

# KIC 010776918

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010776918-01	OBS	No	641.498103	157.584928	2421.3	6.747	11.5	6.7	0.52	4492	2.49	0.07
010776918-02	OBS	No	577.823421	189.862725	2953.7	12.079	10.8	6.7	0.52	4492	3.34	0.08
010776918-03	OBS	No	421.334293	468.458899	1913.2	5.669	10.5	6.6	0.52	4492	2.25	0.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010776918-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
010776918-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010776918-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—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—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.

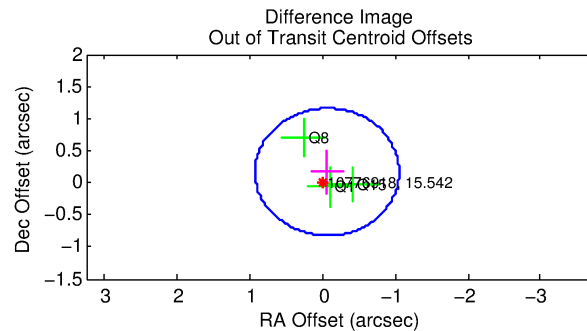
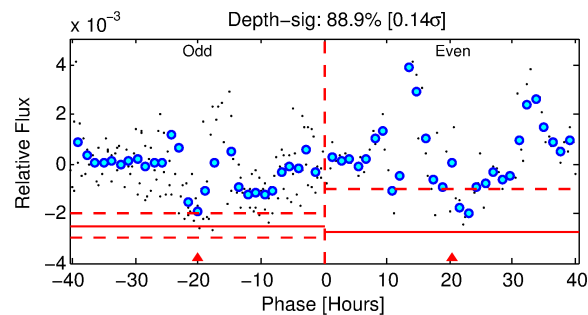
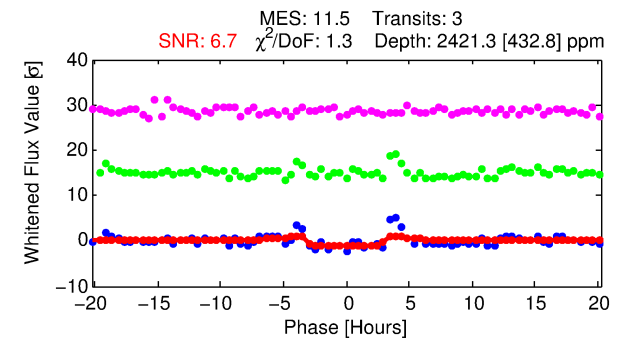
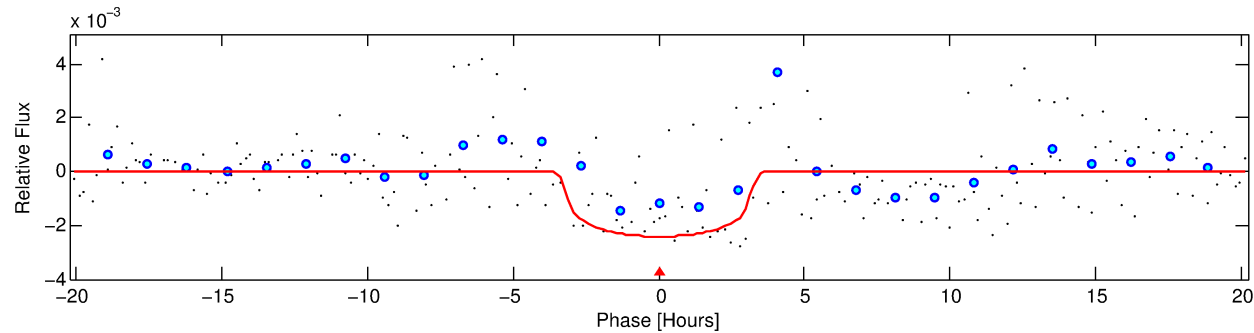
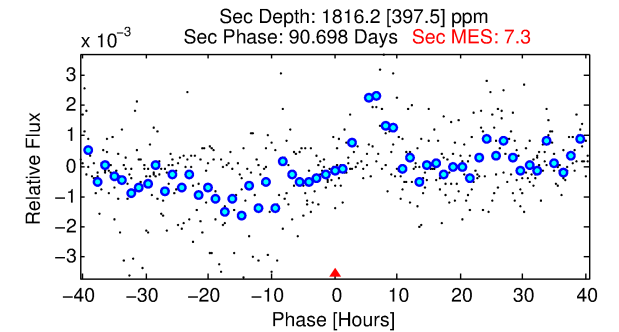
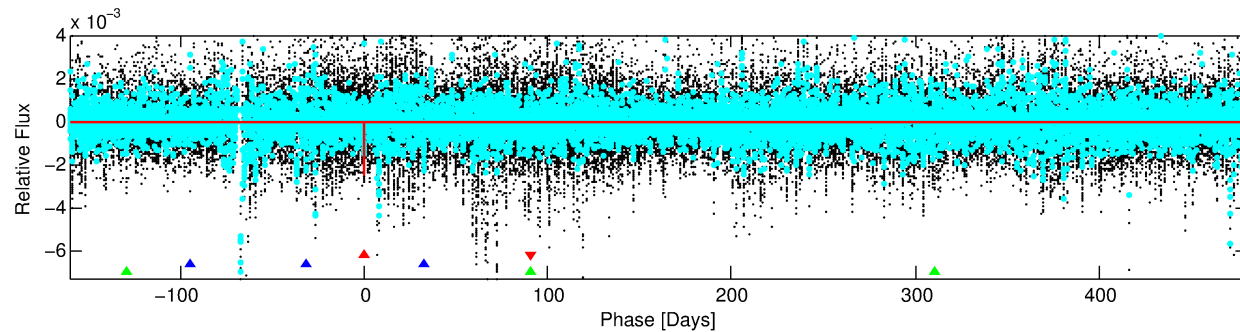
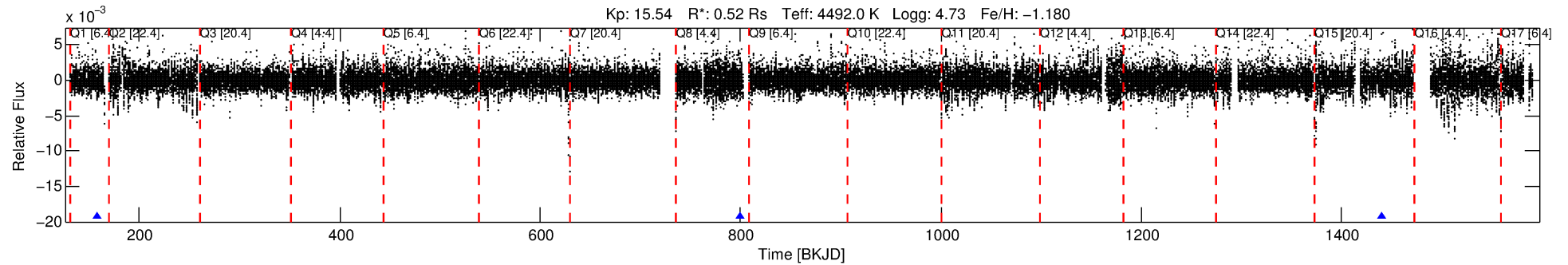
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010776918-01

No Significant Match Found

# DV One-Page Summary

KIC: 10776918 Candidate: 1 of 3 Period: 641.498 d



## DV Fit Results:

Period = 641.49810 [0.00753] d  
Epoch = 157.5849 [0.0109] BKJD  
Rp/R\* = 0.0442 [0.0492]  
a/R\* = 750.26 [3140.10]  
b = 0.15 [26.93]  
Seff = 0.07 [0.01]  
Teq = 132 [5] K  
Rp = 2.49 [2.78] Re  
a = 1.1693 [0.0764] AU  
Ag = 220096.03 [492265.33] [0.45 $\sigma$ ]  
Teffp = 4409 [2466] K [1.73 $\sigma$ ]

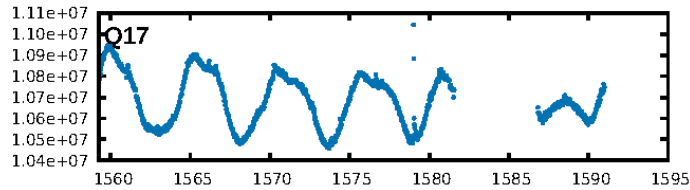
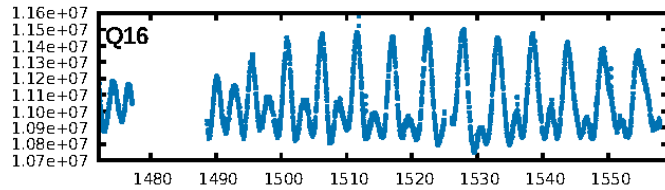
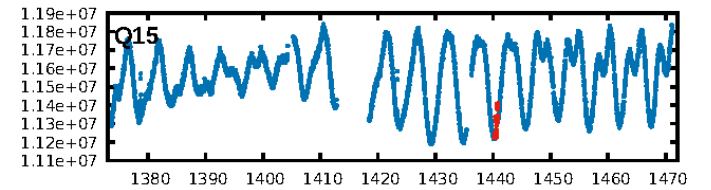
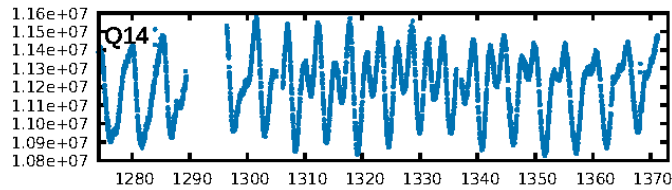
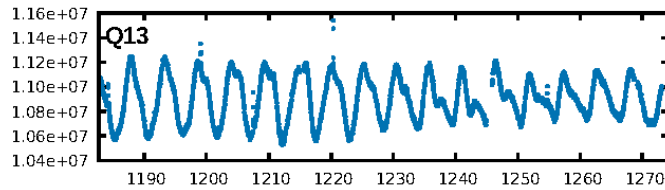
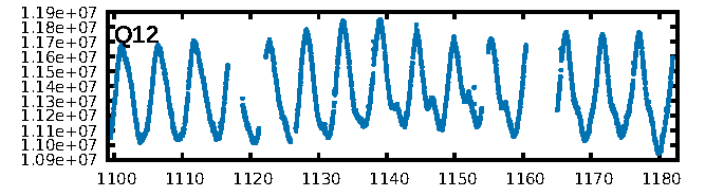
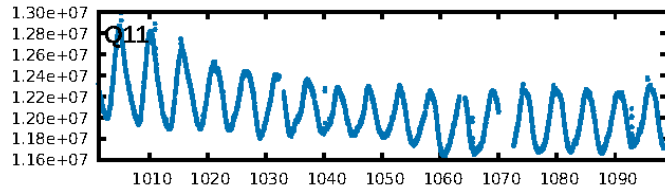
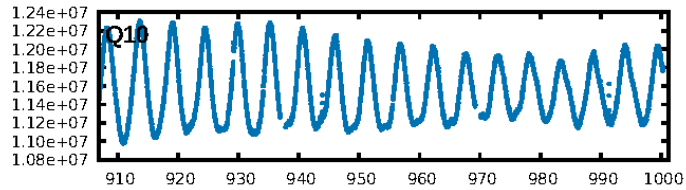
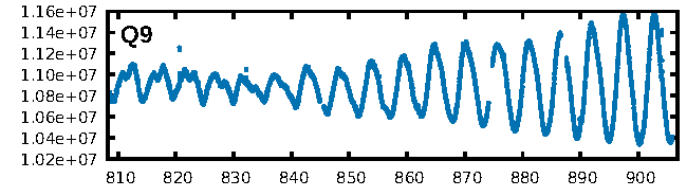
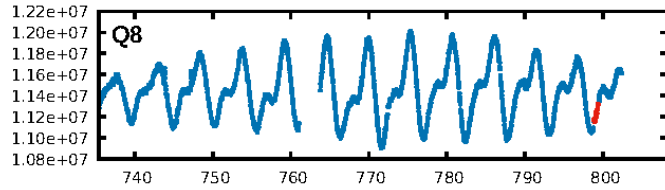
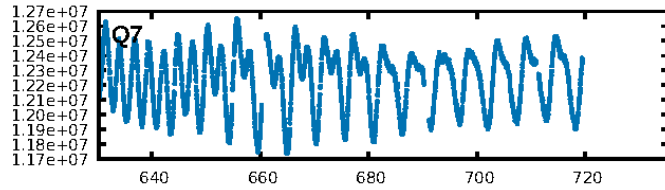
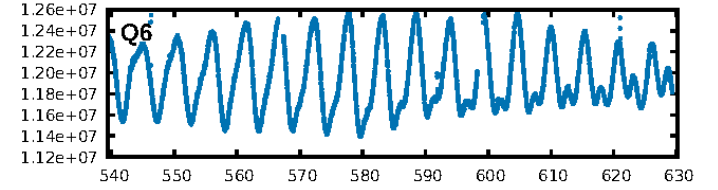
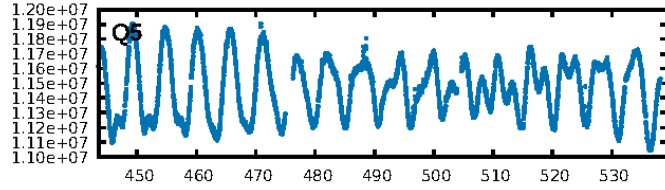
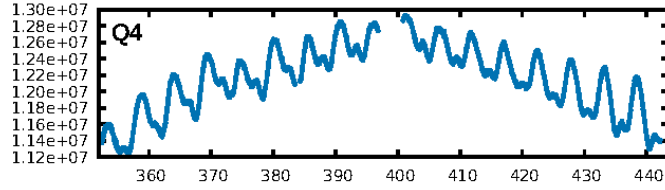
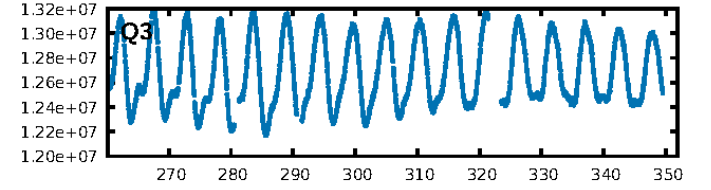
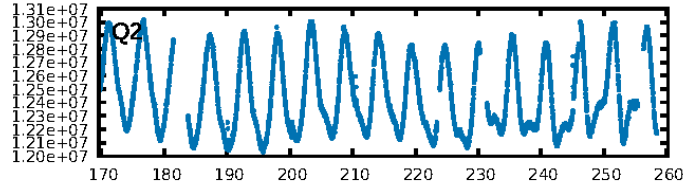
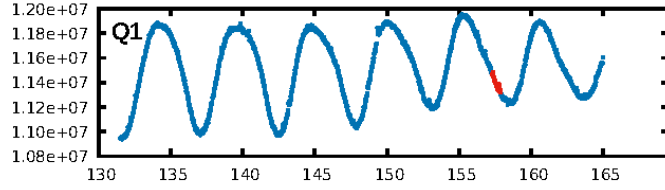
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [110.45 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 5.9%  
ModelChiSquareGof-sig: 67.7%  
**Bootstrap-pfa: 5.86e-12**  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: -1.489  
Centroid-sig: 77.4%  
Centroid-so: 0.709 arcsec [1.12 $\sigma$ ]  
OotOffset-rm: 0.179 arcsec [0.54 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-rm: 0.241 arcsec [0.88 $\sigma$ ]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

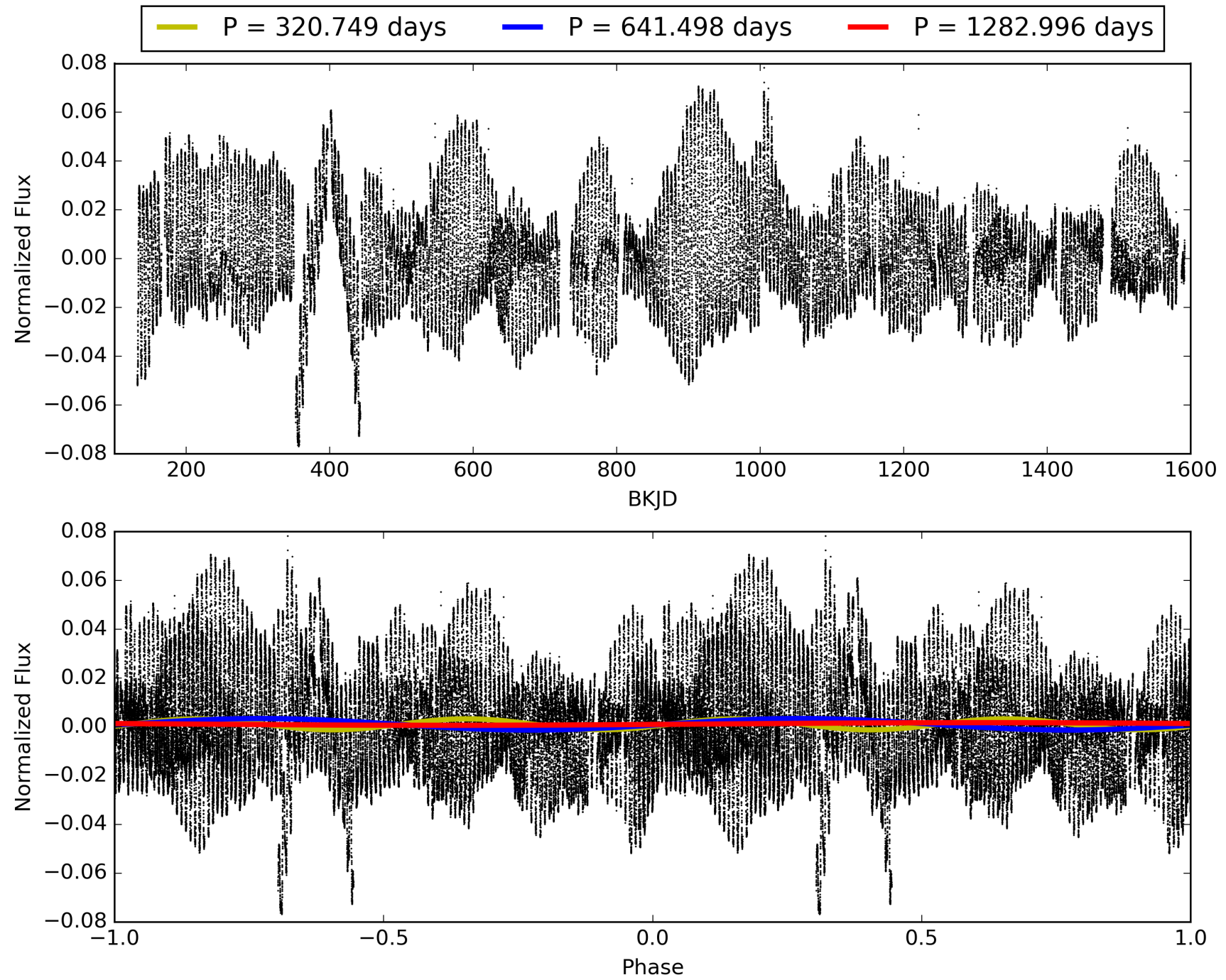
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 19:23:46 Z

