

# KIC 010663294

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010663294-01	OBS	No	1.900058	132.884055	27.7	5.995	11.0	10.0	2.40	7107	1.49	10798.43
010663294-02	OBS	No	399.710551	375.376129	302.3	18.090	10.3	8.0	2.40	7107	4.99	8.63
010663294-03	OBS	No	0.542916	132.056734	22.4	6.515	9.7	12.7	2.40	7107	1.15	57377.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010663294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010663294-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010663294-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_FEW_DIFFS

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

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

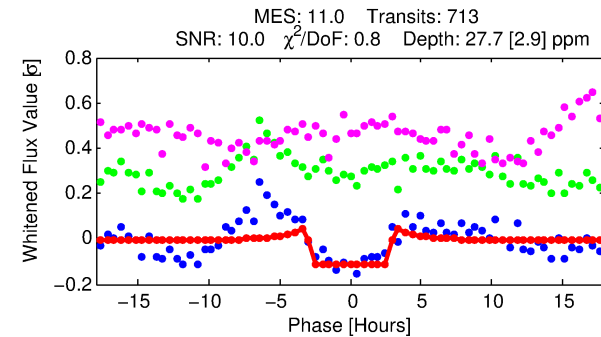
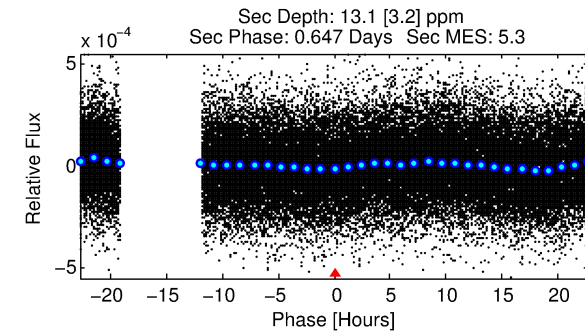
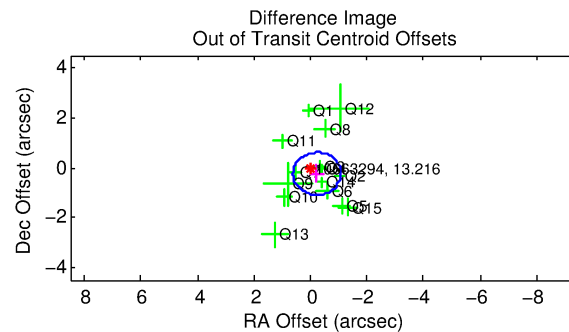
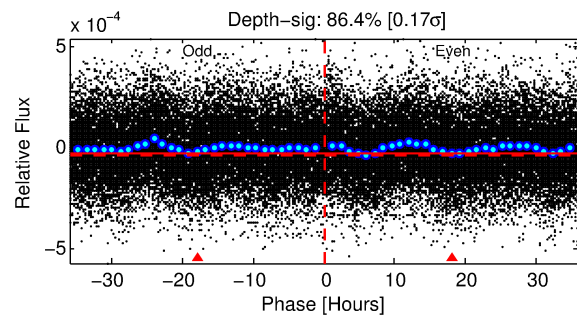
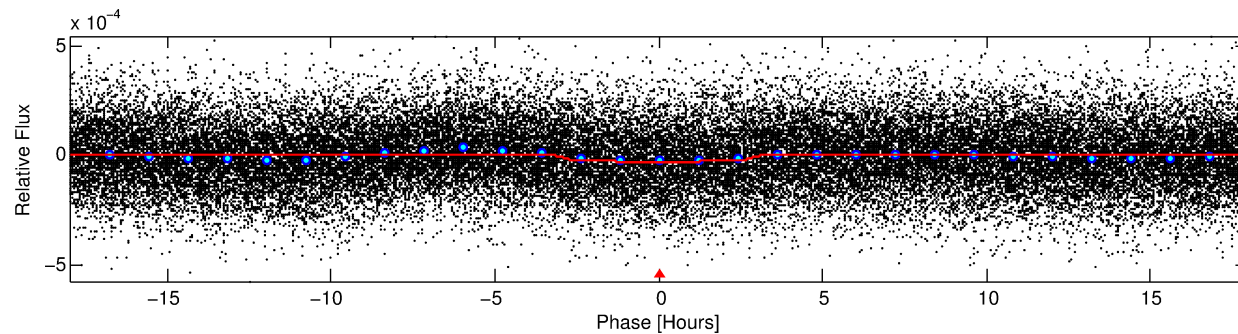
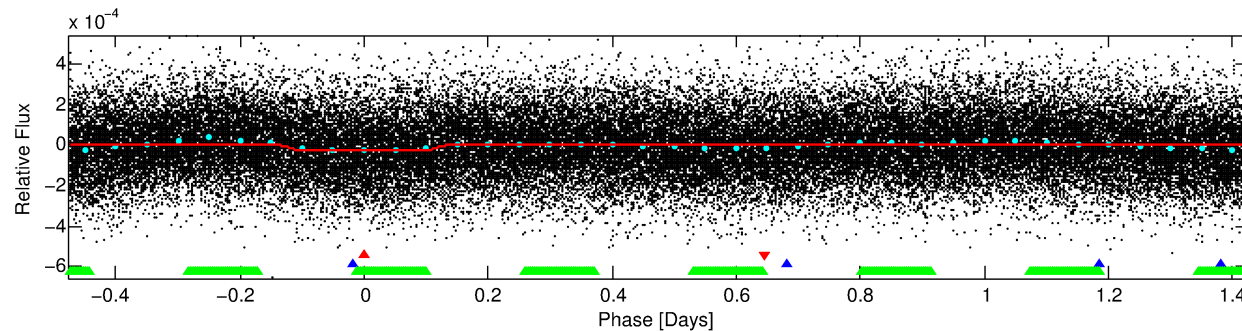
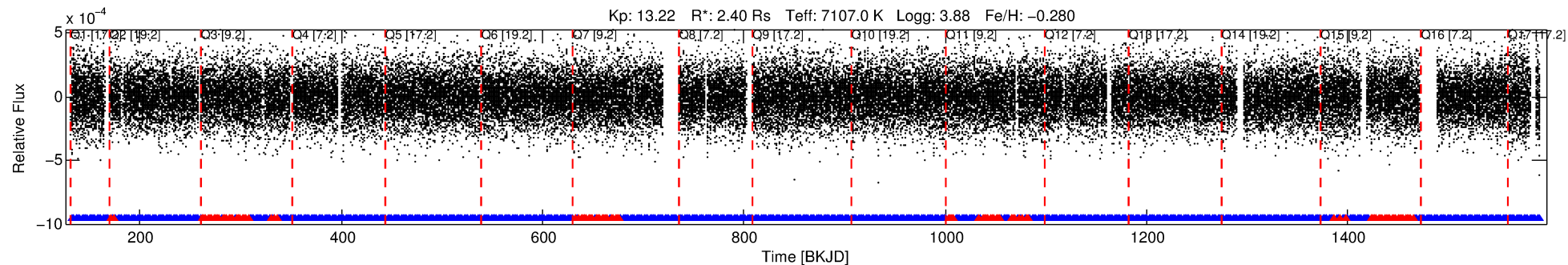
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010663294-01

No Significant Match Found

# DV One-Page Summary

KIC: 10663294 Candidate: 1 of 3 Period: 1.900 d



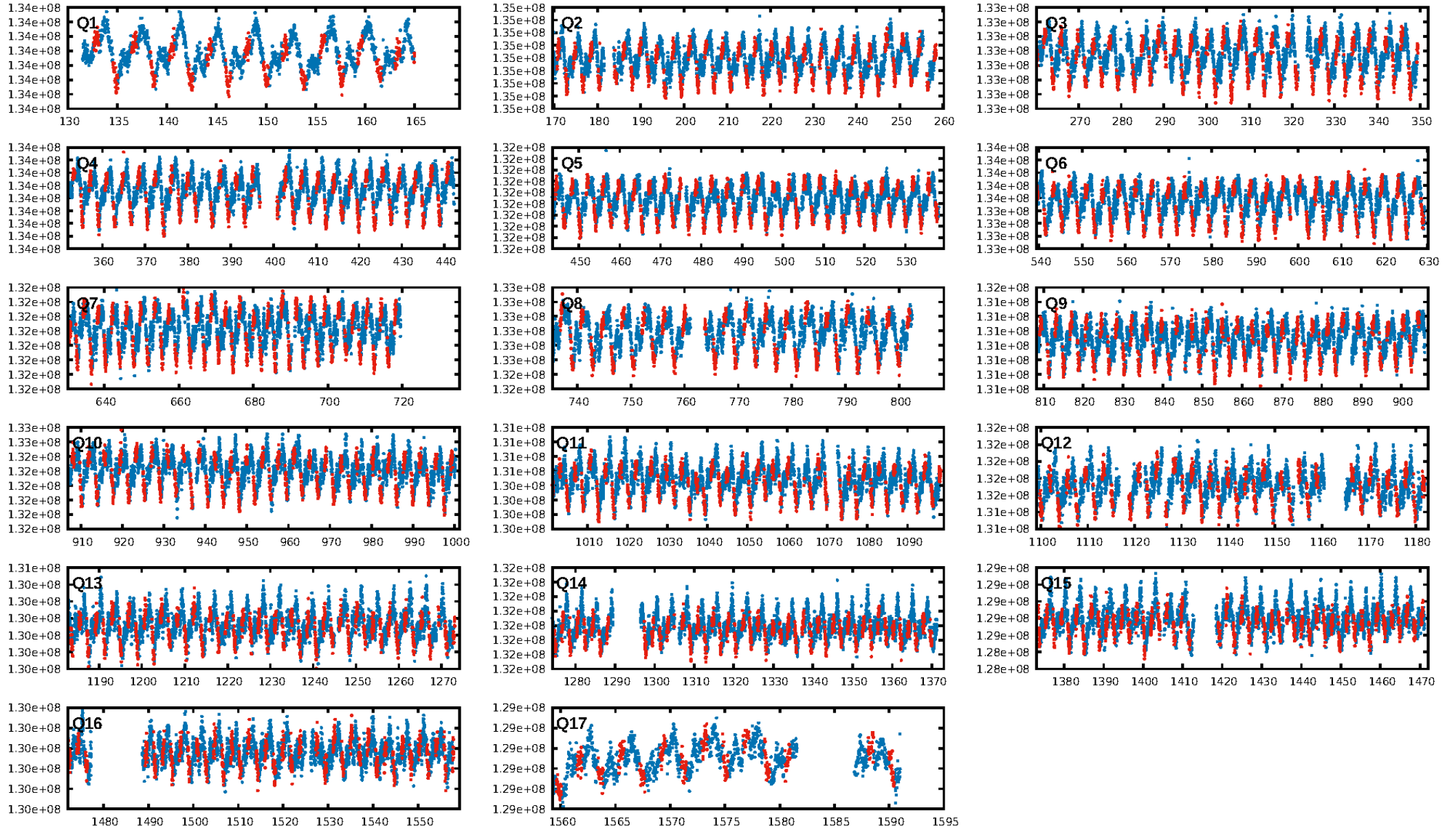
## DV Fit Results:

Period = 1.90006 [0.00002] d  
Epoch = 132.8841 [0.0041] BKJD  
Rp/R\* = 0.0057 [0.0012]  
a/R\* = 1.40 [0.86]  
b = 0.91 [0.24]  
Seff = 10798.43 [5231.61]  
Teq = 2599 [315] K  
Rp = 1.49 [0.58] Re  
a = 0.0350 [0.0104] AU  
Ag = 3.98 [2.68] [1.11 $\sigma$ ]  
Teffp = 5677 [722] K [3.91 $\sigma$ ]

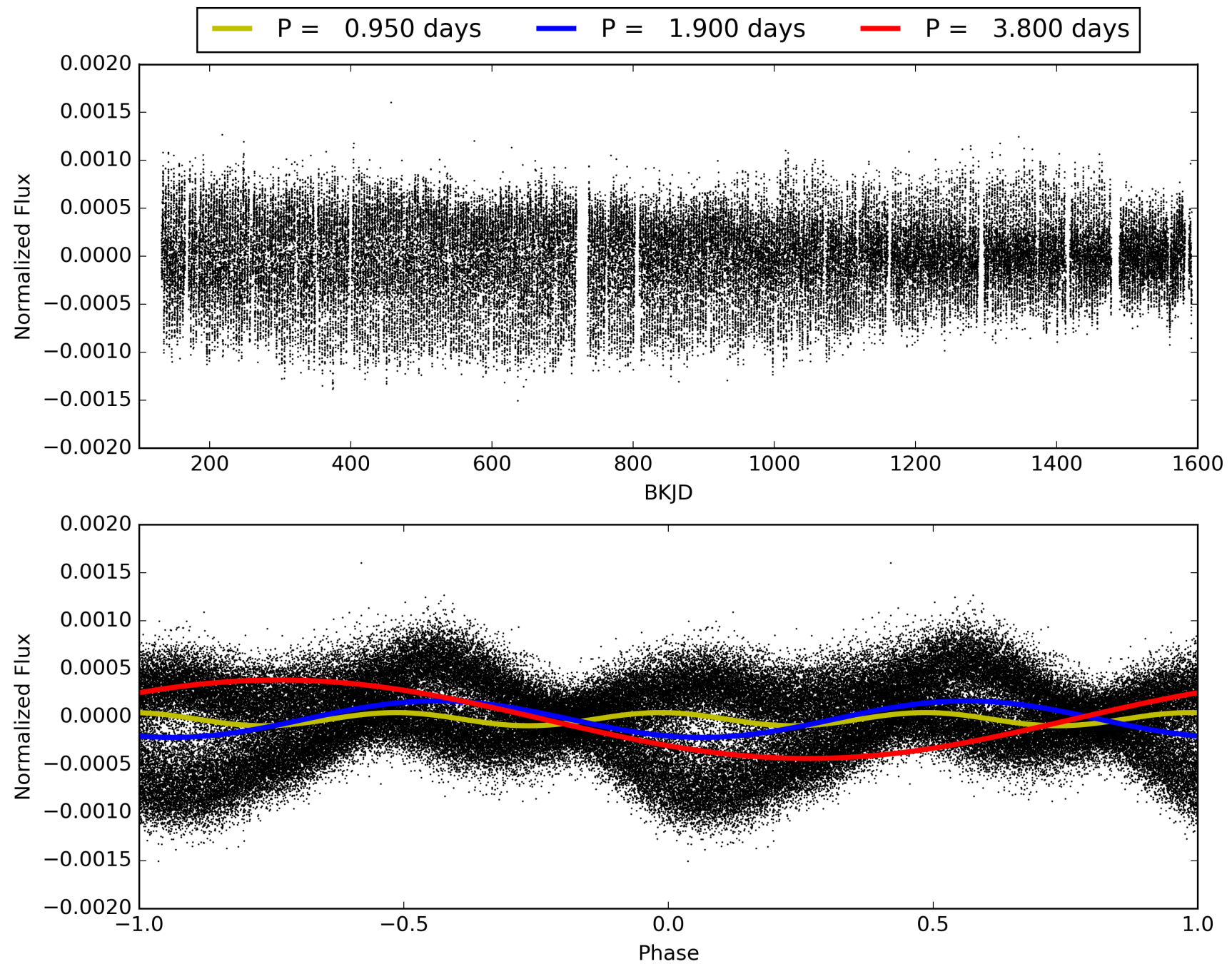
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.68 $\sigma$ ]  
LongPeriod-sig: 100.0% [500.98 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.86 [585/682]  
GhostDiagnostic-chr: 3.428  
Centroid-sig: 45.5%  
Centroid-so: 0.371 arcsec [0.46 $\sigma$ ]  
OotOffset-rm: 0.327 arcsec [1.16 $\sigma$ ]  
OotOffset-st: 4/4/3/4 [15]  
KicOffset-rm: 0.357 arcsec [1.13 $\sigma$ ]  
KicOffset-st: 4/4/3/4 [15]  
DiffImageQuality-fgm: 0.87 [13/15]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 010663294-01, PDC Light Curves



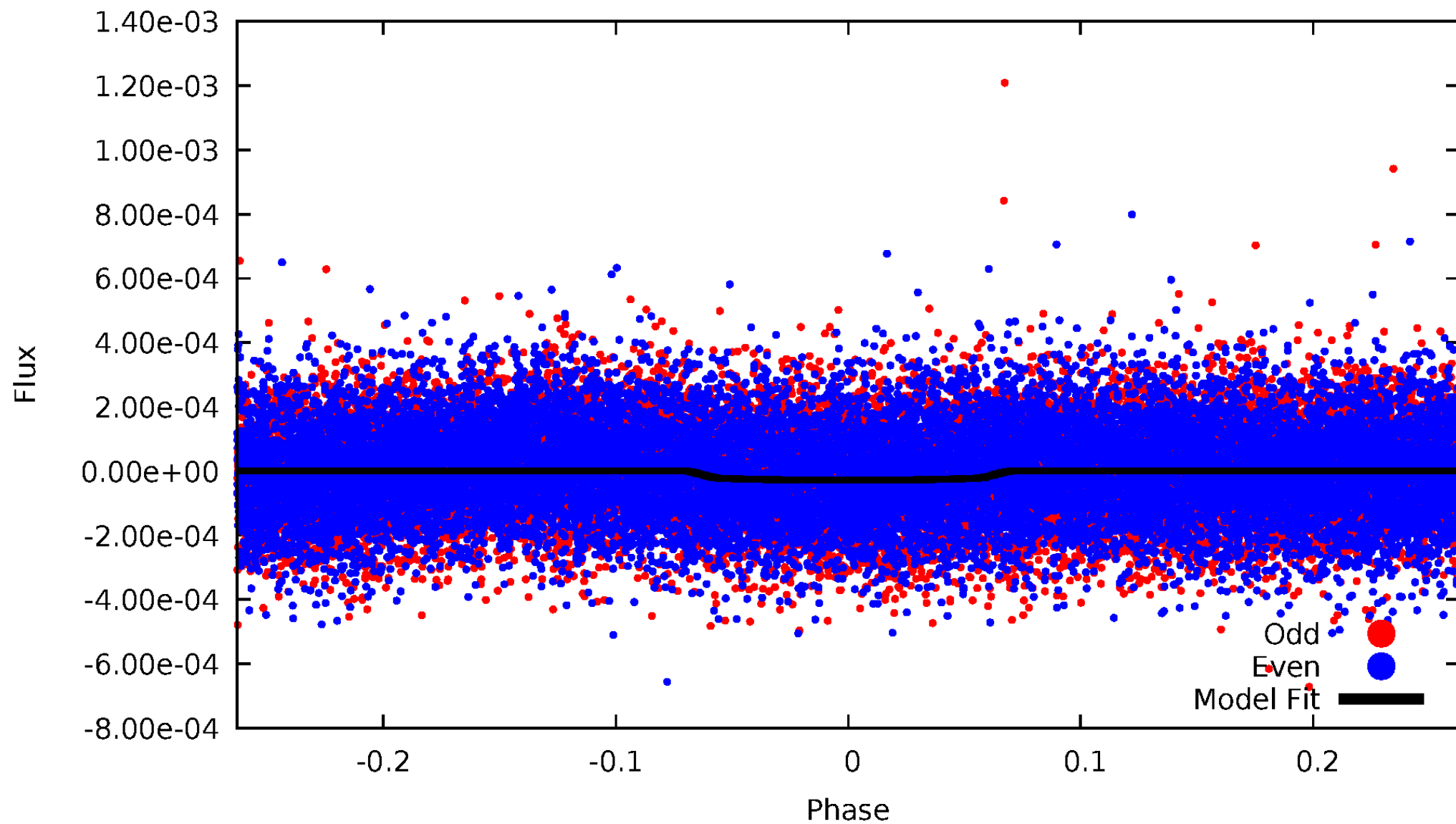
TCE 010663294-01





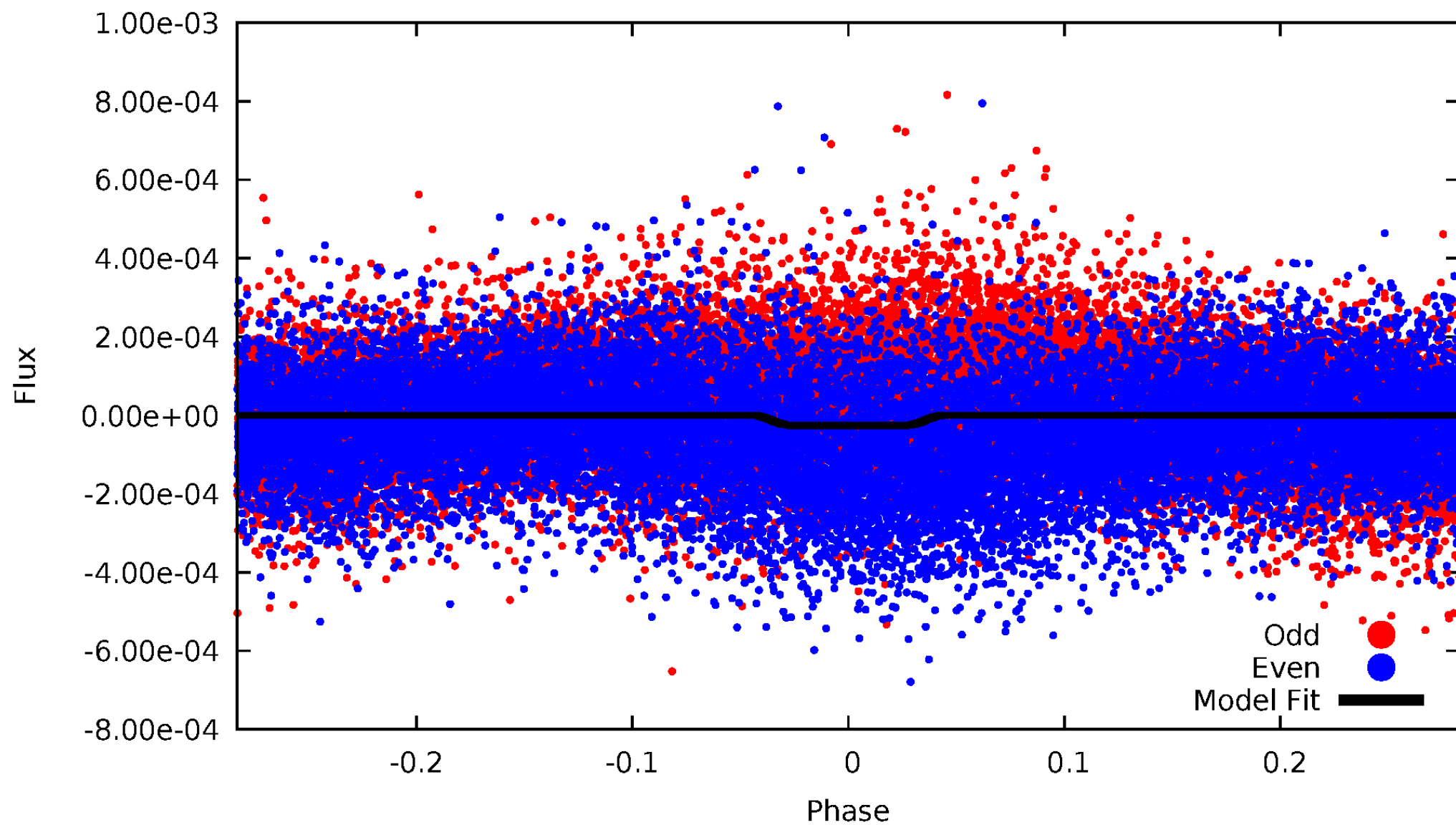
# DV Odd/Even

TCE 010663294-01

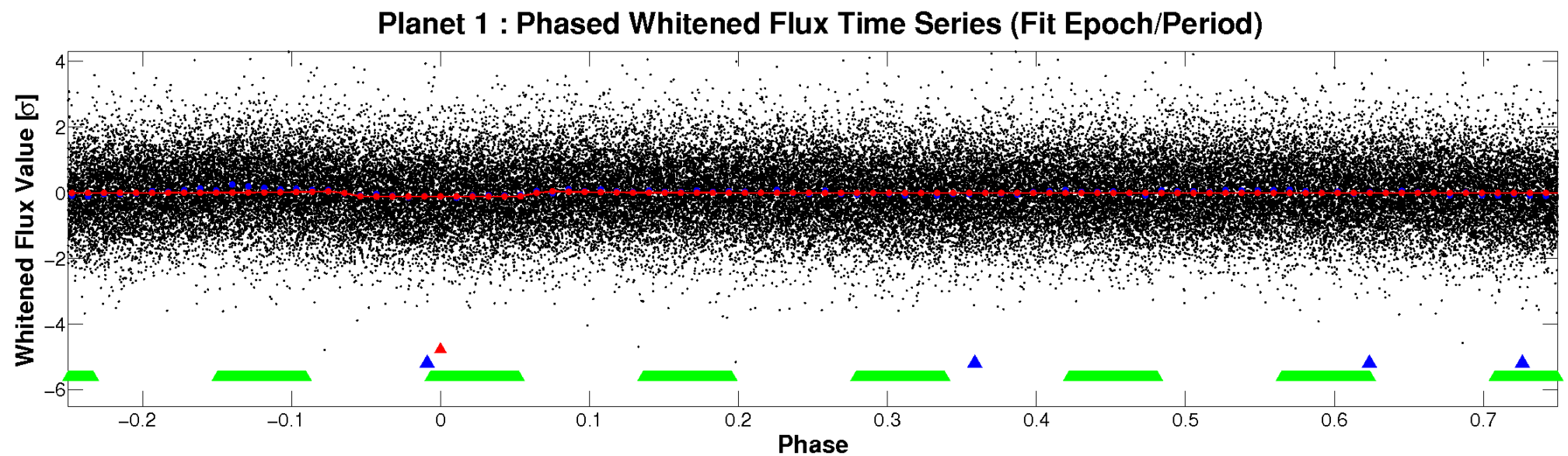
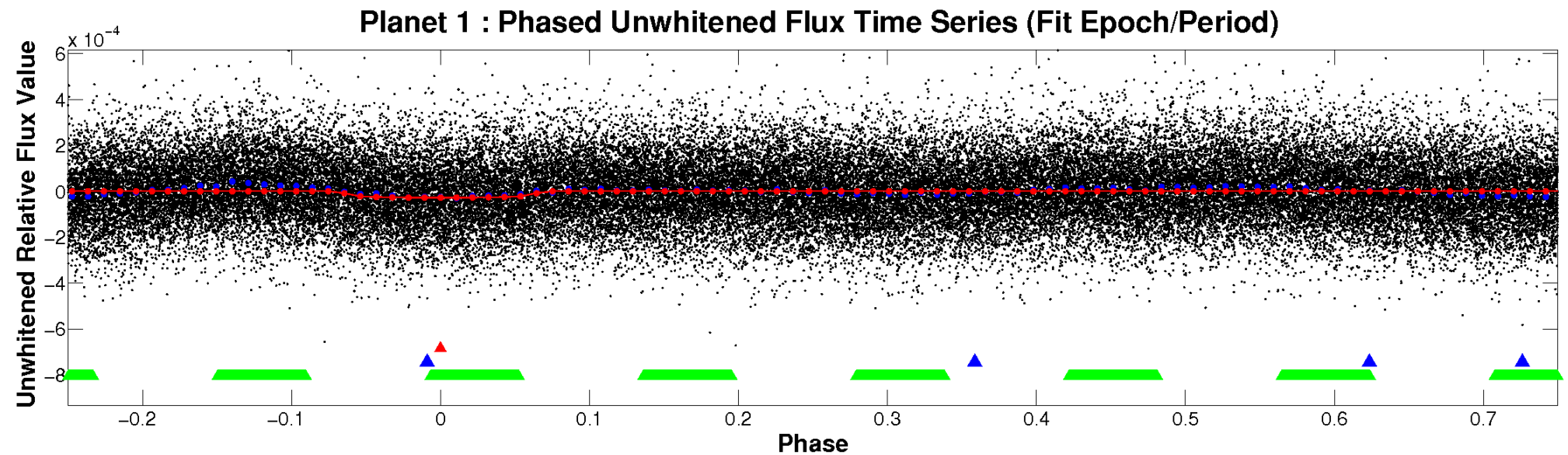


# ALT Odd/Even

TCE 010663294-01

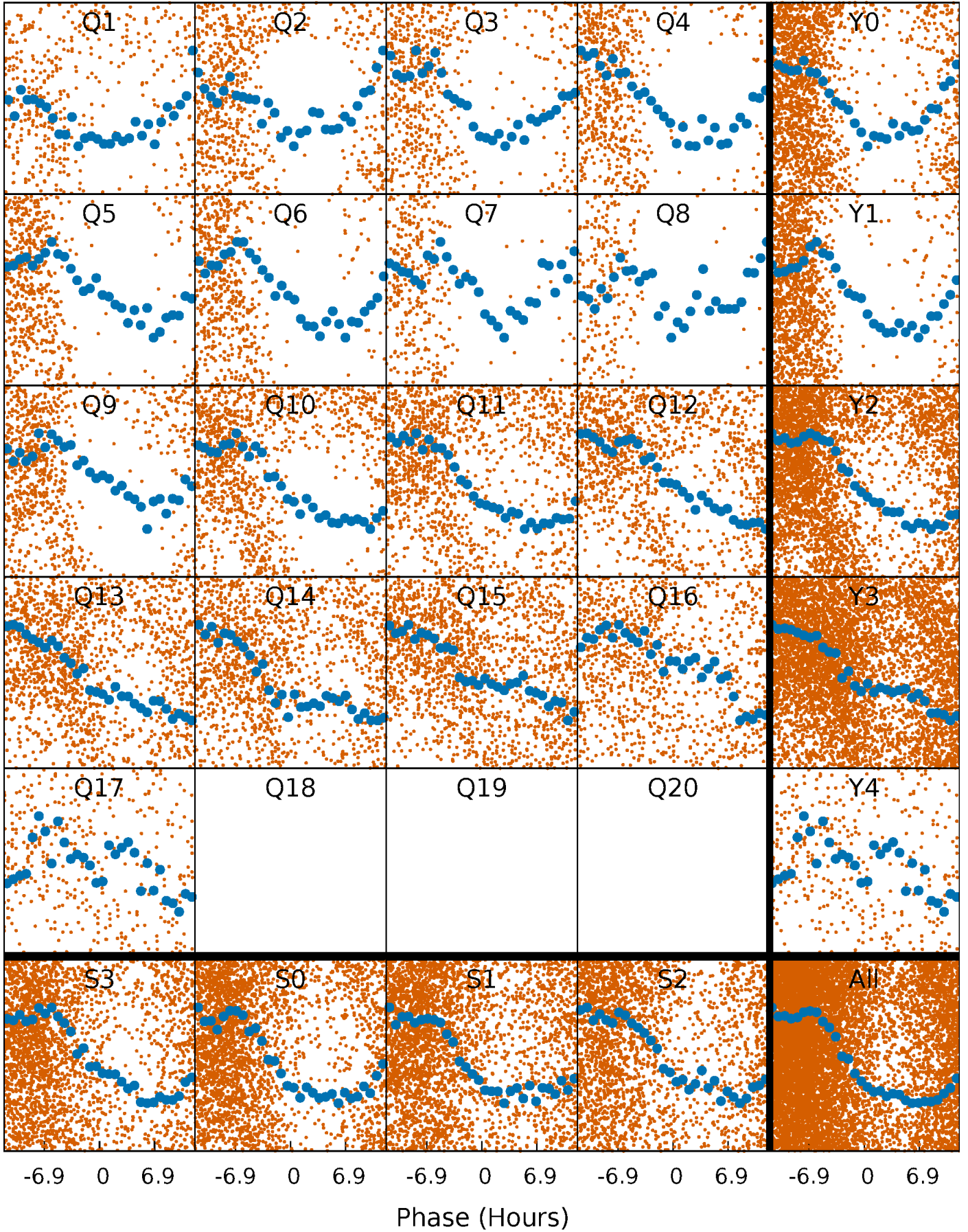


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

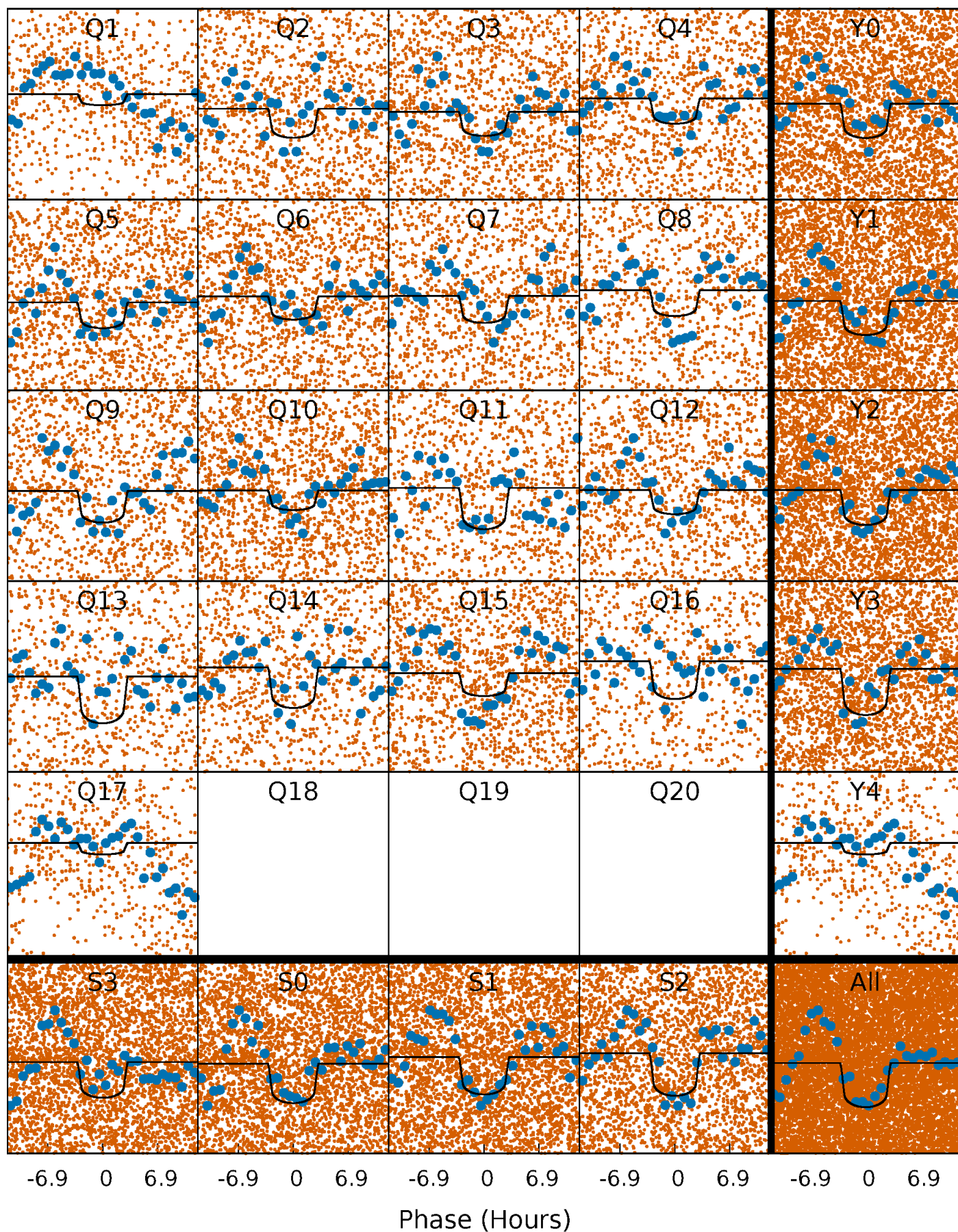
TCE 010663294-01 P= 1.900058 Days  $T_0=132.884055$  (BKJD)





