

# KIC 009673173

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009673173-01	OBS	7222.01	21.294740	147.096709	122623.1	7.597	4593.5	3557.8	1.28	6039	66.26	83.83
009673173-02	OBS	No	21.294739	143.692028	98842.4	7.739	3740.5	3079.0	1.28	6039	59.12	83.83
009673173-03	OBS	No	395.055209	326.318188	1415.3	13.817	16.2	15.2	1.28	6039	5.21	1.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009673173-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009673173-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009673173-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

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

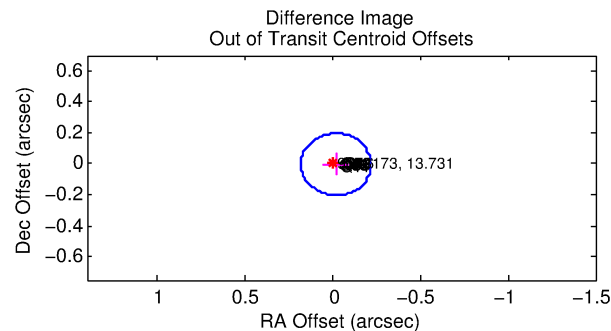
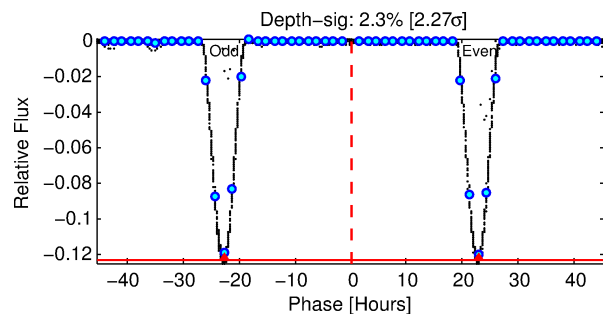
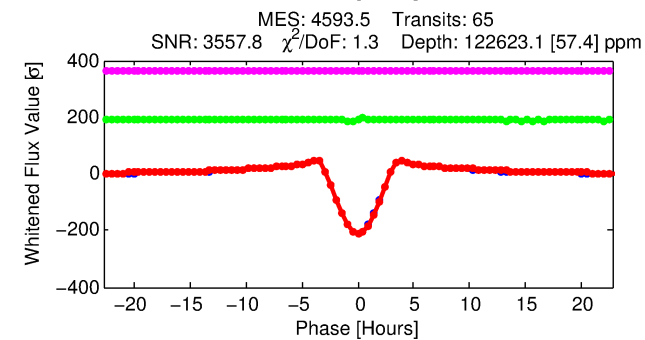
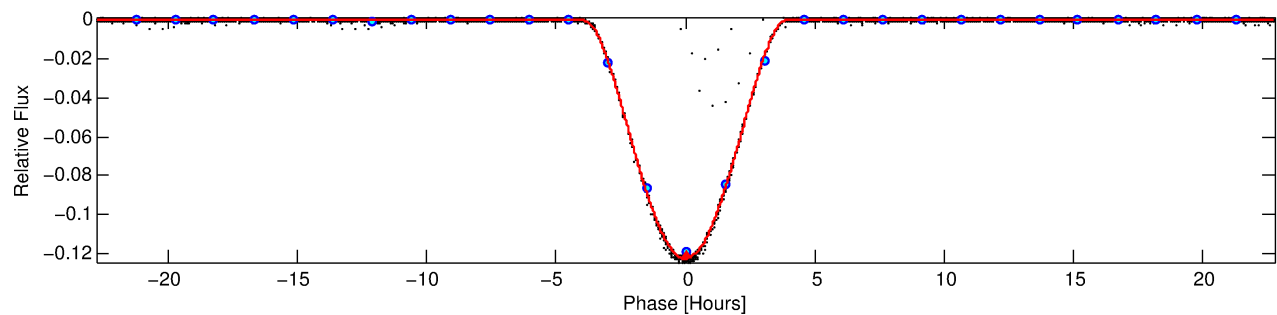
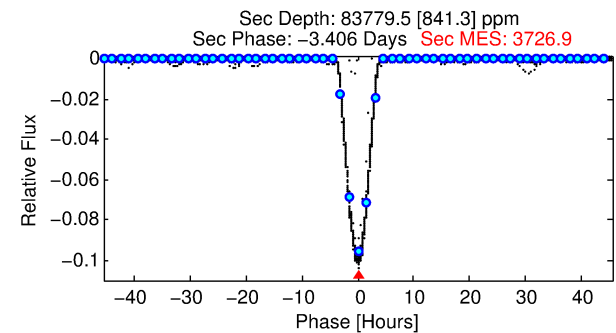
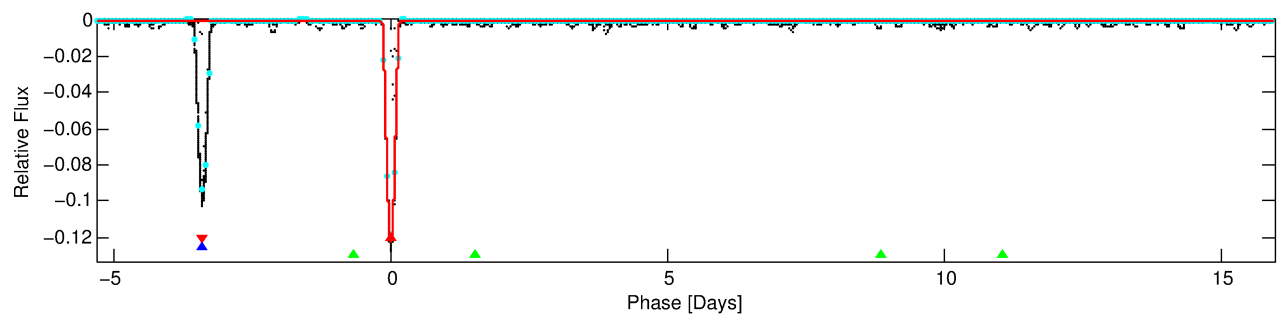
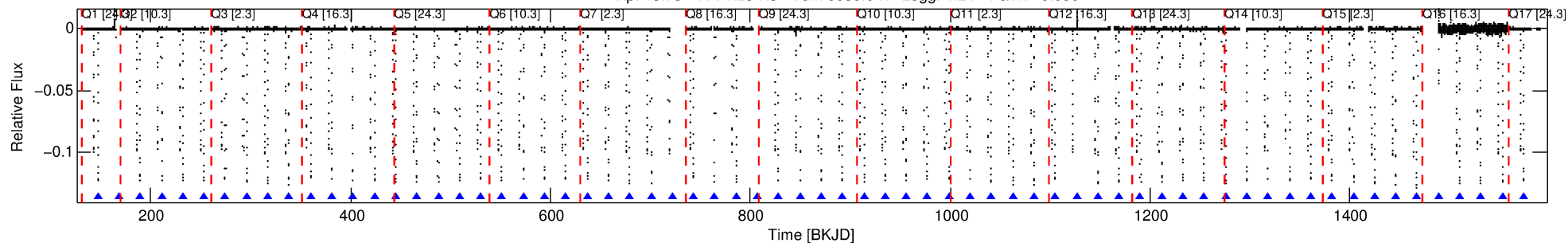
Ephemeris Match Information For 009673173-01

No Significant Match Found

# DV One-Page Summary

KIC: 9673173 Candidate: 1 of 3 Period: 21.295 d  
KOI: K07222.01 Corr: 1.000

Kp: 13.73 R\*: 1.28 Rs Teff: 6039.0 K Logg: 4.24 Fe/H: -0.080



## DV Fit Results:

Period = 21.29474 [0.00000] d  
Epoch = 147.0967 [0.0000] BKJD  
Rp/R\* = 0.4751 [0.0187]  
a/R\* = 24.95 [0.06]  
b = 0.91 [0.03]  
Seff = 83.83 [30.88]  
Teff = 772 [71] K  
Rp = 66.26 [19.10] Re  
a = 0.1524 [0.0365] AU  
Ag = 243.76 [87.09] [2.79σ]  
Teffp = 4714 [170] K [21.45σ]

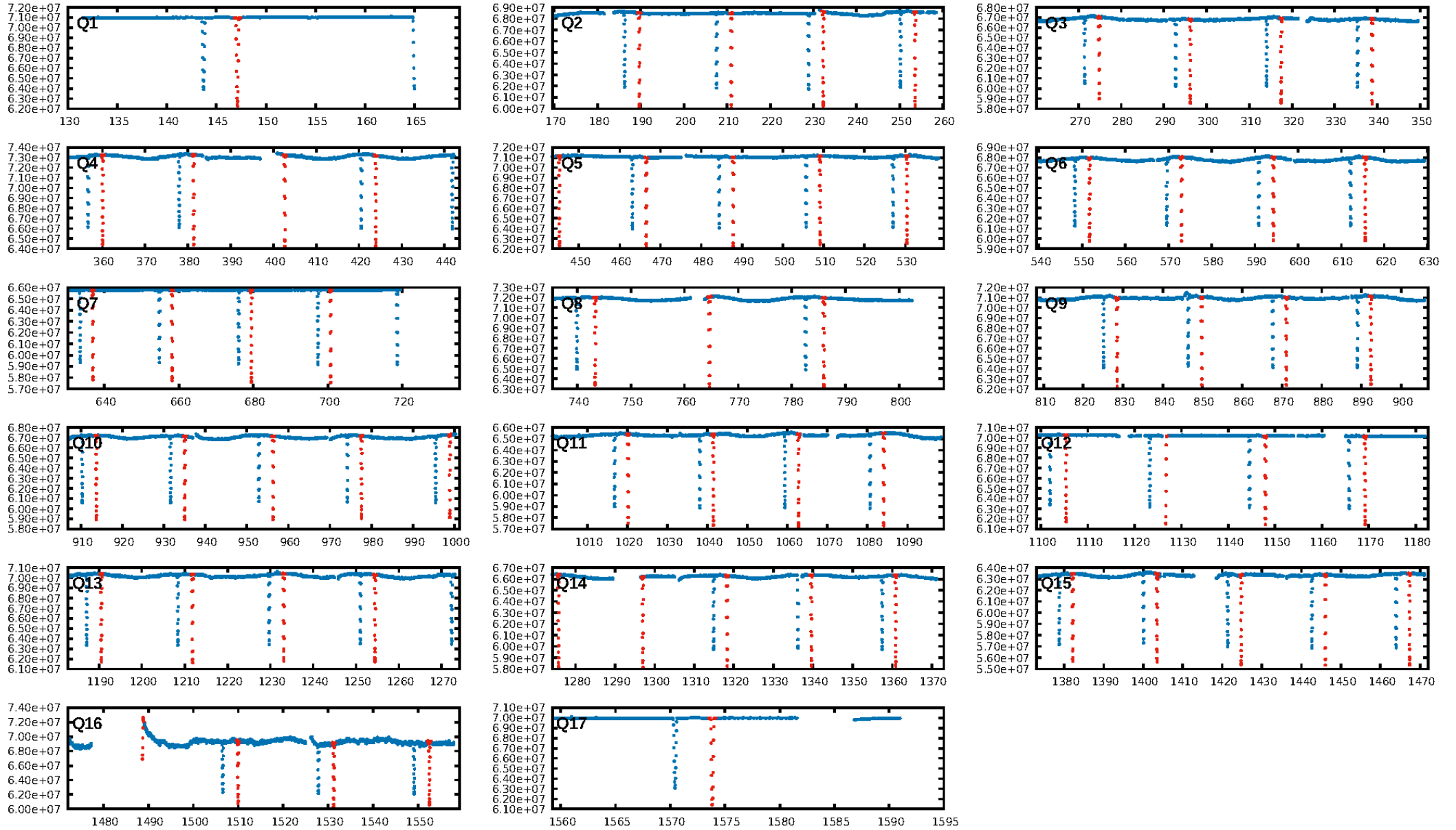
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [568.92σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.3%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [63/63]  
GhostDiagnostic-chr: 5.136  
Centroid-sig: 0.0%  
Centroid-so: 0.515 arcsec [366.81σ]  
OotOffset-rm: 0.019 arcsec [0.29σ]  
KicOffset-rm: 0.069 arcsec [1.03σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

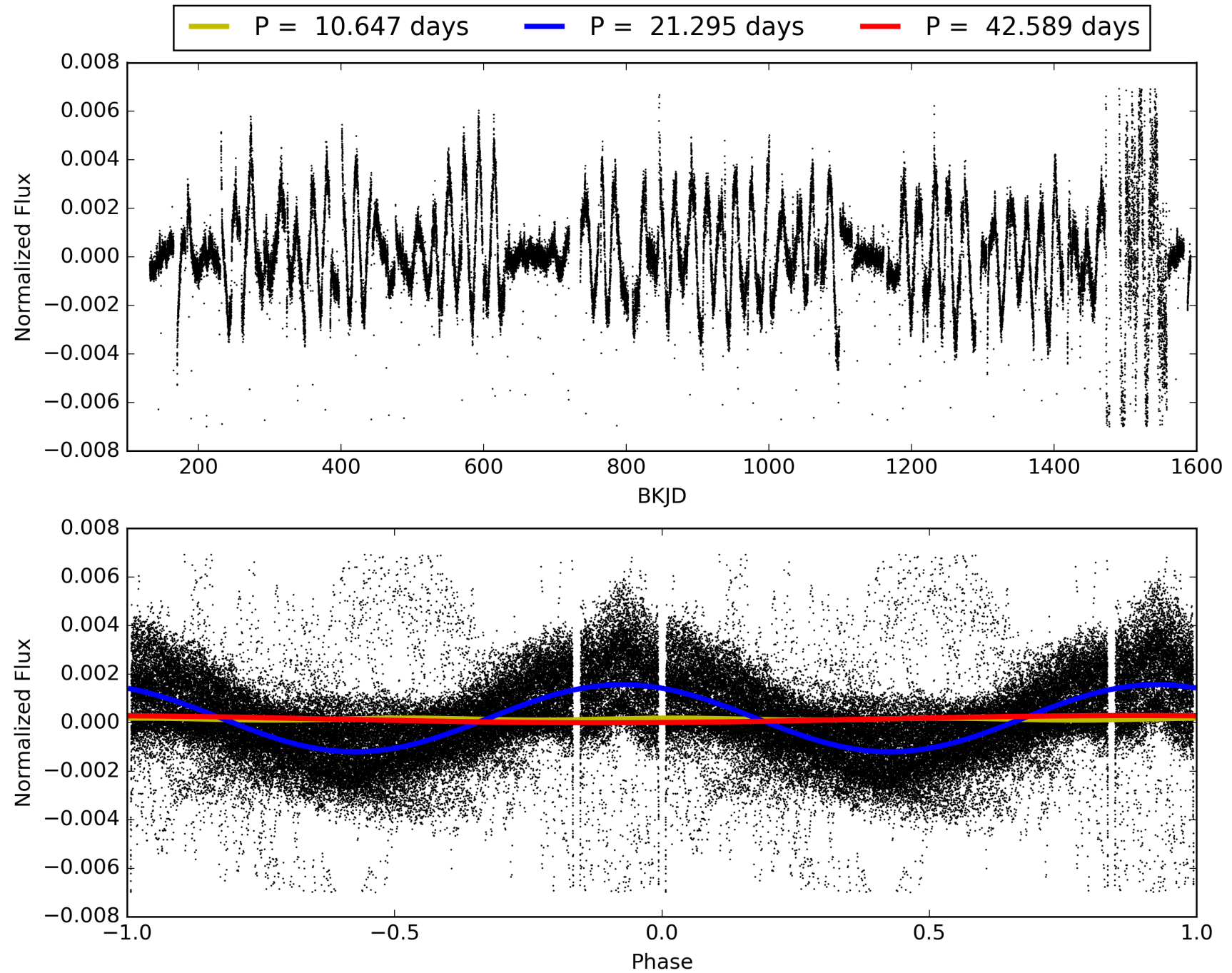
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:55:27 Z

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

# TCE 009673173-01, PDC Light Curves

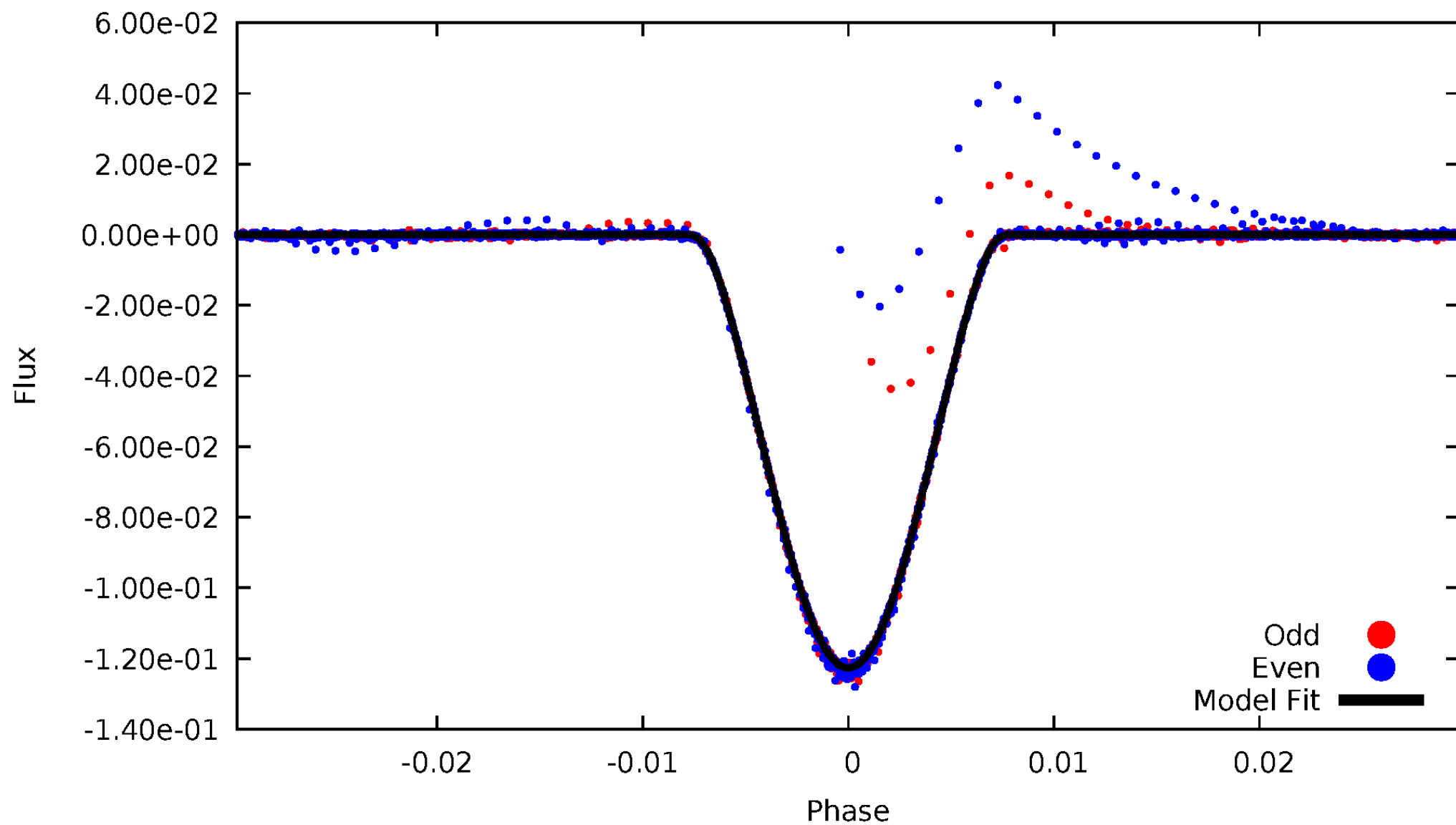


TCE 009673173-01



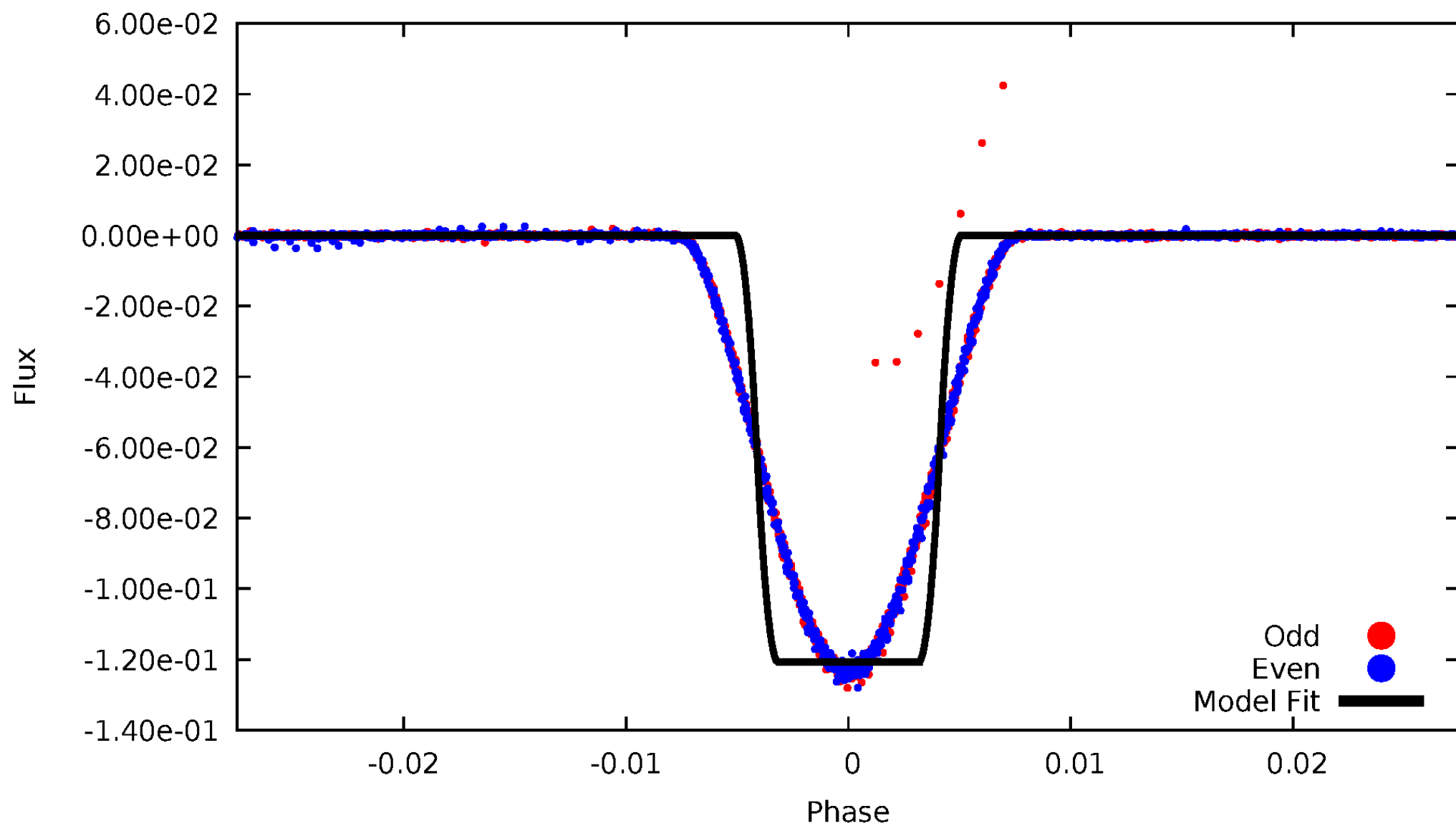
# DV Odd/Even

TCE 009673173-01



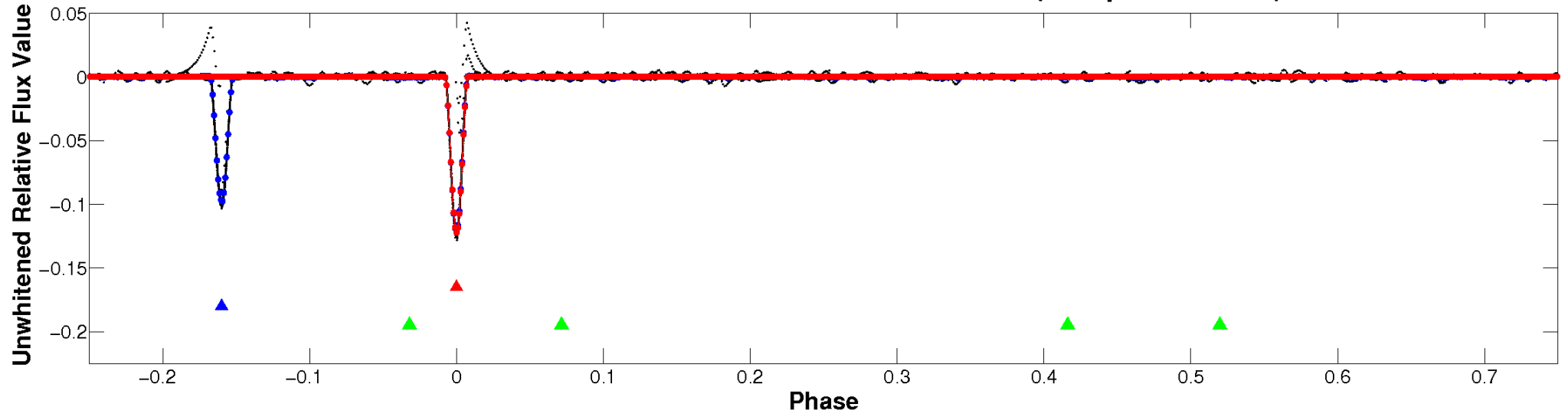
# ALT Odd/Even

TCE 009673173-01

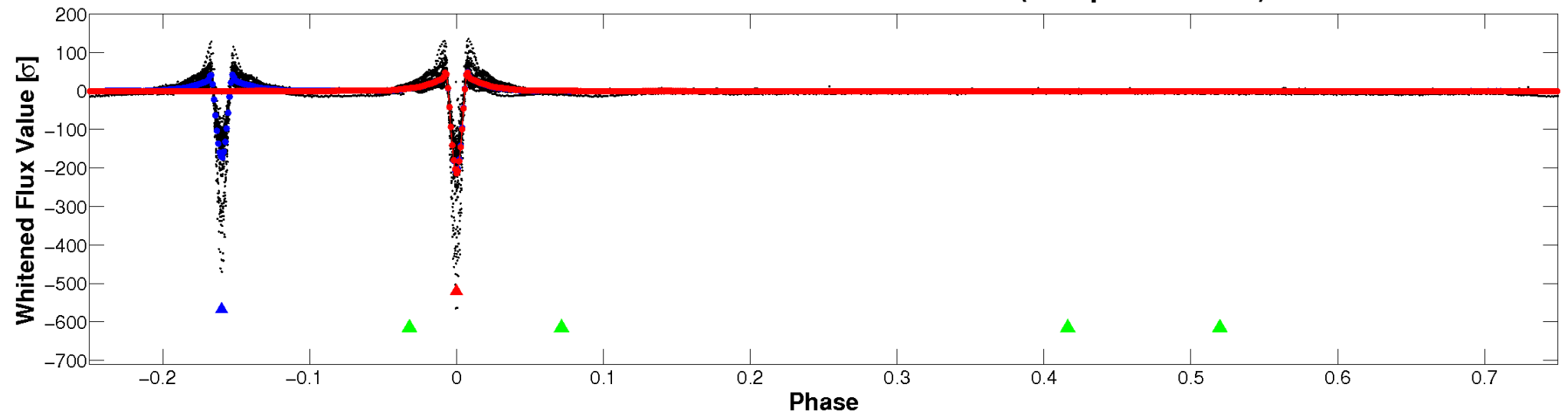


# Non-Whitened Vs. Whitened Light Curve

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

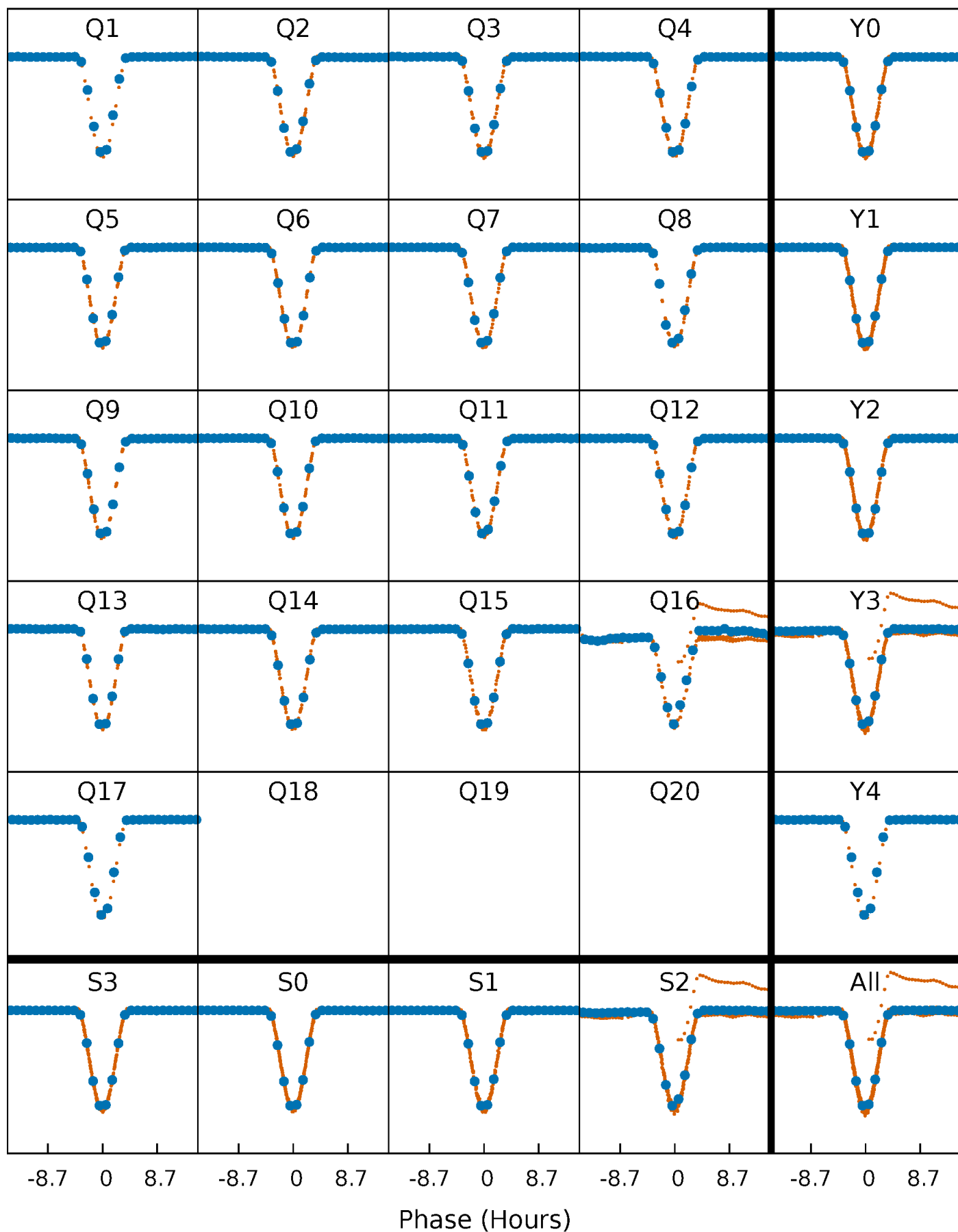


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

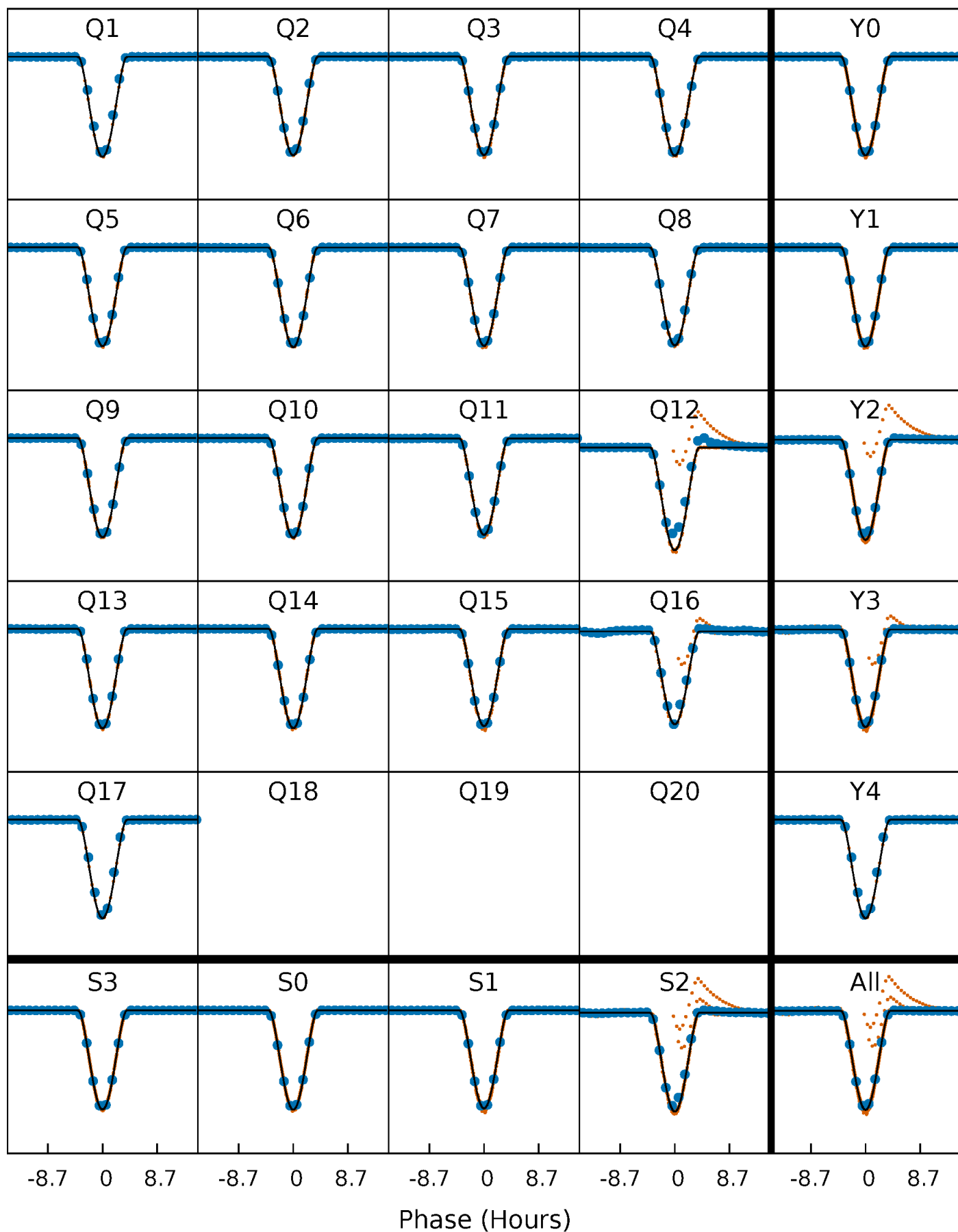
TCE 009673173-01 P= 21.294740 Days  $T_0=147.096709$  (BKJD)





