

# KIC 010056297

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010056297-01	OBS	No	1.484020	132.369999	501.9	8.080	11.7	12.1	1.98	7355	5.86	11721.95
010056297-02	OBS	No	3.990834	134.647427	1385.9	19.124	8.8	12.7	1.98	7355	13.62	3134.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010056297-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
010056297-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

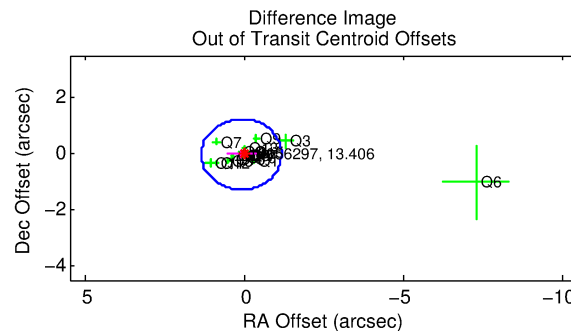
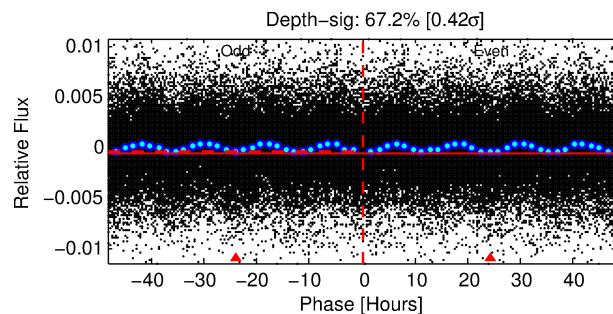
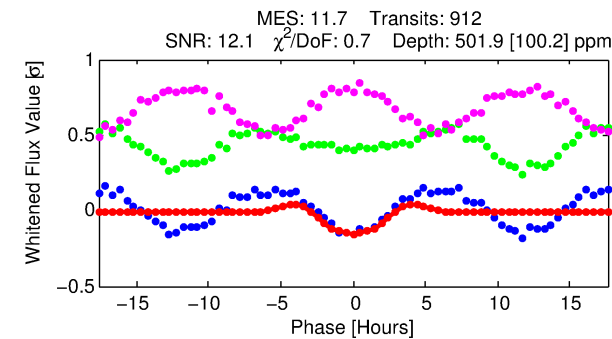
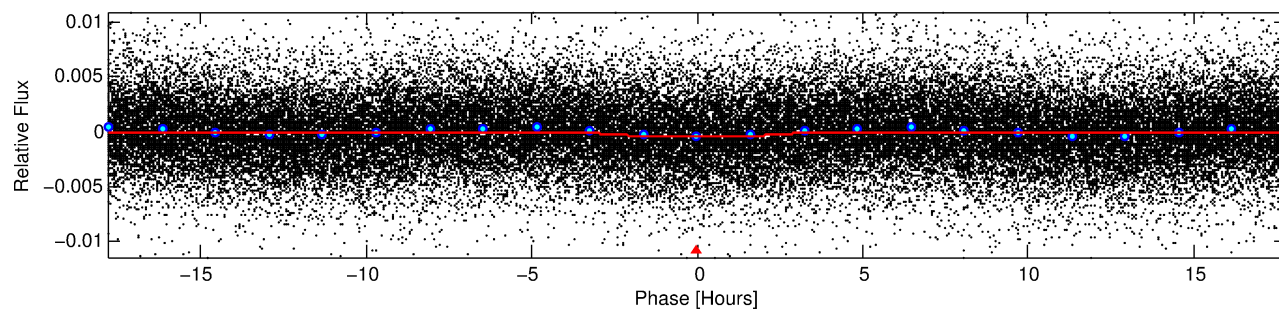
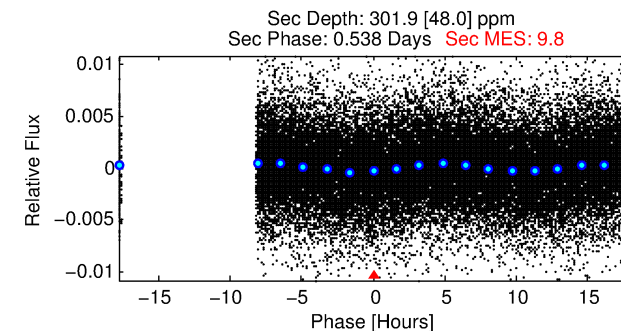
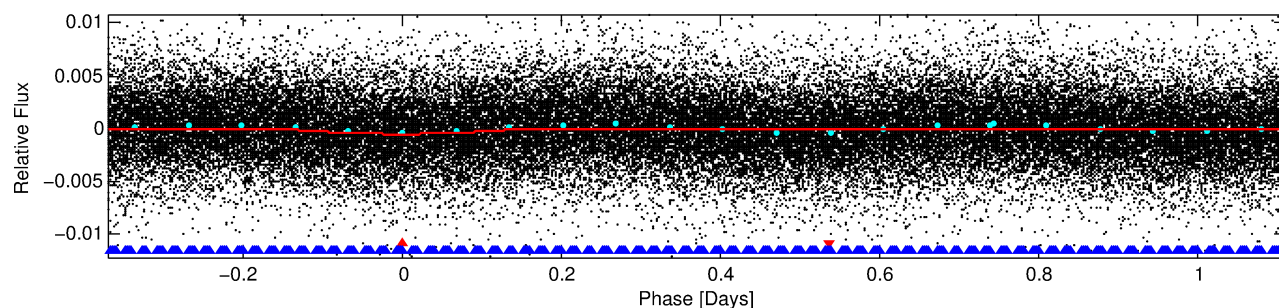
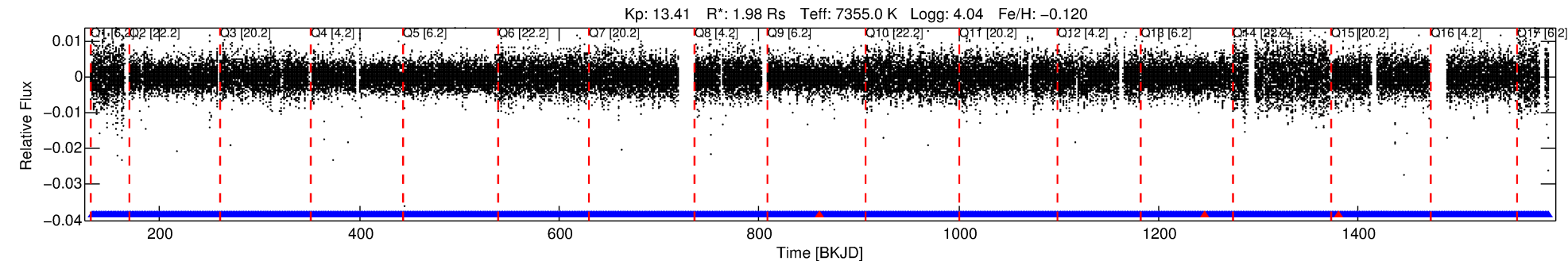
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010056297-01

No Significant Match Found

# DV One-Page Summary

KIC: 10056297 Candidate: 1 of 2 Period: 1.484 d



## DV Fit Results:

Period = 1.48402 [0.00002] d  
Epoch = 132.3700 [0.0088] BKJD  
Rp/R\* = 0.0271 [0.0053]  
a/R\* = 1.09 [0.03]  
b = 0.98 [0.02]  
Seff = 11721.95 [4657.13]  
Teq = 2653 [264] K  
Rp = 5.86 [2.05] Re  
a = 0.0297 [0.0073] AU  
Ag = 4.26 [2.36] [1.38σ]  
**Teffp = 5893 [665] K [4.53σ]**

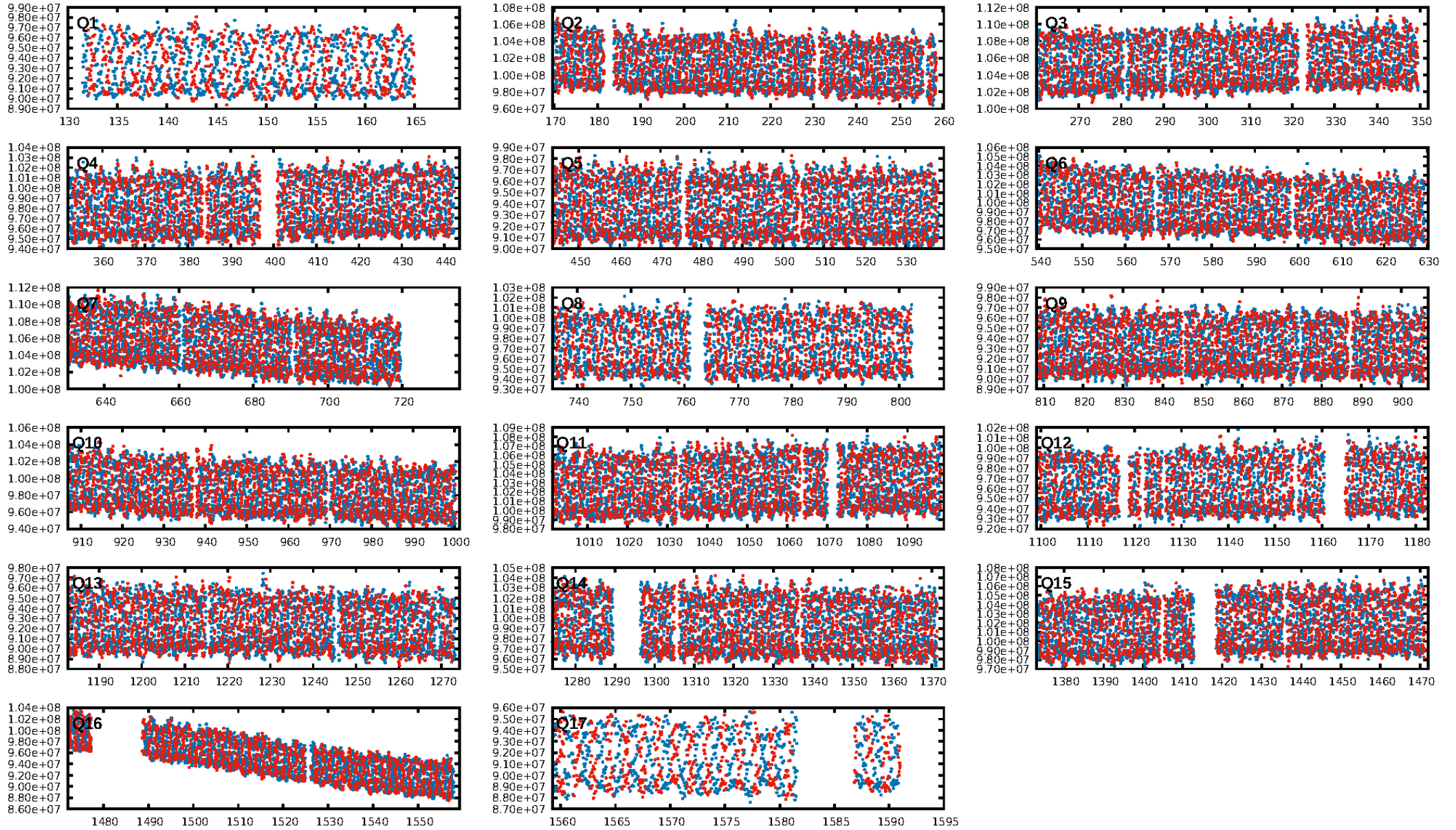
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 99.6% [2.90σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [867/870]  
**GhostDiagnostic-chr: 0.7773**  
**Centroid-sig: 0.1%**  
Centroid-so: 0.158 arcsec [2.91σ]  
OotOffset-rm: 0.106 arcsec [0.25σ]  
KicOffset-rm: 0.180 arcsec [0.61σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.59 [10/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:42:10 Z

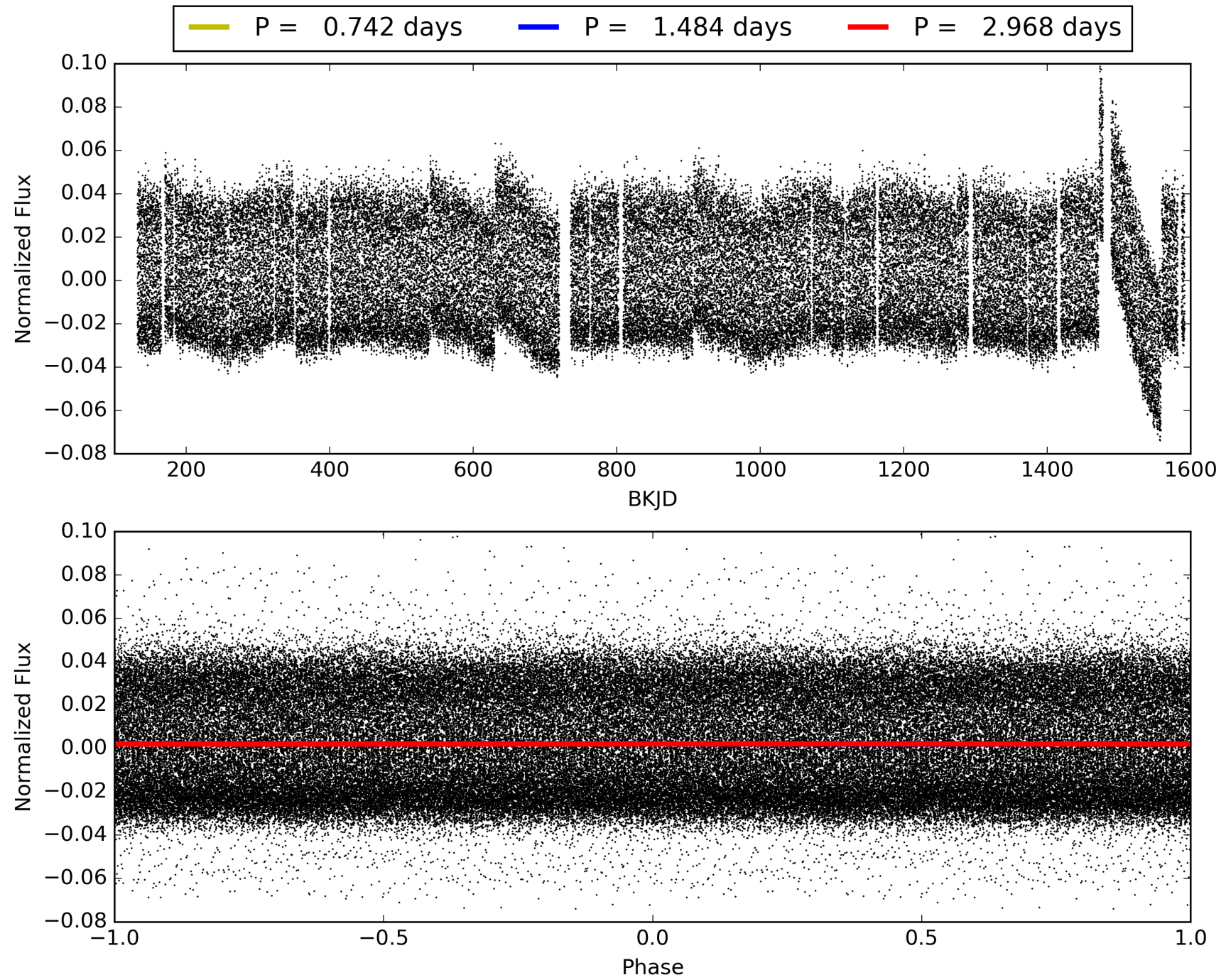
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010056297-01, PDC Light Curves



