

# KIC 009963461

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009963461-01	OBS	1538.01	10.581581	140.682259	113126.8	6.675	5181.3	4305.3	1.57	6168	53.29	343.65
009963461-02	OBS	No	10.581585	132.244638	6198.0	4.607	329.5	342.5	1.57	6168	13.81	343.65
009963461-03	OBS	No	455.051488	332.625141	141.9	1.775	9.7	1.3	1.57	6168	1.87	2.28

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009963461-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE
009963461-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009963461-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

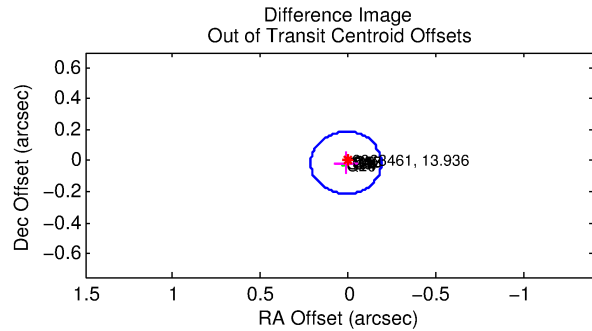
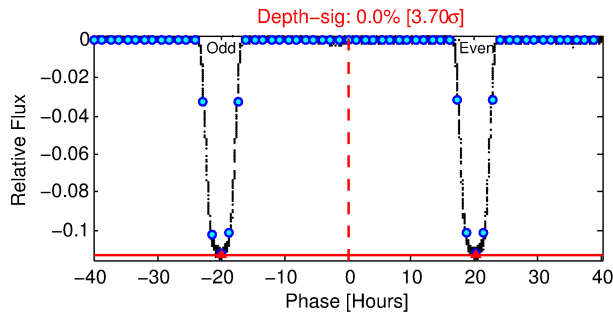
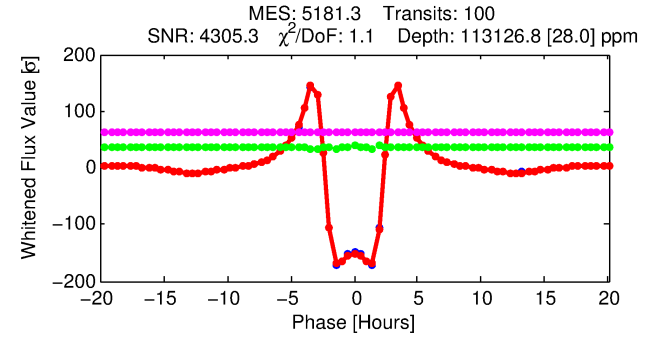
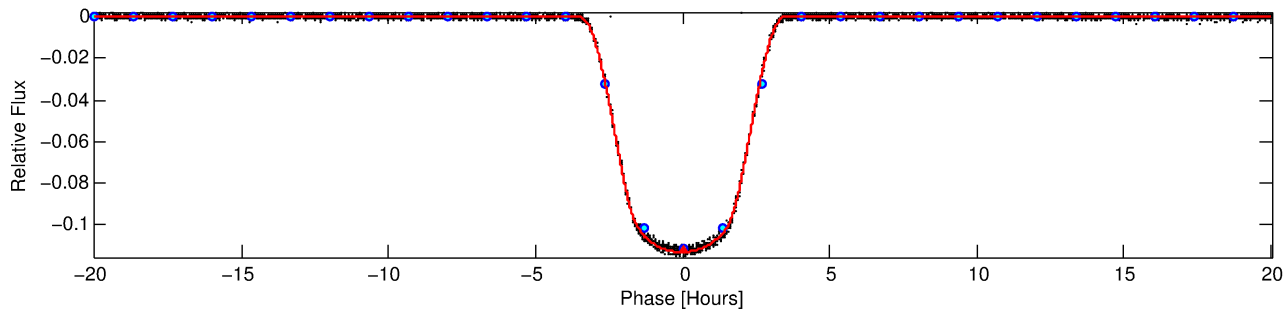
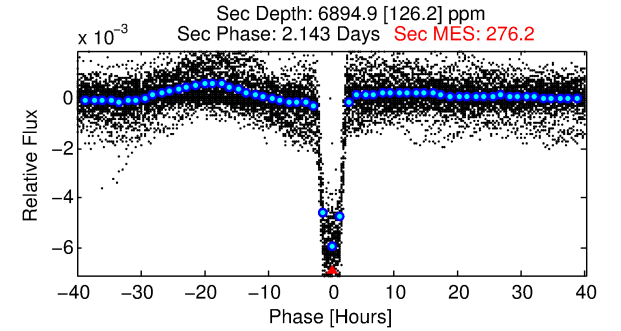
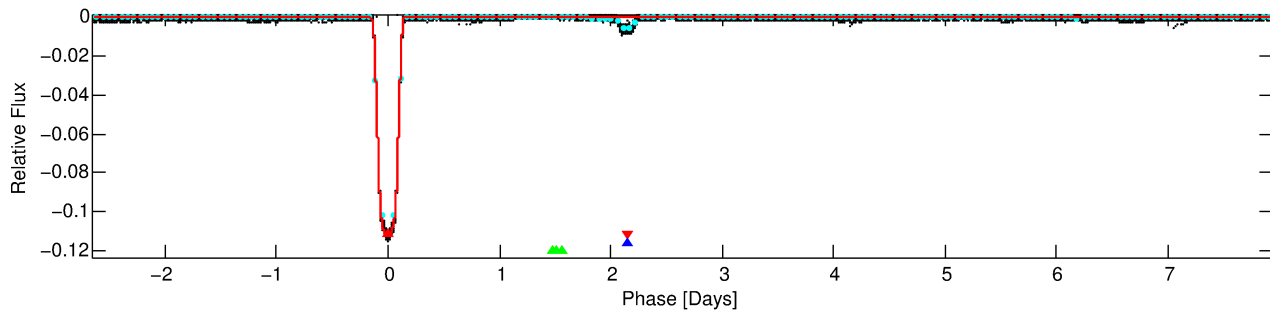
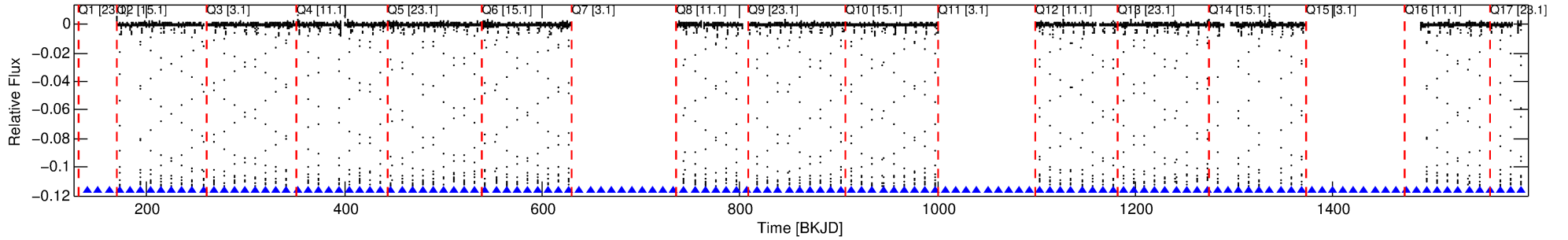
## Ephemeris Match Information For 009963461-01

No Significant Match Found

# DV One-Page Summary

KIC: 9963461 Candidate: 1 of 3 Period: 10.582 d  
KOI: K01538.01 Corr: 1.000

Kp: 13.94 R\*: 1.57 Rs Teff: 6168.0 K Logg: 4.07 Fe/H: -0.240



## DV Fit Results:

Period = 10.58158 [0.00000] d  
Epoch = 140.6823 [0.0000] BKJD  
Rp/R\* = 0.3116 [0.0000]  
a/R\* = 15.67 [0.00]  
b = 0.22 [0.00]  
Seff = 343.65 [200.93]  
Teff = 1098 [160] K  
Rp = 53.29 [18.12] Re  
a = 0.0963 [0.0331] AU  
Ag = 12.38 [6.98] [1.63σ]  
Teffp = 3184 [125] K [10.25σ]

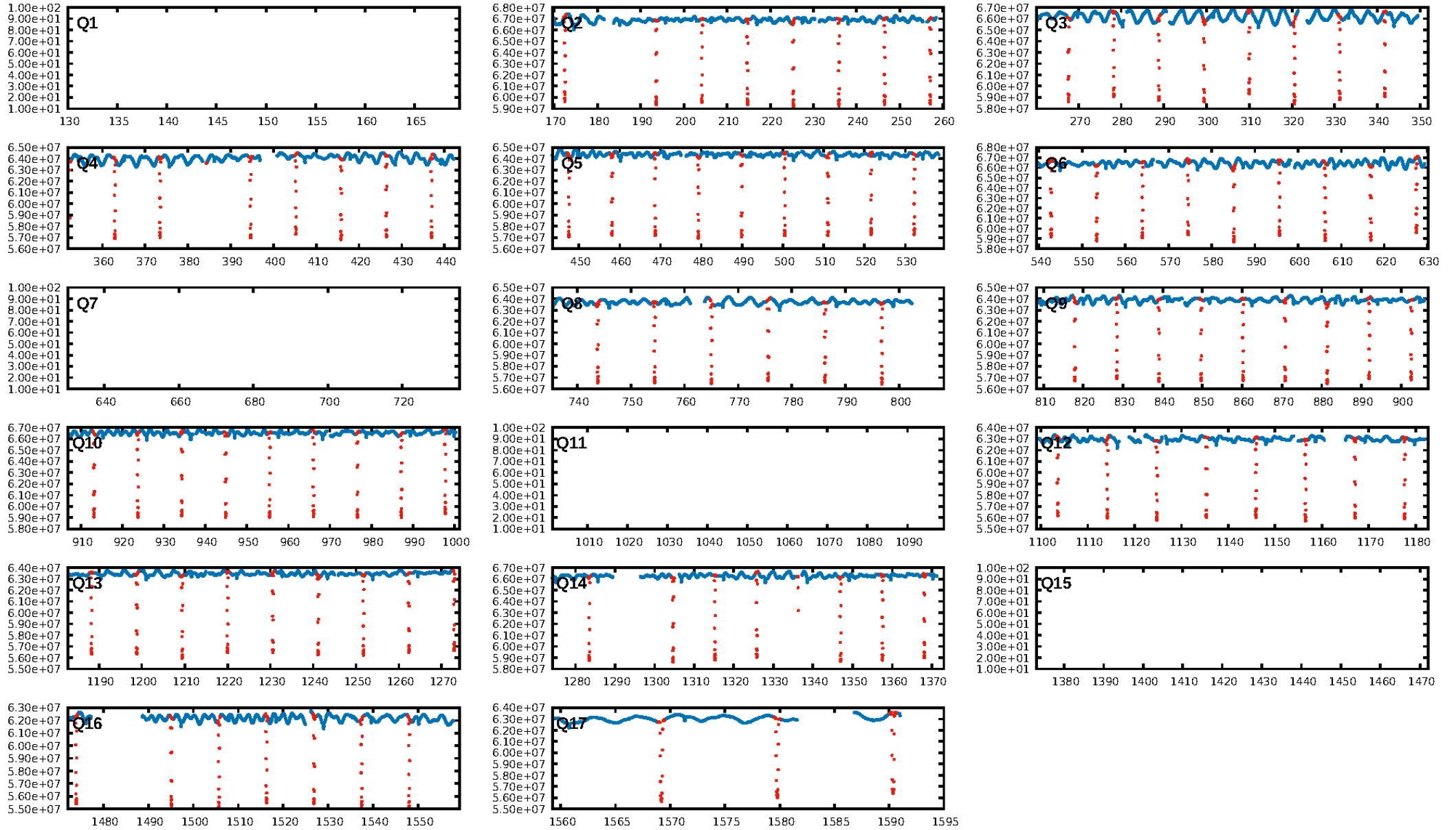
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [97/97]  
GhostDiagnostic-chr: 2.802  
Centroid-sig: N/A  
Centroid-so: 0.078 arcsec [81.19σ]  
OotOffset-rm: 0.019 arcsec [0.28σ]  
KicOffset-rm: 0.043 arcsec [0.63σ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

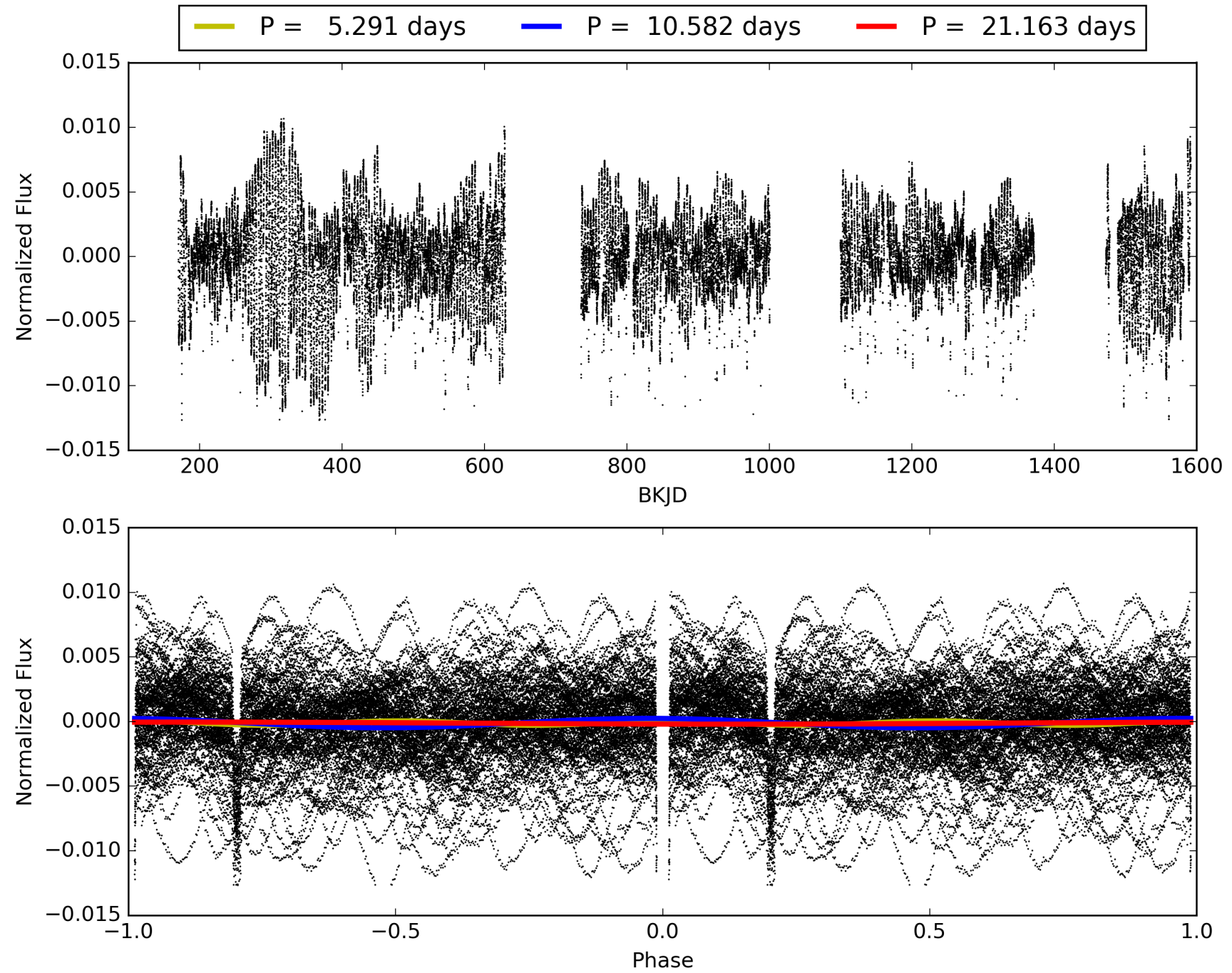
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:05:48 Z

