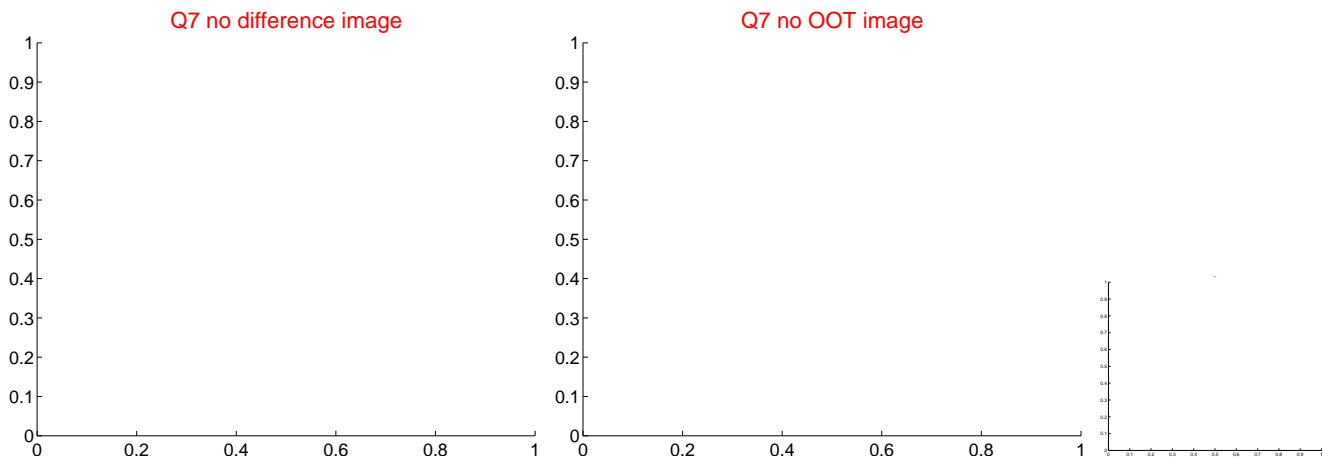
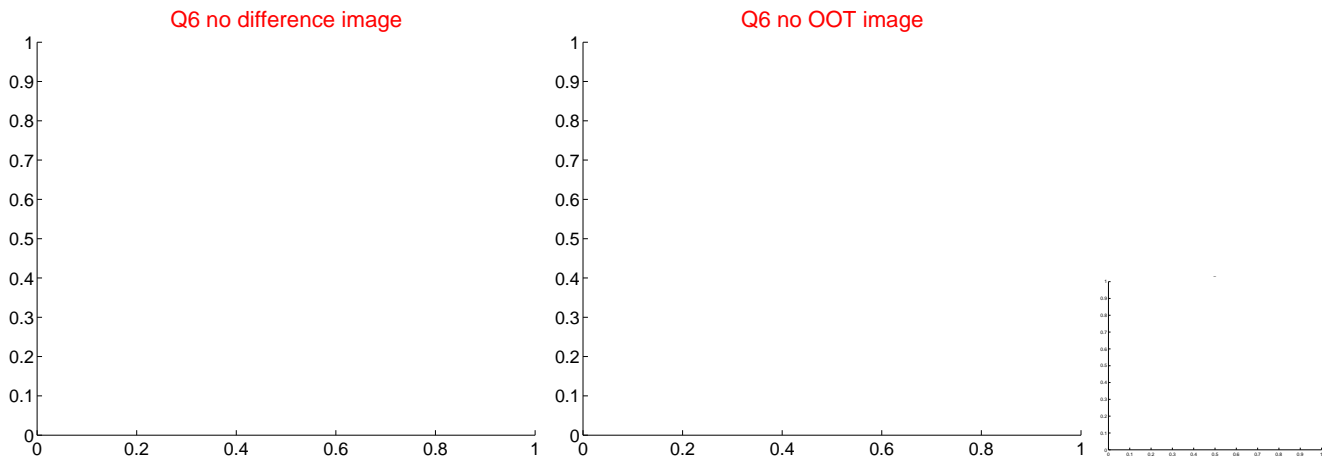
