

# KIC 001720673

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001720673-01	OBS	No	374.564497	445.992949	8688.7	2.056	29.1	16.8	0.57	4348	5.16	0.15
001720673-02	OBS	No	324.771544	168.384813	3231.5	3.925	27.7	6.8	0.57	4348	3.22	0.18
001720673-03	OBS	No	368.353347	496.395202	13192.5	19.027	40.5	28.5	0.57	4348	6.33	0.15
001720673-04	OBS	No	325.394325	168.921929	2416.8	3.328	24.5	4.4	0.57	4348	2.88	0.18
001720673-05	OBS	No	326.044695	168.761374	8151.2	7.500	24.1	-1.0	0.57	4348	4.98	0.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001720673-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

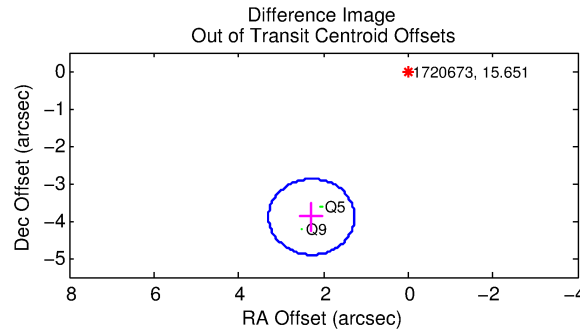
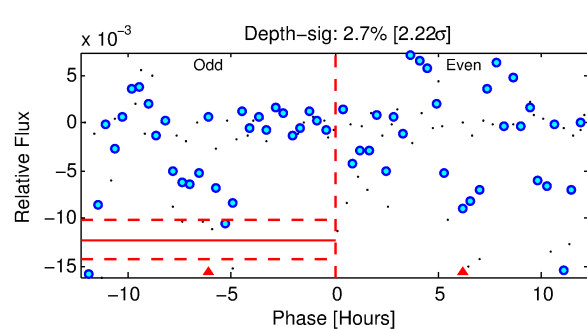
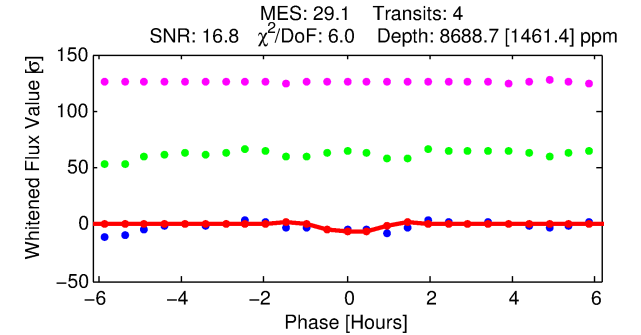
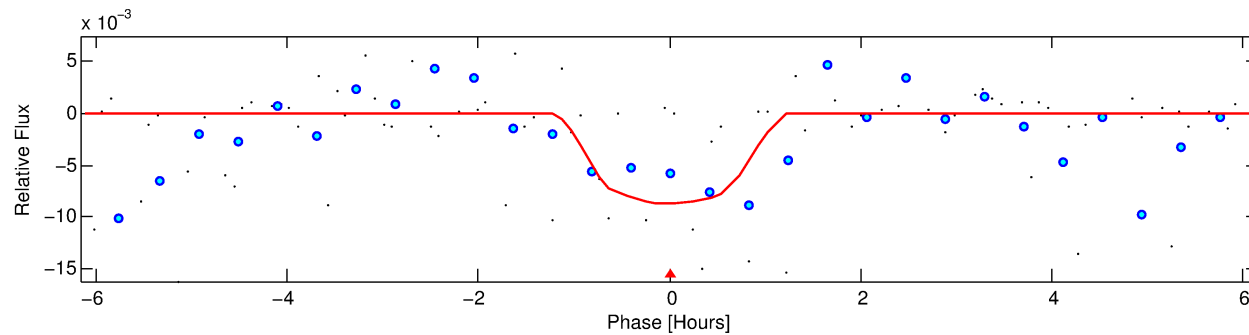
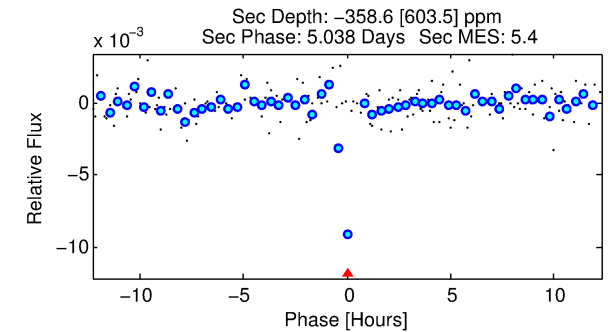
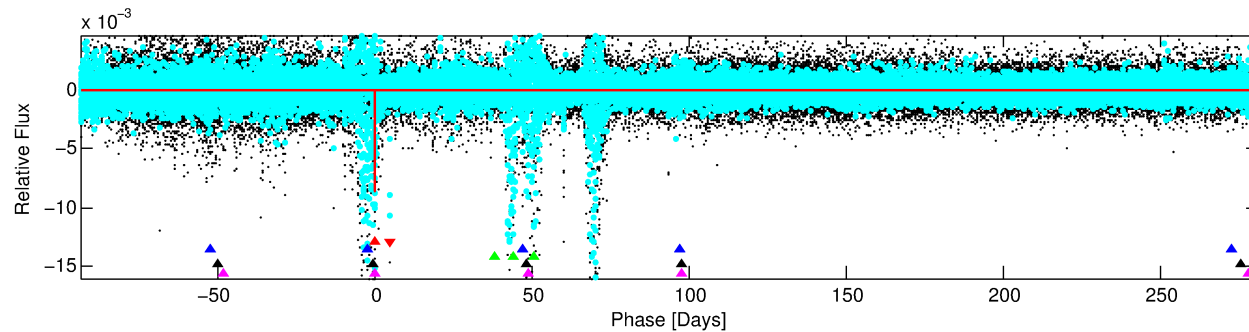
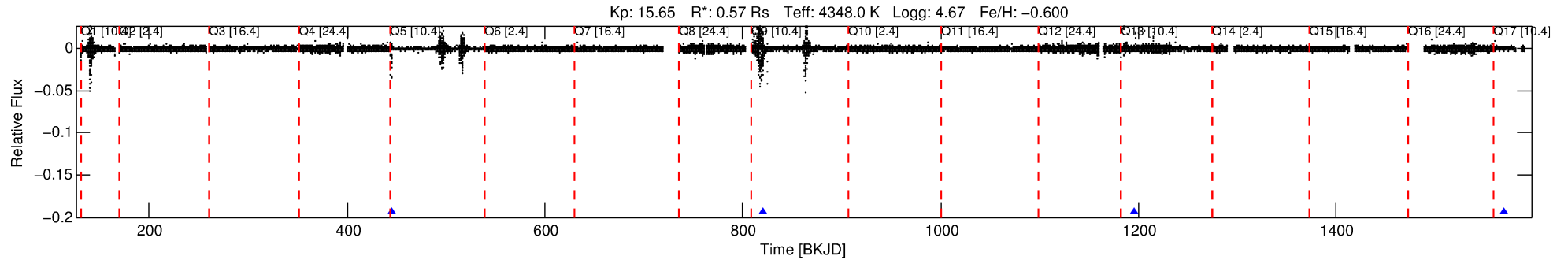
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001720673-01

No Significant Match Found

# DV One-Page Summary

KIC: 1720673 Candidate: 1 of 5 Period: 374.564 d



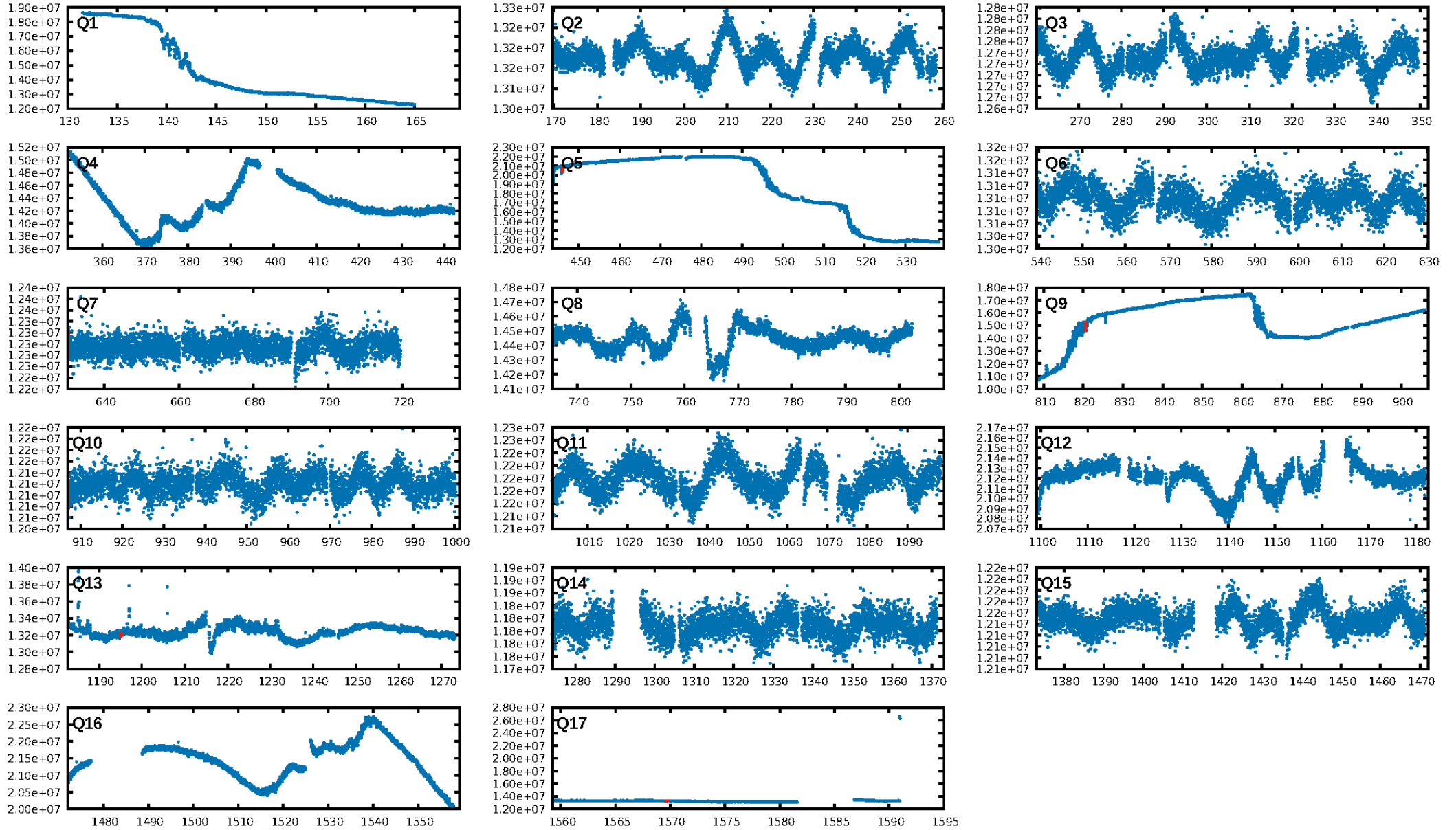
## DV Fit Results:

Period = 374.56450 [0.00279] d  
Epoch = 445.9929 [0.0053] BKJD  
Rp/R\* = 0.0830 [0.1947]  
a/R\* = 1507.32 [11428.42]  
b = 0.02 [347.98]  
Seff = 0.15 [0.03]  
Teq = 158 [7] K  
Rp = 5.16 [12.10] Re  
a = 0.8358 [0.0663] AU  
Ag = N/A  
Teffp = N/A

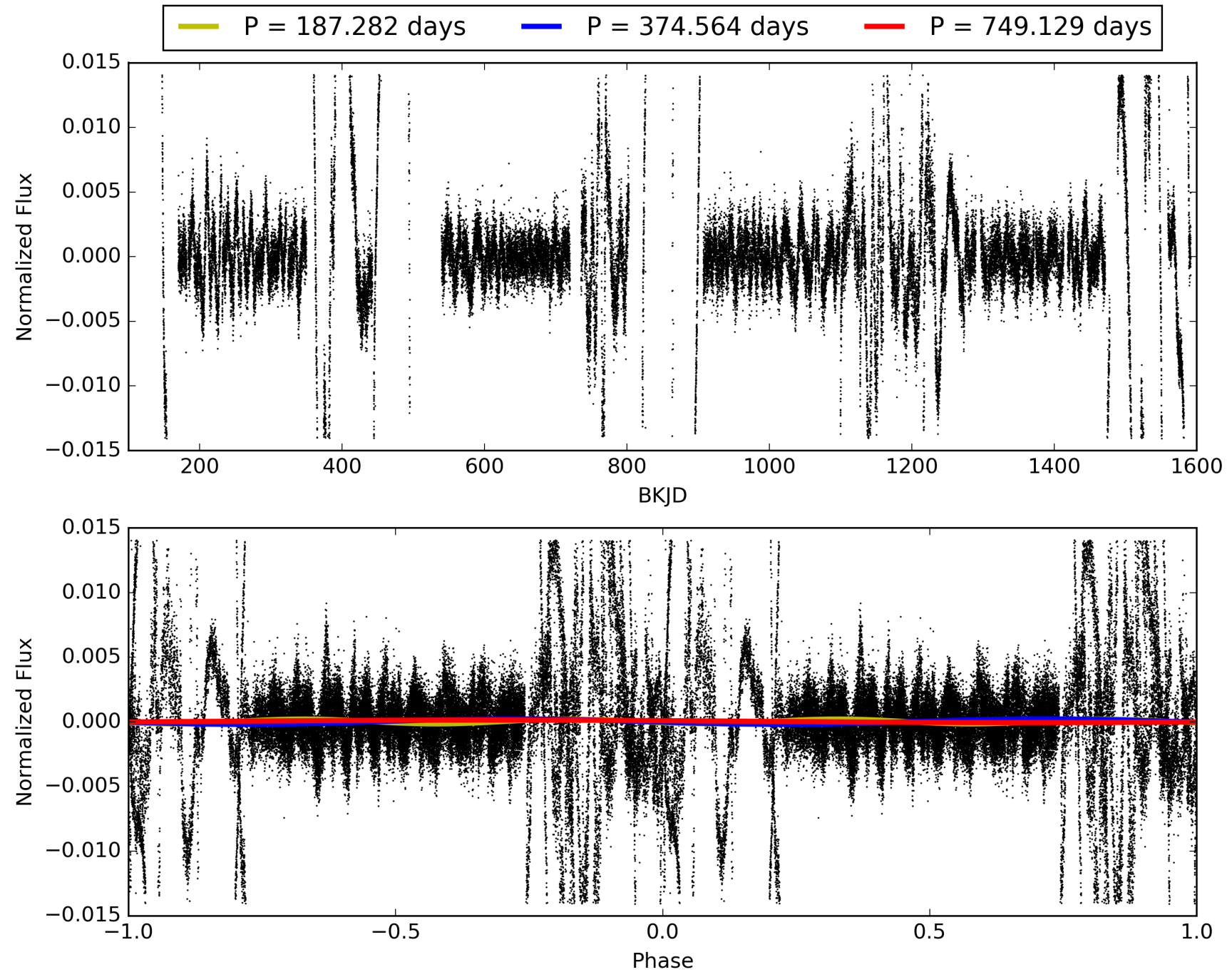
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.79σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.984  
Centroid-sig: N/A  
Centroid-so: 3.794 arcsec [1.66σ]  
OotOffset-rm: 4.516 arcsec [13.38σ]  
KicOffset-rm: 3.167 arcsec [2.30σ]  
OotOffset-st: 0/0/0/2 [2]  
KicOffset-st: 0/0/0/4 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 0.75 [3/4]

# TCE 001720673-01, PDC Light Curves



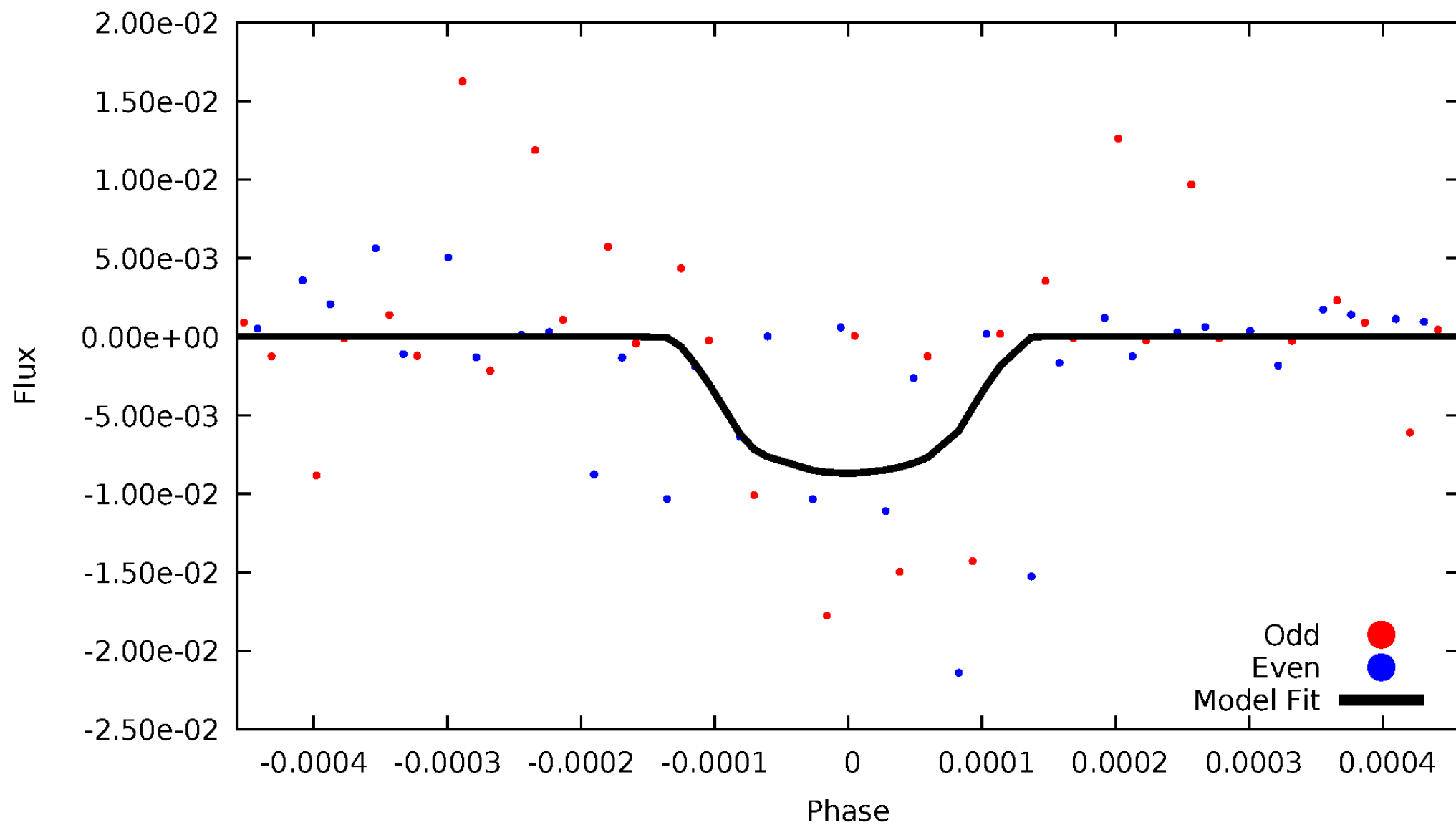
# TCE 001720673-01





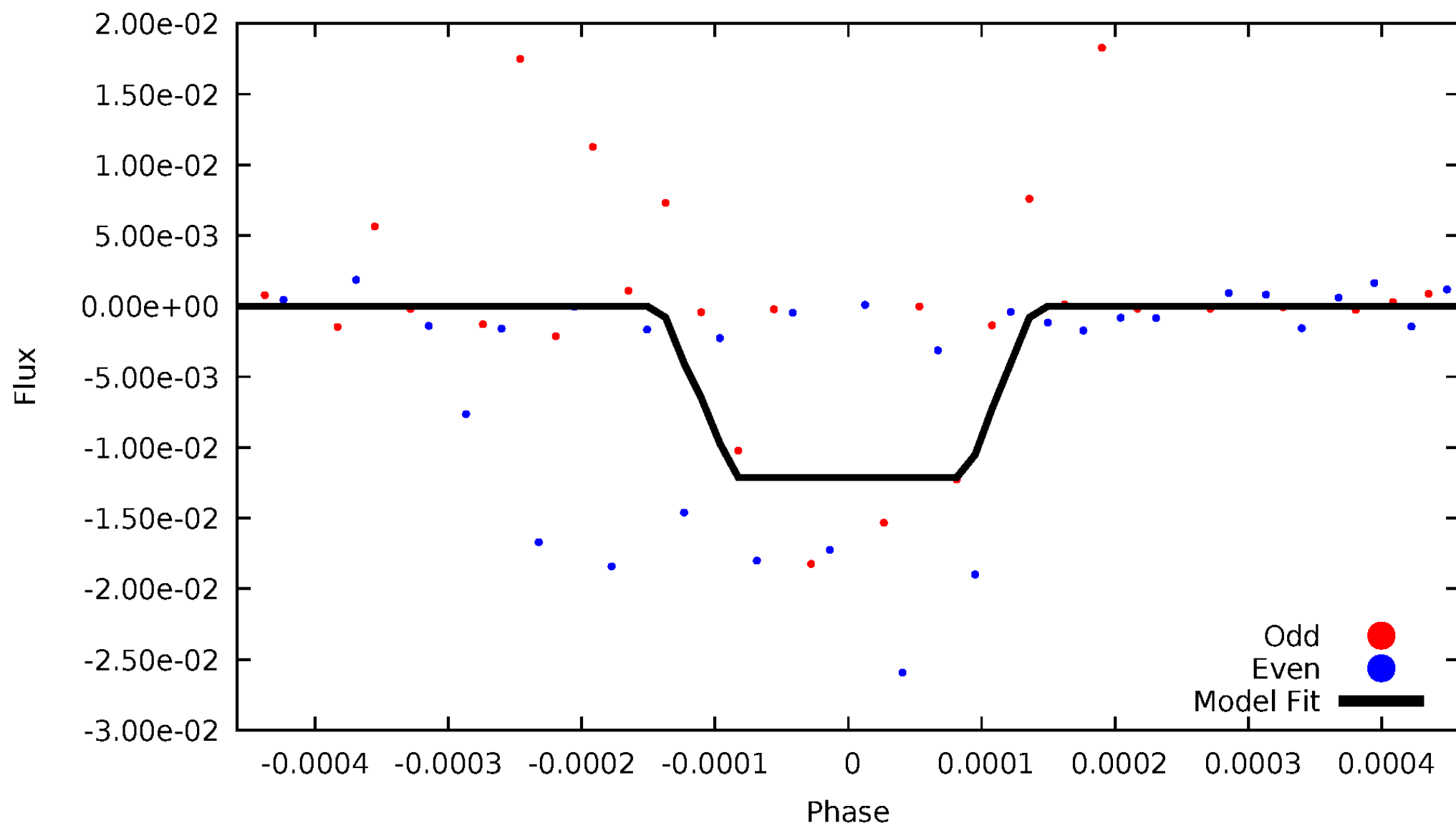
# DV Odd/Even

TCE 001720673-01



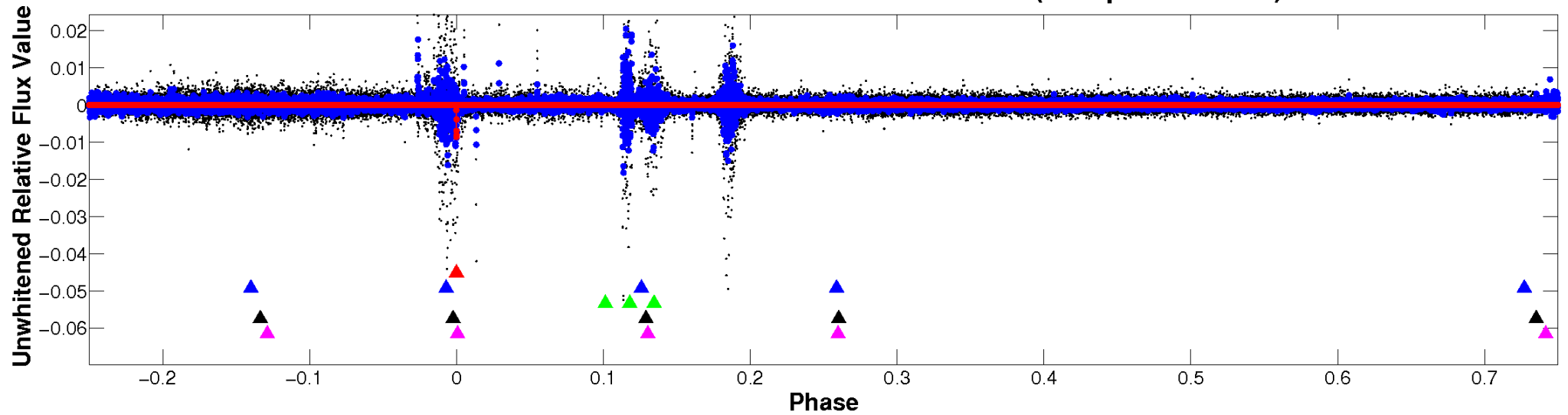
# ALT Odd/Even

TCE 001720673-01

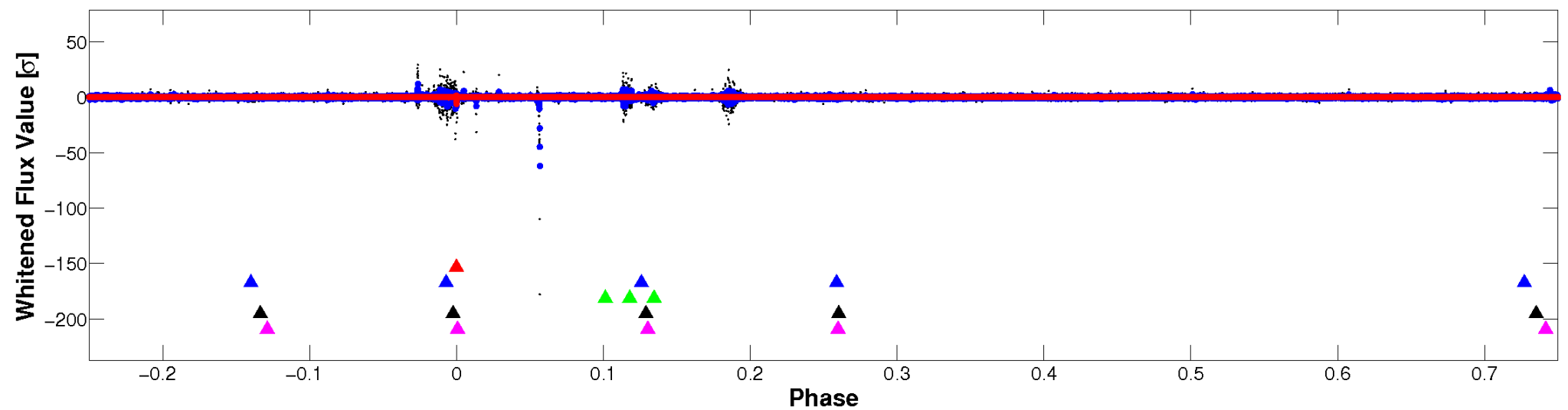


# Non-Whitened Vs. Whitened Light Curve

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

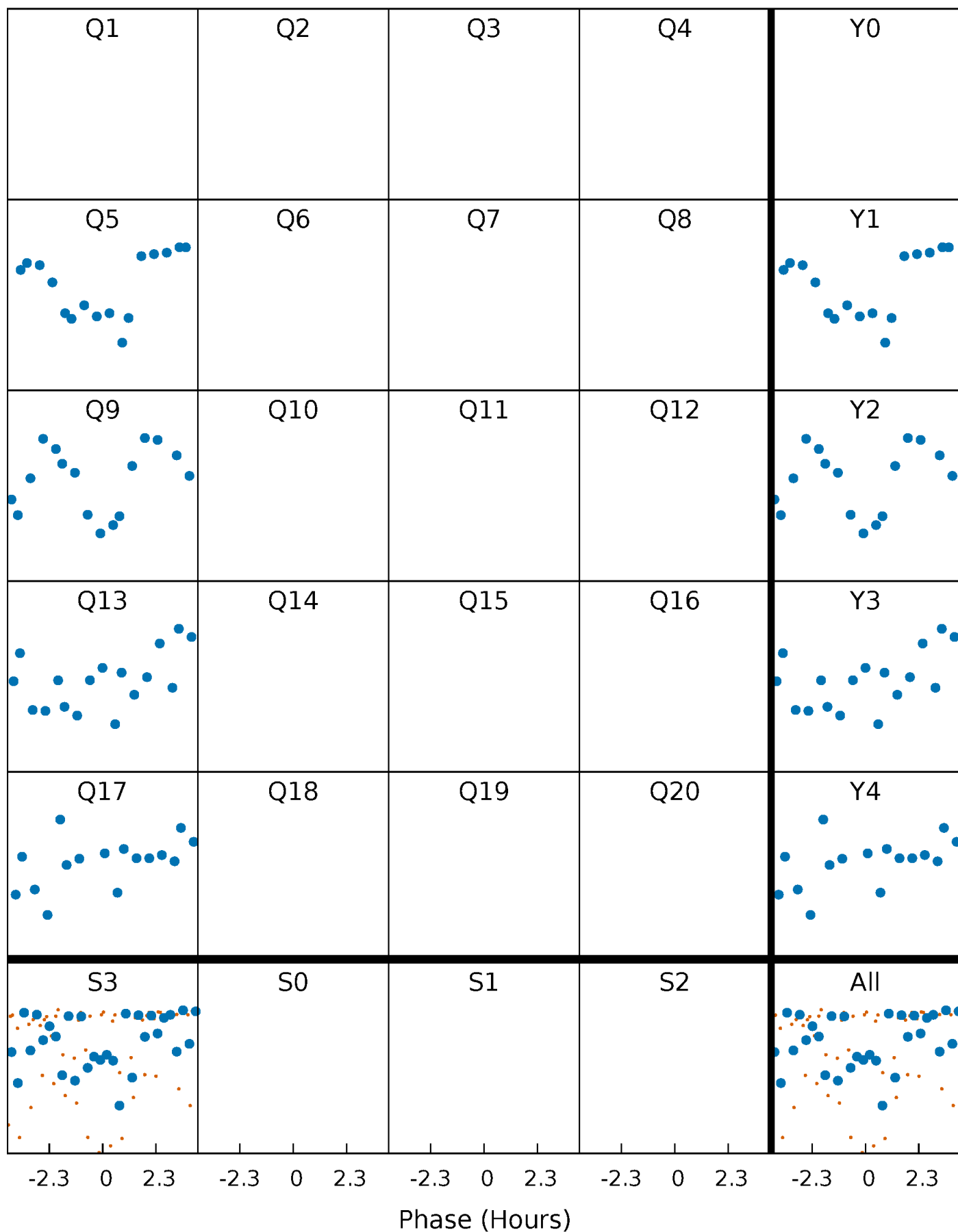


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



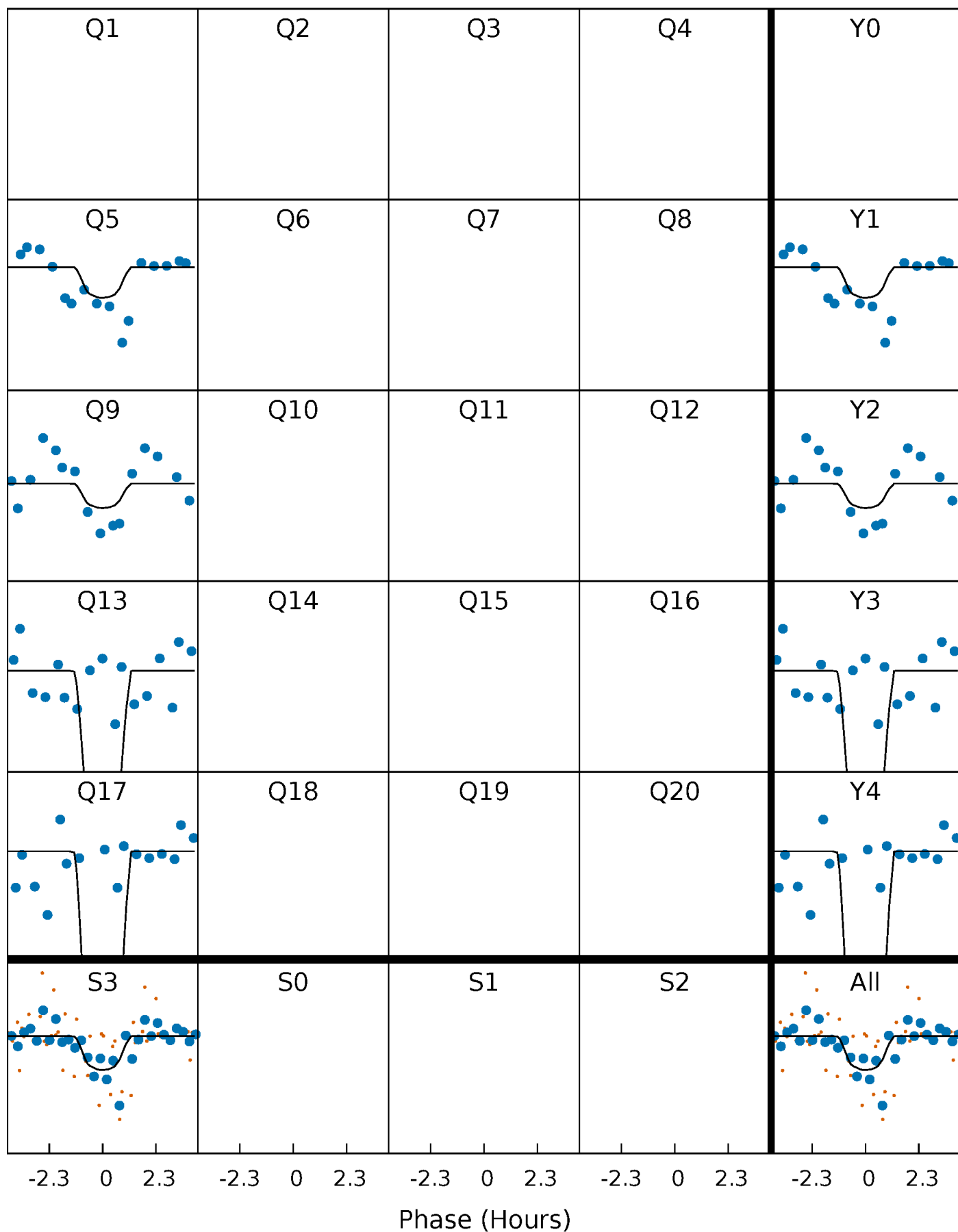
# PDC Quarter-Phased Transit Curves

TCE 001720673-01 P=374.564497 Days  $T_0=445.992949$  (BKJD)



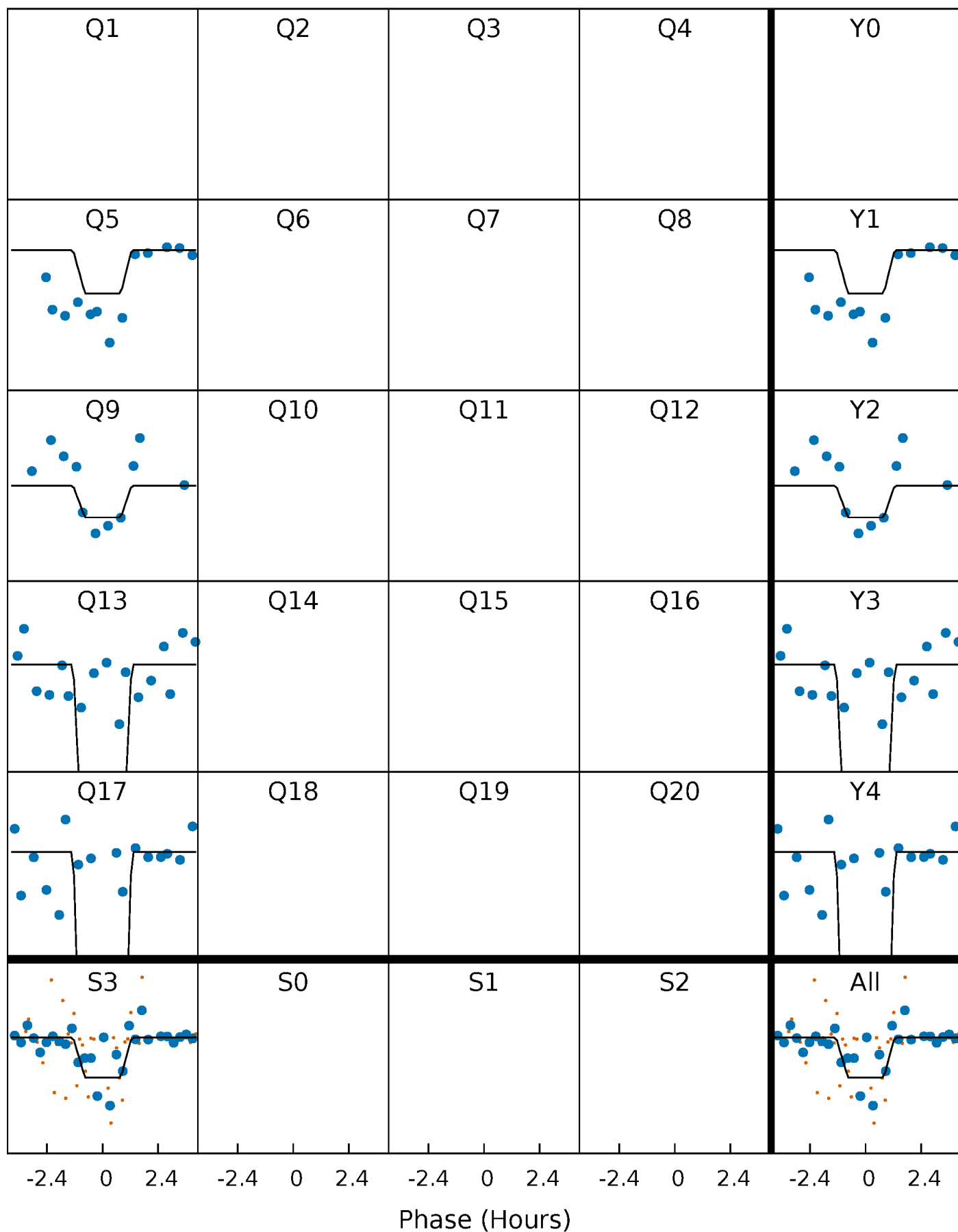
# DV Quarter-Phased Transit Curves

TCE 001720673-01 P=374.564497 Days  $T_0=445.992949$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 001720673-01 P=374.553189 Days  $T_0=446.008687$  (BKJD)