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

# TCE 010776918-01, PDC Light Curves

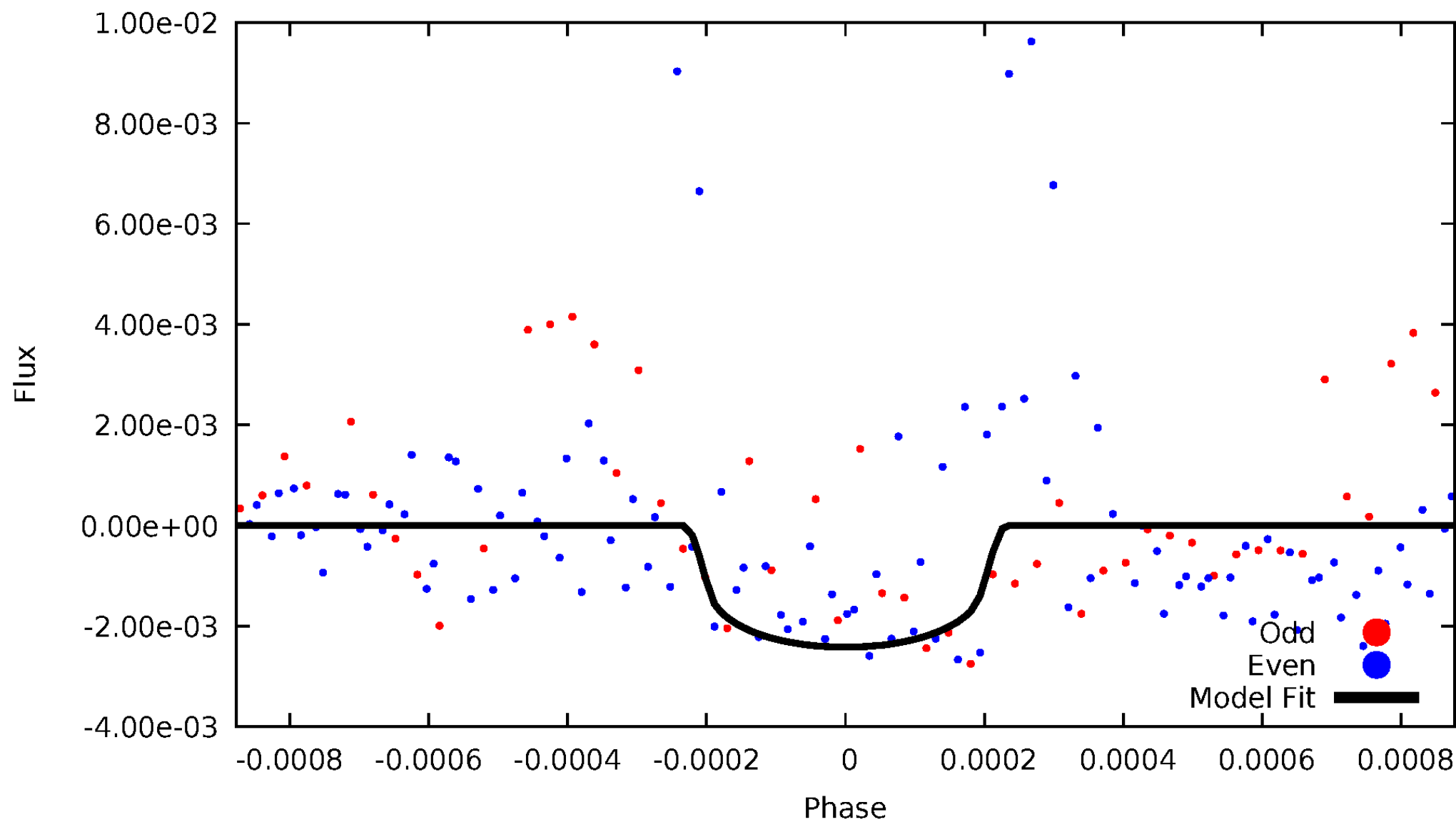


# TCE 010776918-01



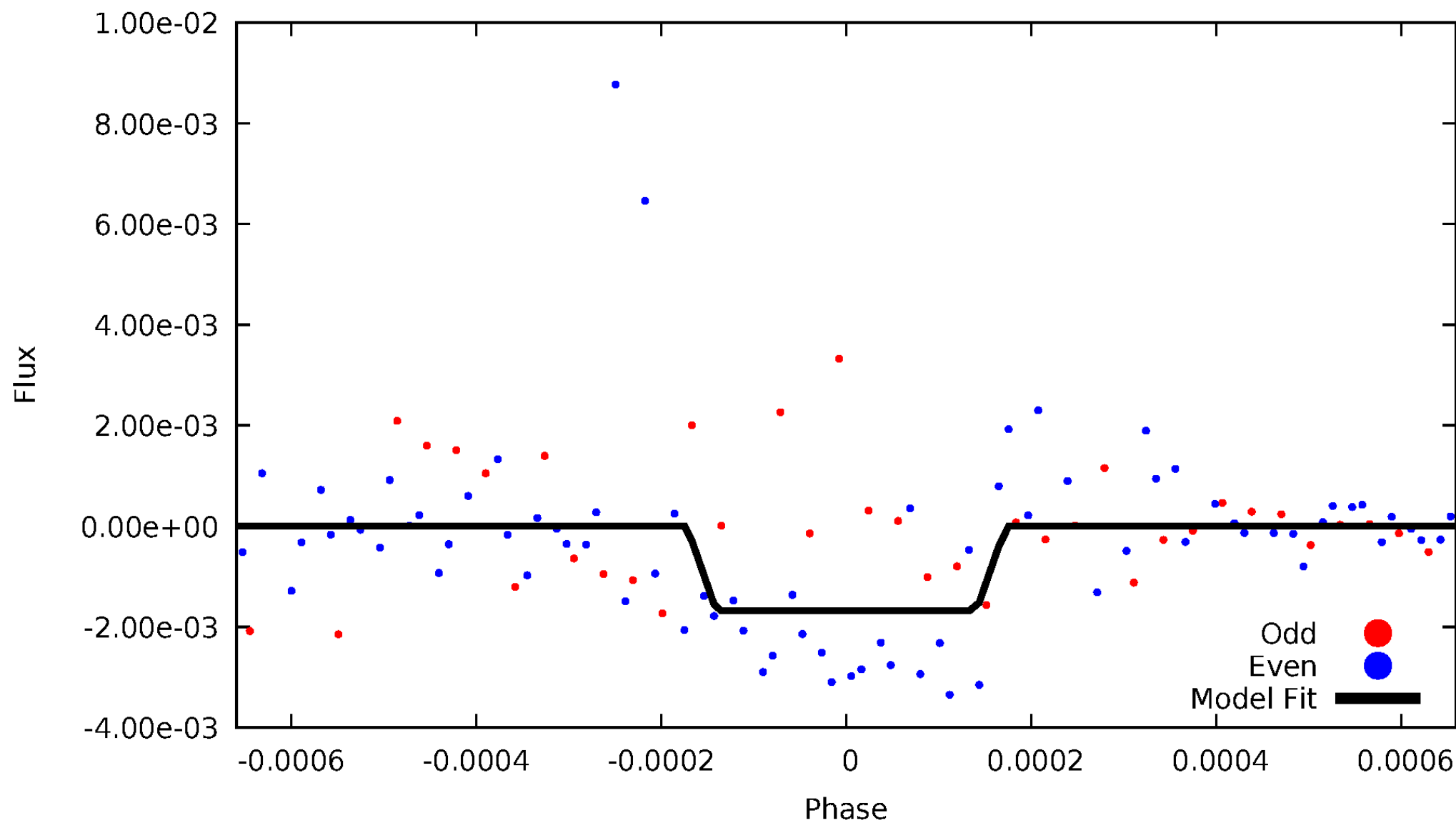
# DV Odd/Even

TCE 010776918-01



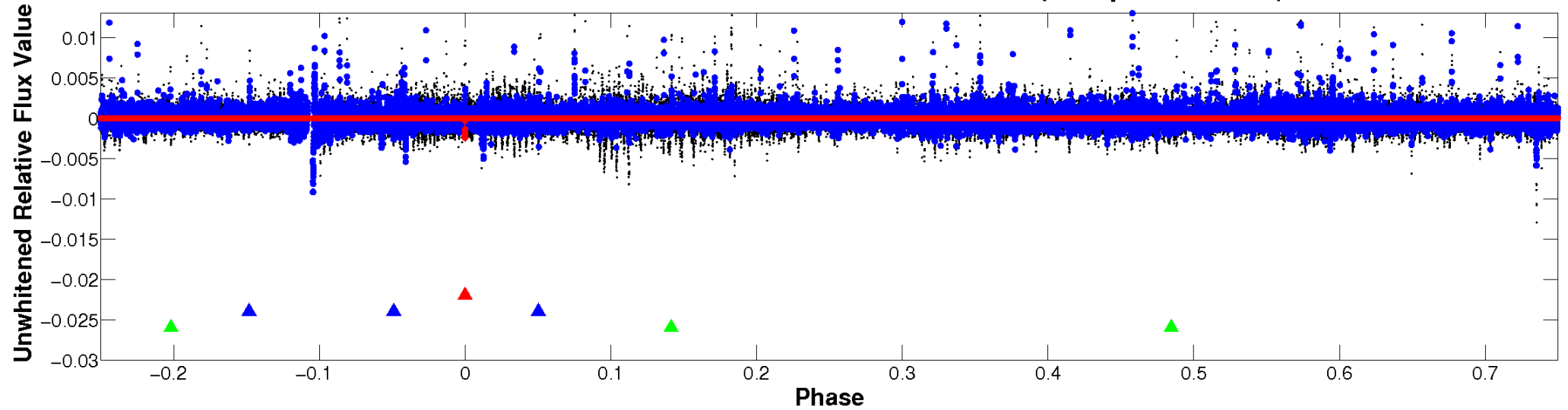
# ALT Odd/Even

TCE 010776918-01

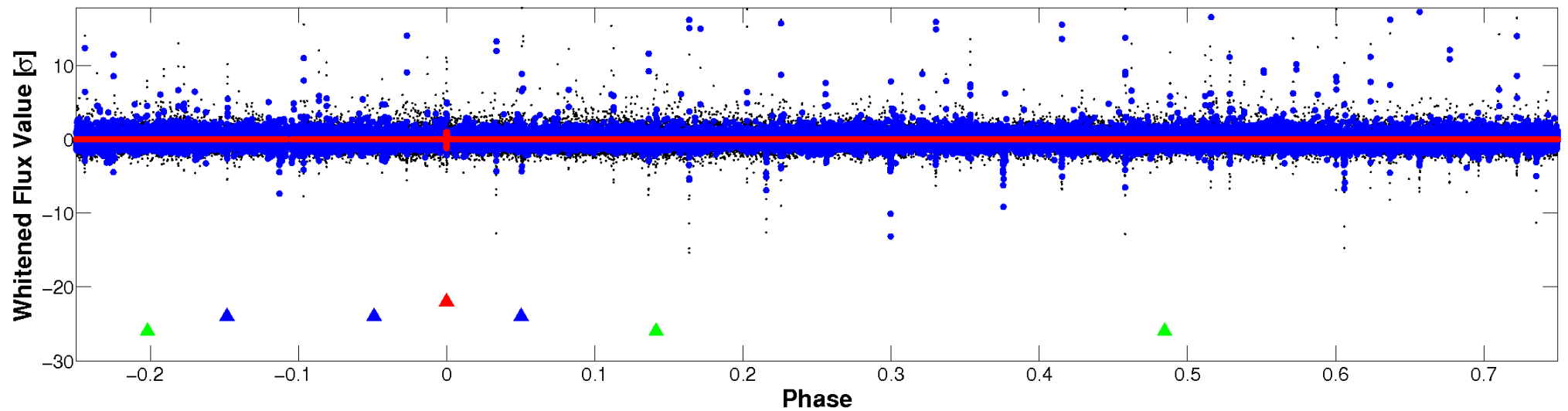


# Non-Whitened Vs. Whitened Light Curve

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

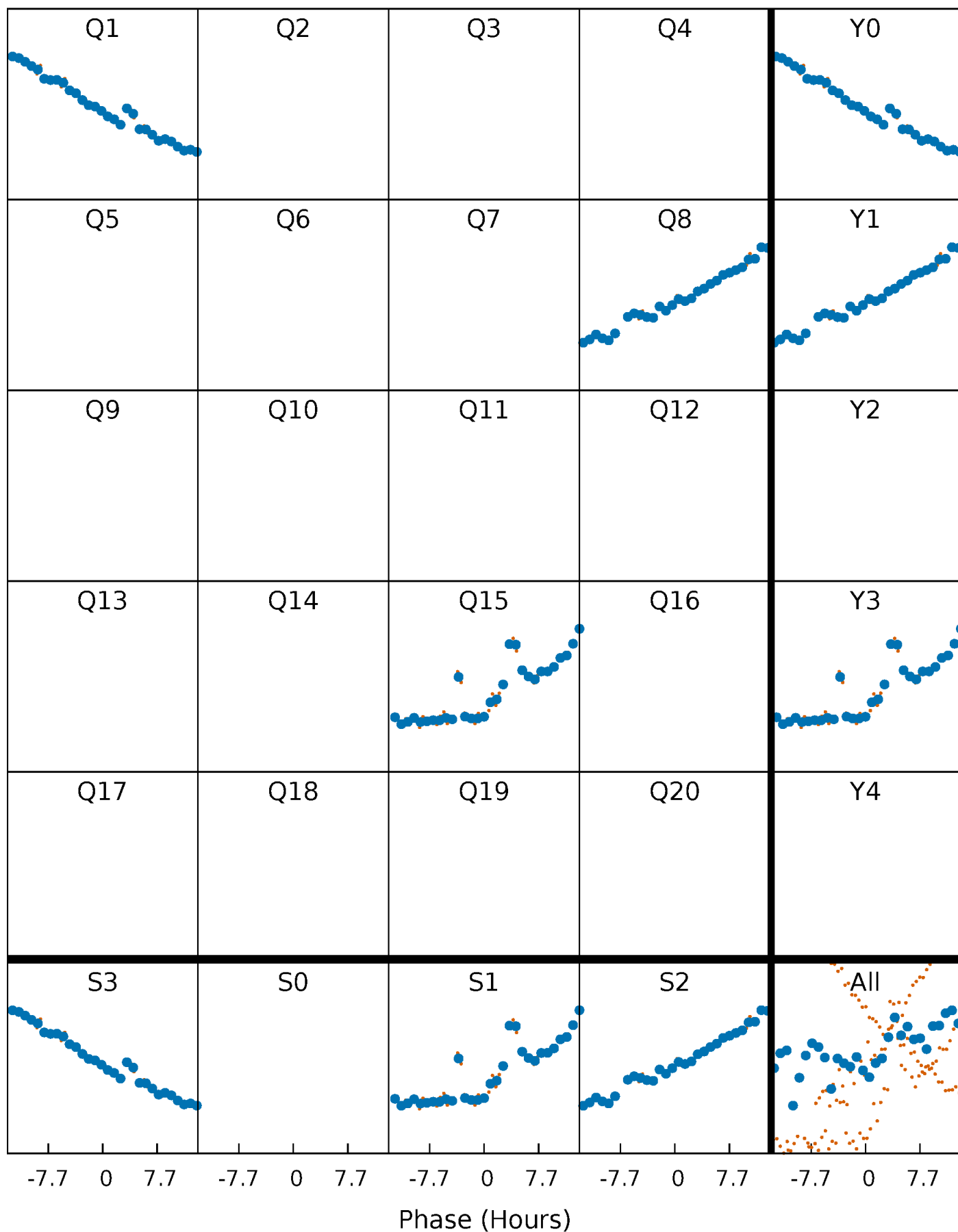


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

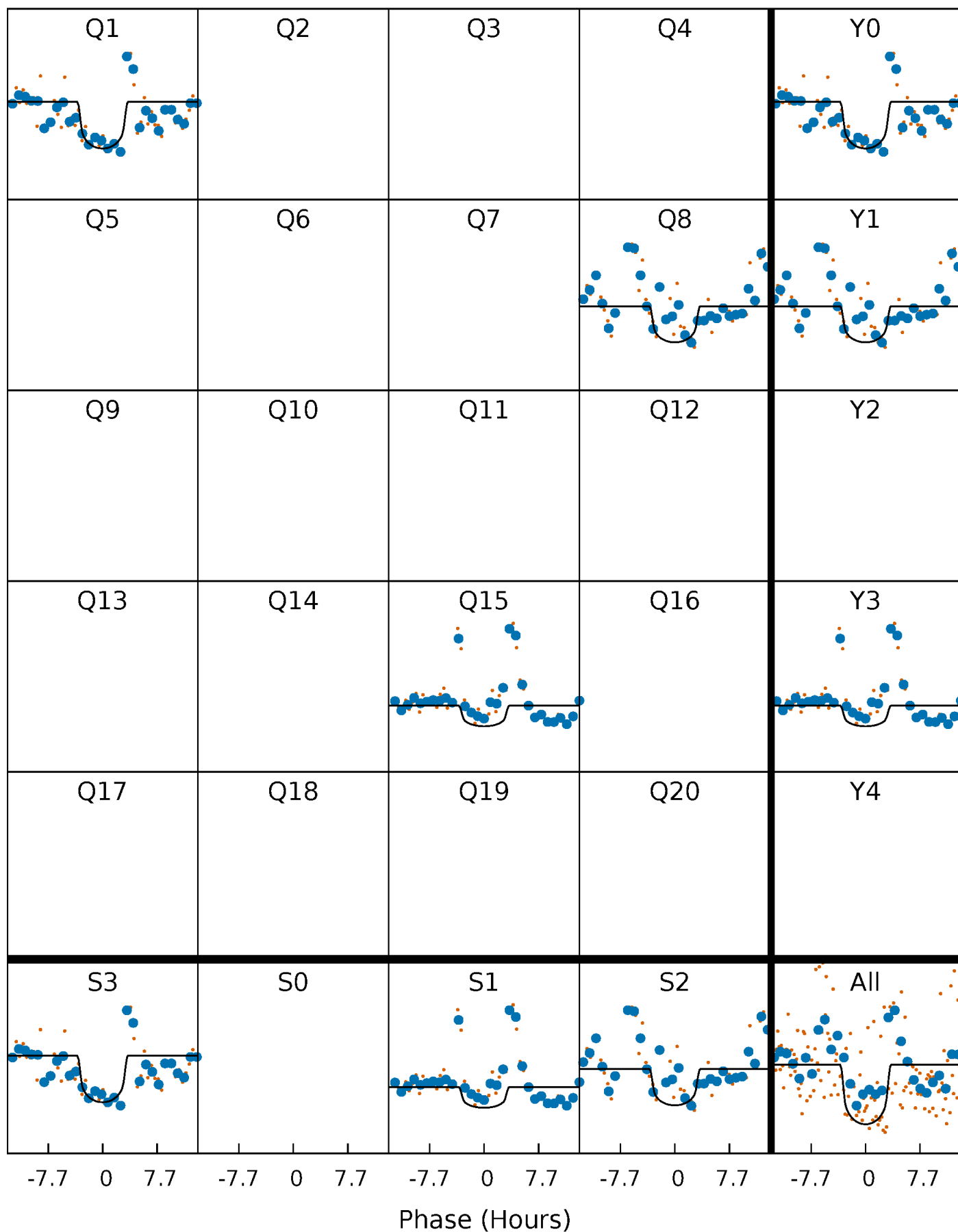
TCE 010776918-01 P=641.498103 Days  $T_0=157.584928$  (BKJD)





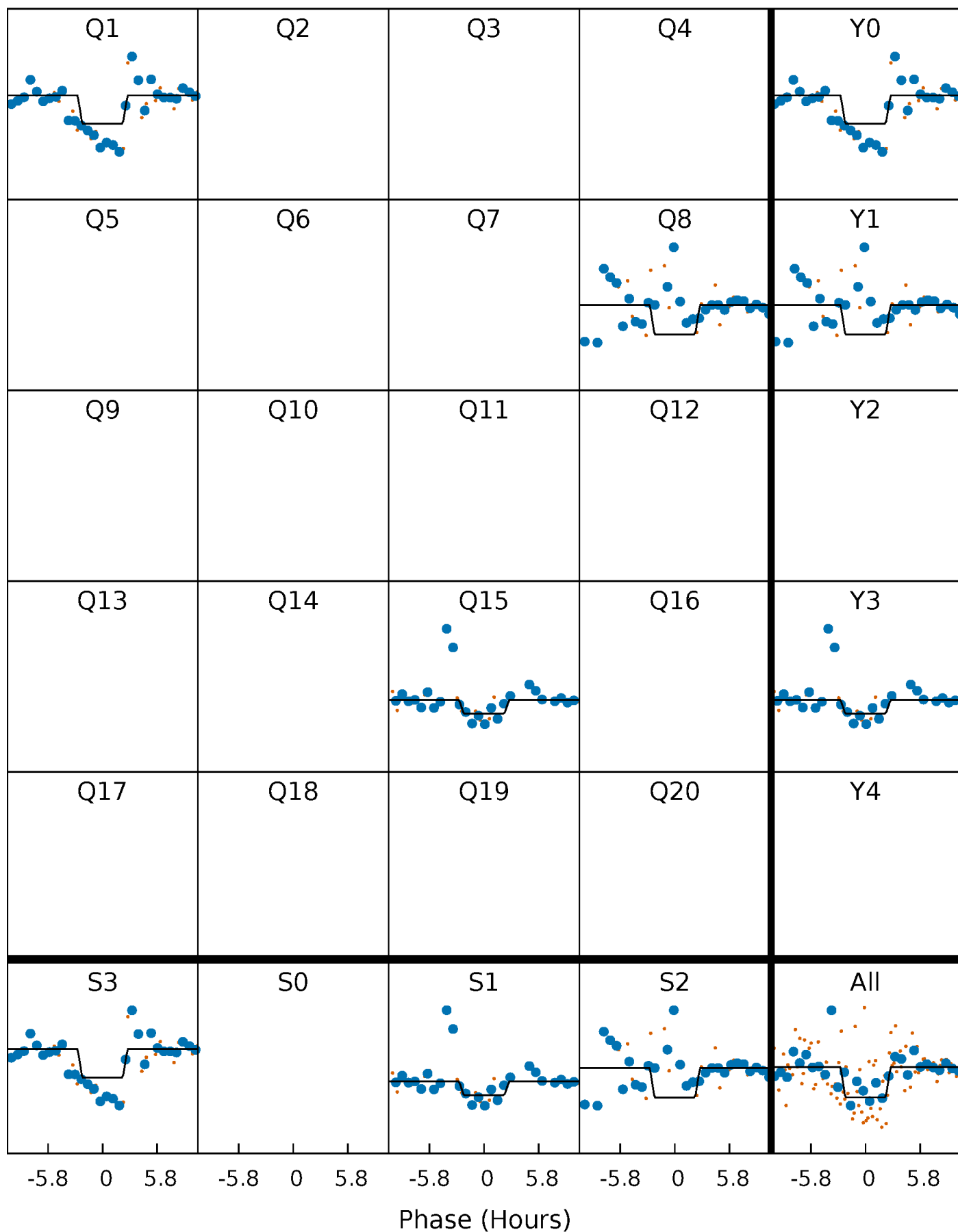
# DV Quarter-Phased Transit Curves

TCE 010776918-01 P=641.498103 Days  $T_0=157.584928$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

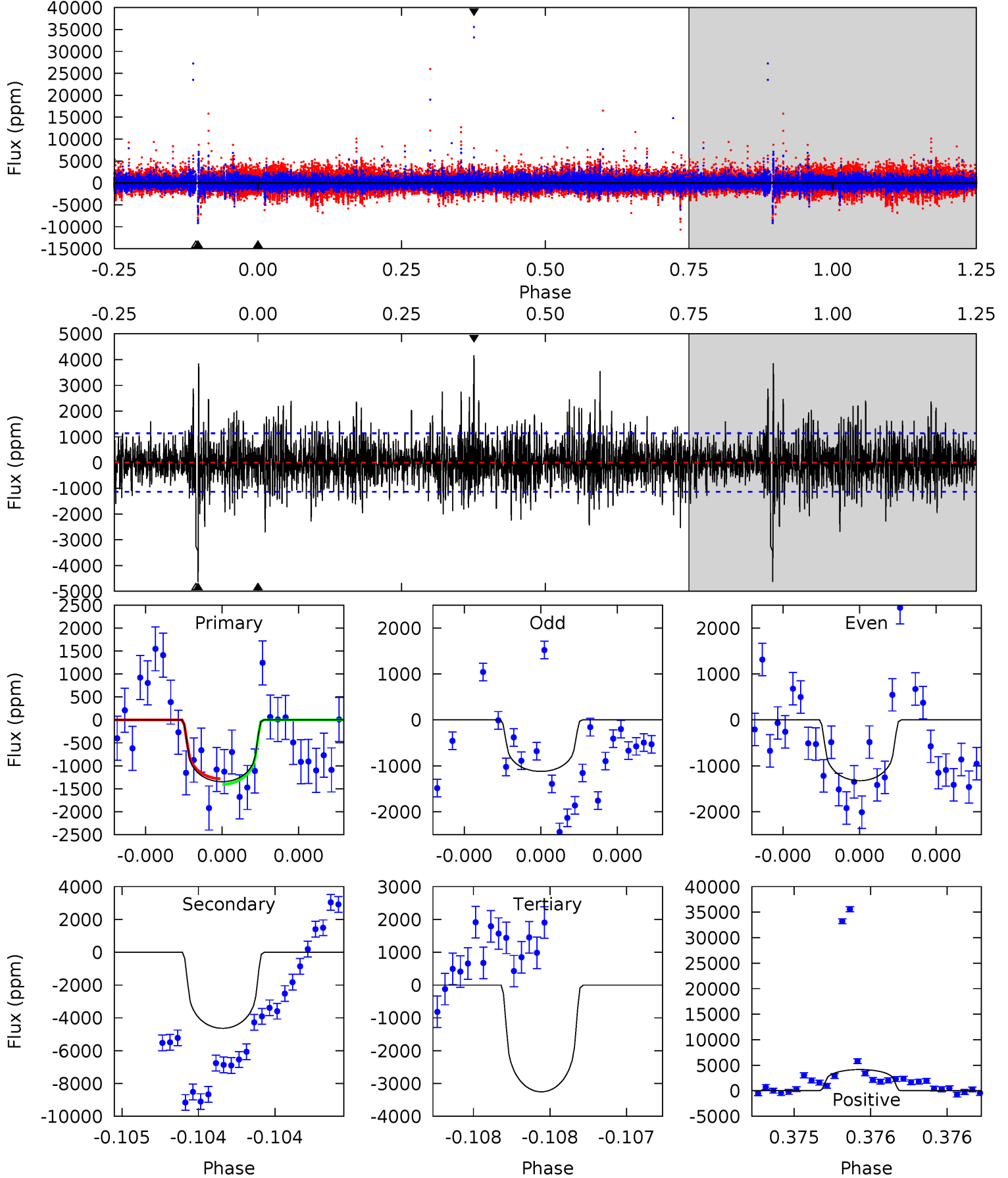
TCE 010776918-01 P=641.484371 Days  $T_0=157.616982$  (BKJD)



# DV Model-Shift Uniqueness Test

010776918-01, P = 641.498103 Days, E = 157.584928 Days

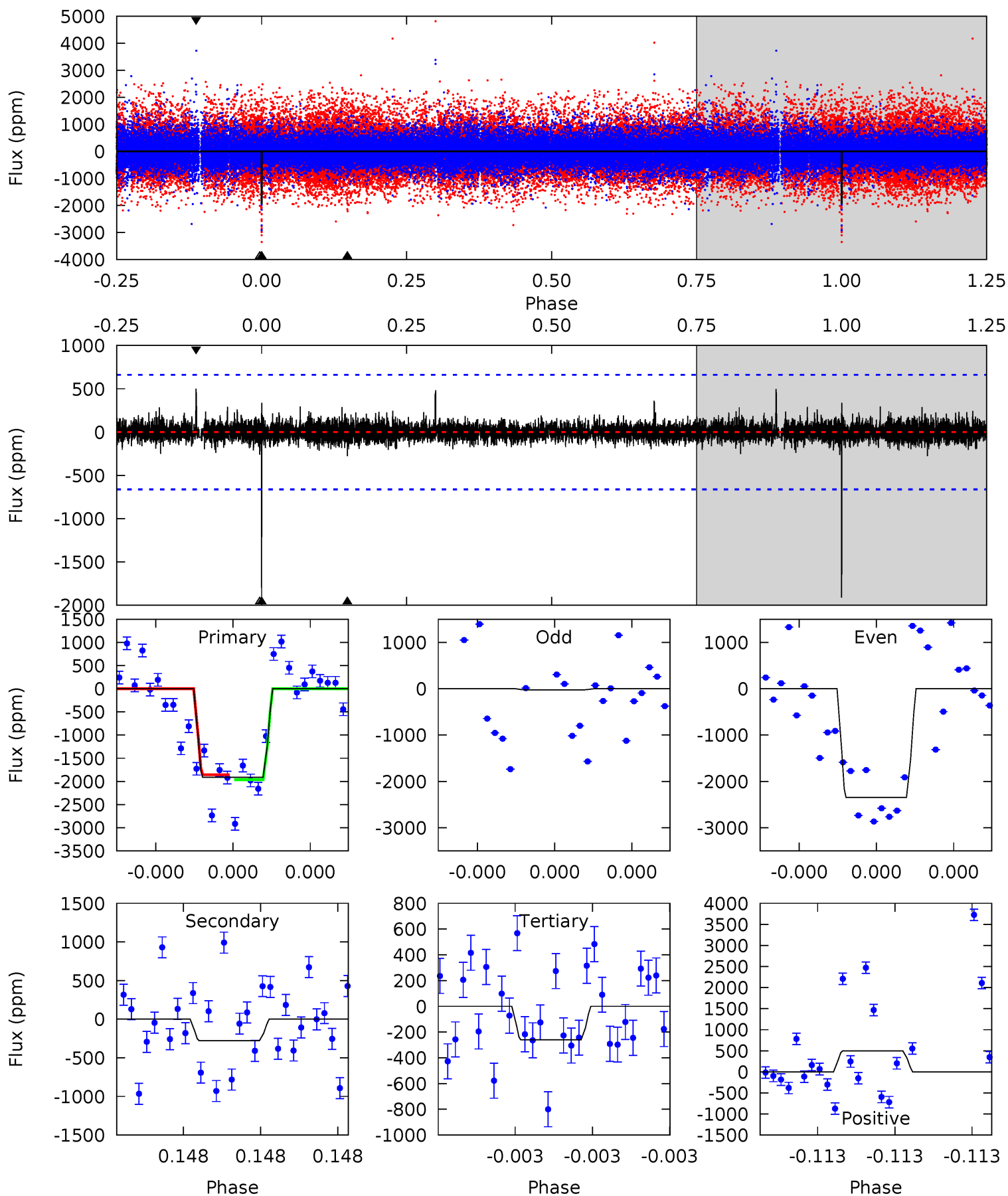
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.62	22.8	16.0	20.5	5.59	3.51	3.33	-9.38	-13.8	6.80	2.35	0.42	1.07	0.47	0.30



# Alt Model-Shift Uniqueness Test

010776918-01, P = 641.484371 Days, E = 157.616982 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
16.3	2.37	2.21	4.22	5.64	3.58	0.51	14.1	12.1	0.16	-1.85	9.06	0.77	0.21	0



### Stellar Parameters For KIC 010776918

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4492^{+134}_{-134}$	$4.727^{+0.052}_{-0.028}$	$-1.180^{+0.300}_{-0.300}$	$0.516^{+0.032}_{-0.040}$	$0.518^{+0.036}_{-0.029}$	$5.317^{+1.227}_{-0.688}$
	+3%/-3%	+1%/-1%	+25%/-25%	+6%/-8%	+7%/-6%	+23%/-13%
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 010776918-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-4636 \pm 203$	$3.17^{+2.27}_{-2.08}$	$183^{+6}_{-7}$	$4851^{+3432}_{-925}$	$349381^{+2566232}_{-229406}$
Alt.	$-277 \pm 117$	$3.05^{+2.27}_{-2.06}$	$183^{+6}_{-6}$	$3057^{+1211}_{-524}$	$22361^{+178350}_{-16650}$

$T_{\text{max}}$  = 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

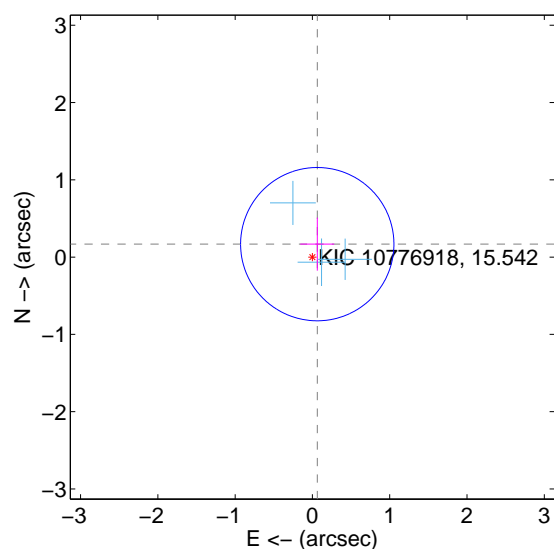
Supplemental centroid analysis for 010776918-01. Kepler magnitude: 15.54. Transit SNR 6.75

