

# KIC 002442118

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002442118-01	OBS	No	1.221489	132.012148	6.9	5.625	13.1	15.5	3.21	9338	1.00	74265.94
002442118-02	OBS	No	167.584202	216.595256	35.6	4.370	11.7	4.6	3.21	9338	2.20	104.95
002442118-03	OBS	No	192.718803	233.059585	73.2	4.541	12.0	8.8	3.21	9338	3.11	87.11
002442118-04	OBS	No	212.867150	218.951929	63.0	4.888	9.9	6.6	3.21	9338	2.92	76.30

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002442118-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
002442118-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

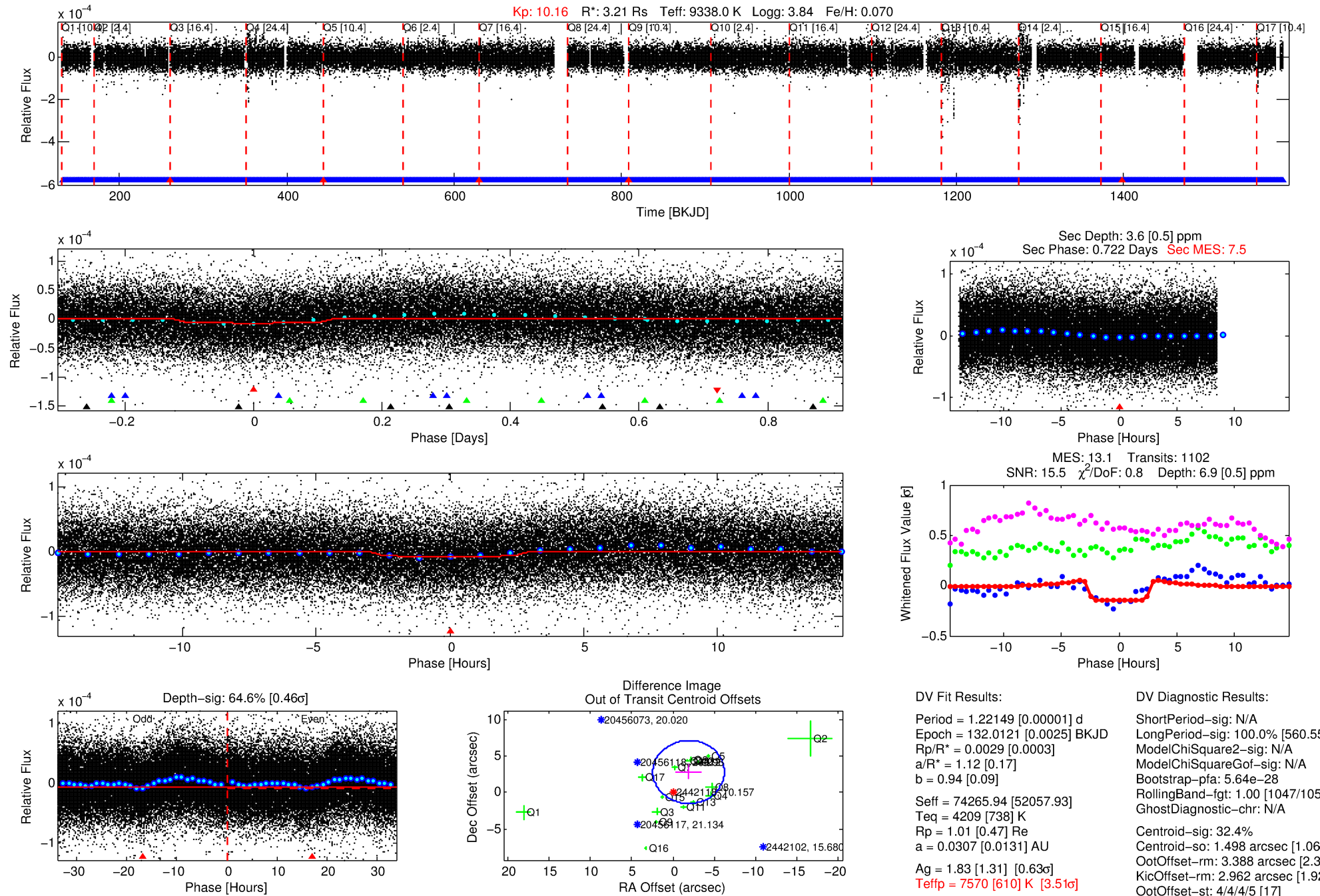
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002442118-01

No Significant Match Found

# DV One-Page Summary

KIC: 2442118 Candidate: 1 of 4 Period: 1.221 d



## DV Fit Results:

Period = 1.22149 [0.00001] d  
Epoch = 132.0121 [0.0025] BKJD  
Rp/R\* = 0.0029 [0.0003]  
a/R\* = 1.12 [0.17]  
b = 0.94 [0.09]  
Seff = 74265.94 [52057.93]  
Teff = 4209 [738] K  
Rp = 1.01 [0.47] Re  
a = 0.0307 [0.0131] AU  
Ag = 1.83 [1.31] [0.63 $\sigma$ ]  
Teffp = 7570 [610] K [3.51 $\sigma$ ]

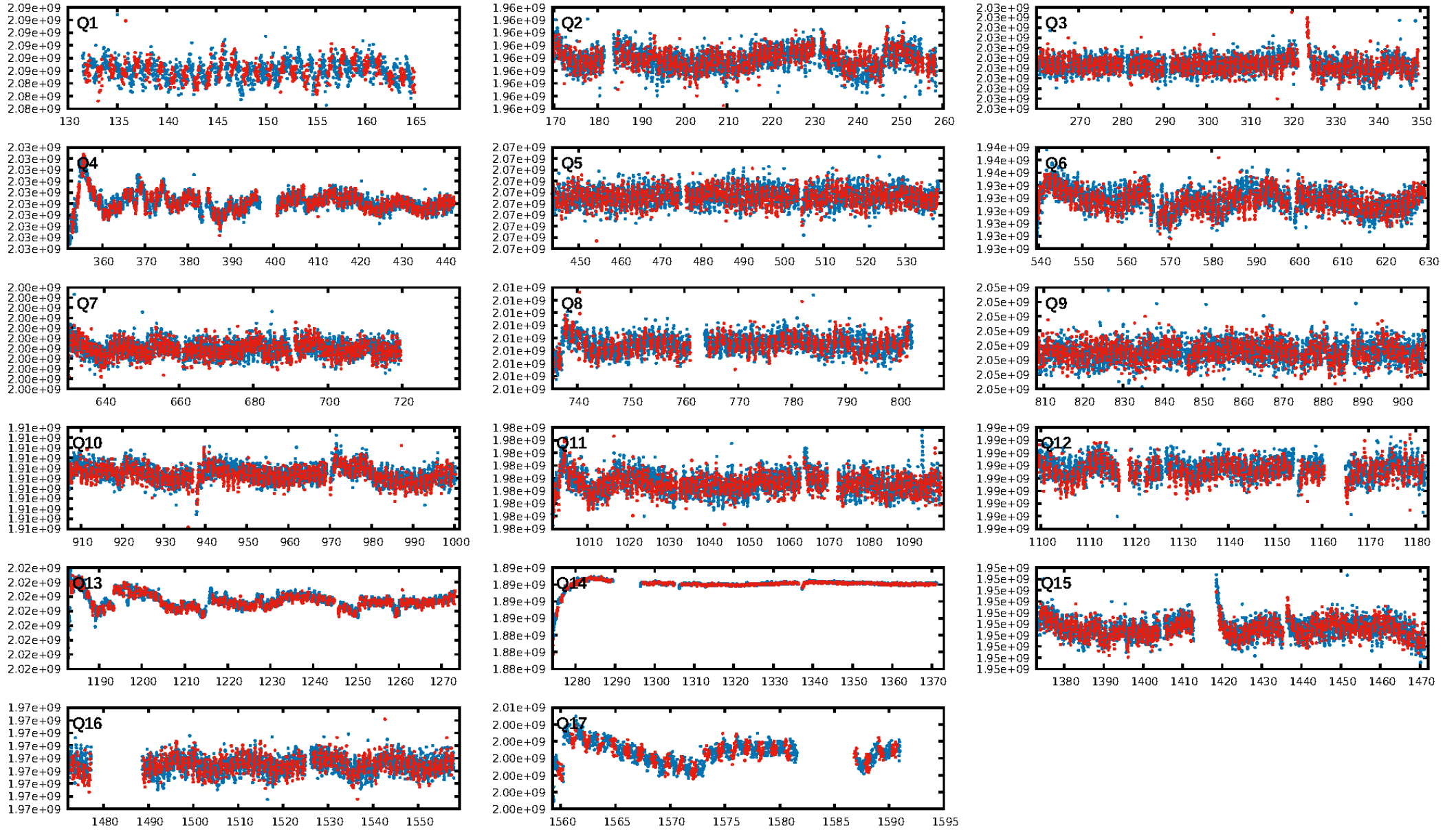
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [560.55 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.64e-28  
RollingBand-fgt: 1.00 [1047/1052]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 32.4%  
Centroid-so: 1.498 arcsec [1.06 $\sigma$ ]  
OotOffset-rm: 3.388 arcsec [2.35 $\sigma$ ]  
KicOffset-rm: 2.962 arcsec [1.92 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.35 [6/17]  
DiffImageOverlap-fno: 1.00 [17/17]

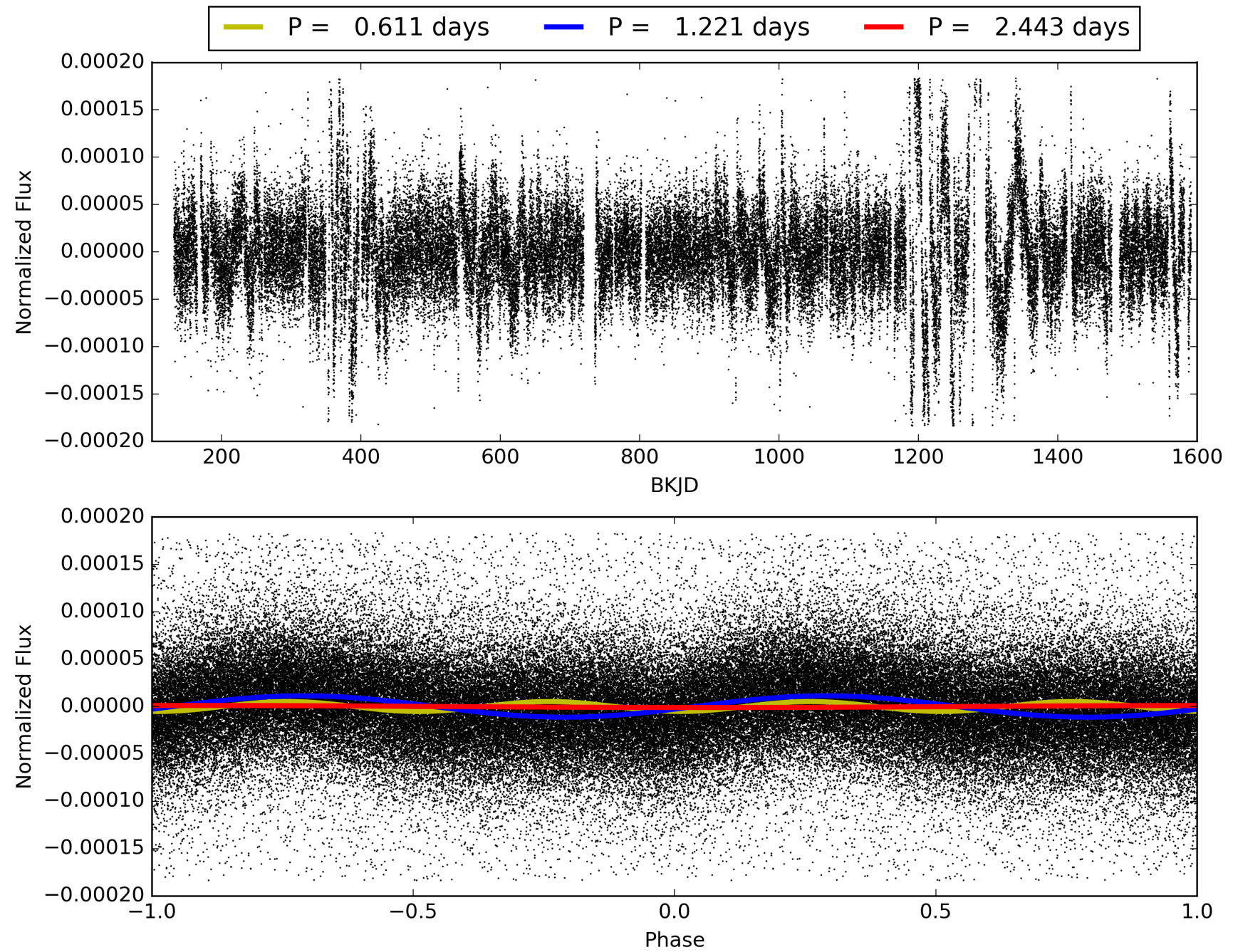
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:03:04 Z

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

# TCE 002442118-01, PDC Light Curves



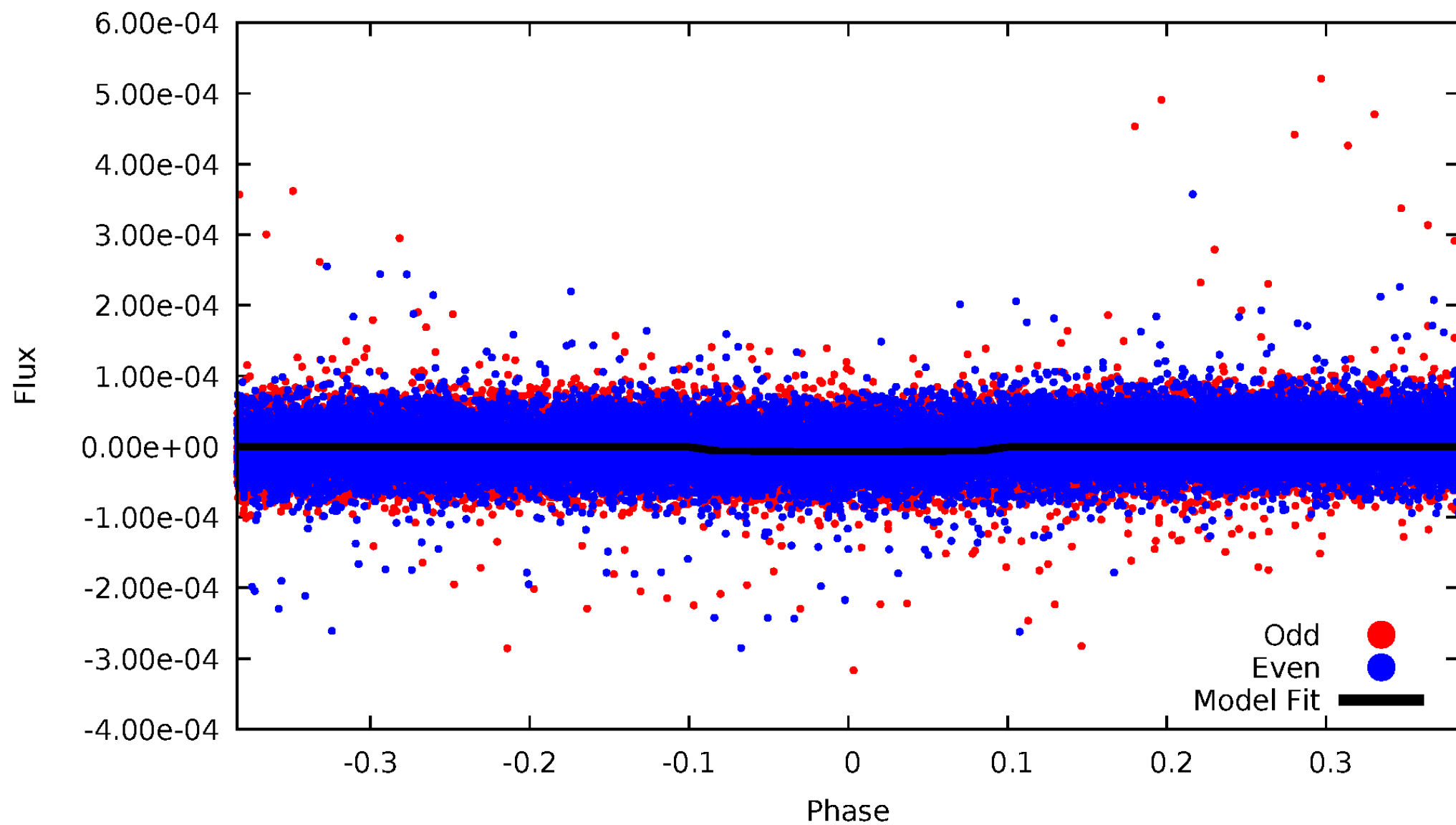
TCE 002442118-01





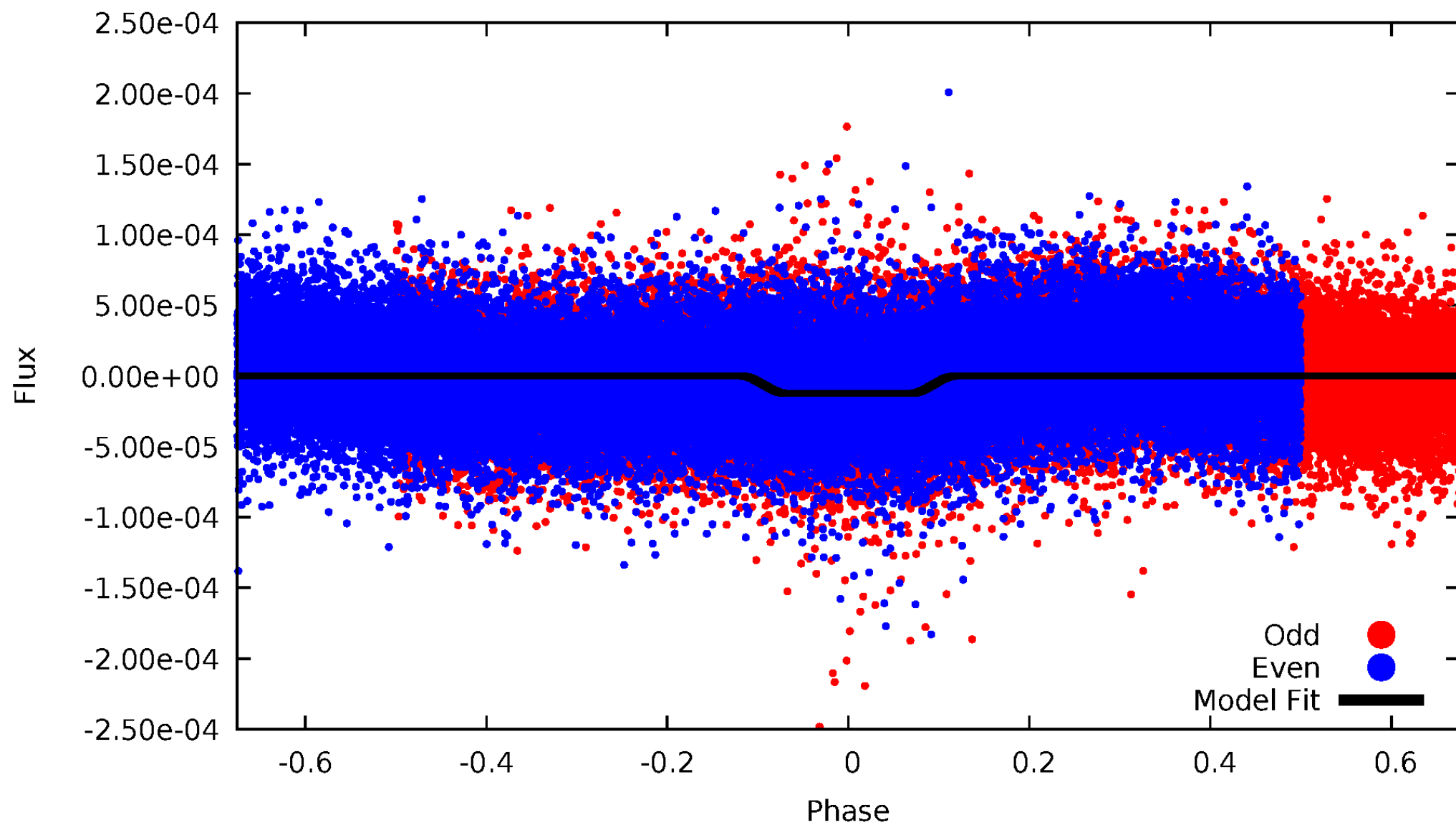
# DV Odd/Even

TCE 002442118-01

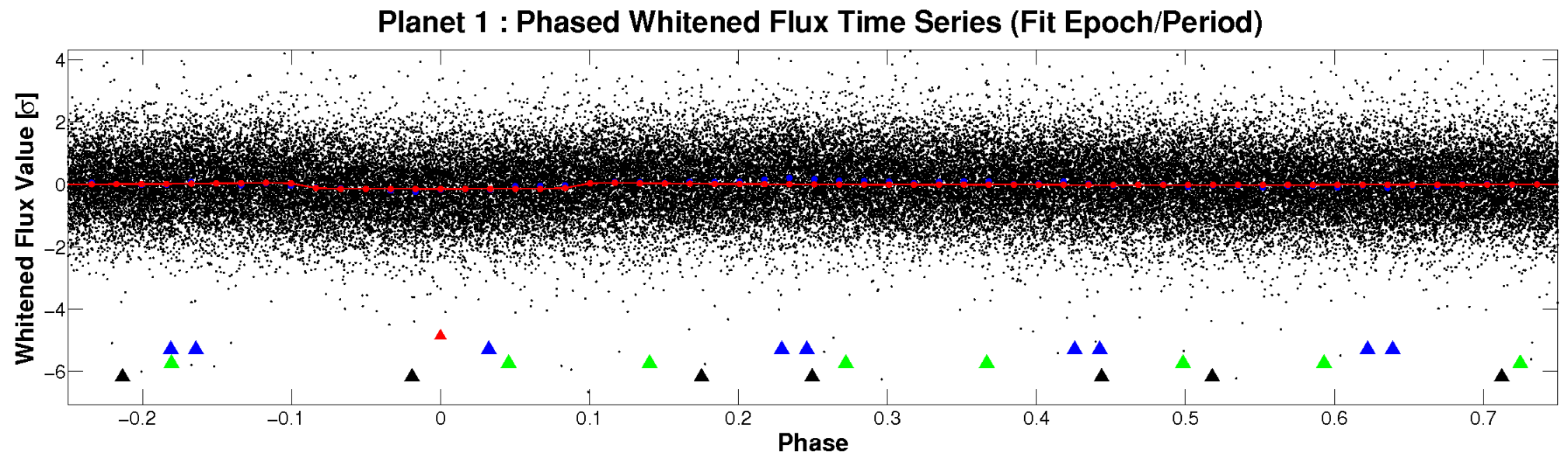
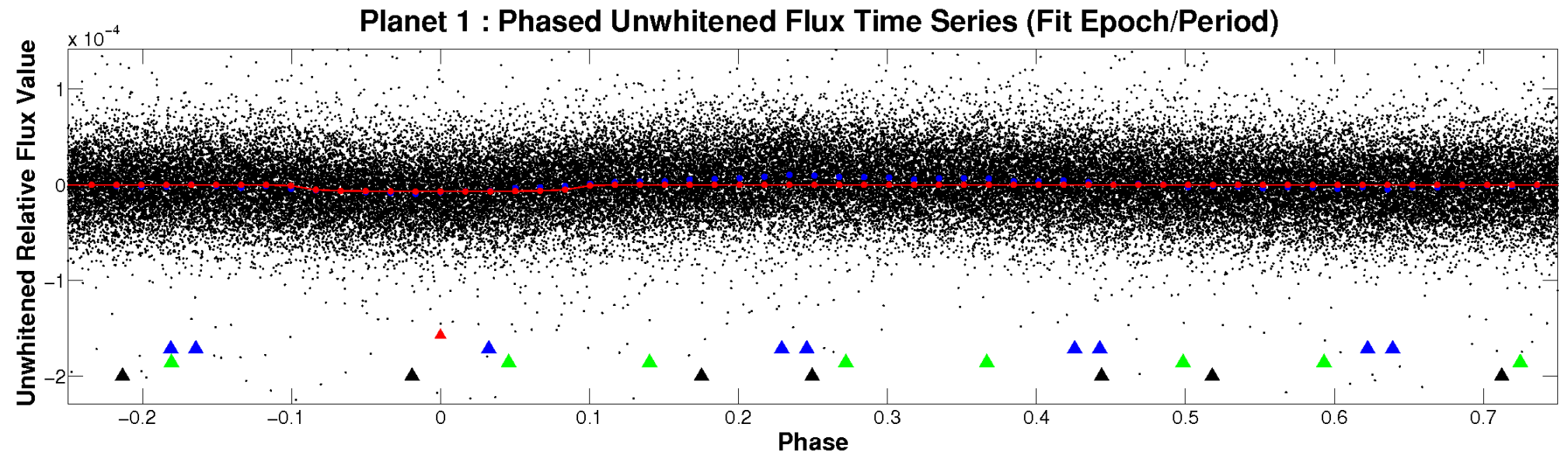


# ALT Odd/Even

TCE 002442118-01

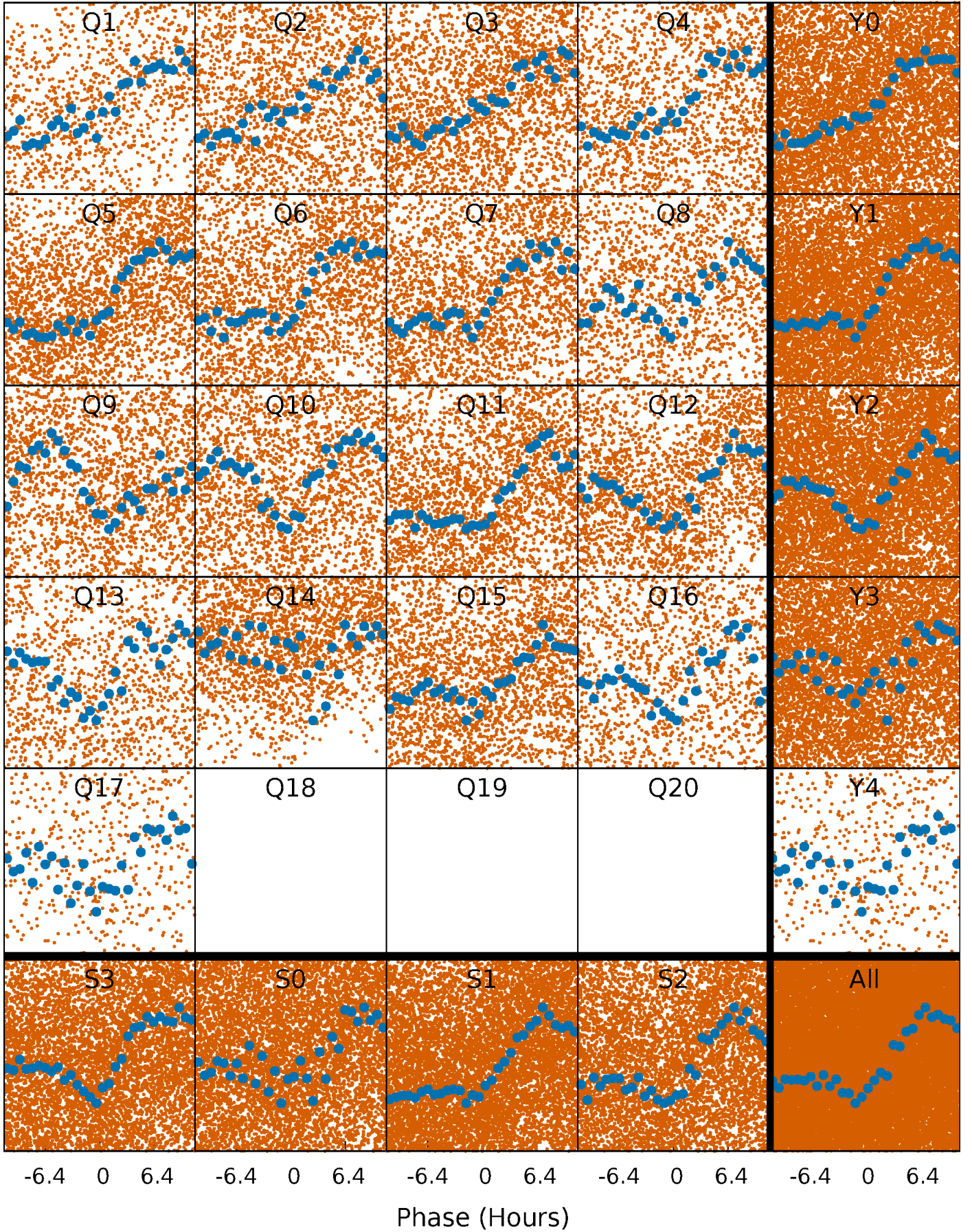


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

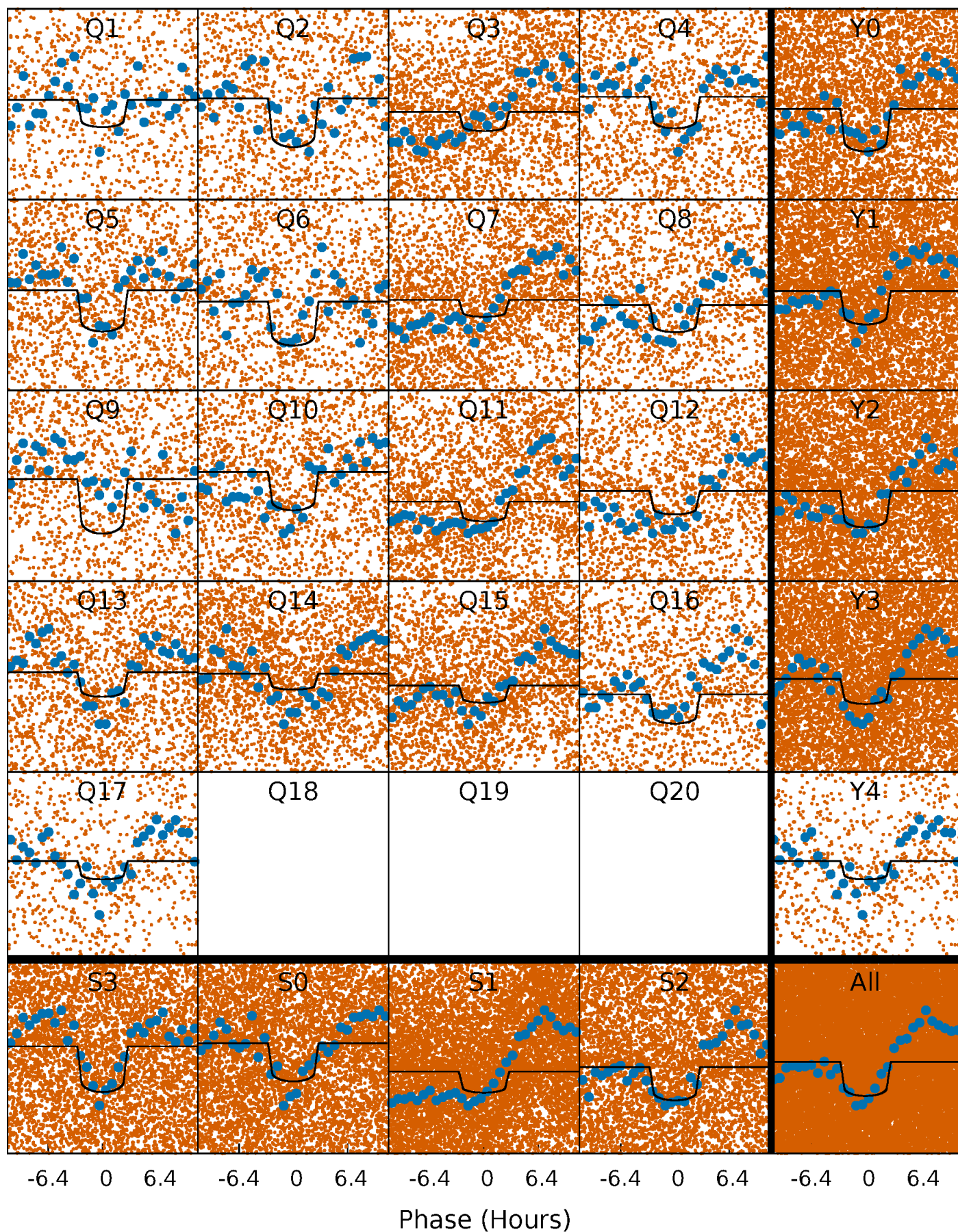
TCE 002442118-01 P= 1.221489 Days  $T_0=132.012148$  (BKJD)





# DV Quarter-Phased Transit Curves

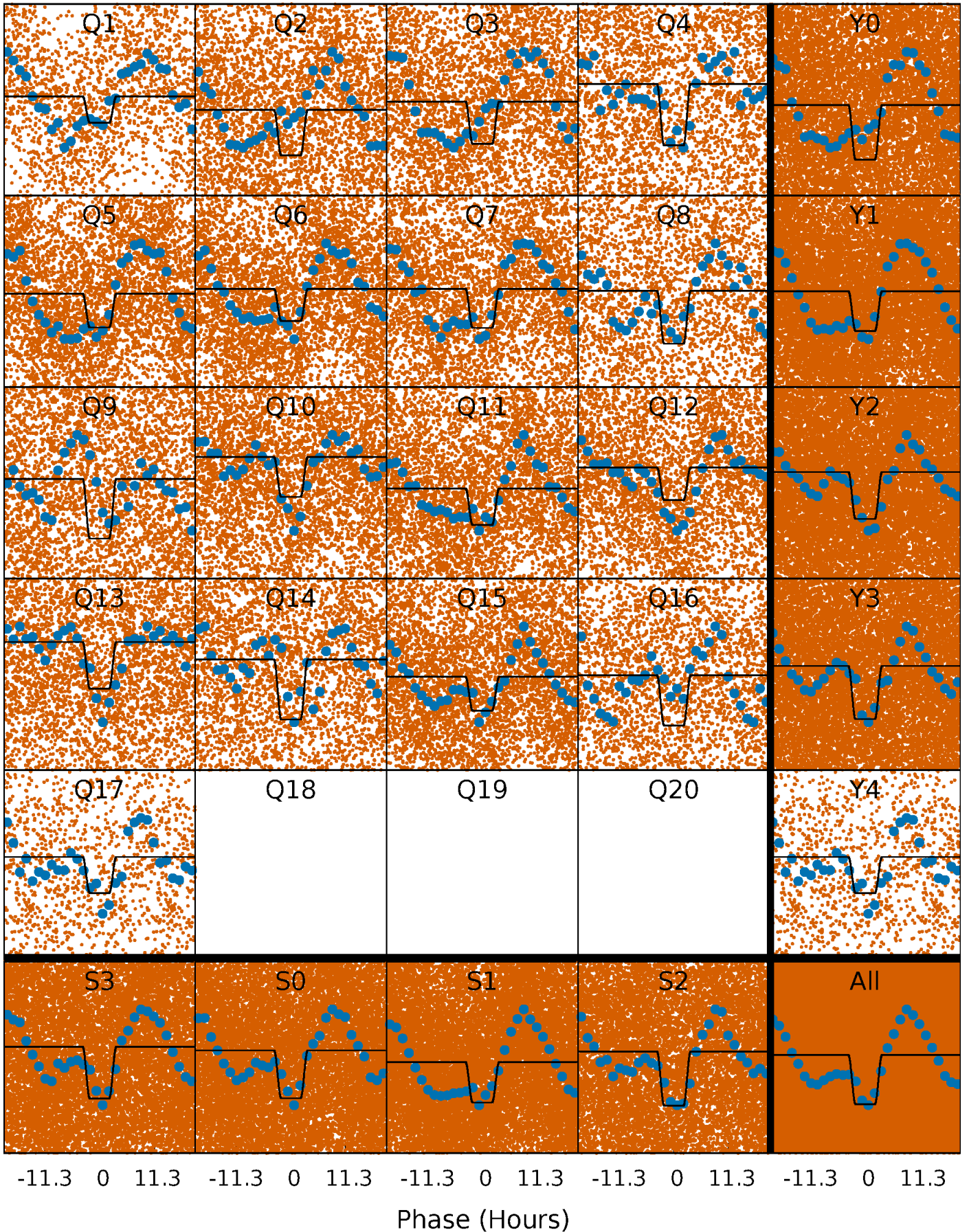
TCE 002442118-01 P= 1.221489 Days  $T_0=132.012148$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