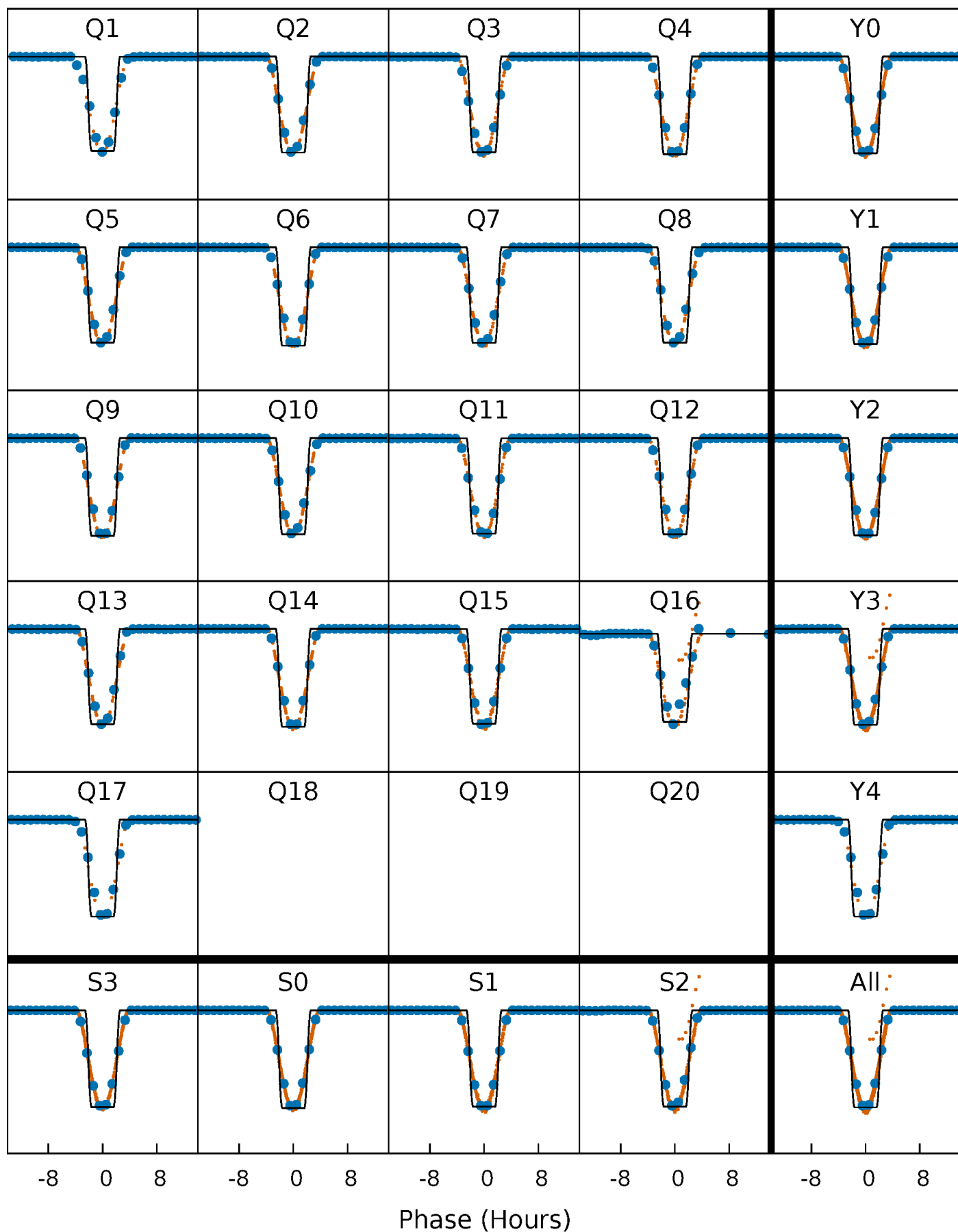
# DV Quarter-Phased Transit Curves

TCE 009673173-01 P= 21.294740 Days  $T_0=147.096709$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

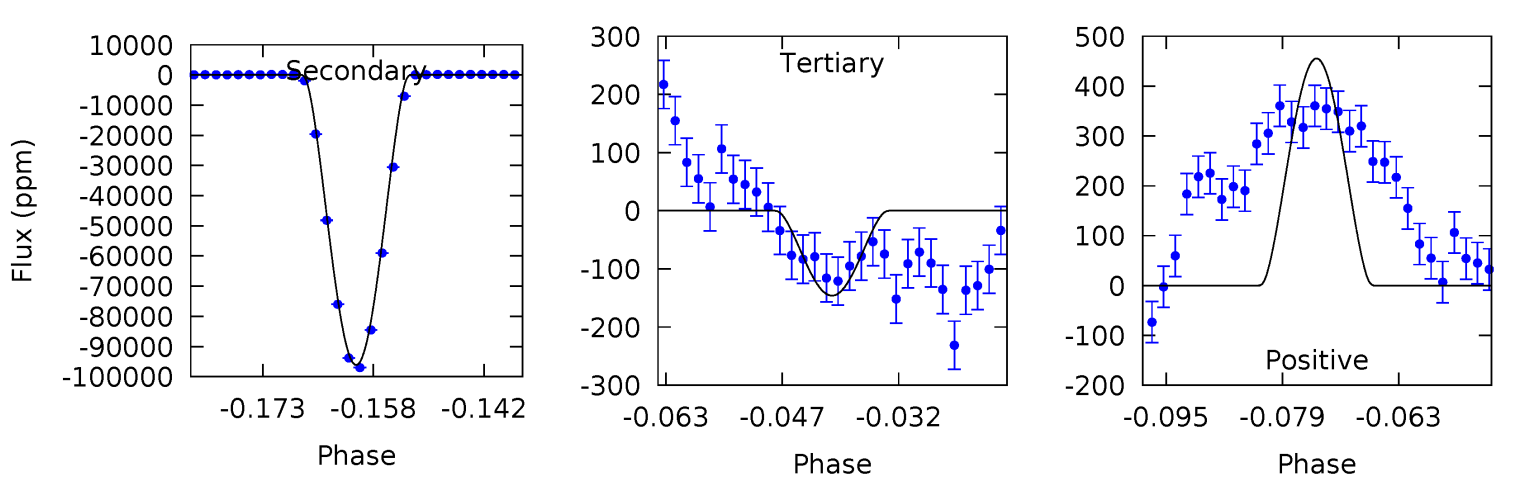
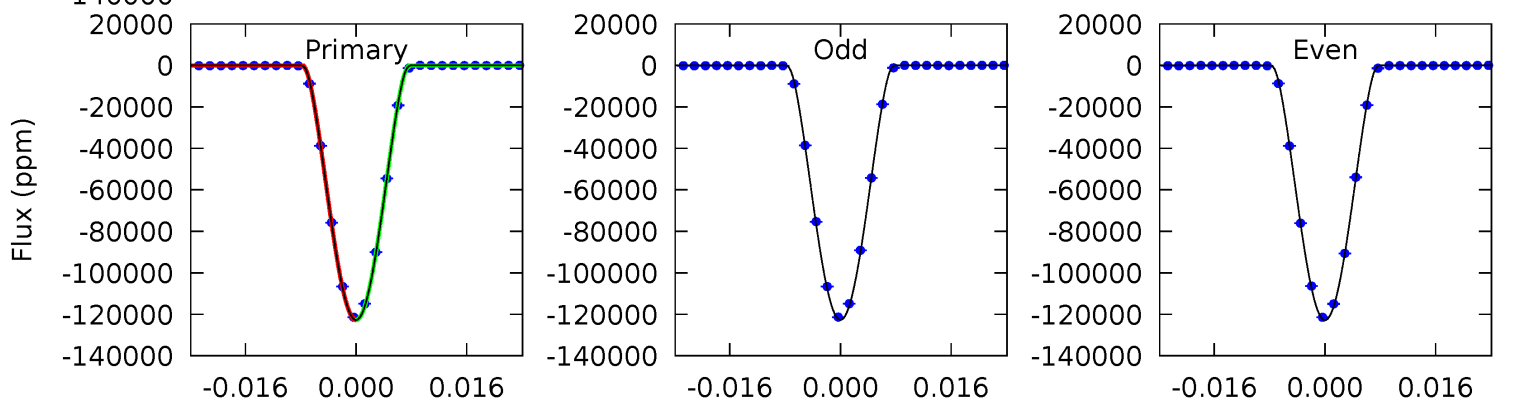
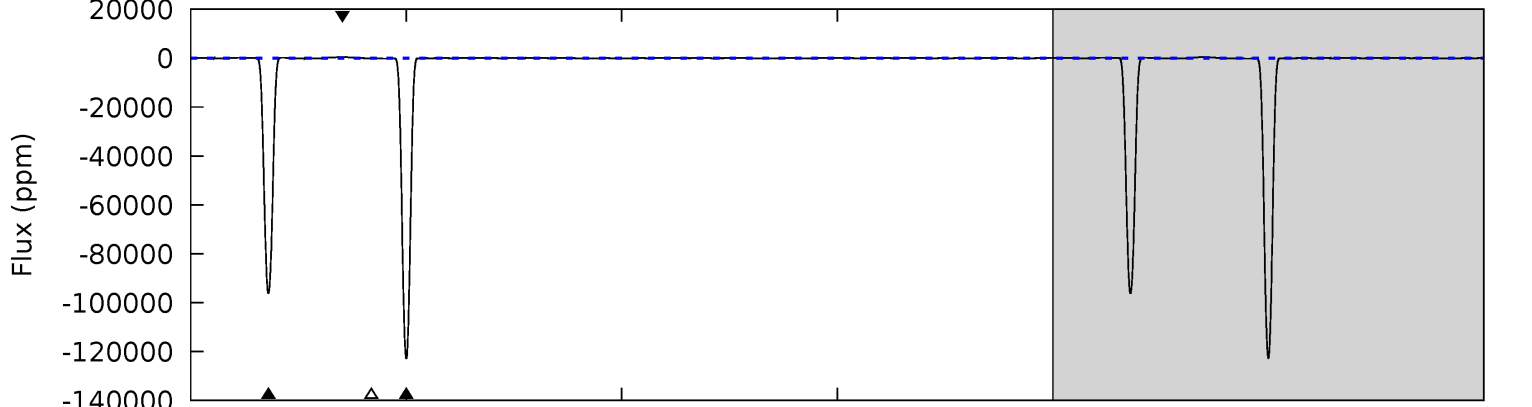
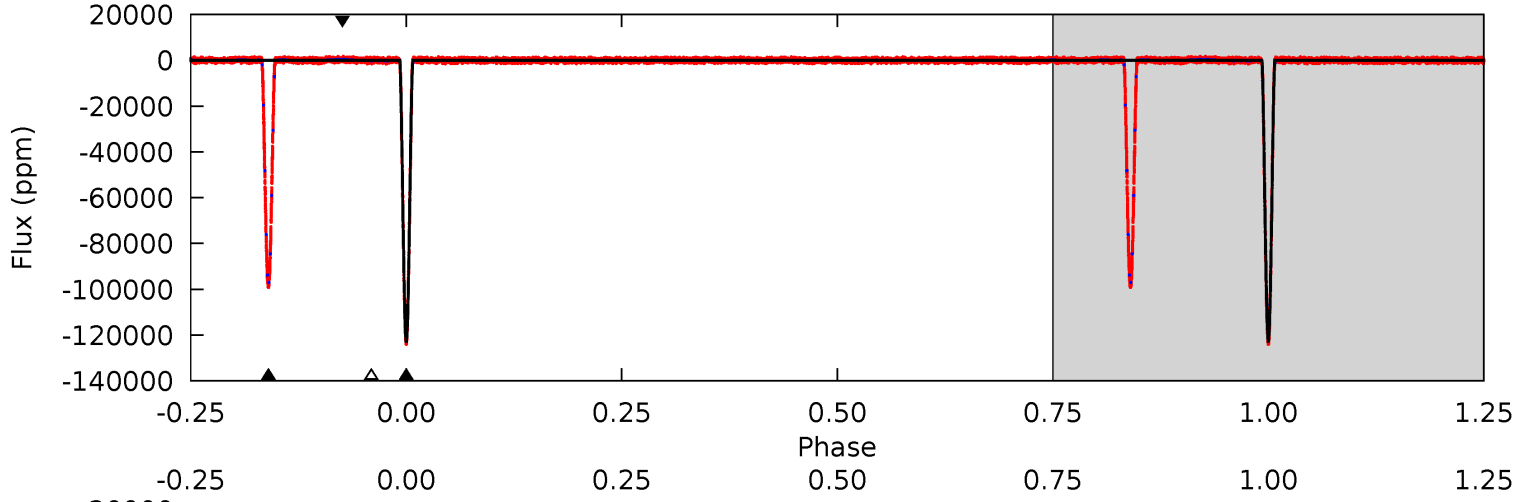
TCE 009673173-01 P= 21.294672 Days  $T_0=147.098723$  (BKJD)



# DV Model-Shift Uniqueness Test

009673173-01, P = 21.294740 Days, E = 125.801969 Days

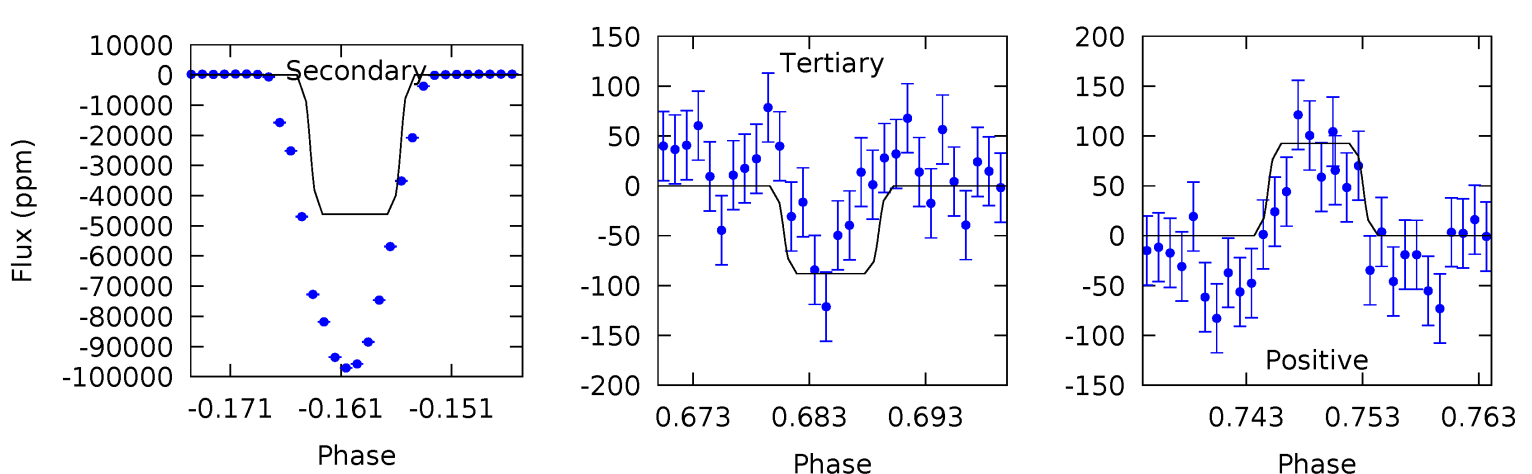
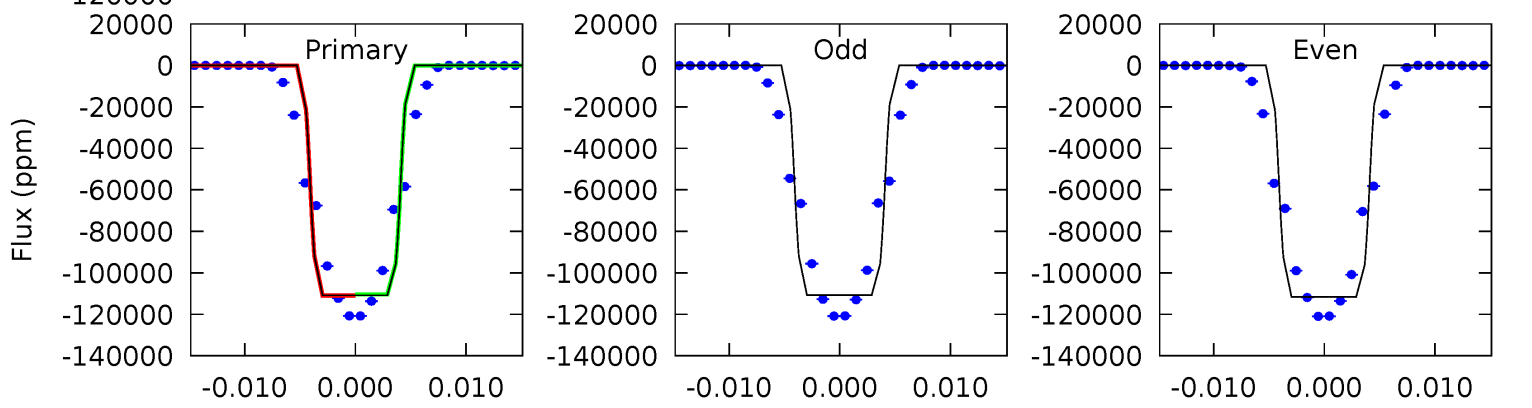
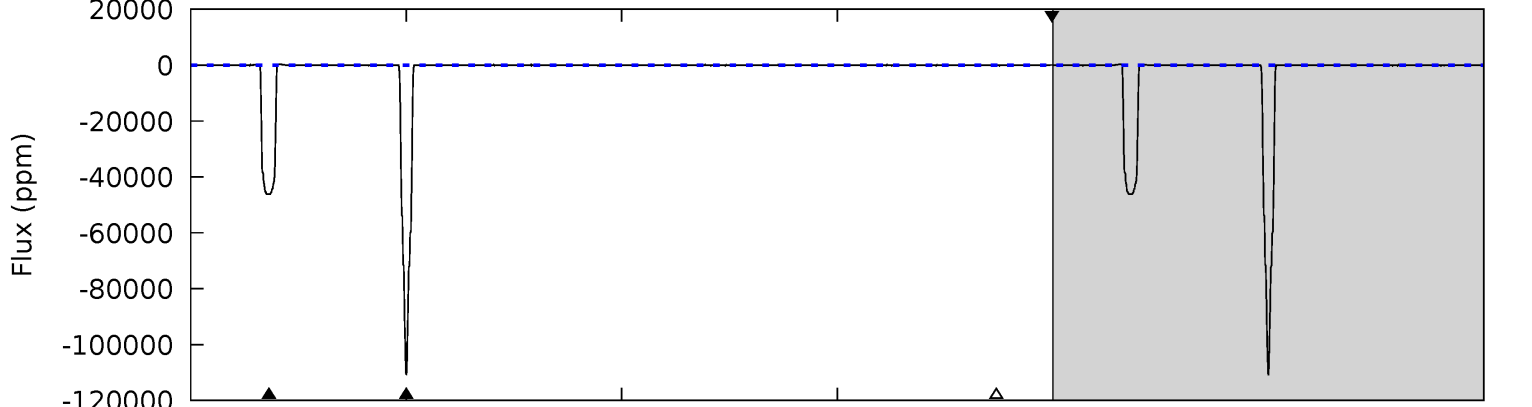
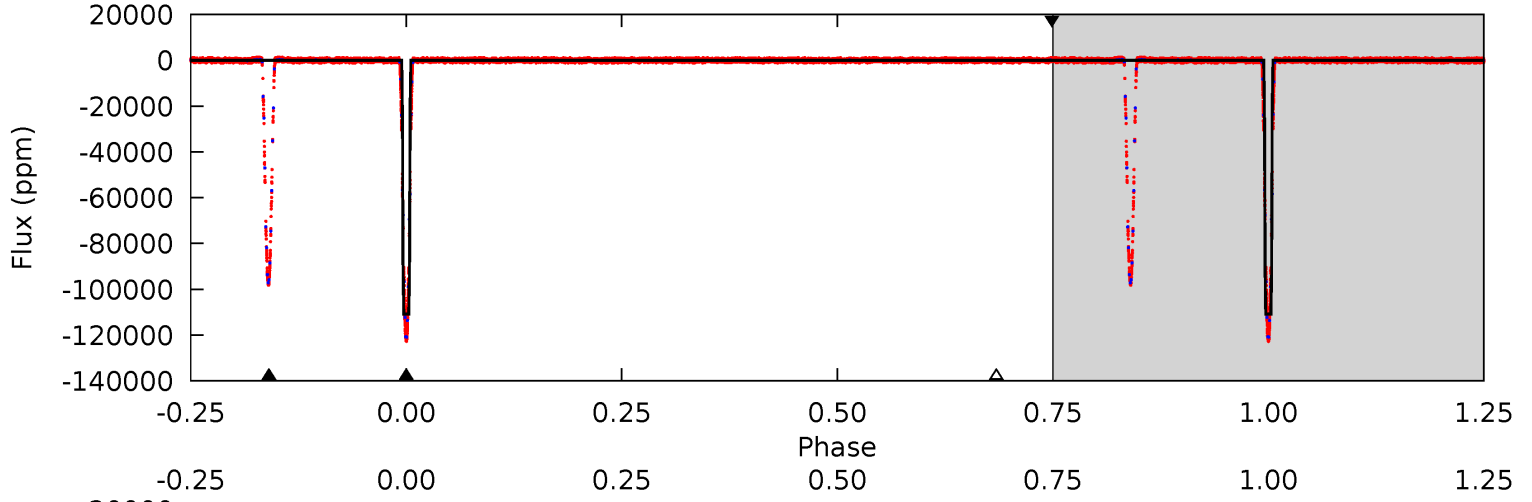
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10080	7893	12.0	37.4	4.94	2.41	6.70	10068	10042	7881	7855	5.67	0.98	0.00	0



# Alt Model-Shift Uniqueness Test

009673173-01, P = 21.294672 Days, E = 125.804051 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
5906	2461	4.69	4.93	5.03	2.57	2.31	5902	5901	2456	2456	19.3	0.99	0.00	0



### Stellar Parameters For KIC 009673173

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6039^{+181}_{-181}$	$4.242^{+0.190}_{-0.190}$	$-0.080^{+0.250}_{-0.300}$	$1.278^{+0.365}_{-0.299}$	$1.041^{+0.159}_{-0.130}$	$0.702^{+0.695}_{-0.348}$
	+3%/-3%	+4%/-4%	+312%/-375%	+29%/-23%	+15%/-12%	+99%/-50%
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 009673173-01 / KOI 7222.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-96106 \pm 12$	$66.83^{+10.88}_{-9.47}$	$1079^{+91}_{-77}$	$5077^{+174}_{-168}$	$306^{+104}_{-77}$
Alt.	$-46184 \pm 19$	$48.58^{+8.18}_{-6.51}$	$1081^{+80}_{-76}$	$4911^{+155}_{-163}$	$264^{+80}_{-68}$

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

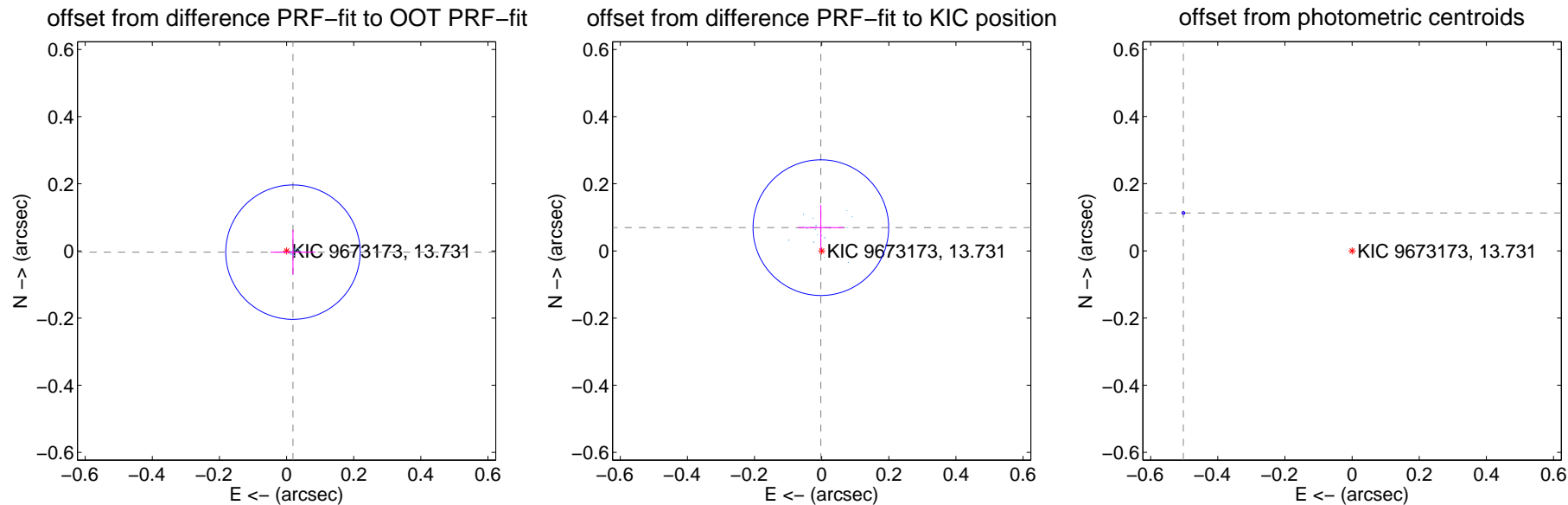
## DV Centroid Data

Supplemental centroid analysis for 009673173-01. Kepler magnitude: 13.73. Transit SNR 3557.82

There are 17 quarters with good PRF difference image offsets

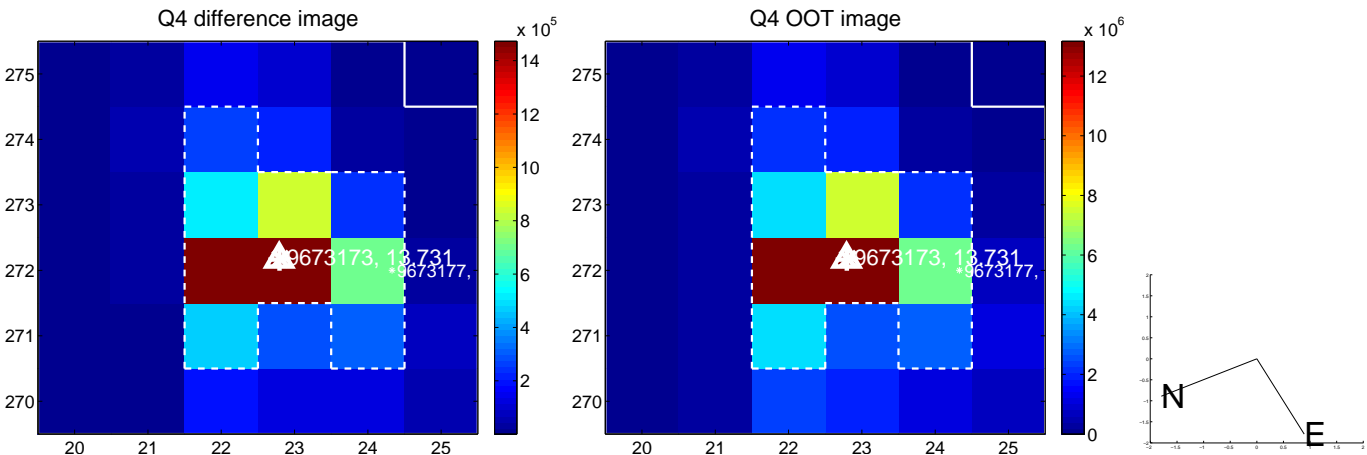
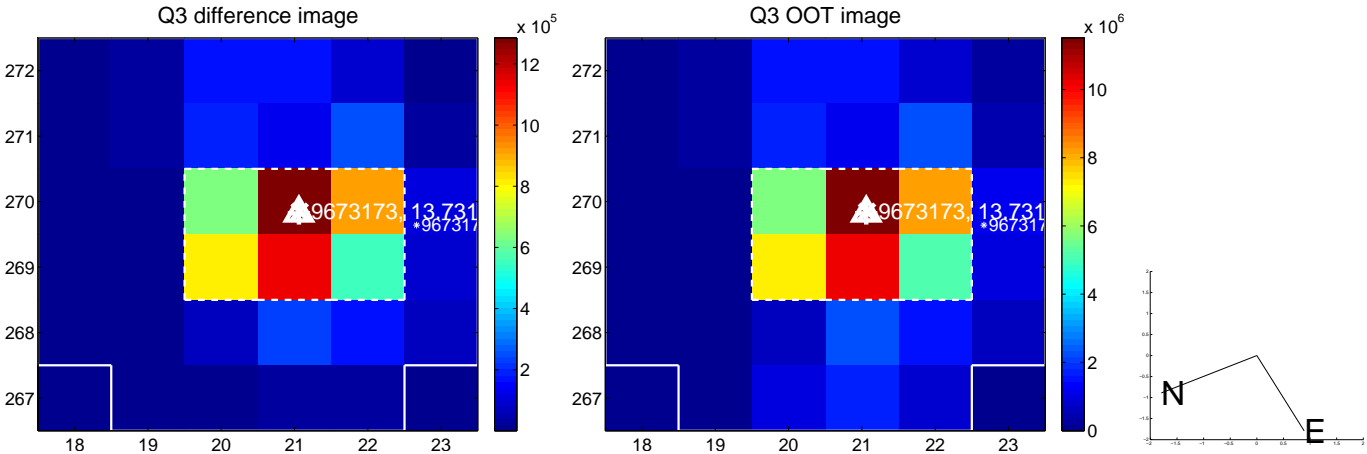
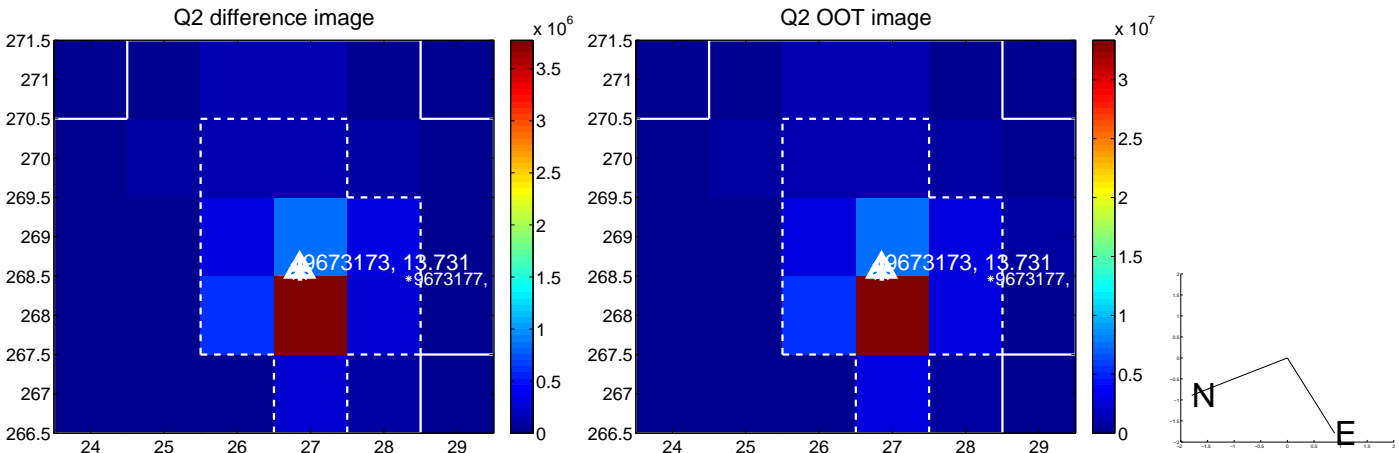
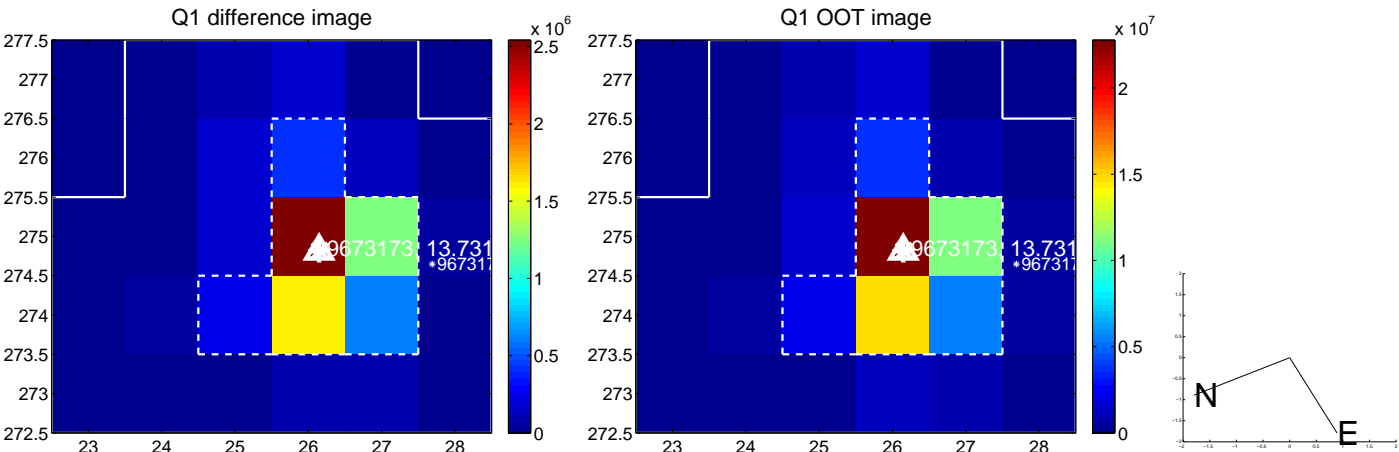
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.019 \pm 0.067$	0.29	$-0.019 \pm 0.067$	$-0.004 \pm 0.067$
PRF-fit source offset from KIC position	$0.069 \pm 0.067$	1.03	$0.002 \pm 0.068$	$0.069 \pm 0.067$
photometric centroid source offset	$0.52 \pm 0.00$	366.81	$0.50 \pm 0.00$	$0.11 \pm 0.00$

