

# KIC 009366988

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009366988-01	OBS	3597.01	1.219062	132.087622	85919.5	2.205	2870.1	1356.4	1.27	5914	38.38	3618.11
009366988-02	OBS	No	1.220946	132.655273	495.7	3.500	8.6	-1.0	1.27	5914	2.82	3610.67

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009366988-01	OBS	FP	0.00	0	1	1	0	SWEET_EB—MOD_SEC_ALT—CENT_UNRESOLVED_OFFSET
009366988-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_NOFITS

**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 009366988-01

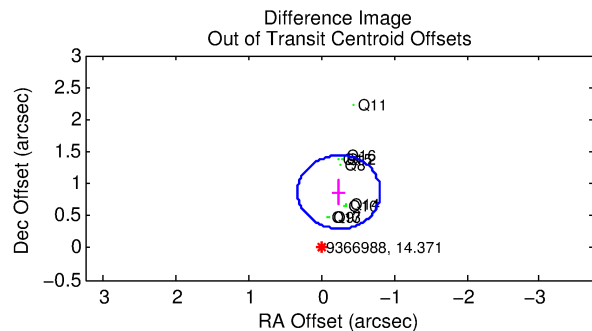
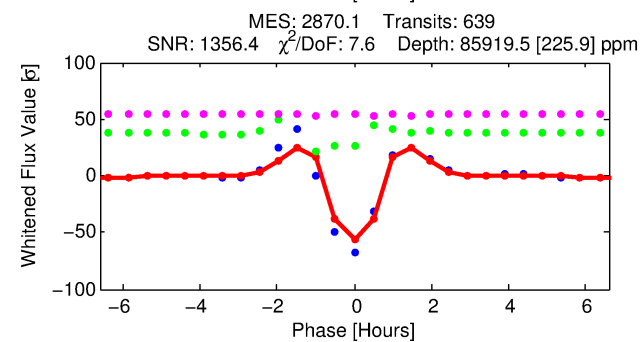
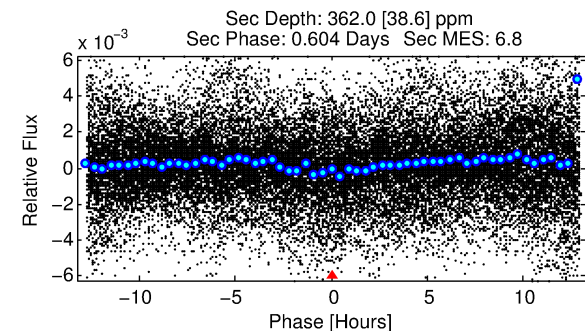
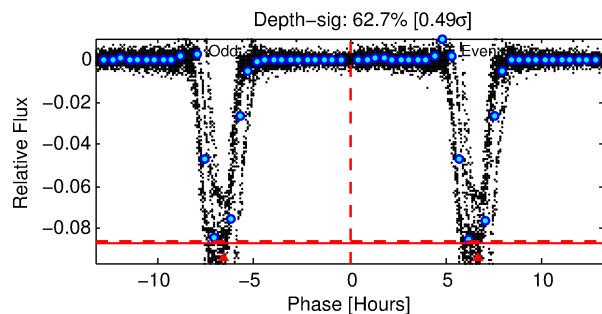
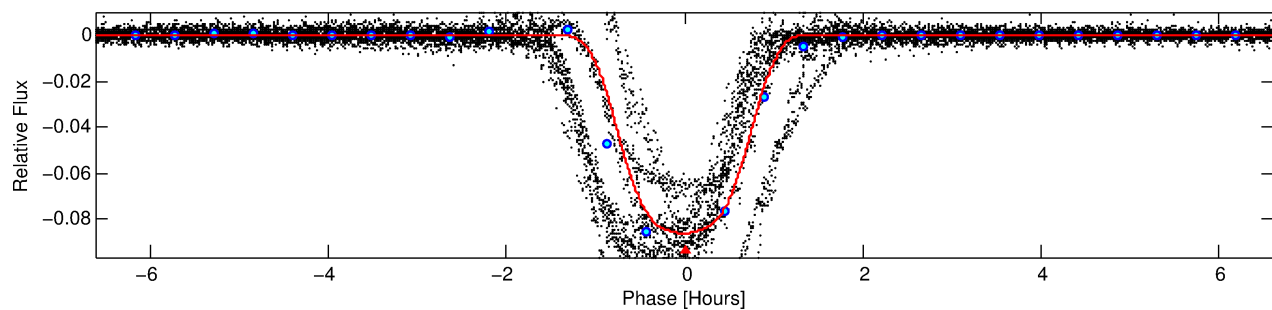
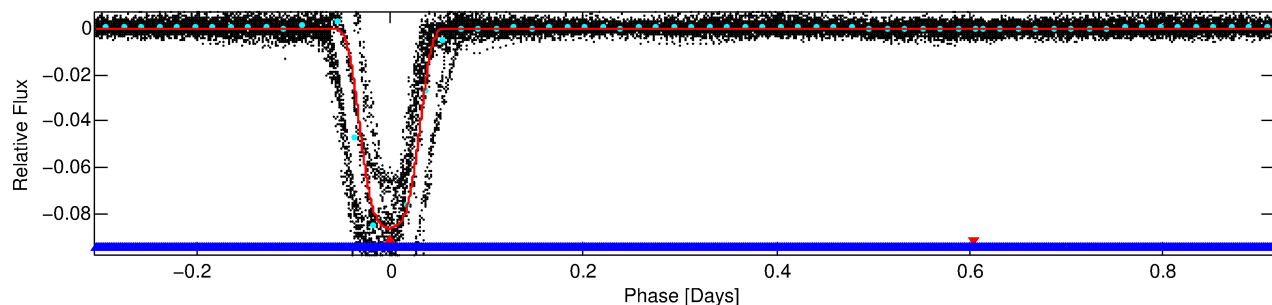
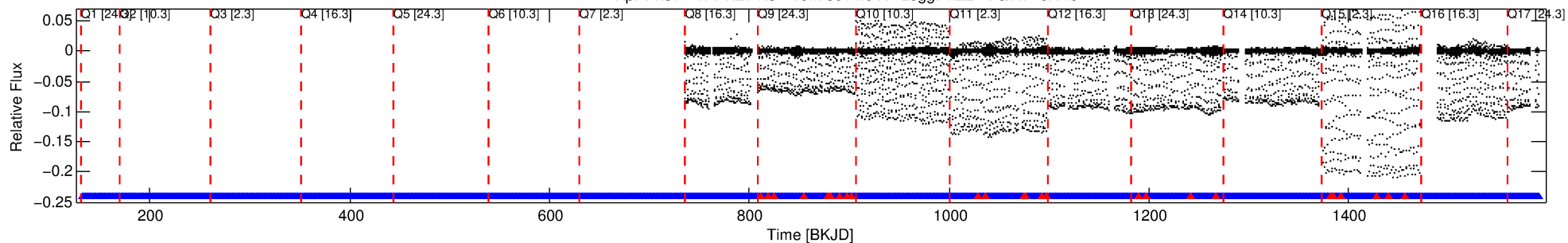
No Significant Match Found

# DV One-Page Summary

KIC: 9366988 Candidate: 1 of 2 Period: 1.219 d

KOI: K03597.01 Corr: 0.903

Kp: 14.37 R\*: 1.27 Rs Teff: 5914.0 K Logg: 4.22 Fe/H: -0.140



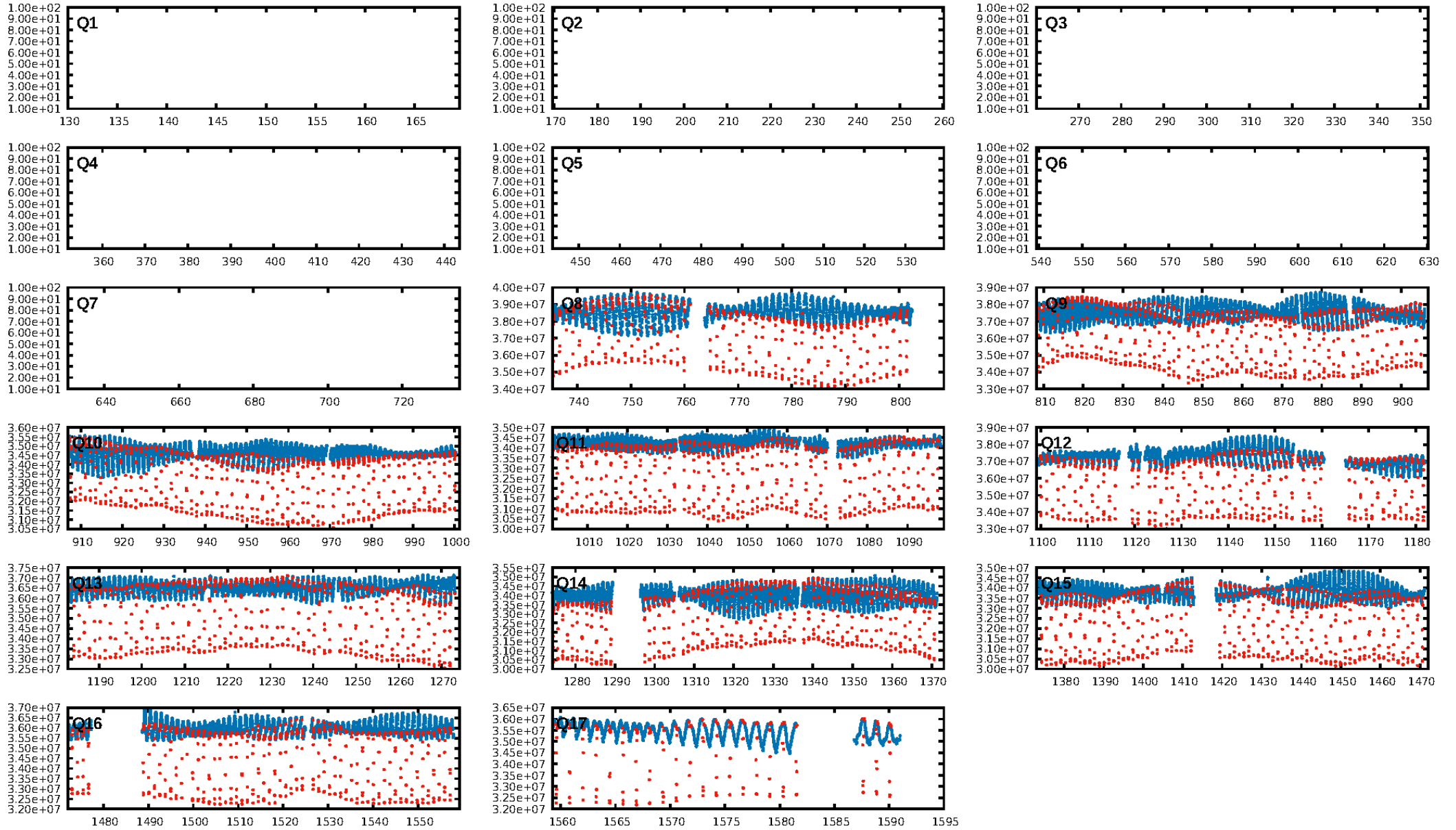
## DV Fit Results:

Period = 1.21906 [0.00000] d  
Epoch = 132.0876 [0.0000] BKJD  
Rp/R\* = 0.2767 [0.0006]  
a/R\* = 5.10 [0.02]  
b = 0.46 [0.01]  
Seff = 3618.11 [1589.96]  
Teq = 1978 [217] K  
Rp = 38.38 [10.45] Re  
a = 0.0221 [0.0058] AU  
Ag = 0.07 [0.03] [-32.64σ]  
Teffp = 1551 [66] K [-1.88σ]

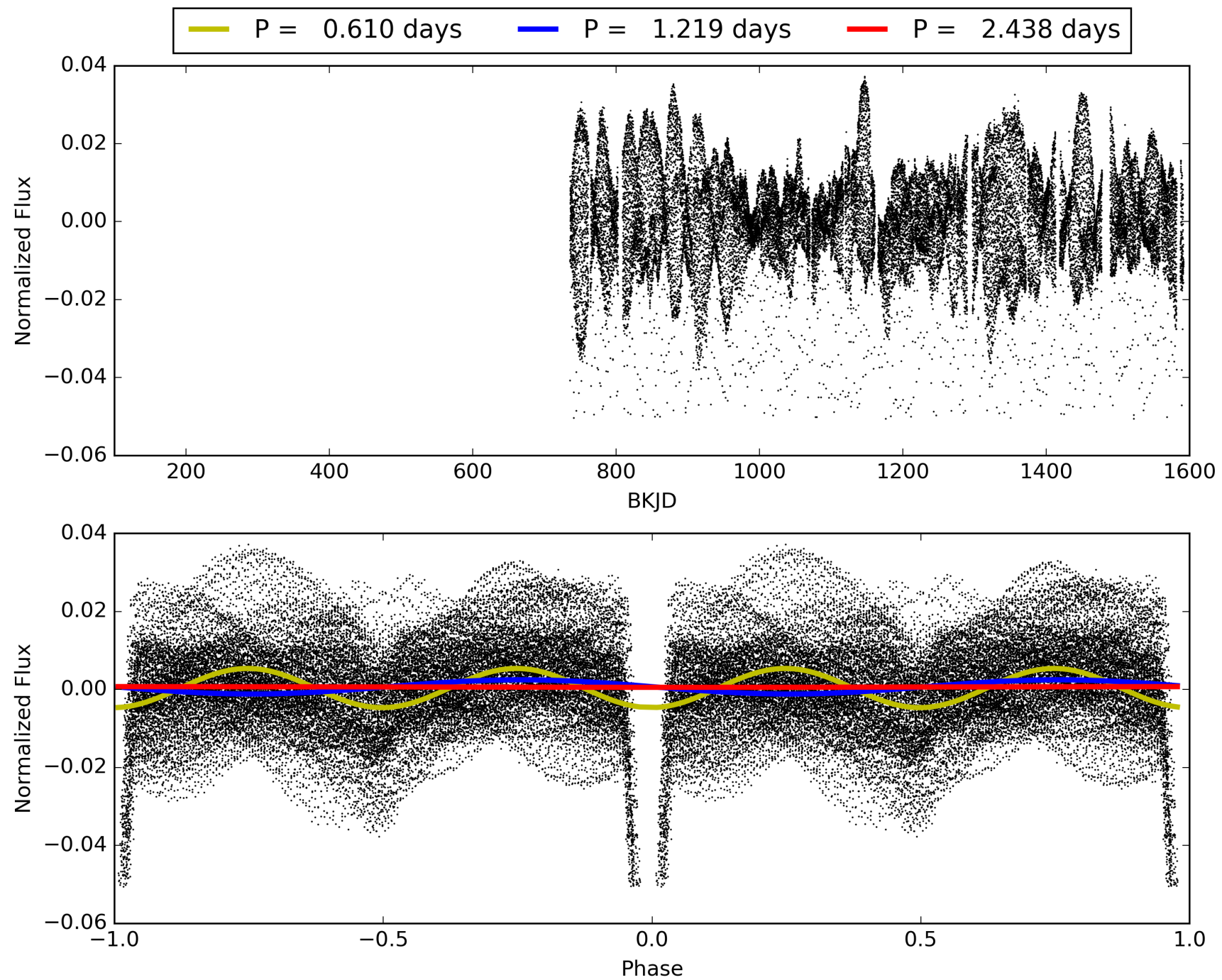
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.9% [0.01σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.96 [591/617]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.904 arcsec [4.75σ]  
KicOffset-rm: 0.104 arcsec [1.46σ]  
OotOffset-st: 2/2/3/3 [10]  
KicOffset-st: 2/2/3/3 [10]  
DiffImageQuality-fgm: 1.00 [10/10]  
DiffImageOverlap-fno: 0.30 [3/10]

