

# KIC 009655419

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009655419-01	OBS	3934.01	1.921493	133.229793	937.8	1.405	27.3	31.2	2.25	6831	8.14	7627.49
009655419-02	OBS	No	0.579727	131.765514	188.6	3.686	13.7	15.9	2.25	6831	3.60	37693.70

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009655419-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV
009655419-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_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 009655419-01

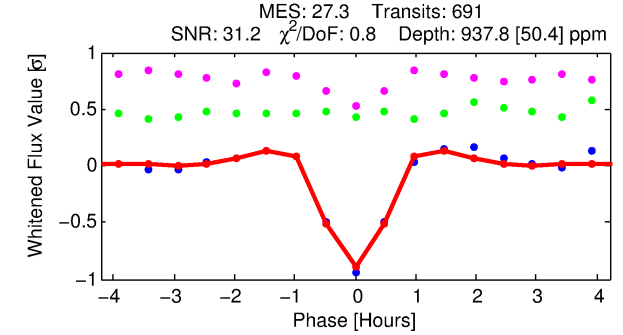
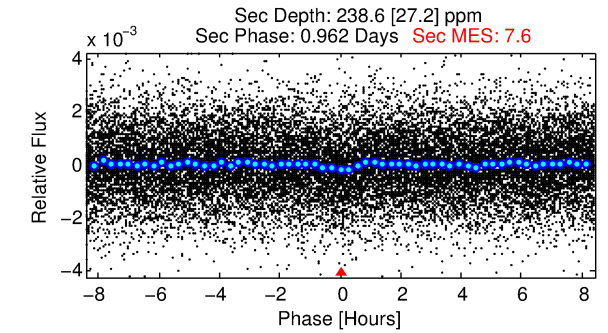
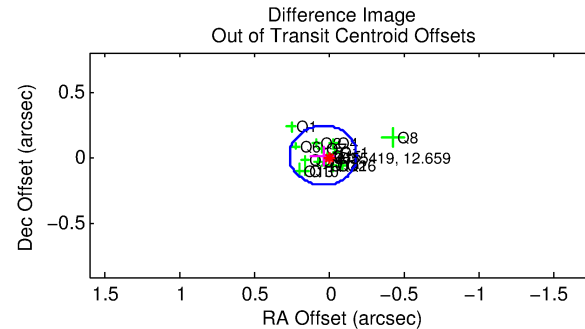
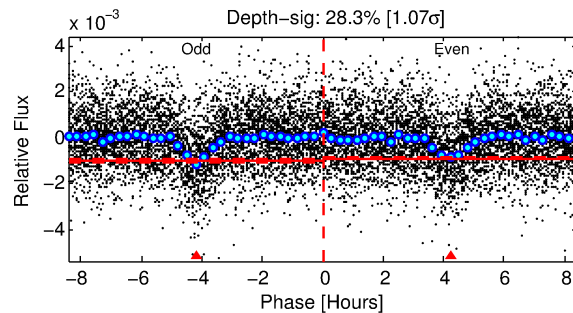
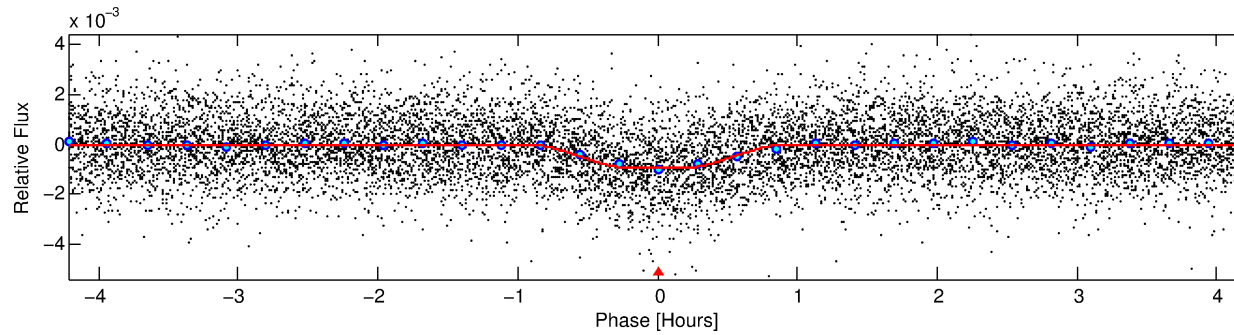
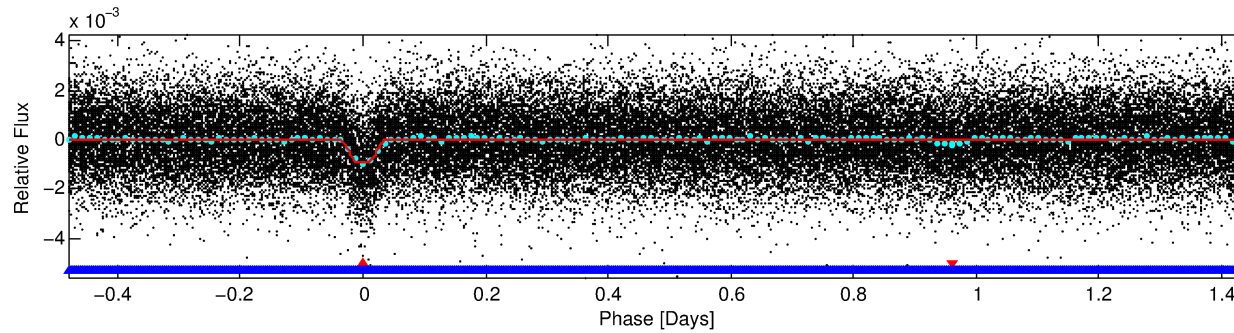
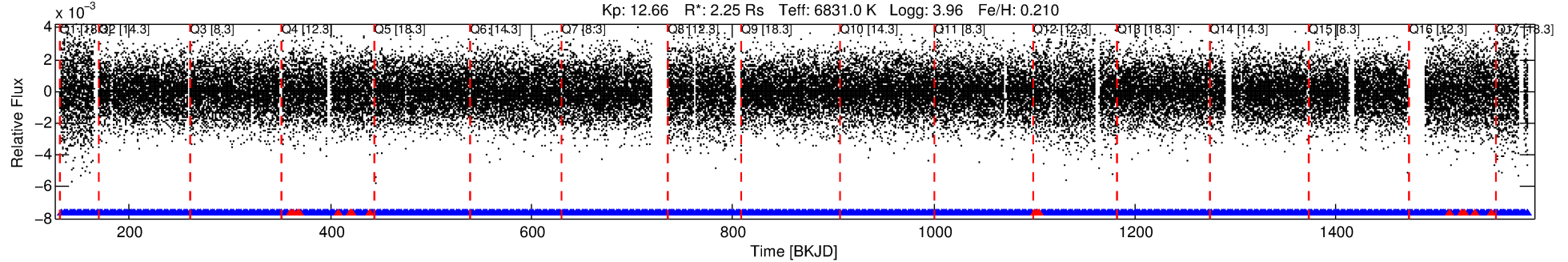
No Significant Match Found

# DV One-Page Summary

KIC: 9655419 Candidate: 1 of 2 Period: 1.921 d

KOI: K03934.01 Corr: 0.872

Kp: 12.66 R\*: 2.25 Rs Teff: 6831.0 K Logg: 3.96 Fe/H: 0.210



## DV Fit Results:

Period = 1.92149 [0.00000] d  
Epoch = 133.2298 [0.0007] BKJD  
Rp/R\* = 0.0332 [0.0038]  
a/R\* = 5.16 [2.93]  
b = 0.91 [0.11]  
Seff = 7627.49 [3630.23]  
Teq = 2383 [284] K  
Rp = 8.14 [2.65] Re  
a = 0.0359 [0.0102] AU  
Ag = 2.56 [1.31] [1.19σ]  
Teffp = 4659 [357] K [5.00σ]

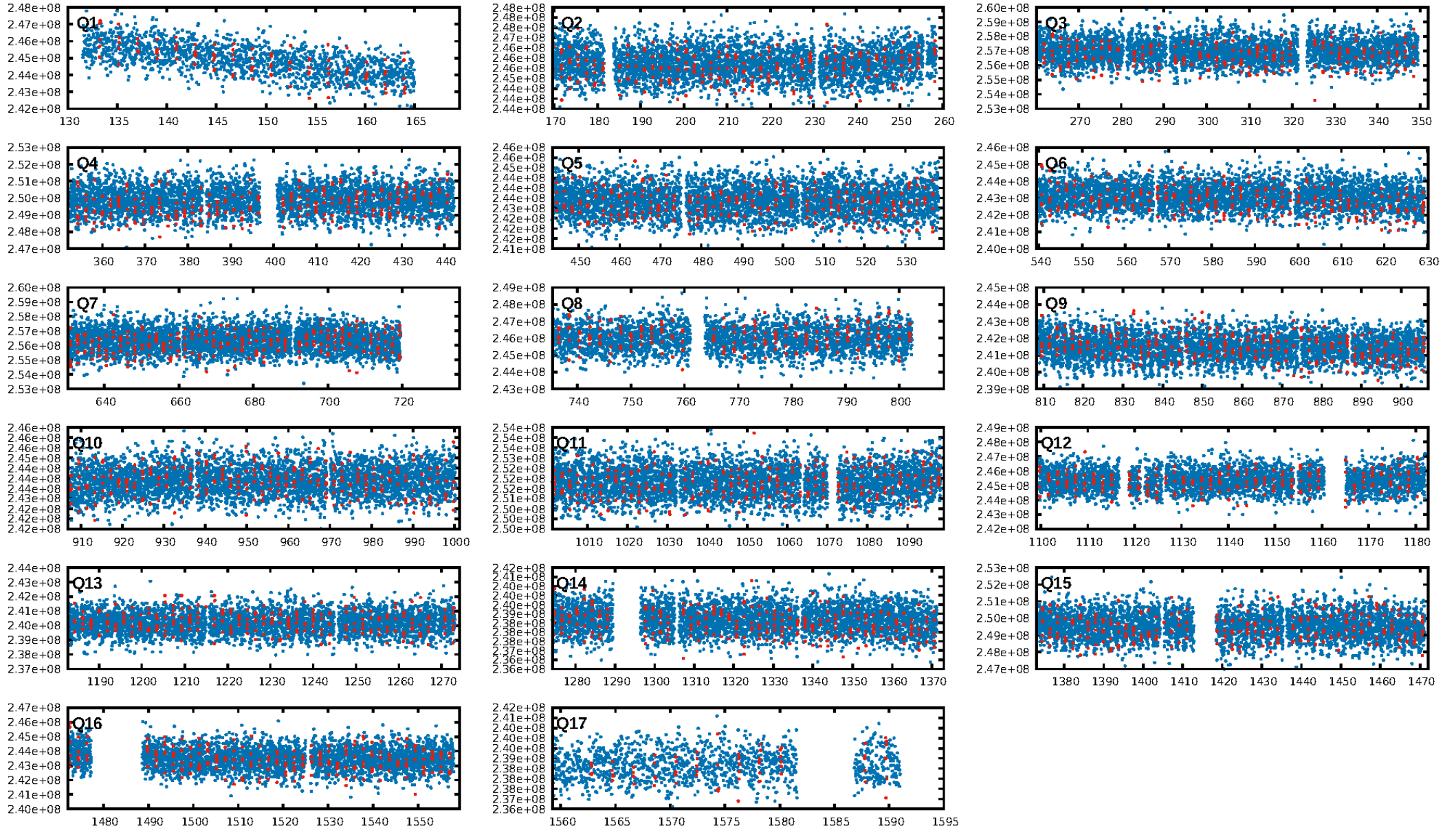
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [8.16σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.35e-74  
RollingBand-fgt: 0.98 [646/662]  
GhostDiagnostic-chr: 1.337  
Centroid-sig: 34.5%  
Centroid-so: 0.154 arcsec [5.28σ]  
OotOffset-rm: 0.042 arcsec [0.56σ]  
KicOffset-rm: 0.012 arcsec [0.17σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:34:29 Z

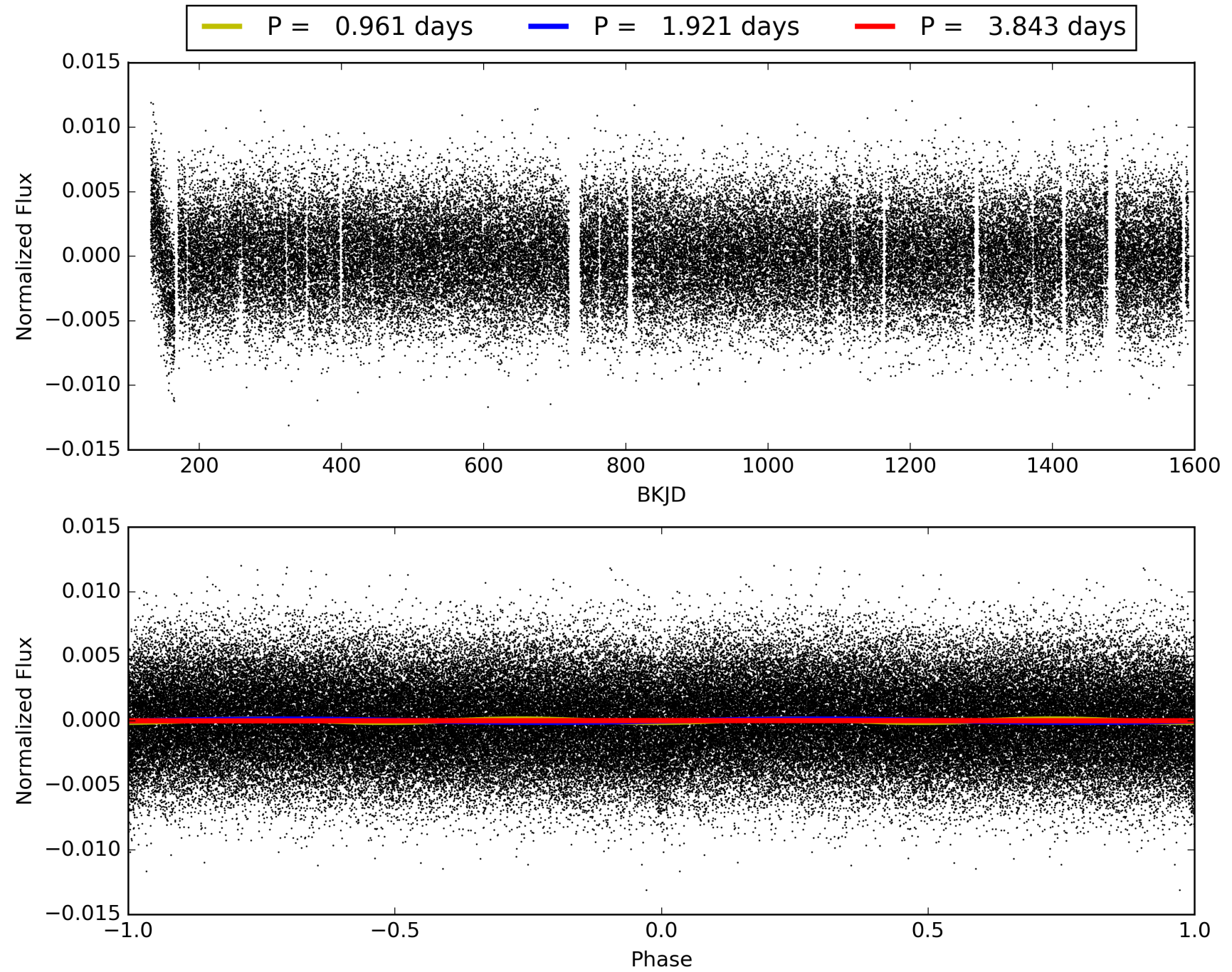
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009655419-01, PDC Light Curves