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

# TCE 009963461-01, PDC Light Curves

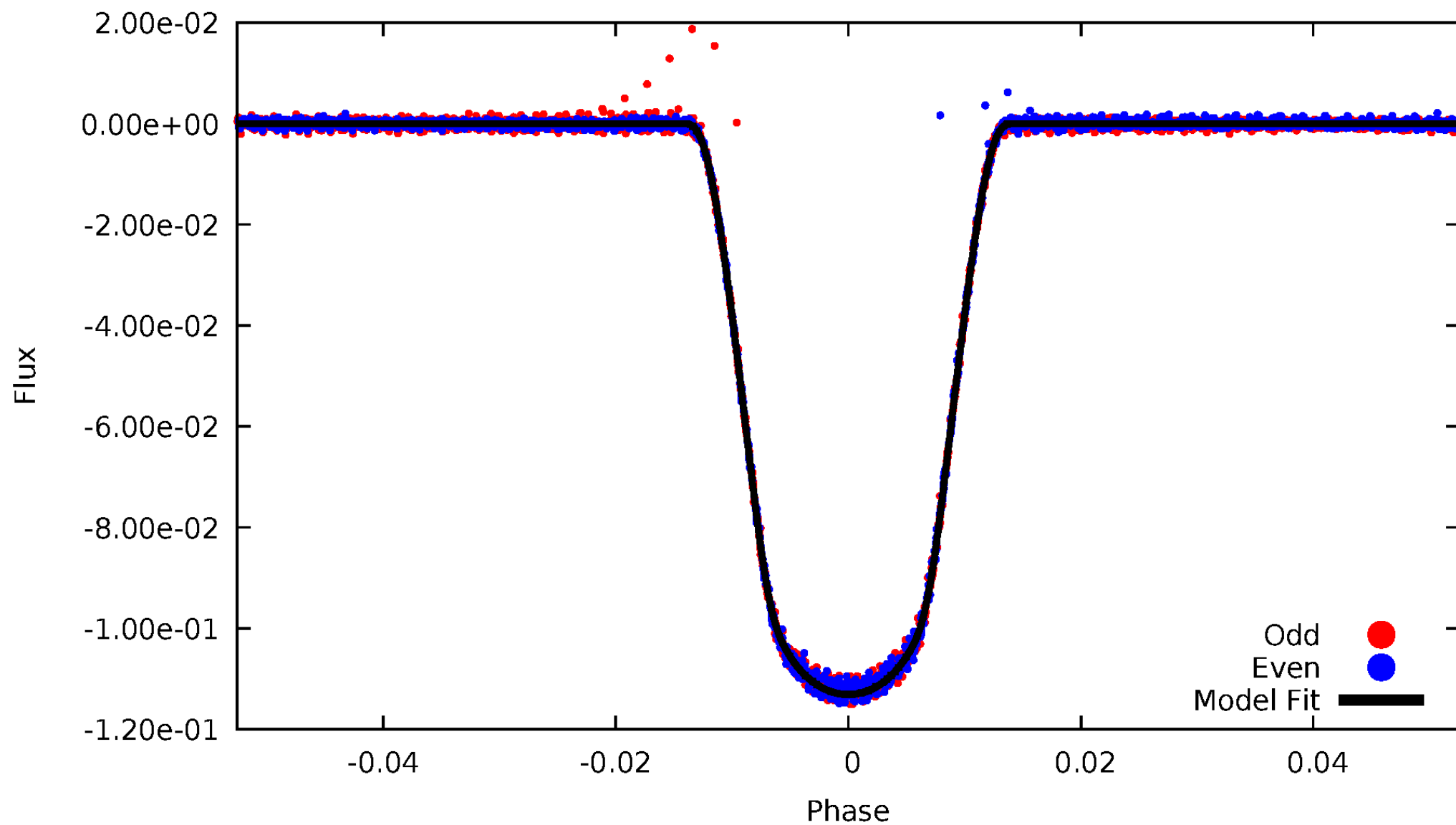


TCE 009963461-01



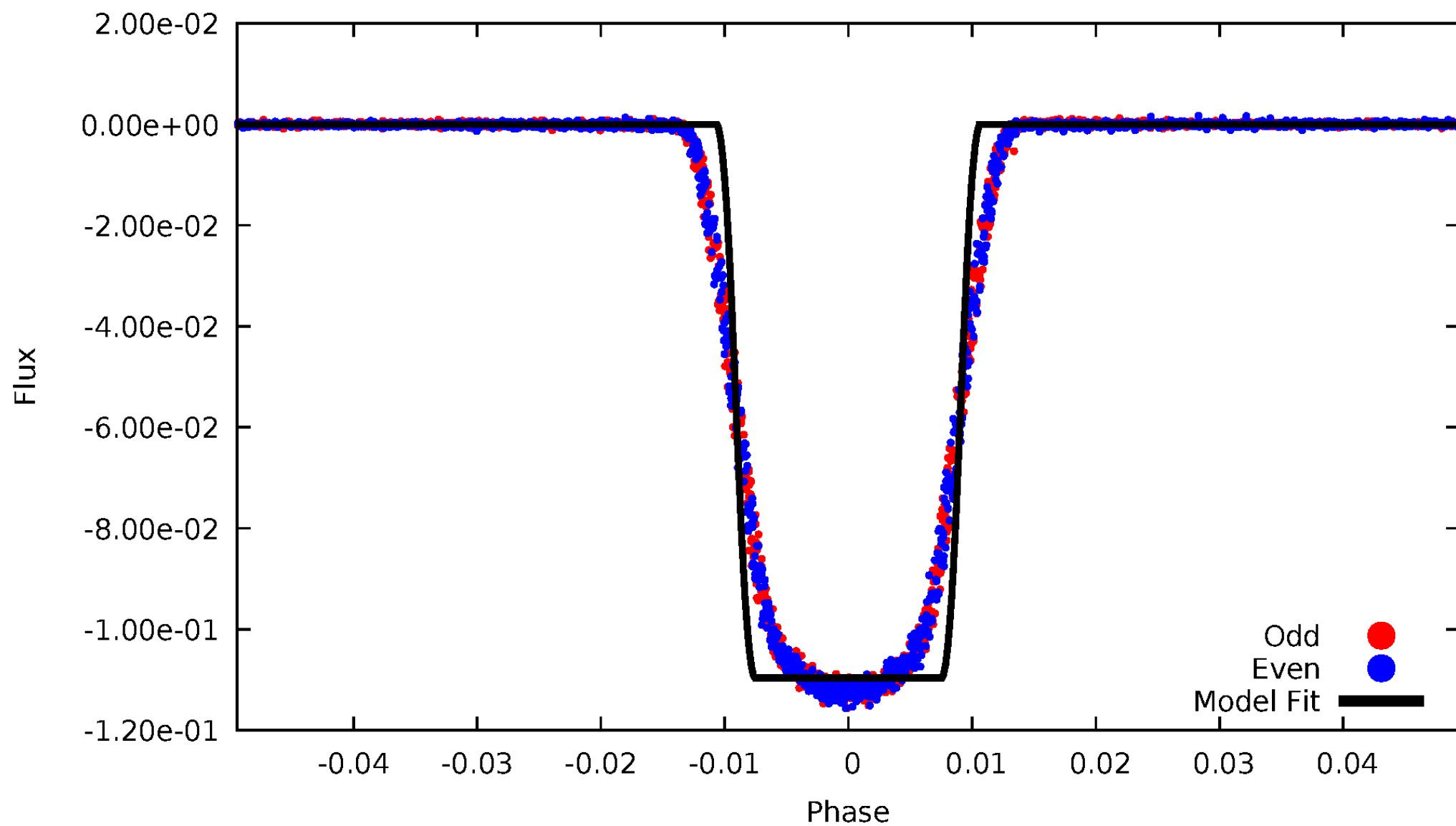
# DV Odd/Even

TCE 009963461-01



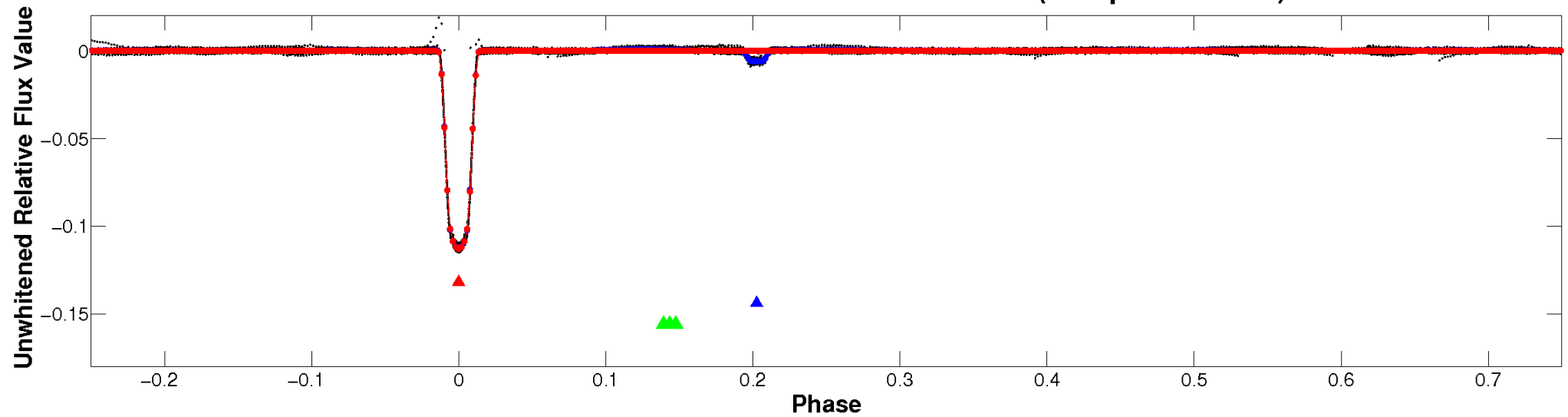
# ALT Odd/Even

TCE 009963461-01

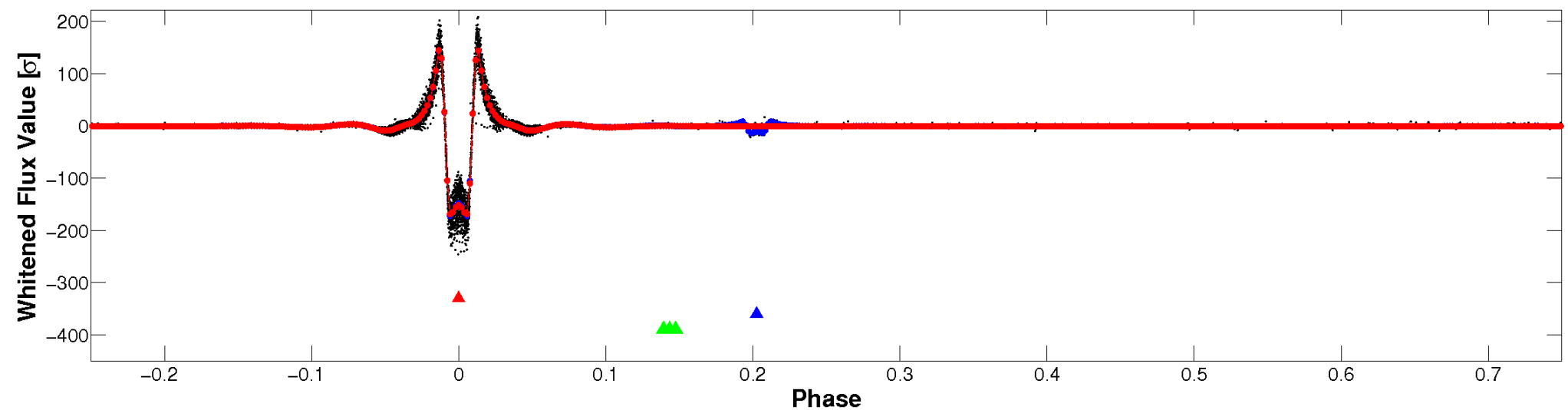


# Non-Whitened Vs. Whitened Light Curve

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

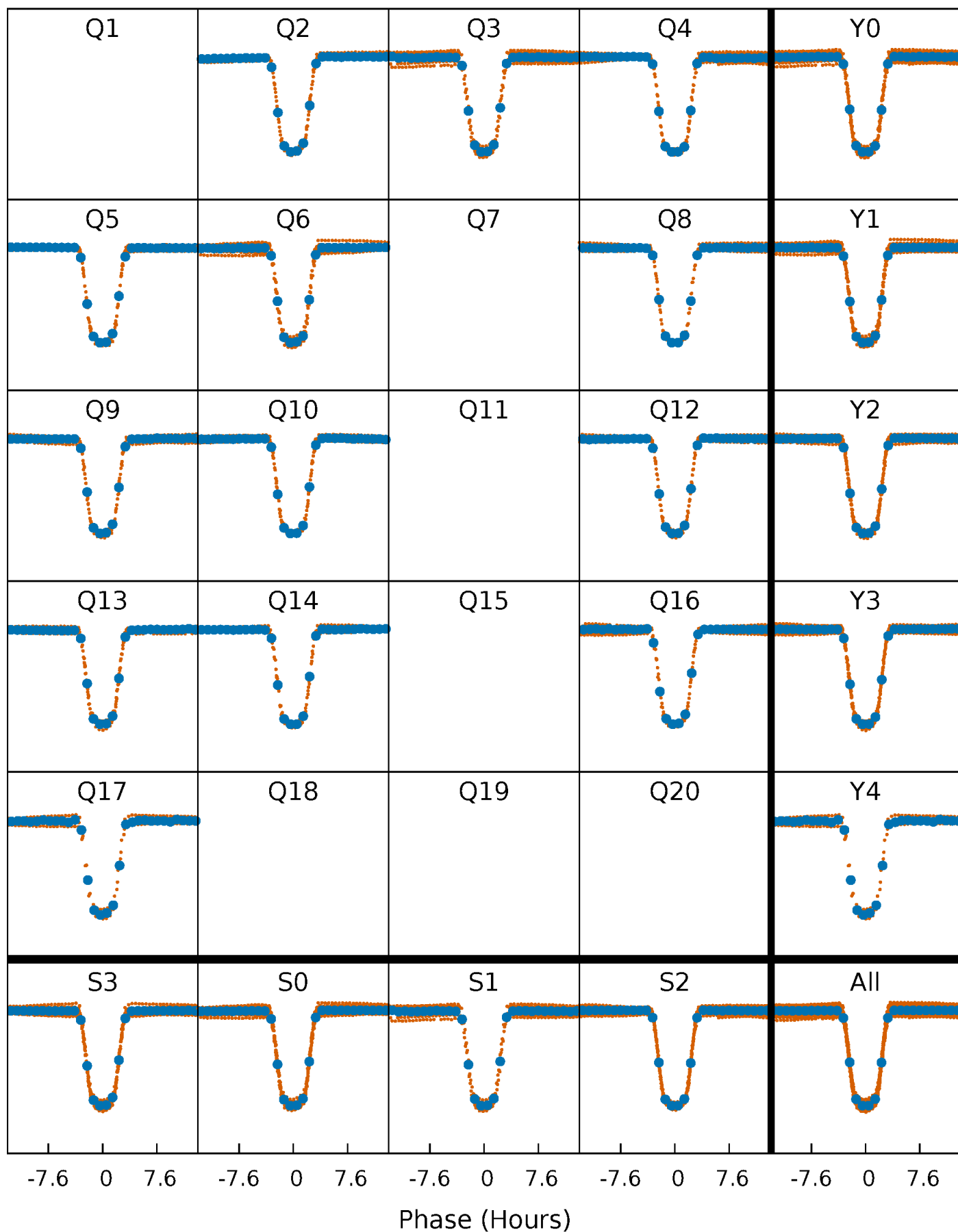


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

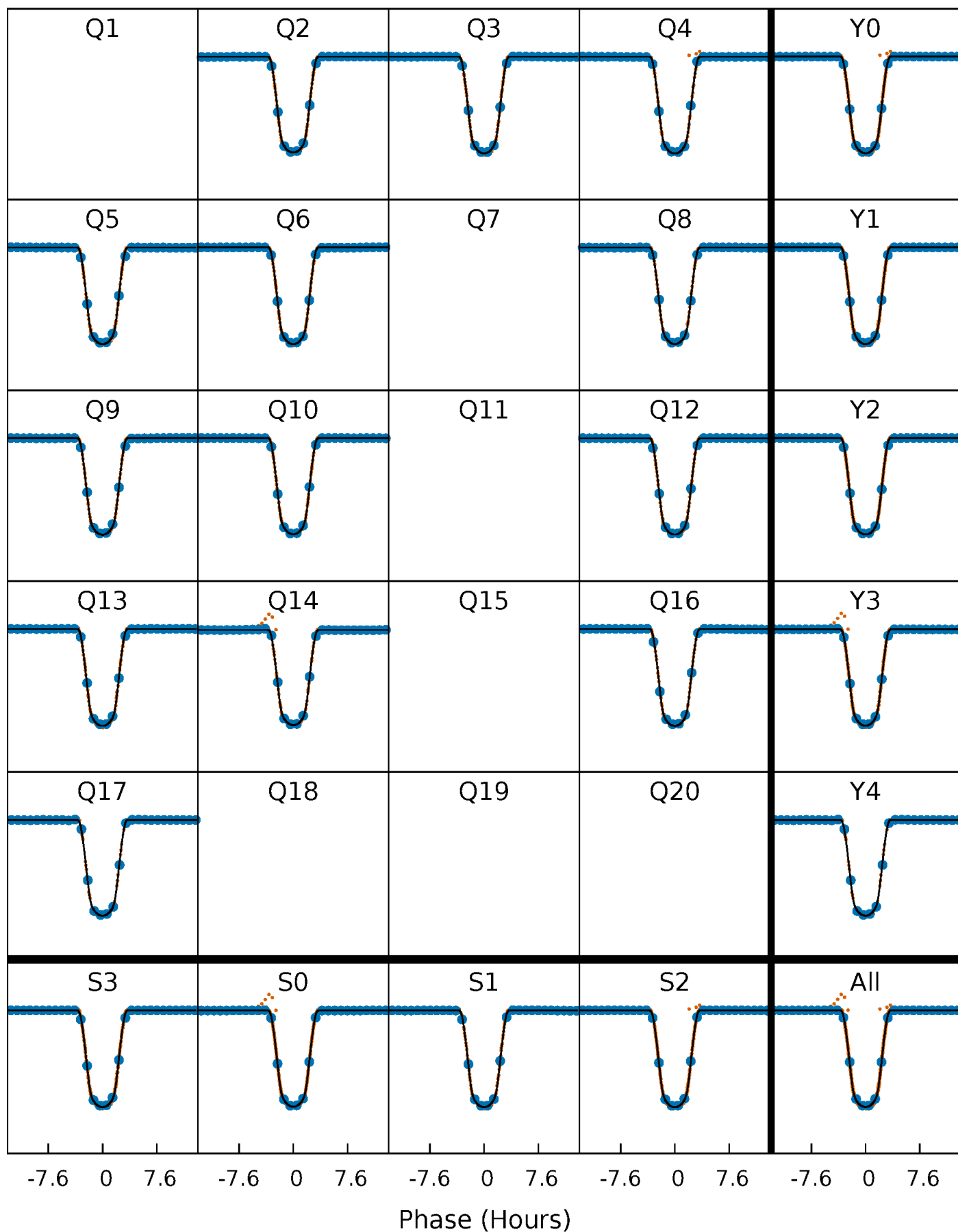
TCE 009963461-01 P= 10.581581 Days  $T_0=140.682258$  (BKJD)





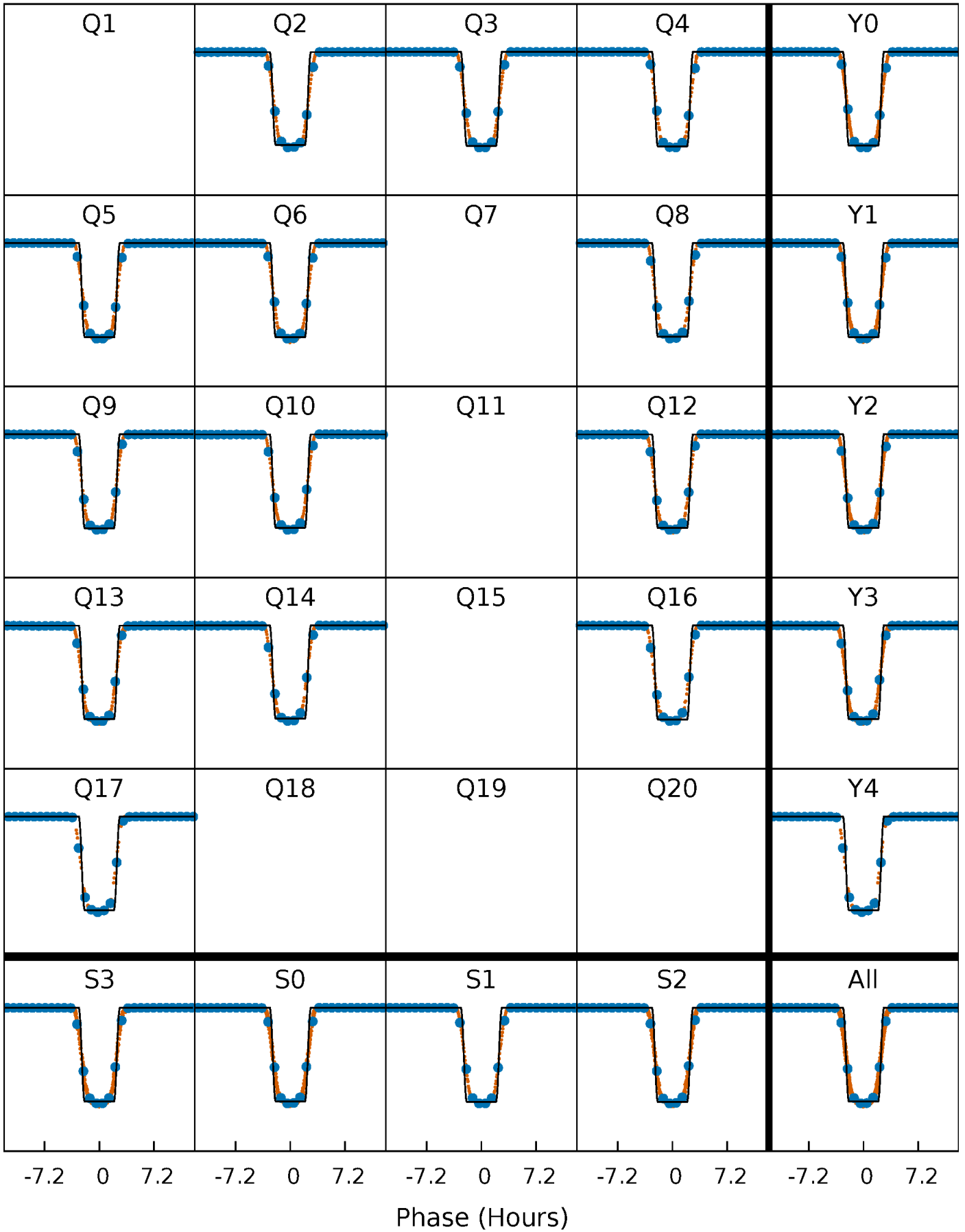
# DV Quarter-Phased Transit Curves

TCE 009963461-01 P= 10.581581 Days  $T_0=140.682258$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

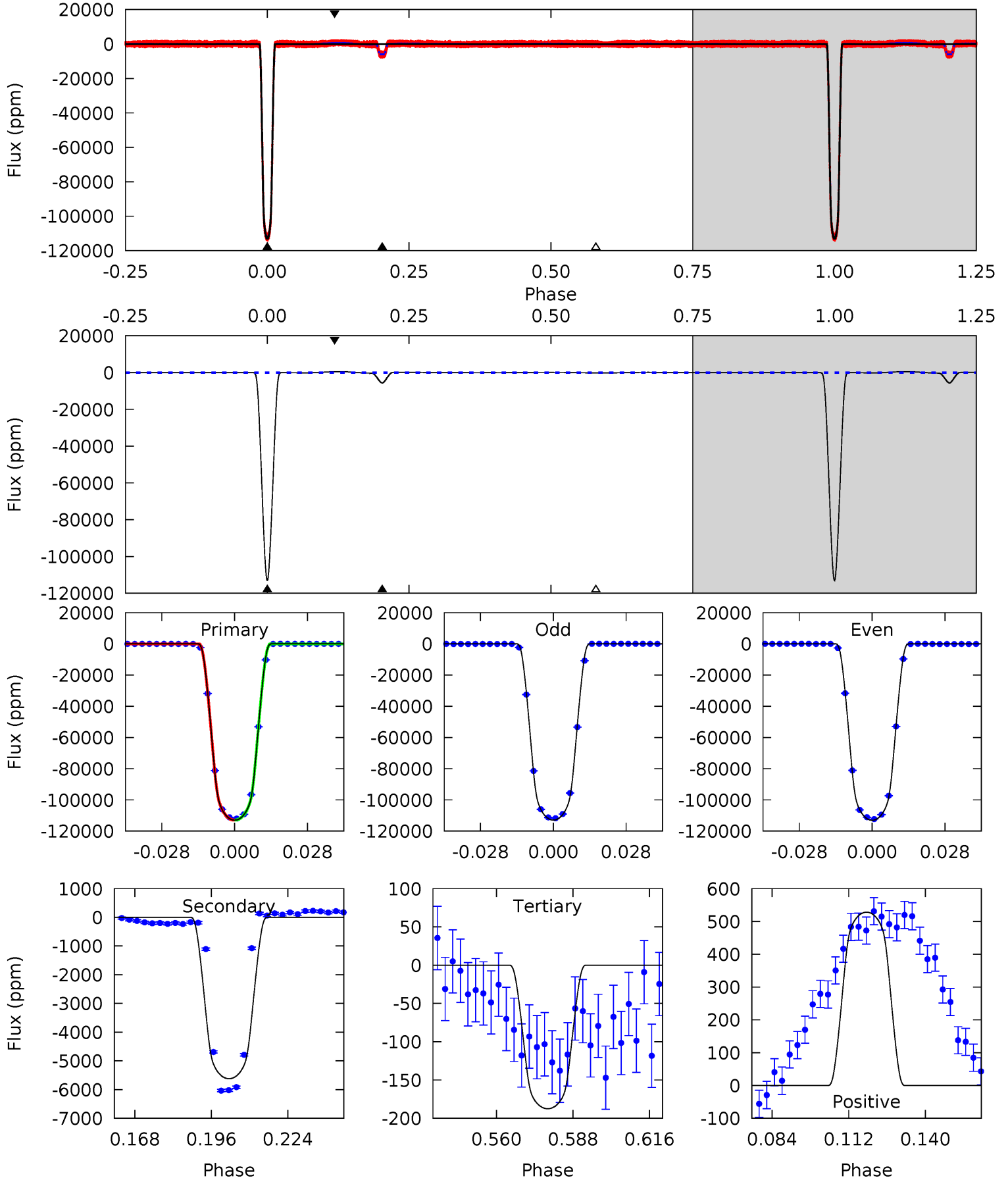
TCE 009963461-01 P= 10.581651 Days  $T_0=140.677843$  (BKJD)



# DV Model-Shift Uniqueness Test

009963461-01, P = 10.581581 Days, E = 140.682258 Days

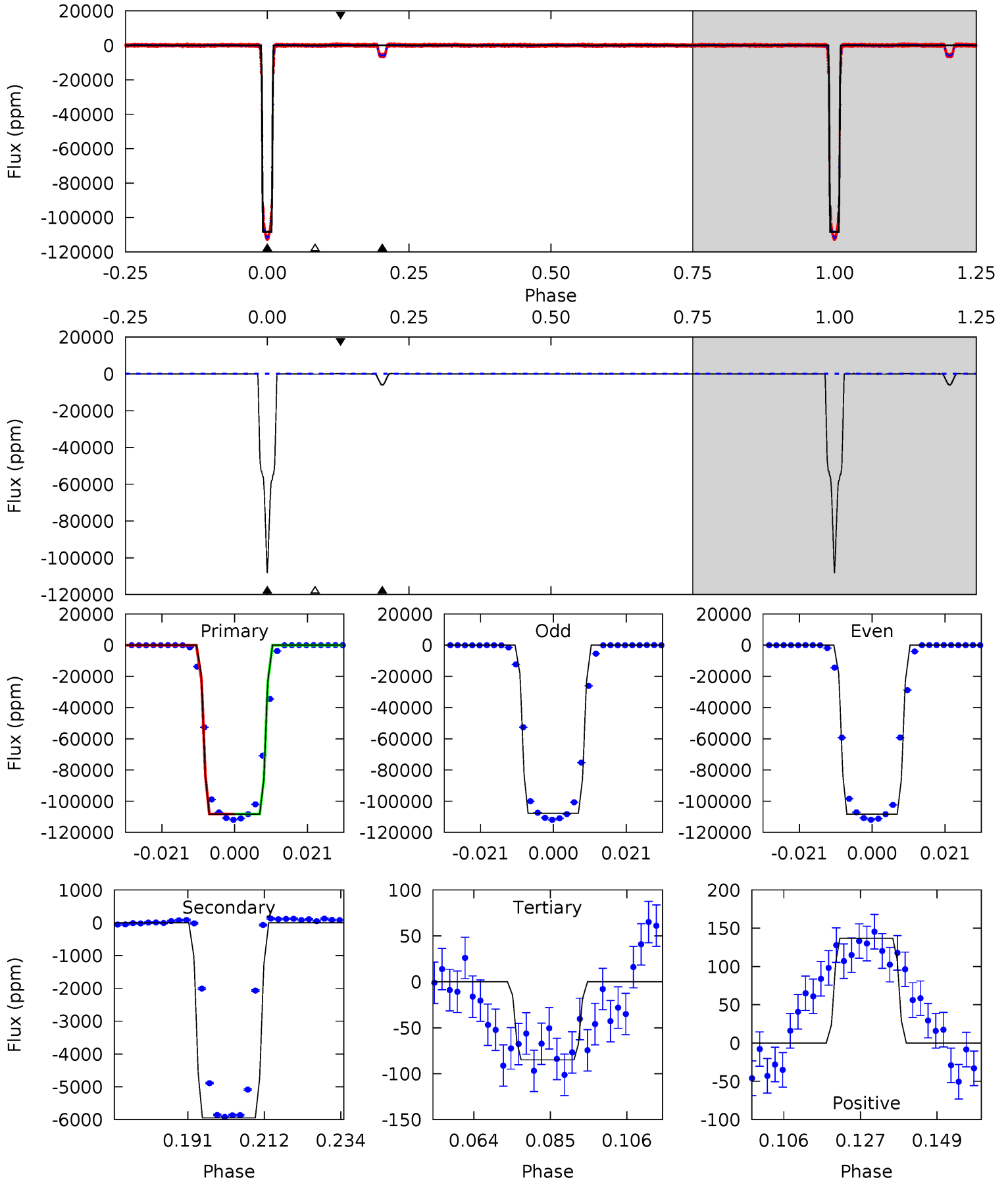
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7291	362.7	12.1	34.1	4.82	2.20	8.59	7278	7256	350.6	328.6	3.47	0.98	0.00	0.07



# Alt Model-Shift Uniqueness Test

009963461-01, P = 10.581651 Days, E = 140.677843 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
8681	476.5	6.81	11.0	4.88	2.30	2.55	8674	8670	469.7	465.5	22.6	1.00	0.00	0.99



### Stellar Parameters For KIC 009963461

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6168^{+219}_{-241}$	$4.074^{+0.336}_{-0.144}$	$-0.240^{+0.300}_{-0.300}$	$1.567^{+0.436}_{-0.533}$	$1.061^{+0.181}_{-0.164}$	$0.389^{+0.843}_{-0.182}$
	+4%/-4%	+8%/-4%	+125%/-125%	+28%/-34%	+17%/-15%	+217%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009963461-01 / KOI 1538.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-5621 \pm 16$	$51.19^{+8.81}_{-9.28}$	$1500^{+124}_{-141}$	$3497^{+78}_{-87}$	$11^{+5}_{-2}$
Alt.	$-5946 \pm 12$	$55.60^{+7.93}_{-10.24}$	$1508^{+122}_{-141}$	$3465^{+71}_{-92}$	$9.945^{+4.654}_{-2.174}$

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

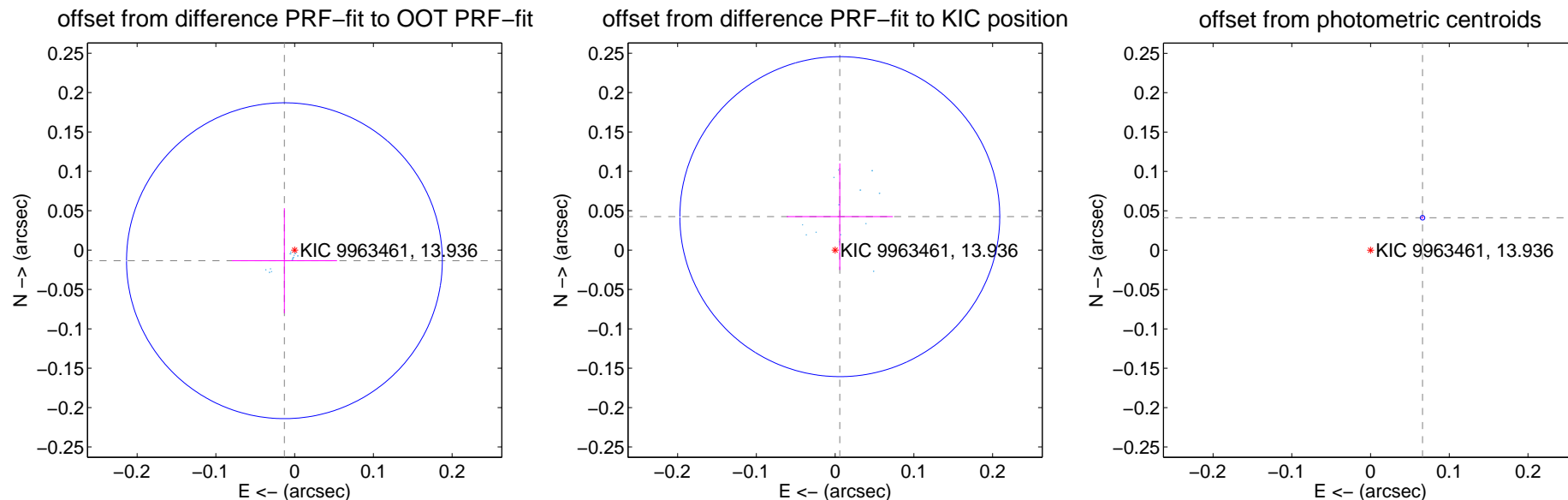
## DV Centroid Data

Supplemental centroid analysis for 009963461-01. Kepler magnitude: 13.94. Transit SNR 4305.25

There are 13 quarters with good PRF difference image offsets

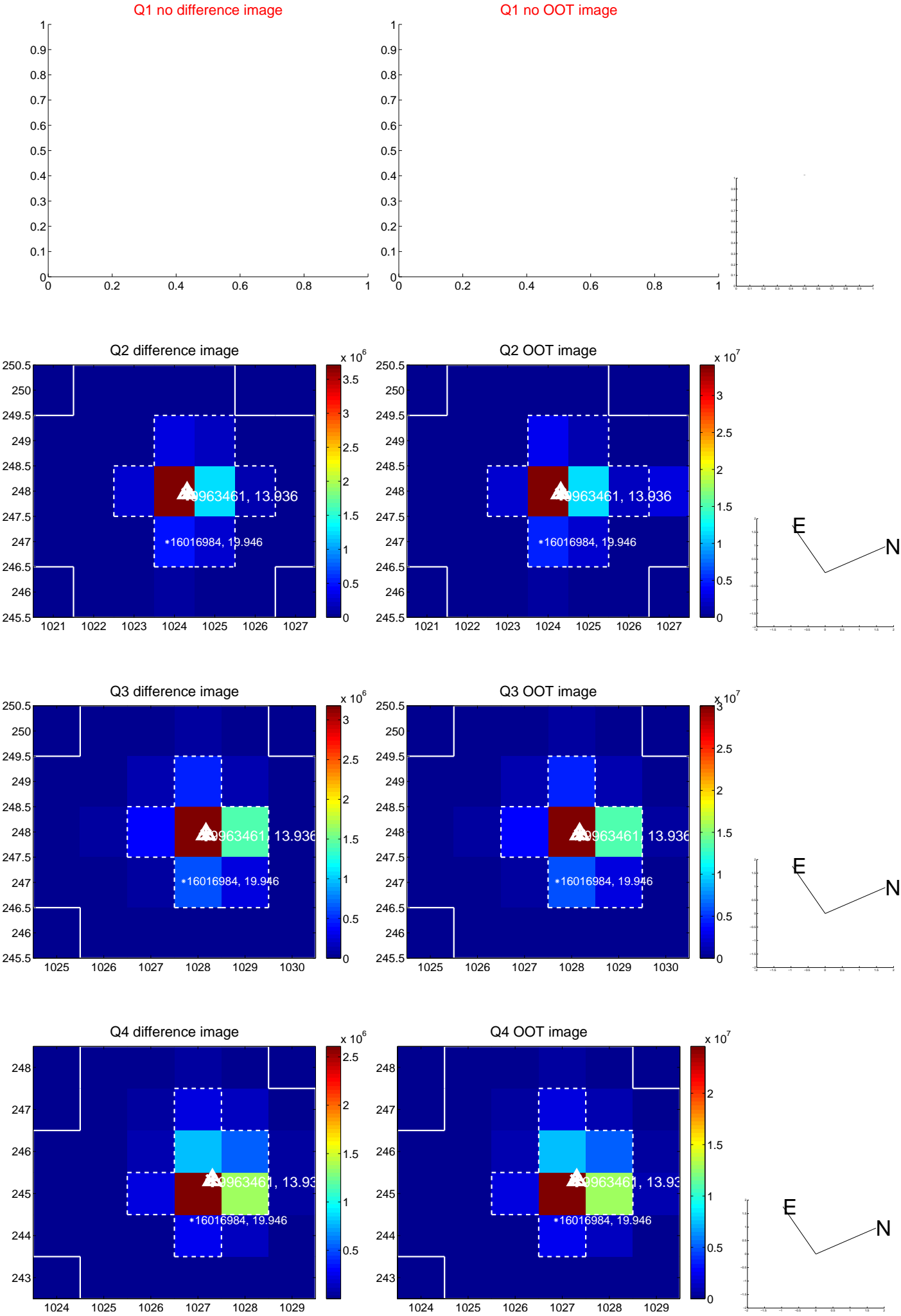
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.019 \pm 0.067$	0.28	$0.013 \pm 0.067$	$-0.014 \pm 0.067$
PRF-fit source offset from KIC position	$0.043 \pm 0.068$	0.63	$-0.006 \pm 0.067$	$0.042 \pm 0.068$
photometric centroid source offset	$0.08 \pm 0.00$	81.19	$-0.07 \pm 0.00$	$0.04 \pm 0.00$

