

# KIC 009071343

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009071343-01	OBS	No	0.843516	131.549942	38.4	3.093	11.8	11.7	1.06	6260	0.78	4728.86
009071343-02	OBS	No	0.843497	131.974259	20.0	4.115	11.7	7.4	1.06	6260	0.48	4729.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009071343-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
009071343-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

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

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

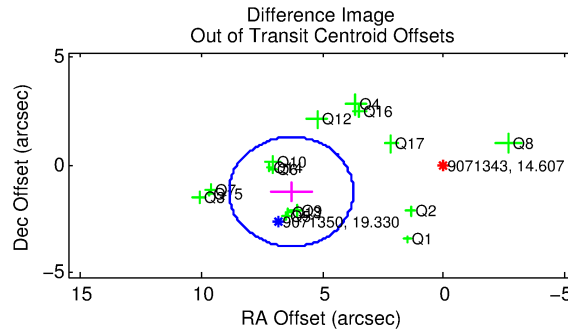
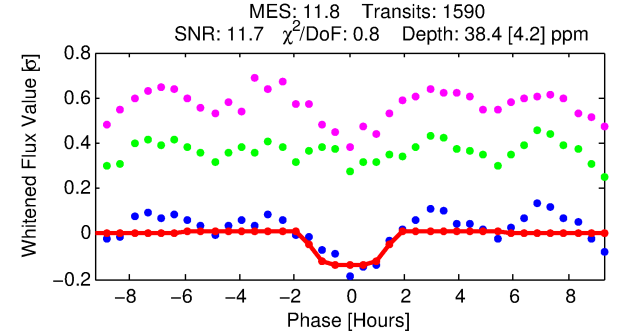
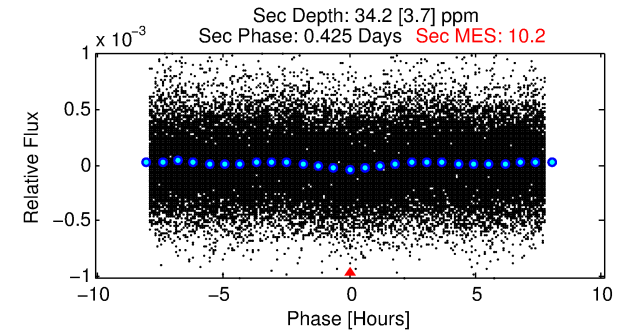
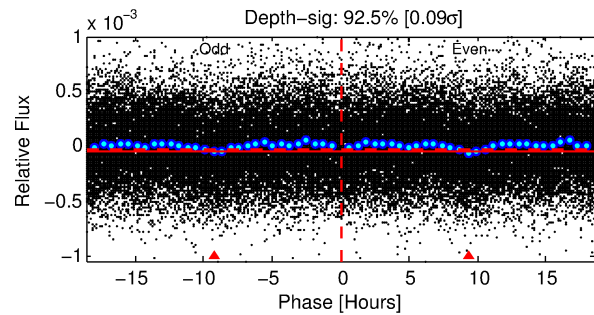
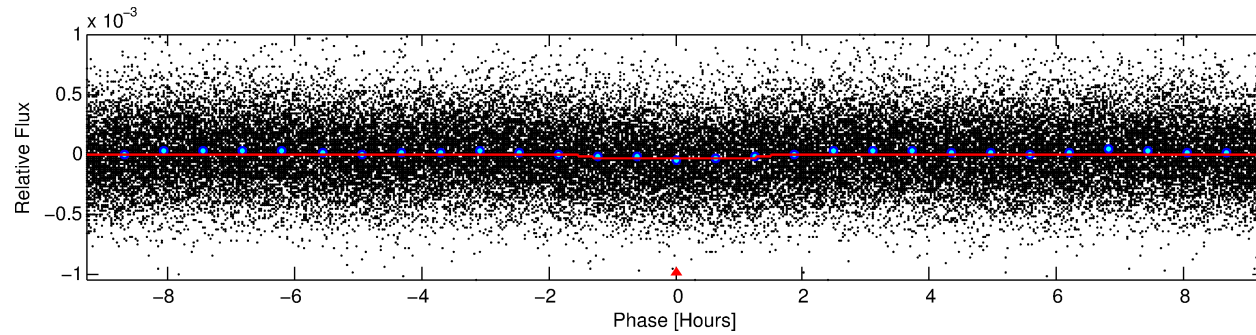
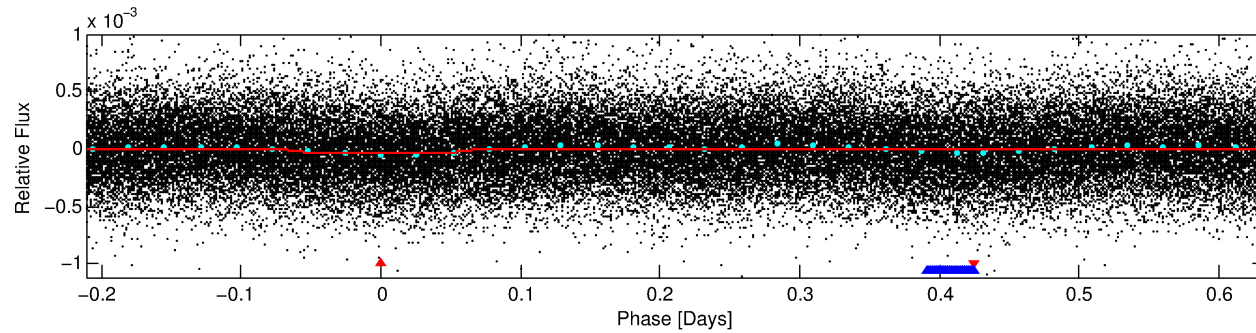
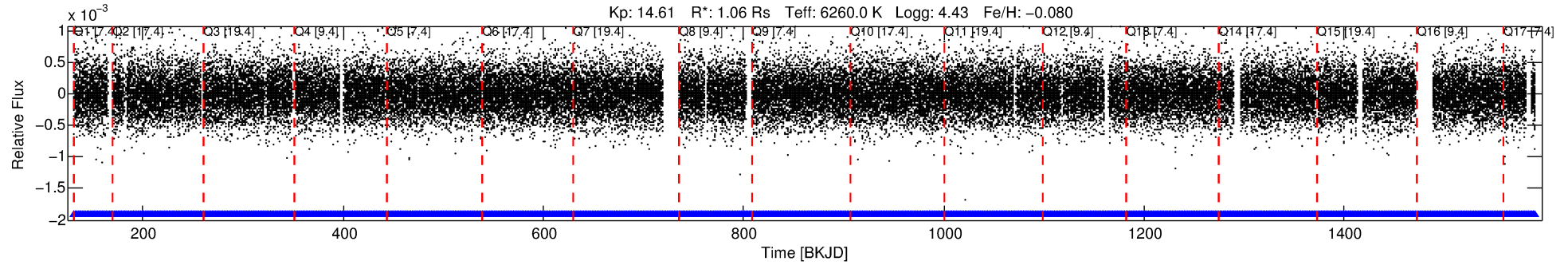
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009071343-01

No Significant Match Found

# DV One-Page Summary

KIC: 9071343 Candidate: 1 of 2 Period: 0.844 d



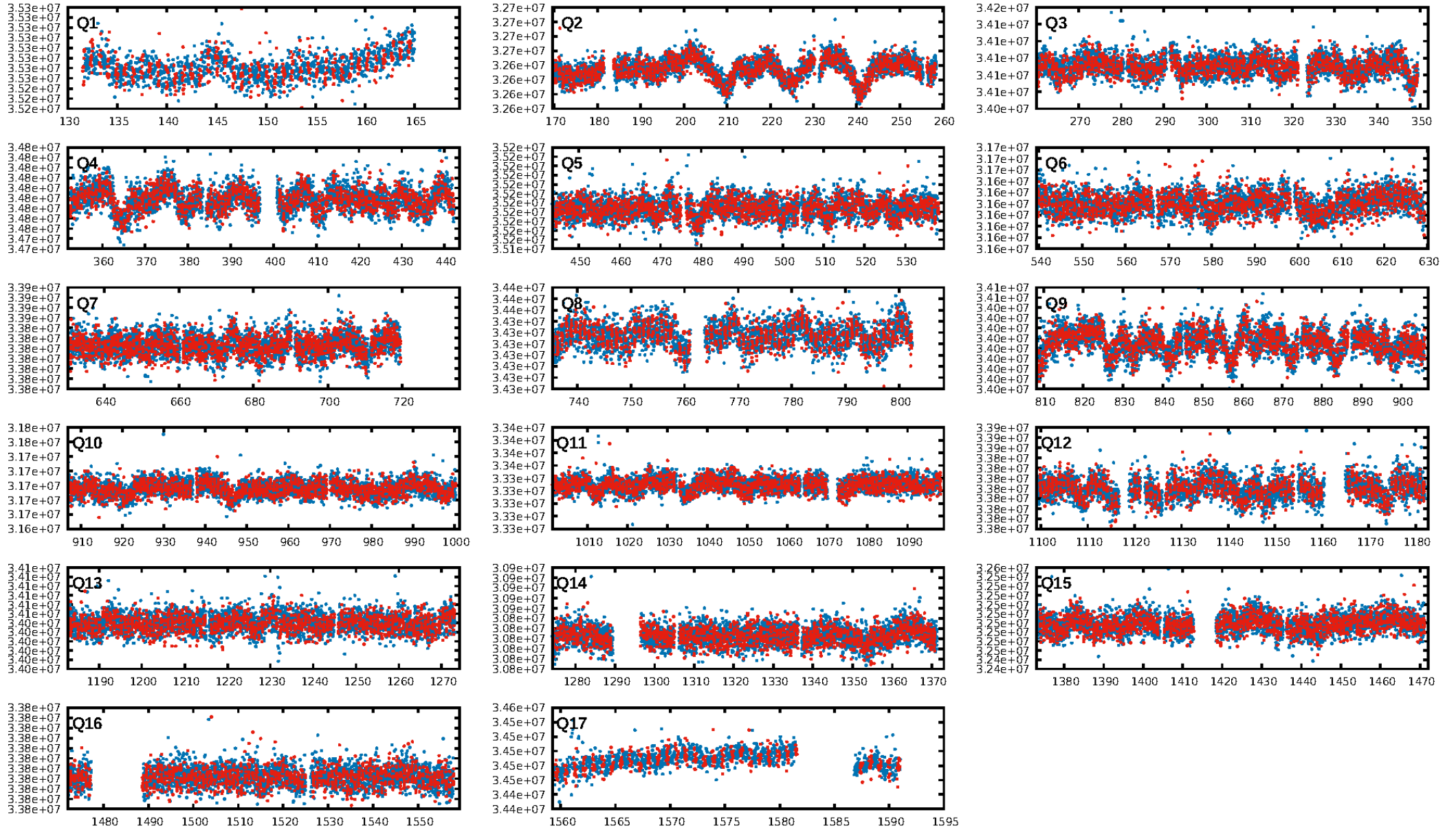
## DV Fit Results:

Period = 0.84352 [0.00001] d  
Epoch = 131.5499 [0.0032] BKJD  
Rp/R\* = 0.0067 [0.0035]  
a/R\* = 1.32 [1.64]  
b = 0.90 [0.61]  
Seff = 4728.86 [1876.41]  
Teff = 2115 [210] K  
Rp = 0.78 [0.48] Re  
a = 0.0181 [0.0047] AU  
Ag = 10.29 [11.54] [0.80 $\sigma$ ]  
Teffp = 5855 [1560] K [2.38 $\sigma$ ]

## DV Diagnostic Results:

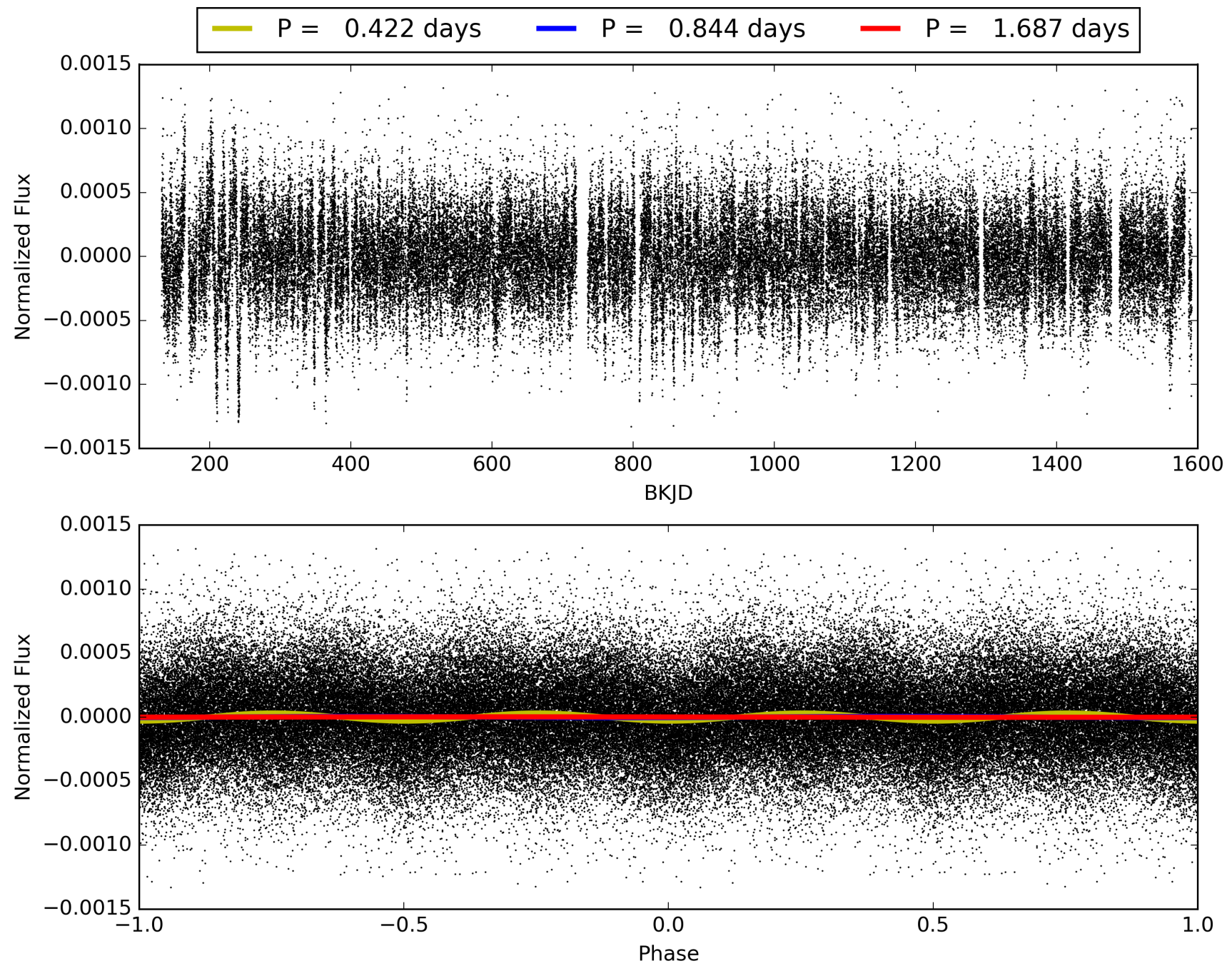
**ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]**  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1518/1518]  
**GhostDiagnostic-chr: -0.3787**  
Centroid-sig: 0.0%  
Centroid-so: 6.801 arcsec [5.80 $\sigma$ ]  
OotOffset-rm: 6.414 arcsec [7.51 $\sigma$ ]  
KicOffset-rm: 6.418 arcsec [7.55 $\sigma$ ]  
OotOffset-st: 4/3/4/5 [16]  
KicOffset-st: 4/3/4/5 [16]  
DiffImageQuality-fgm: 0.62 [10/16]  
DiffImageOverlap-fno: 0.65 [11/17]

