

# KIC 008376471

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008376471-01	OBS	No	1.197885	131.850343	96.0	1.601	11.4	9.6	2.49	7261	2.61	21478.00
008376471-02	OBS	No	0.528733	131.826399	32.6	1.291	10.1	4.0	2.49	7261	1.65	63909.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008376471-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008376471-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

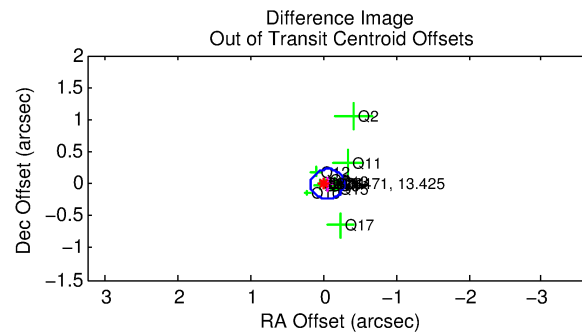
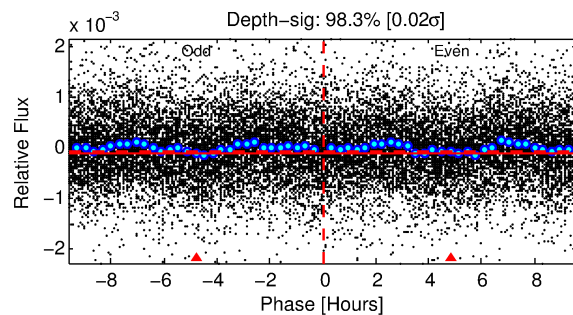
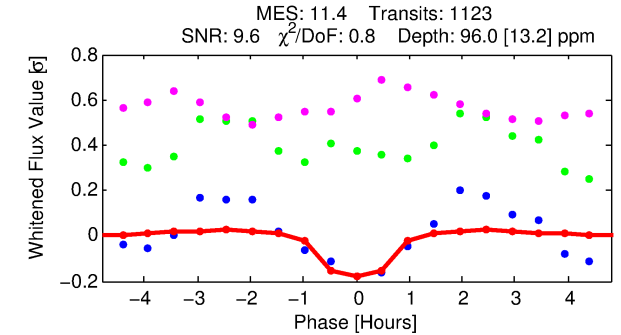
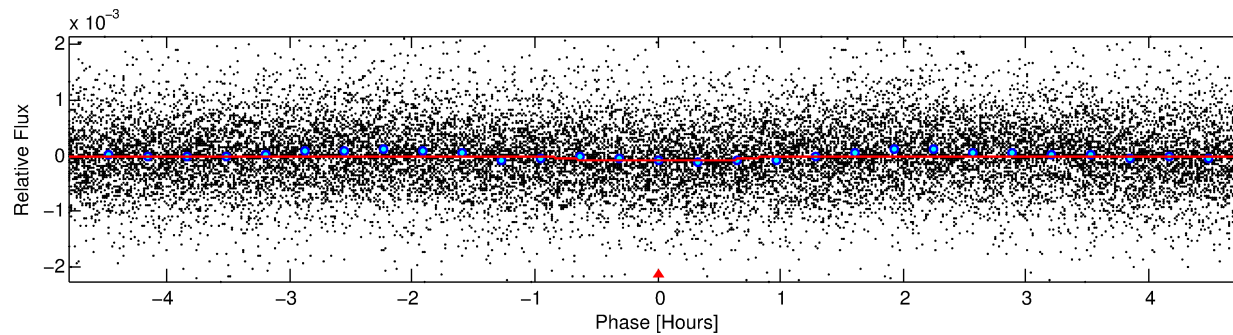
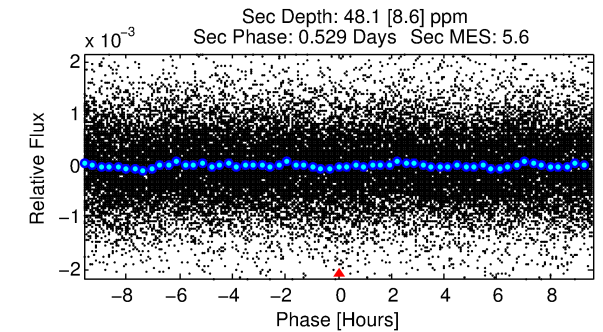
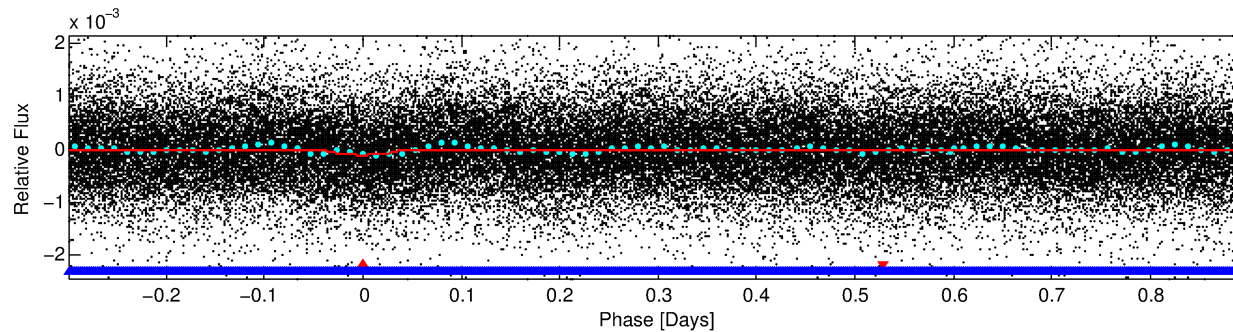
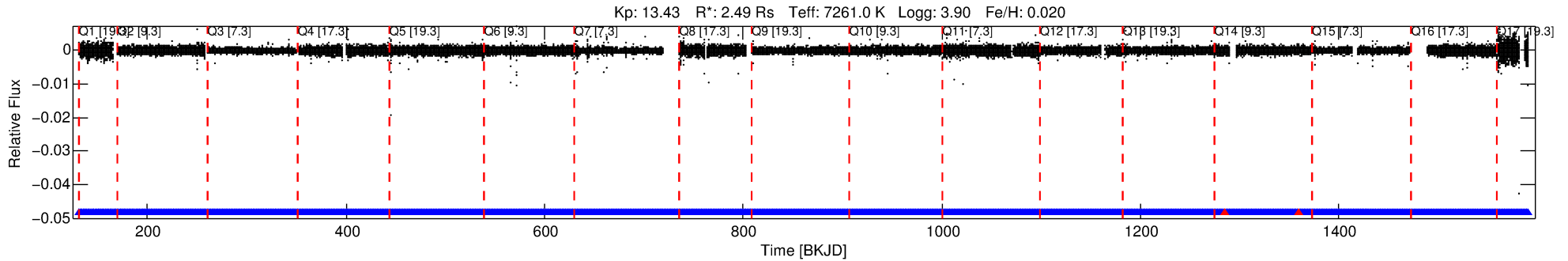
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008376471-01

No Significant Match Found

# DV One-Page Summary

KIC: 8376471 Candidate: 1 of 2 Period: 1.198 d



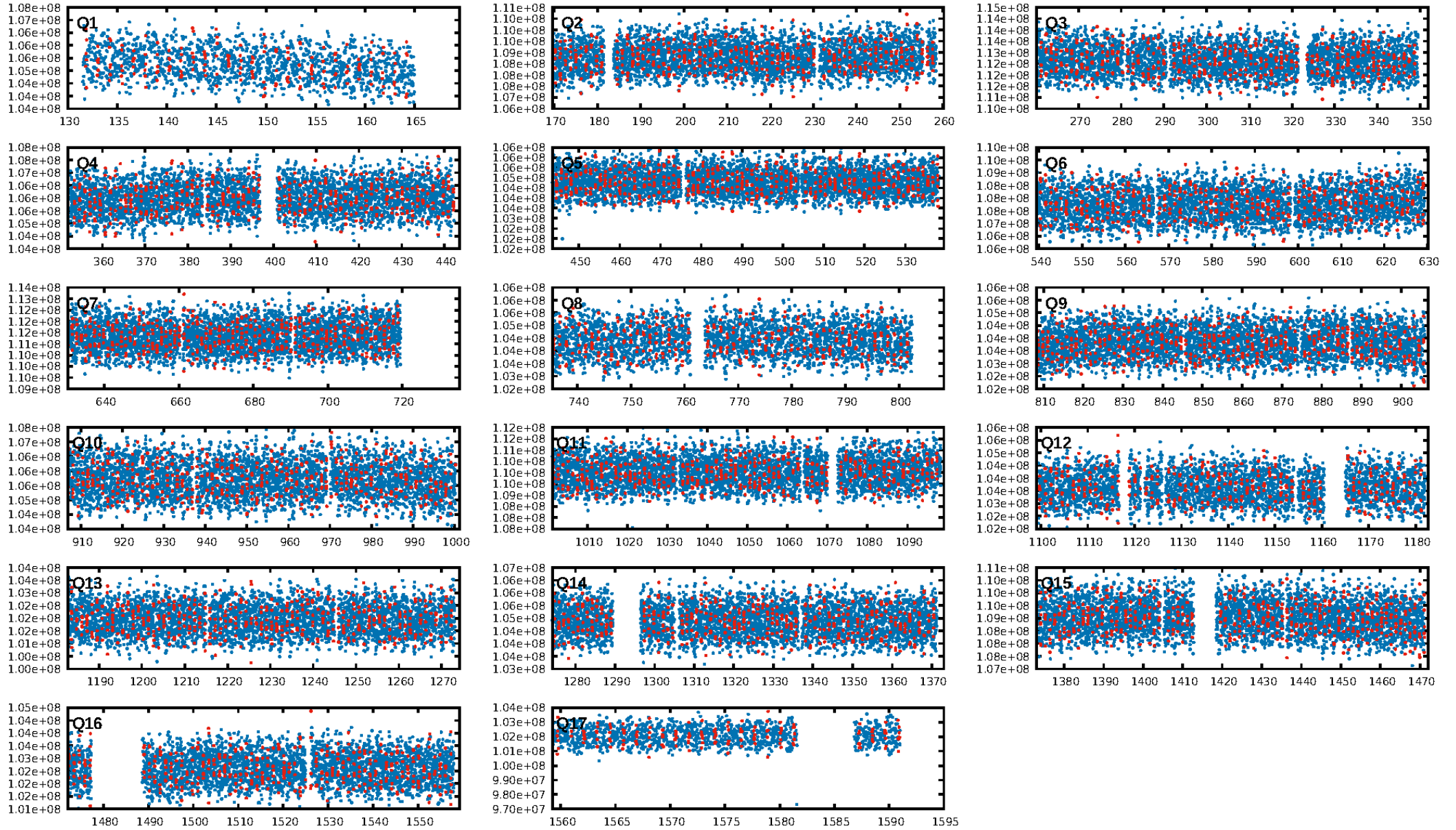
## DV Fit Results:

Period = 1.19789 [0.00001] d  
Epoch = 131.8503 [0.0026] BKJD  
Rp/R\* = 0.0096 [0.0033]  
a/R\* = 4.28 [8.40]  
b = 0.69 [1.57]  
Seff = 21478.00 [11200.53]  
Teq = 3087 [402] K  
Rp = 2.61 [1.32] Re  
a = 0.0268 [0.0086] AU  
Ag = 2.78 [2.40] [0.74σ]  
Teffp = 6161 [1138] K [2.55σ]

## DV Diagnostic Results:

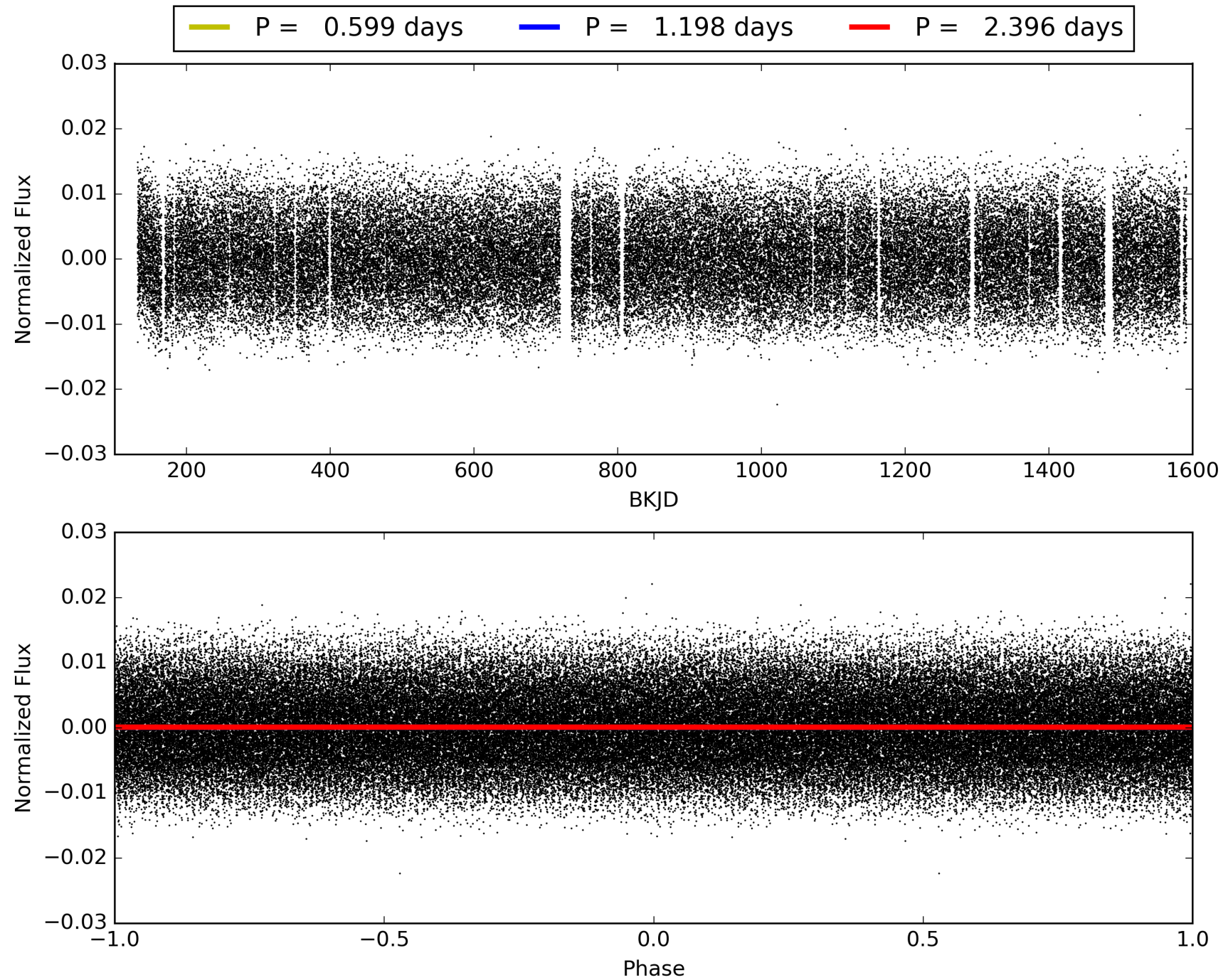
ShortPeriod-sig: 100.0% [7.81σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.02e-28  
RollingBand-fgt: 1.00 [1070/1072]  
GhostDiagnostic-chr: 1.359  
Centroid-sig: 12.6%  
Centroid-so: 0.338 arcsec [1.23σ]  
OotOffset-rm: 0.050 arcsec [0.65σ]  
KicOffset-rm: 0.146 arcsec [1.76σ]  
OotOffset-st: 4/3/4/5 [16]  
KicOffset-st: 4/3/4/5 [16]  
DiffImageQuality-fgm: 0.38 [6/16]  
DiffImageOverlap-fno: 0.47 [8/17]