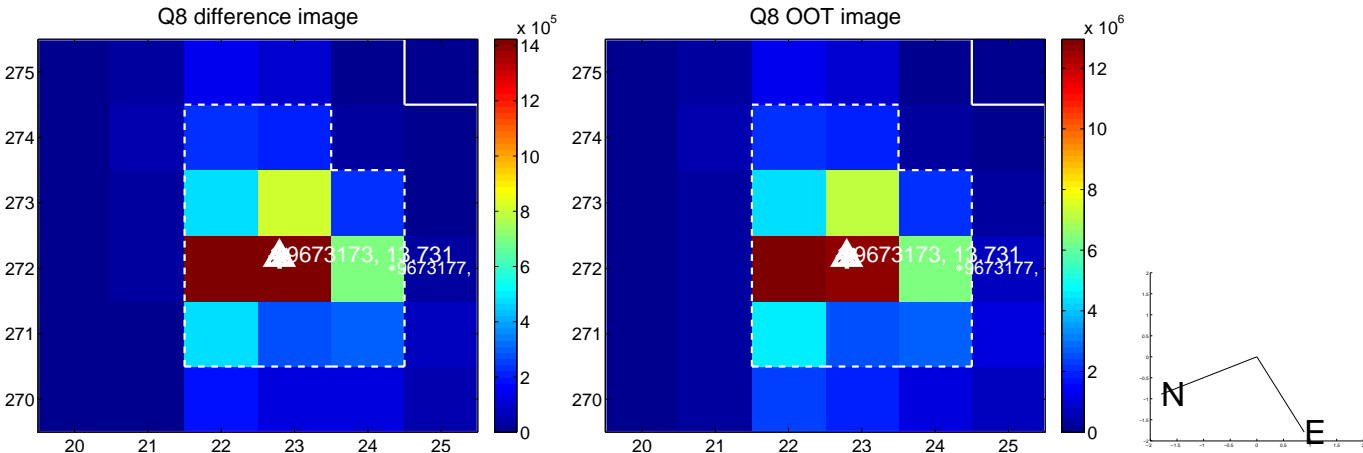
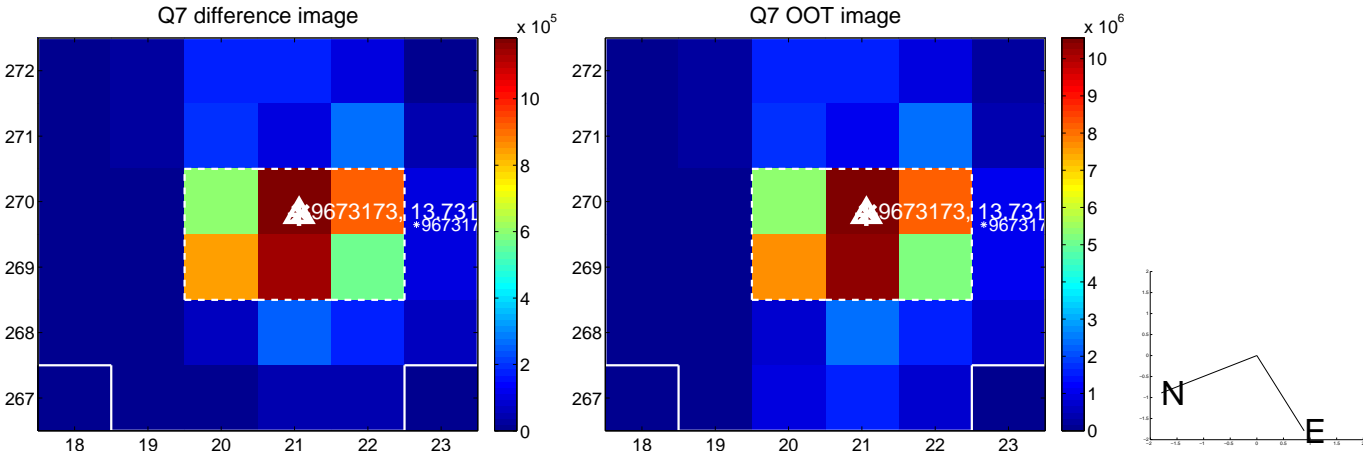
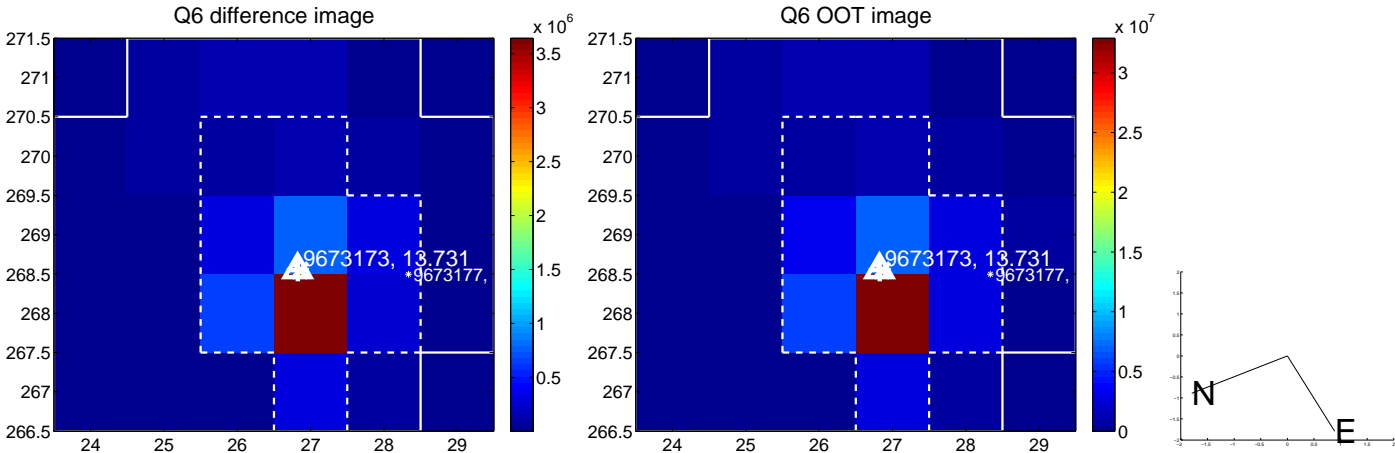
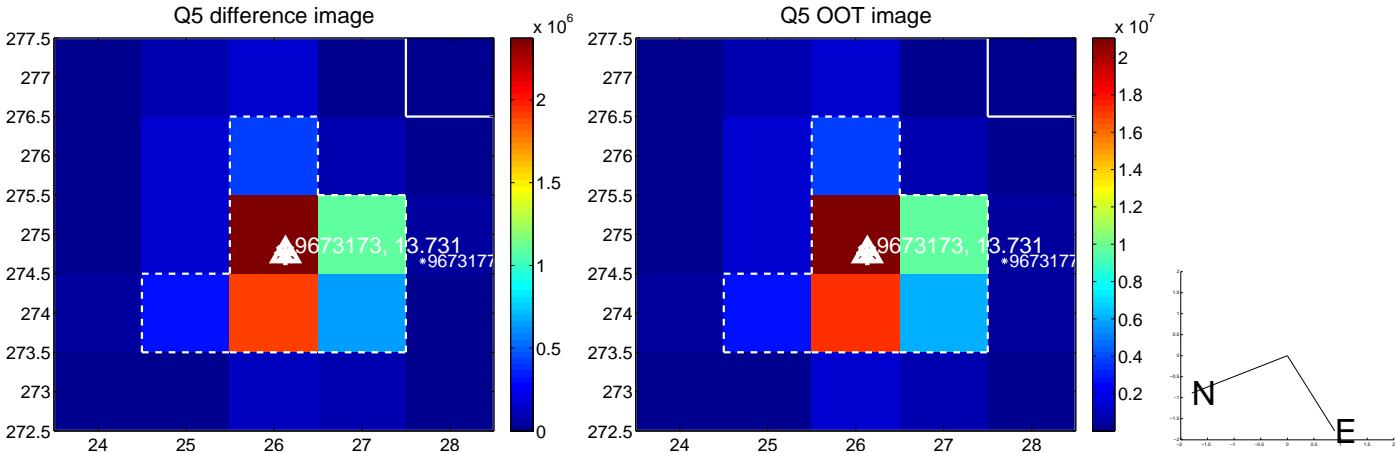


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

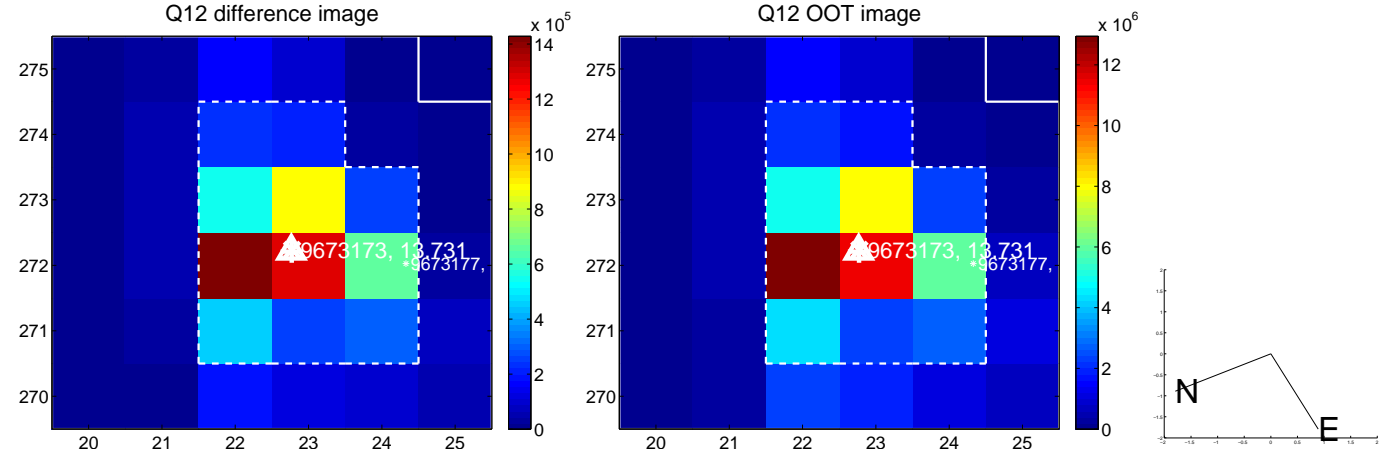
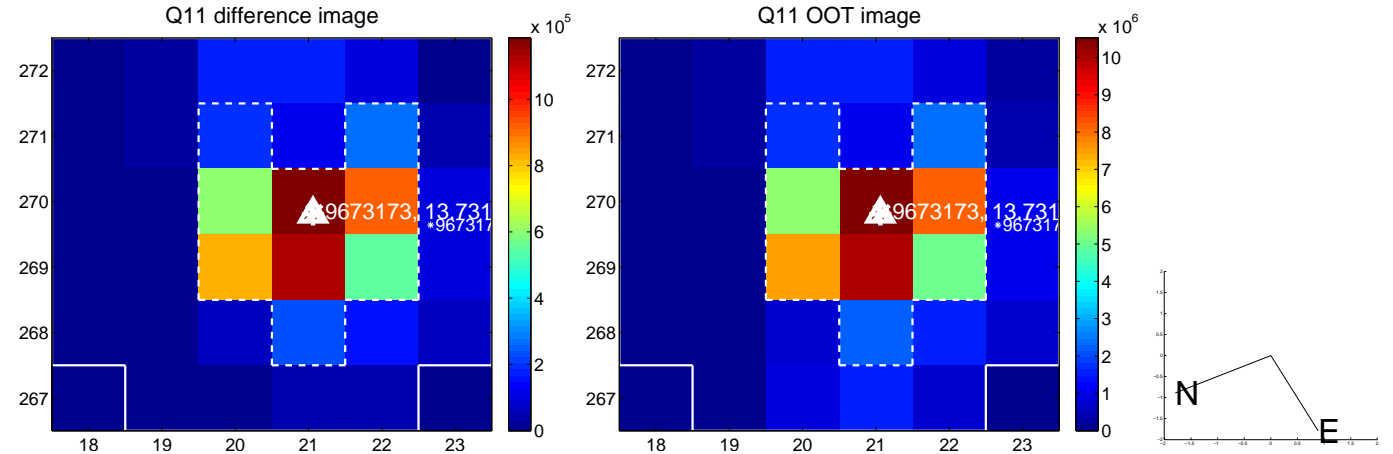
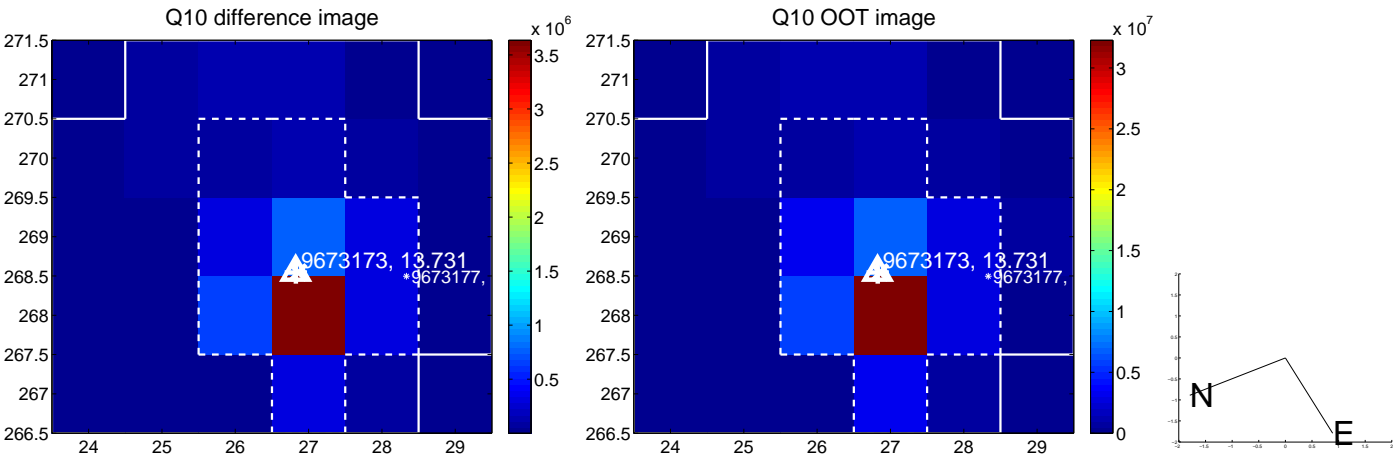
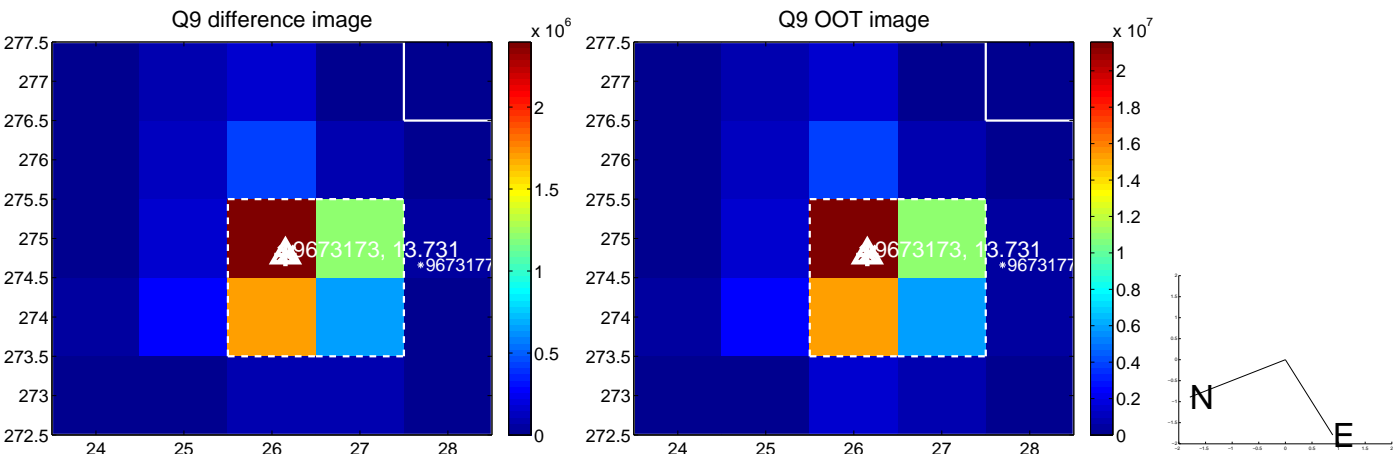


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

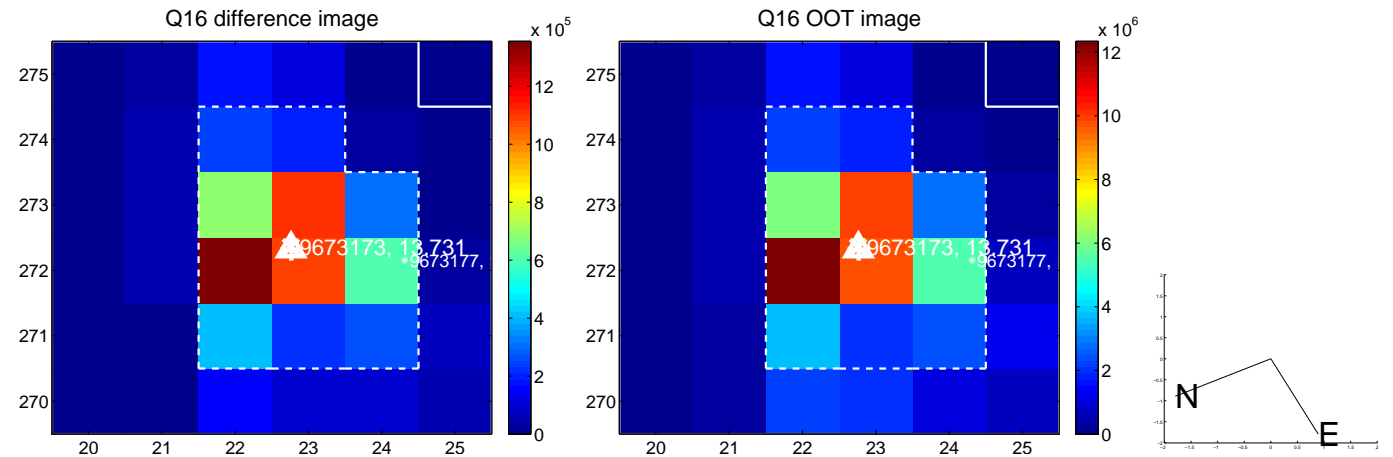
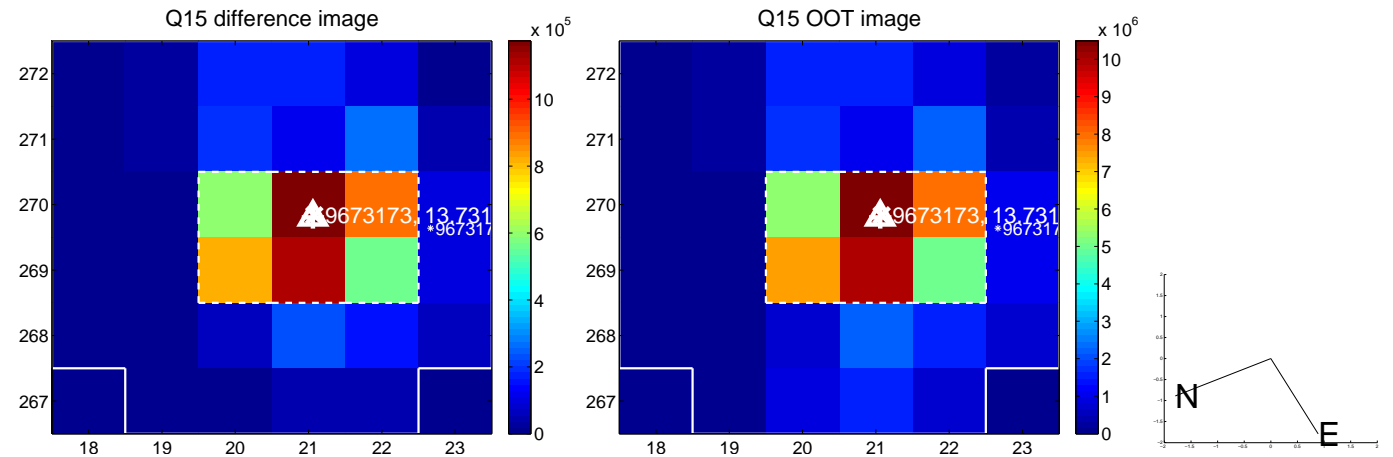
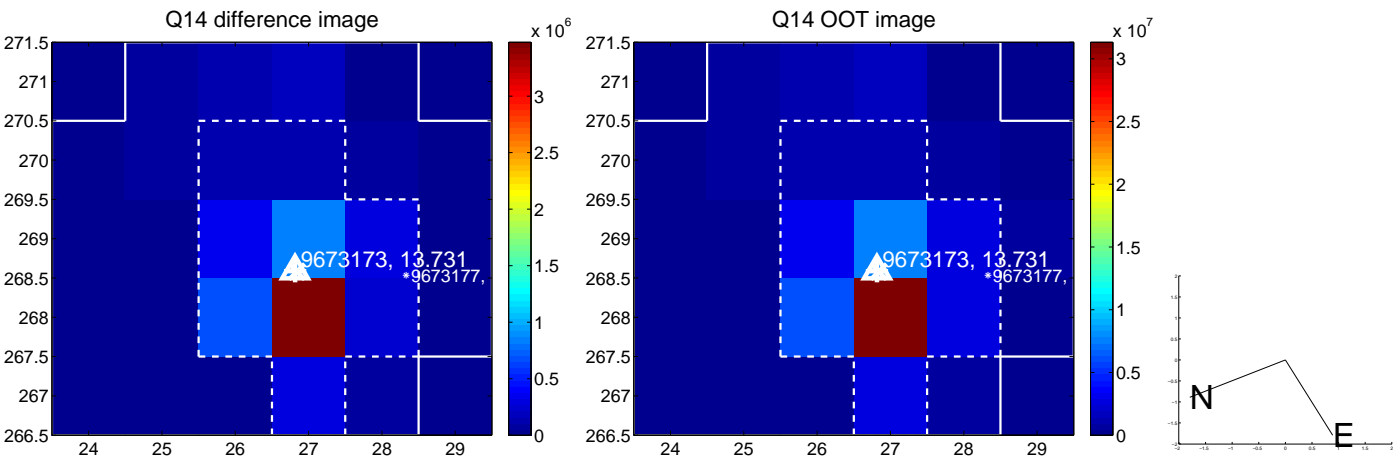
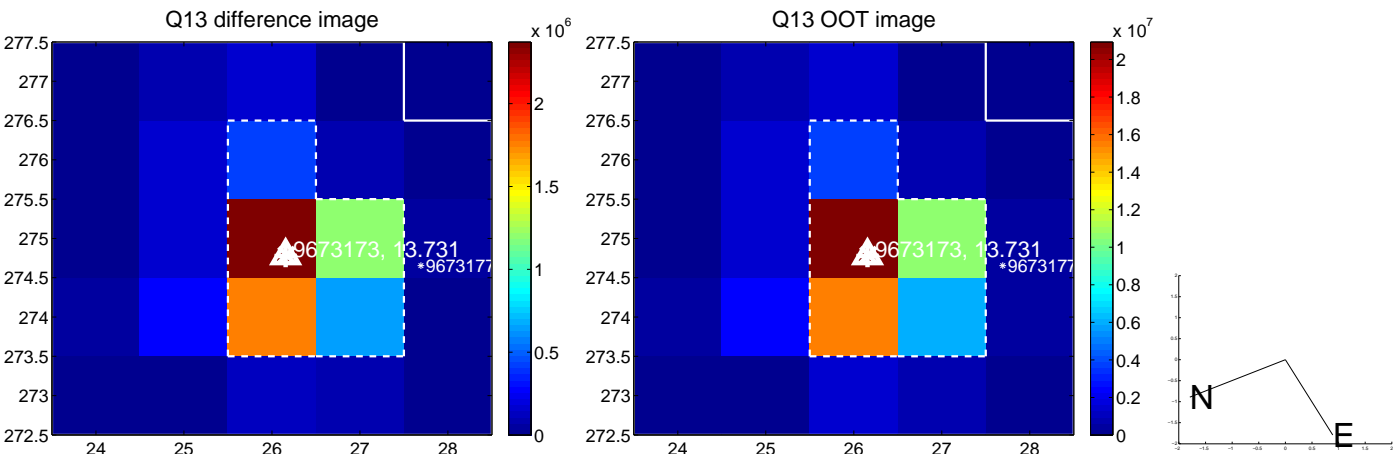




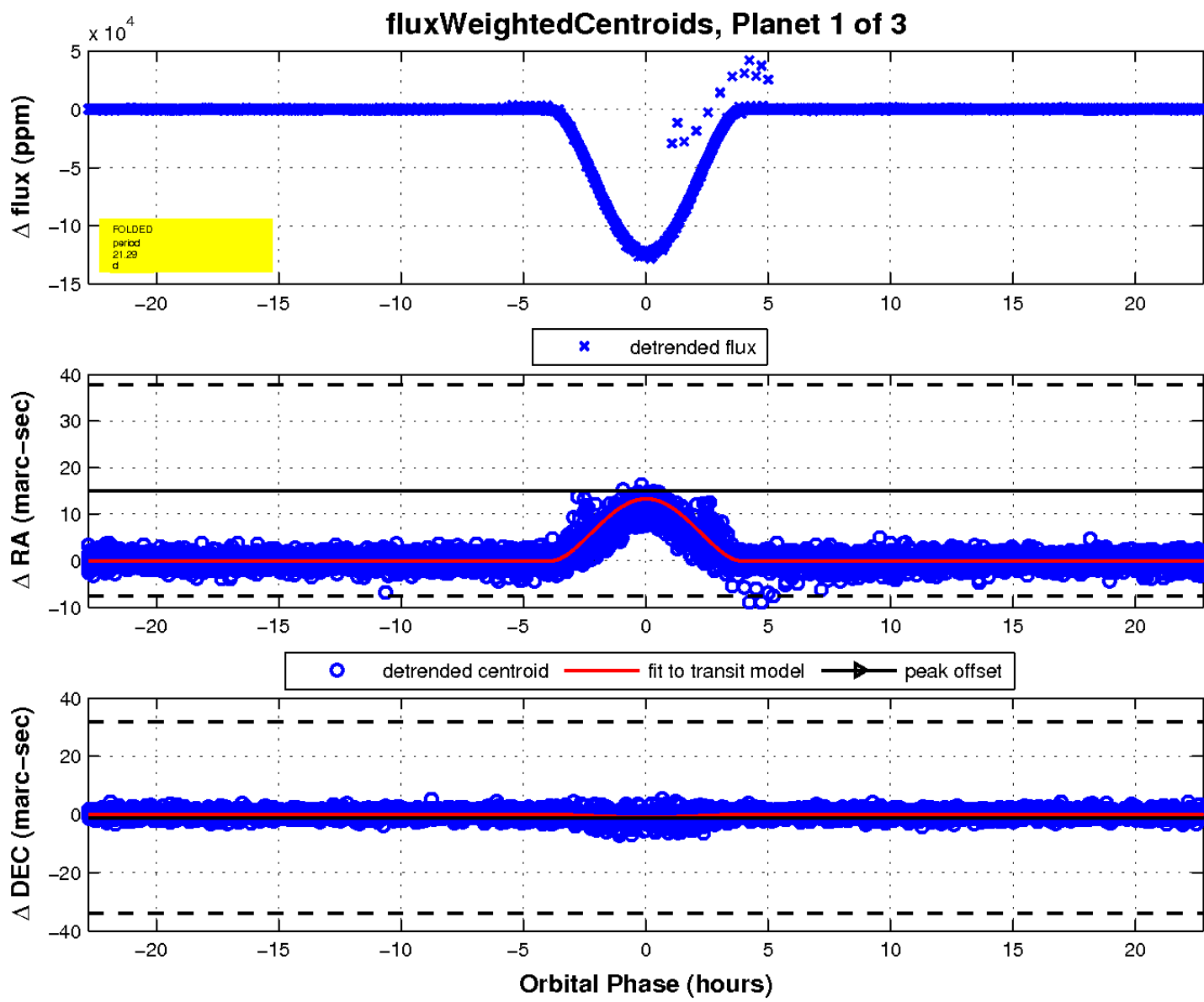
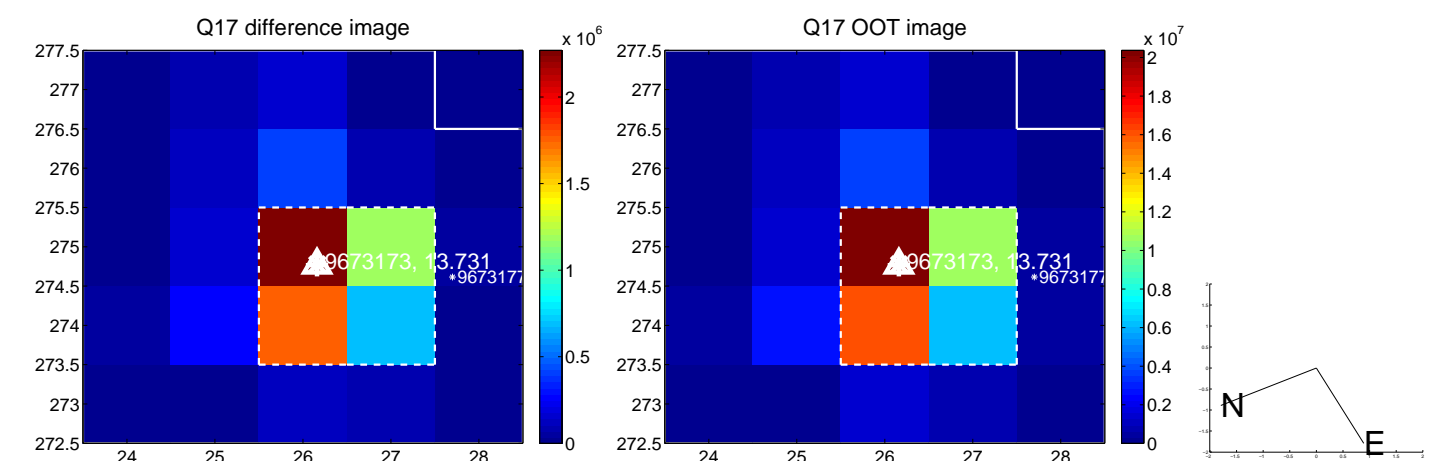
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white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

