

# KIC 005978295

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978295-01	OBS	No	1.034560	132.105445	56.2	3.970	14.7	13.7	1.66	7228	1.44	12507.14
005978295-02	OBS	No	1.462531	132.555108	117.4	17.550	9.6	18.1	1.66	7228	2.25	7883.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978295-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978295-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—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.

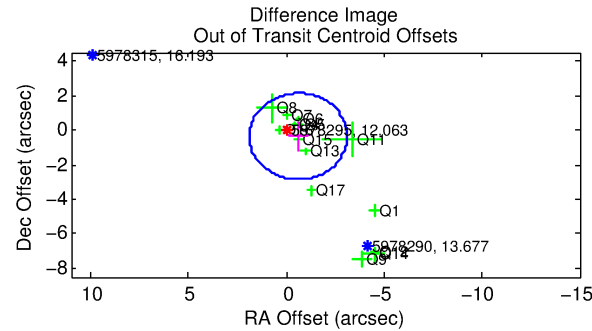
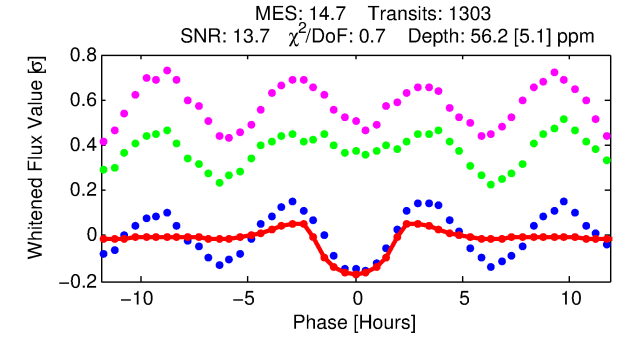
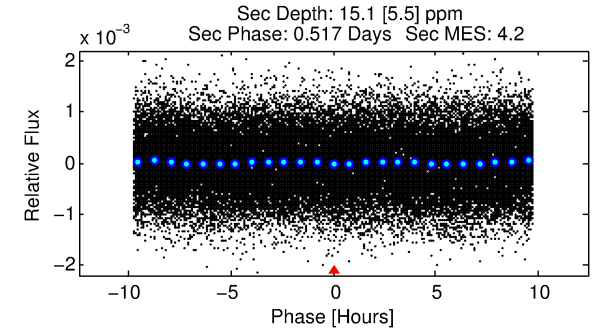
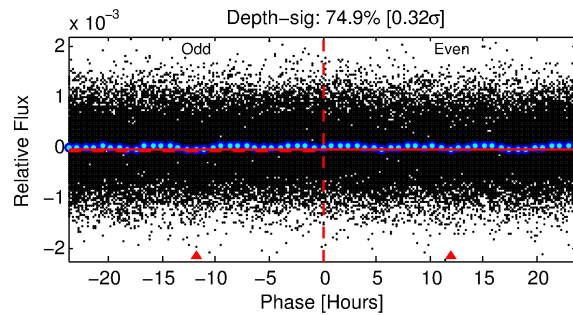
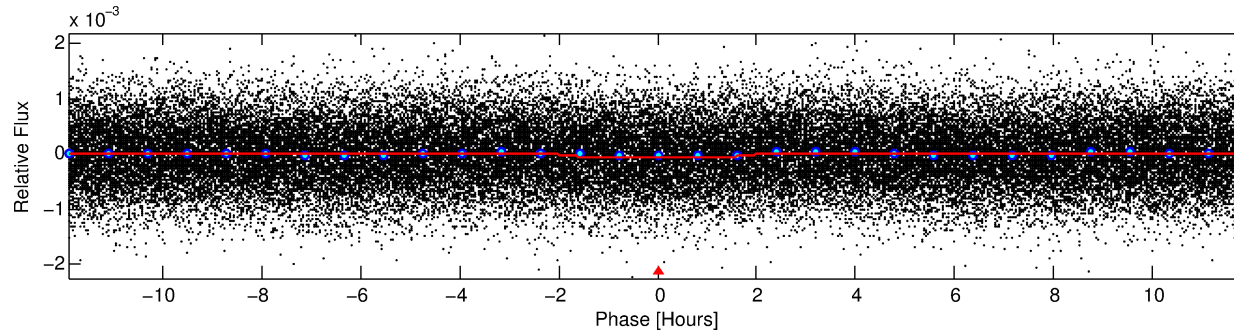
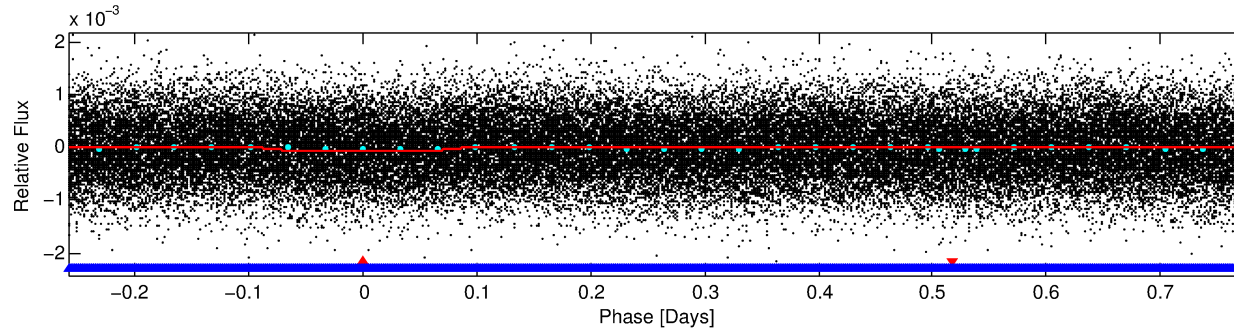
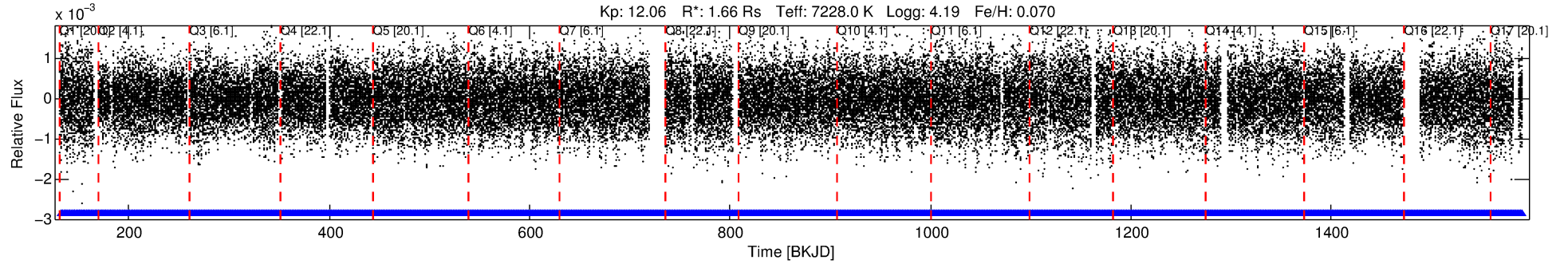
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005978295-01

No Significant Match Found

# DV One-Page Summary

KIC: 5978295 Candidate: 1 of 2 Period: 1.035 d



## DV Fit Results:

Period = 1.03456 [0.00001] d  
Epoch = 132.1054 [0.0034] BKJD  
Rp/R\* = 0.0080 [0.0034]  
a/R\* = 1.30 [1.41]  
b = 0.90 [0.55]  
Seff = 12507.13 [5540.54]  
Teq = 2697 [299] K  
Rp = 1.44 [0.80] Re  
a = 0.0231 [0.0066] AU  
Ag = 2.14 [2.16] [0.53 $\sigma$ ]  
Teffp = 5043 [1190] K [1.91 $\sigma$ ]

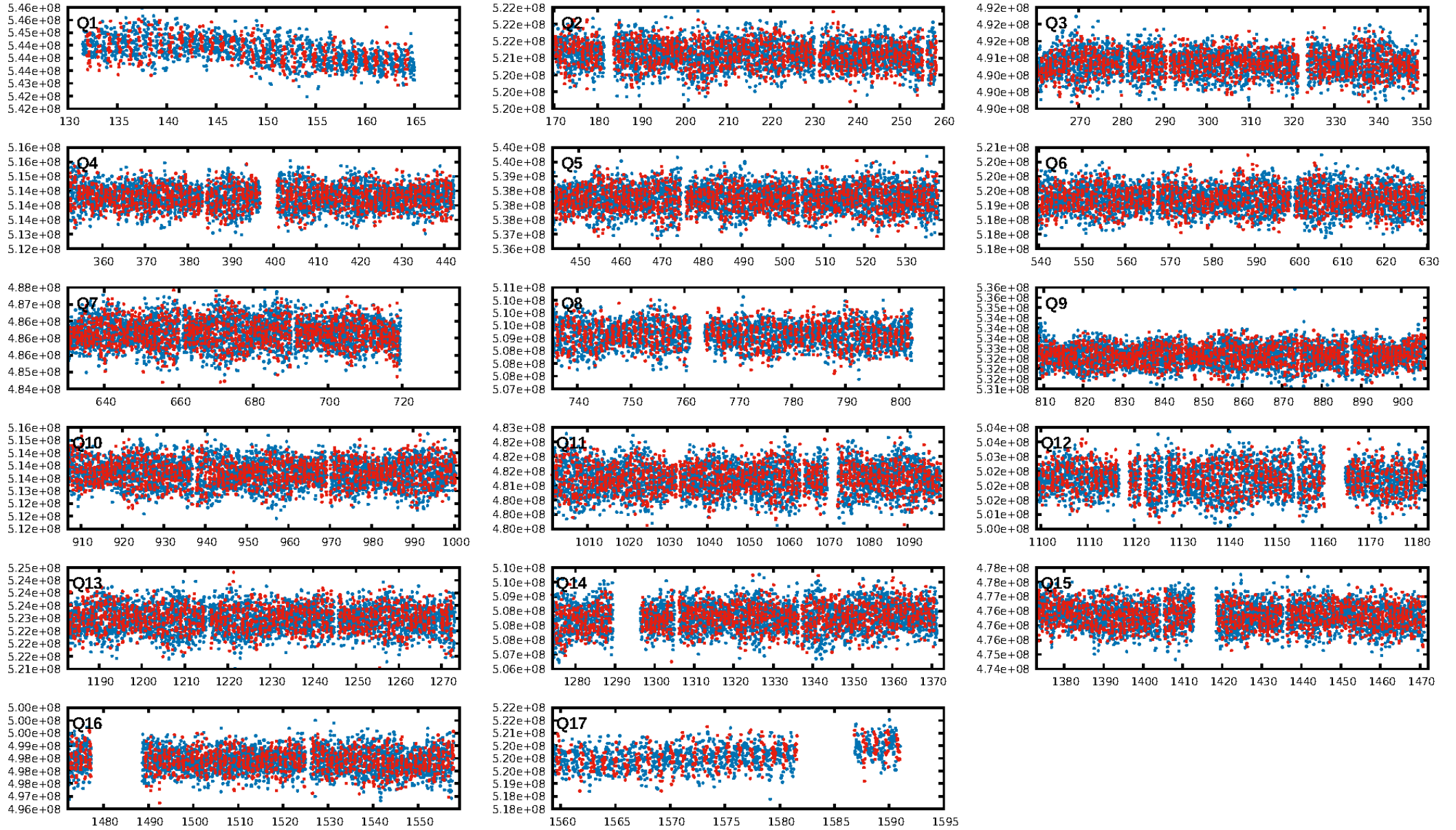
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 43.2% [0.57 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1245/1245]  
GhostDiagnostic-chr: 1.697  
Centroid-sig: 21.9%  
Centroid-so: 0.450 arcsec [1.19 $\sigma$ ]  
OotOffset-rm: 0.706 arcsec [0.85 $\sigma$ ]  
OotOffset-st: 2/3/4/5 [14]  
KicOffset-rm: 0.825 arcsec [0.96 $\sigma$ ]  
KicOffset-st: 2/3/4/5 [14]  
DiffImageQuality-fgm: 0.50 [7/14]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:12:08 Z

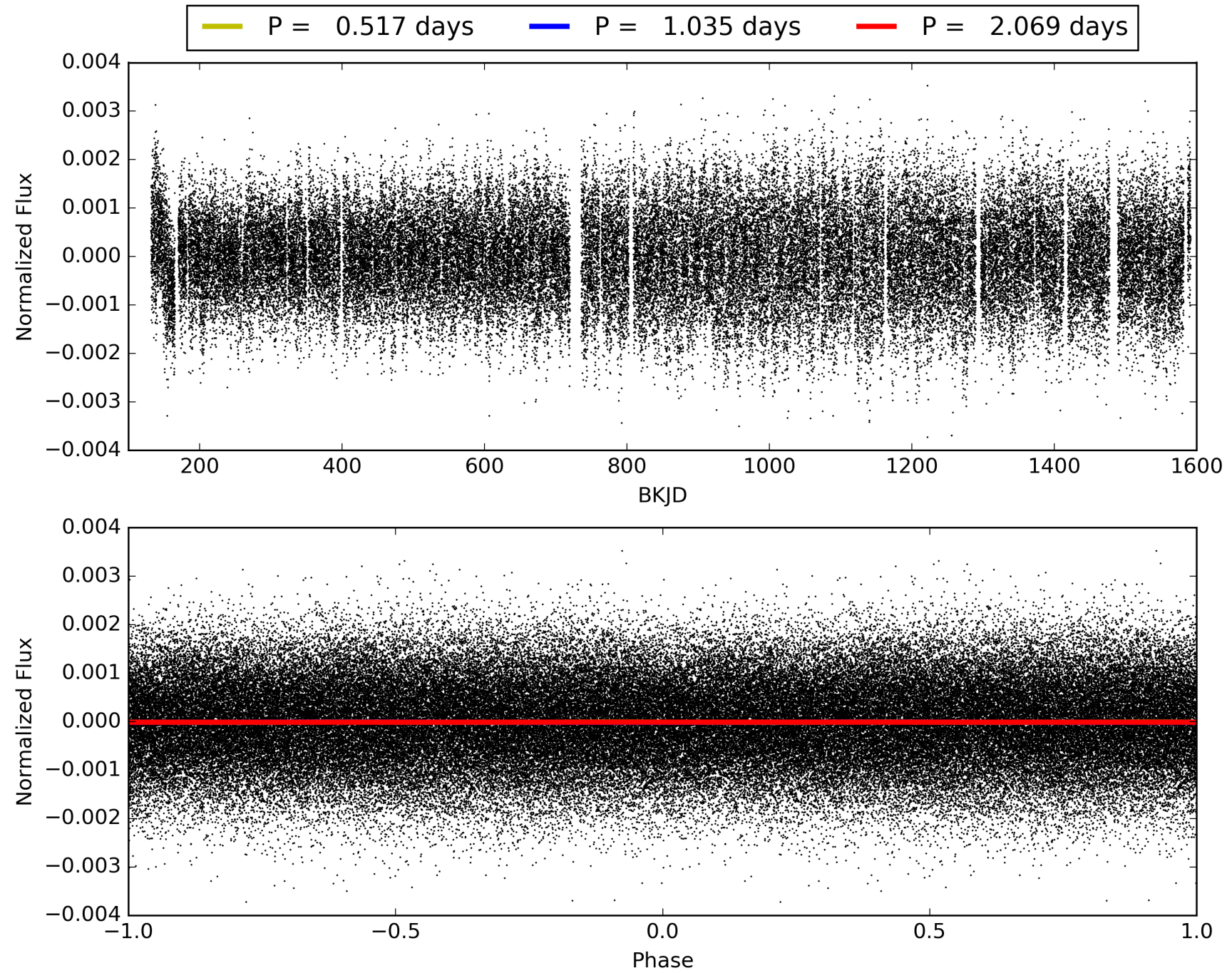
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005978295-01, PDC Light Curves