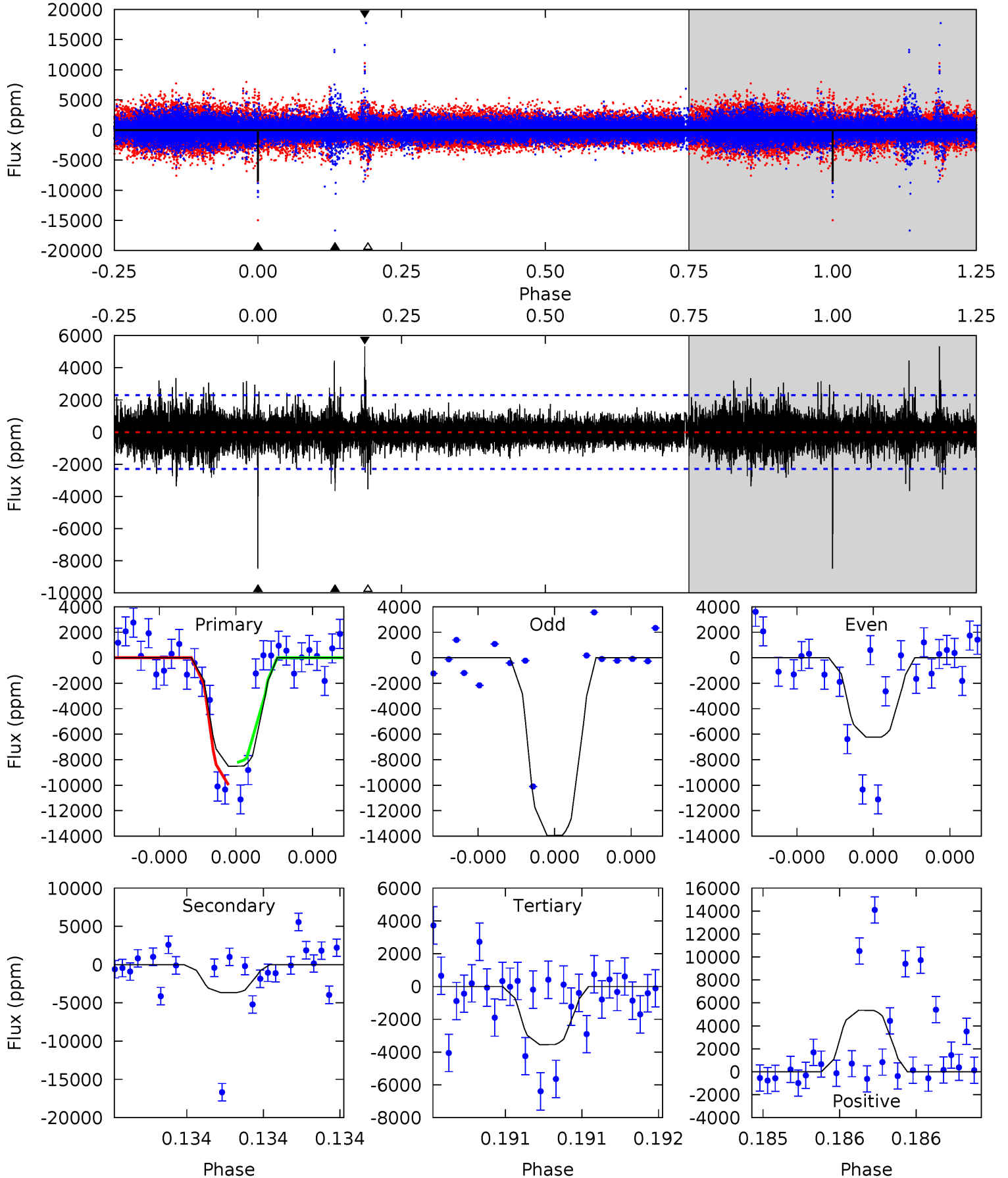




# DV Model-Shift Uniqueness Test

001720673-01, P = 374.564497 Days, E = 71.428452 Days

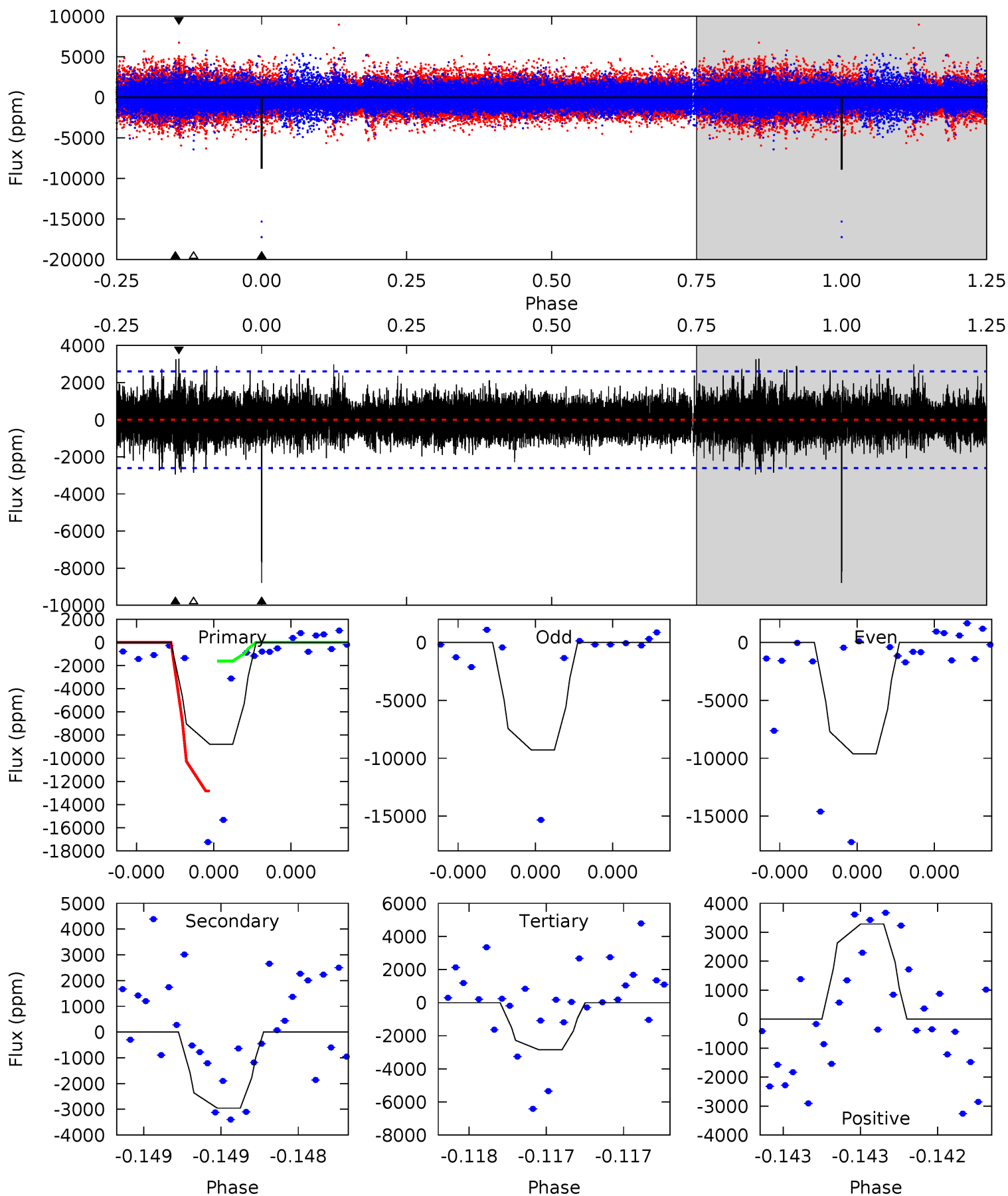
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.0	9.07	8.76	13.2	5.68	3.64	1.44	12.3	7.81	0.31	-4.14	8.18	1.08	0.39	0



# Alt Model-Shift Uniqueness Test

001720673-01, P = 374.553189 Days, E = 71.455498 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.2	6.44	6.22	7.16	5.68	3.64	1.30	13.0	12.0	0.22	-0.72	0.39	1.22	0.27	13.1



### Stellar Parameters For KIC 001720673

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4348^{+118}_{-144}$	$4.672^{+0.058}_{-0.027}$	$-0.600^{+0.300}_{-0.300}$	$0.569^{+0.045}_{-0.056}$	$0.556^{+0.056}_{-0.042}$	$4.239^{+1.221}_{-0.540}$
	+3%/-3%	+1%/-1%	+50%/-50%	+8%/-10%	+10%/-8%	+29%/-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 001720673-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-3666 \pm 404$	$9.93^{+10.43}_{-6.39}$	$220^{+8}_{-8}$	$3129^{+1305}_{-542}$	$13967^{+95808}_{-10353}$
Alt.	$-2953 \pm 459$	$11.59^{+9.90}_{-7.62}$	$219^{+7}_{-8}$	$2918^{+1192}_{-446}$	$8627^{+66016}_{-6176}$

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

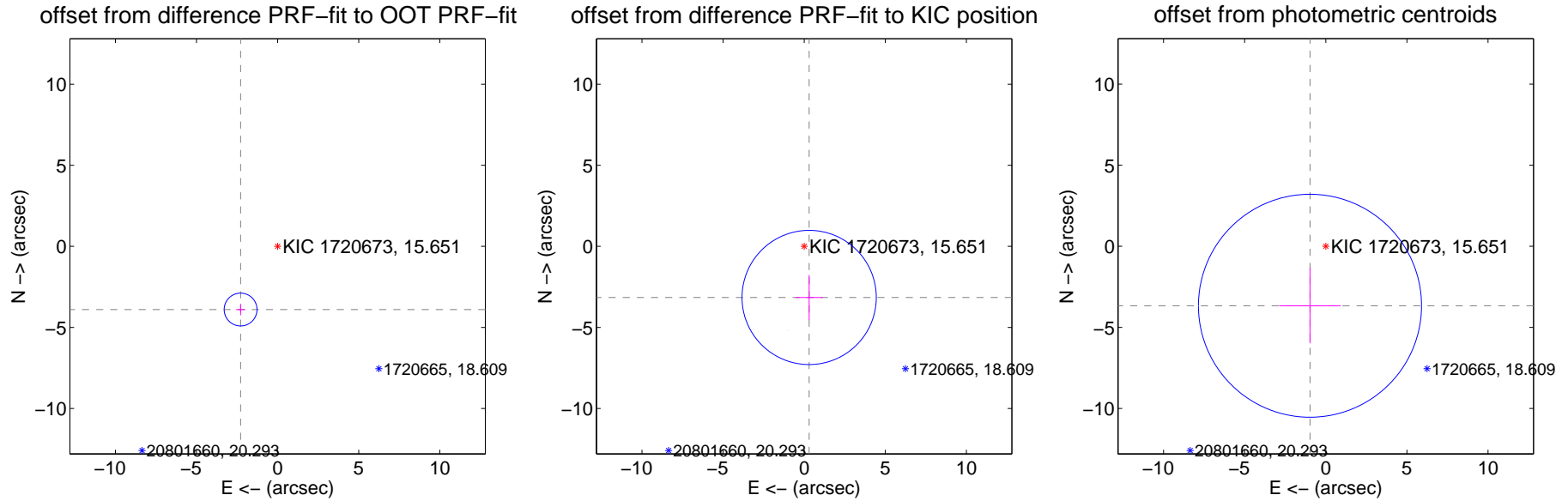
## DV Centroid Data

Supplemental centroid analysis for 001720673-01. Kepler magnitude: 15.65. Transit SNR 16.76

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.54 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.516 \pm 0.337$	13.38	$2.283 \pm 0.280$	$-3.897 \pm 0.355$
PRF-fit source offset from KIC position	$3.167 \pm 1.380$	2.30	$-0.306 \pm 0.833$	$-3.152 \pm 1.384$
photometric centroid source offset	$3.79 \pm 2.29$	1.66	$0.97 \pm 1.89$	$-3.67 \pm 2.32$

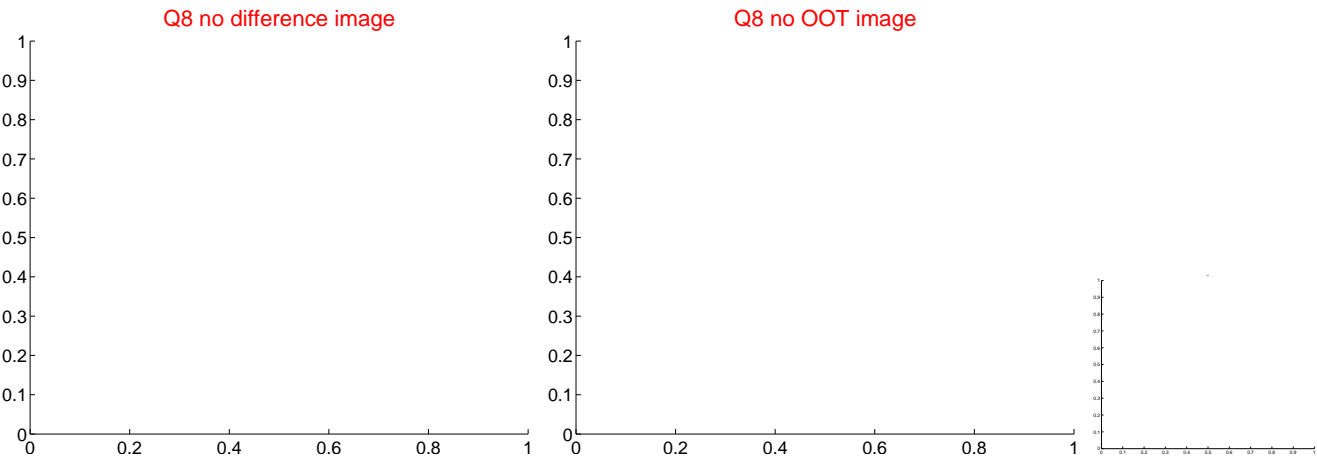
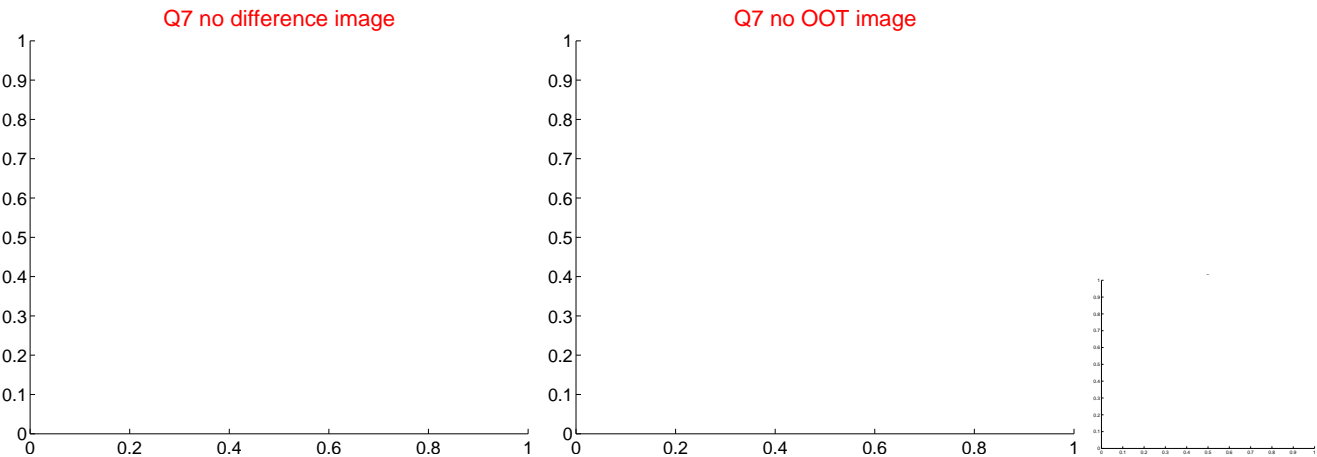
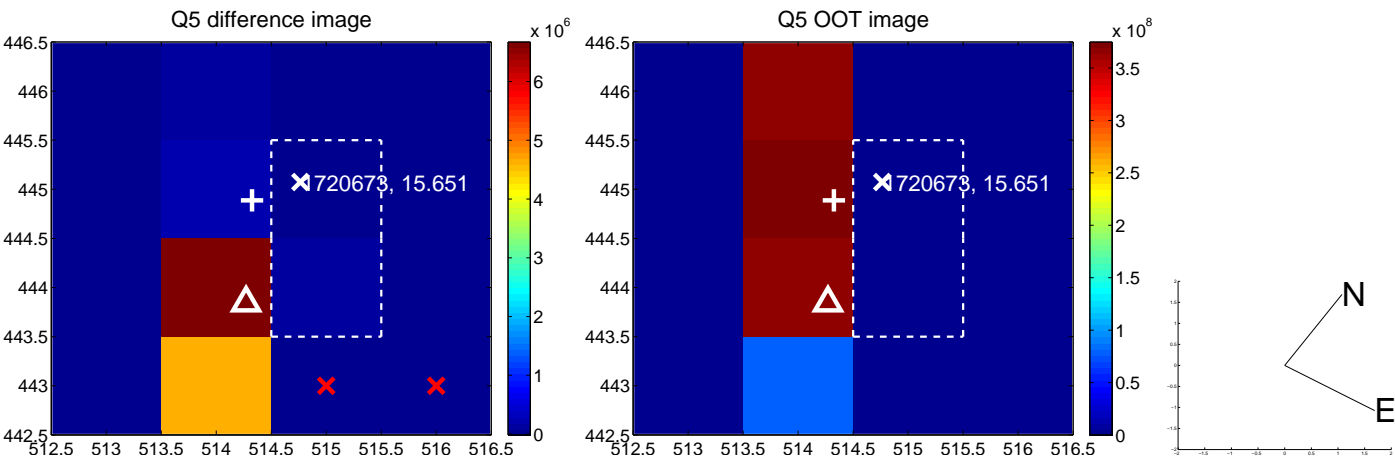


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

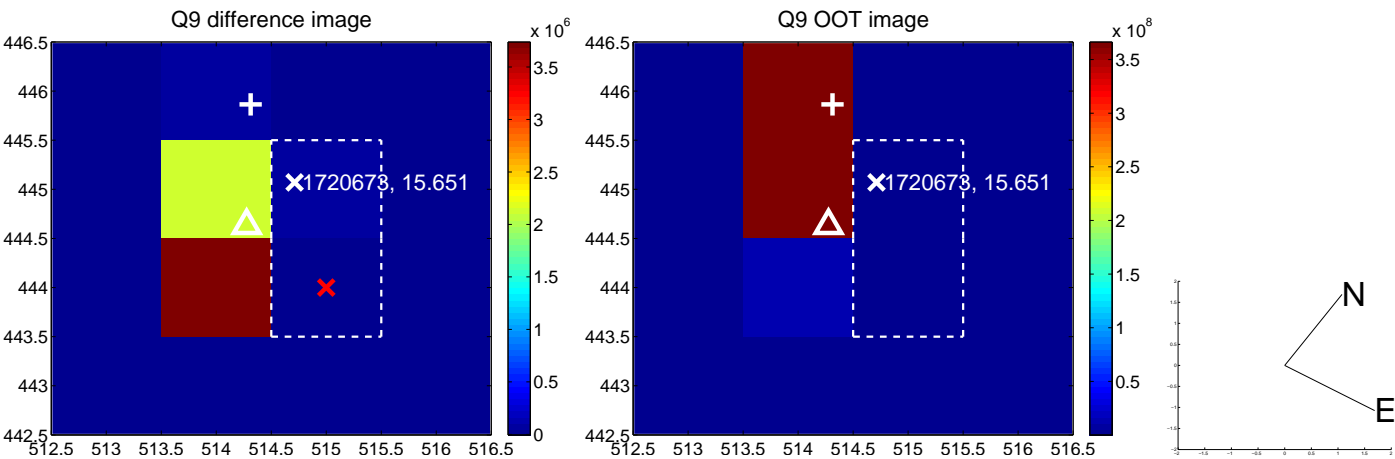


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

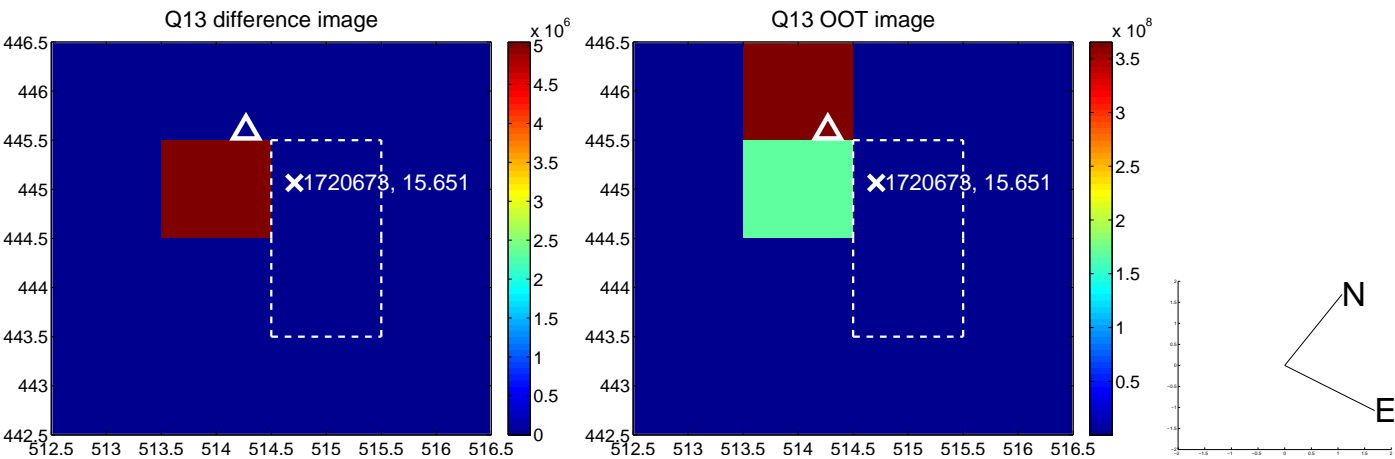




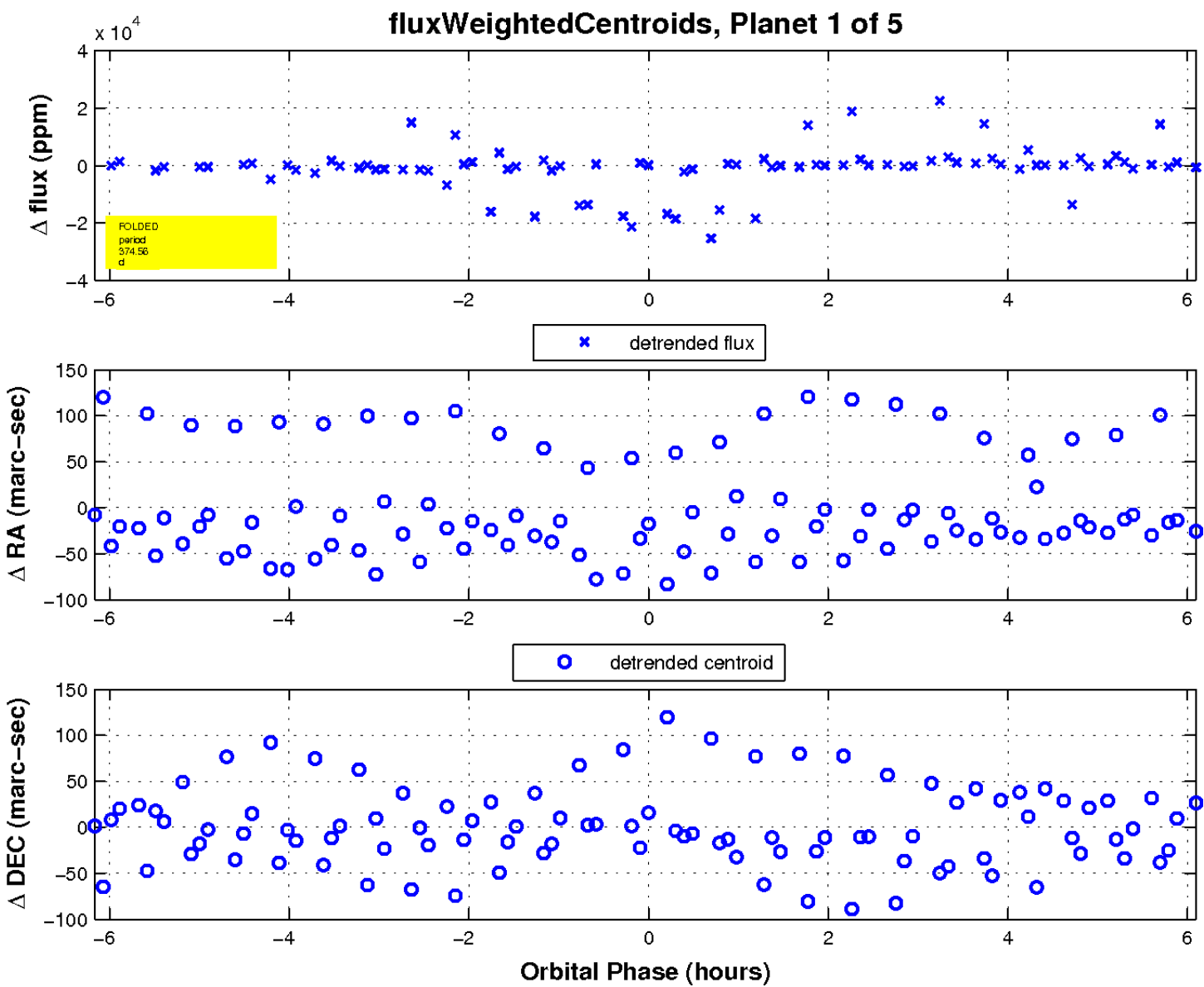
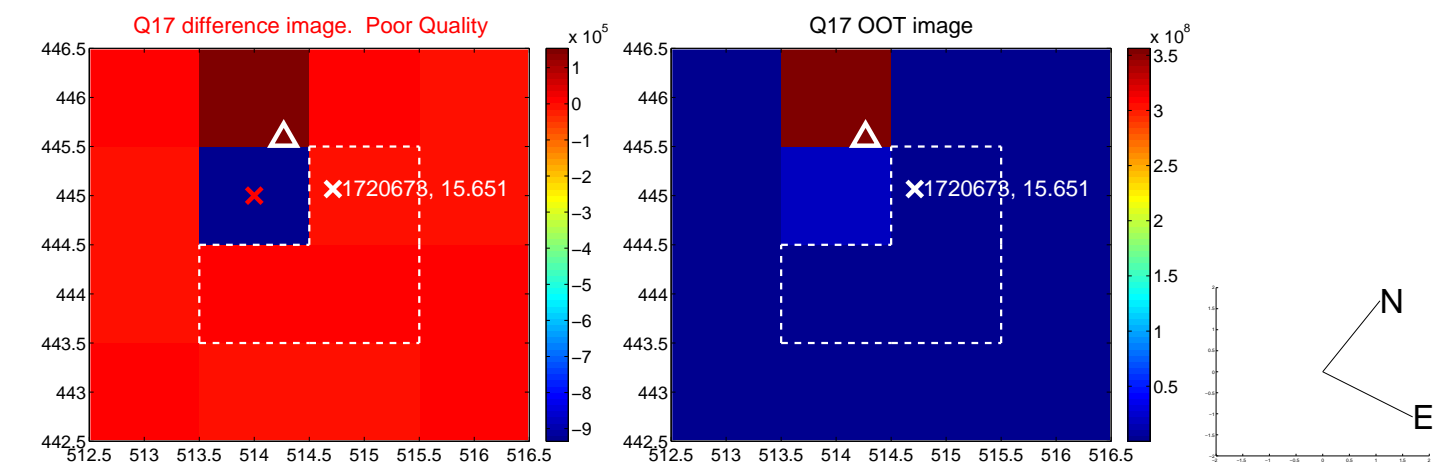
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

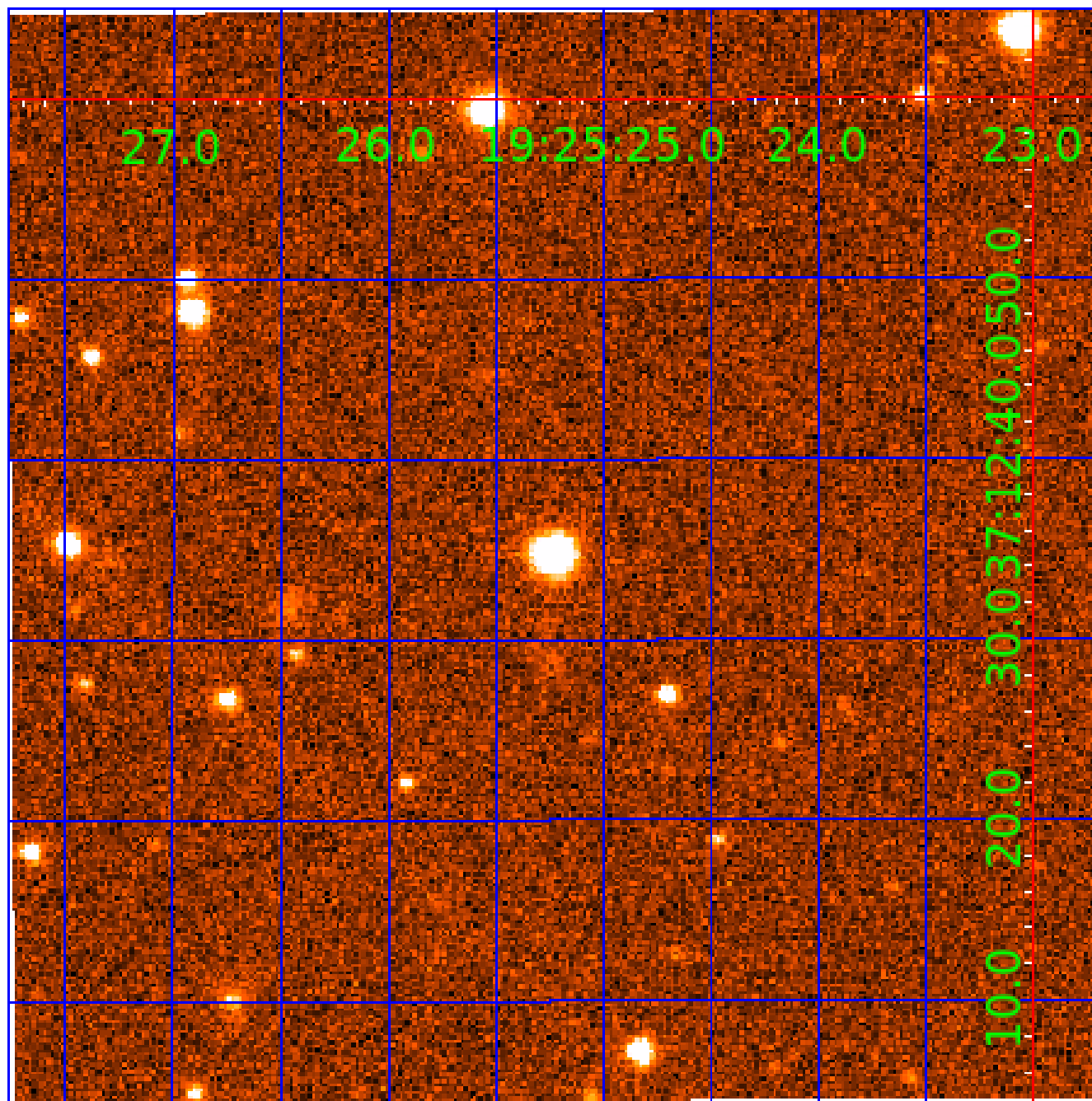


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 001720673

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001720673-01	OBS	No	374.564497	445.992949	8688.7	2.056	29.1	16.8	0.57	4348	5.16	0.15
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001720673-04	OBS	No	325.394325	168.921929	2416.8	3.328	24.5	4.4	0.57	4348	2.88	0.18
001720673-05	OBS	No	326.044695	168.761374	8151.2	7.500	24.1	-1.0	0.57	4348	4.98	0.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001720673-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

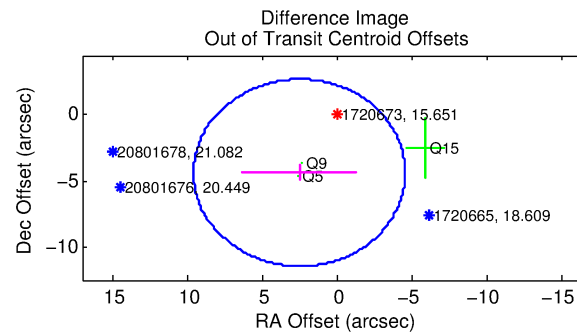
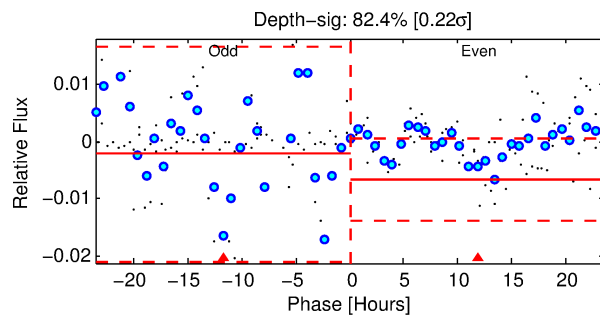
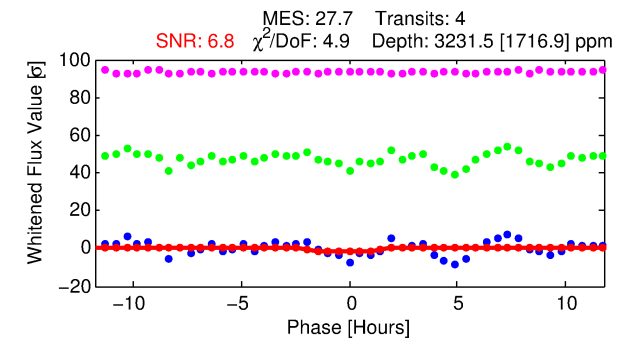
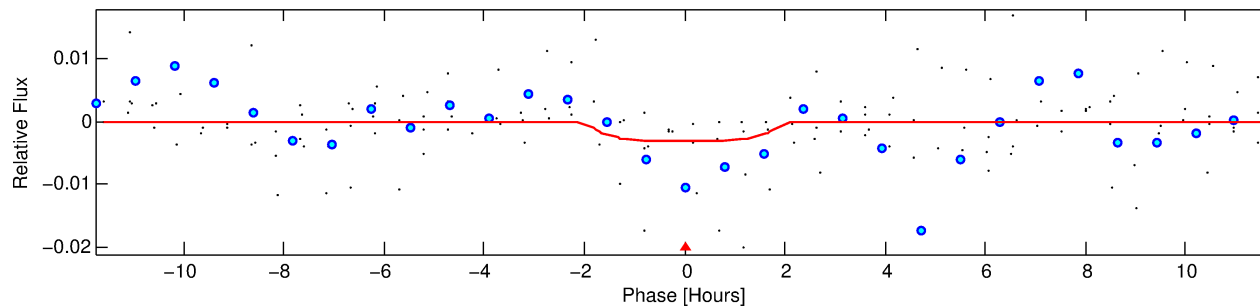
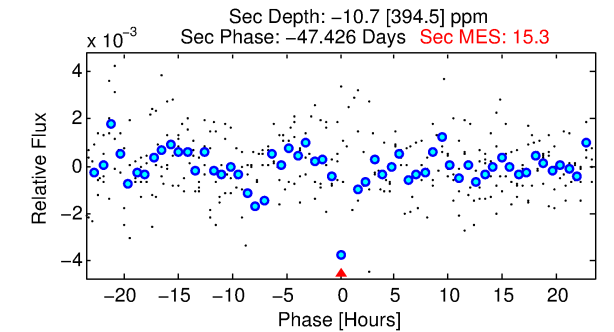
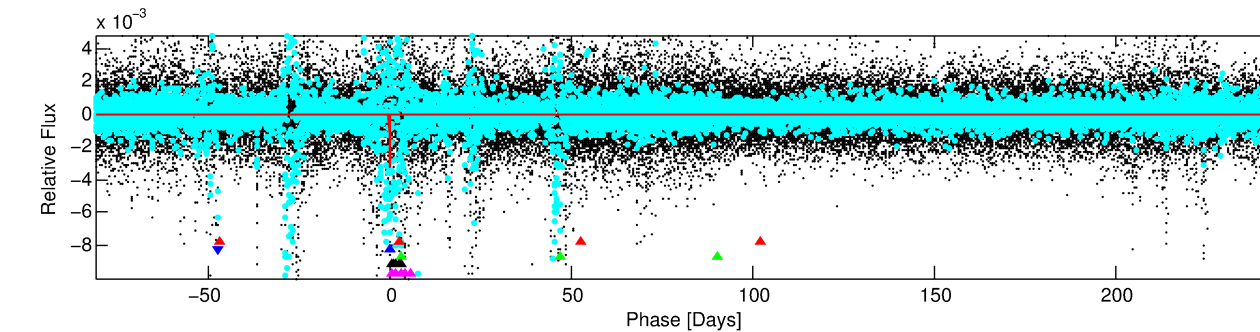
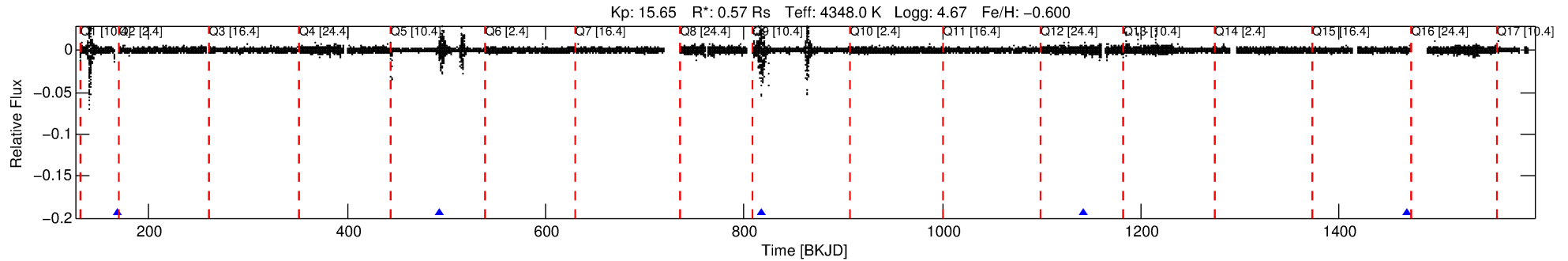
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 001720673-02

No Significant Match Found

# DV One-Page Summary

KIC: 1720673 Candidate: 2 of 5 Period: 324.772 d



## DV Fit Results:

Period = 324.77154 [0.01501] d  
Epoch = 168.3848 [0.0463] BKJD  
Rp/R\* = 0.0518 [0.3102]  
a/R\* = 616.53 [12401.57]  
b = 0.39 [44.07]  
Seff = 0.18 [0.03]  
Teq = 166 [7] K  
Rp = 3.22 [19.27] Re  
a = 0.7600 [0.0603] AU  
Ag = N/A  
Teffp = N/A

## DV Diagnostic Results:

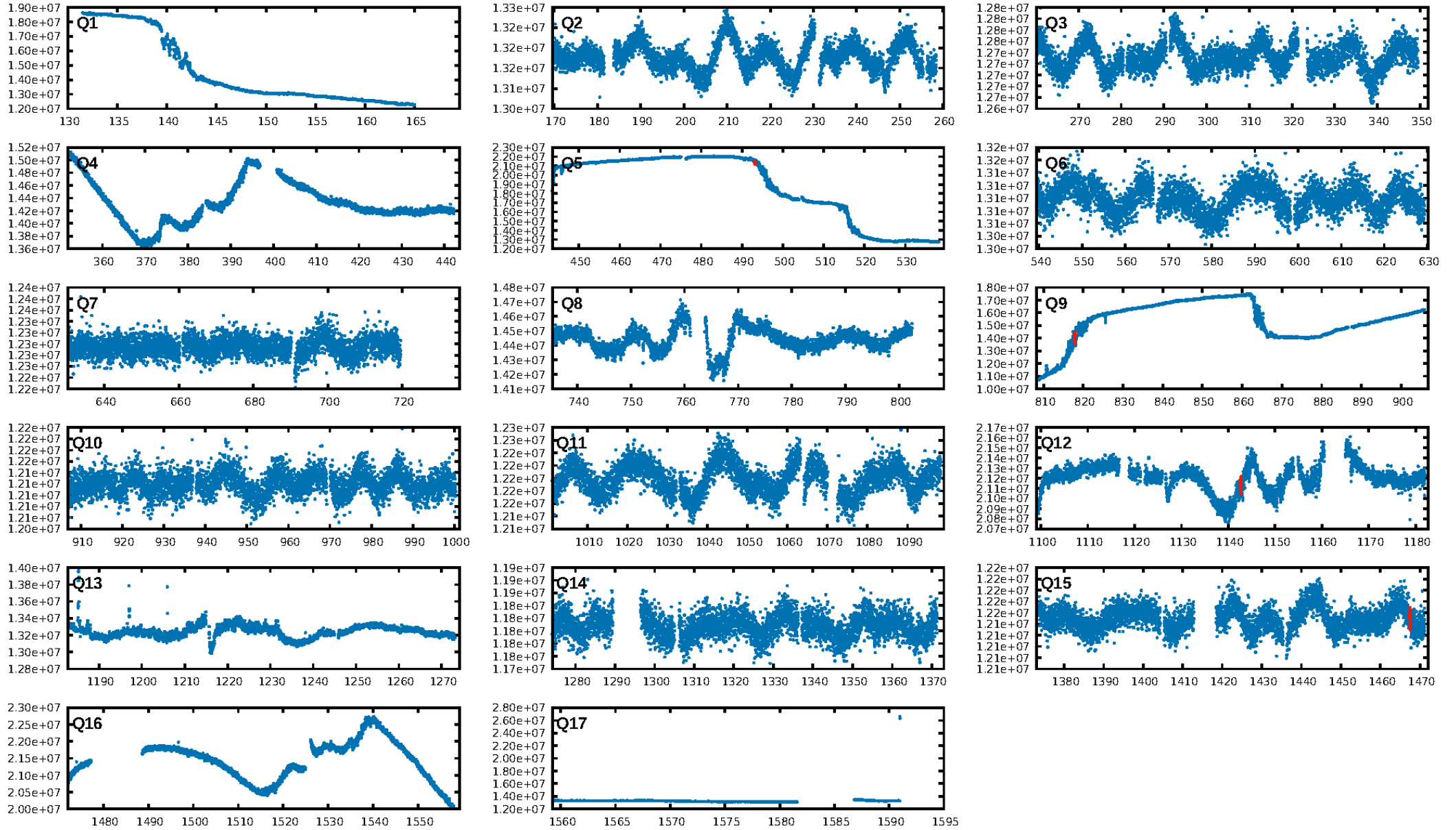
ShortPeriod-sig: N/A  
LongPeriod-sig: 99.6% [2.90σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 2.078  
Centroid-sig: N/A  
Centroid-so: 0.101 arcsec [0.08σ]  
OotOffset-rm: 5.041 arcsec [2.14σ]  
OotOffset-st: 0/1/0/2 [3]  
KicOffset-rm: 5.437 arcsec [3.48σ]  
KicOffset-st: 0/1/0/2 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:14:19 Z

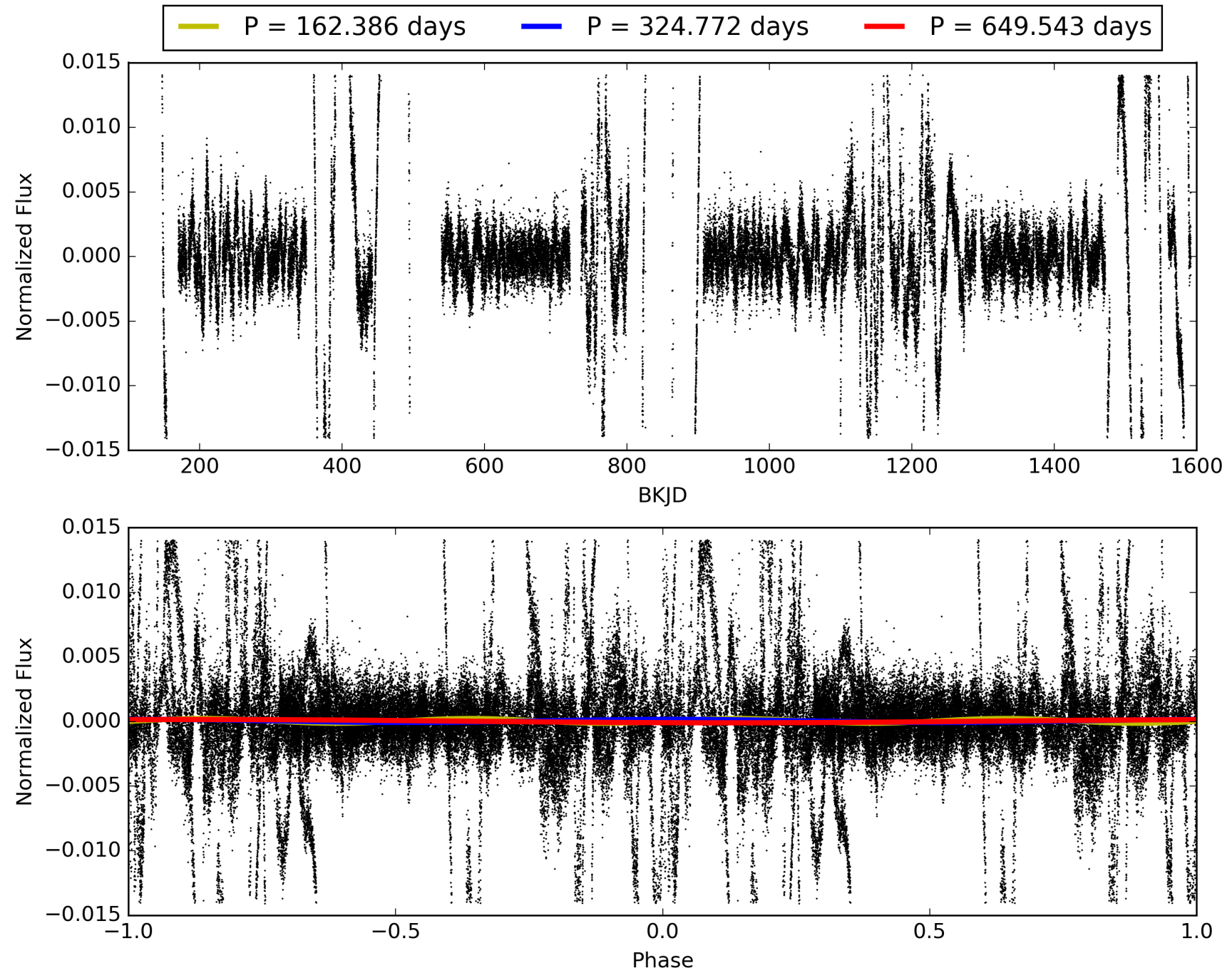
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 001720673-02, PDC Light Curves