# TCE 009366988-01, PDC Light Curves

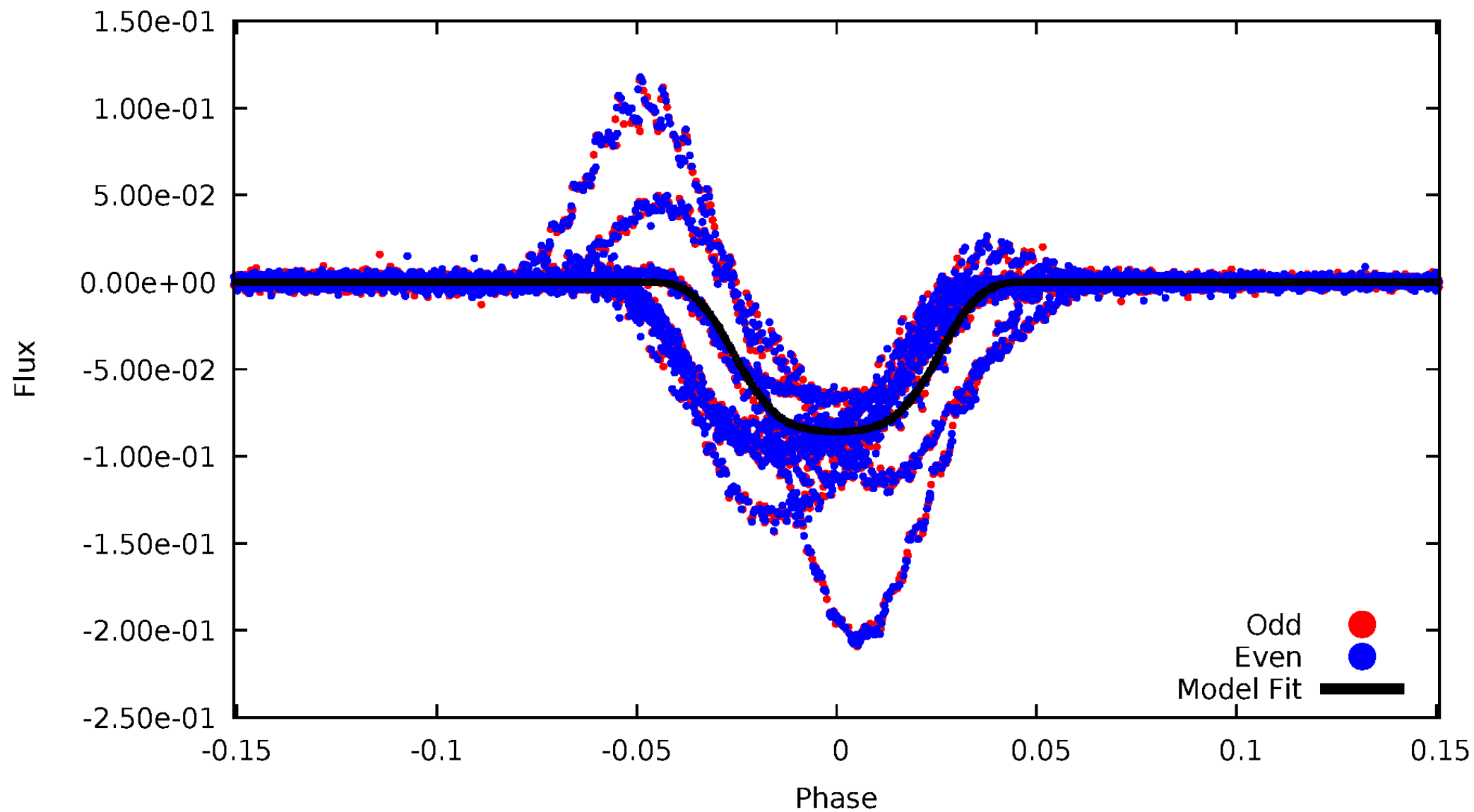


TCE 009366988-01



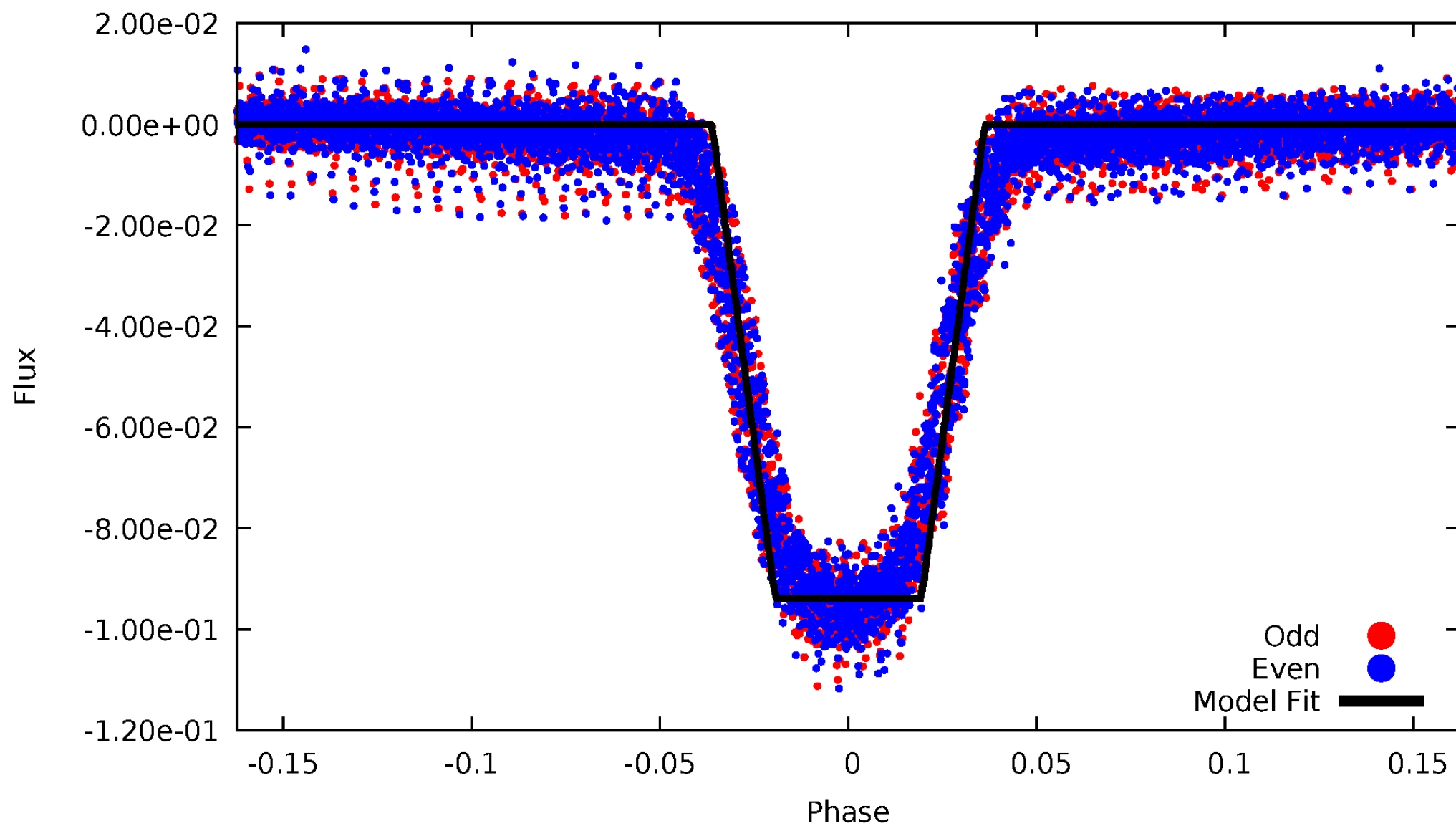
# DV Odd/Even

TCE 009366988-01



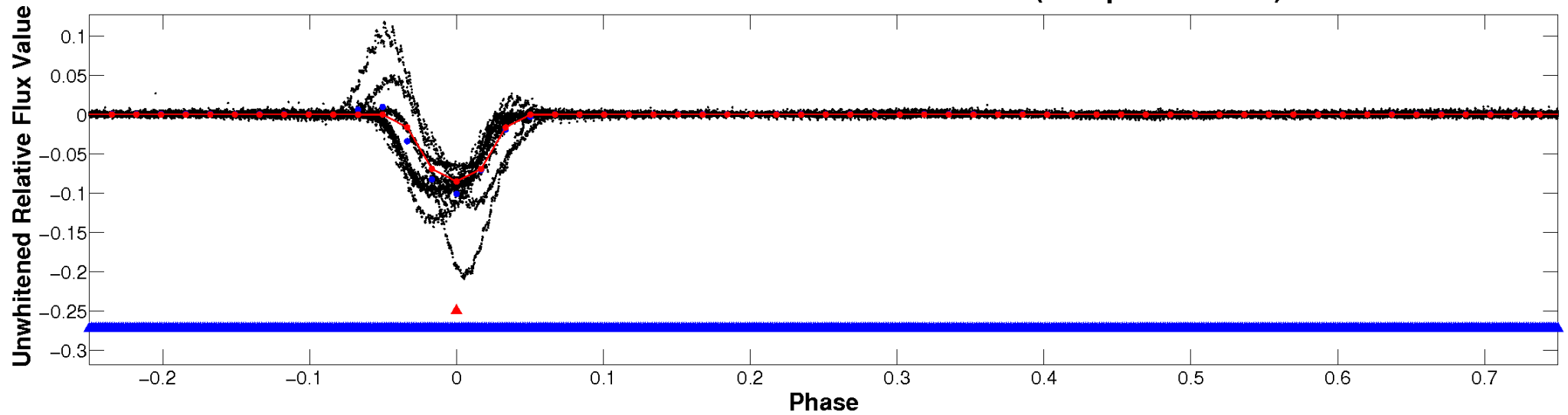
# ALT Odd/Even

TCE 009366988-01

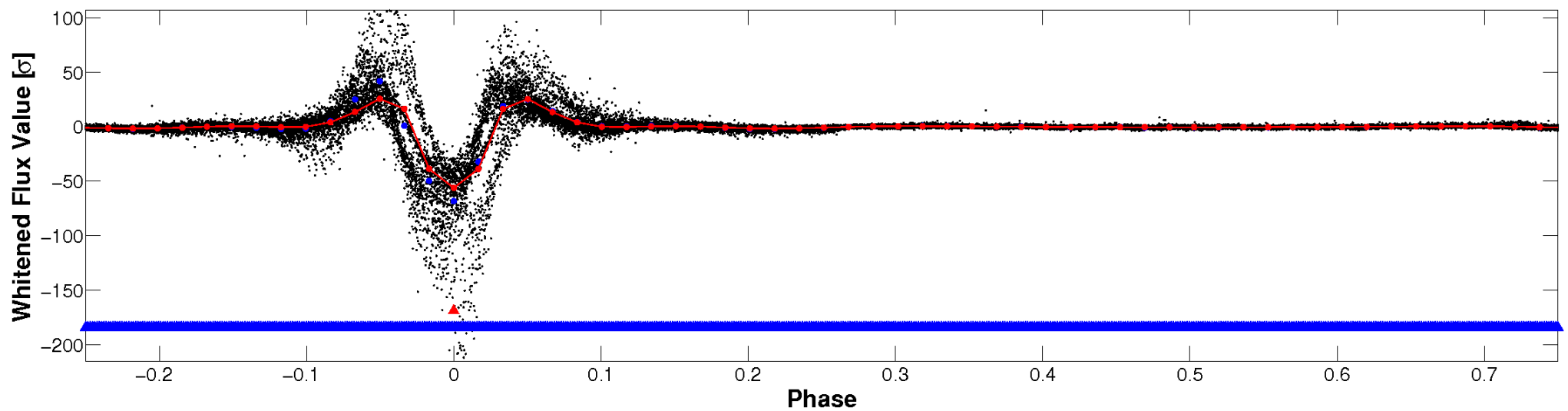


# Non-Whitened Vs. Whitened Light Curve

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

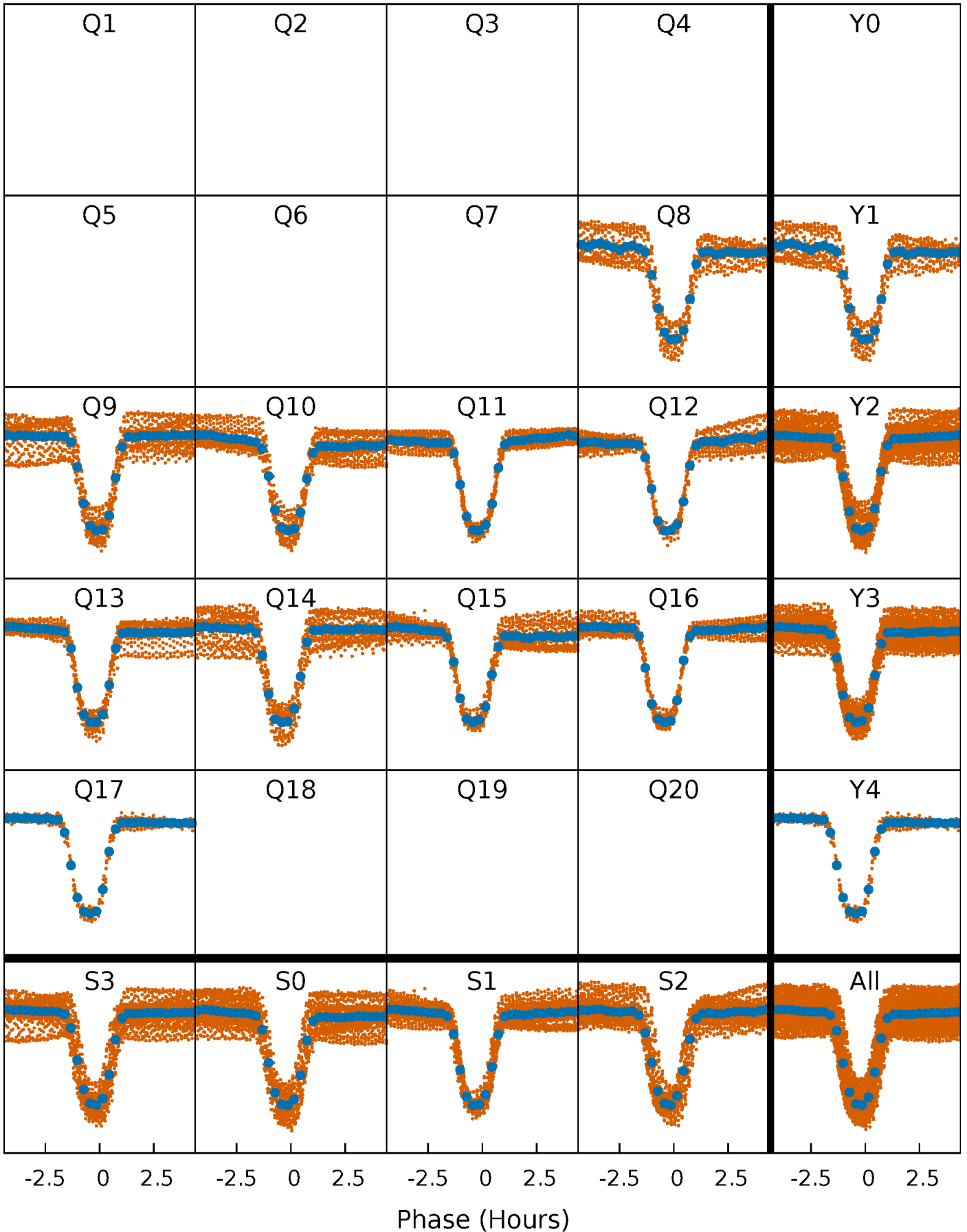


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



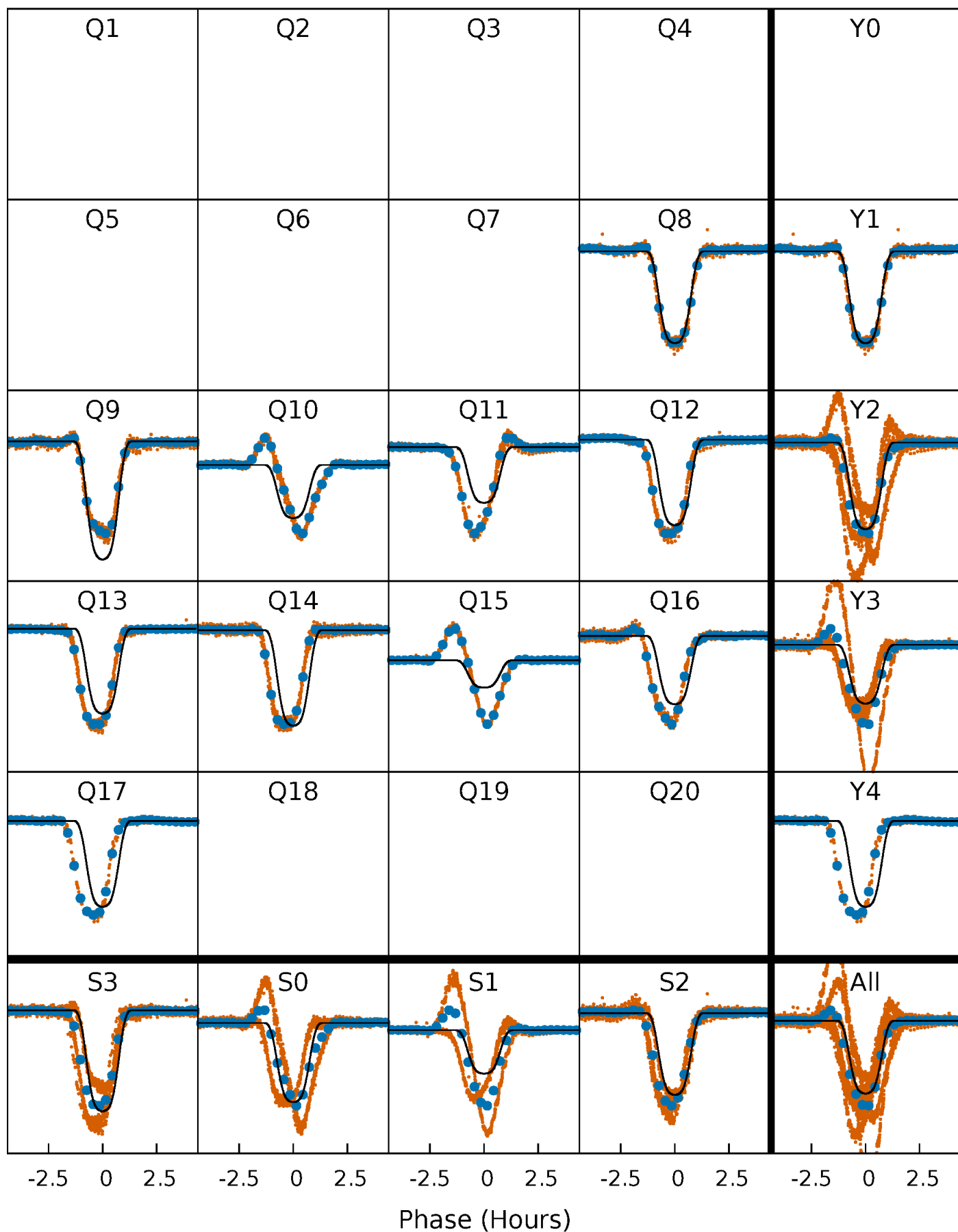
# PDC Quarter-Phased Transit Curves

TCE 009366988-01   P= 1.219062 Days    $T_0=132.087622$  (BKJD)



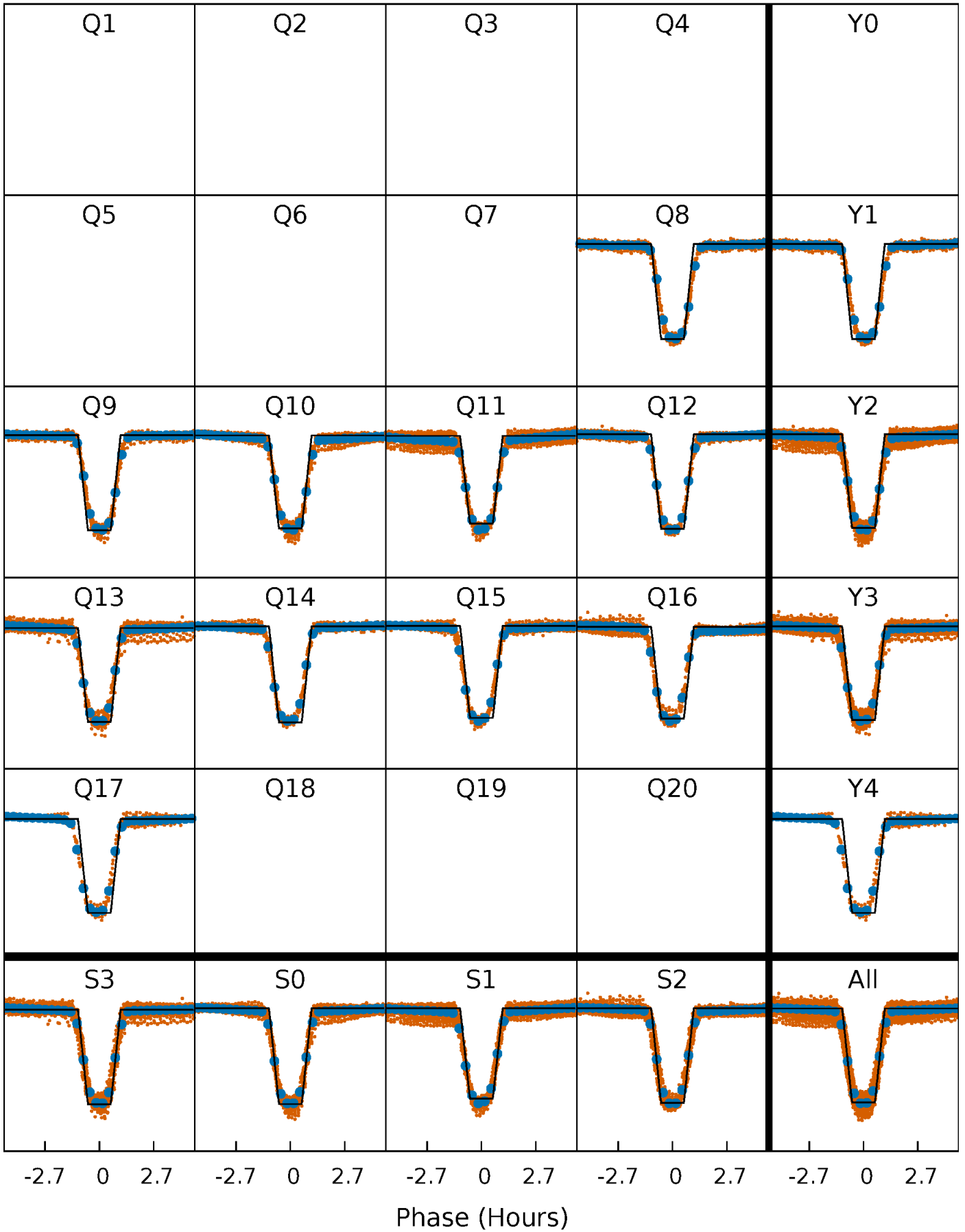
# DV Quarter-Phased Transit Curves

TCE 009366988-01 P= 1.219062 Days  $T_0=132.087622$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