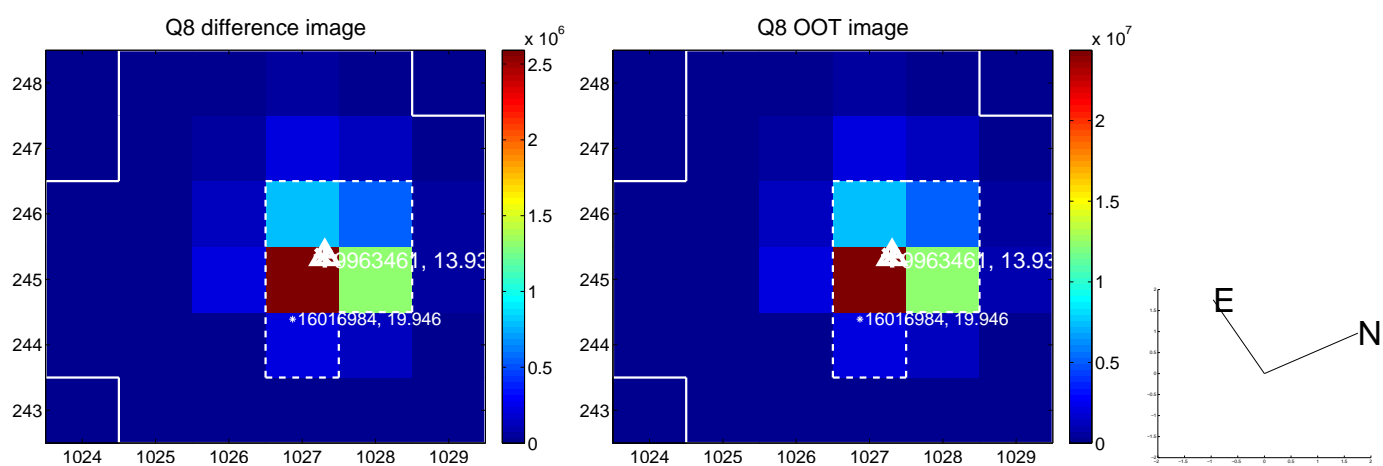
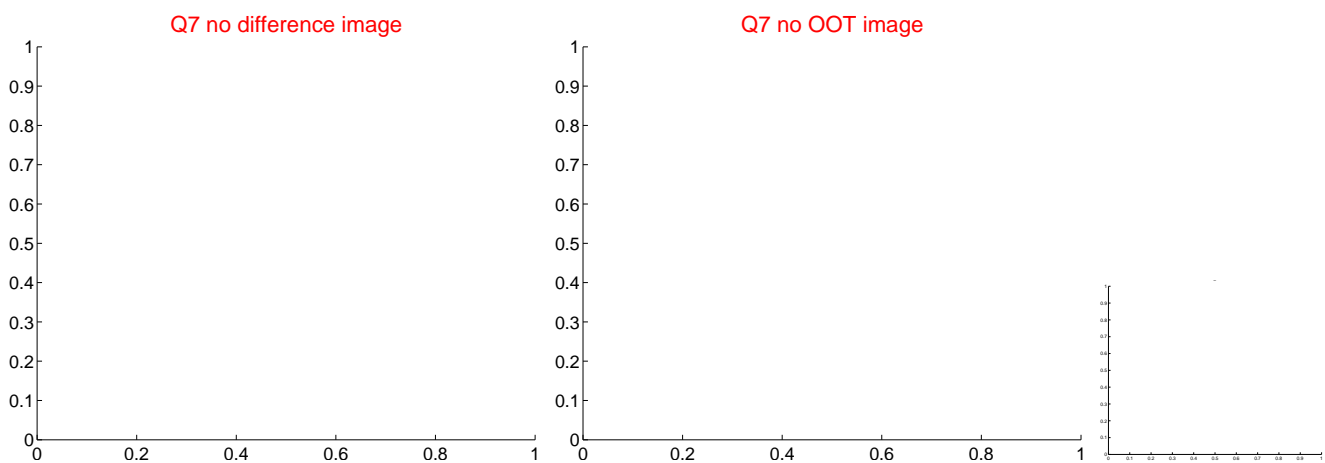
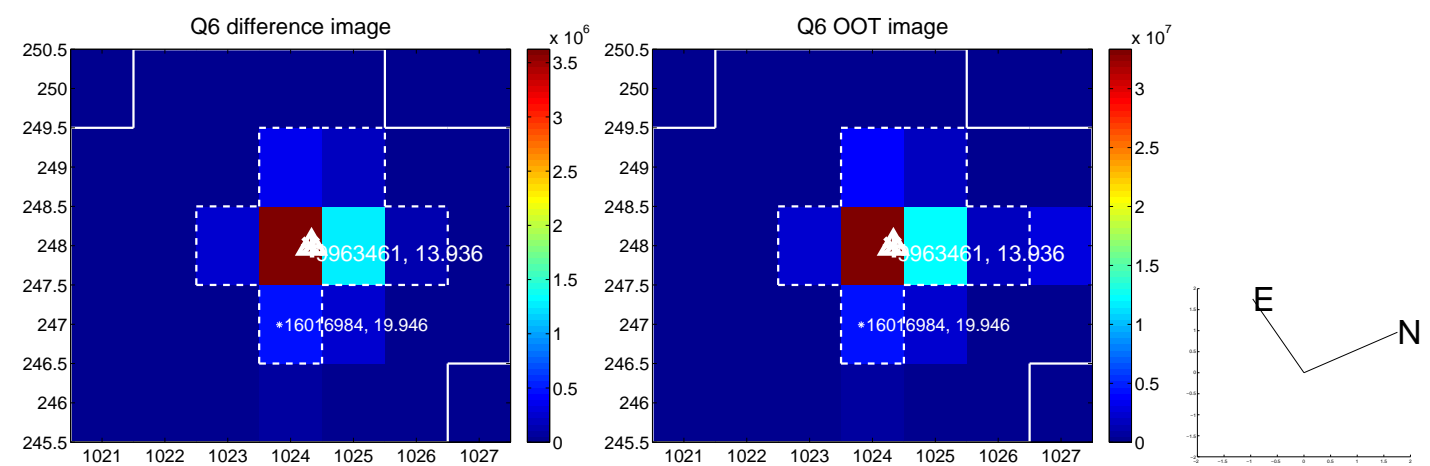
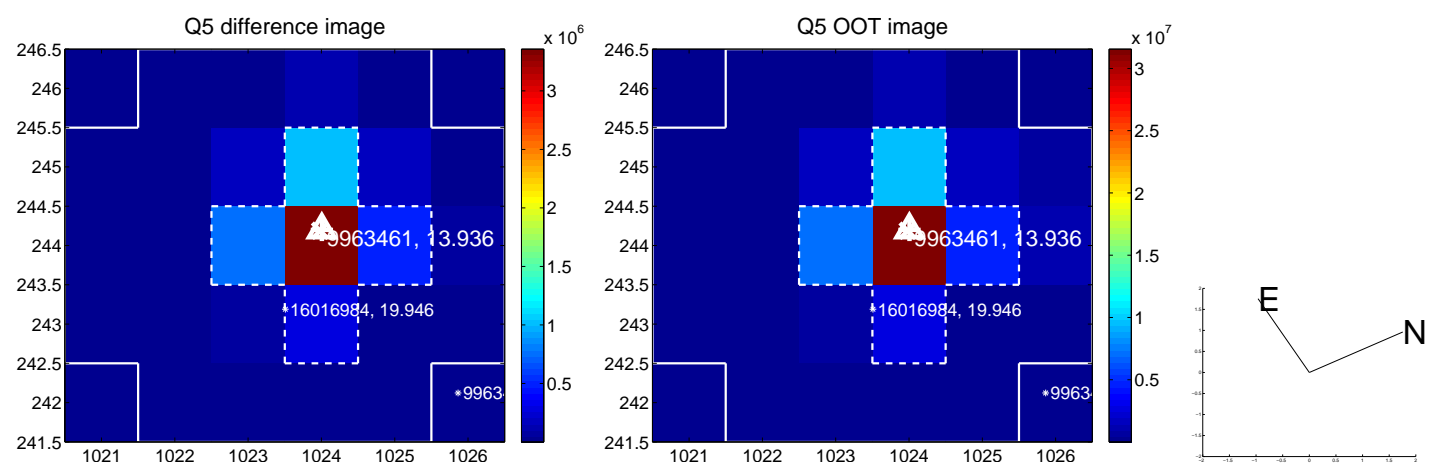


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

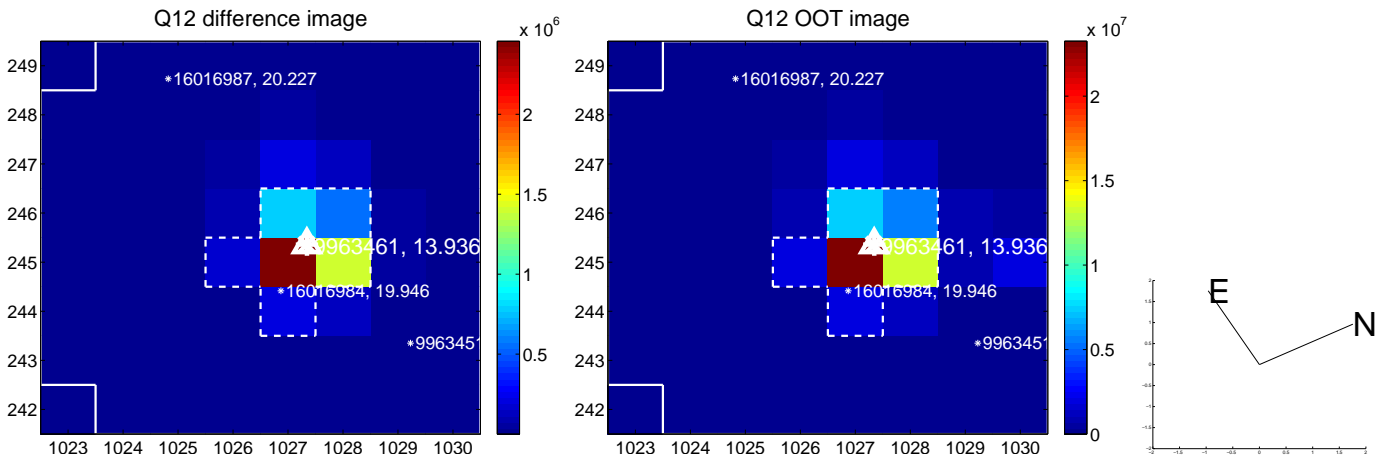
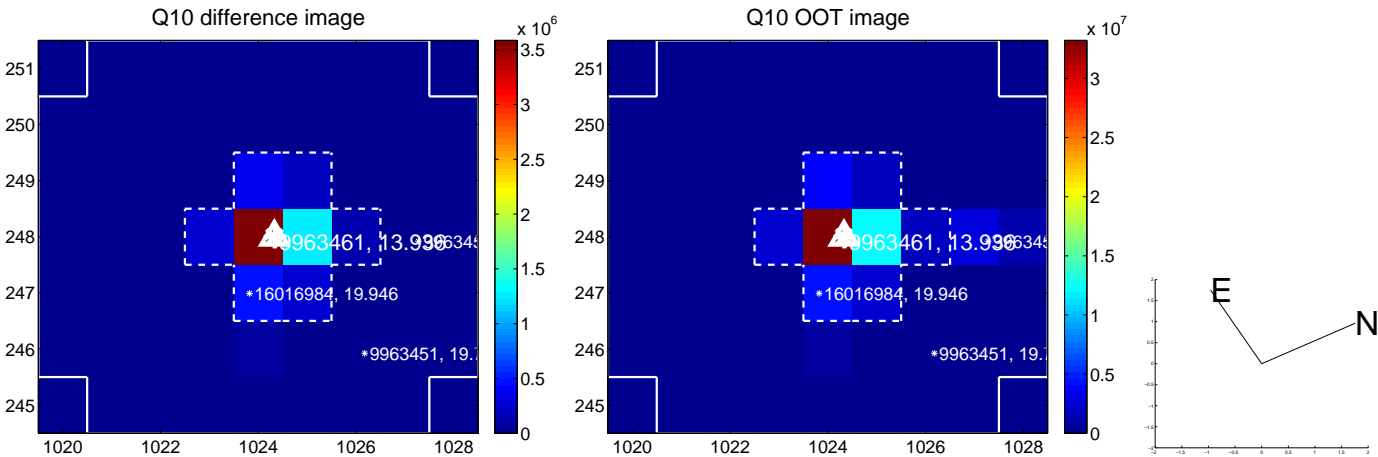
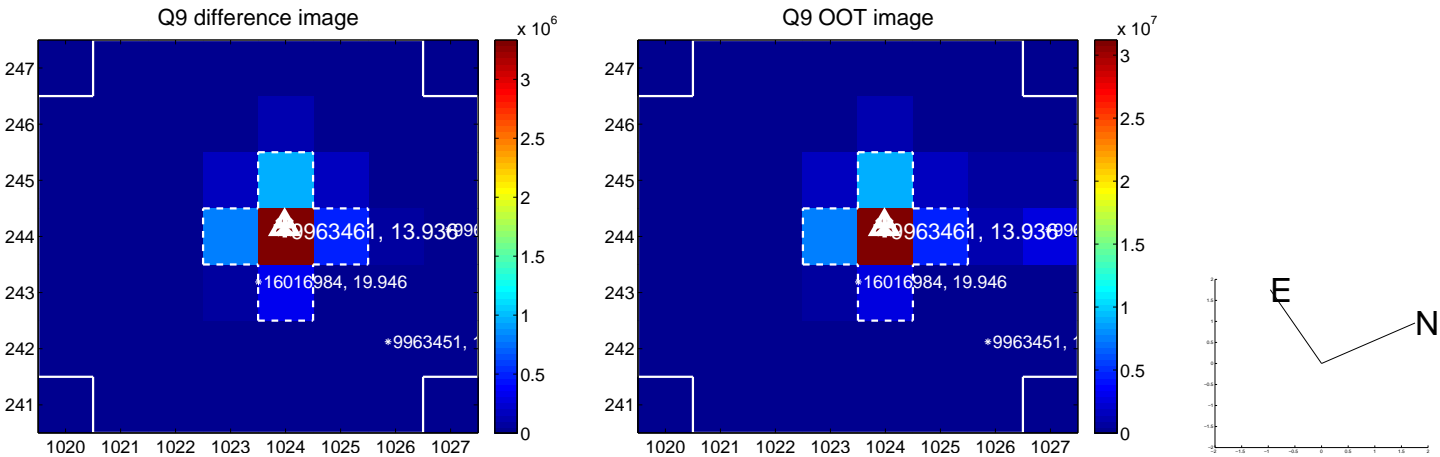


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

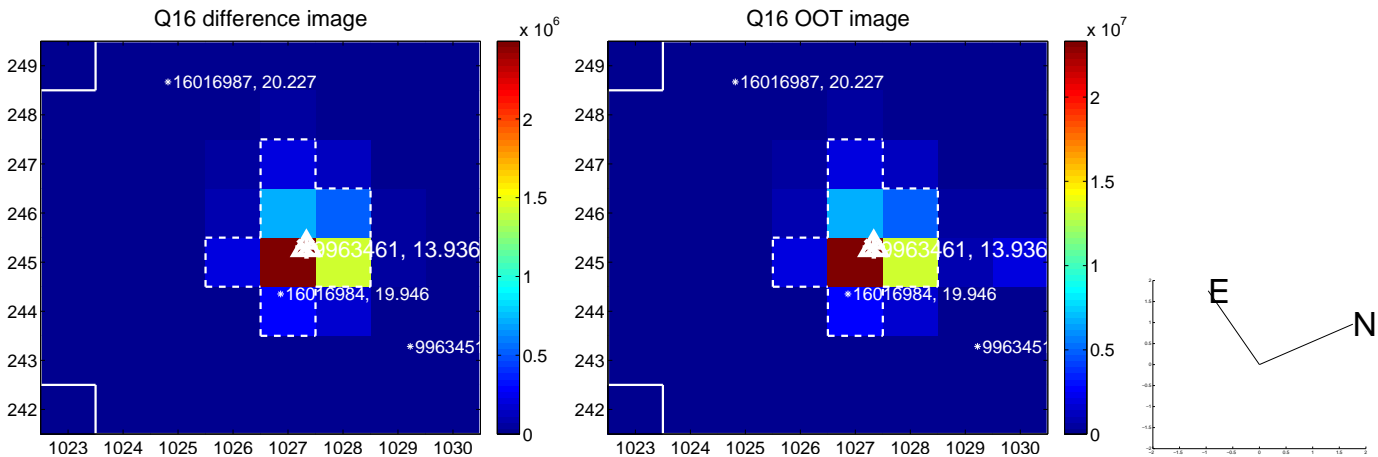
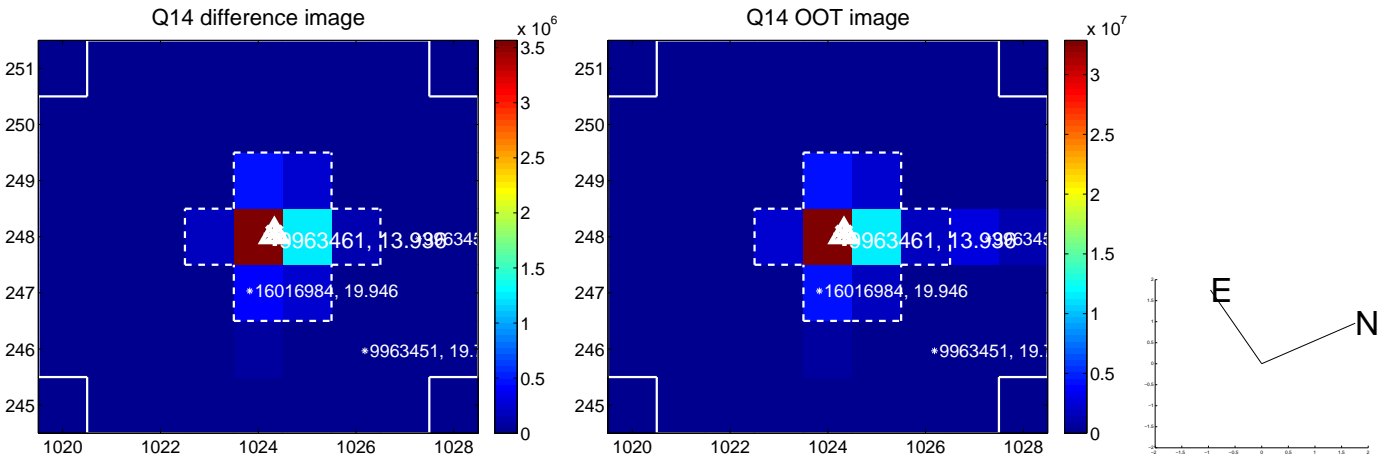
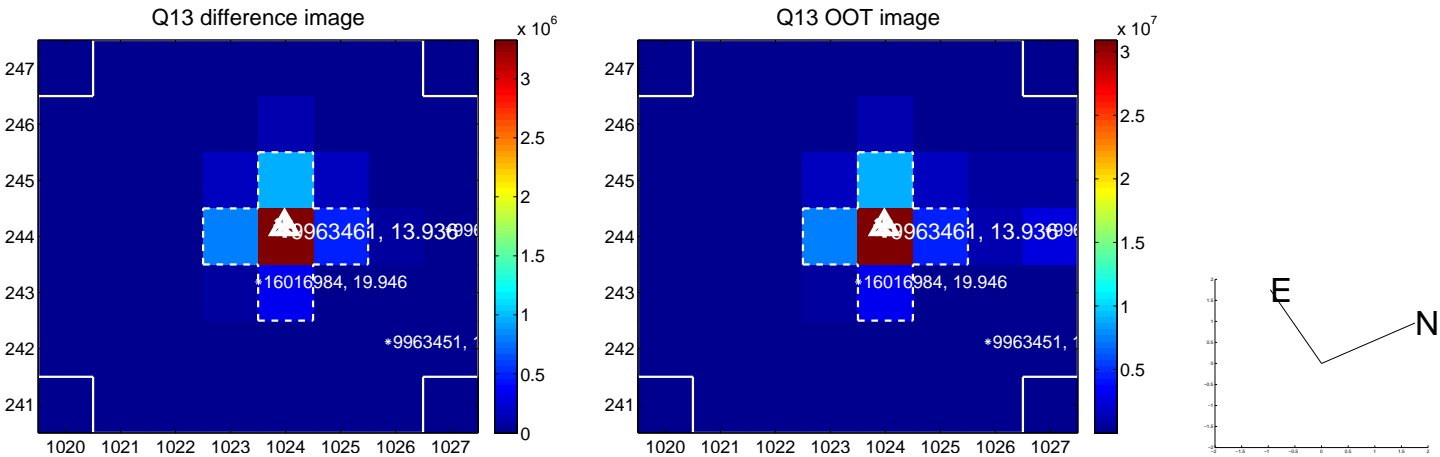




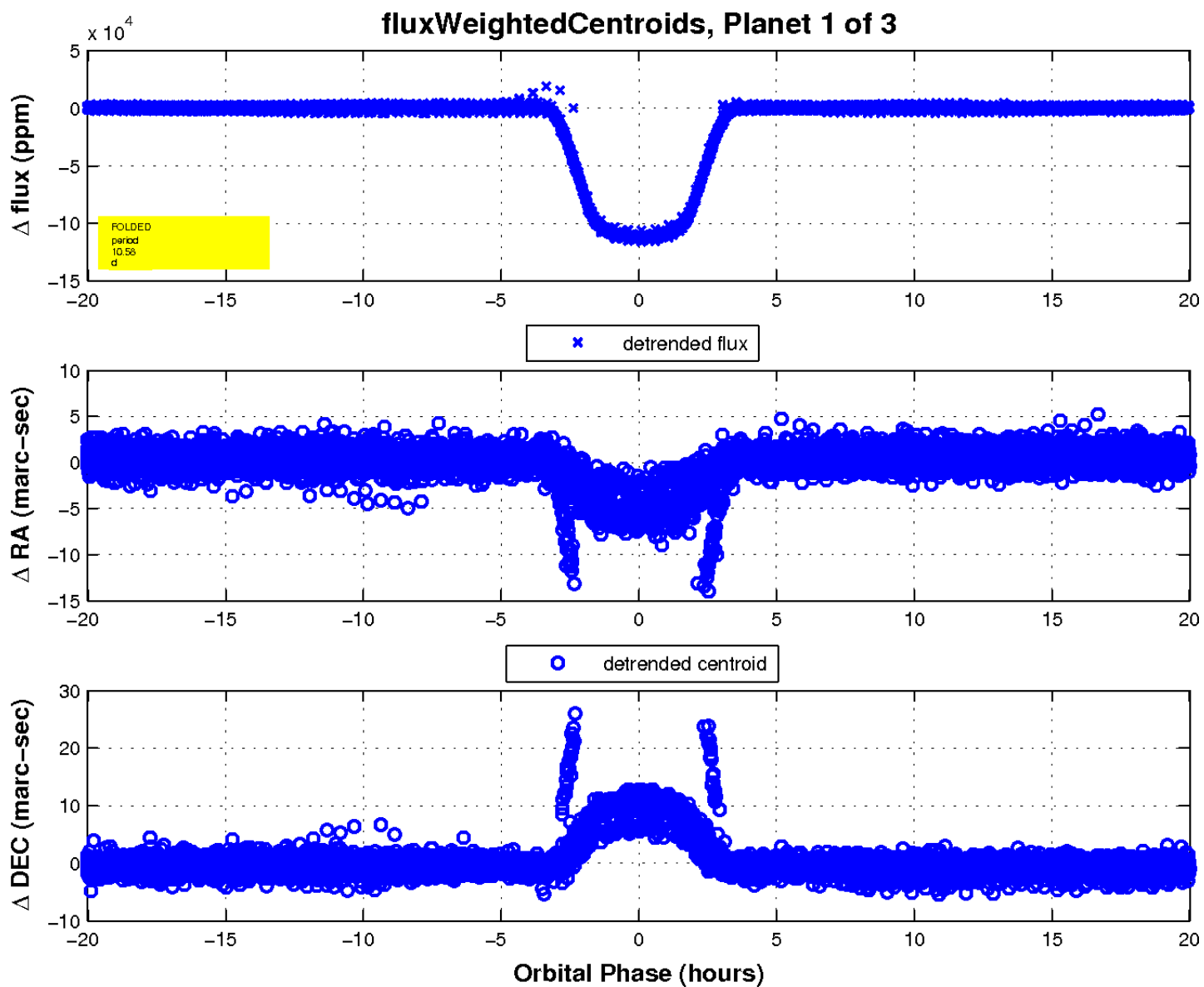
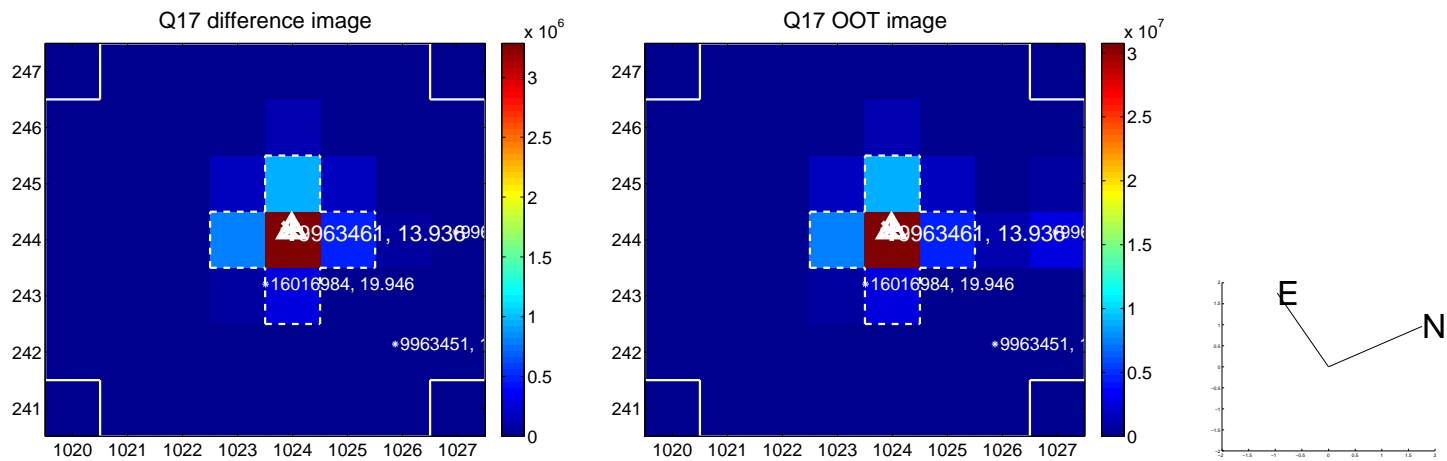
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

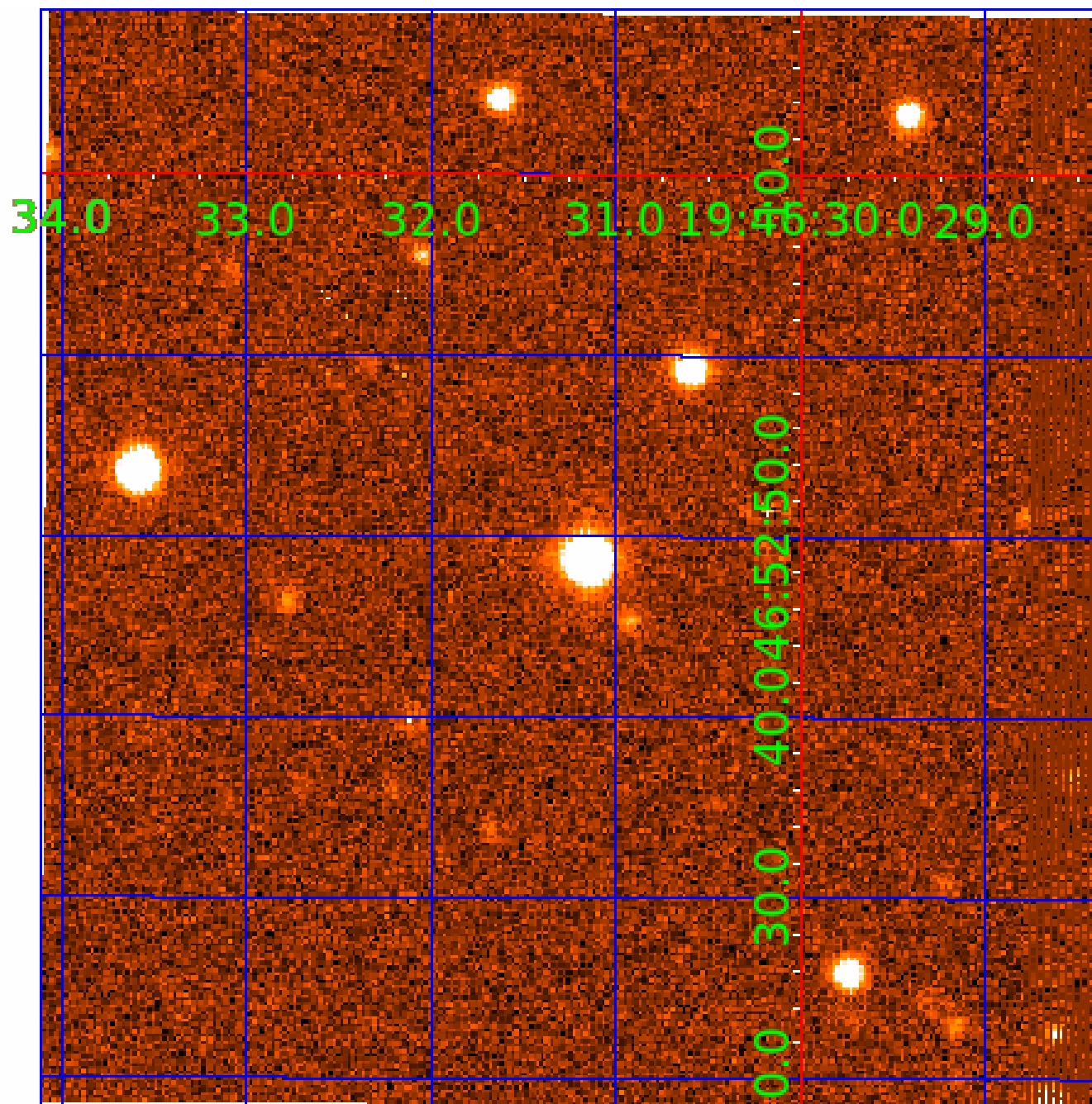


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009963461

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009963461-01	OBS	1538.01	10.581581	140.682259	113126.8	6.675	5181.3	4305.3	1.57	6168	53.29	343.65
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009963461-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE
009963461-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009963461-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—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 009963461-02