# TCE 008376471-01, PDC Light Curves



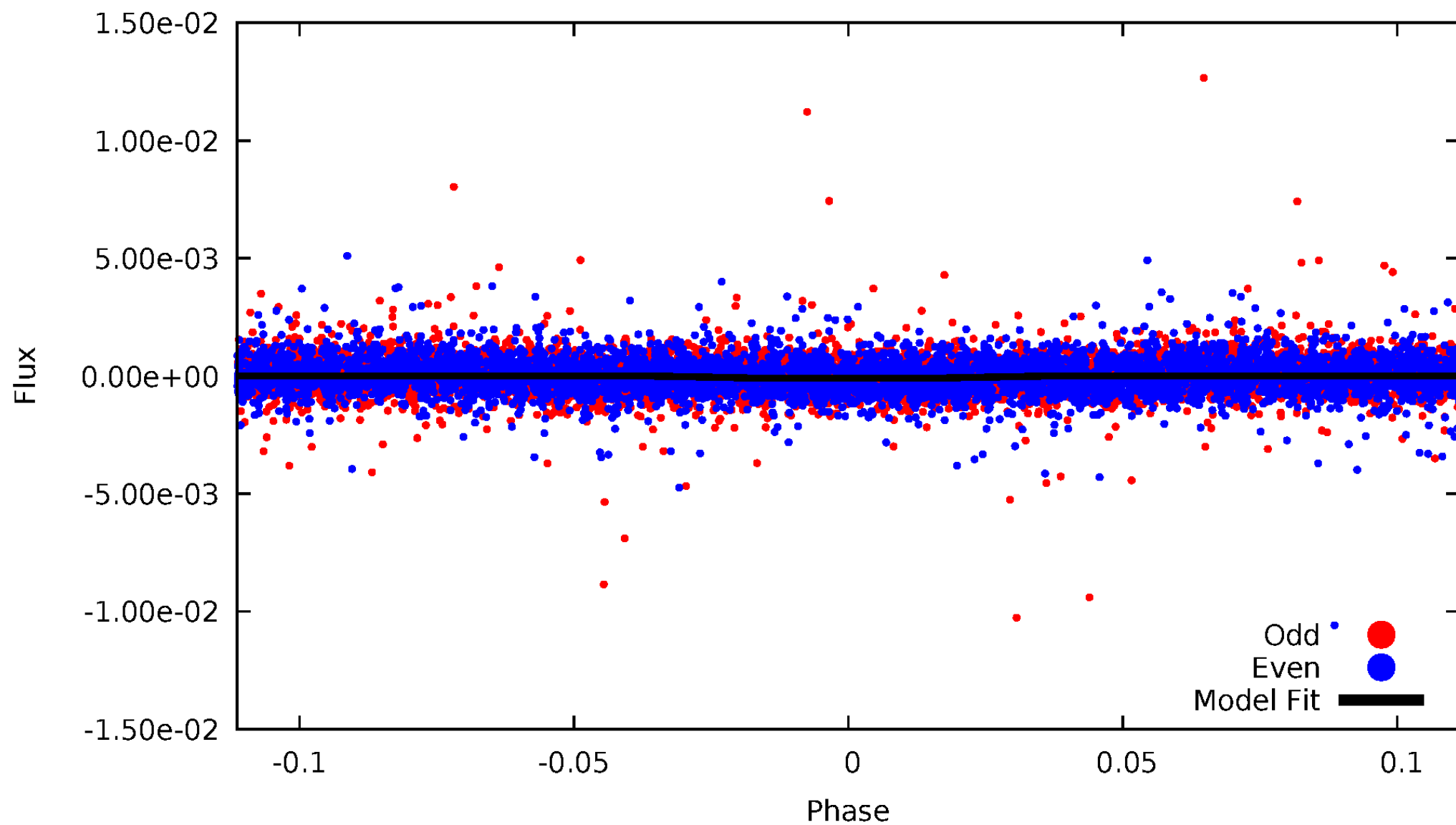


TCE 008376471-01



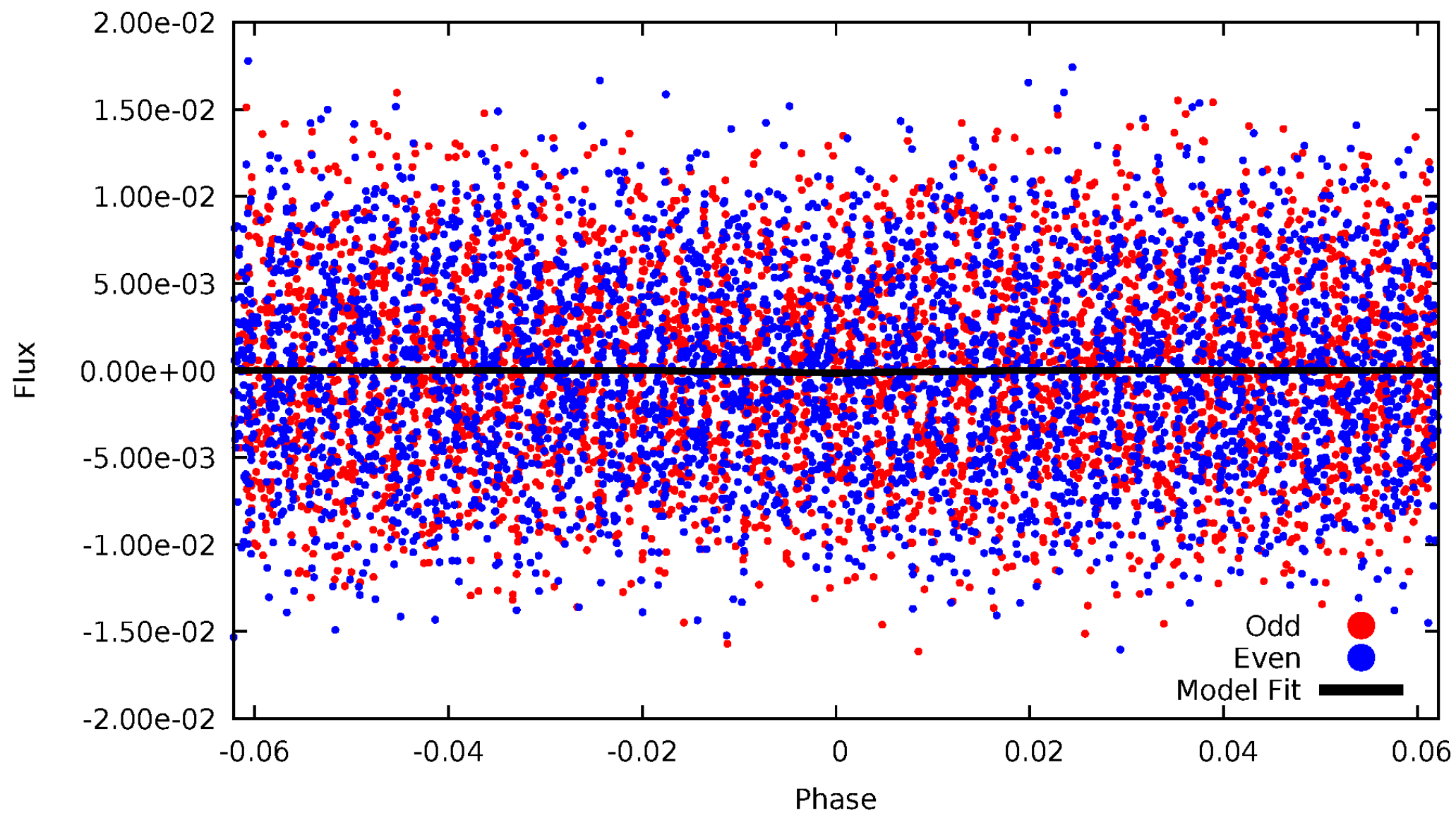
# DV Odd/Even

TCE 008376471-01



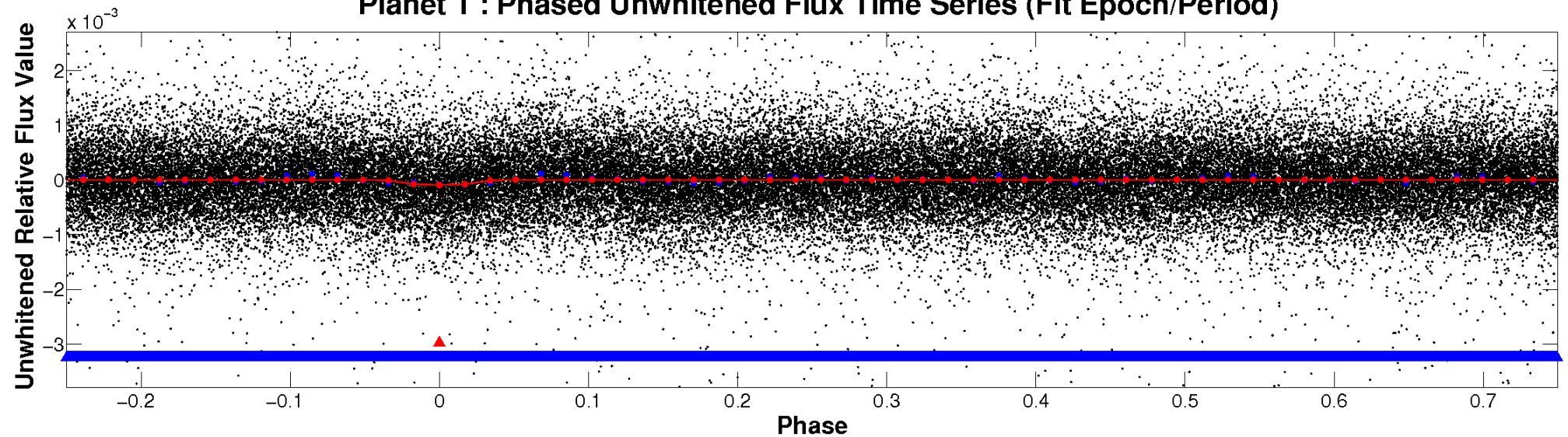
# ALT Odd/Even

TCE 008376471-01

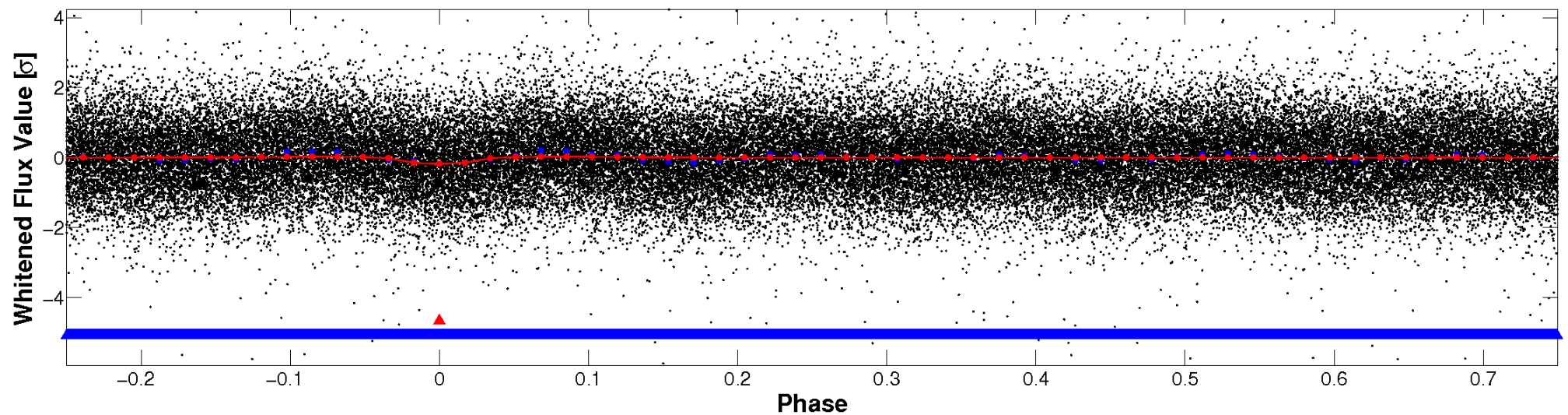


# Non-Whitened Vs. Whitened Light Curve

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



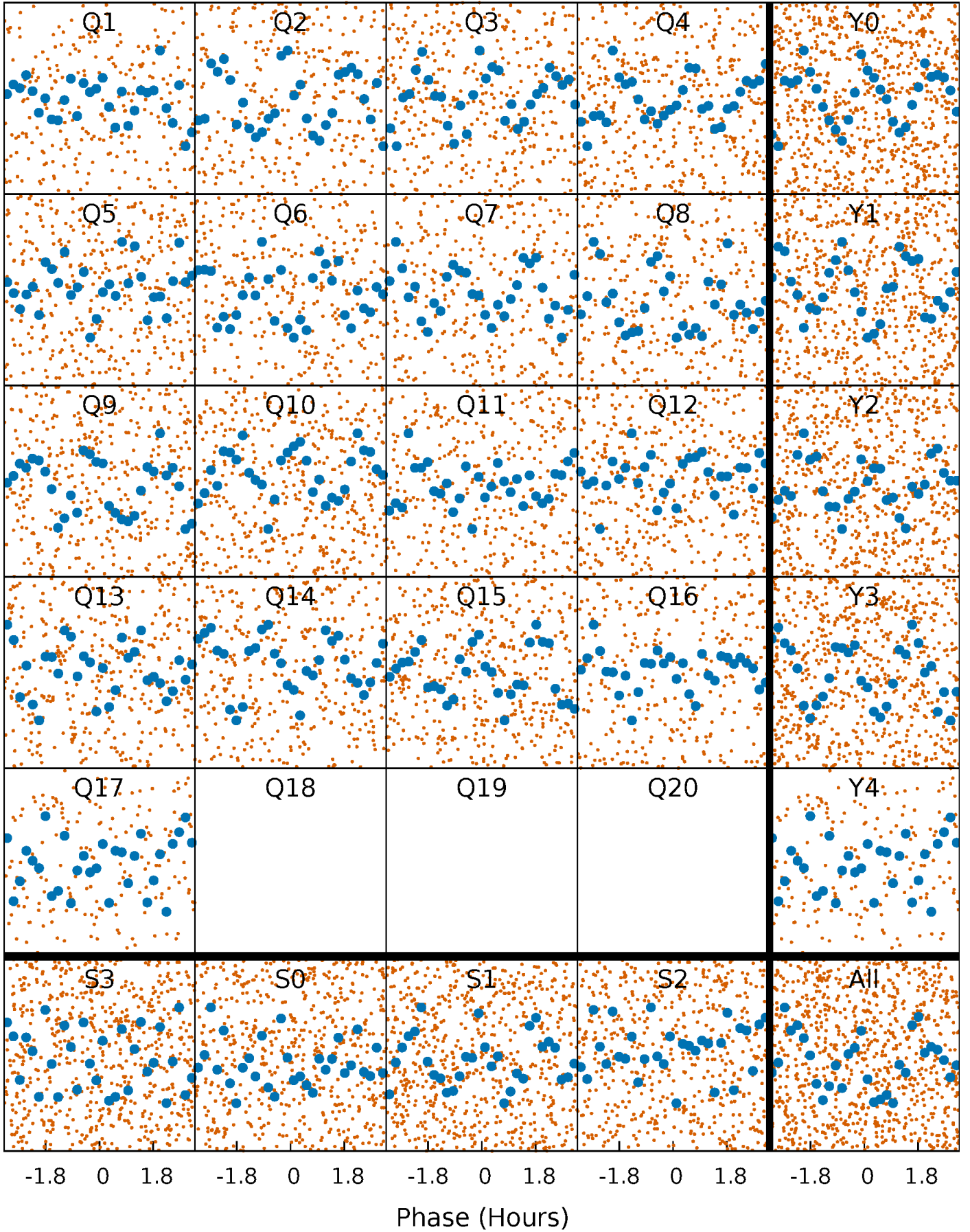
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

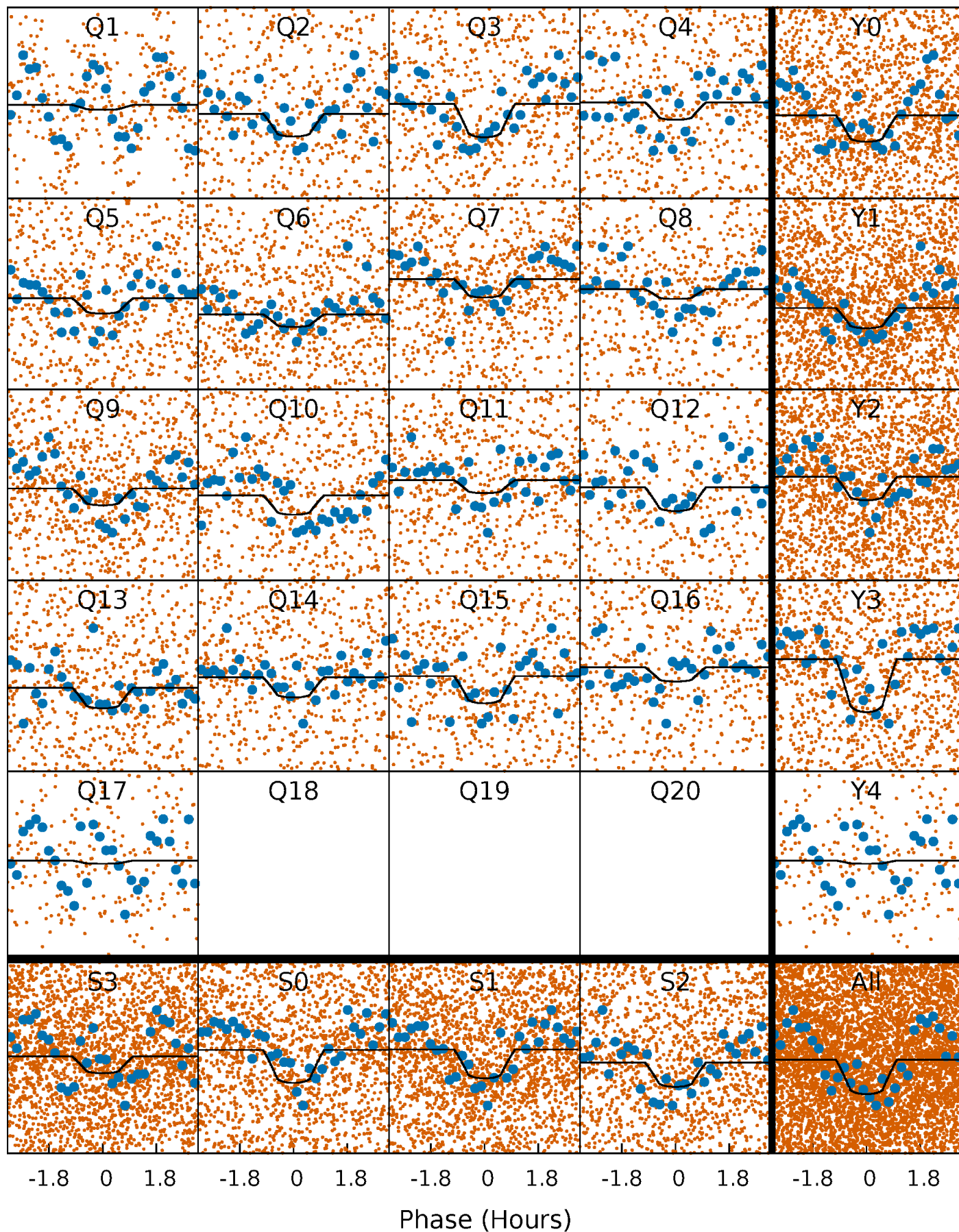
TCE 008376471-01   P= 1.197885 Days    $T_0=131.850343$  (BKJD)





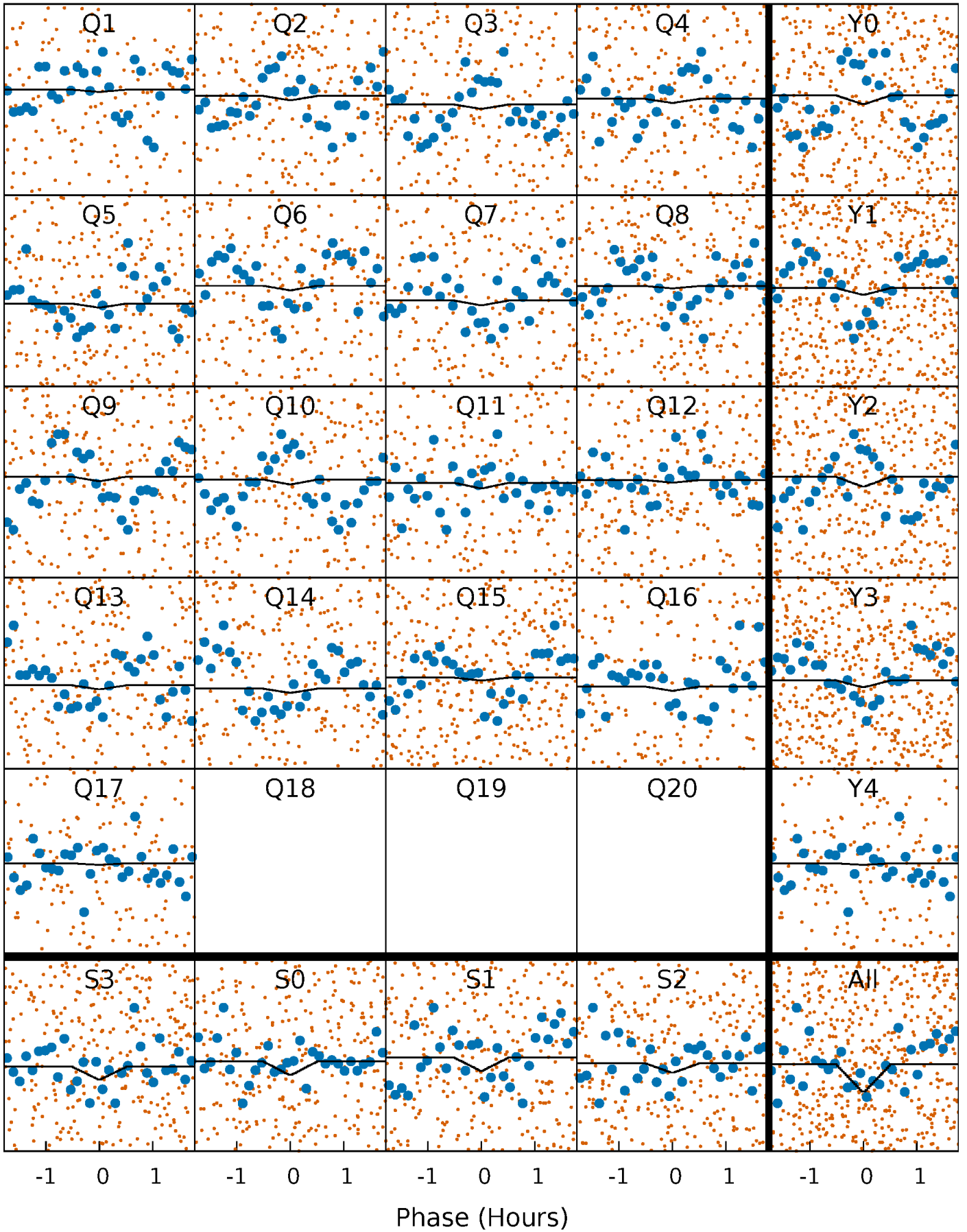
# DV Quarter-Phased Transit Curves

TCE 008376471-01 P= 1.197885 Days  $T_0=131.850343$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

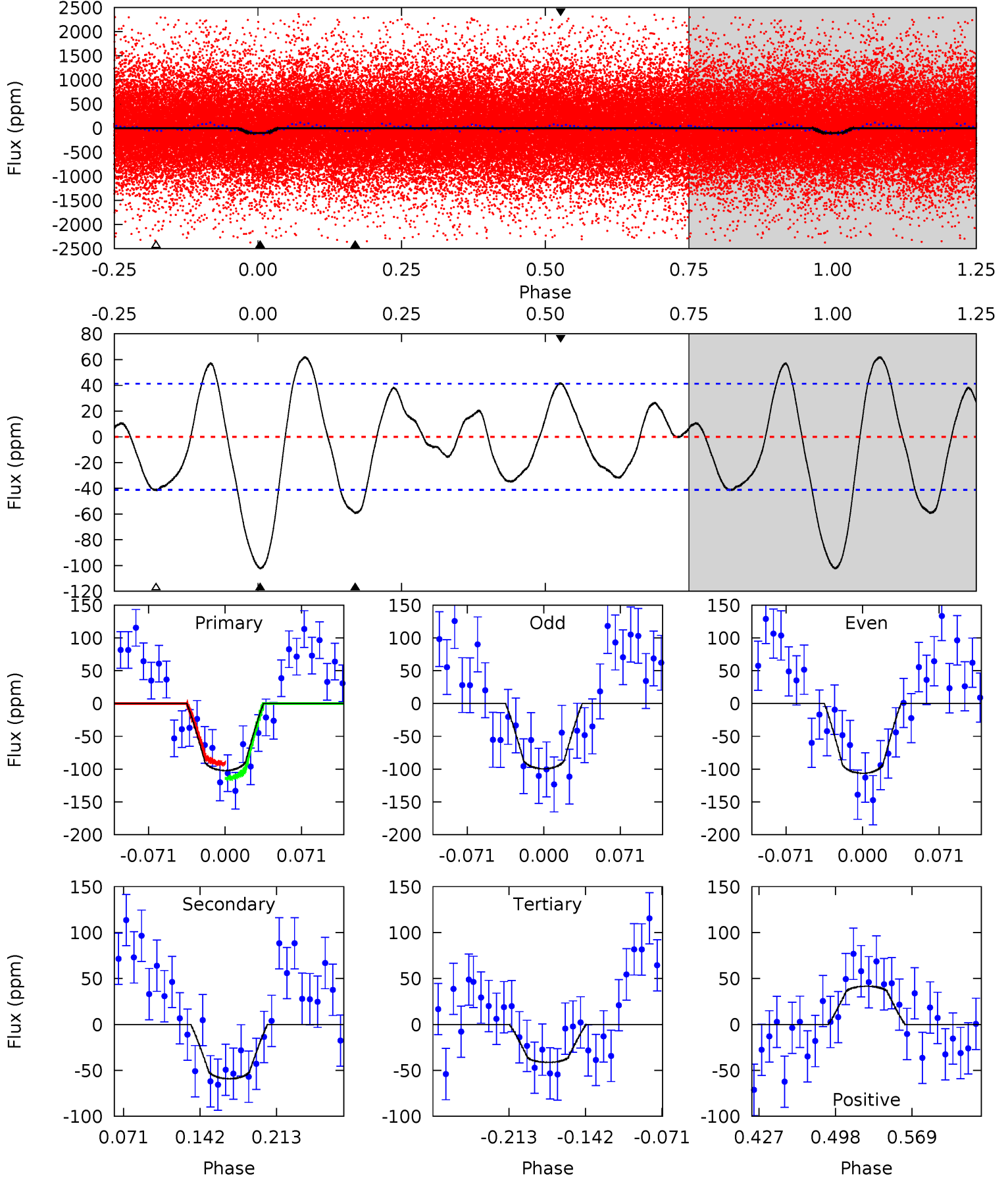
TCE 008376471-01   P= 1.197904 Days    $T_0=131.853382$  (BKJD)



# DV Model-Shift Uniqueness Test

008376471-01, P = 1.197885 Days, E = 130.652458 Days

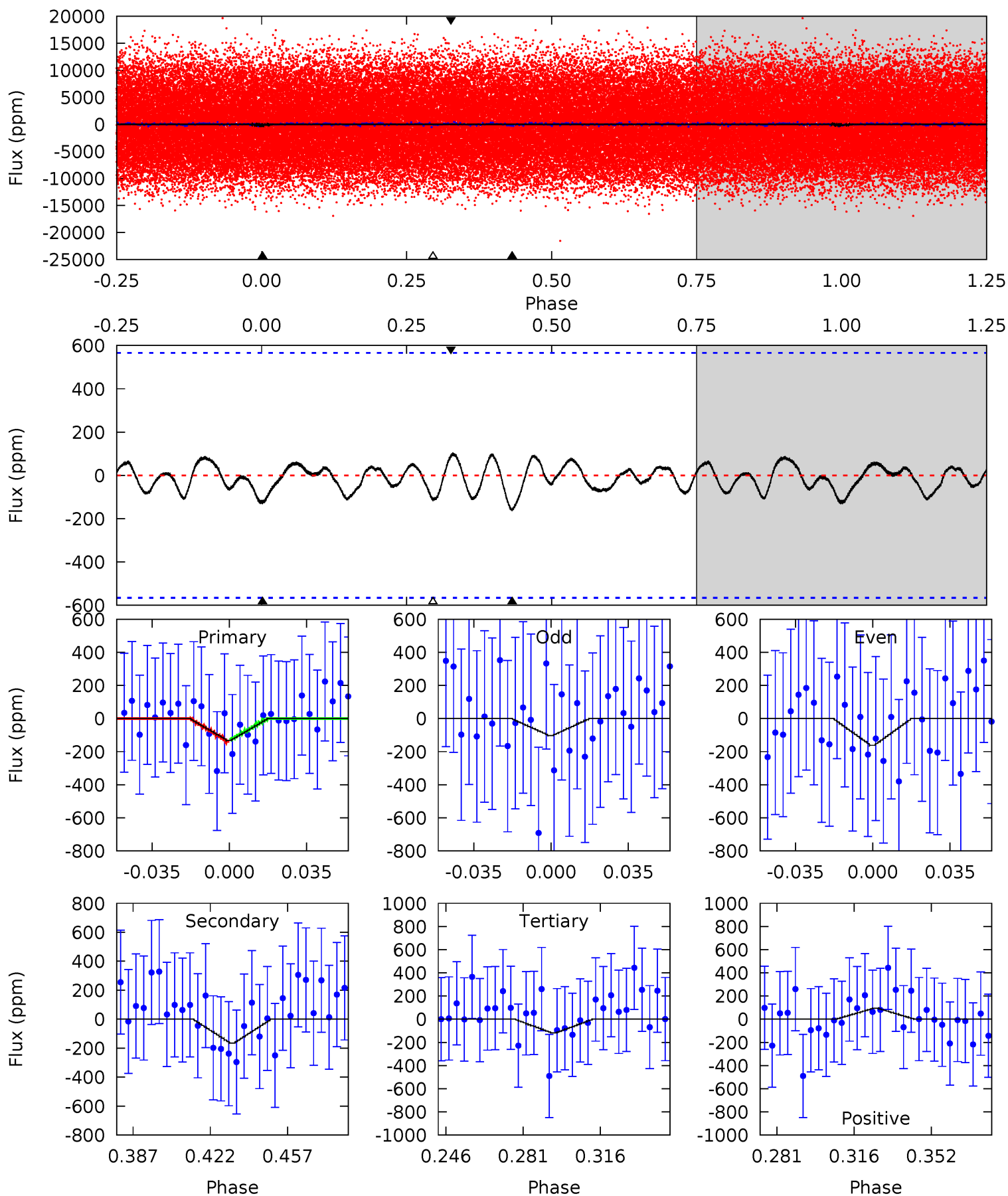
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	6.65	4.65	4.67	4.64	1.80	2.92	6.85	6.82	2.00	1.98	0.38	0.85	0.38	1.28