# TCE 009071343-01, PDC Light Curves



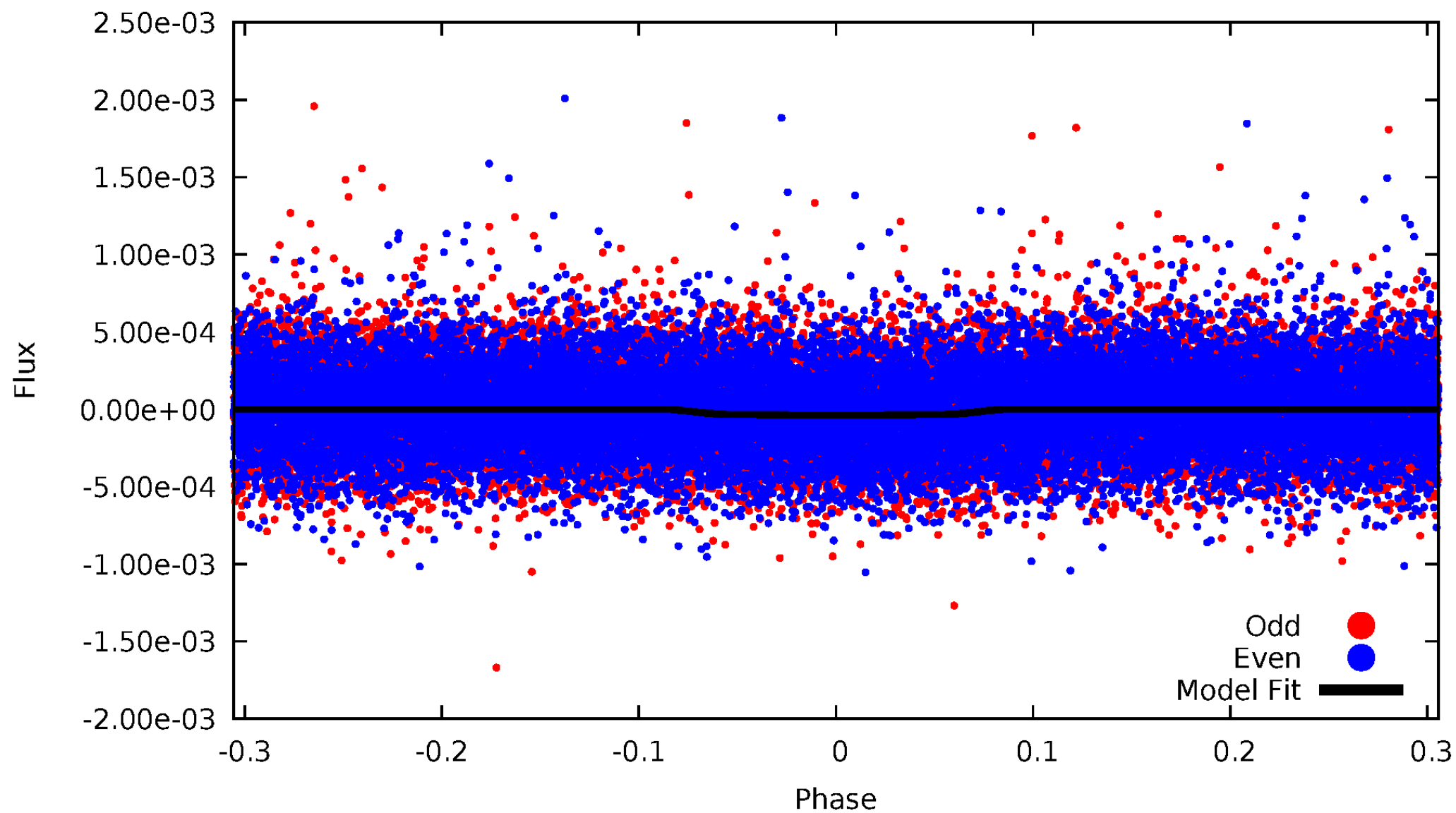


TCE 009071343-01



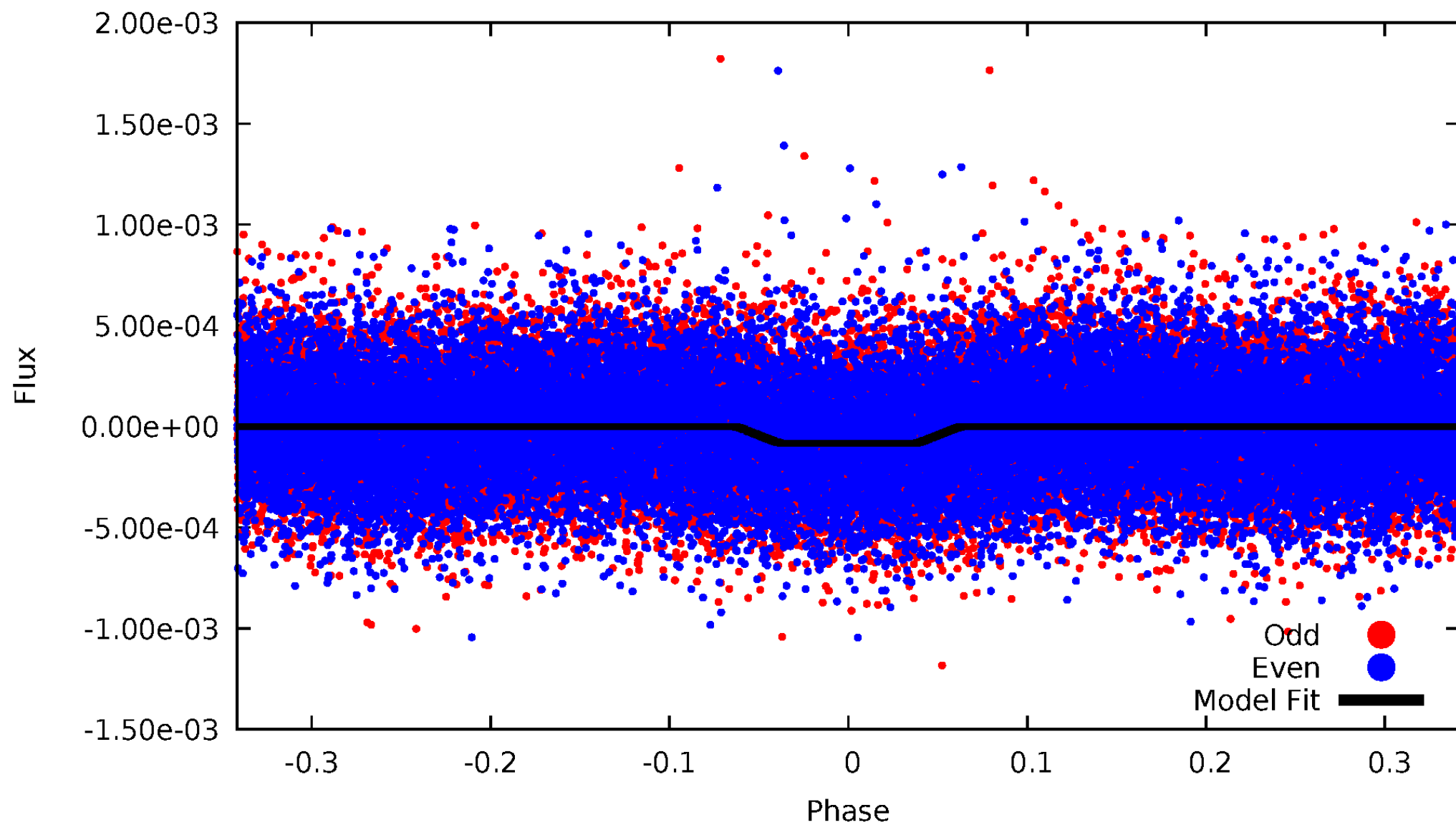
# DV Odd/Even

TCE 009071343-01



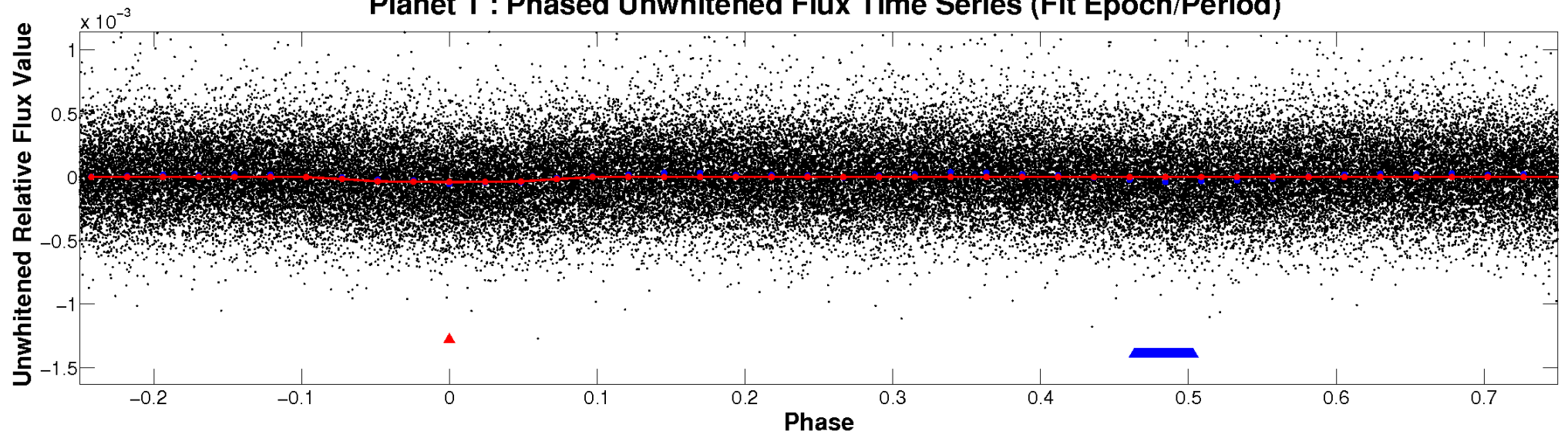
# ALT Odd/Even

TCE 009071343-01

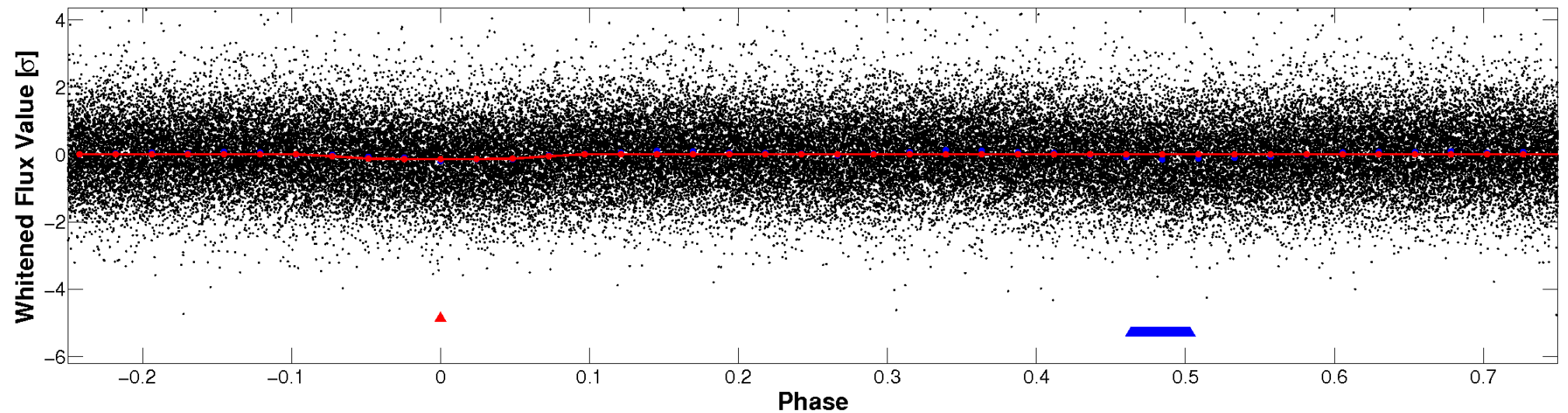


# Non-Whitened Vs. Whitened Light Curve

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



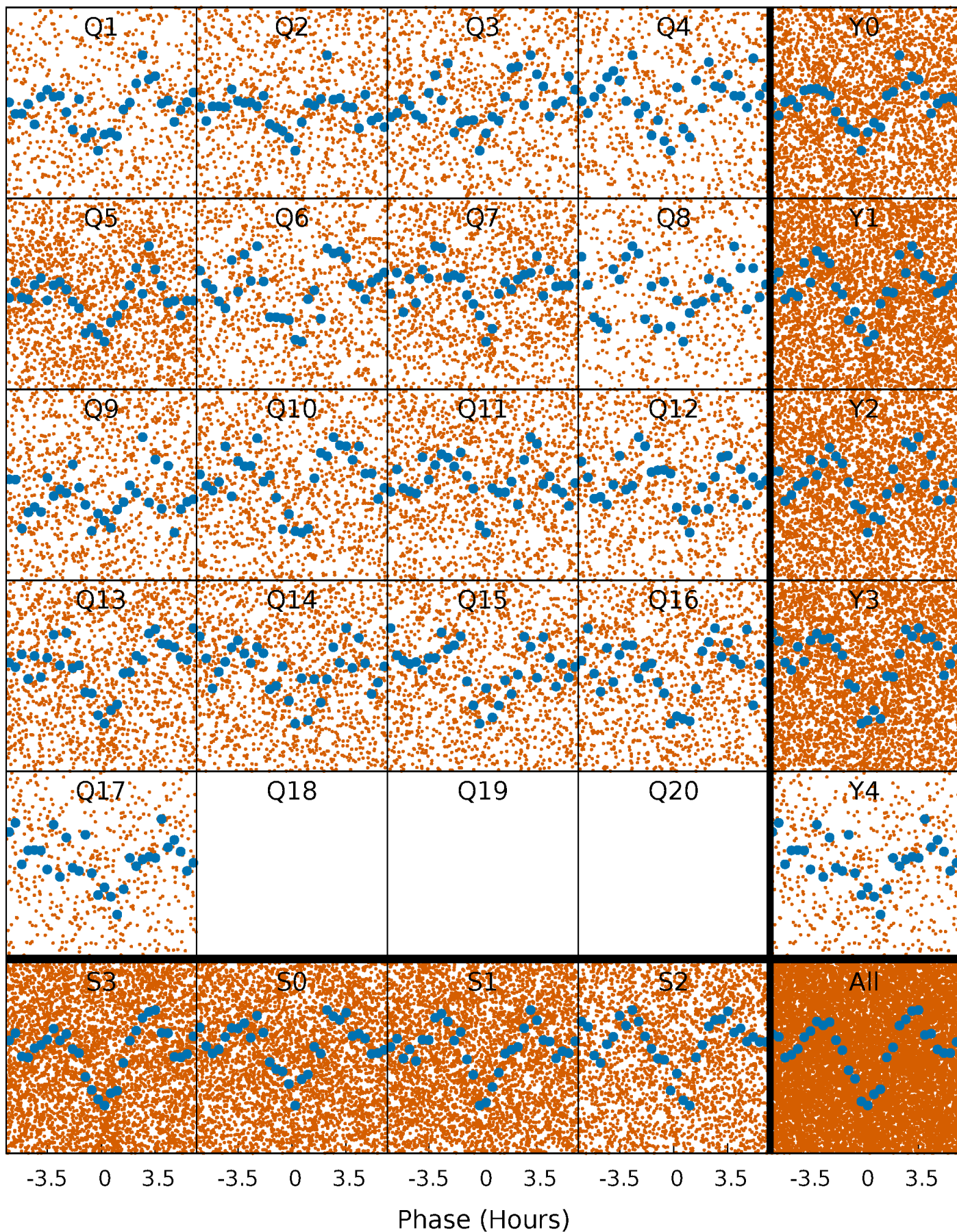
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

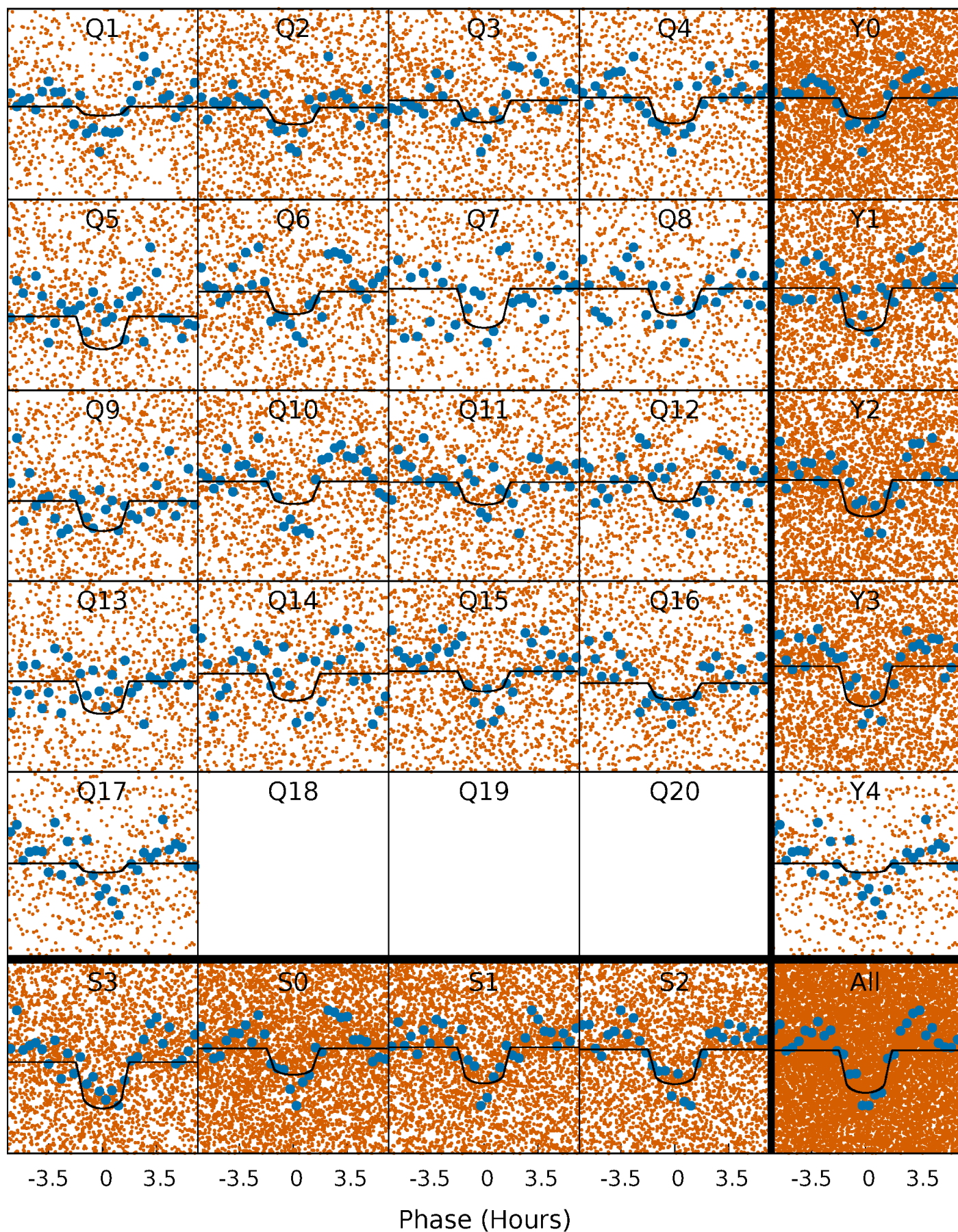
TCE 009071343-01   P= 0.843516 Days    $T_0=131.549942$  (BKJD)





# DV Quarter-Phased Transit Curves

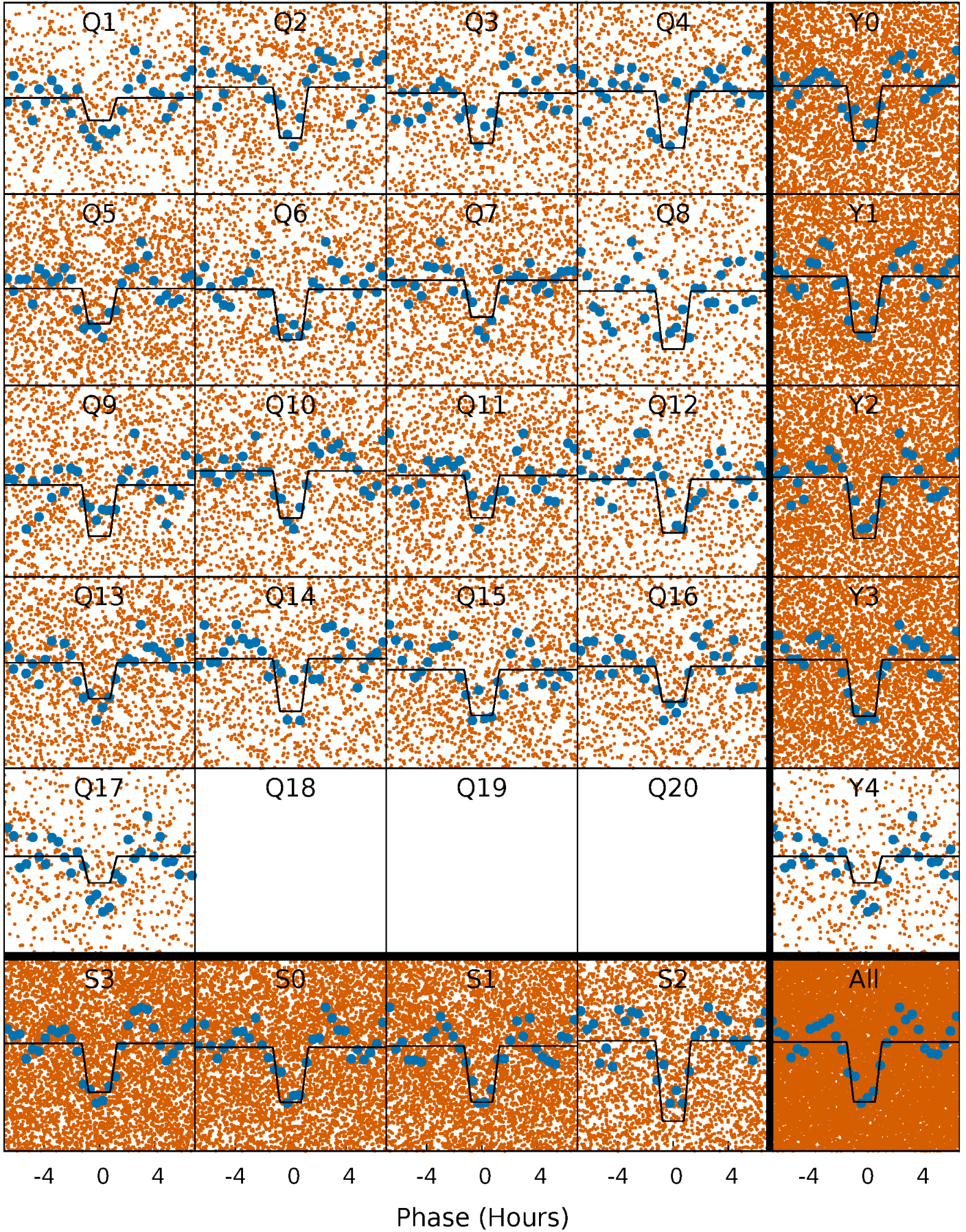
TCE 009071343-01 P= 0.843516 Days  $T_0=131.549942$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

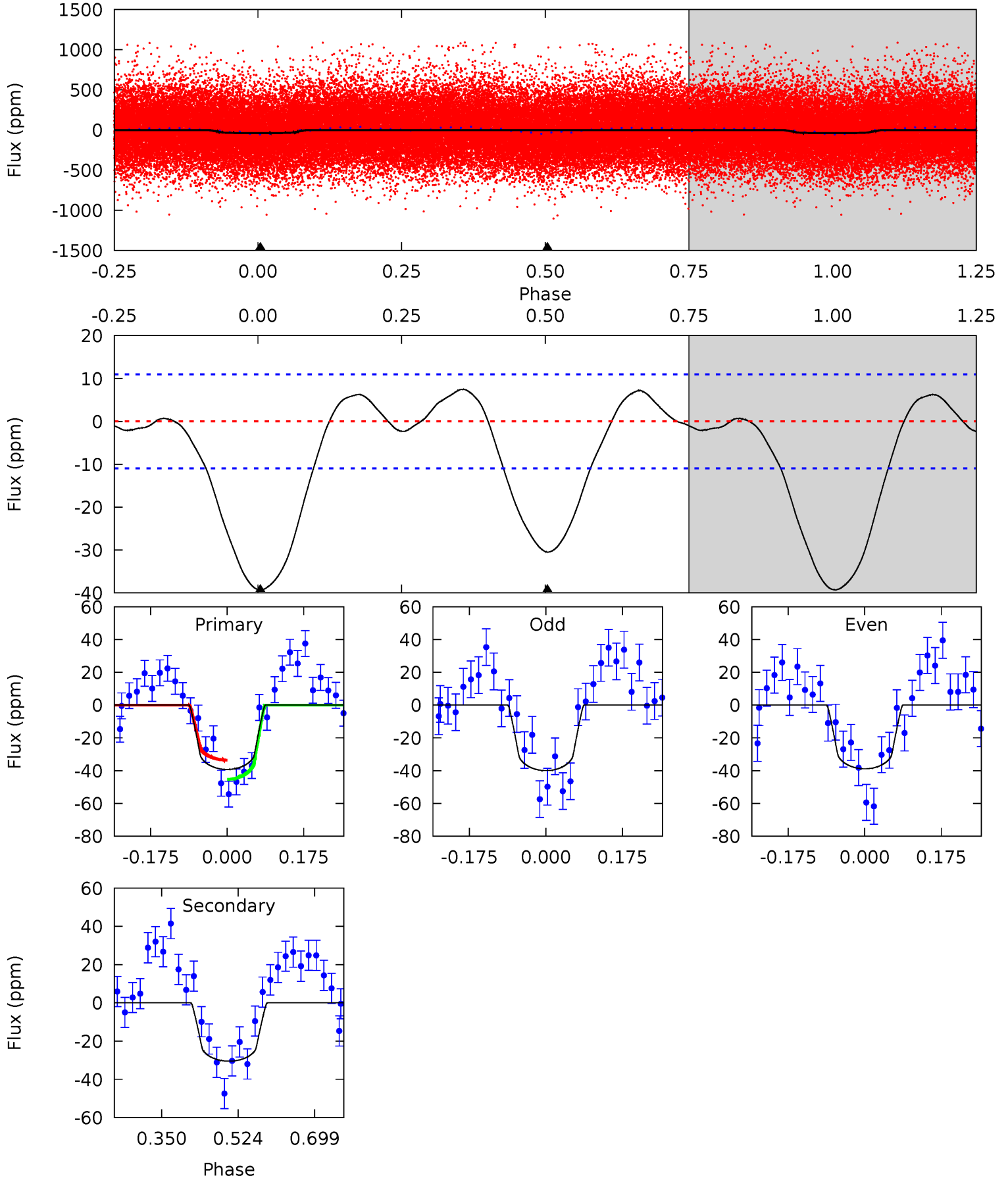
TCE 009071343-01 P= 0.843529 Days  $T_0=131.546008$  (BKJD)