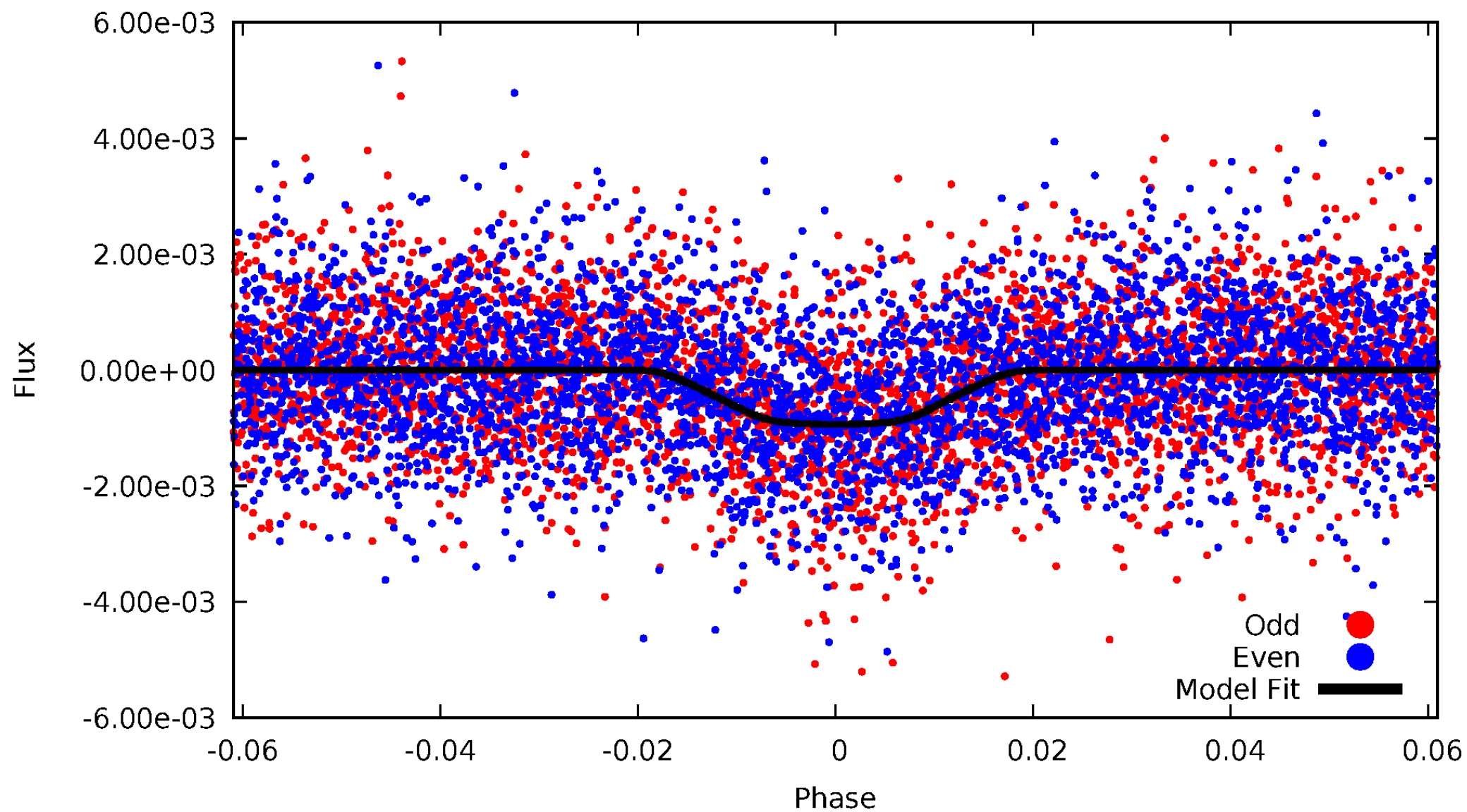


# TCE 009655419-01



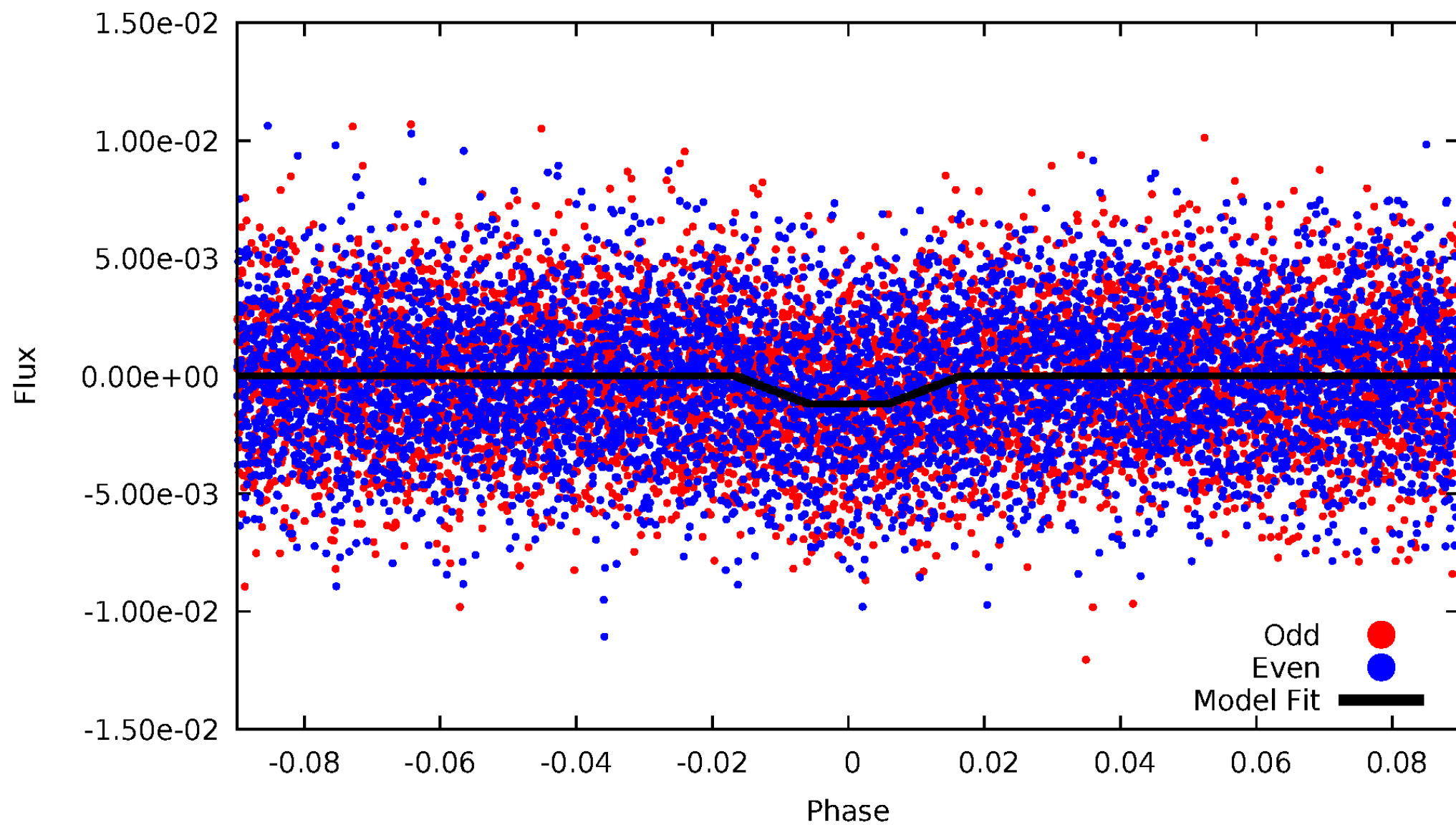
# DV Odd/Even

TCE 009655419-01



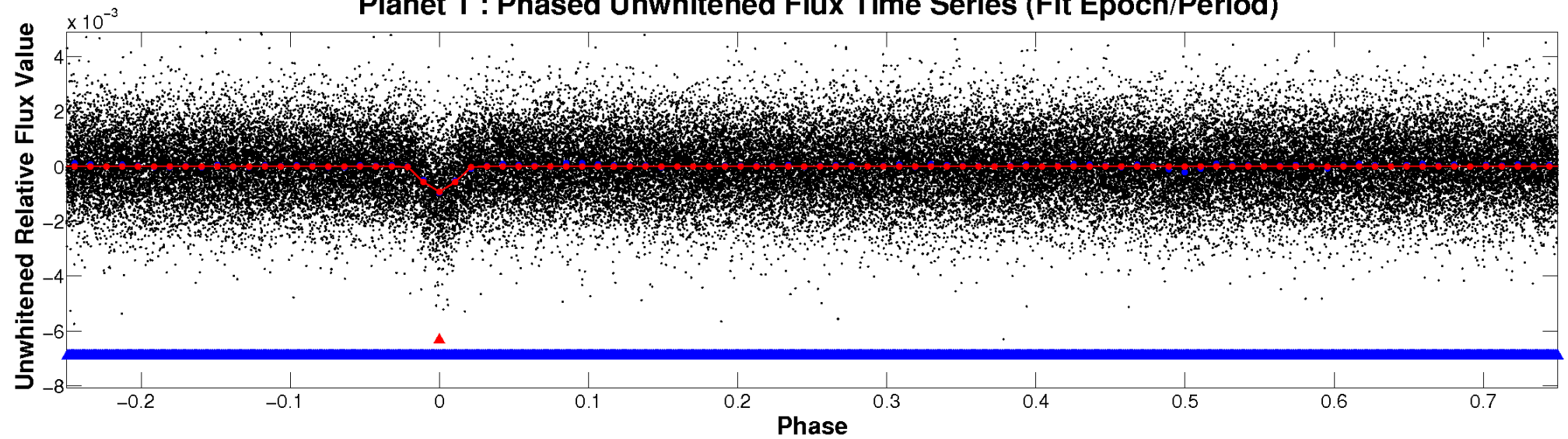
# ALT Odd/Even

TCE 009655419-01

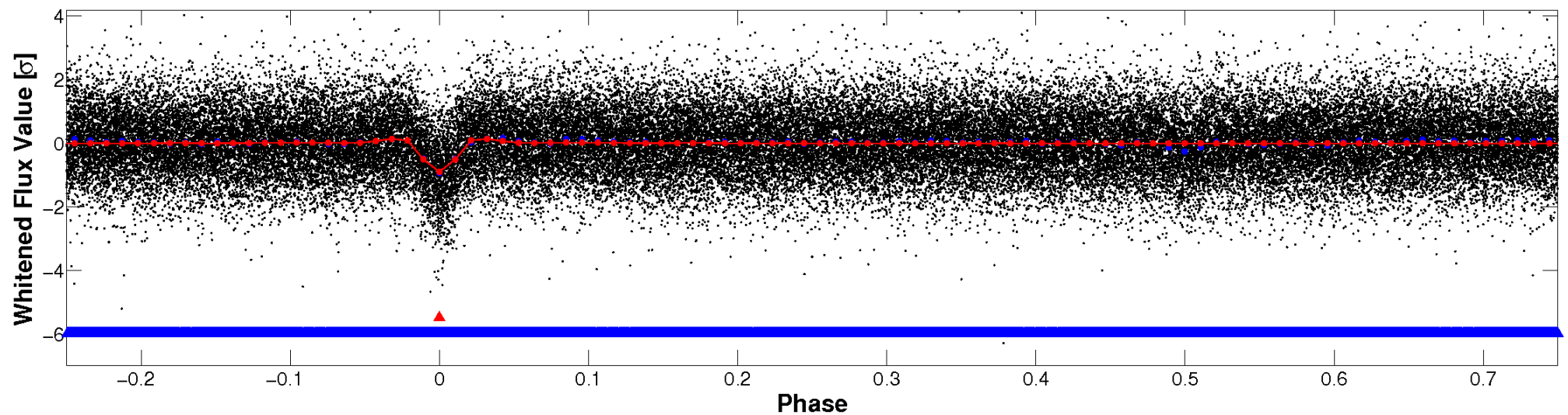


# Non-Whitened Vs. Whitened Light Curve

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



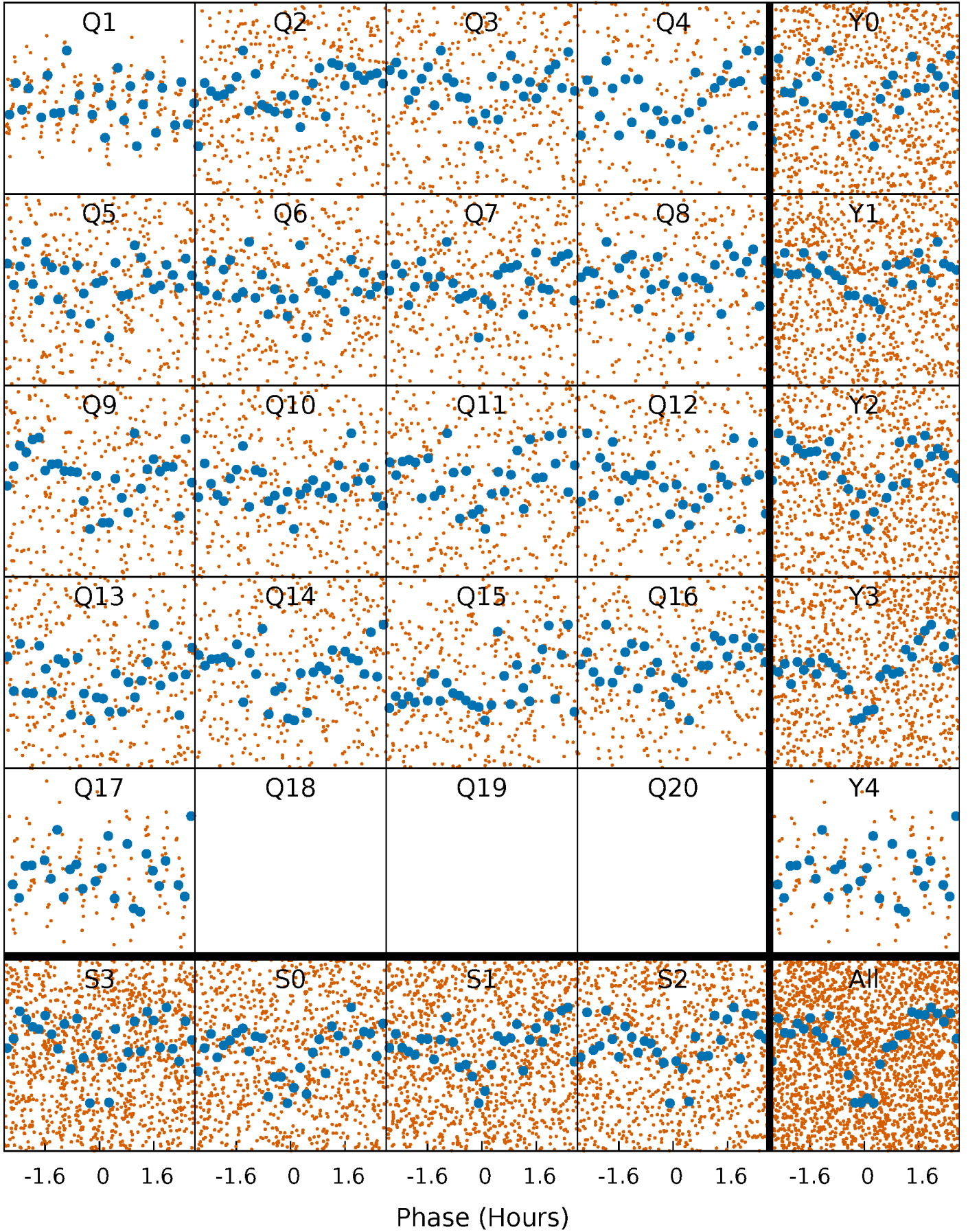
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

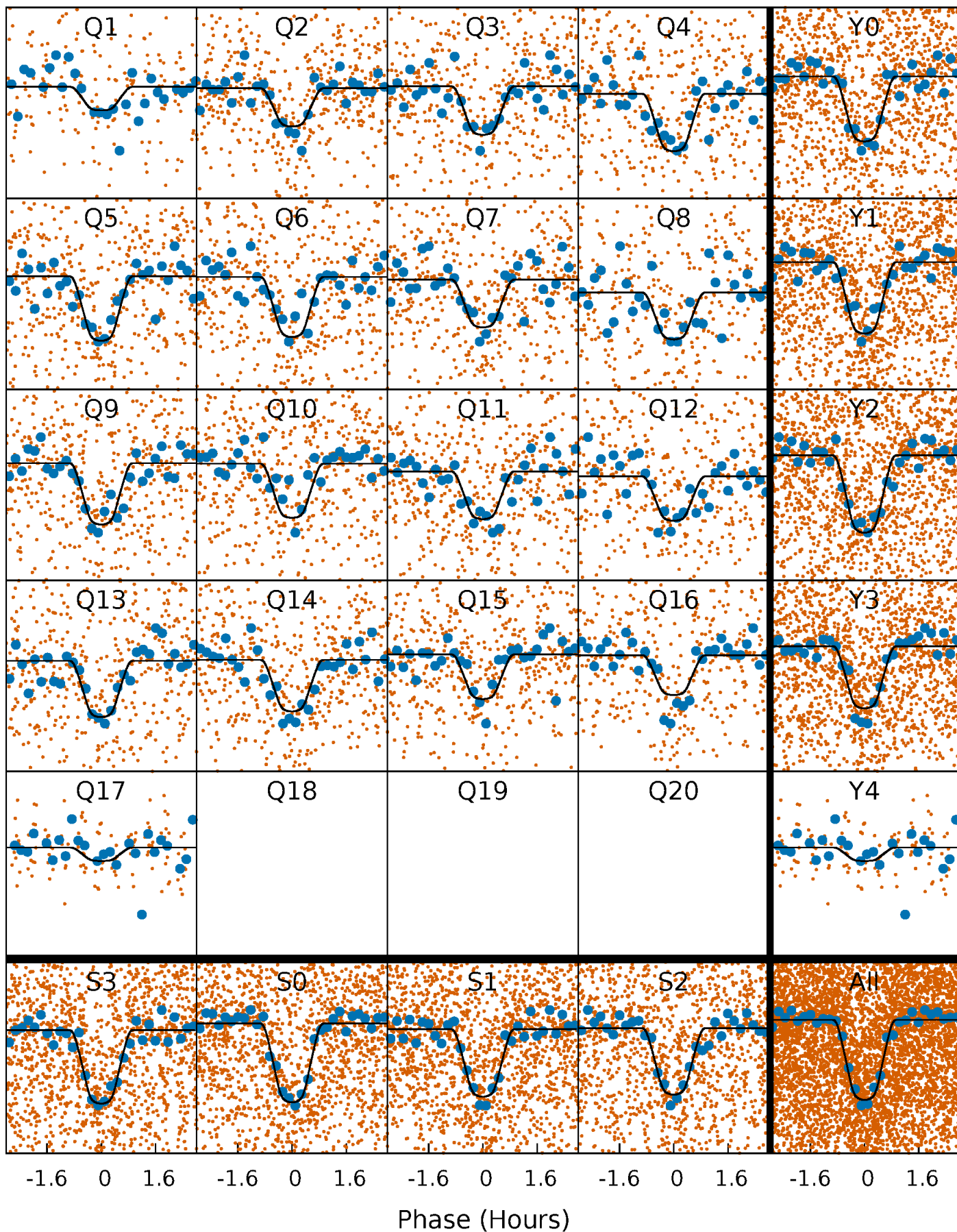
TCE 009655419-01   P= 1.921493 Days    $T_0=133.229793$  (BKJD)





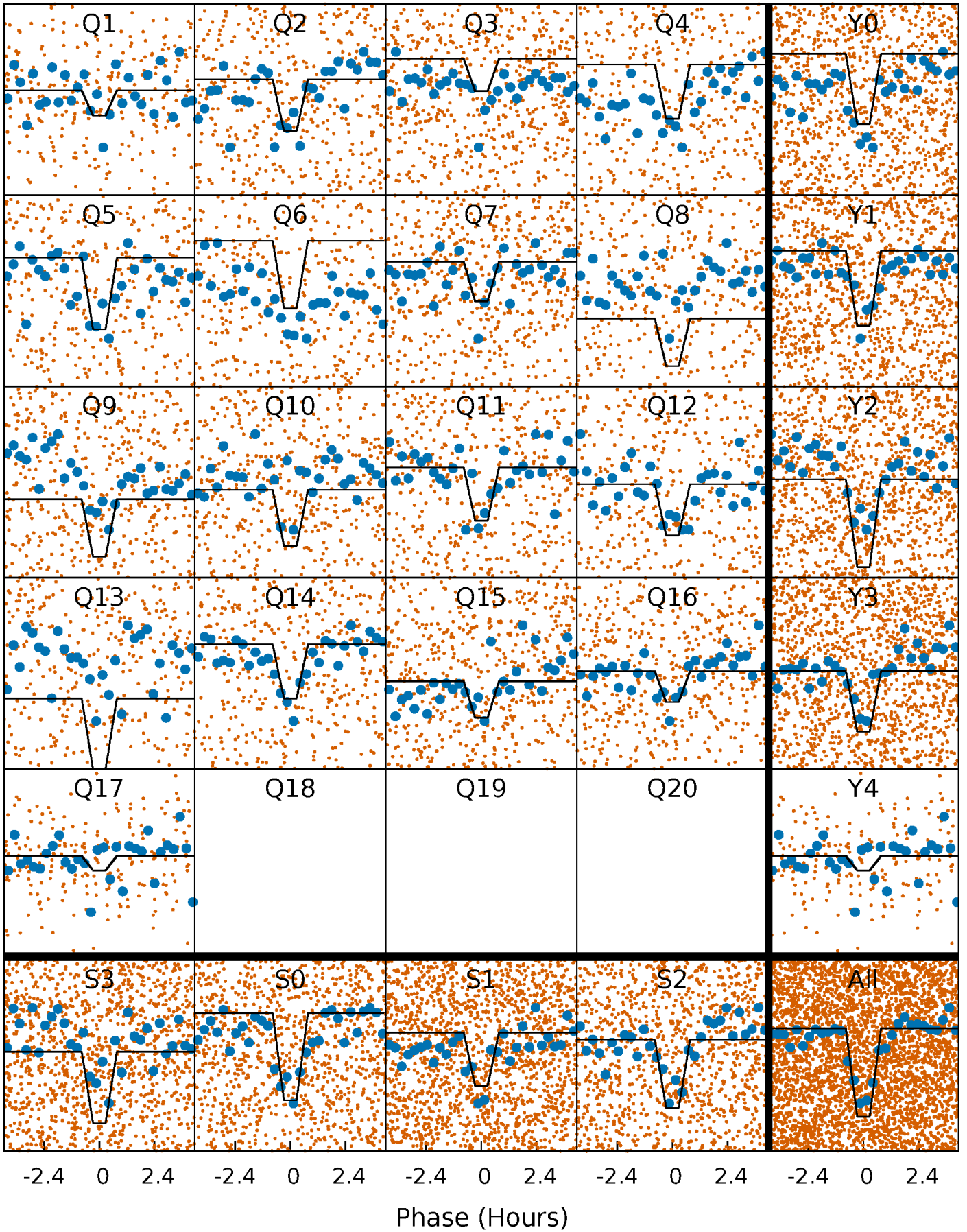
# DV Quarter-Phased Transit Curves

TCE 009655419-01 P= 1.921493 Days  $T_0=133.229793$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

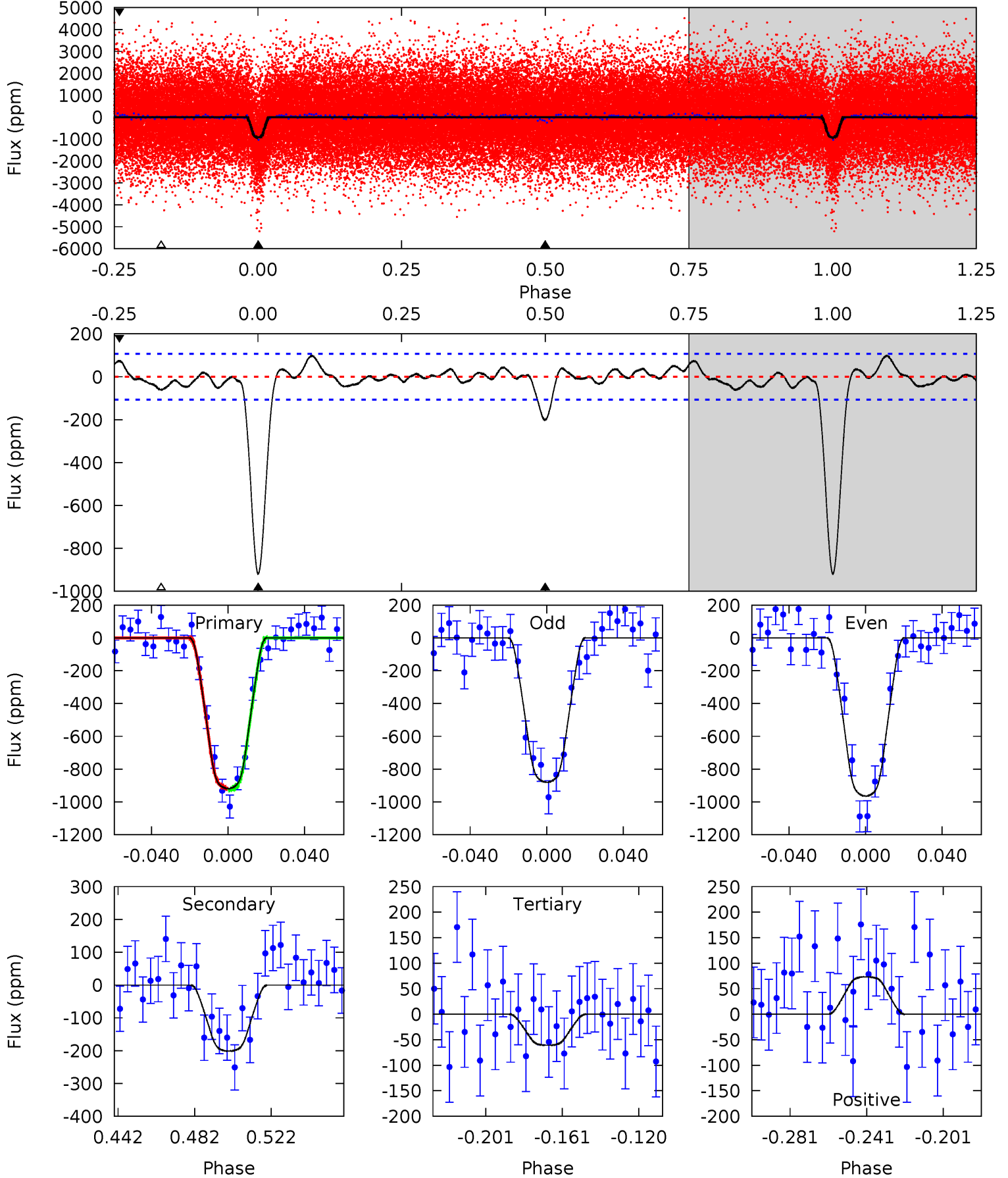
TCE 009655419-01 P= 1.921502 Days  $T_0=133.225625$  (BKJD)



