

# KIC 006445969

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006445969-01	OBS	No	0.616491	132.038293	61.3	2.816	10.2	11.4	1.74	7350	1.58	33587.26
006445969-02	OBS	No	0.960650	131.674849	129.2	4.056	7.8	7.7	1.74	7350	2.29	18591.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006445969-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006445969-02	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.

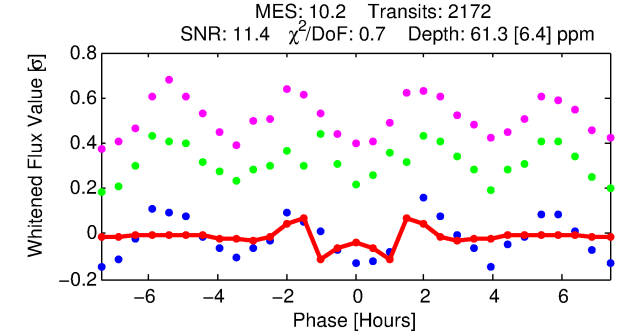
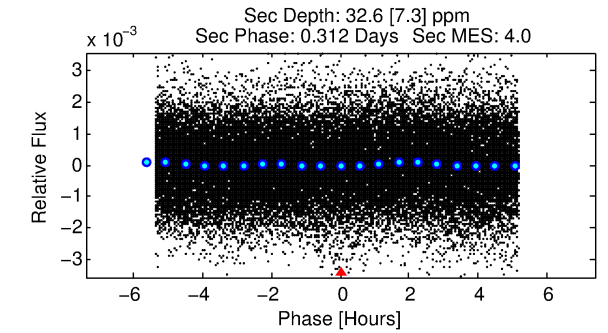
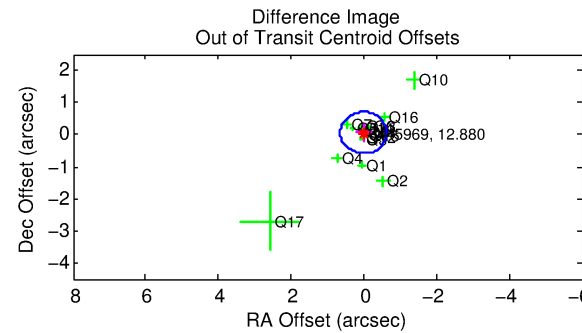
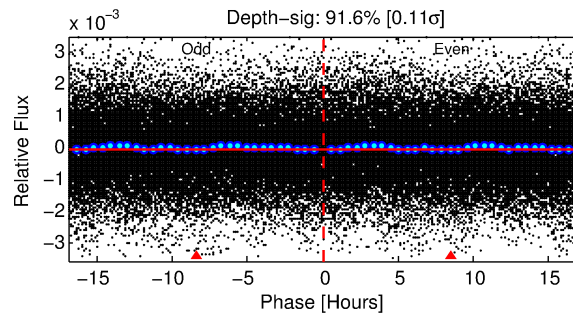
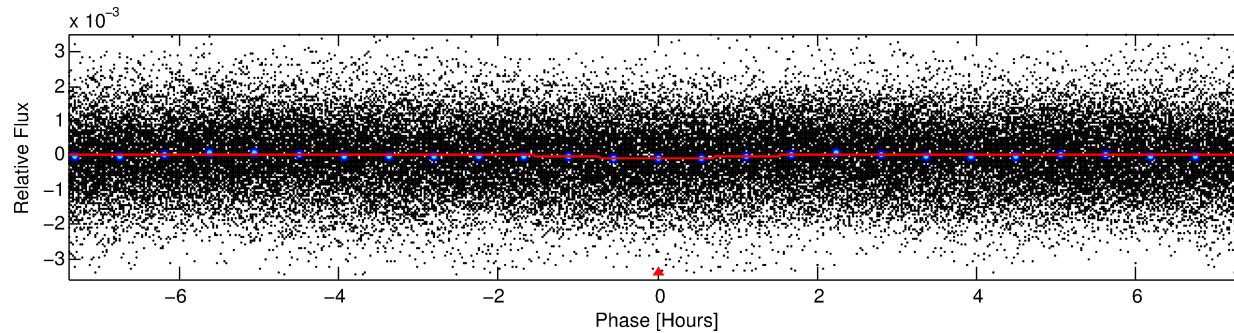
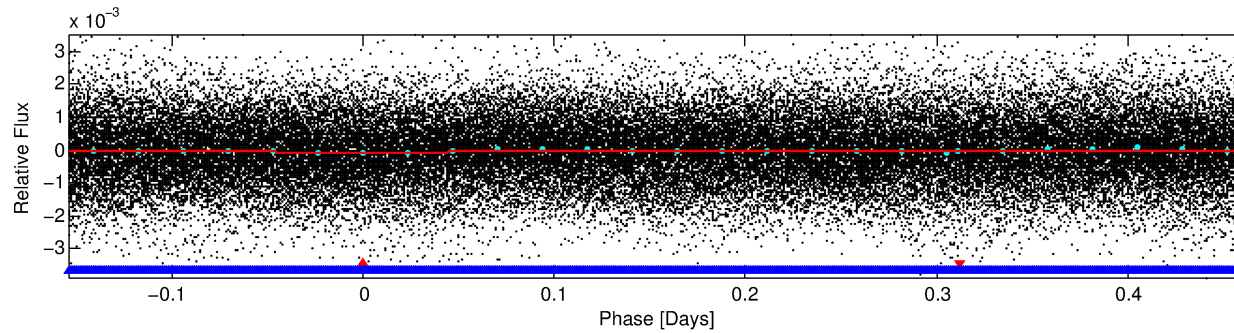
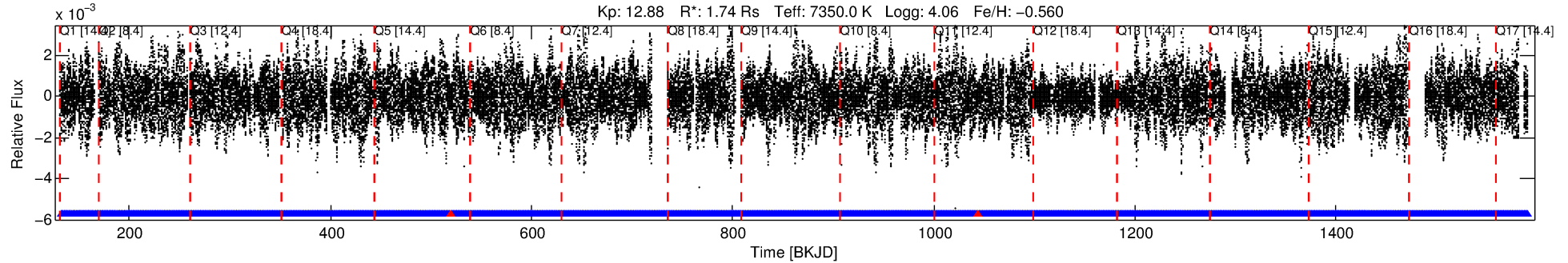
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006445969-01

No Significant Match Found

# DV One-Page Summary

KIC: 6445969 Candidate: 1 of 2 Period: 0.616 d



## DV Fit Results:

Period = 0.61649 [0.00001] d  
Epoch = 132.0383 [0.0010] BKJD  
Rp/R\* = 0.0083 [0.0012]  
a/R\* = 1.21 [0.31]  
b = 0.90 [0.18]  
Seff = 33587.26 [15880.59]  
Teq = 3452 [408] K  
Rp = 1.58 [0.50] Re  
a = 0.0153 [0.0042] AU  
Ag = 1.70 [0.97] [0.72σ]  
Teffp = 6091 [611] K [3.59σ]

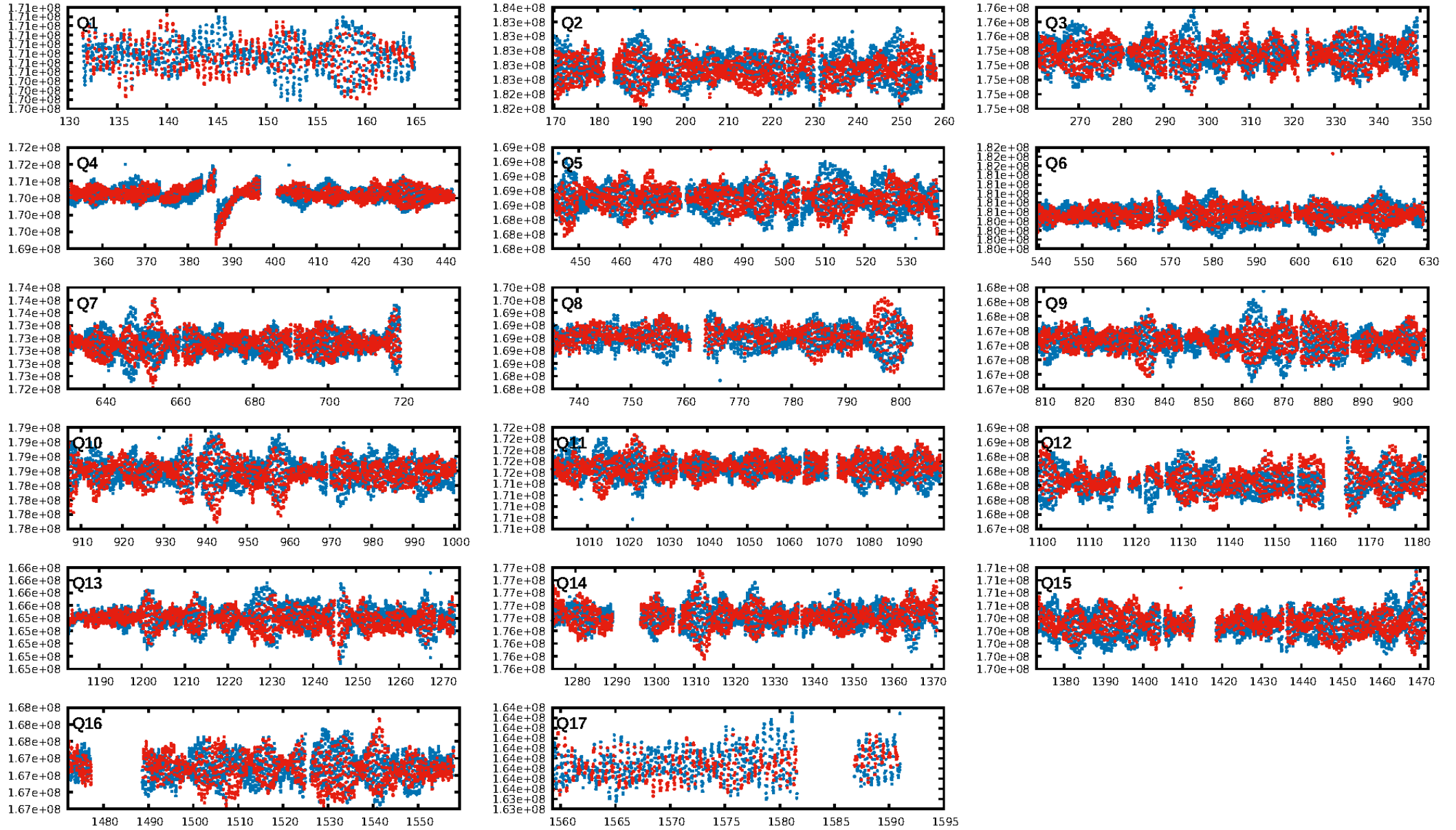
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 90.6% [1.67σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.83e-28  
RollingBand-fgt: 1.00 [2072/2074]  
GhostDiagnostic-chr: 1.568  
Centroid-sig: 32.3%  
Centroid-so: 0.172 arcsec [0.77σ]  
OotOffset-rm: 0.061 arcsec [0.28σ]  
KicOffset-rm: 0.092 arcsec [0.58σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.24 [4/17]  
DiffImageOverlap-fno: 1.00 [17/17]

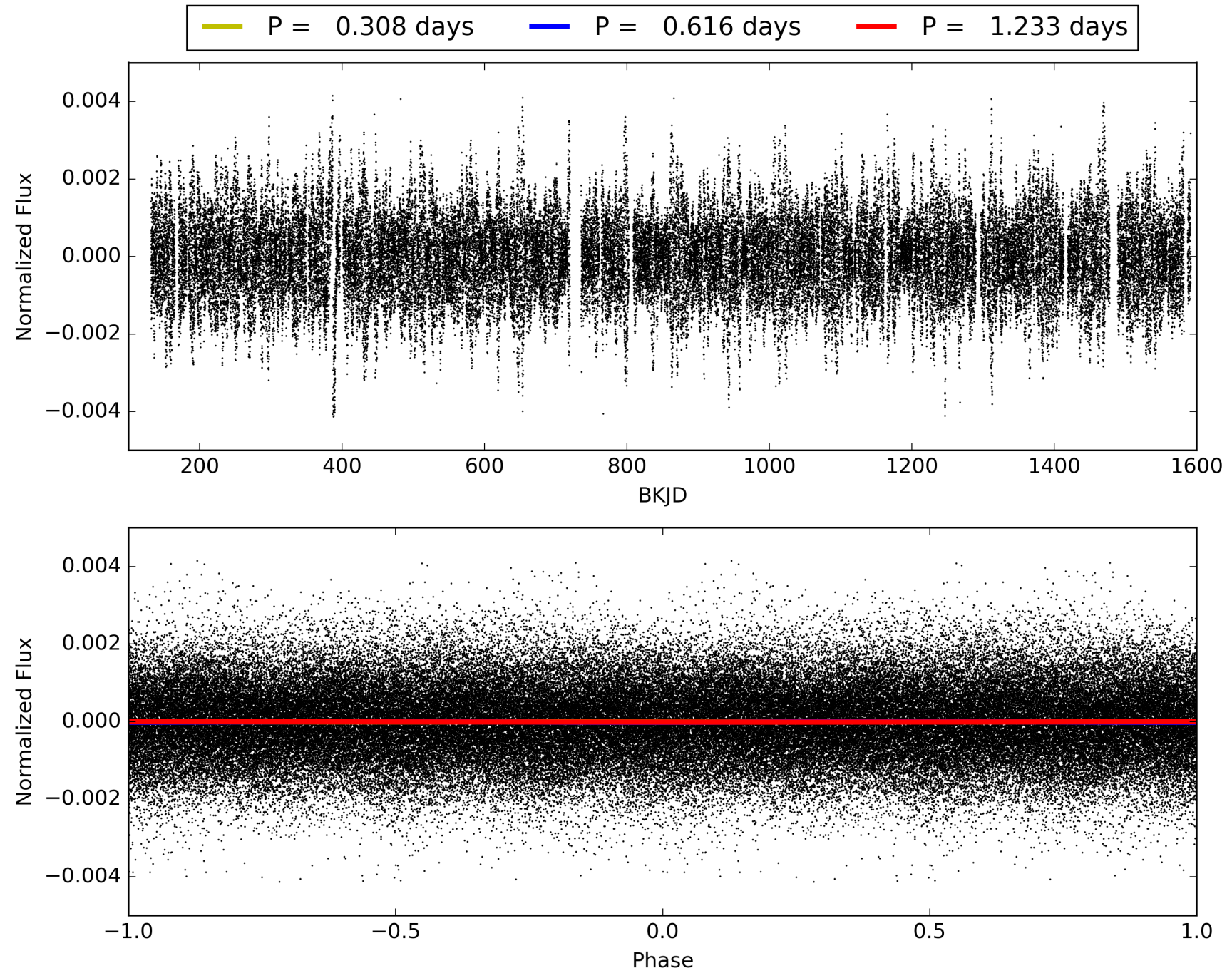
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 03:10:25 Z