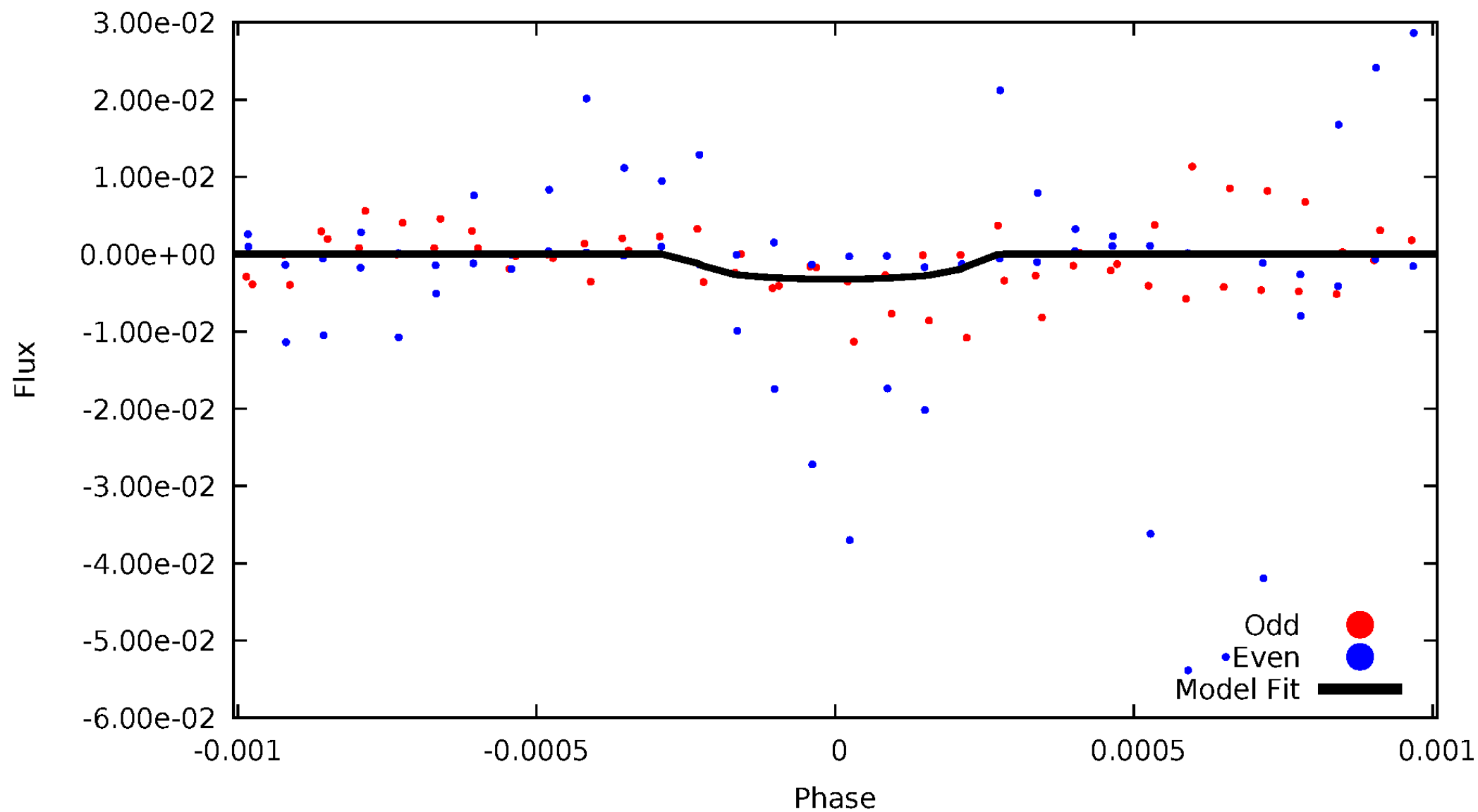


TCE 001720673-02



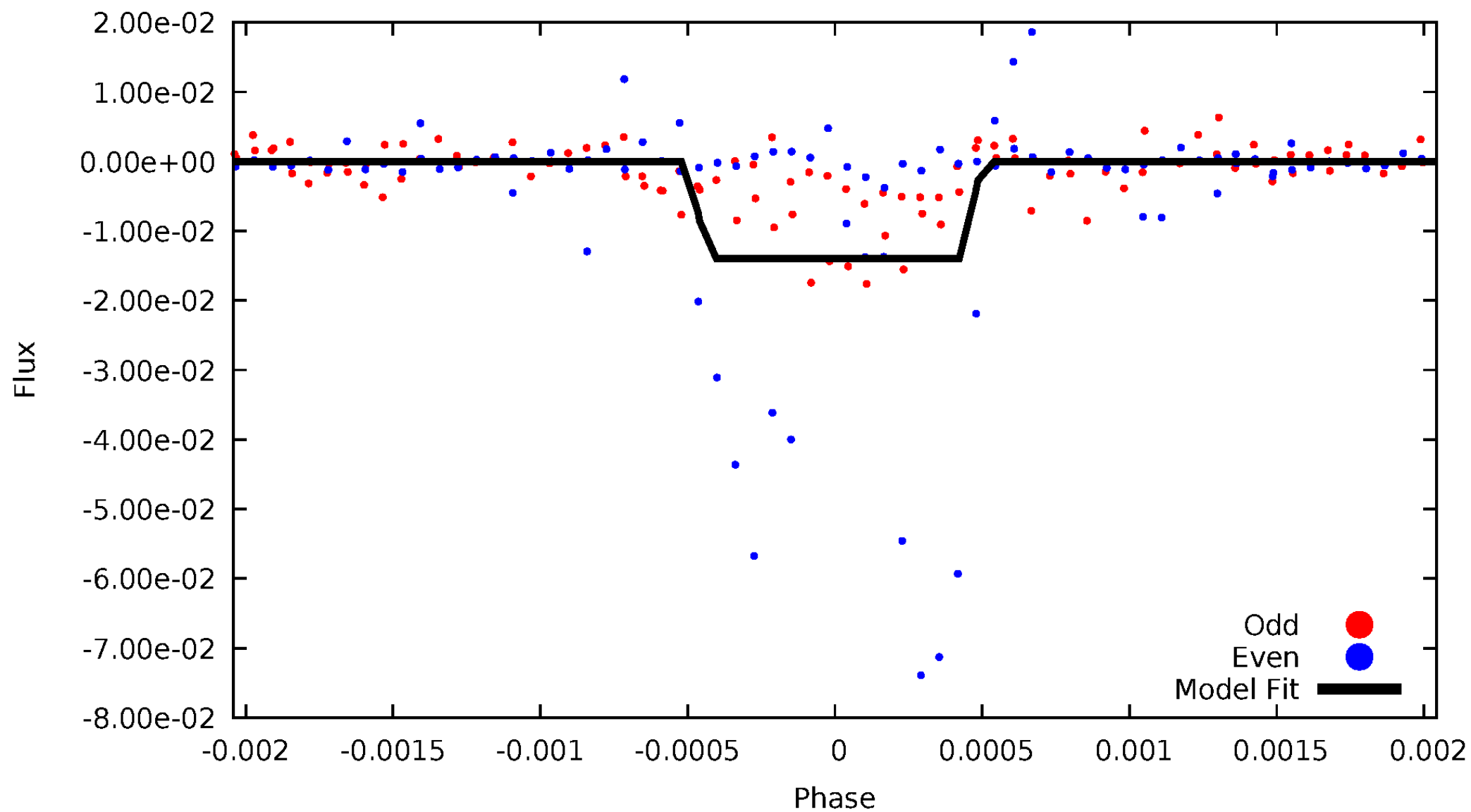
# DV Odd/Even

TCE 001720673-02



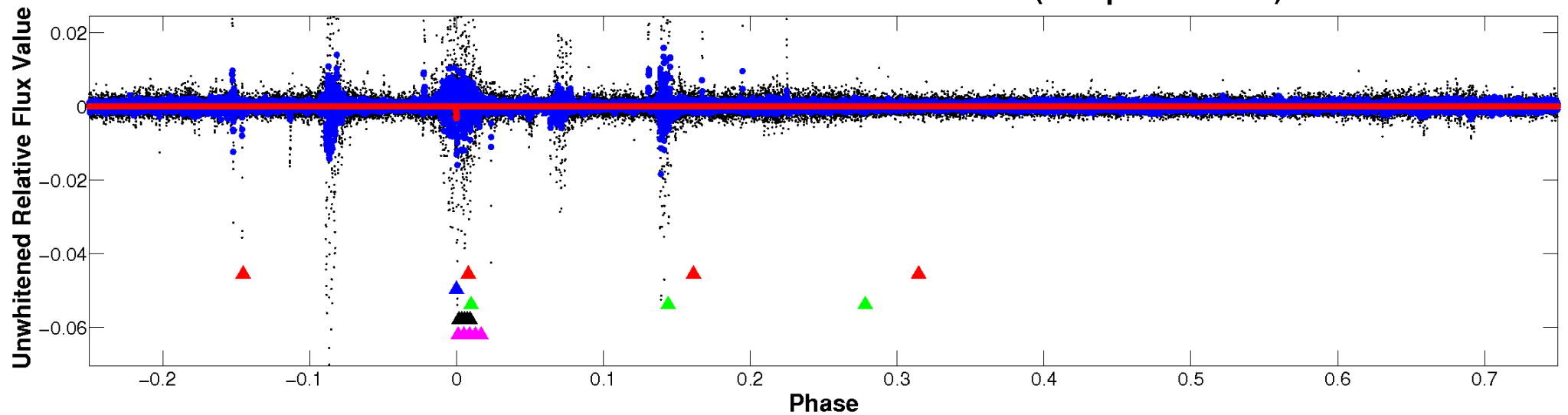
# ALT Odd/Even

TCE 001720673-02

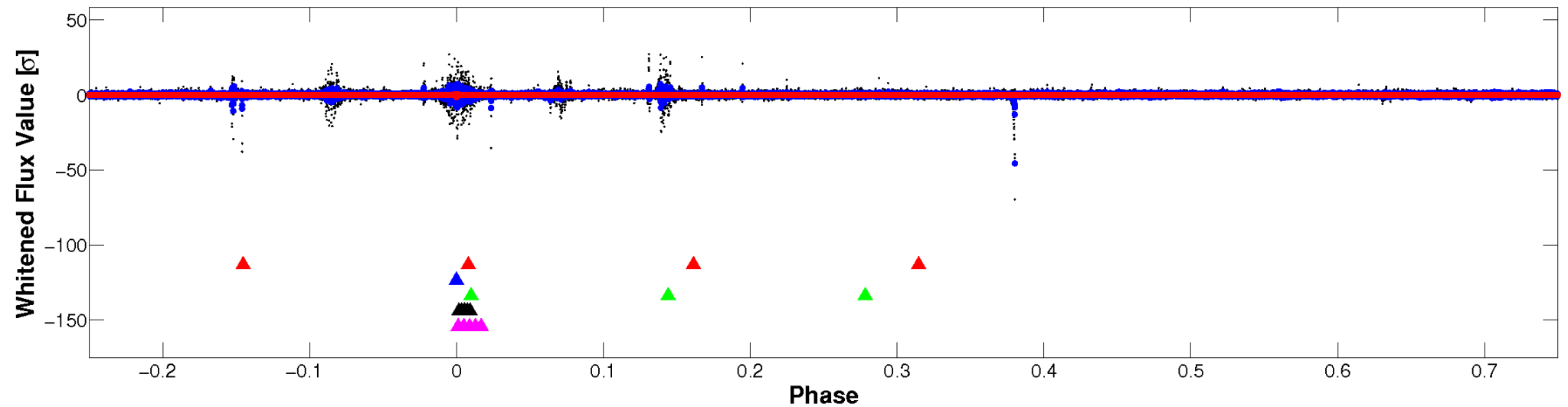


# Non-Whitened Vs. Whitened Light Curve

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

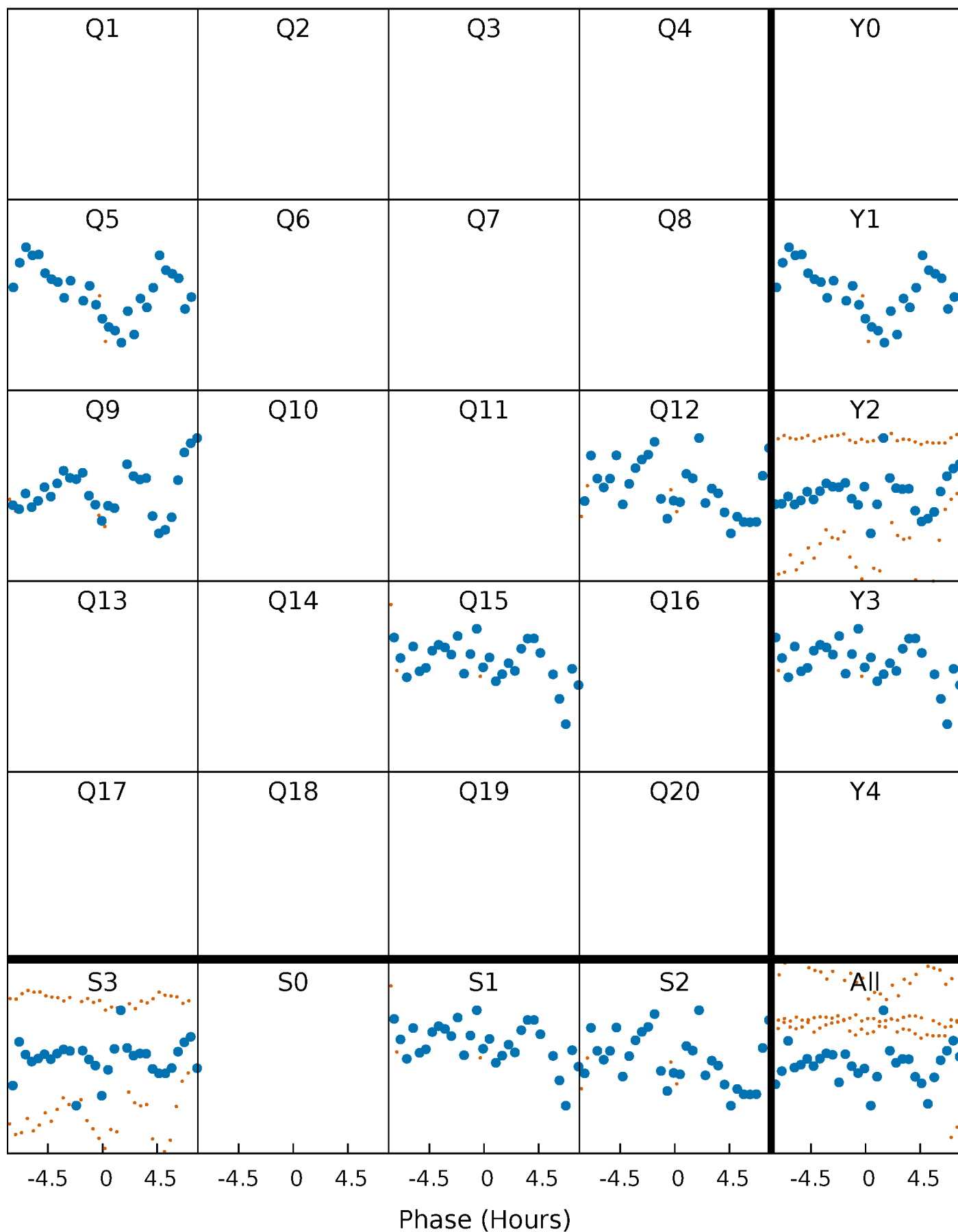


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

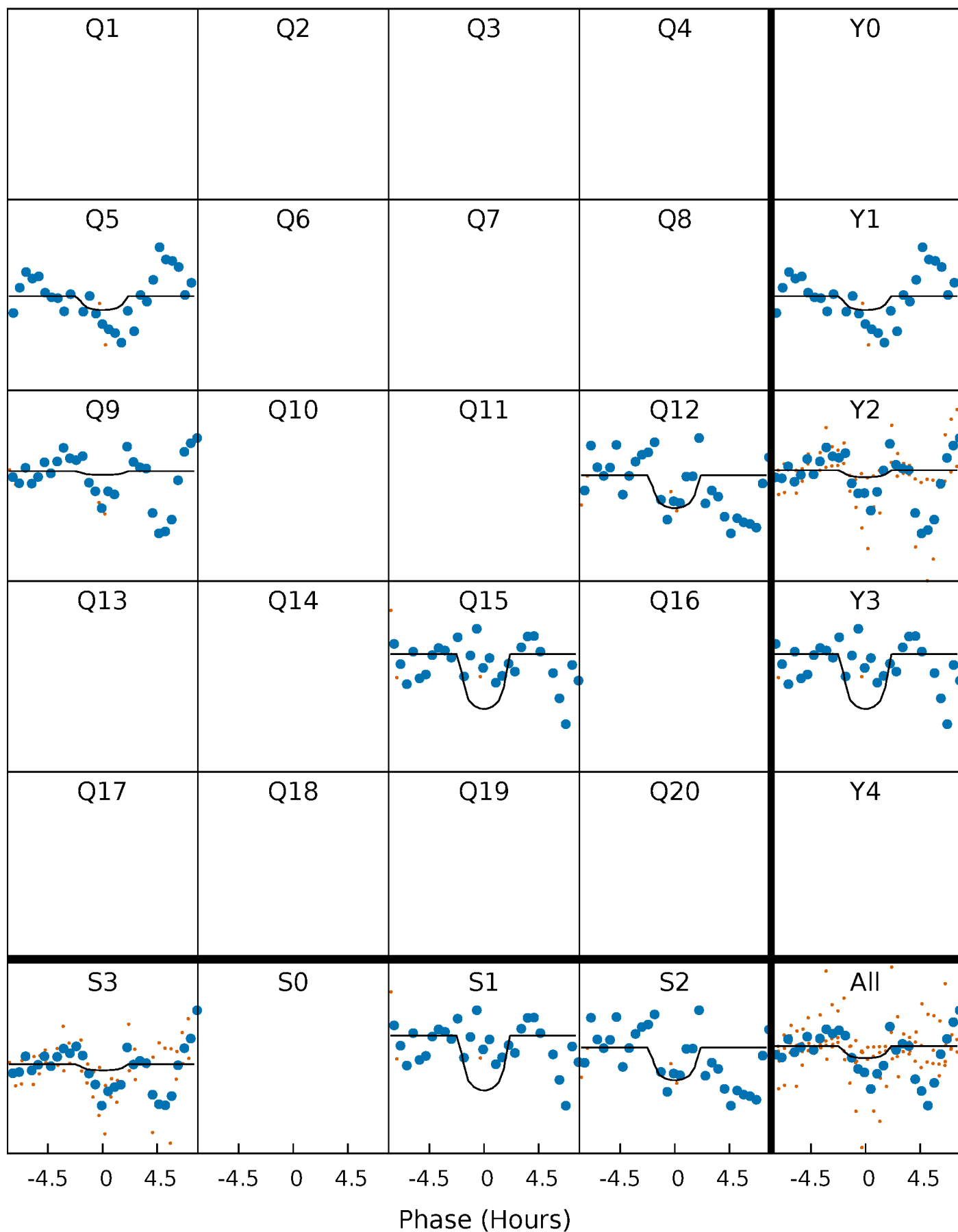
TCE 001720673-02     $P=324.771544$  Days     $T_0=168.384813$  (BKJD)





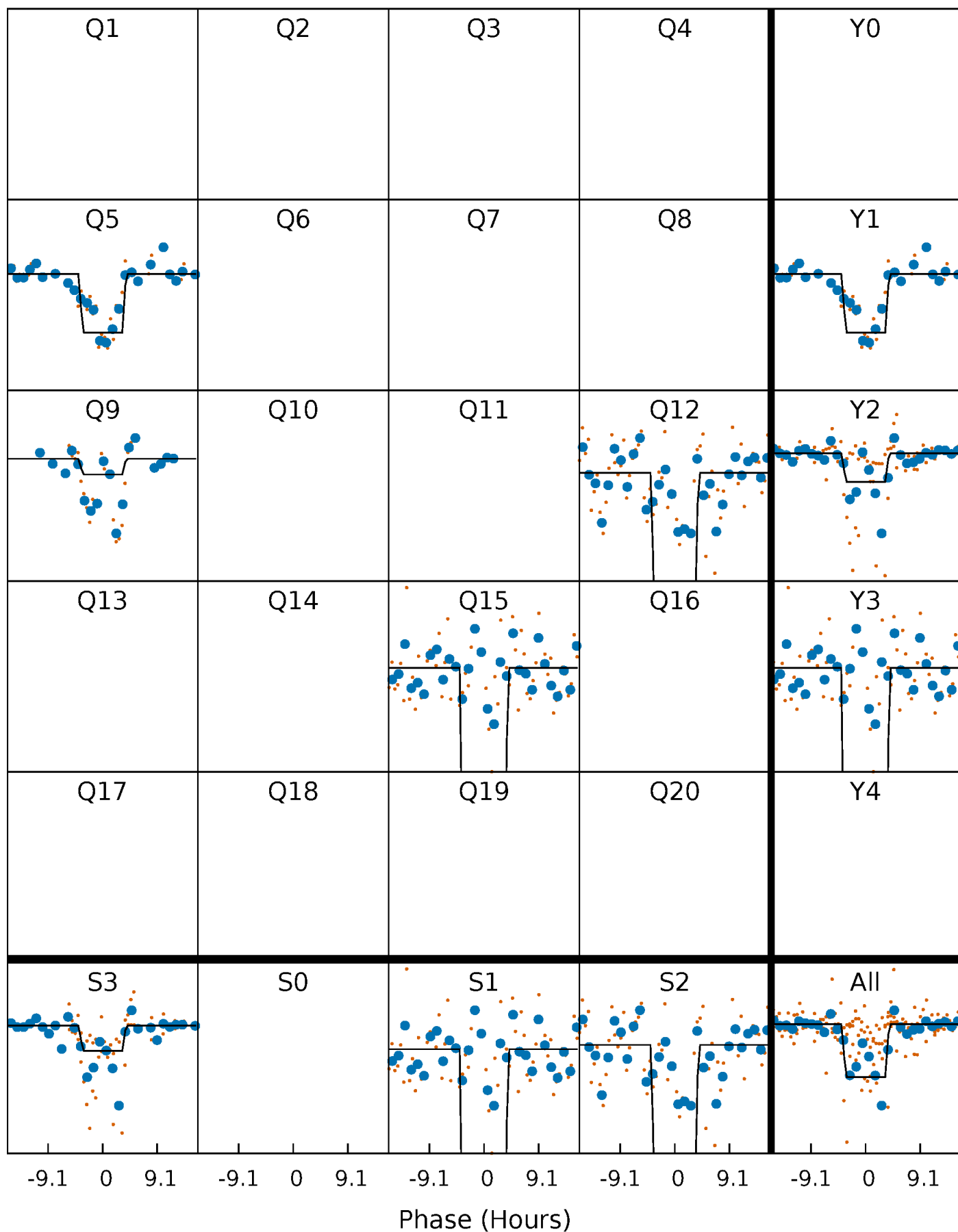
# DV Quarter-Phased Transit Curves

TCE 001720673-02     $P=324.771544$  Days     $T_0=168.384813$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

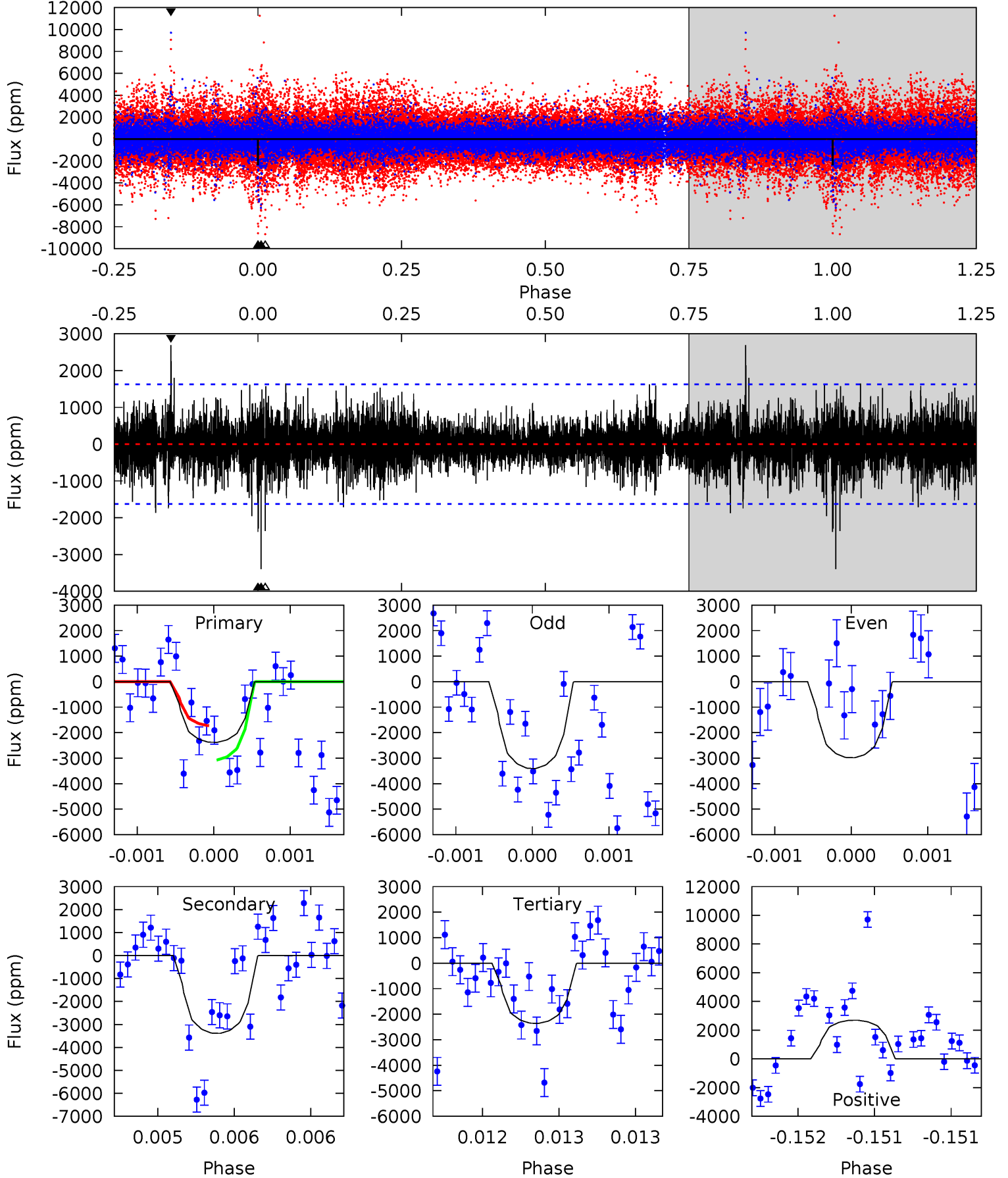
TCE 001720673-02 P=324.832303 Days  $T_0=168.360497$  (BKJD)



# DV Model-Shift Uniqueness Test

001720673-02, P = 324.771544 Days, E = 168.384813 Days

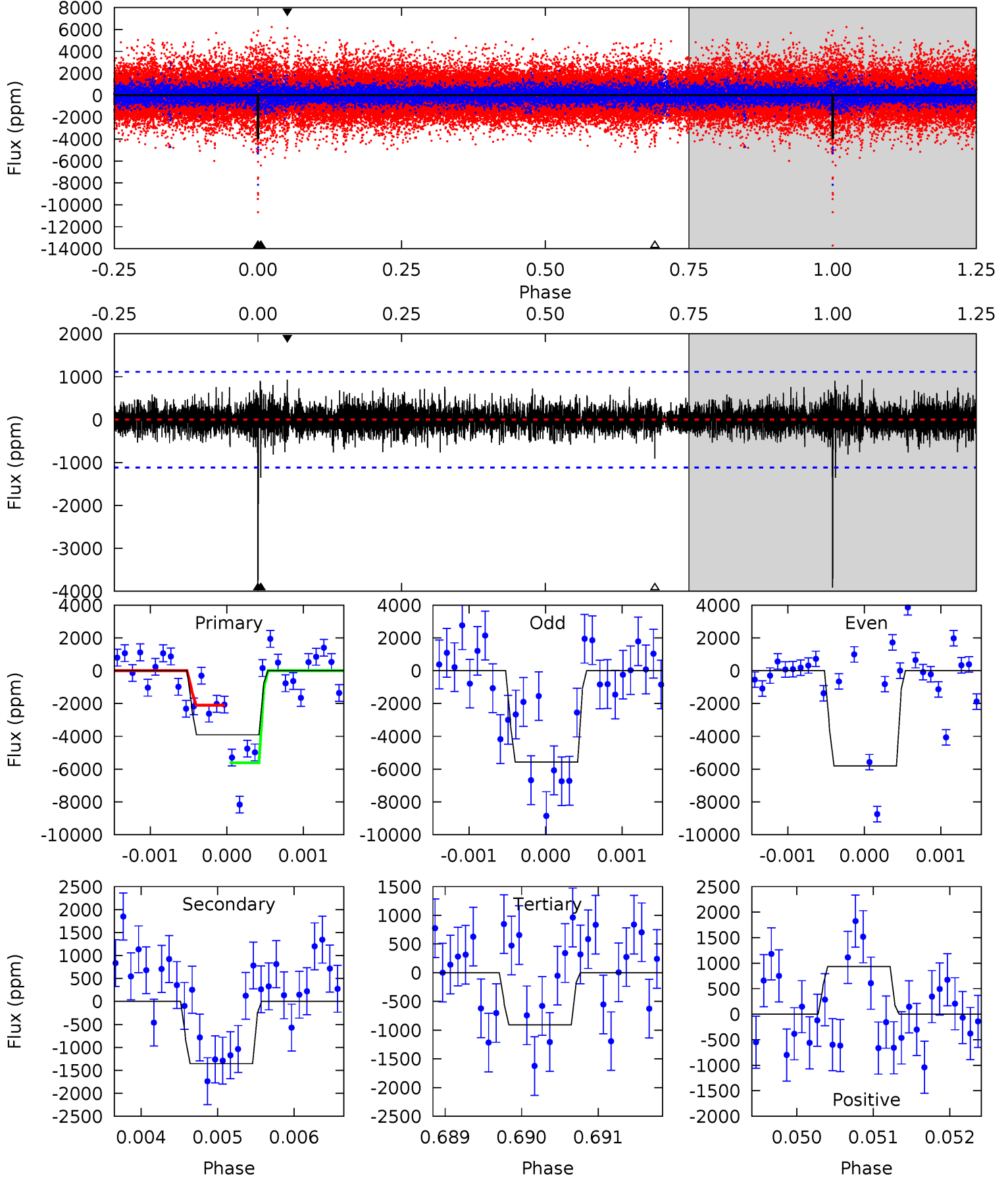
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.15	11.6	8.08	9.23	5.57	3.47	1.45	0.08	-1.07	3.53	2.38	0.64	1.75	0.44	2.31



# Alt Model-Shift Uniqueness Test

001720673-02,  $P = 324.832303$  Days,  $E = 168.360497$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.1	6.62	4.43	4.56	5.45	3.29	0.98	14.7	14.6	2.19	2.06	0.63	1.95	0.19	0



### Stellar Parameters For KIC 001720673

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4348^{+118}_{-144}$	$4.672^{+0.058}_{-0.027}$	$-0.600^{+0.300}_{-0.300}$	$0.569^{+0.045}_{-0.056}$	$0.556^{+0.056}_{-0.042}$	$4.239^{+1.221}_{-0.540}$
	+3%/-3%	+1%/-1%	+50%/-50%	+8%/-10%	+10%/-8%	+29%/-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 001720673-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-3390 \pm 292$	$14.19^{+14.59}_{-9.32}$	$231^{+7}_{-8}$	$2811^{+1085}_{-448}$	$5496^{+39417}_{-4162}$
Alt.	$-1355 \pm 205$	$16.42^{+16.01}_{-11.46}$	$230^{+8}_{-8}$	$2424^{+935}_{-351}$	$1619^{+14818}_{-1196}$

$T_{max}$  = 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

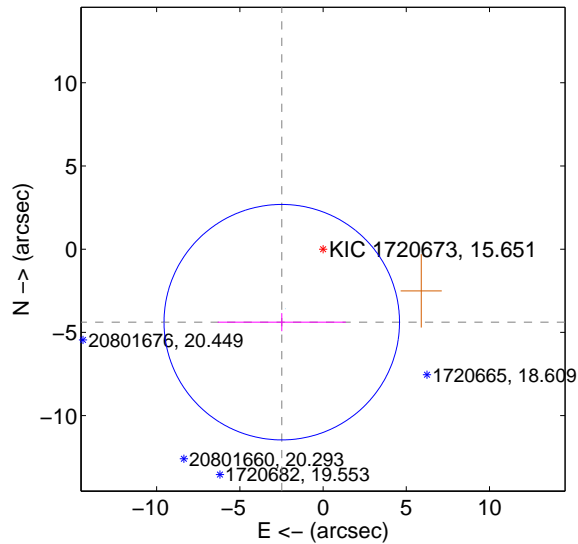
Supplemental centroid analysis for 001720673-02. Kepler magnitude: 15.65. Transit SNR 6.81

There are 2 quarters with good PRF difference image offsets

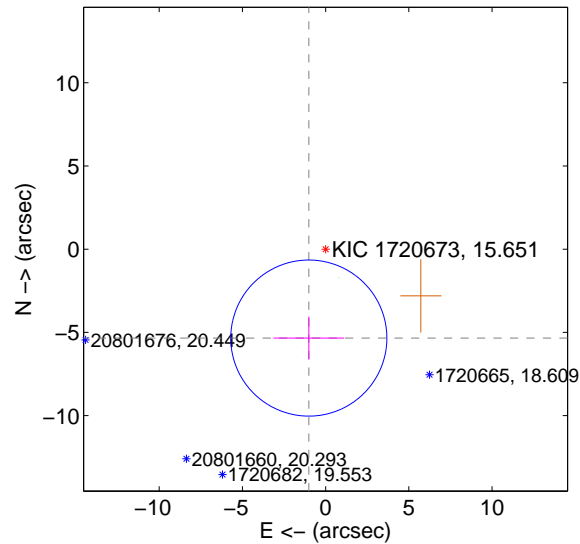
The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.041 \pm 2.358$	2.14	$2.483 \pm 3.851$	$-4.387 \pm 0.542$
PRF-fit source offset from KIC position	$5.437 \pm 1.563$	3.48	$1.010 \pm 2.127$	$-5.342 \pm 1.290$
photometric centroid source offset	$0.10 \pm 1.34$	0.08	$0.09 \pm 1.31$	$-0.05 \pm 1.48$

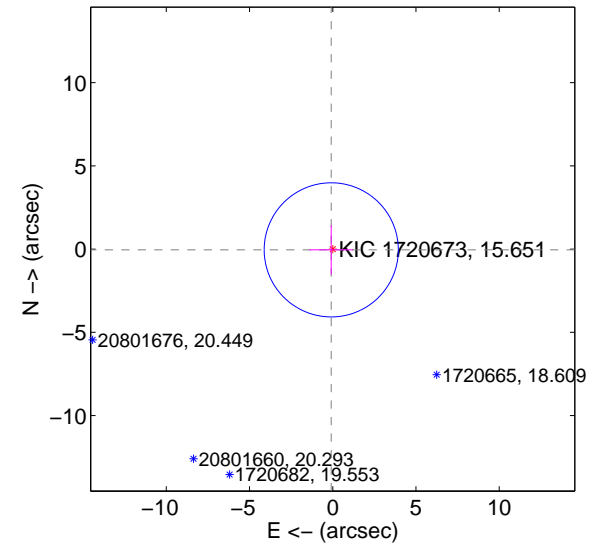
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

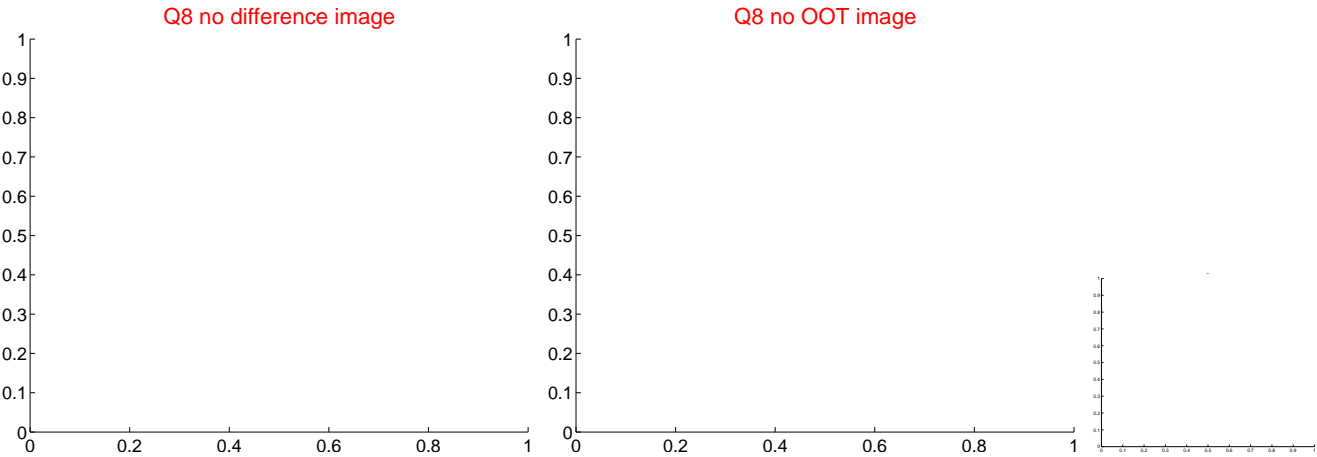
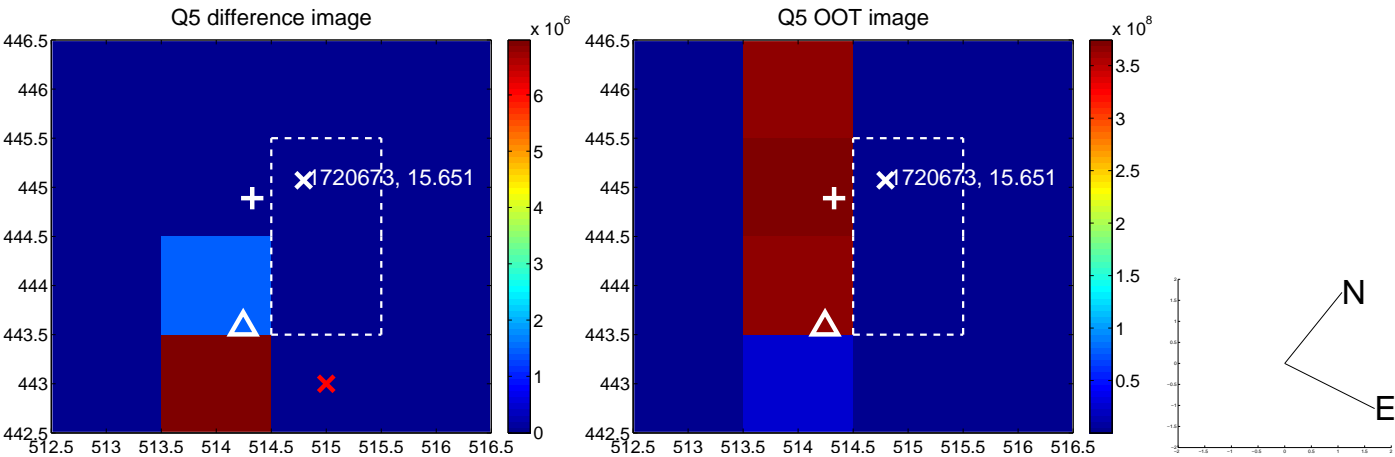