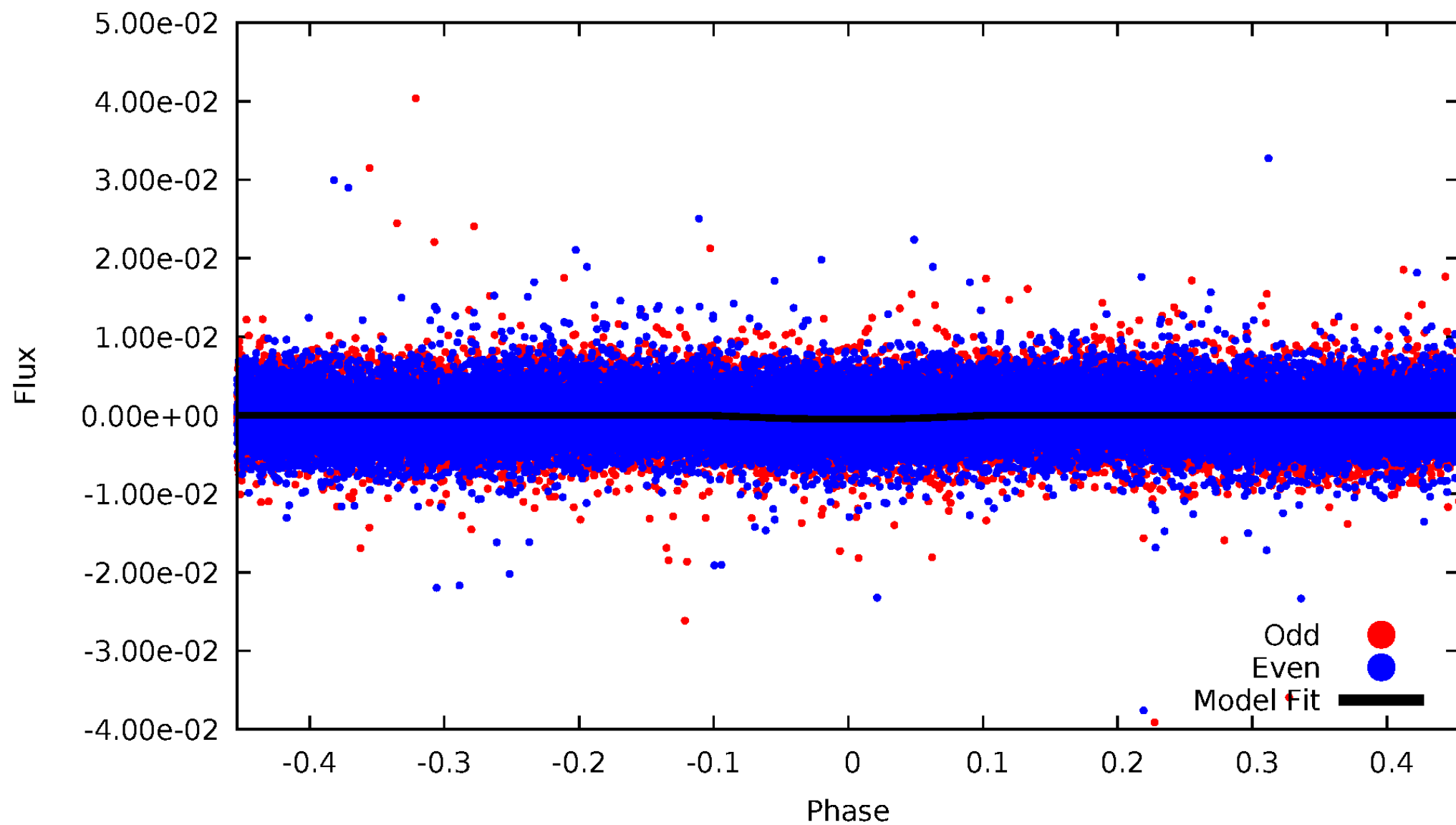


TCE 010056297-01



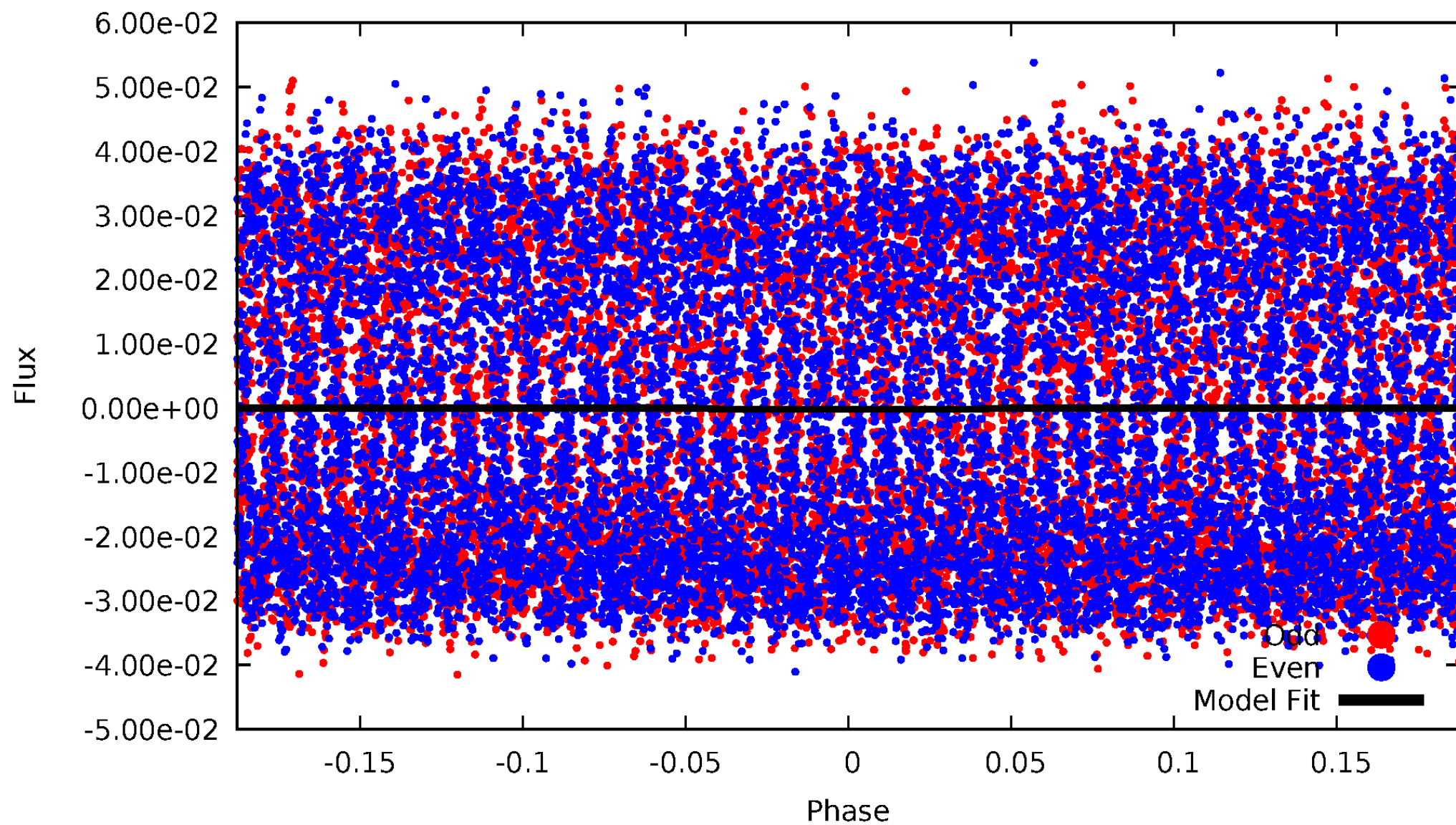
# DV Odd/Even

TCE 010056297-01



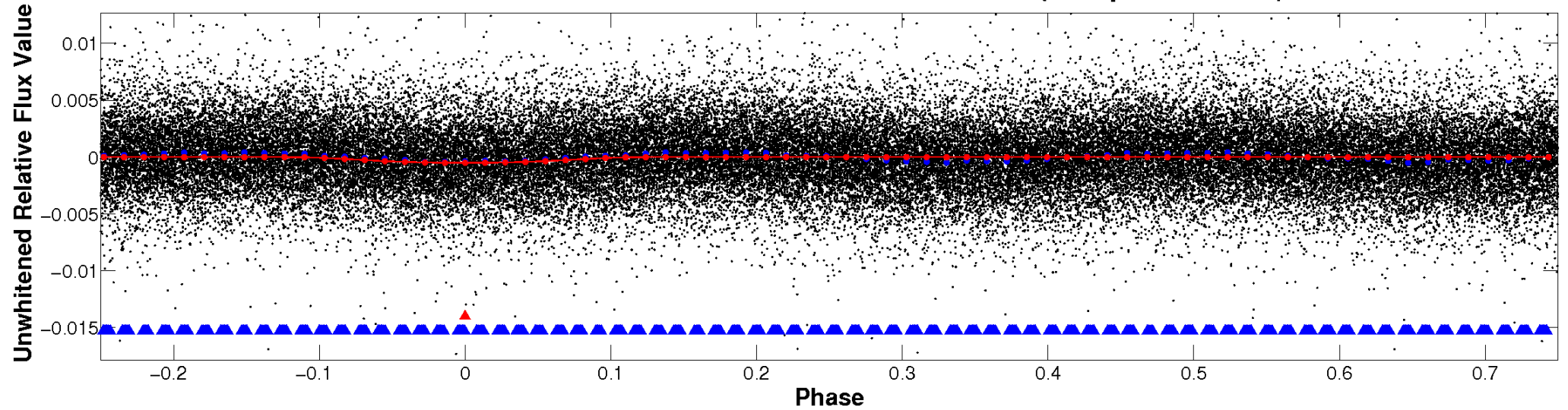
# ALT Odd/Even

TCE 010056297-01

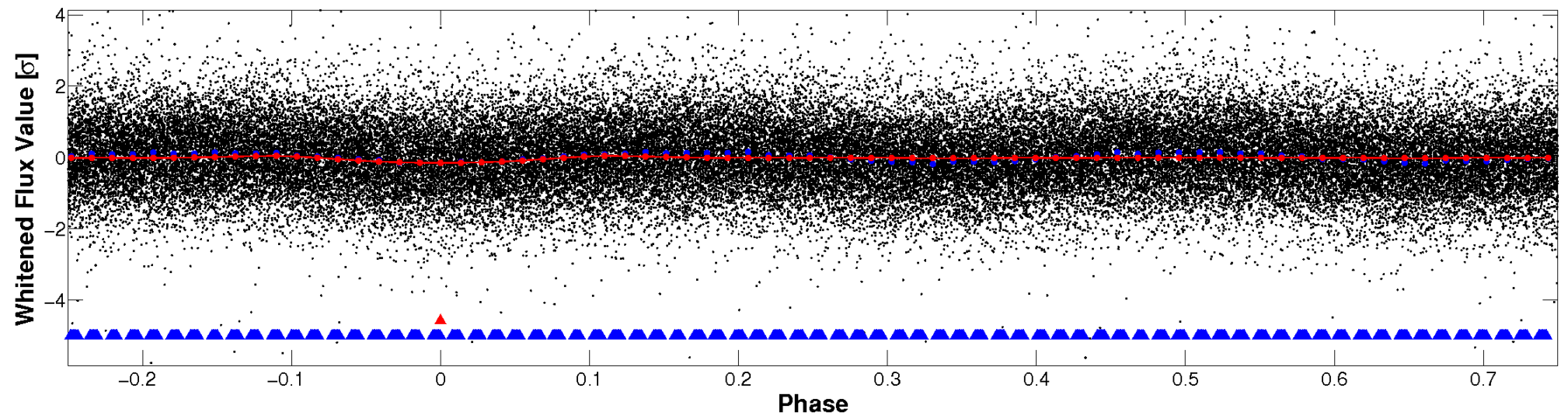


# Non-Whitened Vs. Whitened Light Curve

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



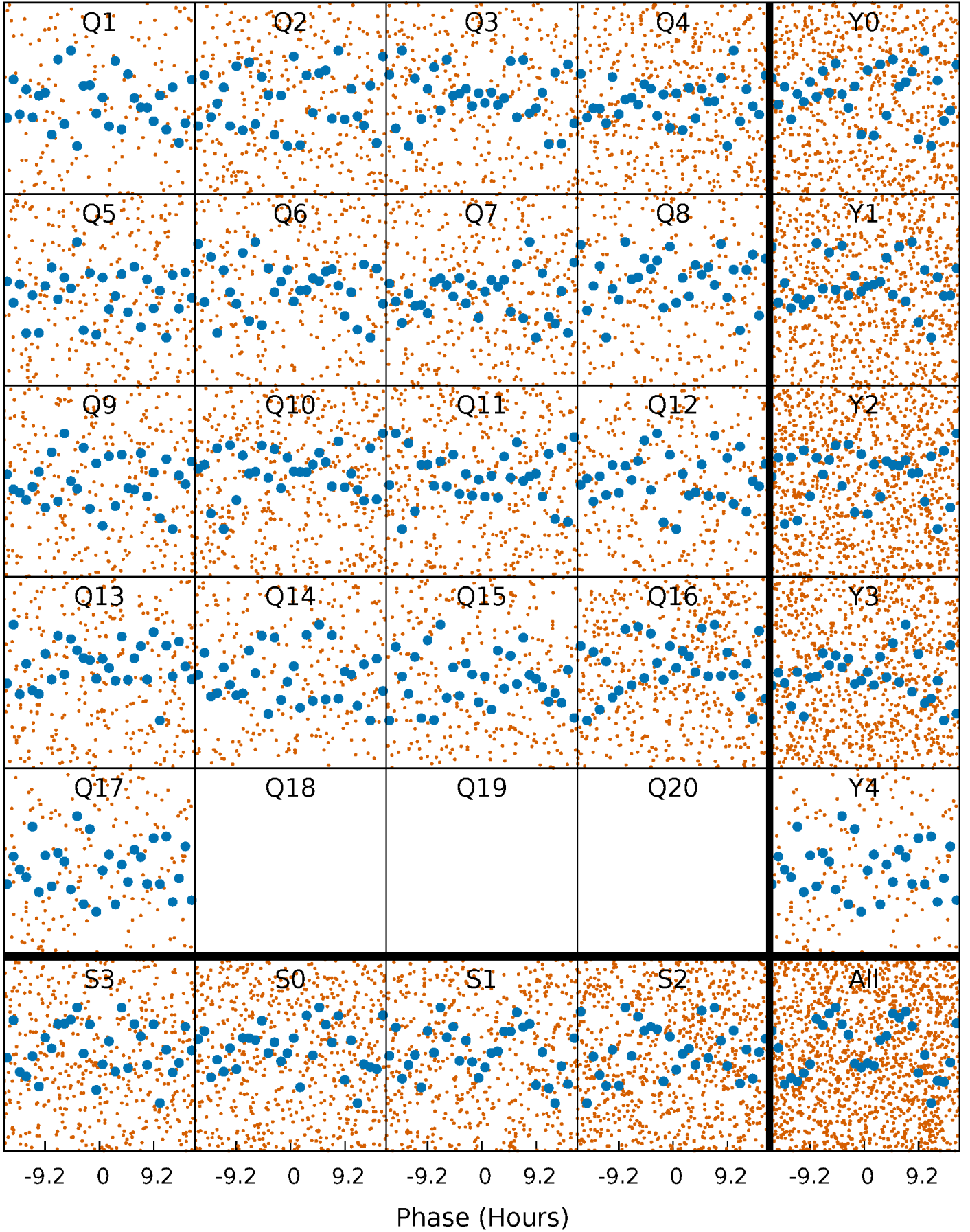
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

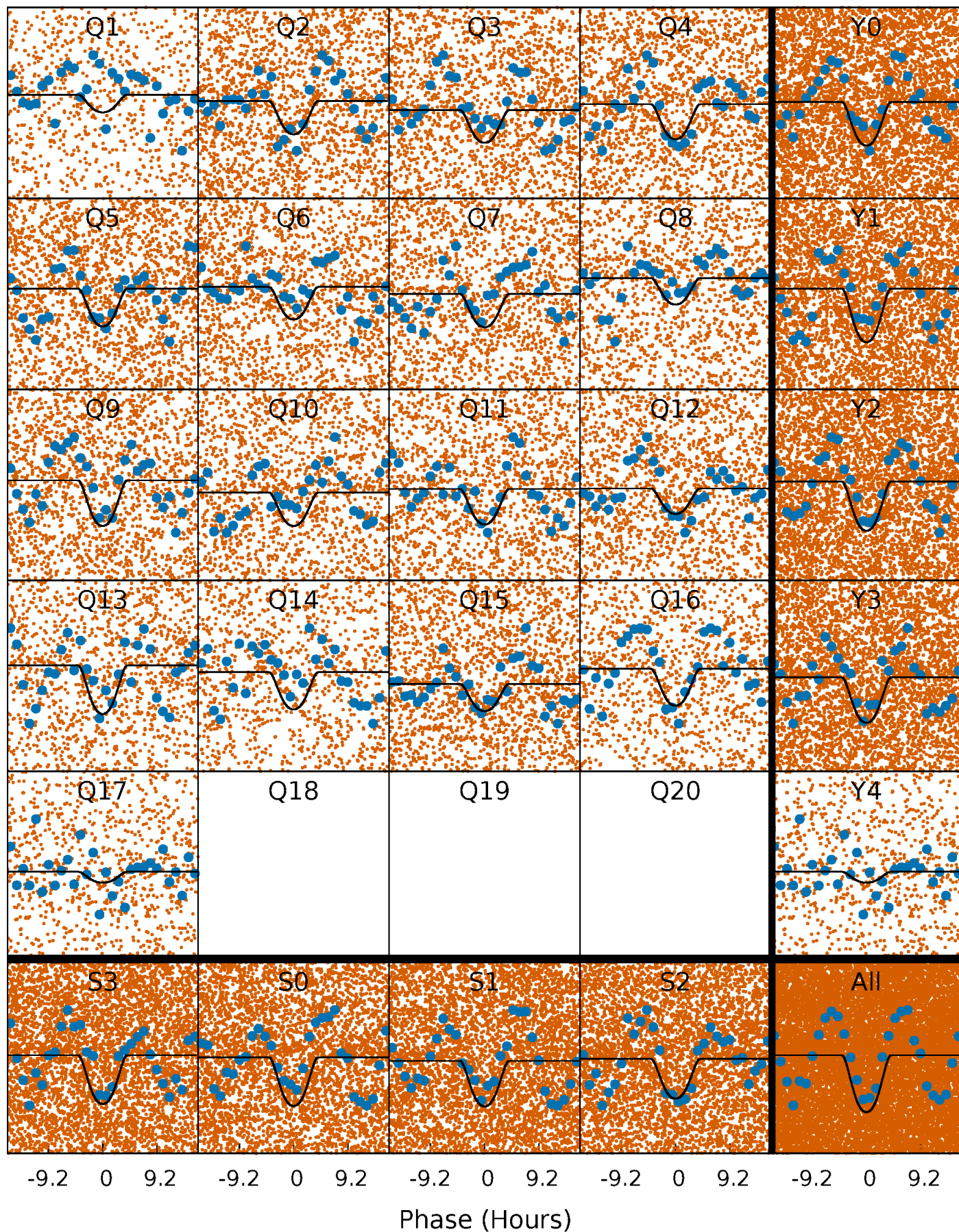
TCE 010056297-01   P= 1.484020 Days    $T_0=132.369999$  (BKJD)





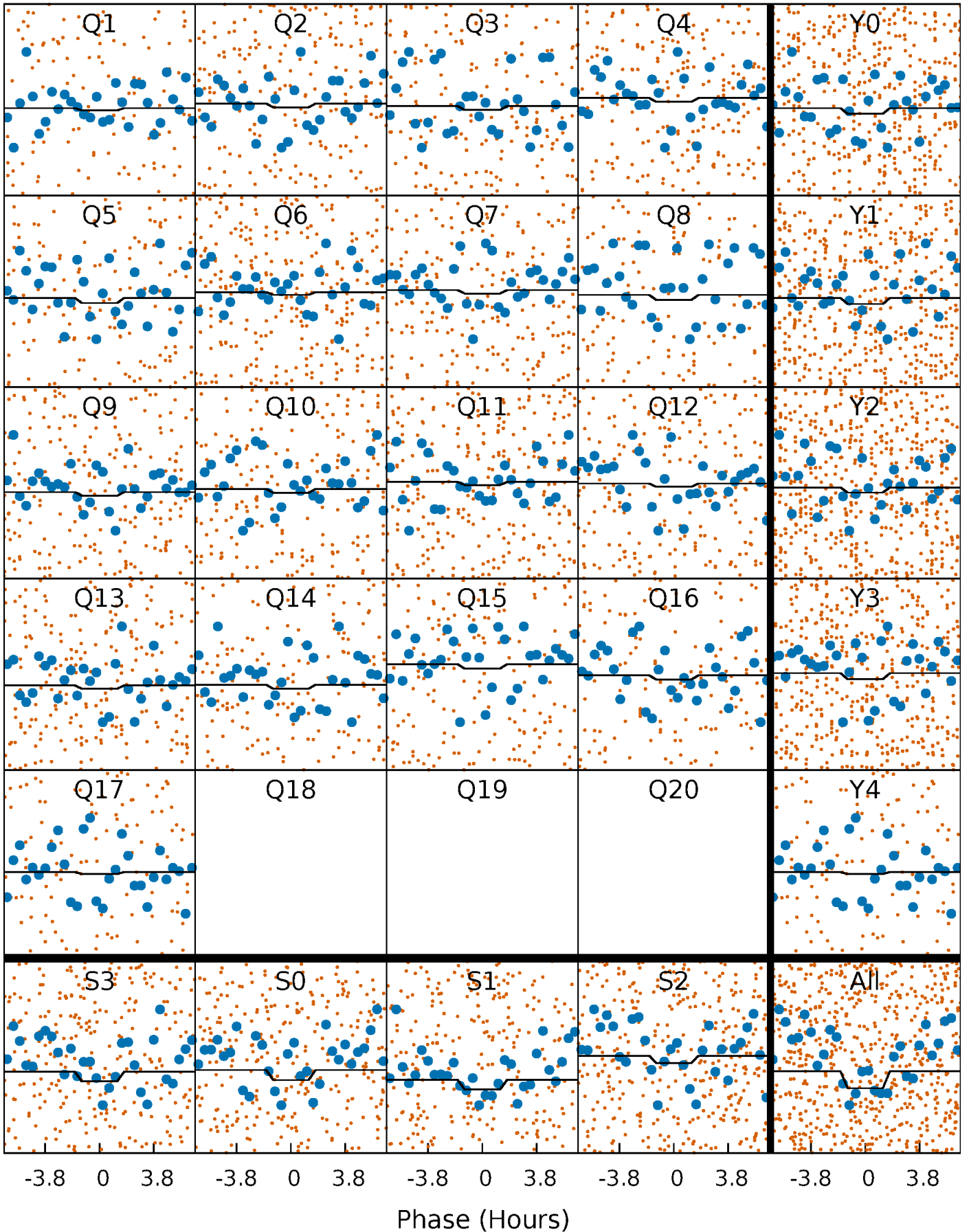
# DV Quarter-Phased Transit Curves

TCE 010056297-01   P= 1.484020 Days    $T_0=132.369999$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