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

# TCE 006445969-01, PDC Light Curves



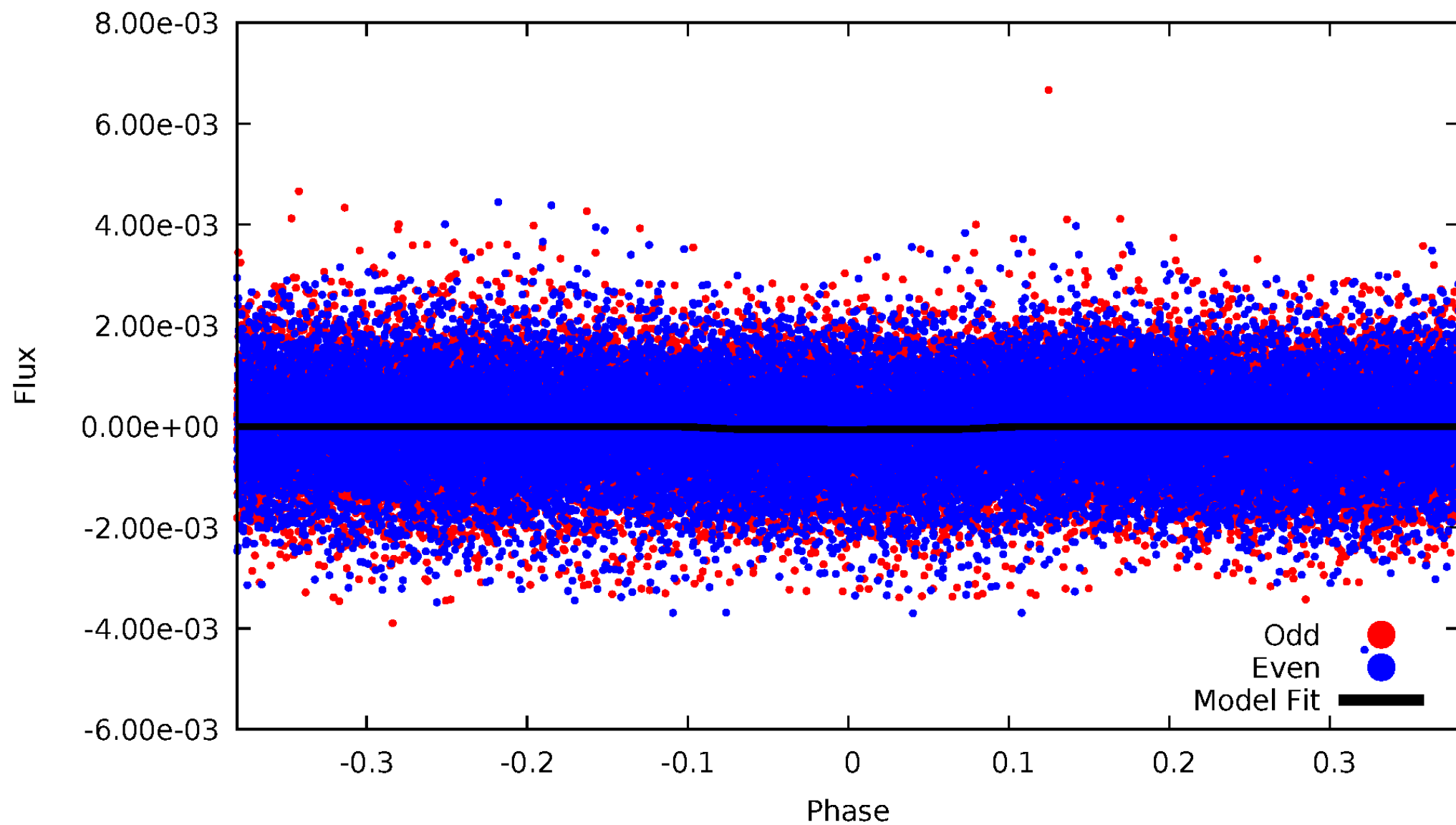
TCE 006445969-01





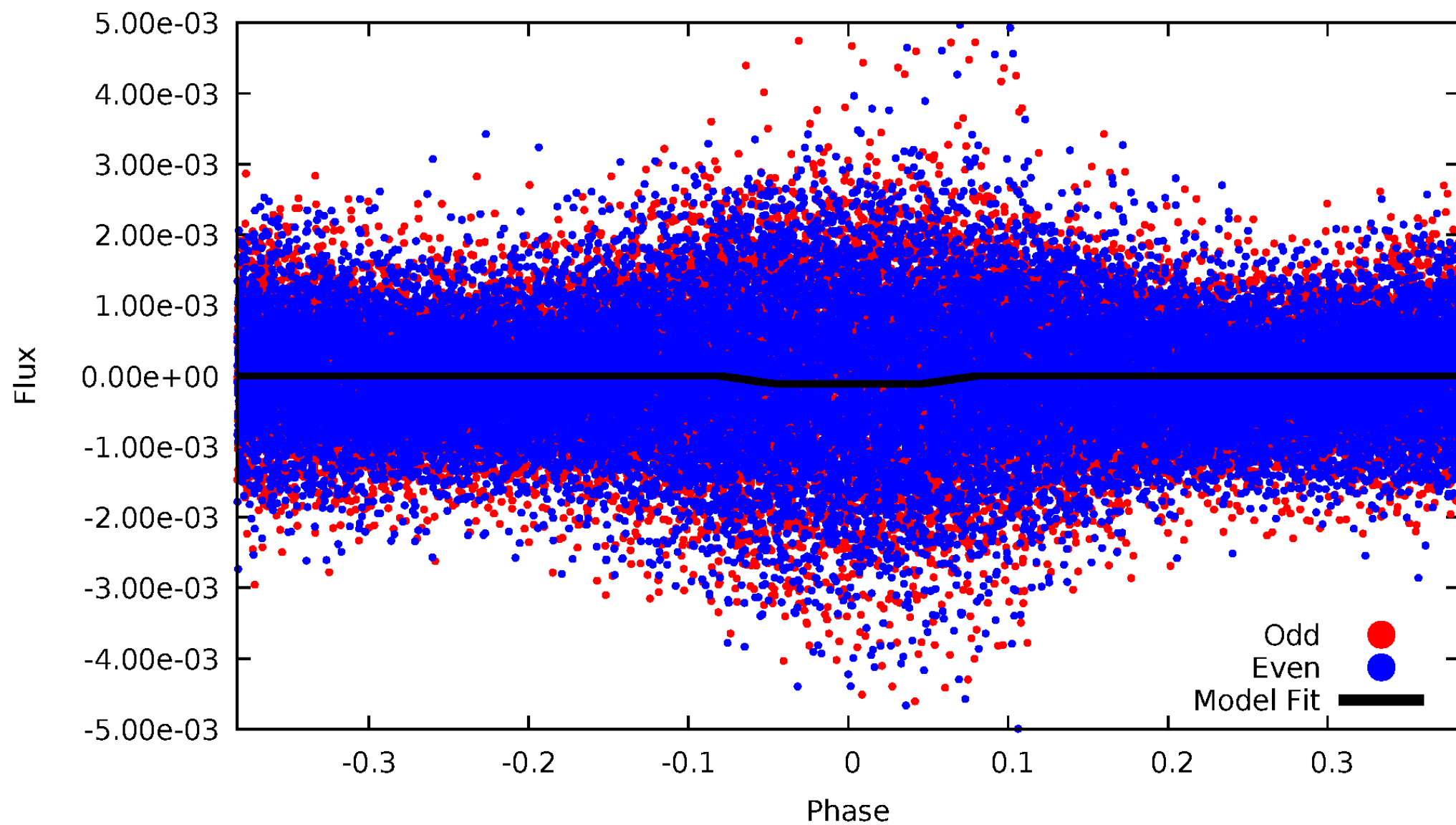
# DV Odd/Even

TCE 006445969-01



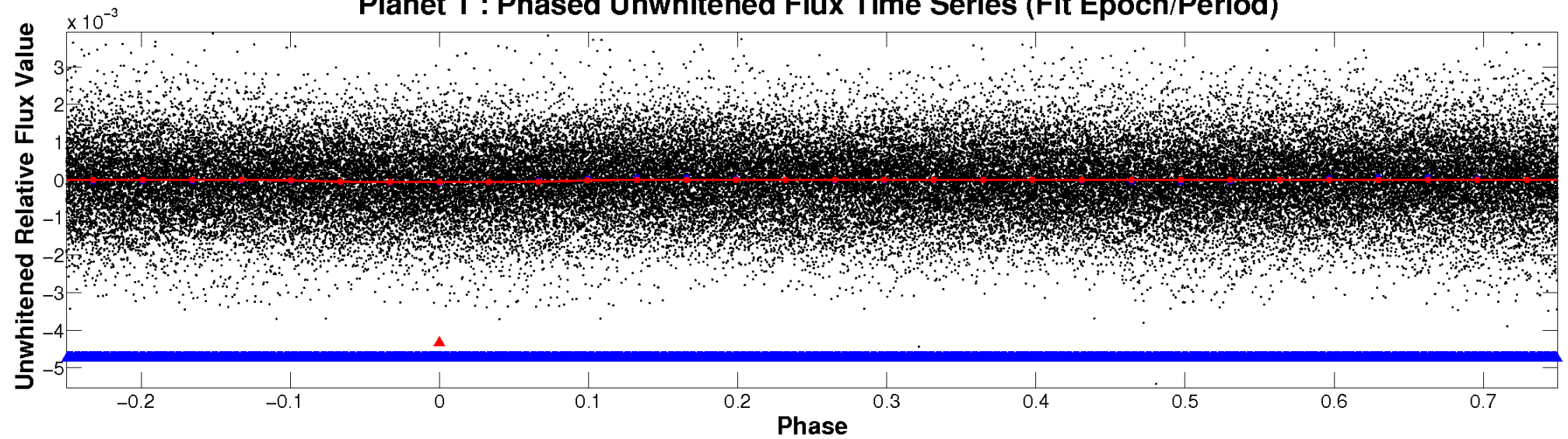
# ALT Odd/Even

TCE 006445969-01

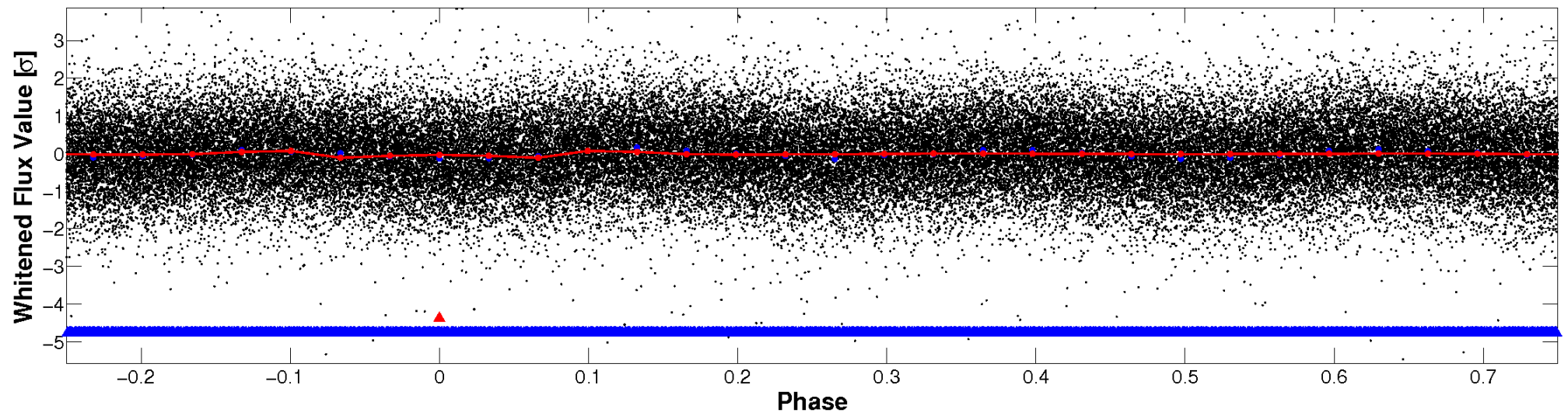


# Non-Whitened Vs. Whitened Light Curve

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

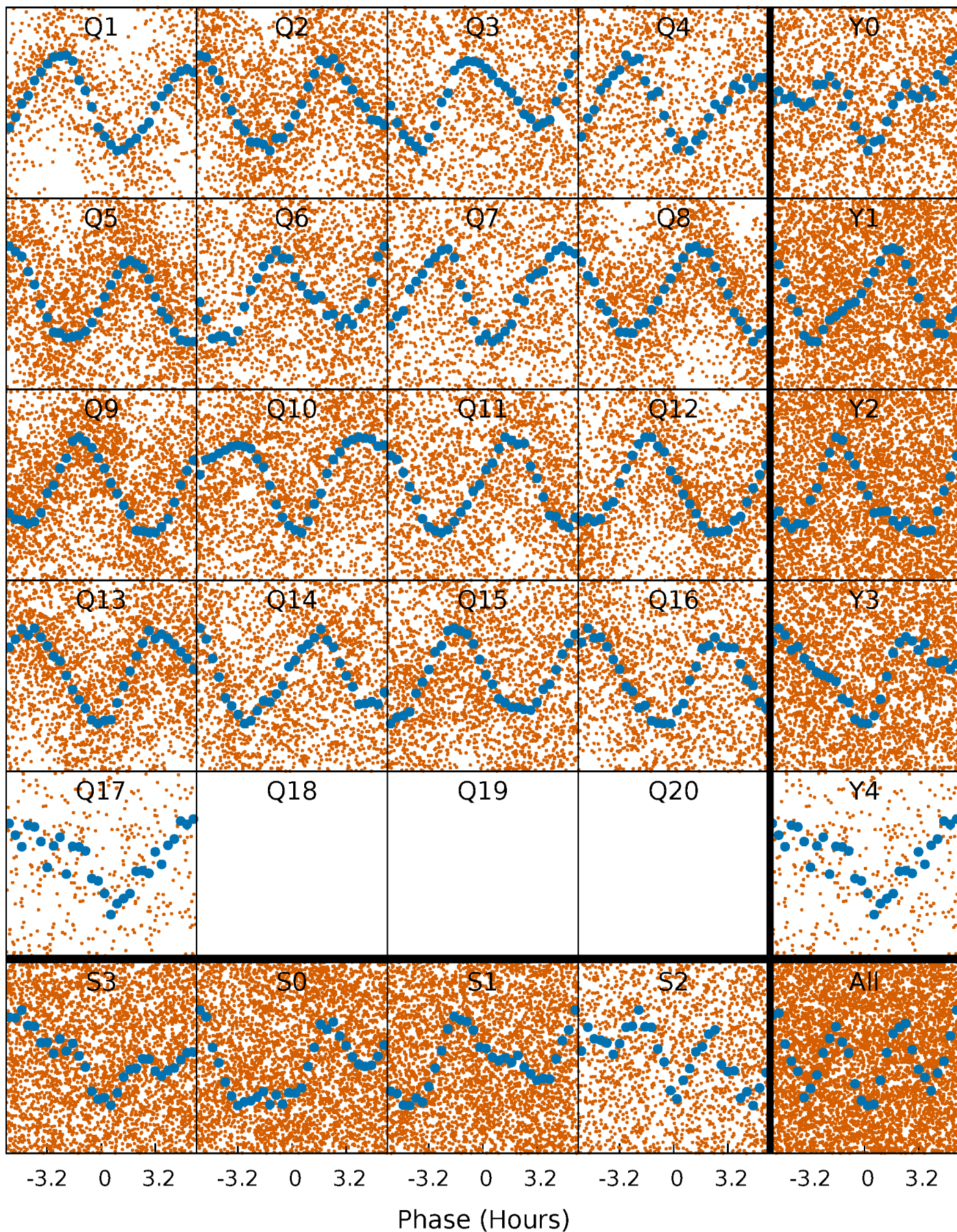


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

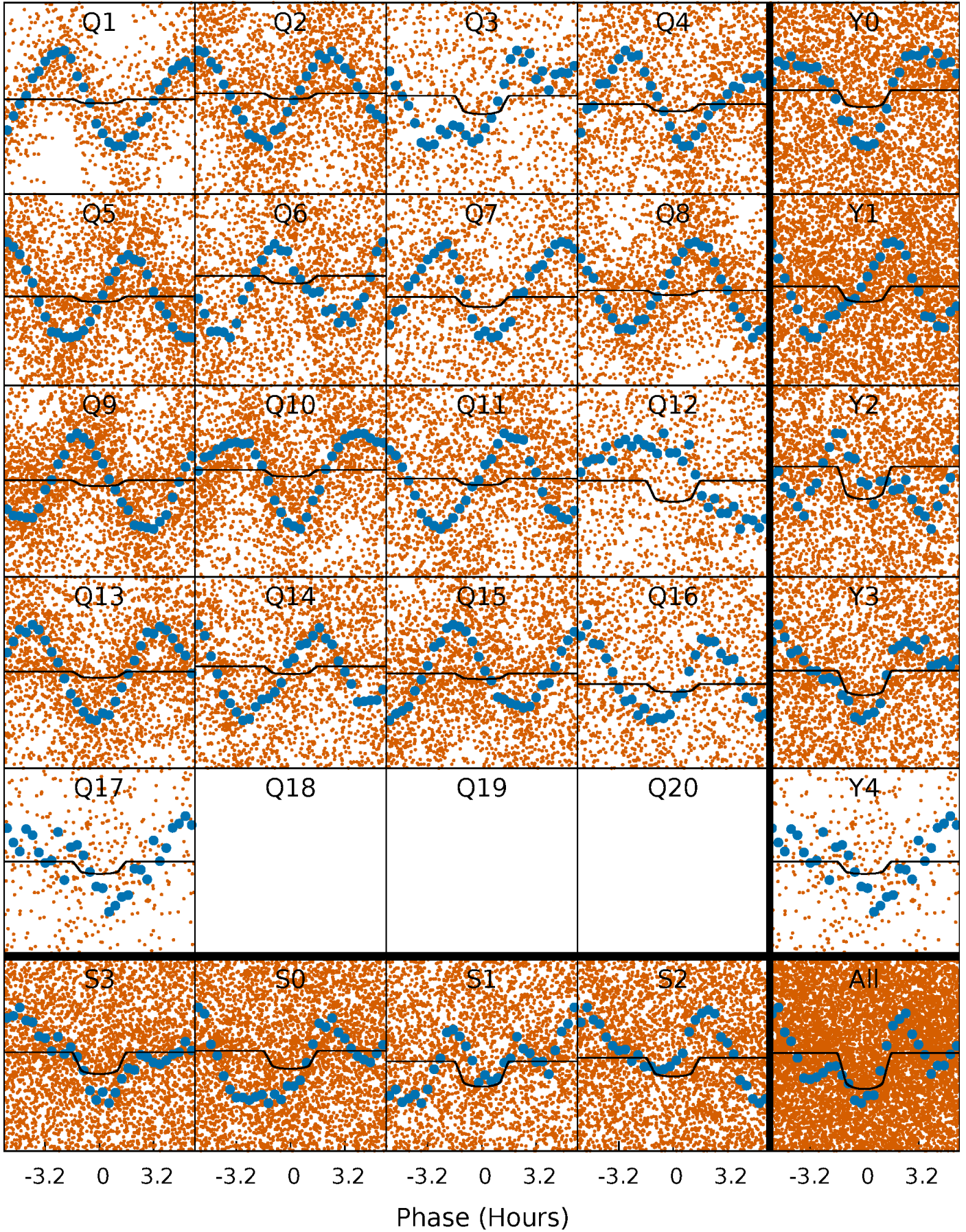
TCE 006445969-01 P= 0.616491 Days  $T_0=132.038293$  (BKJD)





# DV Quarter-Phased Transit Curves

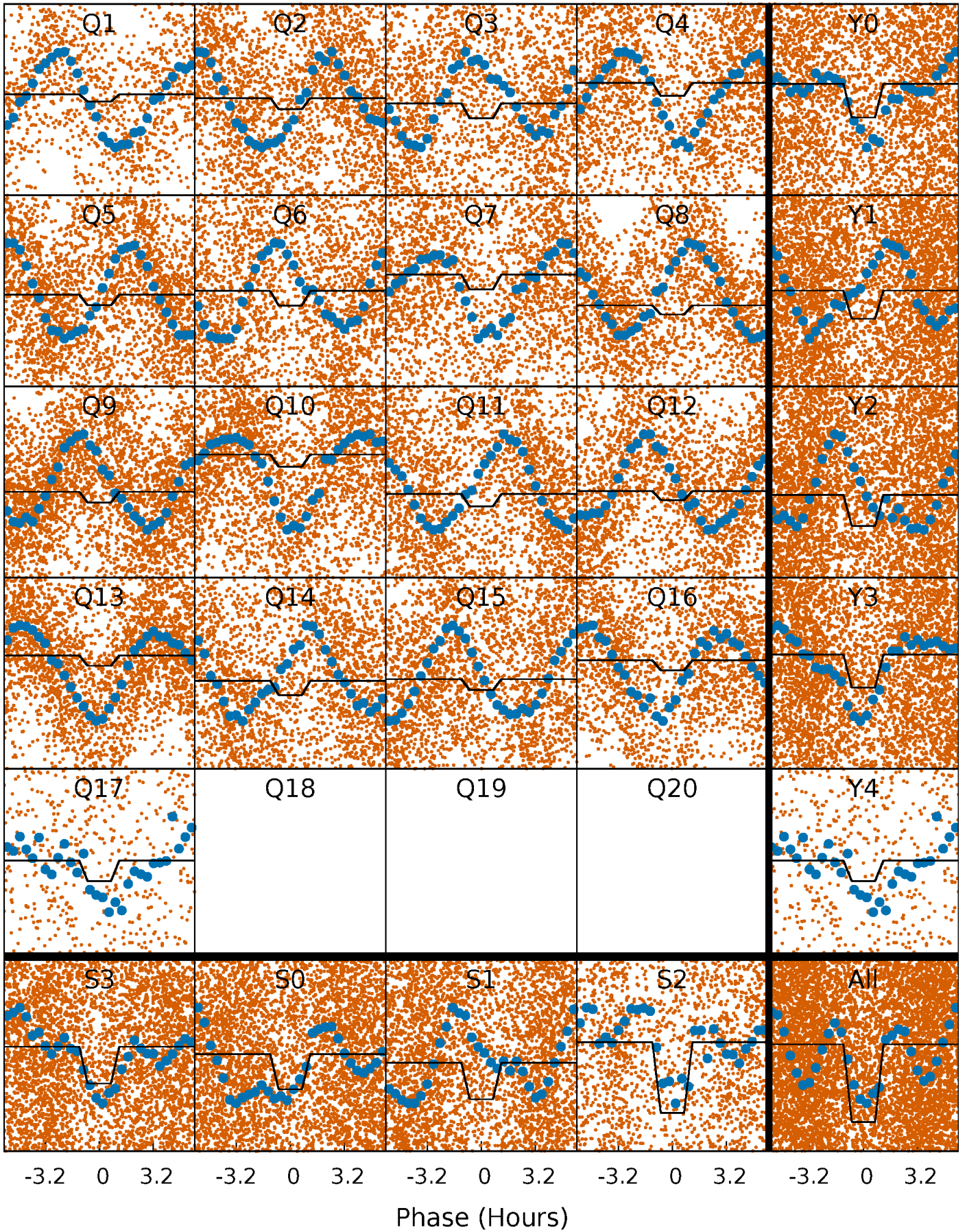
TCE 006445969-01   P= 0.616491 Days    $T_0=132.038293$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

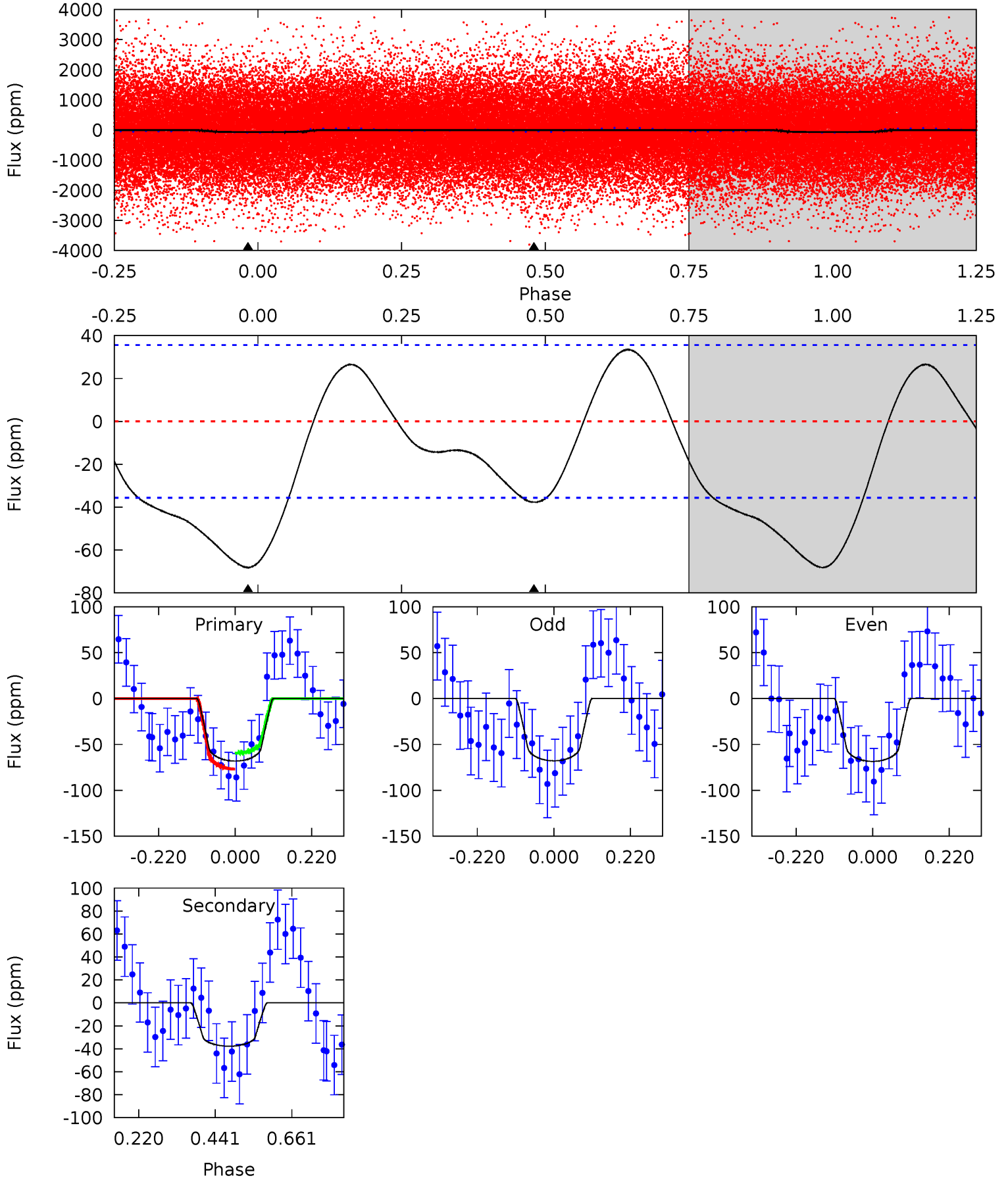
TCE 006445969-01 P= 0.616494 Days  $T_0=132.036397$  (BKJD)



