

# KIC 003731292

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003731292-01	OBS	No	1.122194	132.139759	4.9	1.240	9.8	1.3	4.49	6987	1.12	59822.15
003731292-02	OBS	No	1.124737	132.583091	0.0	2.152	10.4	0.0	4.49	6987	0.11	59641.89
003731292-03	OBS	No	1.123774	131.886110	14.2	4.146	9.8	4.0	4.49	6987	1.73	59710.05
003731292-04	OBS	No	164.874220	242.122941	0.2	0.962	10.6	0.0	4.49	6987	0.23	77.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003731292-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
003731292-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
003731292-03	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—HALO_GHOST
003731292-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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

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

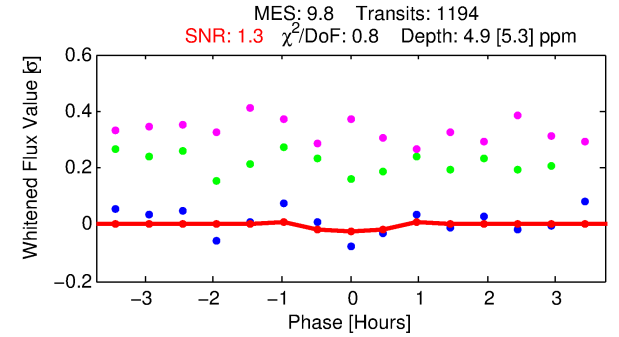
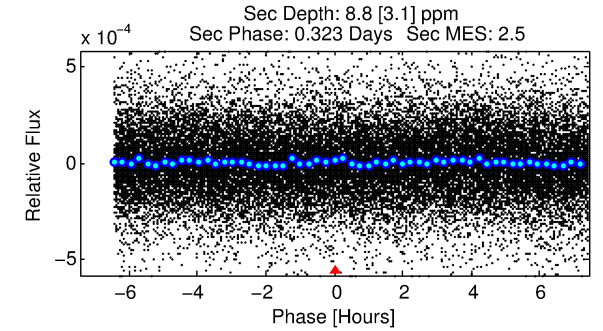
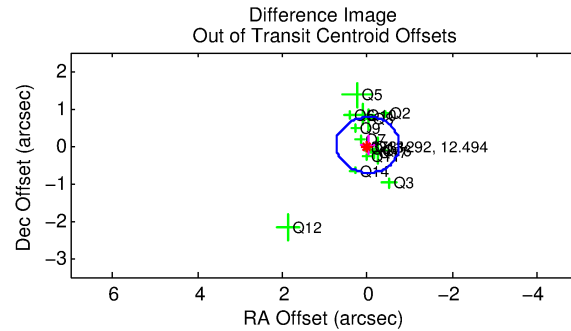
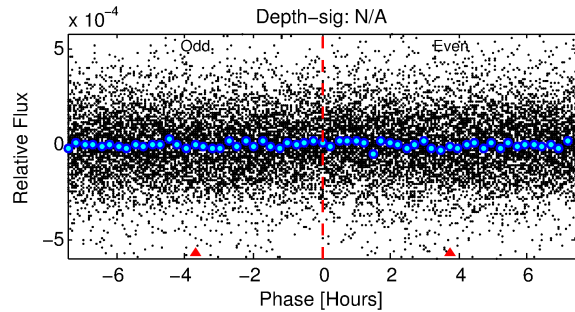
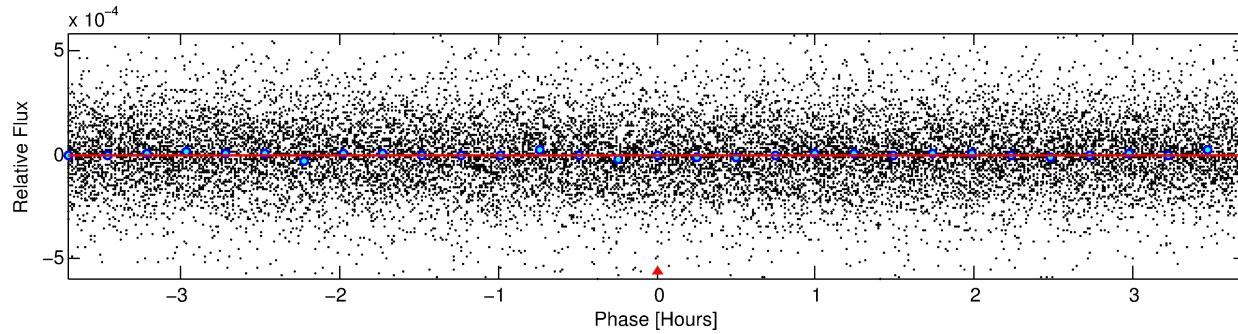
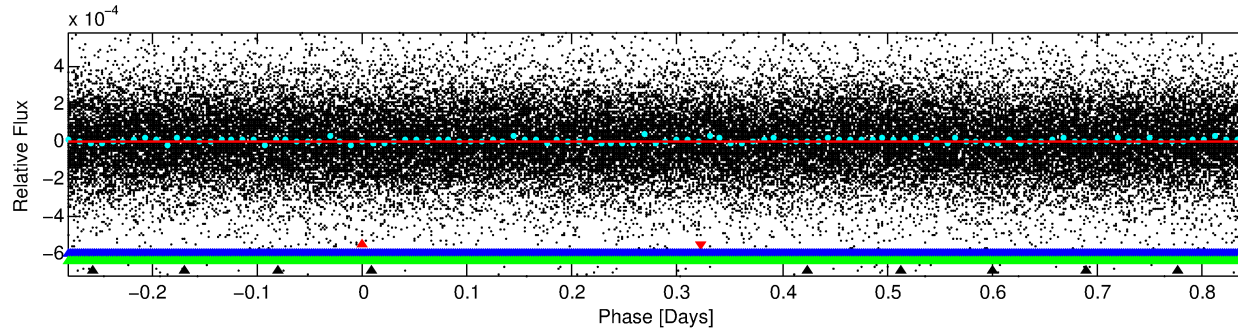
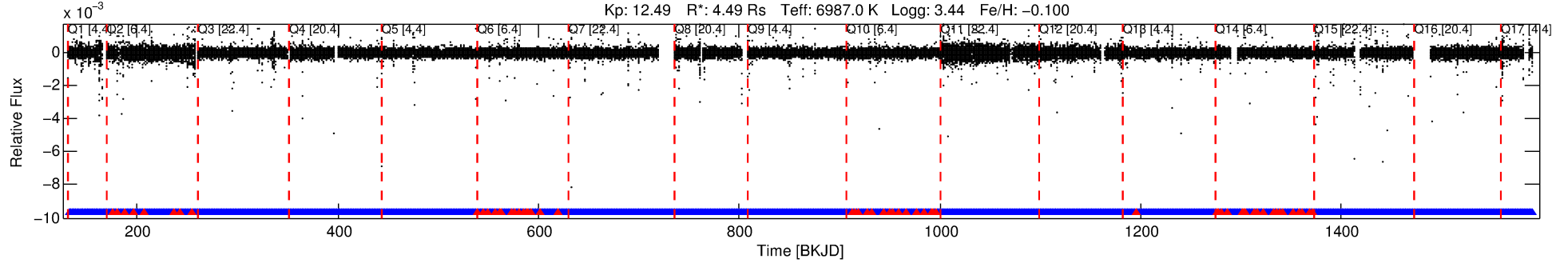
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003731292-01

No Significant Match Found

# DV One-Page Summary

KIC: 3731292 Candidate: 1 of 4 Period: 1.122 d



## DV Fit Results:

Period = 1.12219 [0.00008] d  
Epoch = 132.1398 [0.0135] BKJD  
Rp/R\* = 0.0023 [0.0016]  
a/R\* = 3.83 [9.49]  
b = 0.85 [0.90]  
Seff = 59822.16 [66909.90]  
Teq = 3988 [1115] K  
Rp = 1.12 [1.06] Re  
a = 0.0268 [0.0178] AU  
Ag = 2.77 [5.03] [0.35σ]  
Teffp = 7956 [2885] K [1.28σ]

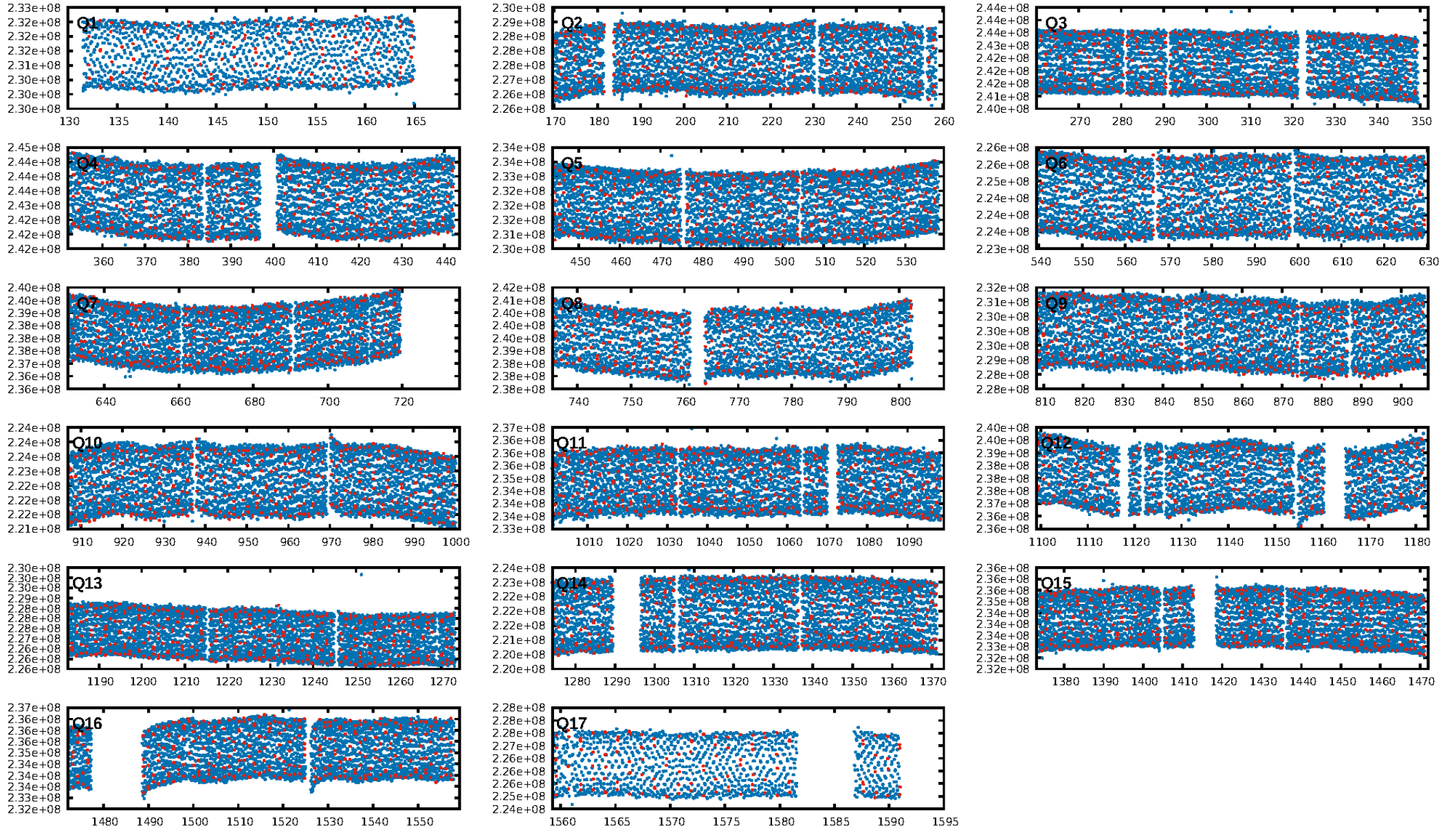
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.7% [0.01σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.77e-15  
RollingBand-fgt: 0.95 [1080/1140]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.032 arcsec [0.13σ]  
KicOffset-rm: 0.112 arcsec [0.57σ]  
OotOffset-st: 4/3/4/4 [15]  
KicOffset-st: 4/3/4/4 [15]  
DiffImageQuality-fgm: 0.53 [8/15]  
DiffImageOverlap-fno: 0.29 [5/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:28:09 Z

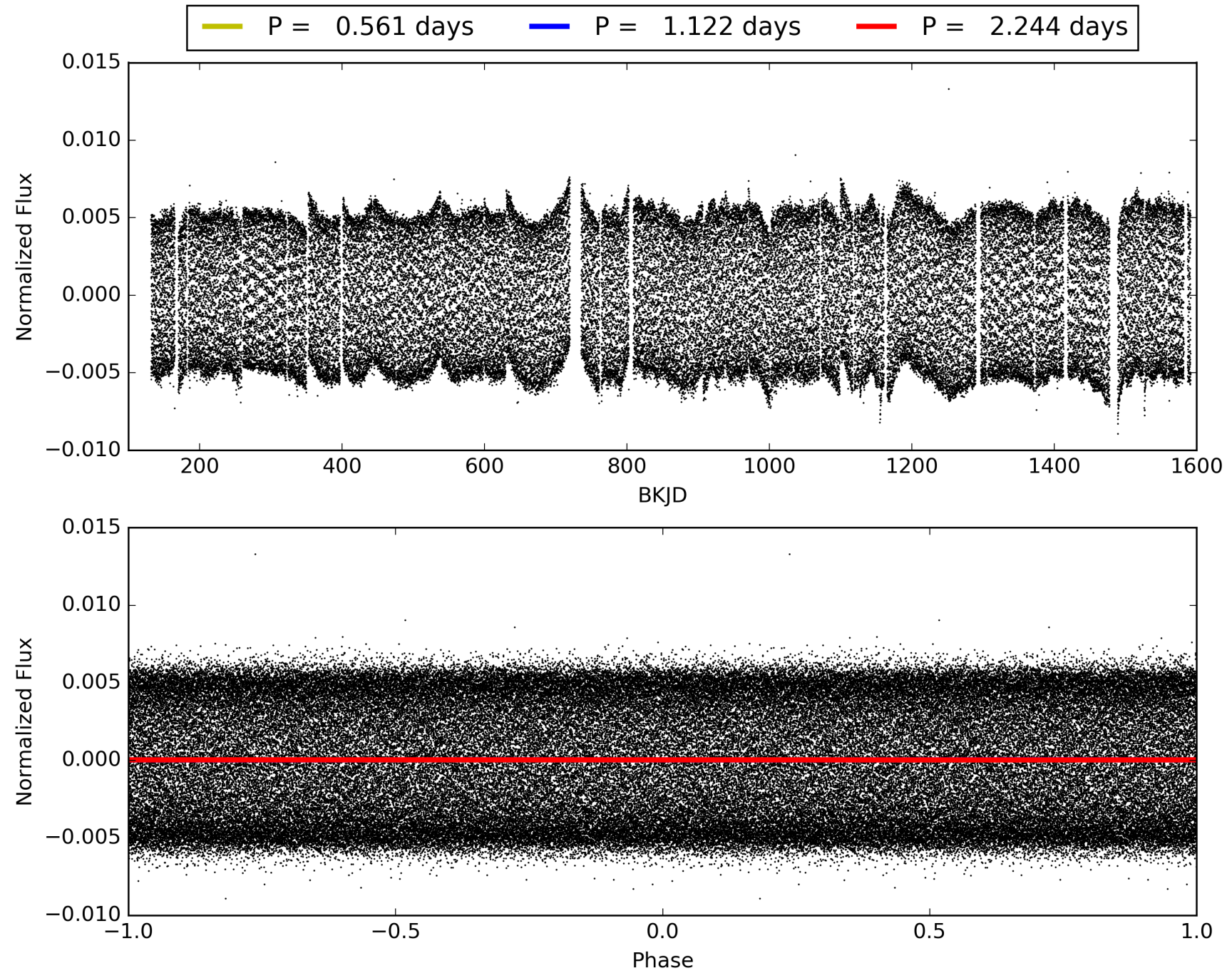
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003731292-01, PDC Light Curves





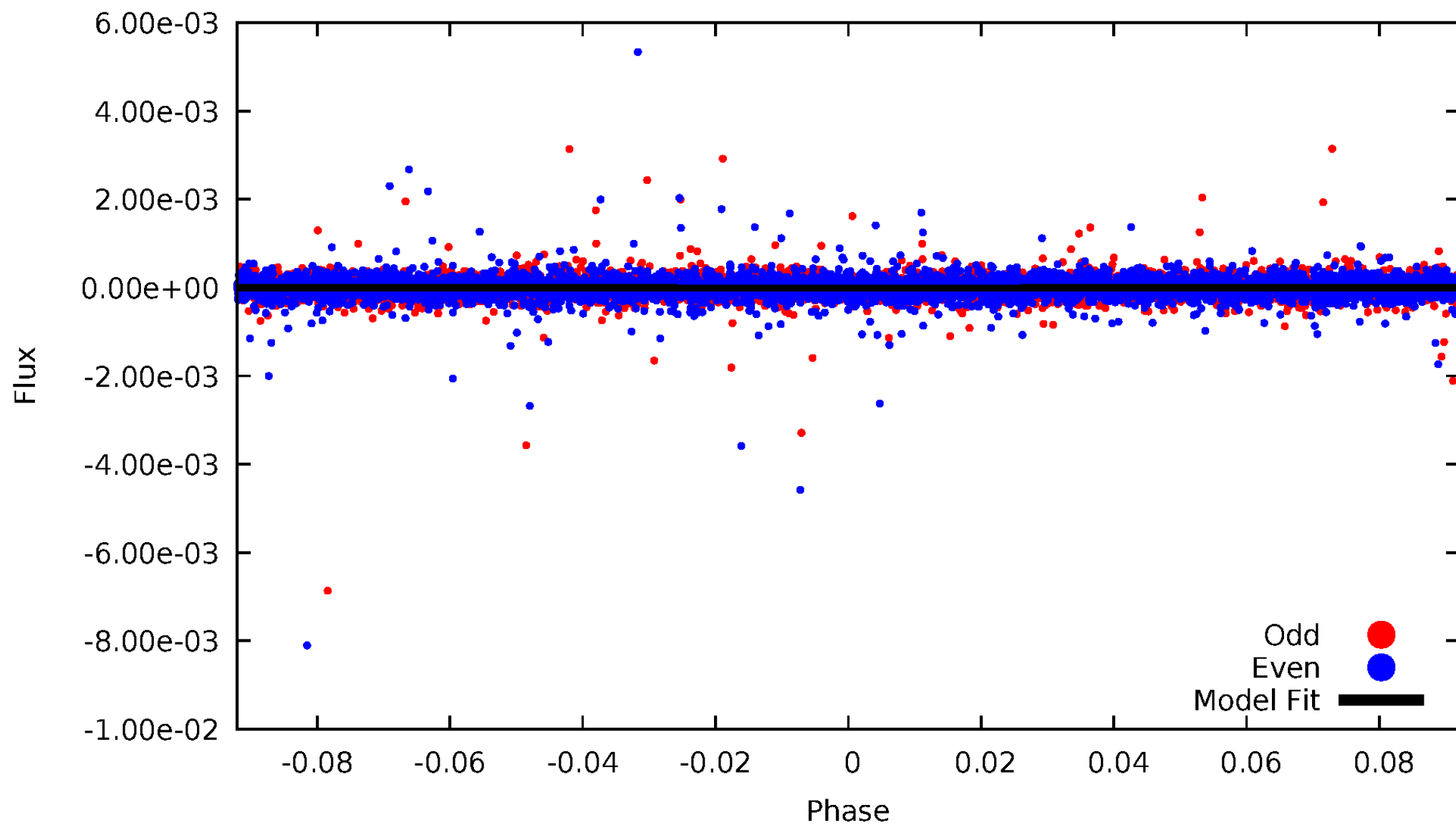
# TCE 003731292-01





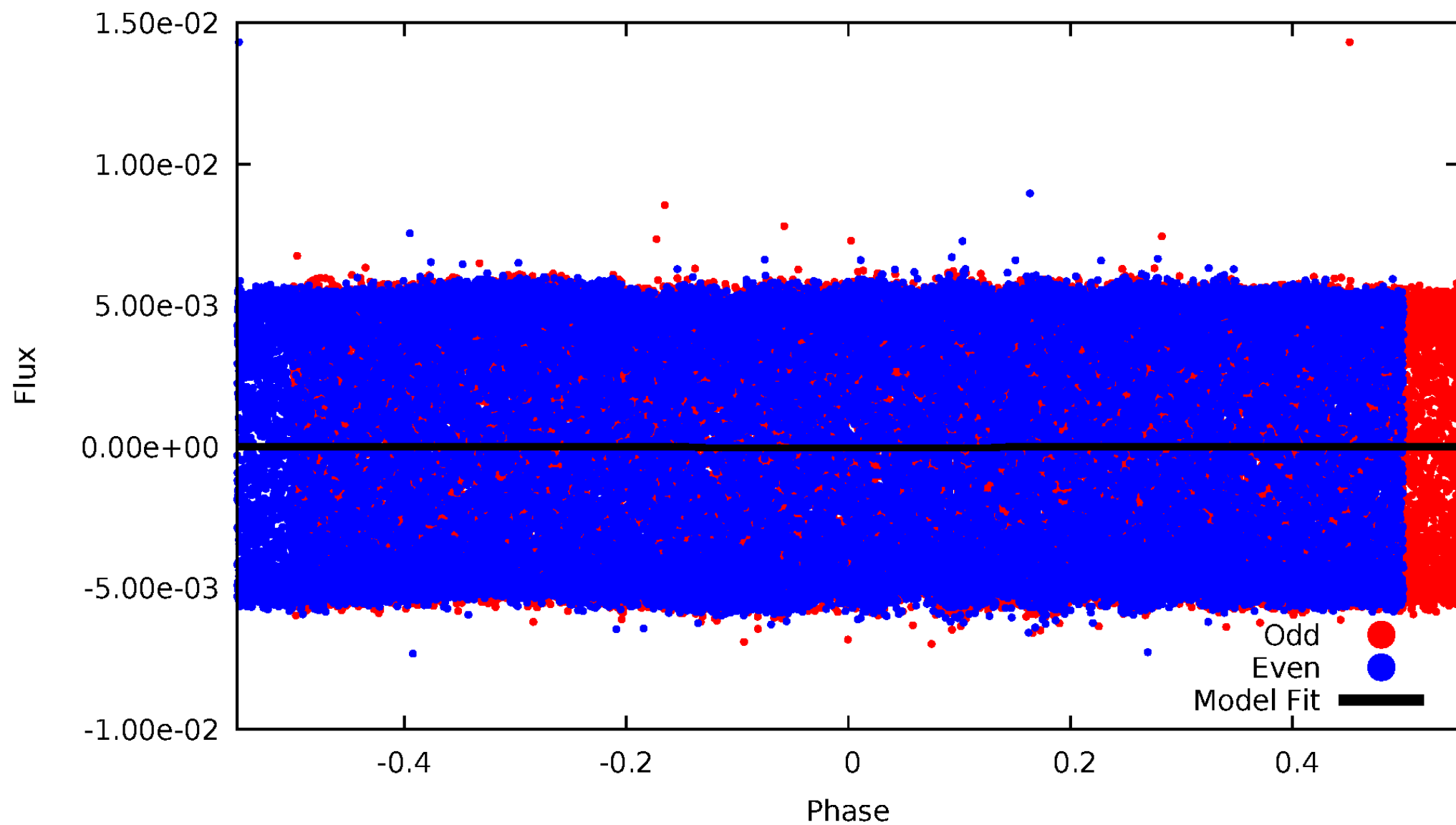
# DV Odd/Even

TCE 003731292-01



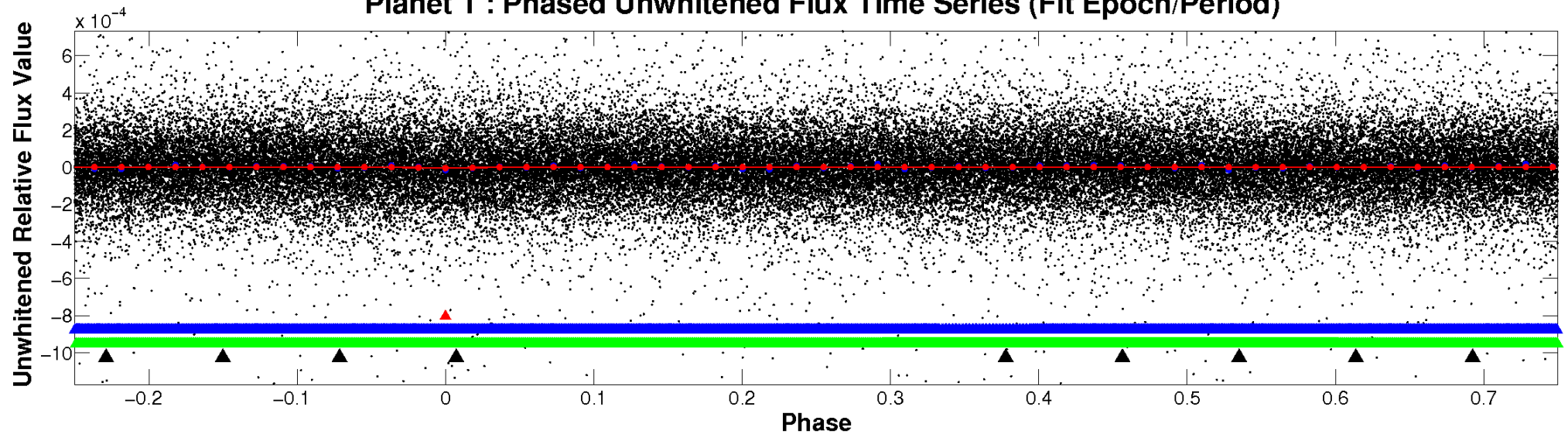
# ALT Odd/Even

TCE 003731292-01

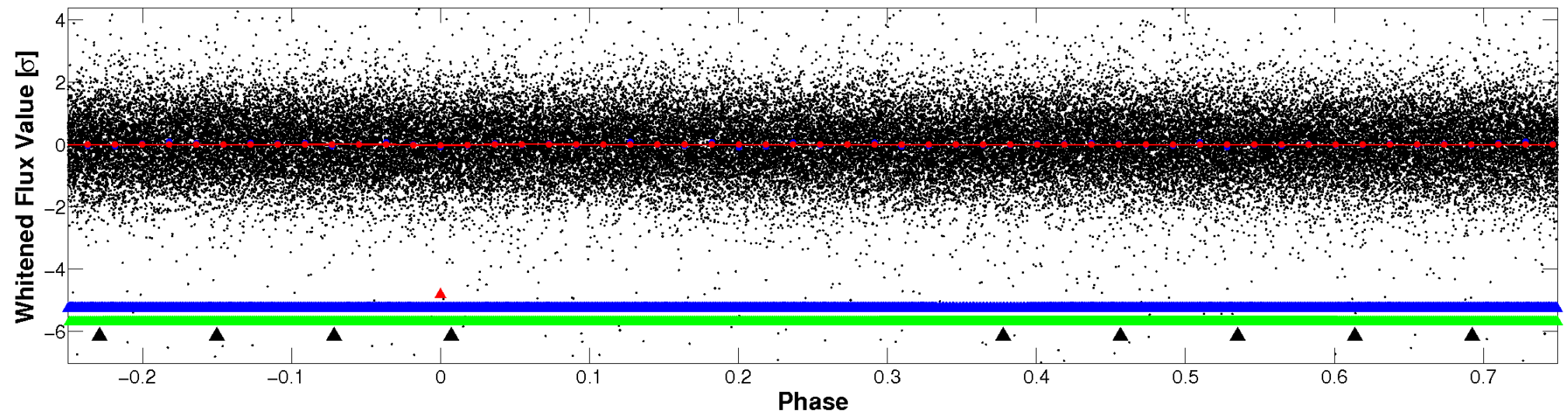


# Non-Whitened Vs. Whitened Light Curve

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



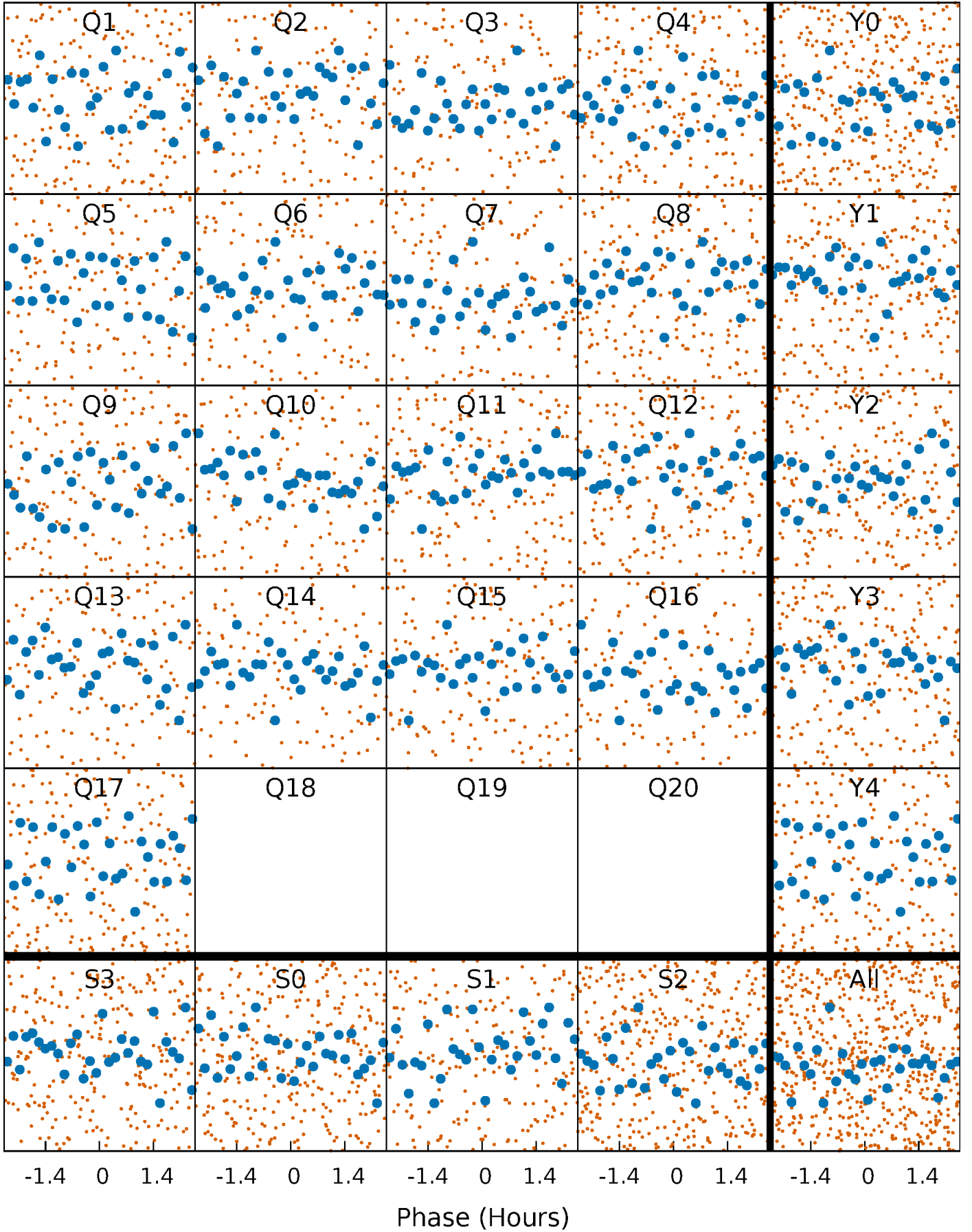
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





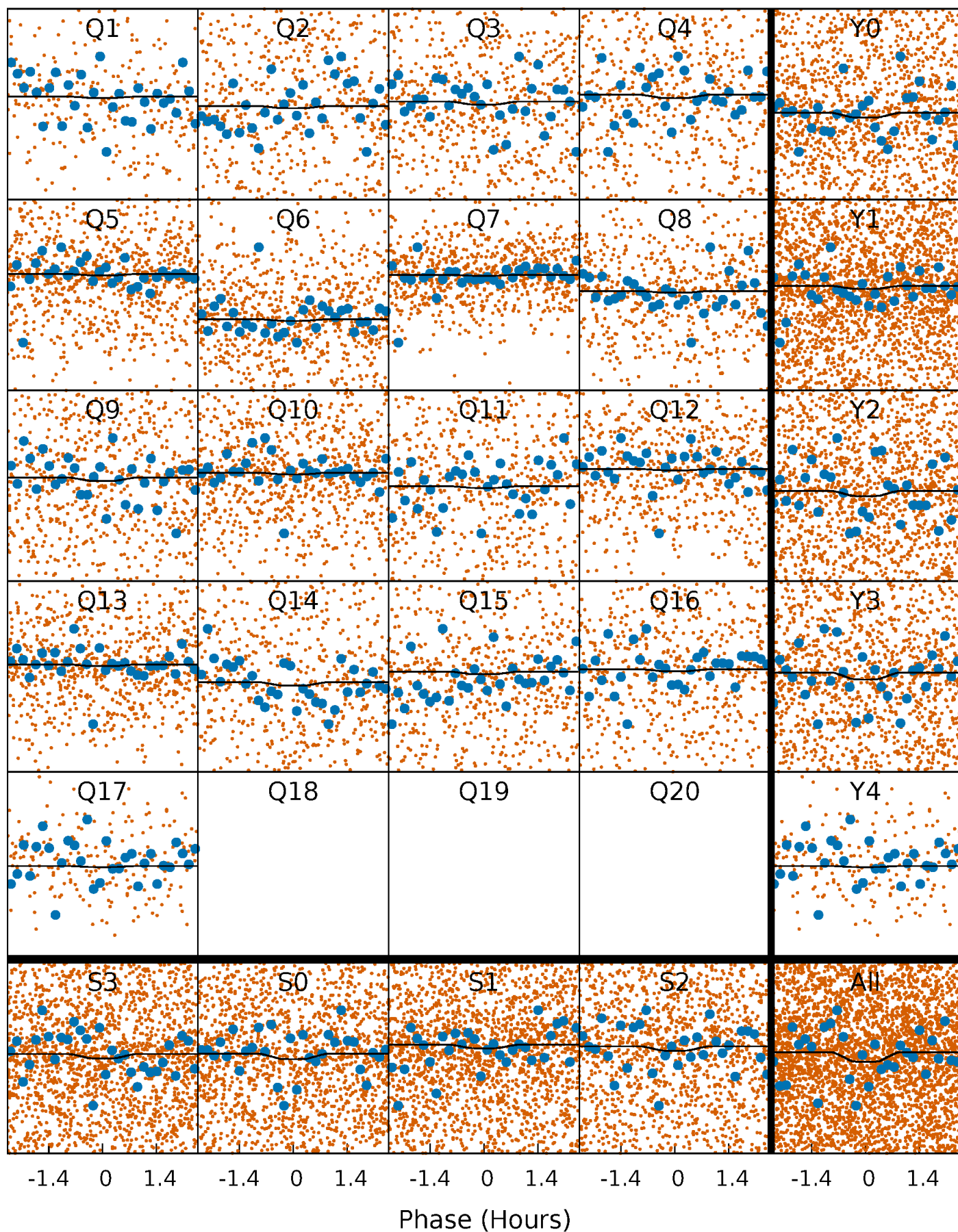
# PDC Quarter-Phased Transit Curves

TCE 003731292-01   P= 1.122194 Days    $T_0=132.139759$  (BKJD)



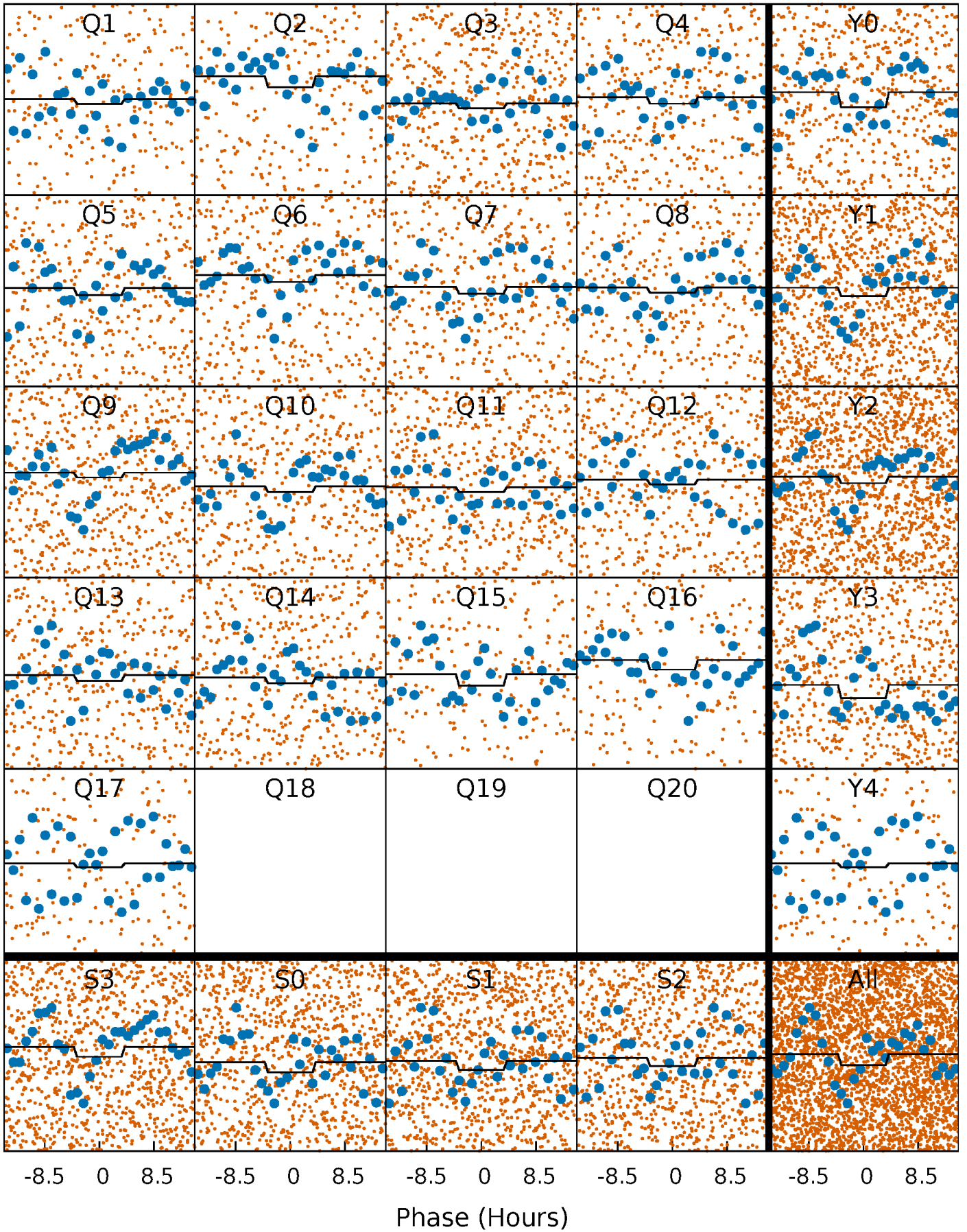
# DV Quarter-Phased Transit Curves

TCE 003731292-01   P= 1.122194 Days    $T_0=132.139759$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003731292-01 P= 1.124727 Days  $T_0=131.622335$  (BKJD)