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

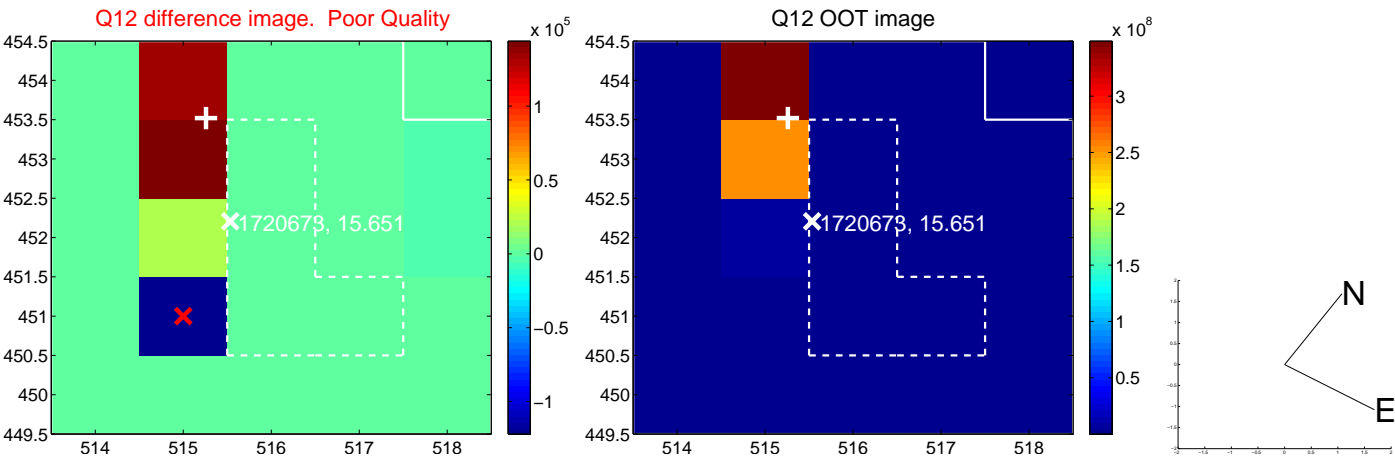
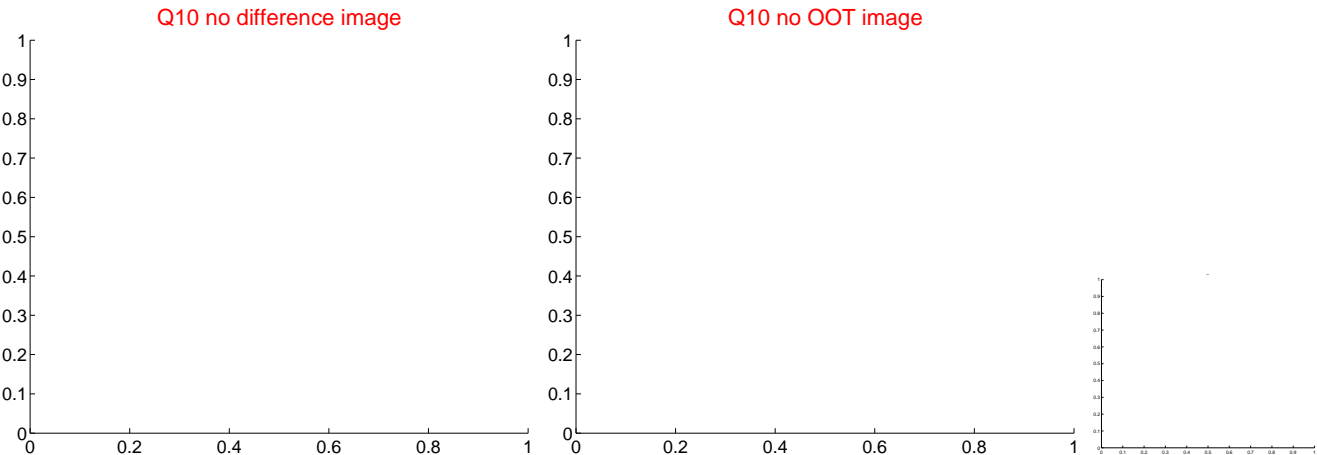
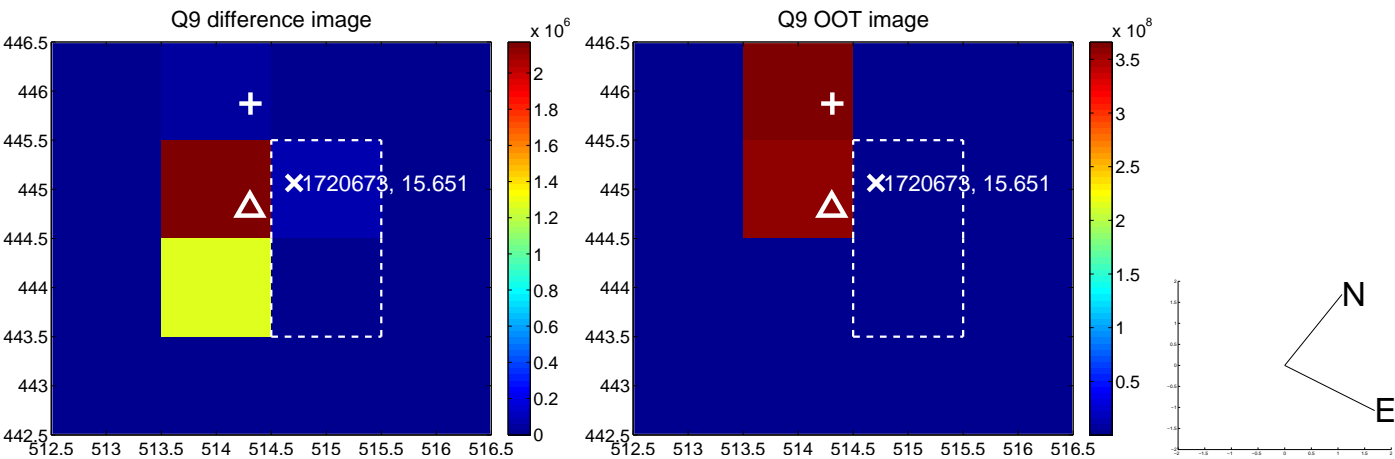


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

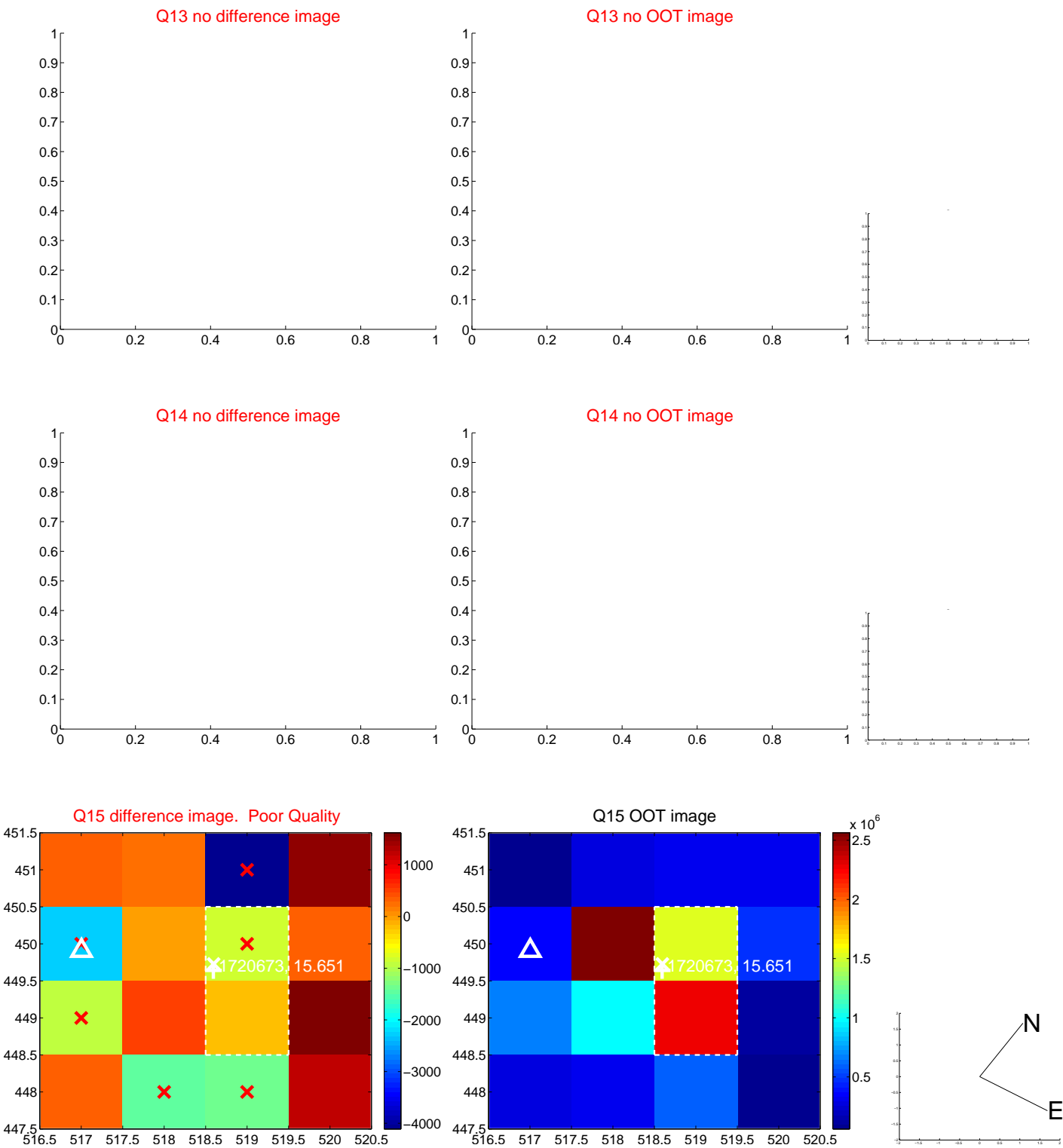




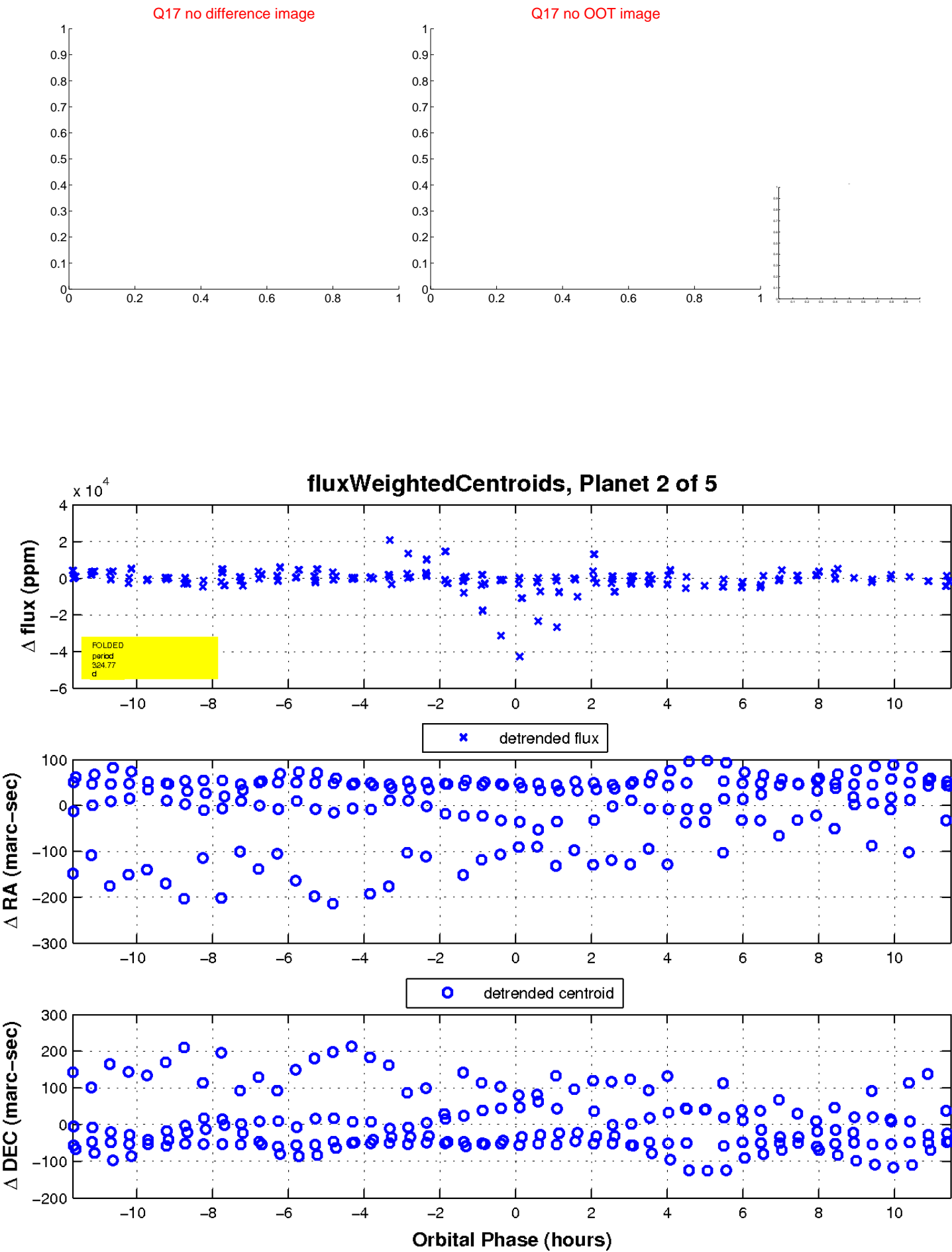
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

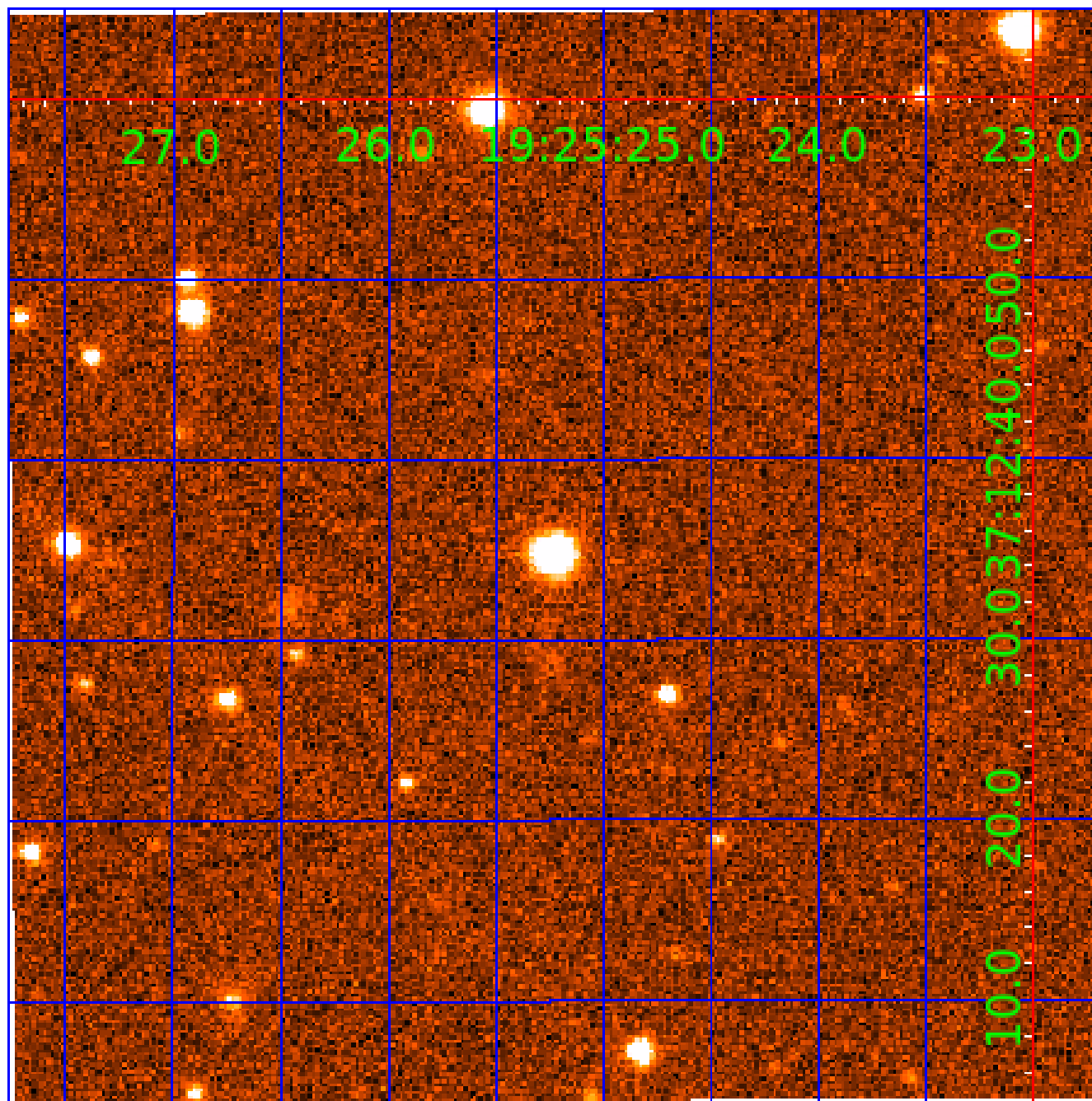


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 001720673

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001720673-01	OBS	No	374.564497	445.992949	8688.7	2.056	29.1	16.8	0.57	4348	5.16	0.15
001720673-02	OBS	No	324.771544	168.384813	3231.5	3.925	27.7	6.8	0.57	4348	3.22	0.18
001720673-03	OBS	No	368.353347	496.395202	13192.5	19.027	40.5	28.5	0.57	4348	6.33	0.15
001720673-04	OBS	No	325.394325	168.921929	2416.8	3.328	24.5	4.4	0.57	4348	2.88	0.18
001720673-05	OBS	No	326.044695	168.761374	8151.2	7.500	24.1	-1.0	0.57	4348	4.98	0.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001720673-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

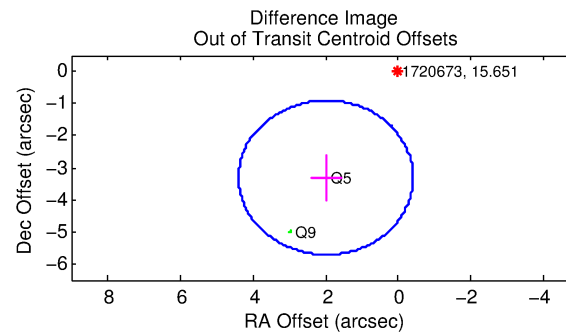
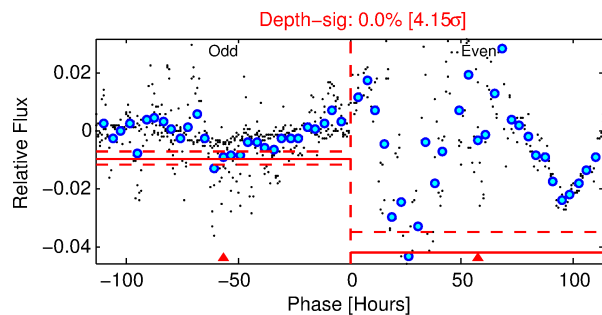
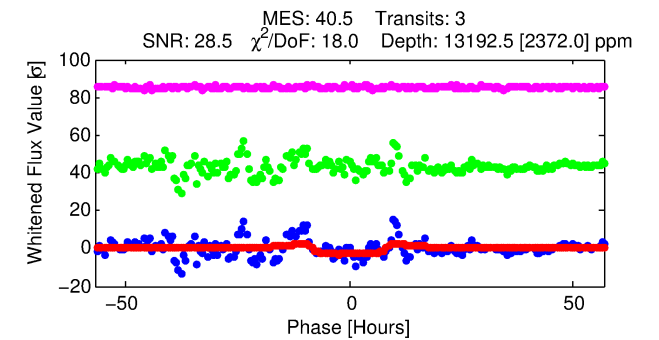
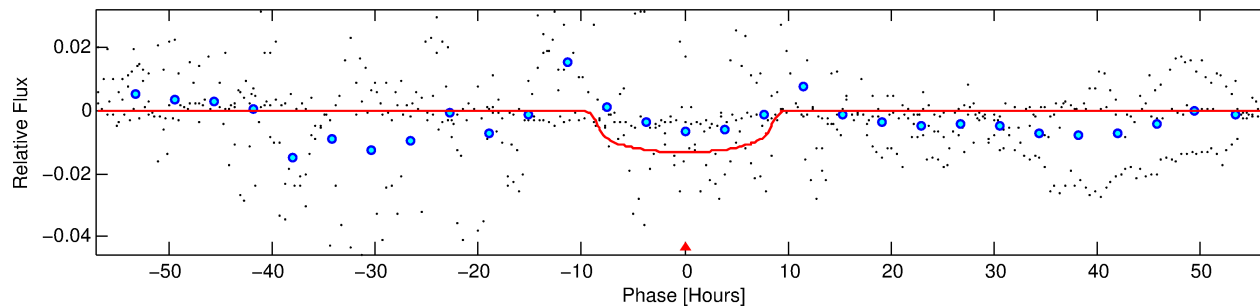
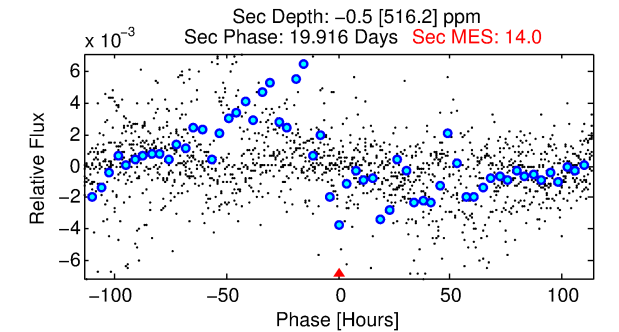
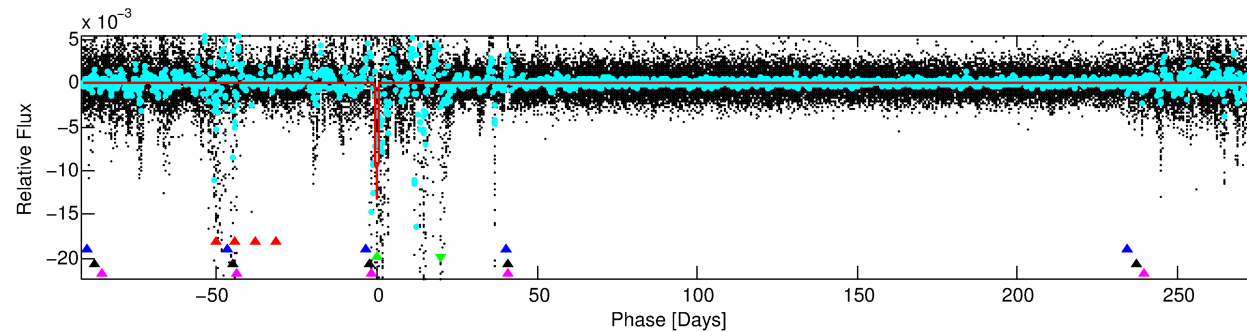
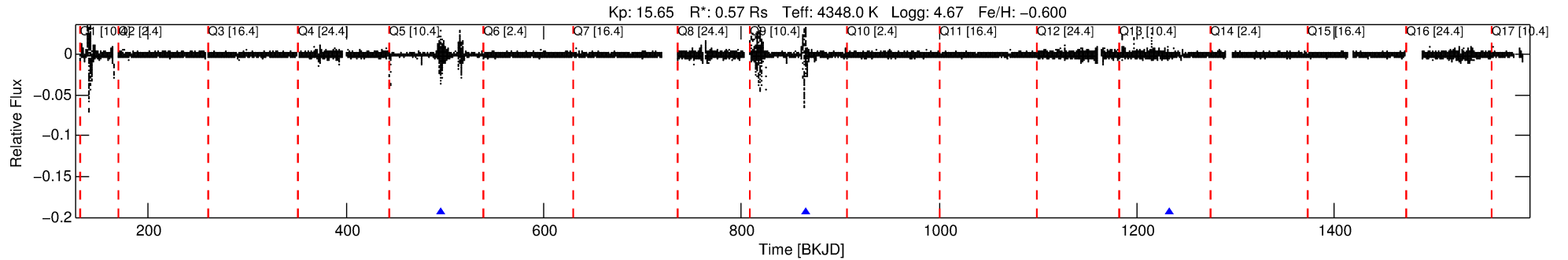
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 001720673-03

No Significant Match Found

# DV One-Page Summary

KIC: 1720673 Candidate: 3 of 5 Period: 368.353 d



## DV Fit Results:

Period = 368.35335 [0.02278] d  
Epoch = 496.3952 [0.0297] BKJD  
Rp/R\* = 0.1020 [0.0244]  
a/R\* = 162.98 [114.32]  
b = 0.00 [1398.11]  
Seff = 0.15 [0.03]  
Teff = 159 [7] K  
Rp = 6.33 [1.64] Re  
a = 0.8266 [0.0655] AU  
Ag = N/A  
Teffp = N/A

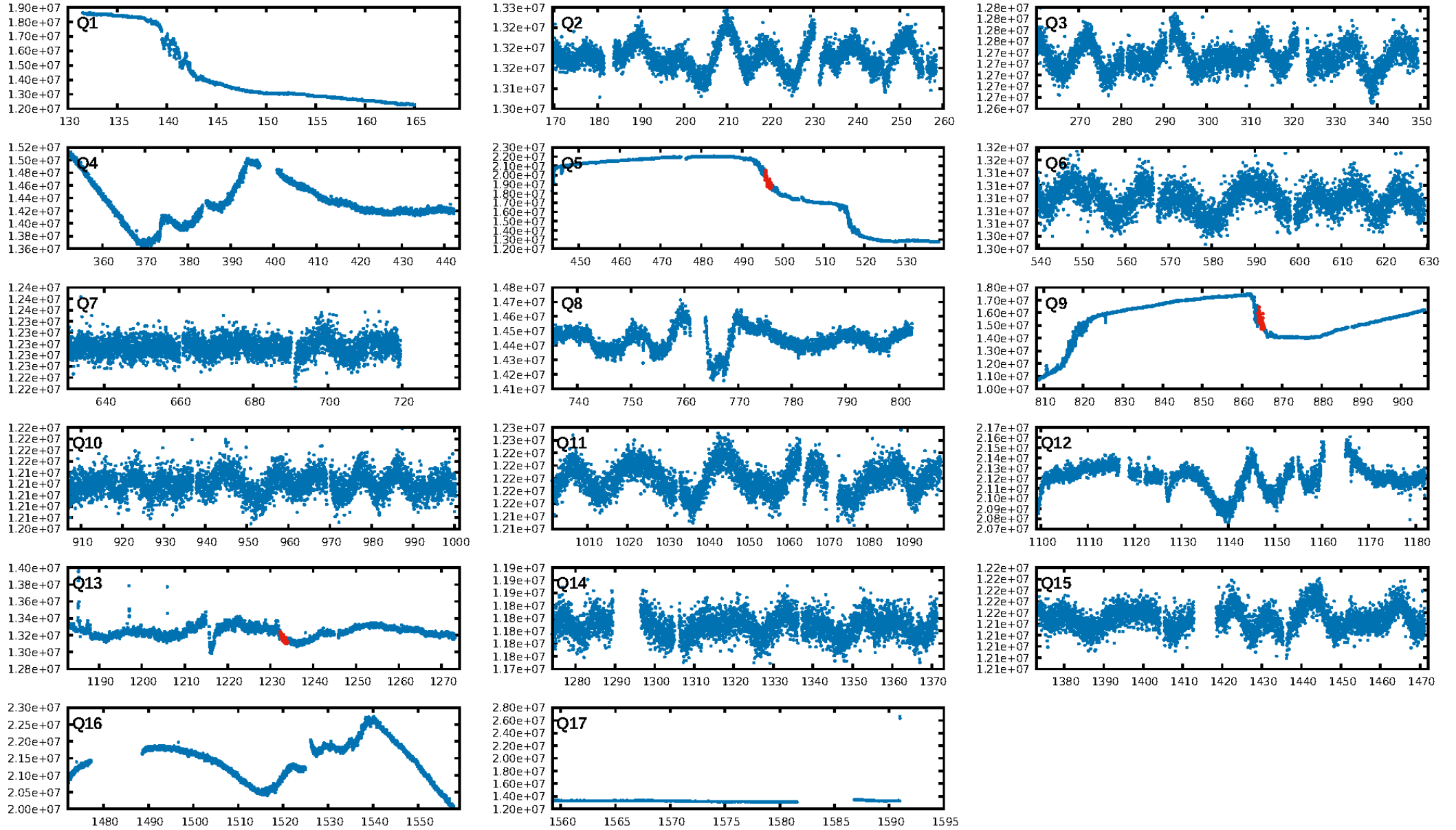
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [49.65σ]  
LongPeriod-sig: 100.0% [7.79σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.8106  
Centroid-sig: N/A  
Centroid-so: 3.659 arcsec [1.87σ]  
OotOffset-rm: 3.864 arcsec [4.83σ]  
KicOffset-rm: 3.188 arcsec [1.67σ]  
OotOffset-st: 0/0/0/2 [2]  
KicOffset-st: 0/0/0/3 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

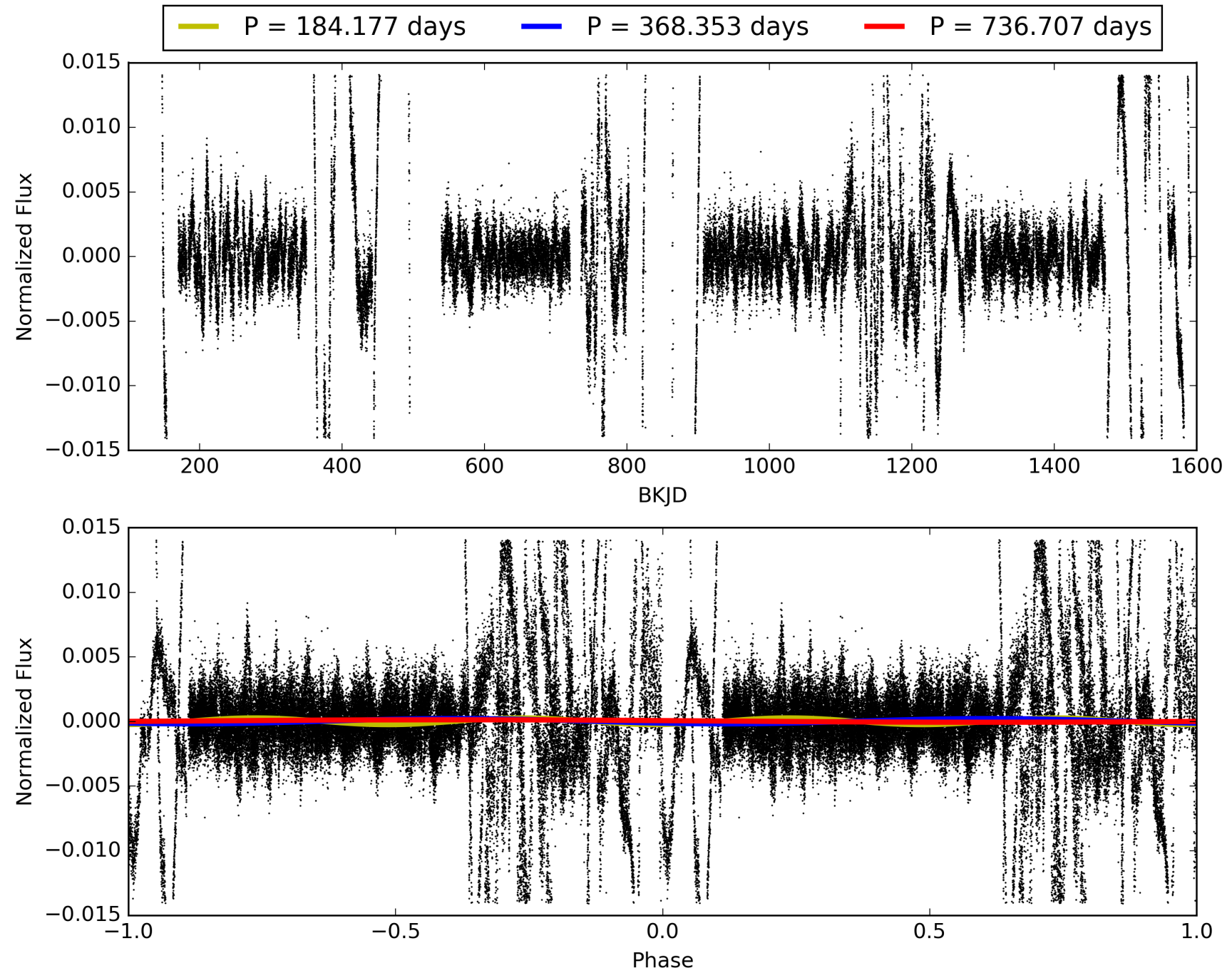
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:14:27 Z