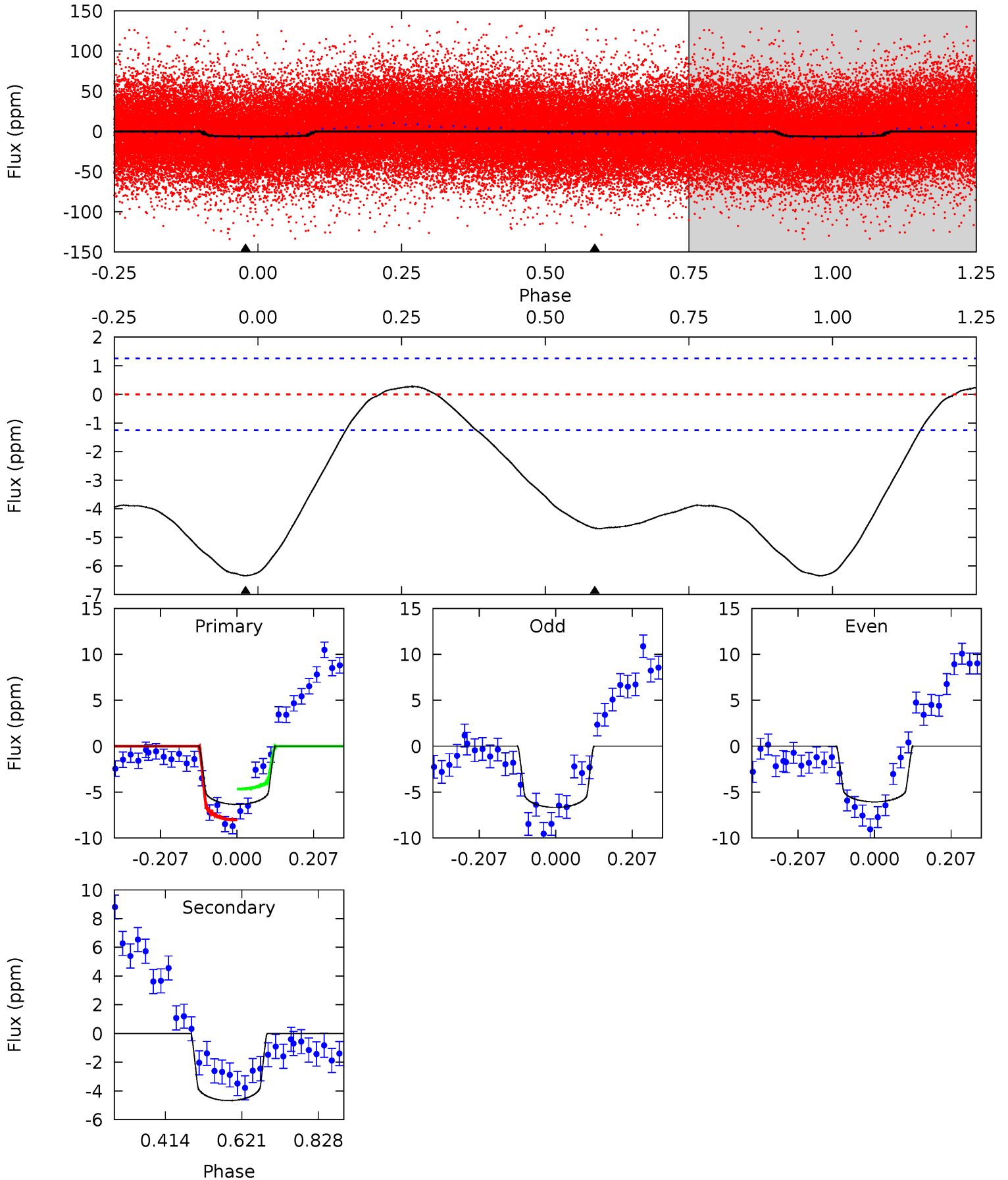
TCE 002442118-01 P= 1.221472 Days  $T_0=131.968590$  (BKJD)



# DV Model-Shift Uniqueness Test

002442118-01, P = 1.221489 Days, E = 130.790659 Days

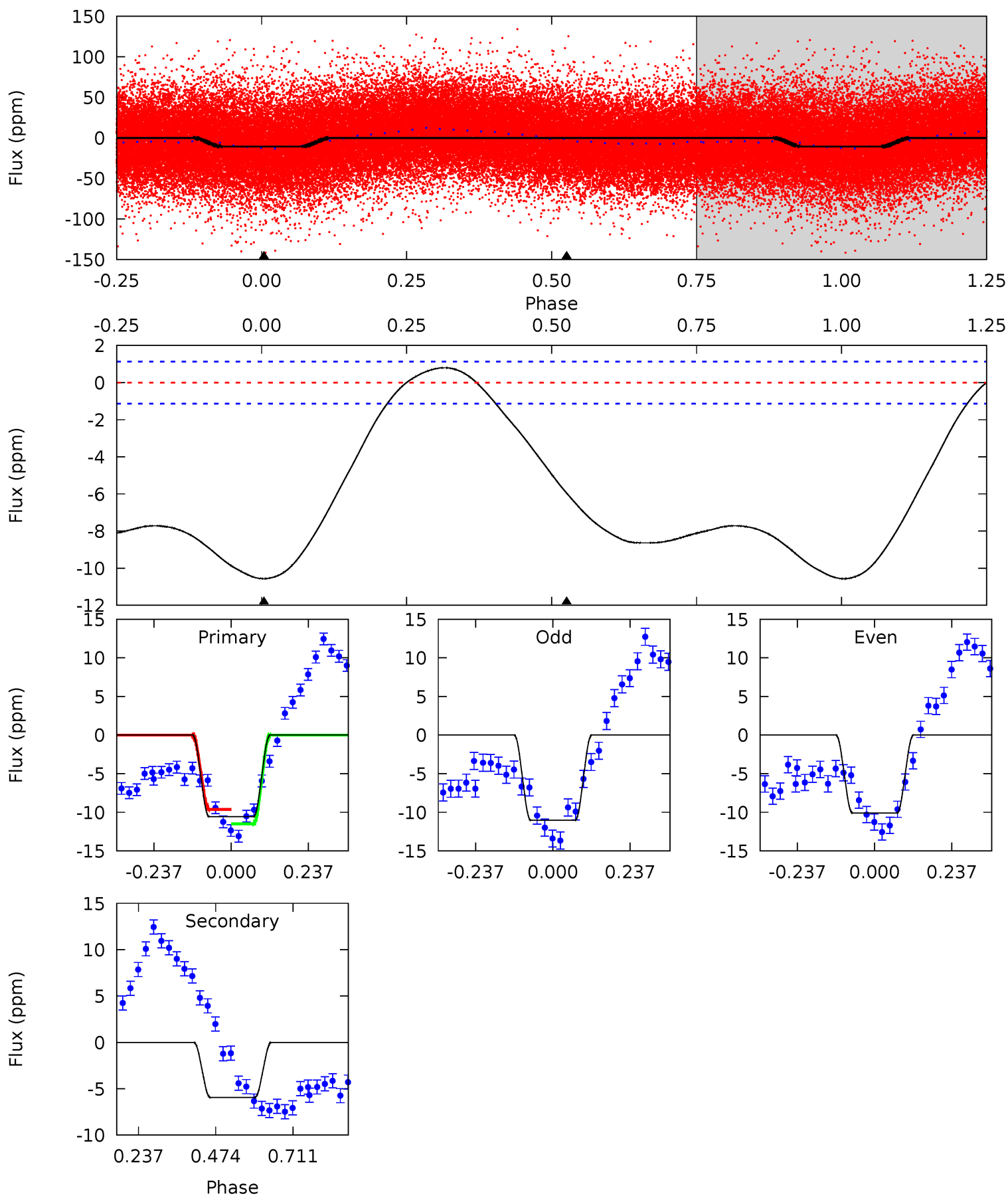
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.3	16.4	0	0	4.41	1.26	1.48	22.3	22.3	16.4	16.4	1.07	1.06	0.04	6.07



# Alt Model-Shift Uniqueness Test

002442118-01, P = 1.221472 Days, E = 130.747118 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
40.8	23.0	0	0	4.38	1.18	14.5	40.8	40.8	23.0	23.0	1.79	1.08	0.07	3.69





### Stellar Parameters For KIC 002442118

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$9338^{+290}_{-471}$	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.200}_{-0.750}$	$3.207^{+0.974}_{-1.461}$	$2.587^{+0.325}_{-0.909}$	$0.110^{+0.400}_{-0.049}$
	+3%/-5%	+10%/-4%	+286%/-1071%	+30%/-46%	+13%/-35%	+362%/-44%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 002442118-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-5 \pm 0$	$0.93^{+0.23}_{-0.24}$	$5693^{+538}_{-678}$	$7467^{+658}_{-566}$	$2.706^{+1.804}_{-0.896}$
Alt.	$-6 \pm 0$	$1.17^{+0.23}_{-0.28}$	$5711^{+519}_{-638}$	$7042^{+500}_{-459}$	$2.201^{+1.383}_{-0.640}$

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

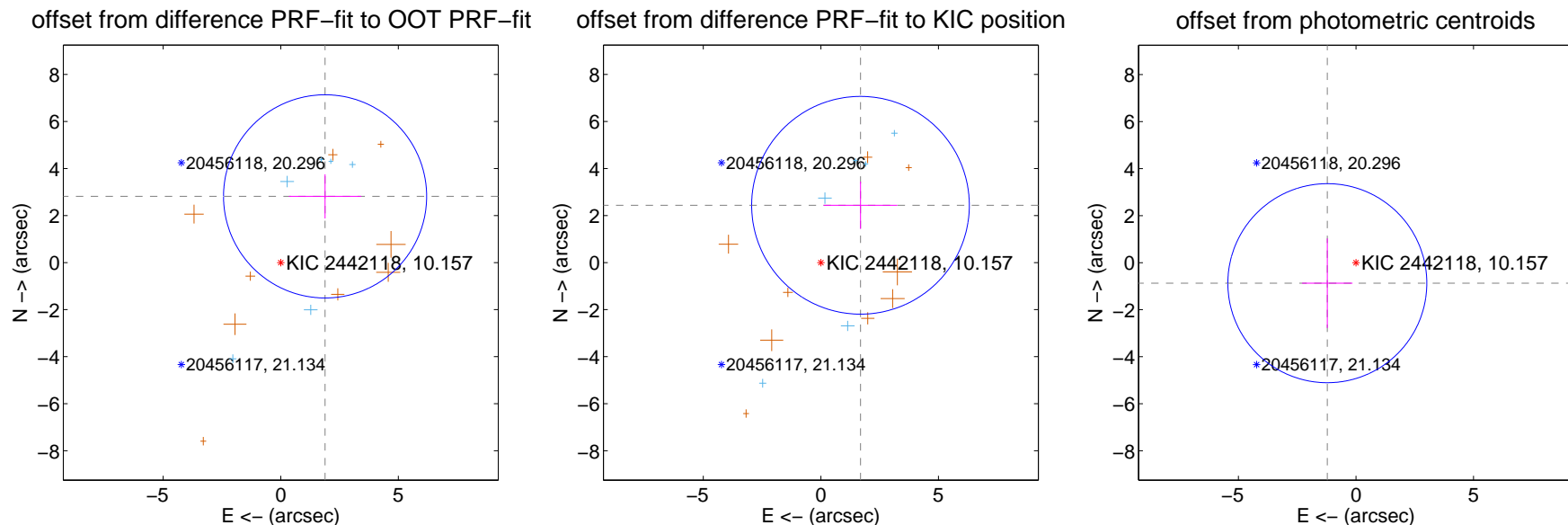
## DV Centroid Data

Supplemental centroid analysis for 002442118-01. **Kepler magnitude: 10.16.** Transit SNR 15.46

There are 6 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 1.30 arcsec

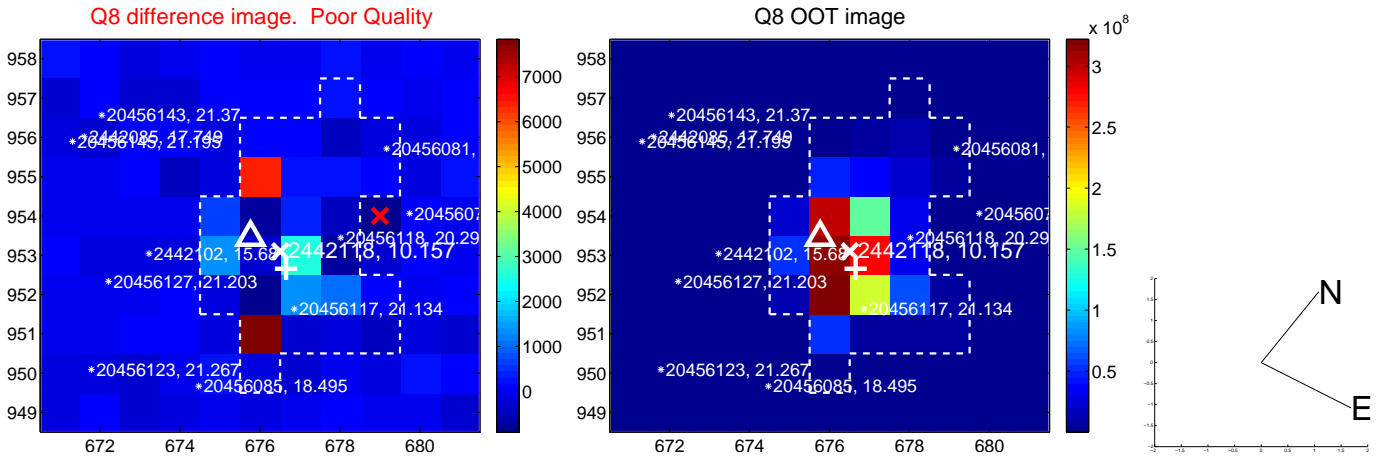
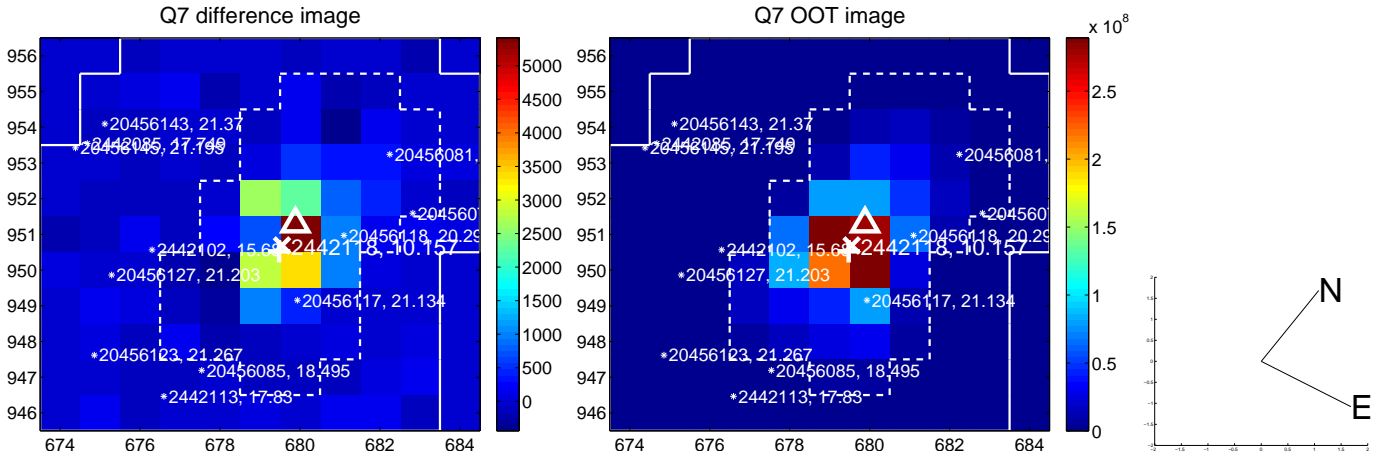
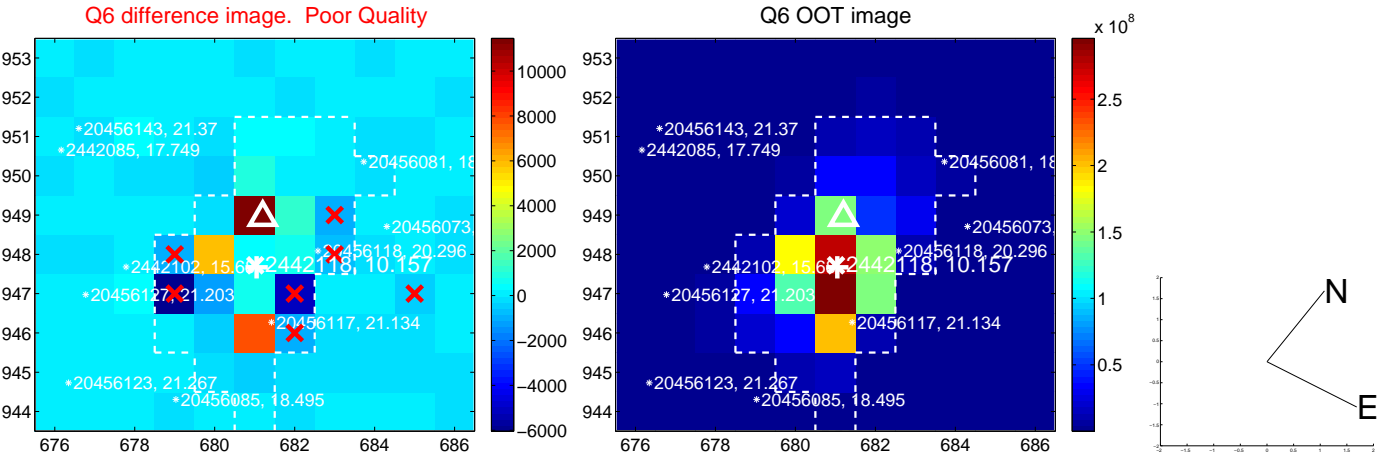
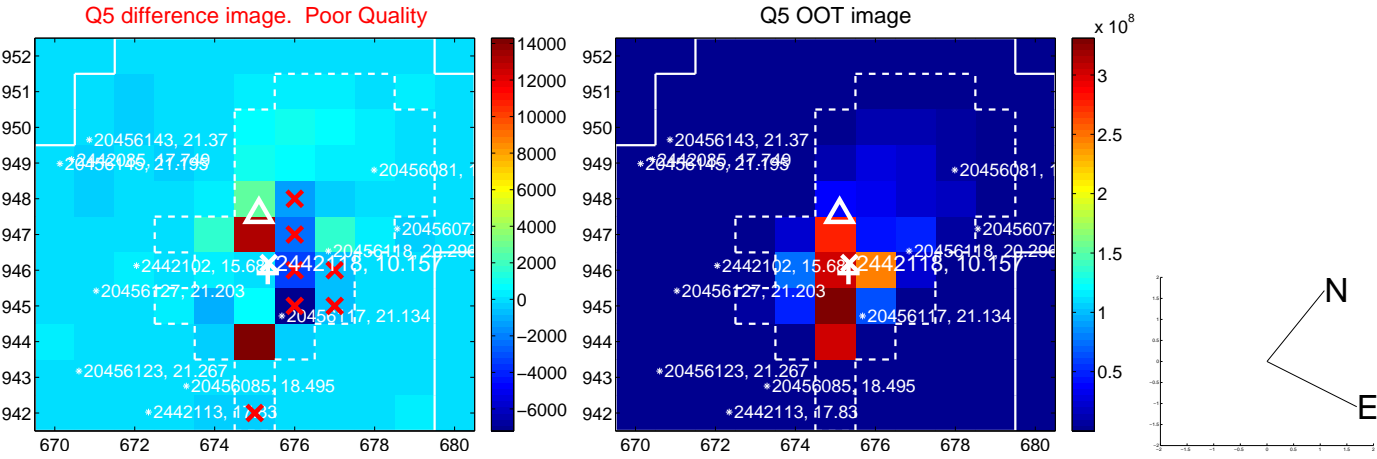
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.388 \pm 1.440$	2.35	$-1.886 \pm 1.538$	$2.815 \pm 0.937$
PRF-fit source offset from KIC position	$2.962 \pm 1.543$	1.92	$-1.685 \pm 1.569$	$2.436 \pm 1.006$
photometric centroid source offset	$1.50 \pm 1.41$	1.06	$1.22 \pm 1.07$	$-0.87 \pm 1.90$



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.

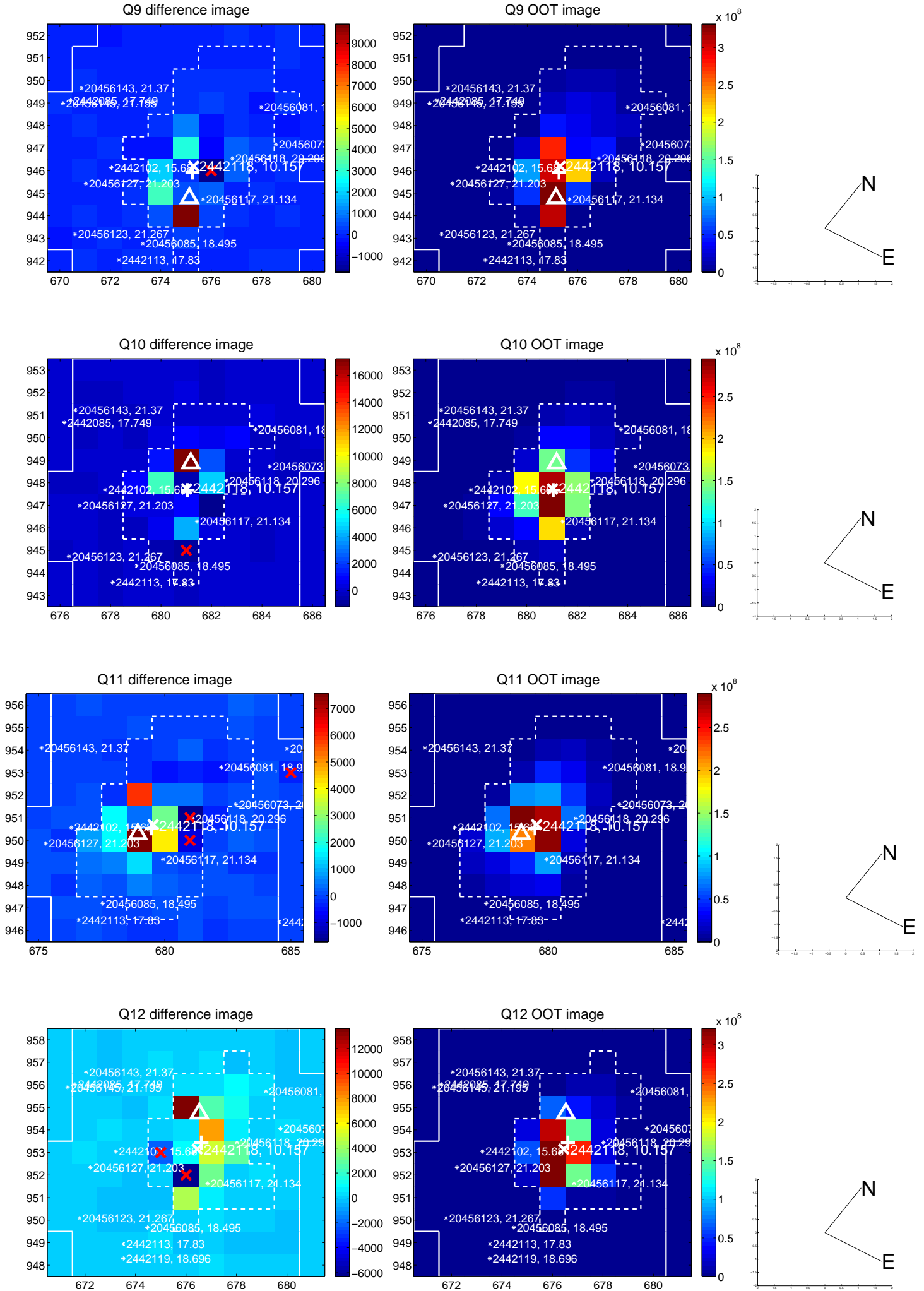


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

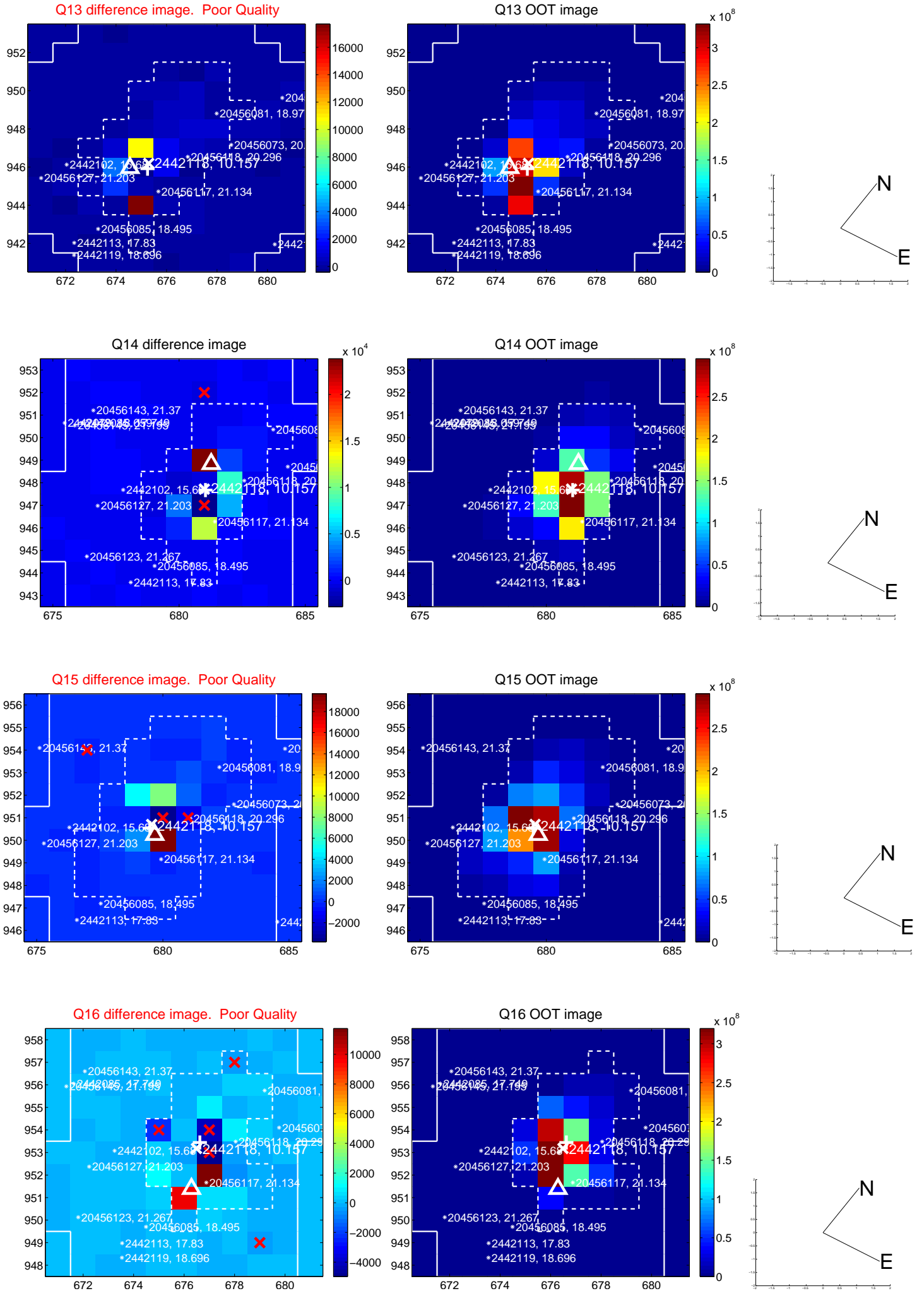




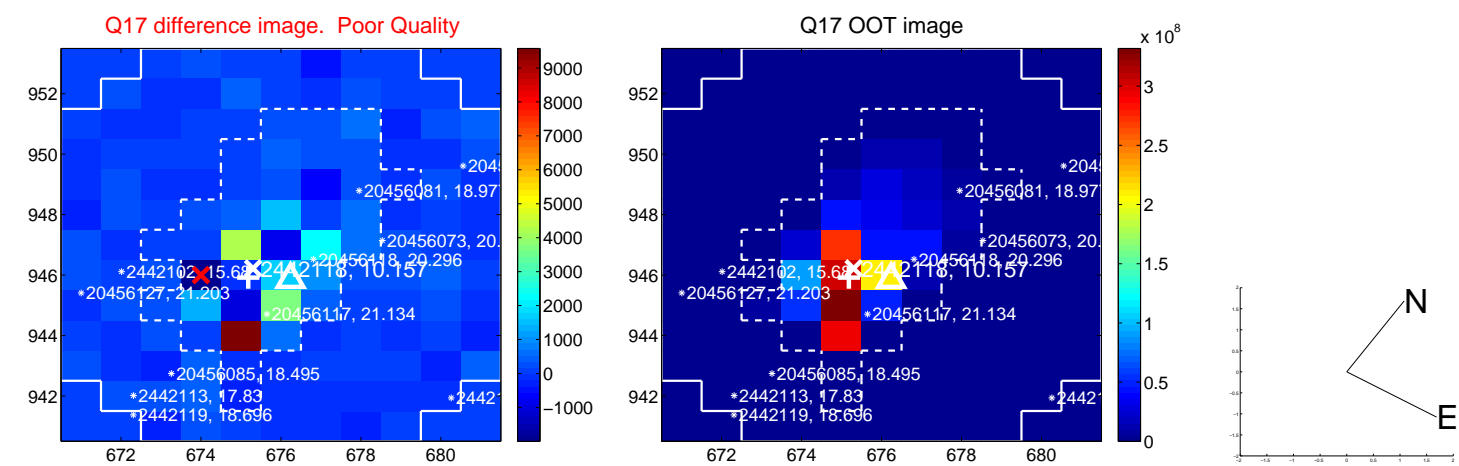
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



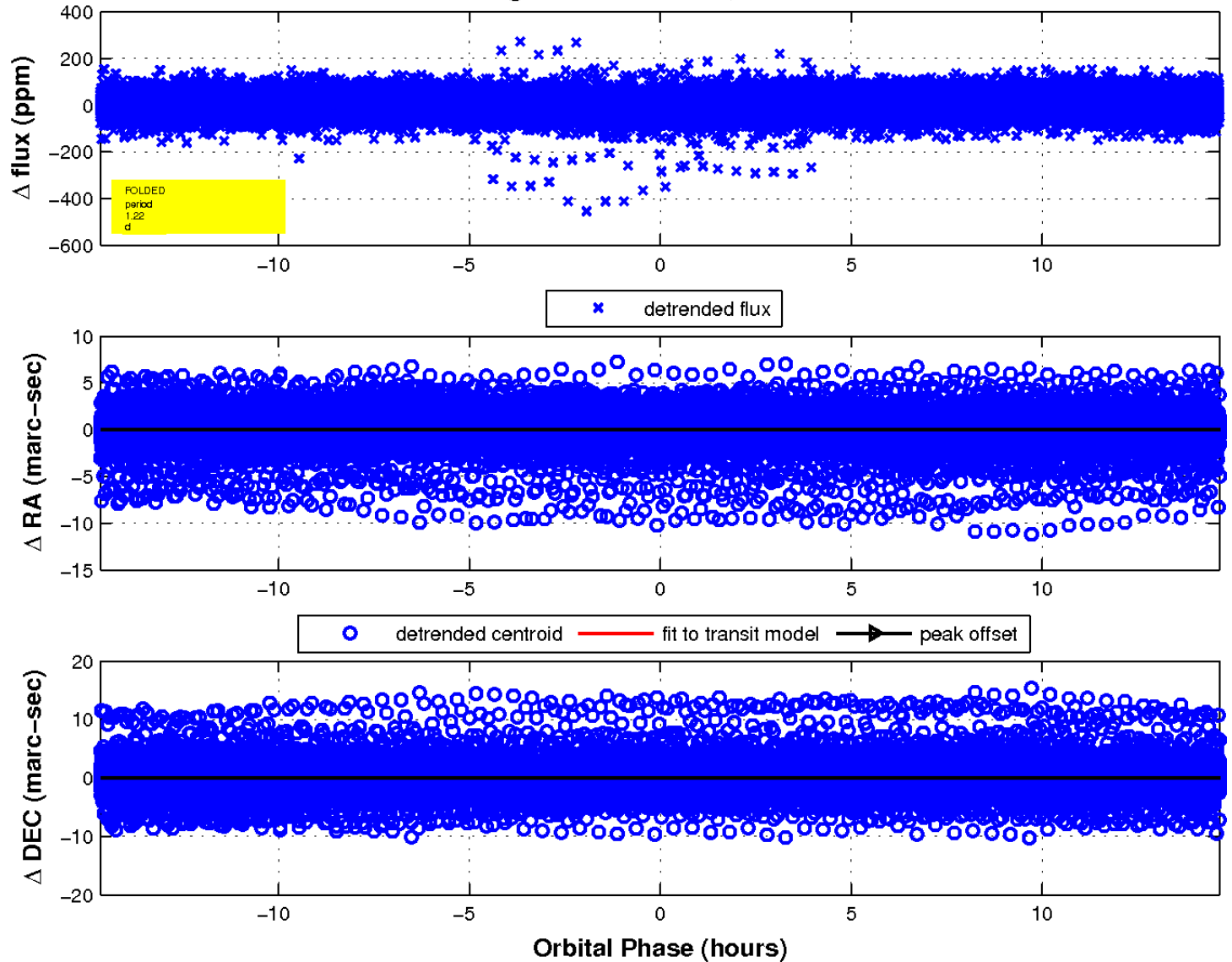
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

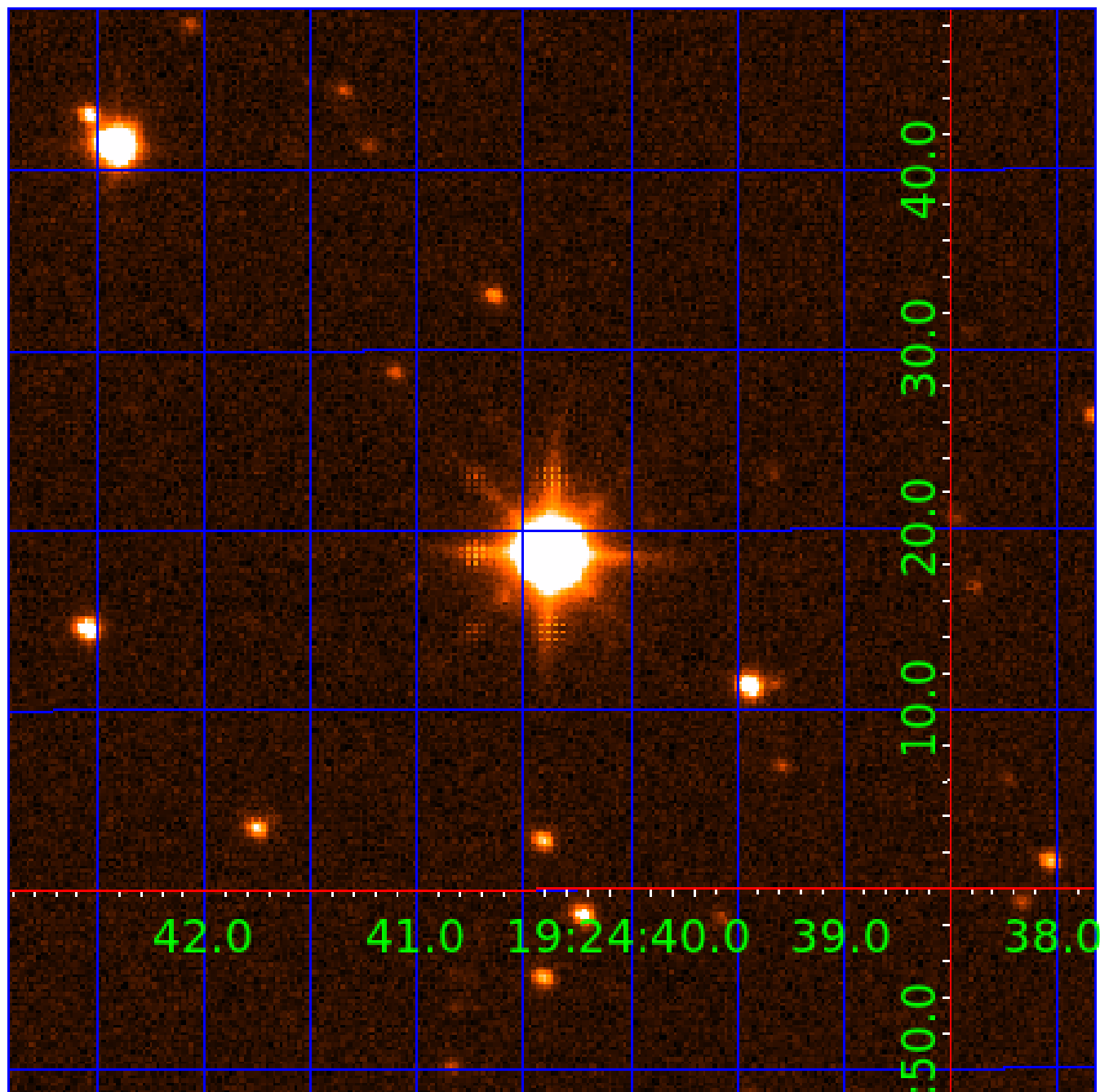


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination





# KIC 002442118

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002442118-01	OBS	No	1.221489	132.012148	6.9	5.625	13.1	15.5	3.21	9338	1.00	74265.94
002442118-02	OBS	No	167.584202	216.595256	35.6	4.370	11.7	4.6	3.21	9338	2.20	104.95
002442118-03	OBS	No	192.718803	233.059585	73.2	4.541	12.0	8.8	3.21	9338	3.11	87.11
002442118-04	OBS	No	212.867150	218.951929	63.0	4.888	9.9	6.6	3.21	9338	2.92	76.30

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002442118-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
002442118-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