# DV Model-Shift Uniqueness Test

009071343-01, P = 0.843516 Days, E = 130.706426 Days

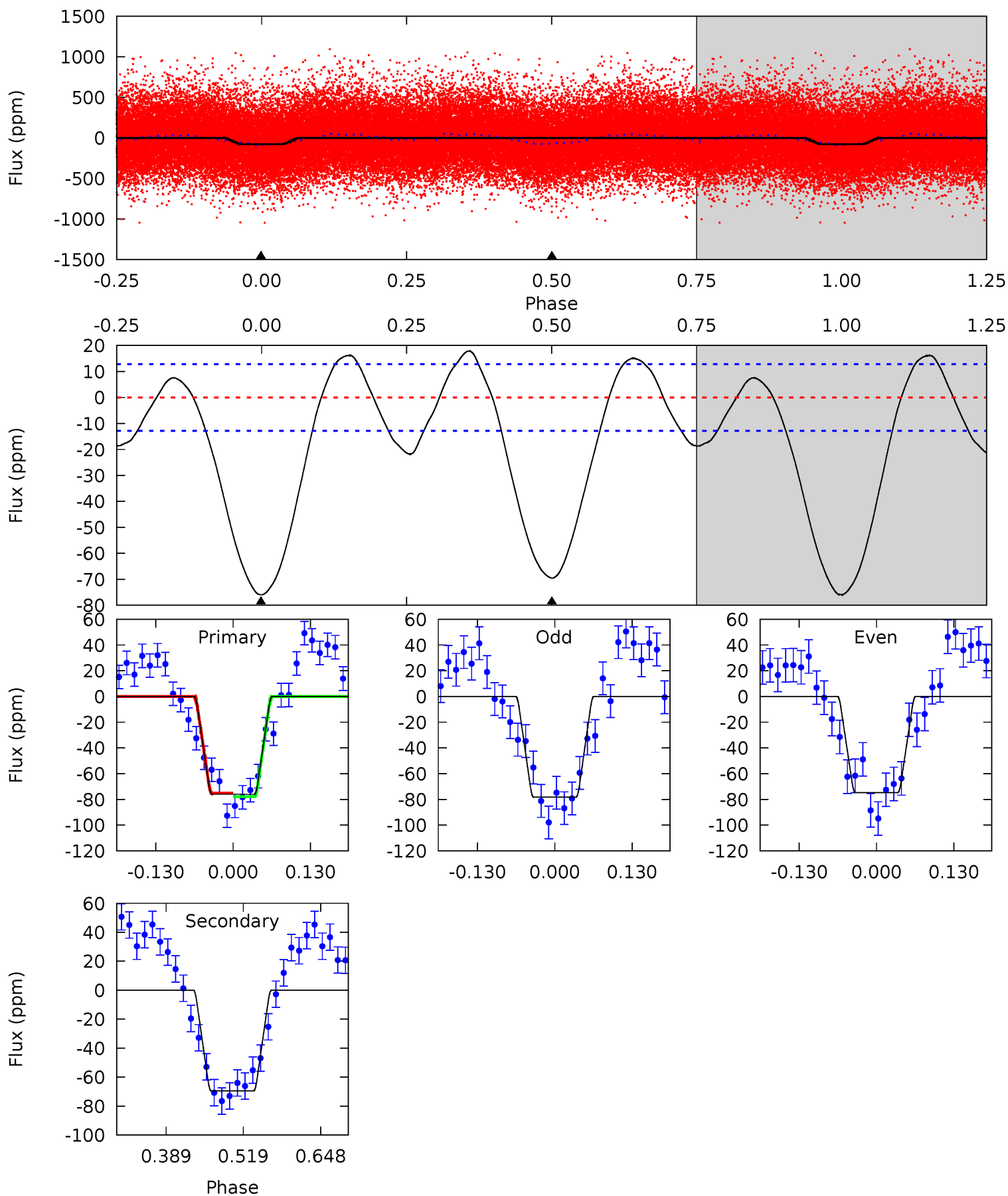
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.0	12.4	0	0	4.45	1.36	1.05	16.0	16.0	12.4	12.4	0.22	0.95	0.16	2.39



# Alt Model-Shift Uniqueness Test

009071343-01, P = 0.843529 Days, E = 130.702479 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
26.7	24.4	0	0	4.51	1.52	4.44	26.7	26.7	24.4	24.4	0.62	0.96	0.19	0.48





### Stellar Parameters For KIC 009071343

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6260^{+168}_{-205}$	$4.433^{+0.054}_{-0.202}$	$-0.080^{+0.250}_{-0.350}$	$1.063^{+0.335}_{-0.112}$	$1.118^{+0.145}_{-0.145}$	$1.310^{+0.374}_{-0.697}$
	+3%/-3%	+1%/-5%	+312%/-438%	+32%/-11%	+13%/-13%	+29%/-53%
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 009071343-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-30 \pm 2$	$0.80^{+0.48}_{-0.38}$	$3000^{+223}_{-135}$	$5608^{+2270}_{-1056}$	$8.391^{+21.148}_{-5.141}$
Alt.	$-70 \pm 3$	$1.13^{+0.42}_{-0.46}$	$3013^{+223}_{-145}$	$5851^{+1828}_{-781}$	$9.717^{+17.147}_{-4.580}$

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

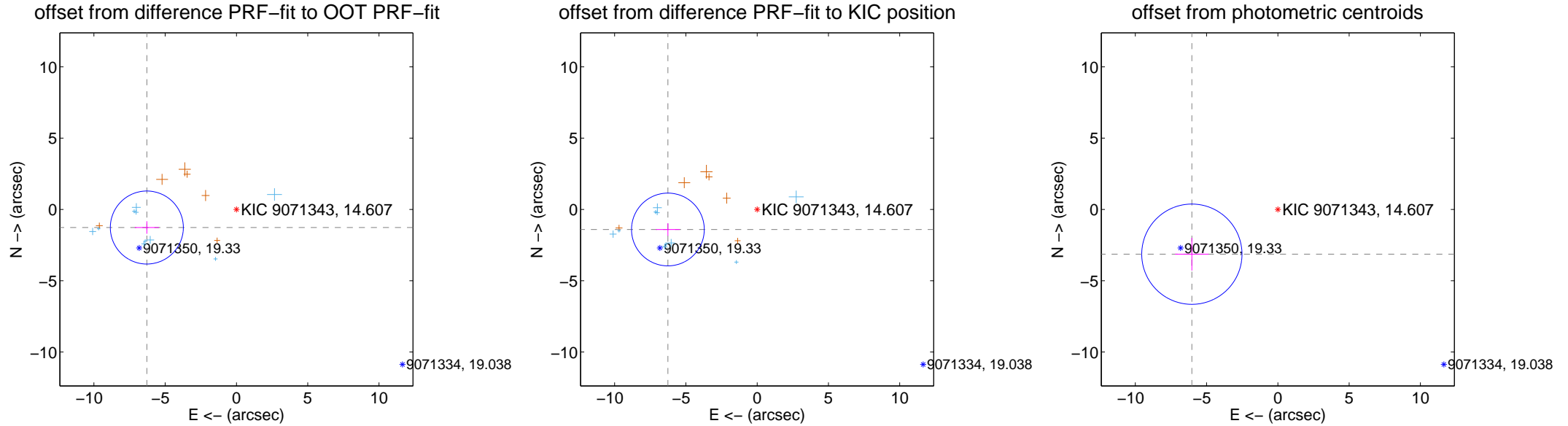
## DV Centroid Data

Supplemental centroid analysis for 009071343-01. Kepler magnitude: 14.61. Transit SNR 11.74

There are 10 quarters with good PRF difference image offsets

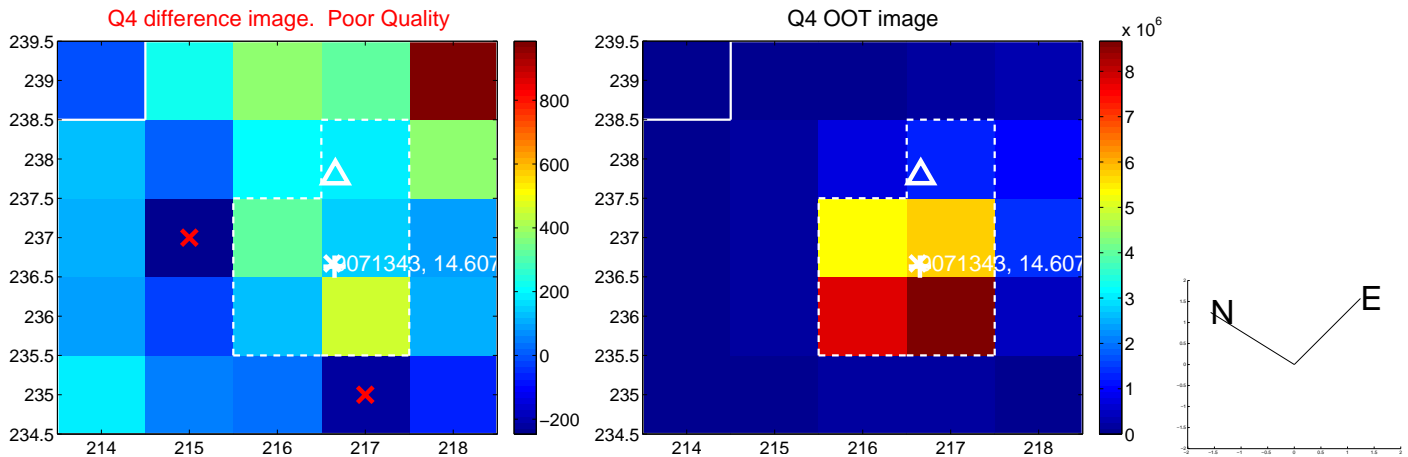
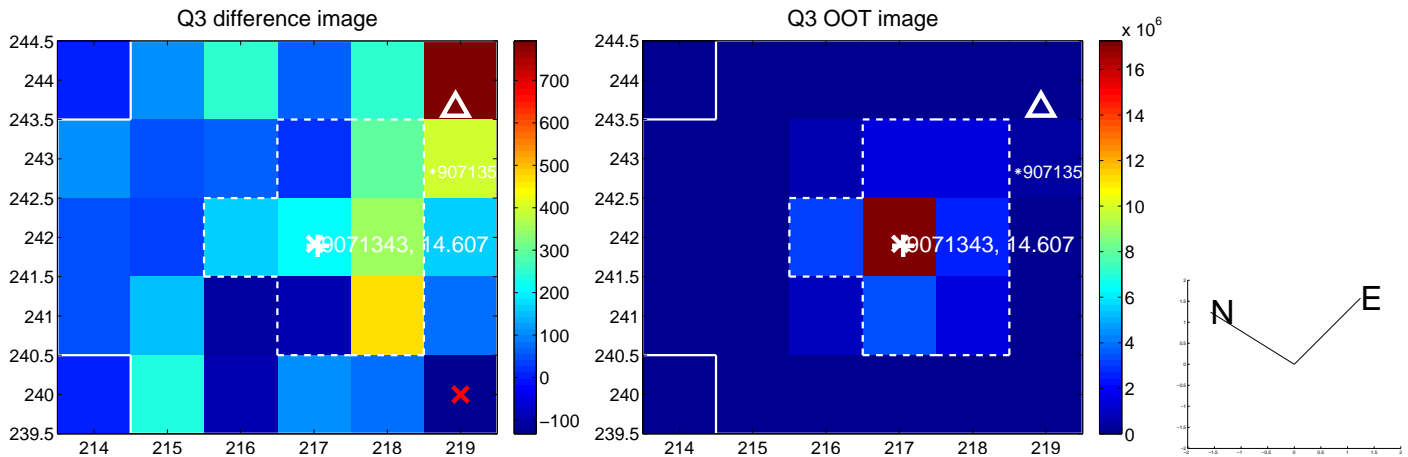
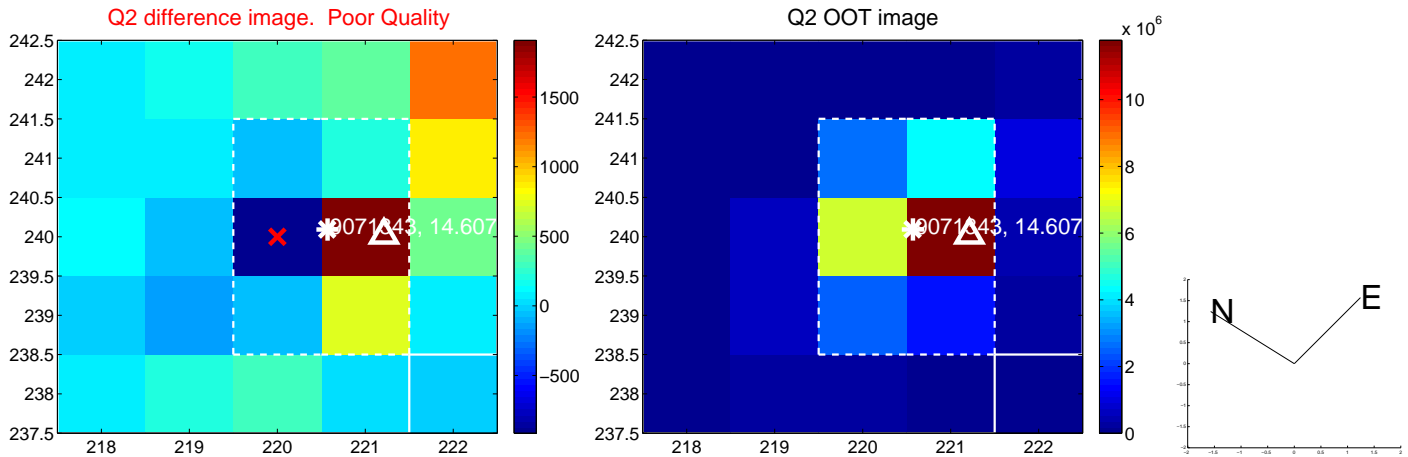
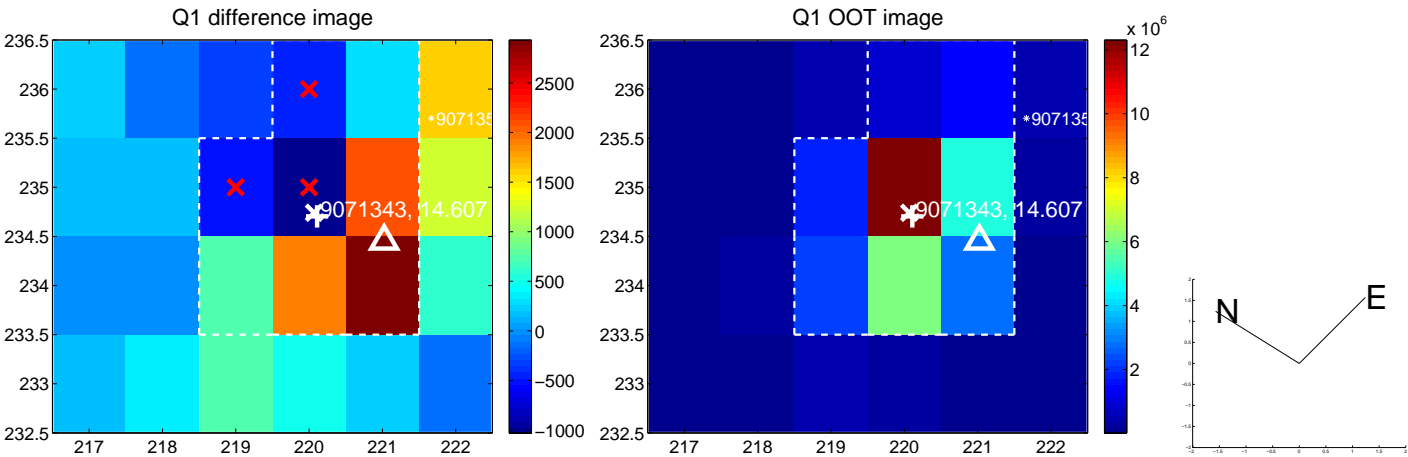
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.414 \pm 0.854$	7.51	$6.287 \pm 0.850$	$-1.270 \pm 0.439$
PRF-fit source offset from KIC position	$6.418 \pm 0.851$	7.55	$6.262 \pm 0.841$	$-1.407 \pm 0.443$
photometric centroid source offset	$6.80 \pm 1.17$	5.80	$6.03 \pm 1.18$	$-3.14 \pm 1.14$



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.

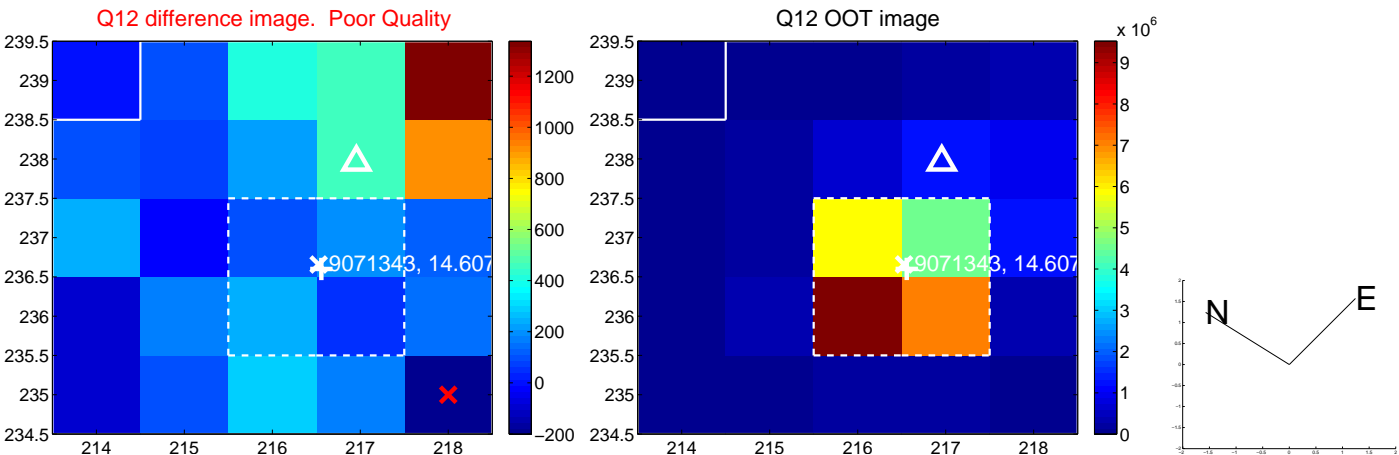
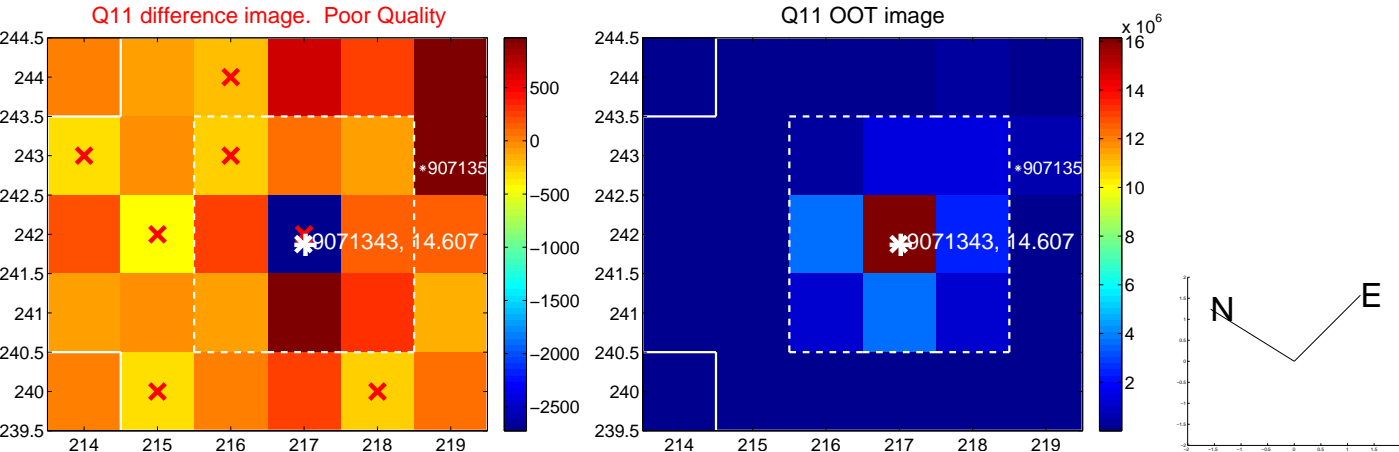
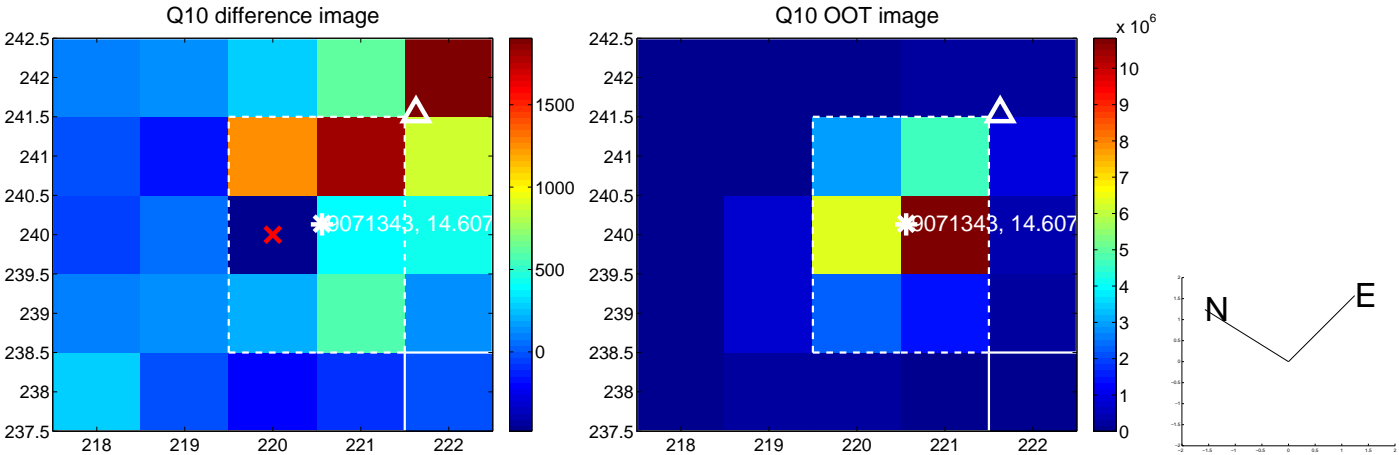
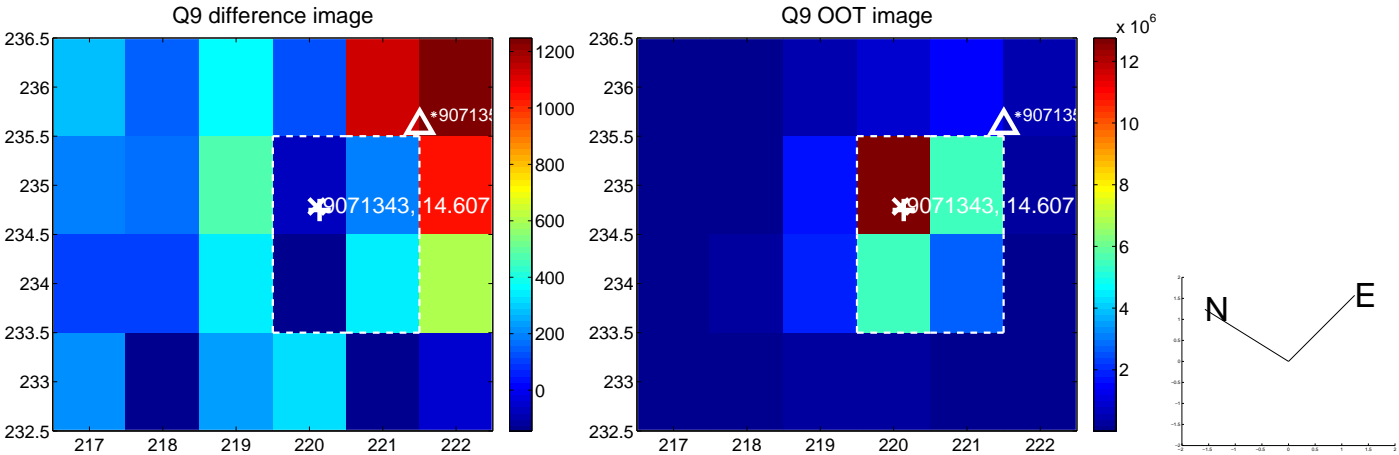
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