# DV Model-Shift Uniqueness Test

009655419-01, P = 1.921493 Days, E = 131.308300 Days

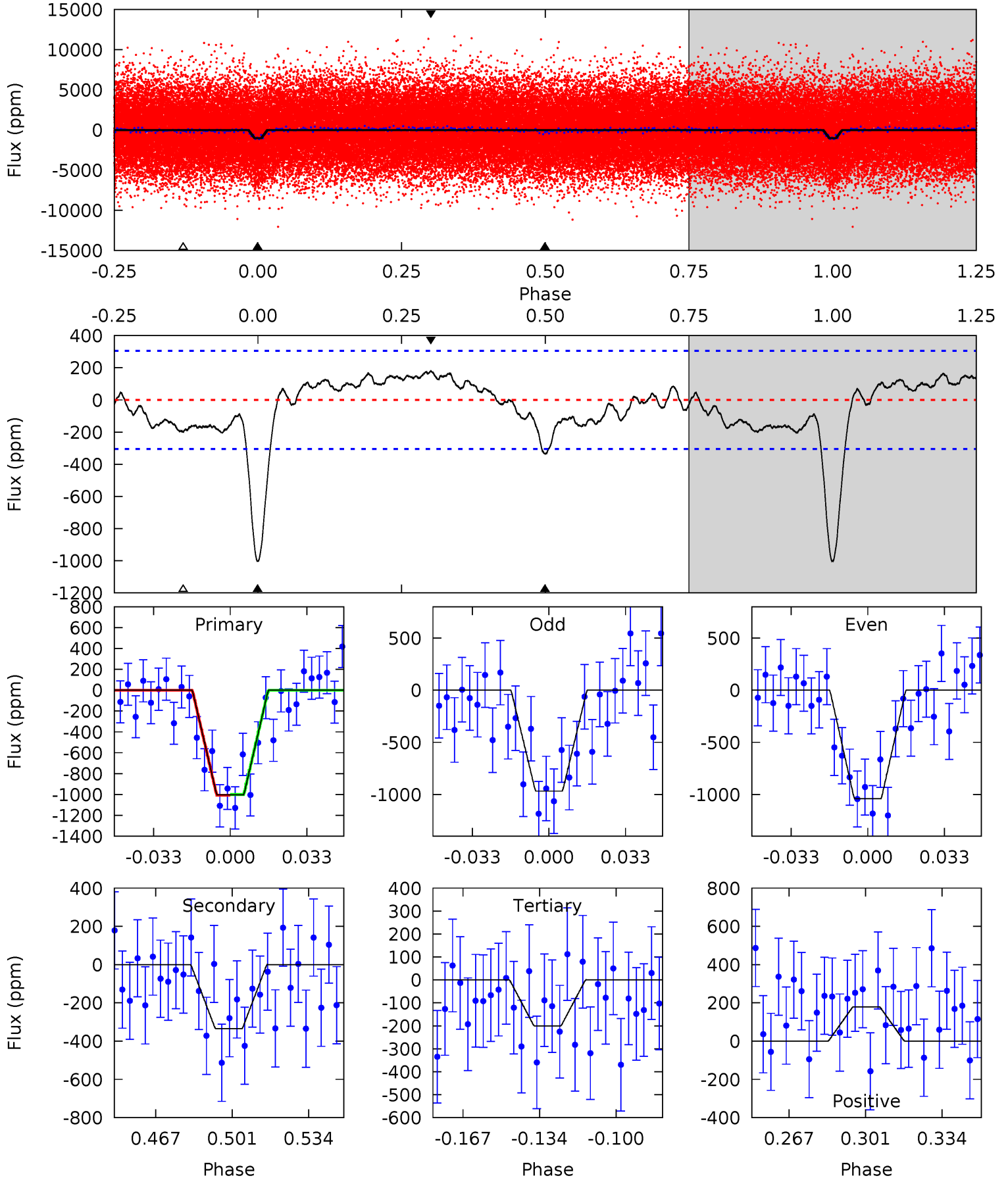
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
40.7	8.92	2.70	3.25	4.75	2.05	1.31	38.0	37.5	6.22	5.67	1.87	0.96	0.10	0.22



# Alt Model-Shift Uniqueness Test

009655419-01, P = 1.921502 Days, E = 131.304123 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
15.7	5.25	3.15	2.81	4.79	2.13	1.76	12.6	12.9	2.11	2.44	0.57	1.01	0.15	0.05





### Stellar Parameters For KIC 009655419

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6831^{+191}_{-287}$	$3.959^{+0.258}_{-0.172}$	$0.210^{+0.150}_{-0.350}$	$2.247^{+0.686}_{-0.686}$	$1.675^{+0.187}_{-0.321}$	$0.208^{+0.332}_{-0.097}$
	+3%/-4%	+7%/-4%	+71%/-167%	+31%/-31%	+11%/-19%	+159%/-46%
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 009655419-01 / KOI 3934.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	-201±23	$7.87^{+1.78}_{-1.49}$	$3291^{+274}_{-289}$	$4457^{+295}_{-264}$	$2.241^{+1.238}_{-0.757}$
Alt.	-335±64	$8.19^{+1.66}_{-1.47}$	$3286^{+254}_{-281}$	$4923^{+352}_{-334}$	$3.481^{+1.749}_{-1.176}$

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

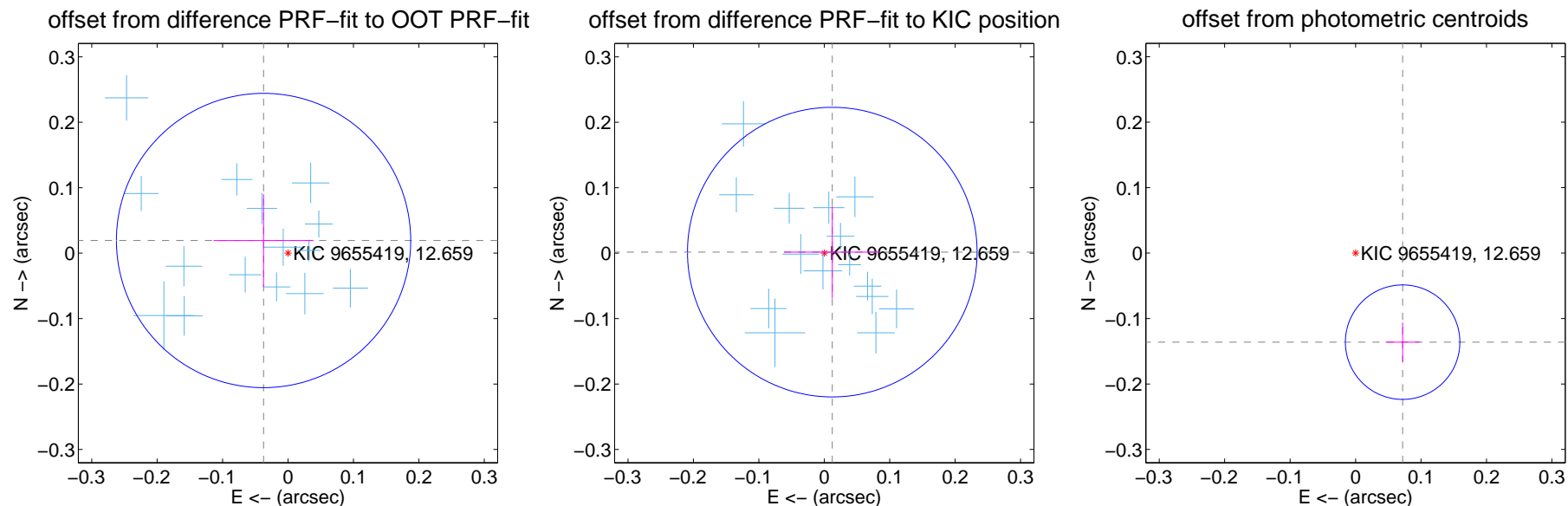
## DV Centroid Data

Supplemental centroid analysis for 009655419-01. Kepler magnitude: 12.66. Transit SNR 31.25

There are 16 quarters with good PRF difference image offsets

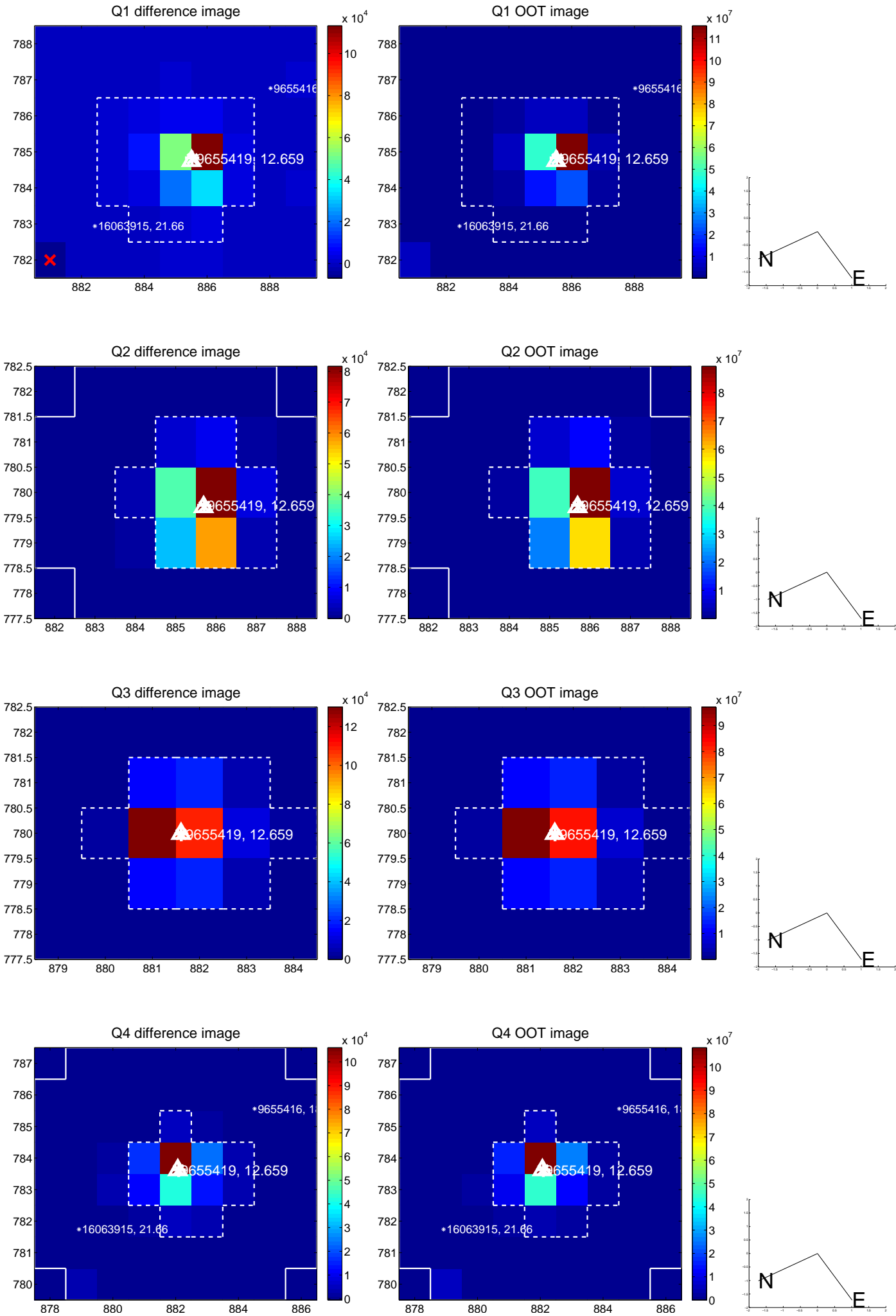
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.042 \pm 0.075$	0.56	$0.037 \pm 0.076$	$0.019 \pm 0.071$
PRF-fit source offset from KIC position	$0.012 \pm 0.074$	0.17	$-0.012 \pm 0.074$	$0.002 \pm 0.070$
photometric centroid source offset	$0.15 \pm 0.03$	5.28	$-0.07 \pm 0.03$	$-0.14 \pm 0.03$

