

# KIC 009272938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009272938-01	OBS	No	0.903367	132.278943	16.0	3.742	10.3	7.9	1.95	6739	0.81	16533.62
009272938-02	OBS	No	102.605334	153.056725	322.4	2.103	7.9	9.1	1.95	6739	4.04	30.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009272938-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
009272938-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

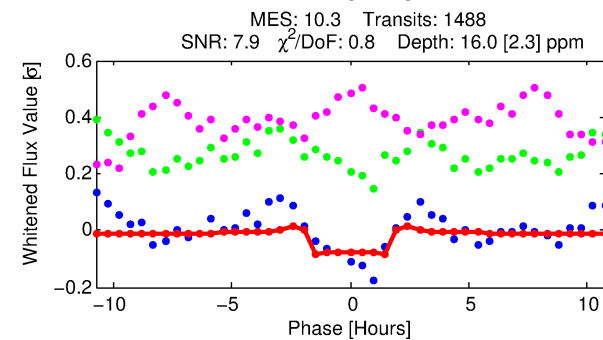
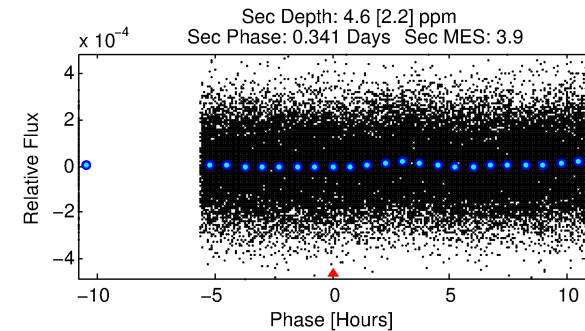
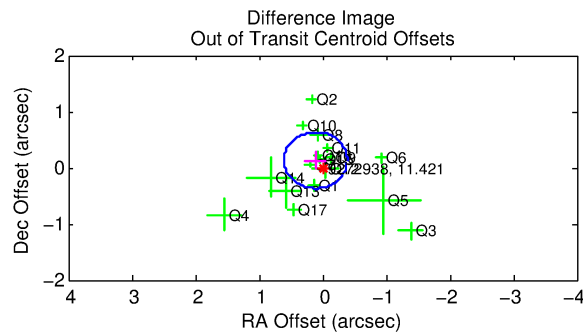
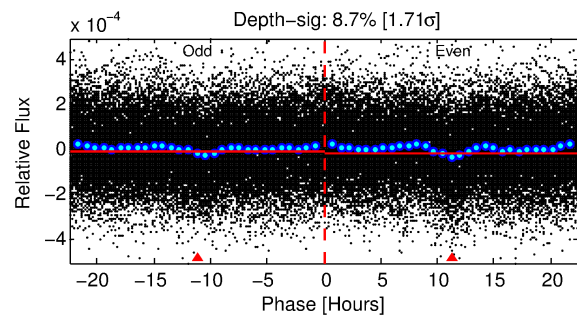
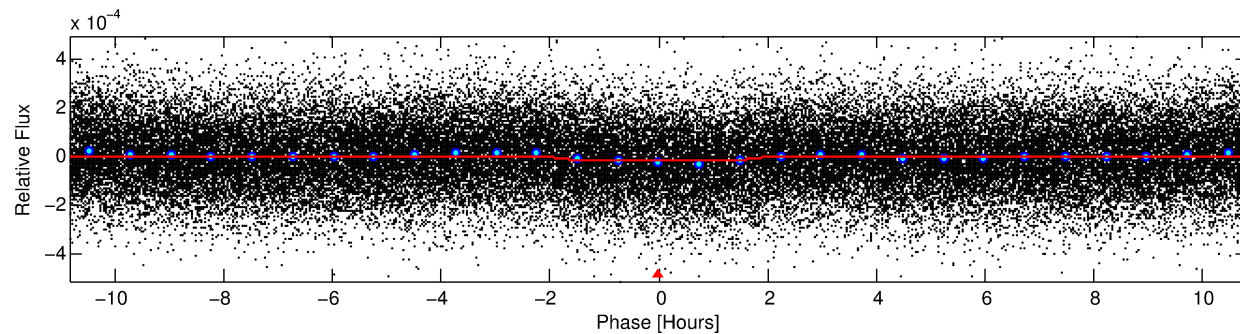
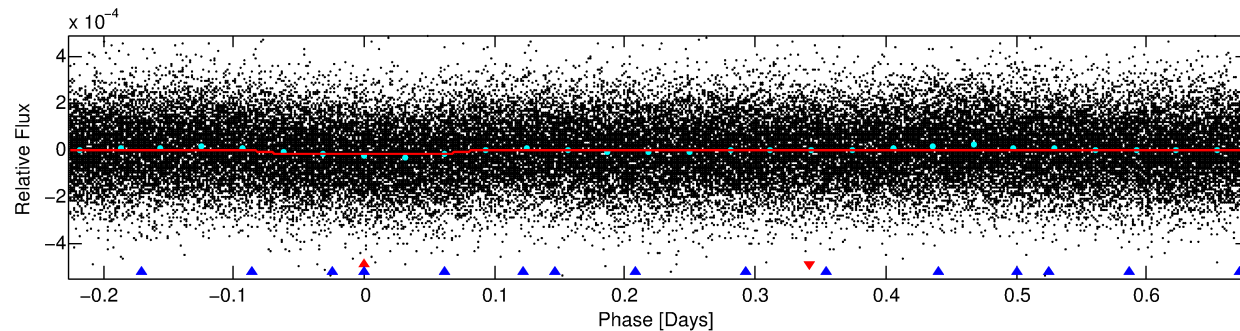
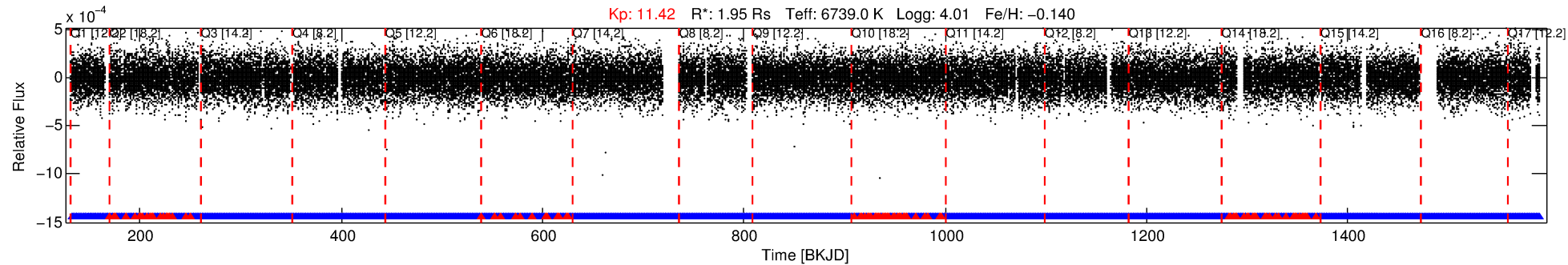
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009272938-01

No Significant Match Found

# DV One-Page Summary

KIC: 9272938 Candidate: 1 of 2 Period: 0.903 d



## DV Fit Results:

Period = 0.90337 [0.00001] d  
Epoch = 132.2789 [0.0033] BKJD  
Rp/R\* = 0.0038 [0.0008]  
a/R\* = 1.72 [1.23]  
b = 0.55 [1.37]  
Seff = 16533.62 [8045.48]  
Teq = 2891 [352] K  
Rp = 0.81 [0.32] Re  
a = 0.0206 [0.0062] AU  
Ag = 1.63 [1.27] [0.49 $\sigma$ ]  
Teffp = 5049 [819] K [2.42 $\sigma$ ]

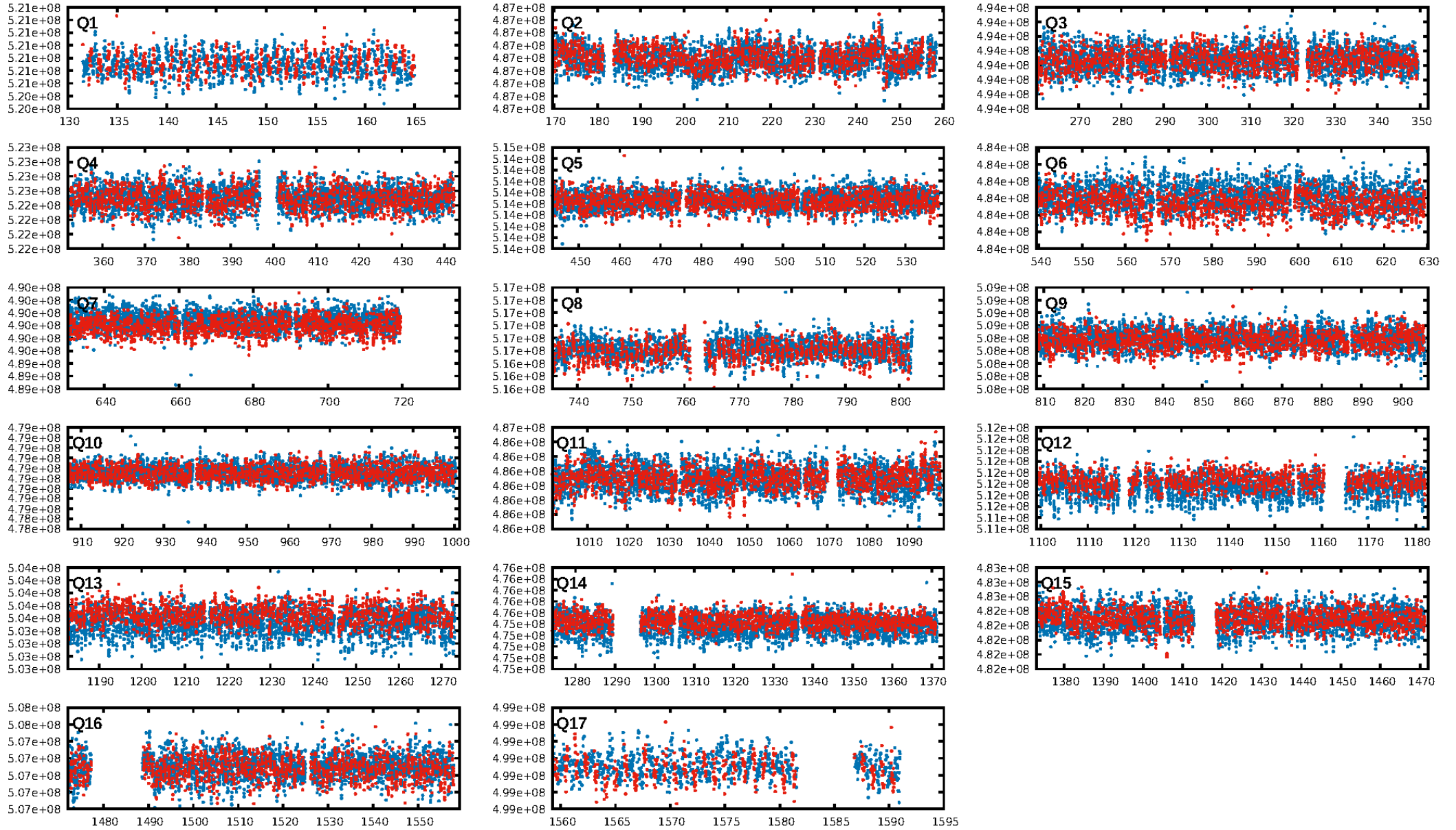
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [568.65 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.50e-15  
RollingBand-fgt: 0.93 [1328/1422]  
GhostDiagnostic-chr: -3.213  
Centroid-sig: 84.8%  
Centroid-so: 0.063 arcsec [0.12 $\sigma$ ]  
OotOffset-rm: 0.175 arcsec [1.05 $\sigma$ ]  
KicOffset-rm: 0.408 arcsec [2.58 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.65 [11/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:09:50 Z

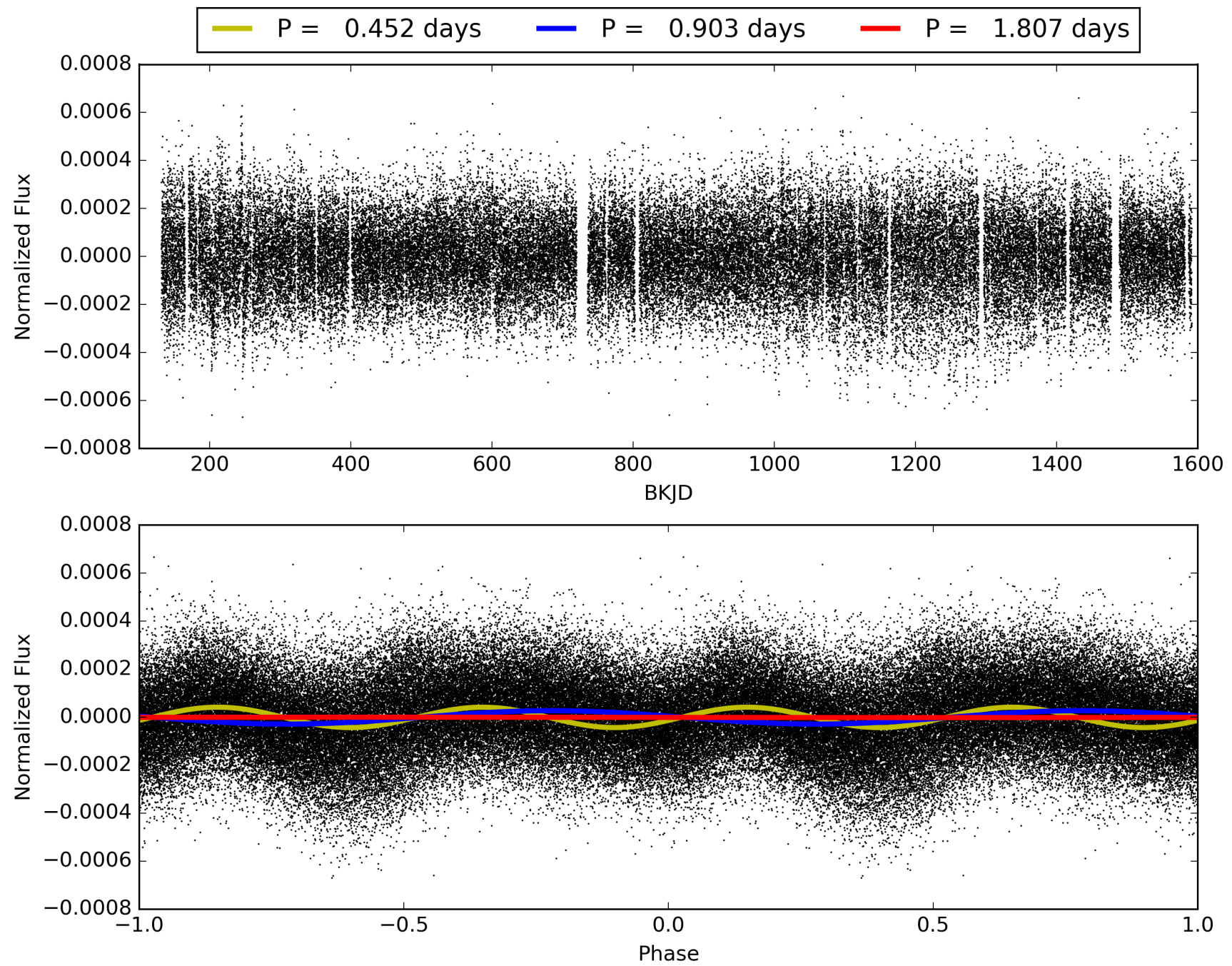
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009272938-01, PDC Light Curves



