

# KIC 009466030

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009466030-01	OBS	No	3.782713	132.530249	110.6	9.434	8.9	9.1	2.24	7865	4.57	5084.47
009466030-02	OBS	No	1.891298	131.683658	47.9	13.301	9.3	9.0	2.24	7865	1.66	12812.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009466030-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009466030-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

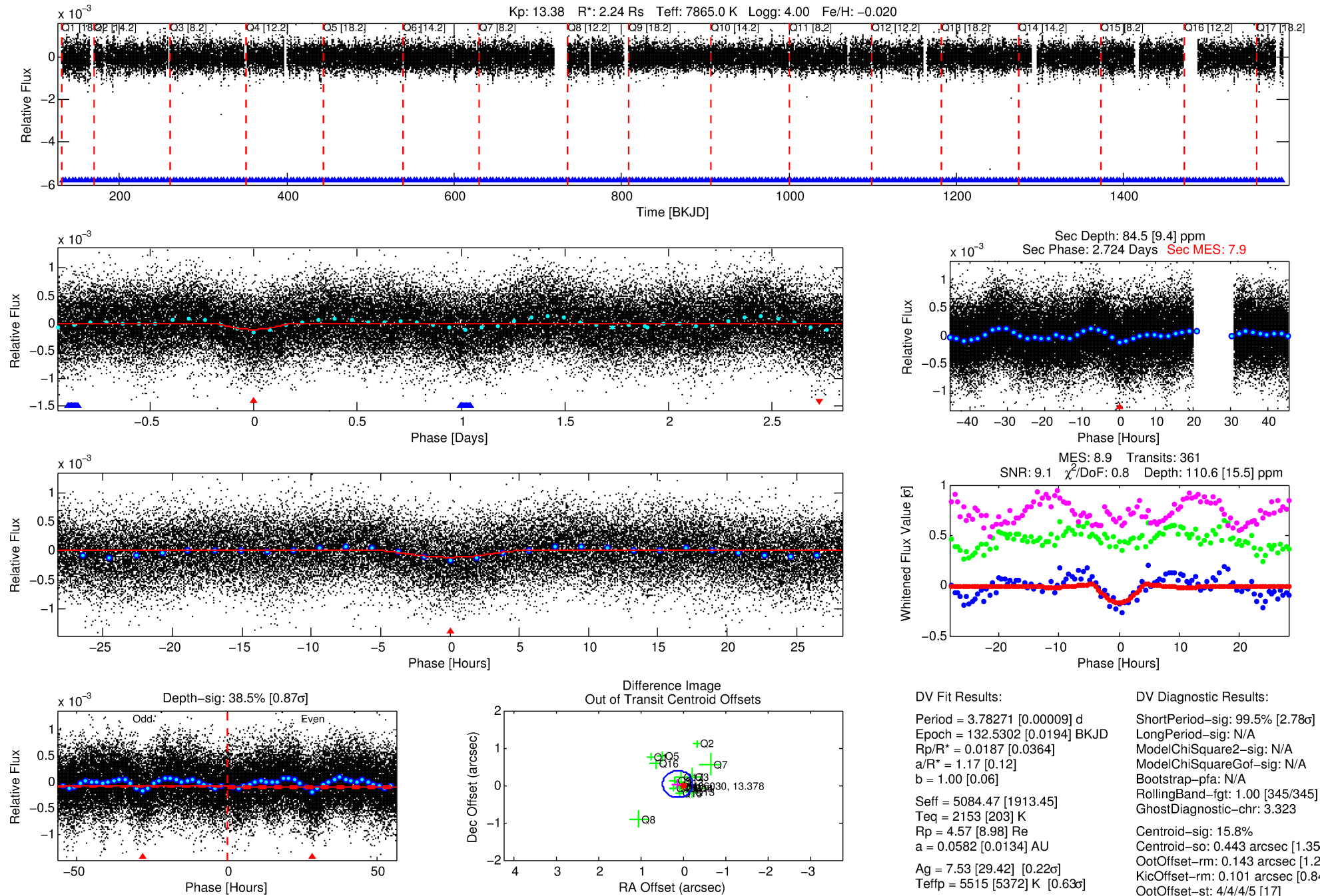
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009466030-01

No Significant Match Found

# DV One-Page Summary

KIC: 9466030 Candidate: 1 of 2 Period: 3.783 d



## DV Fit Results:

Period = 3.78271 [0.00009] d  
Epoch = 132.5302 [0.0194] BKJD  
Rp/R\* = 0.0187 [0.0364]  
a/R\* = 1.17 [0.12]  
b = 1.00 [0.06]  
Seff = 5084.47 [1913.45]  
Teq = 2153 [203] K  
Rp = 4.57 [8.98] Re  
a = 0.0582 [0.0134] AU  
Ag = 7.53 [29.42] [0.22 $\sigma$ ]  
Teffp = 5515 [5372] K [0.63 $\sigma$ ]

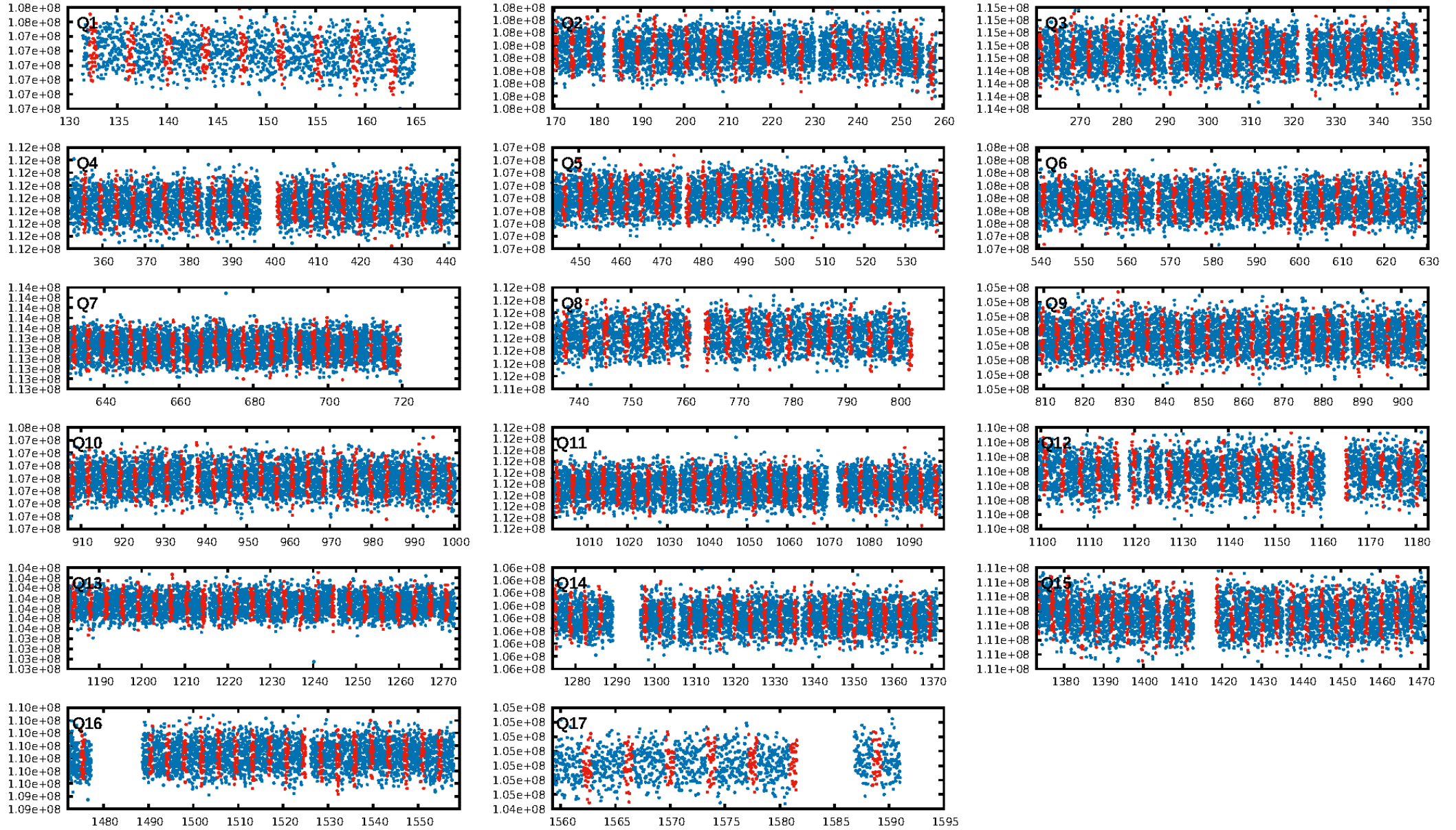
## DV Diagnostic Results:

ShortPeriod-sig: 99.5% [2.78 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [345/345]  
GhostDiagnostic-chr: 3.323  
Centroid-sig: 15.8%  
Centroid-so: 0.443 arcsec [1.35 $\sigma$ ]  
OotOffset-rm: 0.143 arcsec [1.20 $\sigma$ ]  
KicOffset-rm: 0.101 arcsec [0.84 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:39:01 Z

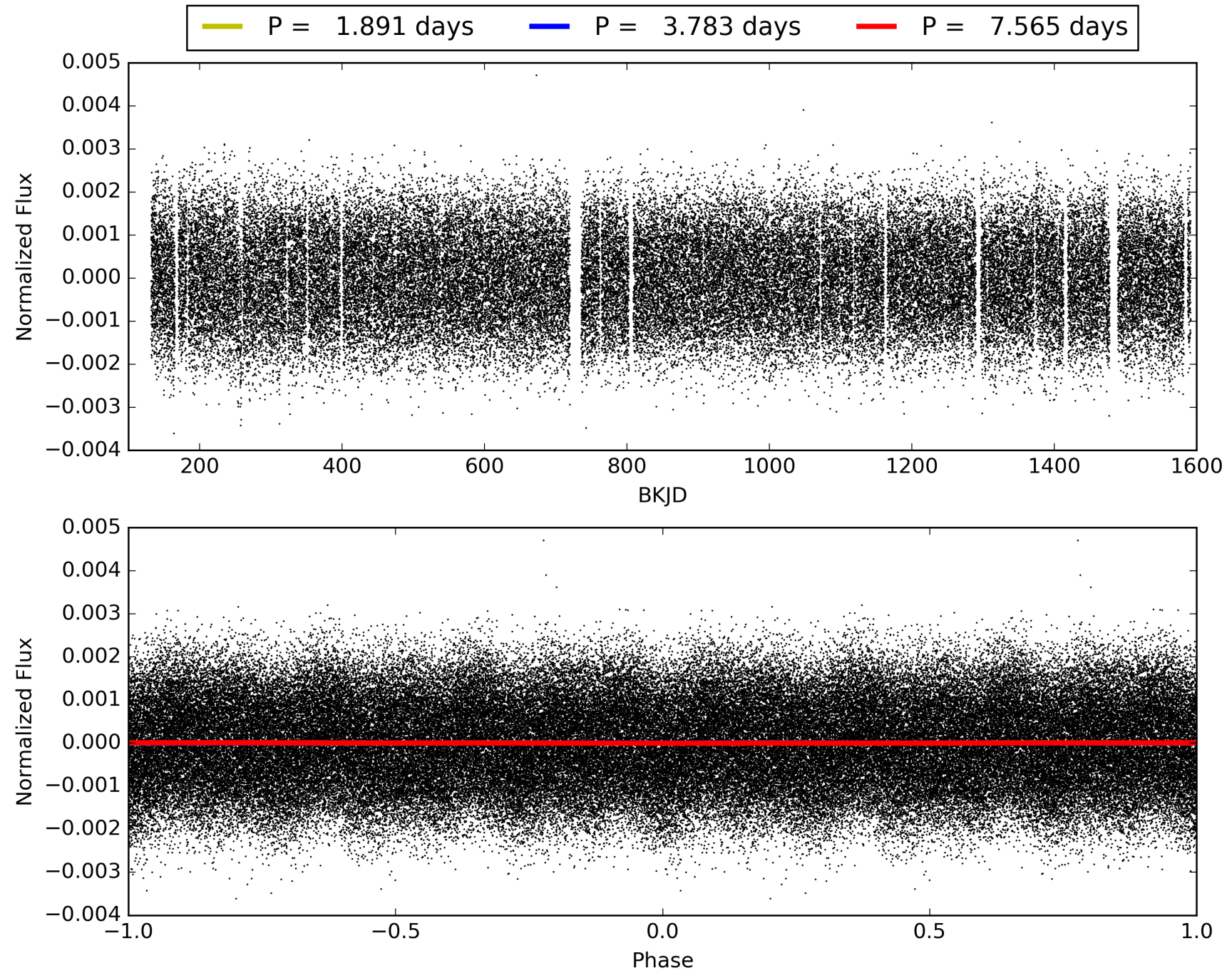
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009466030-01, PDC Light Curves