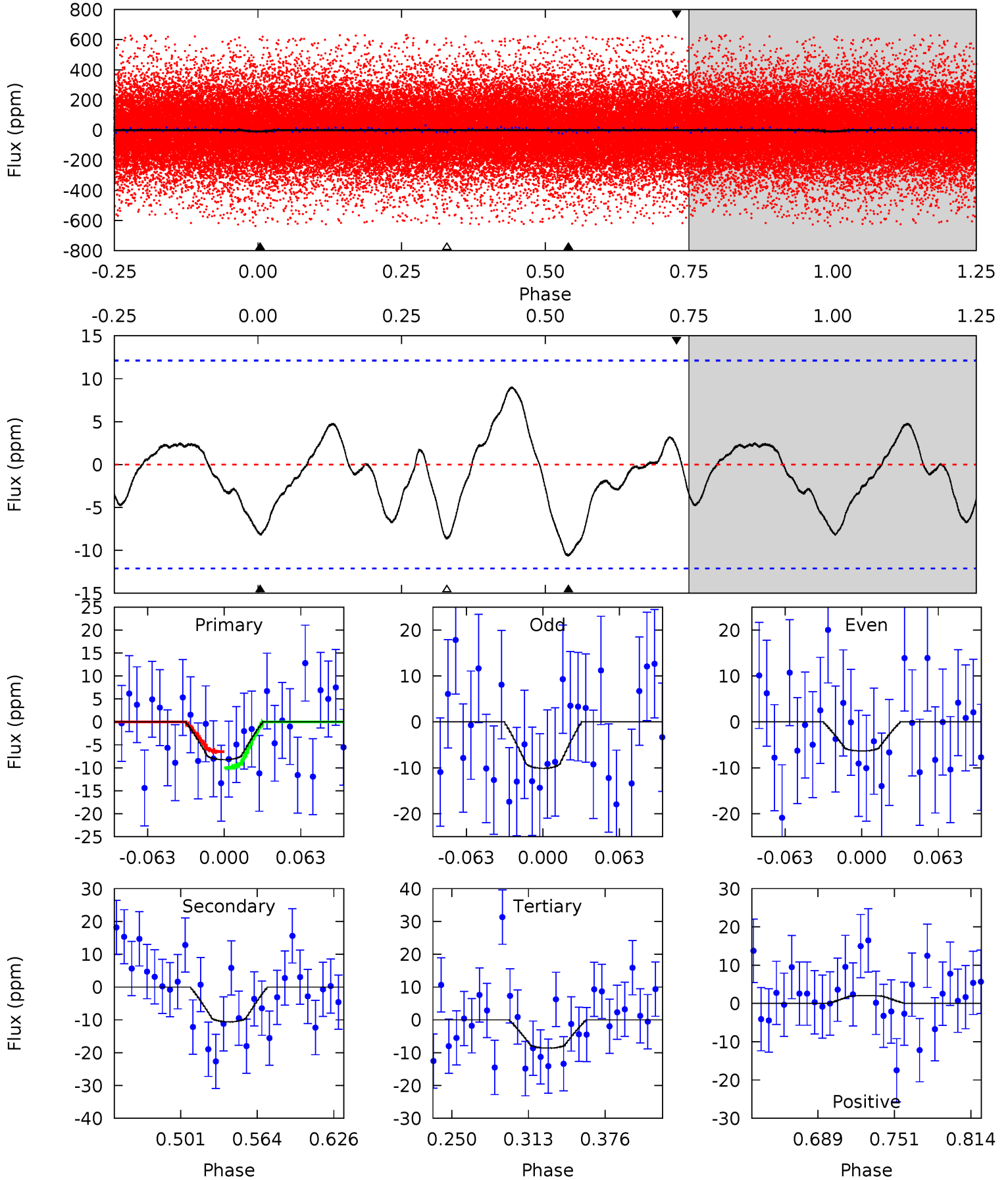




# DV Model-Shift Uniqueness Test

003731292-01, P = 1.122194 Days, E = 131.017565 Days

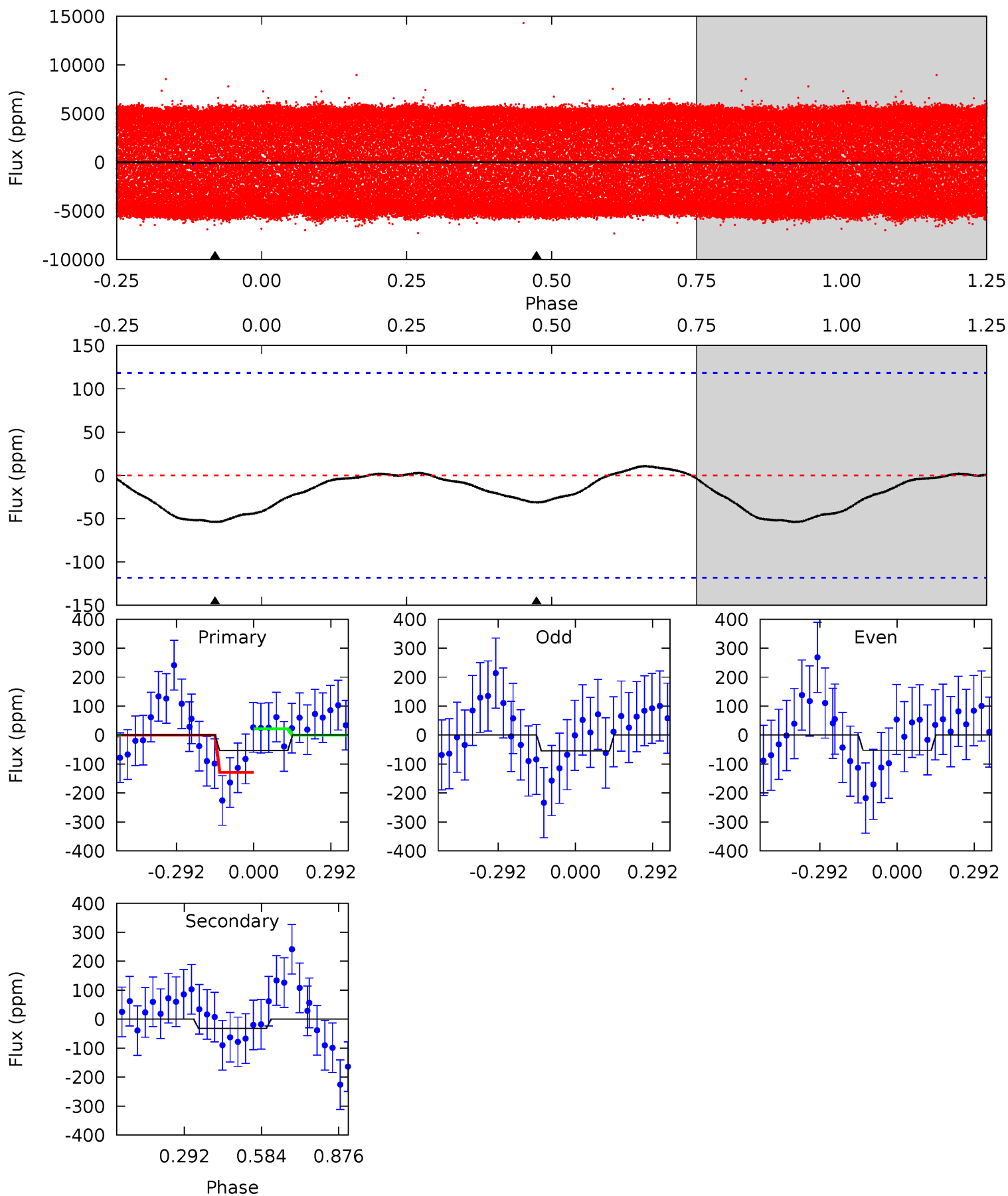
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.17	4.08	3.32	0.79	4.66	1.86	1.36	-0.15	2.37	0.77	3.29	0.73	0.66	0.46	0.67



# Alt Model-Shift Uniqueness Test

003731292-01, P = 1.124727 Days, E = 130.497608 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.97	1.15	0	0	4.33	1.05	0.06	1.97	1.97	1.15	1.15	0.03	0.70	0.17	1.96



### Stellar Parameters For KIC 003731292

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6987^{+194}_{-292}$	$3.444^{+0.666}_{-0.074}$	$-0.100^{+0.250}_{-0.300}$	$4.491^{+0.316}_{-2.841}$	$2.048^{+0.073}_{-0.659}$	$0.032^{+0.374}_{-0.008}$
	+3%/-4%	+19%/-2%	+250%/-300%	+7%/-63%	+4%/-32%	+1174%/-26%
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 003731292-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-11 \pm 3$	$0.99^{+0.81}_{-0.57}$	$5374^{+374}_{-903}$	$7897^{+7261}_{-2206}$	$3.960^{+18.721}_{-2.756}$
Alt.	$-31 \pm 27$	$2.82^{+0.99}_{-1.02}$	$5394^{+341}_{-771}$	$5994^{+2103}_{-10020}$	$1.458^{+2.966}_{-1.310}$

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



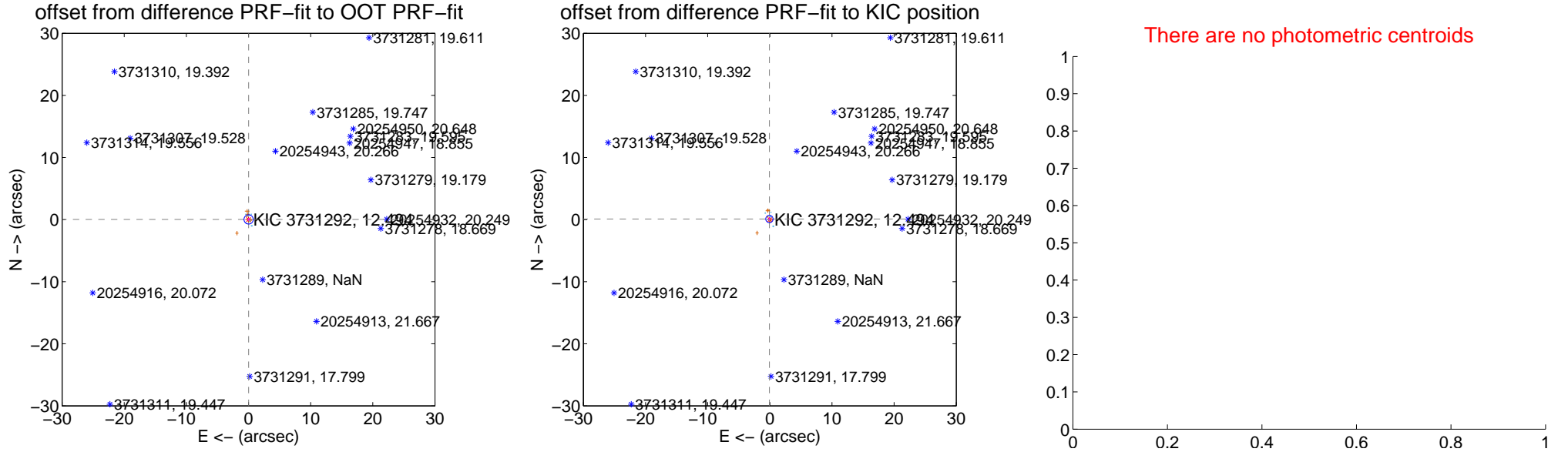
## DV Centroid Data

Supplemental centroid analysis for 003731292-01. Kepler magnitude: 12.49. Transit SNR 1.26

There are 8 quarters with good PRF difference image offsets

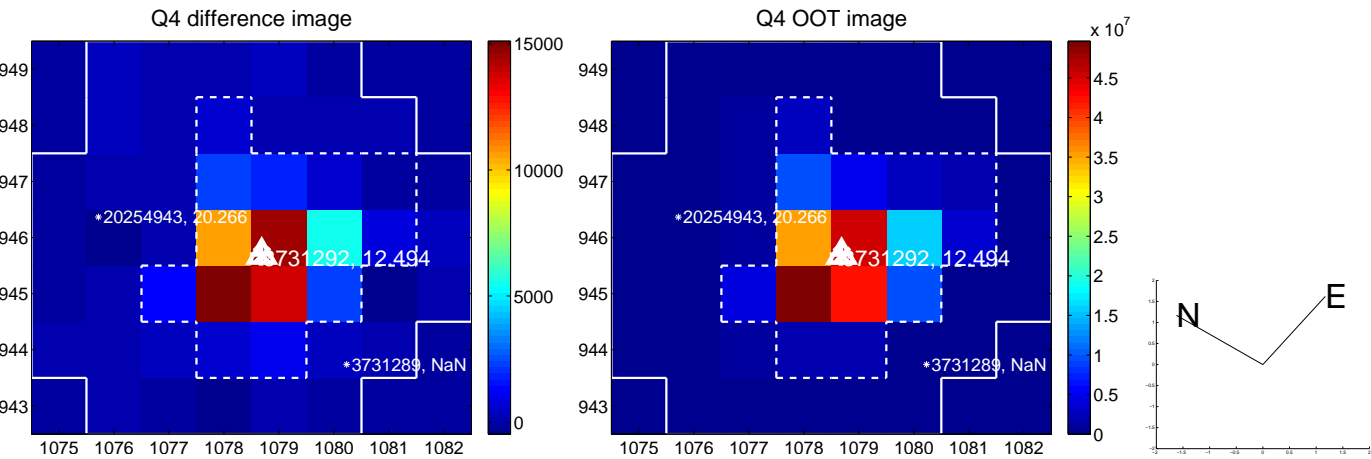
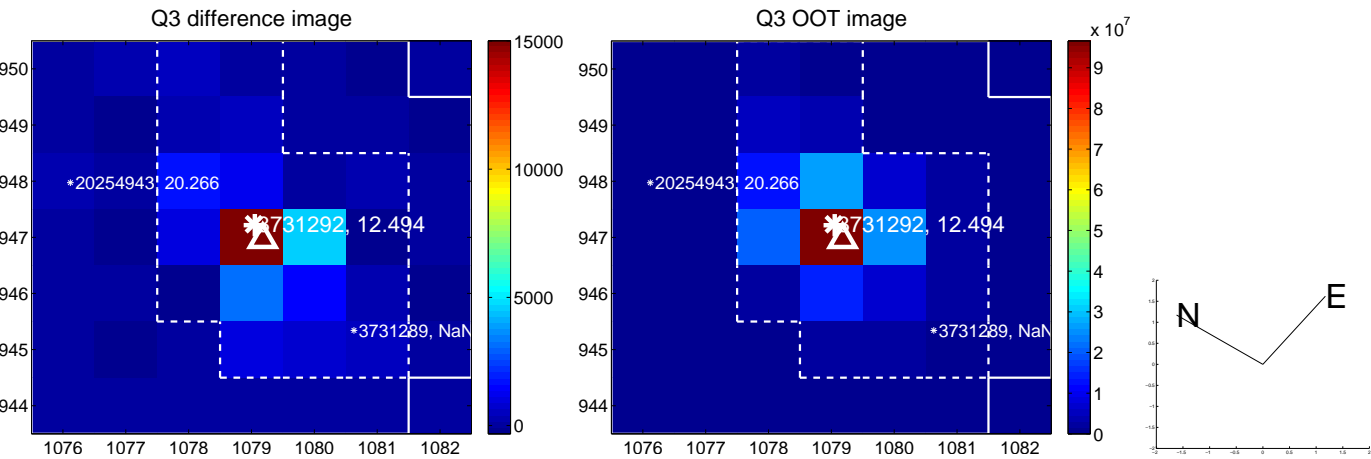
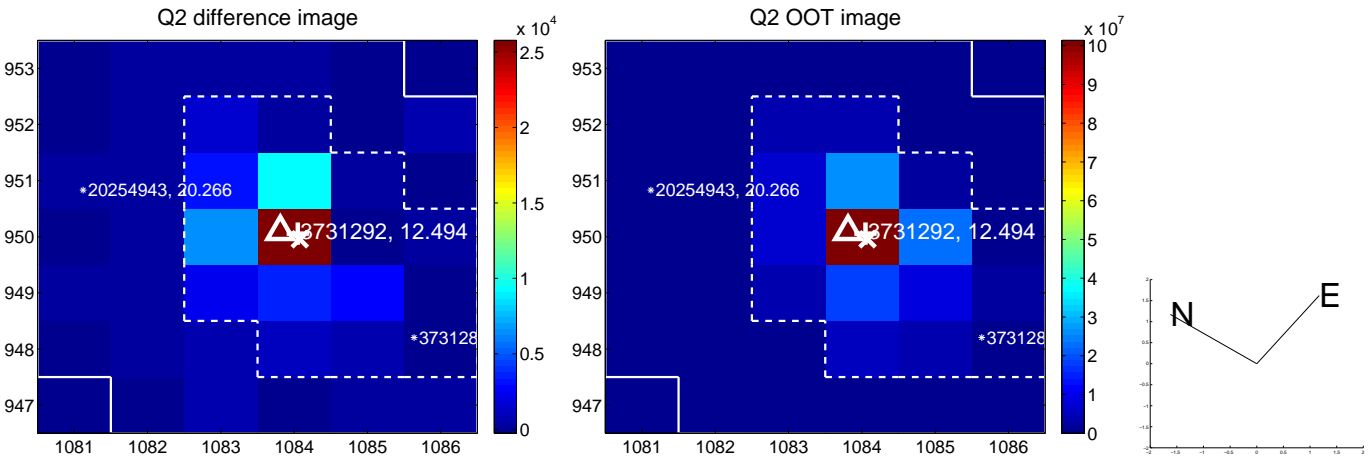
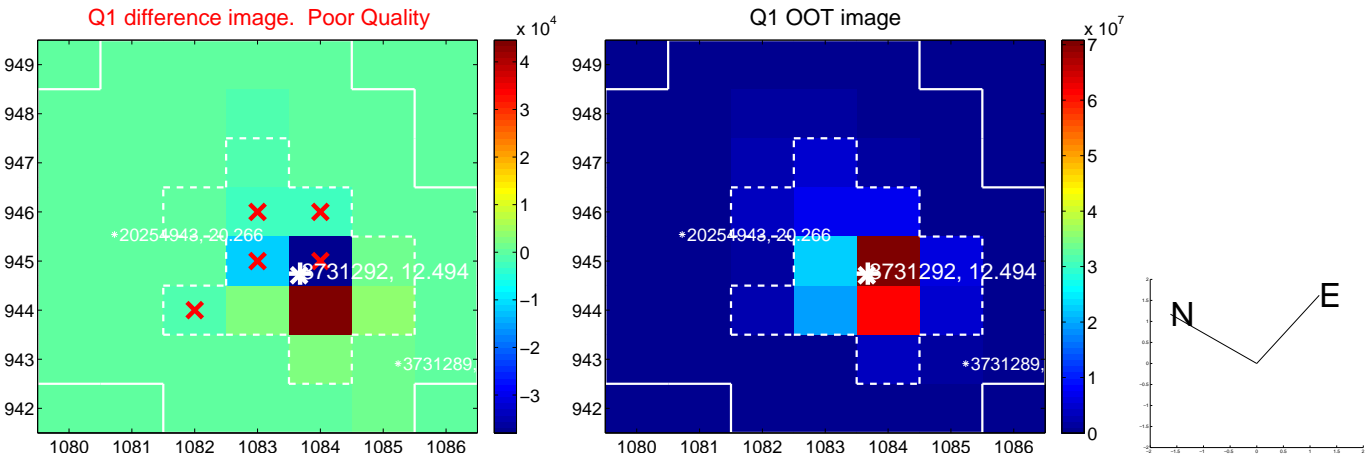
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.032 \pm 0.248$	0.13	$-0.019 \pm 0.158$	$0.027 \pm 0.239$
PRF-fit source offset from KIC position	$0.112 \pm 0.197$	0.57	$0.064 \pm 0.154$	$0.092 \pm 0.246$
photometric centroid source offset	—	—	—	—



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.

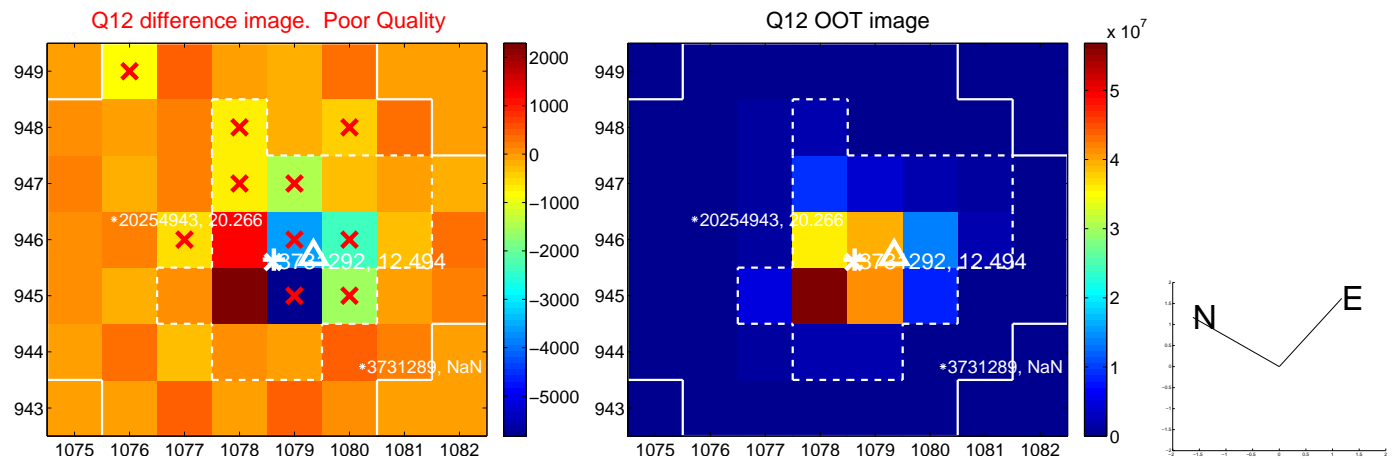
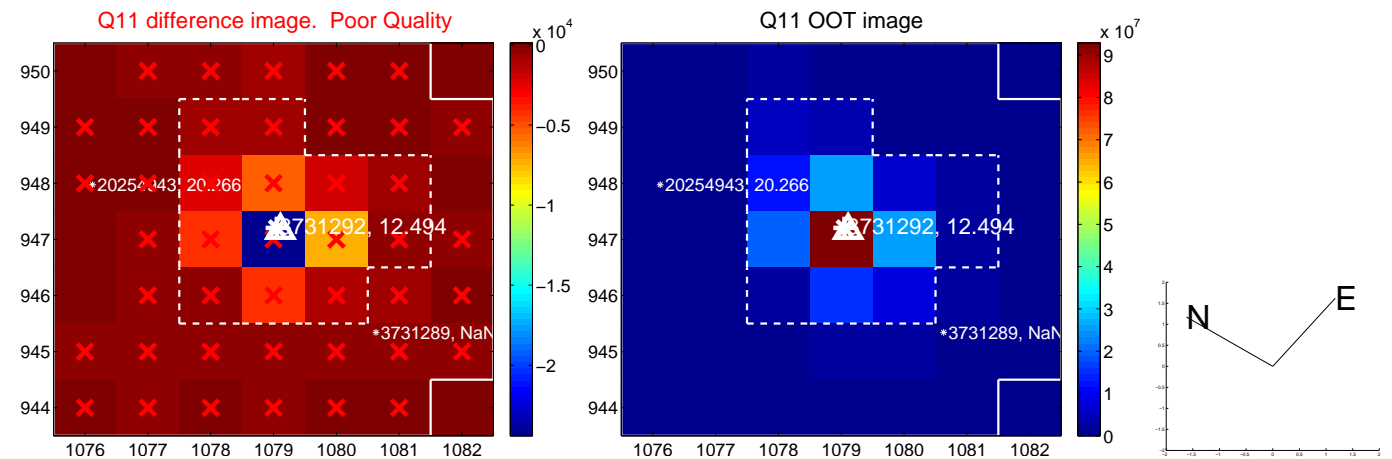
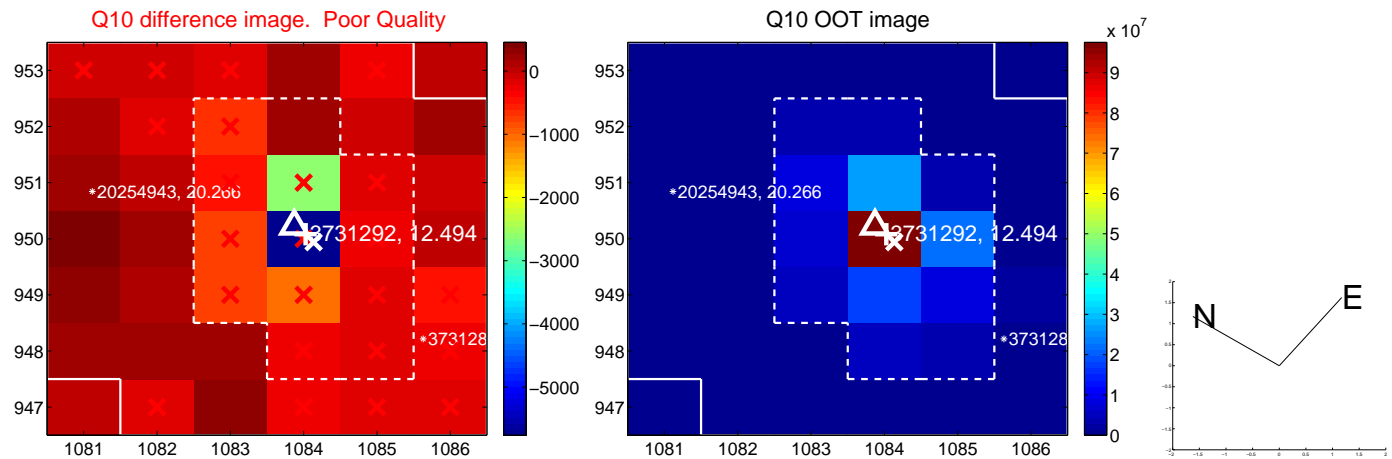
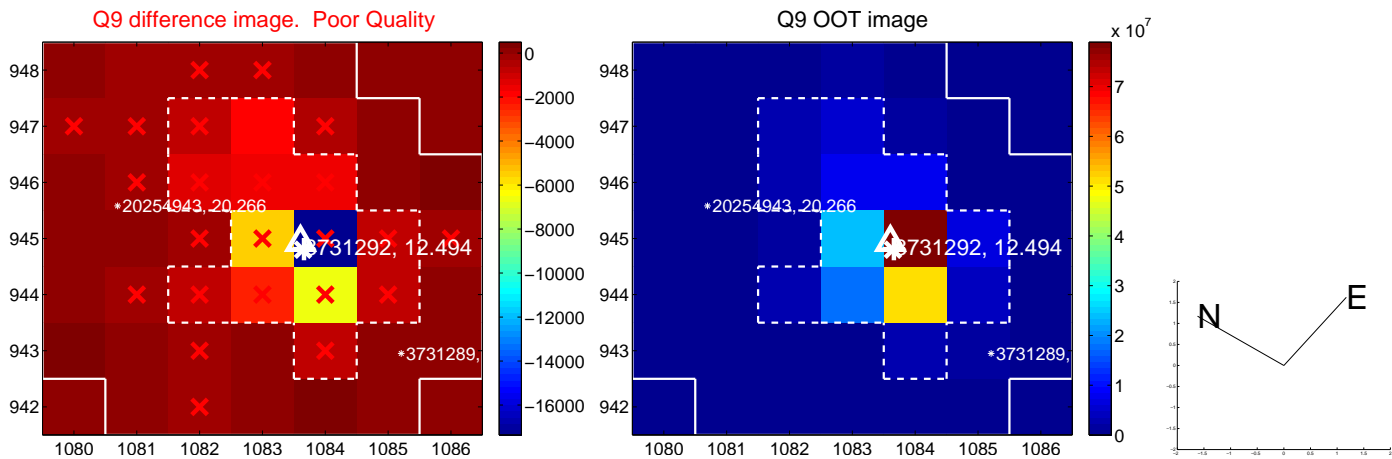
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



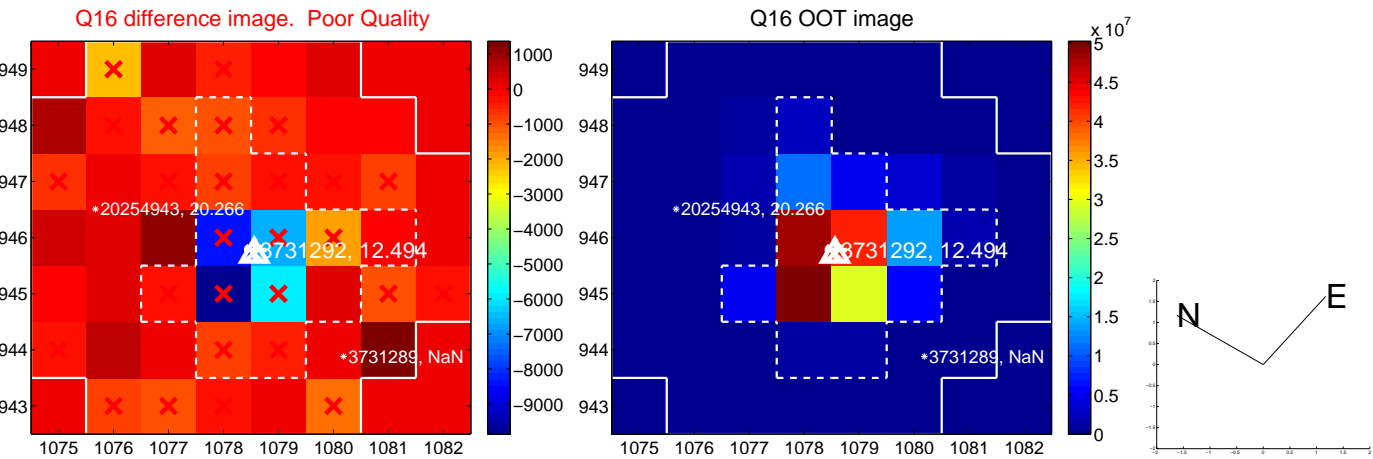
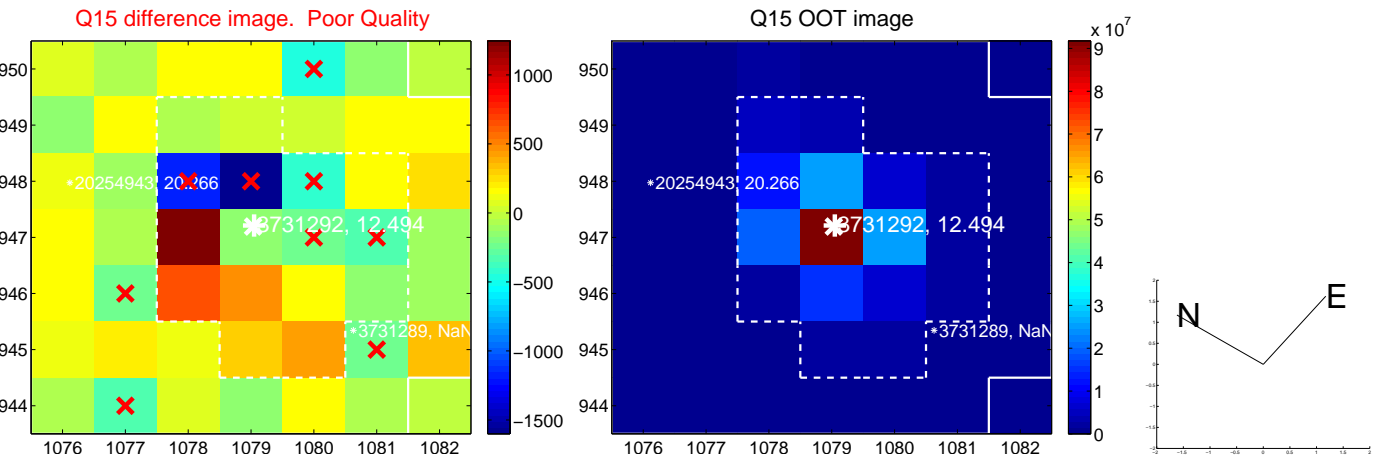
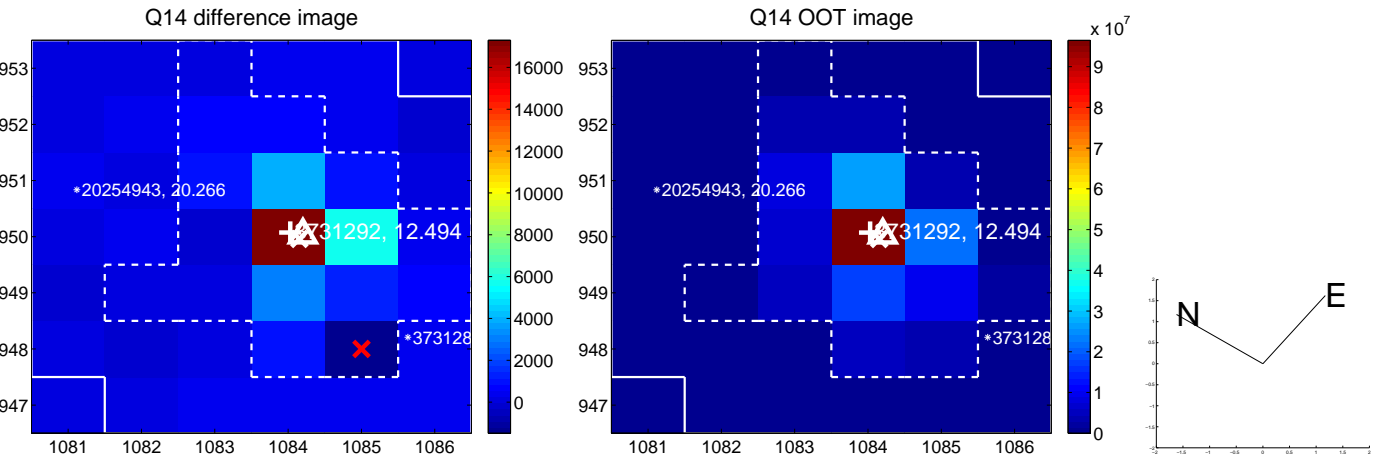
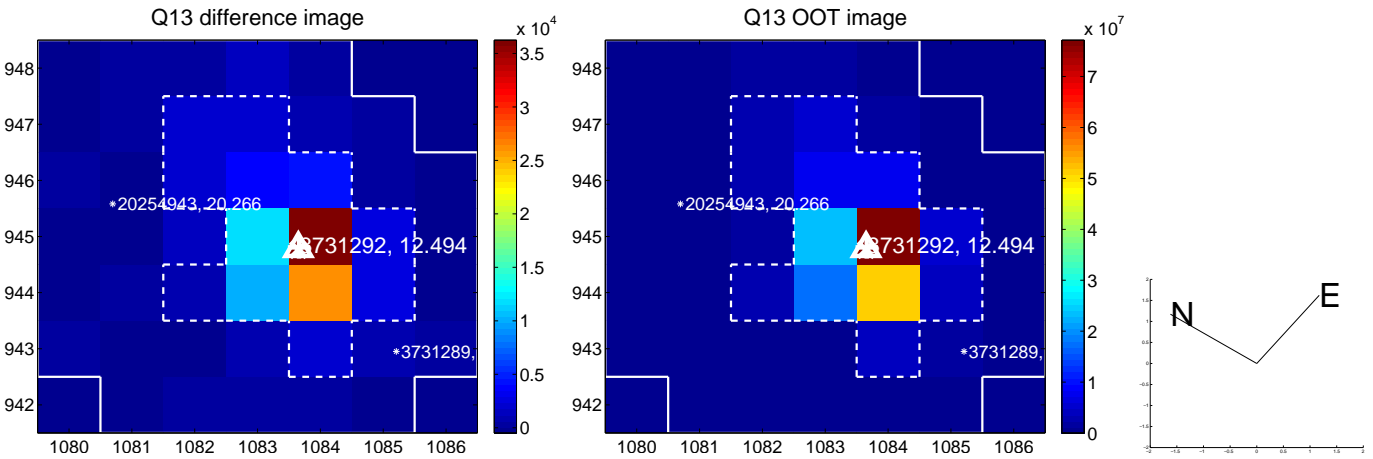