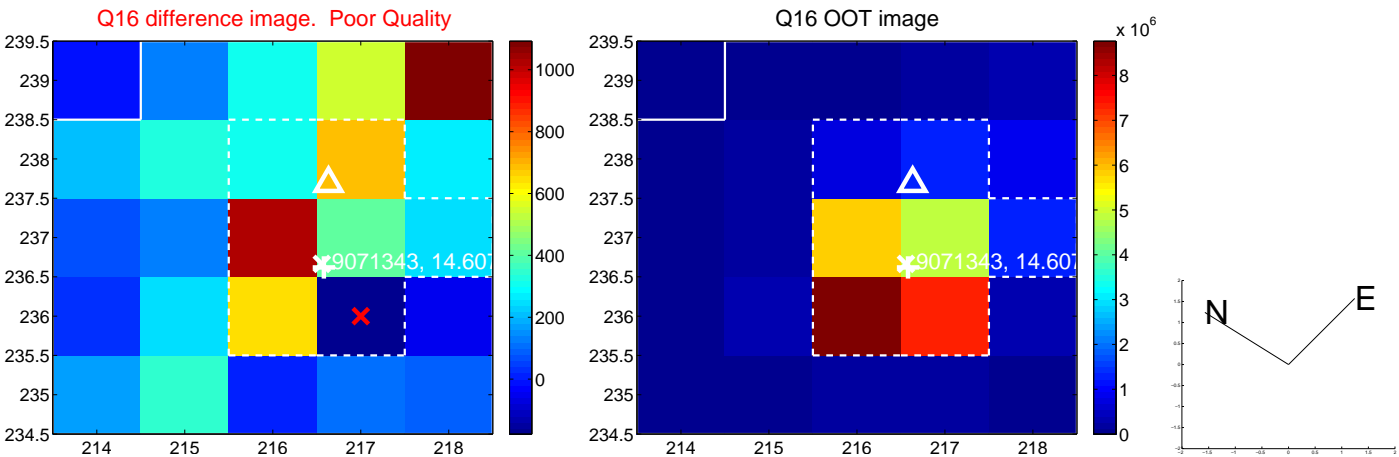
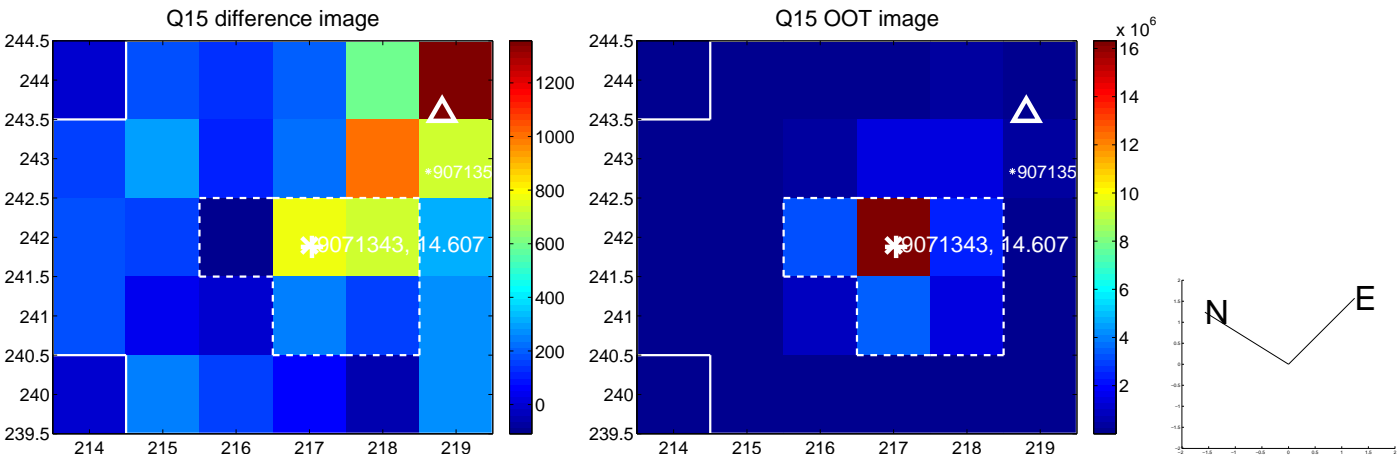
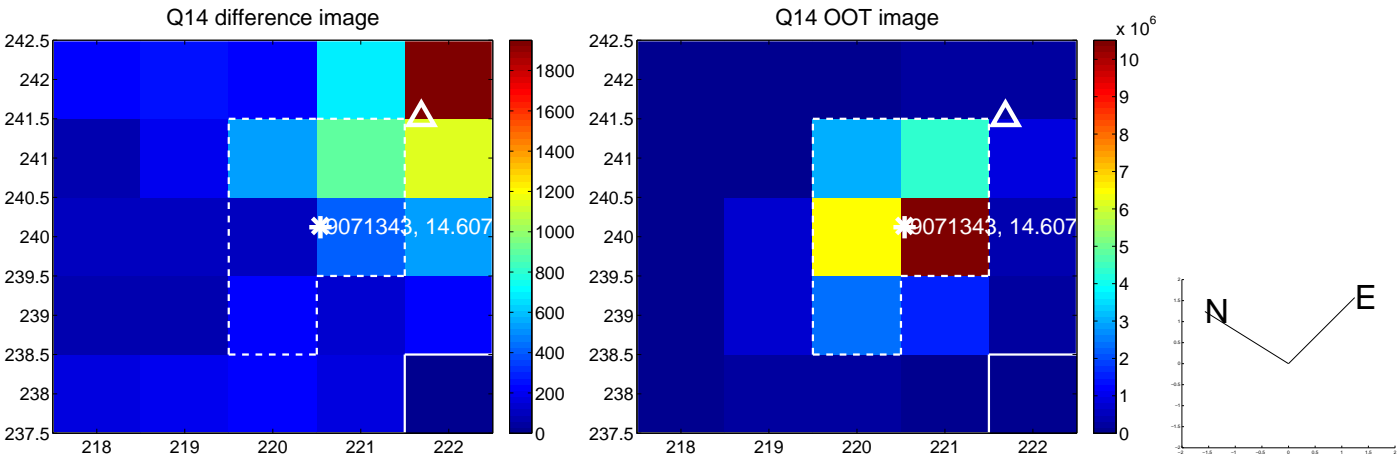
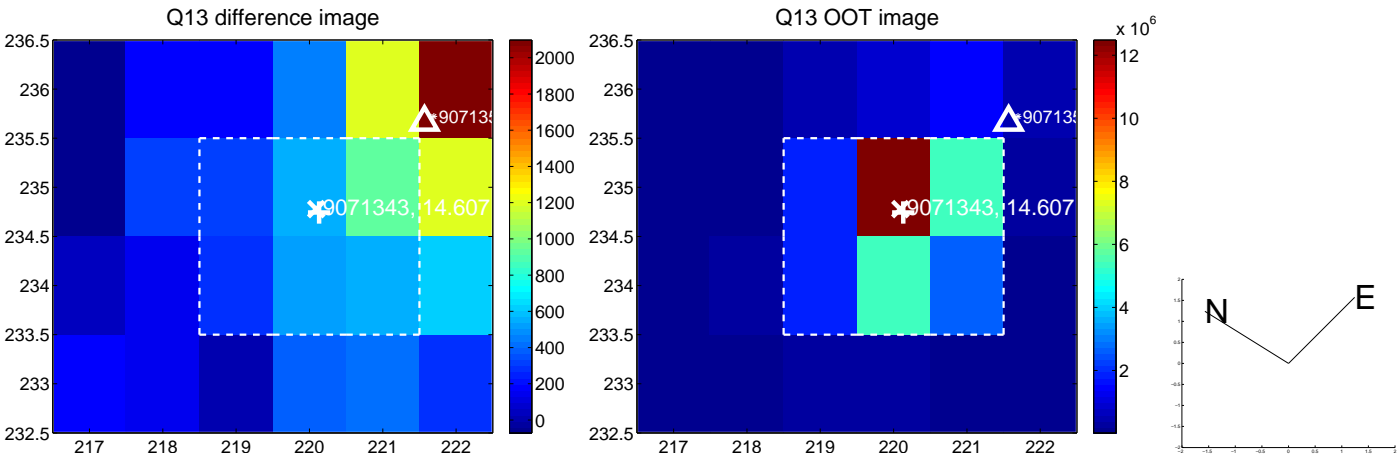




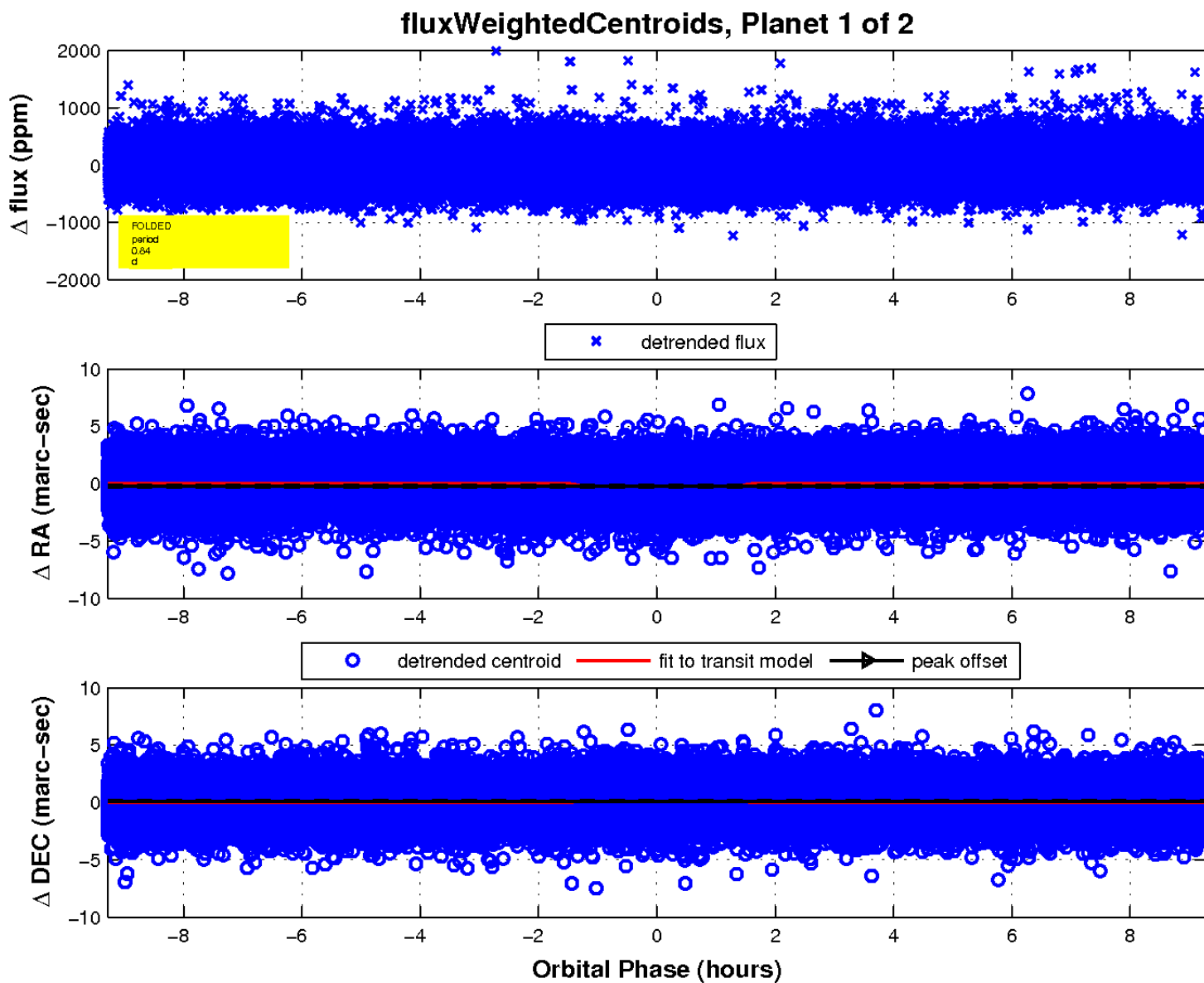
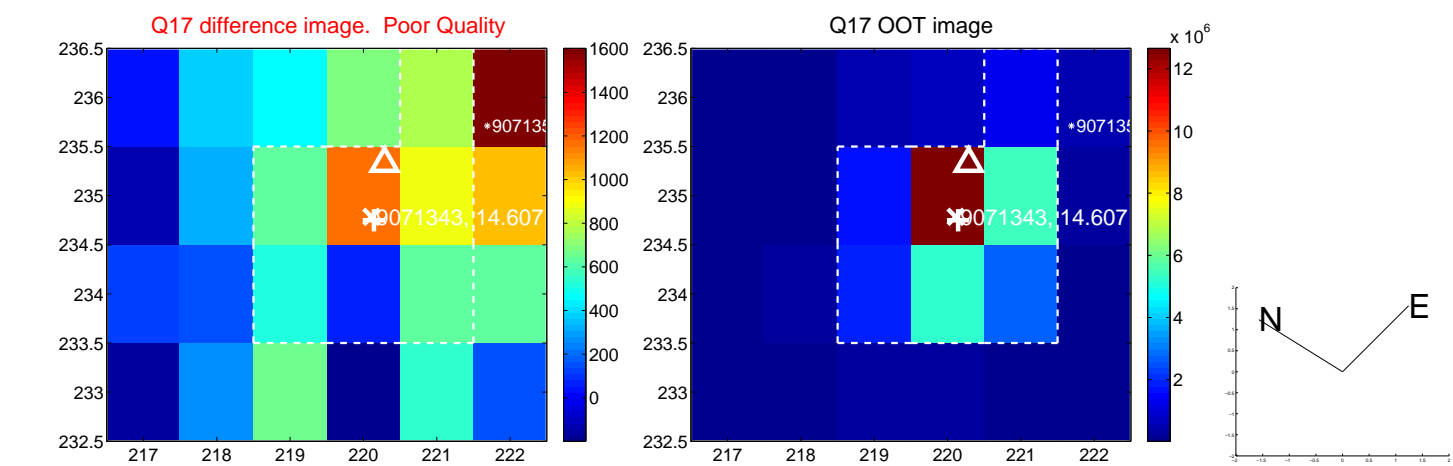
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

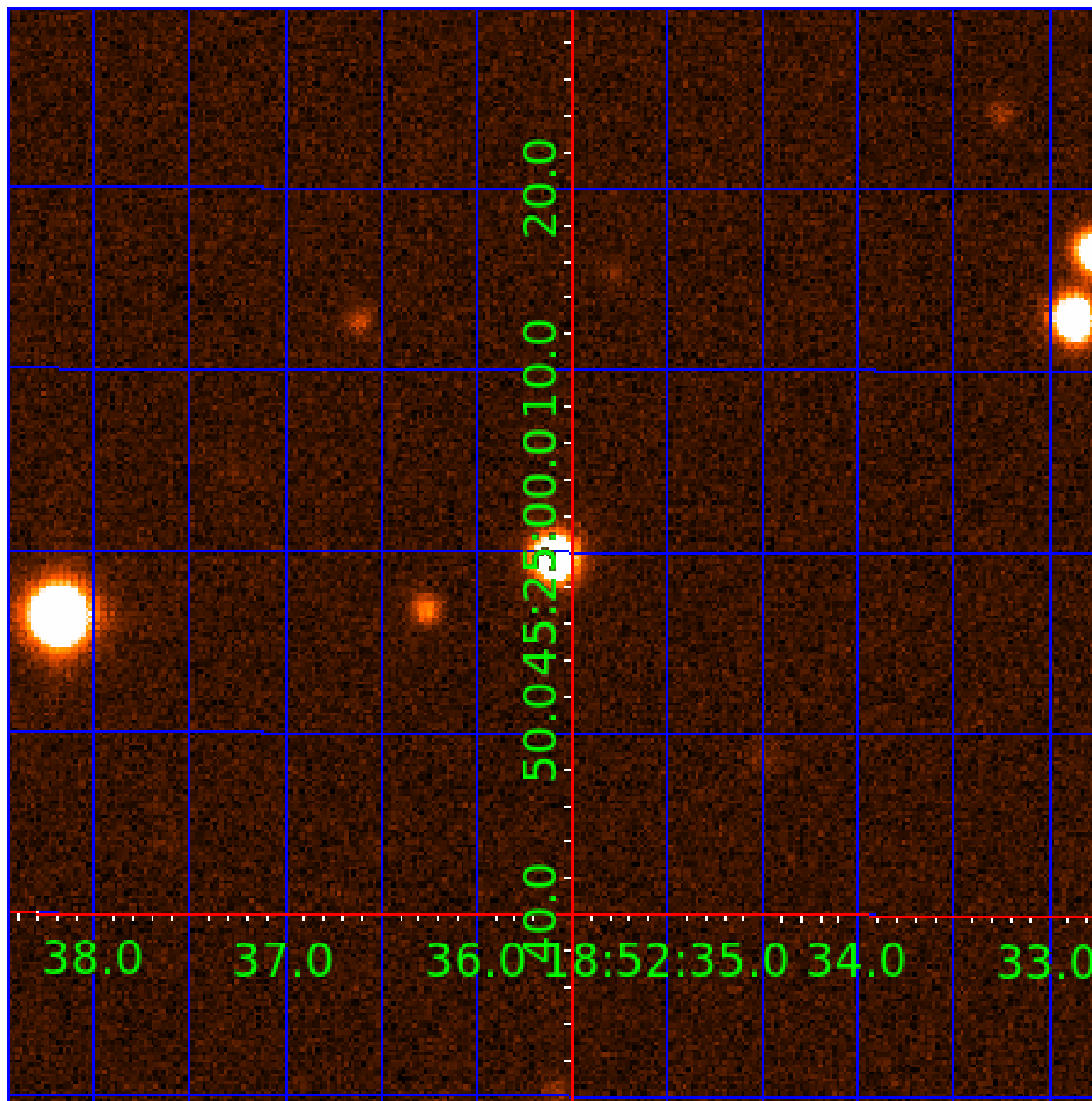


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009071343

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009071343-01	OBS	No	0.843516	131.549942	38.4	3.093	11.8	11.7	1.06	6260	0.78	4728.86
009071343-02	OBS	No	0.843497	131.974259	20.0	4.115	11.7	7.4	1.06	6260	0.48	4729.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009071343-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
009071343-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