# DV Model-Shift Uniqueness Test

006445969-01, P = 0.616491 Days, E = 131.421802 Days

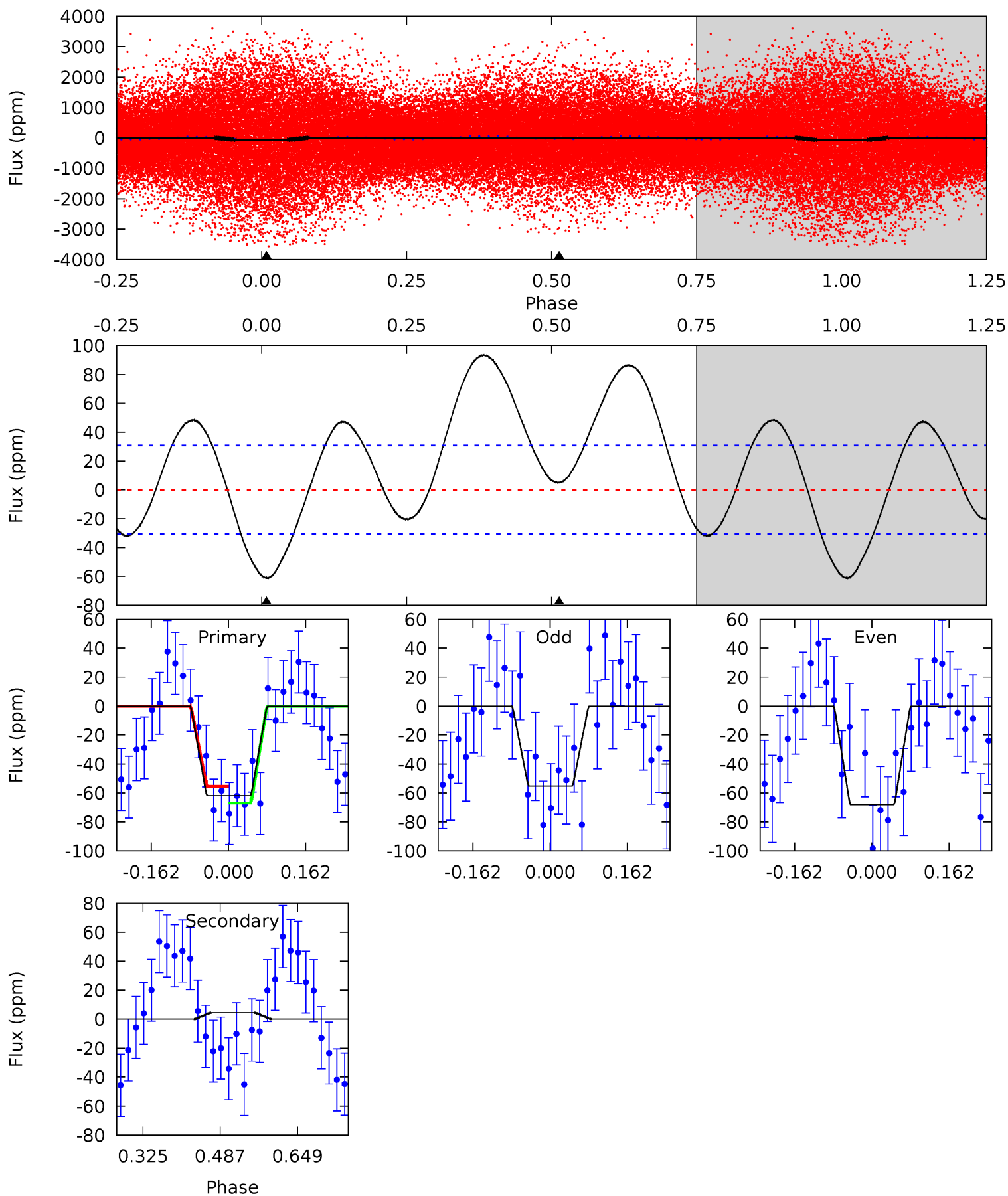
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.42	4.66	0	0	4.40	1.23	1.34	8.42	8.42	4.66	4.66	0.04	1.11	0.33	1.08



# Alt Model-Shift Uniqueness Test

006445969-01, P = 0.616494 Days, E = 131.419903 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
8.96	-0.65	0	0	4.46	1.40	4.02	8.96	8.96	-0.65	-0.65	0.93	1.94	0.60	0.59





### Stellar Parameters For KIC 006445969

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7350^{+207}_{-311}$	$4.060^{+0.260}_{-0.160}$	$-0.560^{+0.250}_{-0.300}$	$1.738^{+0.443}_{-0.492}$	$1.265^{+0.196}_{-0.161}$	$0.339^{+0.507}_{-0.157}$
	+3%/-4%	+6%/-4%	+45%/-54%	+25%/-28%	+15%/-13%	+149%/-46%
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 006445969-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-38 \pm 8$	$1.56^{+0.37}_{-0.31}$	$4777^{+383}_{-383}$	$5959^{+659}_{-574}$	$2.007^{+1.177}_{-0.766}$
Alt.	$4 \pm 7$	$1.93^{+0.40}_{-0.33}$	$4783^{+357}_{-391}$	$-4457^{+603}_{-515}$	$-0.145^{+0.251}_{-0.274}$

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

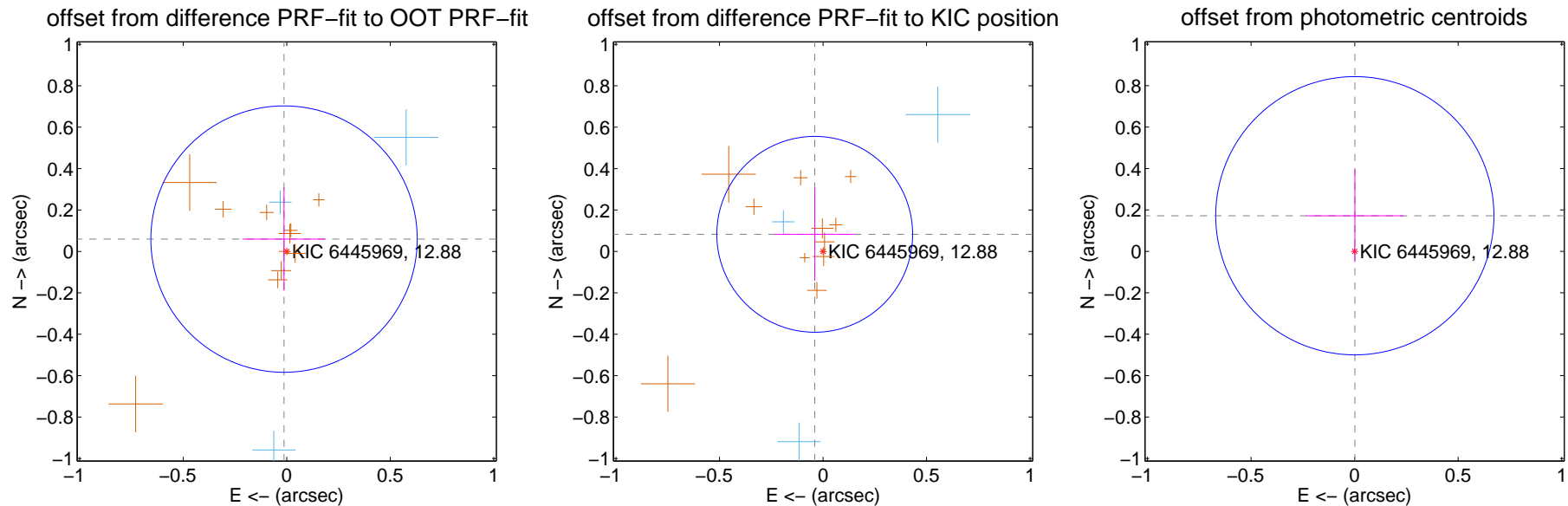
## DV Centroid Data

Supplemental centroid analysis for 006445969-01. Kepler magnitude: 12.88. Transit SNR 11.35

There are 4 quarters with good PRF difference image offsets

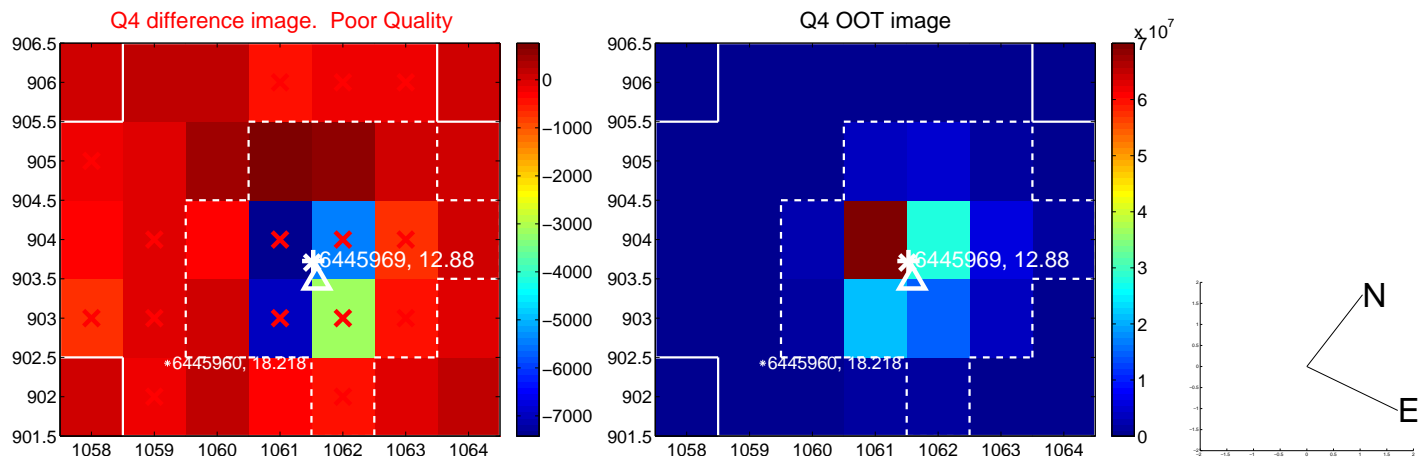
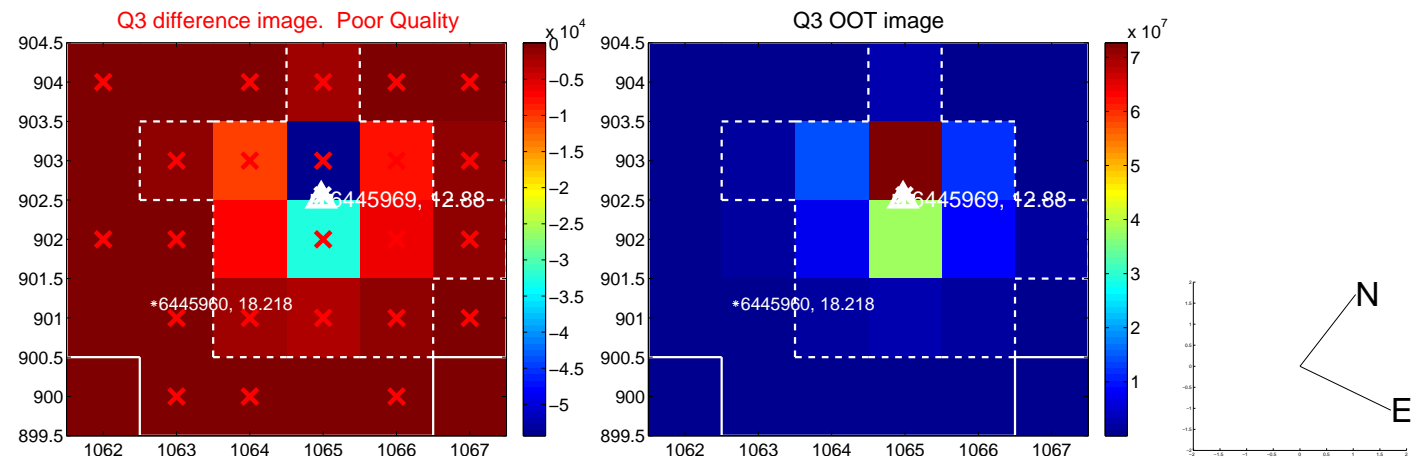
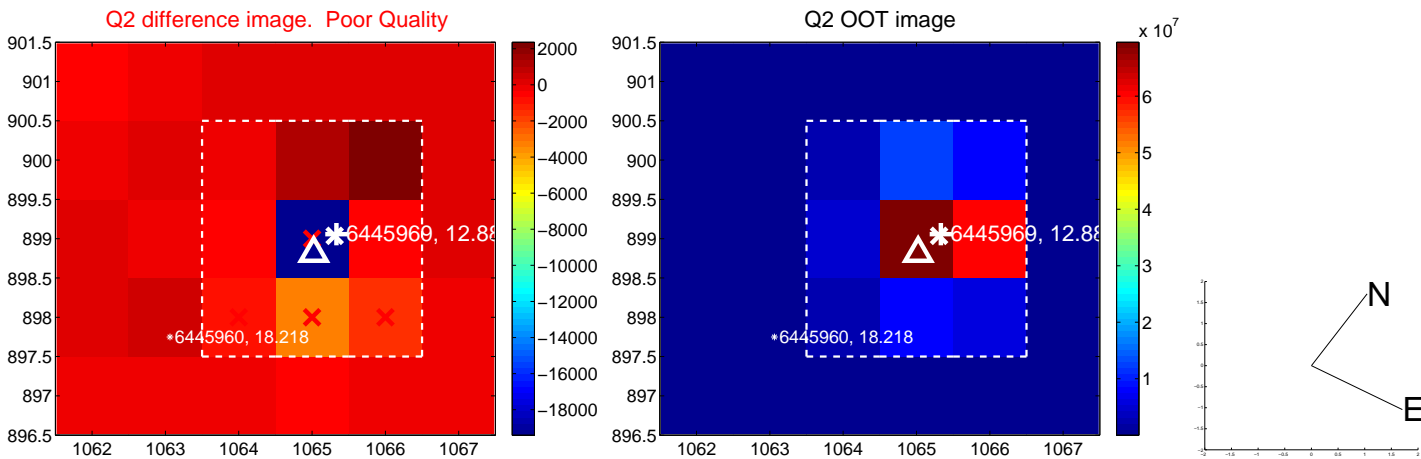
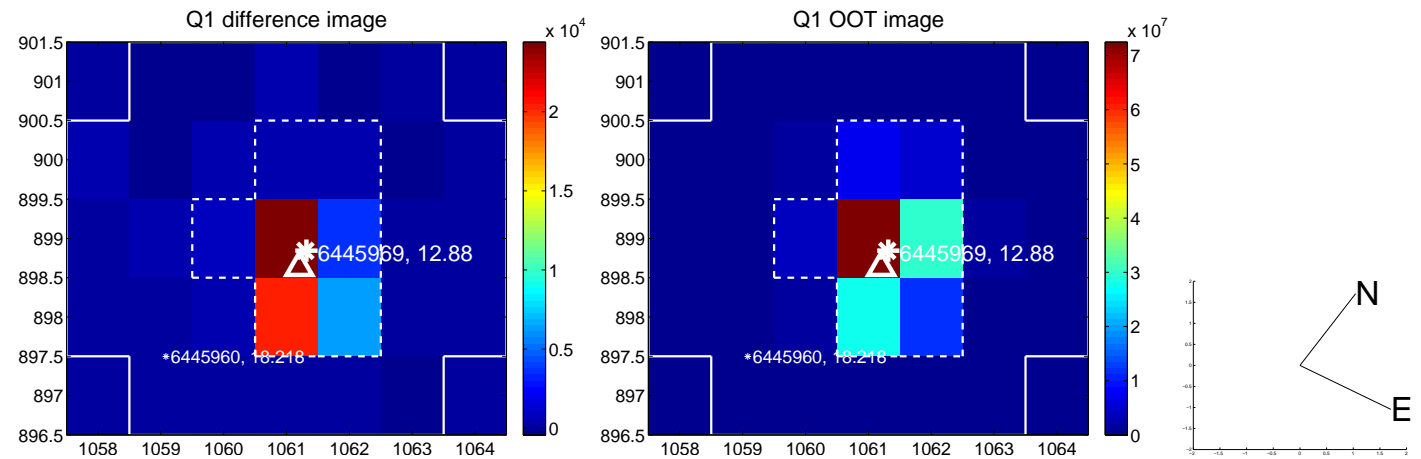
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.061 \pm 0.214$	0.28	$0.013 \pm 0.201$	$0.060 \pm 0.249$
PRF-fit source offset from KIC position	$0.092 \pm 0.158$	0.58	$0.040 \pm 0.192$	$0.083 \pm 0.224$
photometric centroid source offset	$0.17 \pm 0.22$	0.77	$-0.00 \pm 0.24$	$0.17 \pm 0.22$