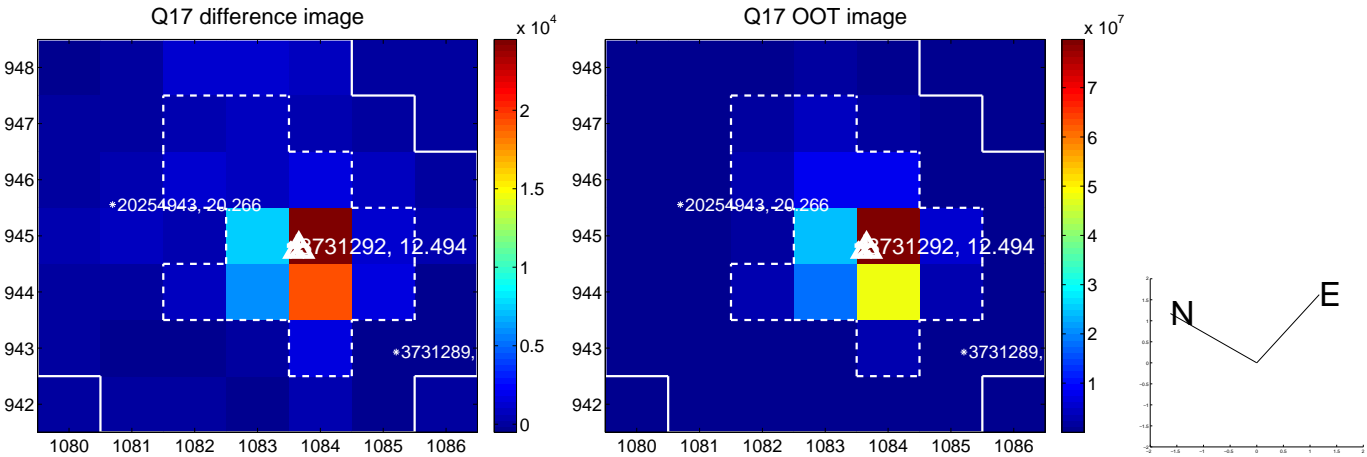
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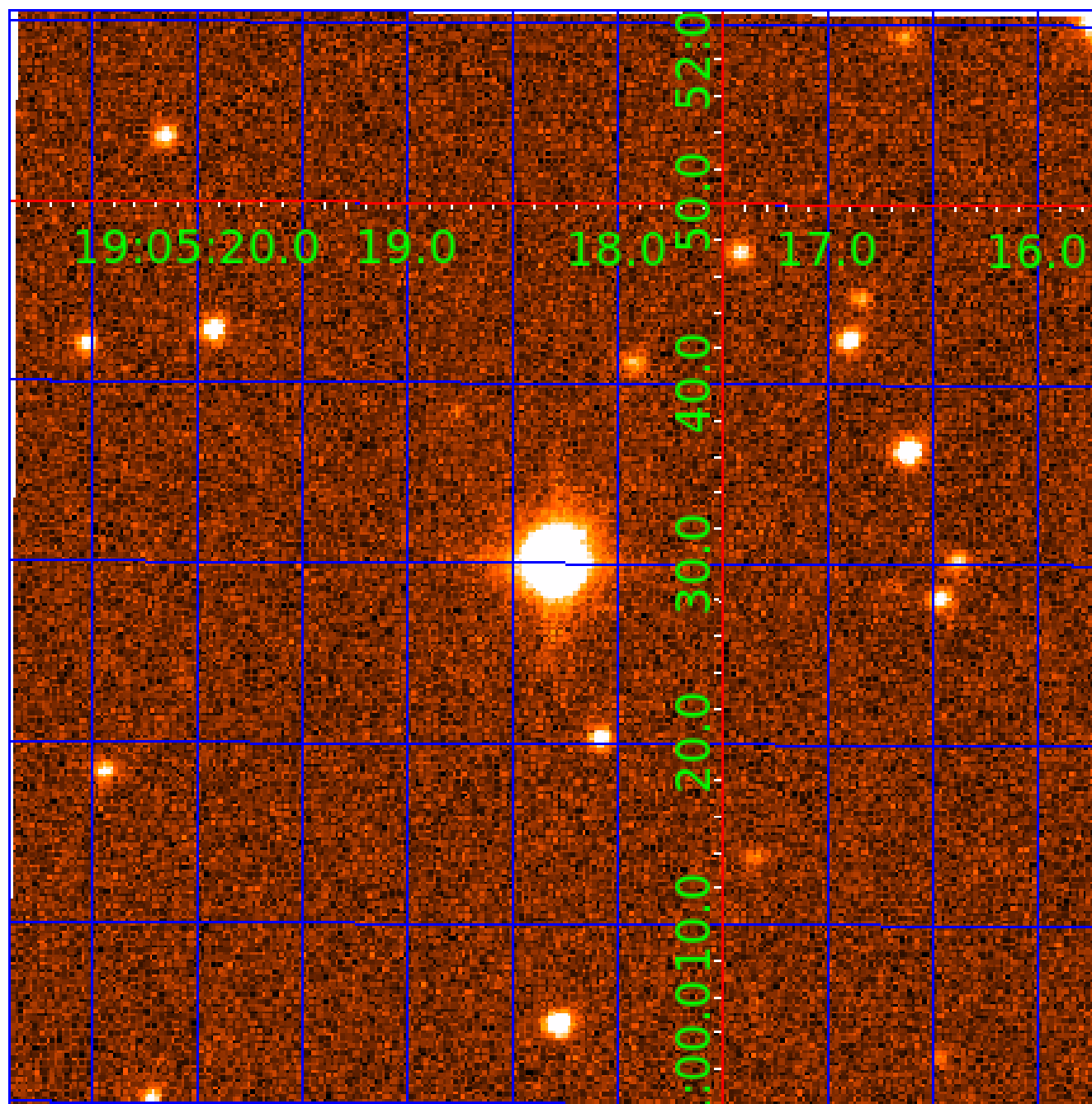
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 003731292

## 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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003731292-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
003731292-03	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—HALO_GHOST
003731292-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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

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

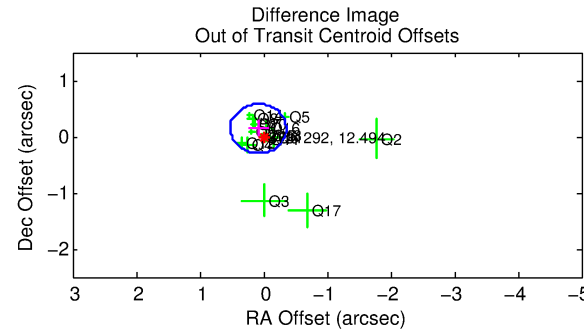
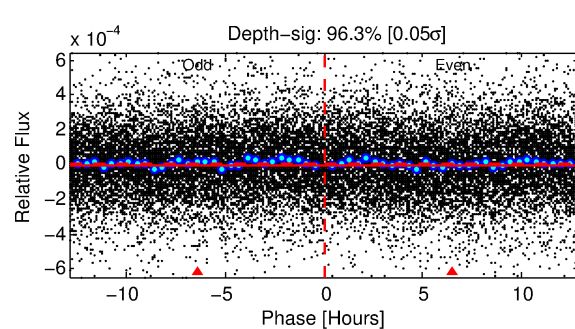
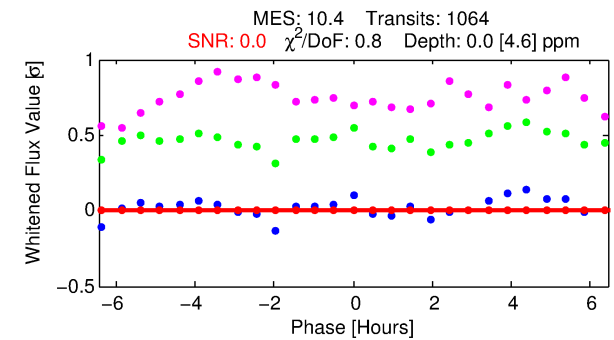
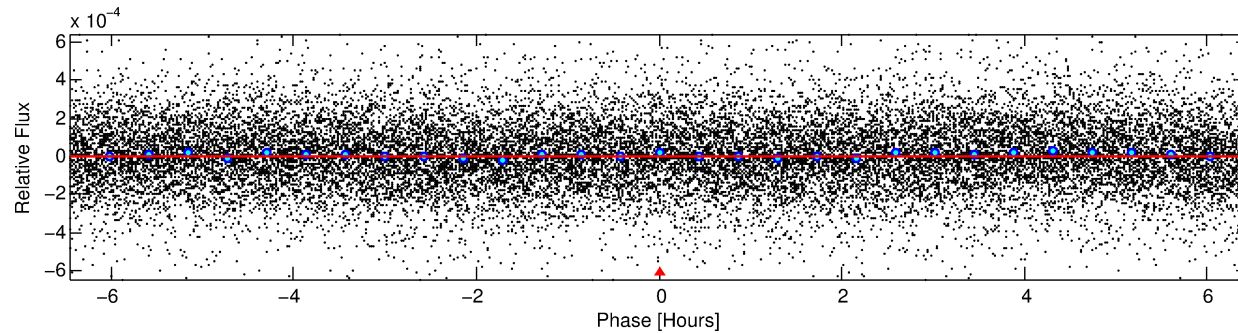
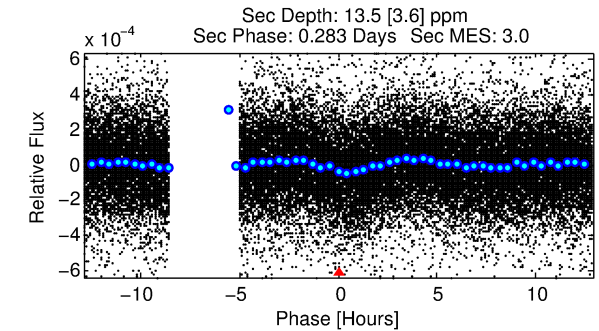
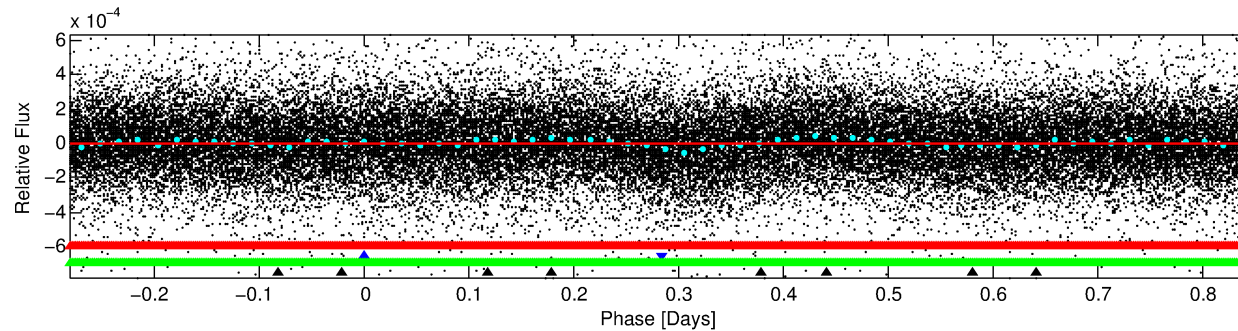
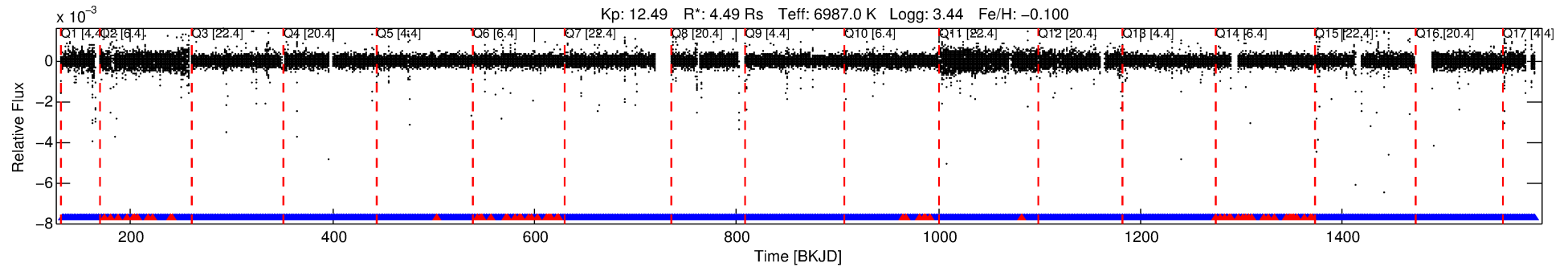
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003731292-02

No Significant Match Found

# DV One-Page Summary

KIC: 3731292 Candidate: 2 of 4 Period: 1.125 d



## DV Fit Results:

Period = 1.12474 [0.00841] d  
Epoch = 132.5831 [1.8946] BKJD  
Rp/R\* = 0.0002 [0.0118]  
a/R\* = 1.94 [30.10]  
b = 0.91 [5.11]  
Seff = 59641.89 [66710.93]  
Teq = 3985 [1114] K  
Rp = 0.11 [5.80] Re  
a = 0.0269 [0.0178] AU  
Ag = 444.14 [46807.74] [0.01σ]  
Teffp = 28284 [745203] K [0.03σ]

## DV Diagnostic Results:

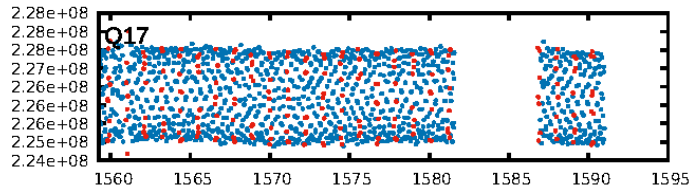
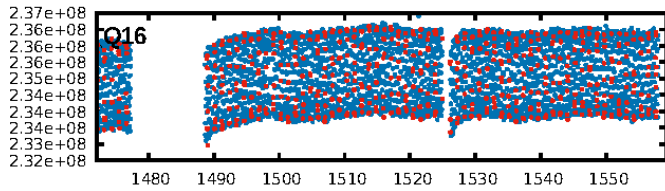
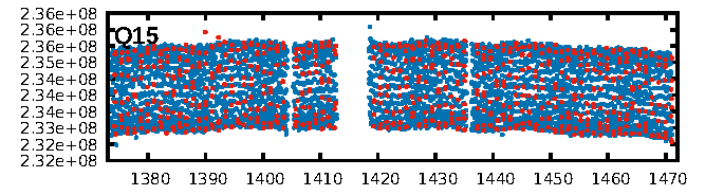
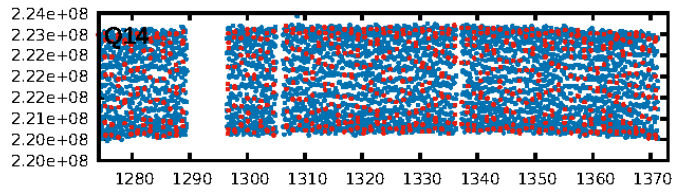
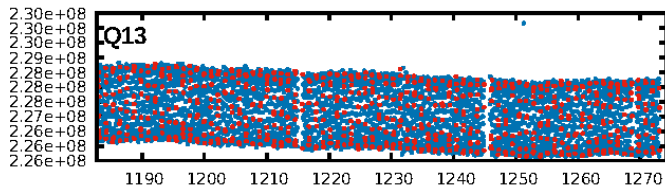
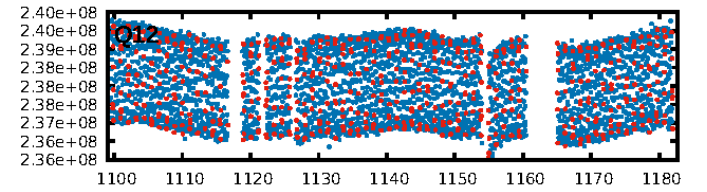
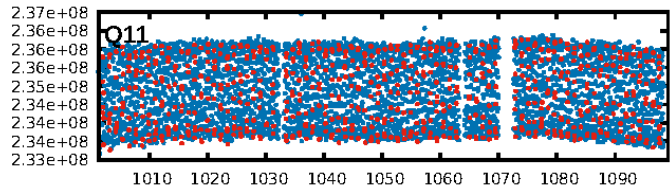
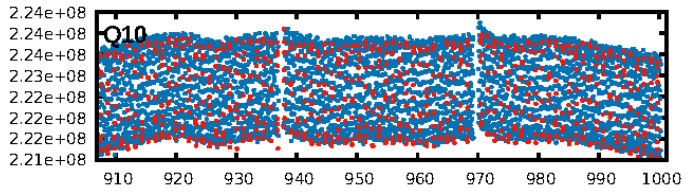
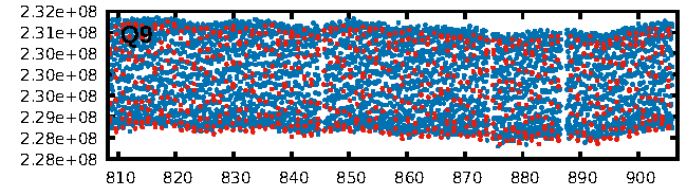
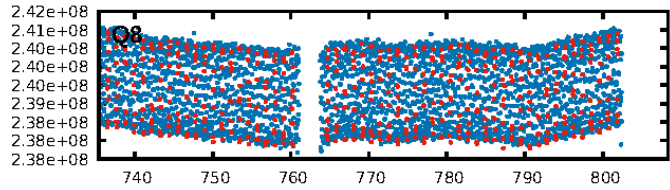
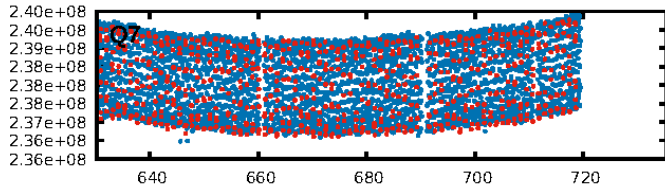
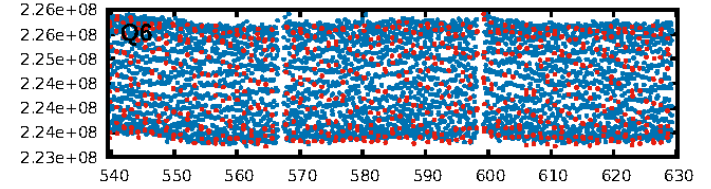
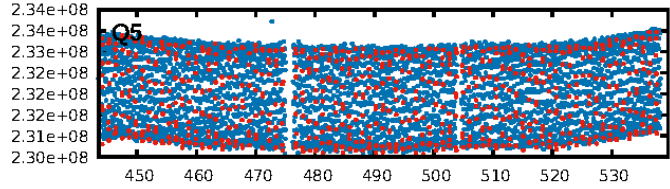
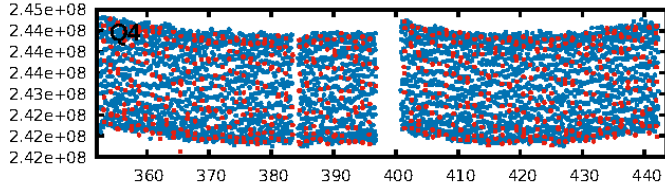
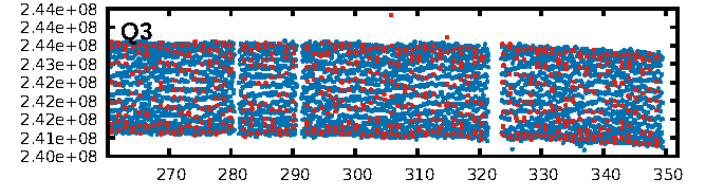
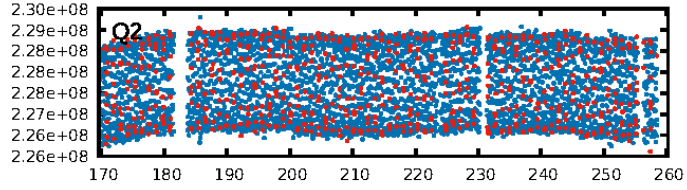
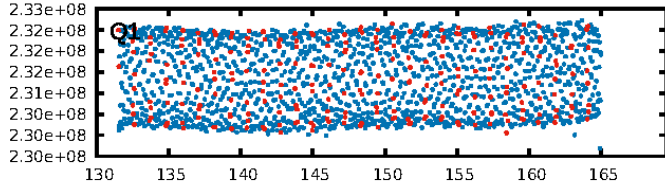
ShortPeriod-sig: 0.4% [0.00σ]  
LongPeriod-sig: 100.0% [1667.51σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.59e-16  
RollingBand-fgt: 0.94 [946/1010]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.162 arcsec [1.11σ]  
KicOffset-rm: 0.191 arcsec [1.25σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.94 [15/16]  
DiffImageOverlap-fno: 0.35 [6/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:28:18 Z

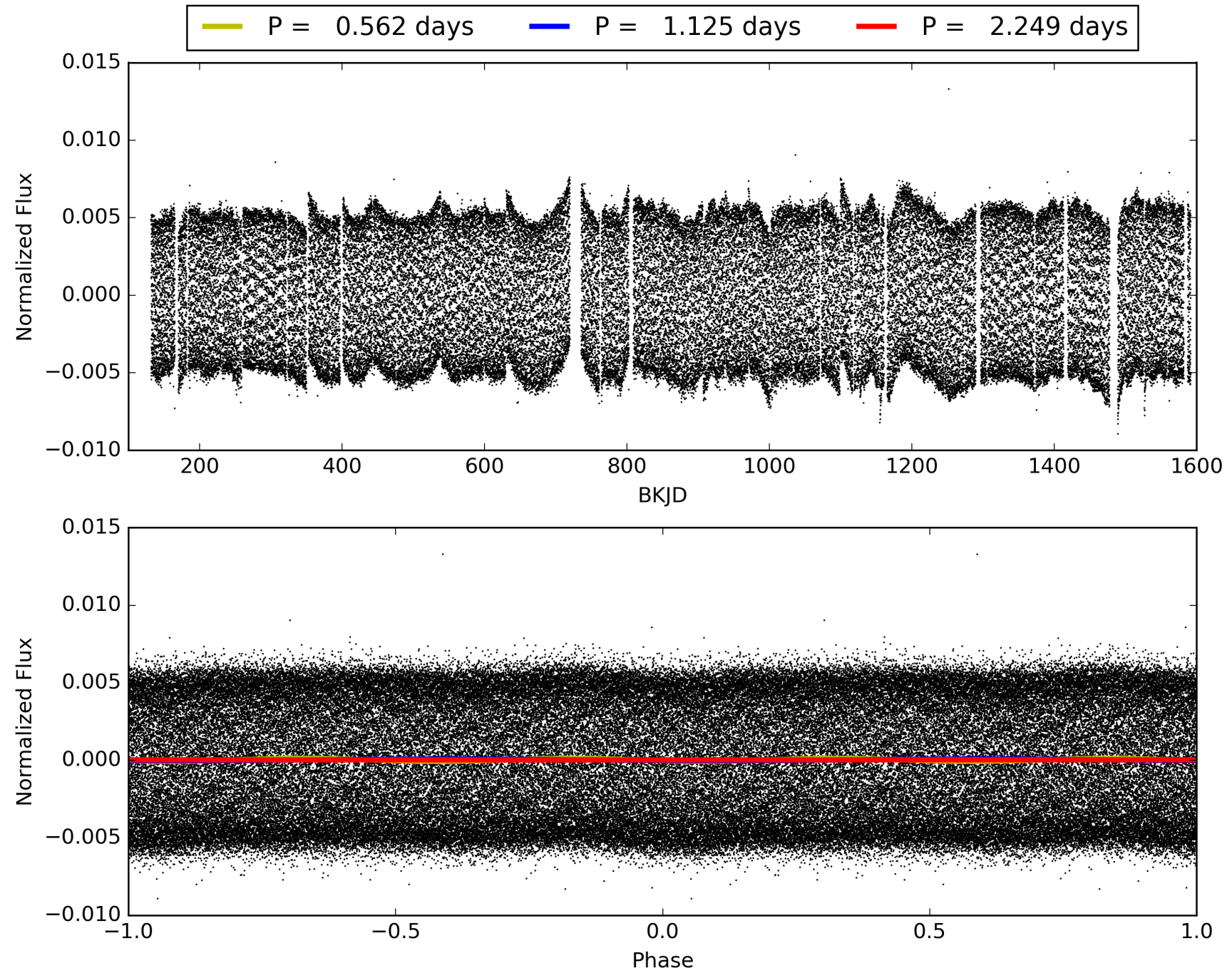
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



## TCE 003731292-02, PDC Light Curves

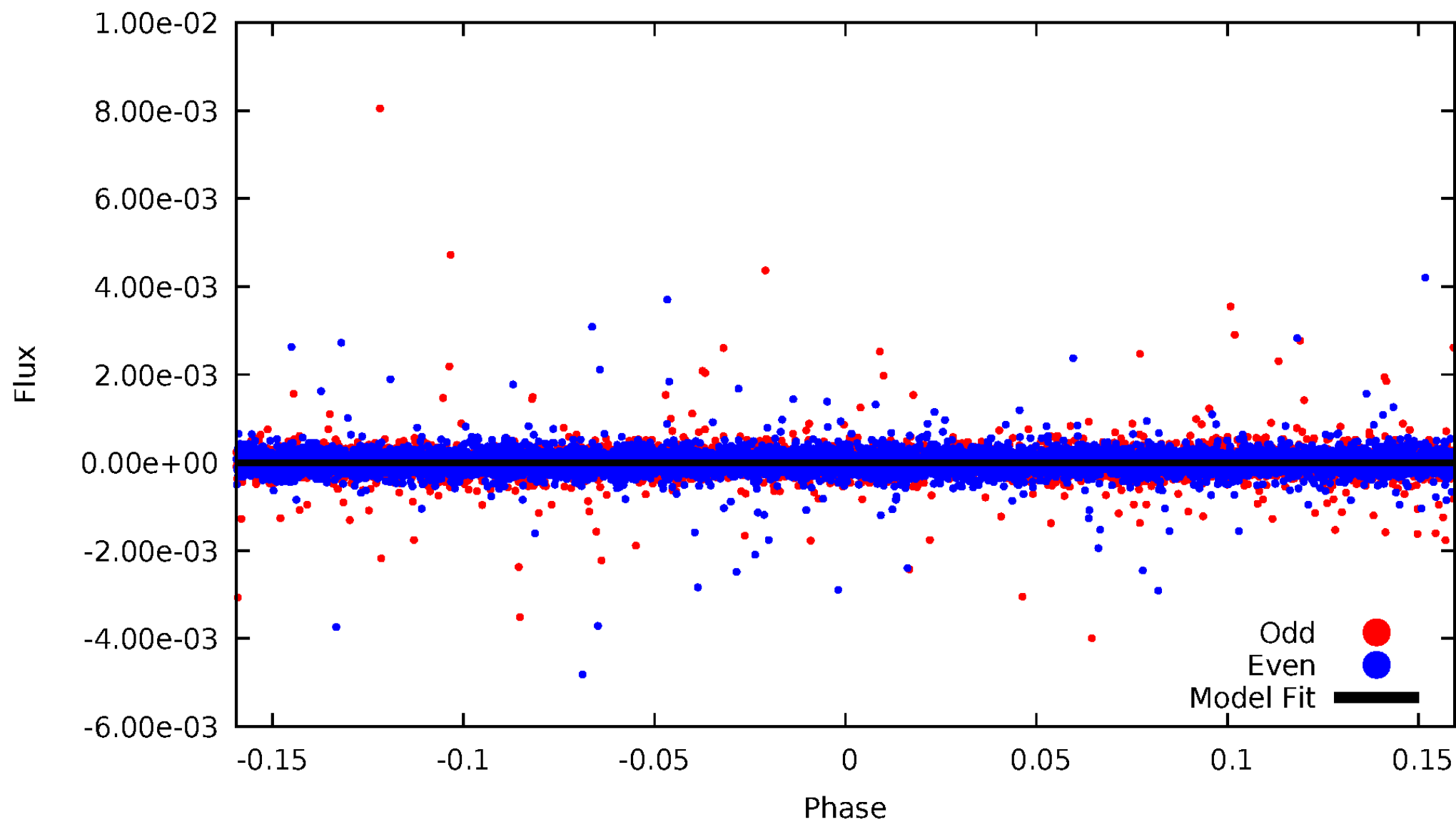


# TCE 003731292-02



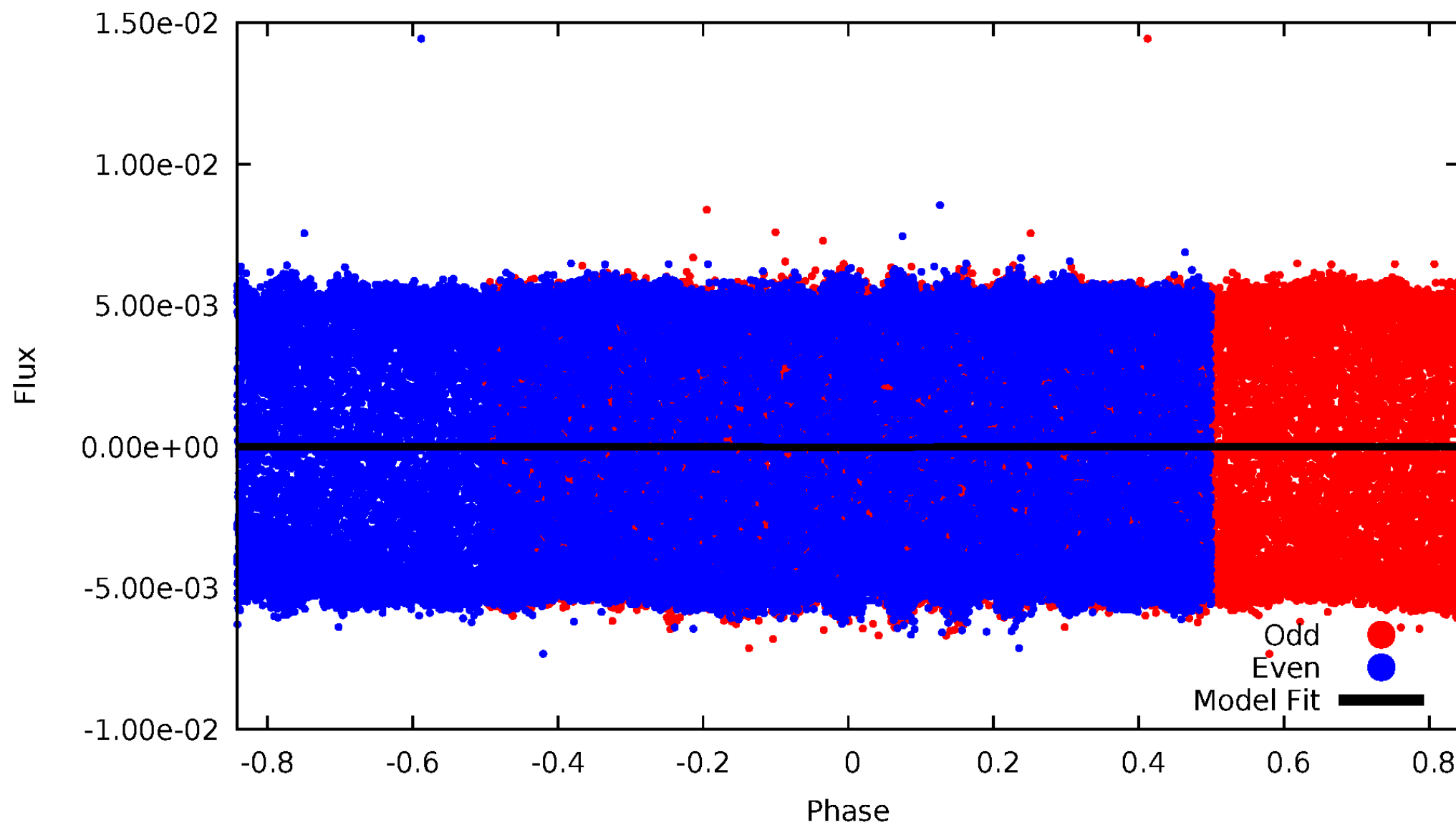
# DV Odd/Even

TCE 003731292-02



# ALT Odd/Even

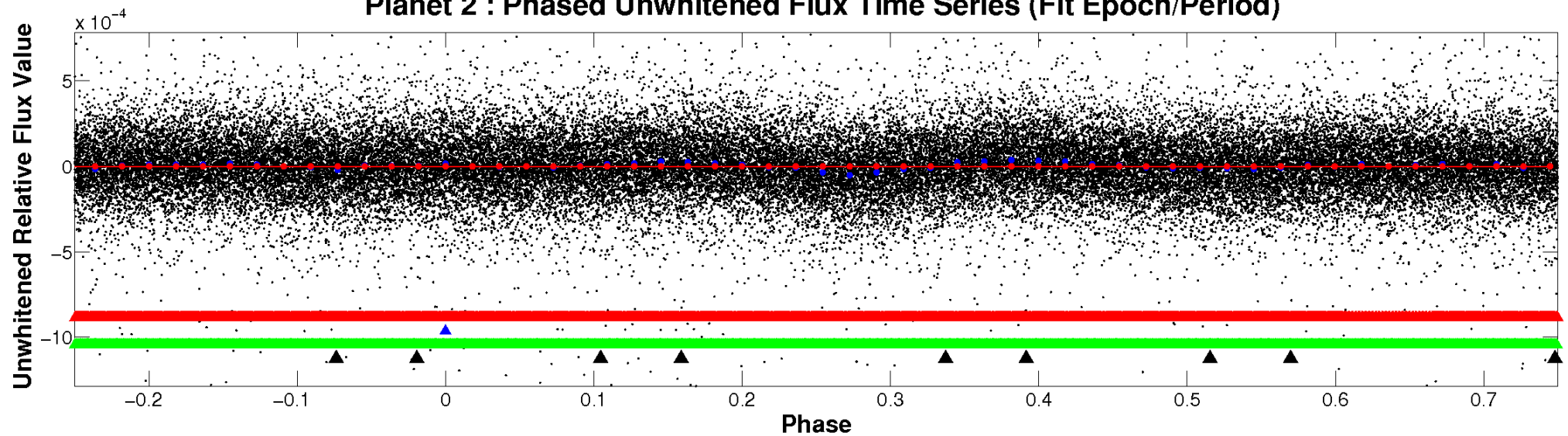
TCE 003731292-02



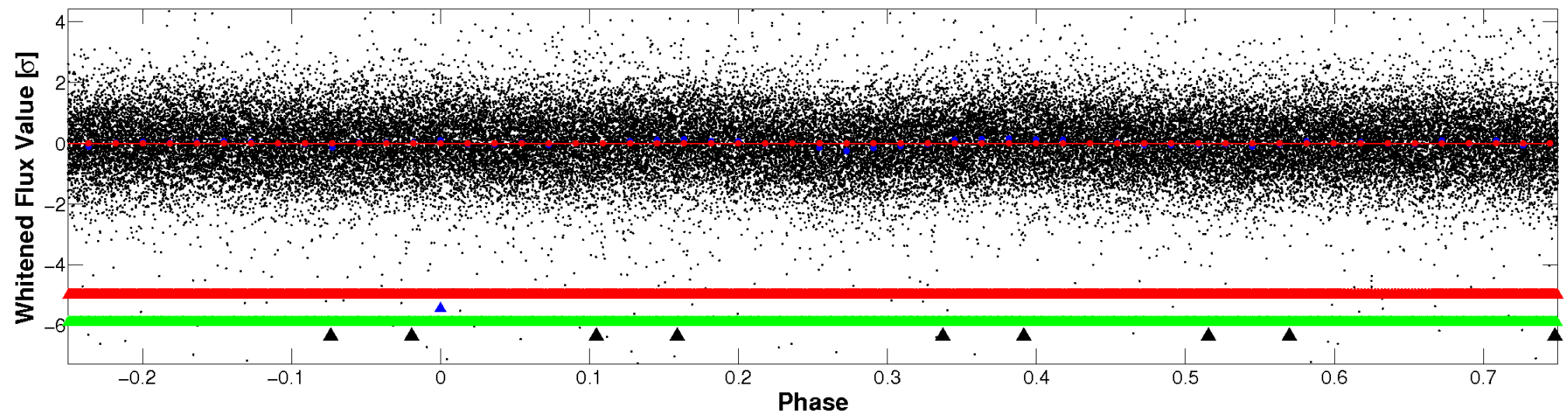


# Non-Whitened Vs. Whitened Light Curve

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

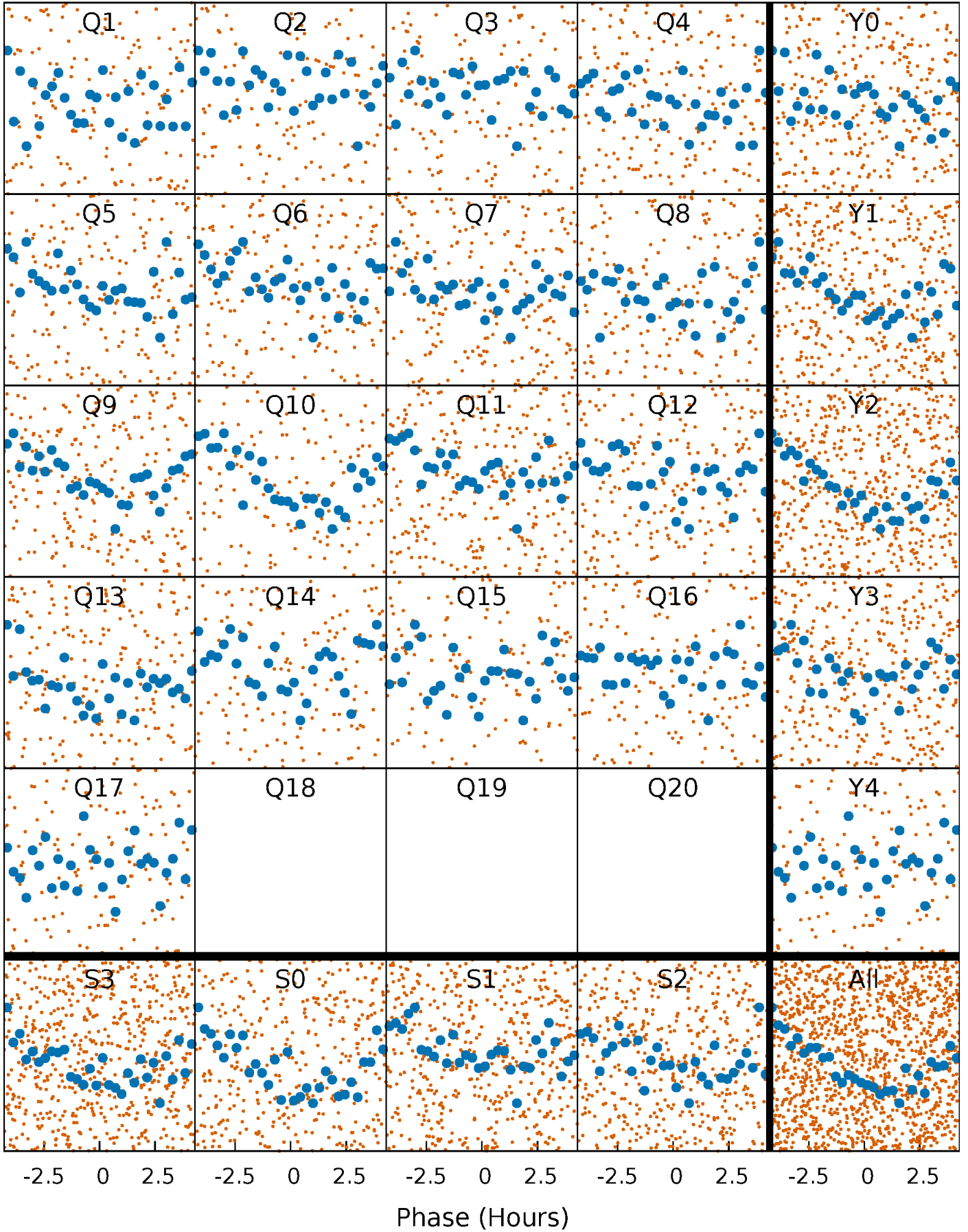


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

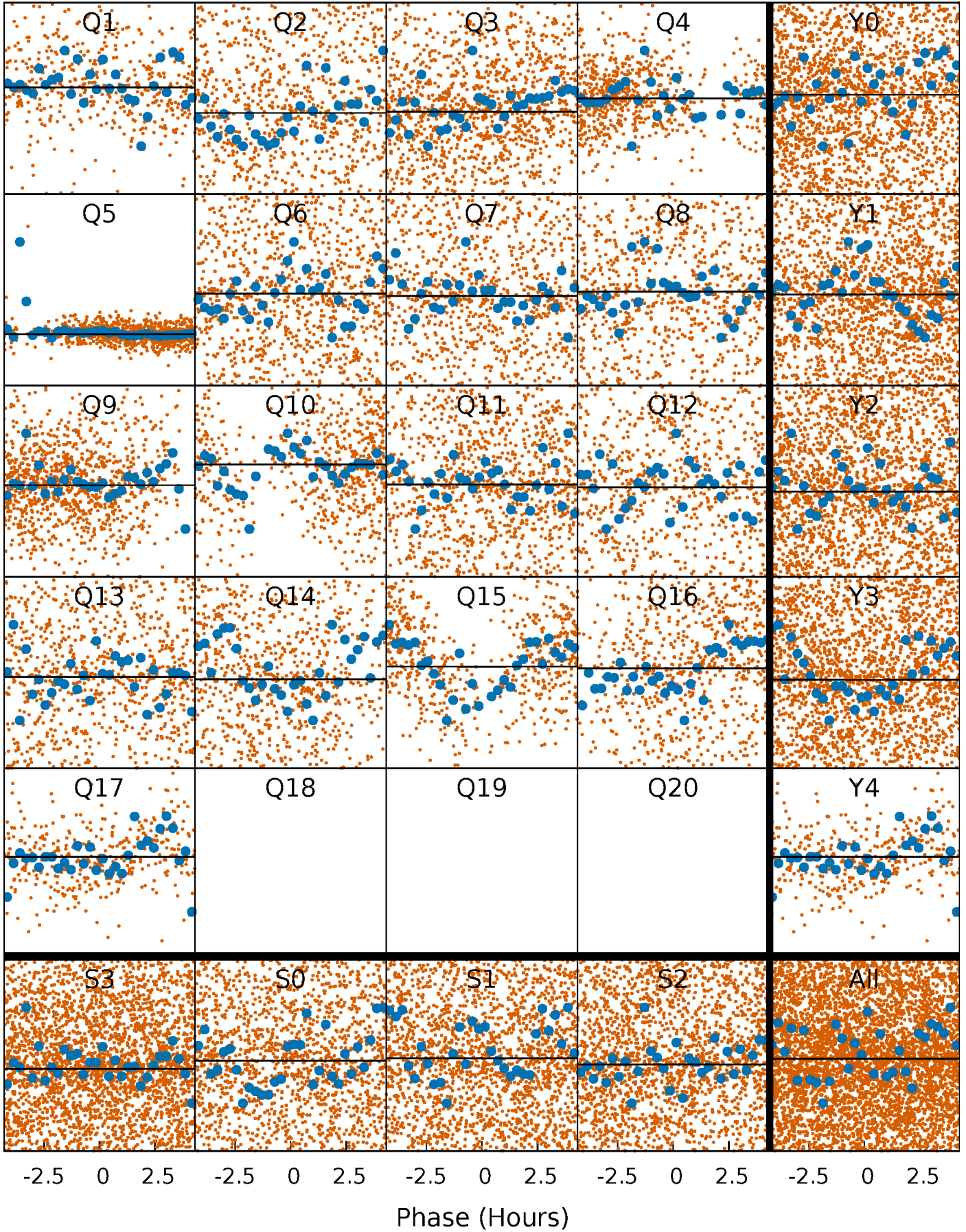
TCE 003731292-02   P= 1.124737 Days    $T_0=132.583091$  (BKJD)





