

# KIC 010296163

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010296163-01	OBS	7309.01	9.296761	135.685073	217153.4	6.947	16704.8	7940.2	2.88	6461	228.32	1372.93
010296163-02	OBS	No	9.296714	138.840719	23524.5	3.909	1910.6	1505.0	2.88	6461	48.84	1372.94
010296163-03	OBS	No	216.827316	347.214464	9183.4	15.000	414.9	-1.0	2.88	6461	27.81	20.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010296163-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
010296163-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
010296163-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

**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.

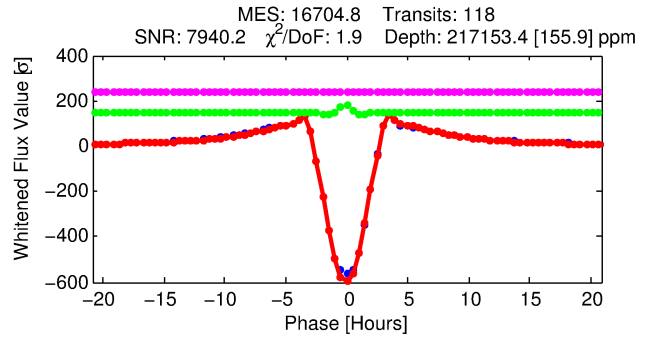
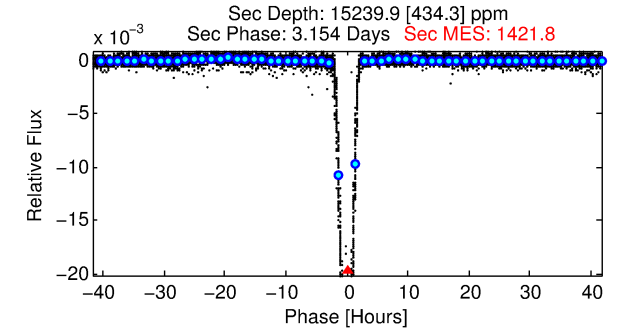
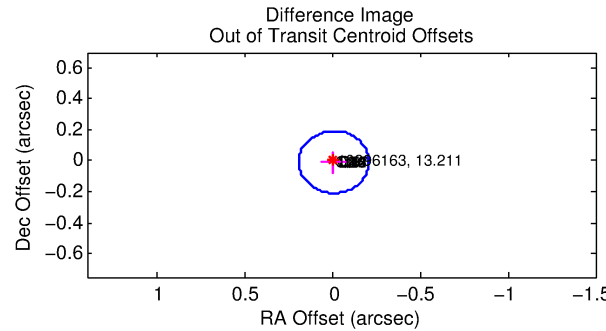
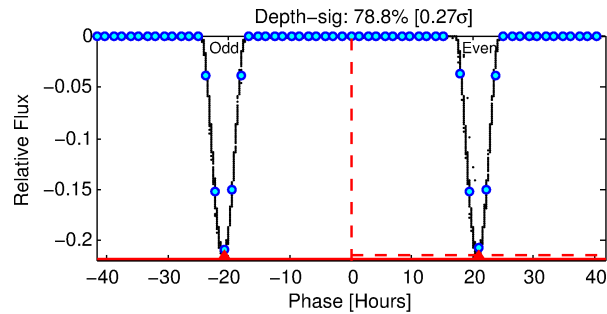
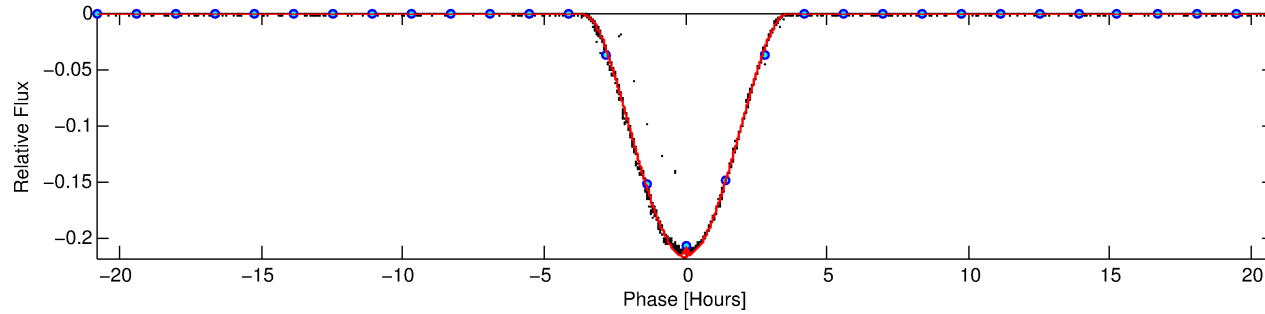
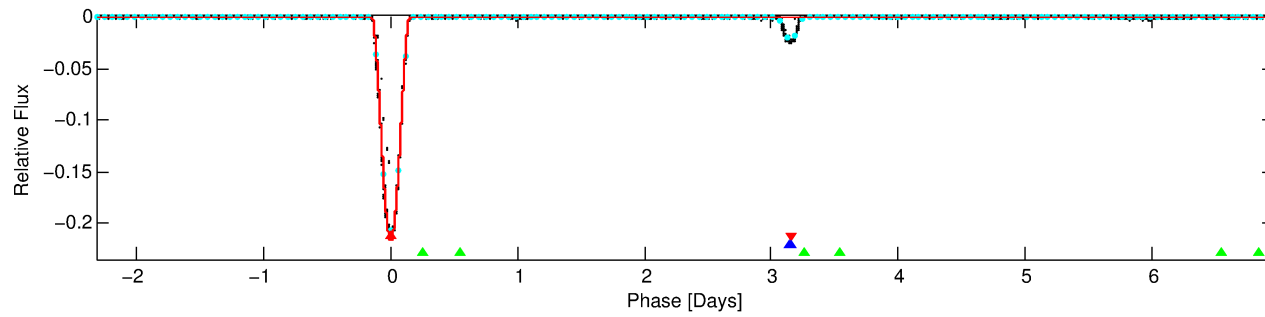
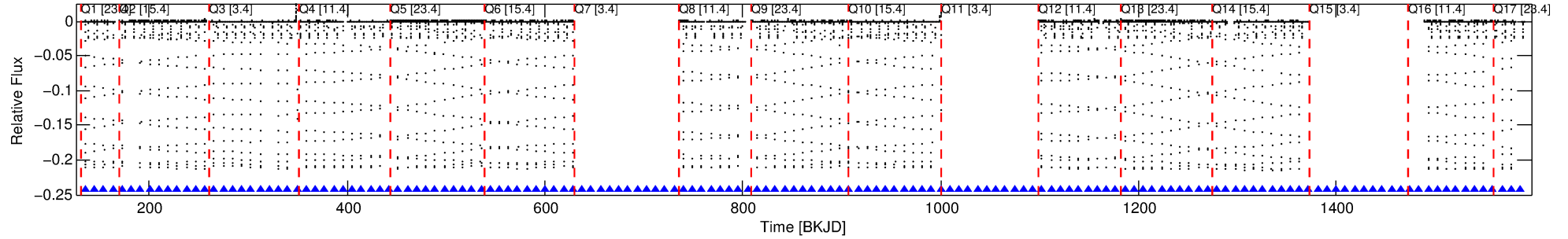
Ephemeris Match Information For 010296163-01

No Significant Match Found

# DV One-Page Summary

KIC: 10296163 Candidate: 1 of 3 Period: 9.297 d  
KOI: K07309.01 Corr: 0.994

Kp: 13.21 R\*: 2.88 Rs Teff: 6461.0 K Logg: 3.67 Fe/H: -0.380



## DV Fit Results:

Period = 9.29676 [0.00000] d  
Epoch = 135.6851 [0.0000] BKJD  
Rp/R\* = 0.7255 [0.0036]  
a/R\* = 14.43 [0.02]  
b = 1.00 [0.00]  
Seff = 1372.93 [805.96]  
Teff = 1552 [228] K  
Rp = 228.32 [92.71] Re  
a = 0.0973 [0.0361] AU  
Ag = 1.52 [0.87] [0.60σ]  
Teffp = 2665 [83] K [4.59σ]

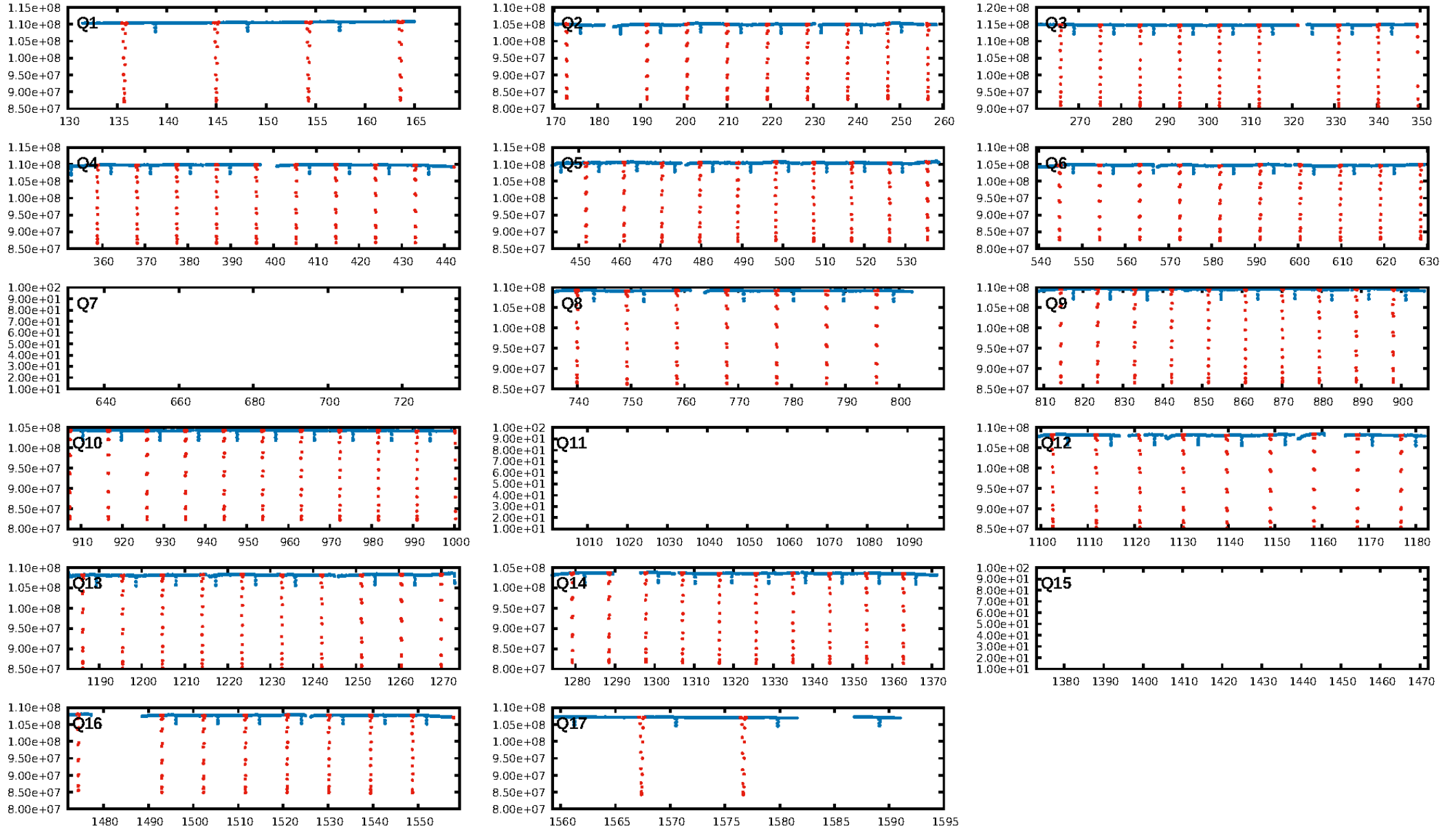
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [301.30σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 1.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [112/112]  
GhostDiagnostic-chr: 5.377  
Centroid-sig: 0.0%  
Centroid-so: 0.209 arcsec [408.88σ]  
OotOffset-rm: 0.010 arcsec [0.16σ]  
KicOffset-rm: 0.047 arcsec [0.69σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

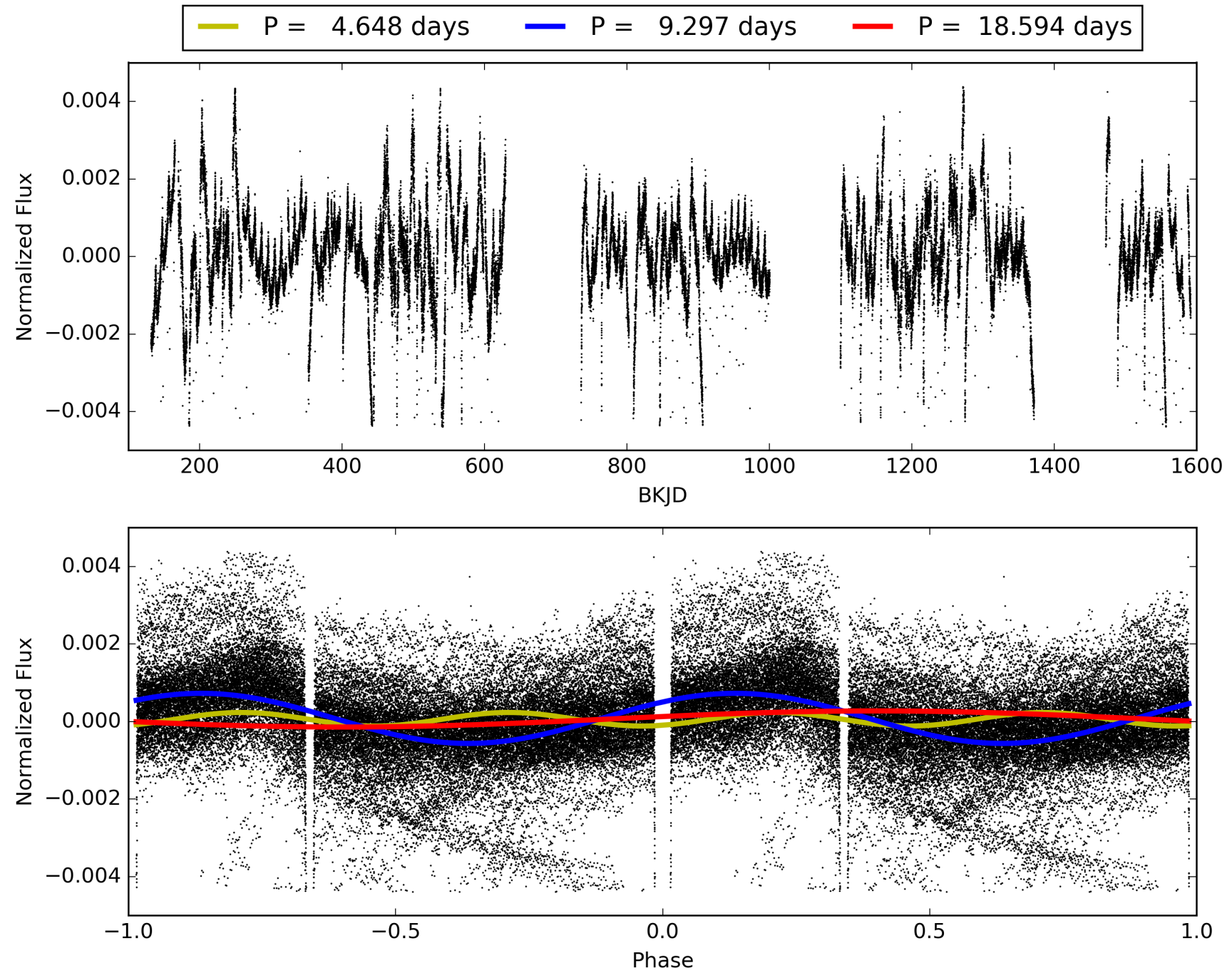
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:27:13 Z