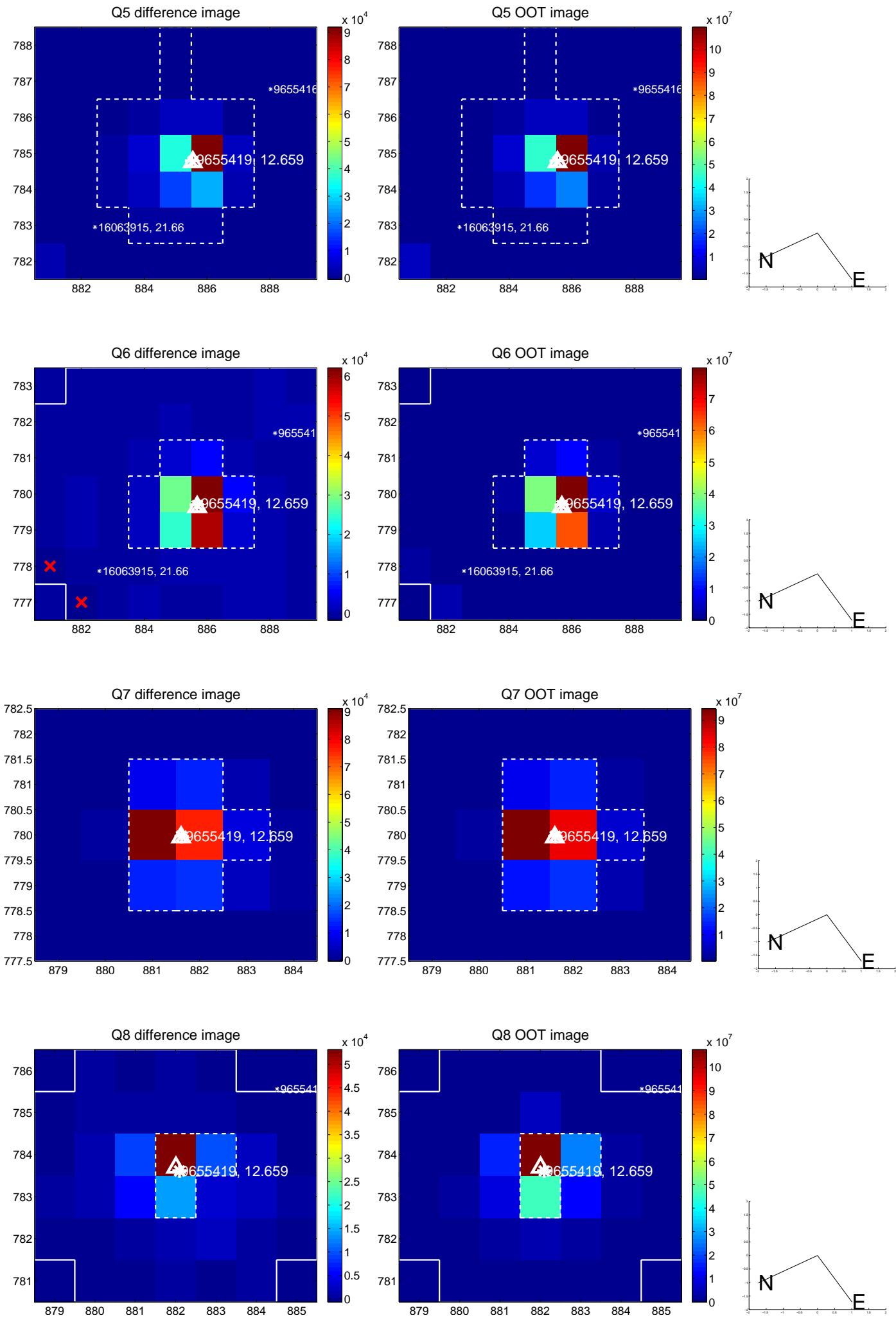


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

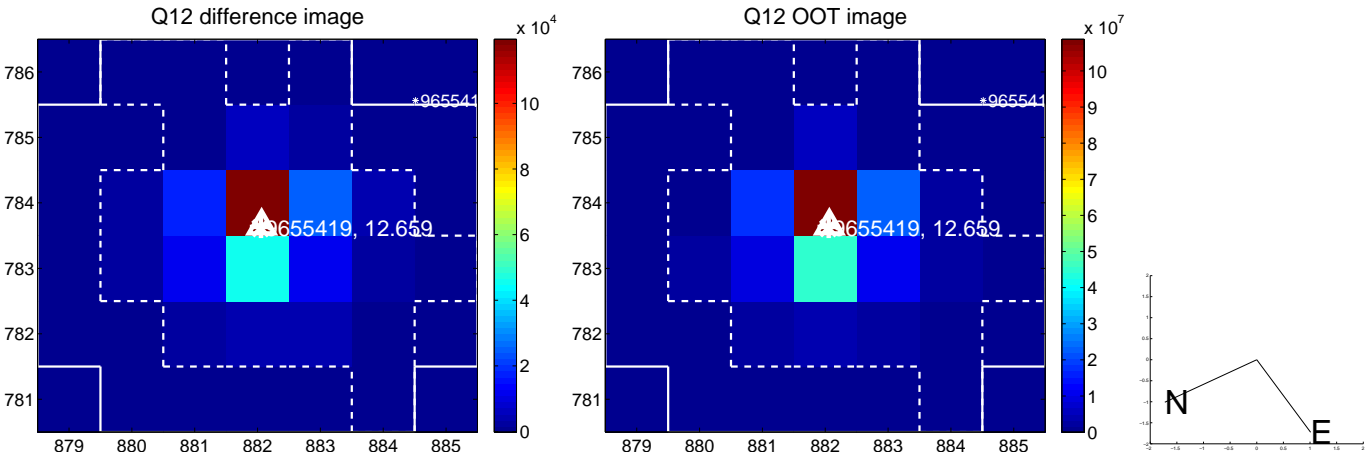
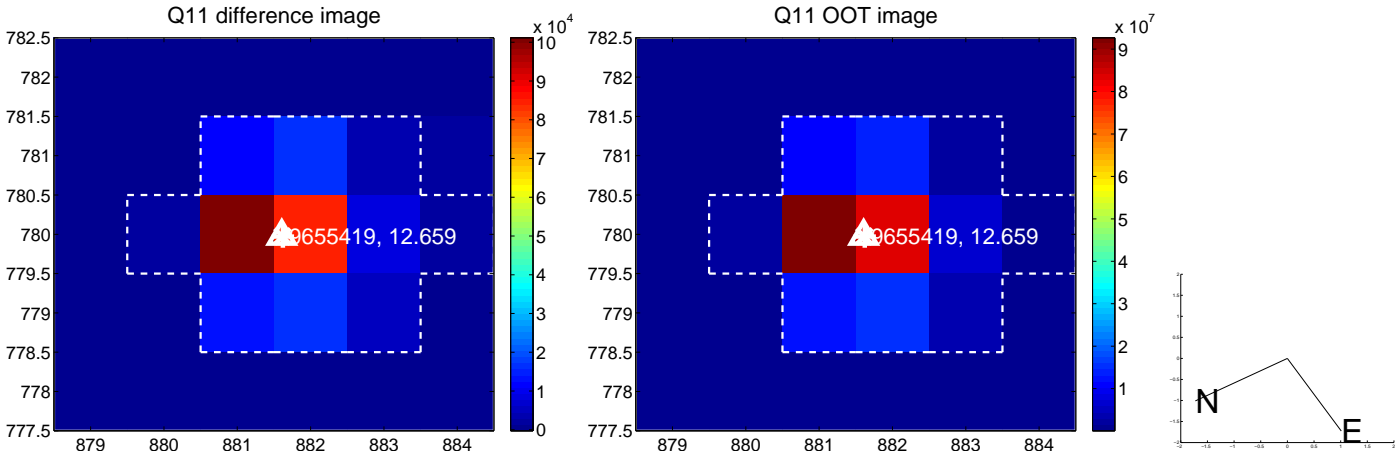
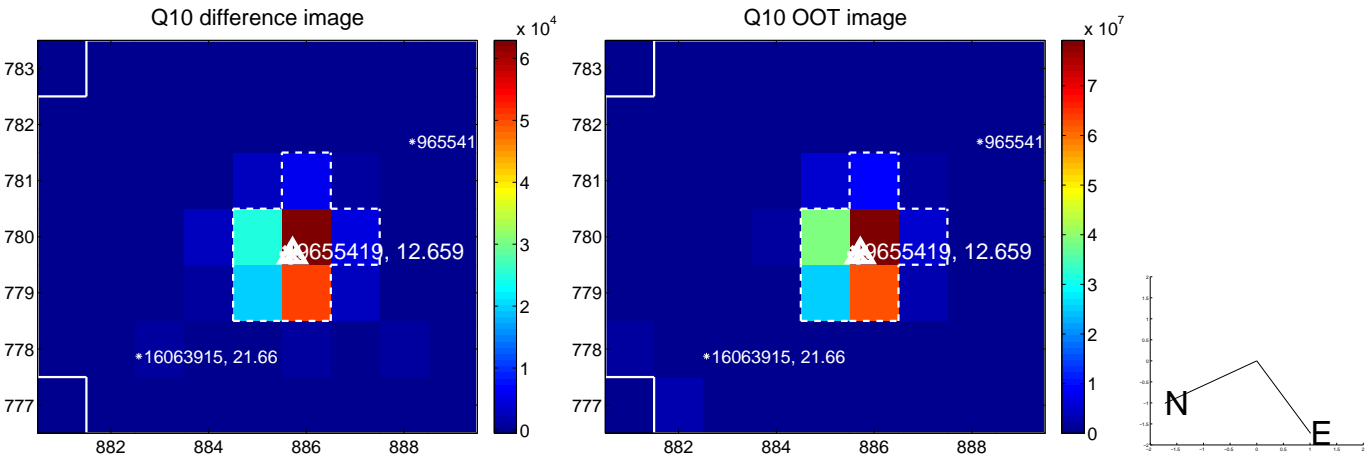
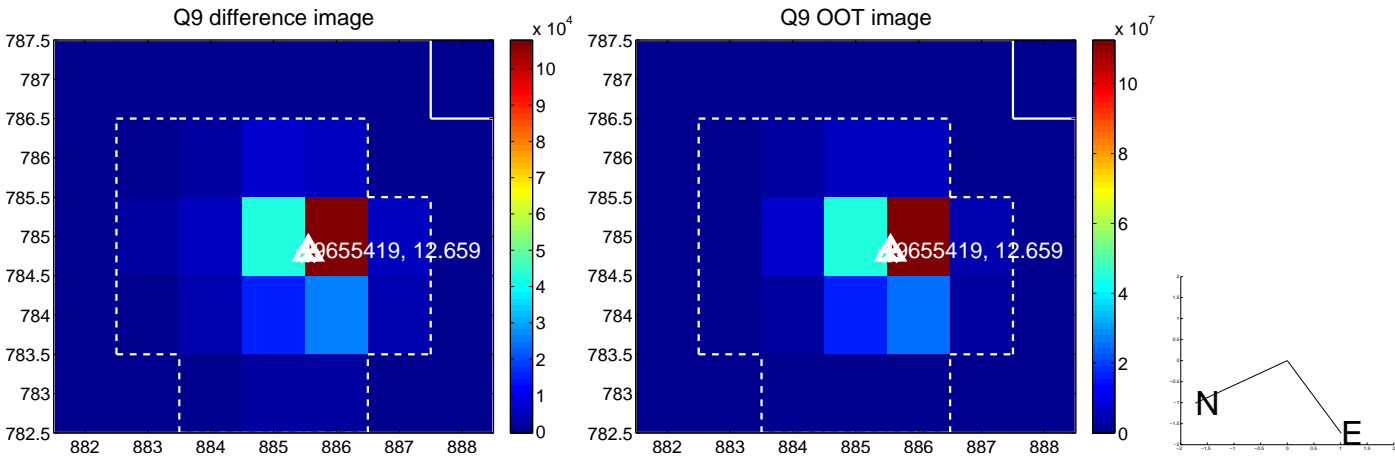


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

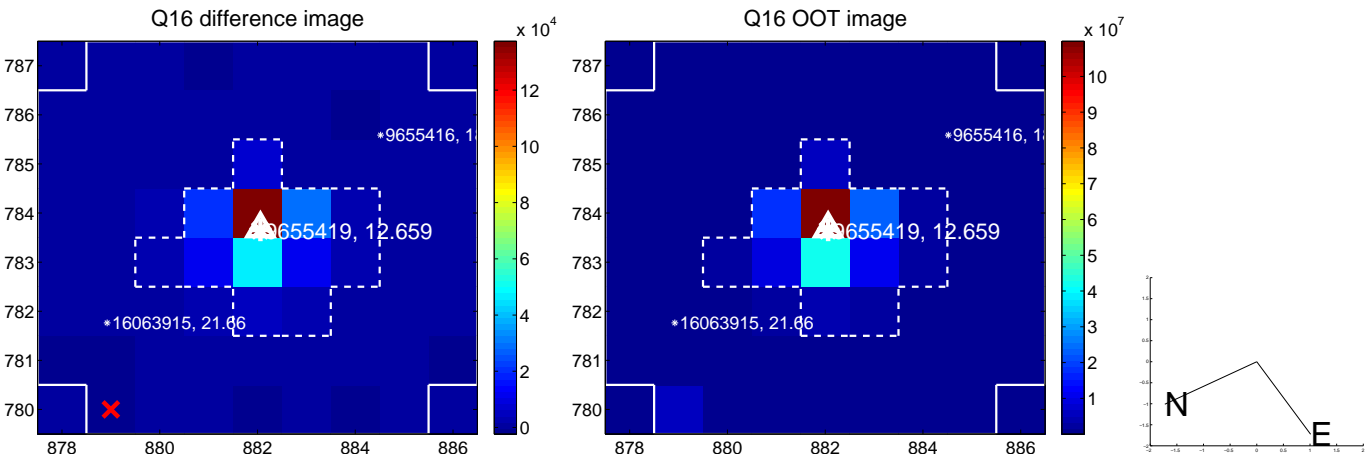
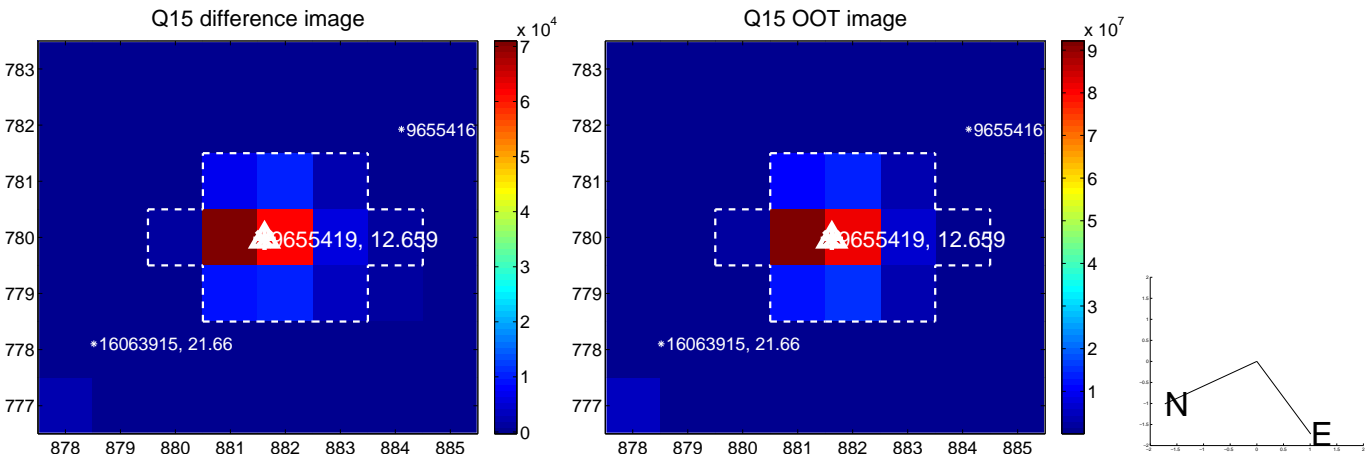
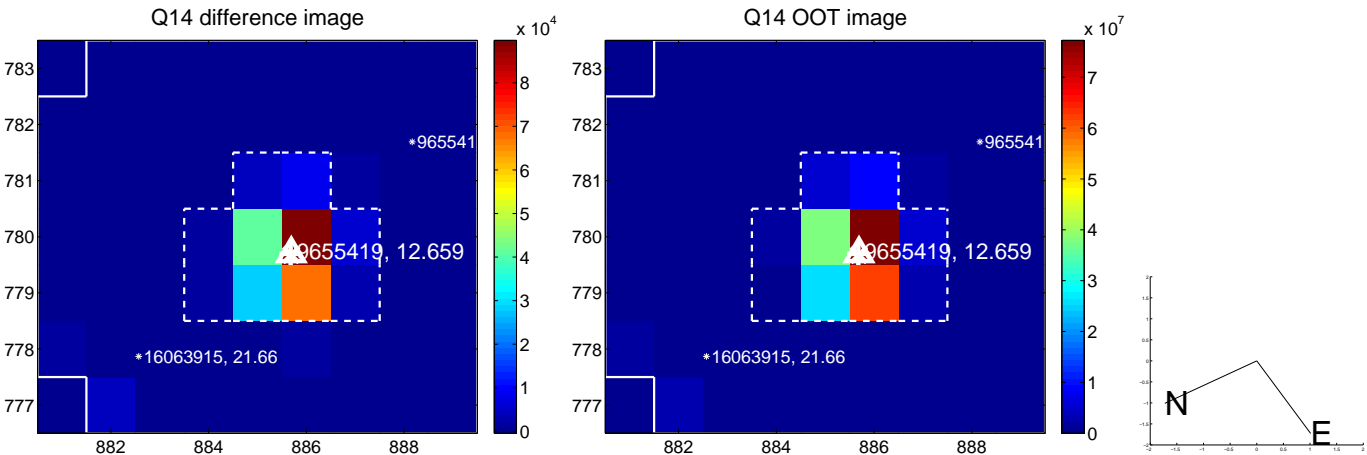
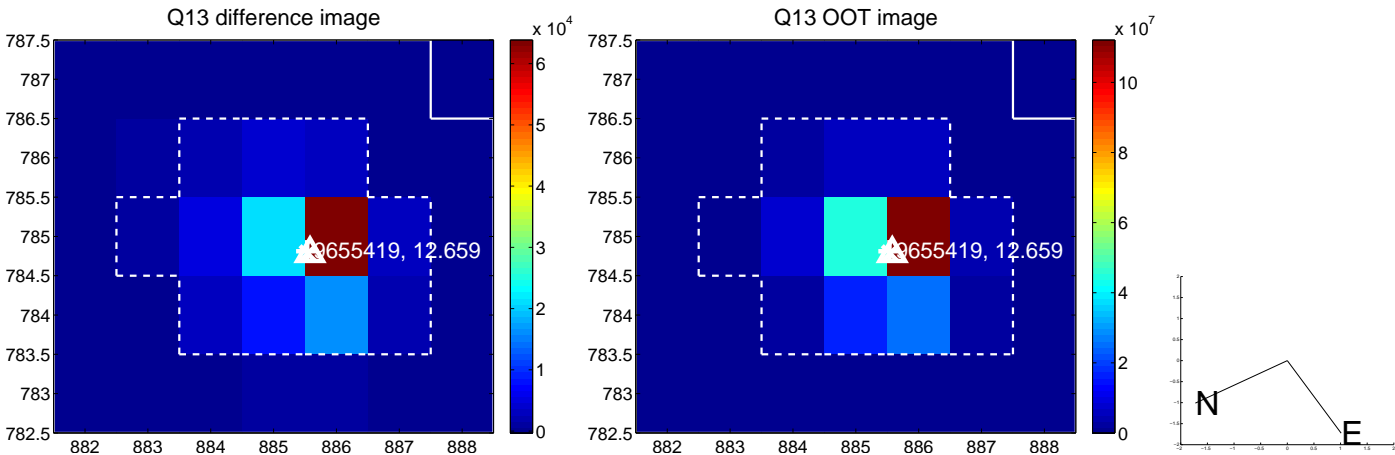




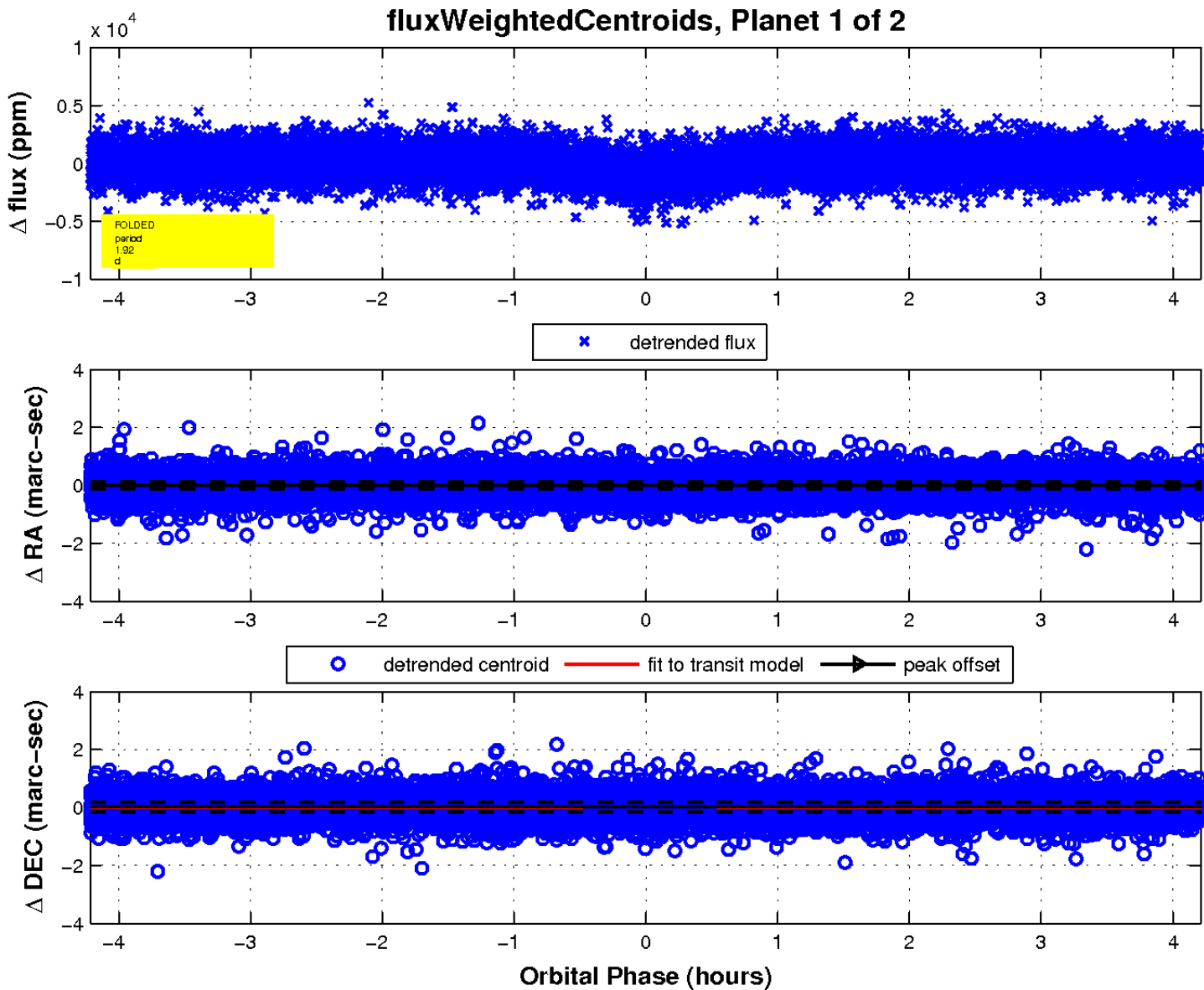
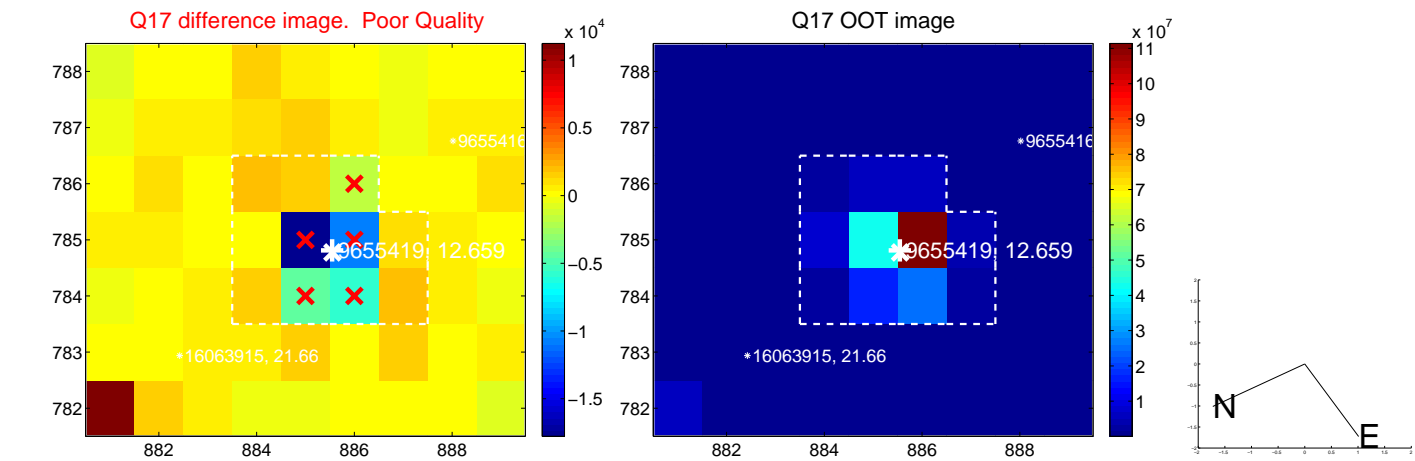
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



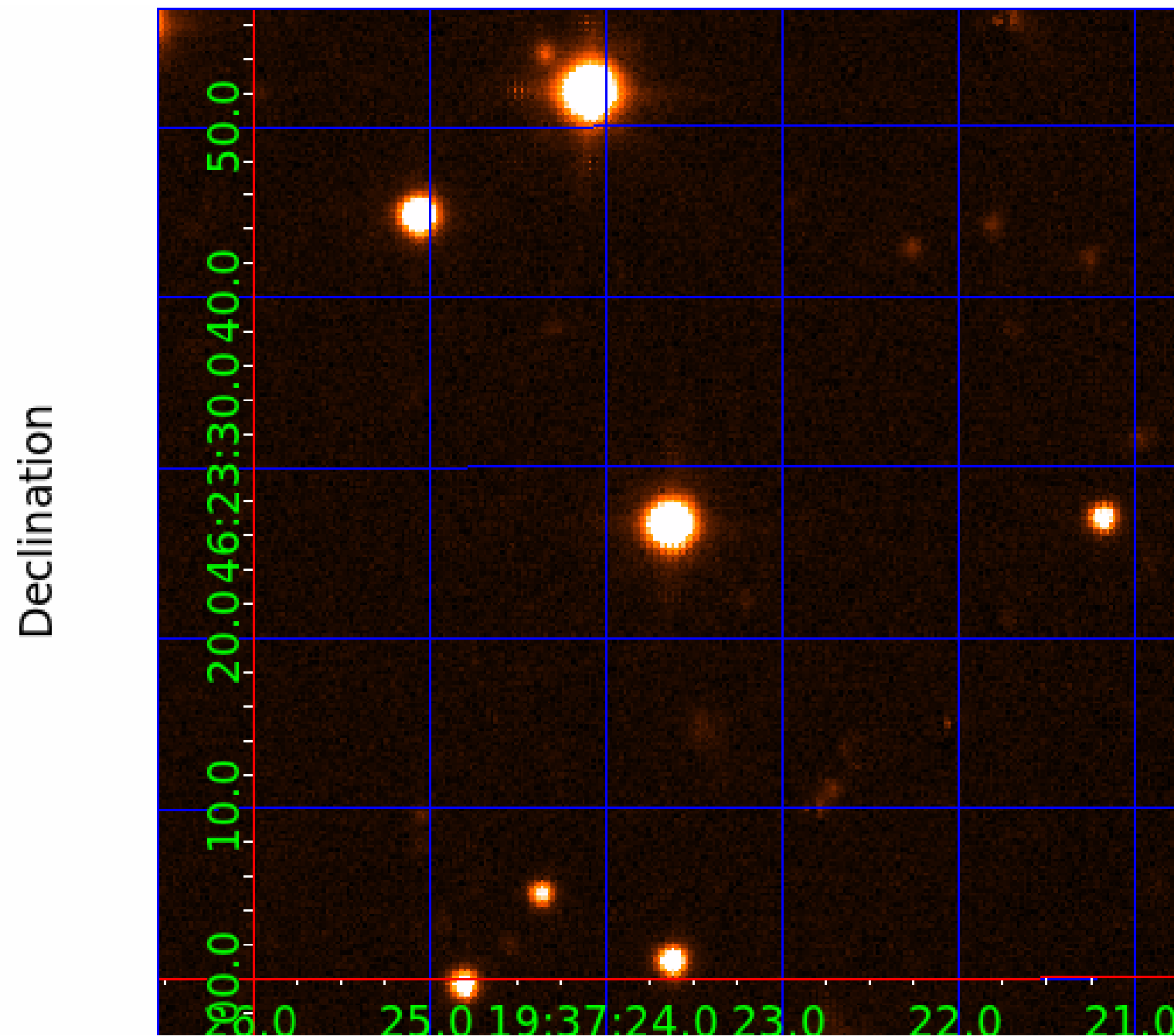
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 009655419

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009655419-01	OBS	3934.01	1.921493	133.229793	937.8	1.405	27.3	31.2	2.25	6831	8.14	7627.49
009655419-02	OBS	No	0.579727	131.765514	188.6	3.686	13.7	15.9	2.25	6831	3.60	37693.70

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009655419-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV
009655419-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_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.