There are 3 quarters with good PRF difference image offsets

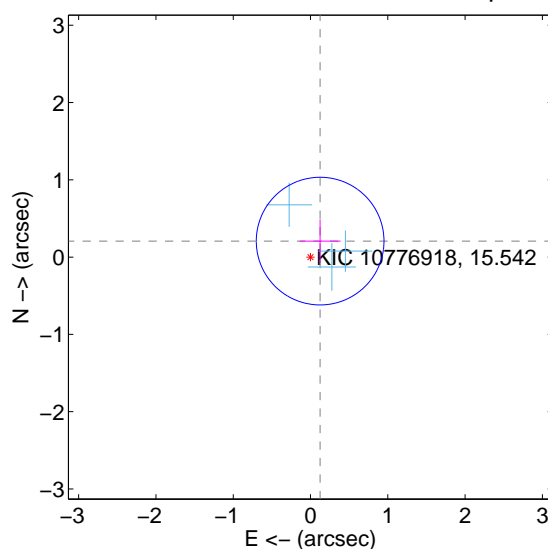
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.179 \pm 0.331$	0.54	$-0.062 \pm 0.220$	$0.167 \pm 0.343$
PRF-fit source offset from KIC position	$0.241 \pm 0.275$	0.88	$-0.124 \pm 0.264$	$0.207 \pm 0.279$
photometric centroid source offset	$0.71 \pm 0.63$	1.12	$-0.36 \pm 0.66$	$0.61 \pm 0.62$

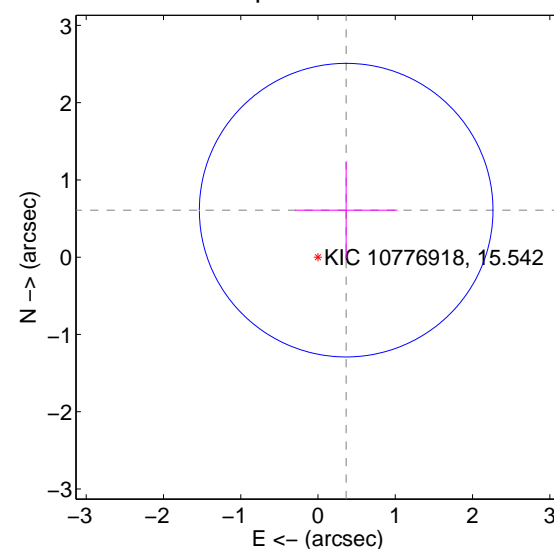
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

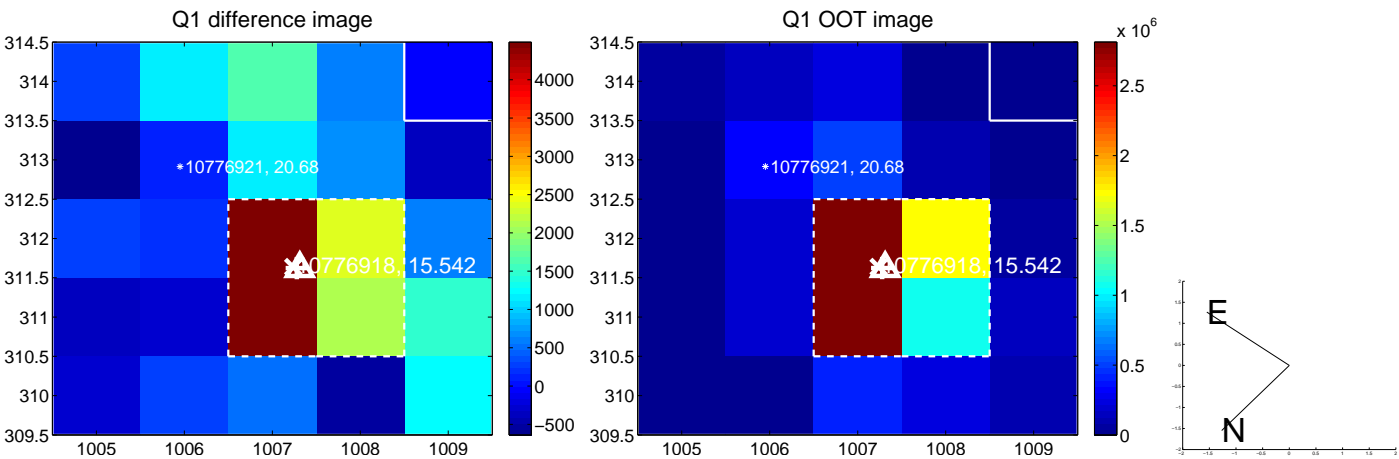


offset from photometric centroids

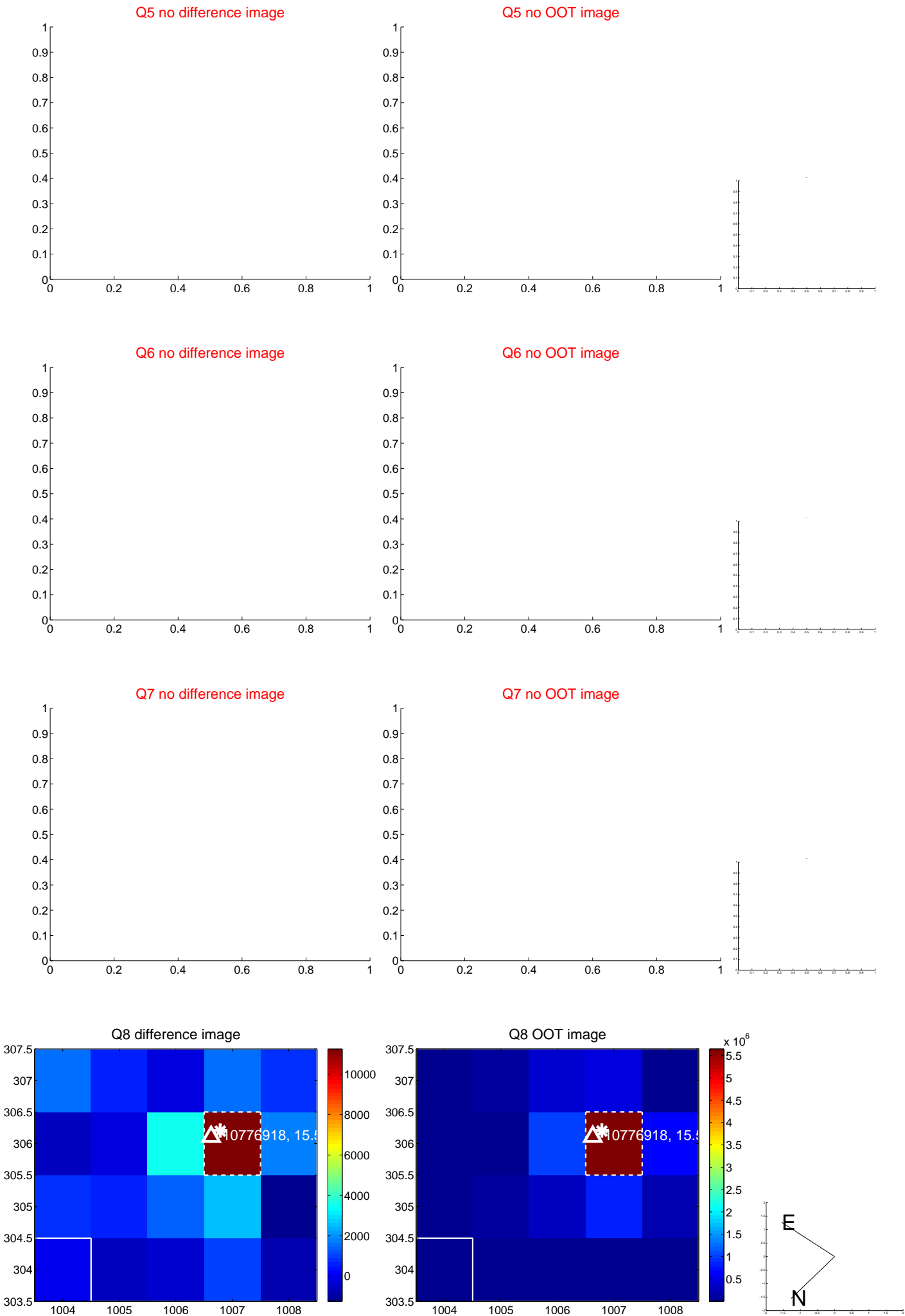


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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



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

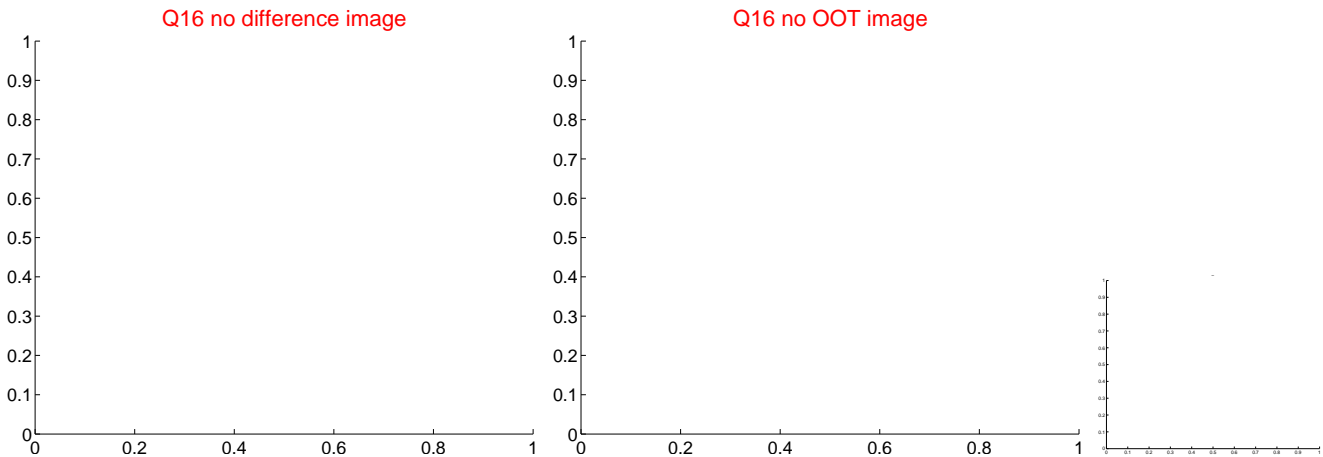
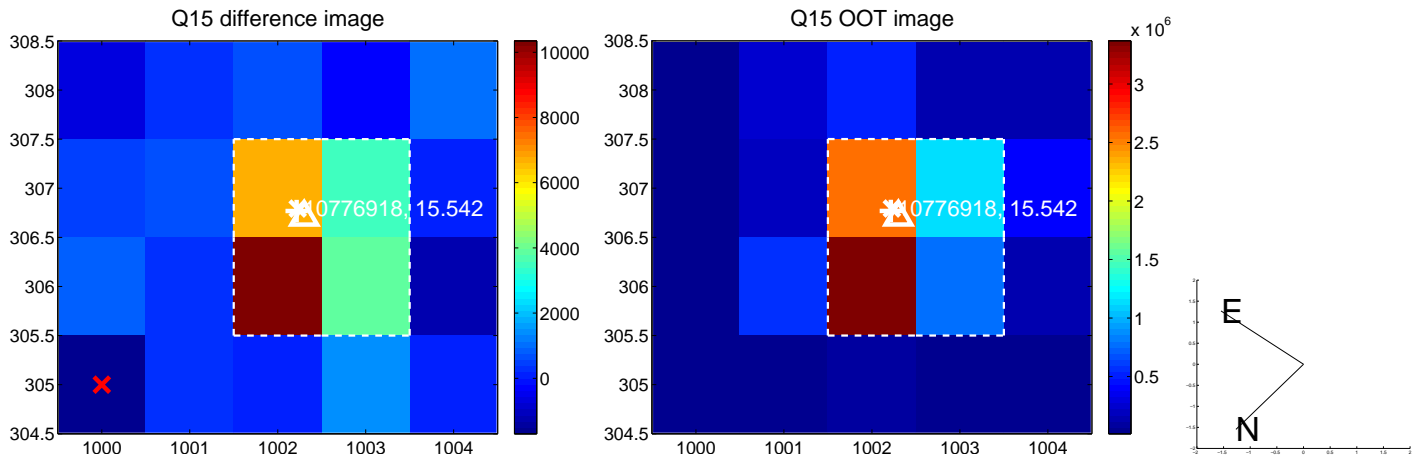
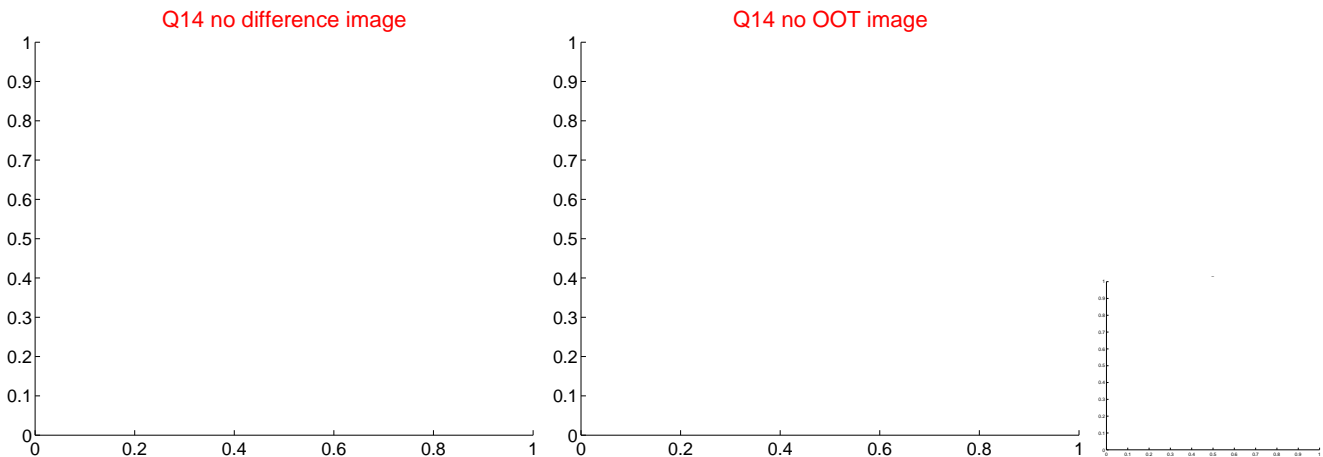




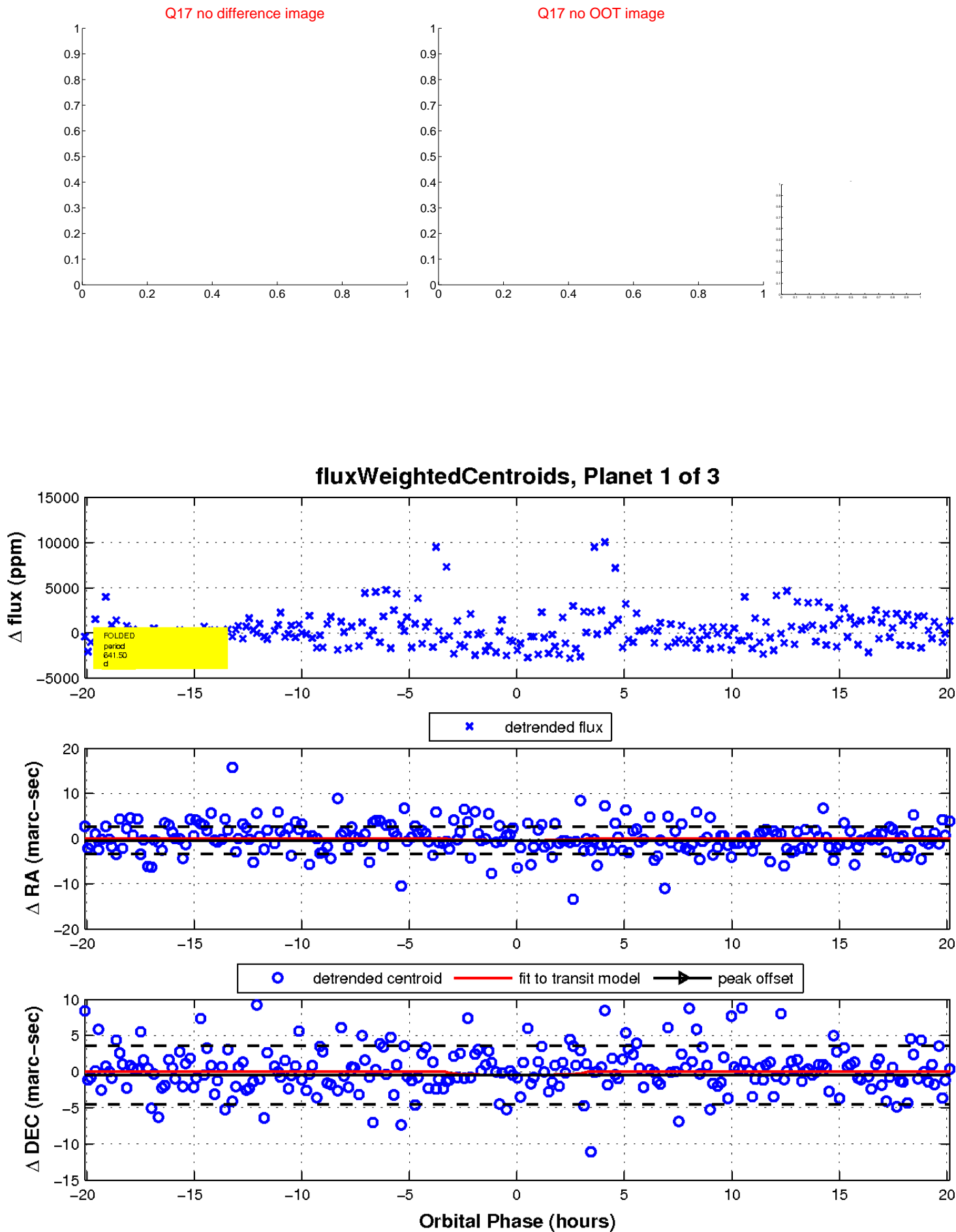
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

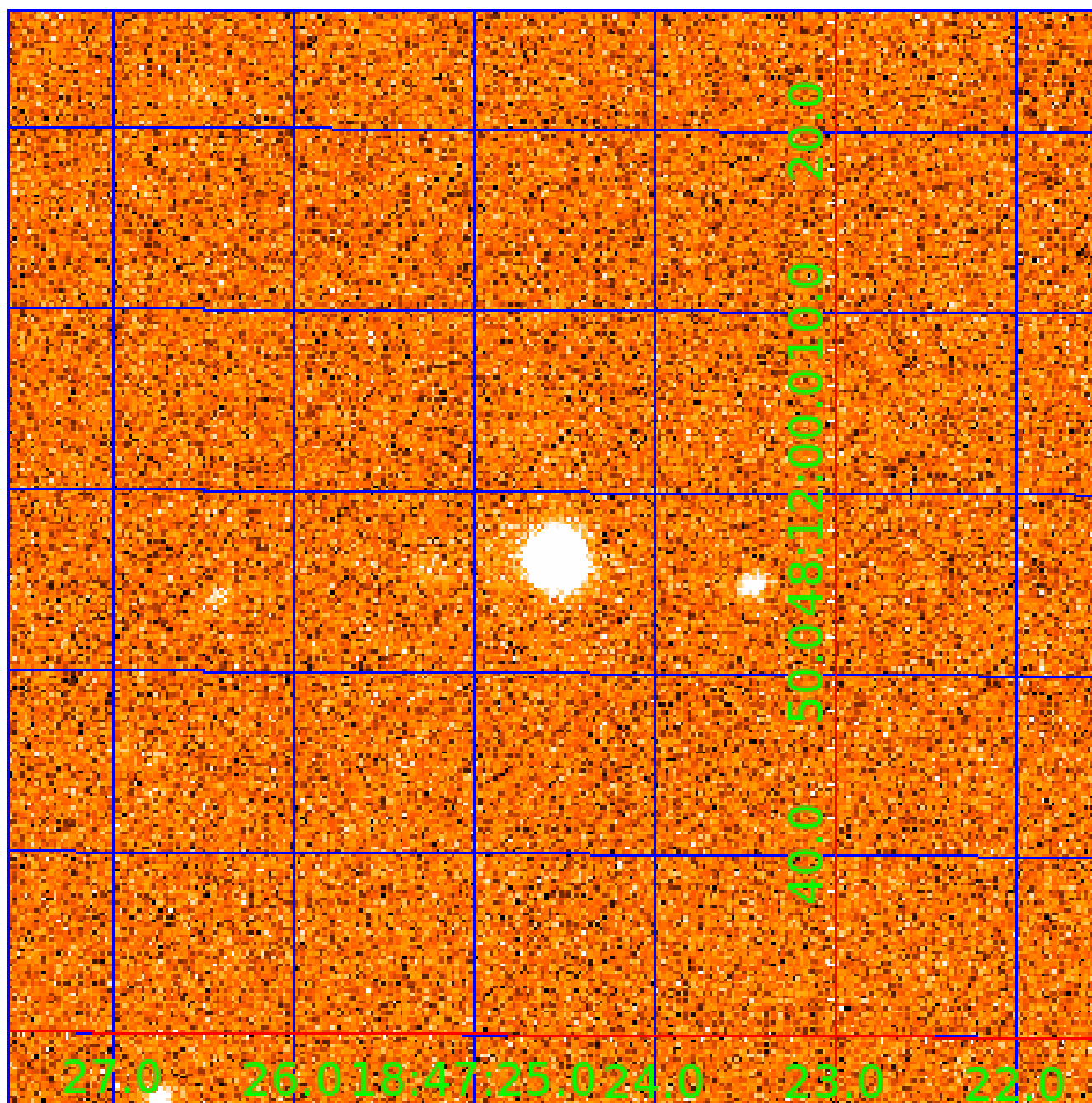


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 010776918

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010776918-01	OBS	No	641.498103	157.584928	2421.3	6.747	11.5	6.7	0.52	4492	2.49	0.07
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010776918-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
010776918-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010776918-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—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—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.