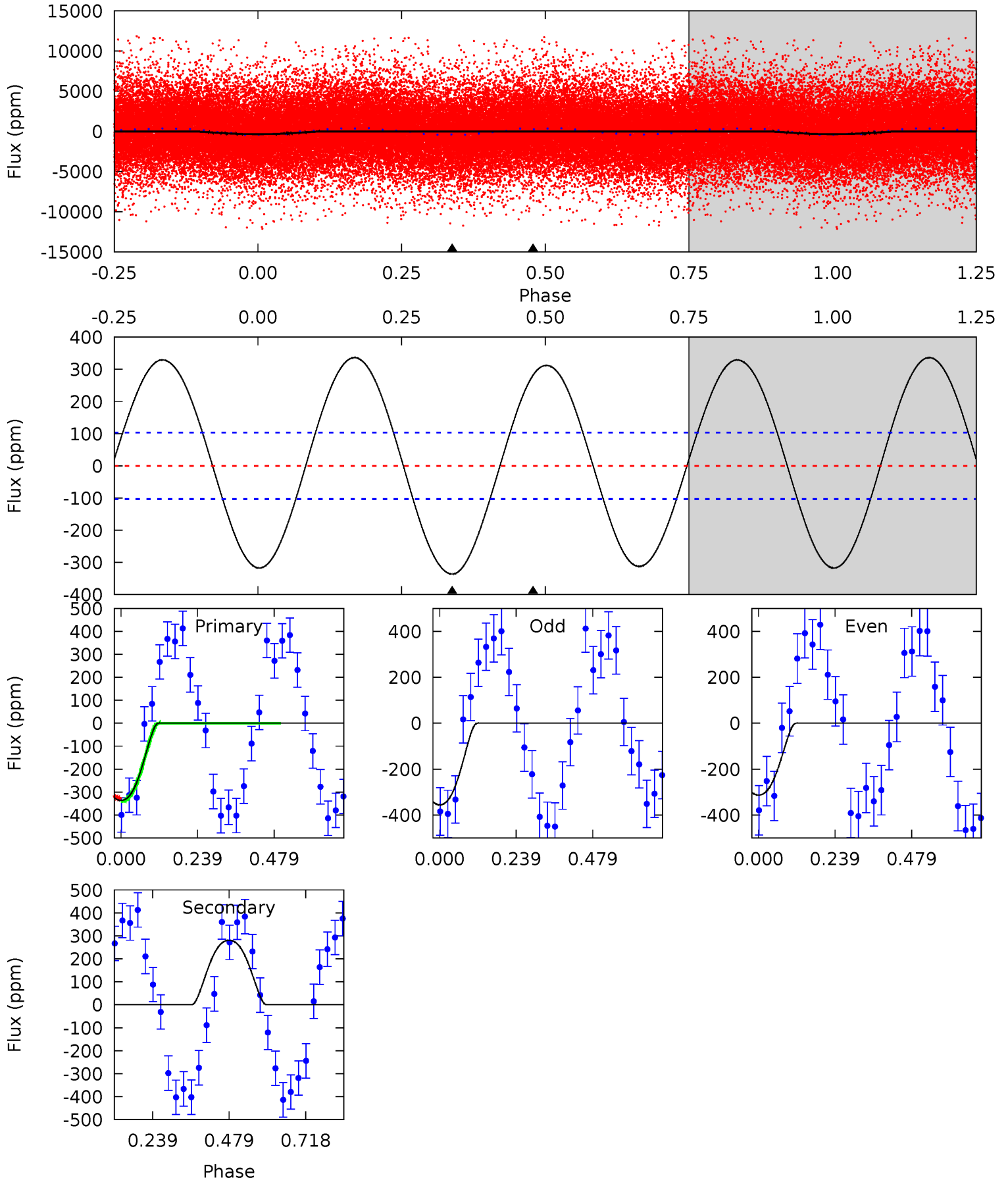
TCE 010056297-01   P= 1.483997 Days    $T_0=132.370234$  (BKJD)



# DV Model-Shift Uniqueness Test

010056297-01, P = 1.484020 Days, E = 130.885979 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
14.2	-11.9	0	0	4.38	1.18	9.14	14.2	14.2	-11.9	-11.9	0.90	1.22	0.50	0.26

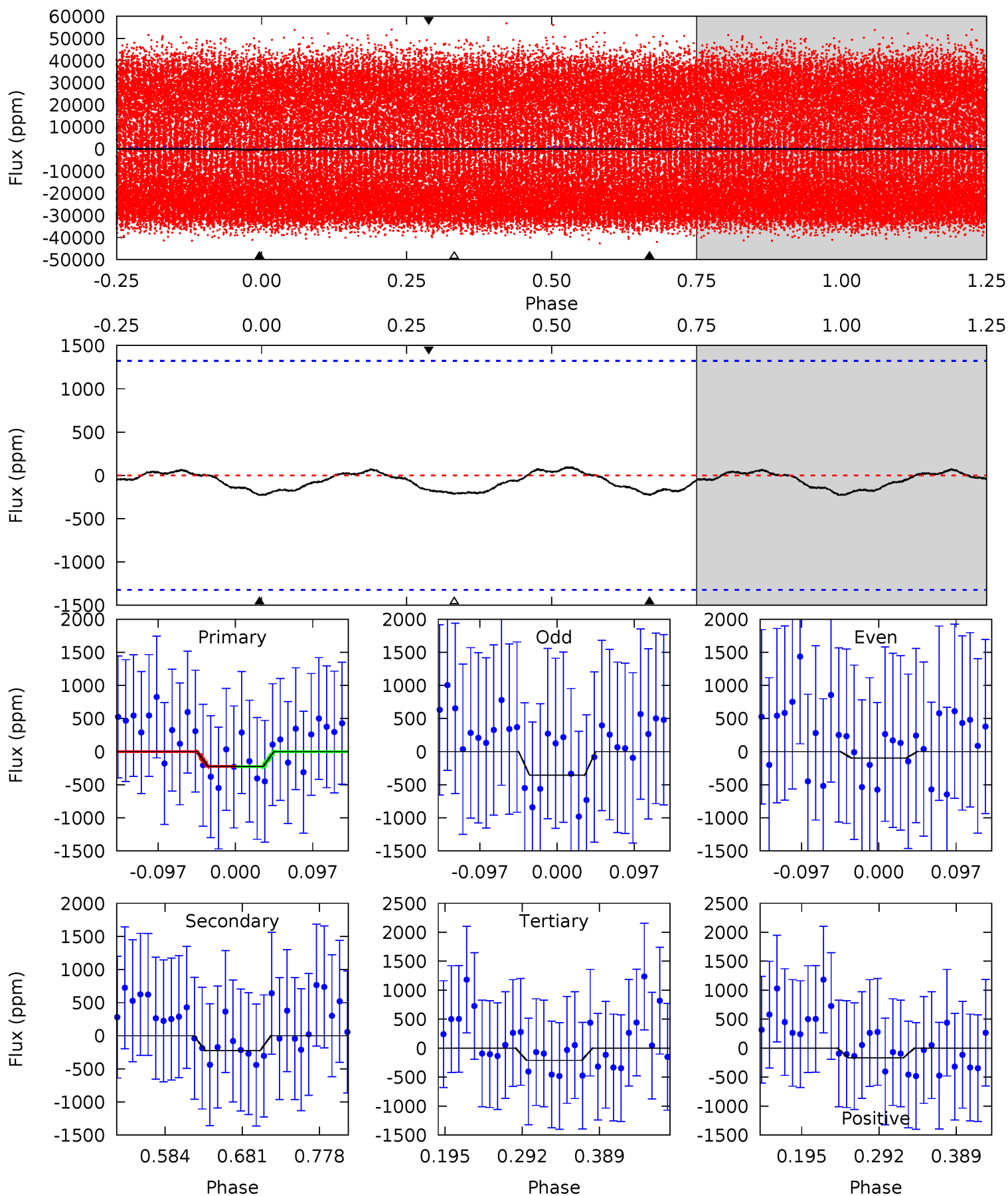




# Alt Model-Shift Uniqueness Test

010056297-01, P = 1.483997 Days, E = 130.886237 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
0.78	0.78	0.73	-0.57	4.57	1.66	0.31	0.05	1.35	0.04	1.35	0.45	0.55	0.29	0.01



### Stellar Parameters For KIC 010056297

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7355^{+230}_{-307}$	$4.042^{+0.198}_{-0.162}$	$-0.120^{+0.250}_{-0.350}$	$1.984^{+0.577}_{-0.472}$	$1.581^{+0.209}_{-0.255}$	$0.285^{+0.311}_{-0.130}$
	+3%/-4%	+5%/-4%	+208%/-292%	+29%/-24%	+13%/-16%	+109%/-45%
Source	KIC0	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 010056297-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$281 \pm 24$	$5.78^{+1.47}_{-1.30}$	$3693^{+280}_{-246}$	$-5840^{+485}_{-627}$	$-4.062^{+1.463}_{-2.545}$
Alt.	$-225 \pm 289$	$3.17^{+1.38}_{-1.16}$	$3686^{+267}_{-251}$	$7024^{+3707}_{-12126}$	$9.272^{+23.408}_{-11.538}$

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

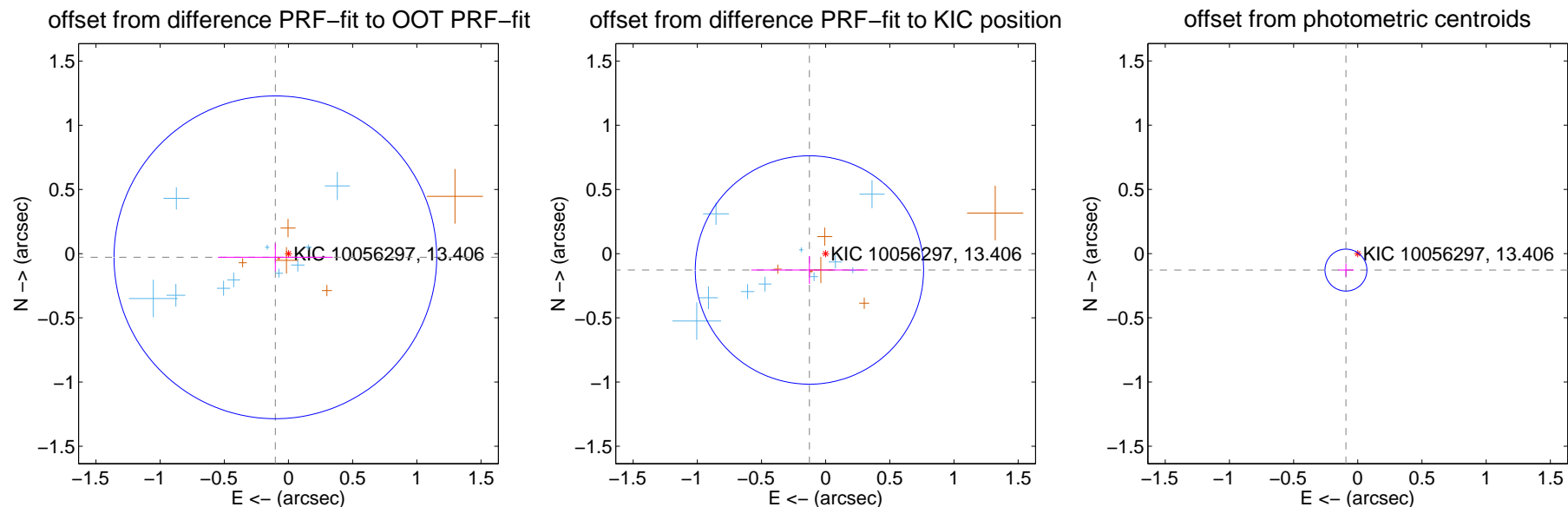
## DV Centroid Data

Supplemental centroid analysis for 010056297-01. Kepler magnitude: 13.41. Transit SNR 12.07

There are 10 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

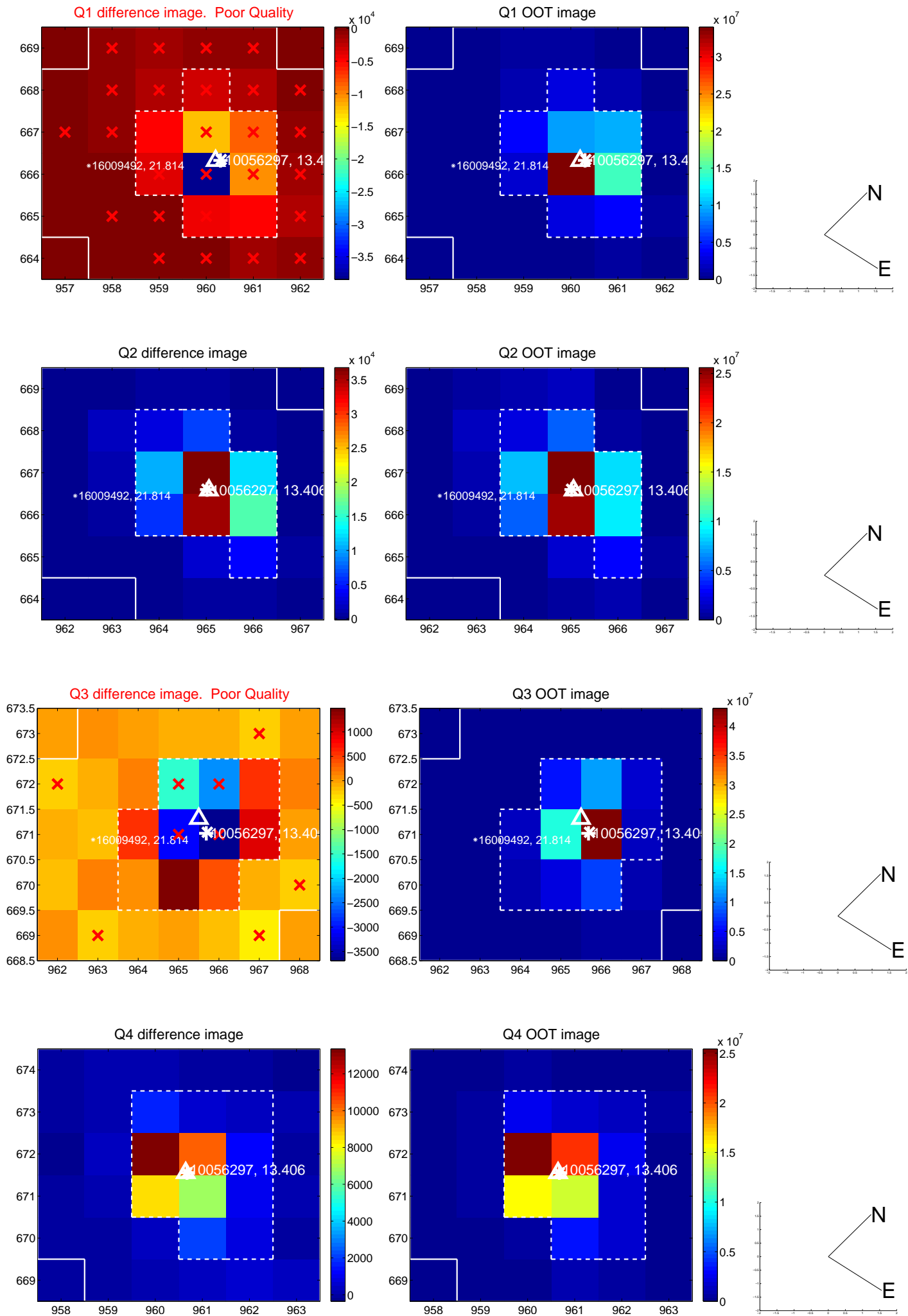
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.106 \pm 0.419$	0.25	$0.102 \pm 0.448$	$-0.029 \pm 0.108$
PRF-fit source offset from KIC position	$0.180 \pm 0.297$	0.61	$0.127 \pm 0.453$	$-0.127 \pm 0.107$
photometric centroid source offset	$0.16 \pm 0.05$	2.91	$0.09 \pm 0.06$	$-0.13 \pm 0.05$



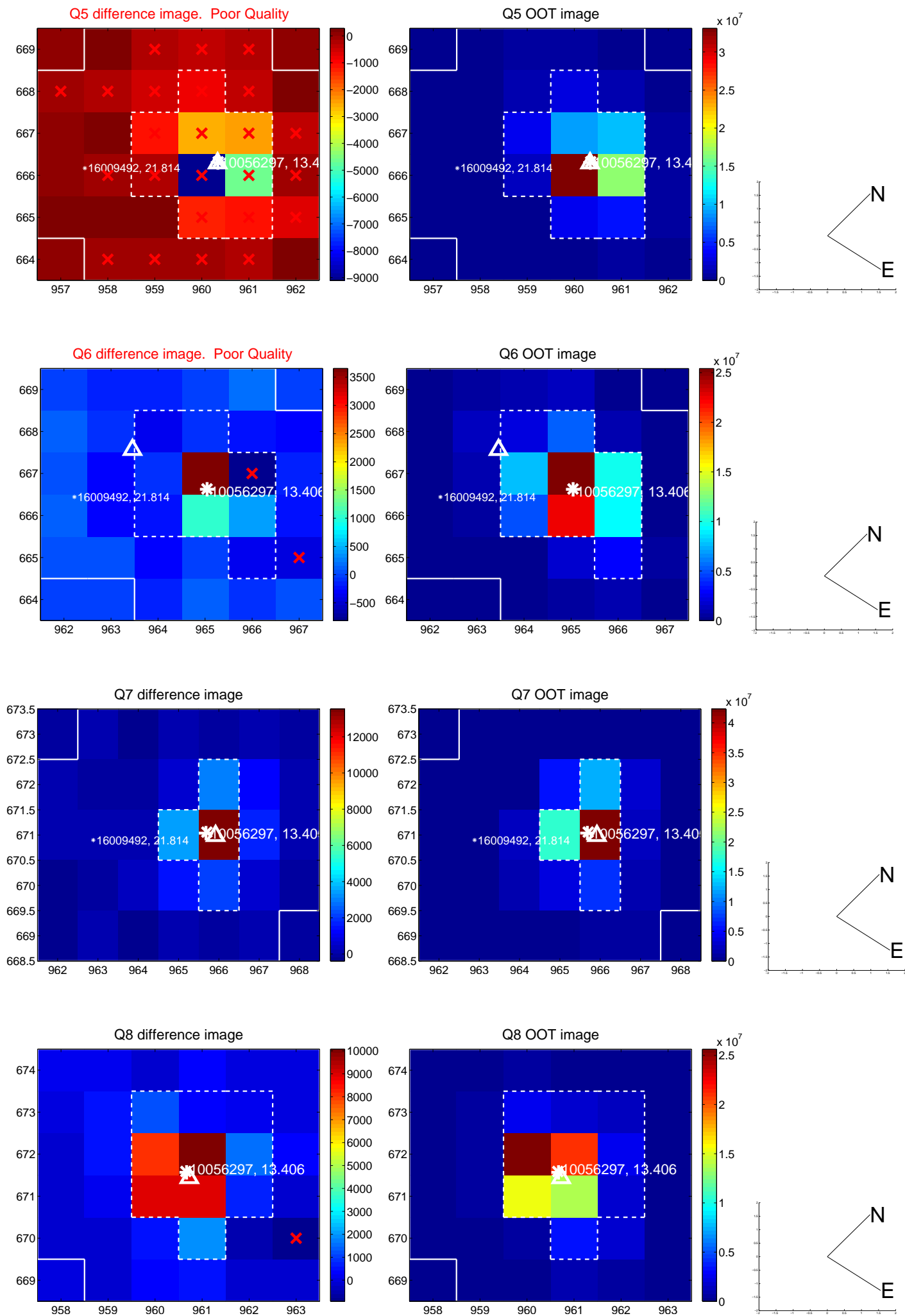
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