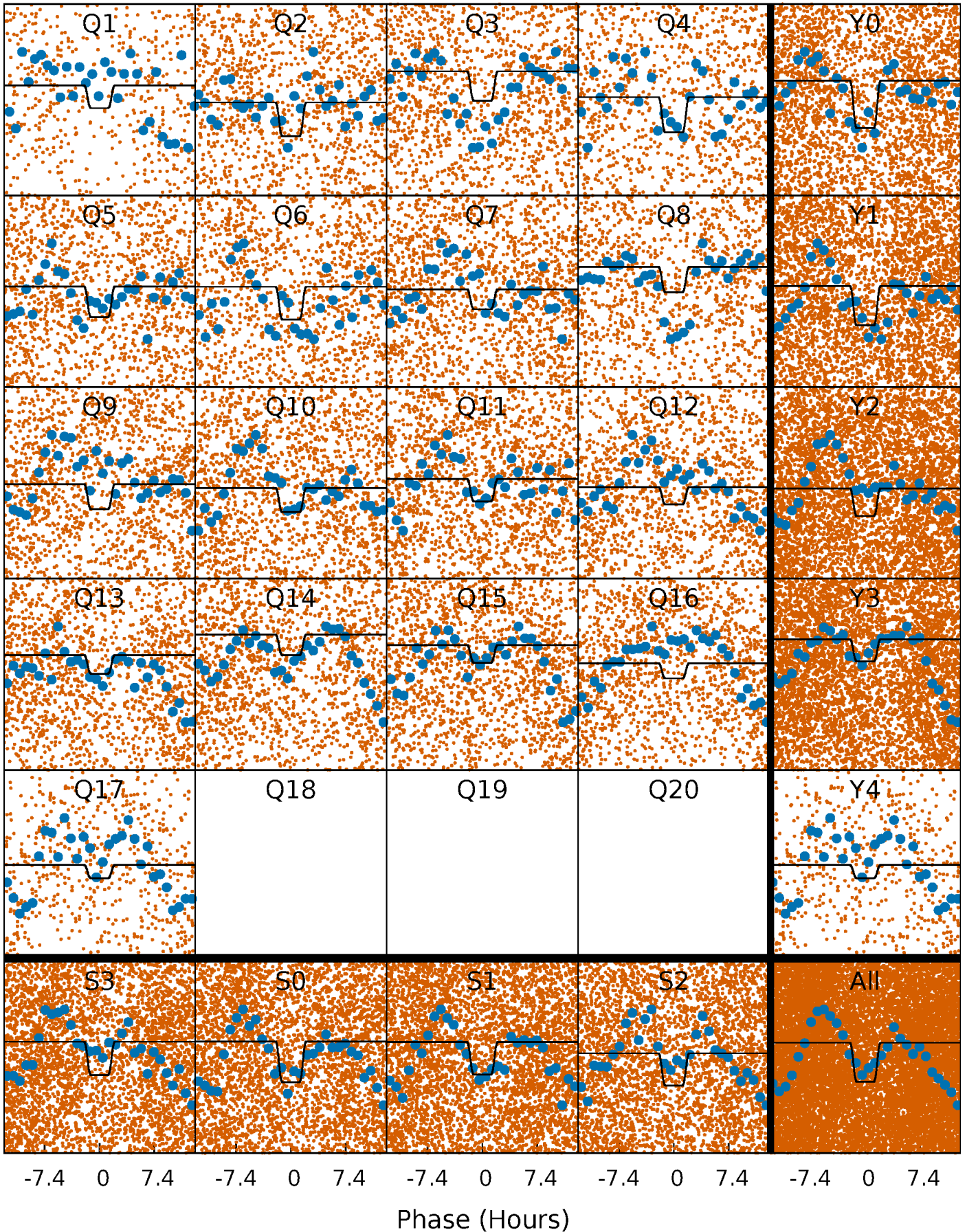
# DV Quarter-Phased Transit Curves

TCE 010663294-01 P= 1.900058 Days  $T_0=132.884055$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010663294-01 P= 1.899994 Days  $T_0=132.915243$  (BKJD)

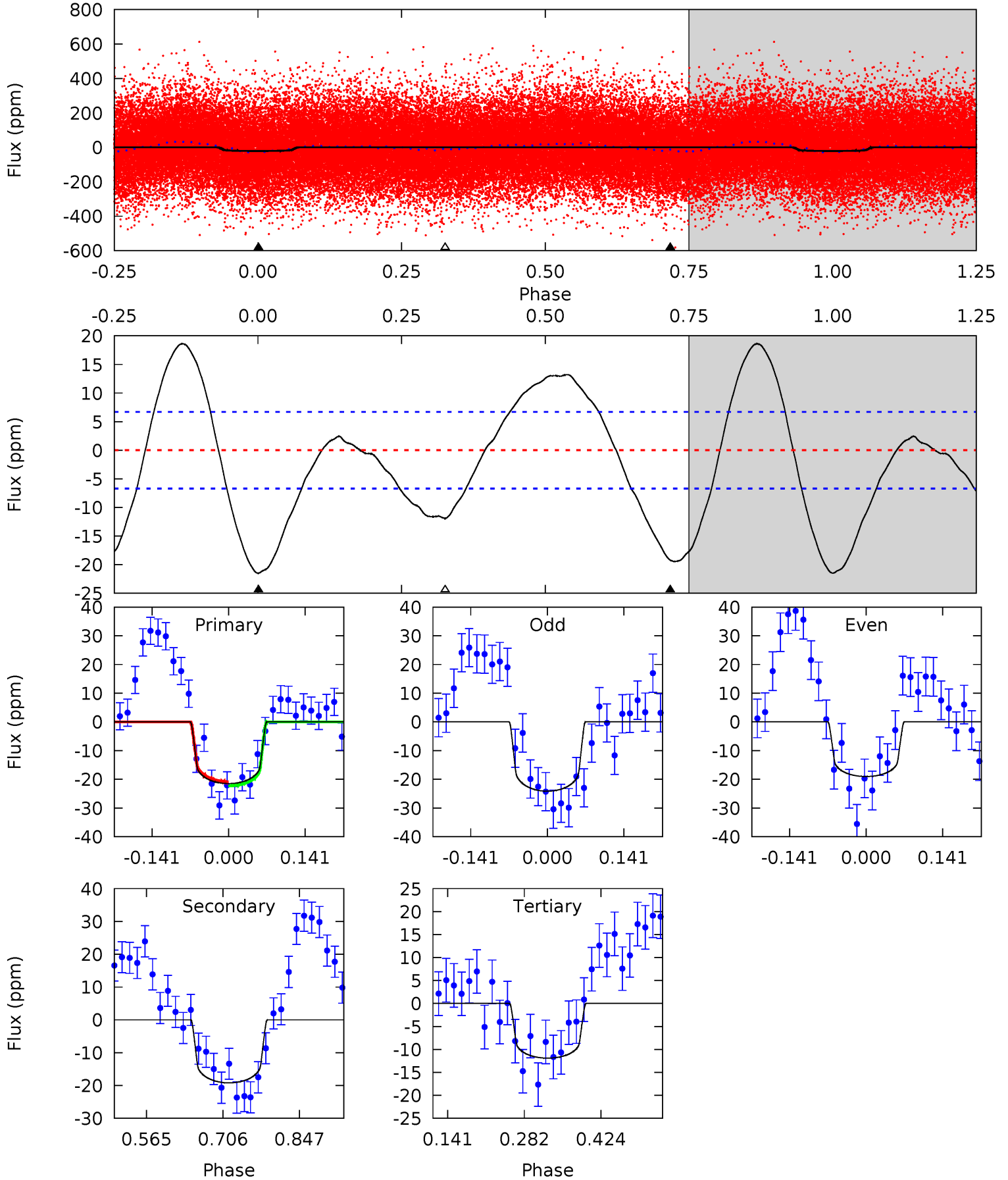




# DV Model-Shift Uniqueness Test

010663294-01, P = 1.900058 Days, E = 130.983997 Days

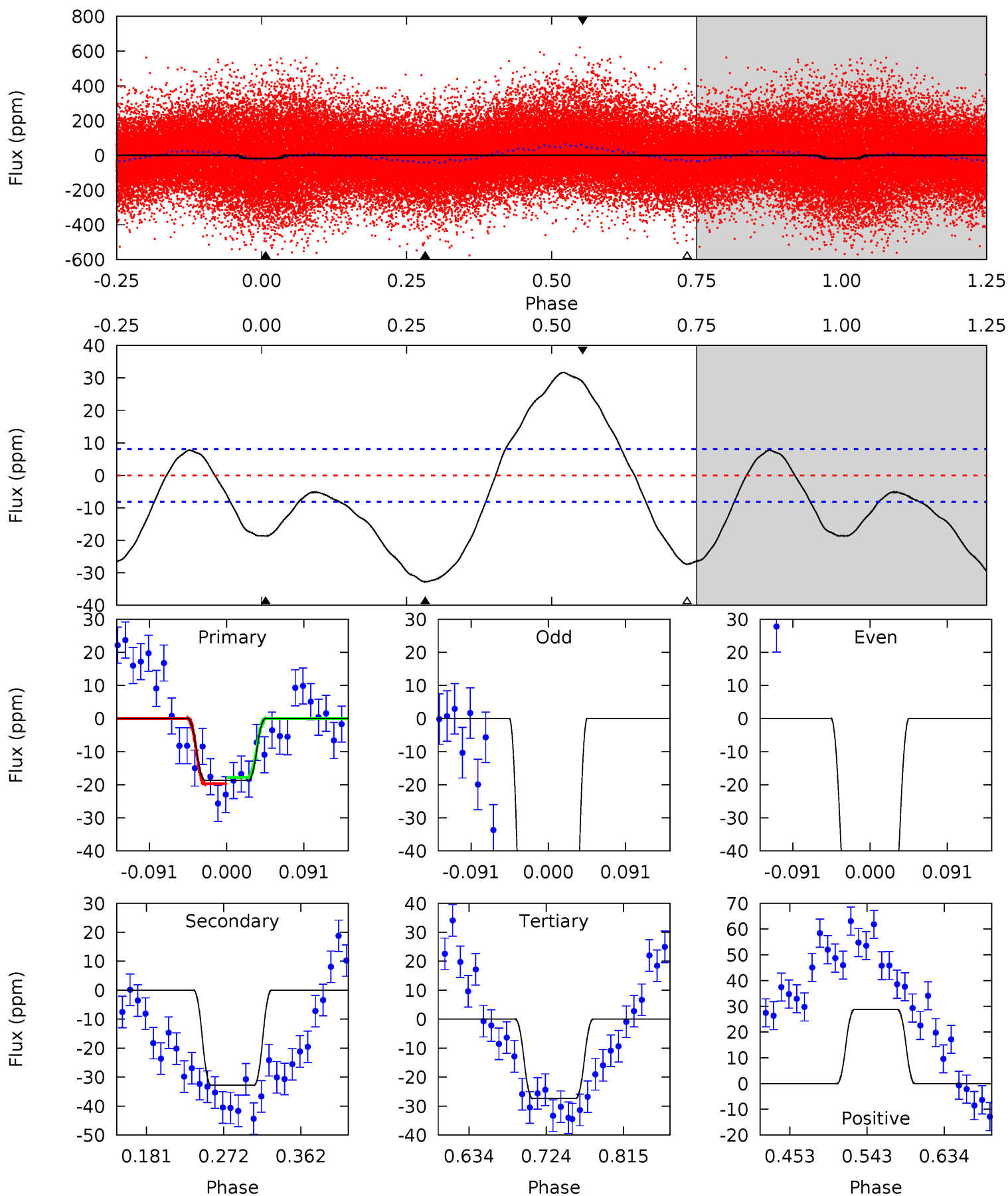
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.4	12.9	7.99	0	4.49	1.47	5.73	6.43	14.4	4.89	12.9	1.72	0.99	0.46	0.49



# Alt Model-Shift Uniqueness Test

010663294-01, P = 1.899994 Days, E = 131.015249 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
10.6	18.6	15.5	16.3	4.59	1.69	9.85	-4.93	-5.73	3.07	2.28	11.1	1.65	0.49	0.51





### Stellar Parameters For KIC 010663294

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7107^{+192}_{-256}$	$3.875^{+0.266}_{-0.114}$	$-0.280^{+0.300}_{-0.300}$	$2.405^{+0.422}_{-0.784}$	$1.580^{+0.205}_{-0.308}$	$0.160^{+0.270}_{-0.055}$
	+3%/-4%	+7%/-3%	+107%/-107%	+18%/-33%	+13%/-19%	+169%/-34%
Source	PHO1	FLK73	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 010663294-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-19 \pm 1$	$1.42^{+0.42}_{-0.37}$	$3565^{+234}_{-312}$	$6097^{+866}_{-617}$	$6.405^{+5.367}_{-2.547}$
Alt.	$-33 \pm 2$	$1.28^{+0.37}_{-0.35}$	$3569^{+234}_{-307}$	$7465^{+1453}_{-821}$	$13^{+12}_{-5}$

$T_{\text{max}}$  = 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

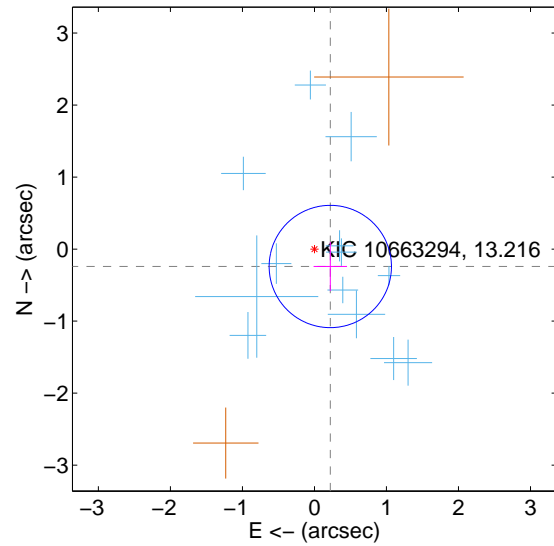
Supplemental centroid analysis for 010663294-01. Kepler magnitude: 13.22. Transit SNR 10.03

There are 13 quarters with good PRF difference image offsets

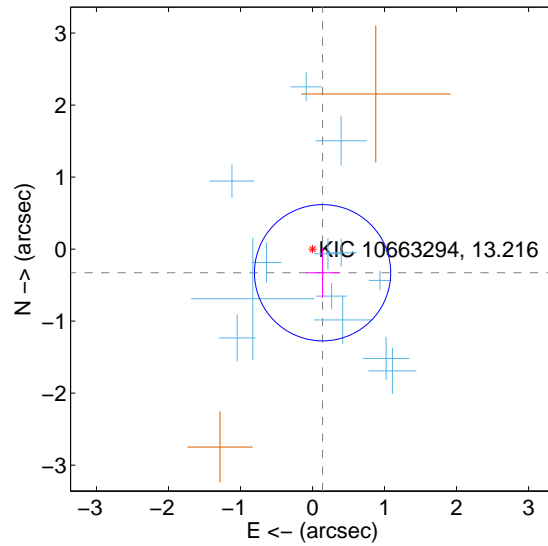
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.327 \pm 0.283$	1.16	$-0.220 \pm 0.233$	$-0.242 \pm 0.340$
PRF-fit source offset from KIC position	$0.357 \pm 0.315$	1.13	$-0.140 \pm 0.232$	$-0.328 \pm 0.348$
photometric centroid source offset	$0.37 \pm 0.81$	0.46	$0.13 \pm 0.83$	$0.35 \pm 0.81$

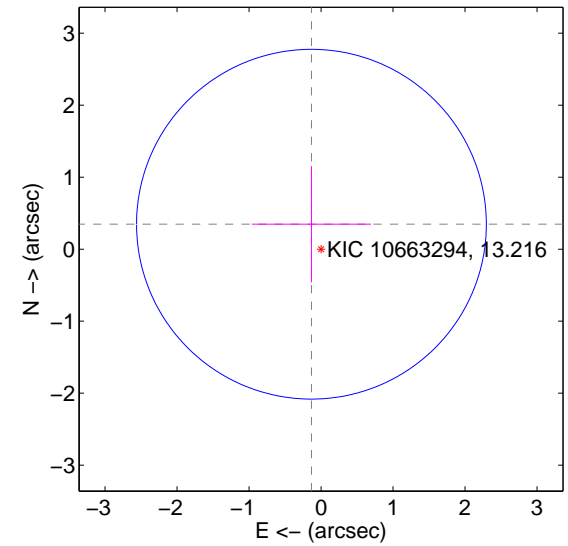
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

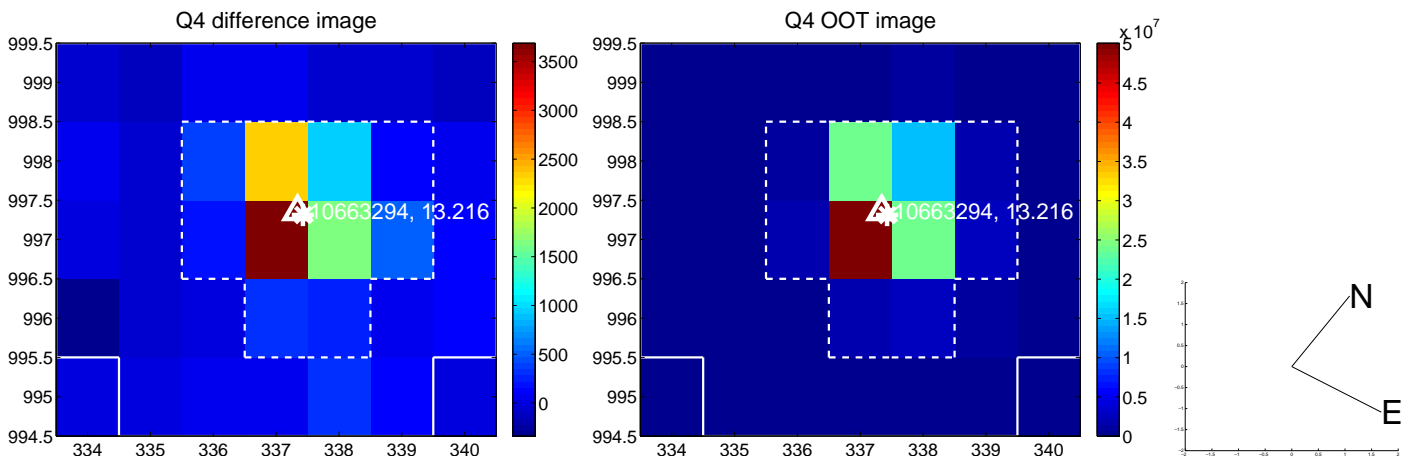
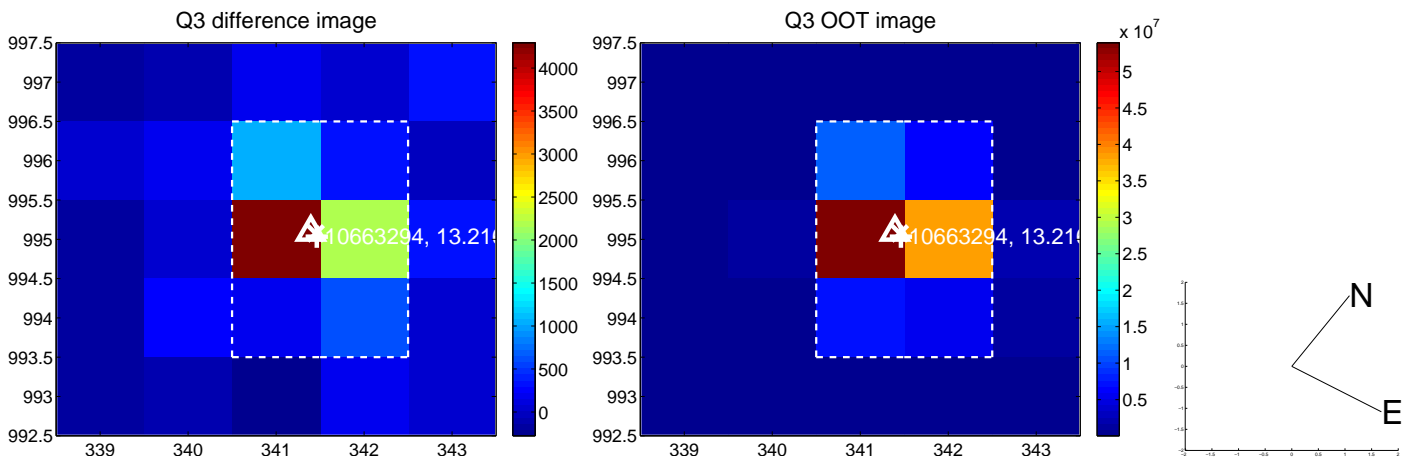
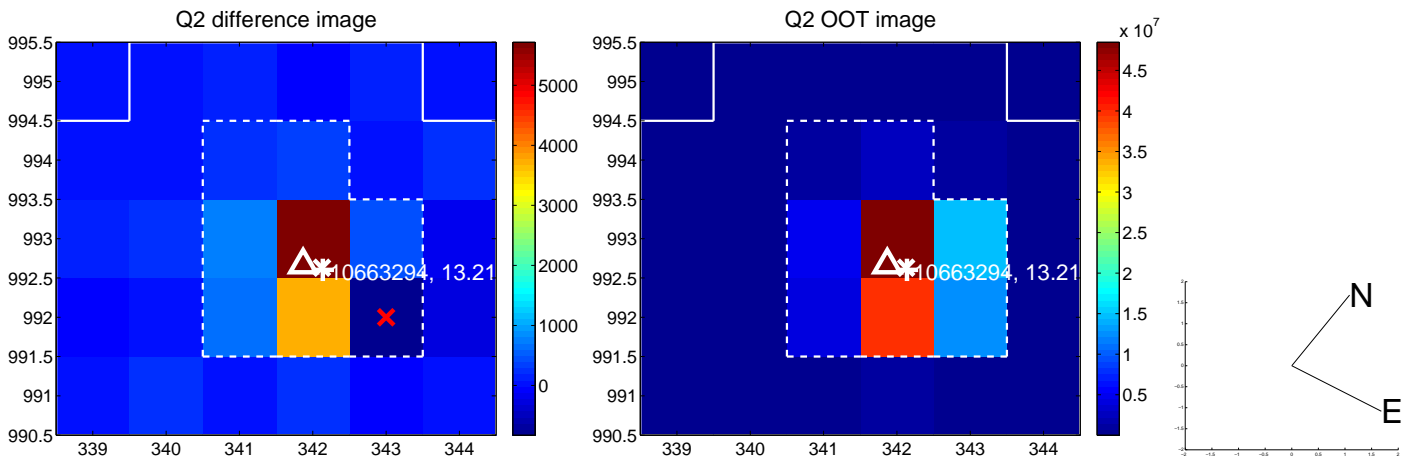
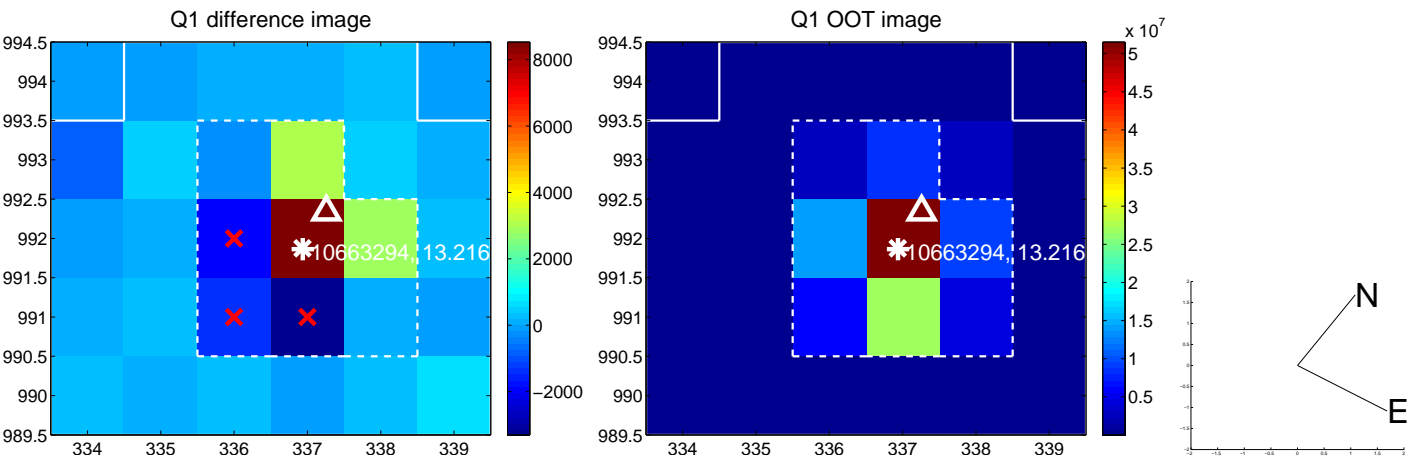


offset from photometric centroids

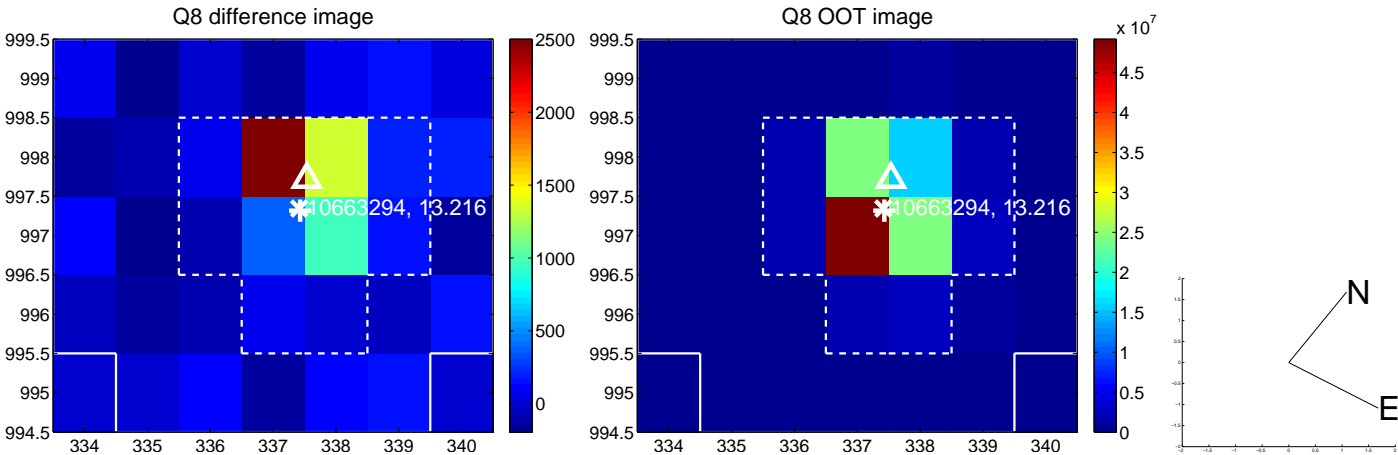
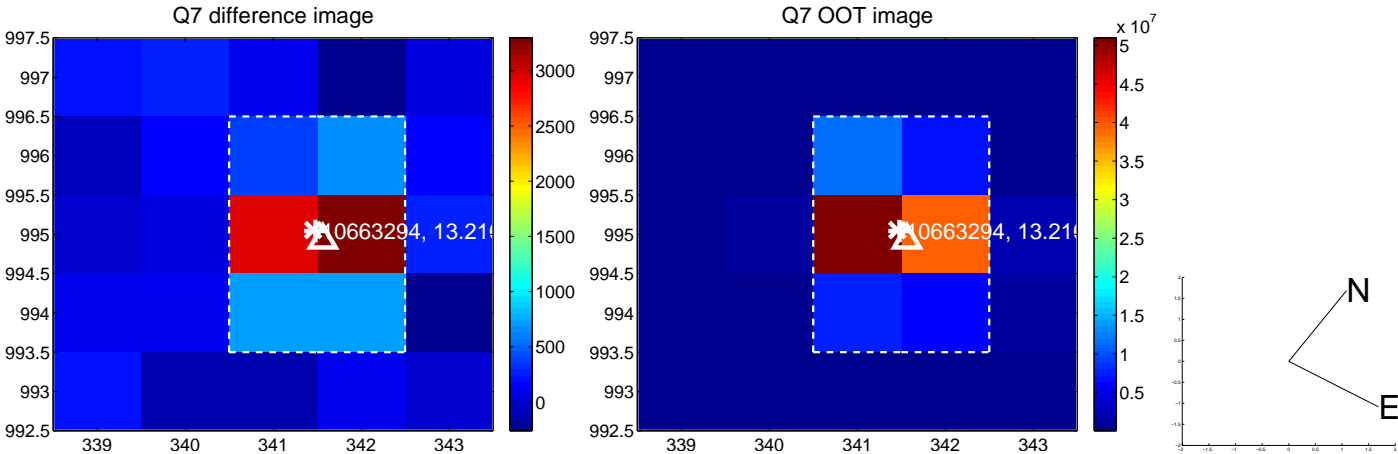
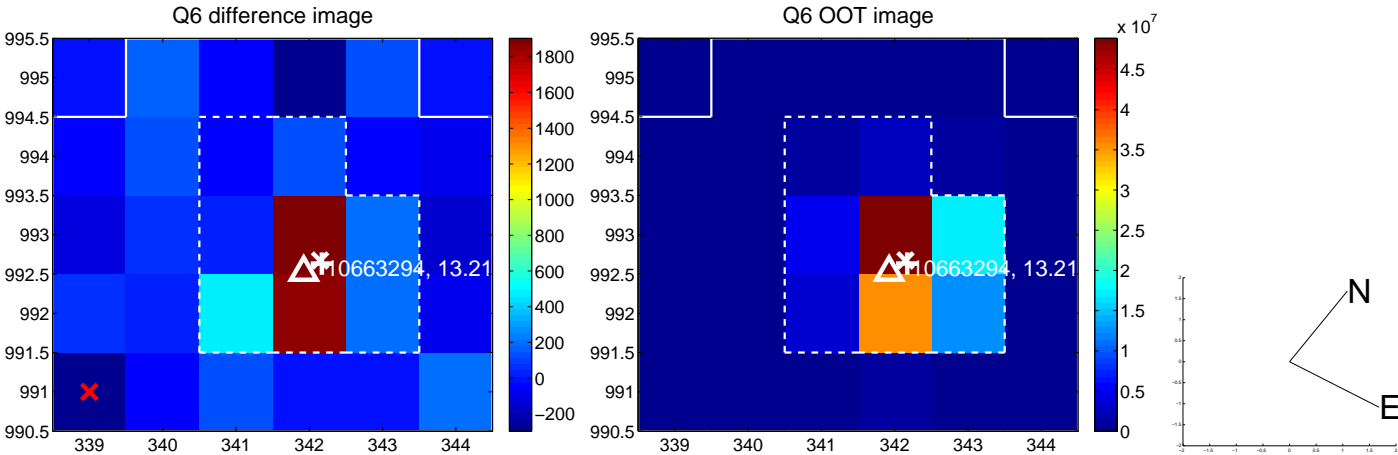
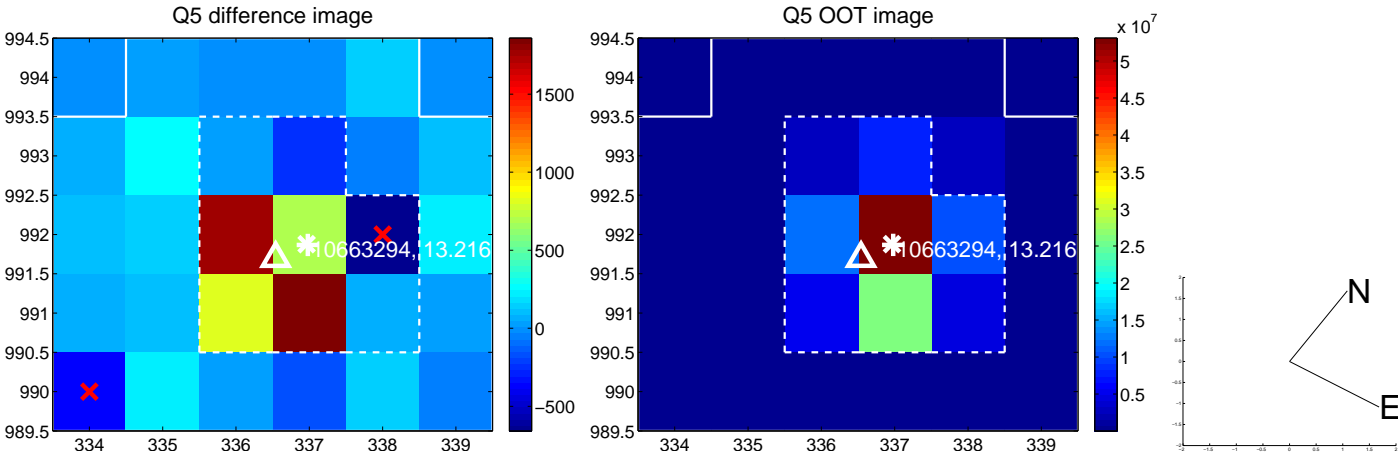