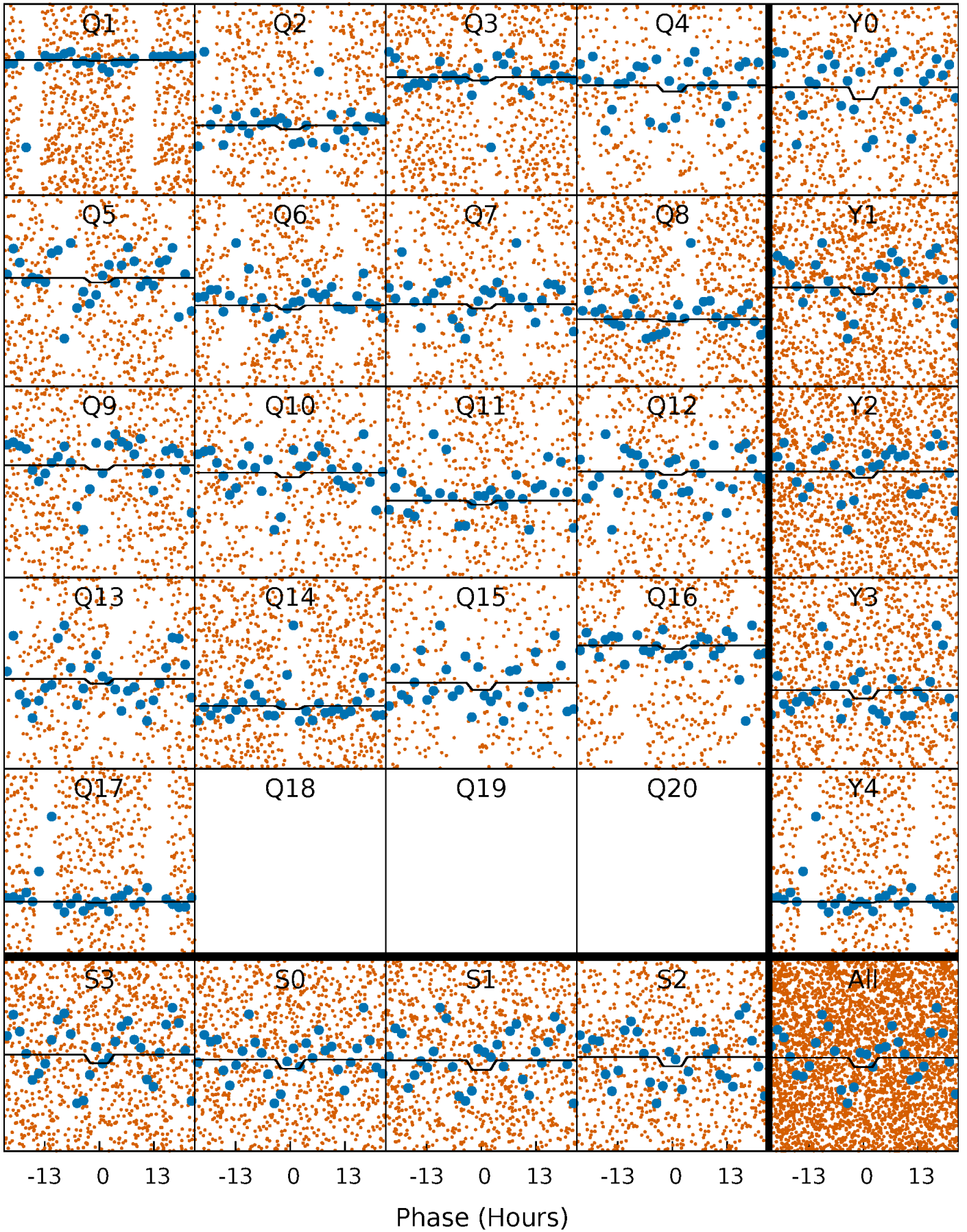
# DV Quarter-Phased Transit Curves

TCE 003731292-02 P= 1.124737 Days  $T_0=132.583091$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

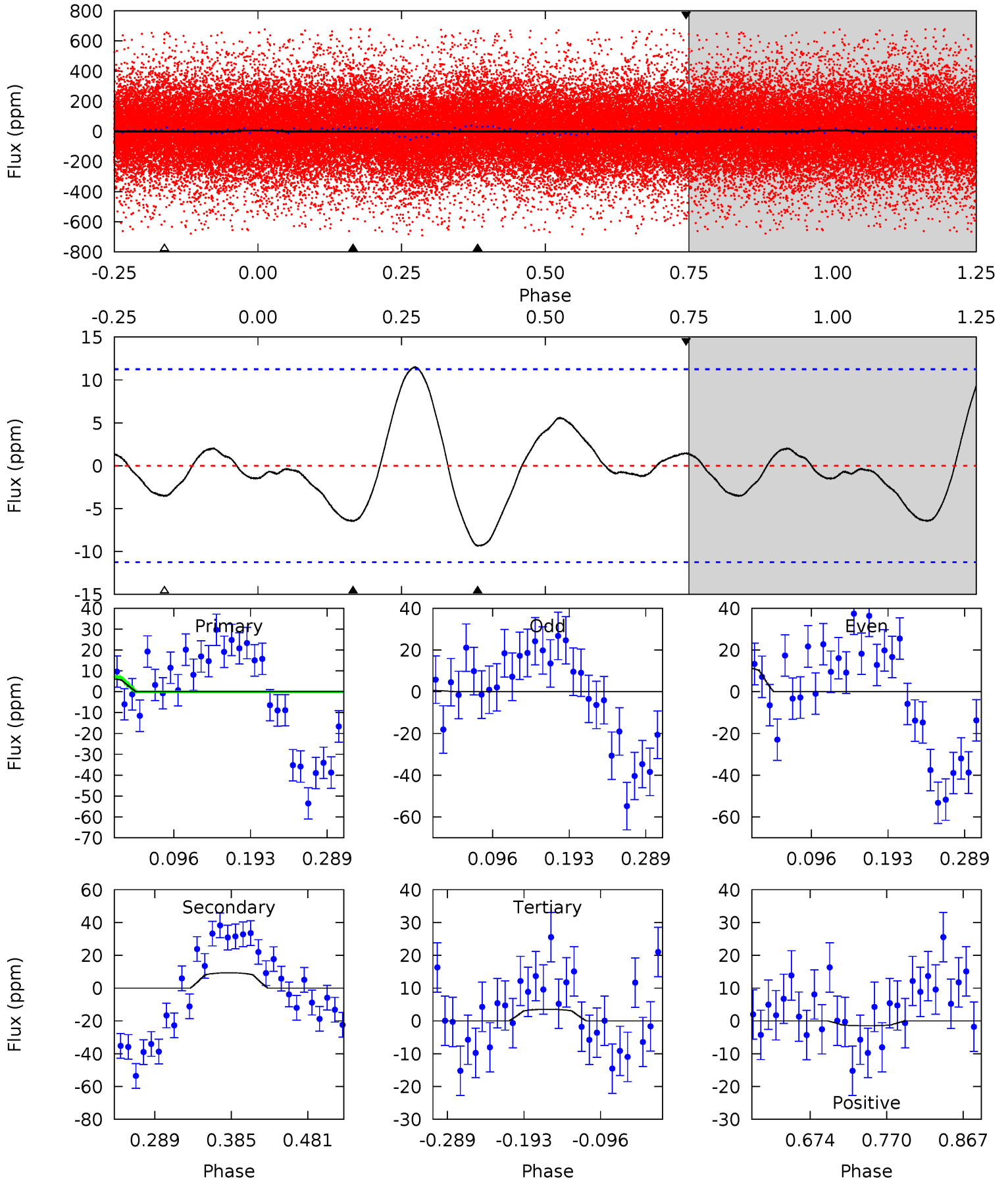
TCE 003731292-02   P= 1.124740 Days    $T_0=131.653615$  (BKJD)



# DV Model-Shift Uniqueness Test

003731292-02, P = 1.124737 Days, E = 131.458354 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
2.62	3.80	1.43	0.59	4.57	1.66	1.22	1.19	2.03	2.37	3.21	2.29	0.59	0.55	0.45

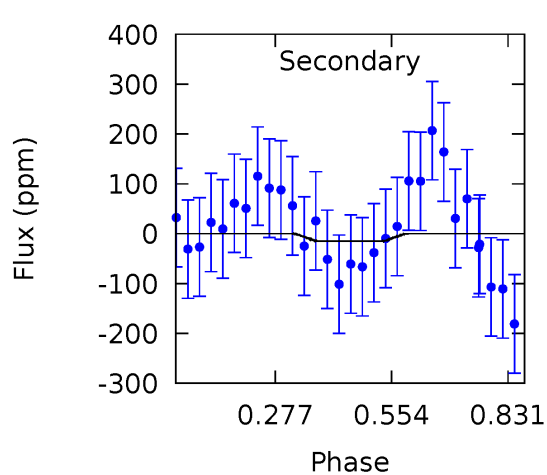
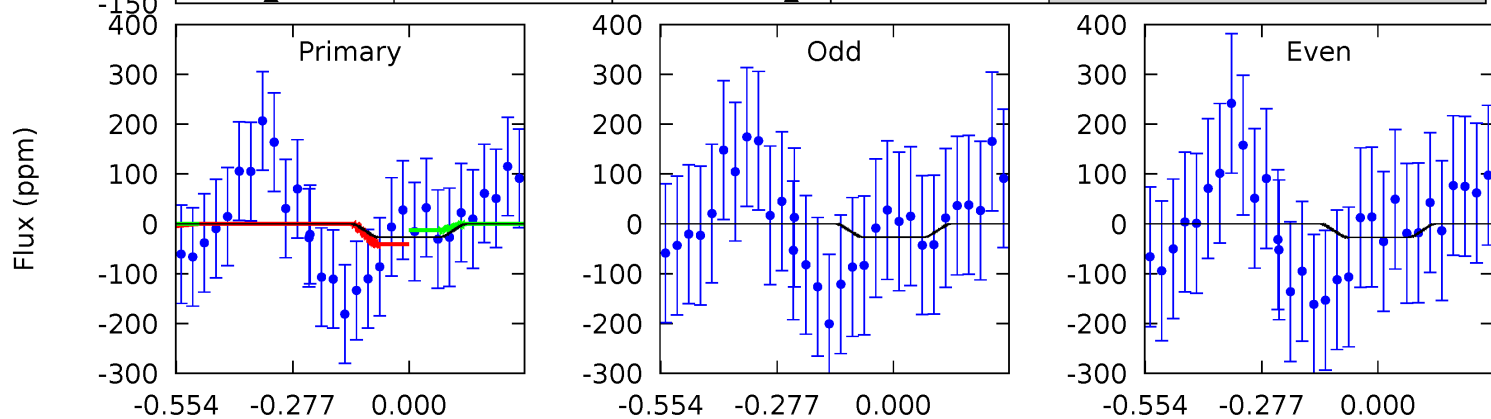
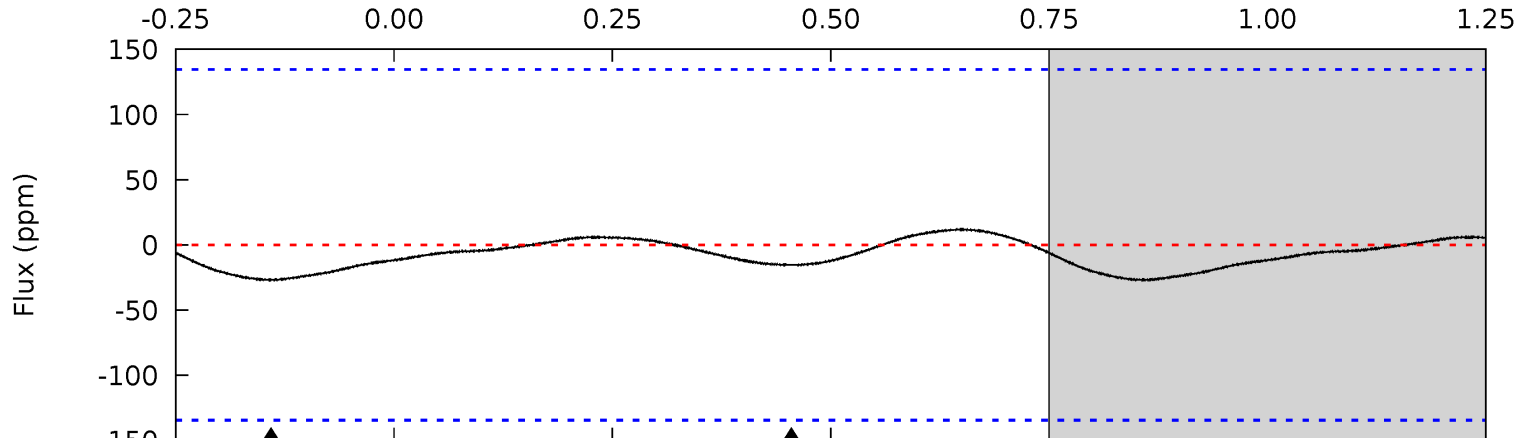
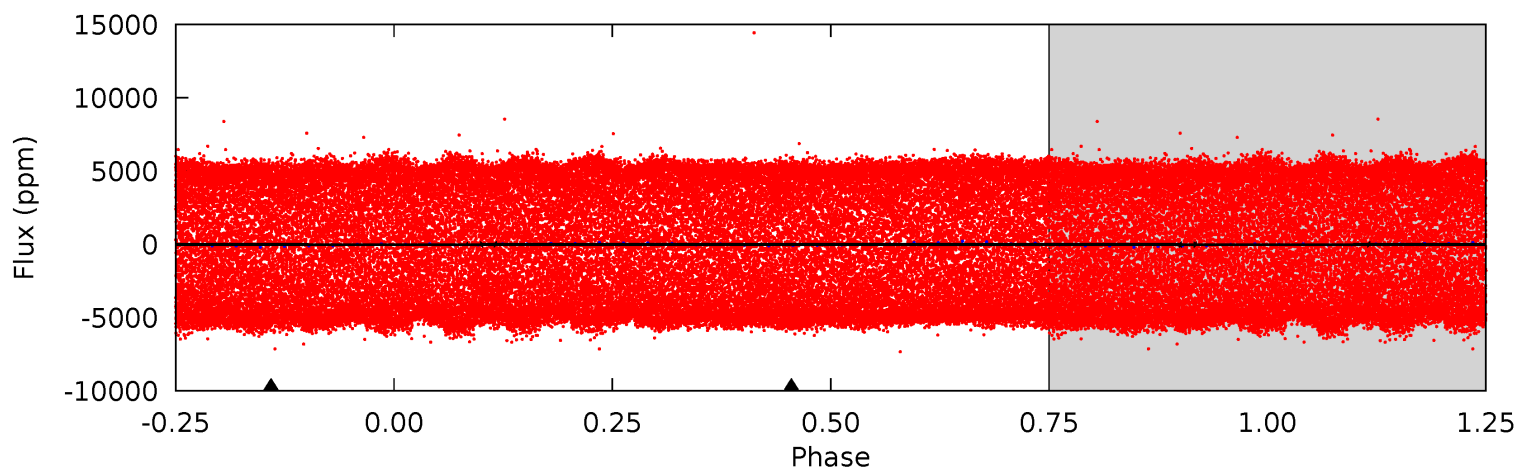




# Alt Model-Shift Uniqueness Test

003731292-02, P = 1.124740 Days, E = 130.528875 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
0.87	0.50	0	0	4.35	1.09	0.09	0.87	0.87	0.50	0.50	0.01	0.58	0.30	0.46



### Stellar Parameters For KIC 003731292

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6987^{+194}_{-292}$	$3.444^{+0.666}_{-0.074}$	$-0.100^{+0.250}_{-0.300}$	$4.491^{+0.316}_{-2.841}$	$2.048^{+0.073}_{-0.659}$	$0.032^{+0.374}_{-0.008}$
	+3%/-4%	+19%/-2%	+250%/-300%	+7%/-63%	+4%/-32%	+1174%/-26%
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 003731292-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-9 \pm 2$	$3.37^{+3.89}_{-2.39}$	$5400^{+356}_{-835}$	$2541^{+4919}_{-6950}$	$0.311^{+3.313}_{-0.250}$
Alt.	$-15 \pm 31$	$4.32^{+4.73}_{-3.27}$	$5366^{+369}_{-827}$	$-3719^{+10814}_{-1417}$	$0.192^{+2.851}_{-0.463}$

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



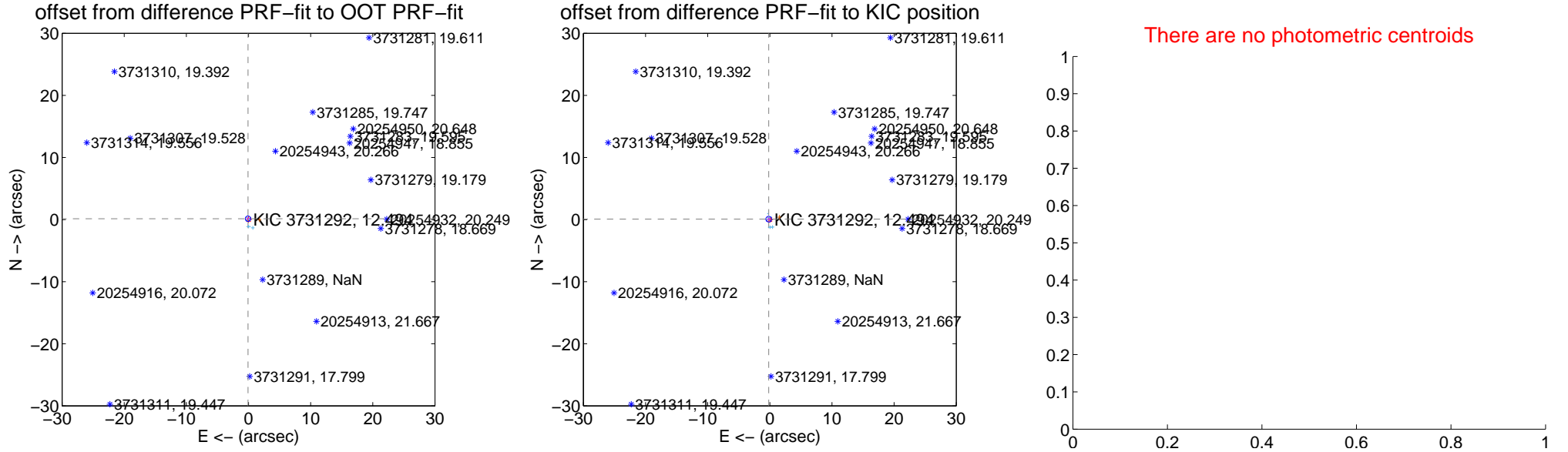
## DV Centroid Data

Supplemental centroid analysis for 003731292-02. Kepler magnitude: 12.49. Transit SNR 0.01

There are 15 quarters with good PRF difference image offsets

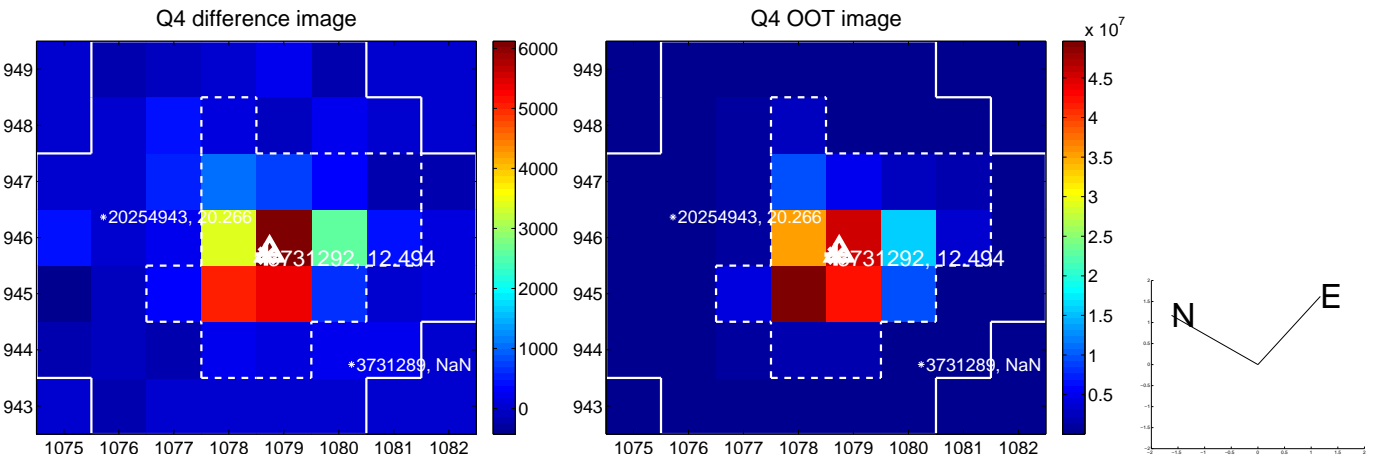
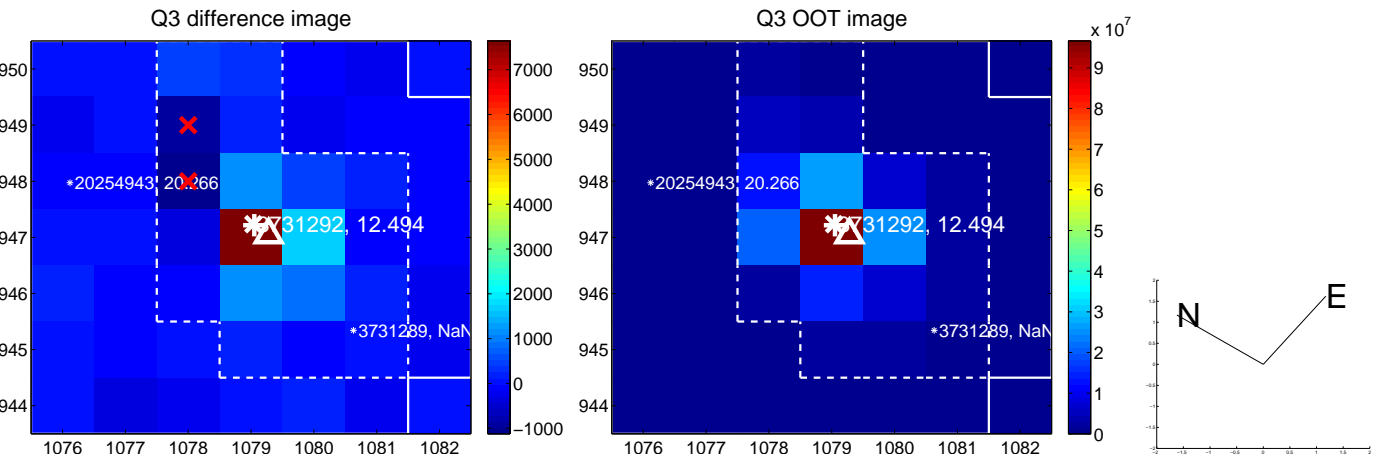
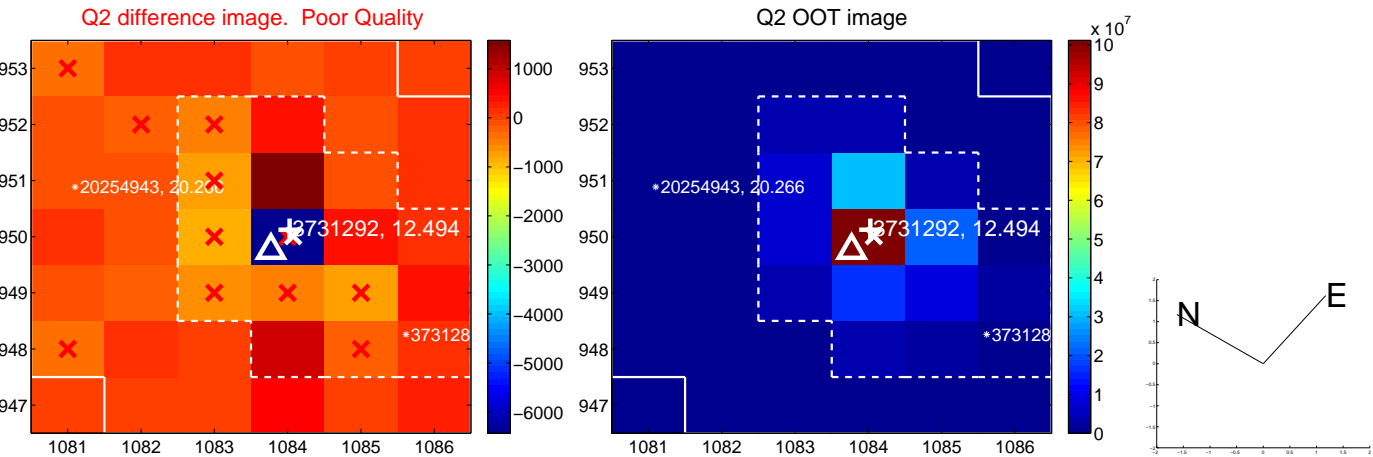
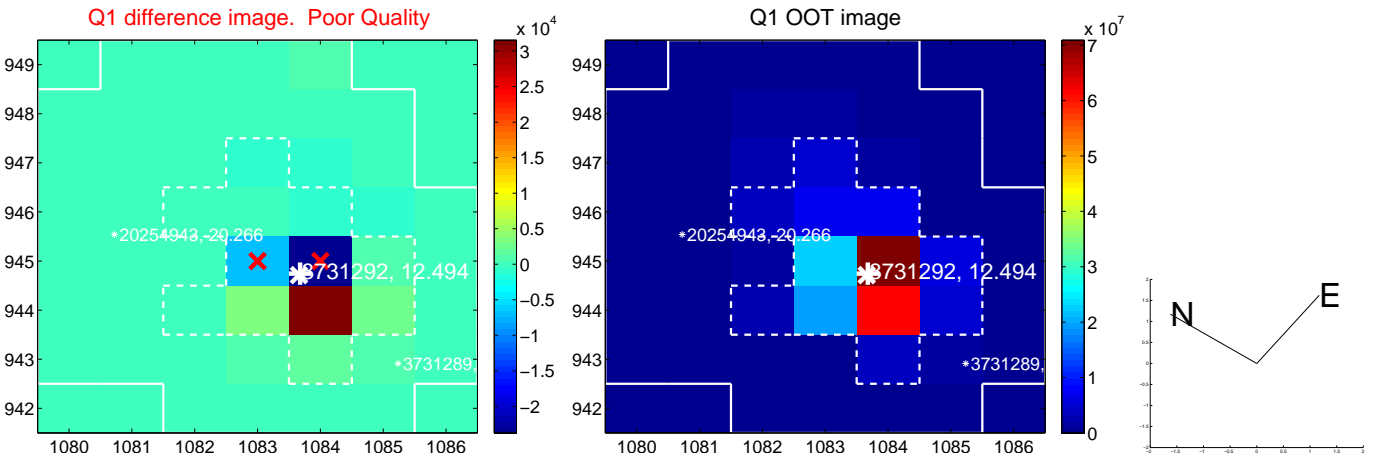
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.162 \pm 0.146$	1.11	$0.081 \pm 0.147$	$0.140 \pm 0.131$
PRF-fit source offset from KIC position	$0.191 \pm 0.153$	1.25	$0.177 \pm 0.138$	$0.072 \pm 0.164$
photometric centroid source offset	—	—	—	—

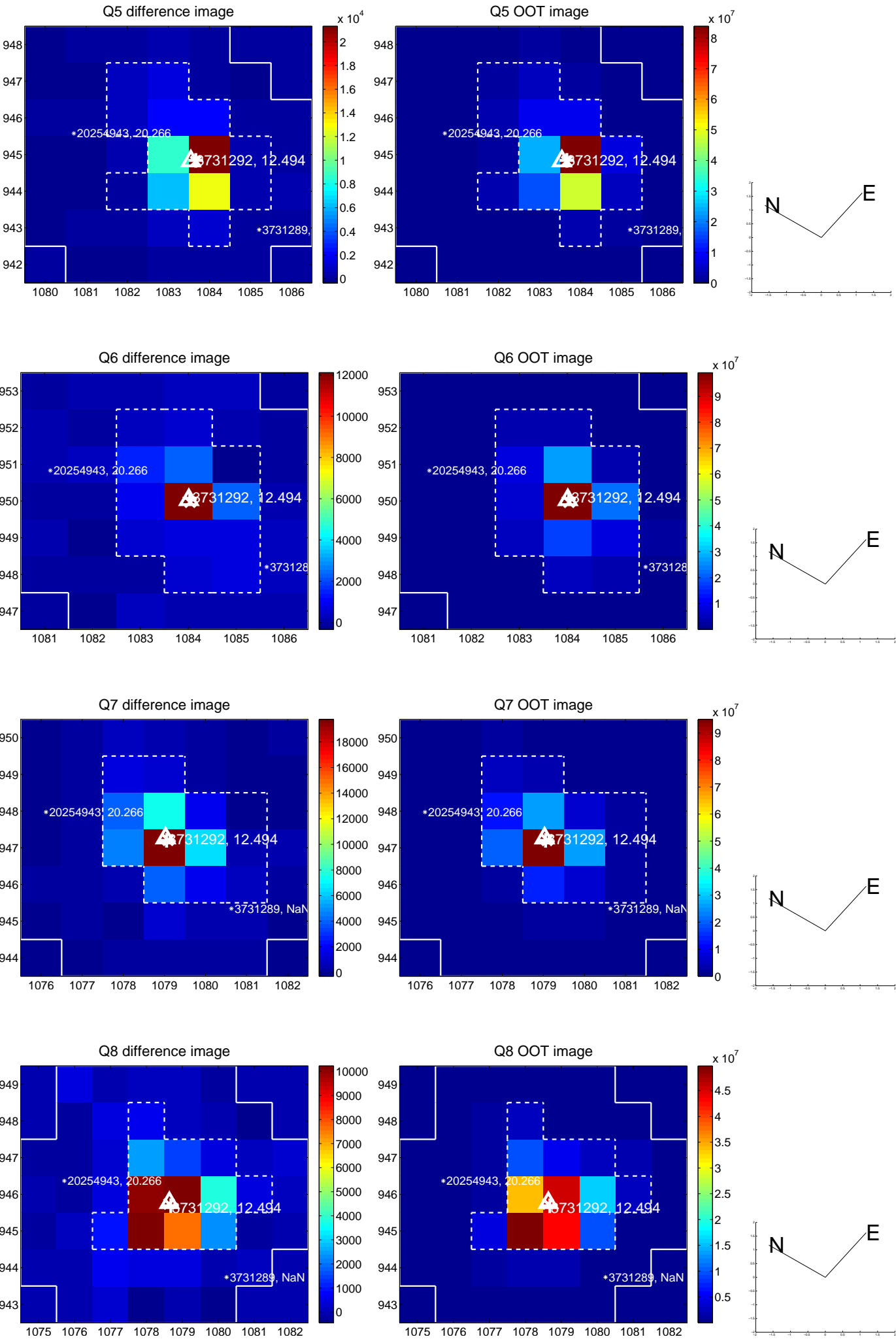


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

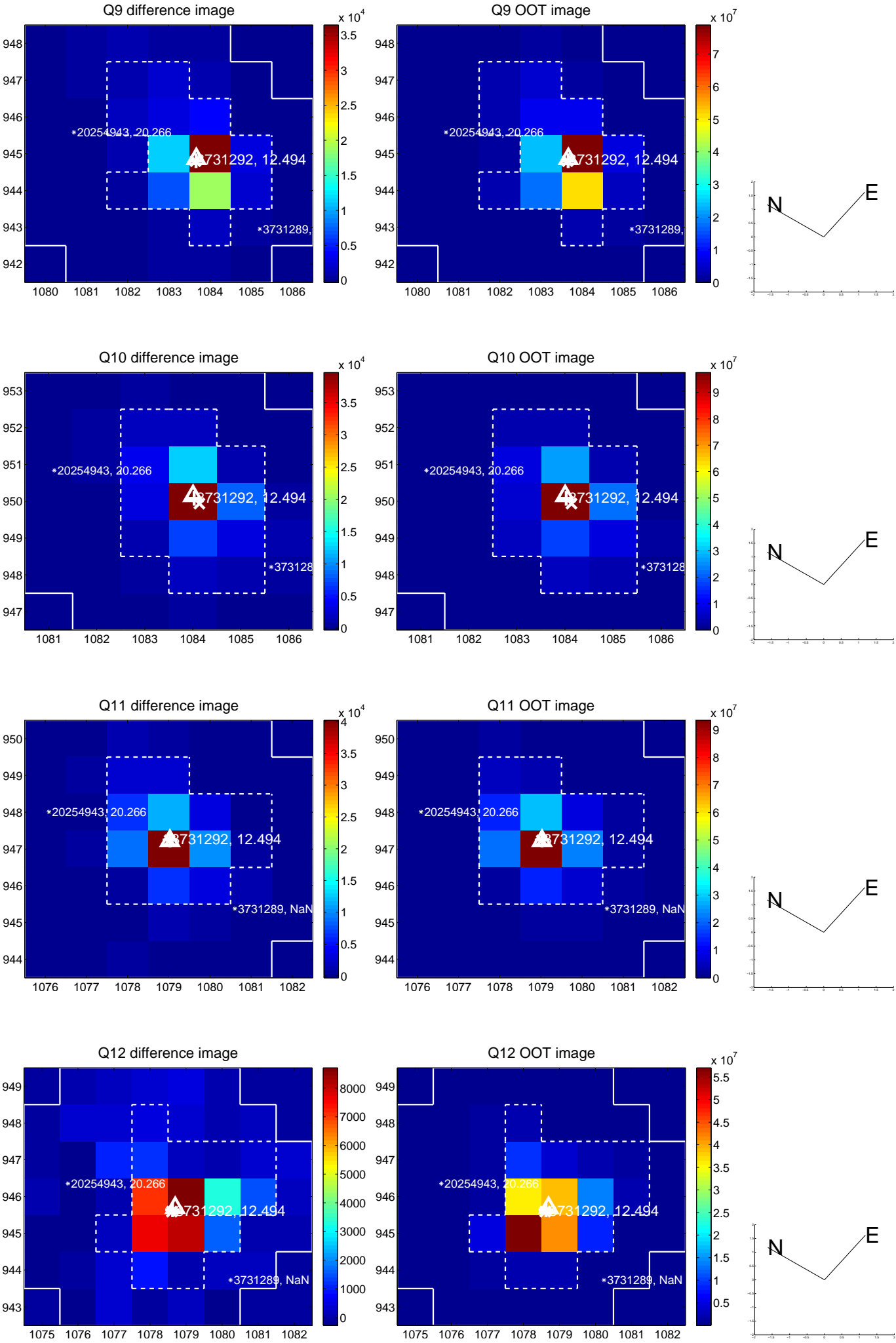
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