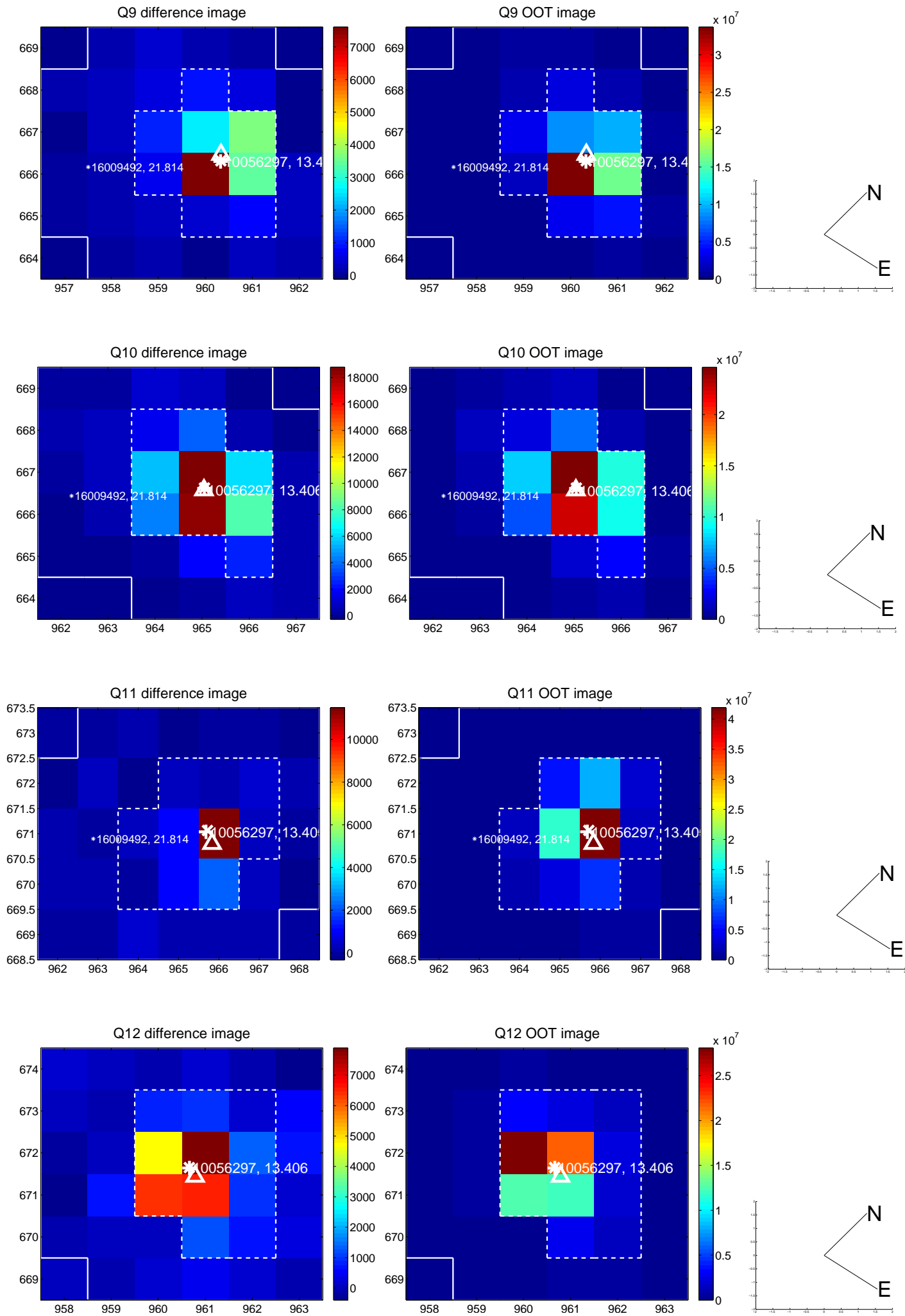
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

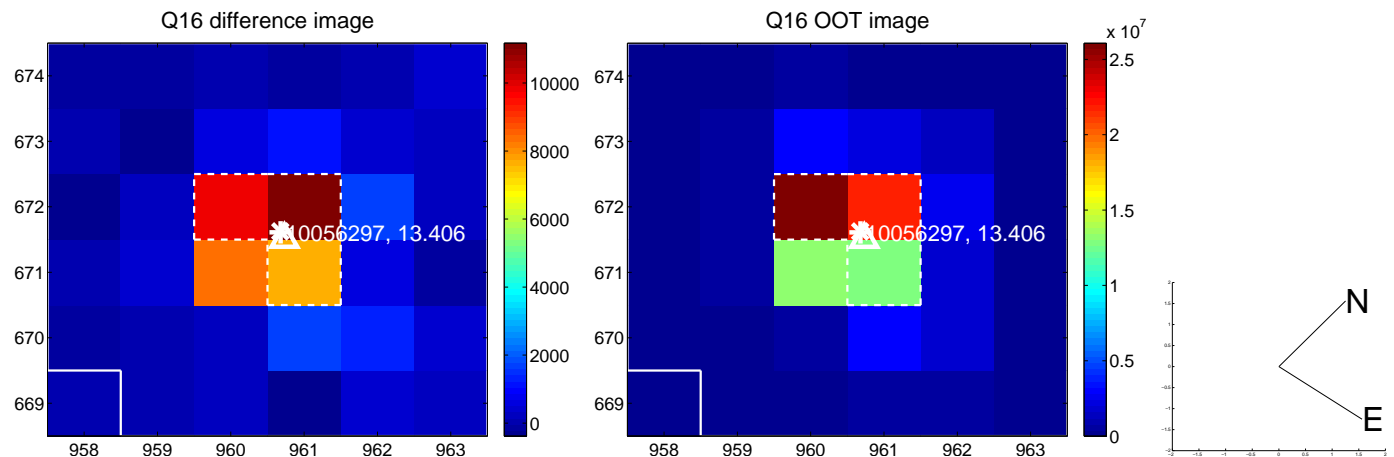
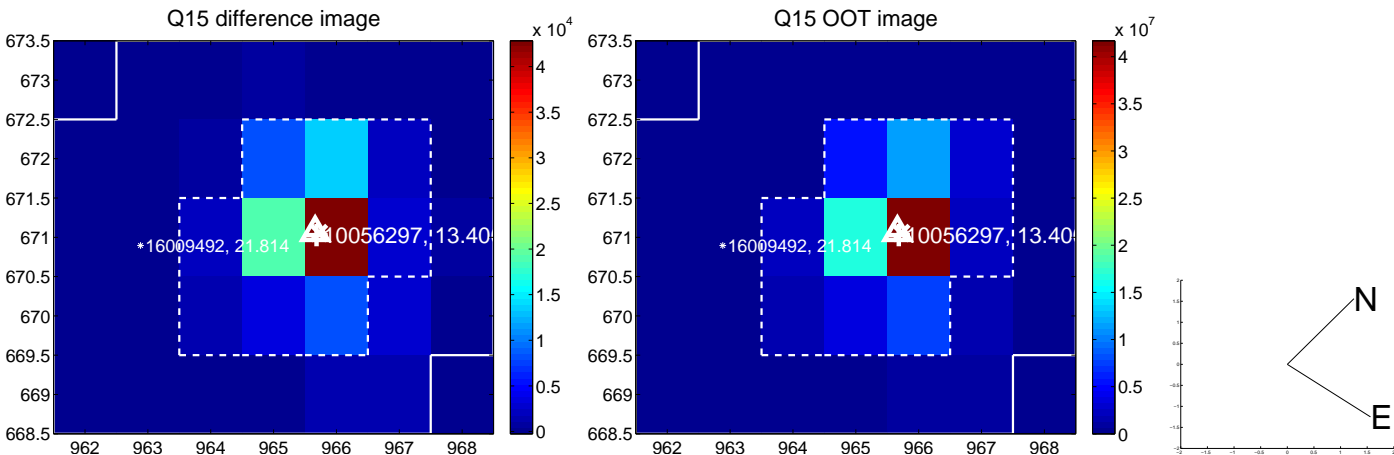
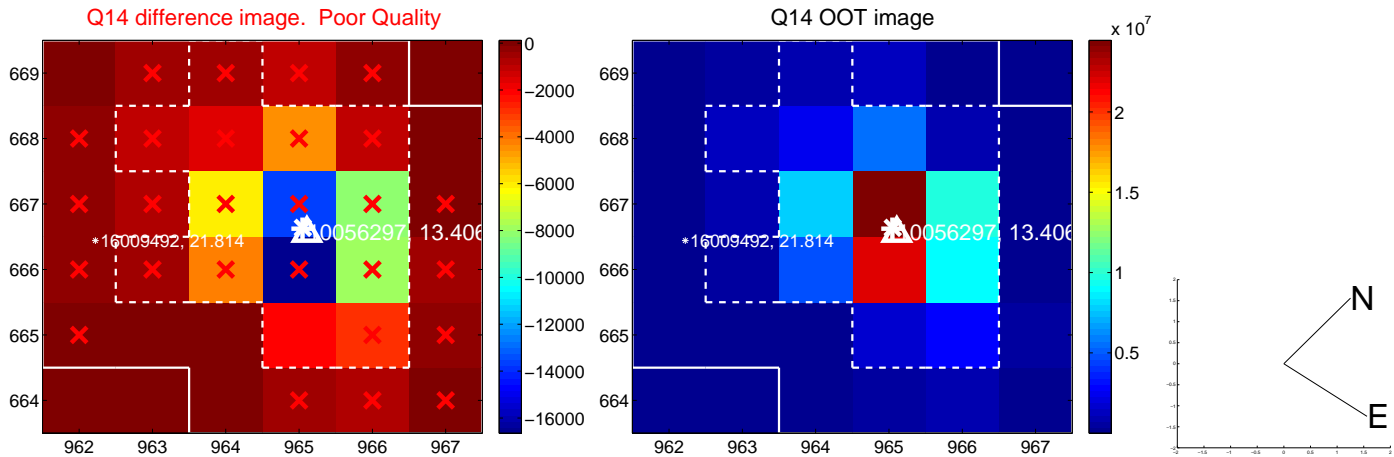
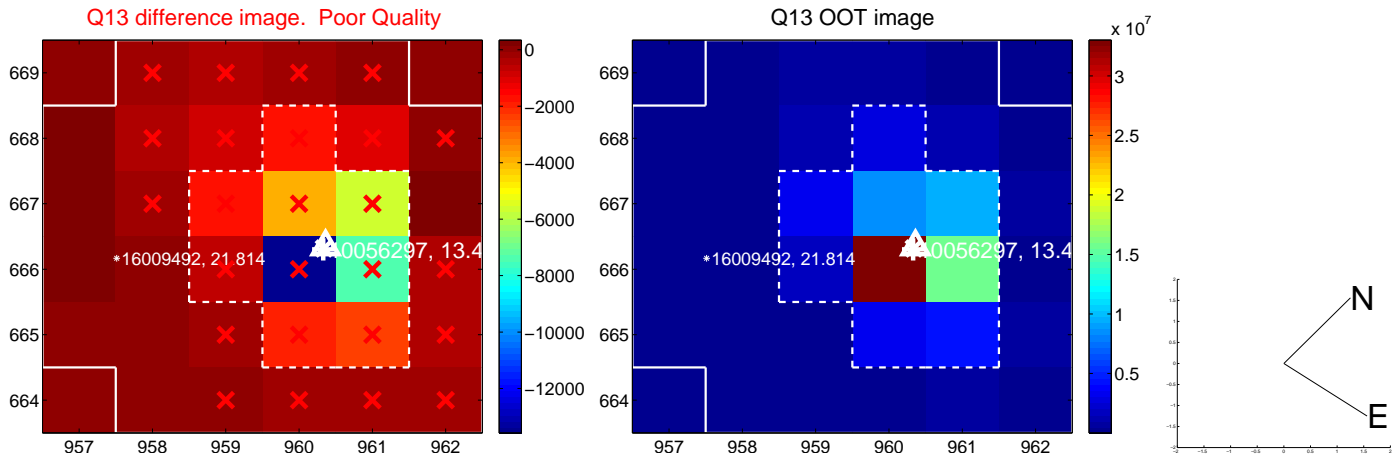


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

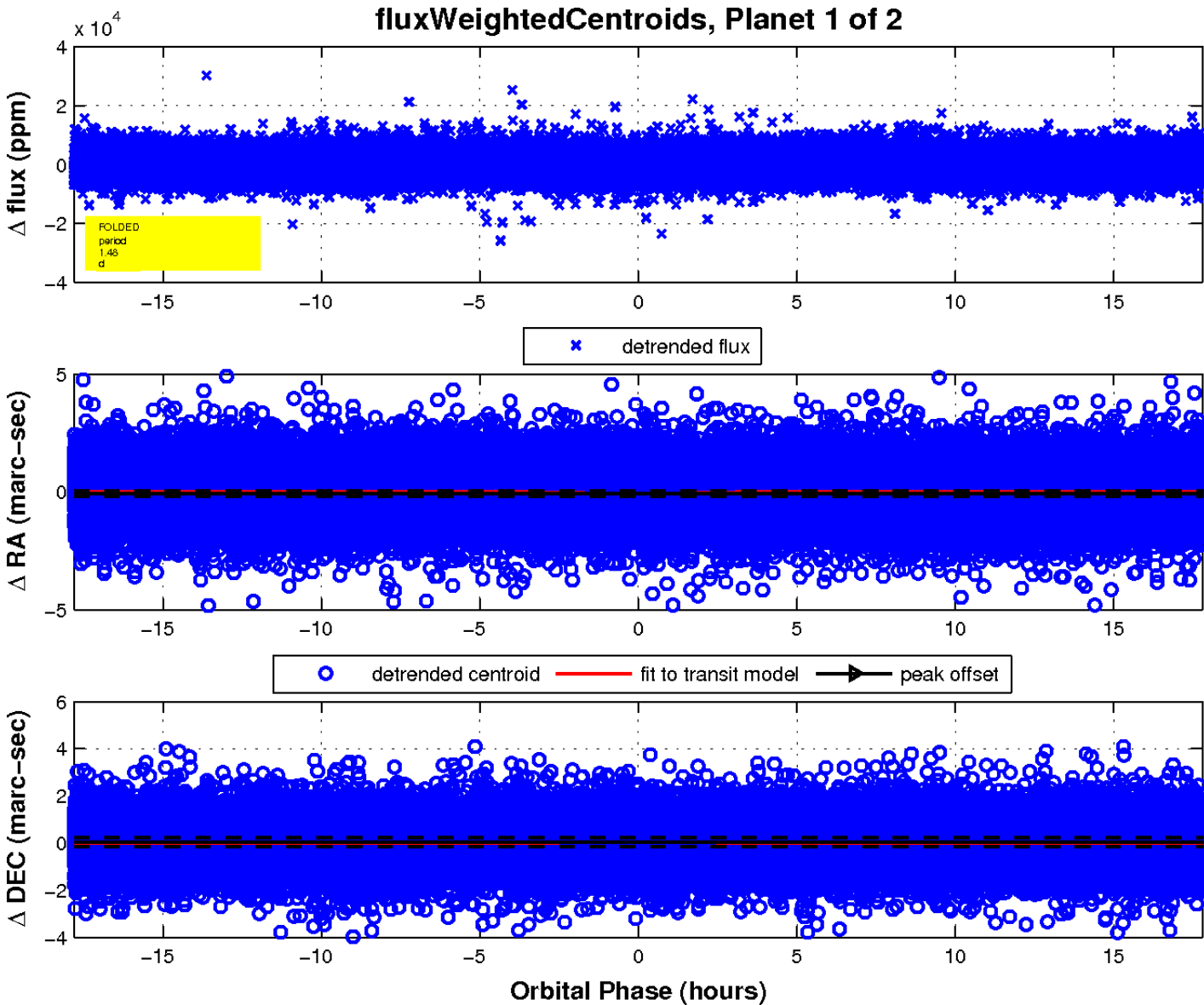
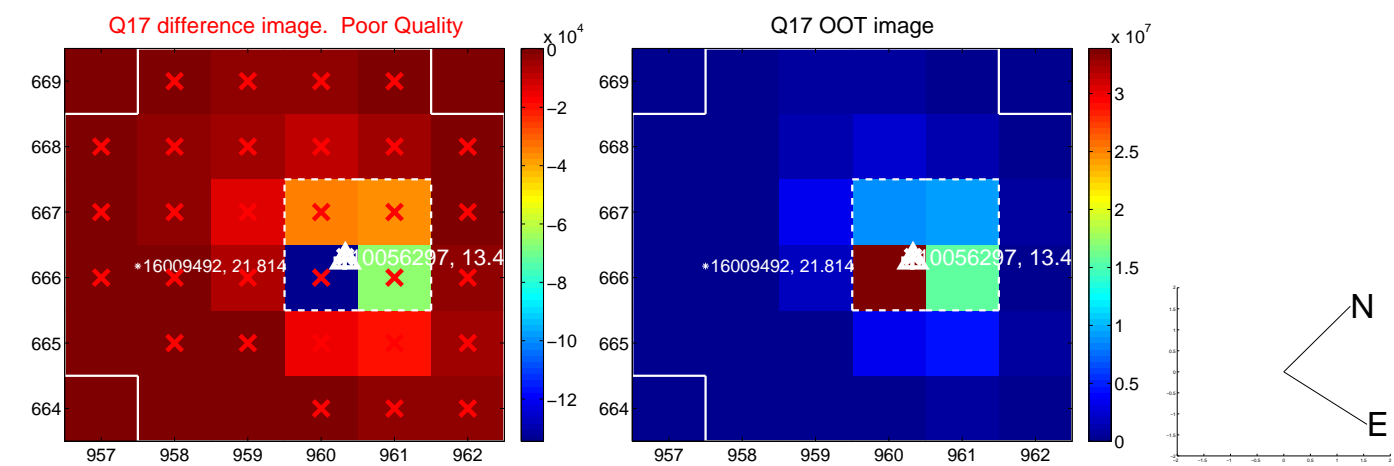