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

# TCE 010296163-01, PDC Light Curves

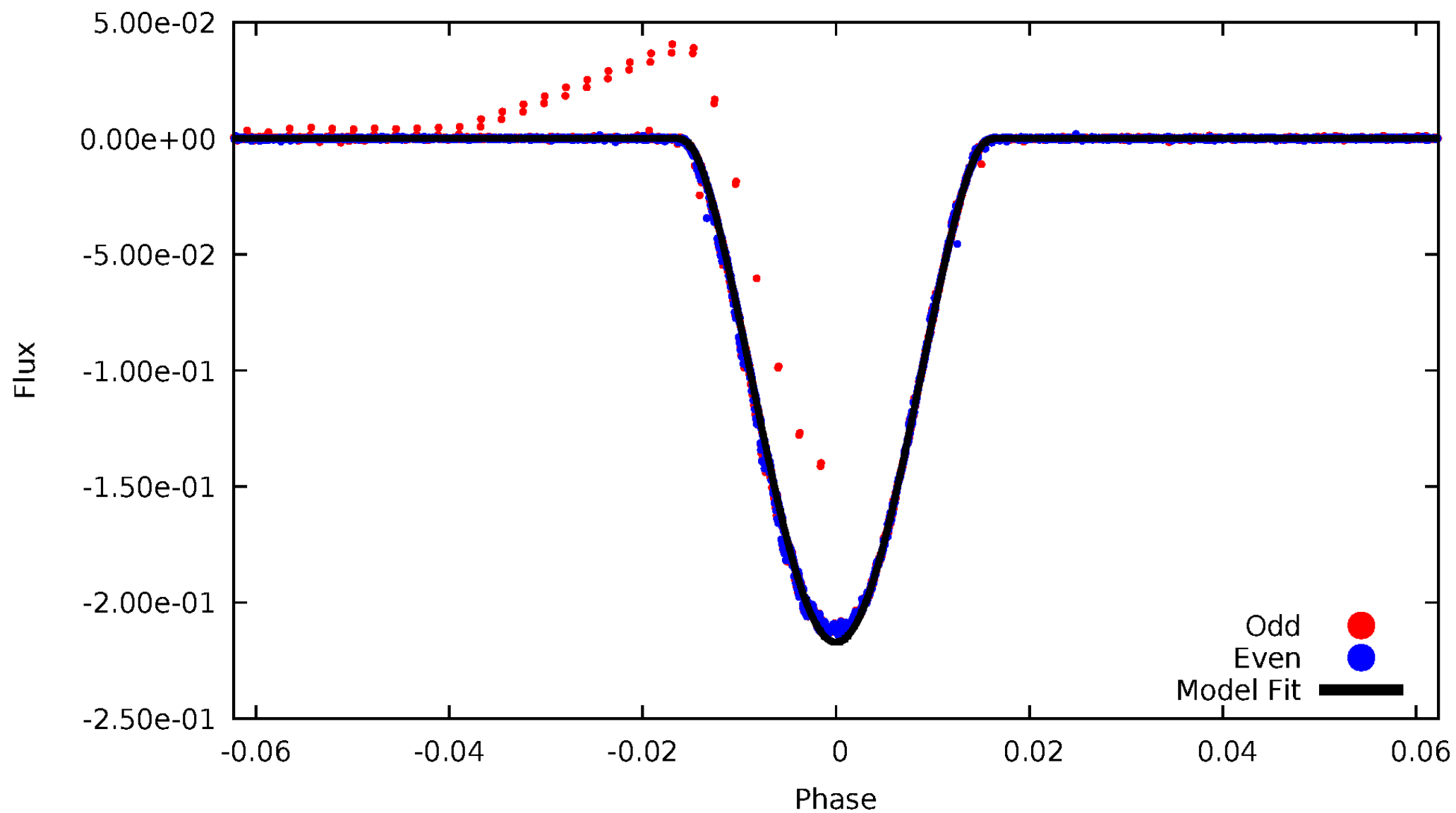


TCE 010296163-01



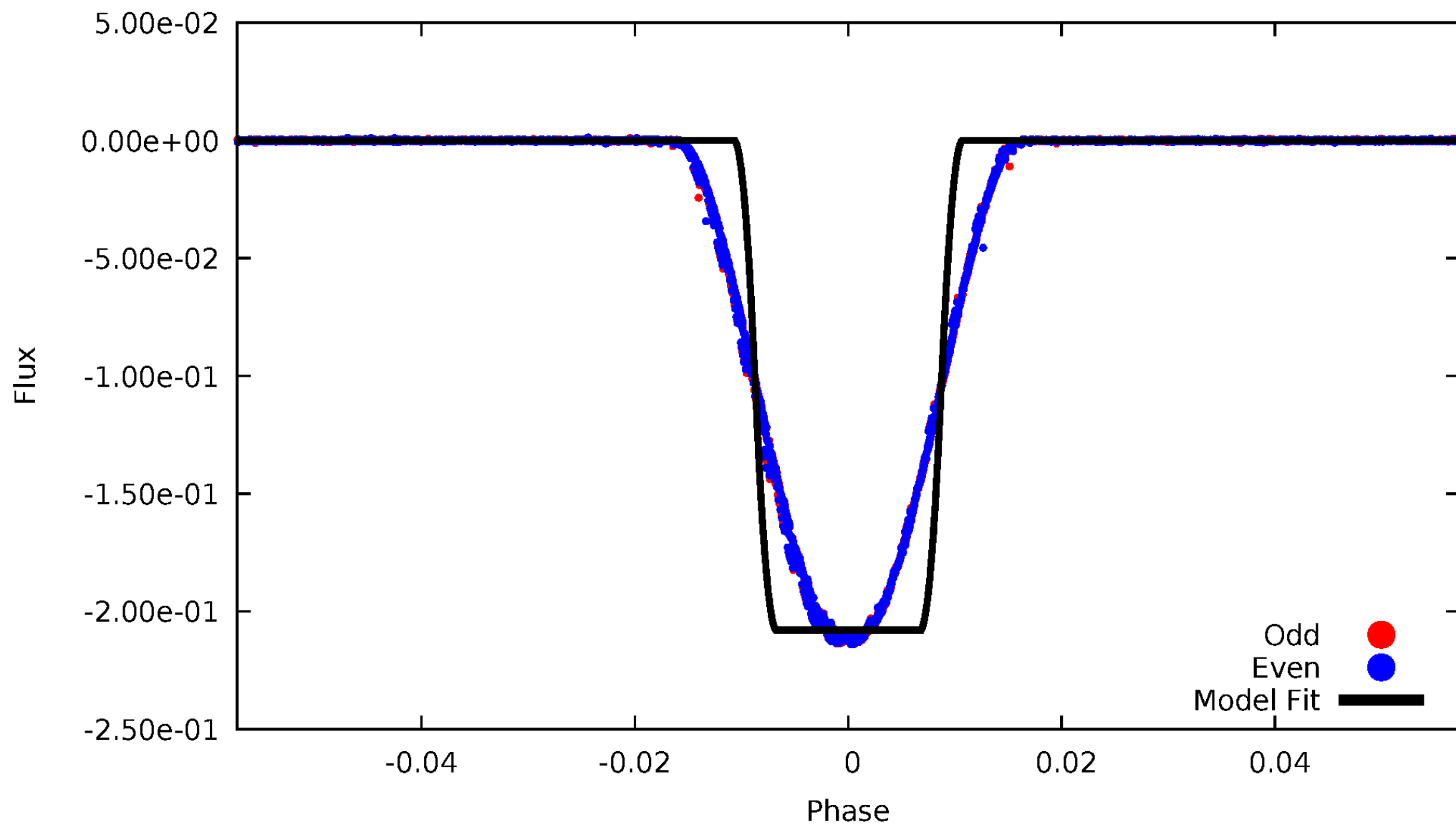
# DV Odd/Even

TCE 010296163-01



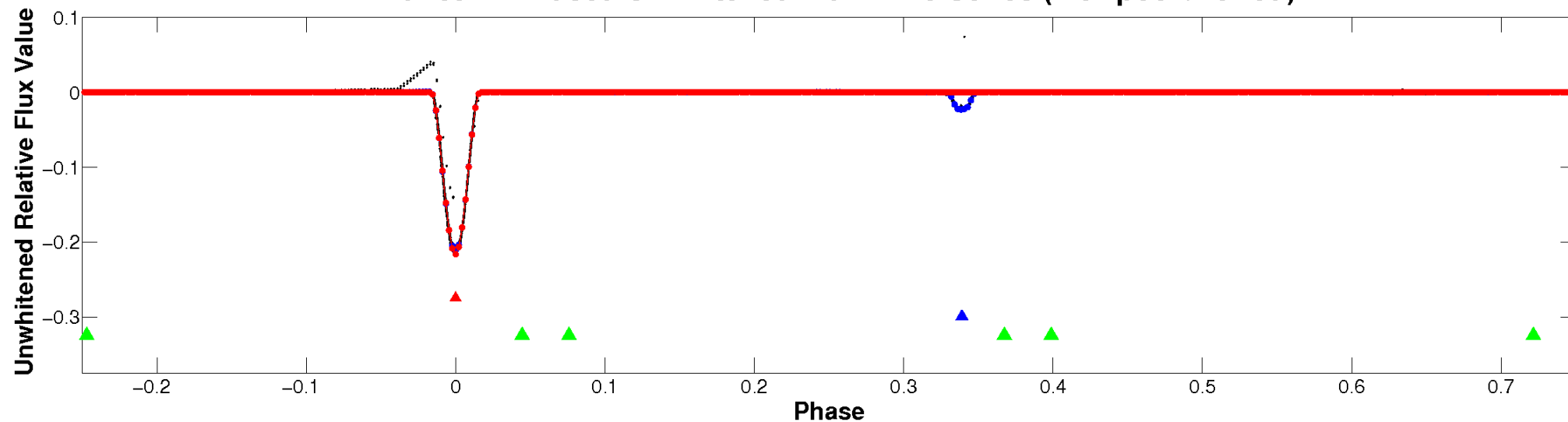
# ALT Odd/Even

TCE 010296163-01

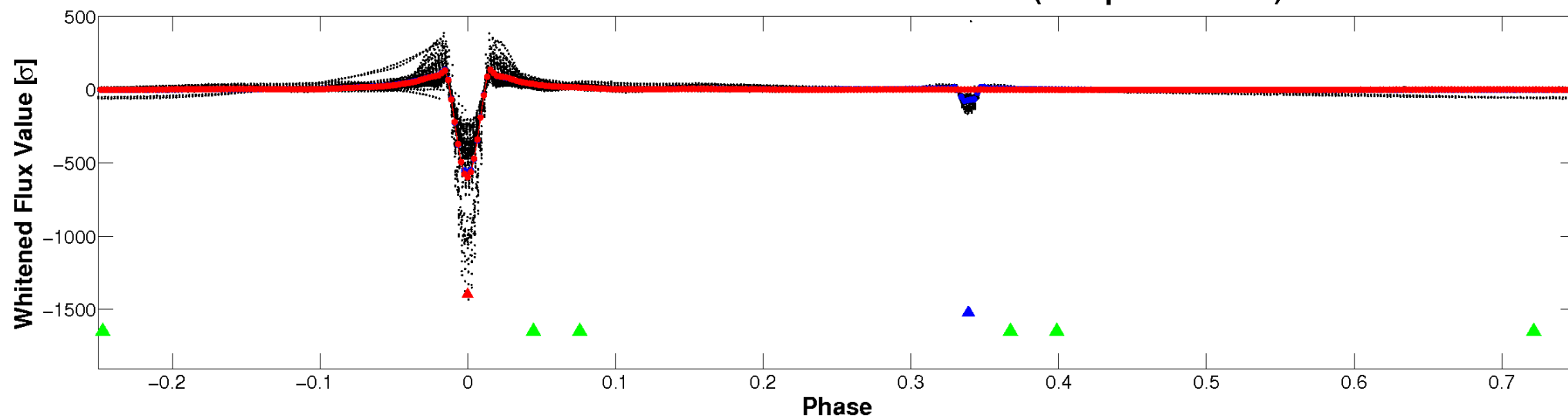


# Non-Whitened Vs. Whitened Light Curve

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

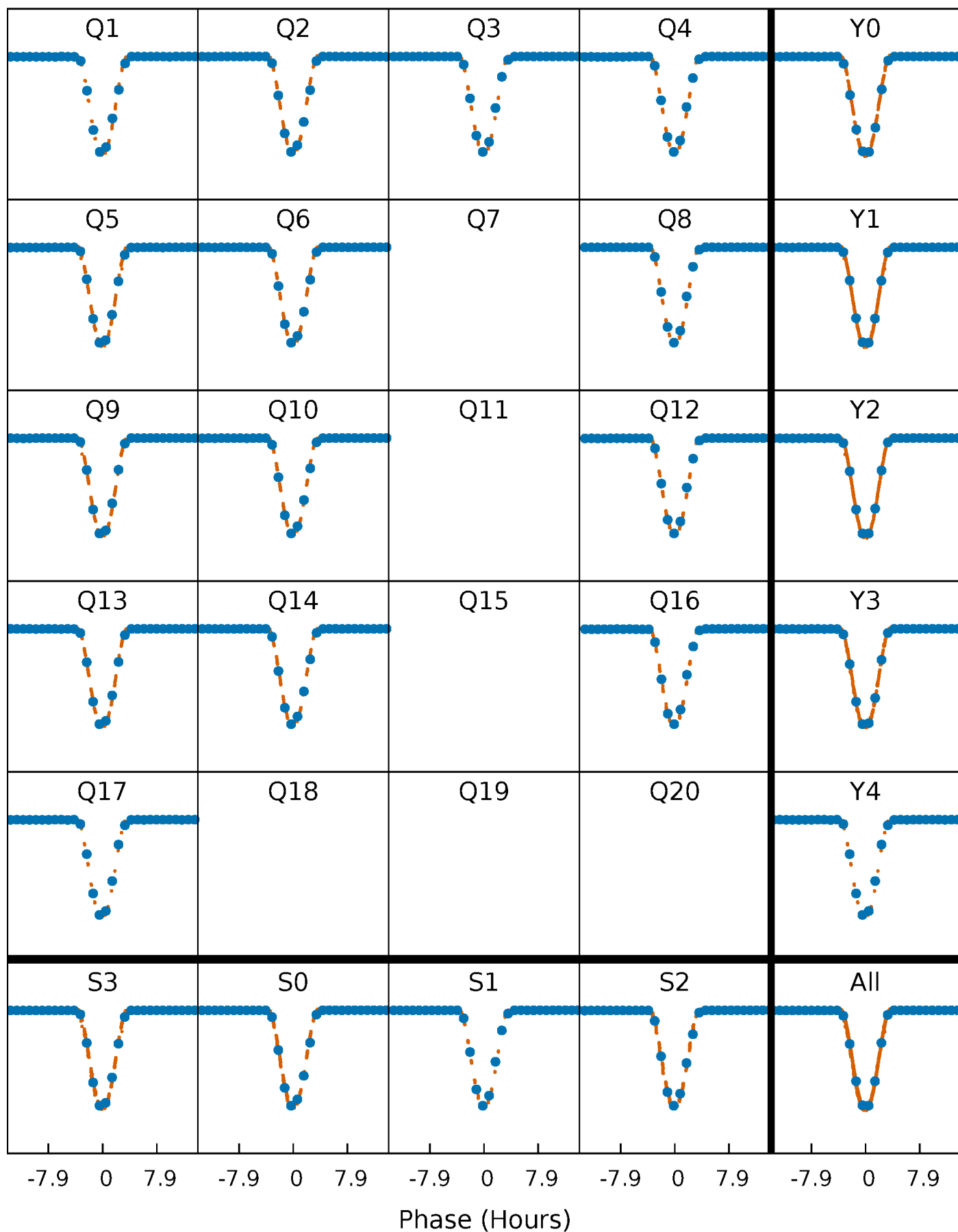


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

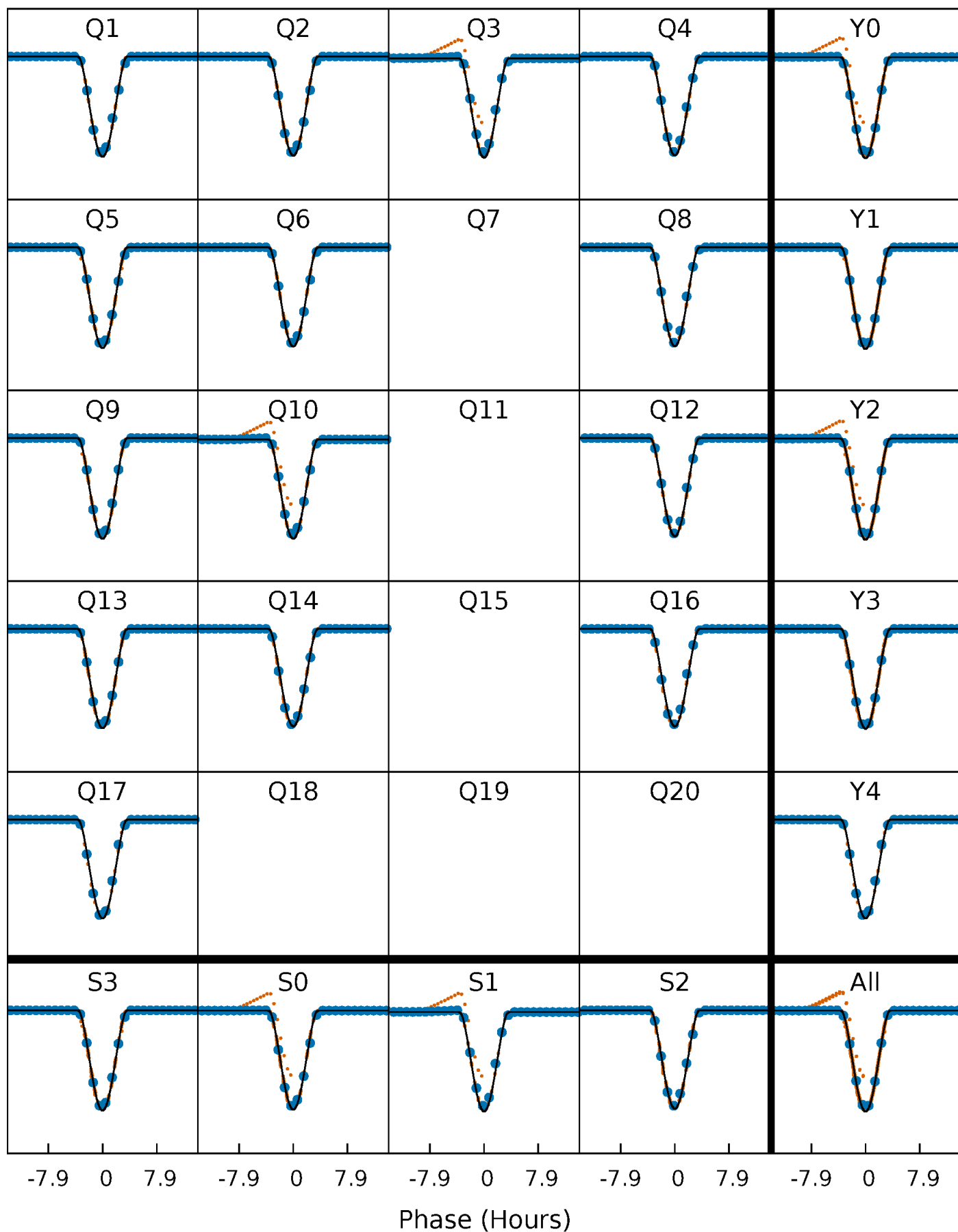
TCE 010296163-01 P= 9.296761 Days  $T_0=135.685073$  (BKJD)





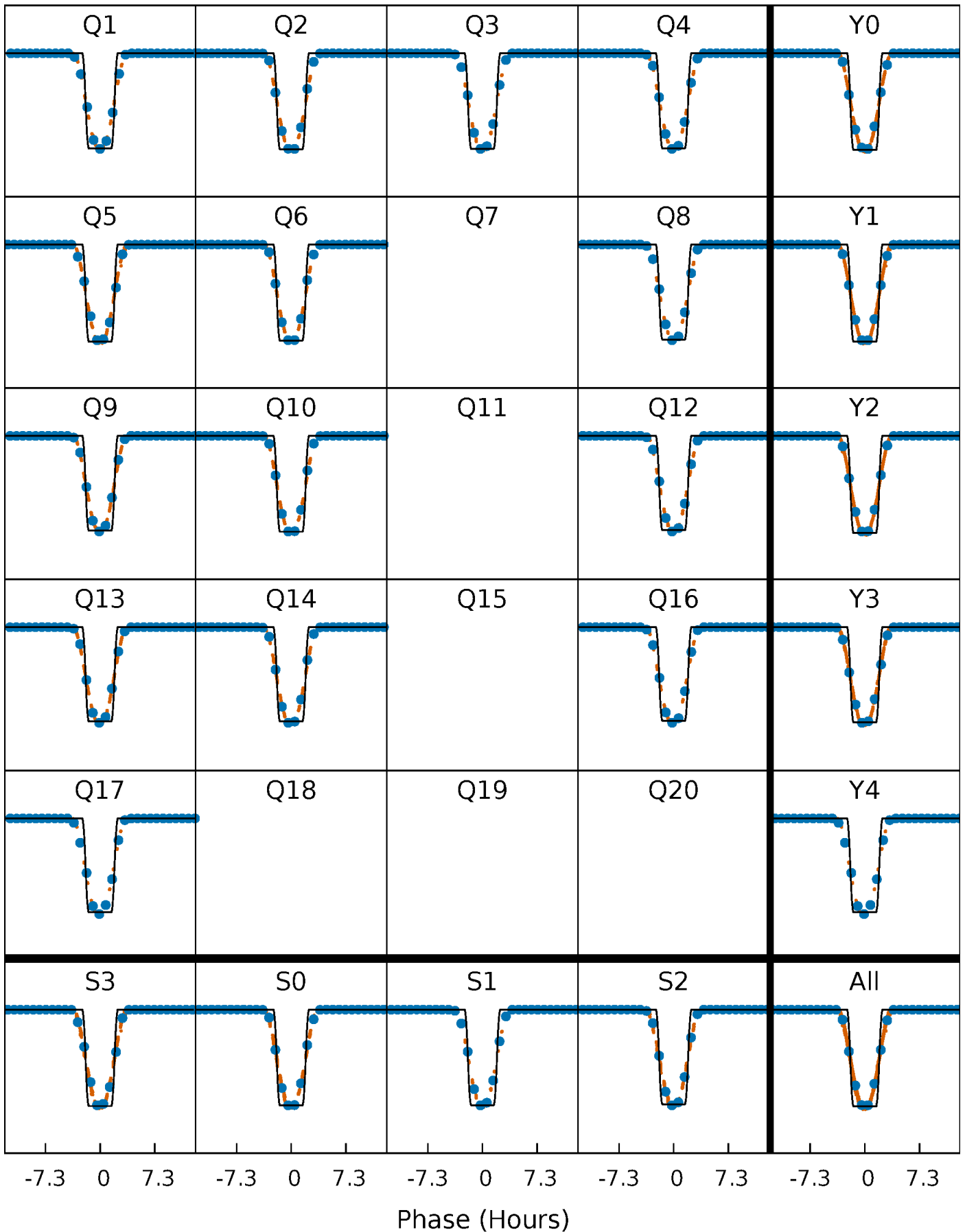
# DV Quarter-Phased Transit Curves

TCE 010296163-01 P= 9.296761 Days  $T_0=135.685073$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

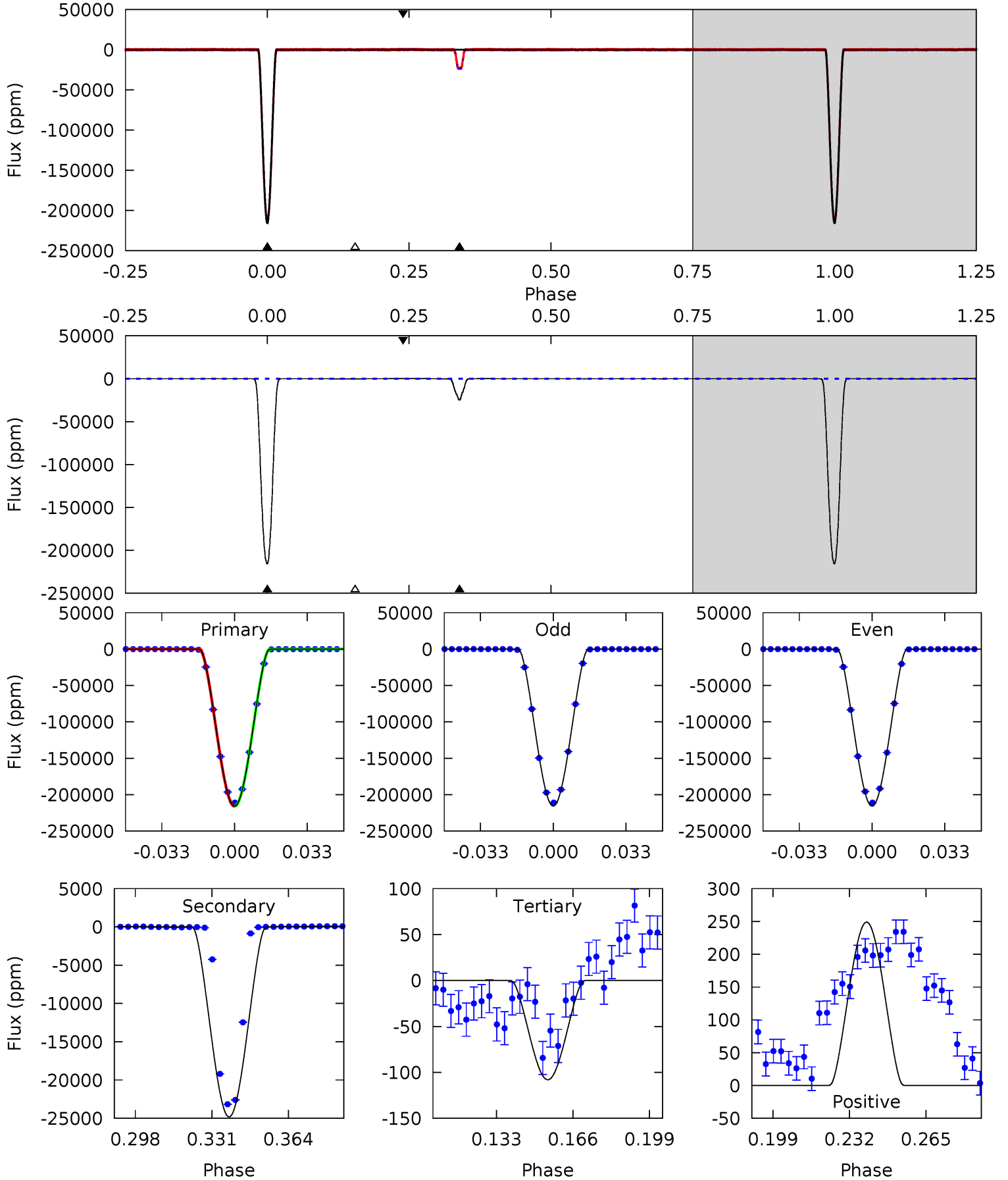
TCE 010296163-01 P= 9.296768 Days  $T_0=135.684163$  (BKJD)



# DV Model-Shift Uniqueness Test

010296163-01, P = 9.296761 Days, E = 126.388312 Days

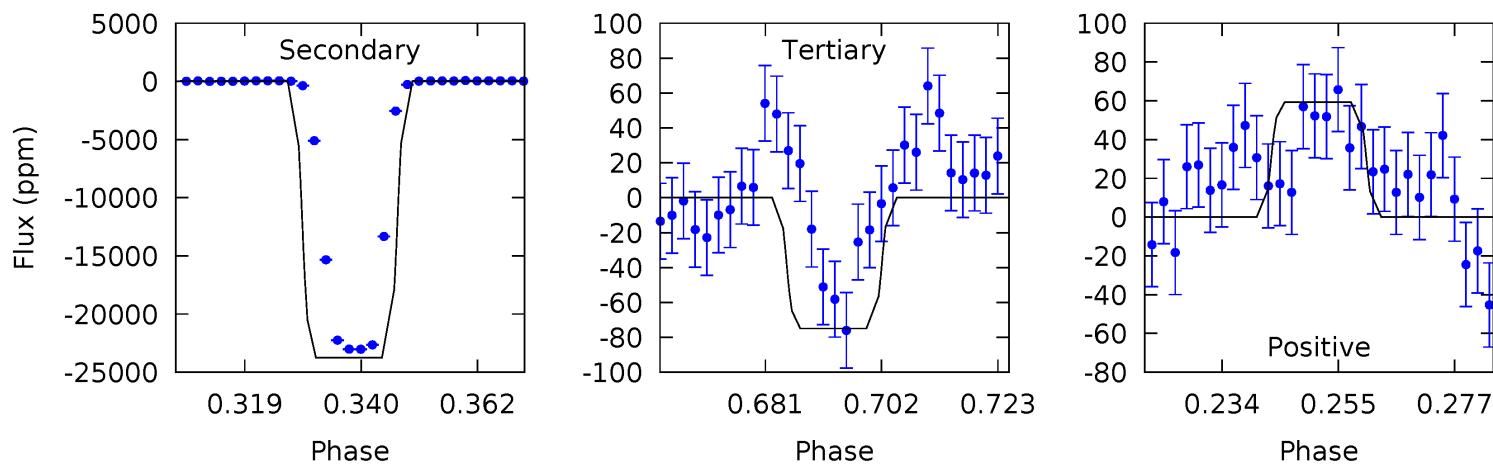
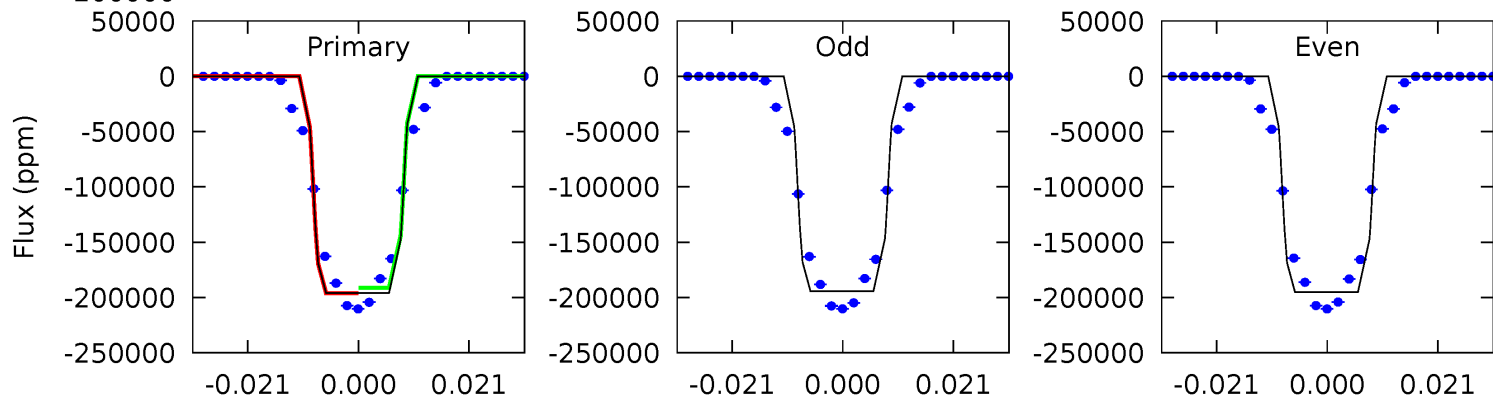
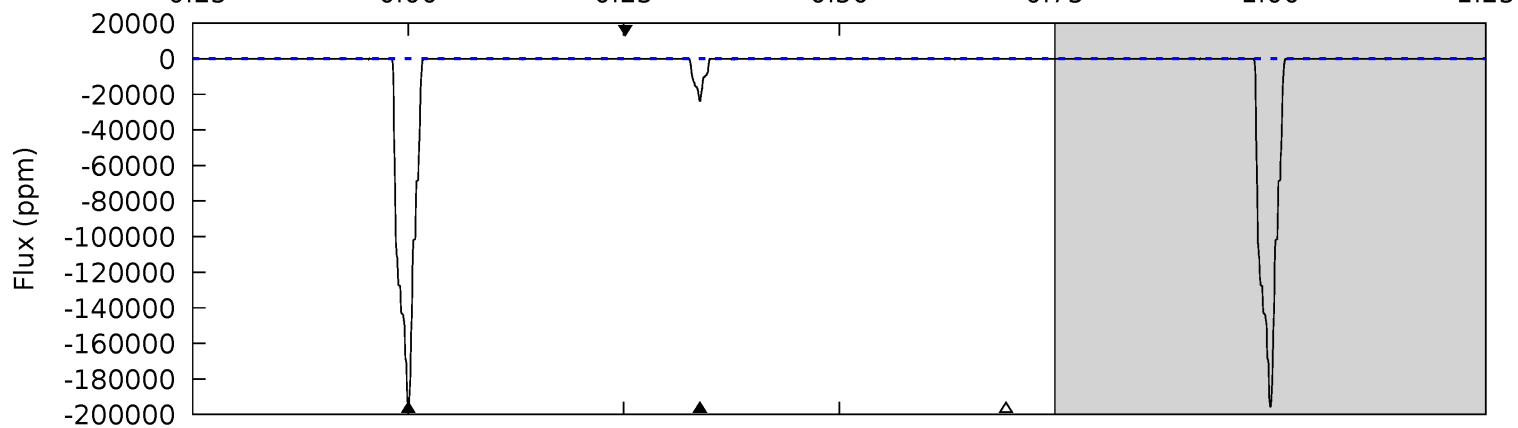
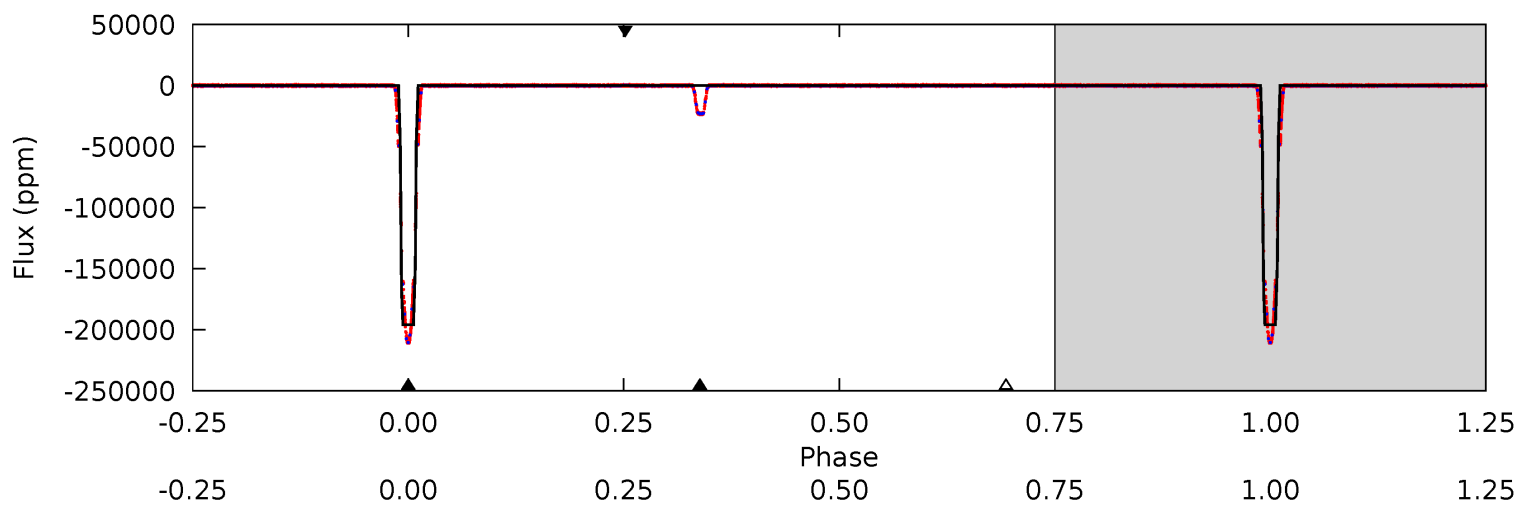
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28319	3260	14.2	32.7	4.79	2.13	8.34	28305	28287	3246	3228	7.51	1.00	0.00	0



# Alt Model-Shift Uniqueness Test

010296163-01, P = 9.296768 Days, E = 126.387395 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
17129	2075	6.55	5.19	4.88	2.30	1.77	17122	17123	2069	2070	33.6	1.00	0.00	0



### Stellar Parameters For KIC 010296163

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6461^{+156}_{-196}$	$3.670^{+0.330}_{-0.088}$	$-0.380^{+0.350}_{-0.250}$	$2.884^{+0.468}_{-1.171}$	$1.418^{+0.229}_{-0.344}$	$0.083^{+0.231}_{-0.024}$
	+2%/-3%	+9%/-2%	+92%/-66%	+16%/-41%	+16%/-24%	+277%/-28%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010296163-01 / KOI 7309.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-24821 \pm 8$	$225.87^{+24.54}_{-49.20}$	$2124^{+132}_{-205}$	$3445^{+60}_{-63}$	$2.685^{+1.339}_{-0.475}$
Alt.	$-23736 \pm 11$	$141.75^{+14.48}_{-29.39}$	$2118^{+123}_{-193}$	$4042^{+64}_{-90}$	$6.491^{+3.059}_{-1.058}$

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

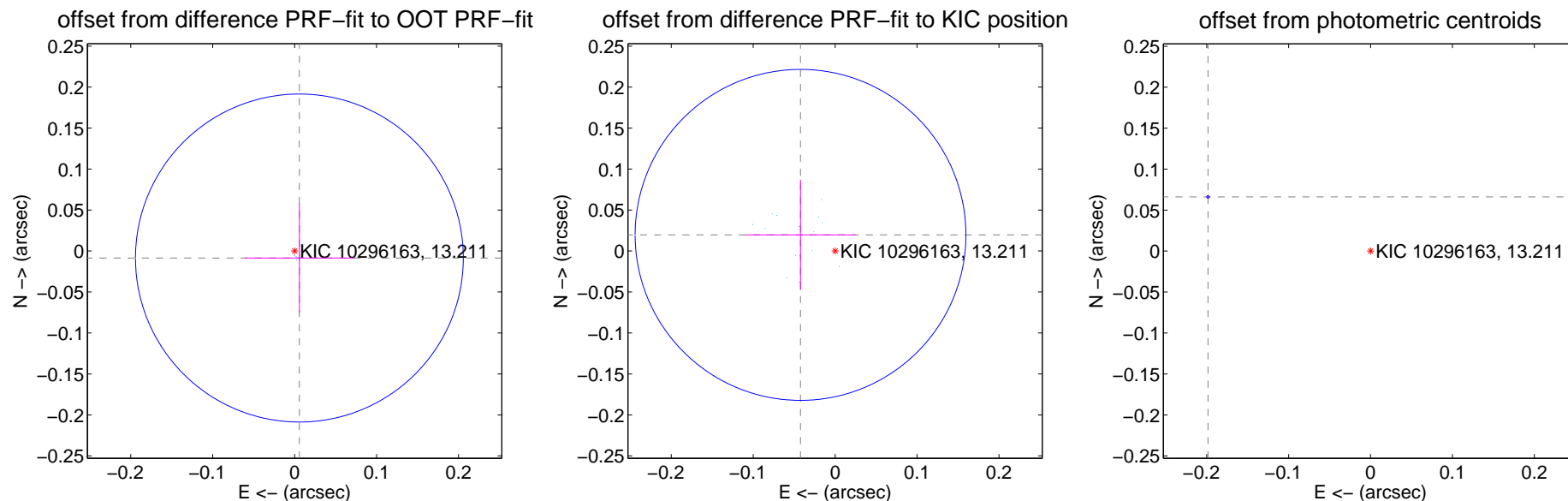
## DV Centroid Data

Supplemental centroid analysis for 010296163-01. Kepler magnitude: 13.21. Transit SNR 7940.15

There are 14 quarters with good PRF difference image offsets

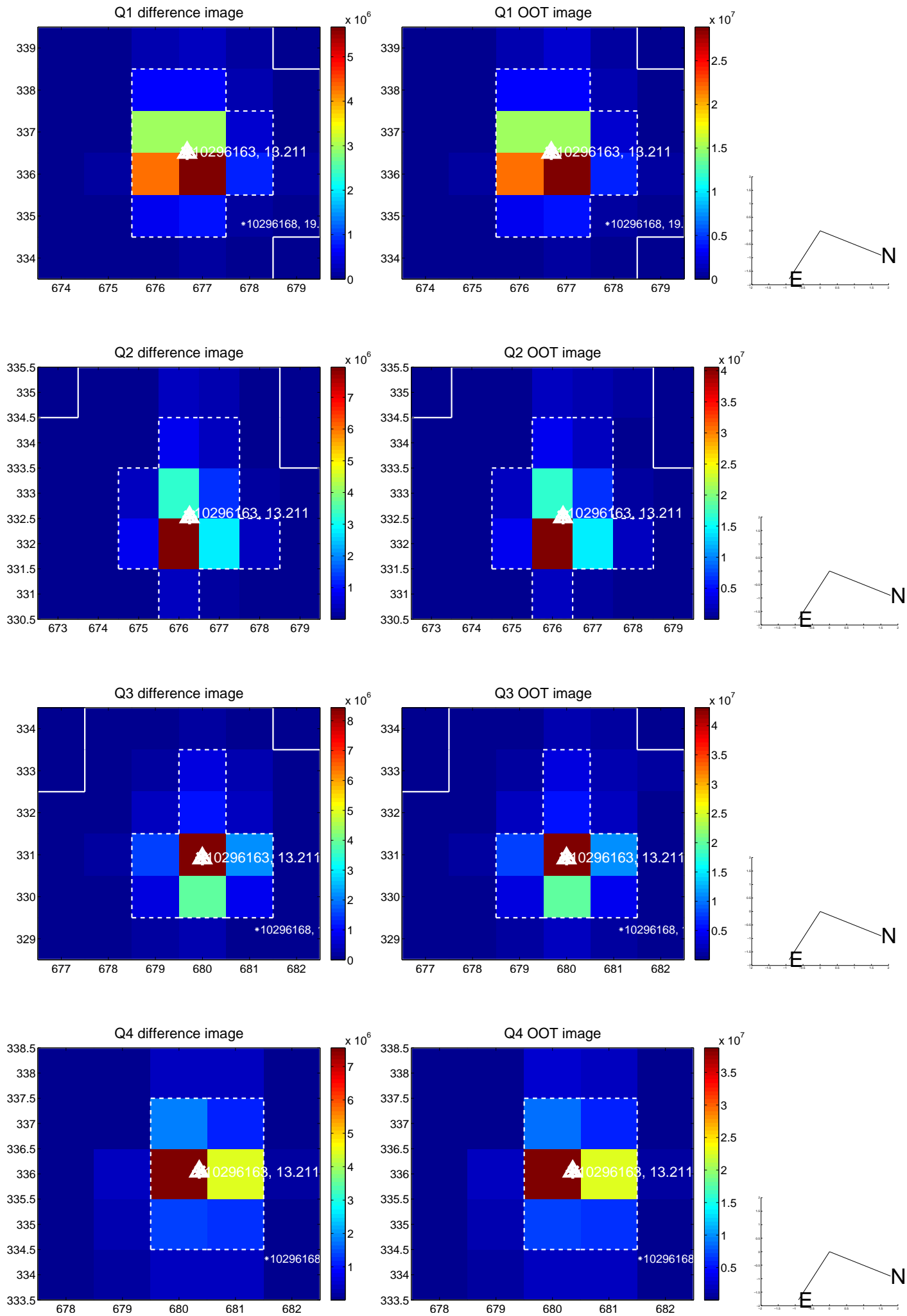
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.010 \pm 0.067$	0.16	$-0.006 \pm 0.067$	$-0.009 \pm 0.067$
PRF-fit source offset from KIC position	$0.047 \pm 0.067$	0.69	$0.042 \pm 0.067$	$0.020 \pm 0.067$
photometric centroid source offset	$0.21 \pm 0.00$	408.88	$0.20 \pm 0.00$	$0.07 \pm 0.00$