# Alt Model-Shift Uniqueness Test

008376471-01, P = 1.197904 Days, E = 130.655478 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.12	1.40	1.00	0.80	4.78	2.11	0.43	0.12	0.32	0.39	0.59	0.25	2.08	0.39	0.05





### Stellar Parameters For KIC 008376471

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7261^{+230}_{-345}$	$3.898^{+0.273}_{-0.147}$	$0.020^{+0.200}_{-0.350}$	$2.486^{+0.563}_{-0.915}$	$1.781^{+0.196}_{-0.392}$	$0.163^{+0.307}_{-0.071}$
	+3%/-5%	+7%/-4%	+1000%/-1750%	+23%/-37%	+11%/-22%	+188%/-44%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008376471-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-59 \pm 9$	$2.50^{+1.04}_{-1.00}$	$4244^{+347}_{-397}$	$6206^{+1895}_{-974}$	$3.613^{+6.366}_{-1.853}$
Alt.	$-165 \pm 118$	$3.06^{+0.96}_{-1.01}$	$4228^{+343}_{-417}$	$7428^{+2706}_{-2436}$	$6.775^{+12.147}_{-5.245}$

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

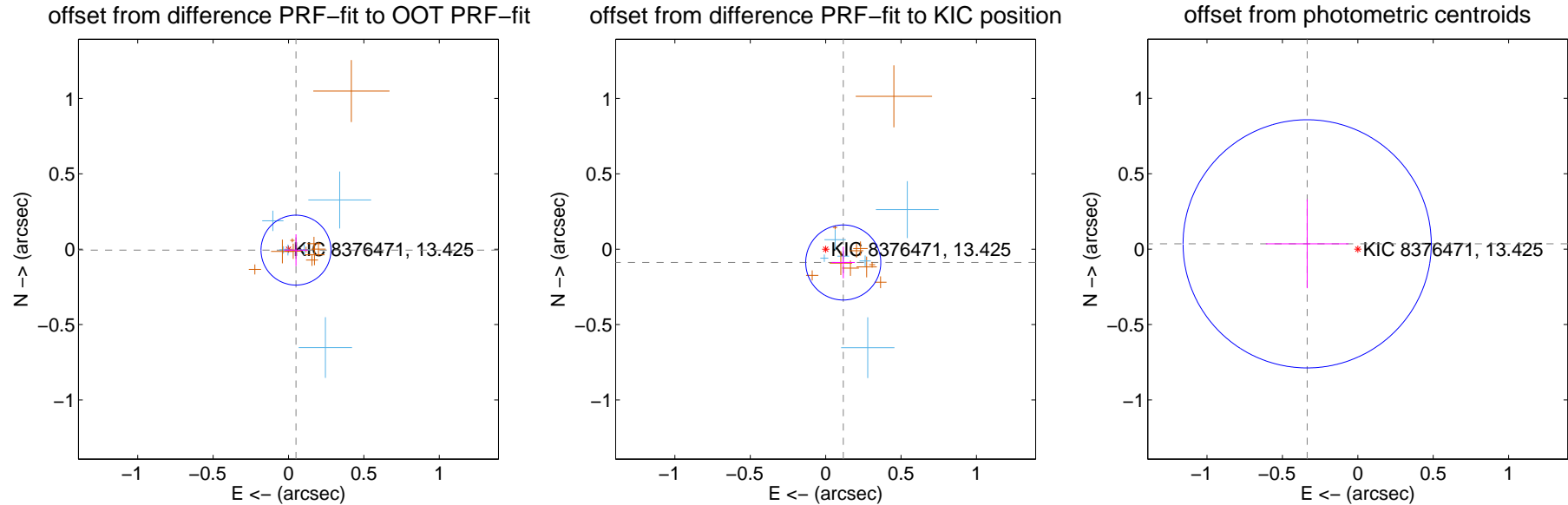
## DV Centroid Data

Supplemental centroid analysis for 008376471-01. Kepler magnitude: 13.43. Transit SNR 9.59

There are 6 quarters with good PRF difference image offsets

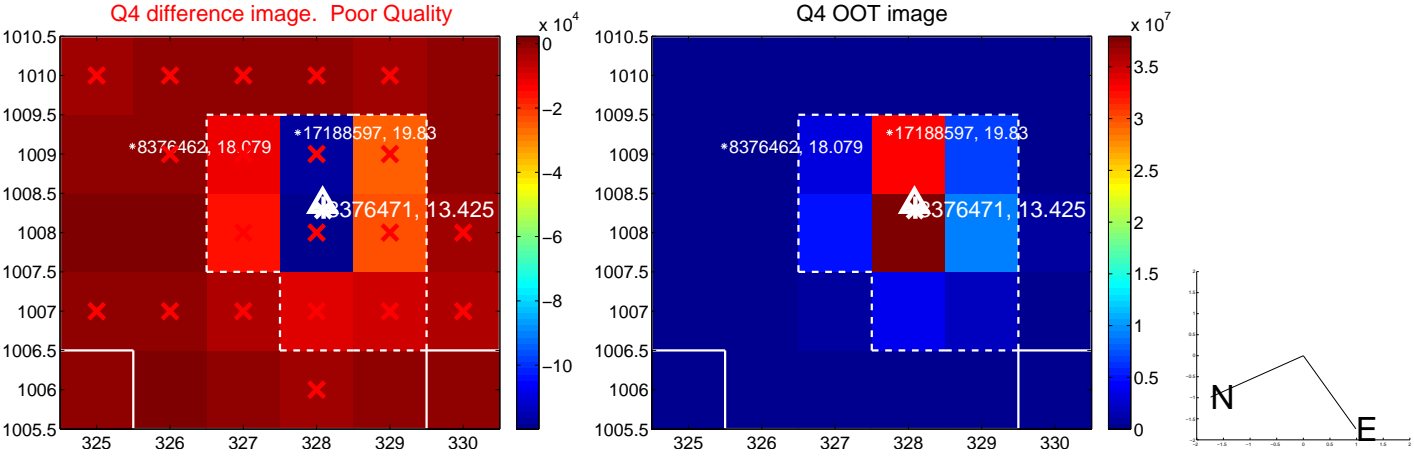
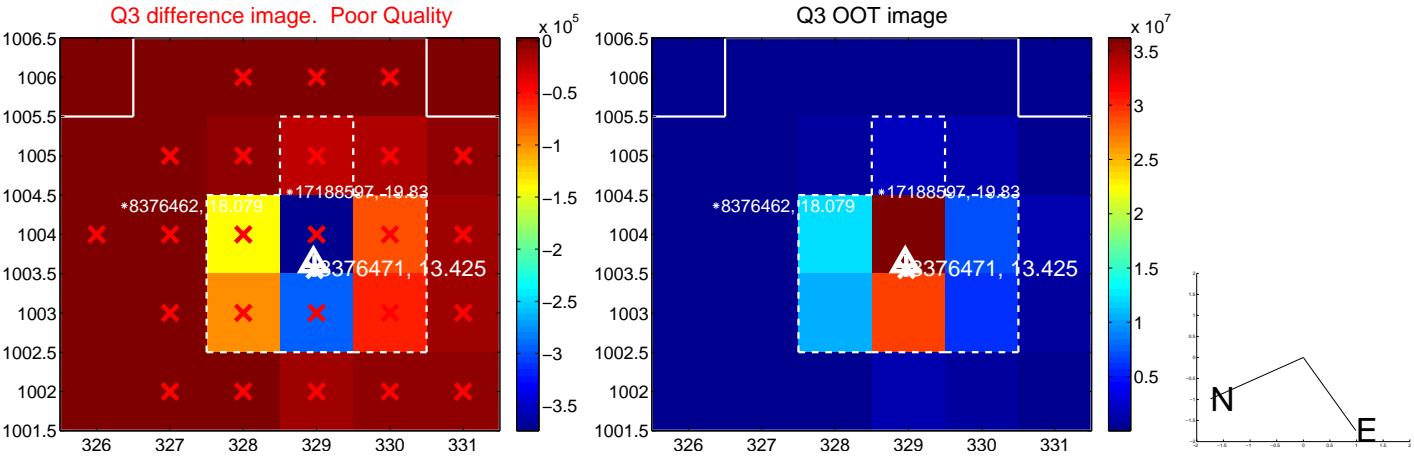
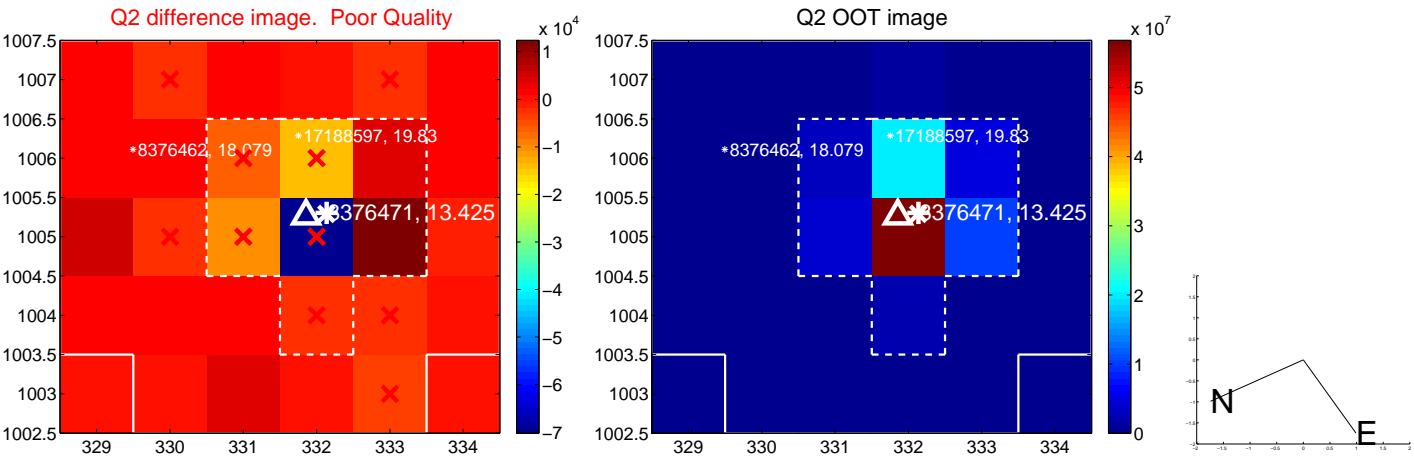
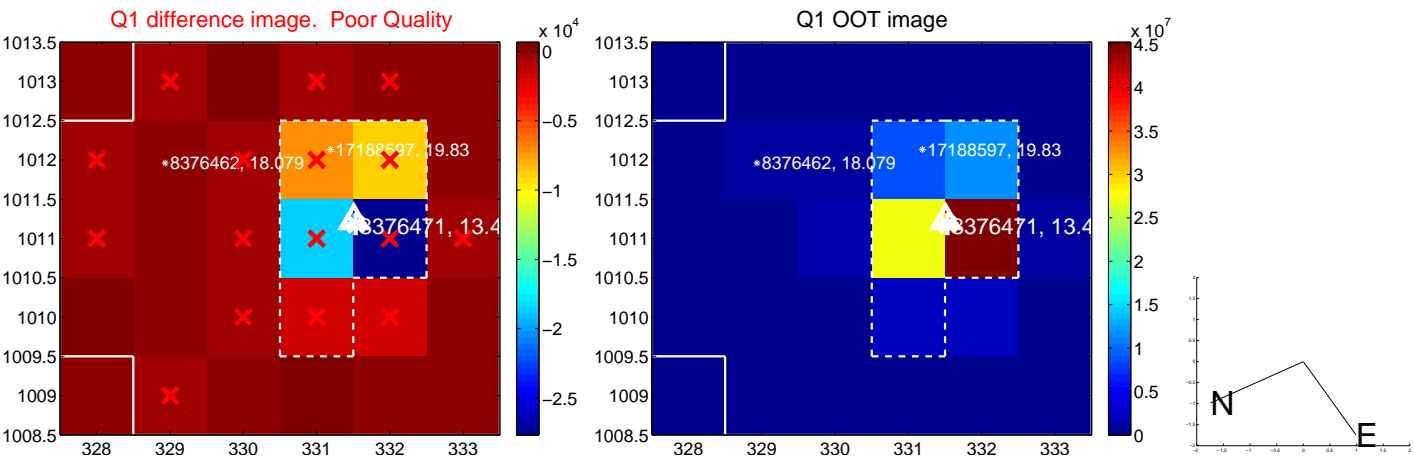
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.050 \pm 0.077$	0.65	$-0.050 \pm 0.079$	$-0.006 \pm 0.105$
PRF-fit source offset from KIC position	$0.146 \pm 0.083$	1.76	$-0.117 \pm 0.077$	$-0.088 \pm 0.104$
photometric centroid source offset	$0.34 \pm 0.27$	1.23	$0.34 \pm 0.27$	$0.03 \pm 0.29$

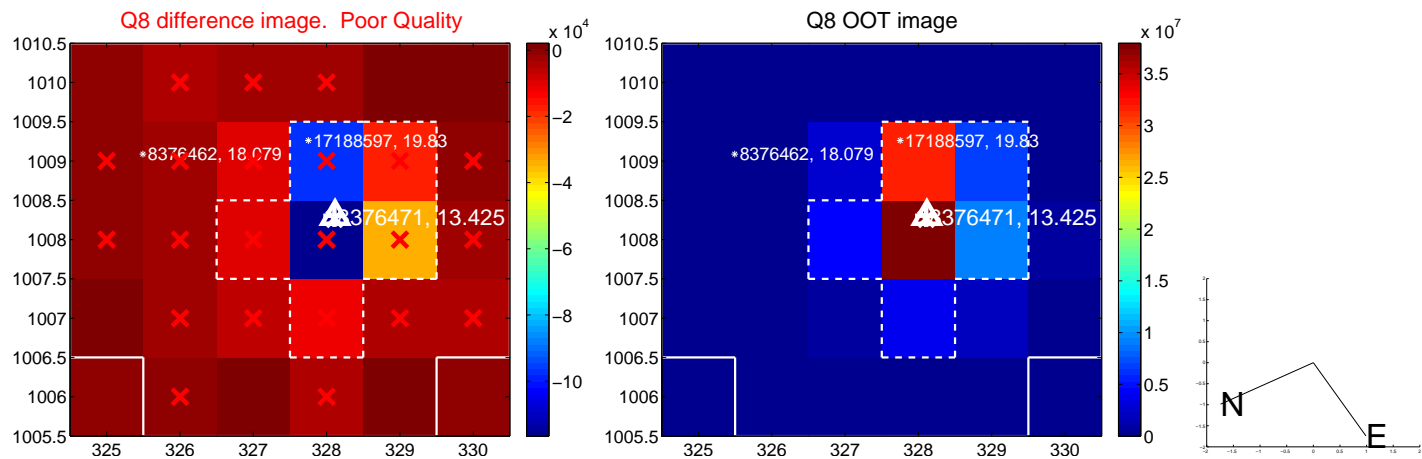
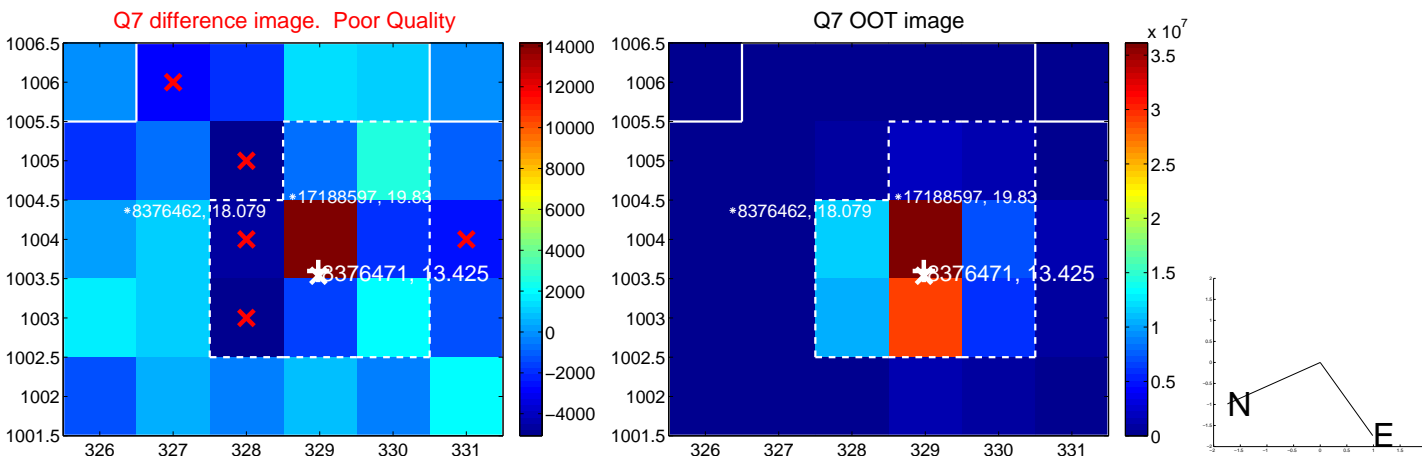
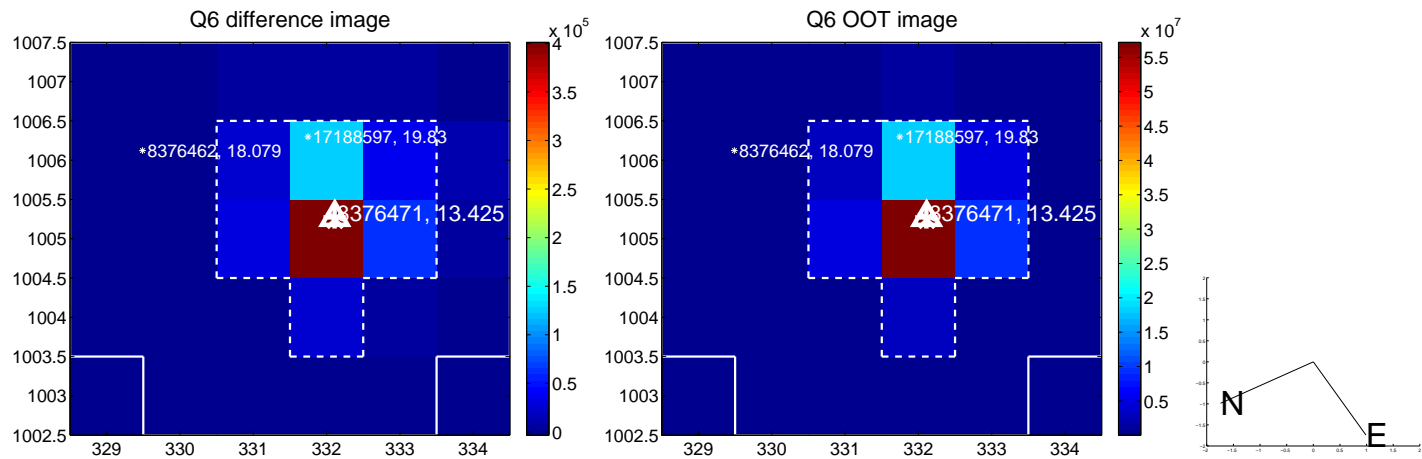
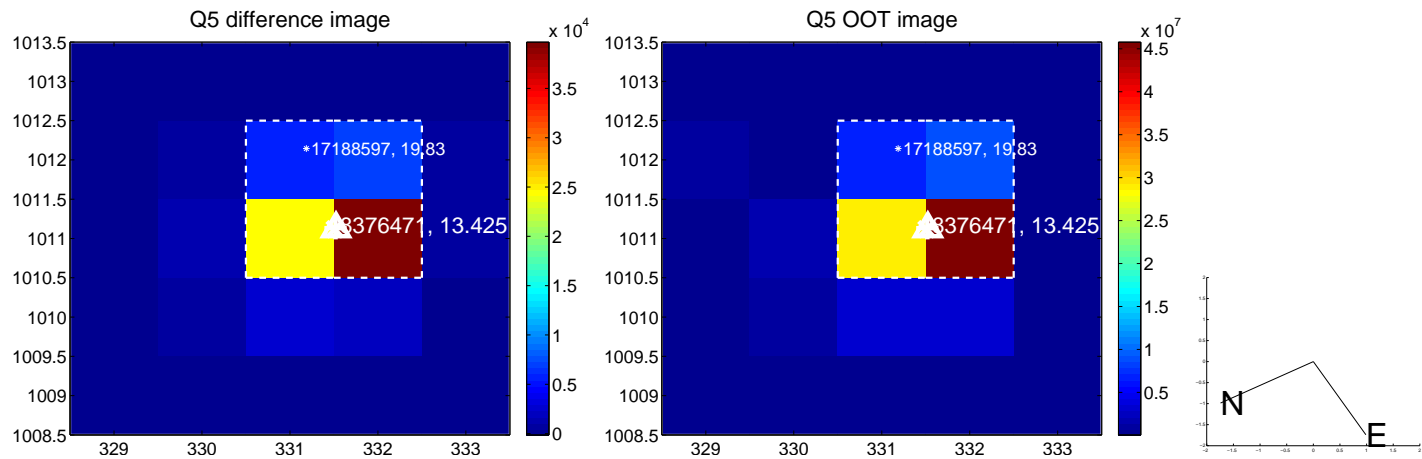