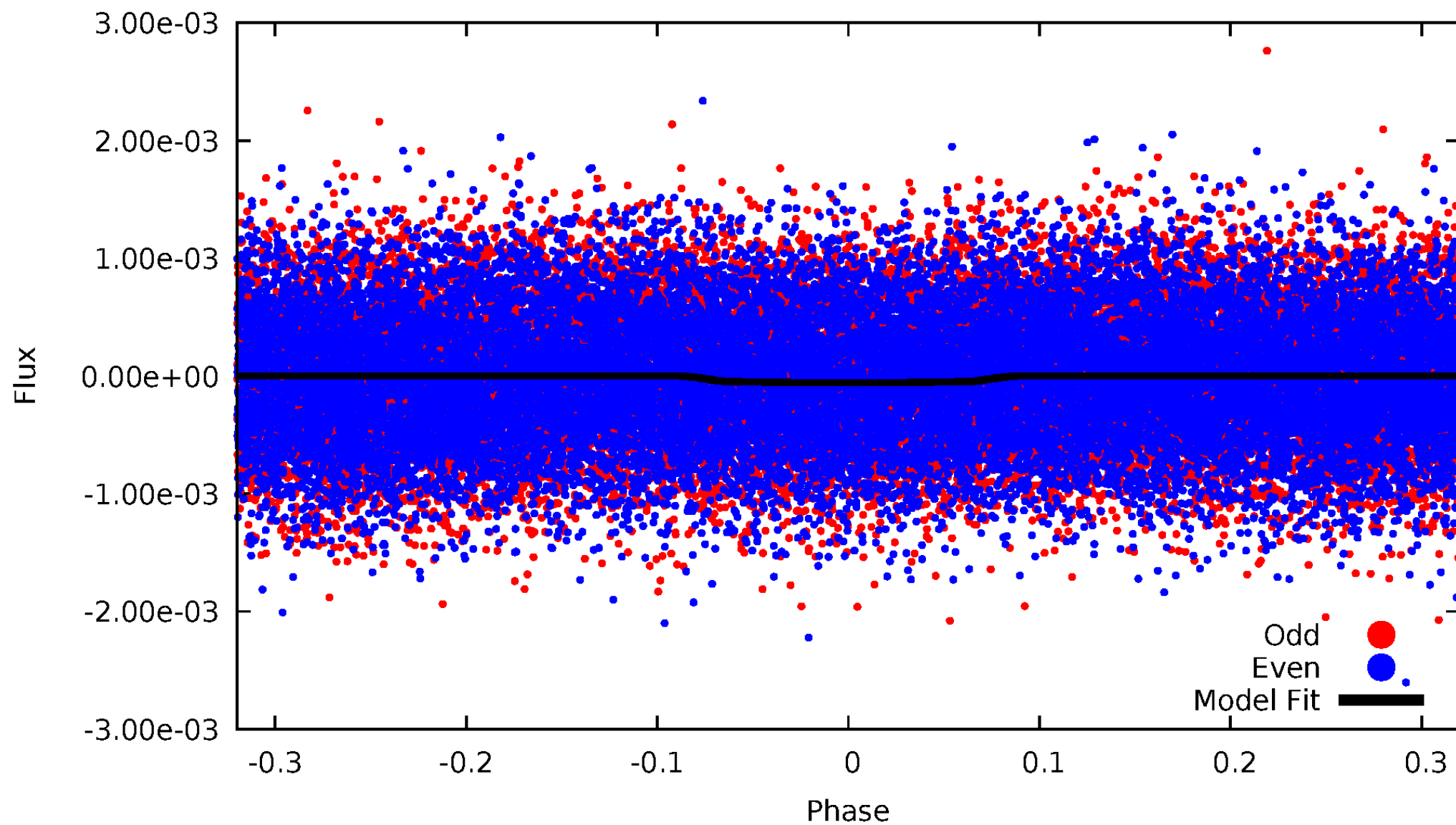


TCE 005978295-01



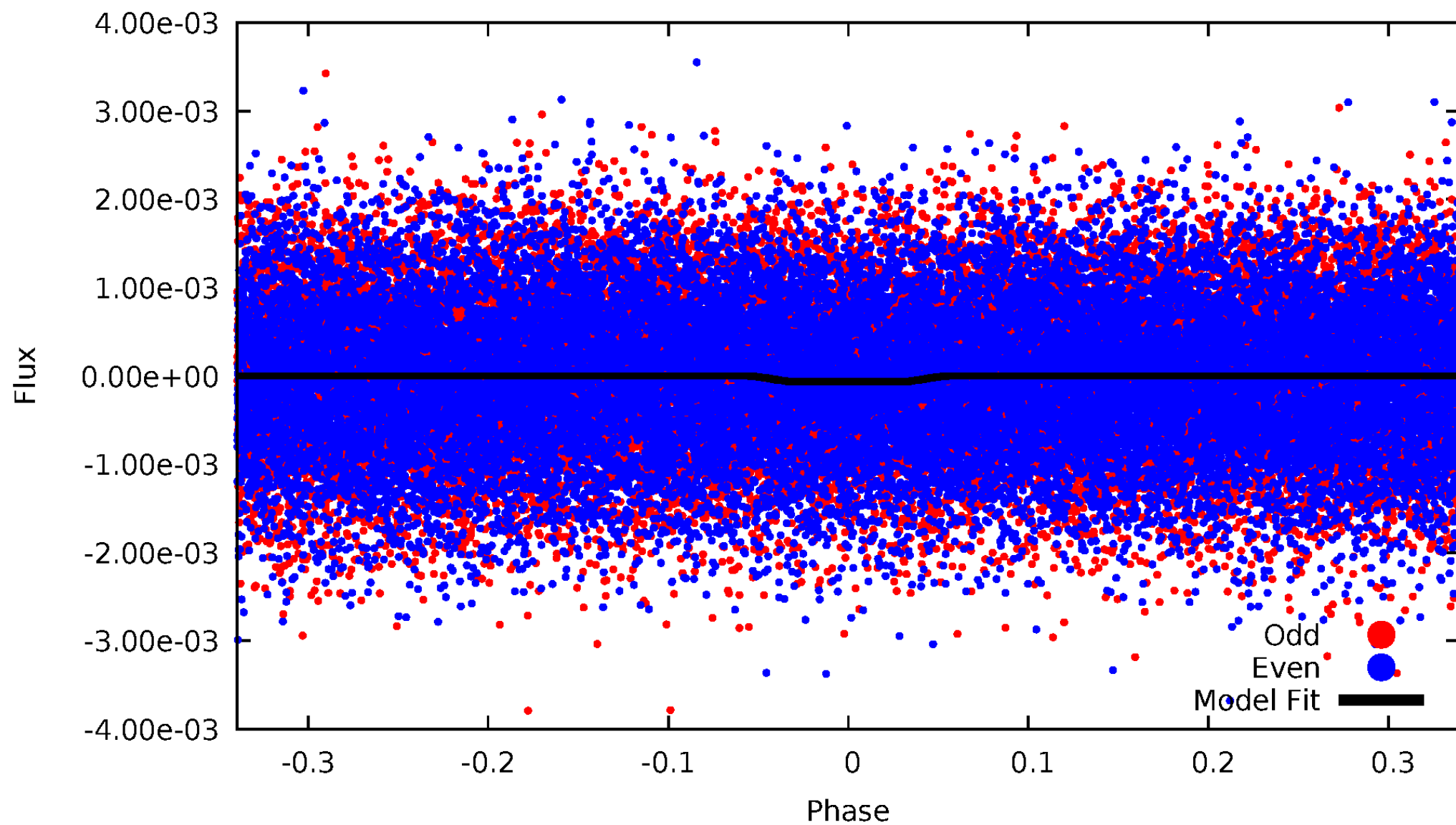
# DV Odd/Even

TCE 005978295-01



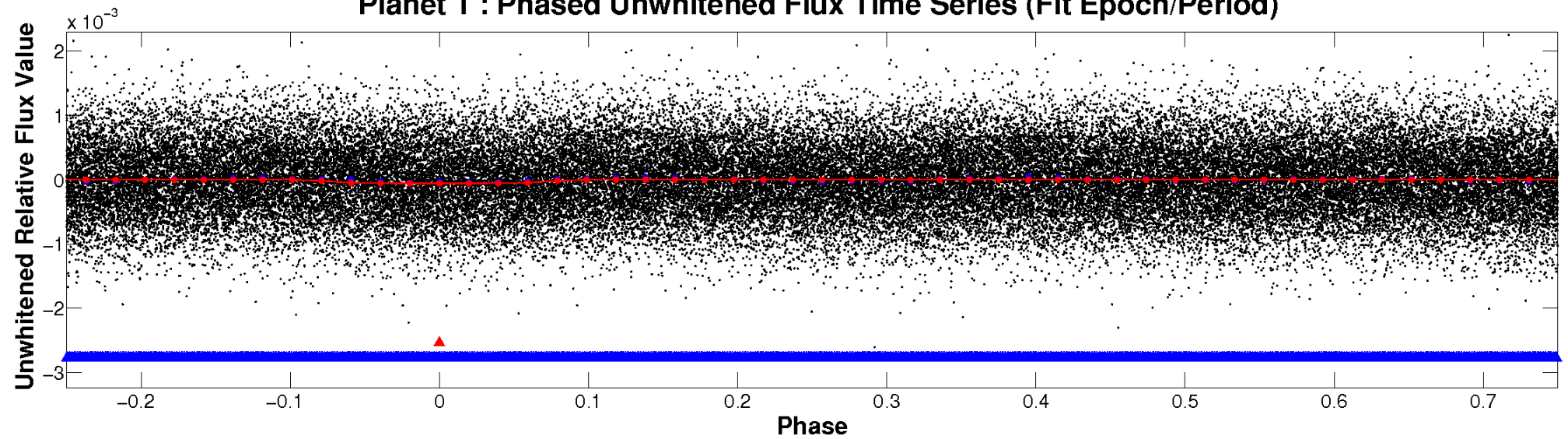
# ALT Odd/Even

TCE 005978295-01

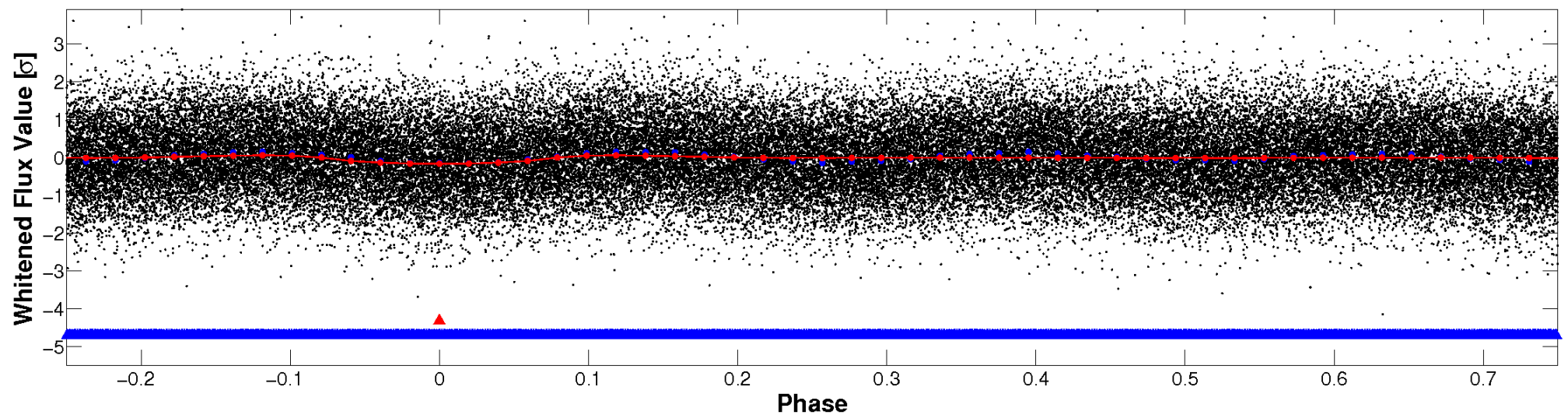


# Non-Whitened Vs. Whitened Light Curve

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



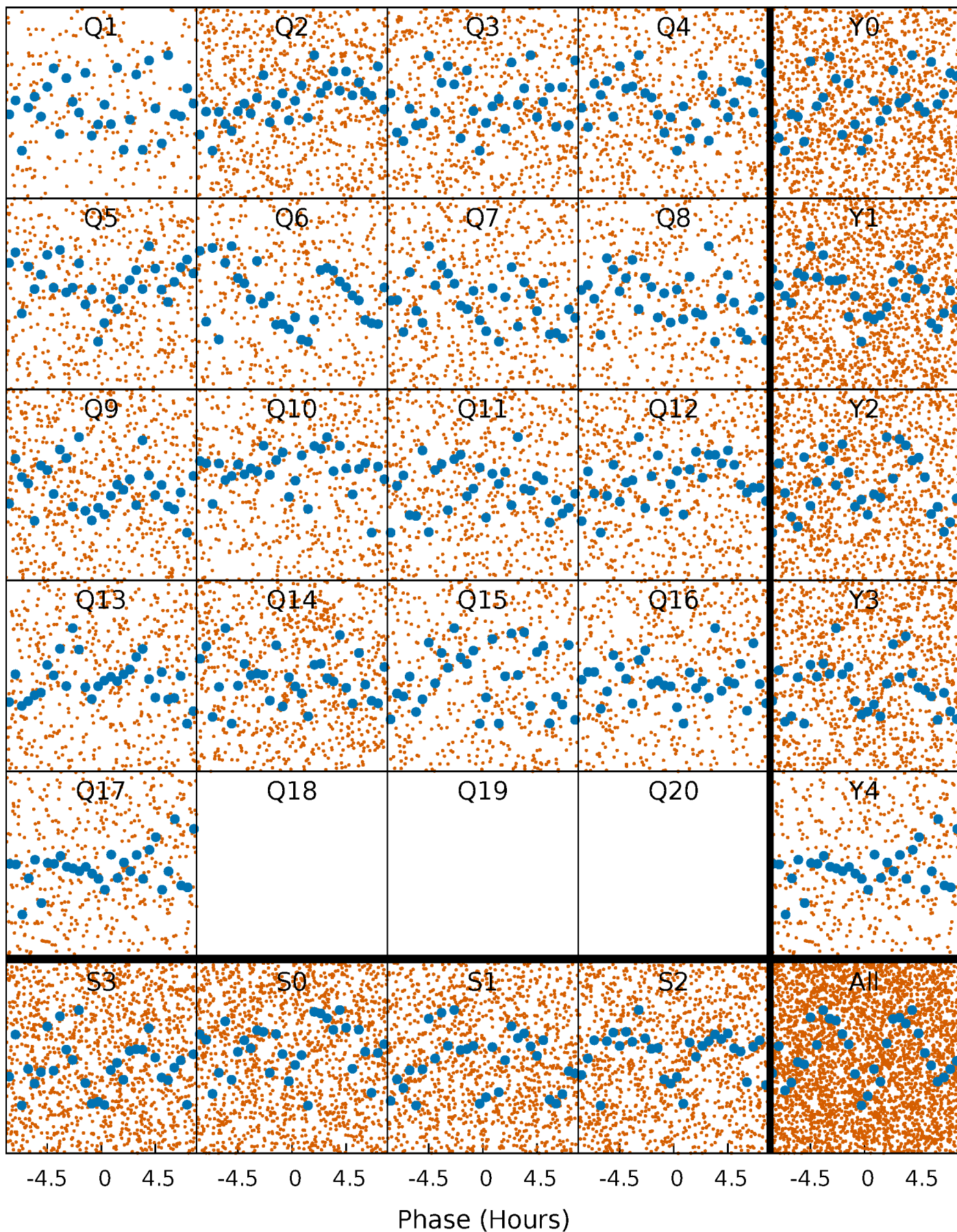
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

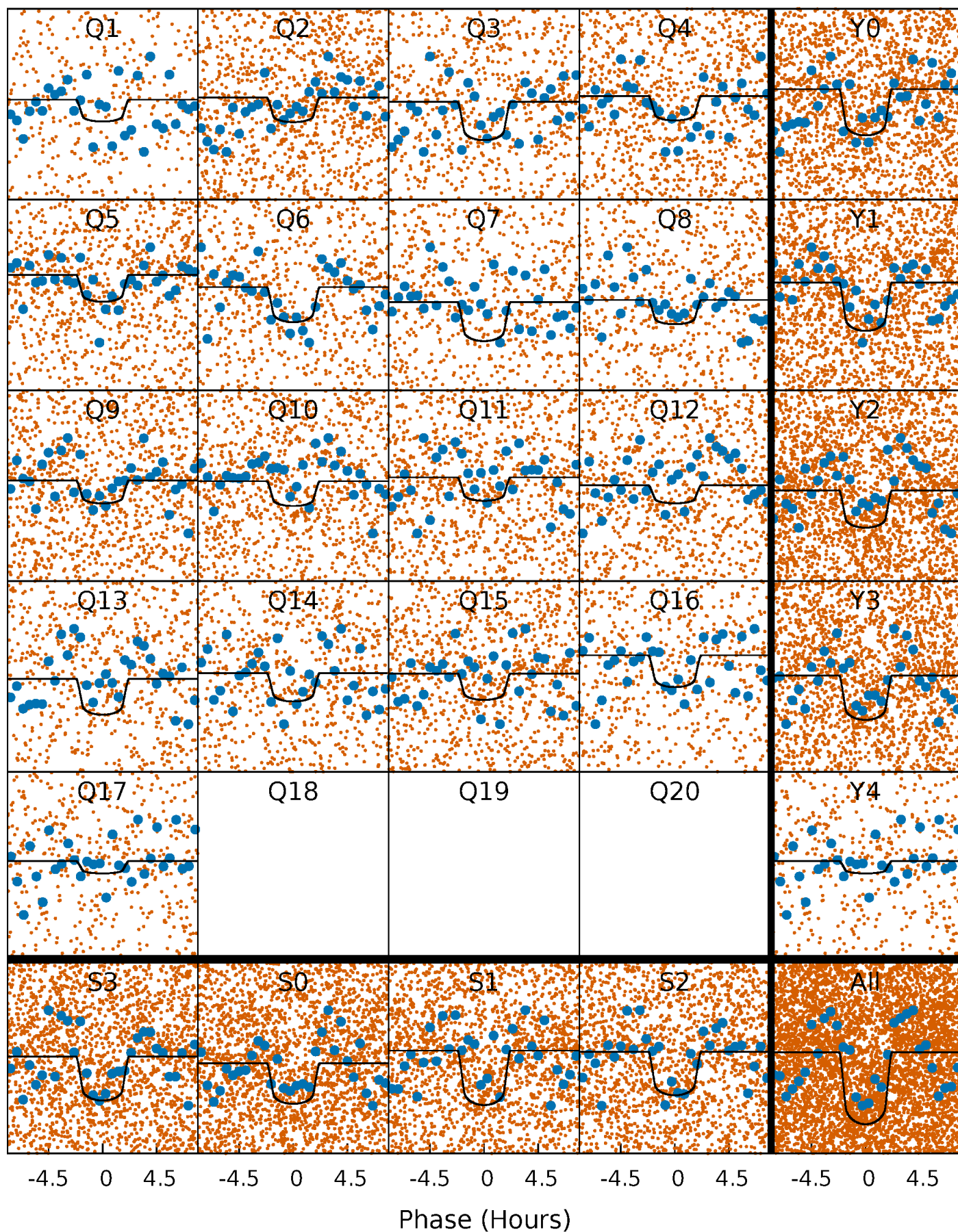
TCE 005978295-01 P= 1.034560 Days  $T_0=132.105445$  (BKJD)