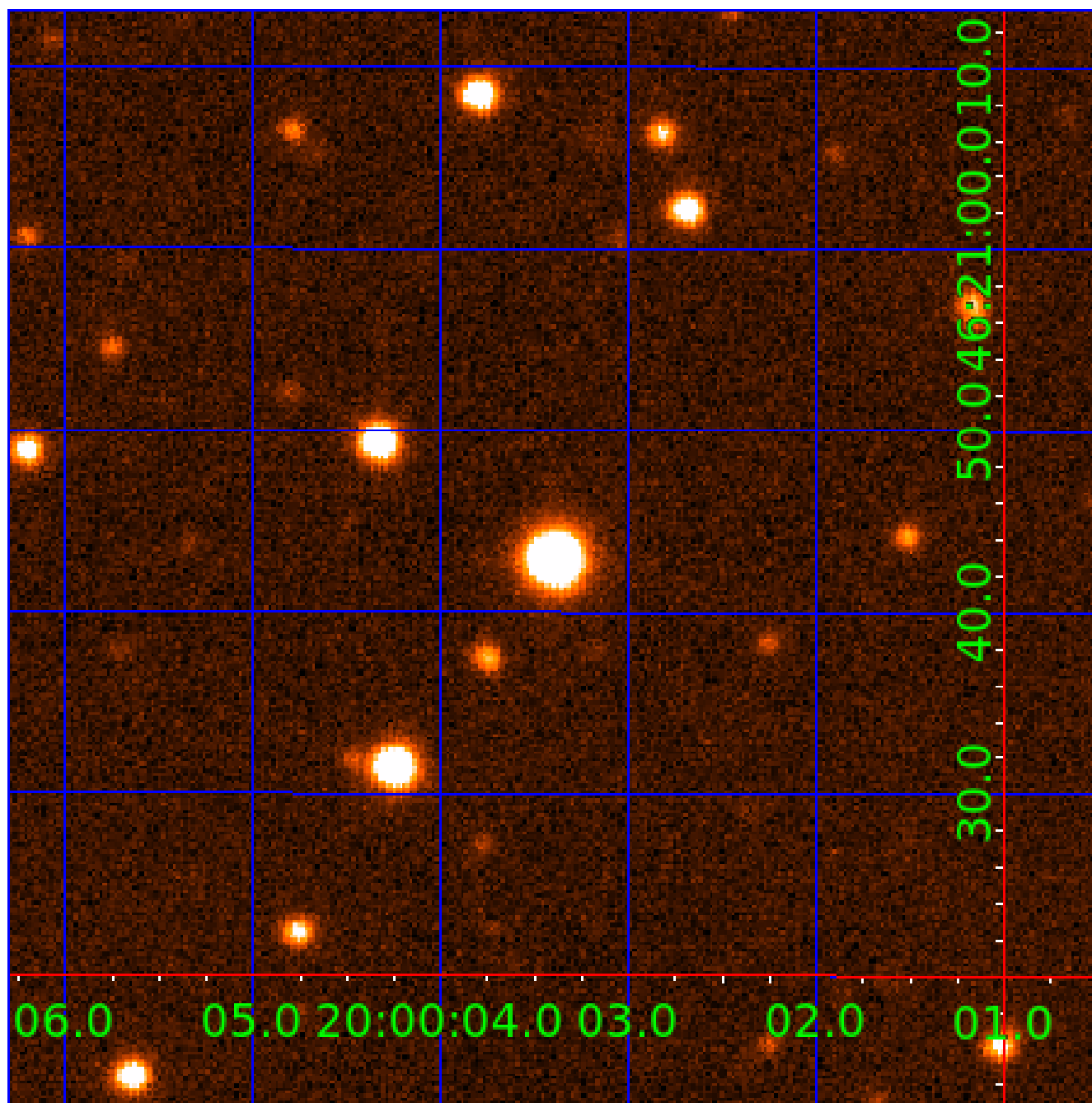


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009673173

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009673173-01	OBS	7222.01	21.294740	147.096709	122623.1	7.597	4593.5	3557.8	1.28	6039	66.26	83.83
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009673173-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009673173-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009673173-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

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

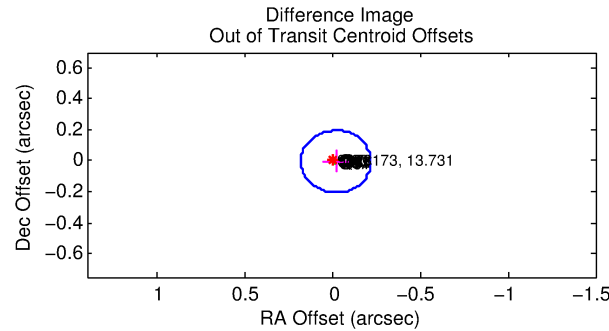
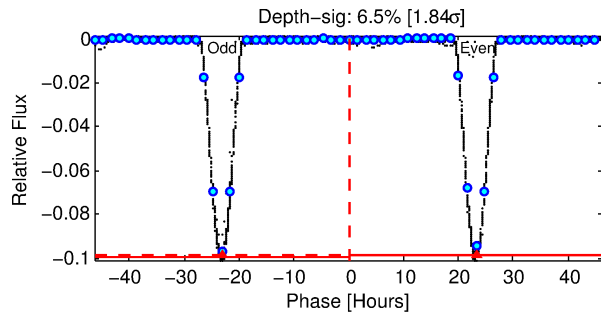
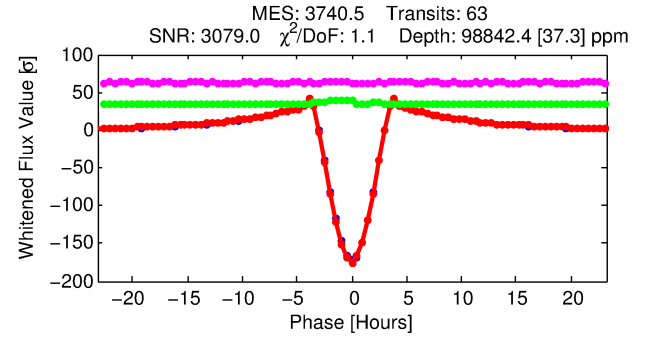
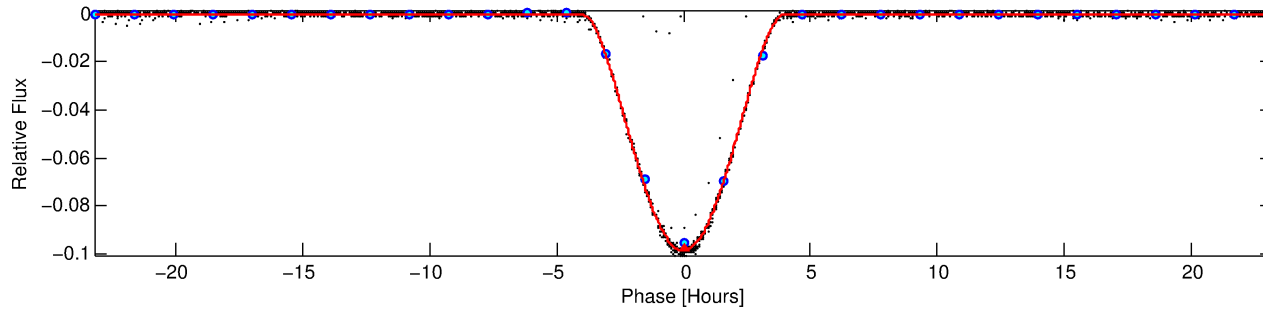
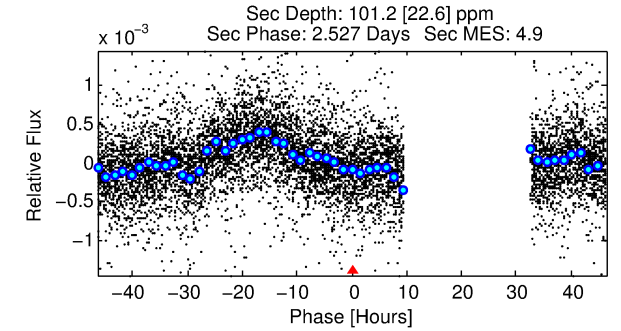
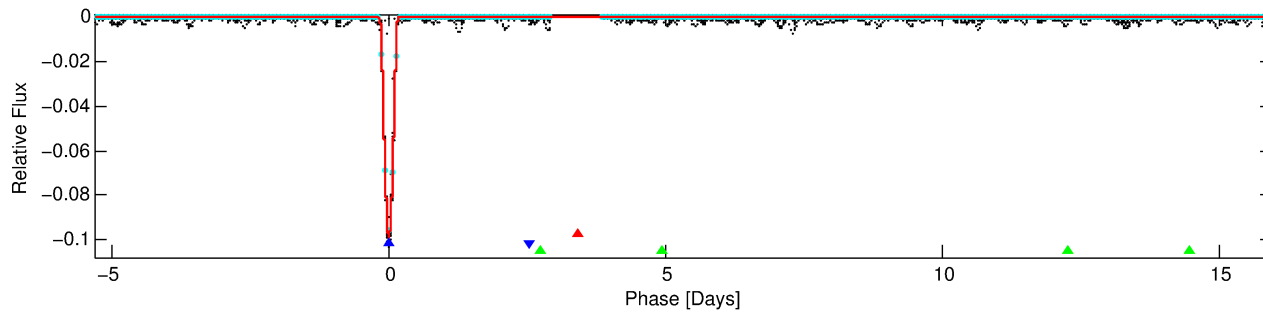
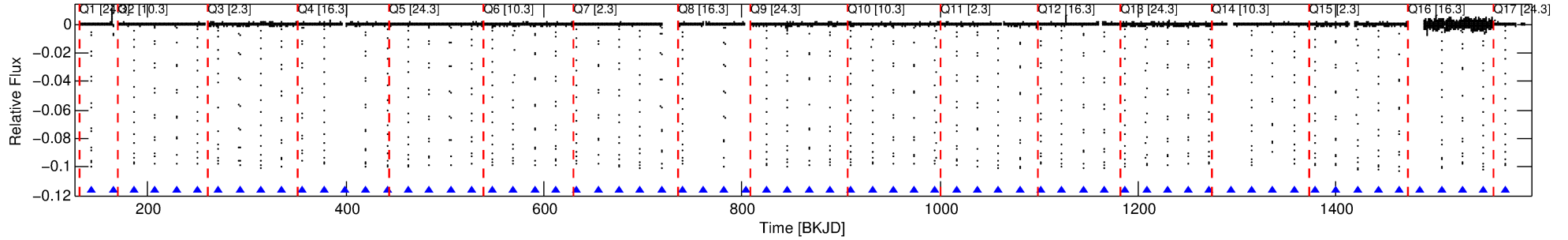
## Ephemeris Match Information For 009673173-02

No Significant Match Found

# DV One-Page Summary

KIC: 9673173 Candidate: 2 of 3 Period: 21.295 d  
KOI: K07222 Corr: No Ephemeris Match

Kp: 13.73 R\*: 1.28 Rs Teff: 6039.0 K Logg: 4.24 Fe/H: -0.080



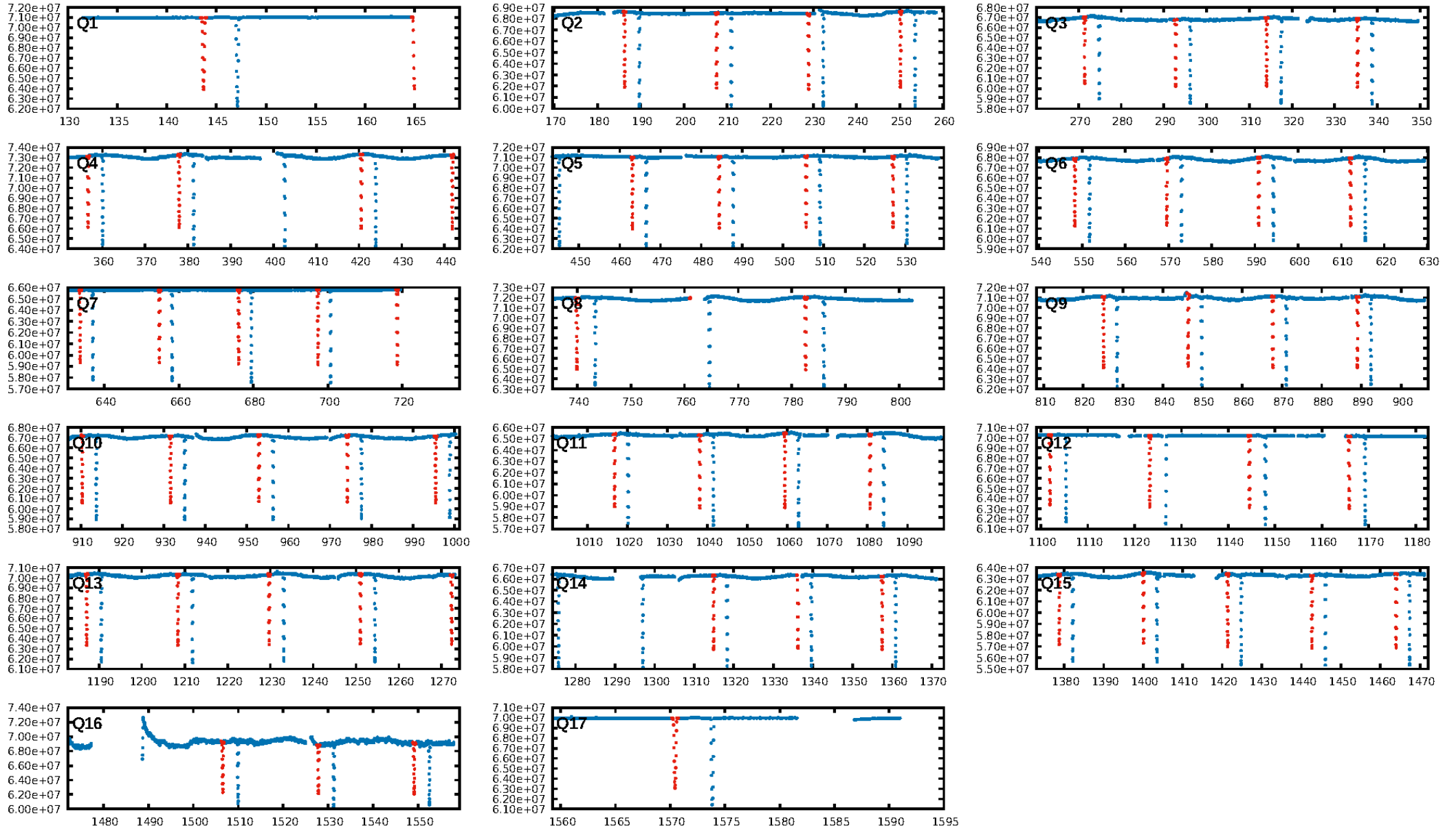
## DV Fit Results:

Period = 21.29474 [0.00000] d  
Epoch = 143.6920 [0.0000] BKJD  
Rp/R\* = 0.4239 [0.0093]  
a/R\* = 23.05 [0.01]  
b = 0.91 [0.01]  
Seff = 83.83 [30.88]  
Teff = 772 [71] K  
Rp = 59.12 [16.93] Re  
a = 0.1524 [0.0365] AU  
Ag = 0.37 [0.15] [-4.10σ]  
Teffp = 930 [60] K [1.71σ]

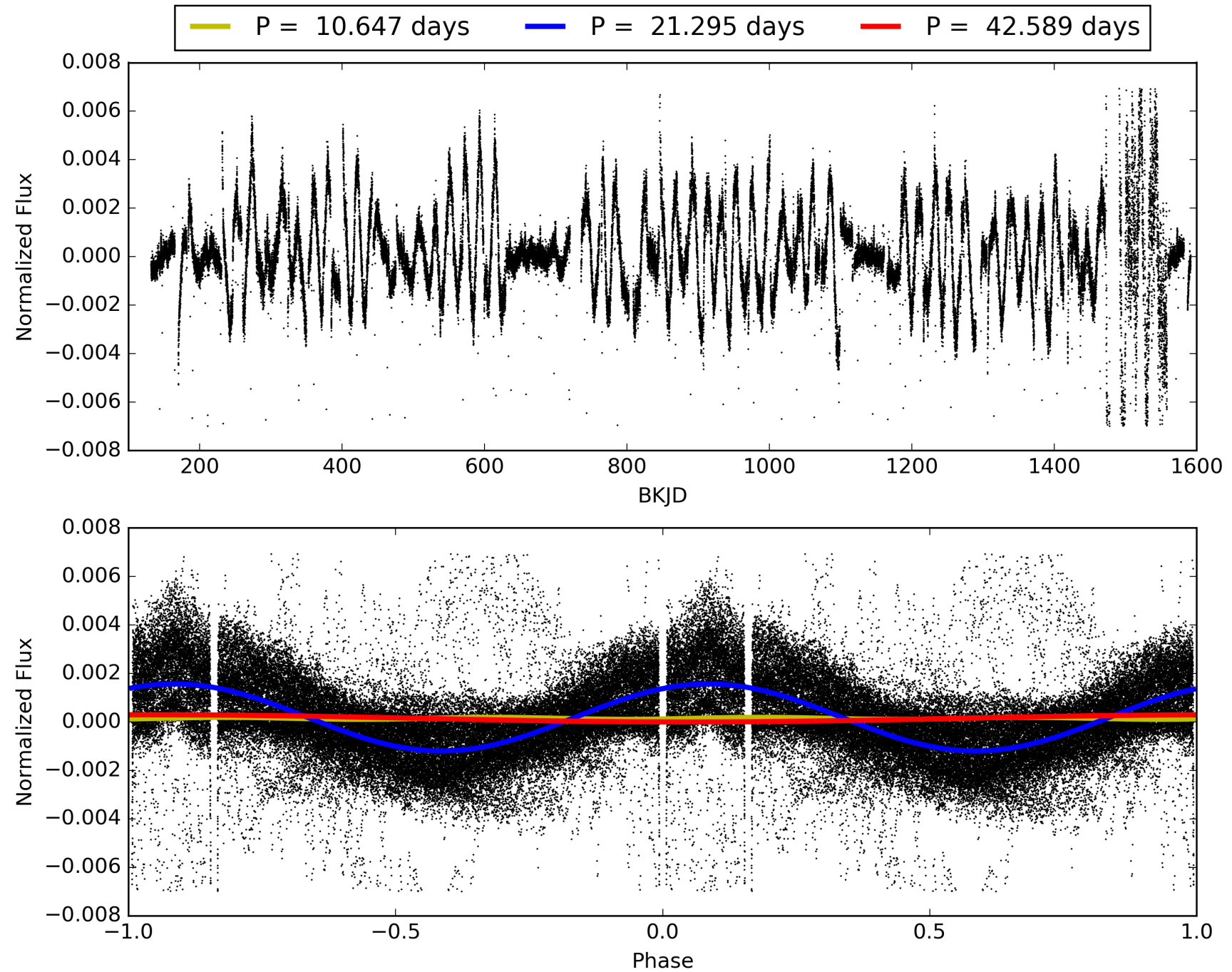
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [60/60]  
GhostDiagnostic-chr: 5.851  
Centroid-sig: 0.0%  
Centroid-so: 0.538 arcsec [310.98σ]  
OotOffset-rm: 0.020 arcsec [0.29σ]  
KicOffset-rm: 0.067 arcsec [0.99σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009673173-02, PDC Light Curves