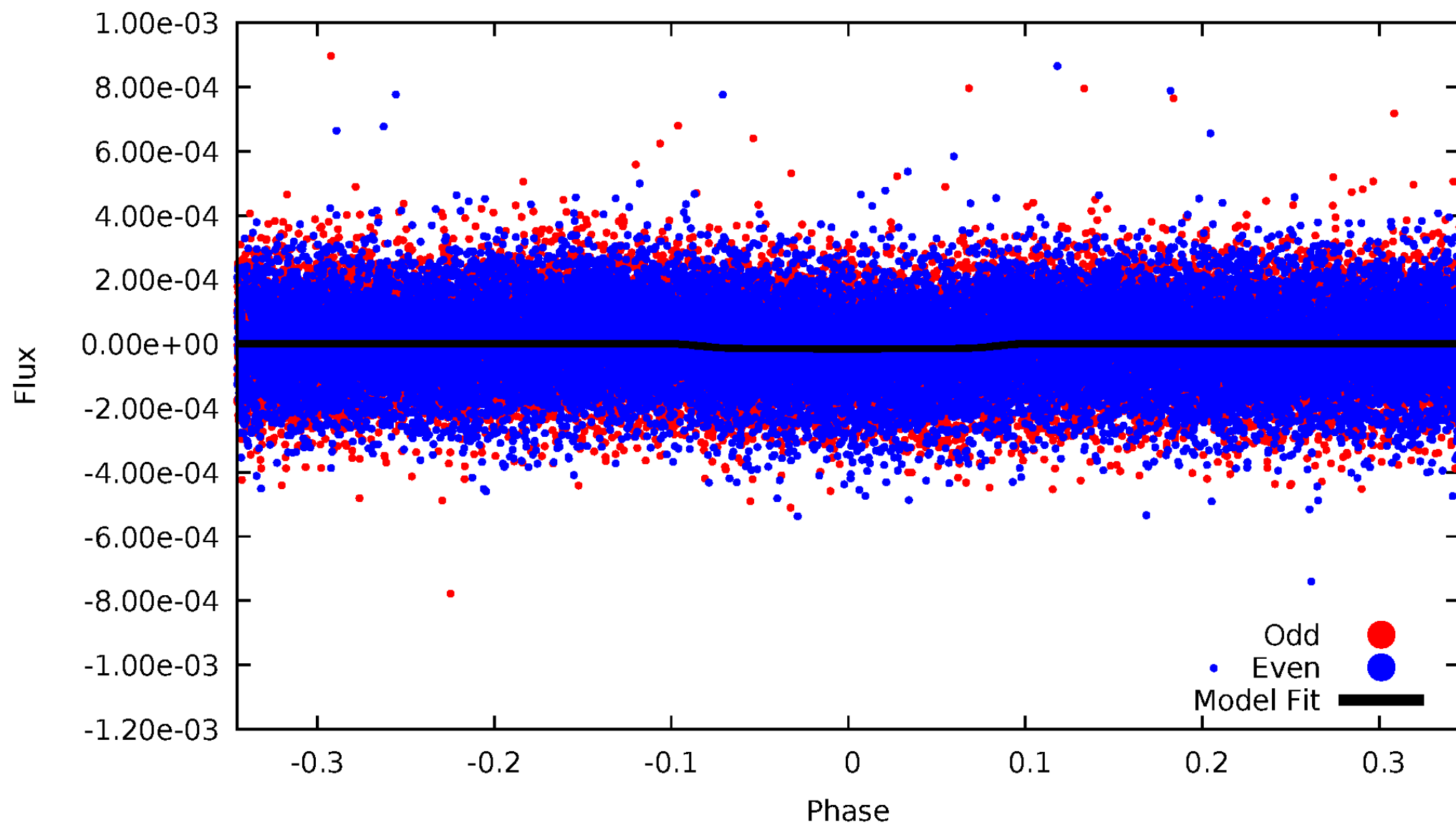


TCE 009272938-01



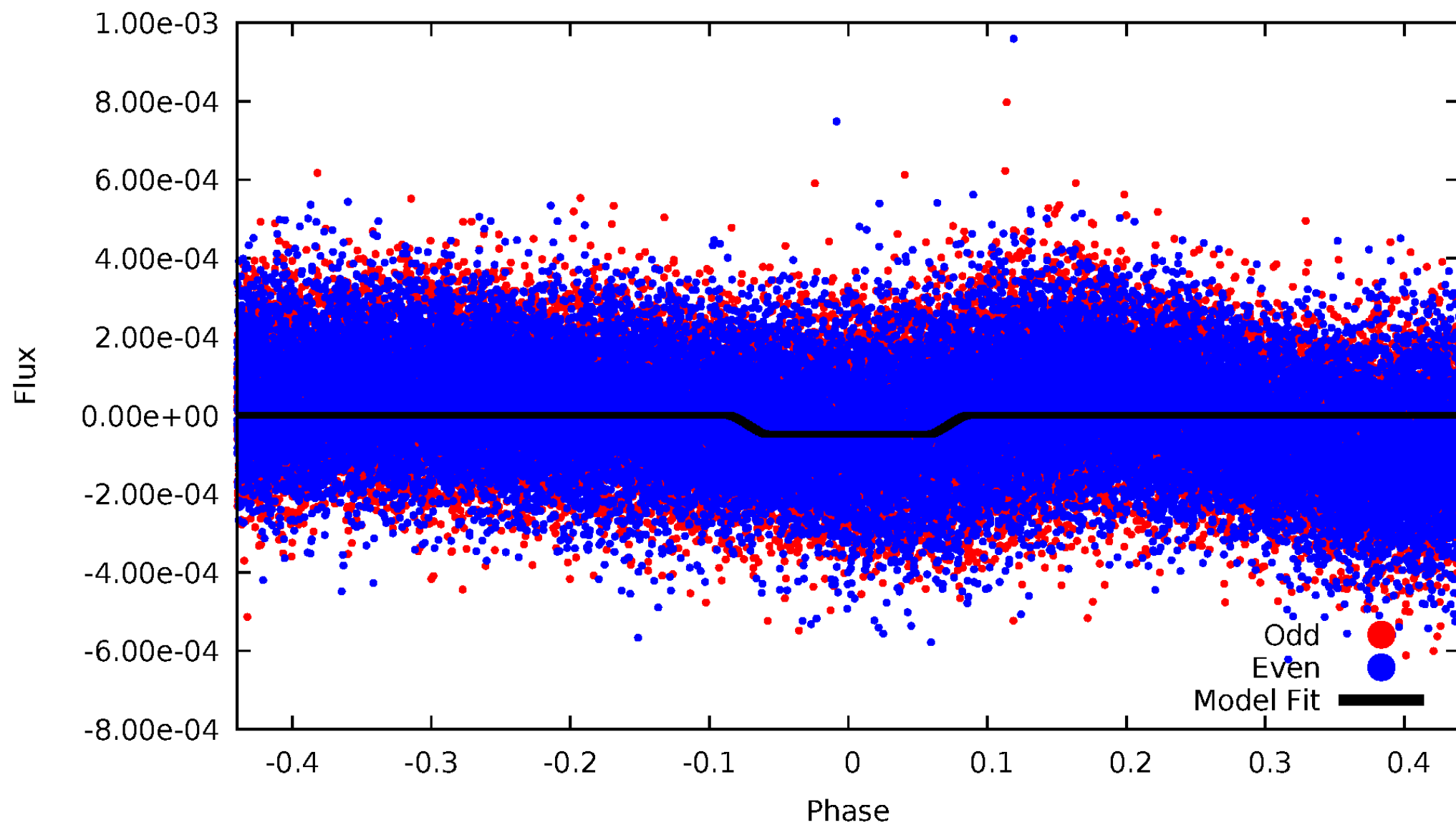
# DV Odd/Even

TCE 009272938-01



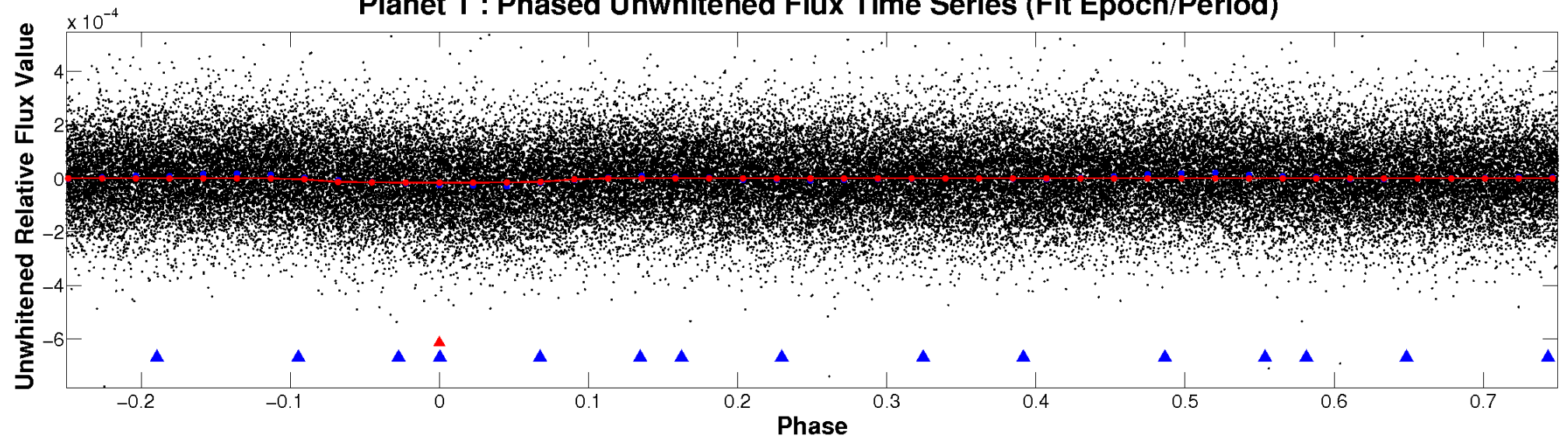
# ALT Odd/Even

TCE 009272938-01

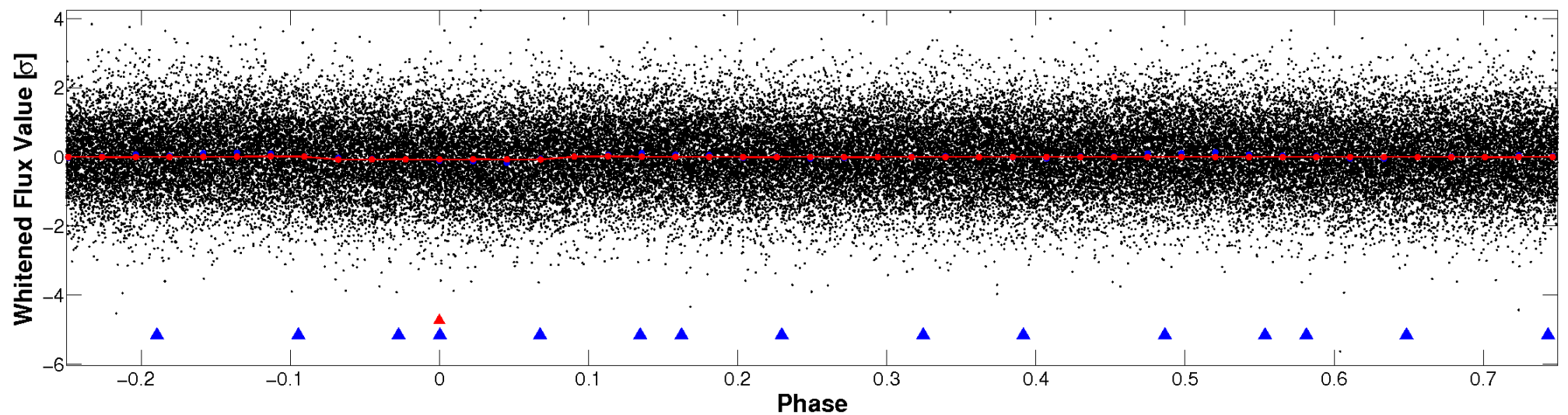


# Non-Whitened Vs. Whitened Light Curve

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



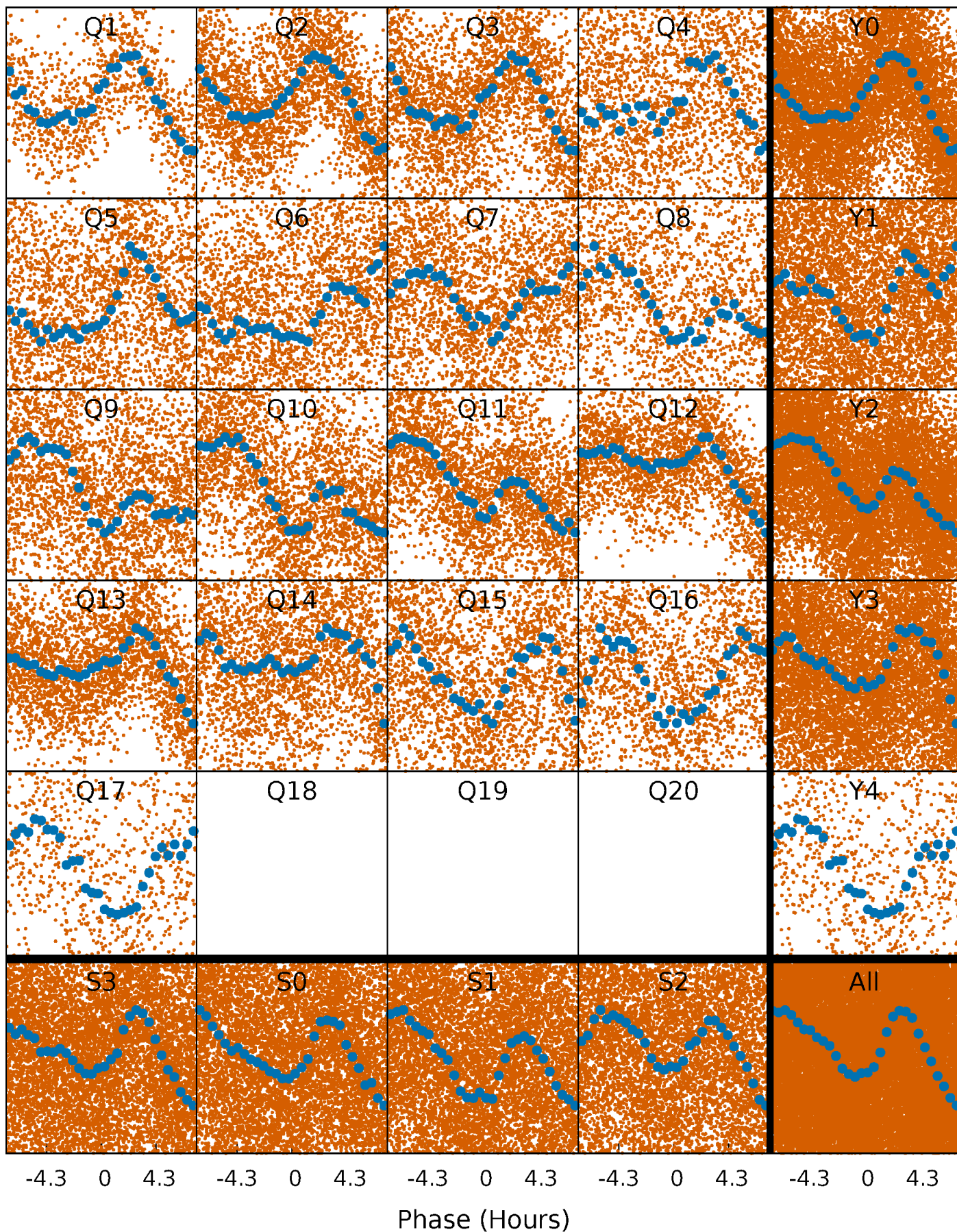
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

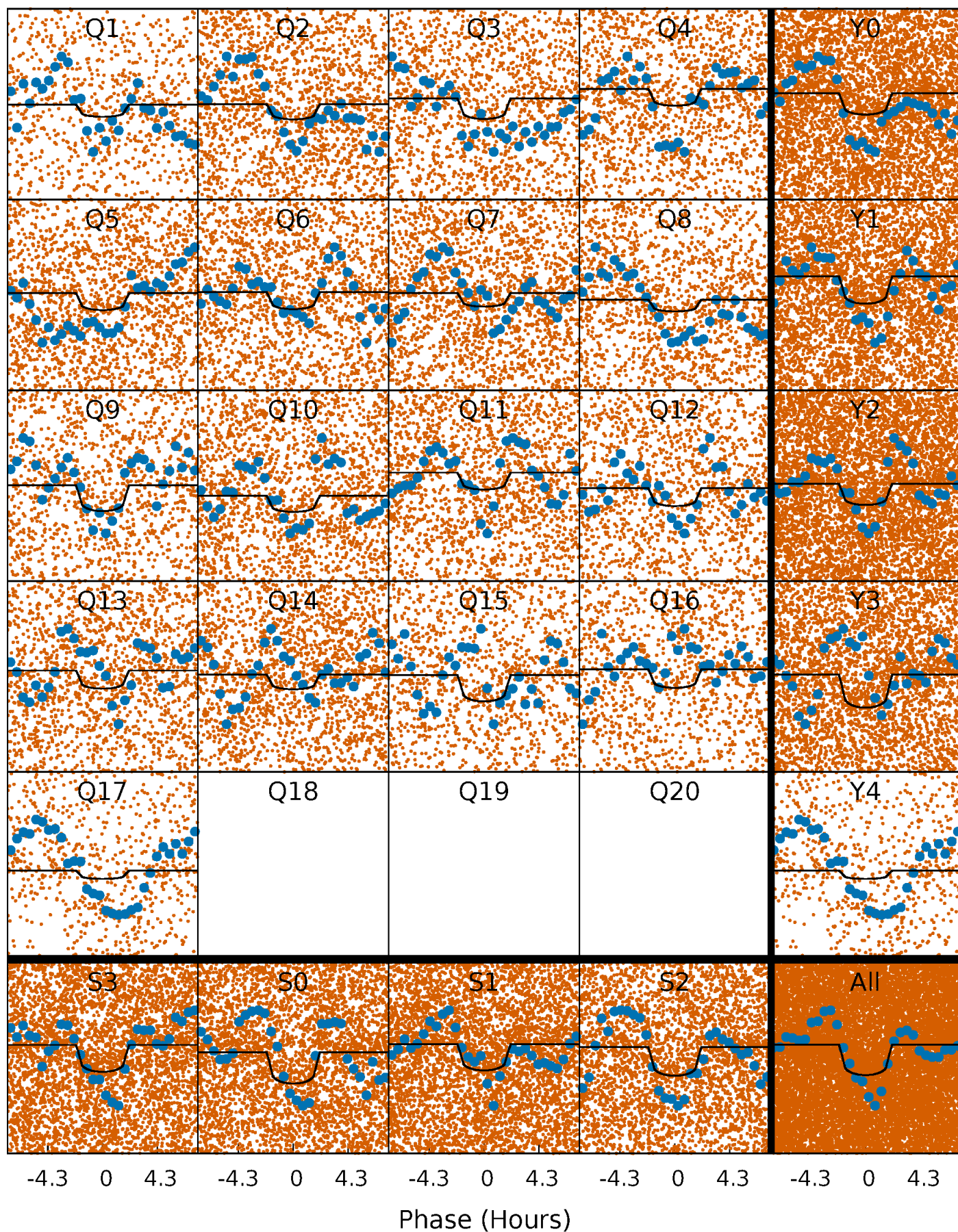
TCE 009272938-01 P= 0.903367 Days  $T_0=132.278943$  (BKJD)