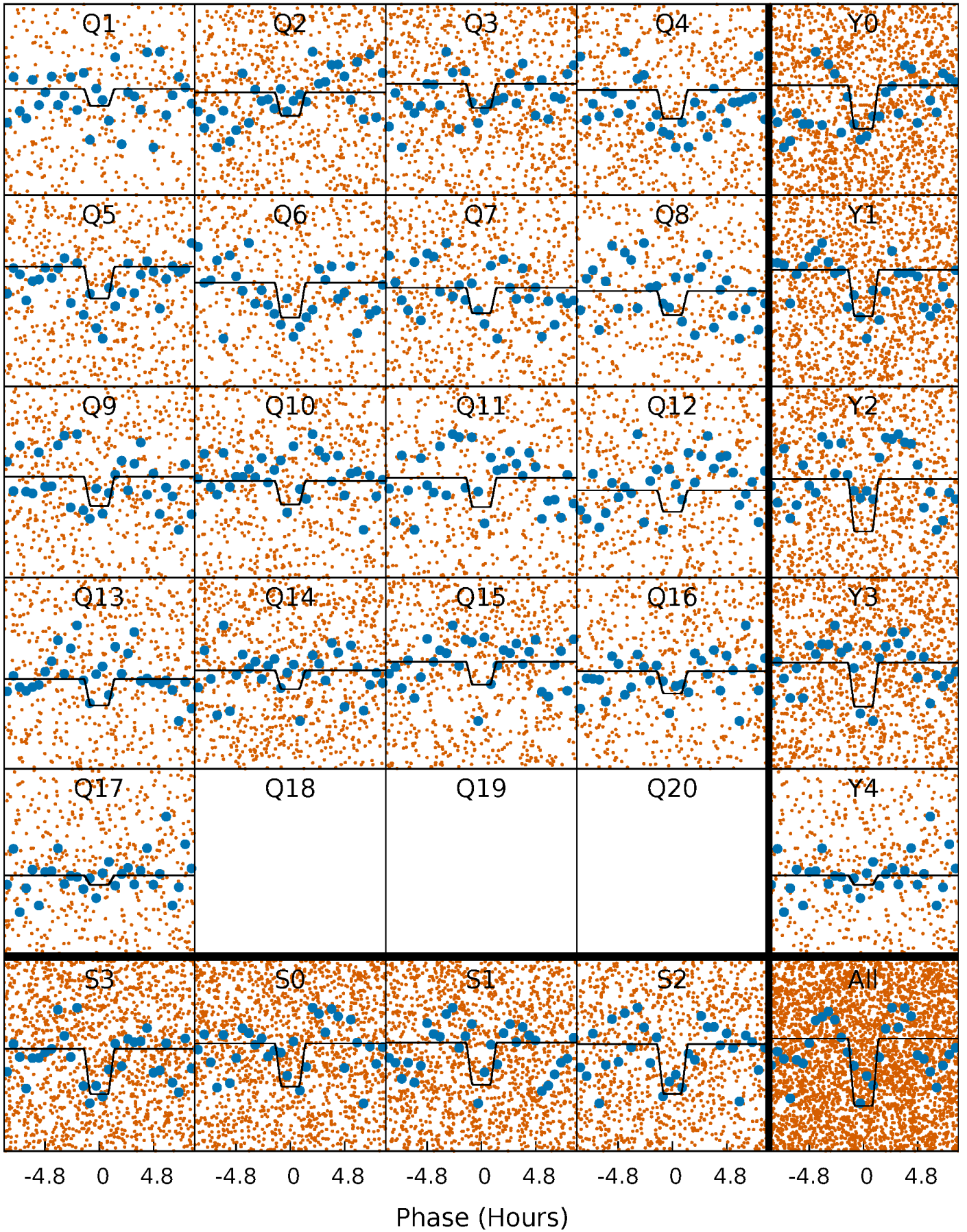
# DV Quarter-Phased Transit Curves

TCE 005978295-01   P= 1.034560 Days    $T_0=132.105445$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

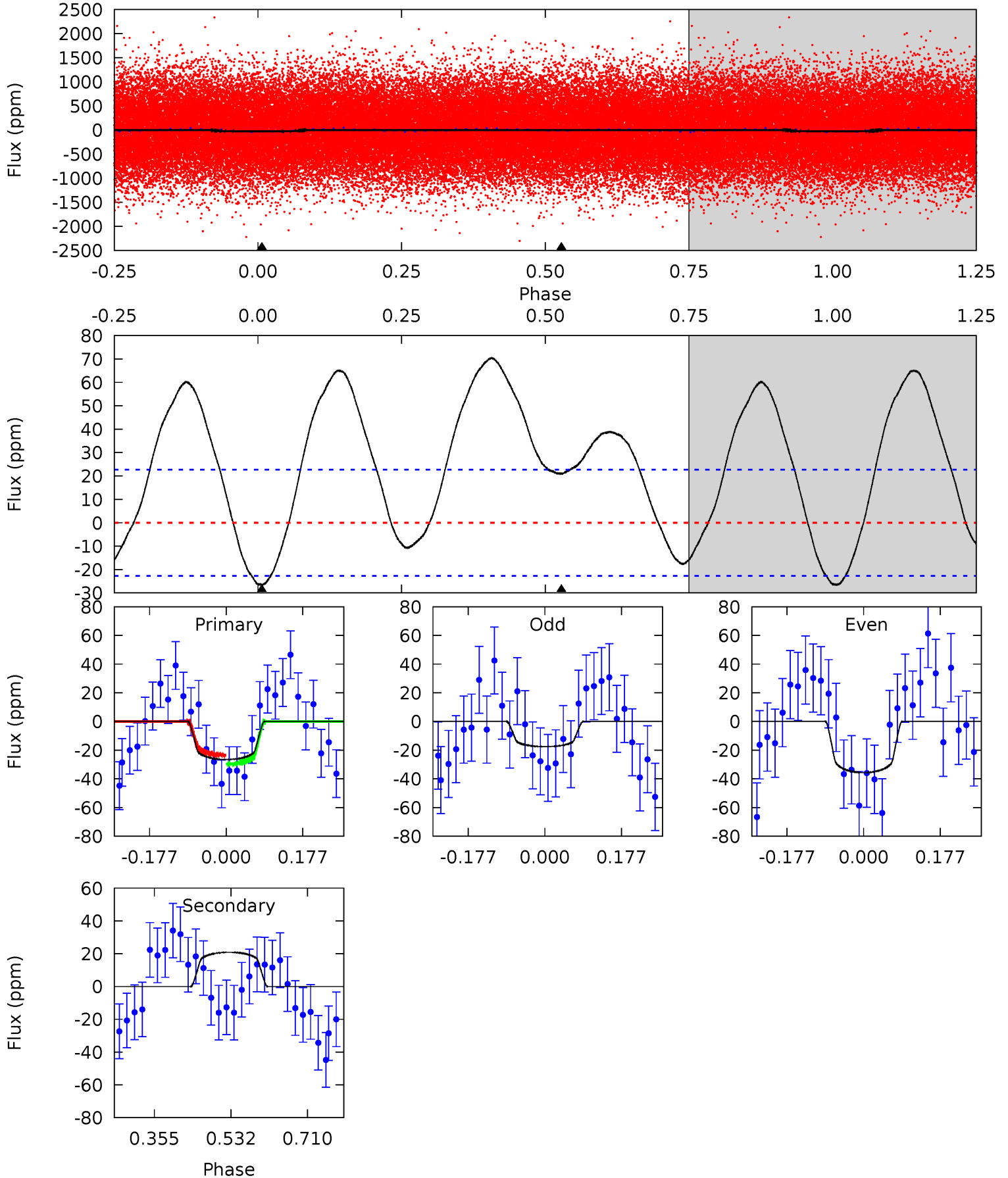
TCE 005978295-01 P= 1.034569 Days  $T_0=132.104471$  (BKJD)



# DV Model-Shift Uniqueness Test

005978295-01, P = 1.034560 Days, E = 131.070885 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
5.19	-4.08	0	0	4.44	1.35	3.46	5.19	5.19	-4.08	-4.08	1.78	1.58	0.73	0.61

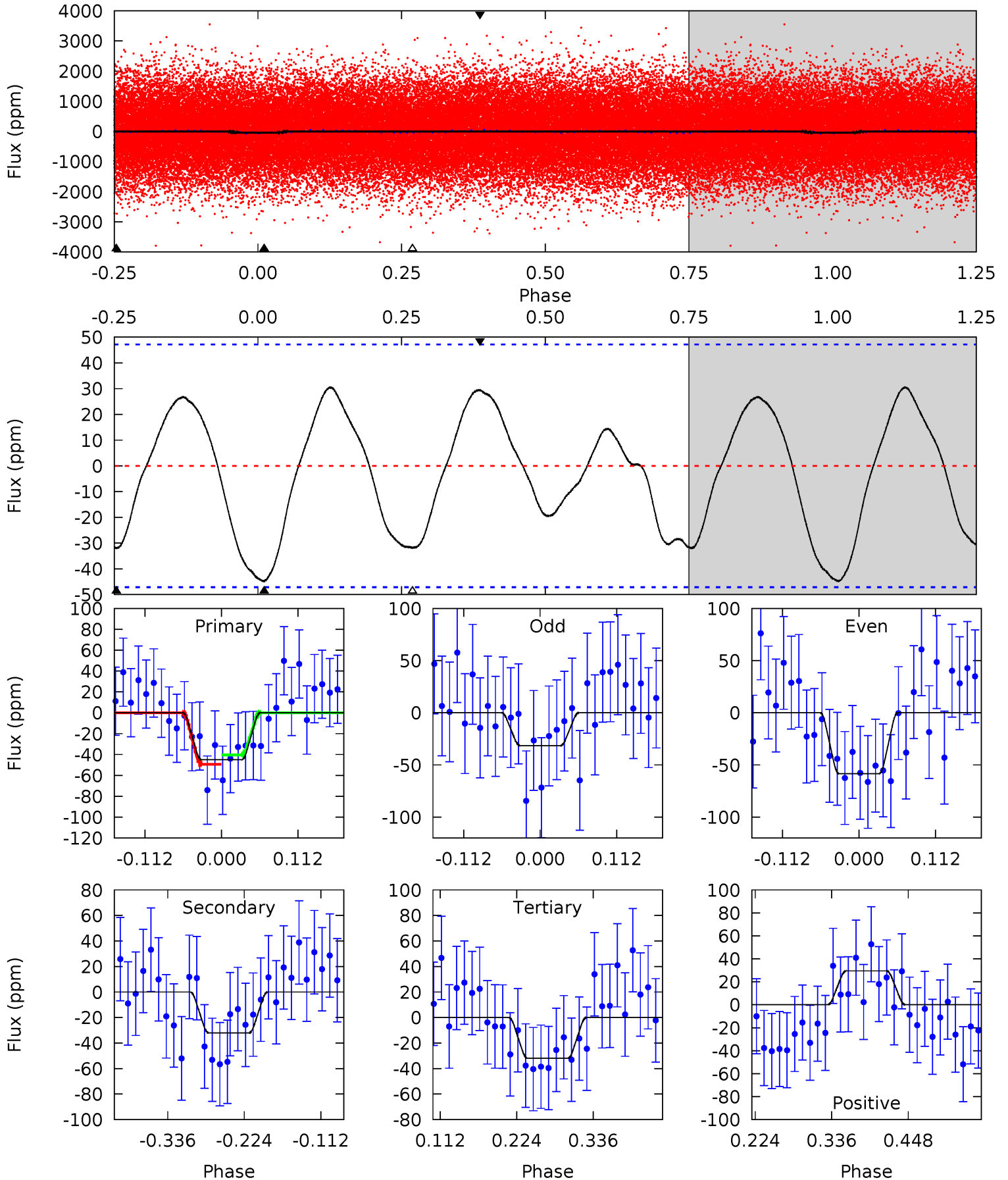




# Alt Model-Shift Uniqueness Test

005978295-01, P = 1.034569 Days, E = 131.069902 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.33	3.09	3.07	2.84	4.54	1.59	1.87	1.25	1.48	0.01	0.24	1.29	1.12	0.41	0.43





### Stellar Parameters For KIC 005978295

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7228^{+200}_{-343}$	$4.189^{+0.090}_{-0.210}$	$0.070^{+0.200}_{-0.350}$	$1.655^{+0.589}_{-0.252}$	$1.542^{+0.233}_{-0.211}$	$0.479^{+0.207}_{-0.262}$
	+3%/-5%	+2%/-5%	+286%/-500%	+36%/-15%	+15%/-14%	+43%/-55%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 005978295-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$21 \pm 5$	$1.50^{+0.73}_{-0.67}$	$3792^{+311}_{-224}$	$-5517^{+745}_{-1820}$	$-2.692^{+1.531}_{-6.070}$
Alt.	$-32 \pm 10$	$1.50^{+0.70}_{-0.68}$	$3804^{+322}_{-226}$	$5888^{+2217}_{-1048}$	$4.132^{+9.579}_{-2.376}$

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

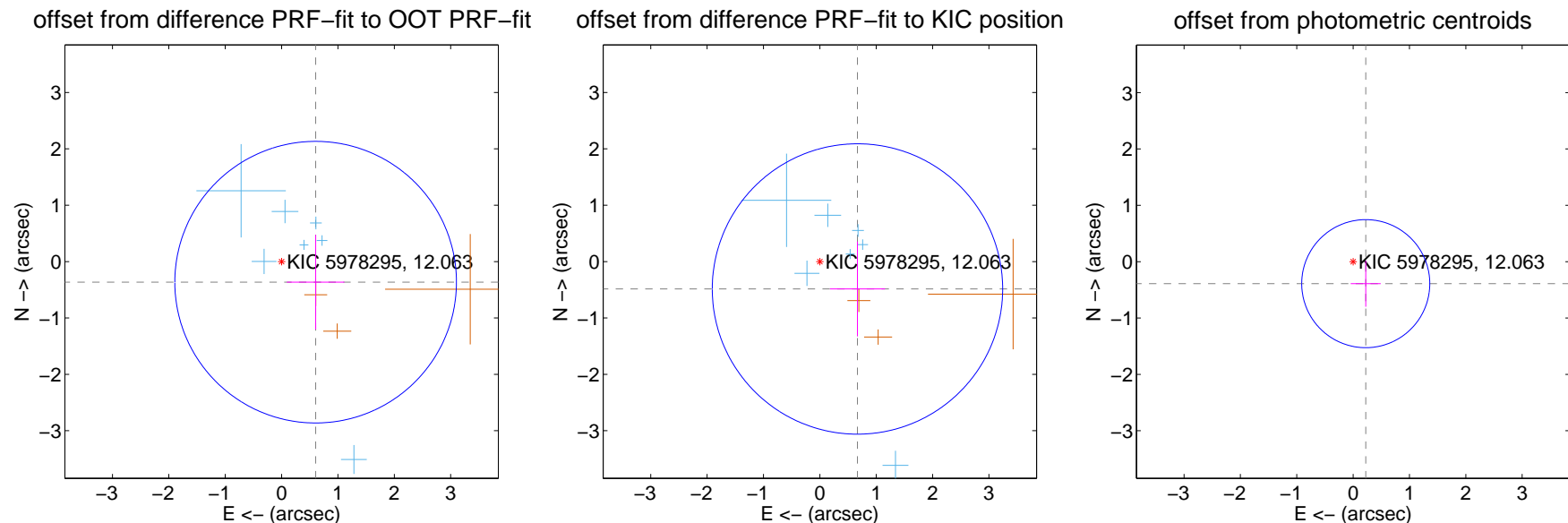
## DV Centroid Data

Supplemental centroid analysis for 005978295-01. Kepler magnitude: 12.06. Transit SNR 13.73