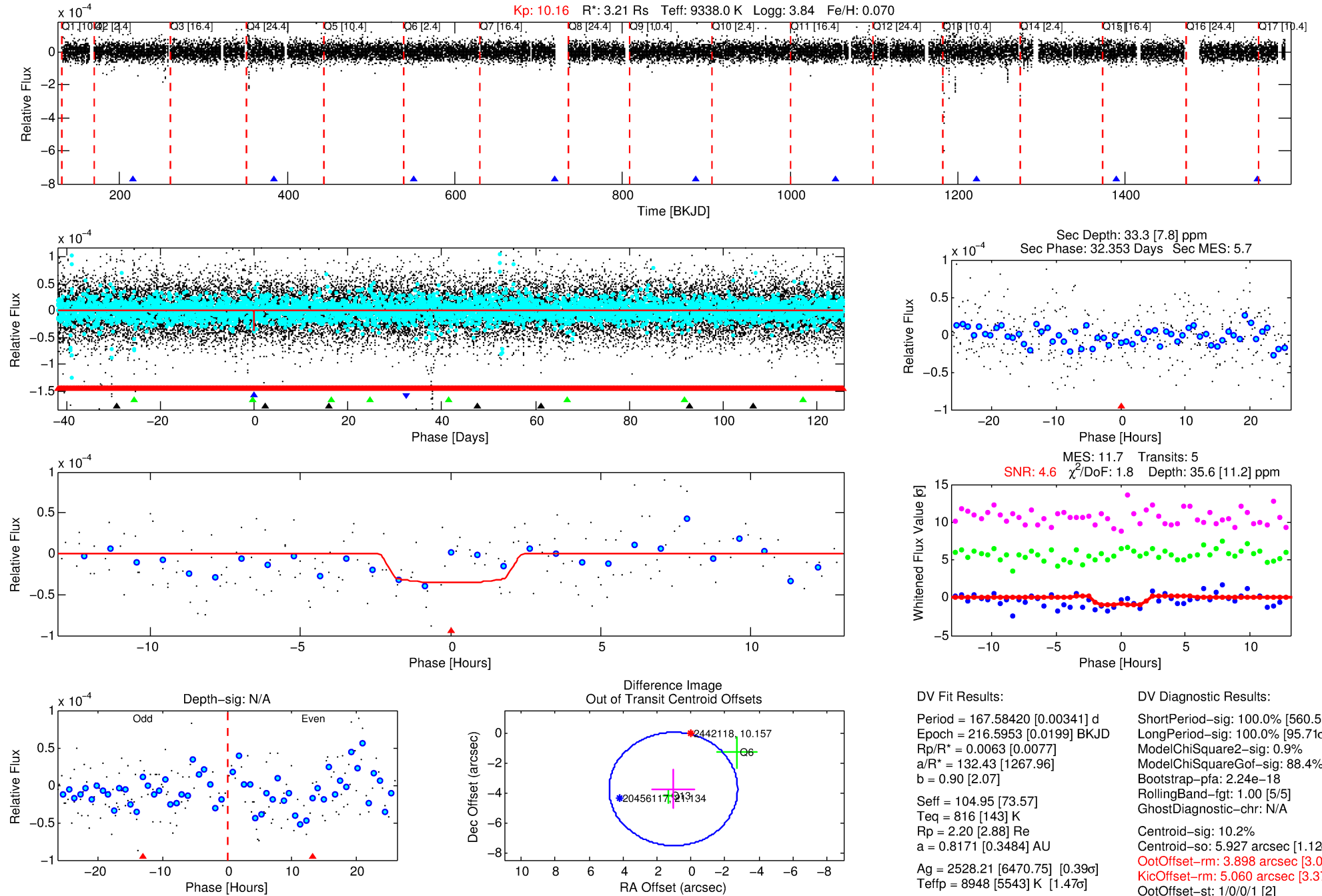
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002442118-02

No Significant Match Found

# DV One-Page Summary

KIC: 2442118 Candidate: 2 of 4 Period: 167.584 d



## DV Fit Results:

Period = 167.58420 [0.00341] d  
Epoch = 216.5953 [0.0199] BKJD  
 $R_p/R^* = 0.0063$  [0.0077]  
 $a/R^* = 132.43$  [1267.96]  
 $b = 0.90$  [2.07]  
 $T_{\text{eff}} = 104.95$  [73.57]  
 $T_{\text{eq}} = 816$  [143] K  
 $R_p = 2.20$  [2.88]  $R_{\text{e}}$   
 $a = 0.8171$  [0.3484] AU  
 $A_g = 2528.21$  [6470.75] [0.39] $\sigma$   
 $T_{\text{eff}} = 8948$  [5543] K [1.47] $\sigma$

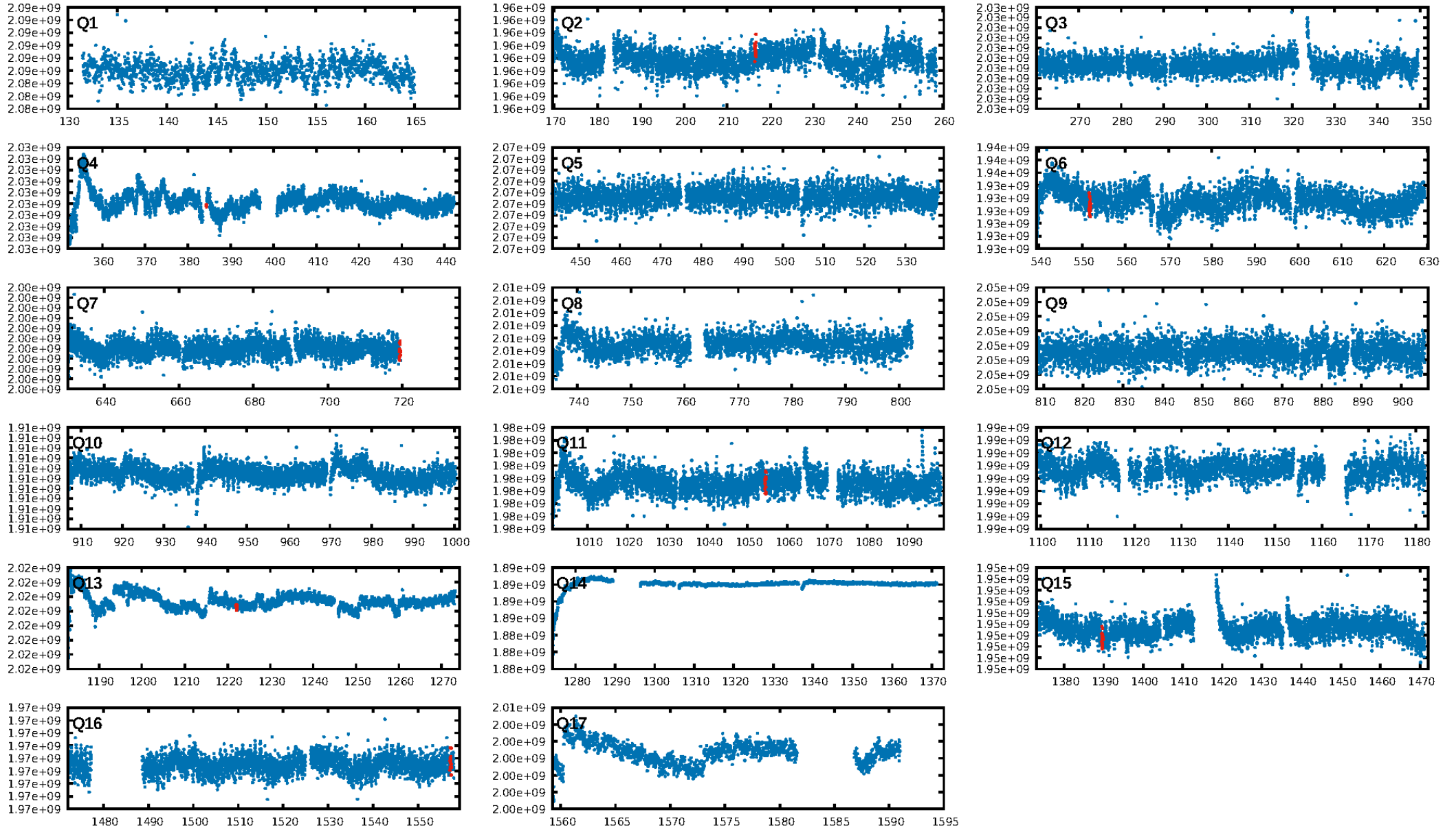
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [560.55] $\sigma$   
LongPeriod-sig: 100.0% [95.71] $\sigma$   
ModelChiSquare2-sig: 0.9%  
ModelChiSquareGof-sig: 88.4%  
Bootstrap-pfa: 2.24e-18  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 10.2%  
Centroid-so: 5.927 arcsec [1.12] $\sigma$   
OotOffset-rm: 3.898 arcsec [3.09] $\sigma$   
KicOffset-rm: 5.060 arcsec [3.37] $\sigma$   
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.00 [0/6]

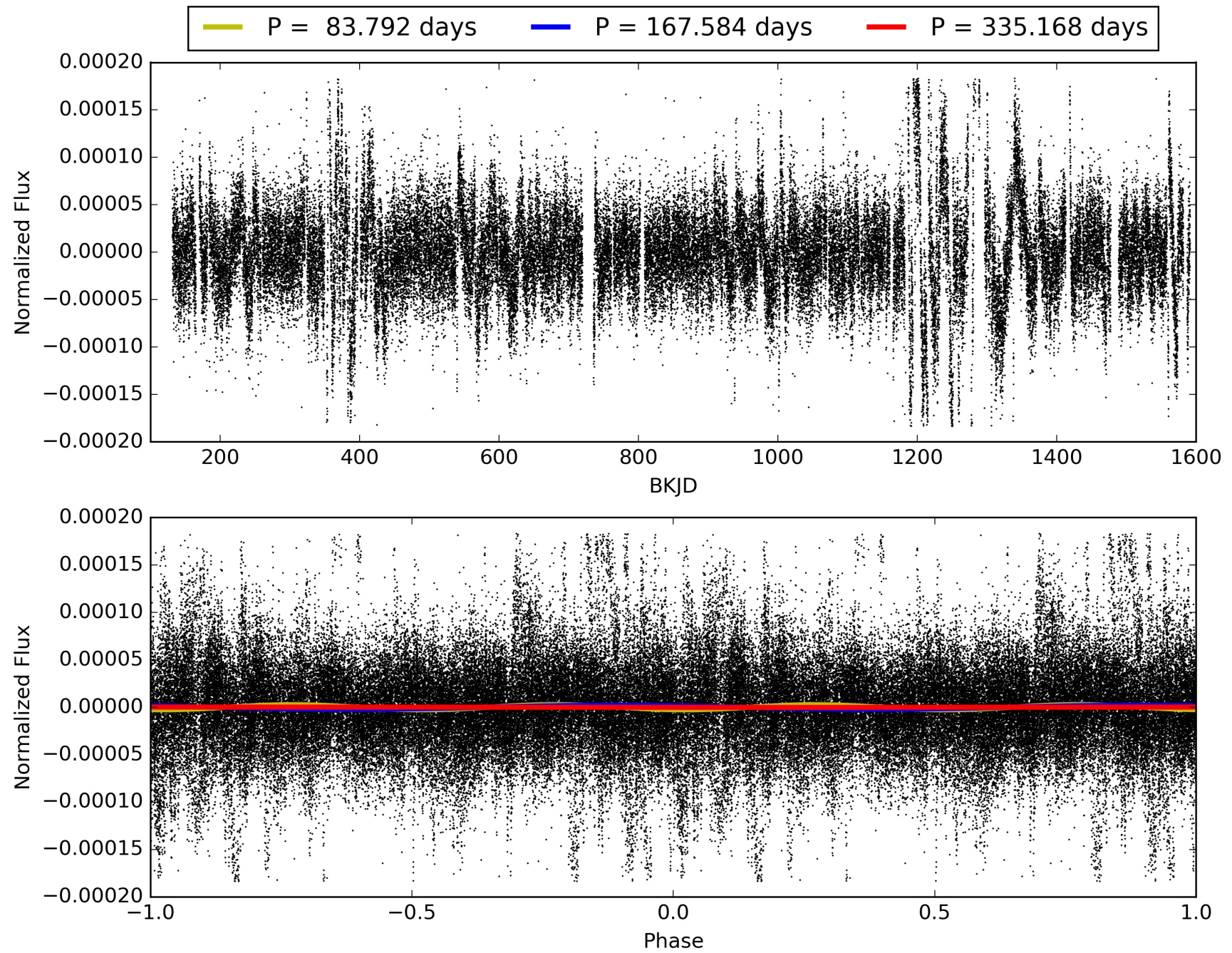
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:03:16 Z

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

# TCE 002442118-02, PDC Light Curves

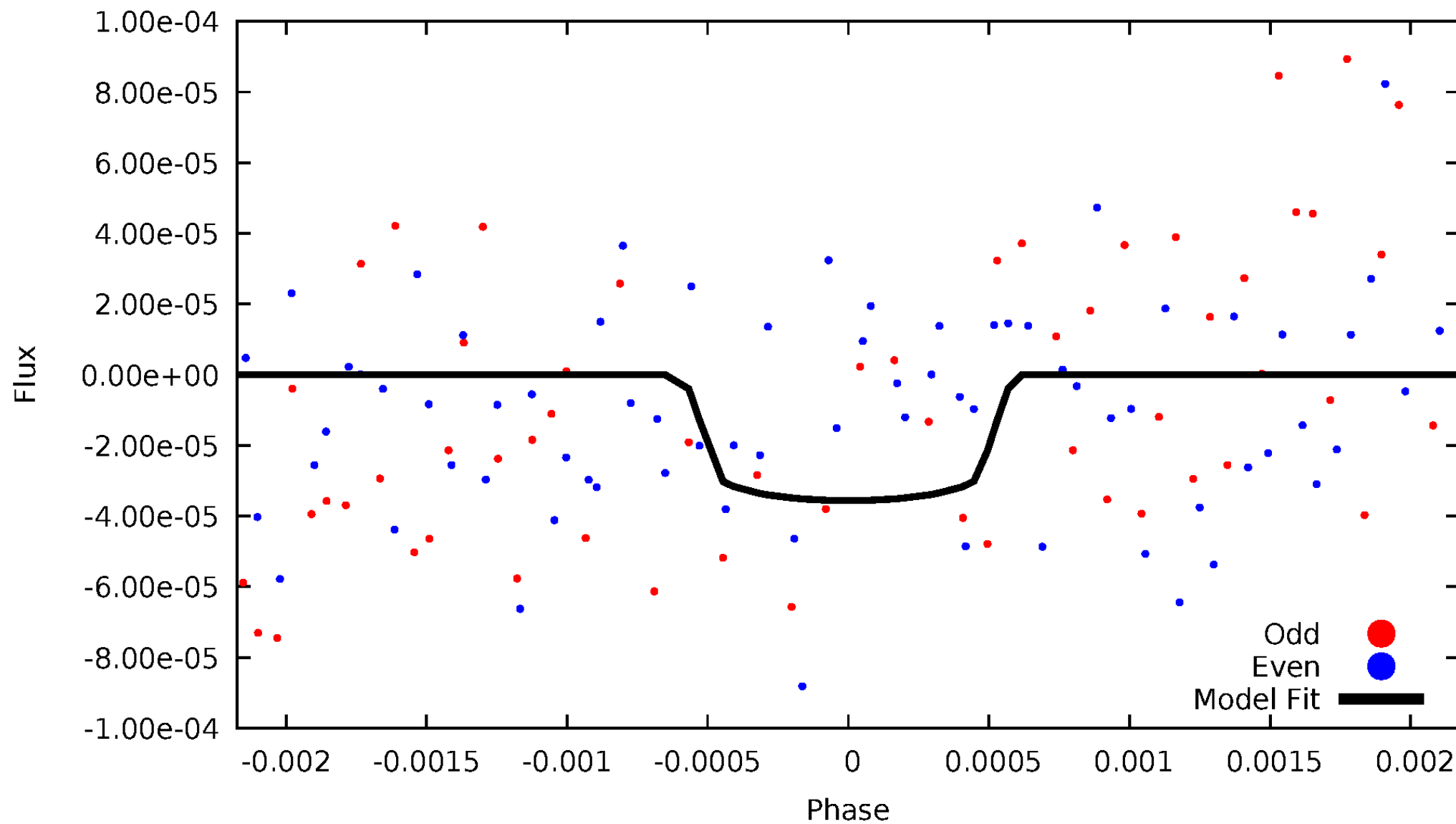


TCE 002442118-02



# DV Odd/Even

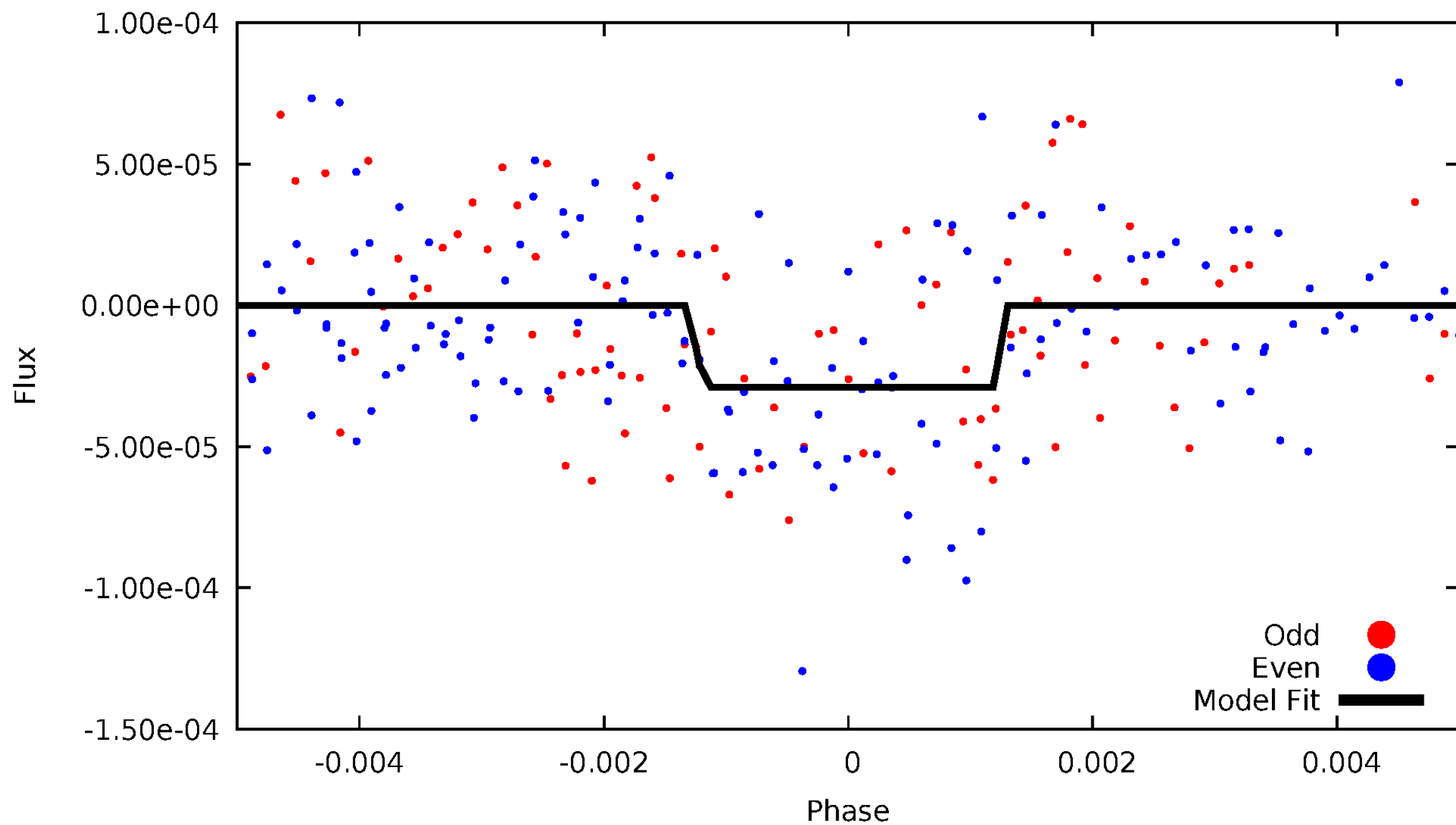
TCE 002442118-02





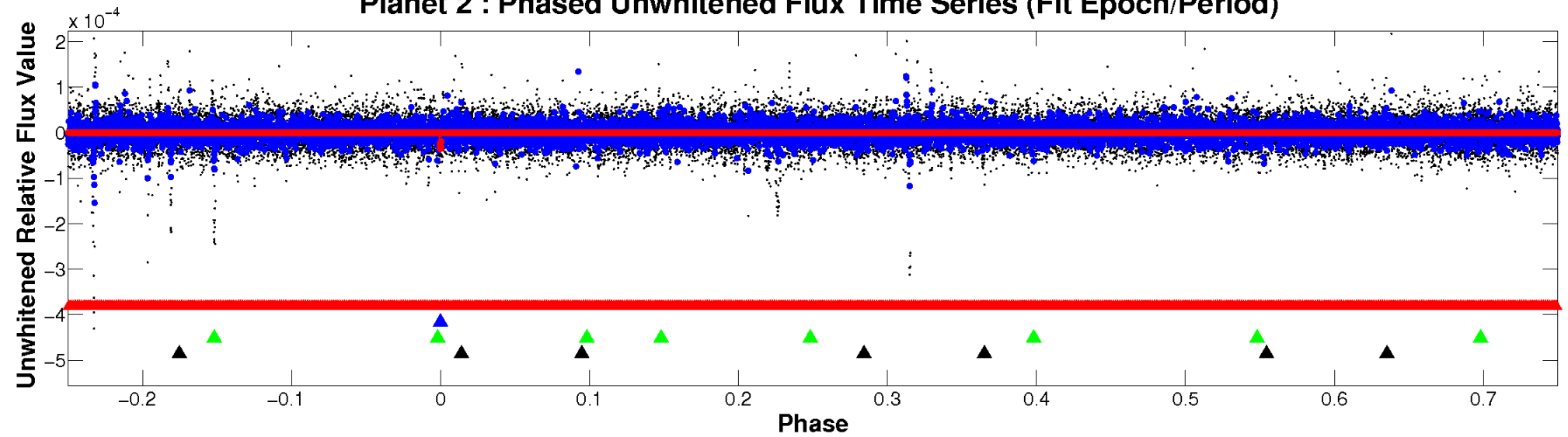
# ALT Odd/Even

TCE 002442118-02

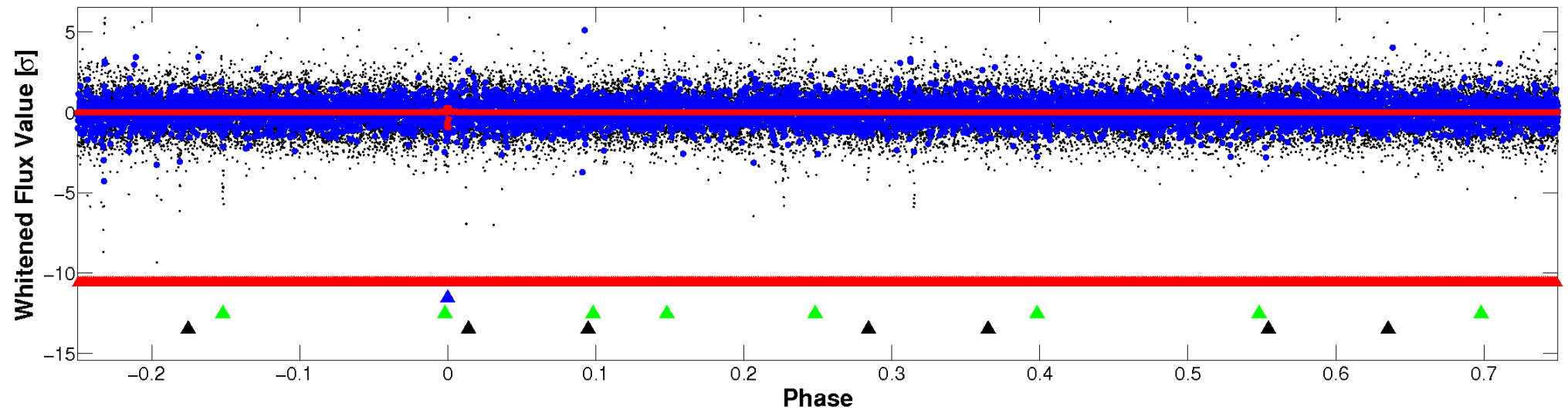


# Non-Whitened Vs. Whitened Light Curve

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

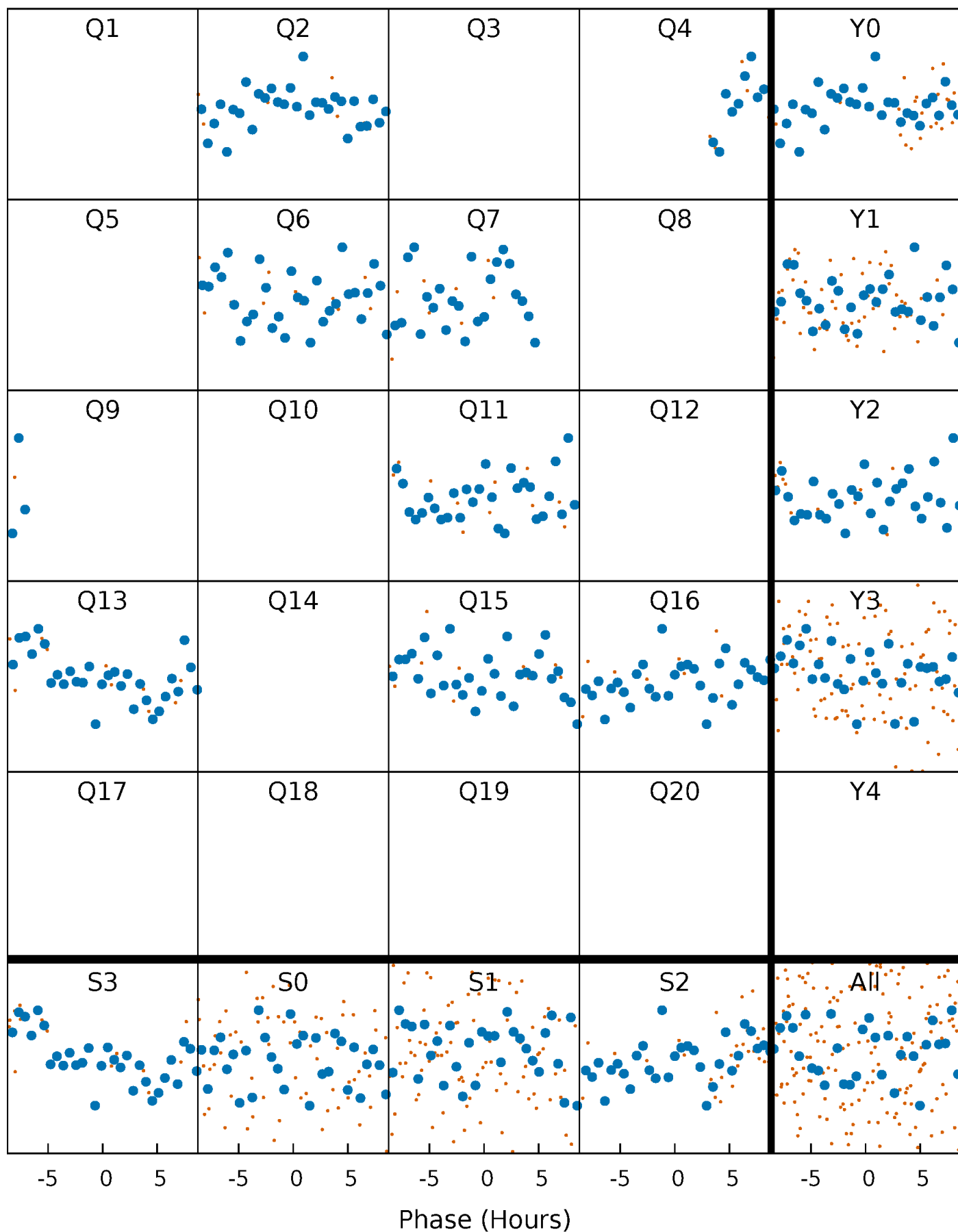


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



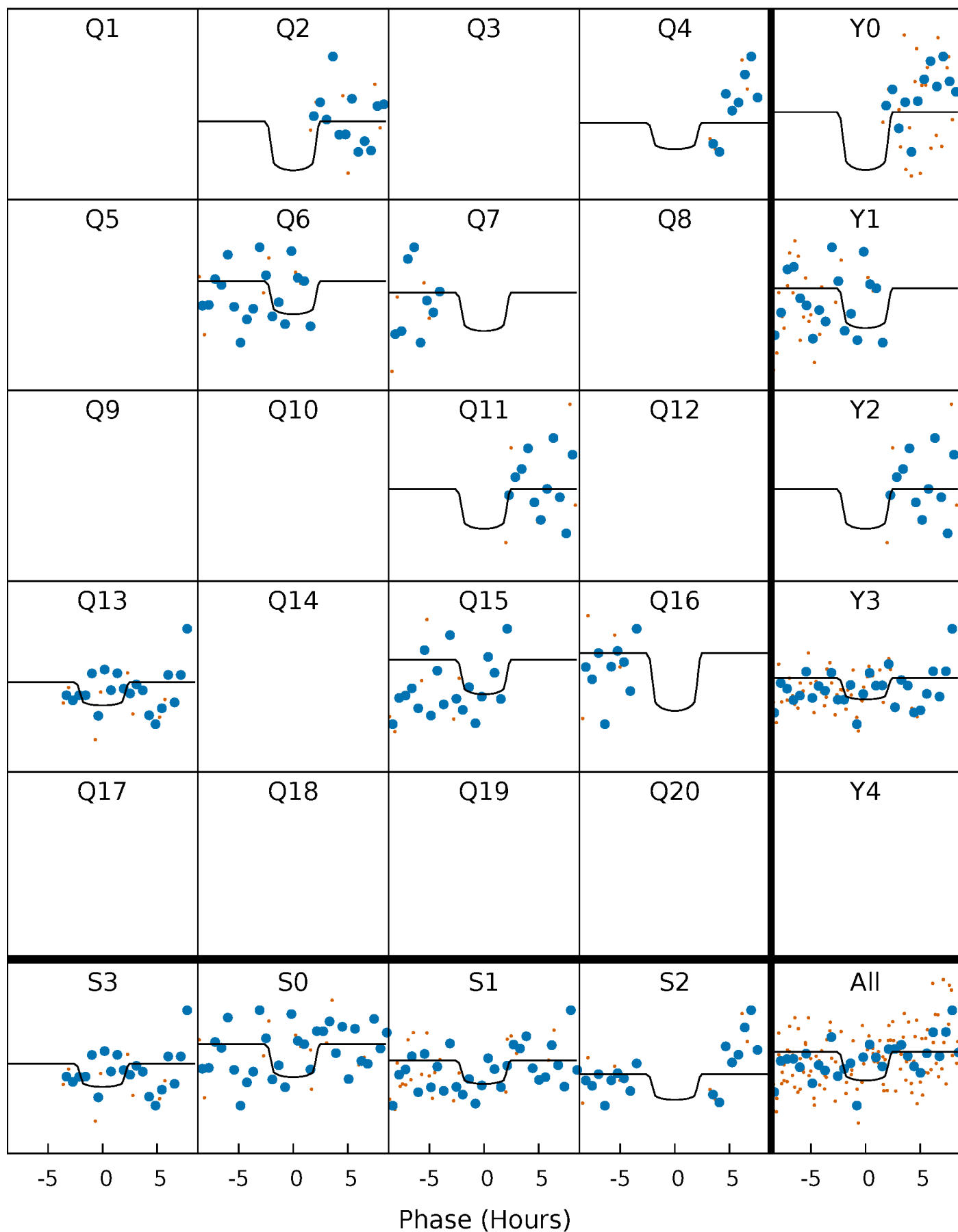
# PDC Quarter-Phased Transit Curves

TCE 002442118-02 P=167.584202 Days  $T_0=216.595256$  (BKJD)



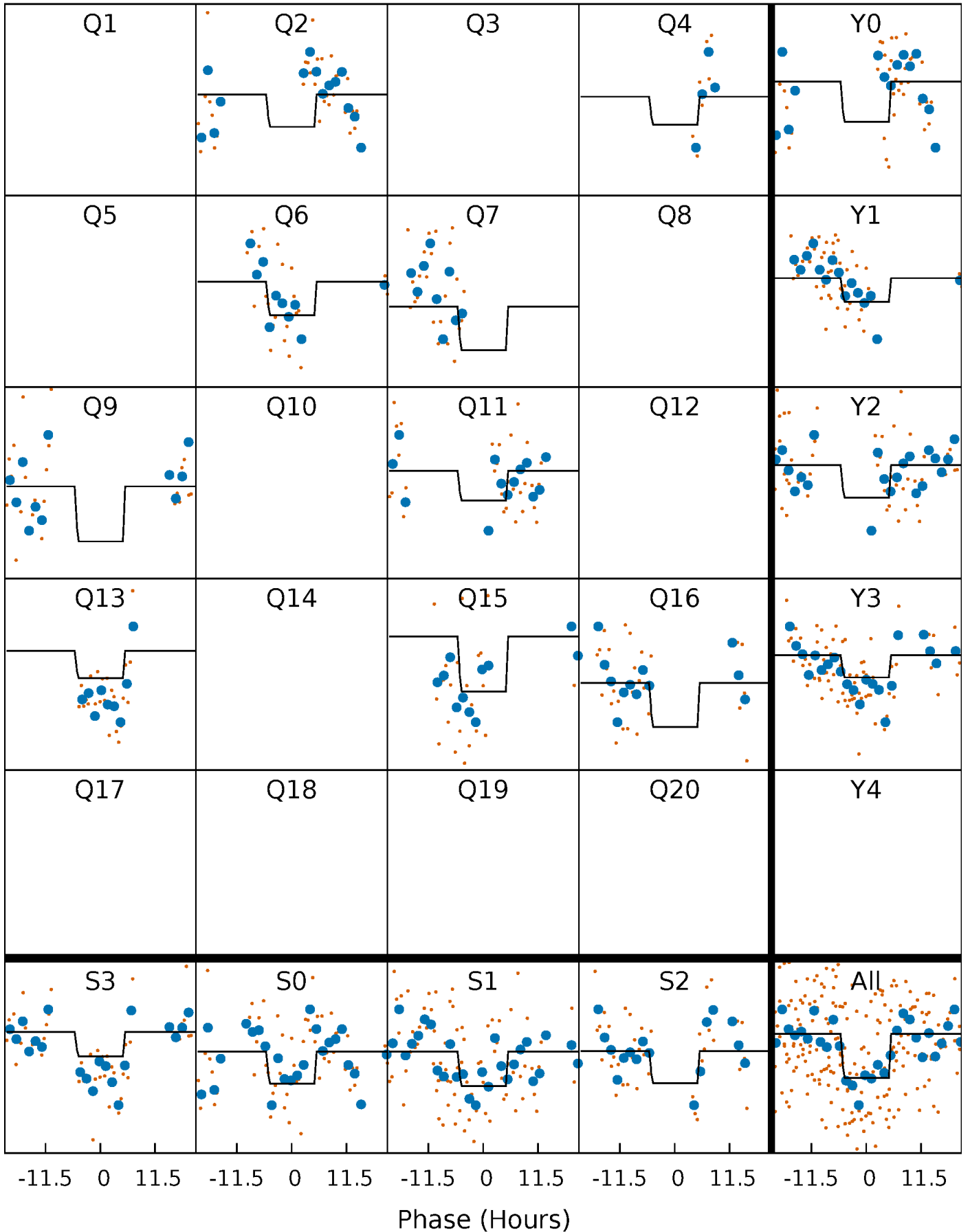
# DV Quarter-Phased Transit Curves

TCE 002442118-02 P=167.584202 Days  $T_0=216.595256$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 002442118-02 P=167.596059 Days  $T_0=216.559738$  (BKJD)