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

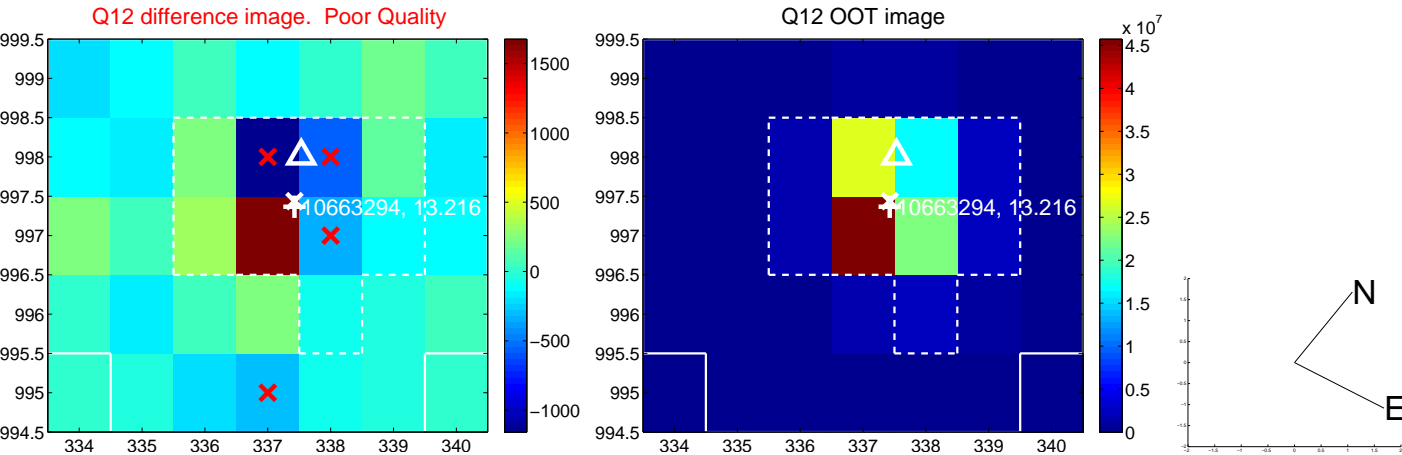
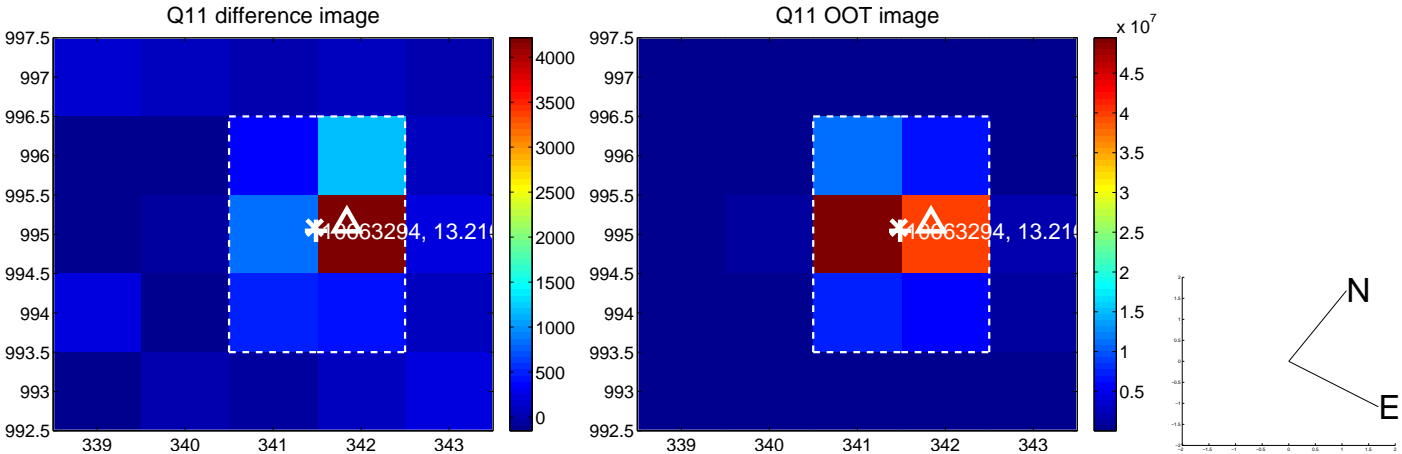
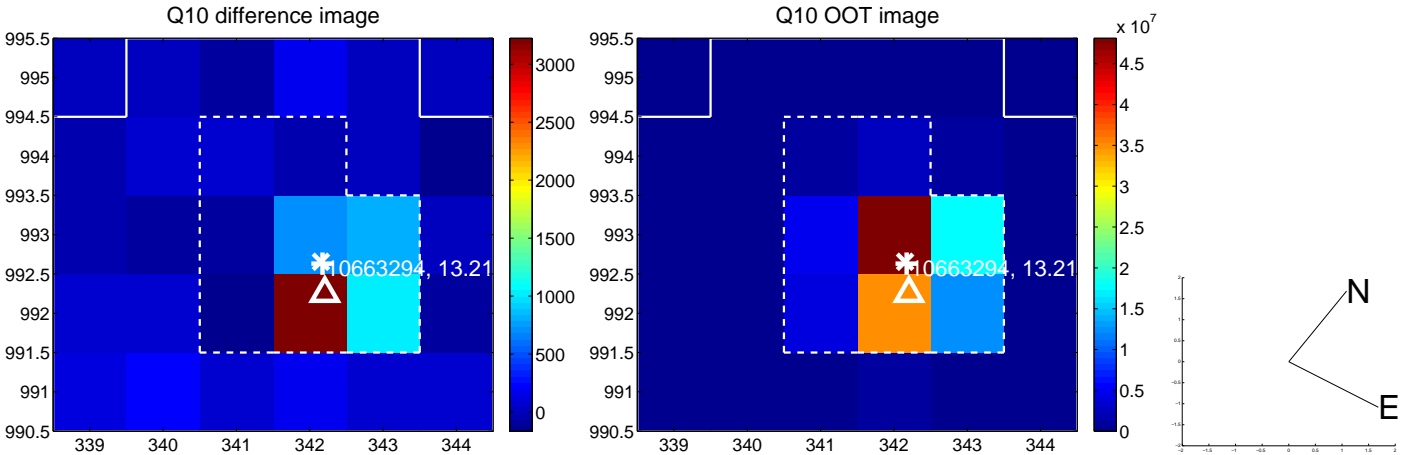
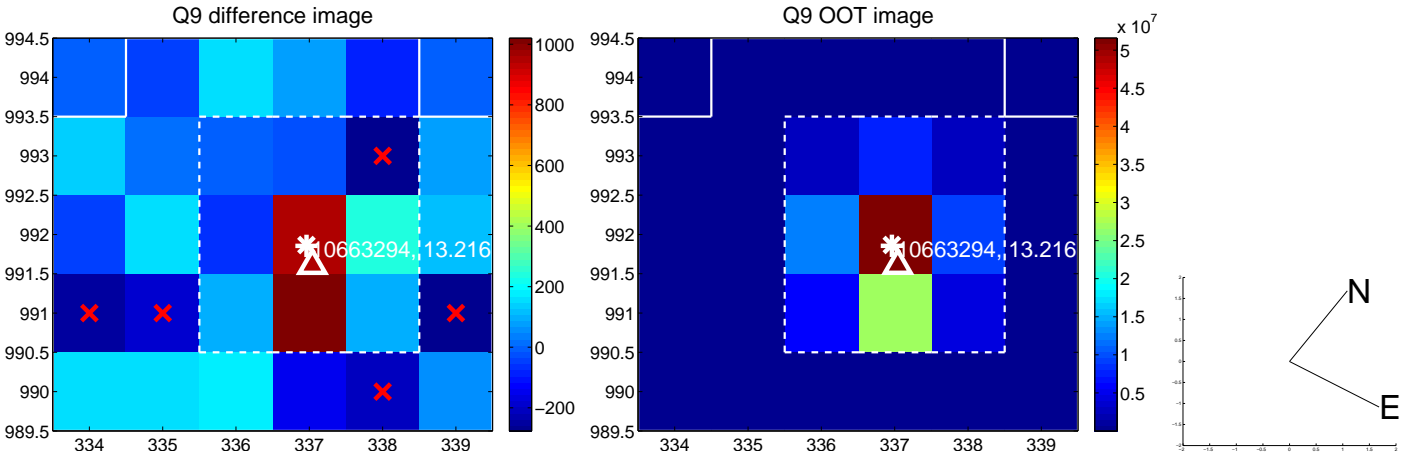


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

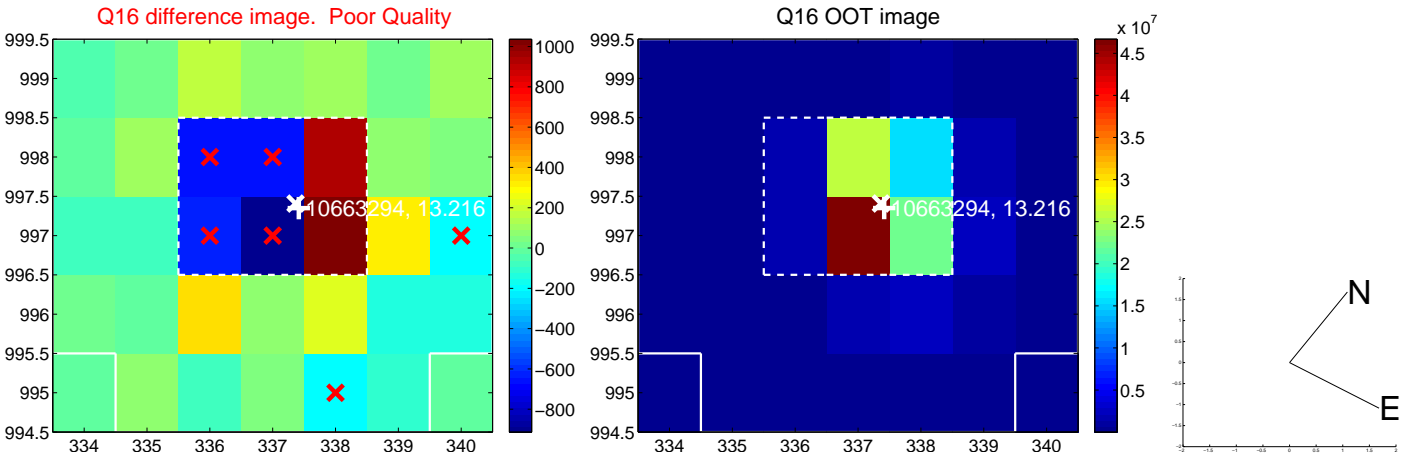
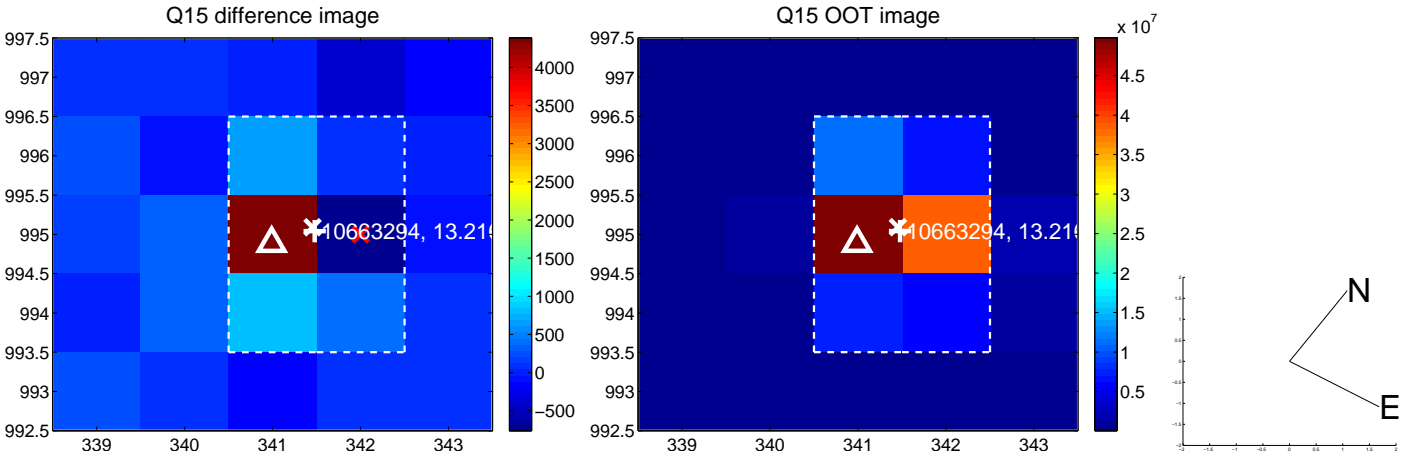
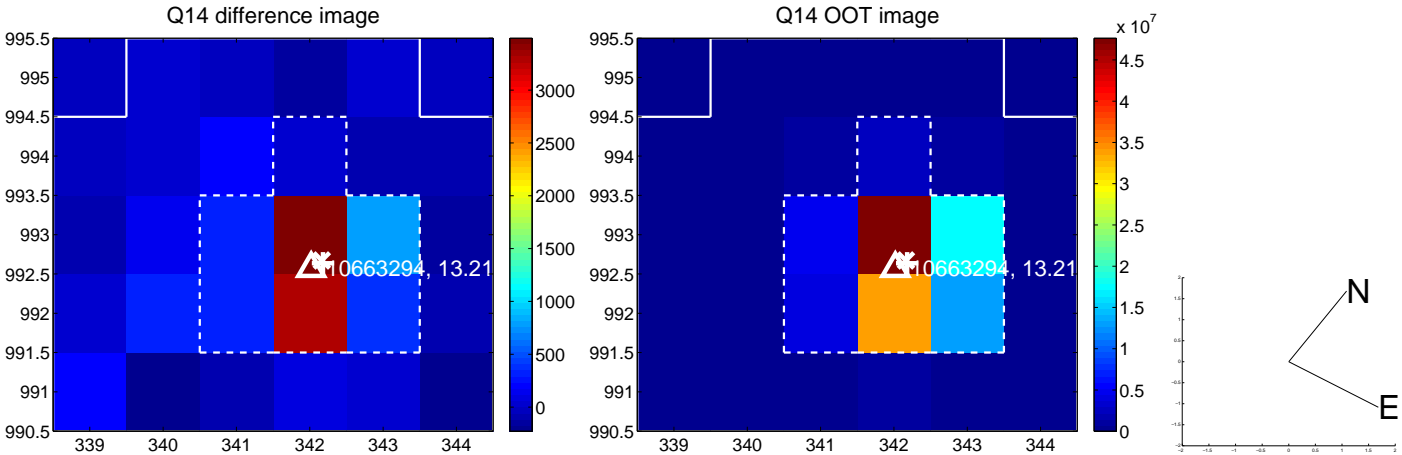
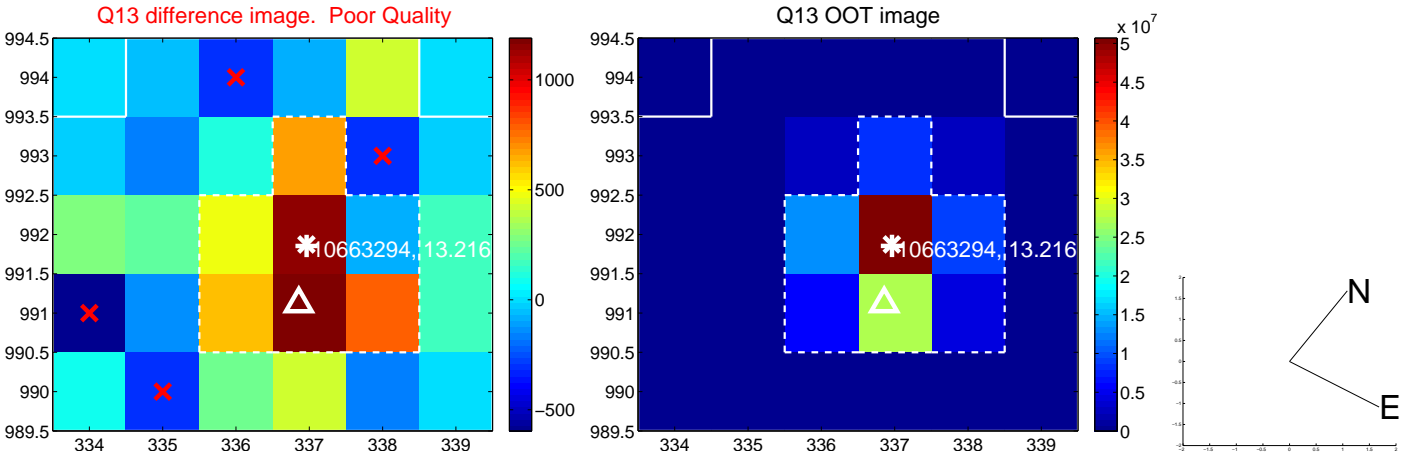




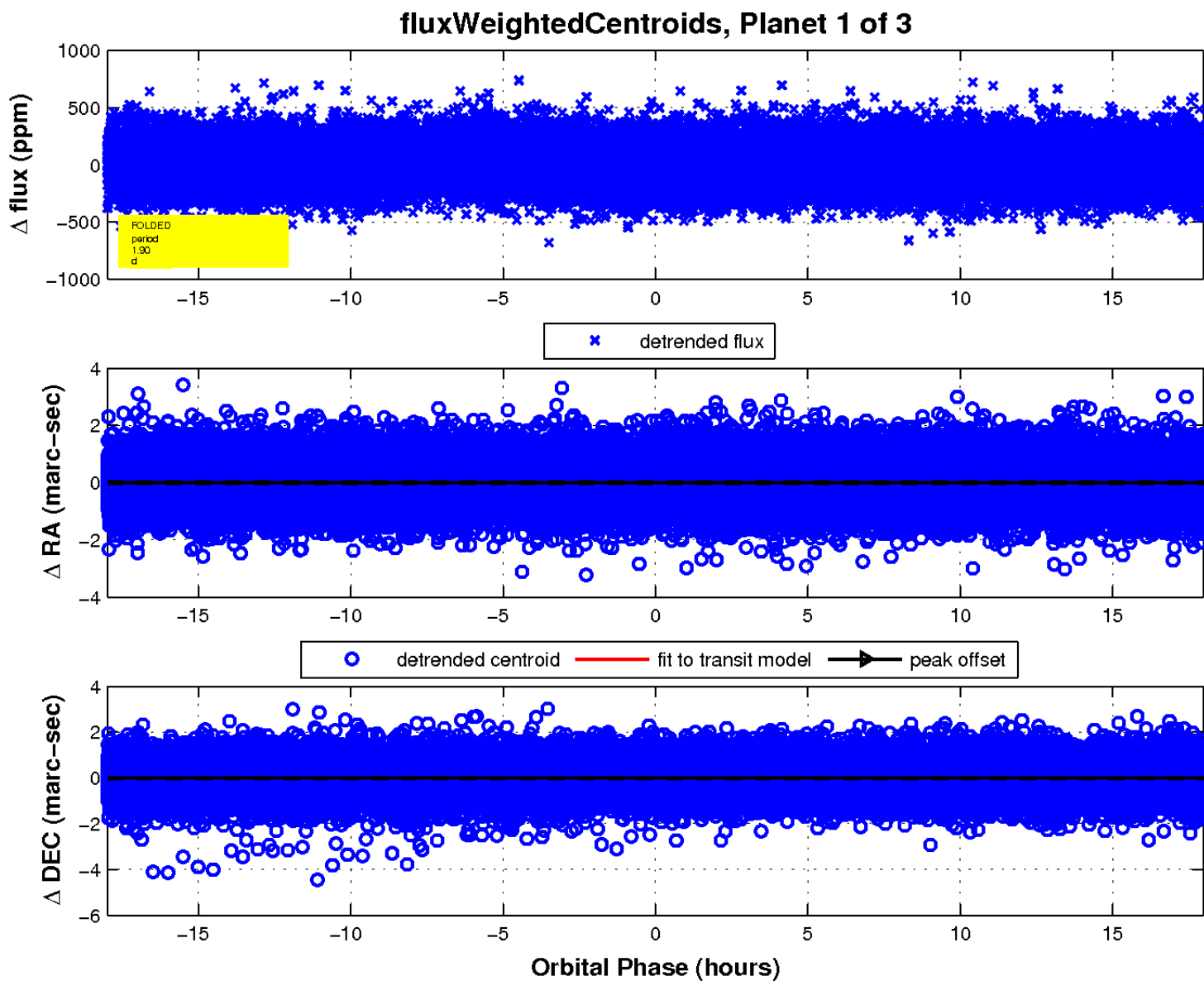
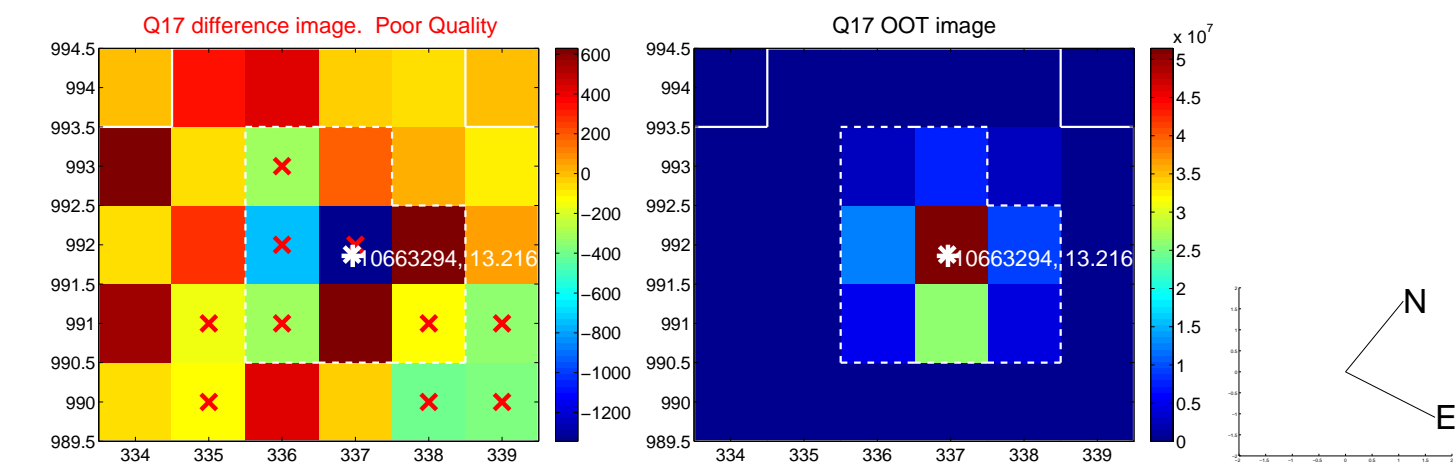
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

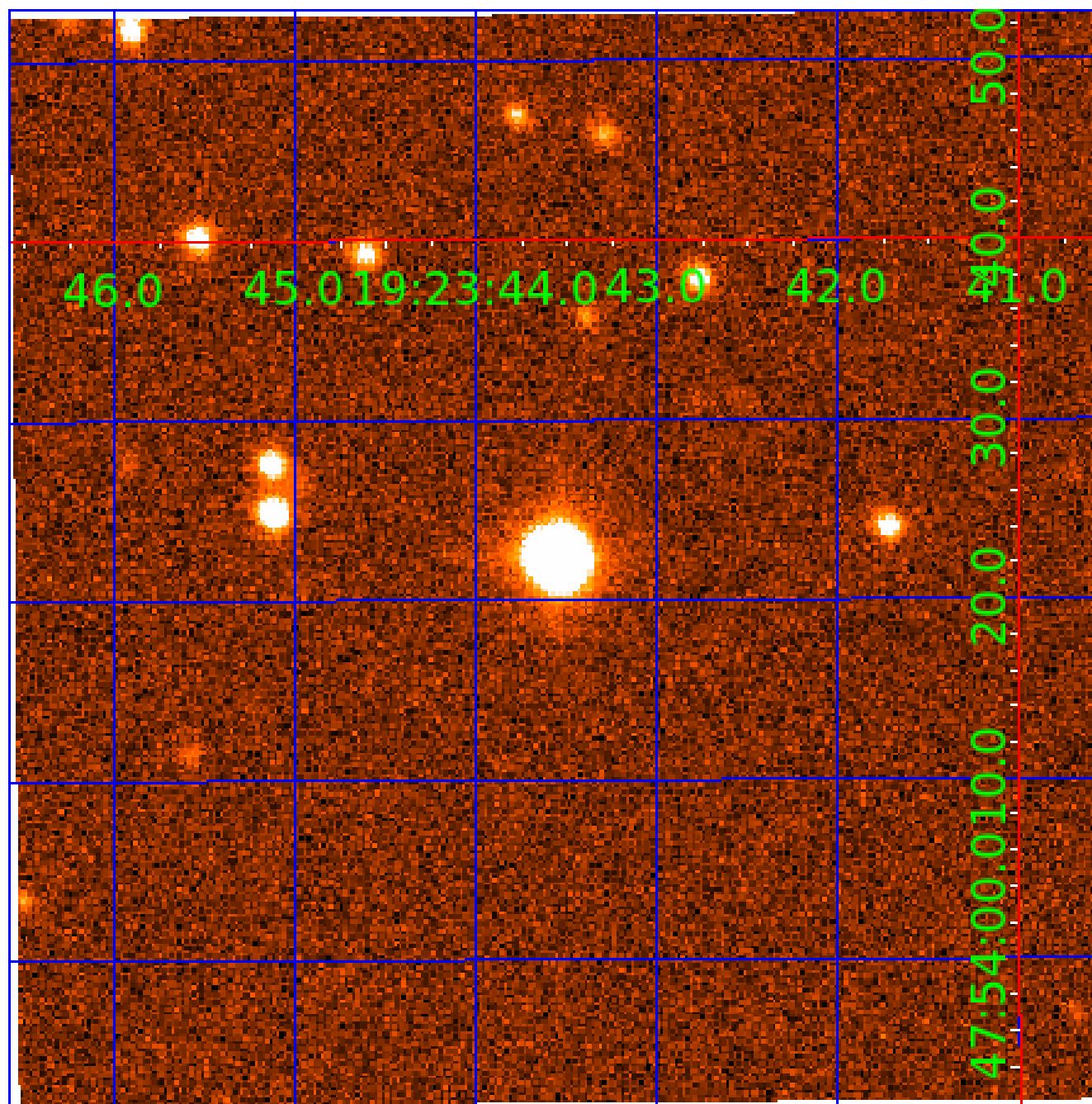


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 010663294

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

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010663294-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010663294-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_FEW_DIFFS