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

# TCE 001720673-03, PDC Light Curves



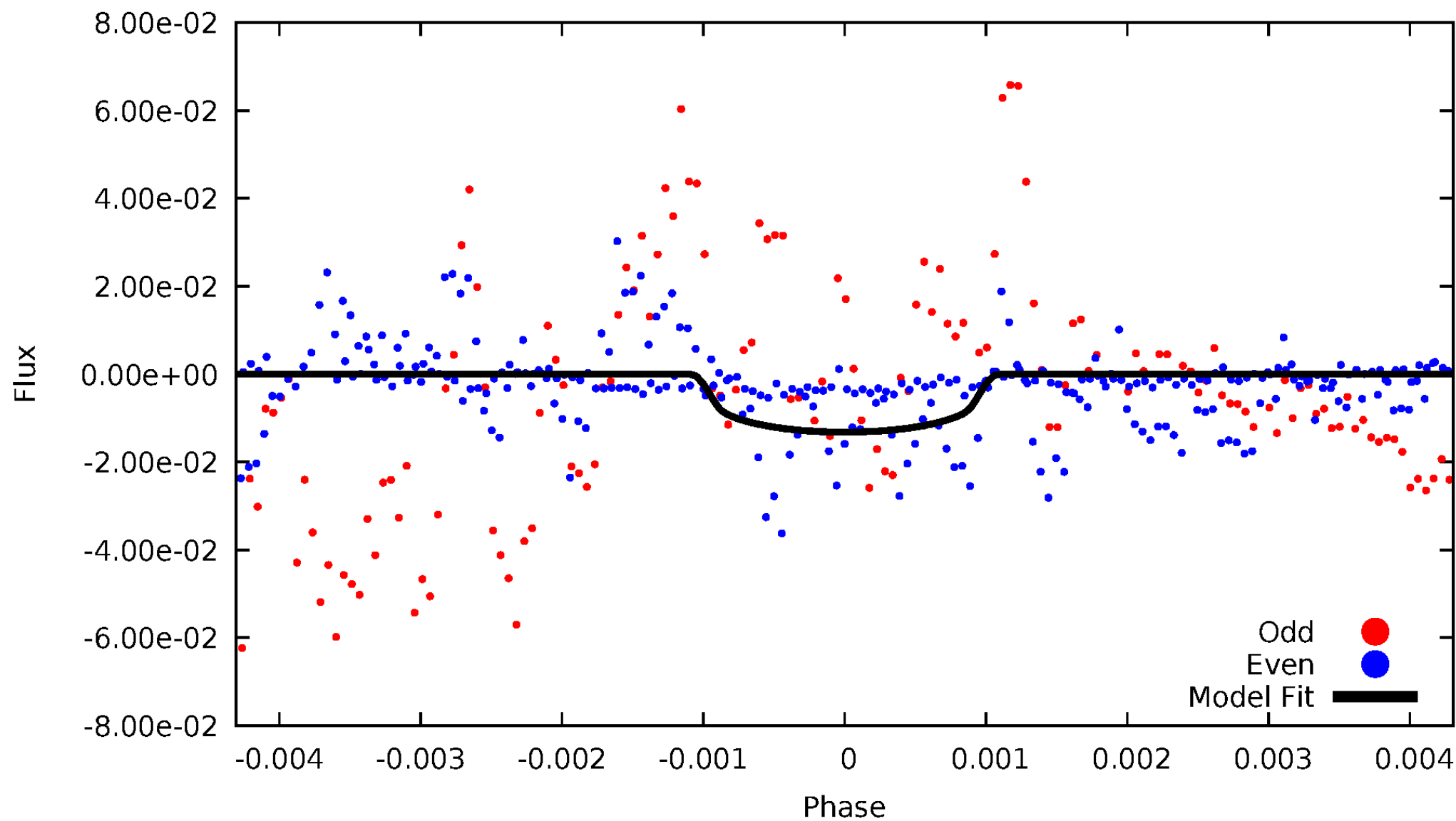
TCE 001720673-03





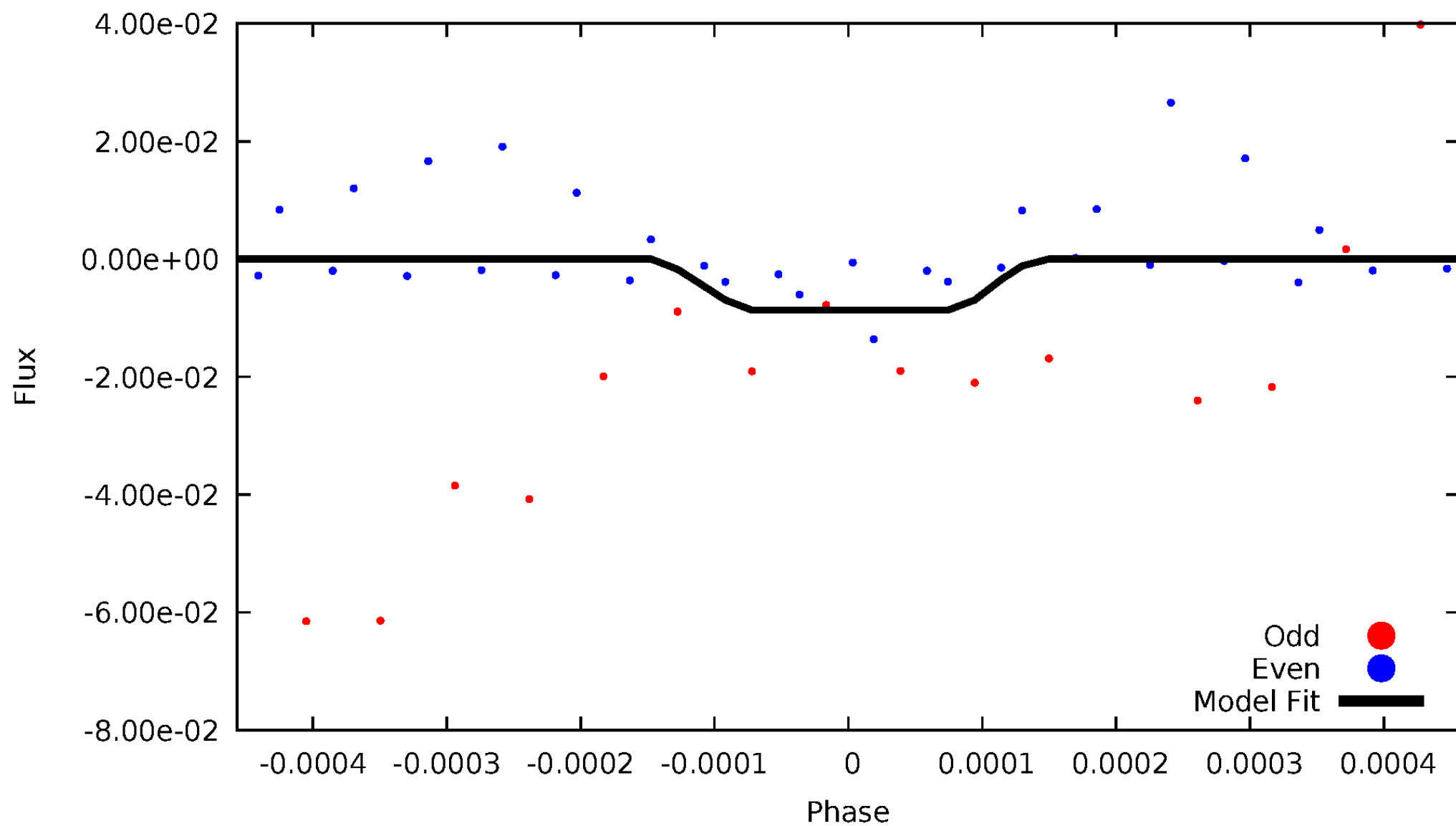
# DV Odd/Even

TCE 001720673-03



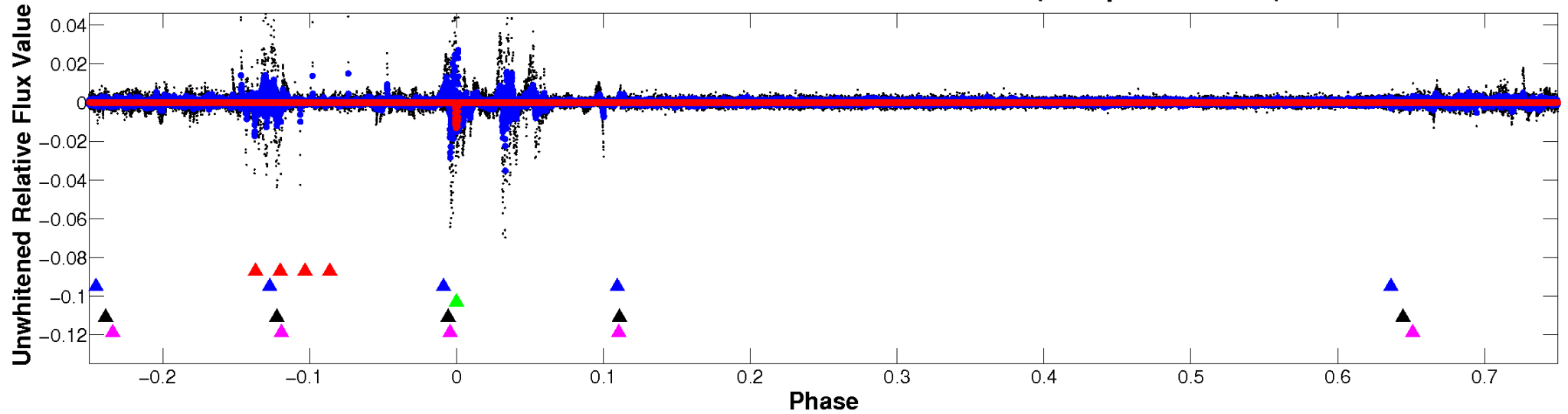
# ALT Odd/Even

TCE 001720673-03

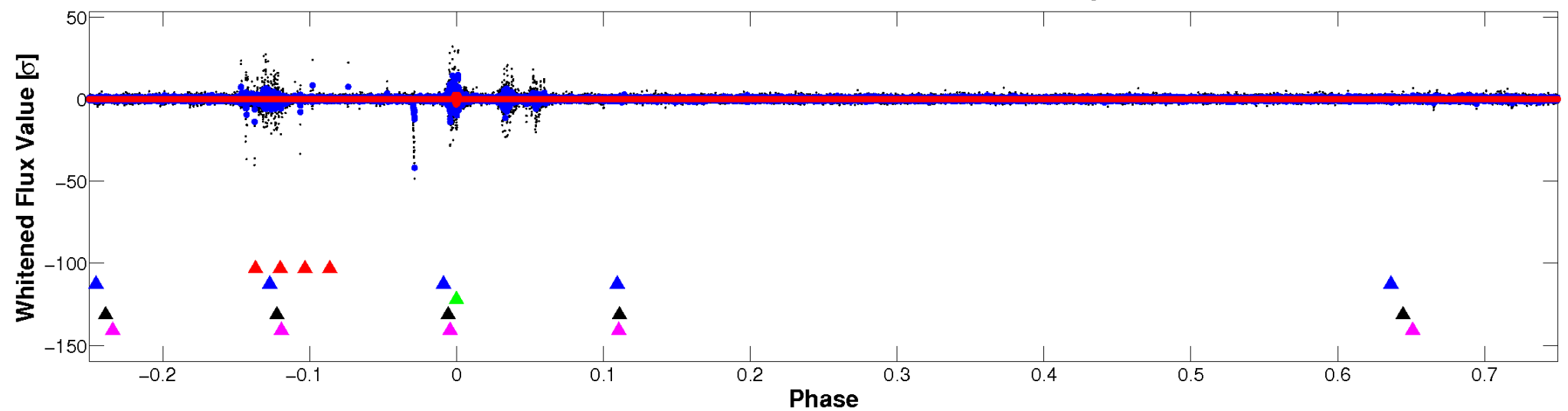


# Non-Whitened Vs. Whitened Light Curve

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

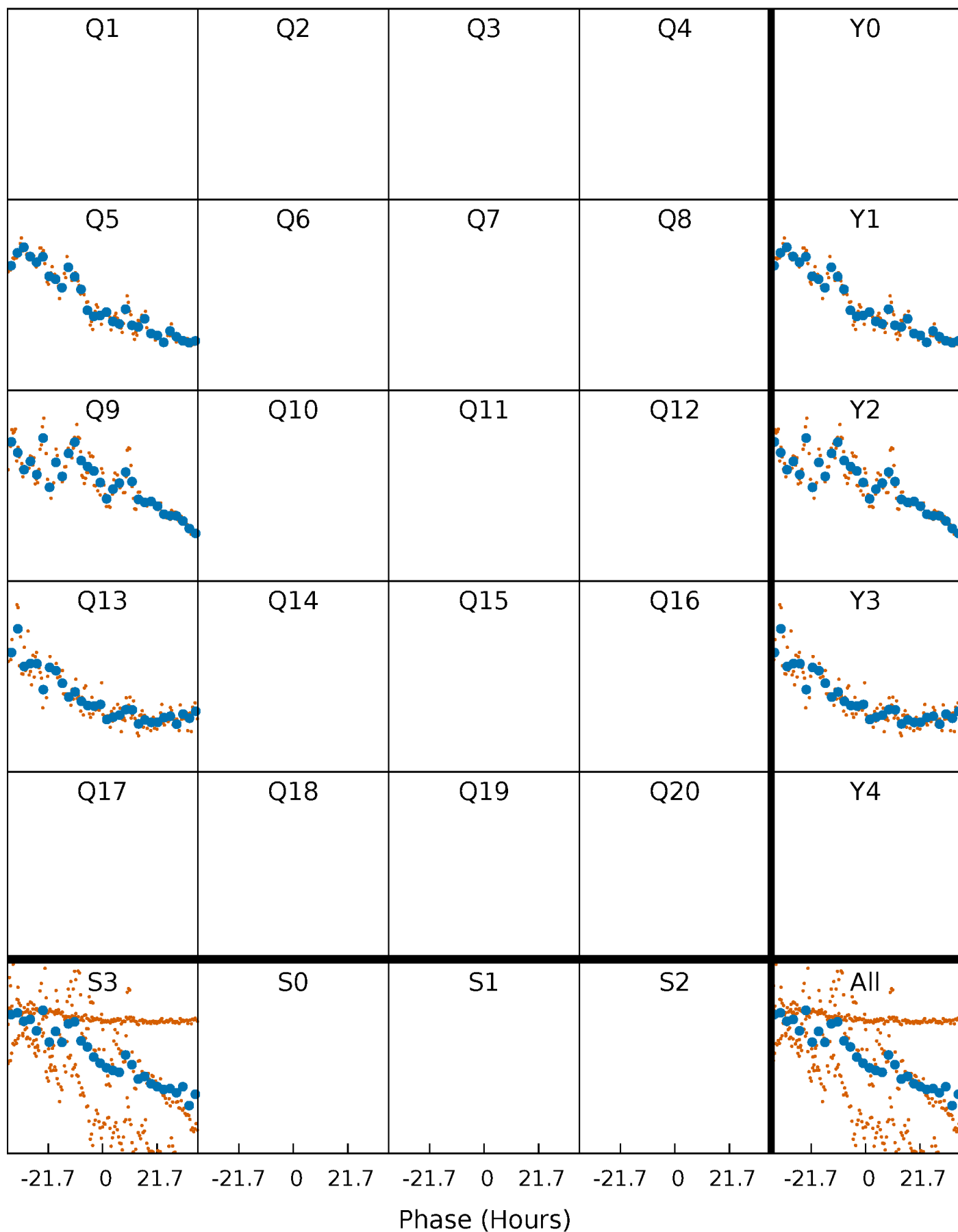


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



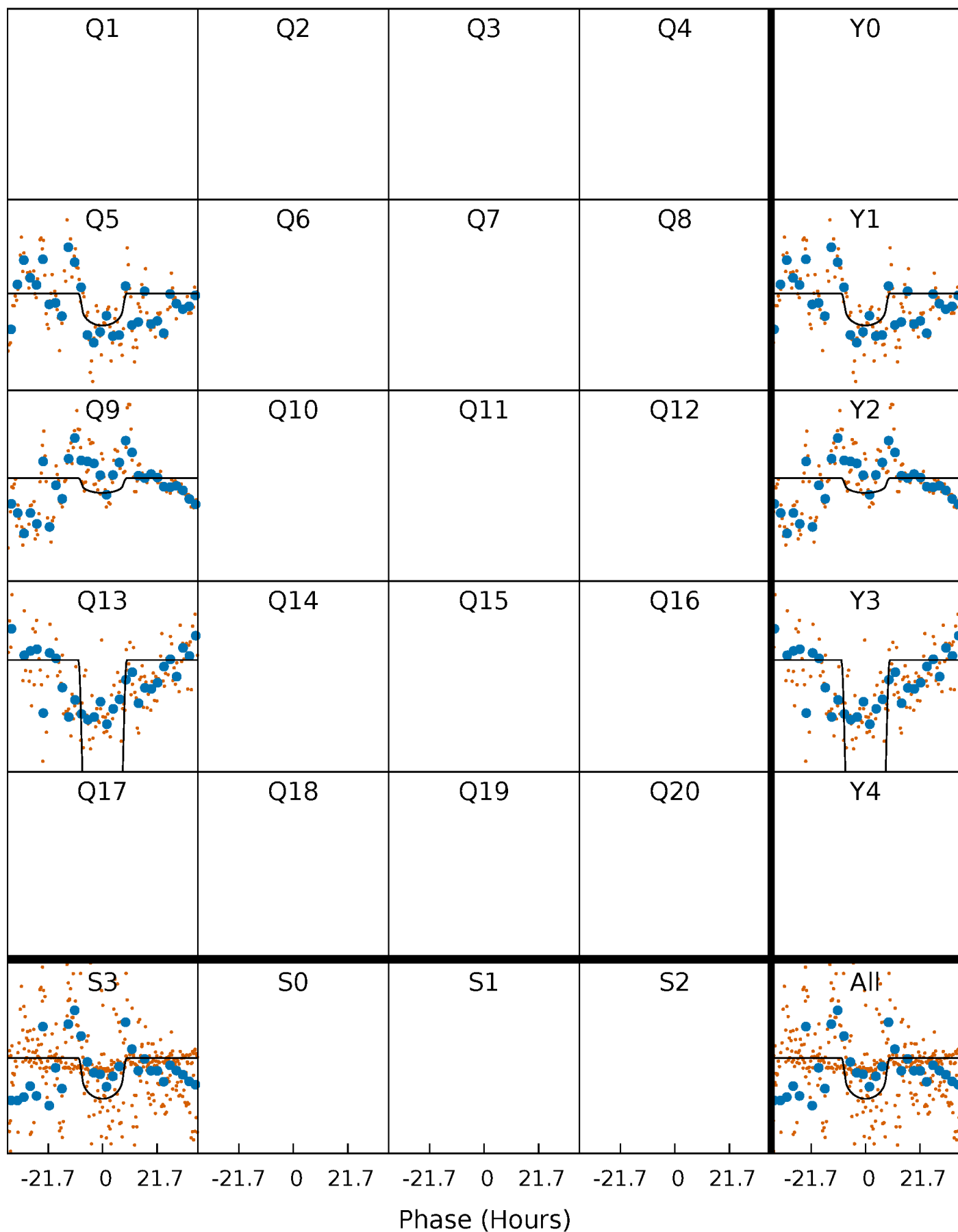
# PDC Quarter-Phased Transit Curves

TCE 001720673-03     $P=368.353347$  Days     $T_0=496.395201$  (BKJD)



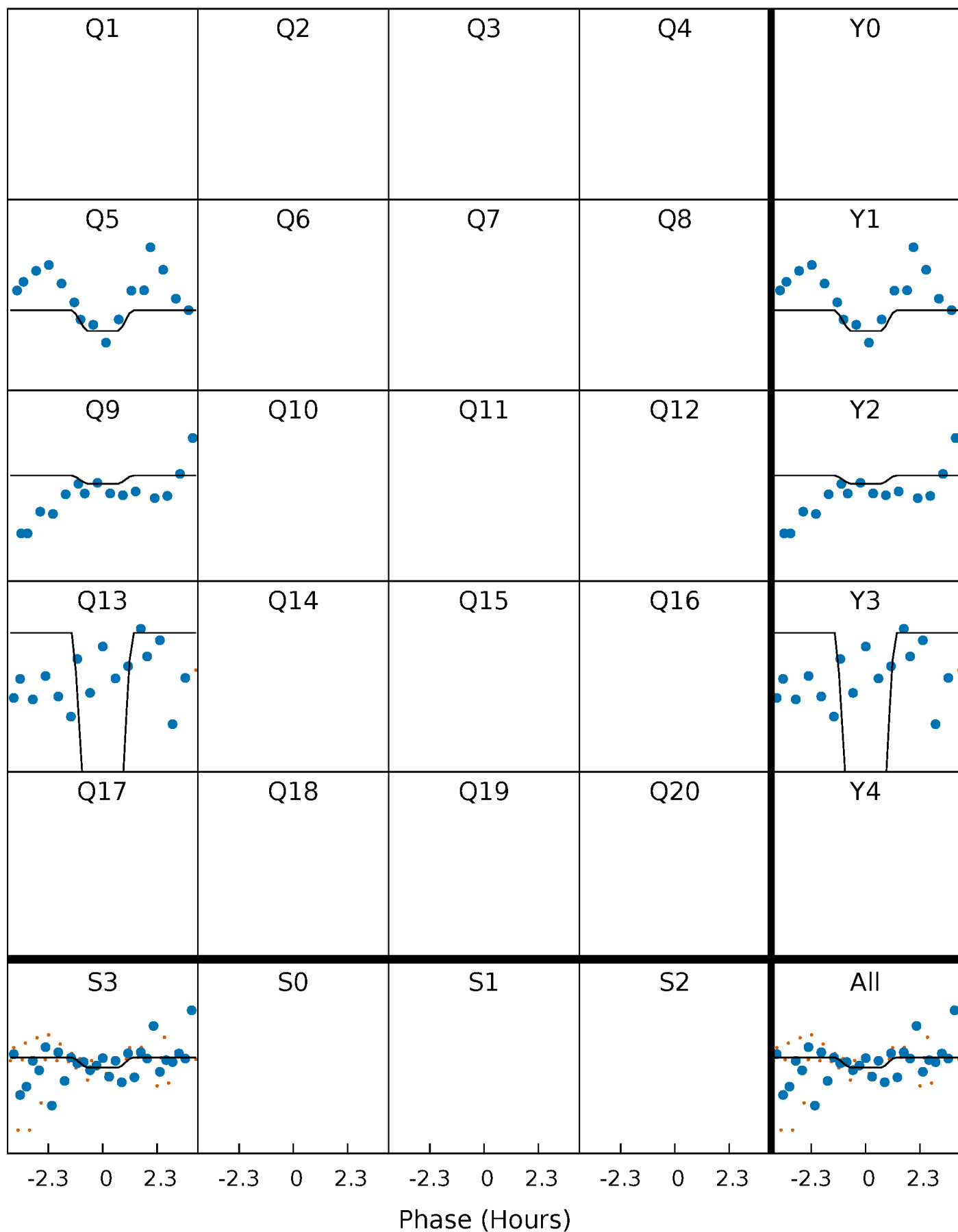
# DV Quarter-Phased Transit Curves

TCE 001720673-03     $P=368.353347$  Days     $T_0=496.395201$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

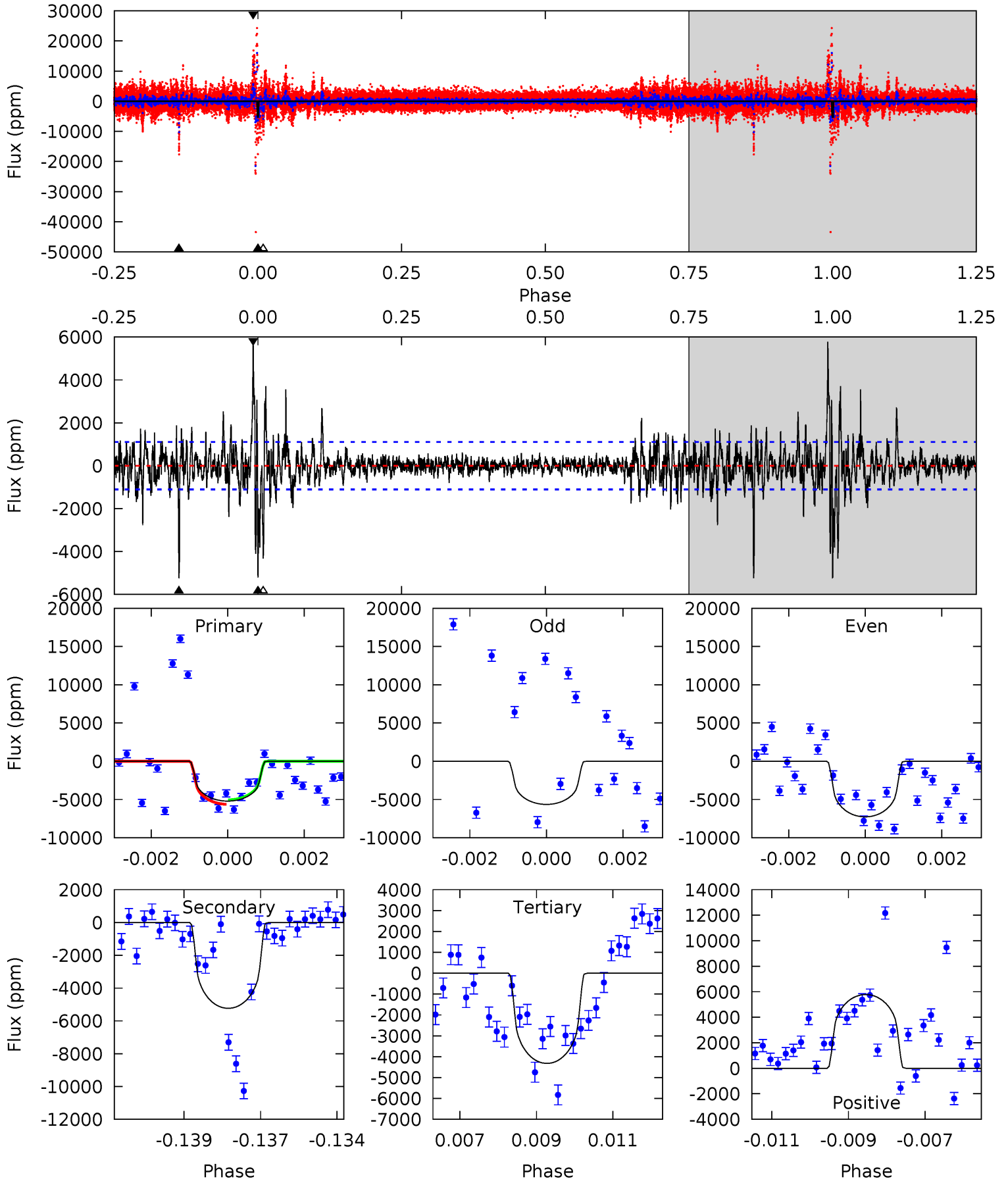
TCE 001720673-03     $P=368.287674$  Days     $T_0=496.715112$  (BKJD)



# DV Model-Shift Uniqueness Test

001720673-03, P = 368.353347 Days, E = 128.041854 Days

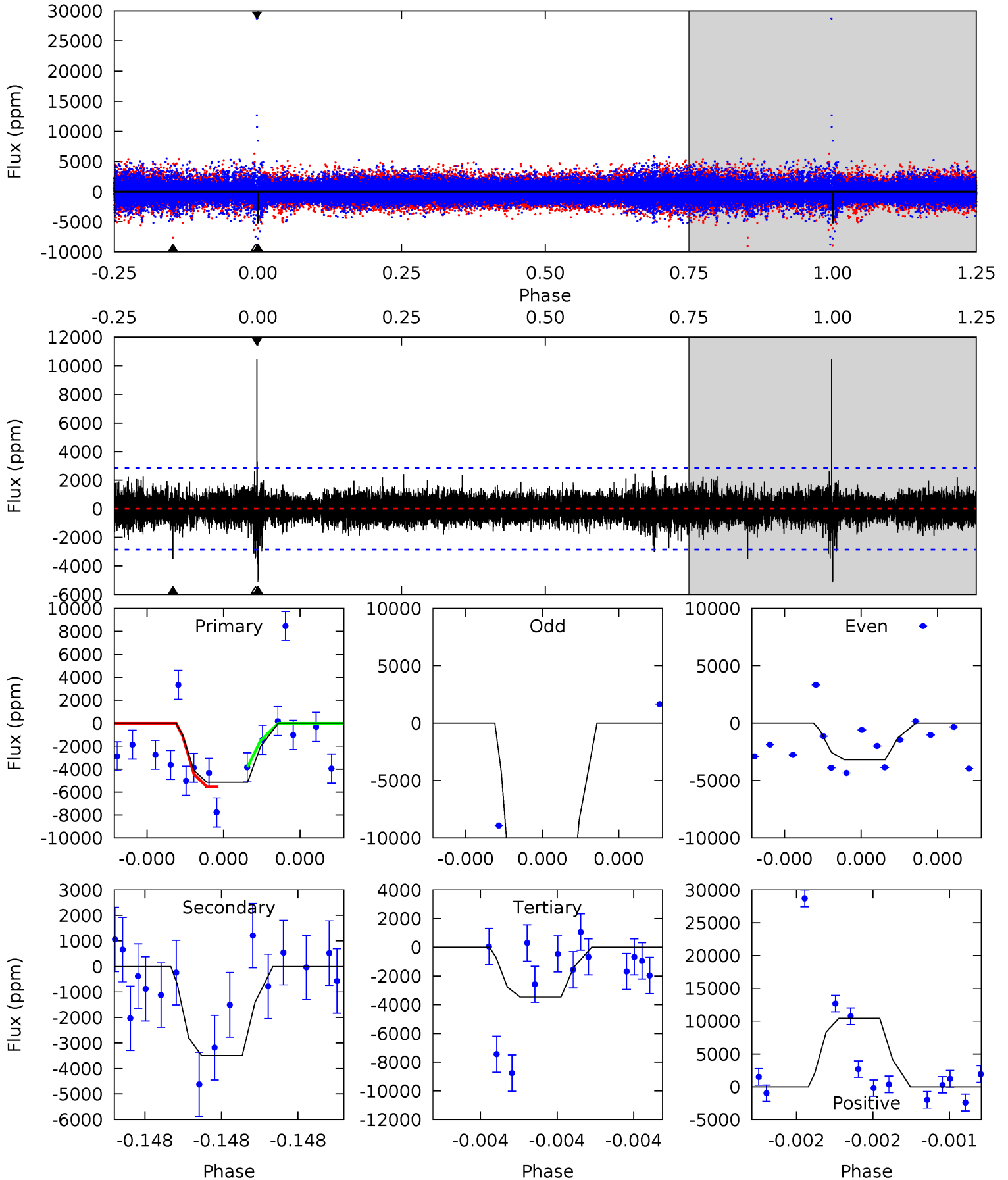
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.0	25.2	20.8	27.8	5.31	3.06	2.92	4.25	-2.76	4.38	-2.63	2.82	1.52	0.52	0



# Alt Model-Shift Uniqueness Test

001720673-03, P = 368.287674 Days, E = 128.427438 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
10.3	6.99	6.94	20.9	5.70	3.68	1.10	3.35	-10.6	0.05	-13.9	18.7	1.26	0.67	1.65





### Stellar Parameters For KIC 001720673

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4348^{+118}_{-144}$	$4.672^{+0.058}_{-0.027}$	$-0.600^{+0.300}_{-0.300}$	$0.569^{+0.045}_{-0.056}$	$0.556^{+0.056}_{-0.042}$	$4.239^{+1.221}_{-0.540}$
	+3%/-3%	+1%/-1%	+50%/-50%	+8%/-10%	+10%/-8%	+29%/-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 001720673-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-5232 \pm 208$	$6.18^{+1.52}_{-1.40}$	$220^{+8}_{-8}$	$3862^{+364}_{-297}$	$52274^{+35280}_{-18609}$
Alt.	$-3491 \pm 500$	$5.75^{+1.53}_{-1.55}$	$221^{+7}_{-9}$	$3674^{+443}_{-284}$	$39564^{+35346}_{-14884}$

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

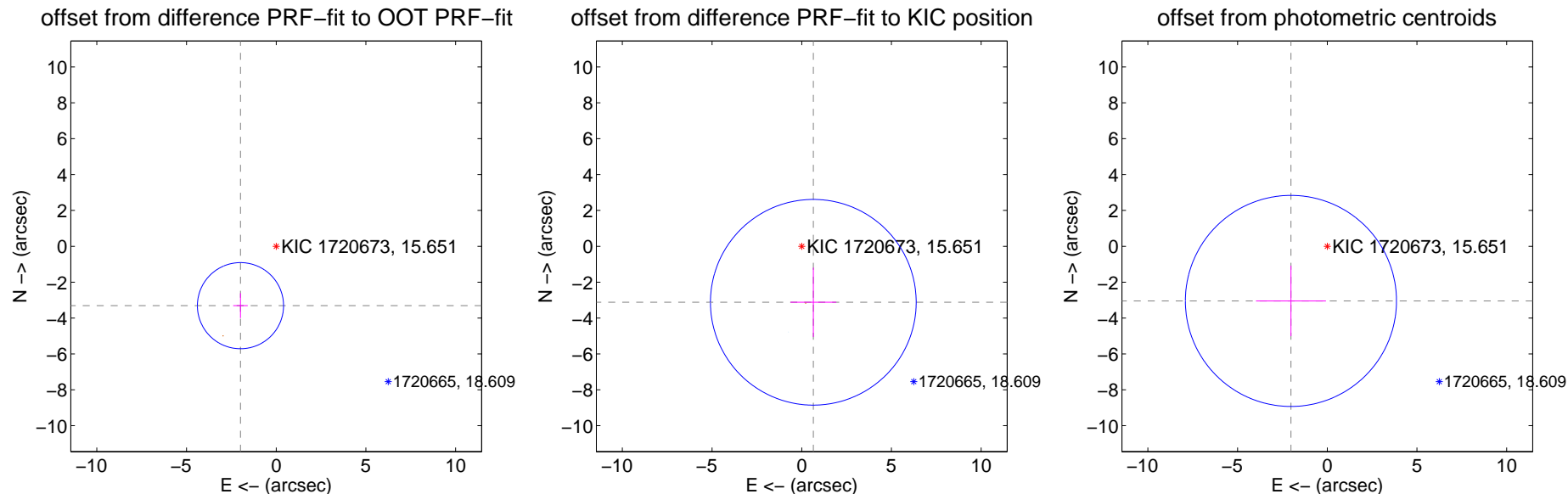
## DV Centroid Data

Supplemental centroid analysis for 001720673-03. Kepler magnitude: 15.65. Transit SNR 28.54

There are 2 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.67 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.864 \pm 0.801$	4.83	$1.992 \pm 0.405$	$-3.311 \pm 0.694$
PRF-fit source offset from KIC position	$3.188 \pm 1.912$	1.67	$-0.646 \pm 1.278$	$-3.122 \pm 1.934$
photometric centroid source offset	$3.66 \pm 1.96$	1.87	$2.03 \pm 1.95$	$-3.05 \pm 1.97$

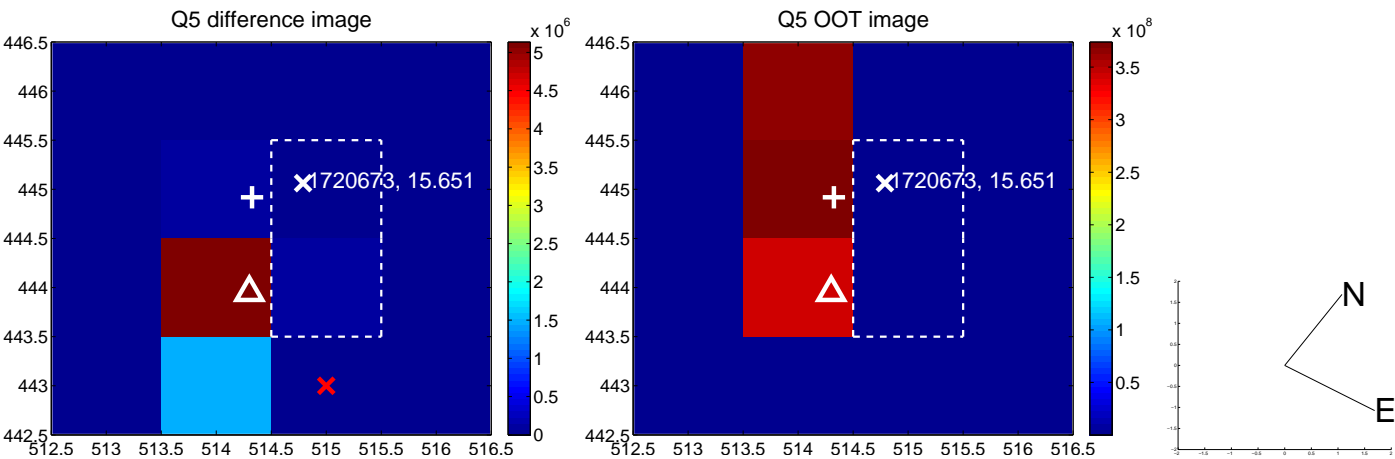


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

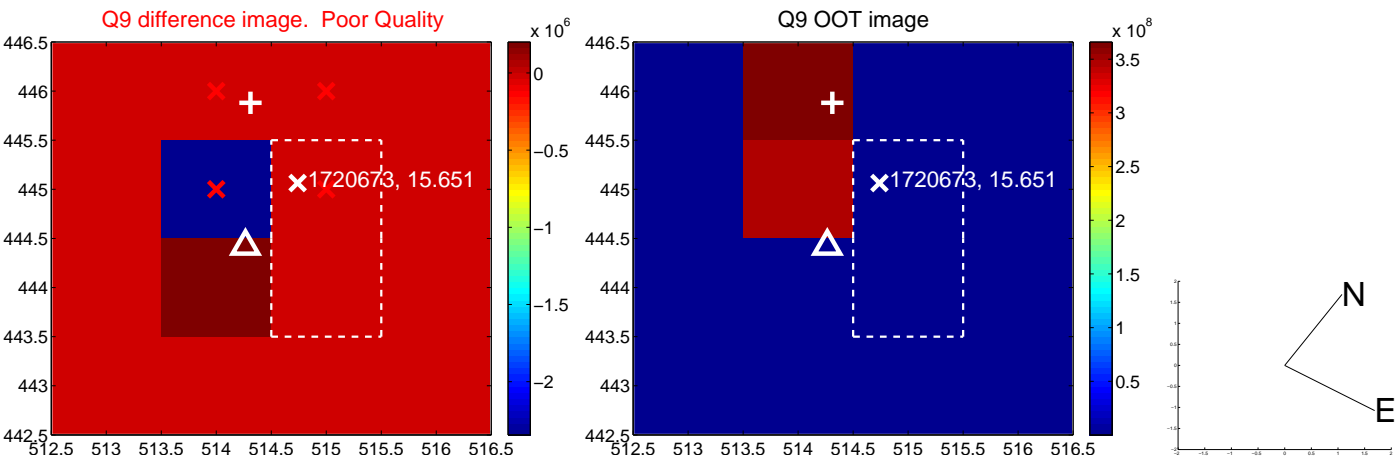
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



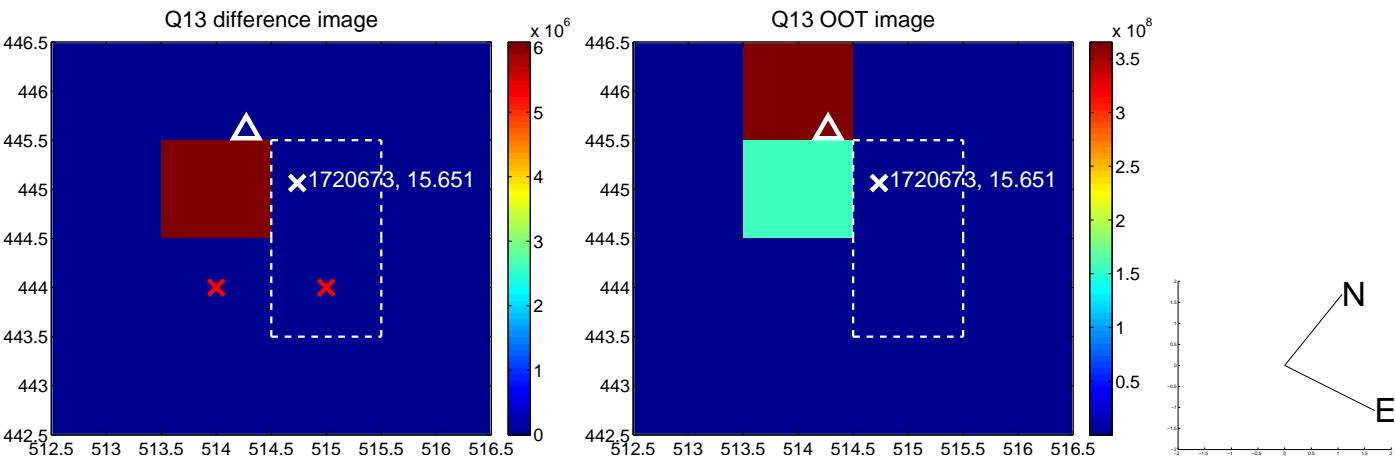
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



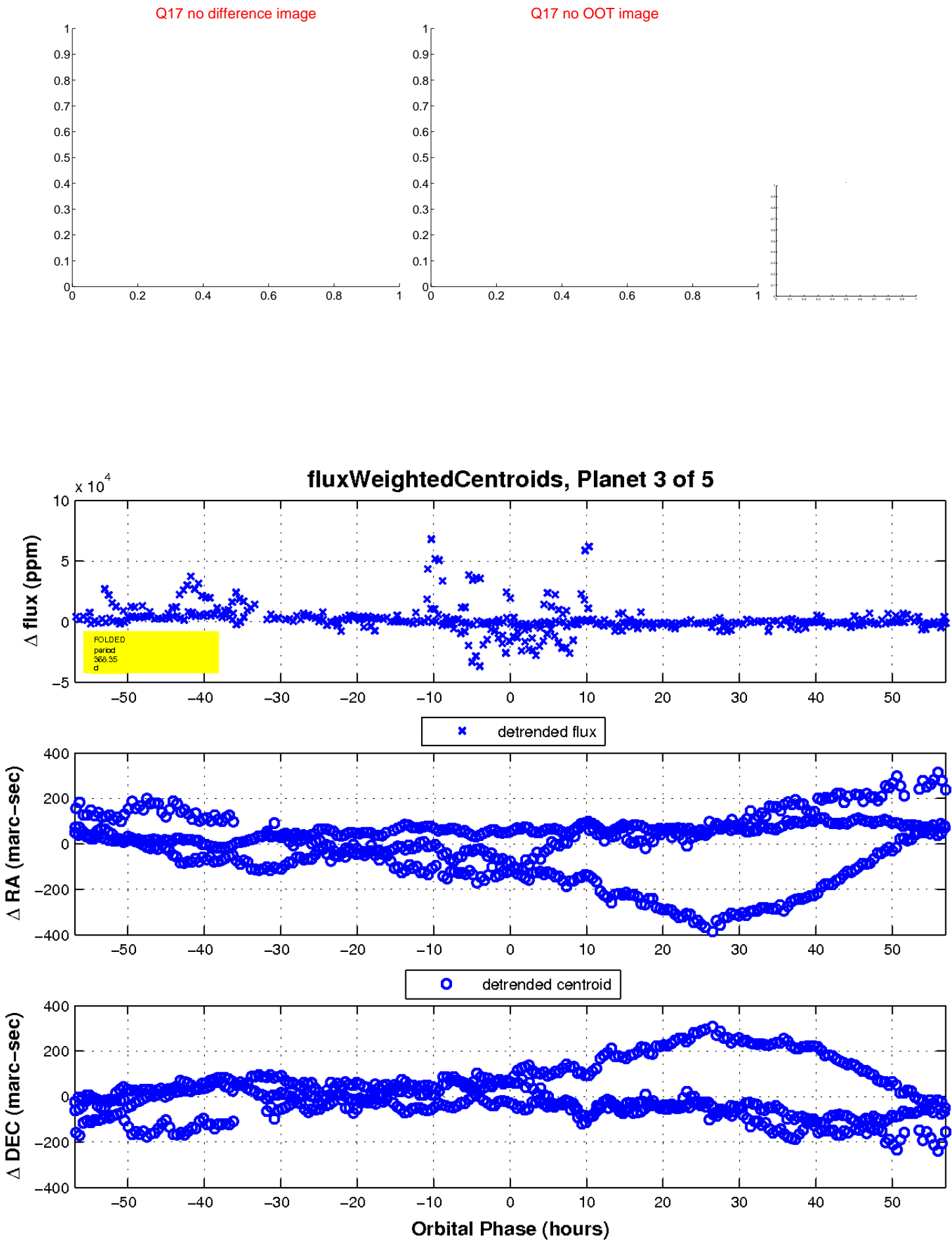
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

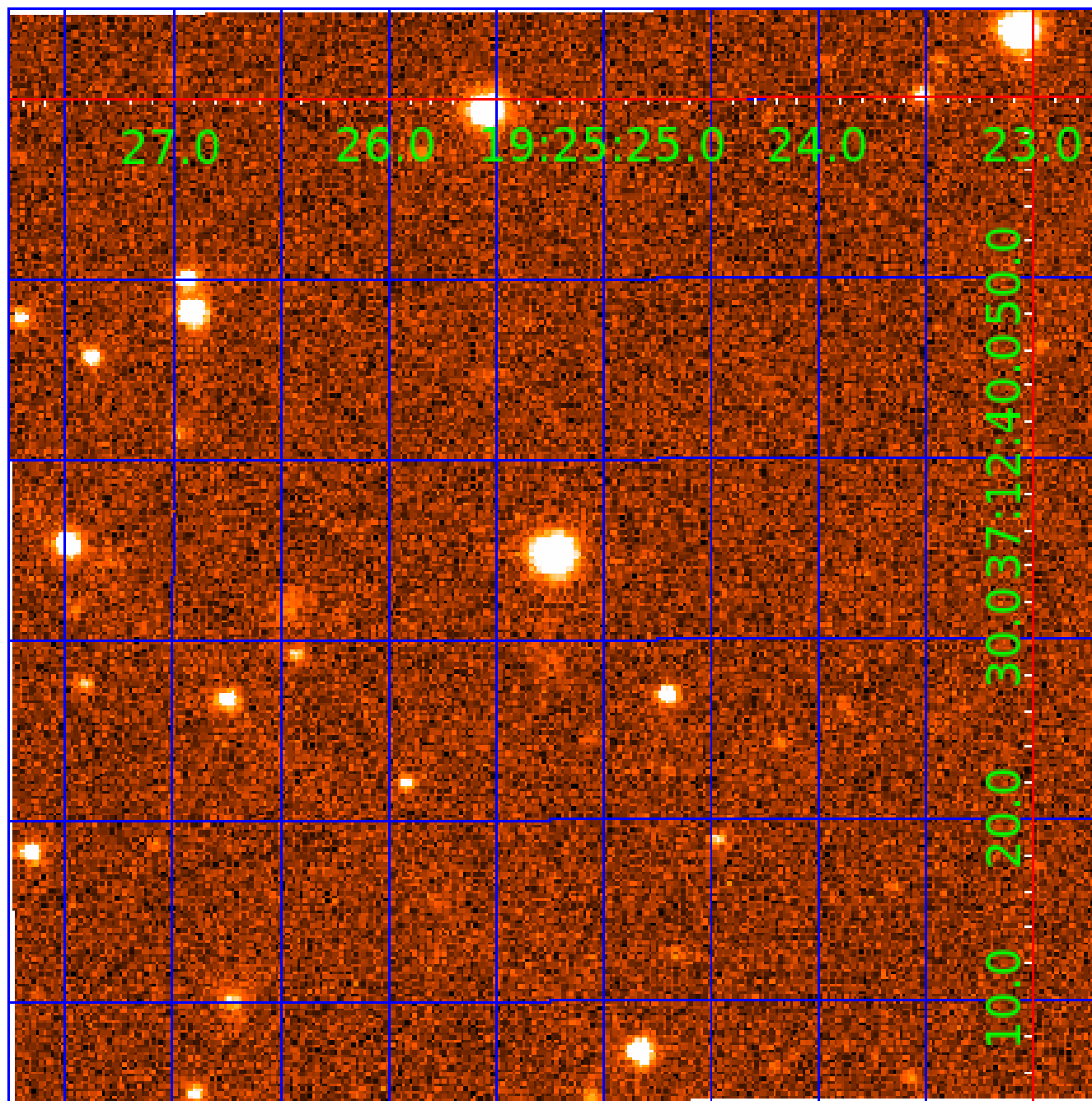


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 001720673

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001720673-01	OBS	No	374.564497	445.992949	8688.7	2.056	29.1	16.8	0.57	4348	5.16	0.15
001720673-02	OBS	No	324.771544	168.384813	3231.5	3.925	27.7	6.8	0.57	4348	3.22	0.18
001720673-03	OBS	No	368.353347	496.395202	13192.5	19.027	40.5	28.5	0.57	4348	6.33	0.15
001720673-04	OBS	No	325.394325	168.921929	2416.8	3.328	24.5	4.4	0.57	4348	2.88	0.18
001720673-05	OBS	No	326.044695	168.761374	8151.2	7.500	24.1	-1.0	0.57	4348	4.98	0.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001720673-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

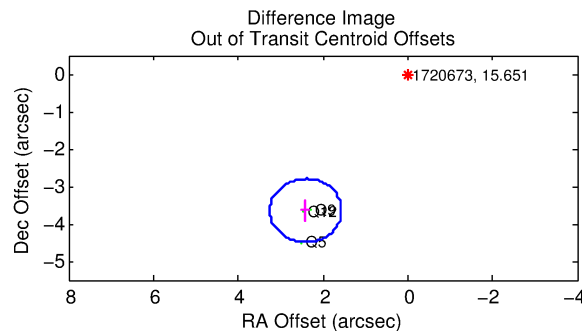
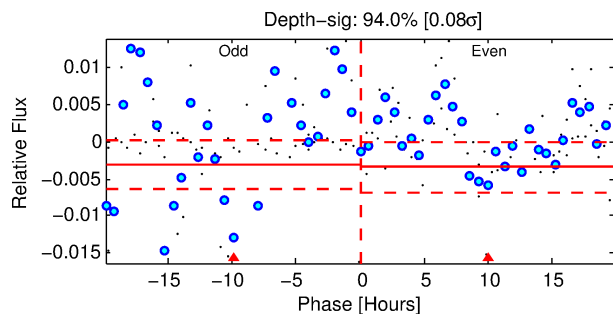
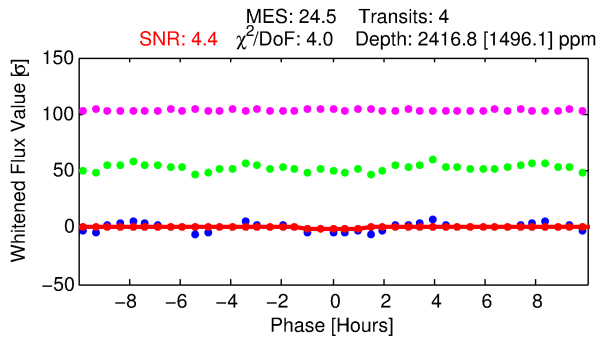
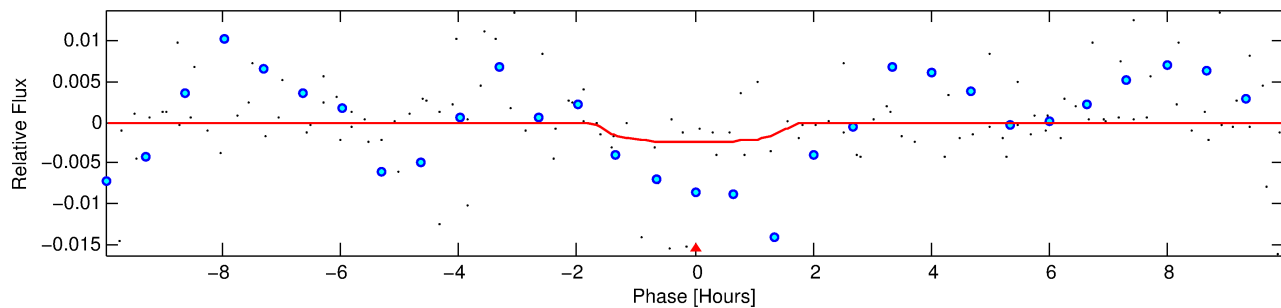
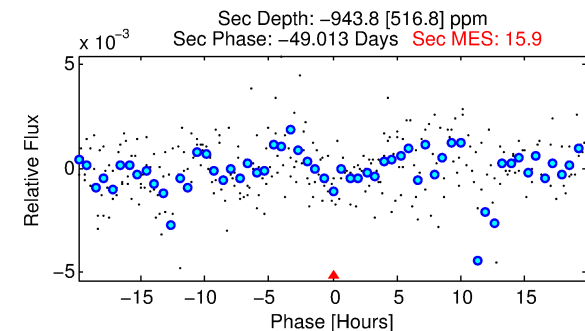
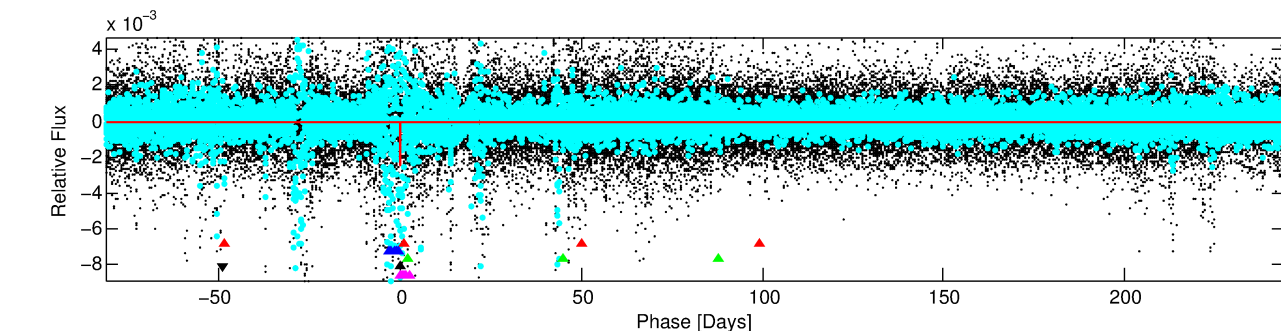
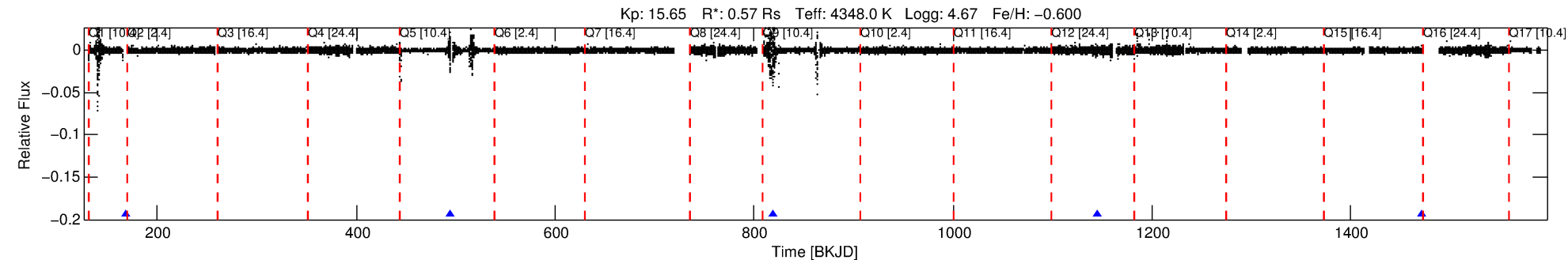
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001720673-04