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

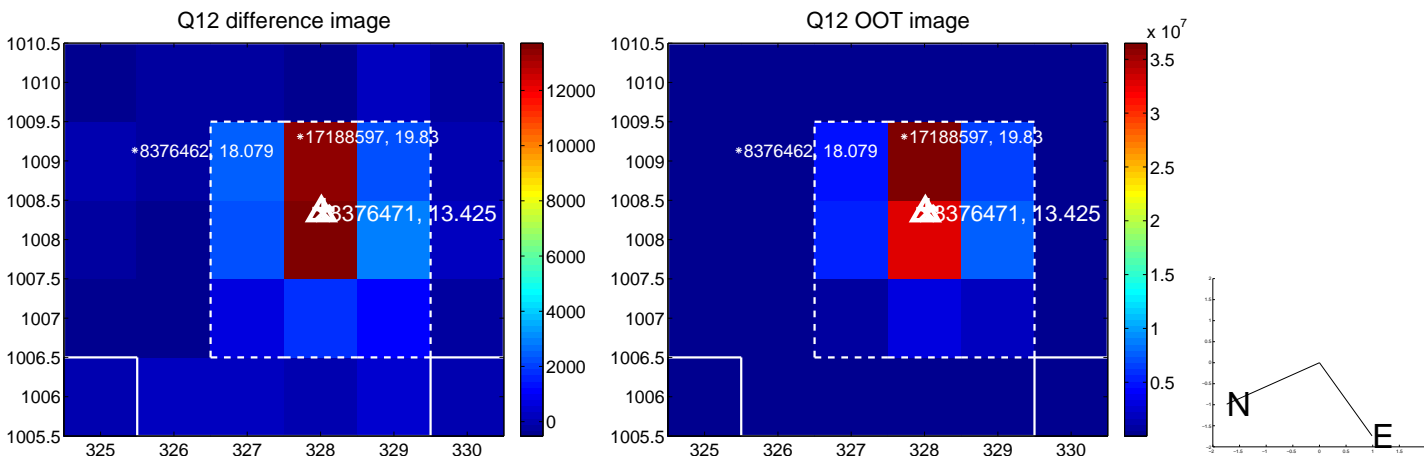
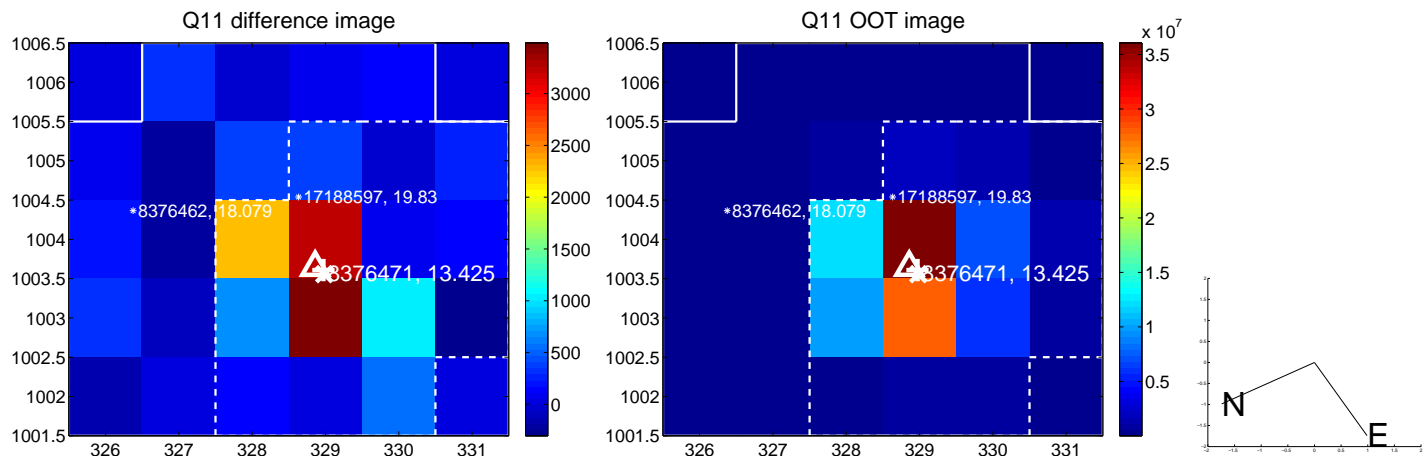
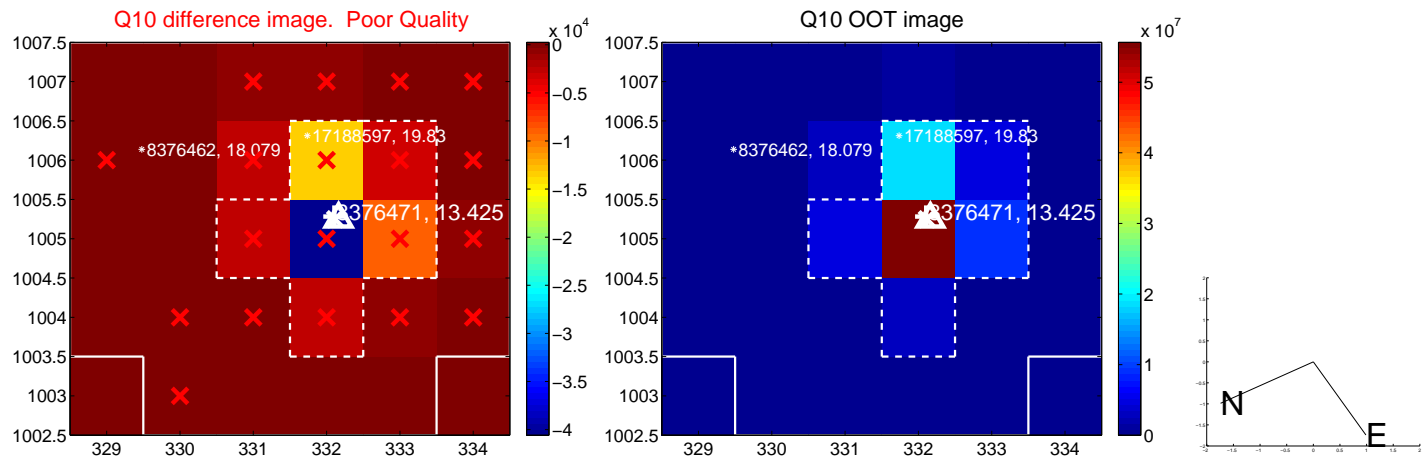
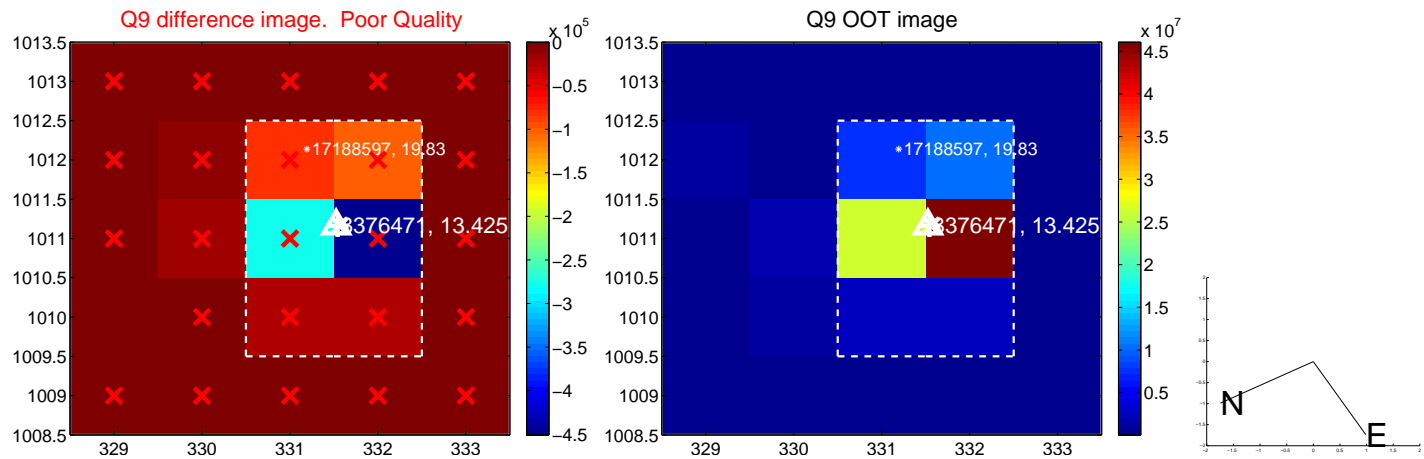


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

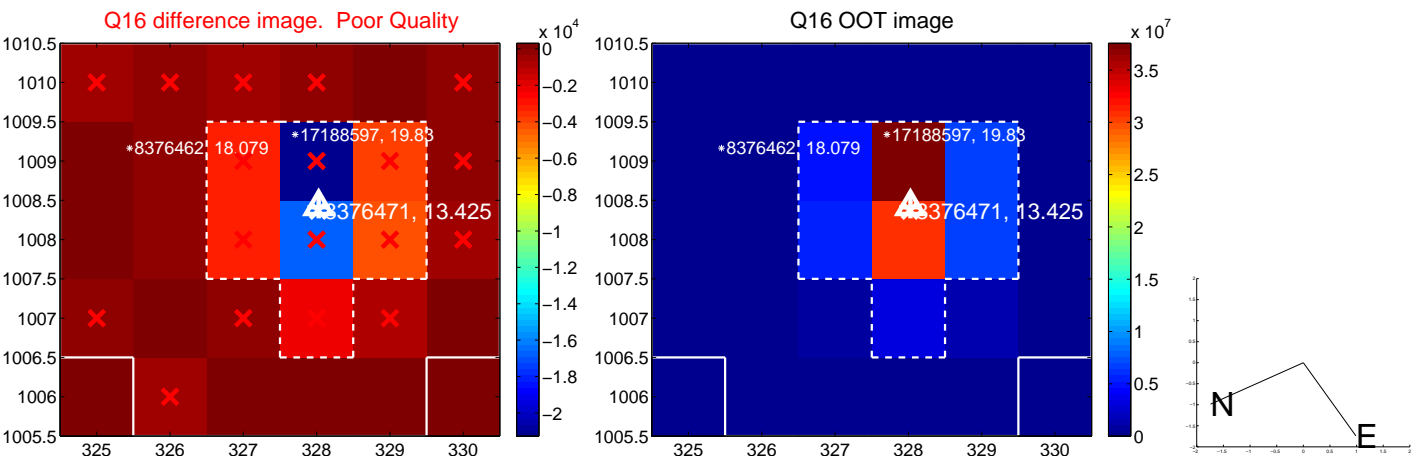
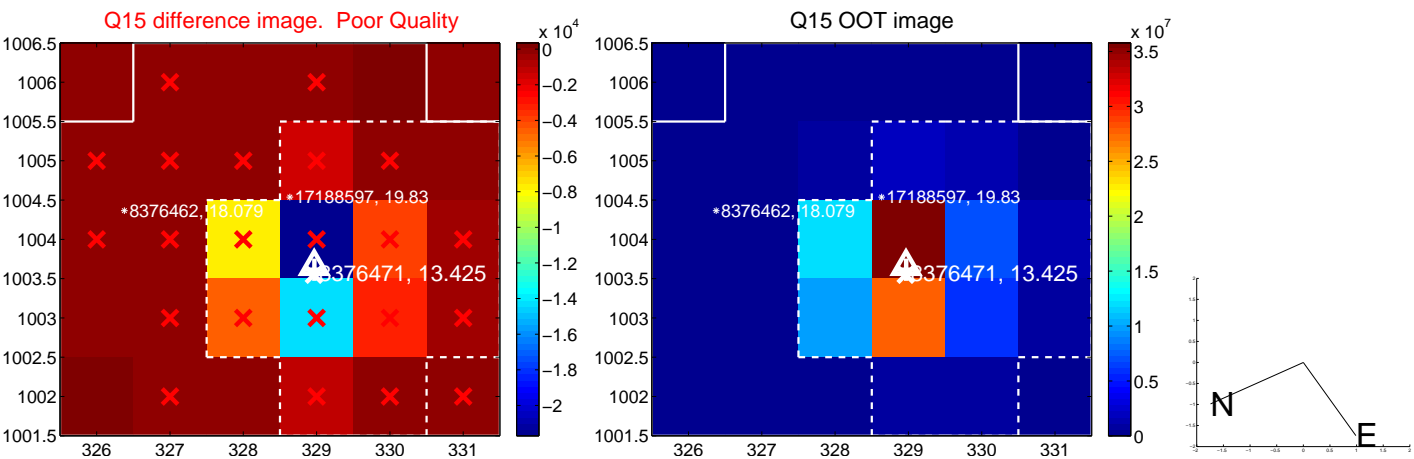
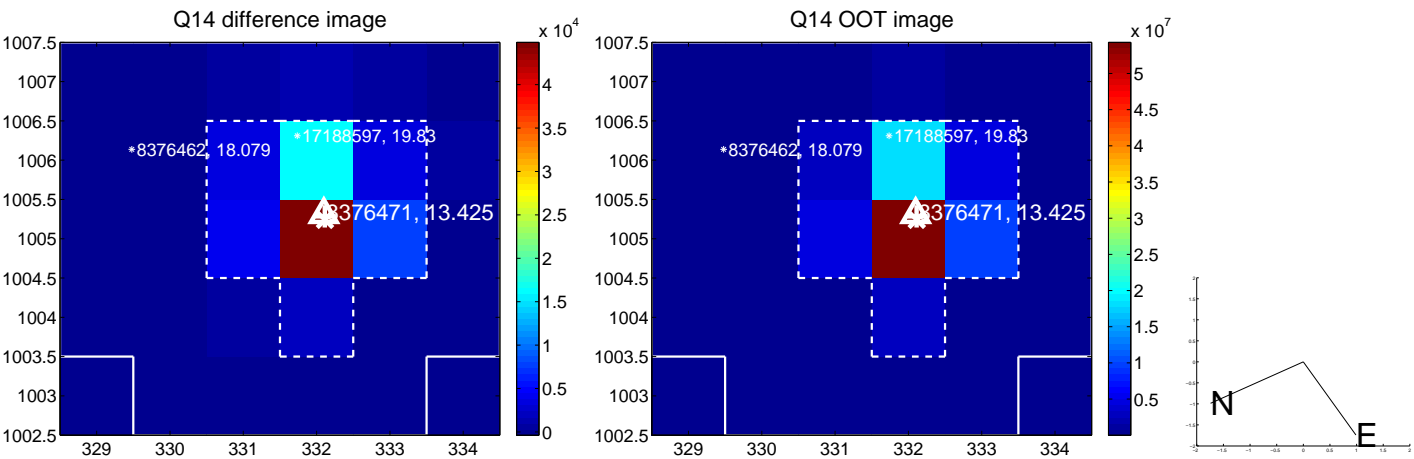
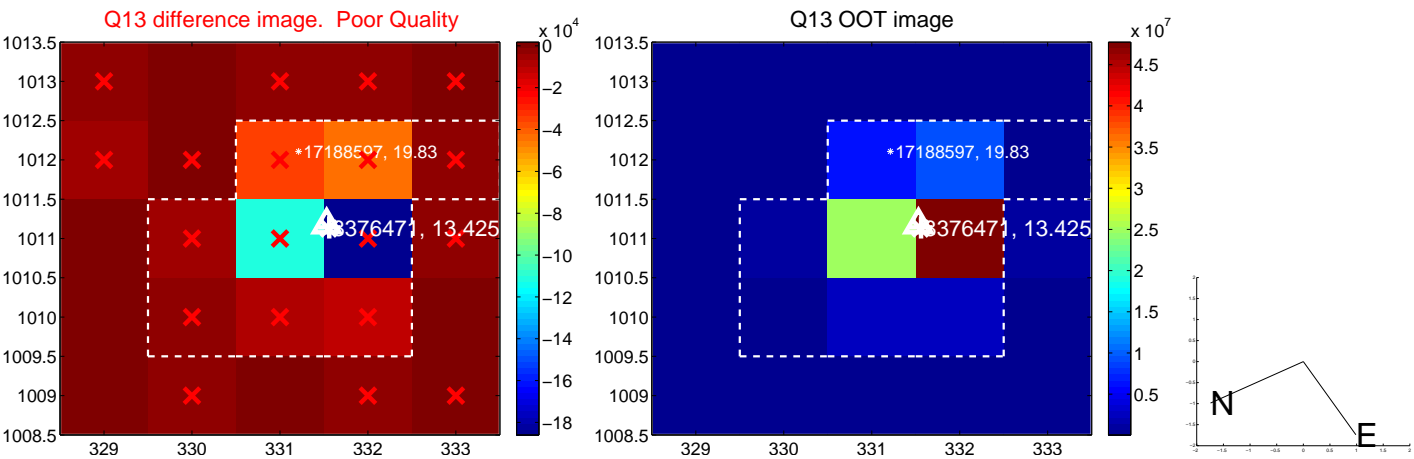




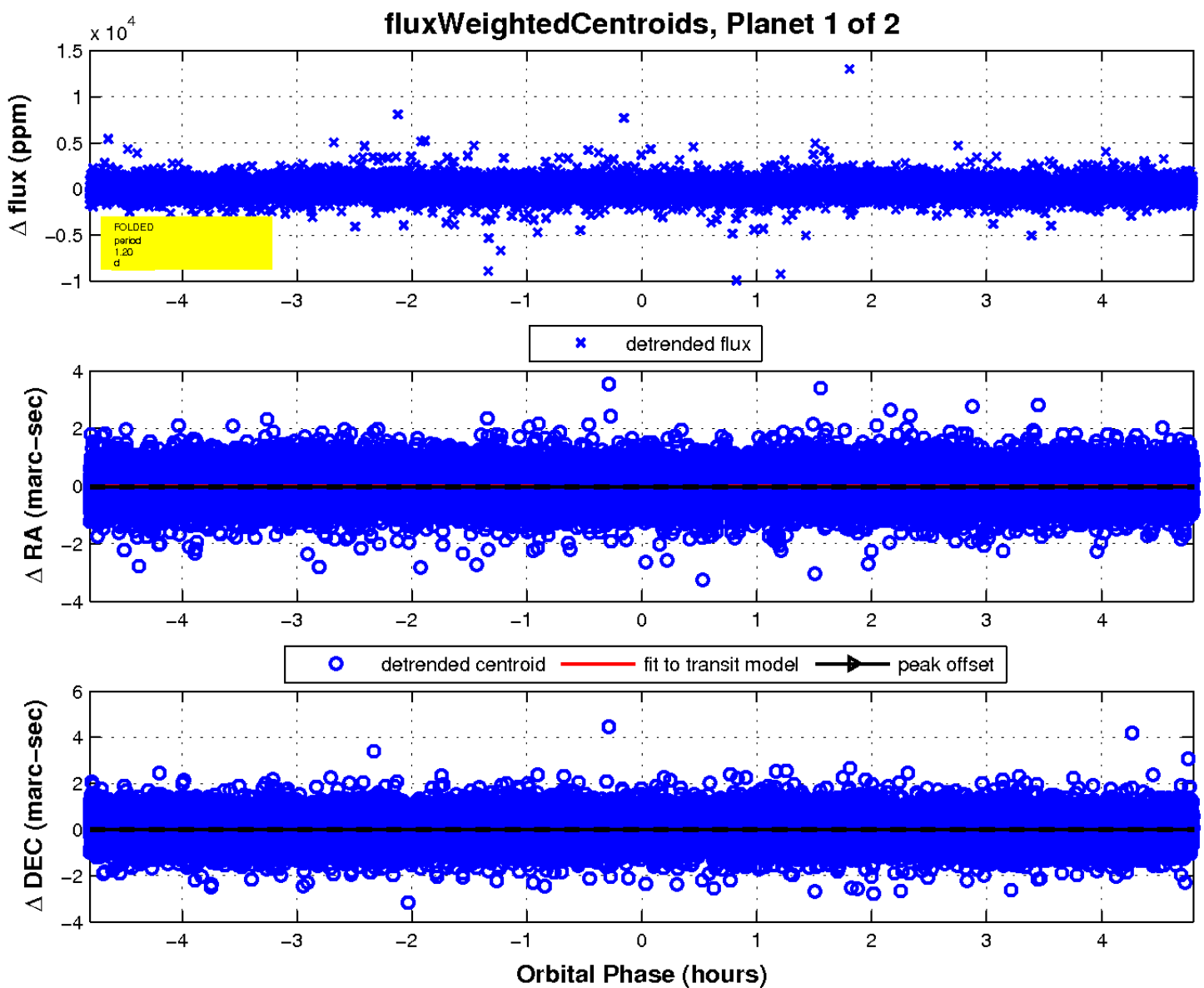
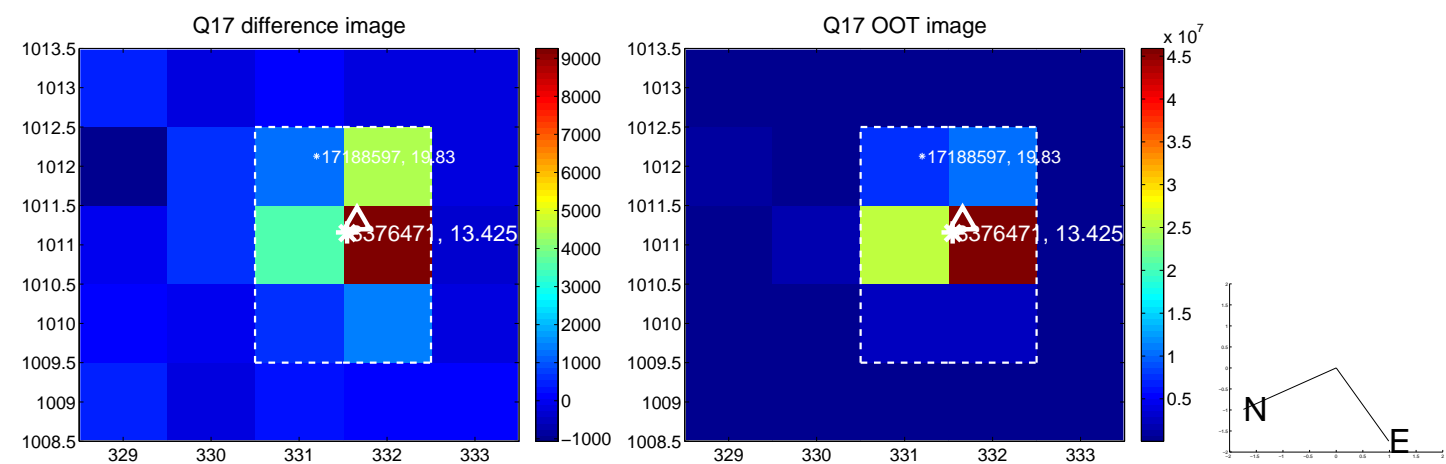
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