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

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

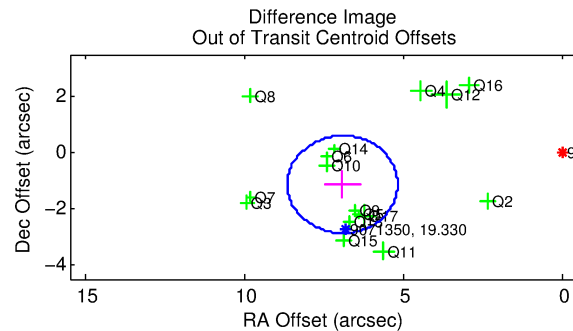
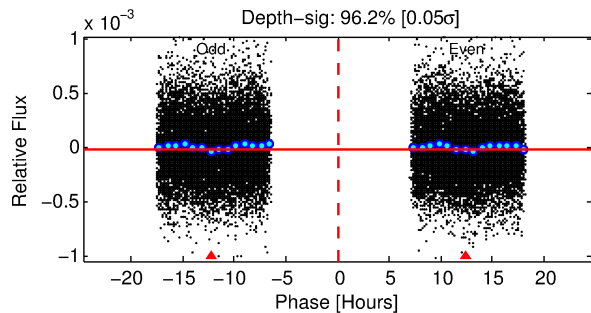
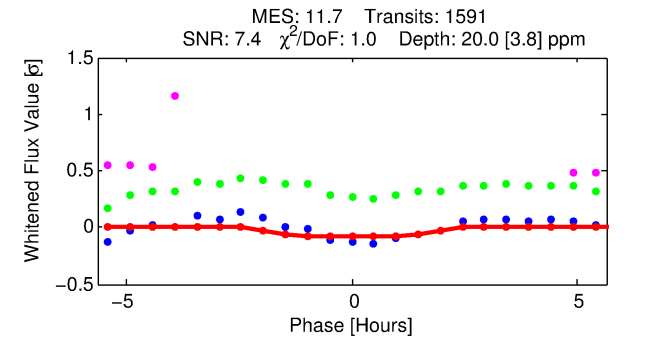
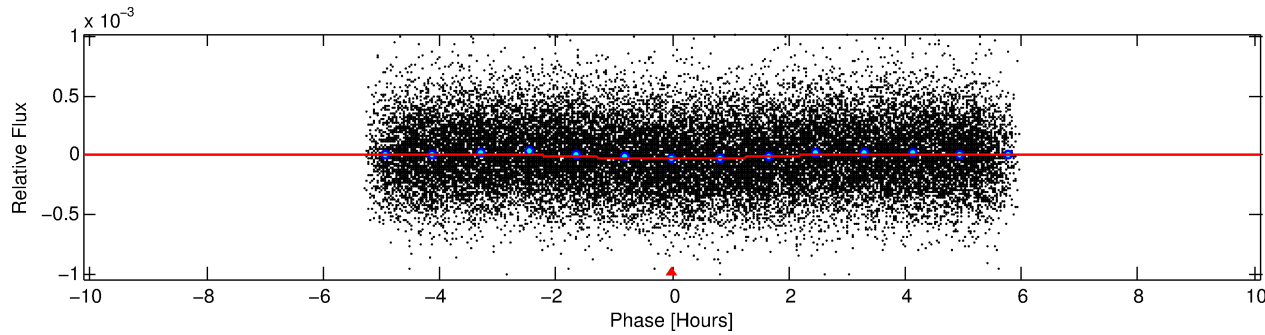
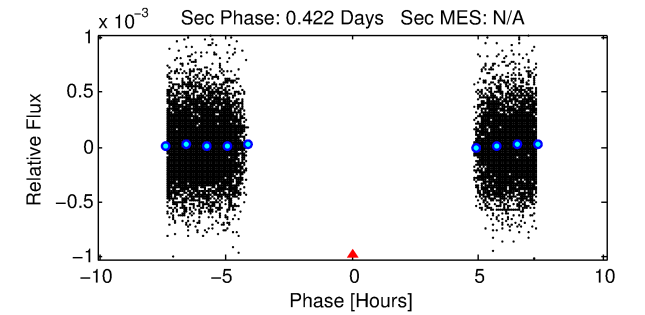
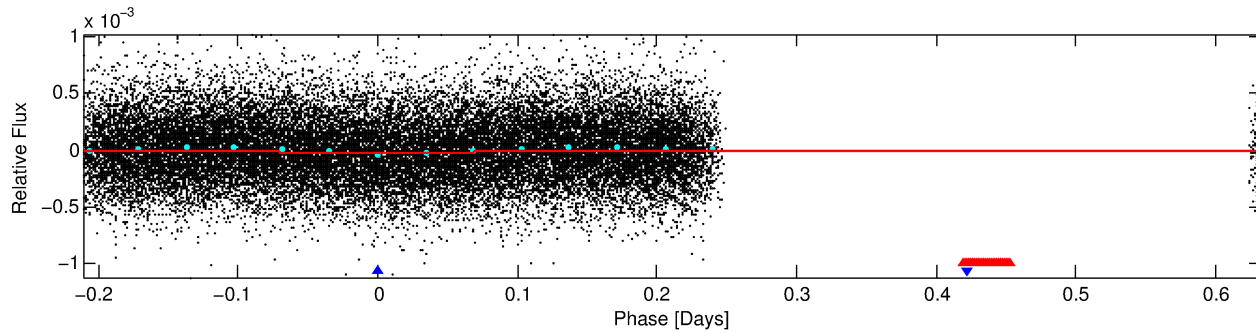
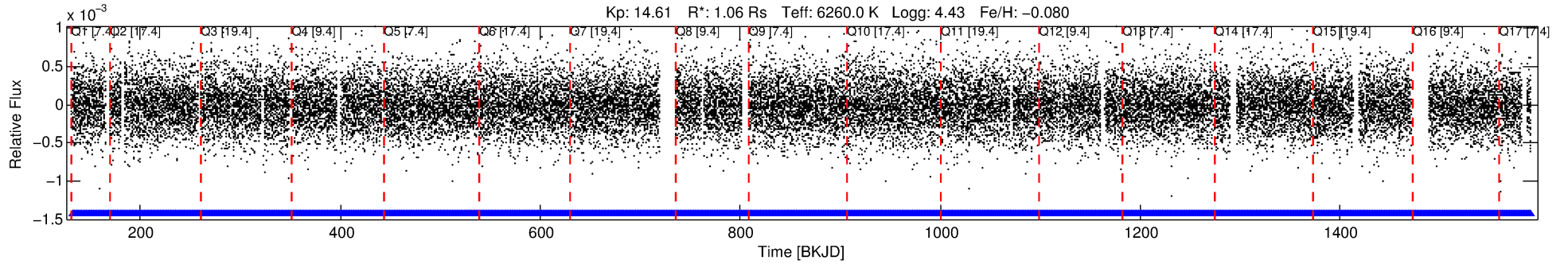
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009071343-02

No Significant Match Found

# DV One-Page Summary

KIC: 9071343 Candidate: 2 of 2 Period: 0.843 d



## DV Fit Results:

Period = 0.84350 [0.00002] d  
Epoch = 131.9743 [0.0068] BKJD  
Rp/R\* = 0.0041 [0.0082]  
a/R\* = 1.68 [10.97]  
b = 0.05 [196.18]  
Seff = 4729.00 [1876.46]  
Teq = 2115 [210] K  
Rp = 0.48 [0.96] Re  
a = 0.0181 [0.0047] AU

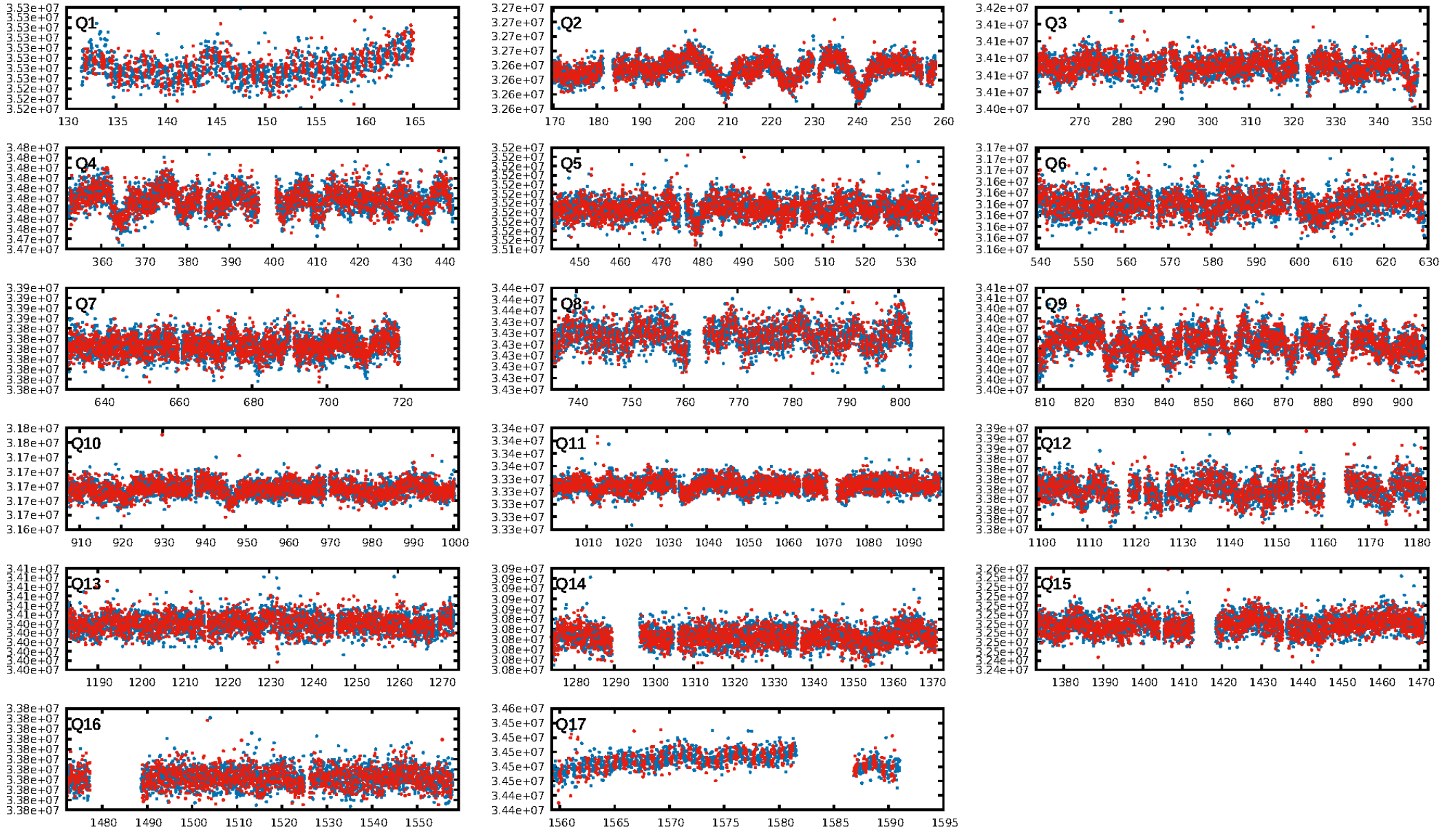
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1519/1519]  
GhostDiagnostic-chr: 0.2694  
Centroid-sig: 0.0%  
Centroid-so: 9.071 arcsec [4.64σ]  
OotOffset-rm: 7.017 arcsec [12.13σ]  
KicOffset-rm: 6.963 arcsec [11.61σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.56 [9/16]  
DiffImageOverlap-fno: 0.00 [0/17]

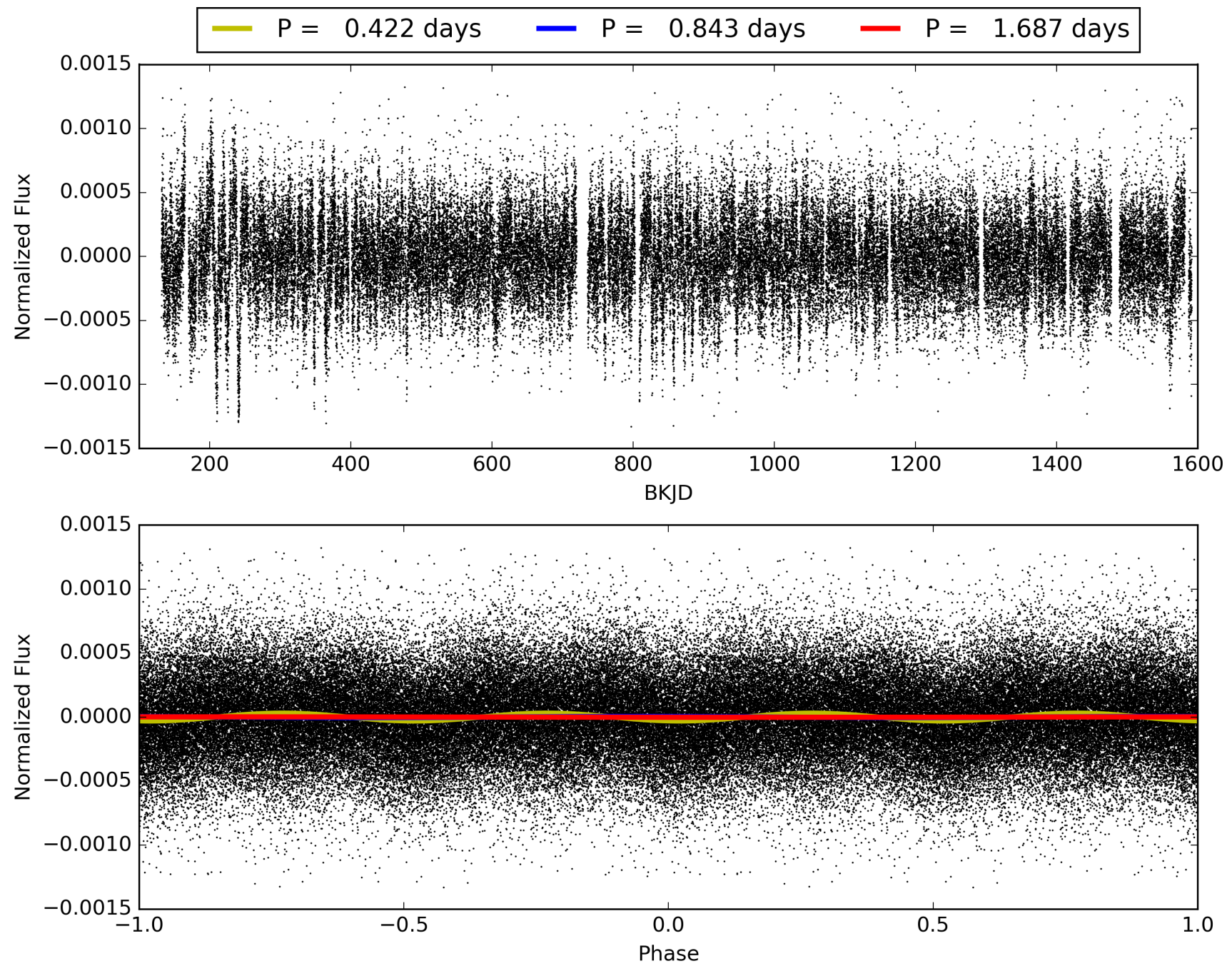
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:30:52 Z