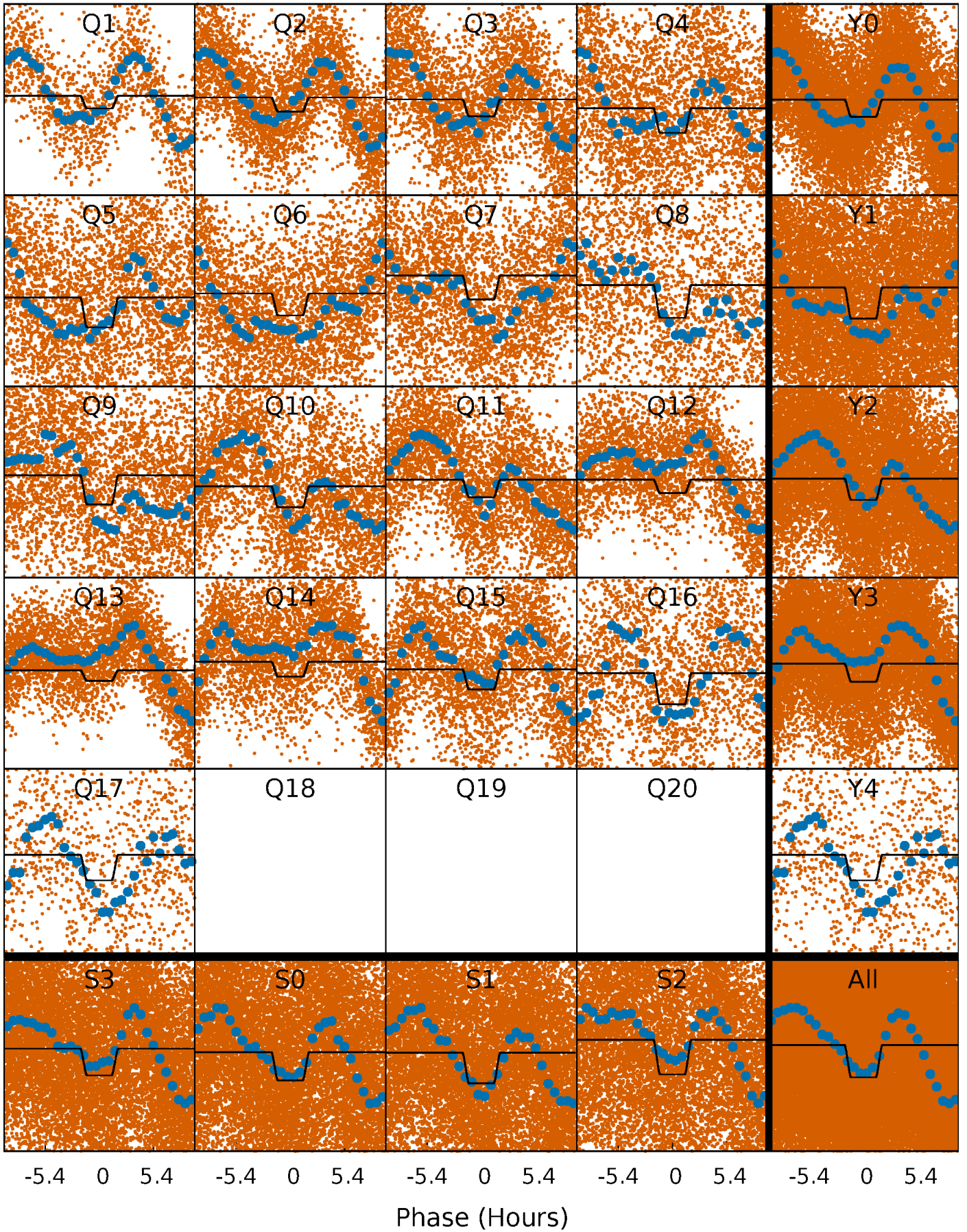
# DV Quarter-Phased Transit Curves

TCE 009272938-01 P= 0.903367 Days  $T_0=132.278943$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009272938-01 P= 0.903409 Days  $T_0=132.222388$  (BKJD)

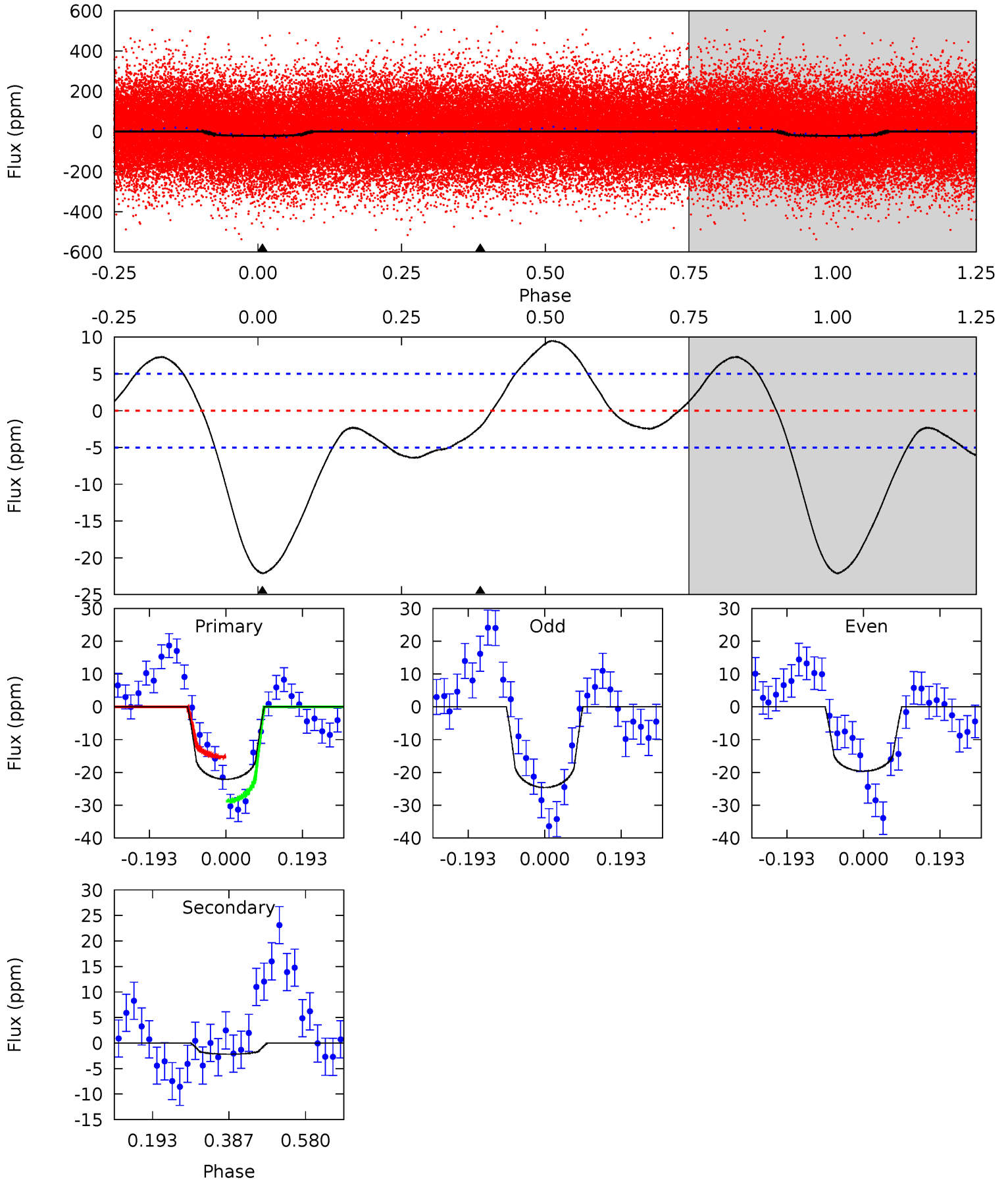




# DV Model-Shift Uniqueness Test

009272938-01, P = 0.903367 Days, E = 131.375576 Days

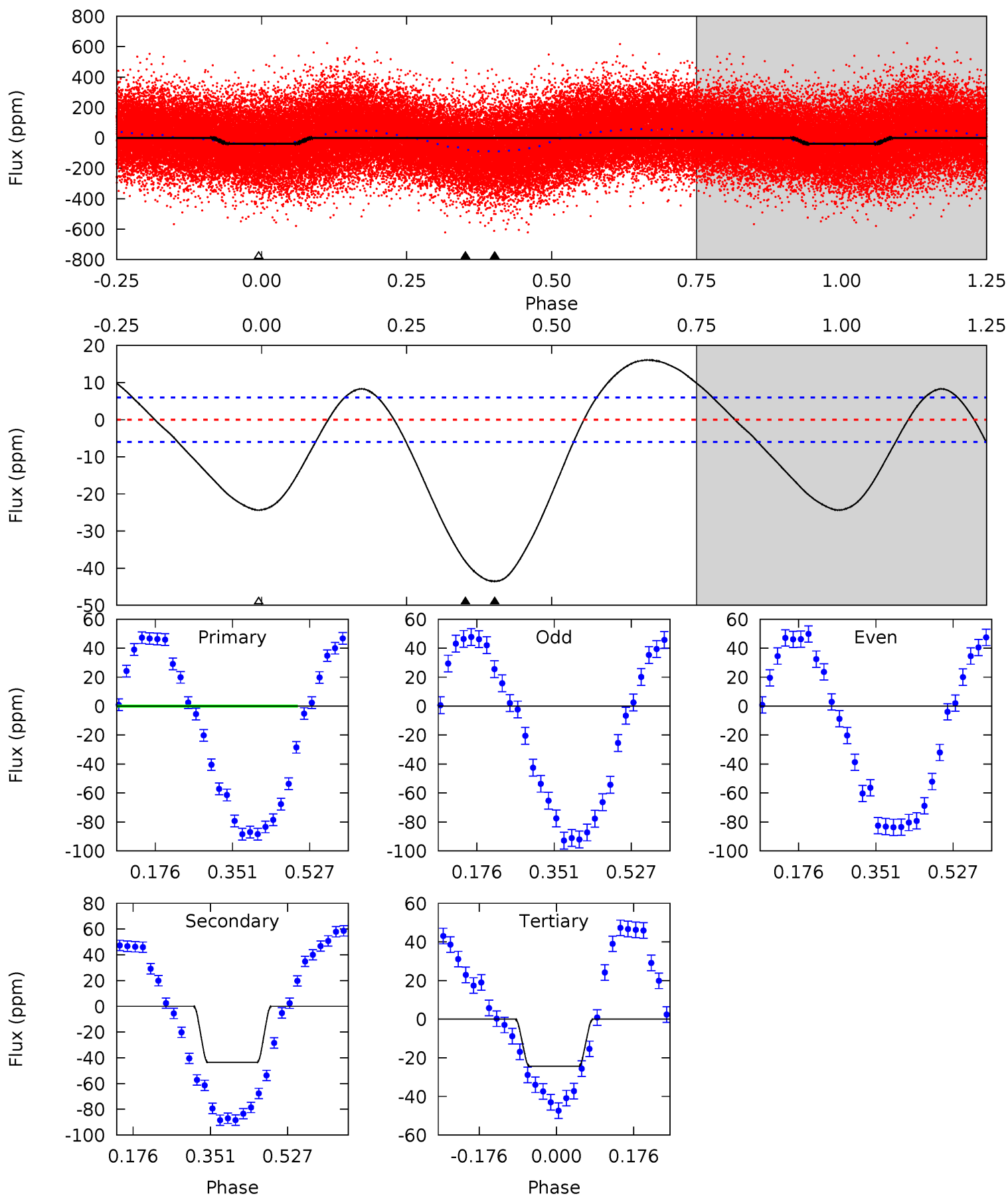
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.5	1.93	0	0	4.42	1.30	2.47	19.5	19.5	1.93	1.93	2.20	1.10	0.30	5.92



# Alt Model-Shift Uniqueness Test

009272938-01, P = 0.903409 Days, E = 131.318979 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
28.3	32.3	18.0	0	4.45	1.35	10.1	10.3	28.3	14.2	32.3	2.77	0.87	0.27	0.34





### Stellar Parameters For KIC 009272938

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6739^{+188}_{-259}$	$4.013^{+0.264}_{-0.176}$	$-0.140^{+0.250}_{-0.300}$	$1.947^{+0.528}_{-0.646}$	$1.430^{+0.196}_{-0.318}$	$0.273^{+0.522}_{-0.117}$
	+3%/-4%	+7%/-4%	+179%/-214%	+27%/-33%	+14%/-22%	+191%/-43%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009272938-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2 \pm 1$	$0.79^{+0.24}_{-0.20}$	$4012^{+319}_{-348}$	$3931^{+773}_{-1458}$	$0.742^{+0.808}_{-0.427}$
Alt.	$-44 \pm 1$	$1.47^{+0.29}_{-0.29}$	$4017^{+308}_{-346}$	$6387^{+470}_{-438}$	$4.660^{+2.353}_{-1.413}$

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

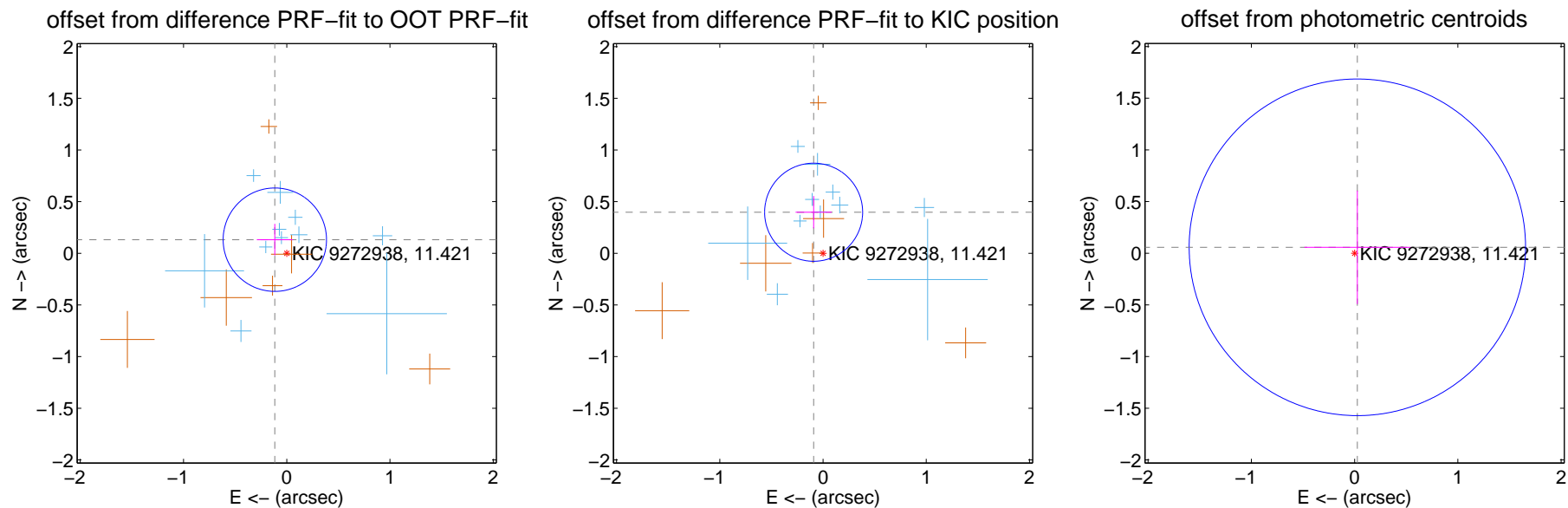
## DV Centroid Data

Supplemental centroid analysis for 009272938-01. **Kepler magnitude: 11.42.** Transit SNR 7.88