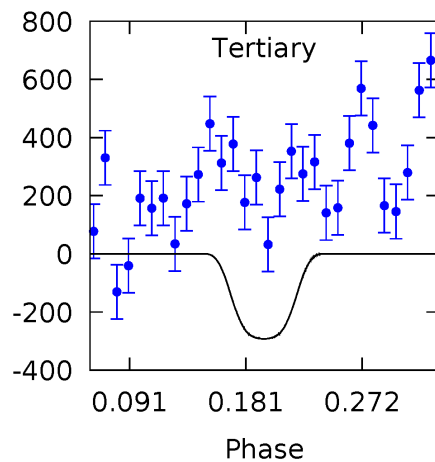
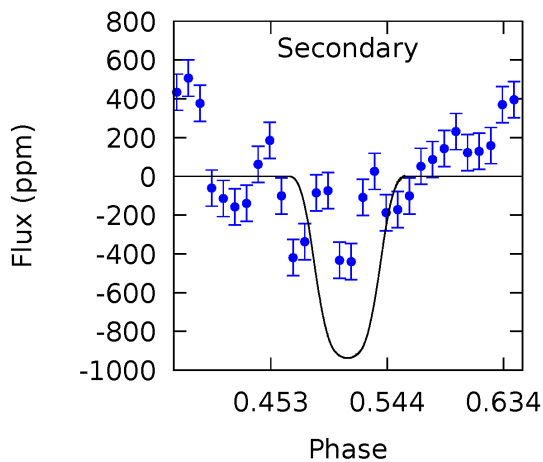
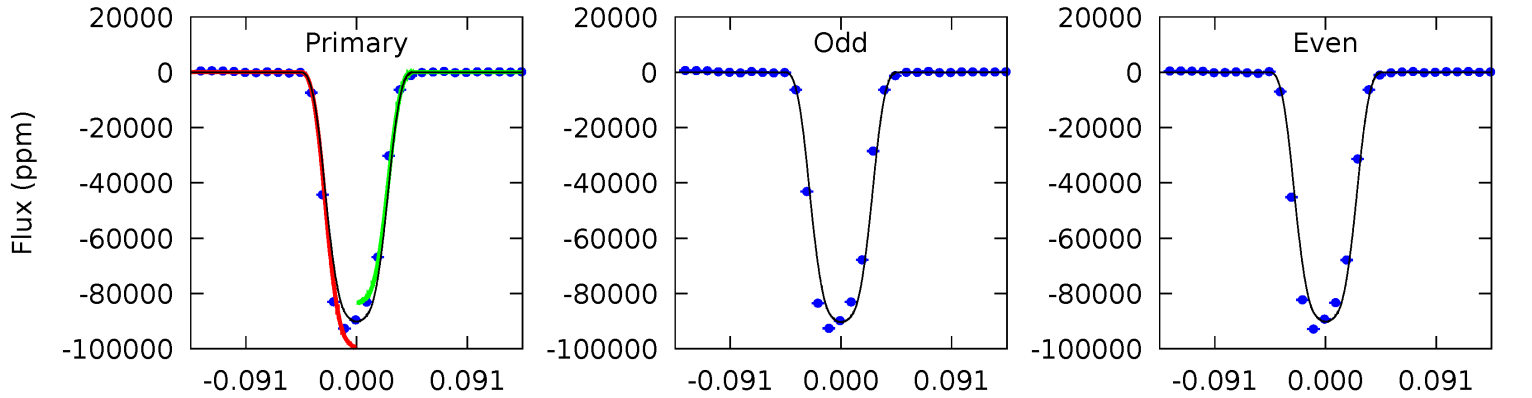
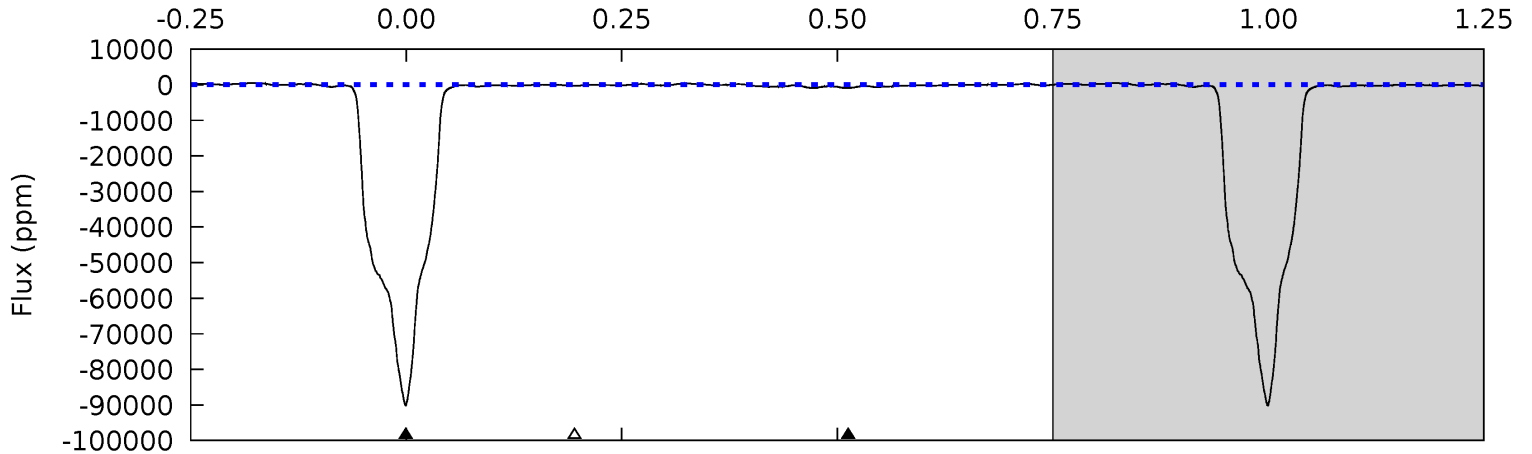
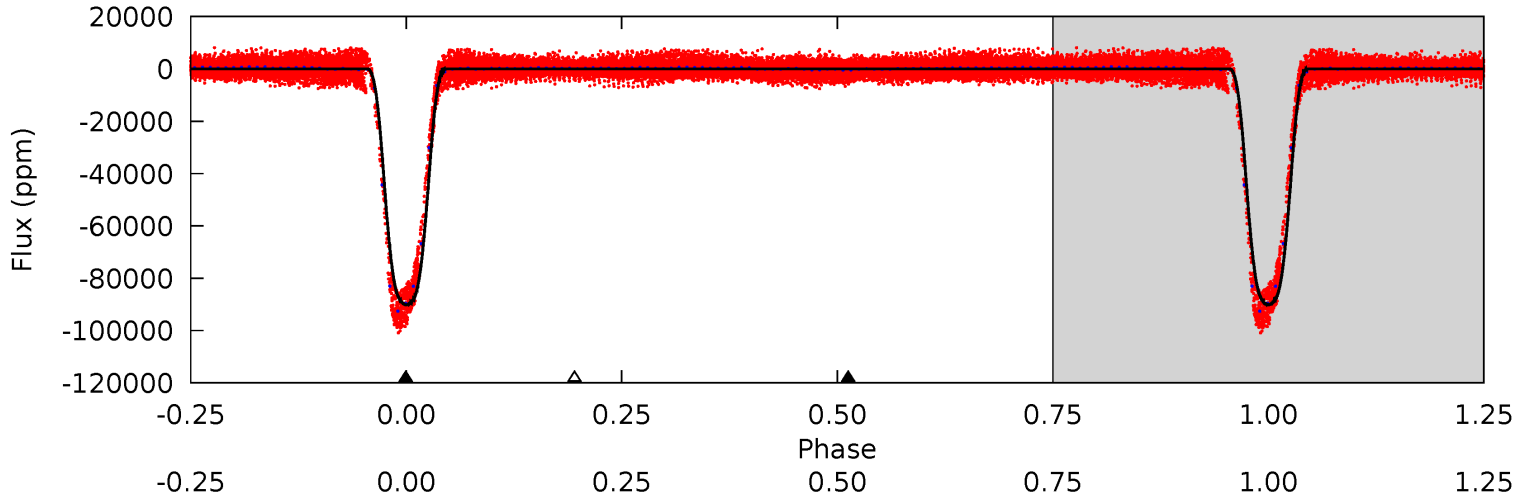
TCE 009366988-01   P= 1.219050 Days    $T_0=132.088089$  (BKJD)



# DV Model-Shift Uniqueness Test

009366988-01, P = 1.219062 Days, E = 132.087622 Days

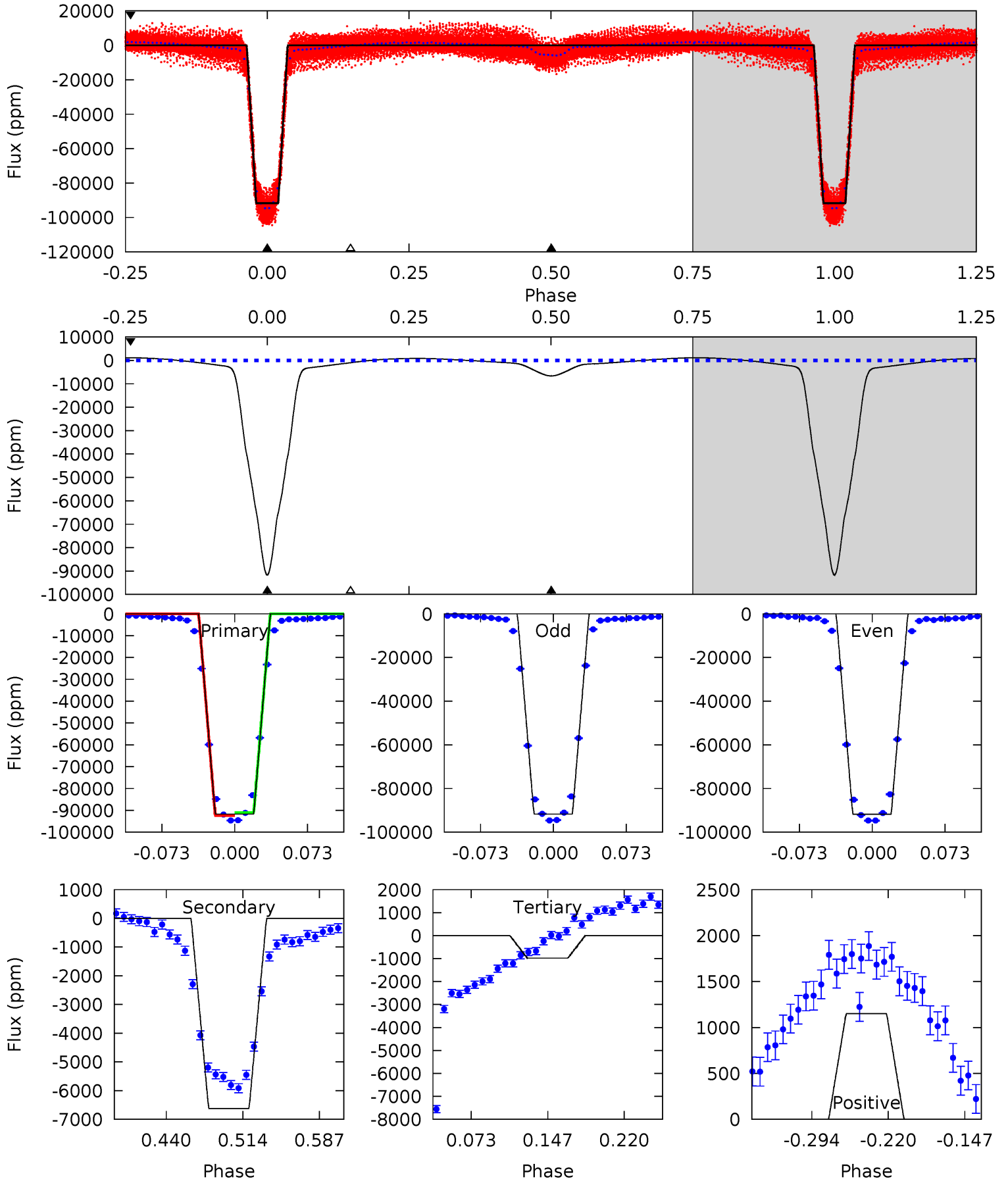
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1397	14.5	4.53	0	4.59	1.69	2.97	1392	1397	10.0	14.5	1.43	1.07	0.01	0



# Alt Model-Shift Uniqueness Test

009366988-01, P = 1.219050 Days, E = 132.088089 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
1383	99.8	14.8	17.4	4.63	1.79	15.7	1368	1365	85.0	82.5	1.03	1.00	0.01	10.4



### Stellar Parameters For KIC 009366988

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5914^{+196}_{-196}$	$4.217^{+0.246}_{-0.164}$	$-0.140^{+0.300}_{-0.300}$	$1.271^{+0.346}_{-0.346}$	$0.972^{+0.147}_{-0.110}$	$0.666^{+0.863}_{-0.331}$
	+3%/-3%	+6%/-4%	+214%/-214%	+27%/-27%	+15%/-11%	+130%/-50%
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 009366988-01 / KOI 3597.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-937 \pm 65$	$38.10^{+5.72}_{-5.43}$	$2745^{+222}_{-213}$	$-2620^{+311}_{-205}$	$0.174^{+0.065}_{-0.041}$
Alt.	$-6622 \pm 66$	$41.76^{+6.86}_{-6.30}$	$2736^{+208}_{-215}$	$3339^{+94}_{-103}$	$1.039^{+0.372}_{-0.254}$

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

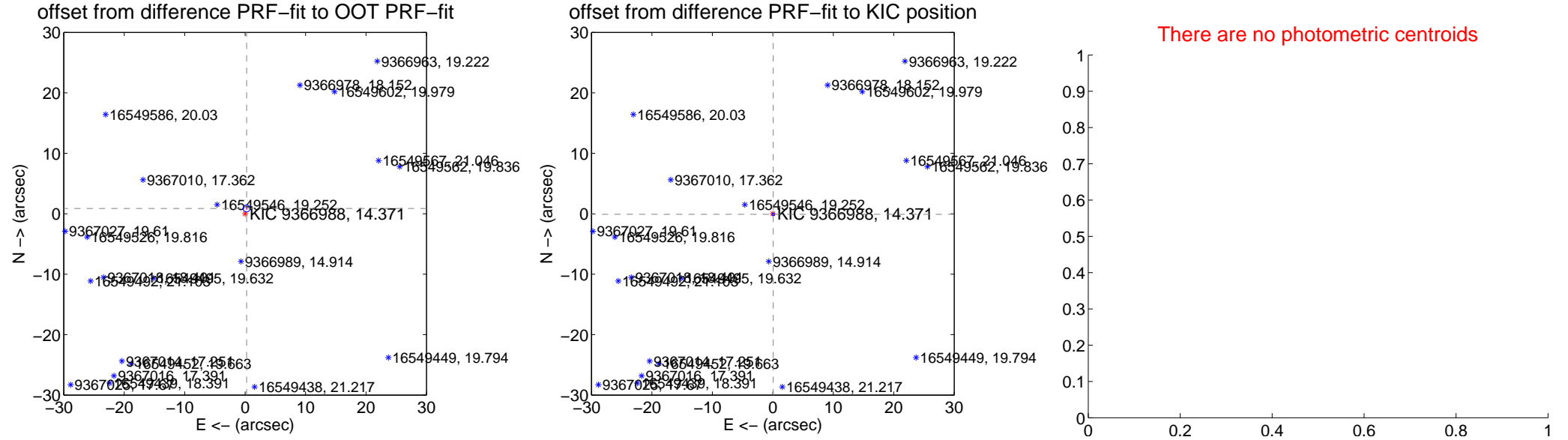
## DV Centroid Data

Supplemental centroid analysis for 009366988-01. Kepler magnitude: 14.37. Transit SNR 1356.39

There are 10 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.57 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.904 \pm 0.190$	$4.75$	$-0.243 \pm 0.076$	$0.870 \pm 0.189$
PRF-fit source offset from KIC position	$0.104 \pm 0.072$	1.46	$-0.057 \pm 0.069$	$-0.087 \pm 0.070$
photometric centroid source offset	—	—	—	—