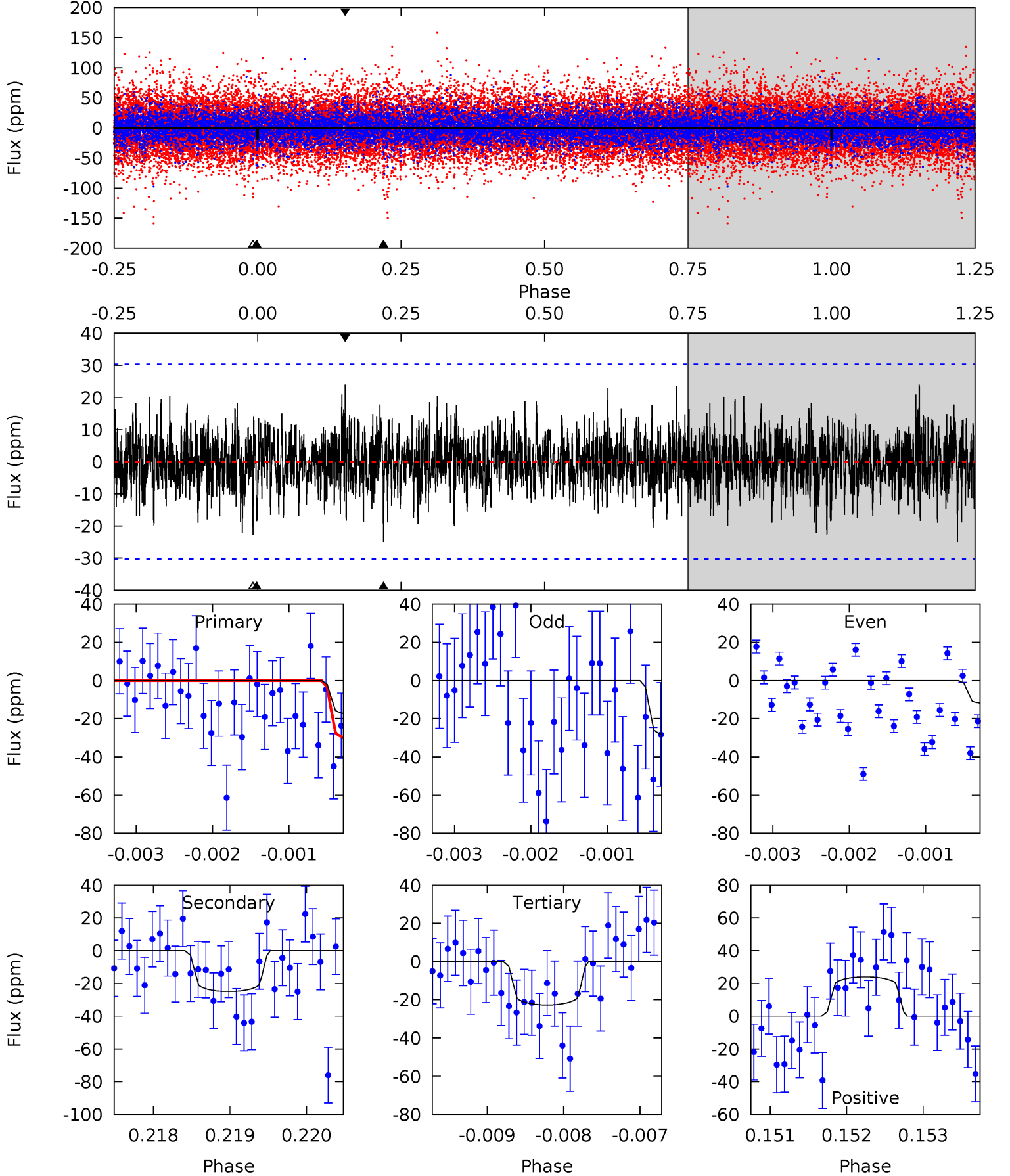




# DV Model-Shift Uniqueness Test

002442118-02,  $P = 167.584202$  Days,  $E = 49.011054$  Days

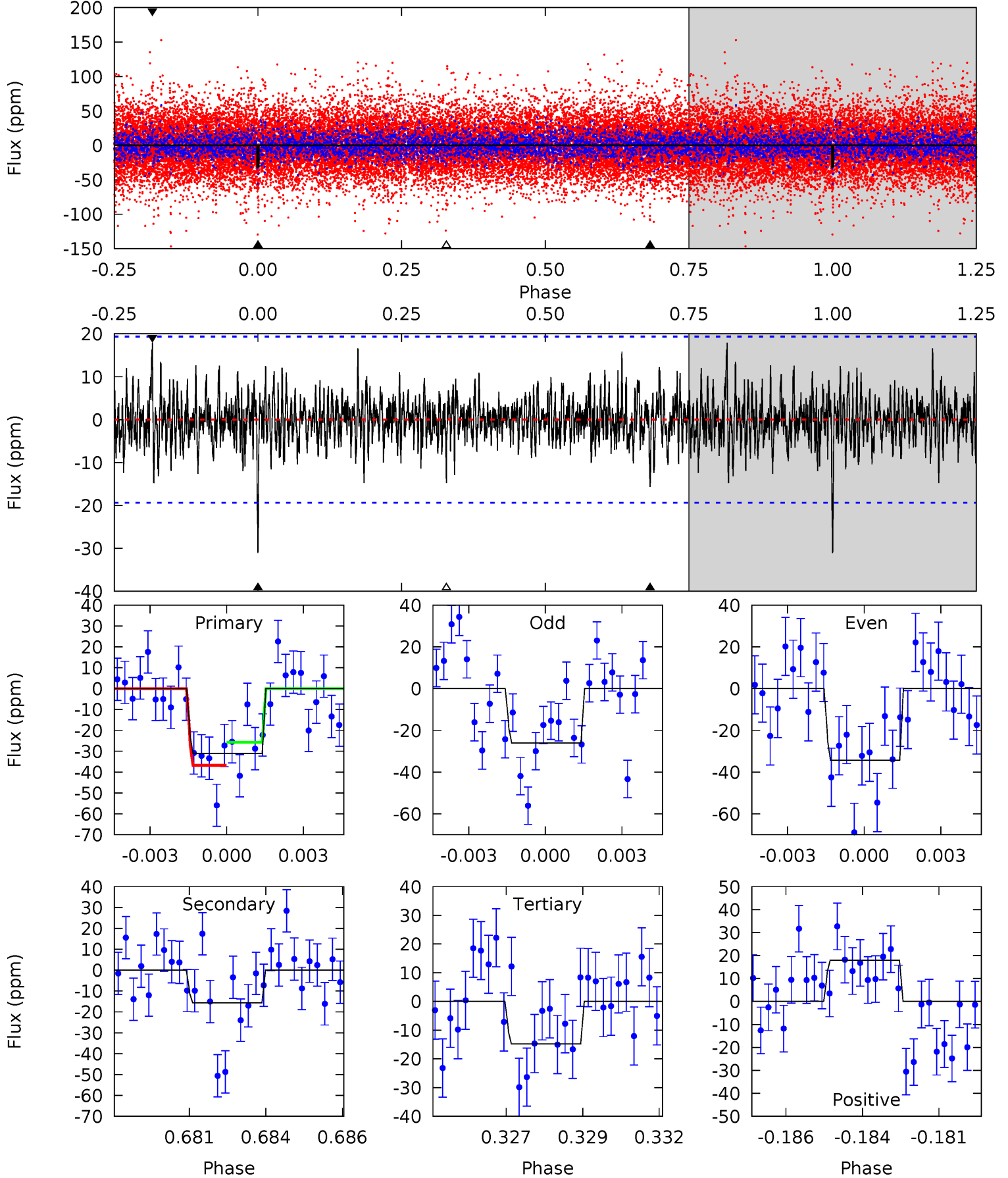
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.31	4.47	4.07	4.30	5.43	3.25	1.18	-0.76	-0.99	0.41	0.18	1.47	1.00	0.49	2.29



# Alt Model-Shift Uniqueness Test

002442118-02, P = 167.596059 Days, E = 48.963679 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
8.48	4.27	4.03	4.88	5.28	3.02	1.20	4.44	3.59	0.23	-0.62	1.09	0.83	0.37	1.50



### Stellar Parameters For KIC 002442118

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$9338^{+290}_{-471}$	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.200}_{-0.750}$	$3.207^{+0.974}_{-1.461}$	$2.587^{+0.325}_{-0.909}$	$0.110^{+0.400}_{-0.049}$
	+3%/-5%	+10%/-4%	+286%/-1071%	+30%/-46%	+13%/-35%	+362%/-44%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 002442118-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-25 \pm 6$	$2.69^{+2.25}_{-1.82}$	$1113^{+107}_{-128}$	$6818^{+7679}_{-1753}$	$1275^{+10003}_{-937}$
Alt.	$-16 \pm 4$	$2.46^{+2.30}_{-1.63}$	$1110^{+107}_{-130}$	$6323^{+6043}_{-1639}$	$925^{+6684}_{-692}$

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

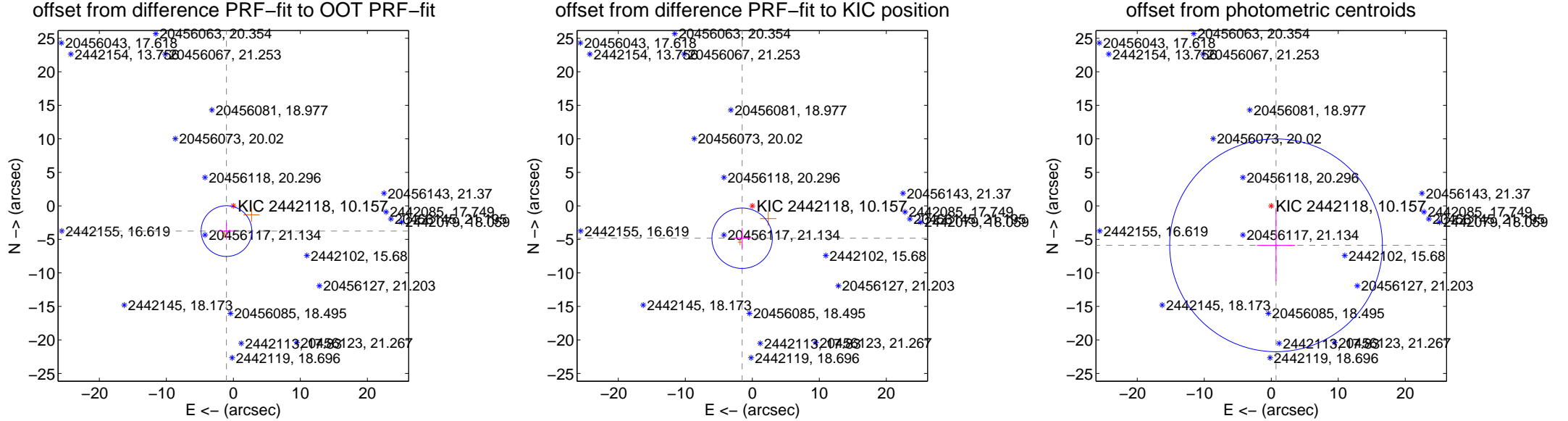
## DV Centroid Data

Supplemental centroid analysis for 002442118-02. **Kepler magnitude: 10.16.** Transit SNR 4.55

**There are 0 quarters with good PRF difference image offsets**

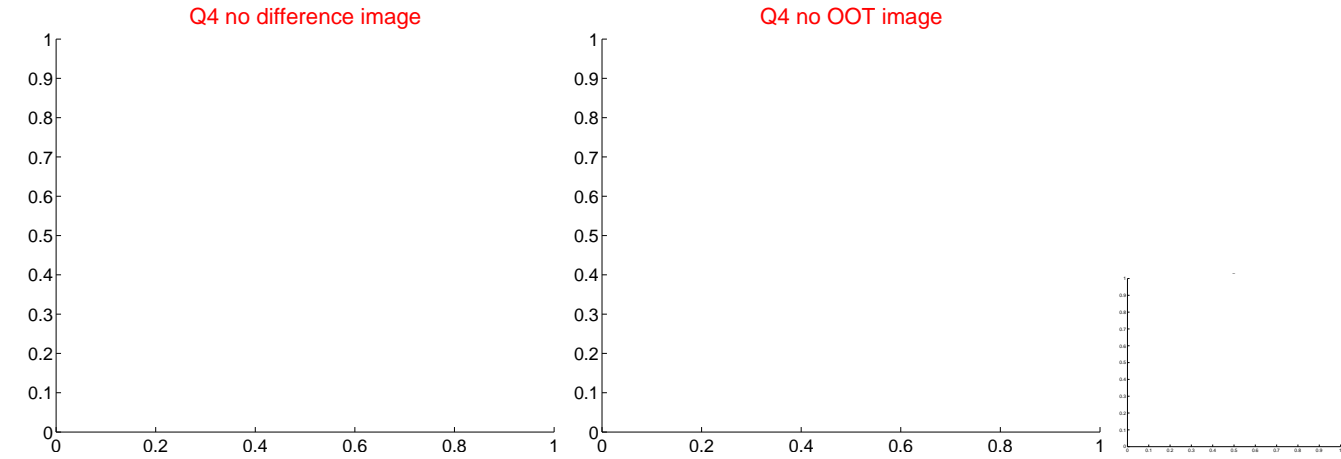
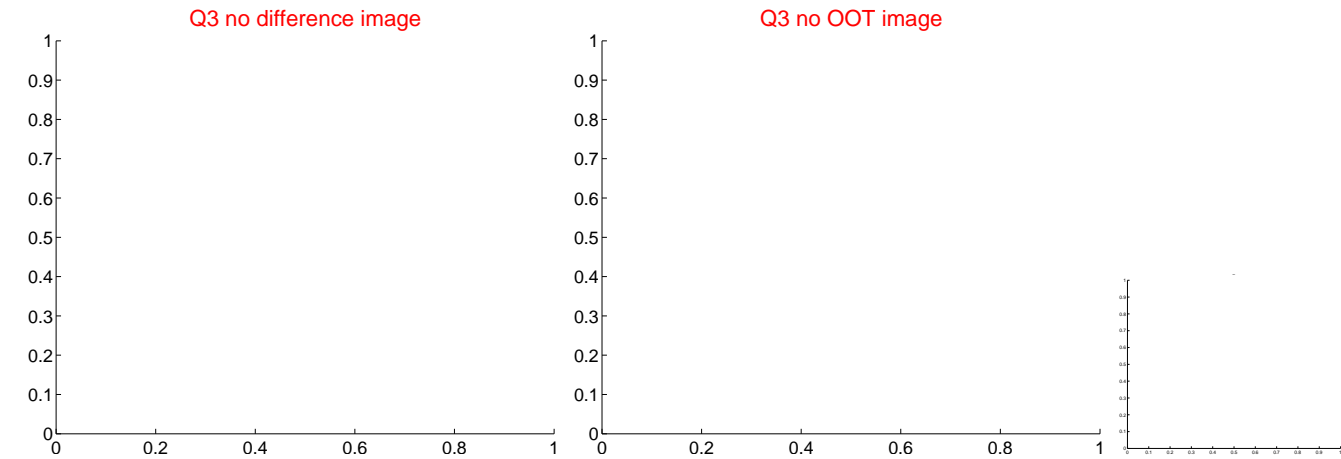
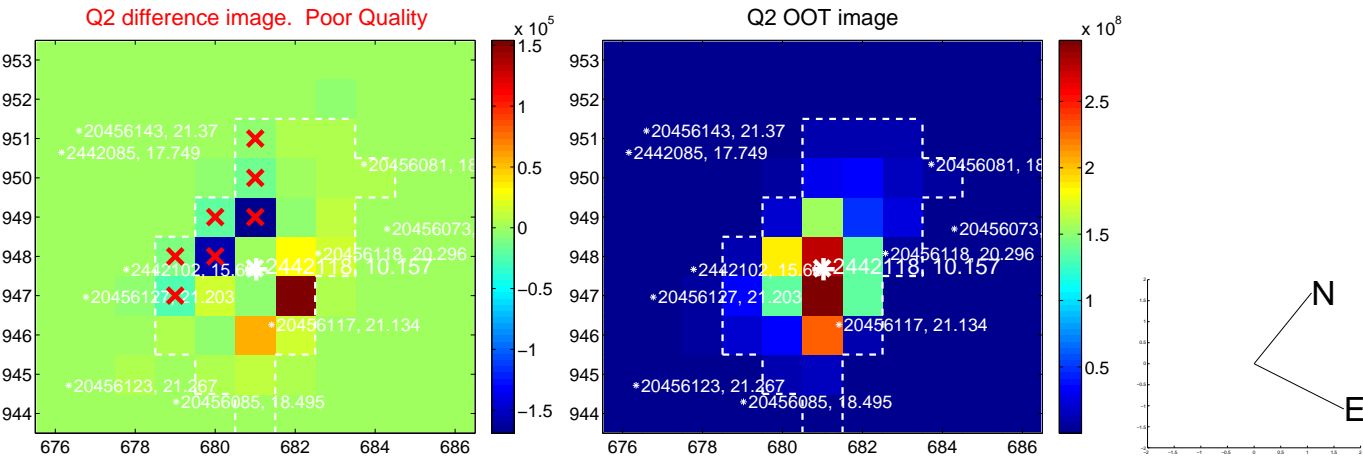
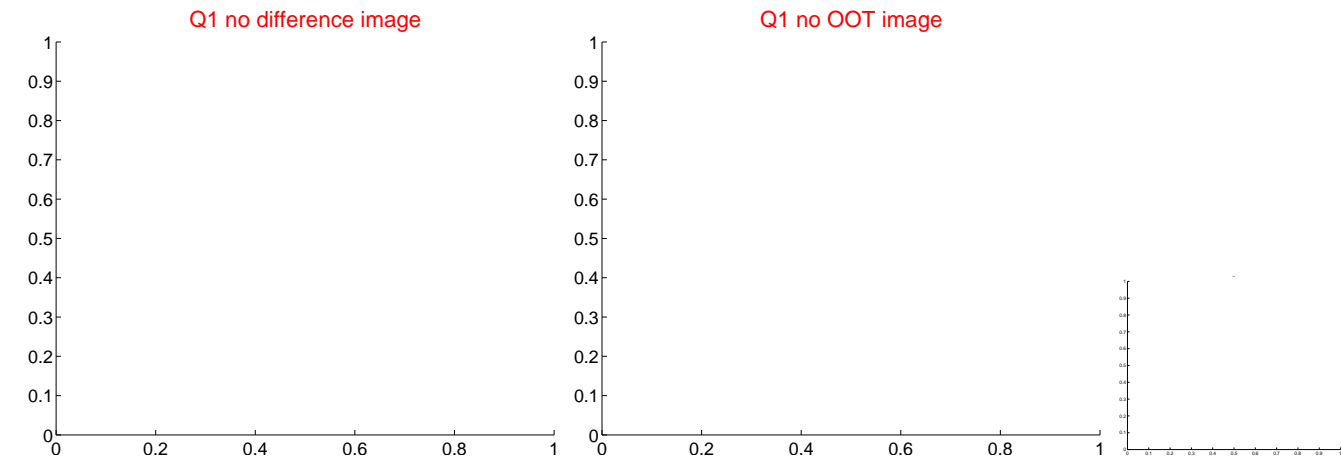
The direct PRF centroid is offset from the target star catalog position by about 1.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>3.898 \pm 1.262</math></b>	<b>3.09</b>	$1.028 \pm 1.226$	$-3.760 \pm 1.265$
PRF-fit source offset from KIC position	<b><math>5.060 \pm 1.503</math></b>	<b>3.37</b>	$1.517 \pm 1.279$	$-4.827 \pm 1.523$
photometric centroid source offset	$5.93 \pm 5.29$	1.12	$-0.72 \pm 2.85$	$-5.88 \pm 5.32$



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.

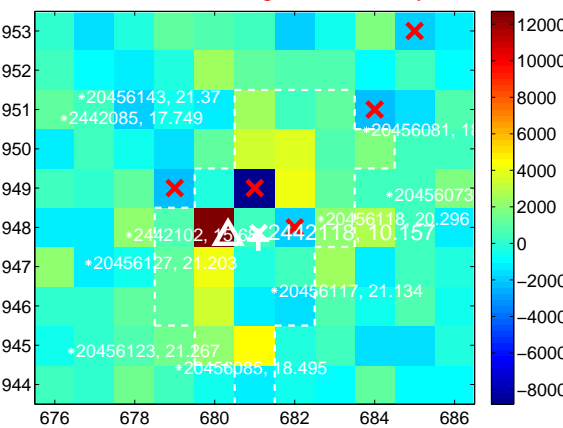
Q5 no difference image



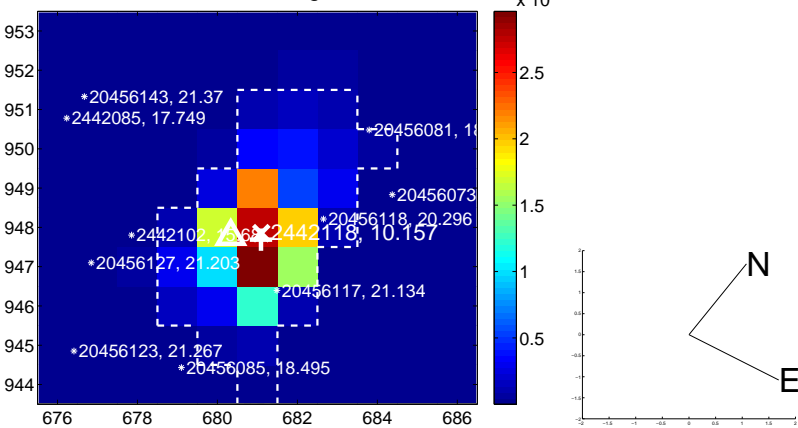
Q5 no OOT image



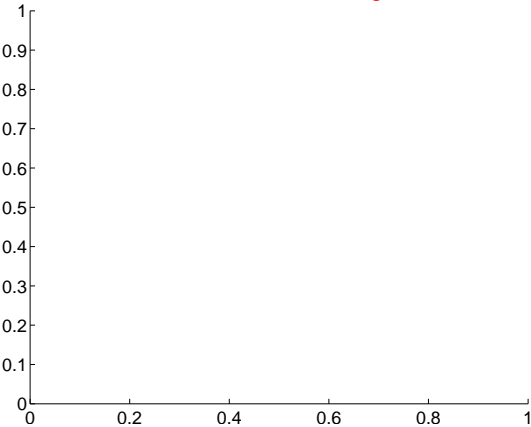
Q6 difference image. Poor Quality



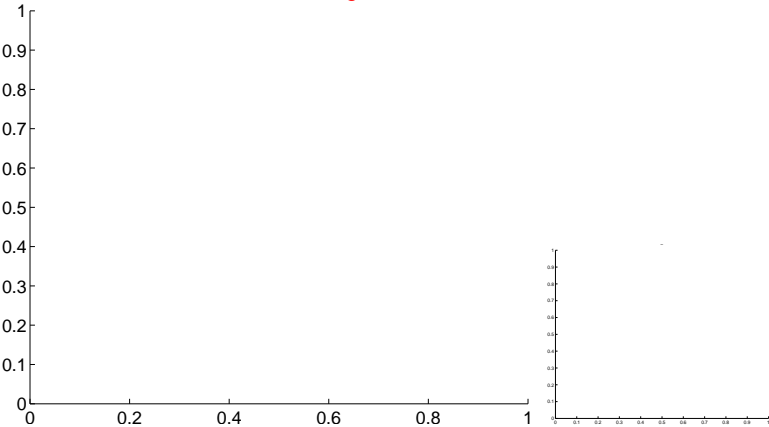
Q6 OOT image



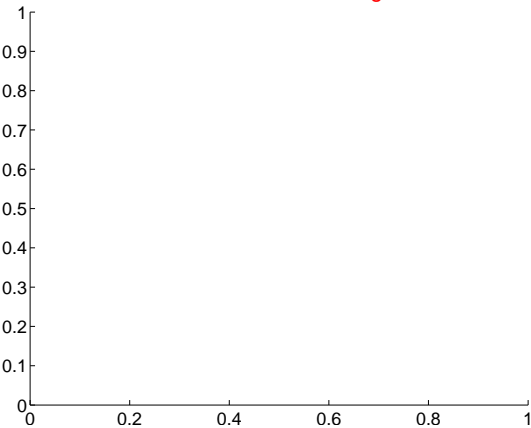
Q7 no difference image



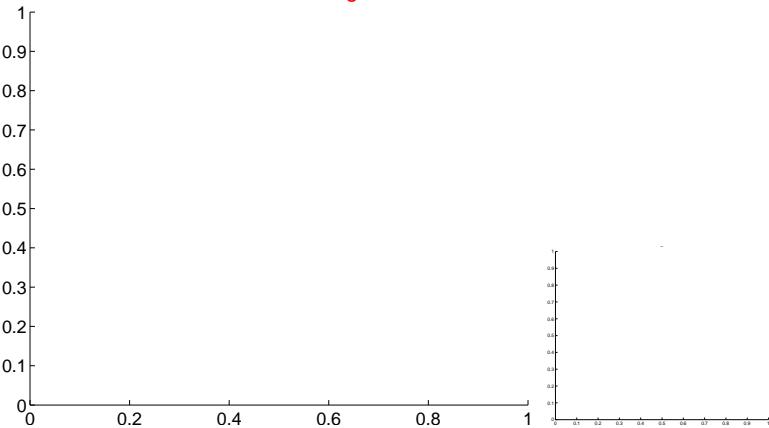
Q7 no OOT image



Q8 no difference image



Q8 no OOT image



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

Q9 no difference image



Q9 no OOT image



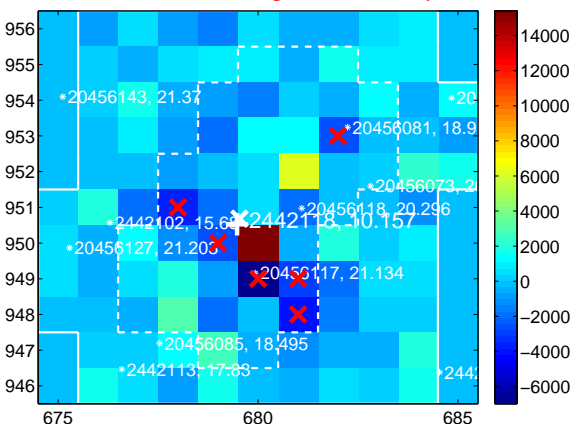
Q10 no difference image



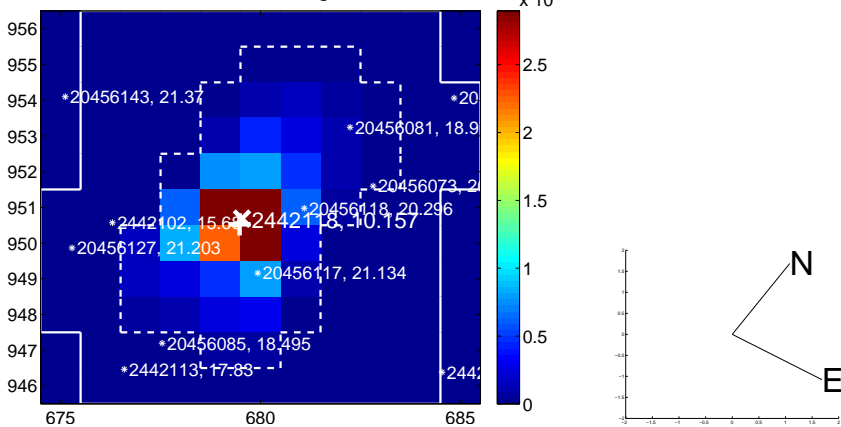
Q10 no OOT image



Q11 difference image. Poor Quality



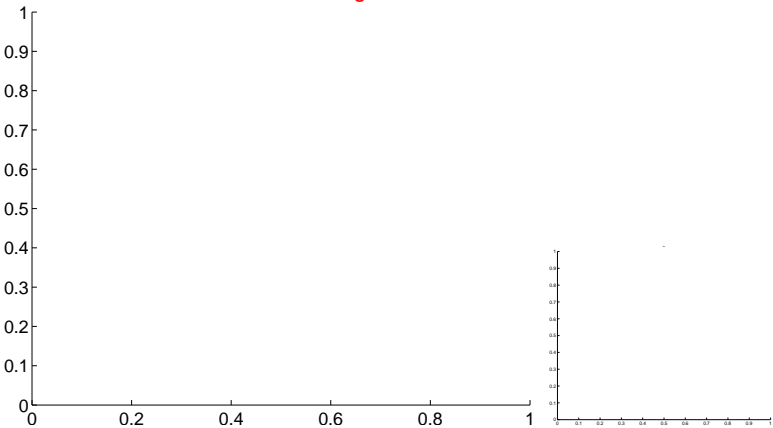
Q11 OOT image



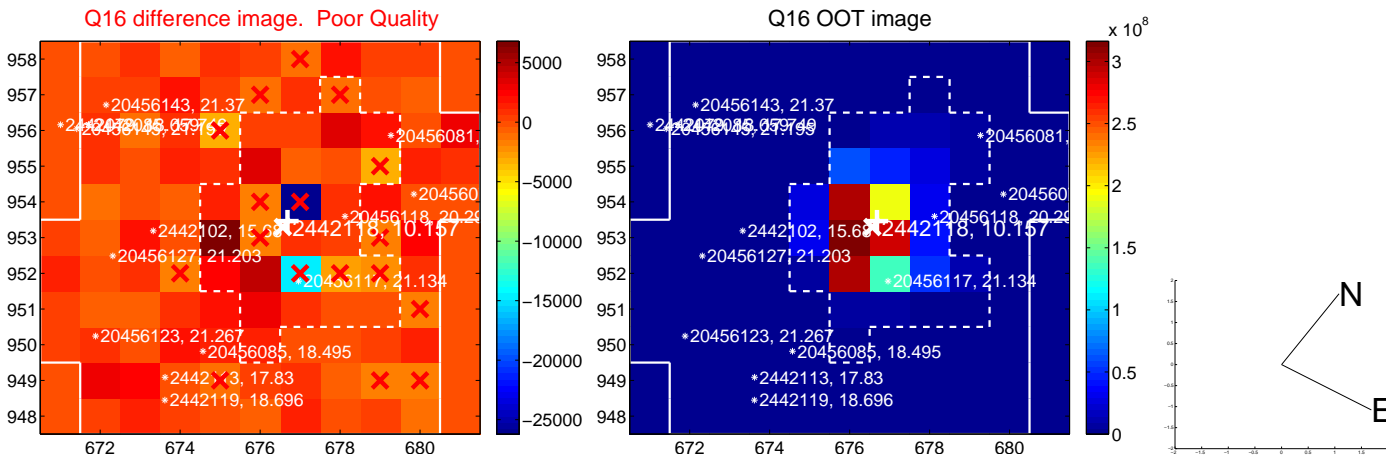
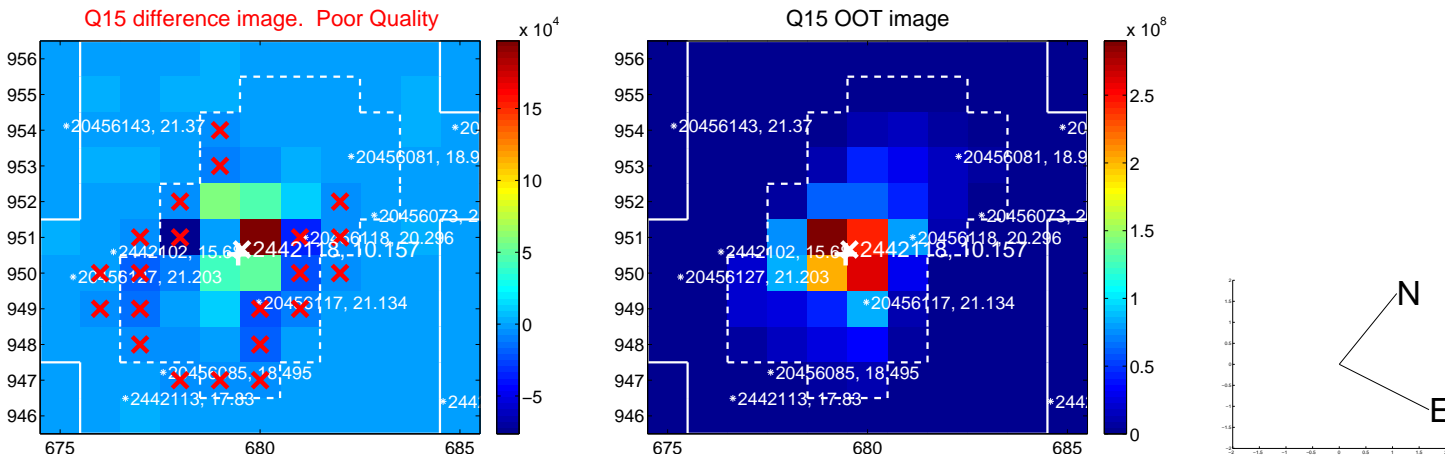
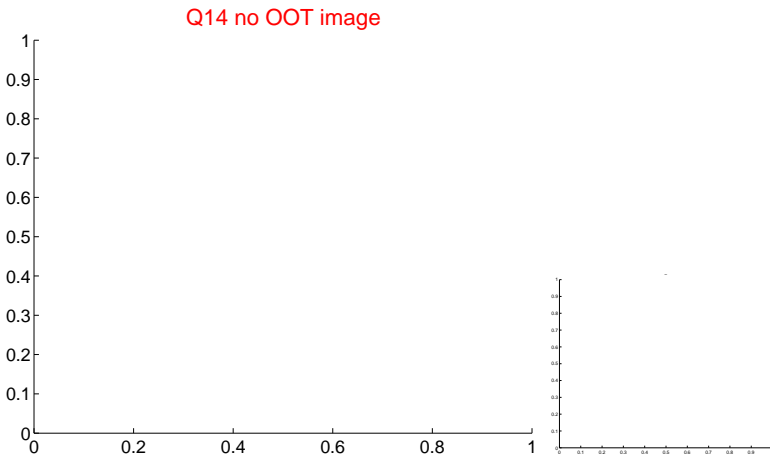
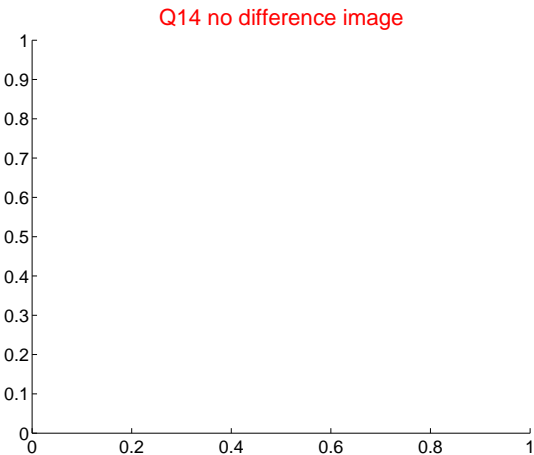
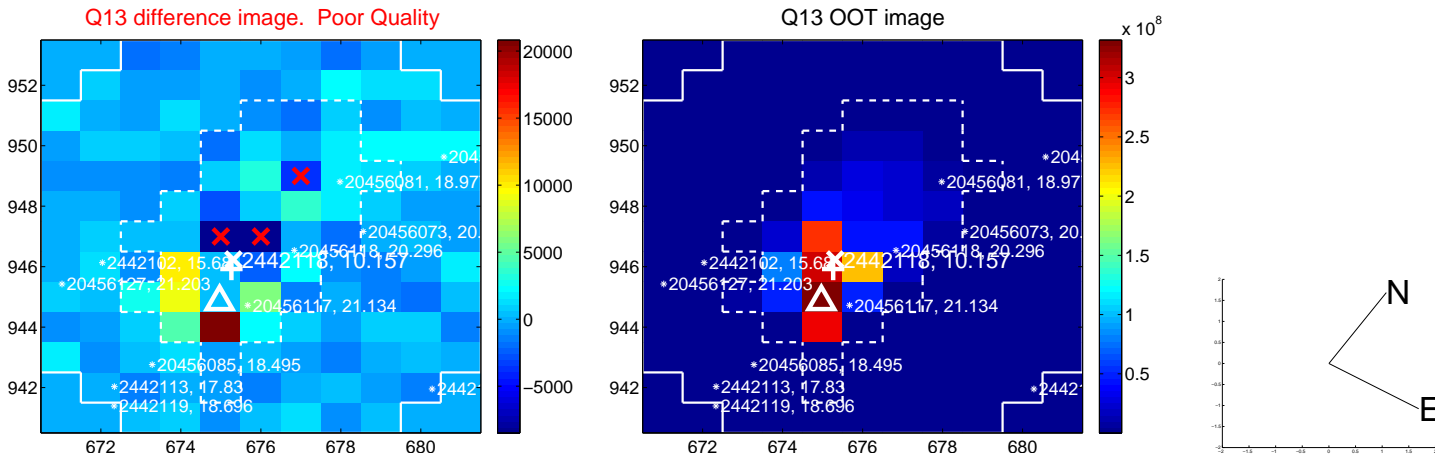
Q12 no difference image



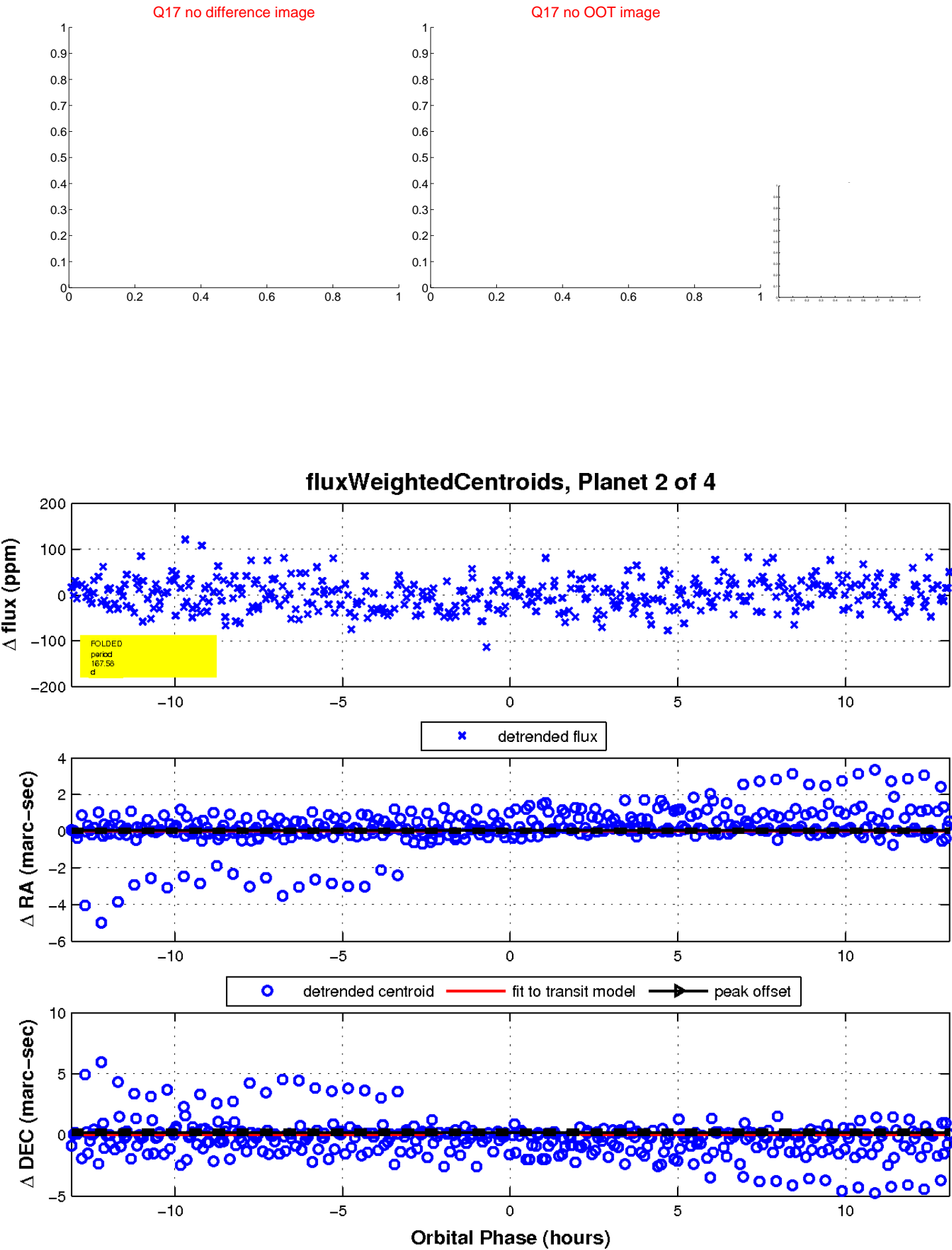
Q12 no OOT image



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

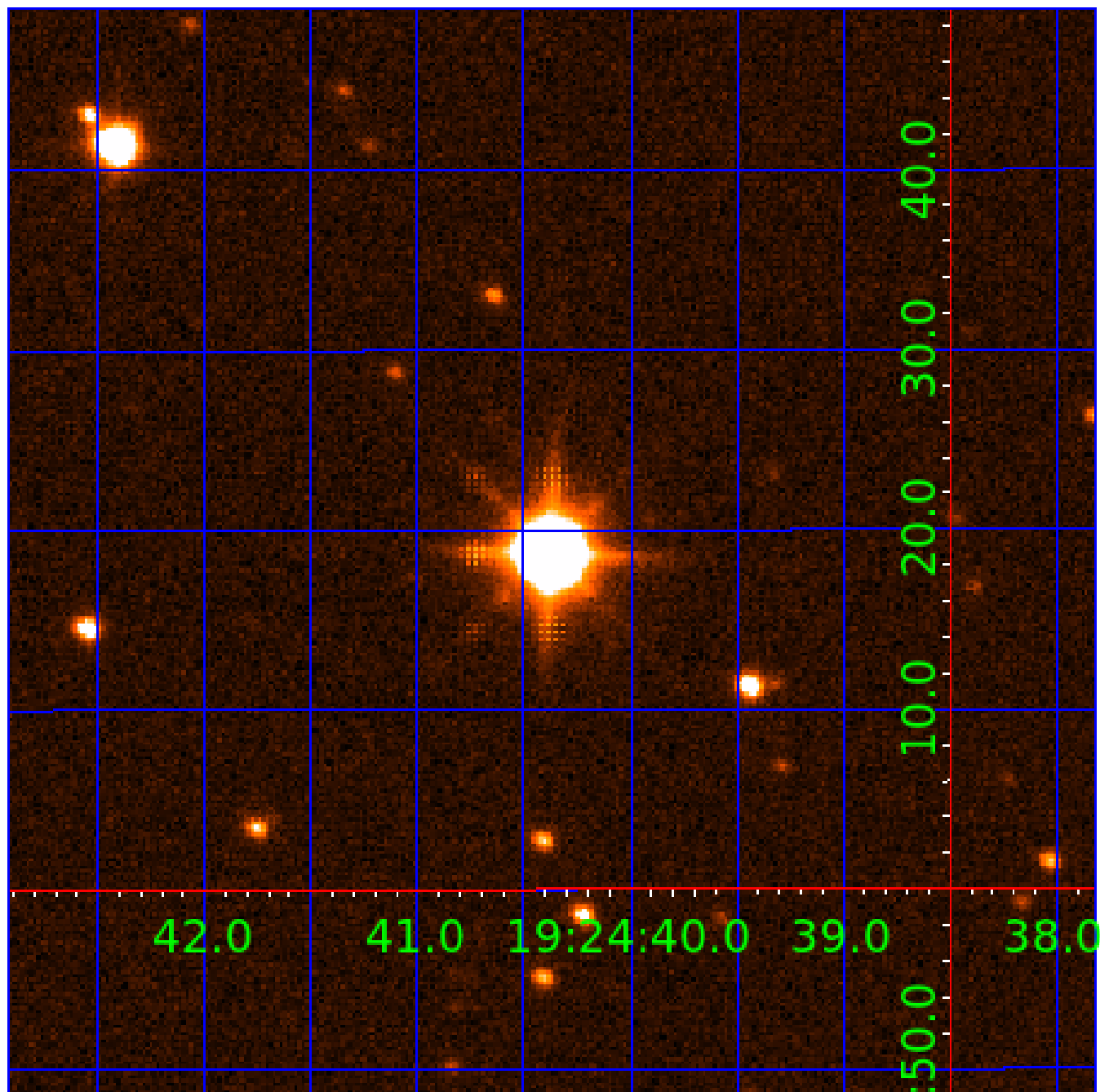


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 002442118

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002442118-01	OBS	No	1.221489	132.012148	6.9	5.625	13.1	15.5	3.21	9338	1.00	74265.94
002442118-02	OBS	No	167.584202	216.595256	35.6	4.370	11.7	4.6	3.21	9338	2.20	104.95
002442118-03	OBS	No	192.718803	233.059585	73.2	4.541	12.0	8.8	3.21	9338	3.11	87.11
002442118-04	OBS	No	212.867150	218.951929	63.0	4.888	9.9	6.6	3.21	9338	2.92	76.30