No Significant Match Found

# DV One-Page Summary

KIC: 1720673 Candidate: 4 of 5 Period: 325.394 d



## DV Fit Results:

Period = 325.39432 [0.01628] d  
Epoch = 168.9219 [0.0499] BKJD  
Rp/R\* = 0.0464 [0.2611]  
a/R\* = 652.79 [12708.68]  
b = 0.58 [23.17]  
Seff = 0.18 [0.03]  
Teq = 166 [7] K  
Rp = 2.88 [16.21] Re  
a = 0.7610 [0.0603] AU  
Ag = N/A  
Teffp = N/A

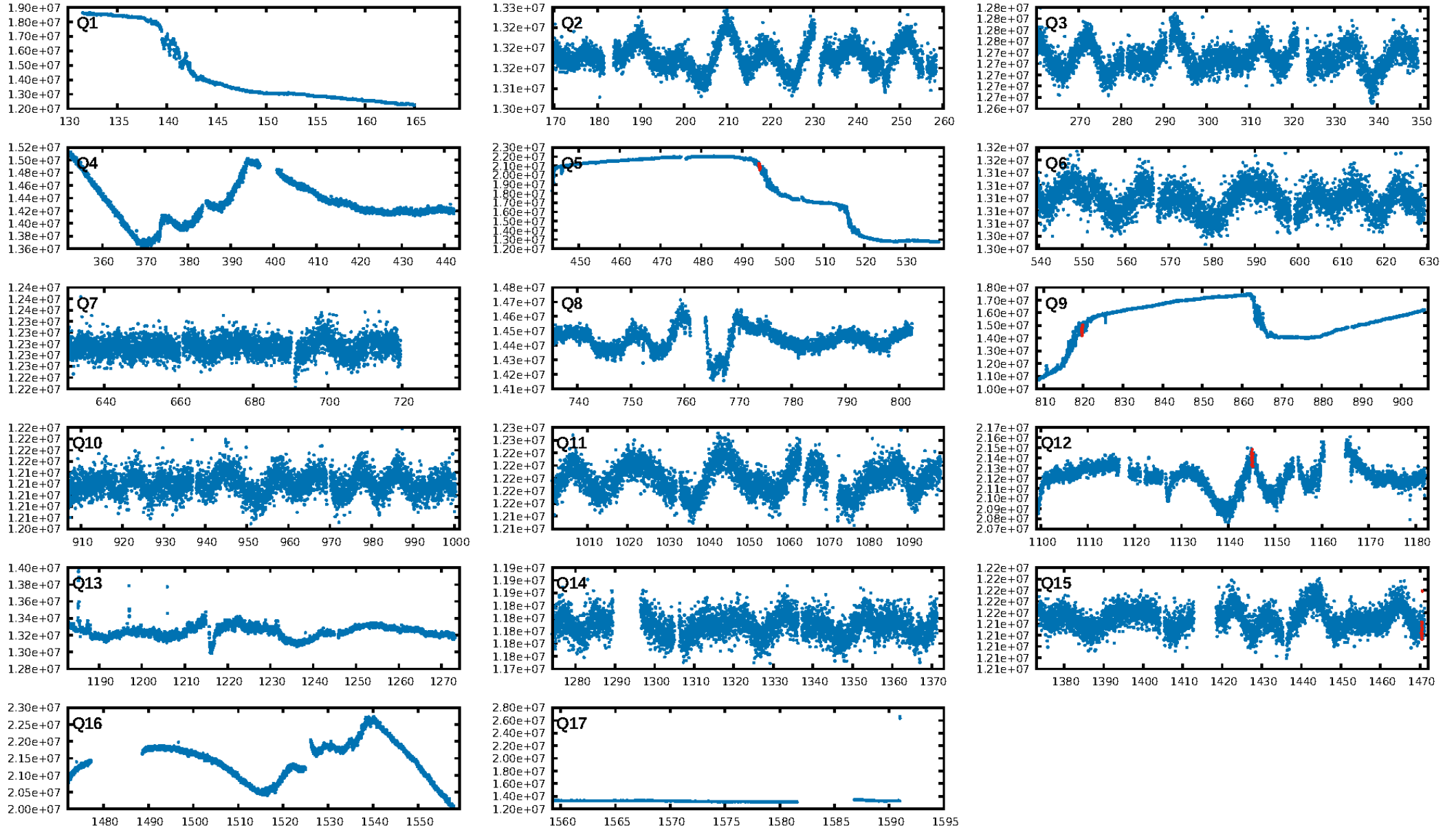
## DV Diagnostic Results:

ShortPeriod-sig: 99.6% [2.90σ]  
LongPeriod-sig: 94.3% [1.90σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 48.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.3333  
Centroid-sig: N/A  
Centroid-so: 0.314 arcsec [0.15σ]  
OotOffset-rm: 4.370 arcsec [15.46σ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-rm: 1.903 arcsec [1.34σ]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.75 [3/4]

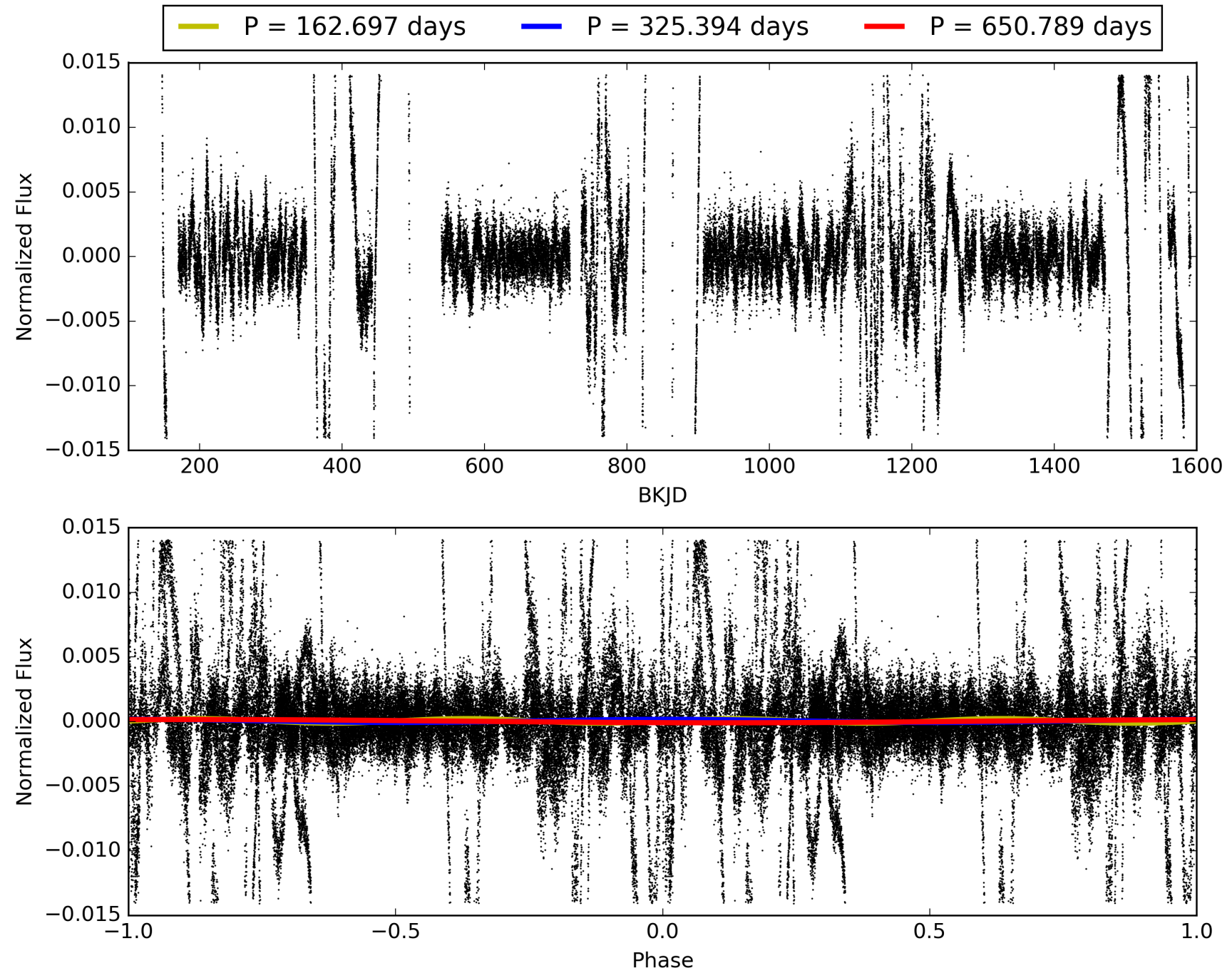
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 001720673-04, PDC Light Curves

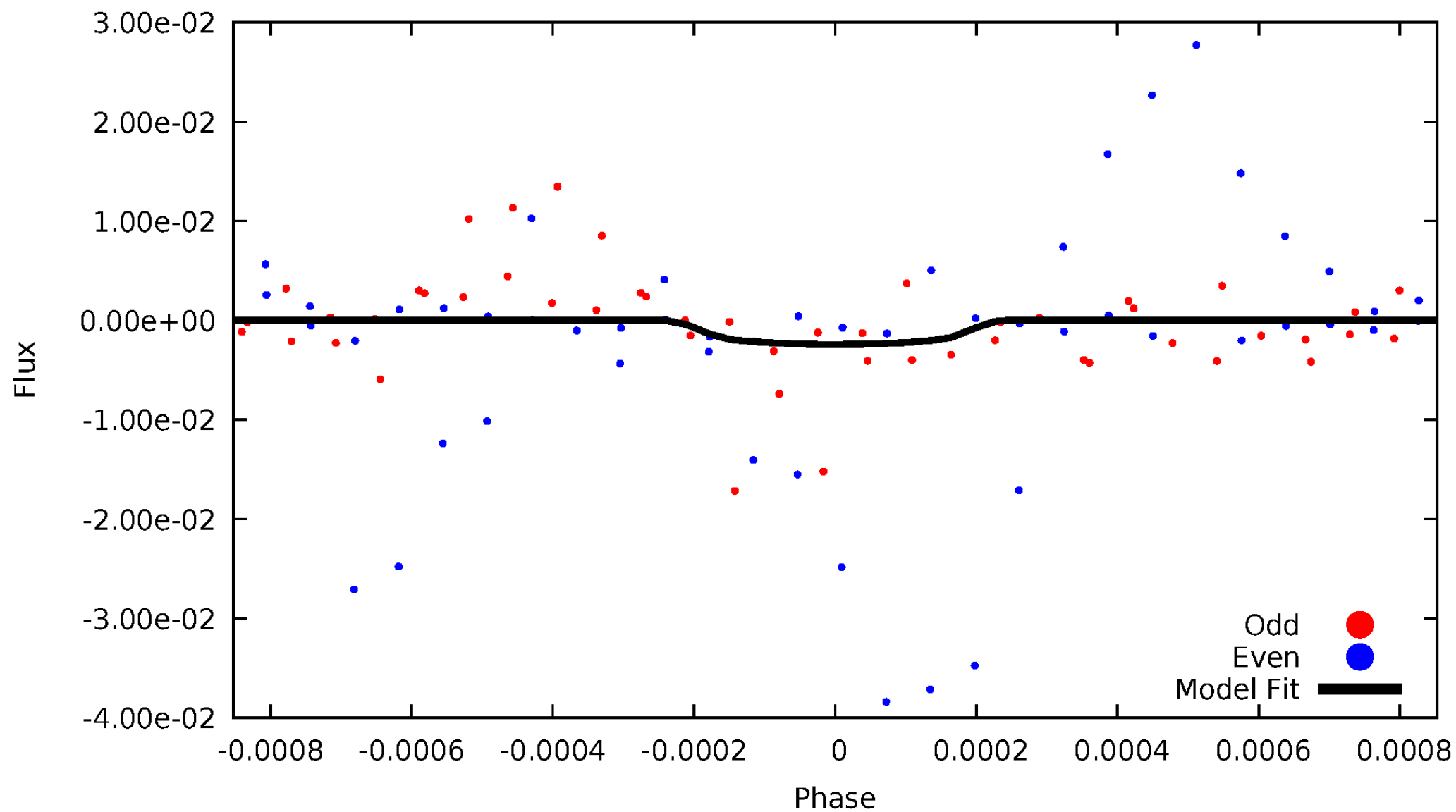


TCE 001720673-04



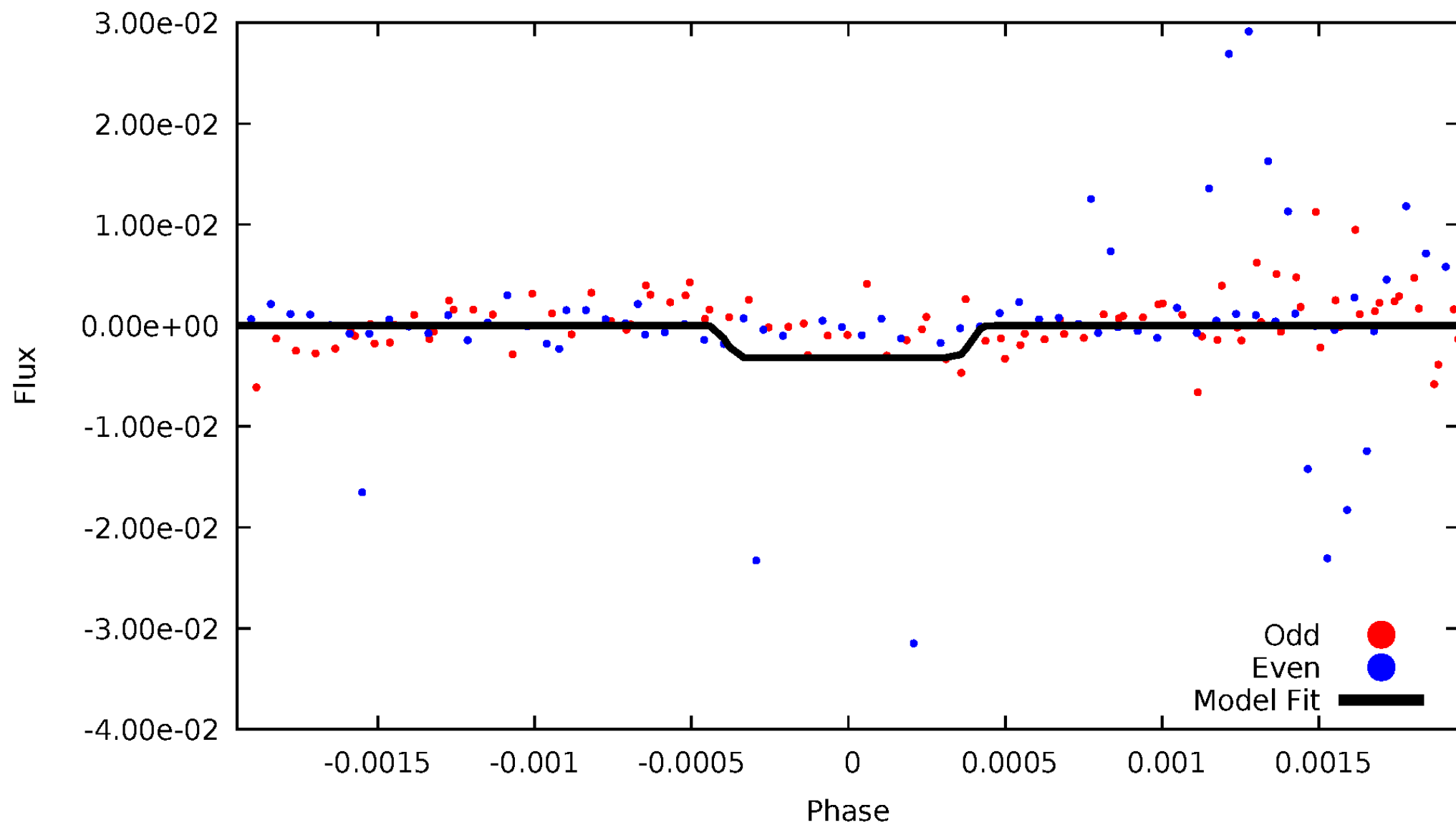
# DV Odd/Even

TCE 001720673-04



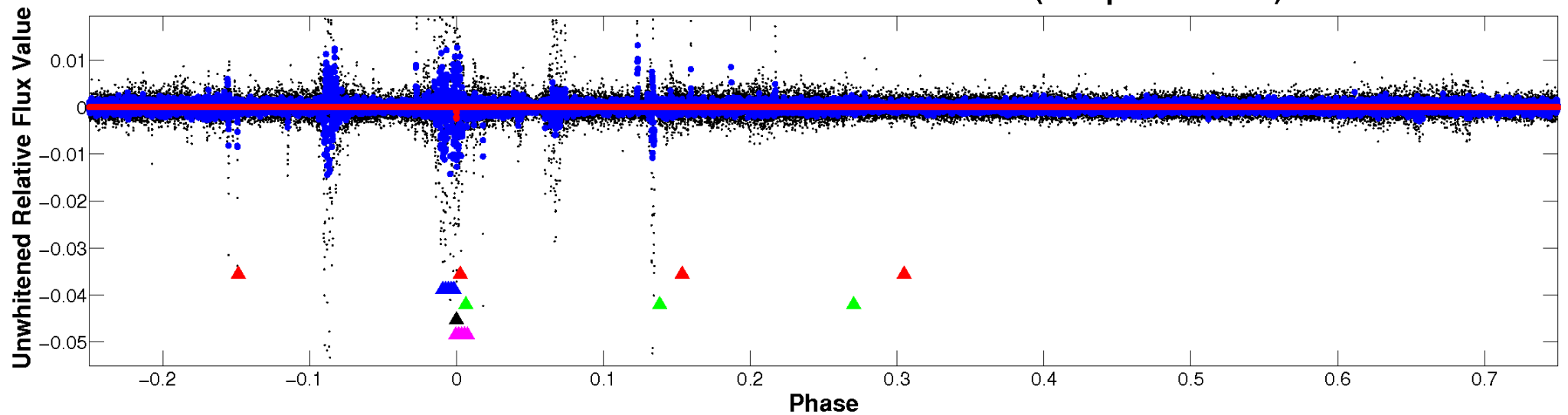
# ALT Odd/Even

TCE 001720673-04

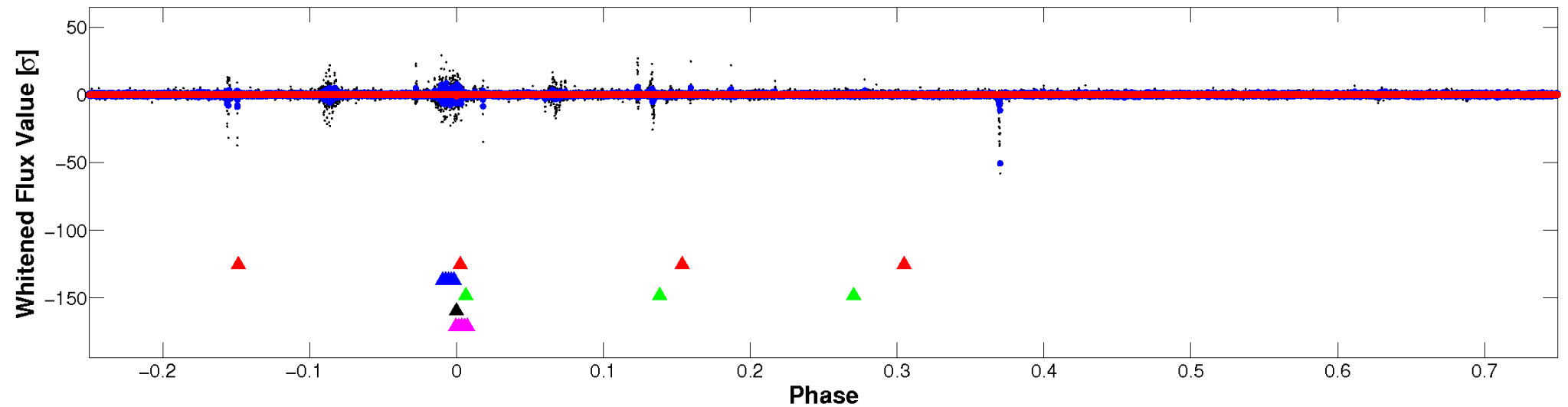


# Non-Whitened Vs. Whitened Light Curve

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

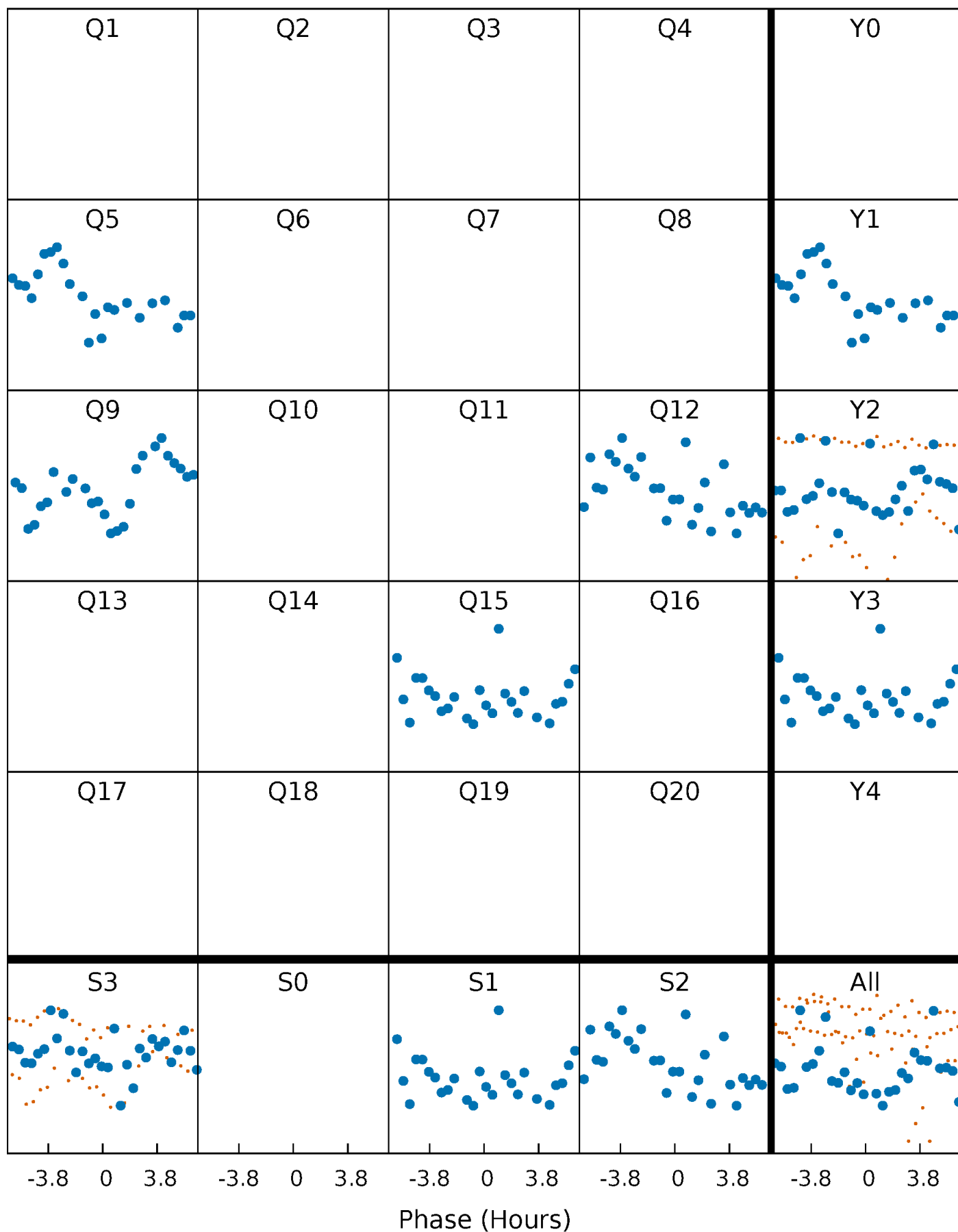


**Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

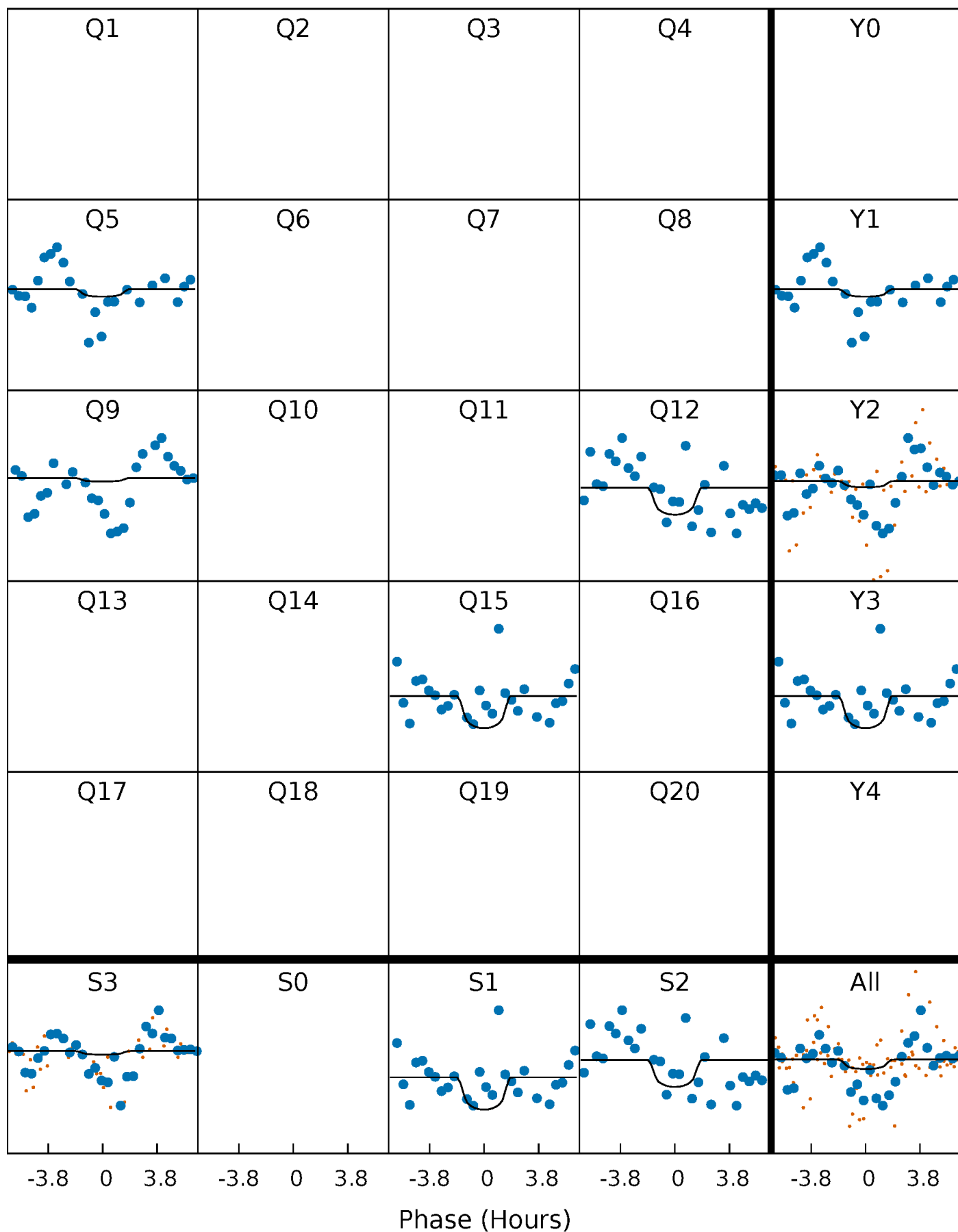
TCE 001720673-04 P=325.394324 Days  $T_0=168.921929$  (BKJD)





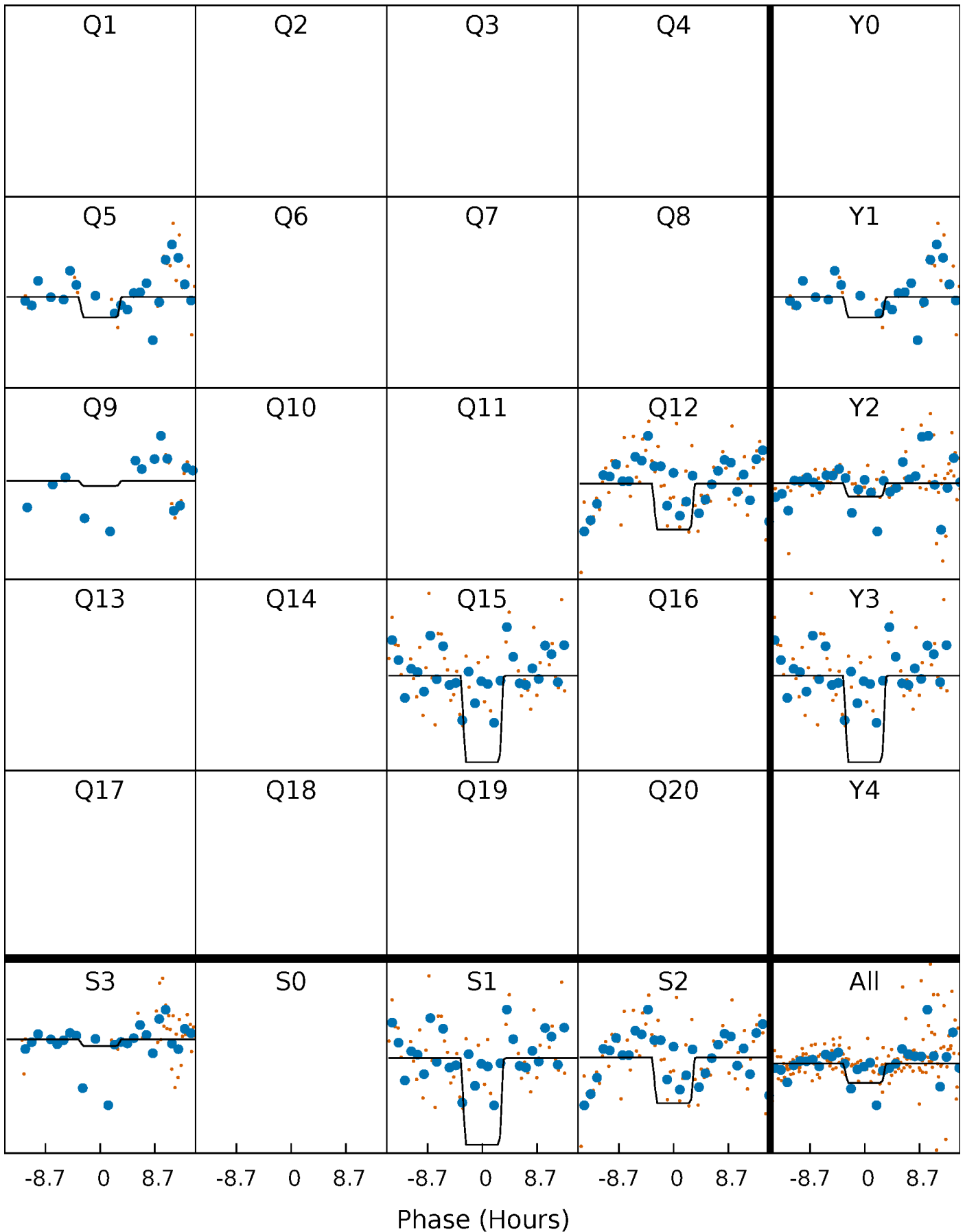
# DV Quarter-Phased Transit Curves

TCE 001720673-04     $P=325.394324$  Days     $T_0=168.921929$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

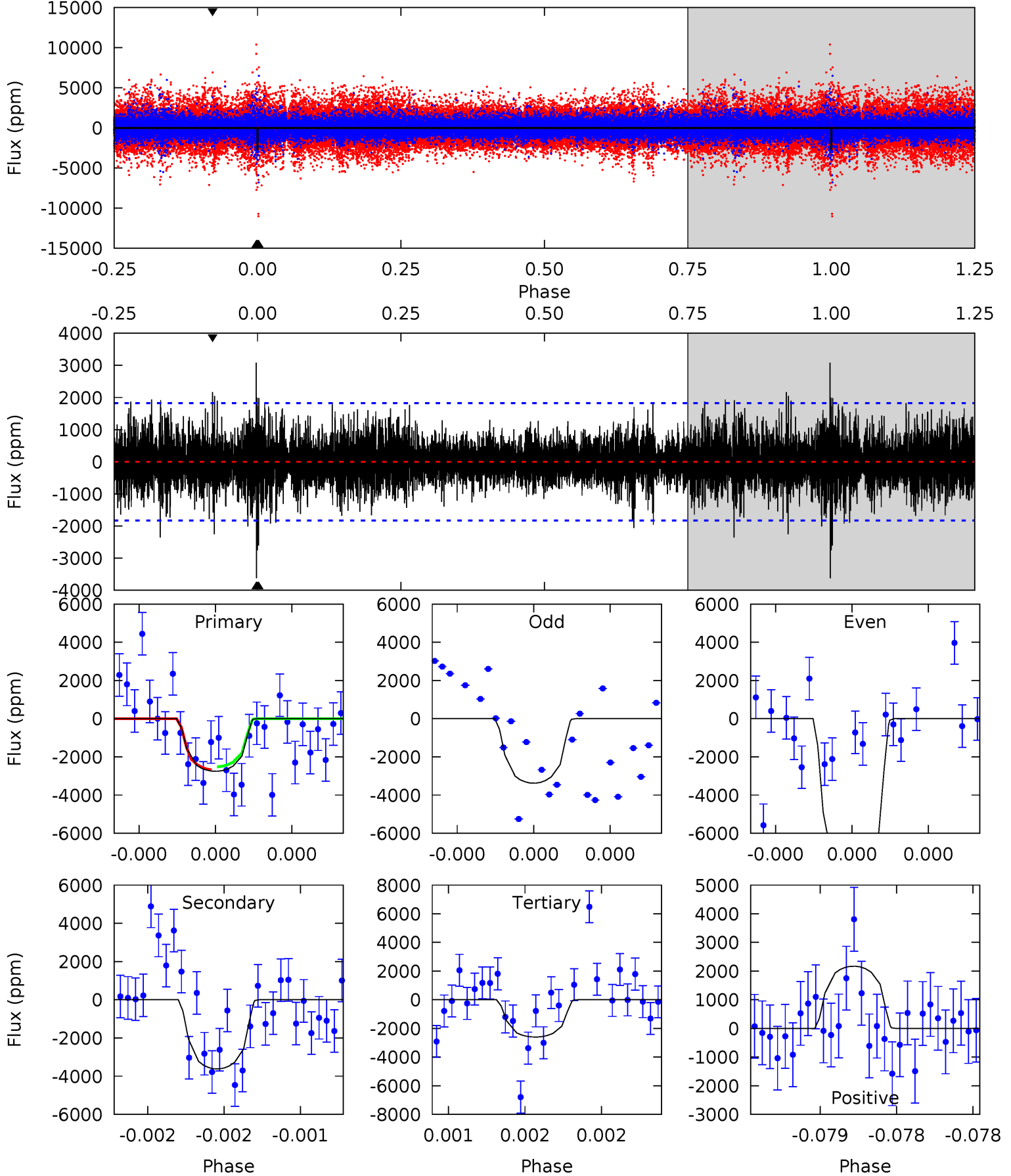
TCE 001720673-04     $P=325.472555$  Days     $T_0=168.700655$  (BKJD)



# DV Model-Shift Uniqueness Test

001720673-04, P = 325.394324 Days, E = 168.921929 Days

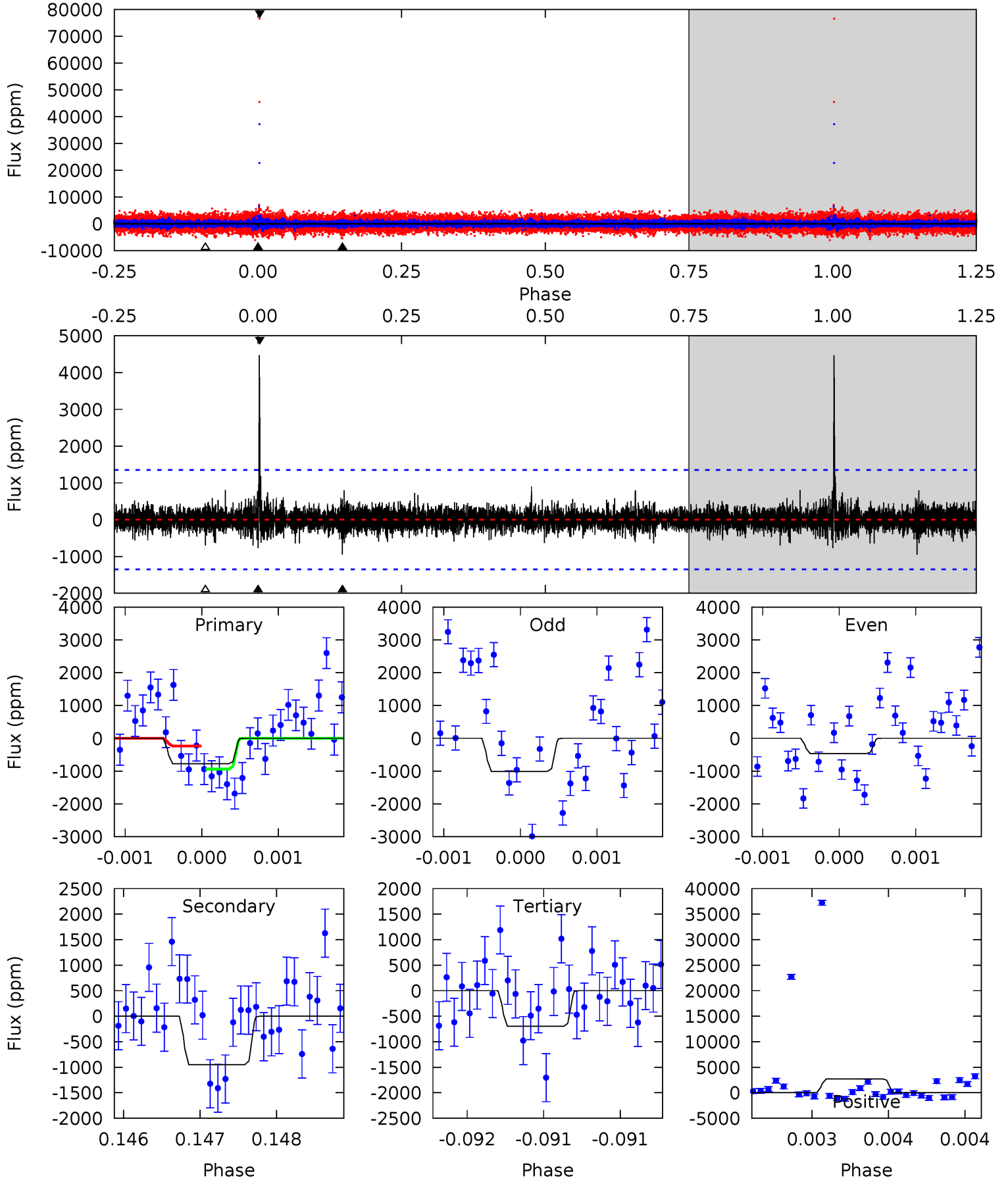
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.41	11.1	7.95	6.63	5.58	3.50	1.47	0.46	1.78	3.11	4.43	7.97	1.77	0.46	0



# Alt Model-Shift Uniqueness Test

001720673-04, P = 325.472555 Days, E = 168.700655 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
3.14	3.84	2.83	11.0	5.47	3.33	0.78	0.31	-7.88	1.01	-7.18	1.08	7.30	0.83	1.46



### Stellar Parameters For KIC 001720673

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4348^{+118}_{-144}$	$4.672^{+0.058}_{-0.027}$	$-0.600^{+0.300}_{-0.300}$	$0.569^{+0.045}_{-0.056}$	$0.556^{+0.056}_{-0.042}$	$4.239^{+1.221}_{-0.540}$
	+3%/-3%	+1%/-1%	+50%/-50%	+8%/-10%	+10%/-8%	+29%/-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 001720673-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-3620 \pm 327$	$11.85^{+12.32}_{-8.29}$	$230^{+8}_{-9}$	$2964^{+1448}_{-498}$	$8439^{+79501}_{-6438}$
Alt.	$-948 \pm 247$	$12.15^{+11.75}_{-8.22}$	$230^{+7}_{-8}$	$2485^{+890}_{-367}$	$2070^{+16813}_{-1571}$