There are 11 quarters with good PRF difference image offsets

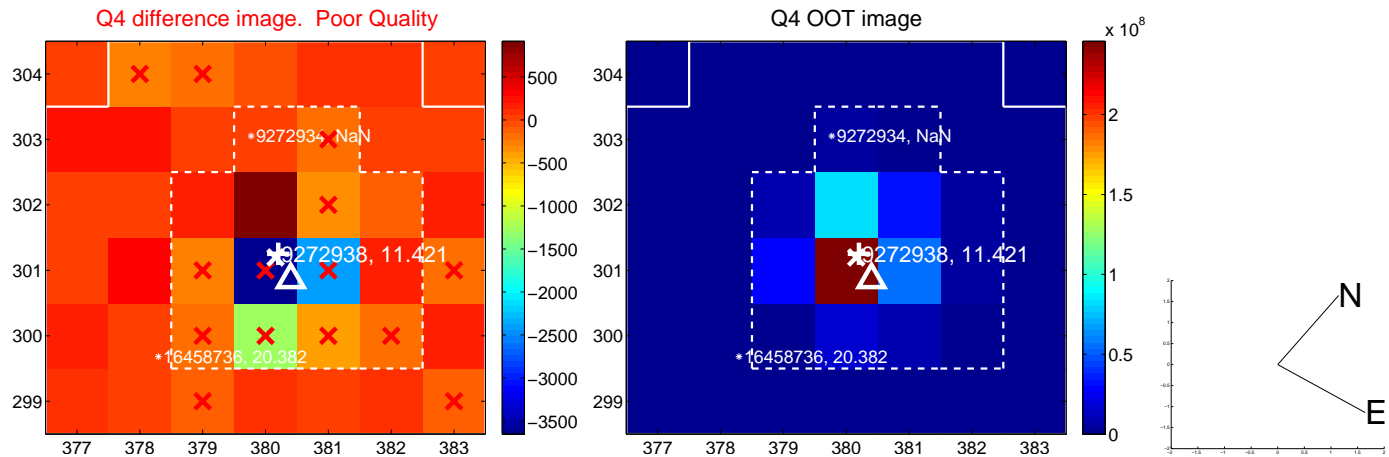
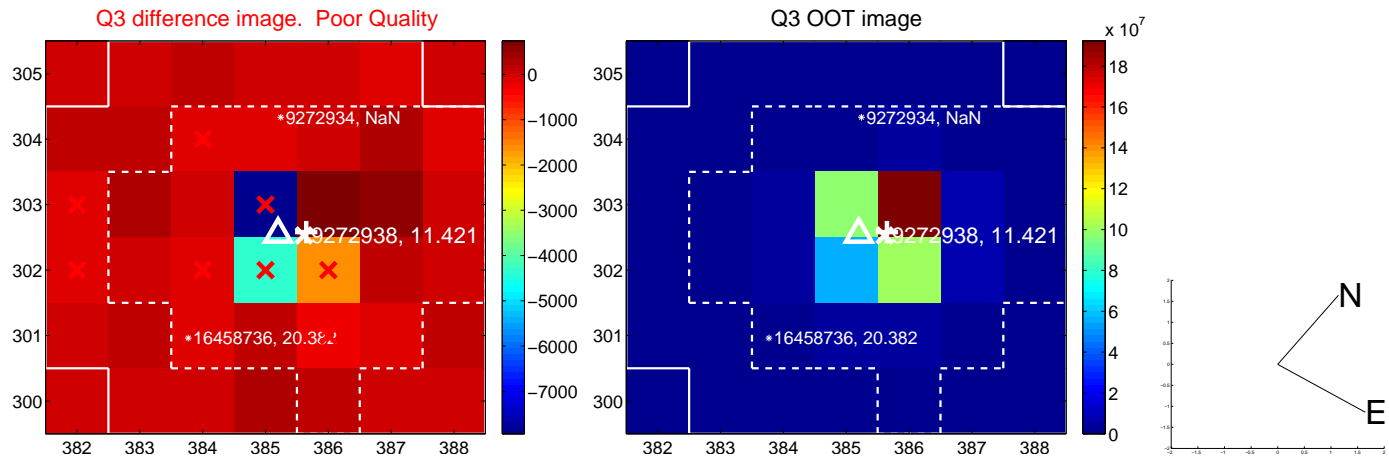
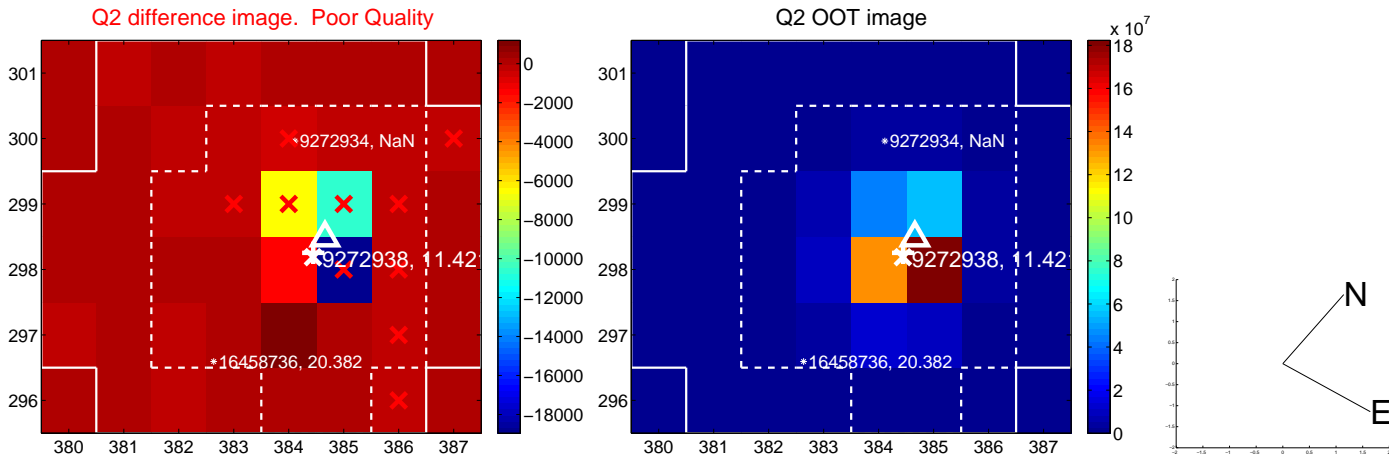
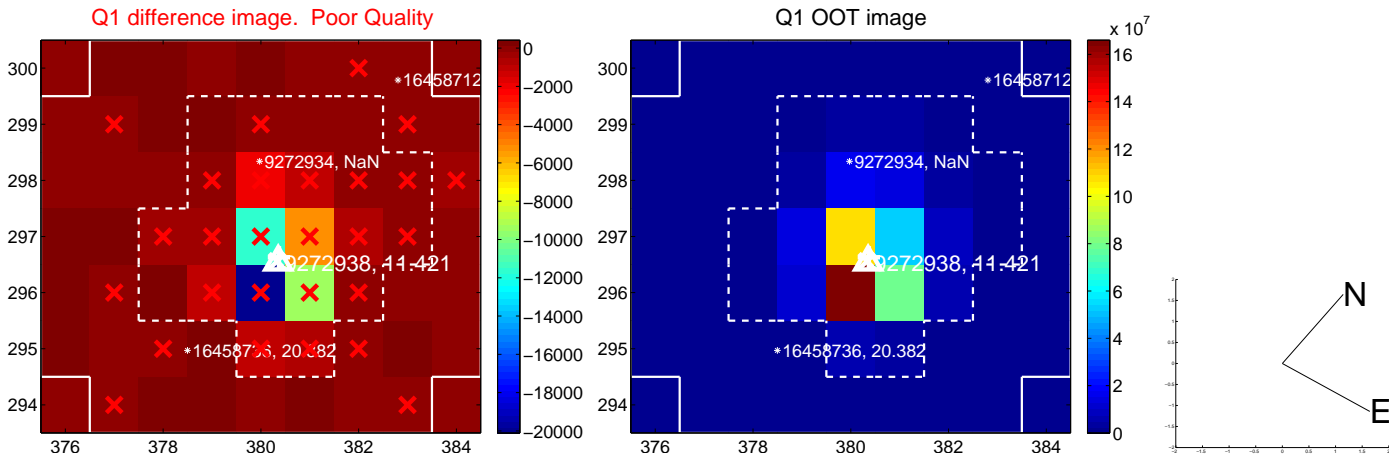
The direct PRF centroid is offset from the target star catalog position by about 0.36 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.175 \pm 0.167$	1.05	$0.115 \pm 0.174$	$0.132 \pm 0.154$
PRF-fit source offset from KIC position	$0.408 \pm 0.158$	2.58	$0.091 \pm 0.175$	$0.397 \pm 0.156$
photometric centroid source offset	$0.06 \pm 0.54$	0.12	$-0.03 \pm 0.51$	$0.06 \pm 0.55$

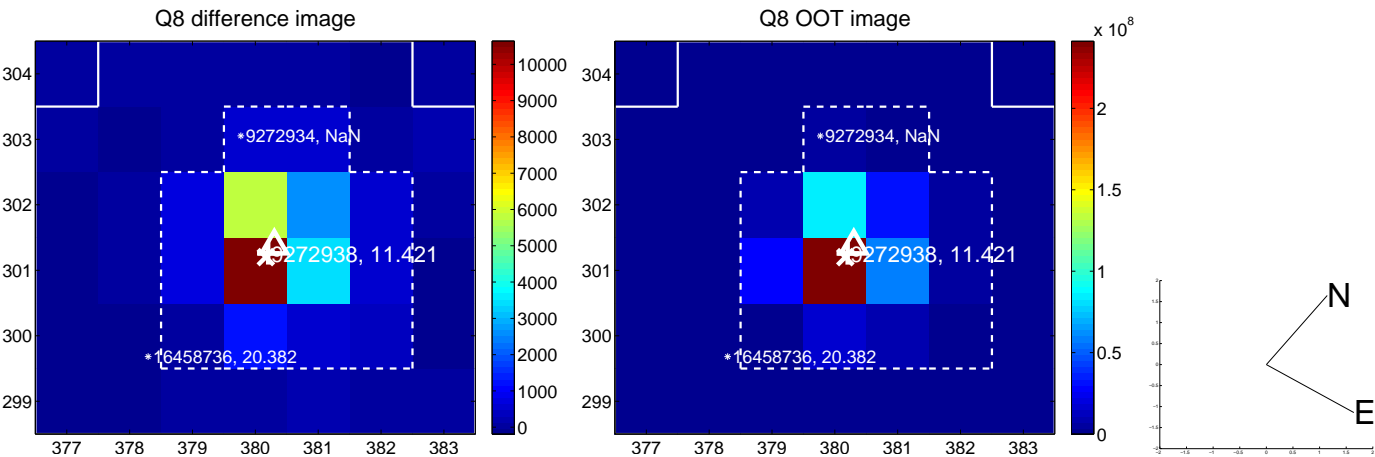
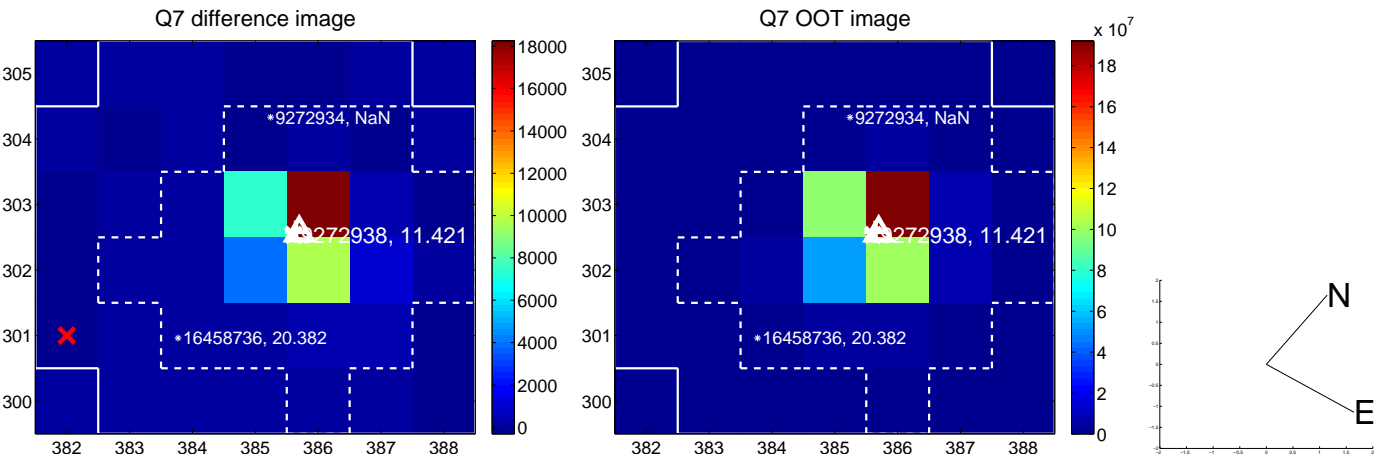
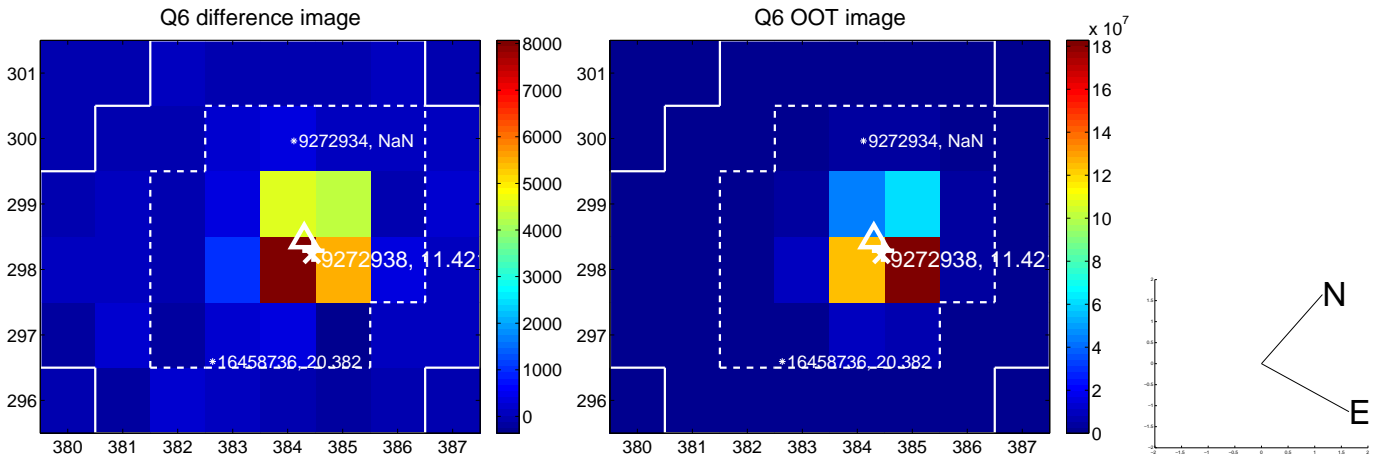
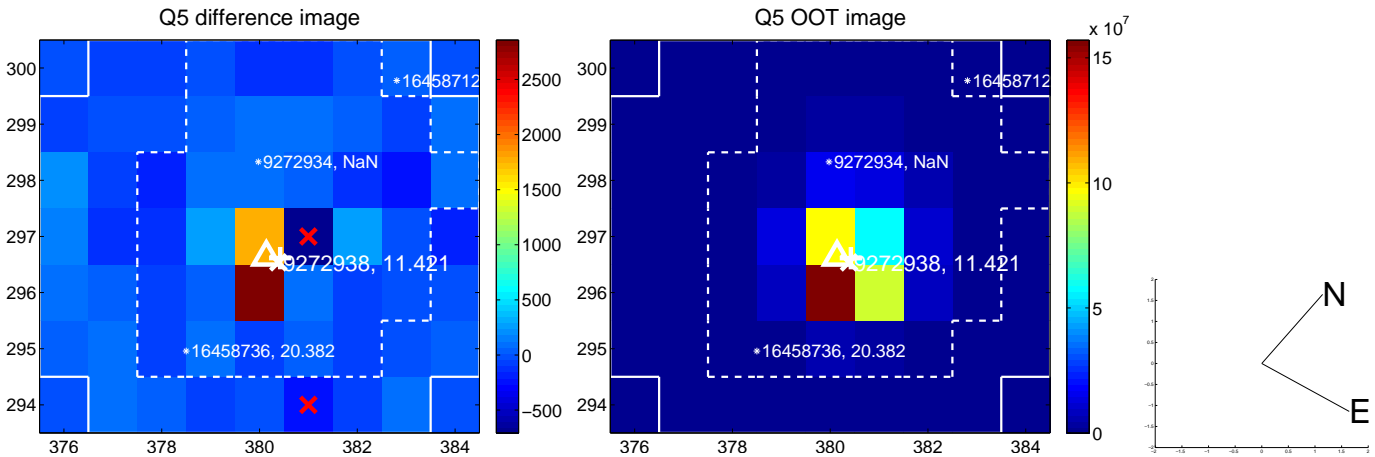