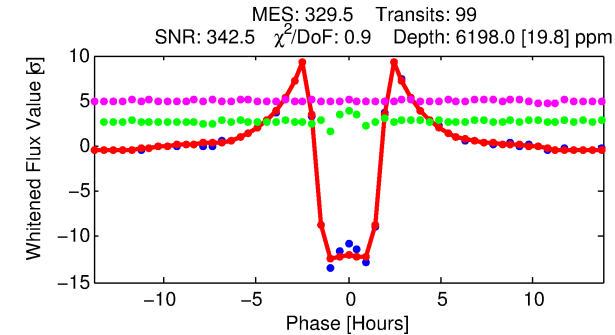
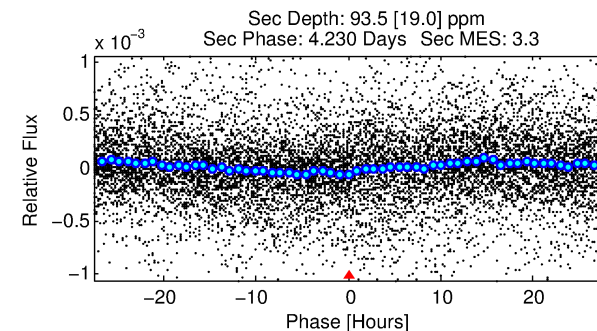
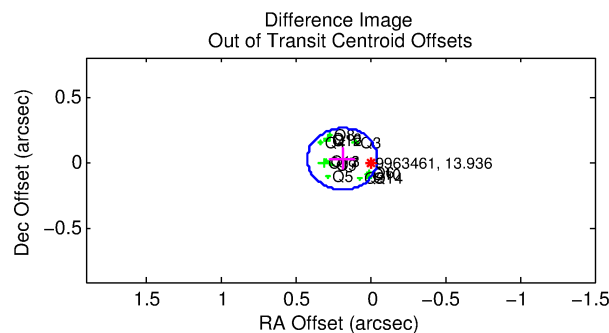
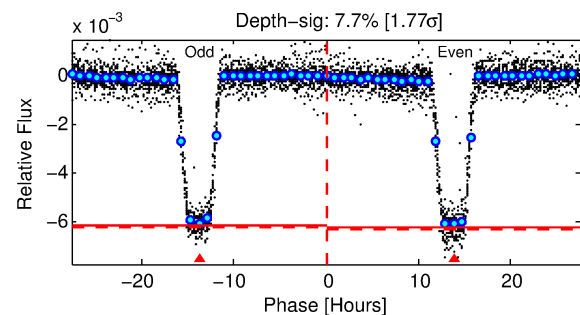
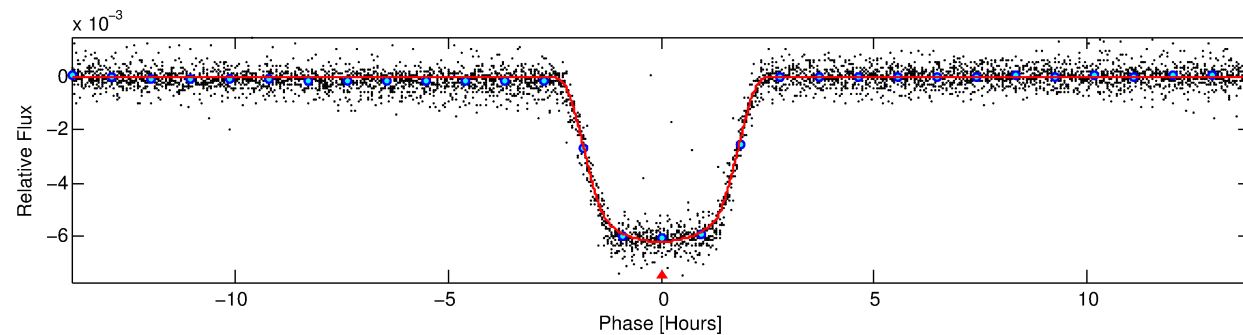
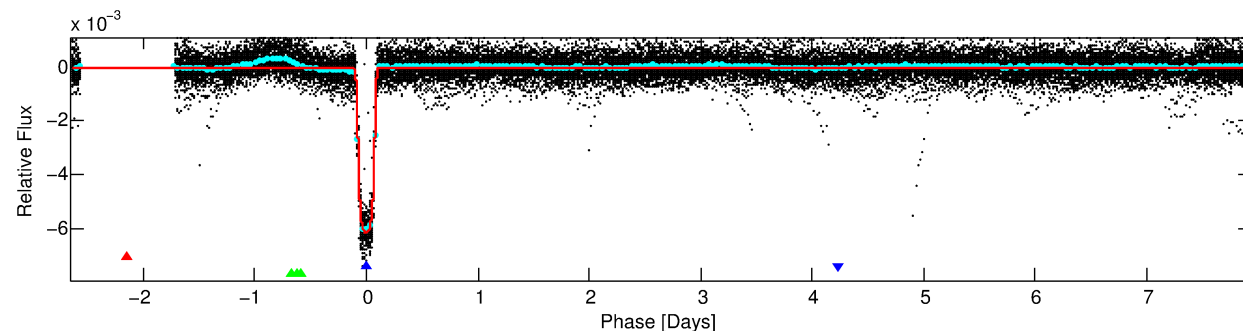
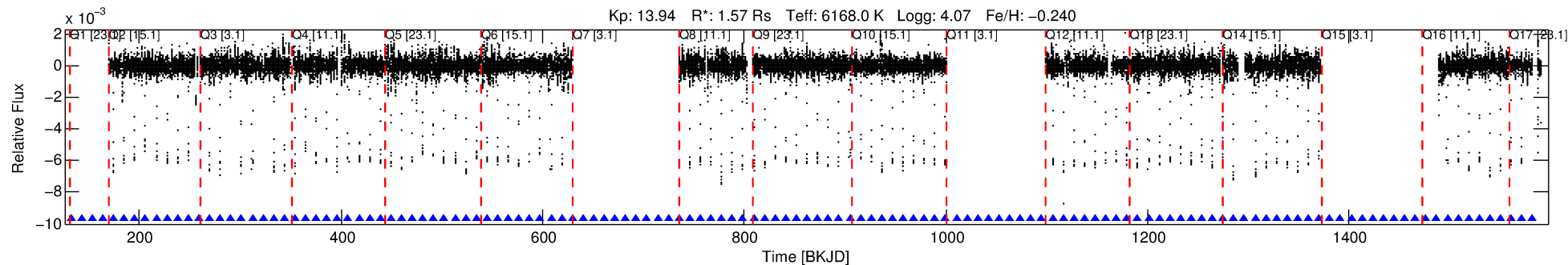
No Significant Match Found

# DV One-Page Summary

KIC: 9963461 Candidate: 2 of 3 Period: 10.582 d

KOI: K01538 Corr: No Ephemeris Match

Kp: 13.94 R\*: 1.57 Rs Teff: 6168.0 K Logg: 4.07 Fe/H: -0.240



## DV Fit Results:

Period = 10.58159 [0.00000] d  
Epoch = 132.2446 [0.0002] BKJD  
Rp/R\* = 0.0808 [0.0002]  
a/R\* = 12.37 [0.08]  
b = 0.82 [0.00]  
Seff = 343.65 [200.93]  
Teq = 1098 [160] K  
Rp = 13.81 [4.70] Re  
a = 0.0963 [0.0331] AU  
Ag = 2.50 [1.50] [1.00σ]  
Teffp = 2135 [137] K [4.92σ]

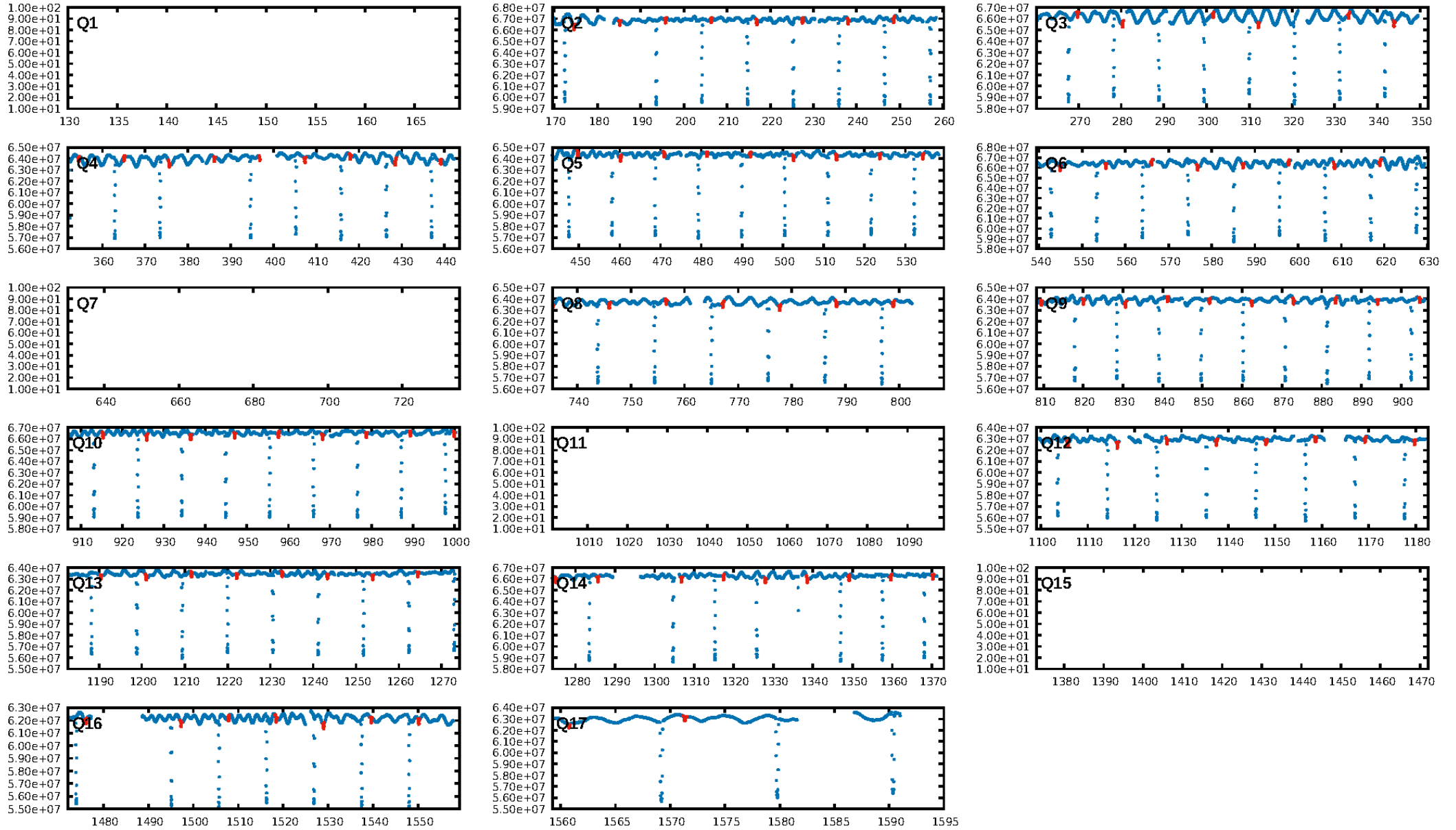
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [2160.56σ]  
ModelChiSquare2-sig: 83.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [97/97]  
GhostDiagnostic-chr: 3.391  
Centroid-sig: N/A  
Centroid-so: 0.086 arcsec [4.64σ]  
OotOffset-rm: 0.189 arcsec [2.42σ]  
KicOffset-rm: 0.193 arcsec [2.35σ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

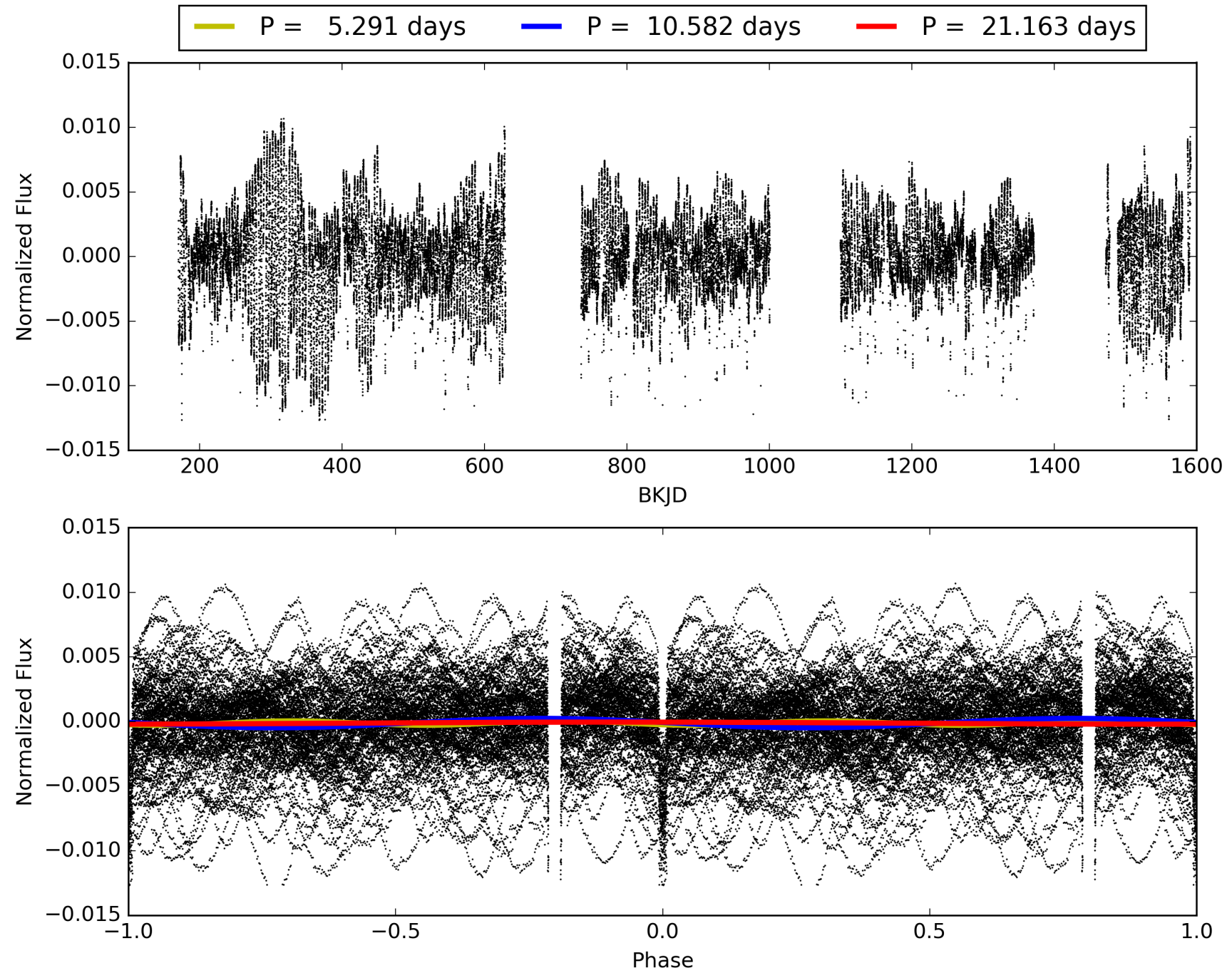
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009963461-02, PDC Light Curves



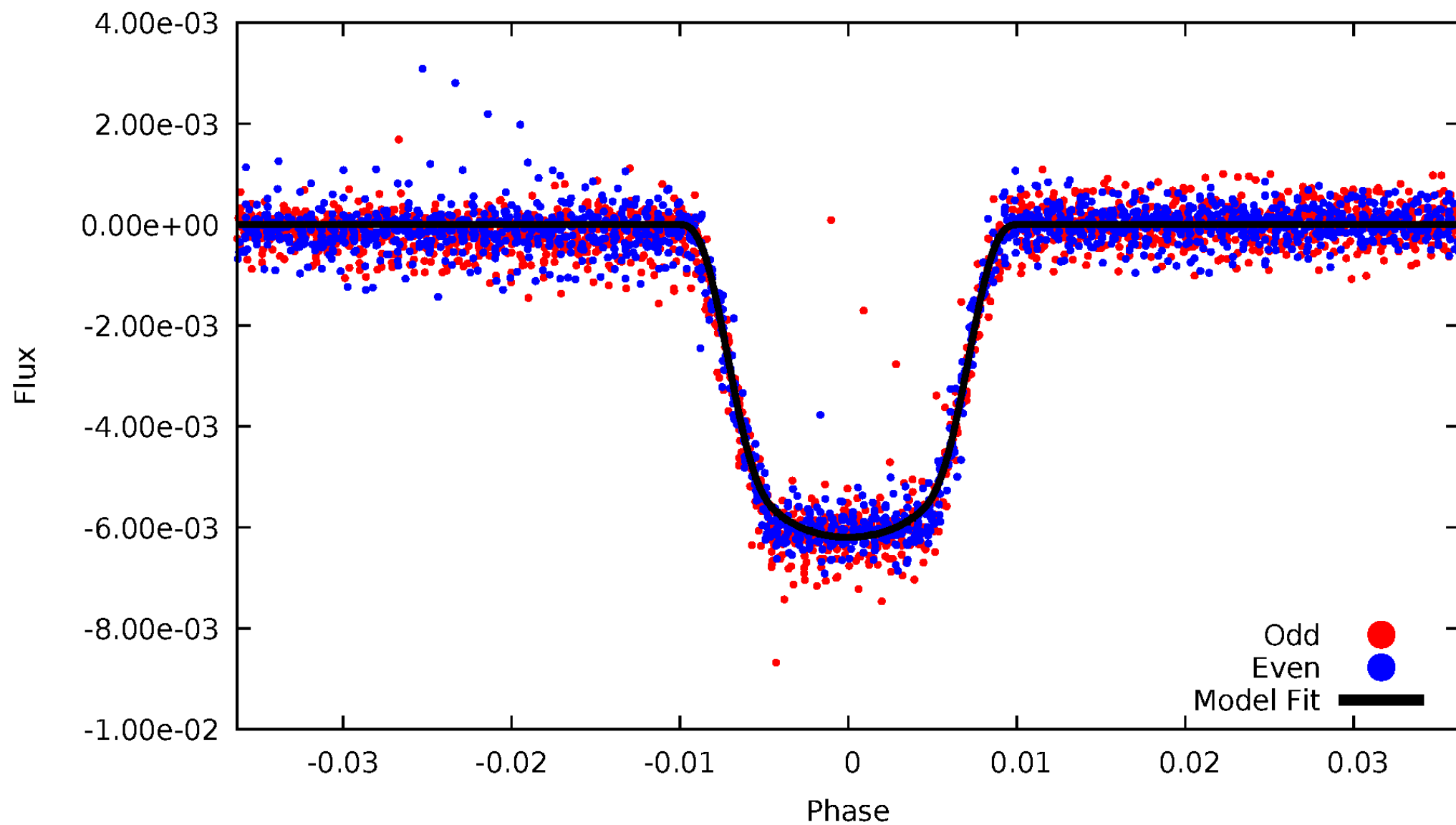
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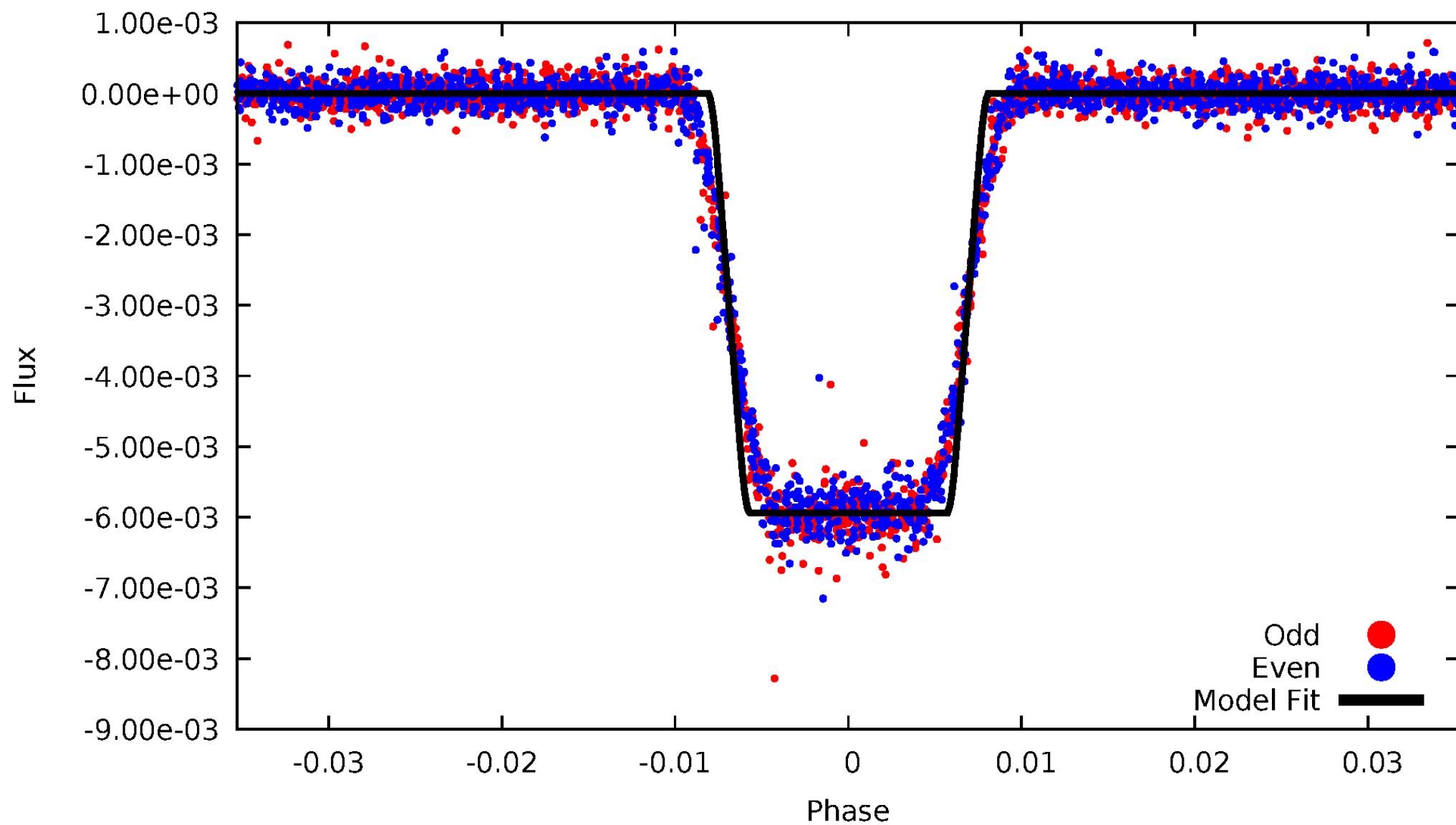
# DV Odd/Even

TCE 009963461-02



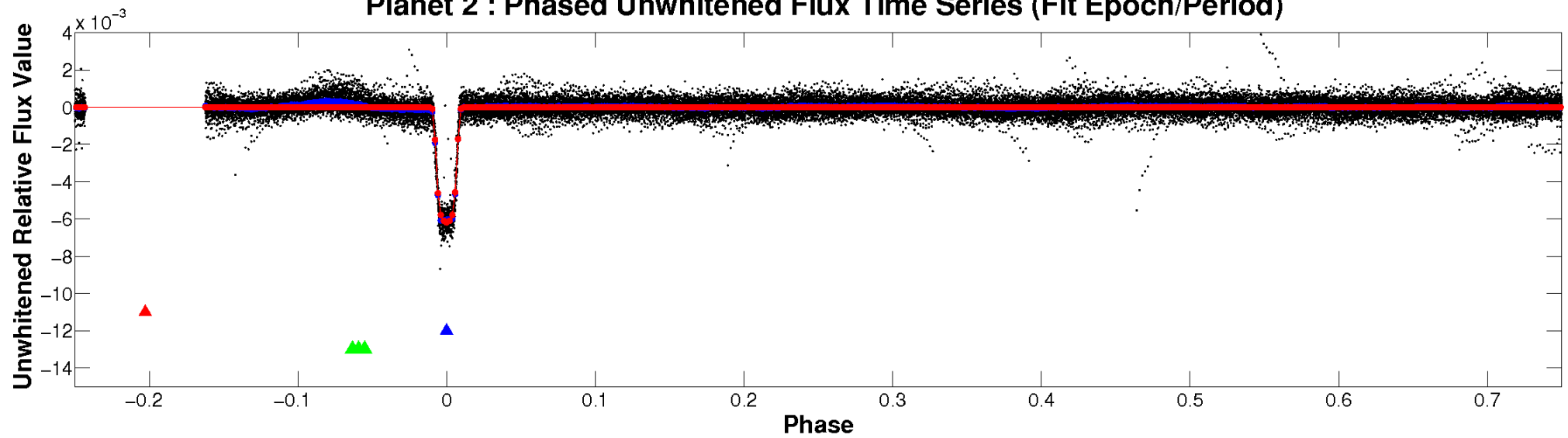
# ALT Odd/Even

TCE 009963461-02

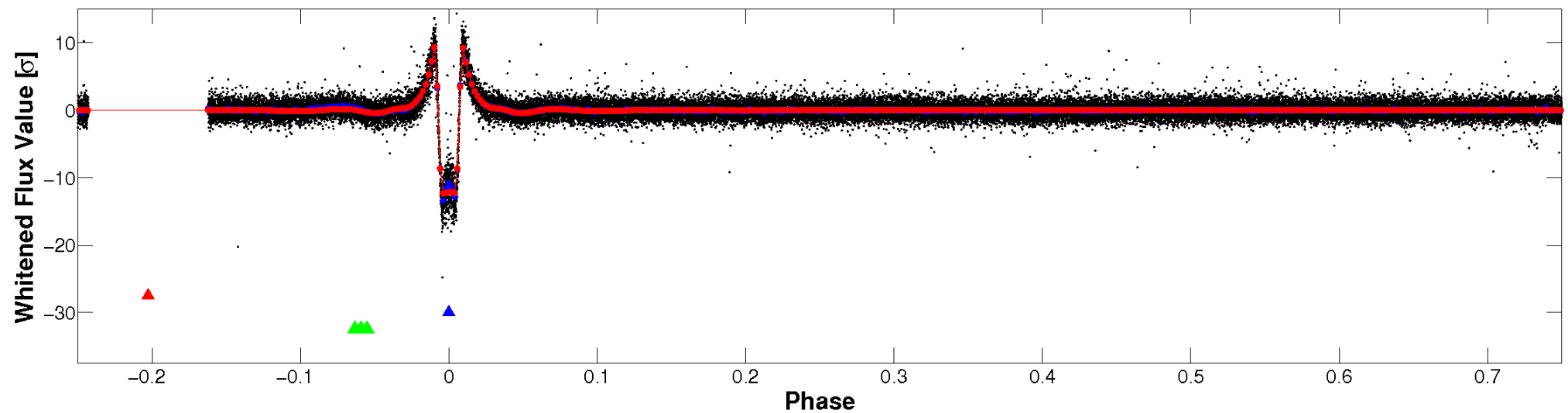


# Non-Whitened Vs. Whitened Light Curve

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

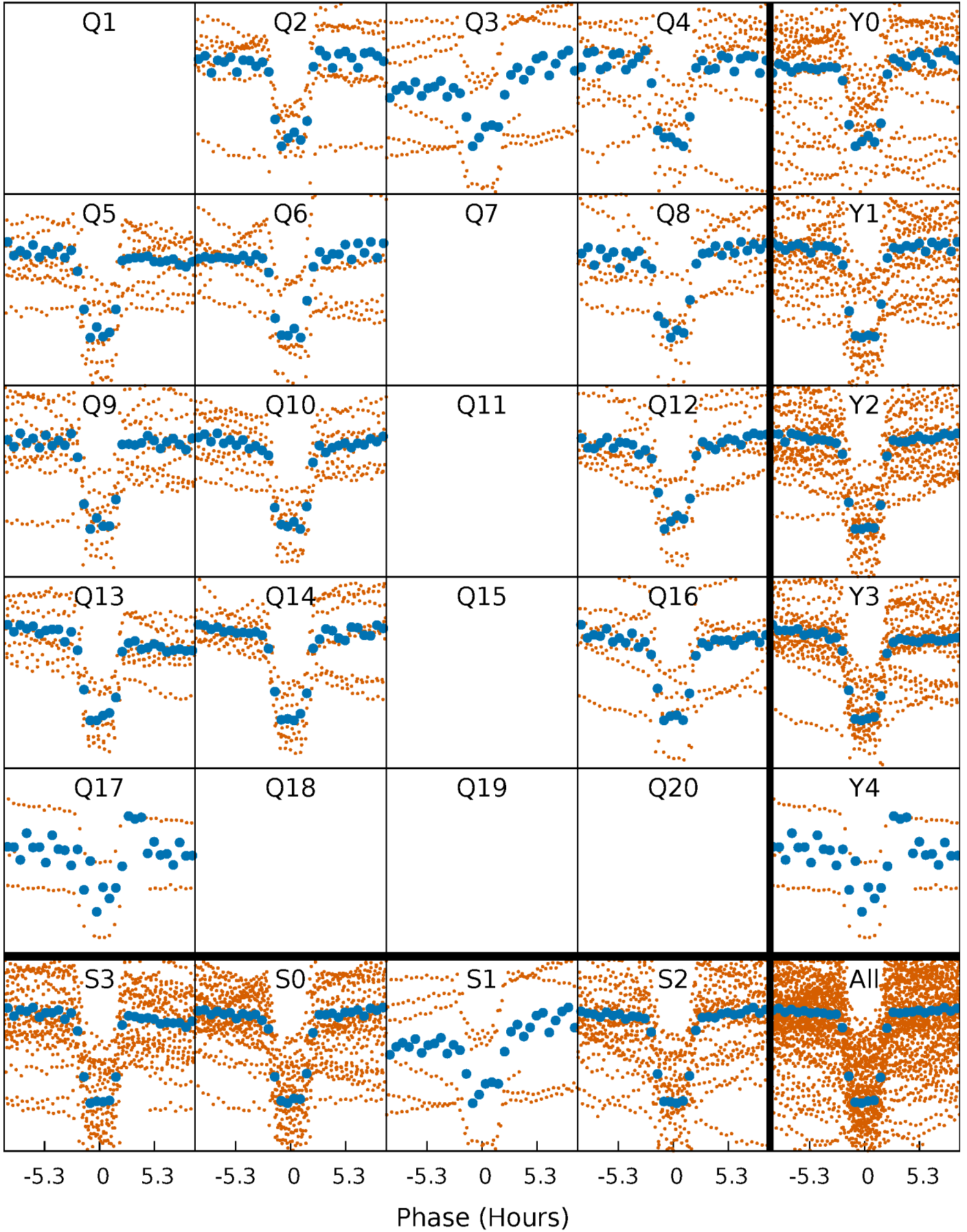


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



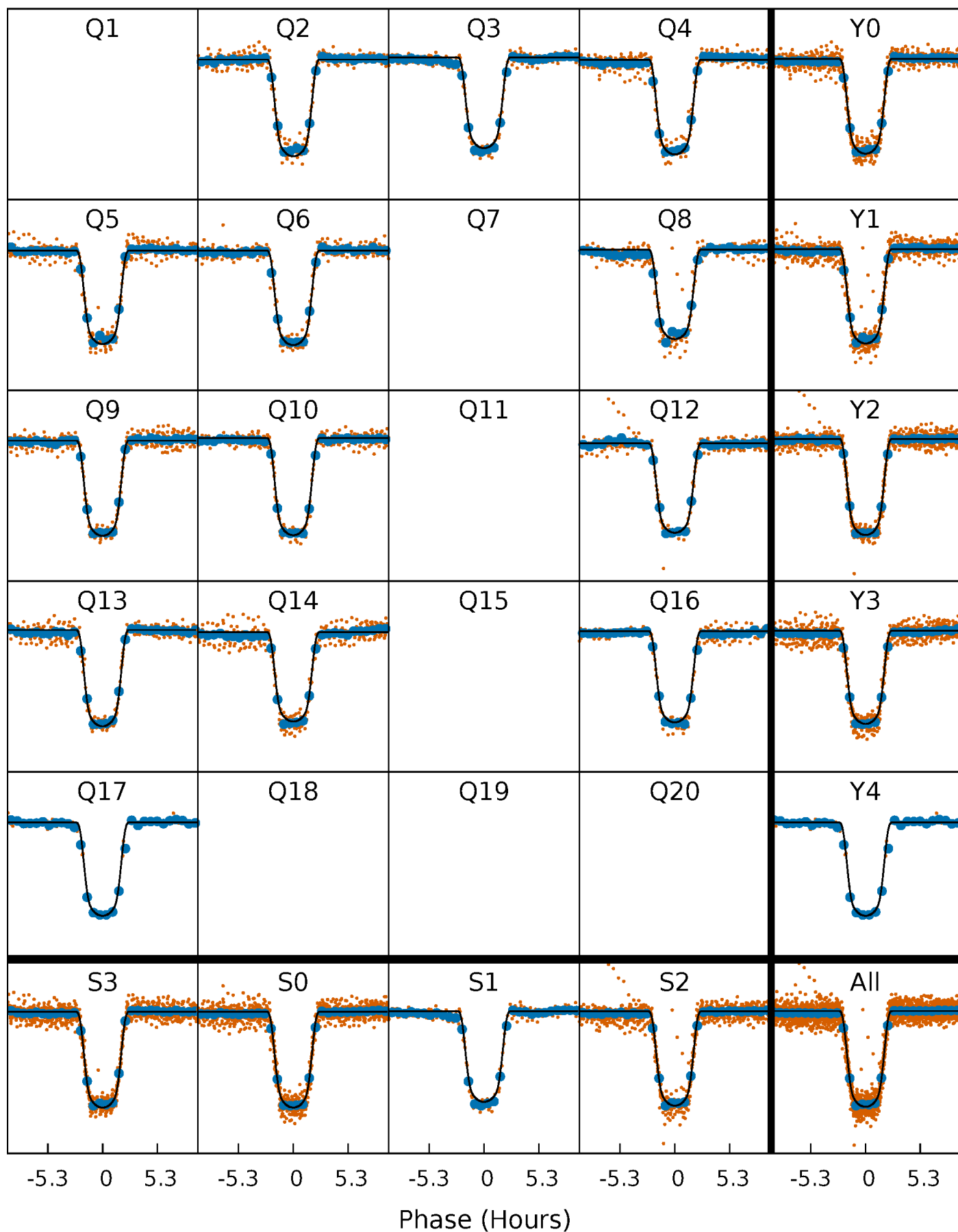
# PDC Quarter-Phased Transit Curves

TCE 009963461-02 P= 10.581585 Days  $T_0=132.244638$  (BKJD)