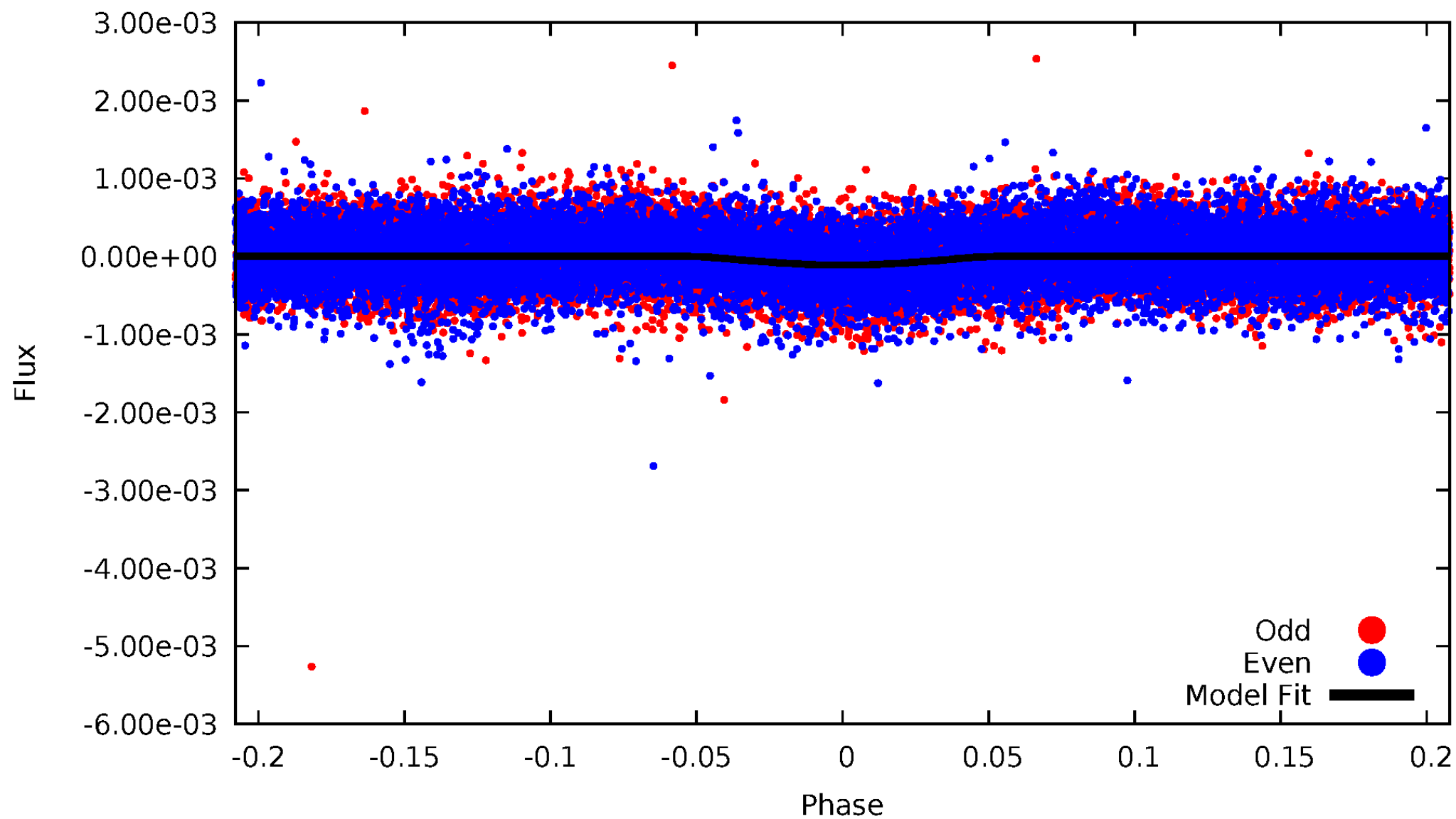


TCE 009466030-01



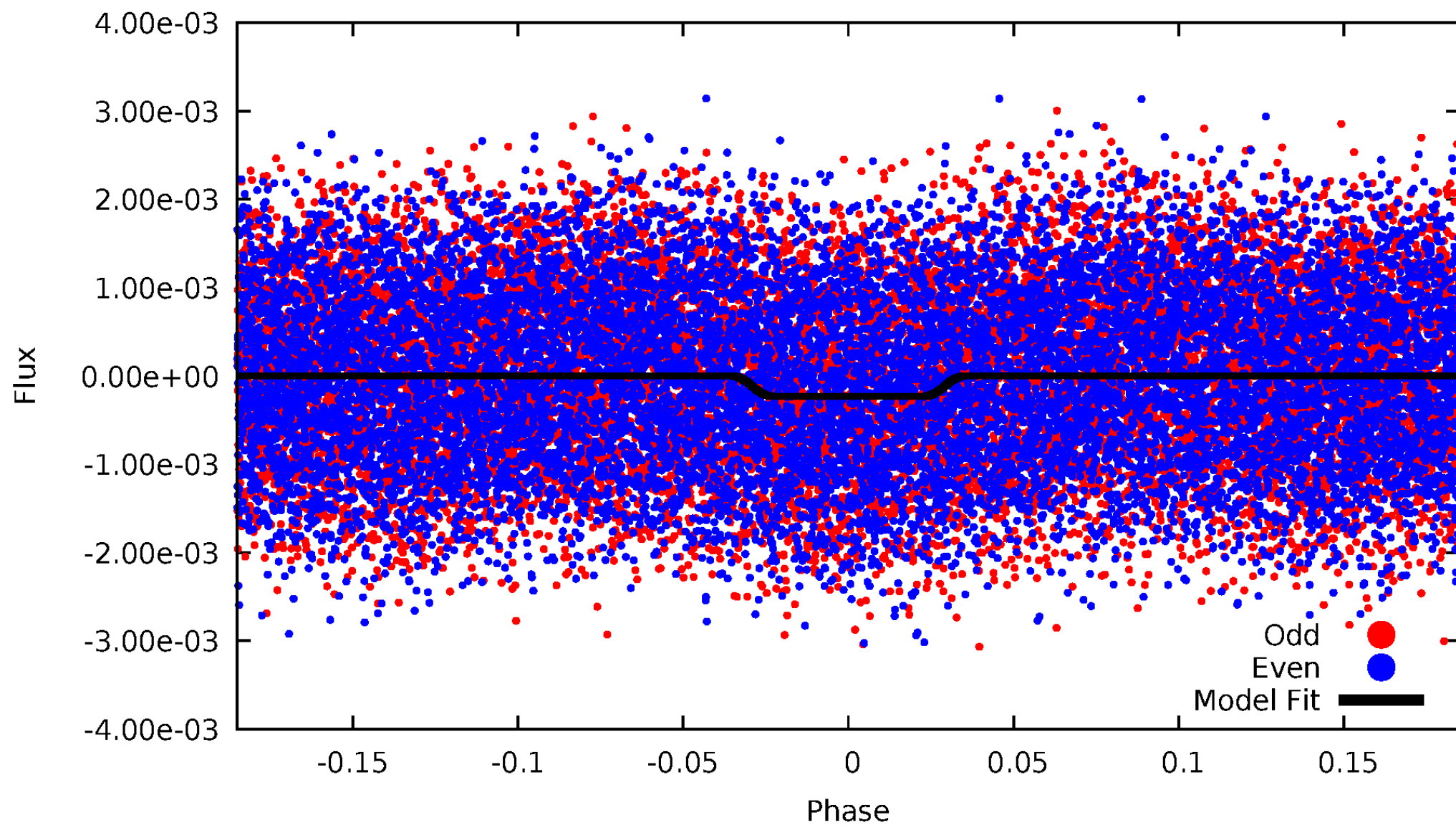
# DV Odd/Even

TCE 009466030-01



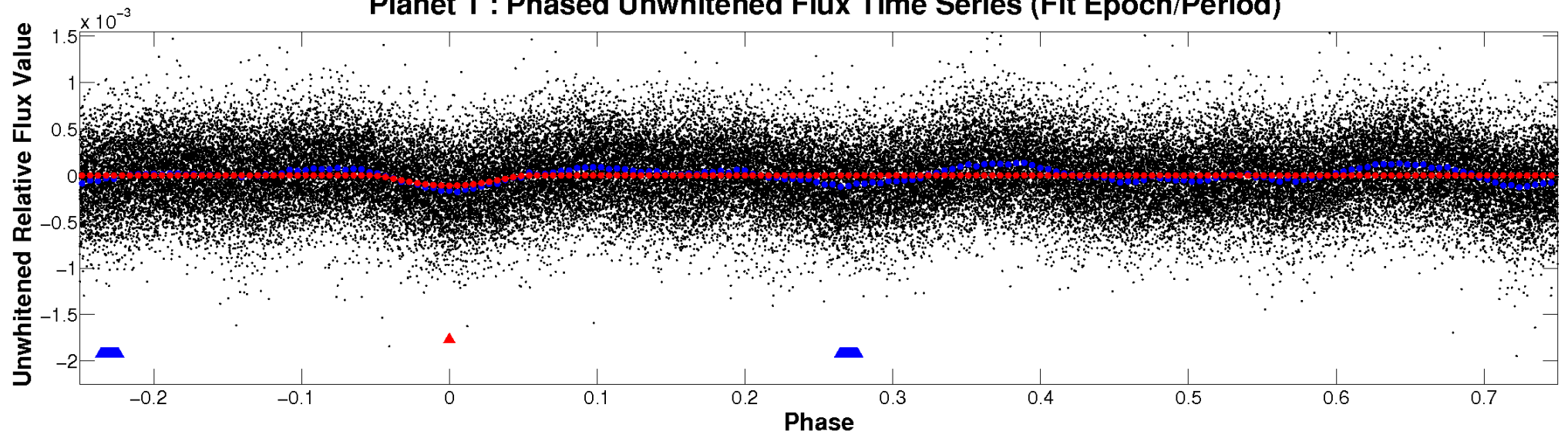
# ALT Odd/Even

TCE 009466030-01

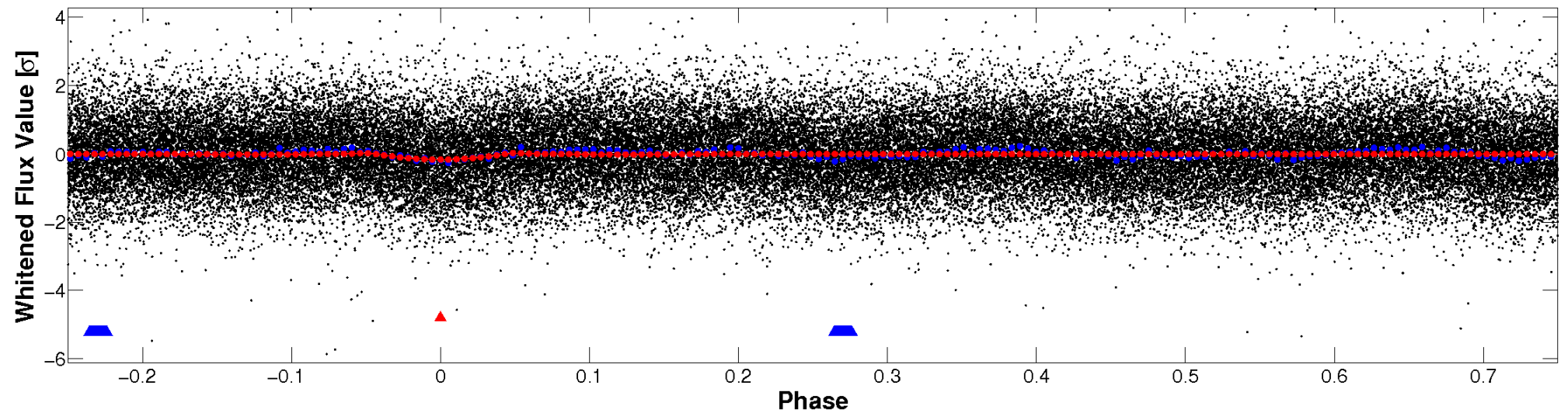


# Non-Whitened Vs. Whitened Light Curve

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



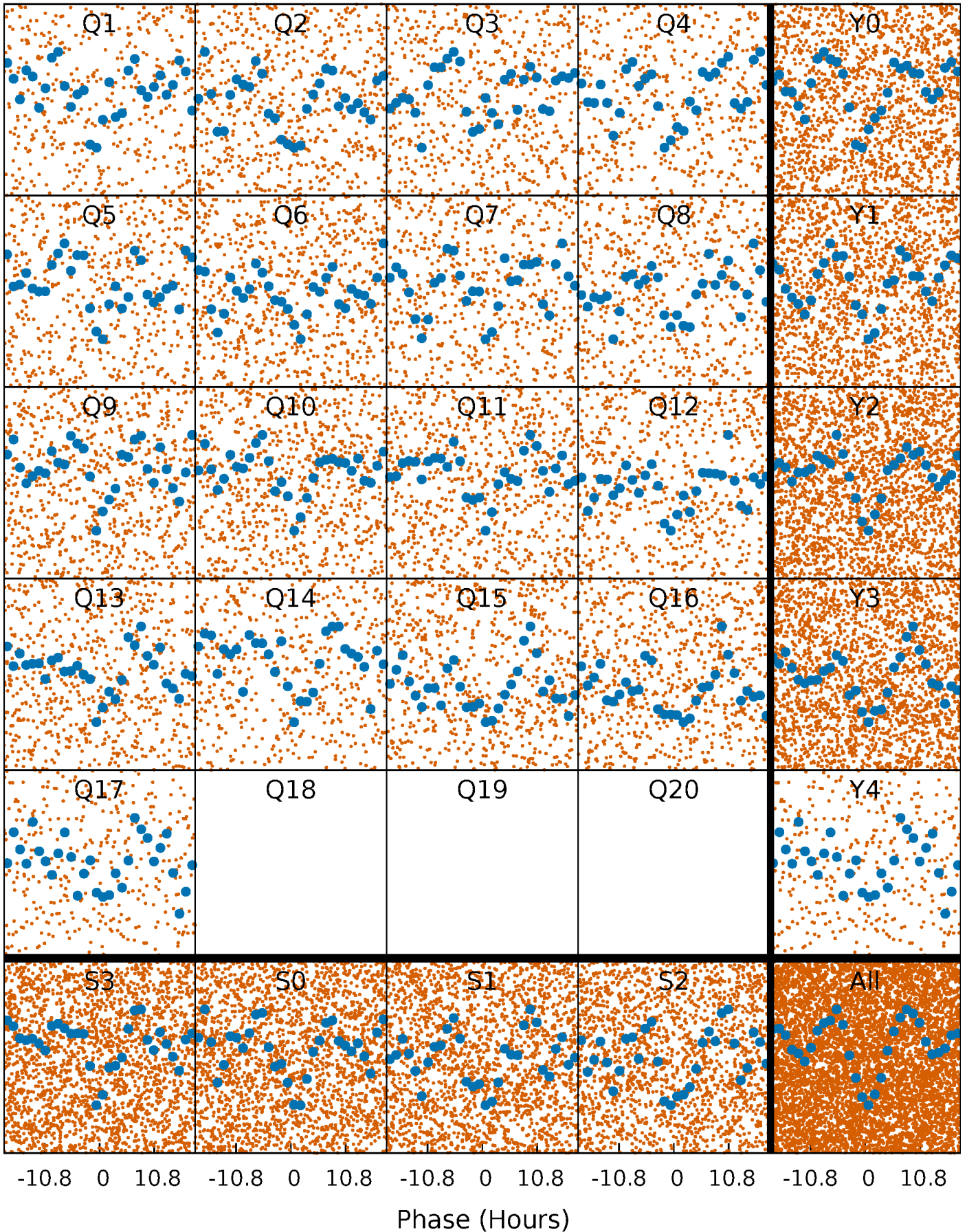
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

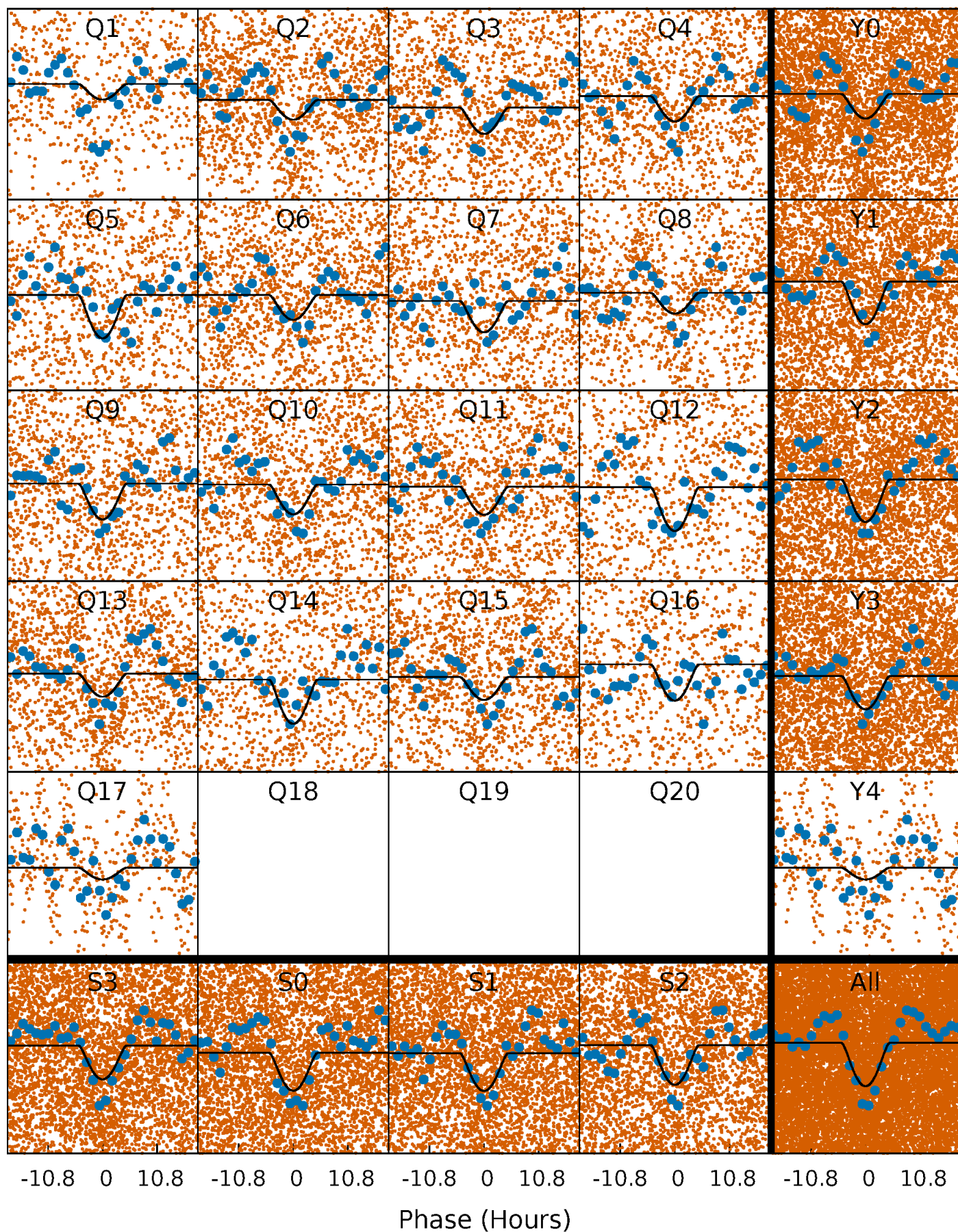
TCE 009466030-01   P= 3.782713 Days    $T_0=132.530249$  (BKJD)





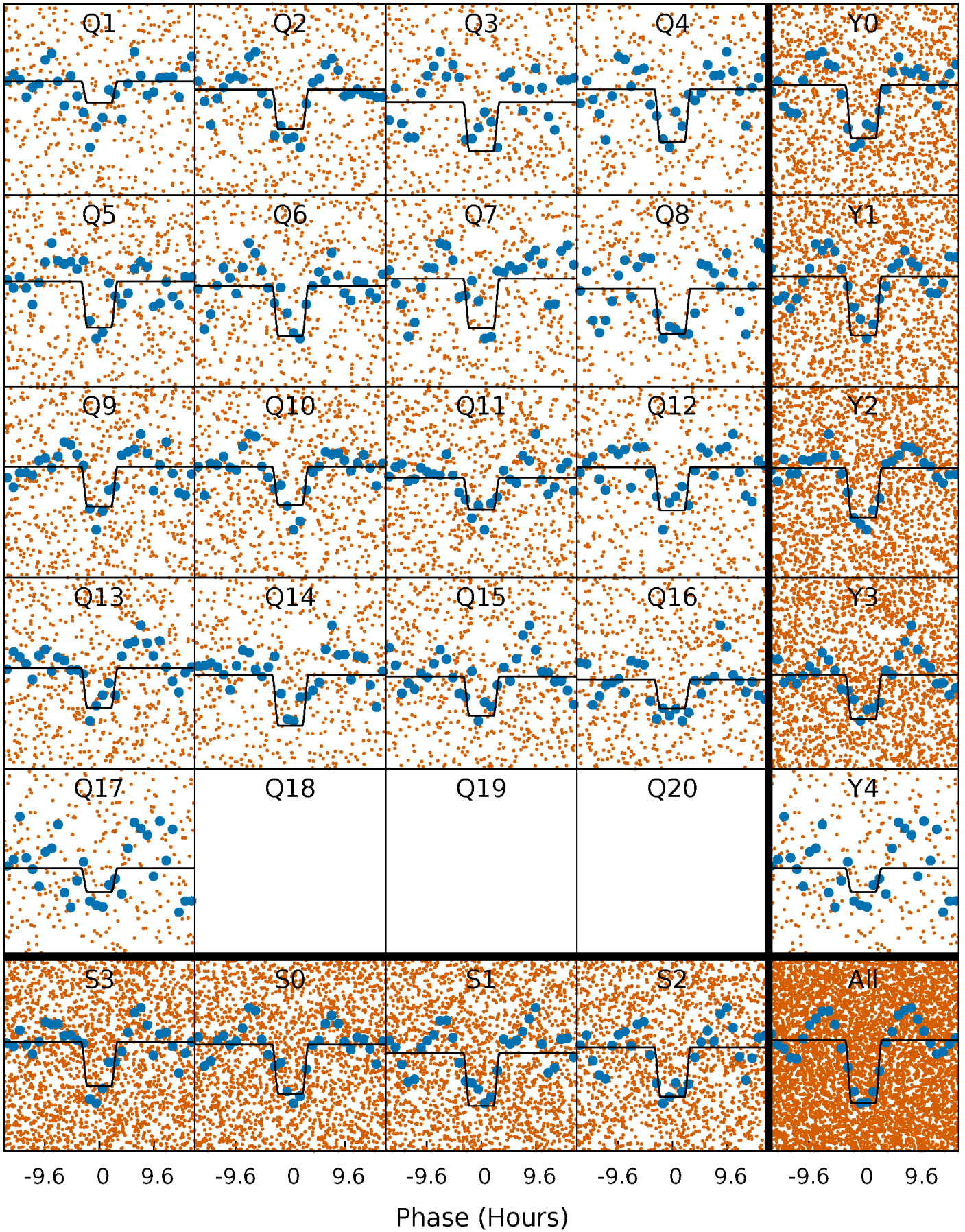
# DV Quarter-Phased Transit Curves

TCE 009466030-01 P= 3.782713 Days  $T_0=132.530249$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009466030-01 P= 3.782810 Days  $T_0=132.535736$  (BKJD)

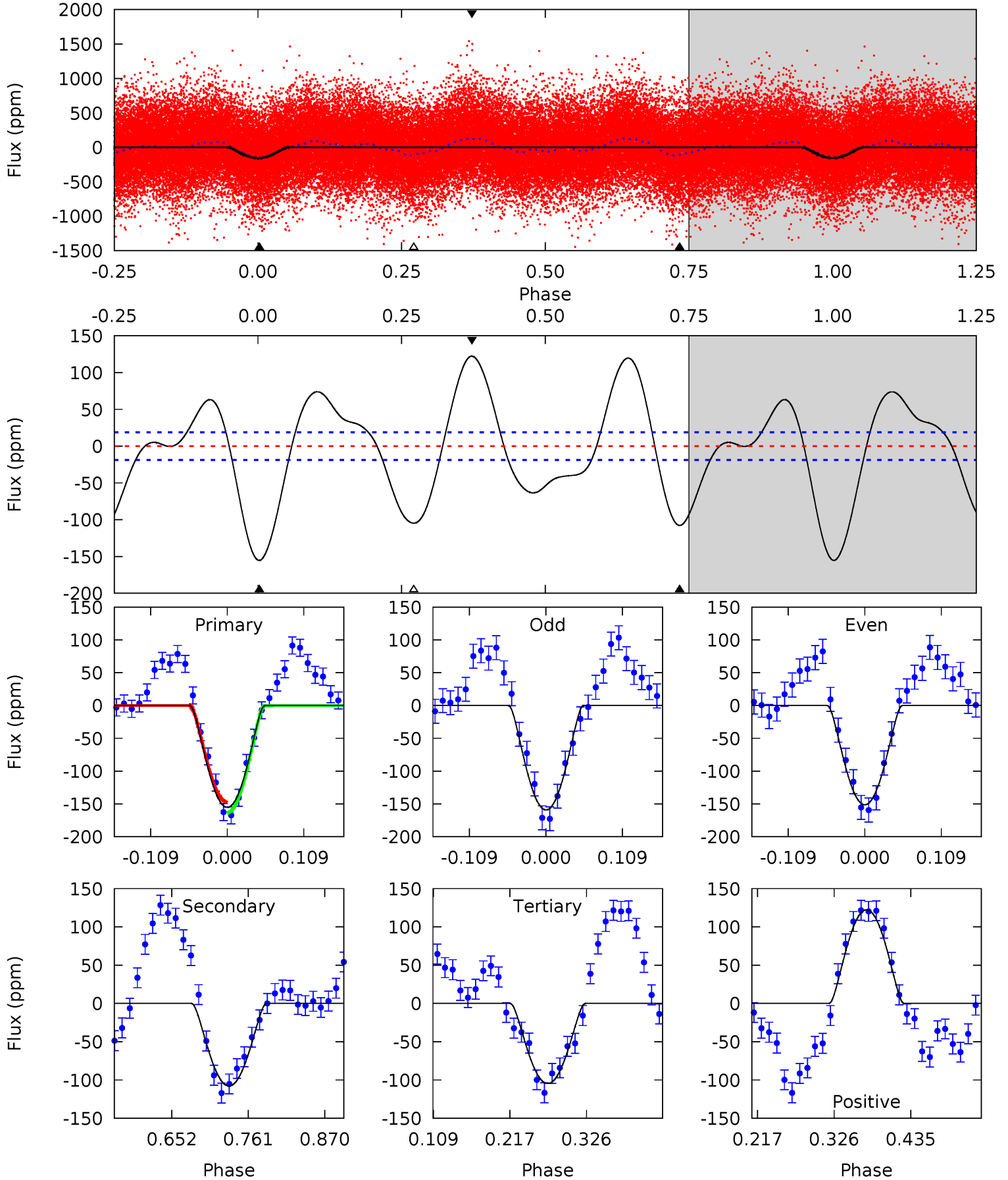




# DV Model-Shift Uniqueness Test

009466030-01, P = 3.782713 Days, E = 128.747536 Days

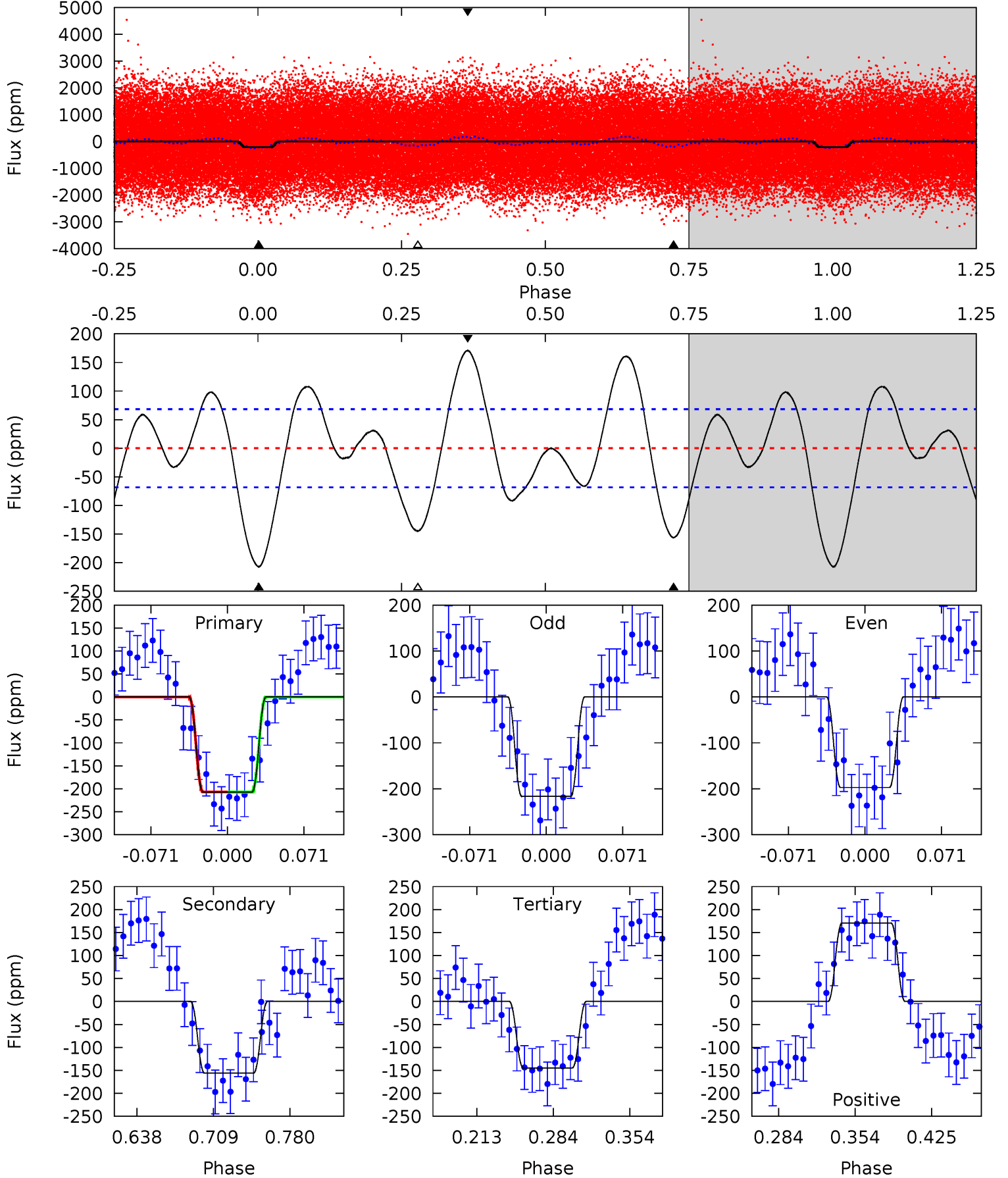
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
37.6	26.1	25.4	29.6	4.55	1.60	14.4	12.3	7.97	0.74	-3.55	0.95	1.02	0.44	1.92