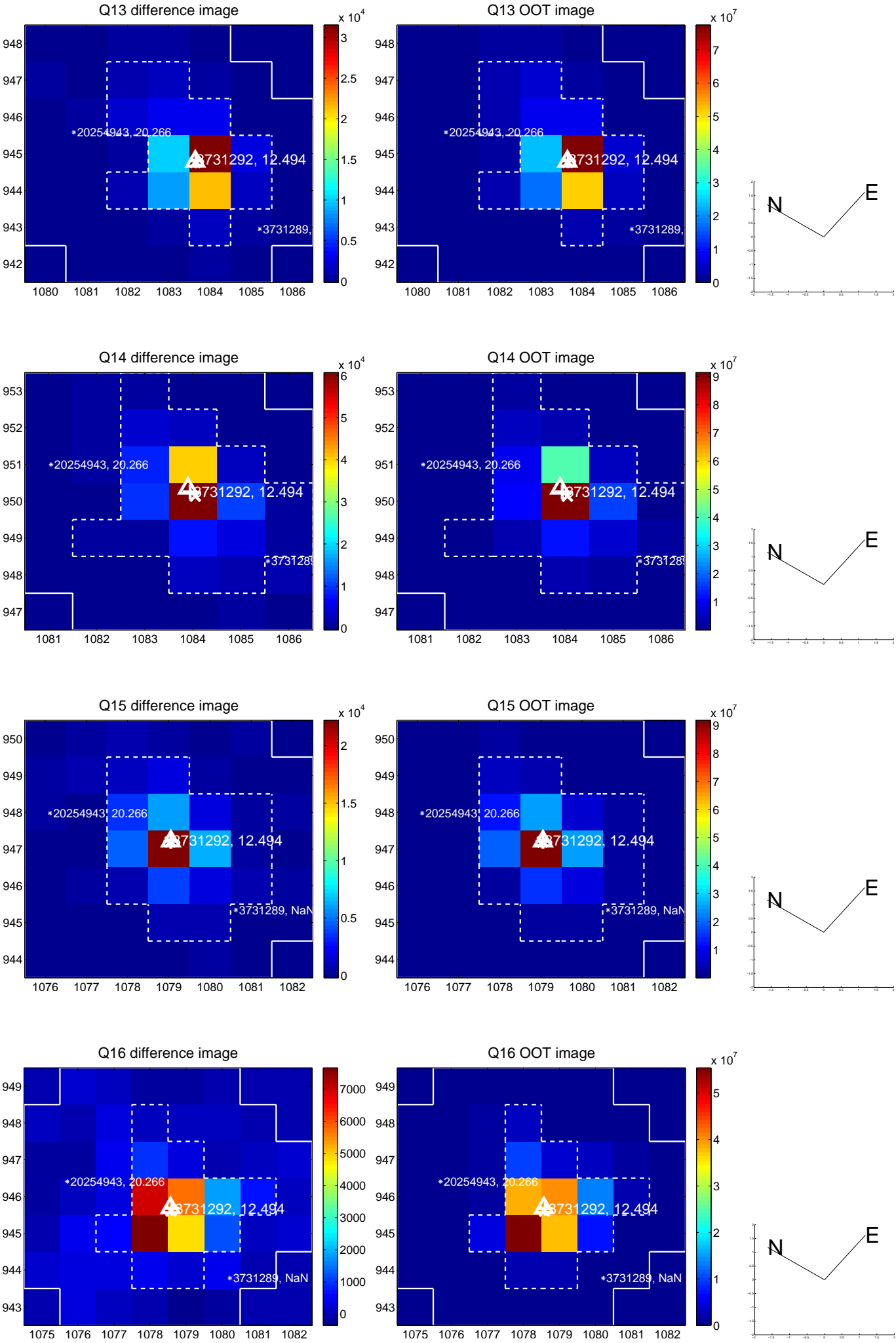
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

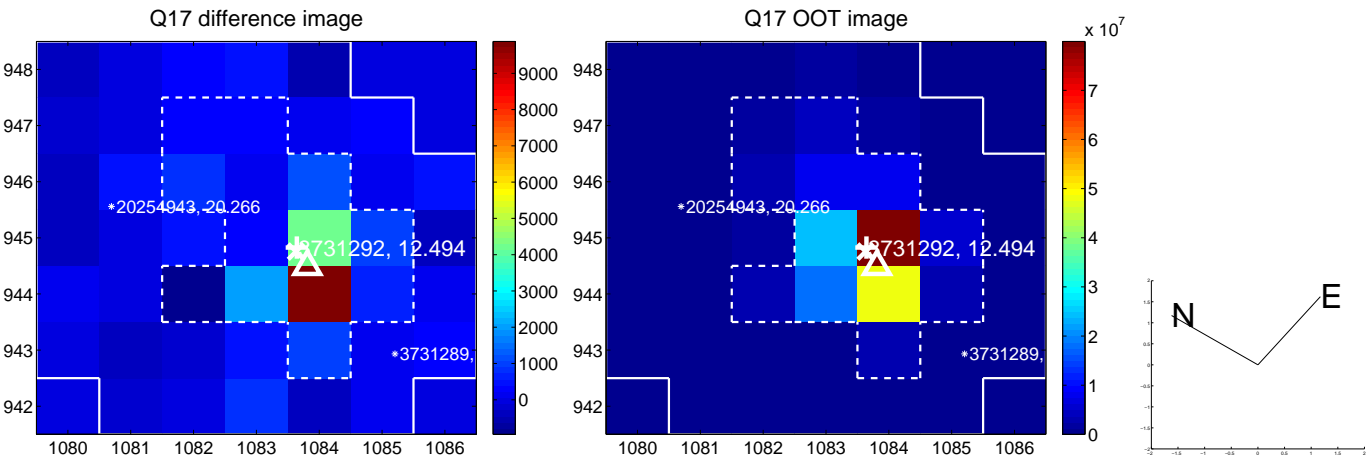


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





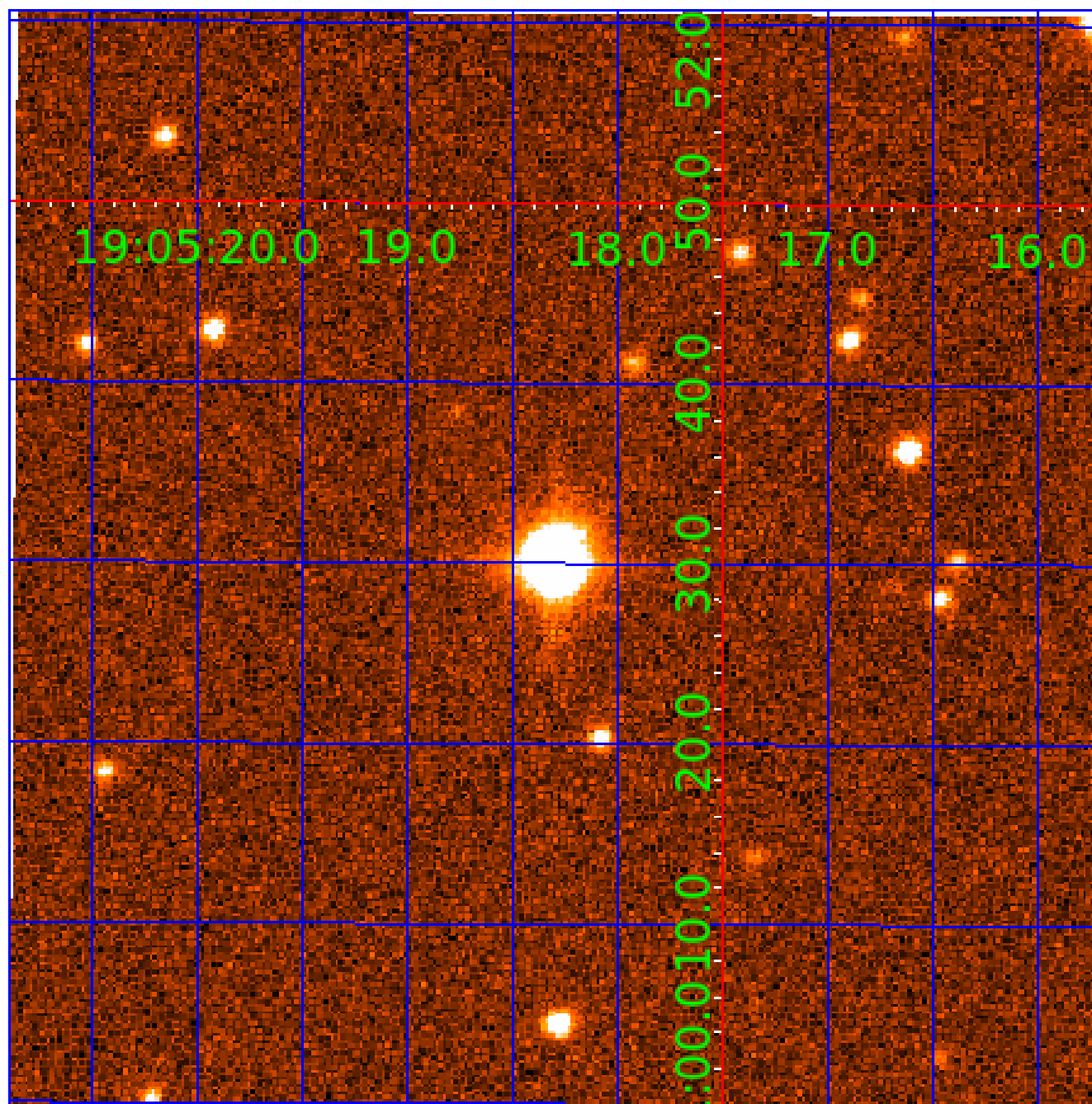
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 003731292

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003731292-01	OBS	No	1.122194	132.139759	4.9	1.240	9.8	1.3	4.49	6987	1.12	59822.15
003731292-02	OBS	No	1.124737	132.583091	0.0	2.152	10.4	0.0	4.49	6987	0.11	59641.89
003731292-03	OBS	No	1.123774	131.886110	14.2	4.146	9.8	4.0	4.49	6987	1.73	59710.05
003731292-04	OBS	No	164.874220	242.122941	0.2	0.962	10.6	0.0	4.49	6987	0.23	77.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003731292-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
003731292-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
003731292-03	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—HALO_GHOST
003731292-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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

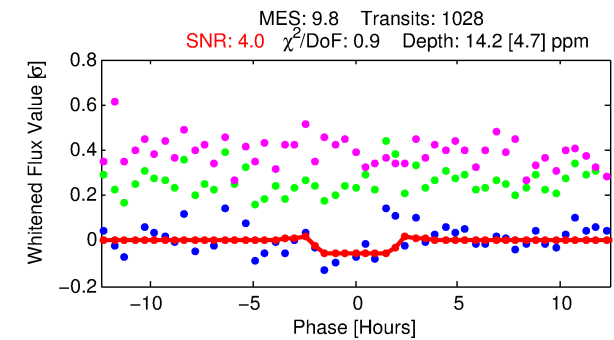
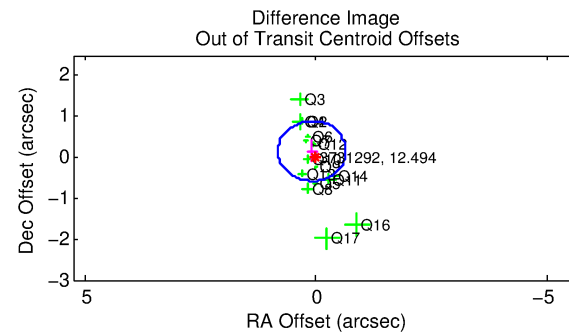
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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 003731292-03

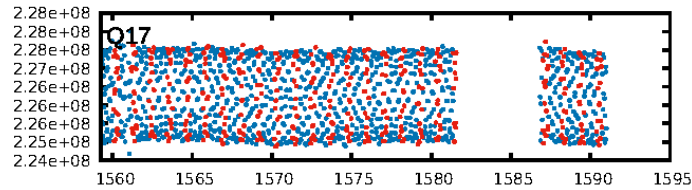
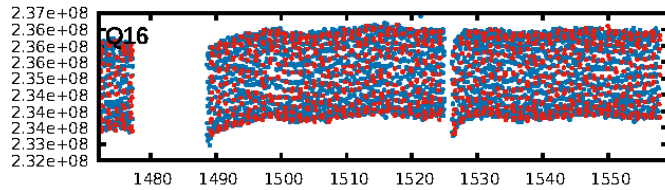
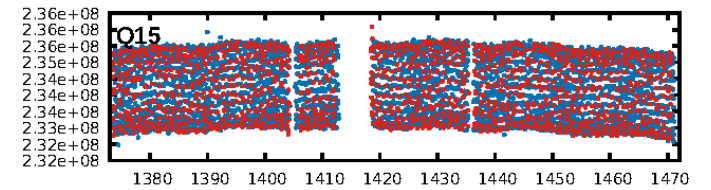
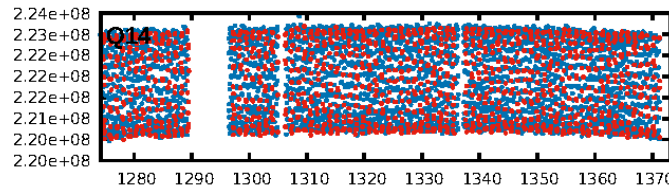
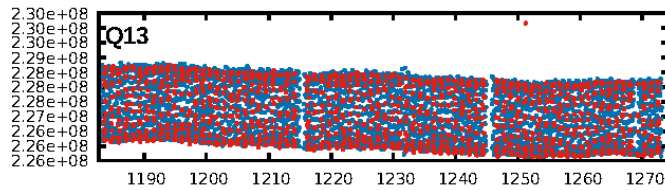
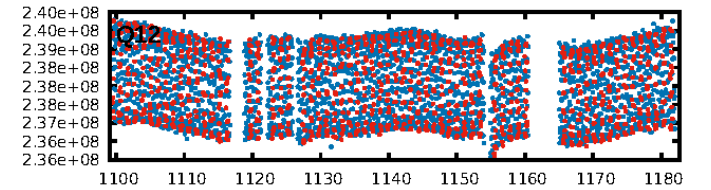
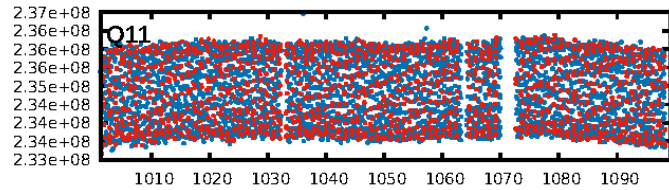
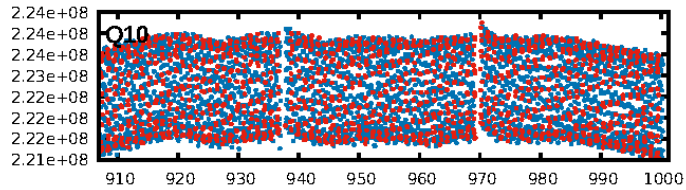
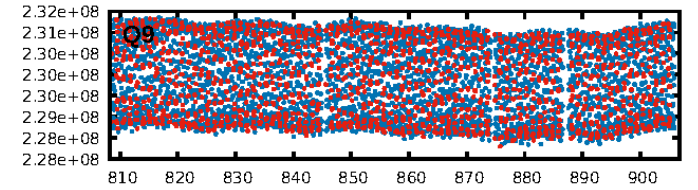
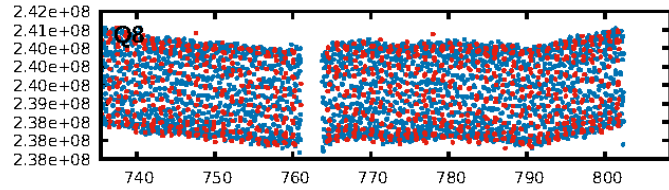
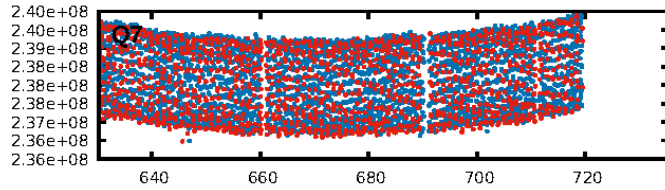
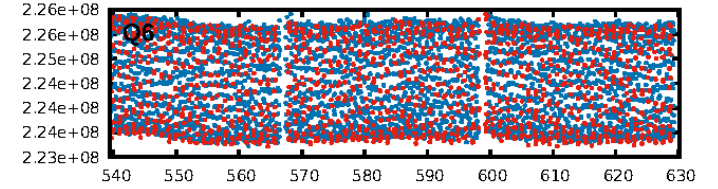
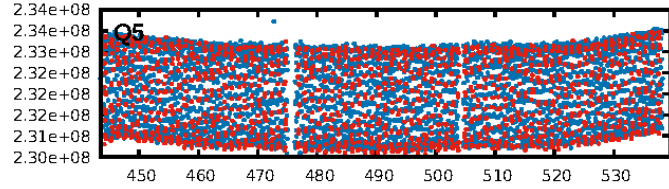
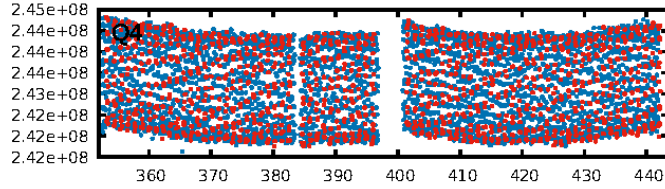
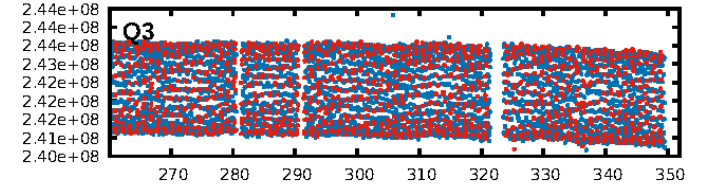
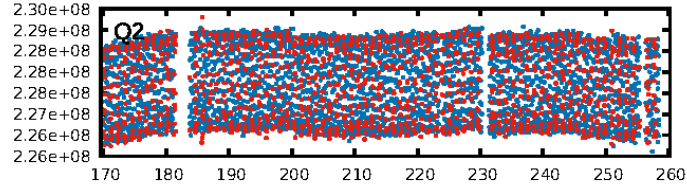
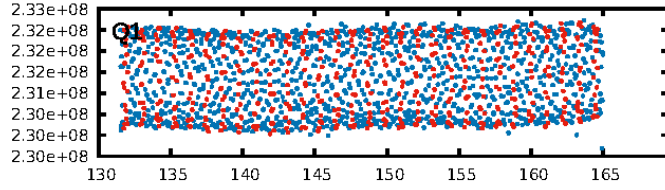
No Significant Match Found

## KIC: 3731292    Candidate: 3 of 4    Period: 1.124 d



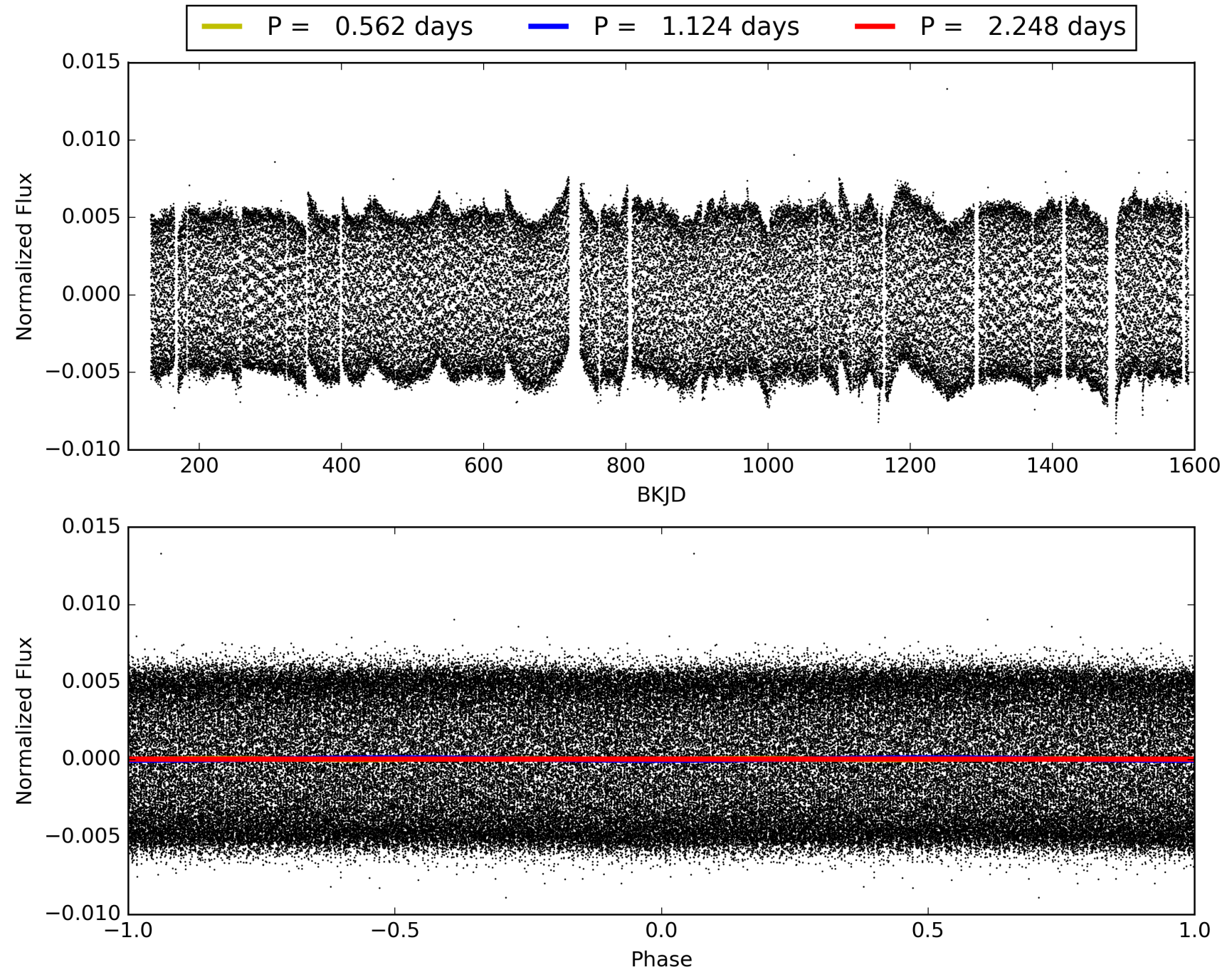
ShortPeriod-sig: 0.7% [0.01σ]  
LongPeriod-sig: 0.4% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.36e-14  
RollingBand-fgt: 0.99 [966/974]  
**GhostDiagnostic-chr: 0.1852**  
  
**Centroid-sig: 0.0%**  
**Centroid-so: 6.534 arcsec [5.63σ]**  
OotOffset-rm: 0.180 arcsec [0.73σ]  
KicOffset-rm: 0.383 arcsec [1.60σ]  
OotOffset-st: 4/3/4/4 [15]  
KicOffset-st: 4/3/4/4 [15]  
DiffImageQuality-fgm: 0.73 [11/15]  
DiffImageOverlap-fno: 0.06 [1/17]