There are 7 quarters with good PRF difference image offsets

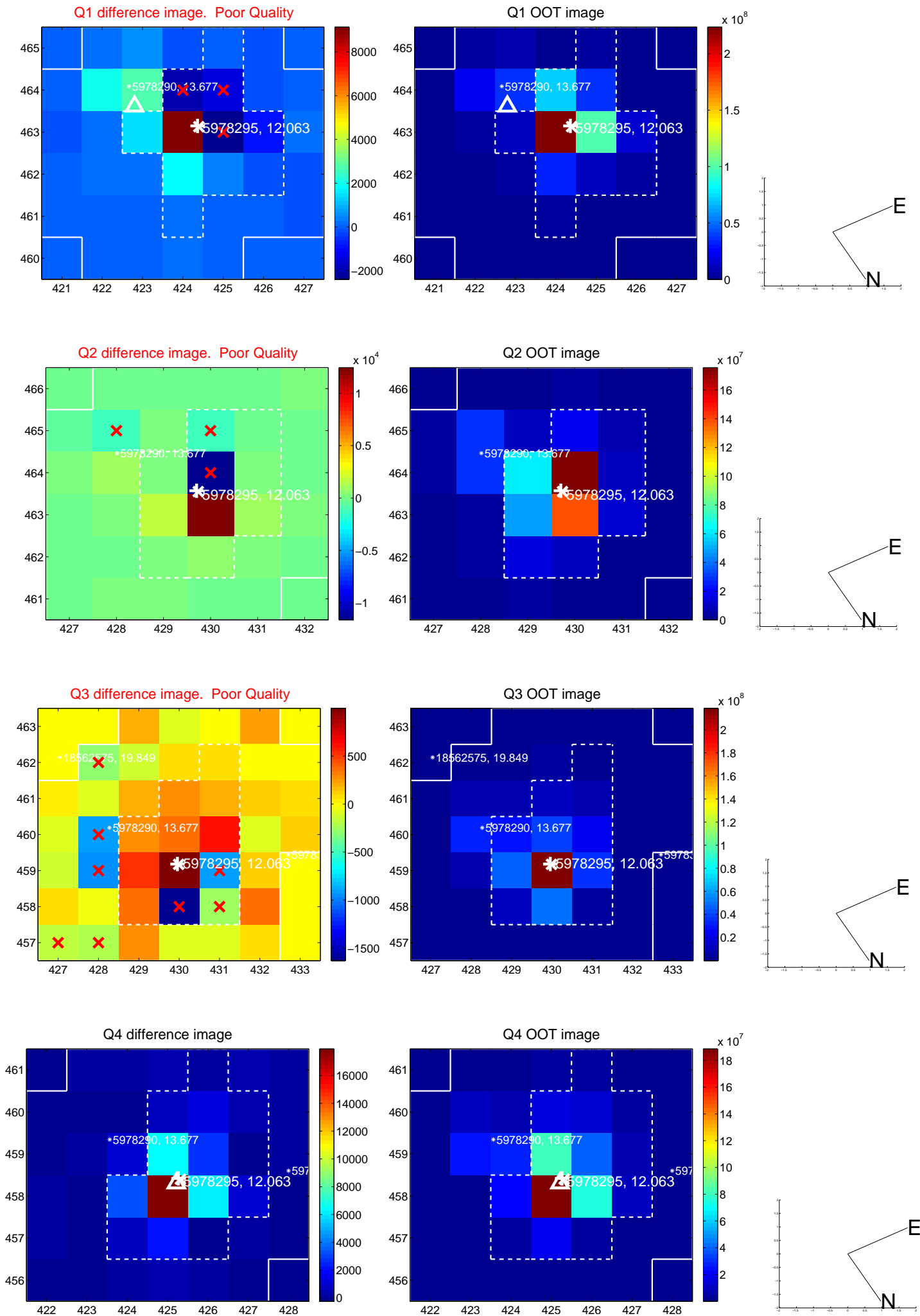
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.706 \pm 0.833$	0.85	$-0.604 \pm 0.511$	$-0.365 \pm 0.838$
PRF-fit source offset from KIC position	$0.825 \pm 0.858$	0.96	$-0.667 \pm 0.488$	$-0.486 \pm 0.842$
photometric centroid source offset	$0.45 \pm 0.38$	1.19	$-0.22 \pm 0.27$	$-0.39 \pm 0.41$



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.

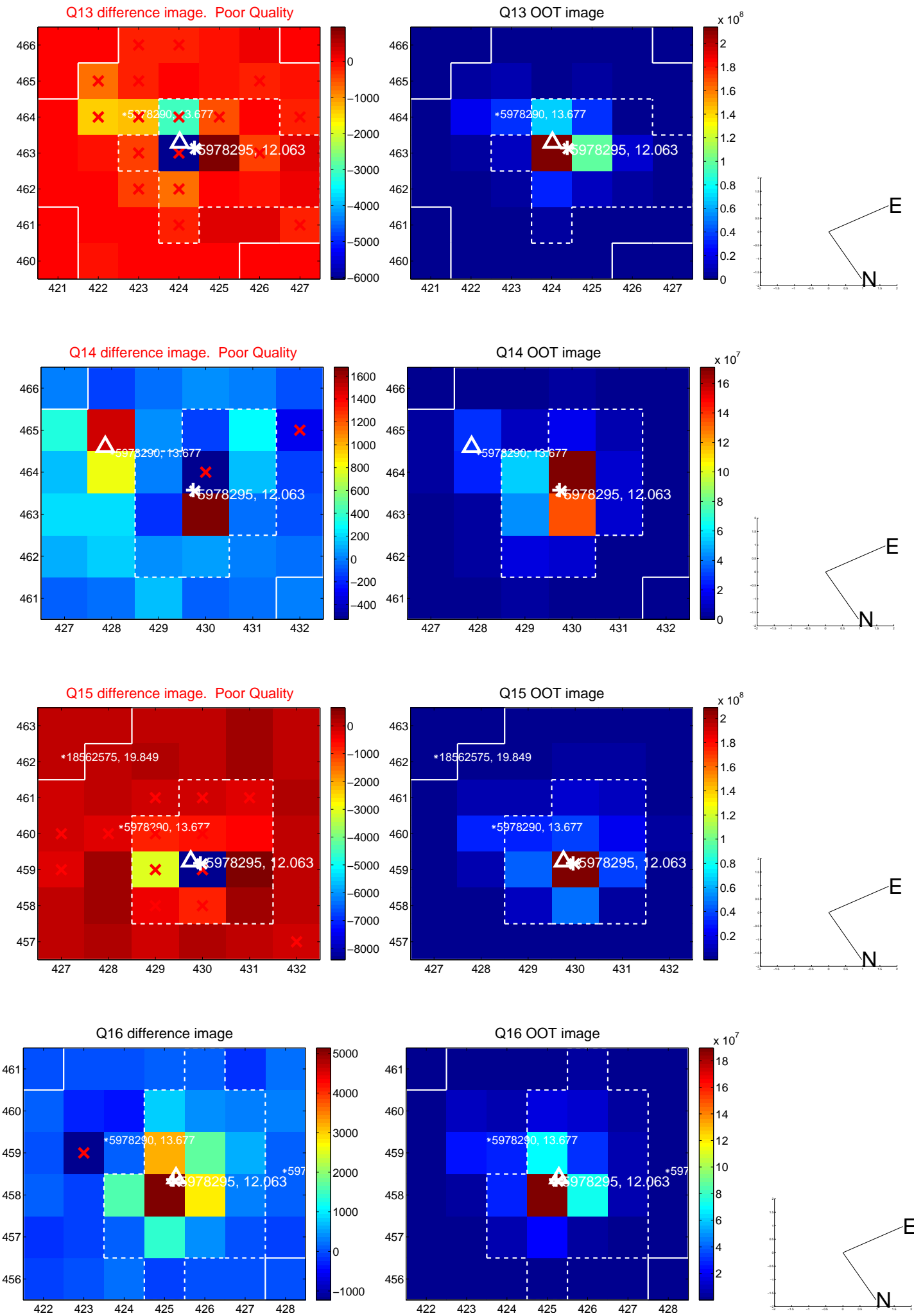




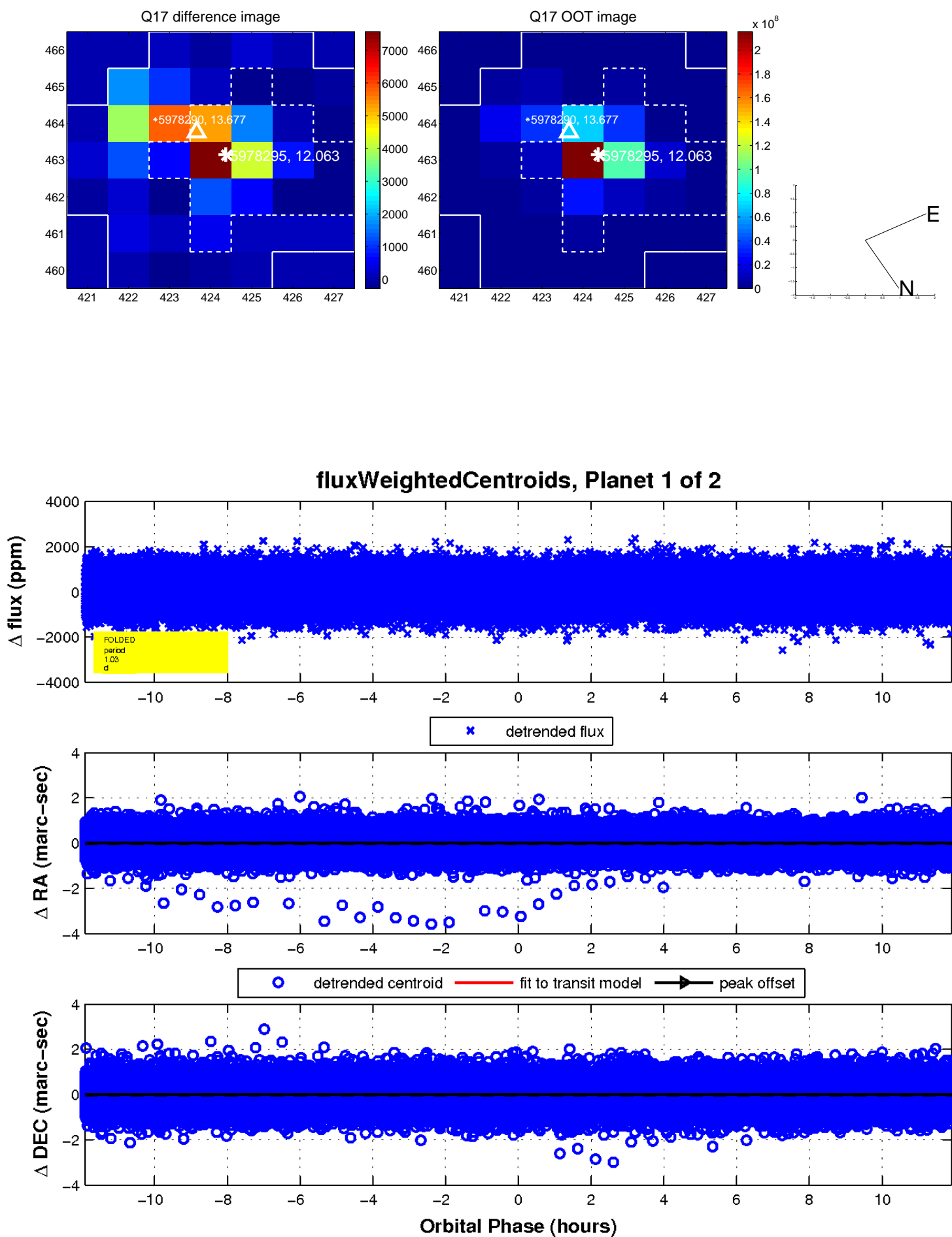




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

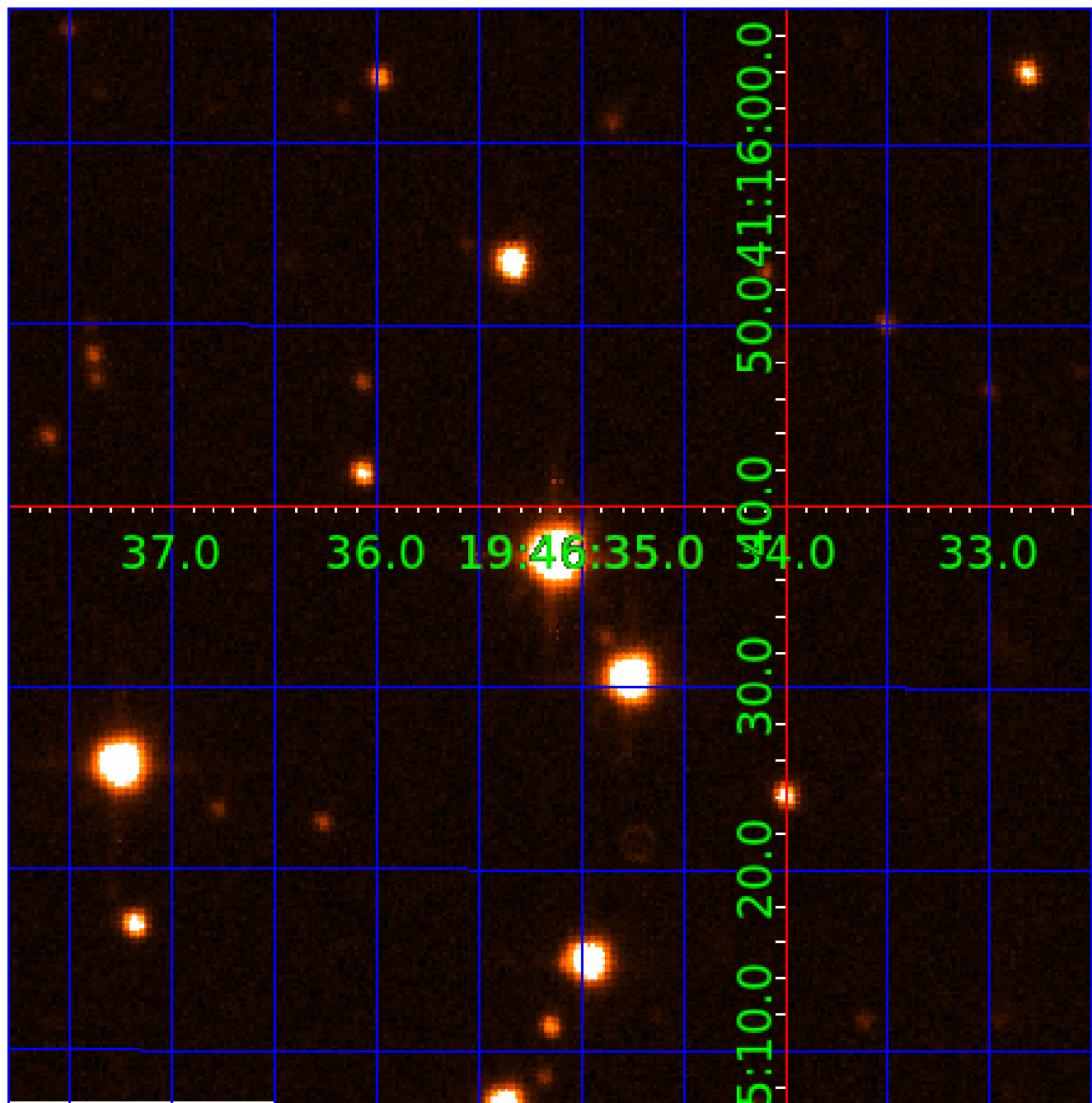


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 005978295

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978295-01	OBS	No	1.034560	132.105445	56.2	3.970	14.7	13.7	1.66	7228	1.44	12507.14
005978295-02	OBS	No	1.462531	132.555108	117.4	17.550	9.6	18.1	1.66	7228	2.25	7883.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978295-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978295-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—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.