# Alt Model-Shift Uniqueness Test

009466030-01, P = 3.782810 Days, E = 128.752926 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.1	10.6	9.82	11.6	4.64	1.81	5.24	4.24	2.46	0.78	-1.00	0.65	1.07	0.45	0.02





### Stellar Parameters For KIC 009466030

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7865^{+216}_{-324}$	$4.001^{+0.187}_{-0.136}$	$-0.020^{+0.200}_{-0.350}$	$2.241^{+0.493}_{-0.602}$	$1.834^{+0.147}_{-0.344}$	$0.230^{+0.254}_{-0.089}$
	+3%/-4%	+5%/-3%	+1000%/-1750%	+22%/-27%	+8%/-19%	+111%/-39%
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 009466030-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-108 \pm 4$	$7.76^{+7.04}_{-4.96}$	$2984^{+206}_{-201}$	$4423^{+3036}_{-1048}$	$3.273^{+22.903}_{-2.407}$
Alt.	$-156 \pm 15$	$7.31^{+7.36}_{-4.89}$	$2980^{+196}_{-217}$	$4831^{+4017}_{-1188}$	$5.112^{+40.554}_{-3.802}$

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

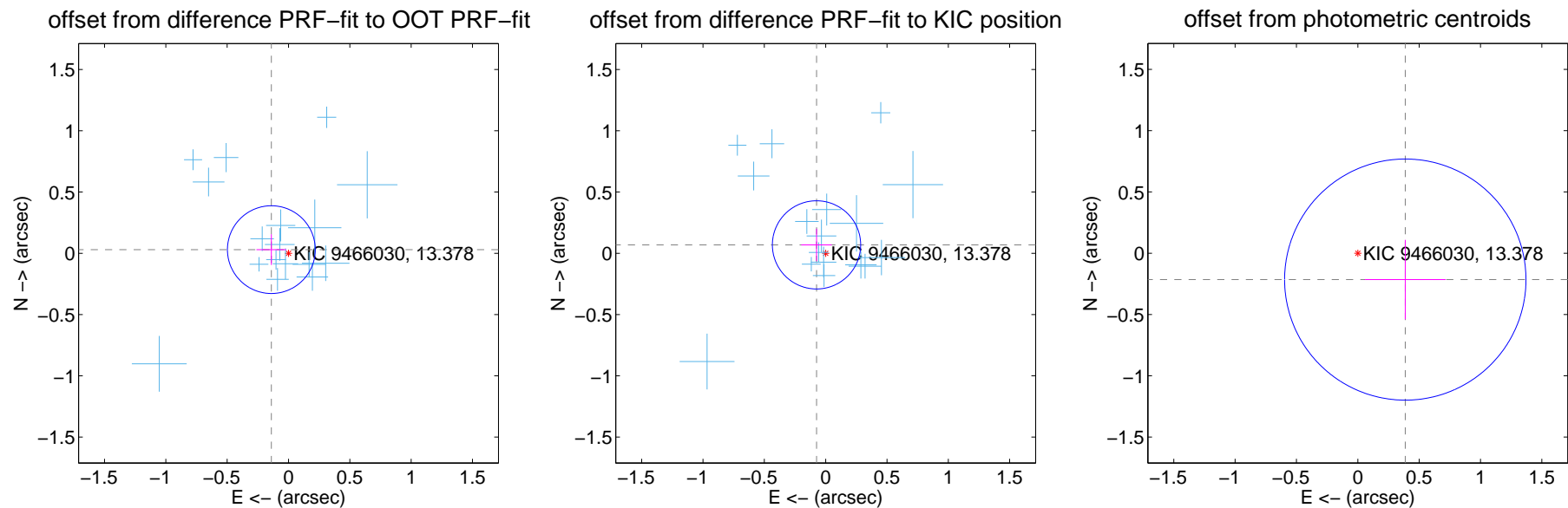
## DV Centroid Data

Supplemental centroid analysis for 009466030-01. Kepler magnitude: 13.38. Transit SNR 9.06

There are 17 quarters with good PRF difference image offsets

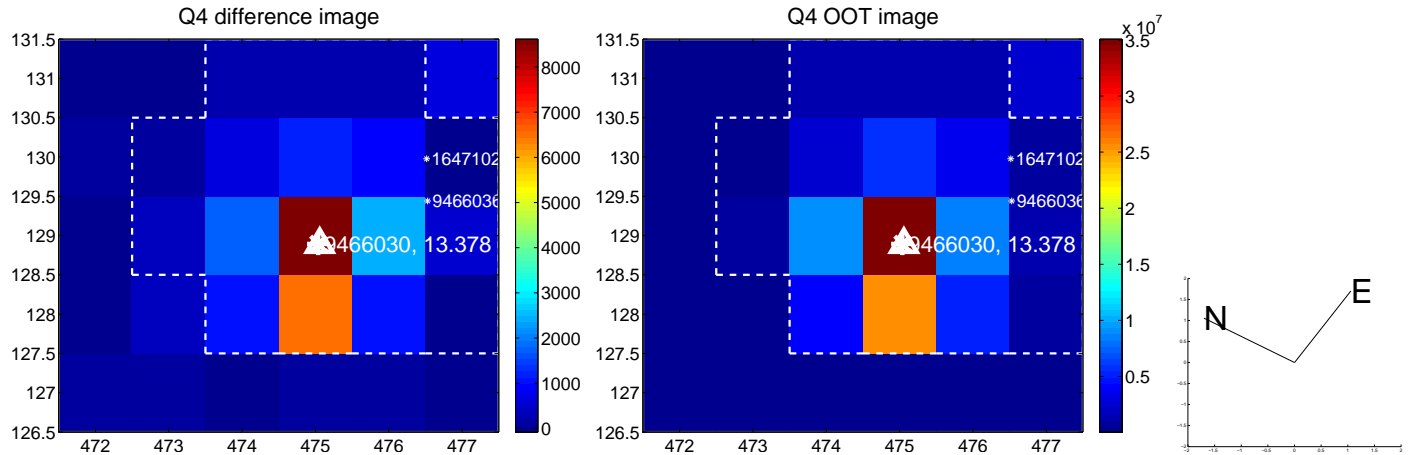
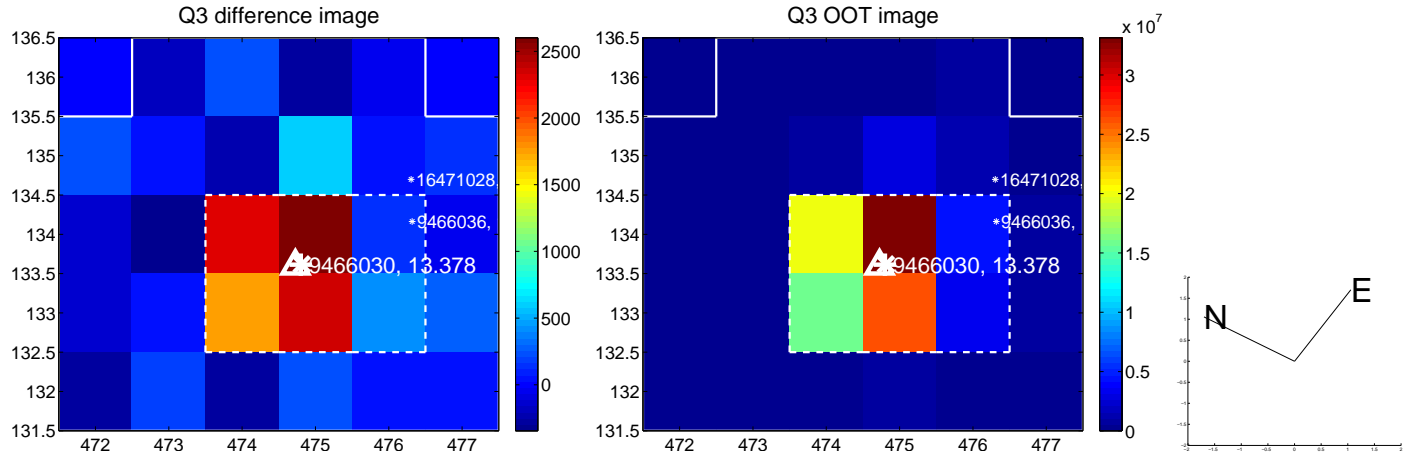
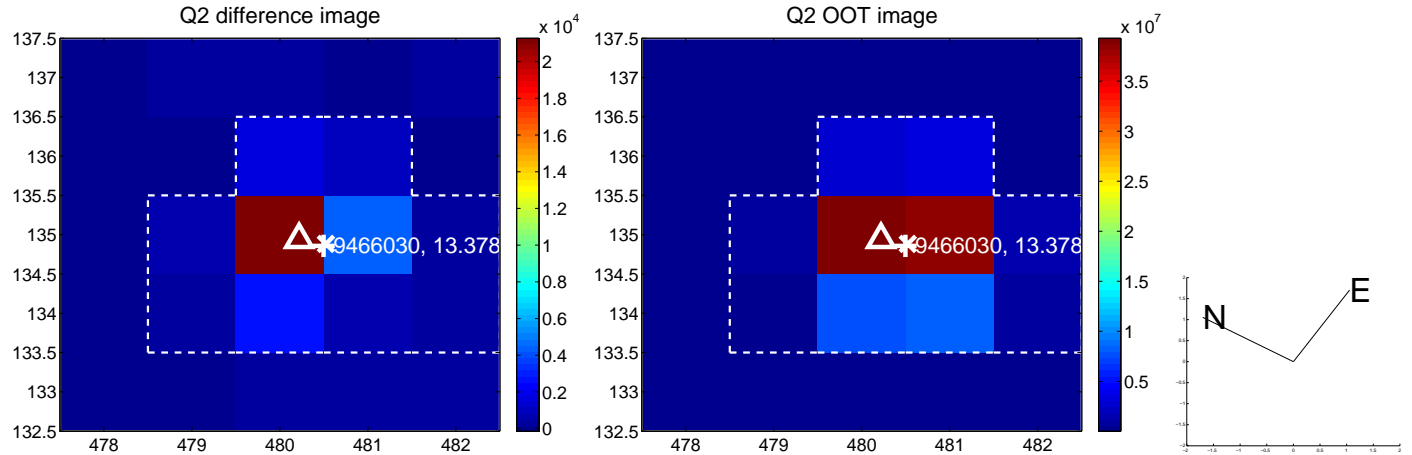
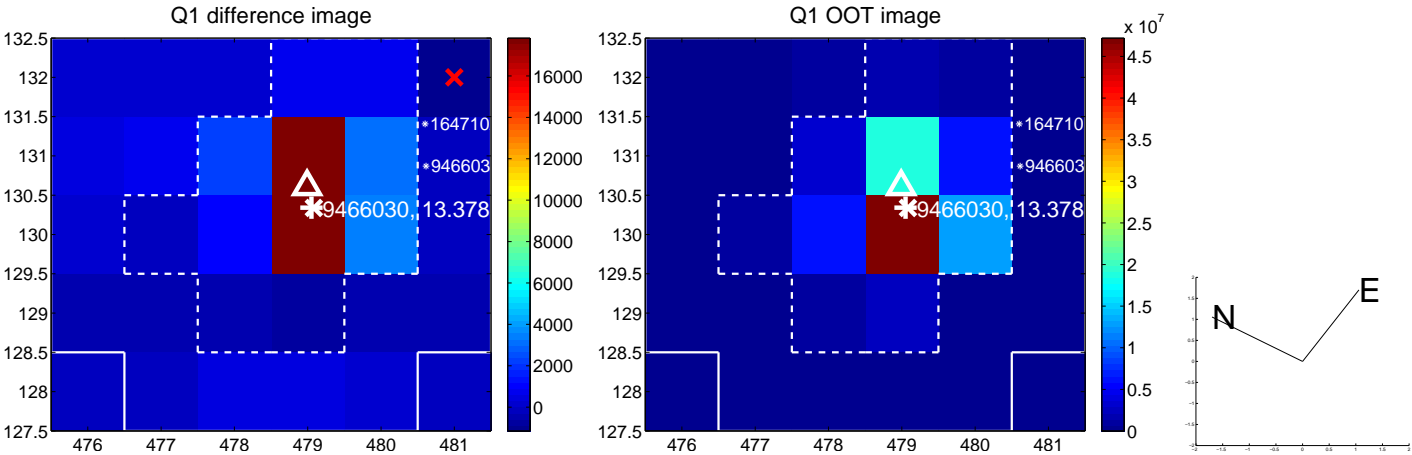
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.143 \pm 0.119$	1.20	$0.140 \pm 0.122$	$0.030 \pm 0.125$
PRF-fit source offset from KIC position	$0.101 \pm 0.120$	0.84	$0.075 \pm 0.123$	$0.069 \pm 0.132$
photometric centroid source offset	$0.44 \pm 0.33$	1.35	$-0.39 \pm 0.33$	$-0.22 \pm 0.32$

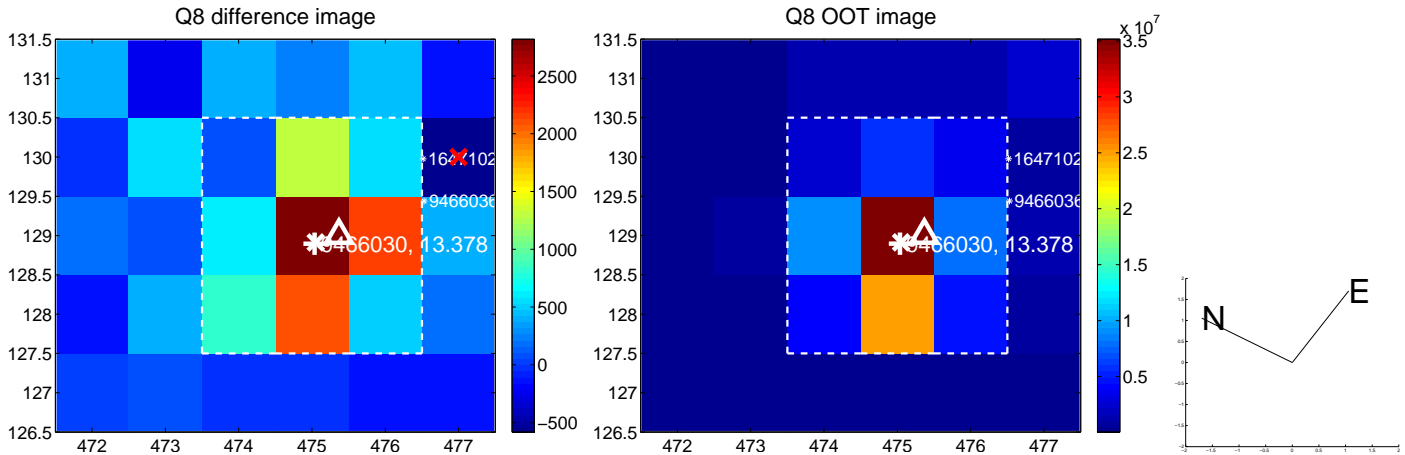
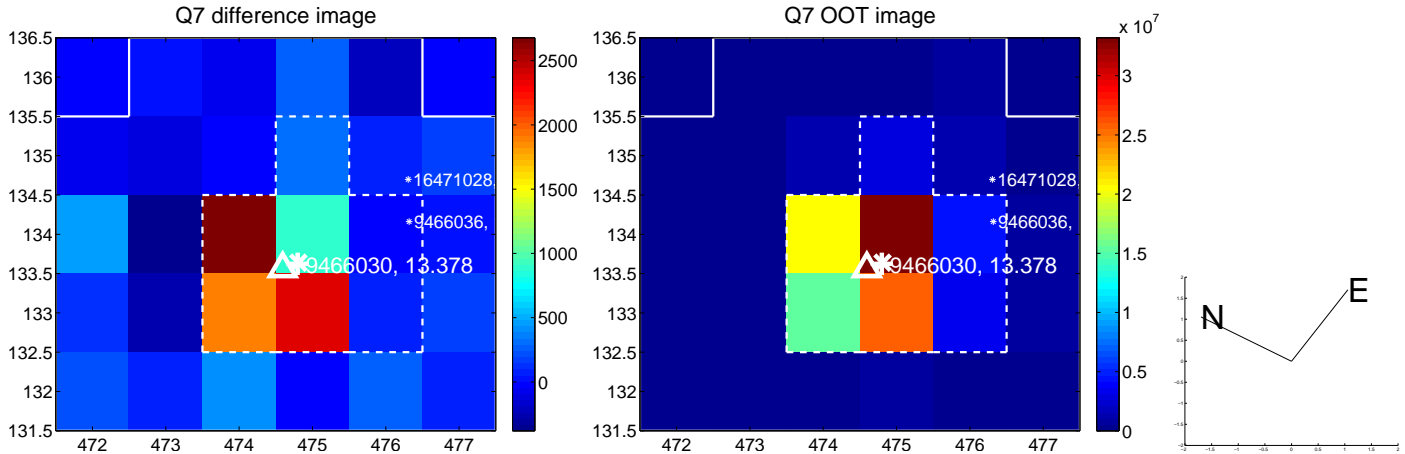
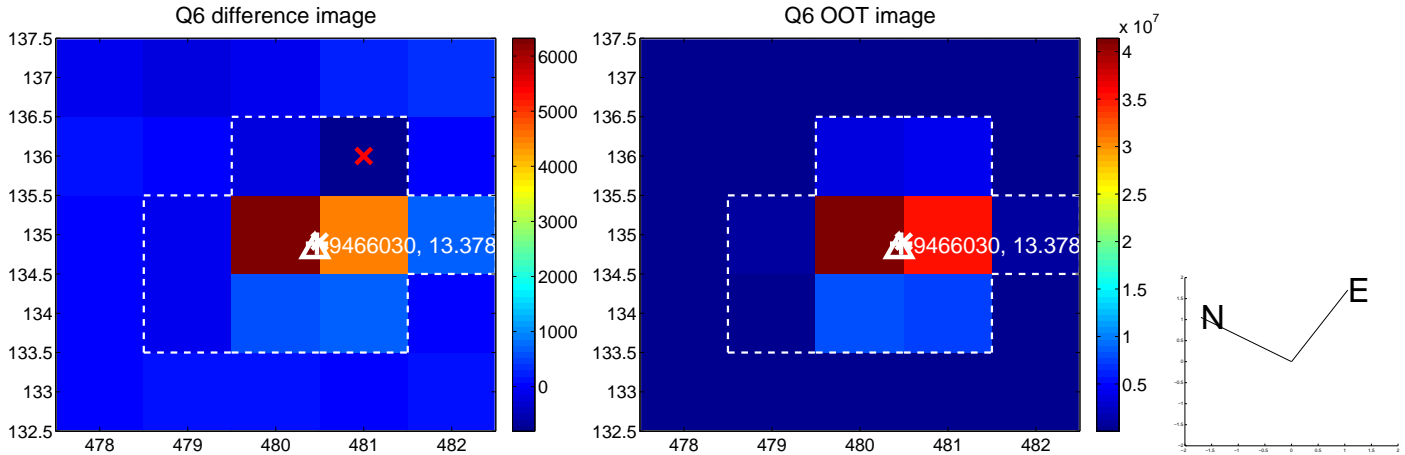
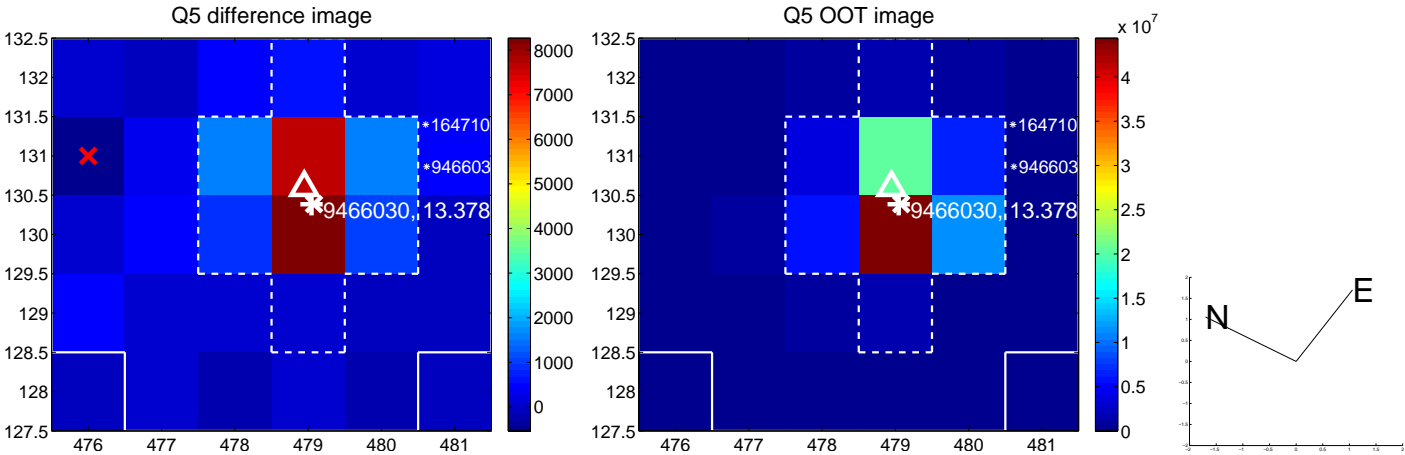