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

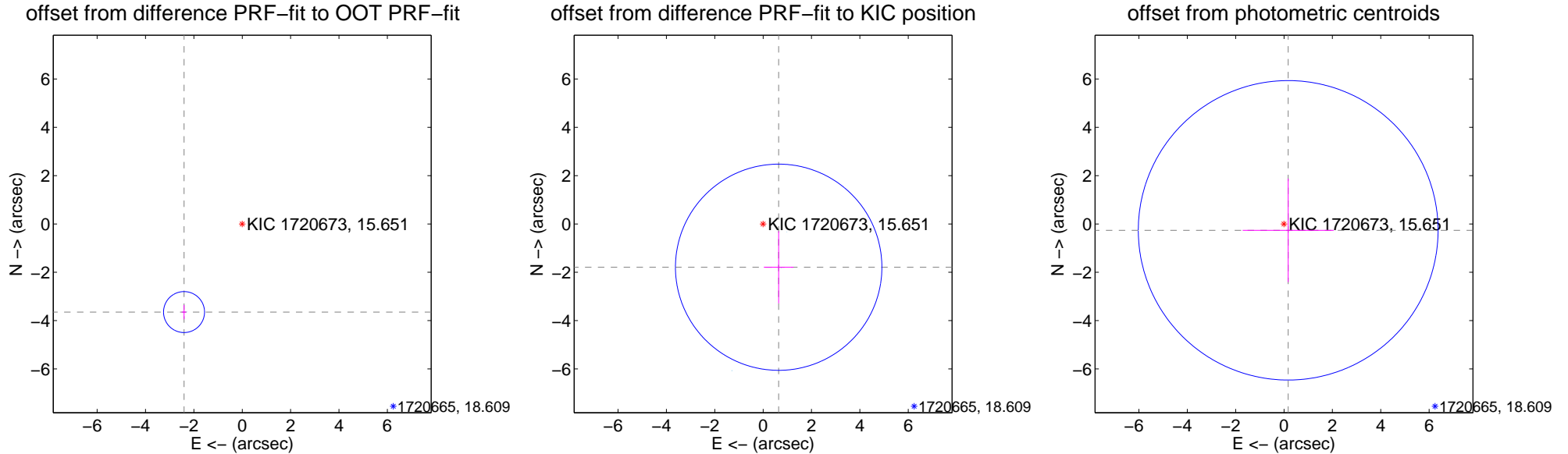
## DV Centroid Data

Supplemental centroid analysis for 001720673-04. Kepler magnitude: 15.65. Transit SNR 4.37

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 4.78 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.370 \pm 0.283$	15.46	$2.407 \pm 0.095$	$-3.647 \pm 0.295$
PRF-fit source offset from KIC position	$1.903 \pm 1.423$	1.34	$-0.642 \pm 0.615$	$-1.792 \pm 1.495$
photometric centroid source offset	$0.31 \pm 2.07$	0.15	$-0.17 \pm 1.88$	$-0.26 \pm 2.14$

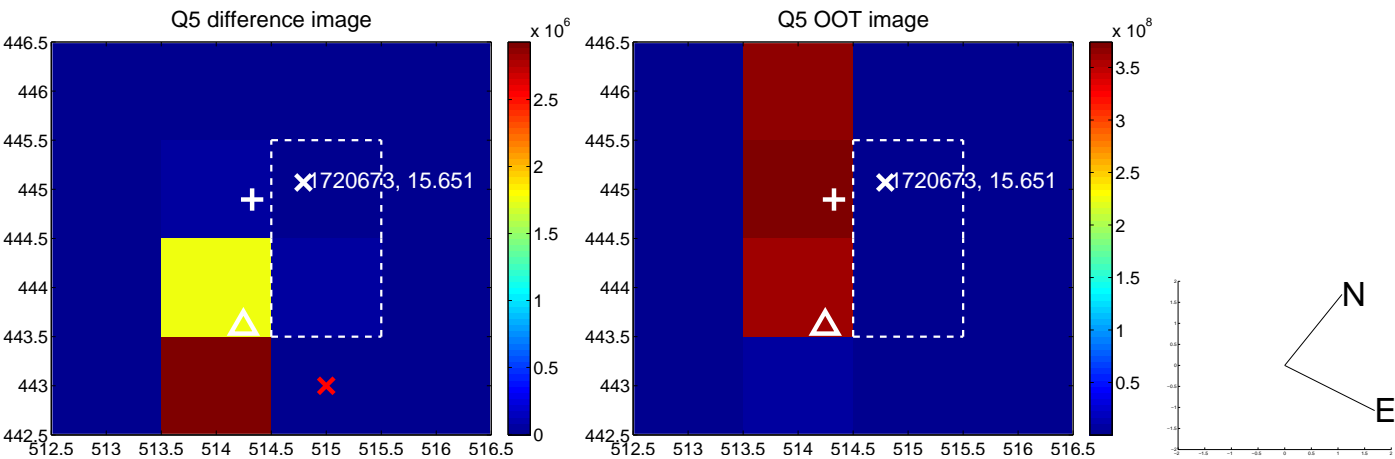


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

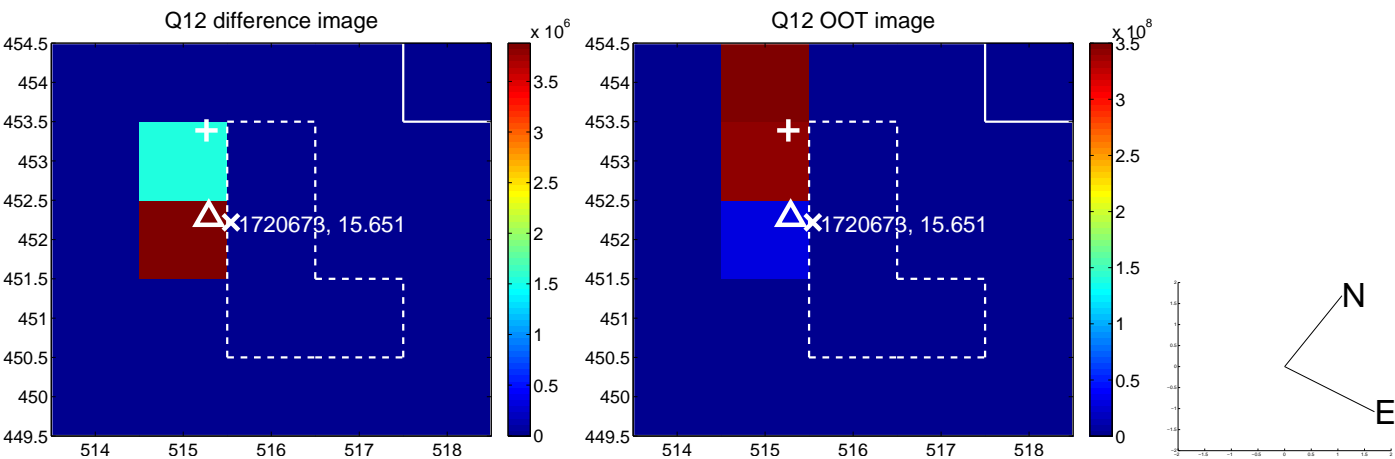
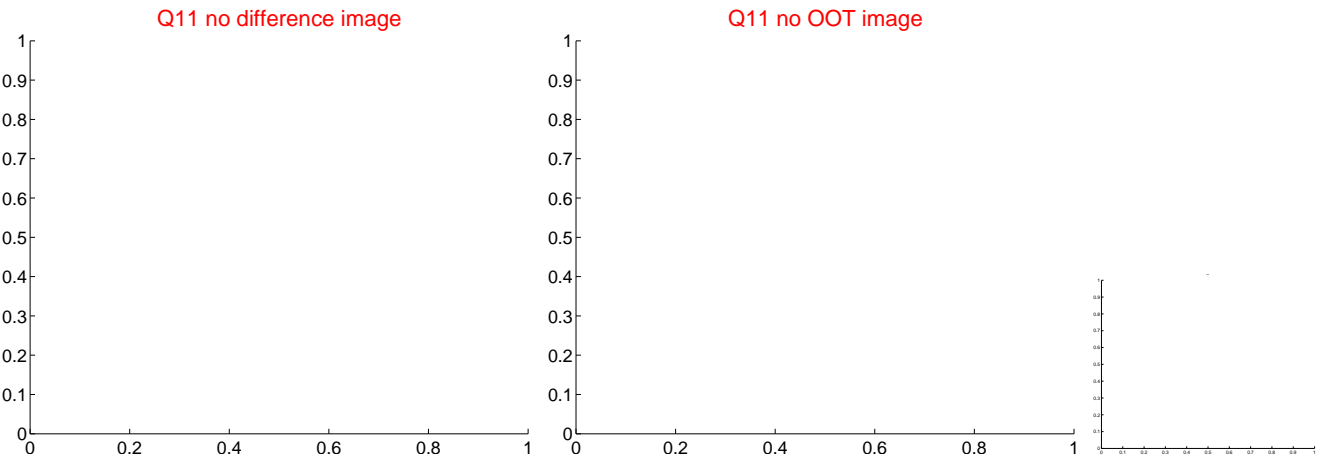
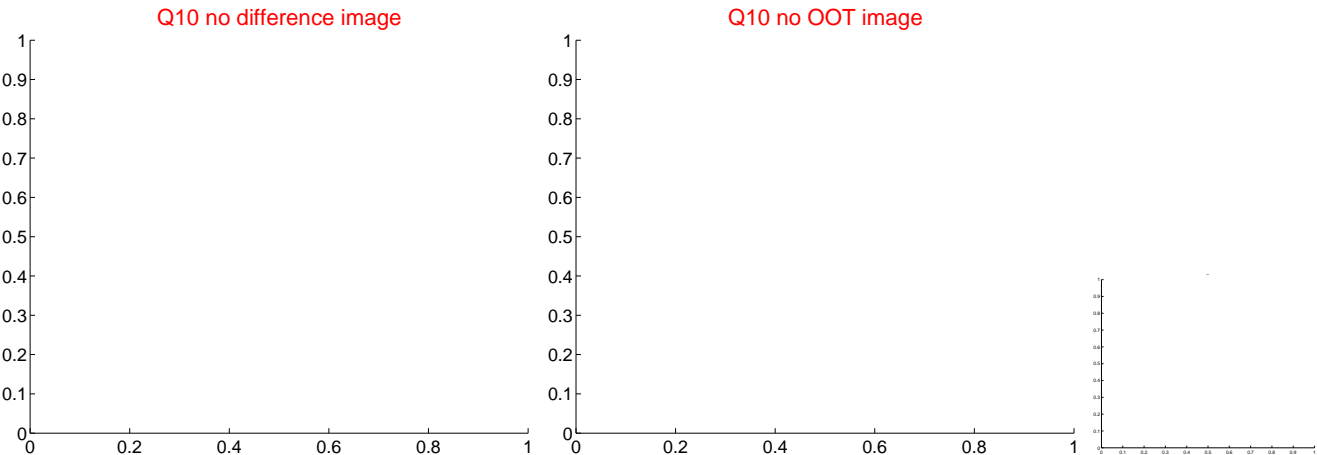
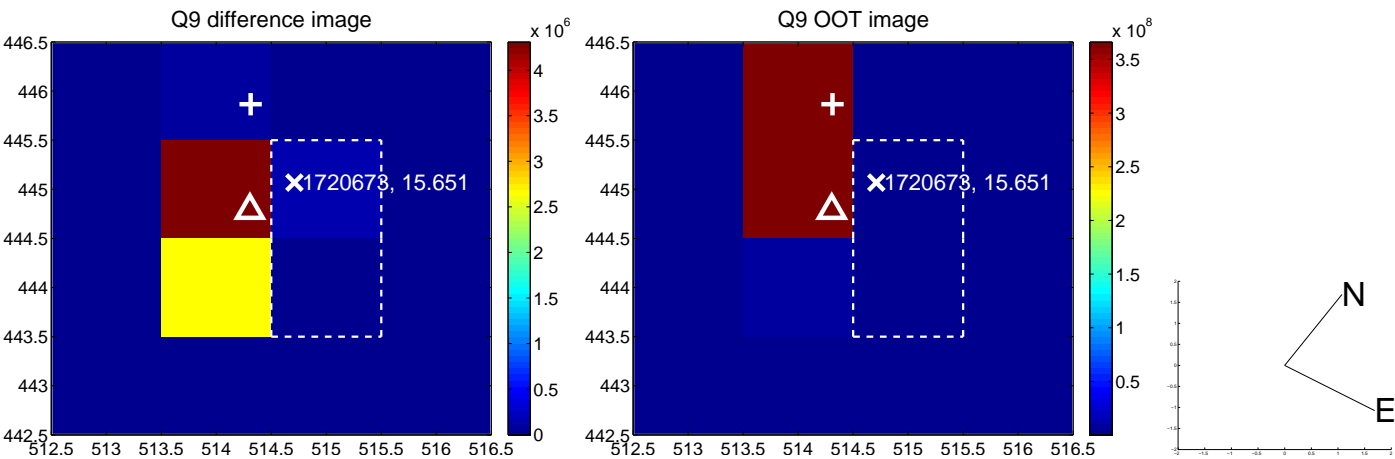


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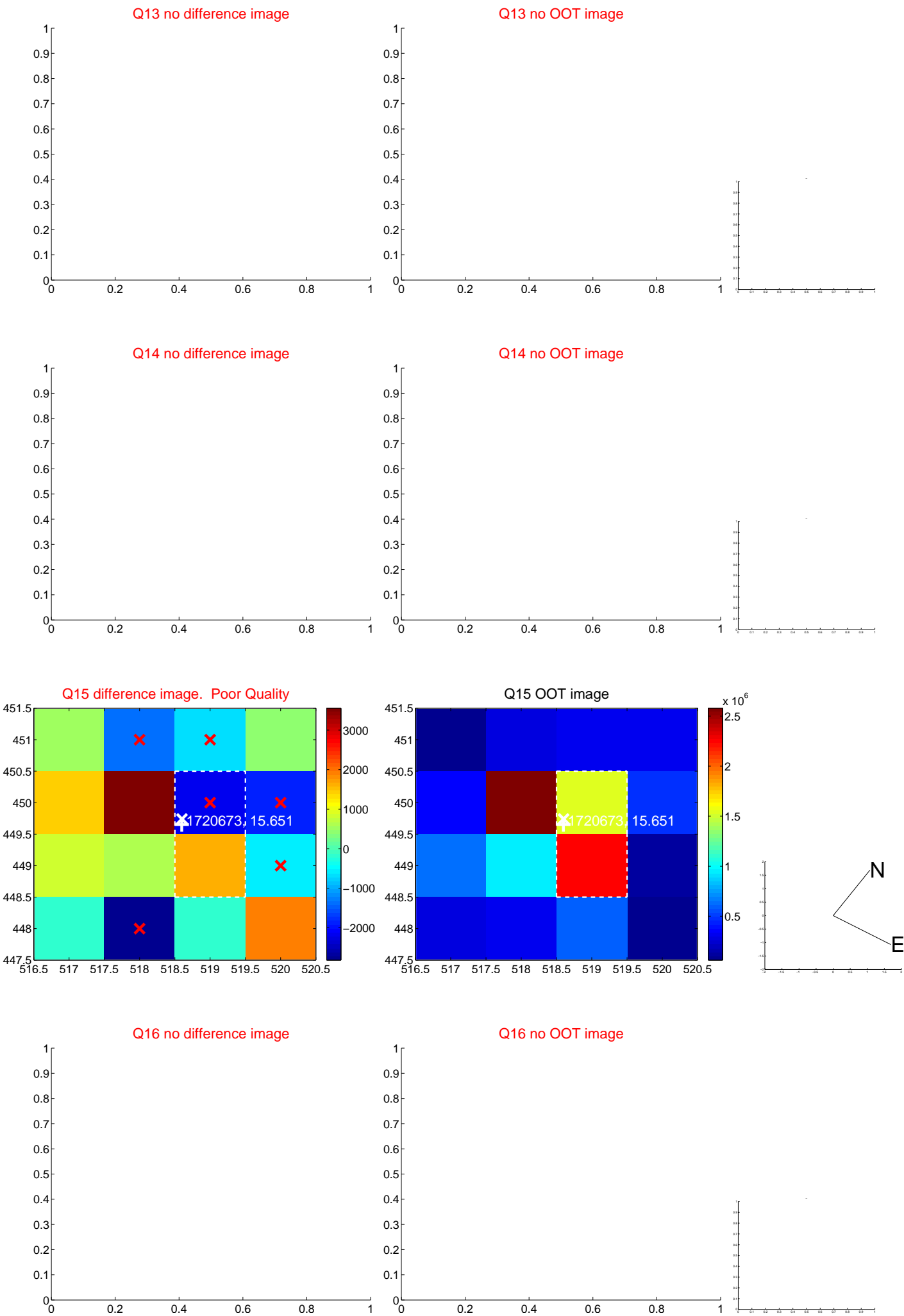




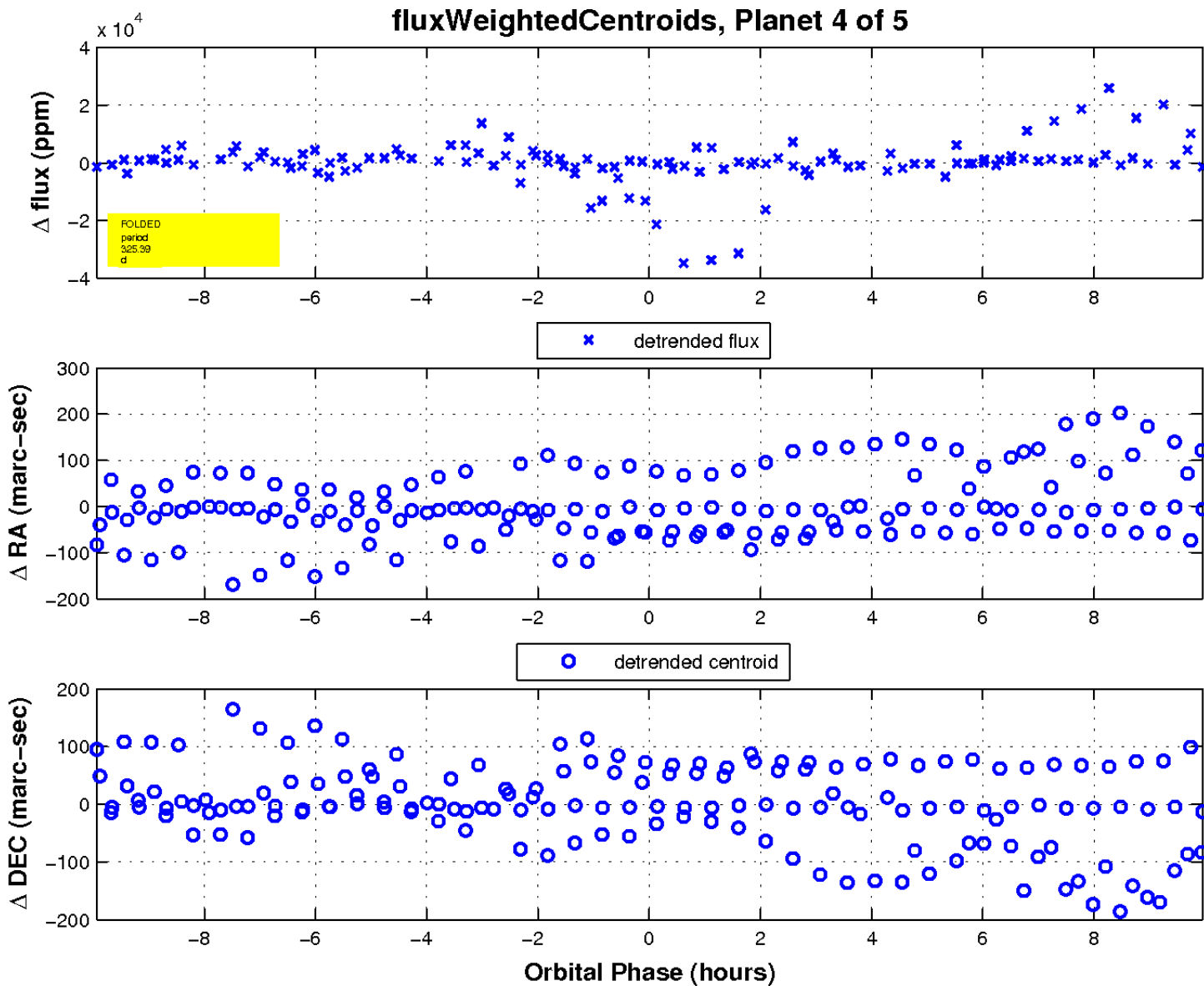
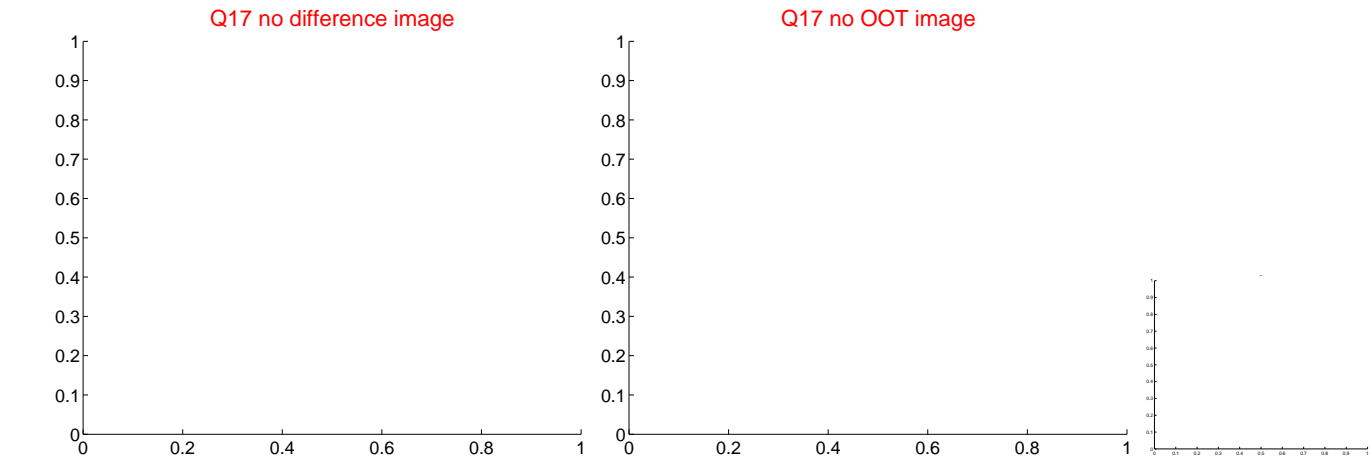
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

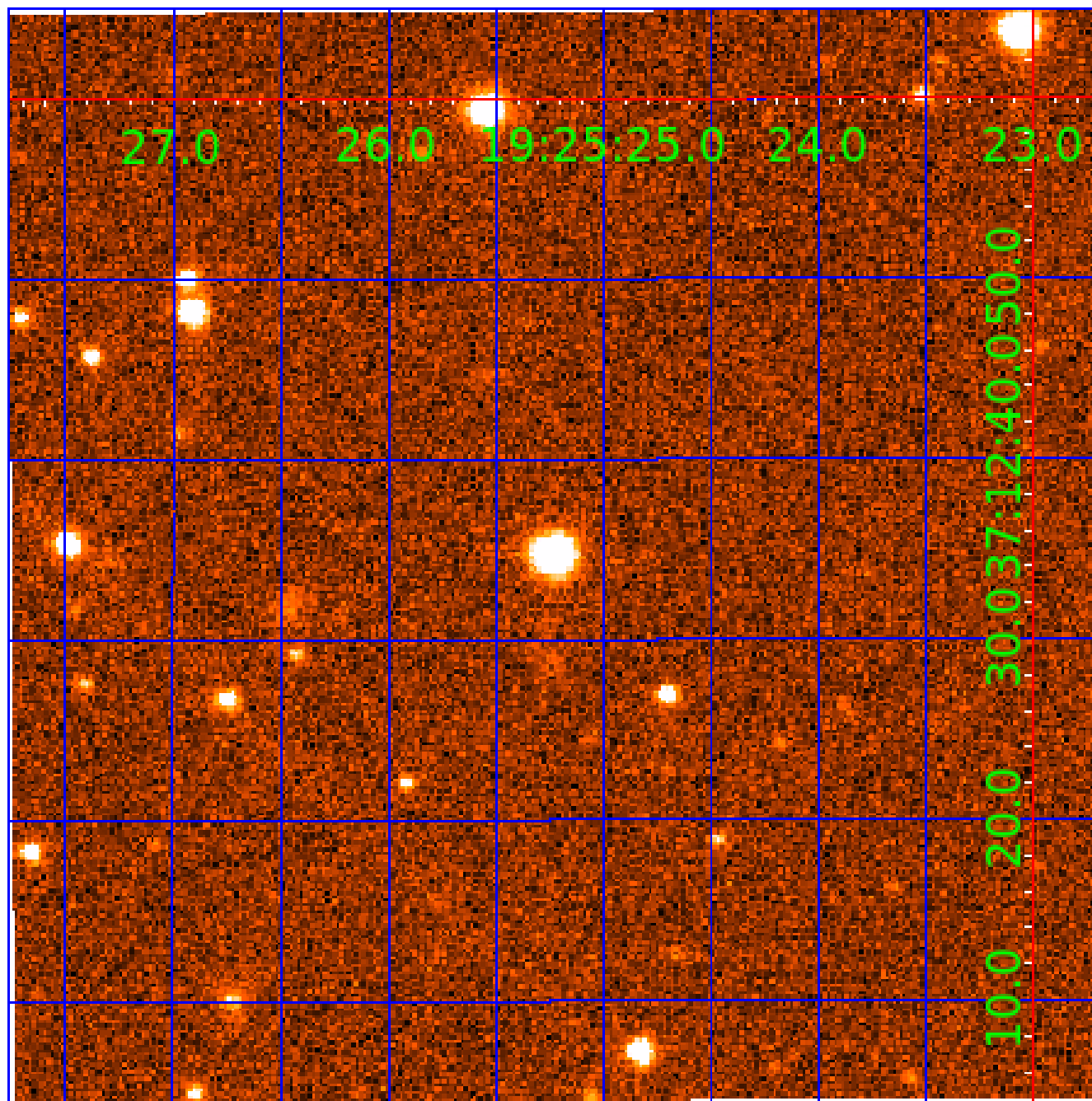


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 001720673

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001720673-01	OBS	No	374.564497	445.992949	8688.7	2.056	29.1	16.8	0.57	4348	5.16	0.15
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001720673-05	OBS	No	326.044695	168.761374	8151.2	7.500	24.1	-1.0	0.57	4348	4.98	0.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001720673-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001720673-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

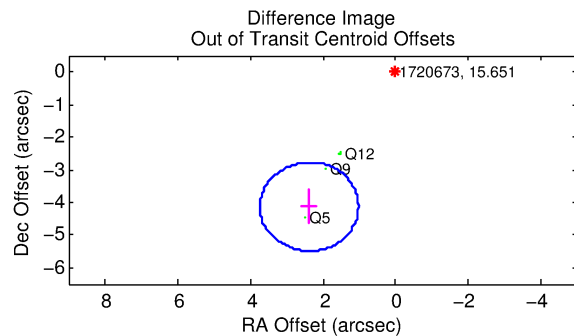
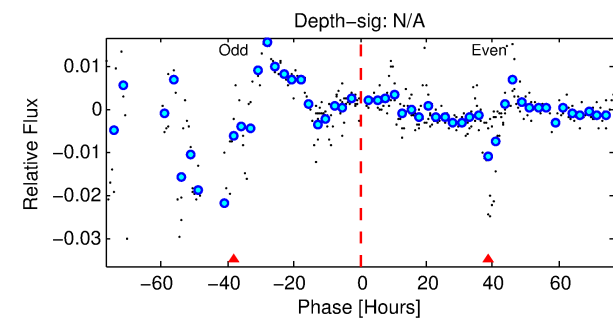
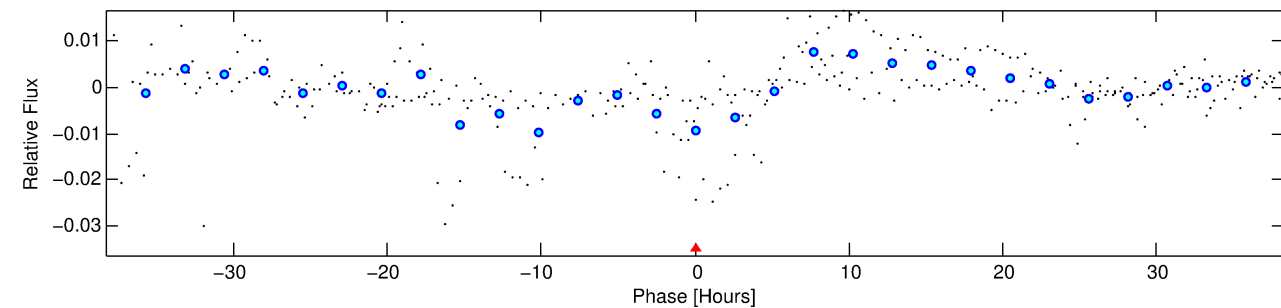
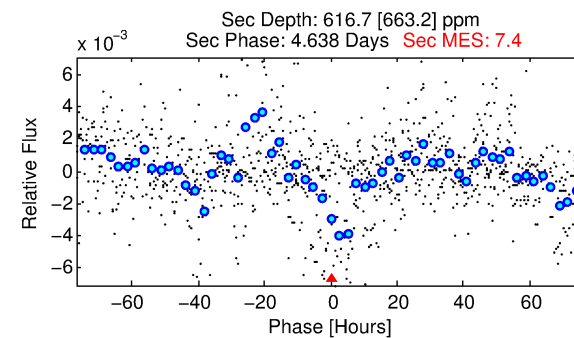
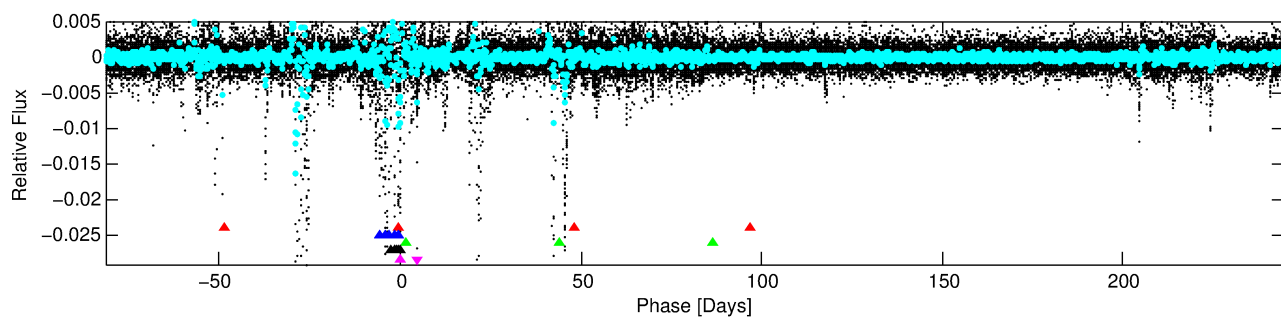
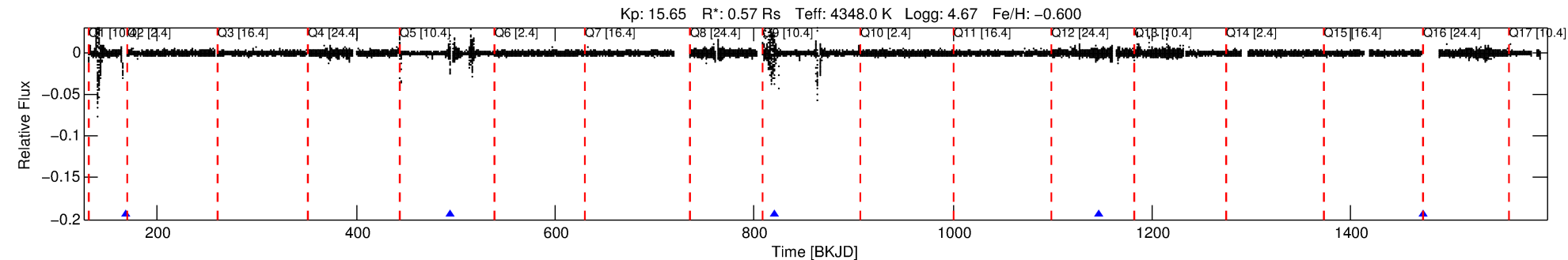
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001720673-05

No Significant Match Found

# DV One-Page Summary

KIC: 1720673 Candidate: 5 of 5 Period: 326.045 d



## TPS TCE Results:

Period = 326.04469 d  
Epoch = 168.7614 BKJD

**DV fit results are unavailable**

## DV Diagnostic Results:

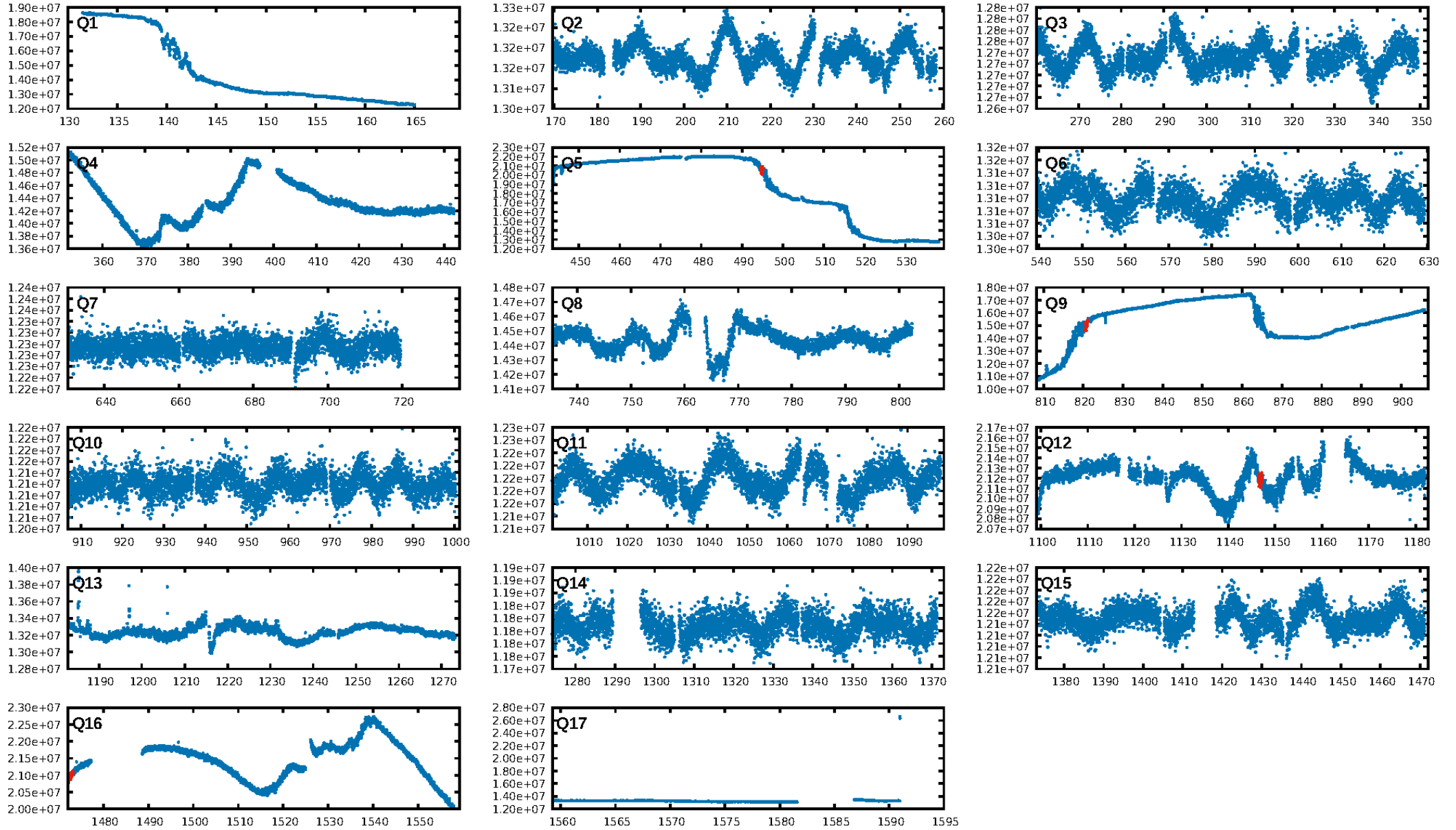
ShortPeriod-sig: 94.3% [1.90 $\sigma$ ]  
LongPeriod-sig: 100.0% [49.65 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 2.069**

Centroid-sig: N/A  
**Centroid-so: 4.832 arcsec [4.34 $\sigma$ ]**  
**OotOffset-rm: 4.766 arcsec [10.53 $\sigma$ ]**  
KicOffset-rm: 4.991 arcsec [2.97 $\sigma$ ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.33 [1/3]

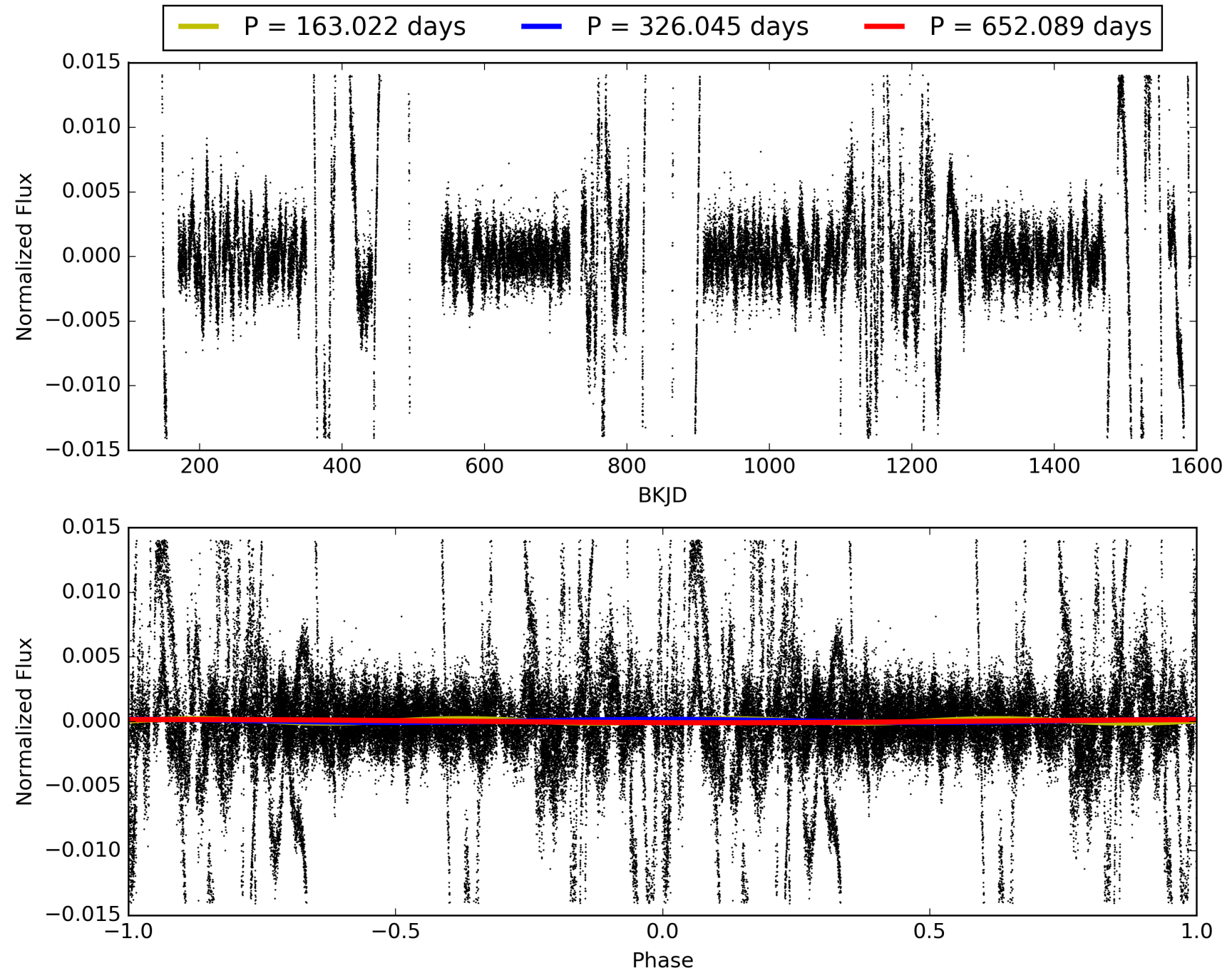
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:14:50 Z