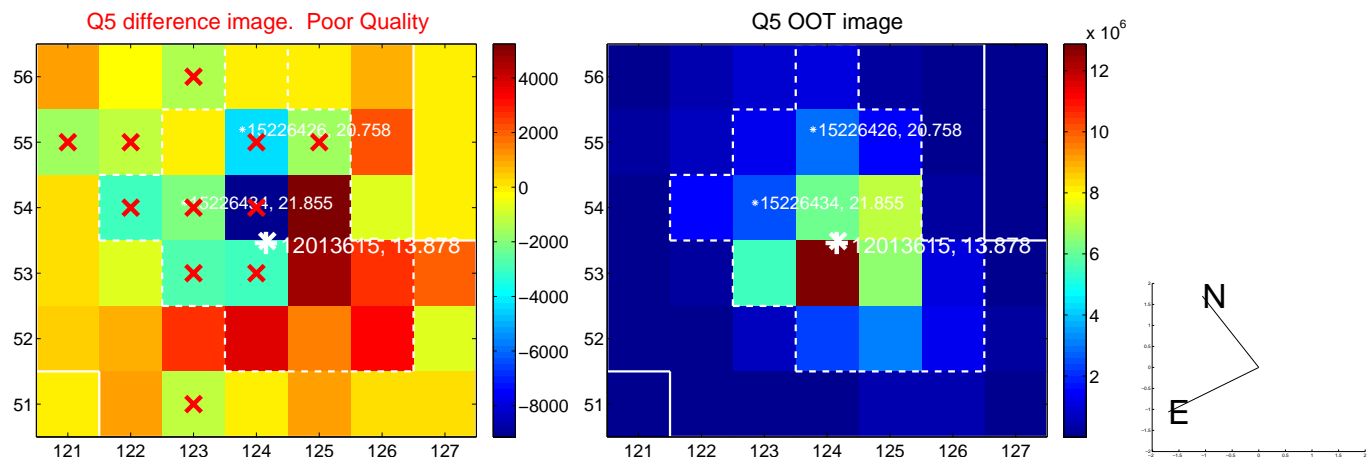
Q4 no difference image