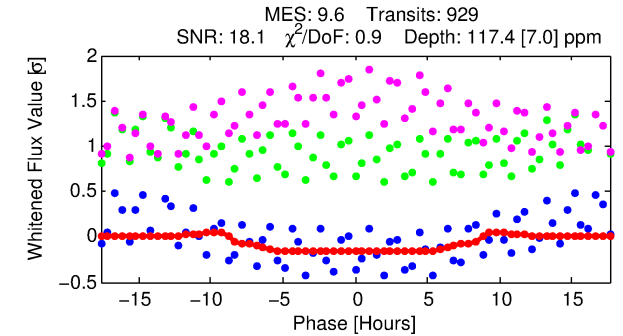
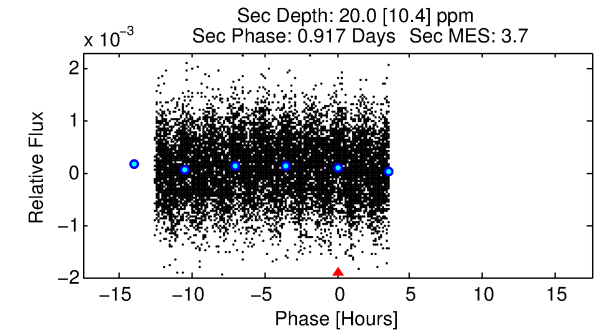
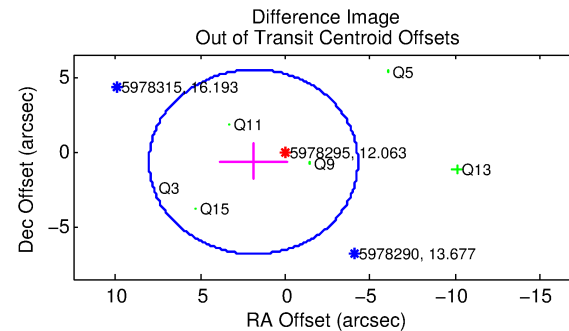
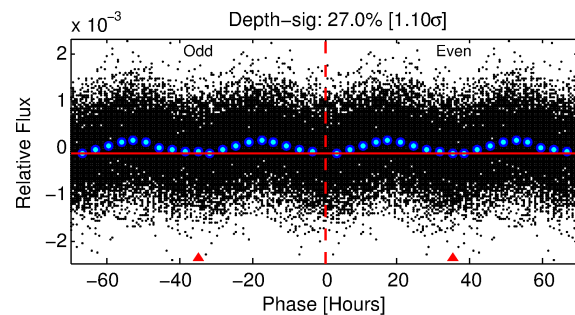
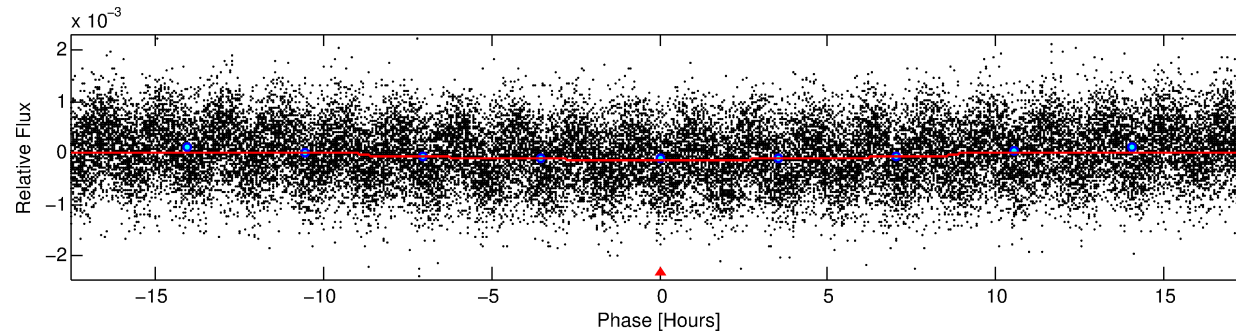
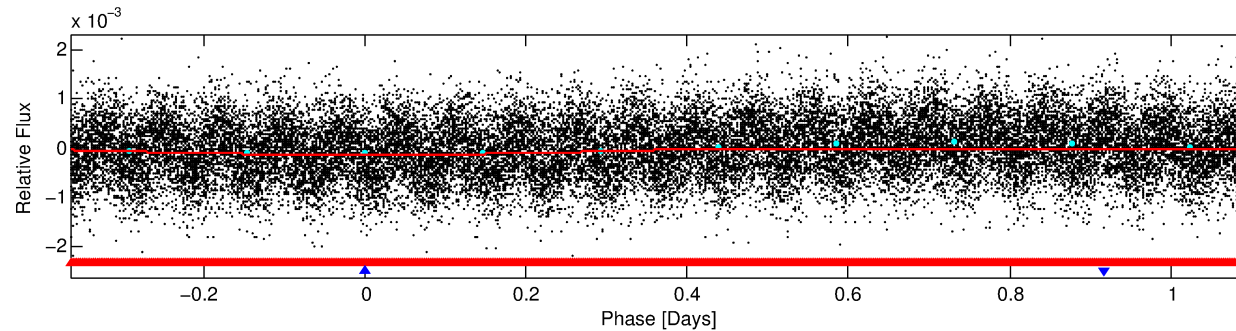
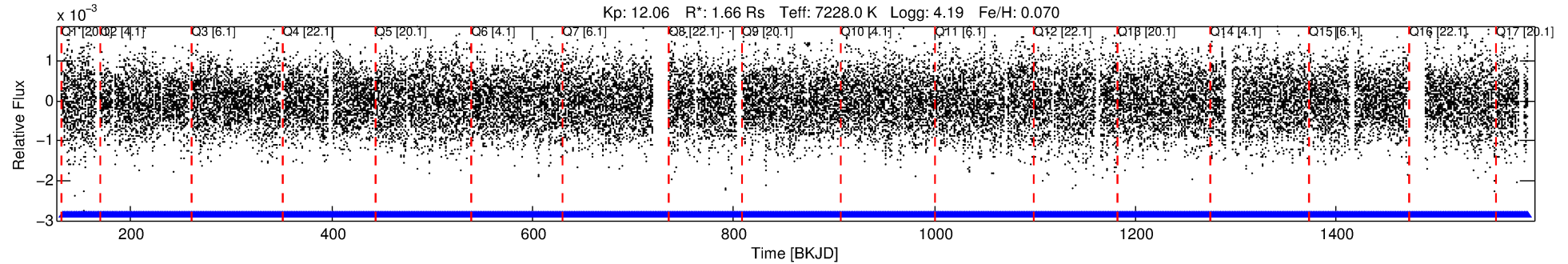
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005978295-02

No Significant Match Found

# DV One-Page Summary

KIC: 5978295 Candidate: 2 of 2 Period: 1.463 d



## DV Fit Results:

Period = 1.46253 [0.00002] d  
Epoch = 132.5551 [0.0079] BKJD  
Rp/R\* = 0.0125 [0.0005]  
a/R\* = 1.00 [0.00]  
b = 0.97 [0.01]  
Seff = 7883.01 [3492.10]  
Teq = 2403 [266] K  
Rp = 2.25 [0.81] Re  
a = 0.0291 [0.0084] AU  
Ag = 1.84 [1.22] [0.69 $\sigma$ ]  
Teffp = 4326 [605] K [2.91 $\sigma$ ]

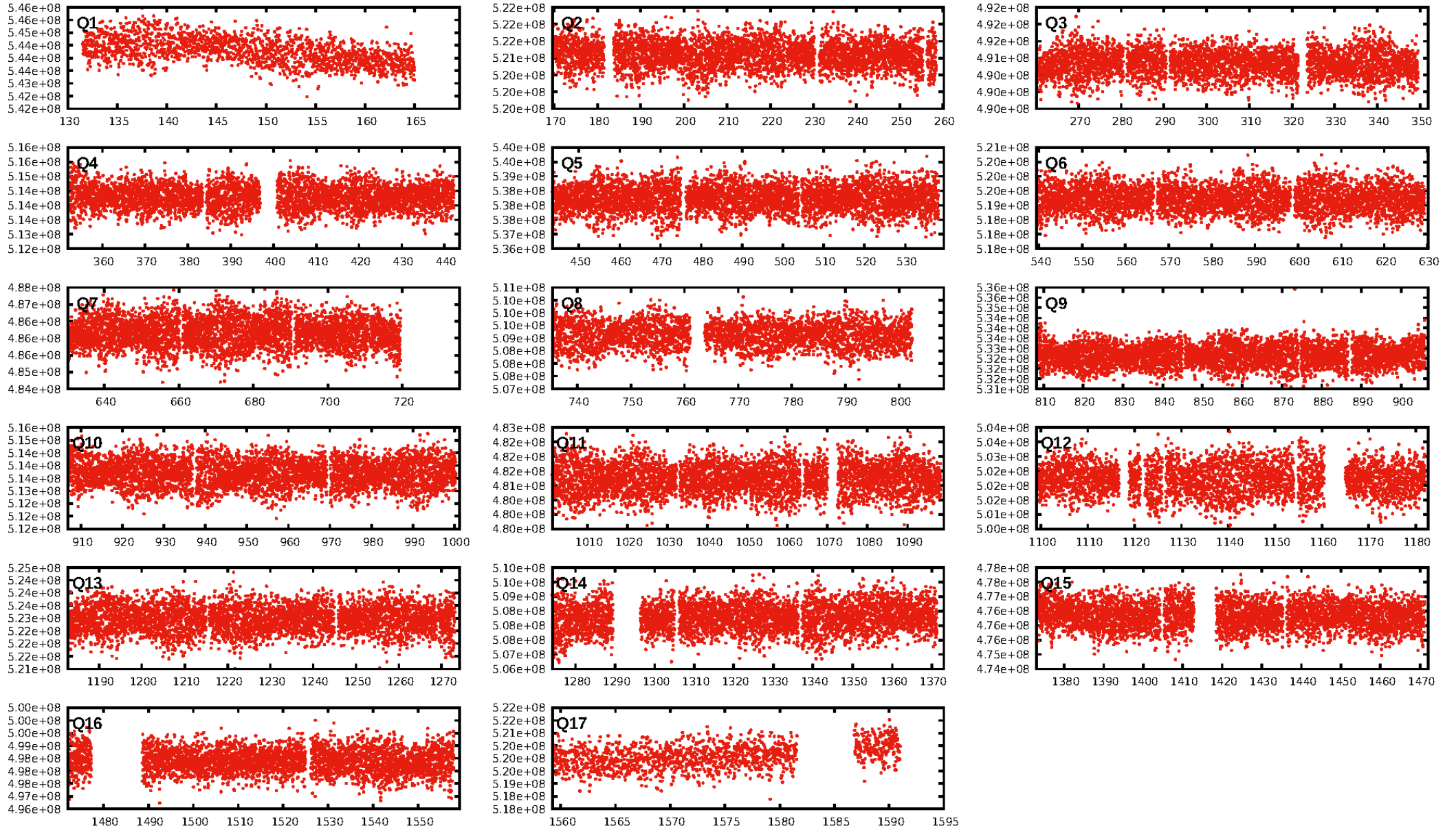
## DV Diagnostic Results:

ShortPeriod-sig: 43.2% [0.57 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [888/888]  
GhostDiagnostic-chr: 2.317  
Centroid-sig: 0.0%  
Centroid-so: 0.584 arcsec [6.07 $\sigma$ ]  
OotOffset-rm: 1.986 arcsec [0.97 $\sigma$ ]  
KicOffset-rm: 1.962 arcsec [0.66 $\sigma$ ]  
OotOffset-st: 0/3/0/3 [6]  
KicOffset-st: 0/3/0/3 [6]  
DiffImageQuality-fgm: 0.17 [1/6]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:12:25 Z

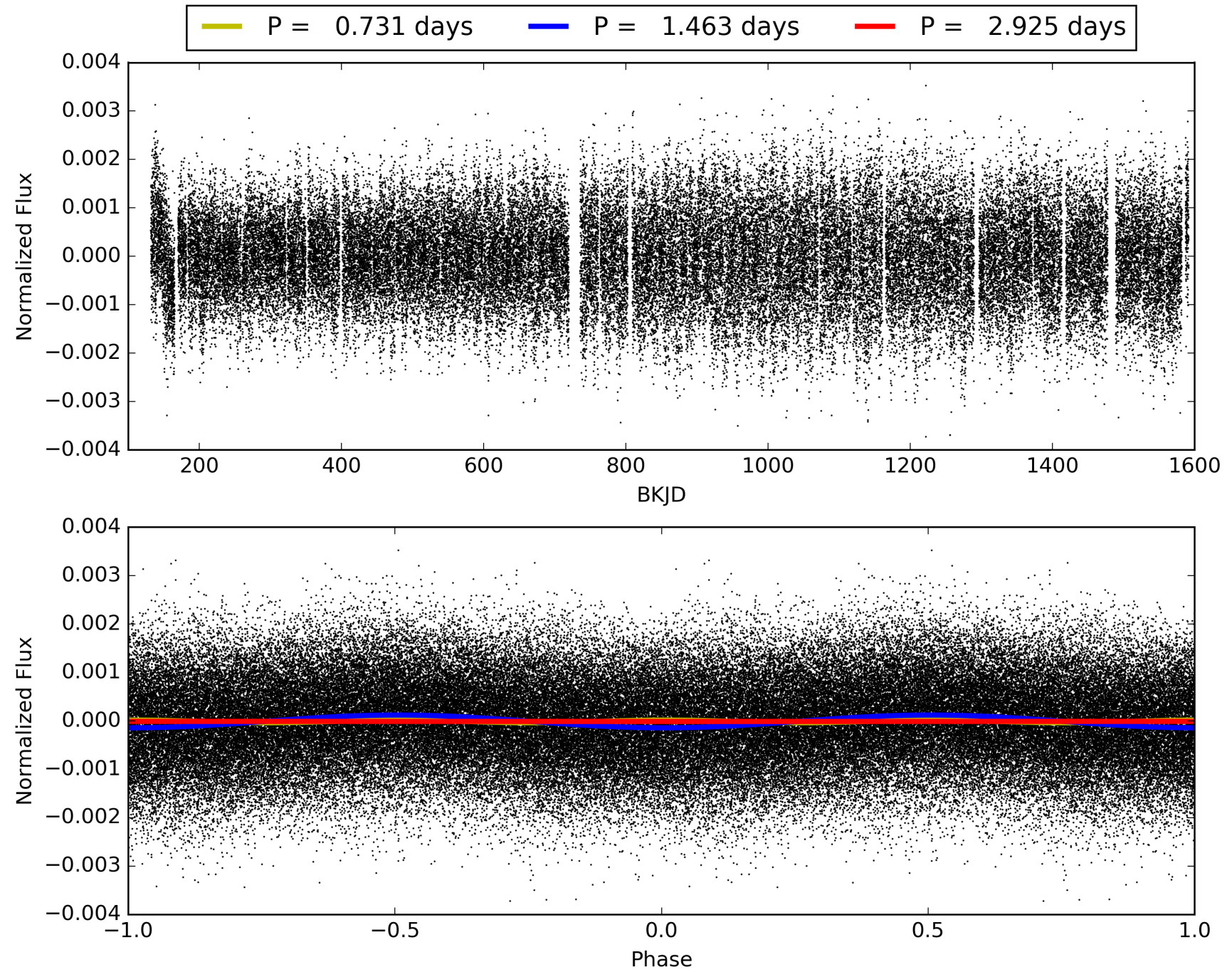
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005978295-02, PDC Light Curves