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

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

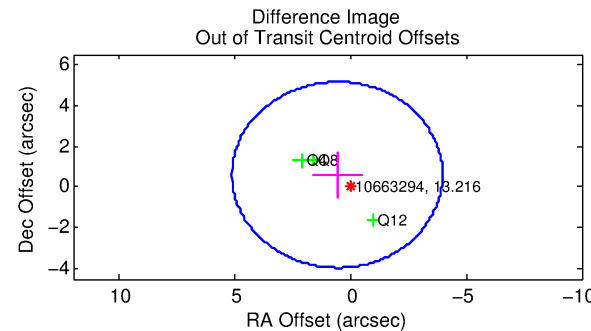
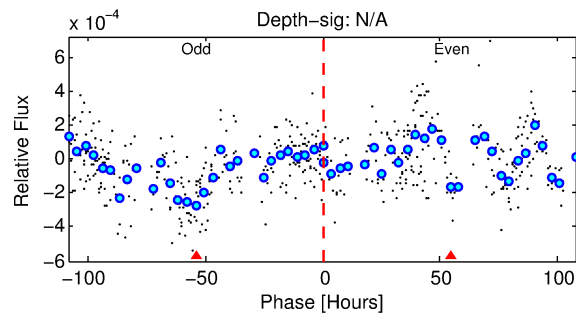
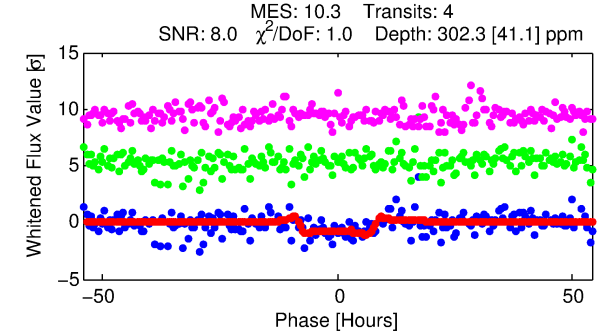
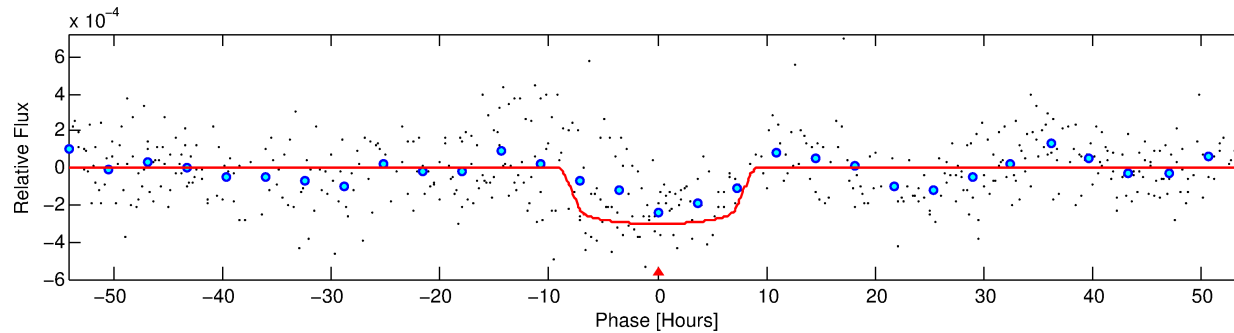
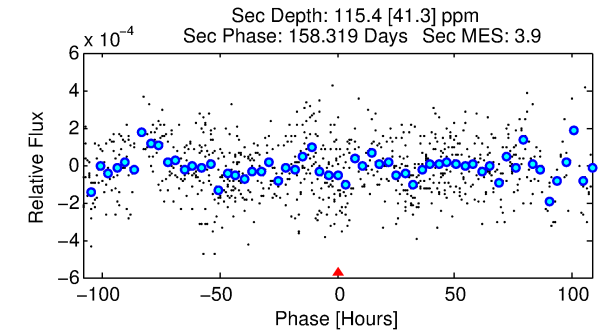
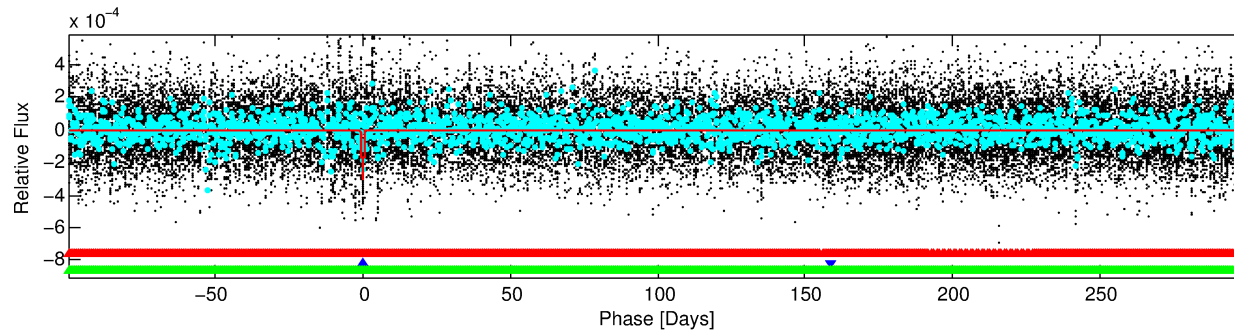
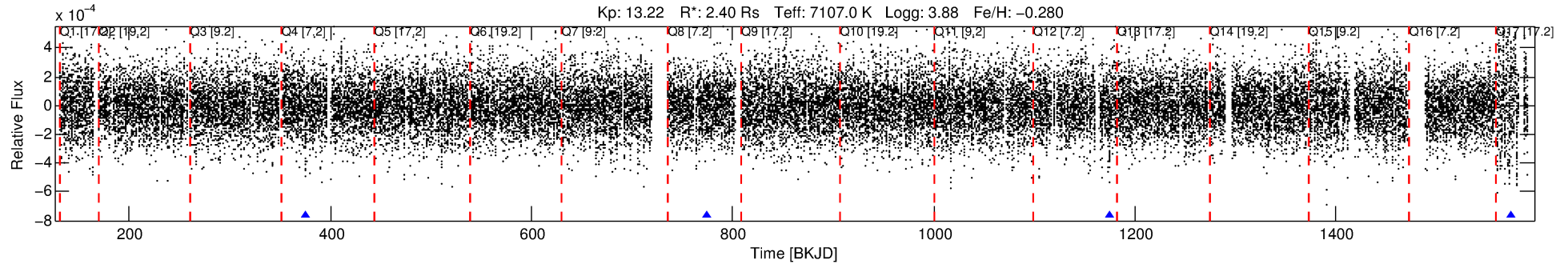
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010663294-02

No Significant Match Found

# DV One-Page Summary

KIC: 10663294 Candidate: 2 of 3 Period: 399.711 d



## DV Fit Results:

Period = 399.71055 [0.01249] d  
Epoch = 375.3761 [0.0230] BKJD  
Rp/R\* = 0.0190 [0.0017]  
a/R\* = 71.47 [21.05]  
b = 0.93 [0.04]  
Seff = 8.63 [4.18]  
Teq = 437 [53] K  
Rp = 4.99 [1.68] Re  
a = 1.2377 [0.3691] AU  
Ag = 3910.86 [2387.63] [1.64σ]  
Teffp = 5344 [566] K [8.63σ]

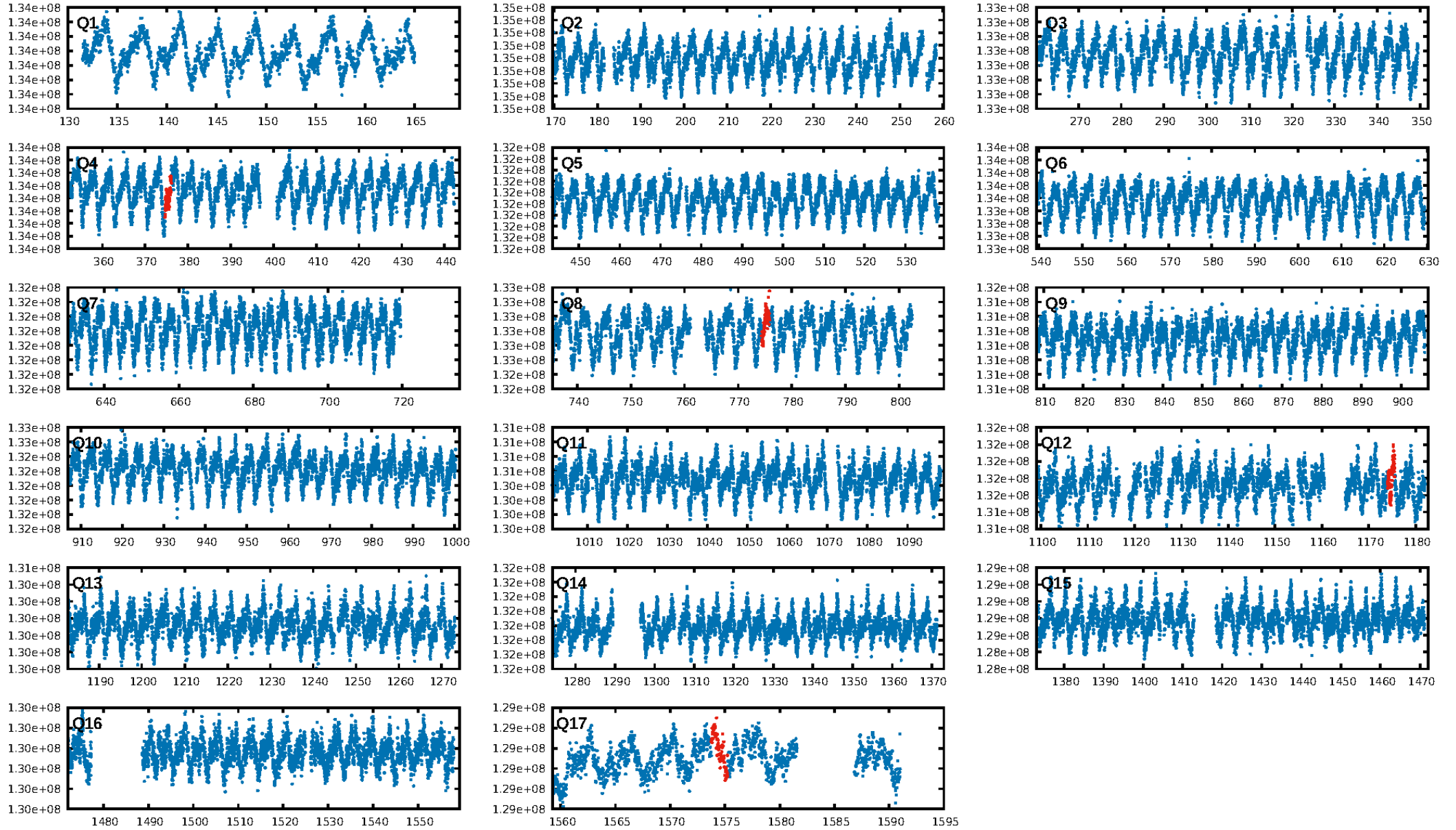
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [500.98σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 10.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.5769  
Centroid-sig: 1.8%  
Centroid-so: 0.760 arcsec [1.27σ]  
OotOffset-rm: 0.831 arcsec [0.55σ]  
OotOffset-st: 0/0/3/0 [3]  
KicOffset-rm: 0.848 arcsec [0.74σ]  
KicOffset-st: 0/0/3/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/4]

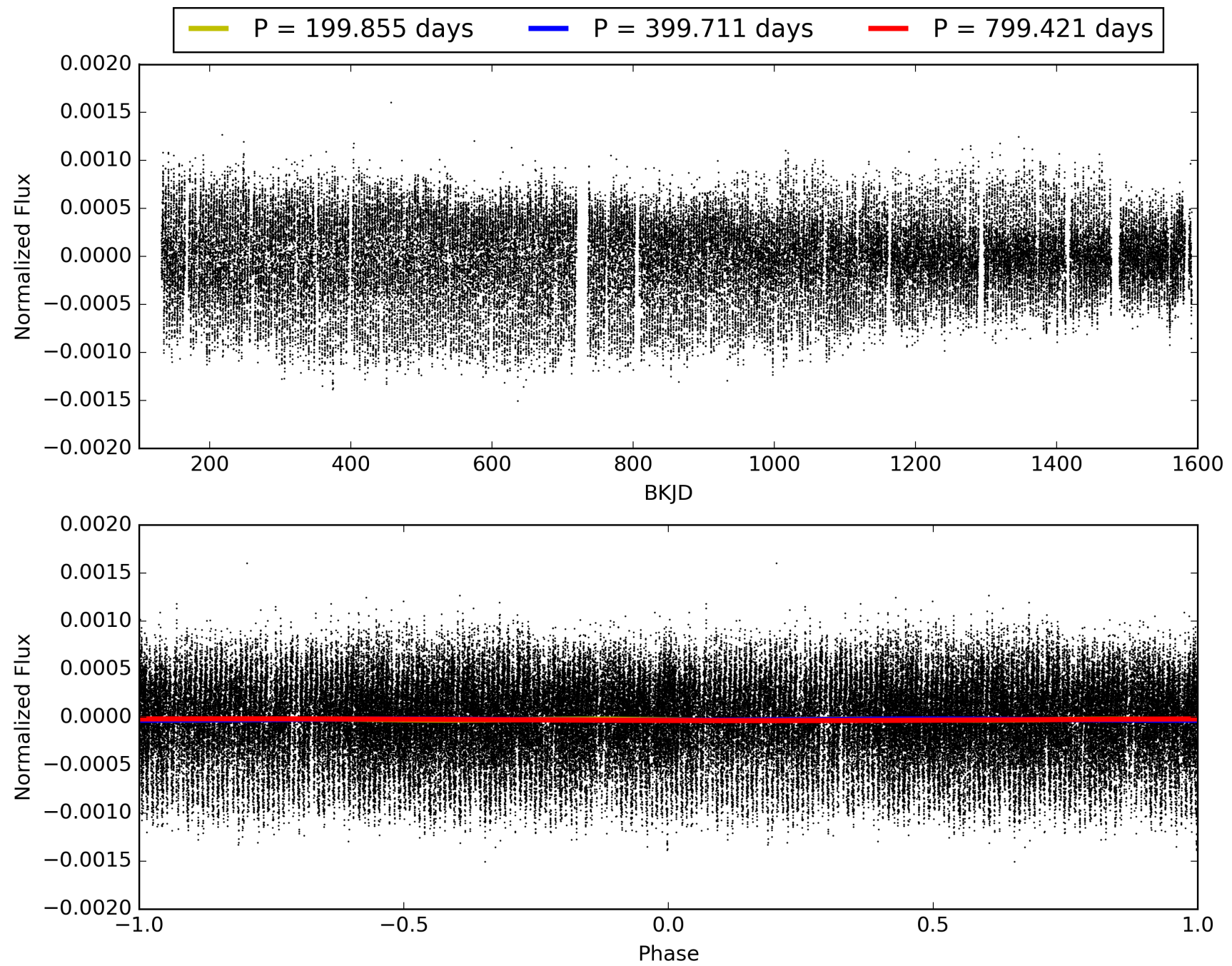
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:17:19 Z

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

# TCE 010663294-02, PDC Light Curves

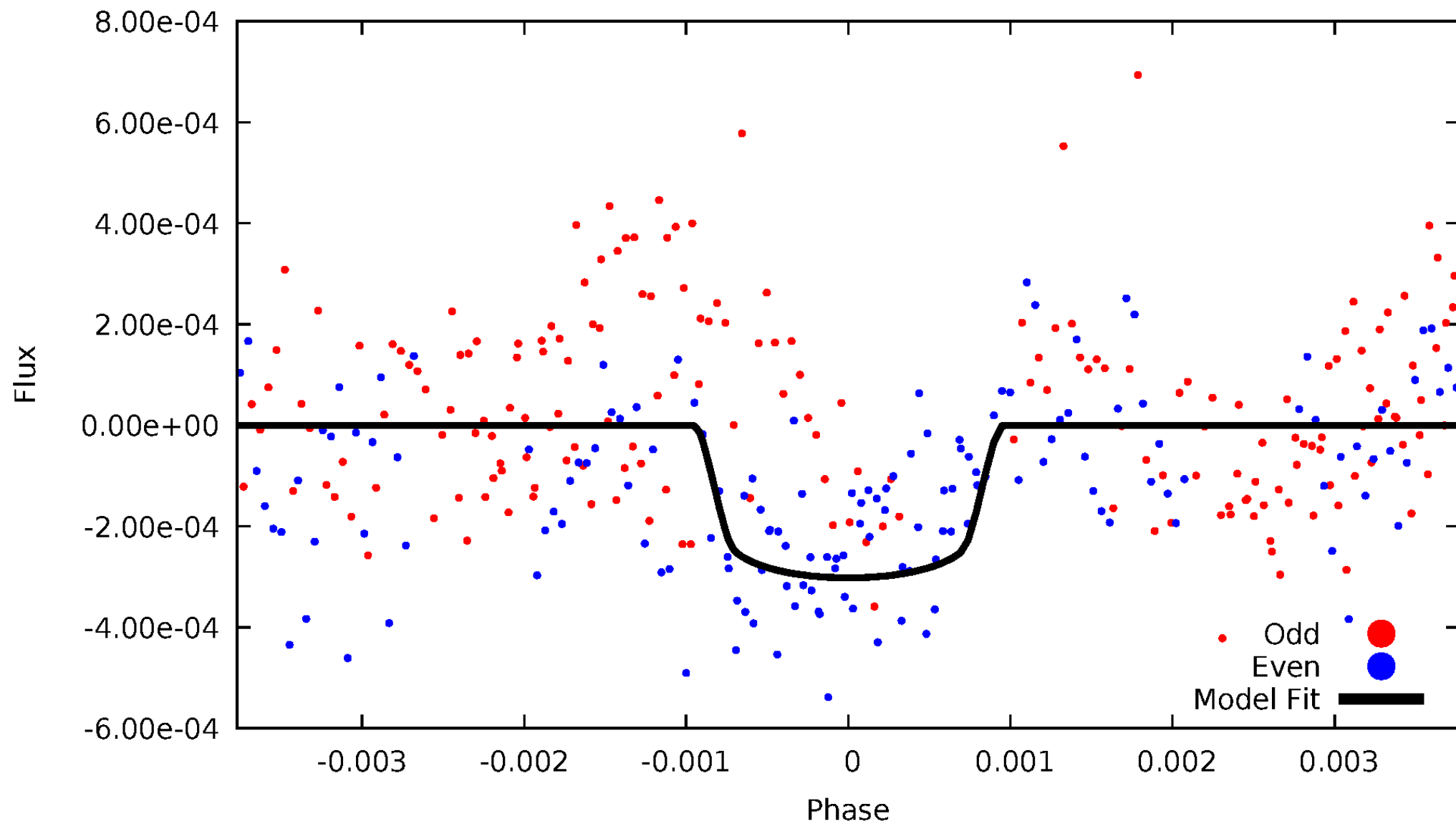


TCE 010663294-02



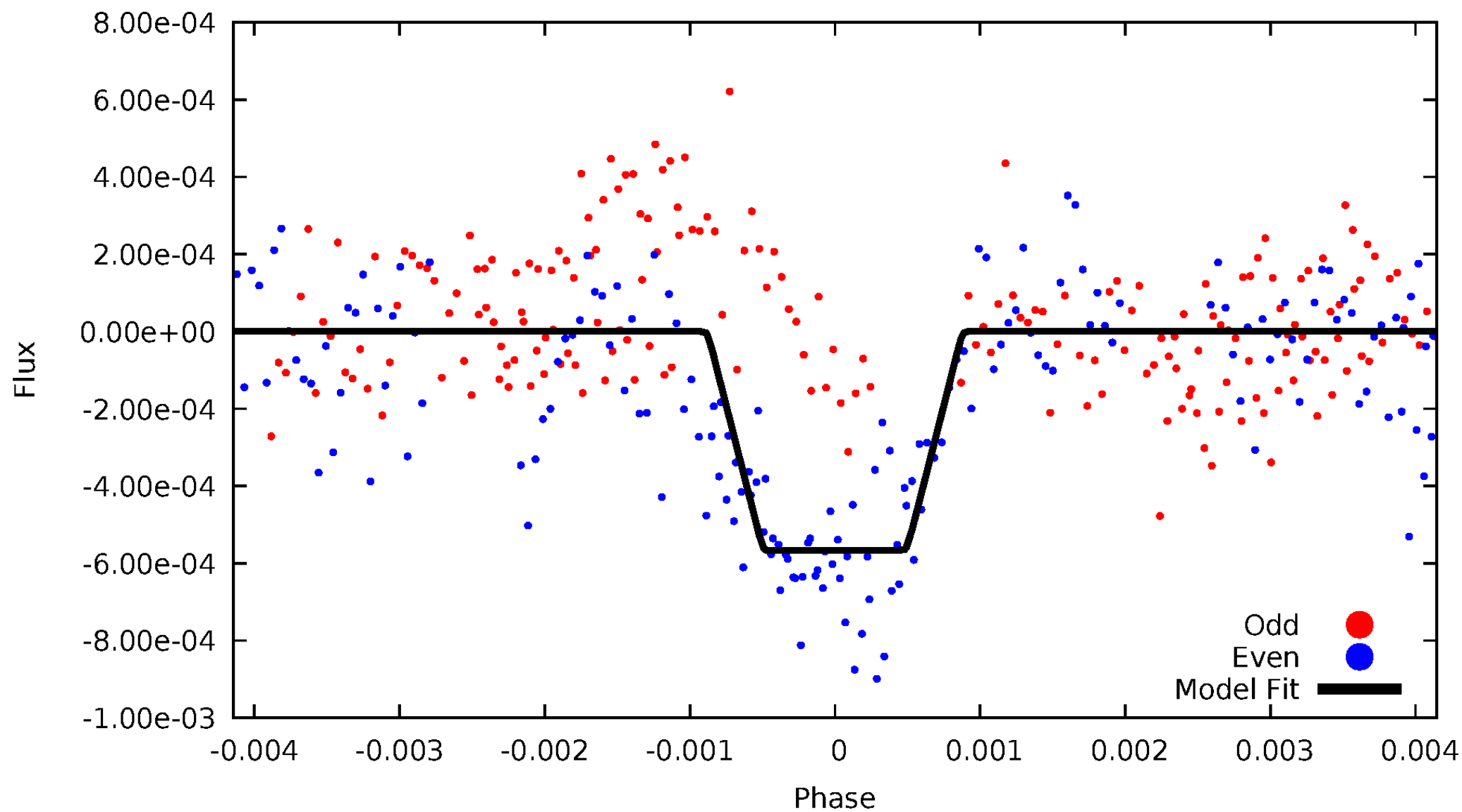
# DV Odd/Even

TCE 010663294-02



# ALT Odd/Even

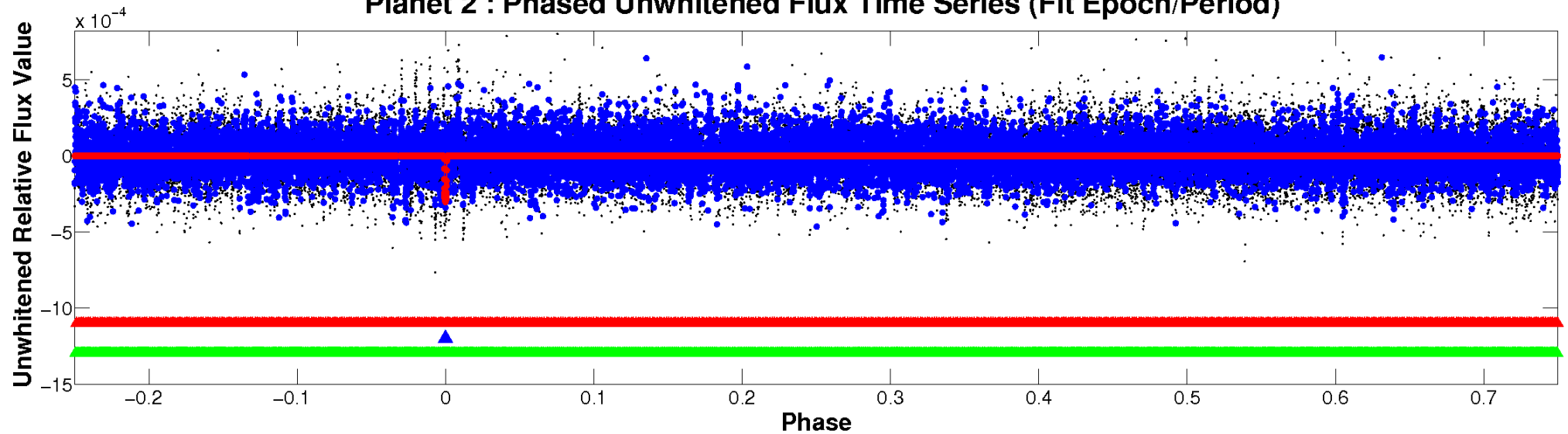
TCE 010663294-02



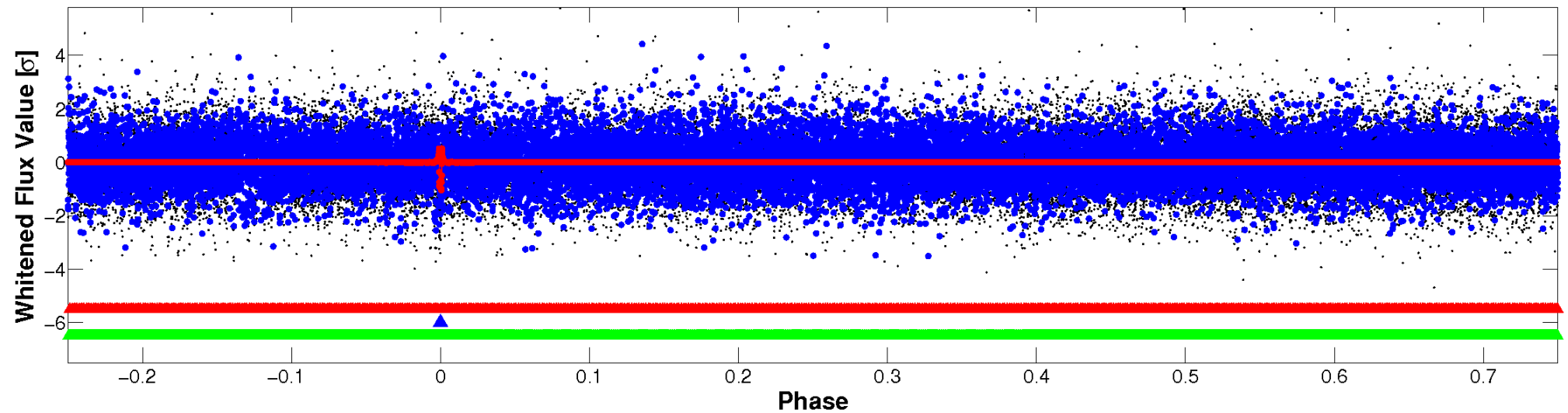


# Non-Whitened Vs. Whitened Light Curve

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

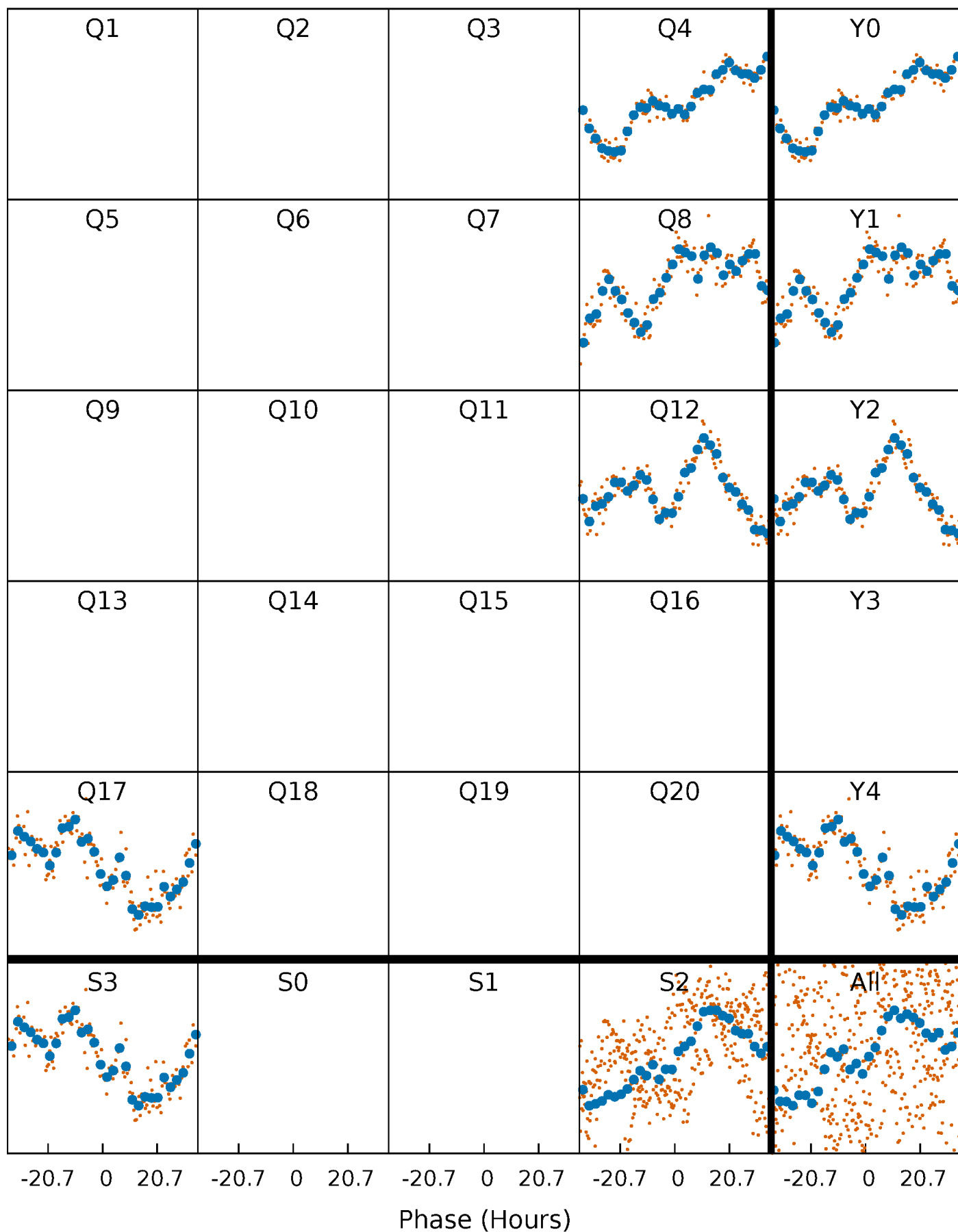


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 010663294-02     $P=399.710551$  Days     $T_0=375.376129$  (BKJD)



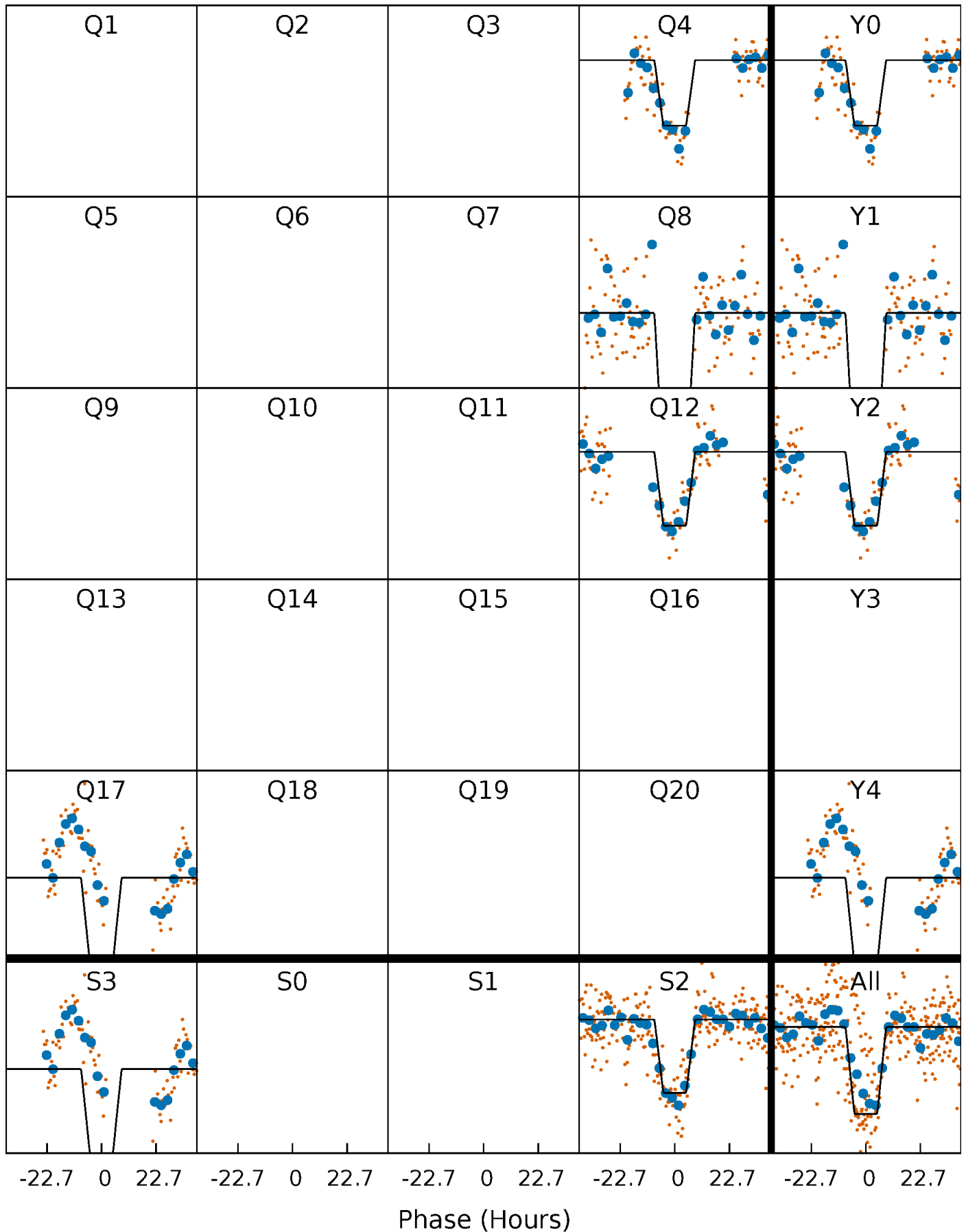
# DV Quarter-Phased Transit Curves

TCE 010663294-02 P=399.710551 Days  $T_0=375.376129$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