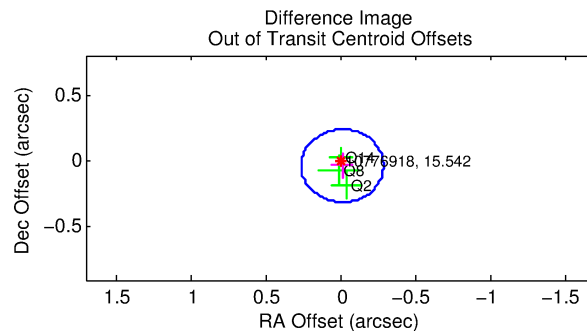
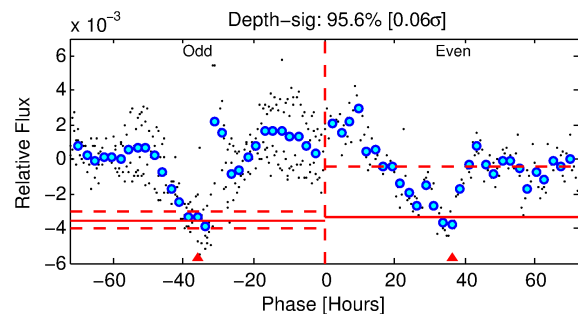
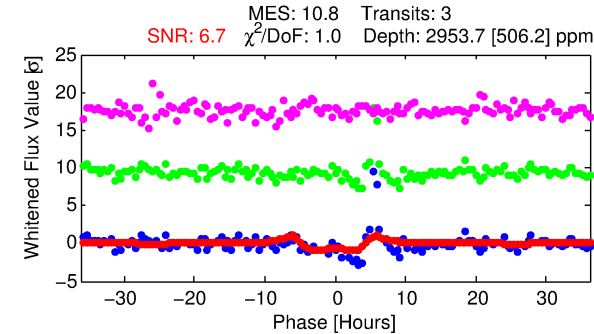
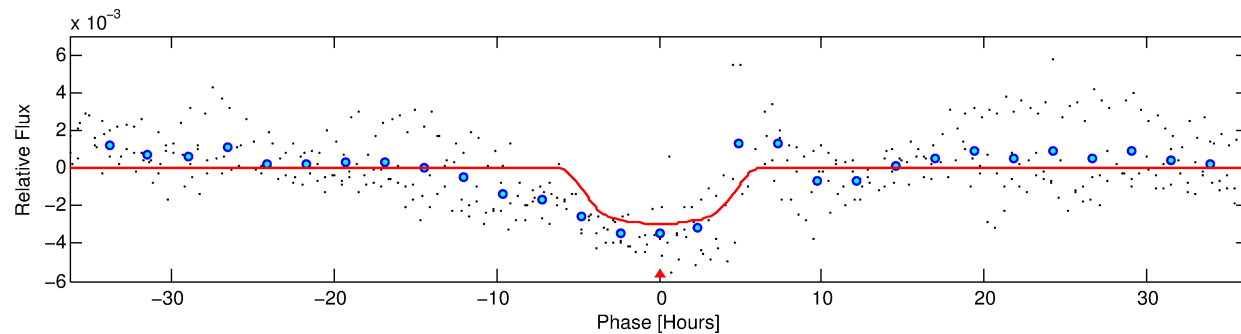
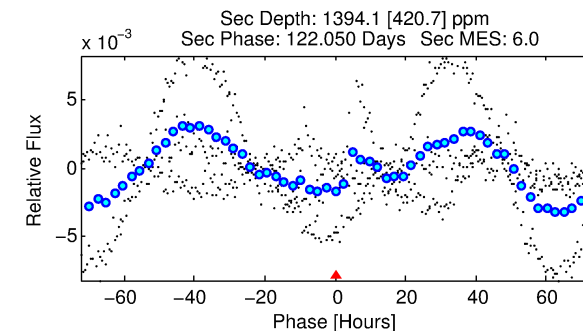
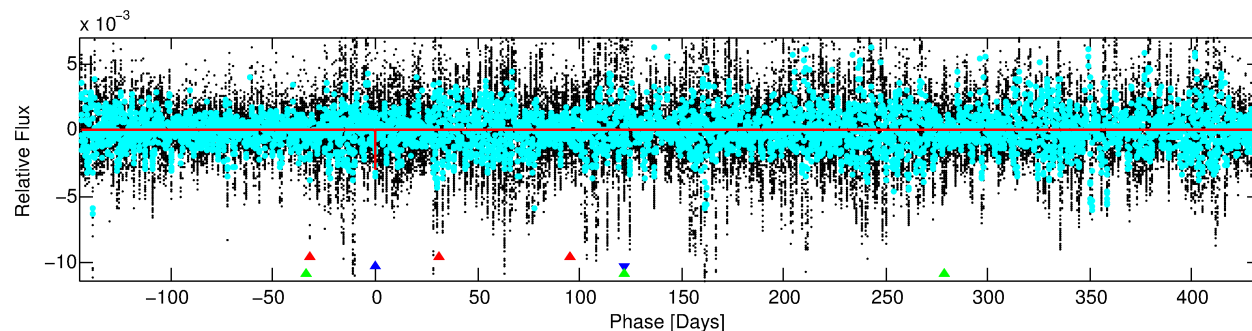
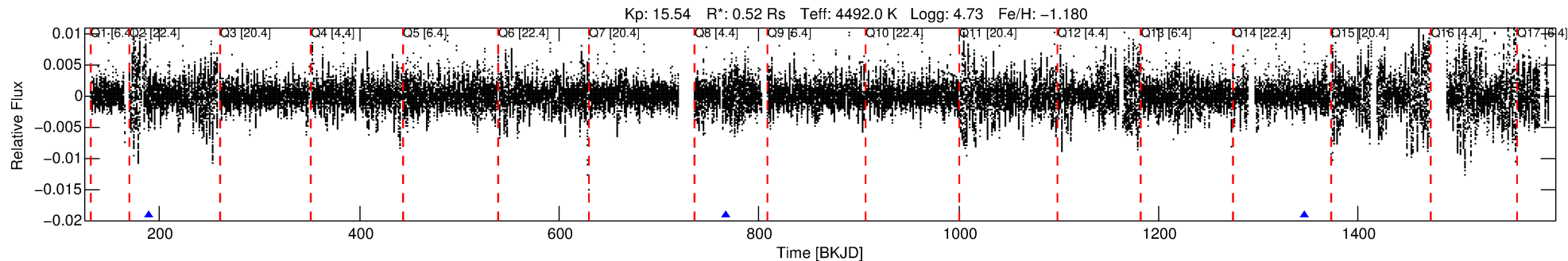
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010776918-02

No Significant Match Found

# DV One-Page Summary

KIC: 10776918 Candidate: 2 of 3 Period: 577.823 d



## DV Fit Results:

Period = 577.82342 [0.01158] d  
Epoch = 189.8627 [0.0149] BKJD  
Rp/R\* = 0.0593 [0.0061]  
a/R\* = 210.77 [34.44]  
b = 0.89 [0.04]  
Seff = 0.08 [0.01]  
Teq = 136 [5] K  
Rp = 3.34 [0.43] Re  
a = 1.0906 [0.0712] AU  
Ag = 81731.18 [30818.47] [2.65σ]  
Teff = 3563 [342] K [10.02σ]

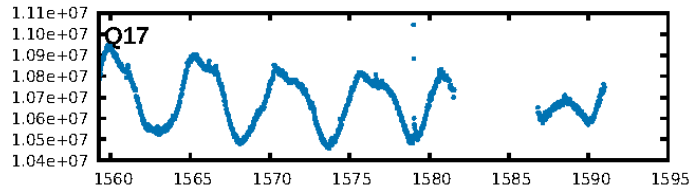
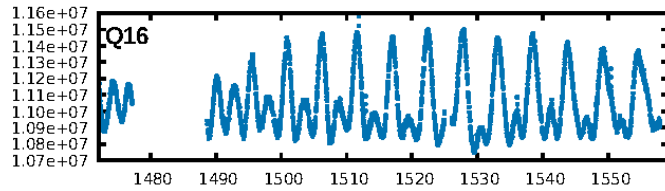
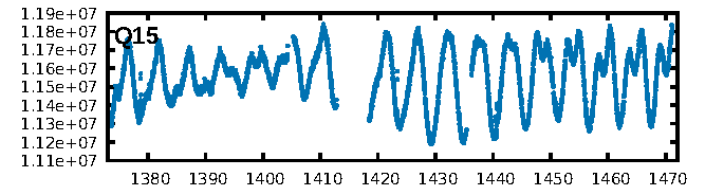
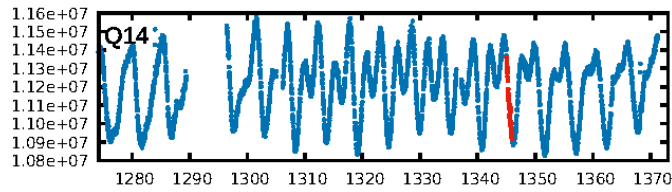
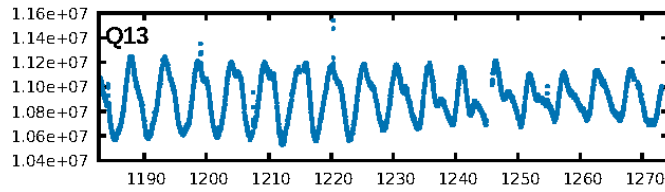
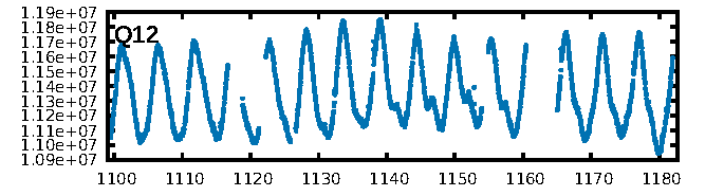
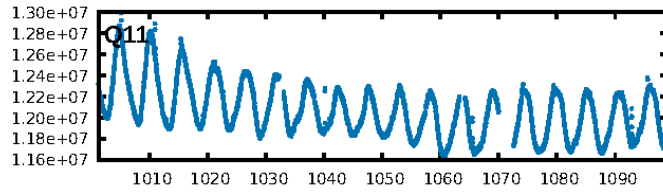
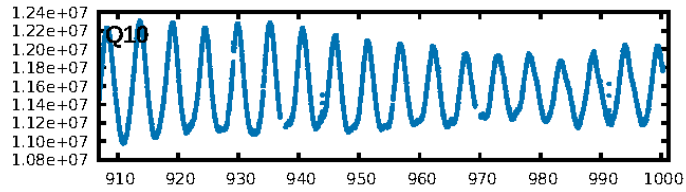
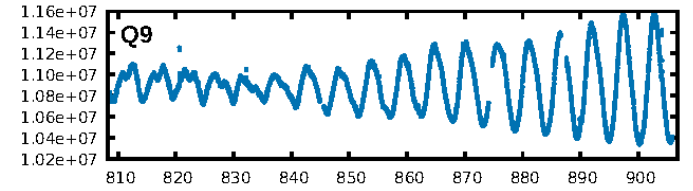
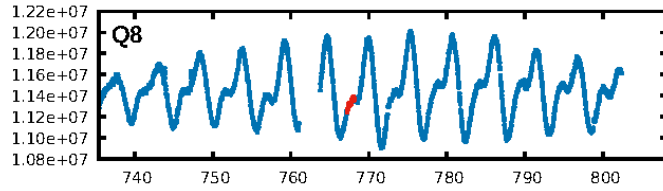
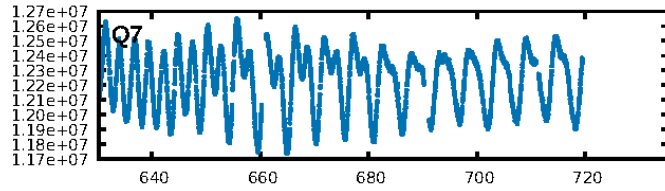
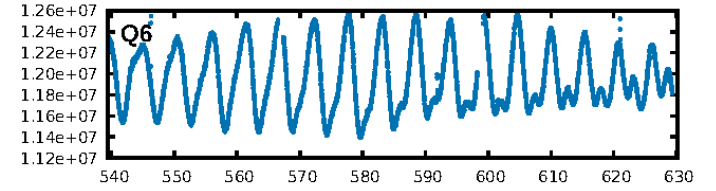
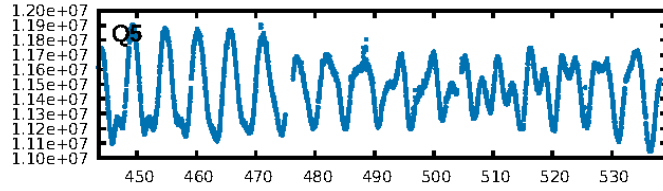
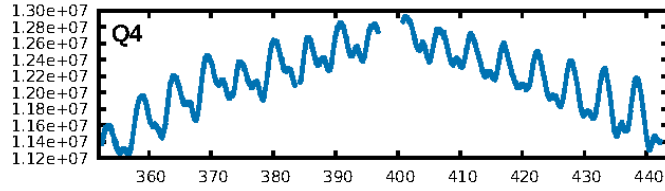
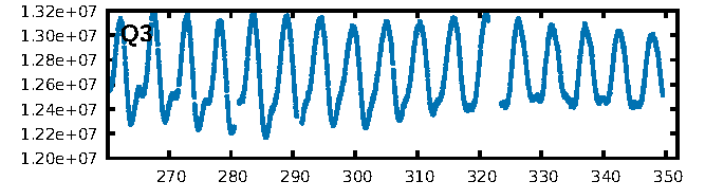
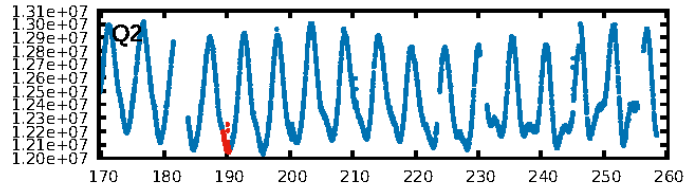
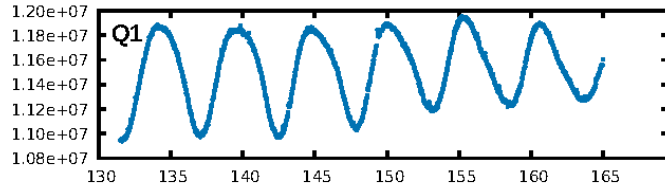
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [281.47σ]  
LongPeriod-sig: 100.0% [110.45σ]  
ModelChiSquare2-sig: 46.0%  
ModelChiSquareGof-sig: 99.0%  
**Bootstrap-pfa: 1.50e-10**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: -2.231**  
Centroid-sig: 4.4%  
Centroid-so: 1.310 arcsec [2.97σ]  
OotOffset-rm: 0.038 arcsec [0.41σ]  
KicOffset-rm: 0.107 arcsec [0.99σ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 19:23:57 Z

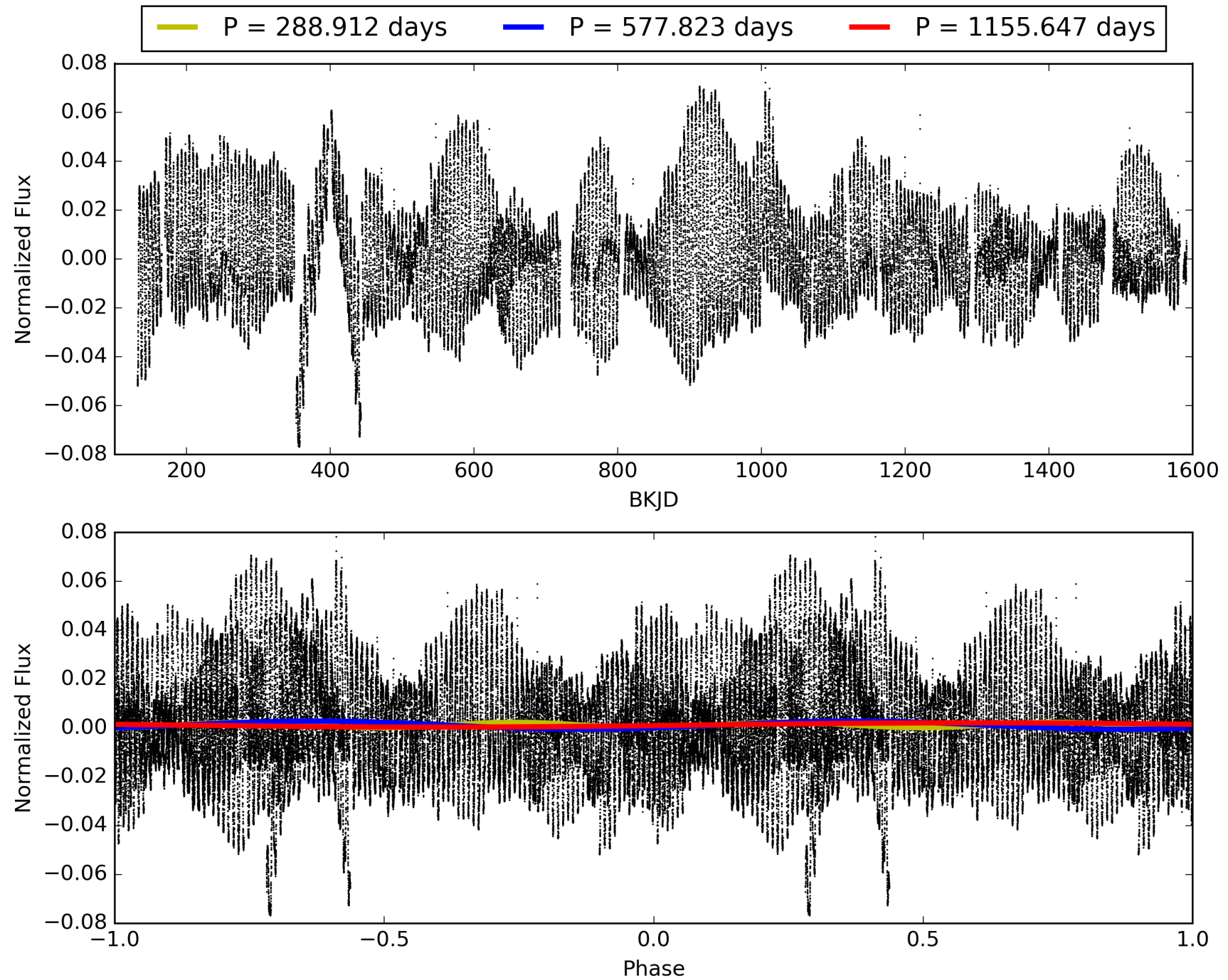
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010776918-02, PDC Light Curves