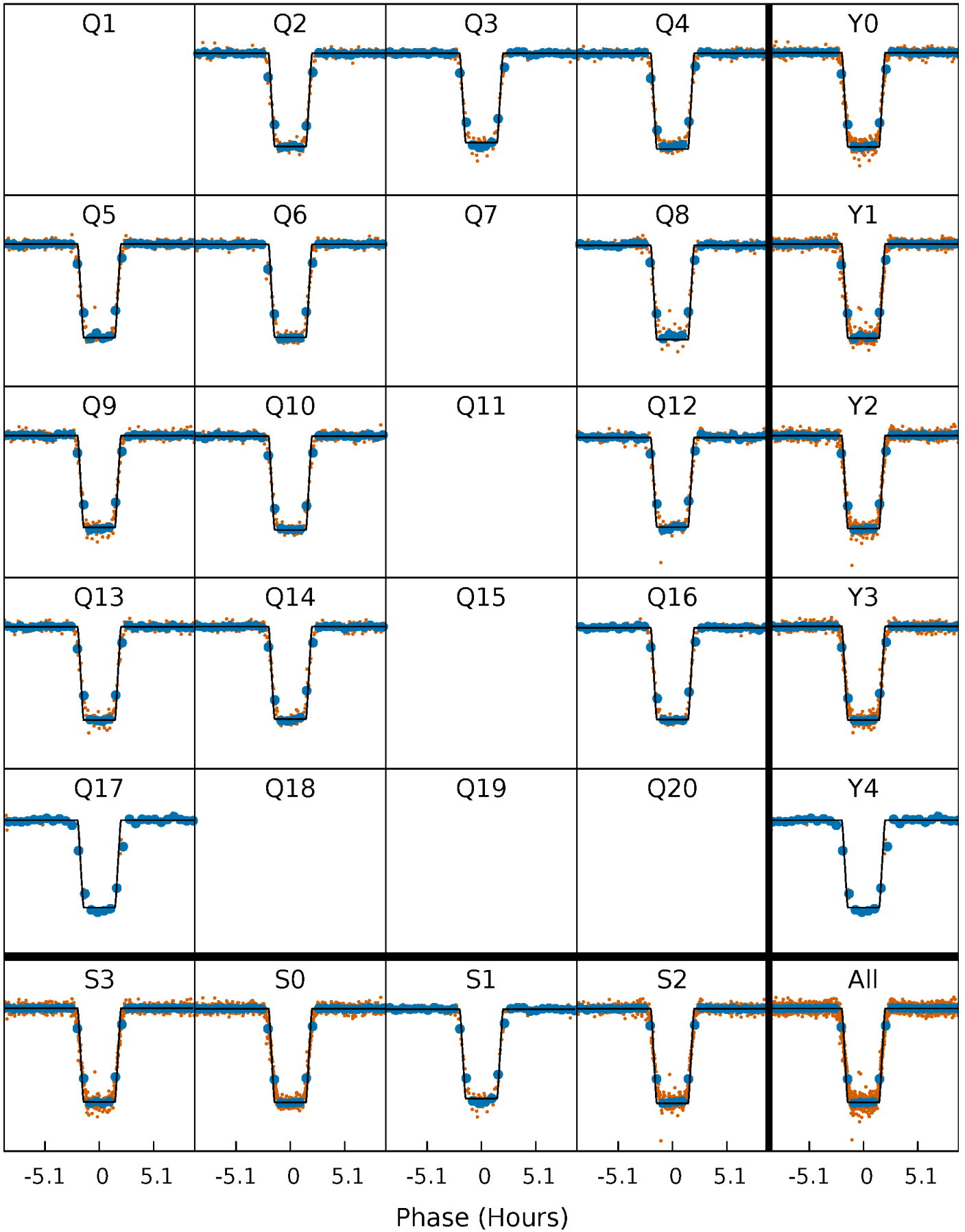
# DV Quarter-Phased Transit Curves

TCE 009963461-02 P= 10.581585 Days  $T_0=132.244638$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

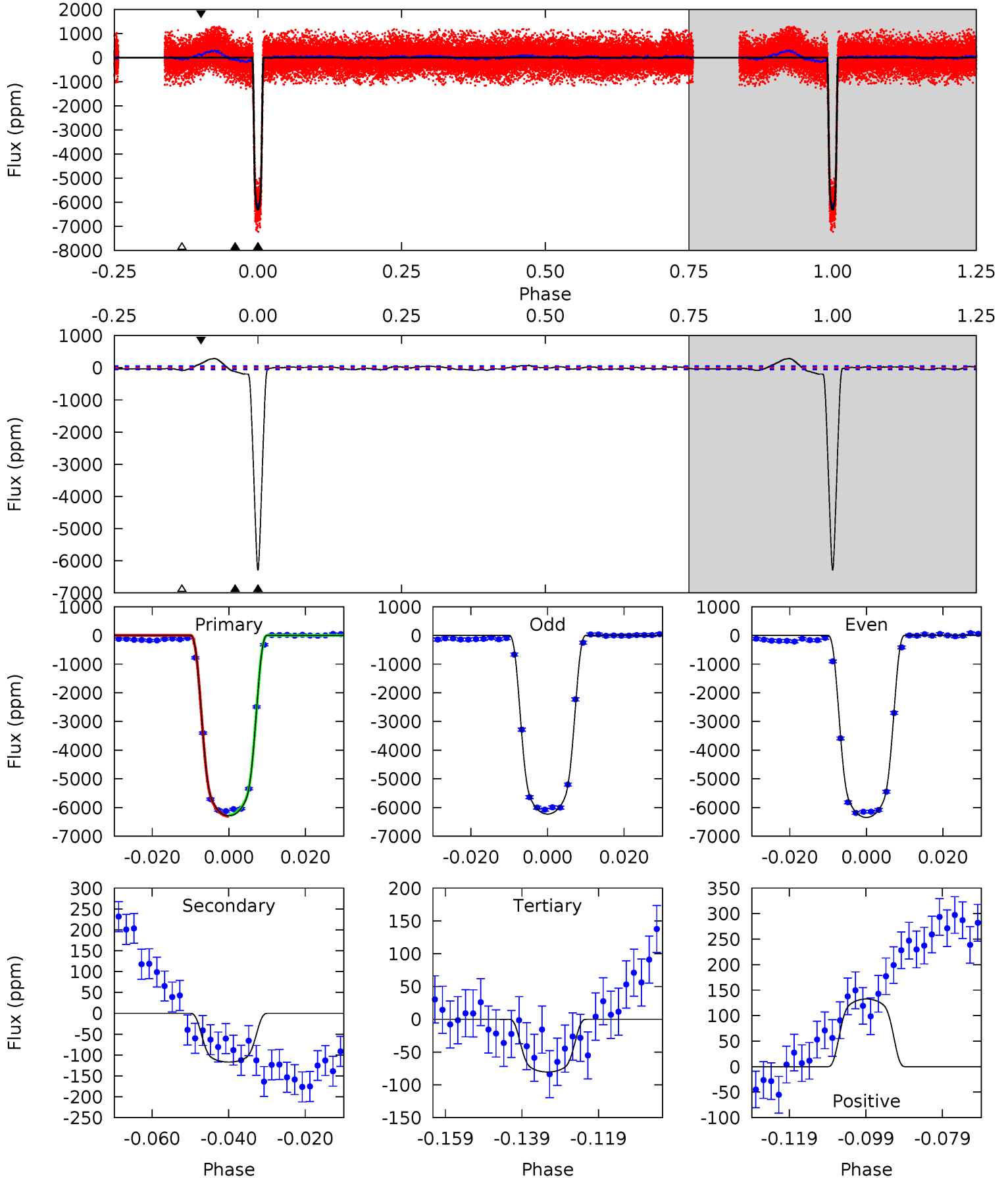
TCE 009963461-02 P= 10.581575 Days  $T_0=132.245343$  (BKJD)



# DV Model-Shift Uniqueness Test

009963461-02, P = 10.581585 Days, E = 132.244638 Days

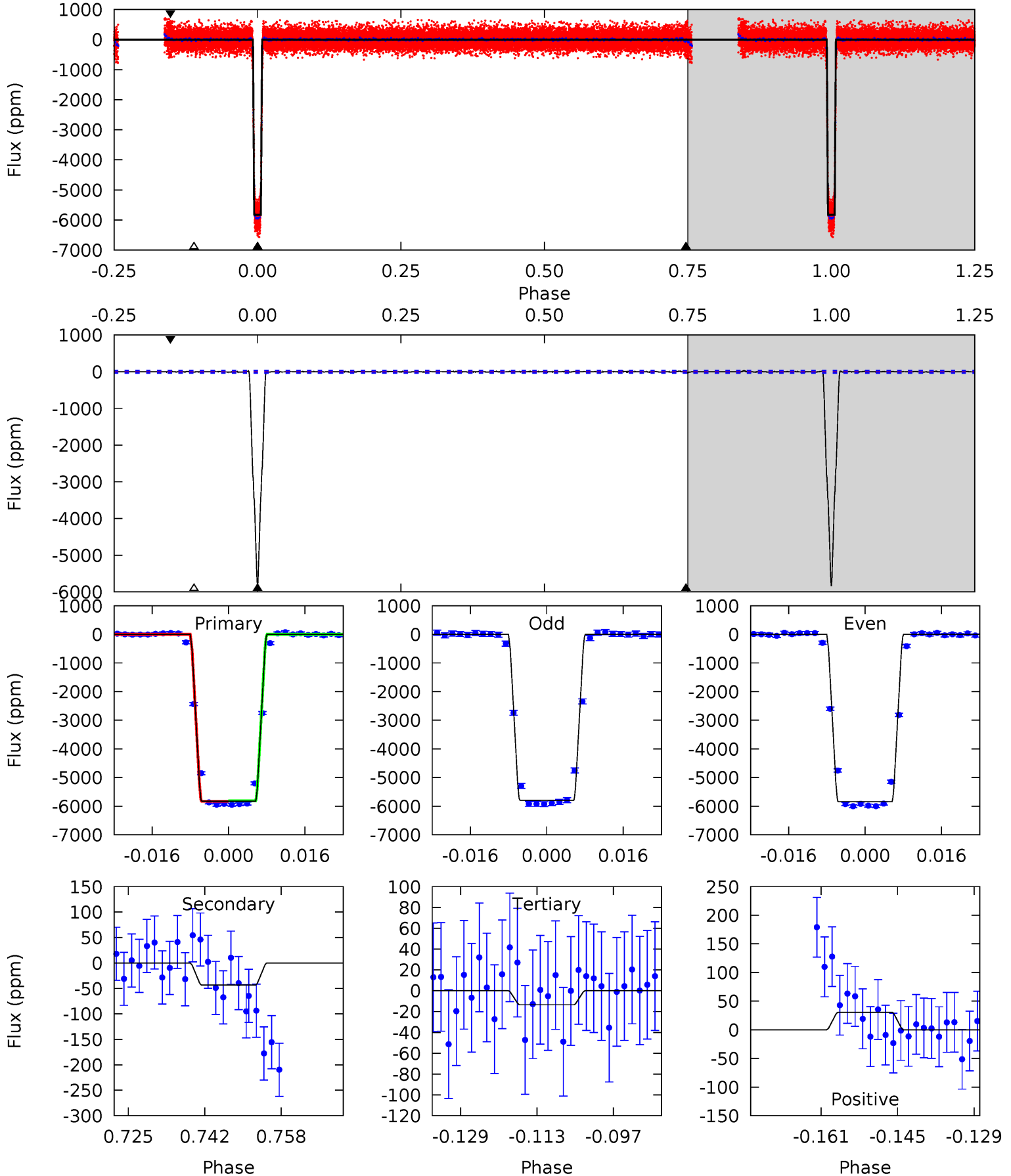
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
590.0	11.0	7.55	12.4	4.89	2.33	5.68	582.5	577.6	3.42	-1.47	5.58	1.00	0.04	1.76



# Alt Model-Shift Uniqueness Test

009963461-02, P = 10.581575 Days, E = 132.245343 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
913.2	6.77	2.12	4.79	4.93	2.41	0.76	911.1	908.4	4.65	1.98	3.69	1.00	0.01	1.52





### Stellar Parameters For KIC 009963461

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6168^{+219}_{-241}$	$4.074^{+0.336}_{-0.144}$	$-0.240^{+0.300}_{-0.300}$	$1.567^{+0.436}_{-0.533}$	$1.061^{+0.181}_{-0.164}$	$0.389^{+0.843}_{-0.182}$
	+4%/-4%	+8%/-4%	+125%/-125%	+28%/-34%	+17%/-15%	+217%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009963461-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-117 \pm 11$	$13.50^{+2.04}_{-2.49}$	$1506^{+121}_{-140}$	$2907^{+73}_{-71}$	$3.316^{+1.539}_{-0.843}$
Alt.	$-43 \pm 6$	$12.77^{+2.13}_{-2.50}$	$1500^{+130}_{-148}$	$2533^{+79}_{-93}$	$1.352^{+0.707}_{-0.362}$

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

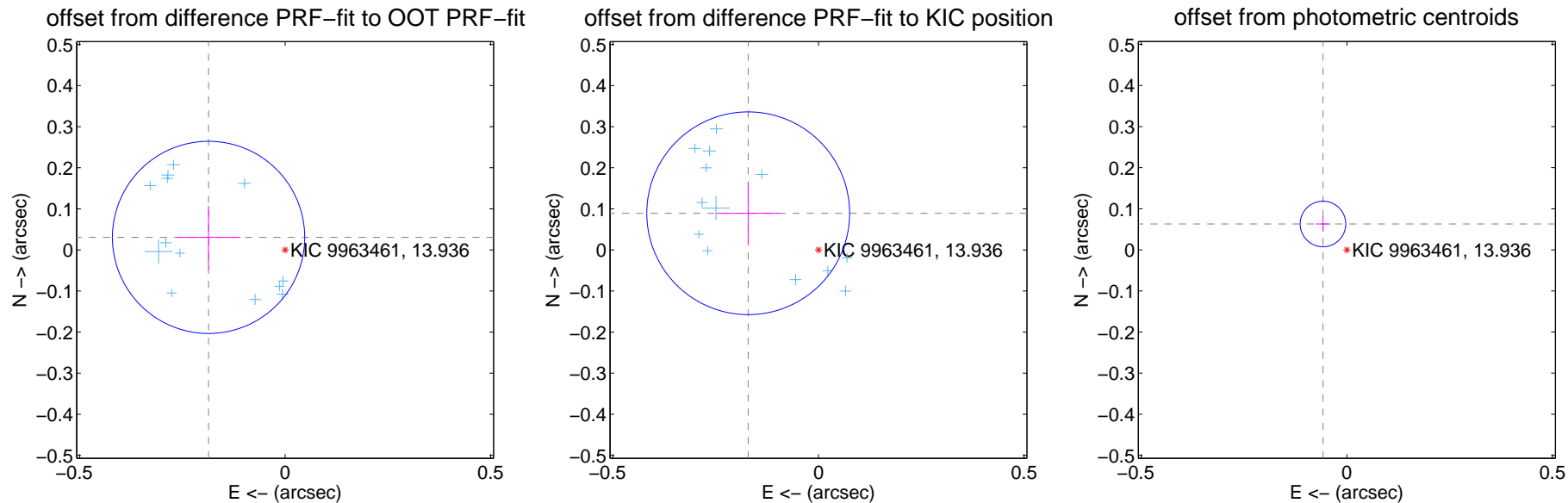
## DV Centroid Data

Supplemental centroid analysis for 009963461-02. Kepler magnitude: 13.94. Transit SNR 342.51

There are 13 quarters with good PRF difference image offsets

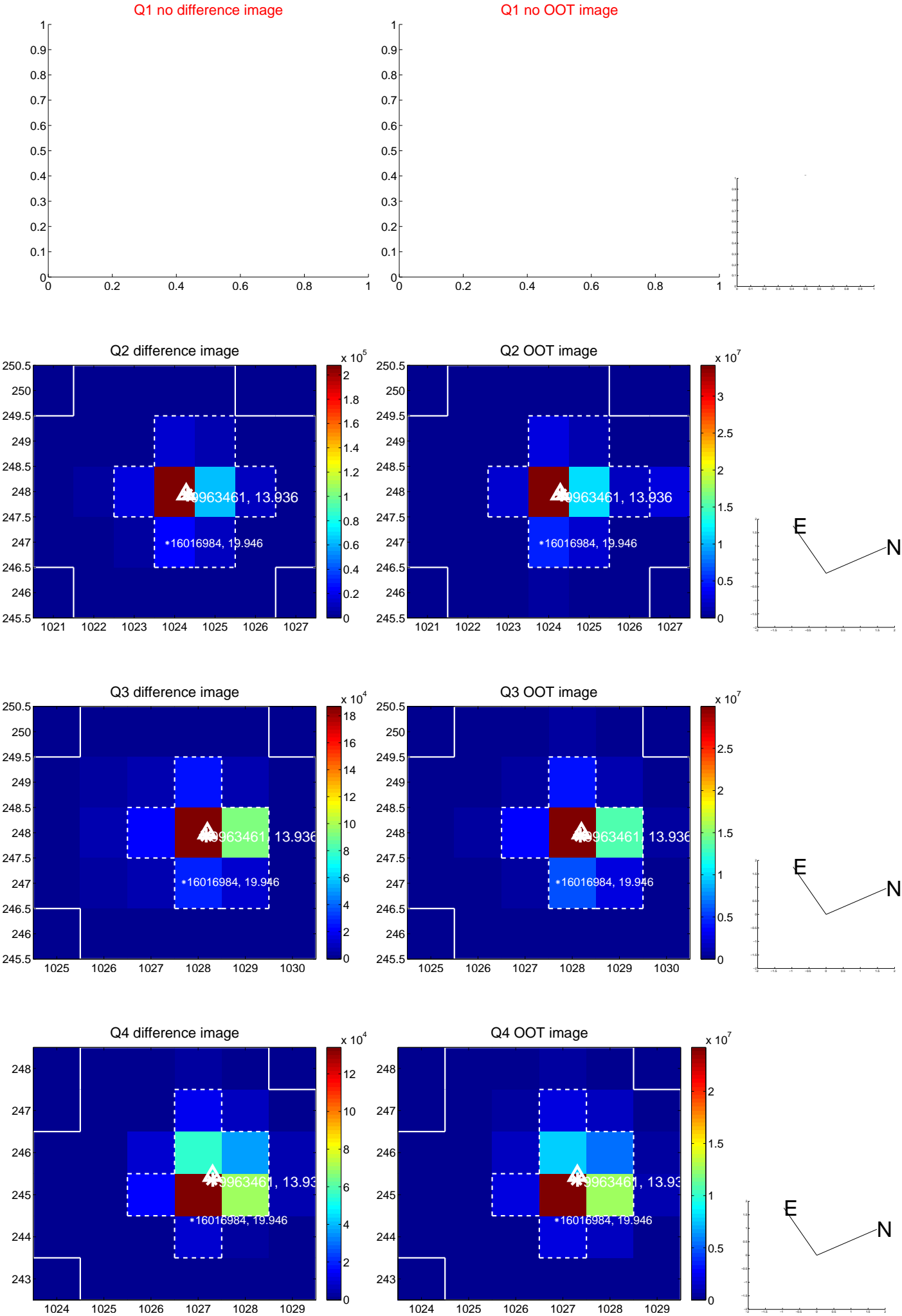
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.189 \pm 0.078$	2.42	$0.186 \pm 0.078$	$0.031 \pm 0.077$
PRF-fit source offset from KIC position	$0.193 \pm 0.082$	2.35	$0.171 \pm 0.077$	$0.089 \pm 0.076$
photometric centroid source offset	$0.09 \pm 0.02$	4.64	$0.06 \pm 0.02$	$0.06 \pm 0.02$

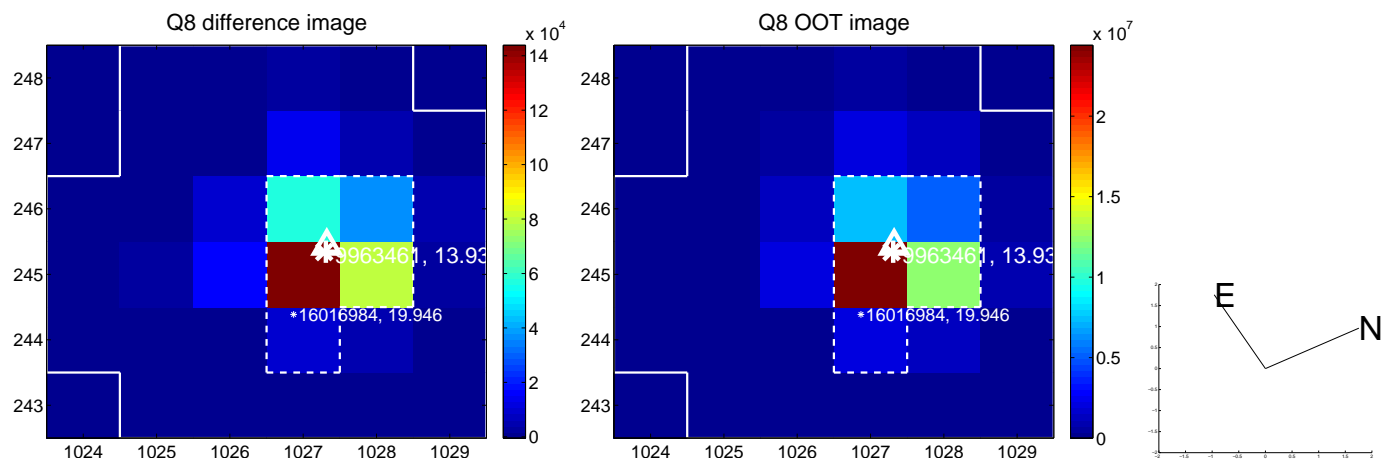
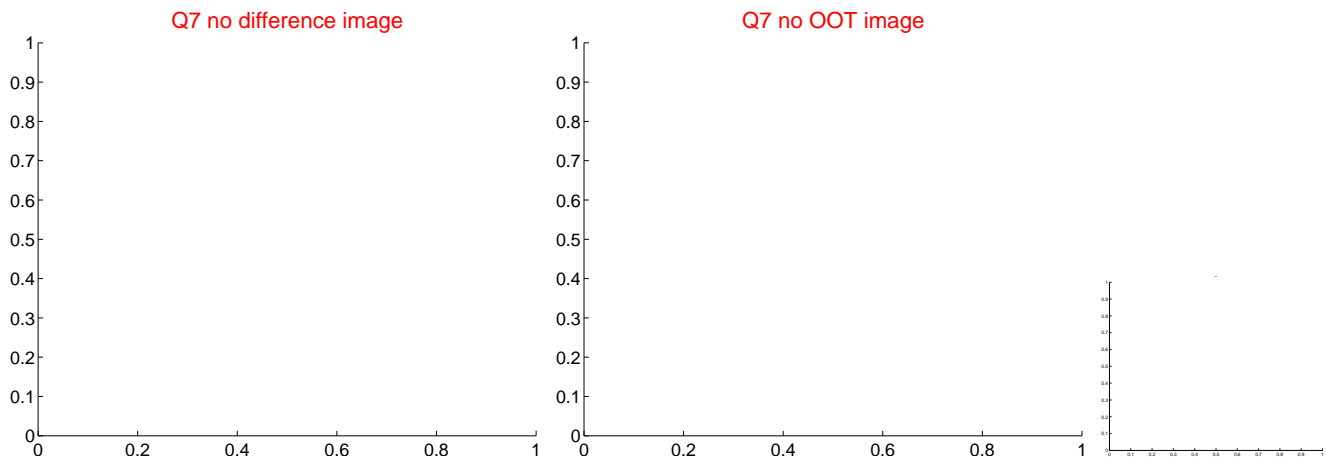
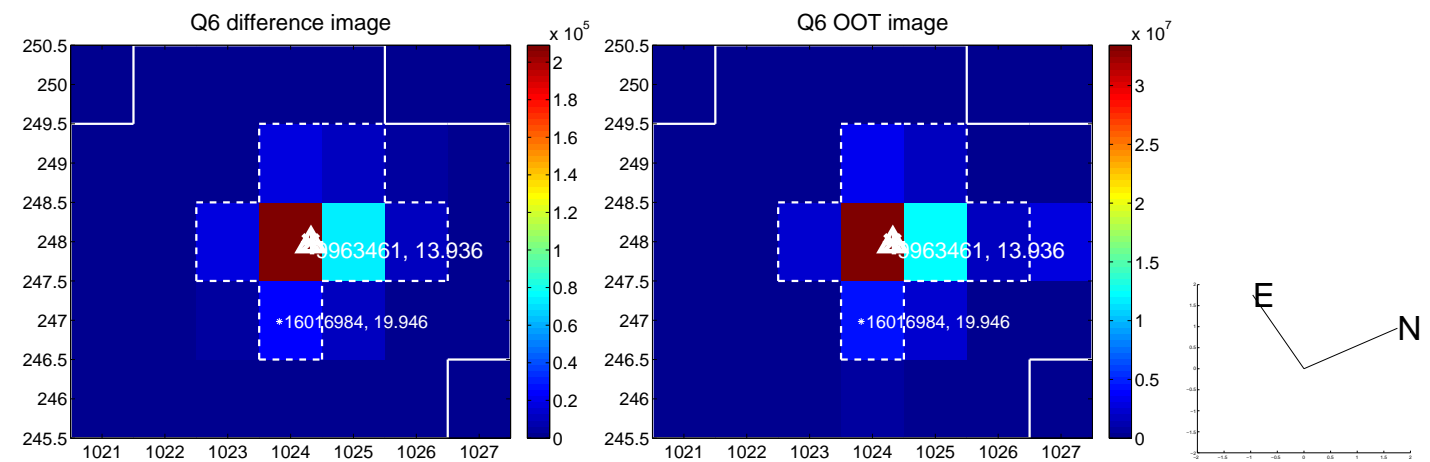
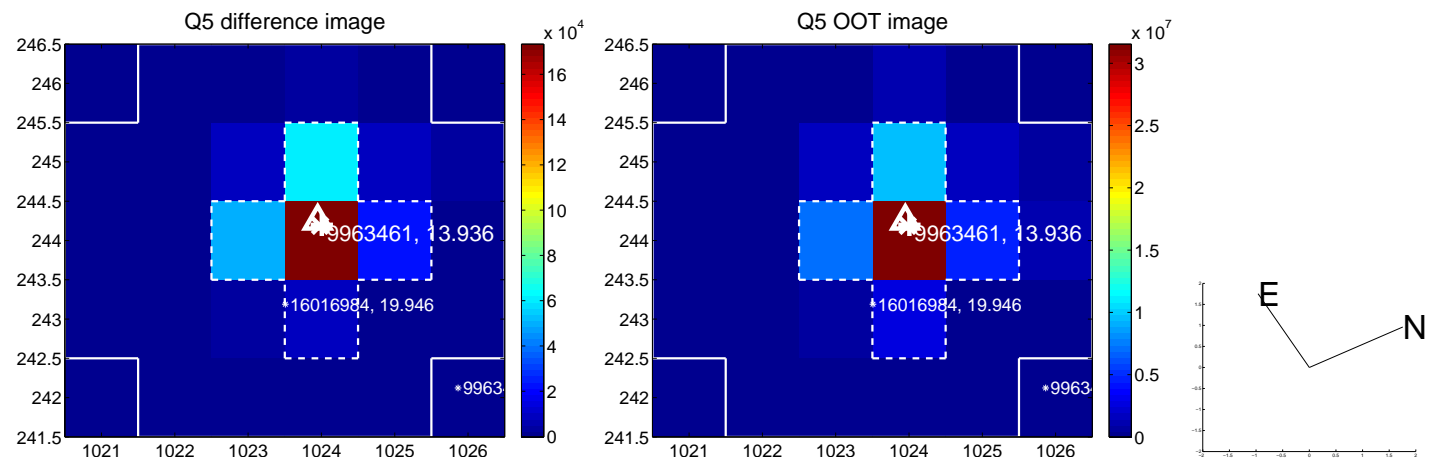