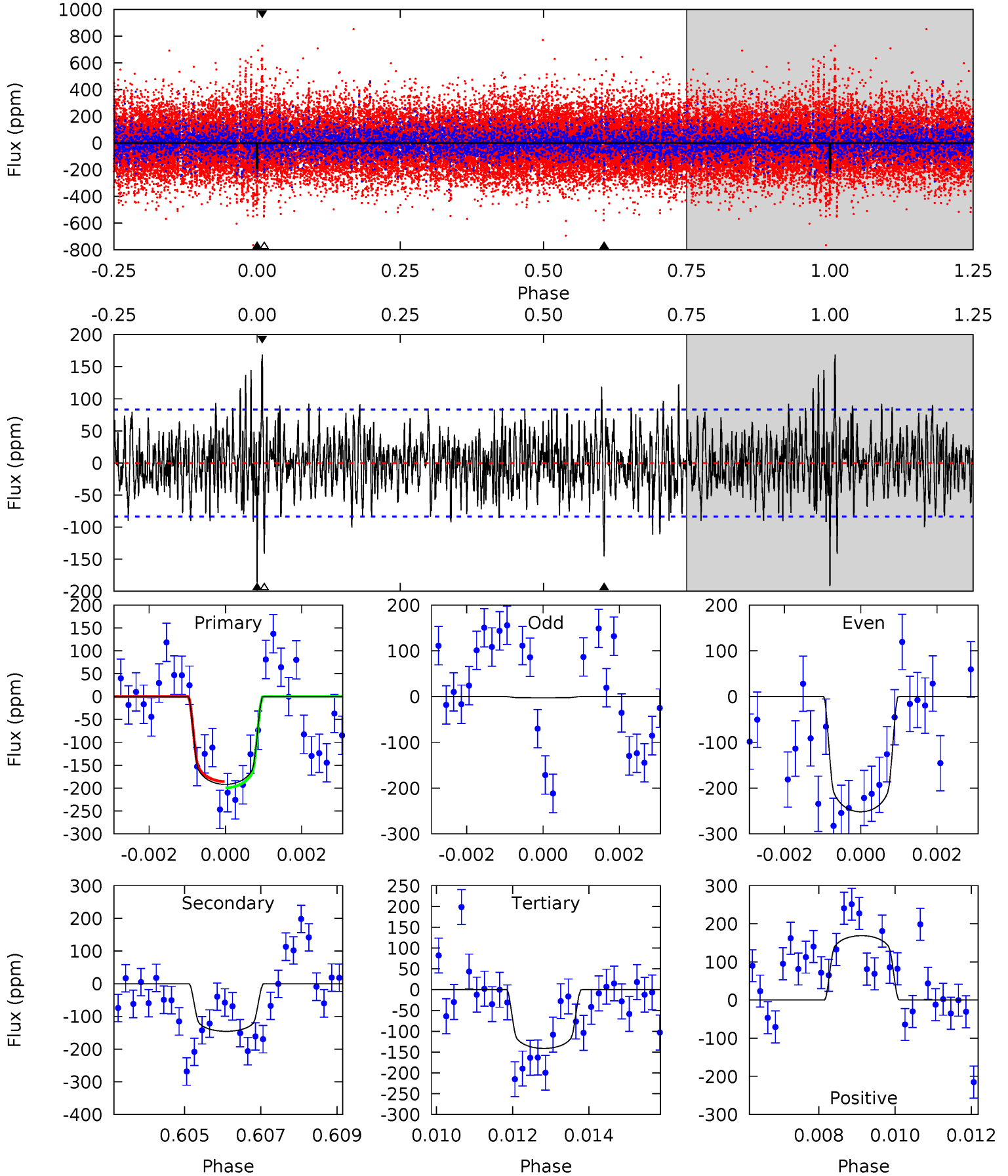
TCE 010663294-02     $P=399.694056$  Days     $T_0=375.453484$  (BKJD)



# DV Model-Shift Uniqueness Test

010663294-02, P = 399.710551 Days, E = 375.376129 Days

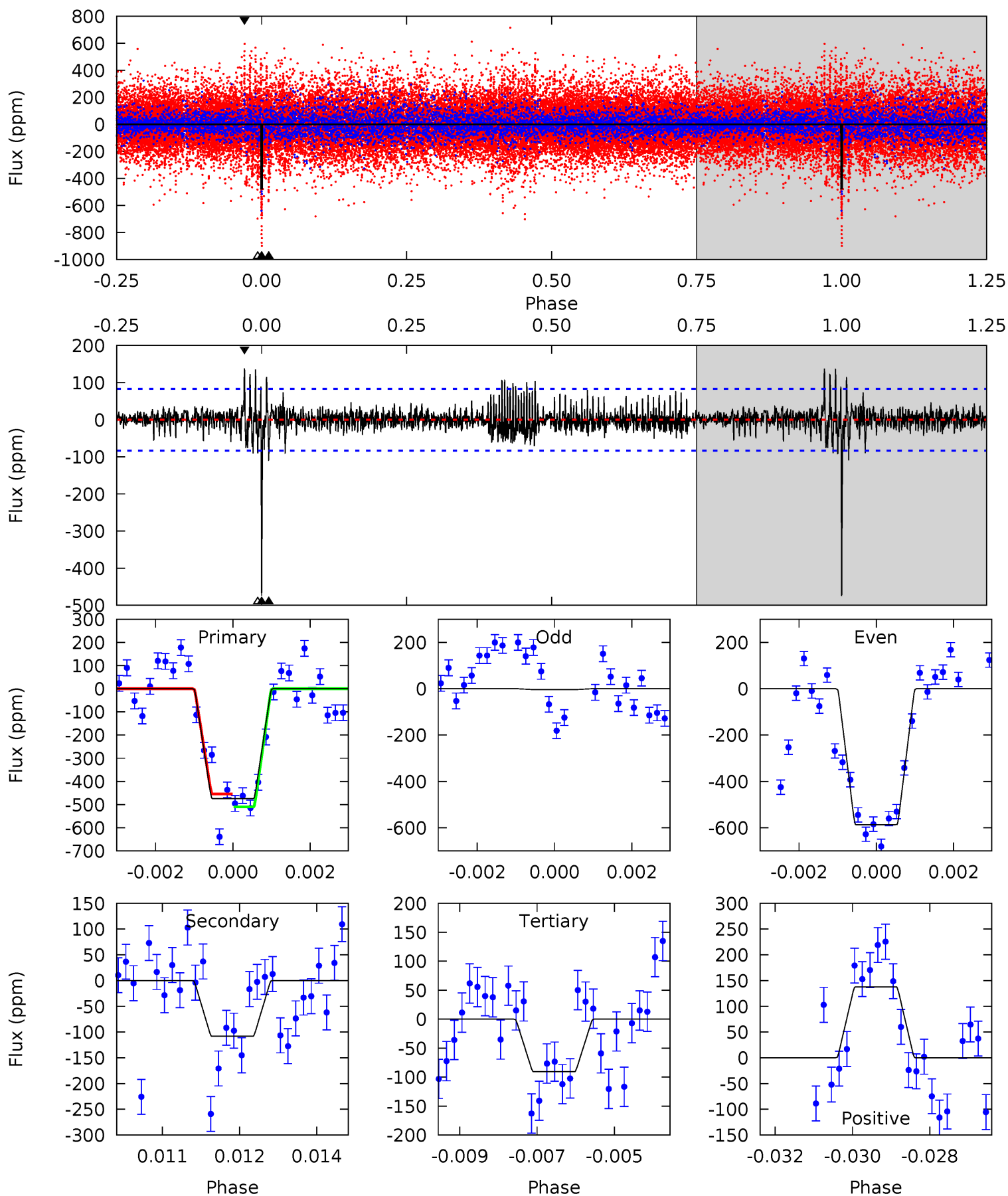
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	9.30	9.02	10.8	5.33	3.10	2.41	3.24	1.48	0.28	-1.48	7.05	0.71	0.47	0.43



# Alt Model-Shift Uniqueness Test

010663294-02, P = 399.694056 Days, E = 375.453484 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
30.5	6.96	5.83	8.85	5.35	3.13	1.58	24.7	21.6	1.13	-1.89	16.9	0.72	0.22	1.75





### Stellar Parameters For KIC 010663294

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7107^{+192}_{-256}$	$3.875^{+0.266}_{-0.114}$	$-0.280^{+0.300}_{-0.300}$	$2.405^{+0.422}_{-0.784}$	$1.580^{+0.205}_{-0.308}$	$0.160^{+0.270}_{-0.055}$
	+3%/-4%	+7%/-3%	+107%/-107%	+18%/-33%	+13%/-19%	+169%/-34%
Source	PHO1	FLK73	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 010663294-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-146 \pm 16$	$4.88^{+0.74}_{-0.80}$	$602^{+38}_{-47}$	$5620^{+338}_{-295}$	$5157^{+2264}_{-1221}$
Alt.	$-108 \pm 16$	$6.03^{+0.98}_{-1.06}$	$600^{+39}_{-53}$	$4770^{+238}_{-227}$	$2528^{+1132}_{-721}$

$T_{max}$  = 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

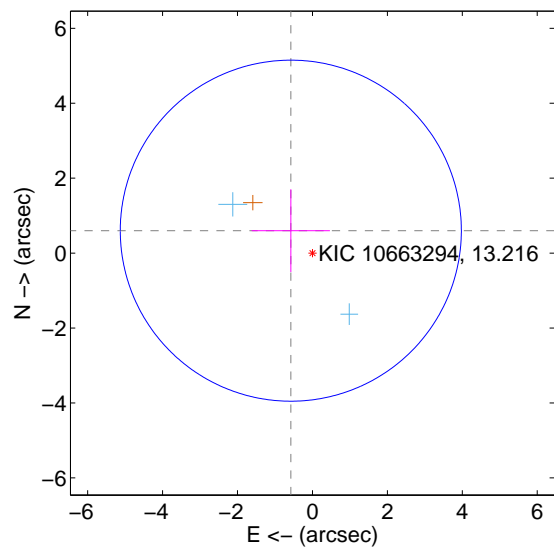
Supplemental centroid analysis for 010663294-02. Kepler magnitude: 13.22. Transit SNR 7.99

There are 2 quarters with good PRF difference image offsets

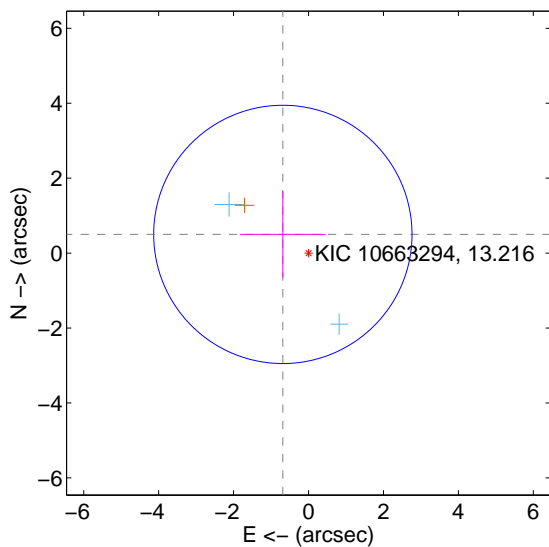
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.831 \pm 1.517$	0.55	$0.577 \pm 1.044$	$0.598 \pm 1.105$
PRF-fit source offset from KIC position	$0.848 \pm 1.149$	0.74	$0.685 \pm 1.146$	$0.499 \pm 1.155$
photometric centroid source offset	$0.76 \pm 0.60$	1.27	$-0.46 \pm 0.62$	$0.60 \pm 0.58$

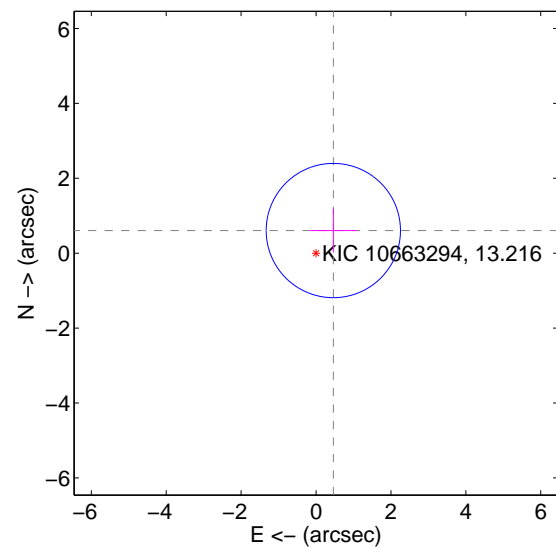
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

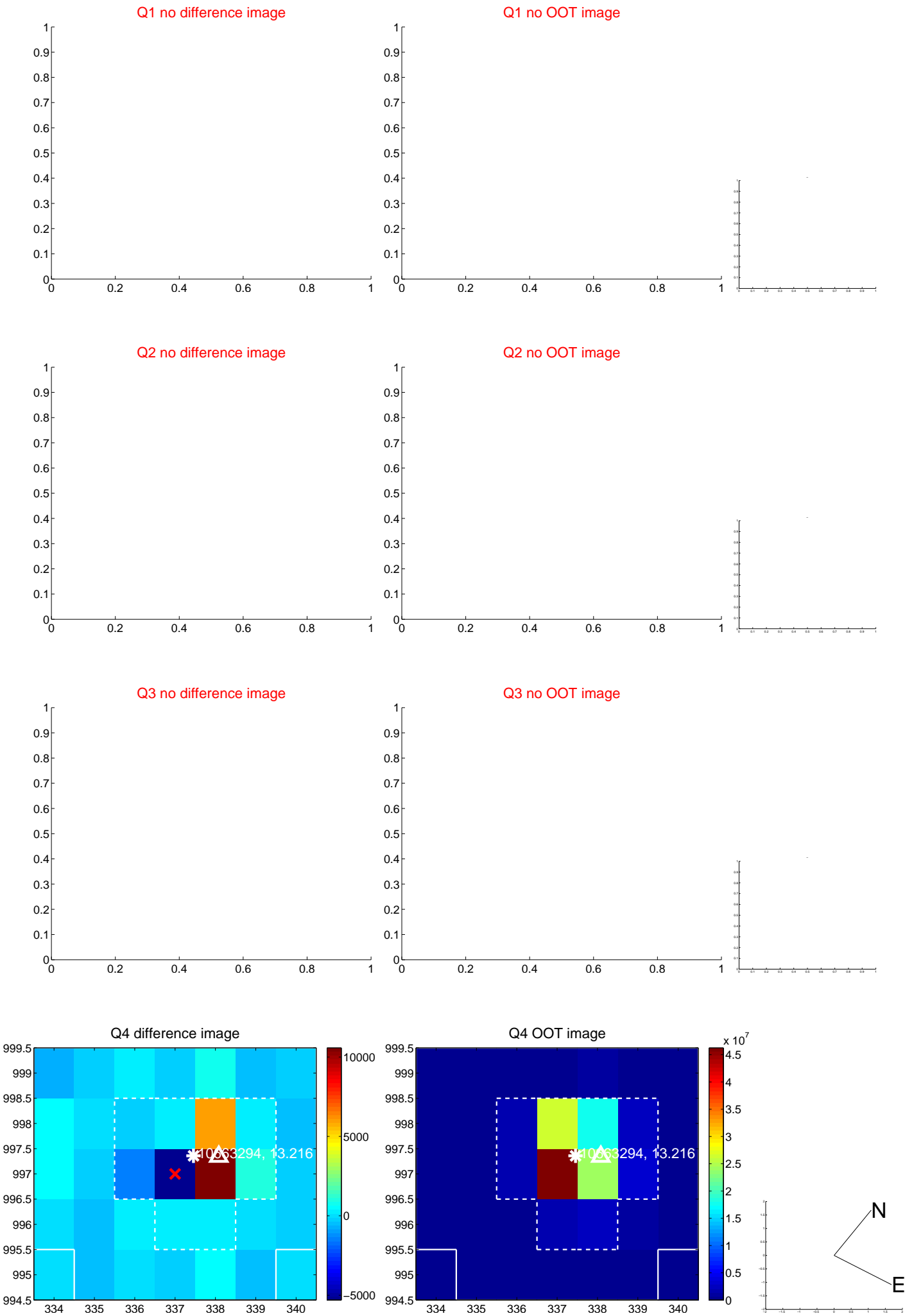


offset from photometric centroids



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



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

Q5 no difference image



Q5 no OOT image



Q6 no difference image



Q6 no OOT image



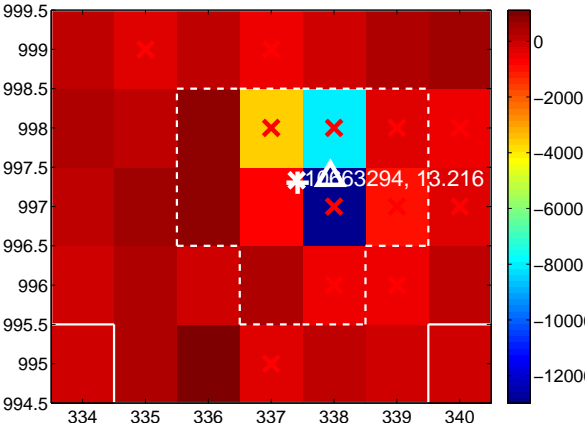
Q7 no difference image



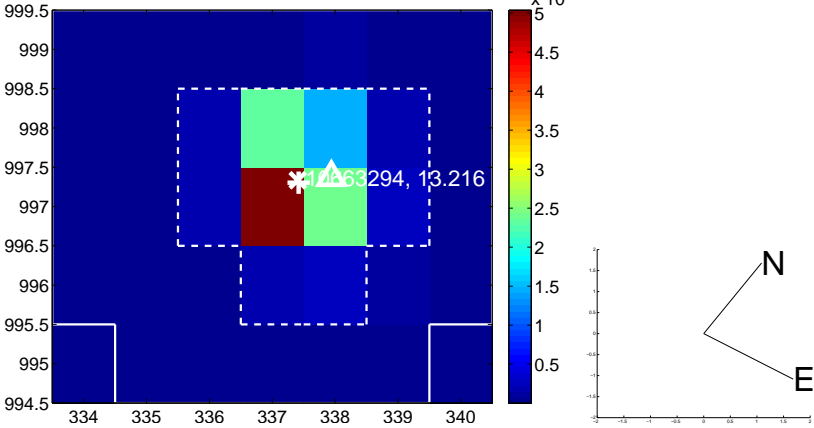
Q7 no OOT image



Q8 difference image. Poor Quality



Q8 OOT image



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

Q9 no difference image



Q9 no OOT image



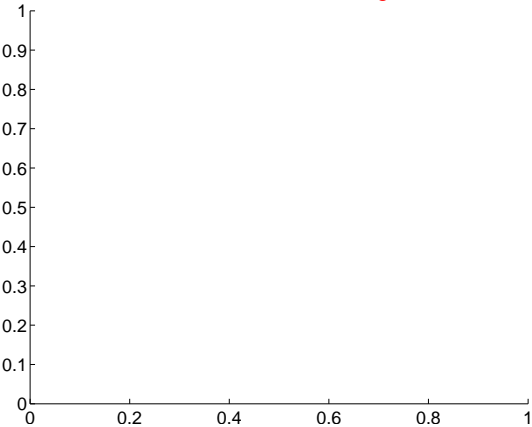
Q10 no difference image



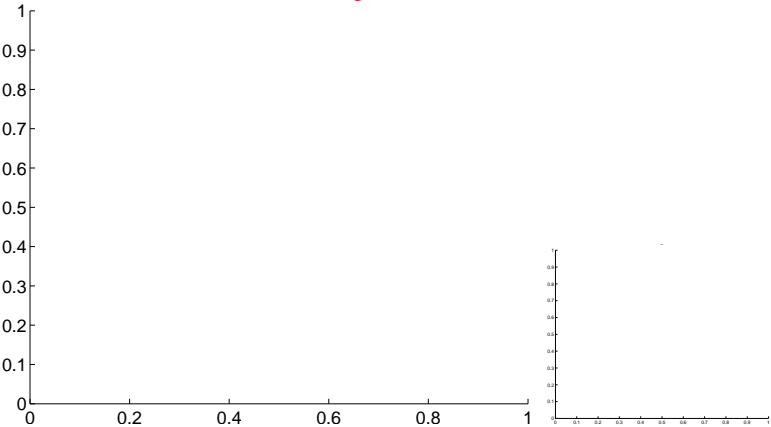
Q10 no OOT image



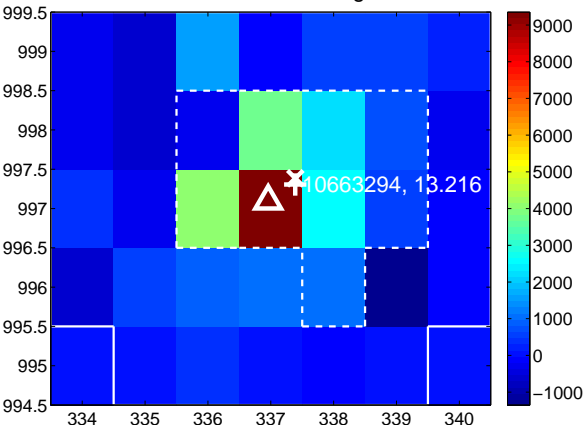
Q11 no difference image



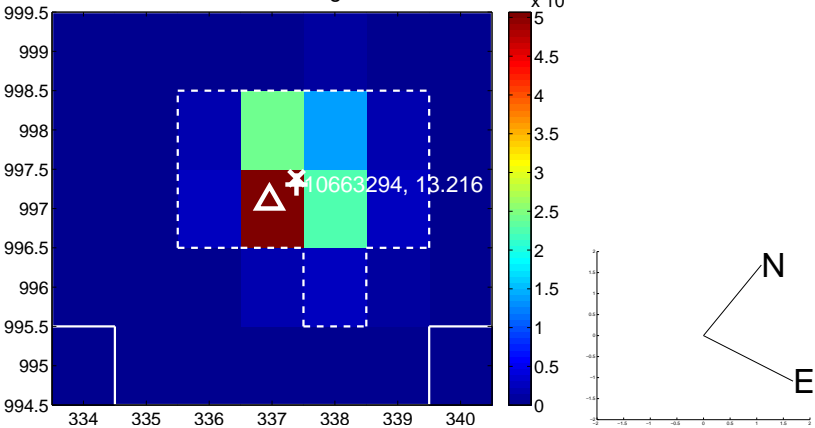
Q11 no OOT image



Q12 difference image



Q12 OOT image

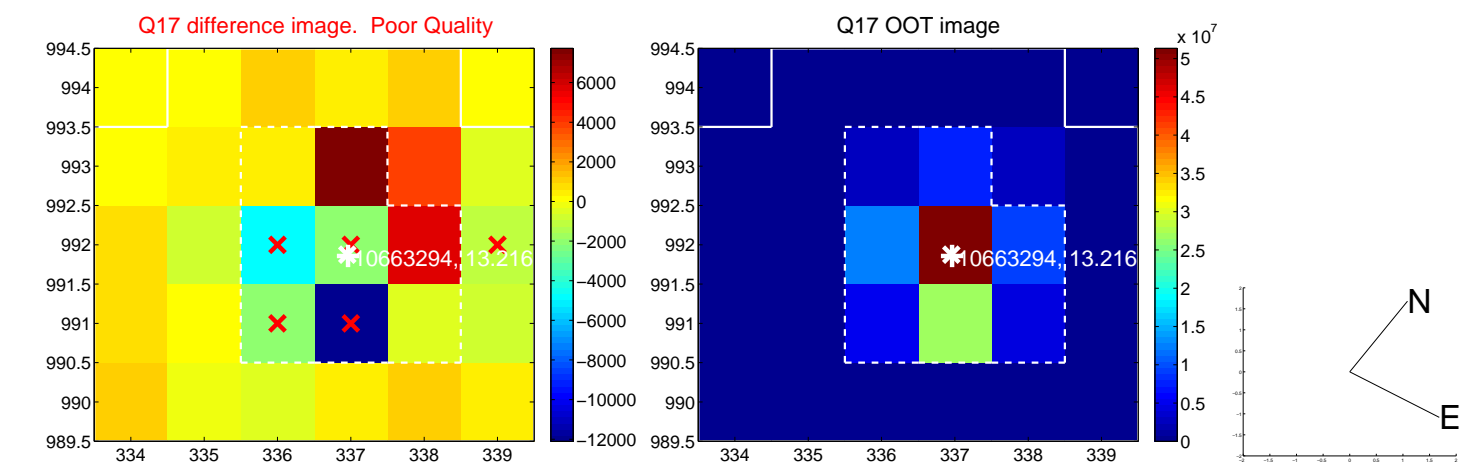




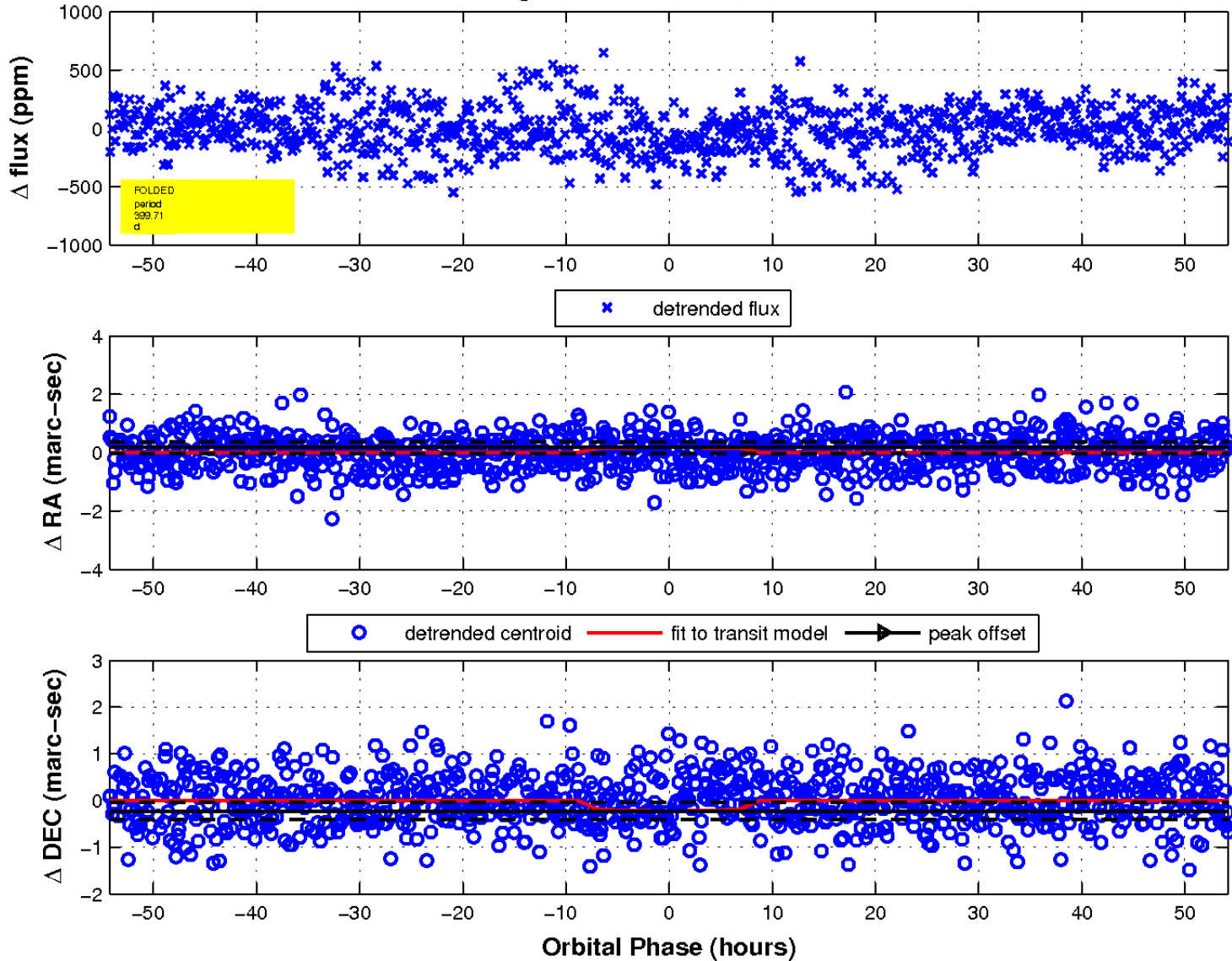
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

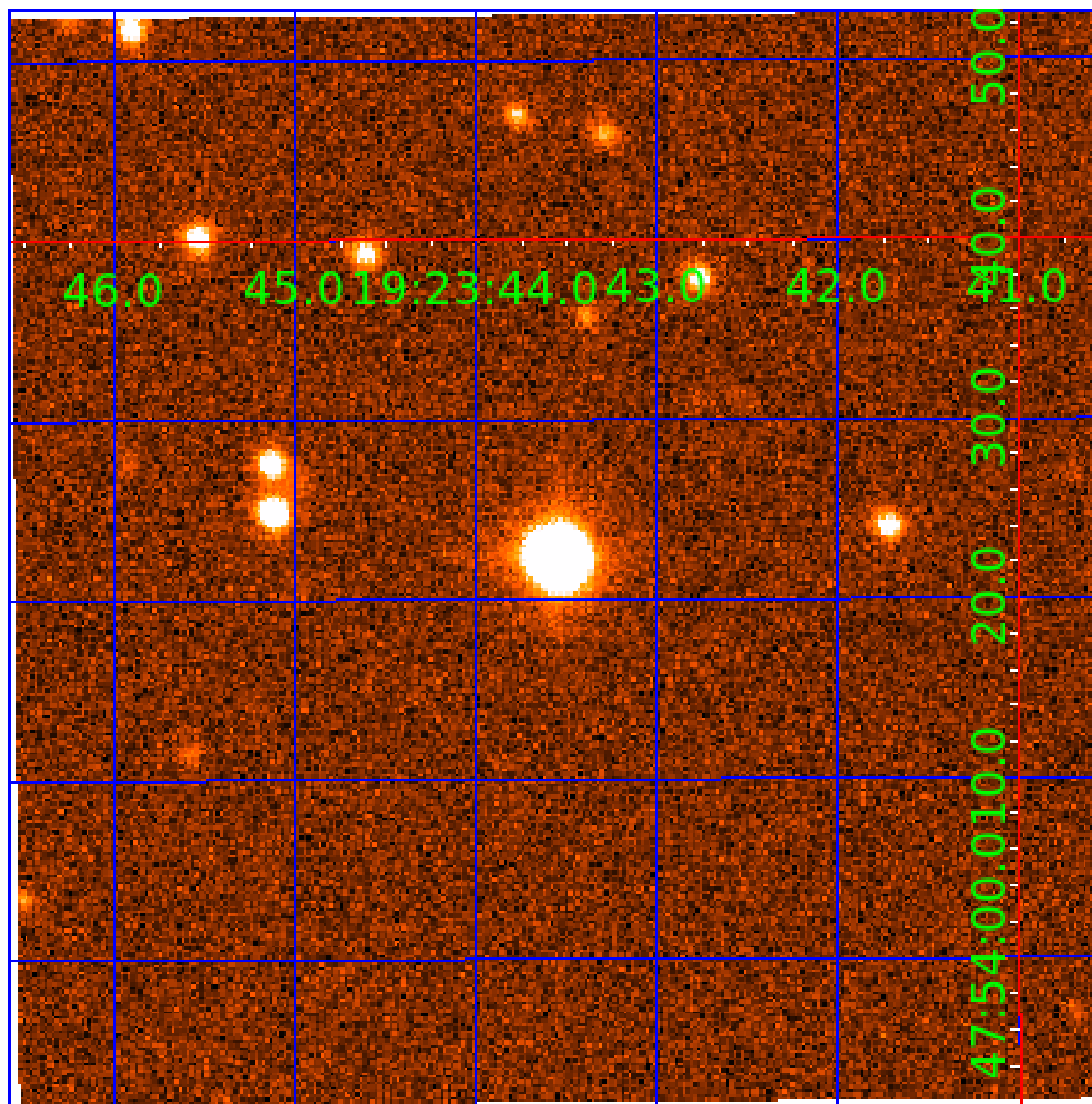


### fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 010663294

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010663294-01	OBS	No	1.900058	132.884055	27.7	5.995	11.0	10.0	2.40	7107	1.49	10798.43
010663294-02	OBS	No	399.710551	375.376129	302.3	18.090	10.3	8.0	2.40	7107	4.99	8.63
010663294-03	OBS	No	0.542916	132.056734	22.4	6.515	9.7	12.7	2.40	7107	1.15	57377.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010663294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010663294-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010663294-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_FEW_DIFFS