Q4 no OOT image

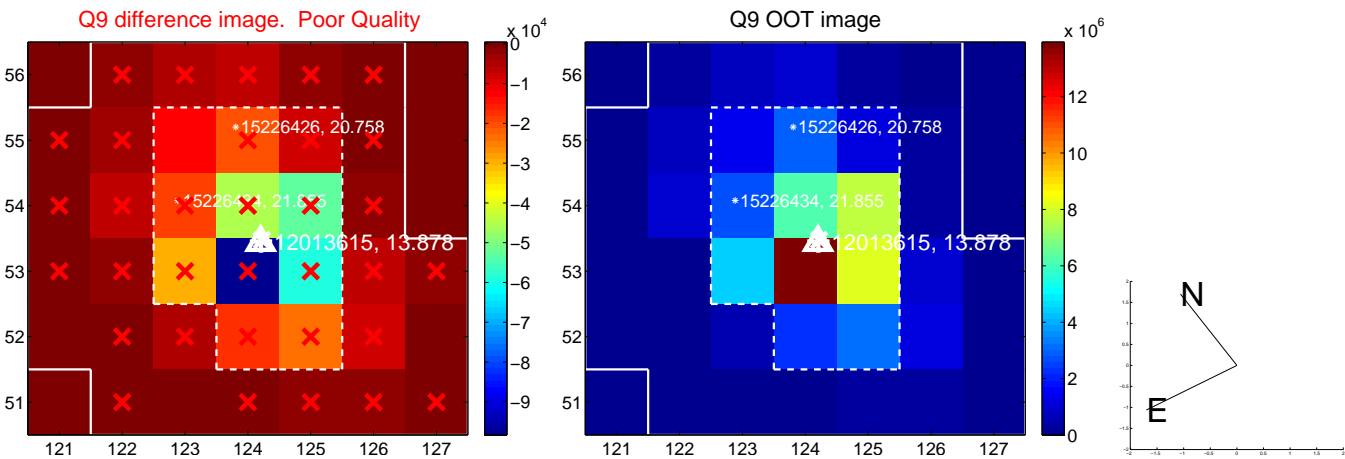


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





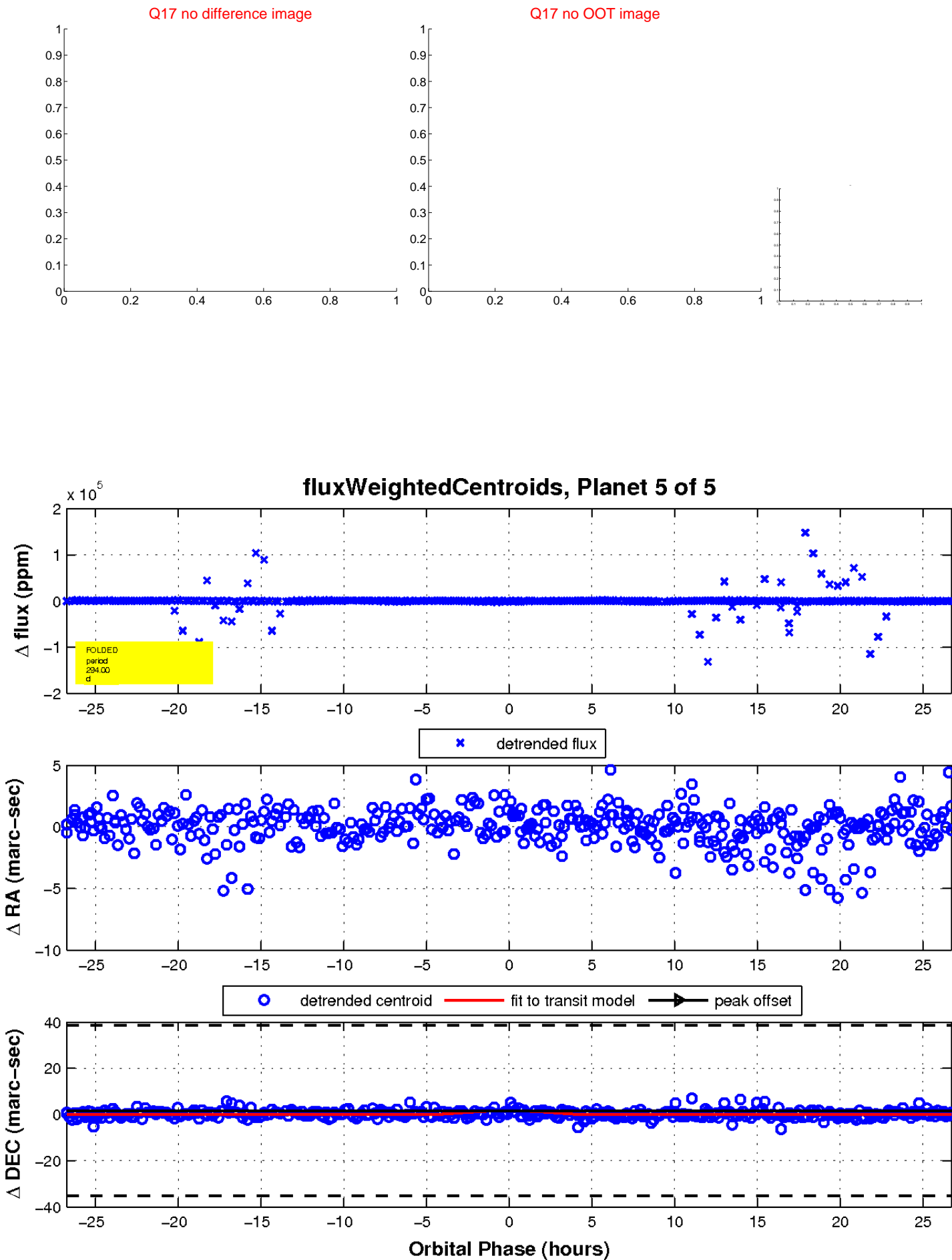
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



# UKIRT Image

Declination