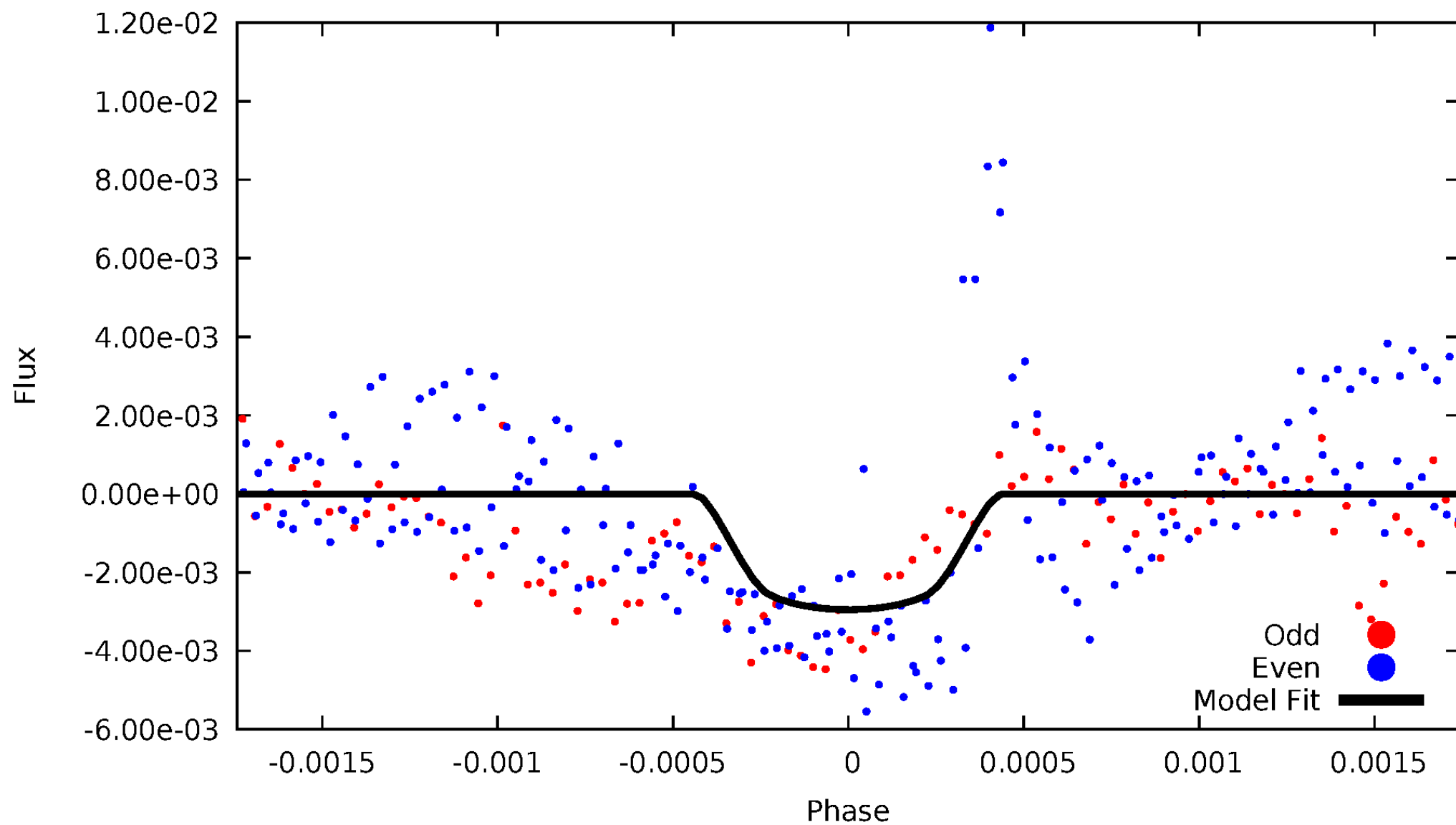
# TCE 010776918-02





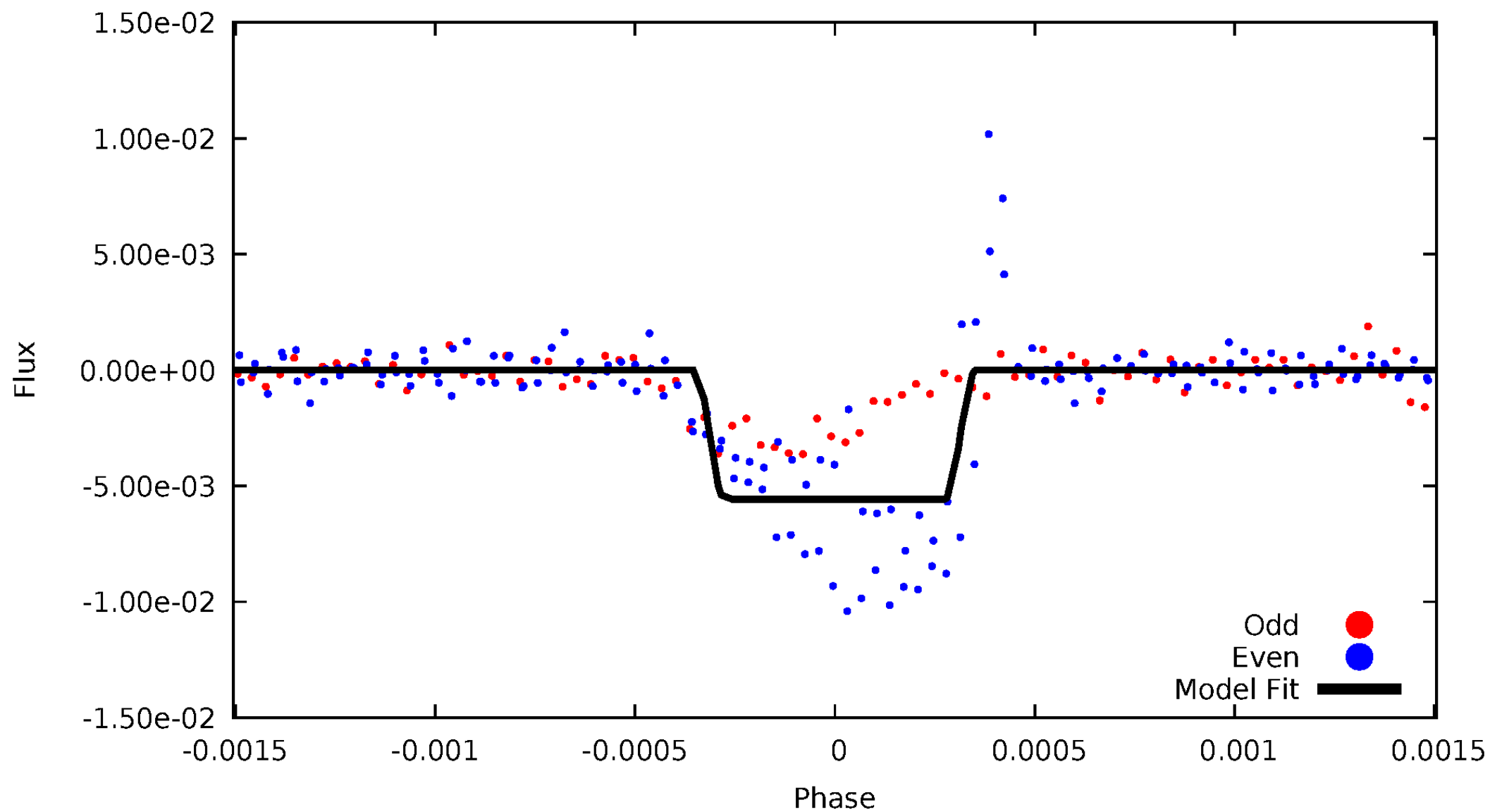
# DV Odd/Even

TCE 010776918-02



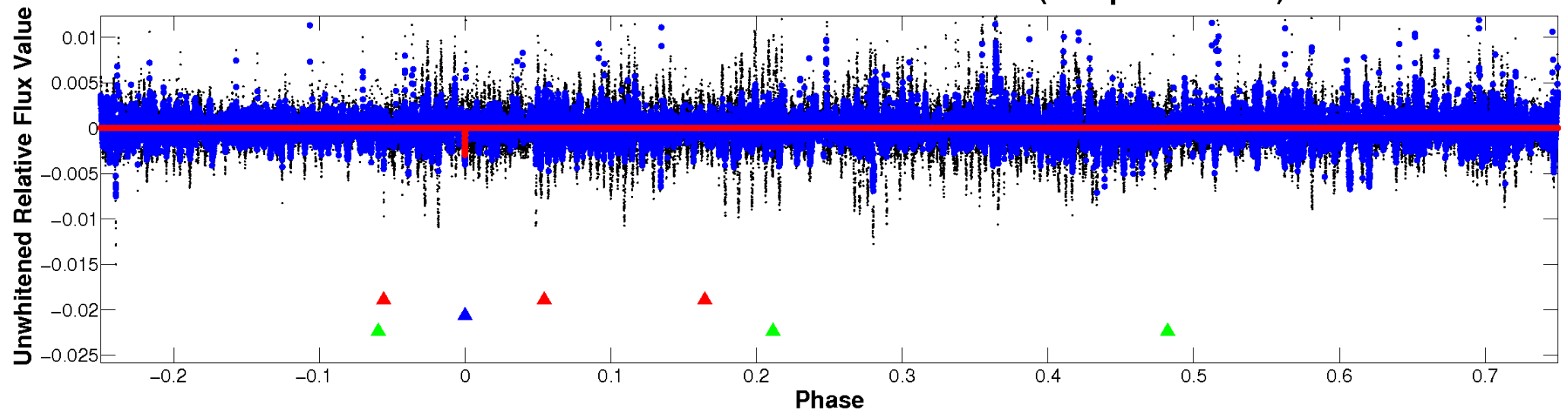
# ALT Odd/Even

TCE 010776918-02

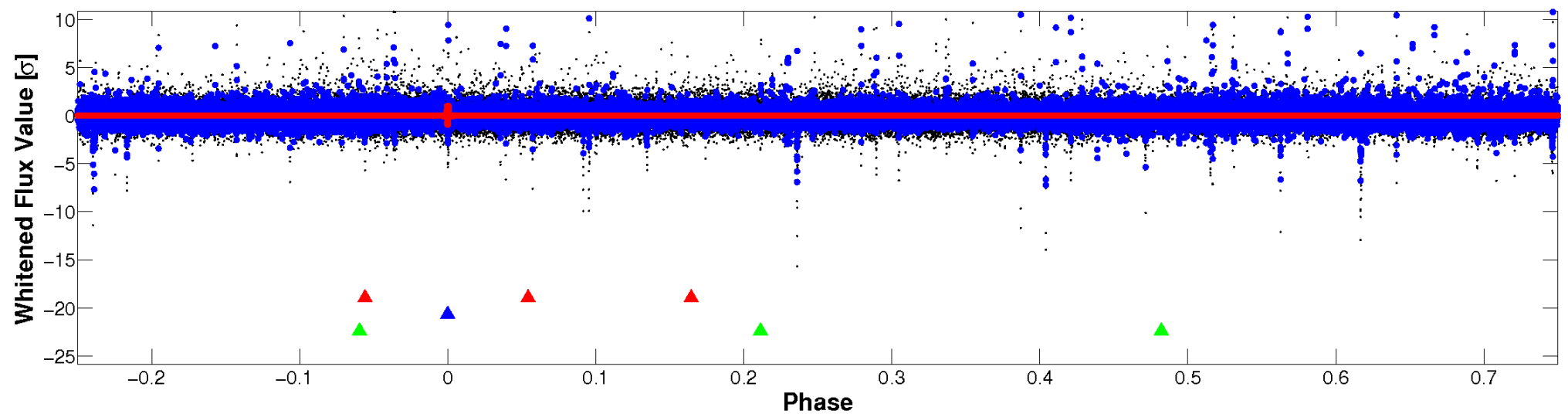


# Non-Whitened Vs. Whitened Light Curve

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

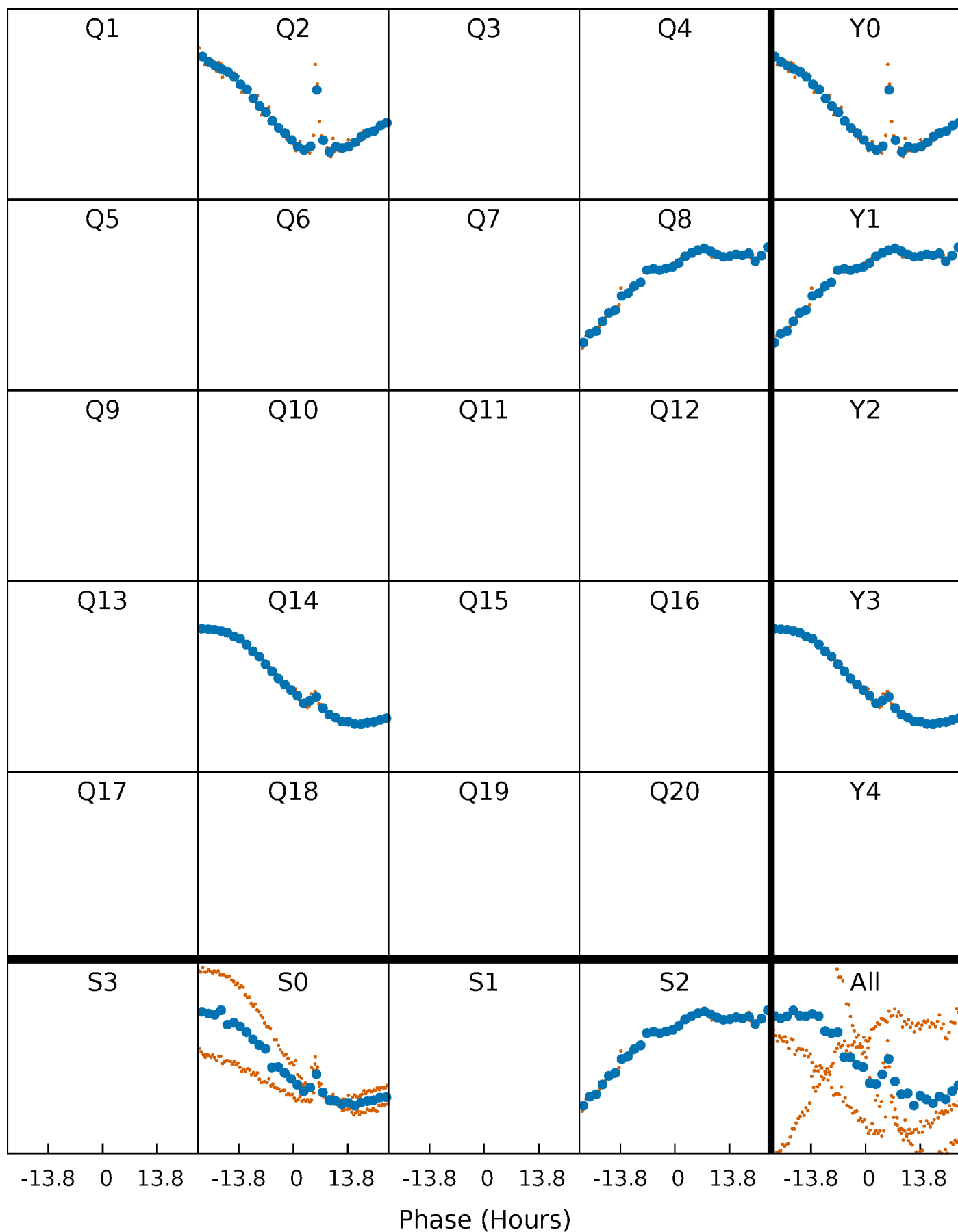


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

TCE 010776918-02 P=577.823421 Days  $T_0=189.862725$  (BKJD)



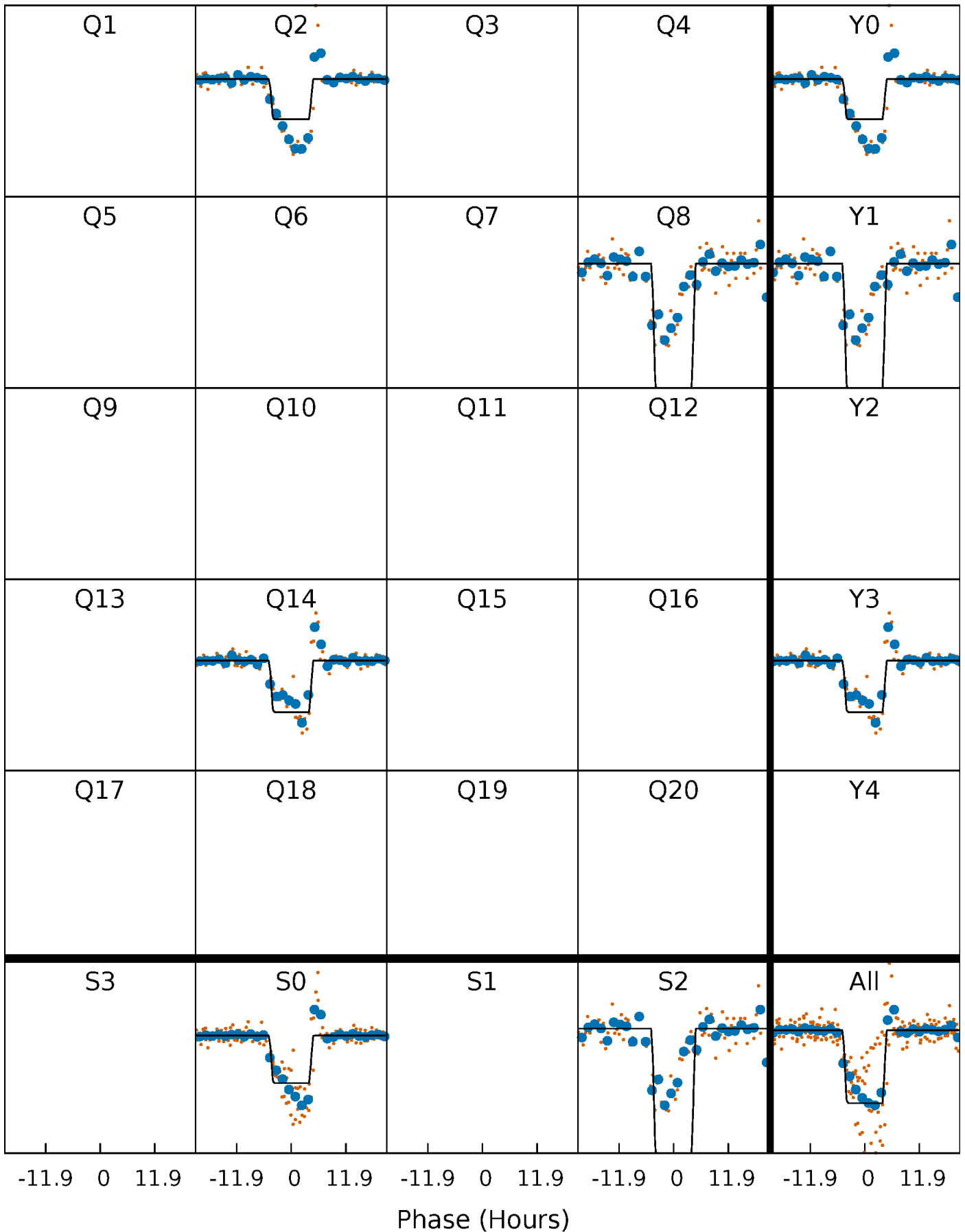
# DV Quarter-Phased Transit Curves

TCE 010776918-02 P=577.823421 Days  $T_0=189.862725$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

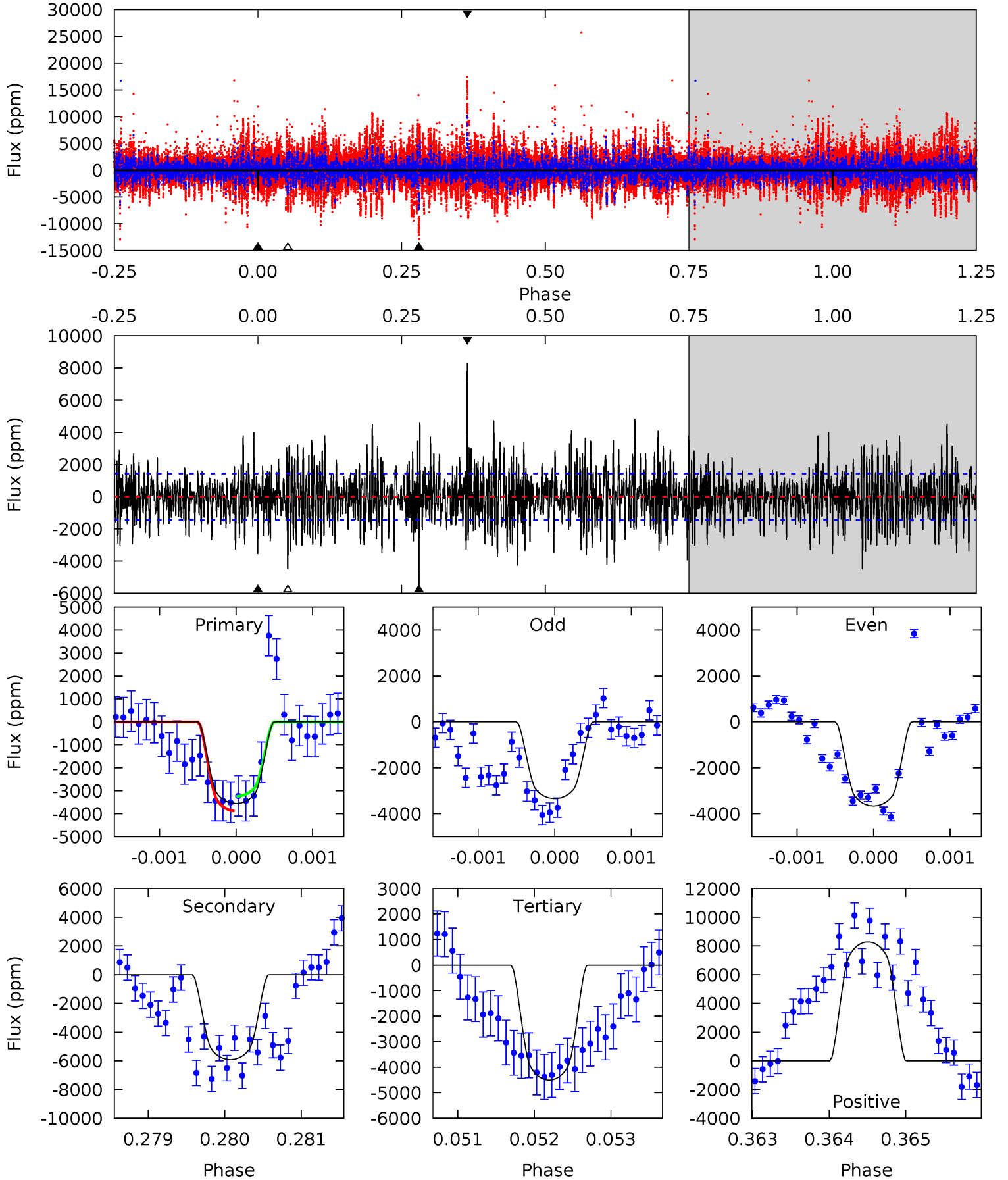
TCE 010776918-02 P=577.820210 Days  $T_0=189.874635$  (BKJD)



# DV Model-Shift Uniqueness Test

010776918-02, P = 577.823421 Days, E = 189.862725 Days

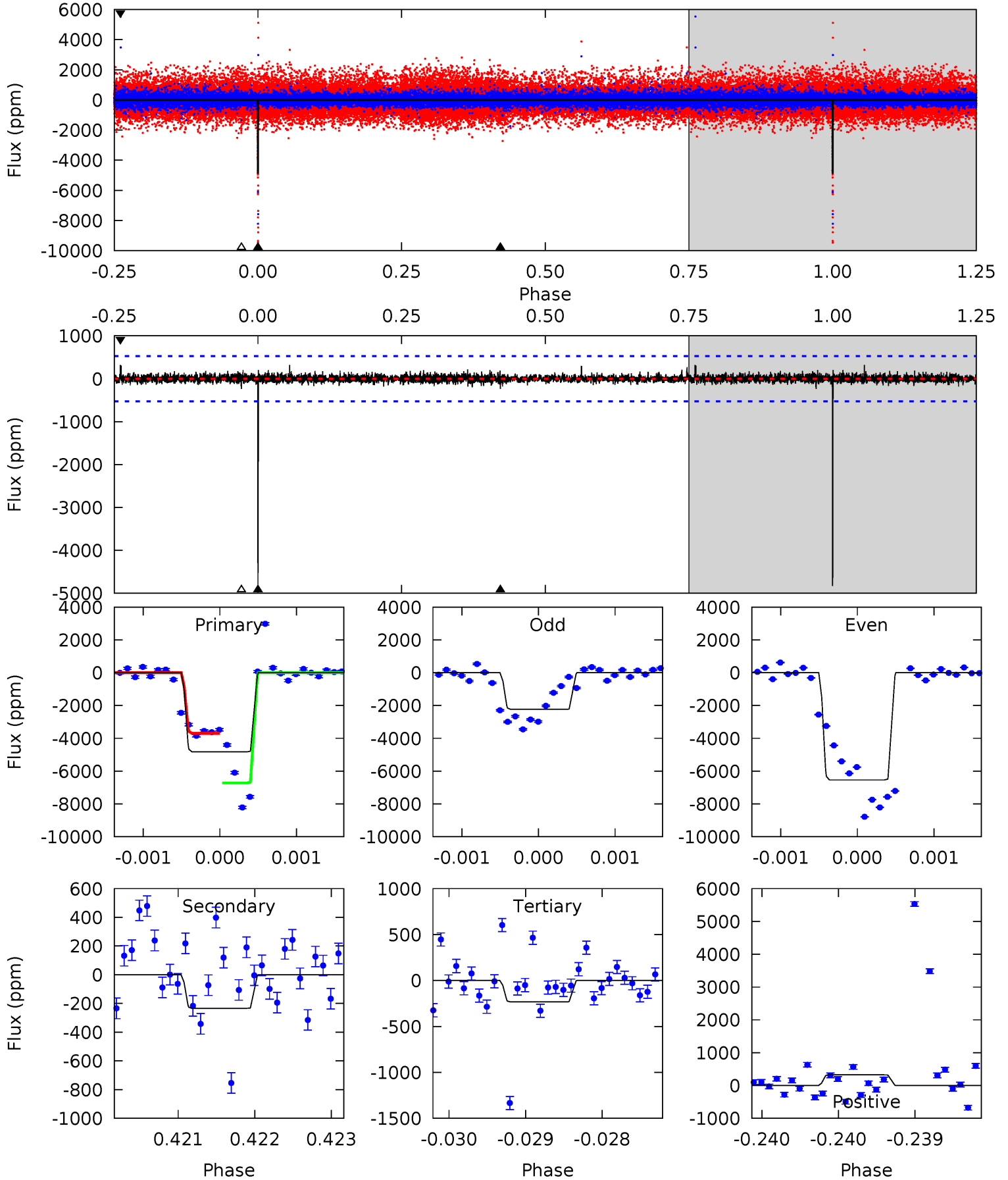
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.5	22.4	17.0	31.4	5.47	3.32	5.17	-3.60	-17.9	5.32	-9.01	0.57	1.06	0.58	1.22



# Alt Model-Shift Uniqueness Test

010776918-02, P = 577.820210 Days, E = 189.874635 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
50.6	2.46	2.44	3.38	5.51	3.39	0.49	48.2	47.2	0.02	-0.93	25.8	1.05	0.06	15.6





### Stellar Parameters For KIC 010776918

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4492^{+134}_{-134}$	$4.727^{+0.052}_{-0.028}$	$-1.180^{+0.300}_{-0.300}$	$0.516^{+0.032}_{-0.040}$	$0.518^{+0.036}_{-0.029}$	$5.317^{+1.227}_{-0.688}$
	+3%/-3%	+1%/-1%	+25%/-25%	+6%/-8%	+7%/-6%	+23%/-13%
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 010776918-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-5908 \pm 264$	$3.31^{+0.35}_{-0.36}$	$189^{+7}_{-6}$	$4995^{+291}_{-251}$	$356618^{+93783}_{-67446}$
Alt.	$-234 \pm 95$	$4.16^{+0.43}_{-0.37}$	$189^{+7}_{-6}$	$2712^{+162}_{-195}$	$8657^{+4611}_{-3929}$

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

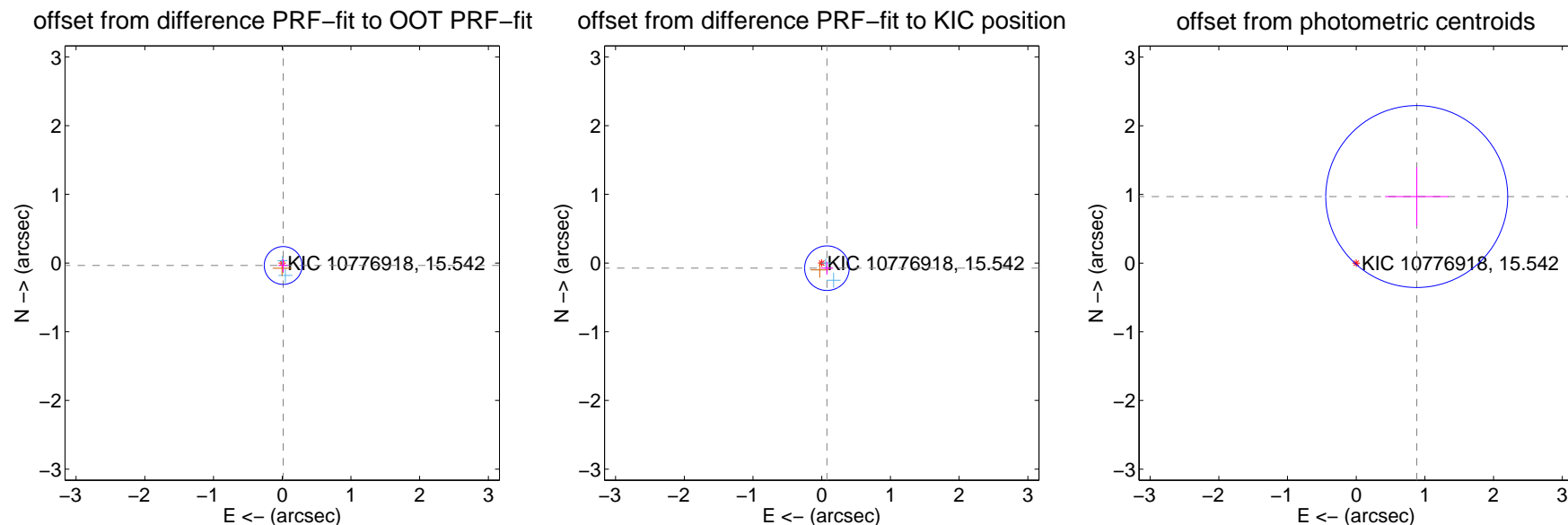
## DV Centroid Data

Supplemental centroid analysis for 010776918-02. Kepler magnitude: 15.54. Transit SNR 6.73

There are 2 quarters with good PRF difference image offsets

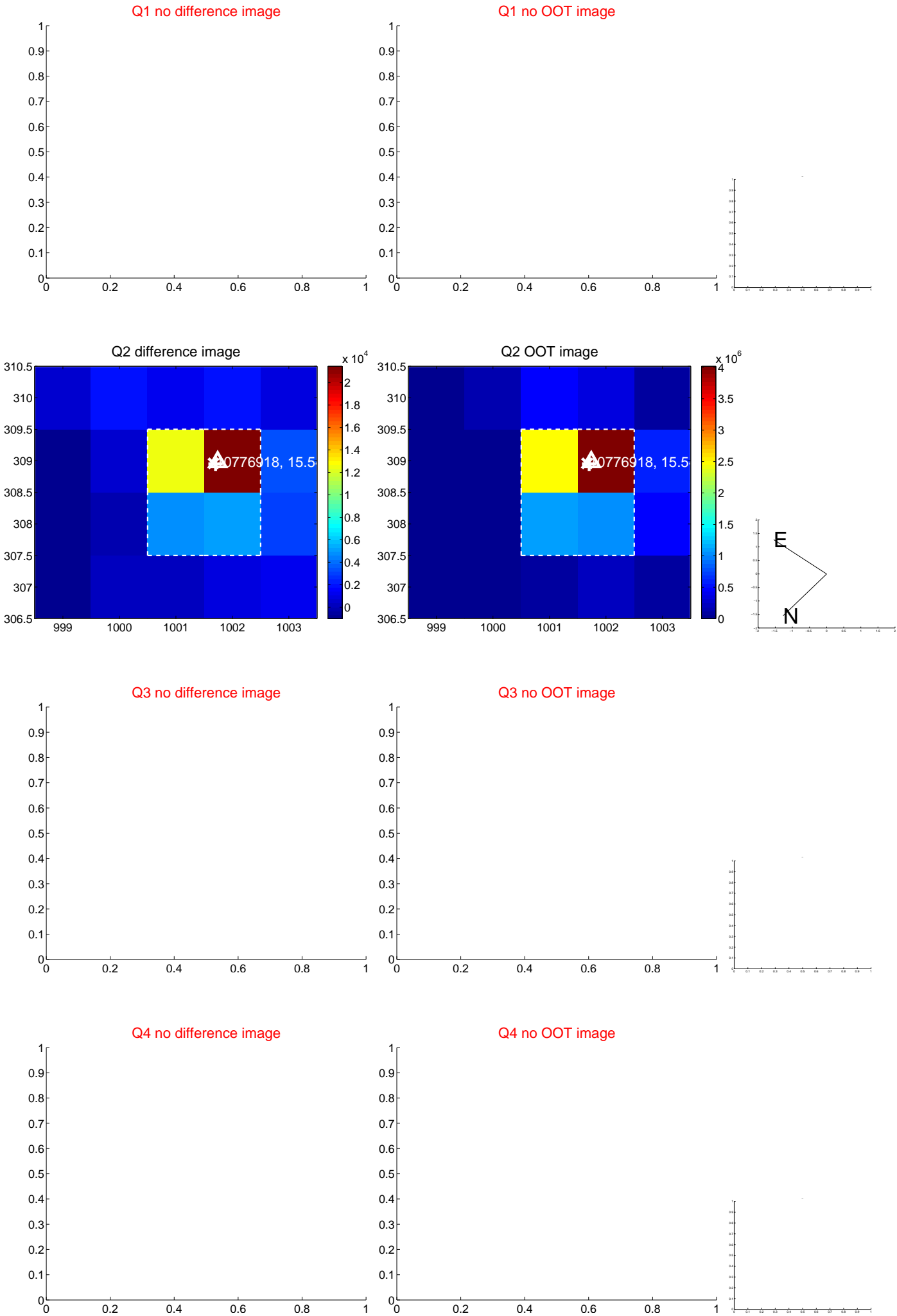
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.038 \pm 0.092$	0.41	$-0.014 \pm 0.069$	$-0.035 \pm 0.095$
PRF-fit source offset from KIC position	$0.107 \pm 0.108$	0.99	$-0.076 \pm 0.089$	$-0.075 \pm 0.095$
photometric centroid source offset	$1.31 \pm 0.44$	2.97	$-0.88 \pm 0.46$	$0.97 \pm 0.43$