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

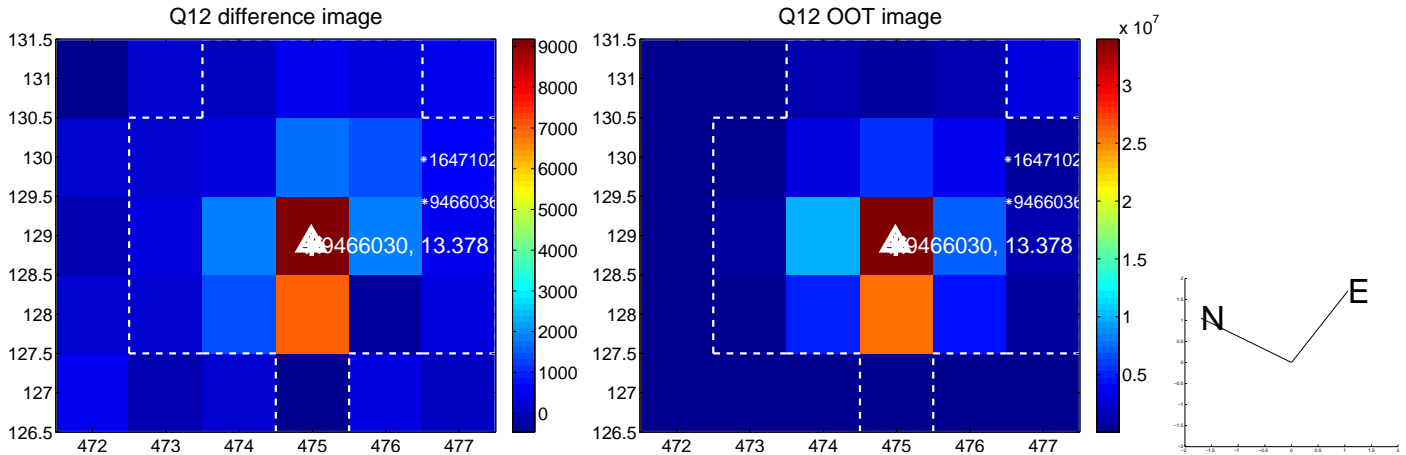
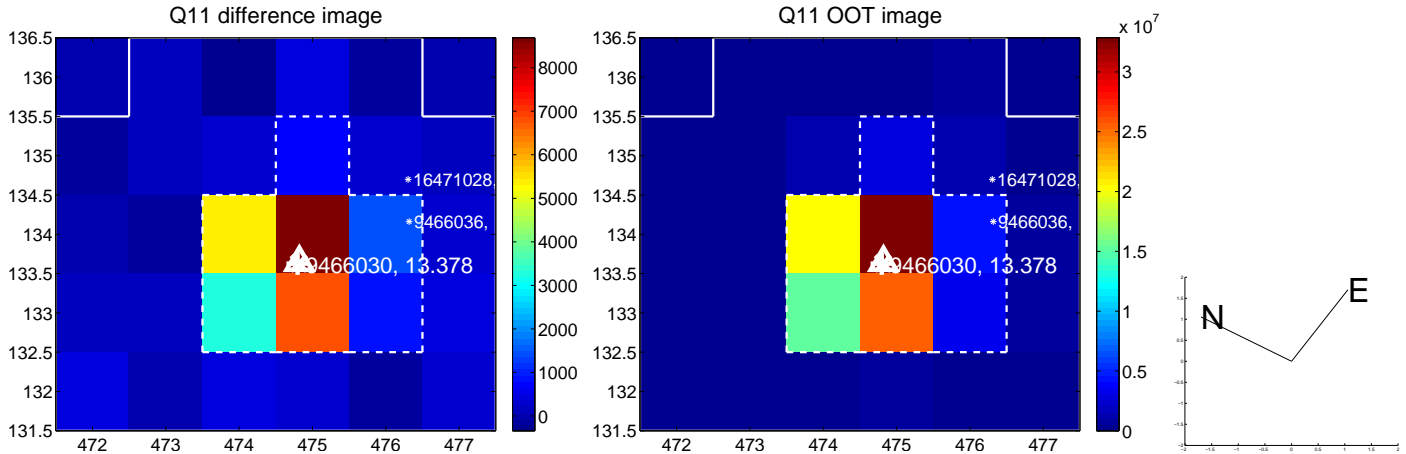
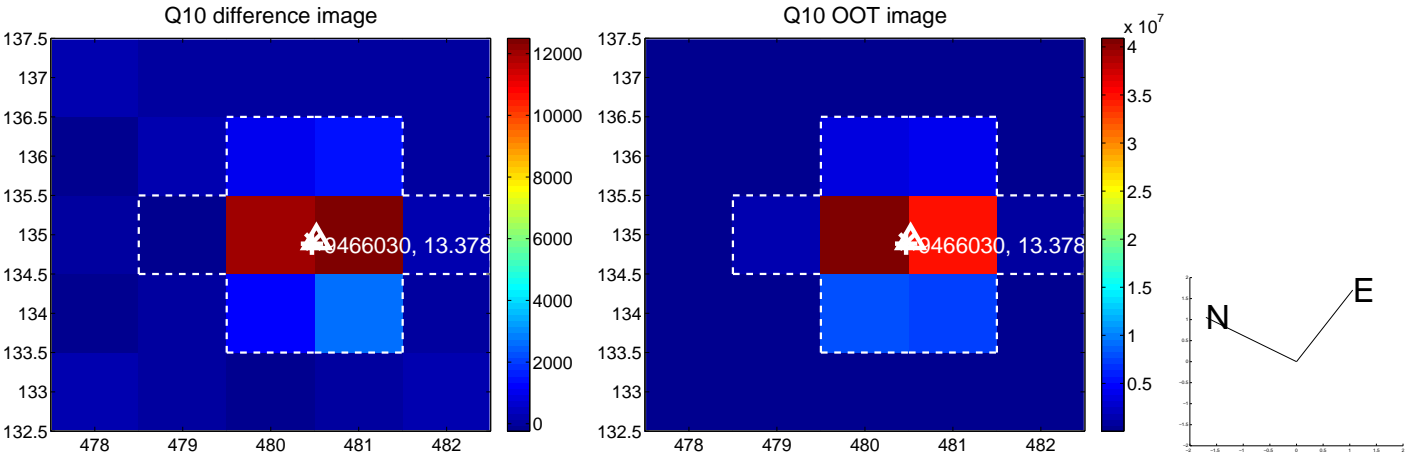
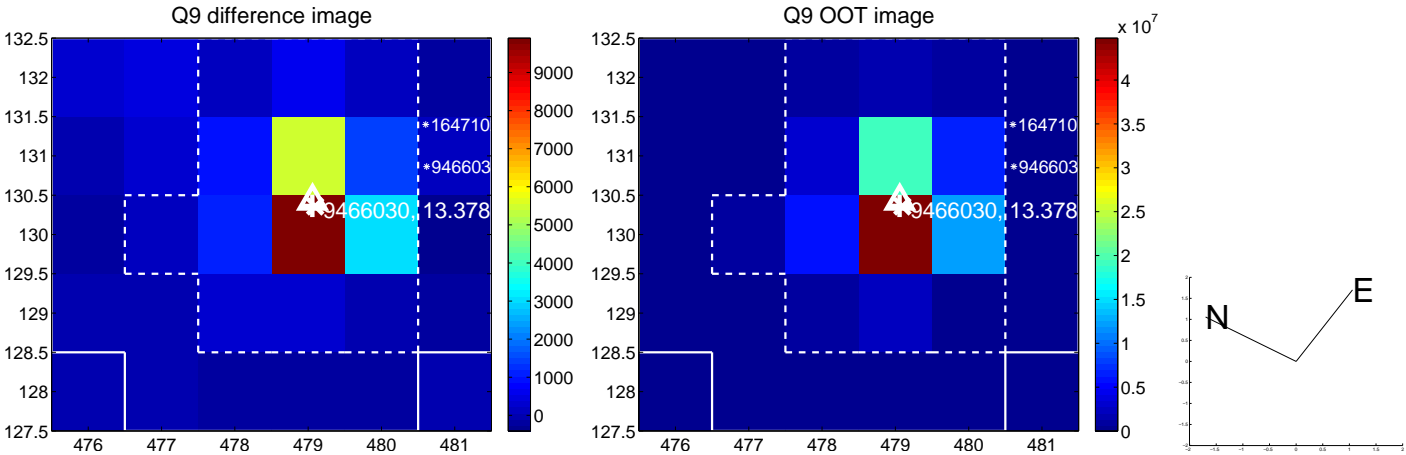


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

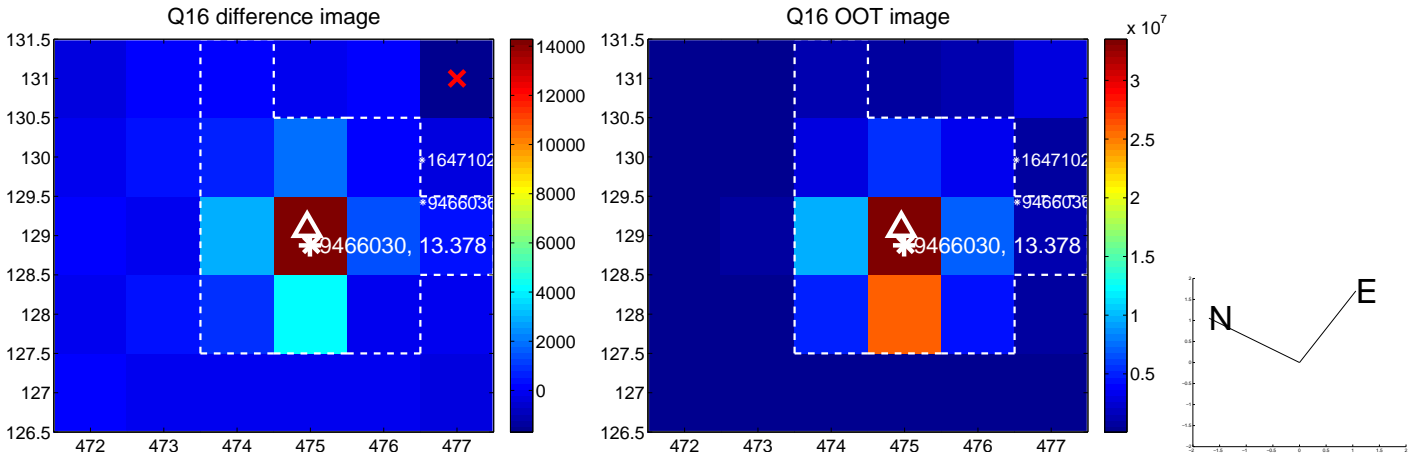
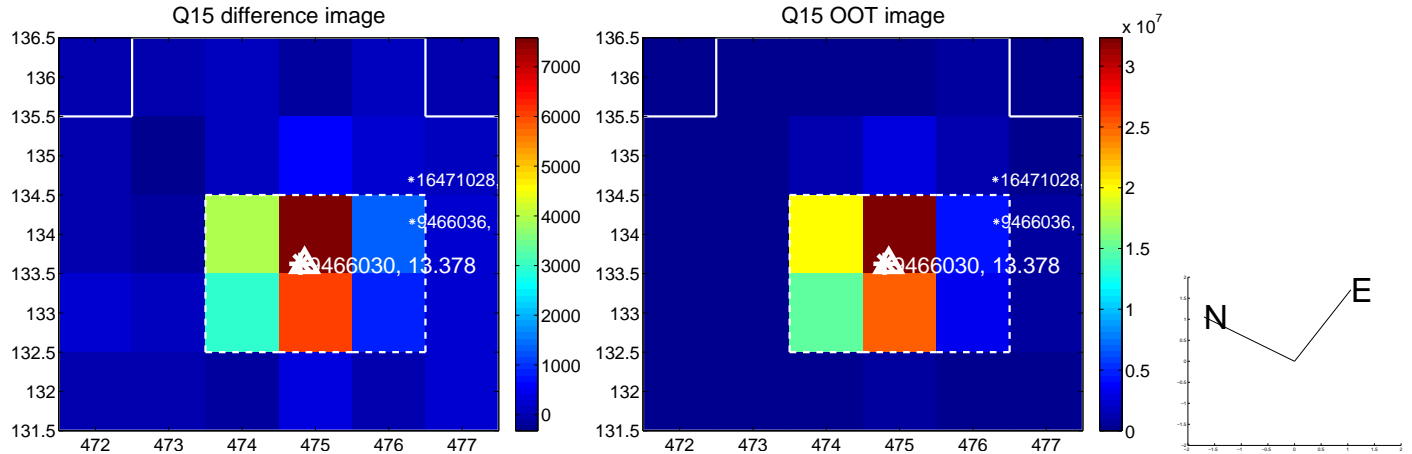
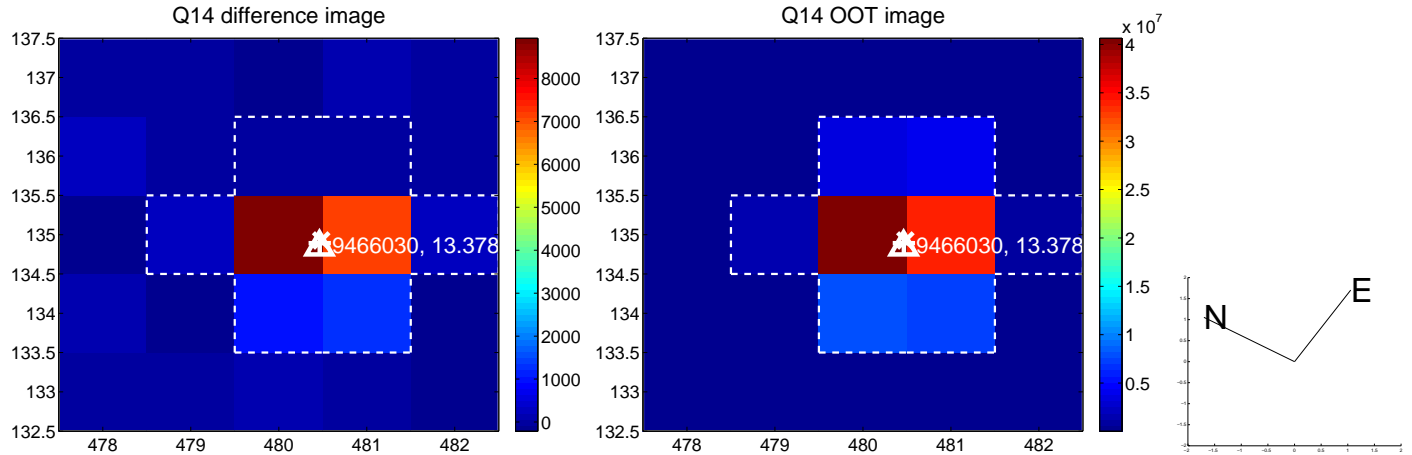
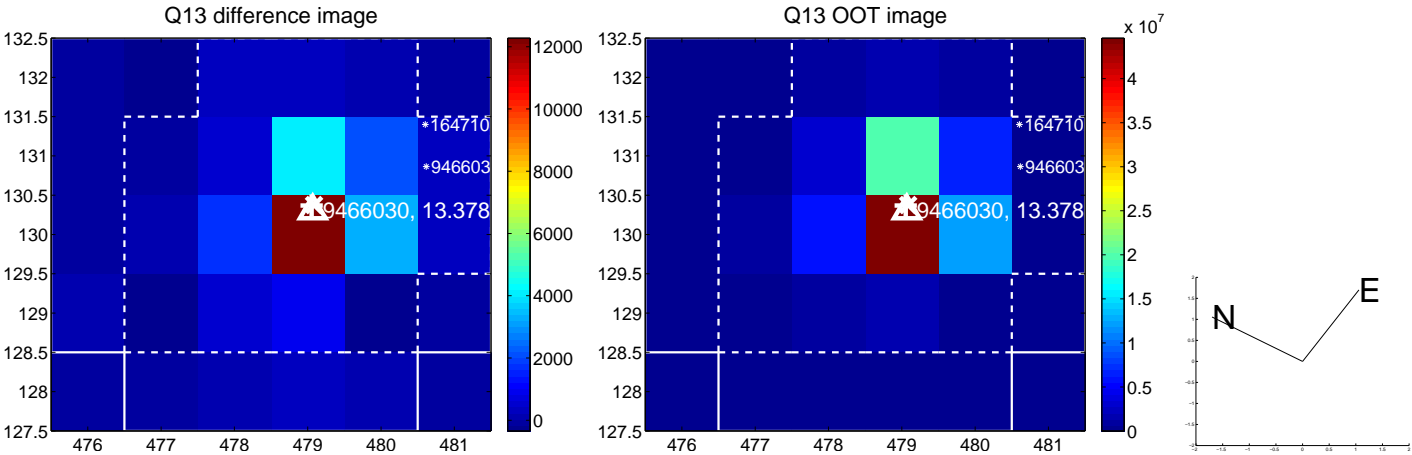




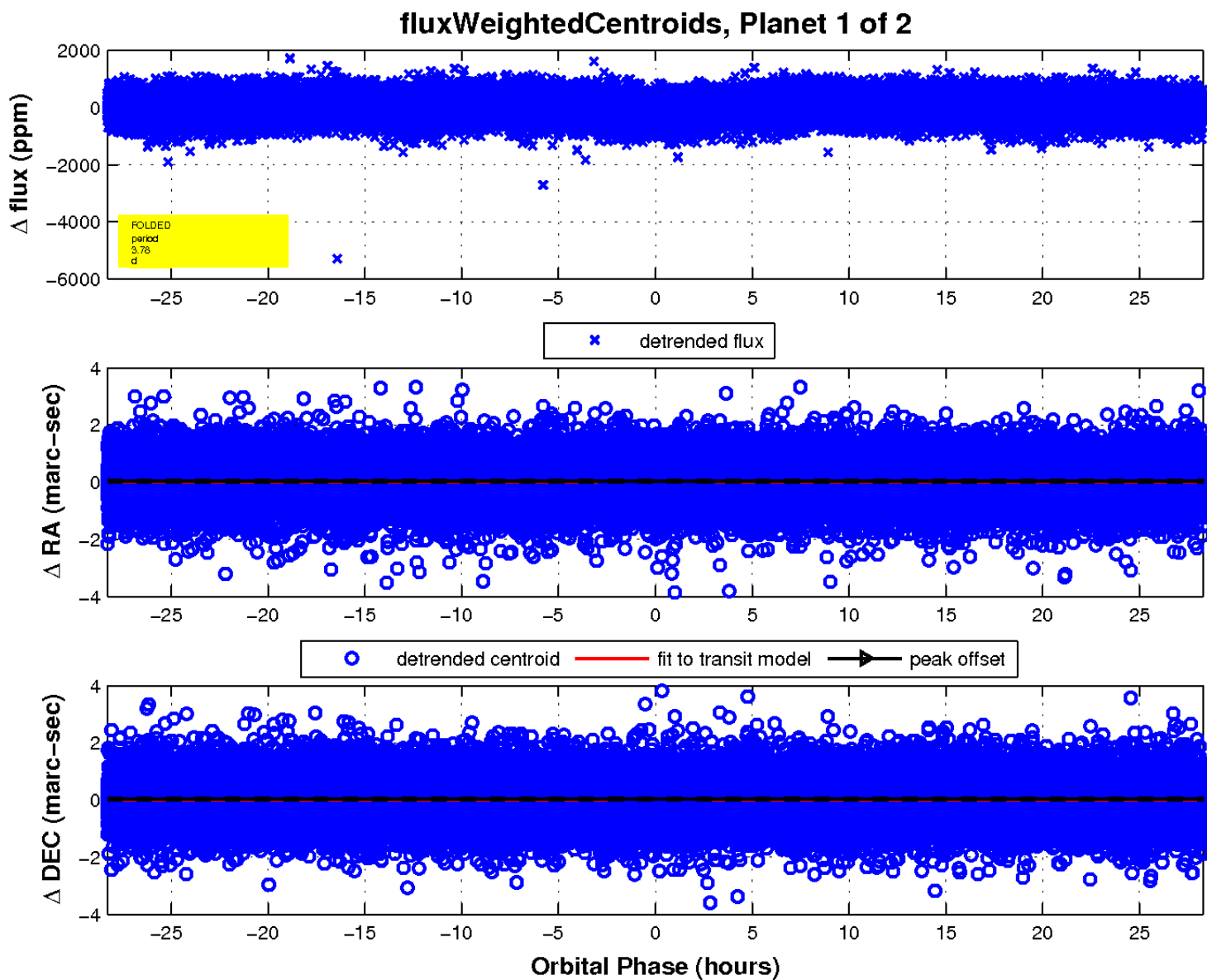
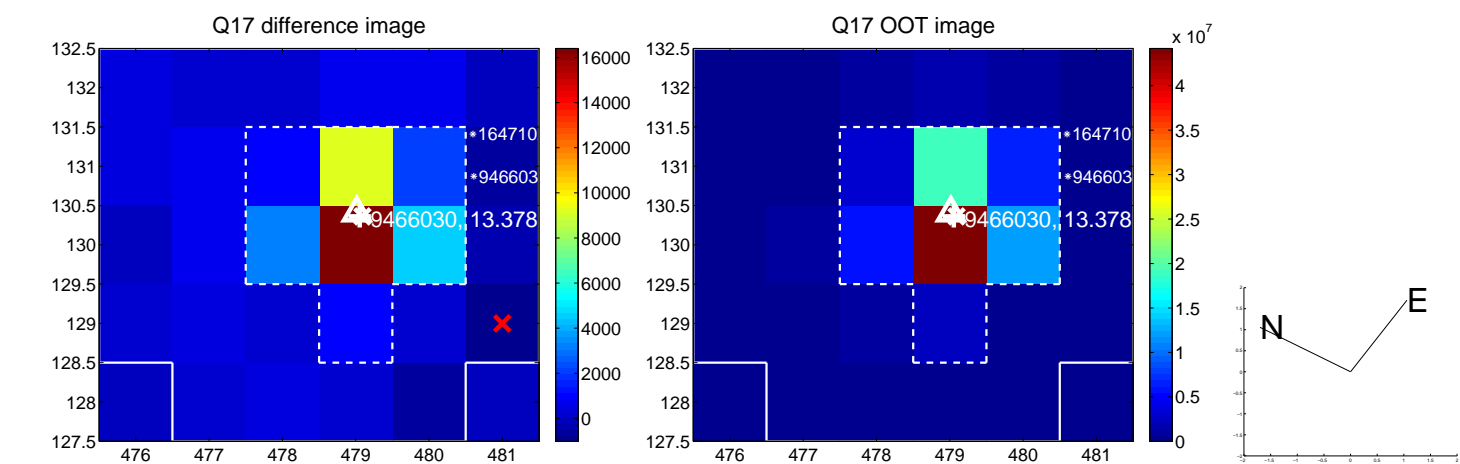
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