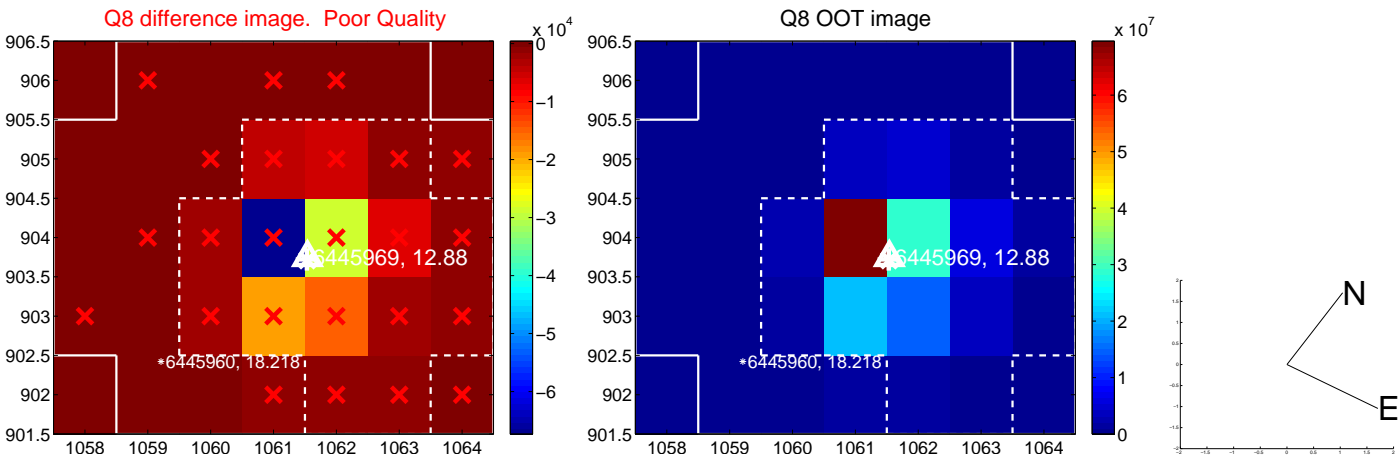
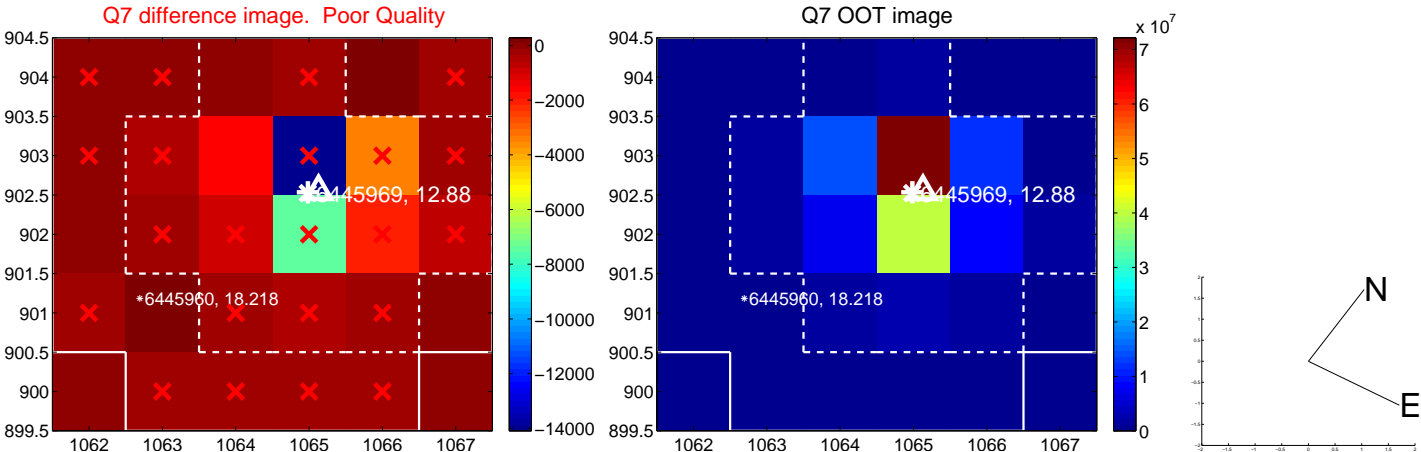
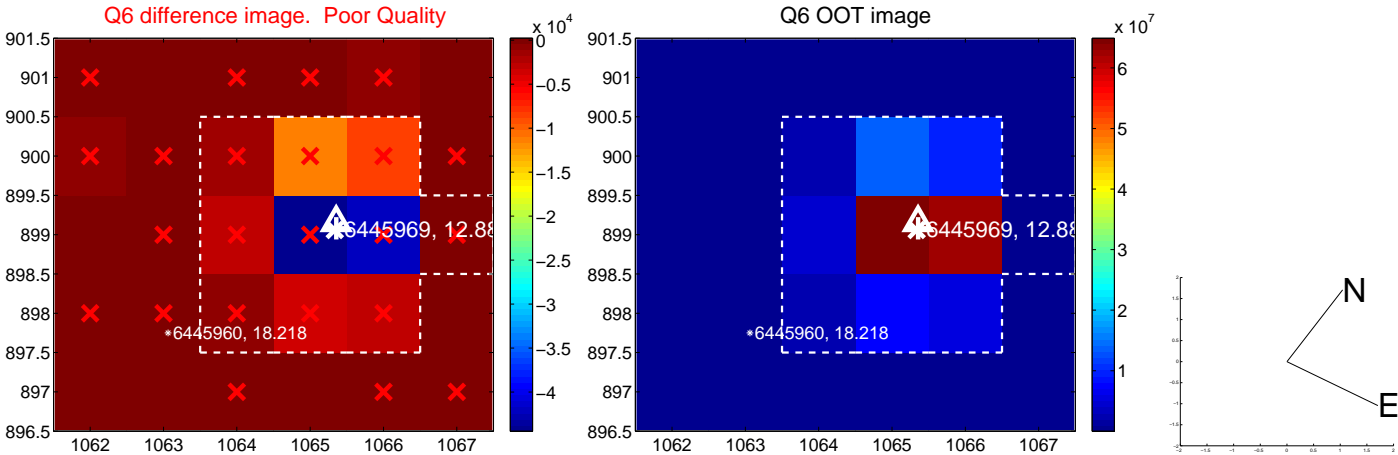
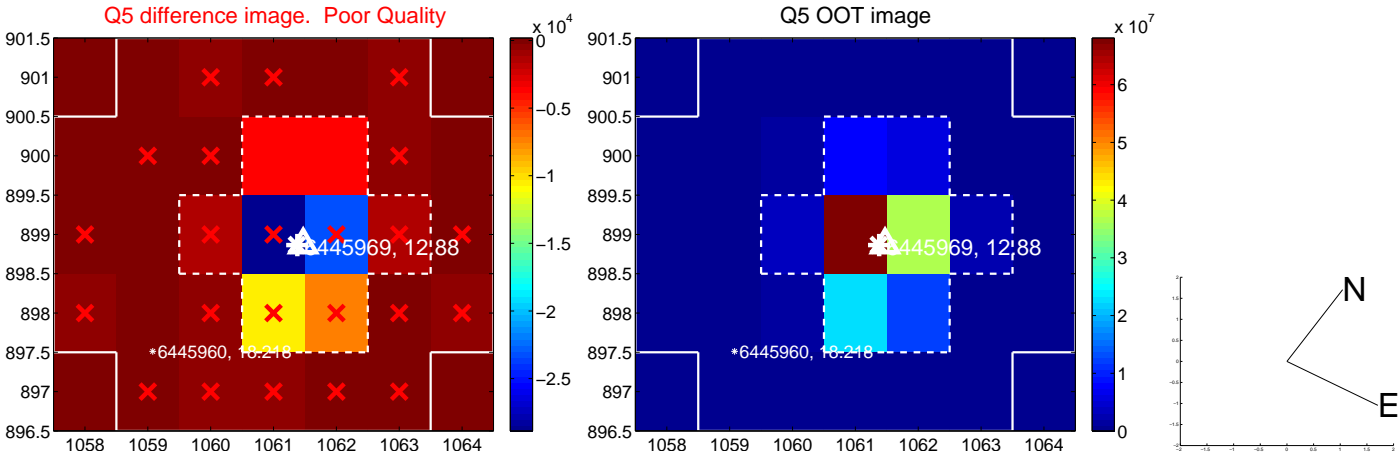


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

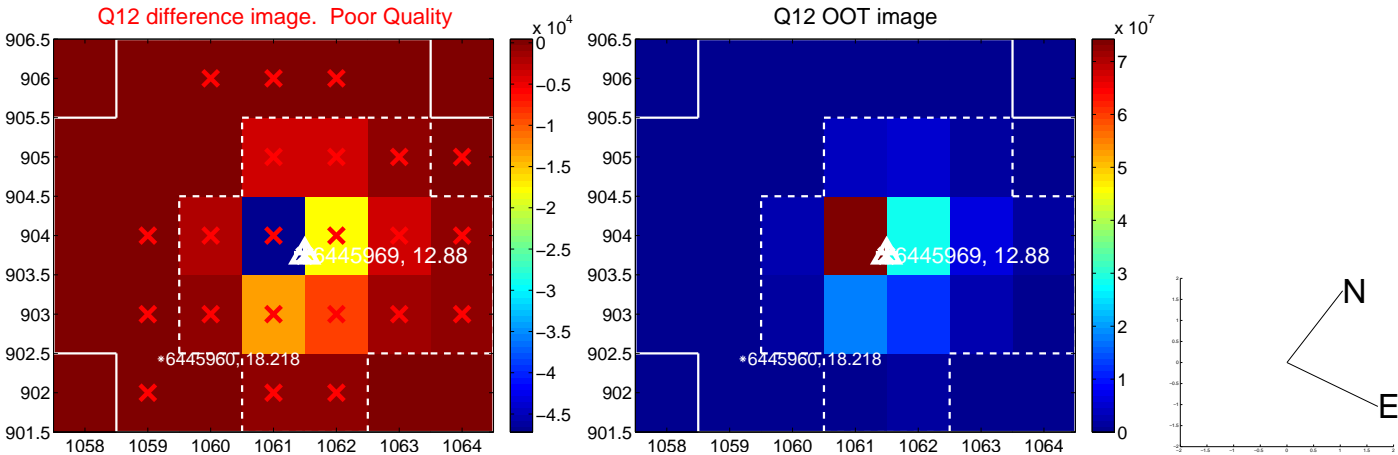
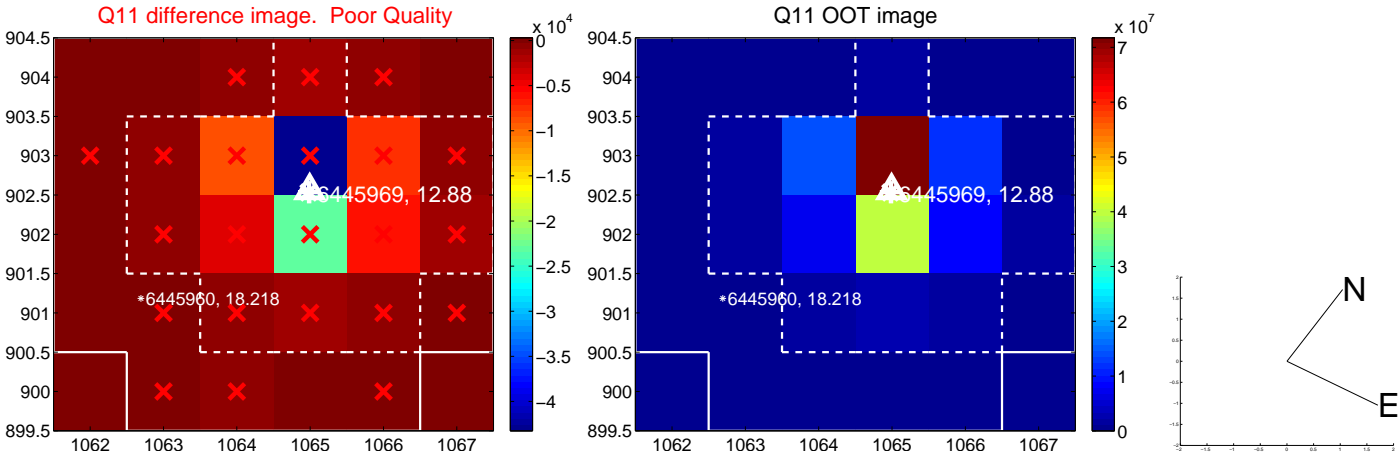
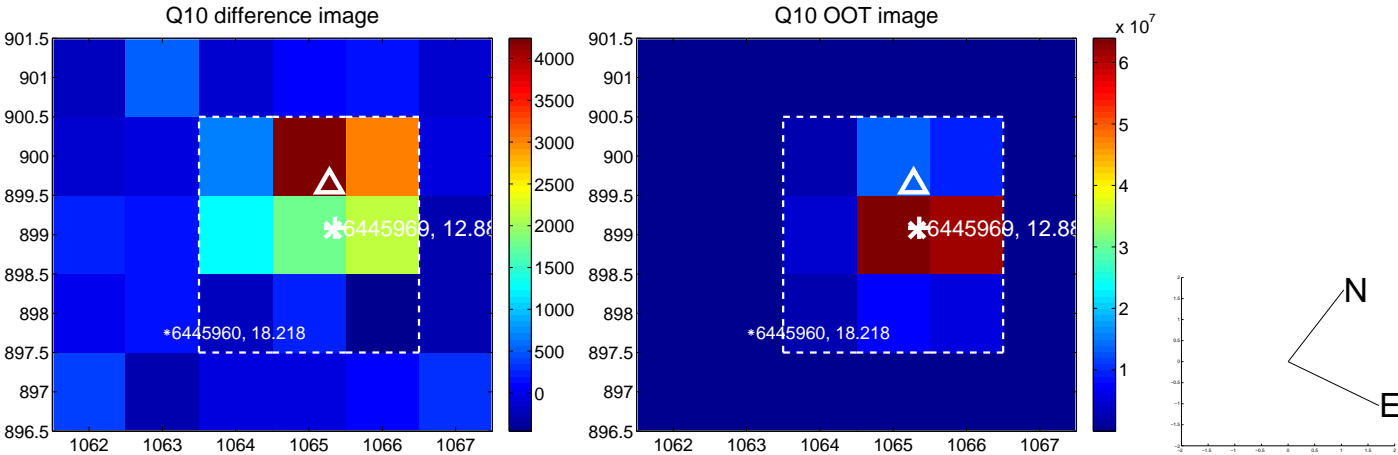
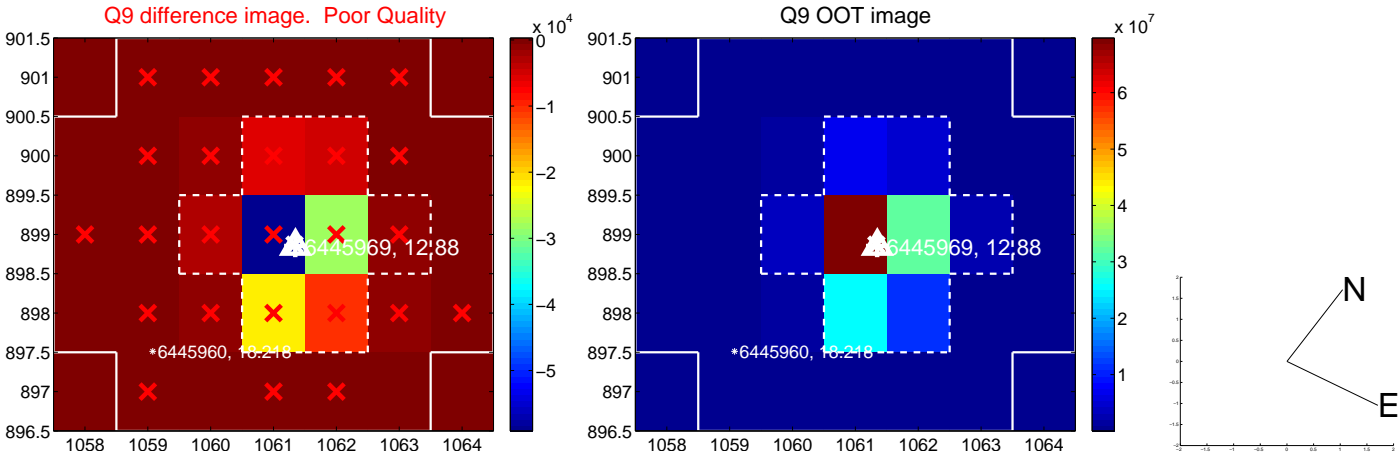


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

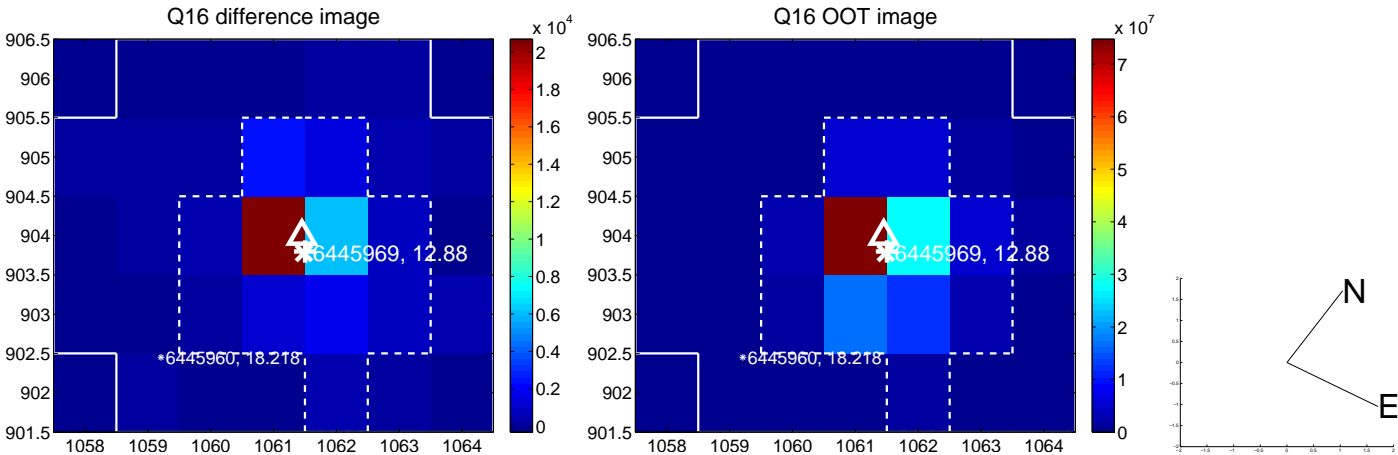
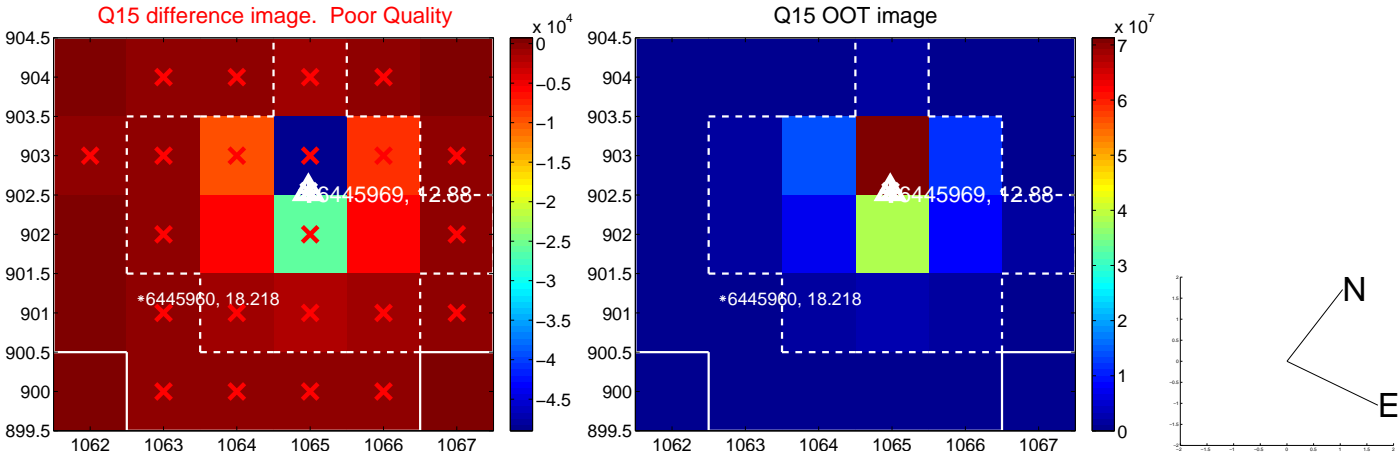
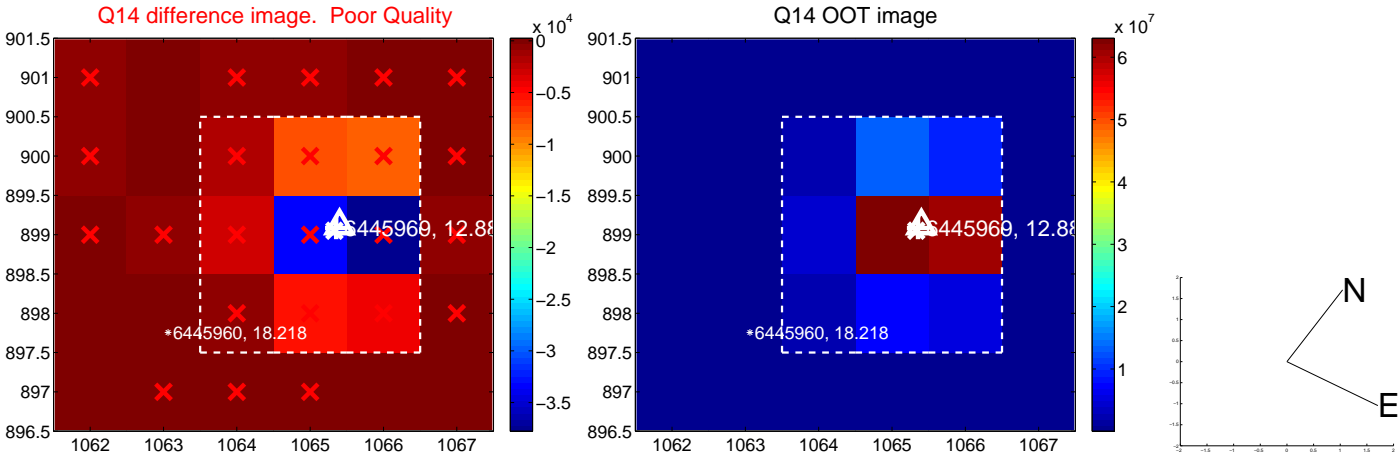
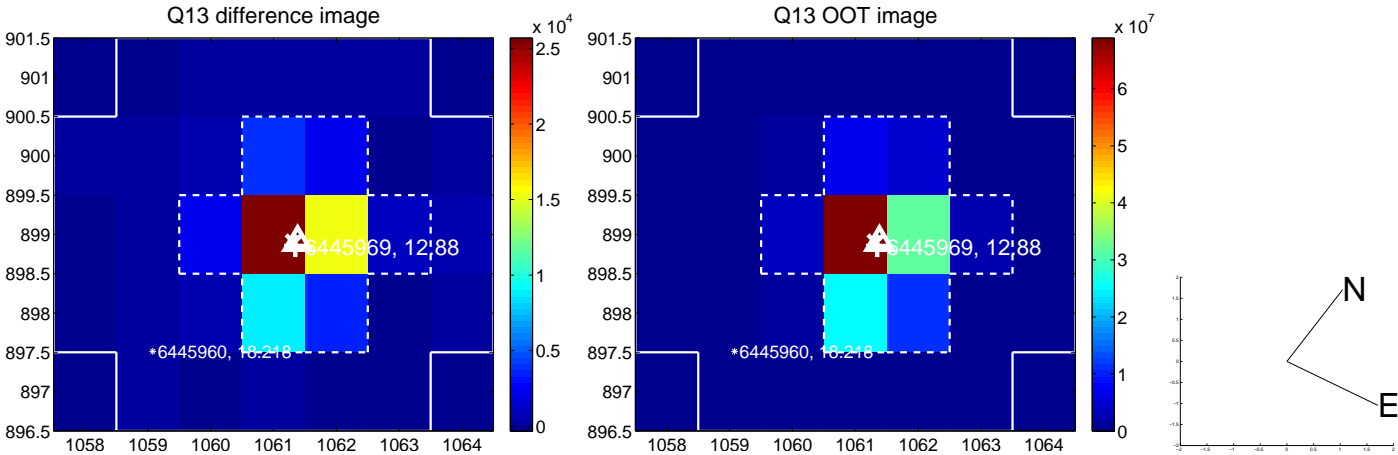