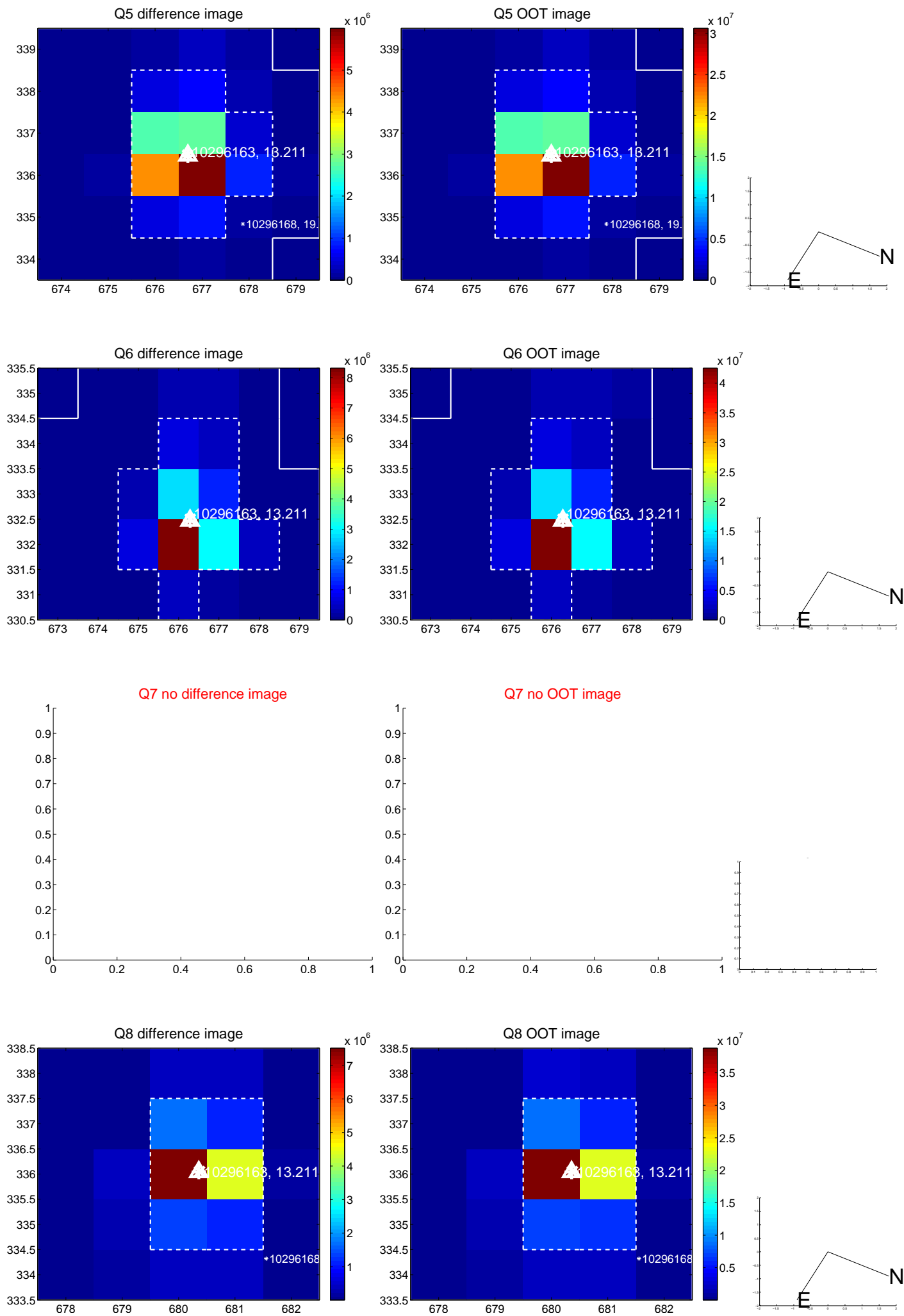


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

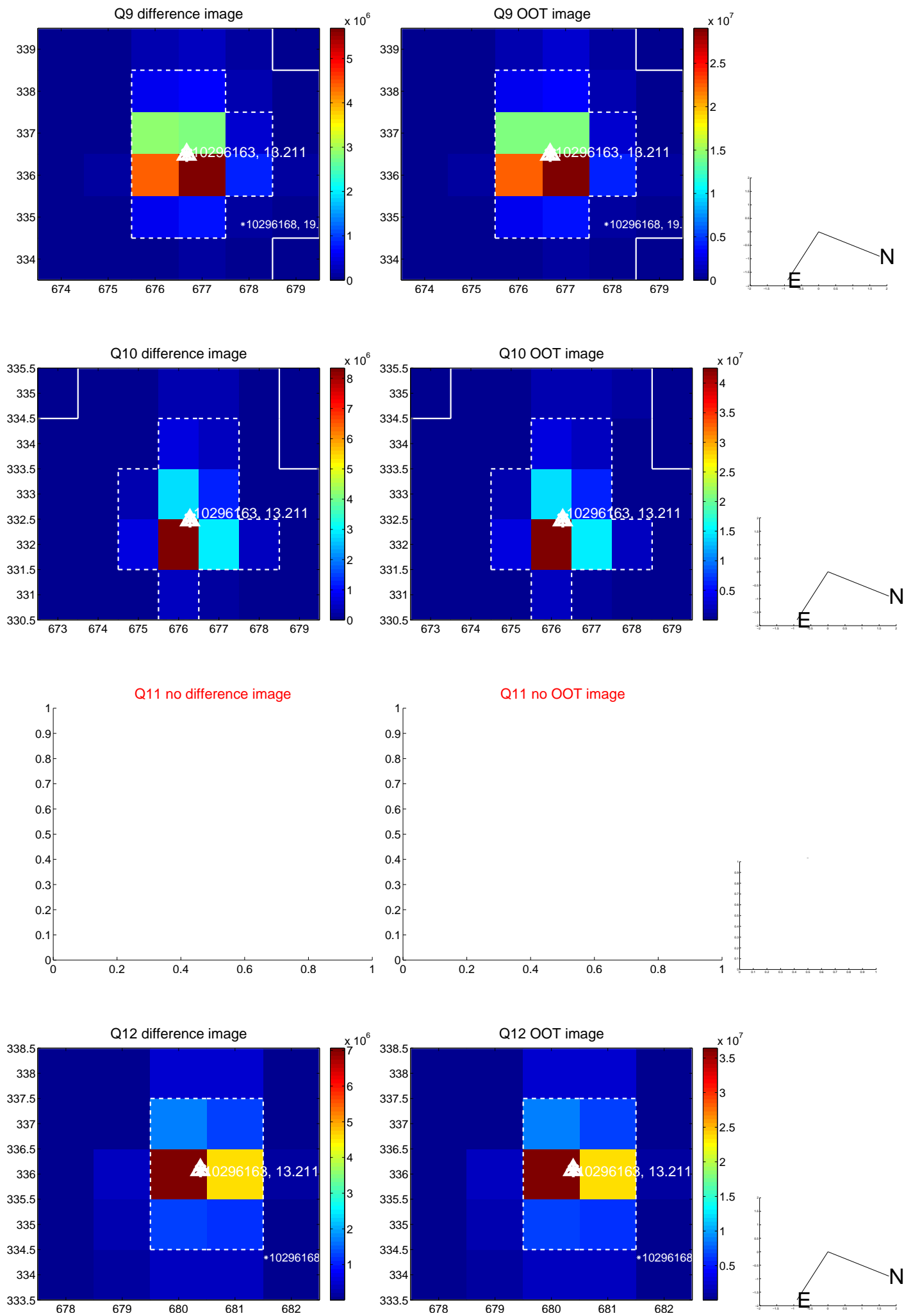


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

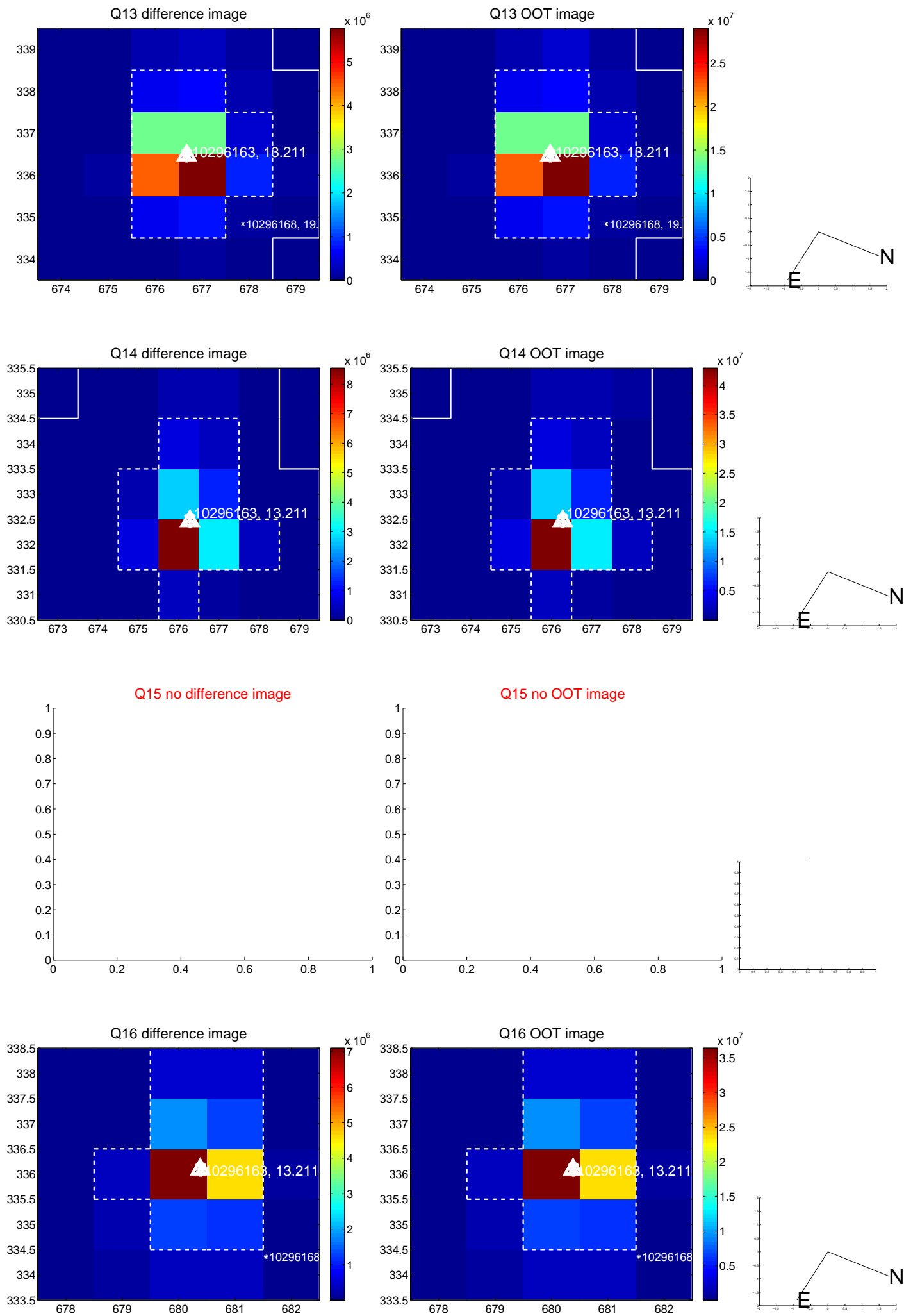




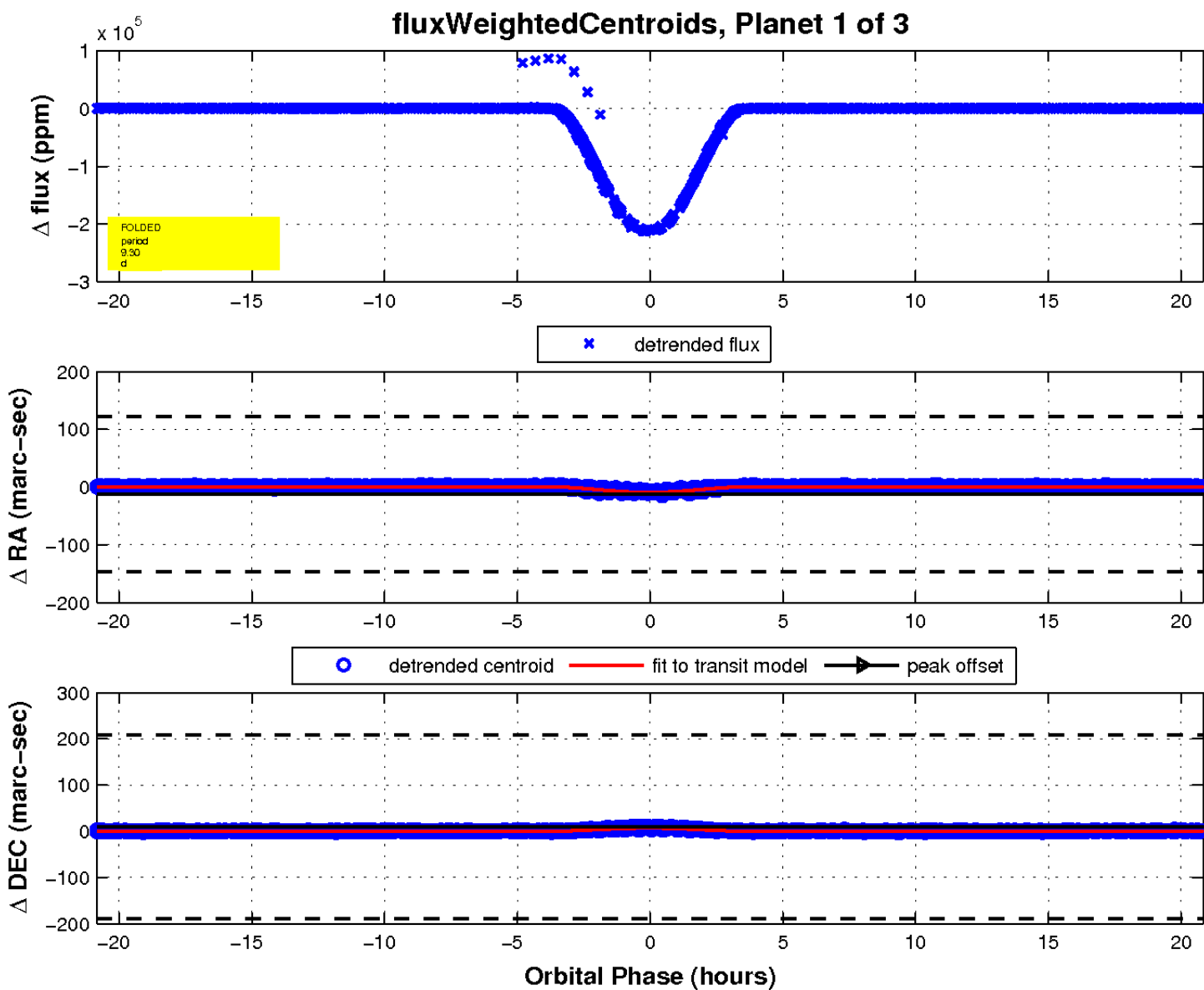
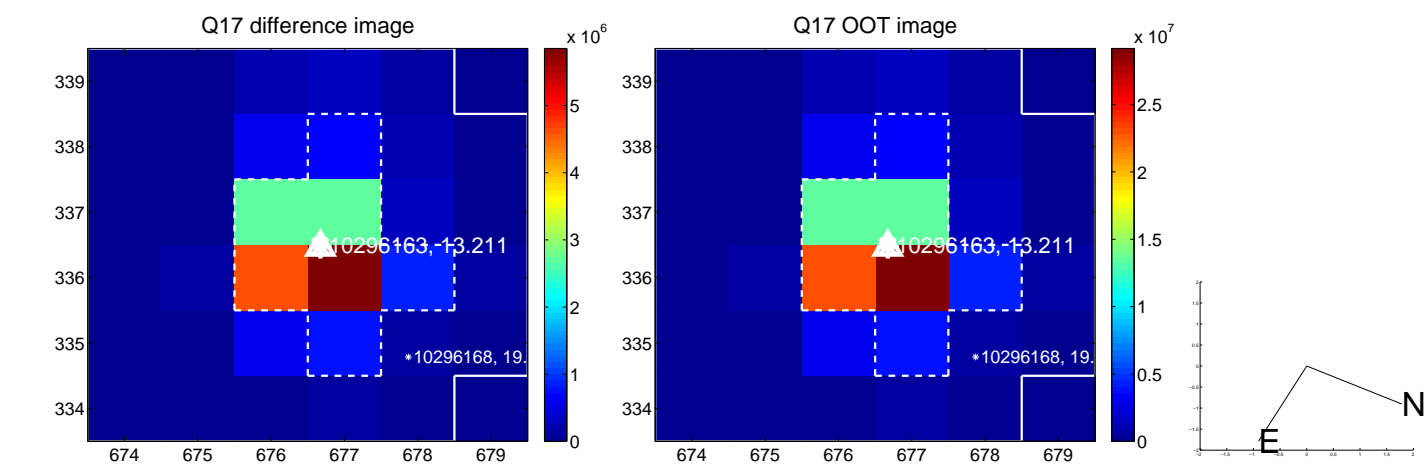
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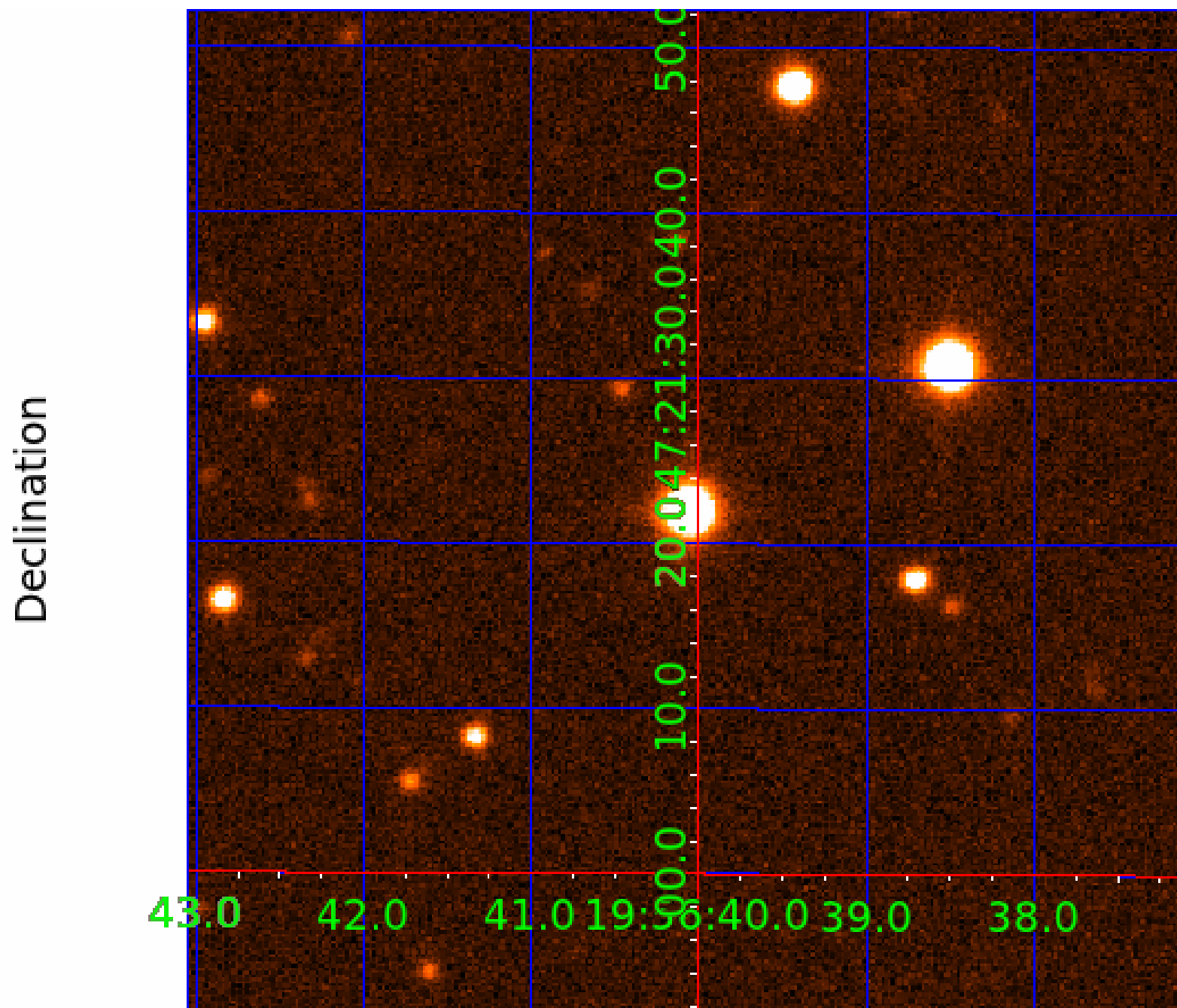
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



# KIC 010296163

## 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
010296163-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
010296163-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
010296163-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

**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 010296163-02

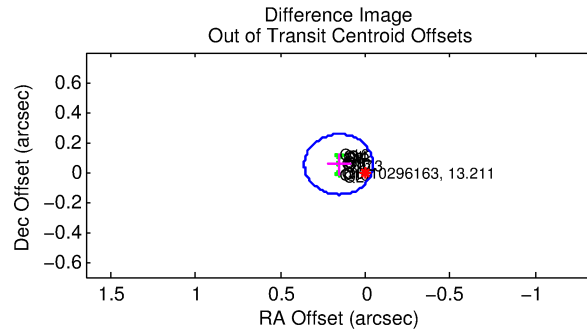
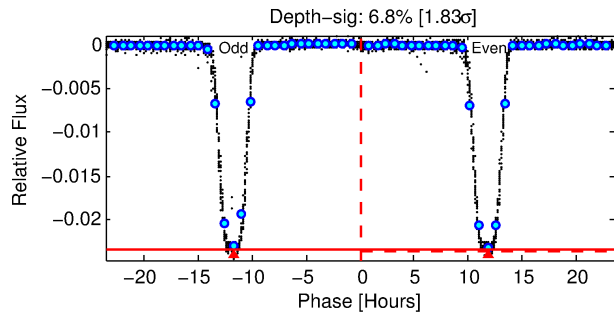
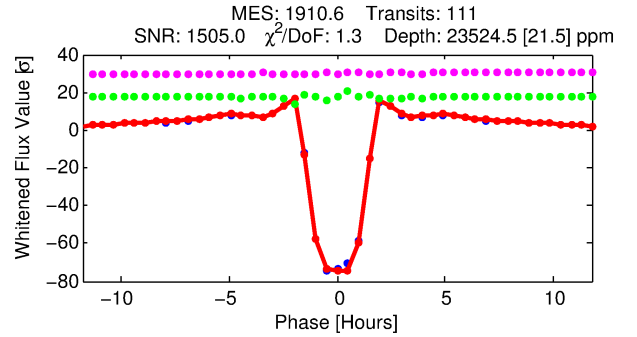
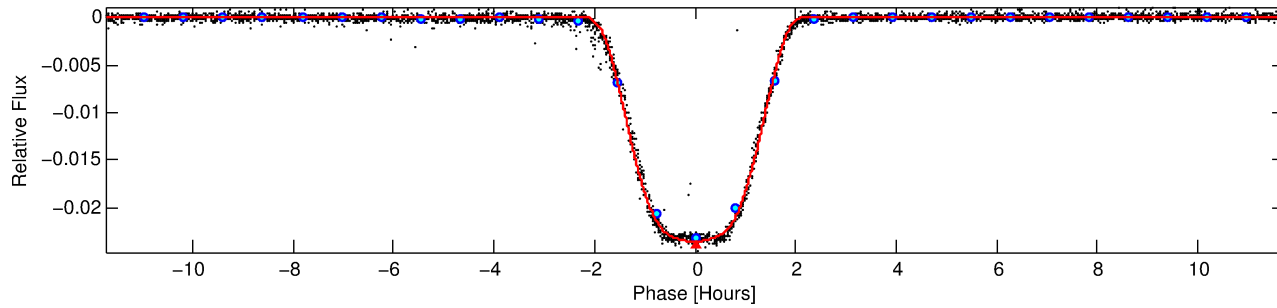
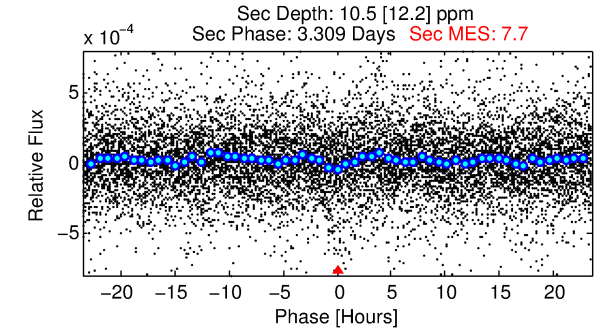
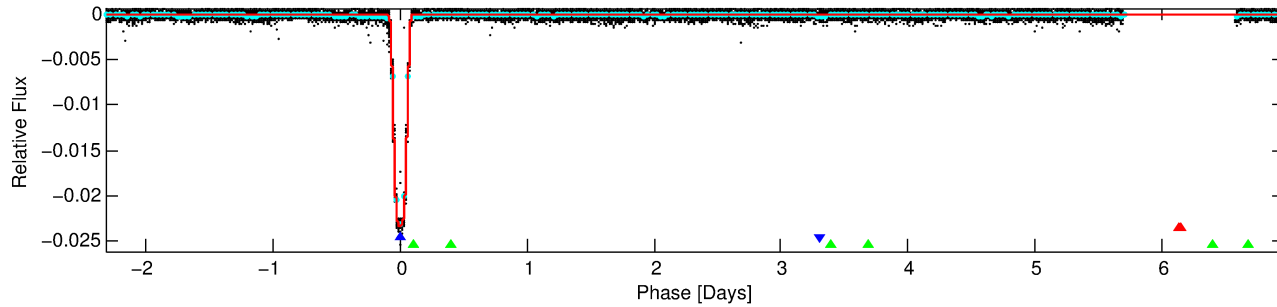
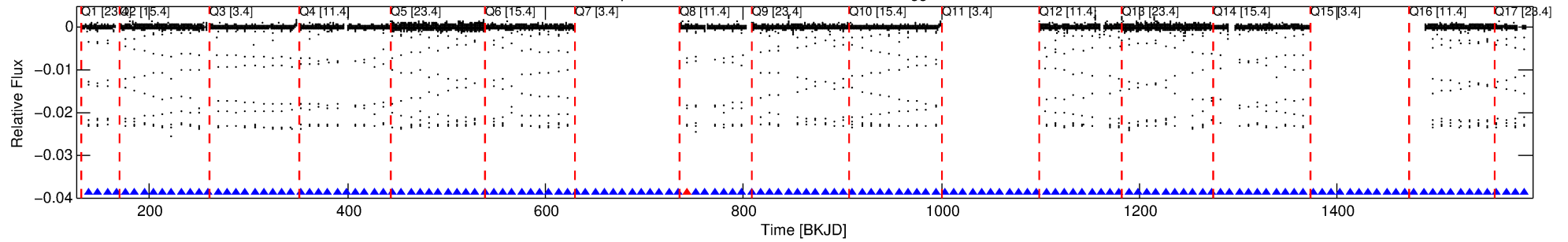
No Significant Match Found