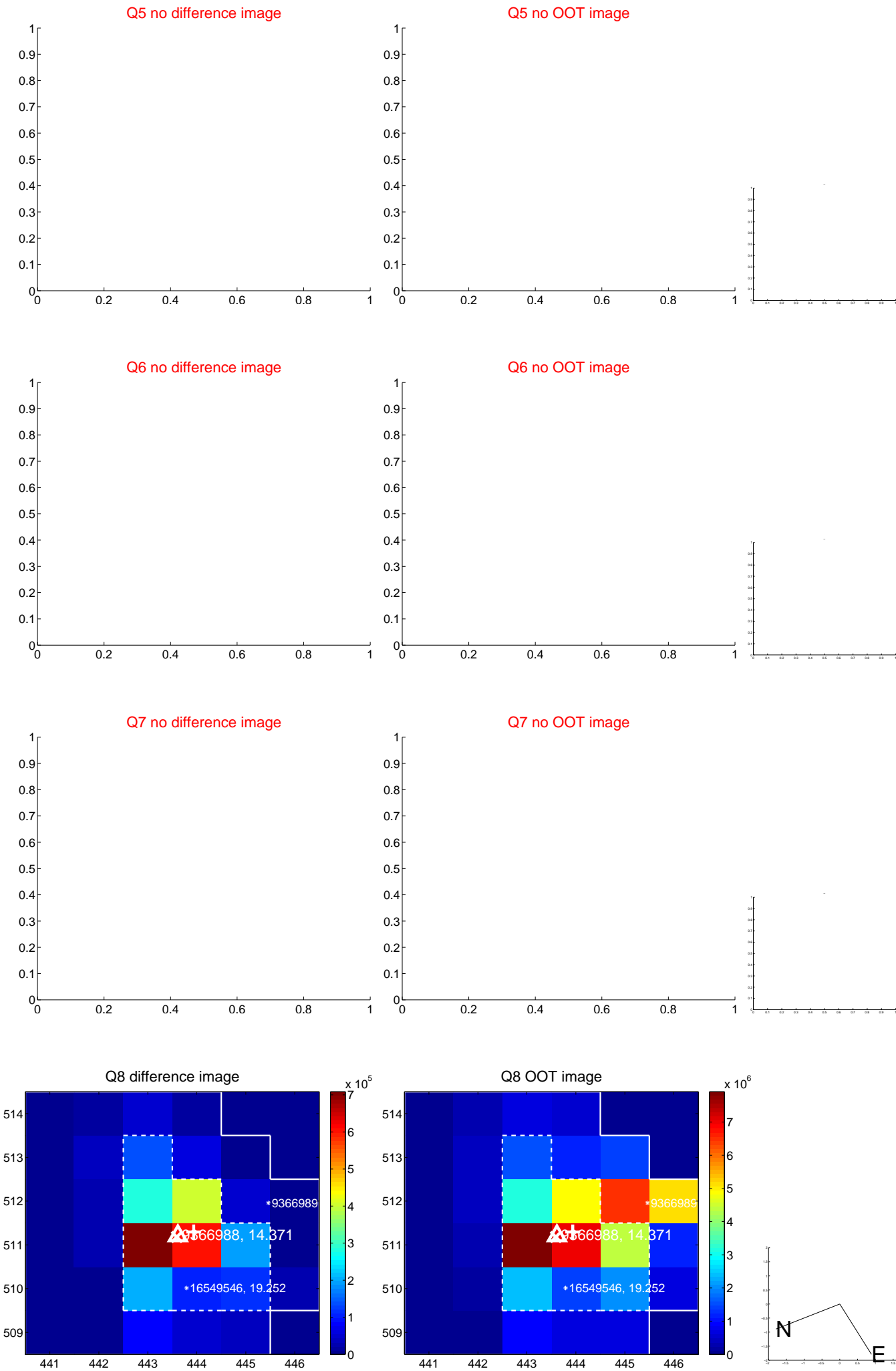


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

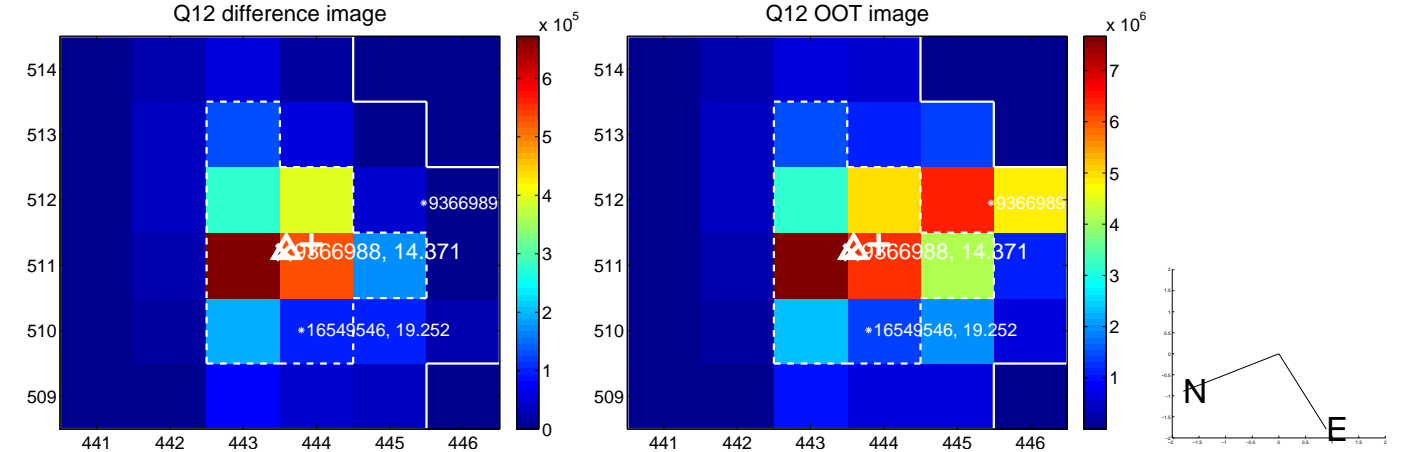
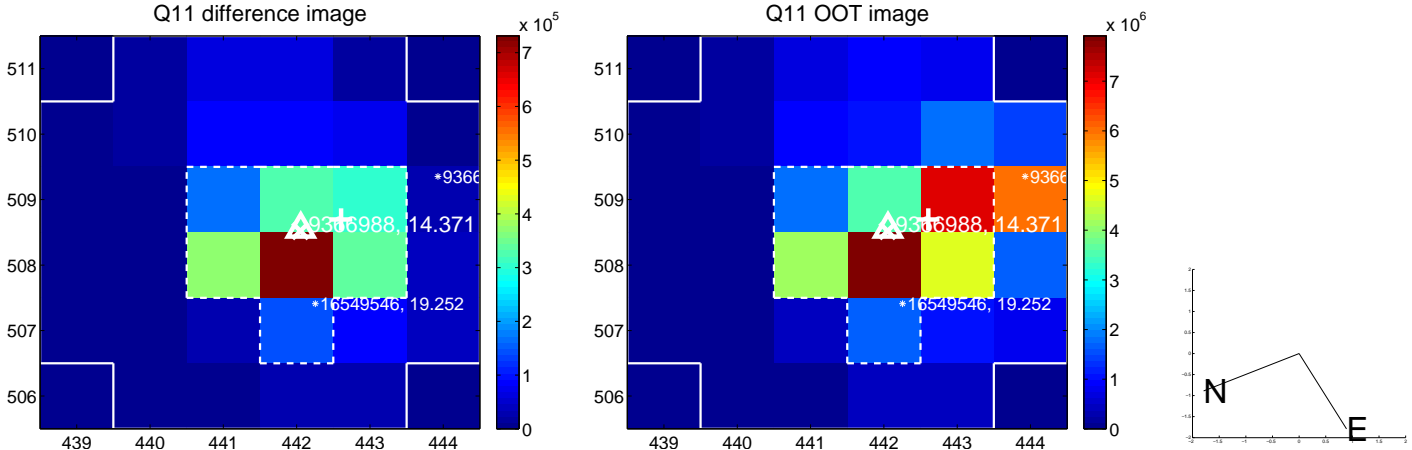
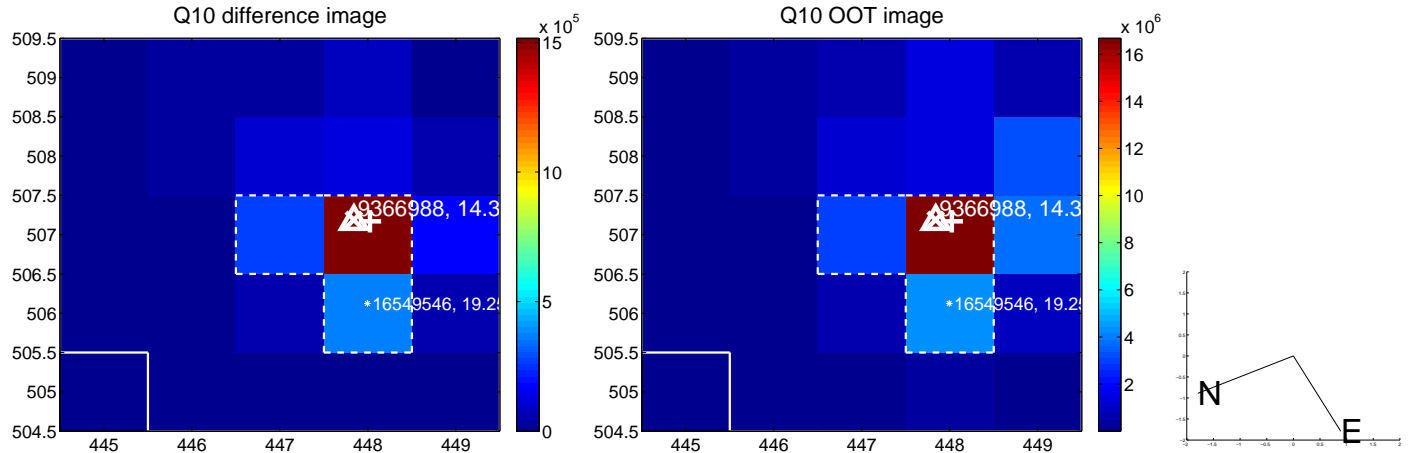
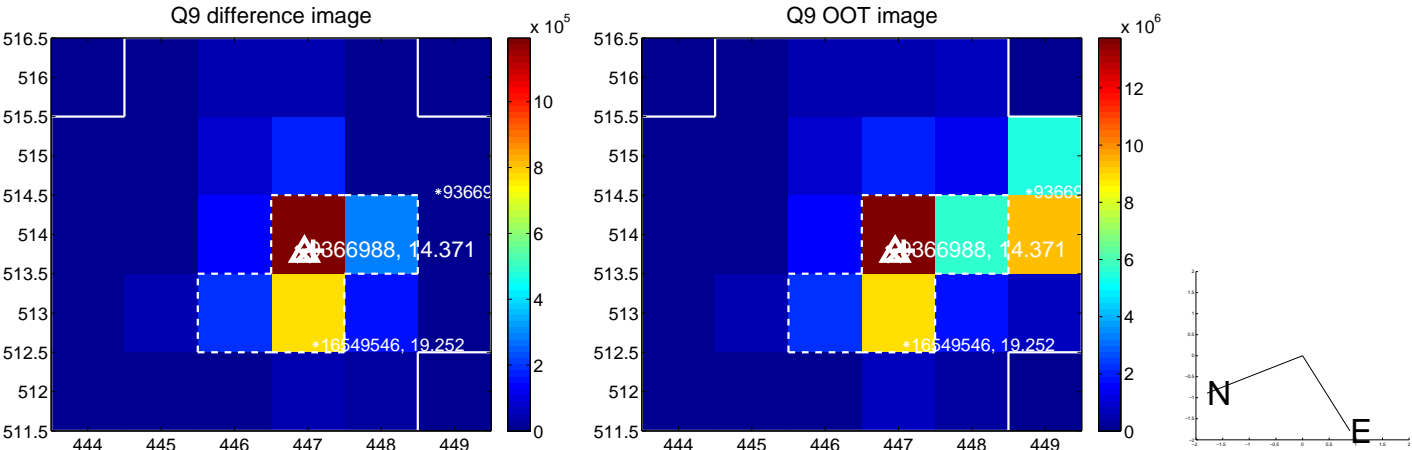
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



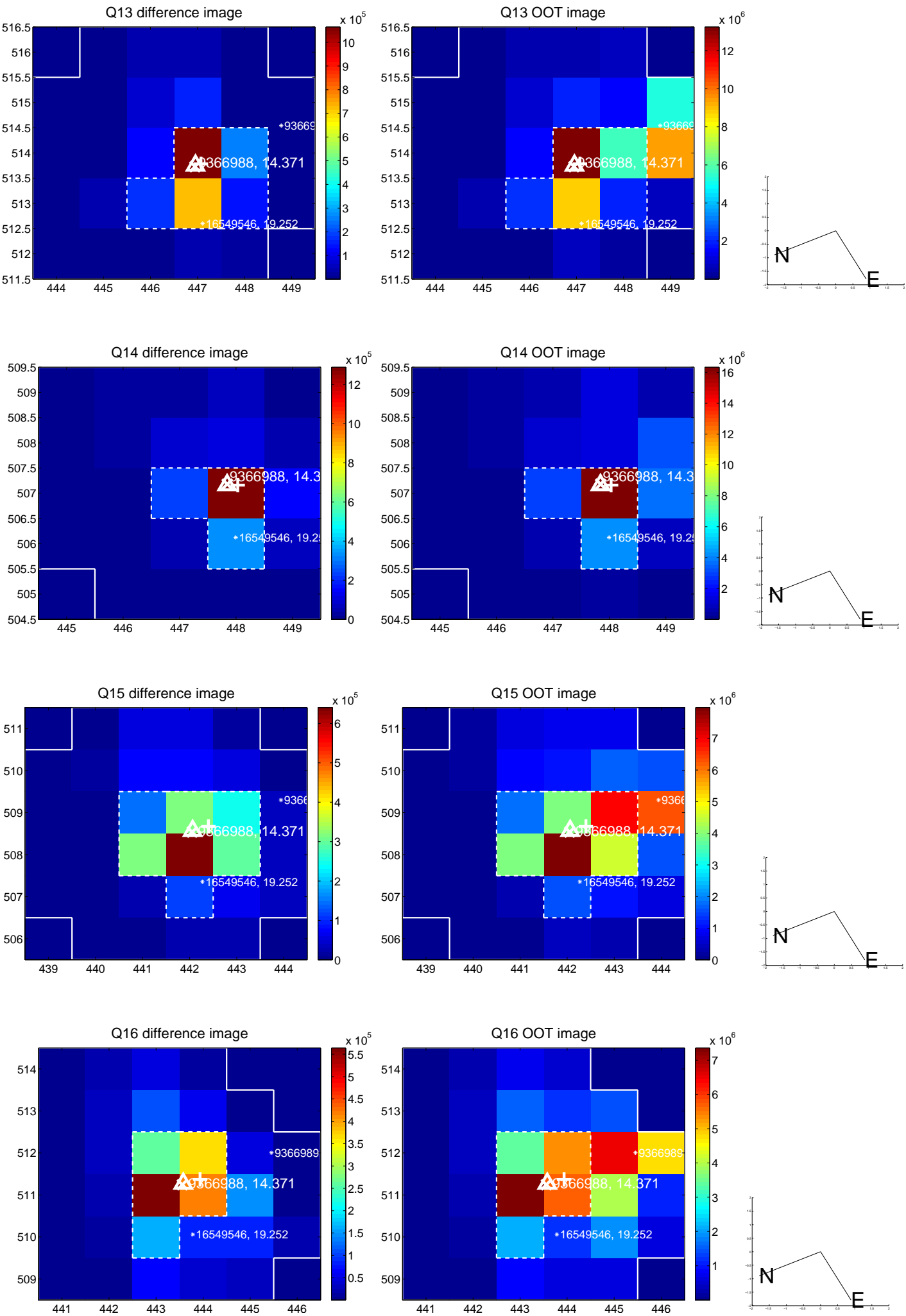
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



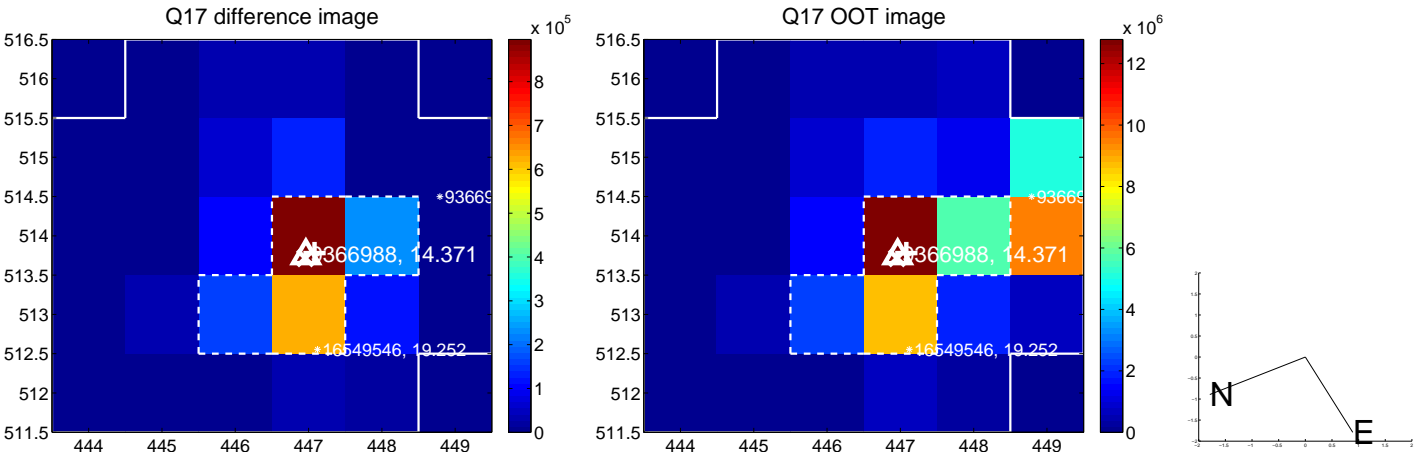
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



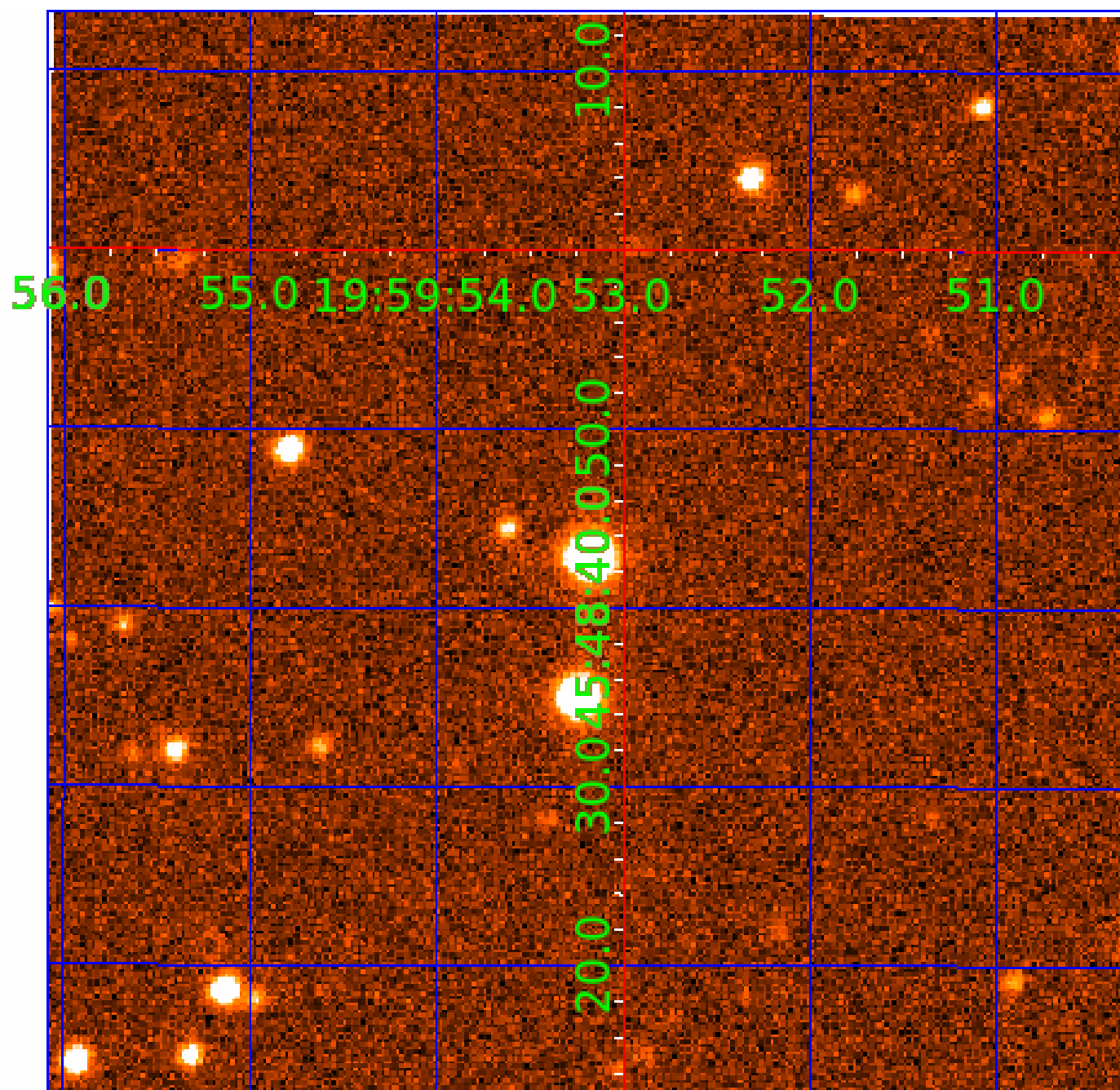
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 009366988

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009366988-01	OBS	3597.01	1.219062	132.087622	85919.5	2.205	2870.1	1356.4	1.27	5914	38.38	3618.11
009366988-02	OBS	No	1.220946	132.655273	495.7	3.500	8.6	-1.0	1.27	5914	2.82	3610.67

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009366988-01	OBS	FP	0.00	0	1	1	0	SWEET_EB—MOD_SEC_ALT—CENT_UNRESOLVED_OFFSET
009366988-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_NOFITS