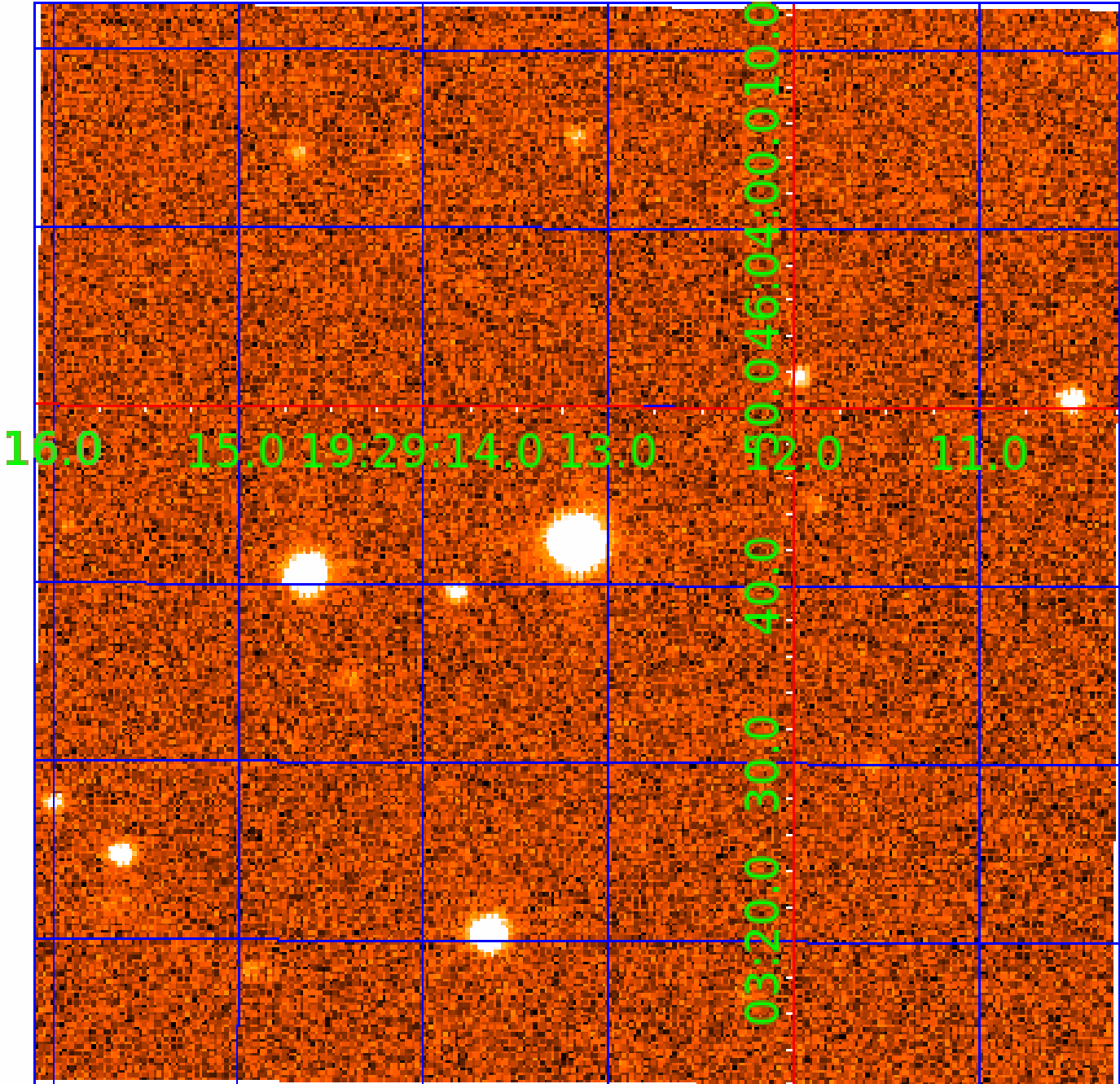


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009466030

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009466030-01	OBS	No	3.782713	132.530249	110.6	9.434	8.9	9.1	2.24	7865	4.57	5084.47
009466030-02	OBS	No	1.891298	131.683658	47.9	13.301	9.3	9.0	2.24	7865	1.66	12812.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009466030-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009466030-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

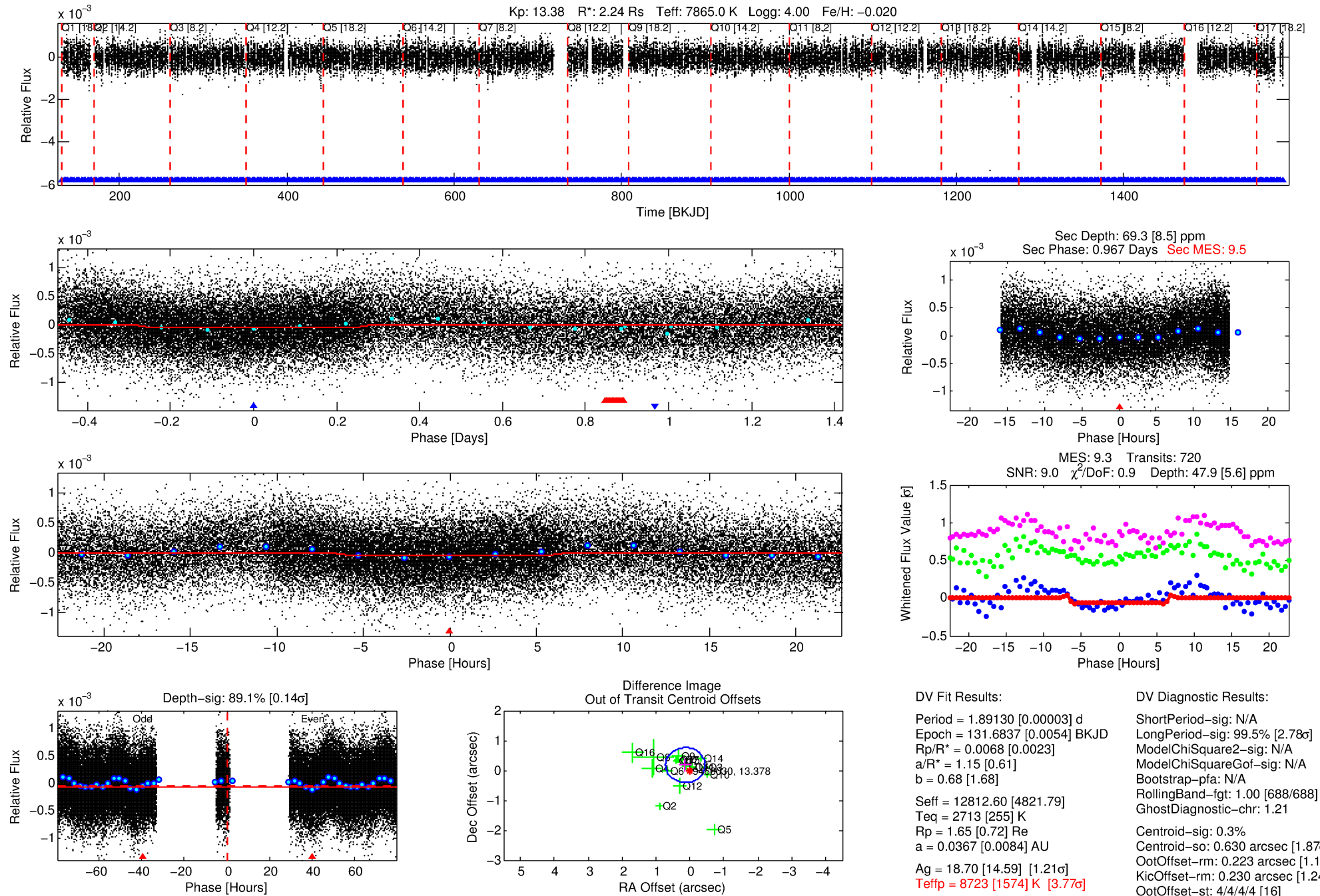
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009466030-02

No Significant Match Found

# DV One-Page Summary

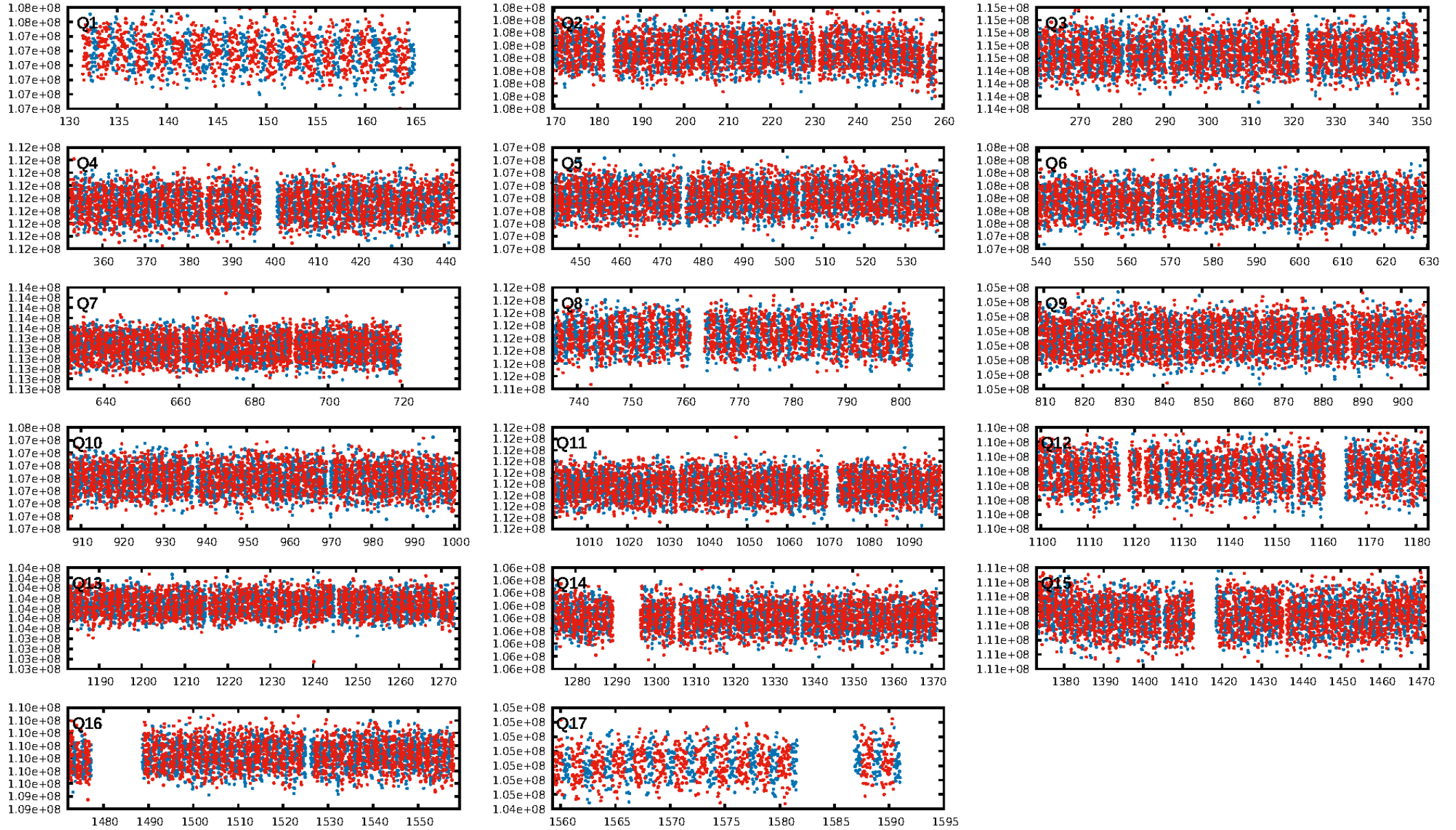
KIC: 9466030 Candidate: 2 of 2 Period: 1.891 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:39:14 Z

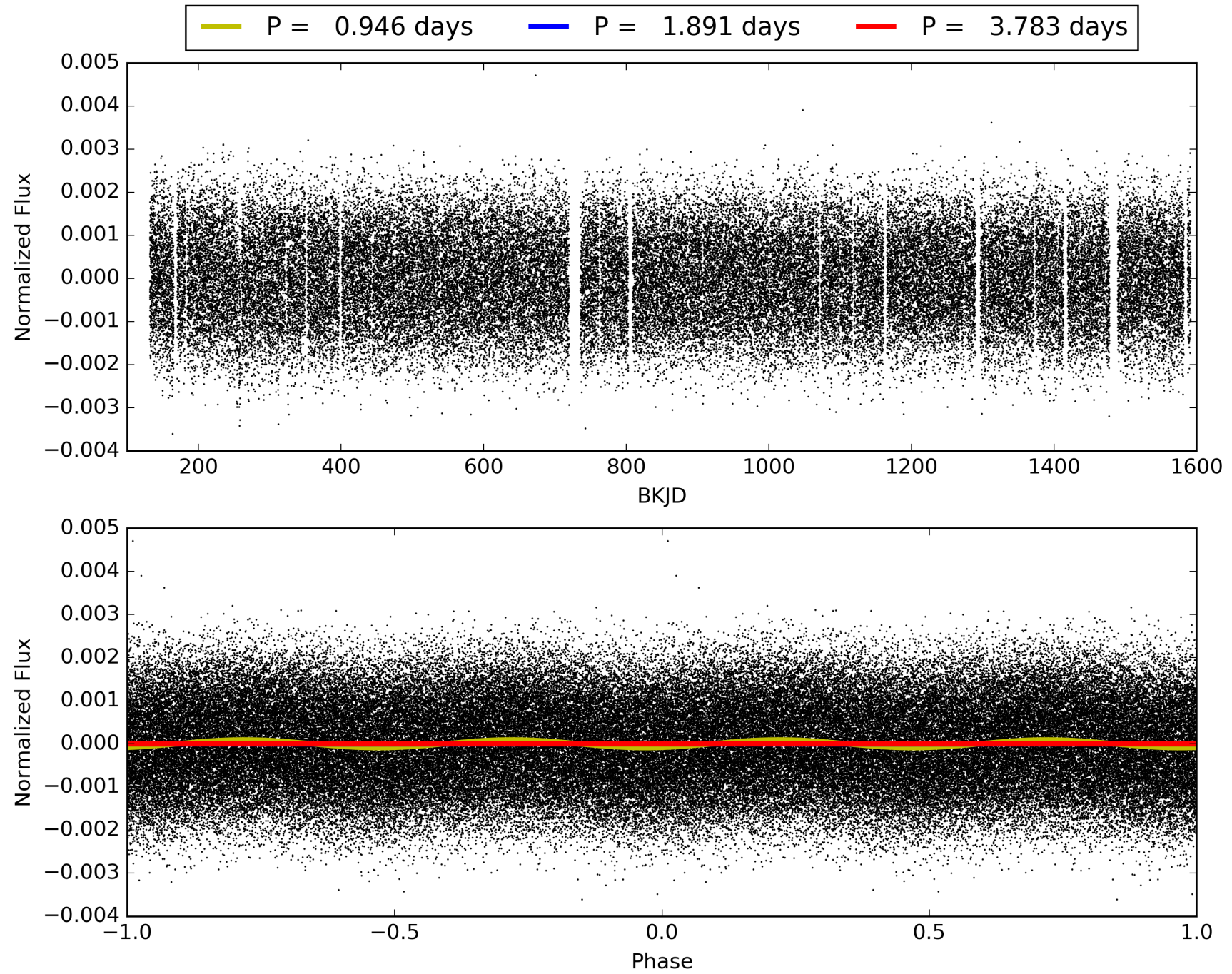
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009466030-02, PDC Light Curves