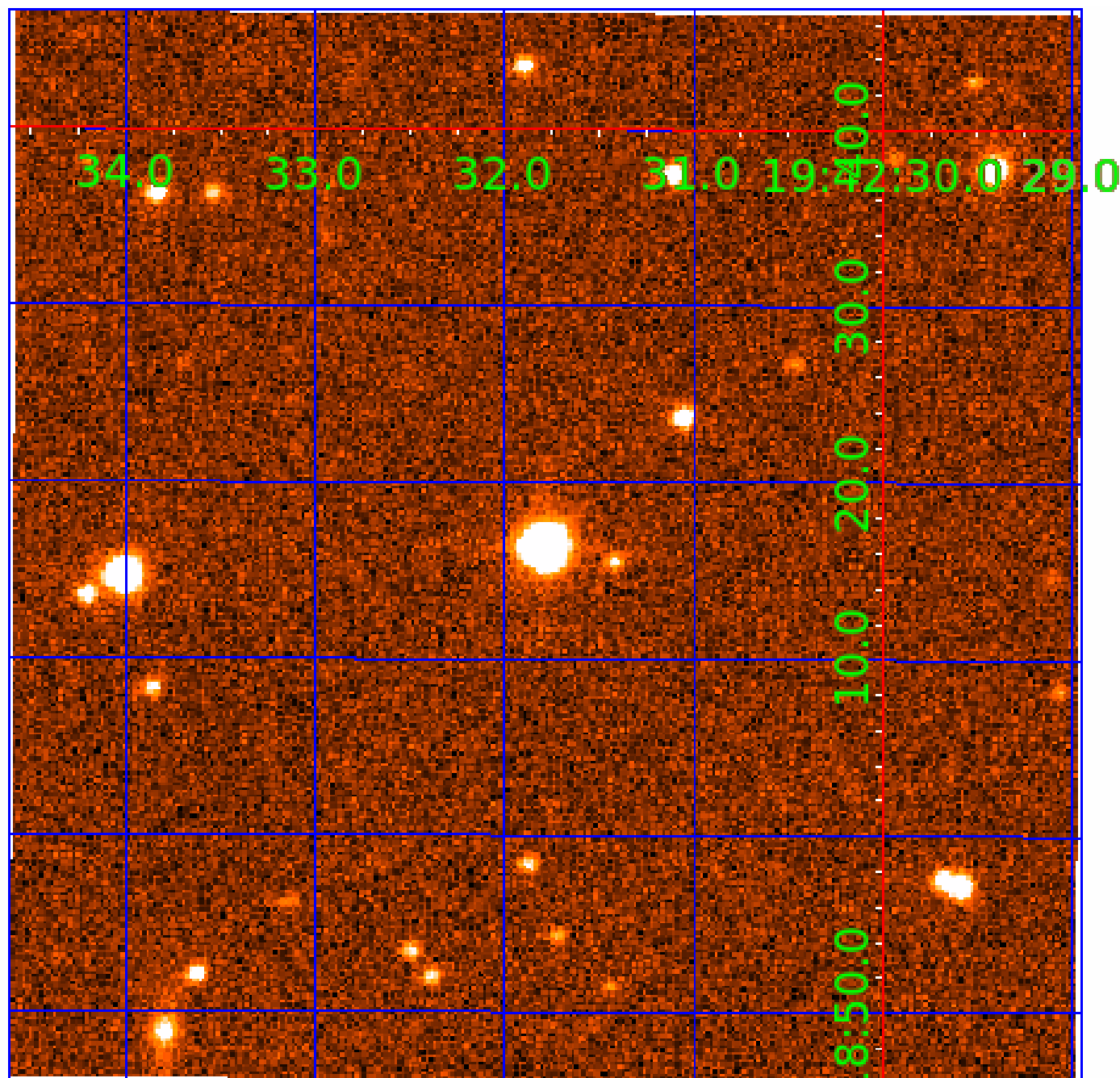


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 008376471

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008376471-01	OBS	No	1.197885	131.850343	96.0	1.601	11.4	9.6	2.49	7261	2.61	21478.00
008376471-02	OBS	No	0.528733	131.826399	32.6	1.291	10.1	4.0	2.49	7261	1.65	63909.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008376471-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008376471-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

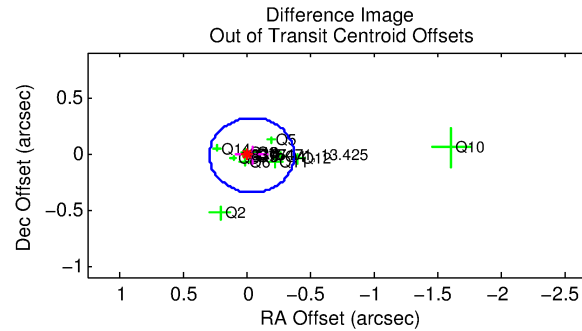
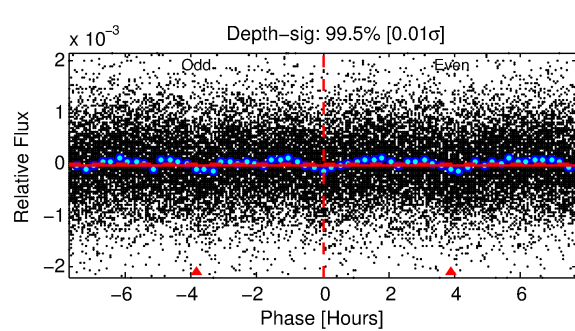
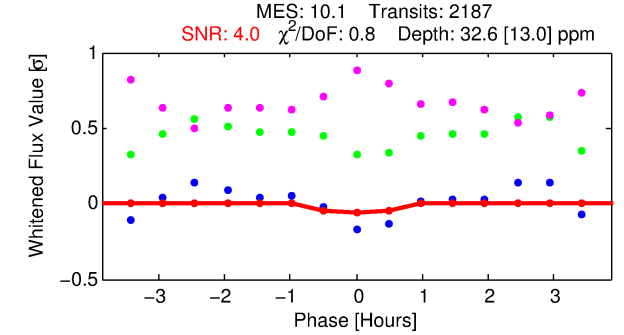
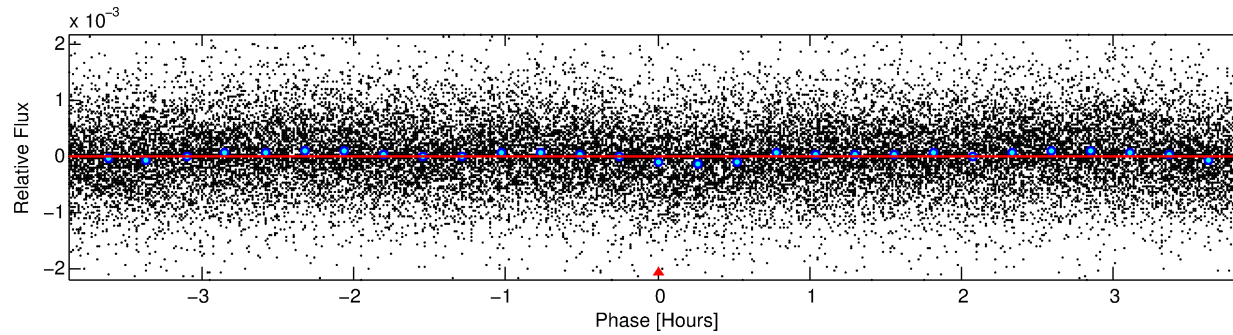
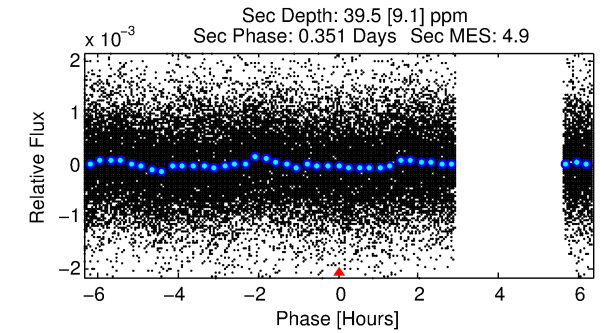
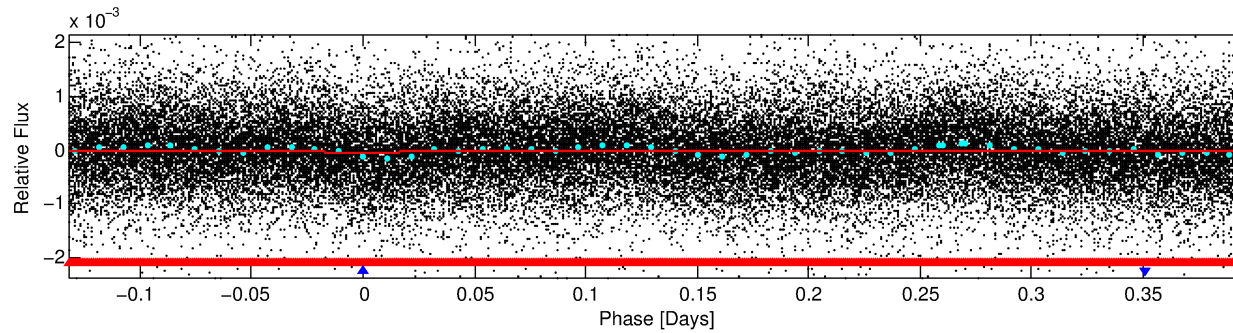
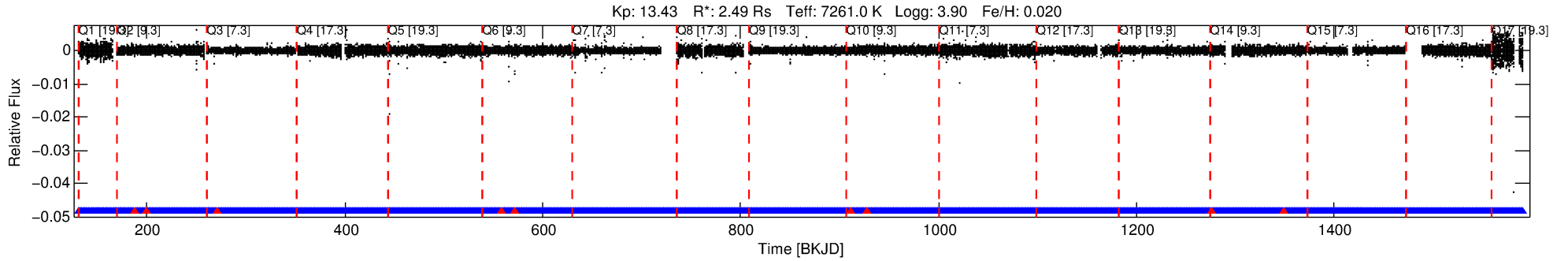
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008376471-02

No Significant Match Found

# DV One-Page Summary

KIC: 8376471 Candidate: 2 of 2 Period: 0.529 d



## DV Fit Results:

Period = 0.52873 [0.00003] d  
Epoch = 131.8264 [0.0054] BKJD  
Rp/R\* = 0.0061 [0.0038]  
a/R\* = 1.70 [4.27]  
b = 0.90 [0.84]  
Seff = 63909.61 [33328.11]  
Teff = 4054 [529] K  
Rp = 1.65 [1.21] Re  
a = 0.0155 [0.0050] AU  
Ag = 1.92 [2.64] [0.35σ]  
Teffp = 7381 [2392] K [1.36σ]

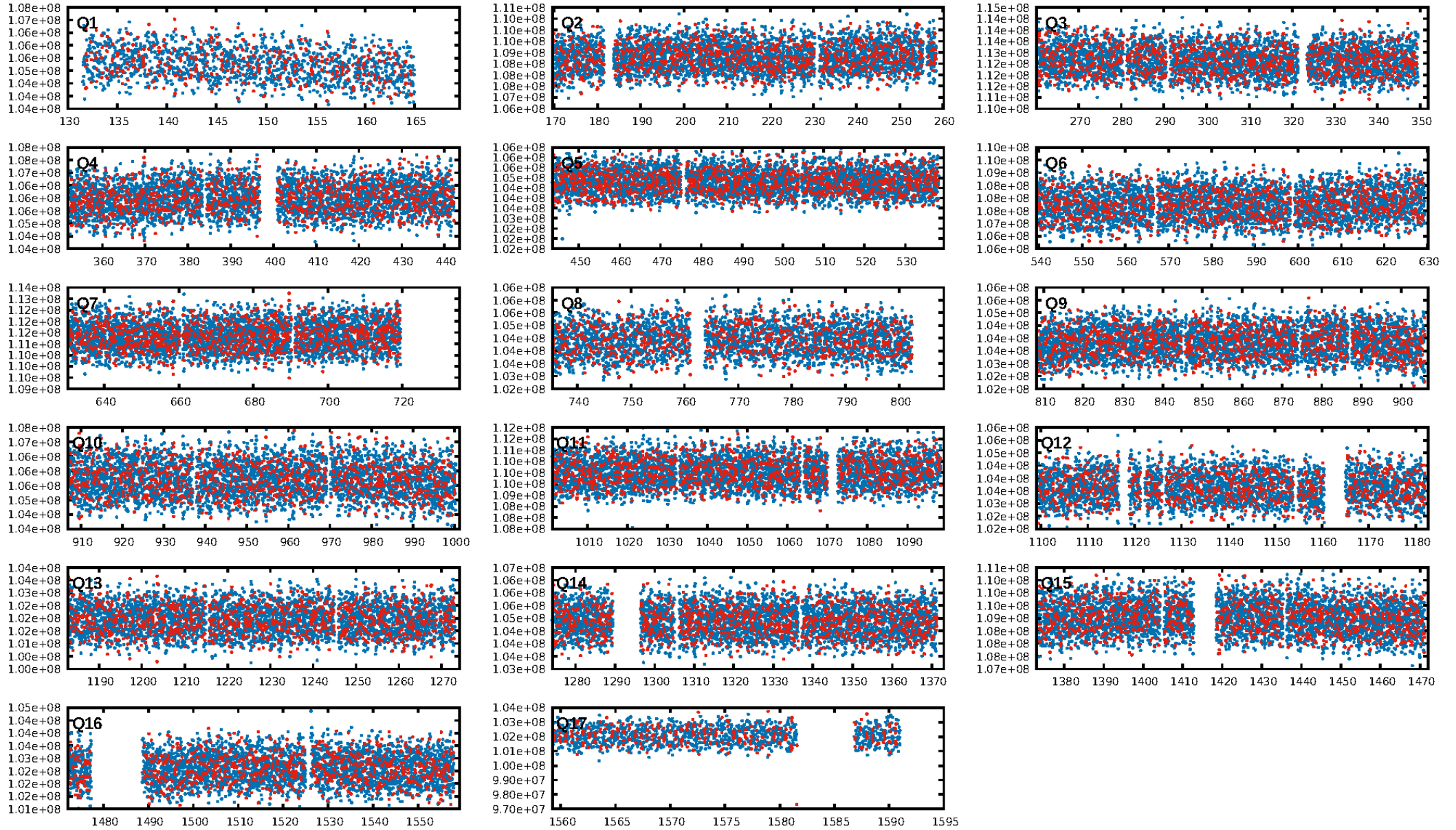
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [7.81σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.54e-21  
RollingBand-fgt: 1.00 [2079/2088]  
GhostDiagnostic-chr: 2.338  
Centroid-sig: 4.7%  
Centroid-so: 0.971 arcsec [1.50σ]  
OotOffset-rm: 0.047 arcsec [0.43σ]  
KicOffset-rm: 0.188 arcsec [1.66σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.53 [9/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:25:40 Z

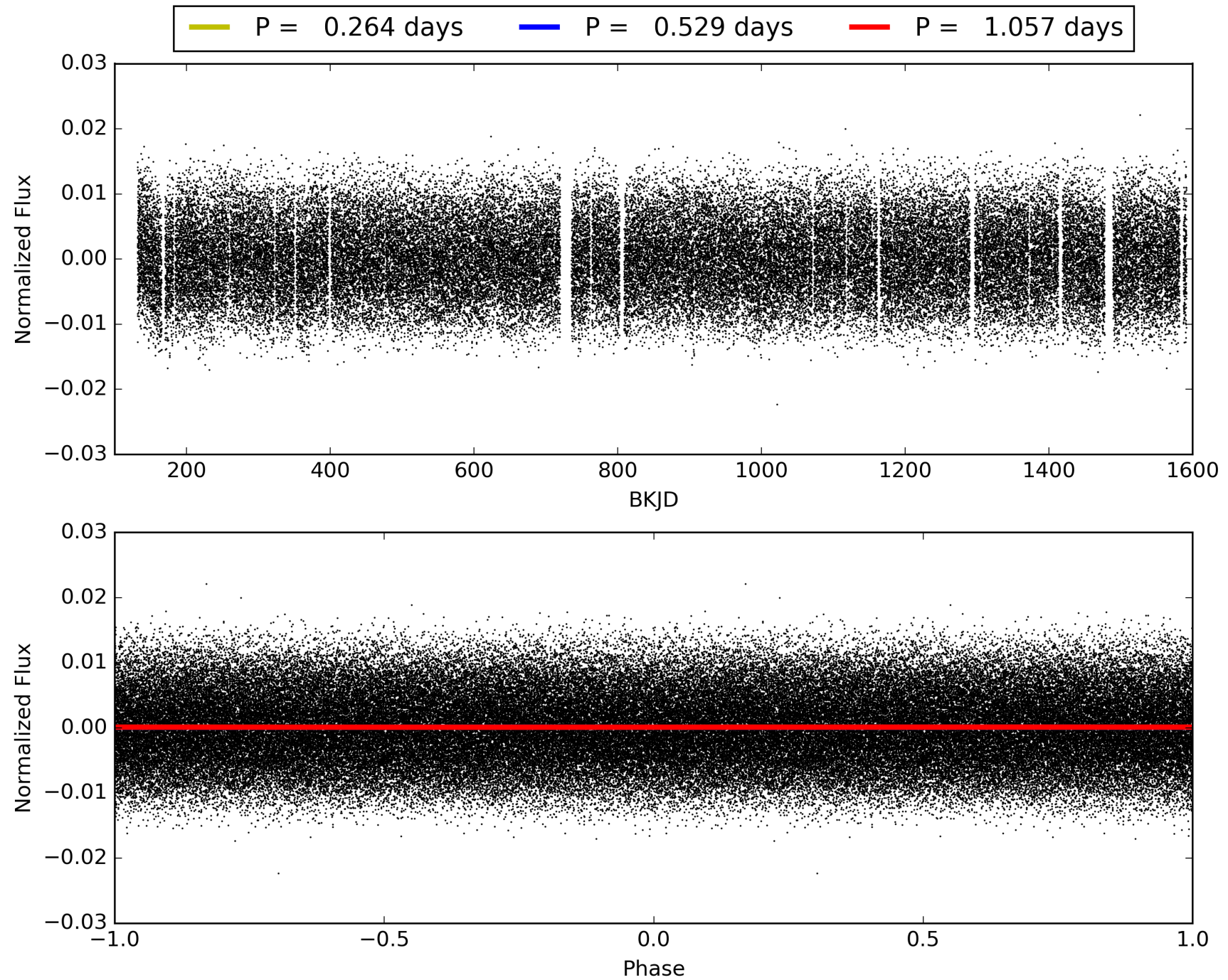
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008376471-02, PDC Light Curves