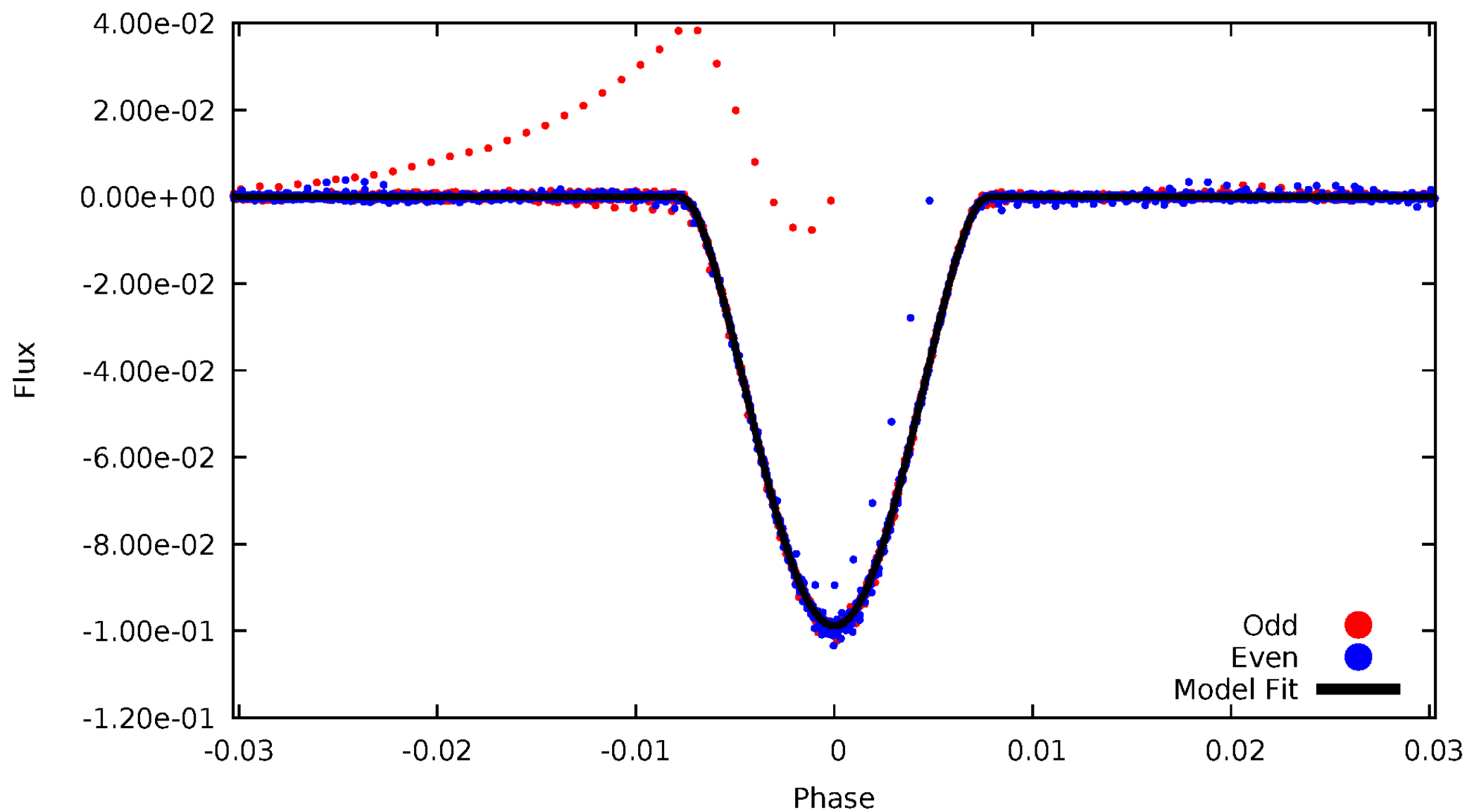
TCE 009673173-02





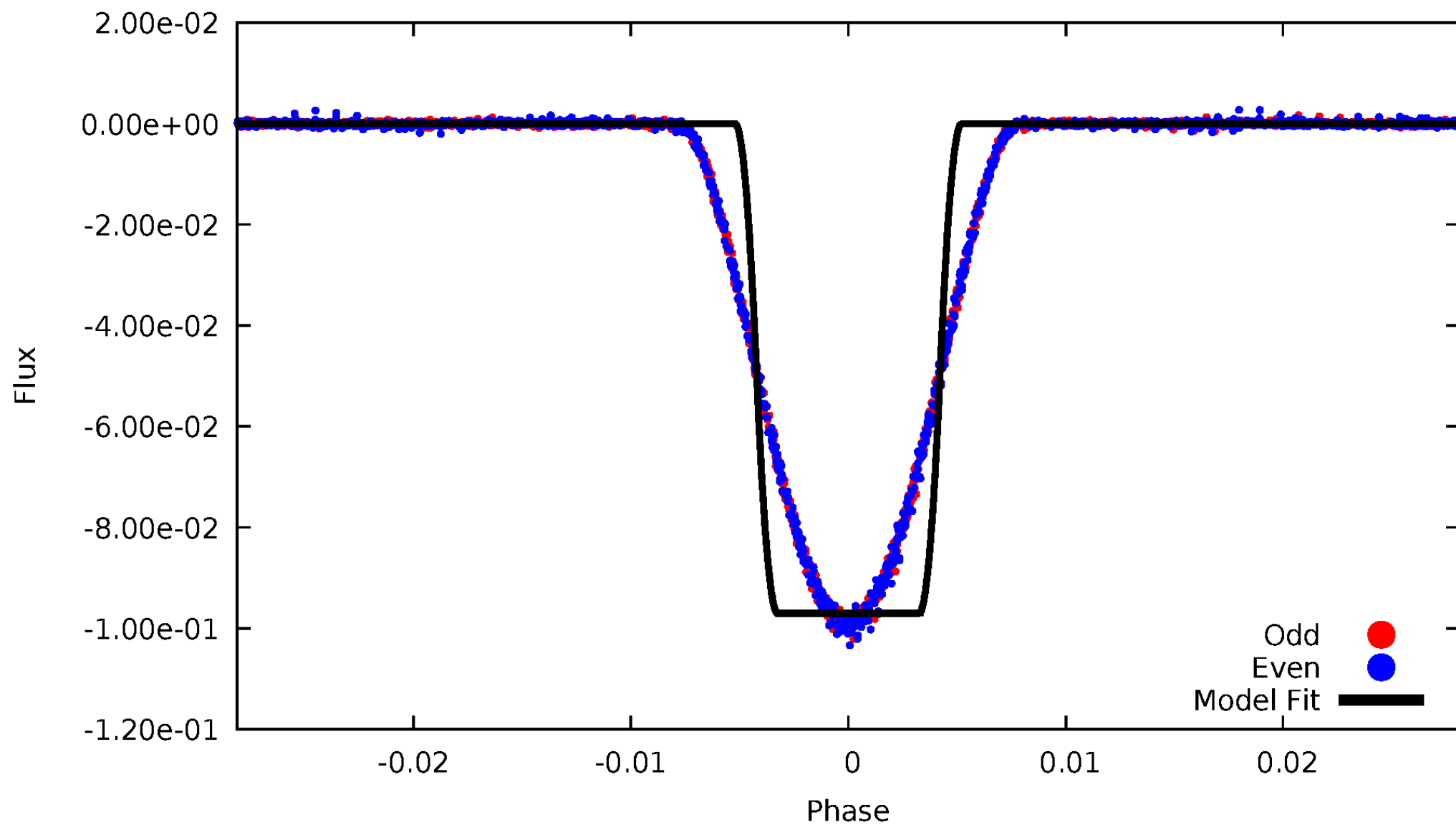
# DV Odd/Even

TCE 009673173-02



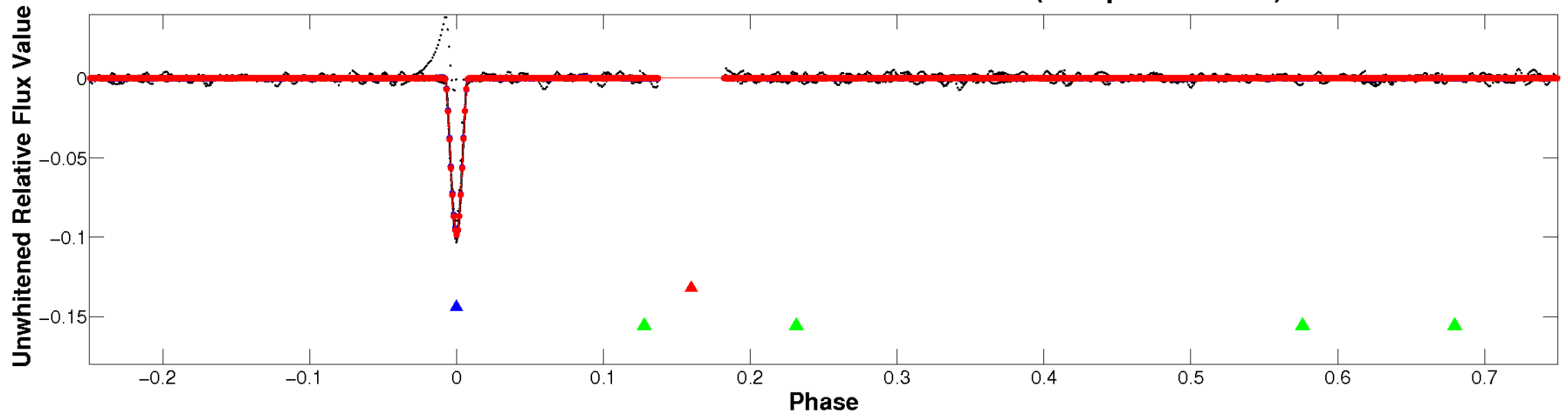
# ALT Odd/Even

TCE 009673173-02

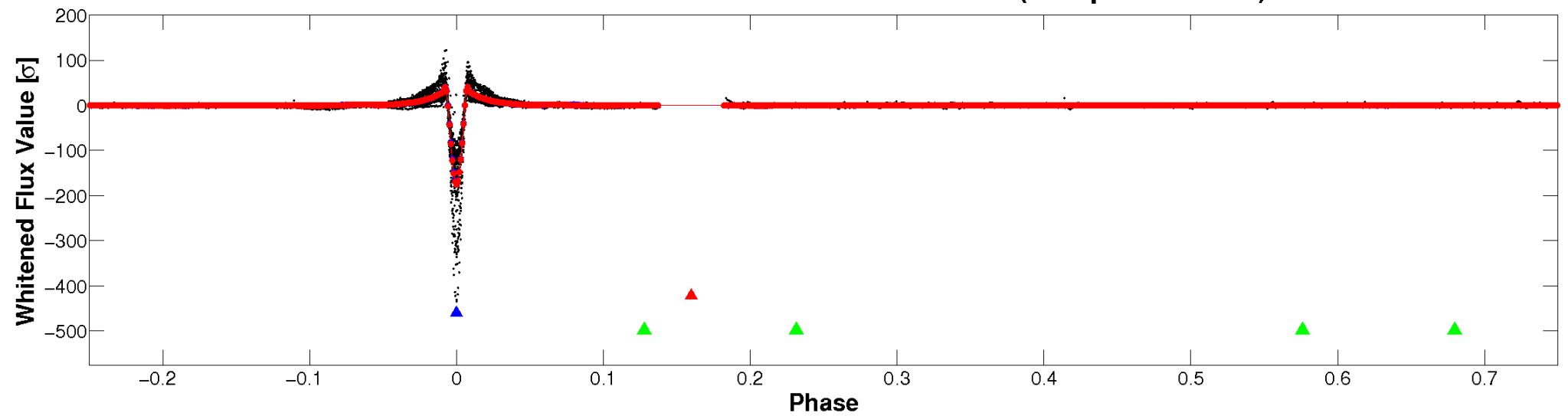


# Non-Whitened Vs. Whitened Light Curve

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

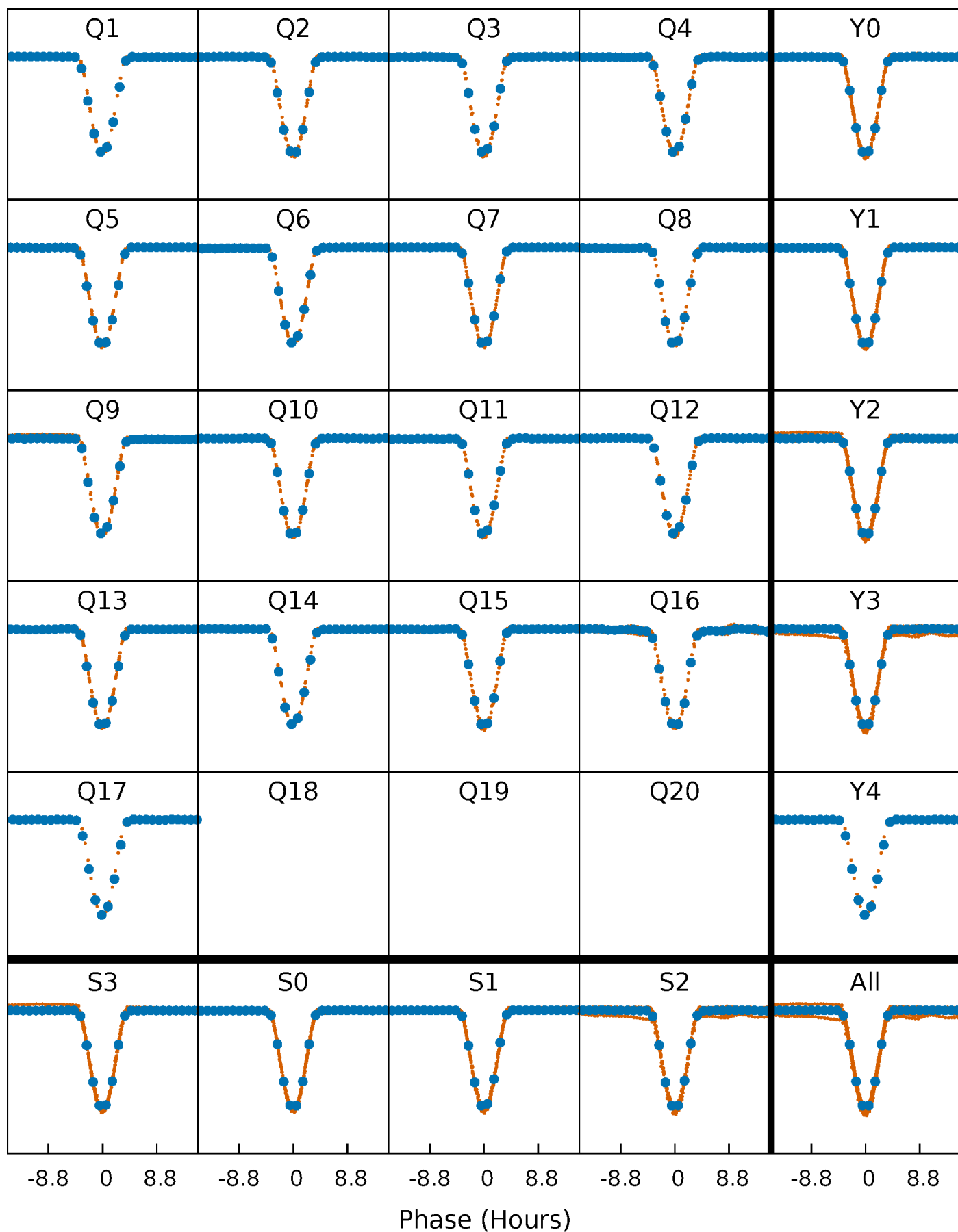


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



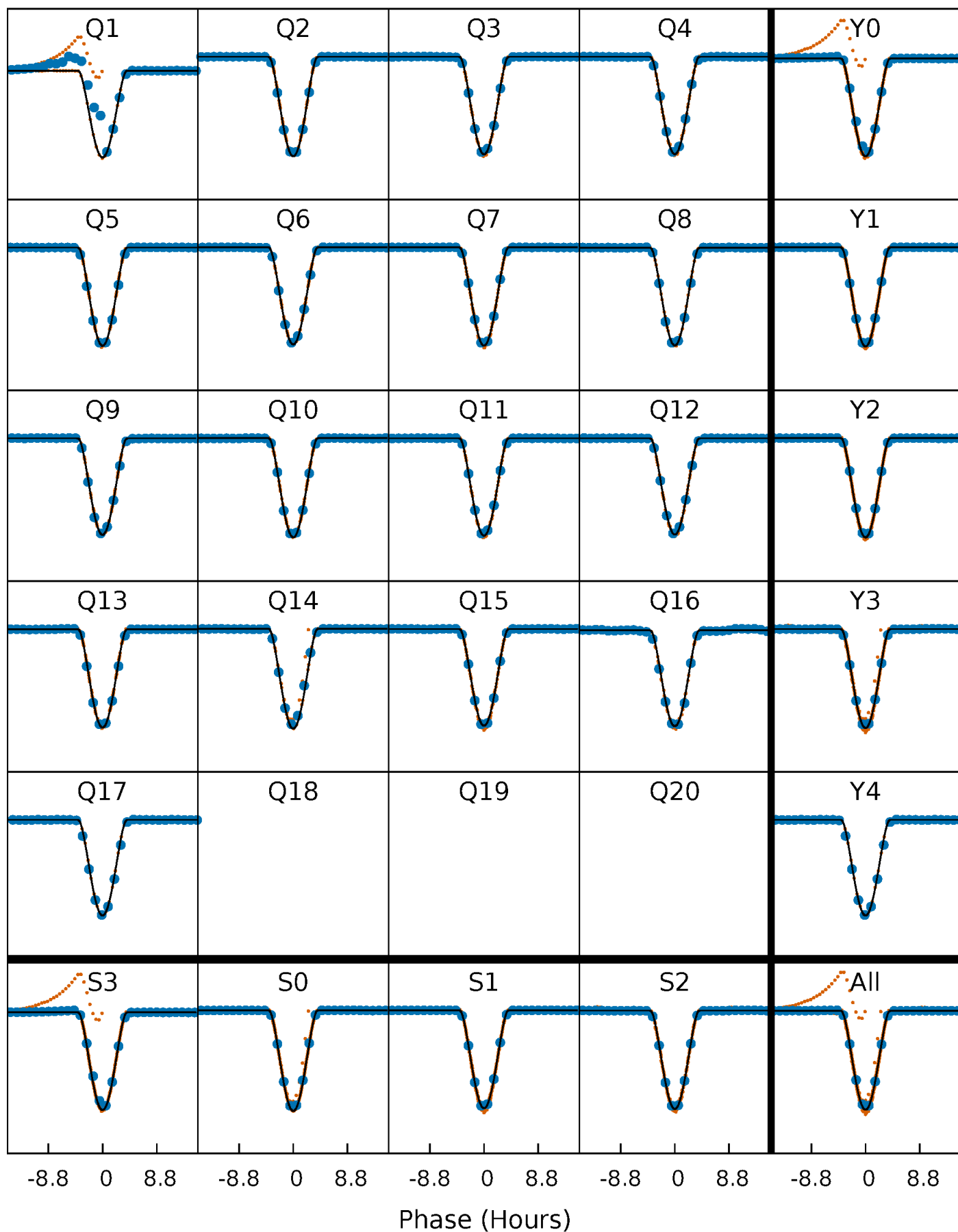
# PDC Quarter-Phased Transit Curves

TCE 009673173-02 P= 21.294739 Days  $T_0=143.692028$  (BKJD)



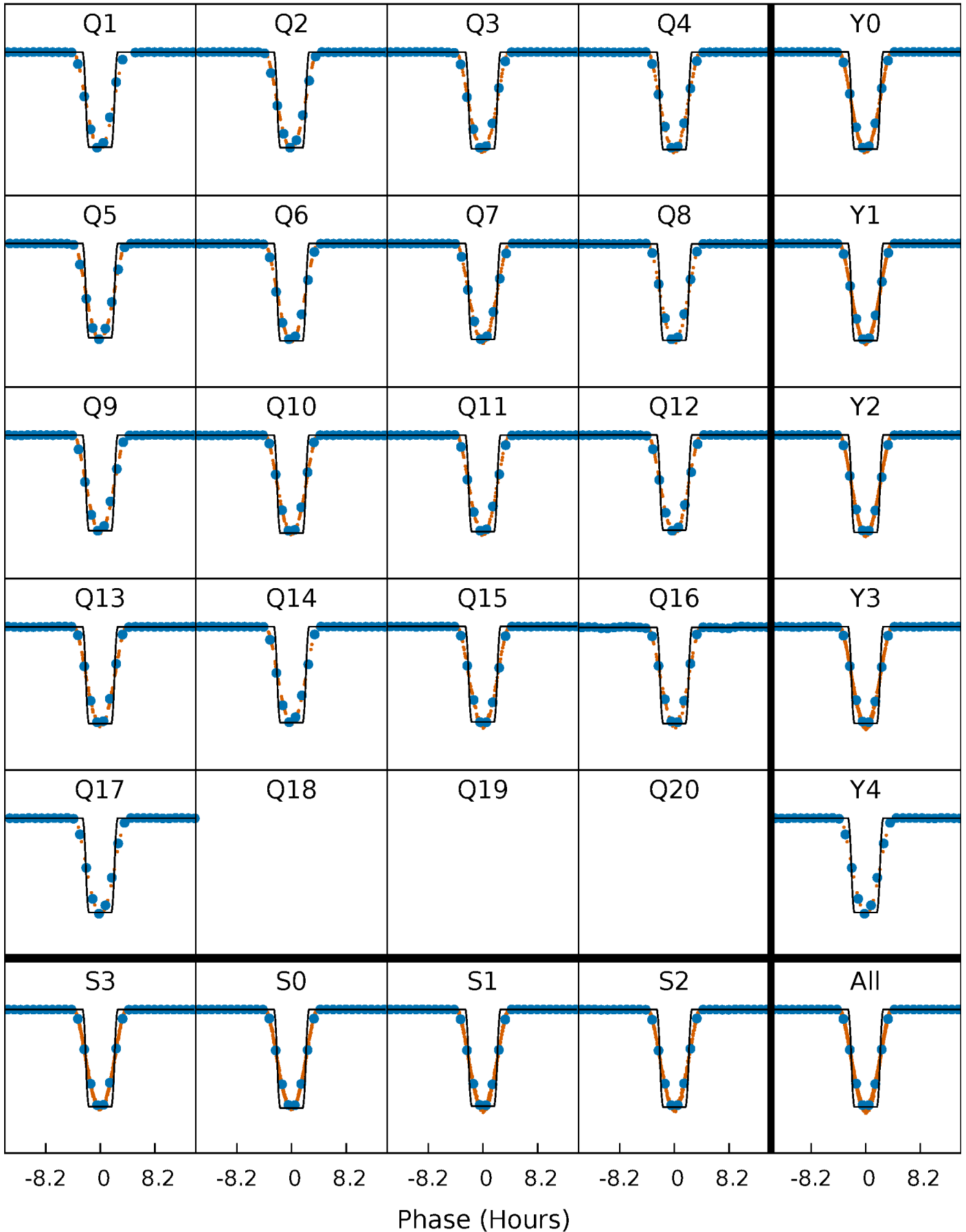
# DV Quarter-Phased Transit Curves

TCE 009673173-02 P= 21.294739 Days  $T_0=143.692028$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

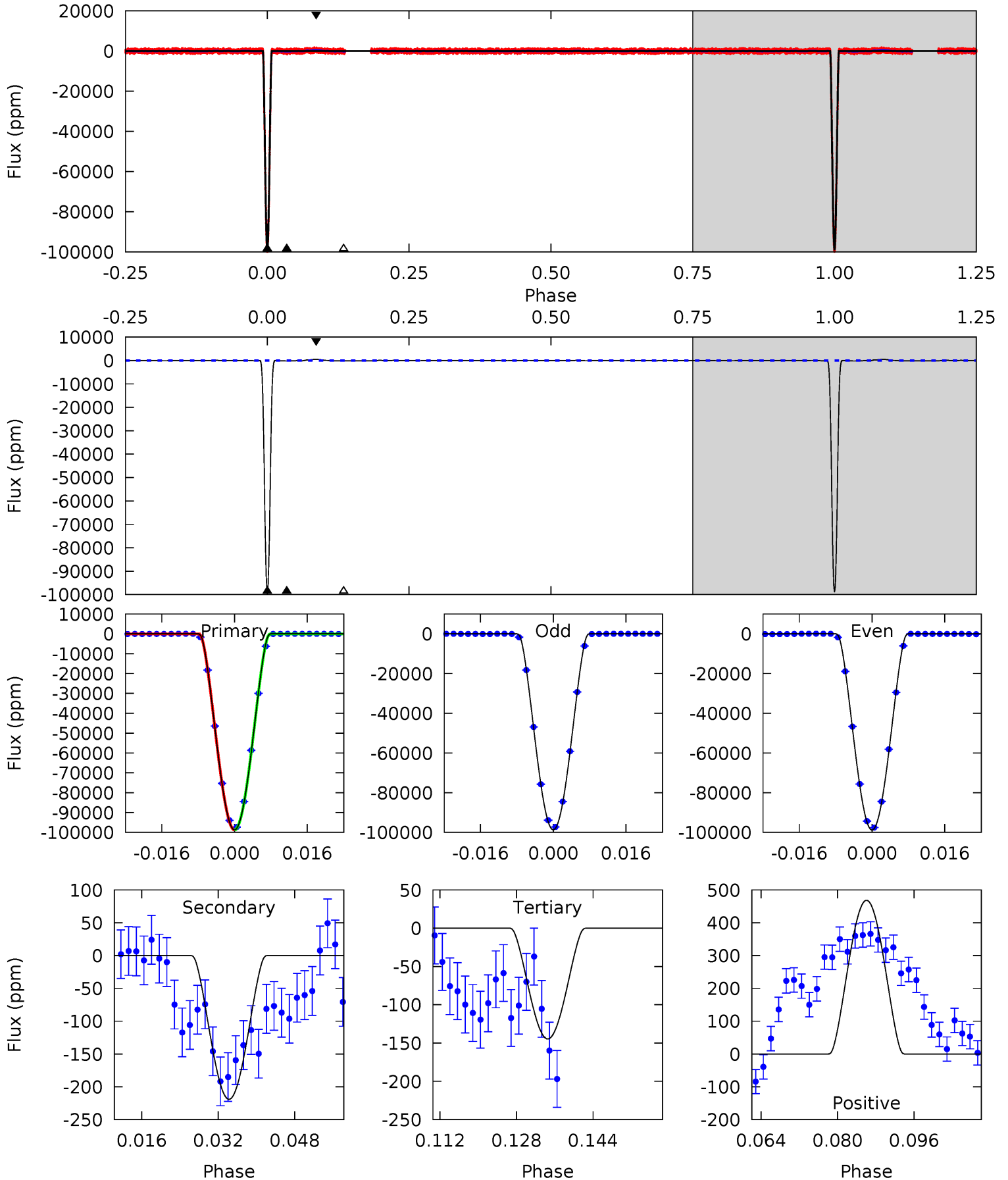
TCE 009673173-02     $P = 21.294672$  Days     $T_0 = 143.694030$  (BKJD)



# DV Model-Shift Uniqueness Test

009673173-02, P = 21.294739 Days, E = 122.397289 Days

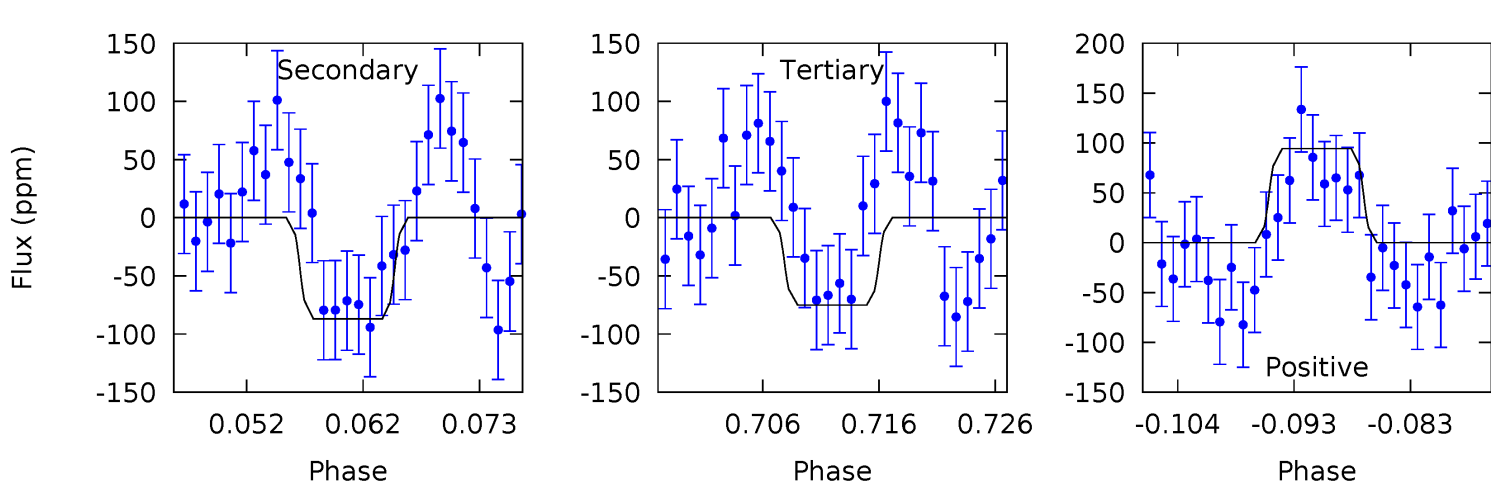
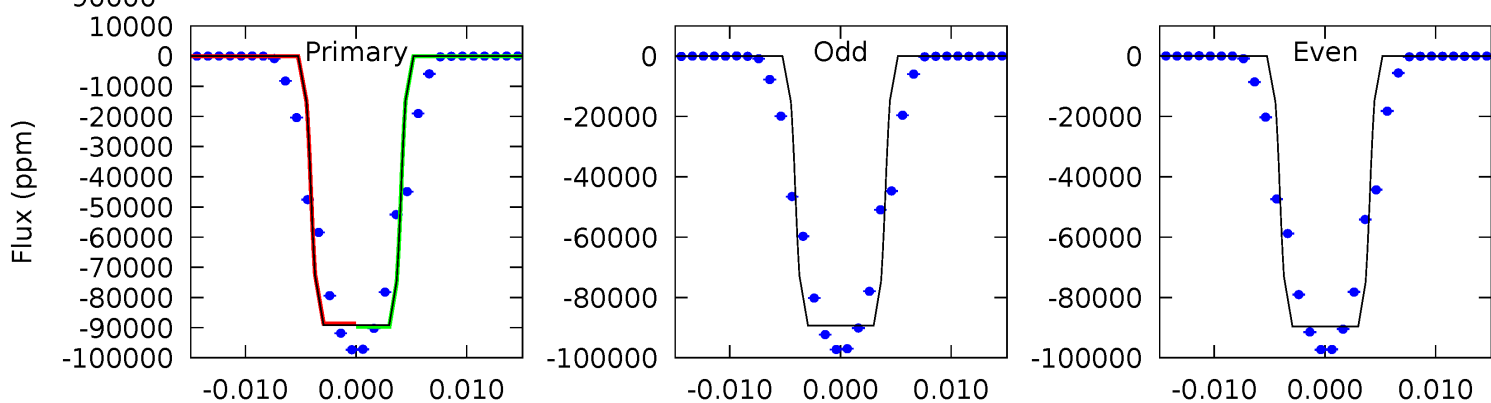
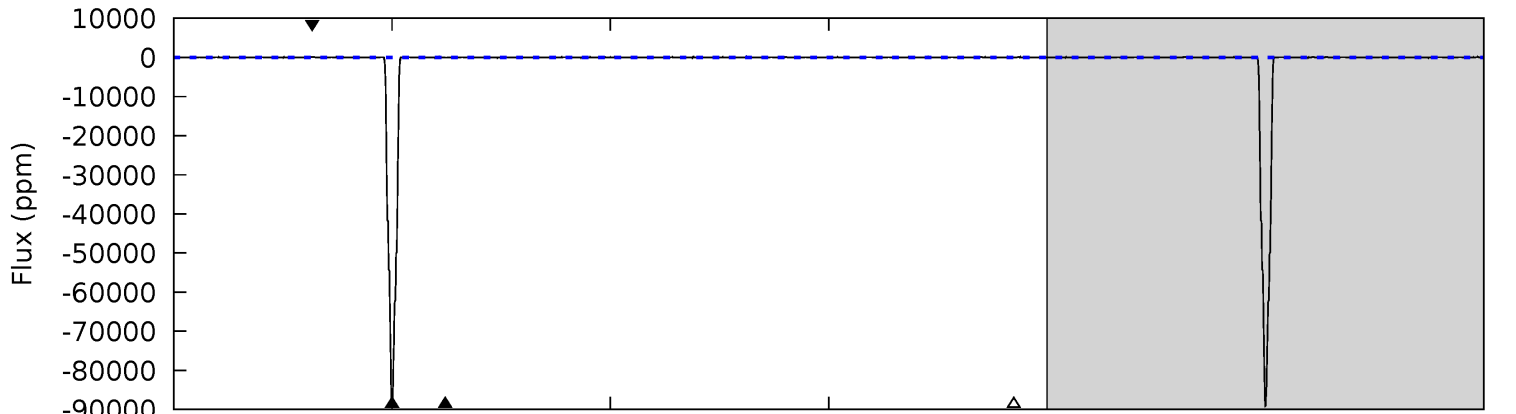
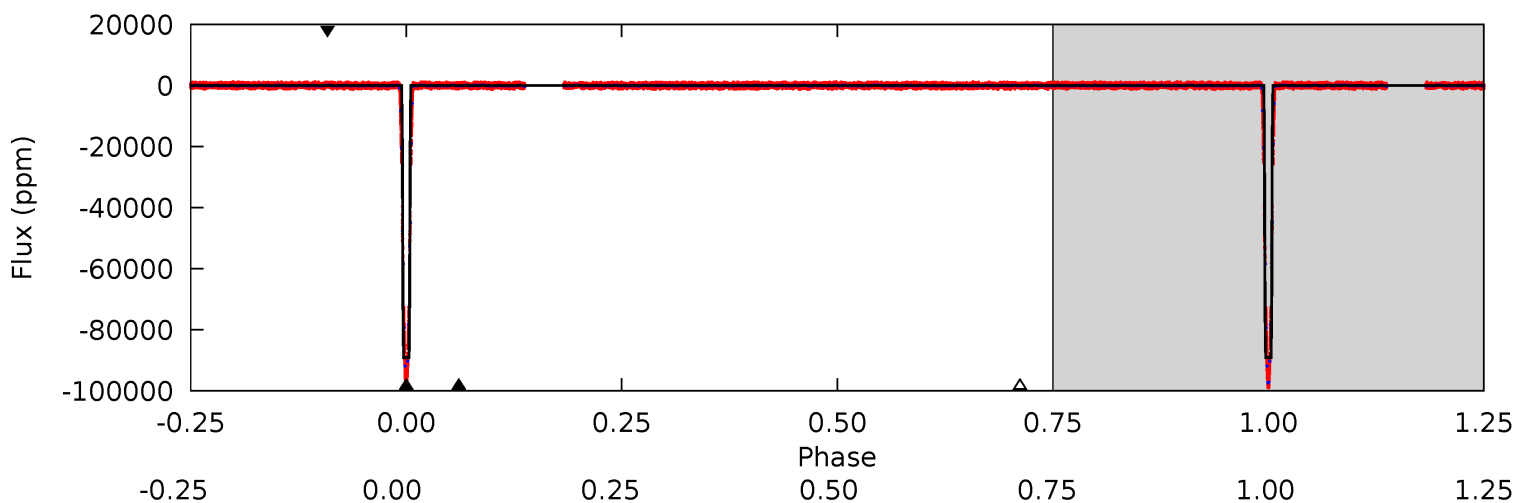
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8086	17.9	11.8	38.4	4.94	2.41	6.51	8074	8048	6.09	-20.4	5.95	0.98	0.00	0



# Alt Model-Shift Uniqueness Test

009673173-02, P = 21.294672 Days, E = 122.399358 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
5099	4.97	4.30	5.39	5.02	2.56	1.58	5094	5093	0.67	-0.42	11.2	1.00	0.00	27.6





### Stellar Parameters For KIC 009673173

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6039^{+181}_{-181}$	$4.242^{+0.190}_{-0.190}$	$-0.080^{+0.250}_{-0.300}$	$1.278^{+0.365}_{-0.299}$	$1.041^{+0.159}_{-0.130}$	$0.702^{+0.695}_{-0.348}$
	+3%/-3%	+4%/-4%	+312%/-375%	+29%/-23%	+15%/-12%	+99%/-50%
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 009673173-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	-219±12	$59.63^{+8.68}_{-7.06}$	$1081^{+82}_{-70}$	$2002^{+44}_{-52}$	$0.785^{+0.241}_{-0.182}$
Alt.	-87±17	$43.56^{+7.43}_{-5.61}$	$1080^{+85}_{-80}$	$1885^{+93}_{-137}$	$0.570^{+0.234}_{-0.169}$

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

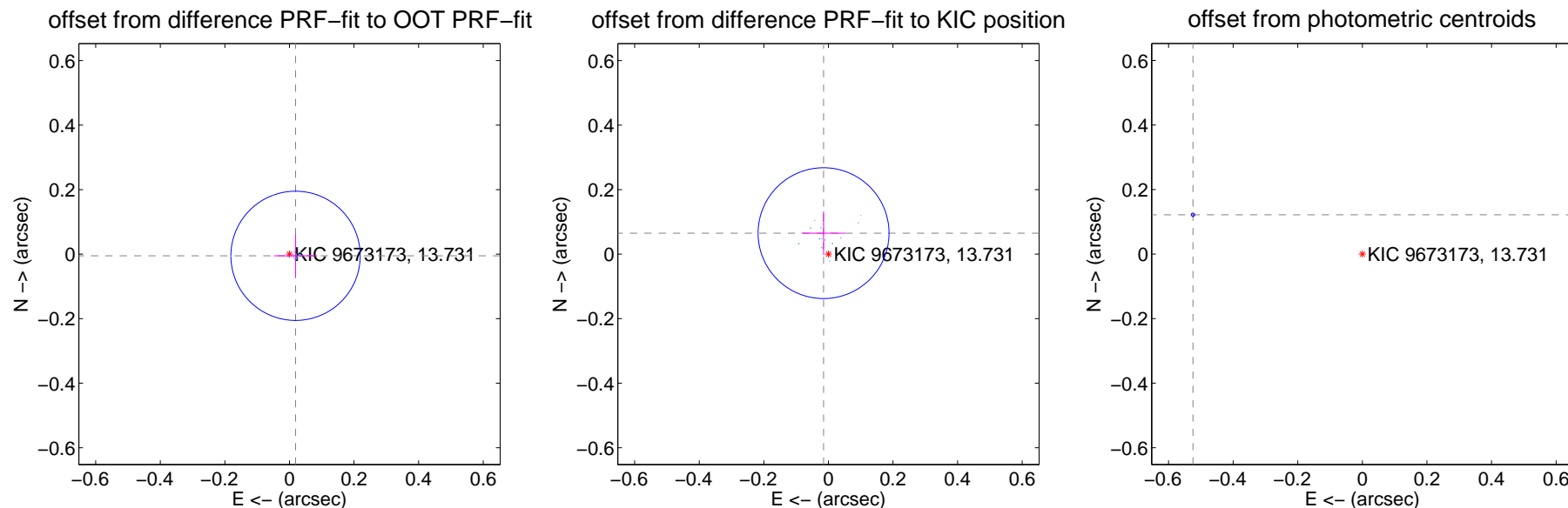
## DV Centroid Data

Supplemental centroid analysis for 009673173-02. Kepler magnitude: 13.73. Transit SNR 3078.97

There are 17 quarters with good PRF difference image offsets

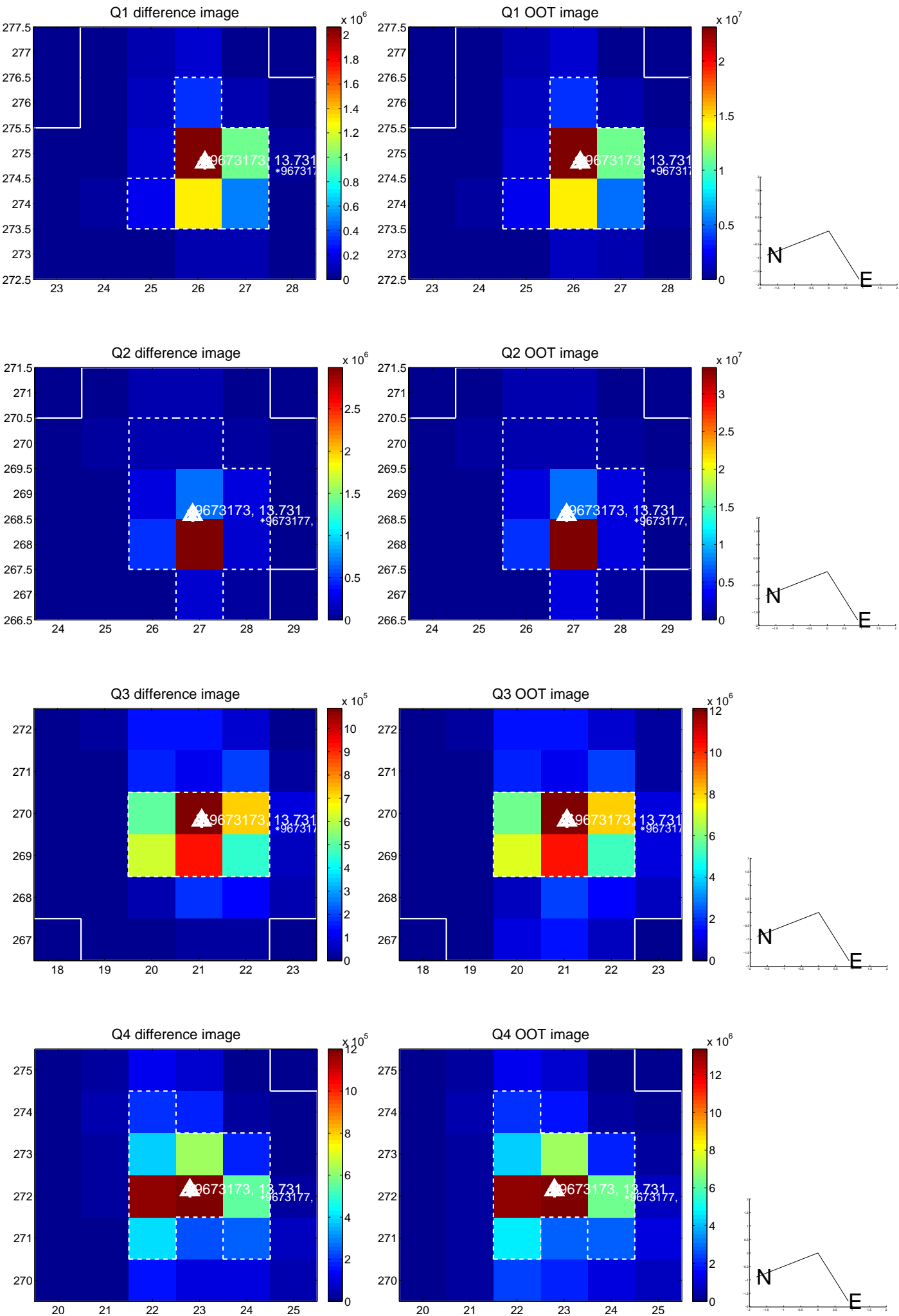
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.020 \pm 0.067$	0.29	$-0.019 \pm 0.067$	$-0.005 \pm 0.067$
PRF-fit source offset from KIC position	$0.067 \pm 0.068$	0.99	$0.015 \pm 0.067$	$0.065 \pm 0.068$
photometric centroid source offset	$0.54 \pm 0.00$	310.98	$0.52 \pm 0.00$	$0.12 \pm 0.00$