# DV One-Page Summary

KIC: 10296163 Candidate: 2 of 3 Period: 9.297 d

KOI: K07309 Corr: No Ephemeris Match

Kp: 13.21 R\*: 2.88 Rs Teff: 6461.0 K Logg: 3.67 Fe/H: -0.380



## DV Fit Results:

Period = 9.29671 [0.00000] d  
Epoch = 138.8407 [0.0001] BKJD  
Rp/R\* = 0.1552 [0.0001]  
a/R\* = 15.51 [0.02]  
b = 0.78 [0.00]  
Seff = 1372.94 [805.96]  
Teq = 1552 [228] K  
Rp = 48.84 [19.83] Re  
a = 0.0973 [0.0361] AU  
Ag = 0.02 [0.03] [-33.01σ]  
Teffp = 933 [273] K [-1.74σ]

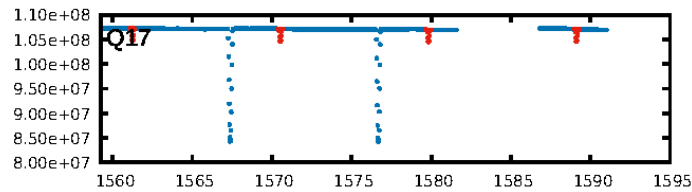
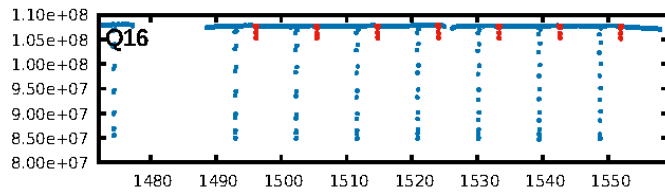
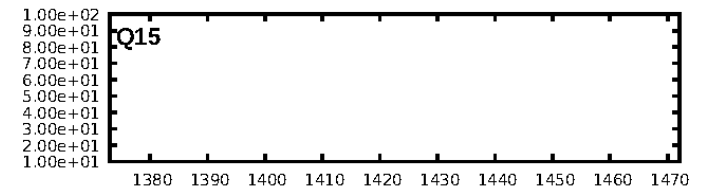
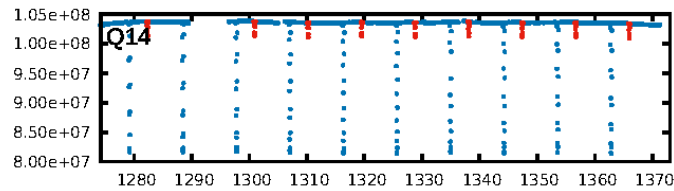
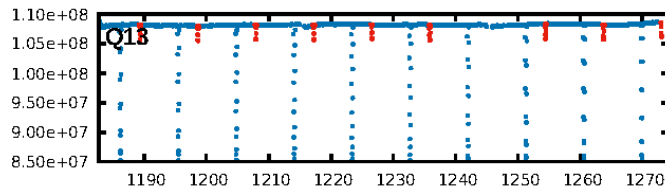
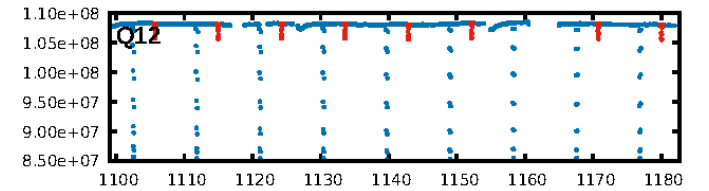
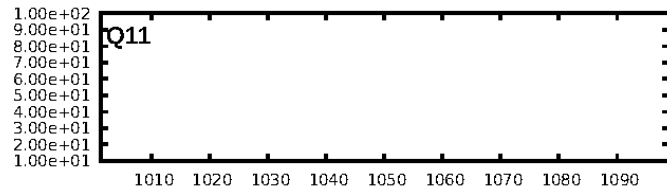
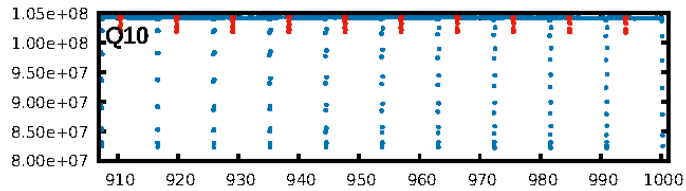
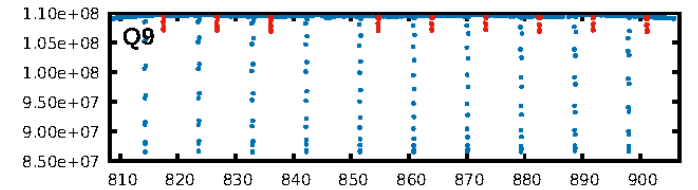
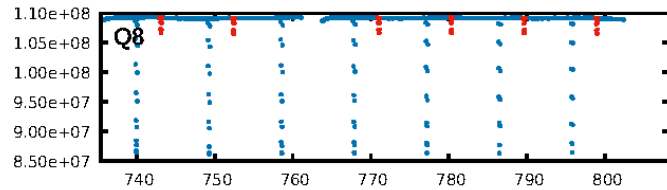
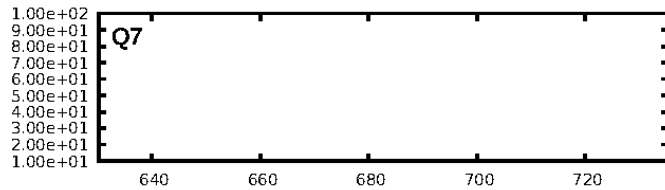
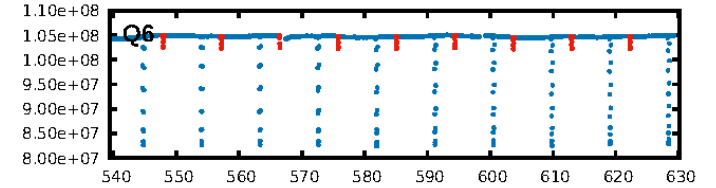
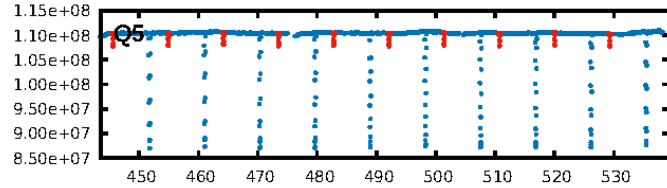
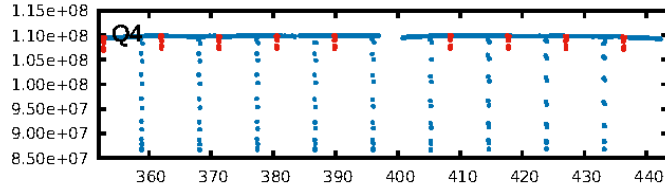
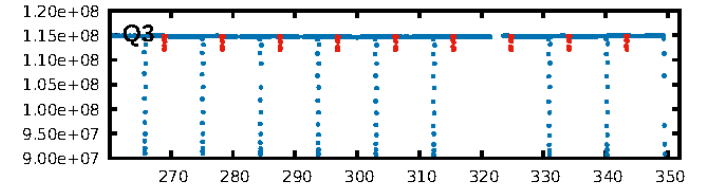
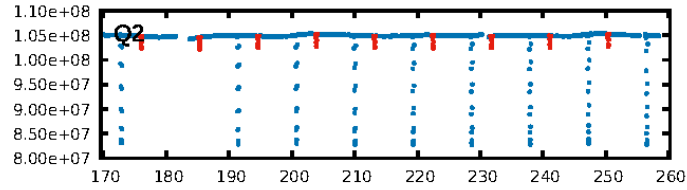
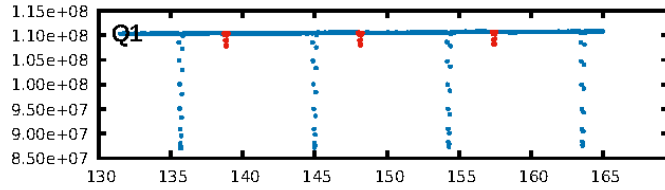
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [103/104]  
GhostDiagnostic-chr: 5.05  
Centroid-sig: 0.0%  
Centroid-so: 0.333 arcsec [73.03σ]  
OotOffset-rm: 0.167 arcsec [2.49σ]  
KicOffset-rm: 0.219 arcsec [3.22σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

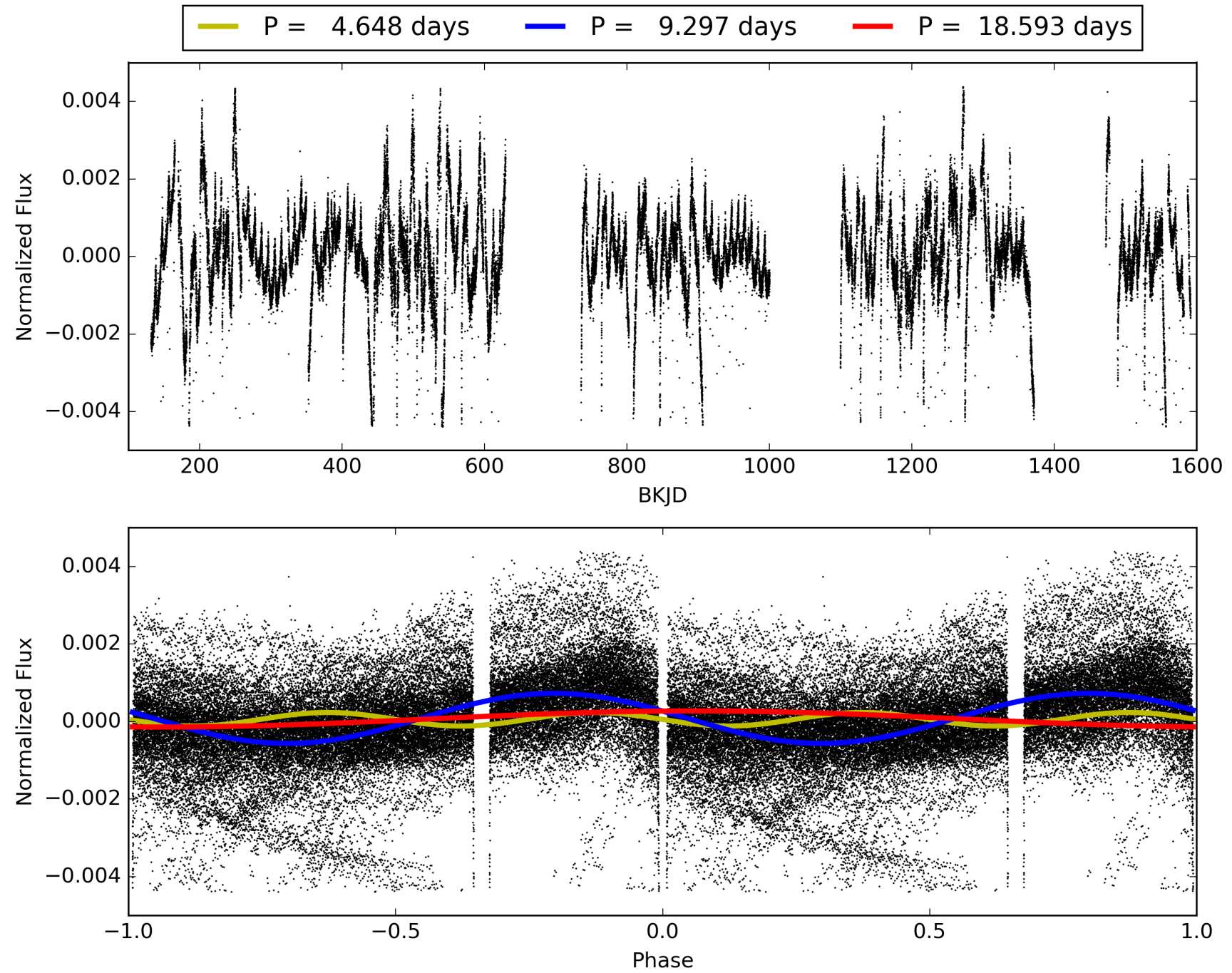
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:27:17 Z

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

## TCE 010296163-02, PDC Light Curves



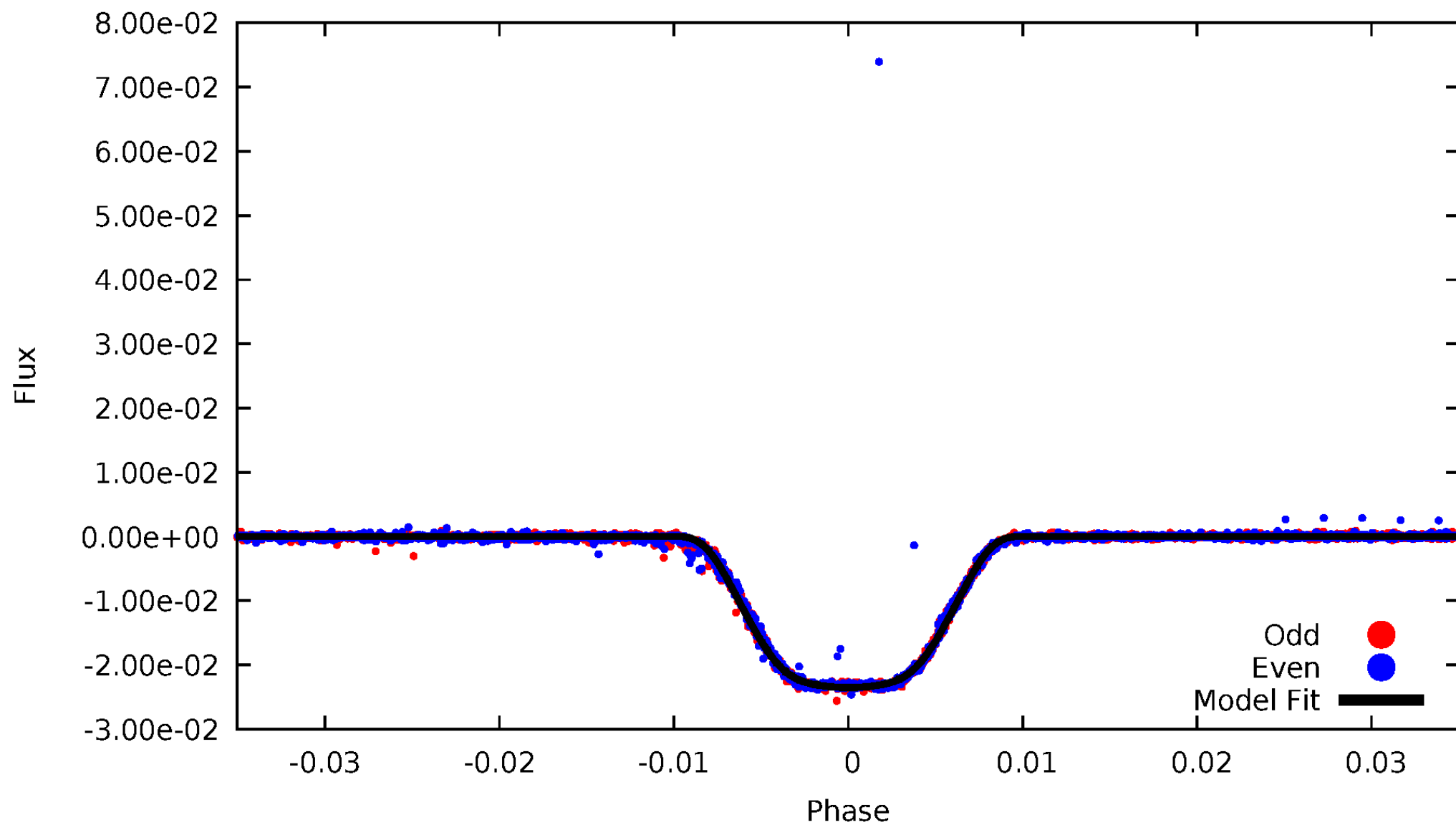
TCE 010296163-02





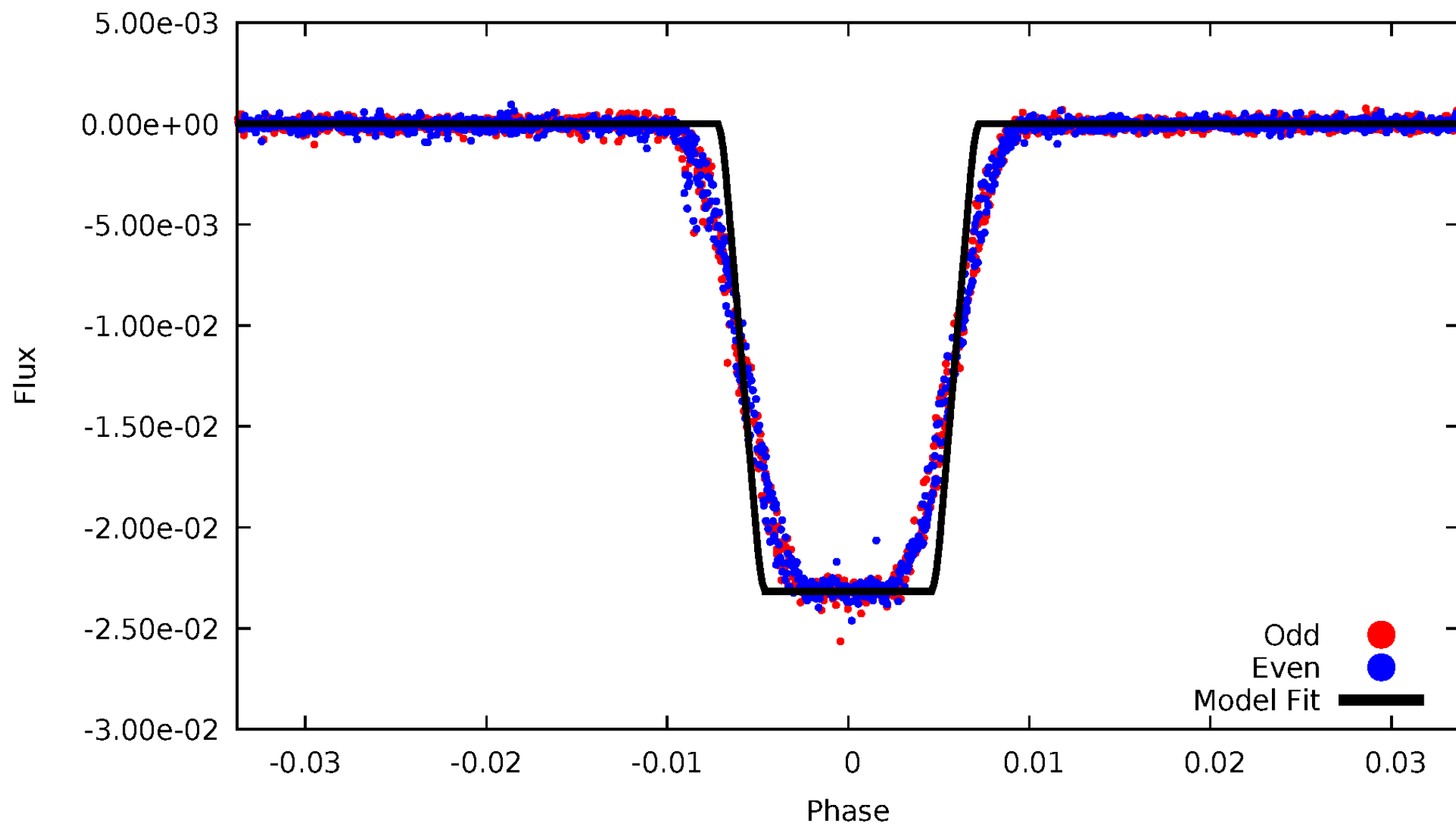
# DV Odd/Even

TCE 010296163-02



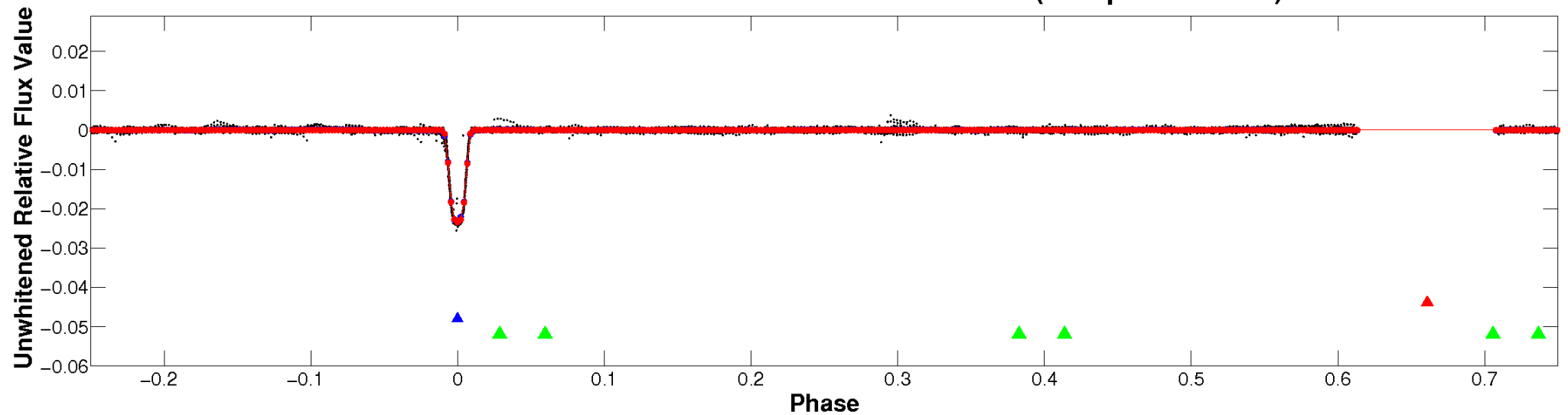
# ALT Odd/Even

TCE 010296163-02

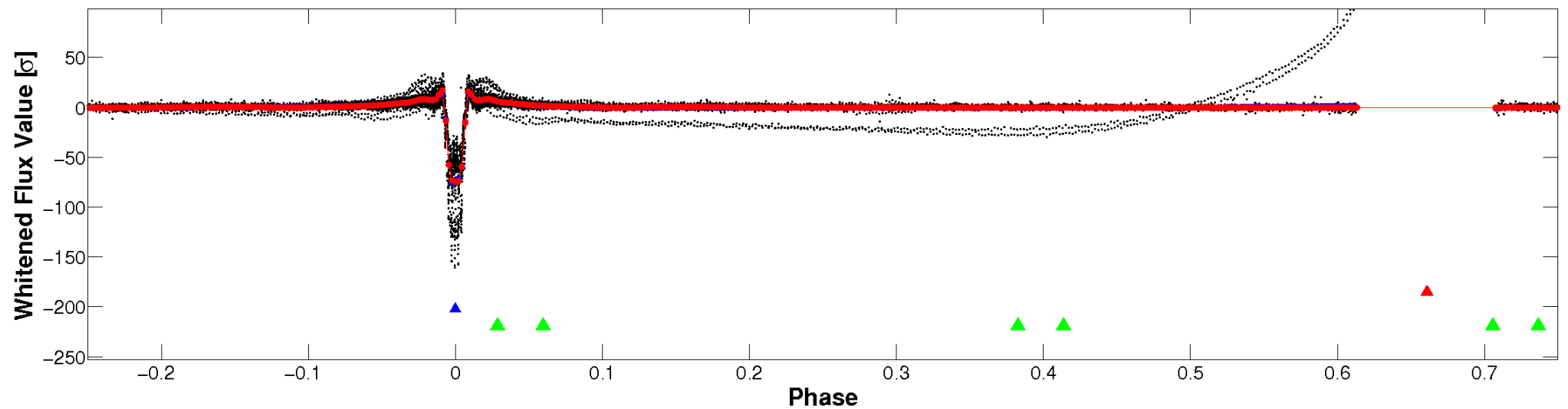


# Non-Whitened Vs. Whitened Light Curve

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

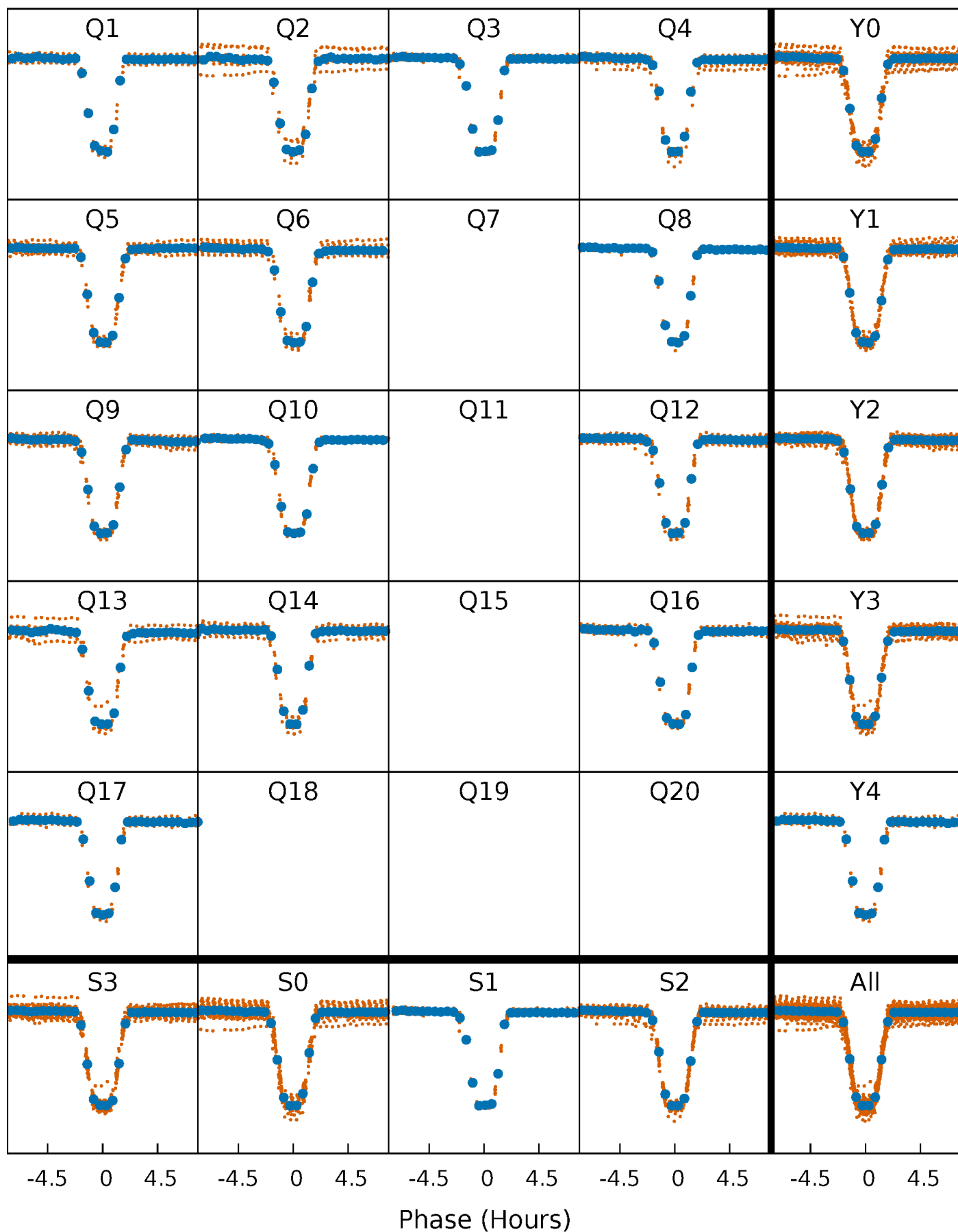


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



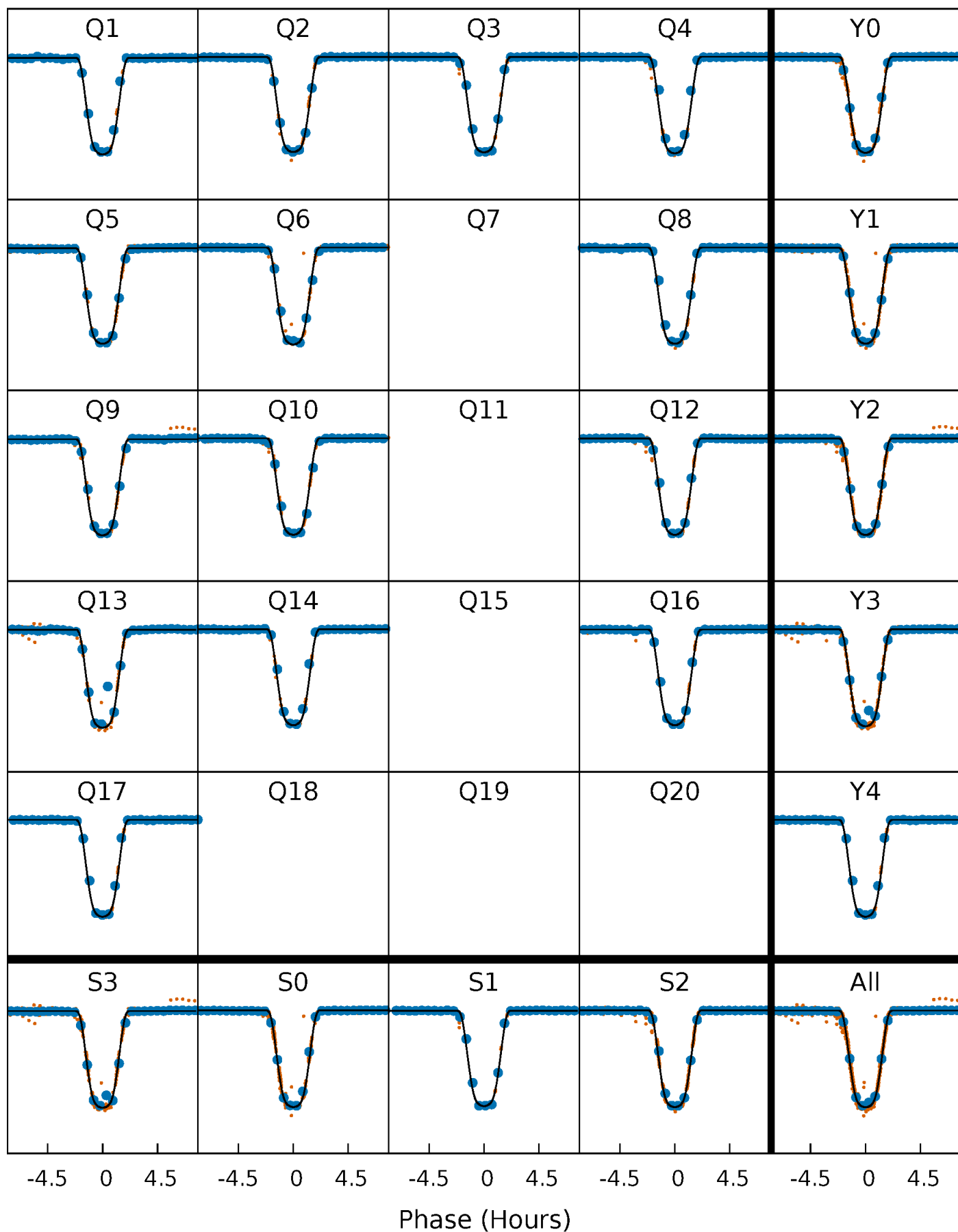
# PDC Quarter-Phased Transit Curves

TCE 010296163-02 P= 9.296714 Days  $T_0=138.840719$  (BKJD)