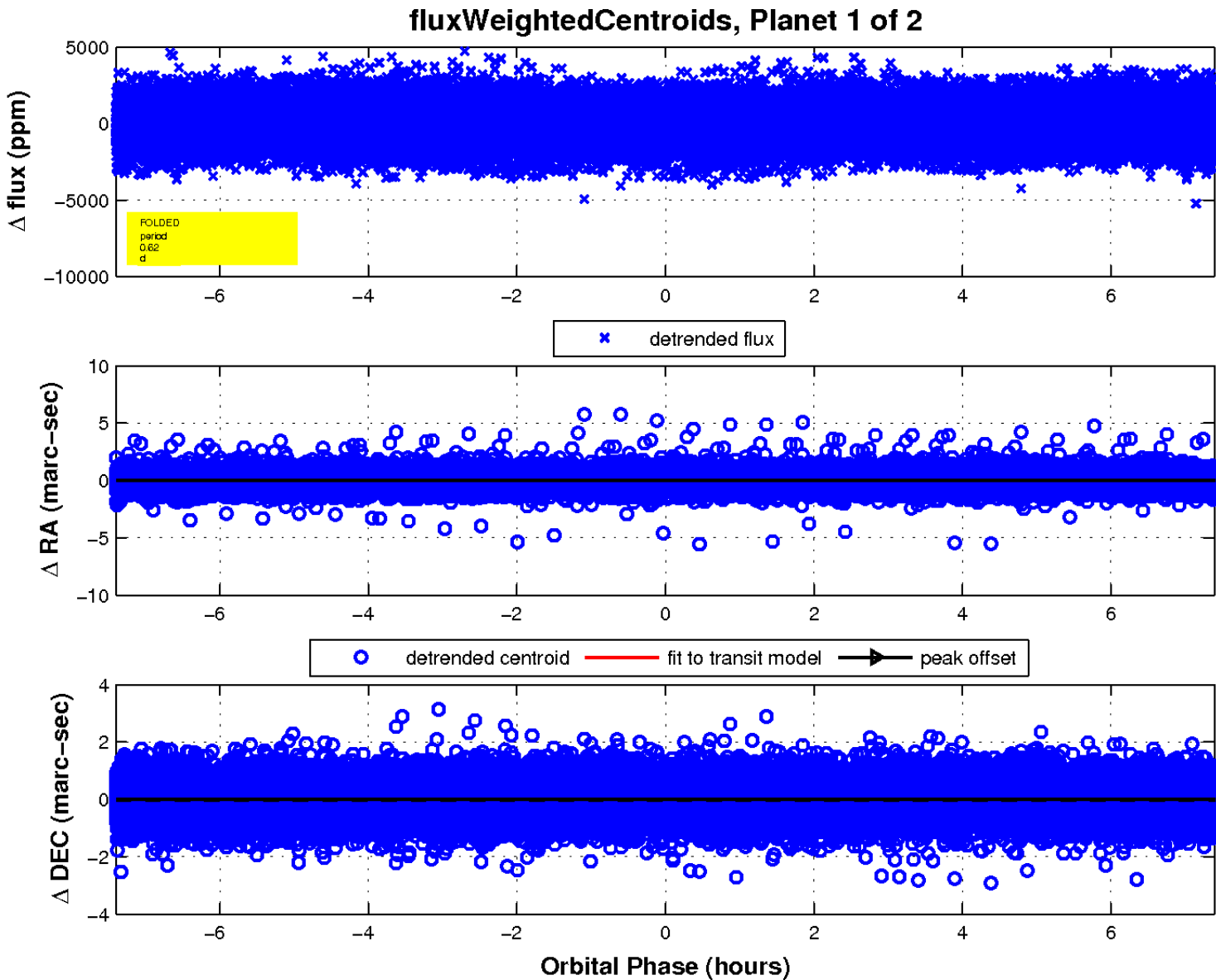
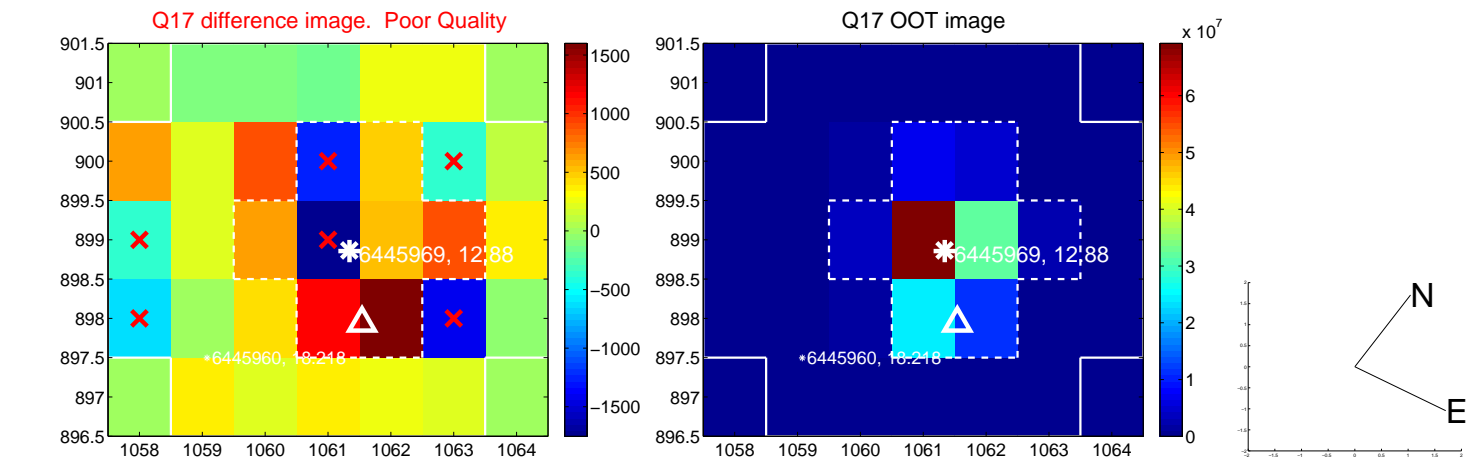
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

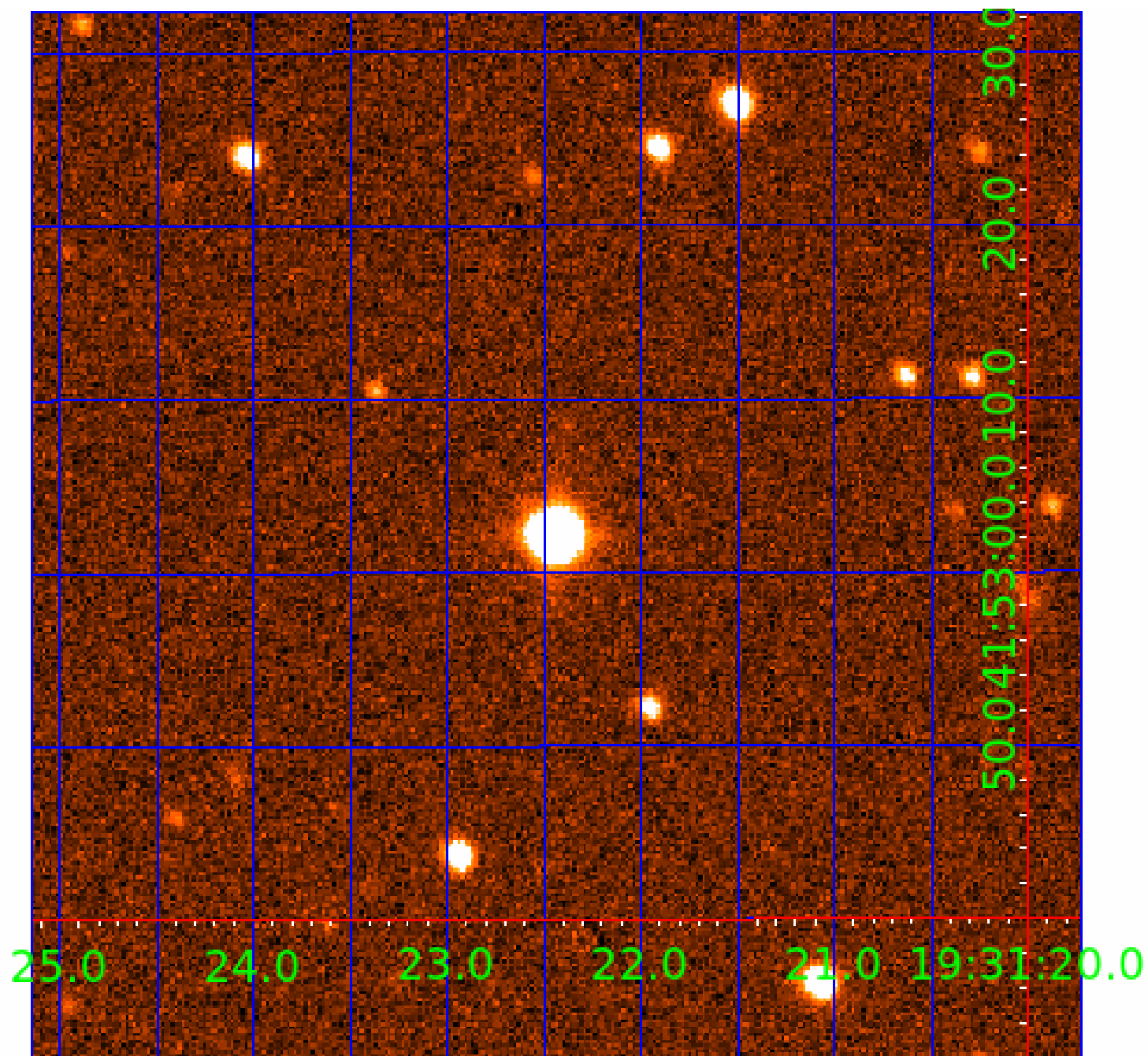


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 006445969

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006445969-01	OBS	No	0.616491	132.038293	61.3	2.816	10.2	11.4	1.74	7350	1.58	33587.26
006445969-02	OBS	No	0.960650	131.674849	129.2	4.056	7.8	7.7	1.74	7350	2.29	18591.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006445969-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006445969-02	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.

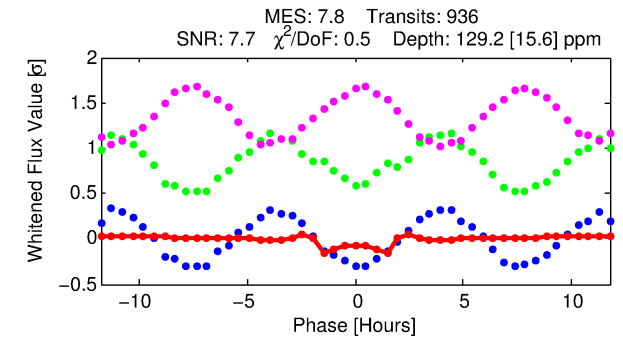
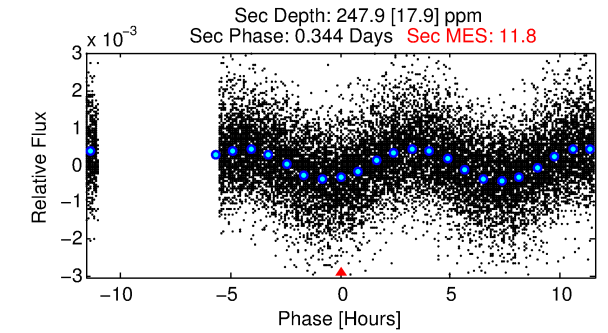
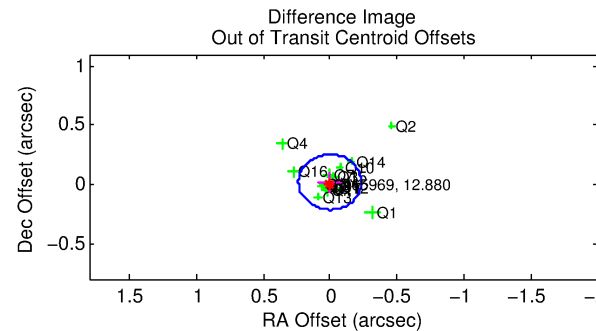
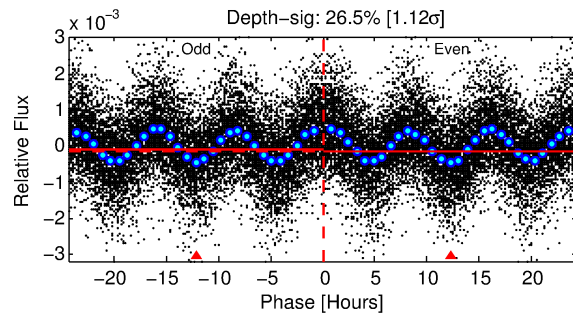
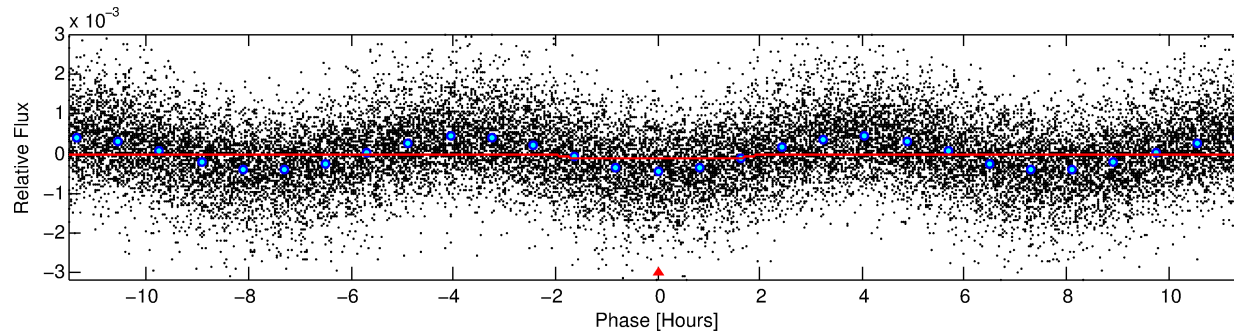
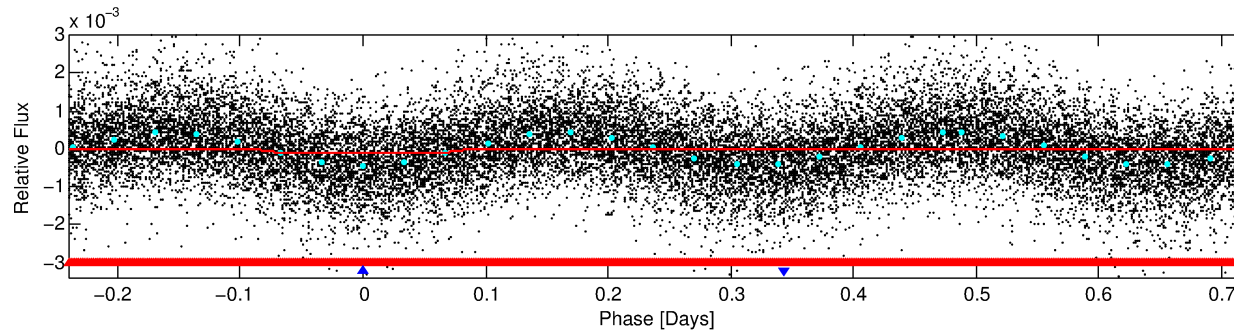
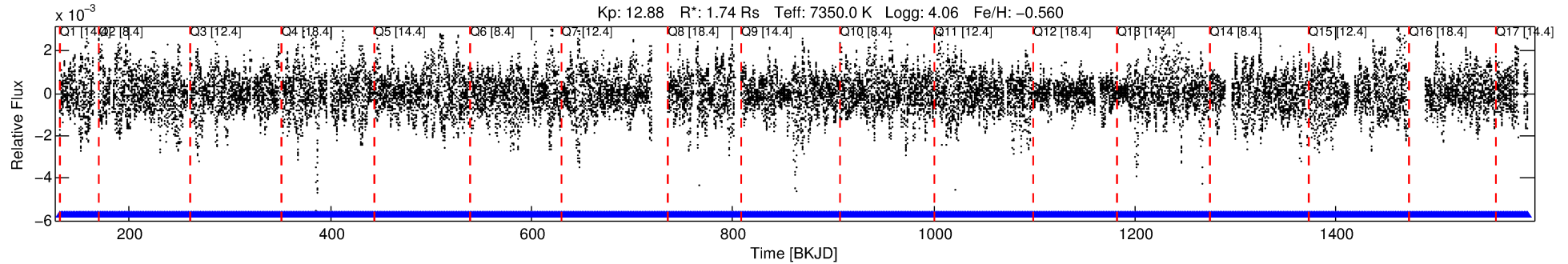
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006445969-02

No Significant Match Found

# DV One-Page Summary

KIC: 6445969 Candidate: 2 of 2 Period: 0.961 d



## DV Fit Results:

Period = 0.96065 [0.00001] d  
Epoch = 131.6748 [0.0018] BKJD  
Rp/R\* = 0.0121 [0.0017]  
a/R\* = 1.26 [0.33]  
b = 0.90 [0.15]  
Seff = 18591.87 [8790.54]  
Teq = 2978 [352] K  
Rp = 2.29 [0.72] Re  
a = 0.0206 [0.0057] AU  
Ag = 11.04 [5.79] [1.73 $\sigma$ ]  
Teffp = 8391 [692] K [6.97 $\sigma$ ]

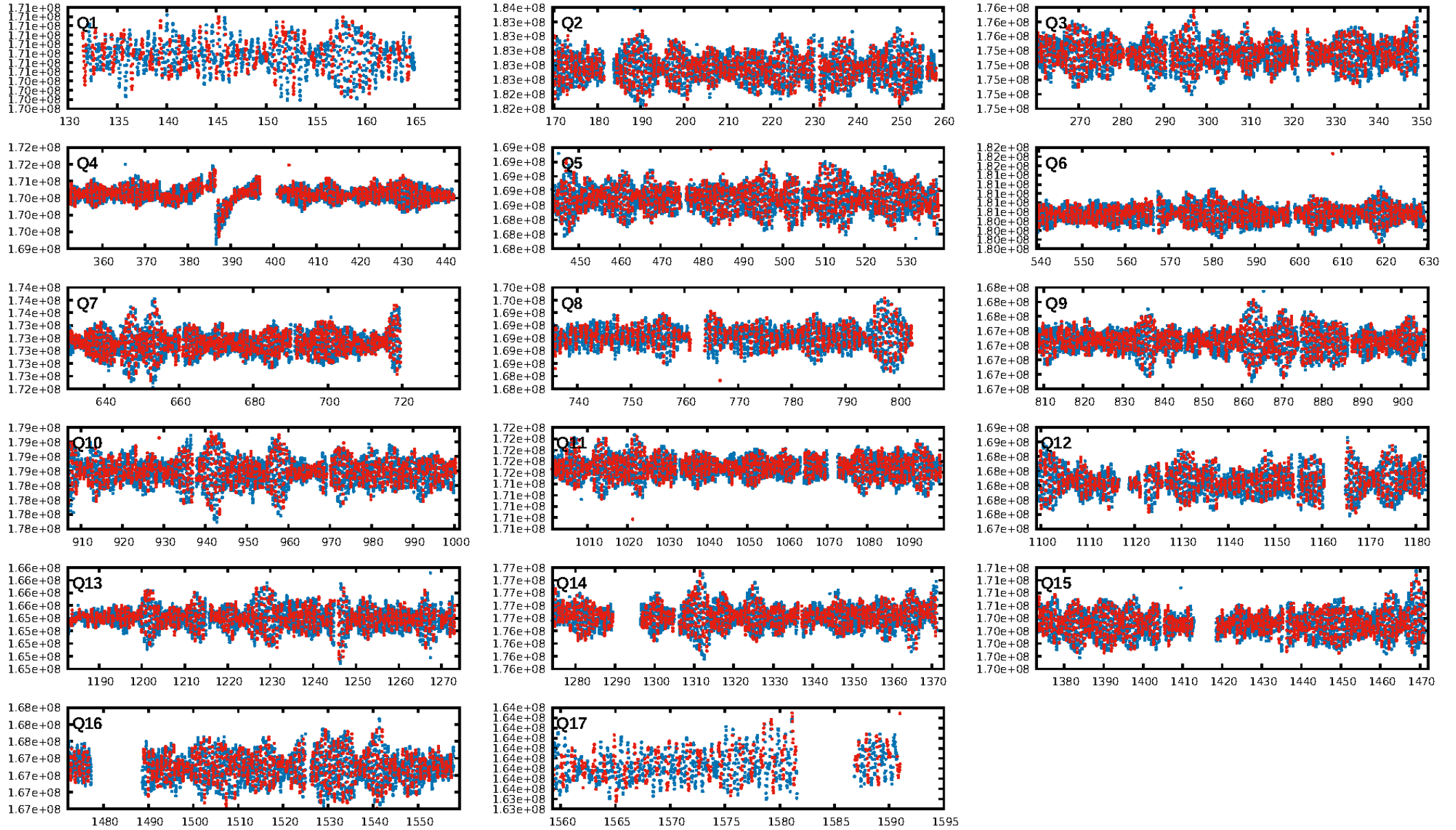
## DV Diagnostic Results:

ShortPeriod-sig: 90.6% [1.67 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.09e-14  
RollingBand-fgt: 1.00 [893/893]  
GhostDiagnostic-chr: 0.2754  
Centroid-sig: 30.3%  
Centroid-so: 0.061 arcsec [0.55 $\sigma$ ]  
OotOffset-rm: 0.019 arcsec [0.25 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.066 arcsec [0.80 $\sigma$ ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

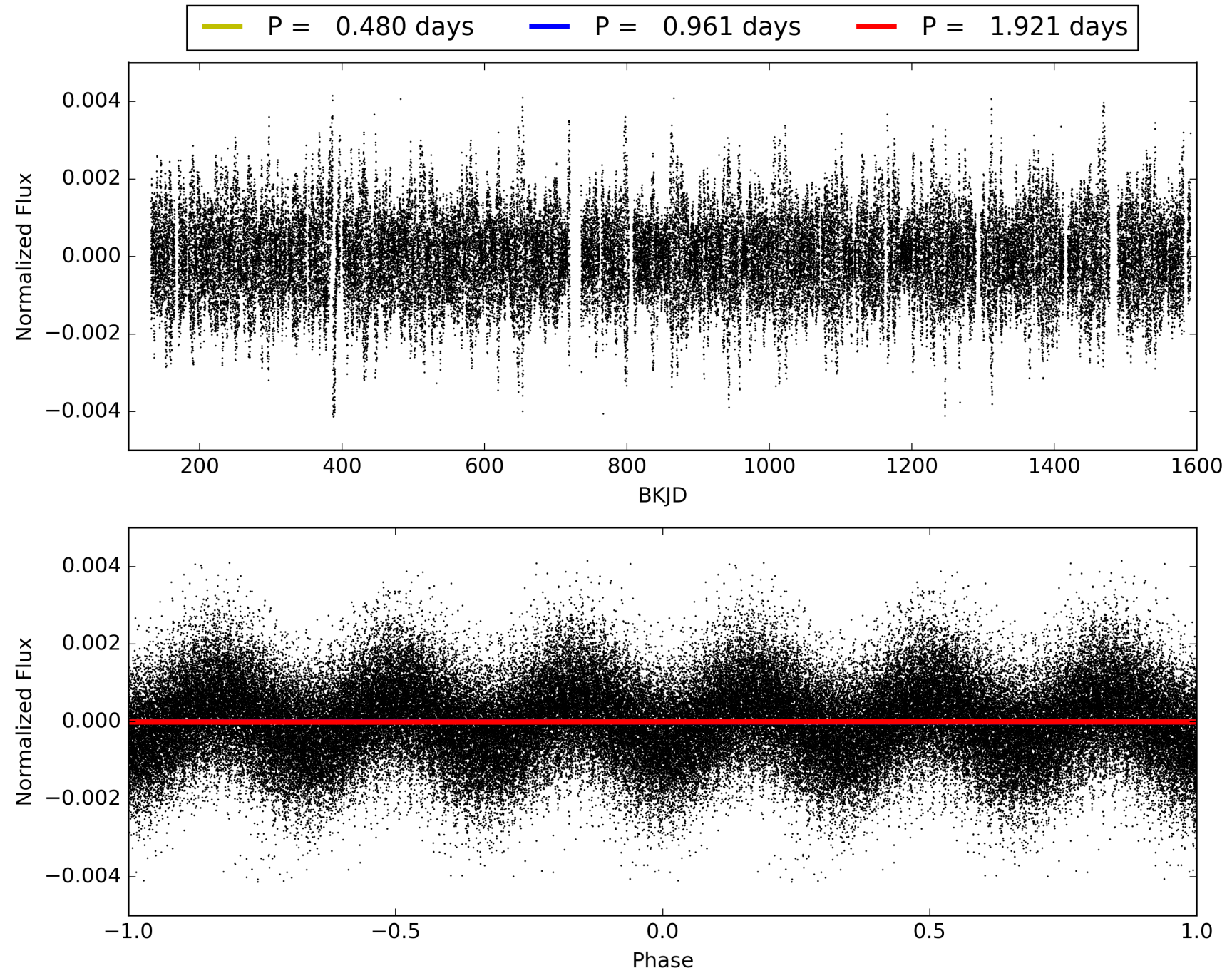
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 03:10:39 Z

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

# TCE 006445969-02, PDC Light Curves



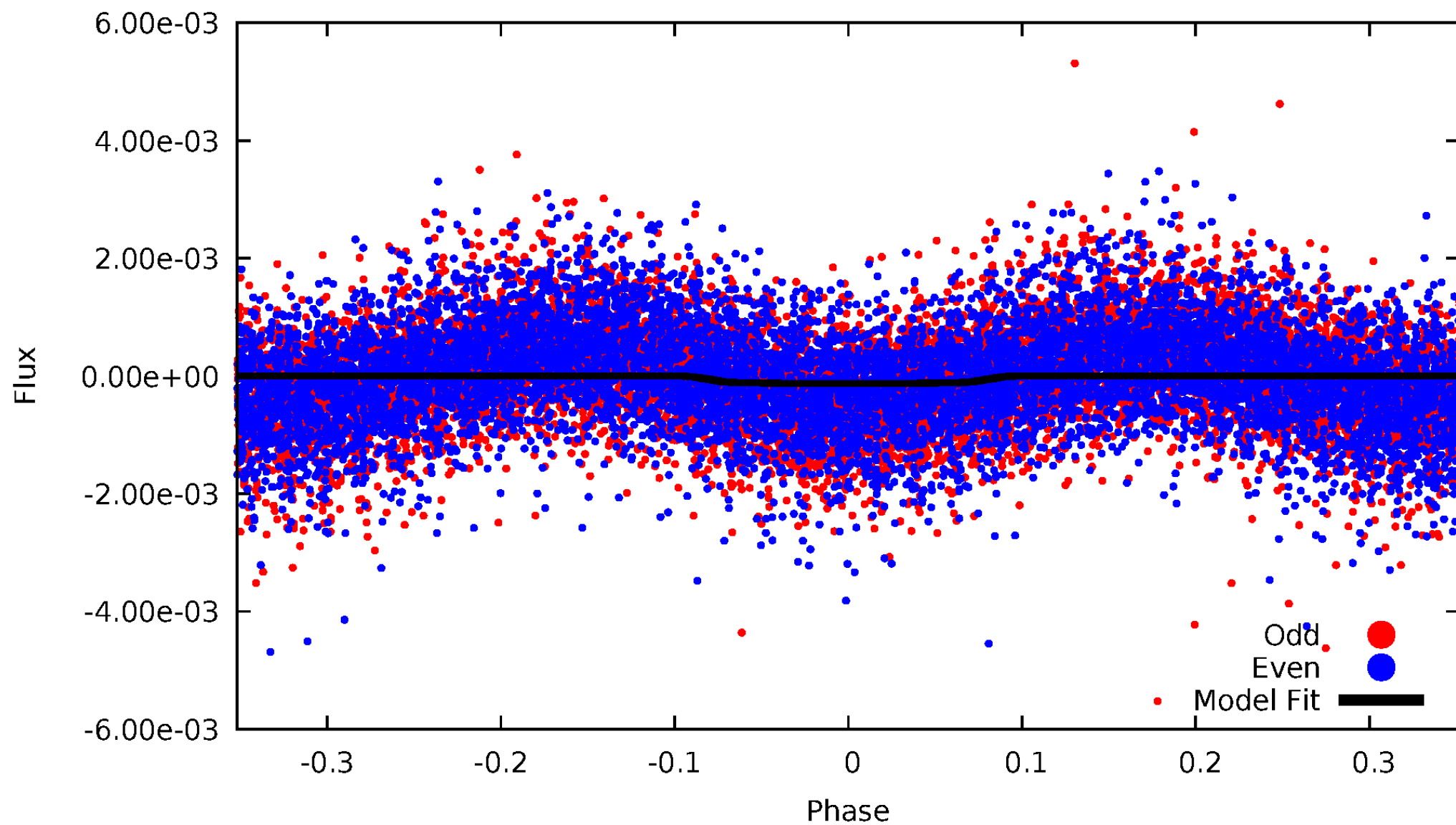
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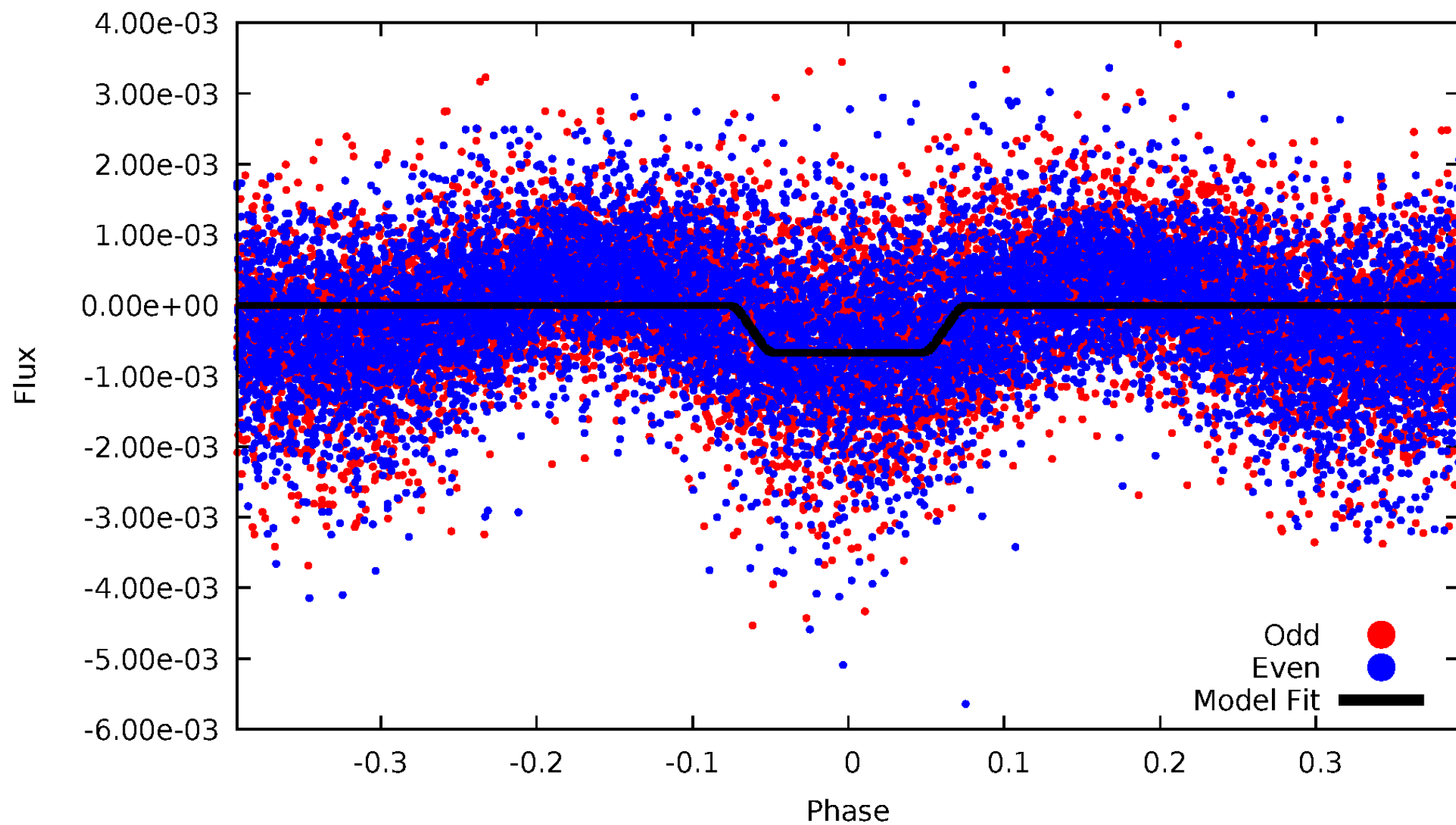
DV Odd/Even

TCE 006445969-02



# ALT Odd/Even

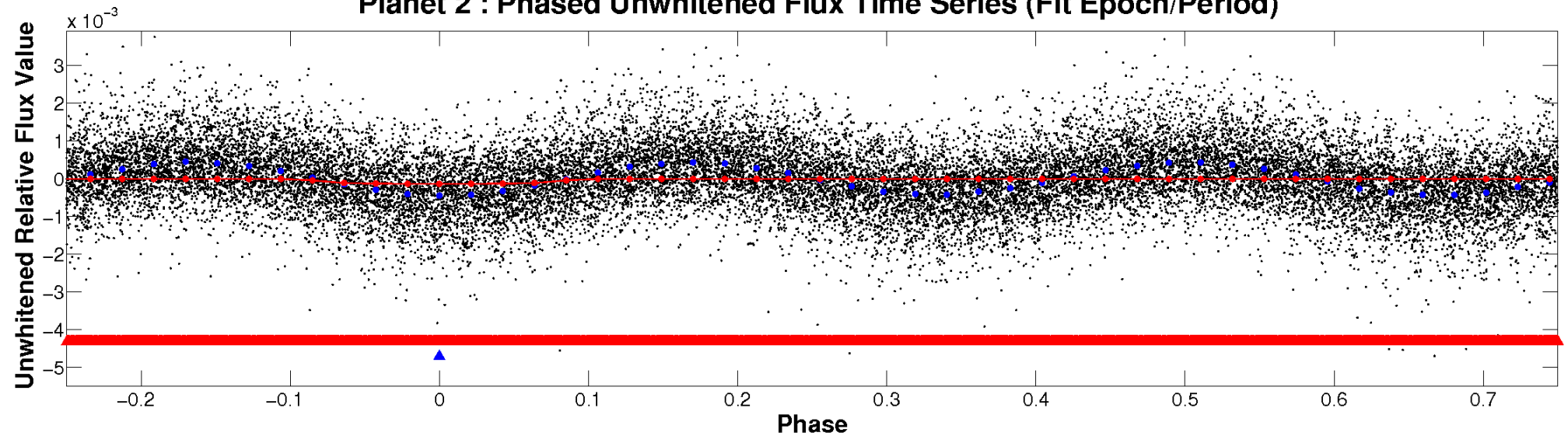
TCE 006445969-02



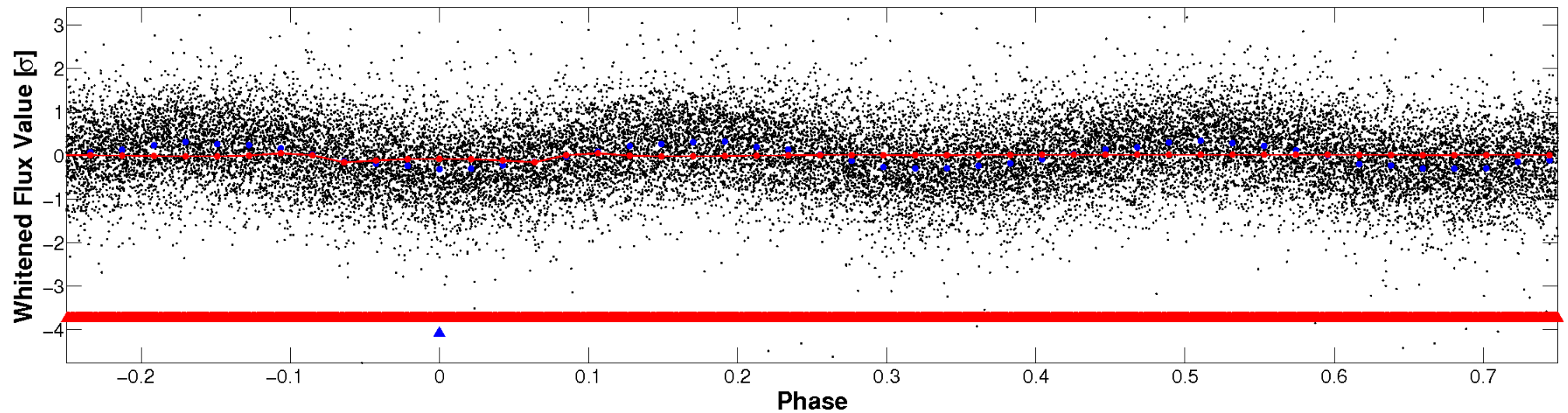


# Non-Whitened Vs. Whitened Light Curve

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

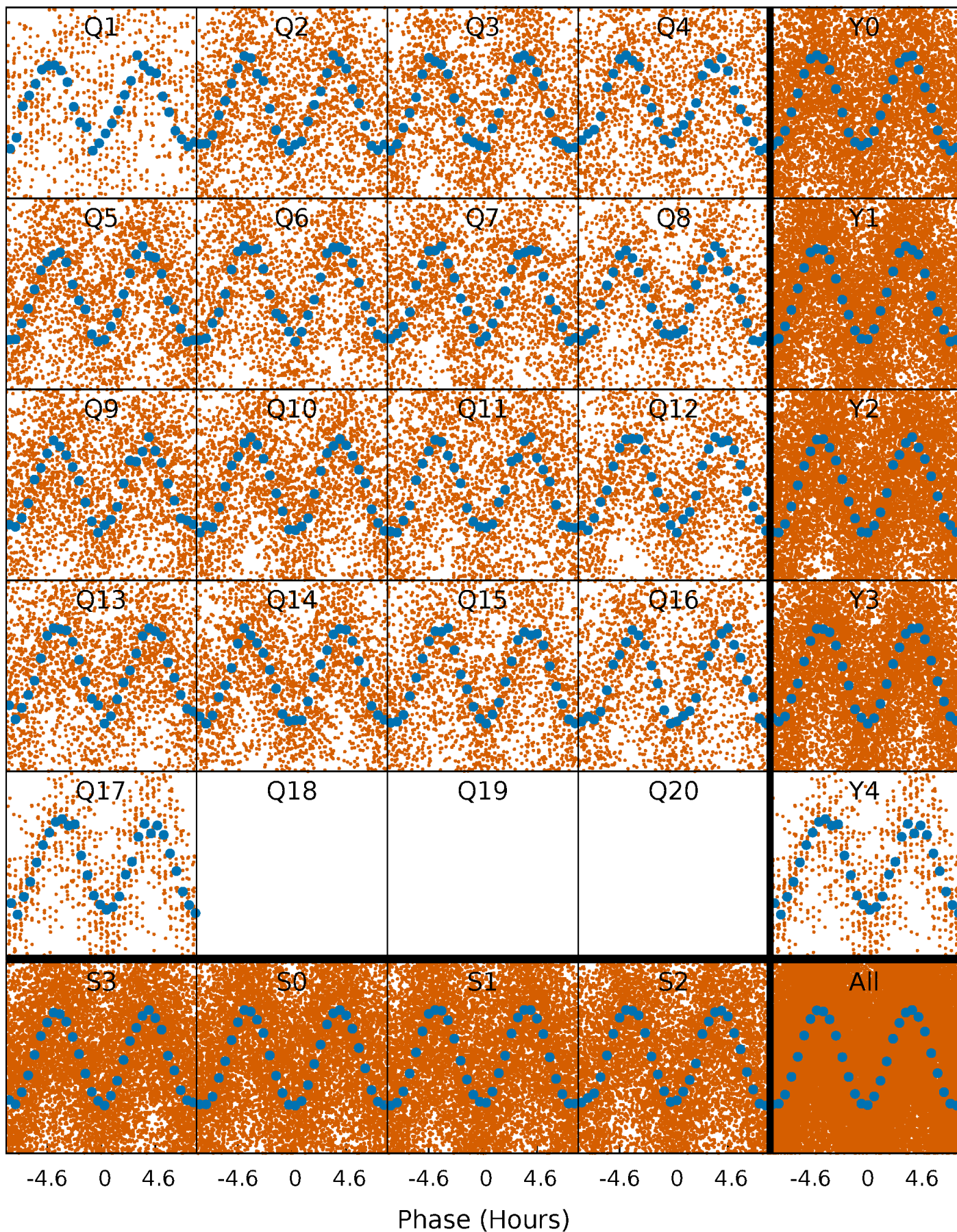


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

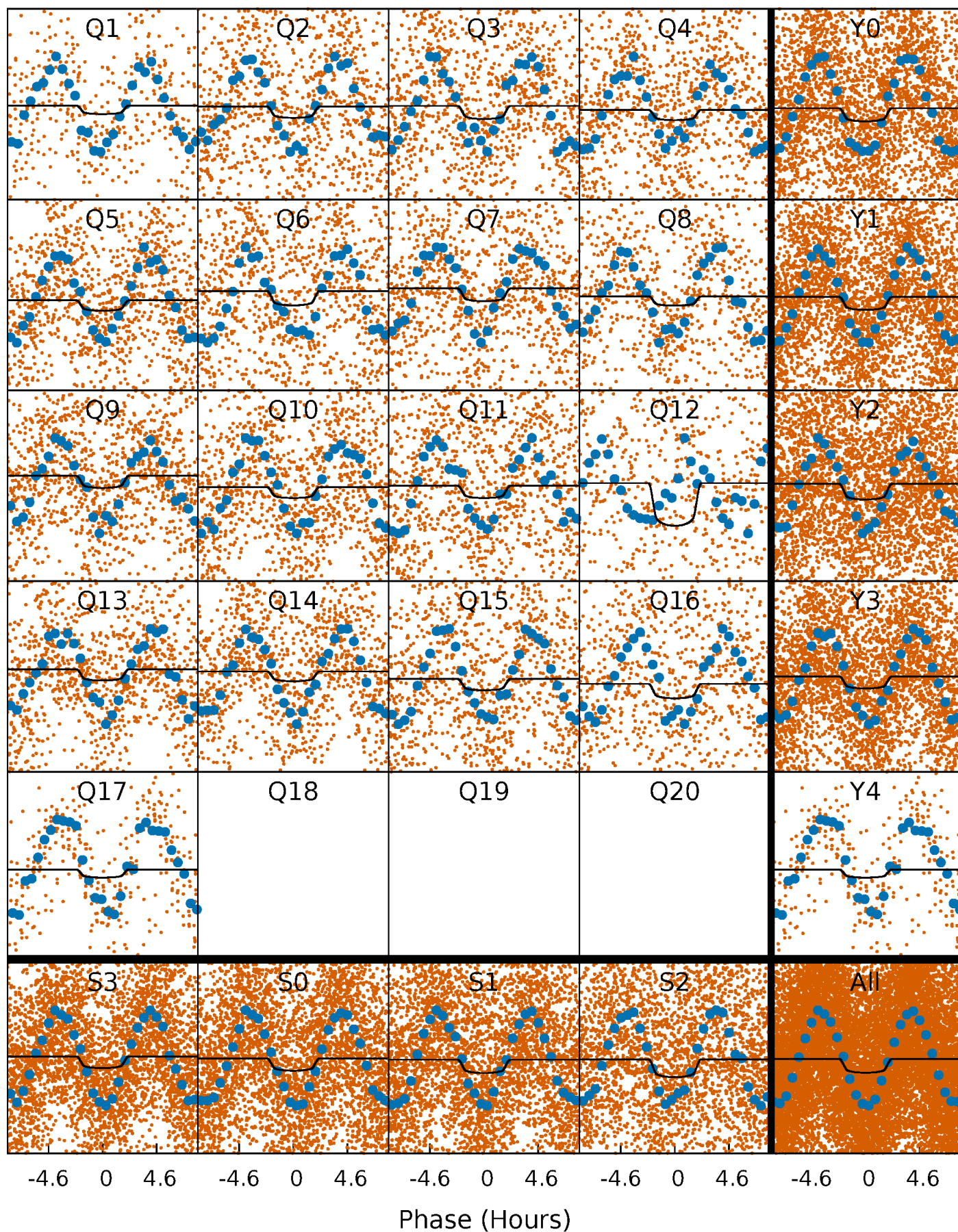
TCE 006445969-02   P= 0.960650 Days    $T_0=131.674849$  (BKJD)