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

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

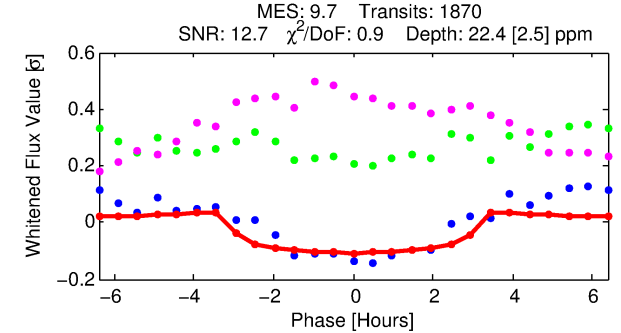
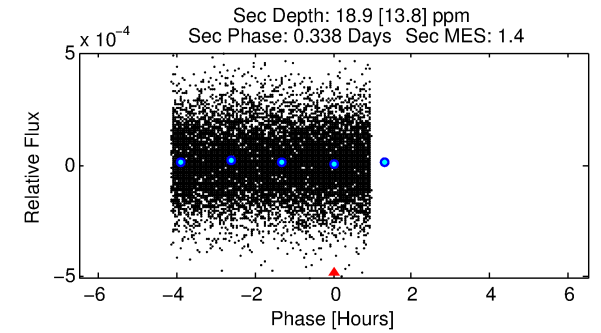
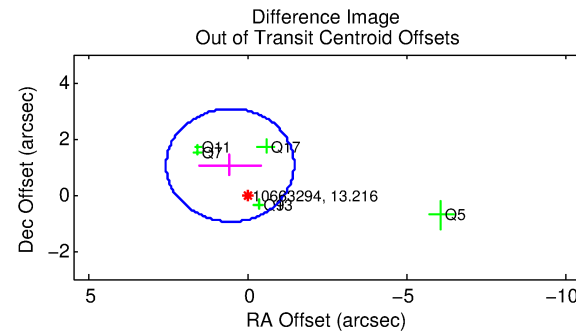
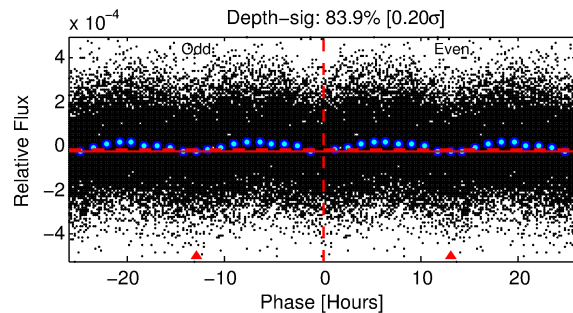
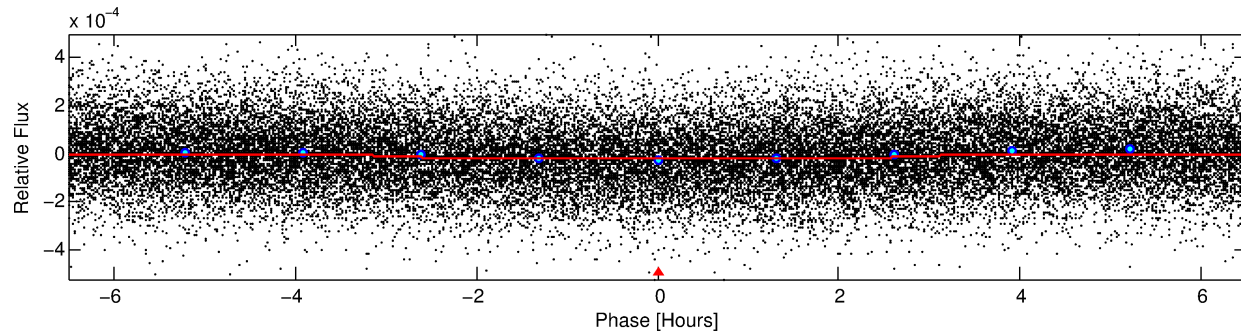
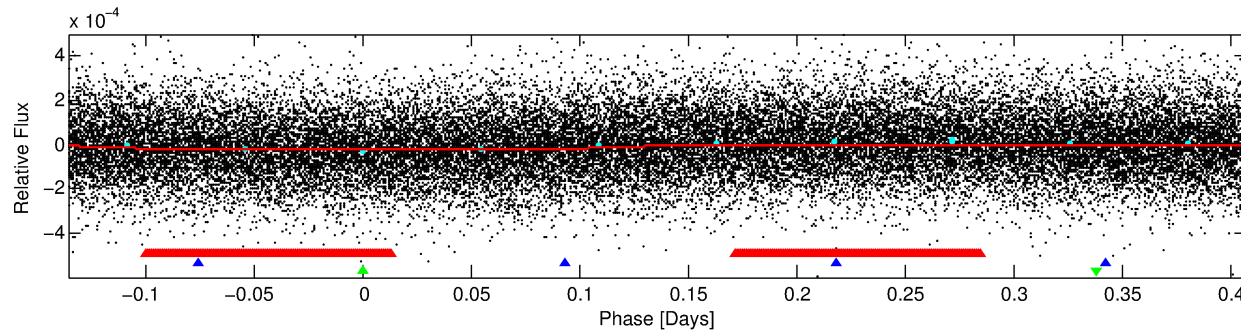
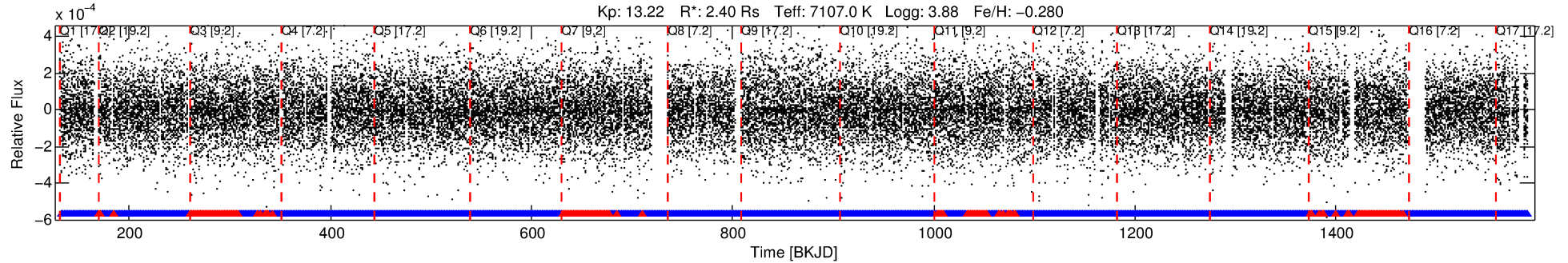
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010663294-03

No Significant Match Found

# DV One-Page Summary

KIC: 10663294 Candidate: 3 of 3 Period: 0.543 d



## DV Fit Results:

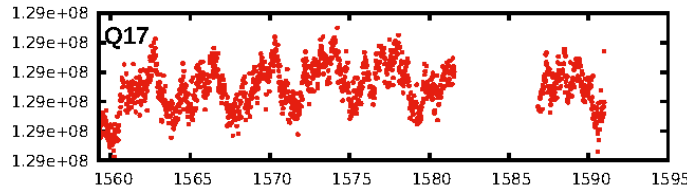
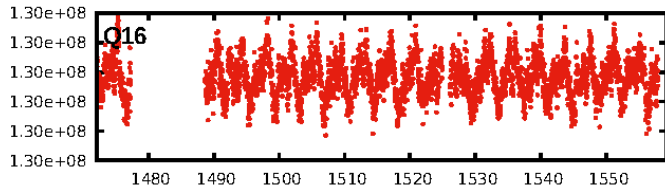
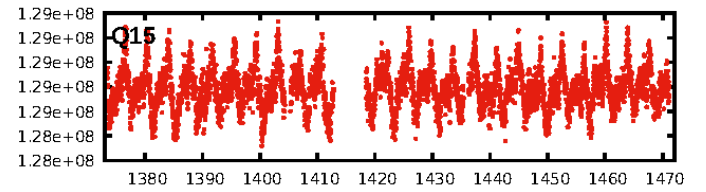
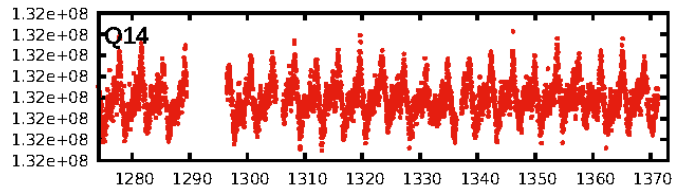
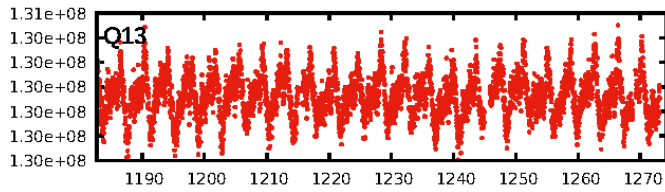
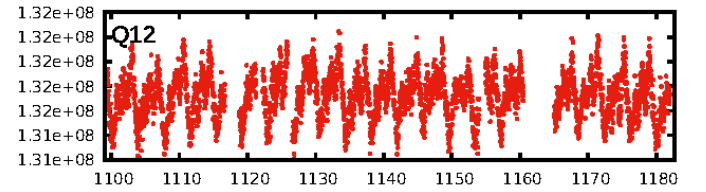
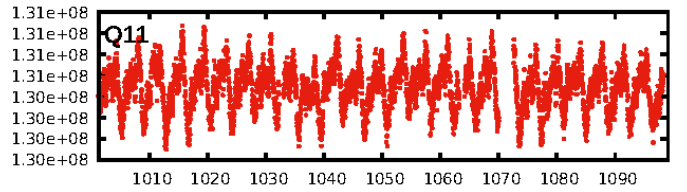
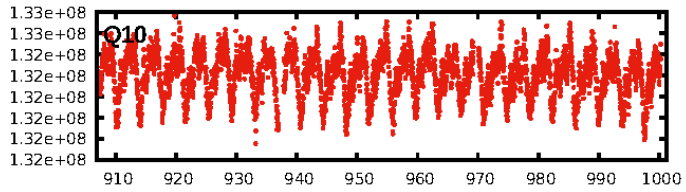
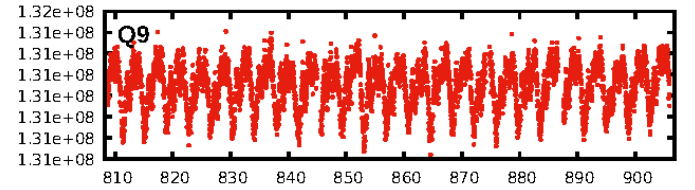
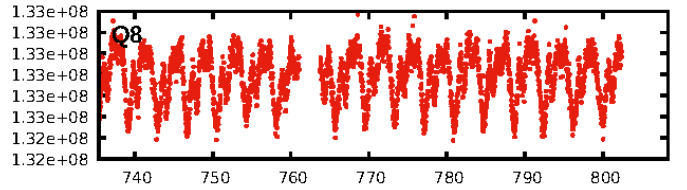
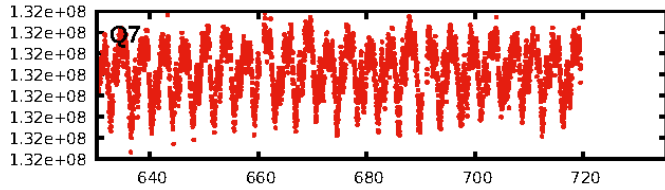
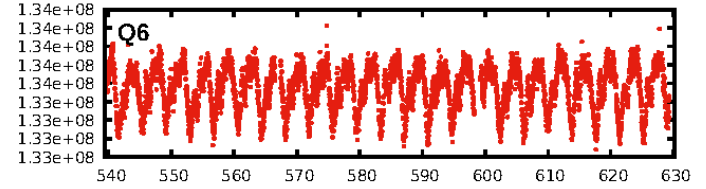
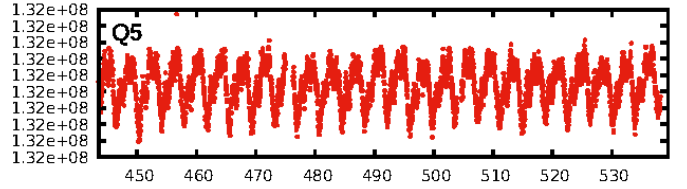
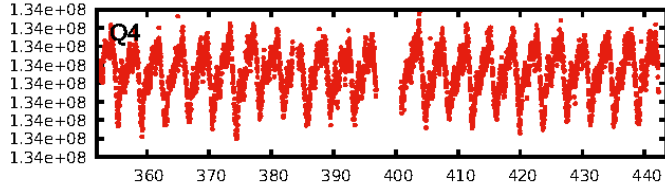
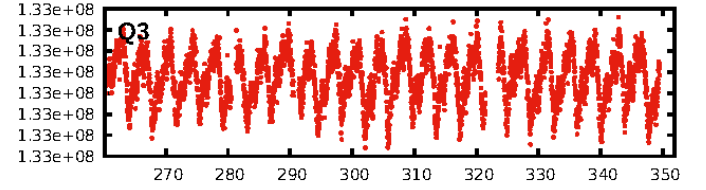
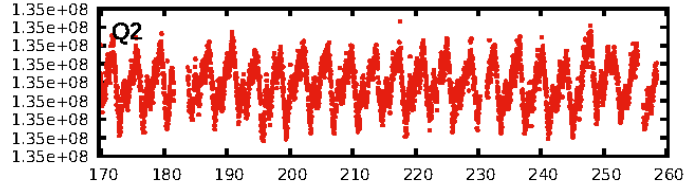
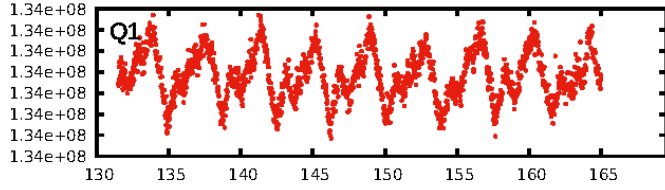
Period = 0.54292 [0.00001] d  
Epoch = 132.0567 [0.0042] BKJD  
Rp/R\* = 0.0044 [0.0019]  
a/R\* = 1.00 [0.00]  
b = 0.10 [25.36]  
Seff = 57377.25 [27798.05]  
Teq = 3946 [478] K  
Rp = 1.15 [0.63] Re  
a = 0.0152 [0.0045] AU  
Ag = 1.81 [2.23] [0.36 $\sigma$ ]  
Teffp = 7078 [2036] K [1.50 $\sigma$ ]

## DV Diagnostic Results:

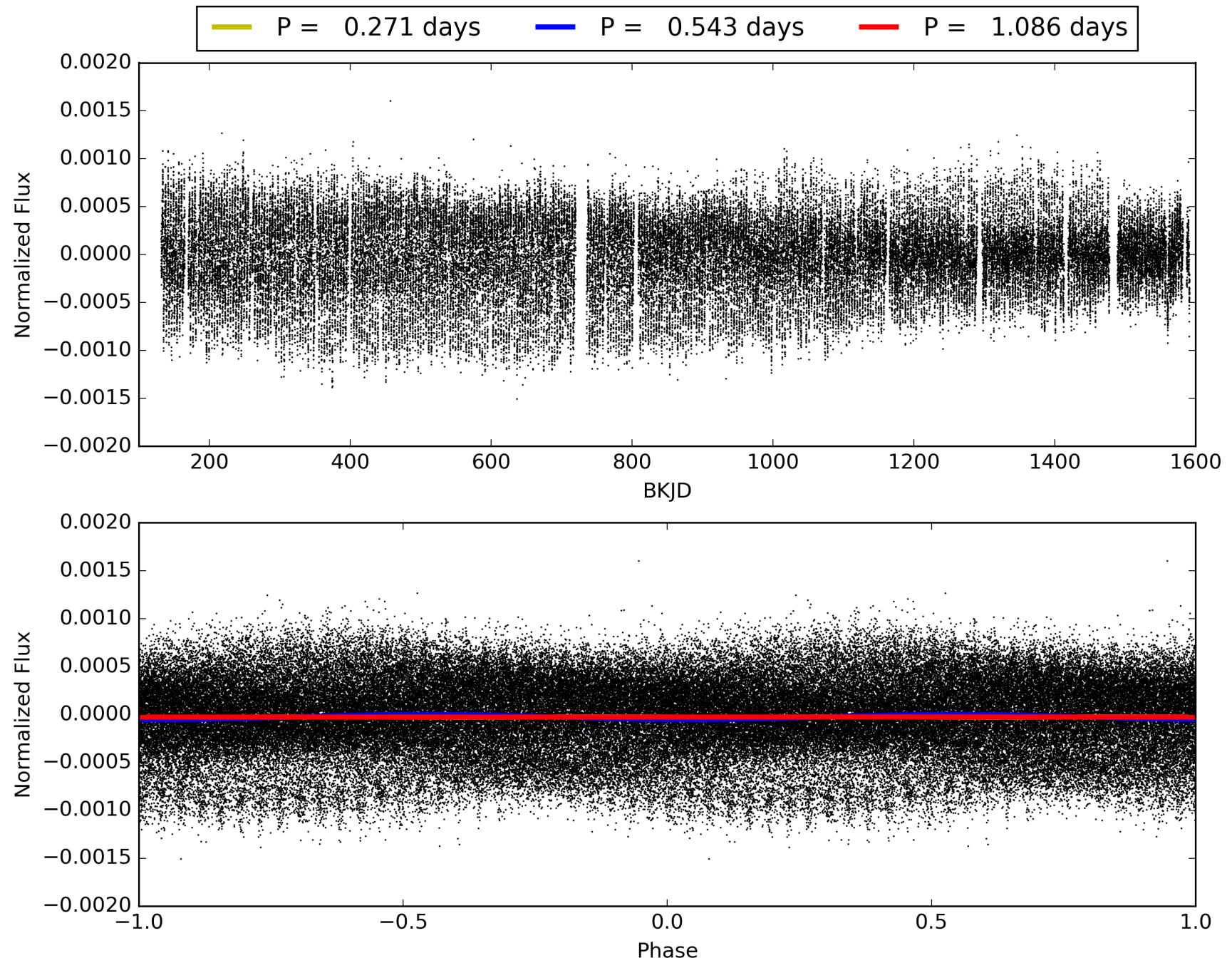
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [3.68 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.86 [1532/1783]  
GhostDiagnostic-chr: -165.4  
Centroid-sig: 0.1%  
Centroid-so: 1.352 arcsec [2.49 $\sigma$ ]  
OotOffset-rm: 1.192 arcsec [1.78 $\sigma$ ]  
KicOffset-rm: 1.195 arcsec [1.48 $\sigma$ ]  
OotOffset-st: 0/2/0/4 [6]  
KicOffset-st: 0/2/0/4 [6]  
DiffImageQuality-fgm: 0.67 [4/6]  
DiffImageOverlap-fno: 1.00 [17/17]



## TCE 010663294-03, PDC Light Curves

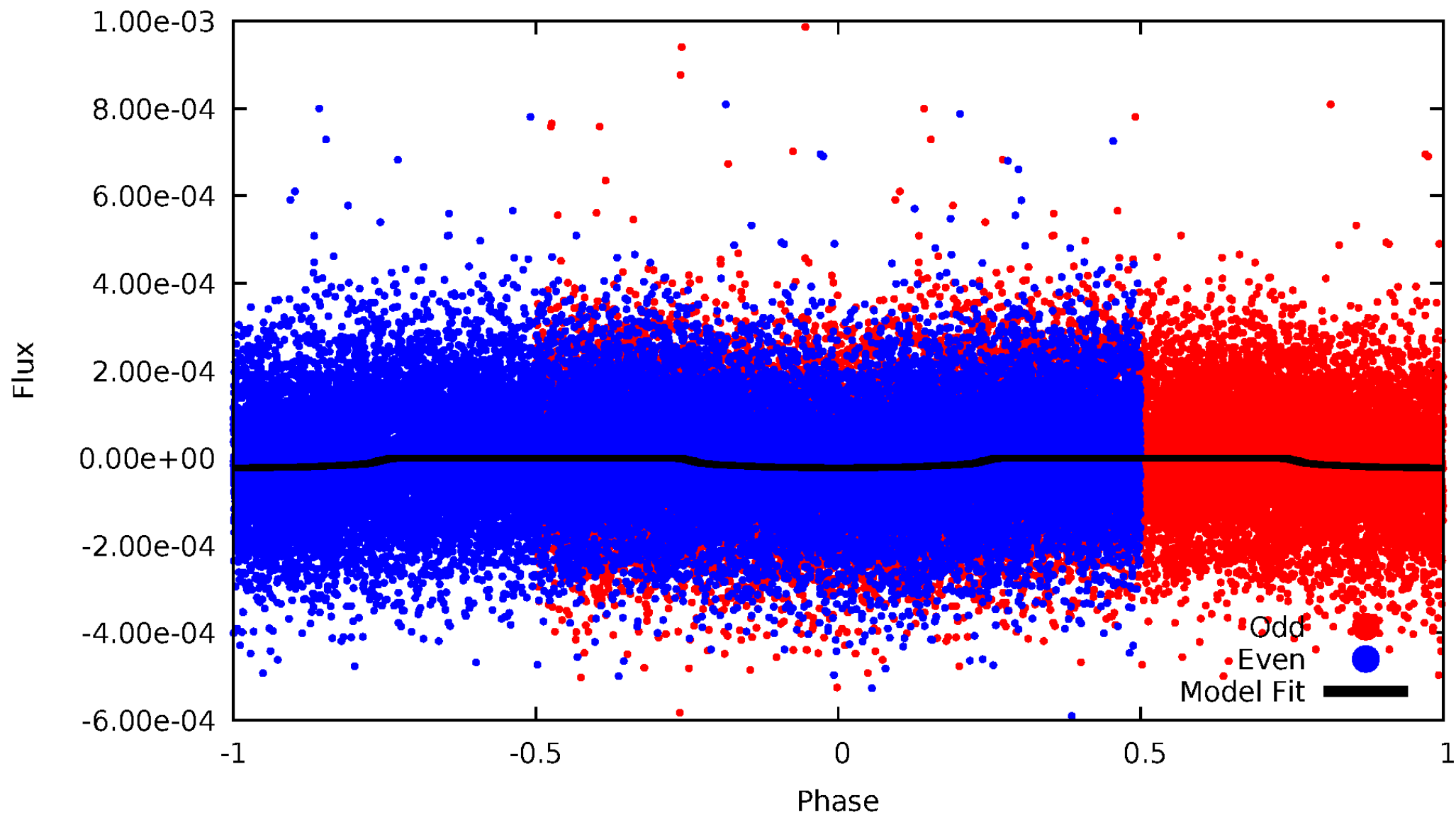


TCE 010663294-03



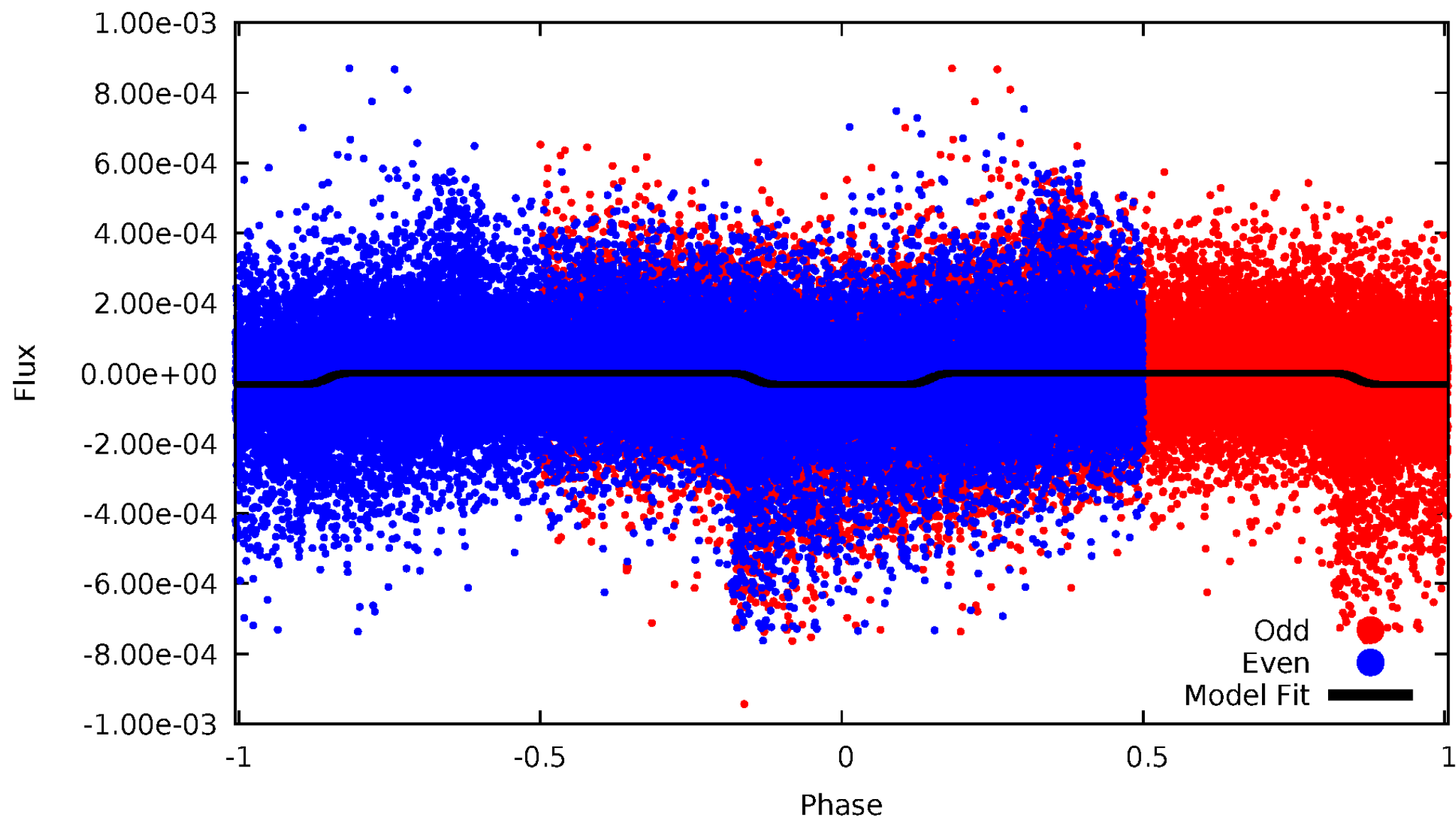
# DV Odd/Even

TCE 010663294-03



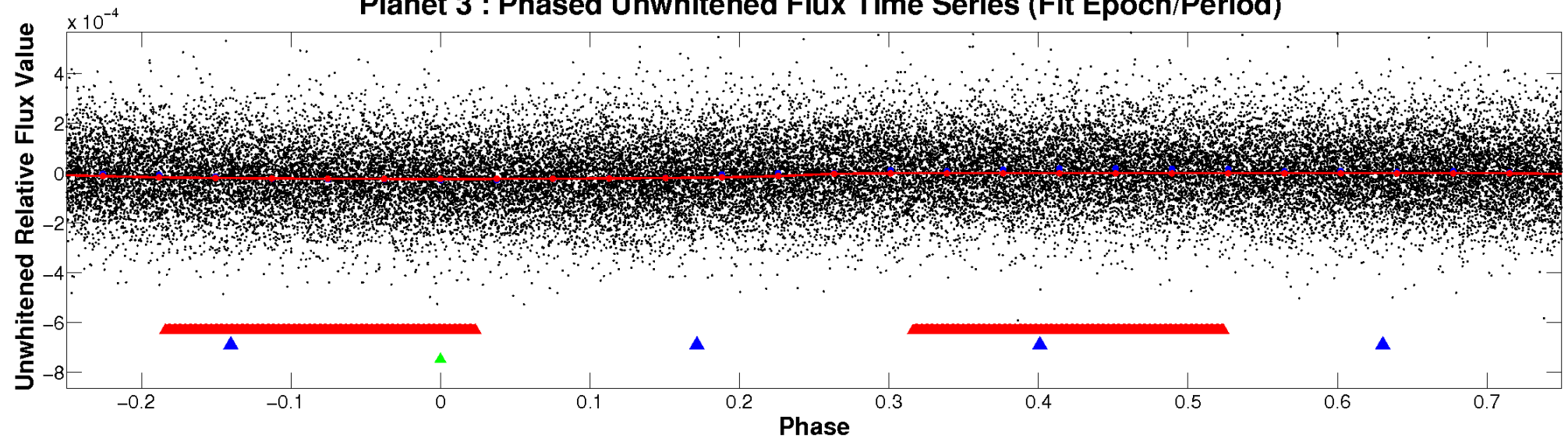
# ALT Odd/Even

TCE 010663294-03

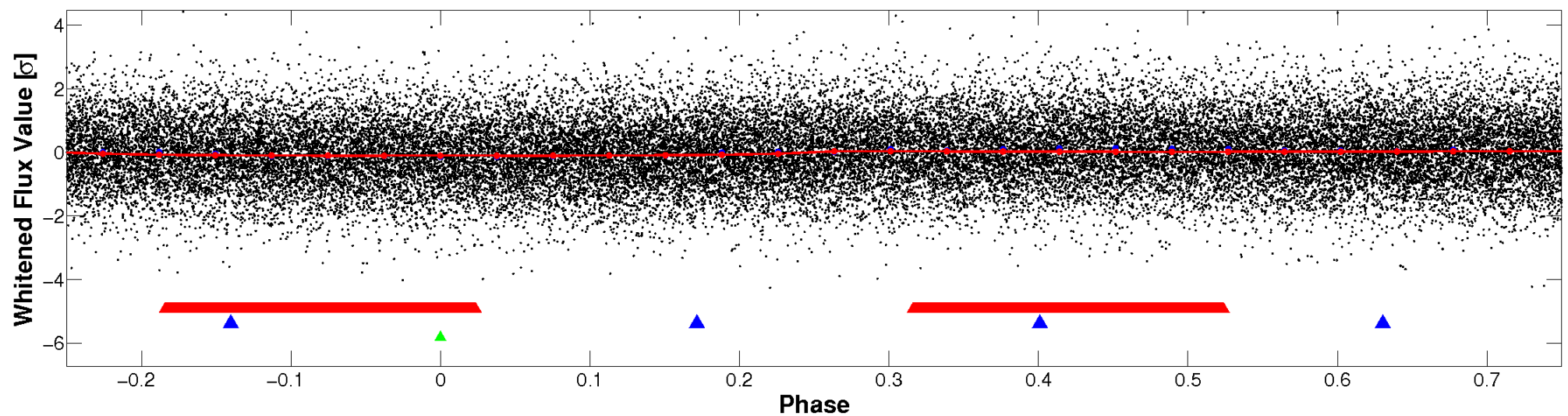


# Non-Whitened Vs. Whitened Light Curve

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



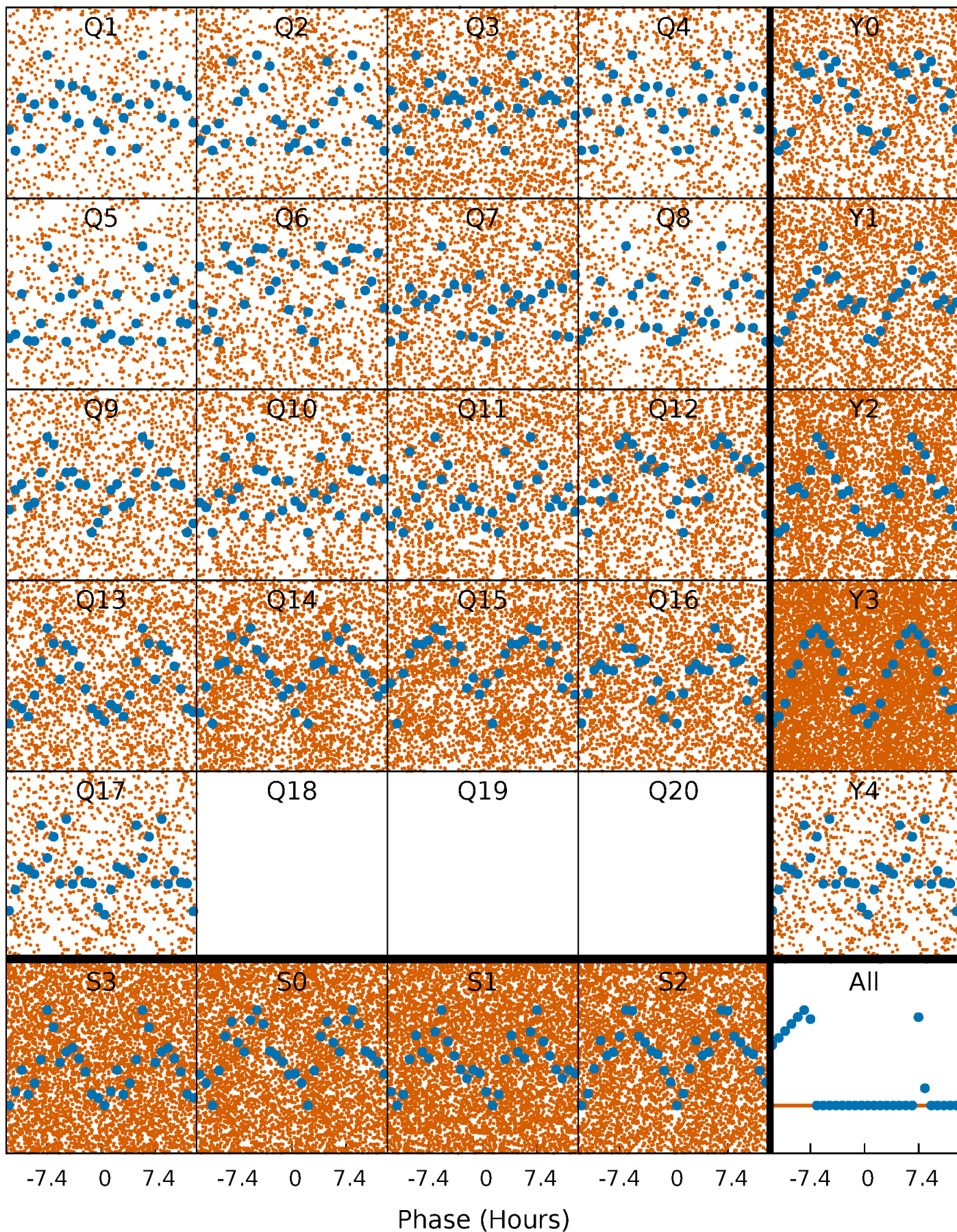
**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