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

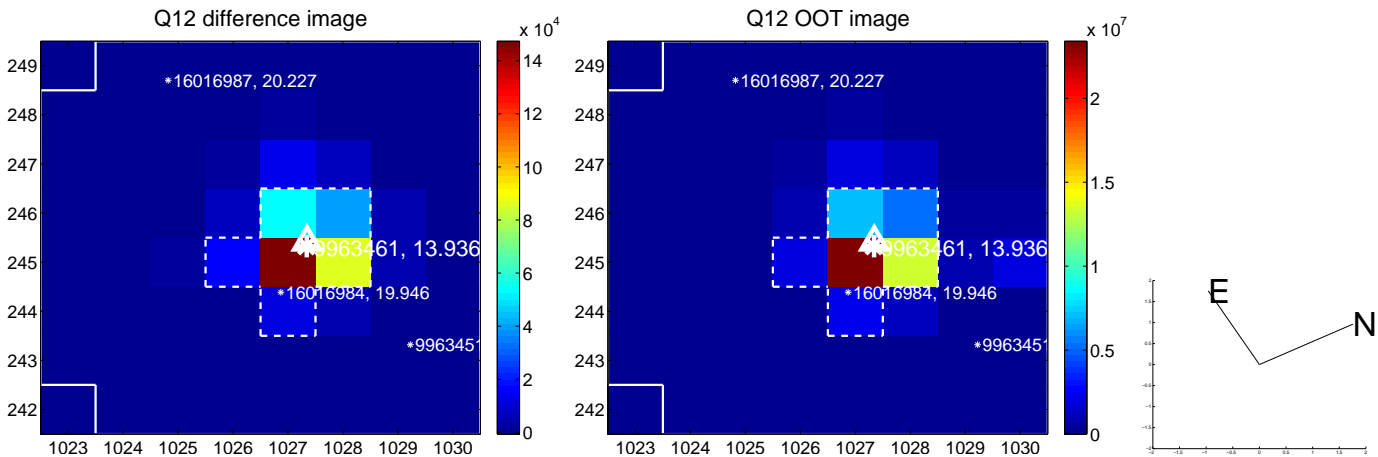
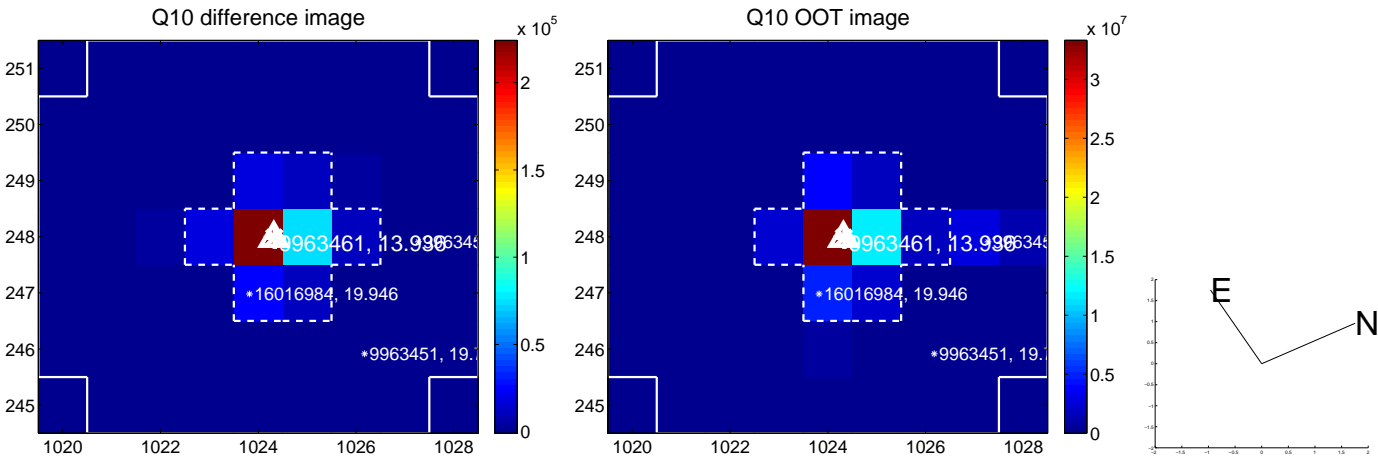
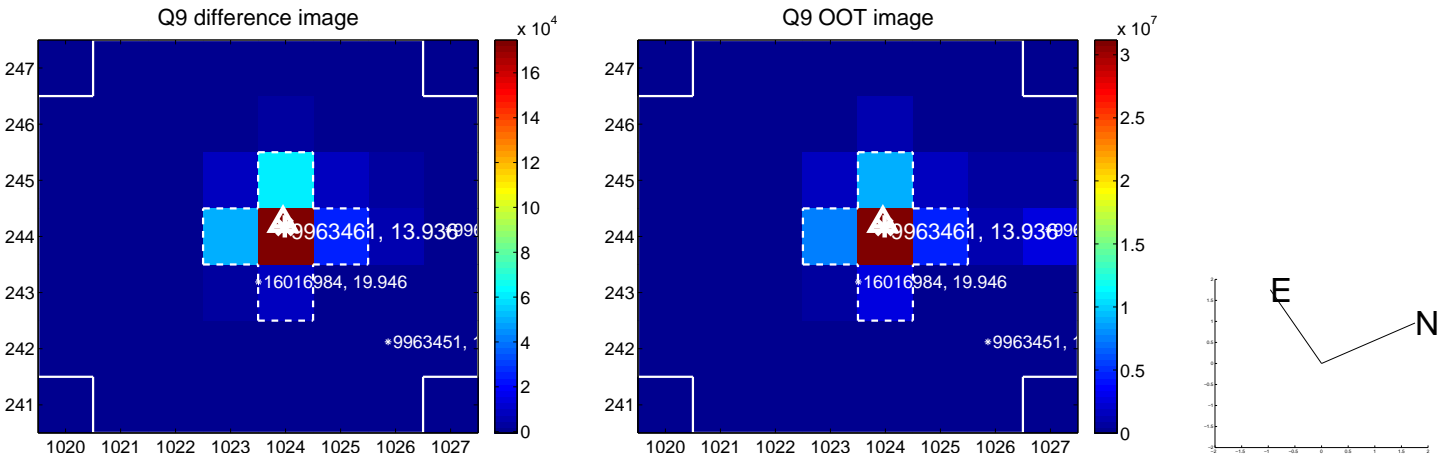
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



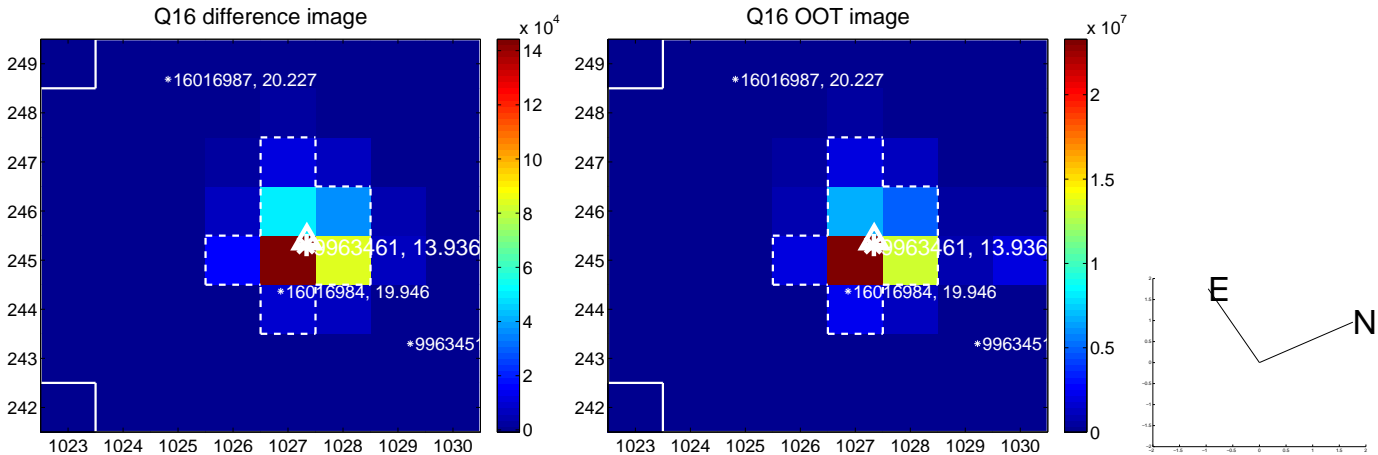
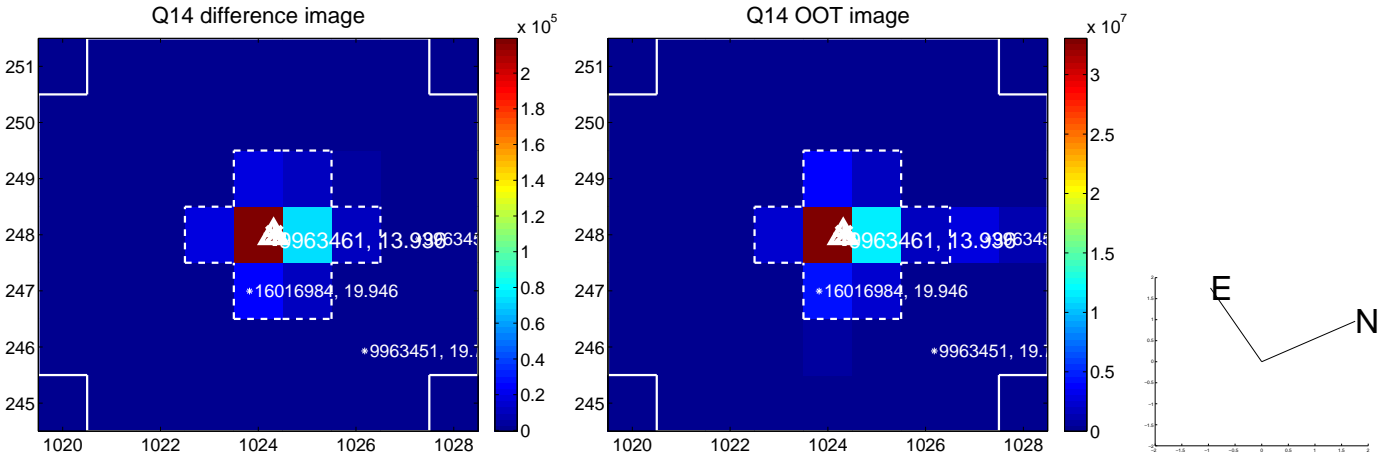
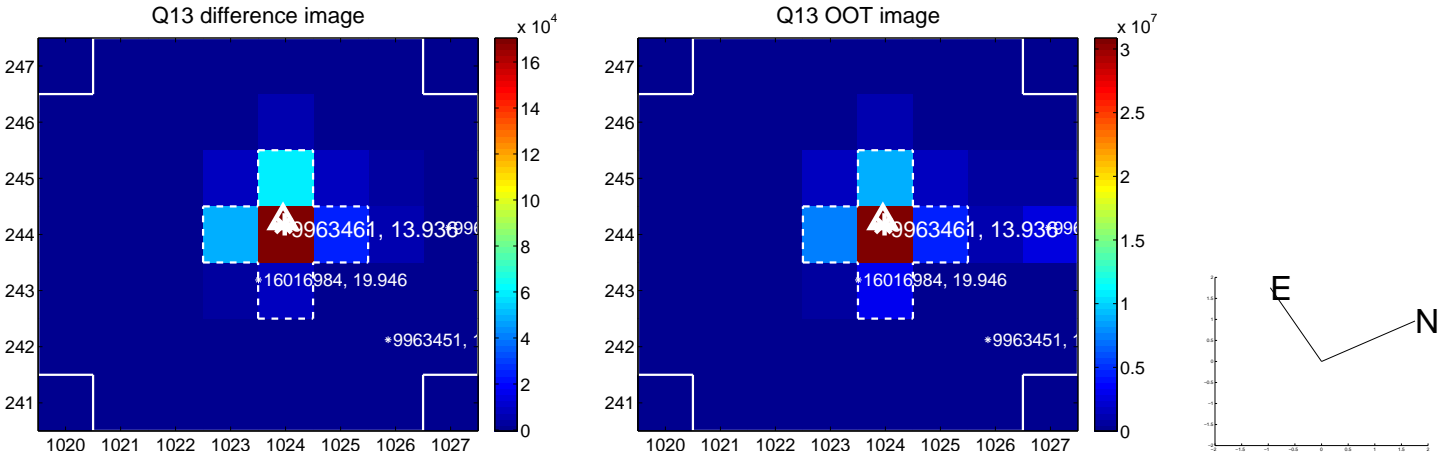
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



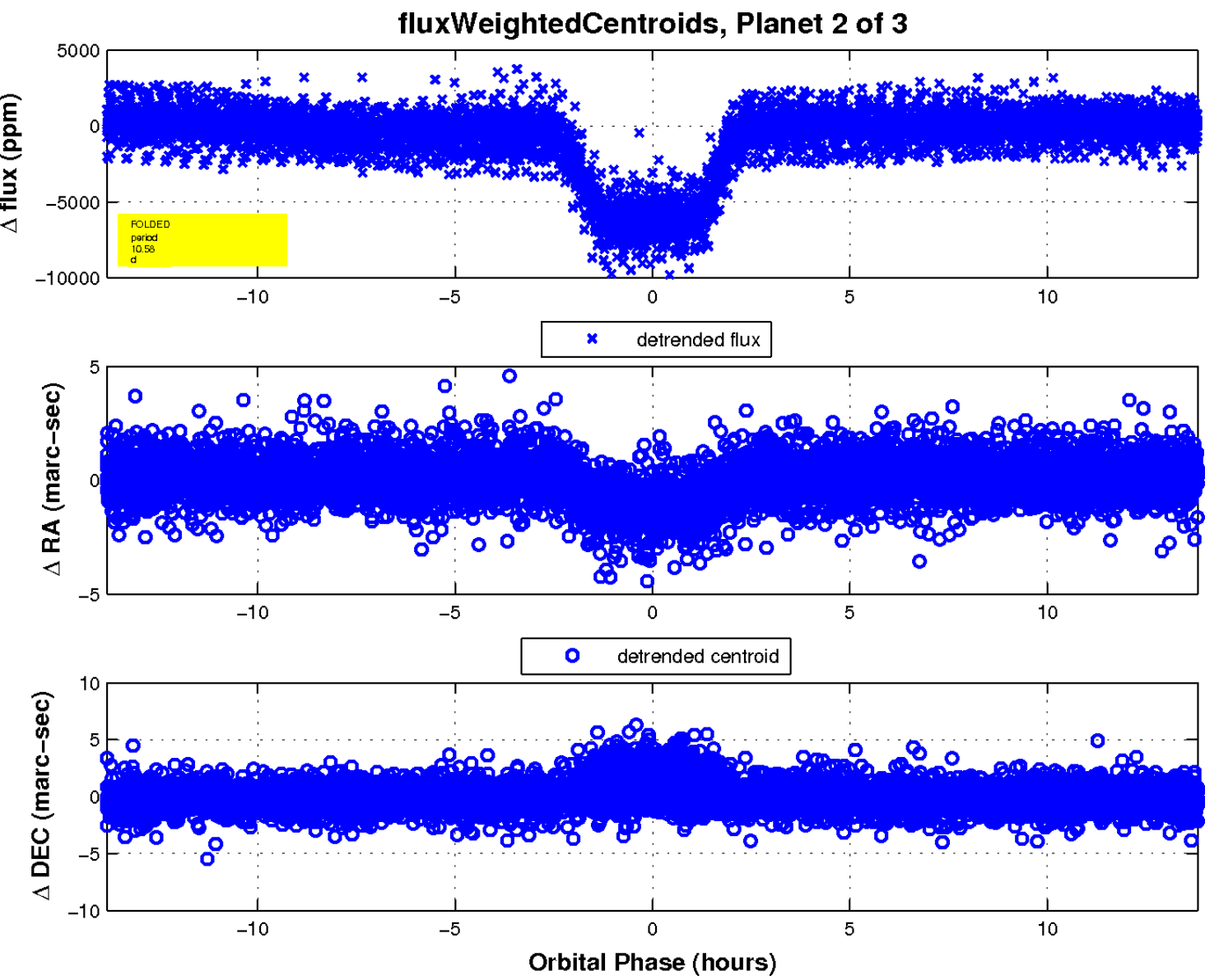
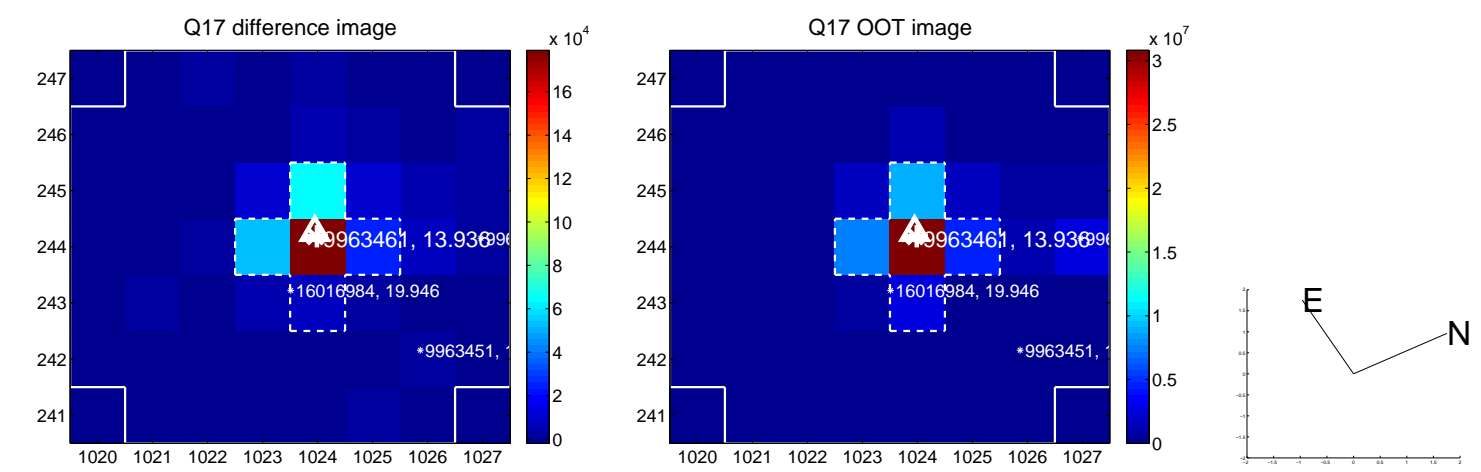
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

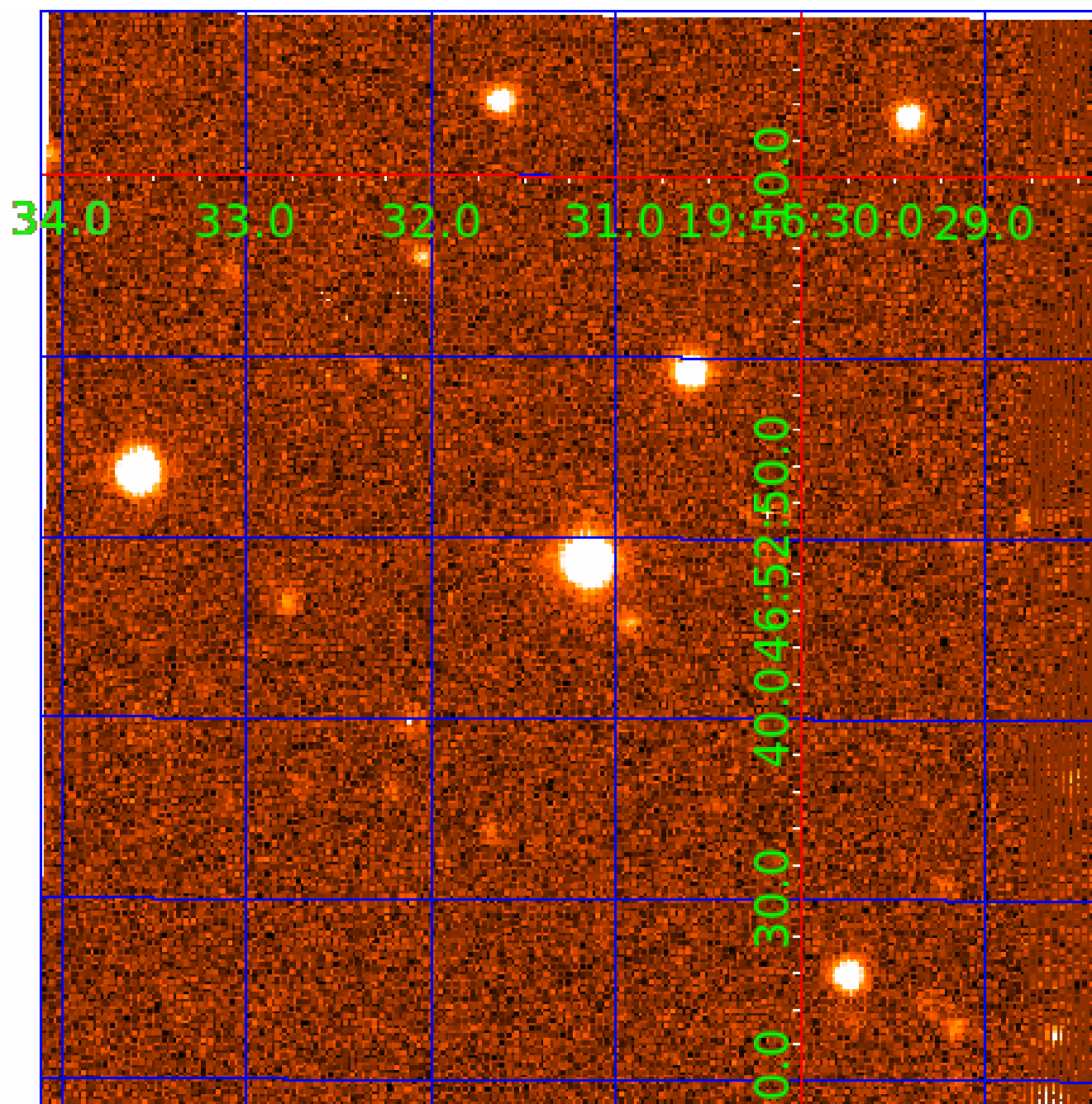


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009963461

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009963461-01	OBS	1538.01	10.581581	140.682259	113126.8	6.675	5181.3	4305.3	1.57	6168	53.29	343.65
009963461-02	OBS	No	10.581585	132.244638	6198.0	4.607	329.5	342.5	1.57	6168	13.81	343.65
009963461-03	OBS	No	455.051488	332.625141	141.9	1.775	9.7	1.3	1.57	6168	1.87	2.28

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009963461-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE
009963461-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009963461-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

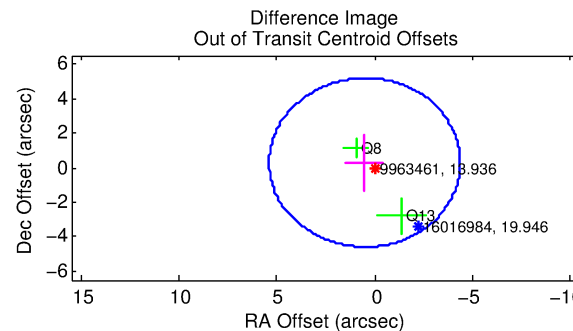
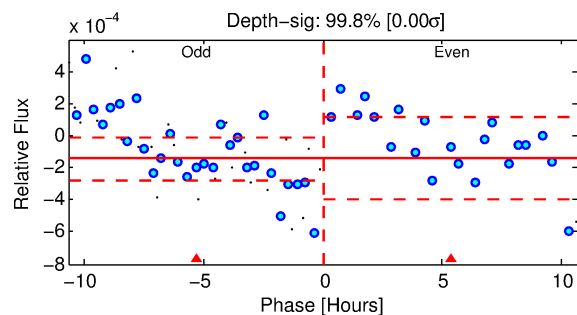
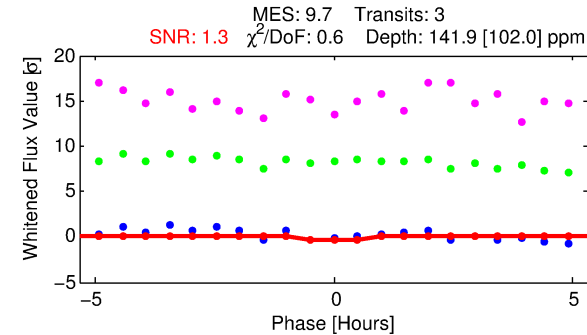
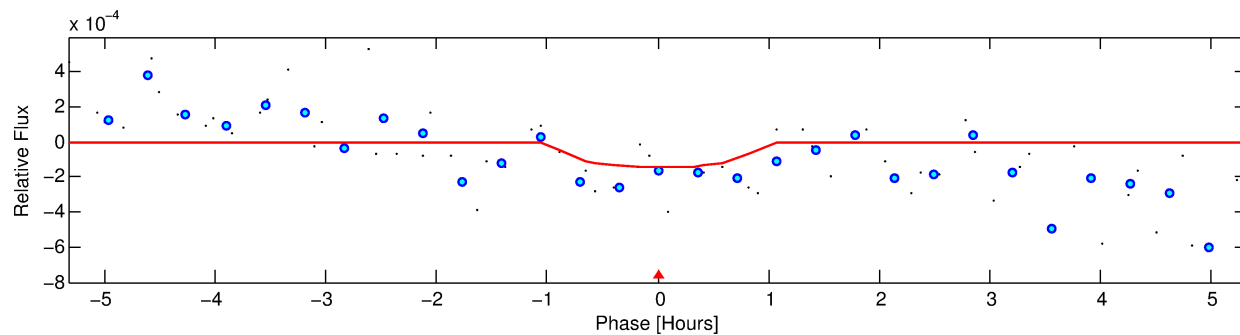
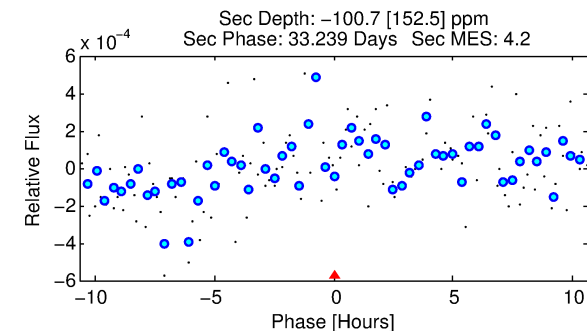
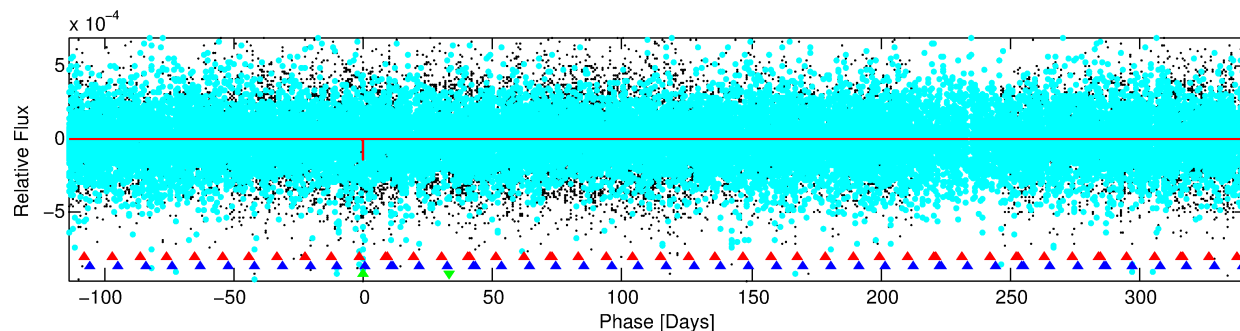
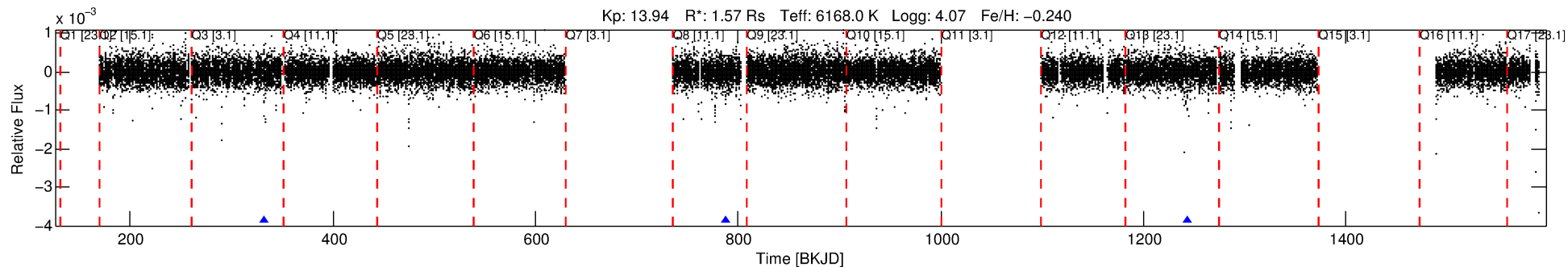
## Ephemeris Match Information For 009963461-03