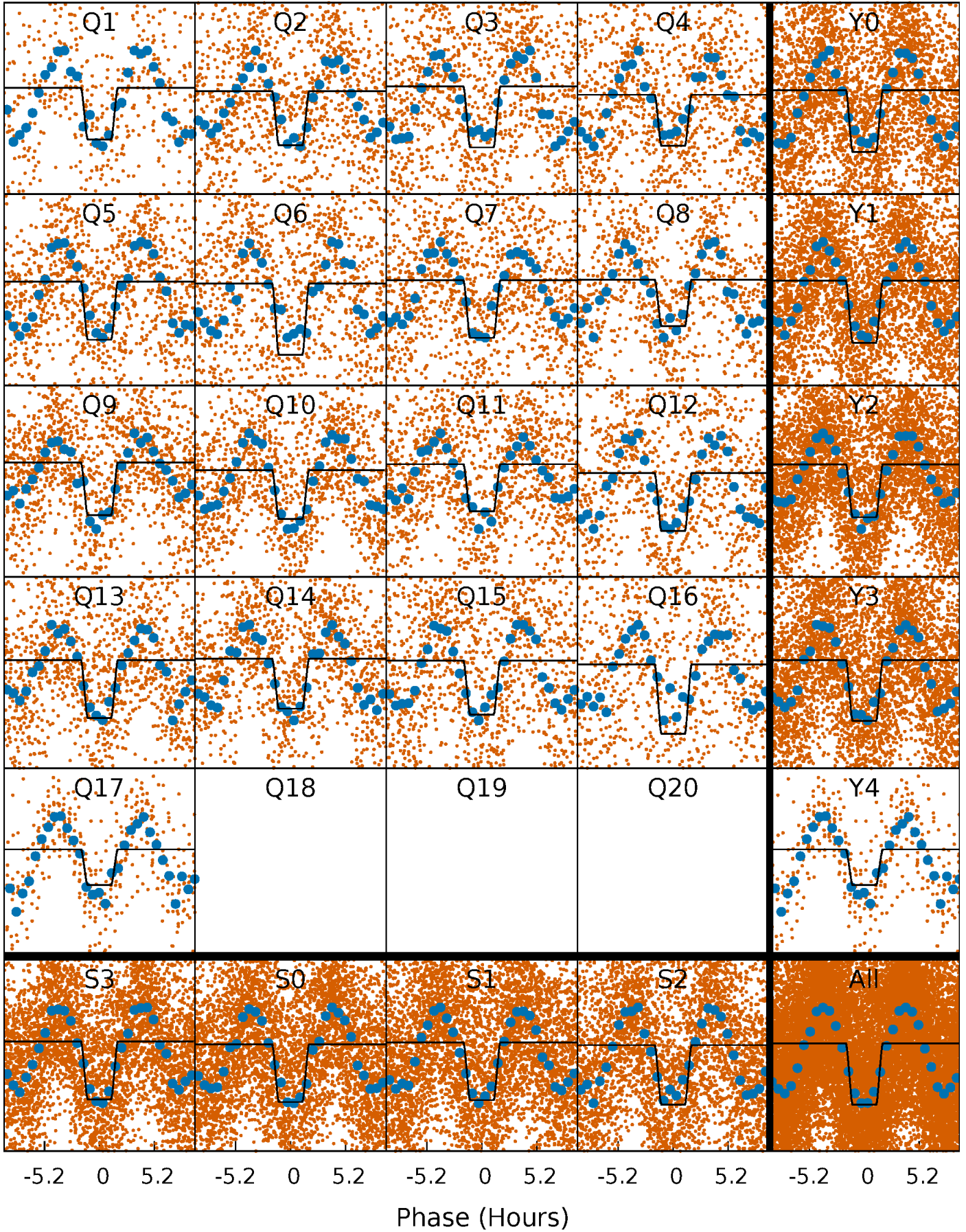
# DV Quarter-Phased Transit Curves

TCE 006445969-02     $P = 0.960650$  Days     $T_0 = 131.674849$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006445969-02   P= 0.960670 Days    $T_0=131.661645$  (BKJD)

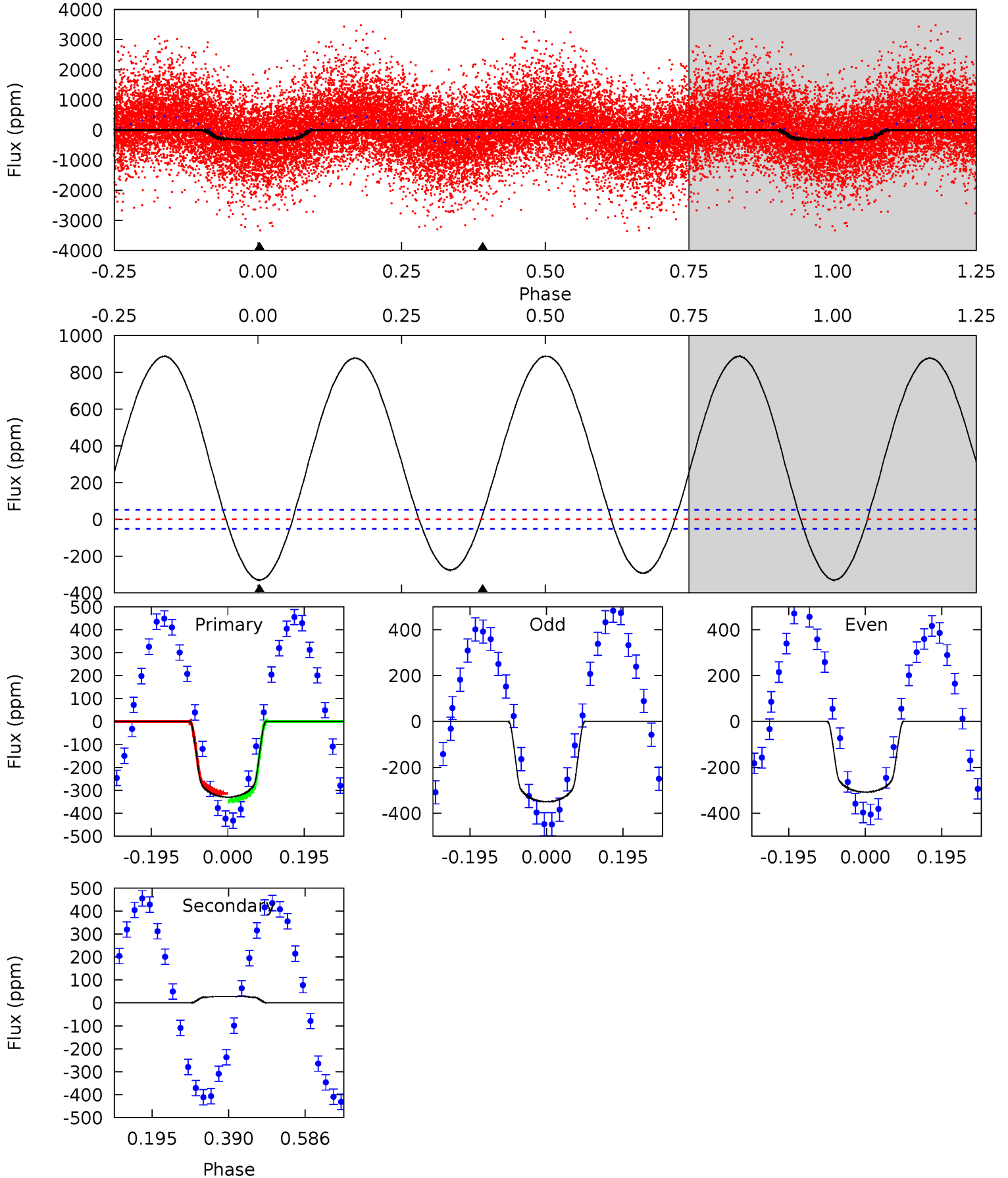




# DV Model-Shift Uniqueness Test

006445969-02, P = 0.960650 Days, E = 130.714199 Days

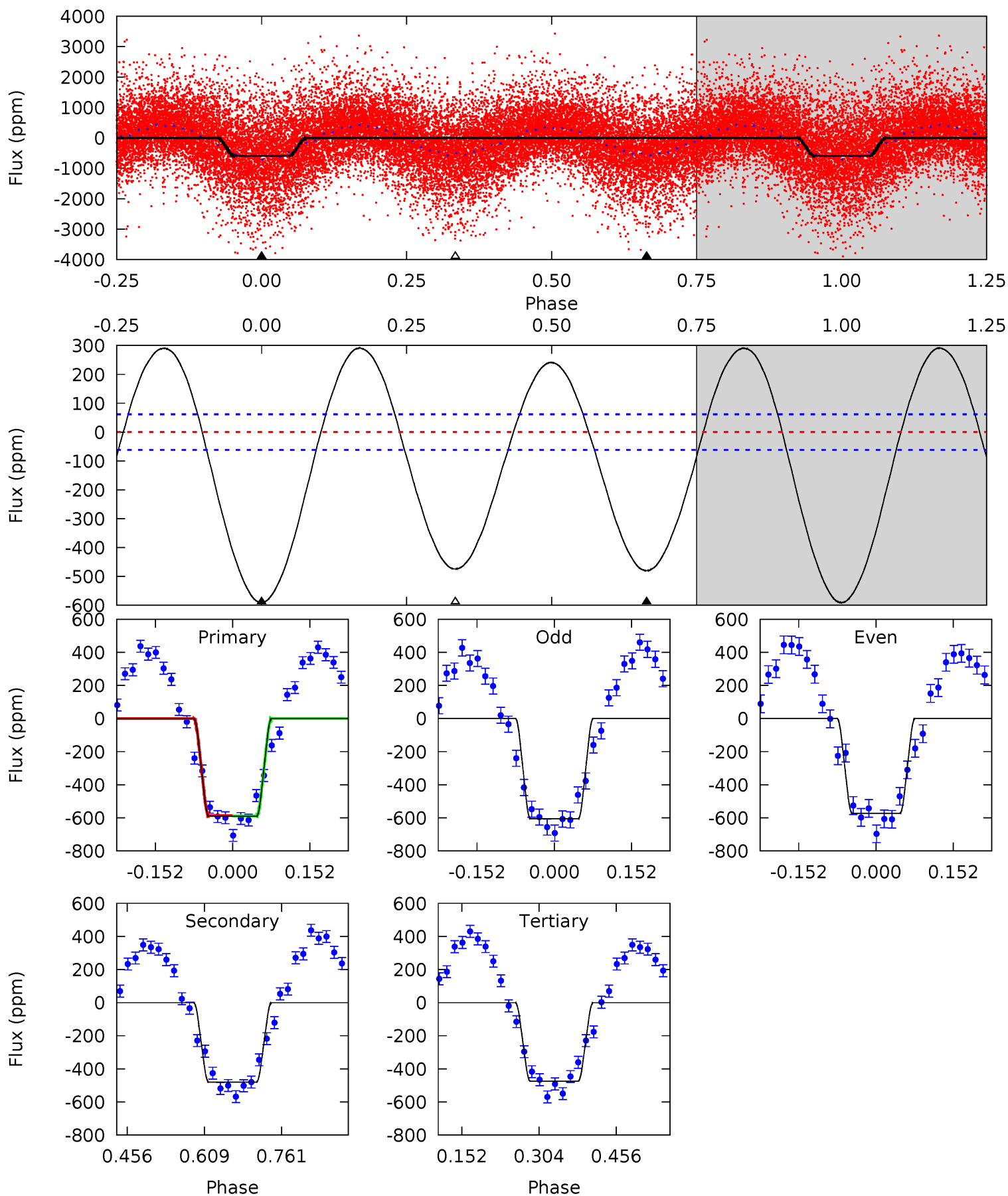
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.2	-2.41	0	0	4.42	1.30	28.3	28.2	28.2	-2.41	-2.41	1.79	1.11	0.73	1.40



# Alt Model-Shift Uniqueness Test

006445969-02, P = 0.960670 Days, E = 130.700975 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
43.0	35.0	34.5	0	4.48	1.43	20.2	8.48	43.0	0.43	35.0	1.22	1.08	0.33	0.05





### Stellar Parameters For KIC 006445969

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7350^{+207}_{-311}$	$4.060^{+0.260}_{-0.160}$	$-0.560^{+0.250}_{-0.300}$	$1.738^{+0.443}_{-0.492}$	$1.265^{+0.196}_{-0.161}$	$0.339^{+0.507}_{-0.157}$
	+3%/-4%	+6%/-4%	+45%/-54%	+25%/-28%	+15%/-13%	+149%/-46%
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 006445969-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$28 \pm 12$	$2.26^{+0.53}_{-0.42}$	$4133^{+287}_{-365}$	$-5096^{+479}_{-482}$	$-1.262^{+0.636}_{-0.973}$
Alt.	$-480 \pm 14$	$4.82^{+0.70}_{-0.80}$	$4081^{+311}_{-350}$	$6553^{+335}_{-330}$	$4.947^{+1.979}_{-1.256}$

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

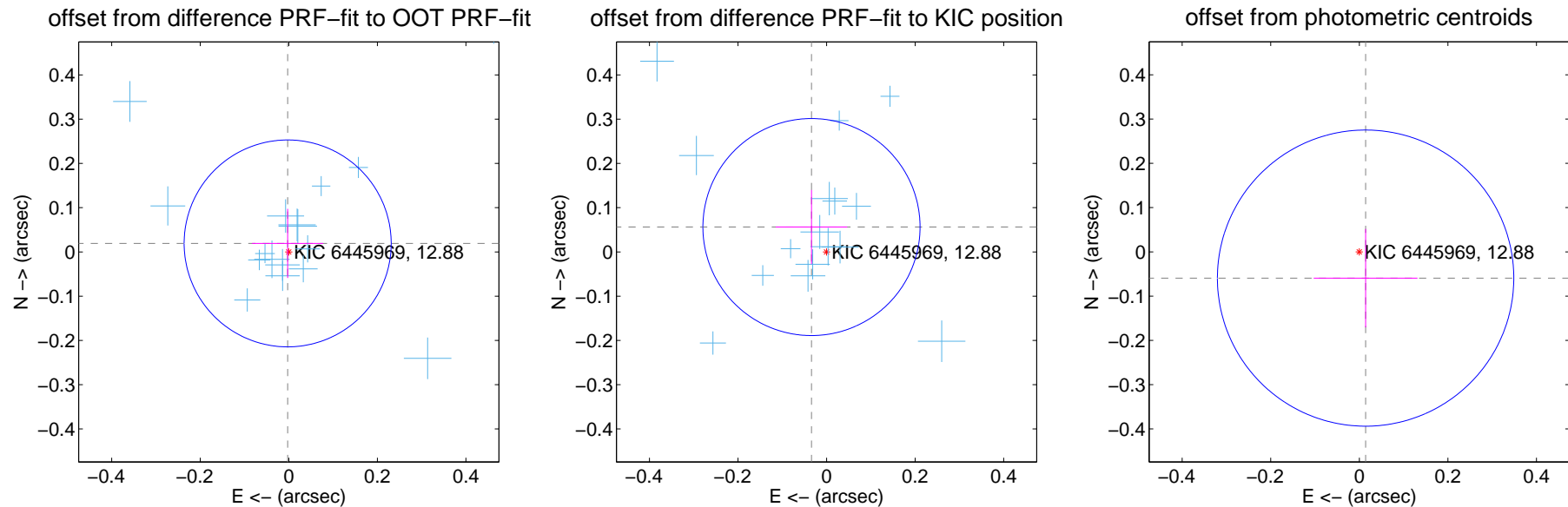
## DV Centroid Data

Supplemental centroid analysis for 006445969-02. Kepler magnitude: 12.88. Transit SNR 7.69