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

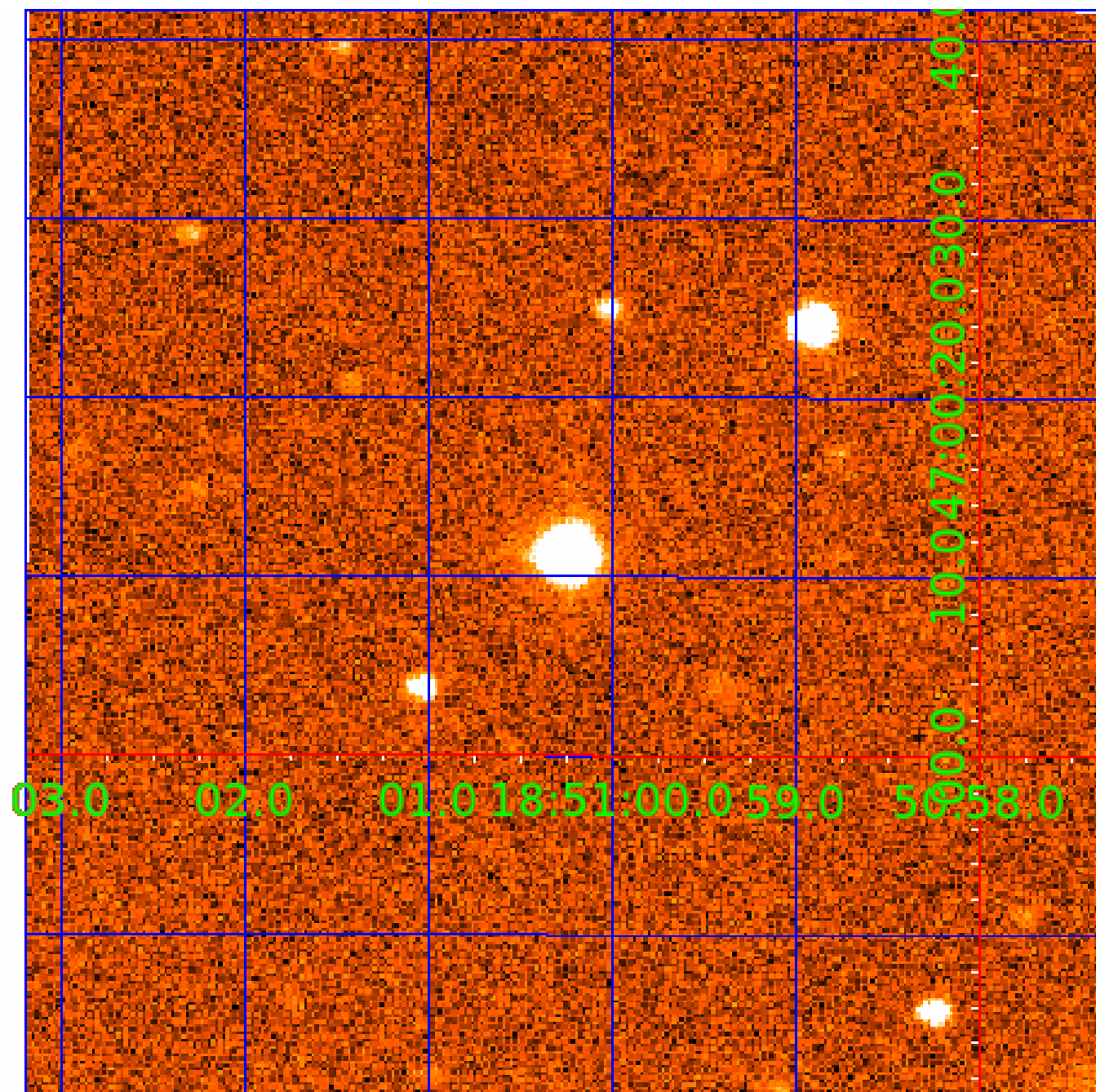


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 010056297

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010056297-01	OBS	No	1.484020	132.369999	501.9	8.080	11.7	12.1	1.98	7355	5.86	11721.95
010056297-02	OBS	No	3.990834	134.647427	1385.9	19.124	8.8	12.7	1.98	7355	13.62	3134.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010056297-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
010056297-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

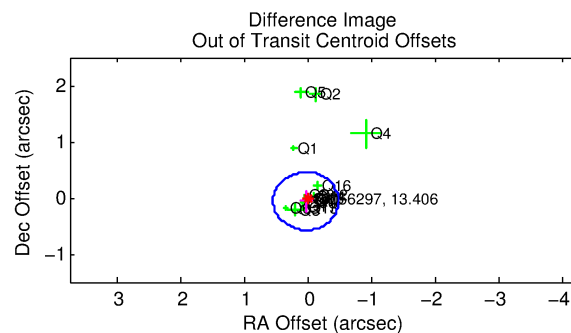
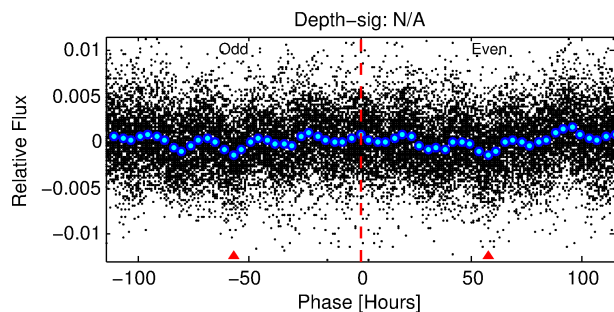
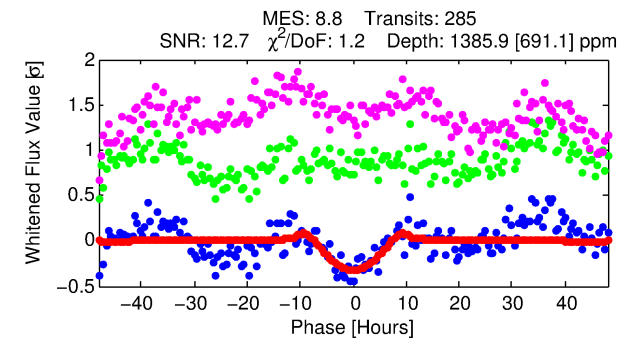
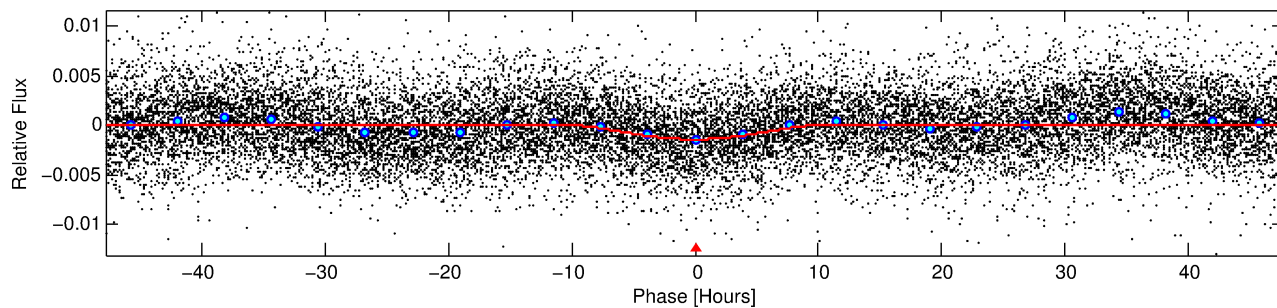
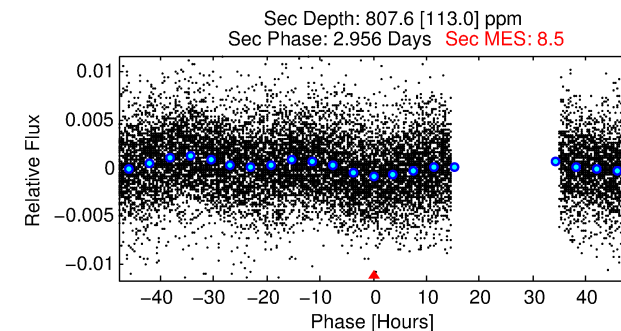
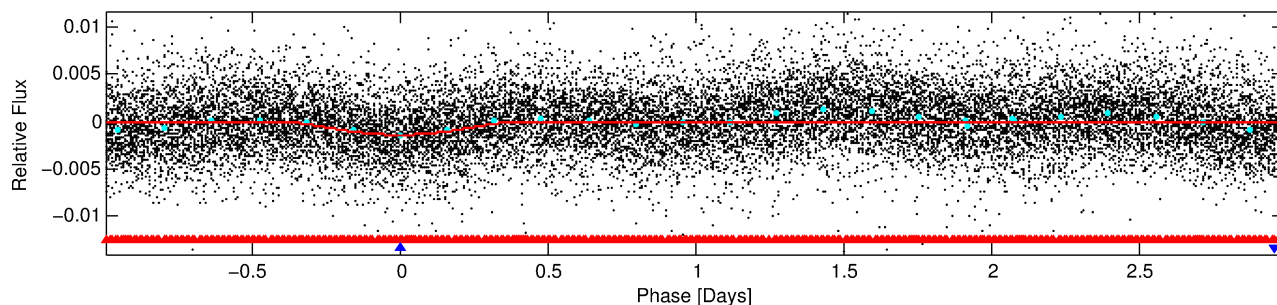
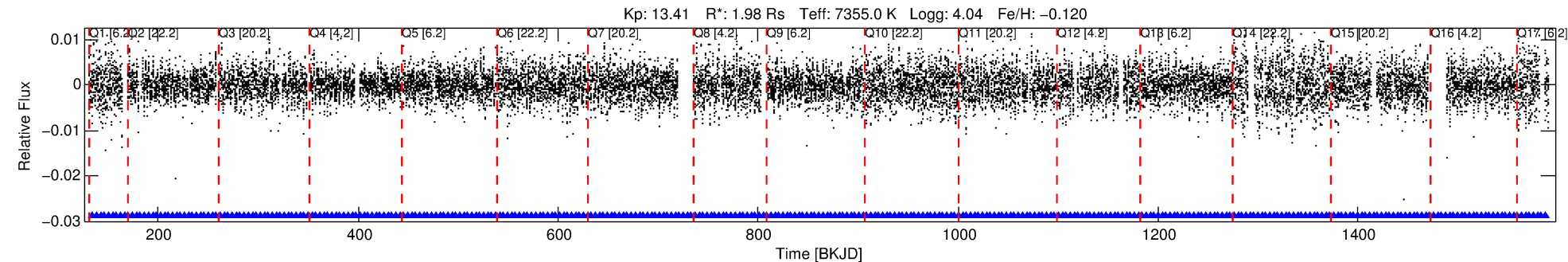
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010056297-02

No Significant Match Found

# DV One-Page Summary

KIC: 10056297 Candidate: 2 of 2 Period: 3.991 d



## DV Fit Results:

Period = 3.99083 [0.00016] d  
Epoch = 134.6474 [0.0316] BKJD  
Rp/R\* = 0.0629 [0.1000]  
a/R\* = 1.17 [0.02]  
b = 1.00 [0.17]  
Seff = 3134.50 [1245.34]  
Teff = 1908 [190] K  
Rp = 13.63 [22.01] Re  
a = 0.0574 [0.0141] AU  
Ag = 7.88 [25.23] [0.27σ]  
Teffp = 4942 [3936] K [0.77σ]

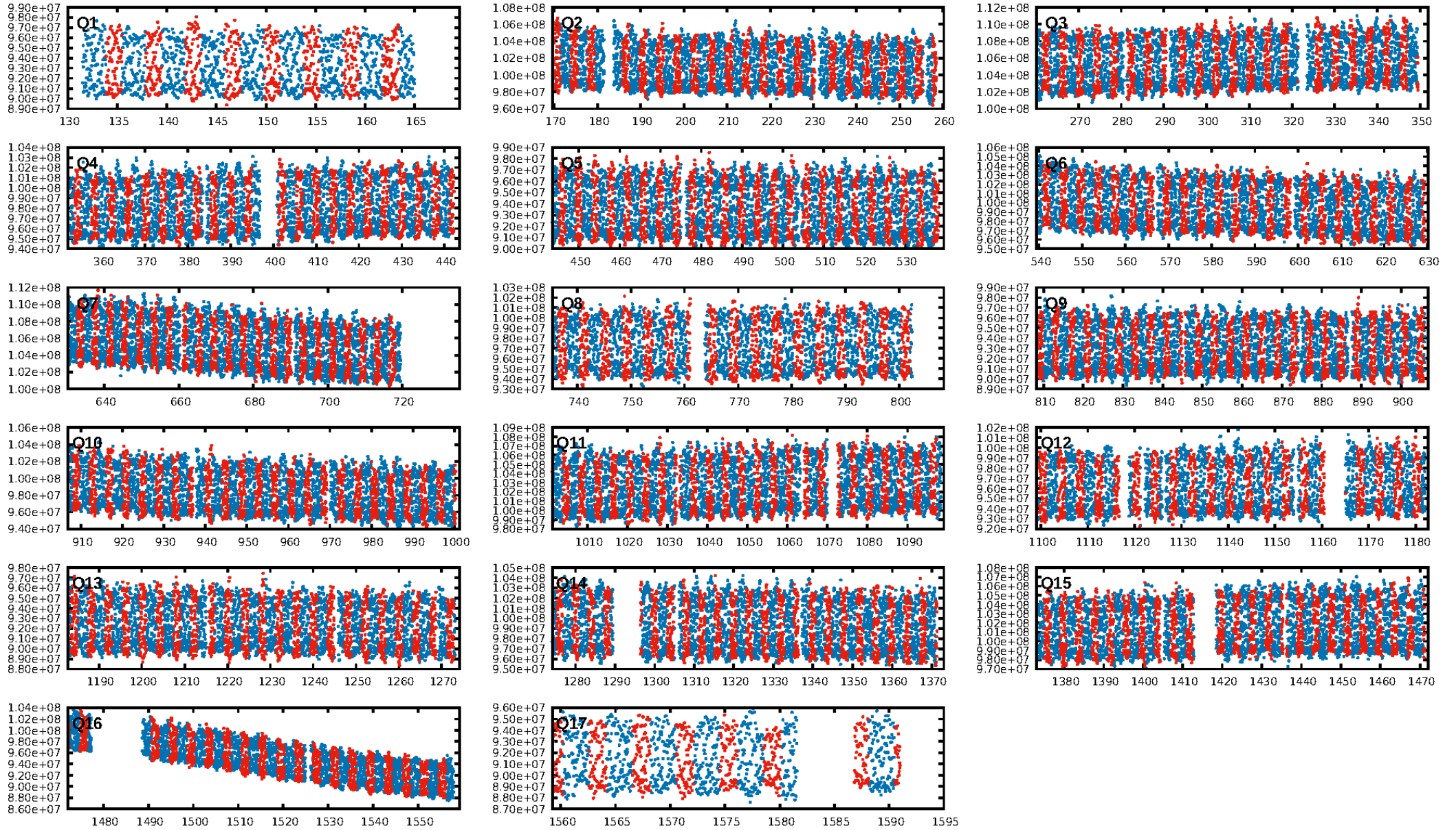
## DV Diagnostic Results:

ShortPeriod-sig: 99.6% [2.90σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [273/273]  
GhostDiagnostic-chr: 1.135  
Centroid-sig: 5.3%  
**Centroid-so: 0.084 arcsec [3.93σ]**  
OotOffset-rm: 0.073 arcsec [0.42σ]  
KicOffset-rm: 0.142 arcsec [0.77σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:42:24 Z

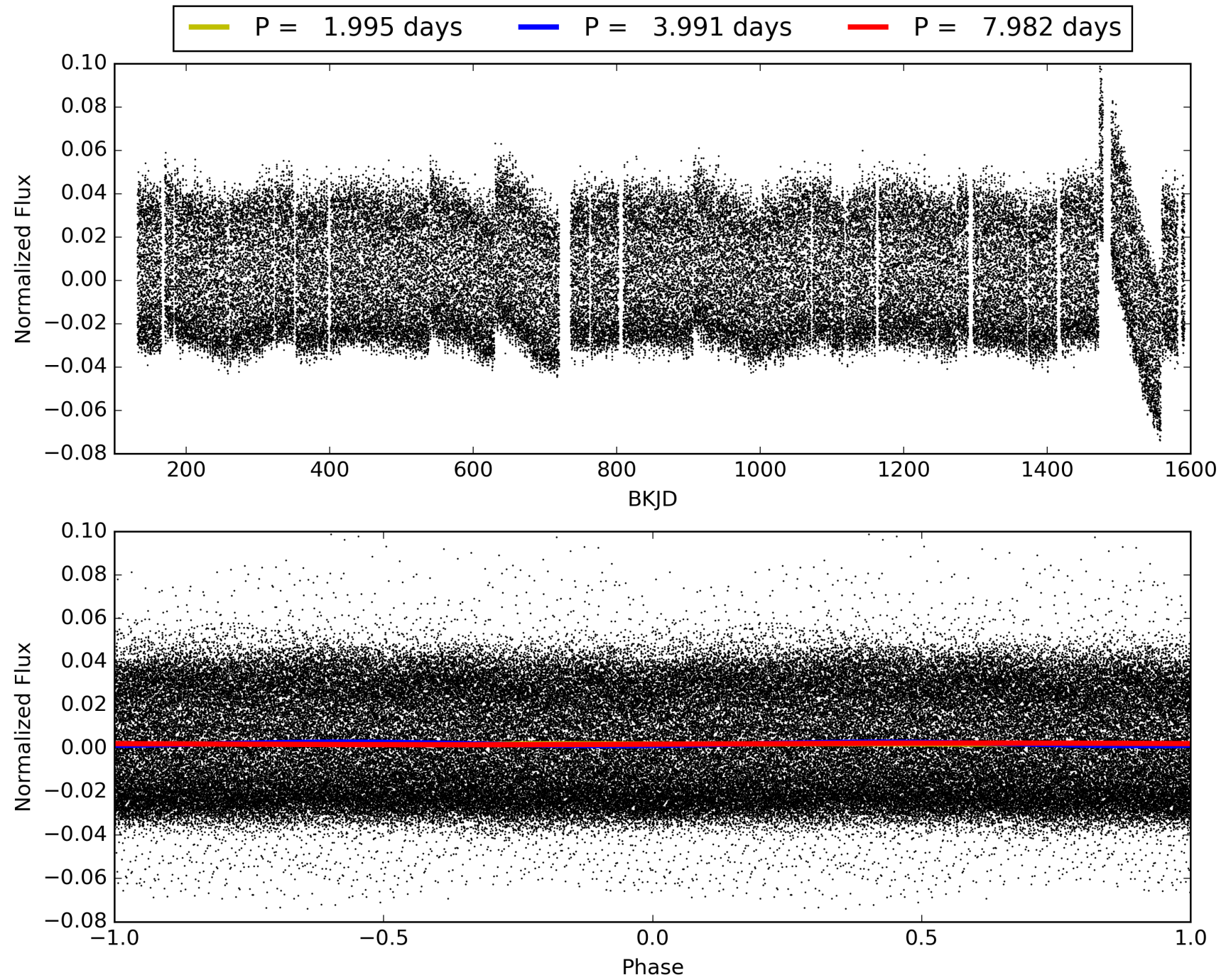
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010056297-02, PDC Light Curves