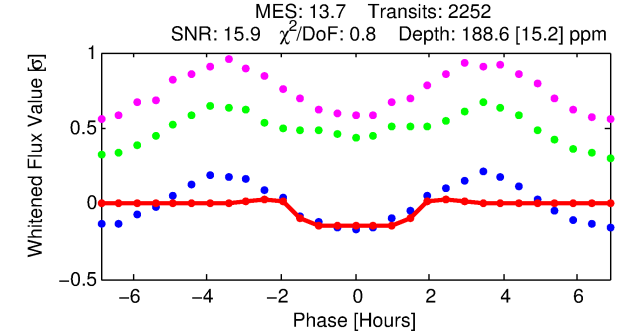
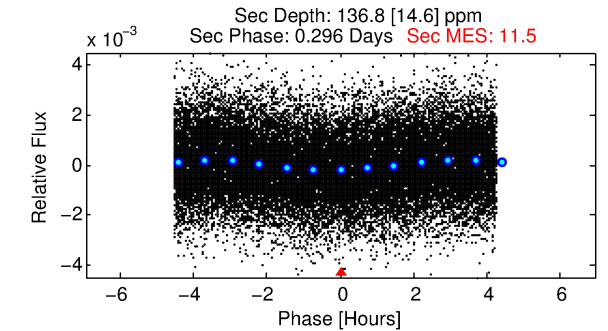
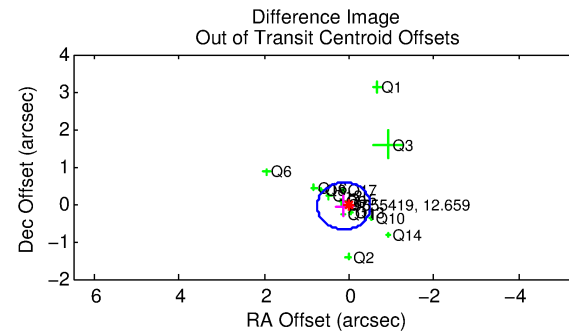
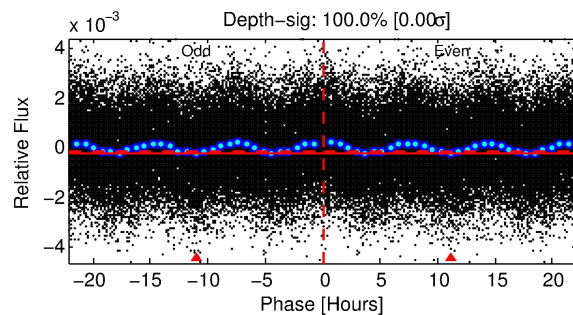
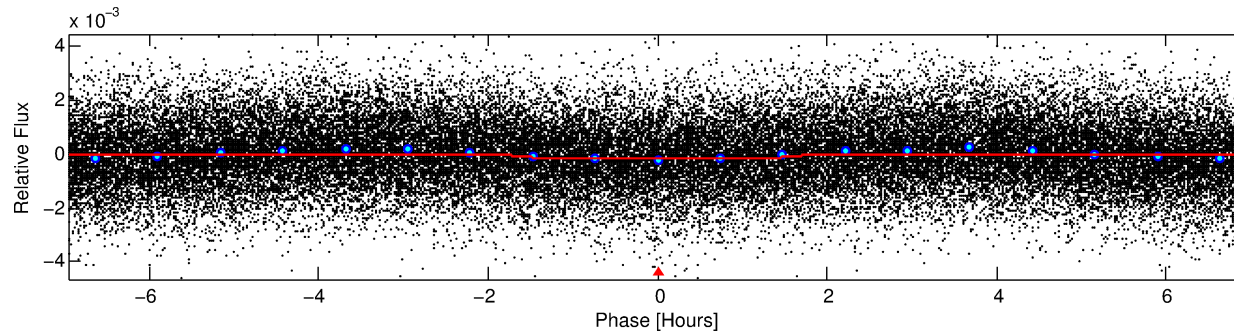
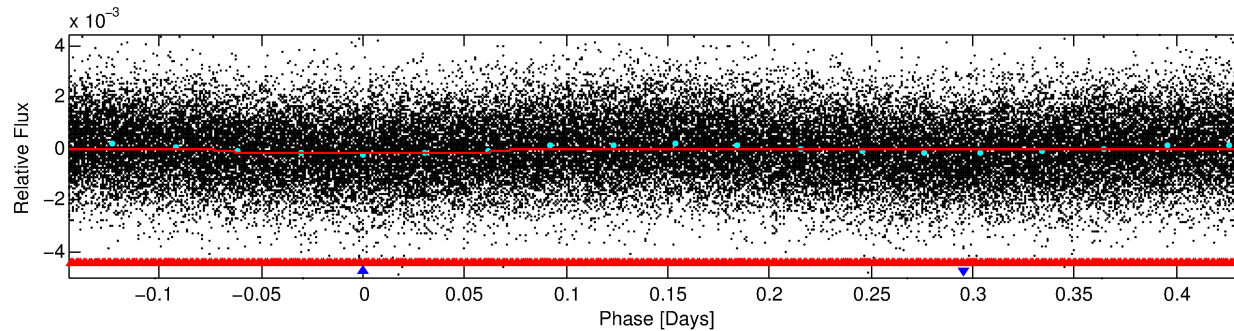
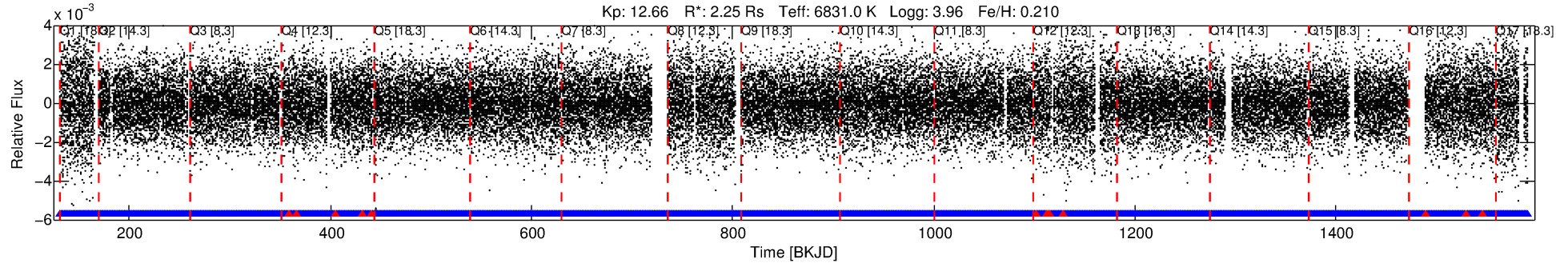
## Ephemeris Match Information For 009655419-02

No Significant Match Found

# DV One-Page Summary

KIC: 9655419 Candidate: 2 of 2 Period: 0.580 d  
KOI: K03934 Corr: No Ephemeris Match

Kp: 12.66 R\*: 2.25 Rs Teff: 6831.0 K Logg: 3.96 Fe/H: 0.210



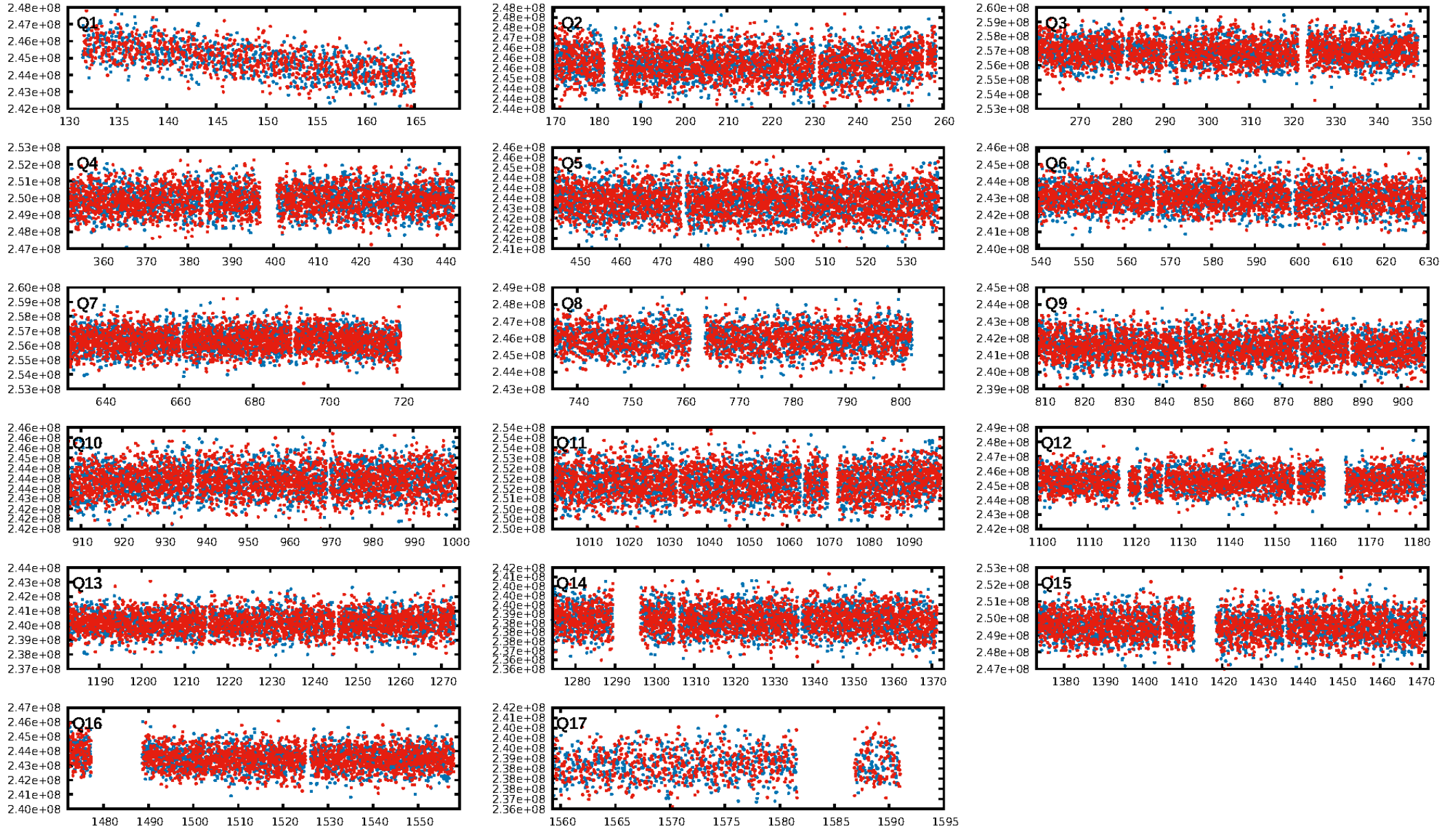
## DV Fit Results:

Period = 0.57973 [0.00001] d  
Epoch = 131.7655 [0.0024] BKJD  
Rp/R\* = 0.0147 [0.0030]  
a/R\* = 1.10 [0.22]  
b = 0.90 [0.25]  
Seff = 37693.70 [17939.96]  
Teq = 3553 [423] K  
Rp = 3.60 [1.32] Re  
a = 0.0162 [0.0046] AU  
Ag = 1.52 [0.93] [0.56σ]  
Teffp = 6101 [687] K [3.16σ]

## DV Diagnostic Results:

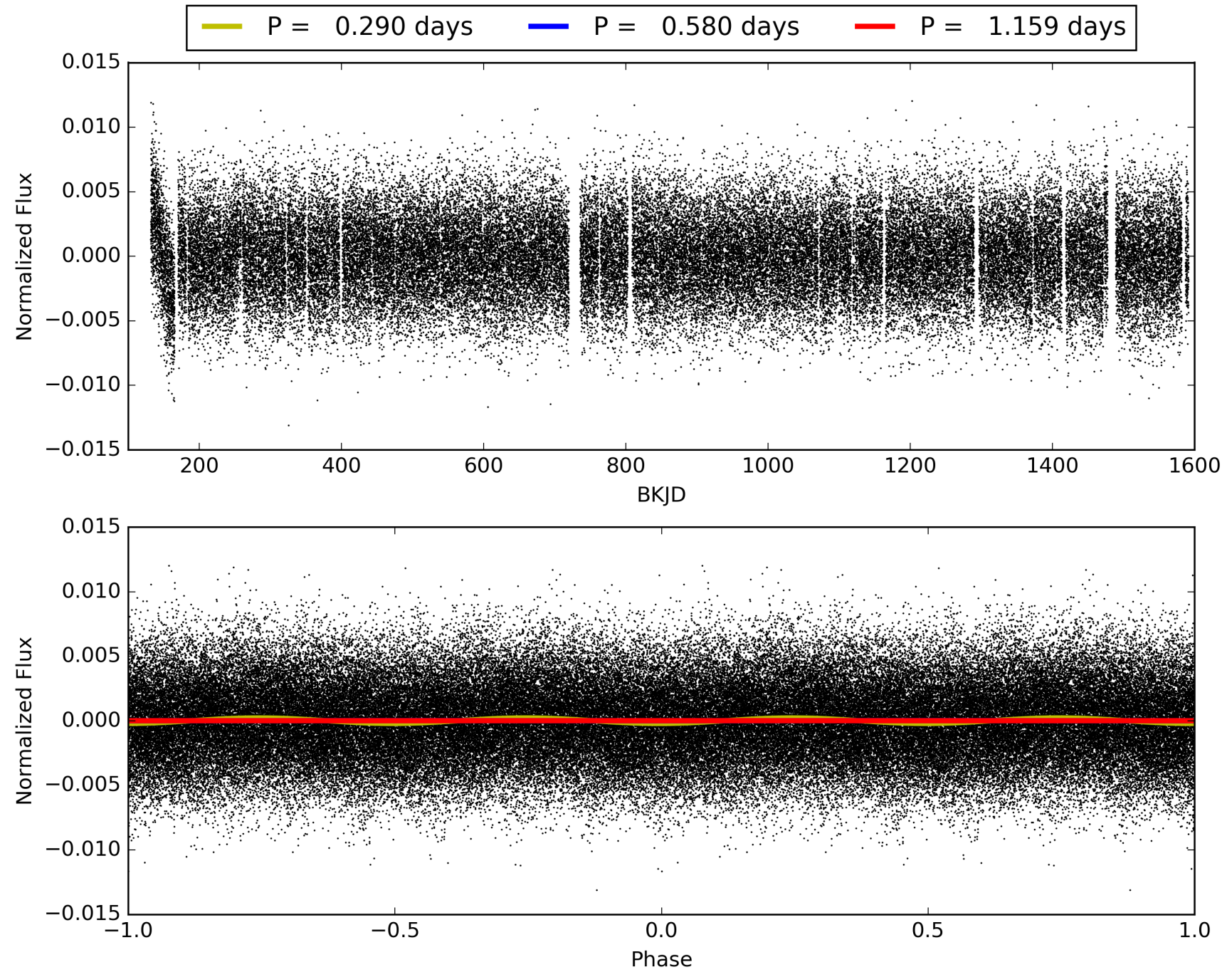
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [8.16σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.47e-15  
RollingBand-fgt: 0.99 [2136/2149]  
GhostDiagnostic-chr: 1.191  
Centroid-sig: 28.5%  
Centroid-so: 0.172 arcsec [3.70σ]  
OotOffset-rm: 0.131 arcsec [0.63σ]  
KicOffset-rm: 0.106 arcsec [0.44σ]  
OotOffset-st: 4/4/3/4 [15]  
KicOffset-st: 4/4/3/4 [15]  
DiffImageQuality-fgm: 0.87 [13/15]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009655419-02, PDC Light Curves