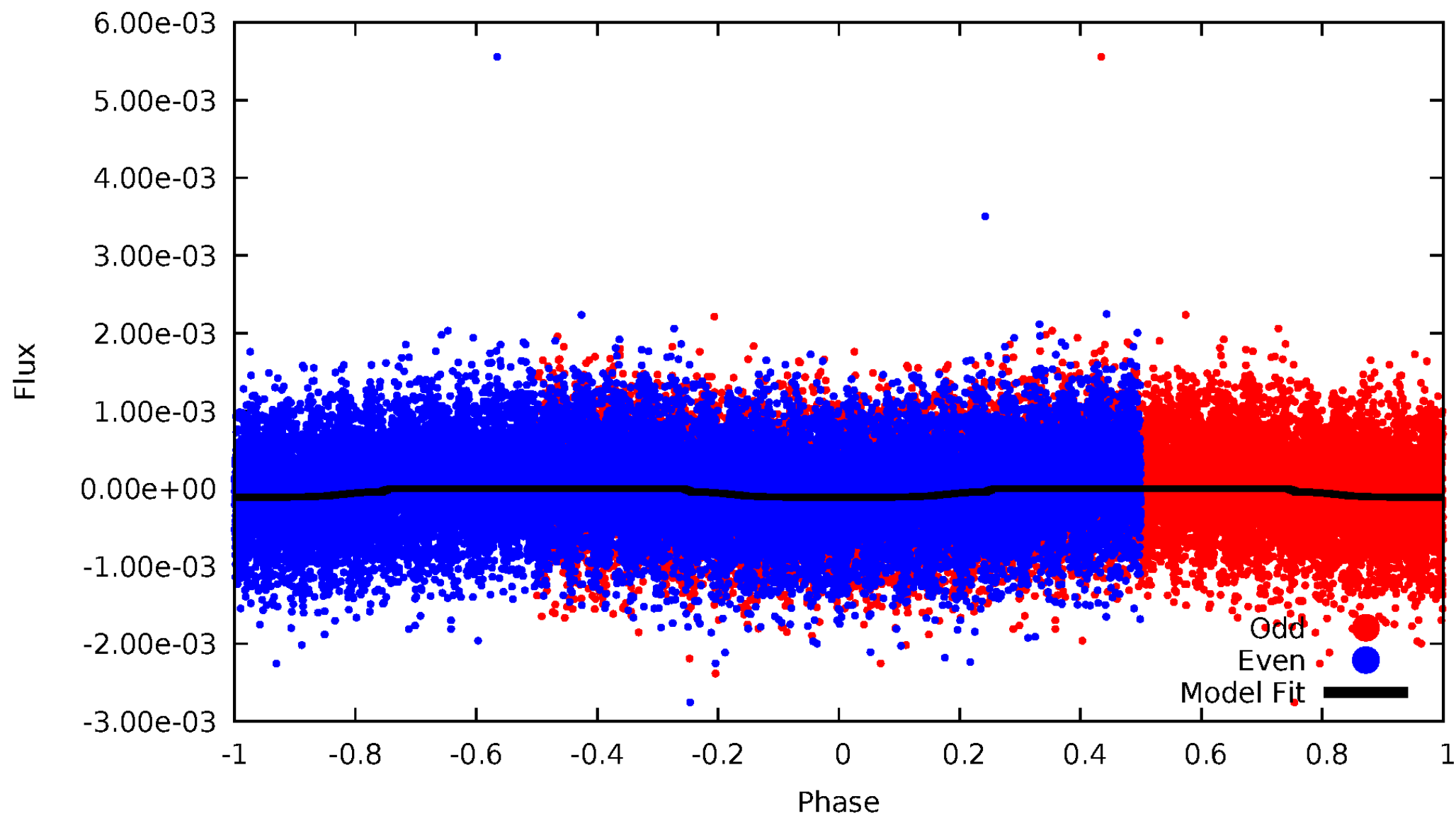


# TCE 005978295-02



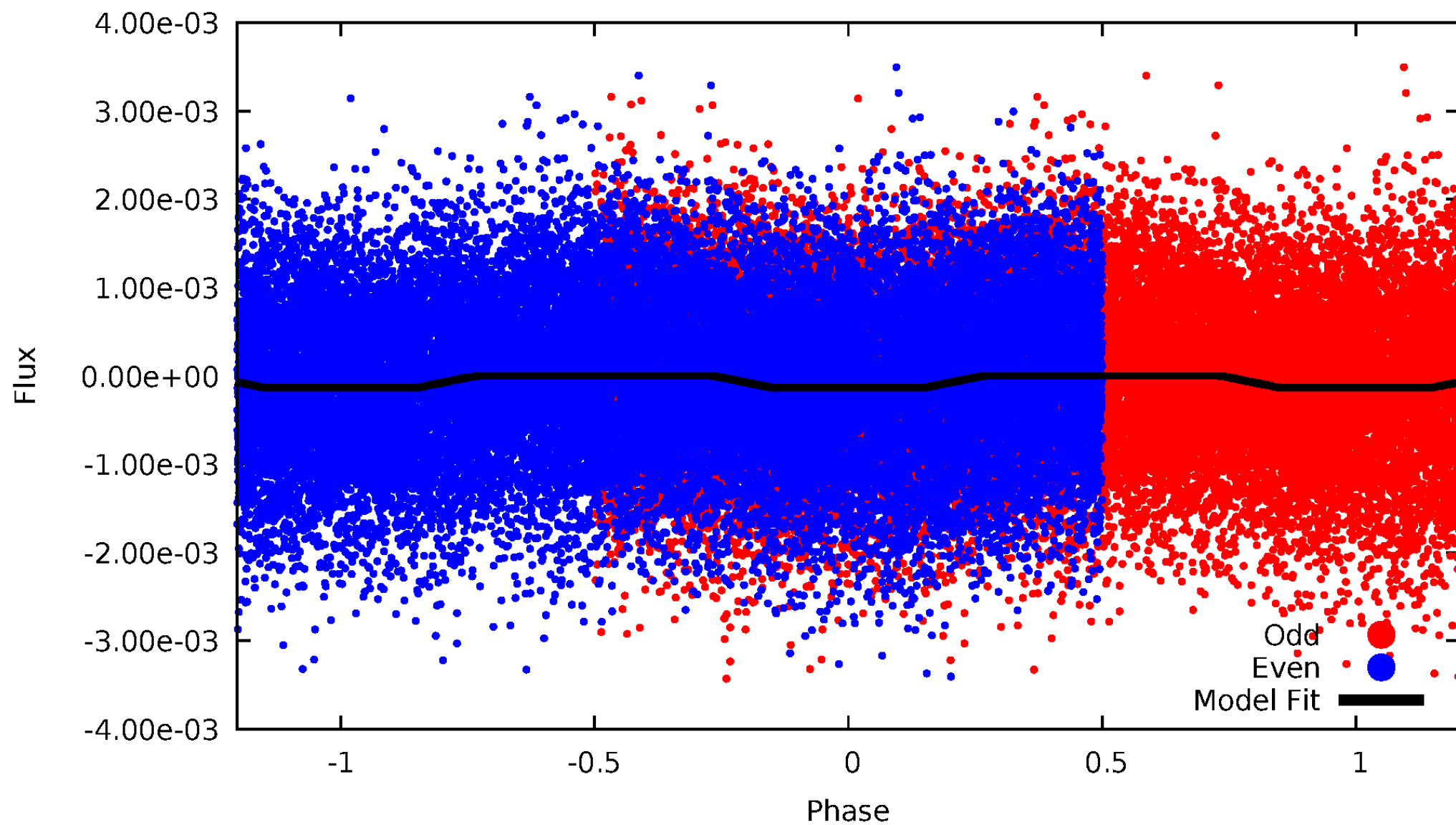
# DV Odd/Even

TCE 005978295-02



# ALT Odd/Even

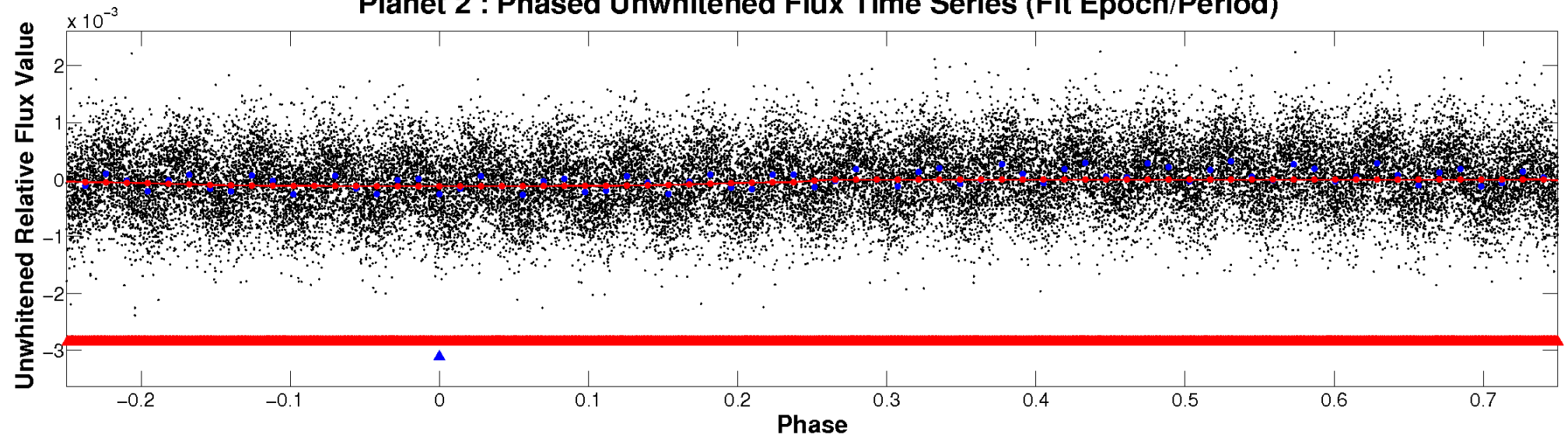
TCE 005978295-02



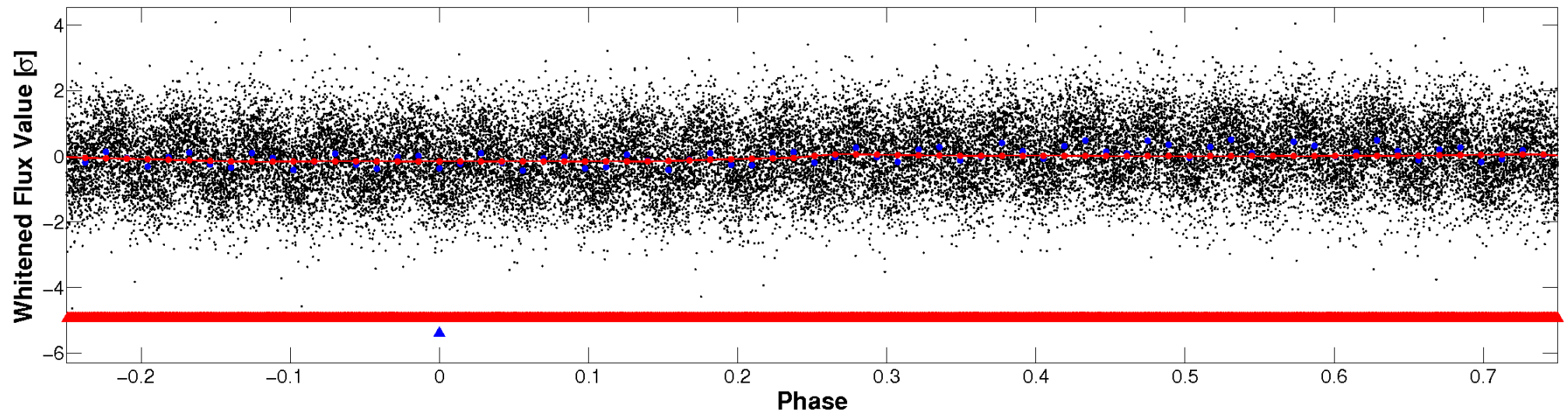


# Non-Whitened Vs. Whitened Light Curve

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

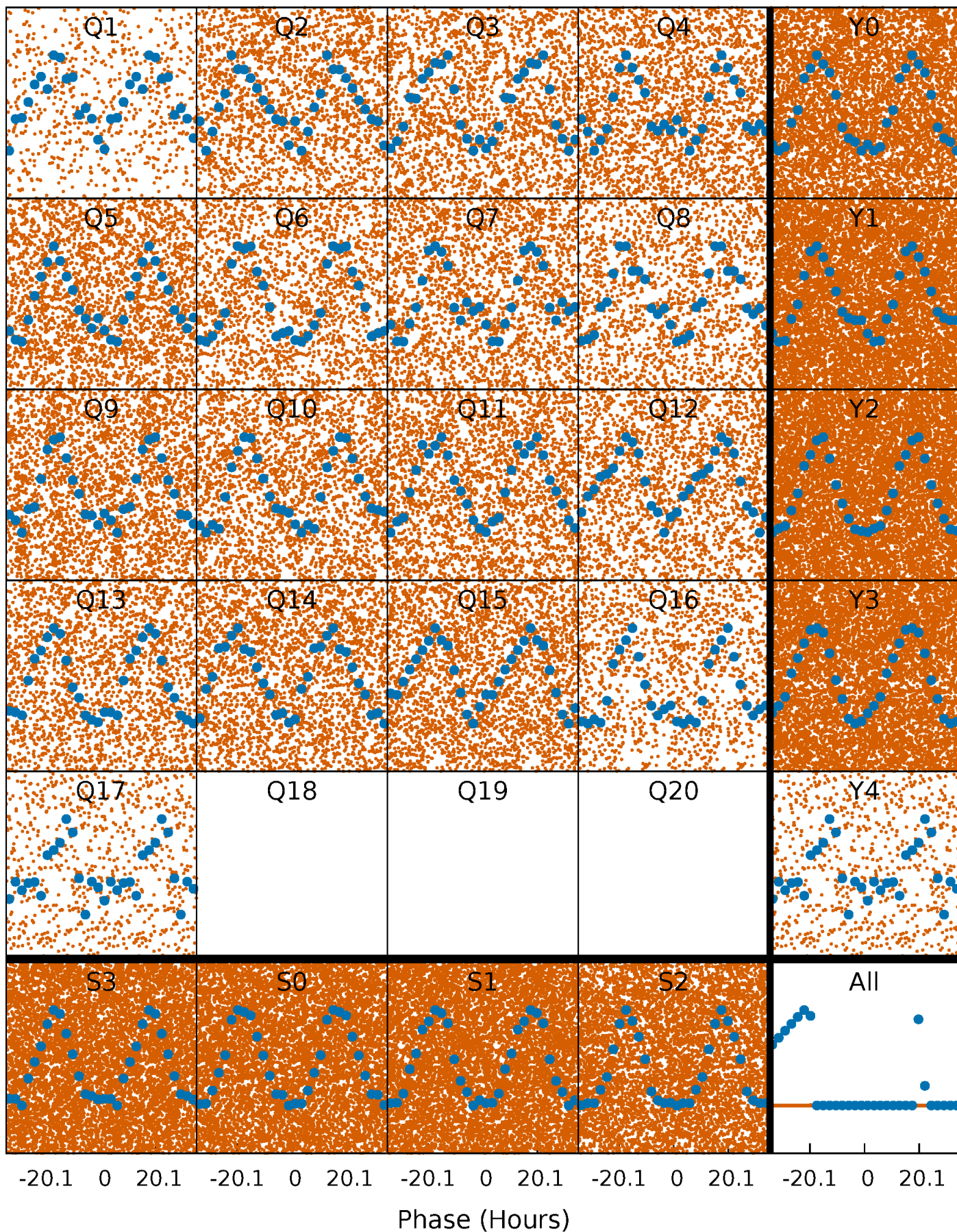


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

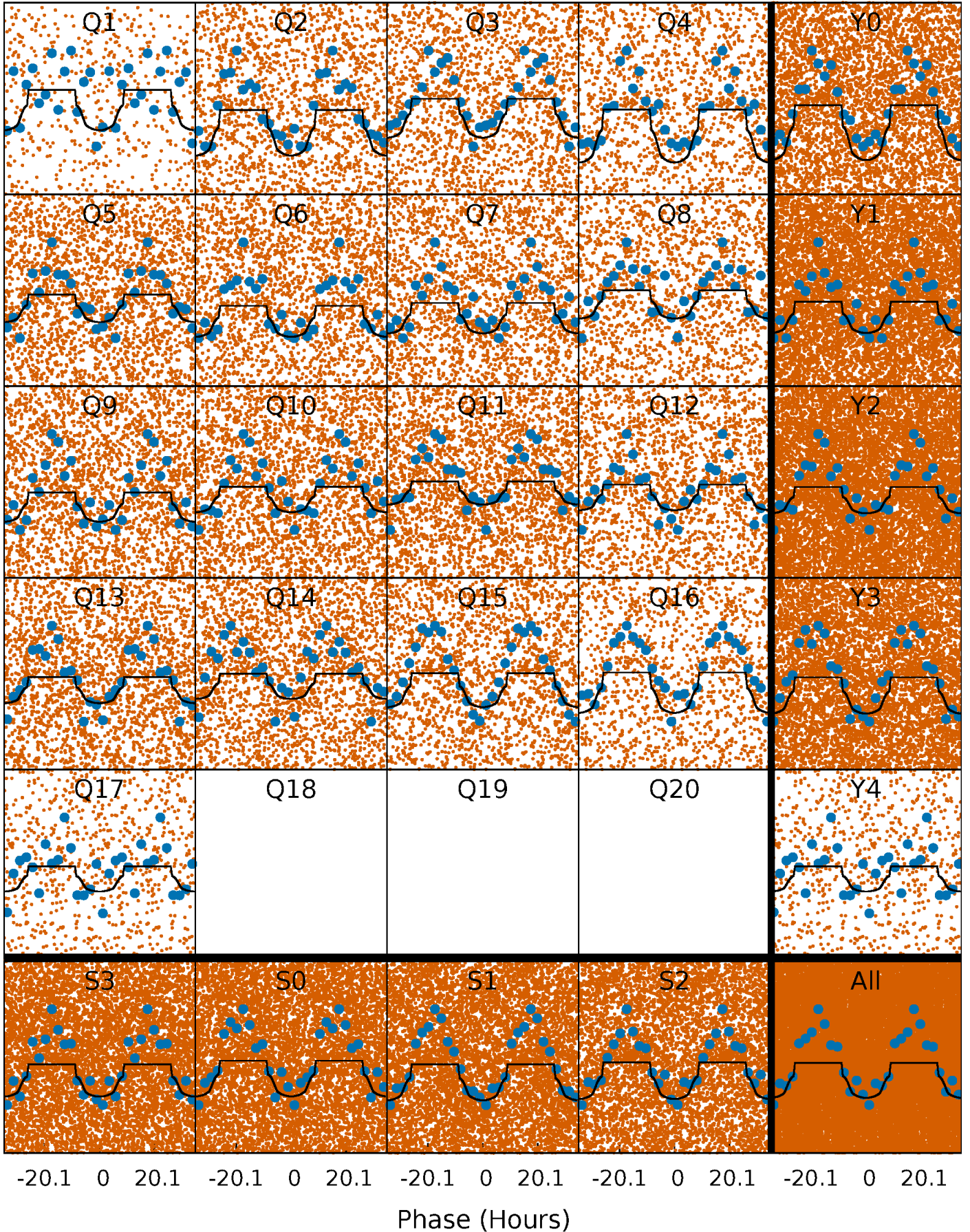
TCE 005978295-02   P= 1.462531 Days    $T_0=132.555108$  (BKJD)





# DV Quarter-Phased Transit Curves

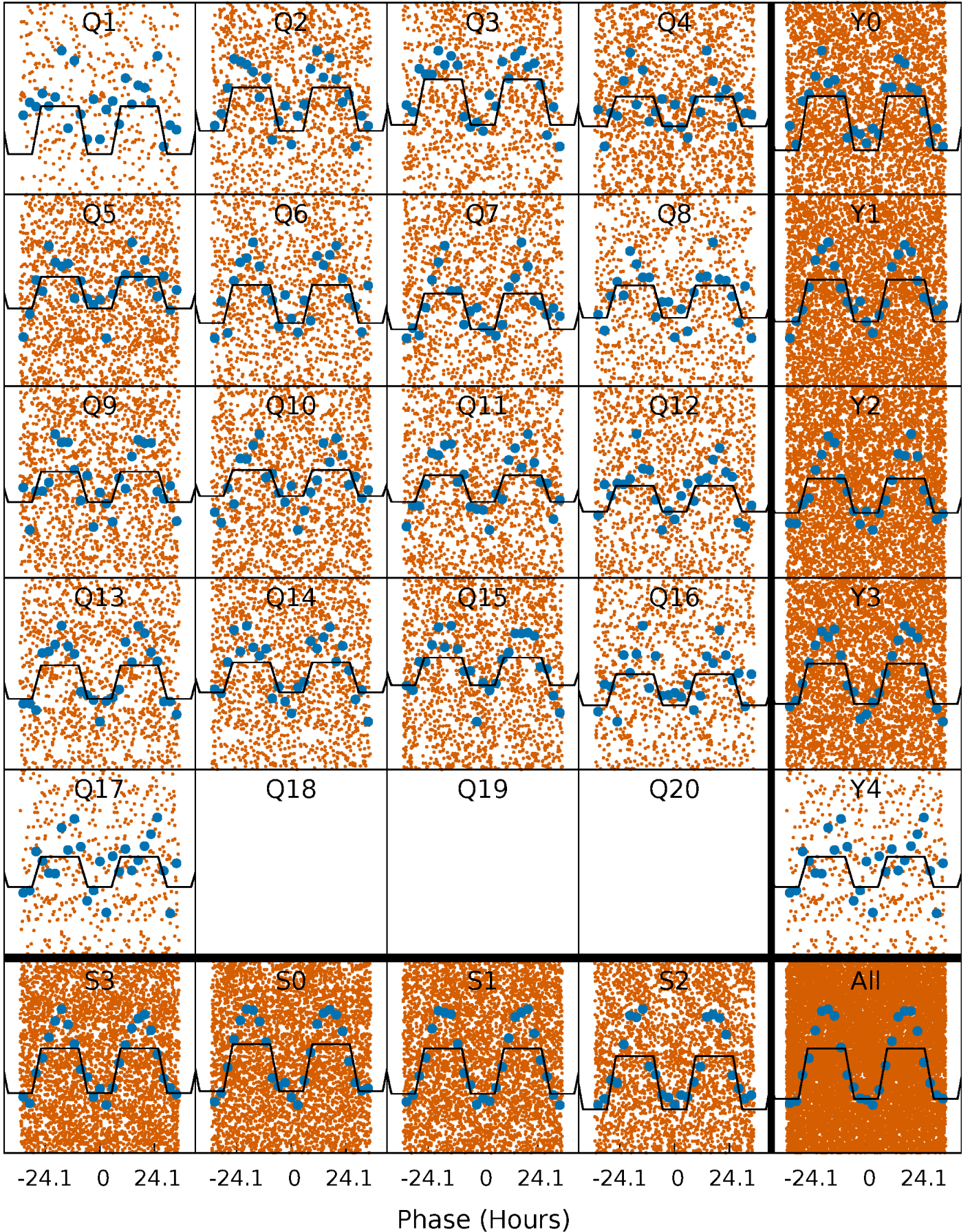
TCE 005978295-02   P= 1.462531 Days    $T_0=132.555108$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