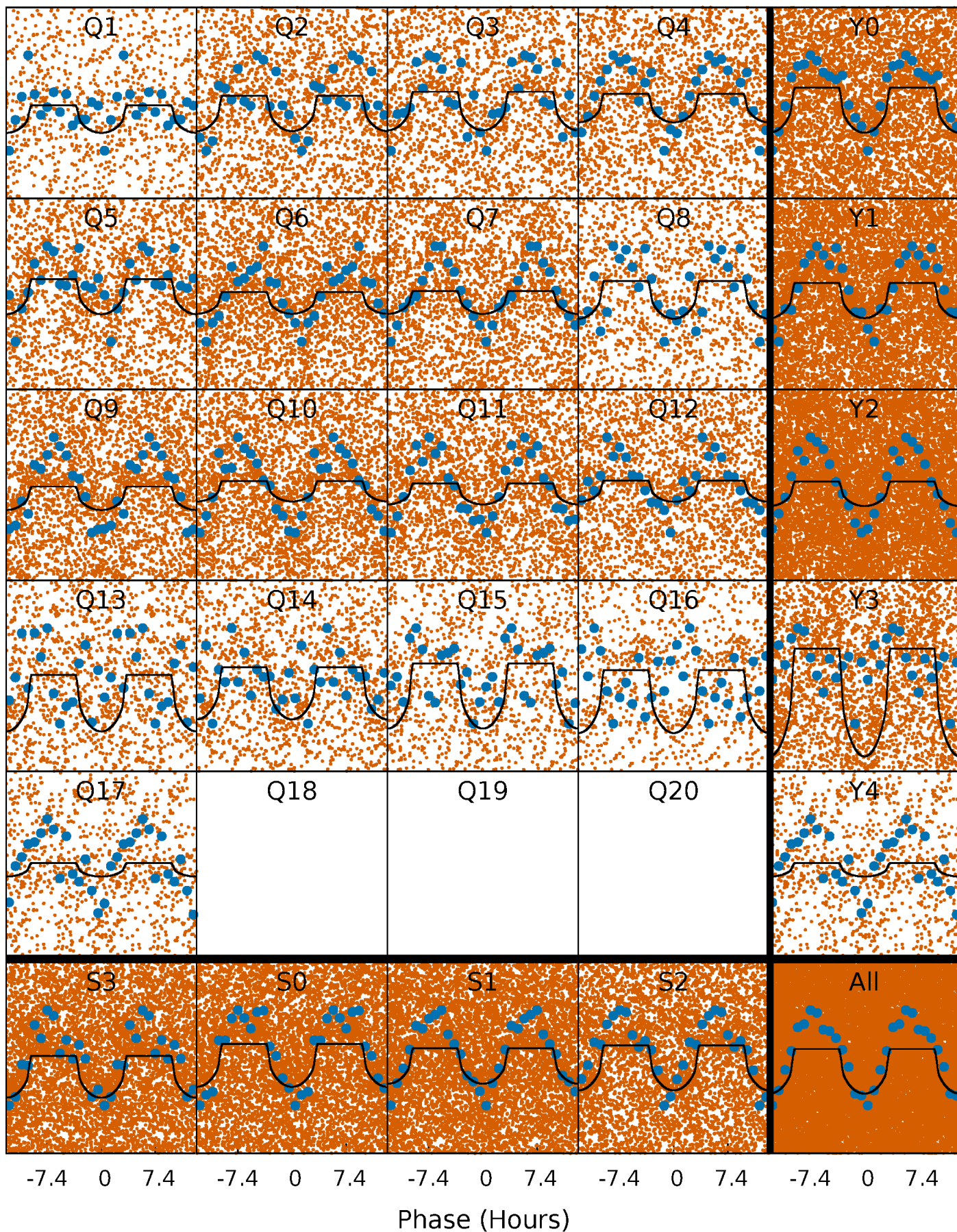
TCE 010663294-03 P= 0.542916 Days  $T_0=132.056734$  (BKJD)





# DV Quarter-Phased Transit Curves

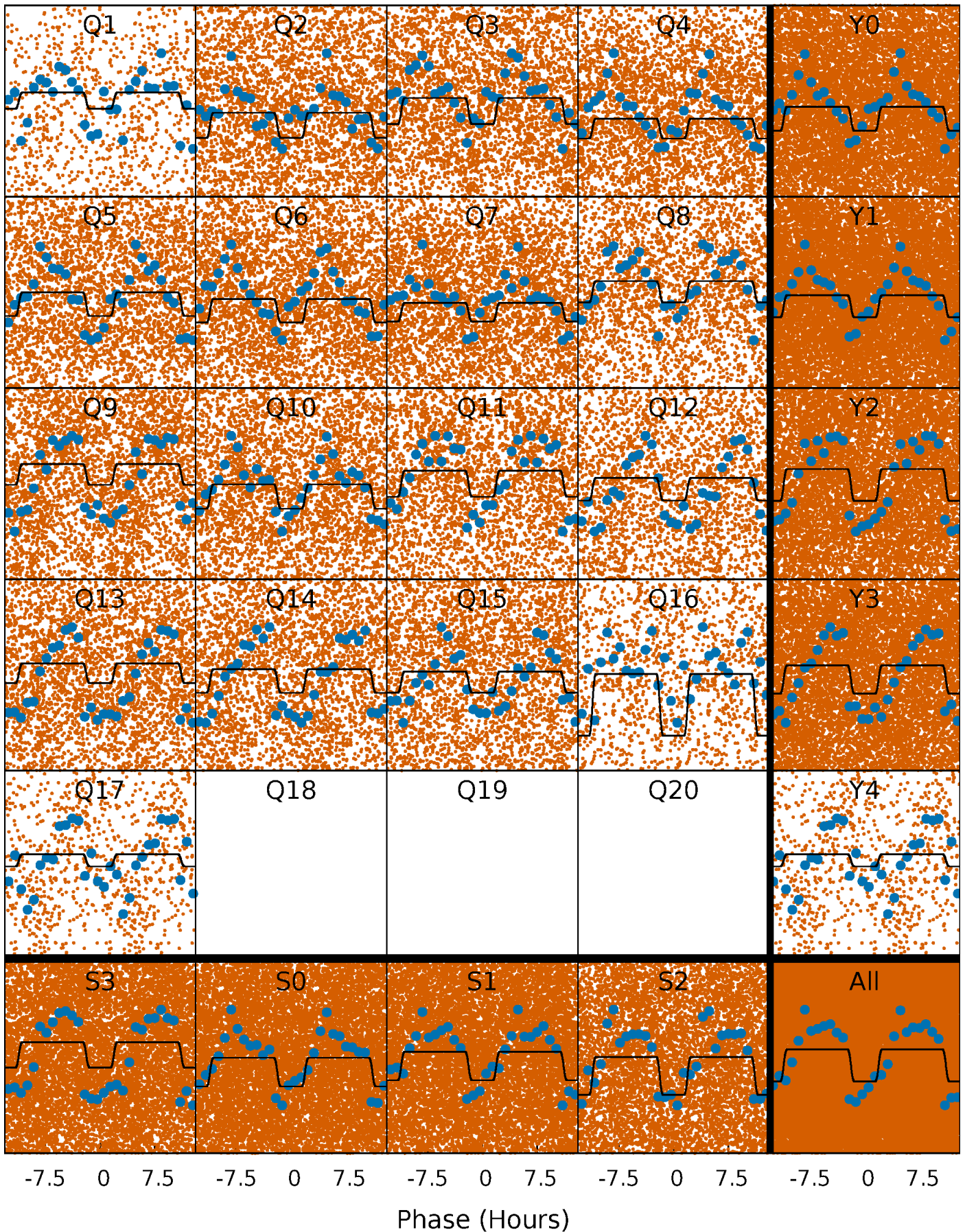
TCE 010663294-03 P= 0.542916 Days  $T_0=132.056734$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

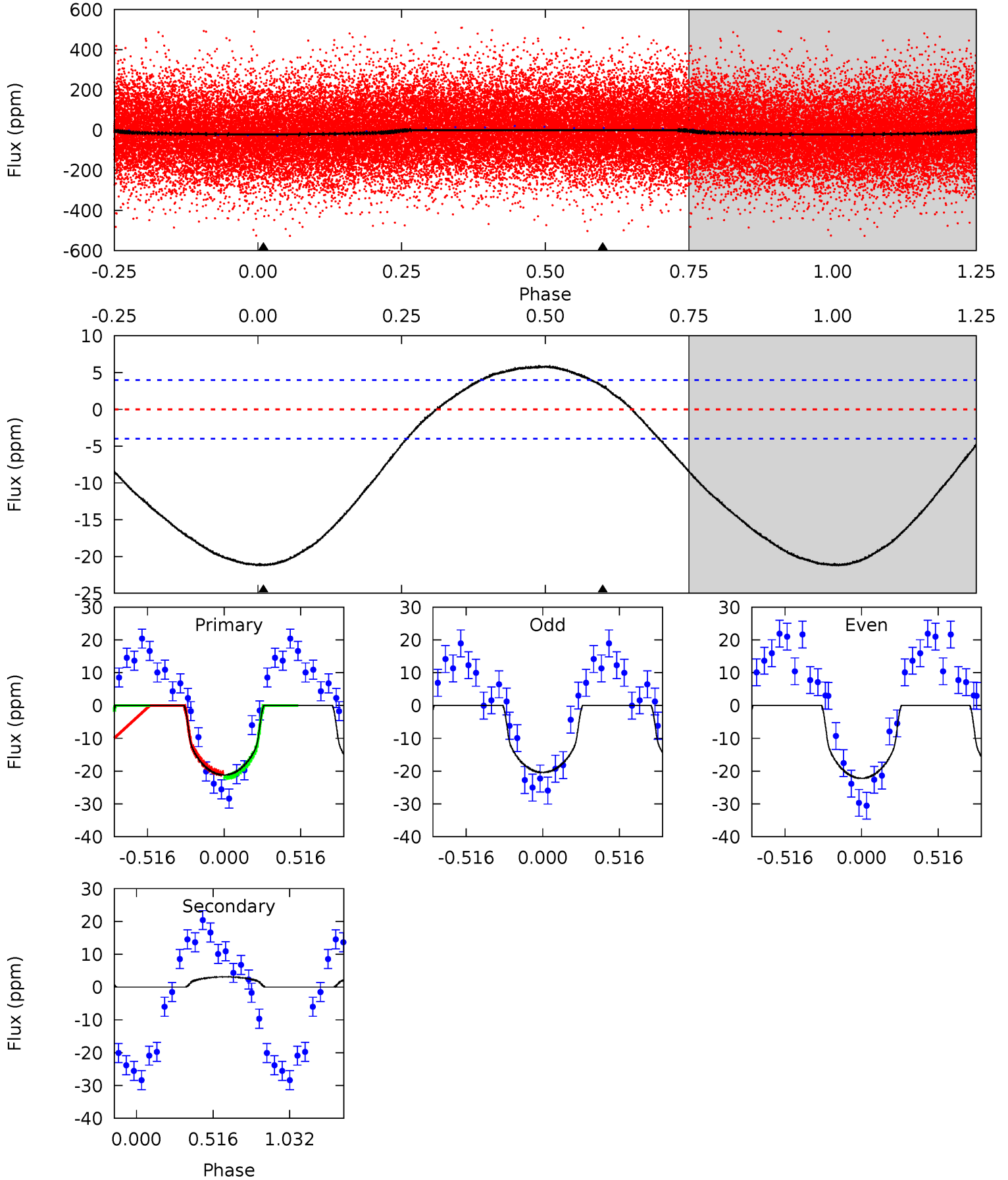
TCE 010663294-03 P= 0.542879 Days  $T_0=132.002803$  (BKJD)



# DV Model-Shift Uniqueness Test

010663294-03, P = 0.542916 Days, E = 130.970902 Days

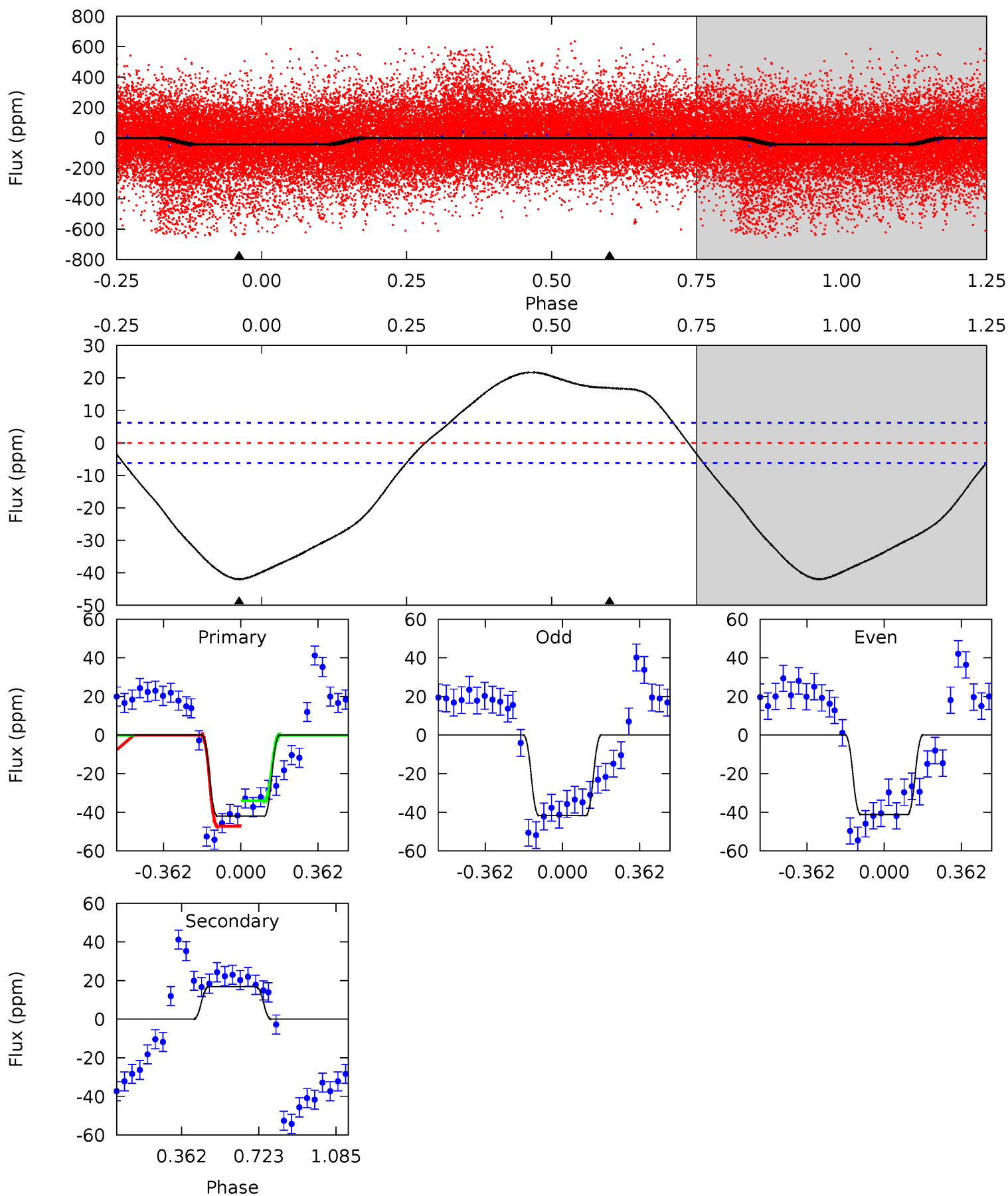
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.4	-3.28	0	0	4.21	0.65	2.06	22.4	22.4	-3.28	-3.28	0.93	0.69	0.22	0.64



# Alt Model-Shift Uniqueness Test

010663294-03, P = 0.542879 Days, E = 131.459924 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
28.9	-11.6	0	0	4.29	0.91	3.60	28.9	28.9	-11.6	-11.6	0.18	2.51	0.34	4.94



### Stellar Parameters For KIC 010663294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7107^{+192}_{-256}$	$3.875^{+0.266}_{-0.114}$	$-0.280^{+0.300}_{-0.300}$	$2.405^{+0.422}_{-0.784}$	$1.580^{+0.205}_{-0.308}$	$0.160^{+0.270}_{-0.055}$
	+3%/-4%	+7%/-3%	+107%/-107%	+18%/-33%	+13%/-19%	+169%/-34%
Source	PHO1	FLK73	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 010663294-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$3\pm 1$	$1.09^{+0.53}_{-0.49}$	$5425^{+332}_{-464}$	$-5354^{+449}_{-987}$	$-0.331^{+0.187}_{-0.827}$
Alt.	$17\pm 1$	$1.35^{+0.55}_{-0.48}$	$5420^{+328}_{-458}$	$-6456^{+686}_{-1385}$	$-1.172^{+0.581}_{-1.564}$

$T_{max}$  = 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

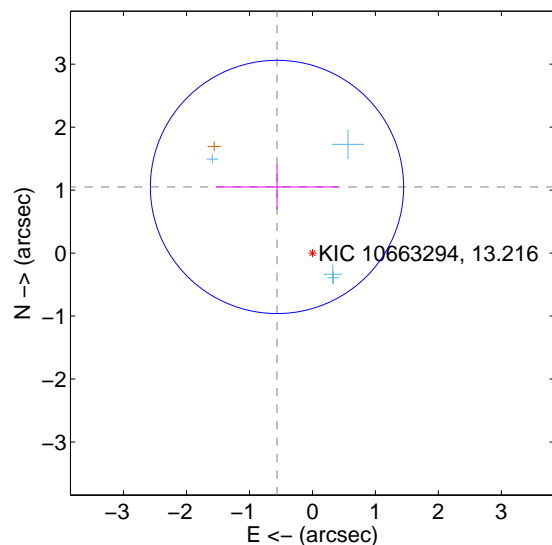
Supplemental centroid analysis for 010663294-03. Kepler magnitude: 13.22. Transit SNR 12.72

There are 4 quarters with good PRF difference image offsets

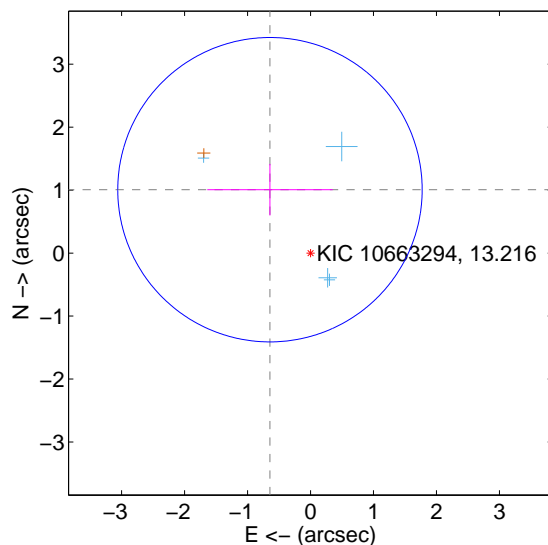
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.192 \pm 0.670$	1.78	$0.563 \pm 0.971$	$1.051 \pm 0.360$
PRF-fit source offset from KIC position	$1.195 \pm 0.806$	1.48	$0.644 \pm 0.996$	$1.007 \pm 0.410$
photometric centroid source offset	$1.35 \pm 0.54$	2.49	$0.81 \pm 0.54$	$-1.08 \pm 0.55$

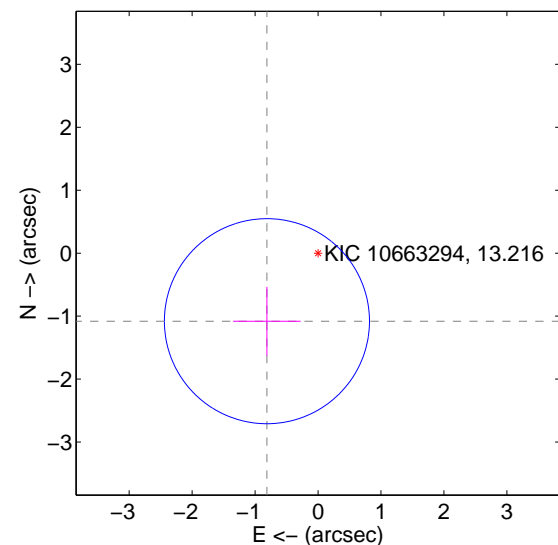
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



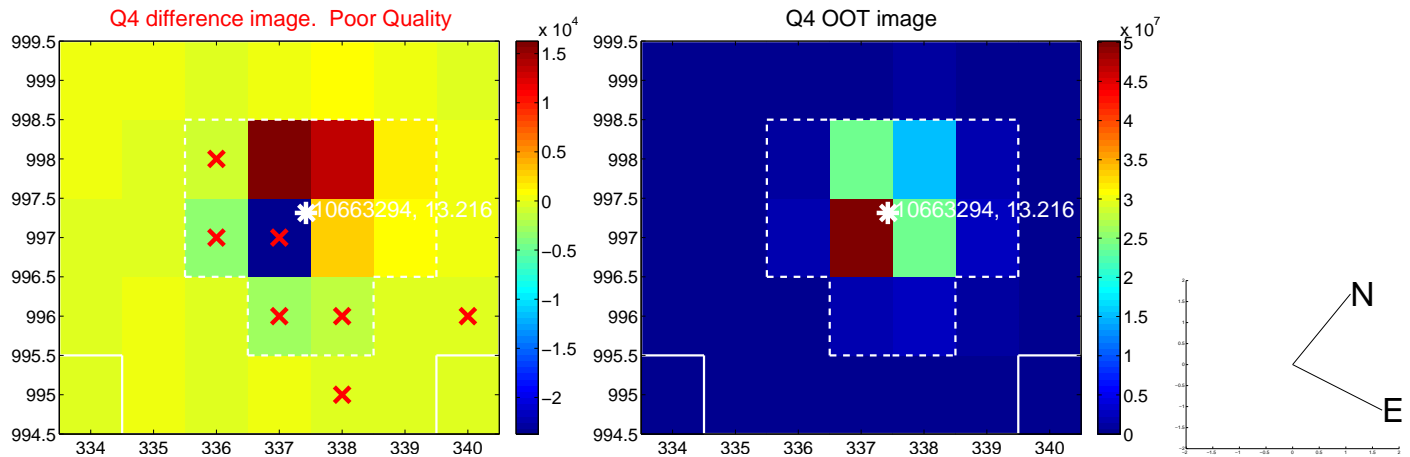
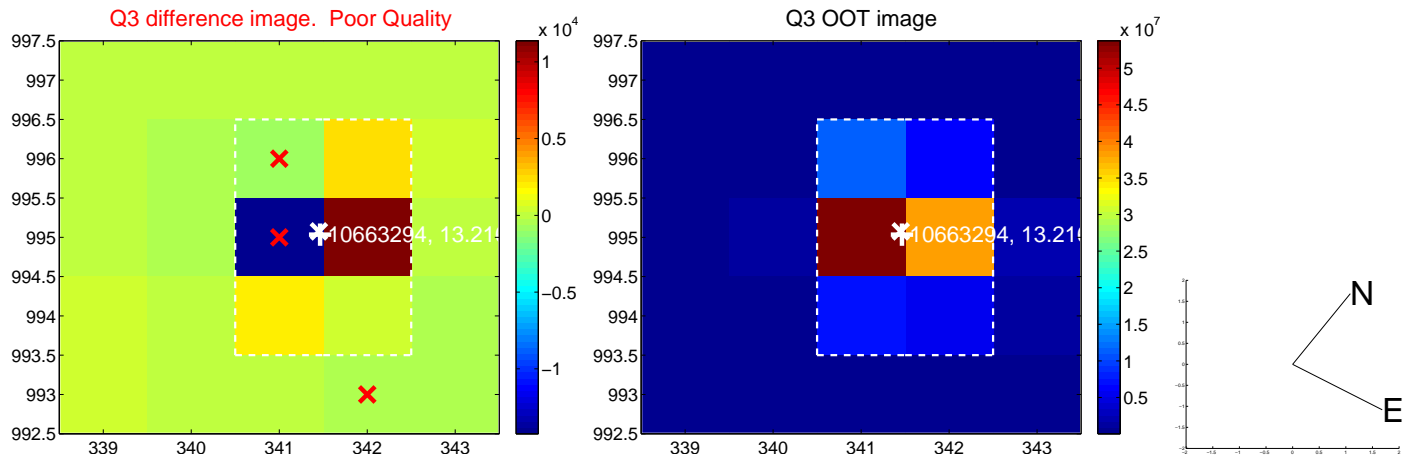
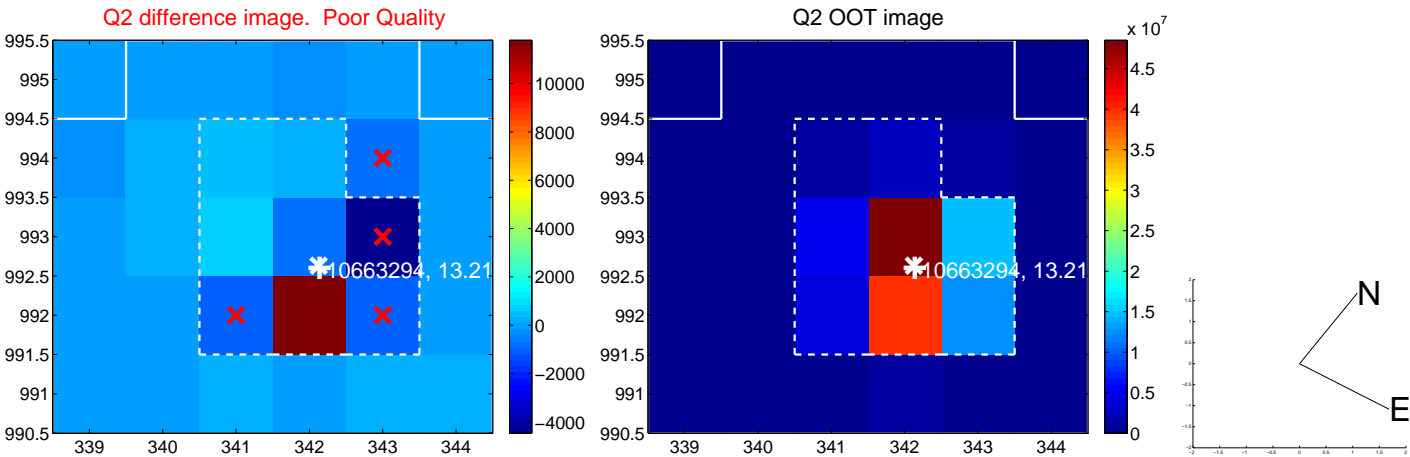
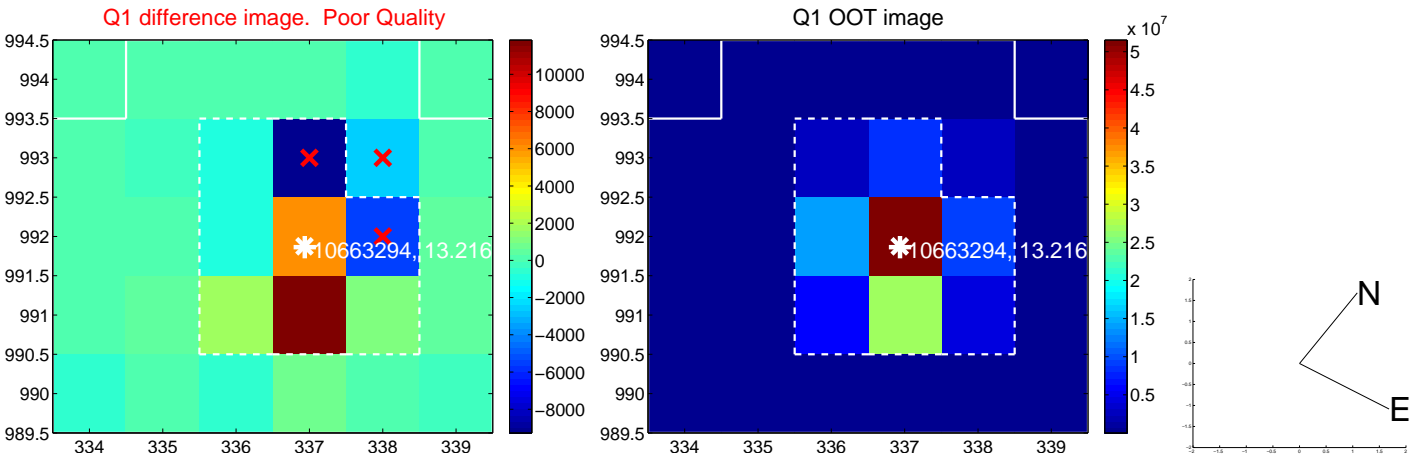
offset from photometric centroids