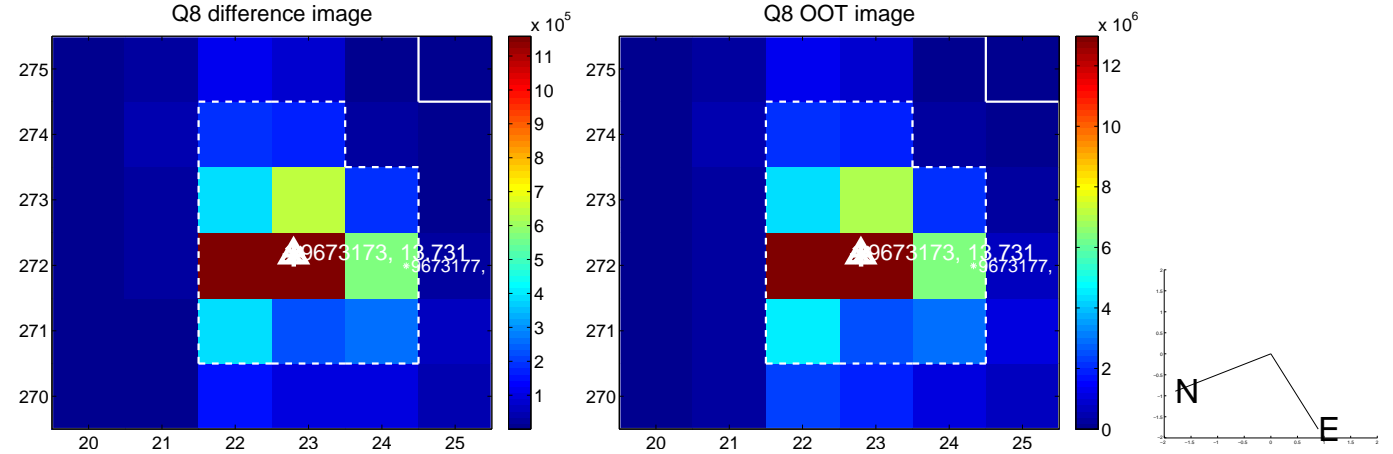
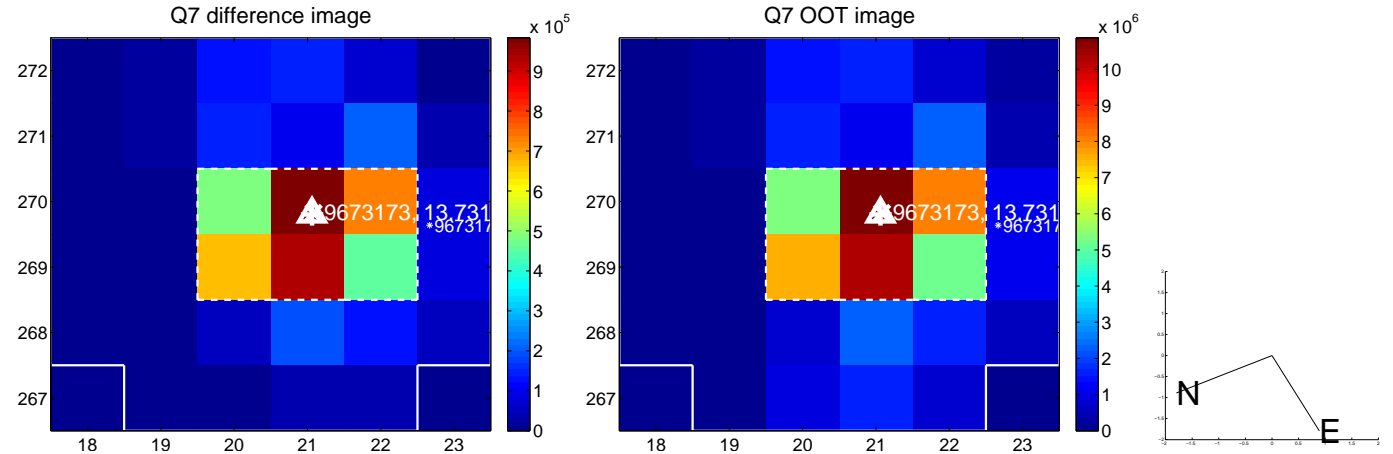
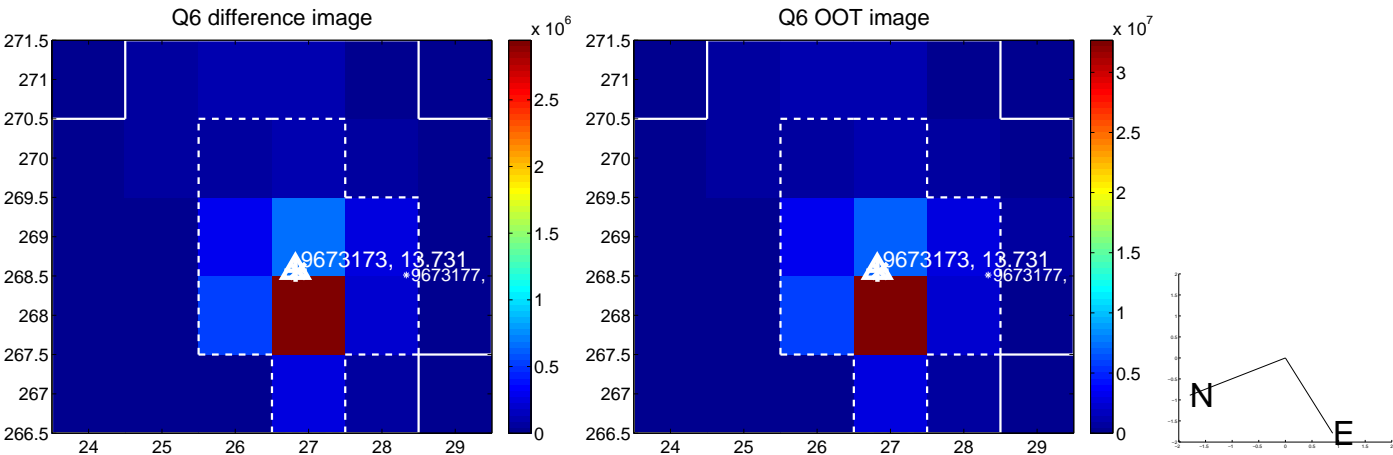
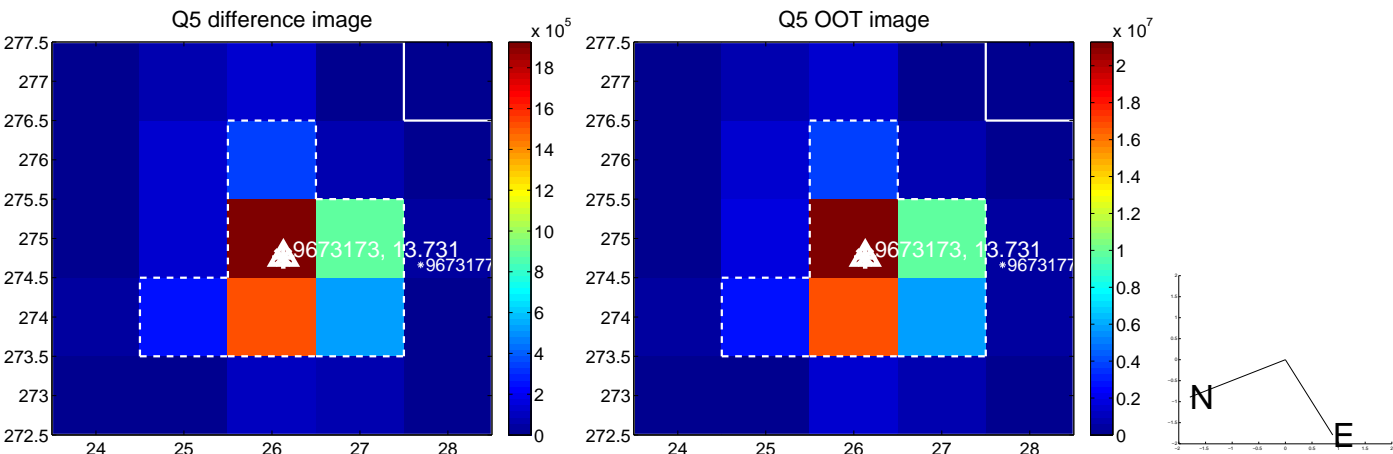


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

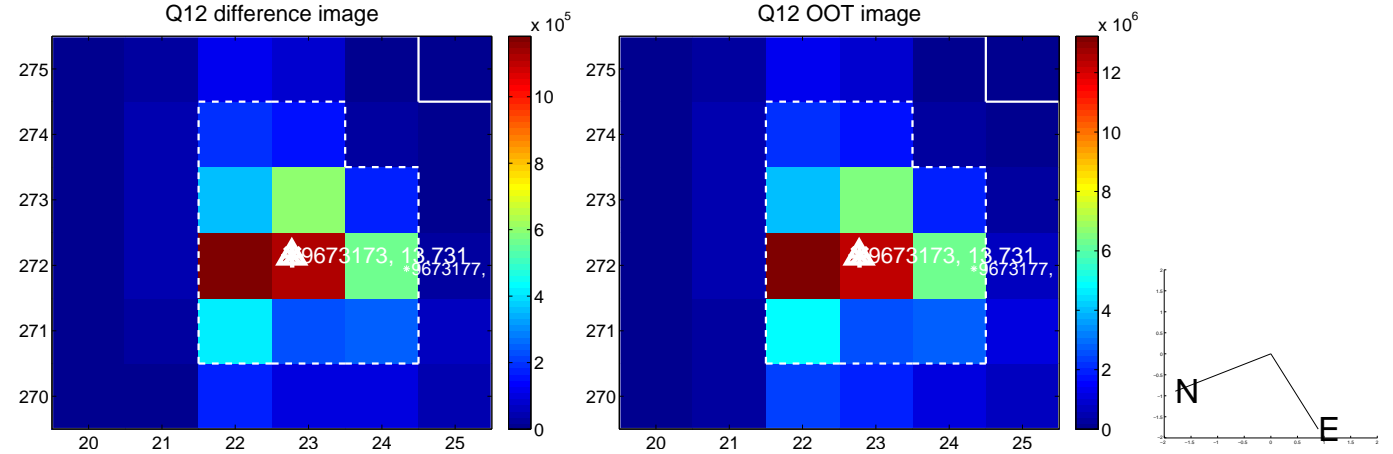
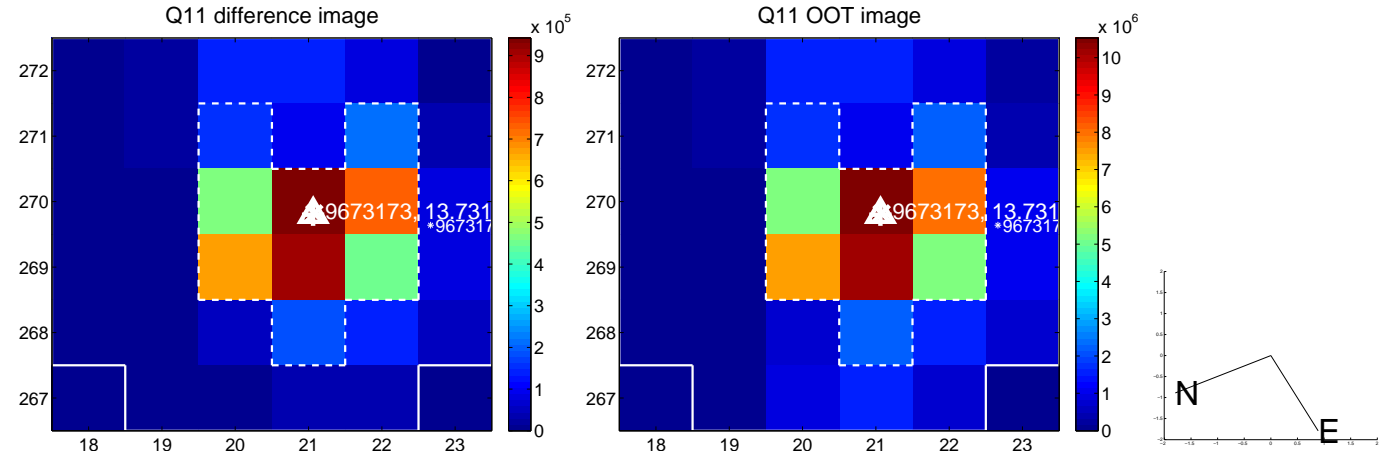
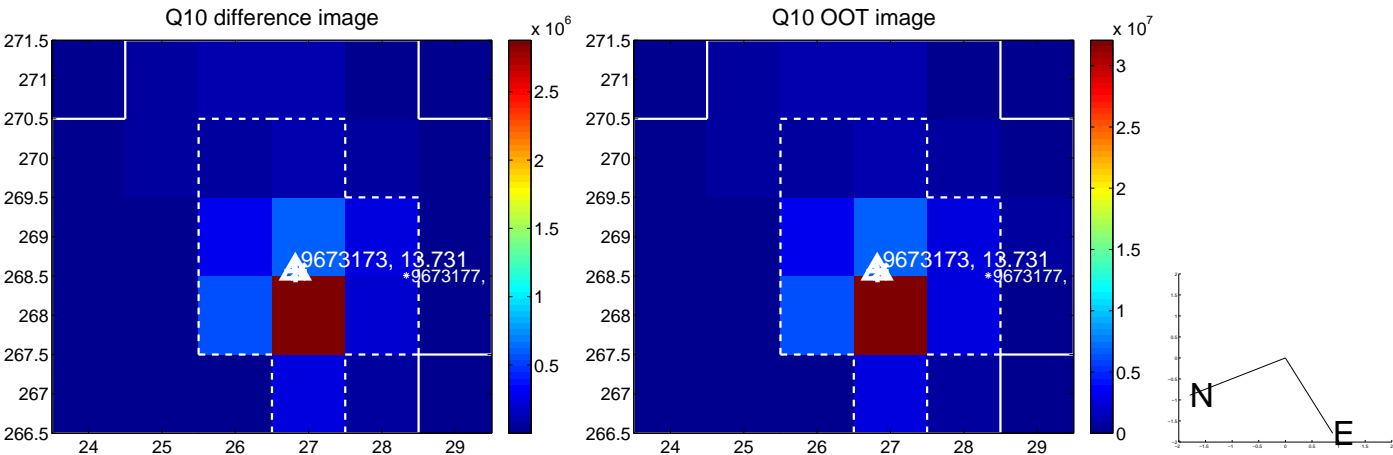
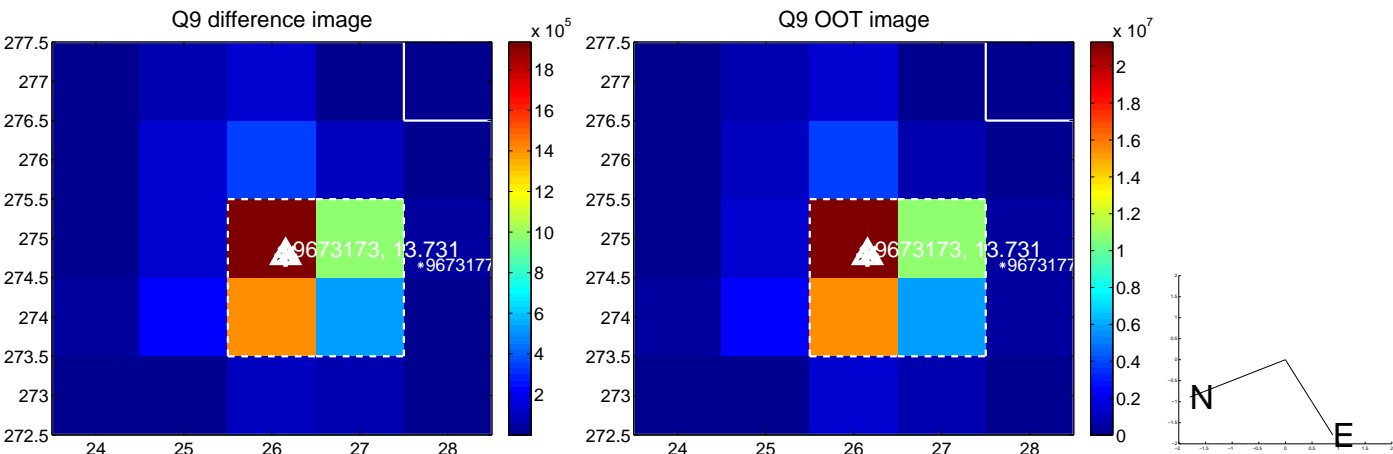
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



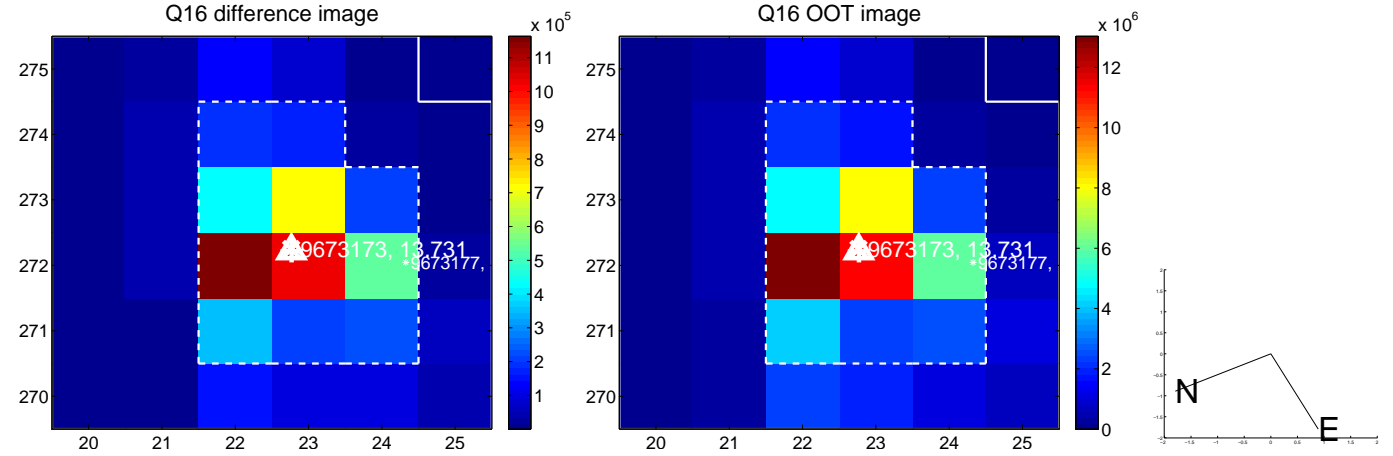
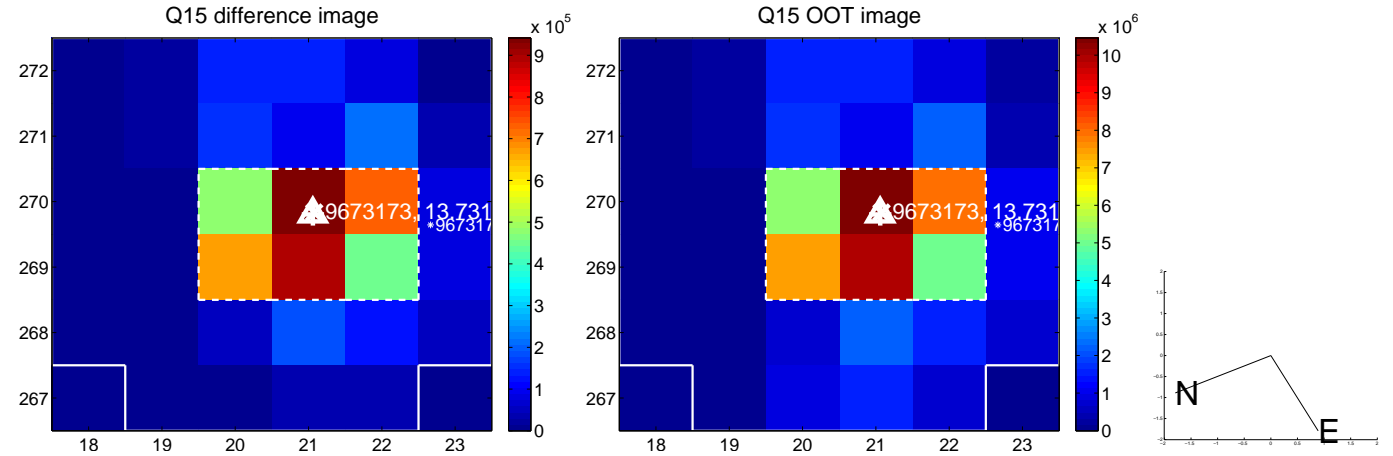
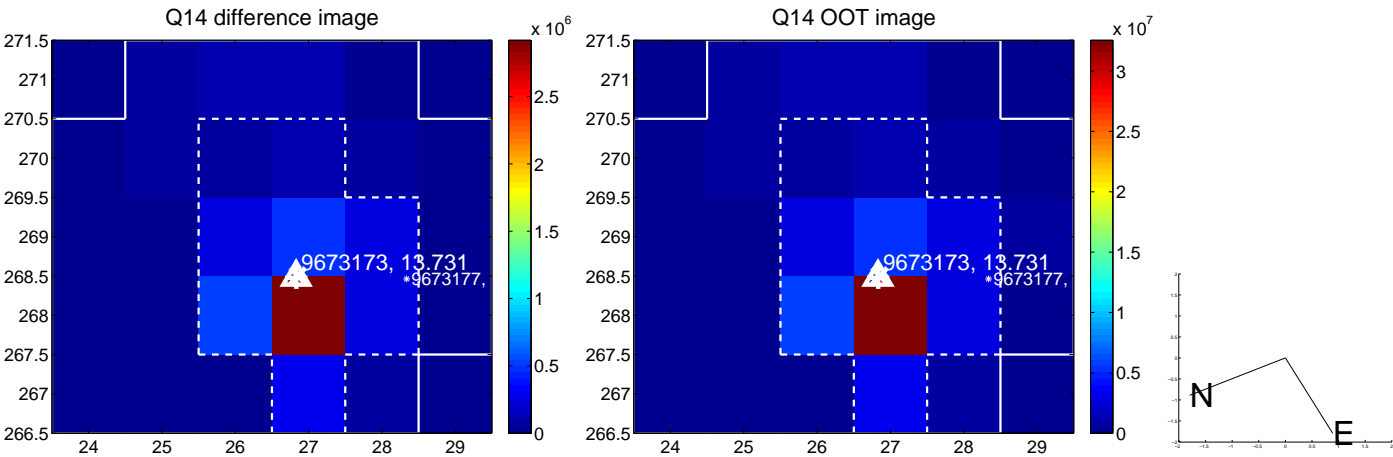
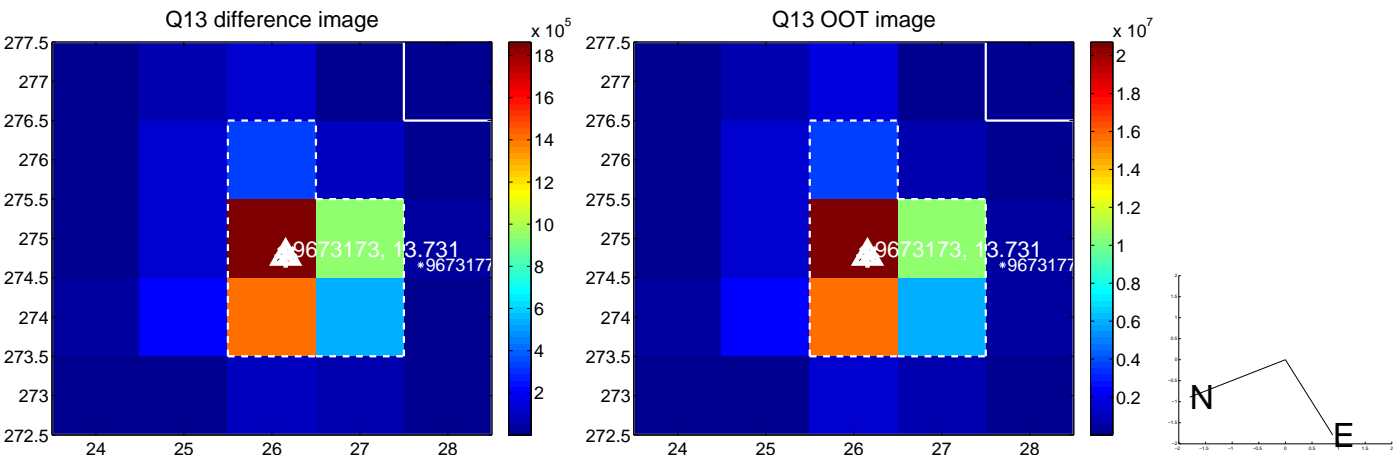
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



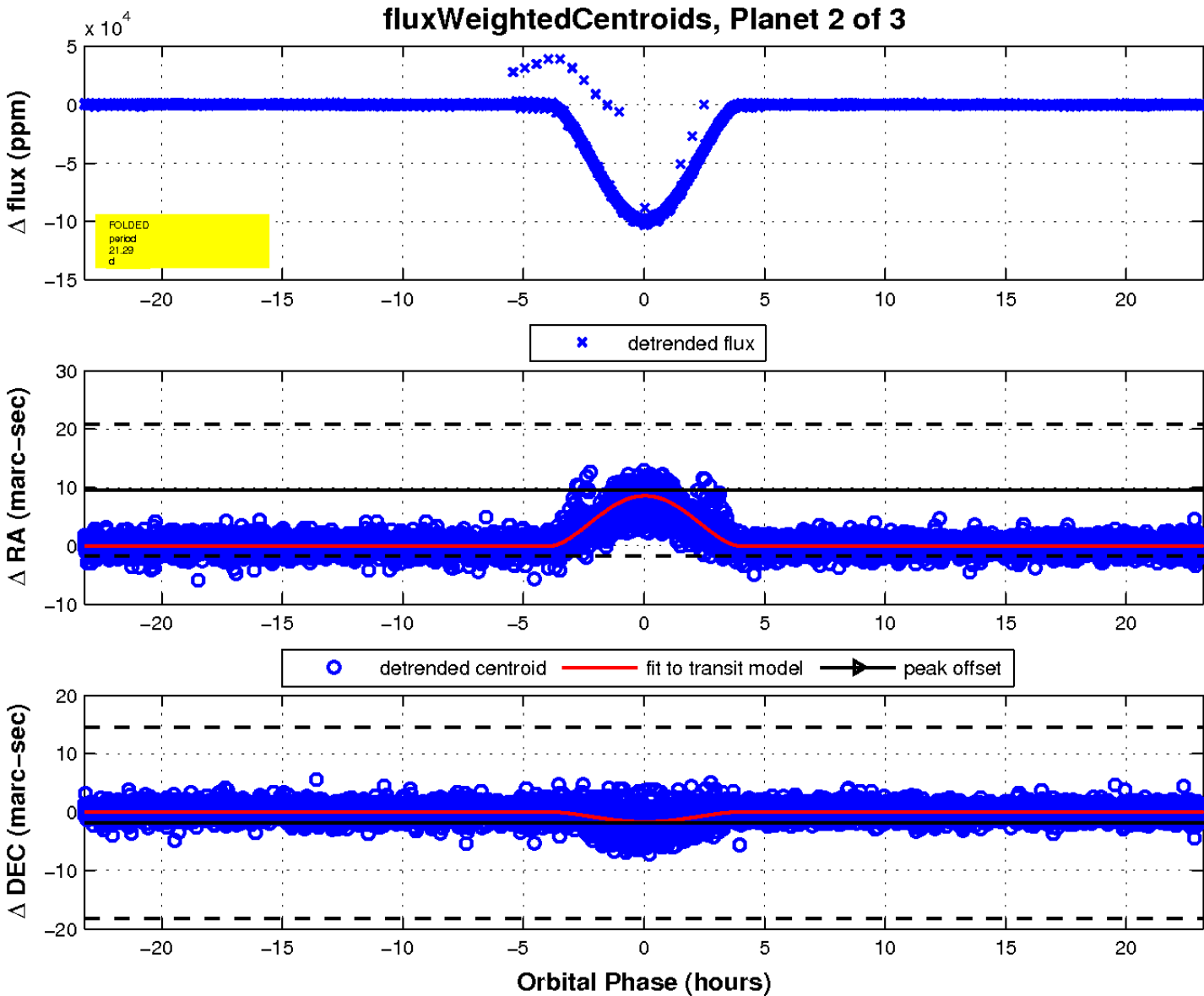
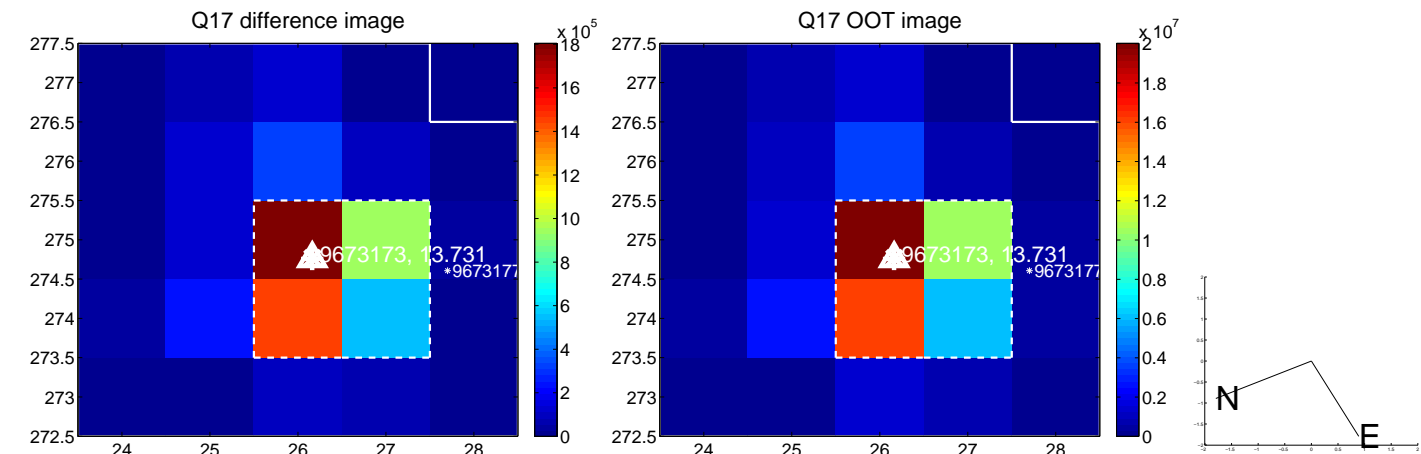
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

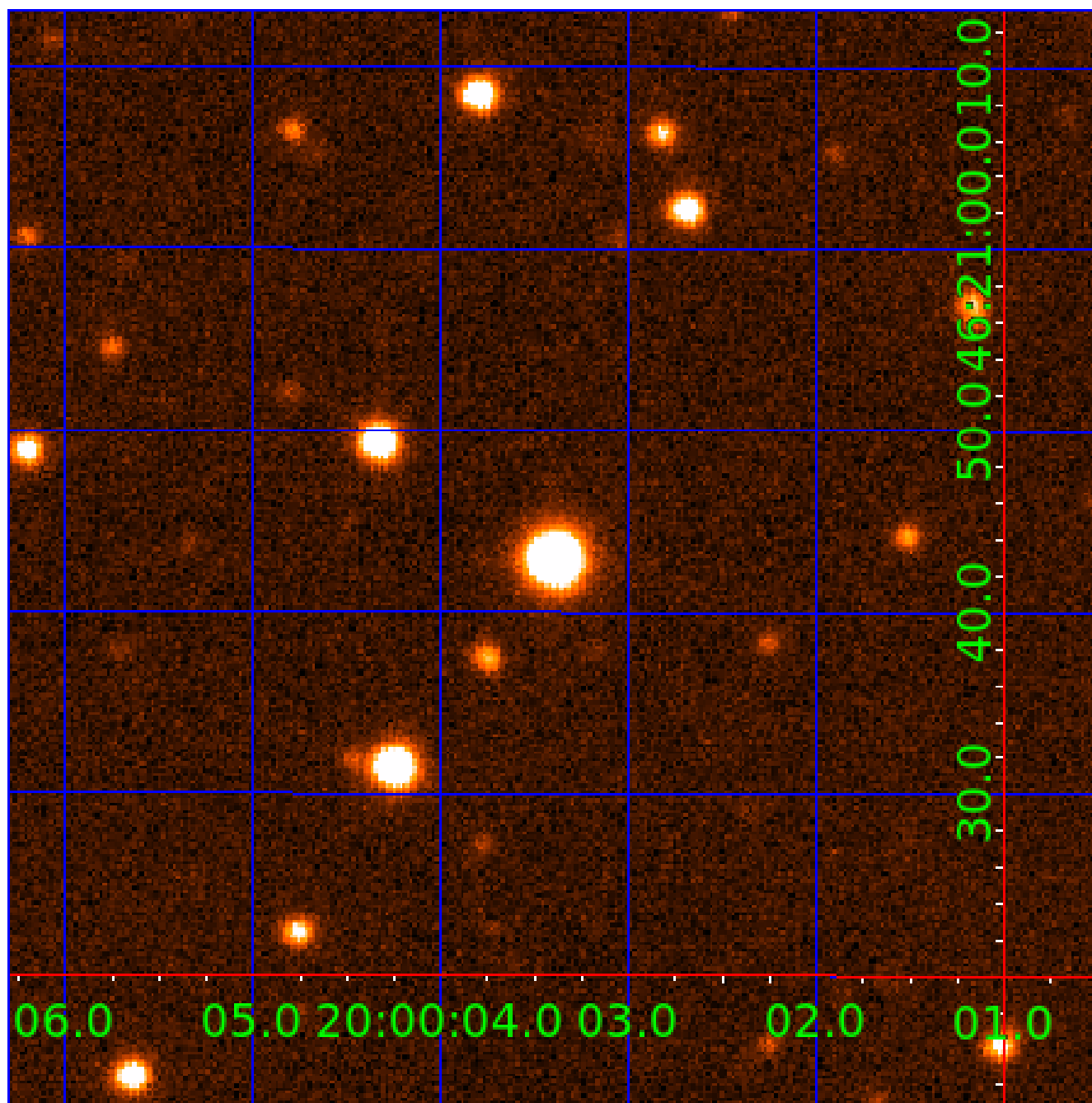


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009673173

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009673173-01	OBS	7222.01	21.294740	147.096709	122623.1	7.597	4593.5	3557.8	1.28	6039	66.26	83.83
009673173-02	OBS	No	21.294739	143.692028	98842.4	7.739	3740.5	3079.0	1.28	6039	59.12	83.83
009673173-03	OBS	No	395.055209	326.318188	1415.3	13.817	16.2	15.2	1.28	6039	5.21	1.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009673173-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009673173-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009673173-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