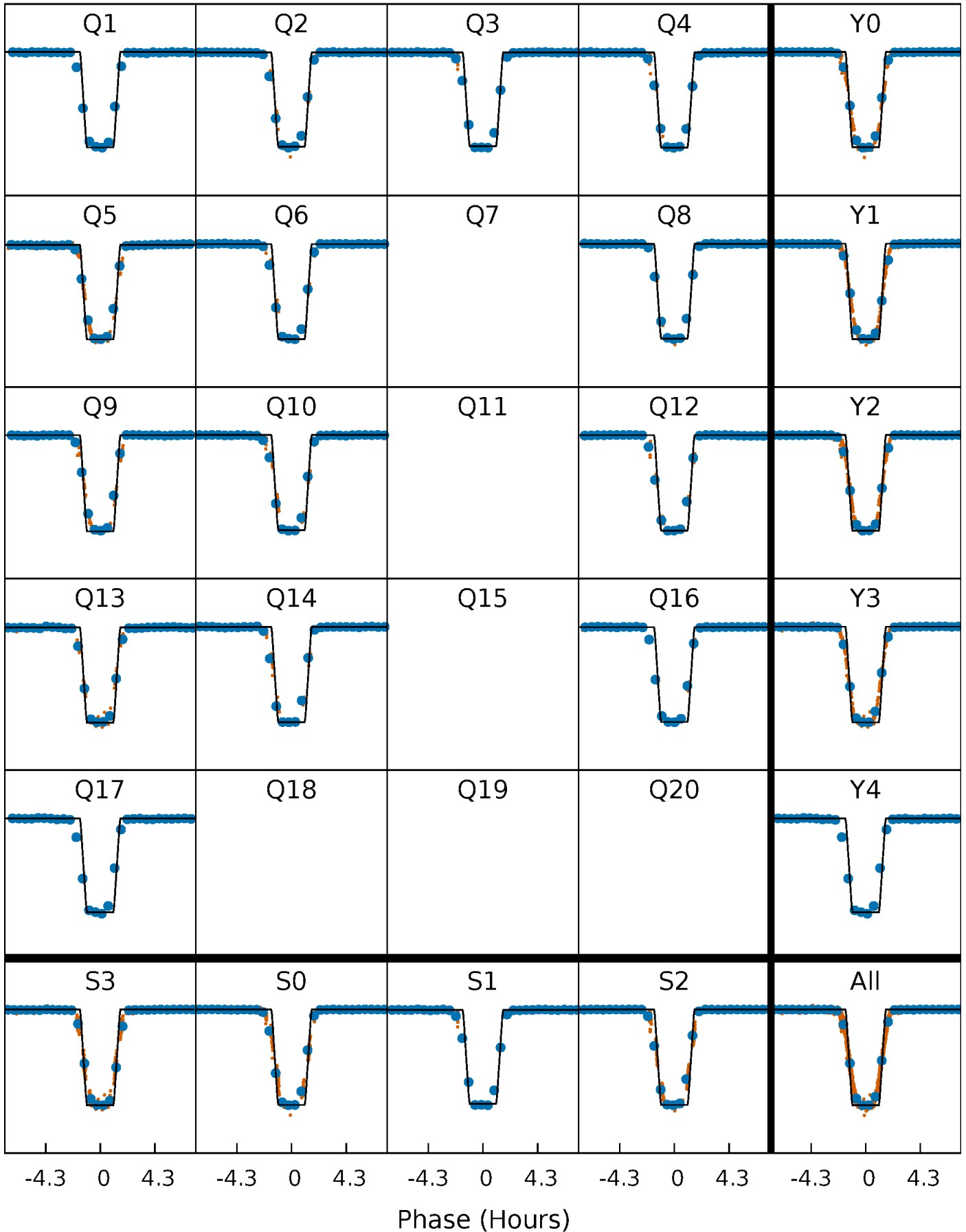
# DV Quarter-Phased Transit Curves

TCE 010296163-02 P= 9.296714 Days  $T_0=138.840719$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

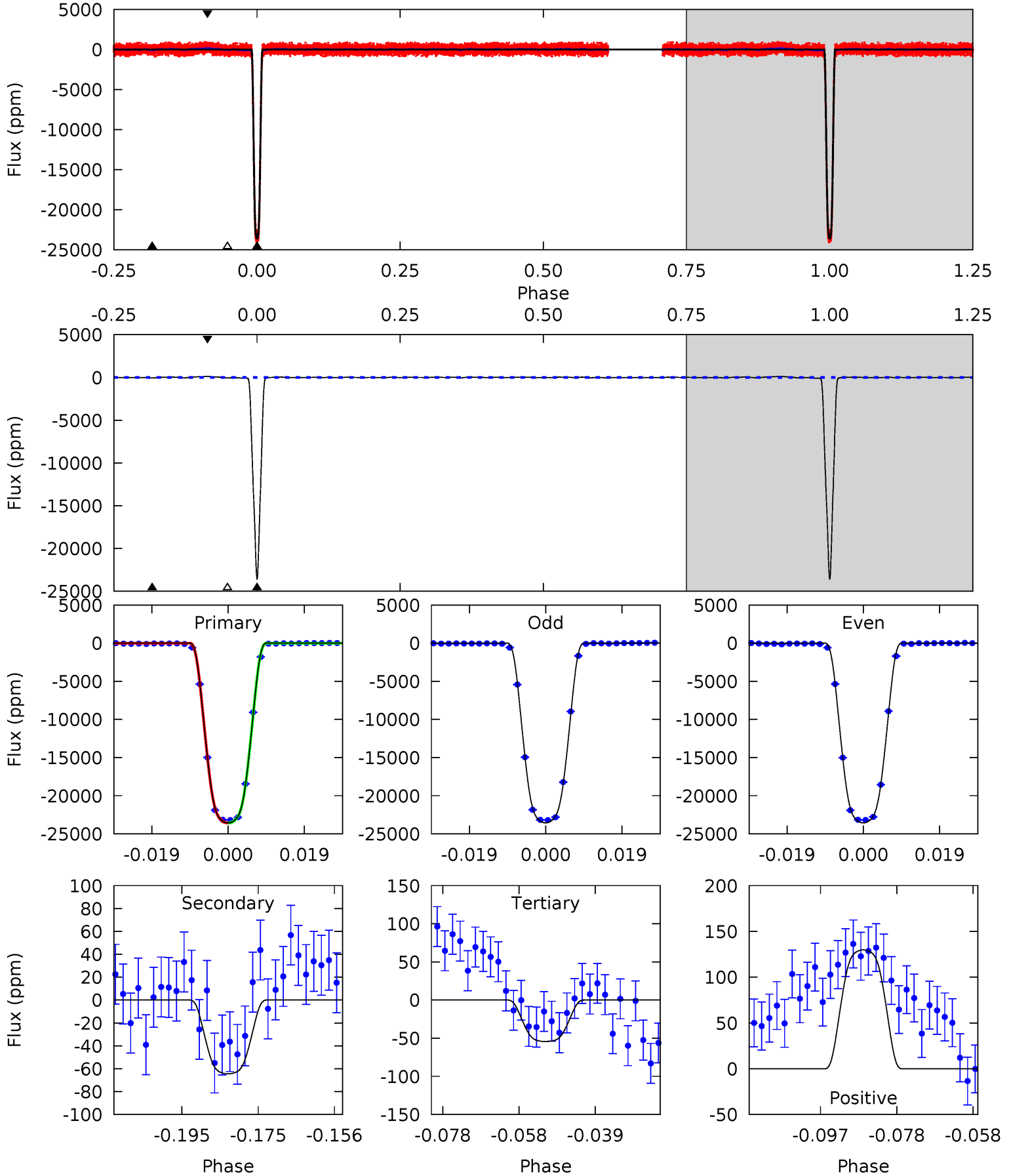
TCE 010296163-02 P= 9.296750 Days  $T_0=138.838267$  (BKJD)



# DV Model-Shift Uniqueness Test

010296163-02, P = 9.296714 Days, E = 129.544005 Days

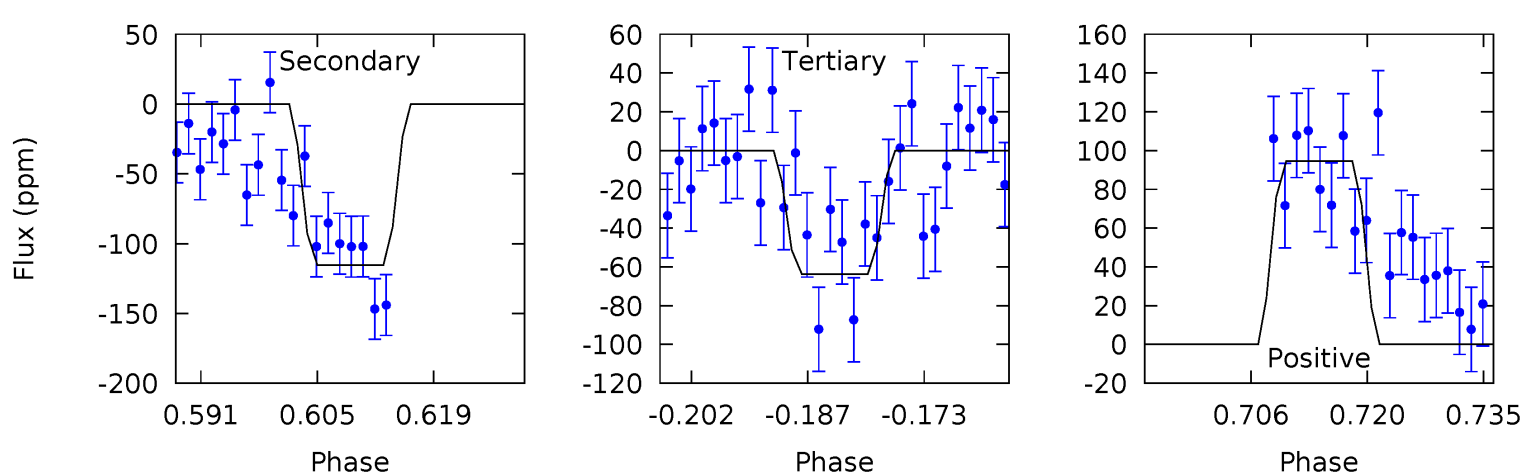
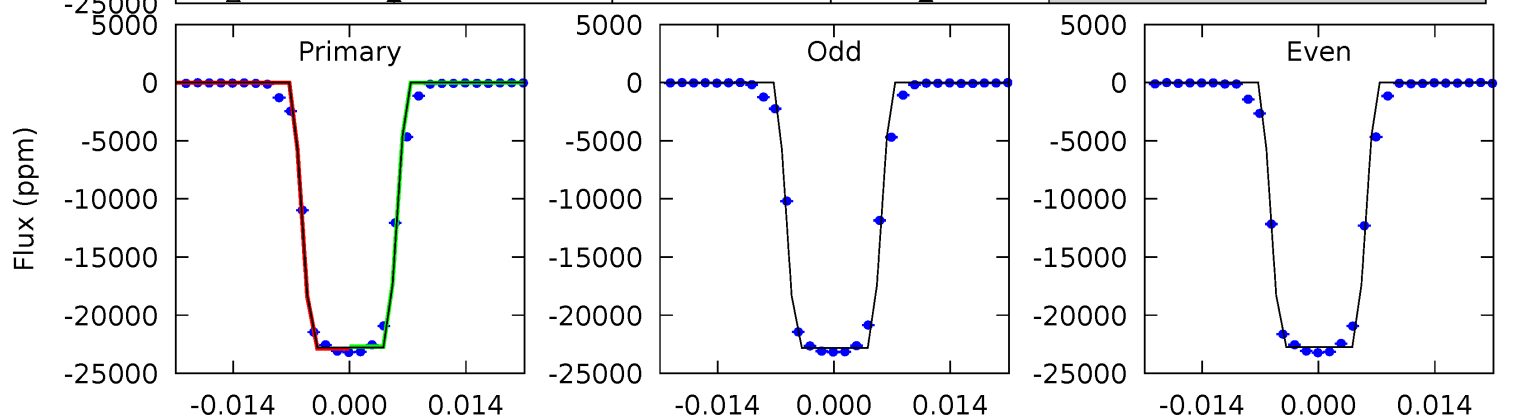
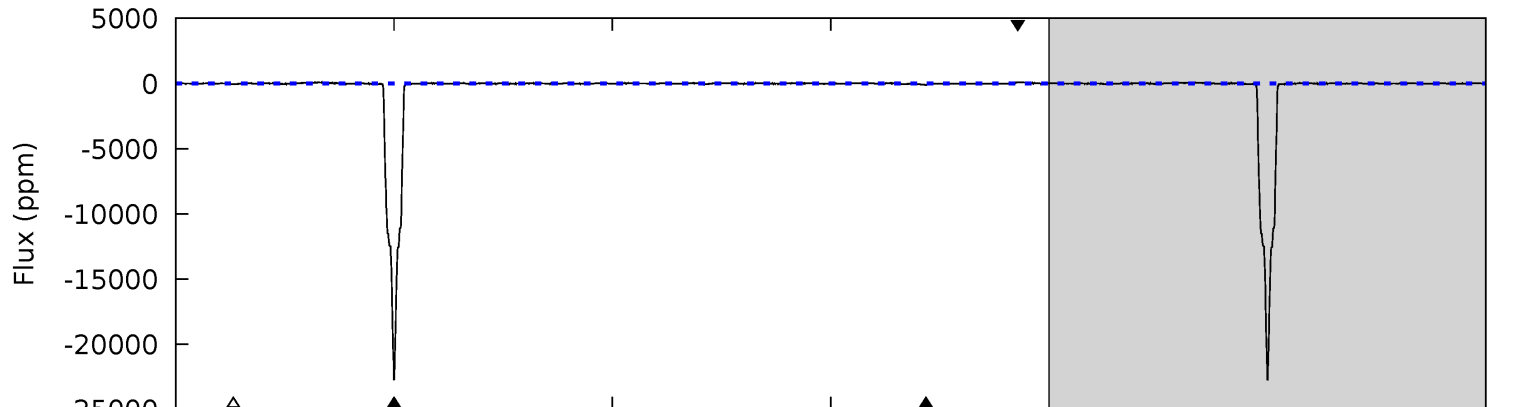
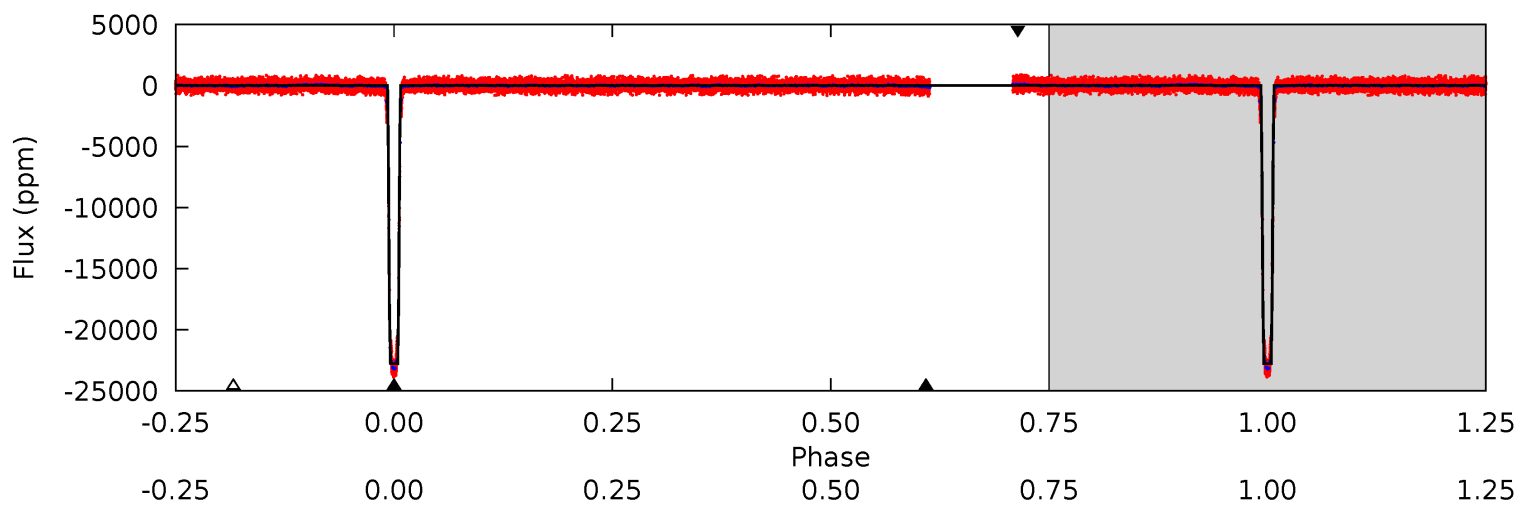
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2921	7.99	6.74	16.1	4.90	2.34	3.74	2914	2905	1.25	-8.09	0.54	0.99	0.01	0.50



# Alt Model-Shift Uniqueness Test

010296163-02, P = 9.296750 Days, E = 129.541517 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
2193	11.1	6.14	9.11	4.96	2.45	2.16	2187	2184	4.98	2.01	2.80	1.00	0.00	0





### Stellar Parameters For KIC 010296163

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6461^{+156}_{-196}$	$3.670^{+0.330}_{-0.088}$	$-0.380^{+0.350}_{-0.250}$	$2.884^{+0.468}_{-1.171}$	$1.418^{+0.229}_{-0.344}$	$0.083^{+0.231}_{-0.024}$
	+2%/-3%	+9%/-2%	+92%/-66%	+16%/-41%	+16%/-24%	+277%/-28%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010296163-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-64 \pm 8$	$47.85^{+5.28}_{-9.64}$	$2122^{+124}_{-180}$	$-2358^{+264}_{-114}$	$0.153^{+0.074}_{-0.034}$
Alt.	$-115 \pm 10$	$47.14^{+4.94}_{-9.94}$	$2126^{+119}_{-195}$	$-1902^{+4072}_{-323}$	$0.281^{+0.122}_{-0.054}$

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

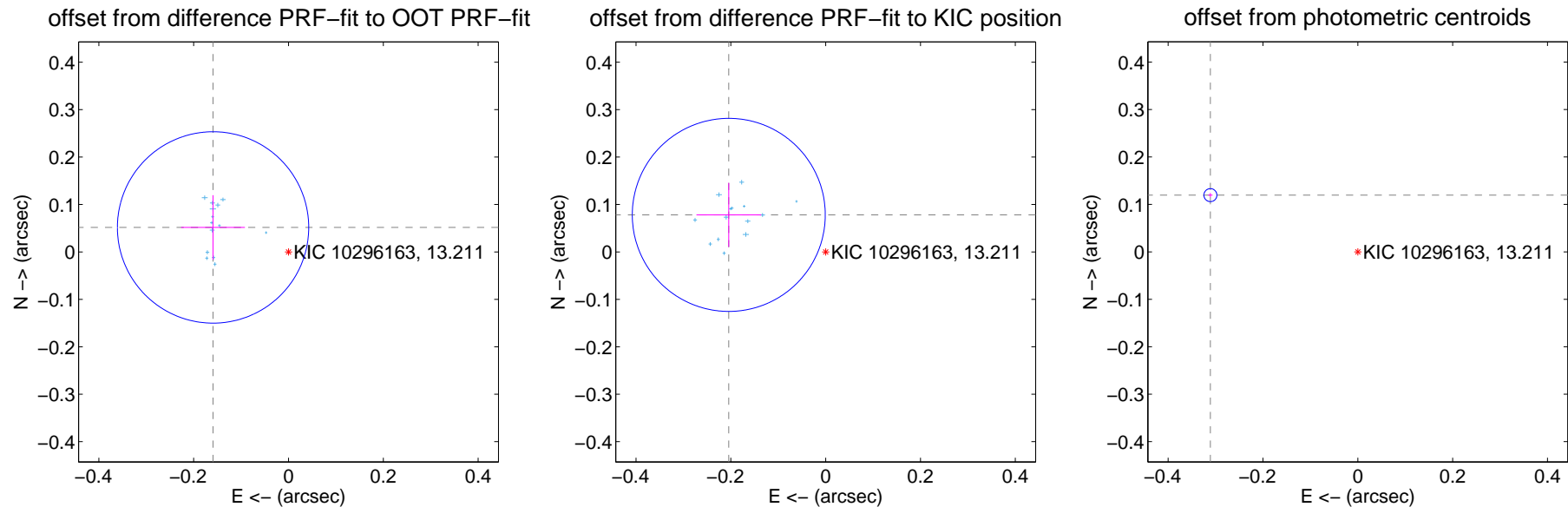
## DV Centroid Data

Supplemental centroid analysis for 010296163-02. Kepler magnitude: 13.21. Transit SNR 1504.96

There are 14 quarters with good PRF difference image offsets

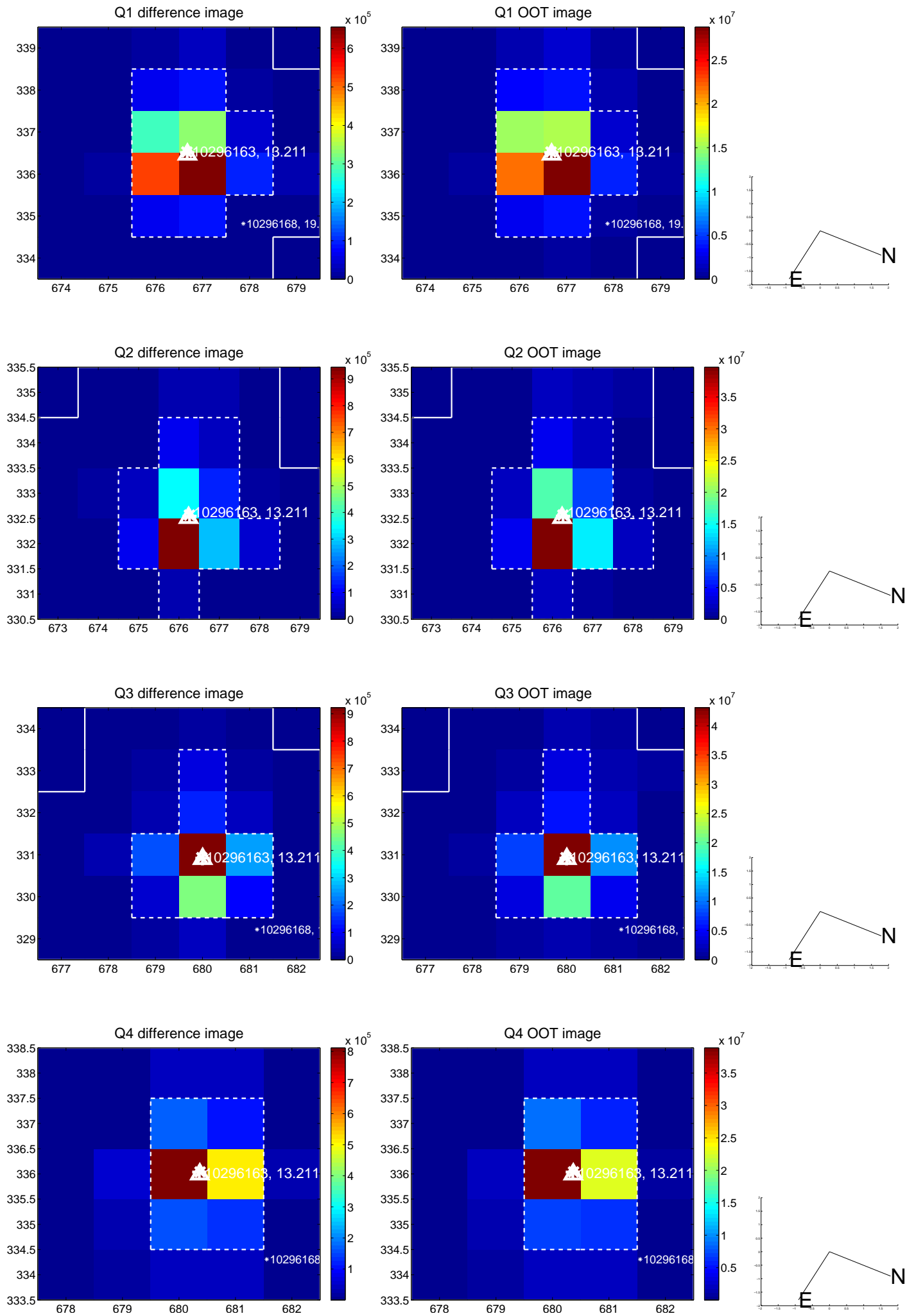
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.167 \pm 0.067$	2.49	$0.159 \pm 0.067$	$0.052 \pm 0.068$
PRF-fit source offset from KIC position	$0.219 \pm 0.068$	3.22	$0.204 \pm 0.068$	$0.078 \pm 0.067$
photometric centroid source offset	$0.33 \pm 0.00$	73.03	$0.31 \pm 0.00$	$0.12 \pm 0.00$