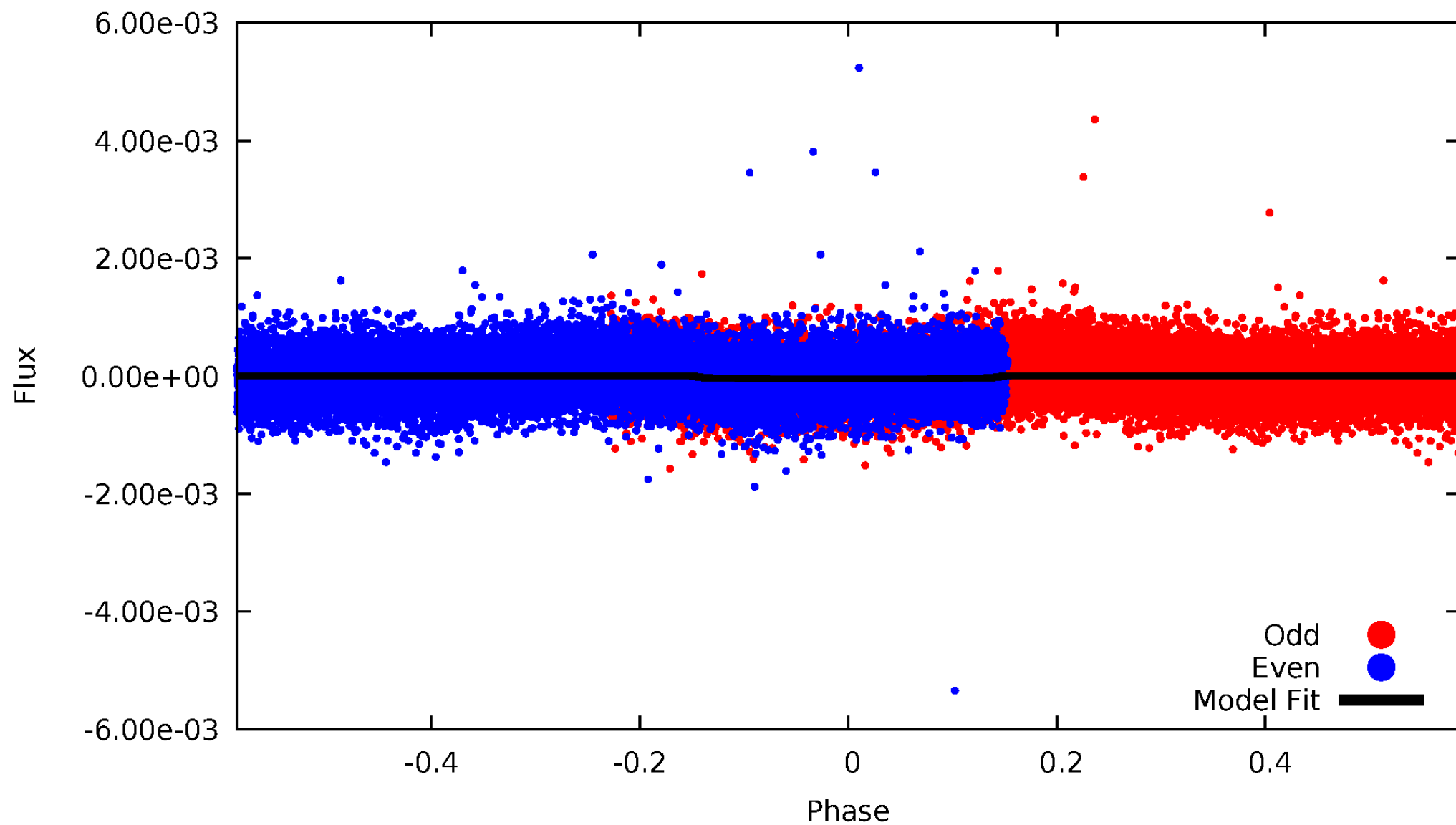
TCE 009466030-02





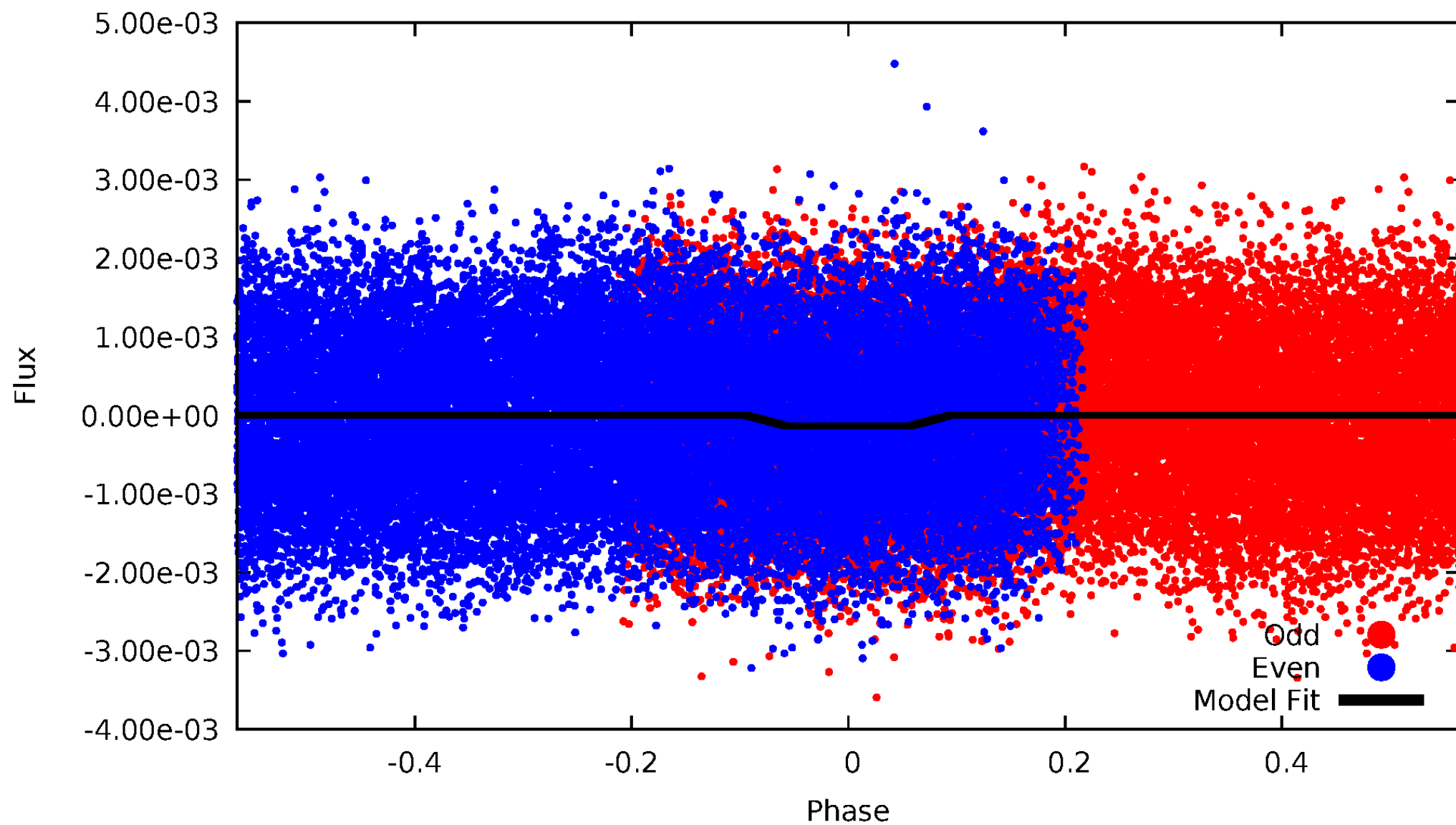
# DV Odd/Even

TCE 009466030-02



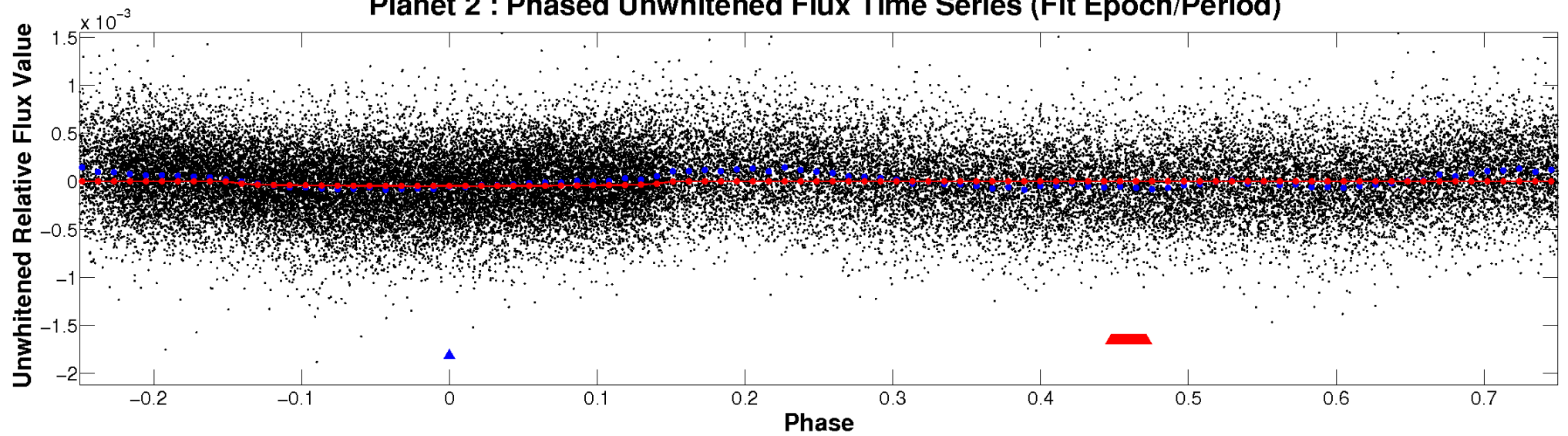
# ALT Odd/Even

TCE 009466030-02

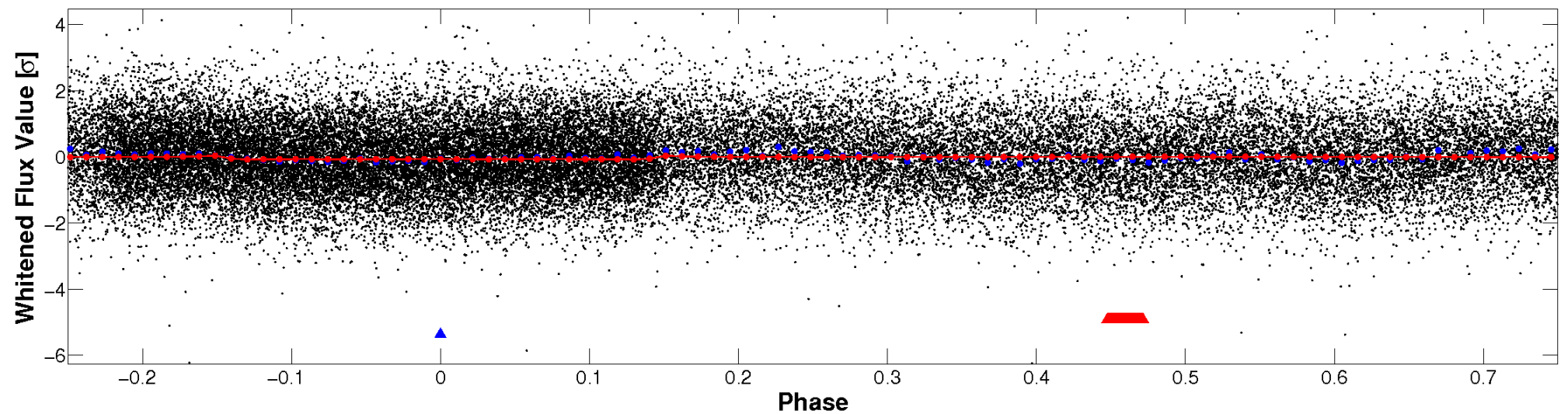


# Non-Whitened Vs. Whitened Light Curve

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

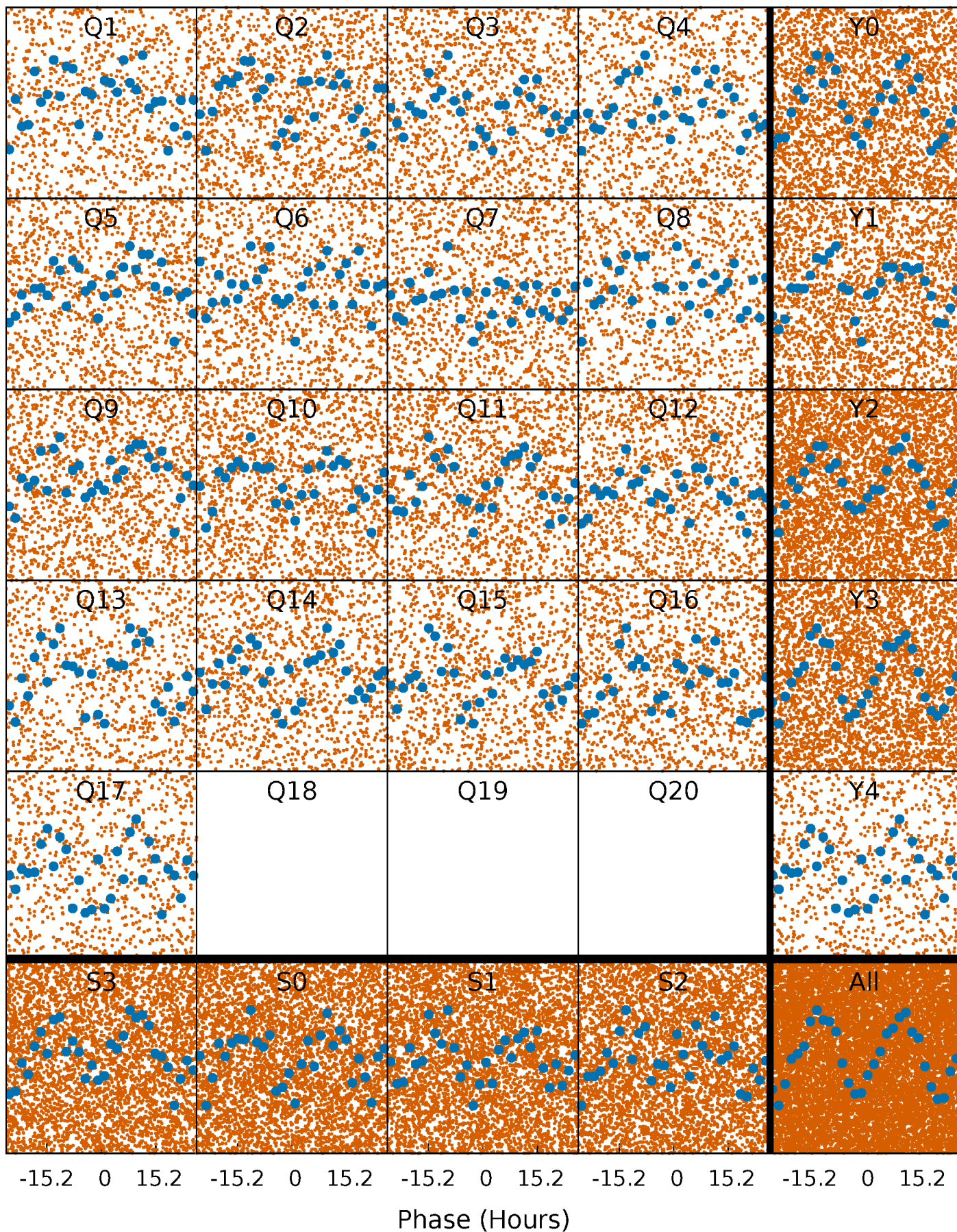


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

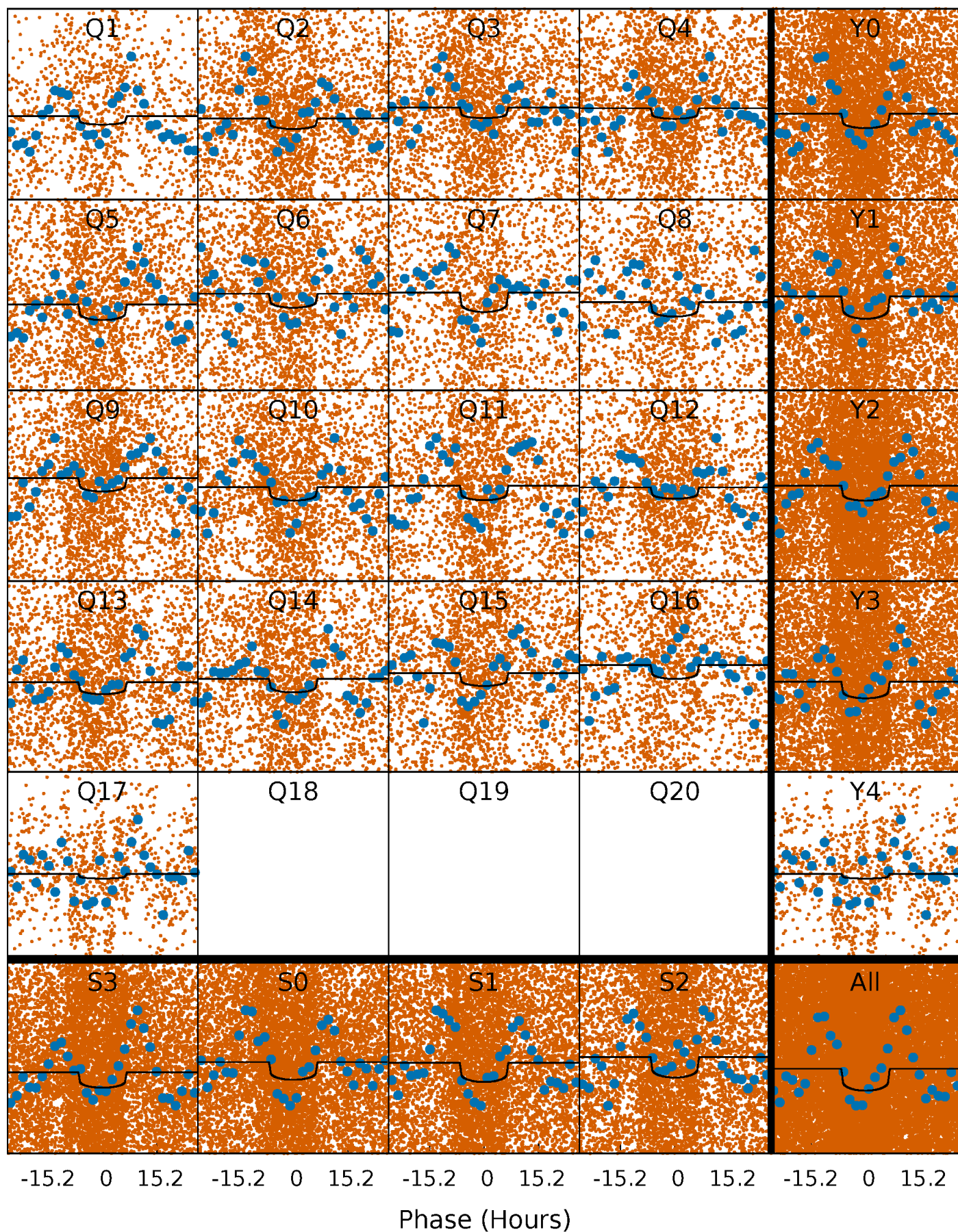
TCE 009466030-02 P= 1.891298 Days  $T_0=131.683658$  (BKJD)





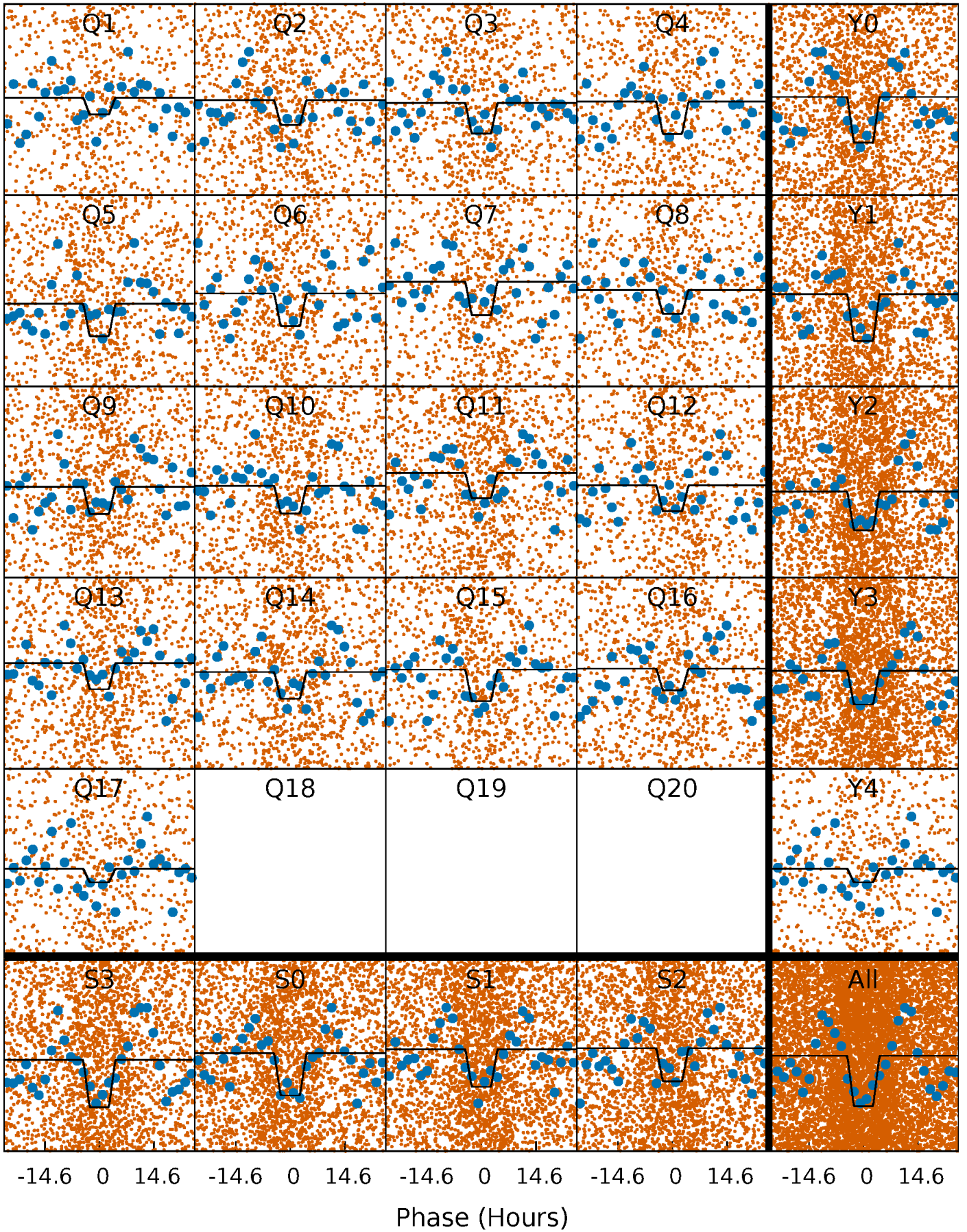
# DV Quarter-Phased Transit Curves

TCE 009466030-02   P= 1.891298 Days    $T_0=131.683658$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009466030-02 P= 1.891168 Days  $T_0=131.659481$  (BKJD)