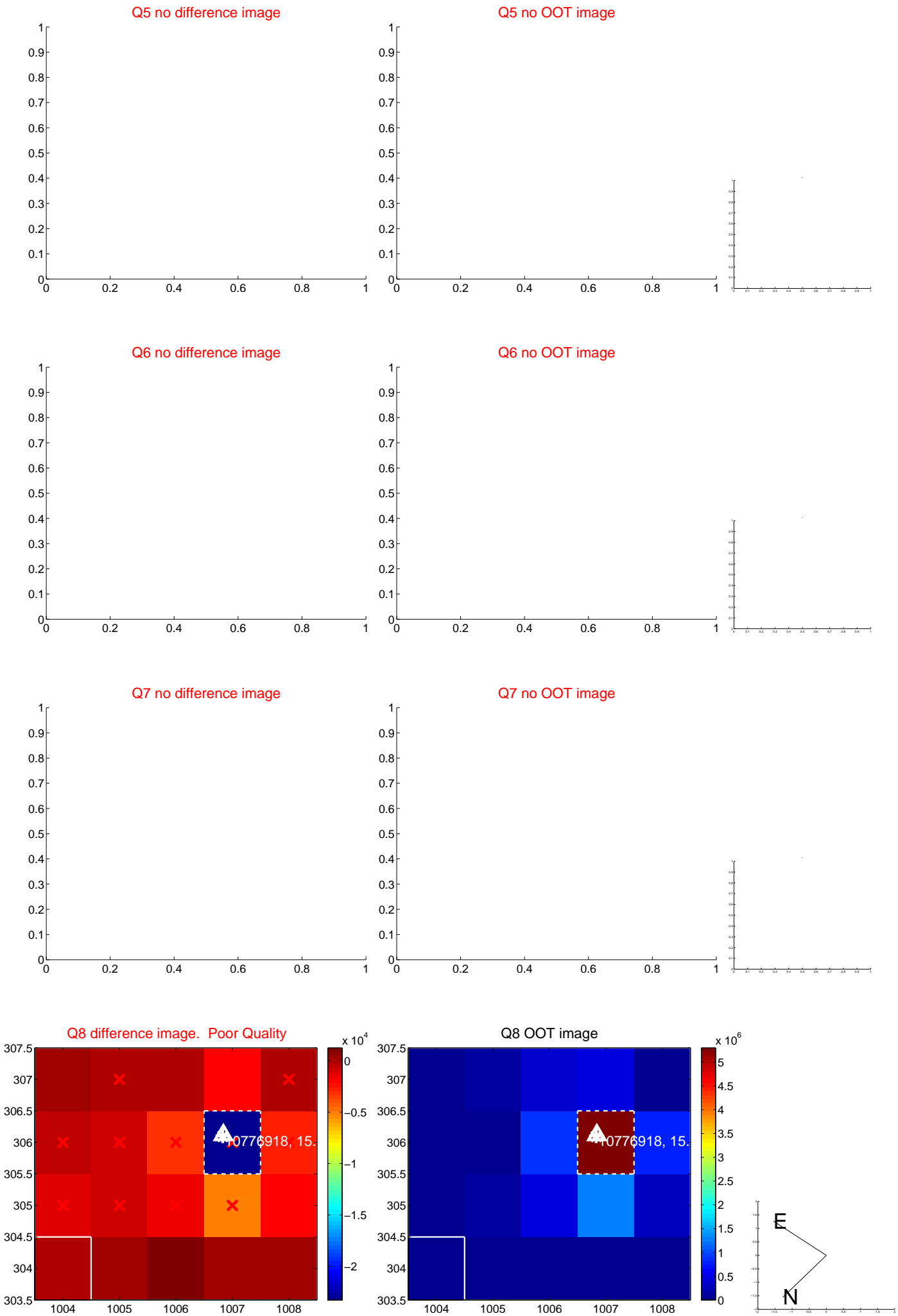


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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



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



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



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

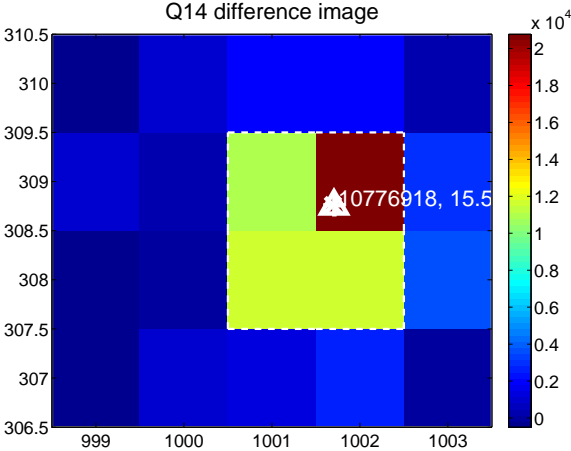
Q13 no difference image



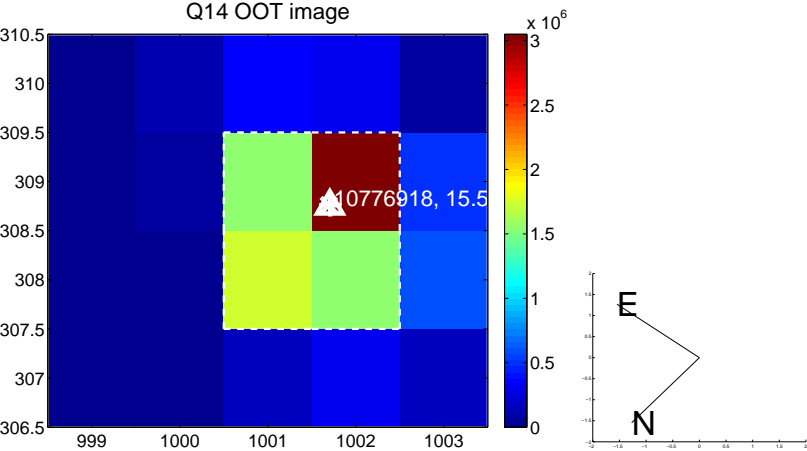
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



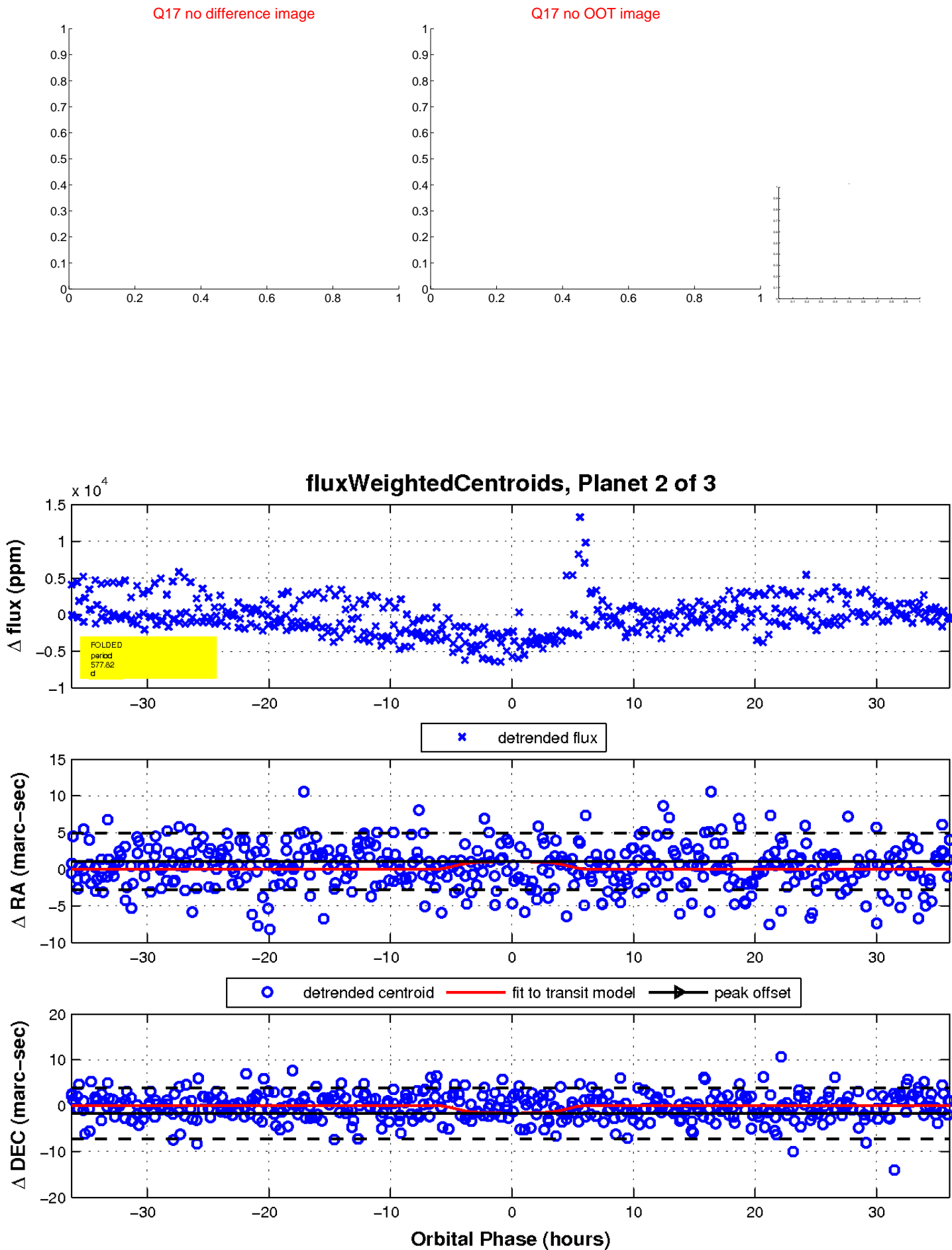
Q16 no difference image



Q16 no OOT image

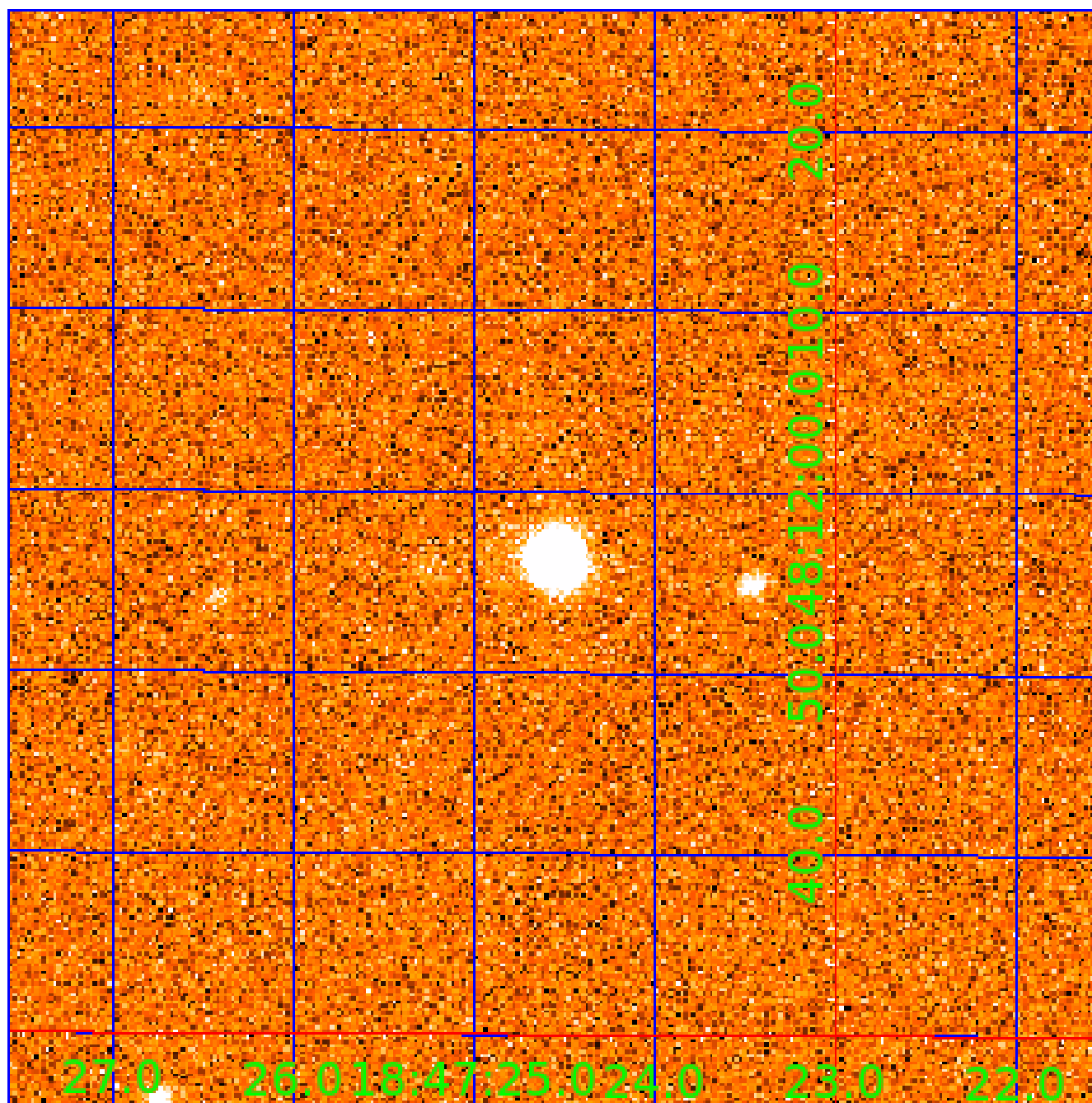


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 010776918

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010776918-01	OBS	No	641.498103	157.584928	2421.3	6.747	11.5	6.7	0.52	4492	2.49	0.07
010776918-02	OBS	No	577.823421	189.862725	2953.7	12.079	10.8	6.7	0.52	4492	3.34	0.08
010776918-03	OBS	No	421.334293	468.458899	1913.2	5.669	10.5	6.6	0.52	4492	2.25	0.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010776918-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
010776918-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010776918-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—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—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.

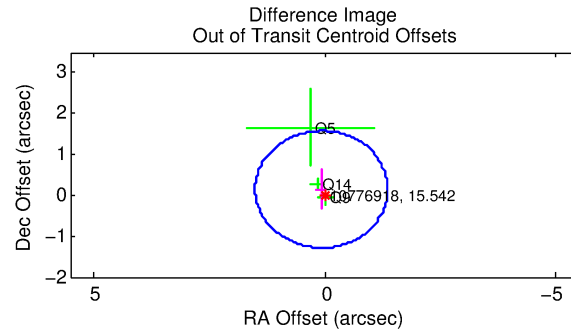
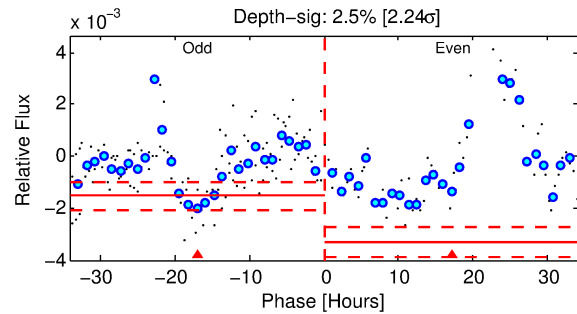
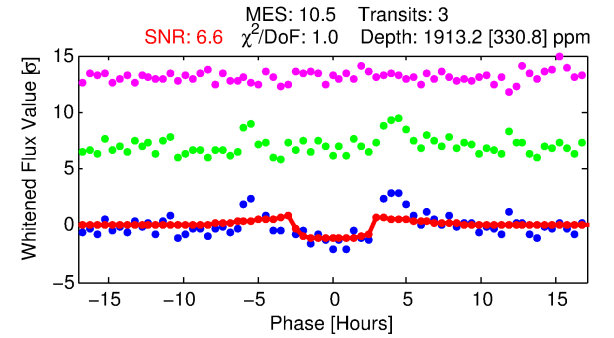
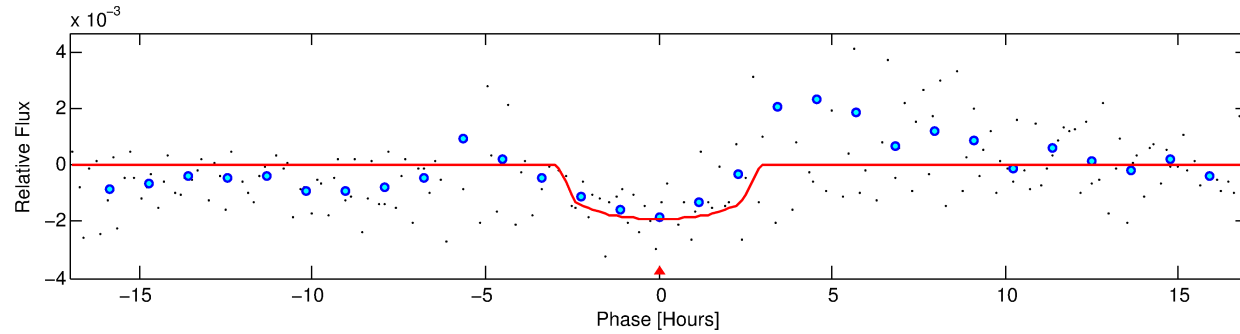
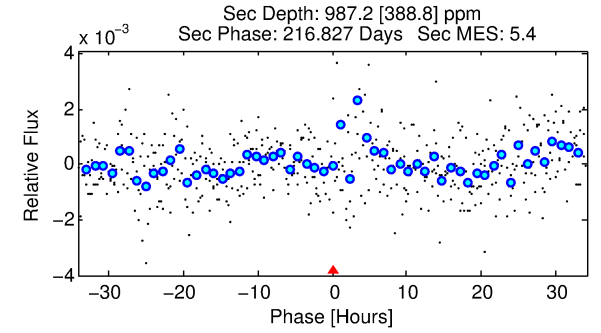
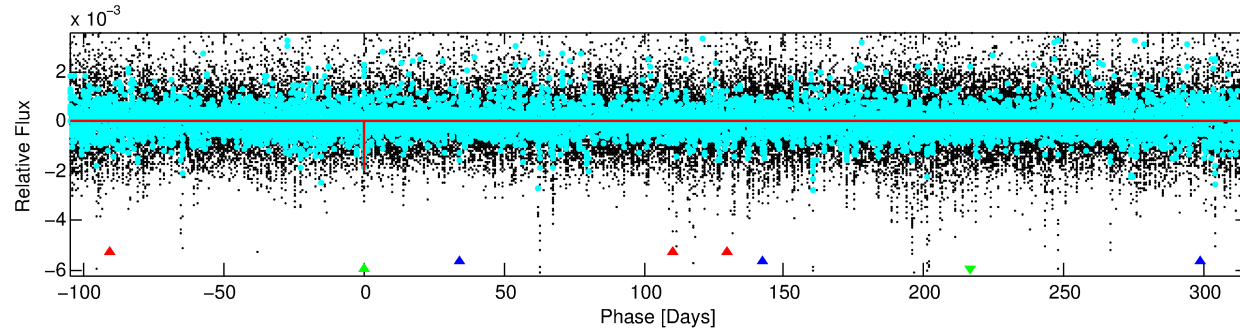
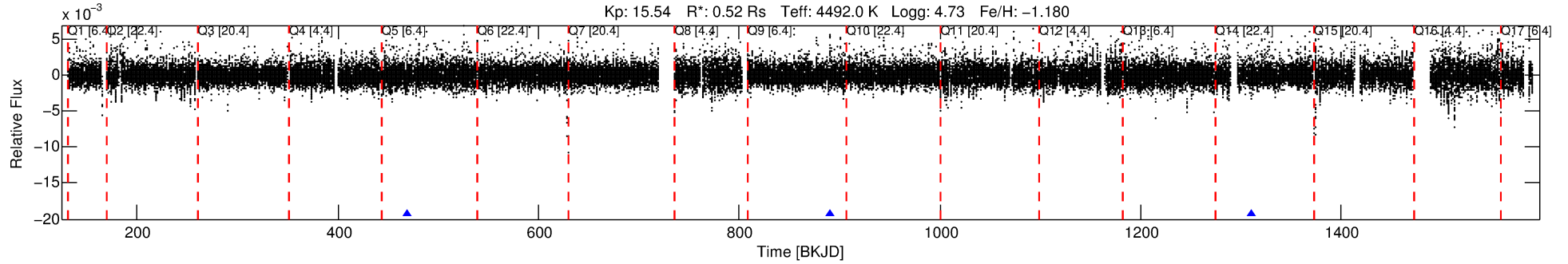
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010776918-03

No Significant Match Found

# DV One-Page Summary

KIC: 10776918 Candidate: 3 of 3 Period: 421.334 d



## DV Fit Results:

Period = 421.33429 [0.00990] d  
Epoch = 468.4589 [0.0121] BKJD  
Rp/R\* = 0.0400 [0.0576]  
a/R\* = 549.85 [2997.50]  
b = 0.38 [12.45]  
Seff = 0.12 [0.02]  
Teq = 151 [6] K  
Rp = 2.25 [3.25] Re  
a = 0.8835 [0.0577] AU  
Ag = 83532.00 [242895.38] [0.34σ]  
Teffp = 3981 [2895] K [1.32σ]

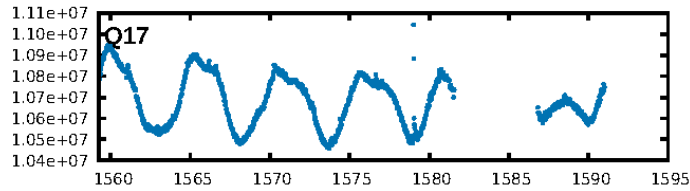
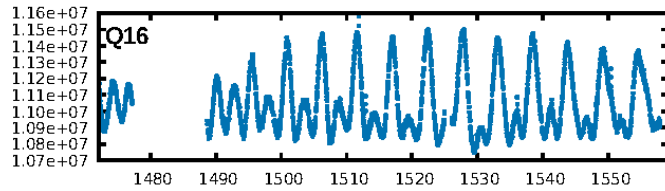
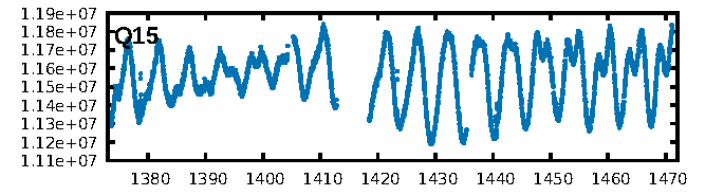
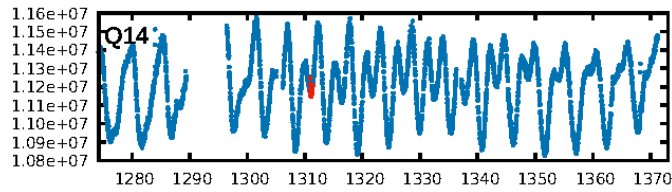
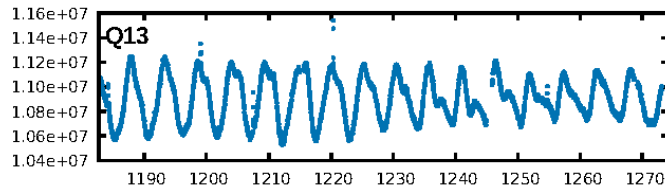
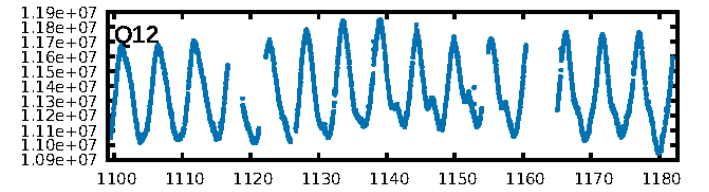
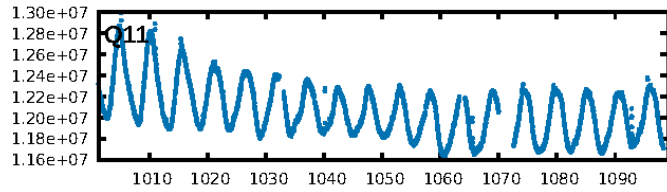
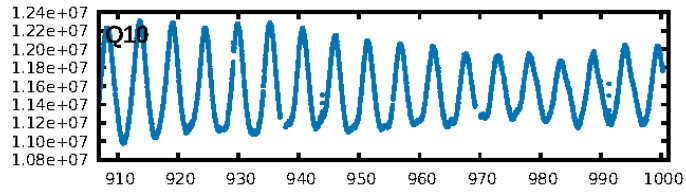
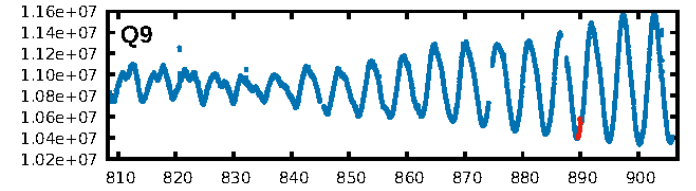
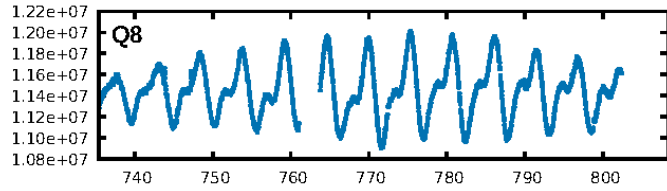
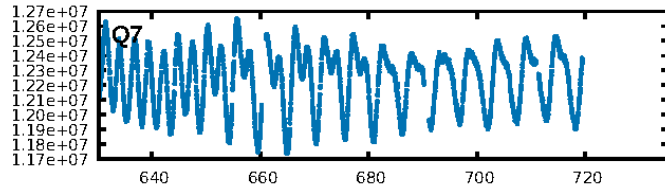
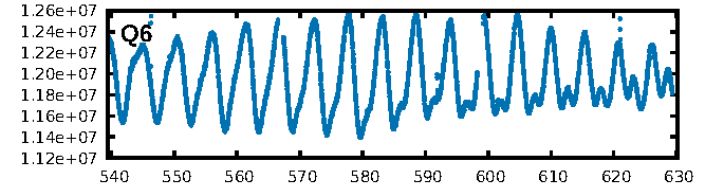
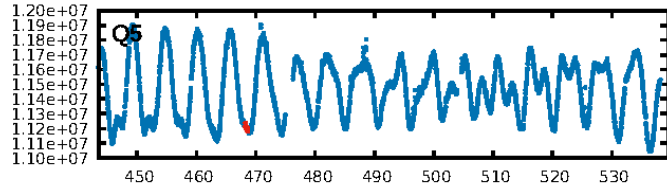
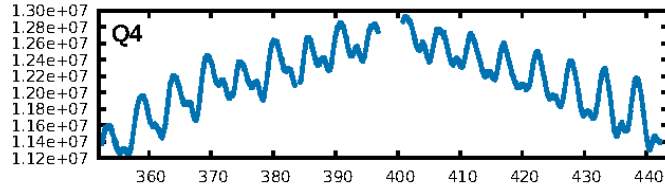
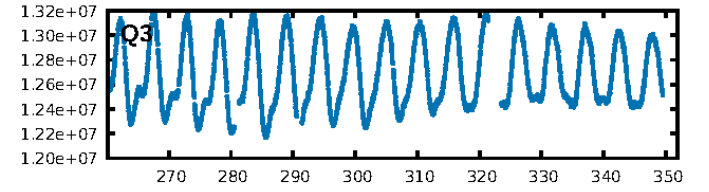
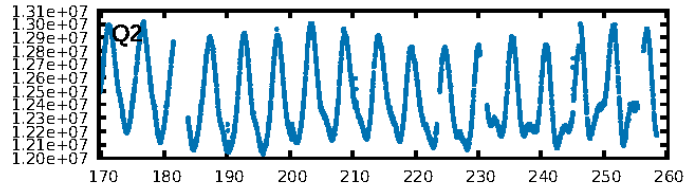
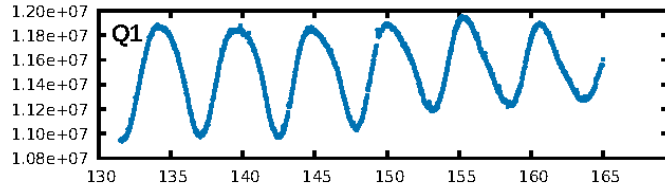
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [281.47σ]  
ModelChiSquare2-sig: 5.9%  
ModelChiSquareGof-sig: 96.1%  
**Bootstrap-pfa: 4.48e-10**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: -8.199**  
Centroid-sig: 31.4%  
Centroid-so: 0.905 arcsec [0.83σ]  
OotOffset-rm: 0.161 arcsec [0.34σ]  
OotOffset-st: 1/0/0/2 [3]  
KicOffset-rm: 0.145 arcsec [0.39σ]  
KicOffset-st: 1/0/0/2 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