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002442118-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
002442118-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

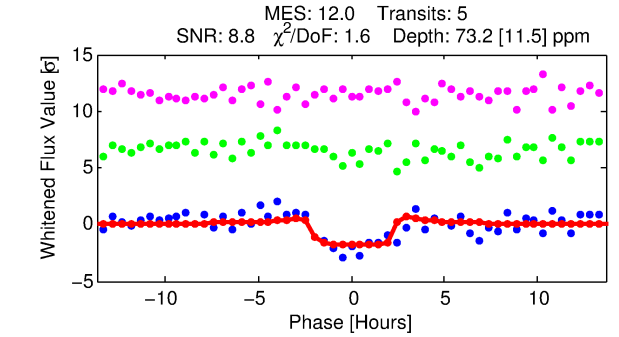
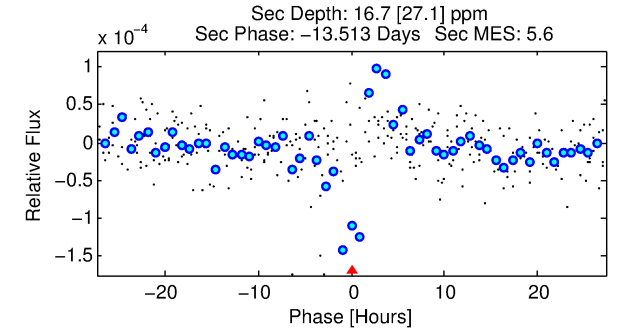
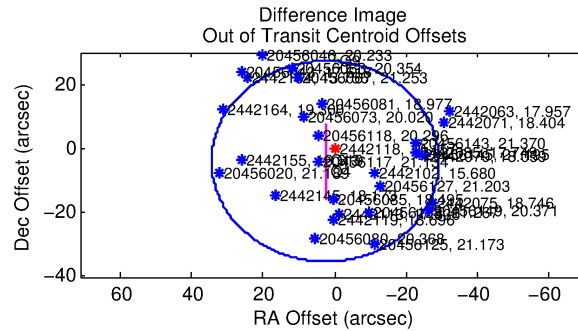
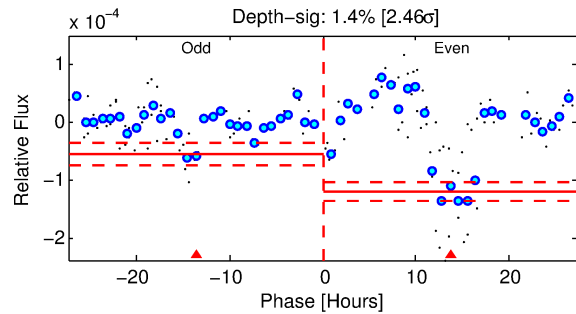
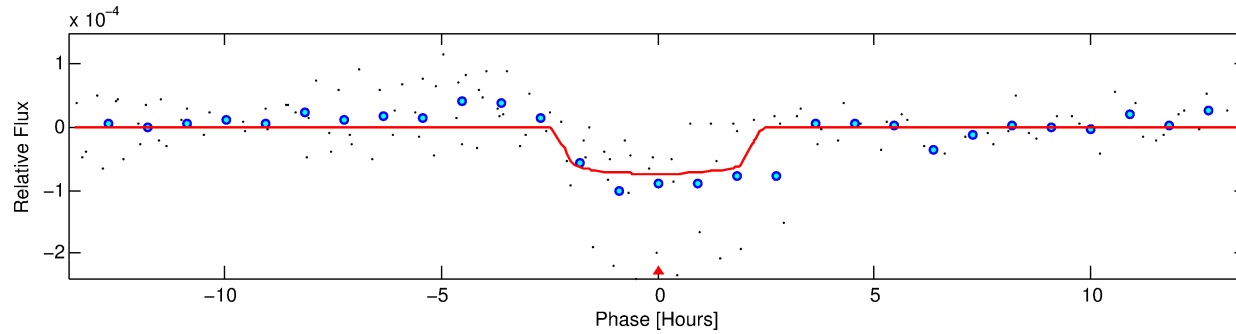
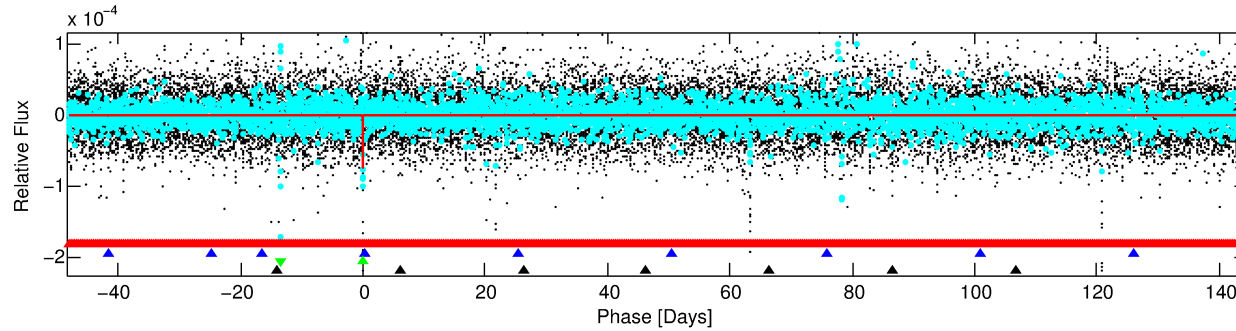
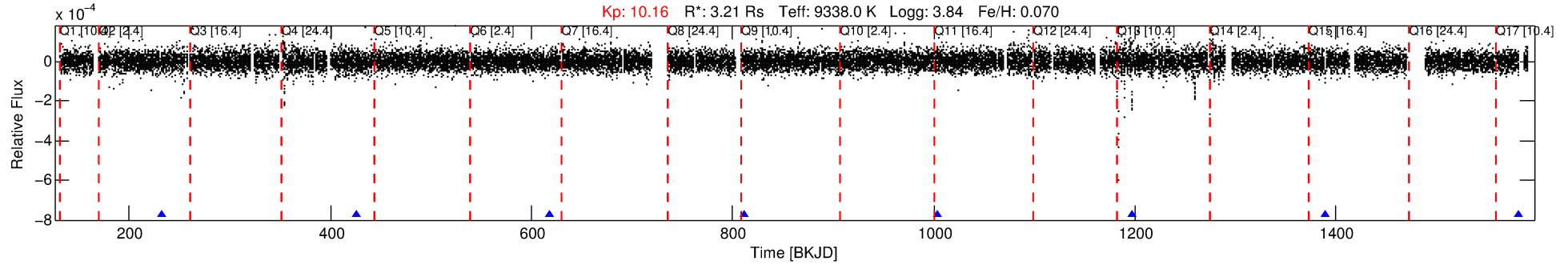
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002442118-03

No Significant Match Found

# DV One-Page Summary

KIC: 2442118 Candidate: 3 of 4 Period: 192.719 d



## DV Fit Results:

Period = 192.71880 [0.00345] d  
Epoch = 233.0596 [0.0087] BKJD  
Rp/R\* = 0.0089 [0.0036]  
a/R\* = 165.13 [480.38]  
b = 0.87 [0.81]  
Seff = 87.11 [61.06]  
Teq = 779 [137] K  
Rp = 3.11 [1.88] Re  
a = 0.8968 [0.3824] AU  
Ag = 764.76 [1476.24] [0.52 $\sigma$ ]  
Teffp = 6334 [2884] K [1.92 $\sigma$ ]

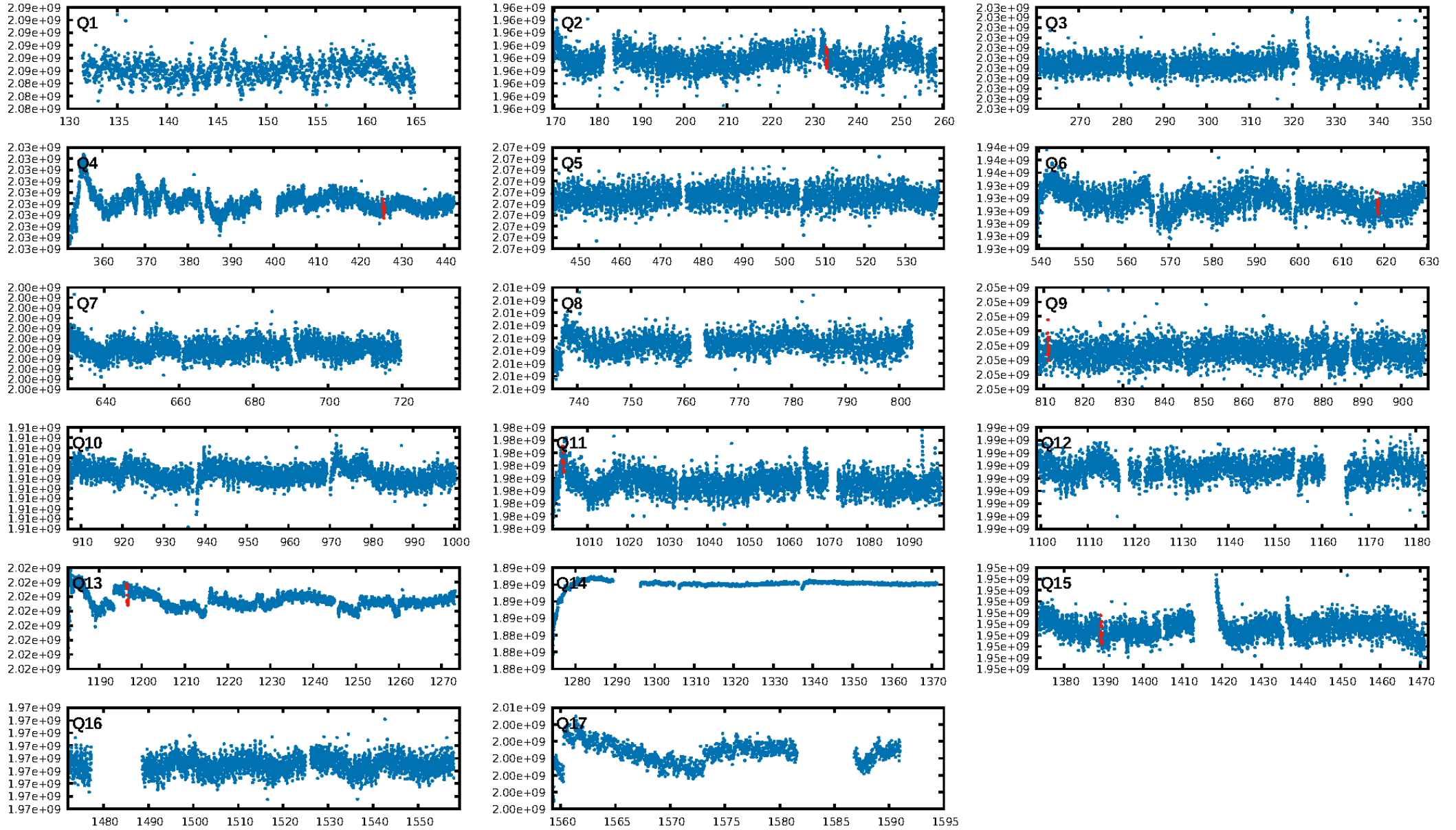
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [95.71 $\sigma$ ]  
LongPeriod-sig: 100.0% [72.47 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 59.3%  
Bootstrap-pfa: 4.77e-15  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 5.3%  
Centroid-so: 3.144 arcsec [1.32 $\sigma$ ]  
OotOffset-rm: 4.717 arcsec [0.45 $\sigma$ ]  
KicOffset-rm: 5.886 arcsec [0.85 $\sigma$ ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 0.17 [1/6]

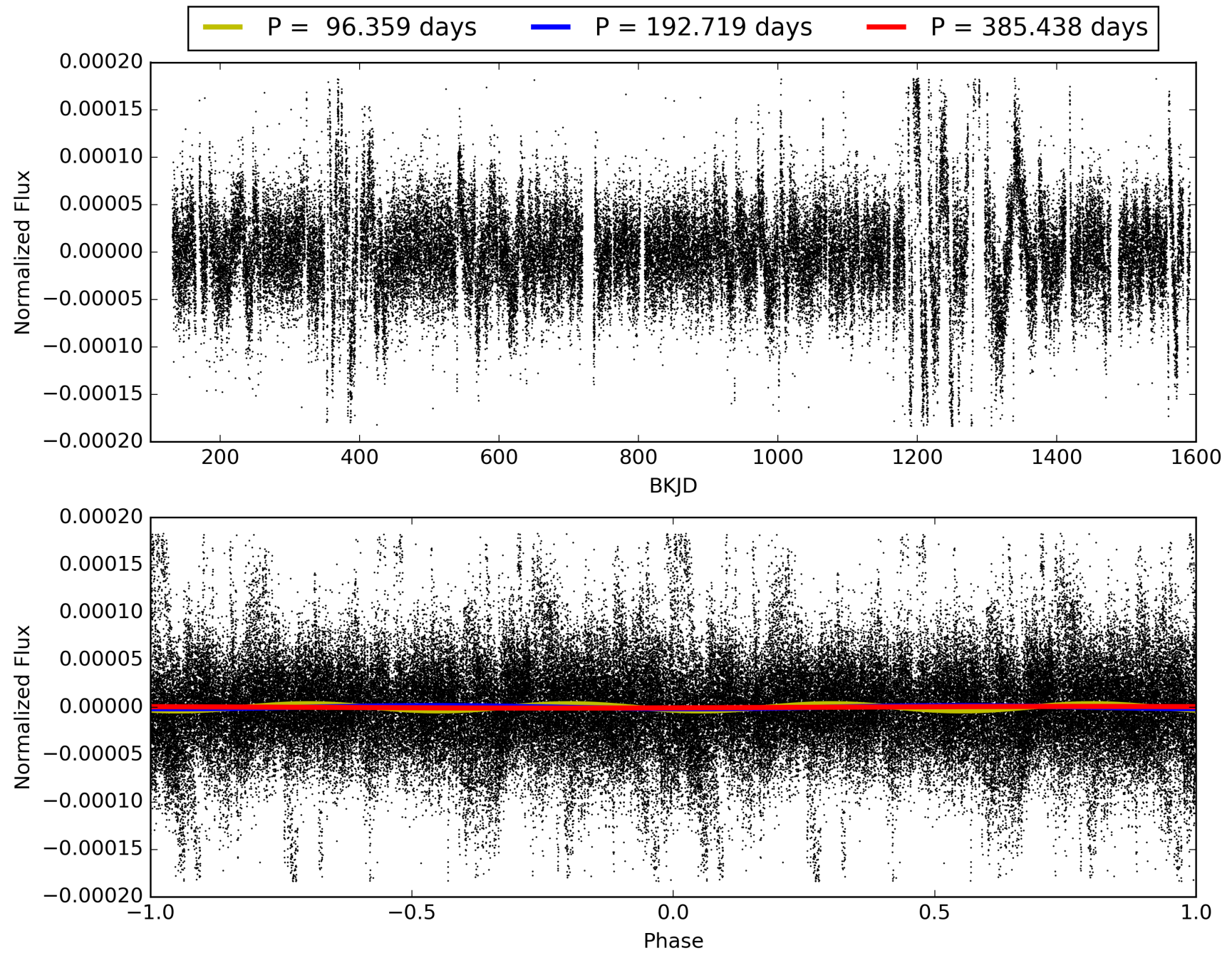
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:03:22 Z

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

# TCE 002442118-03, PDC Light Curves

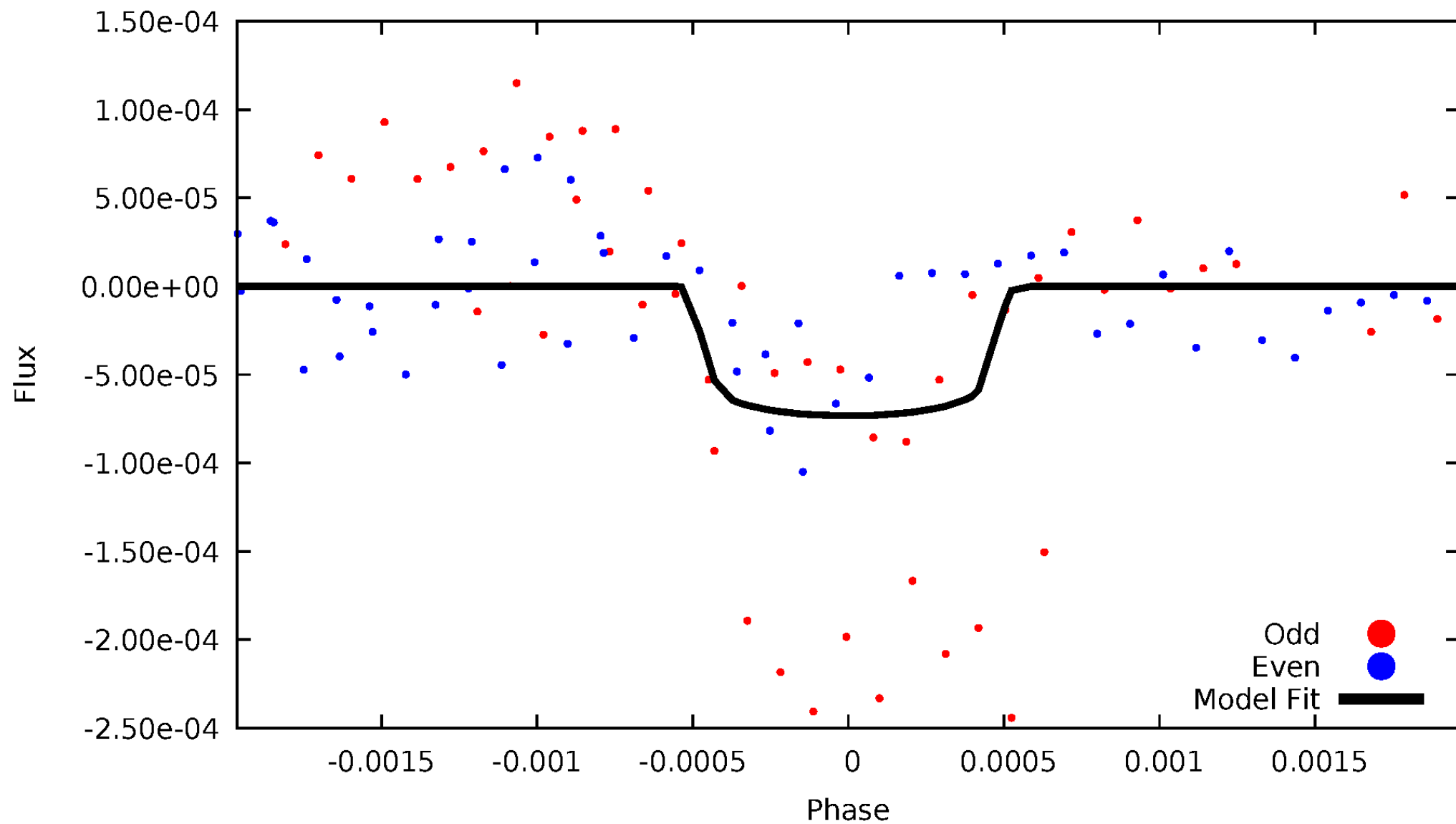


TCE 002442118-03



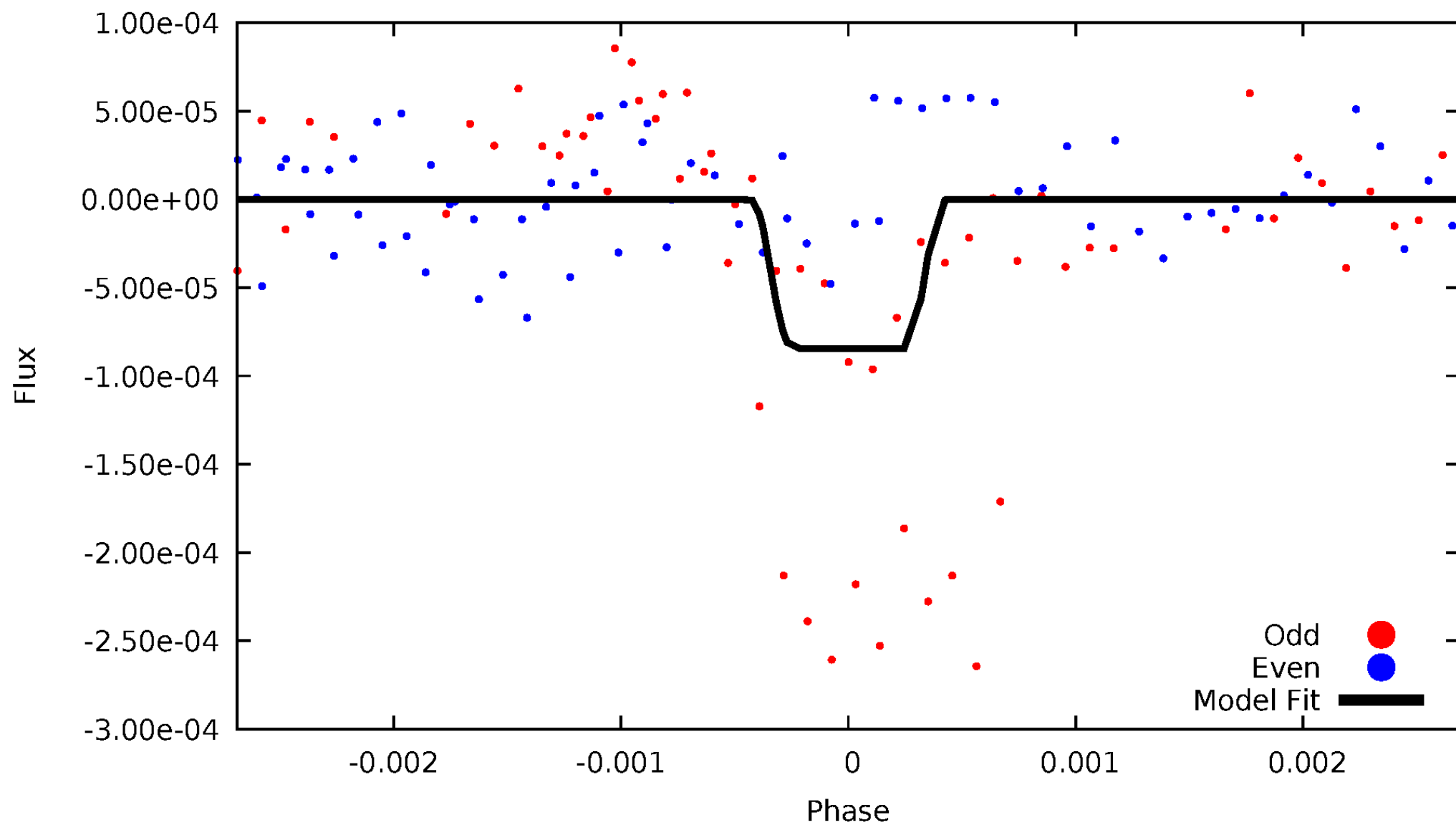
# DV Odd/Even

TCE 002442118-03



# ALT Odd/Even

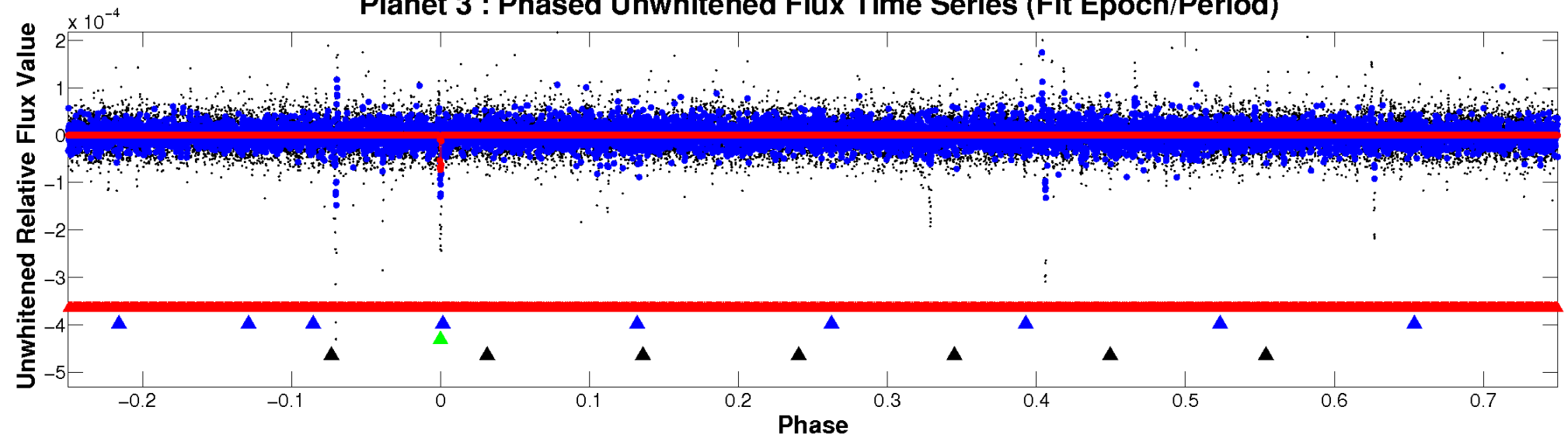
TCE 002442118-03



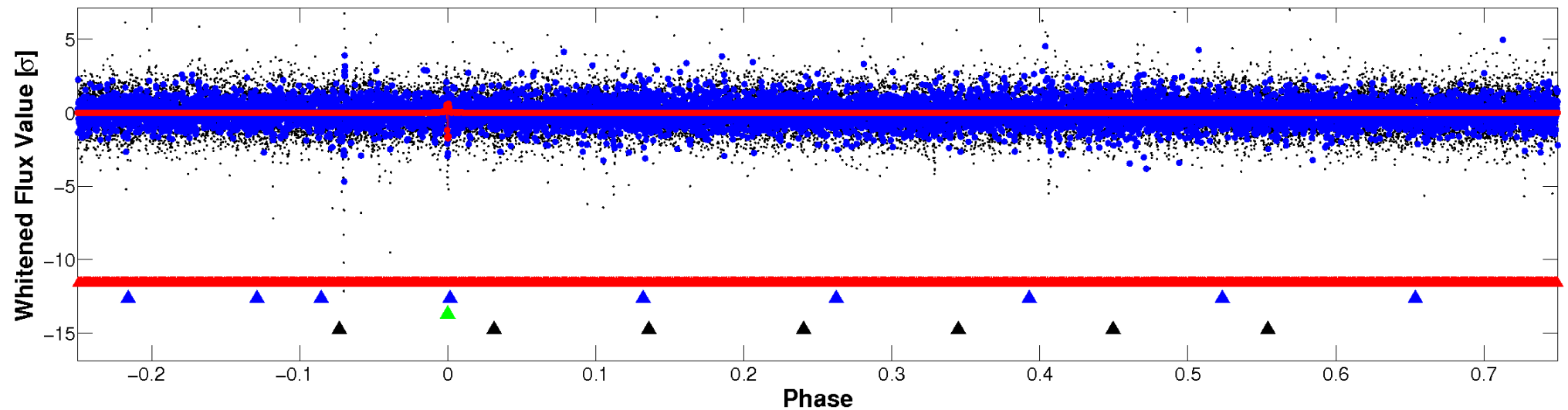


# Non-Whitened Vs. Whitened Light Curve

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

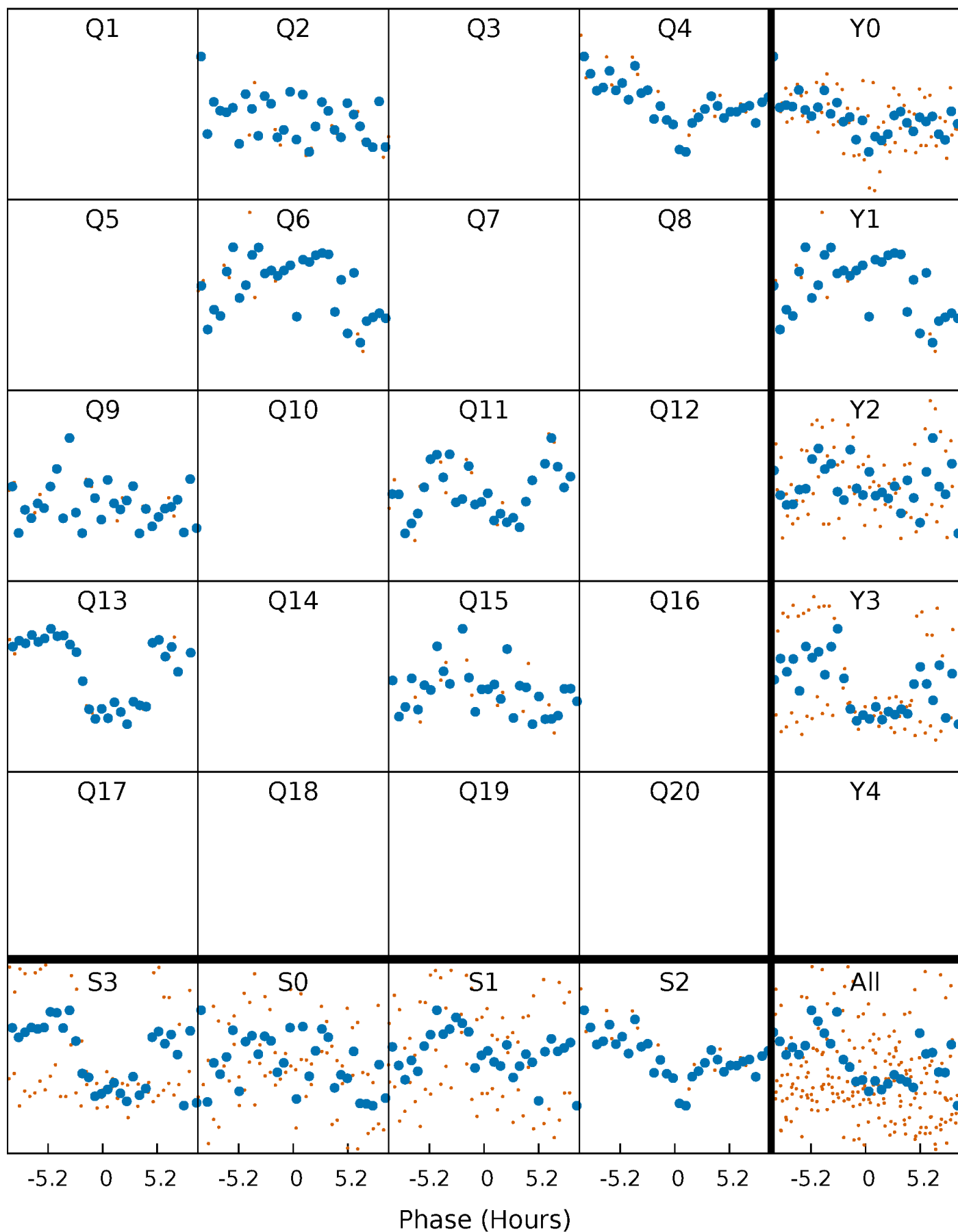


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



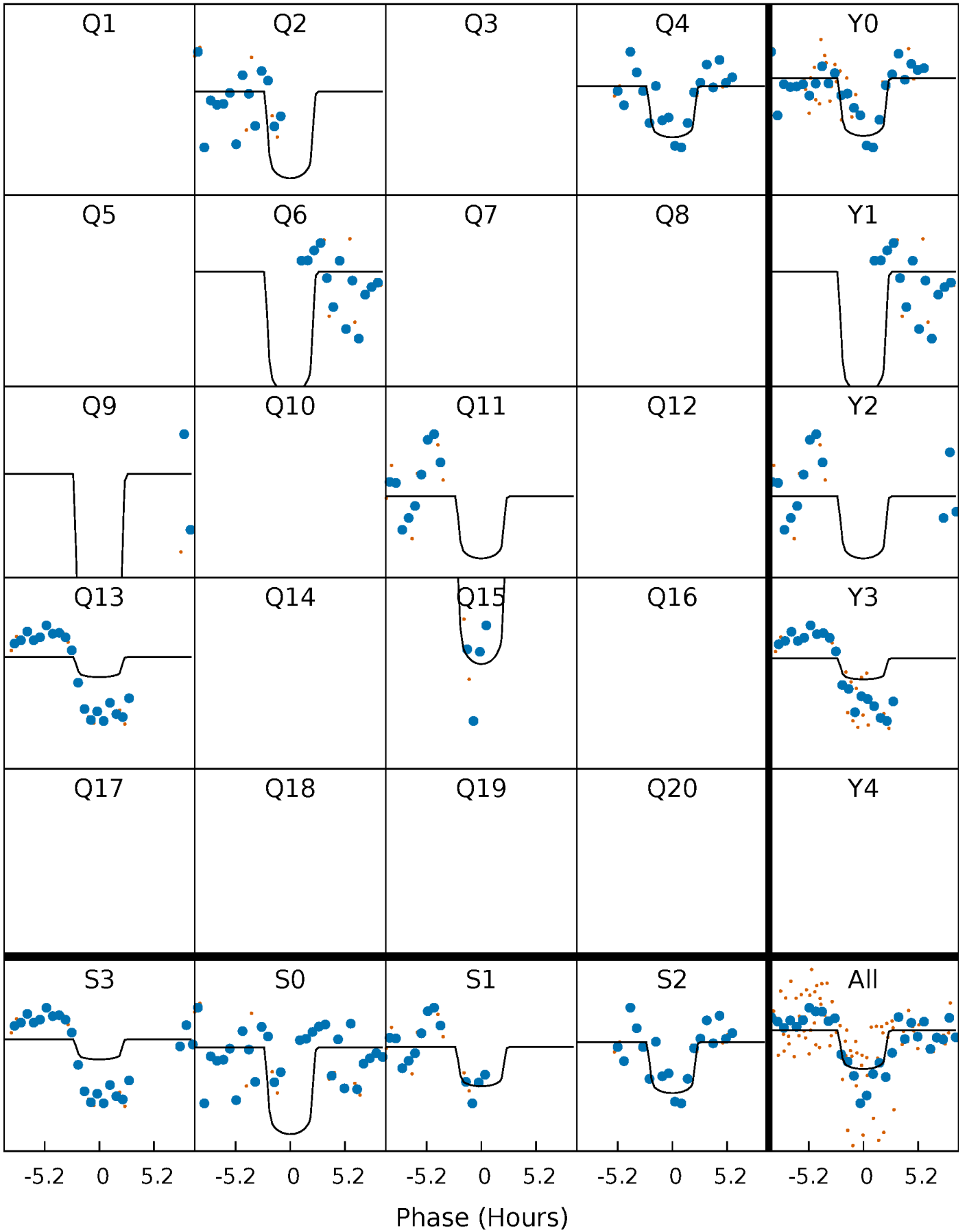
# PDC Quarter-Phased Transit Curves

TCE 002442118-03 P=192.718803 Days  $T_0=233.059585$  (BKJD)