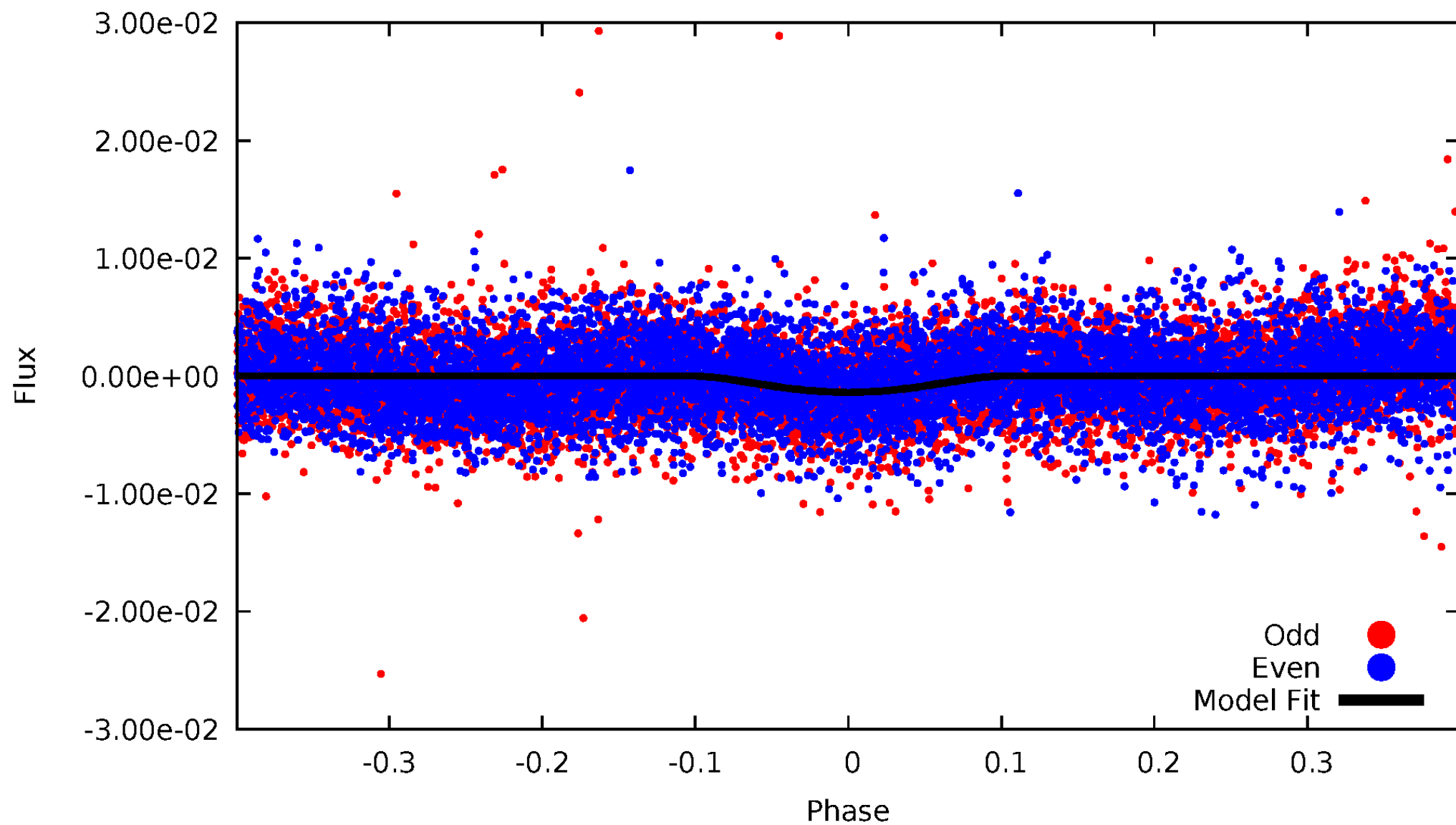


TCE 010056297-02



# DV Odd/Even

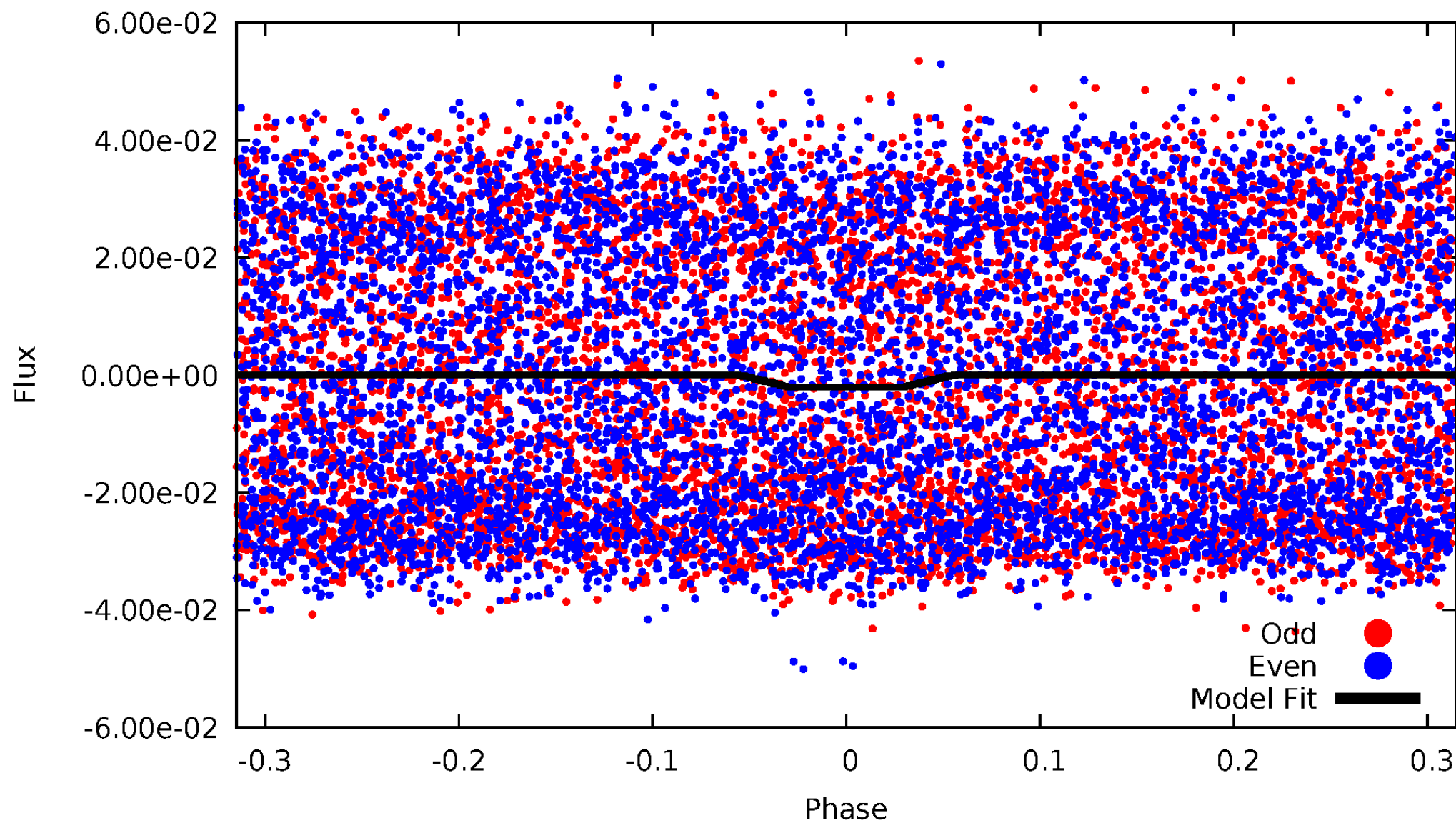
TCE 010056297-02





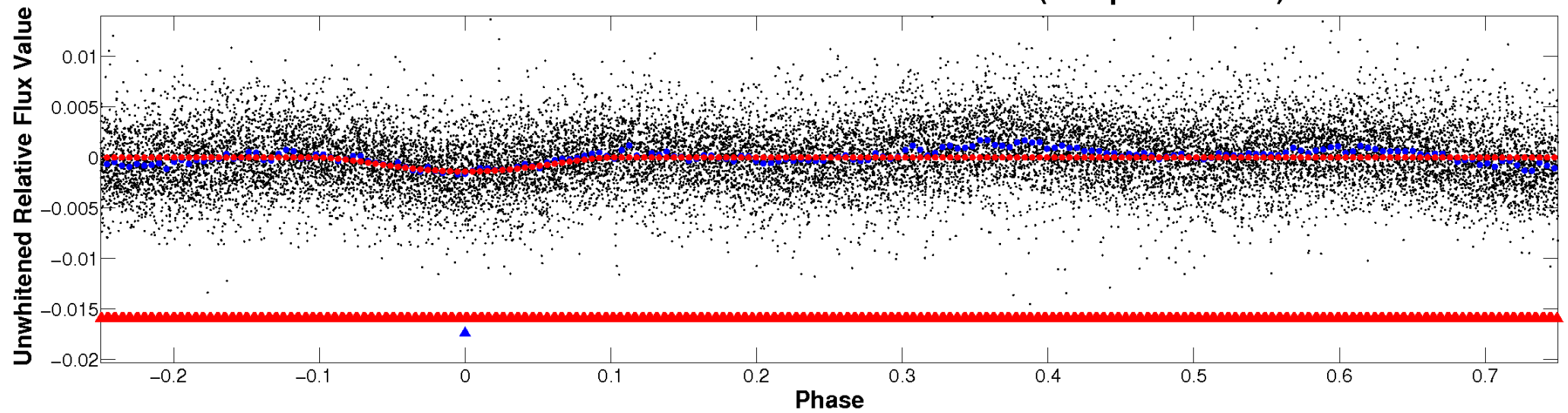
# ALT Odd/Even

TCE 010056297-02

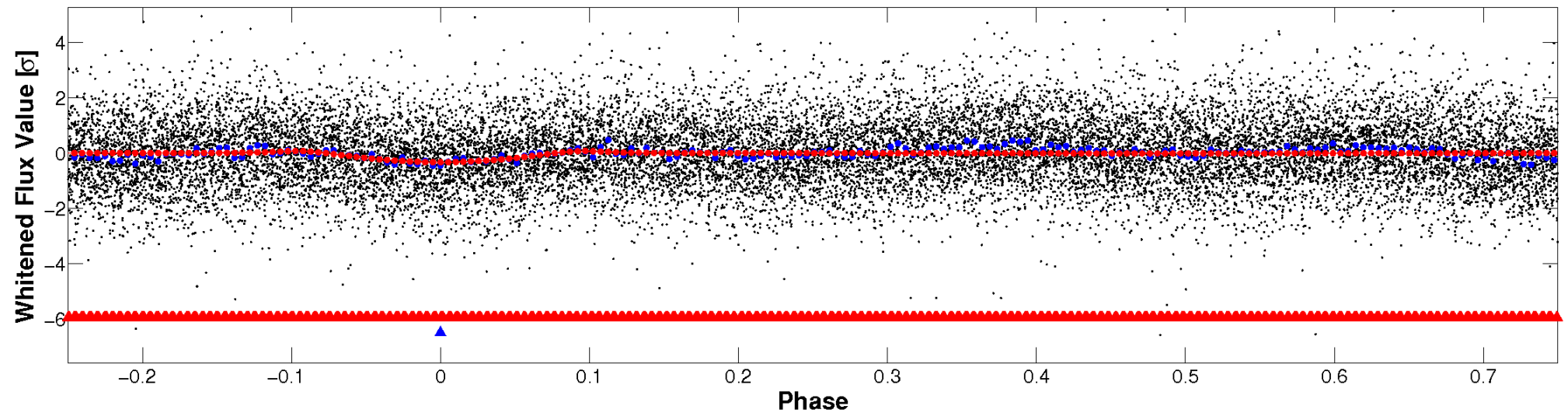


# Non-Whitened Vs. Whitened Light Curve

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

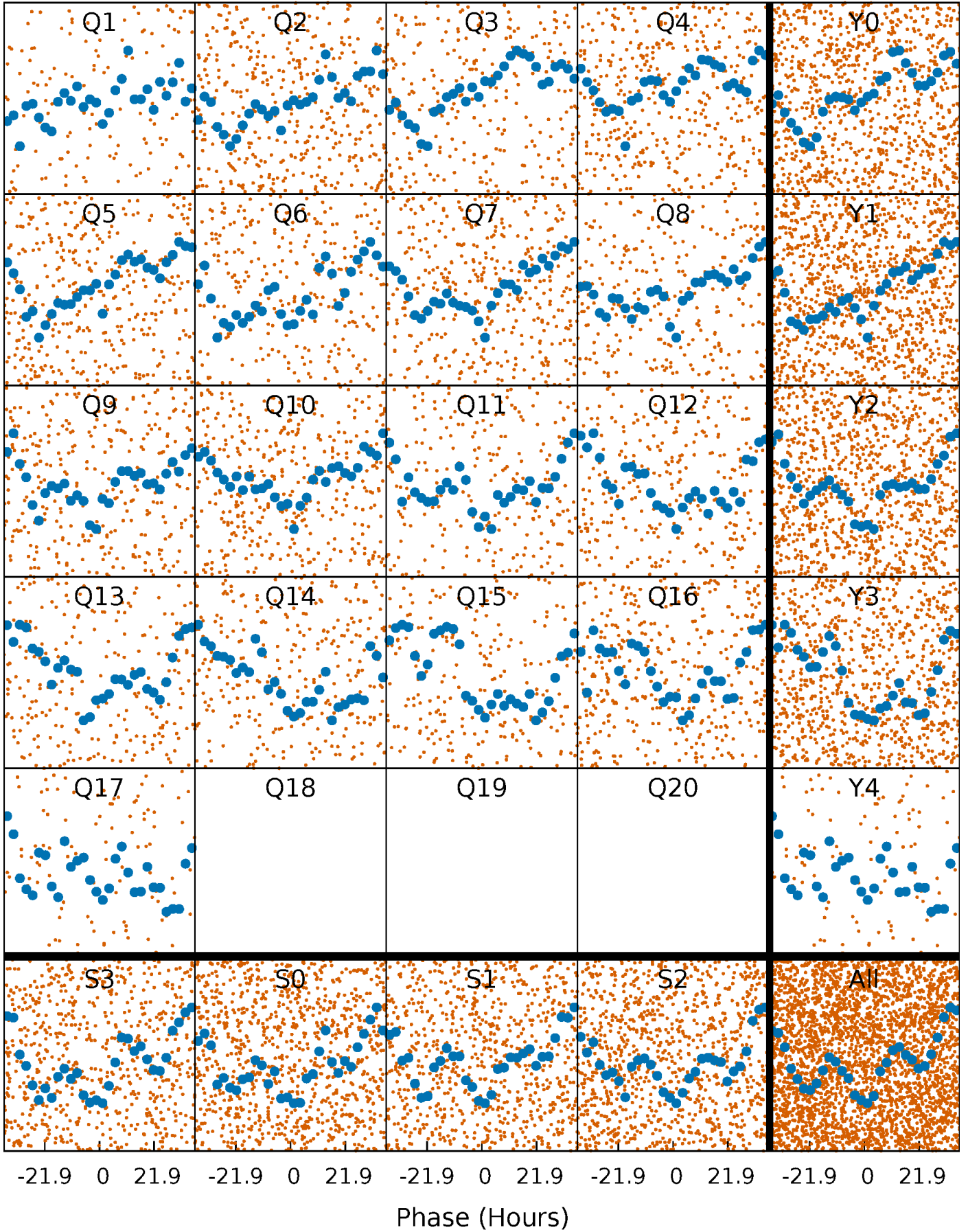


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

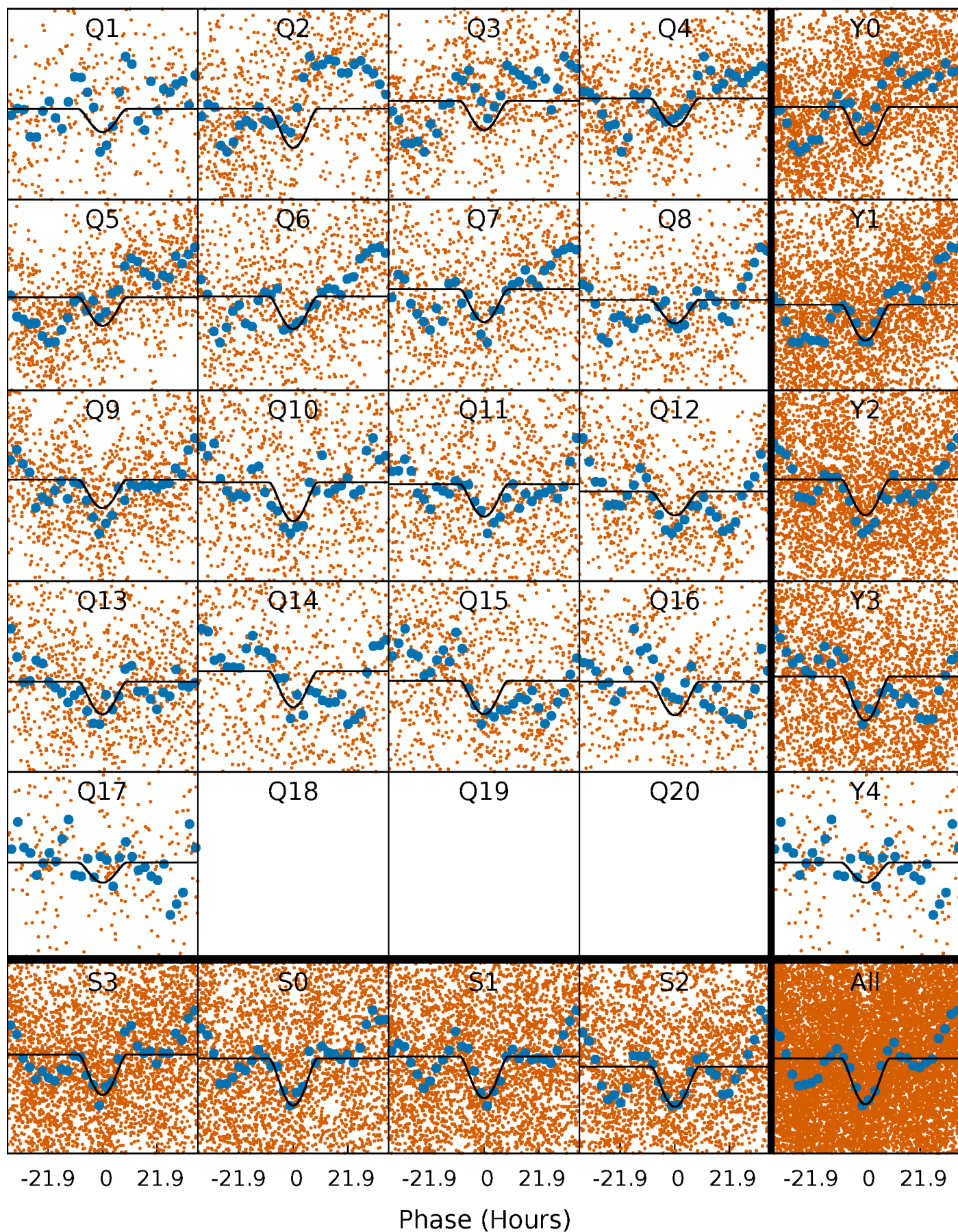
TCE 010056297-02     $P = 3.990834$  Days     $T_0 = 134.647427$  (BKJD)