There are 17 quarters with good PRF difference image offsets

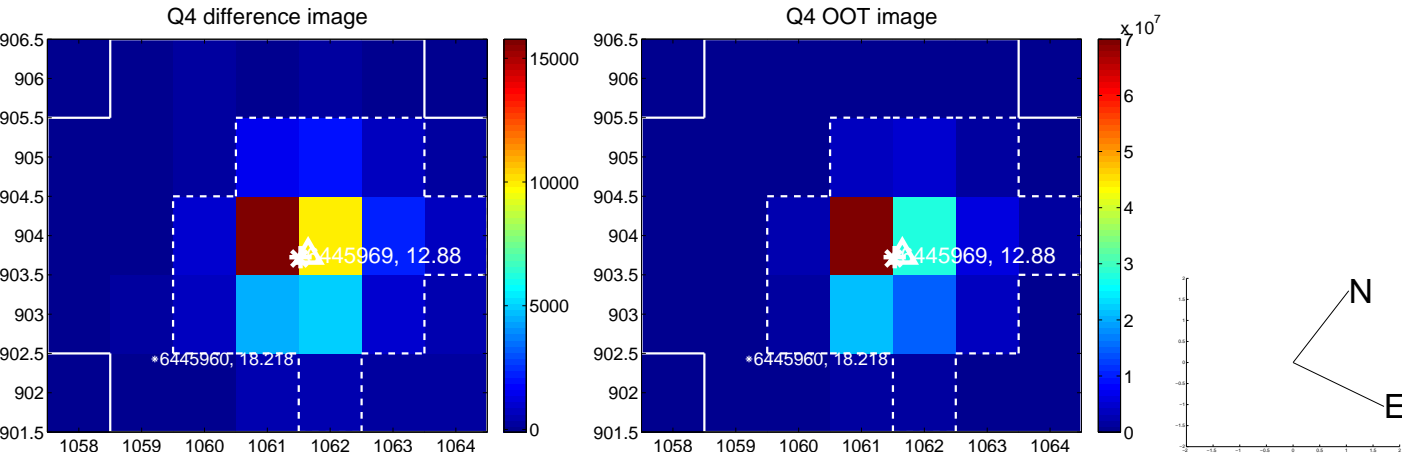
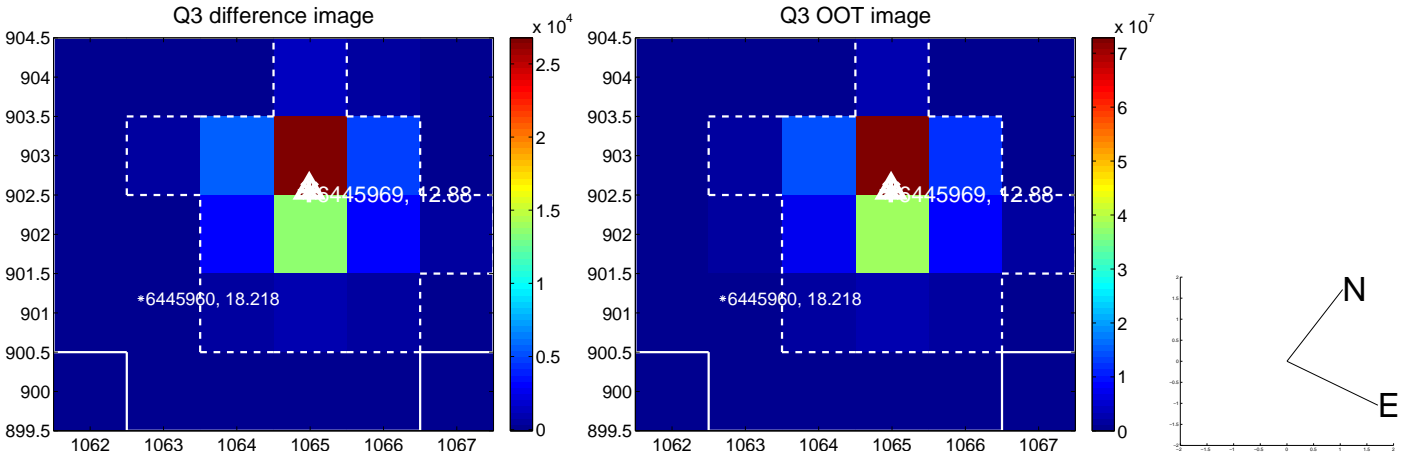
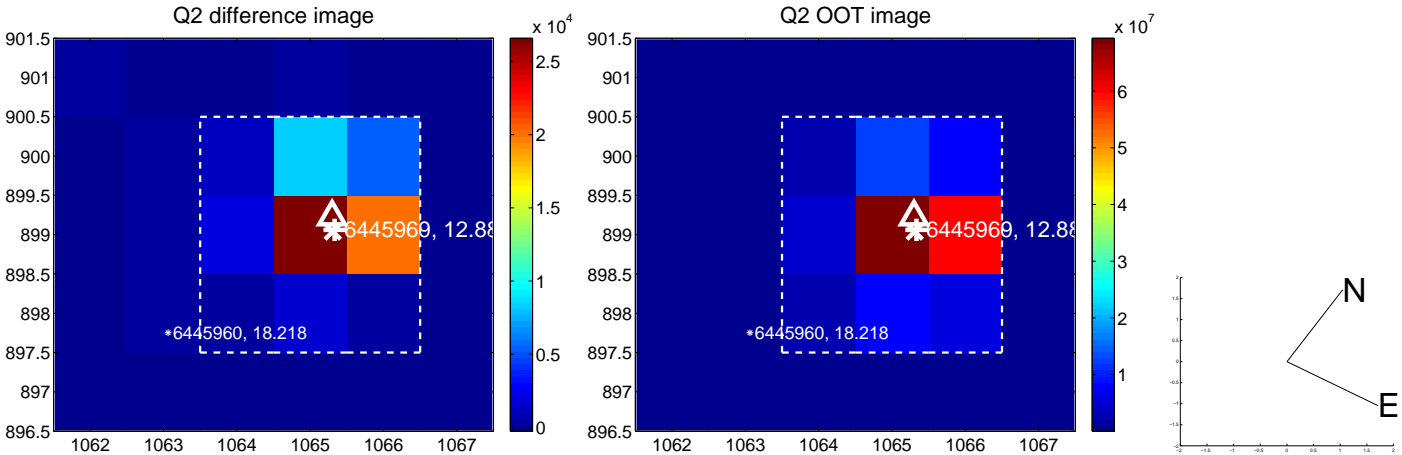
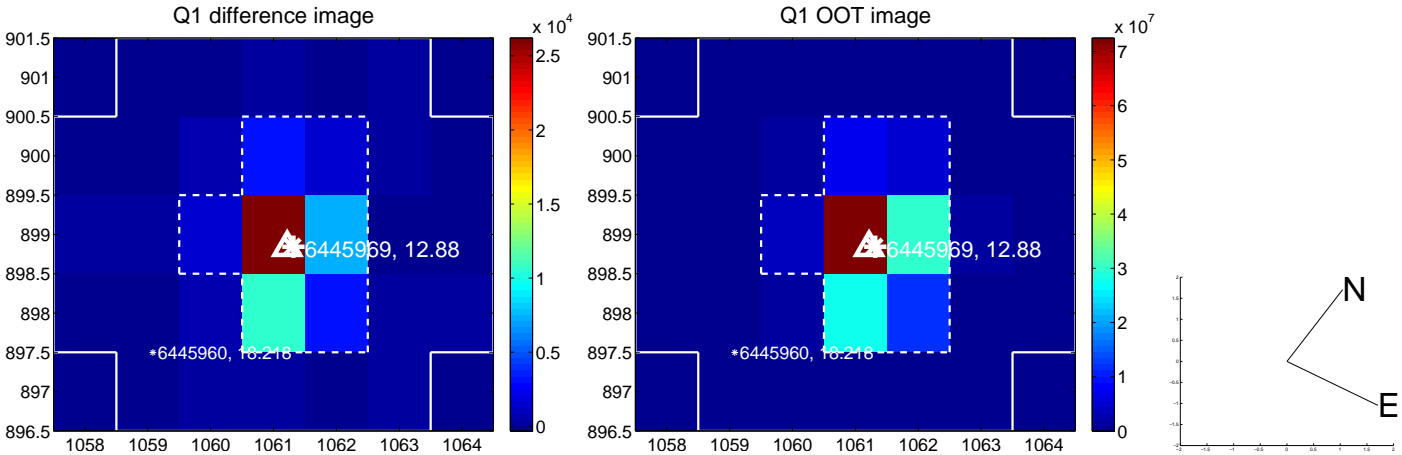
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.019 \pm 0.078$	0.25	$0.003 \pm 0.080$	$0.019 \pm 0.078$
PRF-fit source offset from KIC position	$0.066 \pm 0.082$	0.80	$0.034 \pm 0.081$	$0.056 \pm 0.084$
photometric centroid source offset	$0.06 \pm 0.11$	0.55	$-0.01 \pm 0.12$	$-0.06 \pm 0.11$

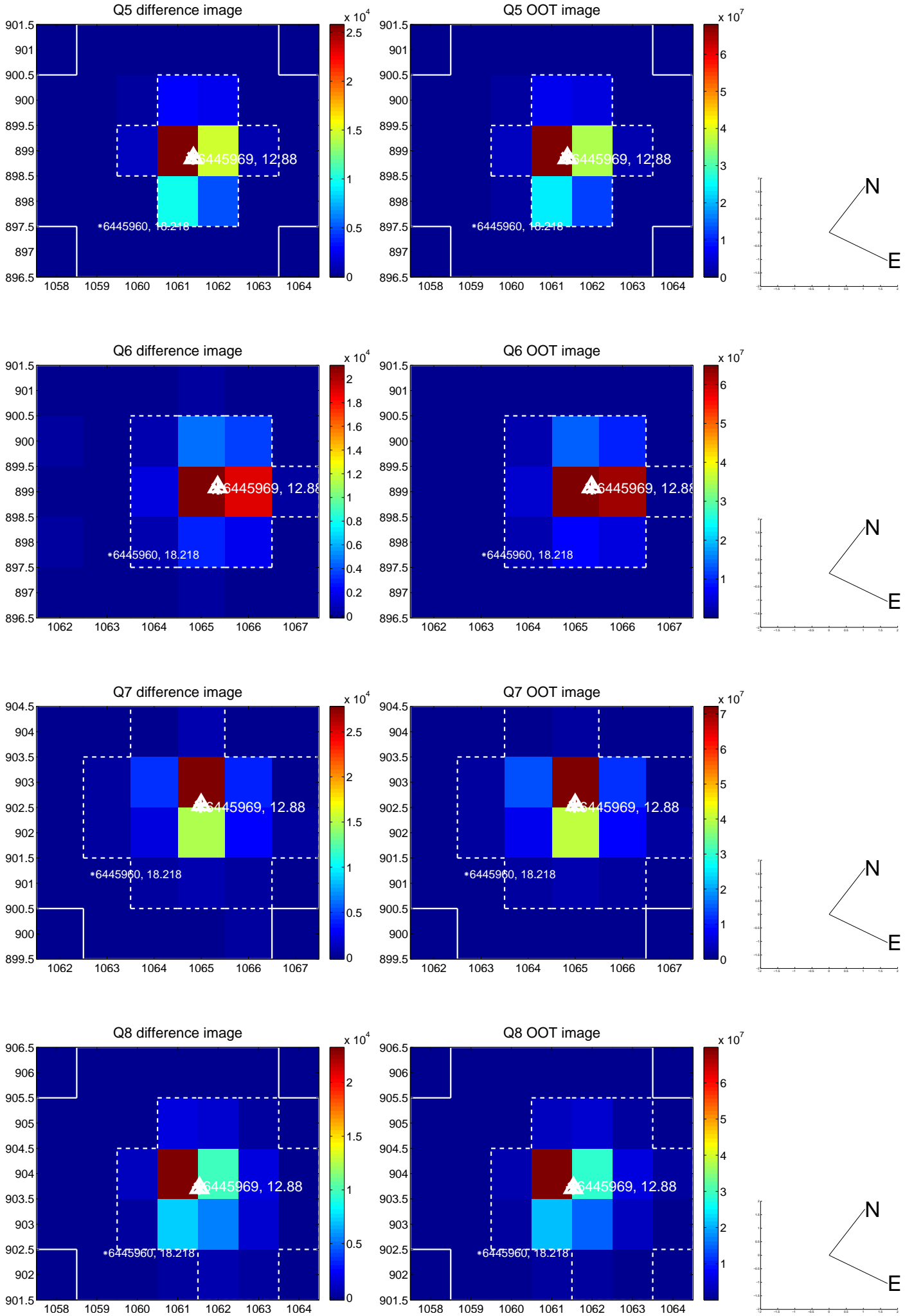


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

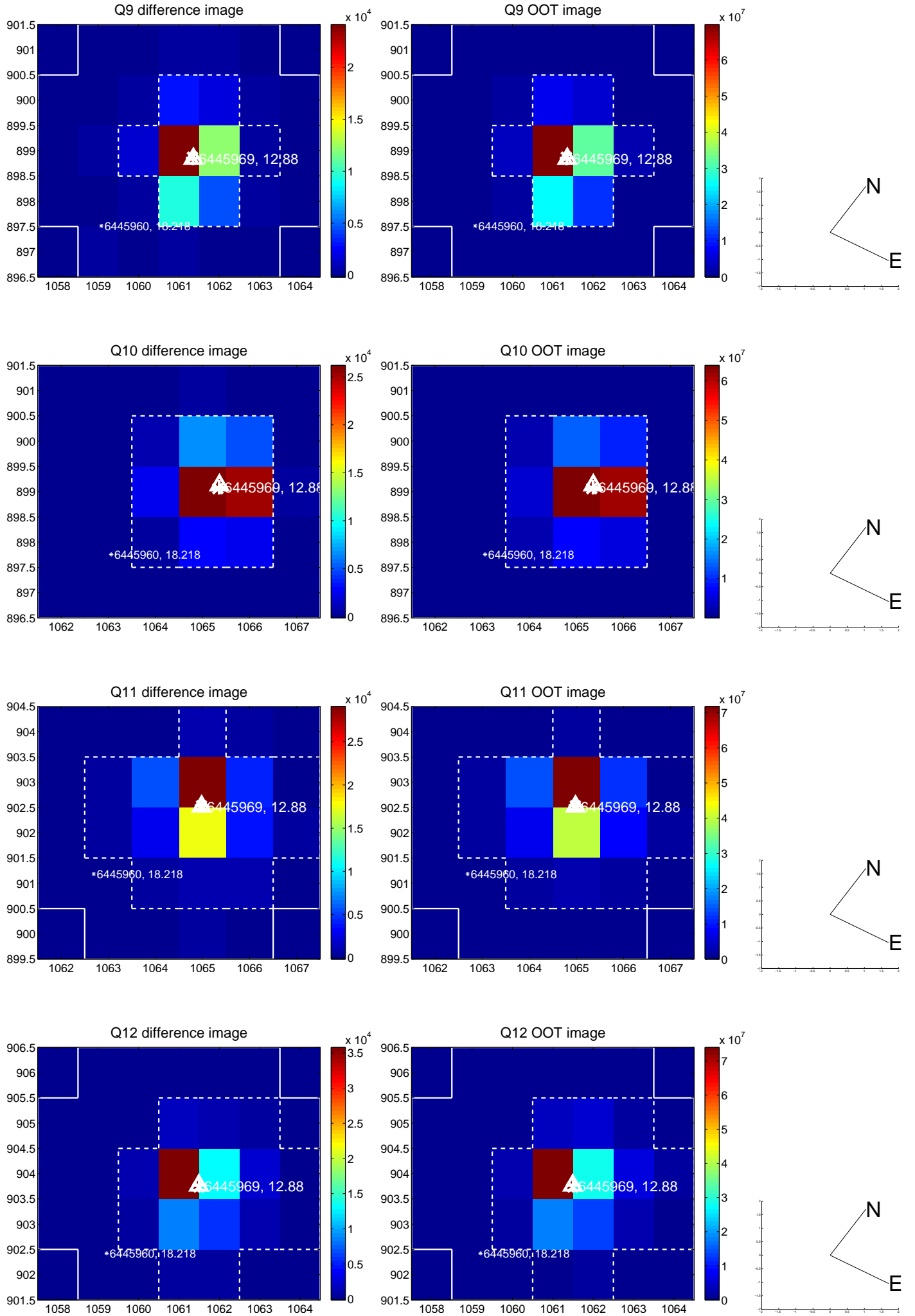
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



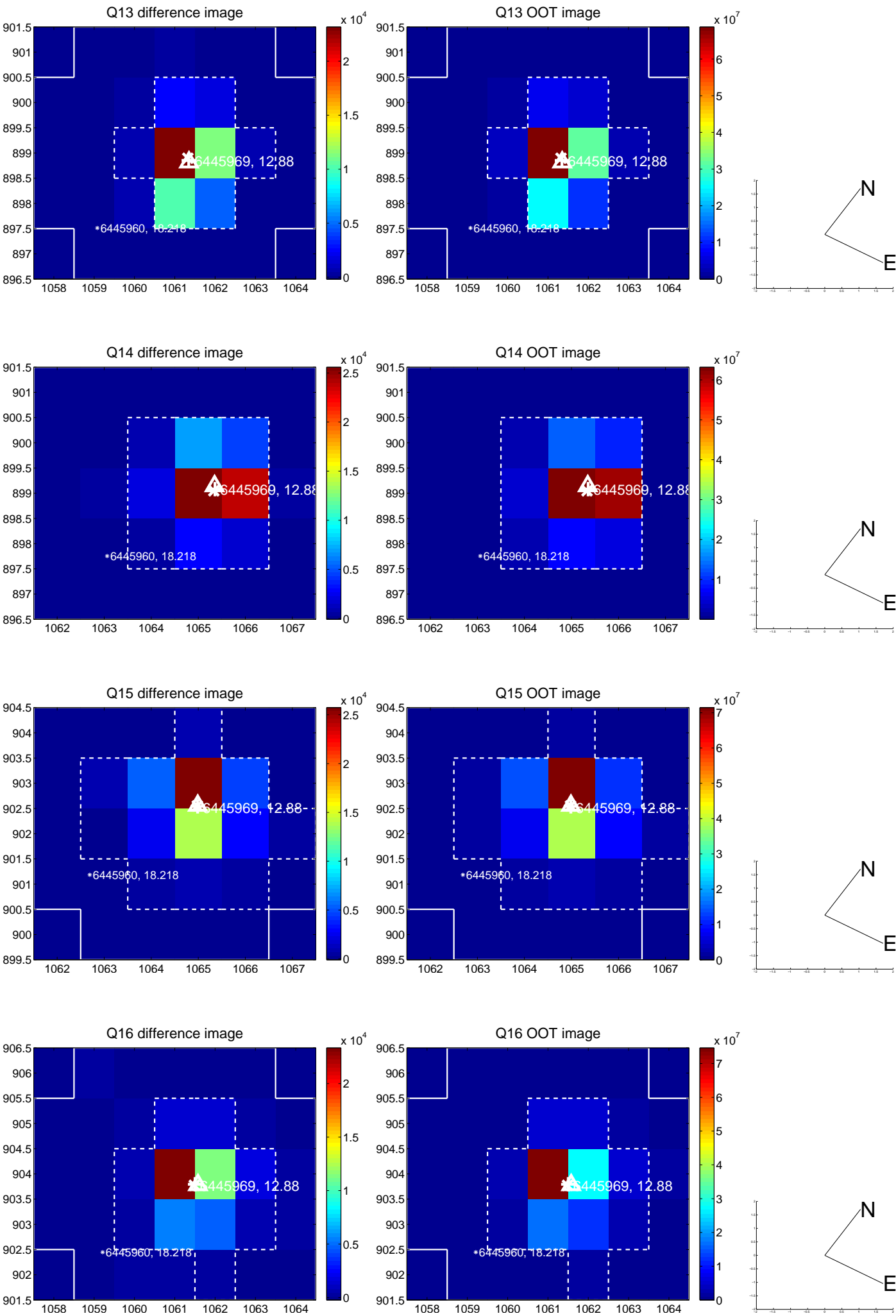
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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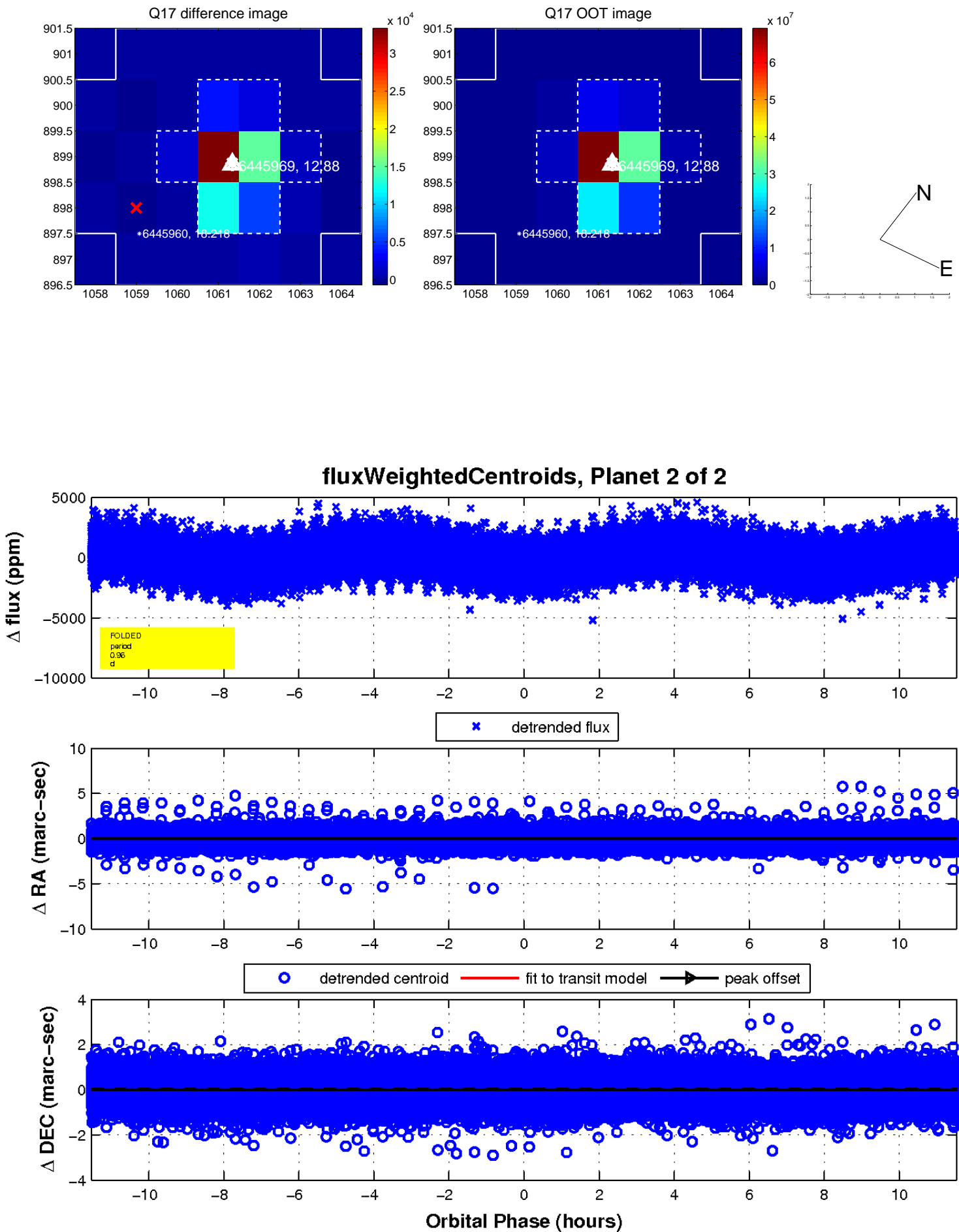


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