**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 009366988-02

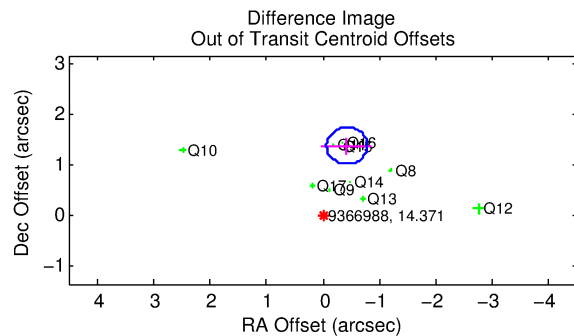
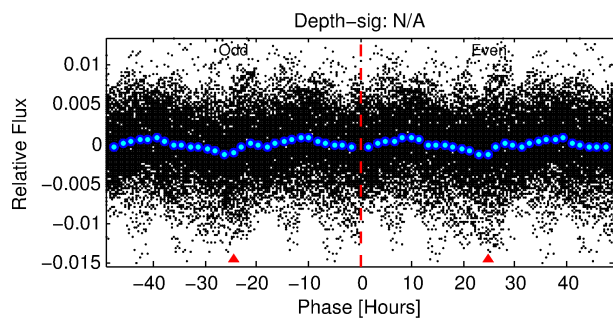
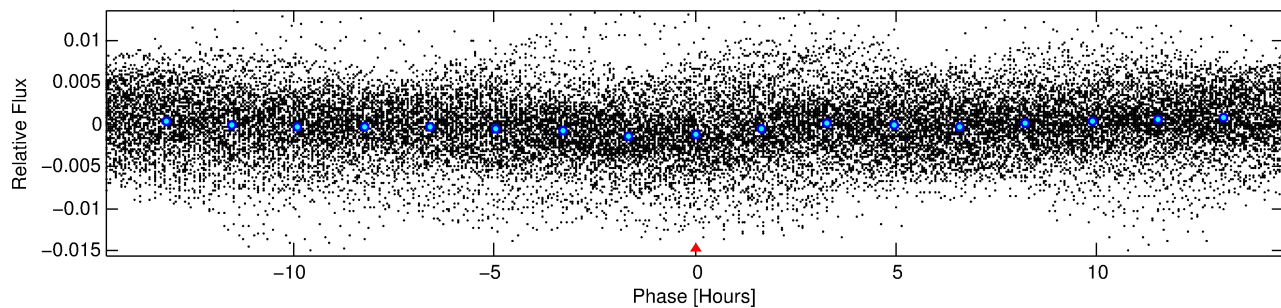
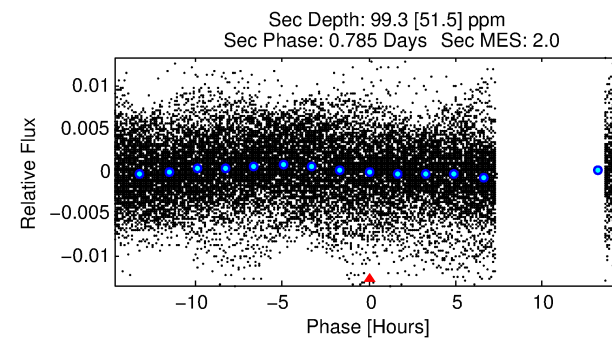
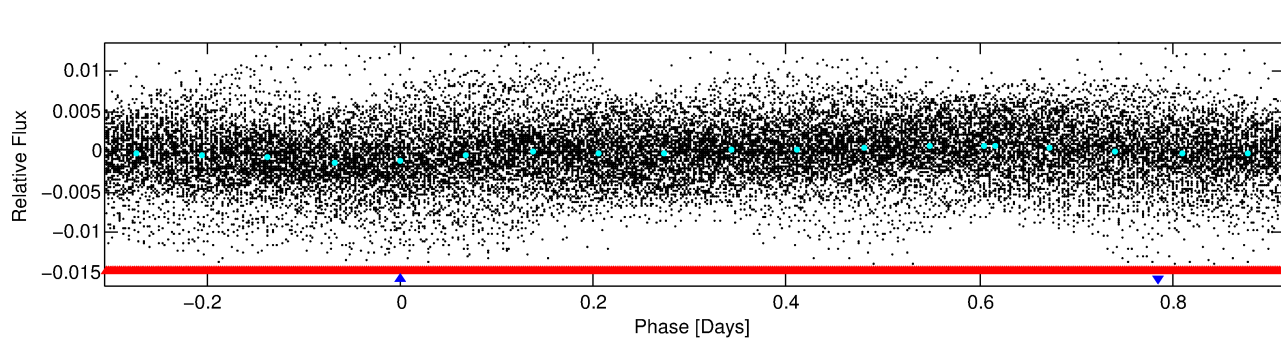
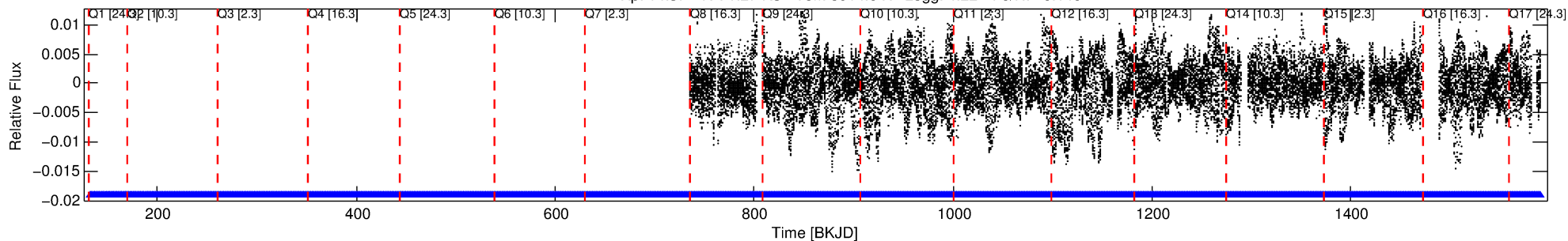
No Significant Match Found

# DV One-Page Summary

KIC: 9366988 Candidate: 2 of 2 Period: 1.221 d

KOI: K03597 Corr: No Ephemeris Match

Kp: 14.37 R\*: 1.27 Rs Teff: 5914.0 K Logg: 4.22 Fe/H: -0.140



## TPS TCE Results:

Period = 1.22095 d  
Epoch = 132.6553 BKJD

DV fit results are unavailable

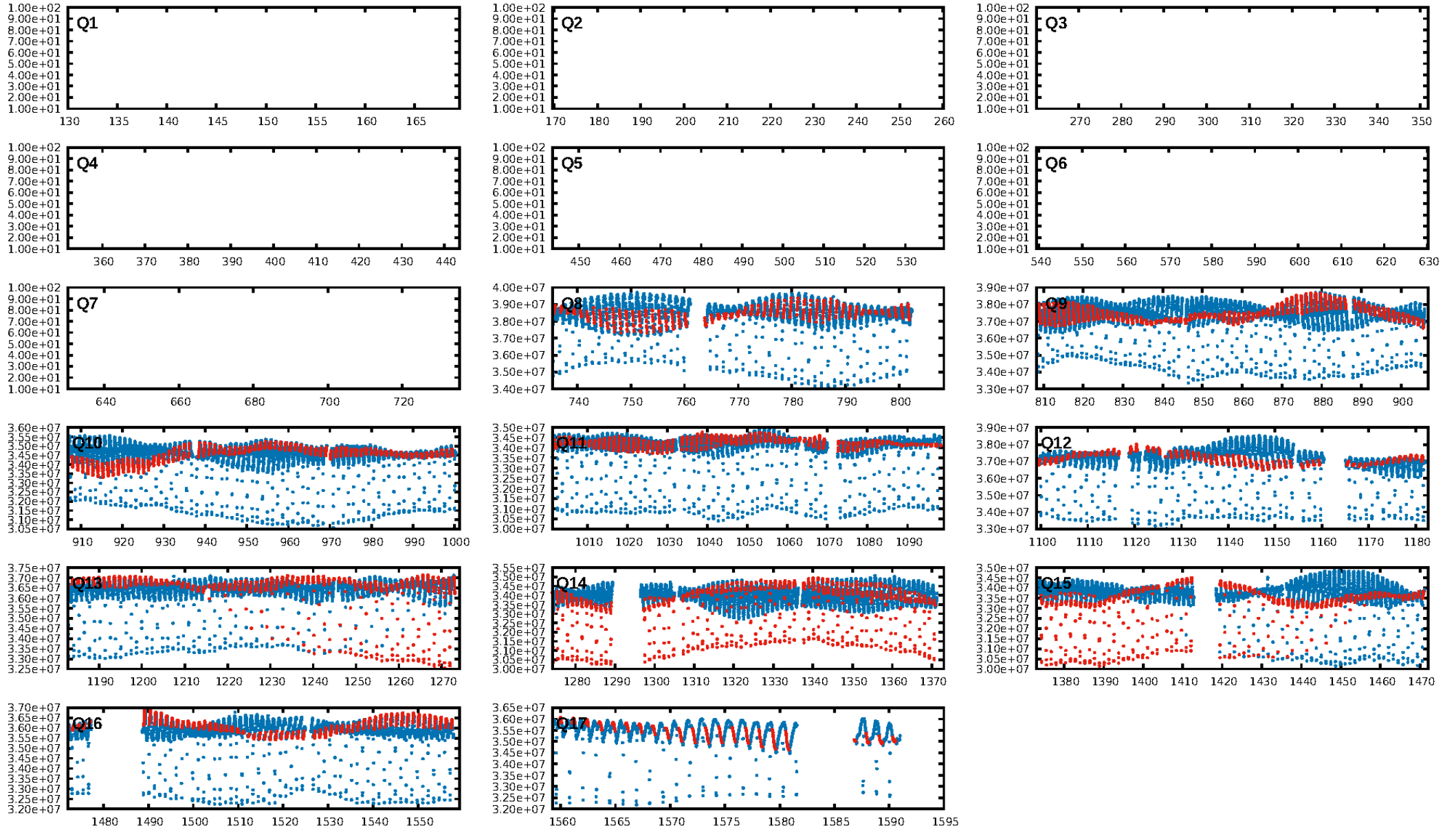
## DV Diagnostic Results:

ShortPeriod-sig: 0.9% [0.01 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [622/622]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 1.436 arcsec [11.92 $\sigma$ ]  
KicOffset-rm: 0.140 arcsec [0.38 $\sigma$ ]  
OotOffset-st: 2/2/3/3 [10]  
KicOffset-st: 2/2/3/3 [10]  
DiffImageQuality-fgm: 0.30 [3/10]  
DiffImageOverlap-fno: 0.00 [0/10]

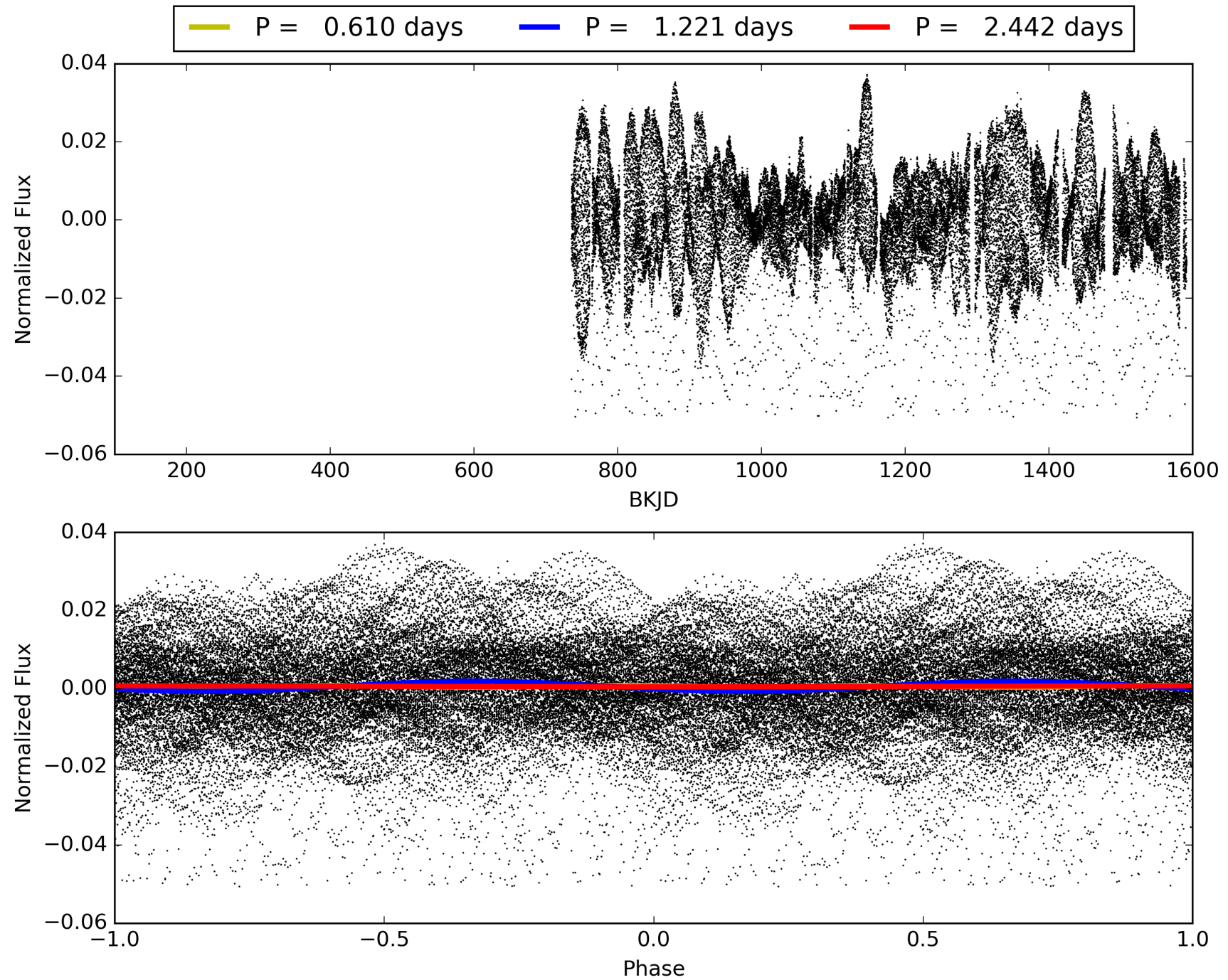
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 16:29:40 Z