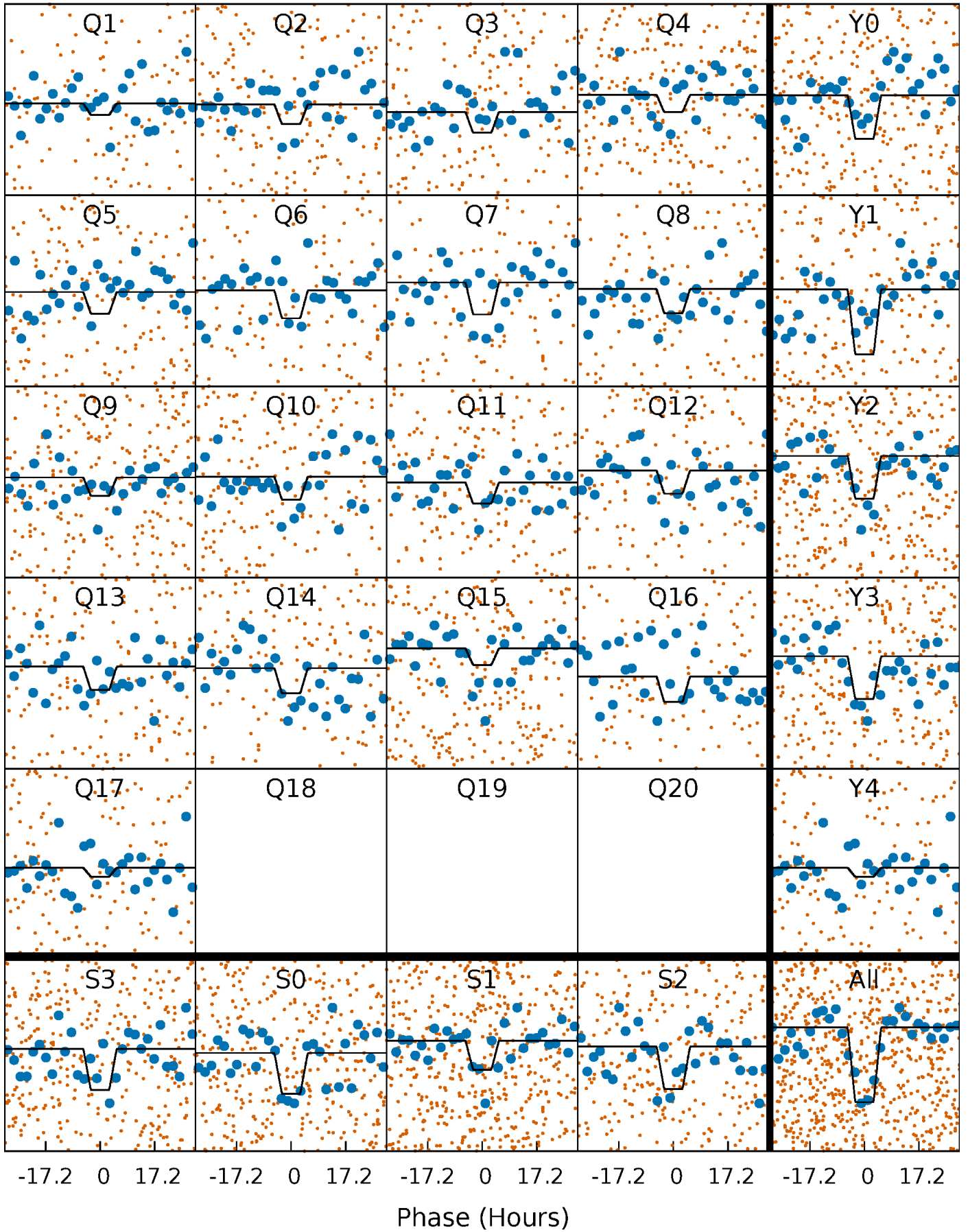
# DV Quarter-Phased Transit Curves

TCE 010056297-02   P= 3.990834 Days    $T_0=134.647427$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010056297-02     $P = 3.990864$  Days     $T_0 = 134.614056$  (BKJD)

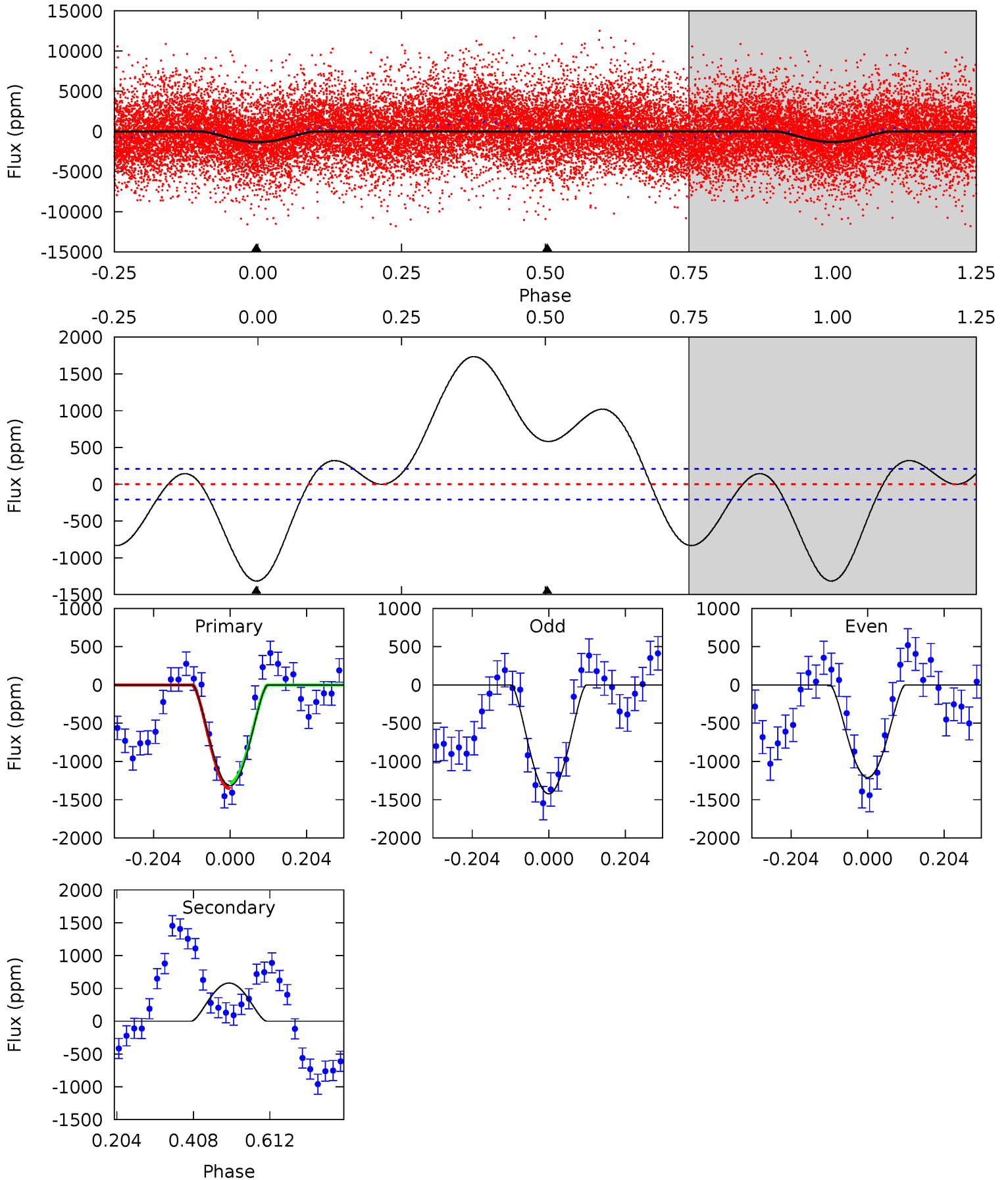




# DV Model-Shift Uniqueness Test

010056297-02, P = 3.990834 Days, E = 130.656593 Days

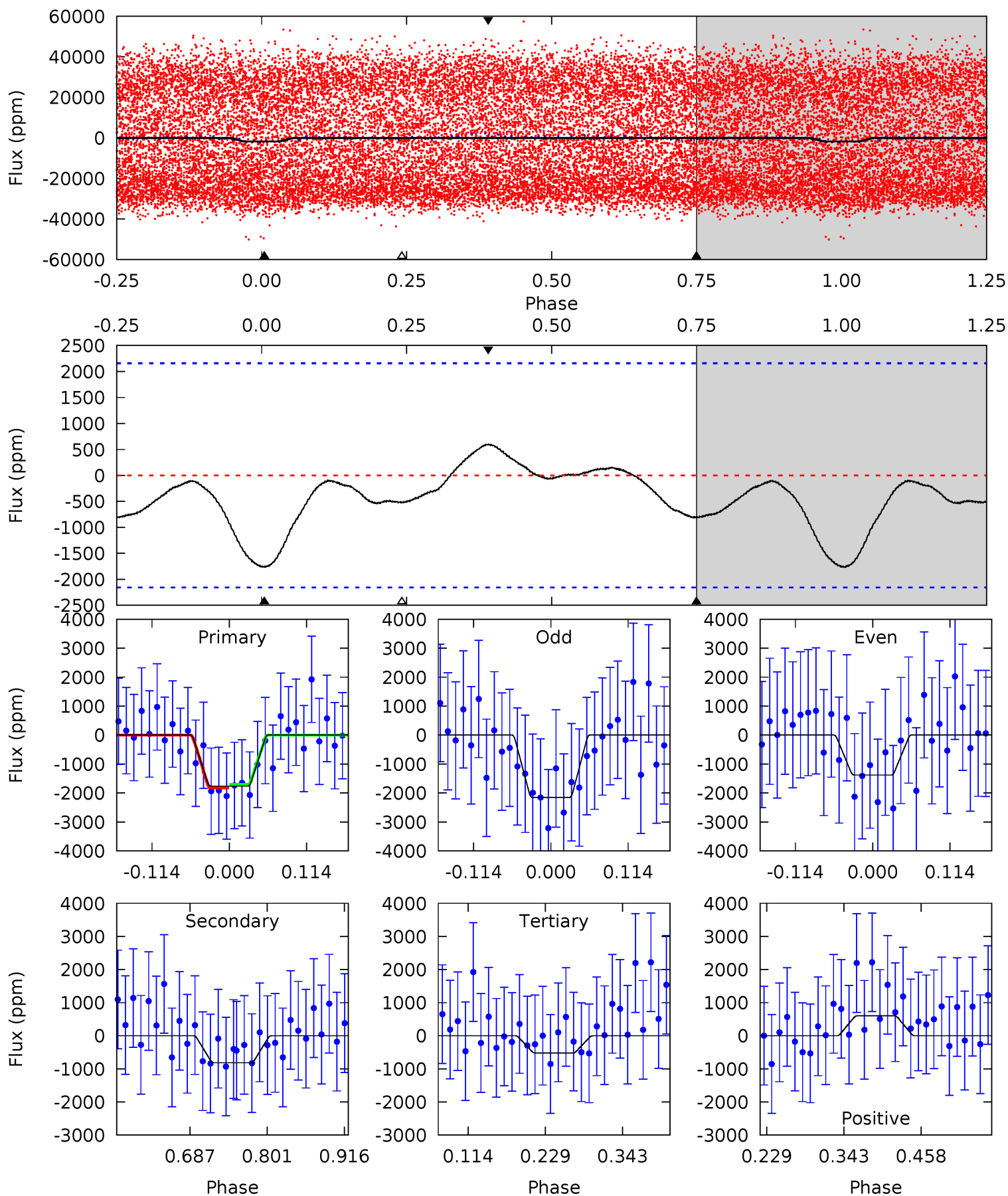
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.8	-12.3	0	0	4.41	1.27	11.0	27.8	27.8	-12.3	-12.3	2.27	2.50	0.57	0.80



# Alt Model-Shift Uniqueness Test

010056297-02, P = 3.990864 Days, E = 130.623192 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
3.71	1.71	1.10	1.26	4.54	1.58	0.66	2.61	2.45	0.61	0.45	0.81	0.32	0.25	0.12



### Stellar Parameters For KIC 010056297

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7355^{+230}_{-307}$	$4.042^{+0.198}_{-0.162}$	$-0.120^{+0.250}_{-0.350}$	$1.984^{+0.577}_{-0.472}$	$1.581^{+0.209}_{-0.255}$	$0.285^{+0.311}_{-0.130}$
	+3%/-4%	+5%/-4%	+208%/-292%	+29%/-24%	+13%/-16%	+109%/-45%
Source	KIC0	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 010056297-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$581 \pm 47$	$19.58^{+20.52}_{-12.64}$	$2636^{+212}_{-186}$	$-4075^{+667}_{-2292}$	$-2.693^{+2.056}_{-18.400}$
Alt.	$-814 \pm 475$	$18.36^{+19.33}_{-12.83}$	$2648^{+220}_{-208}$	$4185^{+3394}_{-1269}$	$3.749^{+43.150}_{-3.076}$

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

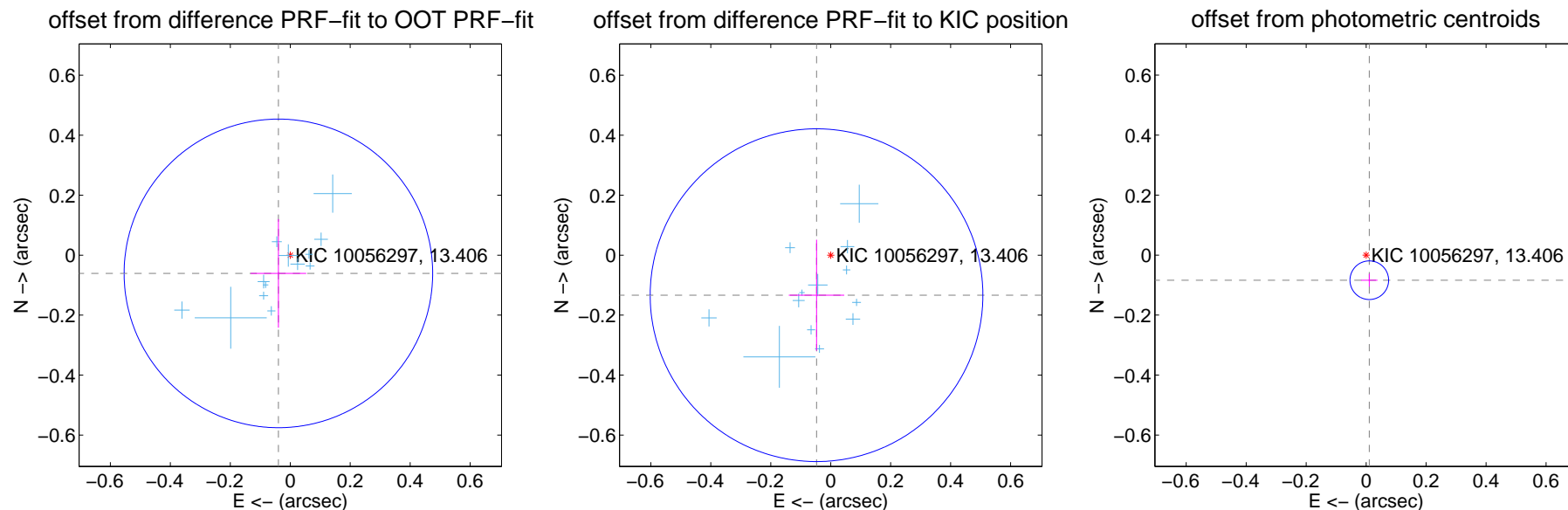
## DV Centroid Data

Supplemental centroid analysis for 010056297-02. Kepler magnitude: 13.41. Transit SNR 12.68

There are 17 quarters with good PRF difference image offsets

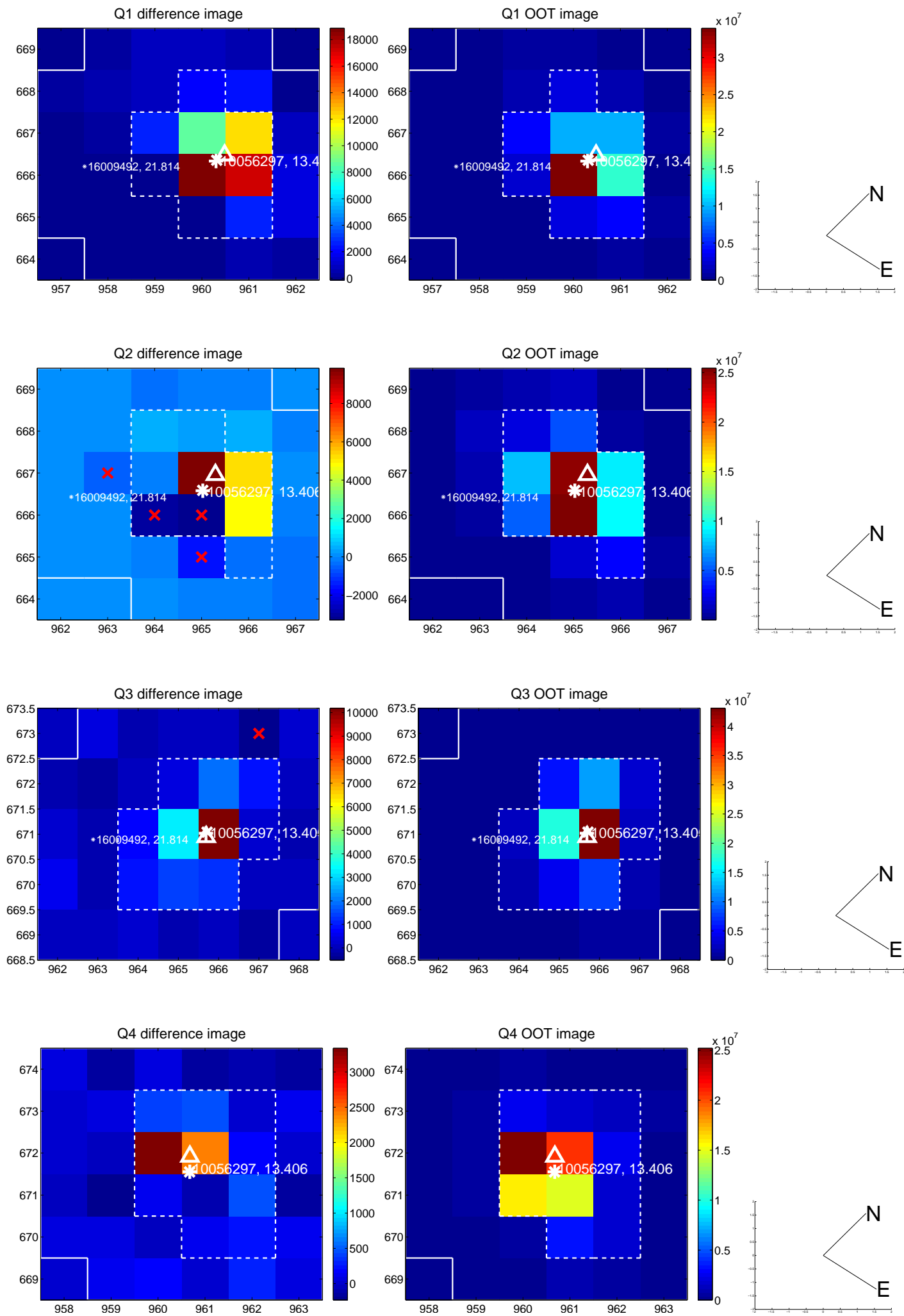
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.073 \pm 0.171$	0.42	$0.040 \pm 0.093$	$-0.061 \pm 0.181$
PRF-fit source offset from KIC position	$0.142 \pm 0.185$	0.77	$0.047 \pm 0.093$	$-0.134 \pm 0.185$
photometric centroid source offset	$0.08 \pm 0.02$	<b>3.93</b>	$-0.01 \pm 0.03$	$-0.08 \pm 0.02$