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

# TCE 009071343-02, PDC Light Curves



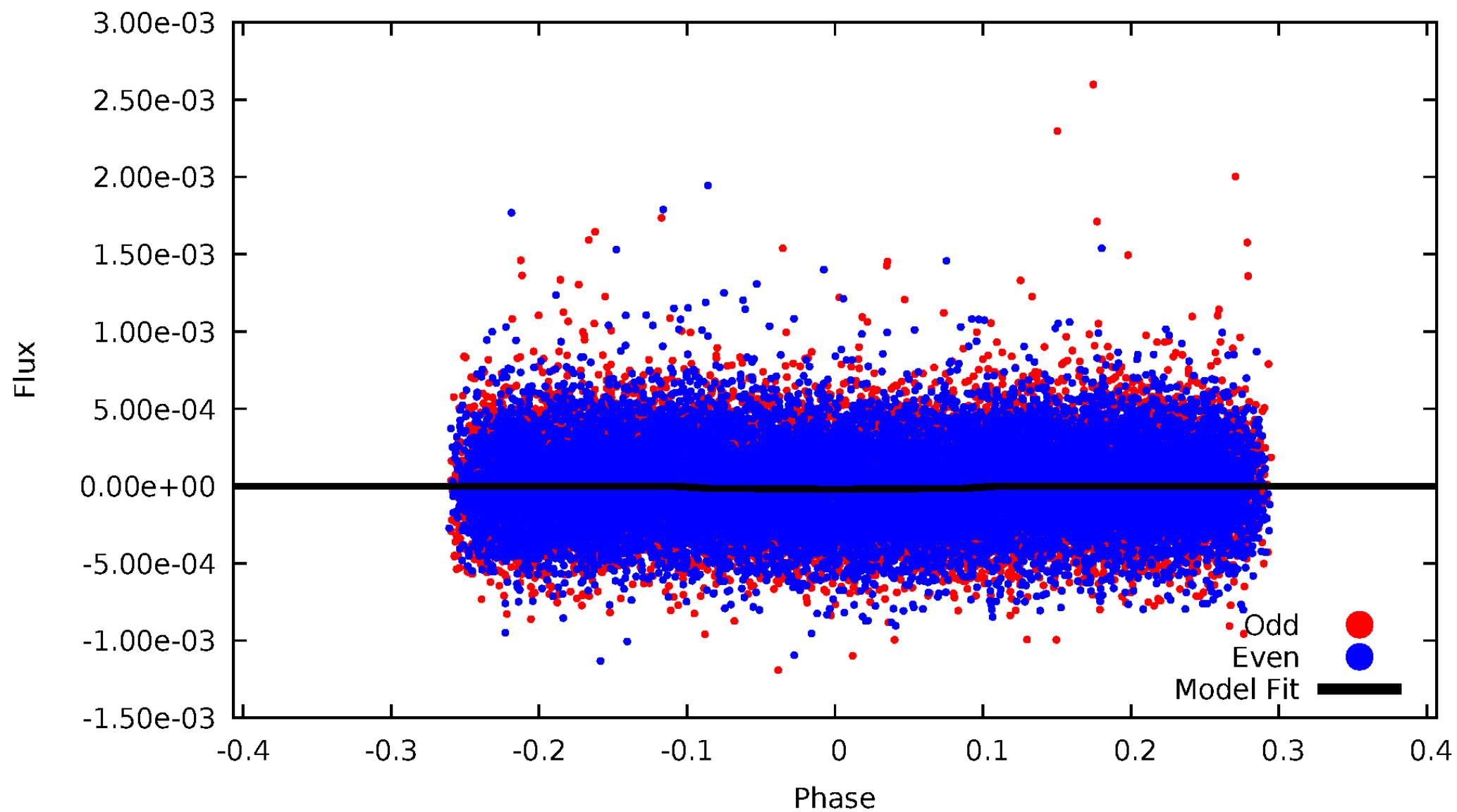
TCE 009071343-02





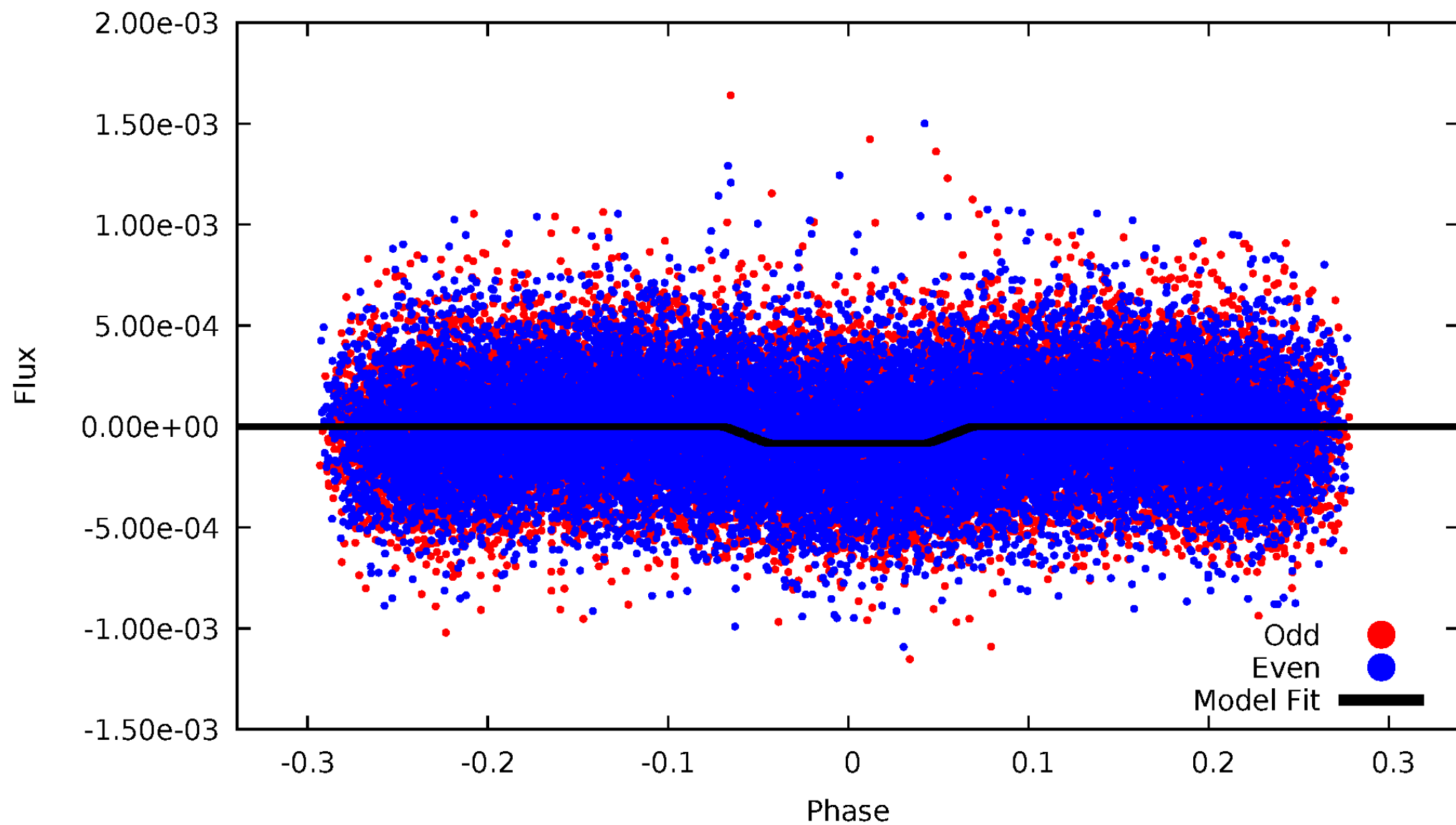
# DV Odd/Even

TCE 009071343-02



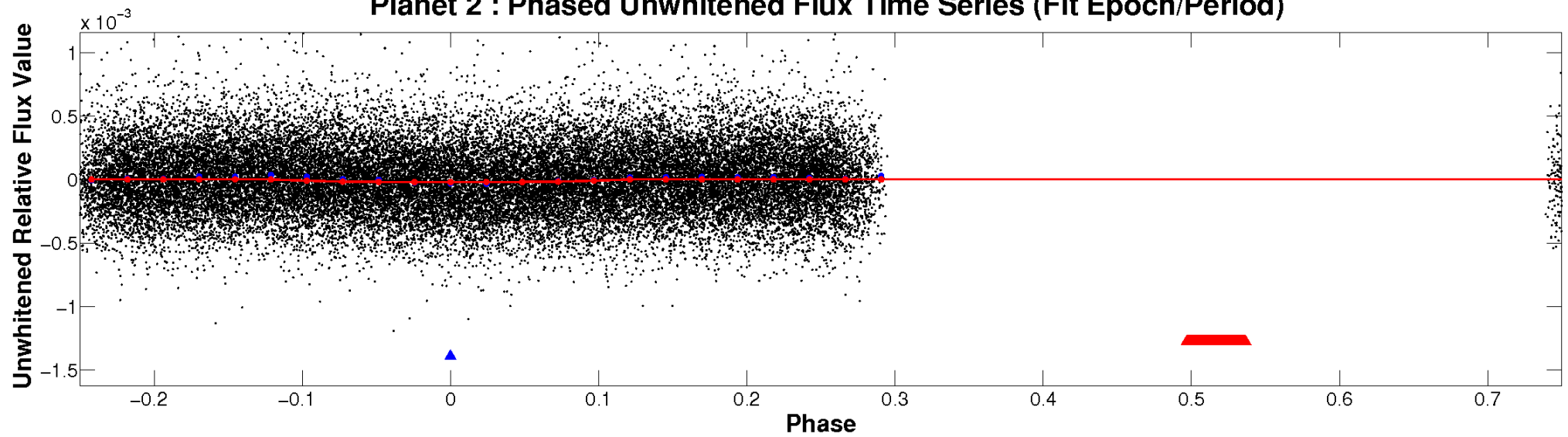
# ALT Odd/Even

TCE 009071343-02

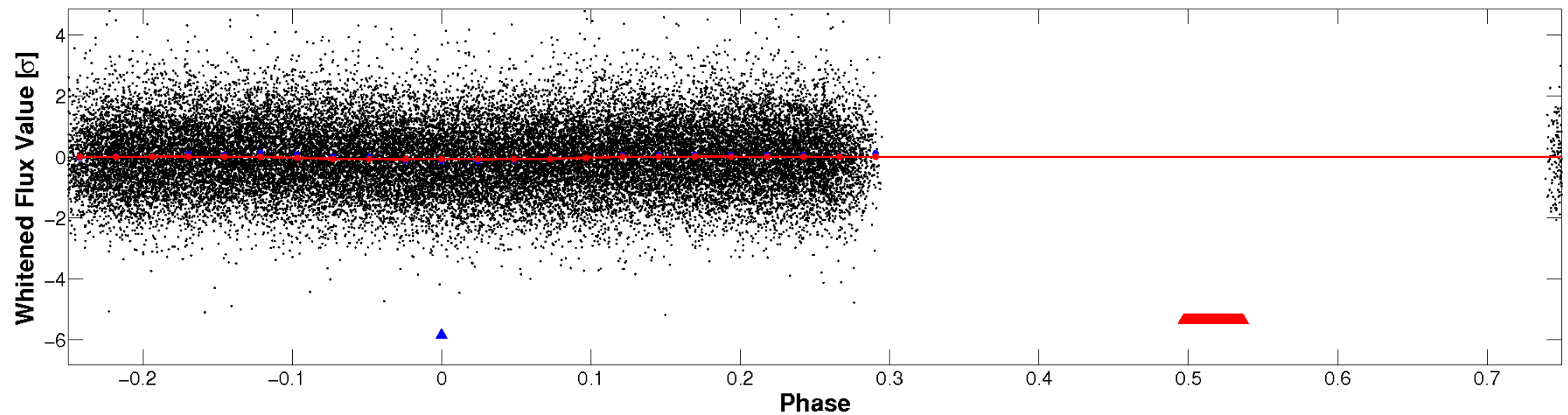


# Non-Whitened Vs. Whitened Light Curve

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

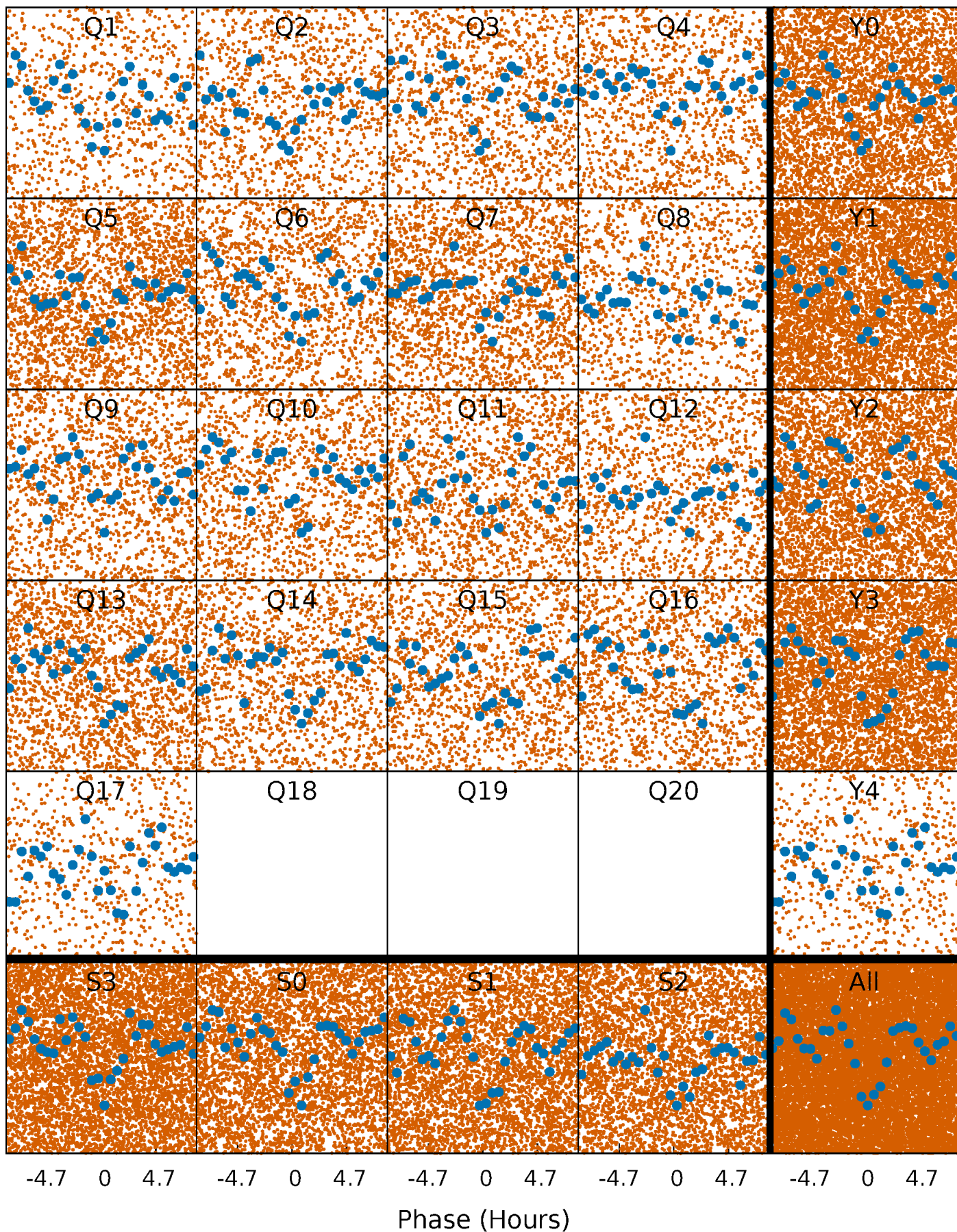


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

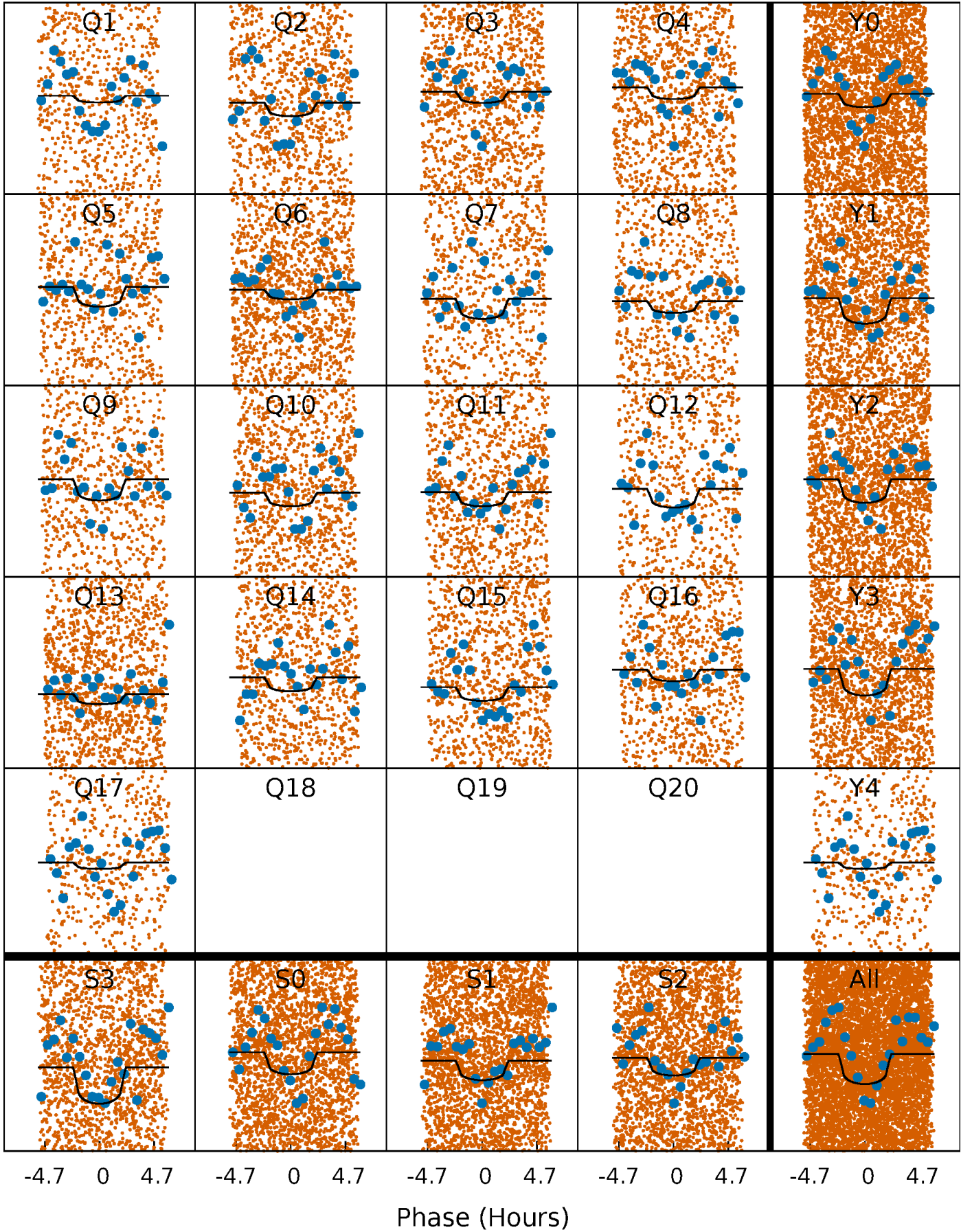
TCE 009071343-02   P= 0.843497 Days    $T_0=131.974259$  (BKJD)





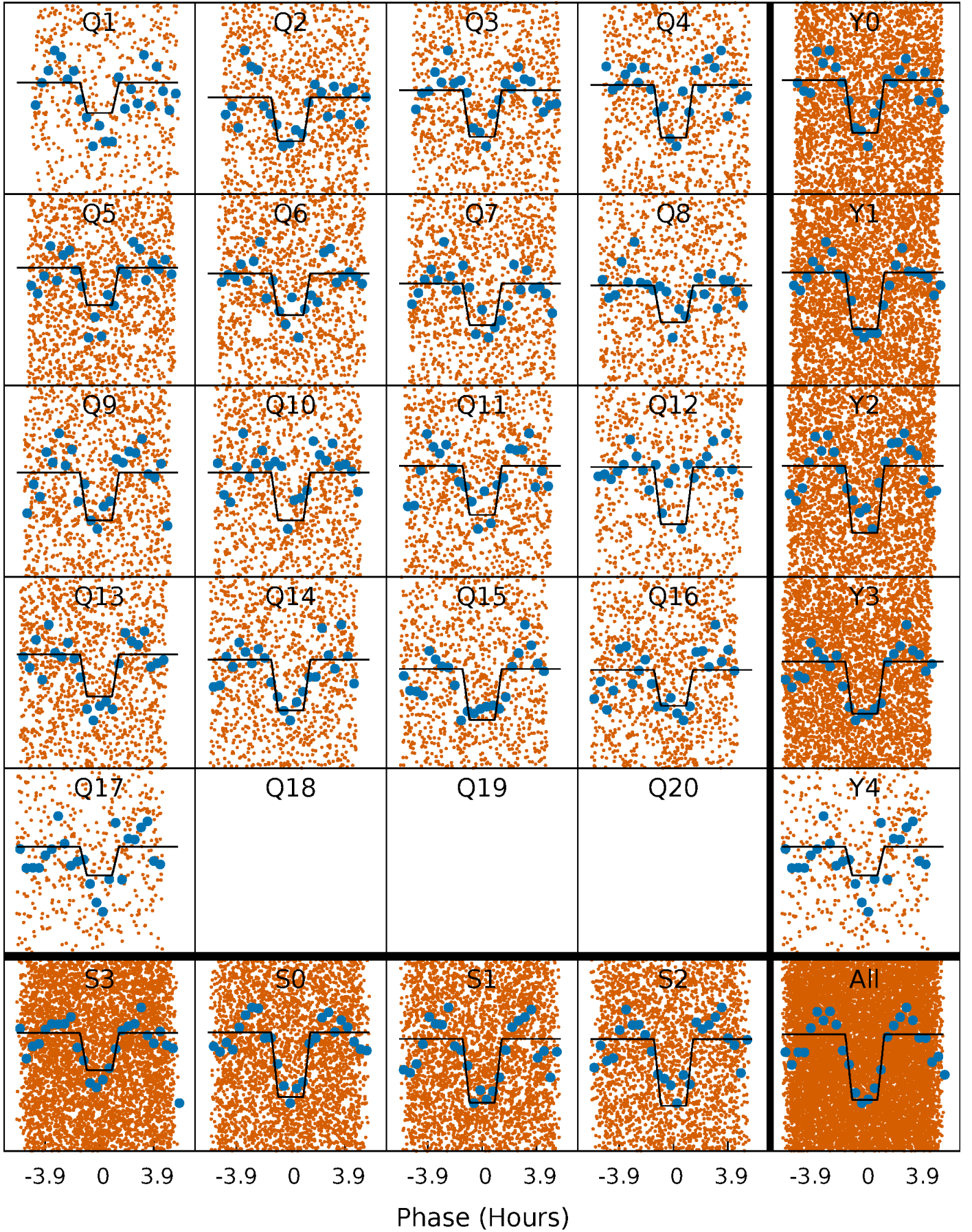
# DV Quarter-Phased Transit Curves

TCE 009071343-02   P= 0.843497 Days    $T_0=131.974259$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009071343-02   P= 0.843544 Days    $T_0=131.954142$  (BKJD)

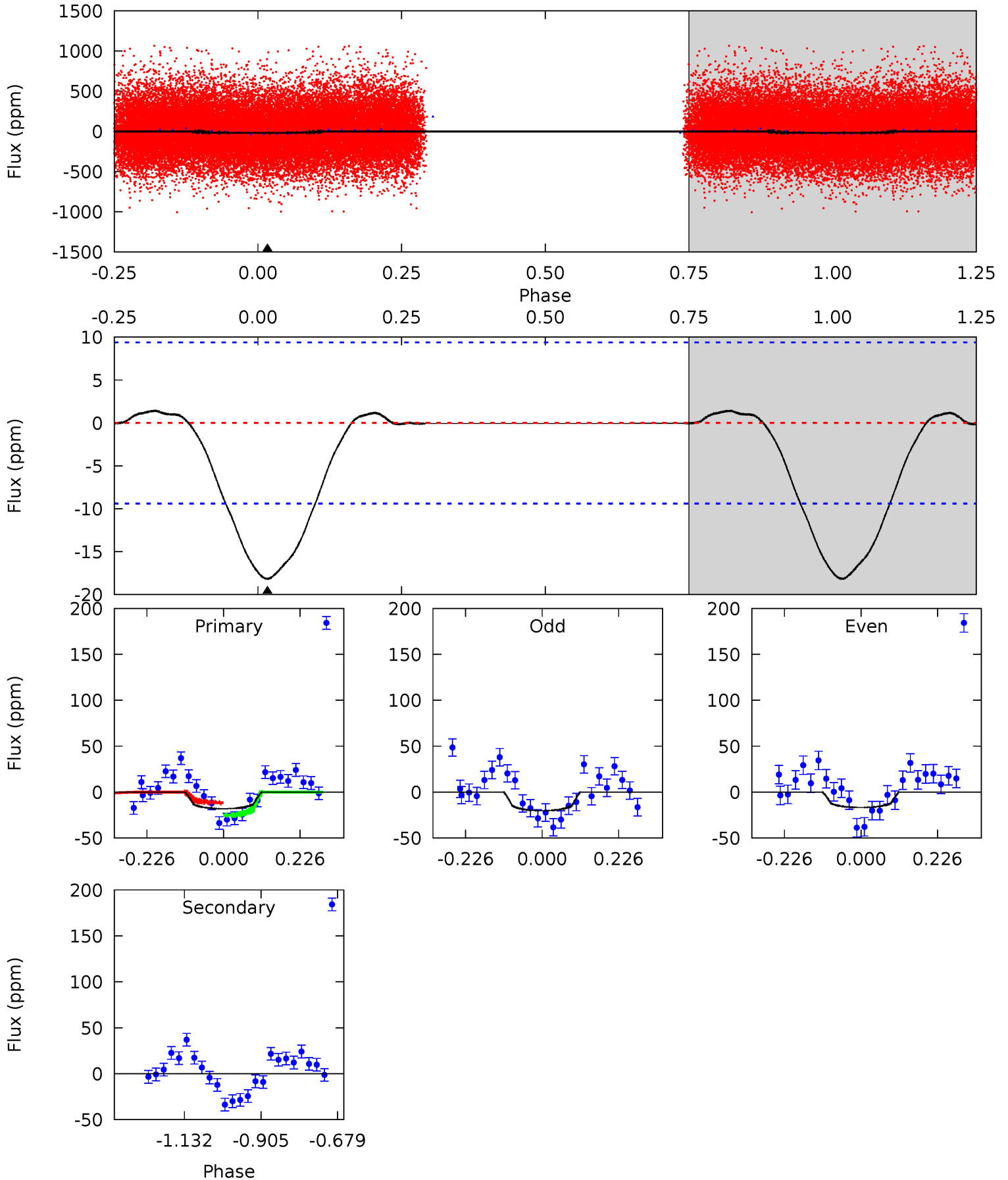




# DV Model-Shift Uniqueness Test

009071343-02, P = 0.843497 Days, E = 131.130762 Days

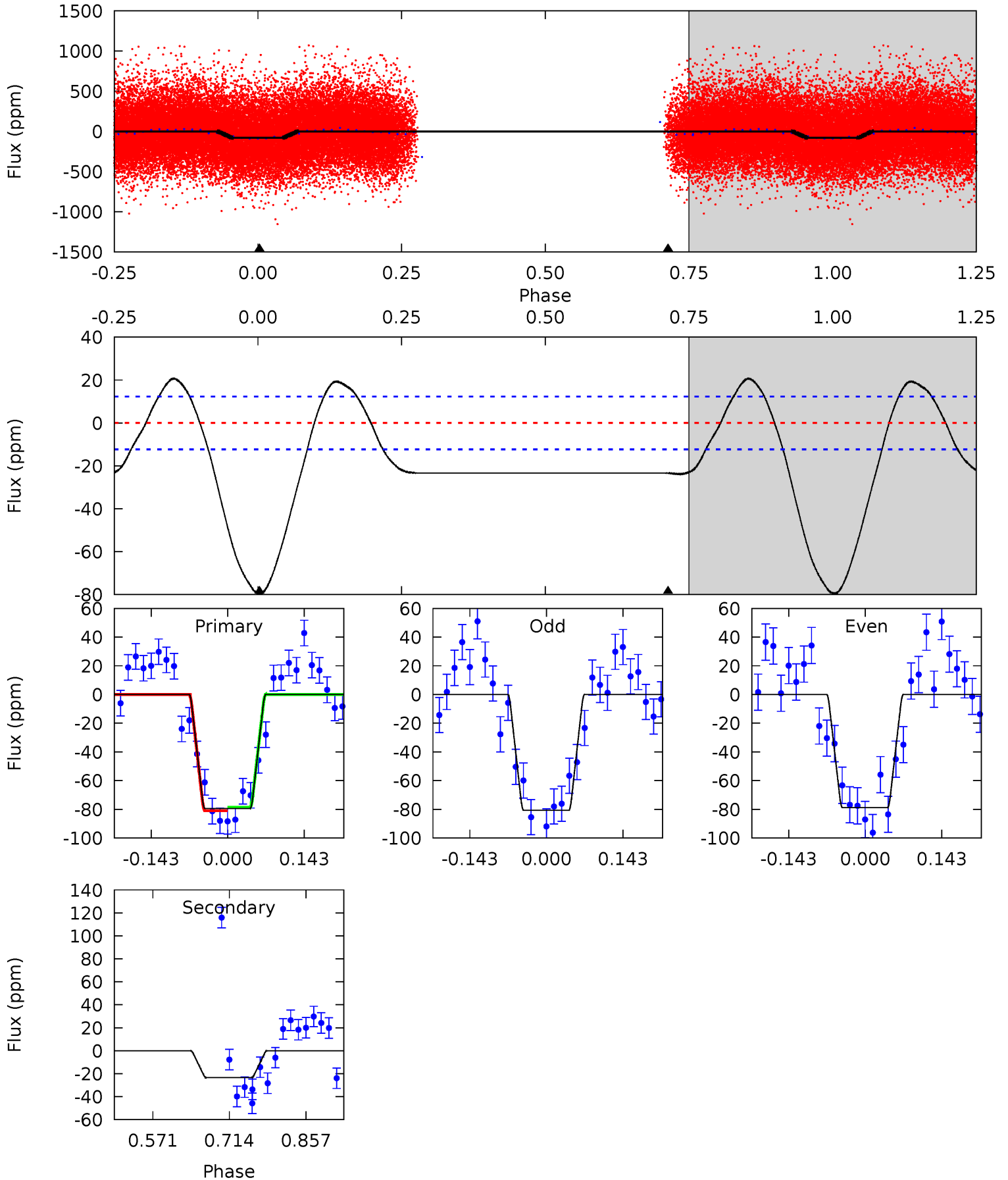
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.49	0	0	0	4.39	1.21	0.16	8.49	8.49	0	0	0.83	0.95	0.07	3.13