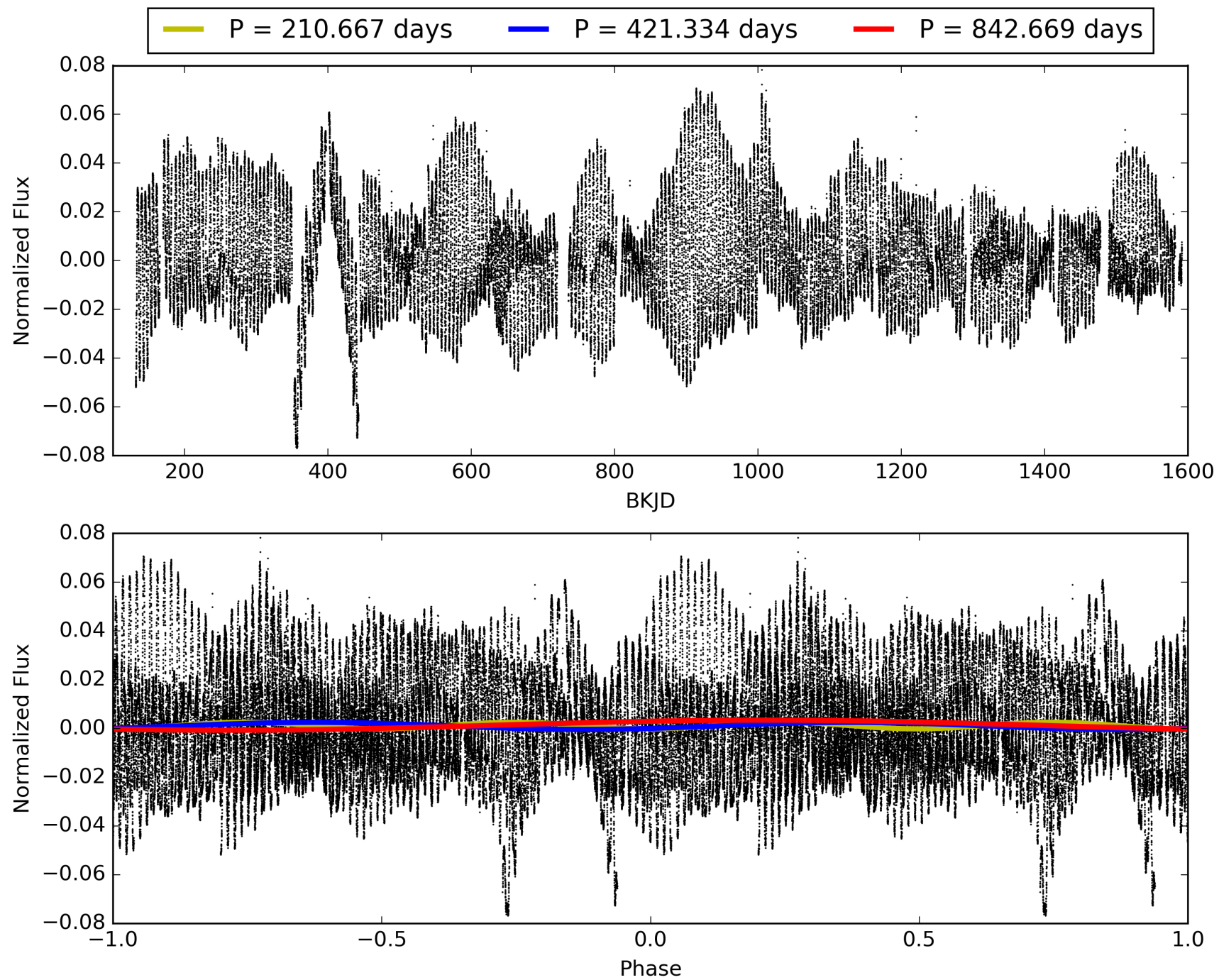
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 19:24:11 Z

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

# TCE 010776918-03, PDC Light Curves

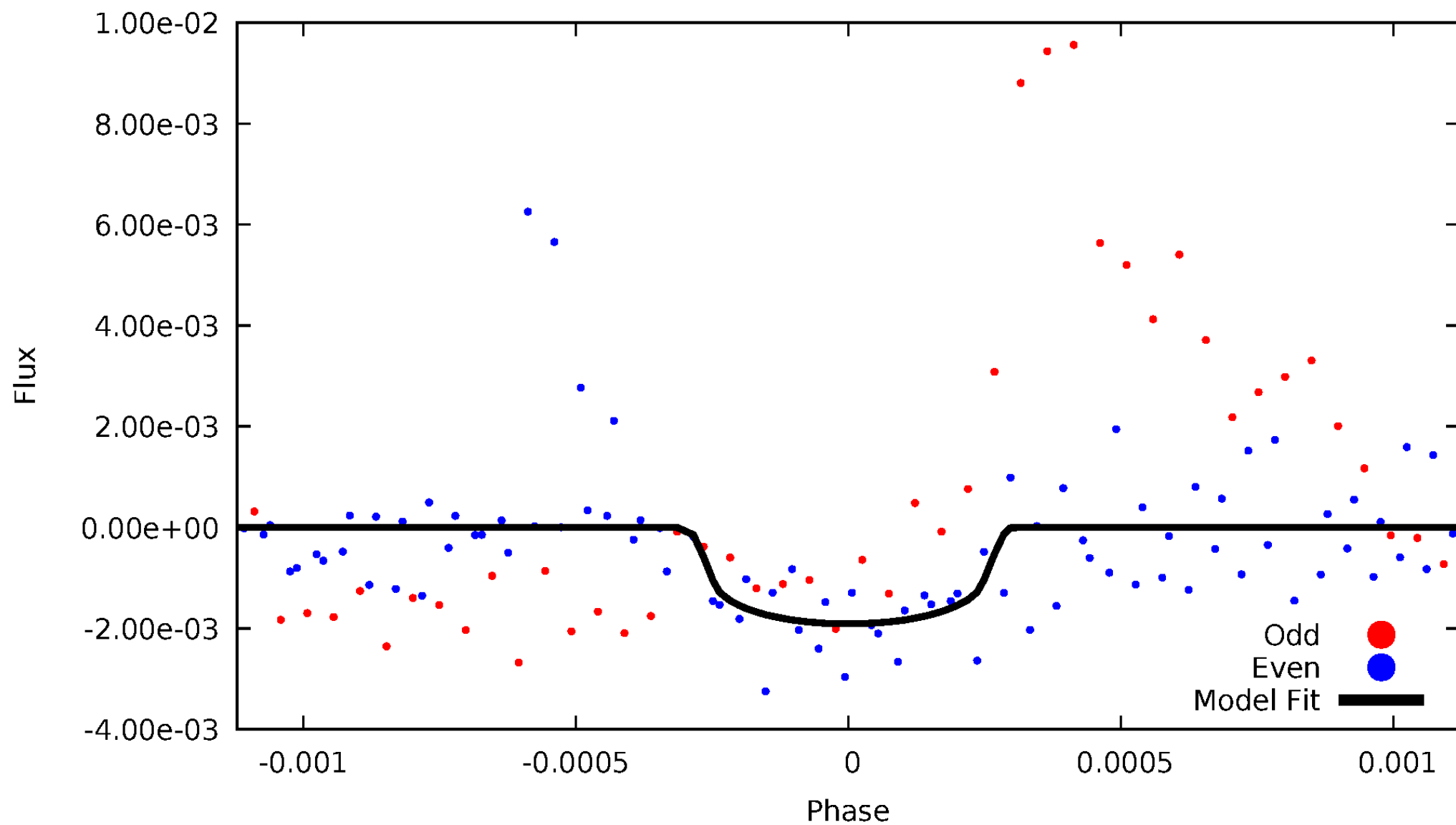


# TCE 010776918-03



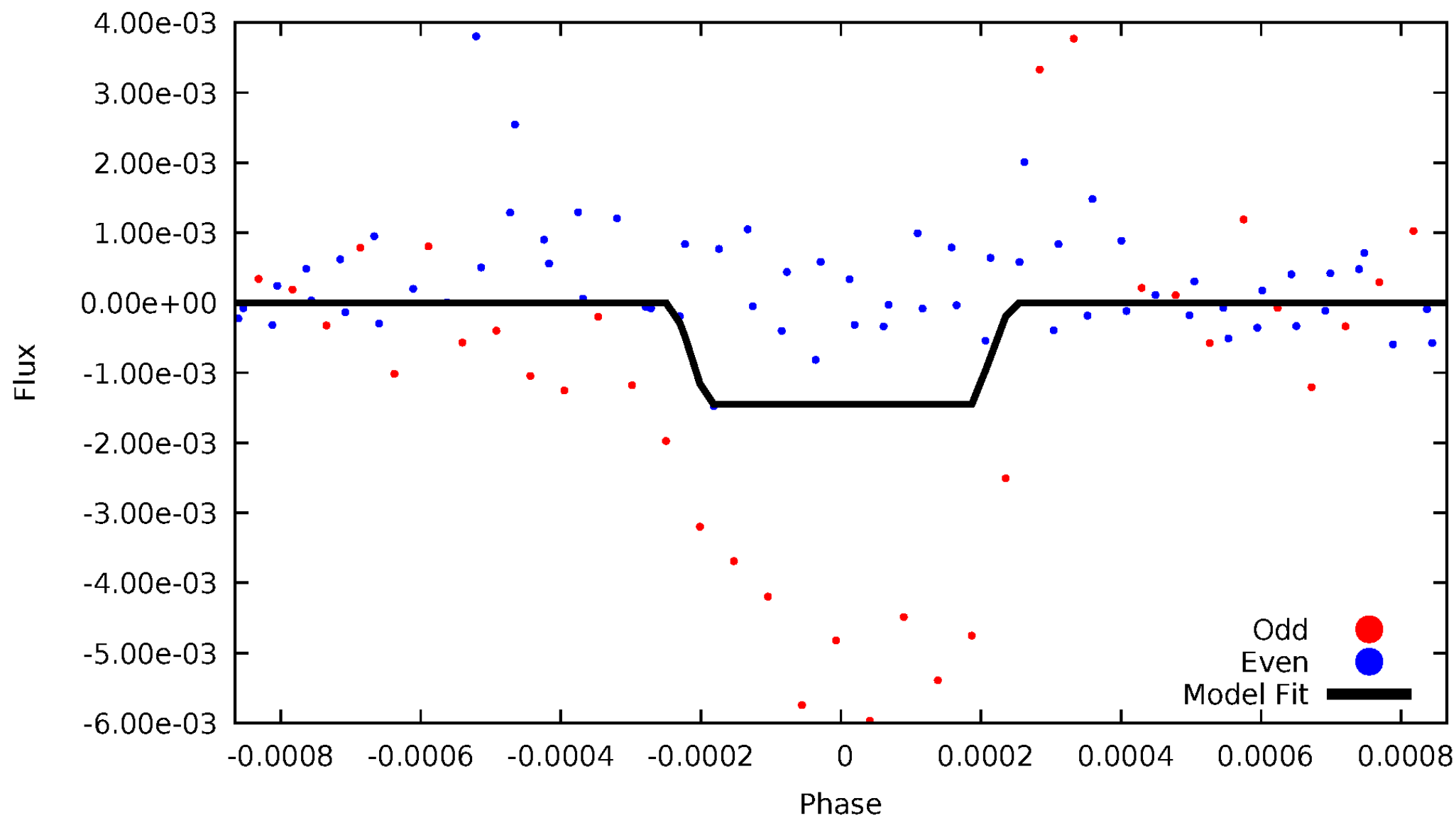
# DV Odd/Even

TCE 010776918-03



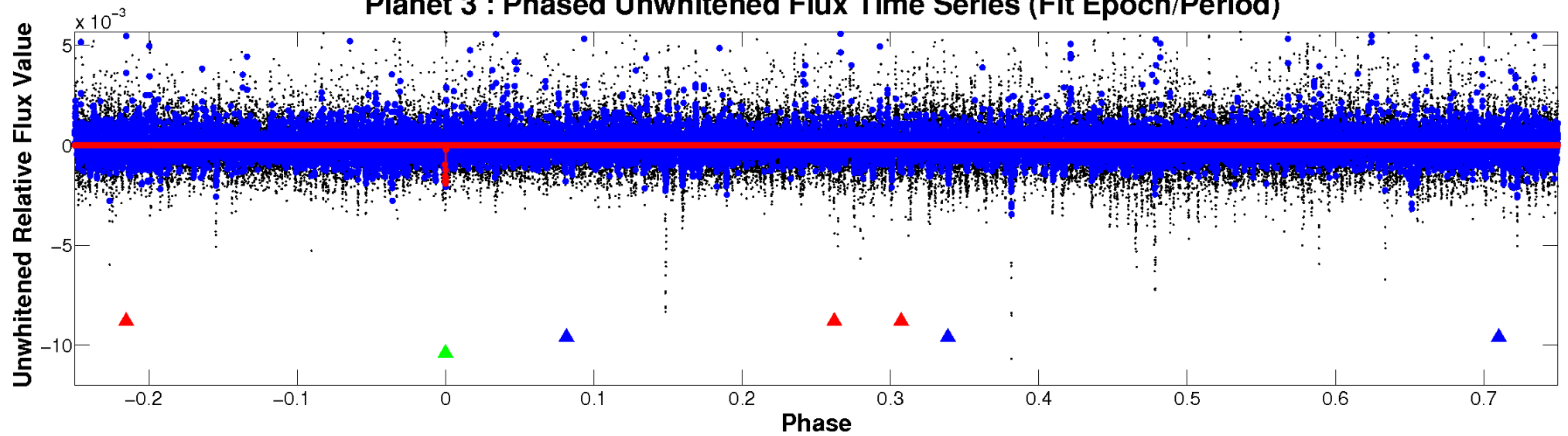
# ALT Odd/Even

TCE 010776918-03

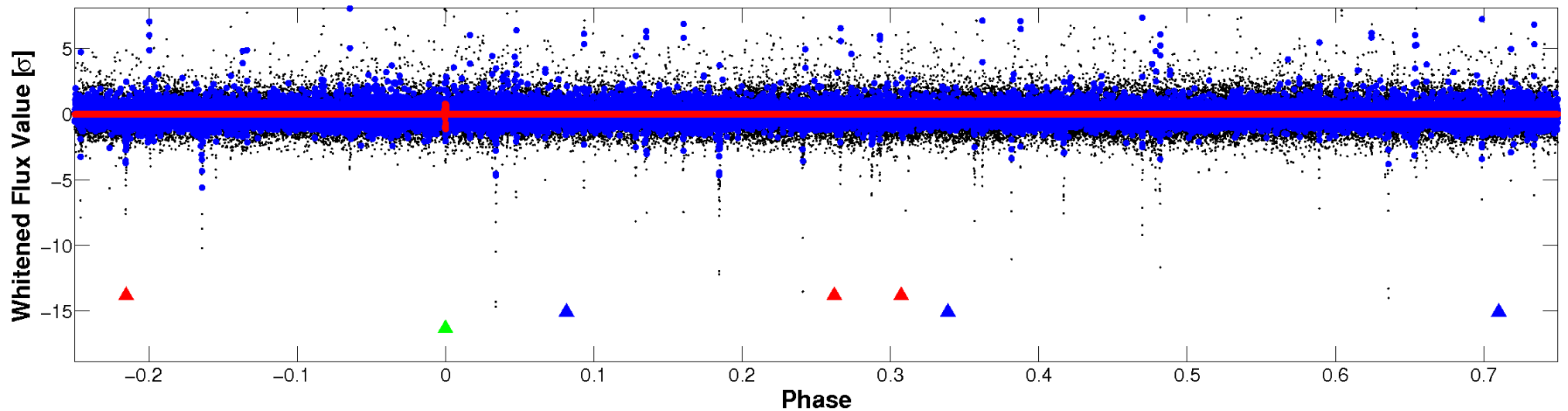


# Non-Whitened Vs. Whitened Light Curve

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



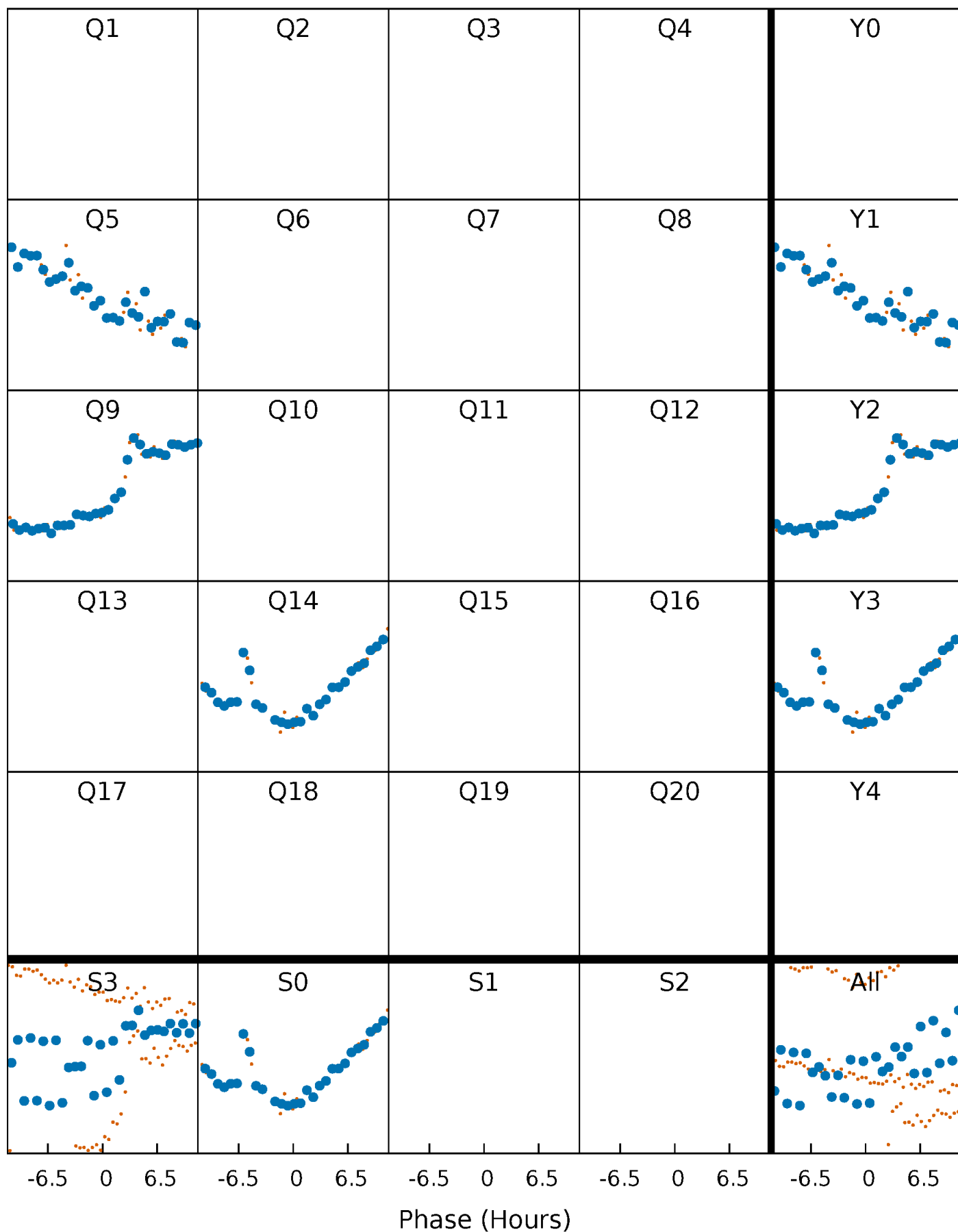
Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

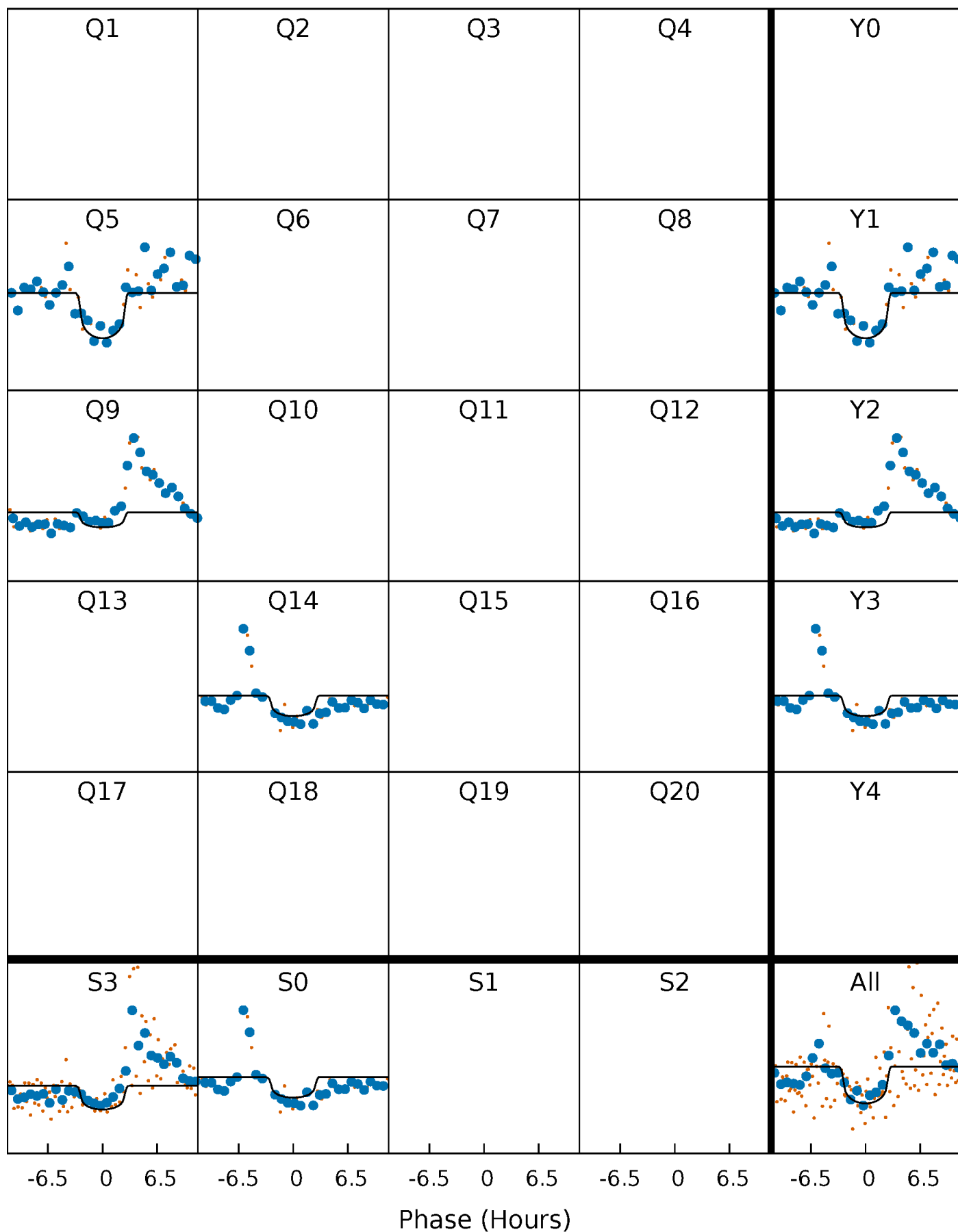
TCE 010776918-03 P=421.334293 Days  $T_0=468.458899$  (BKJD)