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

# TCE 001720673-05, PDC Light Curves



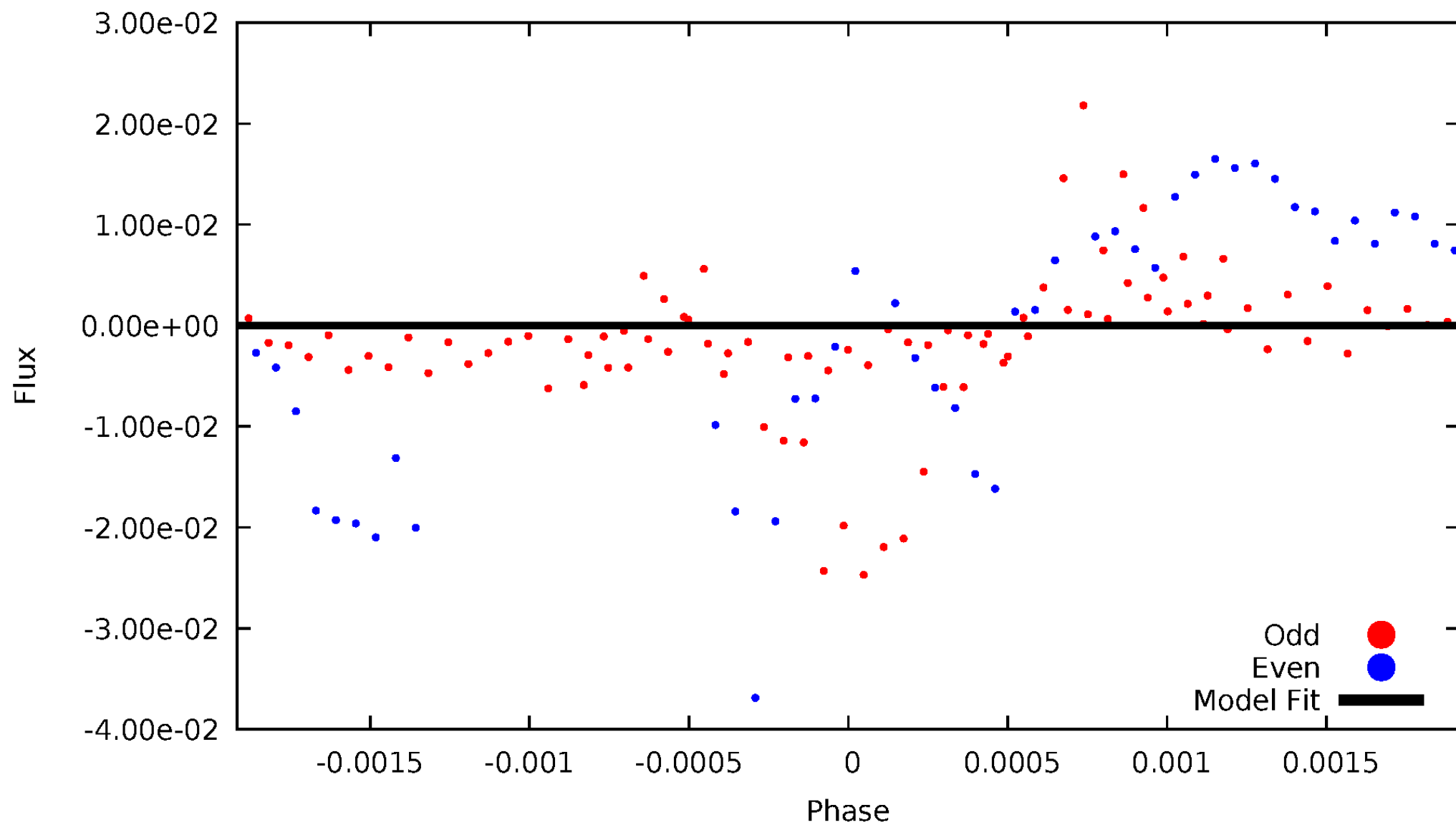
TCE 001720673-05





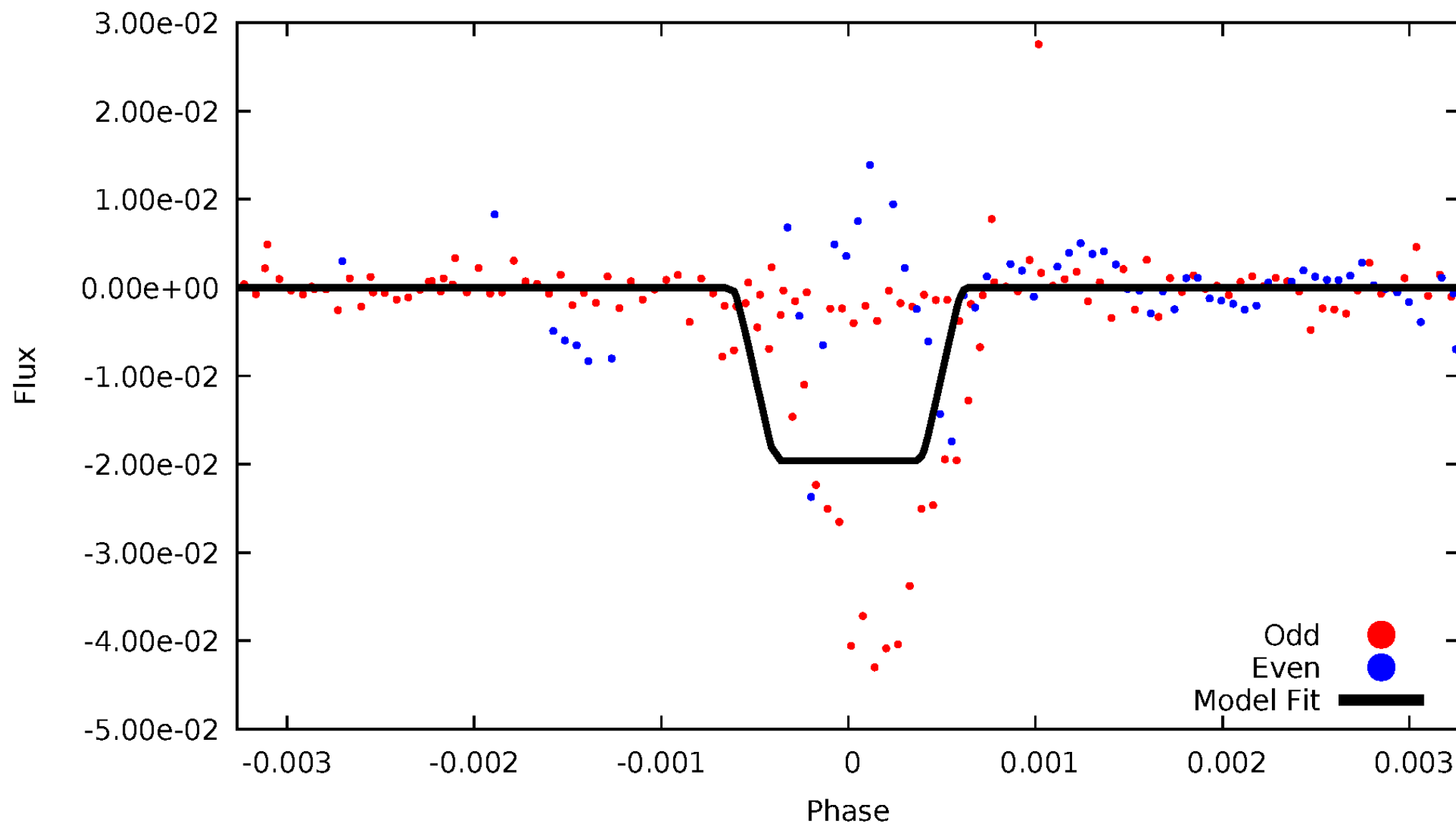
# DV Odd/Even

TCE 001720673-05



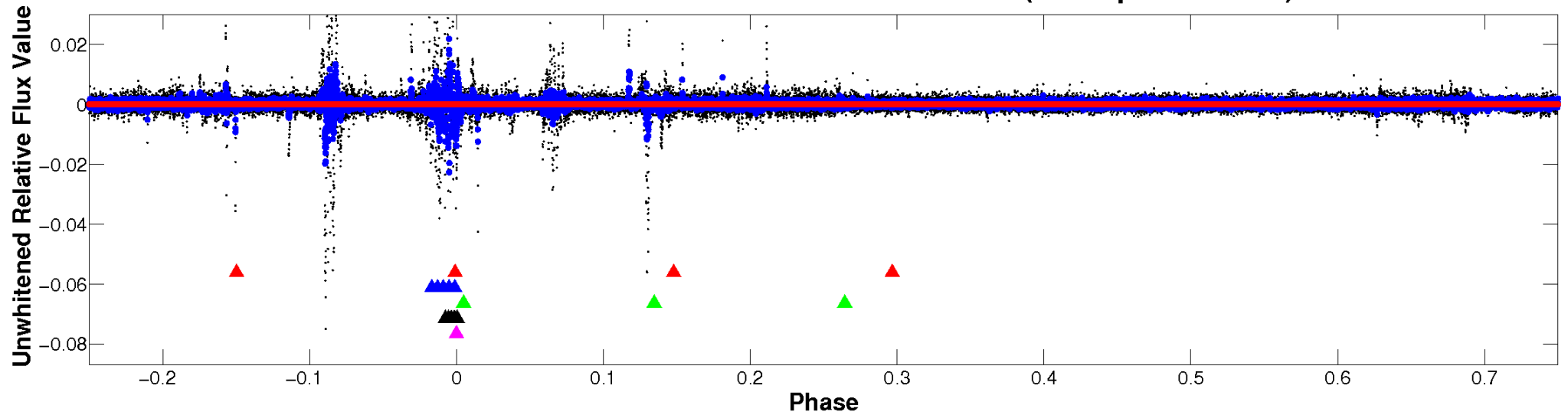
# ALT Odd/Even

TCE 001720673-05



# Non-Whitened Vs. Whitened Light Curve

**Planet 5 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

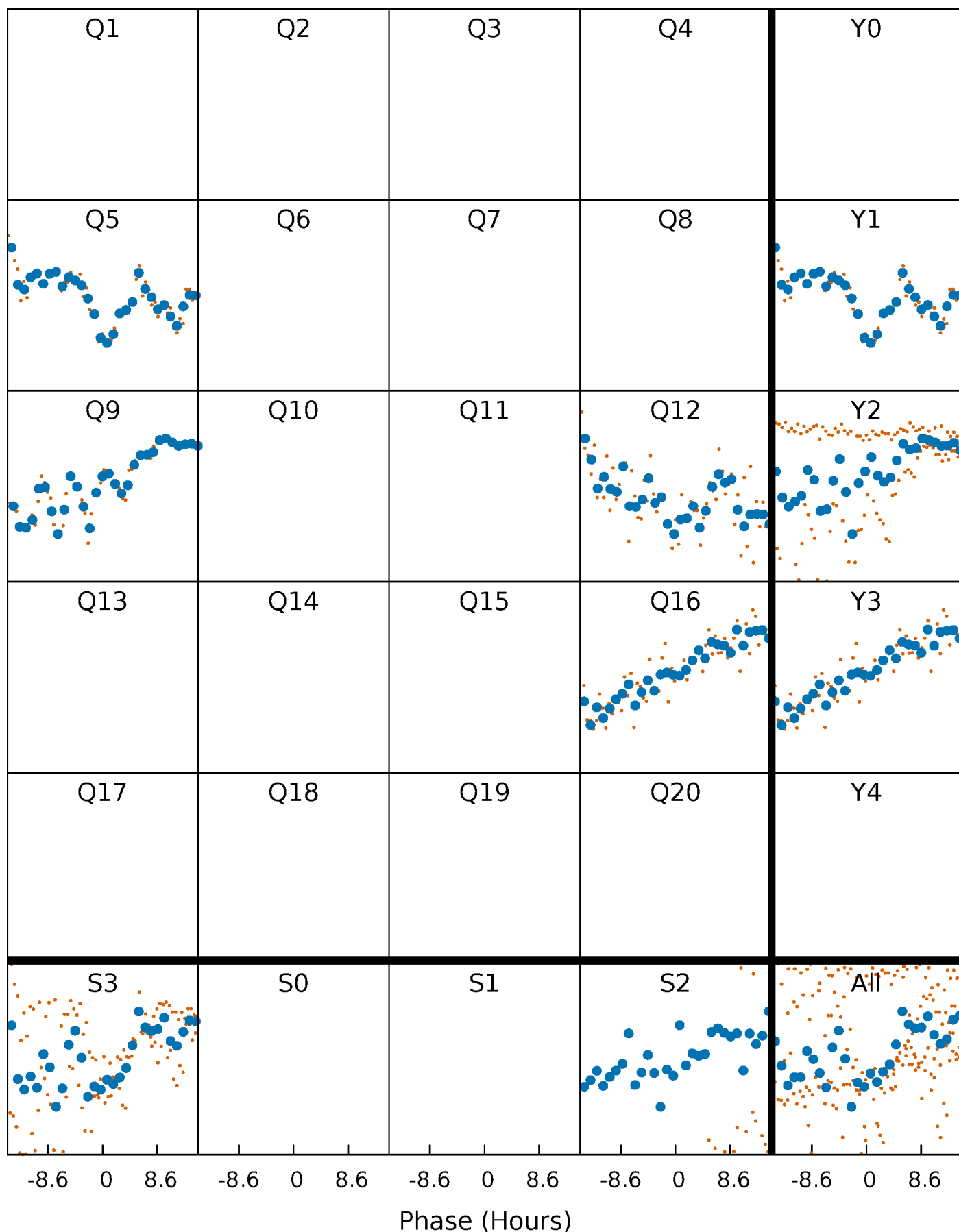


**Planet 5 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



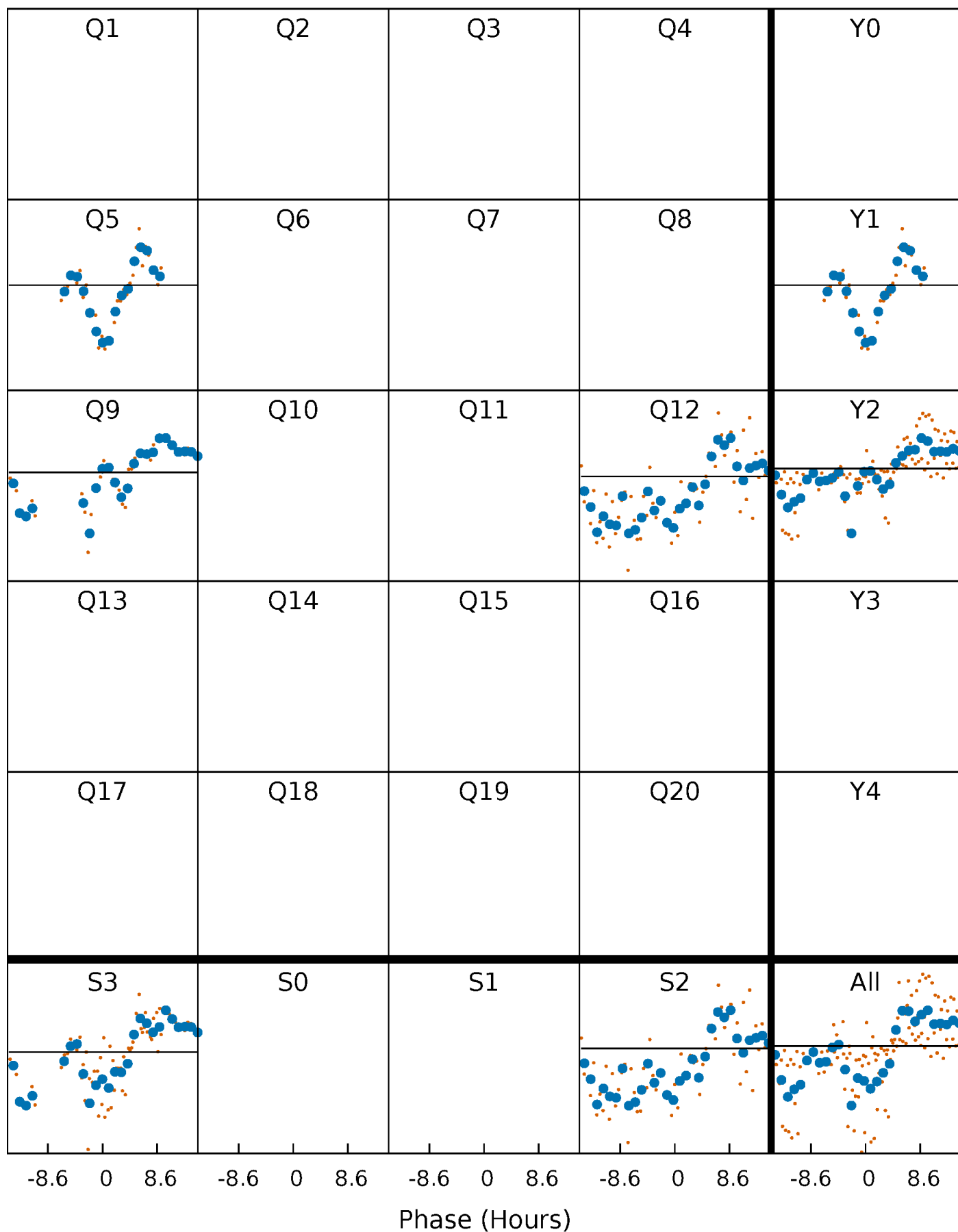
# PDC Quarter-Phased Transit Curves

TCE 001720673-05     $P=326.044694$  Days     $T_0=168.761374$  (BKJD)



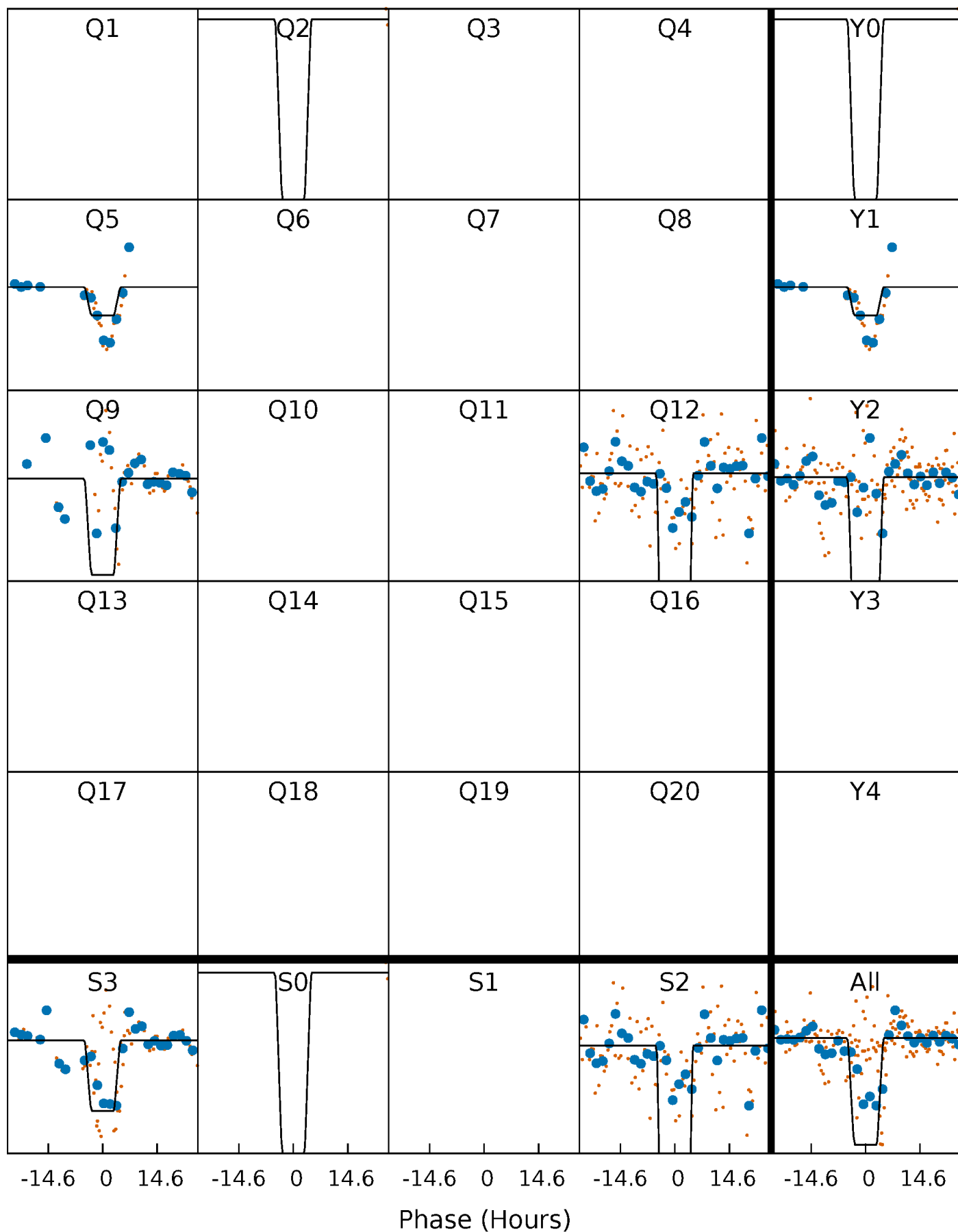
# DV Quarter-Phased Transit Curves

TCE 001720673-05     $P=326.044694$  Days     $T_0=168.761374$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

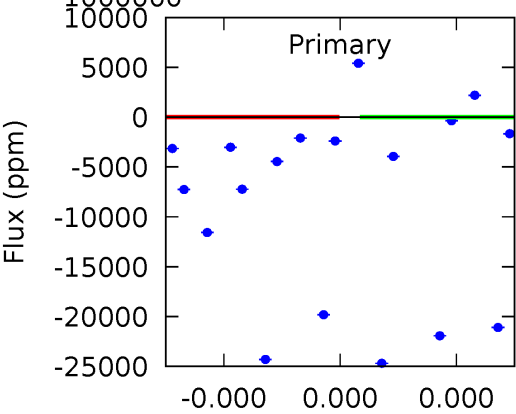
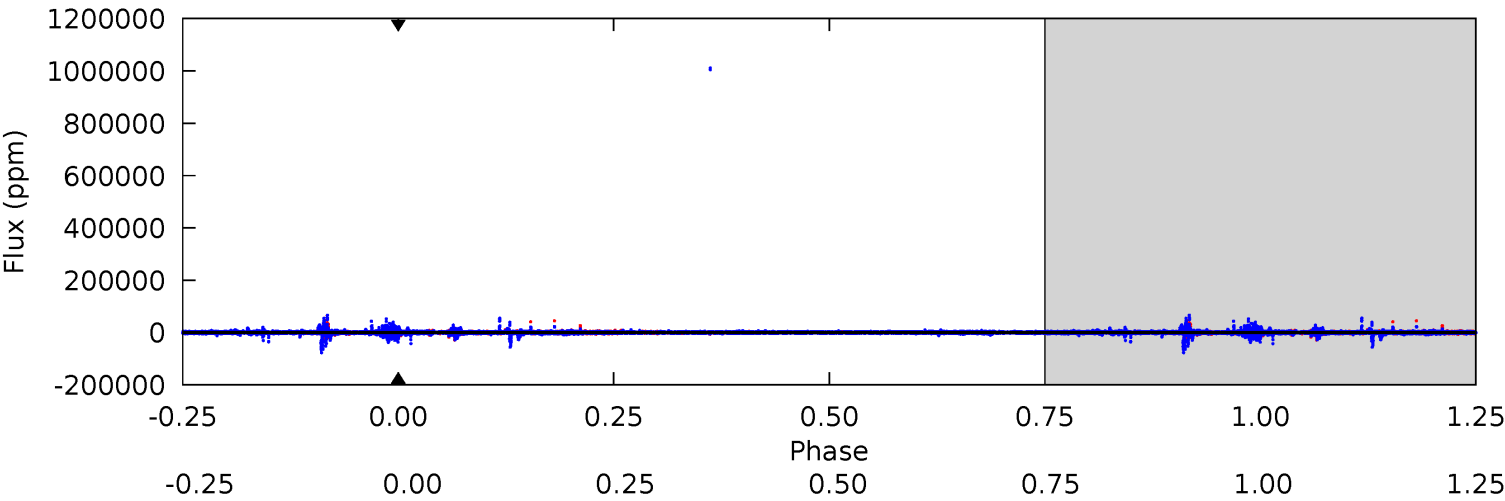
TCE 001720673-05     $P=326.044694$  Days     $T_0=168.731294$  (BKJD)



# DV Model-Shift Uniqueness Test

001720673-05, P = 326.044694 Days, E = 168.761374 Days

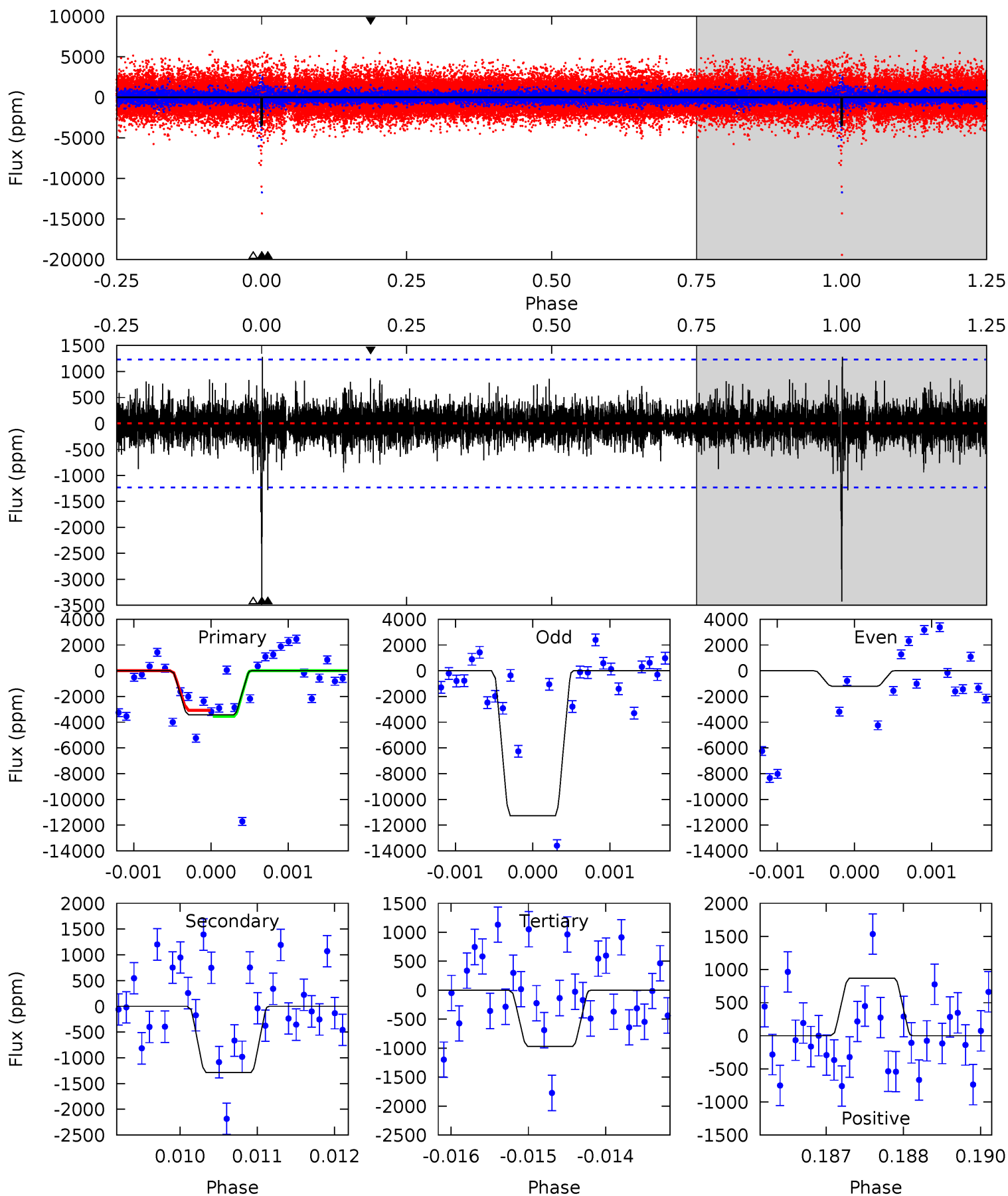
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

001720673-05, P = 326.044694 Days, E = 168.731294 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
15.1	5.64	4.26	3.82	5.41	3.23	0.95	10.8	11.2	1.39	1.82	24.6	6.09	0.27	1.06





### Stellar Parameters For KIC 001720673

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4348^{+118}_{-144}$	$4.672^{+0.058}_{-0.027}$	$-0.600^{+0.300}_{-0.300}$	$0.569^{+0.045}_{-0.056}$	$0.556^{+0.056}_{-0.042}$	$4.239^{+1.221}_{-0.540}$
	+3%/-3%	+1%/-1%	+50%/-50%	+8%/-10%	+10%/-8%	+29%/-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 001720673-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$6.41^{+5.75}_{-4.19}$	$229^{+8}_{-8}$	$4081^{+5252}_{-11602}$	$60963^{+1600132}_{-946157}$
Alt.	$-1283 \pm 227$	$8.98^{+5.67}_{-4.91}$	$230^{+8}_{-8}$	$2794^{+739}_{-346}$	$5130^{+21064}_{-3228}$

$T_{max}$  = 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

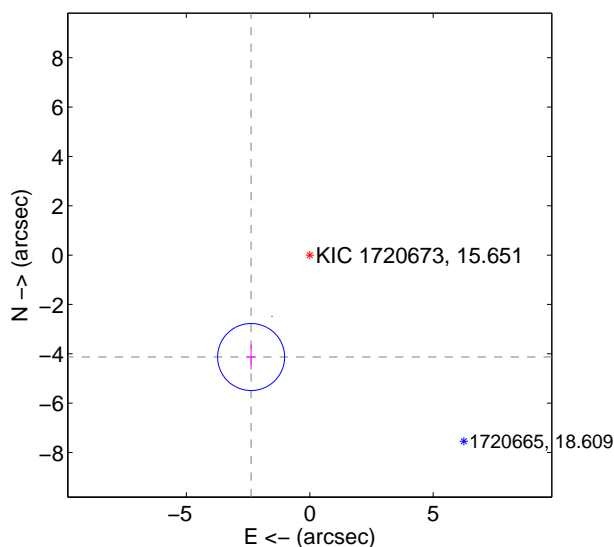
Supplemental centroid analysis for 001720673-05. Kepler magnitude: 15.65. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

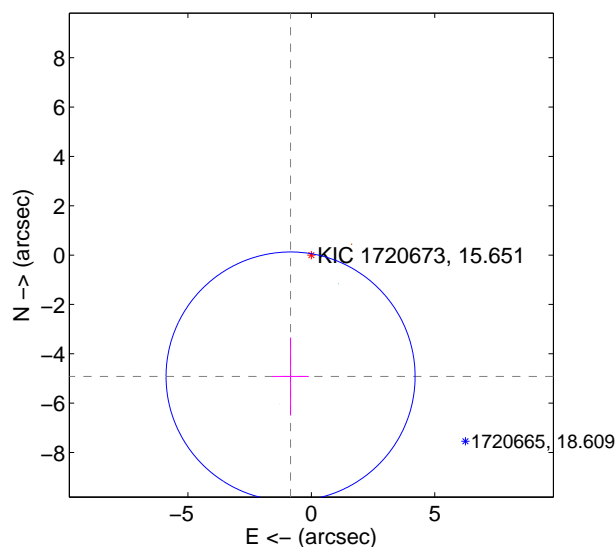
The OOT PRF centroid is offset from the target star catalog position by about 4.31 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	4.766 $\pm$ 0.453	10.53	2.377 $\pm$ 0.200	-4.131 $\pm$ 0.509
PRF-fit source offset from KIC position	4.991 $\pm$ 1.682	2.97	0.841 $\pm$ 0.735	-4.919 $\pm$ 1.581
photometric centroid source offset	4.83 $\pm$ 1.11	4.34	-3.35 $\pm$ 1.01	3.49 $\pm$ 1.20

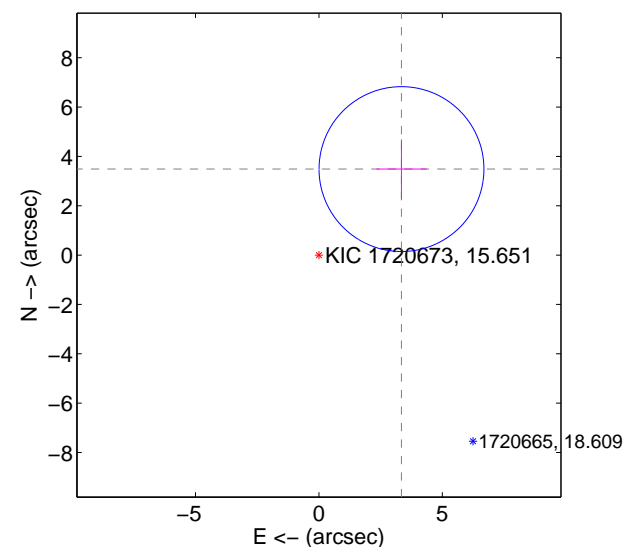
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

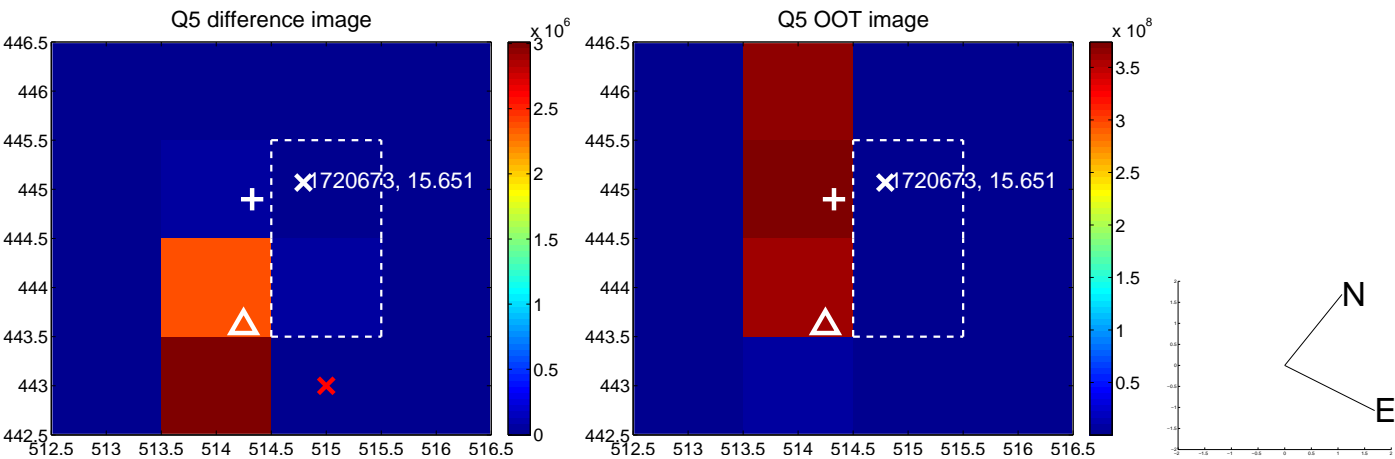


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

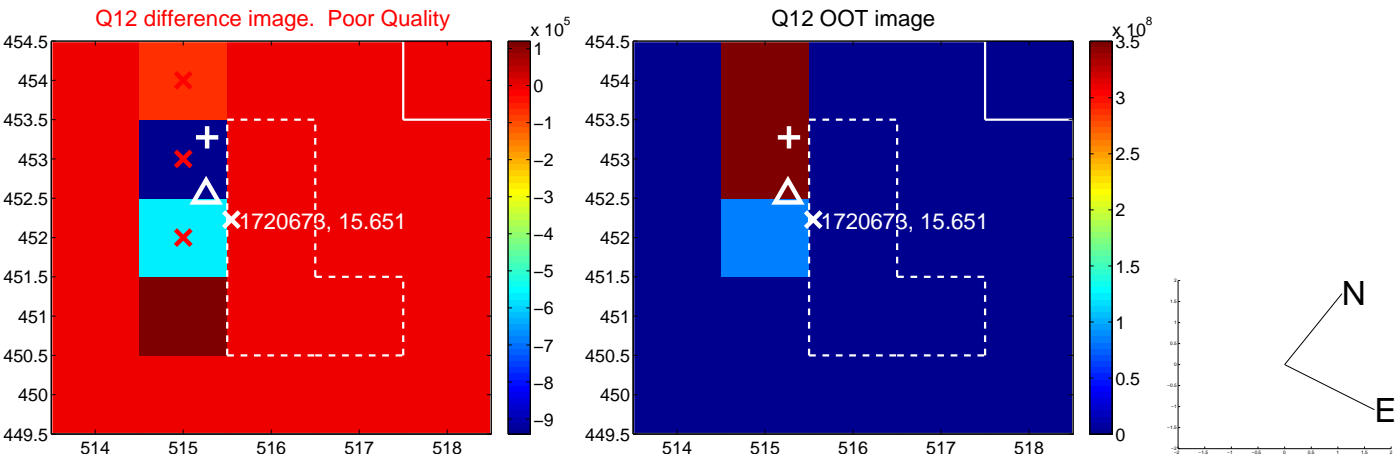
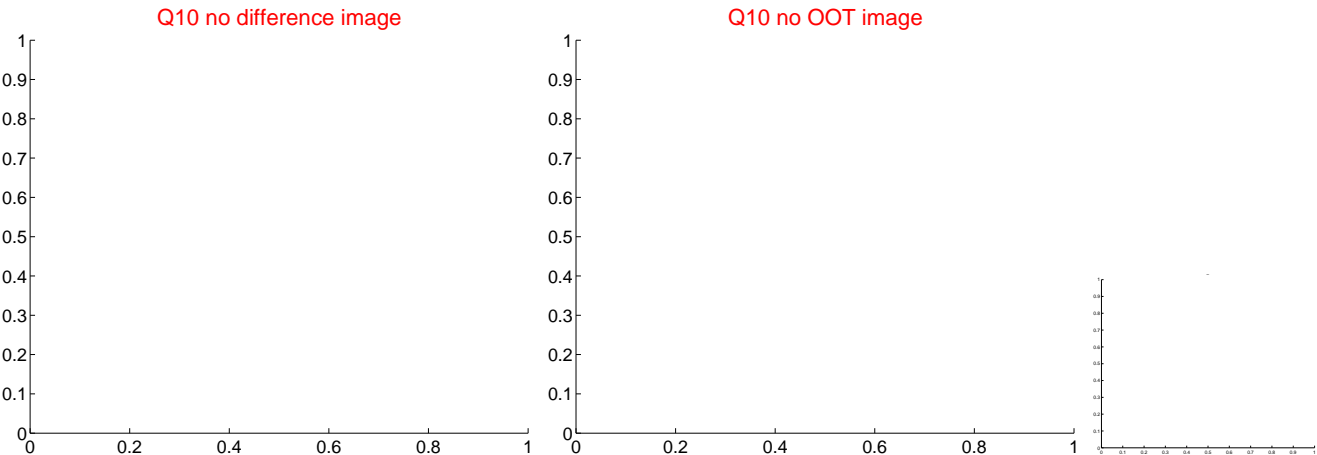
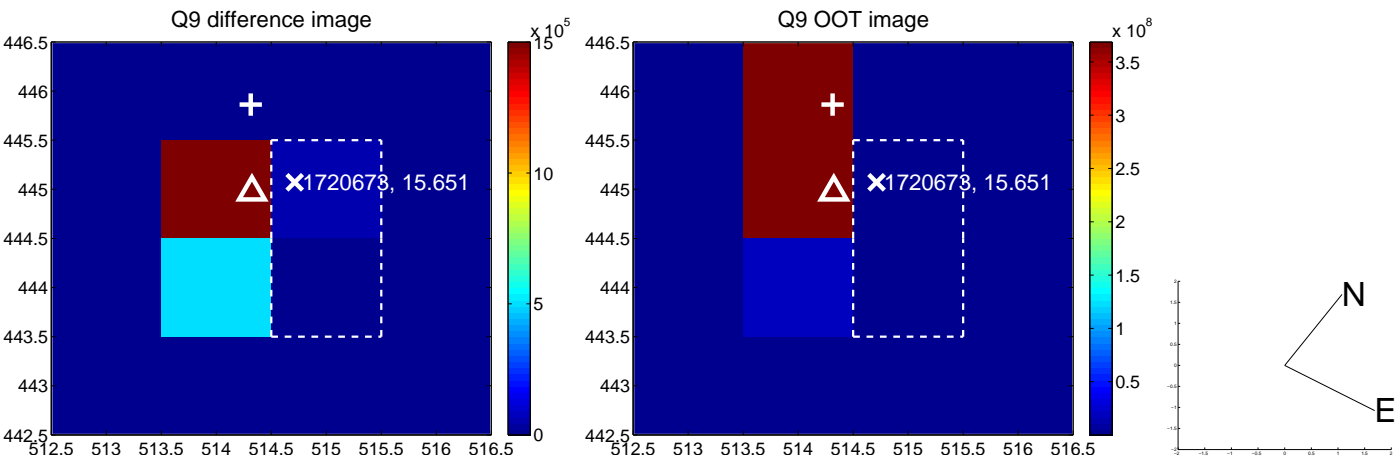
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



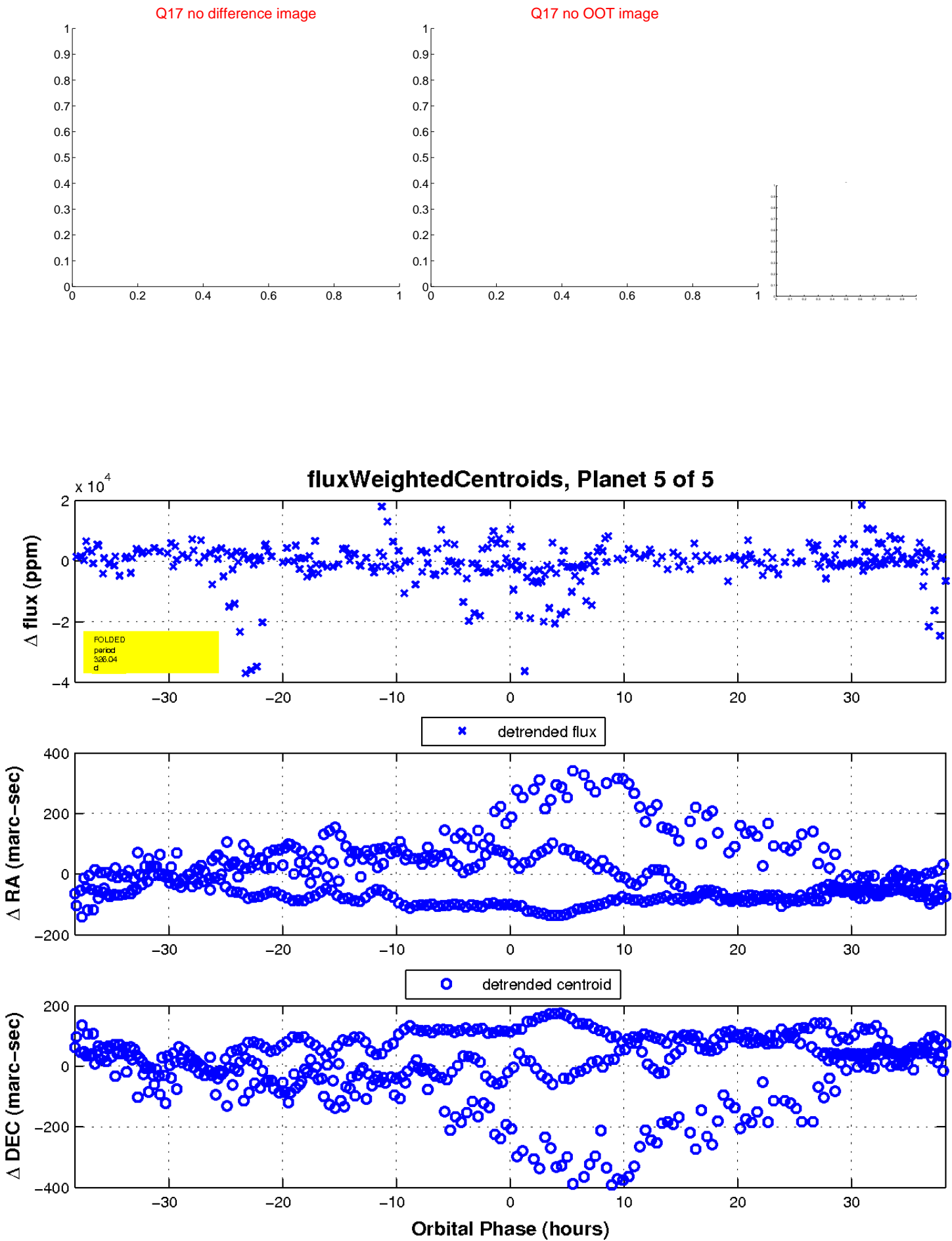
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : 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