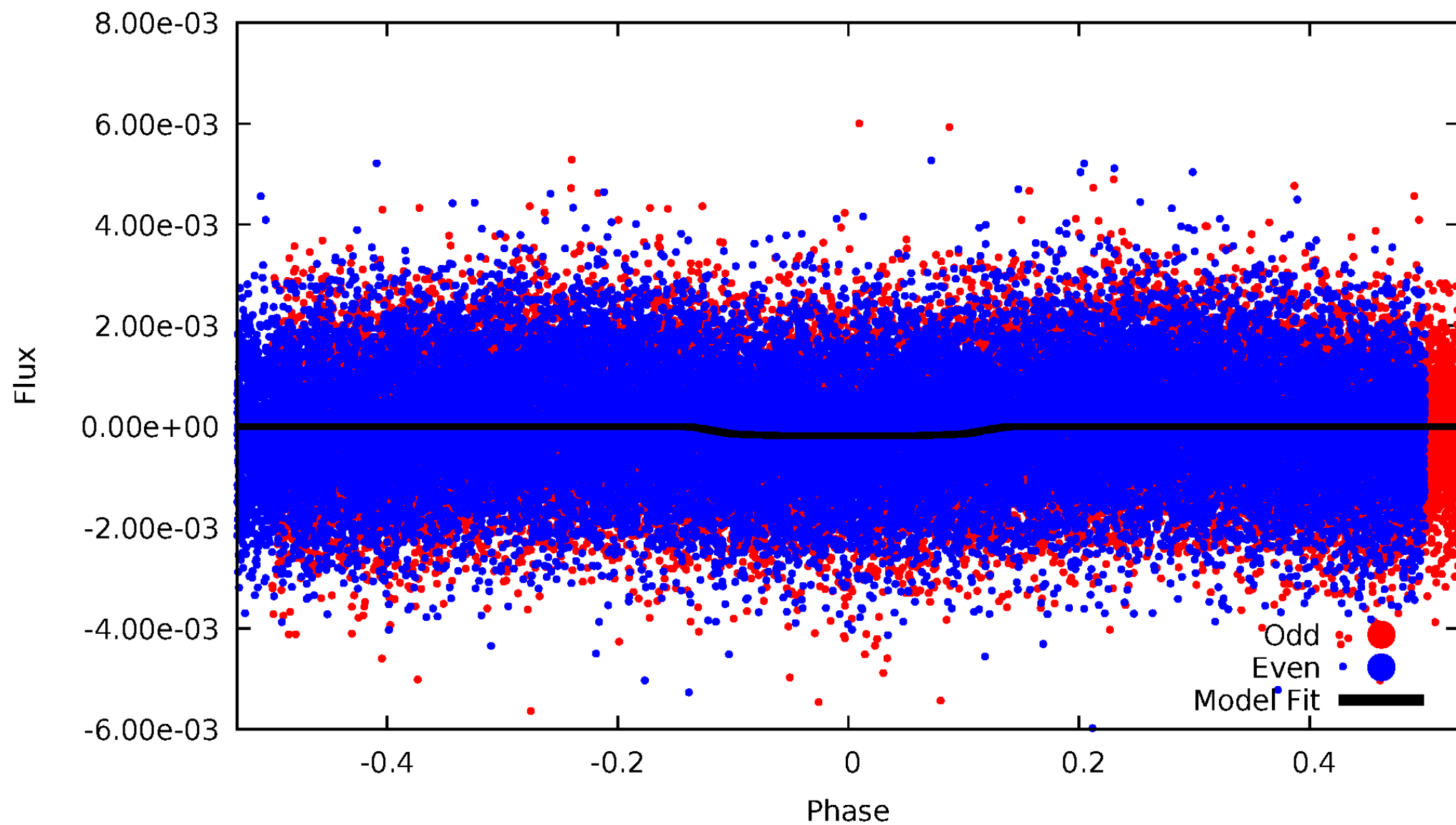
# TCE 009655419-02





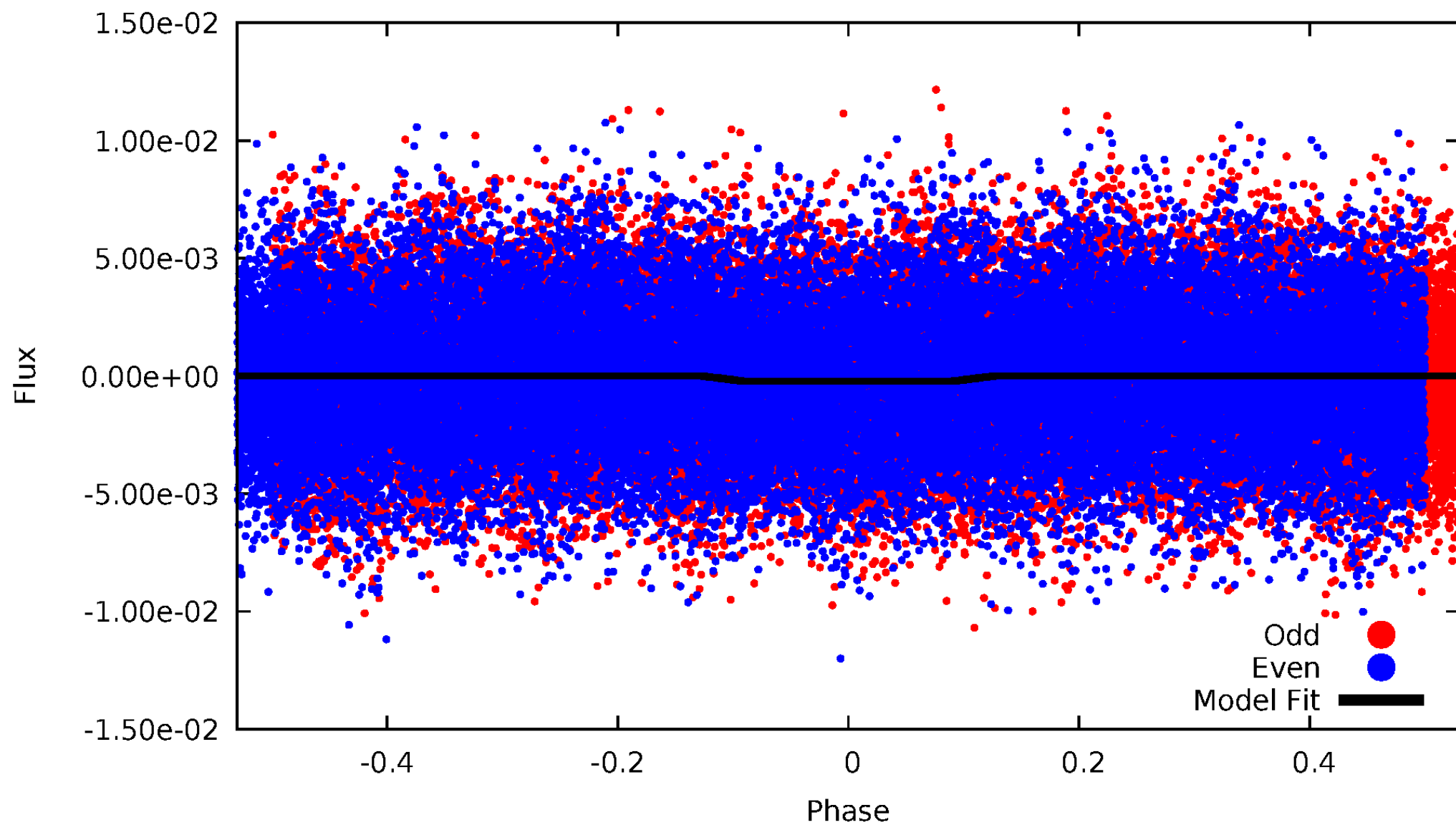
# DV Odd/Even

TCE 009655419-02



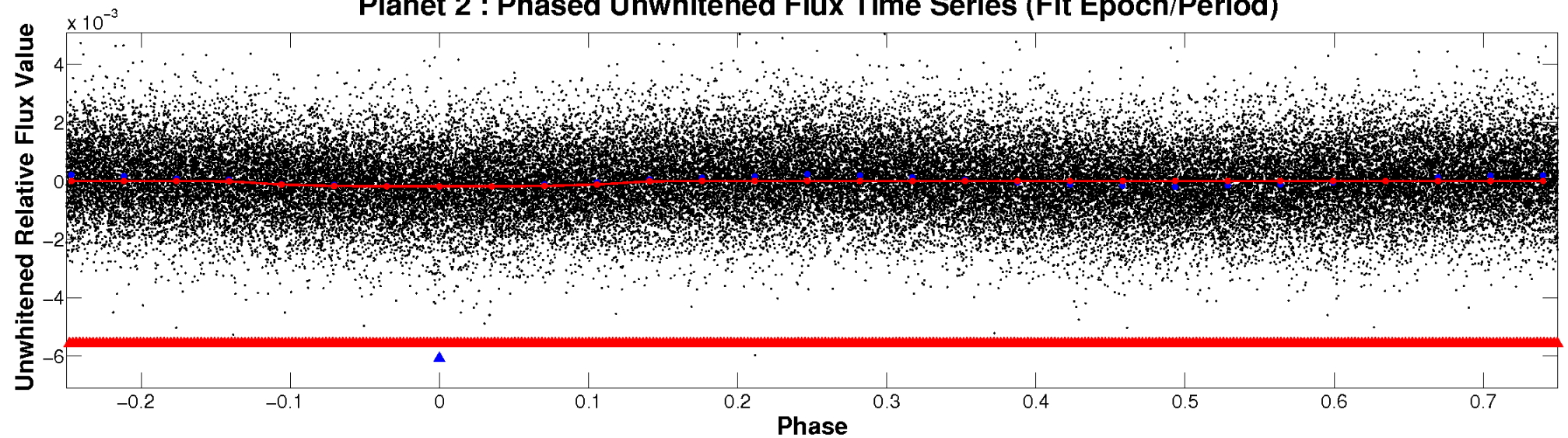
# ALT Odd/Even

TCE 009655419-02

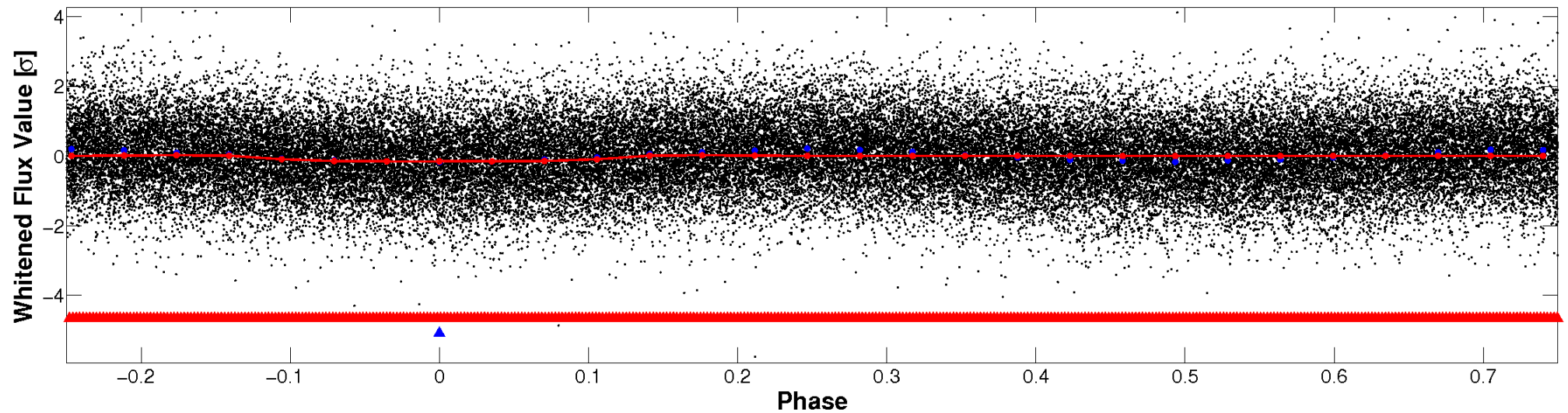


# Non-Whitened Vs. Whitened Light Curve

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

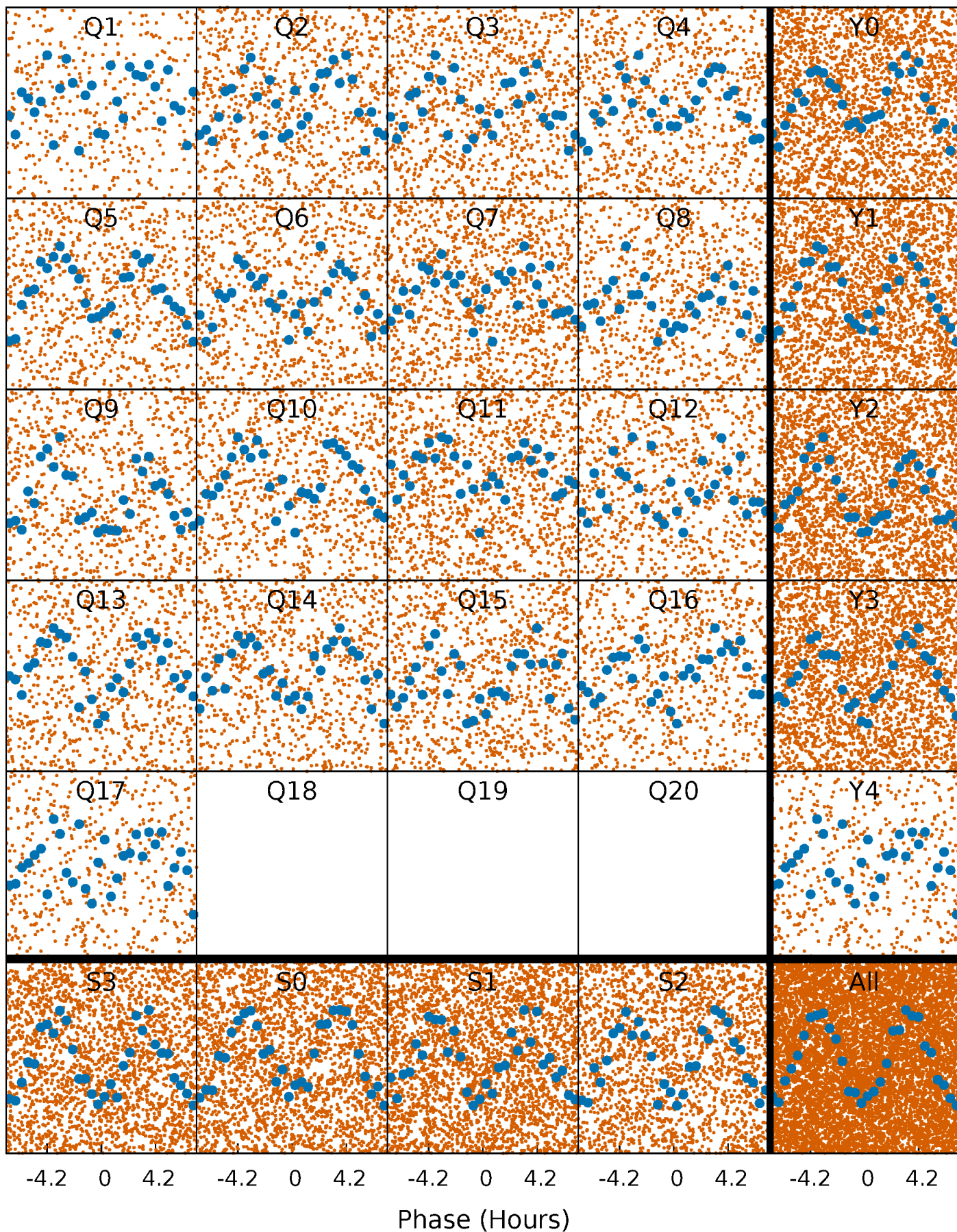


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

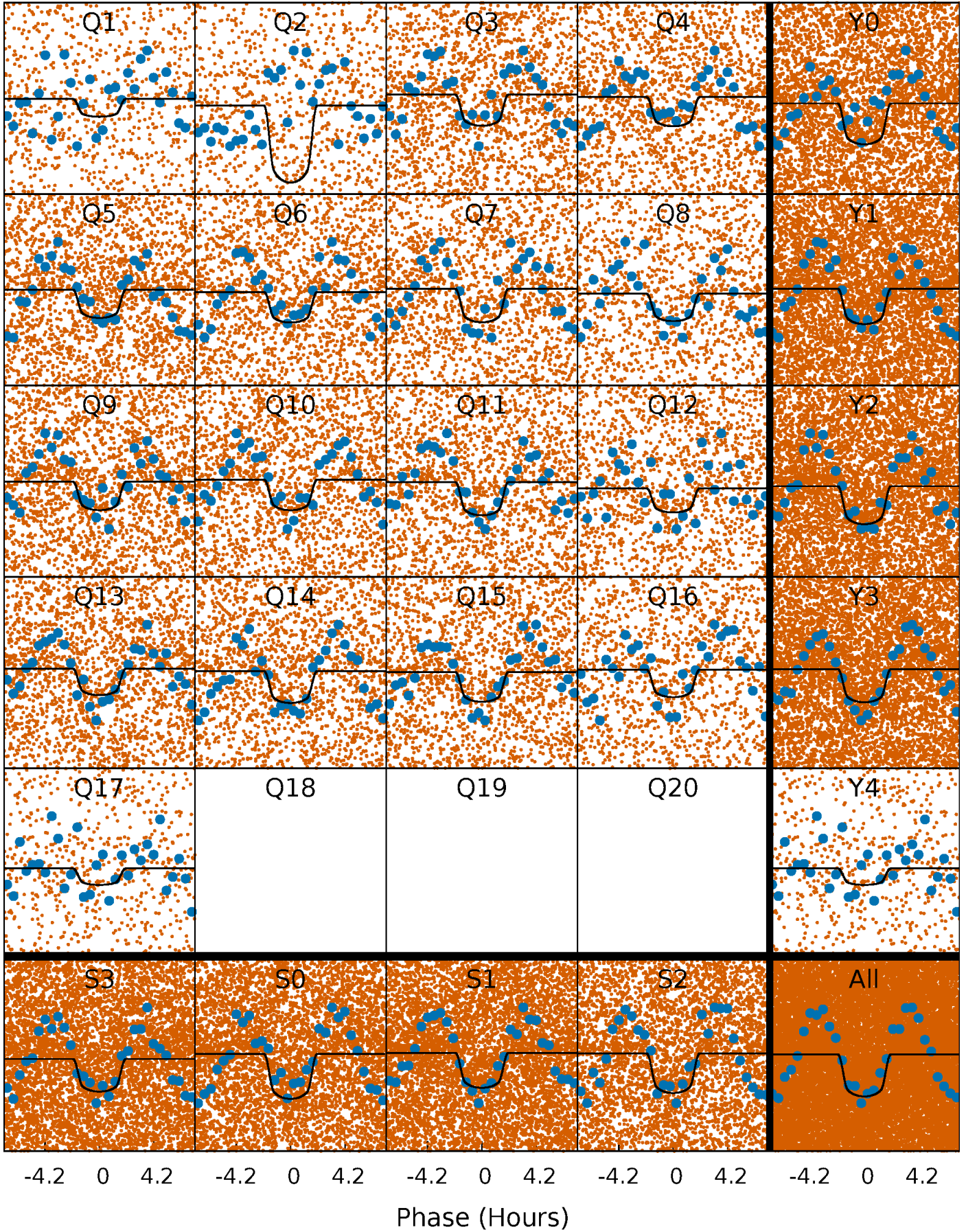
TCE 009655419-02   P= 0.579727 Days    $T_0=131.765514$  (BKJD)





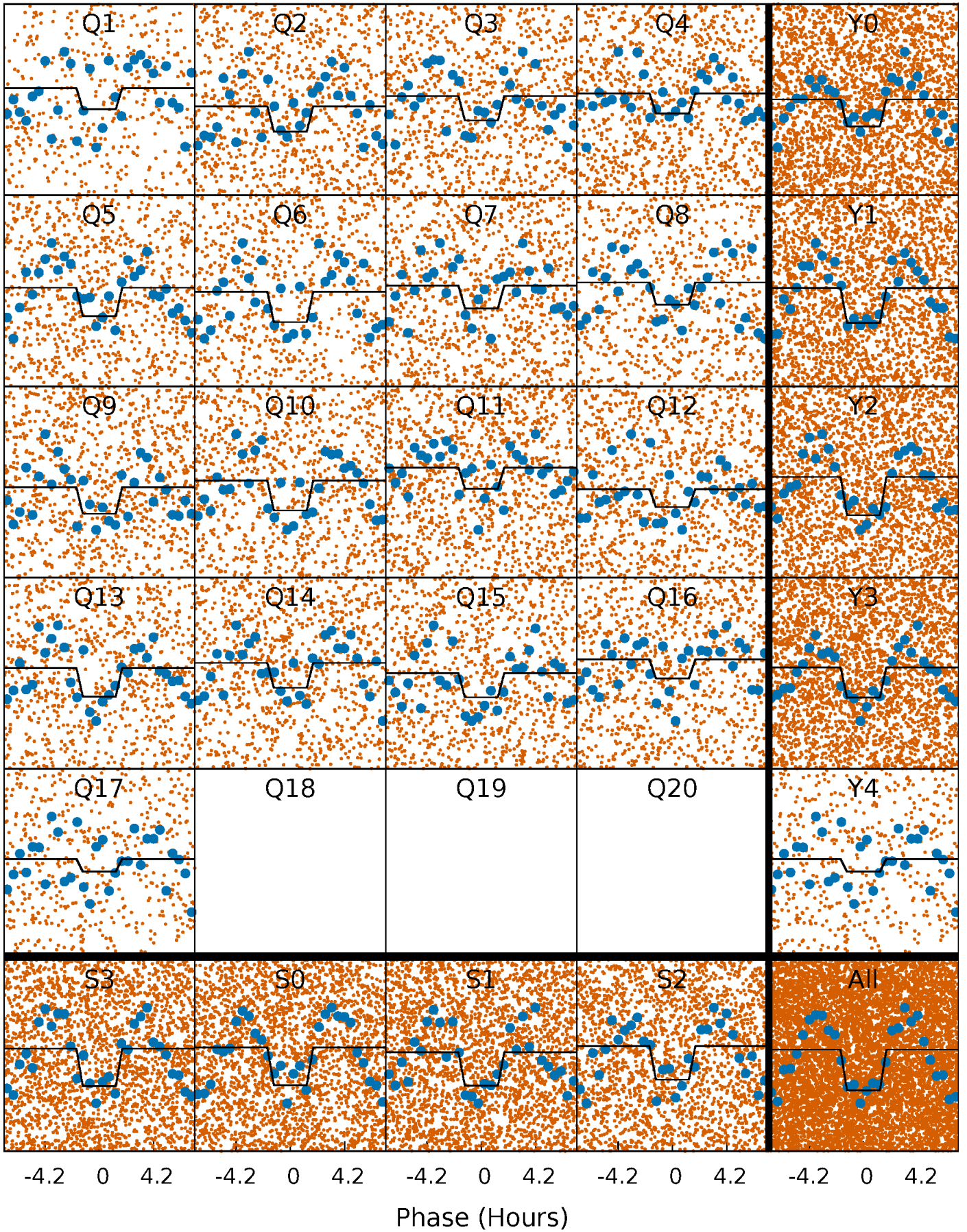
# DV Quarter-Phased Transit Curves

TCE 009655419-02   P= 0.579727 Days    $T_0=131.765514$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009655419-02   P= 0.579727 Days    $T_0=131.765514$  (BKJD)