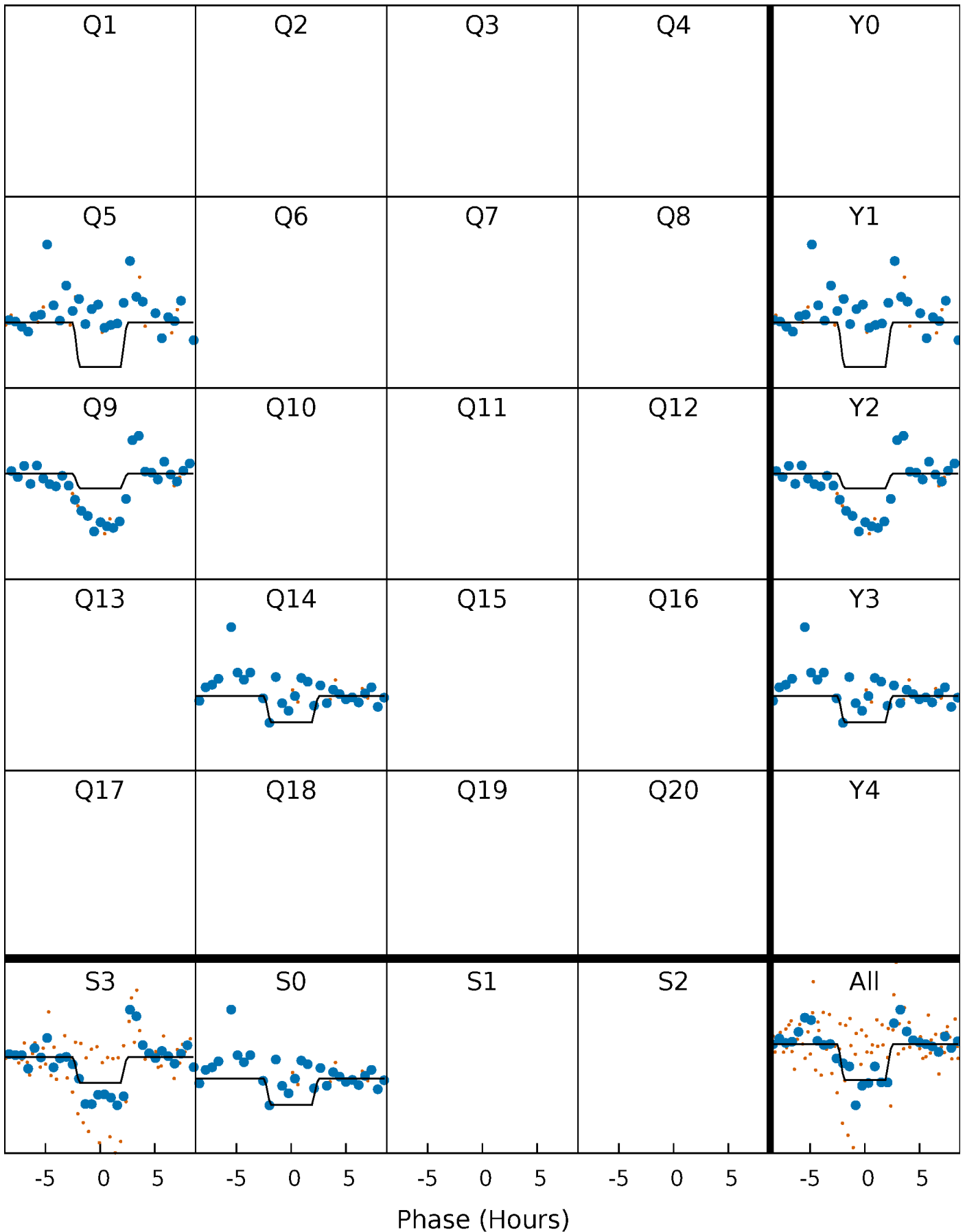
# DV Quarter-Phased Transit Curves

TCE 010776918-03     $P=421.334293$  Days     $T_0=468.458899$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

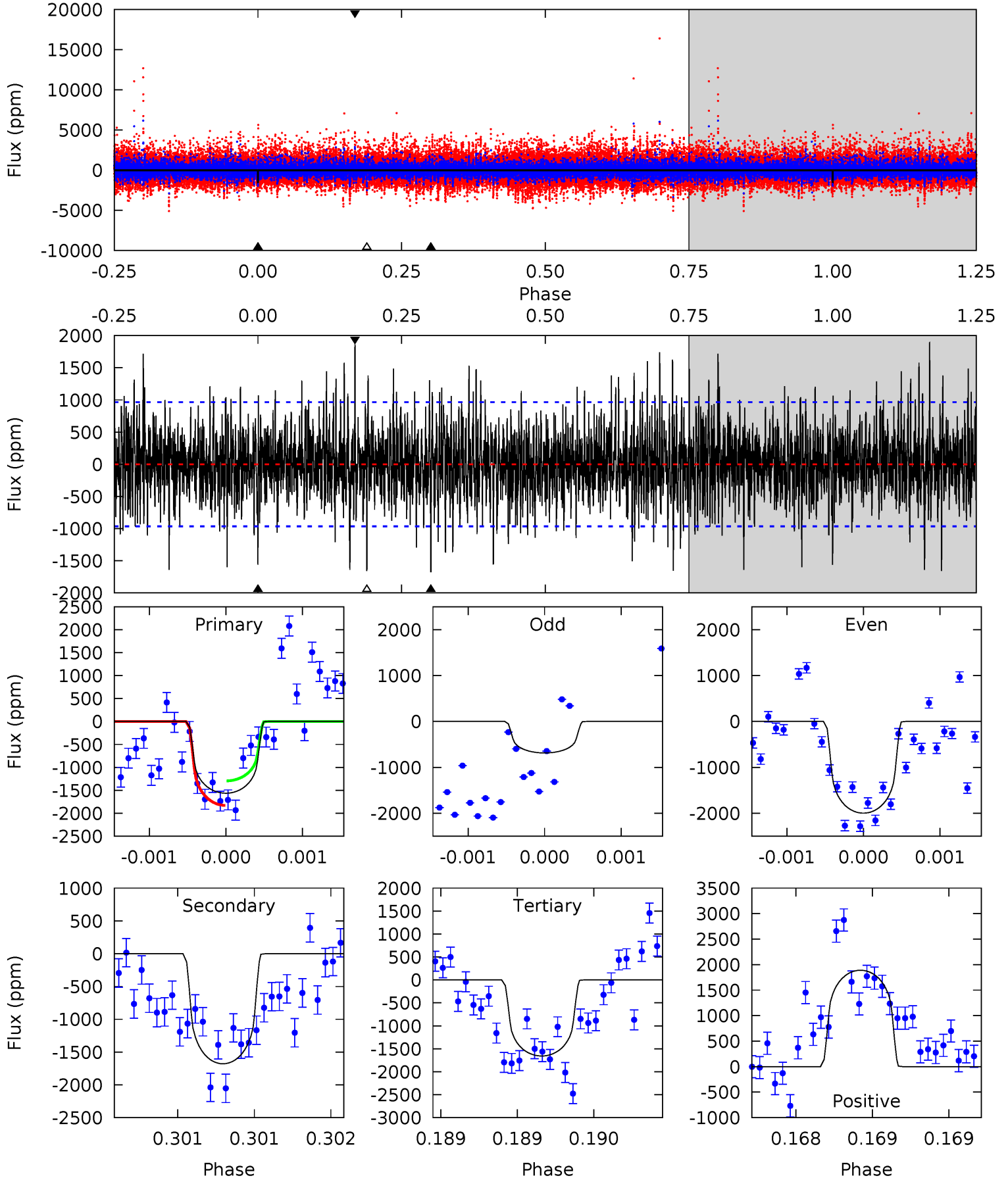
TCE 010776918-03     $P=421.333196$  Days     $T_0=468.473716$  (BKJD)



# DV Model-Shift Uniqueness Test

010776918-03, P = 421.334293 Days, E = 47.124606 Days

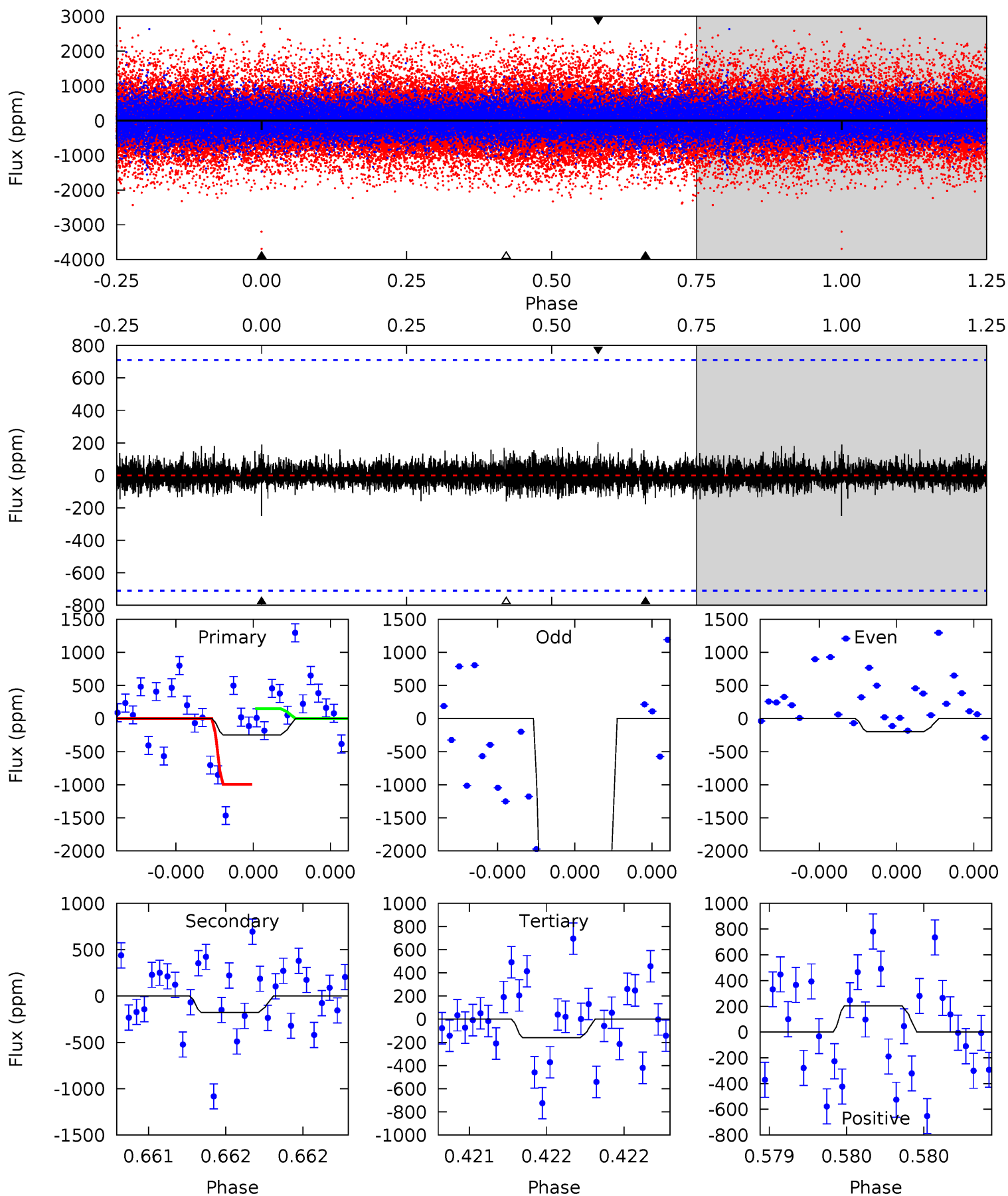
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.98	9.64	9.52	10.9	5.54	3.43	2.52	-0.54	-1.88	0.12	-1.21	3.17	0.95	0.53	1.54



# Alt Model-Shift Uniqueness Test

010776918-03, P = 421.333196 Days, E = 47.140520 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
1.96	1.39	1.26	1.61	5.59	3.50	0.31	0.70	0.35	0.13	-0.22	19.7	50.0	0.45	3.41



### Stellar Parameters For KIC 010776918

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4492^{+134}_{-134}$	$4.727^{+0.052}_{-0.028}$	$-1.180^{+0.300}_{-0.300}$	$0.516^{+0.032}_{-0.040}$	$0.518^{+0.036}_{-0.029}$	$5.317^{+1.227}_{-0.688}$
	+3%/-3%	+1%/-1%	+25%/-25%	+6%/-8%	+7%/-6%	+23%/-13%
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 010776918-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1678 \pm 174$	$3.16^{+2.77}_{-2.13}$	$211^{+7}_{-7}$	$4007^{+2435}_{-759}$	$73691^{+609103}_{-53196}$
Alt.	$-177 \pm 127$	$3.24^{+2.59}_{-2.09}$	$210^{+7}_{-7}$	$2769^{+1044}_{-507}$	$6650^{+49530}_{-5354}$

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

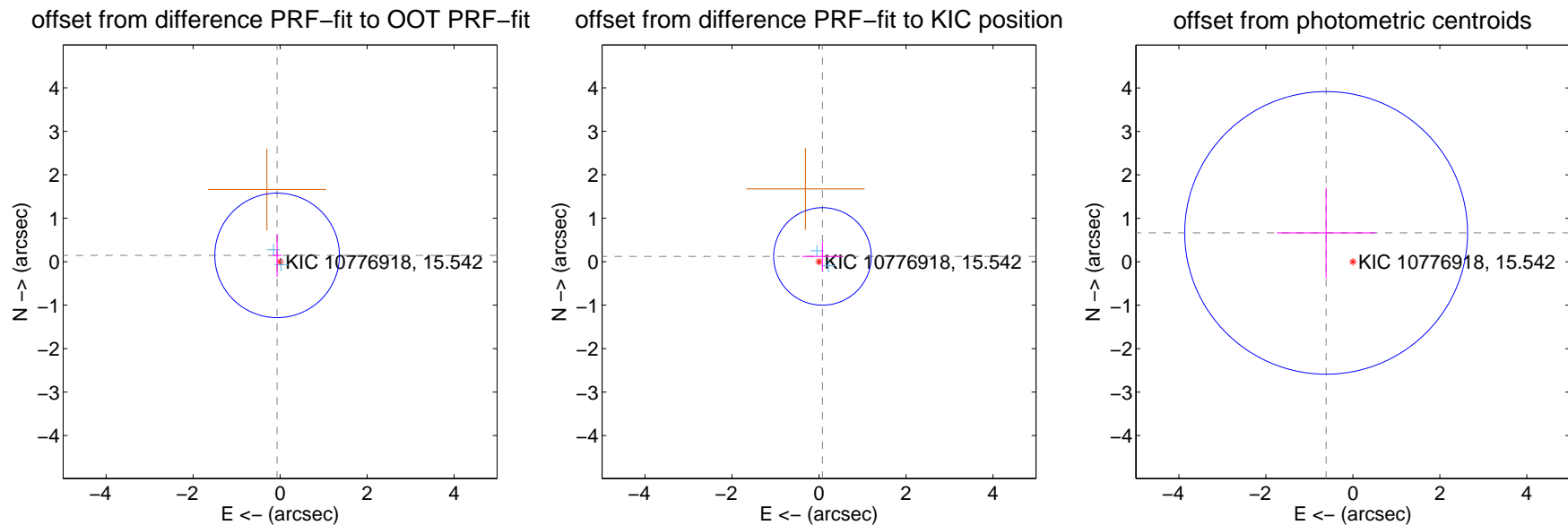
## DV Centroid Data

Supplemental centroid analysis for 010776918-03. Kepler magnitude: 15.54. Transit SNR 6.56

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.161 \pm 0.477$	0.34	$0.069 \pm 0.106$	$0.145 \pm 0.494$
PRF-fit source offset from KIC position	$0.145 \pm 0.374$	0.39	$-0.080 \pm 0.464$	$0.121 \pm 0.327$
photometric centroid source offset	$0.91 \pm 1.08$	0.83	$0.61 \pm 1.13$	$0.66 \pm 1.04$

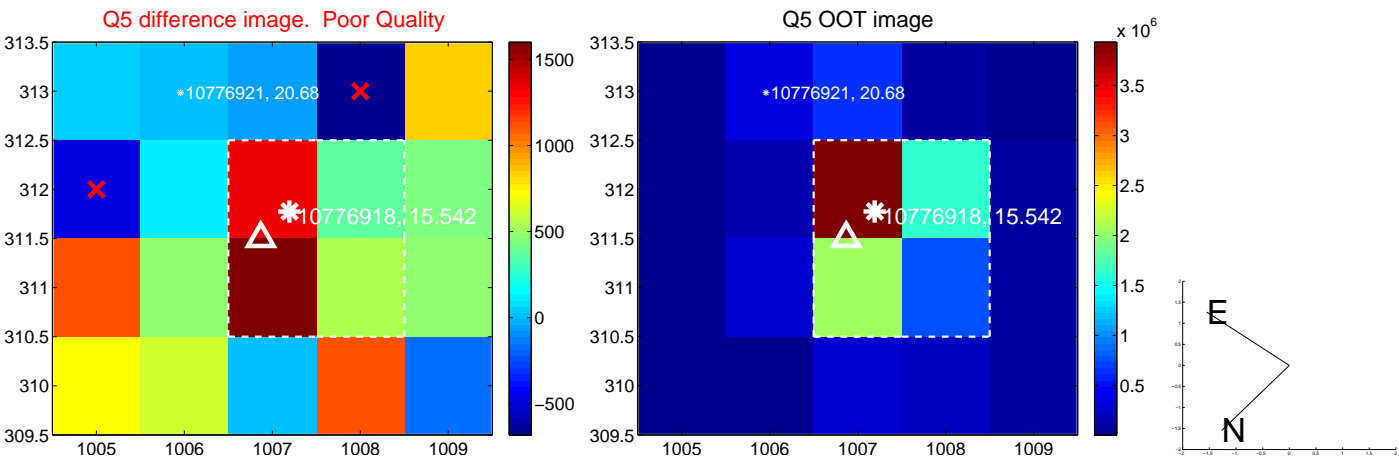


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

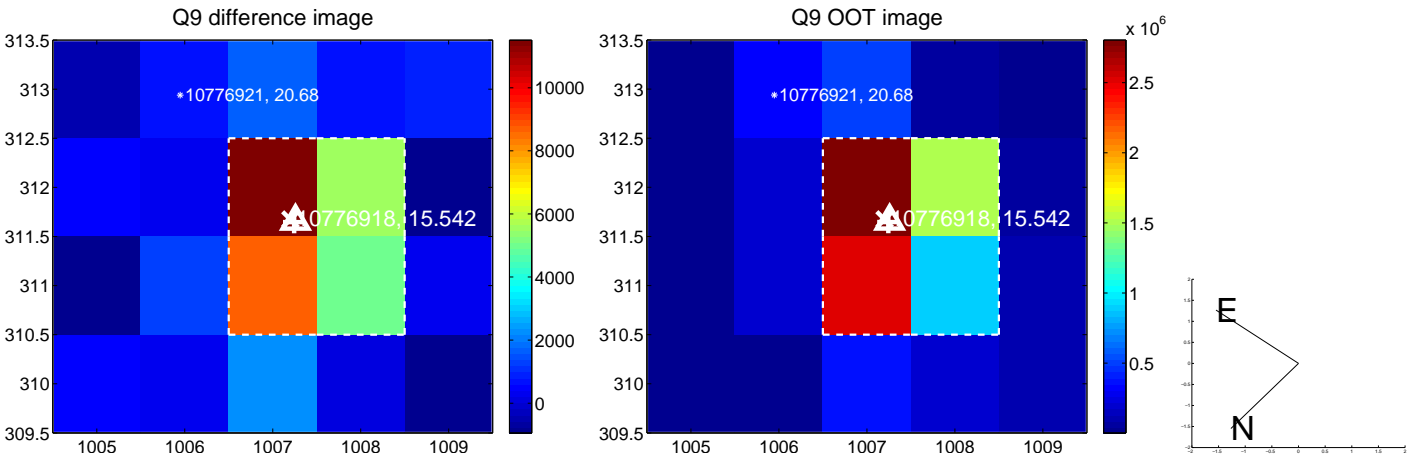


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

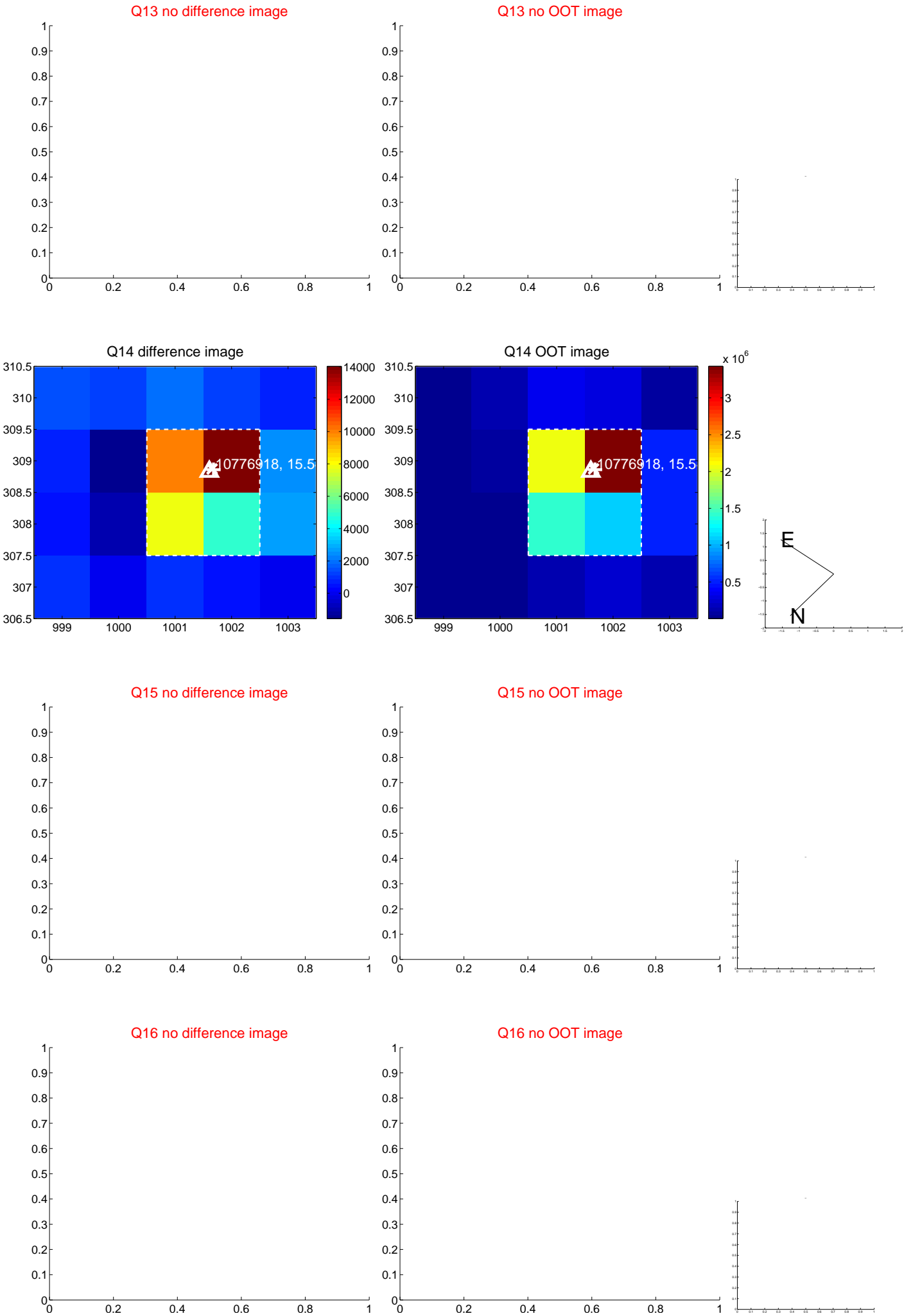




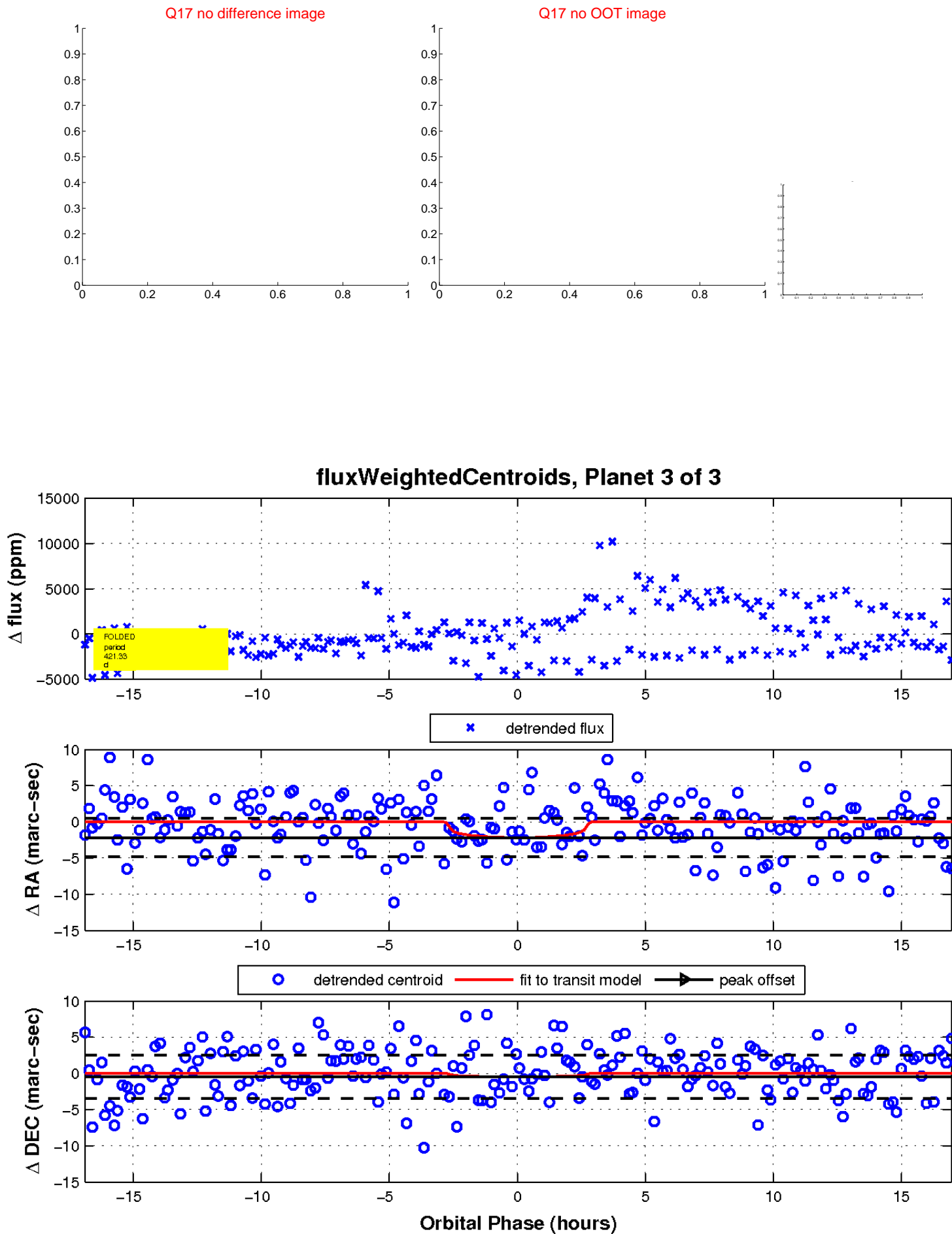
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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