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

# TCE 009366988-02, PDC Light Curves

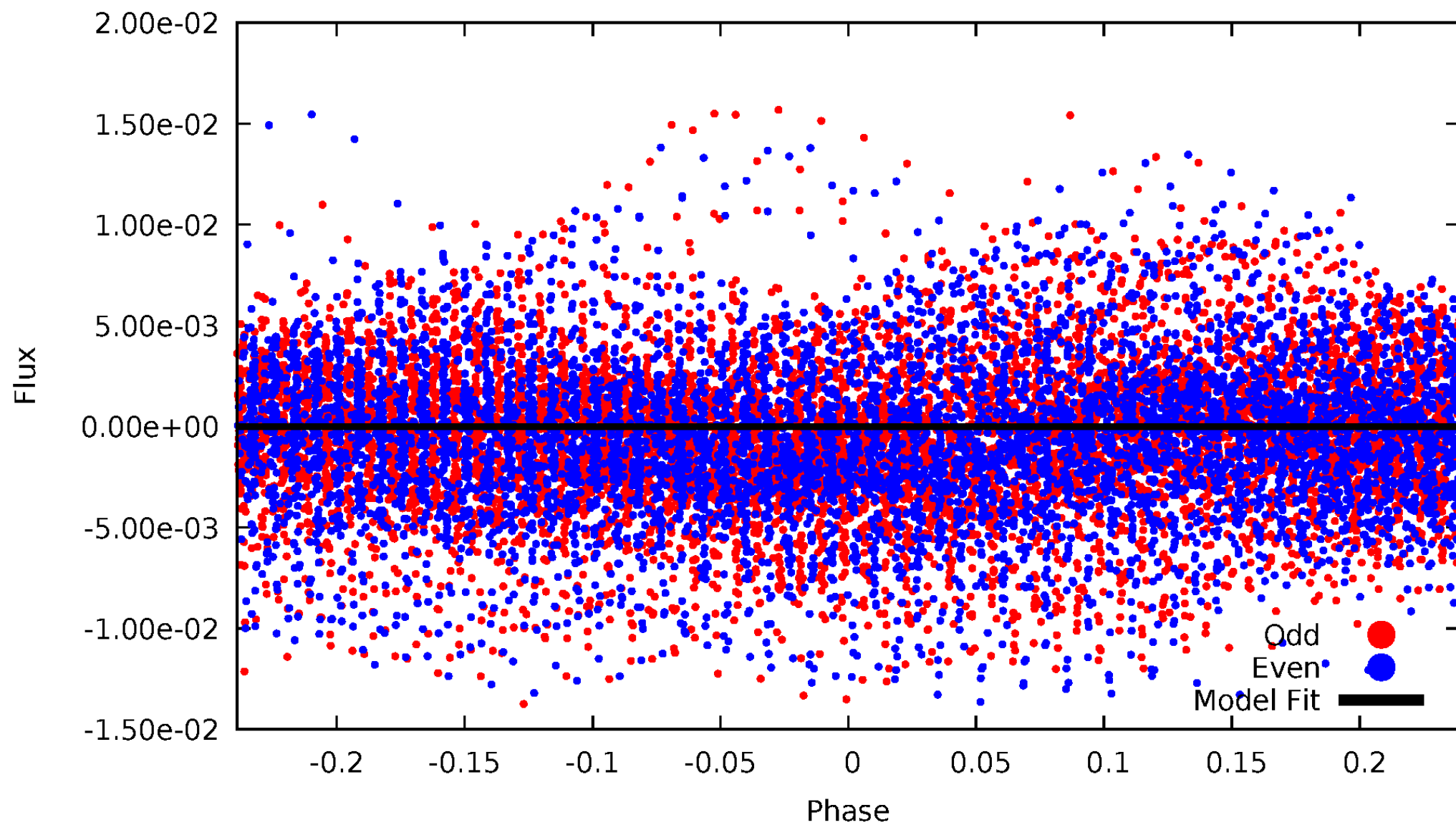


TCE 009366988-02



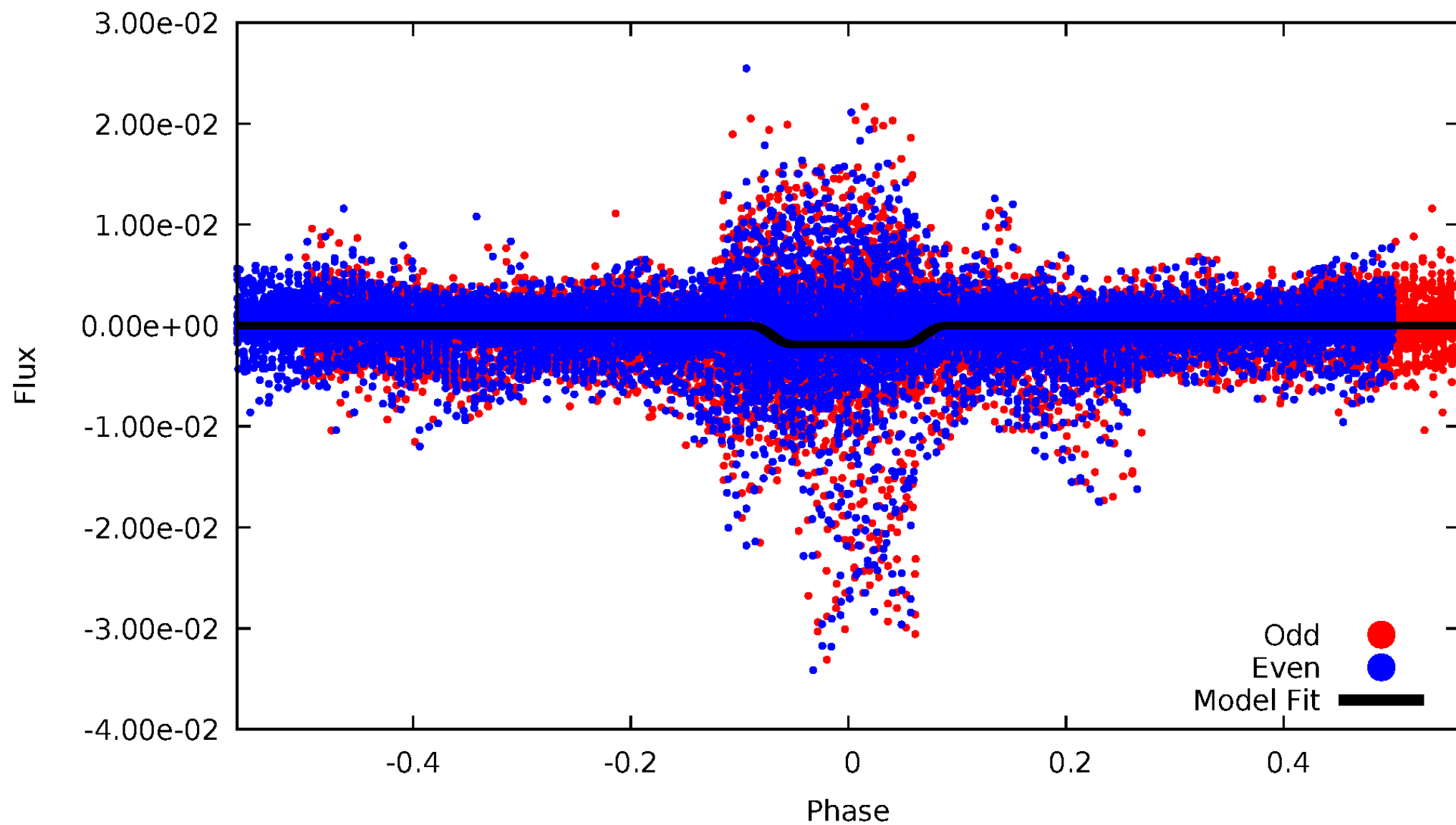
# DV Odd/Even

TCE 009366988-02



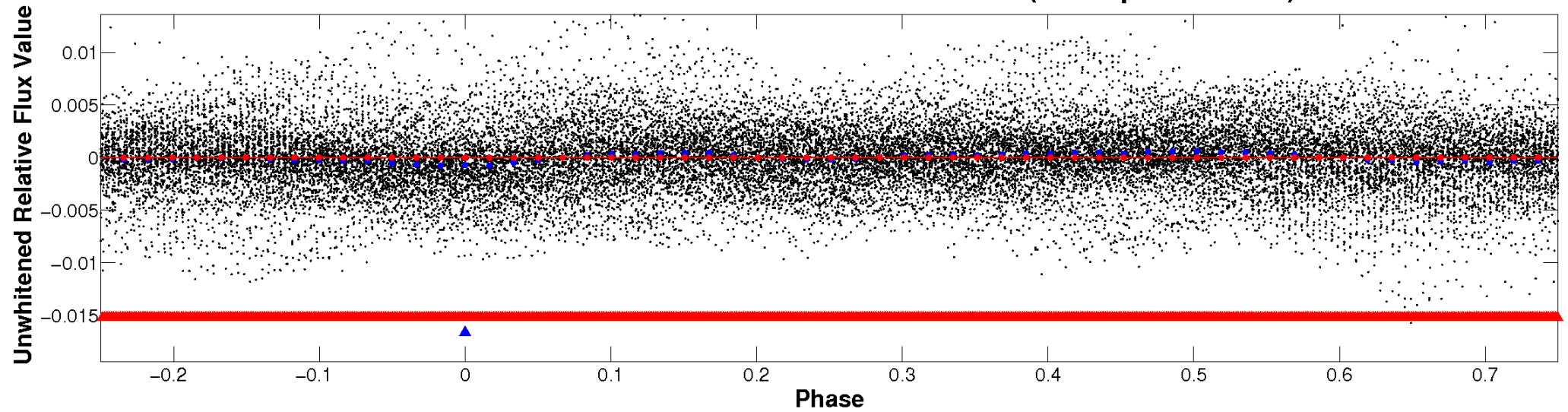
# ALT Odd/Even

TCE 009366988-02

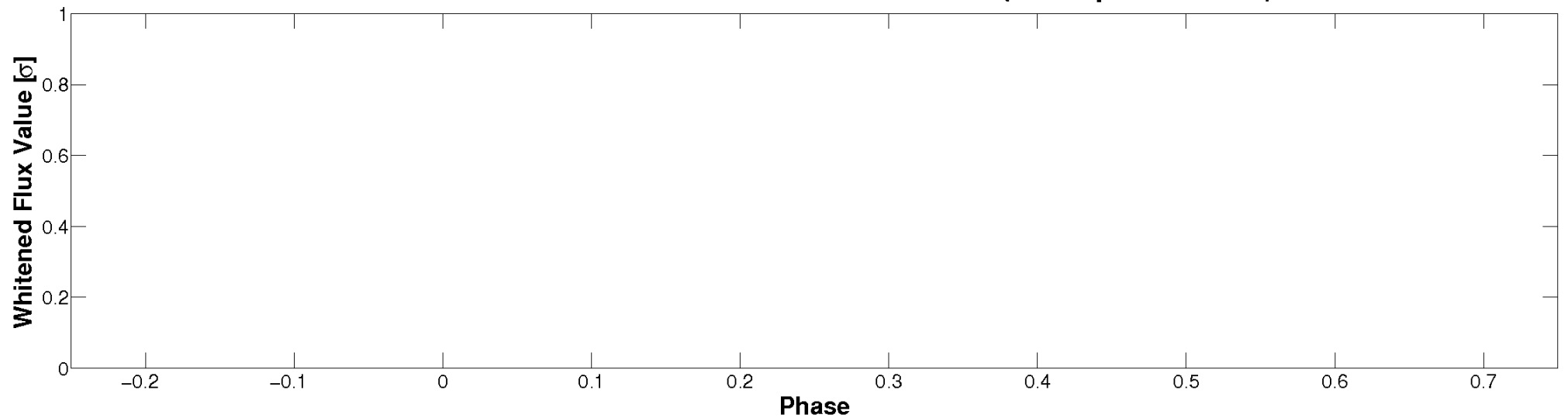


# Non-Whitened Vs. Whitened Light Curve

**Planet 2 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

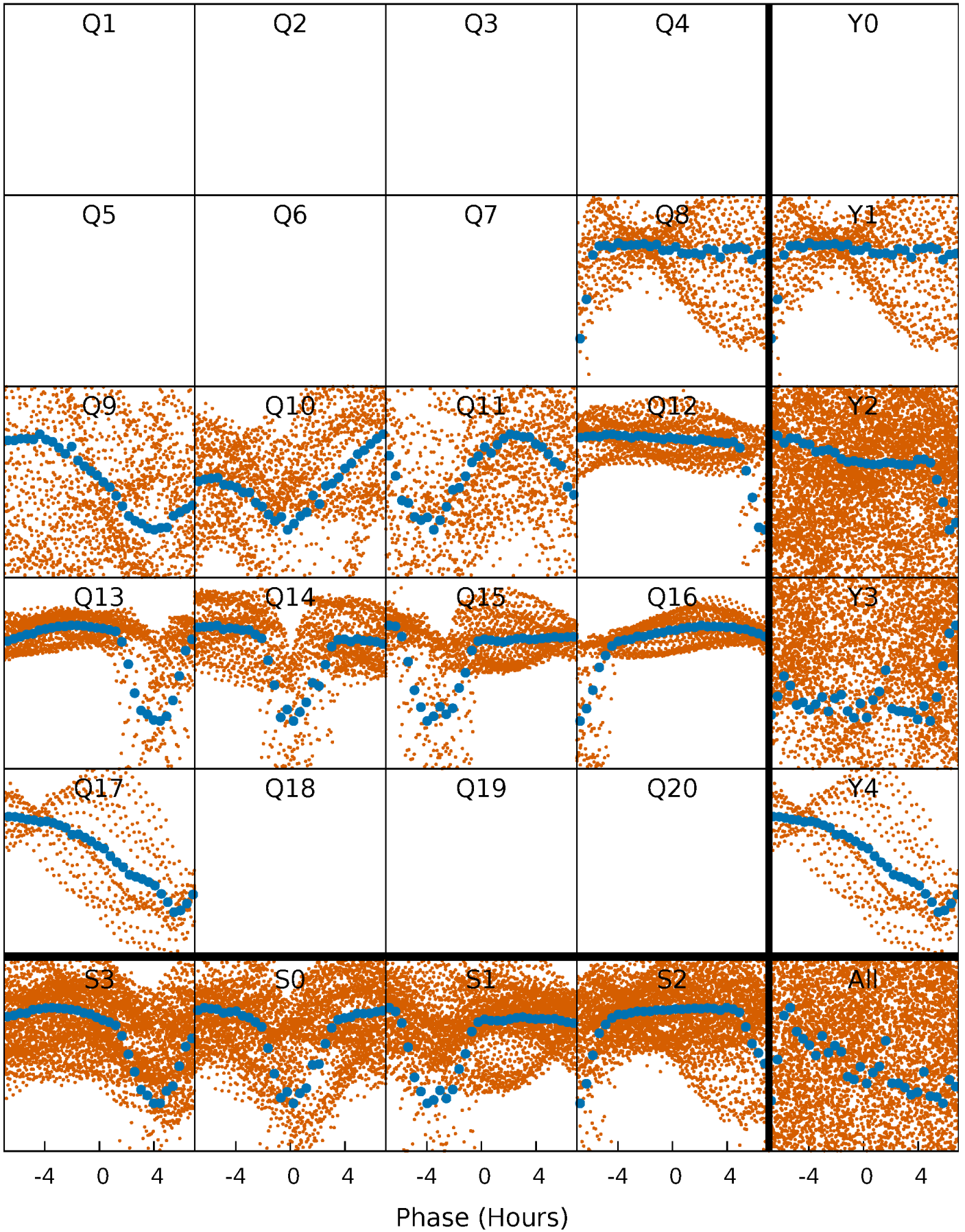


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



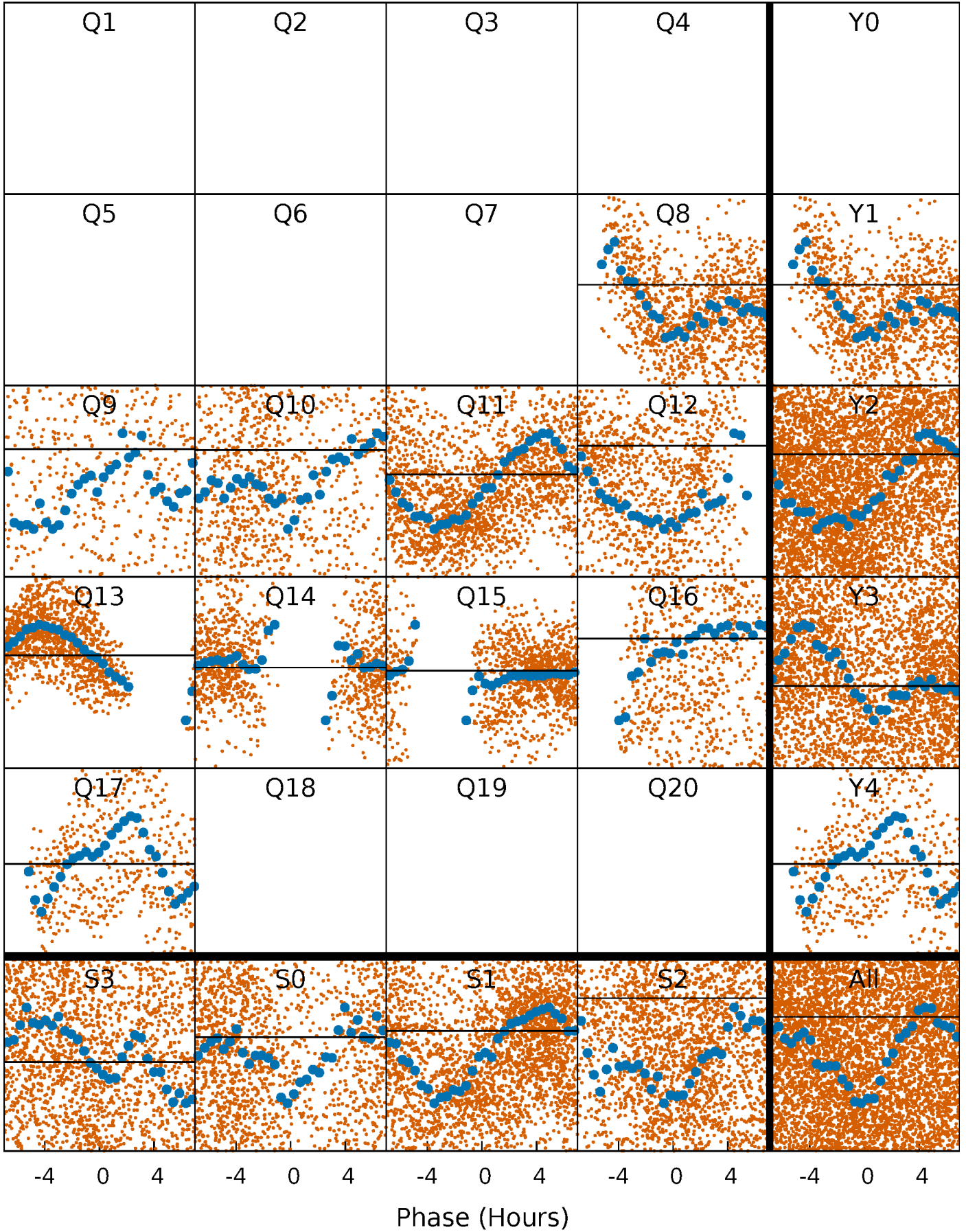
# PDC Quarter-Phased Transit Curves

TCE 009366988-02   P= 1.220946 Days    $T_0=132.655273$  (BKJD)



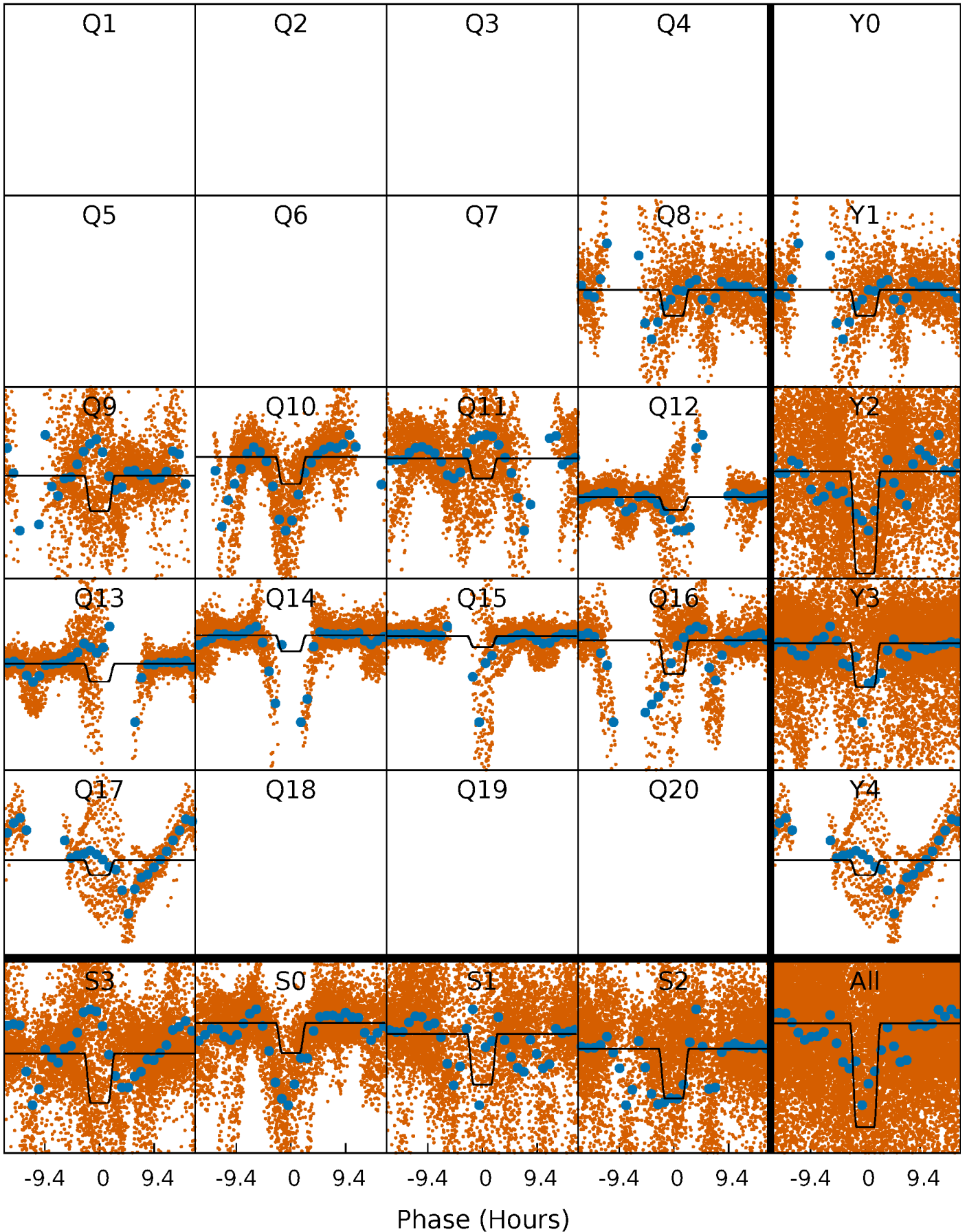
# DV Quarter-Phased Transit Curves

TCE 009366988-02   P= 1.220946 Days    $T_0=132.655273$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

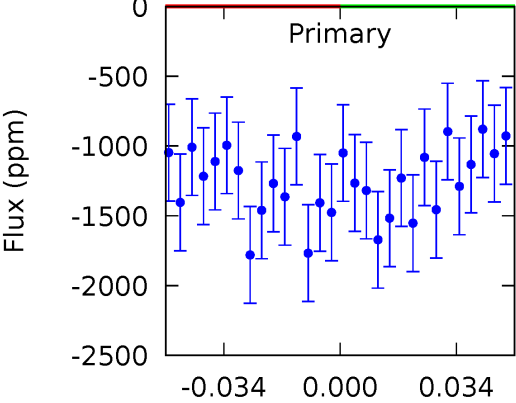
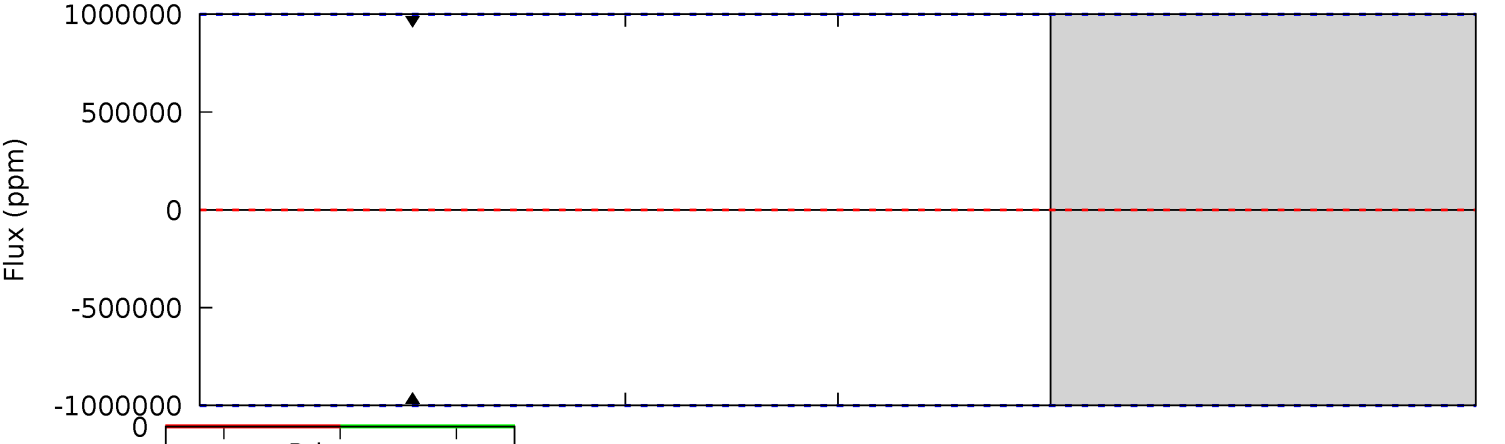
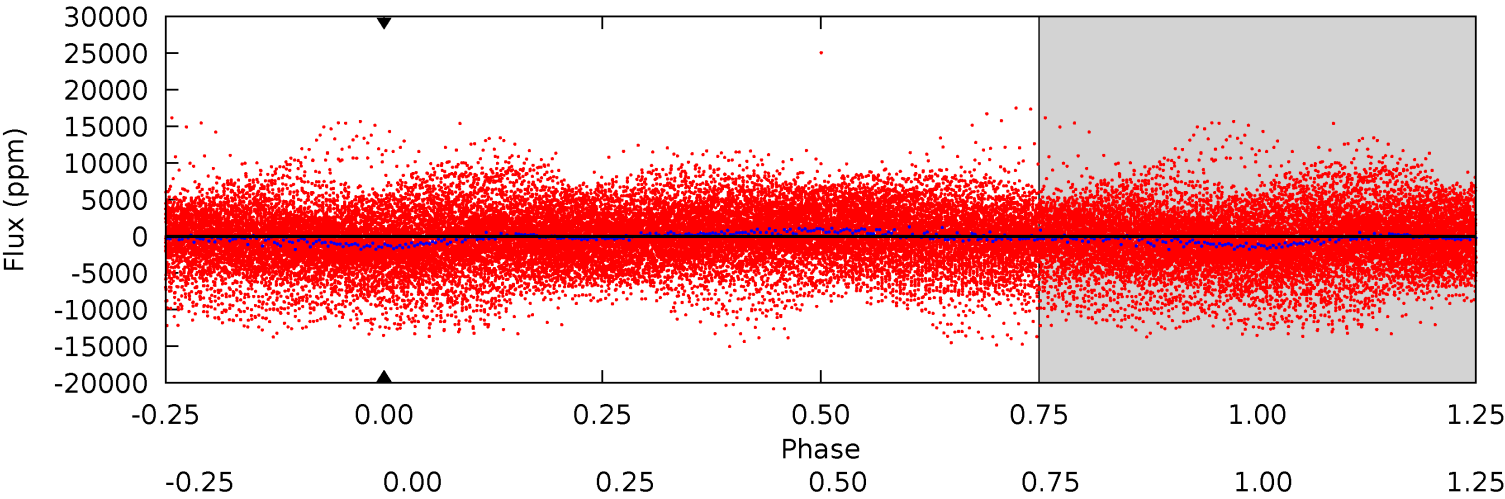
TCE 009366988-02   P= 1.220946 Days    $T_0=132.689233$  (BKJD)