No Significant Match Found

# DV One-Page Summary

KIC: 9963461 Candidate: 3 of 3 Period: 455.051 d  
KOI: K01538 Corr: No Ephemeris Match

Kp: 13.94 R\*: 1.57 Rs Teff: 6168.0 K Logg: 4.07 Fe/H: -0.240



## DV Fit Results:

Period = 455.05149 [0.02494] d  
Epoch = 332.6251 [0.0222] BKJD  
Rp/R\* = 0.0110 [0.1297]  
a/R\* = 1974.50 [115546.07]  
b = 0.07 [785.37]  
Seff = 2.28 [1.33]  
Teq = 313 [46] K  
Rp = 1.87 [22.19] Re  
a = 1.1815 [0.4057] AU  
Ag = N/A  
Teffp = N/A

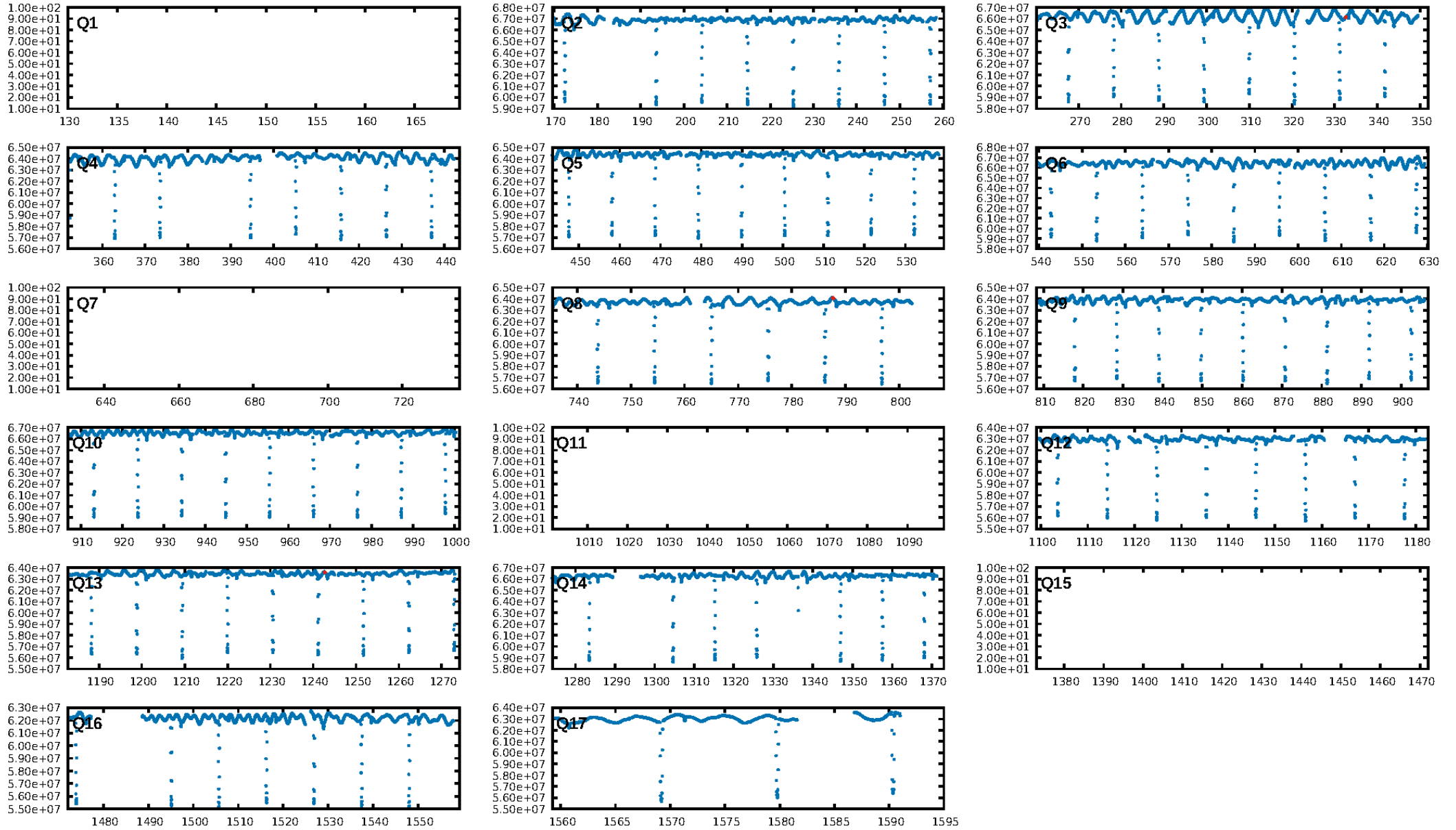
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [2160.56sigma]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 73.1%  
ModelChiSquareGof-sig: 99.5%  
**Bootstrap-pfa: 3.73e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.4687  
Centroid-sig: N/A  
Centroid-so: 9.230 arcsec [1.53sigma]  
OotOffset-rm: 0.587 arcsec [0.36sigma]  
KicOffset-rm: 0.614 arcsec [0.44sigma]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [3/3]

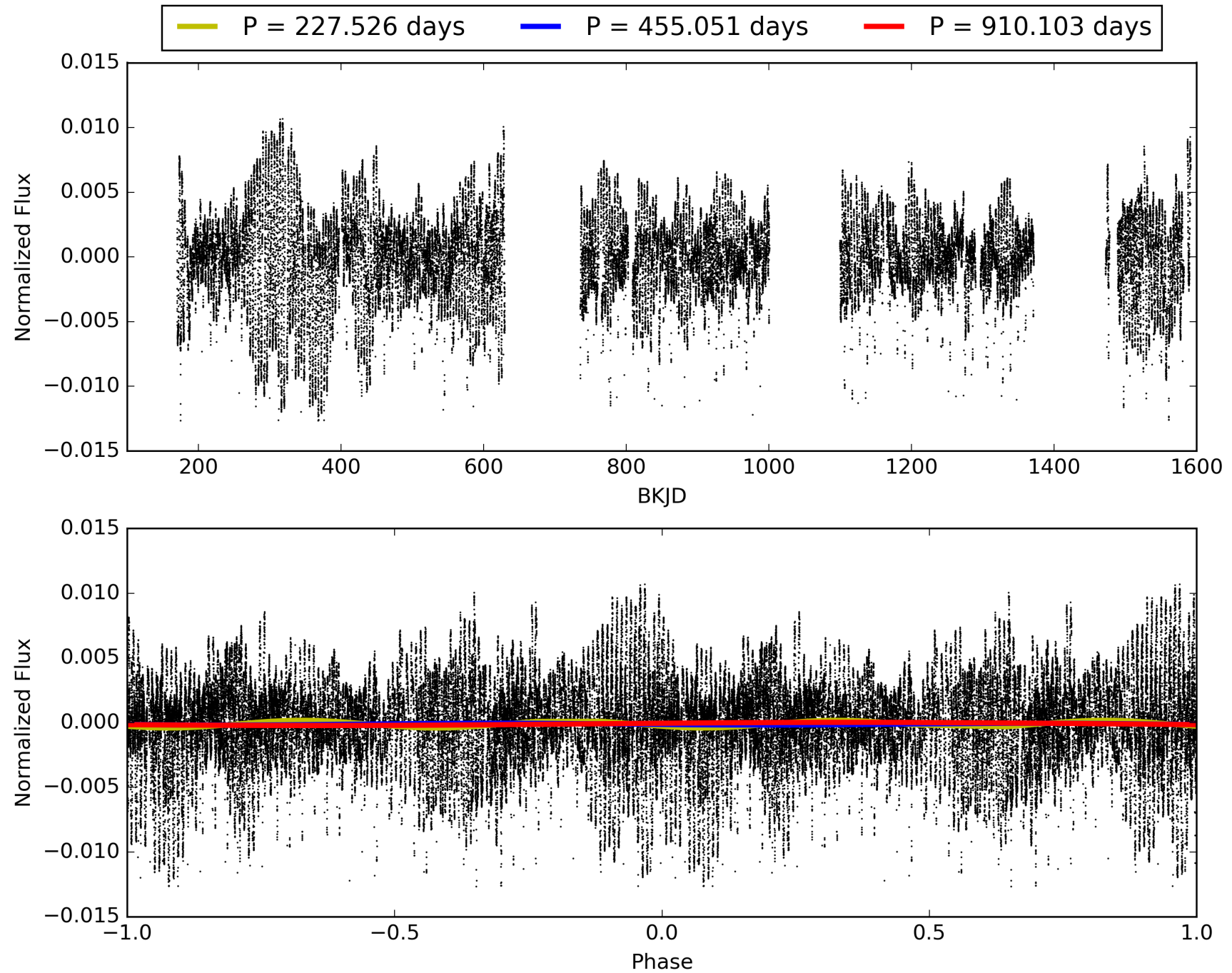
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:06:15 Z

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

# TCE 009963461-03, PDC Light Curves

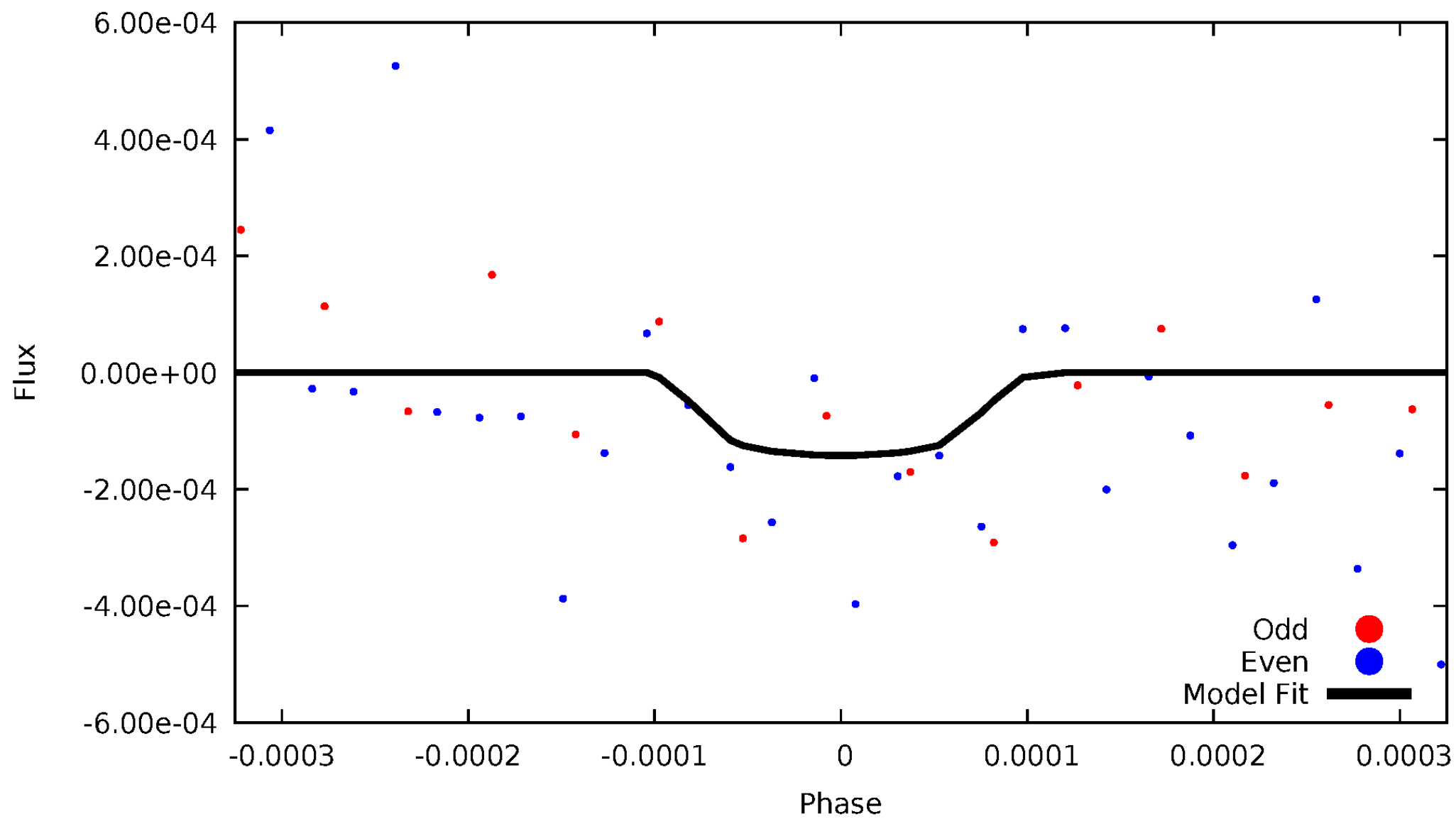


TCE 009963461-03



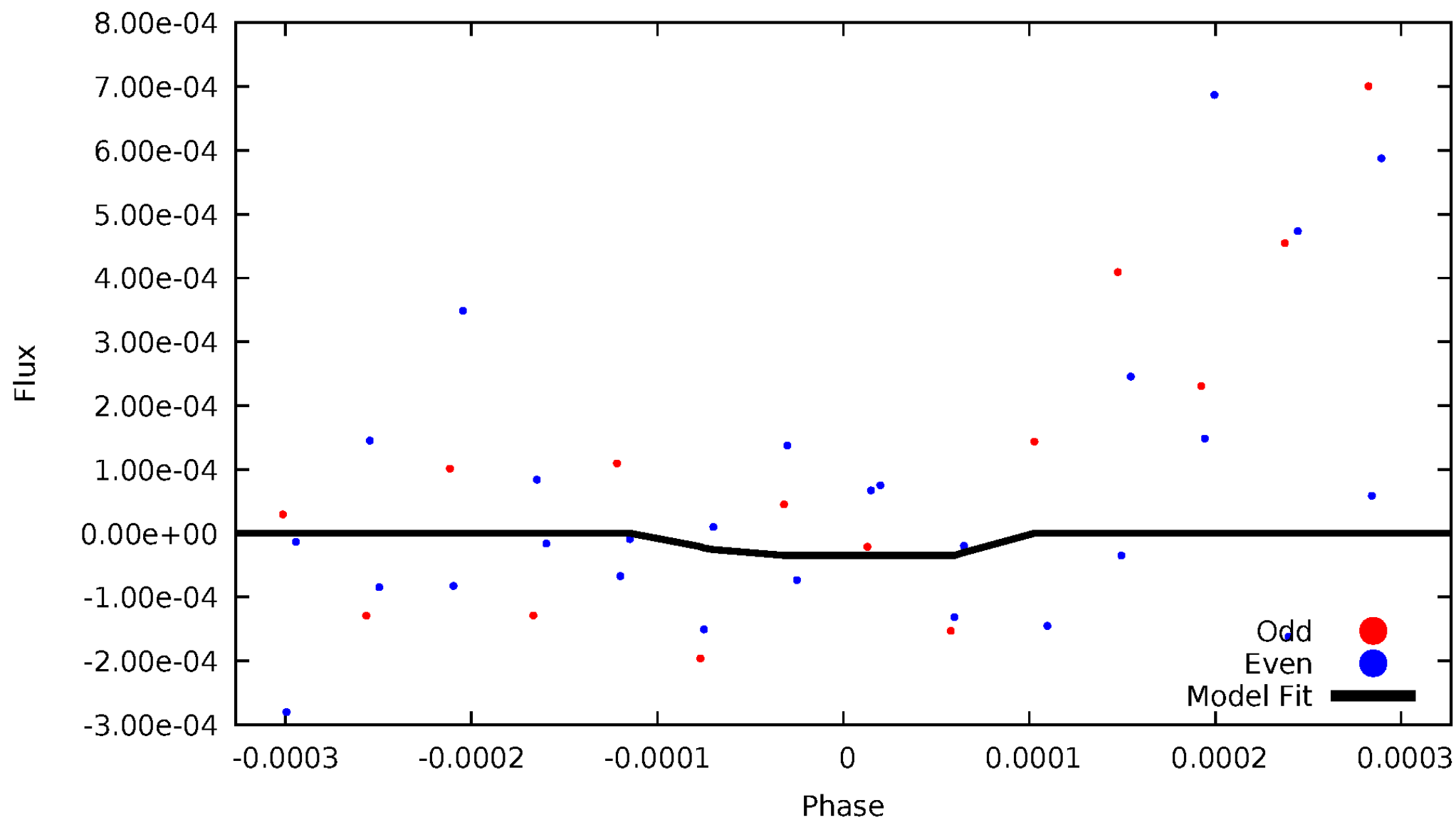
# DV Odd/Even

TCE 009963461-03



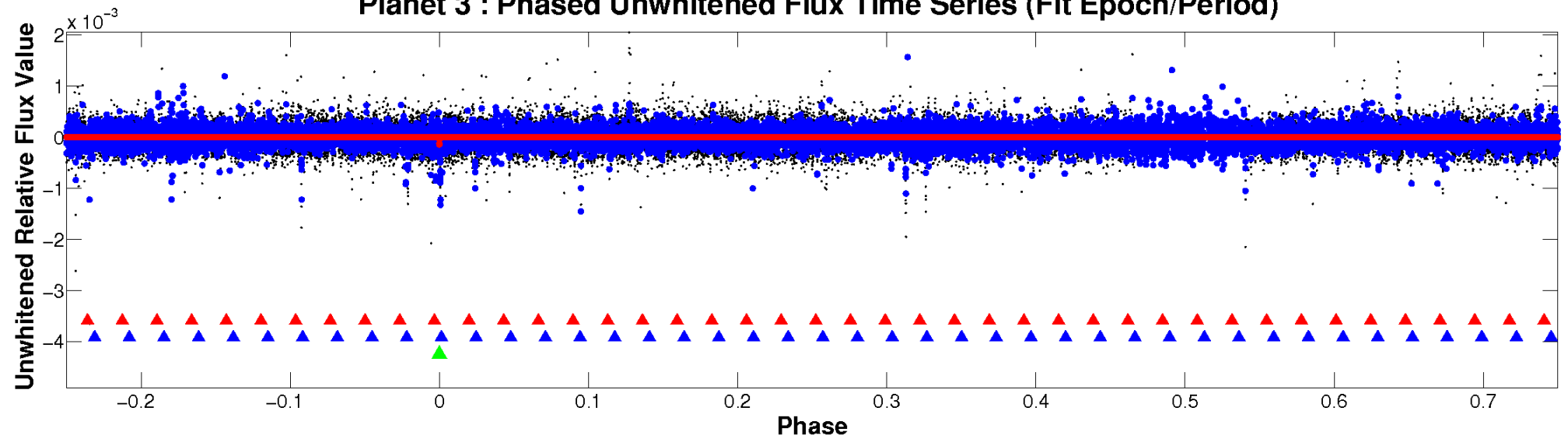
# ALT Odd/Even

TCE 009963461-03

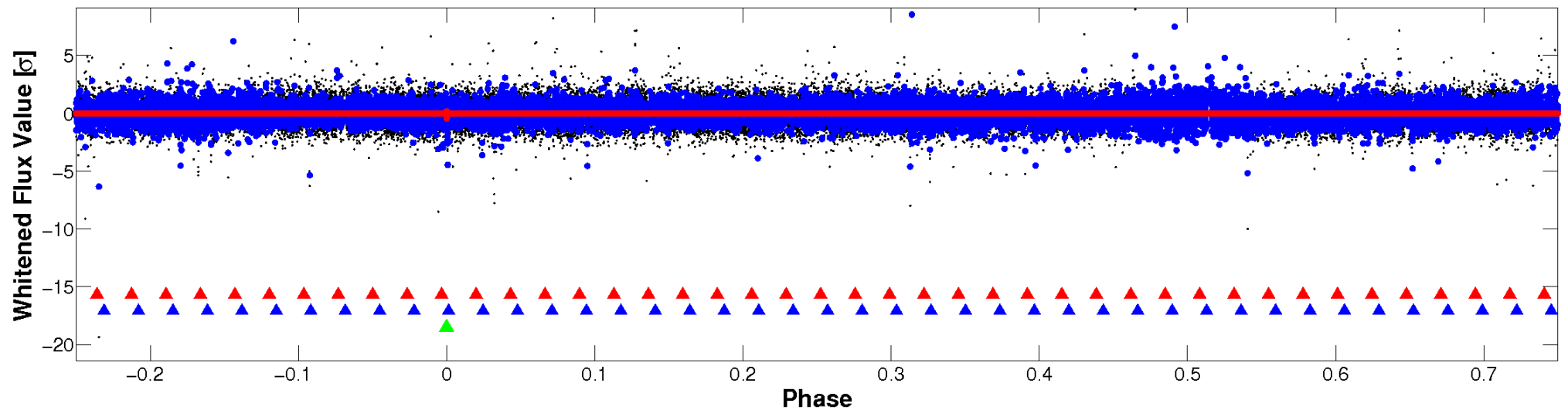


# Non-Whitened Vs. Whitened Light Curve

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

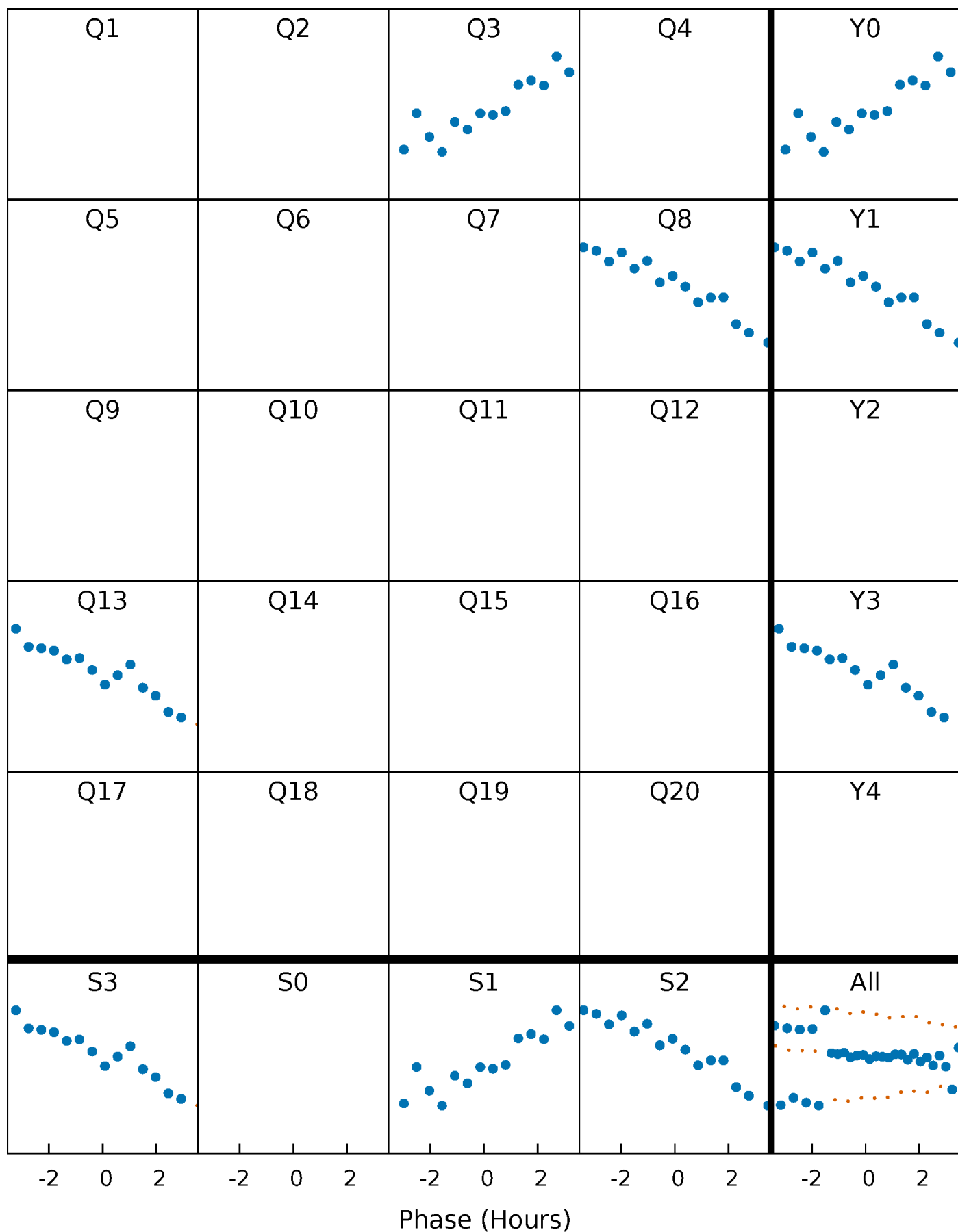


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

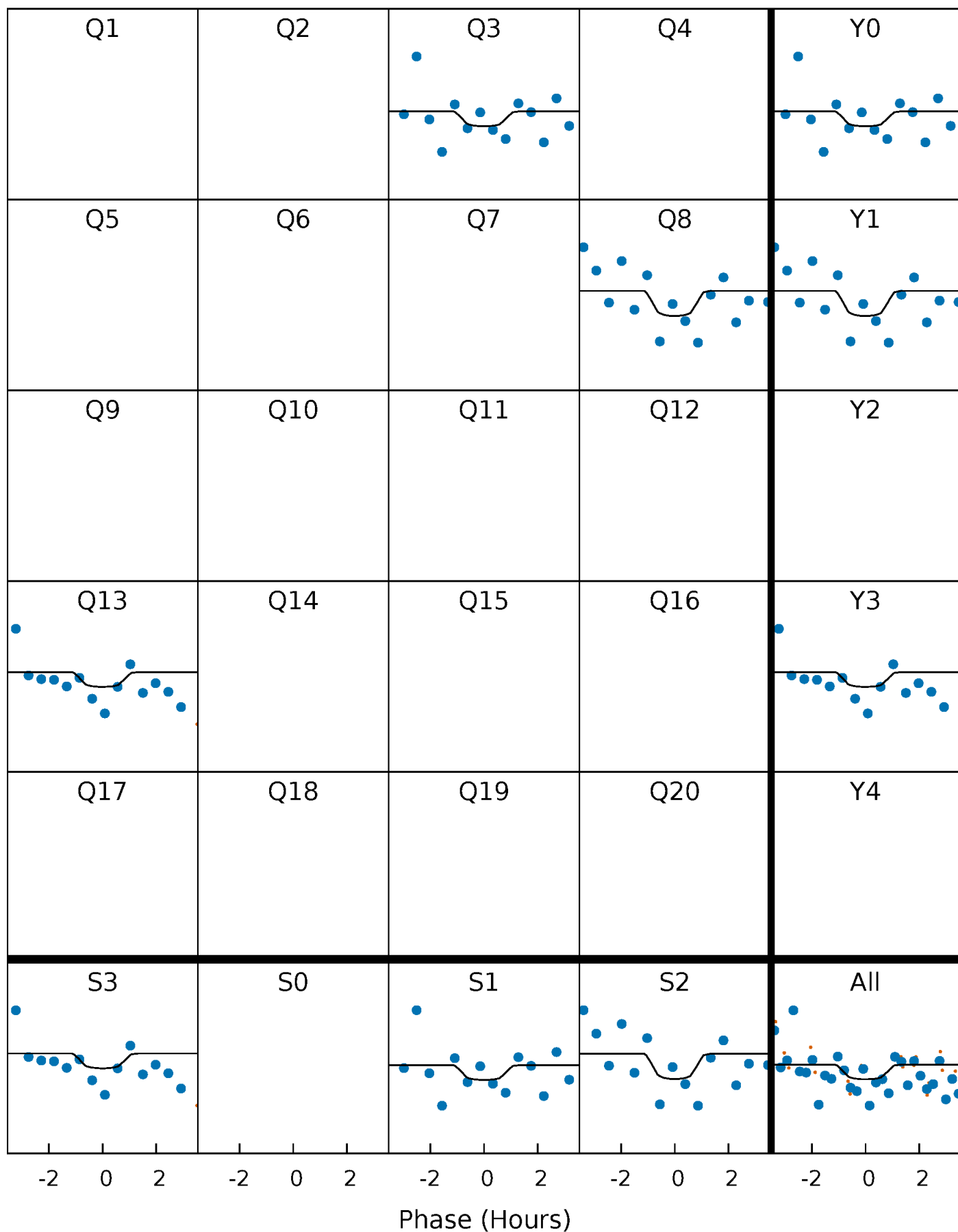
TCE 009963461-03 P=455.051488 Days  $T_0=332.625141$  (BKJD)