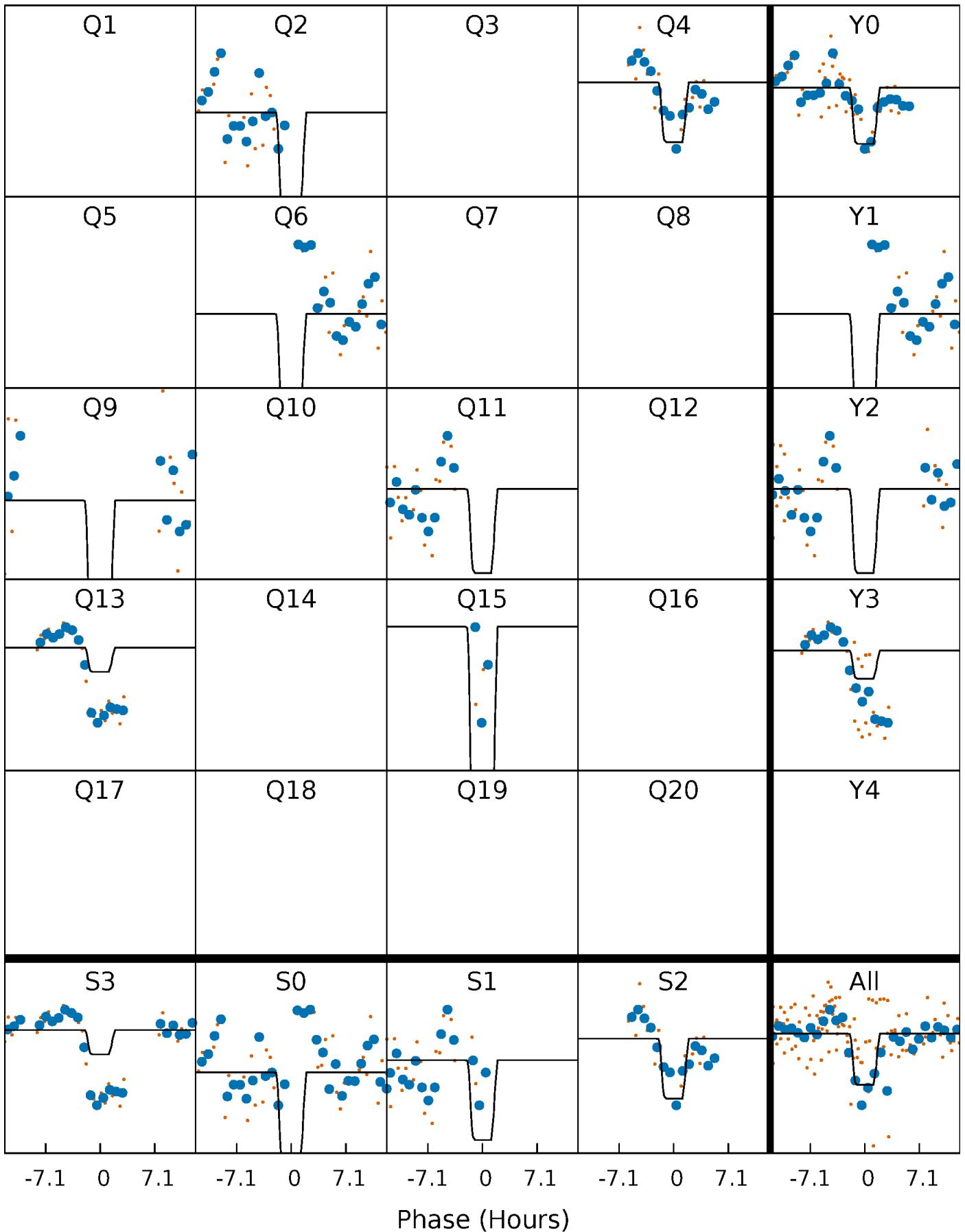
# DV Quarter-Phased Transit Curves

TCE 002442118-03 P=192.718803 Days  $T_0=233.059585$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

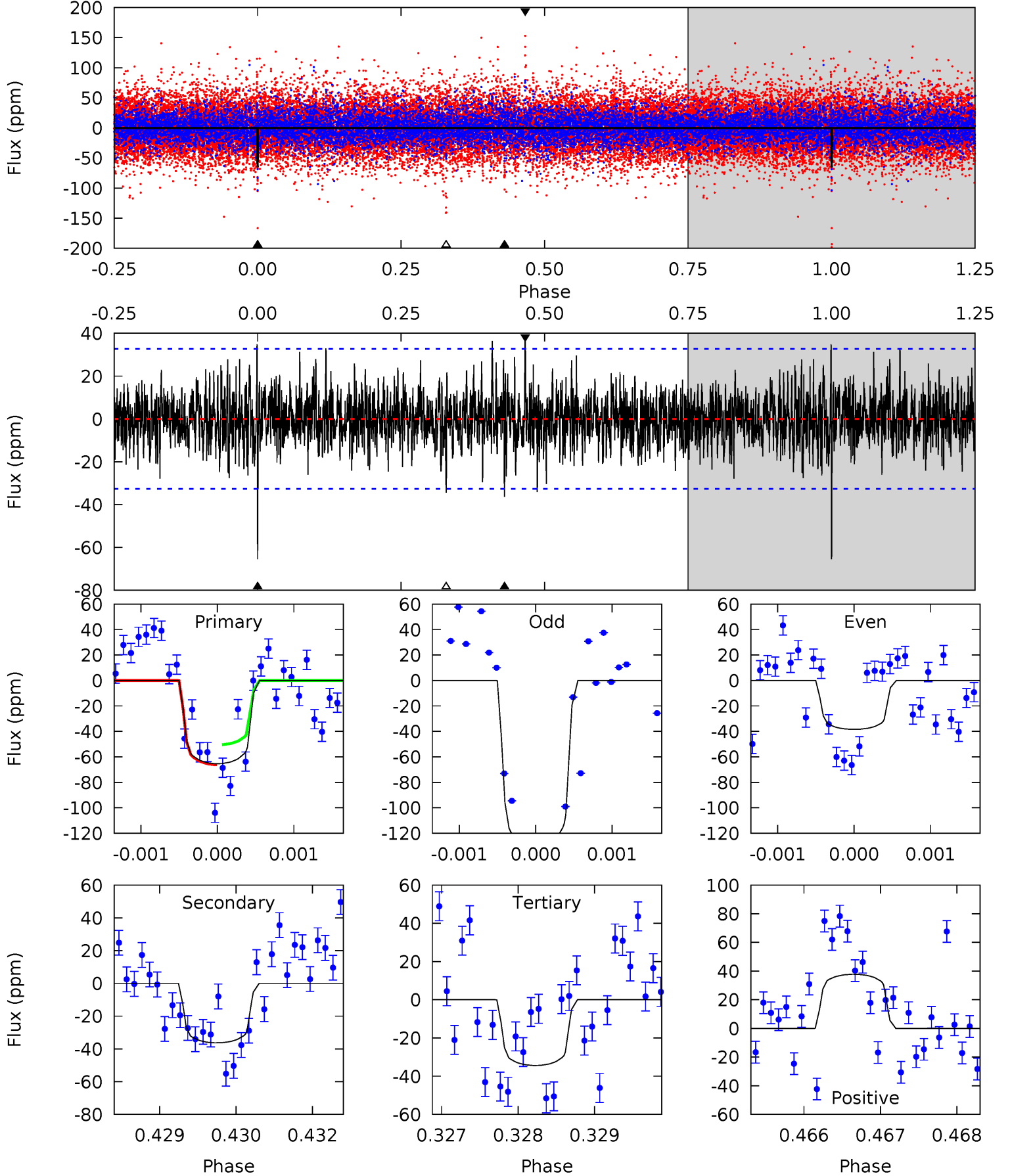
TCE 002442118-03 P=192.713102 Days  $T_0=233.080599$  (BKJD)



# DV Model-Shift Uniqueness Test

002442118-03, P = 192.718803 Days, E = 40.340782 Days

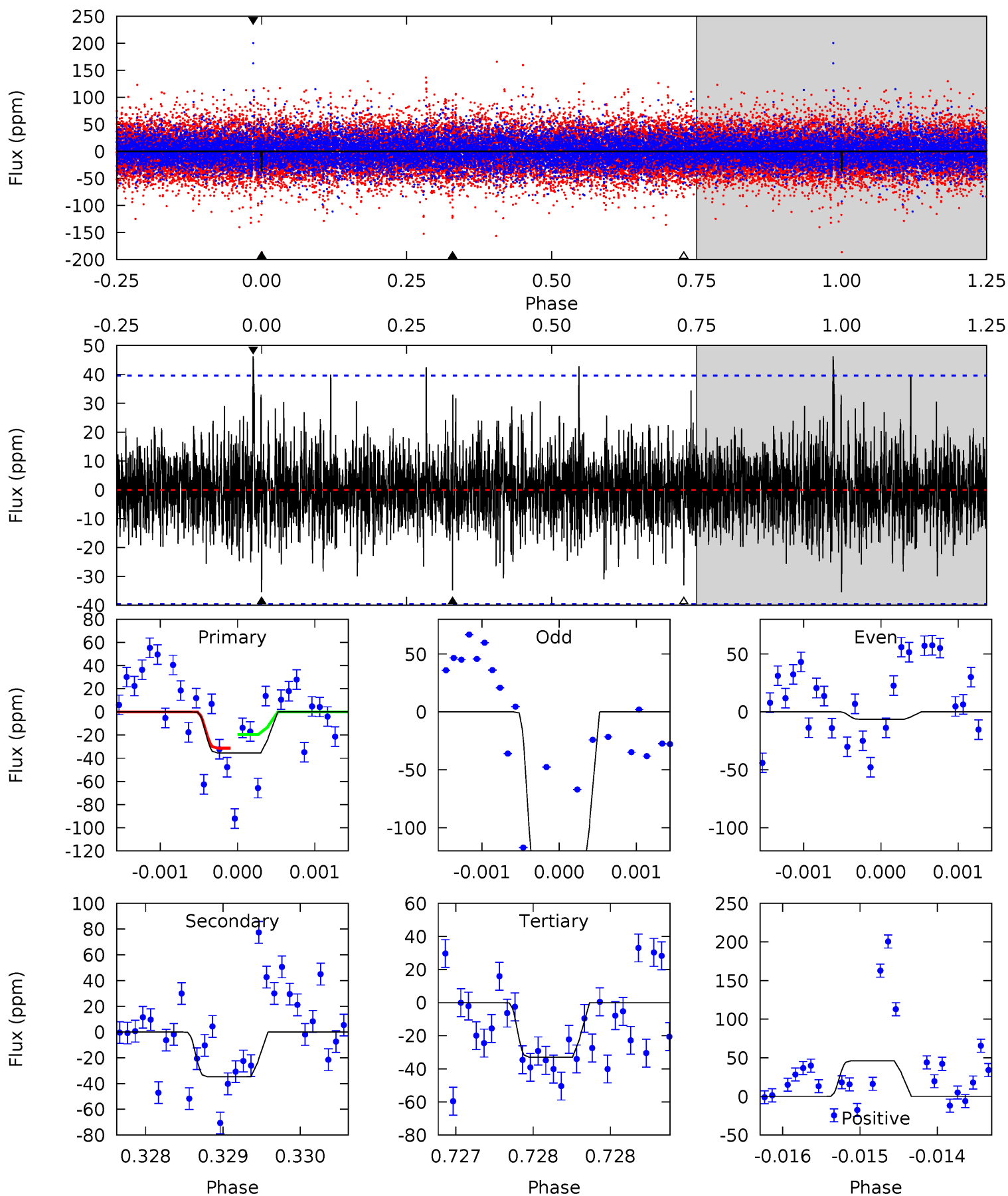
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.9	6.05	5.73	6.29	5.44	3.27	1.54	5.16	4.59	0.32	-0.25	8.09	1.37	0.37	1.27



# Alt Model-Shift Uniqueness Test

002442118-03, P = 192.713102 Days, E = 40.367497 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
4.92	4.83	4.58	6.41	5.49	3.35	1.26	0.33	-1.49	0.24	-1.58	10.8	3.34	0.57	0





### Stellar Parameters For KIC 002442118

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$9338^{+290}_{-471}$	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.200}_{-0.750}$	$3.207^{+0.974}_{-1.461}$	$2.587^{+0.325}_{-0.909}$	$0.110^{+0.400}_{-0.049}$
	+3%/-5%	+10%/-4%	+286%/-1071%	+30%/-46%	+13%/-35%	+362%/-44%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 002442118-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-36 \pm 6$	$2.81^{+1.43}_{-1.26}$	$1055^{+96}_{-120}$	$7216^{+3414}_{-1223}$	$1926^{+3885}_{-1082}$
Alt.	$-35 \pm 7$	$2.96^{+1.52}_{-1.34}$	$1066^{+91}_{-126}$	$7121^{+2694}_{-1248}$	$1719^{+3753}_{-969}$

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

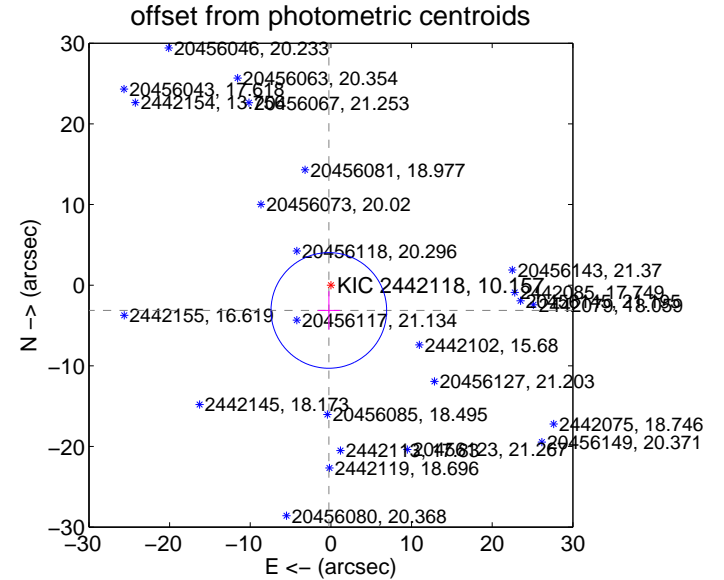
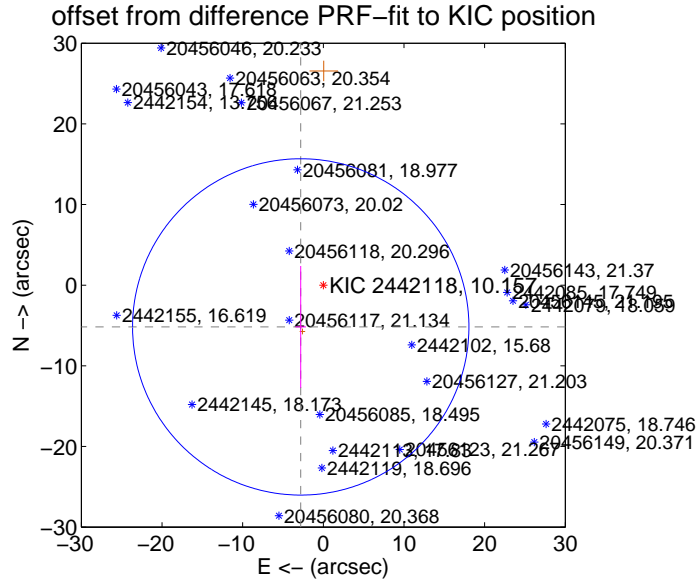
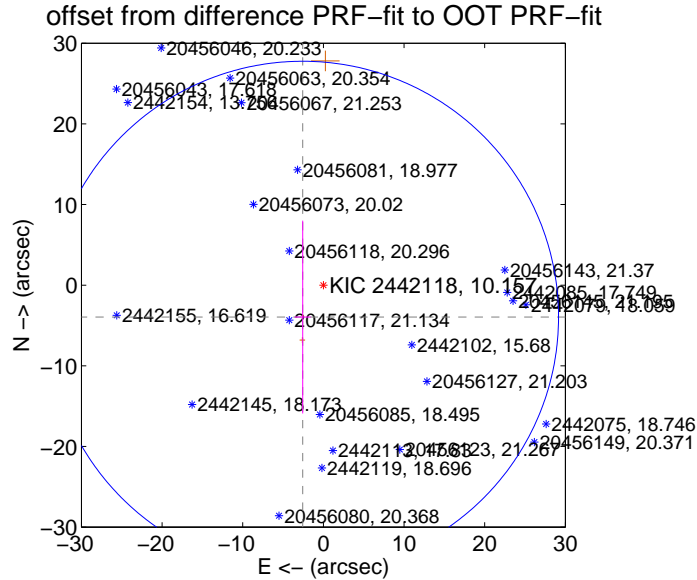
# DV Centroid Data

Supplemental centroid analysis for 002442118-03. **Kepler magnitude: 10.16.** Transit SNR 8.83

**There are 0 quarters with good PRF difference image offsets**

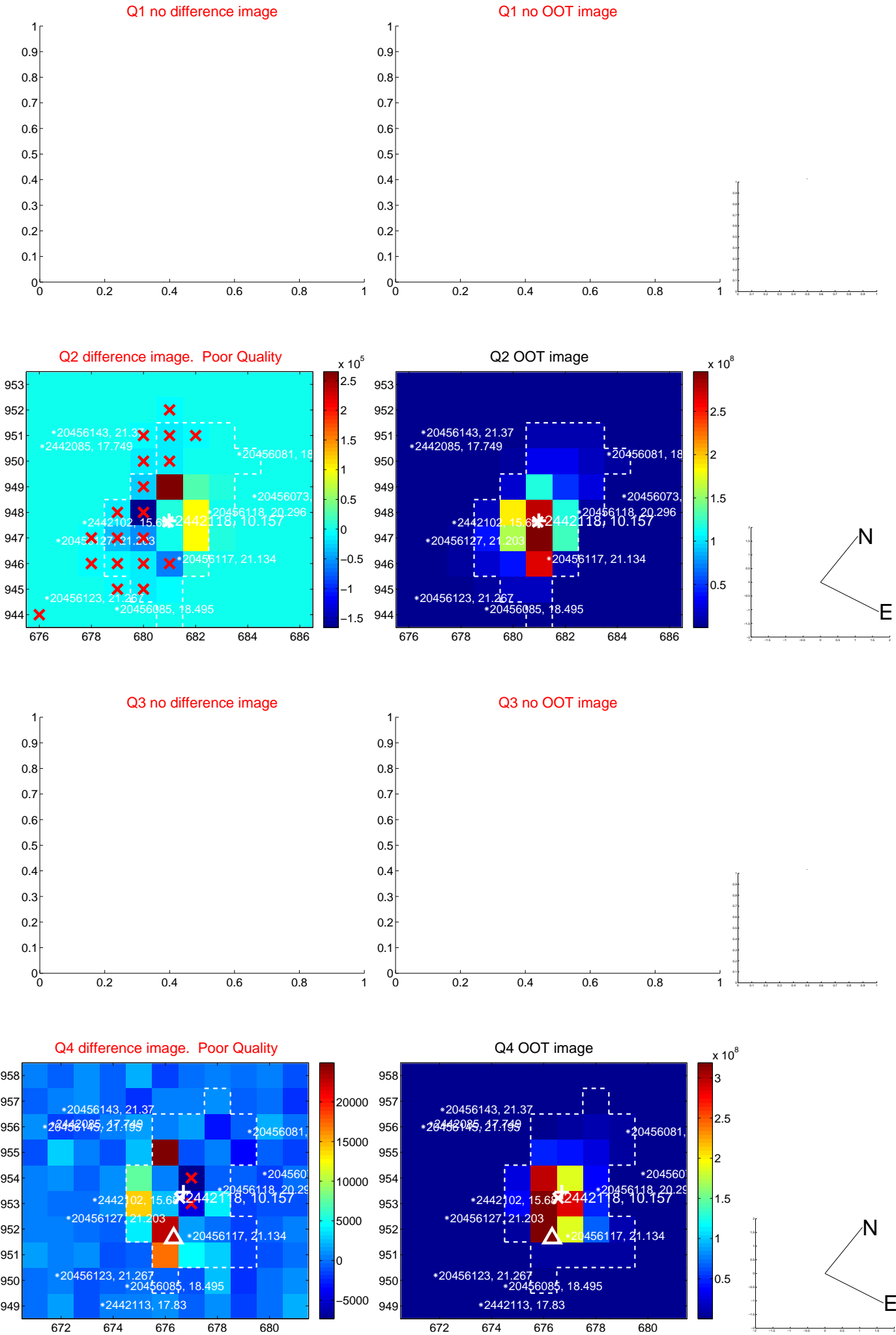
The direct PRF centroid is offset from the target star catalog position by about 1.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.717 \pm 10.574$	0.45	$2.566 \pm 0.999$	$-3.959 \pm 11.956$
PRF-fit source offset from KIC position	$5.886 \pm 6.950$	0.85	$2.801 \pm 0.653$	$-5.177 \pm 7.552$
photometric centroid source offset	$3.14 \pm 2.39$	1.32	$0.26 \pm 1.35$	$-3.13 \pm 2.40$

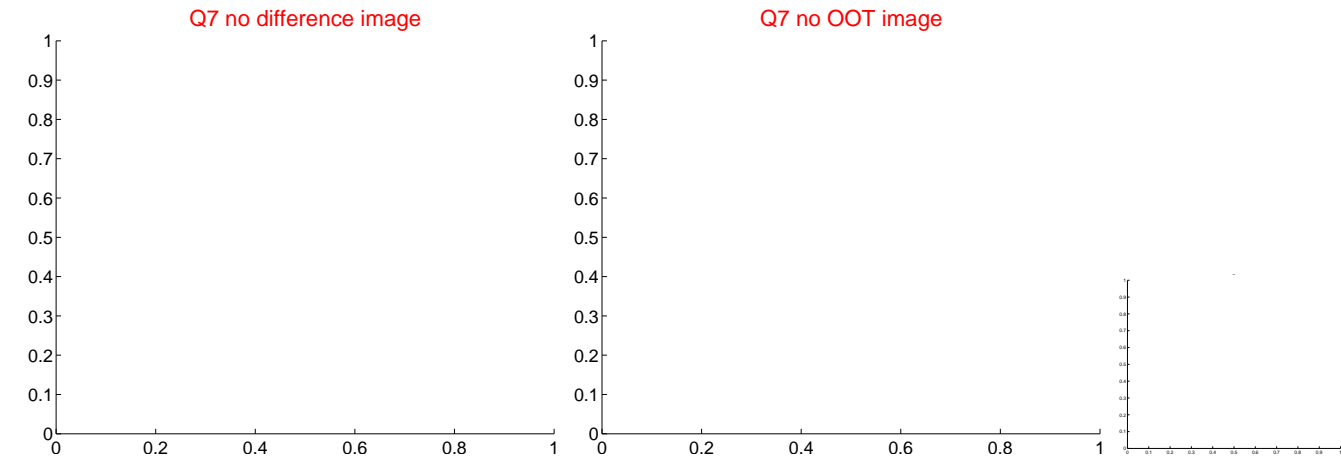
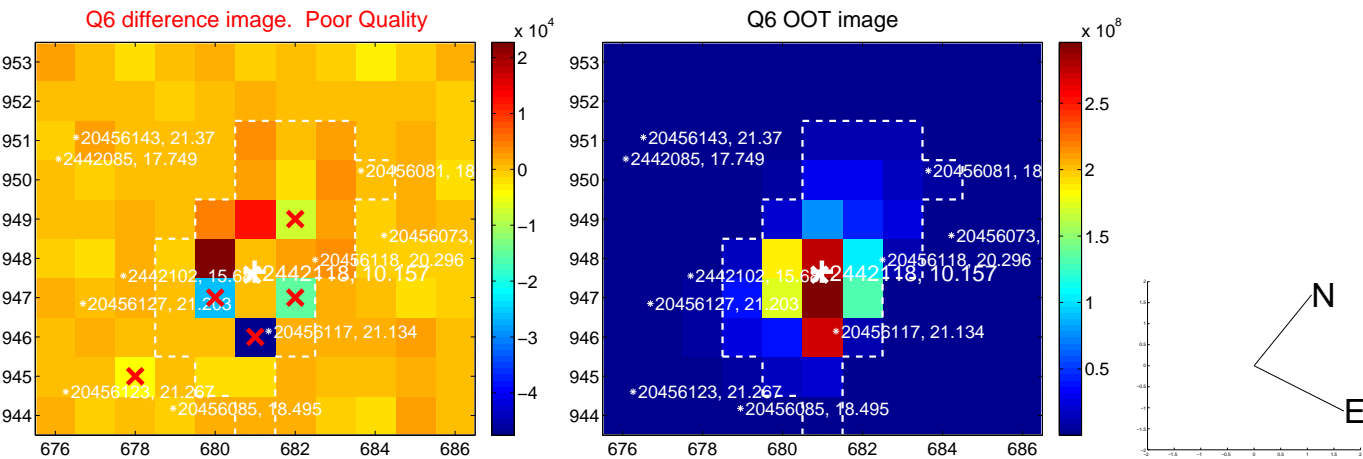


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

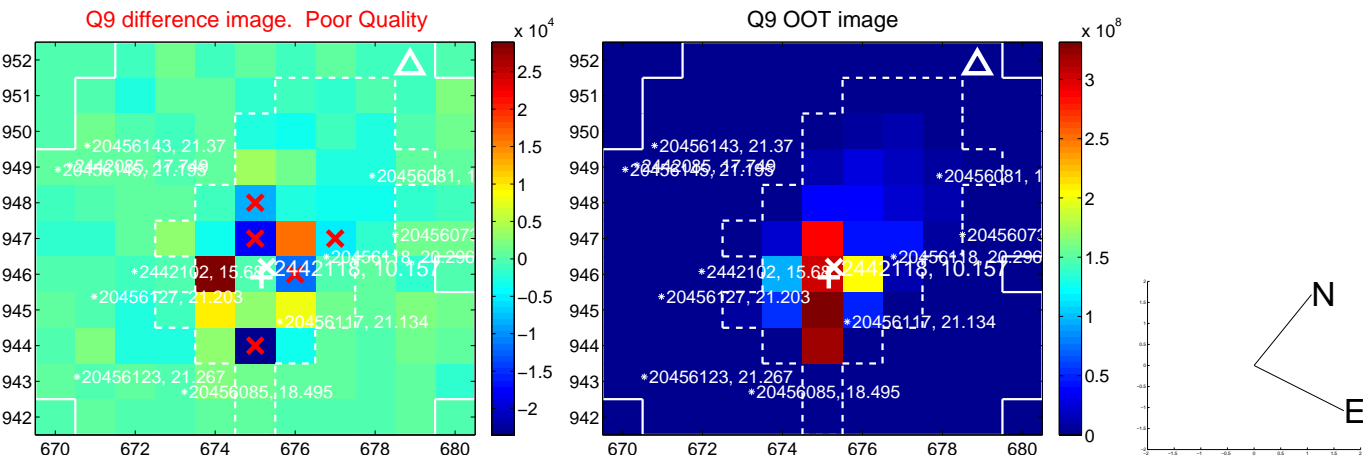
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



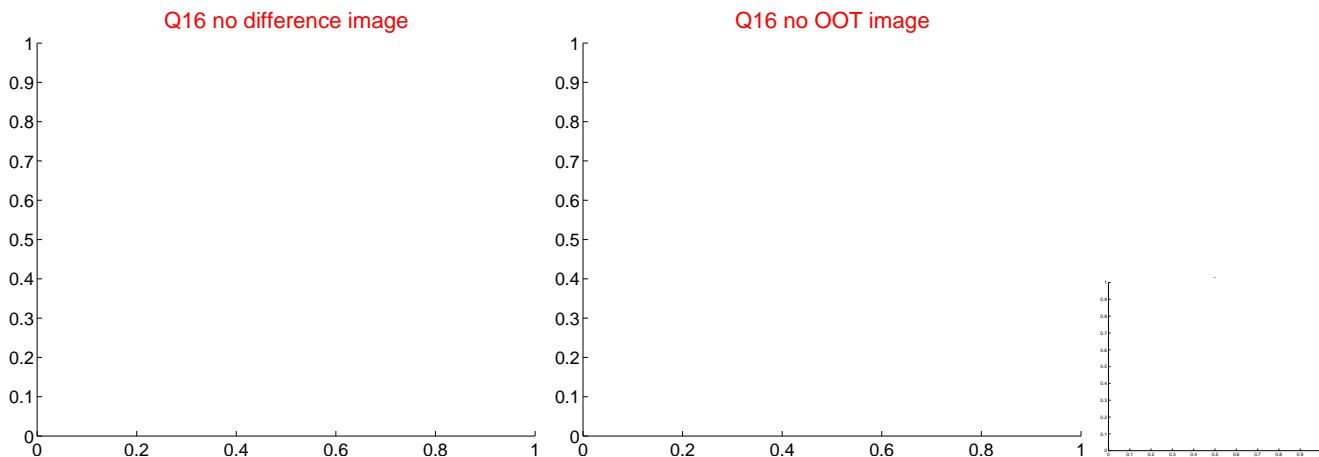
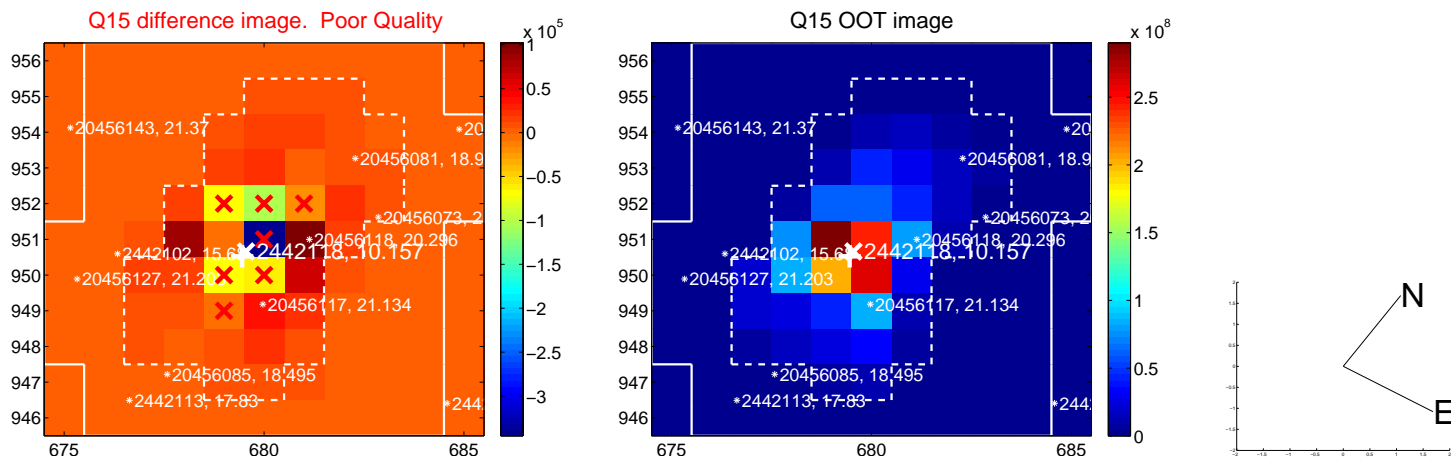
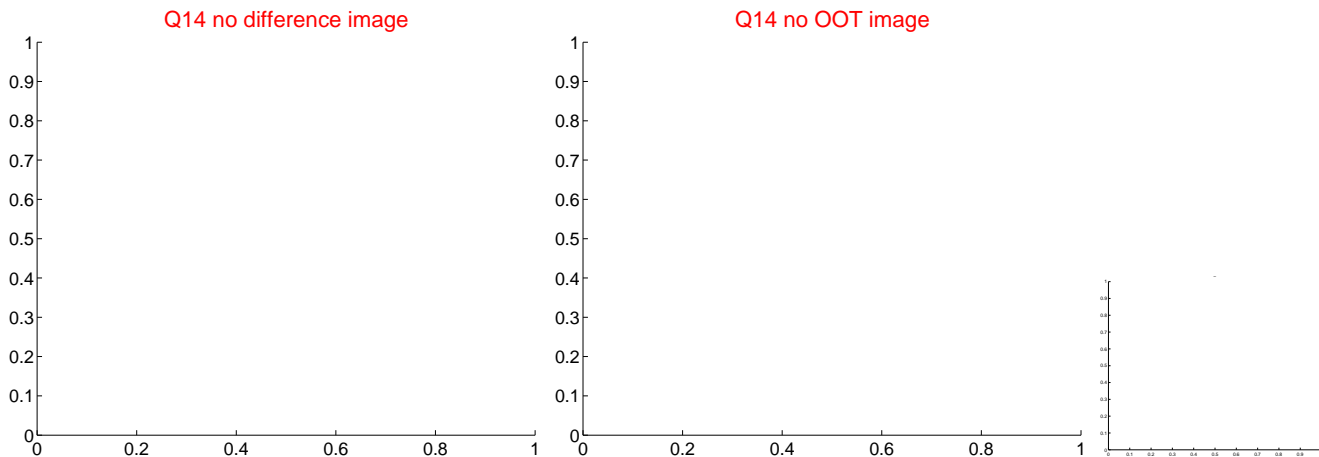
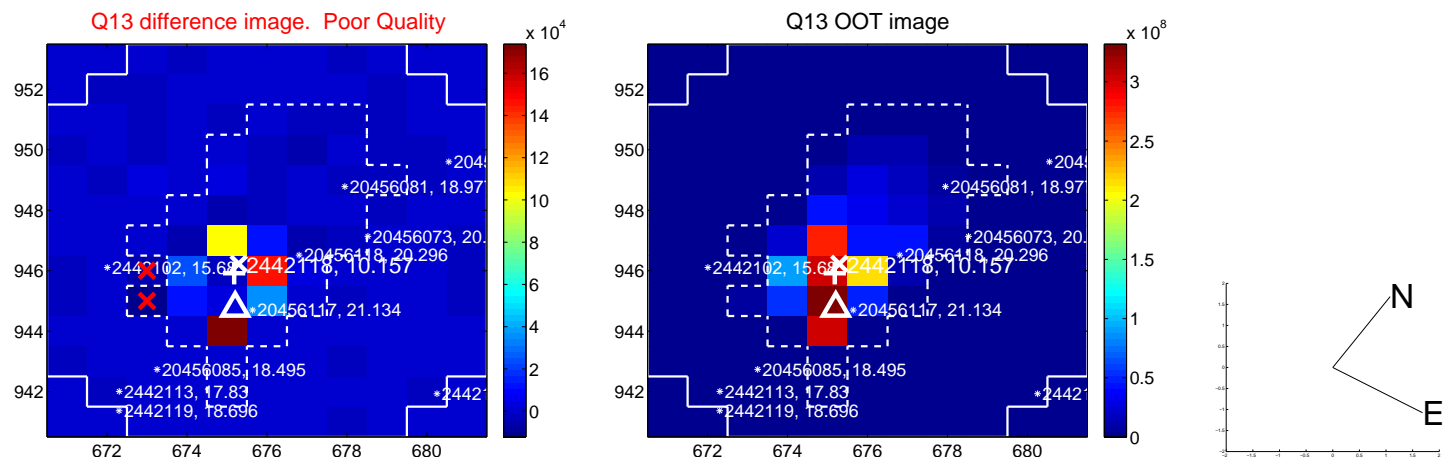
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