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

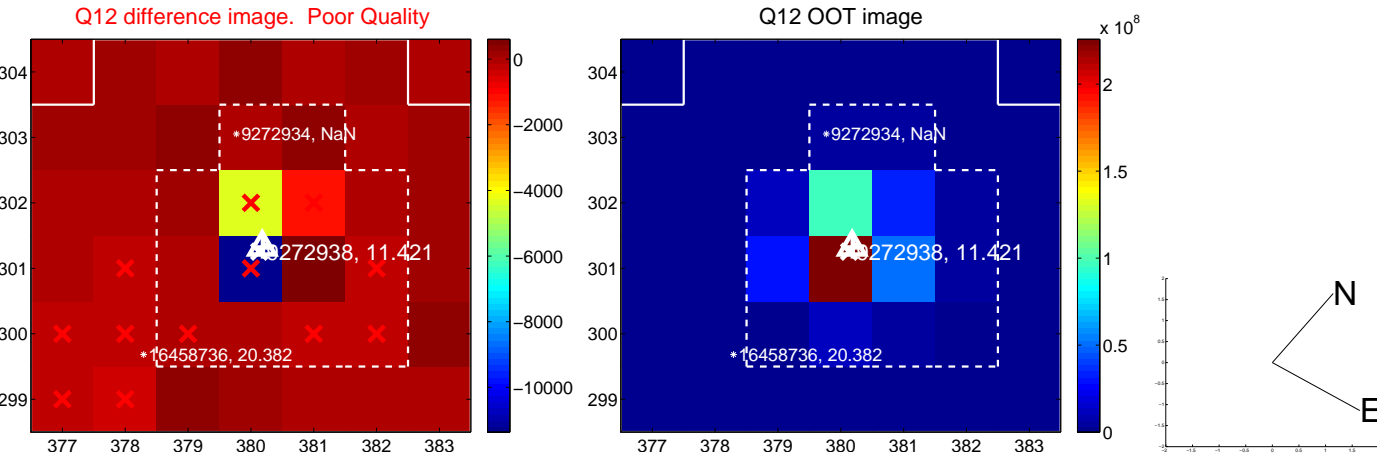
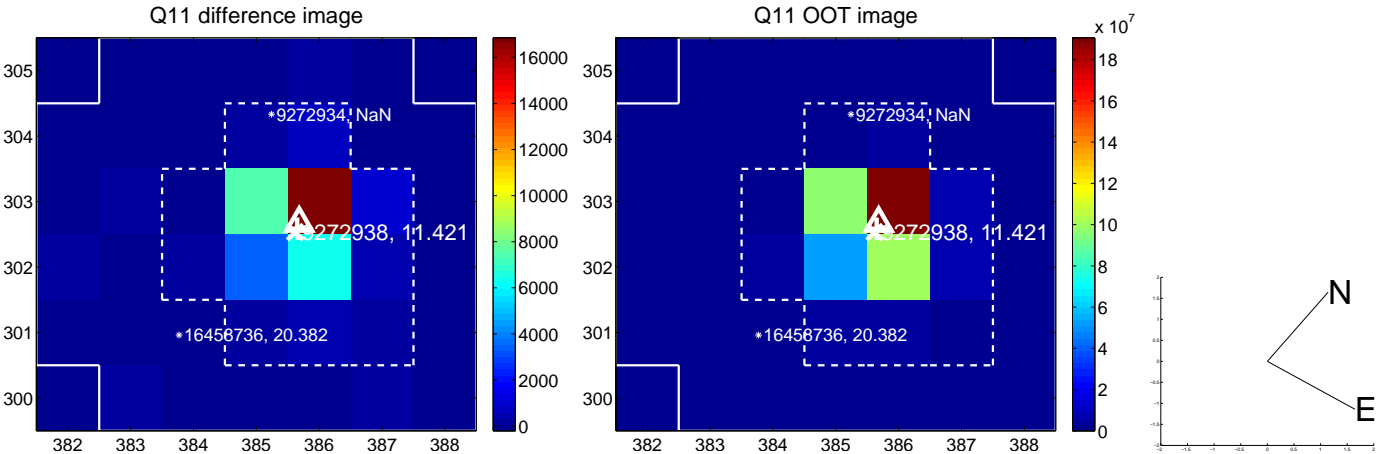
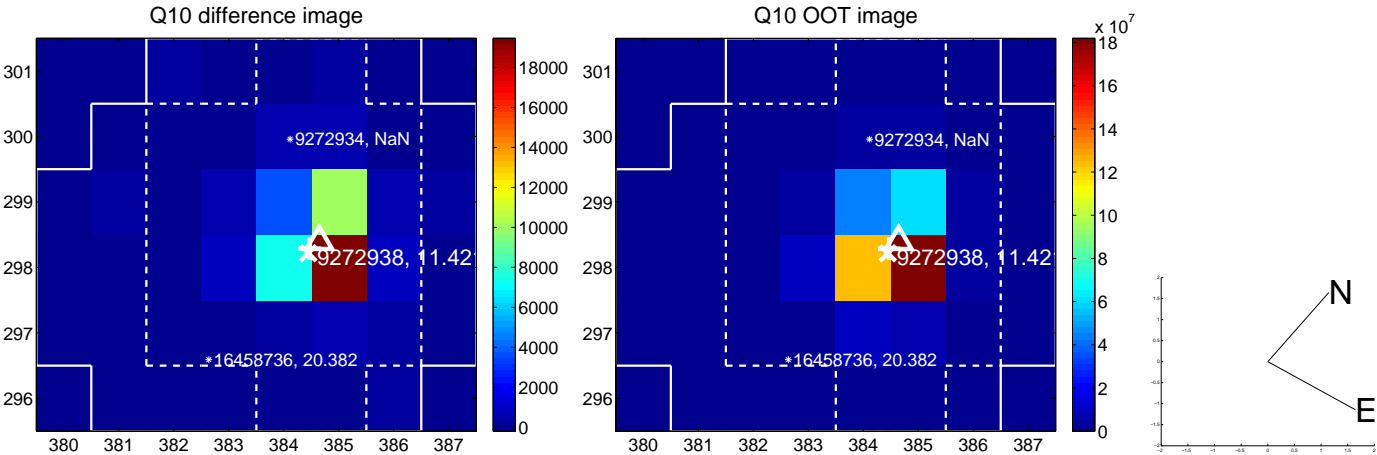
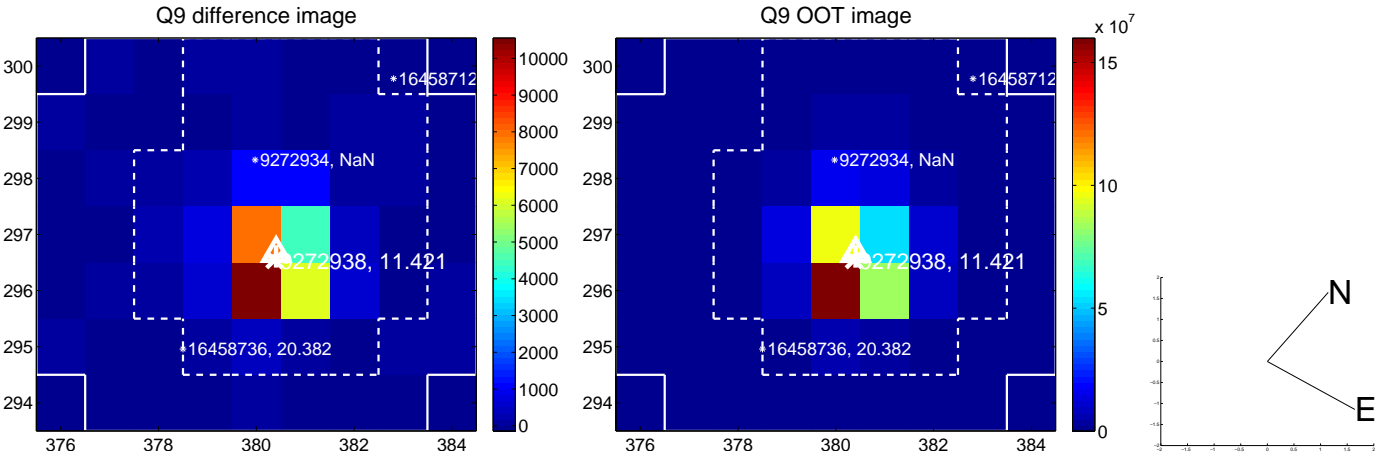


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

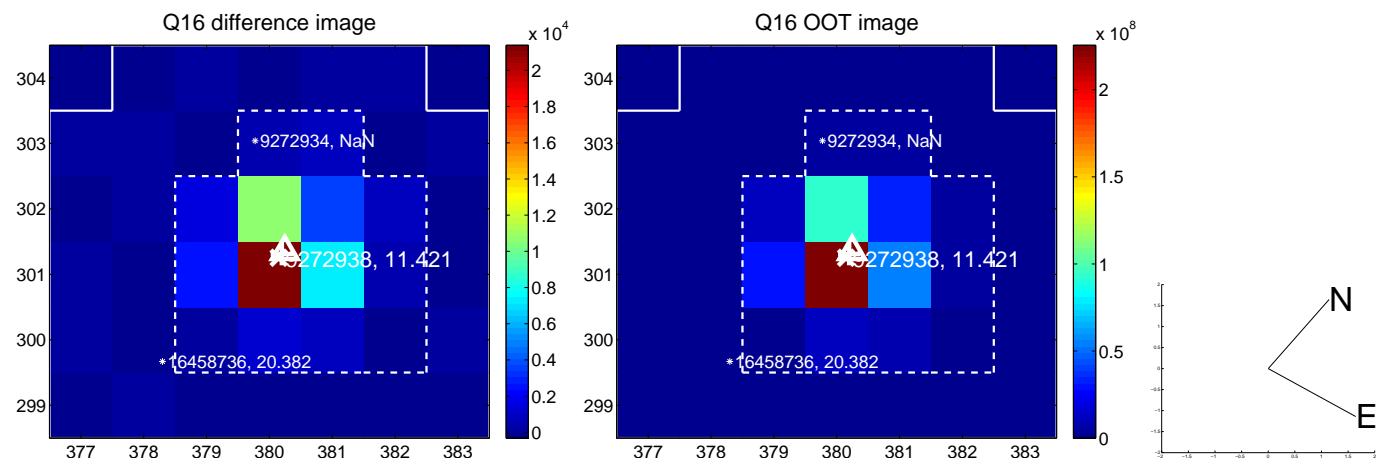
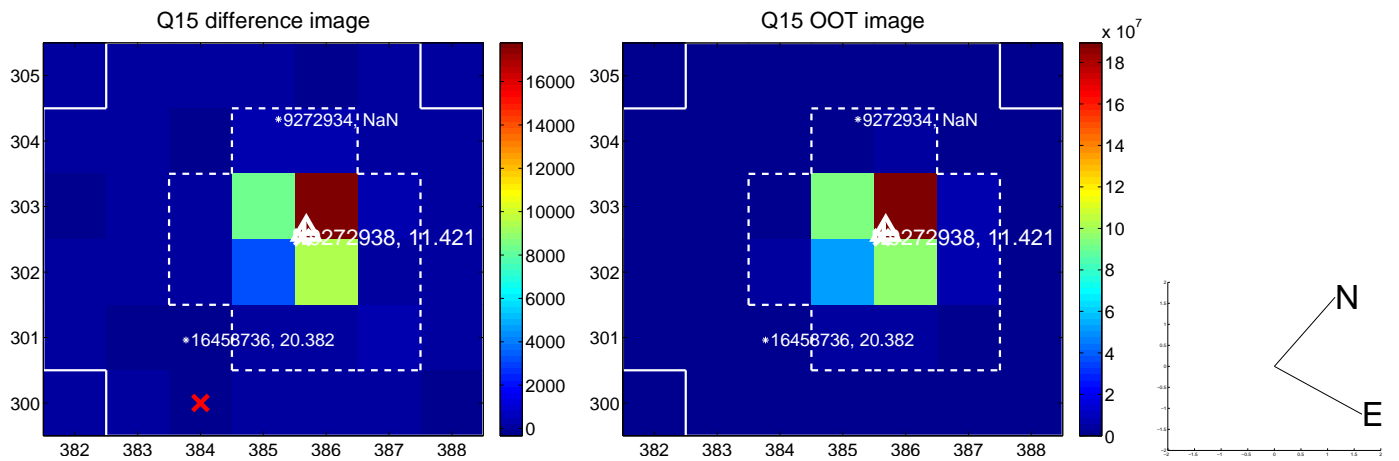
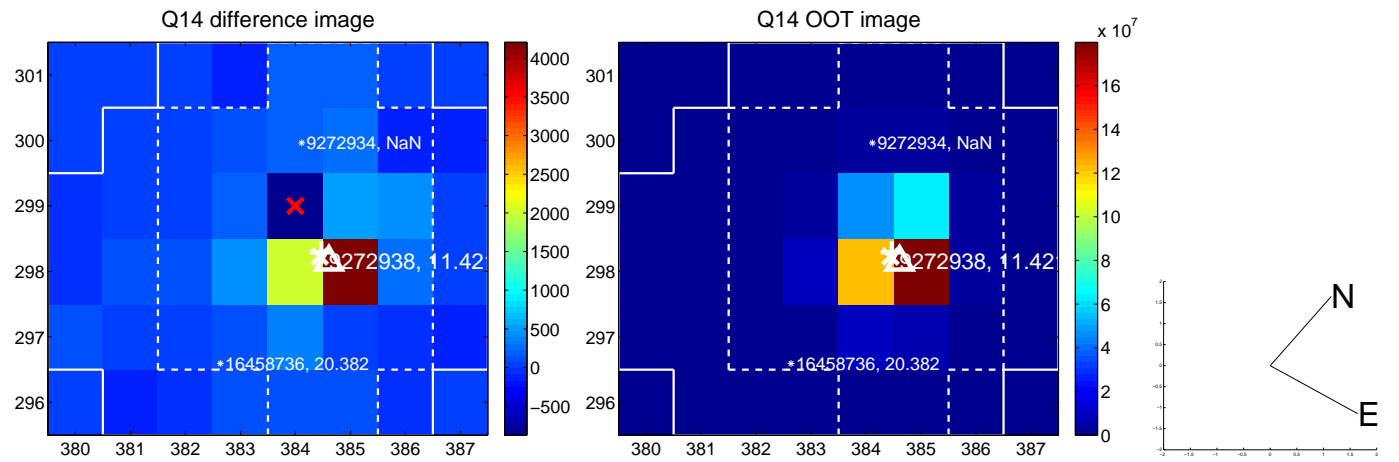
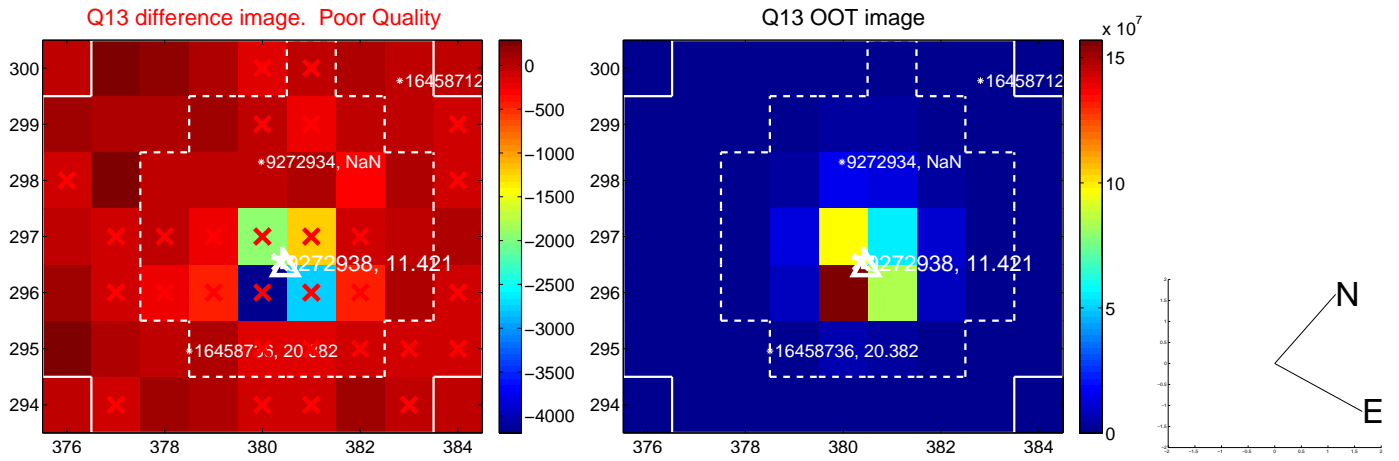




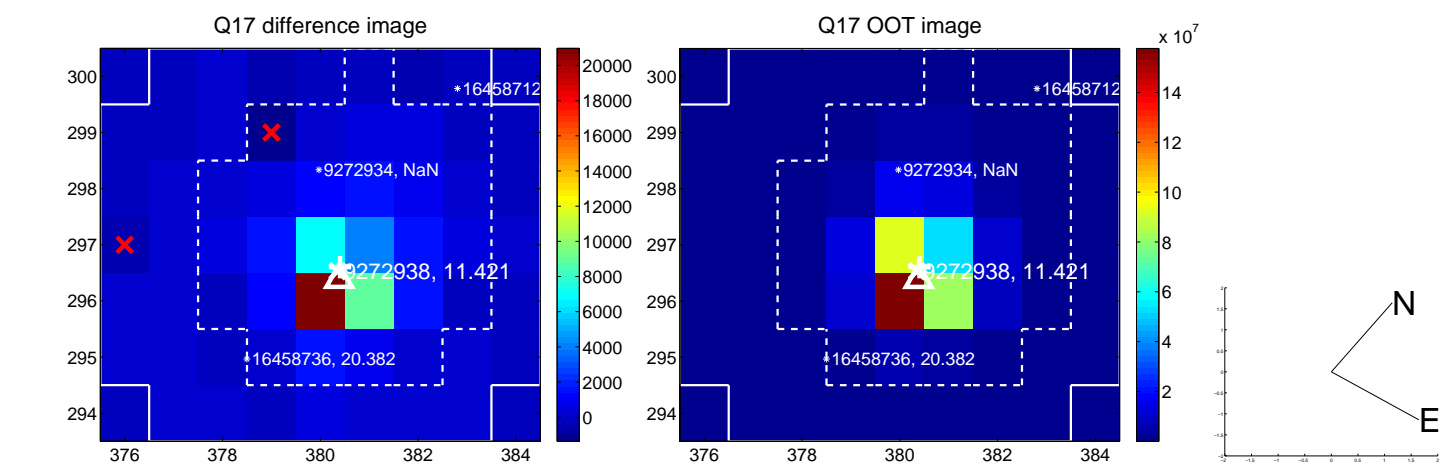
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



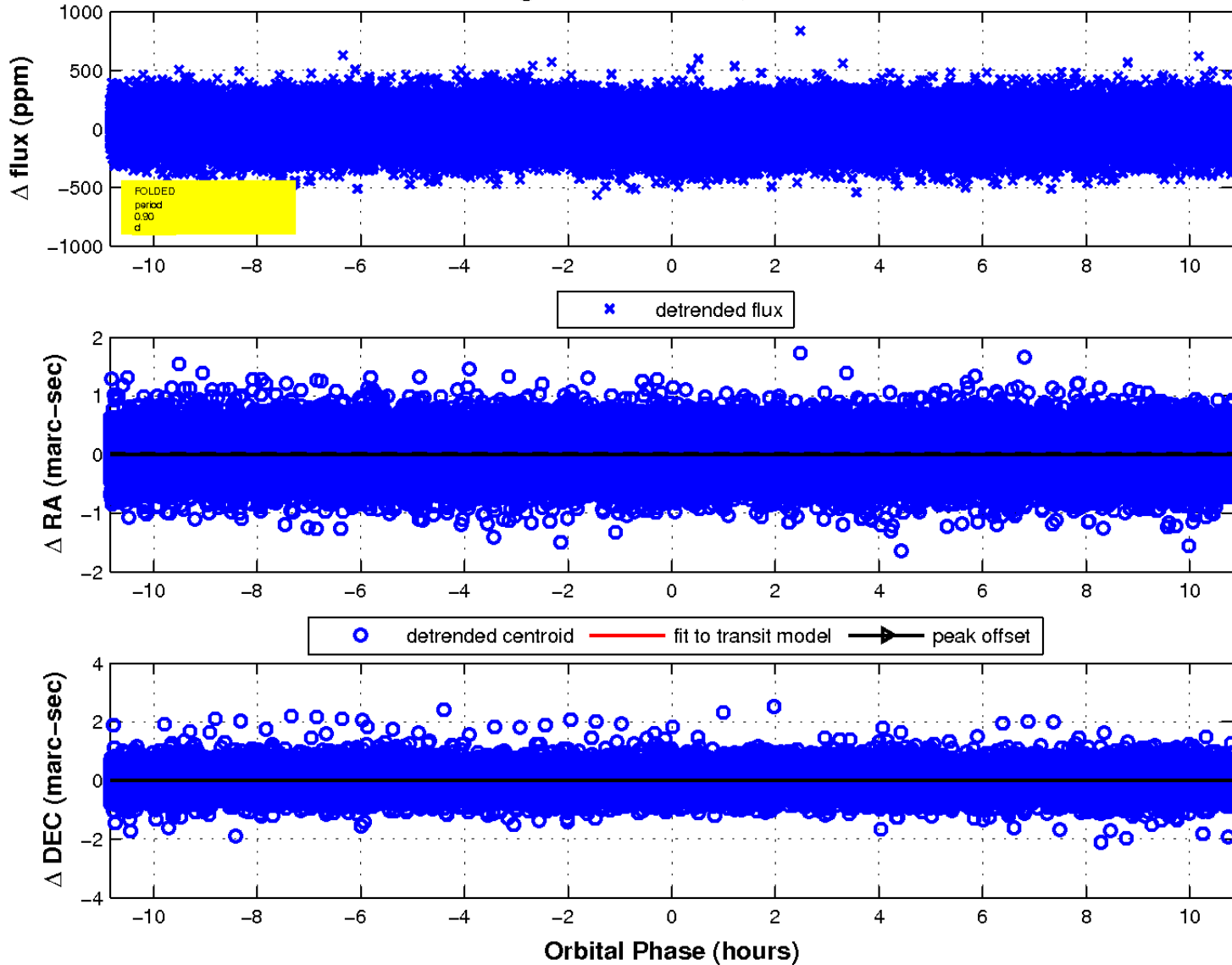
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