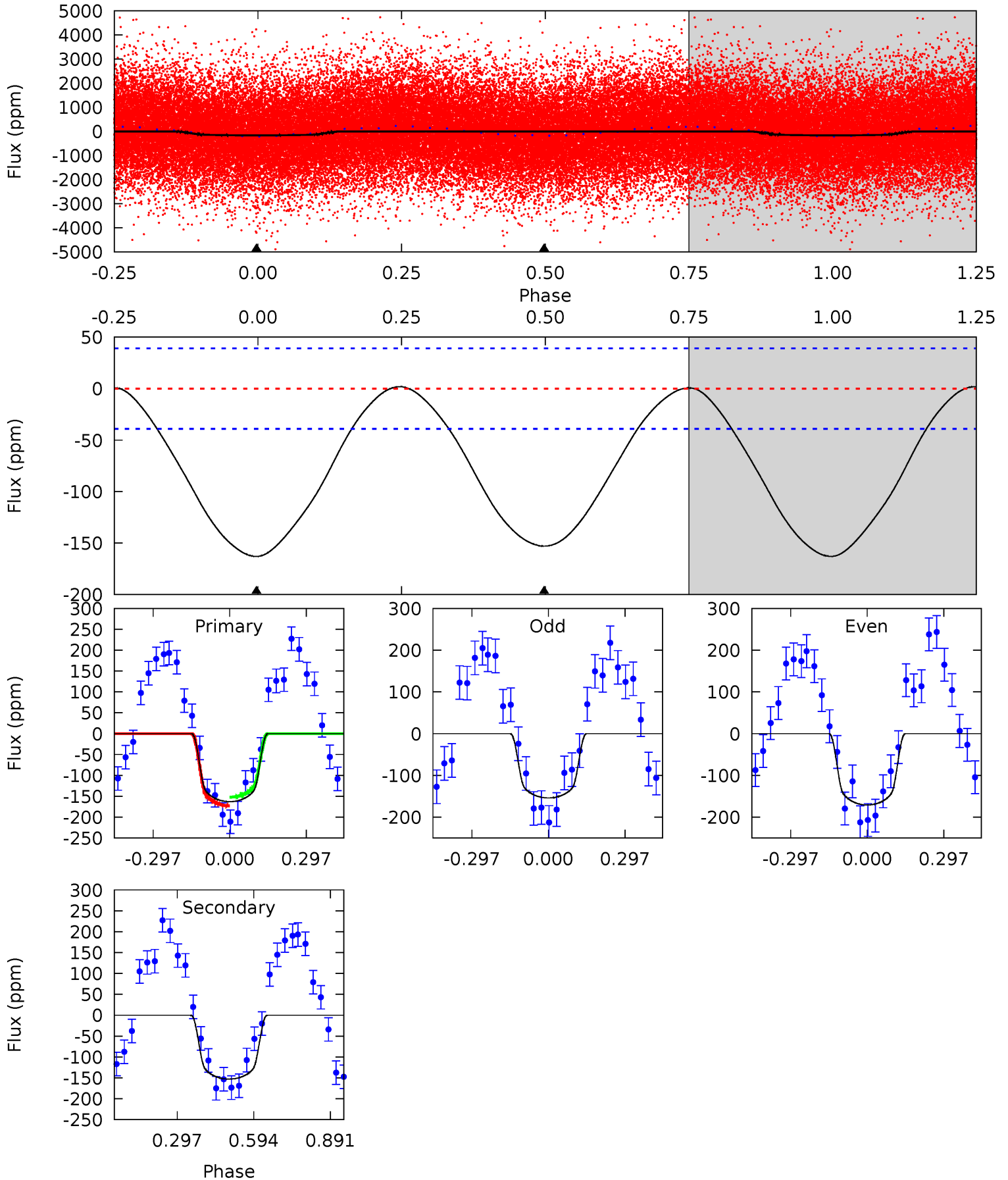




# DV Model-Shift Uniqueness Test

009655419-02, P = 0.579727 Days, E = 131.185787 Days

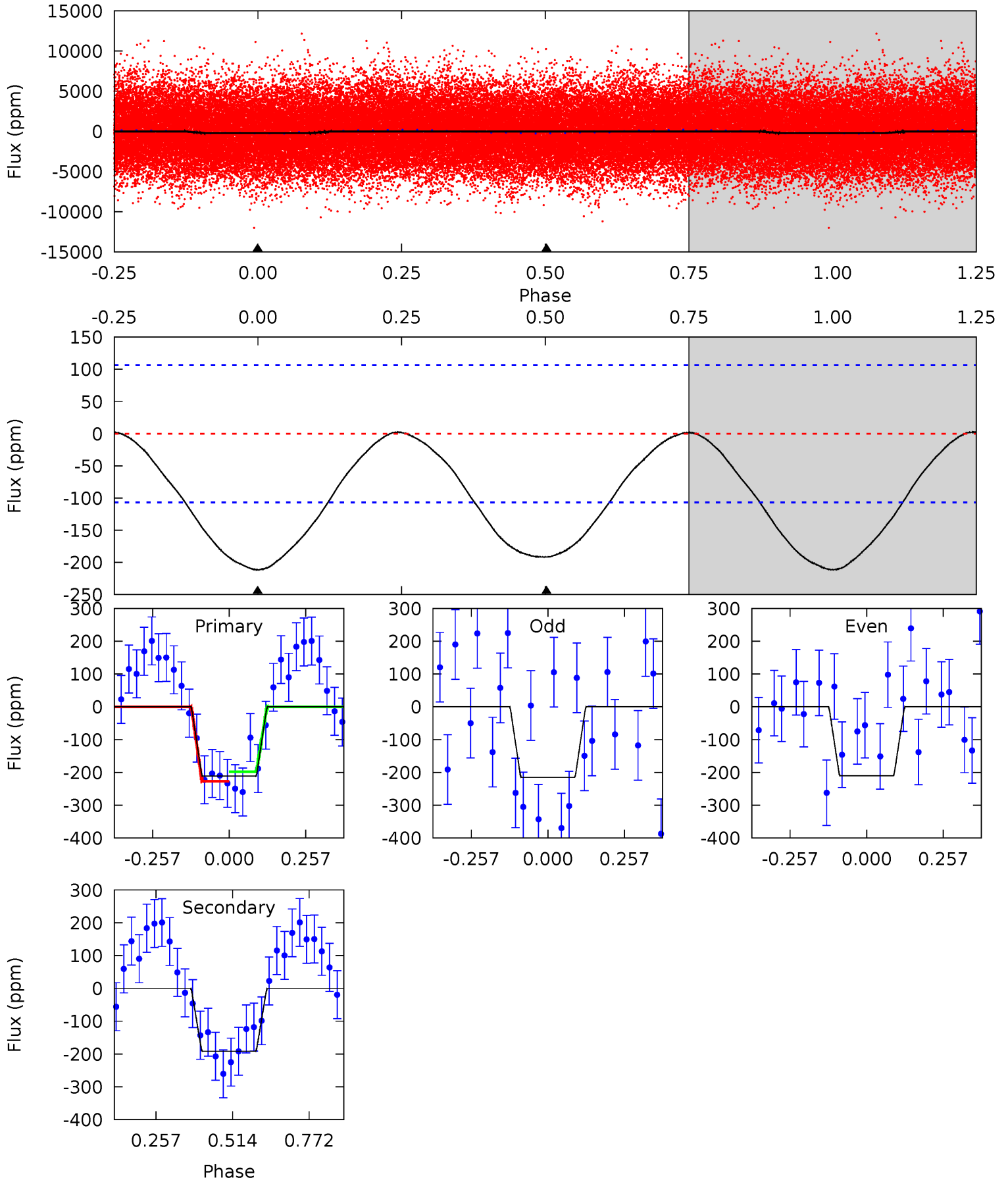
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.0	16.9	0	0	4.33	1.04	0.17	18.0	18.0	16.9	16.9	0.94	1.00	0.01	1.18



# Alt Model-Shift Uniqueness Test

009655419-02, P = 0.579727 Days, E = 131.185787 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
8.65	7.84	0	0	4.36	1.13	0.11	8.65	8.65	7.84	7.84	0.11	0.82	0.01	0.60



### Stellar Parameters For KIC 009655419

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6831^{+191}_{-287}$	$3.959^{+0.258}_{-0.172}$	$0.210^{+0.150}_{-0.350}$	$2.247^{+0.686}_{-0.686}$	$1.675^{+0.187}_{-0.321}$	$0.208^{+0.332}_{-0.097}$
	+3%/-4%	+7%/-4%	+71%/-167%	+31%/-31%	+11%/-19%	+159%/-46%
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 009655419-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-153 \pm 9$	$3.53^{+0.95}_{-0.89}$	$4914^{+401}_{-421}$	$5877^{+875}_{-648}$	$1.721^{+1.291}_{-0.670}$
Alt.	$-192 \pm 24$	$3.47^{+0.95}_{-0.80}$	$4892^{+398}_{-413}$	$6319^{+864}_{-696}$	$2.236^{+1.564}_{-0.871}$

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

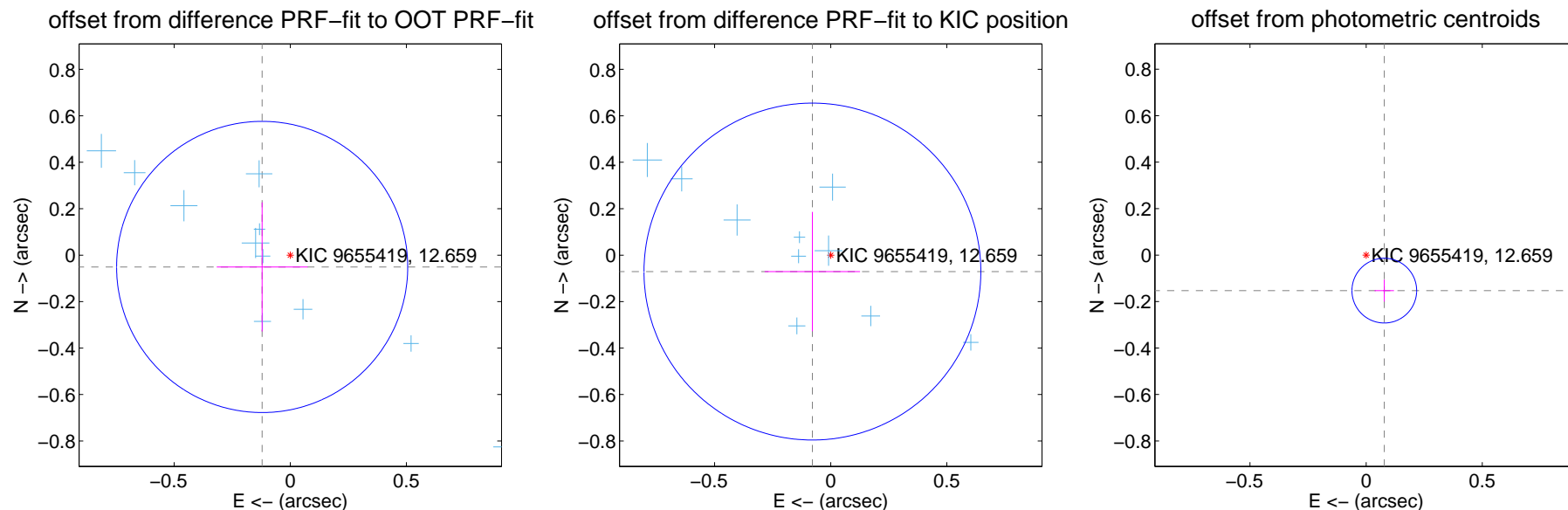
## DV Centroid Data

Supplemental centroid analysis for 009655419-02. Kepler magnitude: 12.66. Transit SNR 15.92

There are 13 quarters with good PRF difference image offsets

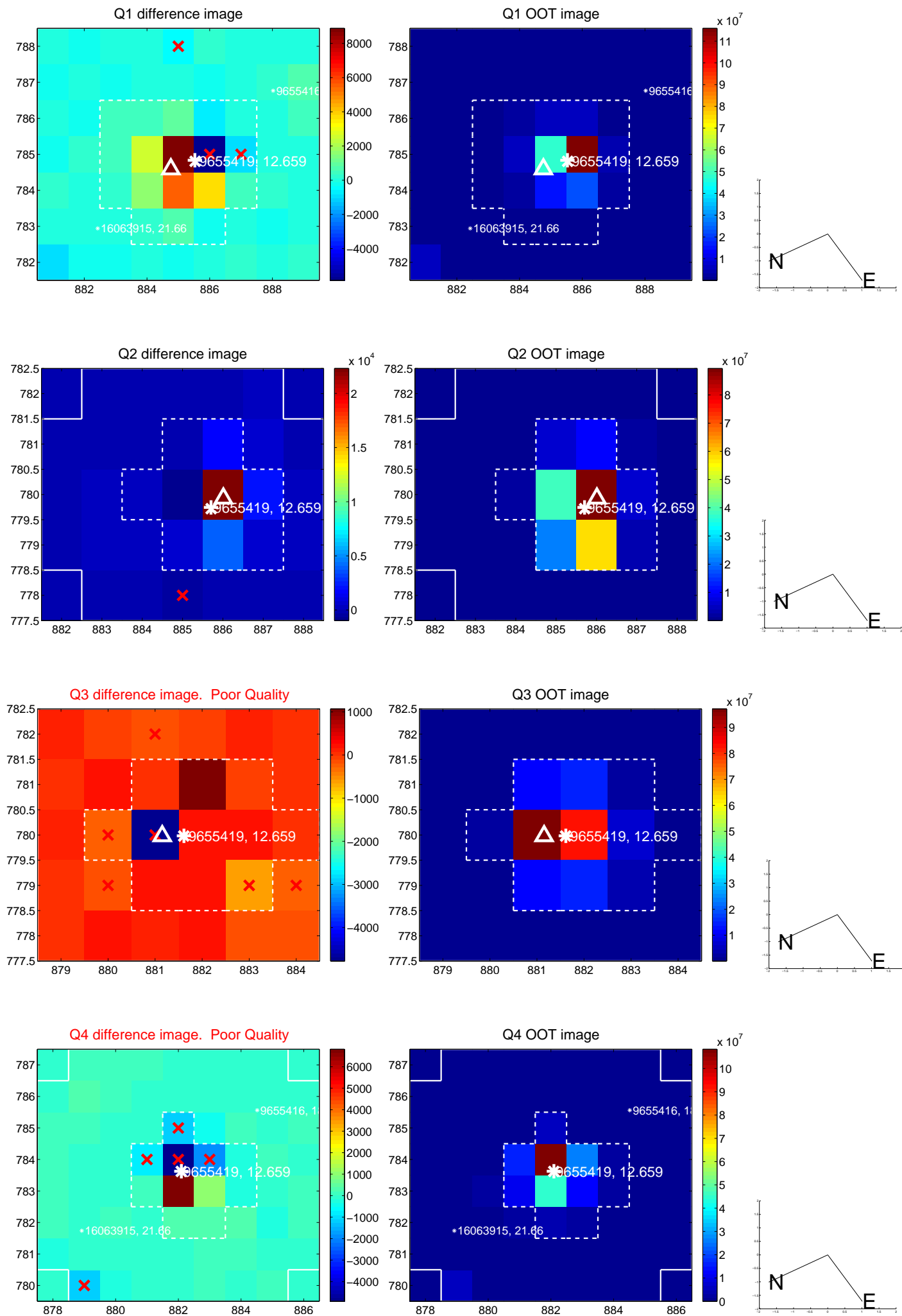
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.131 \pm 0.209$	0.63	$0.121 \pm 0.196$	$-0.051 \pm 0.278$
PRF-fit source offset from KIC position	$0.106 \pm 0.242$	0.44	$0.079 \pm 0.205$	$-0.071 \pm 0.257$
photometric centroid source offset	$0.17 \pm 0.05$	3.70	$-0.08 \pm 0.04$	$-0.15 \pm 0.05$