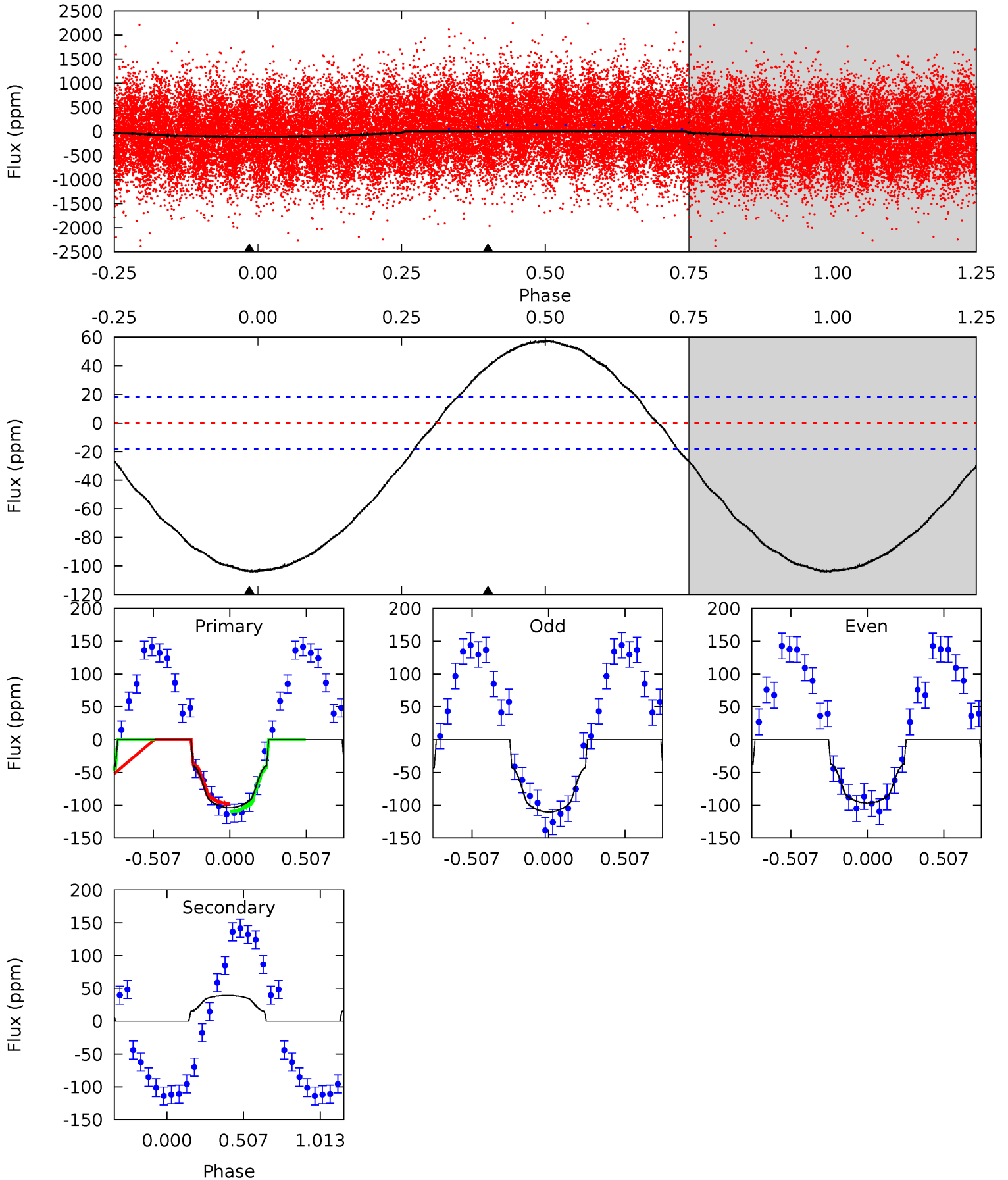
TCE 005978295-02   P= 1.462349 Days    $T_0=132.659575$  (BKJD)



# DV Model-Shift Uniqueness Test

005978295-02, P = 1.462531 Days, E = 131.092577 Days

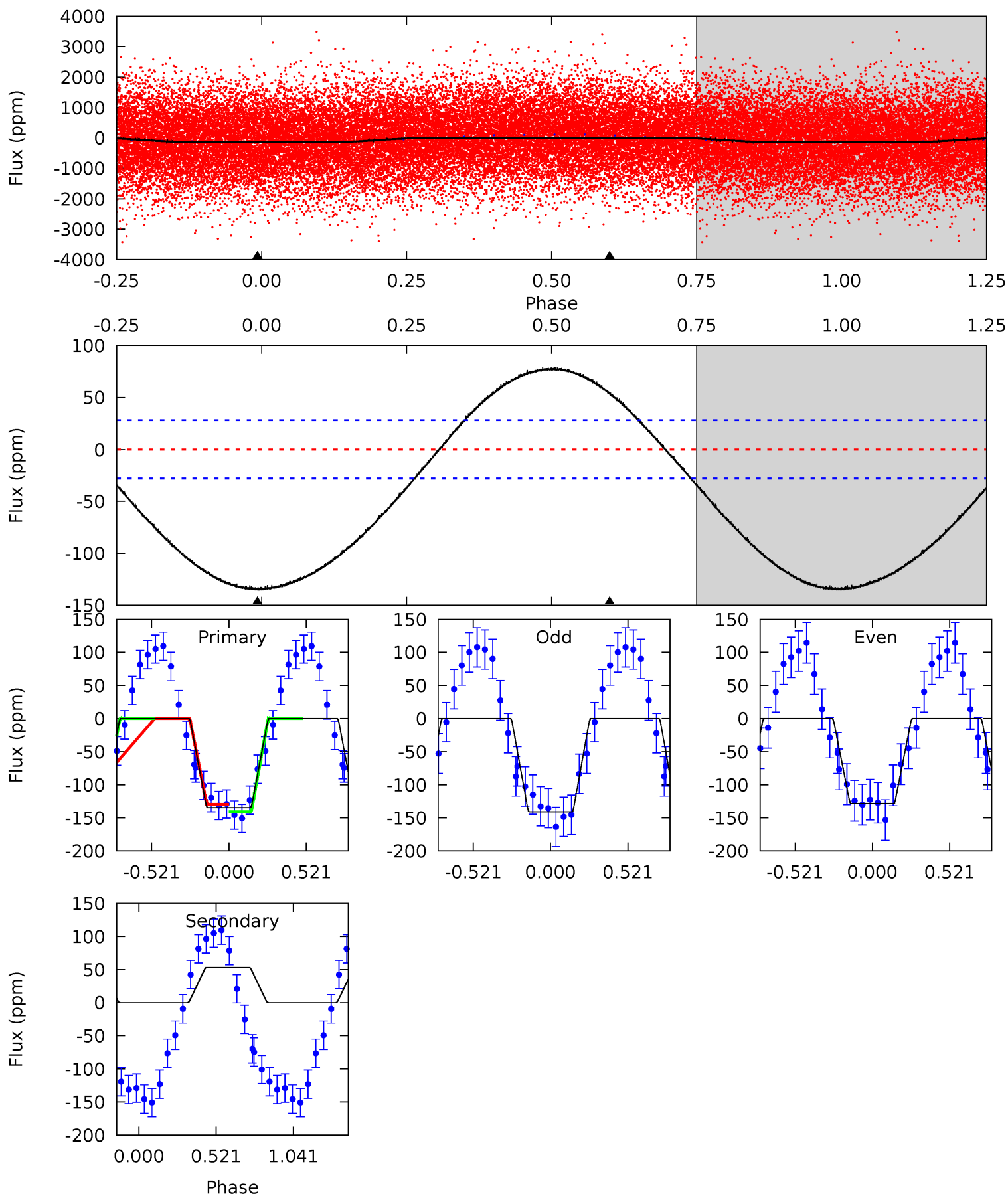
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.0	-9.09	0	0	4.21	0.66	3.45	24.0	24.0	-9.09	-9.09	1.57	1.02	0.36	1.37



# Alt Model-Shift Uniqueness Test

005978295-02, P = 1.462349 Days, E = 131.197226 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
20.2	-7.98	0	0	4.21	0.64	2.87	20.2	20.2	-7.98	-7.98	0.97	1.16	0.37	0.84





### Stellar Parameters For KIC 005978295

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7228^{+200}_{-343}$	$4.189^{+0.090}_{-0.210}$	$0.070^{+0.200}_{-0.350}$	$1.655^{+0.589}_{-0.252}$	$1.542^{+0.233}_{-0.211}$	$0.479^{+0.207}_{-0.262}$
	+3%/-5%	+2%/-5%	+286%/-500%	+36%/-15%	+15%/-14%	+43%/-55%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 005978295-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$39 \pm 4$	$2.29^{+0.41}_{-0.24}$	$3379^{+260}_{-212}$	$-5208^{+223}_{-218}$	$-3.419^{+0.929}_{-0.857}$
Alt.	$53 \pm 7$	$2.13^{+0.39}_{-0.22}$	$3400^{+258}_{-216}$	$-5775^{+296}_{-233}$	$-5.335^{+1.452}_{-1.531}$

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

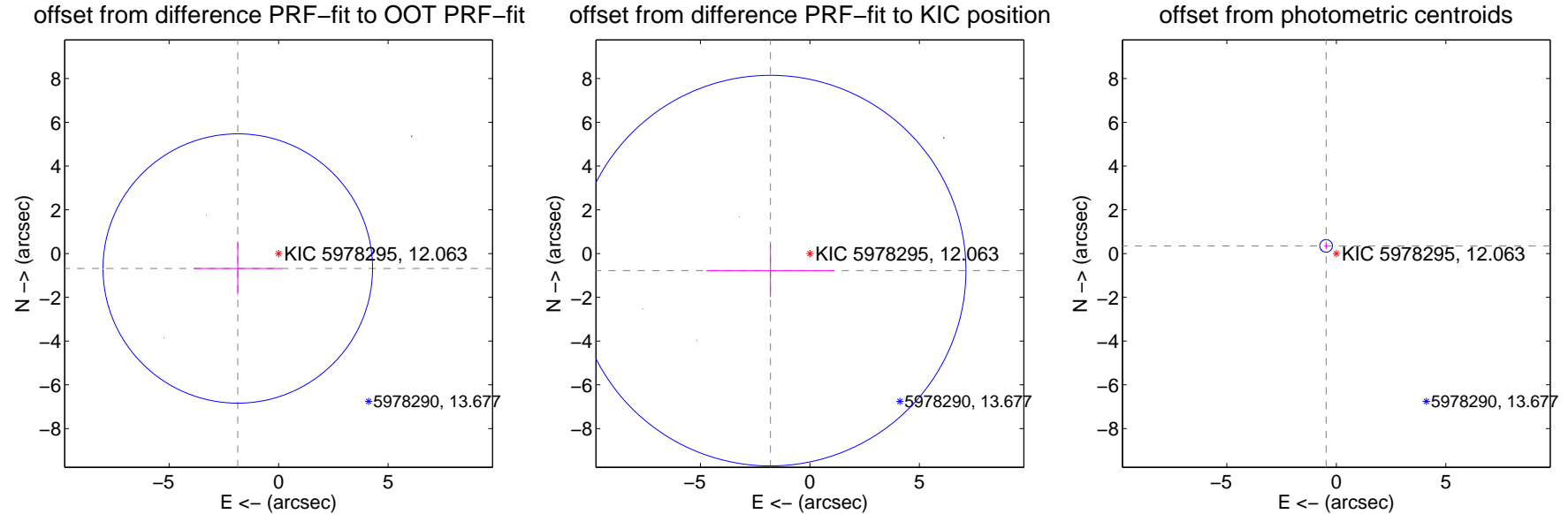
## DV Centroid Data

Supplemental centroid analysis for 005978295-02. Kepler magnitude: 12.06. Transit SNR 18.06

There are 1 quarters with good PRF difference image offsets

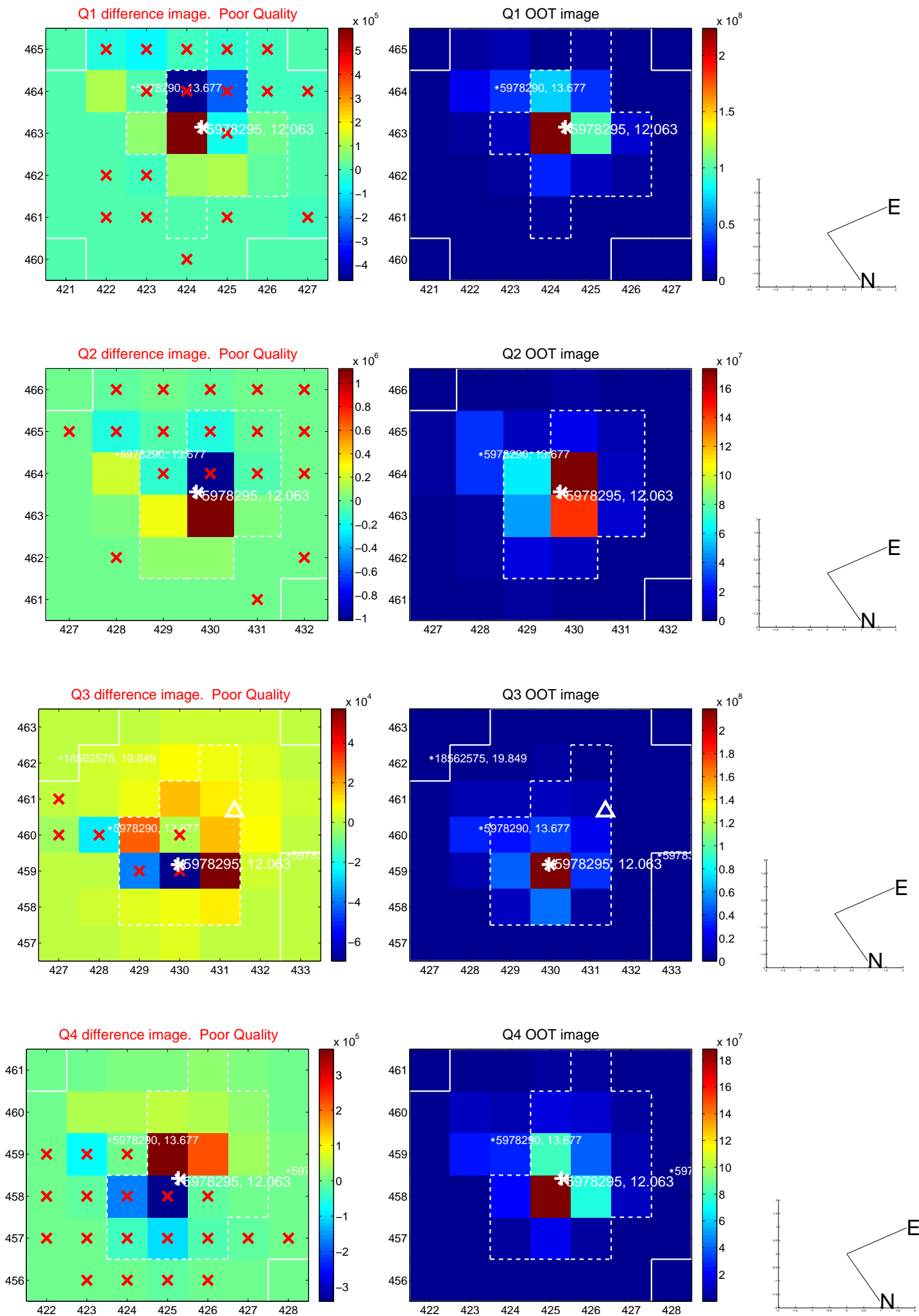
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.986 \pm 2.051$	0.97	$1.865 \pm 2.008$	$-0.683 \pm 1.187$
PRF-fit source offset from KIC position	$1.962 \pm 2.975$	0.66	$1.801 \pm 2.929$	$-0.780 \pm 1.217$
photometric centroid source offset	$0.58 \pm 0.10$	6.07	$0.47 \pm 0.08$	$0.35 \pm 0.12$