# Alt Model-Shift Uniqueness Test

009071343-02, P = 0.843544 Days, E = 131.110598 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
29.0	8.55	0	0	4.49	1.47	5.28	29.0	29.0	8.55	8.55	0.35	0.98	0.21	0.42



### Stellar Parameters For KIC 009071343

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6260^{+168}_{-205}$	$4.433^{+0.054}_{-0.202}$	$-0.080^{+0.250}_{-0.350}$	$1.063^{+0.335}_{-0.112}$	$1.118^{+0.145}_{-0.145}$	$1.310^{+0.374}_{-0.697}$
	+3%/-3%	+1%/-5%	+312%/-438%	+32%/-11%	+13%/-13%	+29%/-53%
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 009071343-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 2$	$0.87^{+0.84}_{-0.61}$	$3009^{+222}_{-149}$	$-3094^{+6591}_{-728}$	$0.012^{+0.909}_{-0.804}$
Alt.	$-23 \pm 3$	$1.29^{+0.92}_{-0.87}$	$3013^{+215}_{-147}$	$4331^{+2827}_{-930}$	$2.471^{+19.139}_{-1.610}$

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

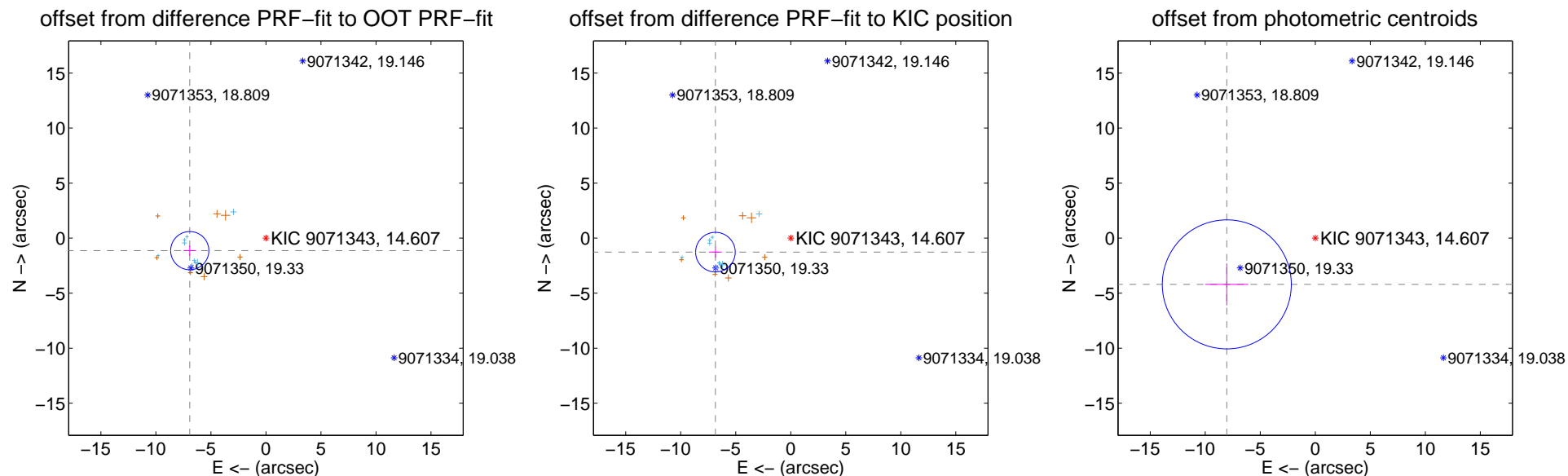
## DV Centroid Data

Supplemental centroid analysis for 009071343-02. Kepler magnitude: 14.61. Transit SNR 7.45

There are 9 quarters with good PRF difference image offsets

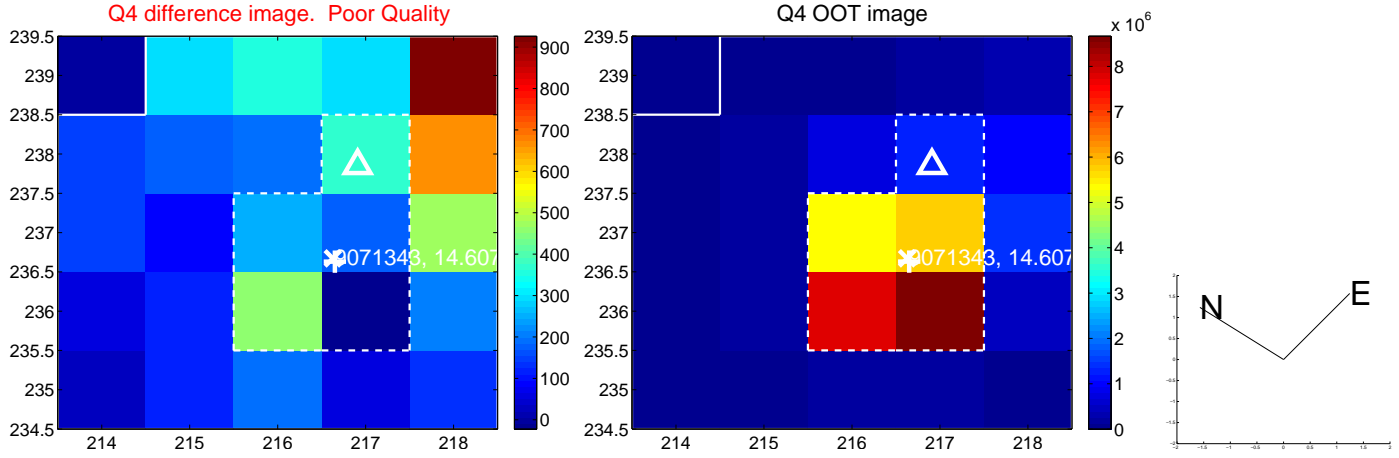
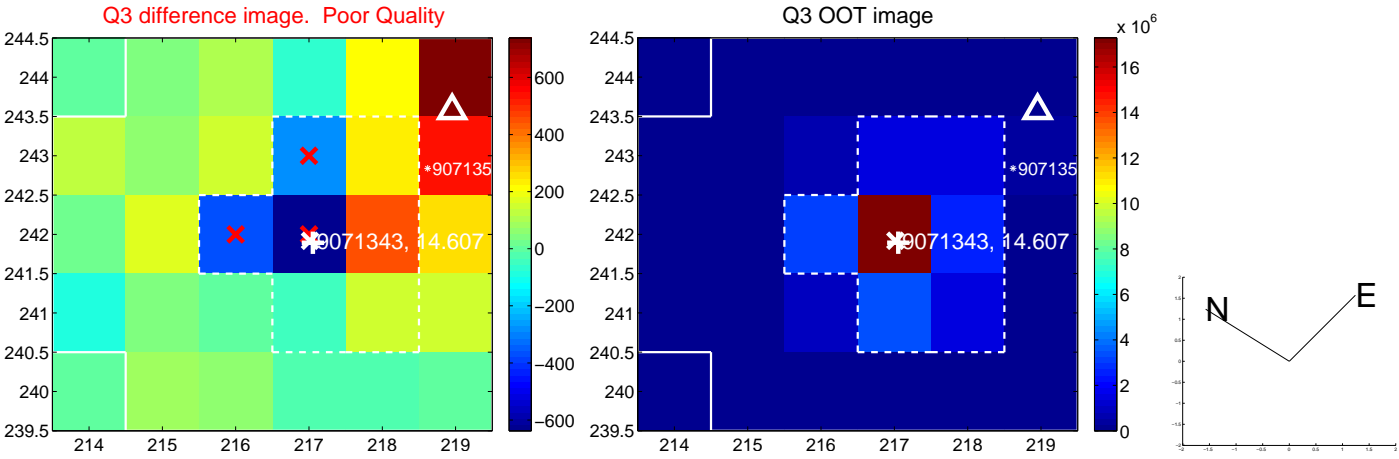
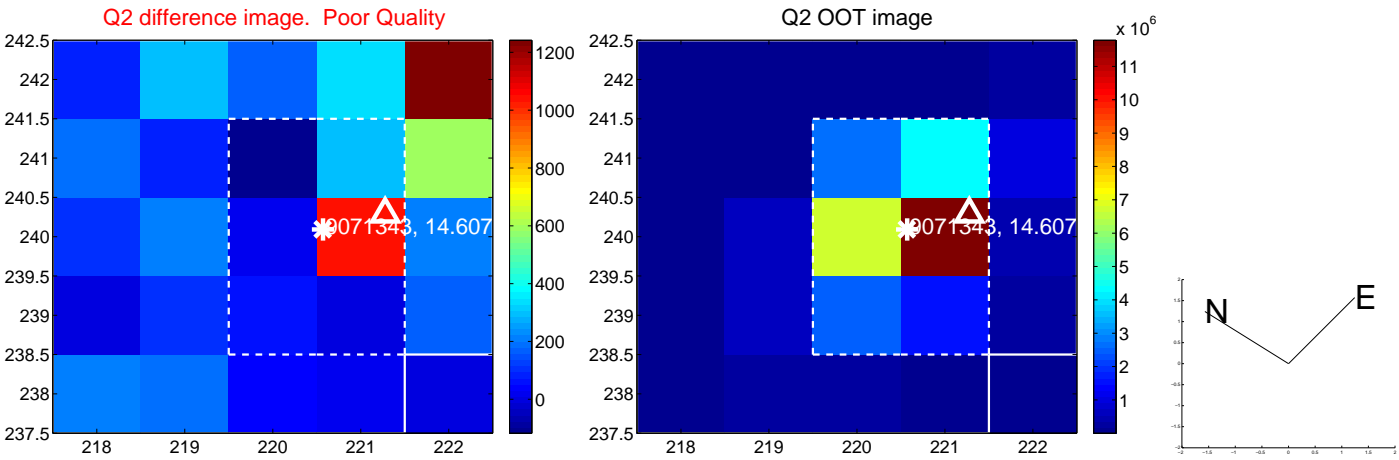
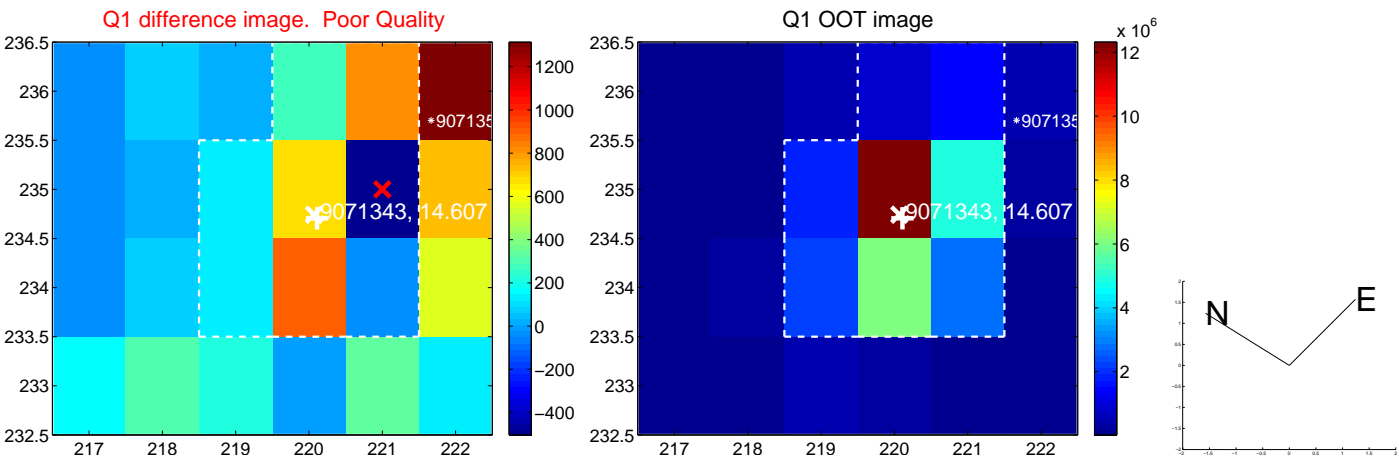
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$7.017 \pm 0.578$	<b>12.13</b>	$6.924 \pm 0.569$	$-1.135 \pm 0.452$
PRF-fit source offset from KIC position	$6.963 \pm 0.600$	<b>11.61</b>	$6.845 \pm 0.579$	$-1.272 \pm 0.497$
photometric centroid source offset	$9.07 \pm 1.95$	<b>4.64</b>	$8.04 \pm 1.97$	$-4.20 \pm 1.90$

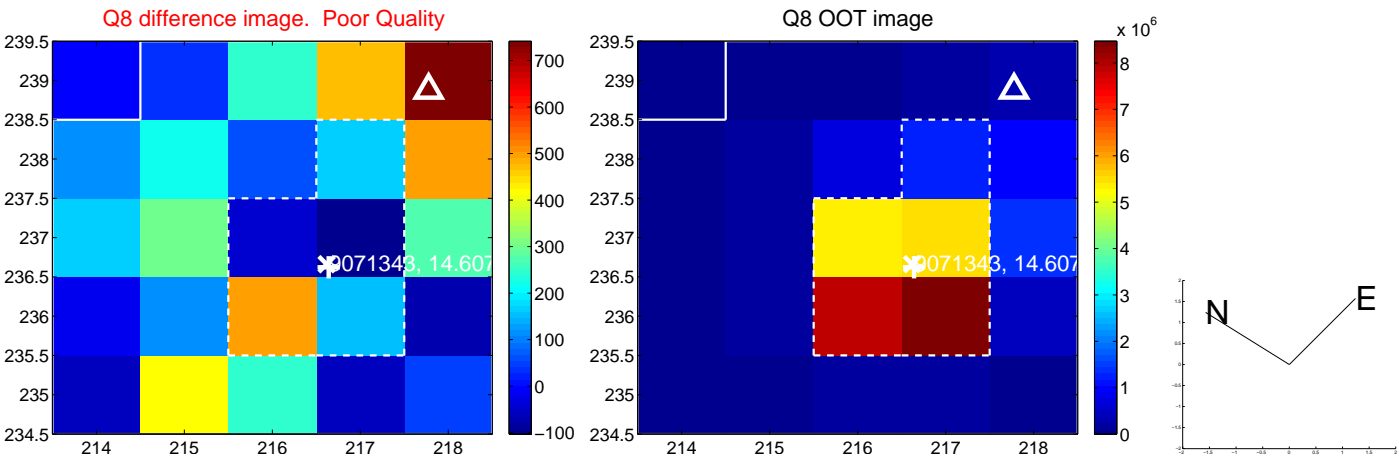
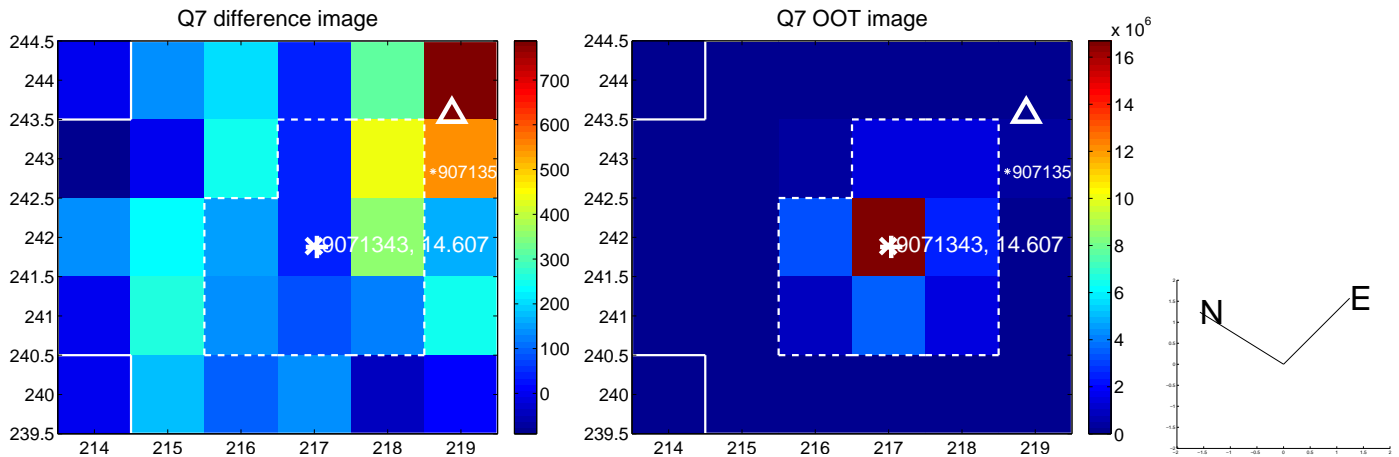
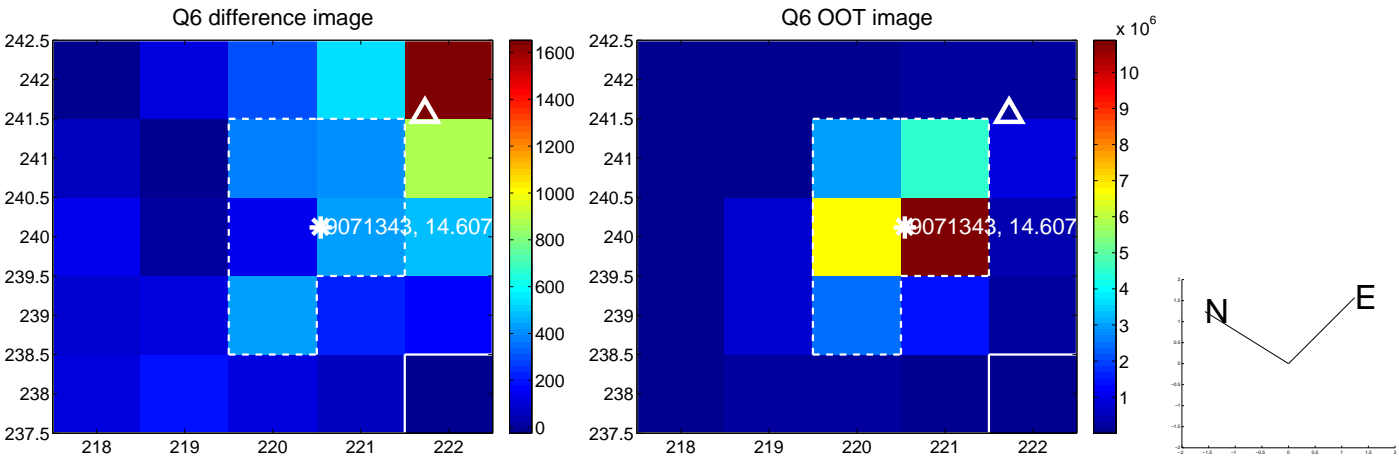
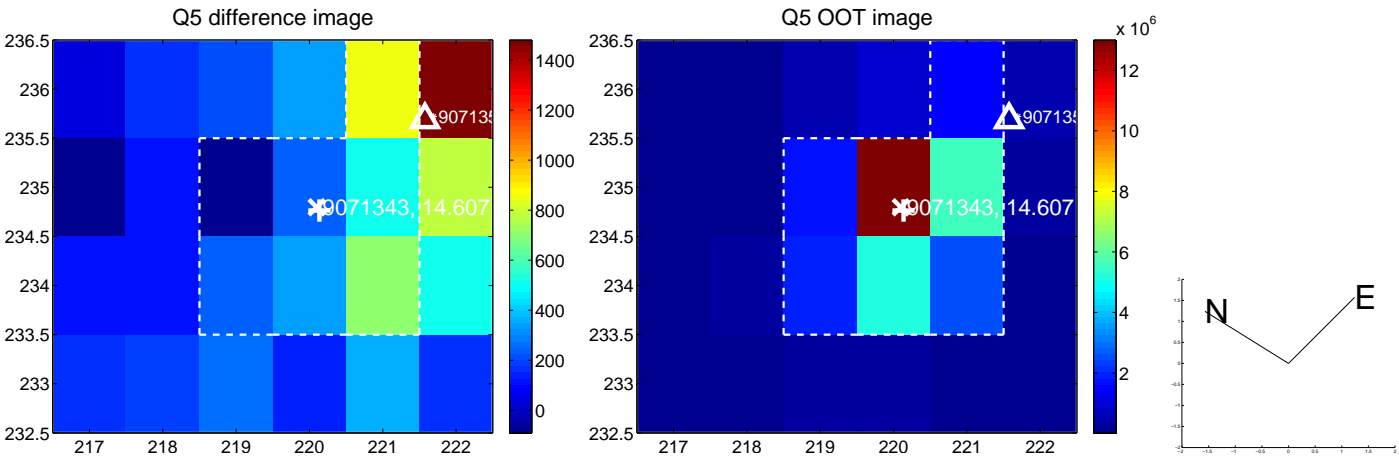