# TCE 003731292-03, PDC Light Curves



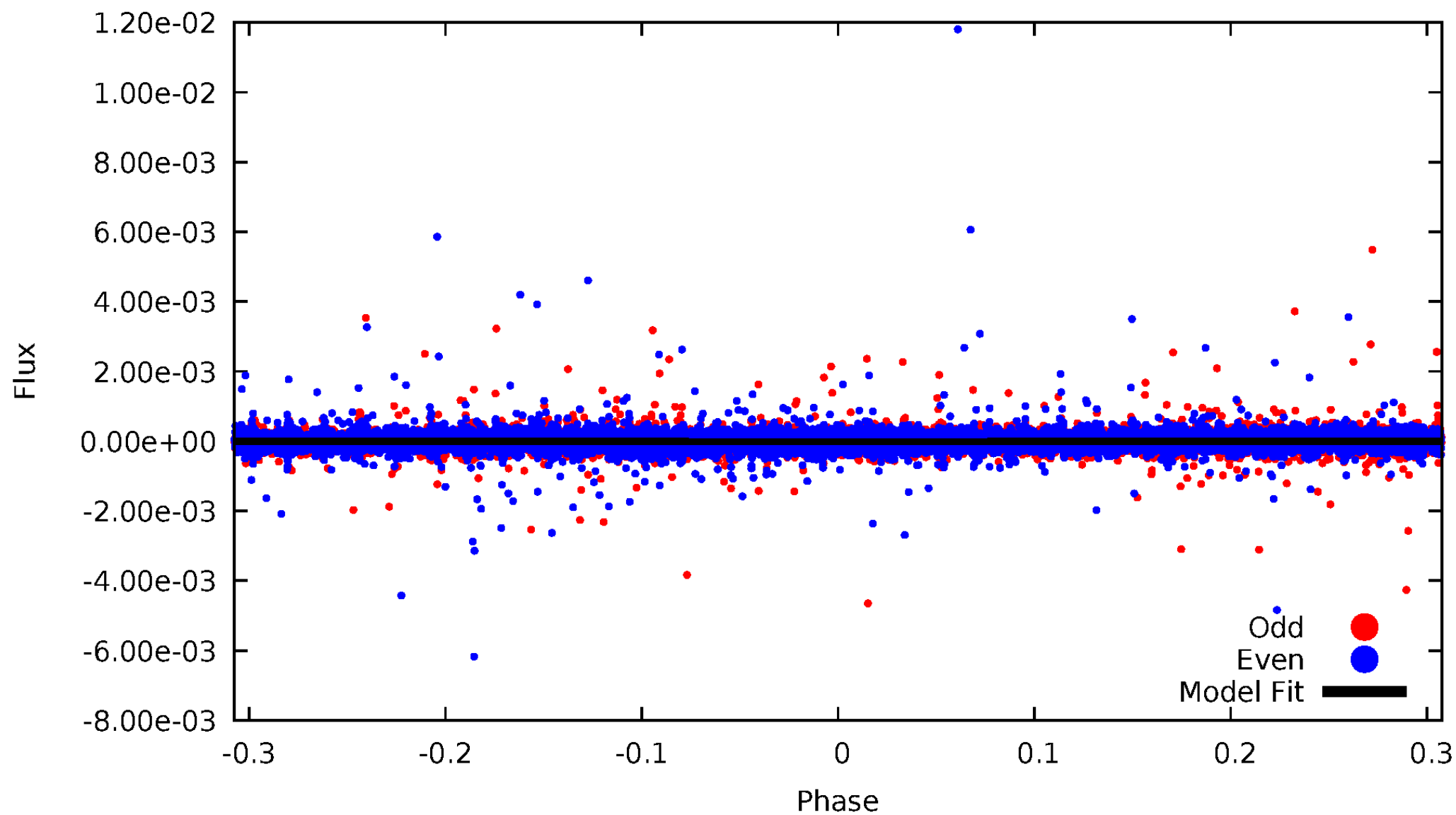


# TCE 003731292-03



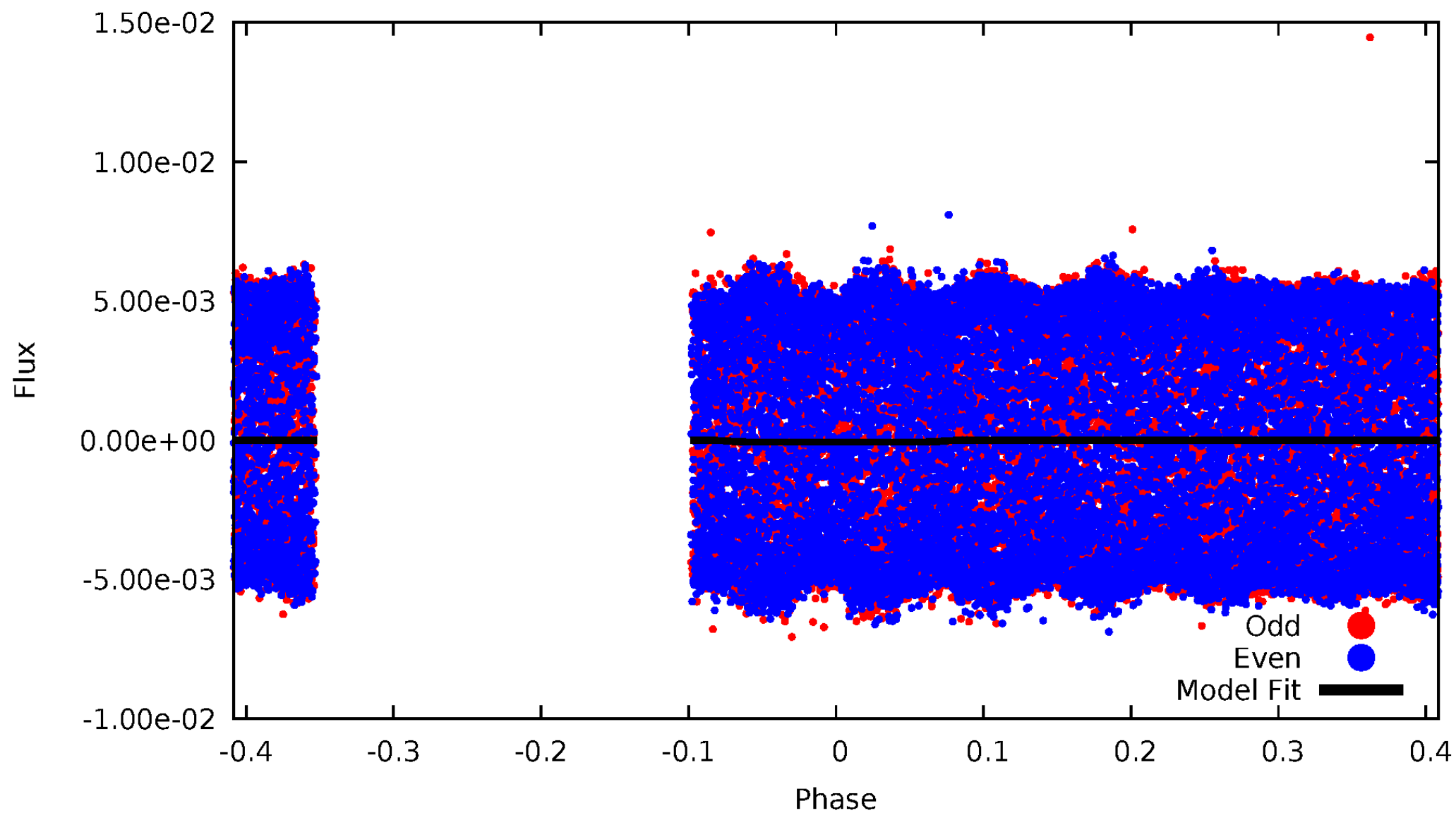
DV Odd/Even

TCE 003731292-03



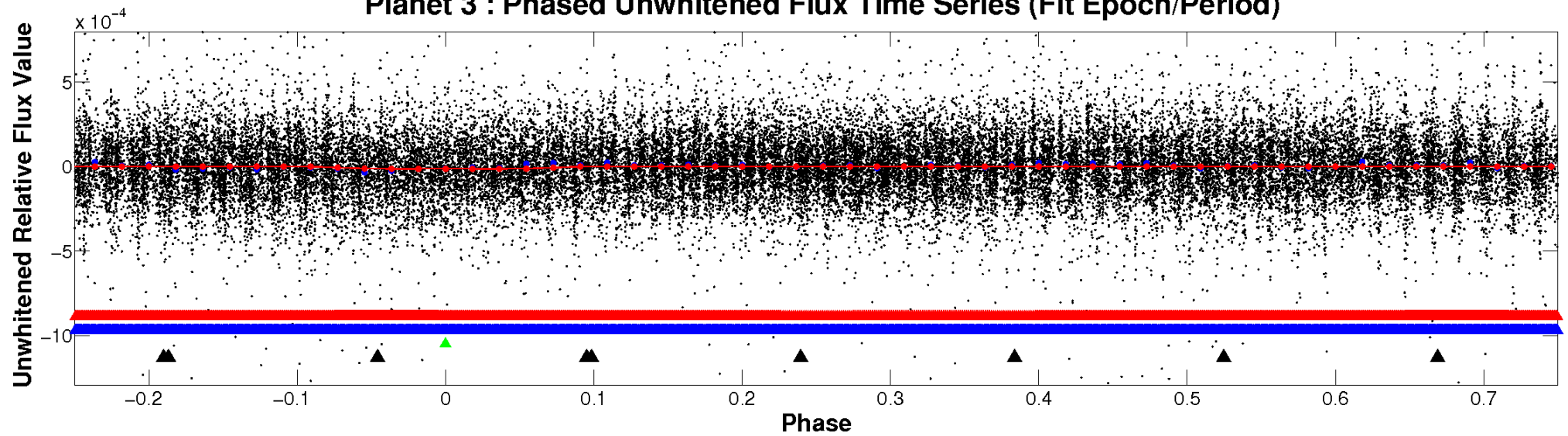
# ALT Odd/Even

TCE 003731292-03

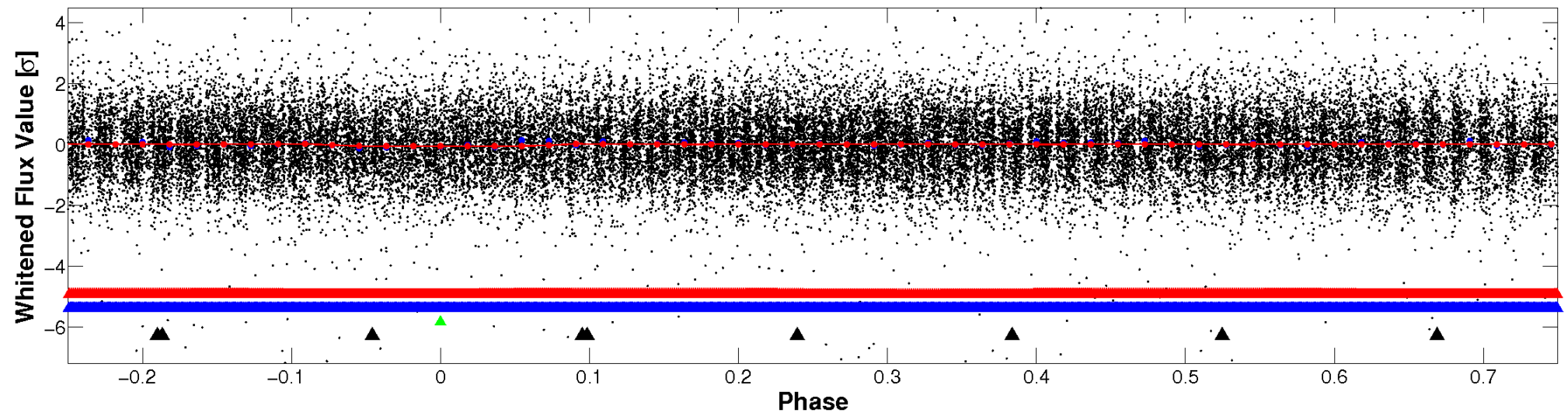


# Non-Whitened Vs. Whitened Light Curve

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

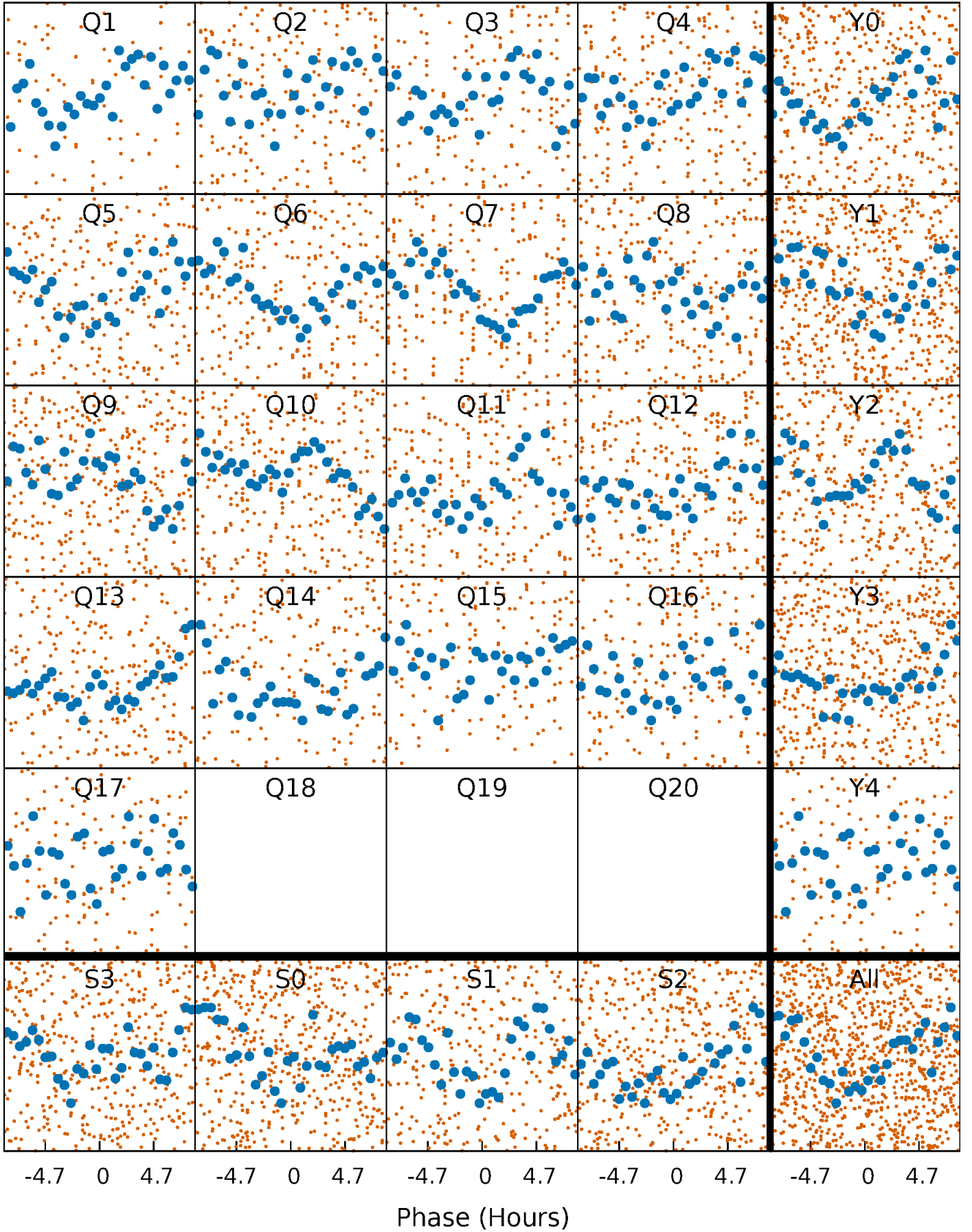


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

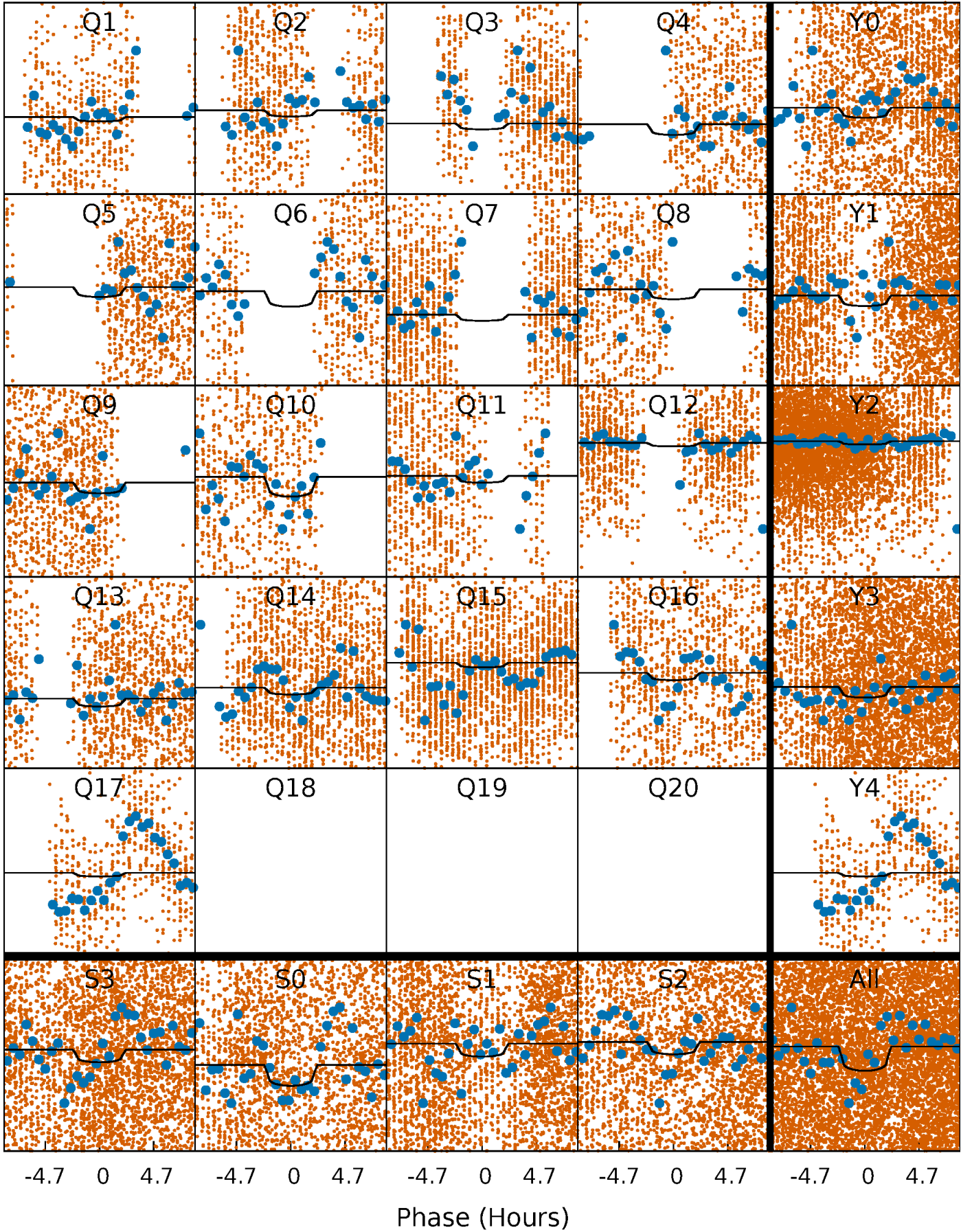
TCE 003731292-03   P= 1.123774 Days    $T_0=131.886110$  (BKJD)





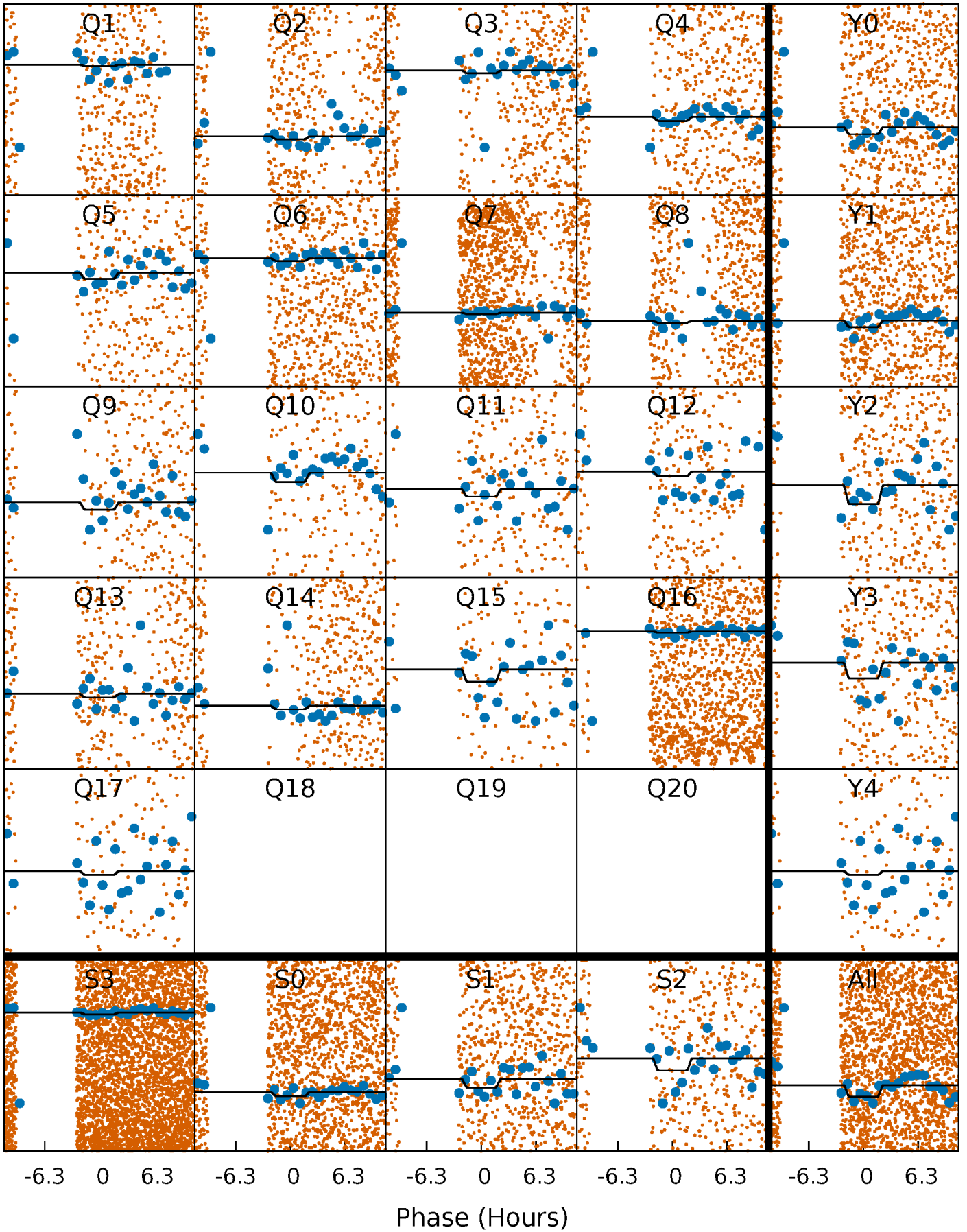
# DV Quarter-Phased Transit Curves

TCE 003731292-03     $P = 1.123774$  Days     $T_0 = 131.886110$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

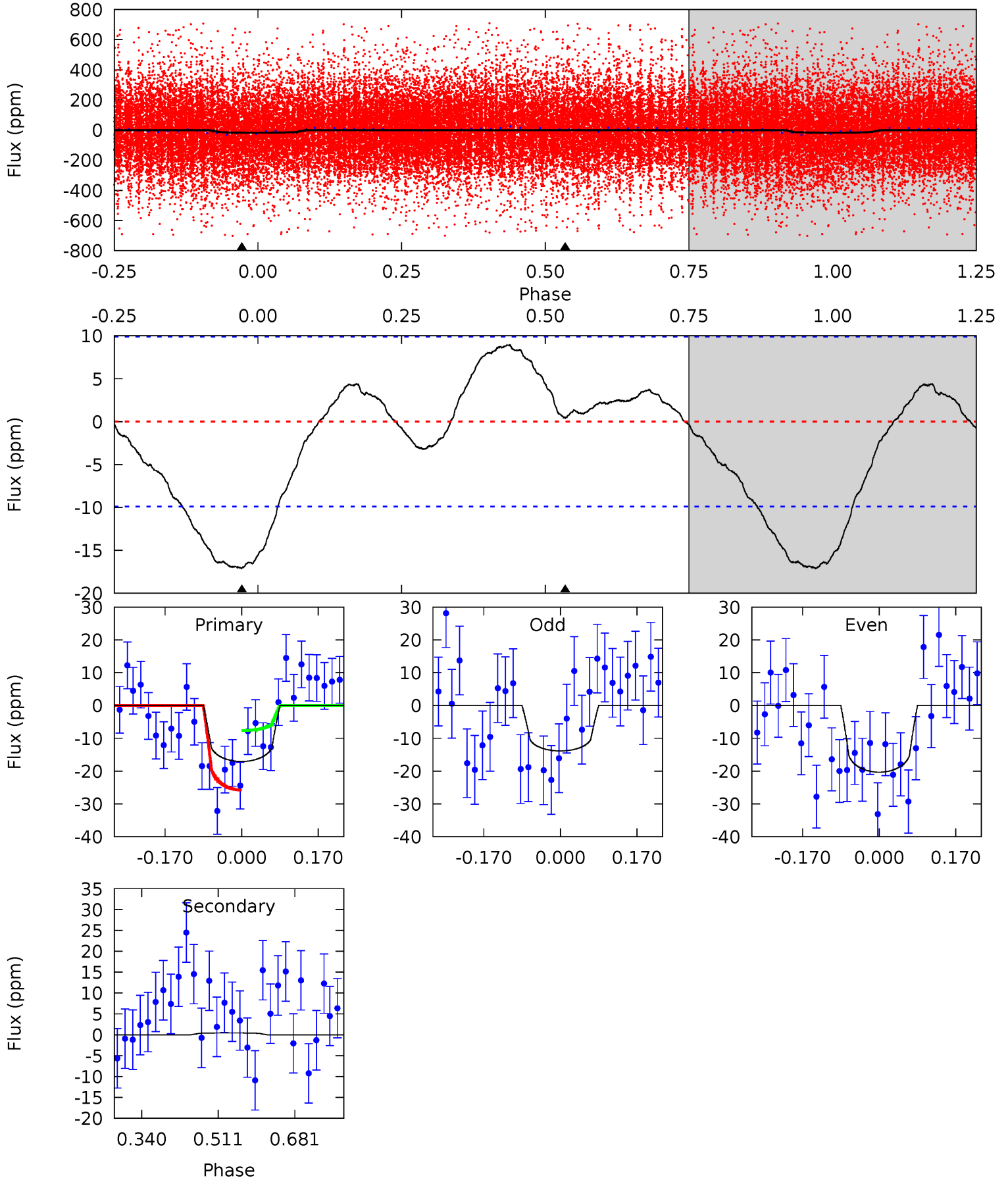
TCE 003731292-03 P= 1.124740 Days  $T_0=131.709721$  (BKJD)



# DV Model-Shift Uniqueness Test

003731292-03, P = 1.123774 Days, E = 130.762336 Days

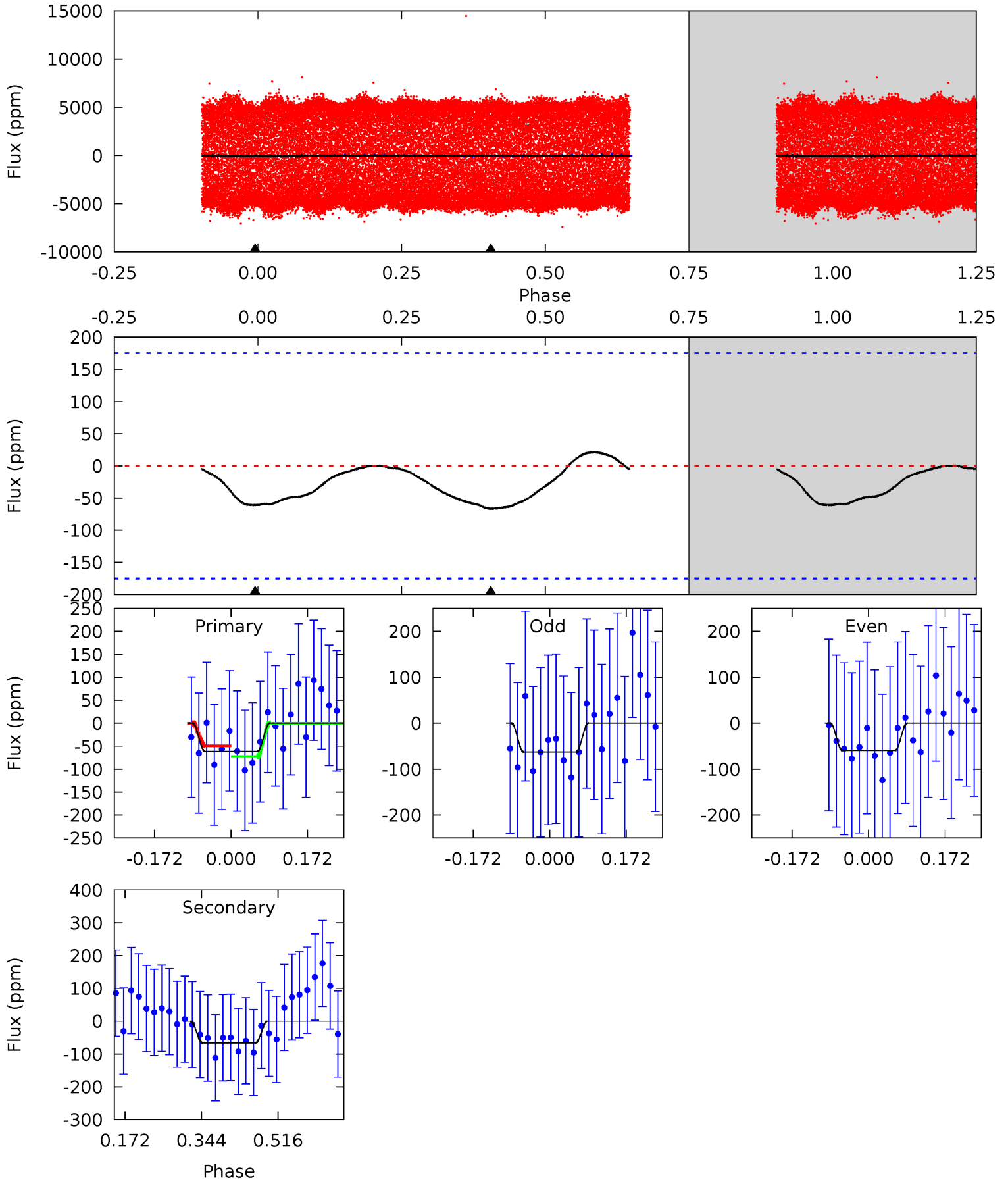
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.67	-0.20	0	0	4.45	1.37	1.17	7.67	7.67	-0.20	-0.20	1.42	0.45	0.34	4.06



# Alt Model-Shift Uniqueness Test

003731292-03, P = 1.124740 Days, E = 130.584981 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.55	1.70	0	0	4.45	1.37	0.24	1.55	1.55	1.70	1.70	0.04	0.77	0.24	0.29



### Stellar Parameters For KIC 003731292

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6987^{+194}_{-292}$	$3.444^{+0.666}_{-0.074}$	$-0.100^{+0.250}_{-0.300}$	$4.491^{+0.316}_{-2.841}$	$2.048^{+0.073}_{-0.659}$	$0.032^{+0.374}_{-0.008}$
	+3%/-4%	+19%/-2%	+250%/-300%	+7%/-63%	+4%/-32%	+1174%/-26%
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 003731292-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 2$	$1.59^{+1.19}_{-0.95}$	$5354^{+377}_{-914}$	$-4694^{+6505}_{-966}$	$-0.056^{+0.357}_{-0.649}$
Alt.	$-67 \pm 39$	$3.47^{+1.39}_{-1.34}$	$5362^{+352}_{-805}$	$6555^{+2040}_{-1885}$	$2.027^{+3.682}_{-1.374}$

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



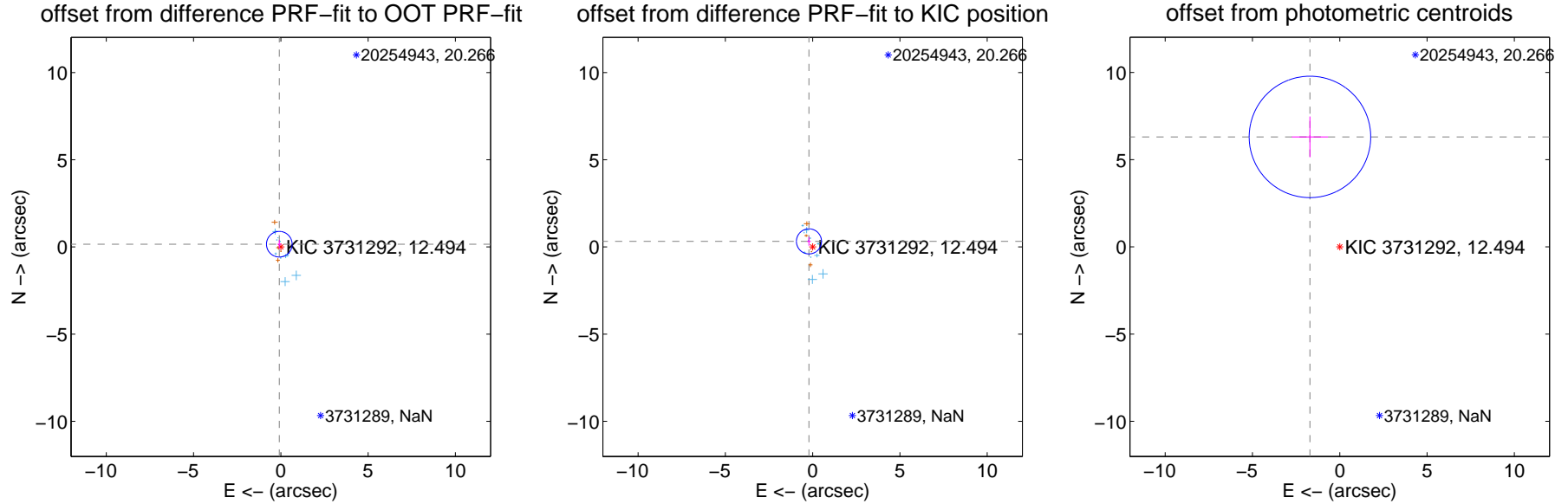
## DV Centroid Data

Supplemental centroid analysis for 003731292-03. Kepler magnitude: 12.49. Transit SNR 4.00

There are 11 quarters with good PRF difference image offsets

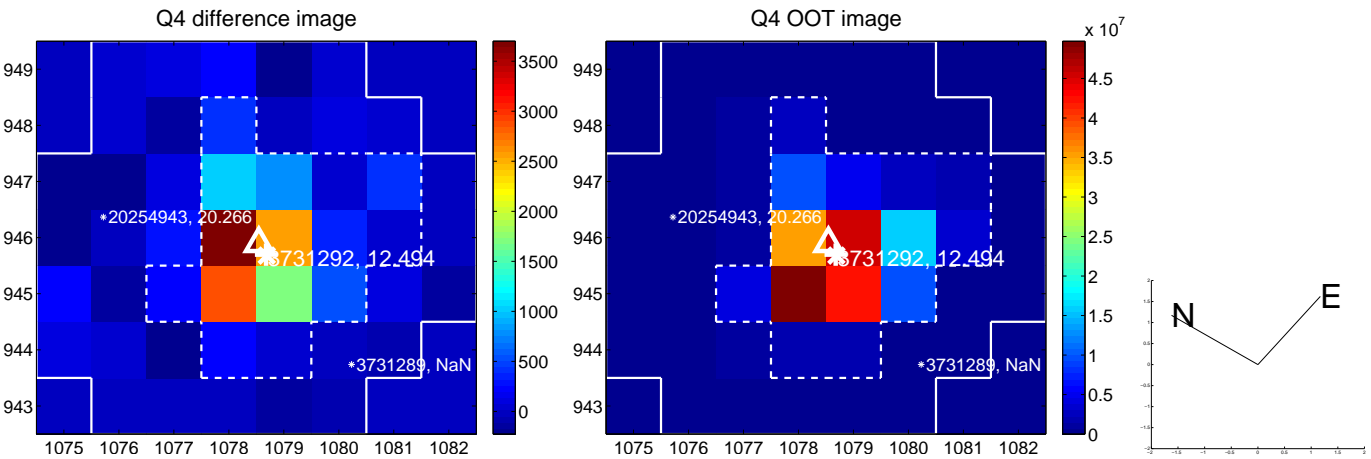
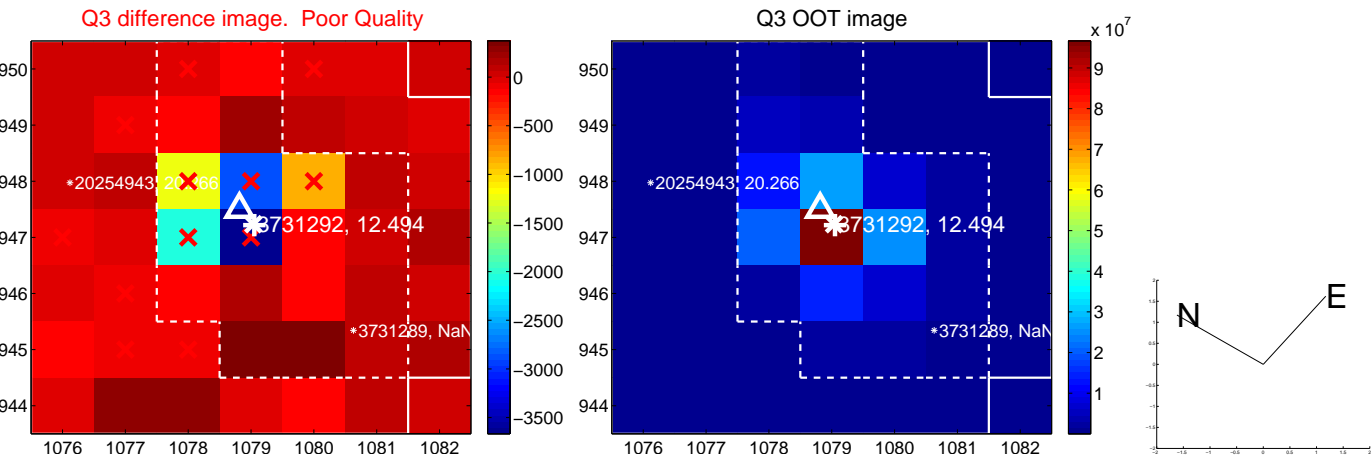
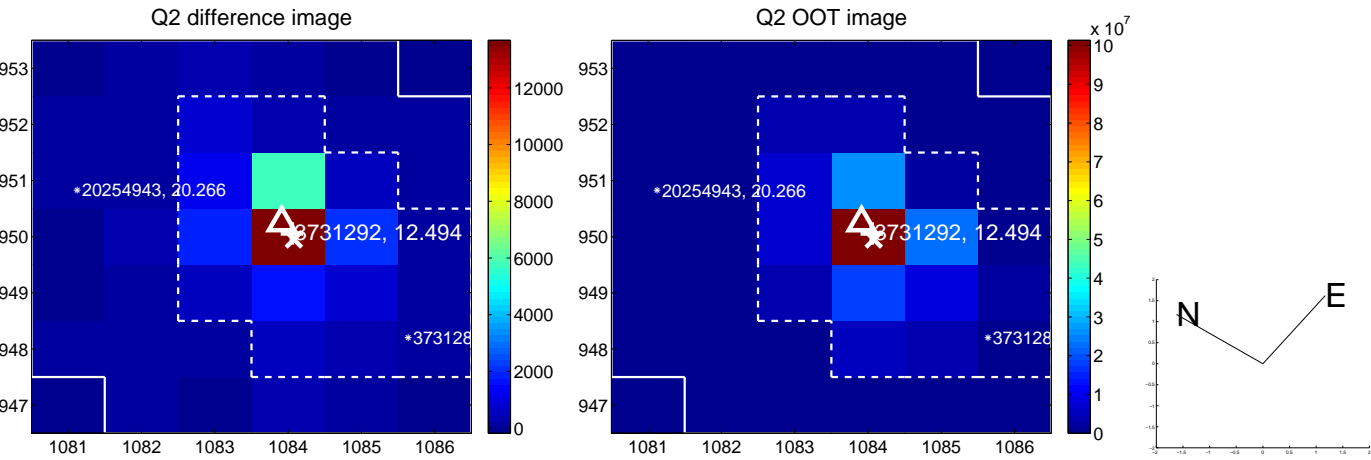
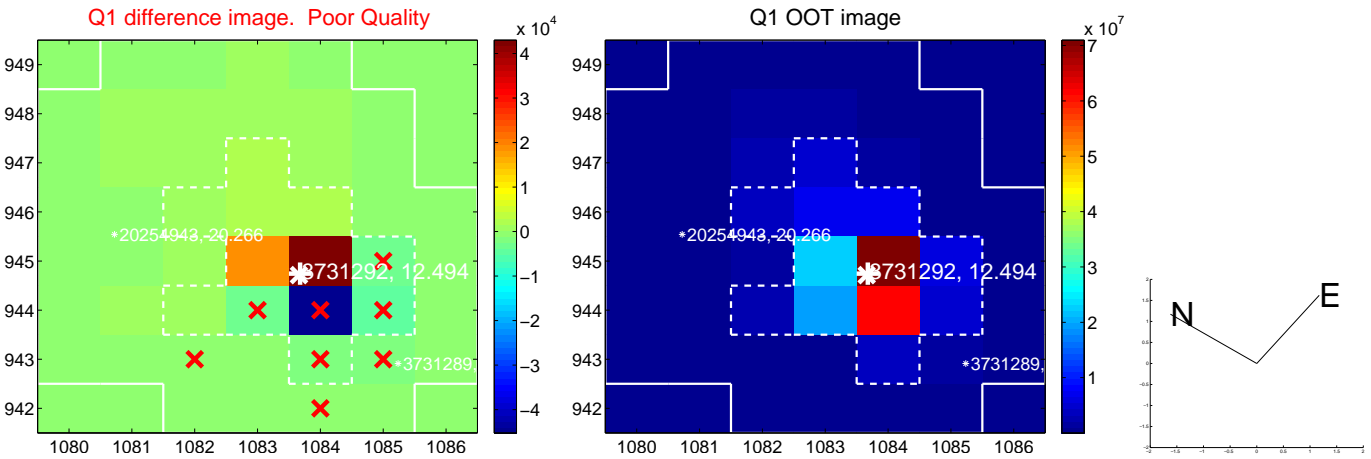
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.180 \pm 0.245$	0.73	$0.088 \pm 0.107$	$0.157 \pm 0.243$
PRF-fit source offset from KIC position	$0.383 \pm 0.240$	1.60	$0.211 \pm 0.104$	$0.320 \pm 0.249$
photometric centroid source offset	$6.53 \pm 1.16$	5.63	$1.71 \pm 1.03$	$6.31 \pm 1.17$

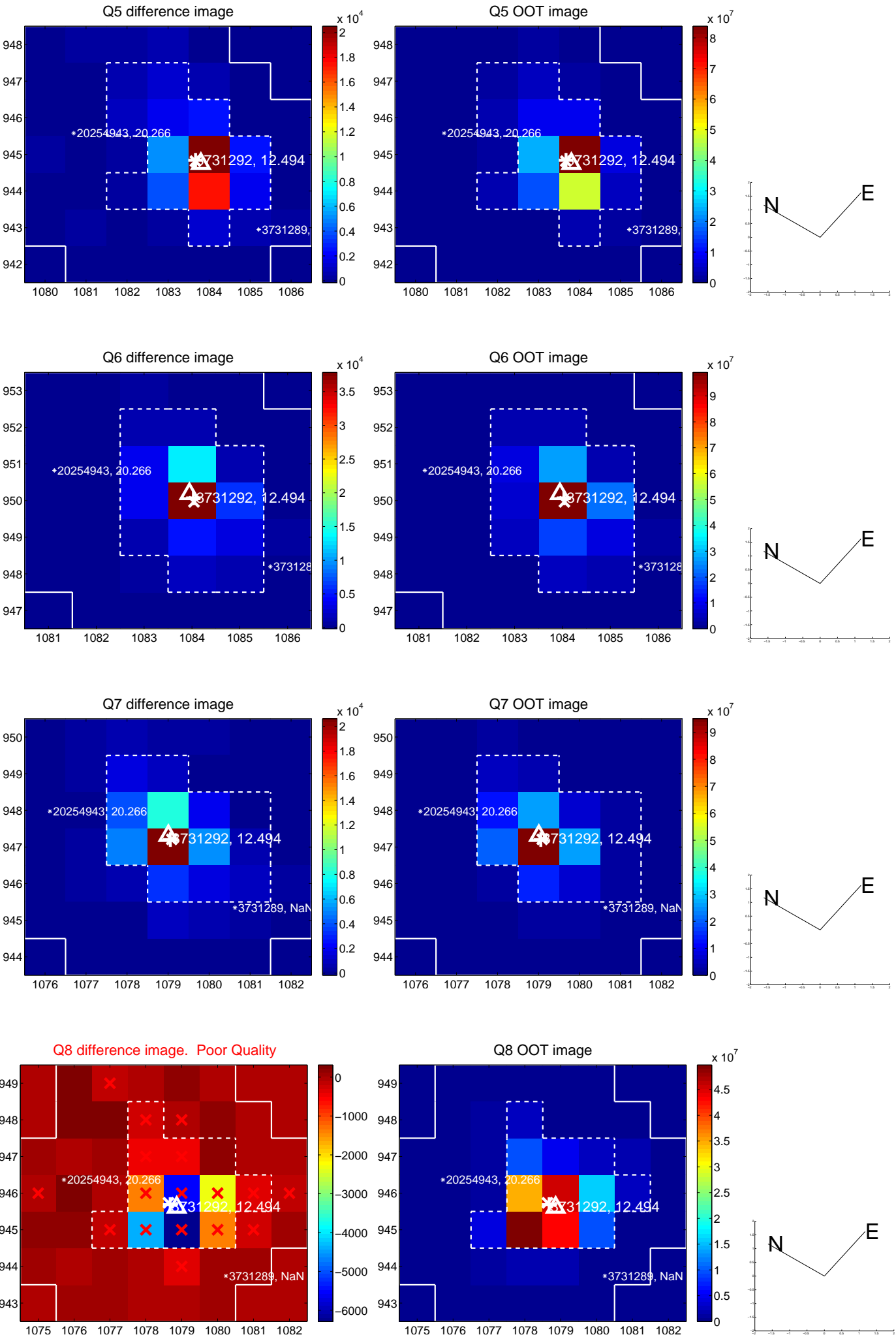


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

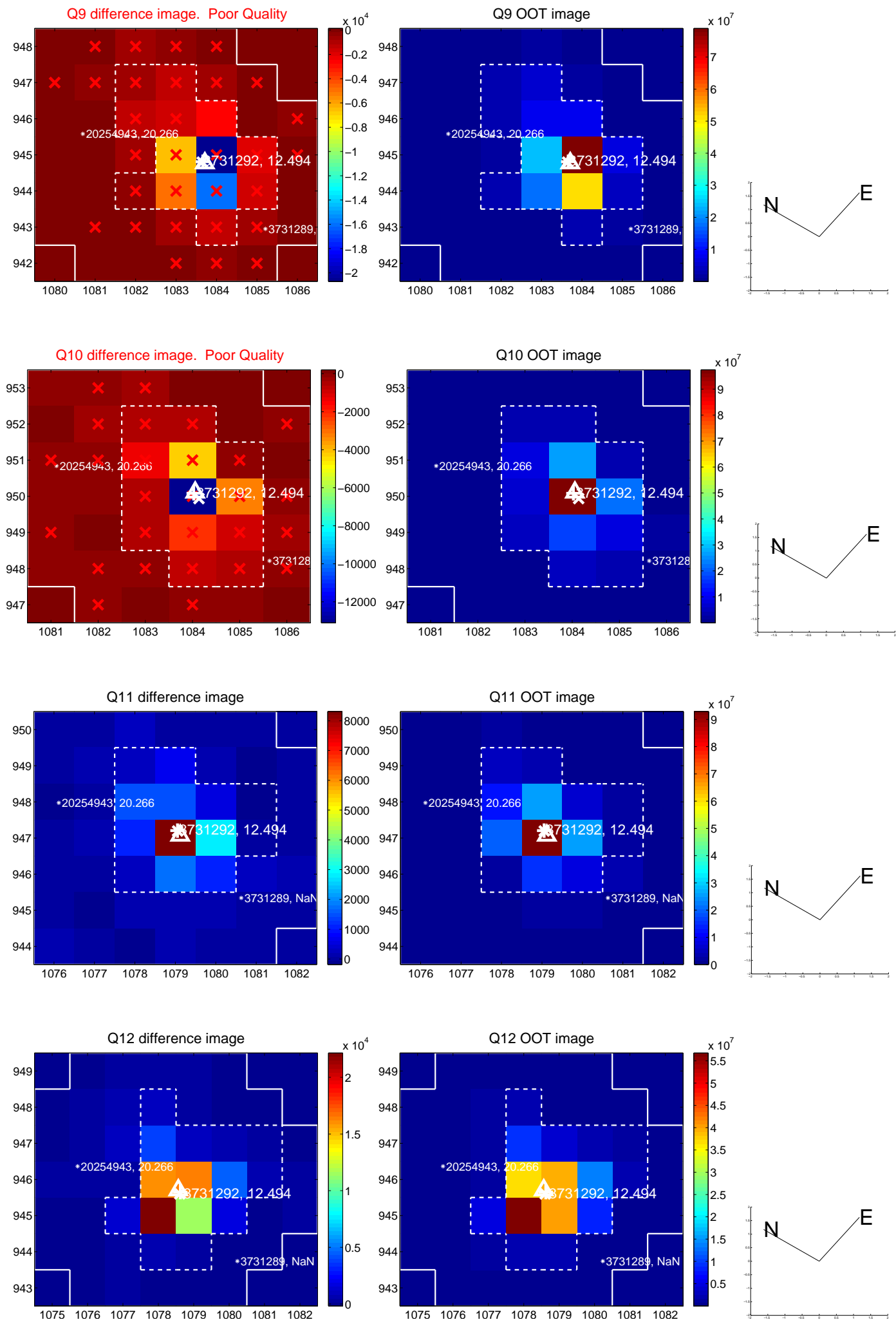
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