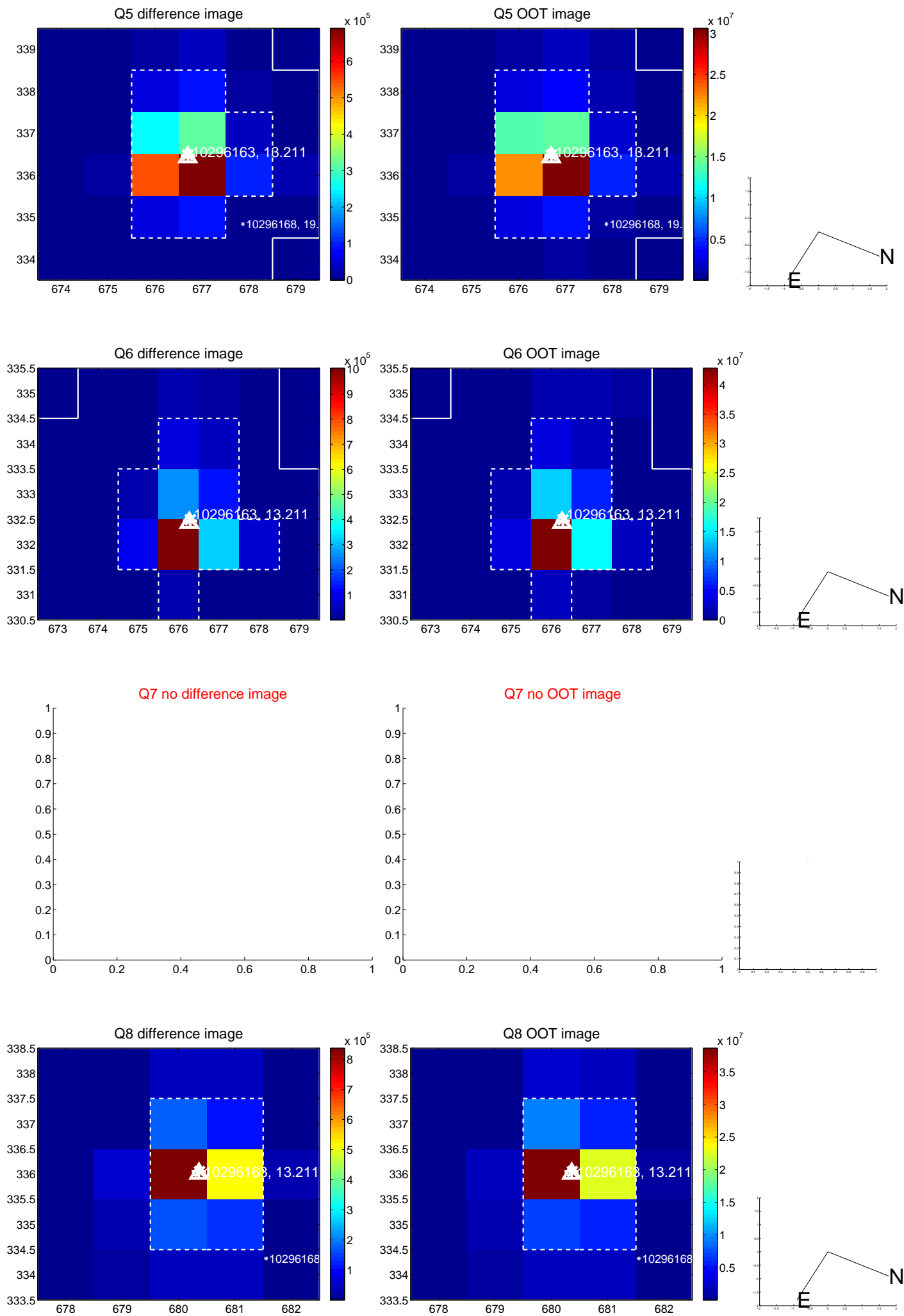


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

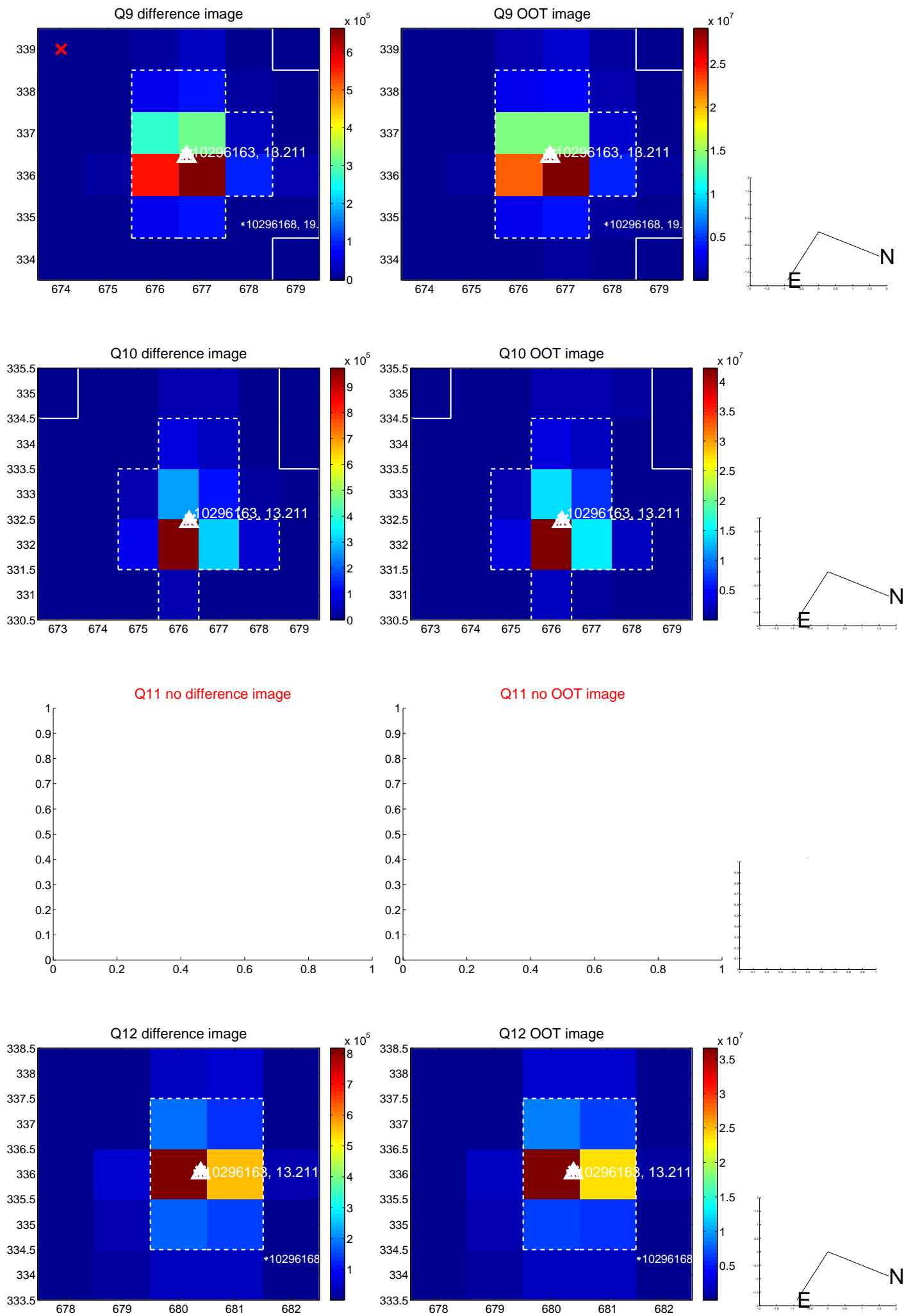
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



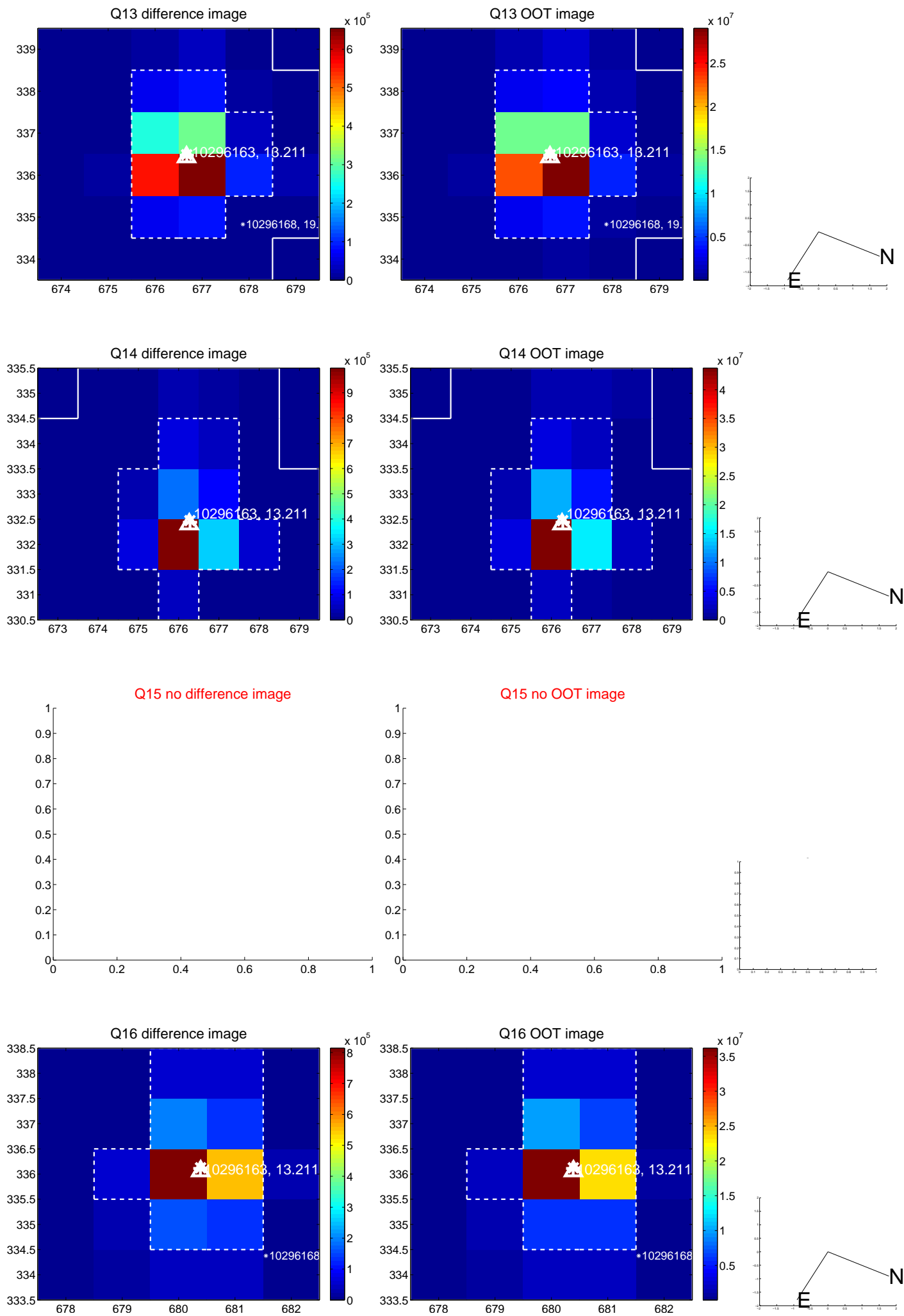
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



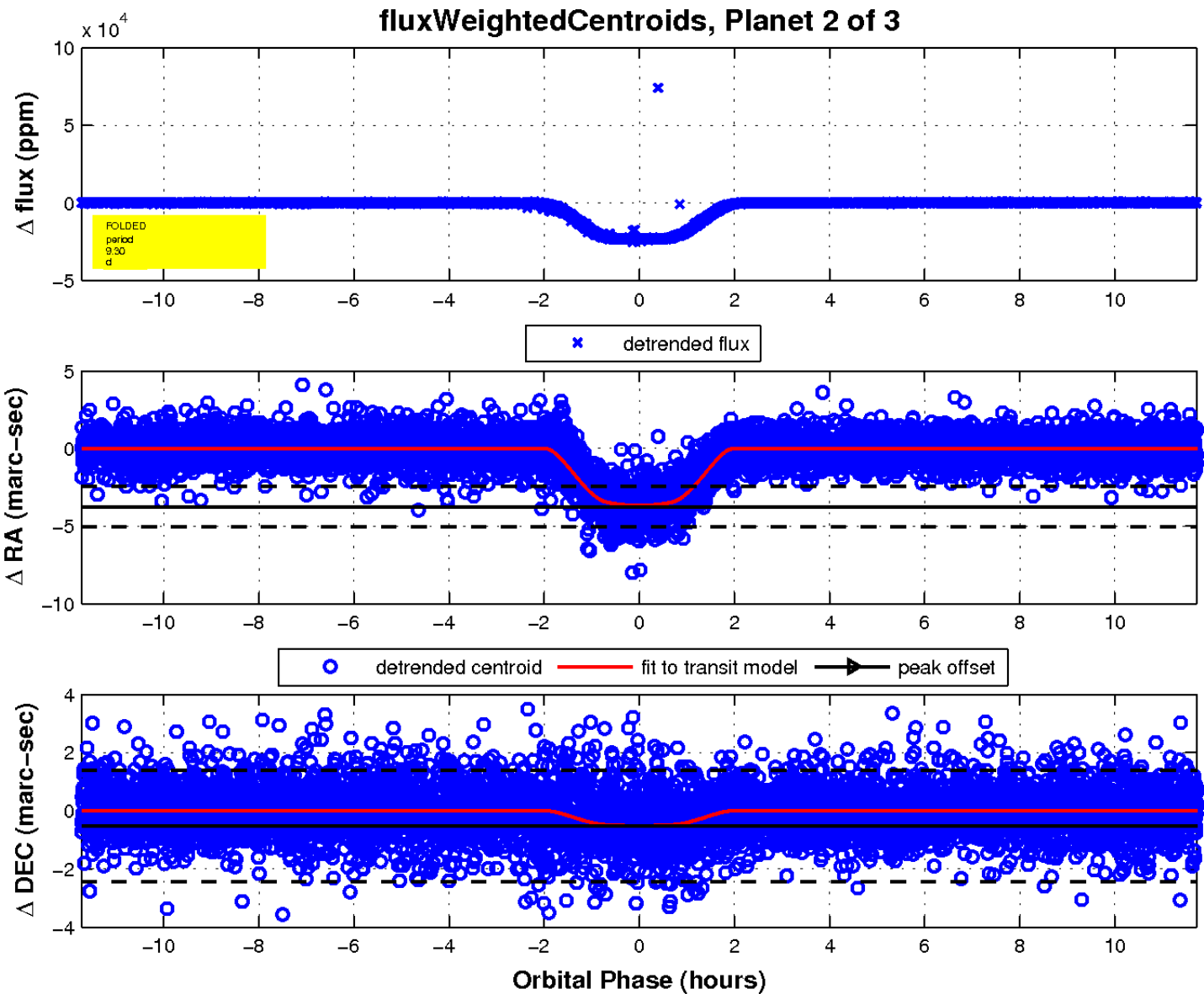
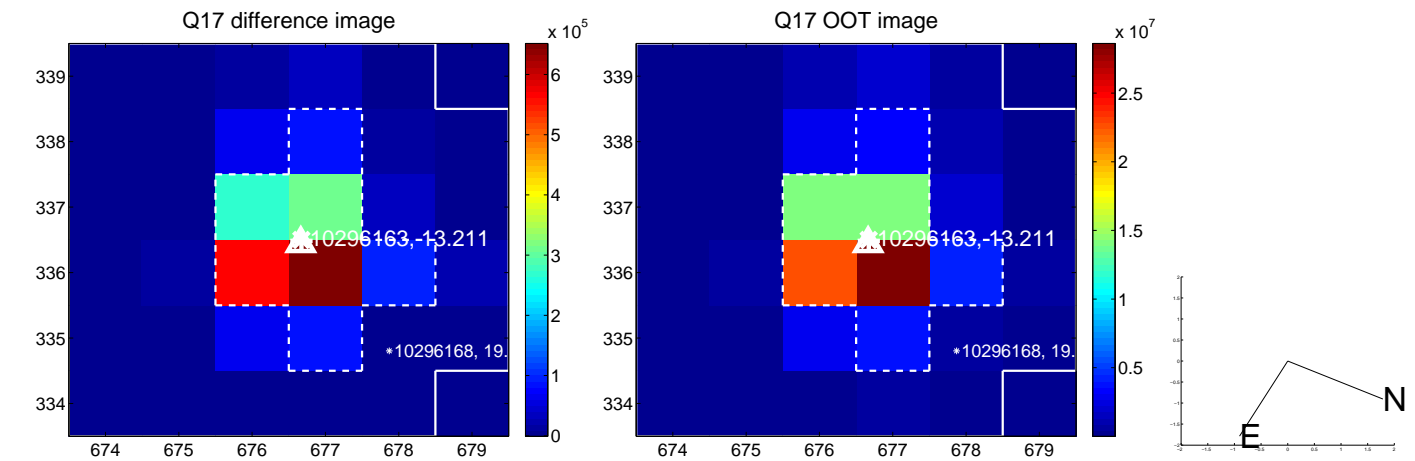
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



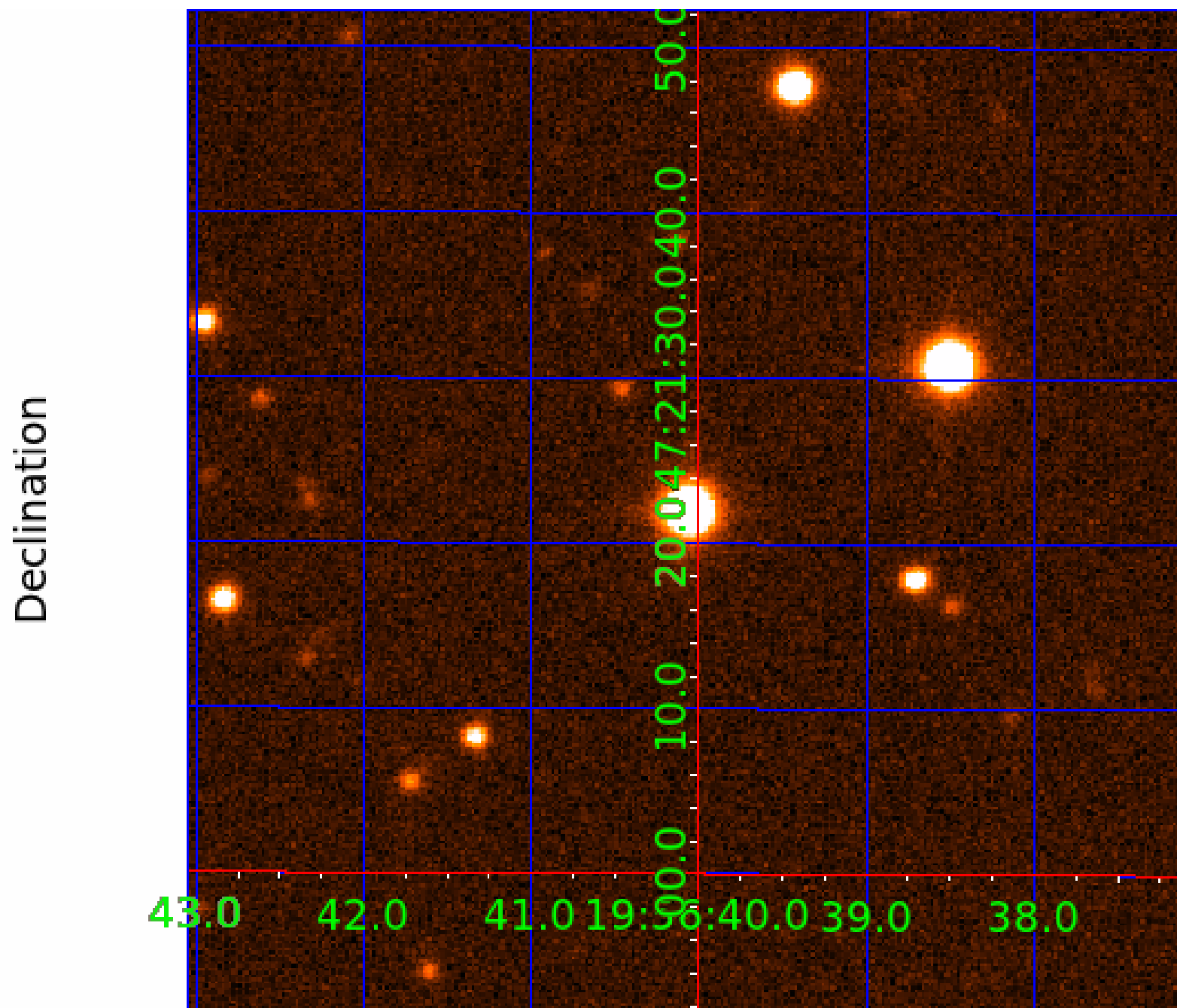
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 010296163

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010296163-01	OBS	7309.01	9.296761	135.685073	217153.4	6.947	16704.8	7940.2	2.88	6461	228.32	1372.93
010296163-02	OBS	No	9.296714	138.840719	23524.5	3.909	1910.6	1505.0	2.88	6461	48.84	1372.94
010296163-03	OBS	No	216.827316	347.214464	9183.4	15.000	414.9	-1.0	2.88	6461	27.81	20.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010296163-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
010296163-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
010296163-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

**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.

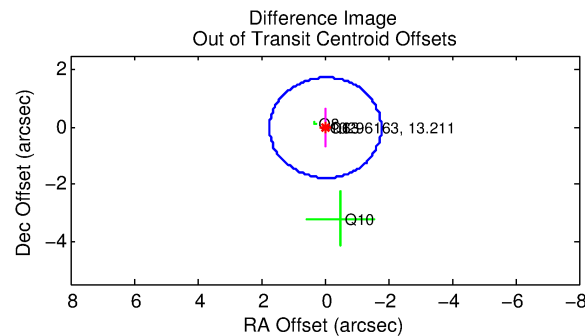
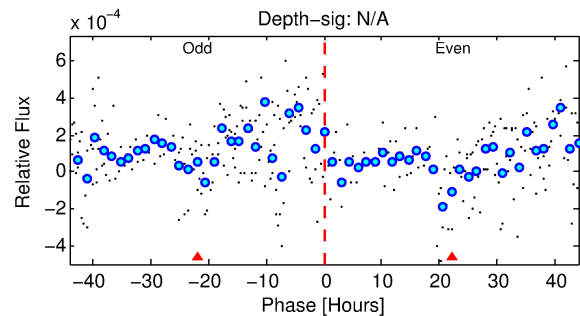
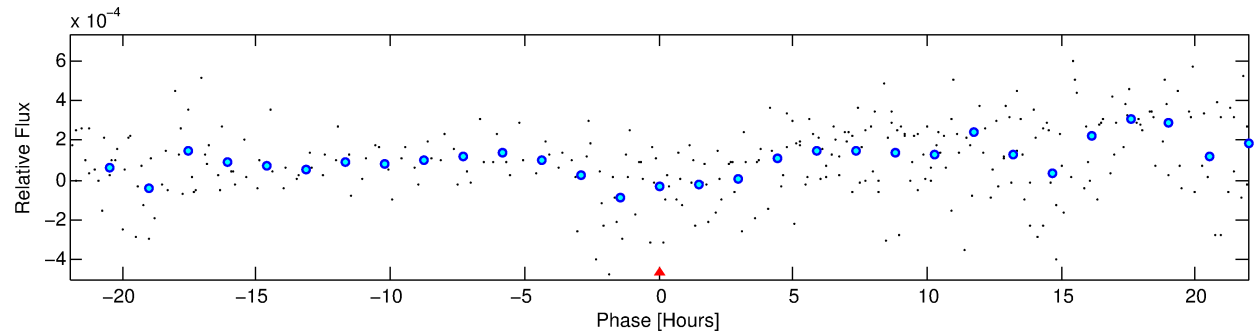
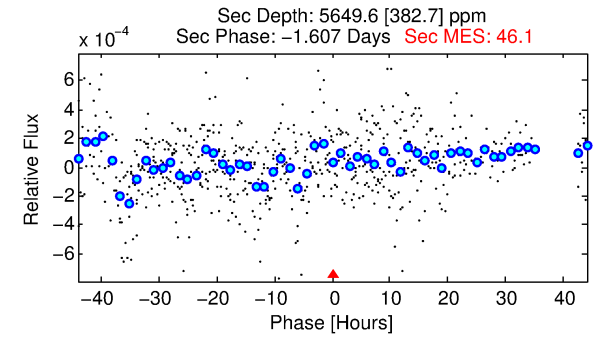
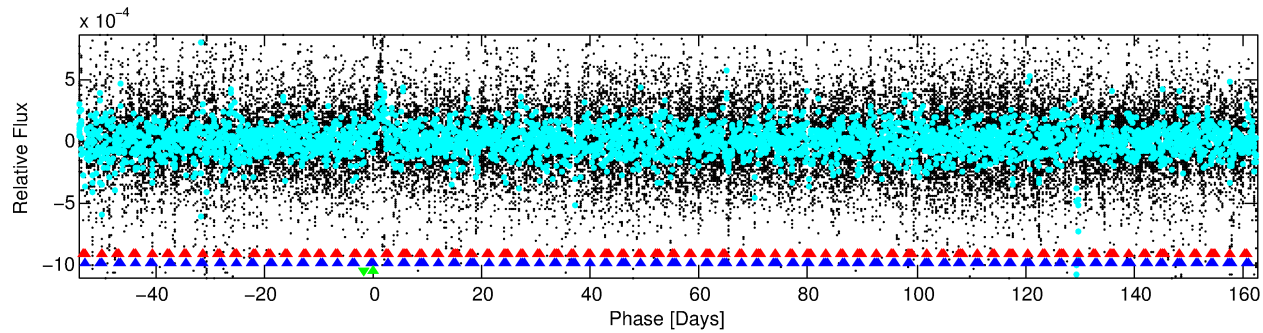
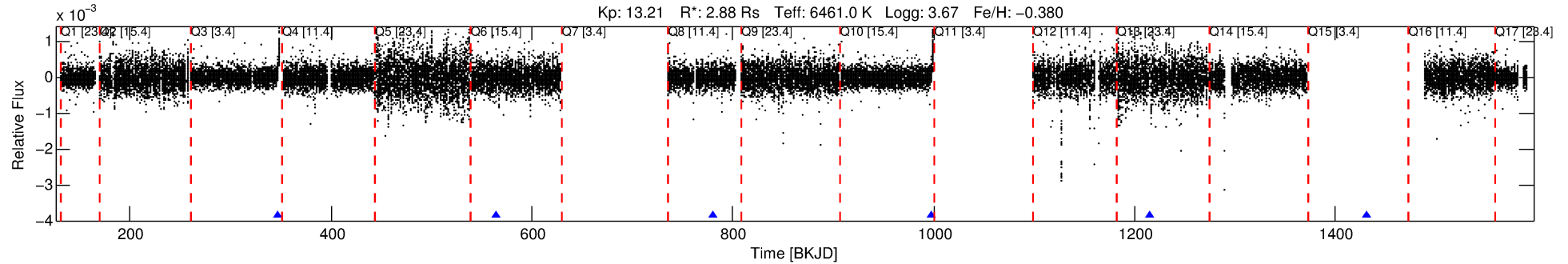
## Ephemeris Match Information For 010296163-03

No Significant Match Found

# DV One-Page Summary

KIC: 10296163 Candidate: 3 of 3 Period: 216.827 d  
KOI: K07309 Corr: No Ephemeris Match

Kp: 13.21 R\*: 2.88 Rs Teff: 6461.0 K Logg: 3.67 Fe/H: -0.380



## TPS TCE Results:

Period = 216.82732 d  
Epoch = 347.2145 BKJD

DV fit results are unavailable

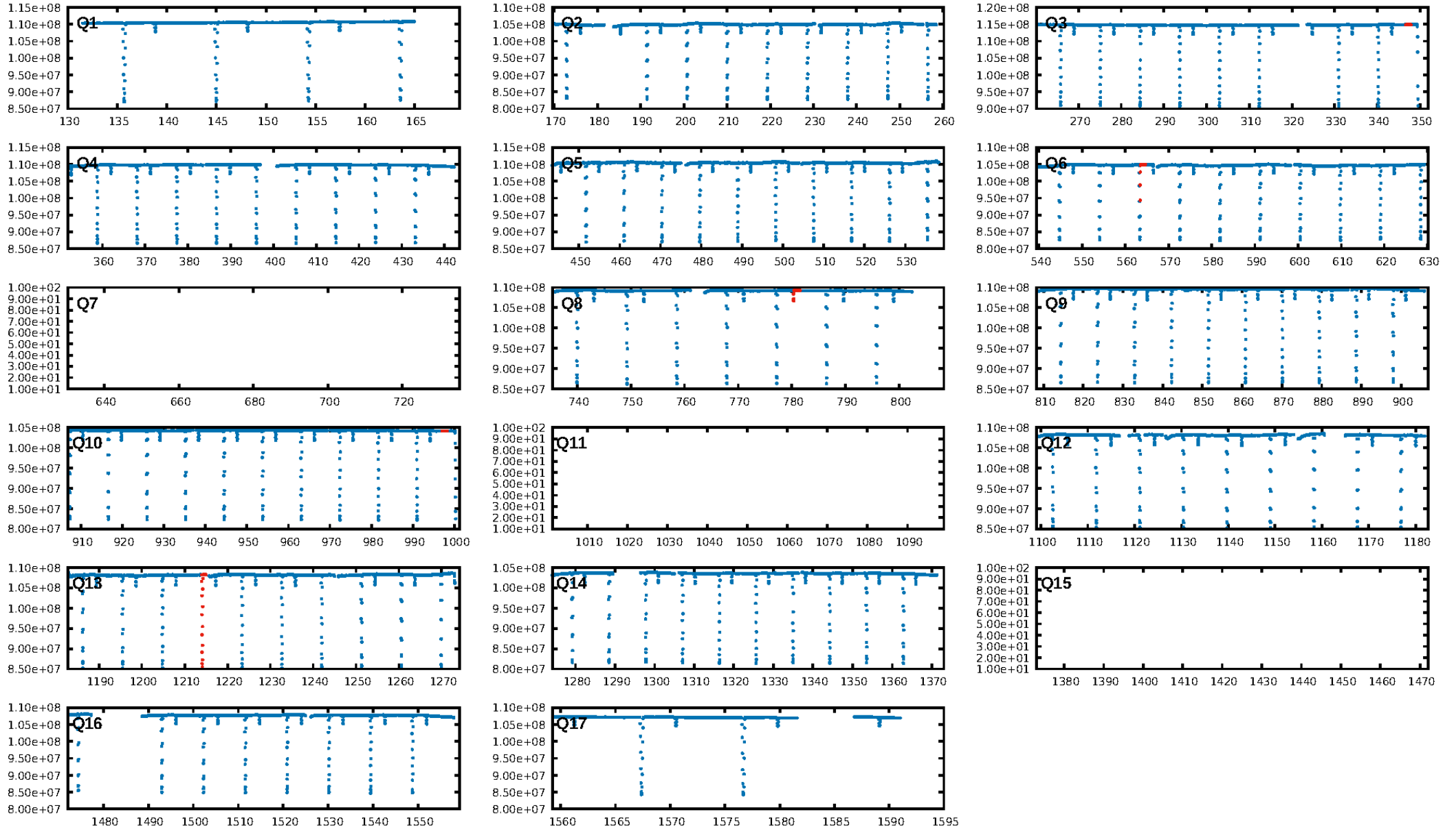
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [301.30σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 18.66  
Centroid-sig: 19.1%  
Centroid-so: 3.457 arcsec [1.05σ]  
OotOffset-rm: 0.037 arcsec [0.06σ]  
KicOffset-rm: 0.038 arcsec [0.14σ]  
OotOffset-st: 2/0/1/1 [4]  
KicOffset-st: 2/0/1/1 [4]  
DiffImageQuality-fgm: 0.00 [0/4]  
DiffImageOverlap-fno: 0.40 [2/5]