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

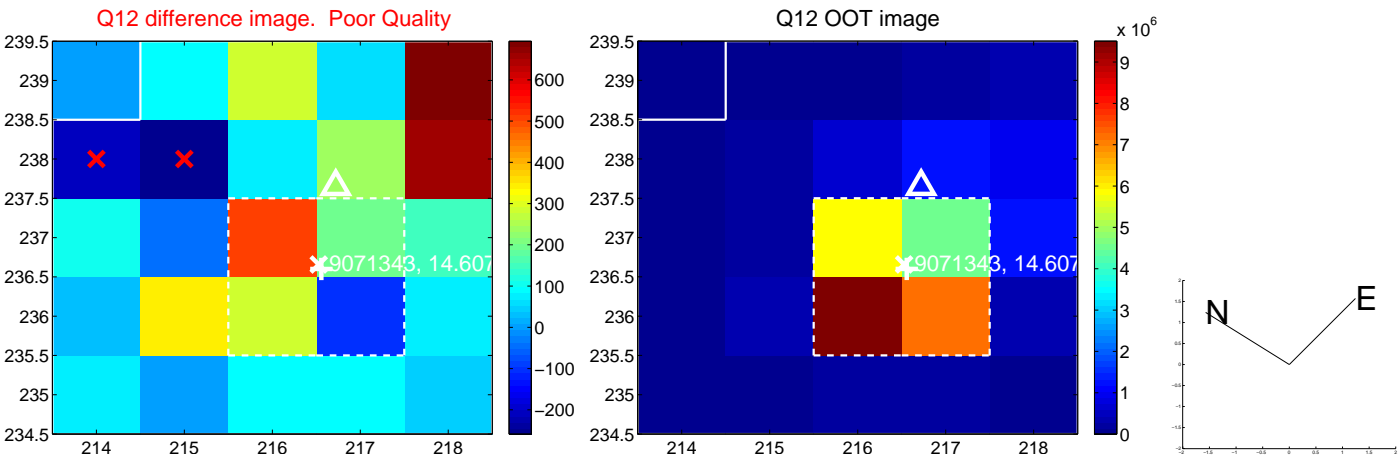
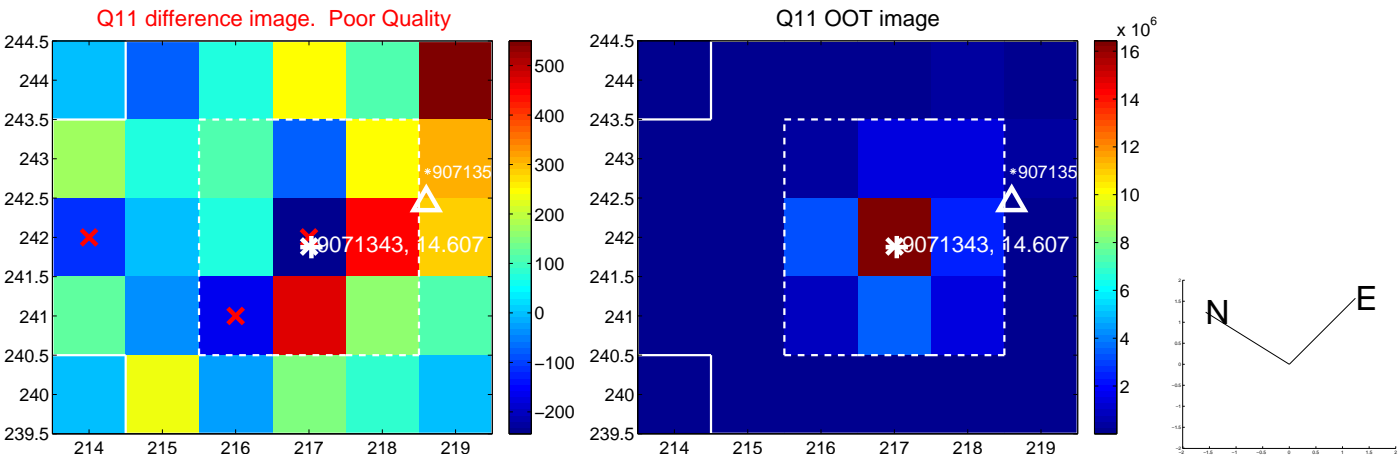
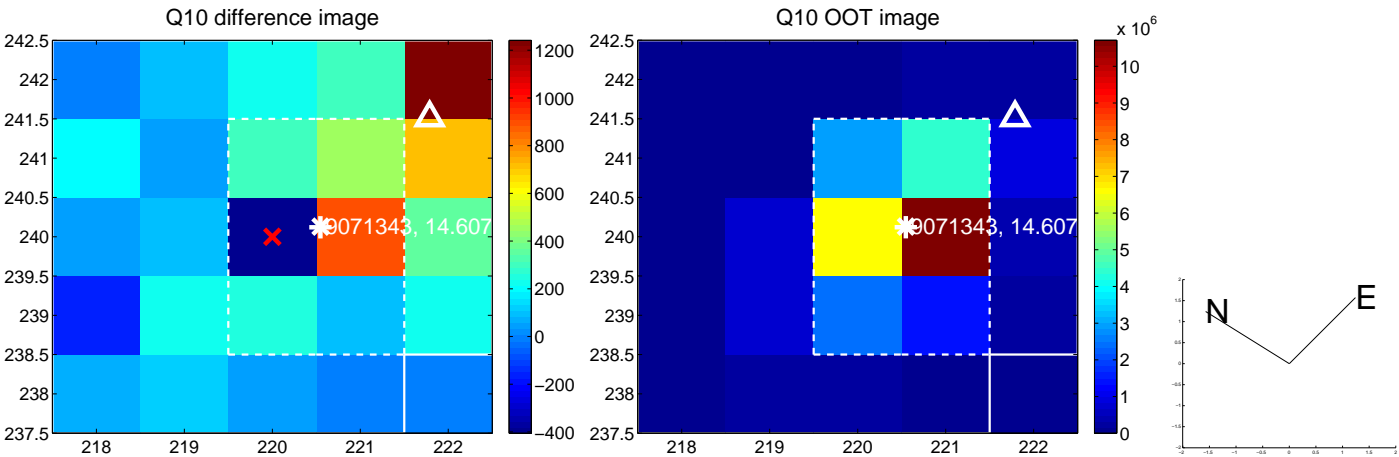
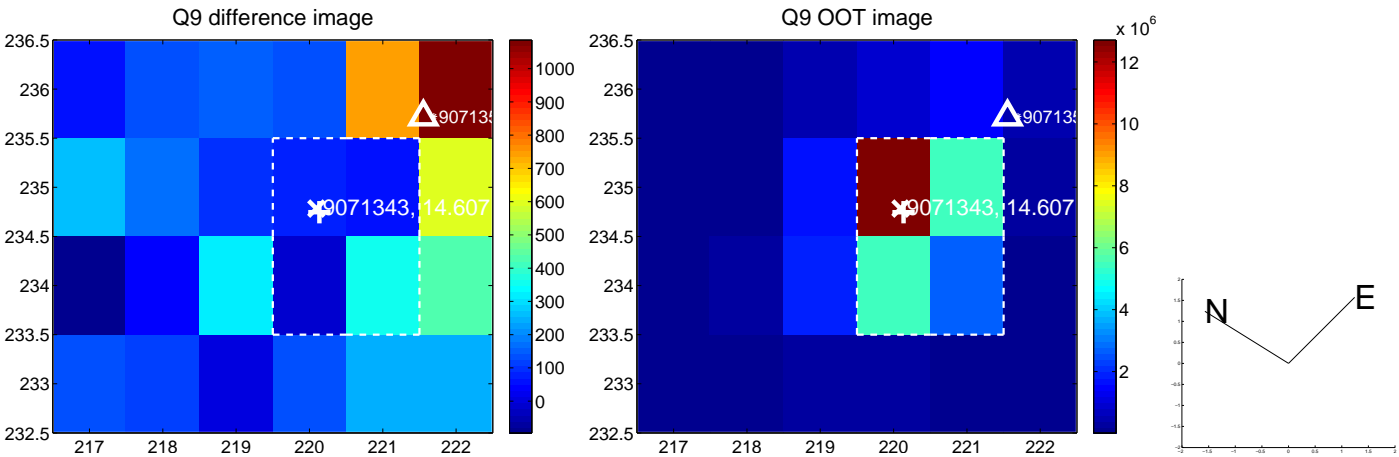


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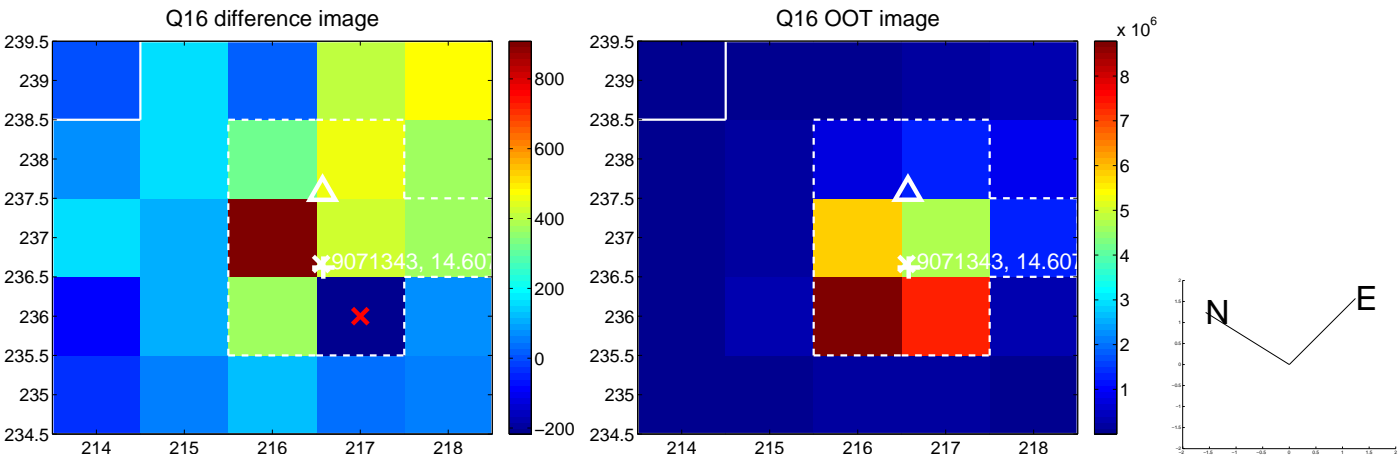
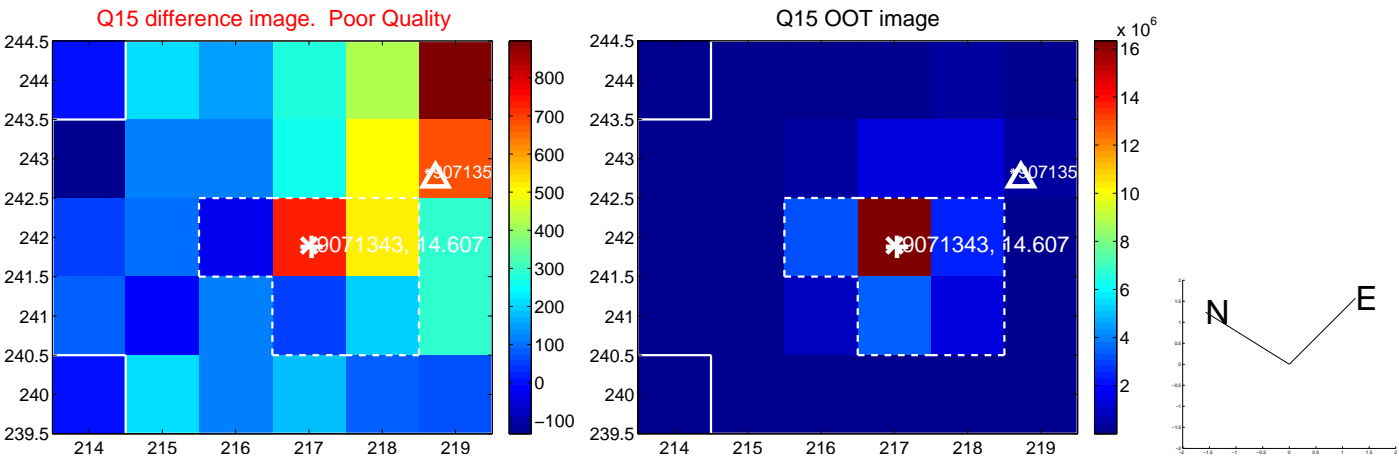
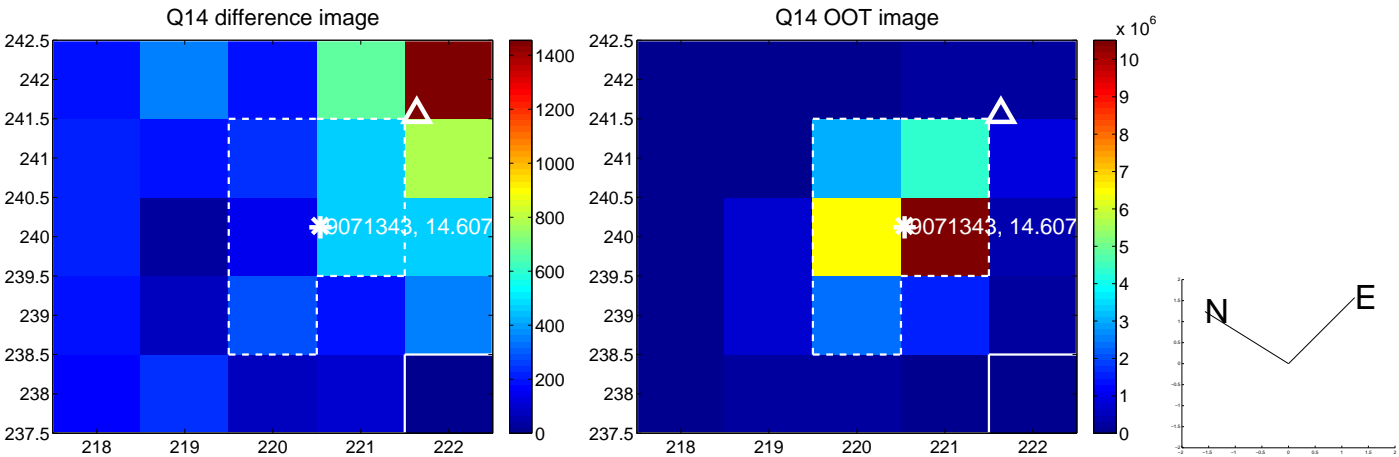
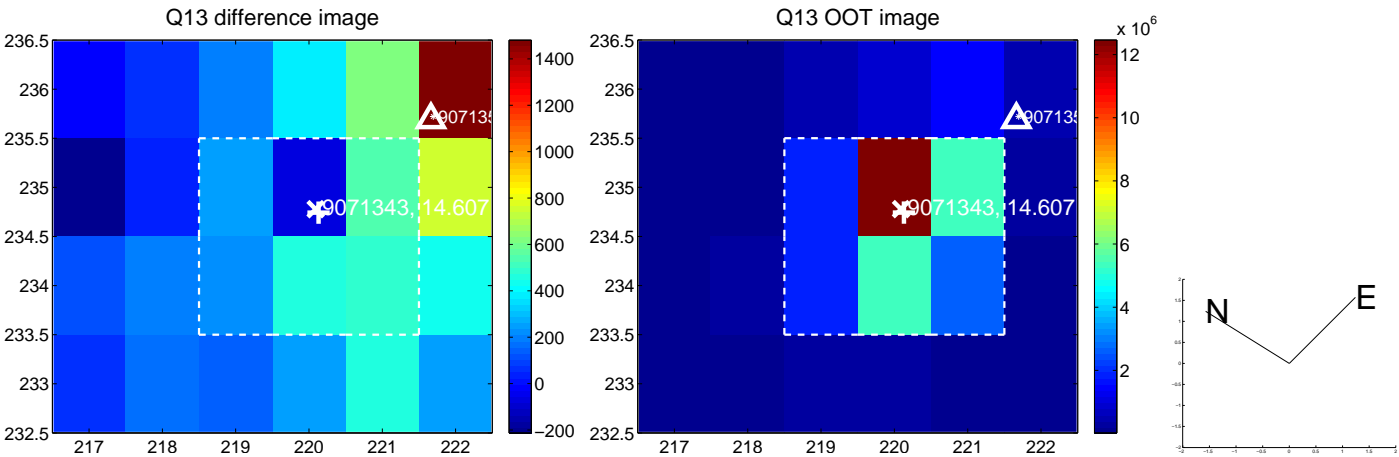




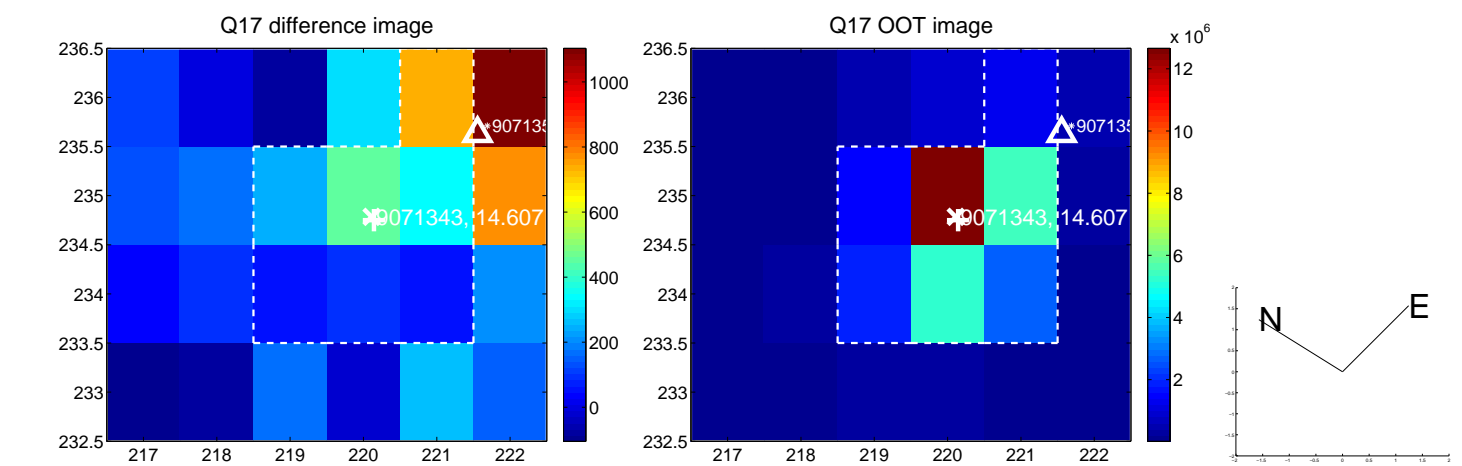
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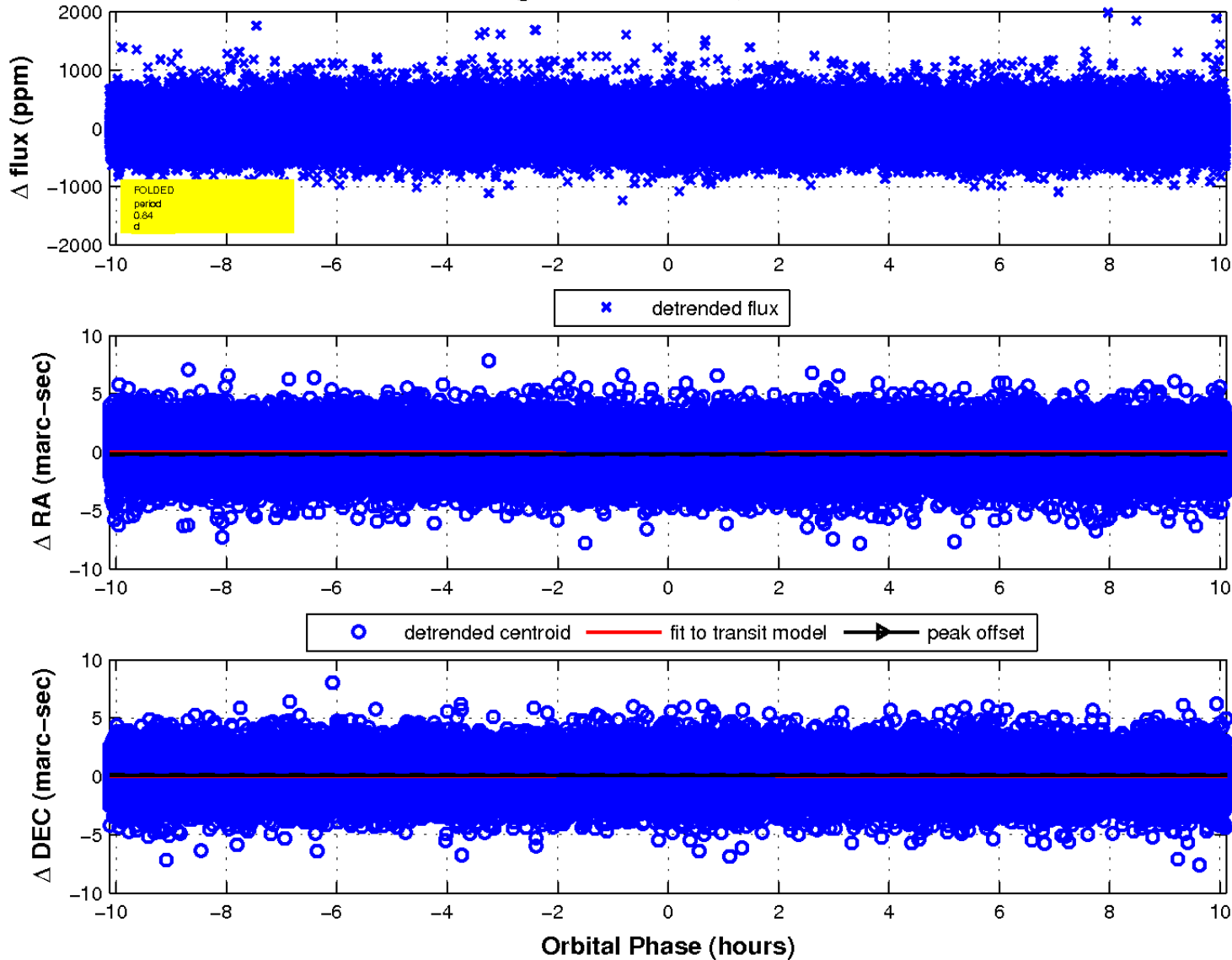
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