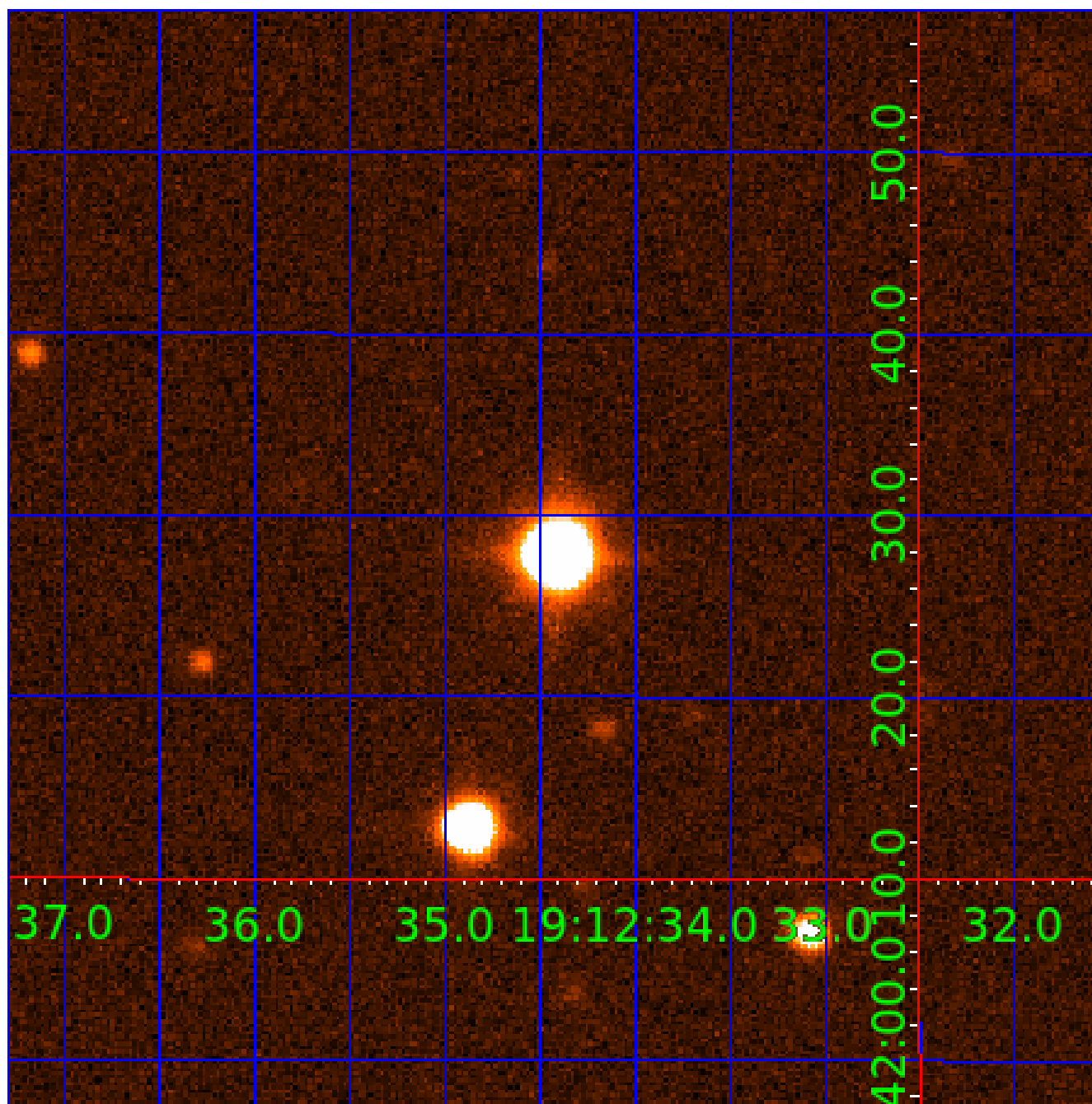


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 009272938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009272938-01	OBS	No	0.903367	132.278943	16.0	3.742	10.3	7.9	1.95	6739	0.81	16533.62
009272938-02	OBS	No	102.605334	153.056725	322.4	2.103	7.9	9.1	1.95	6739	4.04	30.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009272938-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
009272938-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

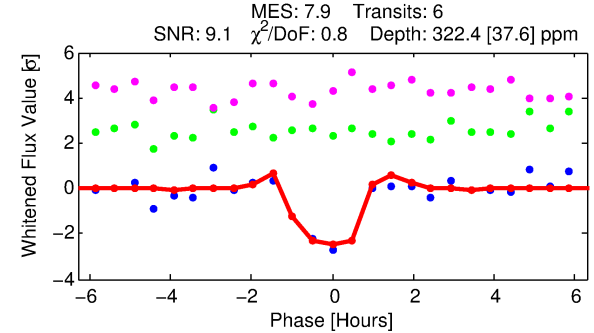
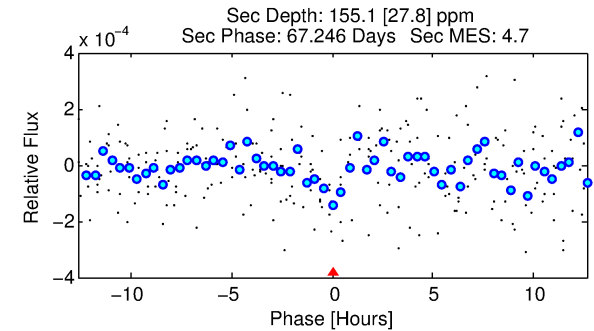
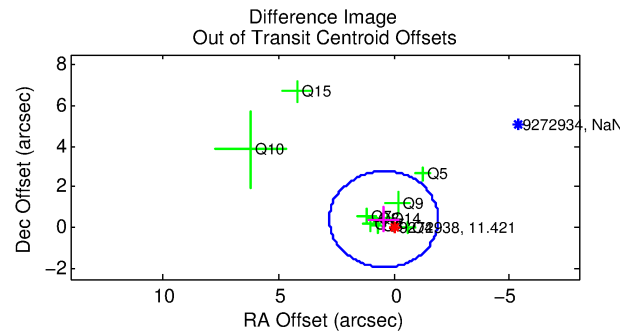
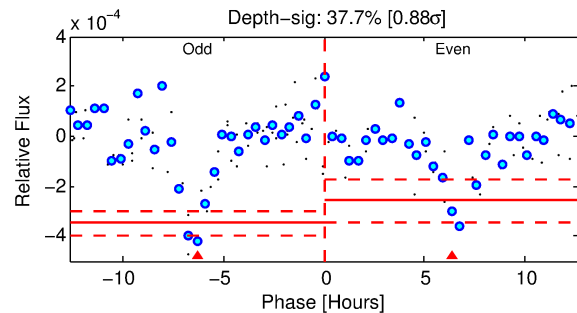
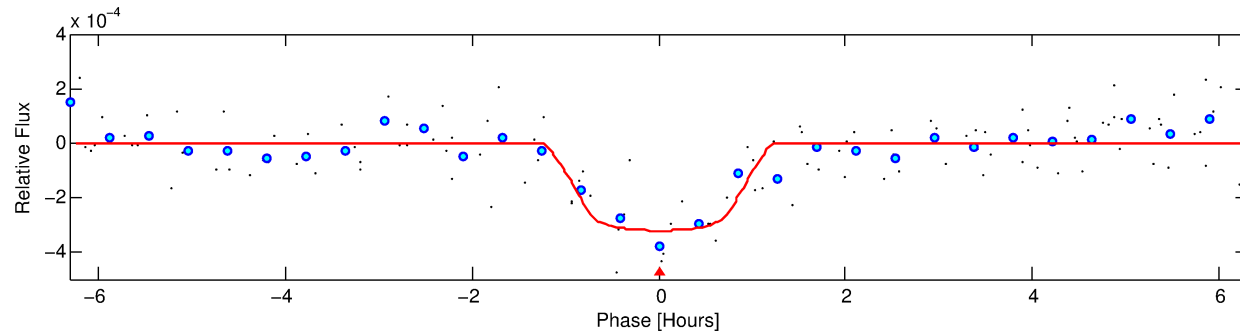
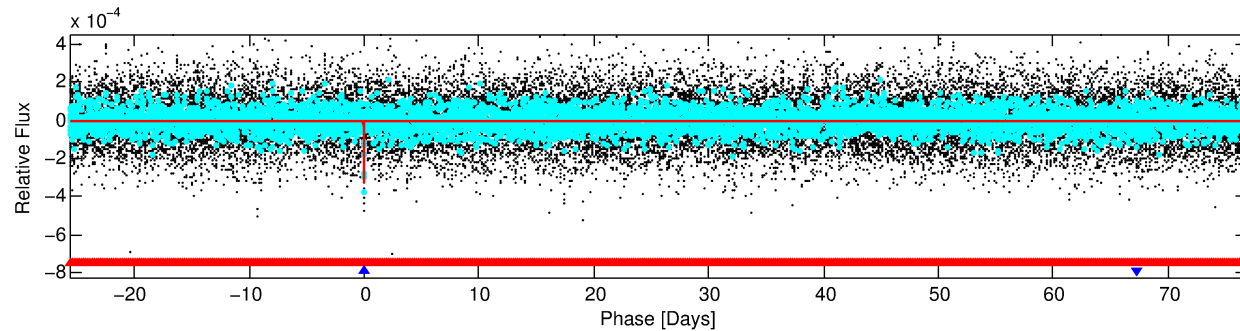
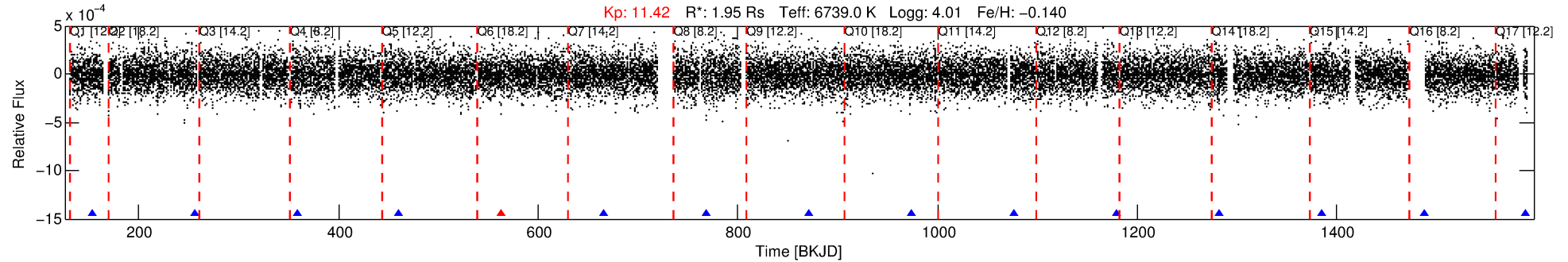
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009272938-02

No Significant Match Found

# DV One-Page Summary

KIC: 9272938 Candidate: 2 of 2 Period: 102.605 d



## DV Fit Results:

Period = 102.60533 [0.00074] d  
Epoch = 153.0567 [0.0055] BKJD  
Rp/R\* = 0.0190 [0.0065]  
a/R\* = 187.32 [363.44]  
b = 0.89 [0.47]  
Seff = 30.06 [14.63]  
Teff = 597 [73] K  
Rp = 4.04 [1.92] Re  
a = 0.4827 [0.1448] AU  
Ag = 1219.13 [1024.52] [1.19 $\sigma$ ]  
Teffp = 5455 [980] K [4.94 $\sigma$ ]

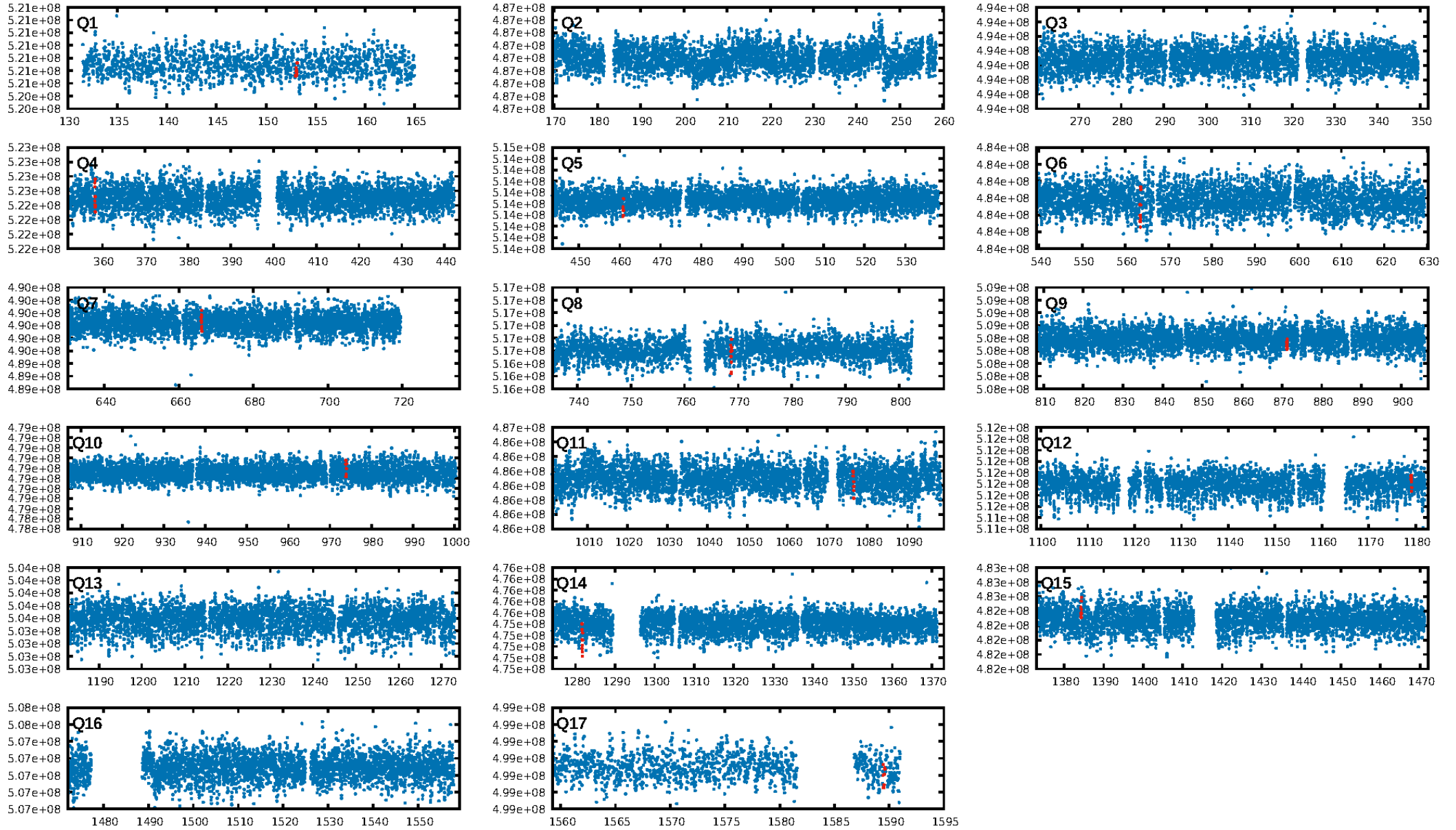
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [568.65 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 67.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.01e-10**  
RollingBand-fgt: 0.83 [5/6]  
GhostDiagnostic-chr: 2.874  
Centroid-sig: 86.8%  
Centroid-so: 0.097 arcsec [0.24 $\sigma$ ]  
OotOffset-rm: 0.612 arcsec [0.78 $\sigma$ ]  
KicOffset-rm: 0.803 arcsec [1.01 $\sigma$ ]  
OotOffset-st: 3/2/2/3 [10]  
KicOffset-st: 3/2/2/3 [10]  
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DiffImageOverlap-fno: 0.17 [2/12]