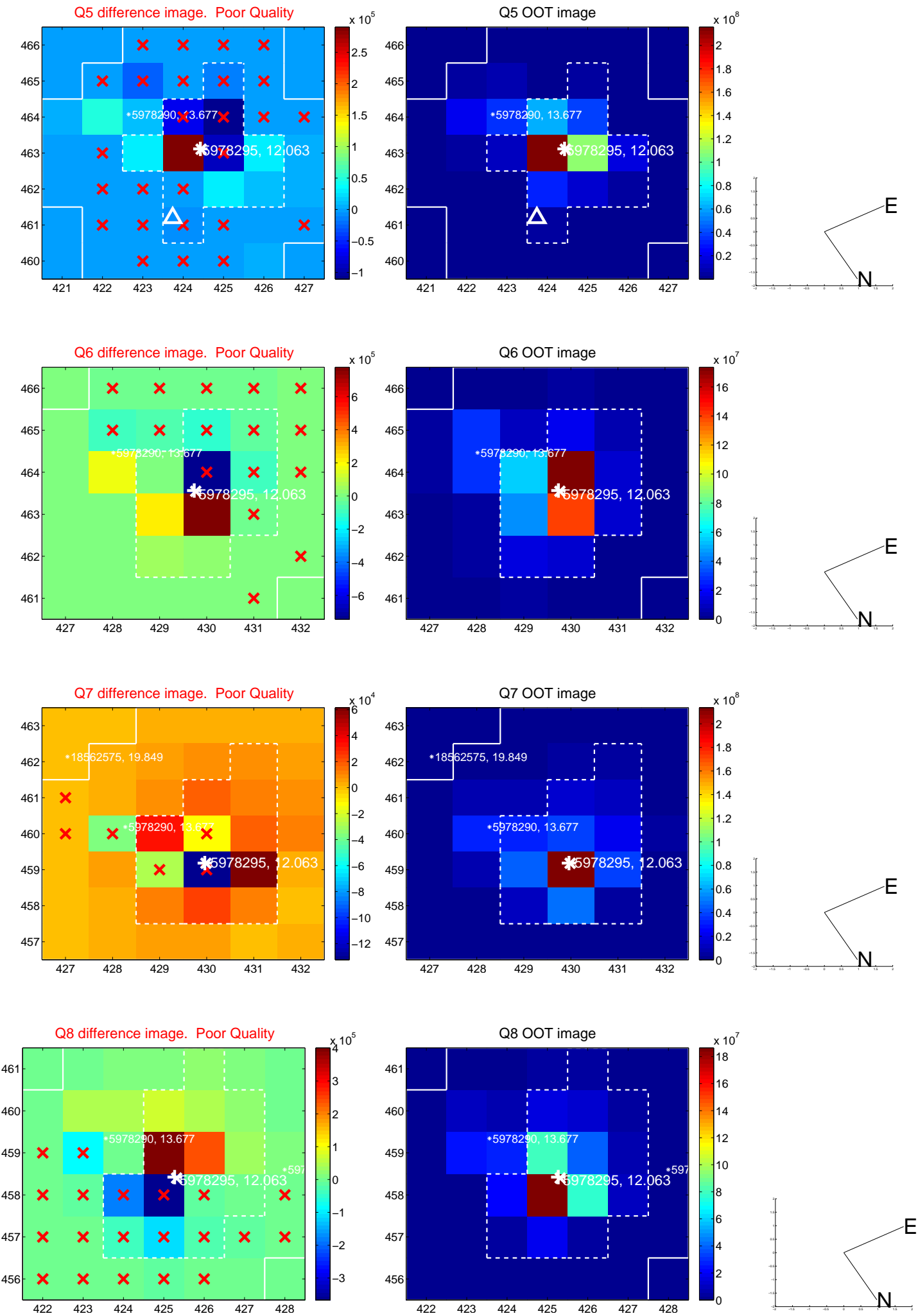


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

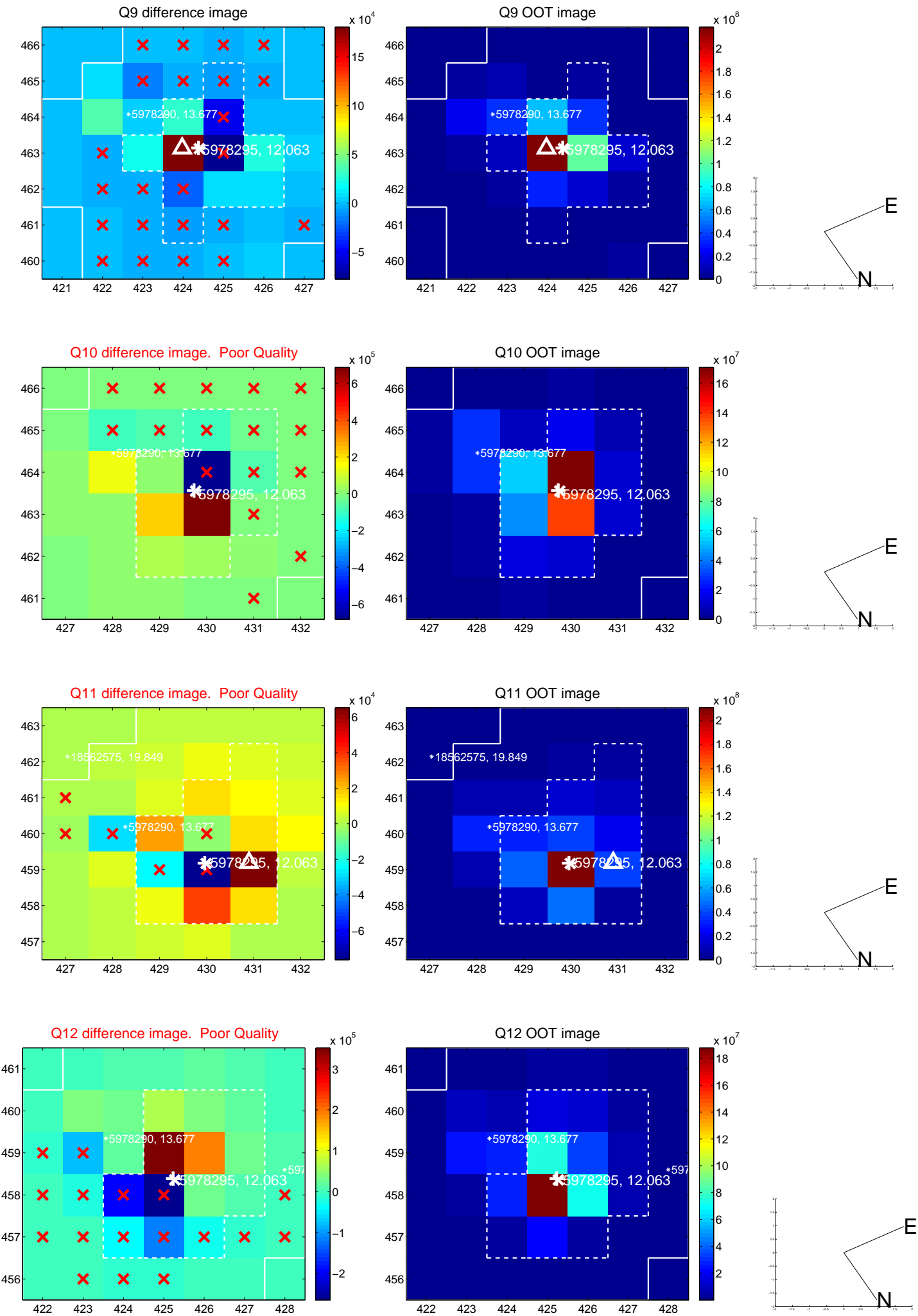
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



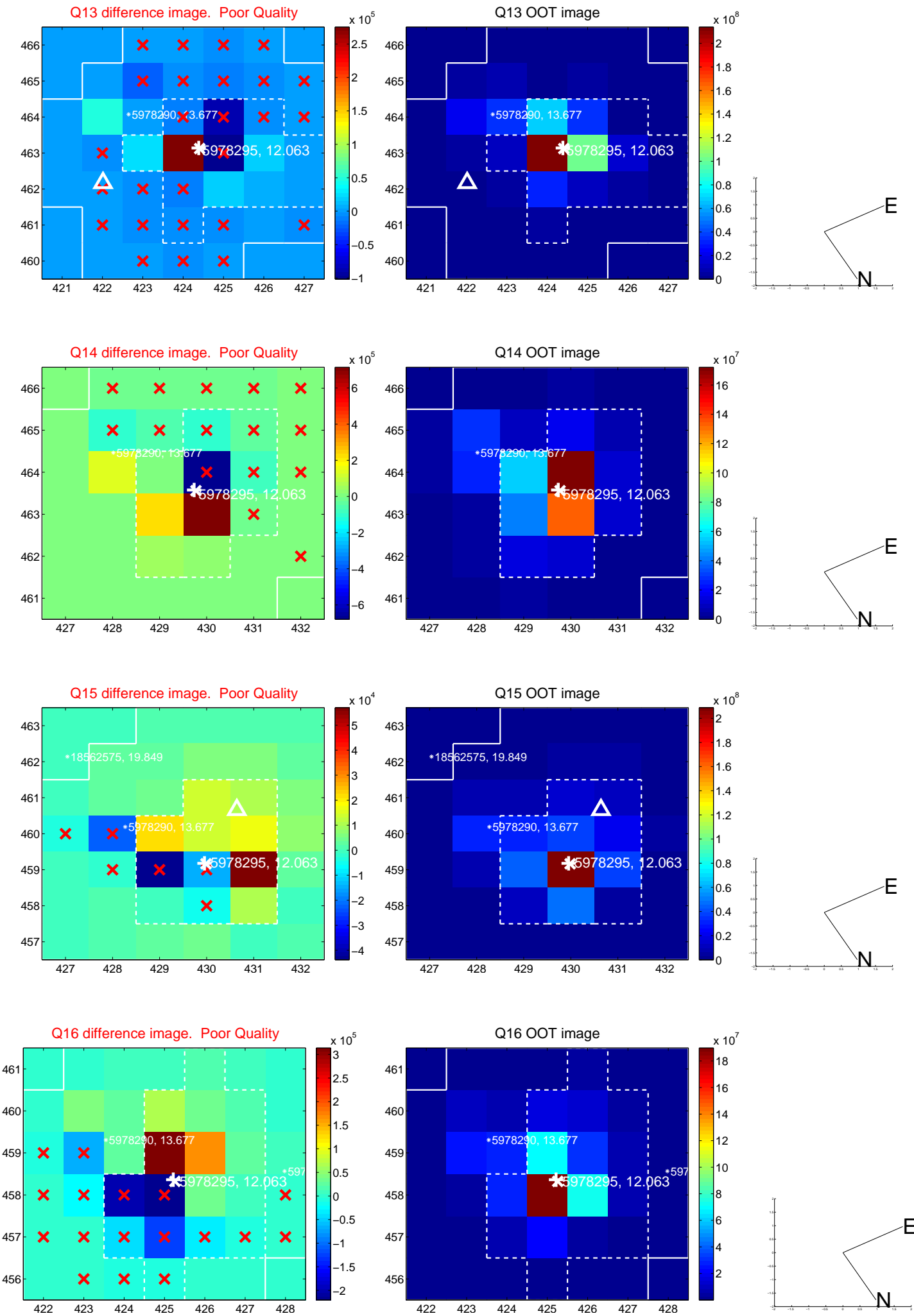
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

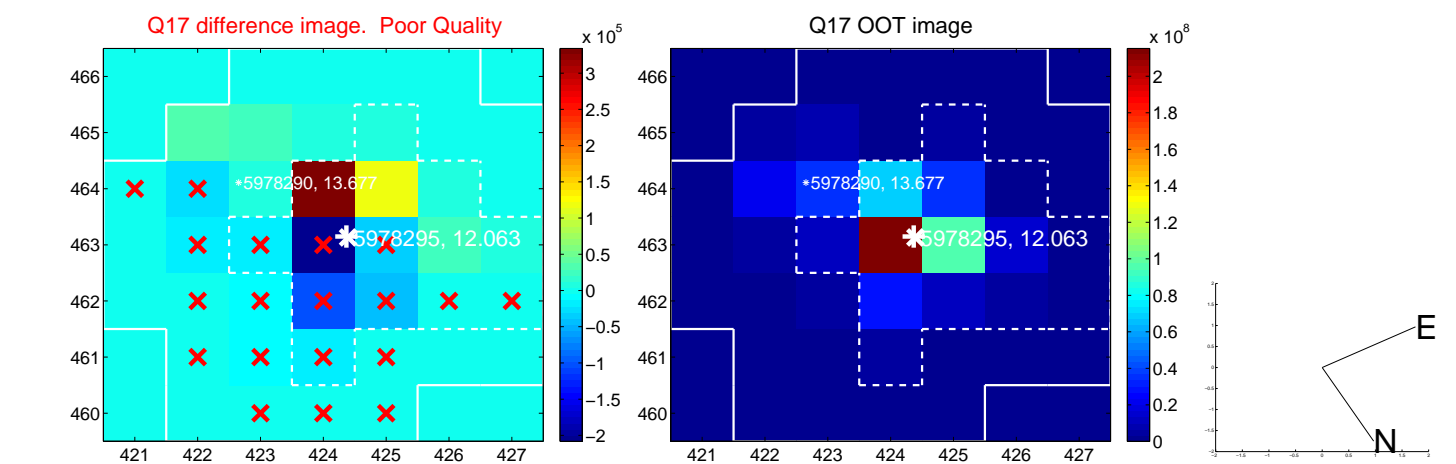


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

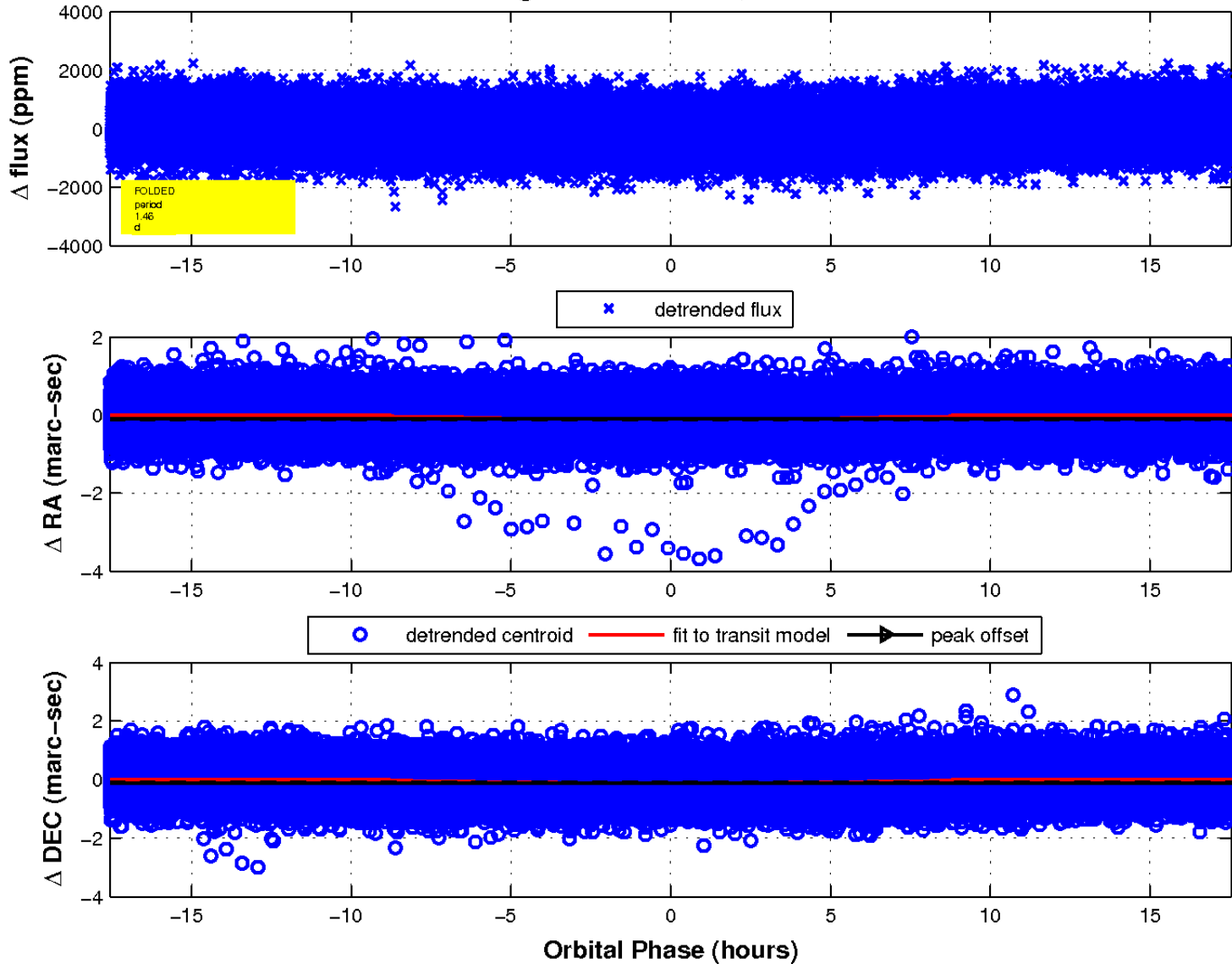




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



# UKIRT Image

Declination