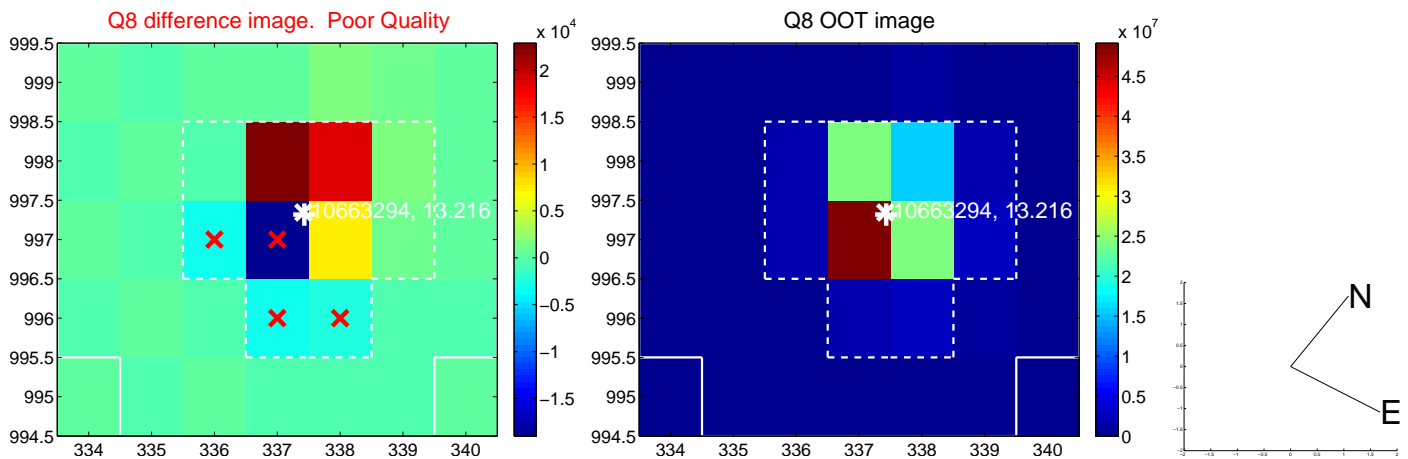
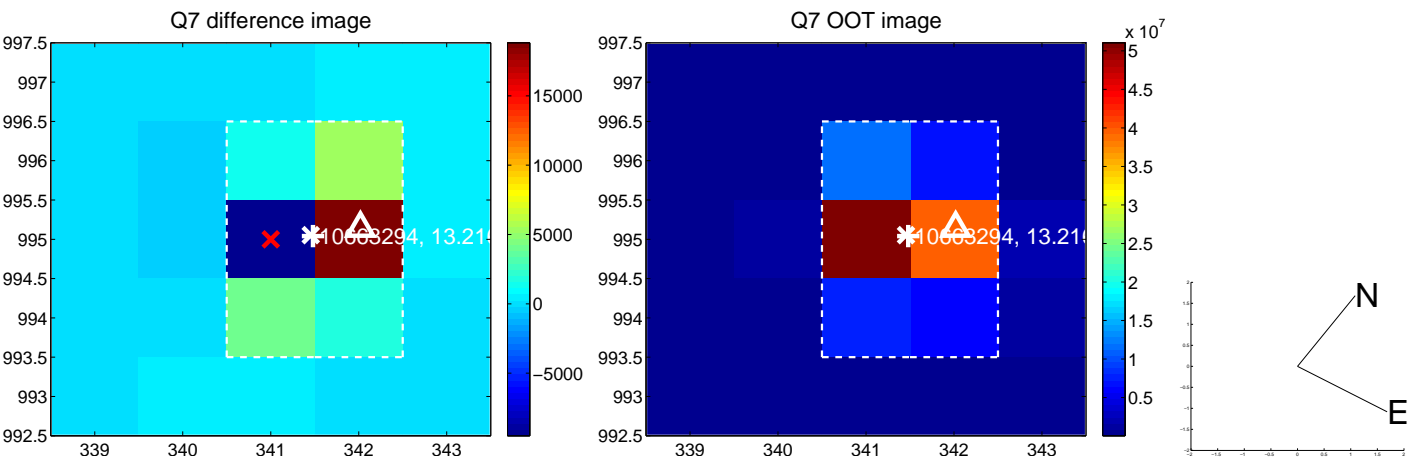
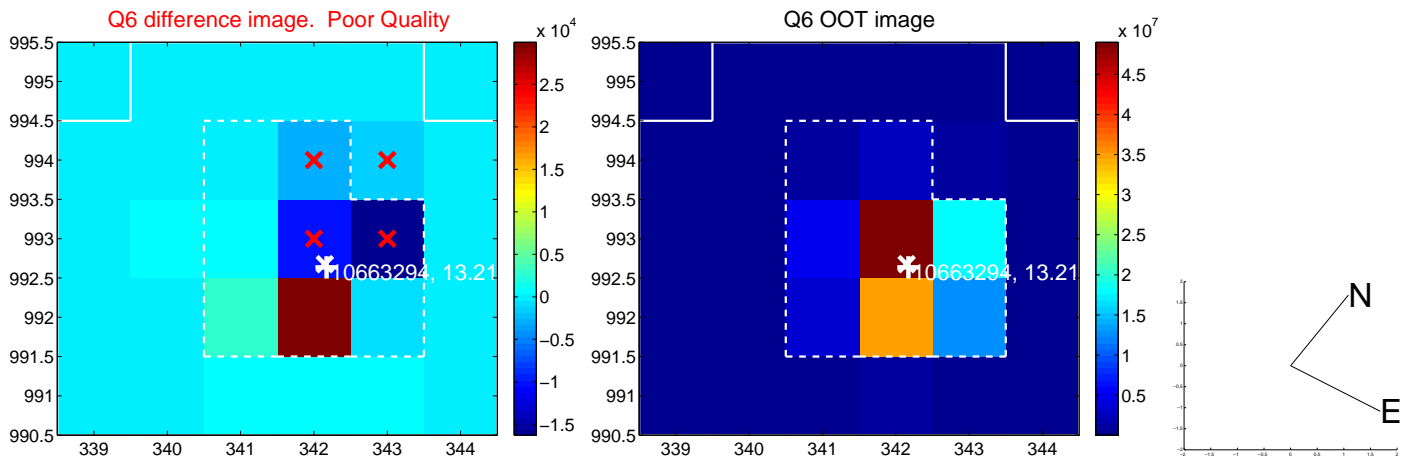
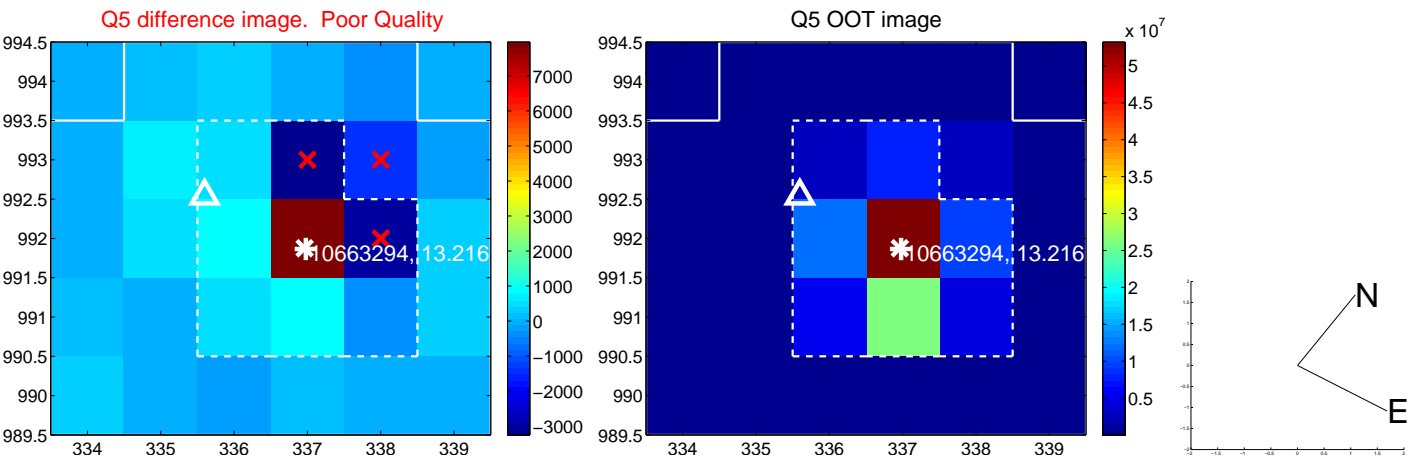
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



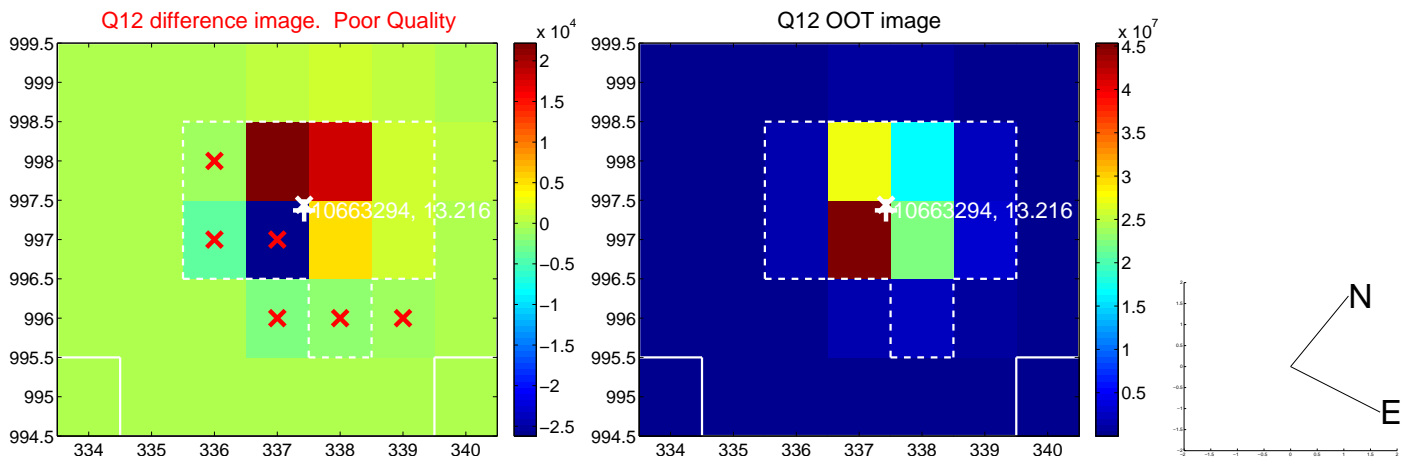
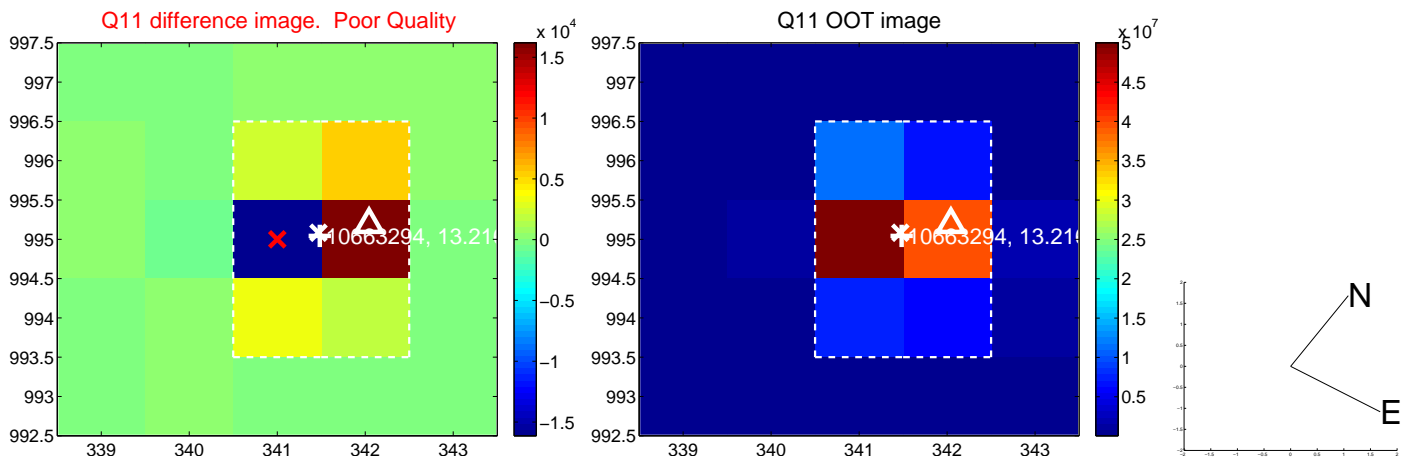
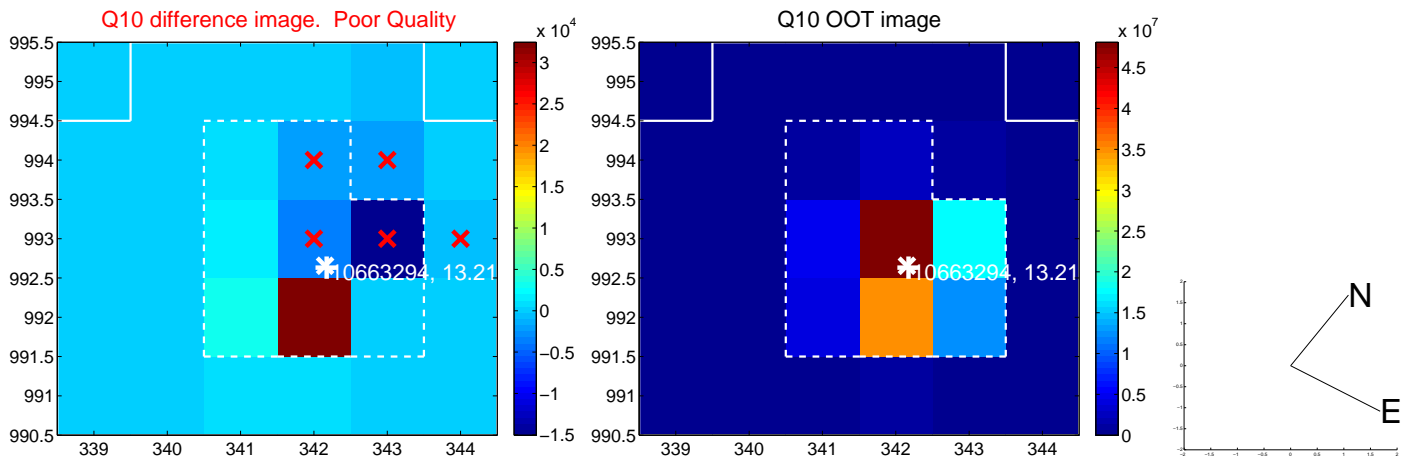
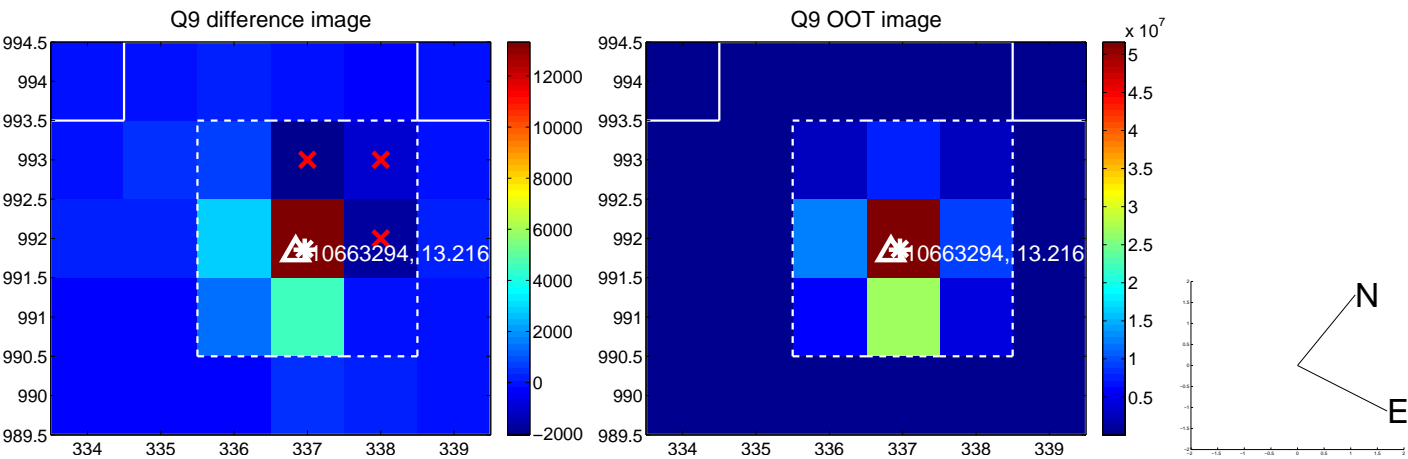
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



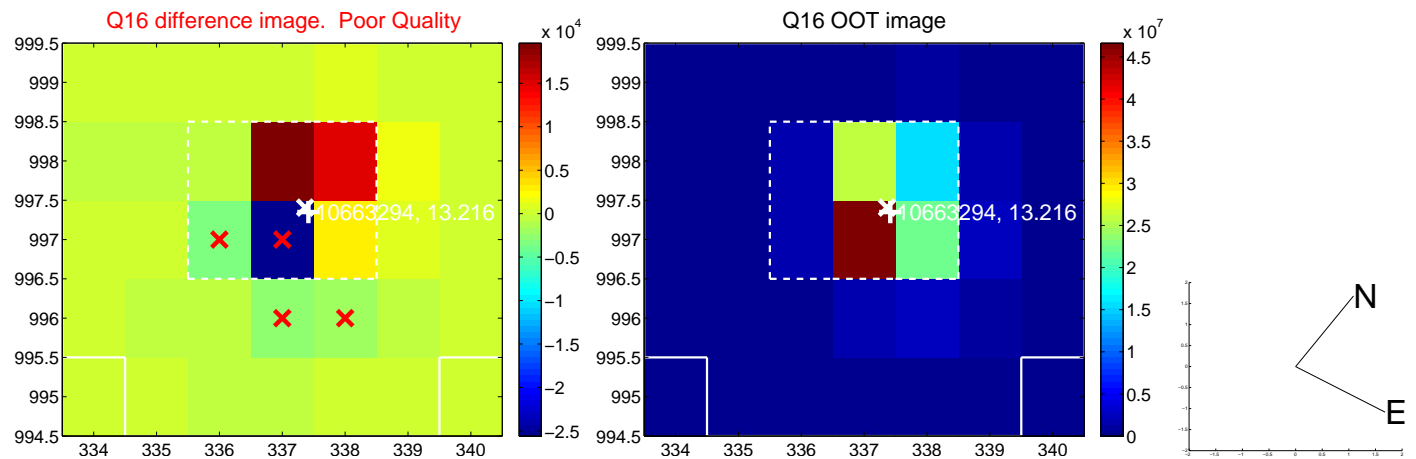
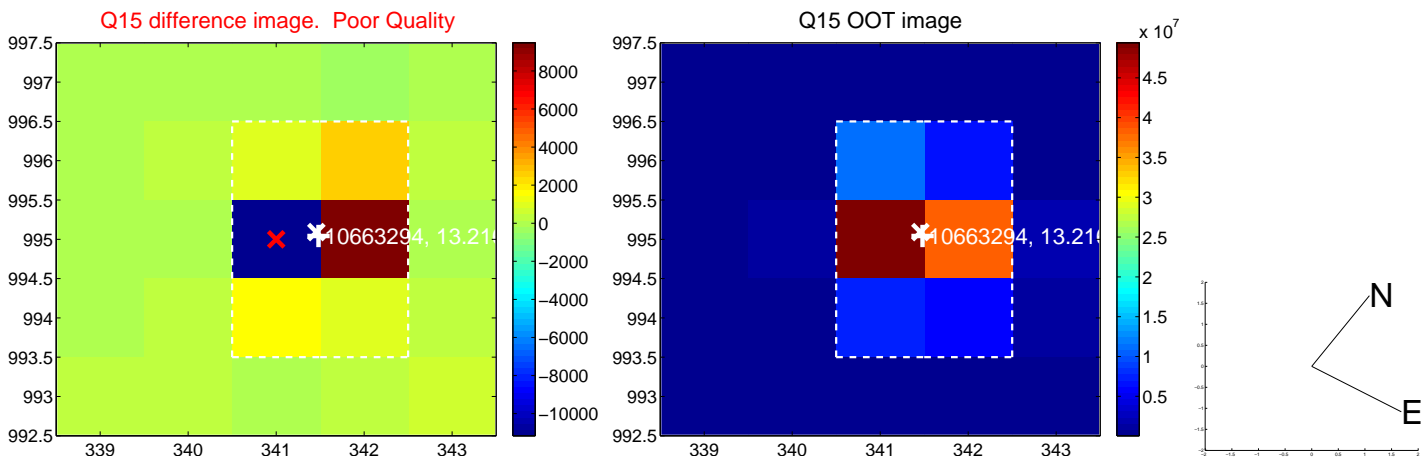
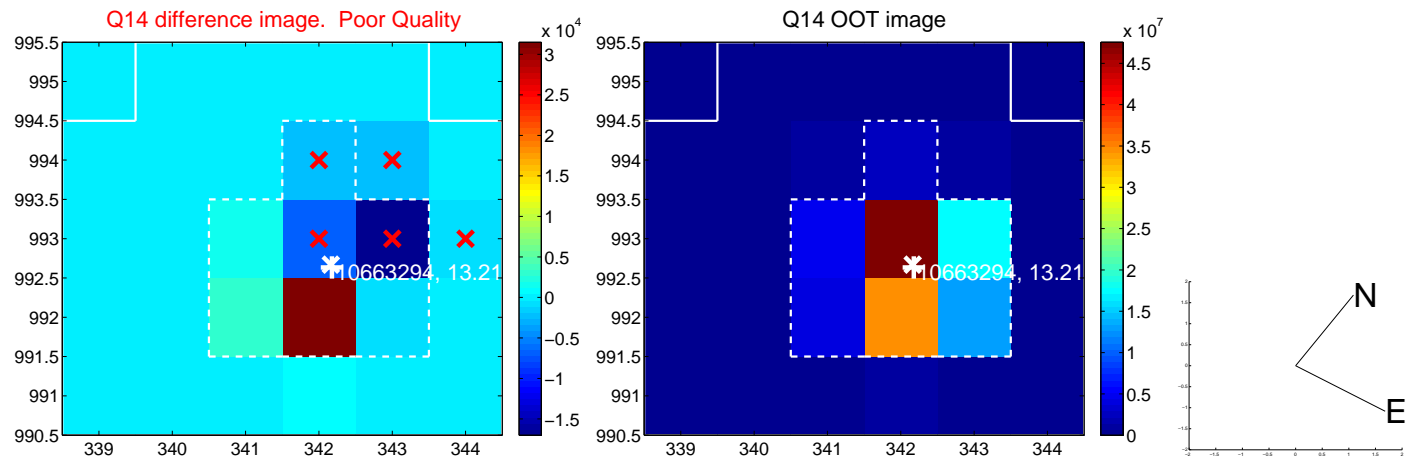
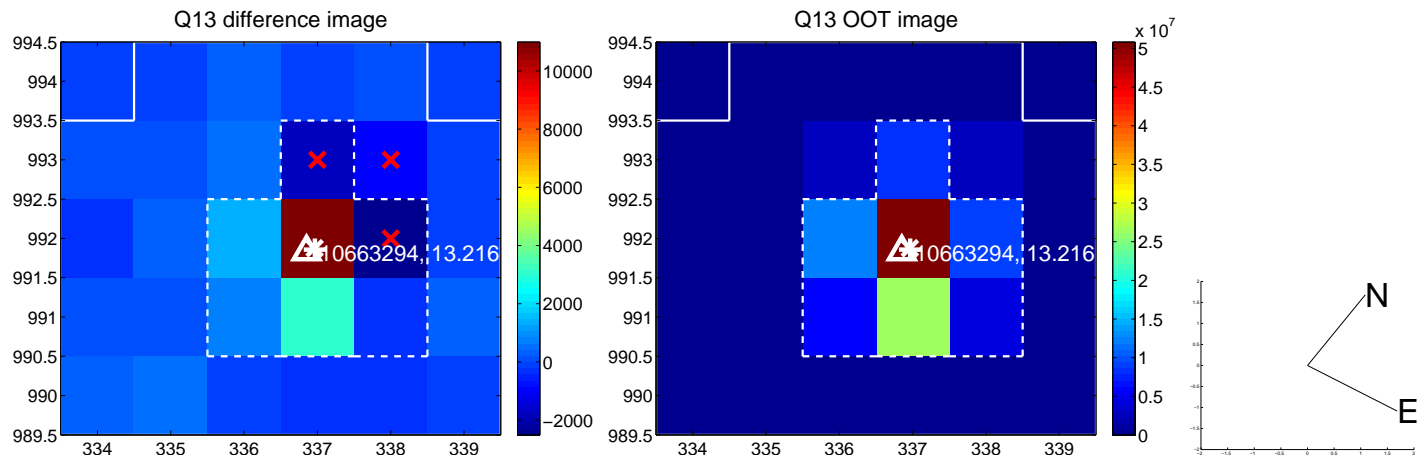
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



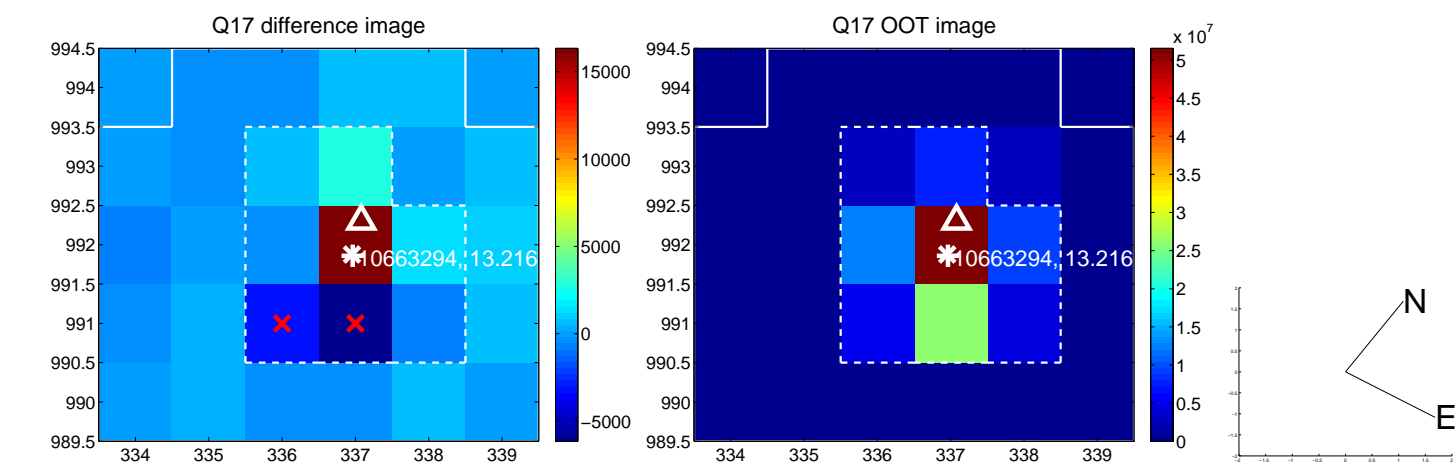
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



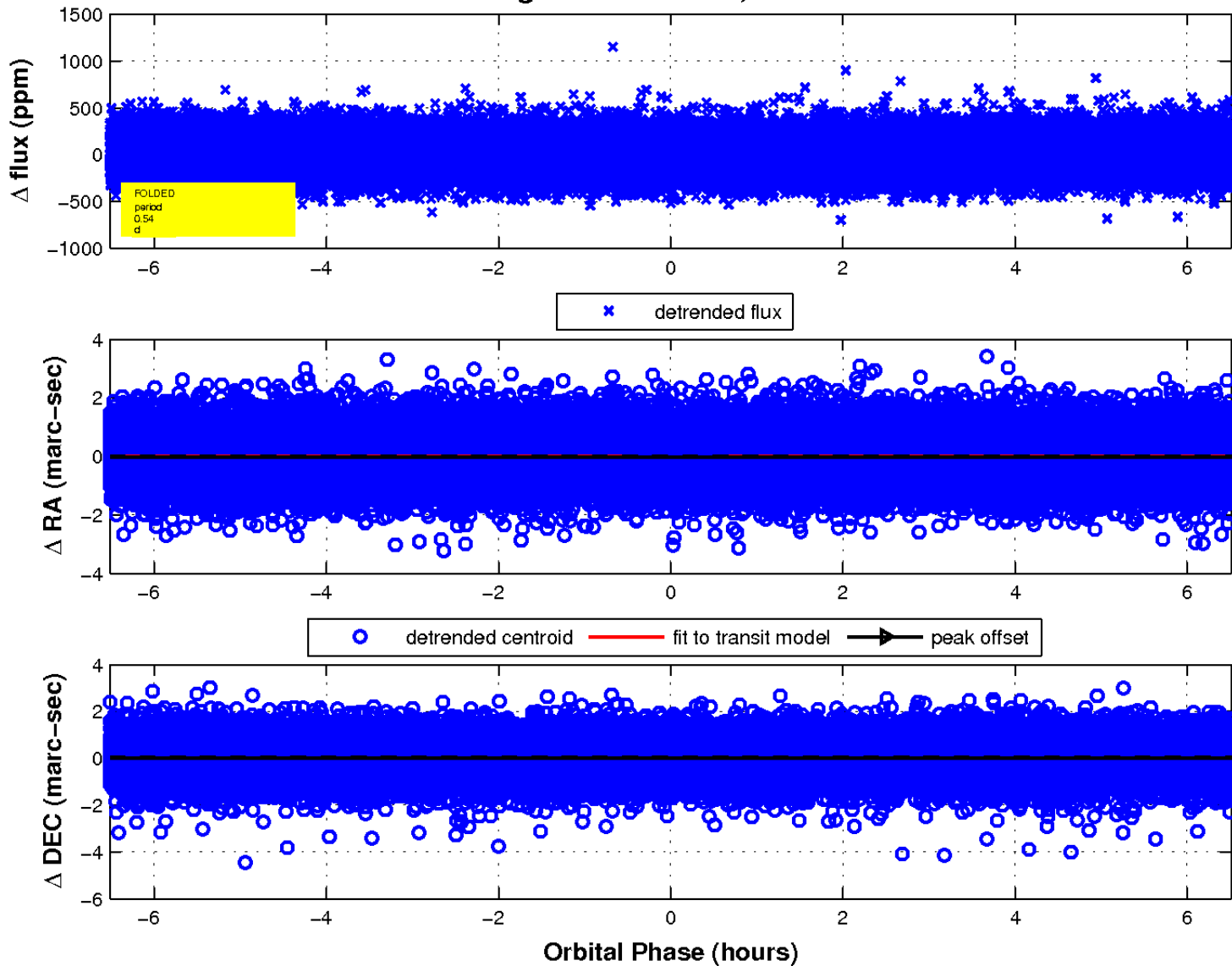
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



### fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