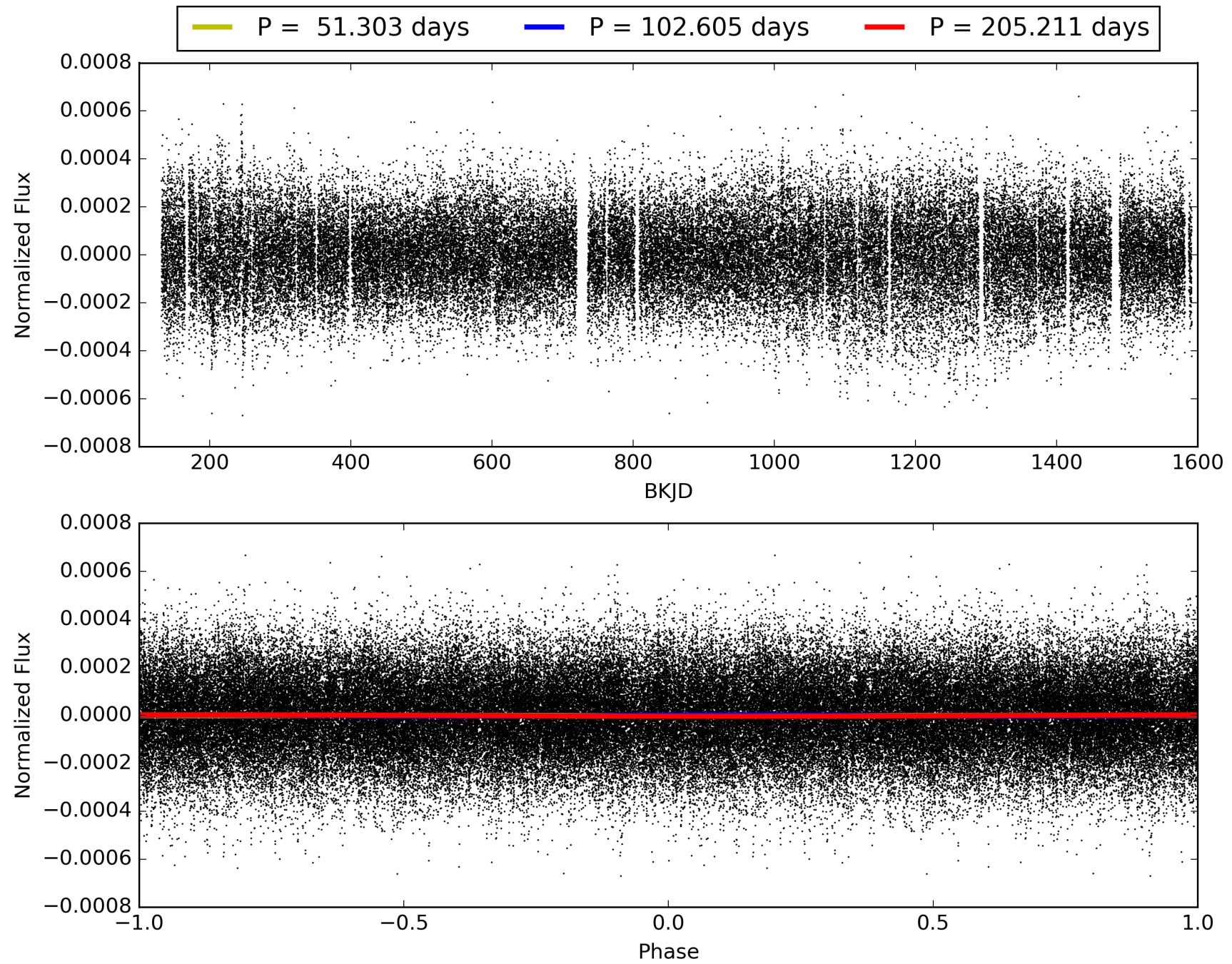
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:10:03 Z