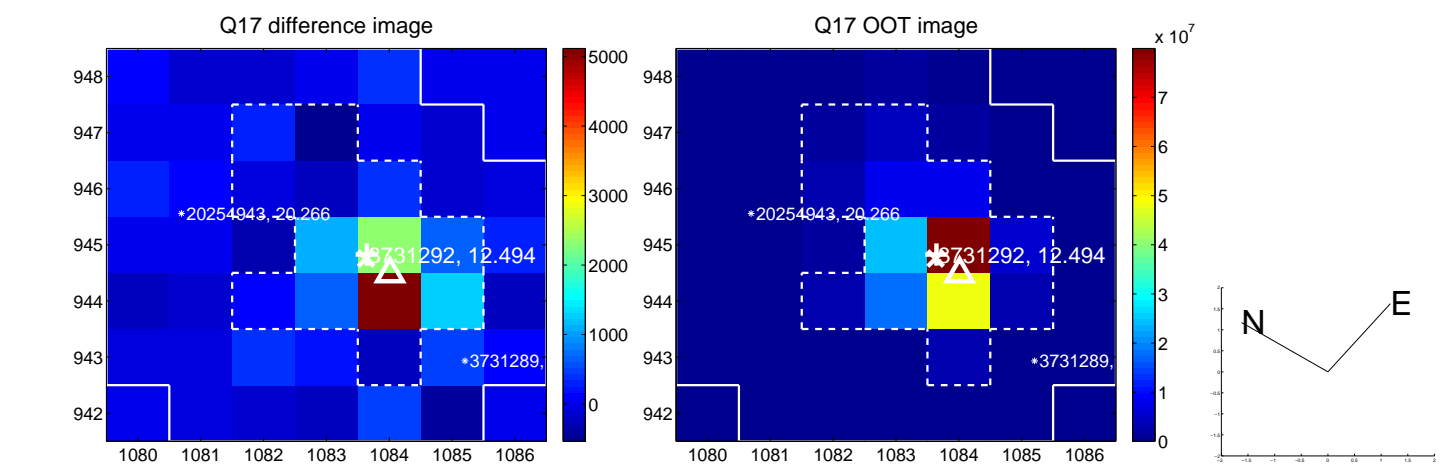
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



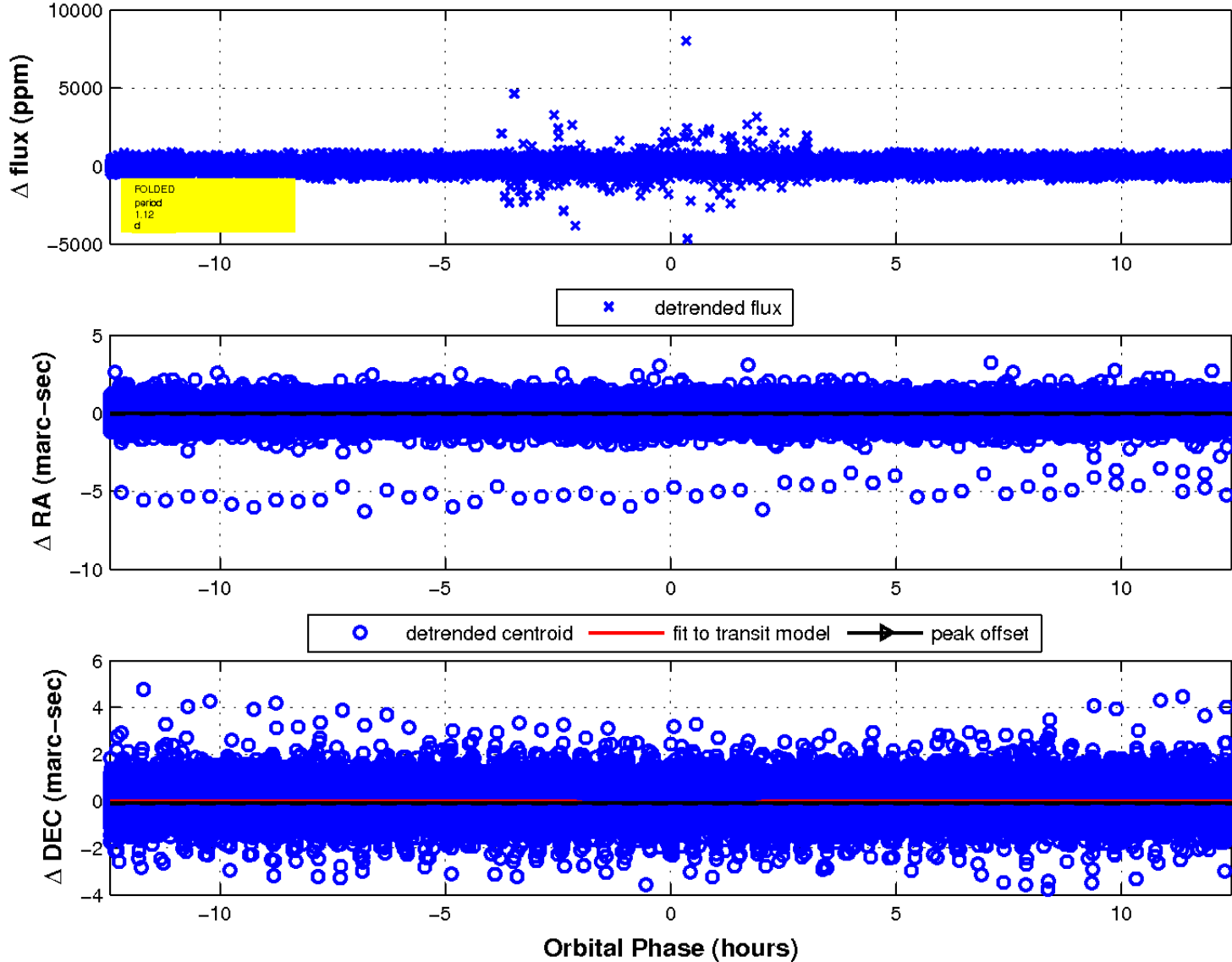




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

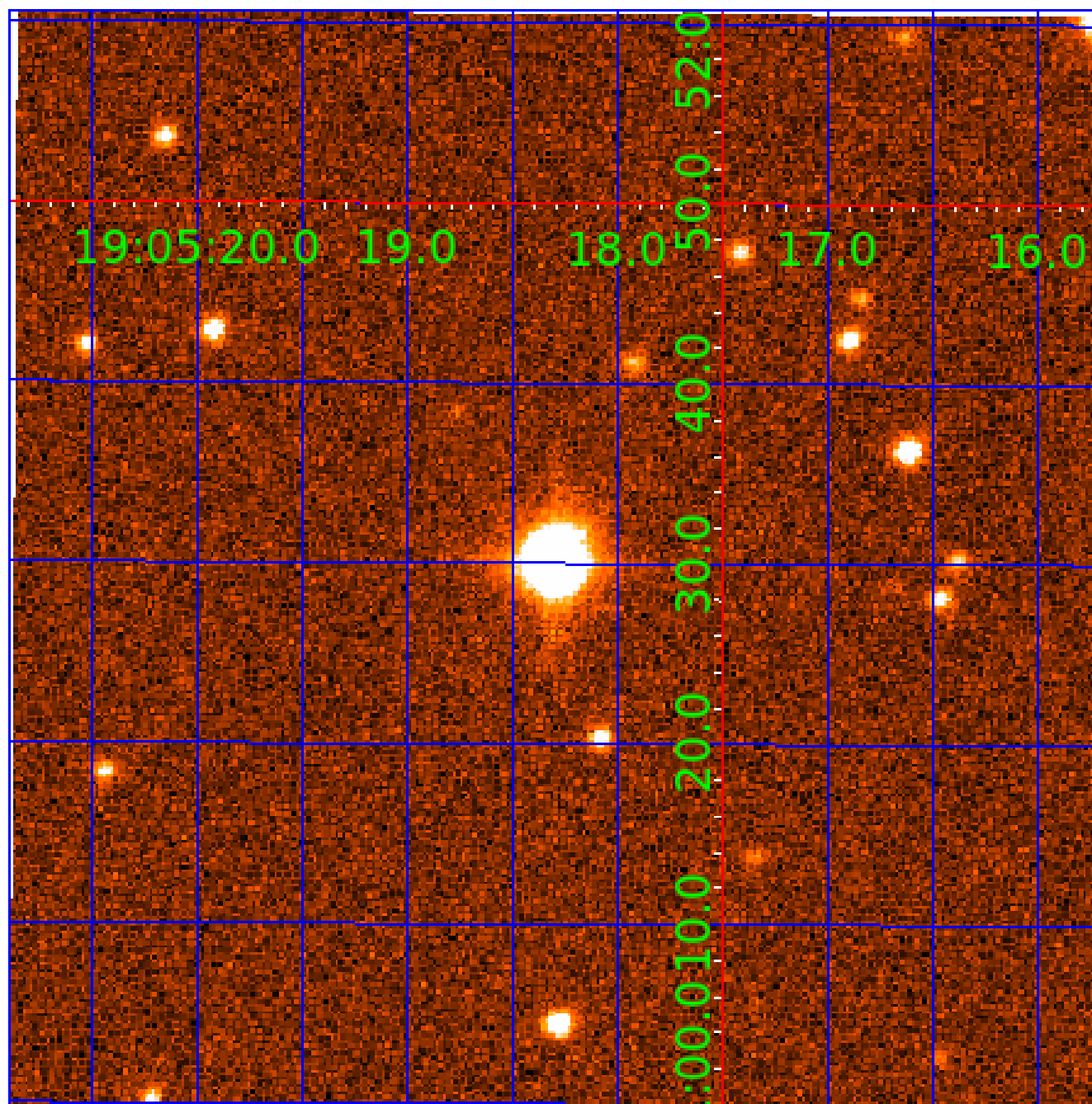


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



# KIC 003731292

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003731292-01	OBS	No	1.122194	132.139759	4.9	1.240	9.8	1.3	4.49	6987	1.12	59822.15
003731292-02	OBS	No	1.124737	132.583091	0.0	2.152	10.4	0.0	4.49	6987	0.11	59641.89
003731292-03	OBS	No	1.123774	131.886110	14.2	4.146	9.8	4.0	4.49	6987	1.73	59710.05
003731292-04	OBS	No	164.874220	242.122941	0.2	0.962	10.6	0.0	4.49	6987	0.23	77.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003731292-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
003731292-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
003731292-03	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—HALO_GHOST
003731292-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS

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

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

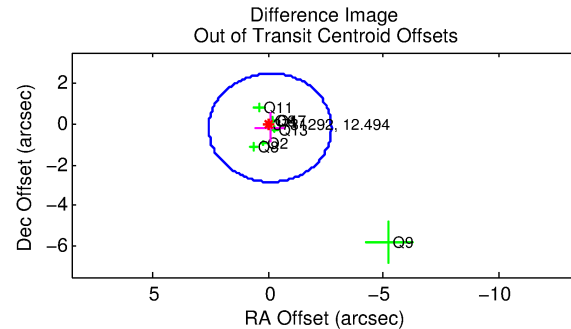
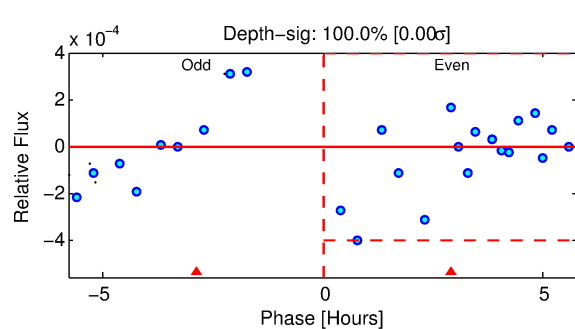
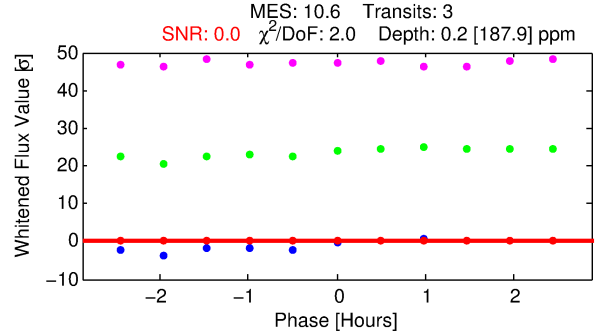
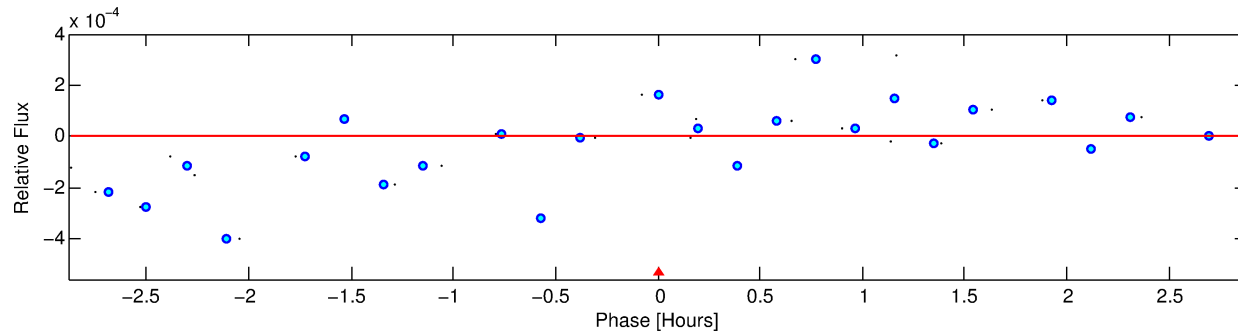
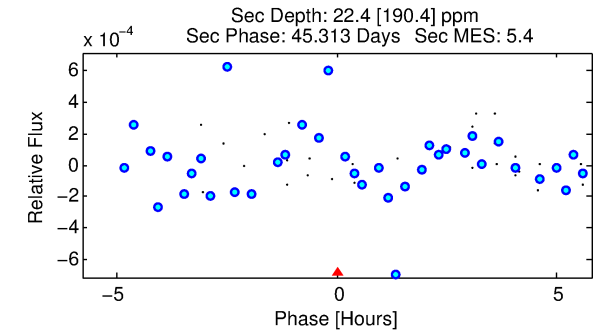
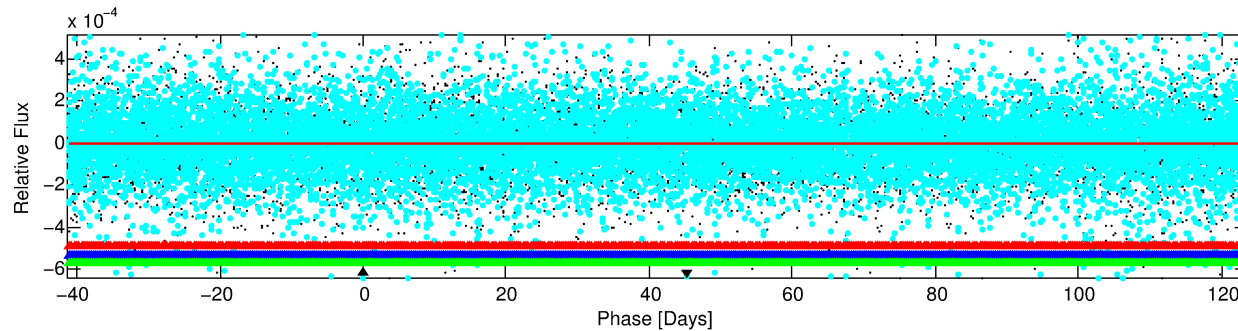
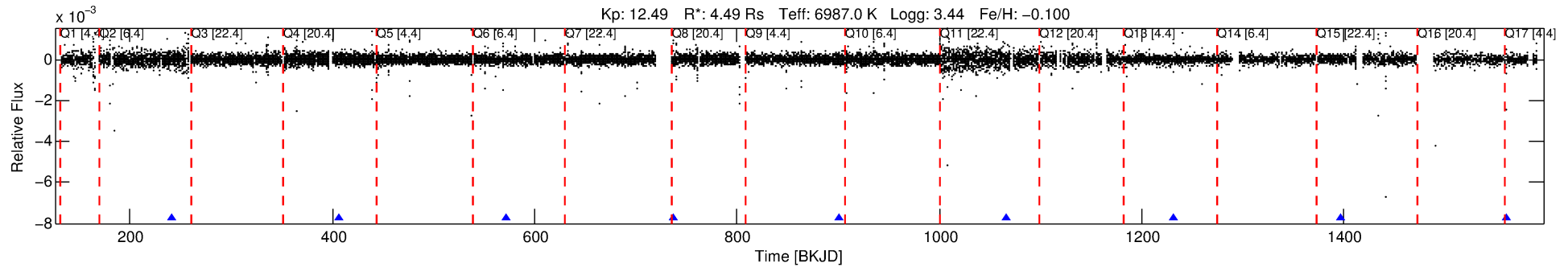
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003731292-04

No Significant Match Found

# DV One-Page Summary

KIC: 3731292 Candidate: 4 of 4 Period: 164.874 d



## DV Fit Results:

Period = 164.87422 [19.82210] d  
Epoch = 242.1229 [24.8497] BKJD  
Rp/R\* = 0.0005 [2.0543]  
a/R\* = 1310.33 [33516096.94]  
b = 0.02 [1131789.33]  
Seff = 77.16 [87.19]  
Teq = 756 [213] K  
Rp = 0.23 [1006.74] Re  
a = 0.7471 [0.4987] AU  
Ag = 132344.50 [1167893444.82] [0.00σ]  
Teff = 22287 [49168211] K [0.00σ]

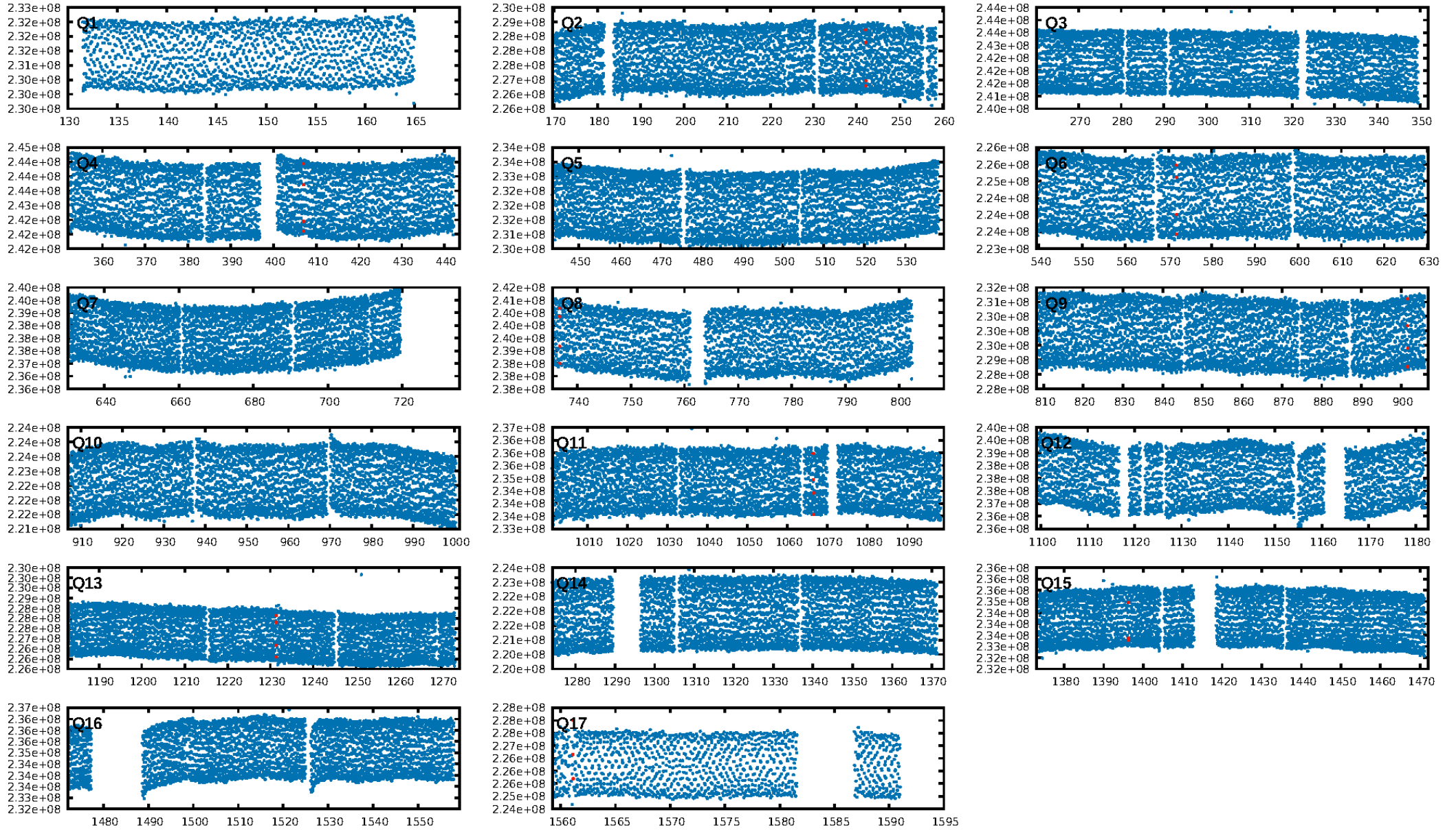
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1667.51σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 63.7%  
ModelChiSquareGof-sig: 95.7%  
**Bootstrap-pfa: 5.58e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OutOffset-rm: 0.213 arcsec [0.24σ]  
KicOffset-rm: 0.143 arcsec [0.45σ]  
OutOffset-st: 2/1/2/3 [8]  
KicOffset-st: 2/1/2/3 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 0.12 [1/8]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:28:41 Z

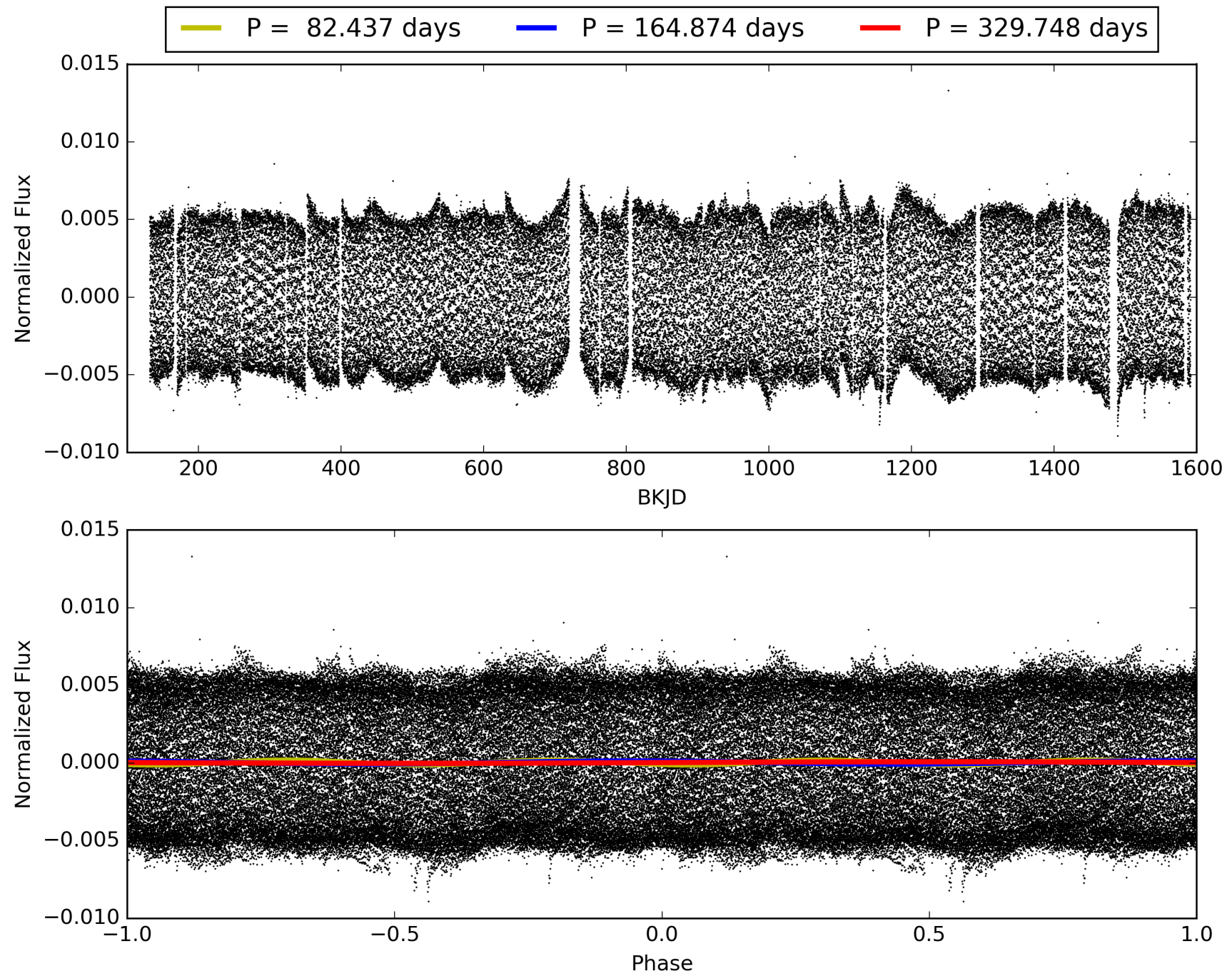
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003731292-04, PDC Light Curves