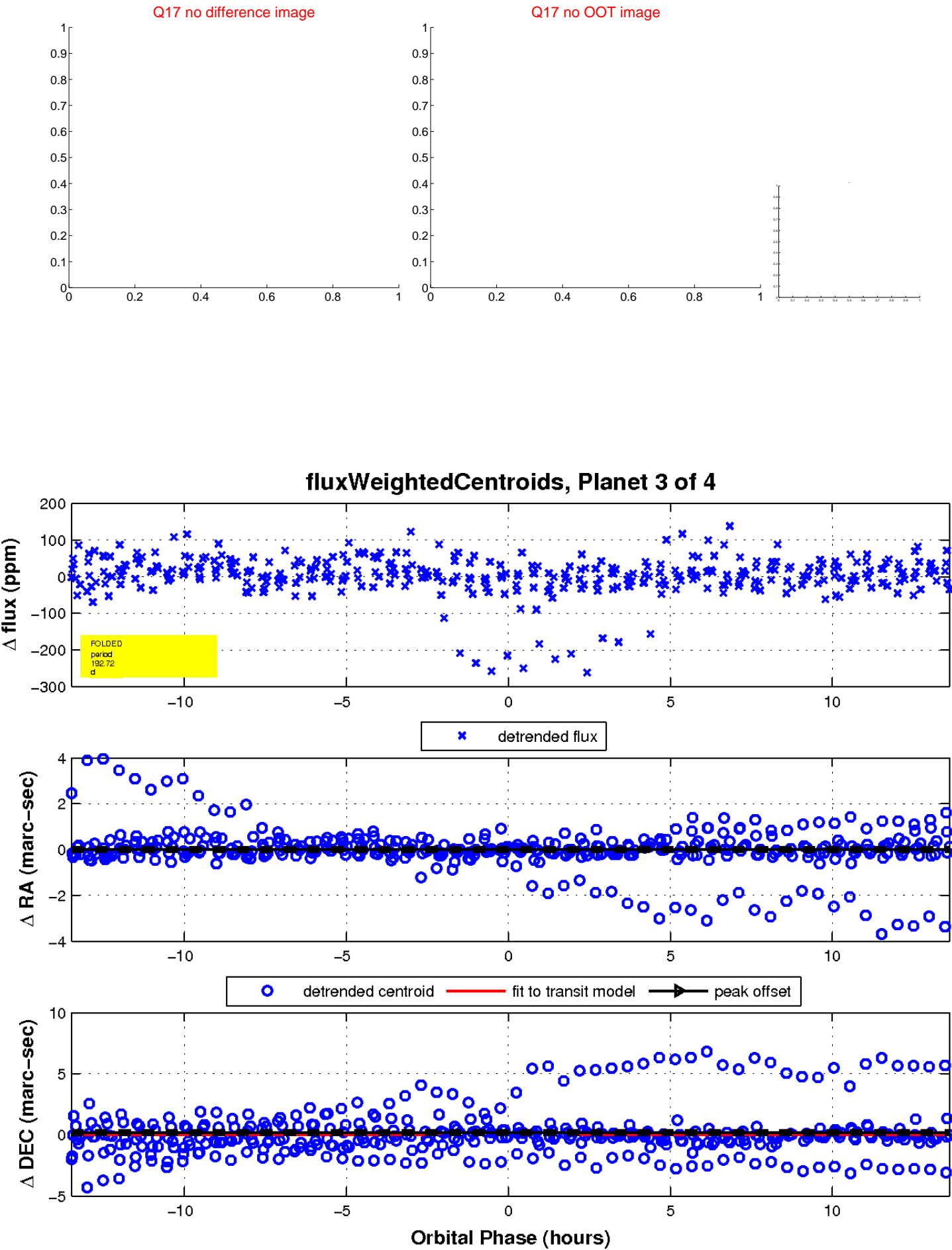


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



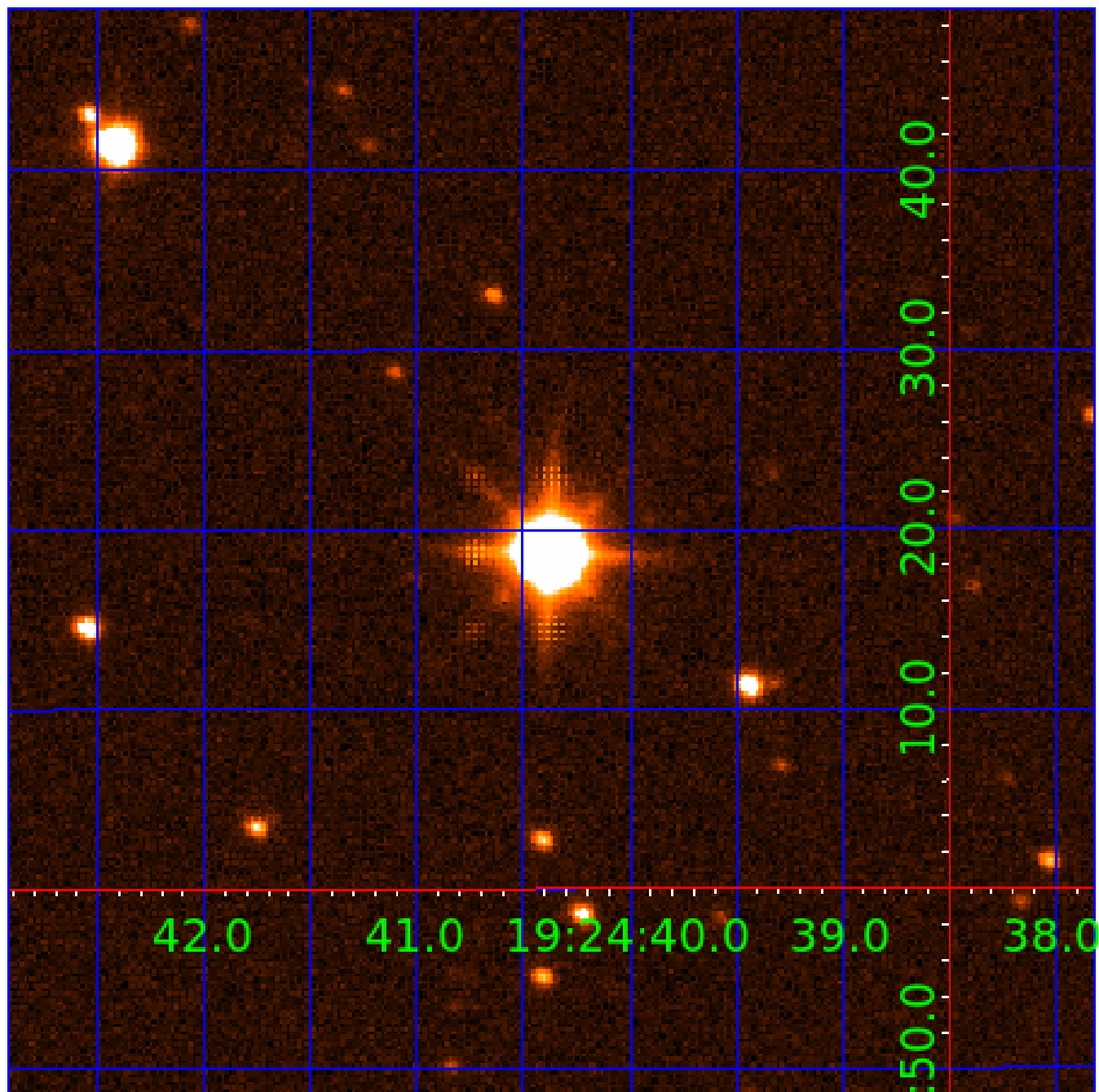


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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# KIC 002442118

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002442118-01	OBS	No	1.221489	132.012148	6.9	5.625	13.1	15.5	3.21	9338	1.00	74265.94
002442118-02	OBS	No	167.584202	216.595256	35.6	4.370	11.7	4.6	3.21	9338	2.20	104.95
002442118-03	OBS	No	192.718803	233.059585	73.2	4.541	12.0	8.8	3.21	9338	3.11	87.11
002442118-04	OBS	No	212.867150	218.951929	63.0	4.888	9.9	6.6	3.21	9338	2.92	76.30

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002442118-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
002442118-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002442118-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

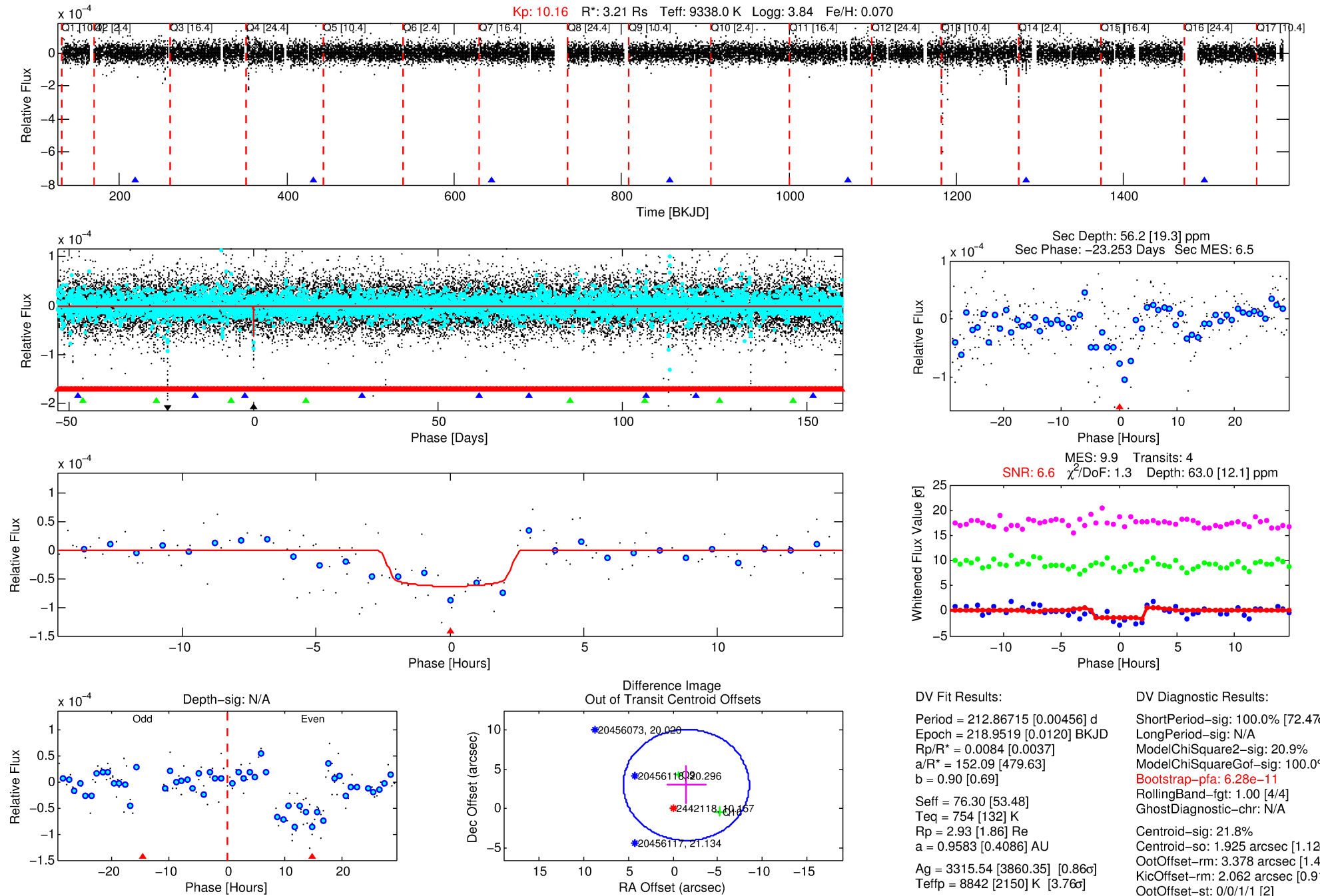
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002442118-04

No Significant Match Found

# DV One-Page Summary

KIC: 2442118 Candidate: 4 of 4 Period: 212.867 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:03:28 Z

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

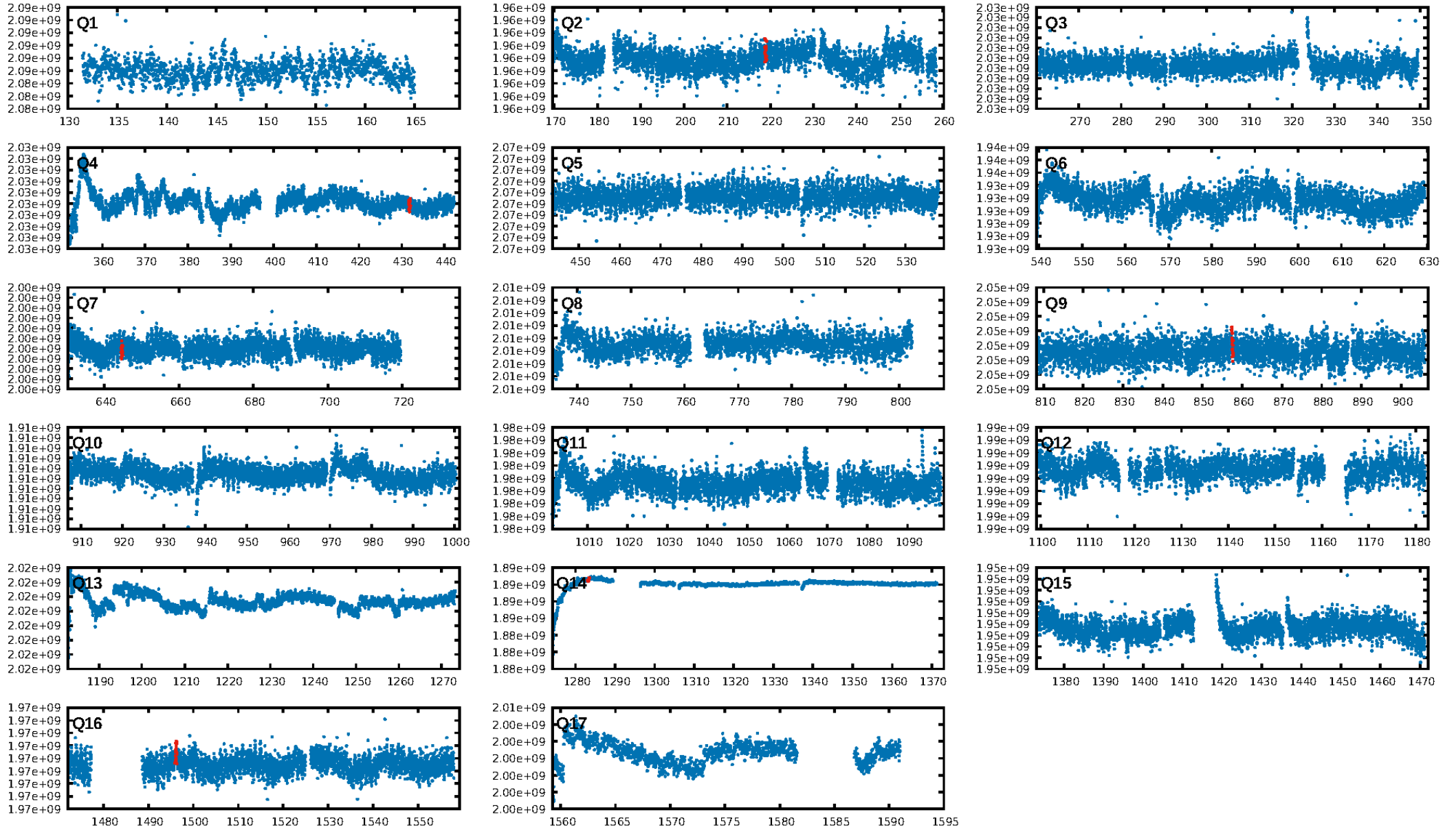
## DV Fit Results:

Period = 212.86715 [0.00456] d  
Epoch = 218.9519 [0.0120] BKJD  
 $R_p/R^* = 0.0084$  [0.0037]  
 $a/R^* = 152.09$  [479.63]  
 $b = 0.90$  [0.69]  
 $T_{\text{eff}} = 76.30$  [53.48]  
 $T_{\text{eq}} = 754$  [132] K  
 $R_p = 2.93$  [1.86]  $R_{\text{e}}$   
 $a = 0.9583$  [0.4086] AU  
 $A_g = 3315.54$  [3860.35] [0.86] $\sigma$   
 $T_{\text{eff}} = 8842$  [2150] K [3.76] $\sigma$

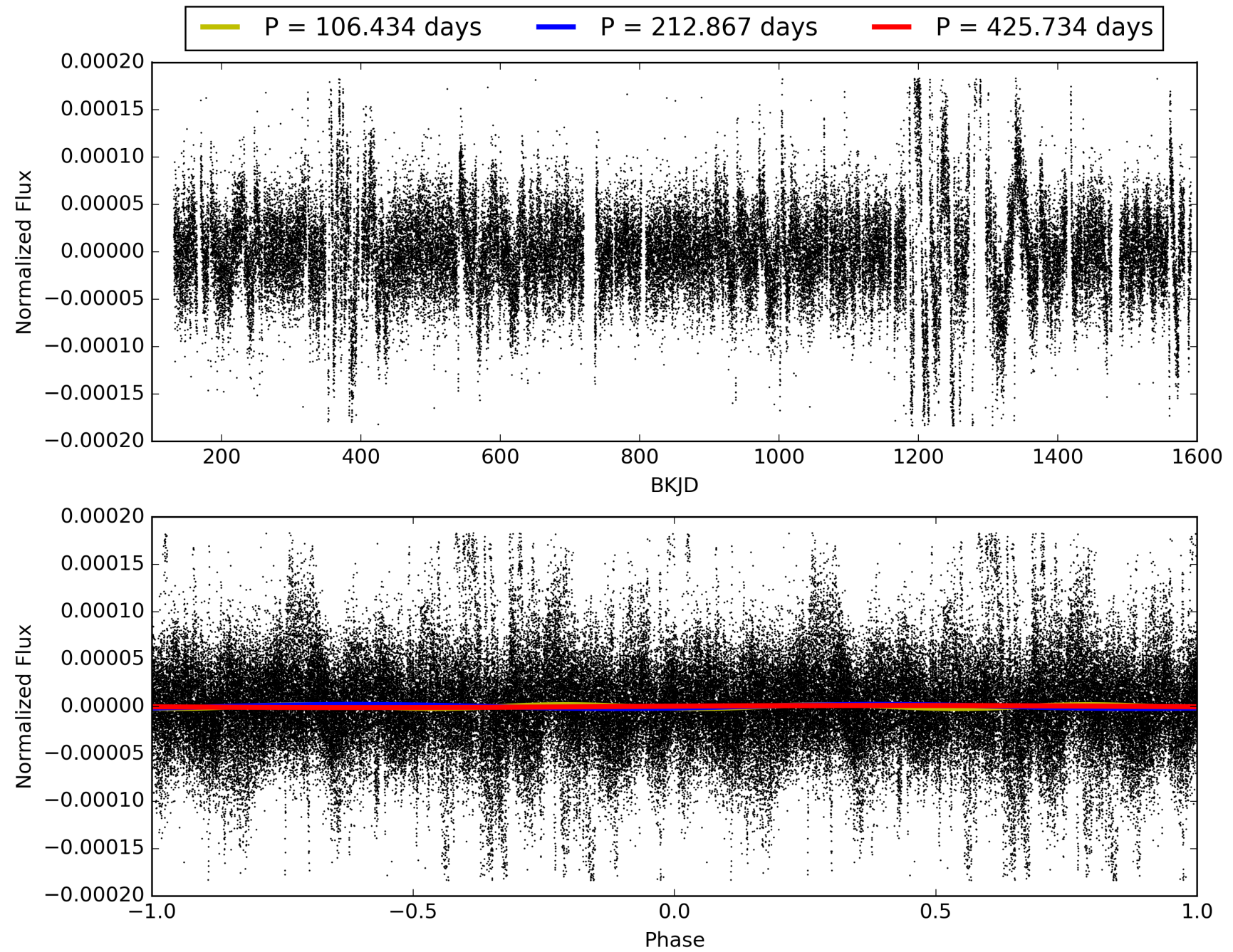
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [72.47 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 20.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 6.28e-11**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 21.8%  
Centroid-so: 1.925 arcsec [1.12 $\sigma$ ]  
OotOffset-rm: 3.378 arcsec [1.44 $\sigma$ ]  
KicOffset-rm: 2.062 arcsec [0.91 $\sigma$ ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.00 [0/4]

# TCE 002442118-04, PDC Light Curves



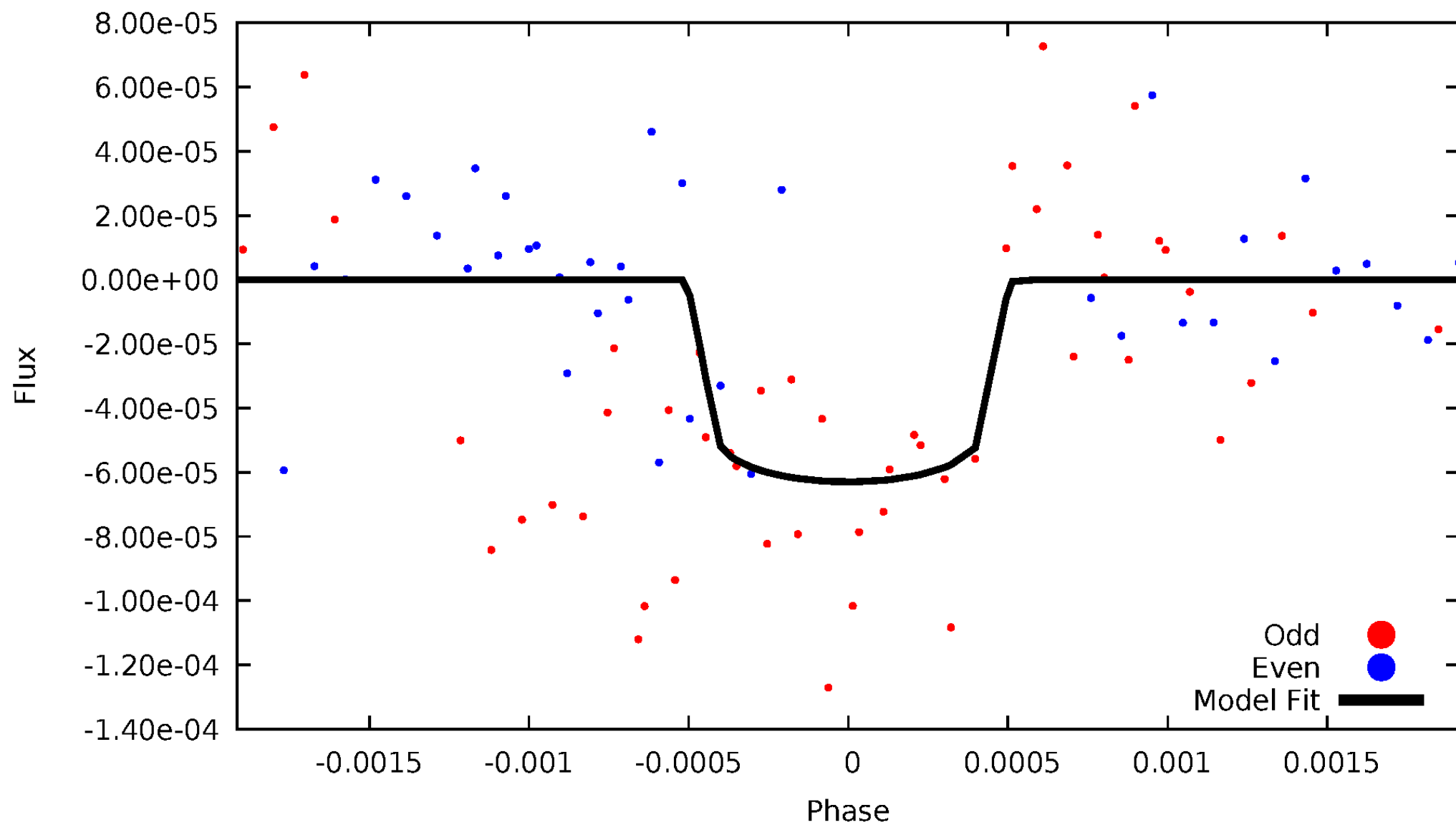
TCE 002442118-04





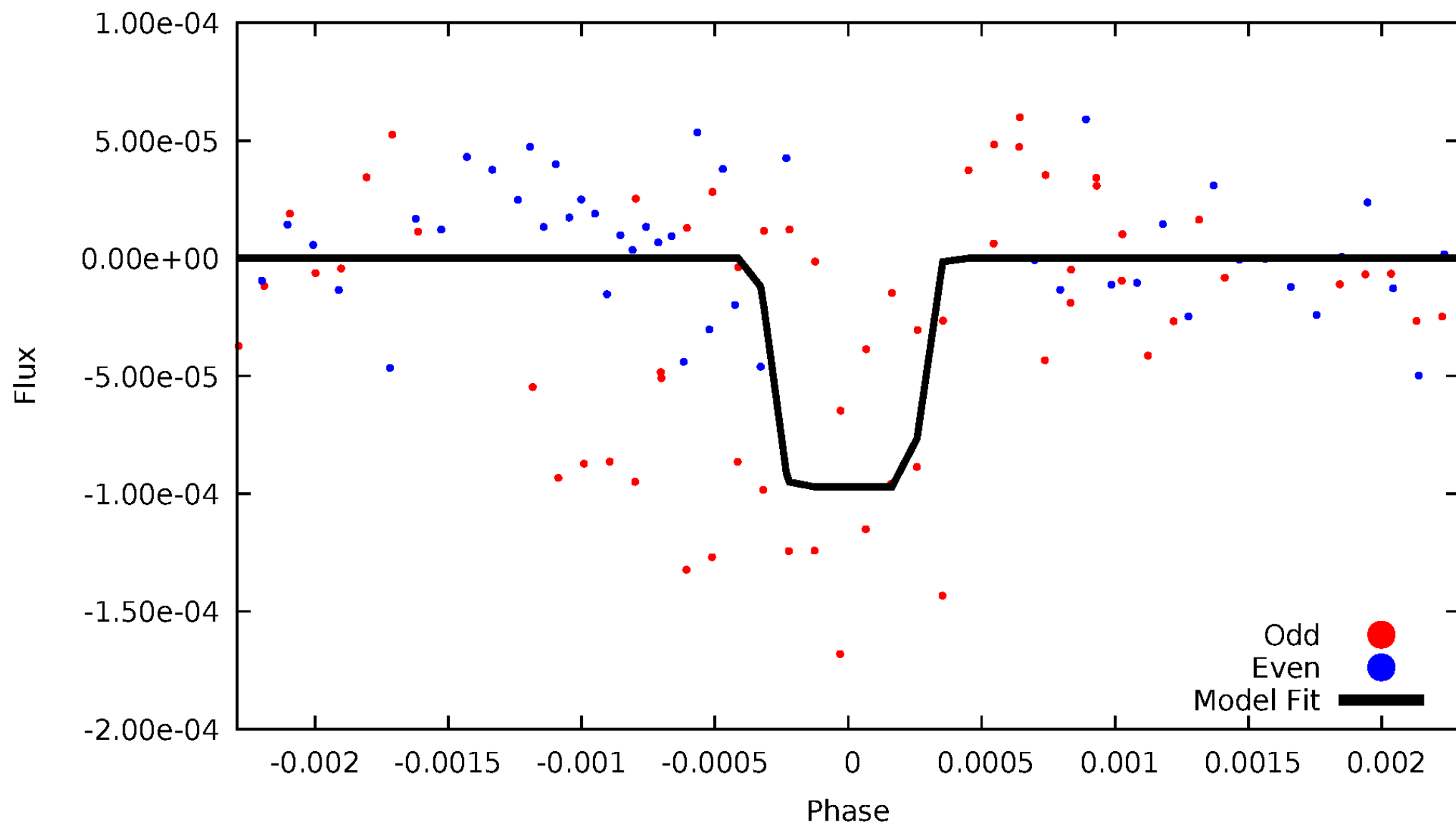
# DV Odd/Even

TCE 002442118-04



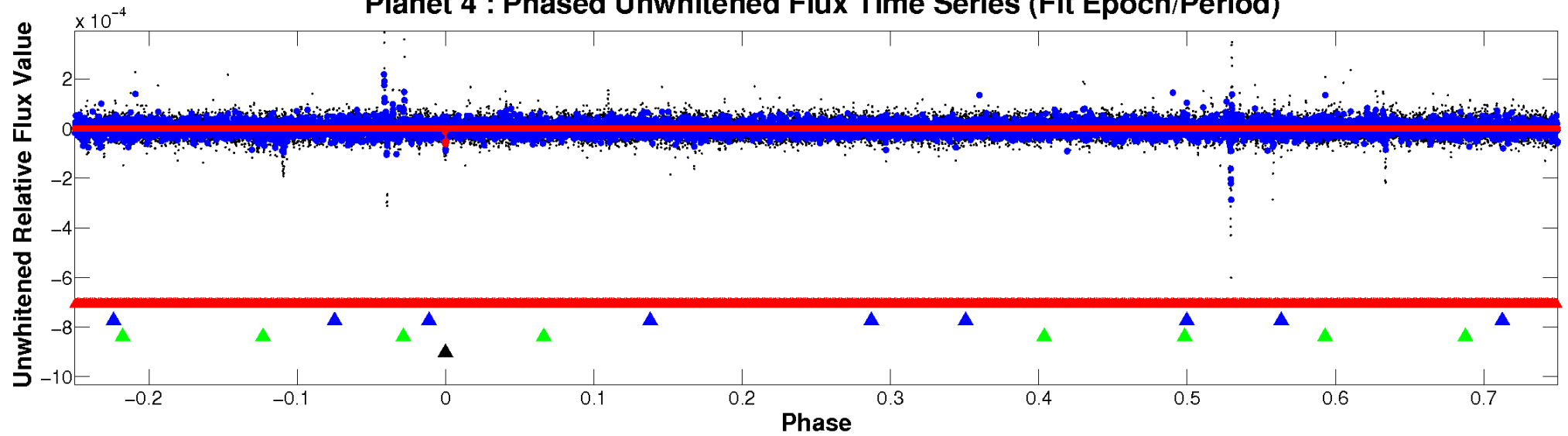
# ALT Odd/Even

TCE 002442118-04

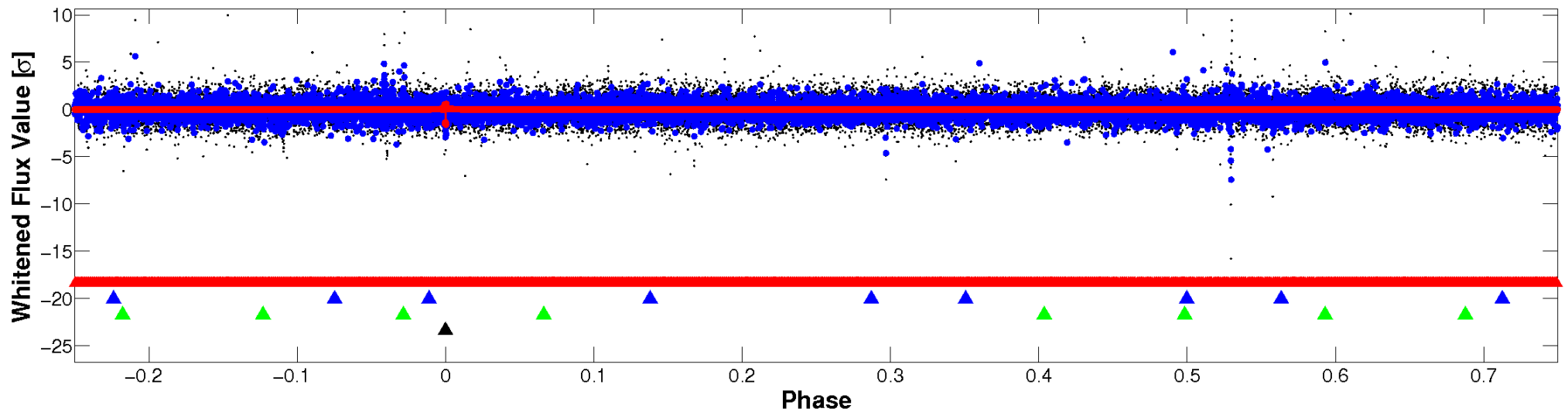


# Non-Whitened Vs. Whitened Light Curve

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

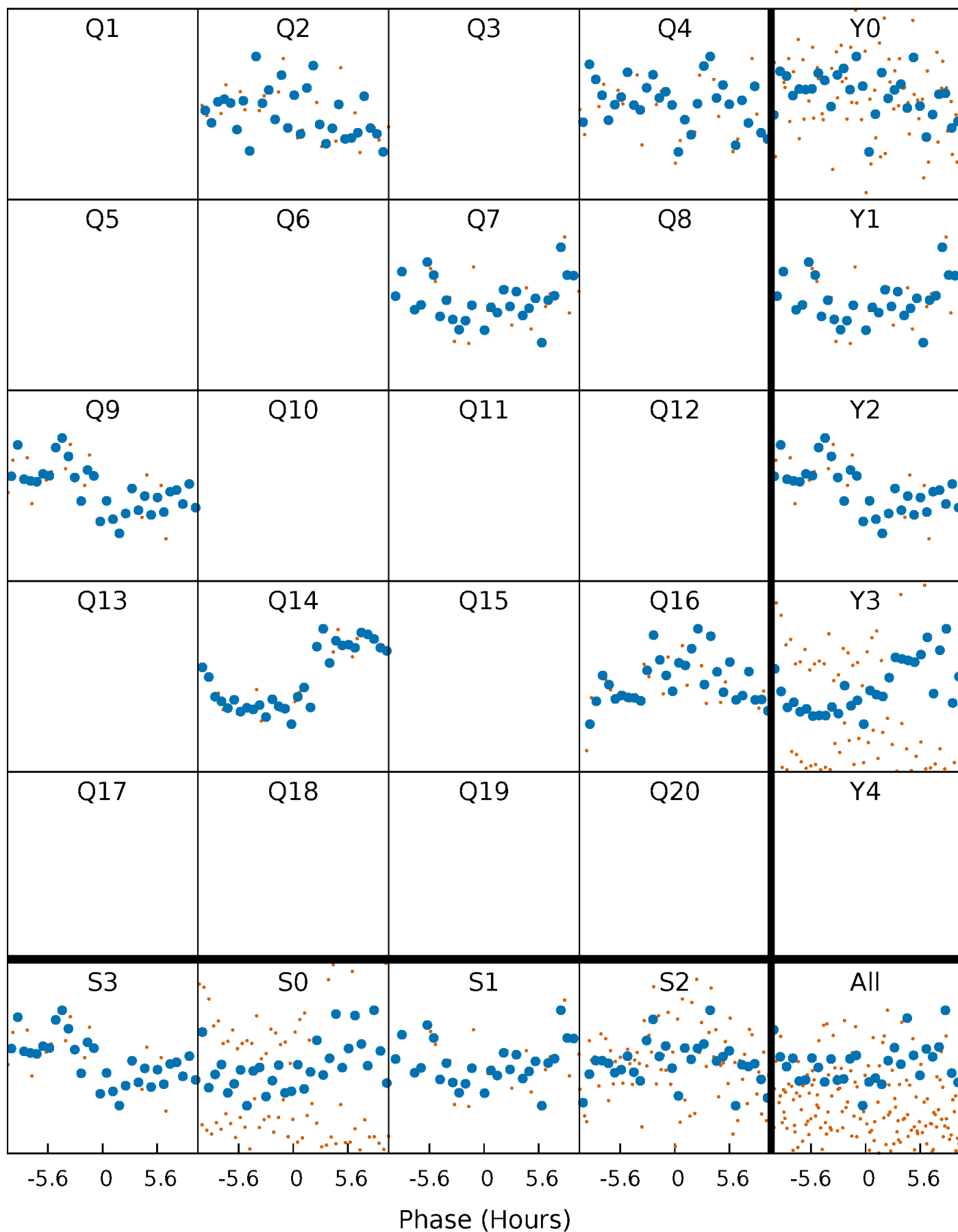


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



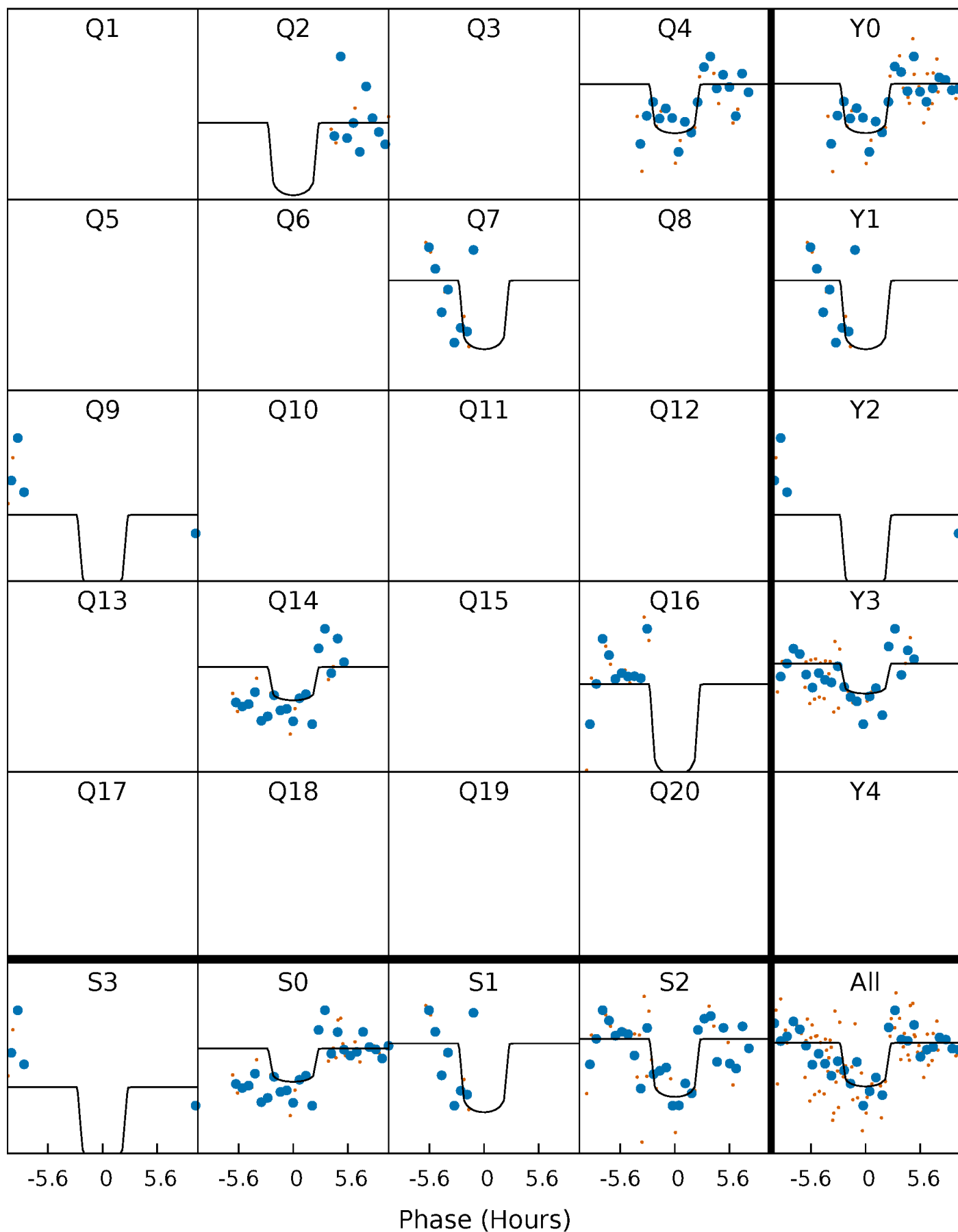
# PDC Quarter-Phased Transit Curves

TCE 002442118-04 P=212.867150 Days  $T_0=218.951929$  (BKJD)