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

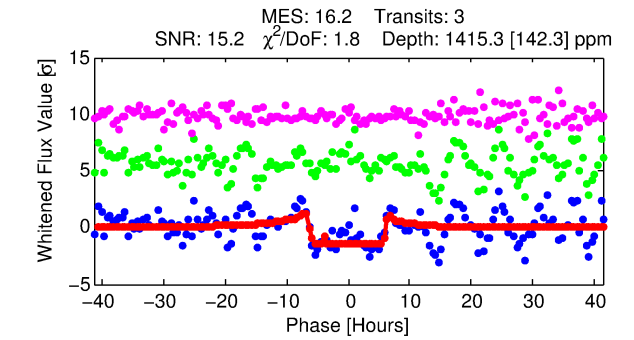
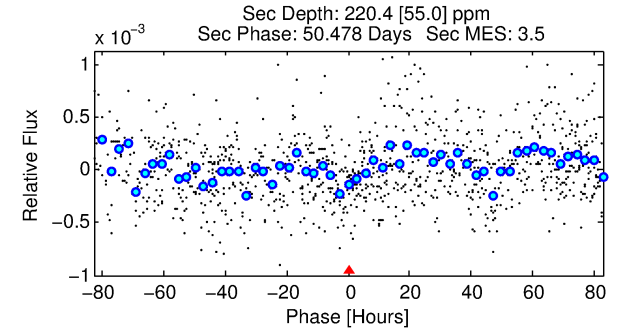
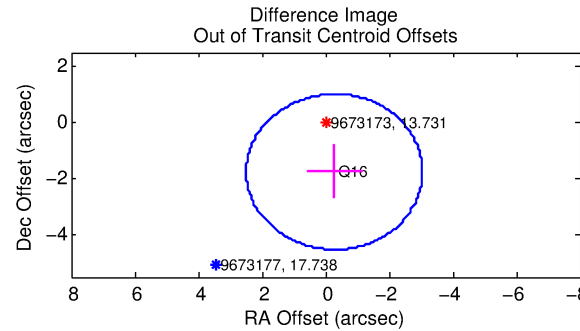
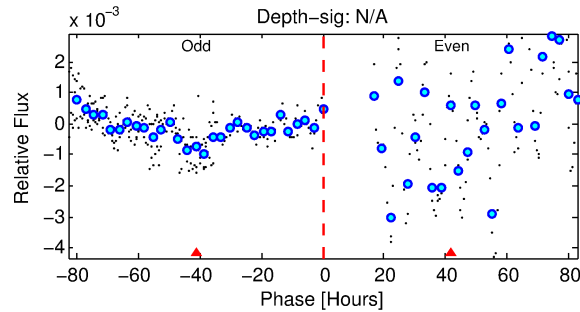
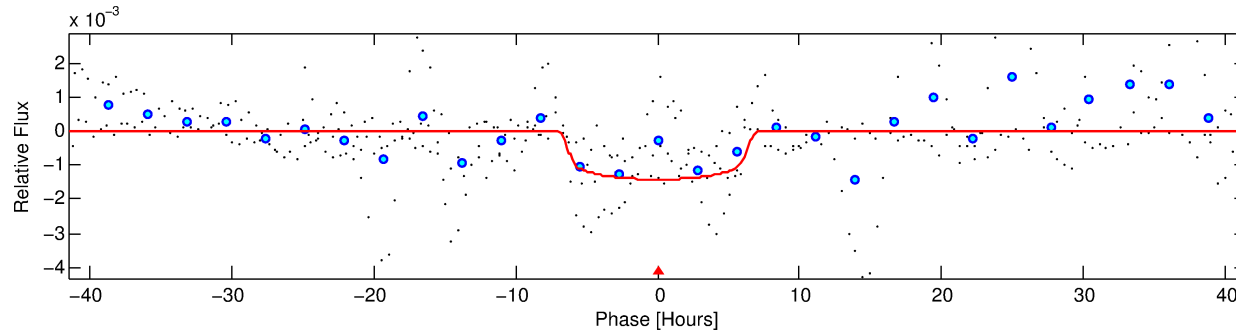
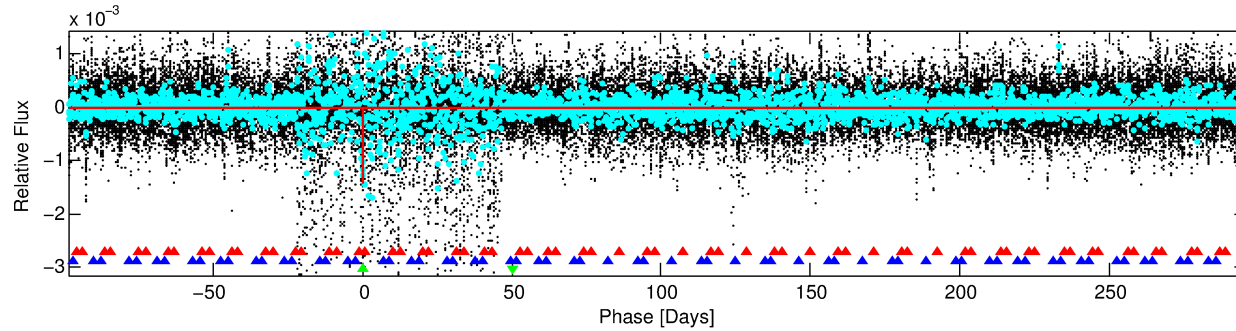
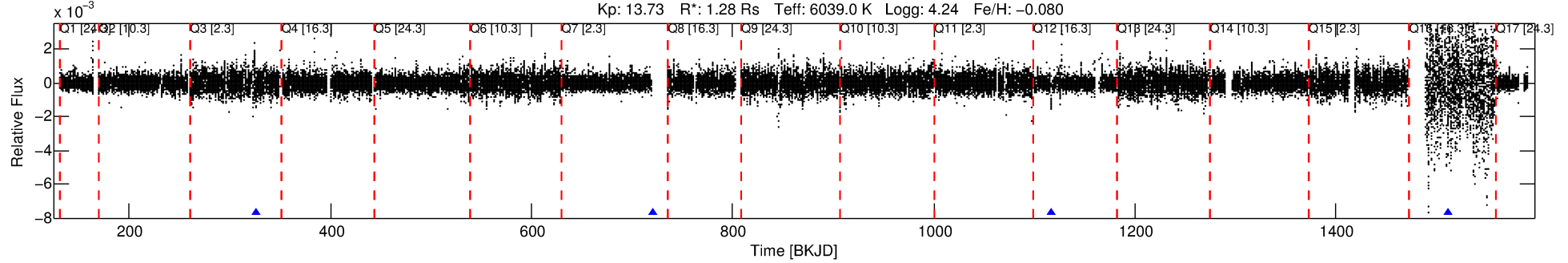
## Ephemeris Match Information For 009673173-03

No Significant Match Found

# DV One-Page Summary

KIC: 9673173 Candidate: 3 of 3 Period: 395.055 d  
KOI: K07222 Corr: No Ephemeris Match

Kp: 13.73 R\*: 1.28 Rs Teff: 6039.0 K Logg: 4.24 Fe/H: -0.080



## DV Fit Results:

Period = 395.05521 [0.00660] d  
Epoch = 326.3182 [0.0125] BKJD  
Rp/R\* = 0.0374 [0.0036]  
a/R\* = 157.72 [58.90]  
b = 0.74 [0.22]  
Seff = 1.71 [0.63]  
Teq = 291 [27] K  
Rp = 5.21 [1.57] Re  
a = 1.0678 [0.2561] AU  
Ag = 5093.32 [2388.34] [2.13σ]  
Teff = 3807 [320] K [10.95σ]

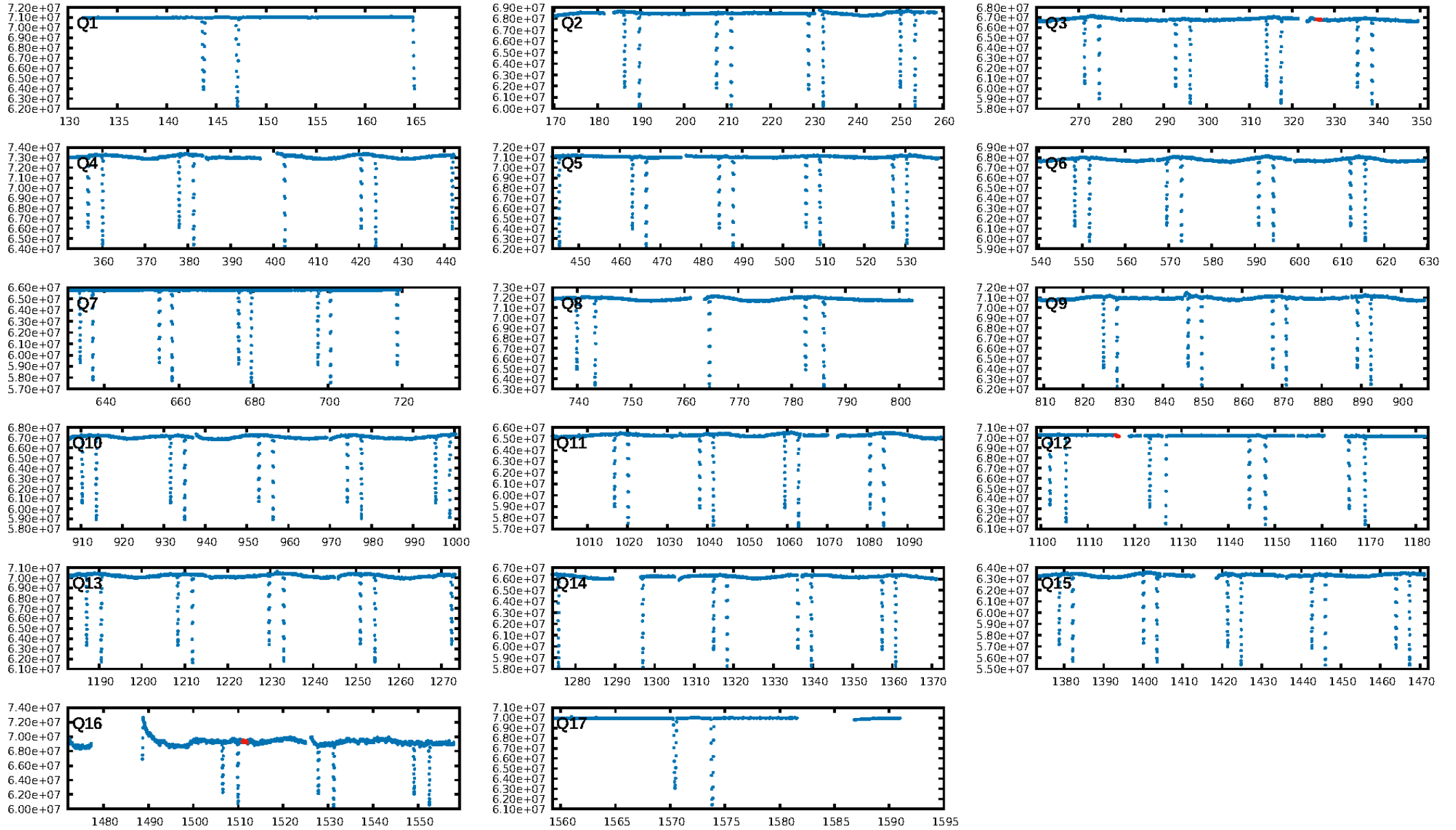
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [568.92σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 13.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.4853  
Centroid-sig: 0.0%  
Centroid-so: 0.897 arcsec [2.49σ]  
OotOffset-rm: 1.779 arcsec [1.93σ]  
KicOffset-rm: 1.727 arcsec [1.87σ]  
OotOffset-st: 0/0/1/0 [1]  
KicOffset-st: 0/0/1/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [2/2]

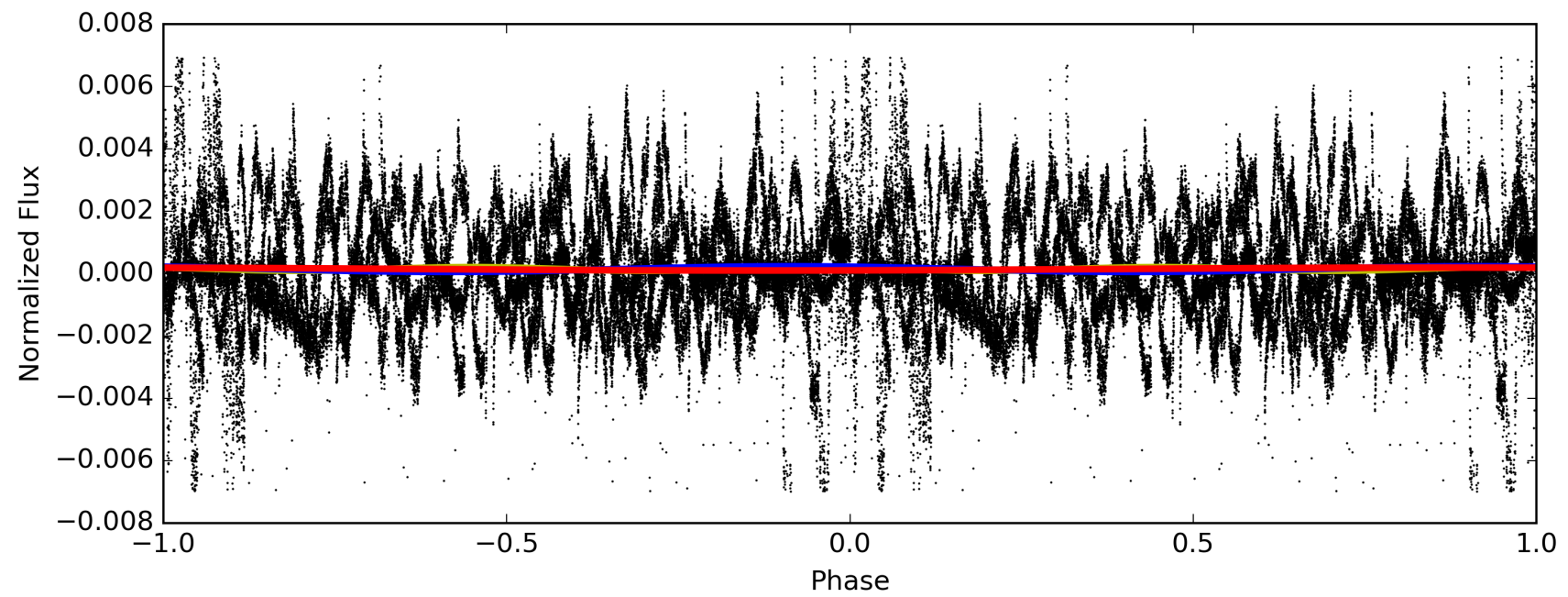
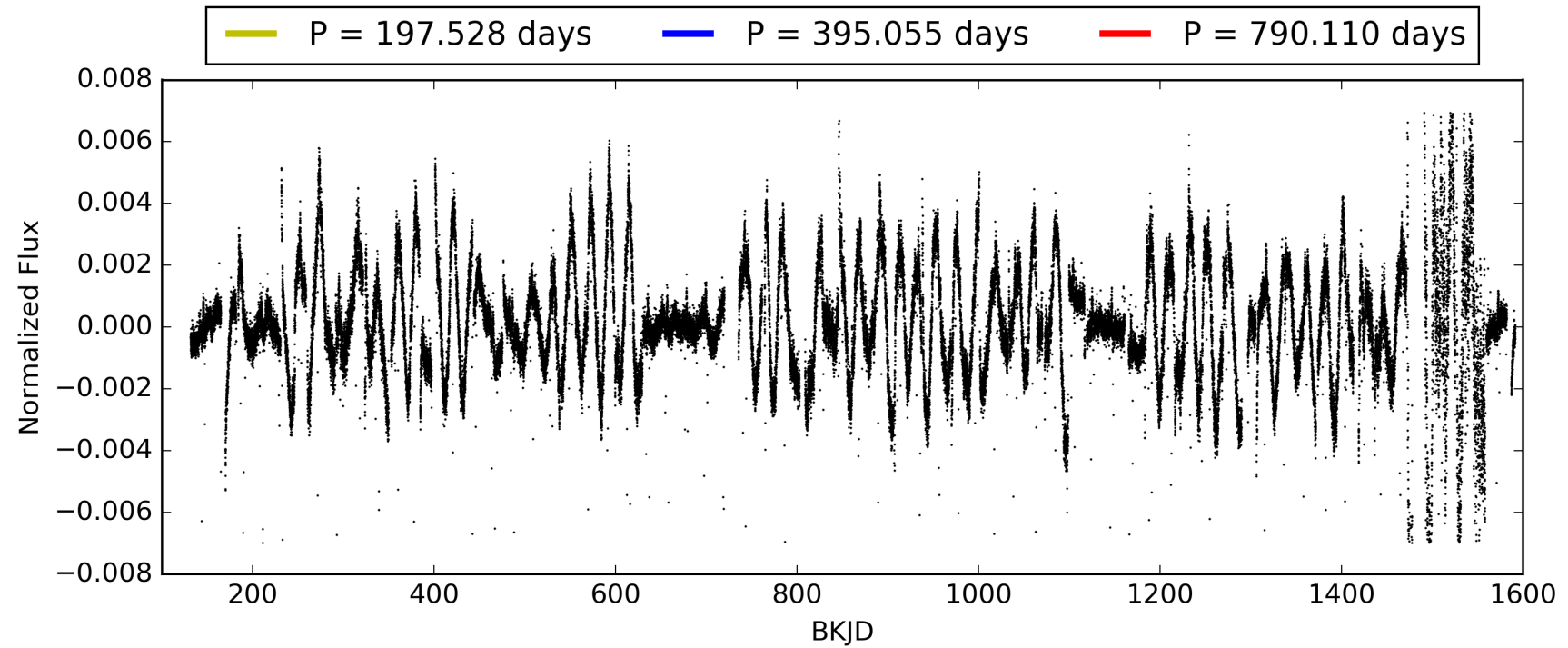
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:55:38 Z

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

# TCE 009673173-03, PDC Light Curves

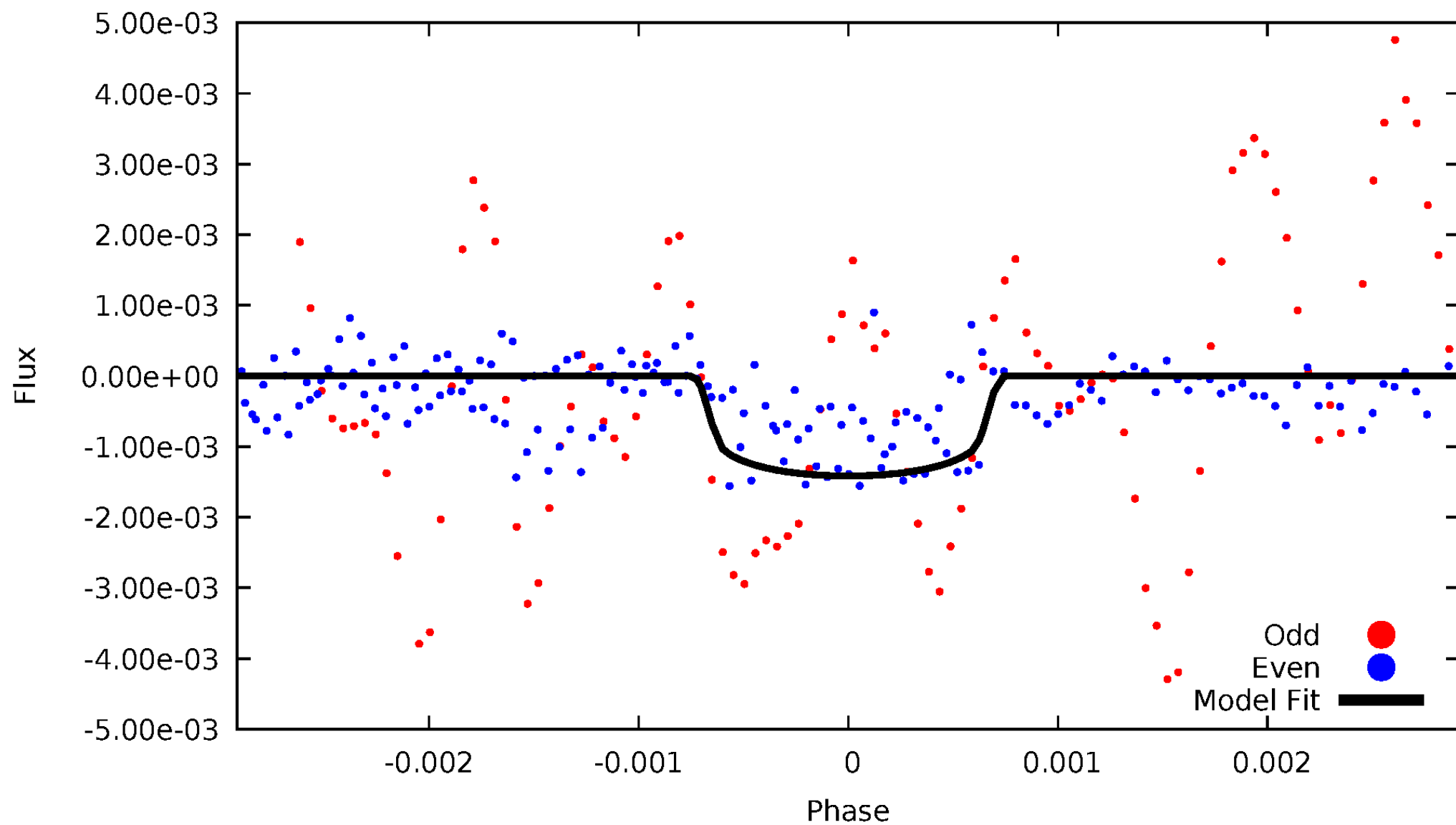


TCE 009673173-03



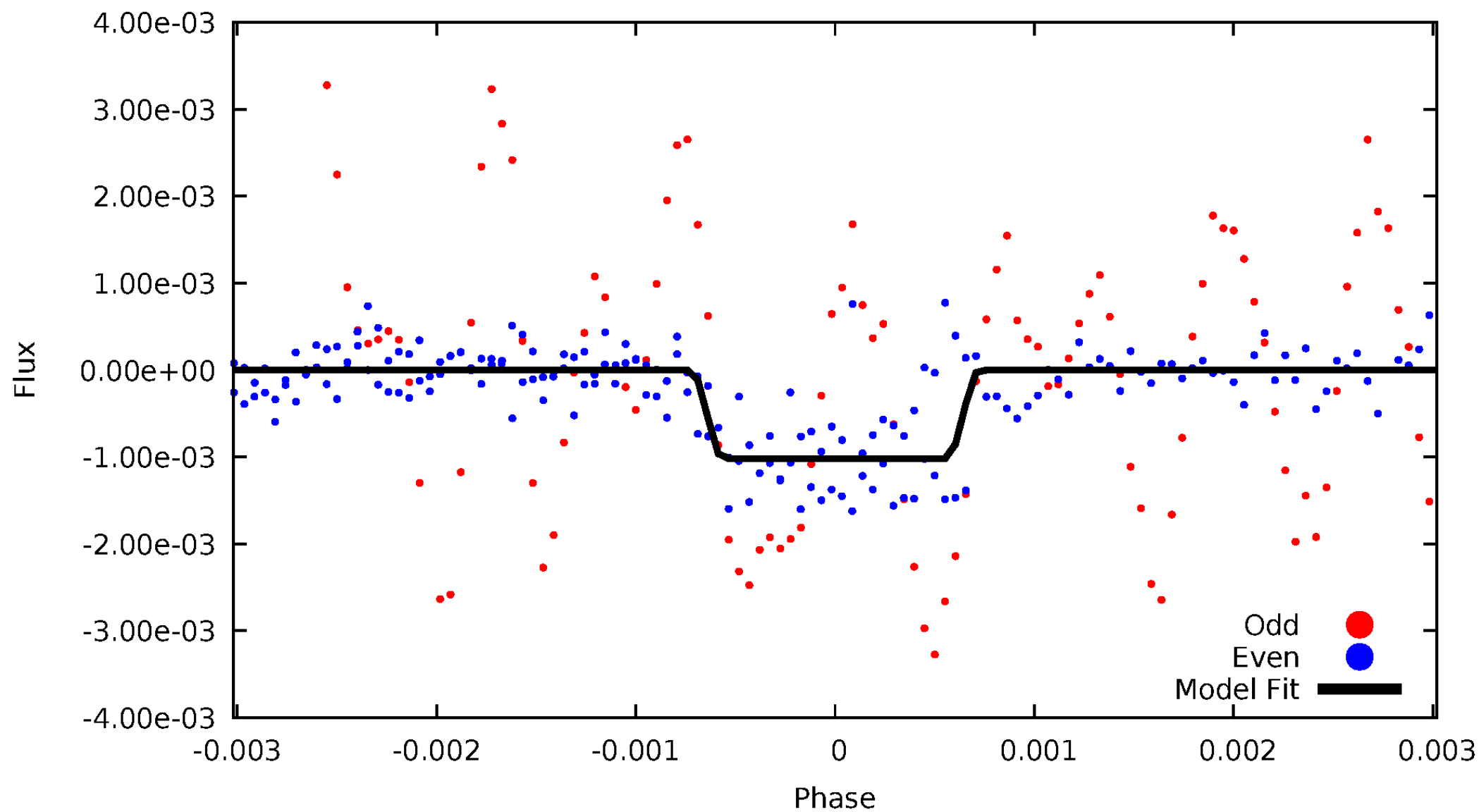
# DV Odd/Even

TCE 009673173-03



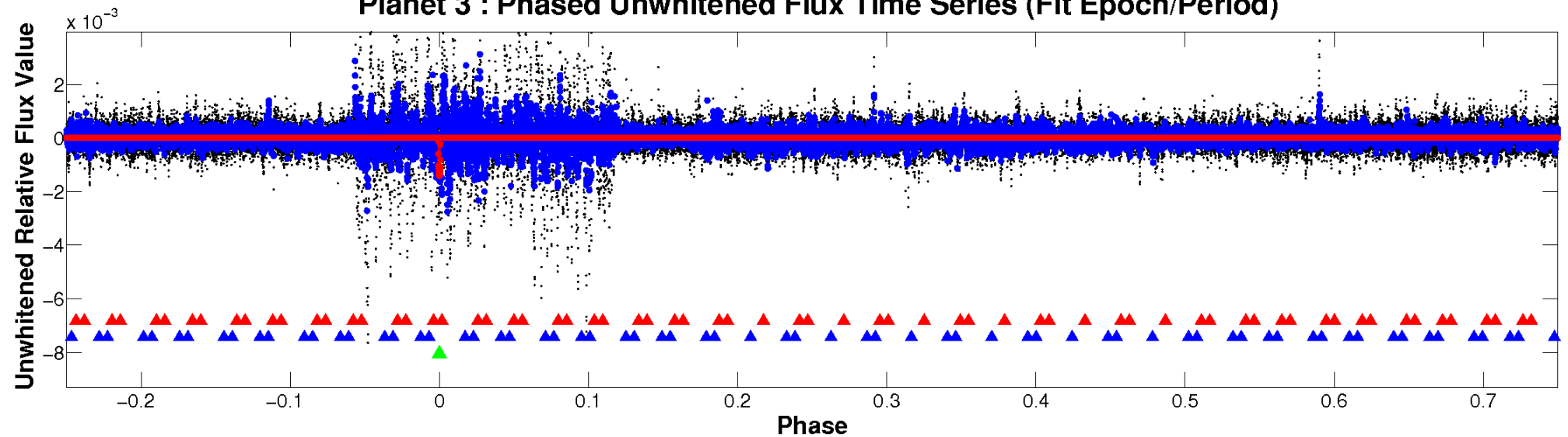
# ALT Odd/Even

TCE 009673173-03

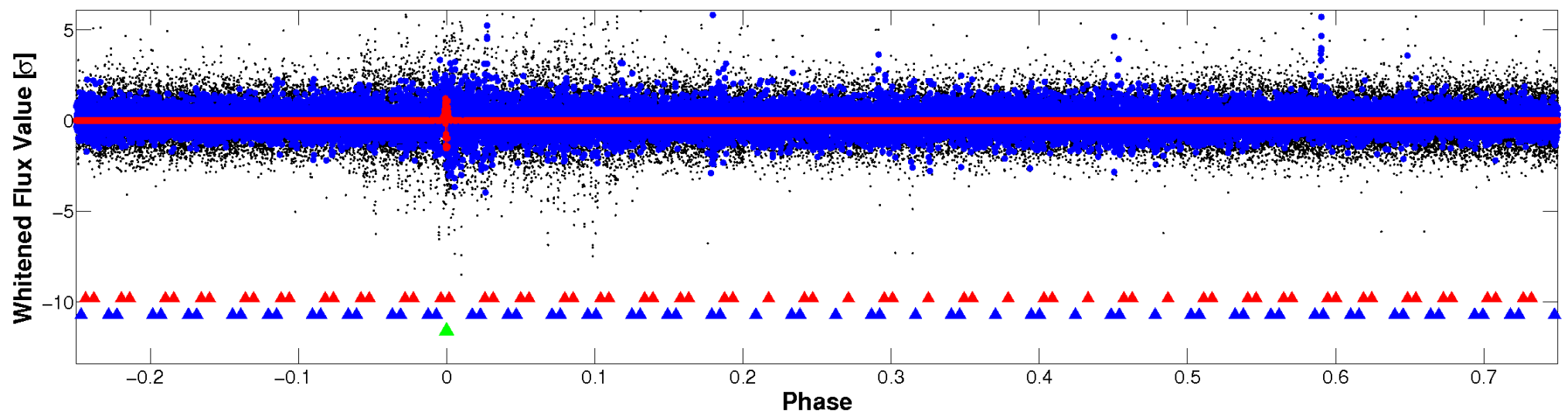


# Non-Whitened Vs. Whitened Light Curve

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

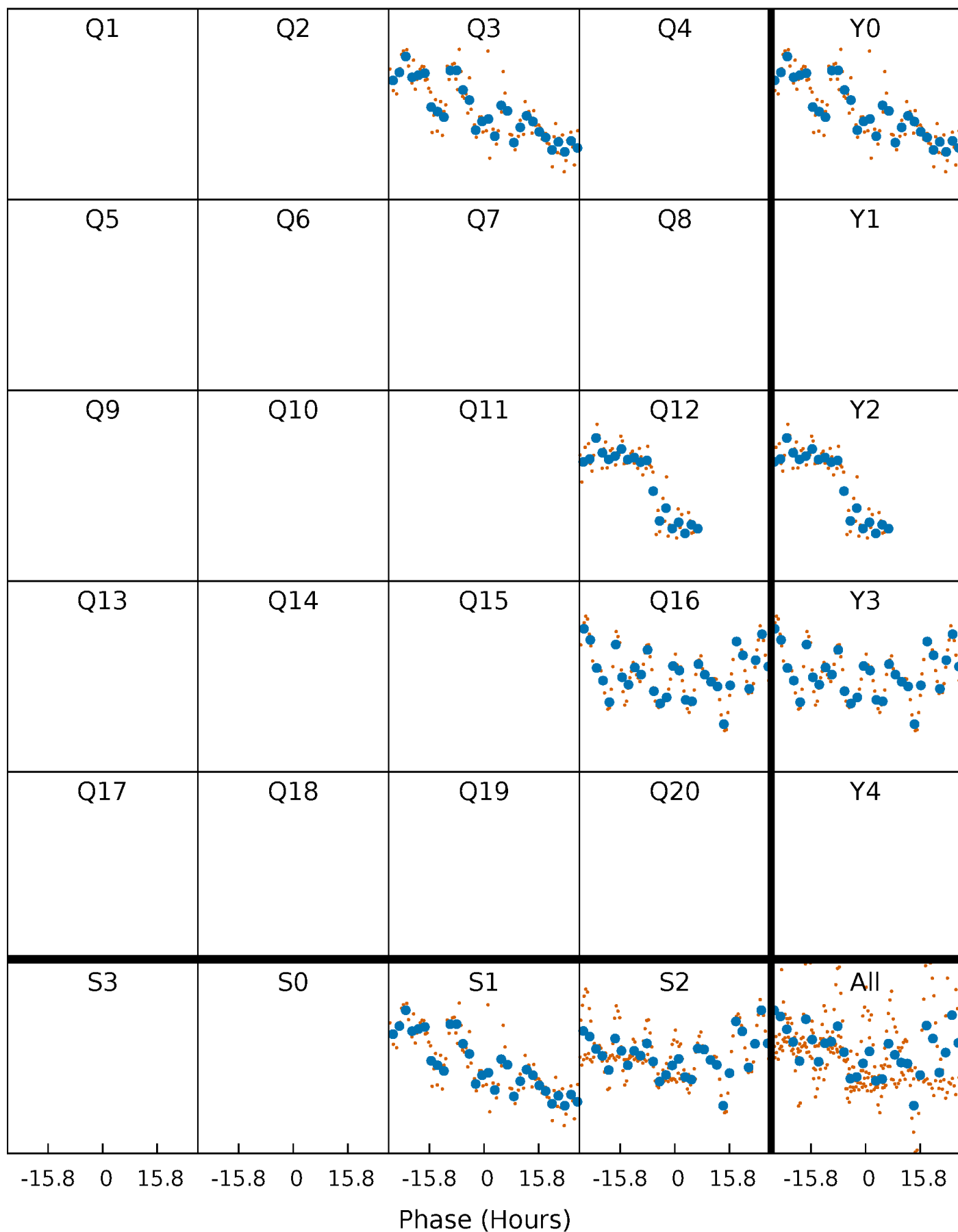


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

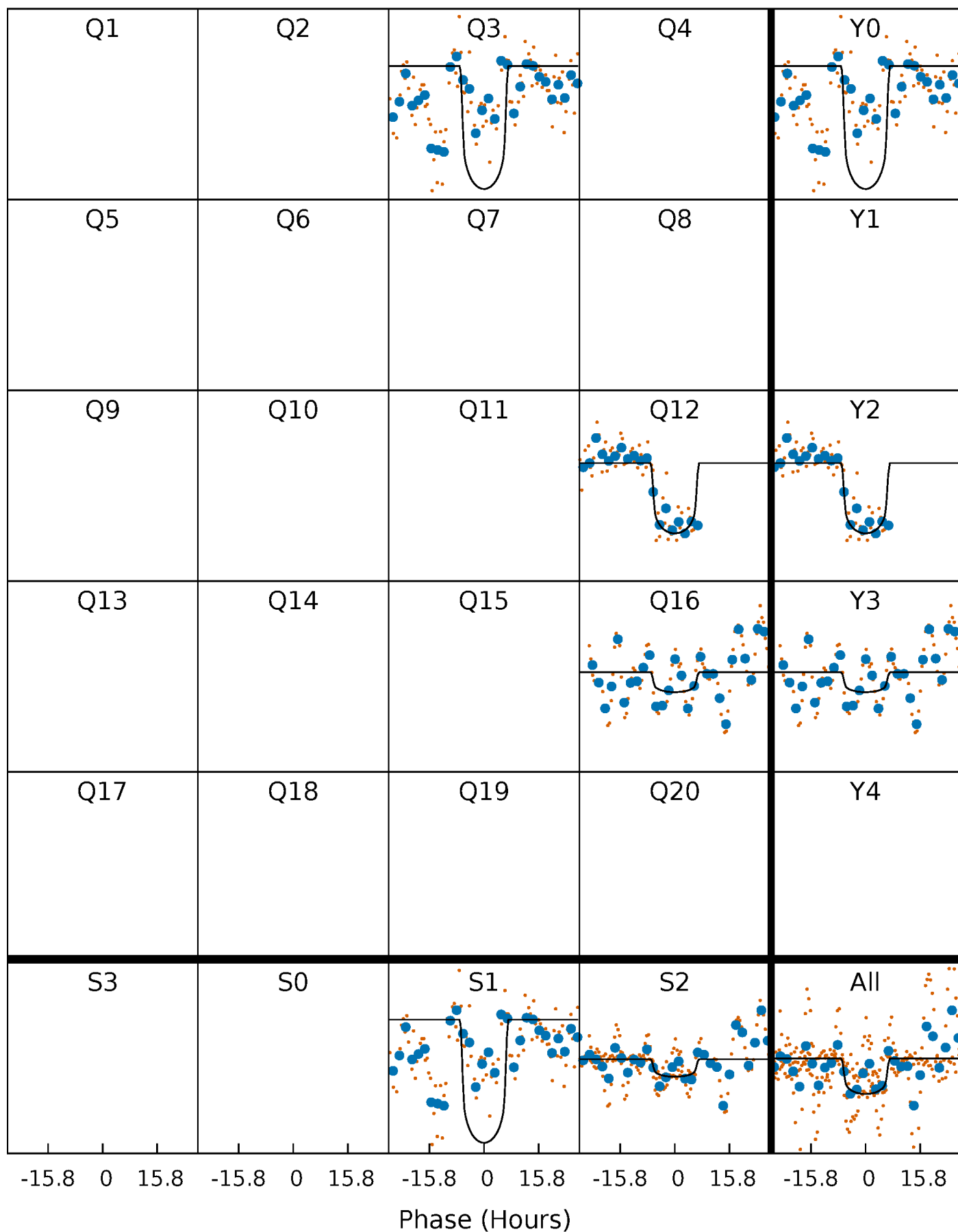
TCE 009673173-03     $P=395.055209$  Days     $T_0=326.318188$  (BKJD)