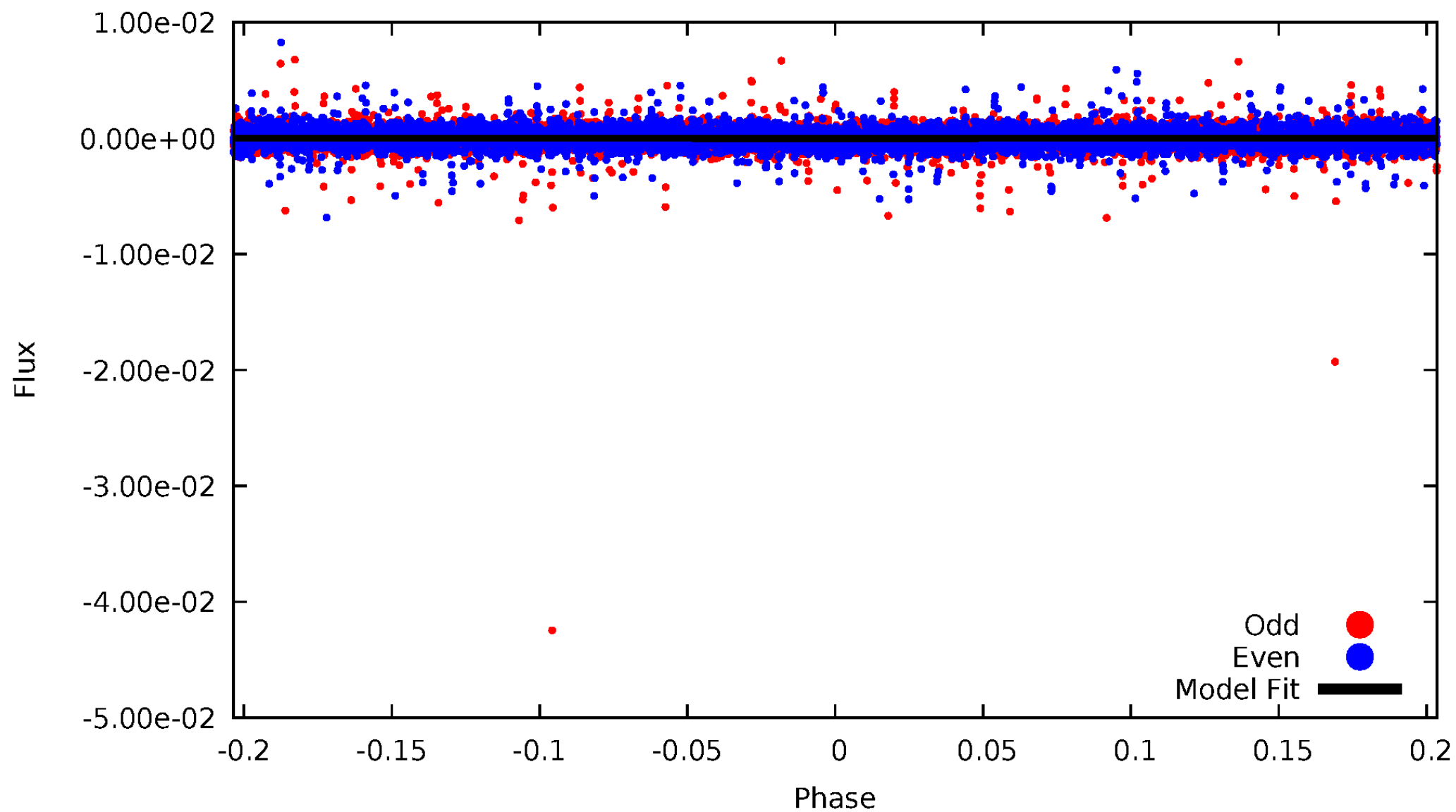


TCE 008376471-02



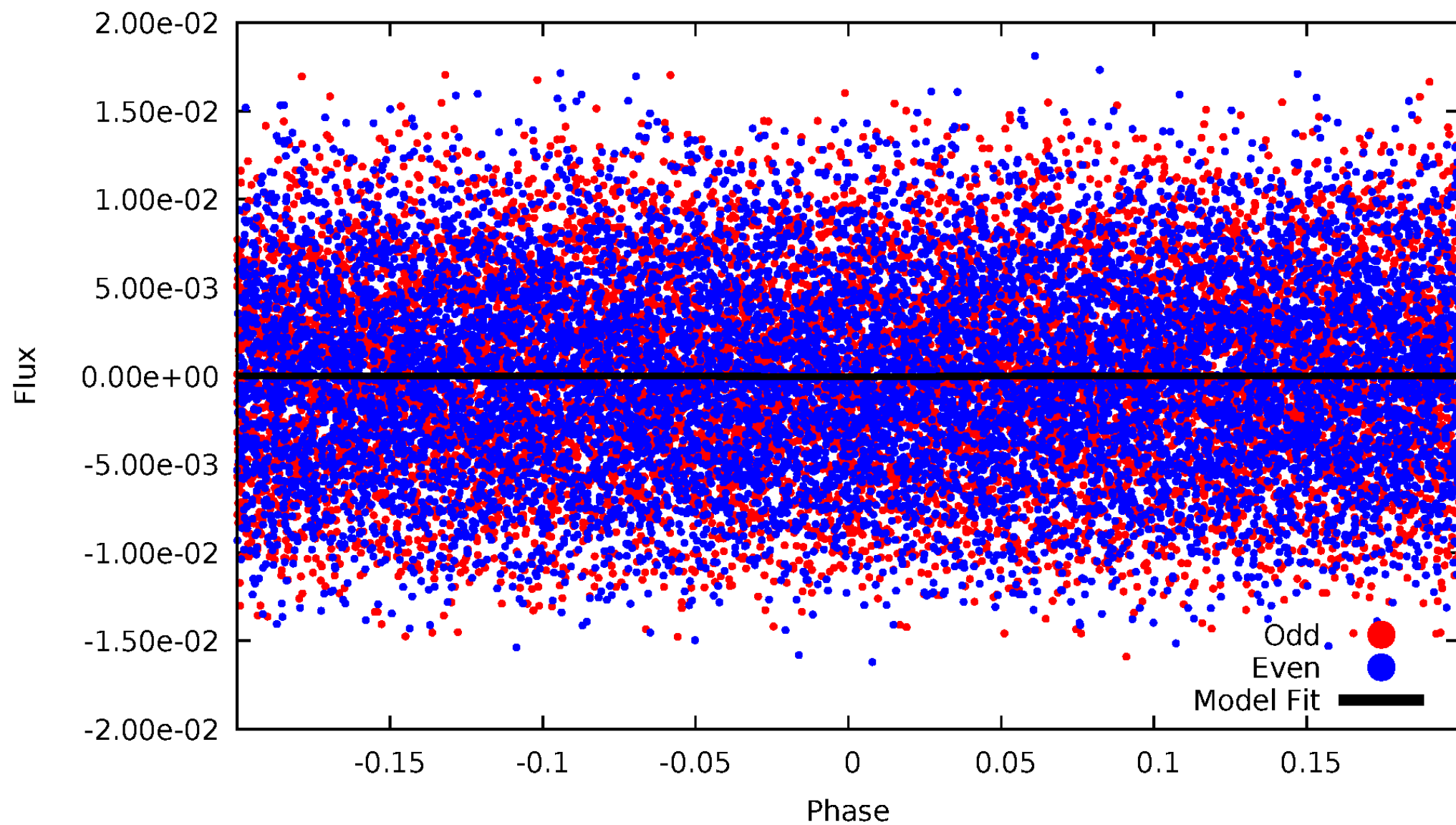
# DV Odd/Even

TCE 008376471-02



# ALT Odd/Even

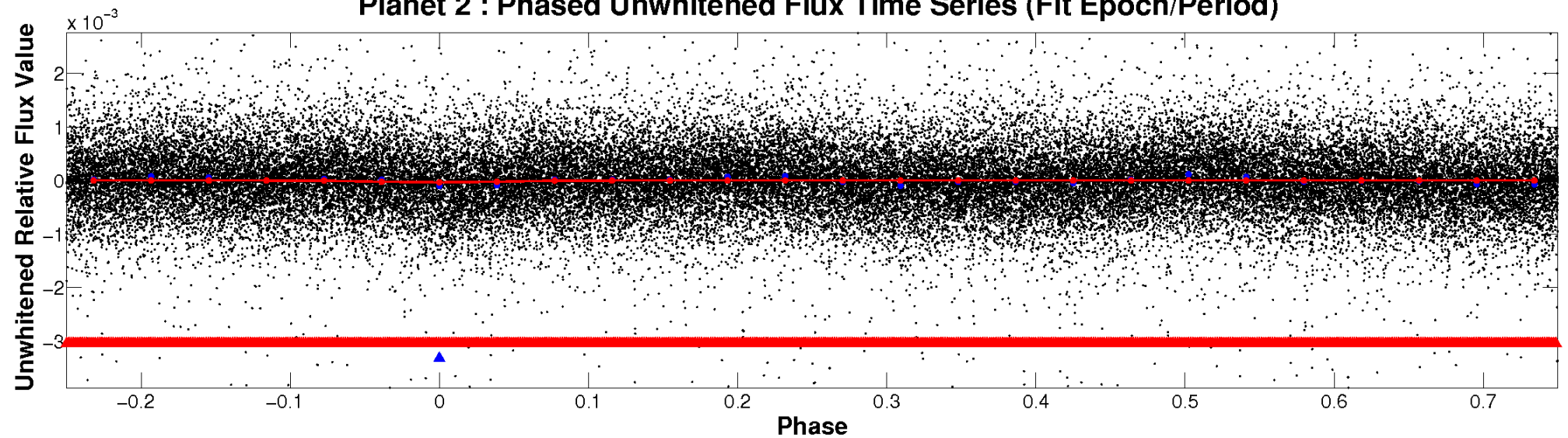
TCE 008376471-02



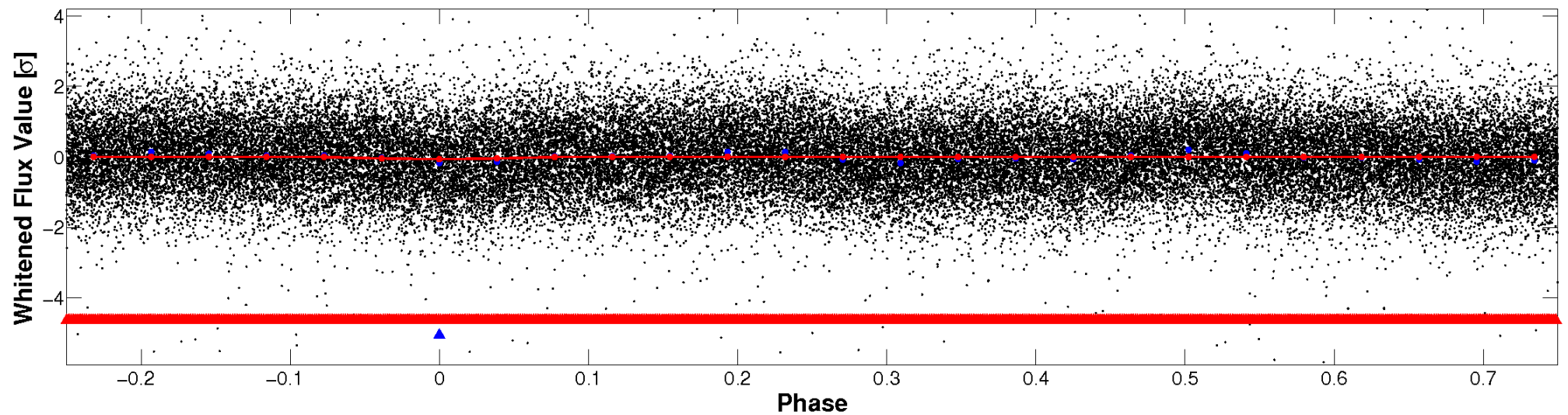


# Non-Whitened Vs. Whitened Light Curve

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

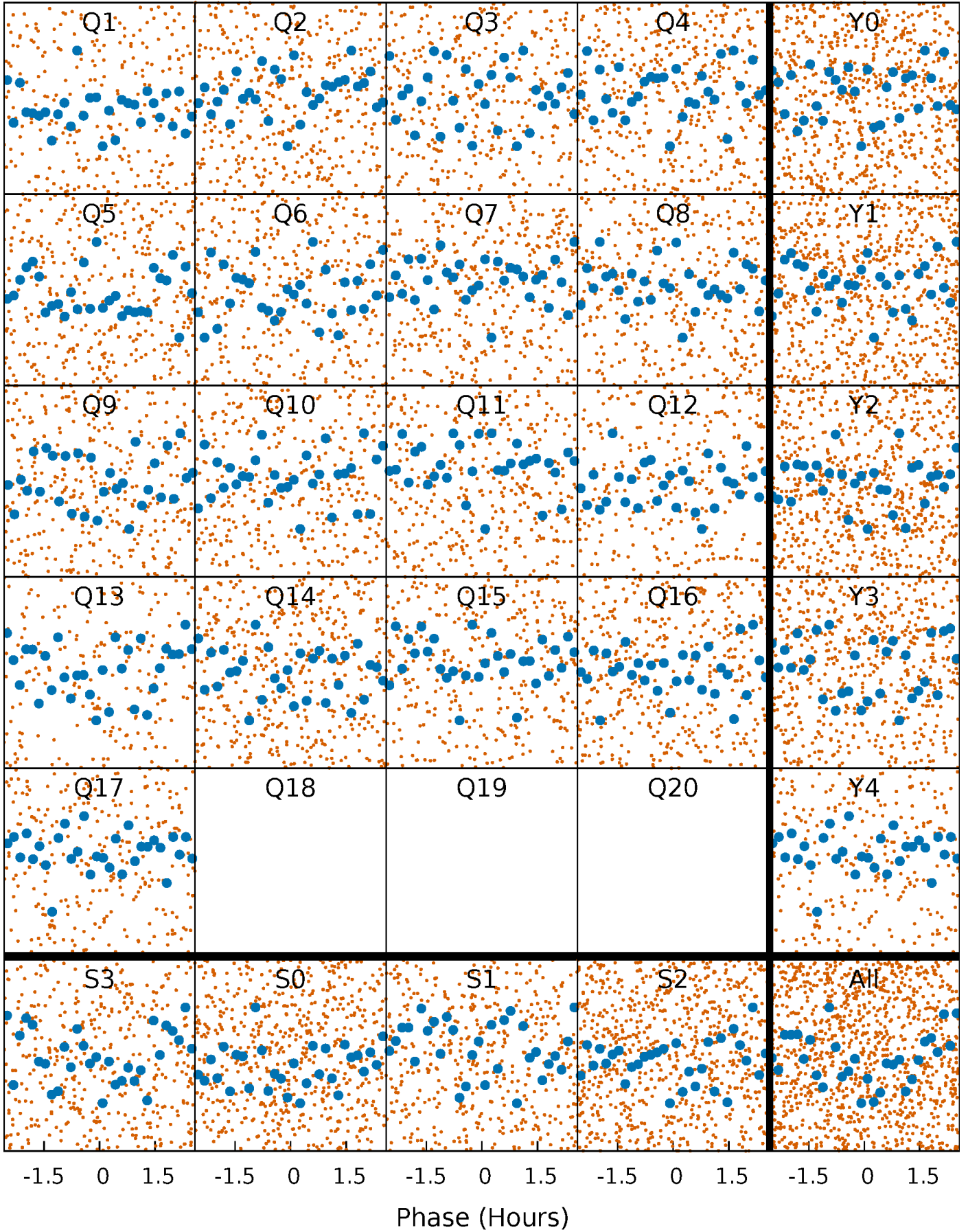


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



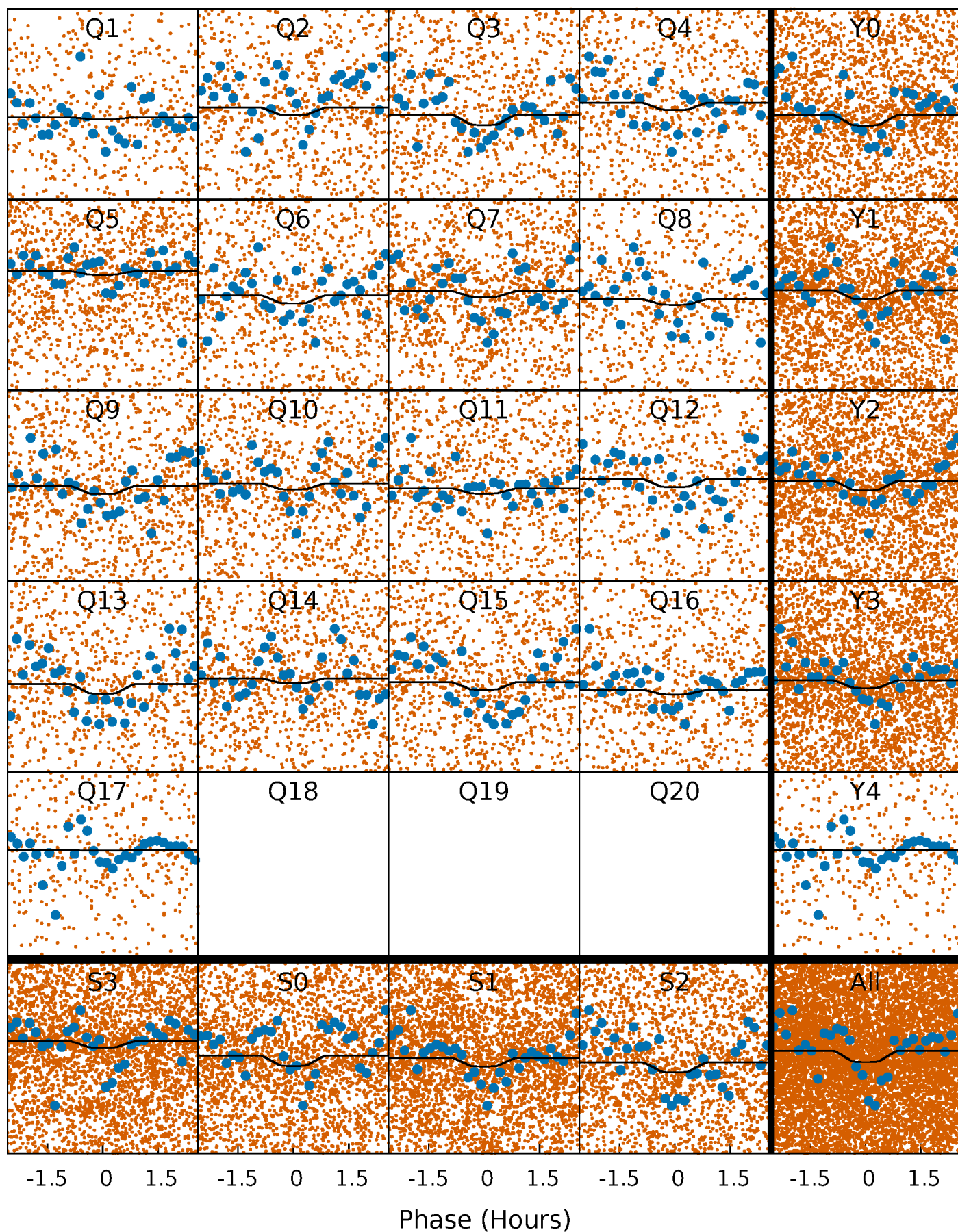
# PDC Quarter-Phased Transit Curves

TCE 008376471-02   P= 0.528733 Days    $T_0=131.826399$  (BKJD)



# DV Quarter-Phased Transit Curves

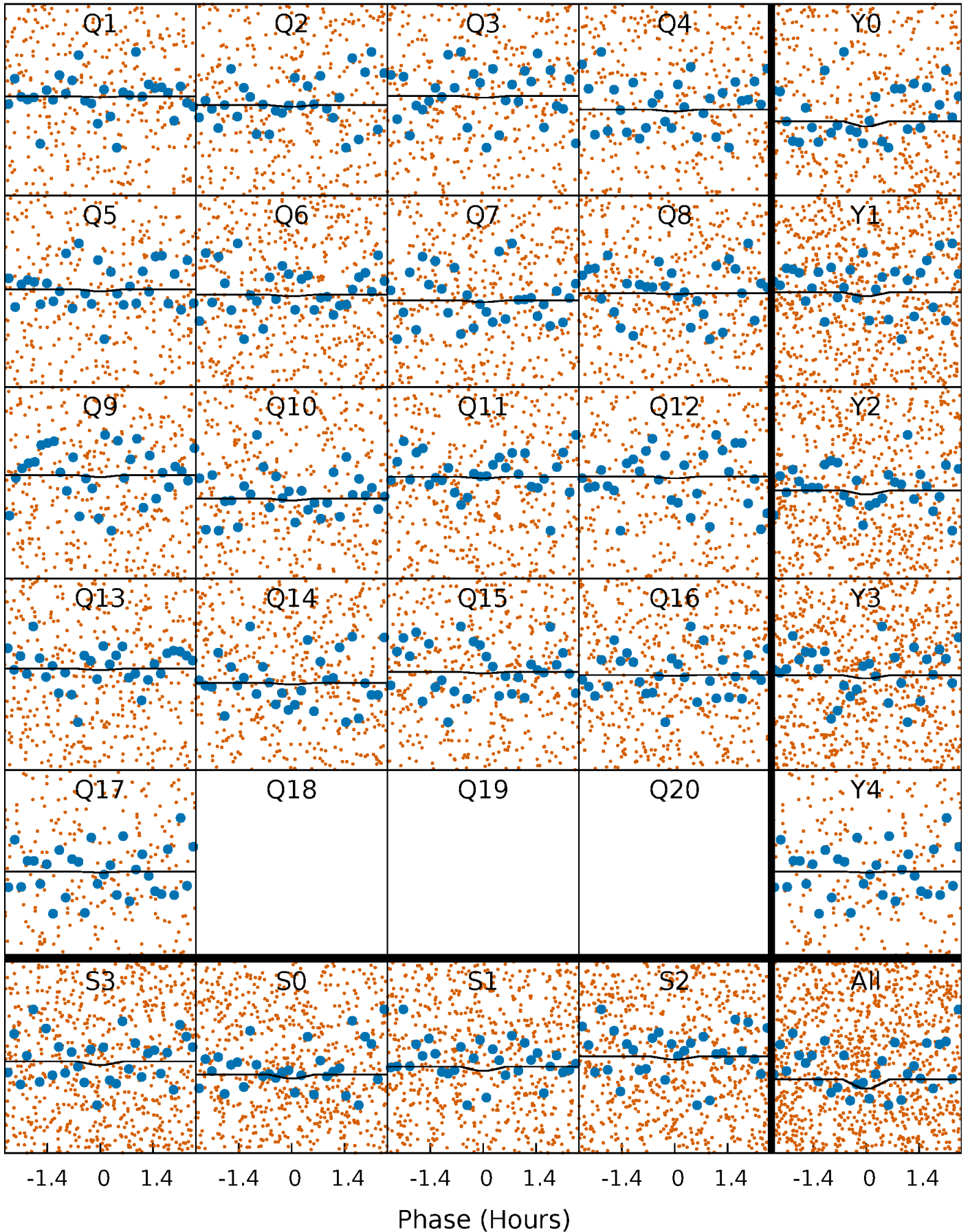
TCE 008376471-02   P= 0.528733 Days    $T_0=131.826399$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

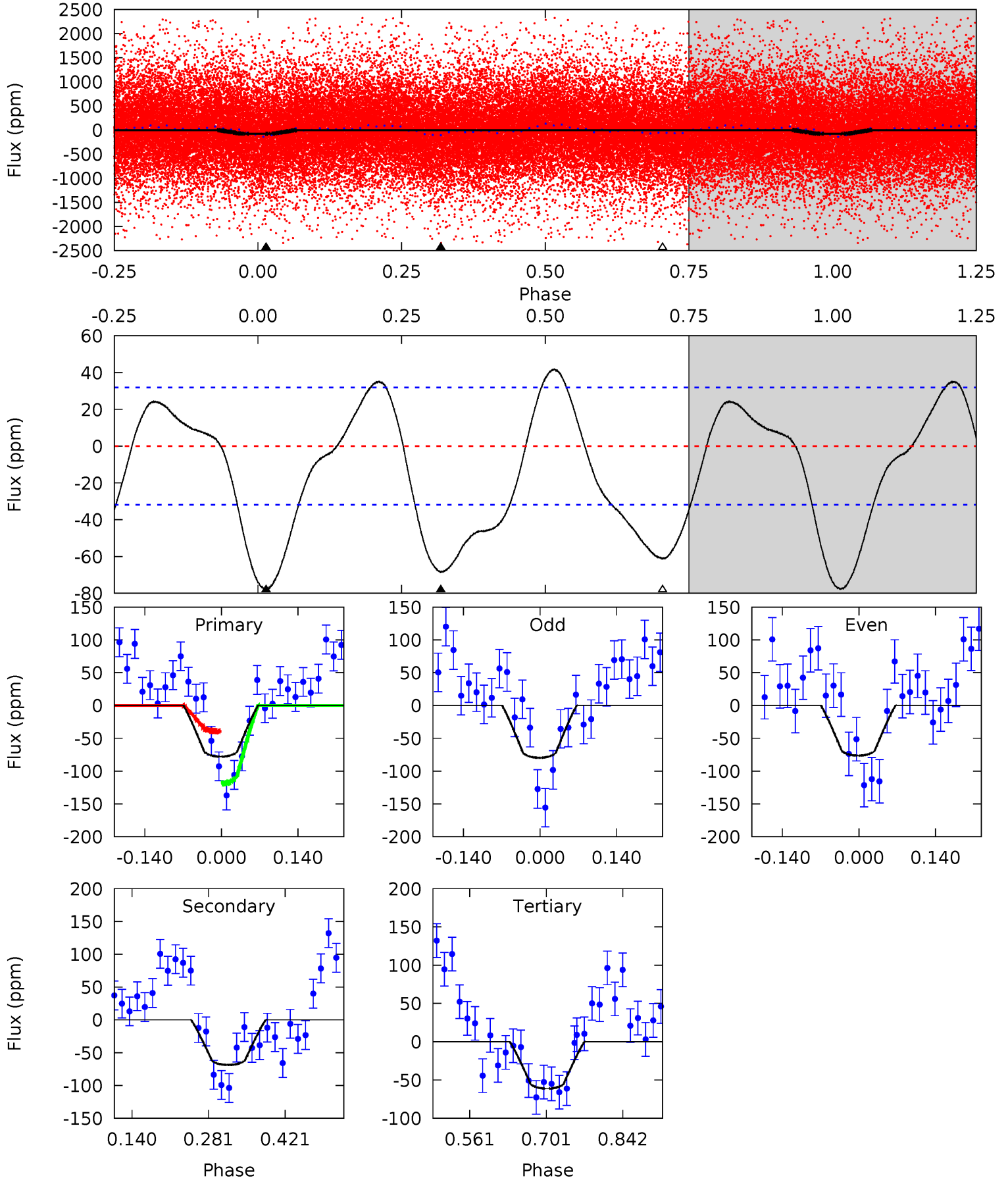
TCE 008376471-02   P= 0.528736 Days    $T_0=131.826464$  (BKJD)