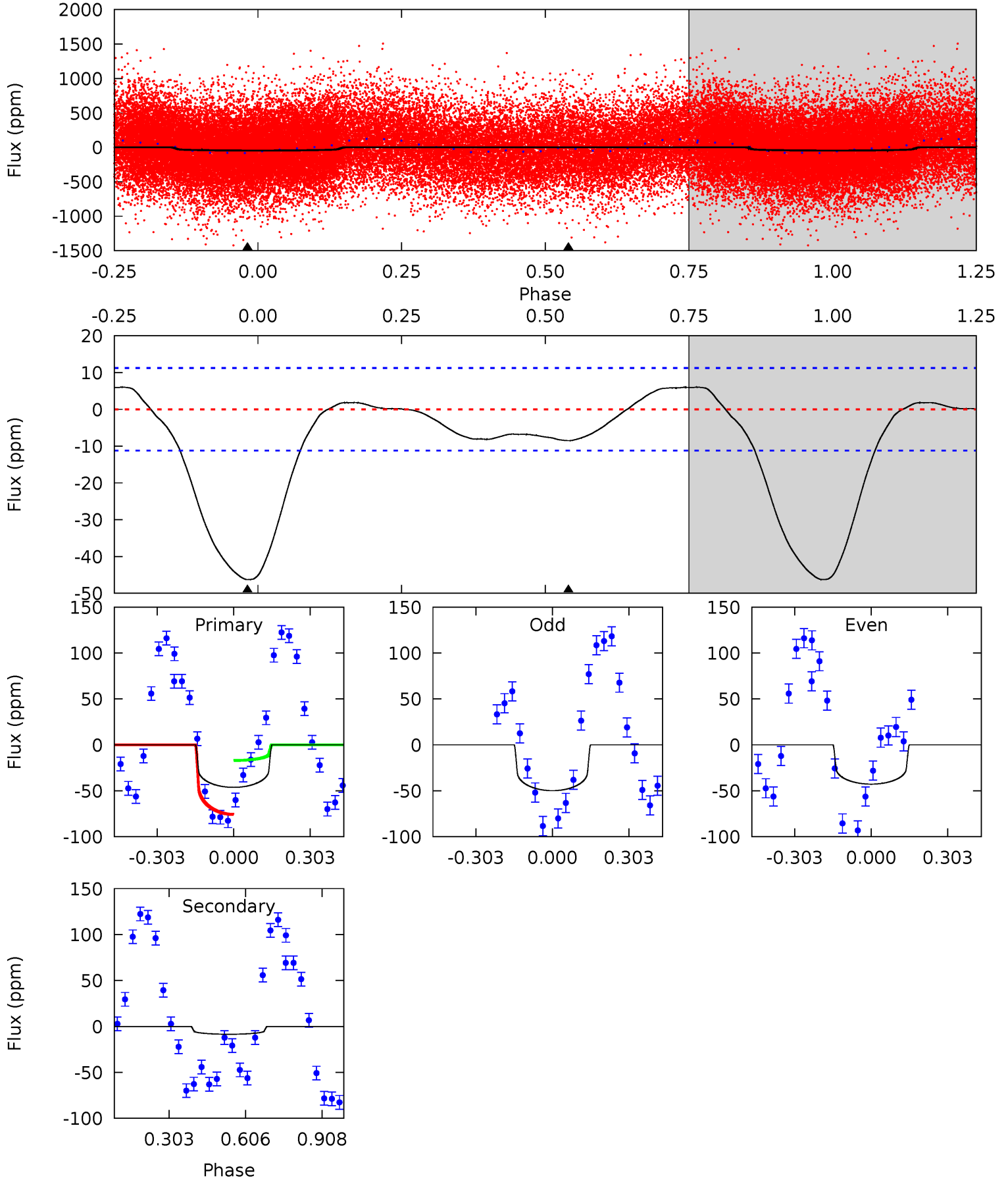




# DV Model-Shift Uniqueness Test

009466030-02, P = 1.891298 Days, E = 129.792360 Days

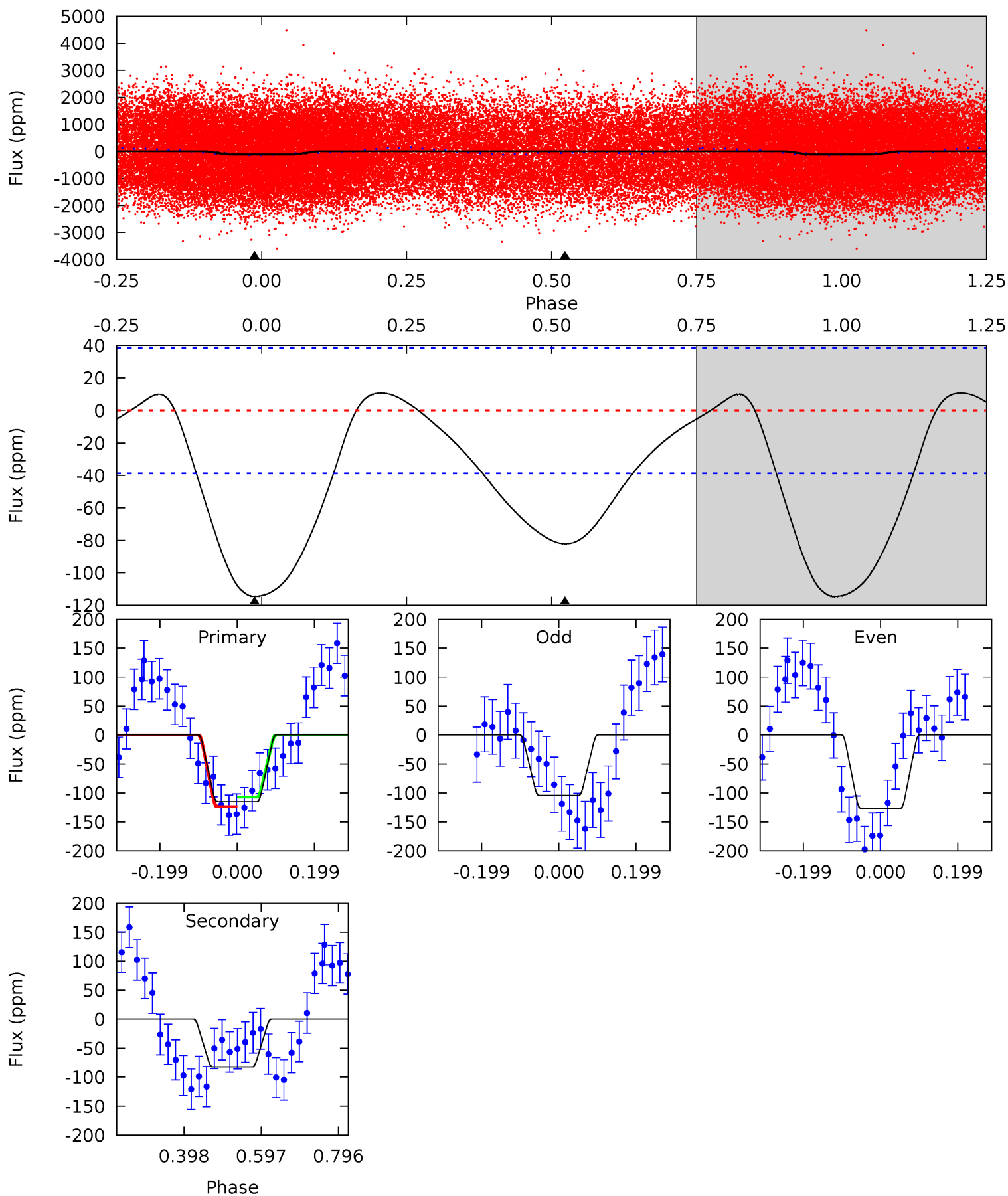
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.8	3.28	0	0	4.33	1.03	0.89	17.8	17.8	3.28	3.28	1.36	1.27	0.12	11.9



# Alt Model-Shift Uniqueness Test

009466030-02, P = 1.891168 Days, E = 129.768313 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
13.1	9.37	0	0	4.42	1.28	0.90	13.1	13.1	9.37	9.37	1.28	1.01	0.09	0.93



### Stellar Parameters For KIC 009466030

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7865^{+216}_{-324}$	$4.001^{+0.187}_{-0.136}$	$-0.020^{+0.200}_{-0.350}$	$2.241^{+0.493}_{-0.602}$	$1.834^{+0.147}_{-0.344}$	$0.230^{+0.254}_{-0.089}$
	+3%/-4%	+5%/-3%	+1000%/-1750%	+22%/-27%	+8%/-19%	+111%/-39%
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 009466030-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-9 \pm 3$	$1.61^{+0.63}_{-0.62}$	$3771^{+238}_{-283}$	$4938^{+1338}_{-802}$	$2.395^{+3.885}_{-1.281}$
Alt.	$-82 \pm 9$	$2.79^{+0.72}_{-0.63}$	$3766^{+249}_{-277}$	$6697^{+922}_{-693}$	$7.669^{+5.116}_{-2.861}$

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

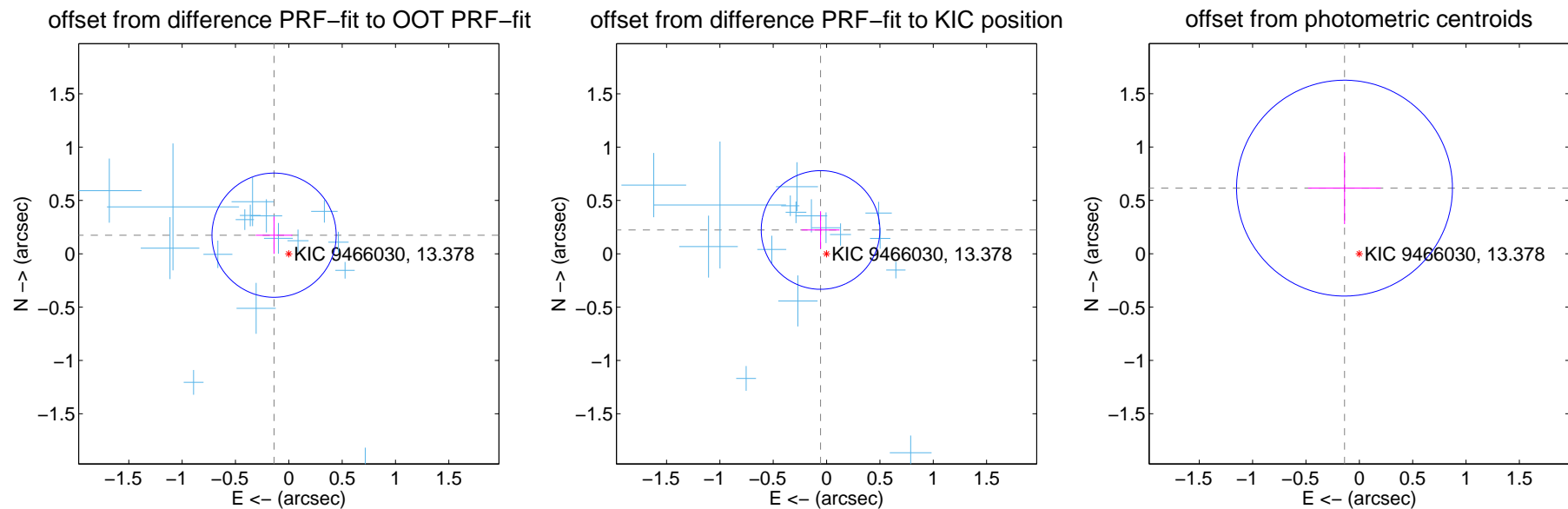
## DV Centroid Data

Supplemental centroid analysis for 009466030-02. Kepler magnitude: 13.38. Transit SNR 8.98

There are 16 quarters with good PRF difference image offsets

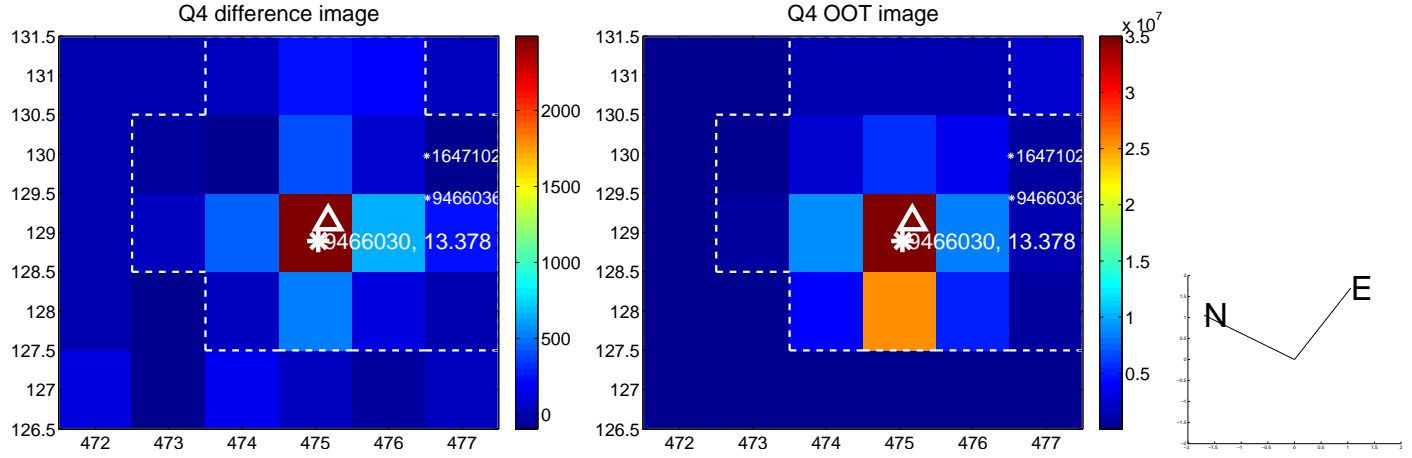
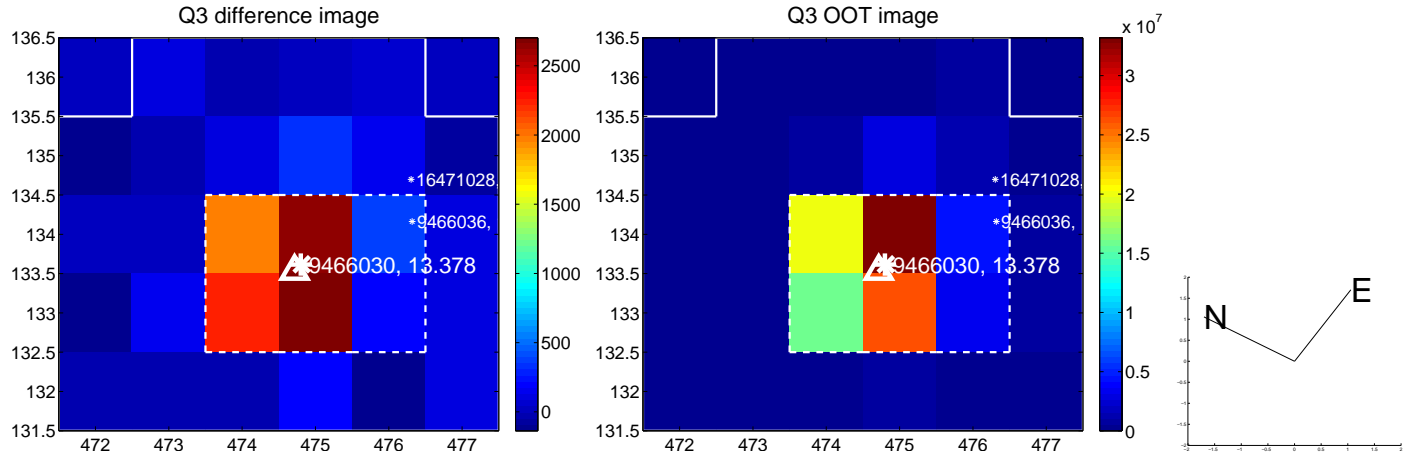
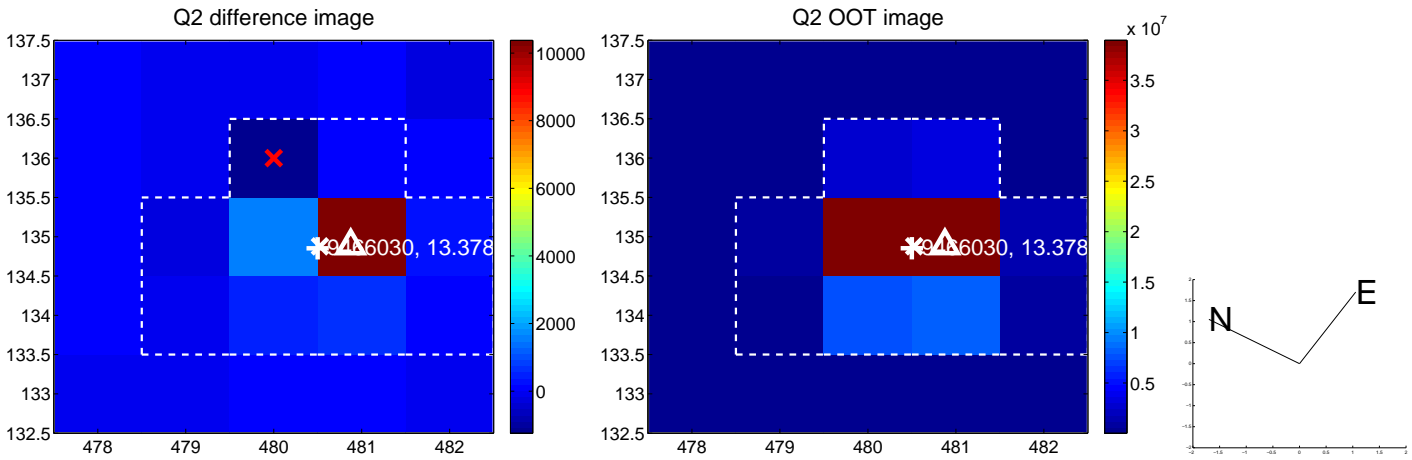
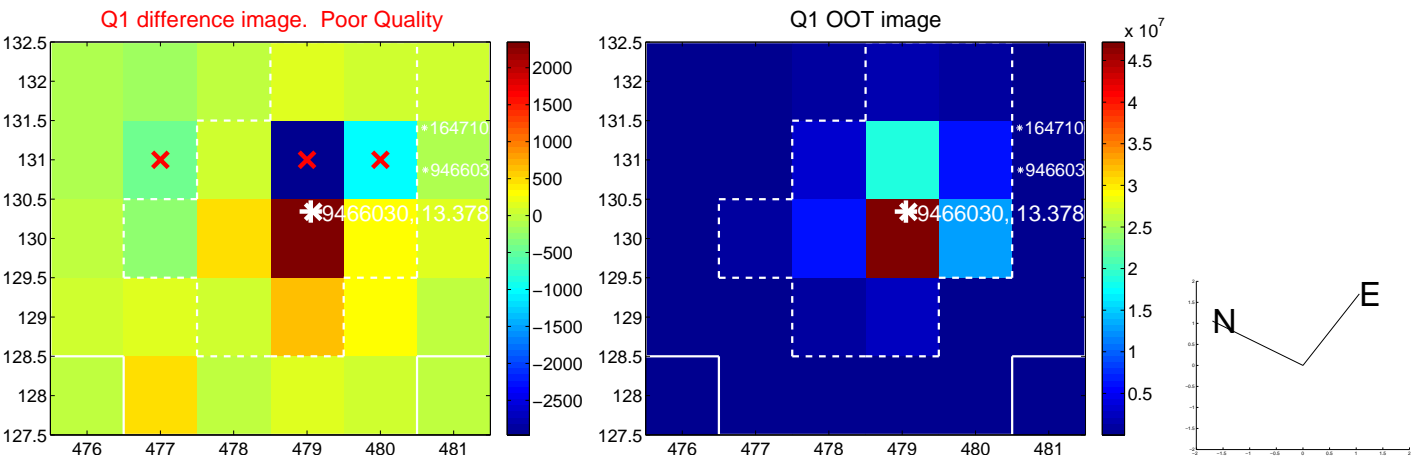
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.223 \pm 0.194$	1.15	$0.138 \pm 0.171$	$0.174 \pm 0.175$
PRF-fit source offset from KIC position	$0.230 \pm 0.185$	1.24	$0.056 \pm 0.178$	$0.223 \pm 0.175$
photometric centroid source offset	$0.63 \pm 0.34$	1.87	$0.14 \pm 0.34$	$0.61 \pm 0.34$



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.