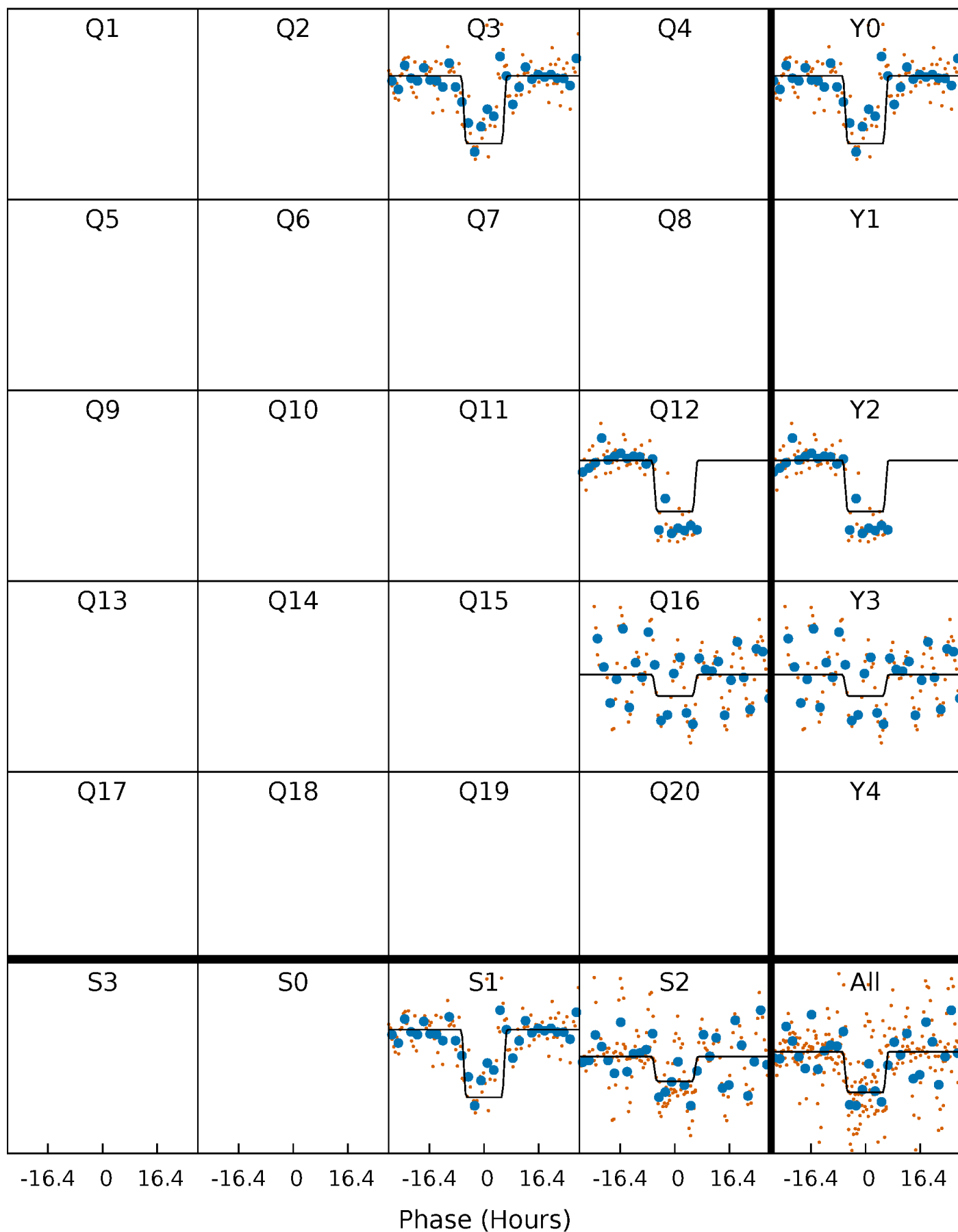
# DV Quarter-Phased Transit Curves

TCE 009673173-03 P=395.055209 Days  $T_0=326.318188$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

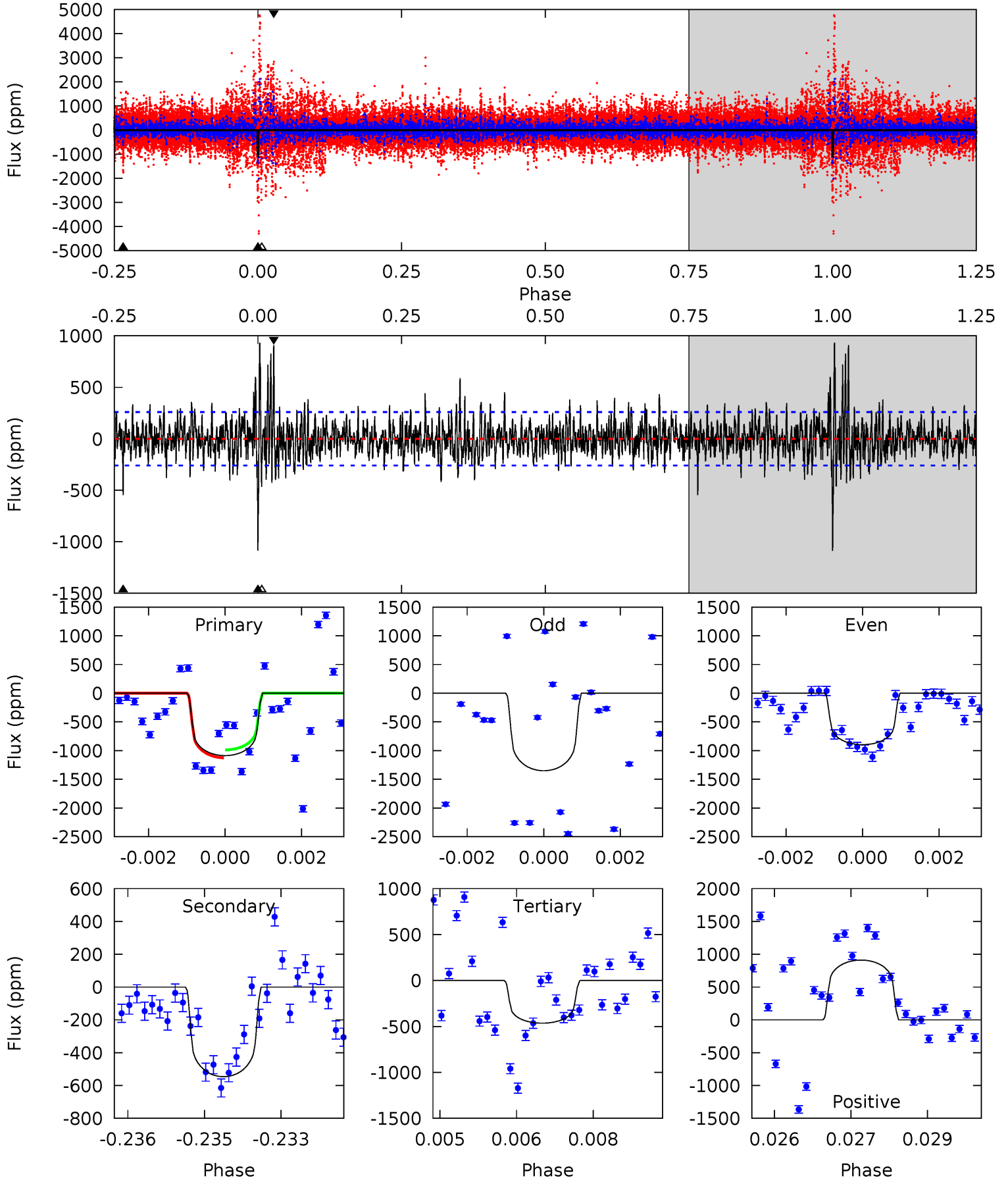
TCE 009673173-03 P=395.042015 Days  $T_0=326.332025$  (BKJD)



# DV Model-Shift Uniqueness Test

009673173-03, P = 395.055209 Days, E = 326.318188 Days

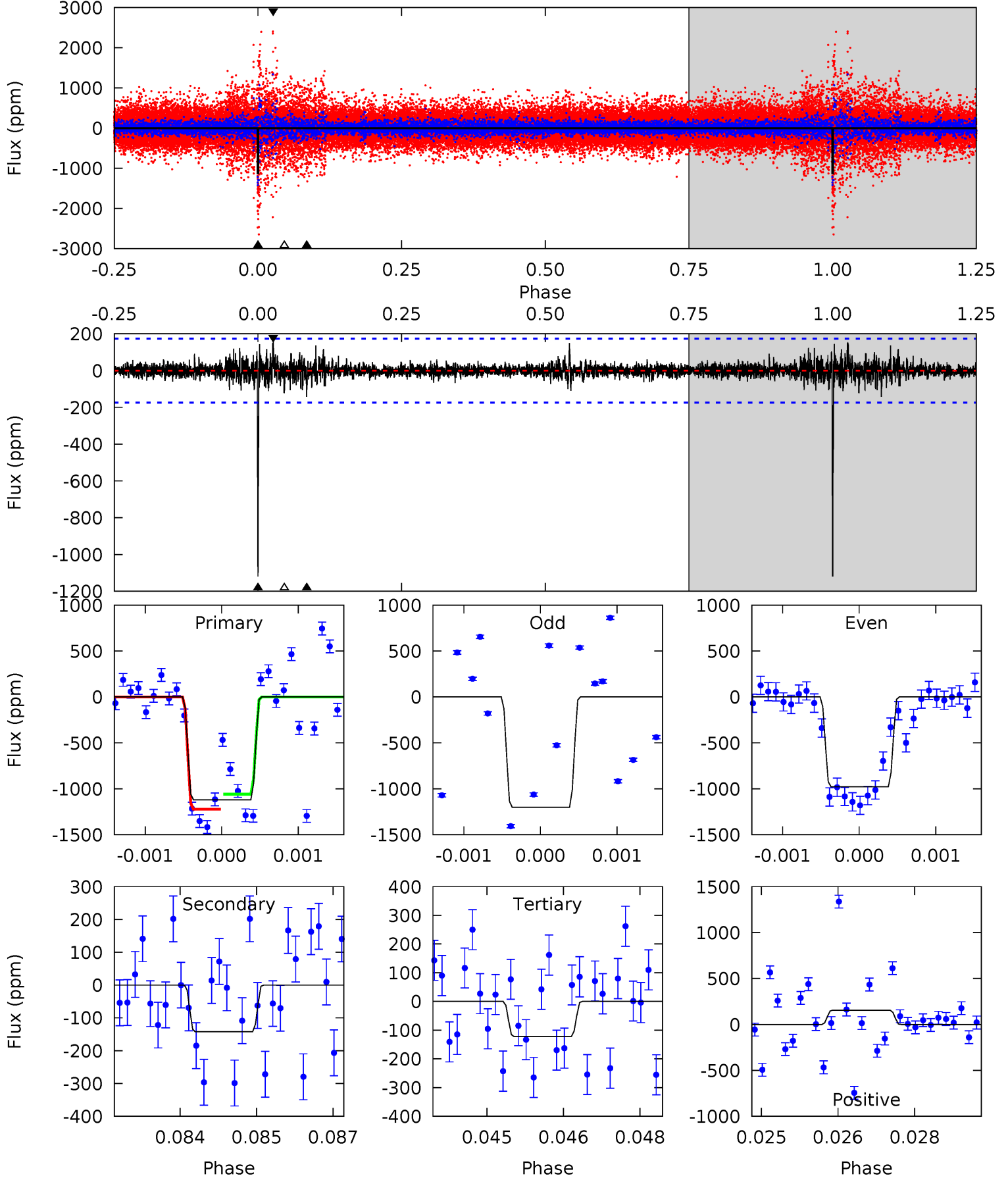
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.5	11.3	9.63	18.9	5.38	3.17	2.90	12.9	3.66	1.69	-7.56	3.24	0.79	0.46	1.42



# Alt Model-Shift Uniqueness Test

009673173-03, P = 395.042015 Days, E = 326.332025 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
34.7	4.40	3.78	4.80	5.38	3.18	0.75	30.9	29.9	0.62	-0.40	2.28	0.86	0.12	0



### Stellar Parameters For KIC 009673173

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6039^{+181}_{-181}$	$4.242^{+0.190}_{-0.190}$	$-0.080^{+0.250}_{-0.300}$	$1.278^{+0.365}_{-0.299}$	$1.041^{+0.159}_{-0.130}$	$0.702^{+0.695}_{-0.348}$
	+3%/-3%	+4%/-4%	+312%/-375%	+29%/-23%	+15%/-12%	+99%/-50%
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 009673173-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-546 \pm 48$	$5.28^{+1.02}_{-0.86}$	$409^{+32}_{-31}$	$4875^{+279}_{-235}$	$12322^{+5233}_{-3705}$
Alt.	$-142 \pm 32$	$4.41^{+0.86}_{-0.76}$	$408^{+31}_{-27}$	$4024^{+278}_{-243}$	$4499^{+2557}_{-1562}$

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

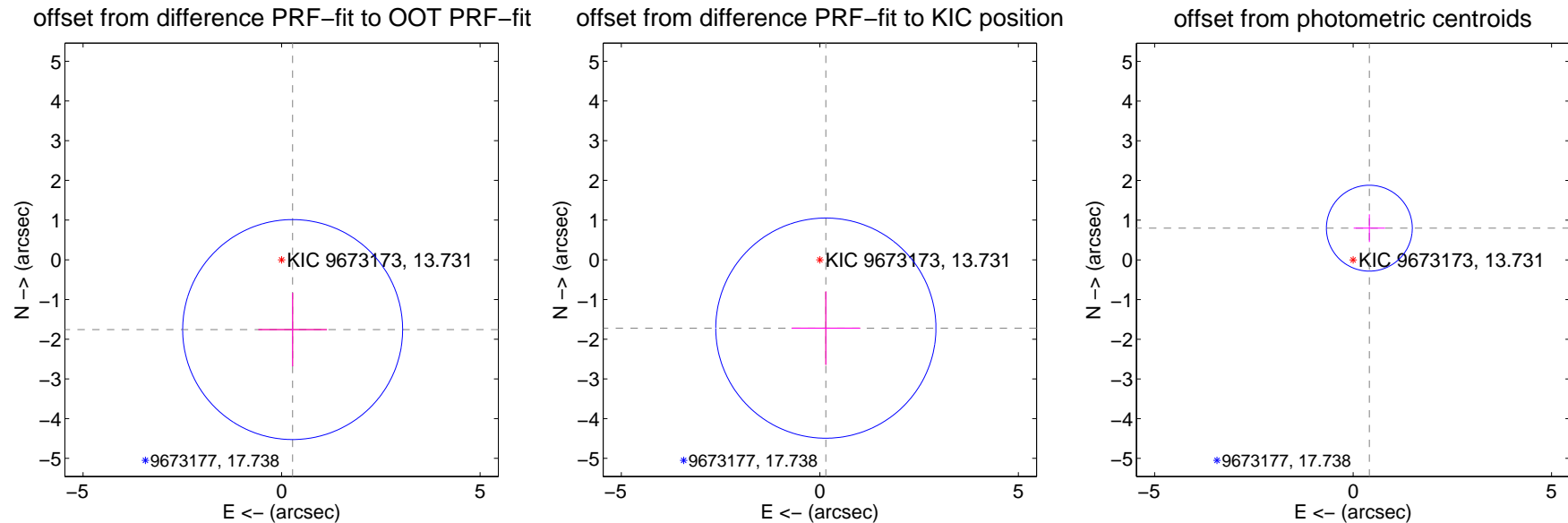
## DV Centroid Data

Supplemental centroid analysis for 009673173-03. Kepler magnitude: 13.73. Transit SNR 15.23

There are 0 quarters with good PRF difference image offsets

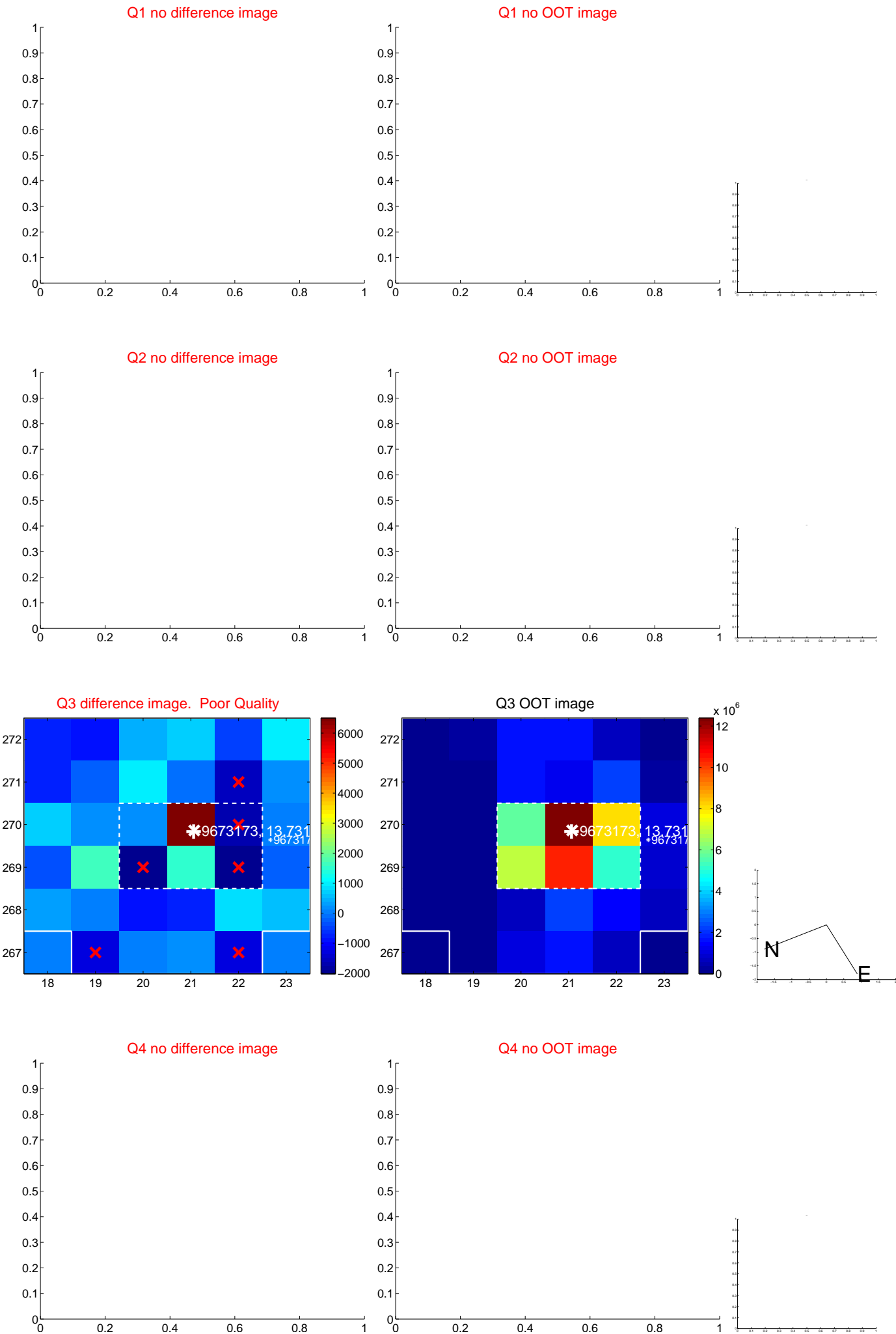
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.779 \pm 0.923$	1.93	$-0.279 \pm 0.865$	$-1.757 \pm 0.925$
PRF-fit source offset from KIC position	$1.727 \pm 0.924$	1.87	$-0.151 \pm 0.865$	$-1.721 \pm 0.925$
photometric centroid source offset	$0.90 \pm 0.36$	2.49	$-0.41 \pm 0.39$	$0.80 \pm 0.35$



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.

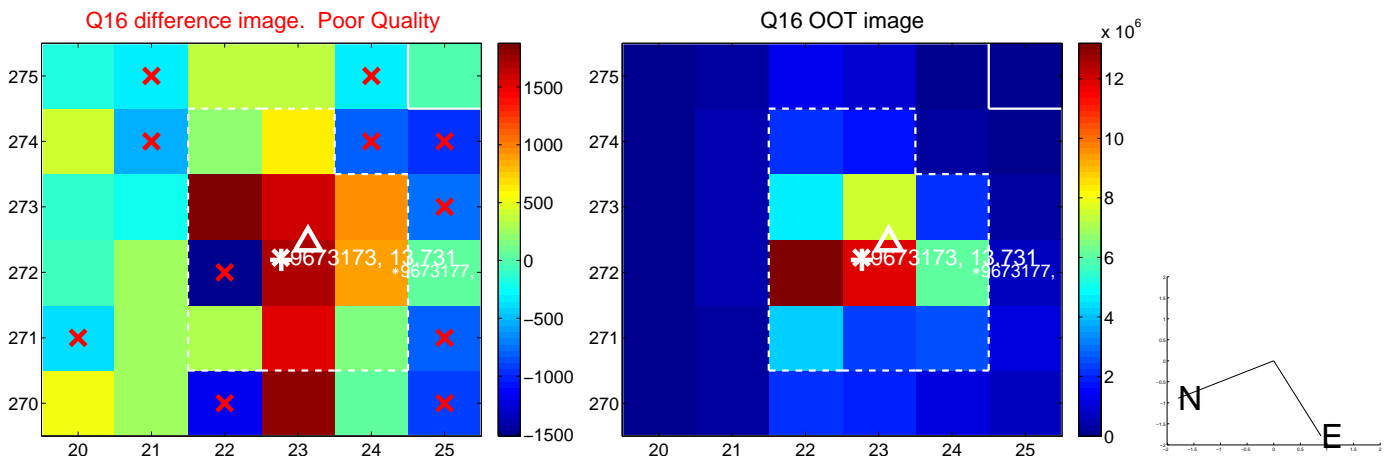
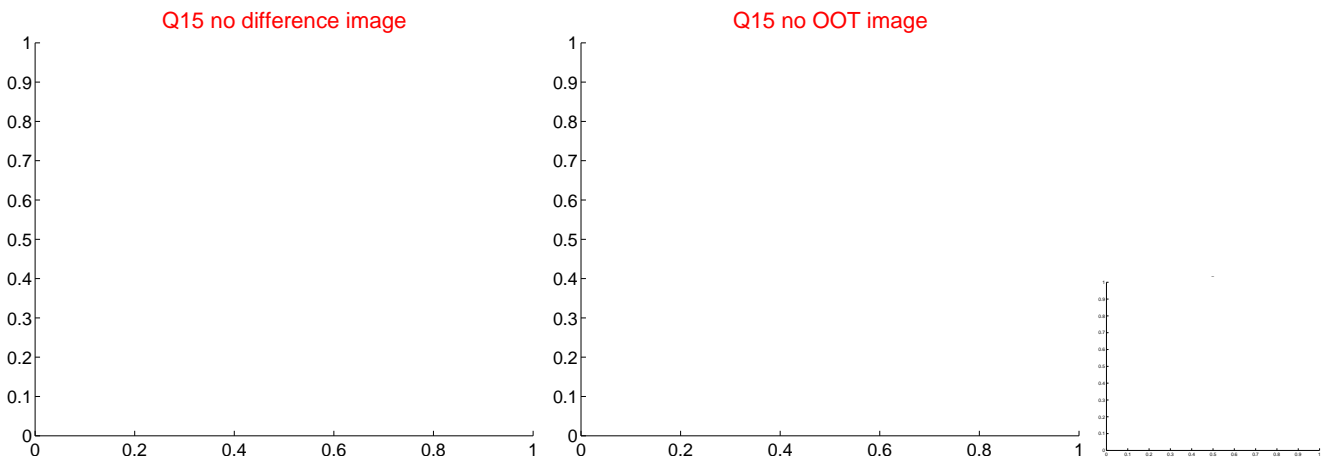
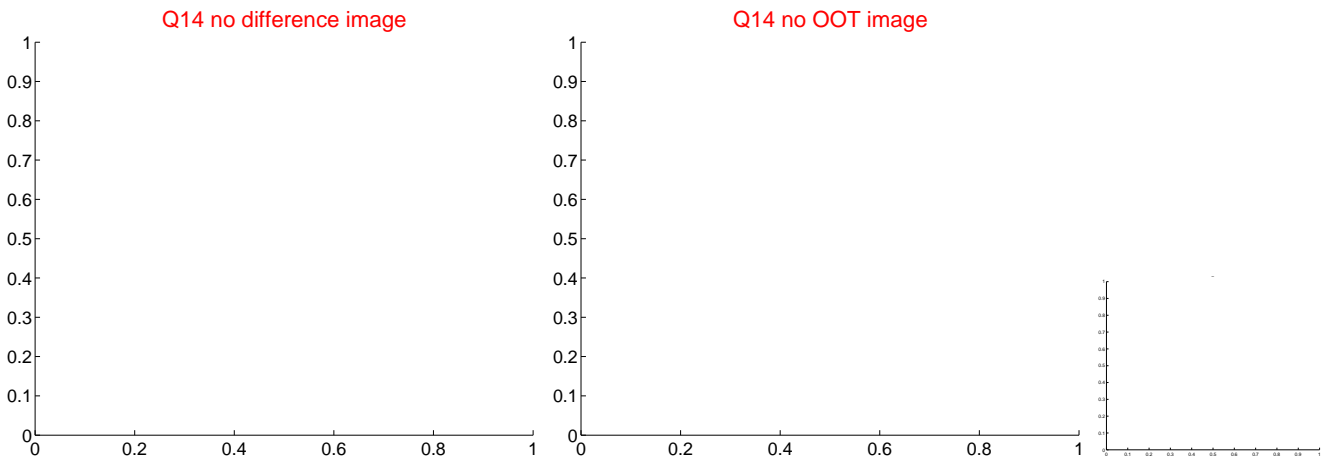
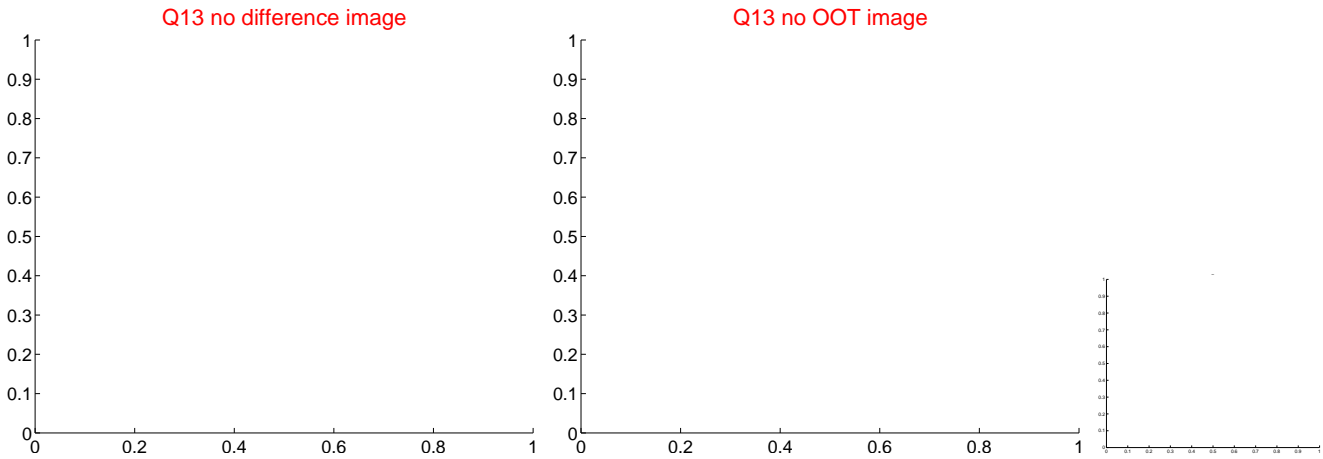




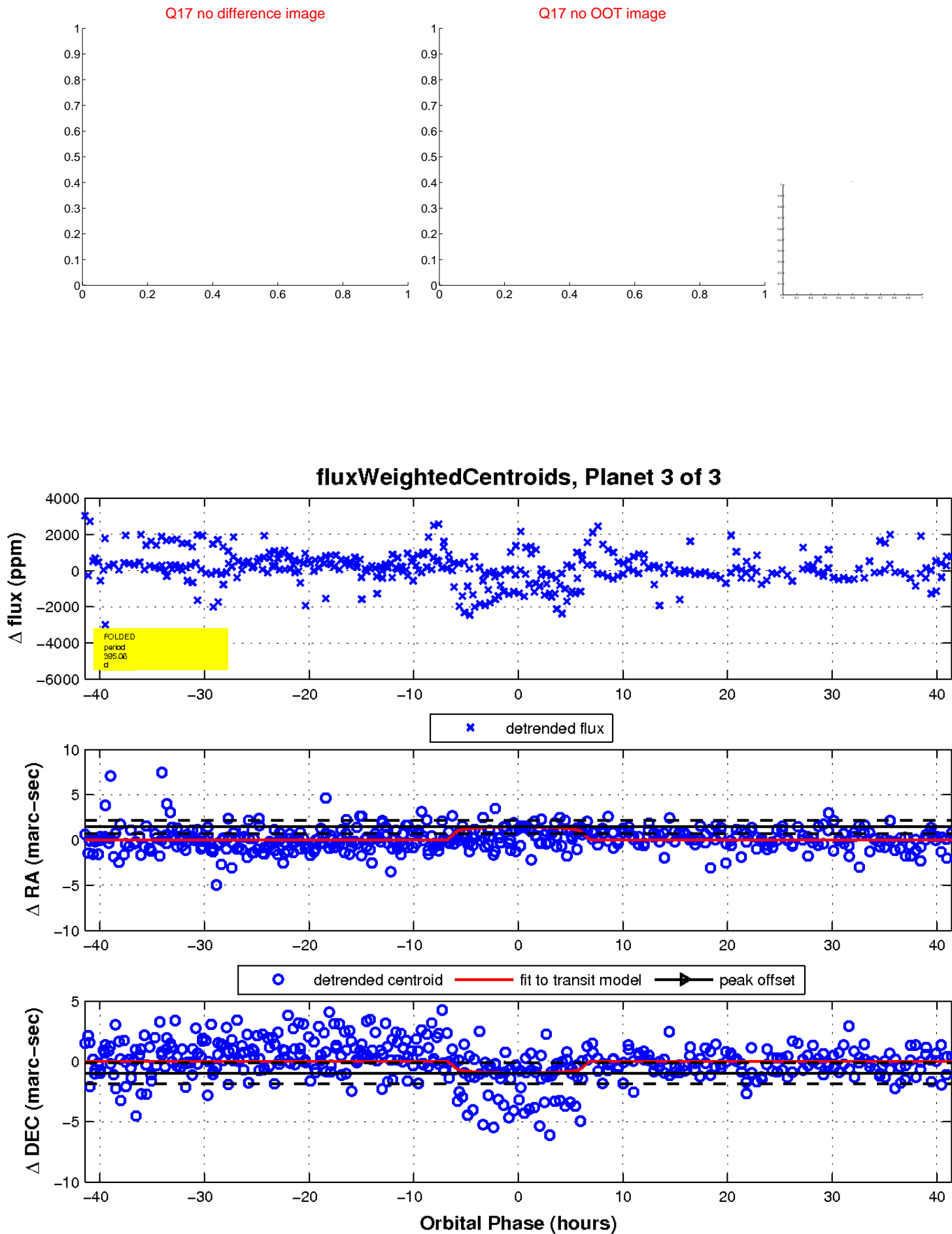
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