# DV Model-Shift Uniqueness Test

008376471-02, P = 0.528733 Days, E = 131.297666 Days

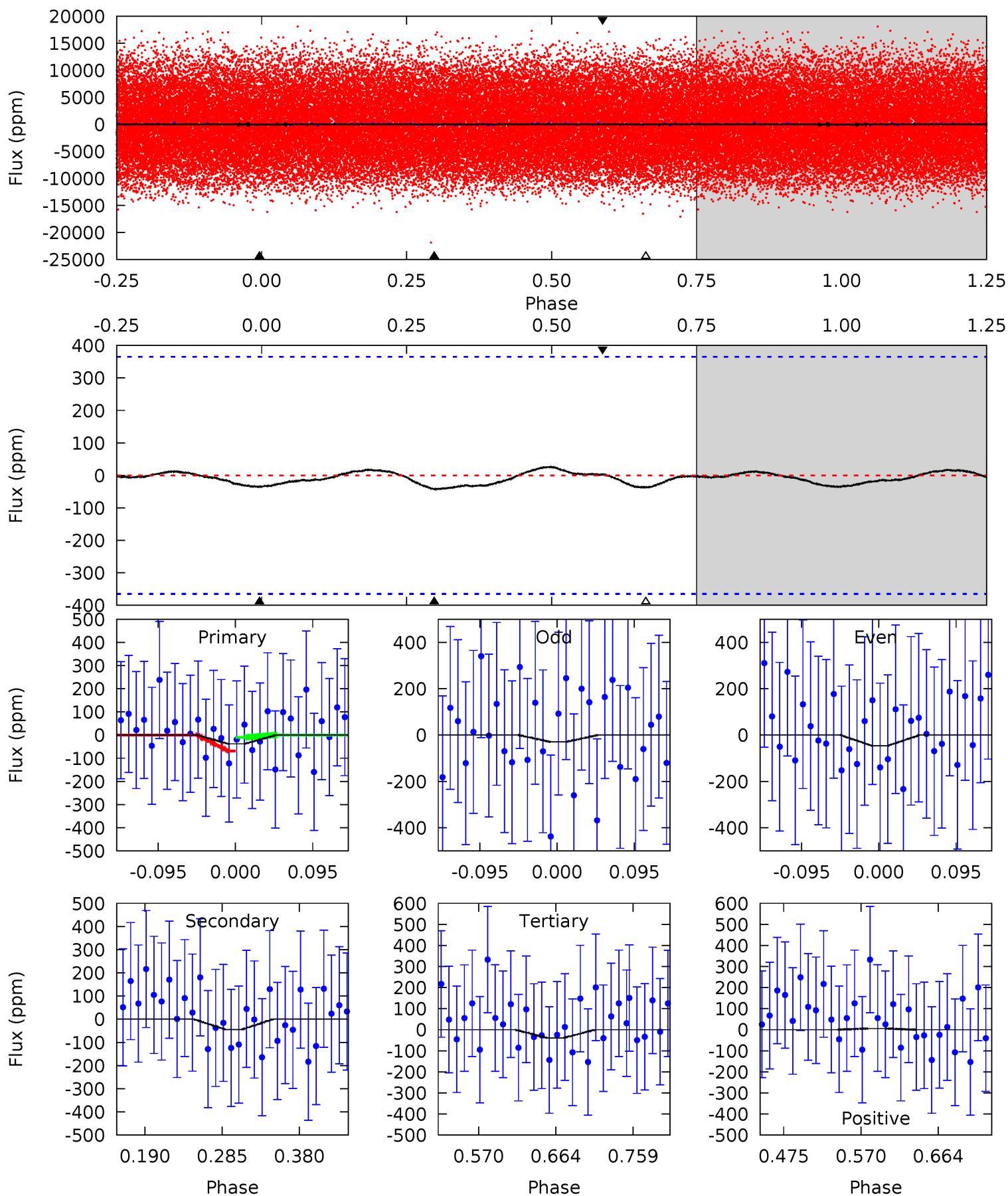
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	9.67	8.63	0	4.49	1.47	4.59	2.35	11.0	1.04	9.67	0.23	0.92	0.35	5.65



# Alt Model-Shift Uniqueness Test

008376471-02, P = 0.528736 Days, E = 131.297728 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.47	0.56	0.49	0.07	4.58	1.67	0.19	-0.02	0.40	0.07	0.49	0.10	0.01	0.39	0.37





### Stellar Parameters For KIC 008376471

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7261^{+230}_{-345}$	$3.898^{+0.273}_{-0.147}$	$0.020^{+0.200}_{-0.350}$	$2.486^{+0.563}_{-0.915}$	$1.781^{+0.196}_{-0.392}$	$0.163^{+0.307}_{-0.071}$
	+3%/-5%	+7%/-4%	+1000%/-1750%	+23%/-37%	+11%/-22%	+188%/-44%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008376471-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-69 \pm 7$	$1.68^{+1.05}_{-0.96}$	$5598^{+452}_{-514}$	$8060^{+9111}_{-2129}$	$3.182^{+14.372}_{-1.979}$
Alt.	$-45 \pm 80$	$1.58^{+0.93}_{-0.94}$	$5594^{+417}_{-507}$	$6934^{+8290}_{-14096}$	$1.931^{+13.468}_{-3.341}$

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

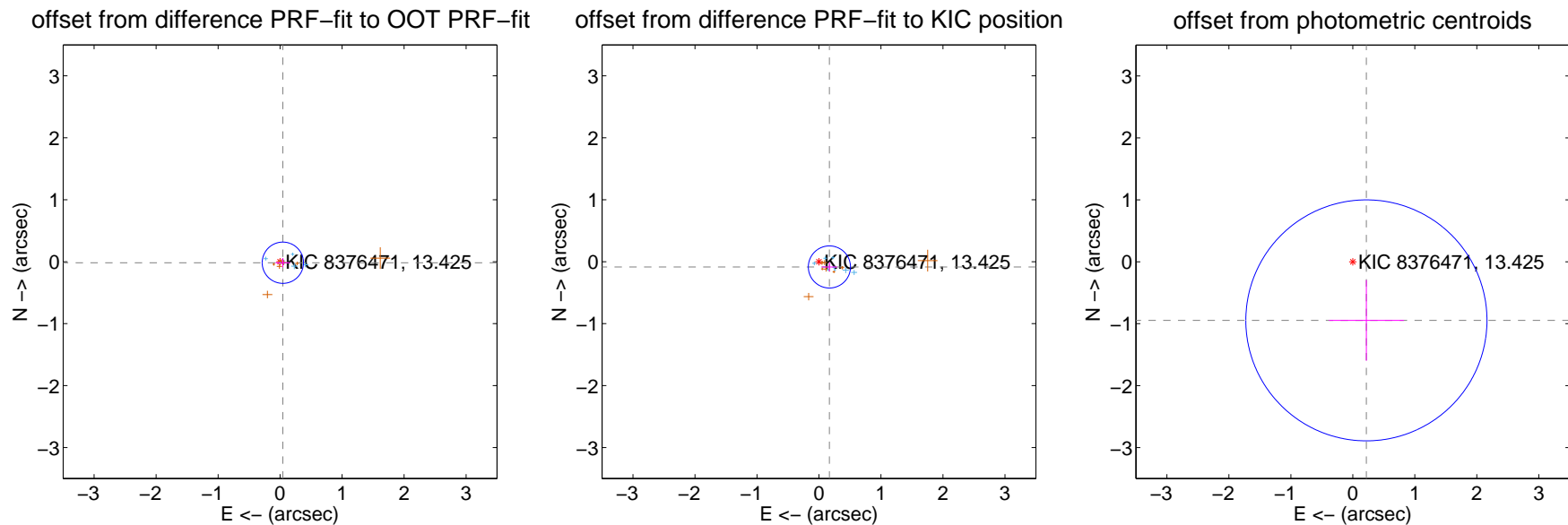
## DV Centroid Data

Supplemental centroid analysis for 008376471-02. Kepler magnitude: 13.43. Transit SNR 3.97

There are 9 quarters with good PRF difference image offsets

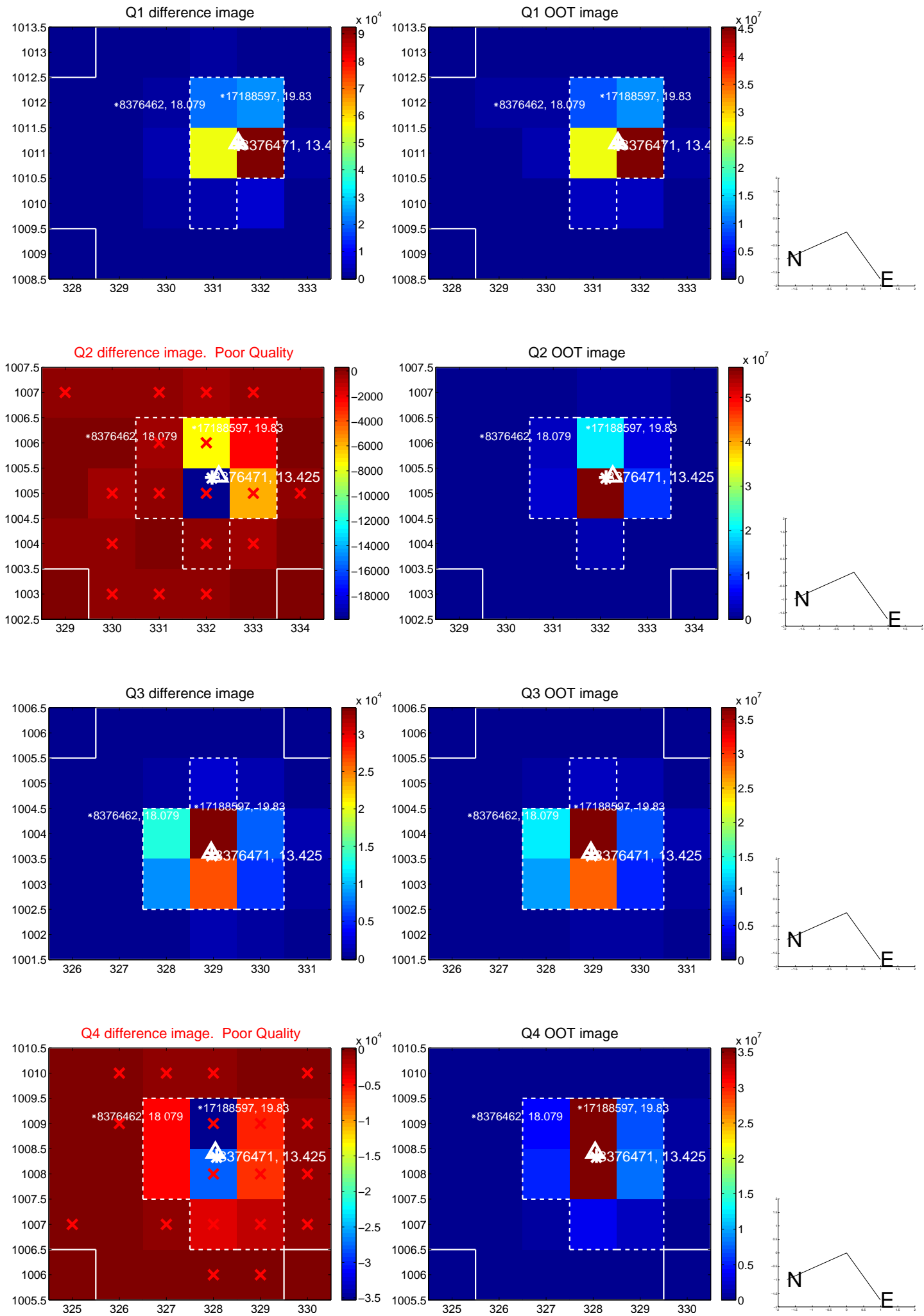
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.047 \pm 0.111$	0.43	$-0.044 \pm 0.120$	$-0.017 \pm 0.075$
PRF-fit source offset from KIC position	$0.188 \pm 0.113$	1.66	$-0.168 \pm 0.124$	$-0.085 \pm 0.074$
photometric centroid source offset	$0.97 \pm 0.65$	1.50	$-0.22 \pm 0.60$	$-0.95 \pm 0.65$

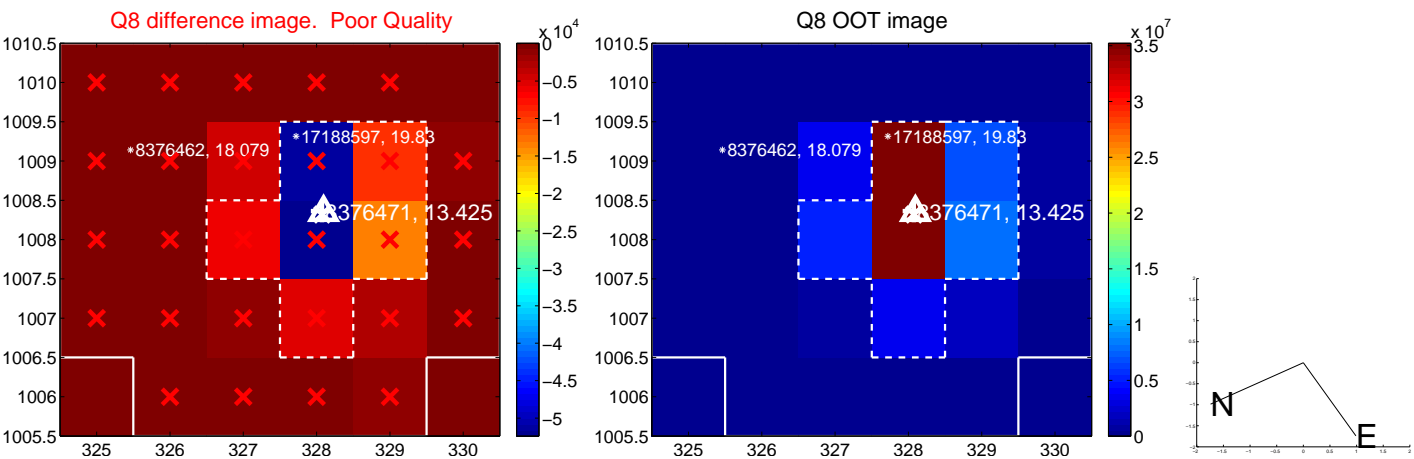
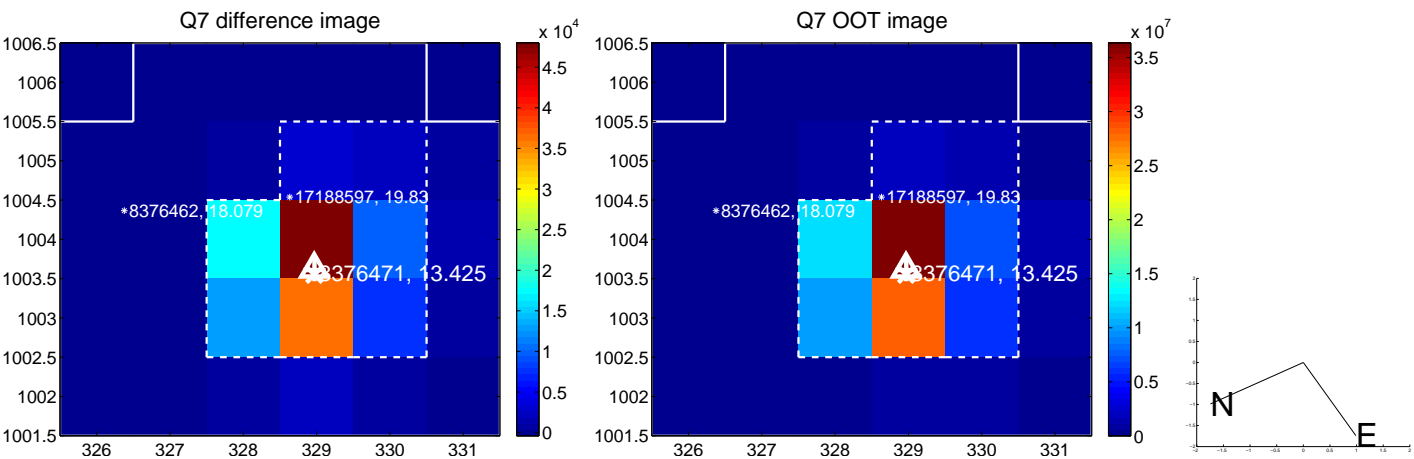
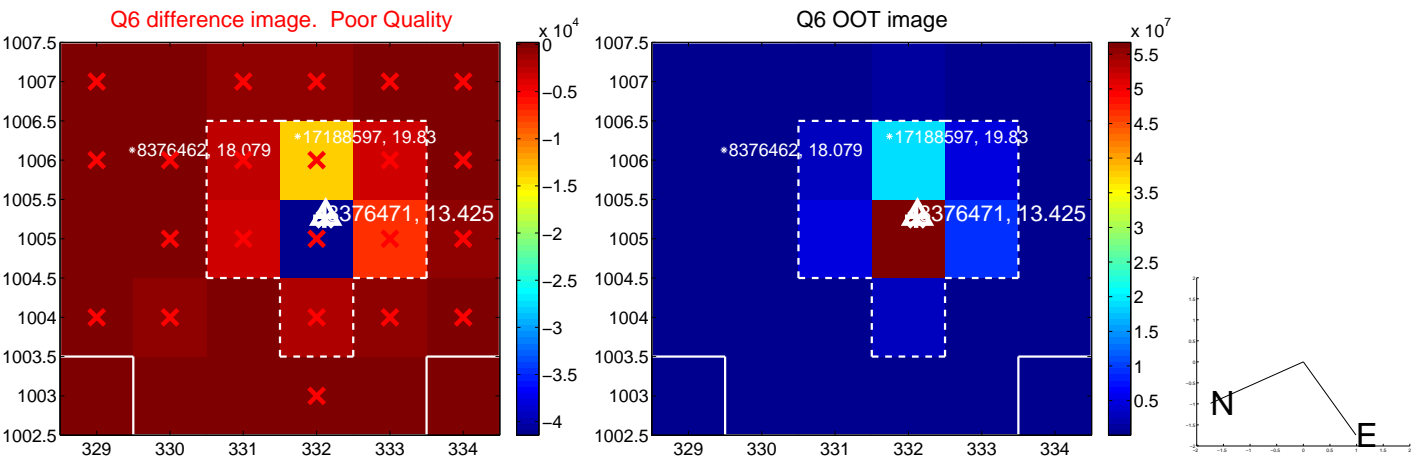
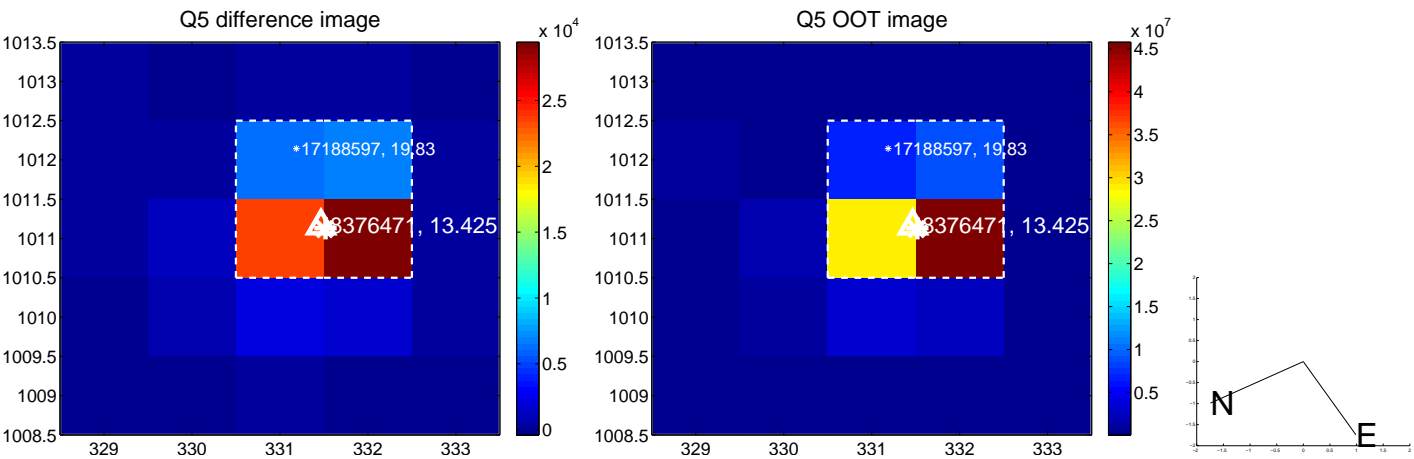