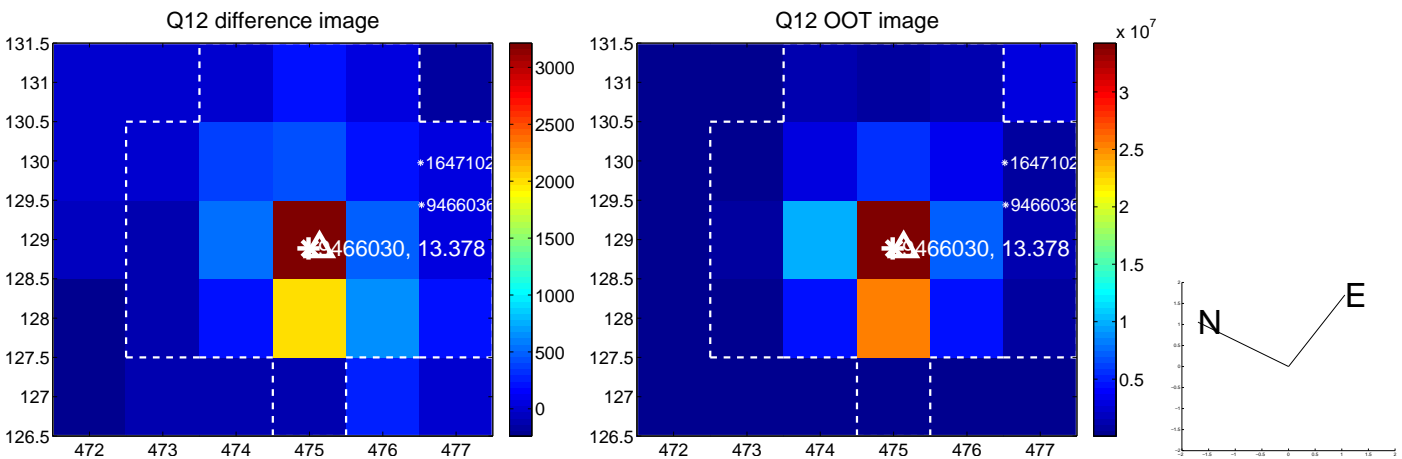
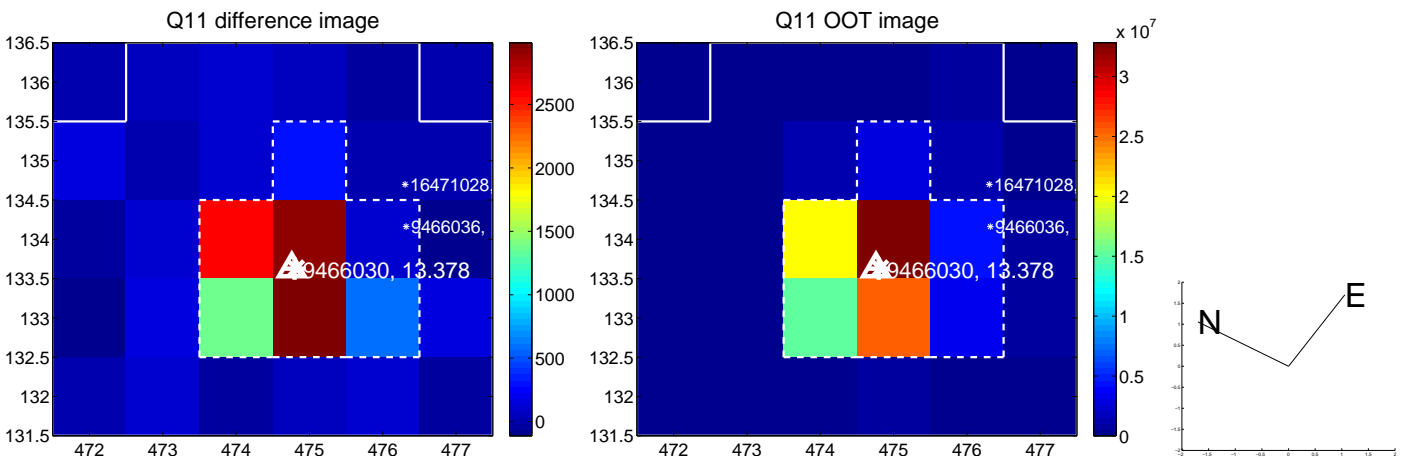
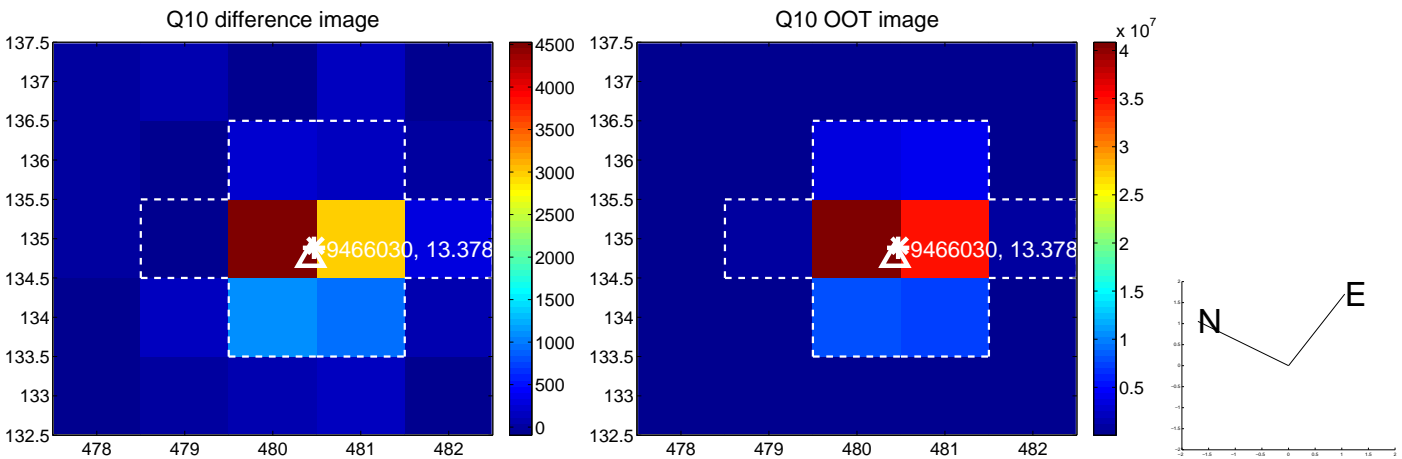
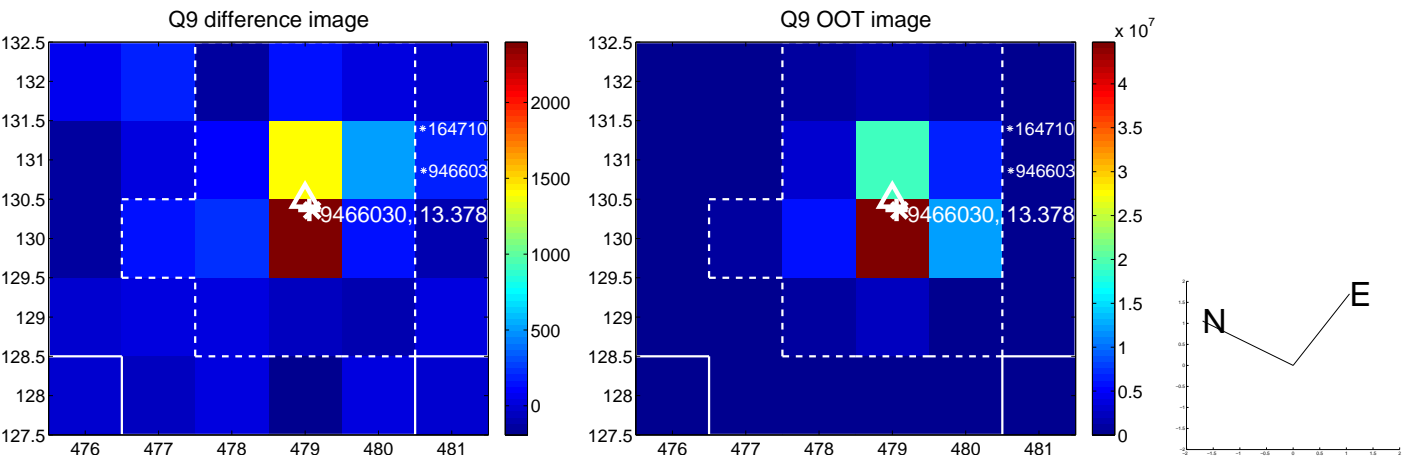
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



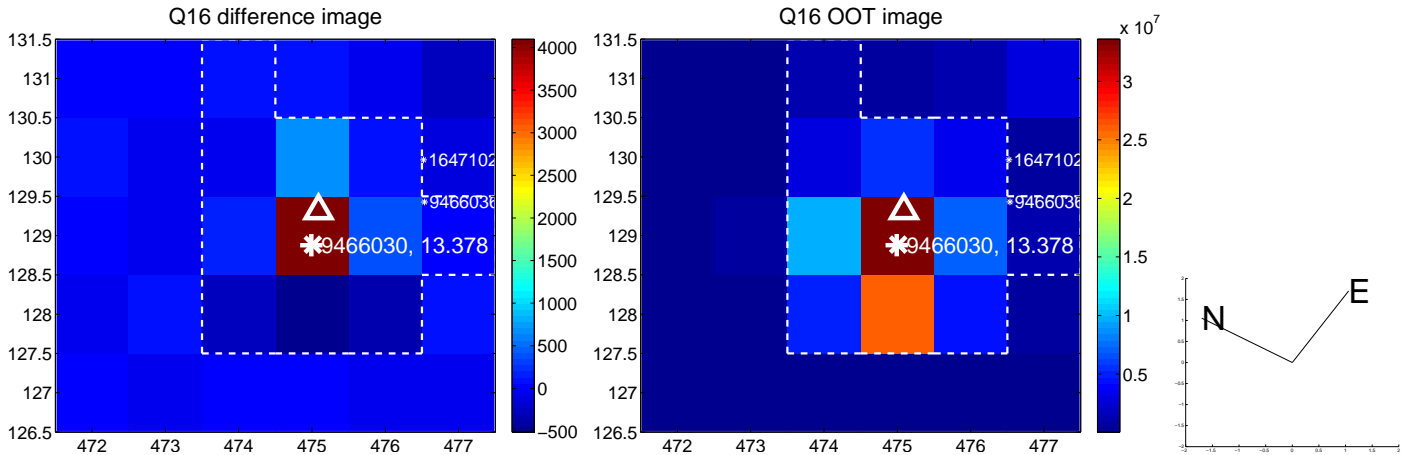
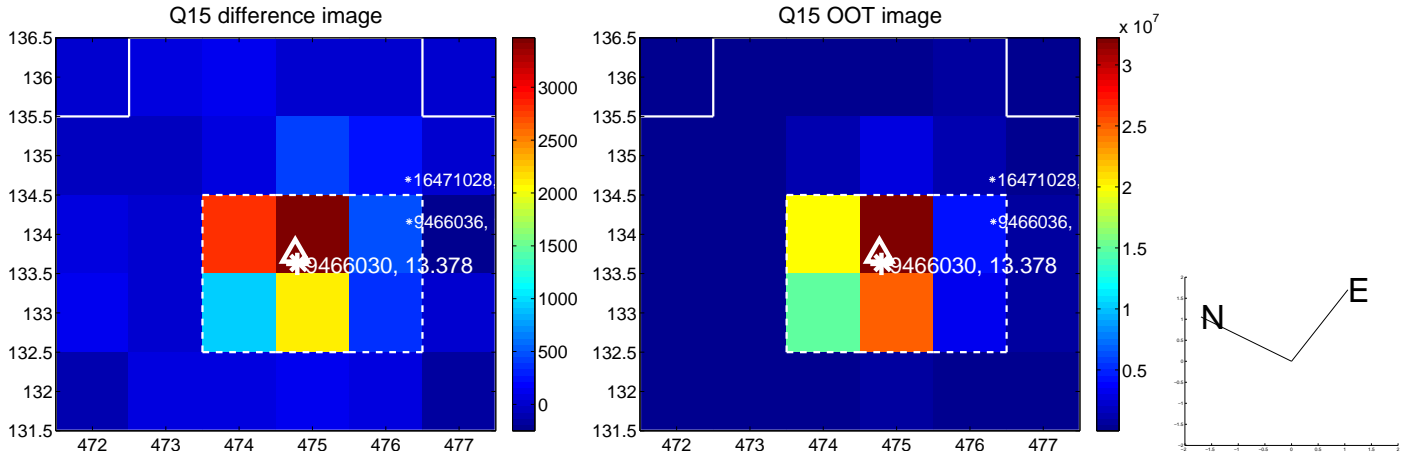
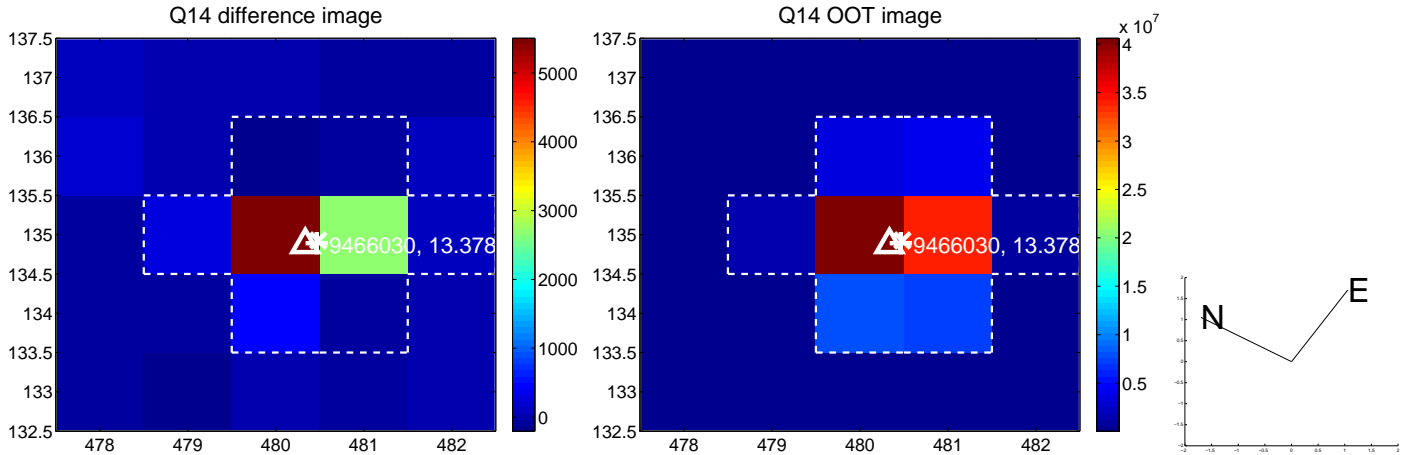
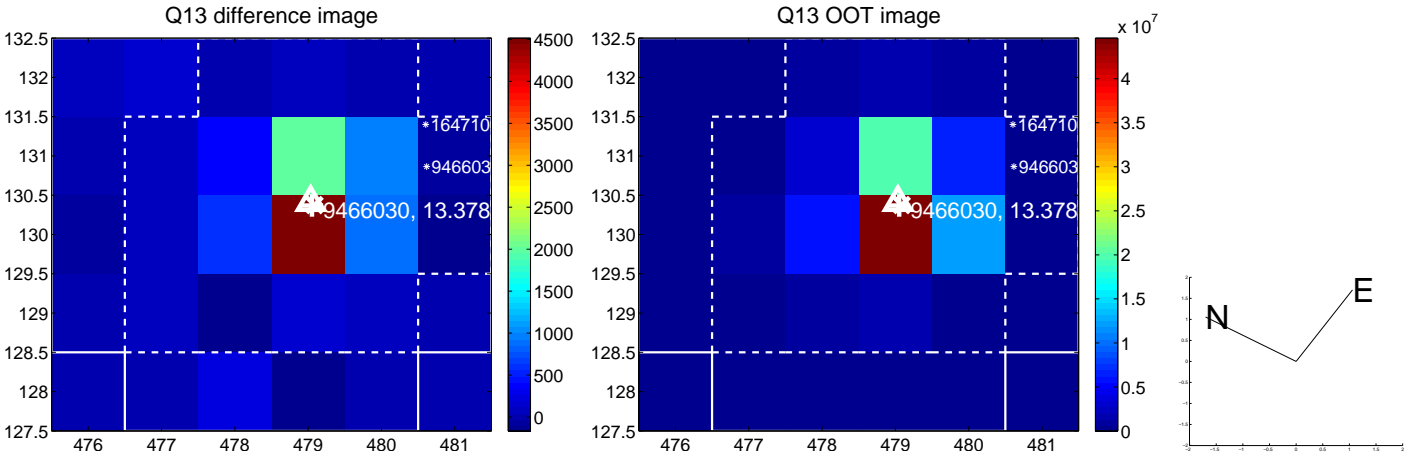




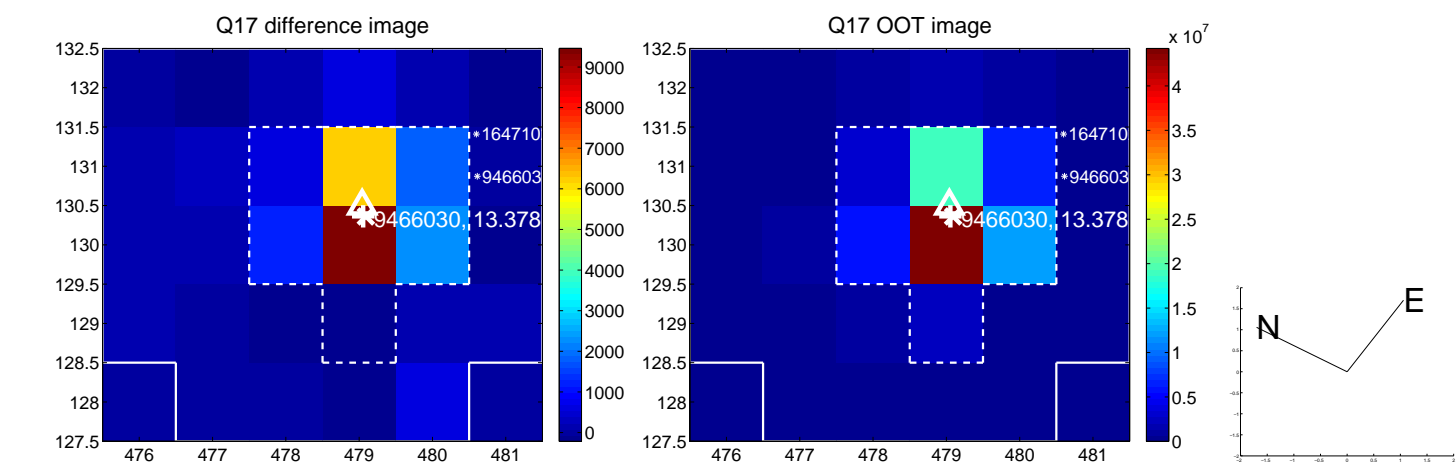
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



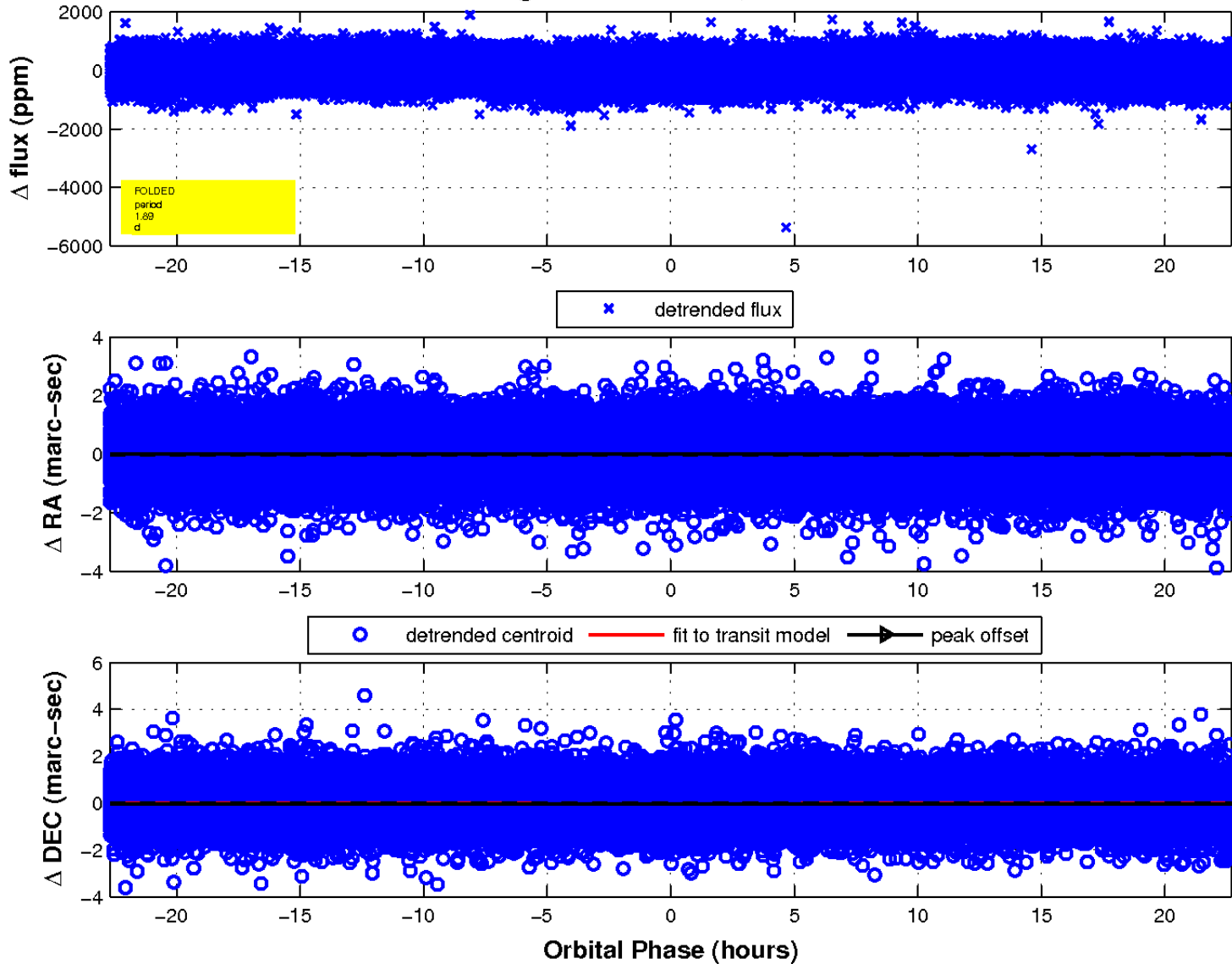
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