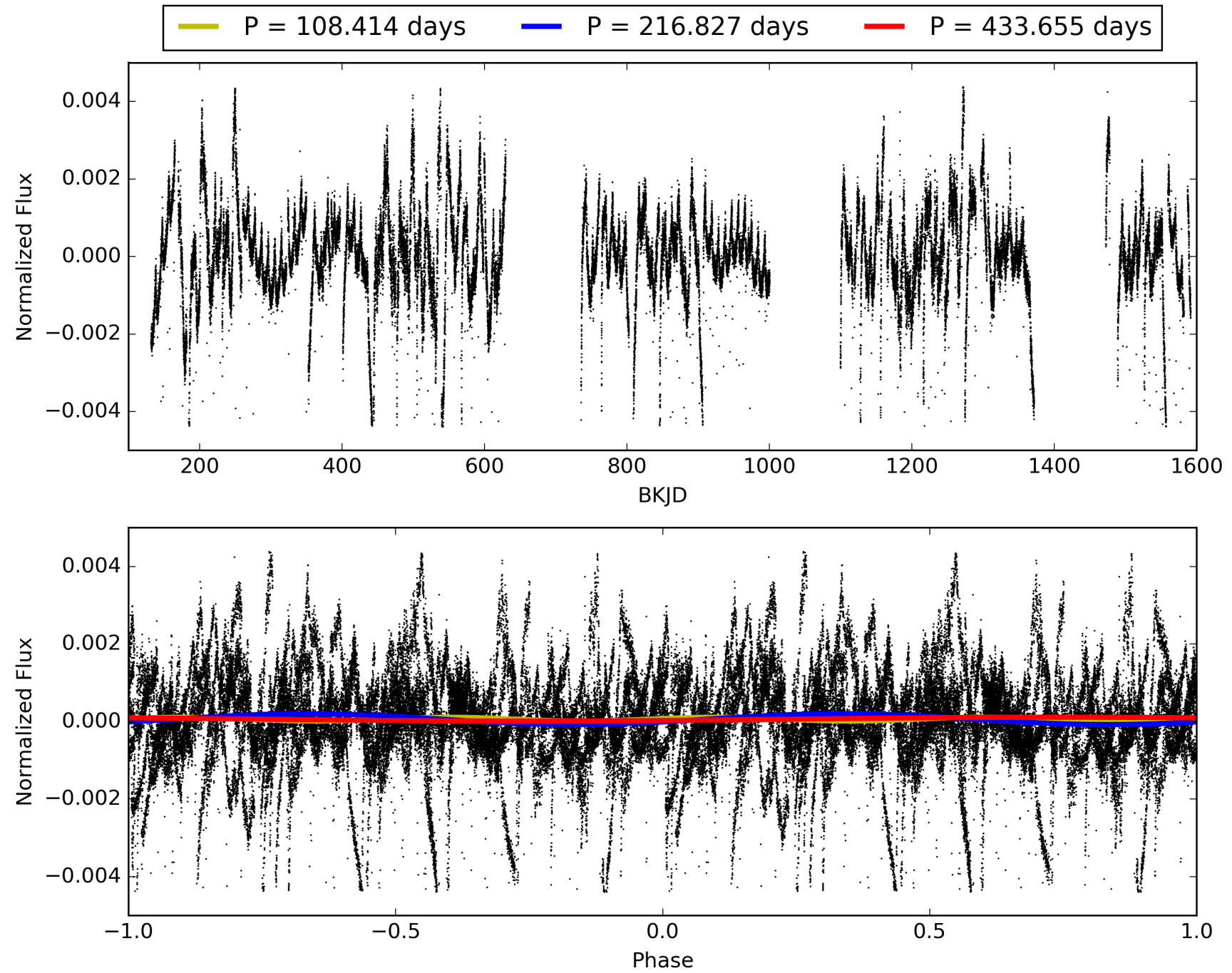
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:27:23 Z

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

# TCE 010296163-03, PDC Light Curves

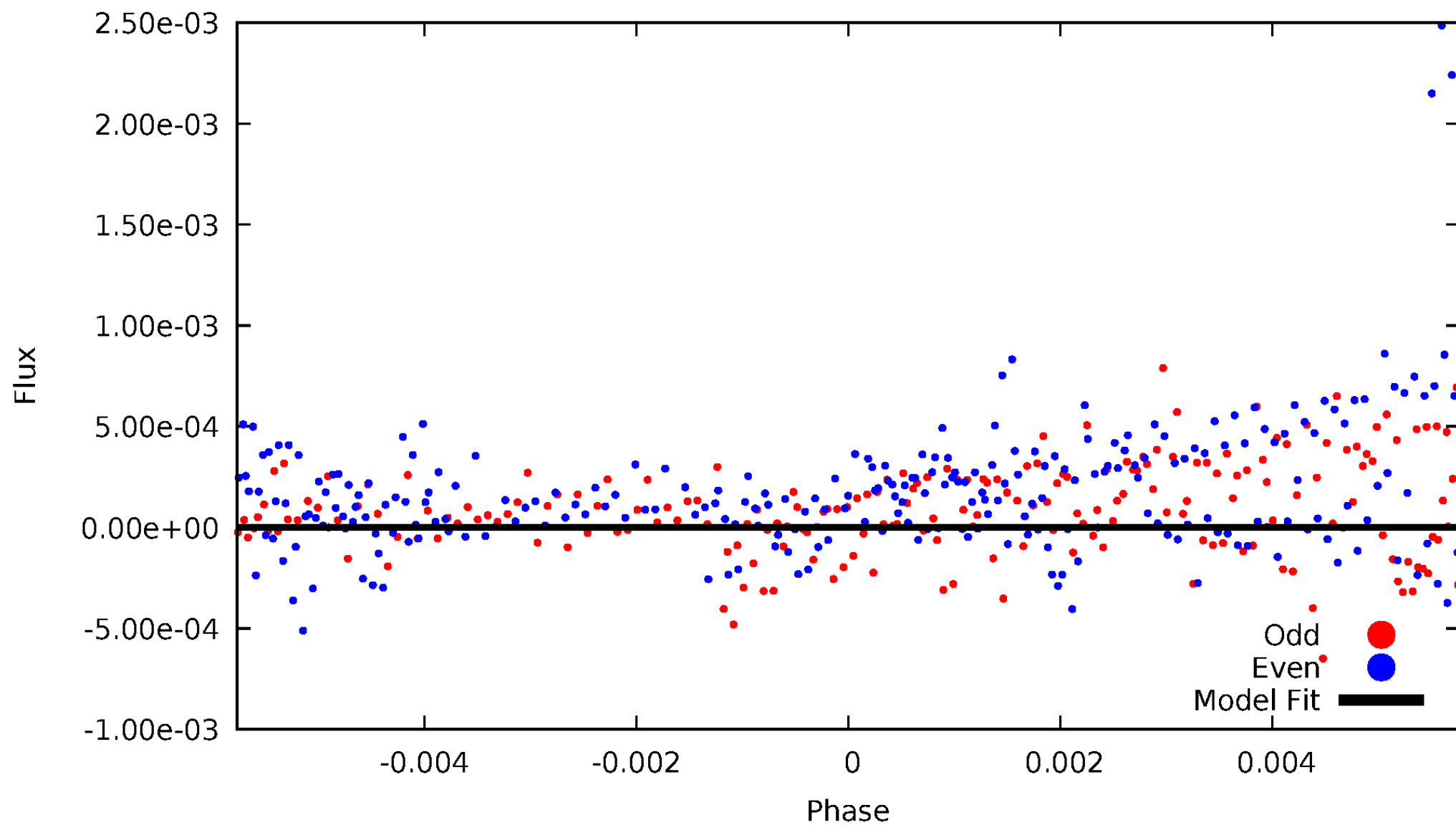


TCE 010296163-03



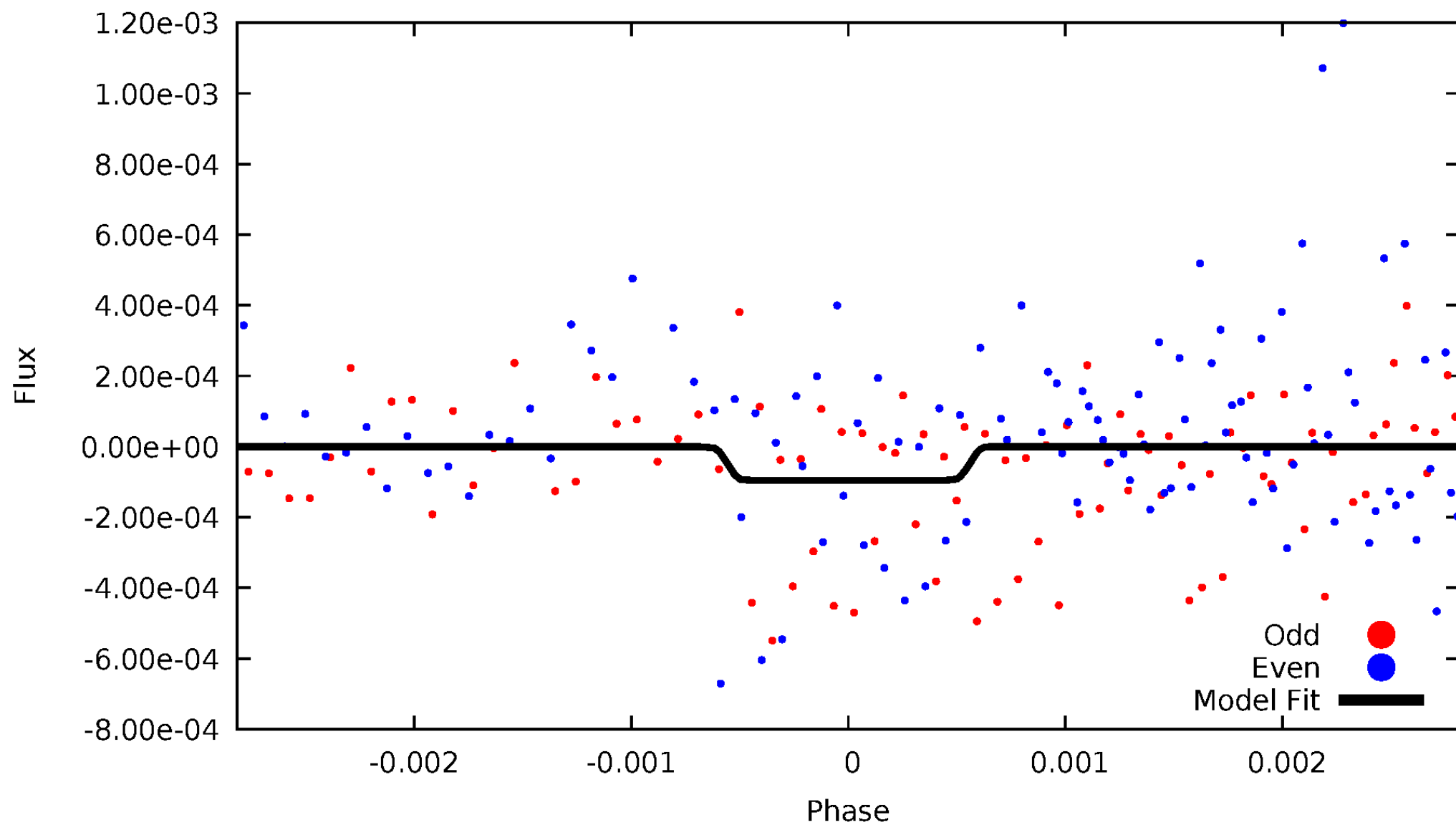
DV Odd/Even

TCE 010296163-03



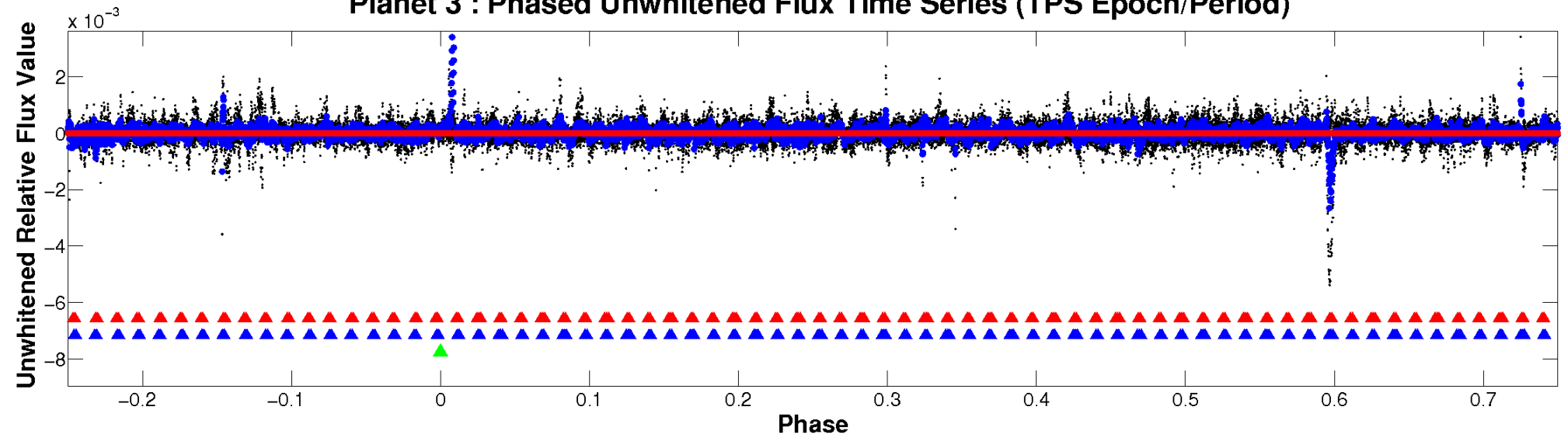
# ALT Odd/Even

TCE 010296163-03

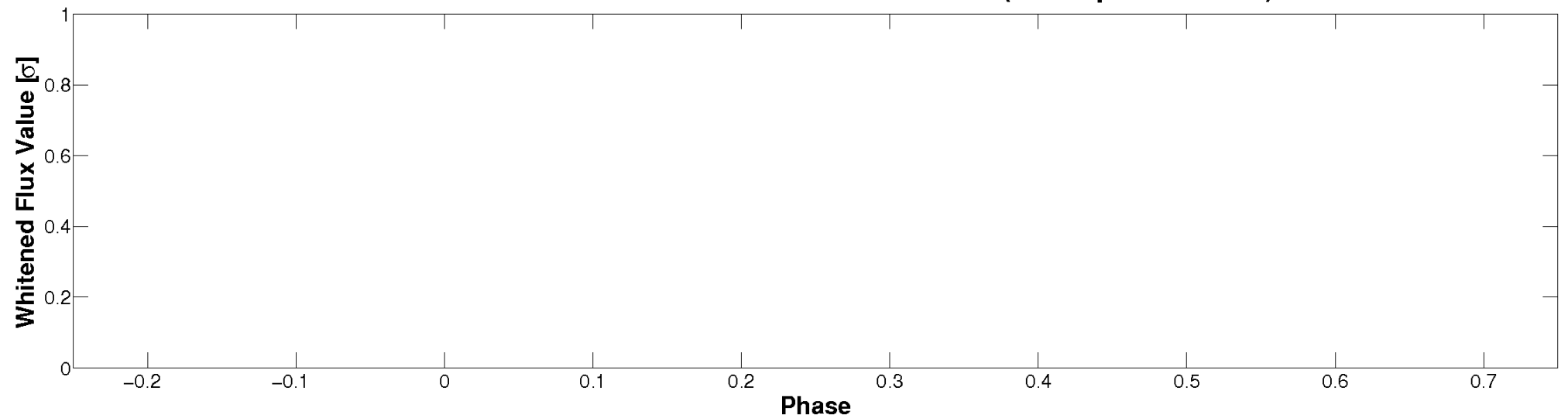


# Non-Whitened Vs. Whitened Light Curve

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

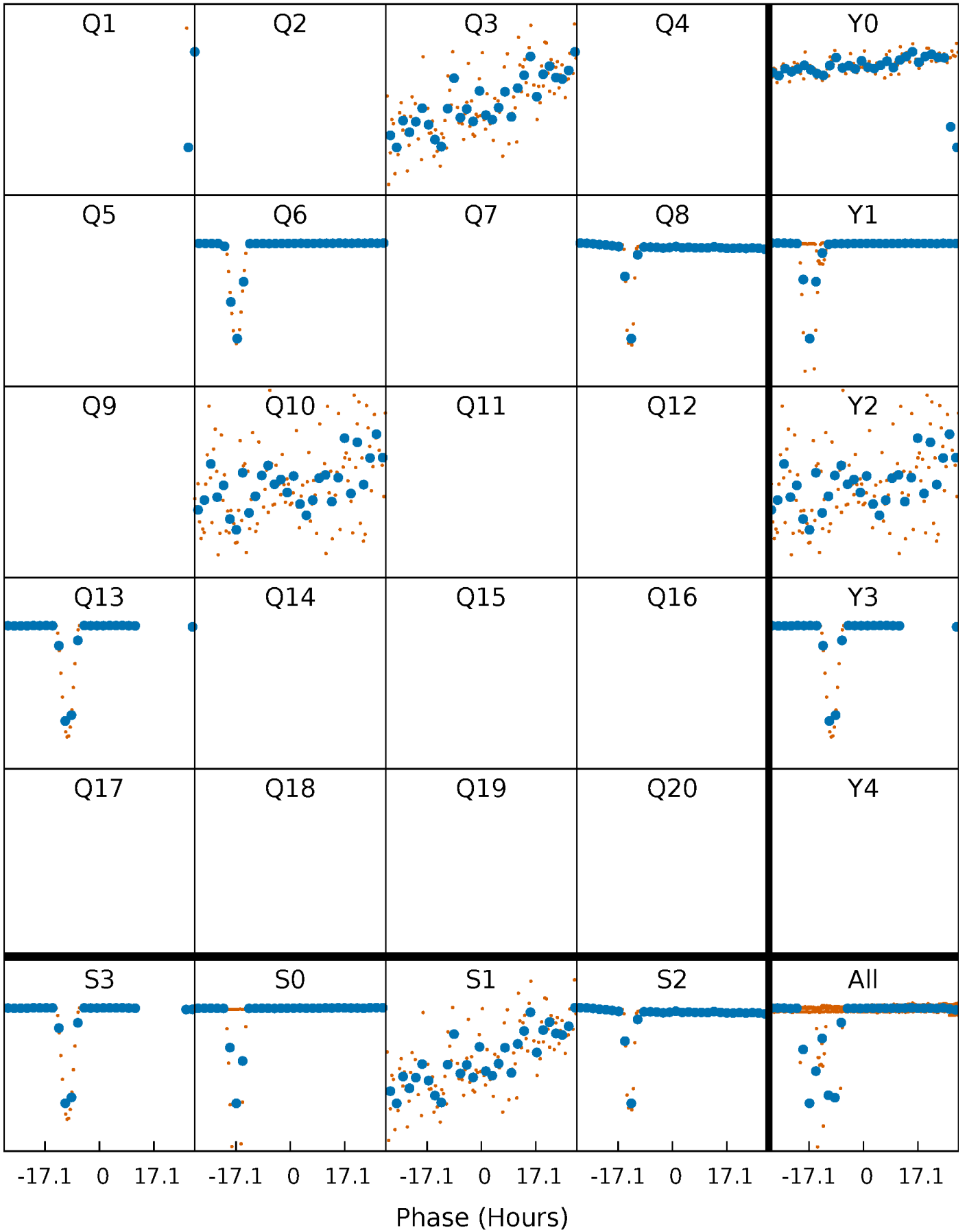


**Planet 3 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

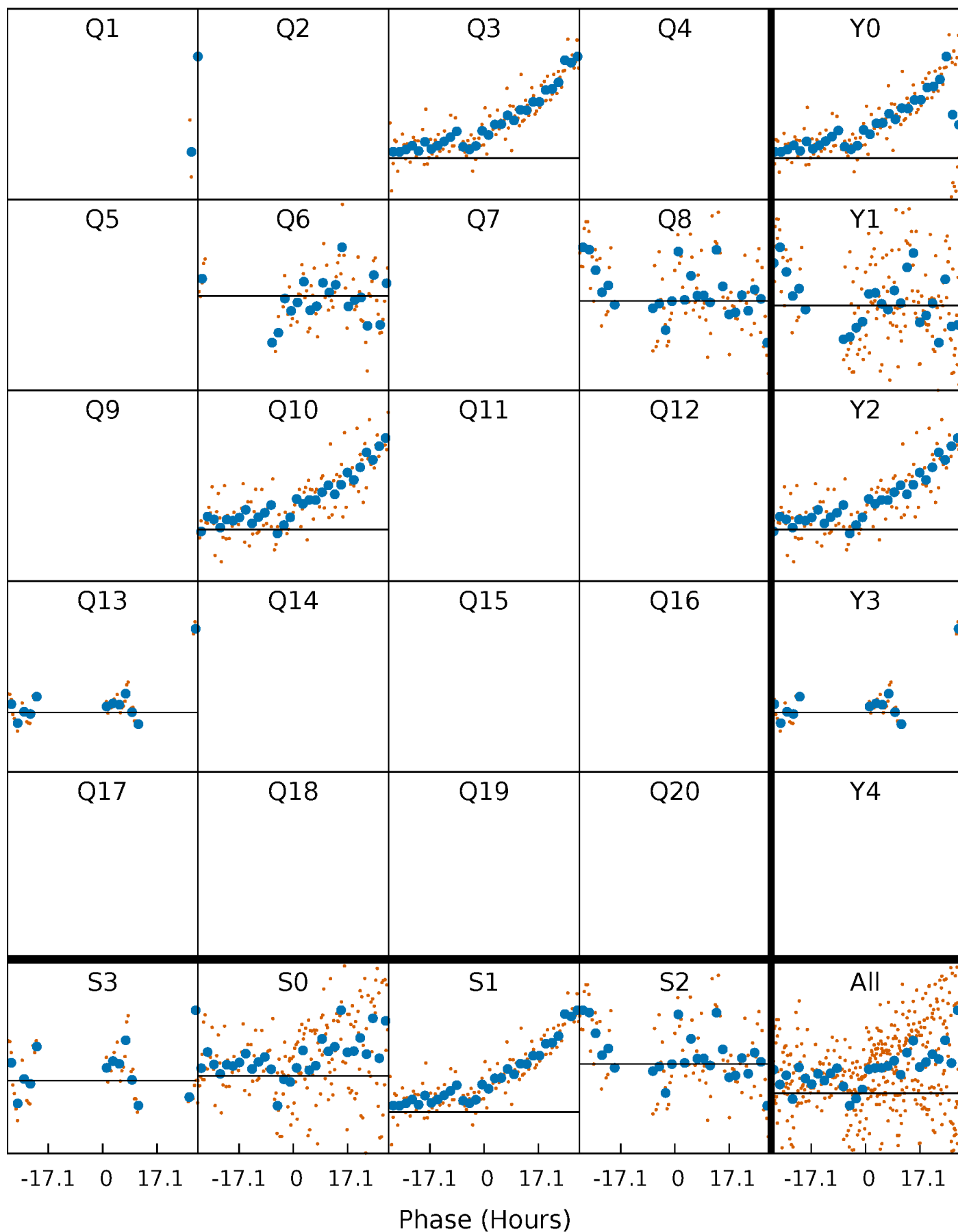
TCE 010296163-03     $P=216.827316$  Days     $T_0=347.214464$  (BKJD)





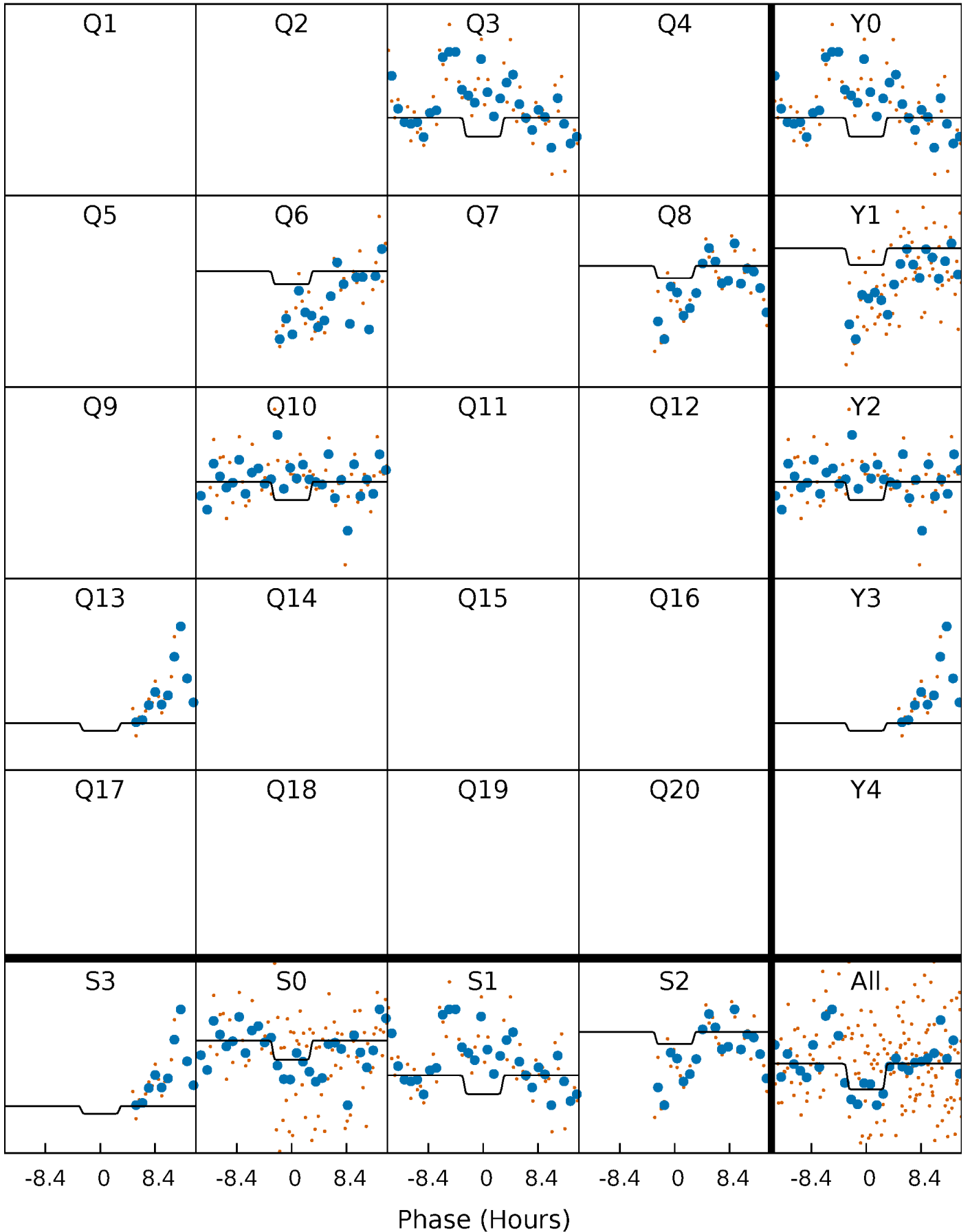
# DV Quarter-Phased Transit Curves

TCE 010296163-03     $P=216.827316$  Days     $T_0=347.214464$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