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

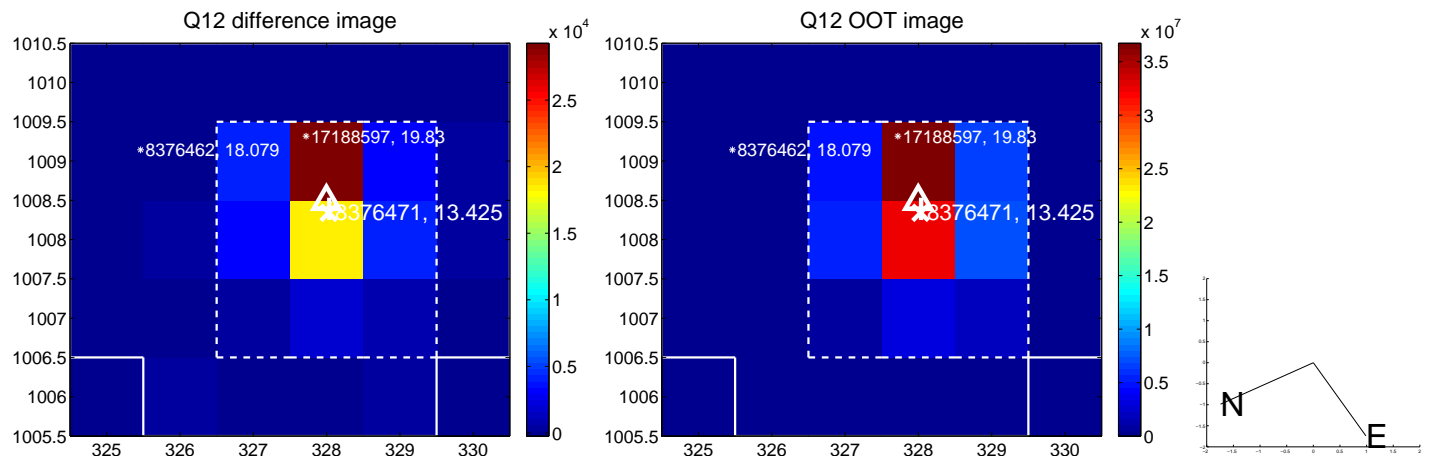
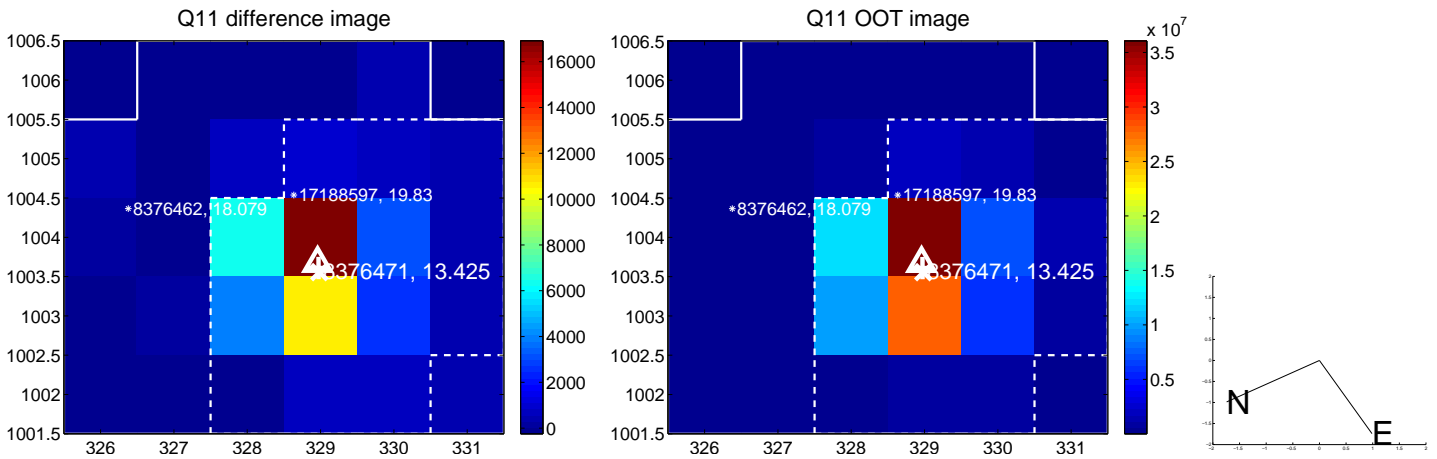
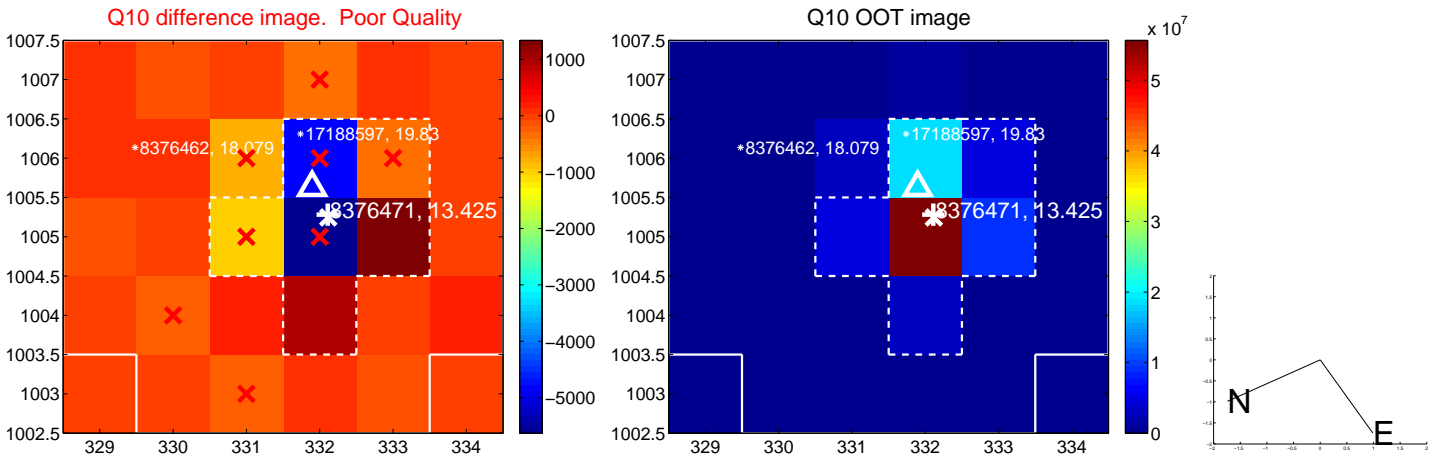
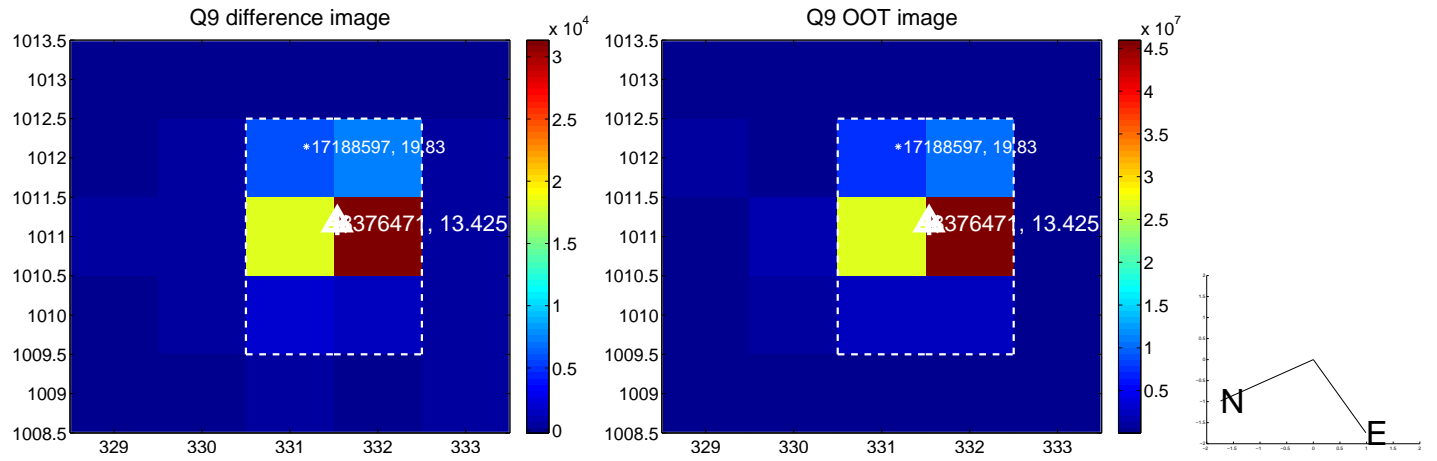
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



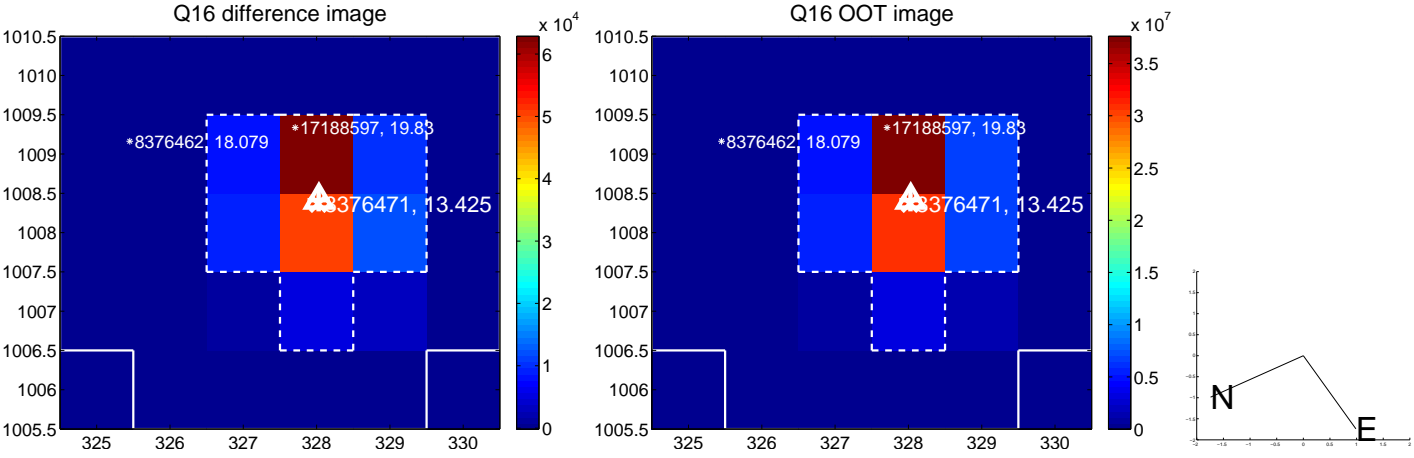
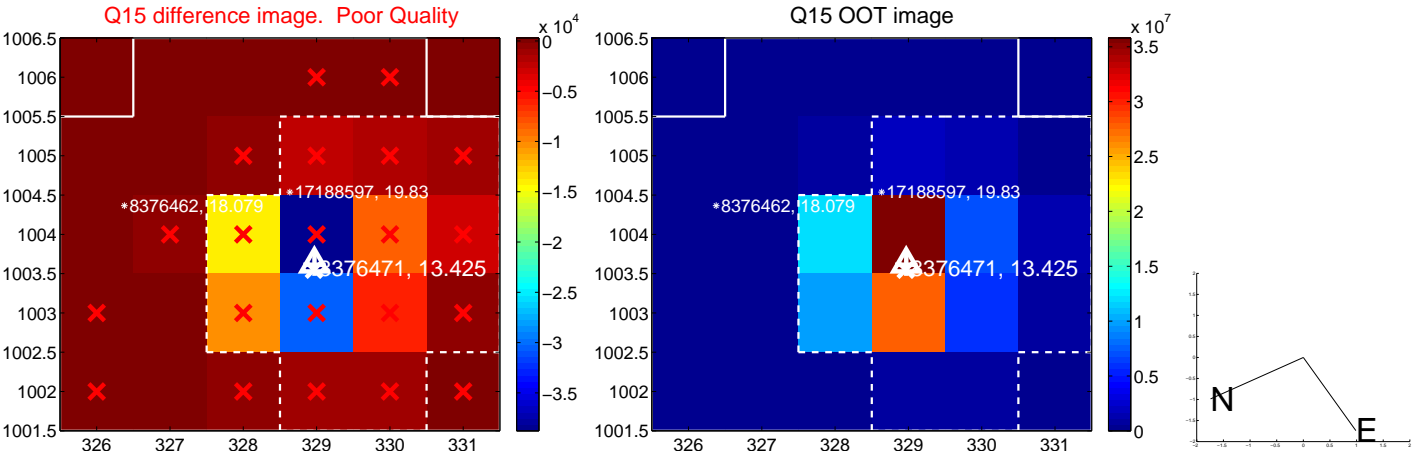
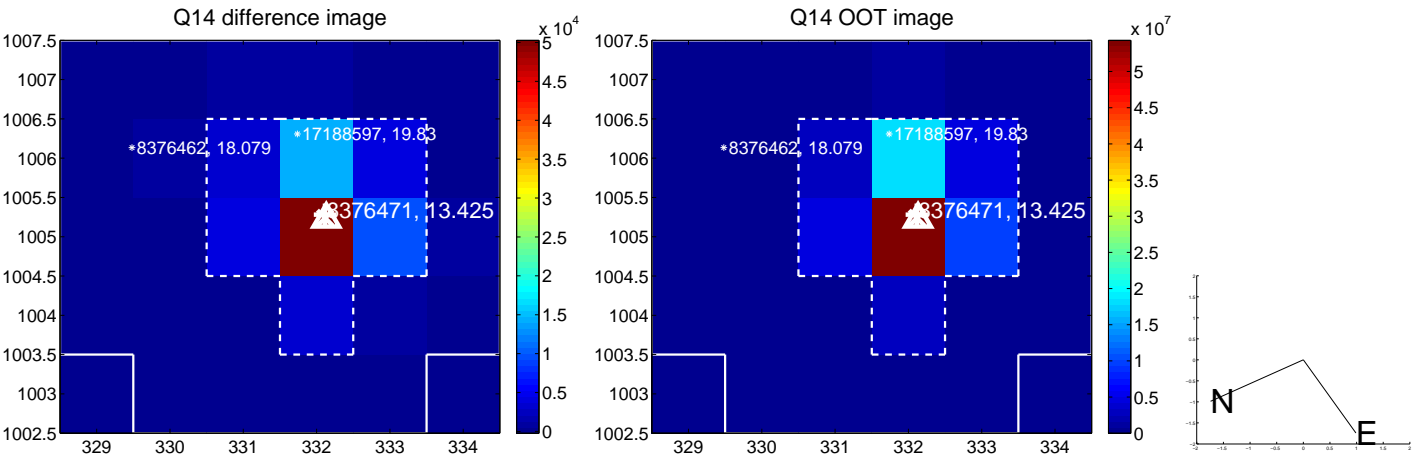
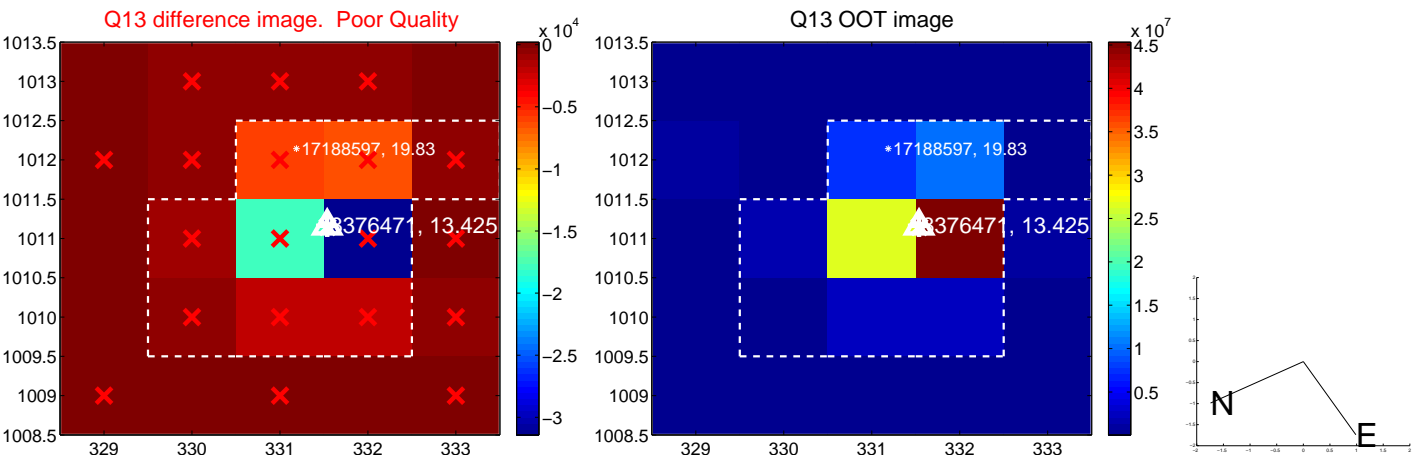
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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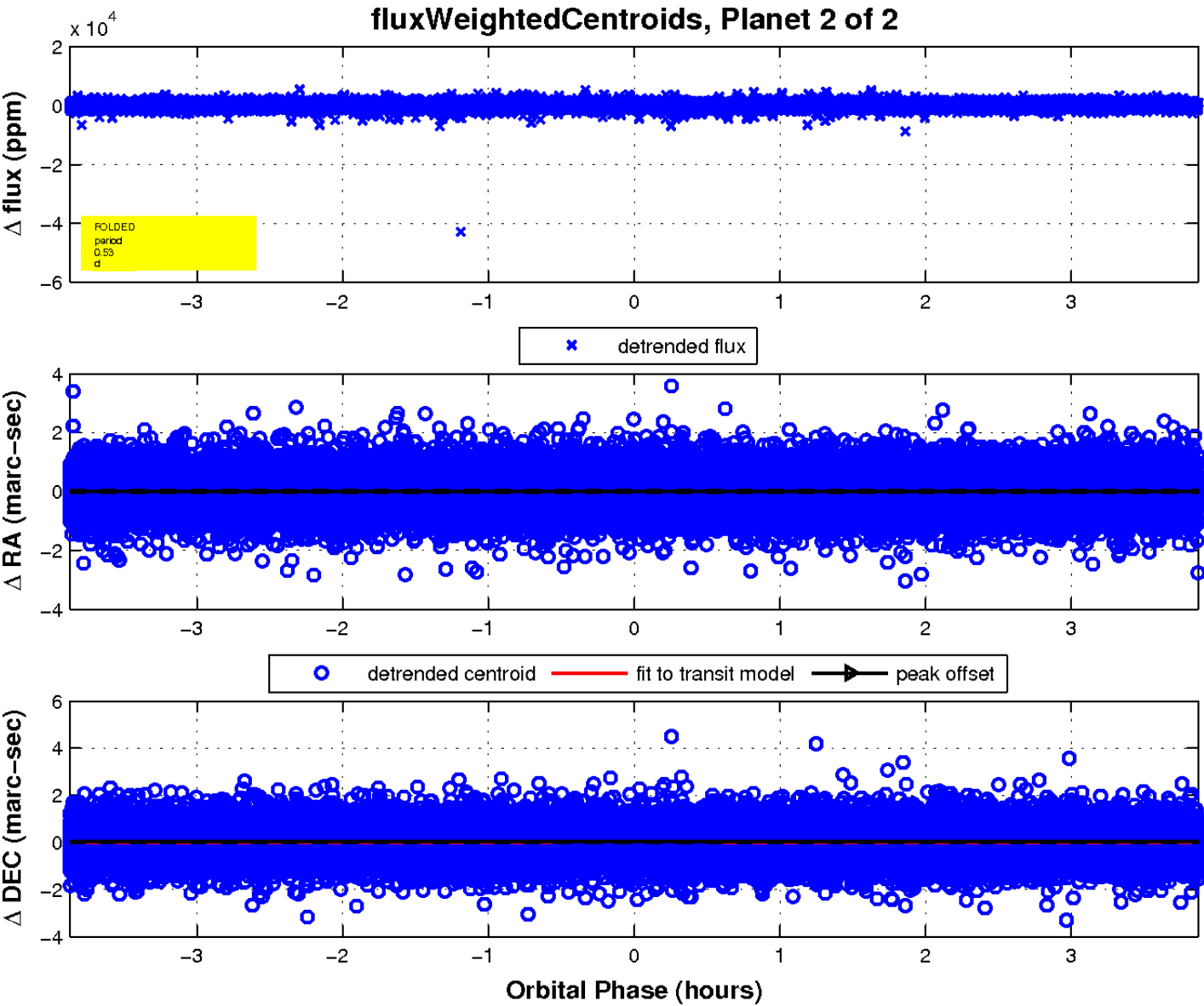
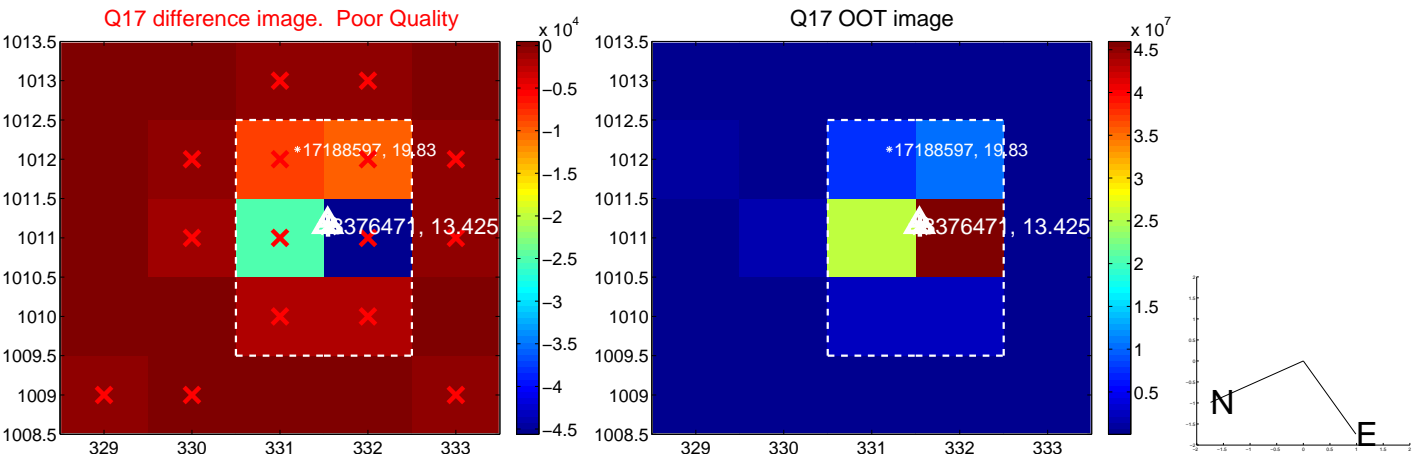


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