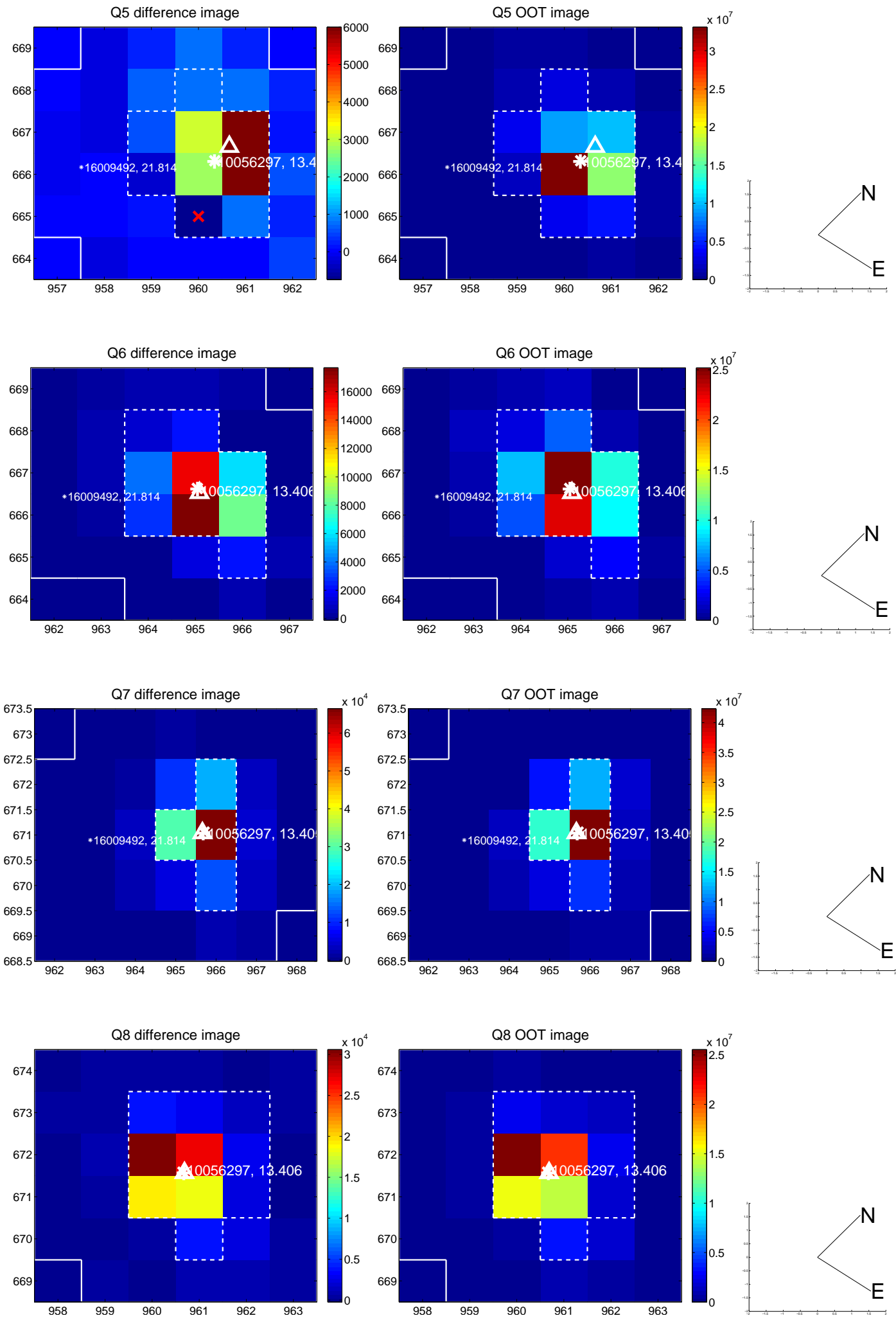
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

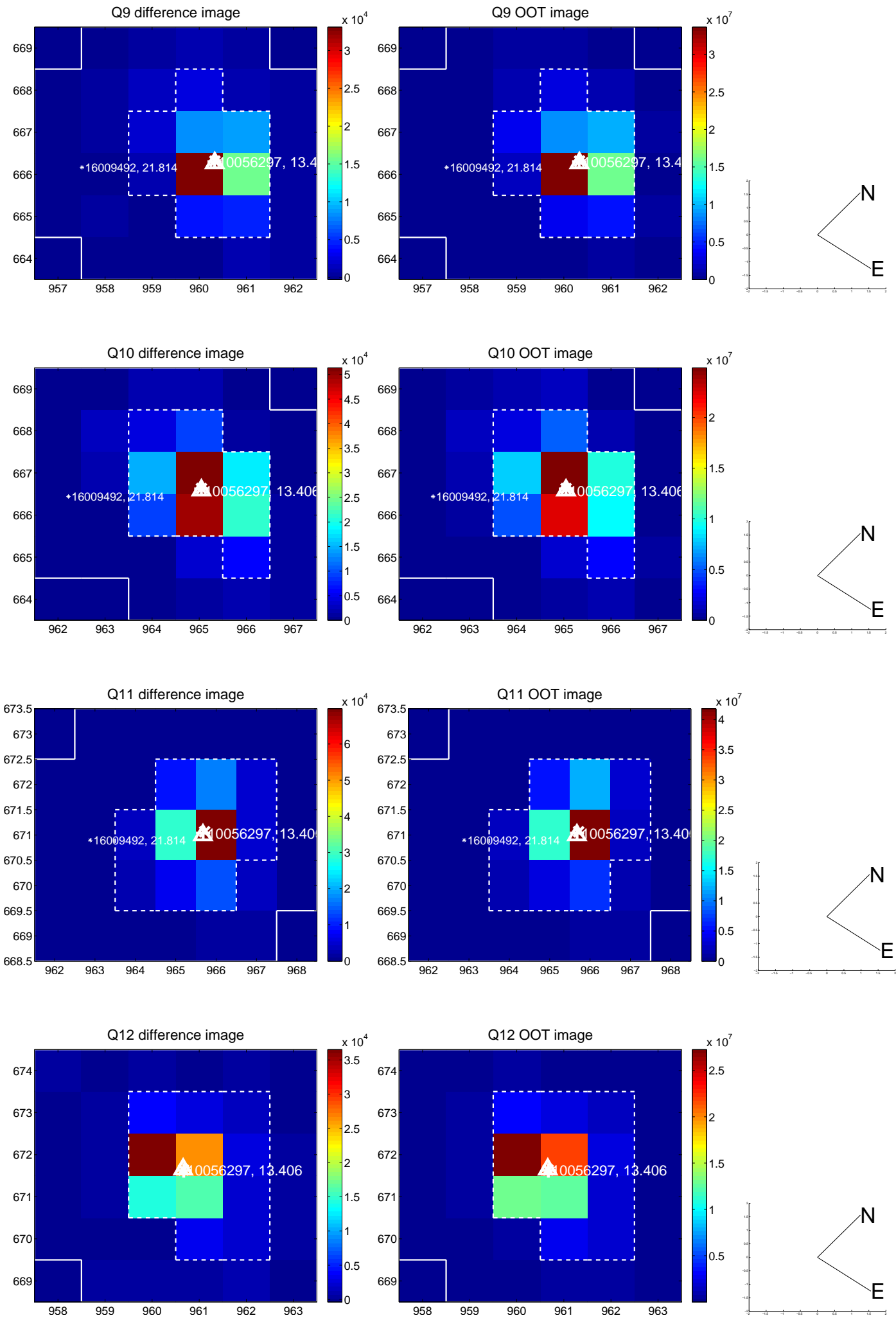




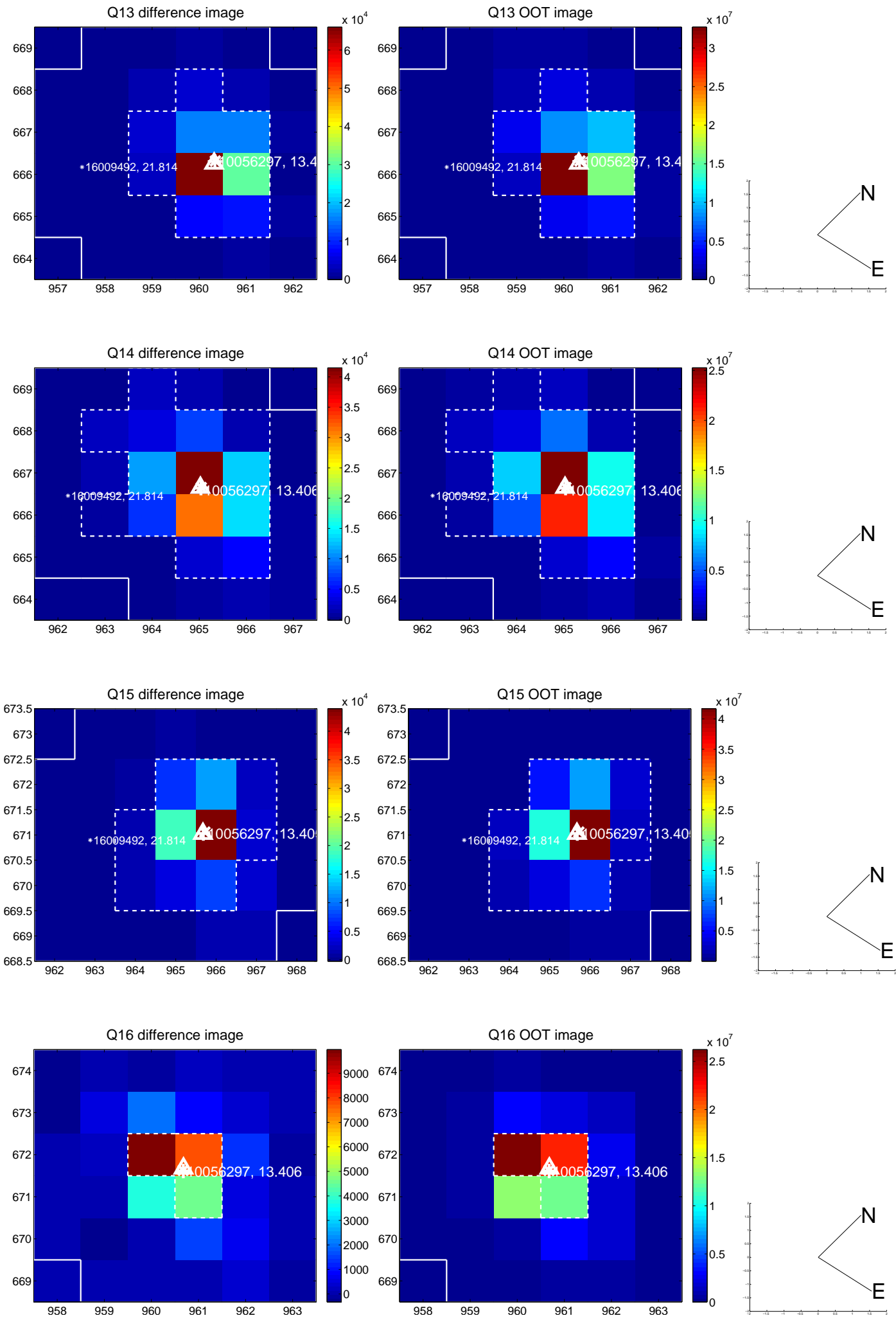
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



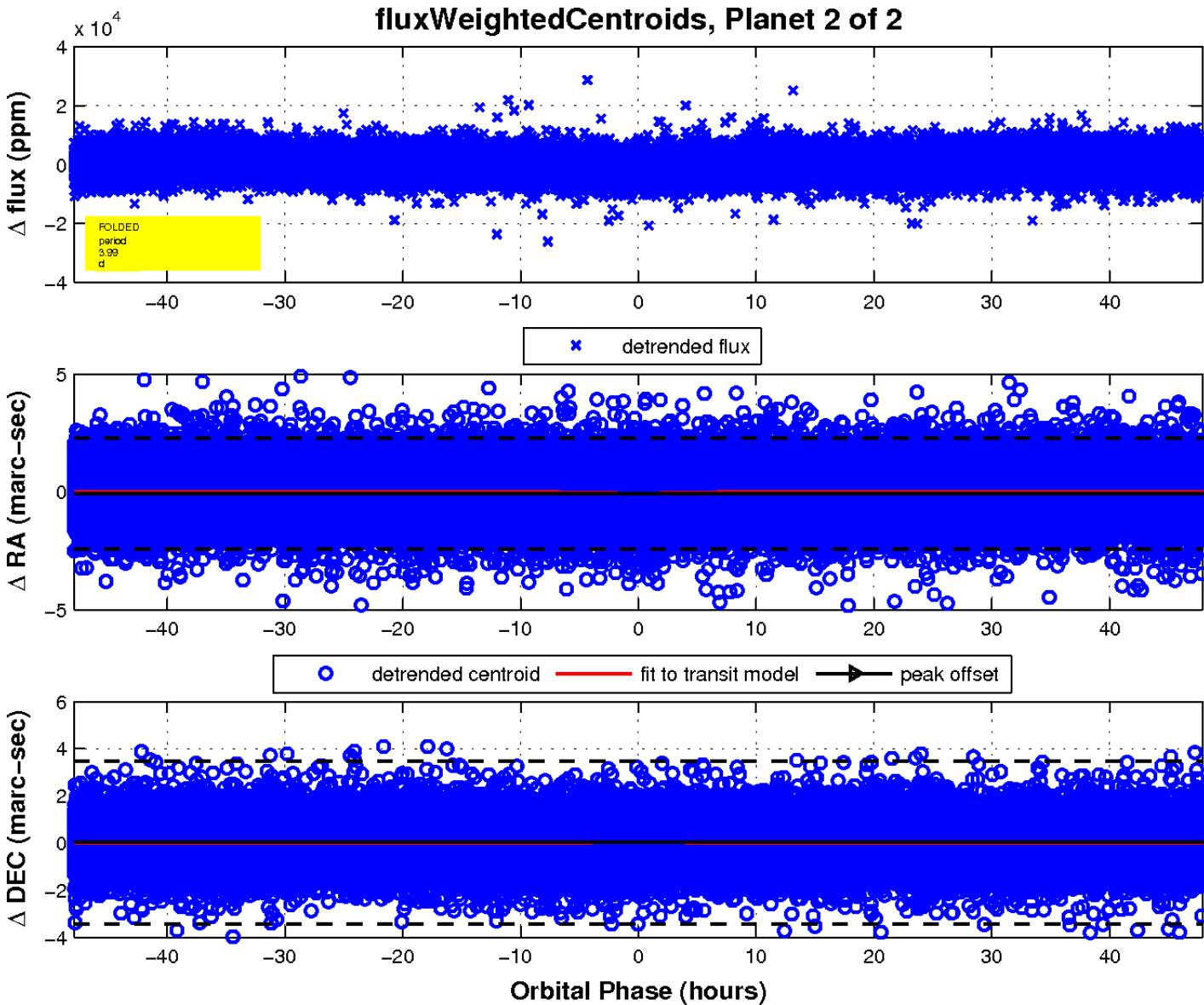
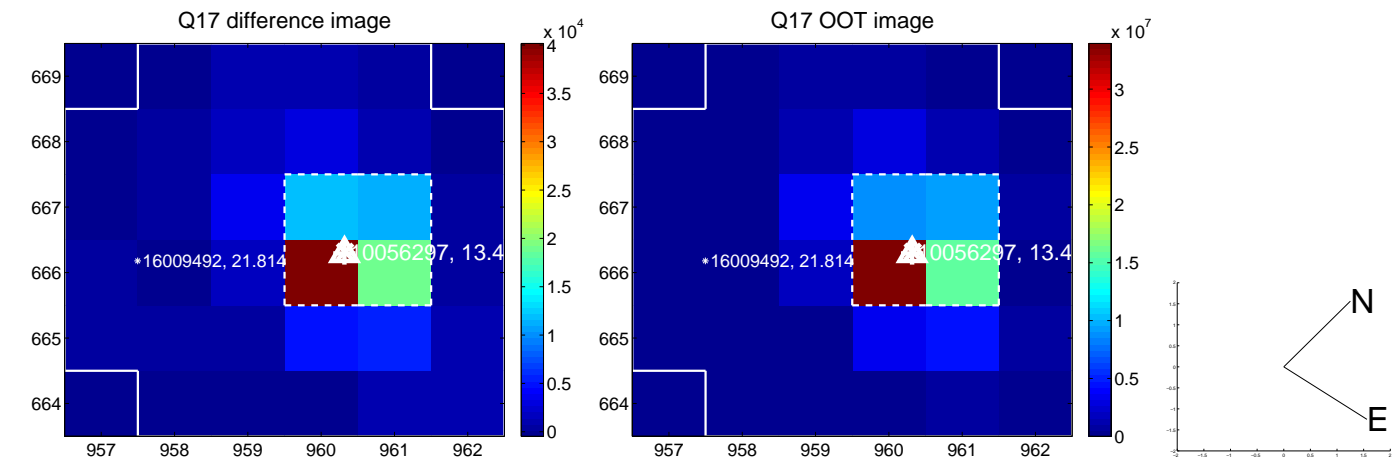
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