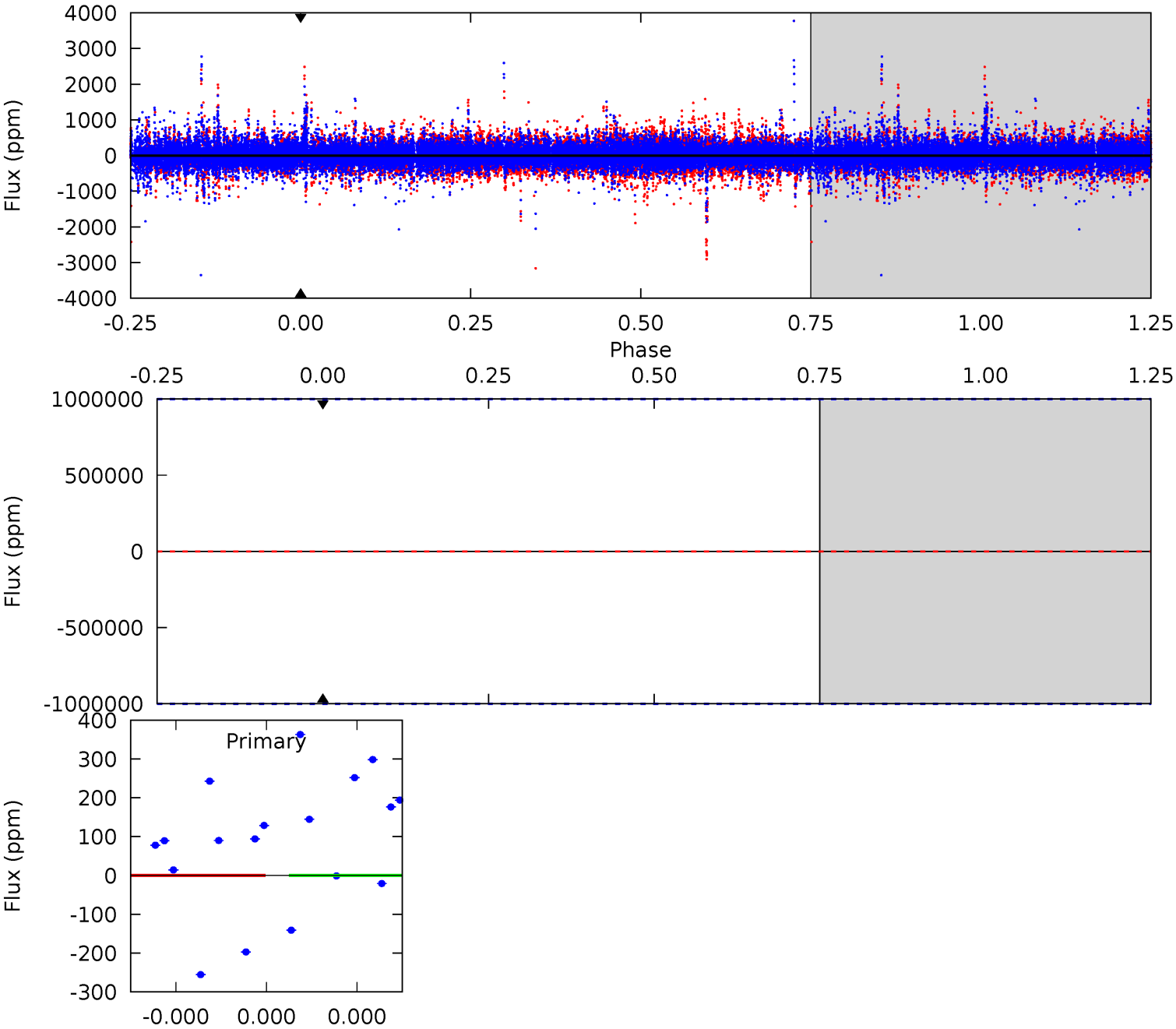
TCE 010296163-03     $P=216.827316$  Days     $T_0=347.055463$  (BKJD)



# DV Model-Shift Uniqueness Test

010296163-03, P = 216.827316 Days, E = 130.387148 Days

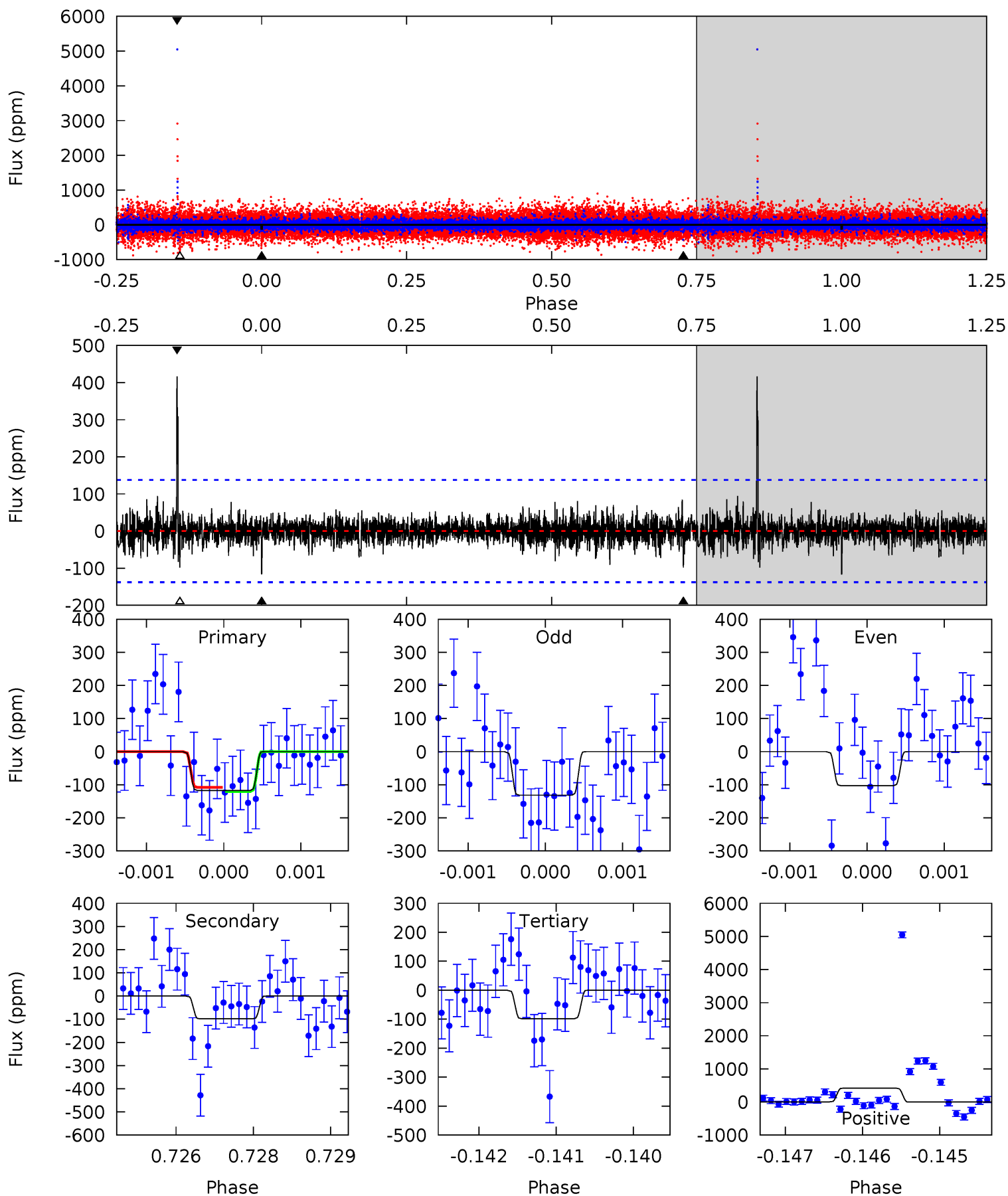
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

010296163-03, P = 216.827316 Days, E = 130.228147 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
4.59	3.86	3.85	16.3	5.40	3.22	0.94	0.74	-11.7	0.01	-12.5	0.54	0.90	0.78	0.24



### Stellar Parameters For KIC 010296163

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6461^{+156}_{-196}$	$3.670^{+0.330}_{-0.088}$	$-0.380^{+0.350}_{-0.250}$	$2.884^{+0.468}_{-1.171}$	$1.418^{+0.229}_{-0.344}$	$0.083^{+0.231}_{-0.024}$
	+2%/-3%	+9%/-2%	+92%/-66%	+16%/-41%	+16%/-24%	+277%/-28%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010296163-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$32.22^{+28.63}_{-19.98}$	$736^{+48}_{-67}$	$3031^{+12607}_{-18930}$	$64^{+49136}_{-50069}$
Alt.	$-98 \pm 26$	$19.37^{+25.04}_{-13.50}$	$739^{+48}_{-71}$	$3083^{+1520}_{-588}$	$92^{+926}_{-75}$

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

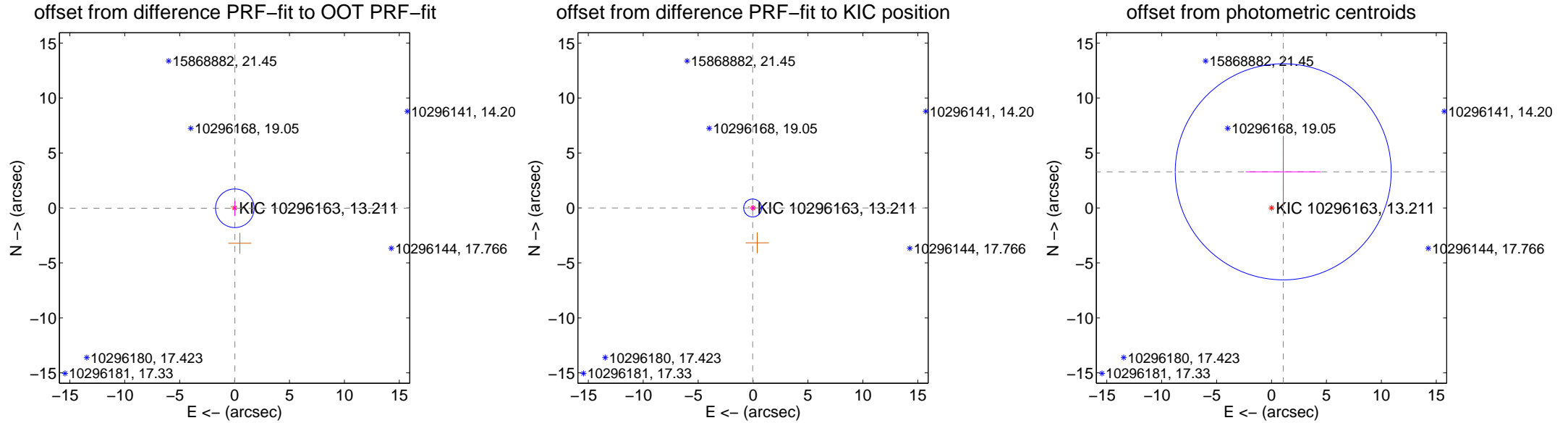
## DV Centroid Data

Supplemental centroid analysis for 010296163-03. Kepler magnitude: 13.21. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.037 \pm 0.586$	0.06	$-0.024 \pm 0.133$	$-0.028 \pm 0.685$
PRF-fit source offset from KIC position	$0.038 \pm 0.272$	0.14	$0.037 \pm 0.272$	$-0.005 \pm 0.246$
photometric centroid source offset	$3.46 \pm 3.28$	1.05	$-1.06 \pm 3.41$	$3.29 \pm 3.26$



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

Q1 no difference image



Q1 no OOT image



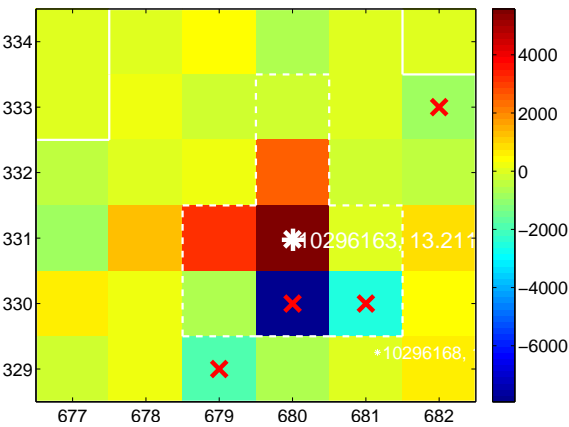
Q2 no difference image



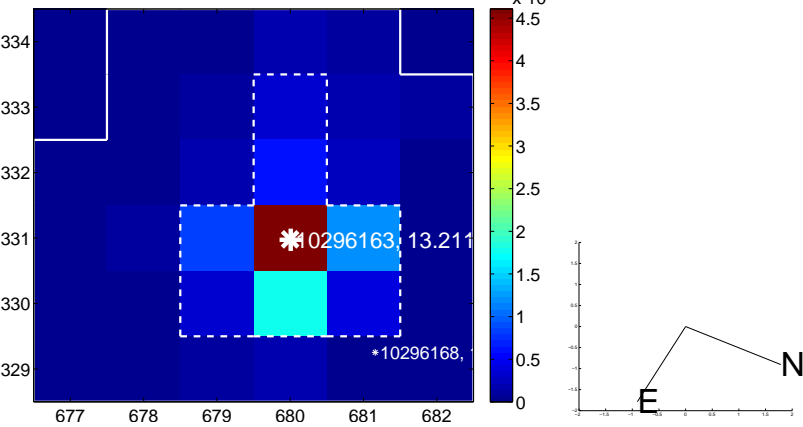
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



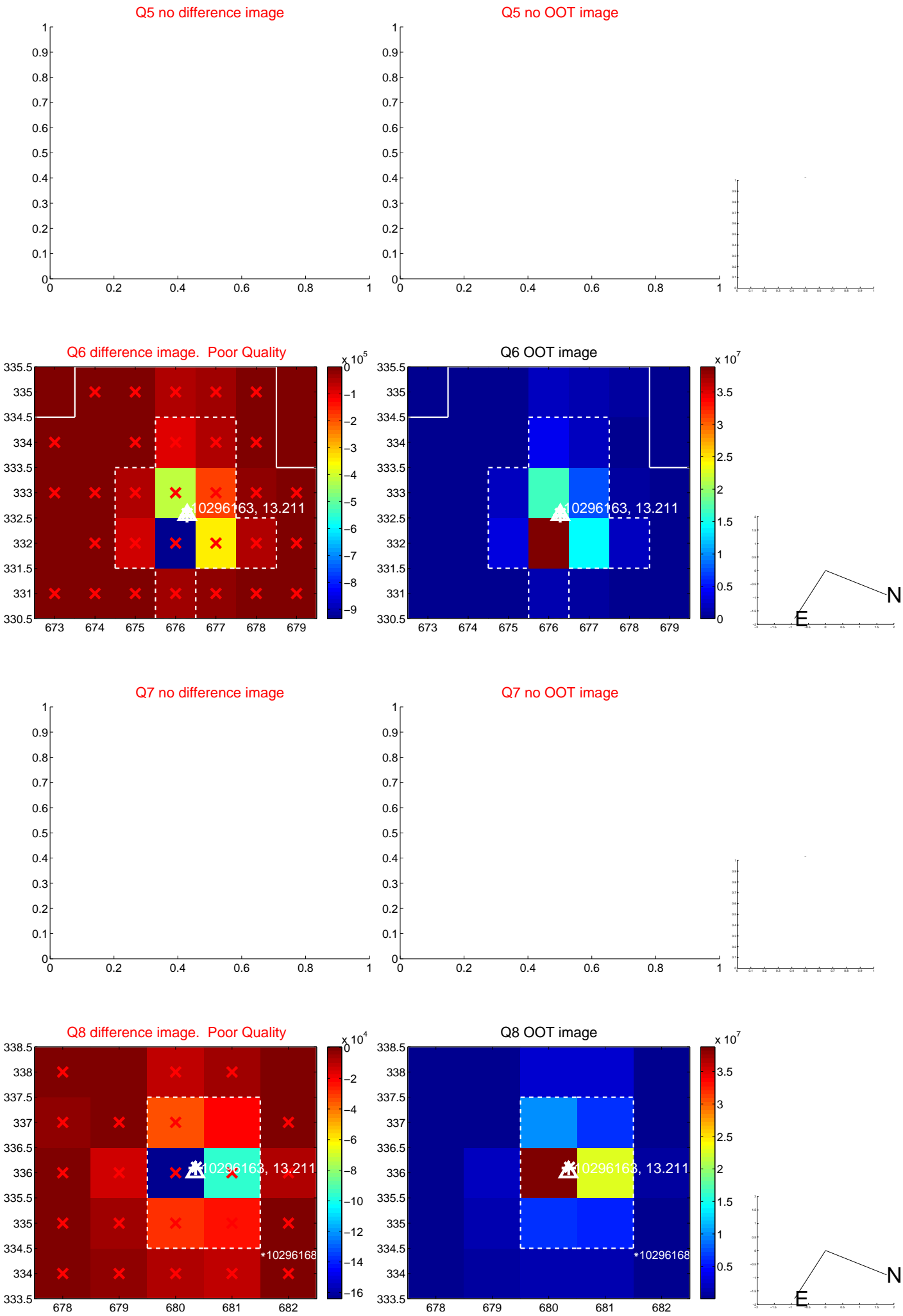
Q4 no difference image



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.

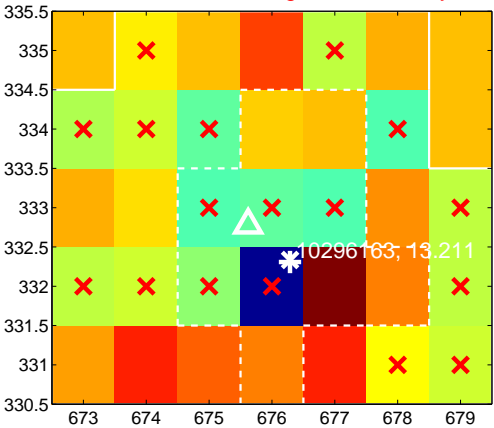
Q9 no difference image



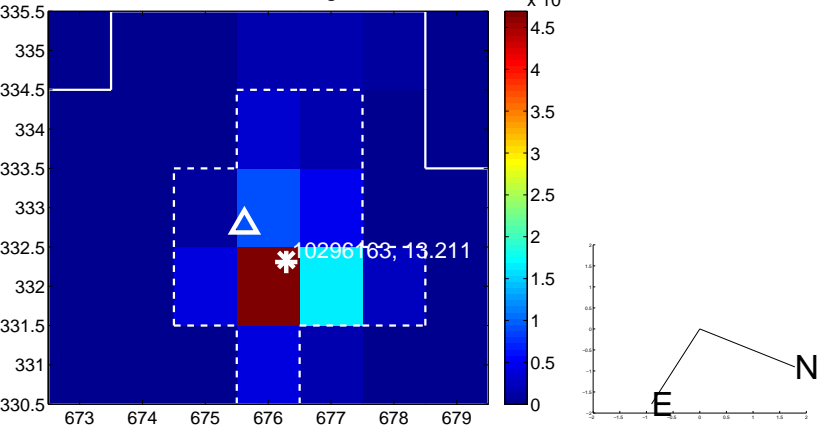
Q9 no OOT image



Q10 difference image. Poor Quality



Q10 OOT image



Q11 no difference image



Q11 no OOT image



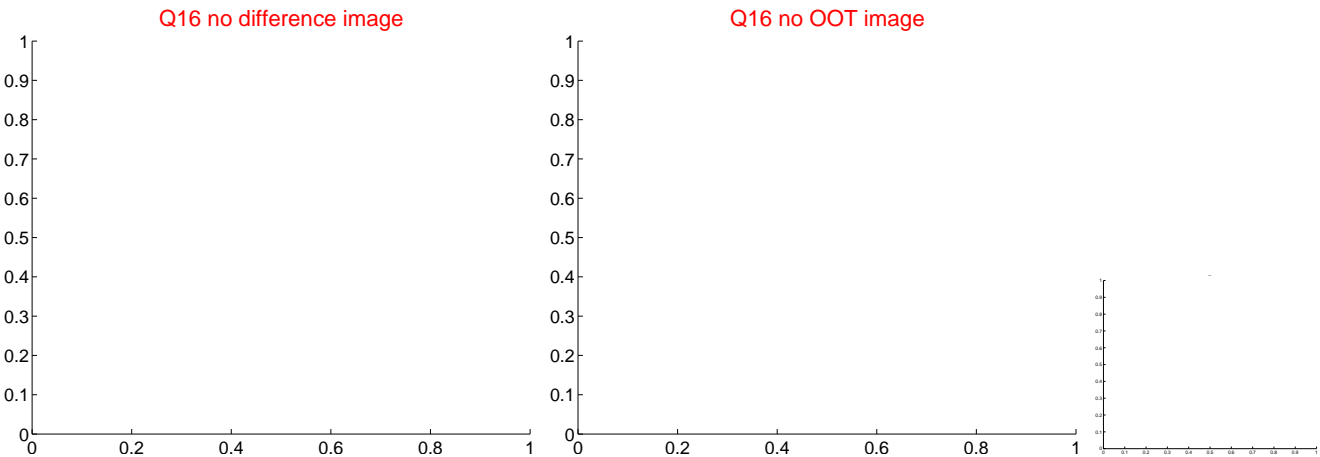
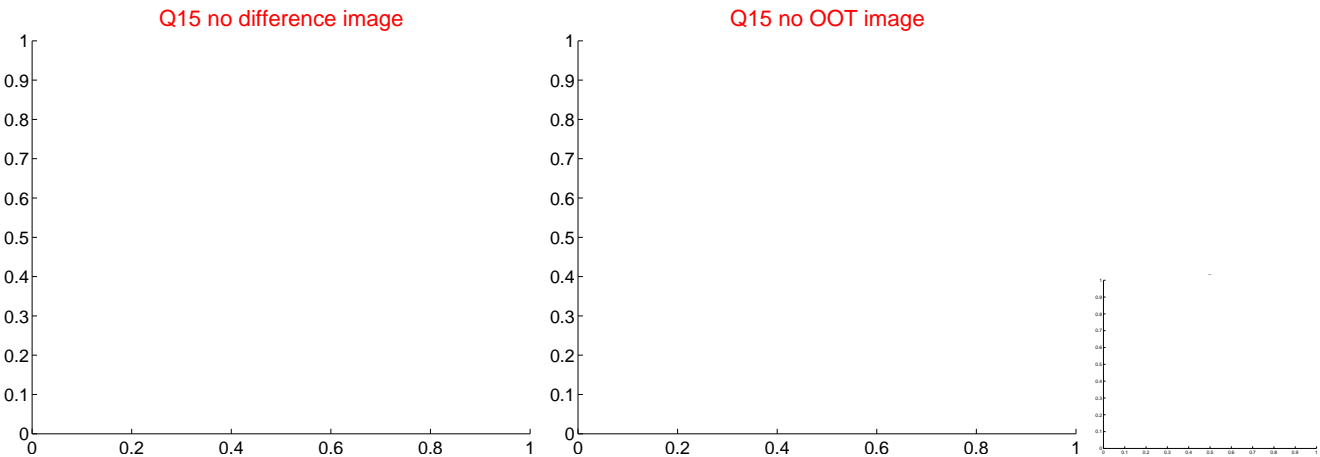
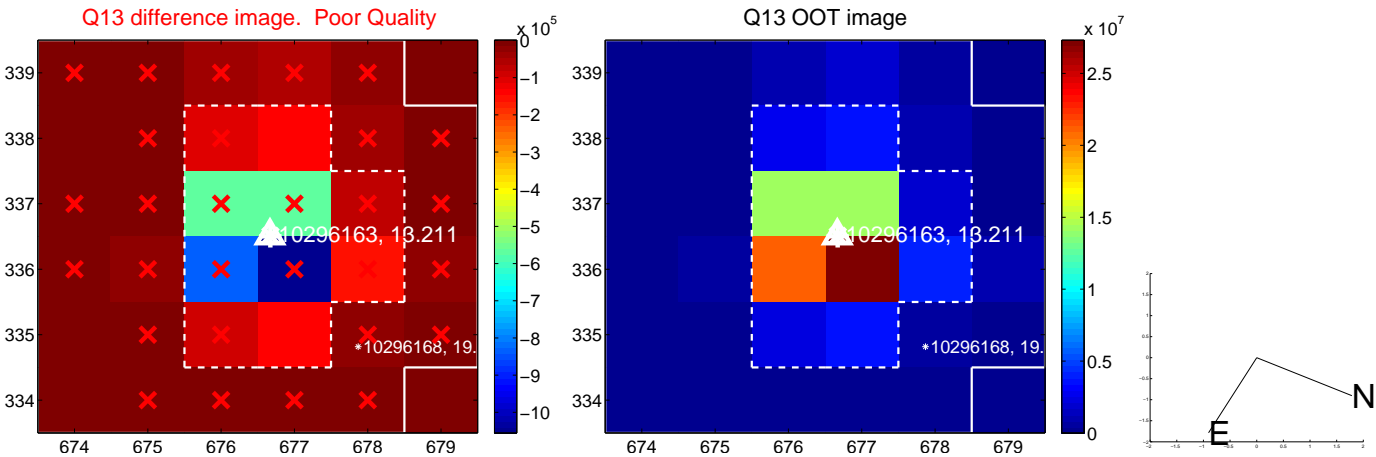
Q12 no difference image



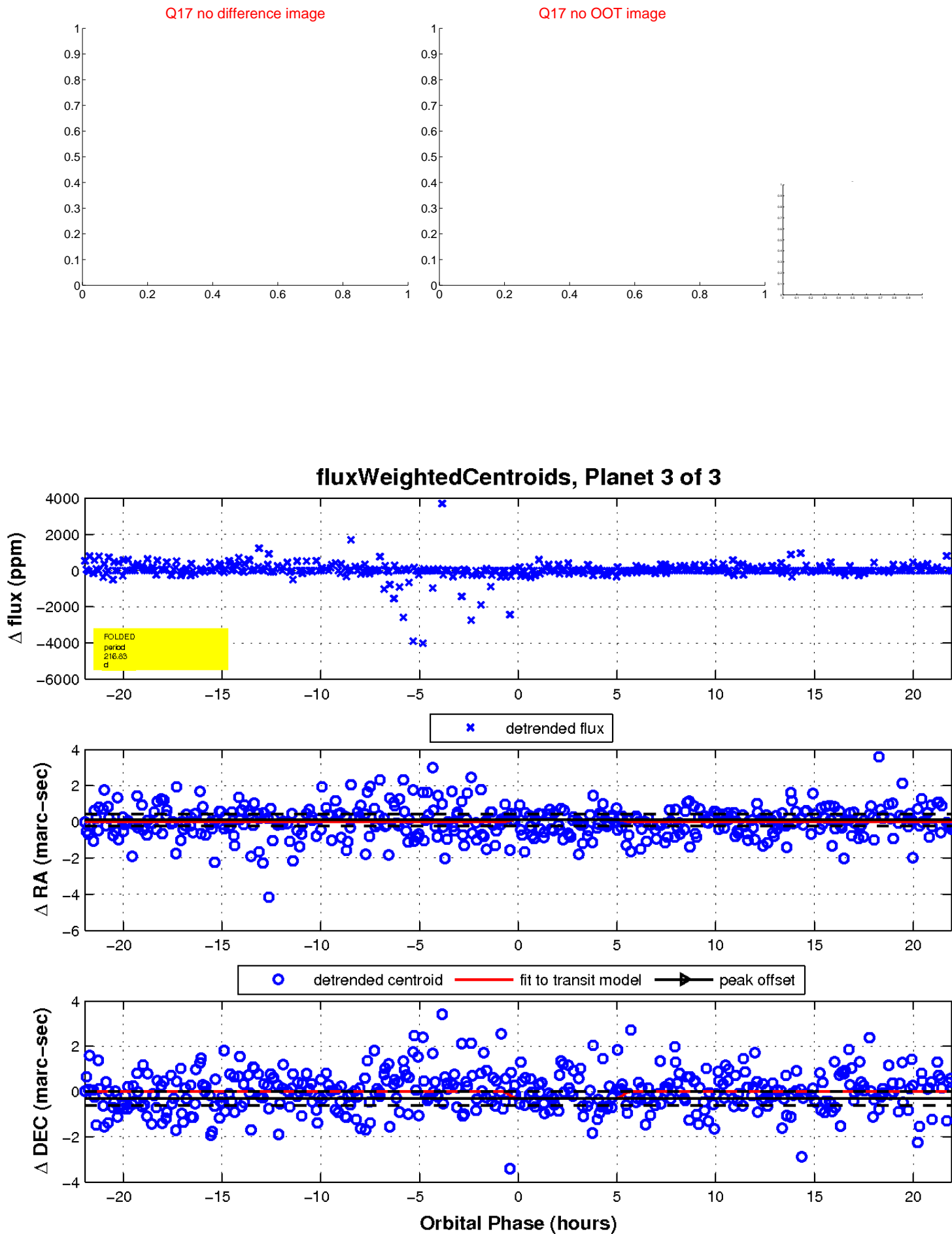
Q12 no OOT image



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