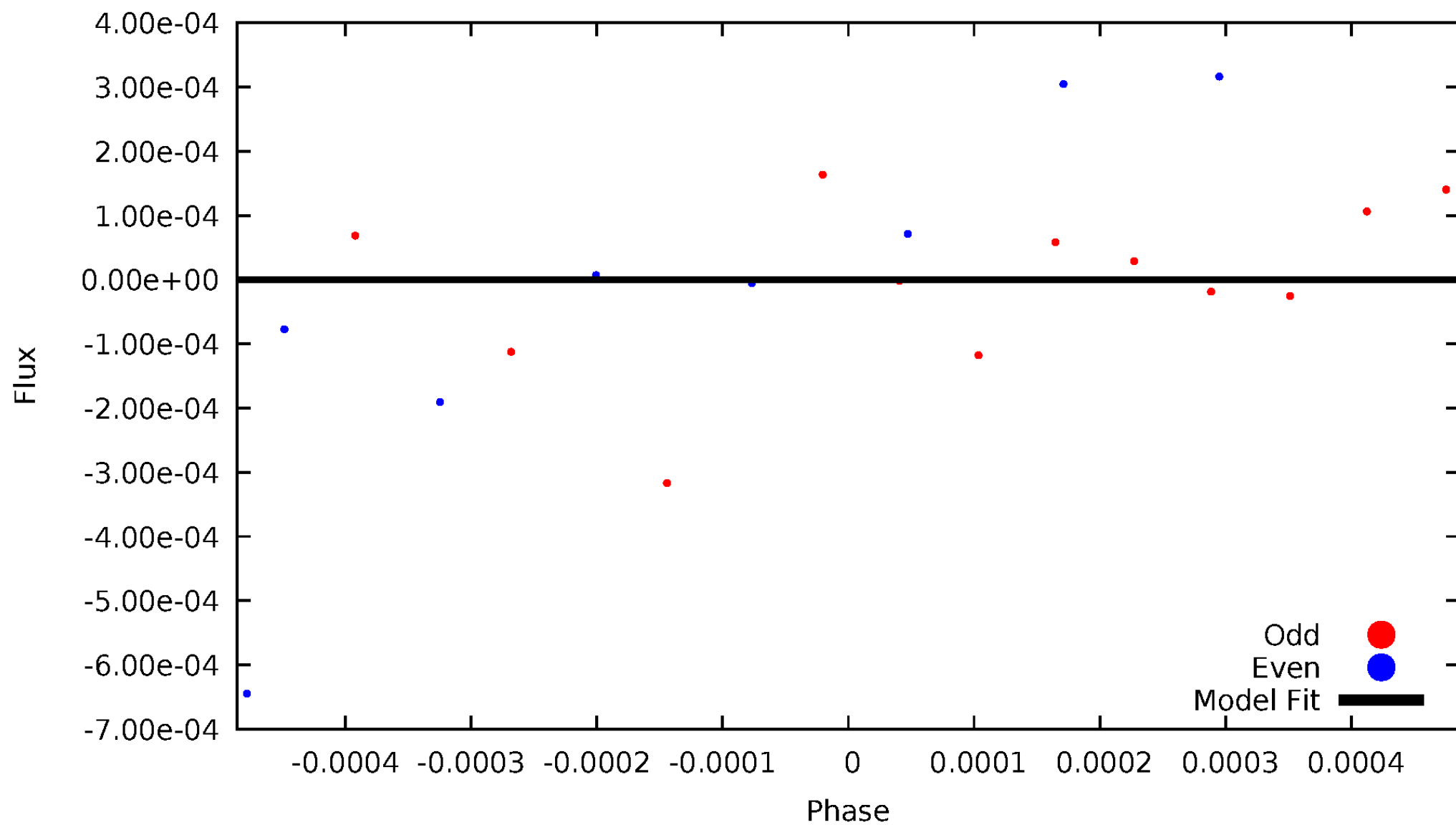
TCE 003731292-04





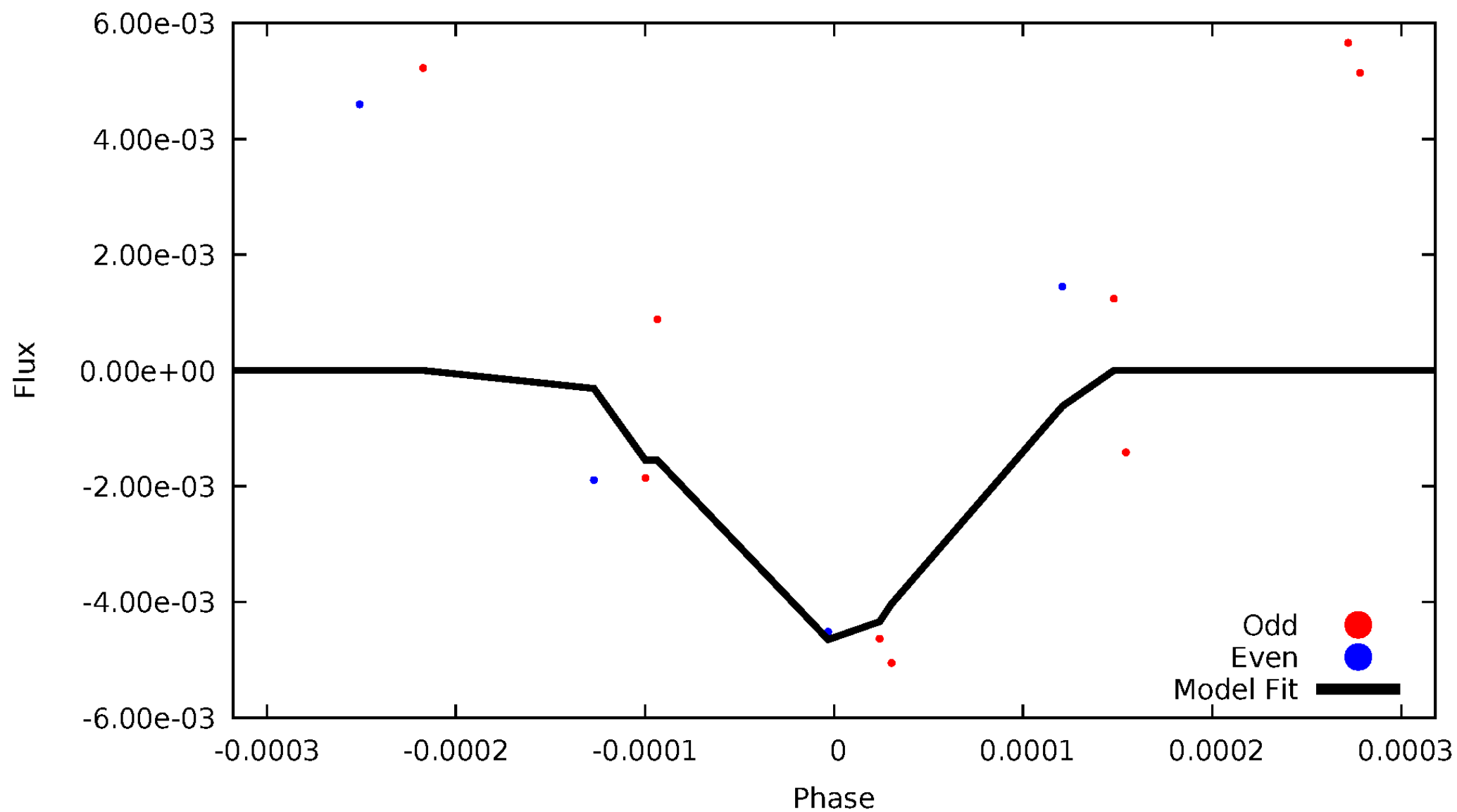
# DV Odd/Even

TCE 003731292-04



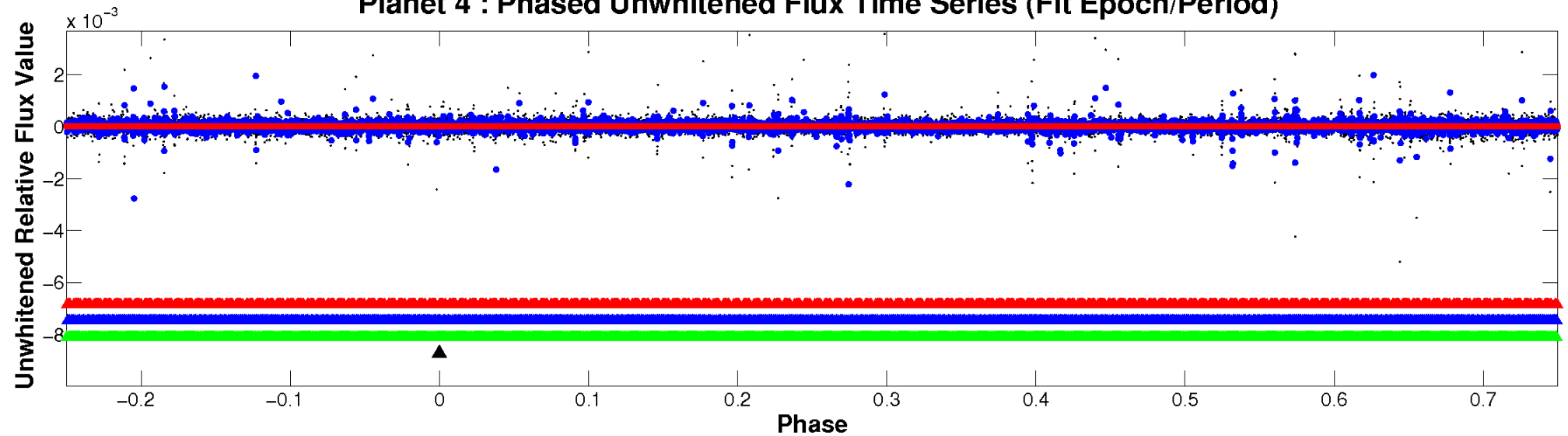
# ALT Odd/Even

TCE 003731292-04

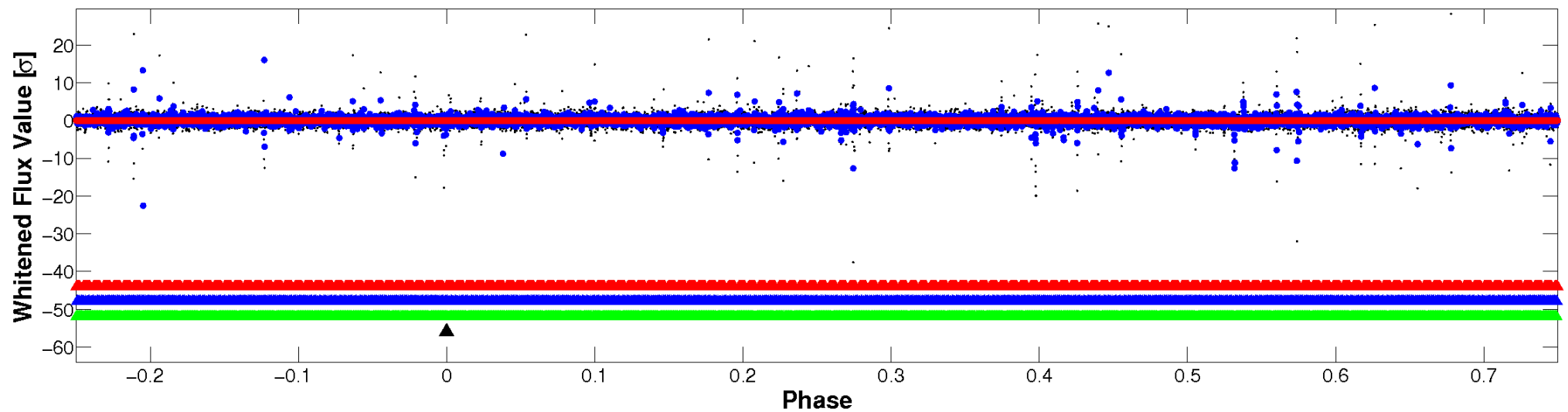


# Non-Whitened Vs. Whitened Light Curve

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

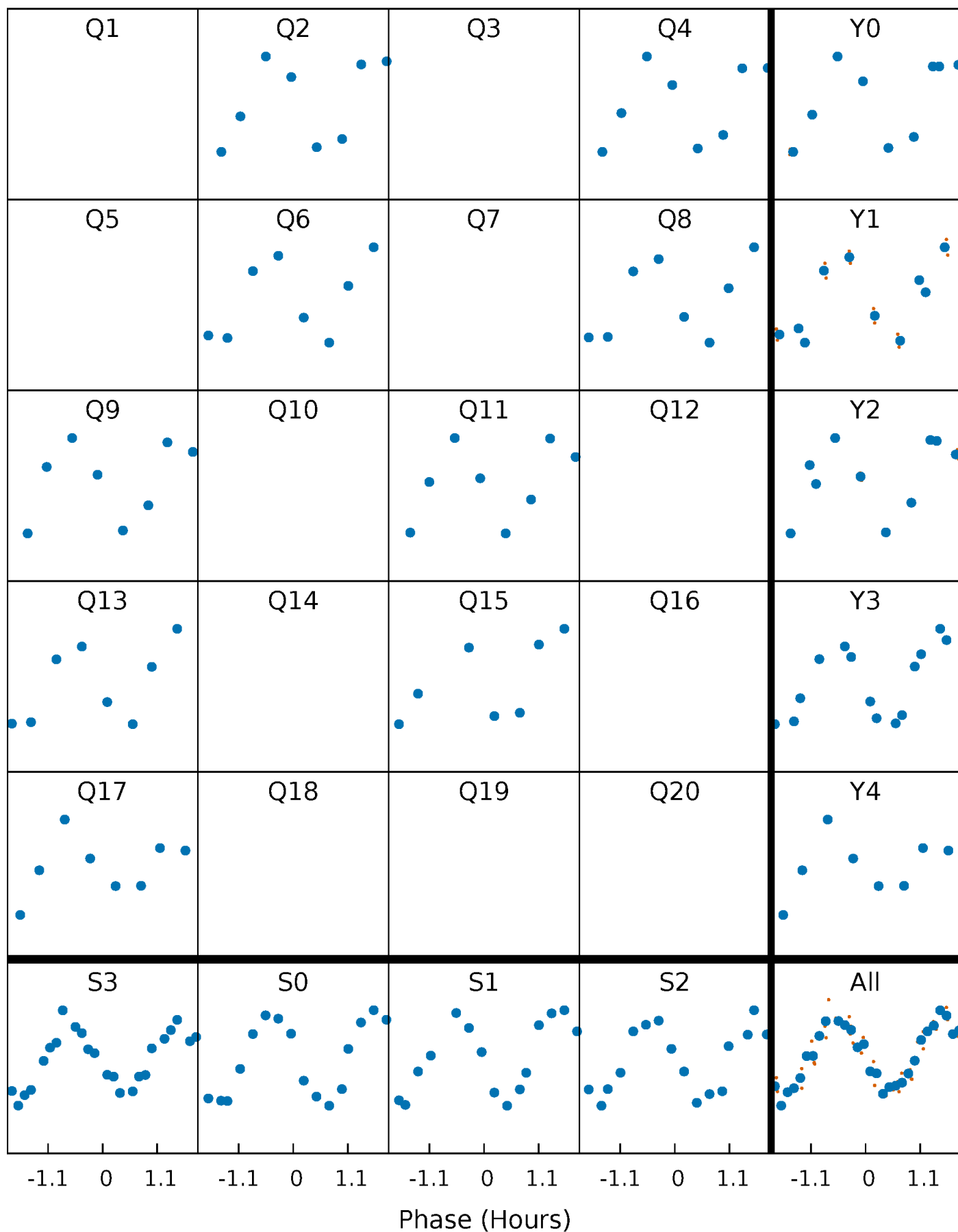


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



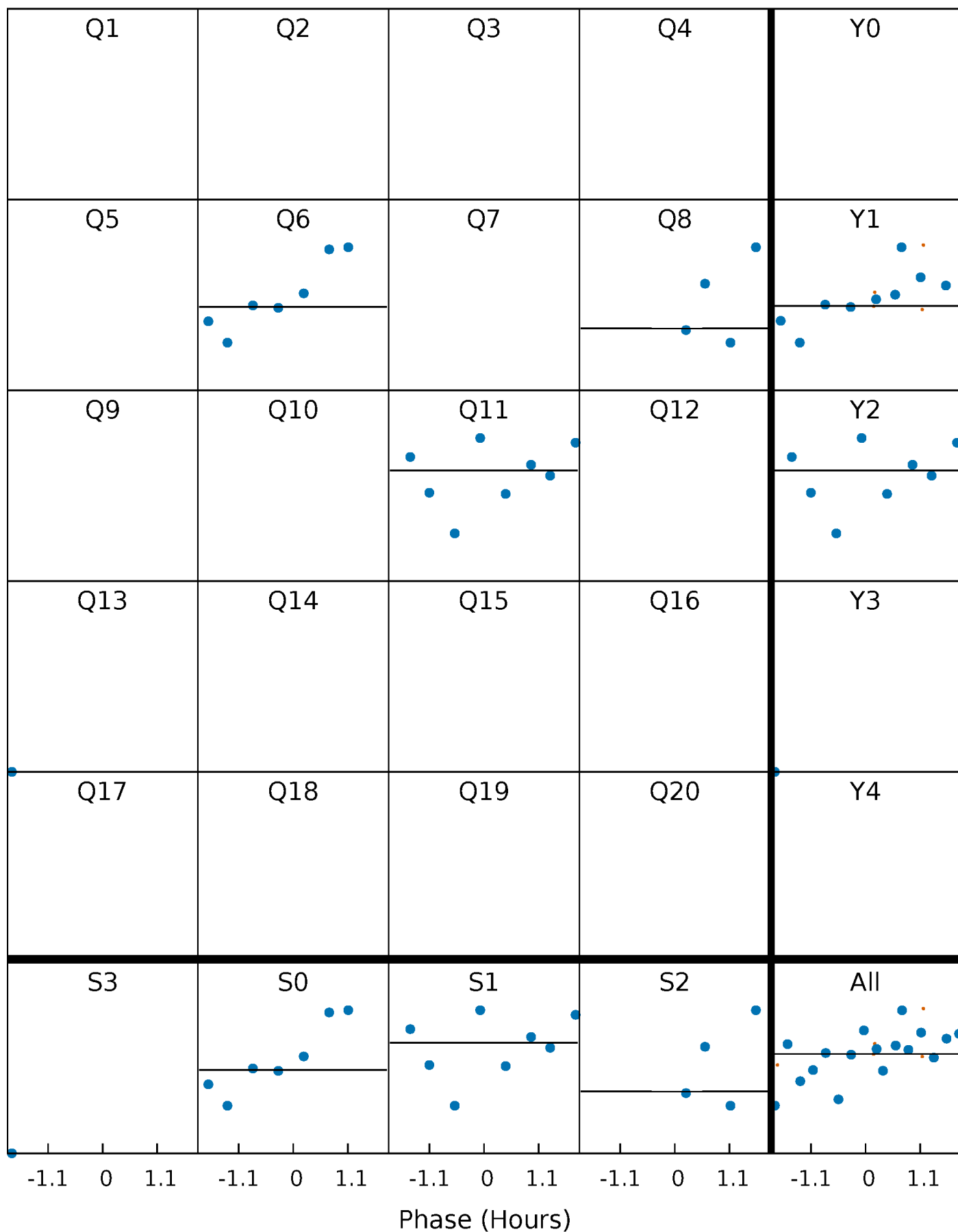
# PDC Quarter-Phased Transit Curves

TCE 003731292-04 P=164.874221 Days  $T_0=242.122941$  (BKJD)



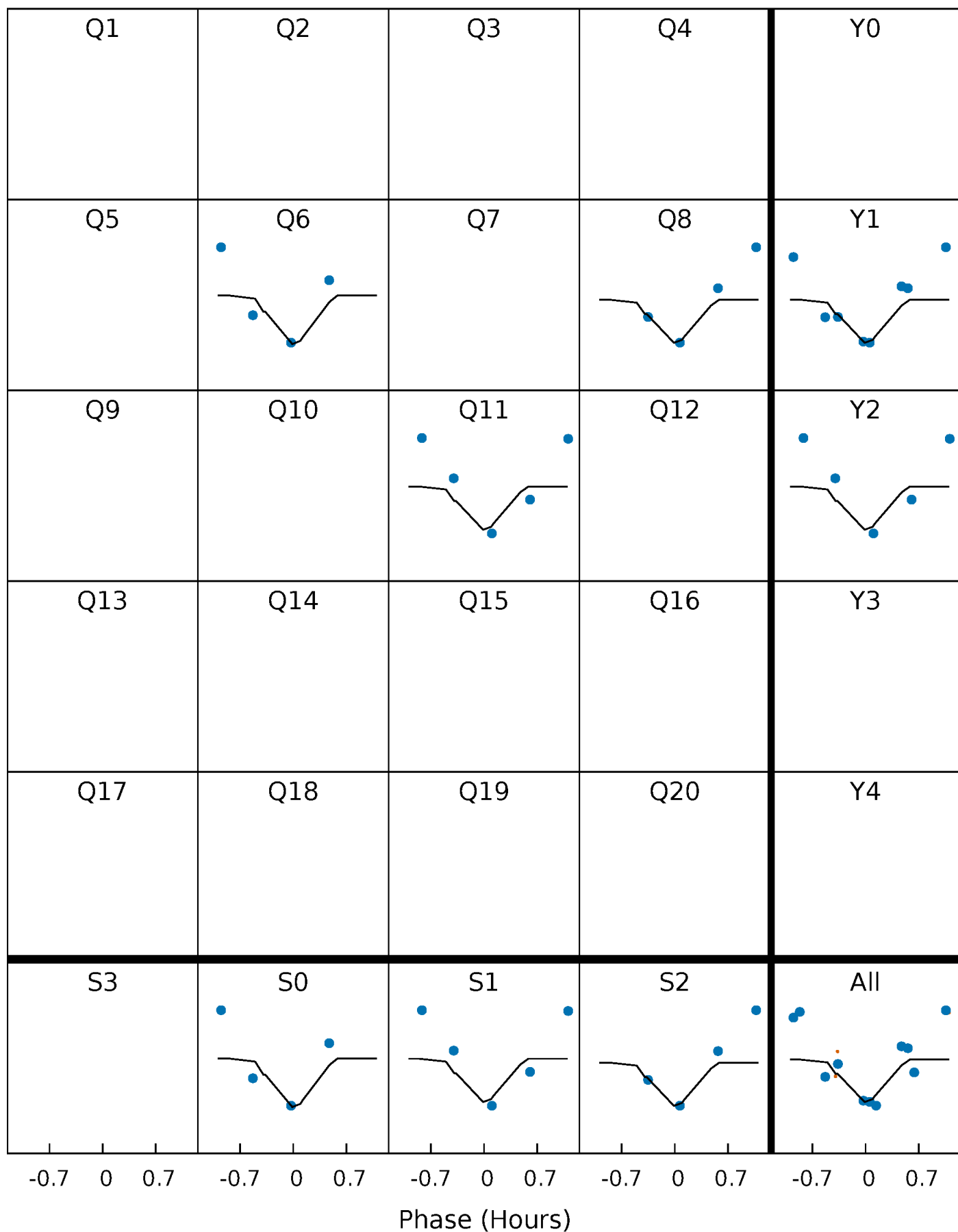
# DV Quarter-Phased Transit Curves

TCE 003731292-04 P=164.874221 Days  $T_0=242.122941$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003731292-04 P=164.868661 Days  $T_0=242.162794$  (BKJD)

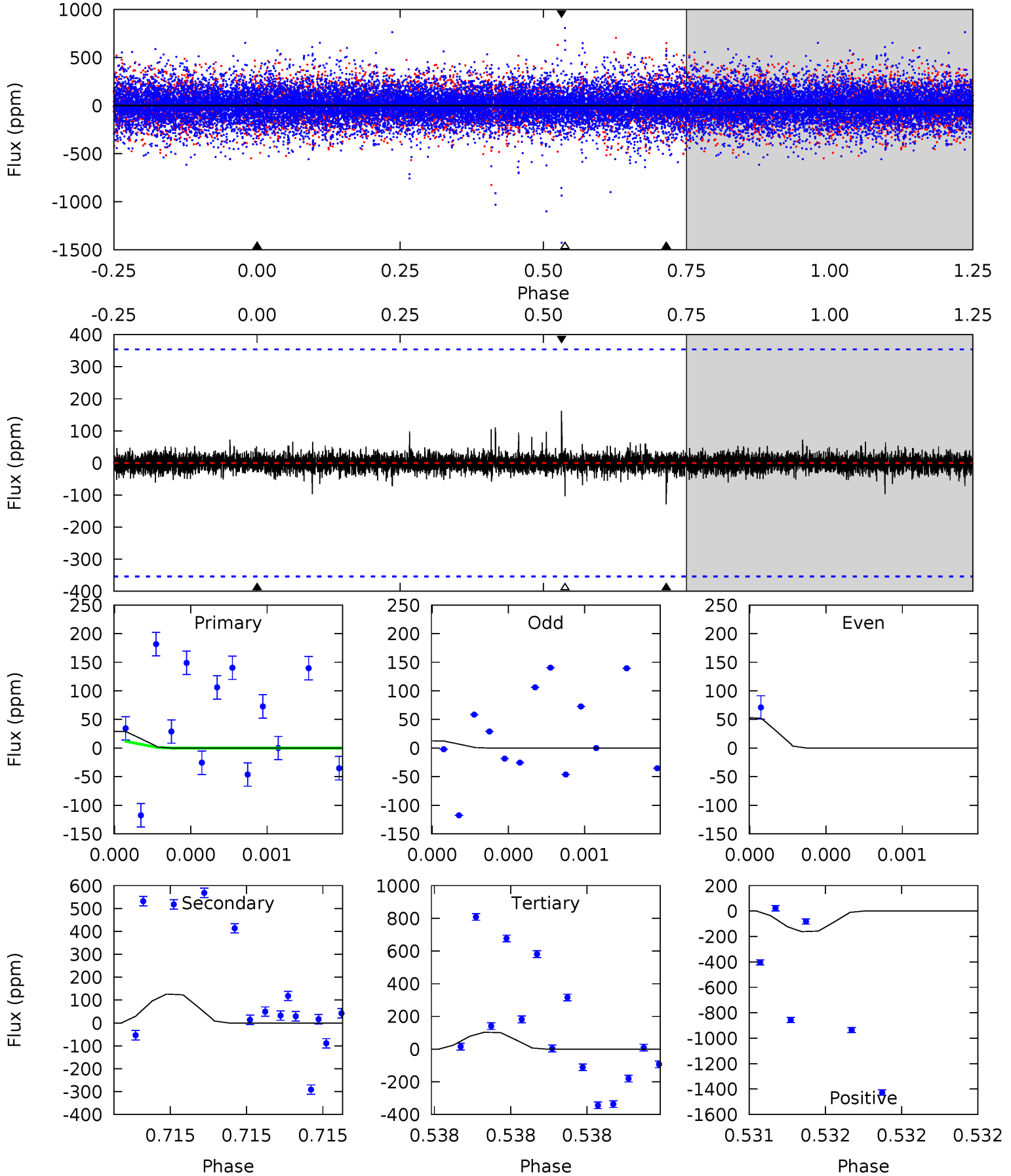




# DV Model-Shift Uniqueness Test

003731292-04, P = 164.874221 Days, E = 77.248720 Days

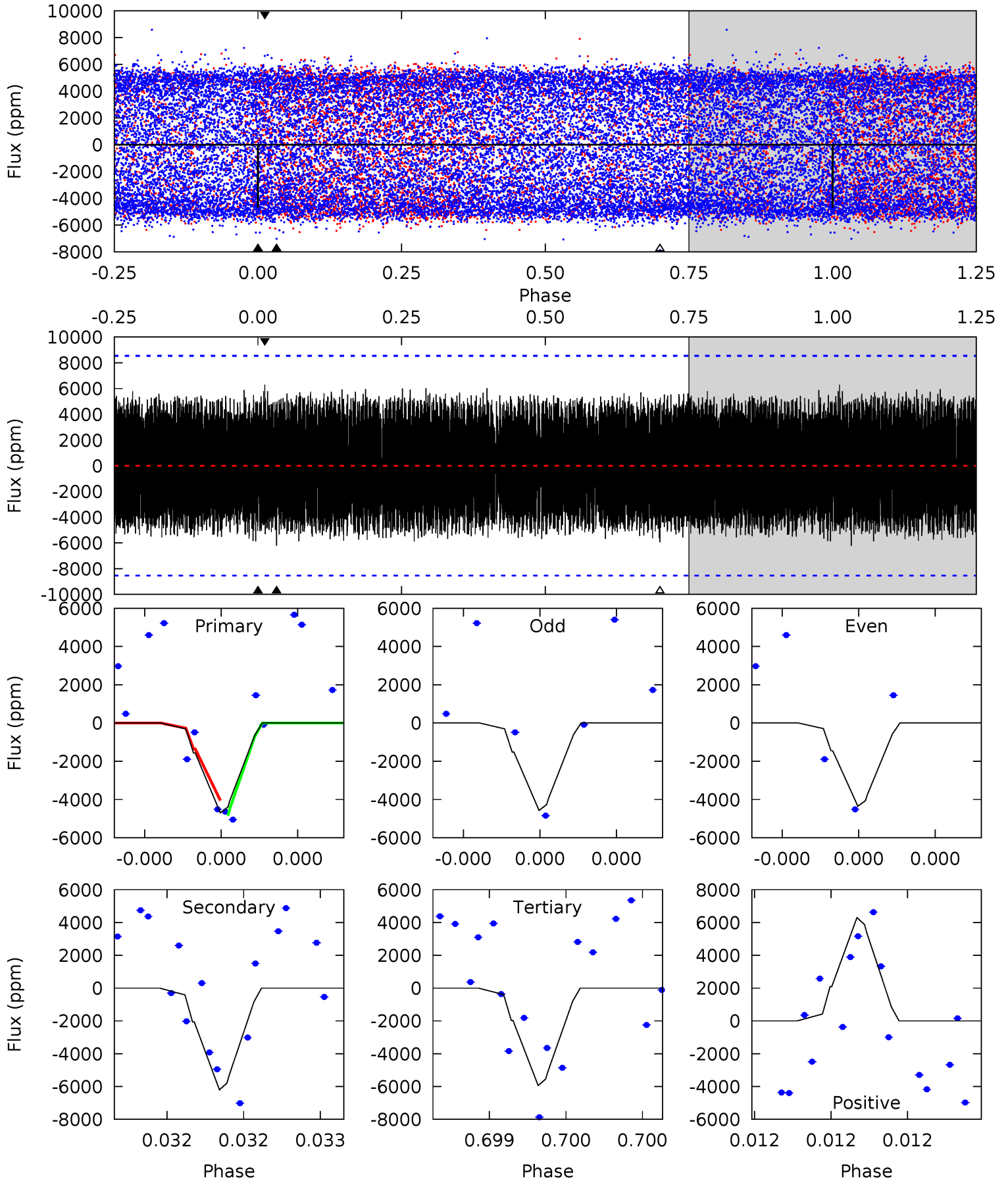
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.47	2.01	1.65	2.59	5.66	3.61	0.27	-1.18	-2.12	0.36	-0.58	0.30	1.47	0.56	0.24



# Alt Model-Shift Uniqueness Test

003731292-04, P = 164.868661 Days, E = 77.294133 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
3.13	4.12	3.95	4.19	5.68	3.64	1.89	-0.82	-1.06	0.18	-0.06	0.07	0.99	0.50	0.26



### Stellar Parameters For KIC 003731292

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6987^{+194}_{-292}$	$3.444^{+0.666}_{-0.074}$	$-0.100^{+0.250}_{-0.300}$	$4.491^{+0.316}_{-2.841}$	$2.048^{+0.073}_{-0.659}$	$0.032^{+0.374}_{-0.008}$
	+3%/-4%	+19%/-2%	+250%/-300%	+7%/-63%	+4%/-32%	+1174%/-26%
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 003731292-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-126 \pm 63$	$557.08^{+714.59}_{-392.83}$	$1009^{+88}_{-157}$	$-1727^{+3781}_{-146}$	$0.110^{+1.286}_{-0.092}$
Alt.	$-6201 \pm 1504$	$587.79^{+705.11}_{-417.89}$	$1020^{+87}_{-161}$	$2460^{+1018}_{-453}$	$5.346^{+54.305}_{-4.324}$

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

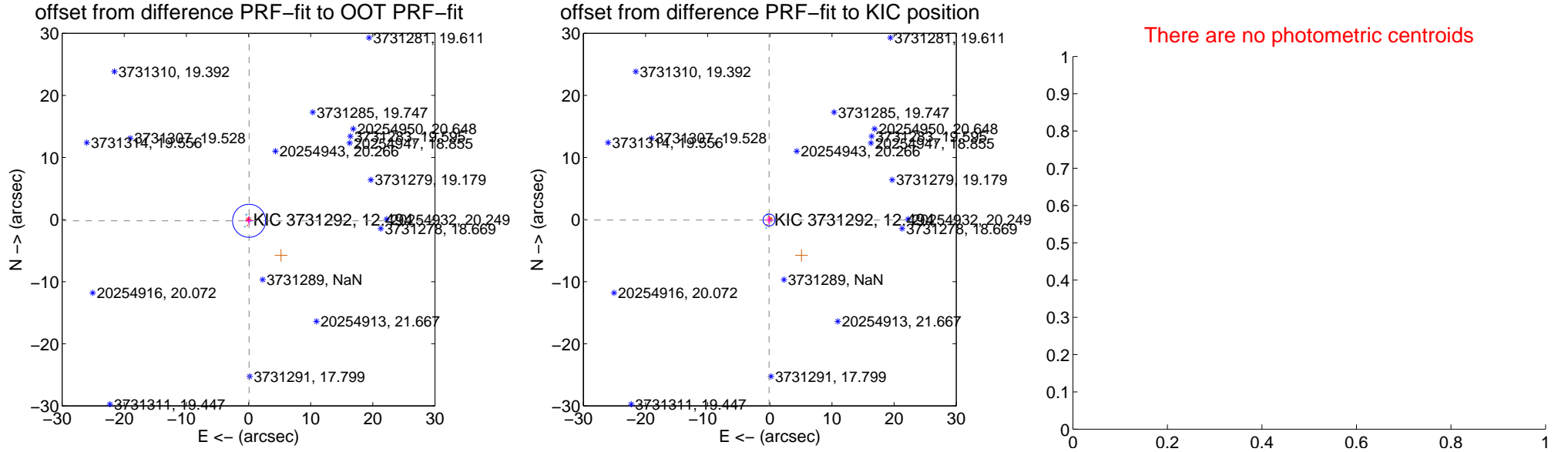
## DV Centroid Data

Supplemental centroid analysis for 003731292-04. Kepler magnitude: 12.49. Transit SNR 0.00

There are 4 quarters with good PRF difference image offsets

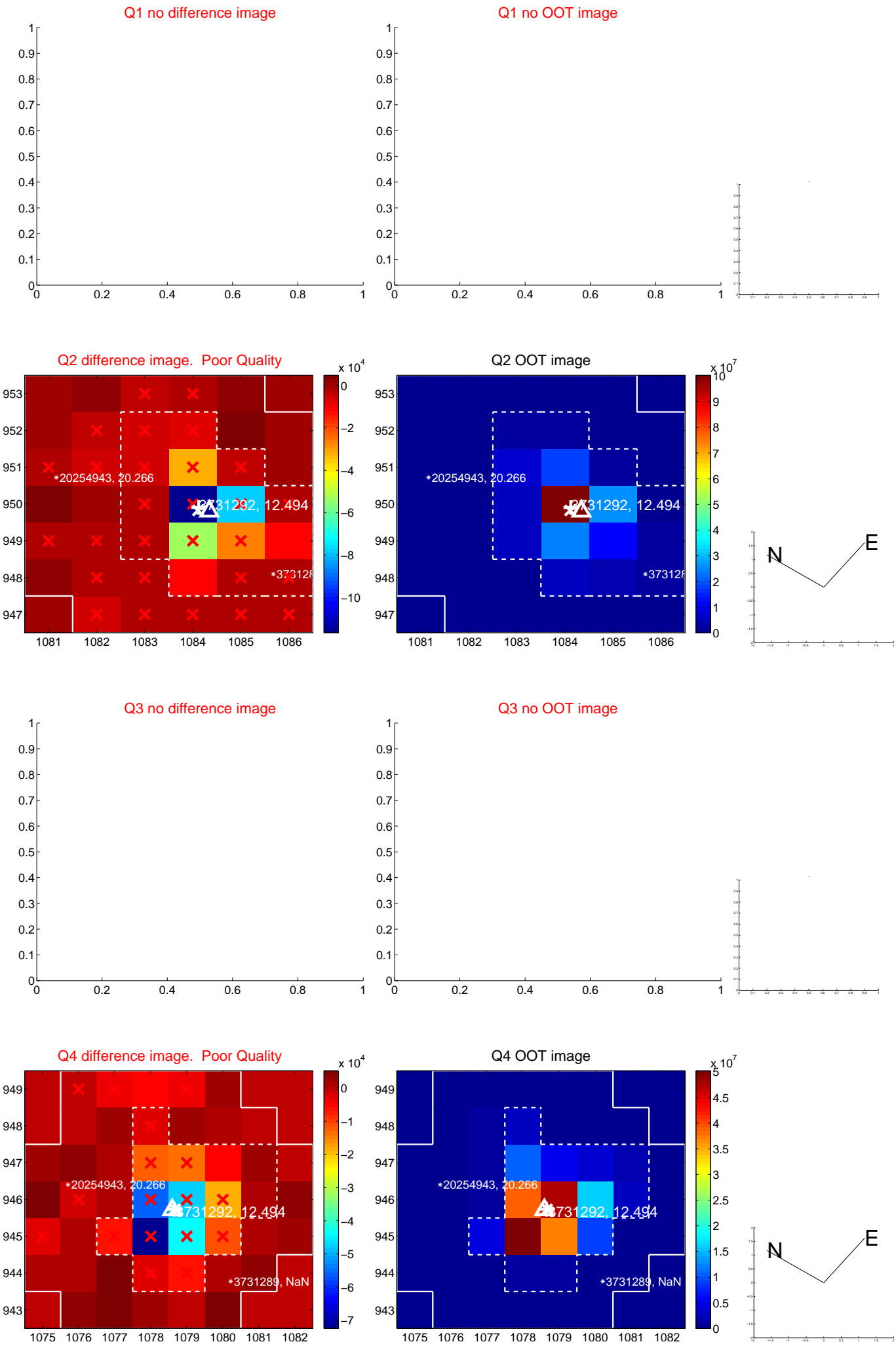
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.213 \pm 0.885$	0.24	$-0.090 \pm 0.629$	$-0.193 \pm 0.699$
PRF-fit source offset from KIC position	$0.143 \pm 0.321$	0.45	$0.124 \pm 0.665$	$-0.071 \pm 0.700$
photometric centroid source offset	—	—	—	—

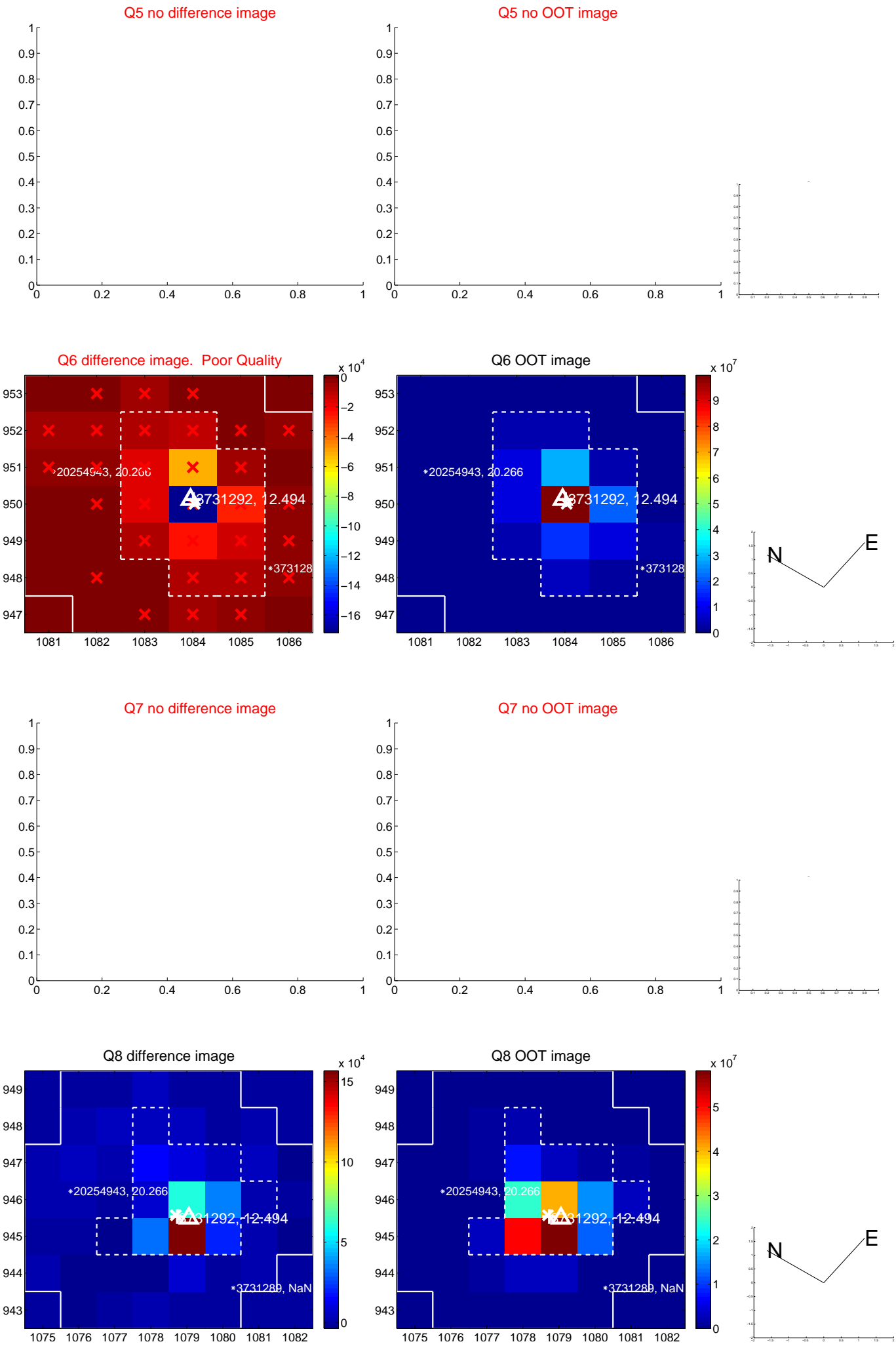


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

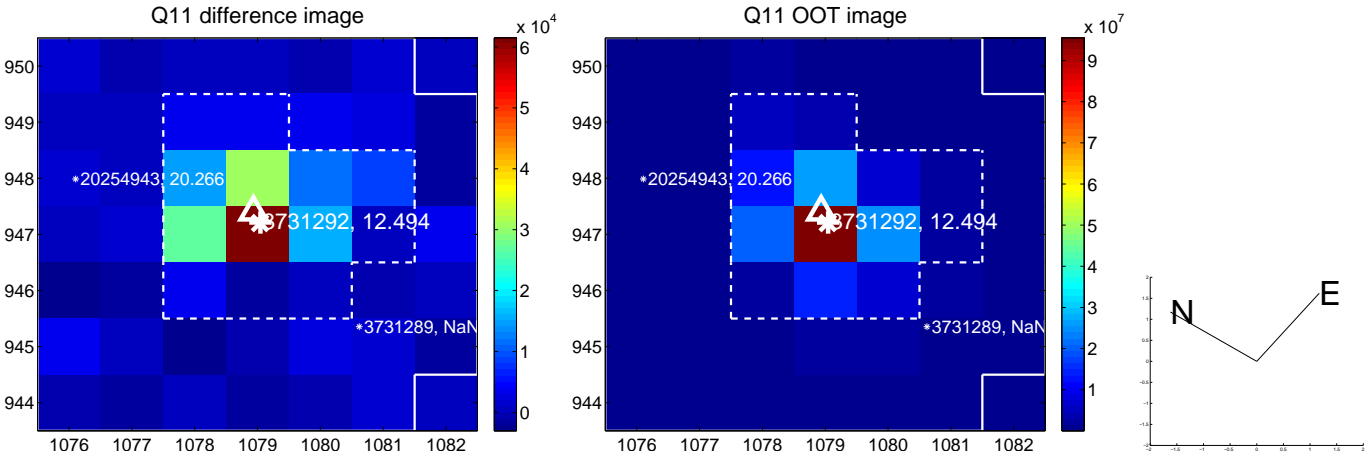
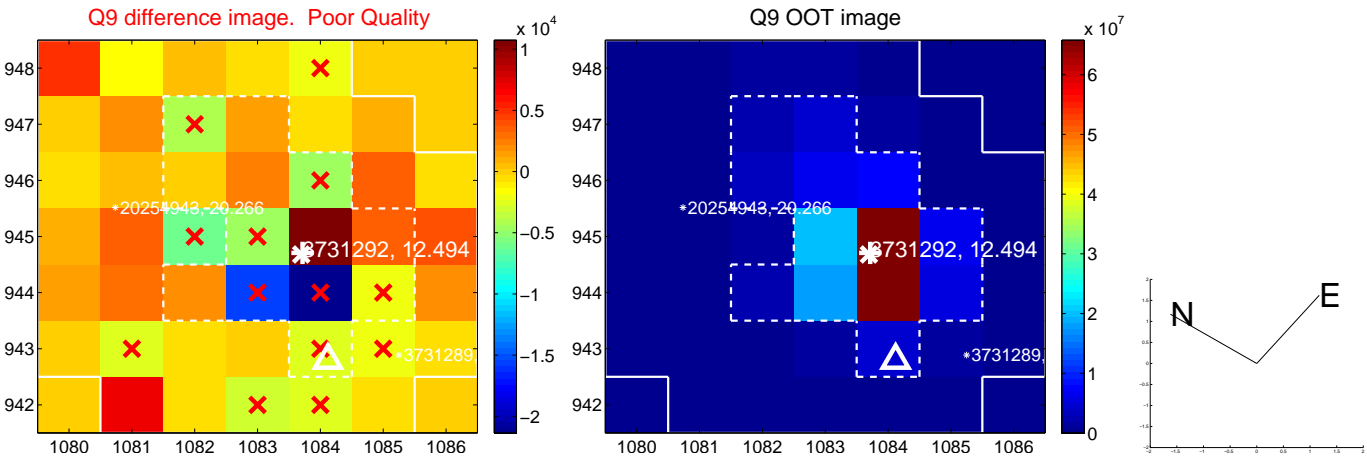


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

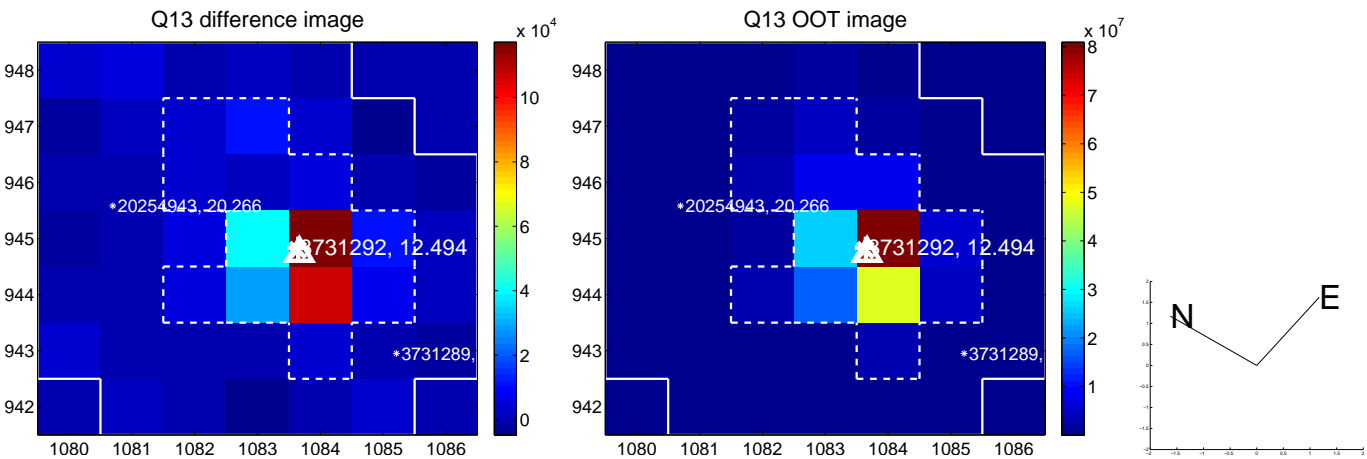




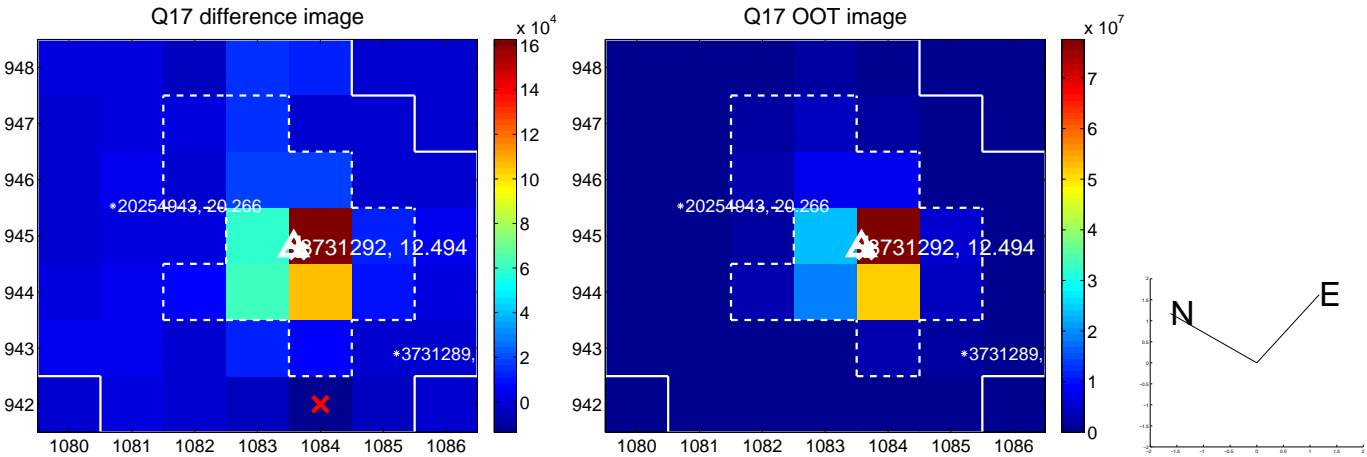
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



folded centroid time series figure for this object.

UKIRT Image

Declination