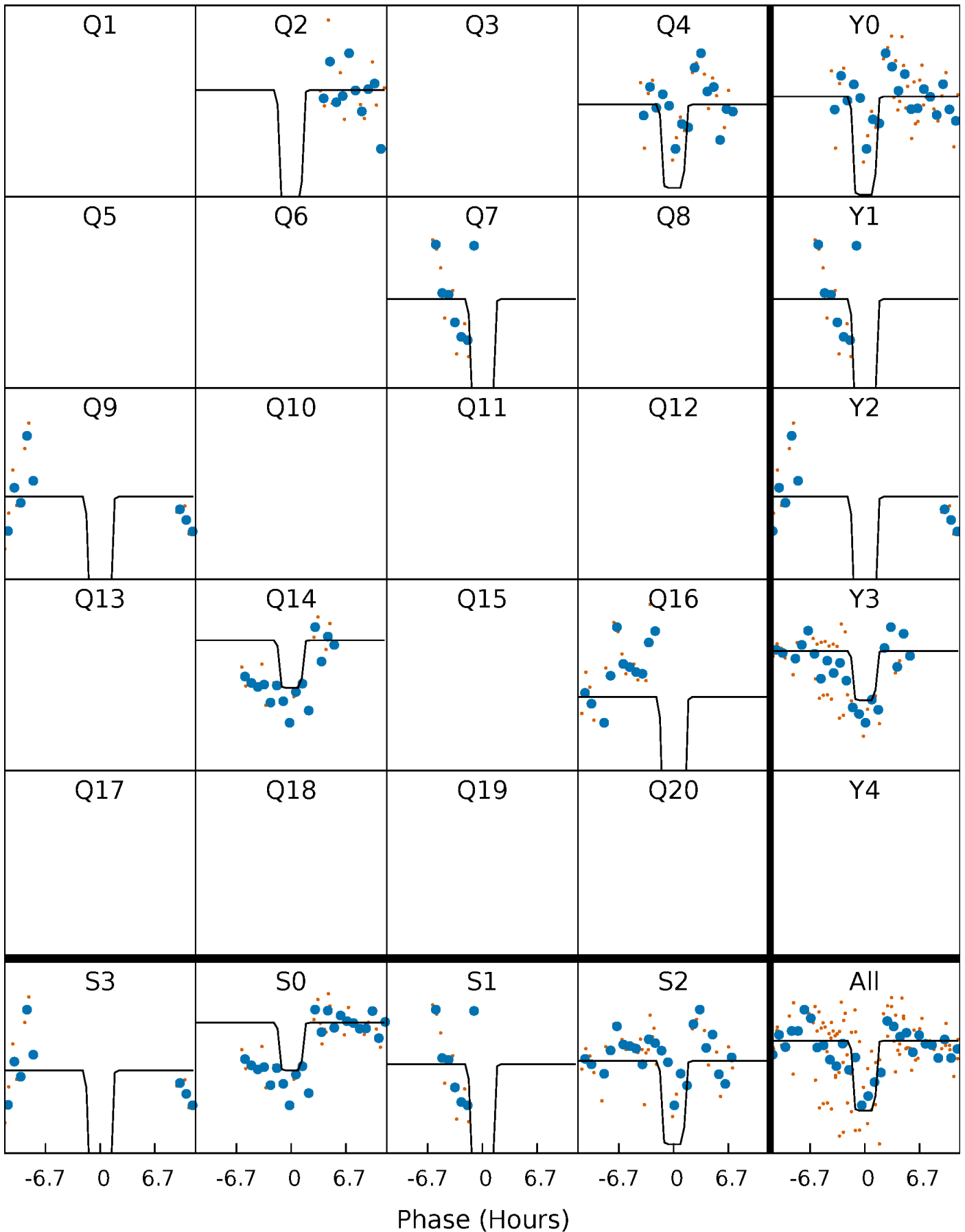
# DV Quarter-Phased Transit Curves

TCE 002442118-04 P=212.867150 Days  $T_0=218.951929$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

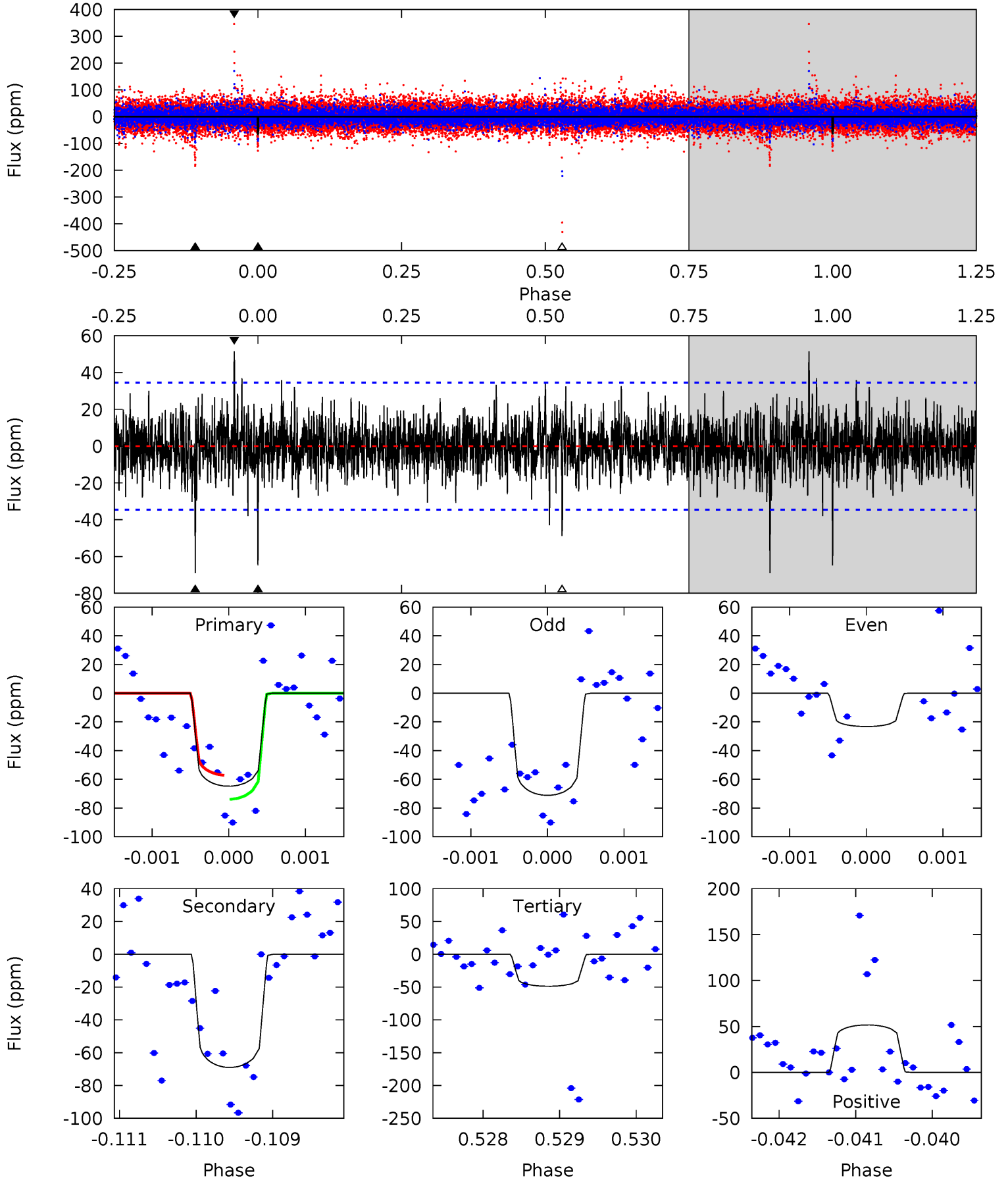
TCE 002442118-04 P=212.863206 Days  $T_0=218.964966$  (BKJD)



# DV Model-Shift Uniqueness Test

002442118-04, P = 212.867150 Days, E = 6.084779 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	10.9	7.69	8.13	5.45	3.28	1.56	2.52	2.08	3.18	2.74	2.85	0.94	0.43	1.30

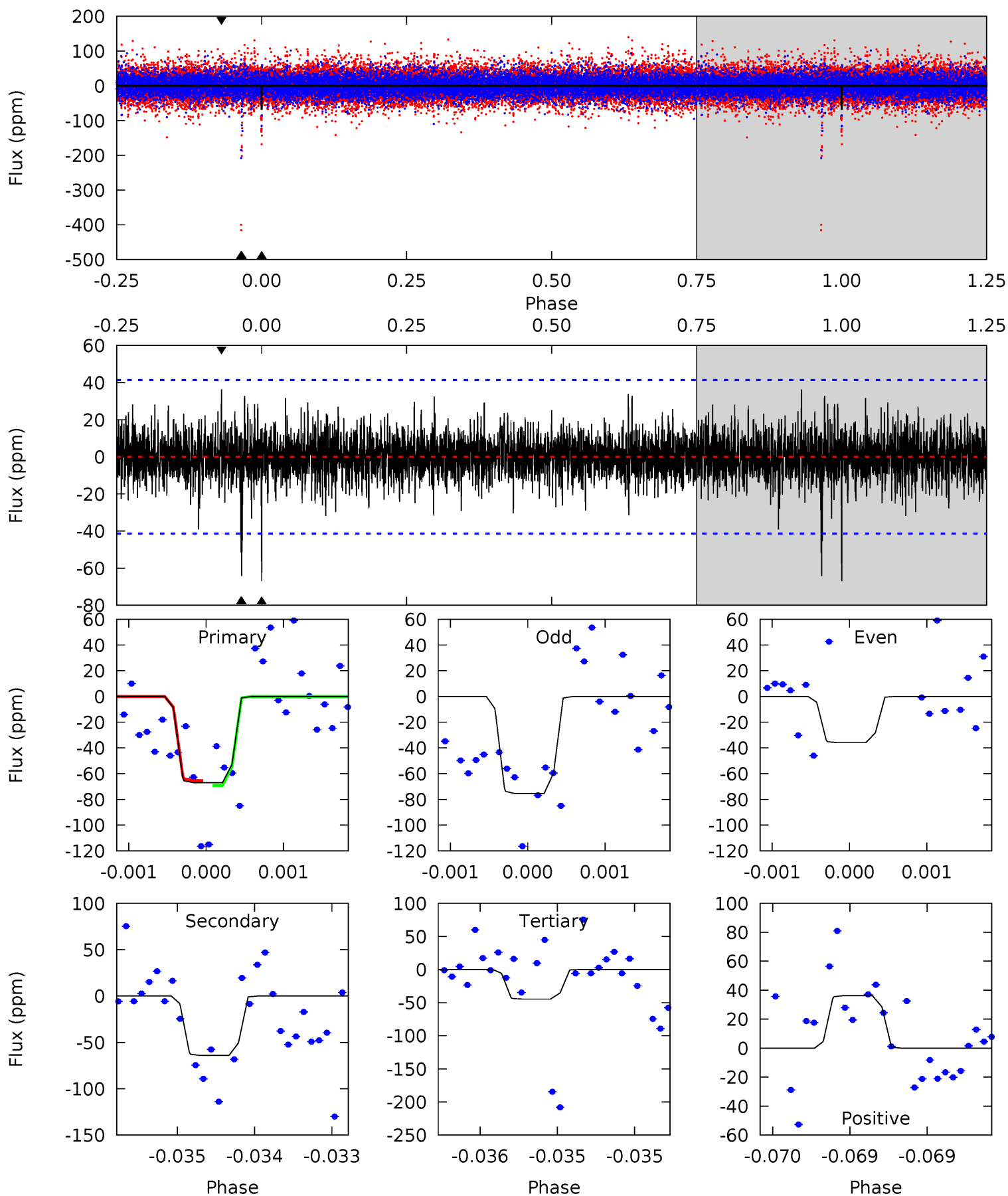




# Alt Model-Shift Uniqueness Test

002442118-04, P = 212.863206 Days, E = 6.101760 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
8.90	8.53	5.93	4.82	5.50	3.36	1.15	2.97	4.09	2.60	3.71	1.27	1.63	0.35	0.25



### Stellar Parameters For KIC 002442118

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$9338^{+290}_{-471}$	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.200}_{-0.750}$	$3.207^{+0.974}_{-1.461}$	$2.587^{+0.325}_{-0.909}$	$0.110^{+0.400}_{-0.049}$
	+3%/-5%	+10%/-4%	+286%/-1071%	+30%/-46%	+13%/-35%	+362%/-44%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 002442118-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-69 \pm 6$	$2.73^{+1.42}_{-1.25}$	$1024^{+96}_{-115}$	$9073^{+4836}_{-1809}$	$4442^{+10868}_{-2404}$
Alt.	$-64 \pm 8$	$3.15^{+1.48}_{-1.29}$	$1021^{+92}_{-117}$	$8070^{+3301}_{-1395}$	$3145^{+6050}_{-1731}$

$T_{max}$  = 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

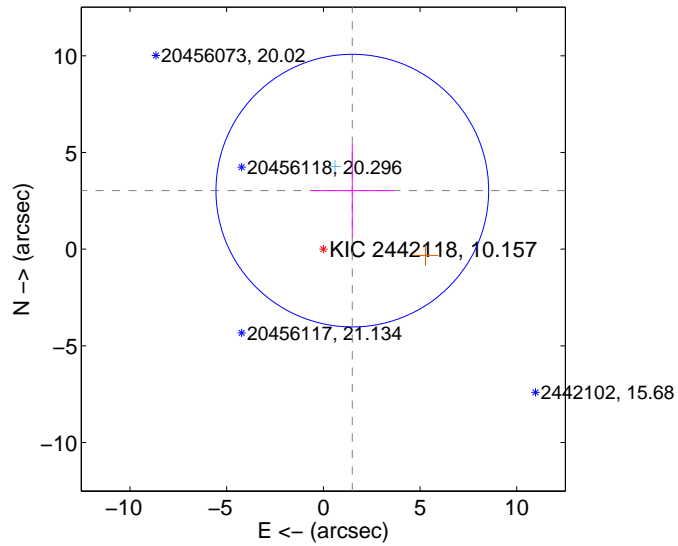
Supplemental centroid analysis for 002442118-04. **Kepler magnitude: 10.16.** Transit SNR 6.59

**There are 1 quarters with good PRF difference image offsets**

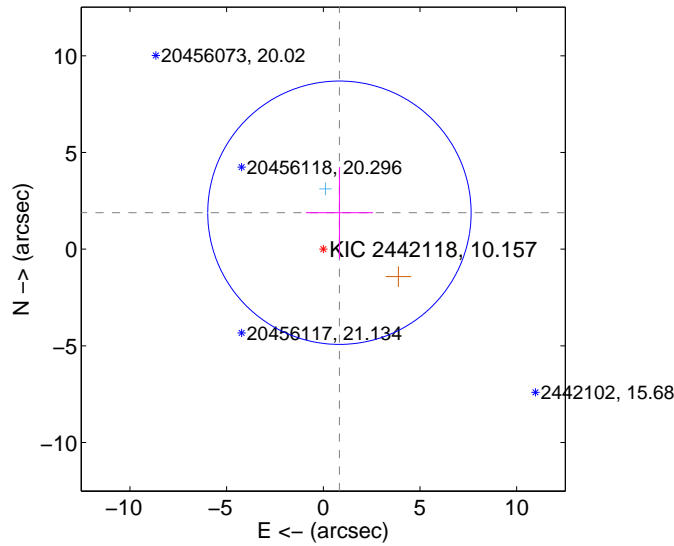
The direct PRF centroid is offset from the target star catalog position by about 1.77 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.378 \pm 2.351$	1.44	$-1.497 \pm 2.154$	$3.029 \pm 2.396$
PRF-fit source offset from KIC position	$2.062 \pm 2.271$	0.91	$-0.834 \pm 1.736$	$1.886 \pm 2.361$
photometric centroid source offset	$1.92 \pm 1.72$	1.12	$1.83 \pm 1.58$	$0.59 \pm 2.70$

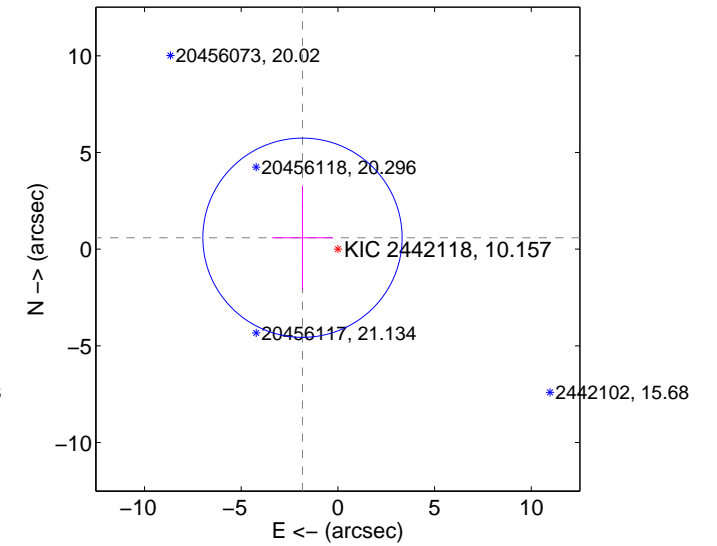
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

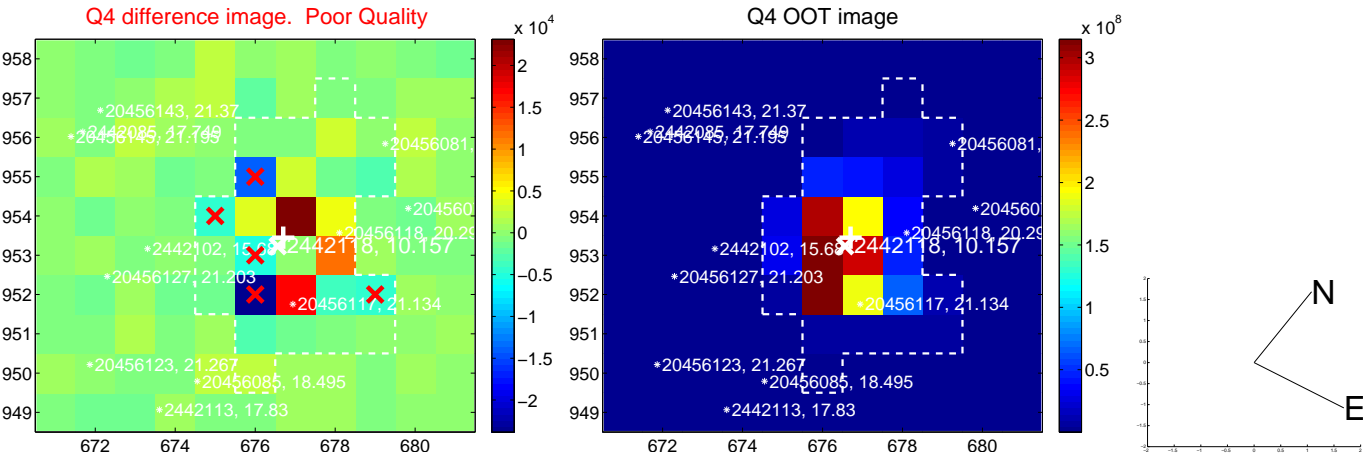
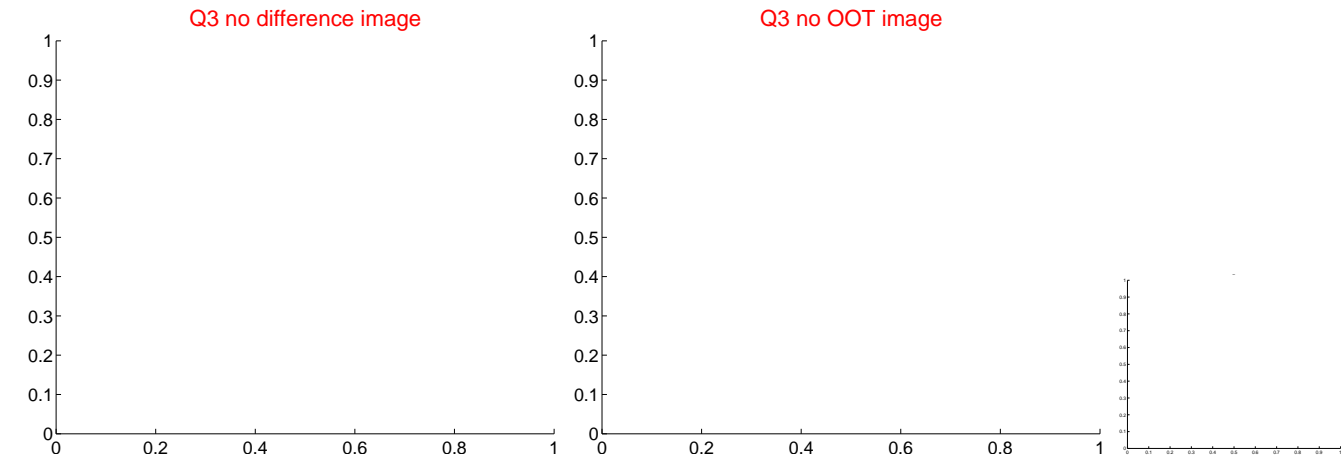
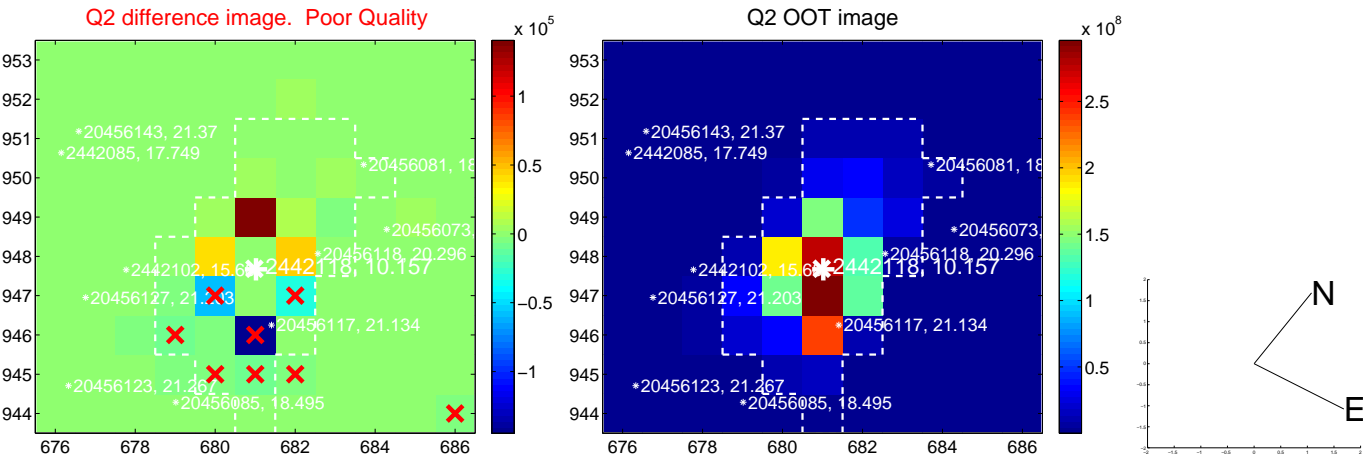


offset from photometric centroids



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.

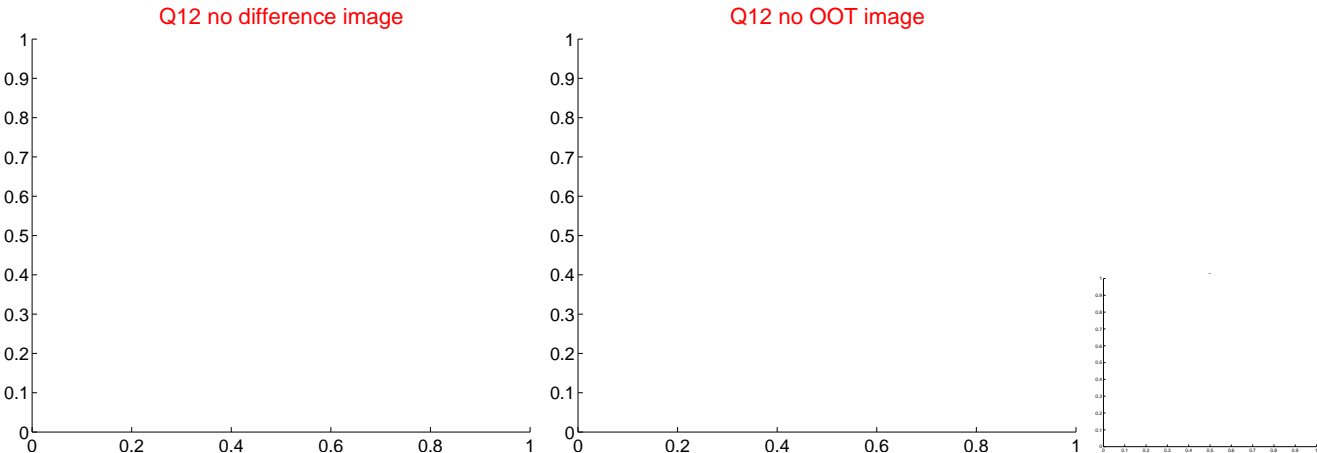
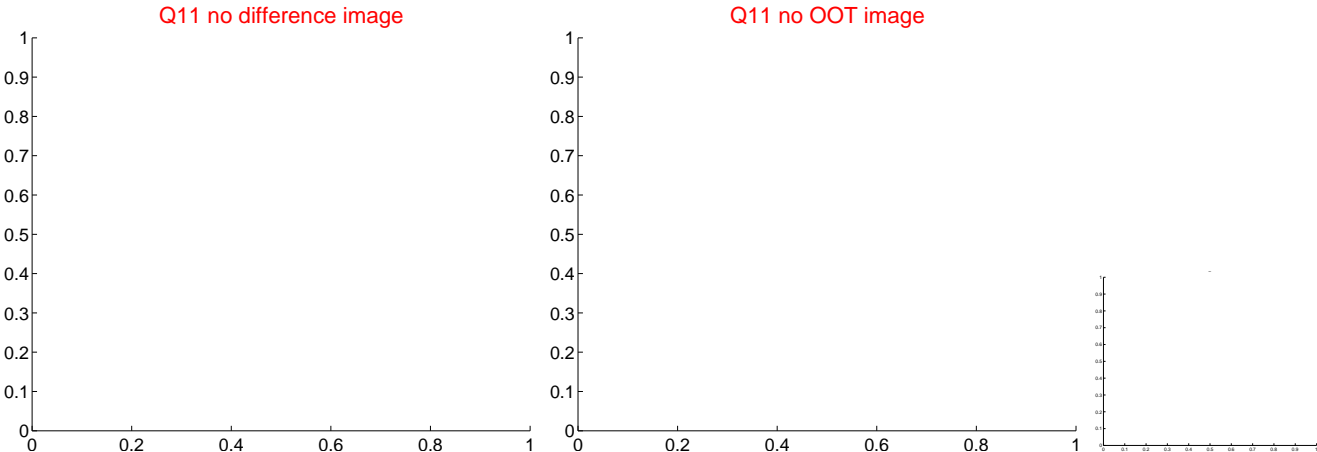
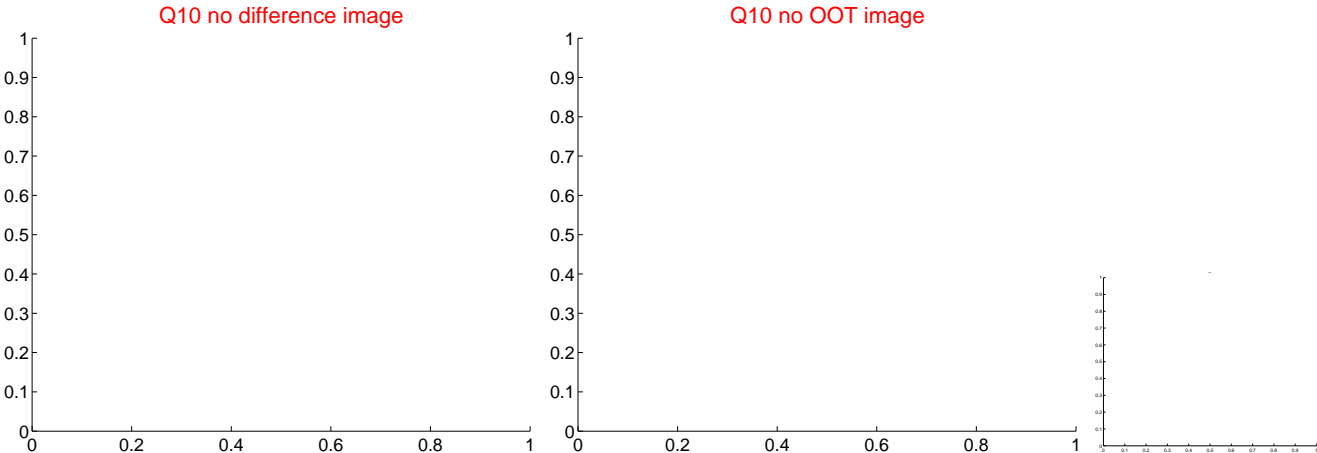
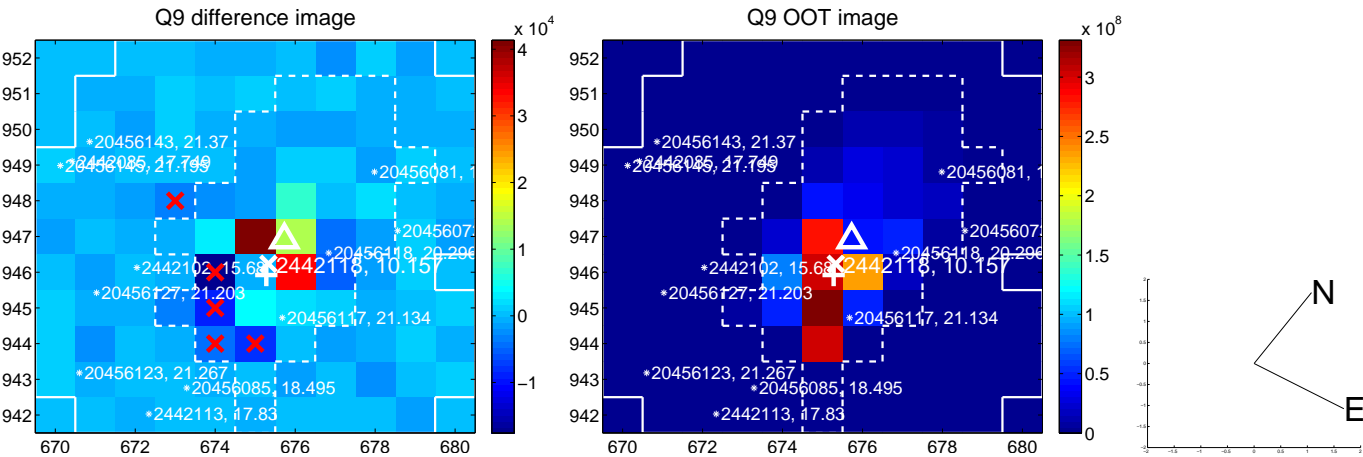
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



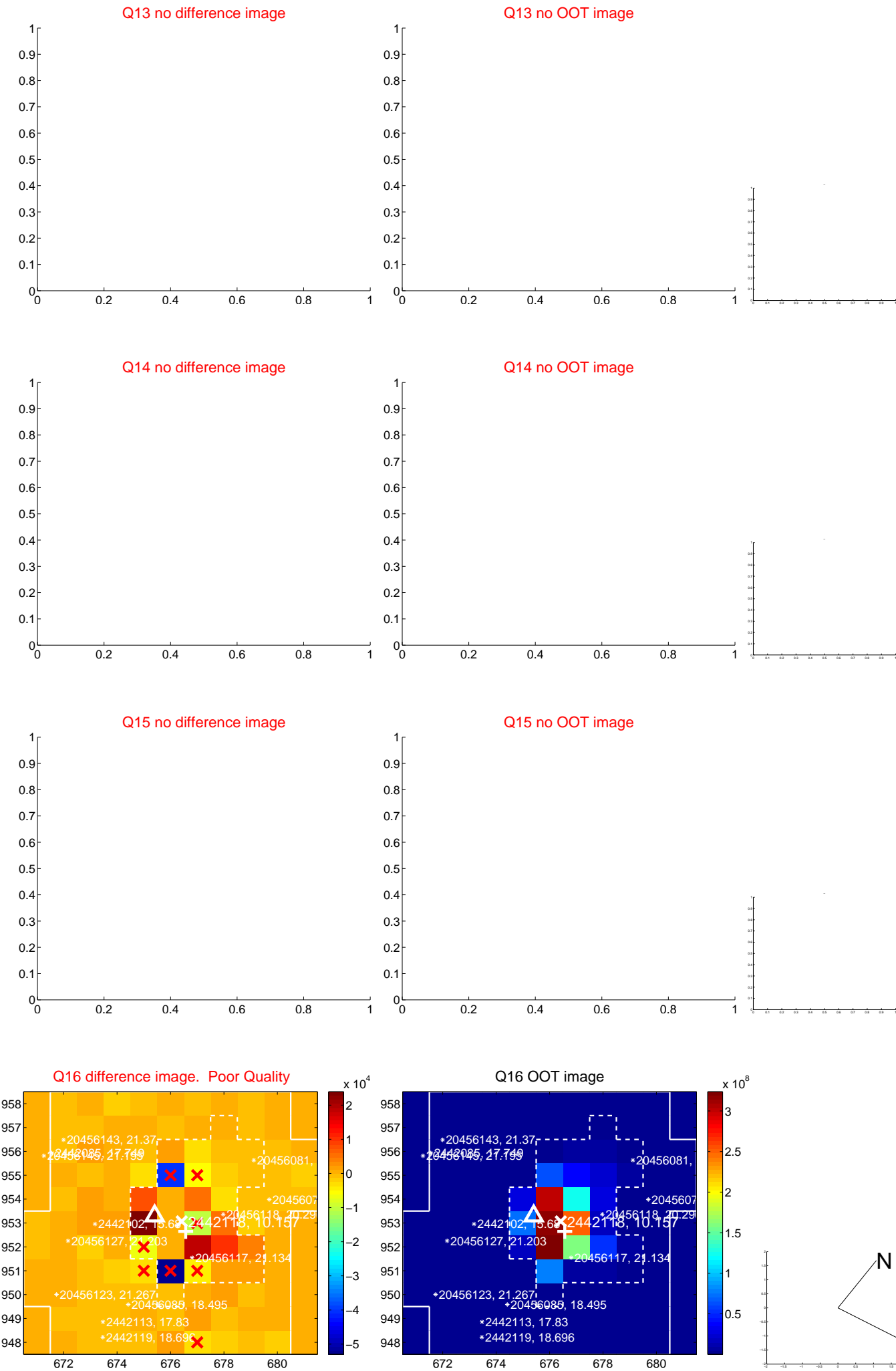
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

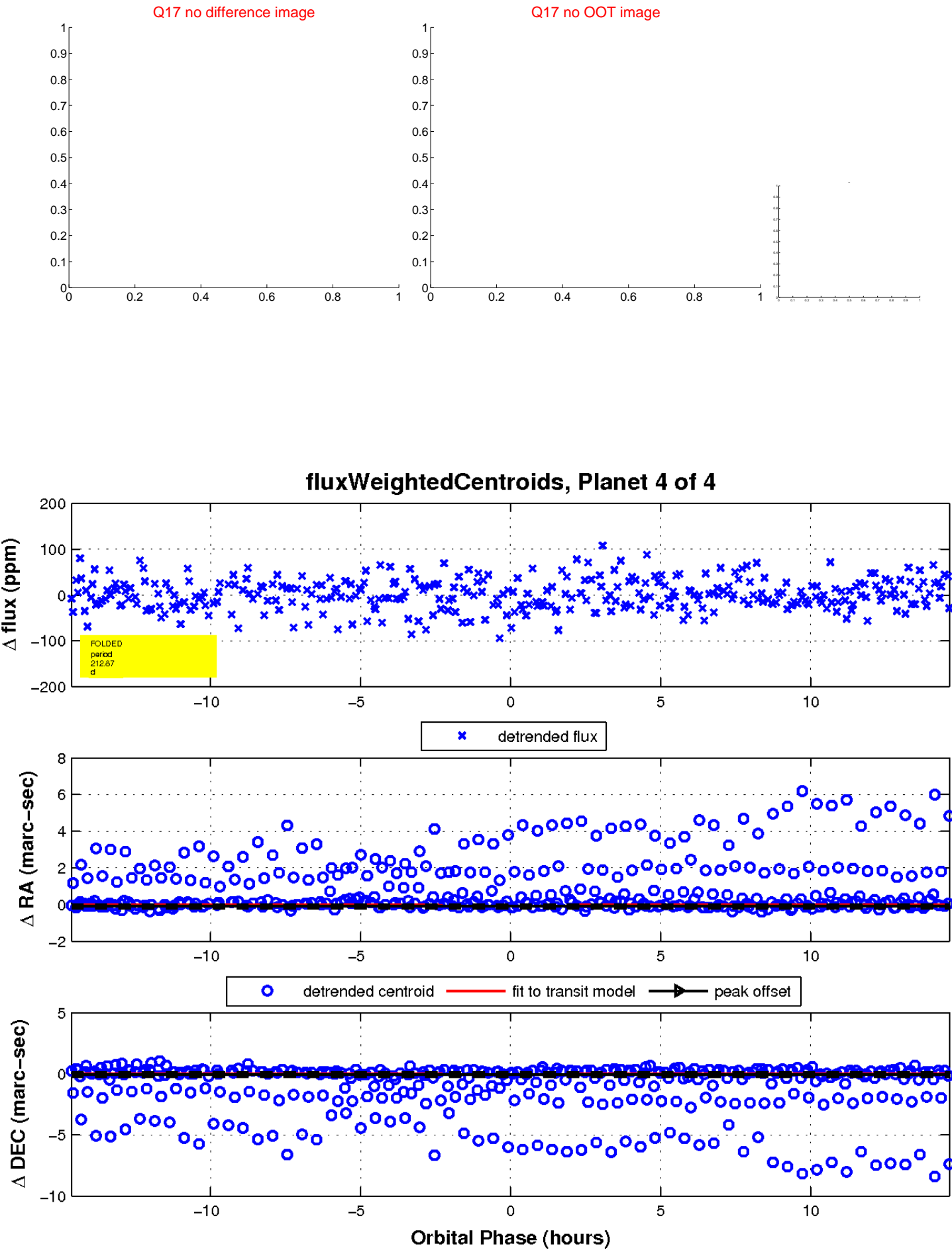


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.





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



UKIRT Image

Declination