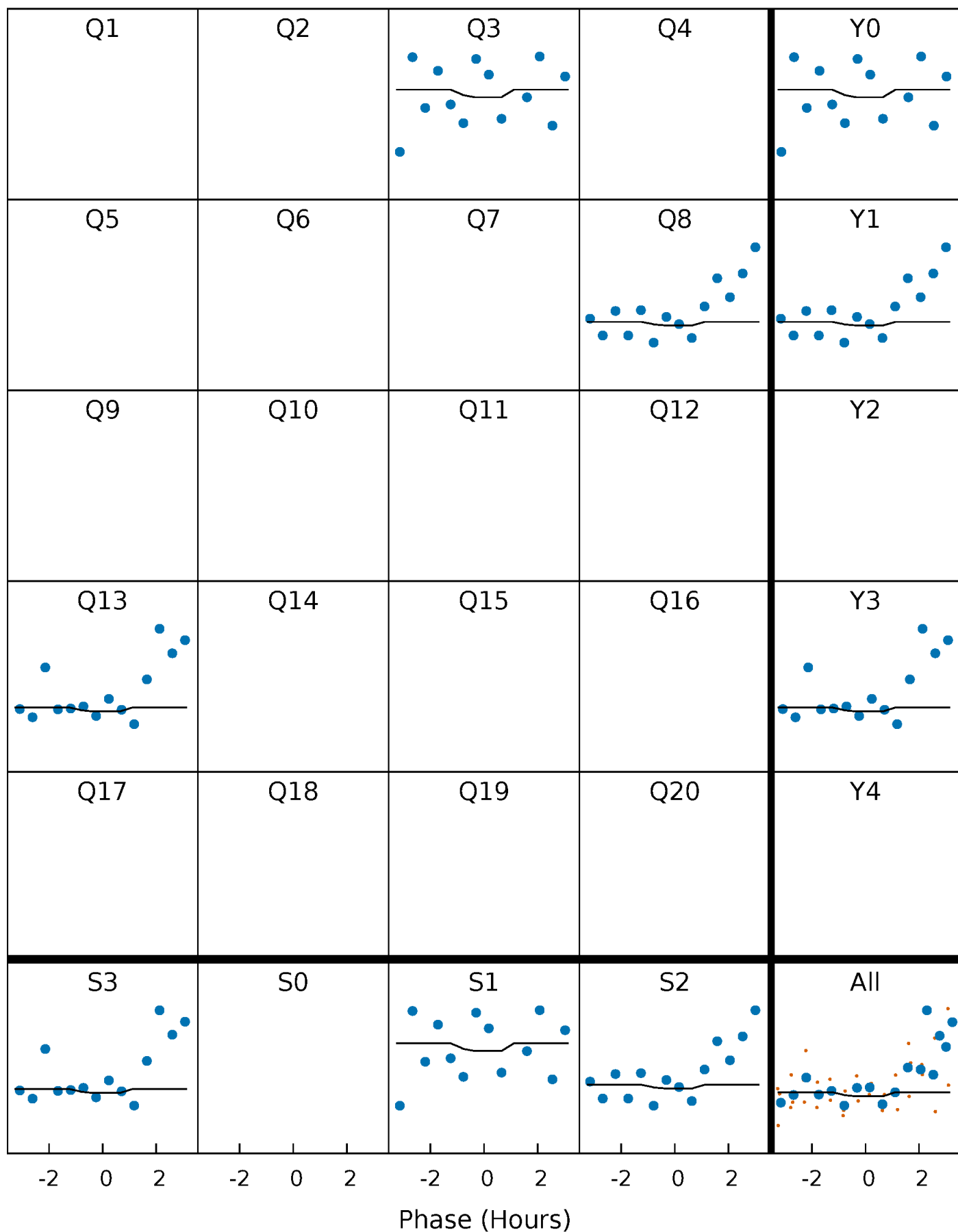
# DV Quarter-Phased Transit Curves

TCE 009963461-03     $P=455.051488$  Days     $T_0=332.625141$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

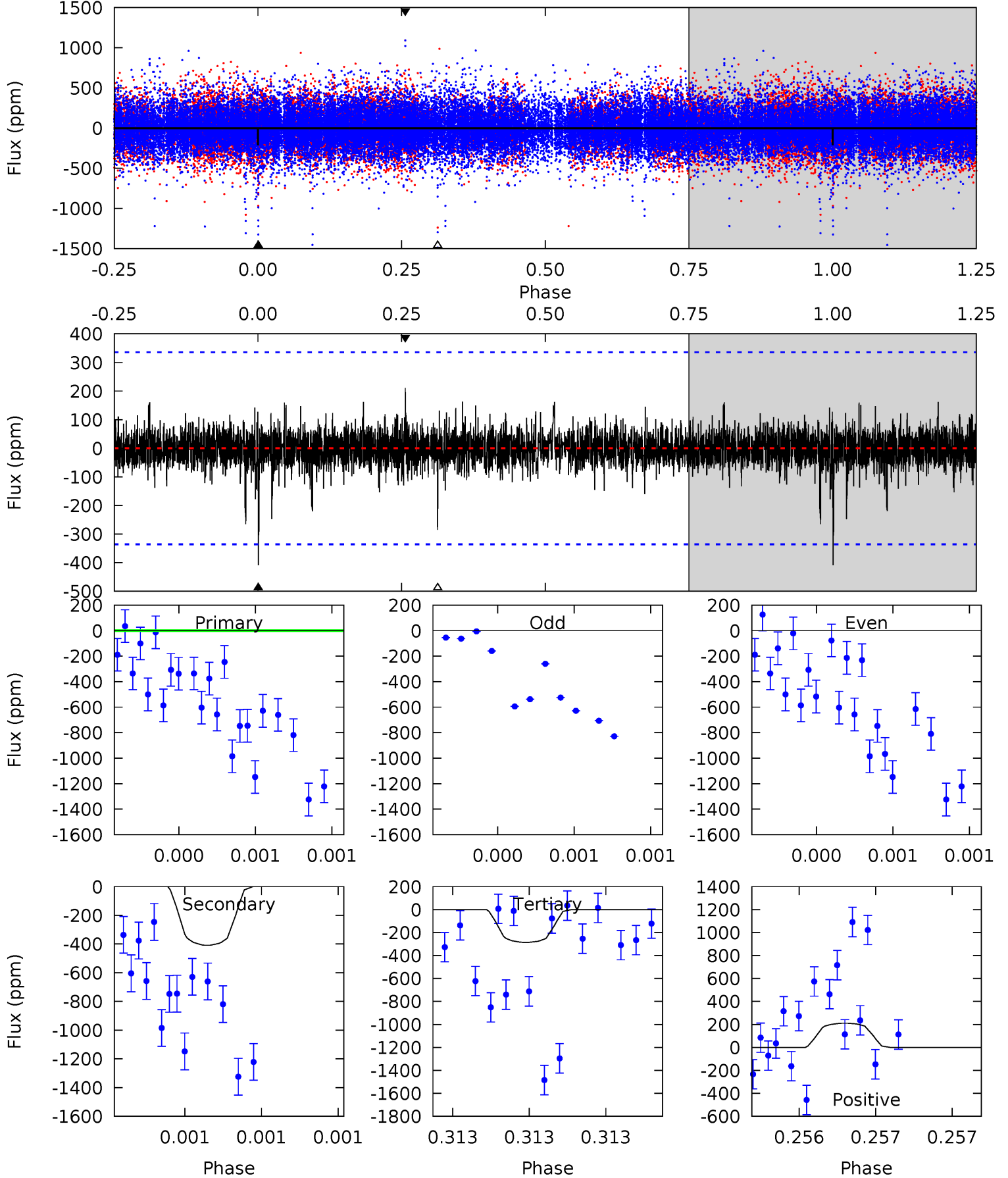
TCE 009963461-03 P=454.994080 Days  $T_0=332.693598$  (BKJD)



# DV Model-Shift Uniqueness Test

009963461-03, P = 455.051488 Days, E = 332.625141 Days

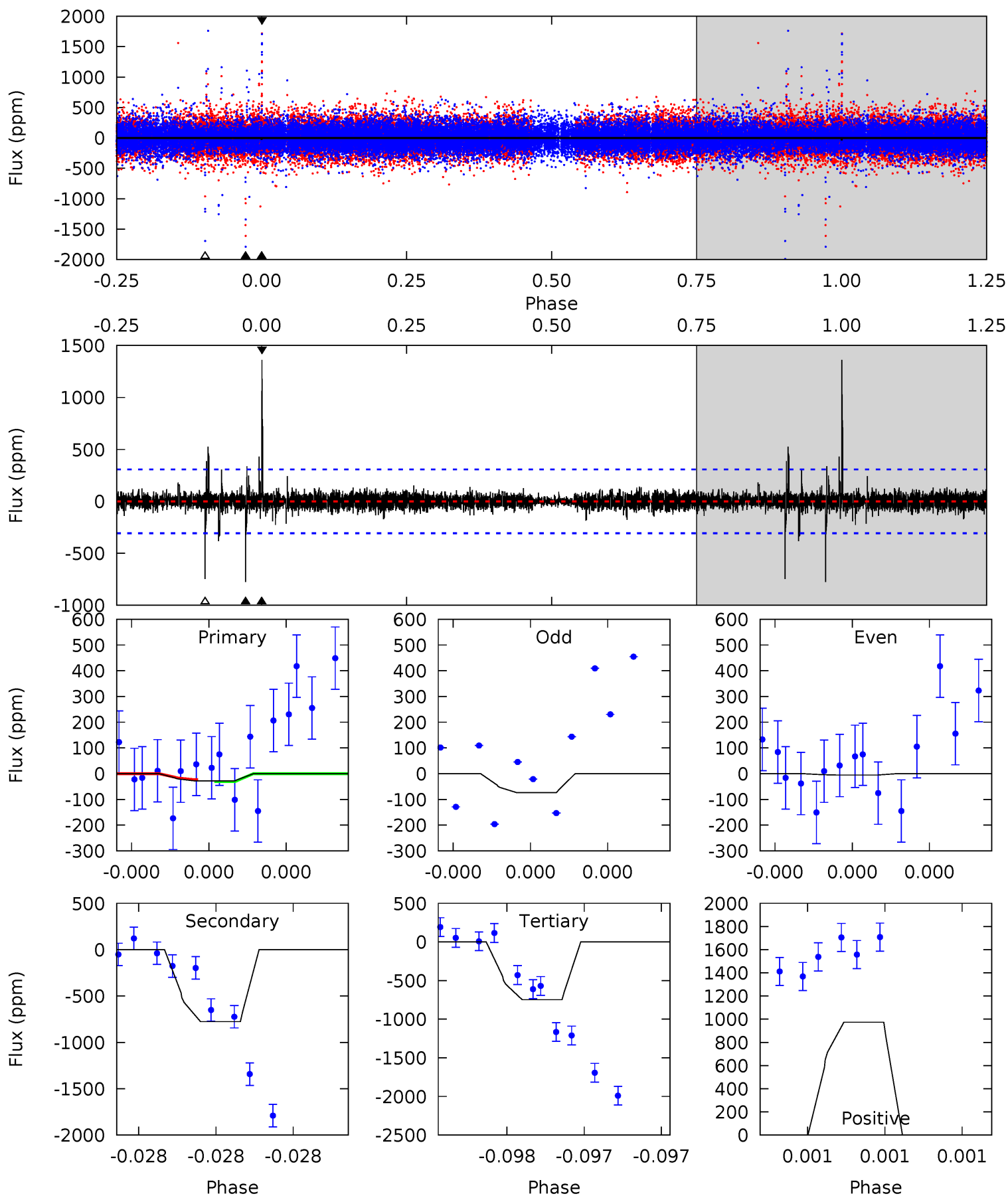
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.65	6.97	4.87	3.59	5.73	3.72	0.64	-1.22	0.06	2.10	3.38	0.08	1.03	0.34	0.92



# Alt Model-Shift Uniqueness Test

009963461-03, P = 454.994080 Days, E = 332.693598 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
0.52	14.5	14.0	18.3	5.75	3.75	0.81	-13.5	-17.7	0.54	-3.71	0.57	3.53	0.64	0.07



### Stellar Parameters For KIC 009963461

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$\rho_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6168^{+219}_{-241}$	$4.074^{+0.336}_{-0.144}$	$-0.240^{+0.300}_{-0.300}$	$1.567^{+0.436}_{-0.533}$	$1.061^{+0.181}_{-0.164}$	$0.389^{+0.843}_{-0.182}$
	+4%/-4%	+8%/-4%	+125%/-125%	+28%/-34%	+17%/-15%	+217%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009963461-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-408 \pm 59$	$15.49^{+16.20}_{-10.87}$	$431^{+34}_{-44}$	$3347^{+1982}_{-602}$	$1324^{+13656}_{-1015}$
Alt.	$-776 \pm 53$	$14.63^{+17.10}_{-9.93}$	$430^{+34}_{-42}$	$3823^{+2346}_{-844}$	$2900^{+24599}_{-2297}$

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

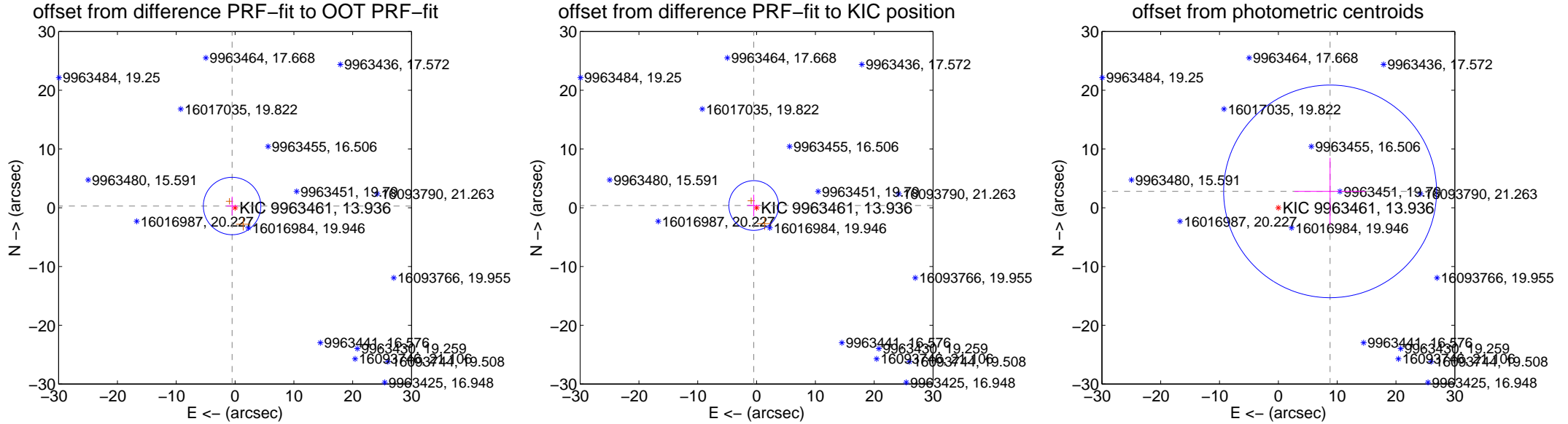
## DV Centroid Data

Supplemental centroid analysis for 009963461-03. Kepler magnitude: 13.94. Transit SNR 1.28

There are 0 quarters with good PRF difference image offsets

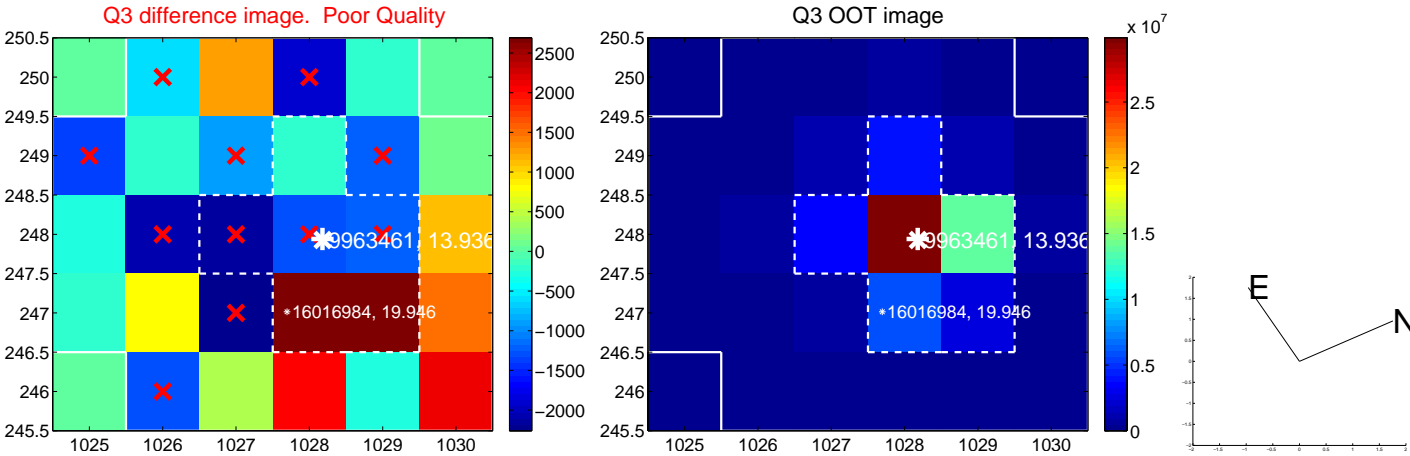
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.587 \pm 1.629$	0.36	$0.507 \pm 0.956$	$0.296 \pm 1.596$
PRF-fit source offset from KIC position	$0.614 \pm 1.410$	0.44	$0.482 \pm 1.056$	$0.381 \pm 1.840$
photometric centroid source offset	$9.23 \pm 6.03$	1.53	$-8.80 \pm 6.06$	$2.79 \pm 5.71$

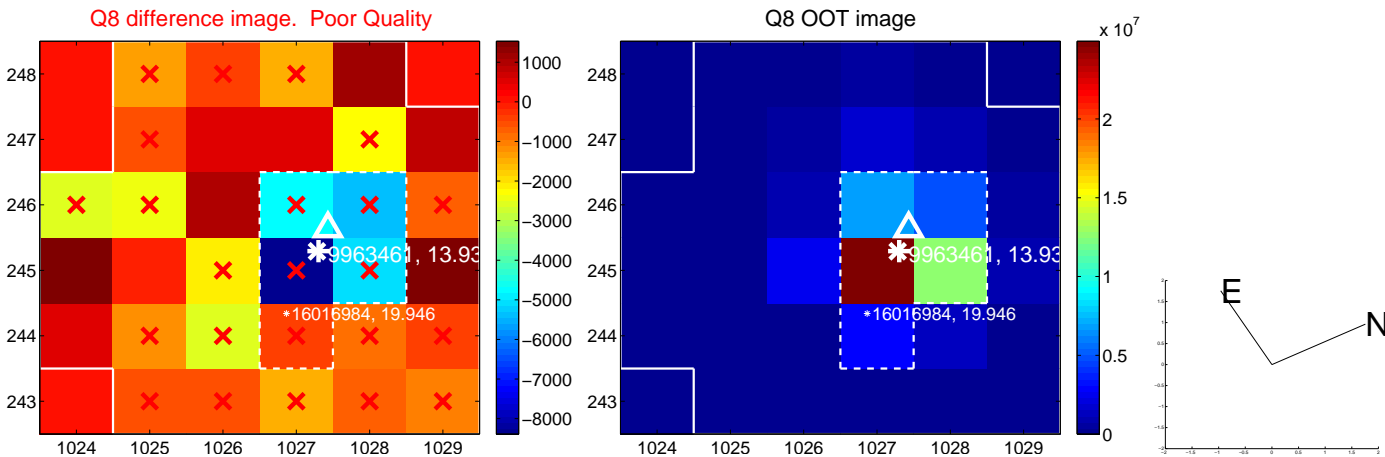


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



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

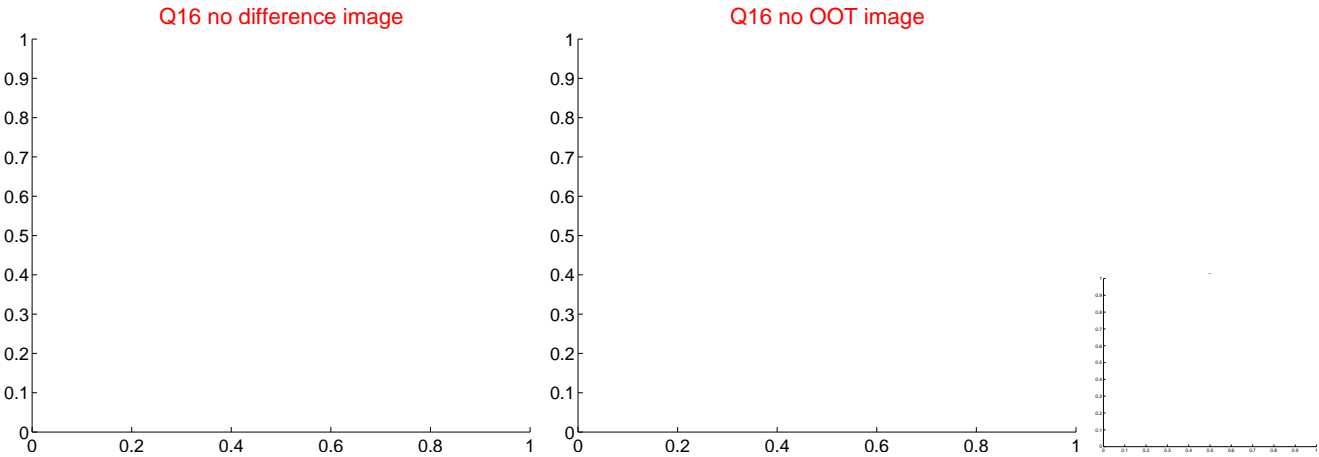
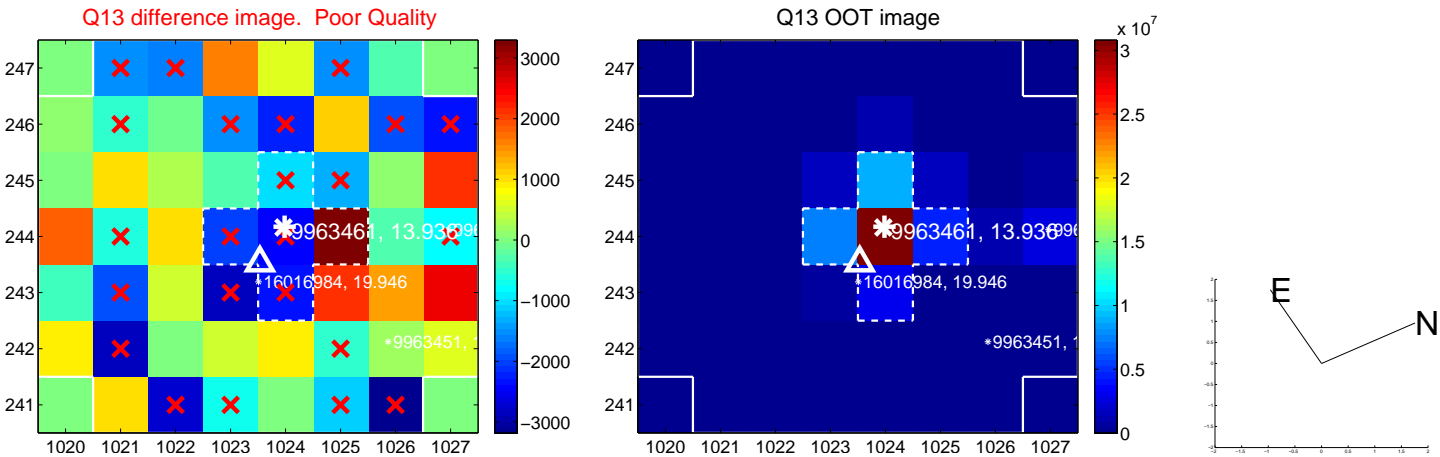




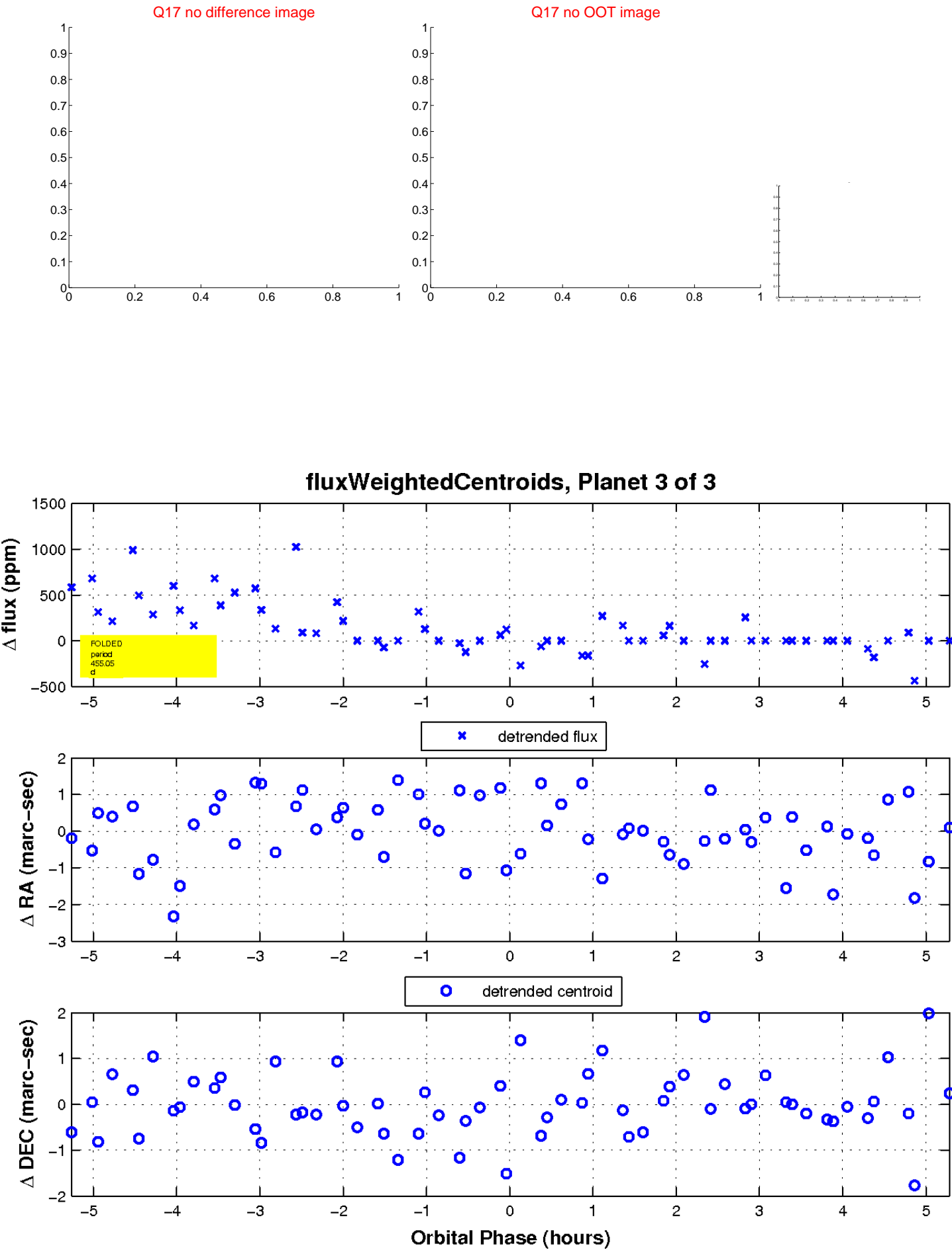
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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.



UKIRT Image

Declination