DV Model-Shift Uniqueness Test

009366988-02, P = 1.220946 Days, E = 132.655273 Days

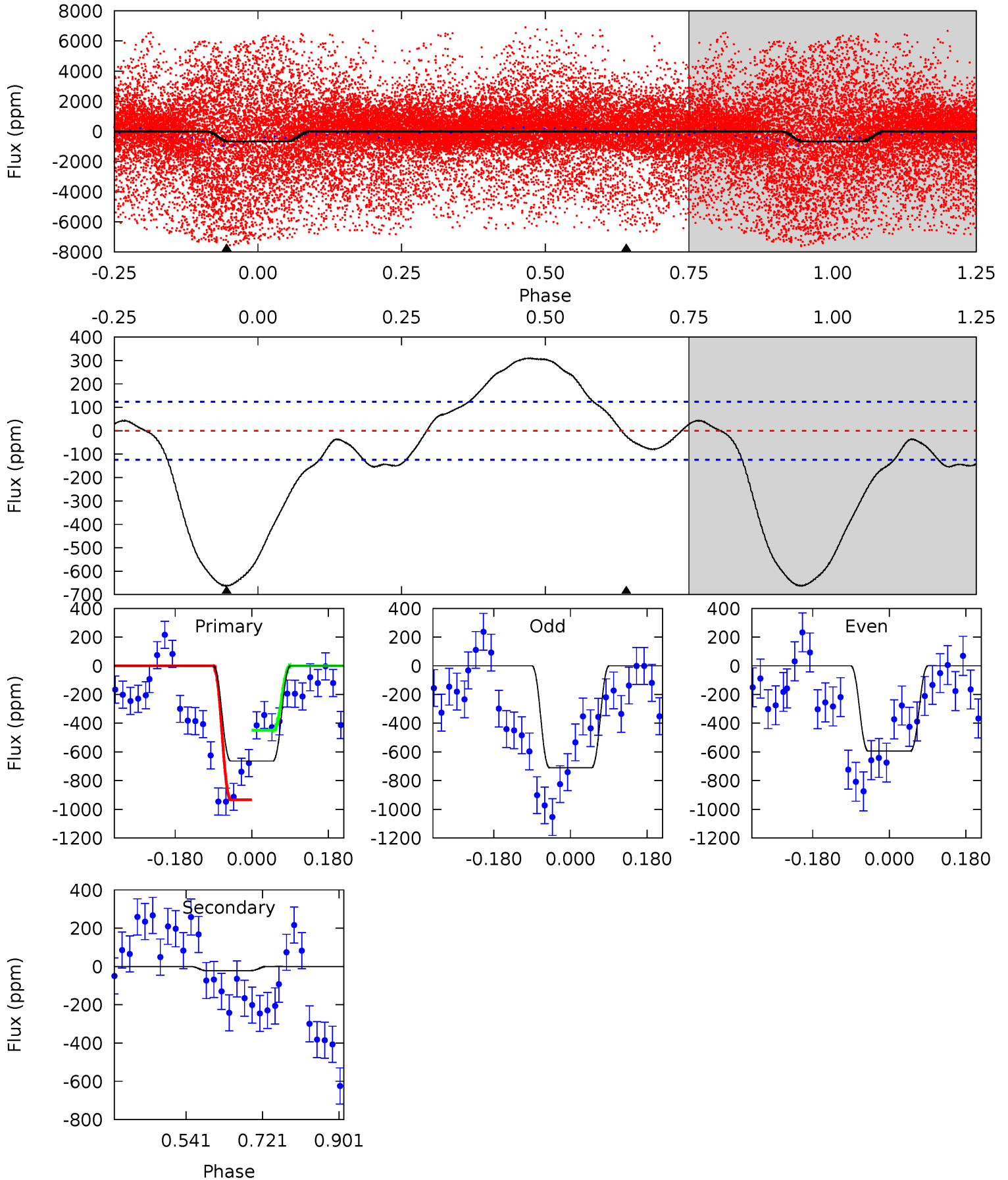
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009366988-02, P = 1.220946 Days, E = 132.689233 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
23.7	0.80	0	0	4.44	1.34	5.31	23.7	23.7	0.80	0.80	2.10	1.72	0.32	0



### Stellar Parameters For KIC 009366988

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5914^{+196}_{-196}$	$4.217^{+0.246}_{-0.164}$	$-0.140^{+0.300}_{-0.300}$	$1.271^{+0.346}_{-0.346}$	$0.972^{+0.147}_{-0.110}$	$0.666^{+0.863}_{-0.331}$
	+3%/-3%	+6%/-4%	+214%/-214%	+27%/-27%	+15%/-11%	+130%/-50%
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 009366988-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$10.18^{+10.12}_{-6.98}$	$2746^{+236}_{-216}$	$-3159^{+25749}_{-18279}$	$-0.247^{+532.949}_{-458.167}$
Alt.	$-22 \pm 28$	$11.62^{+11.64}_{-7.91}$	$2733^{+221}_{-214}$	$-2851^{+5481}_{-199}$	$0.031^{+0.408}_{-0.036}$

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

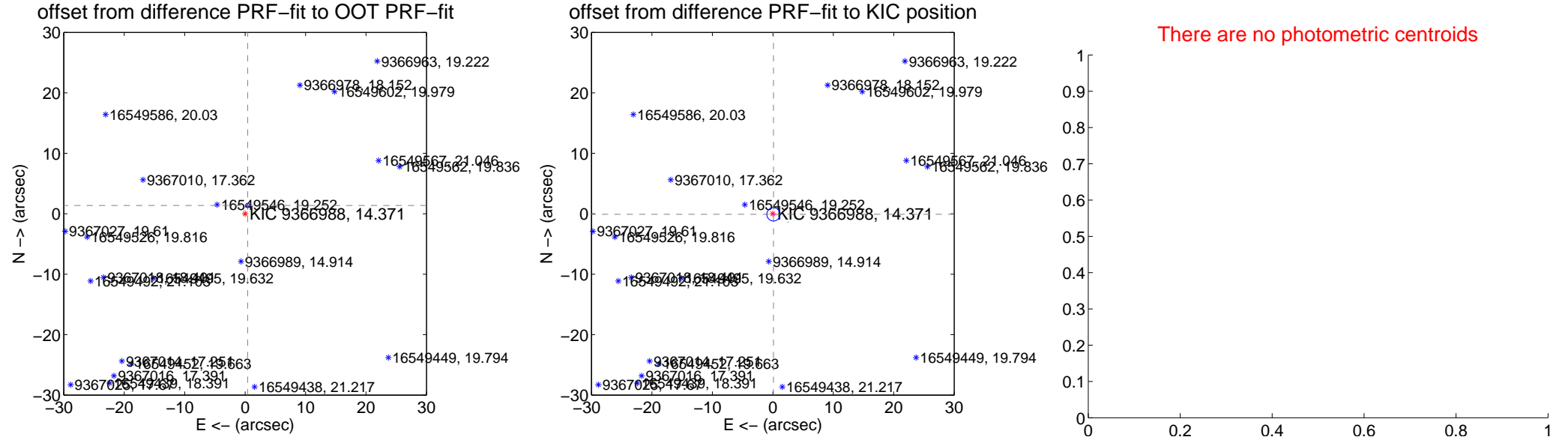
## DV Centroid Data

Supplemental centroid analysis for 009366988-02. Kepler magnitude: 14.37. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

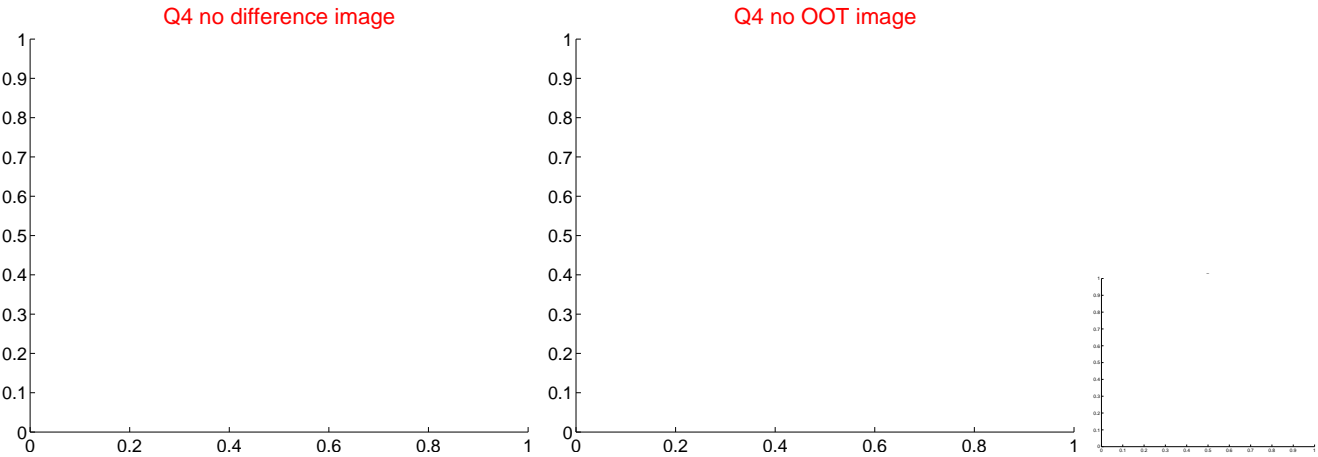
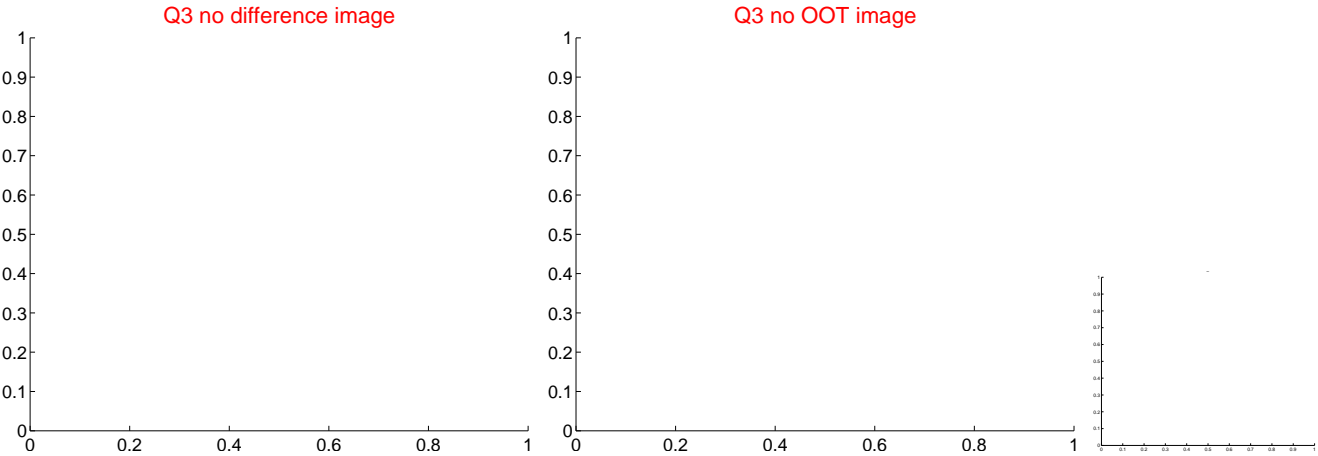
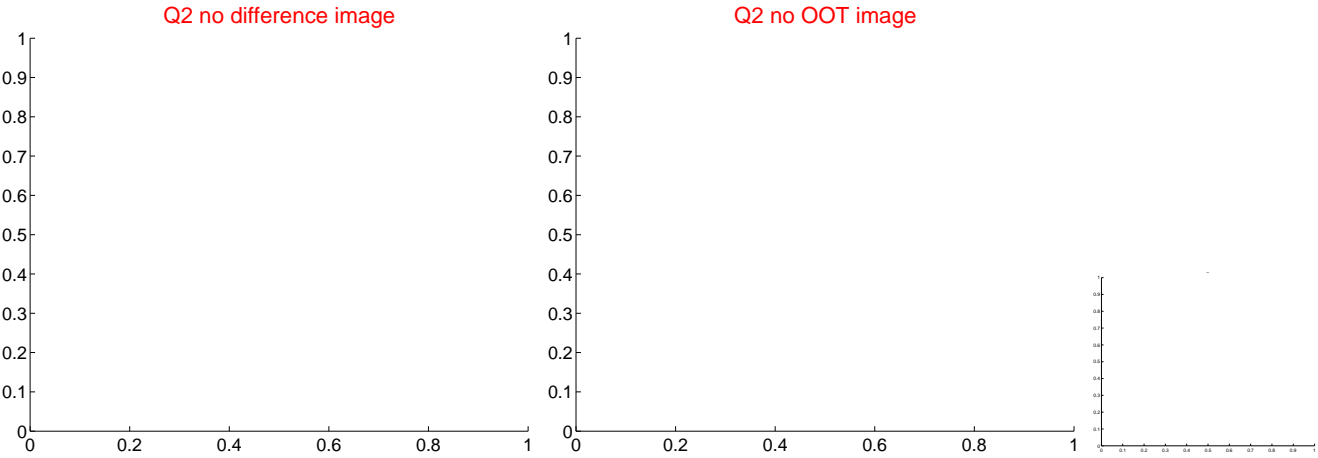
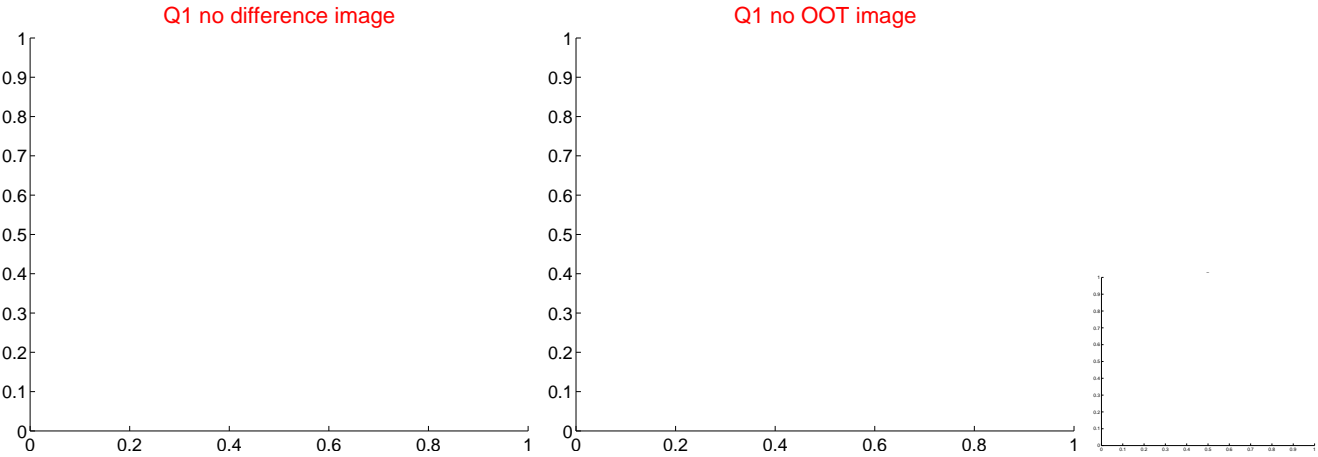
The direct PRF centroid is offset from the target star catalog position by about 0.57 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	1.436 $\pm$ 0.121	11.92	-0.423 $\pm$ 0.425	1.373 $\pm$ 0.147
PRF-fit source offset from KIC position	0.140 $\pm$ 0.367	0.38	-0.102 $\pm$ 0.380	-0.097 $\pm$ 0.153
photometric centroid source offset	—	—	—	—