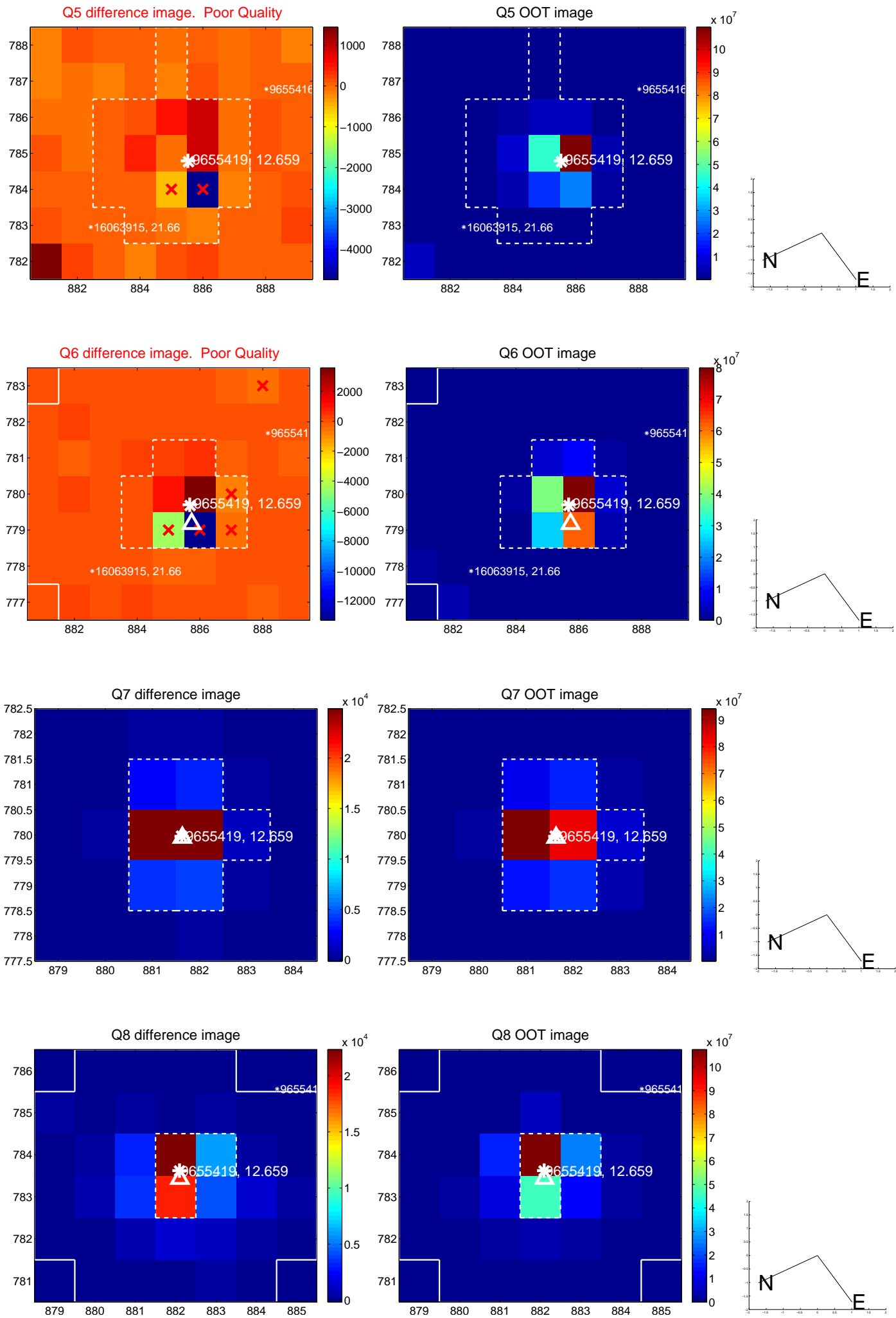


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

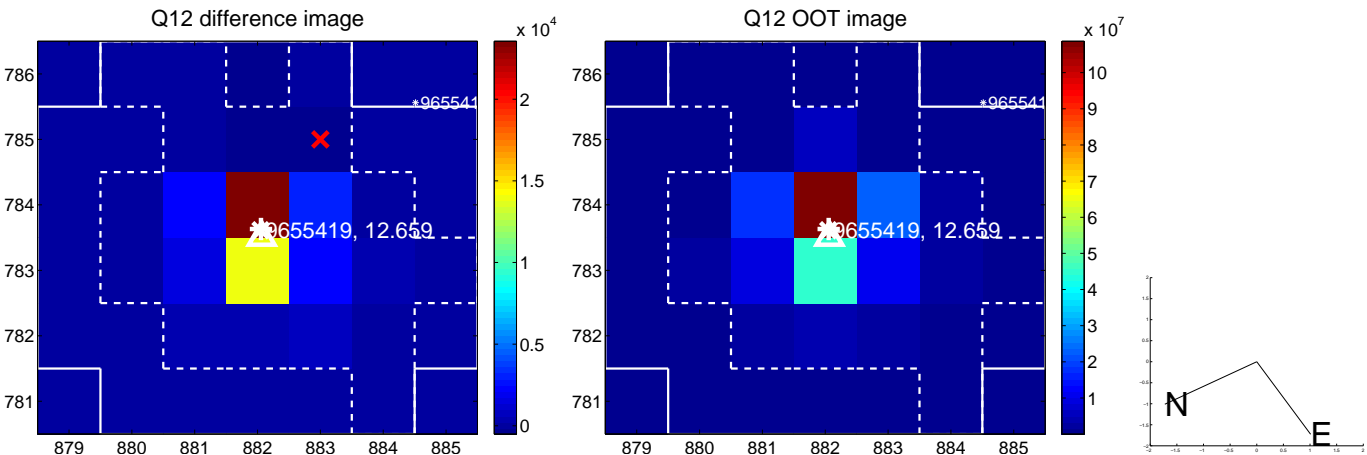
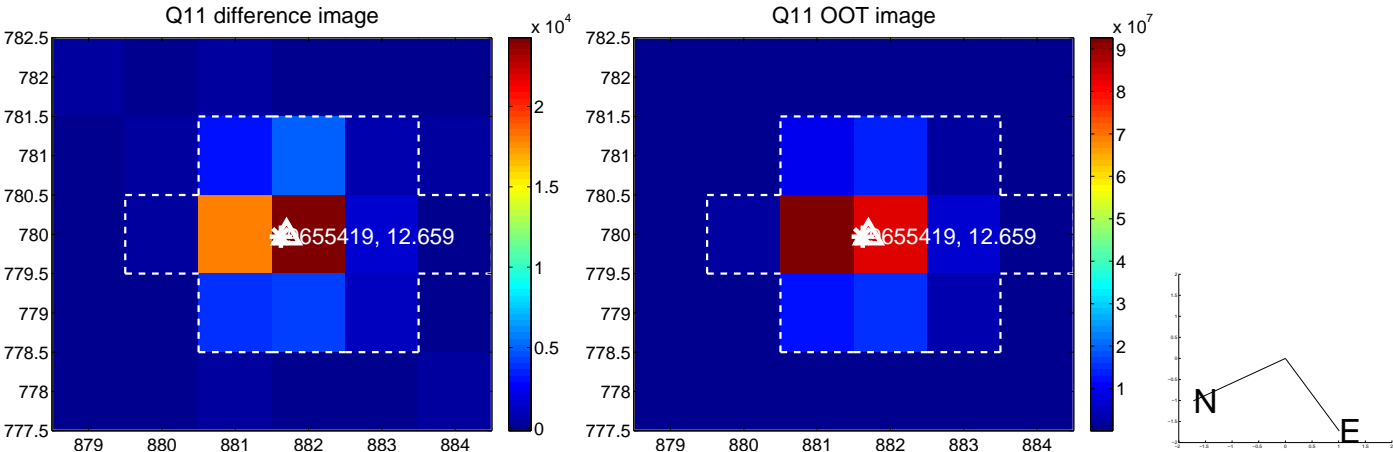
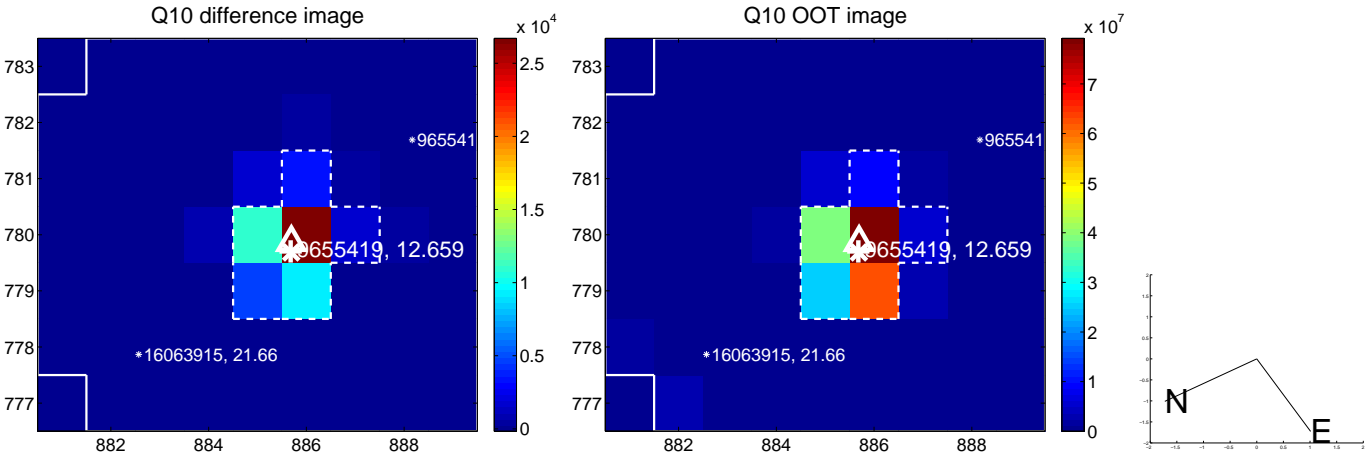
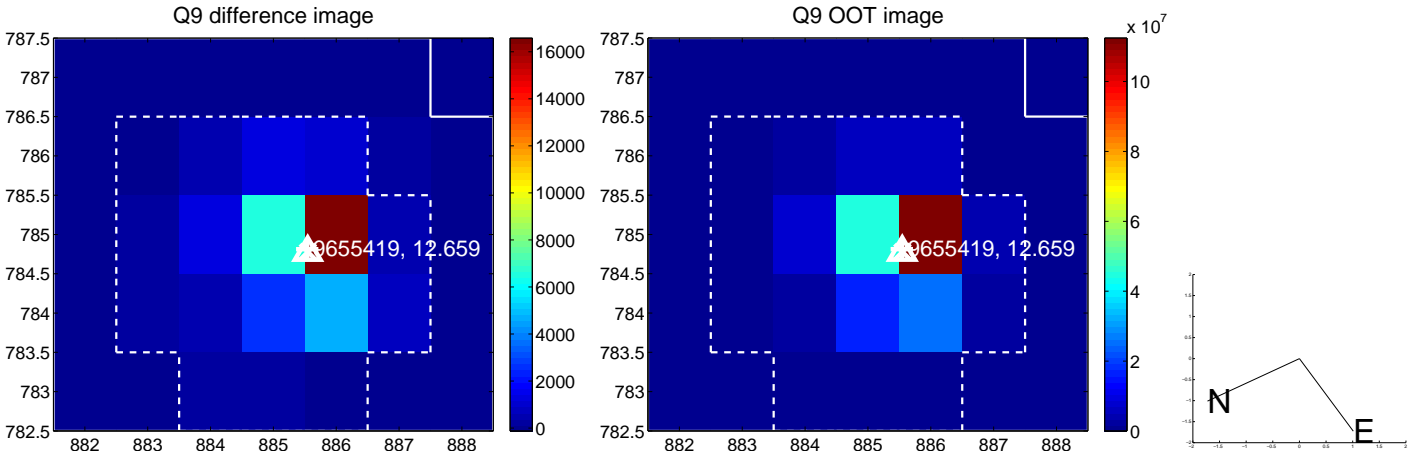


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

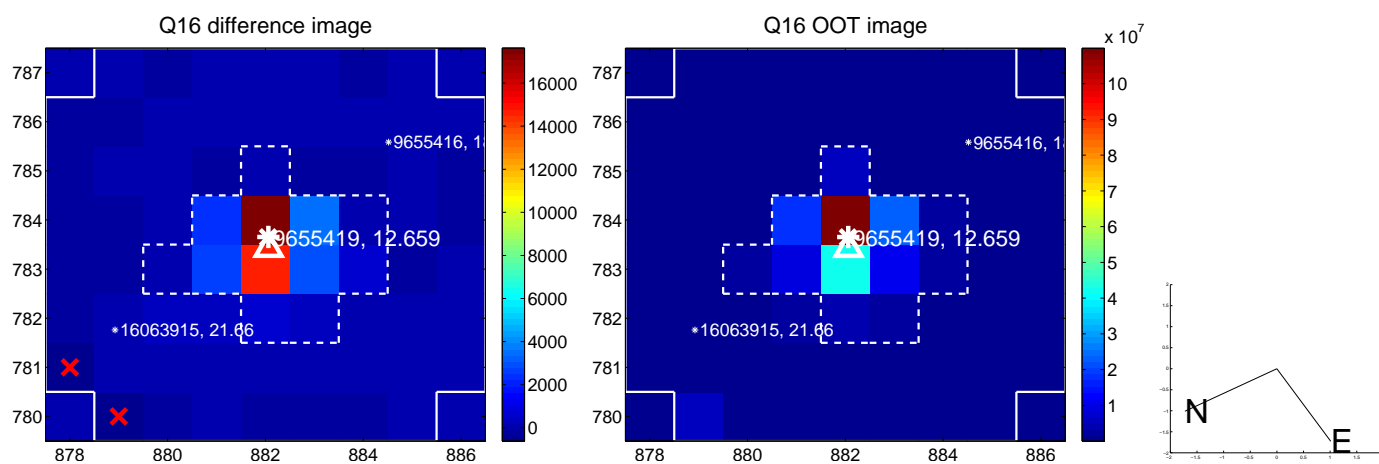
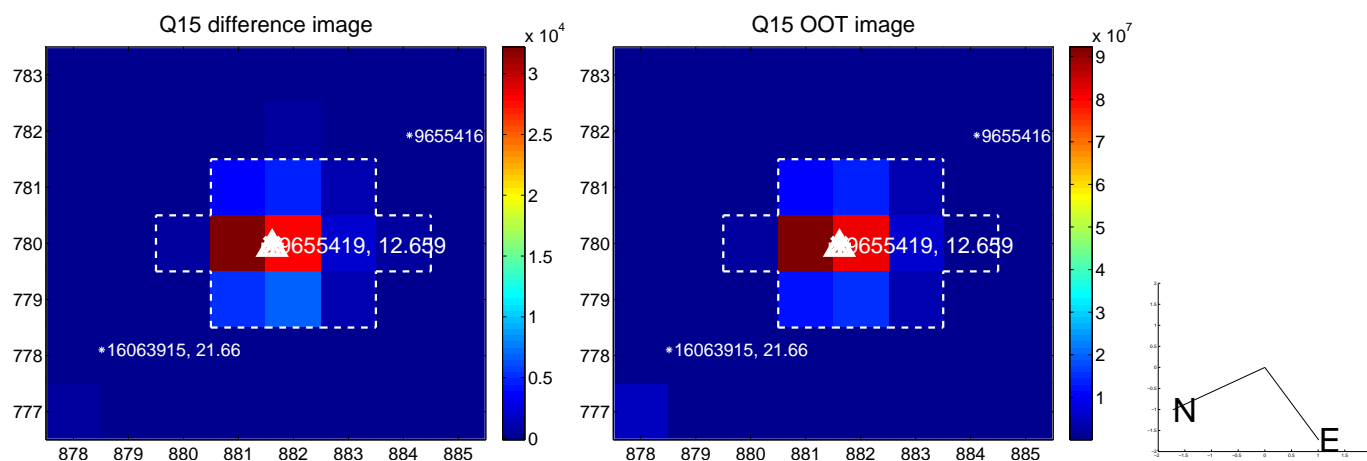
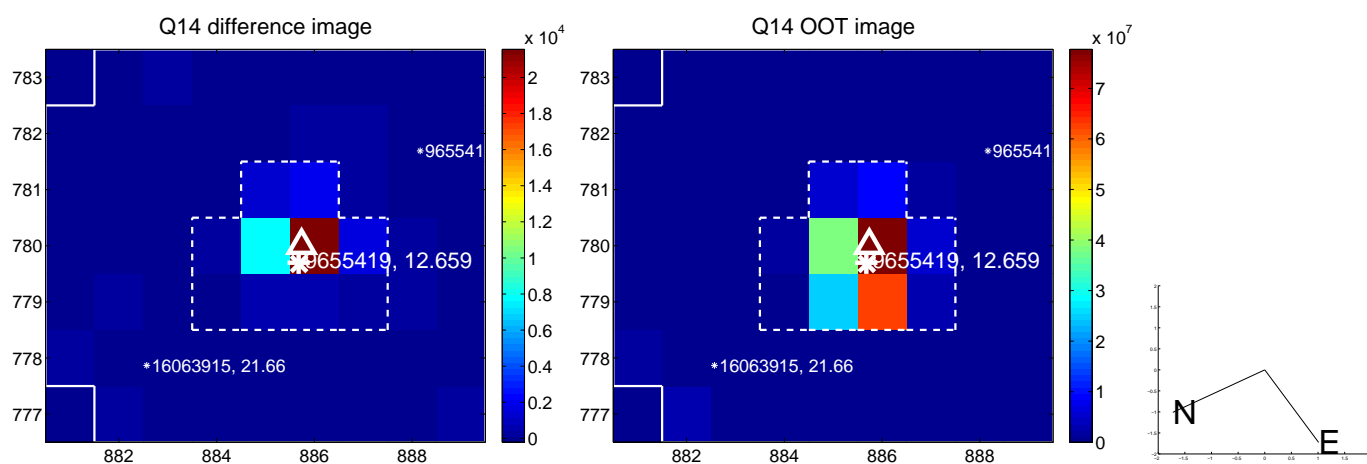
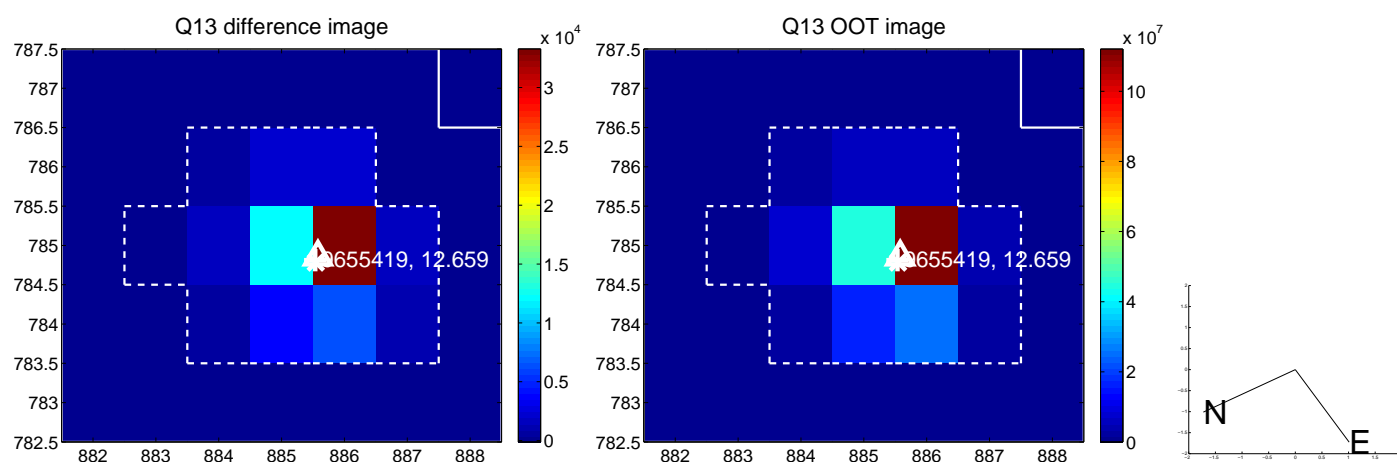




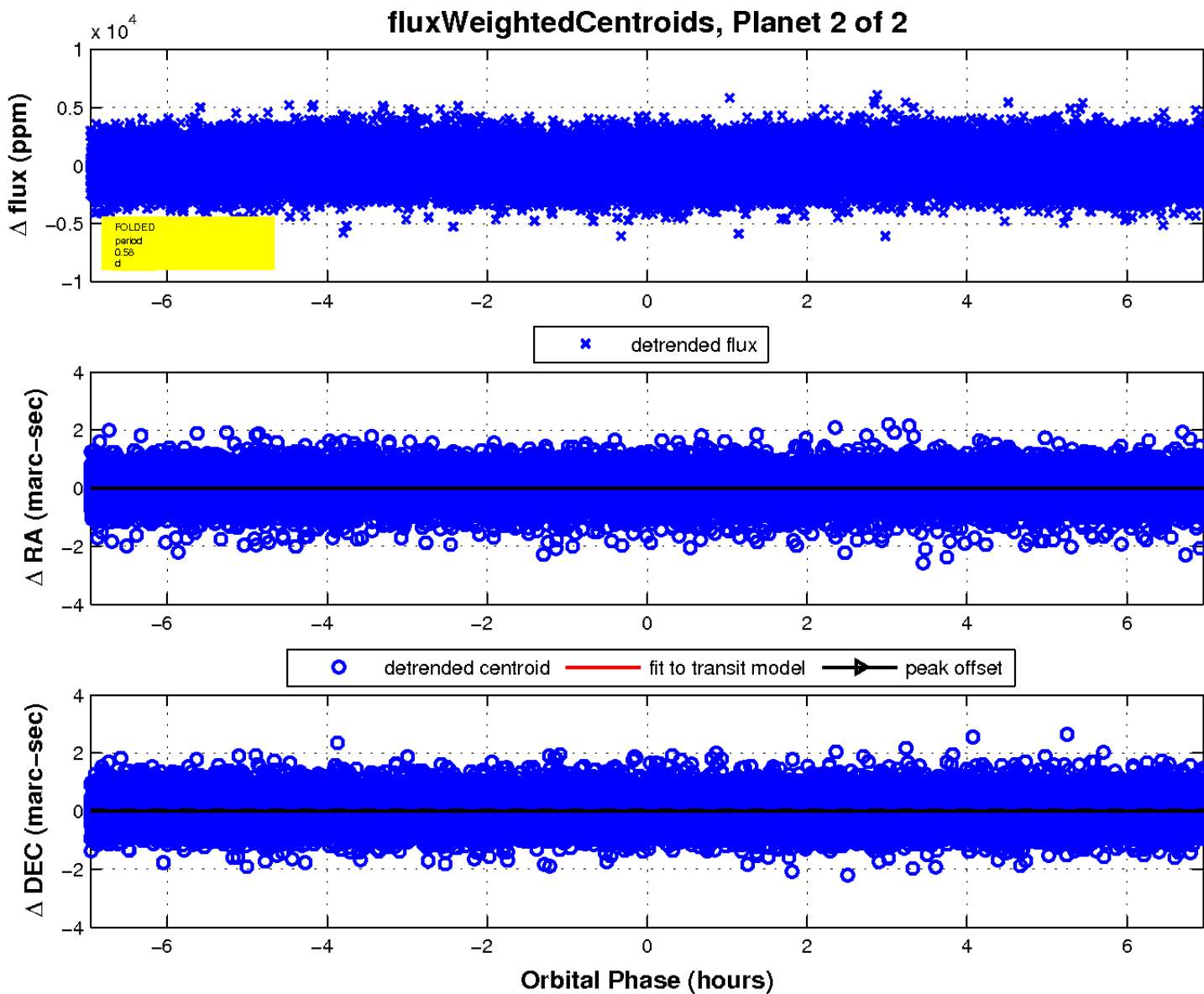
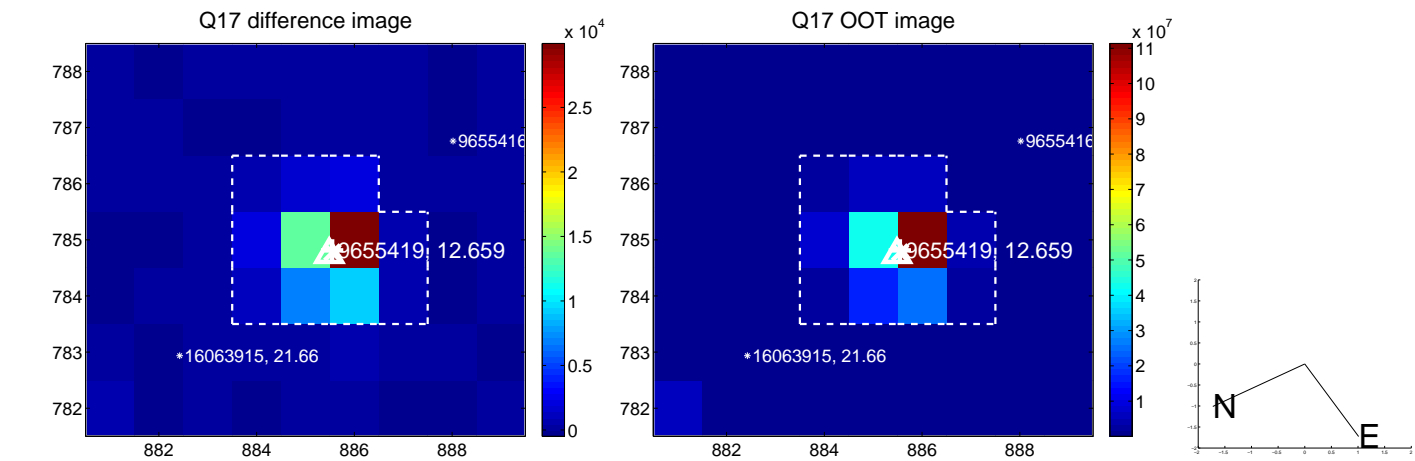
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