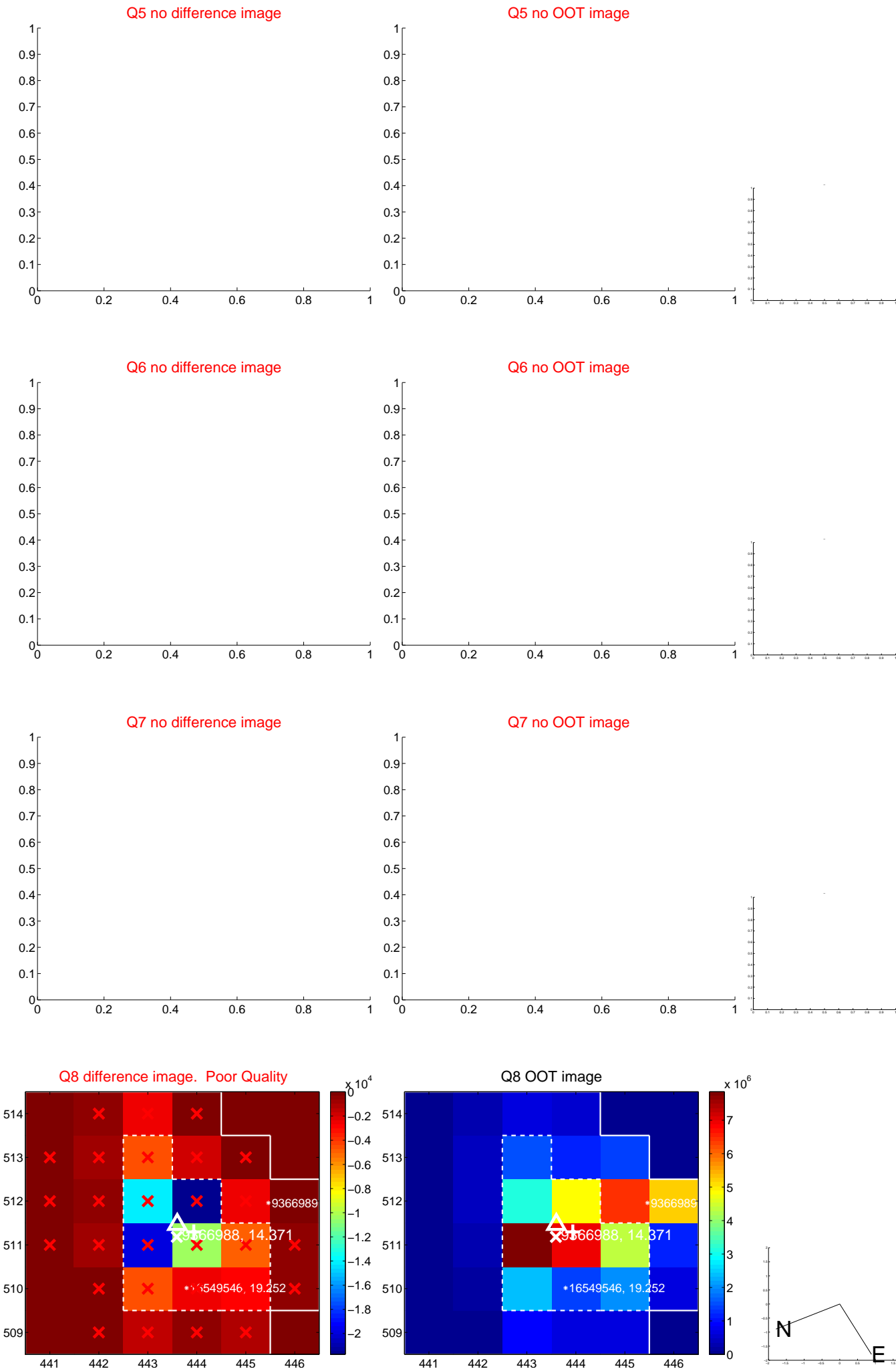


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

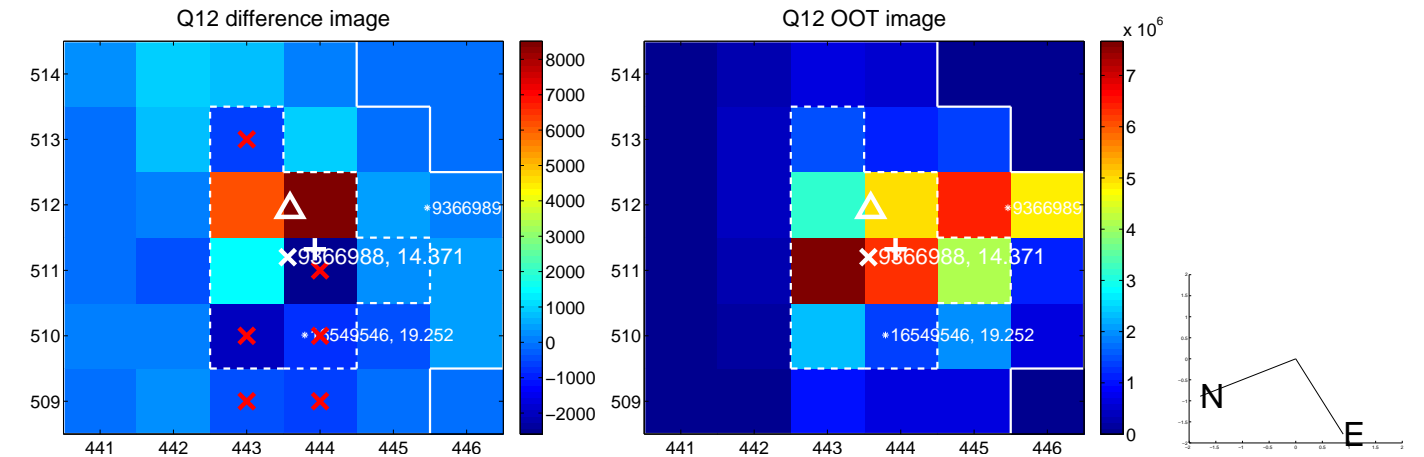
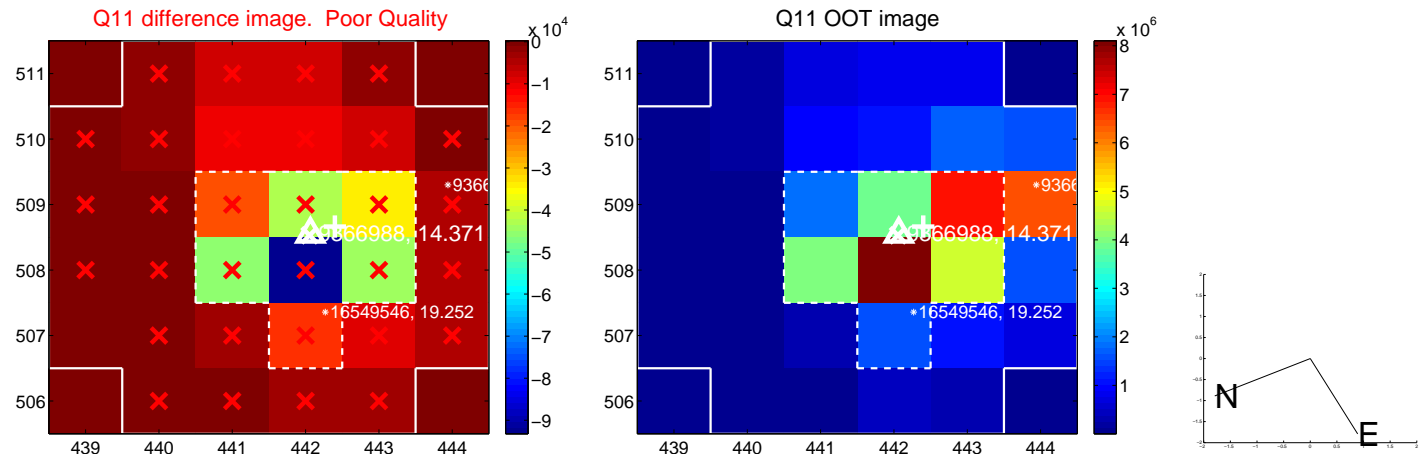
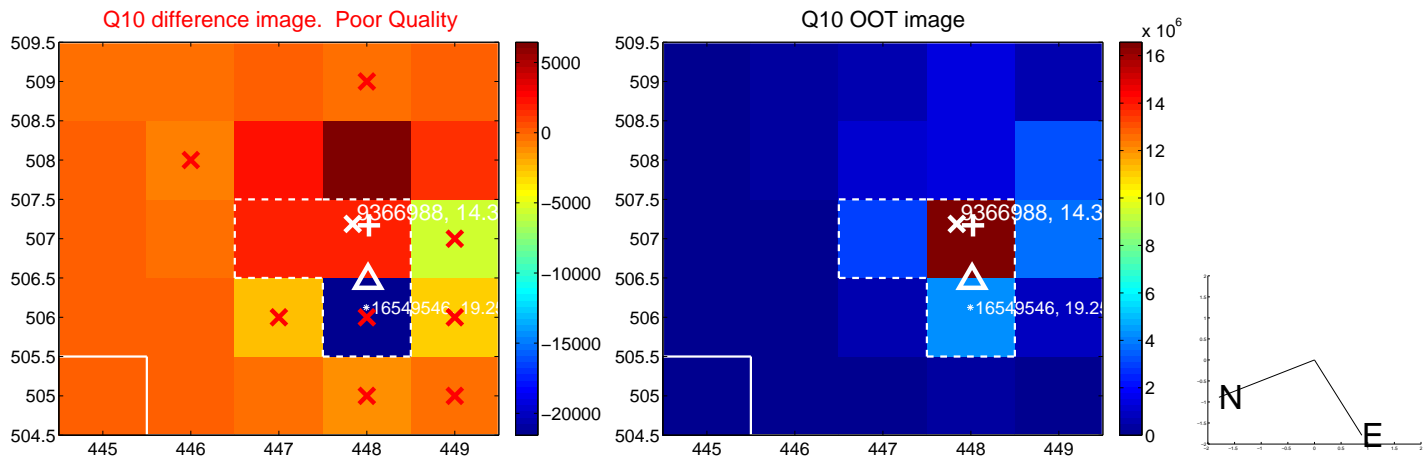
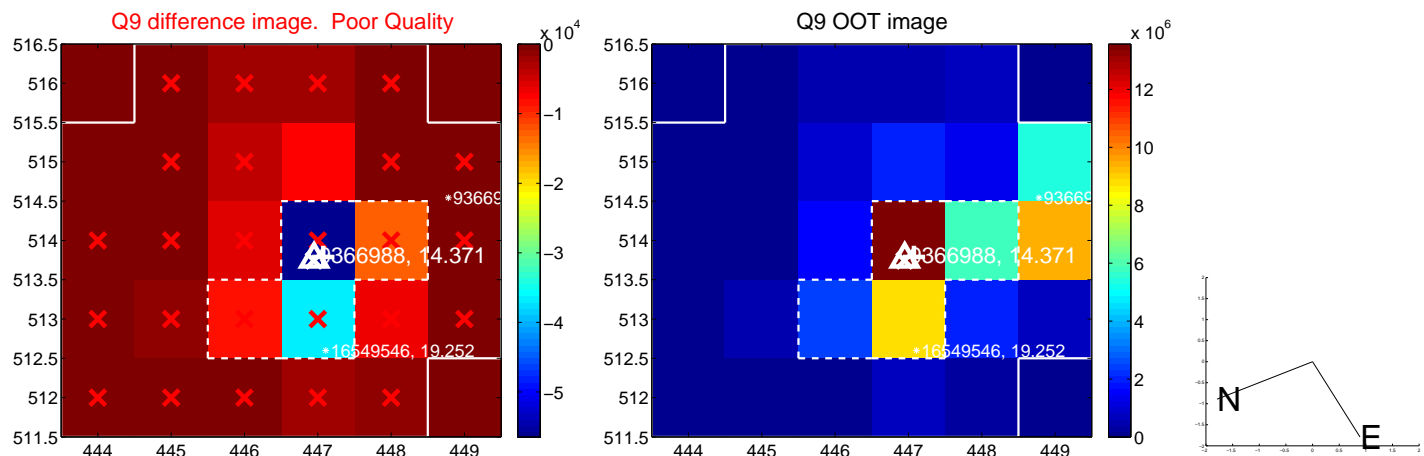
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



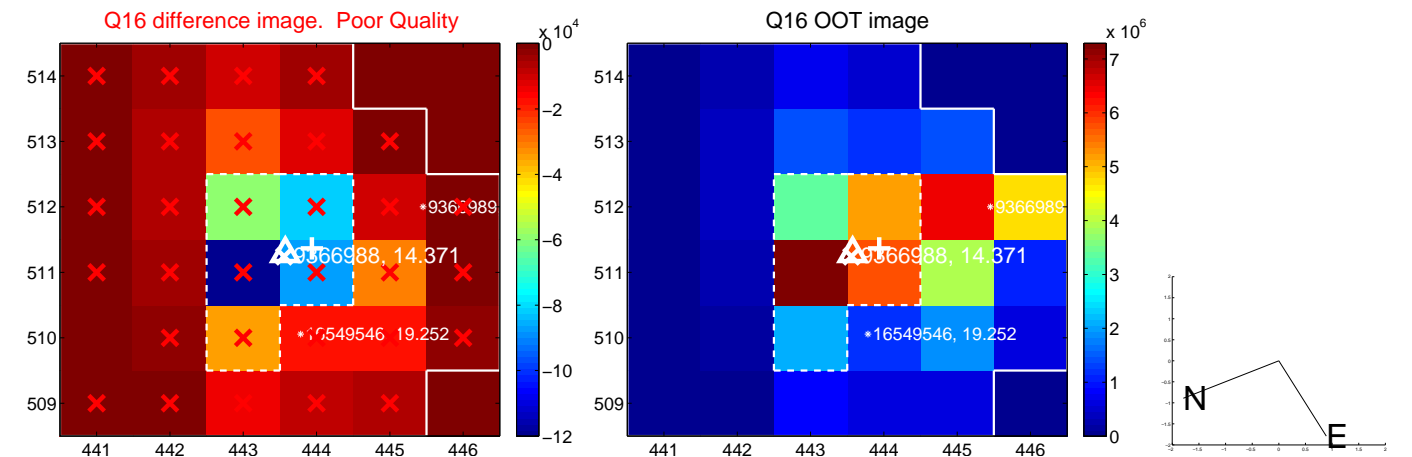
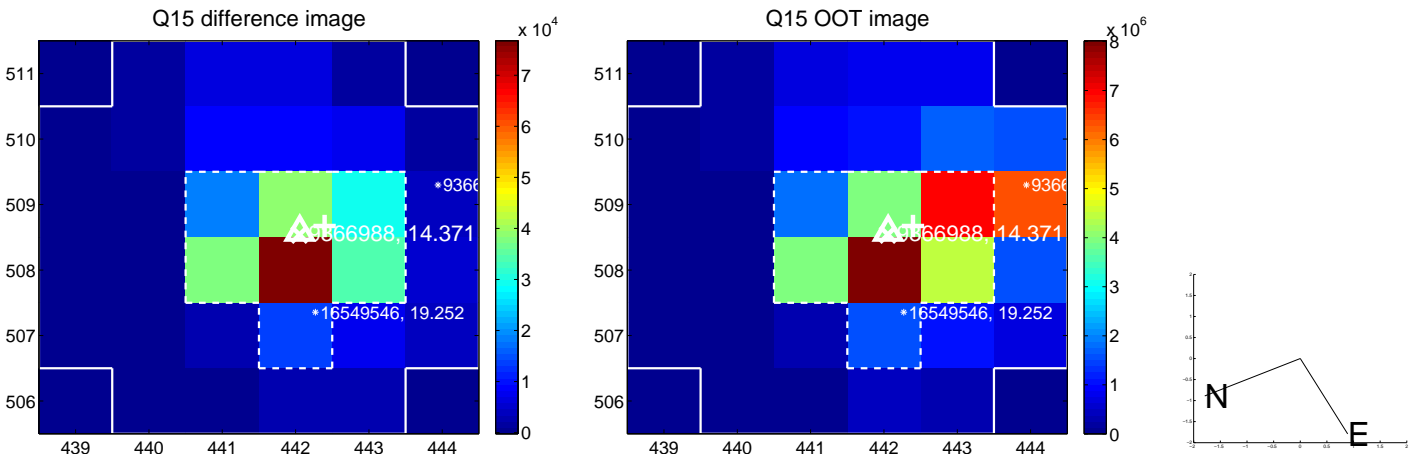
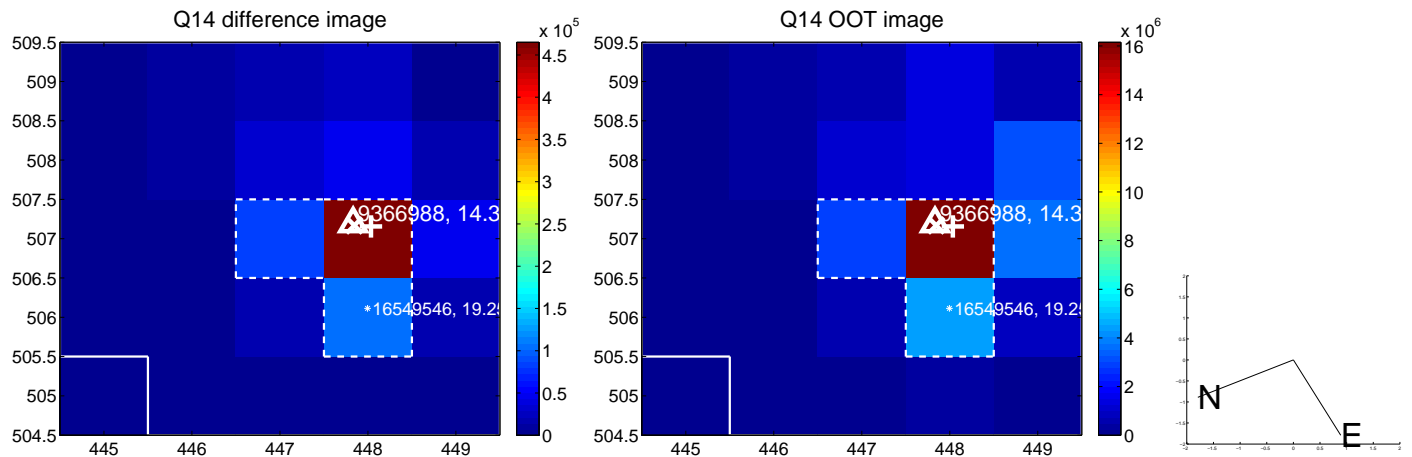
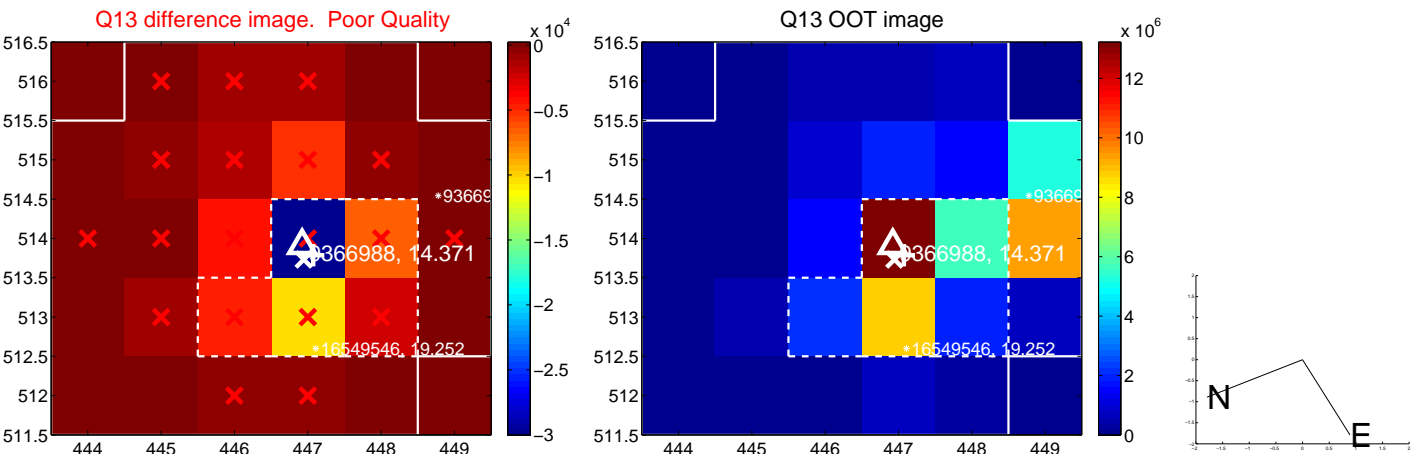
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



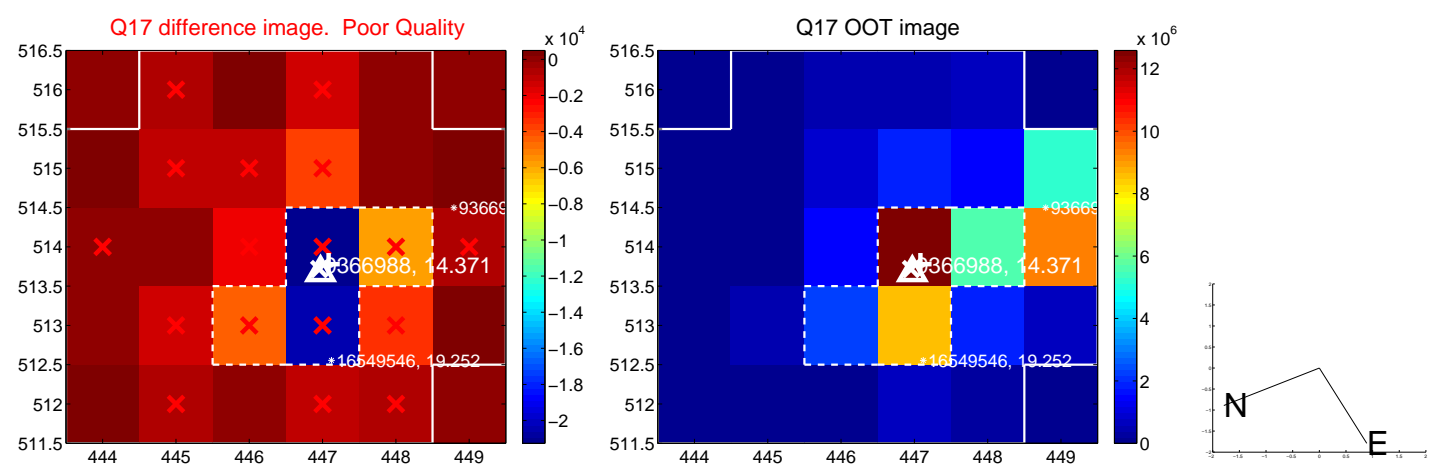
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



folded centroid time series figure for this object.

UKIRT Image

Declination