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

# TCE 009272938-02, PDC Light Curves



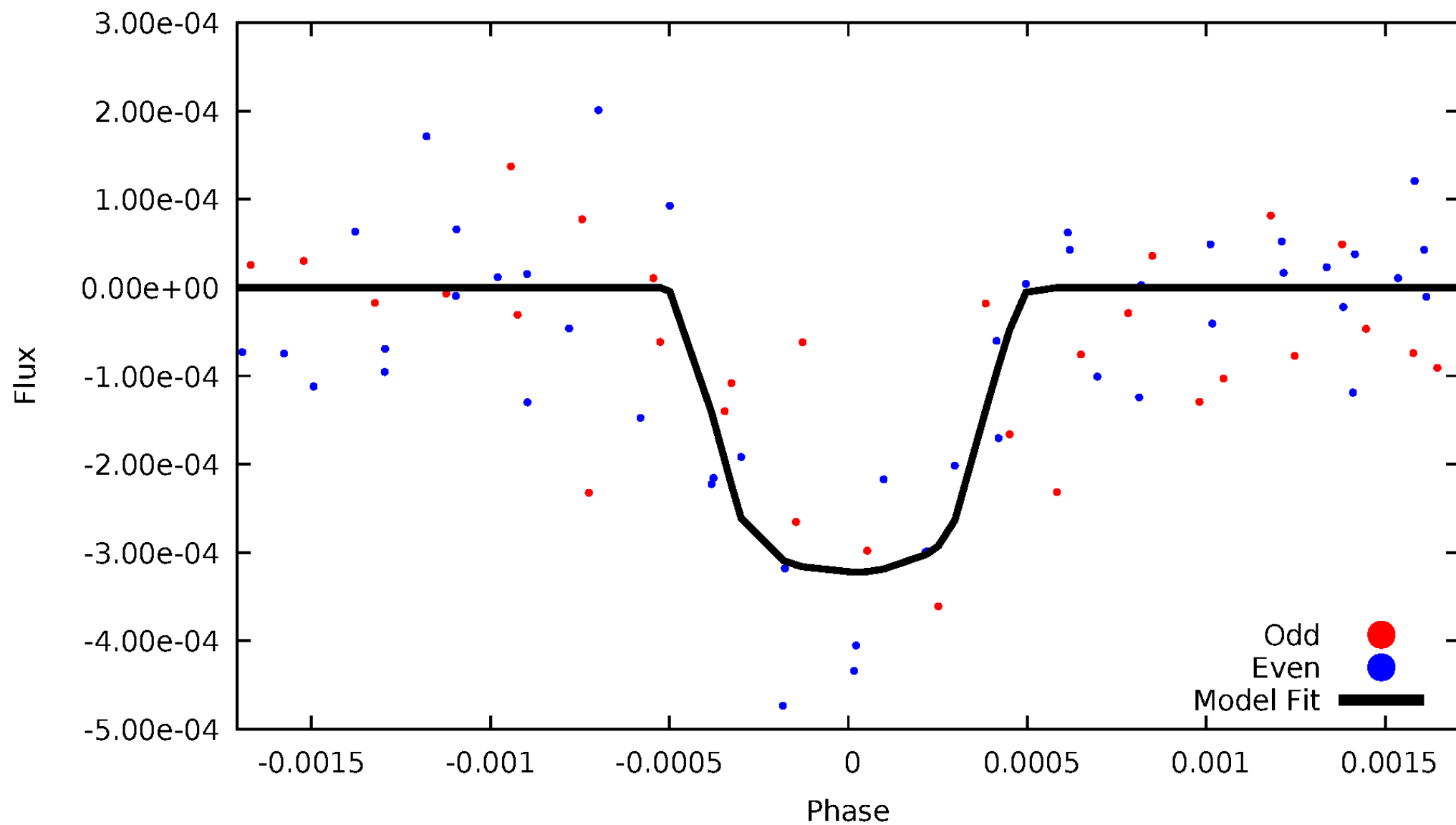
TCE 009272938-02





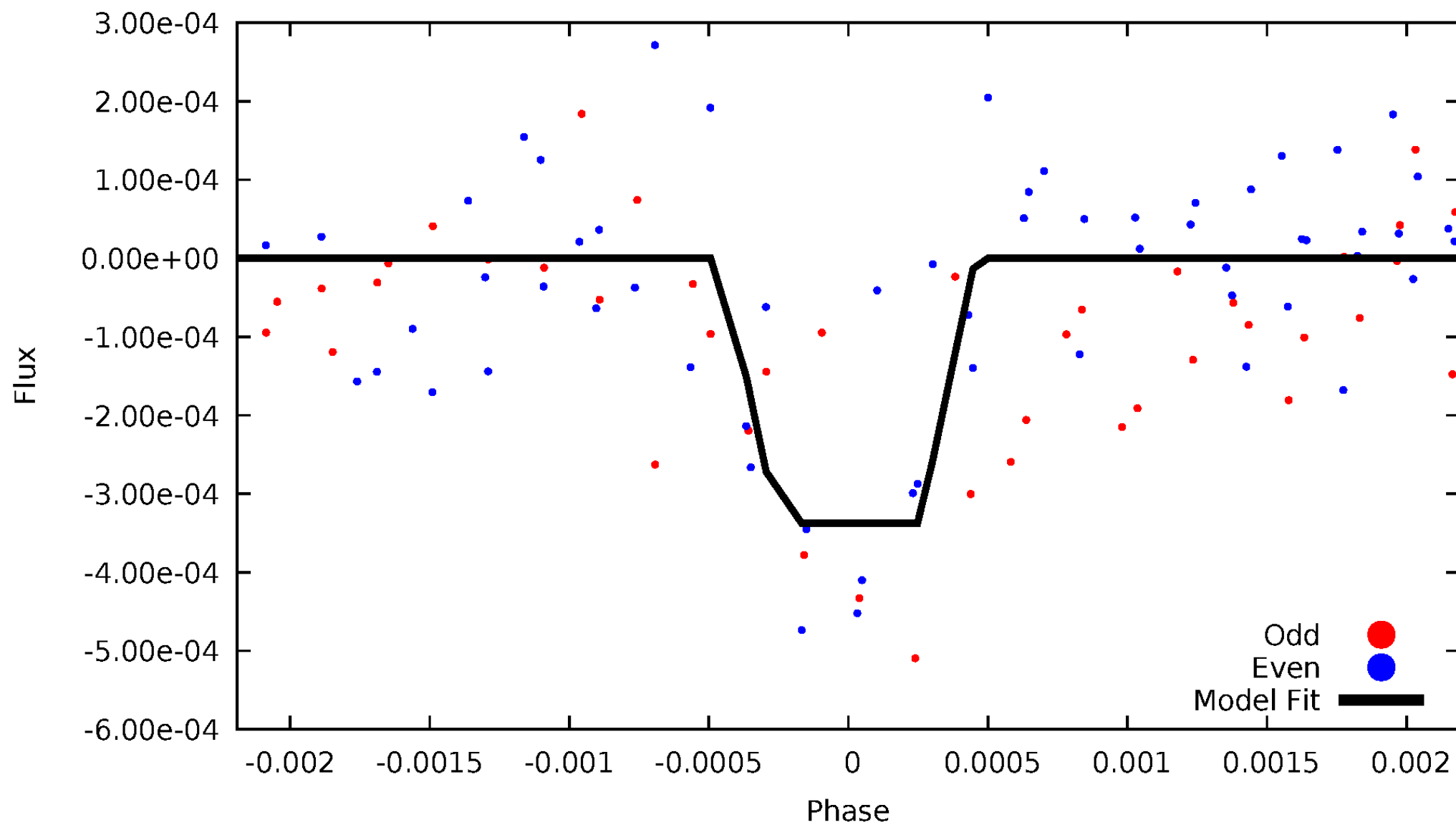
# DV Odd/Even

TCE 009272938-02



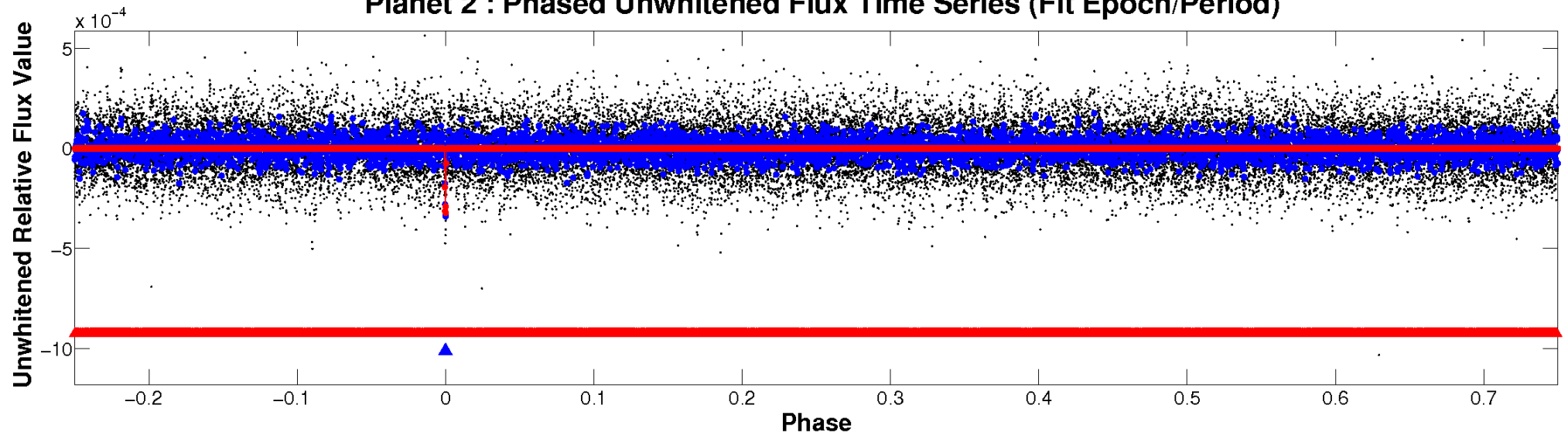
# ALT Odd/Even

TCE 009272938-02

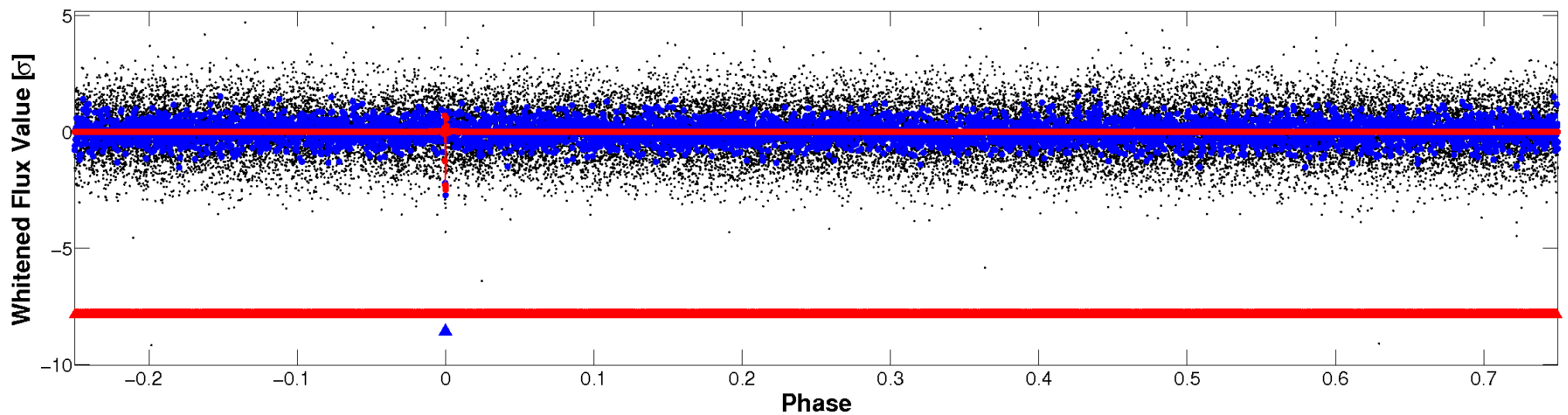


# Non-Whitened Vs. Whitened Light Curve

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

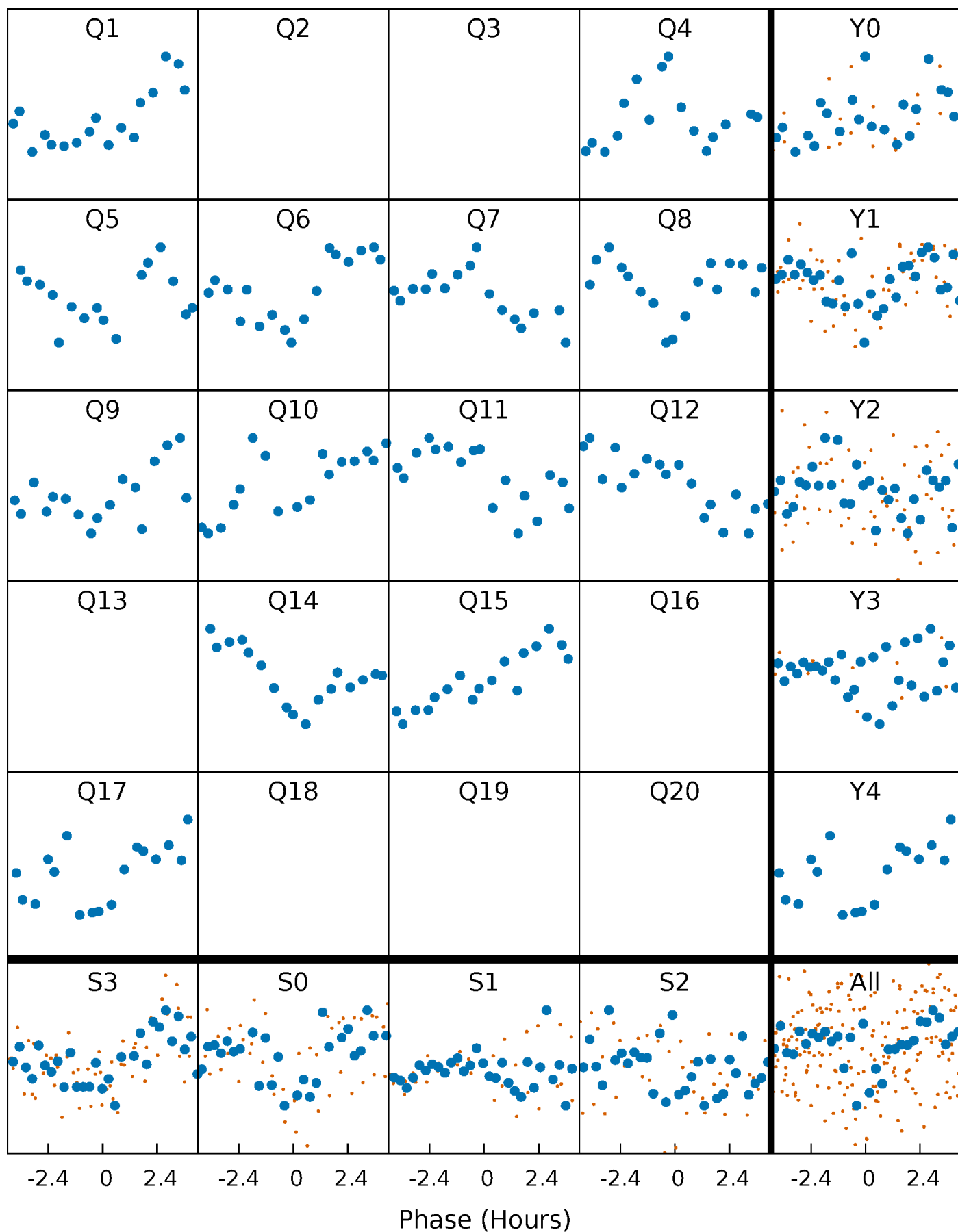


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



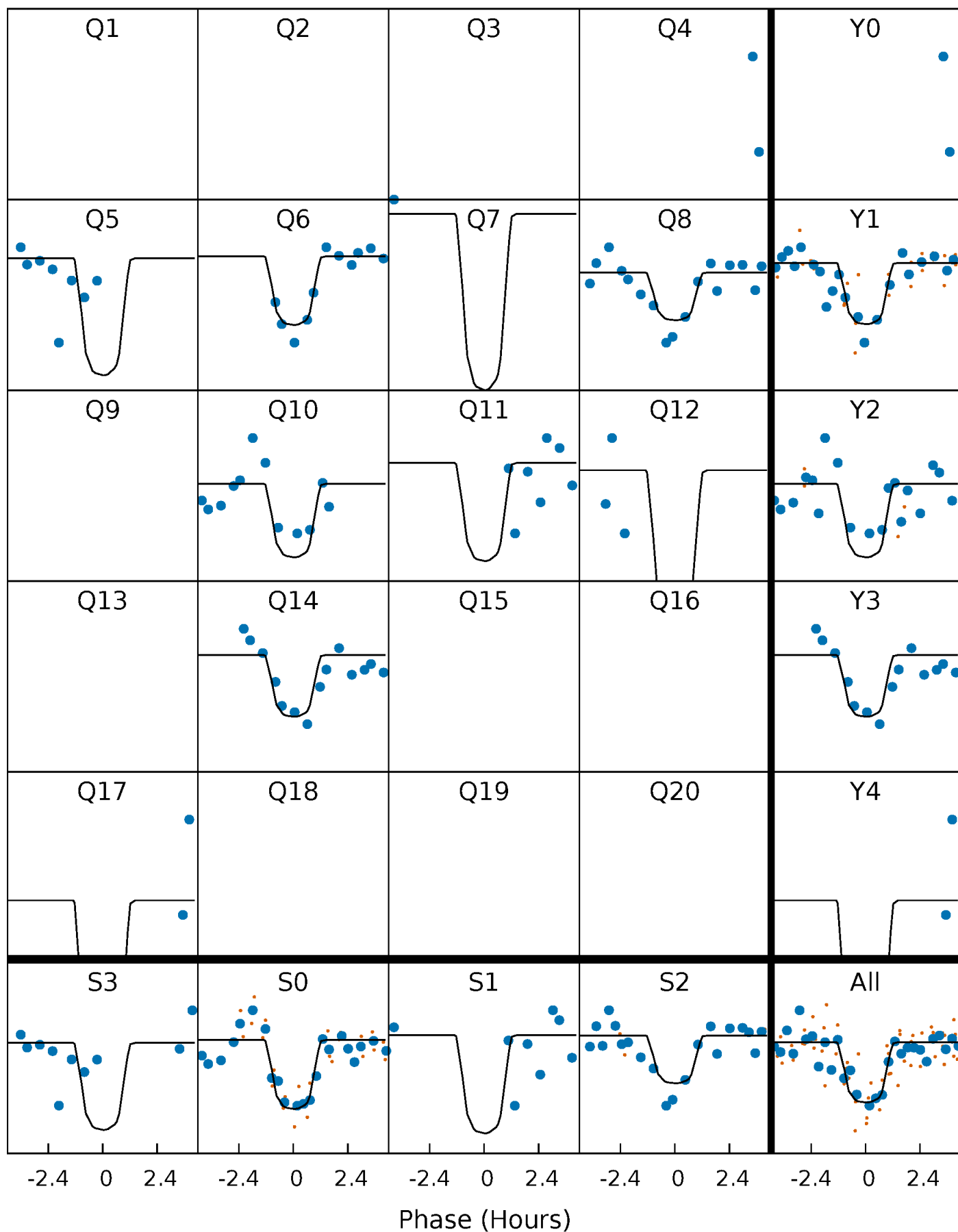
# PDC Quarter-Phased Transit Curves

TCE 009272938-02 P=102.605334 Days  $T_0=153.056725$  (BKJD)



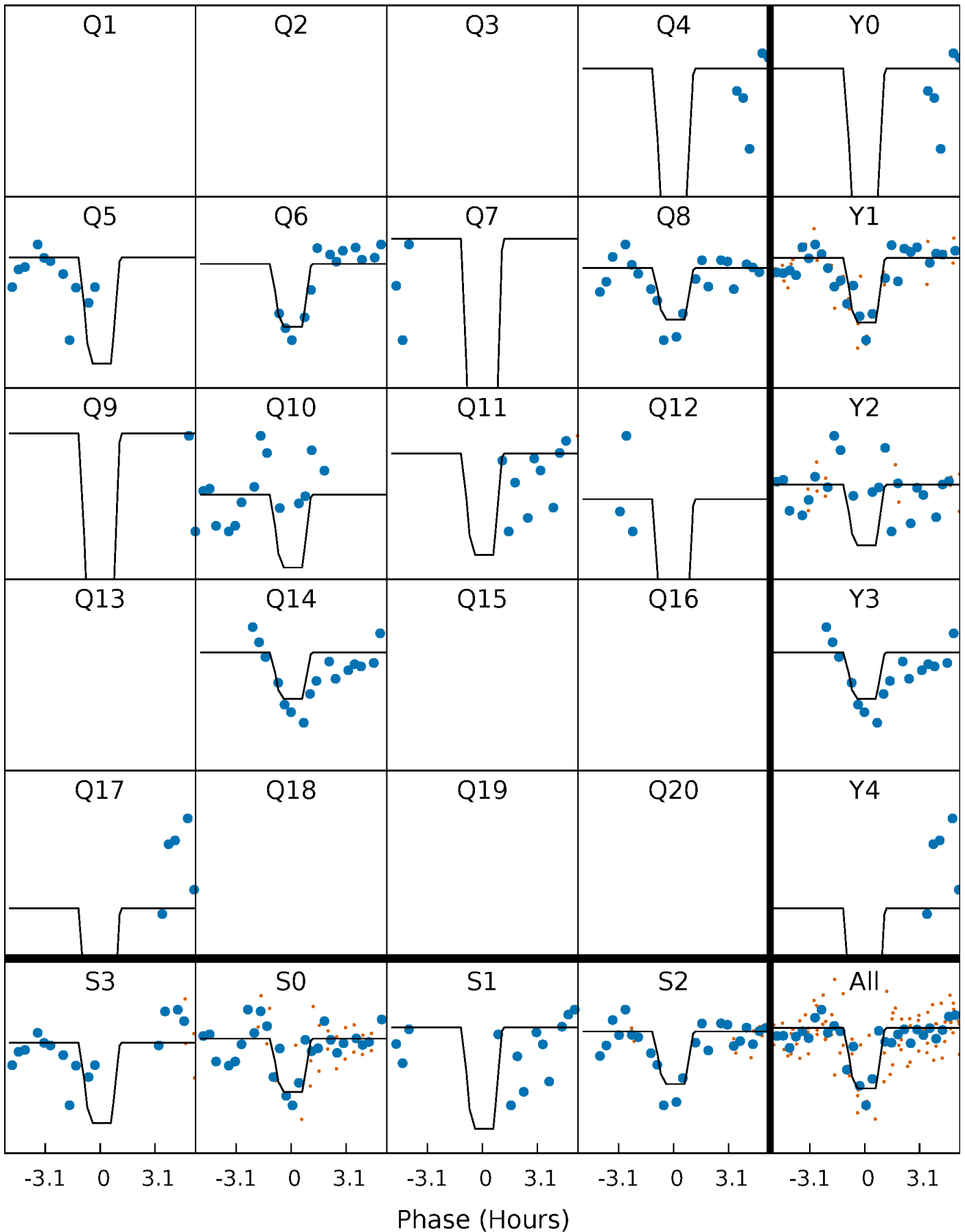
# DV Quarter-Phased Transit Curves

TCE 009272938-02     $P=102.605334$  Days     $T_0=153.056725$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009272938-02 P=102.605916 Days  $T_0=153.051599$  (BKJD)

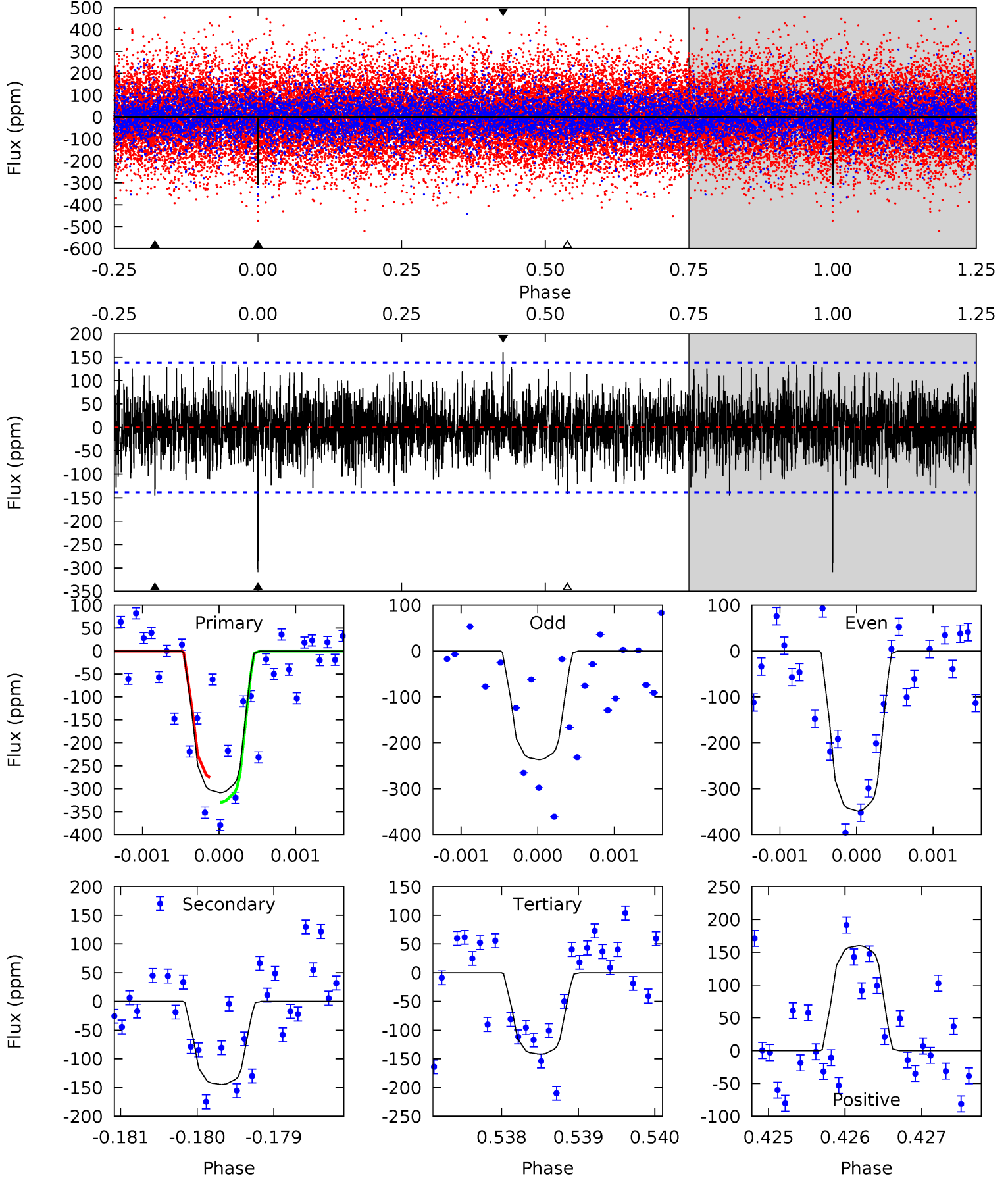




# DV Model-Shift Uniqueness Test

009272938-02,  $P = 102.605334$  Days,  $E = 50.451391$  Days

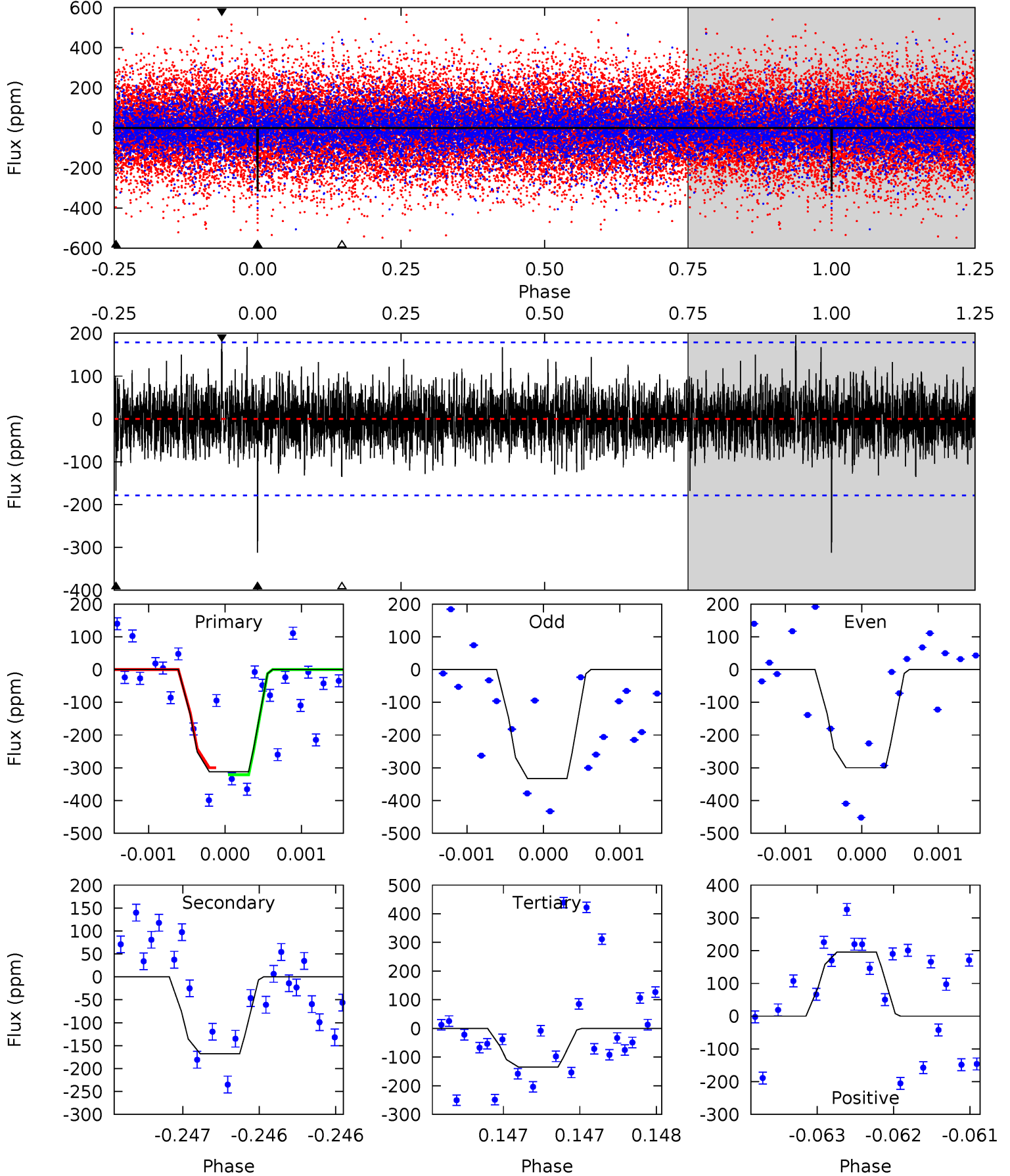
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.1	5.69	5.58	6.30	5.44	3.27	1.67	6.55	5.83	0.11	-0.61	2.13	0.91	0.34	1.05



# Alt Model-Shift Uniqueness Test

009272938-02,  $P = 102.605916$  Days,  $E = 50.445683$  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
9.59	5.16	4.15	6.01	5.49	3.35	1.29	5.44	3.58	1.01	-0.85	0.50	0.77	0.39	0.32



### Stellar Parameters For KIC 009272938

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6739^{+188}_{-259}$	$4.013^{+0.264}_{-0.176}$	$-0.140^{+0.250}_{-0.300}$	$1.947^{+0.528}_{-0.646}$	$1.430^{+0.196}_{-0.318}$	$0.273^{+0.522}_{-0.117}$
	+3%/-4%	+7%/-4%	+179%/-214%	+27%/-33%	+14%/-22%	+191%/-43%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009272938-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-145 \pm 25$	$3.82^{+1.65}_{-1.40}$	$830^{+68}_{-82}$	$5437^{+1242}_{-750}$	$1247^{+1939}_{-644}$
Alt.	$-168 \pm 33$	$3.79^{+1.61}_{-1.50}$	$833^{+67}_{-75}$	$5592^{+1600}_{-723}$	$1393^{+2495}_{-682}$

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

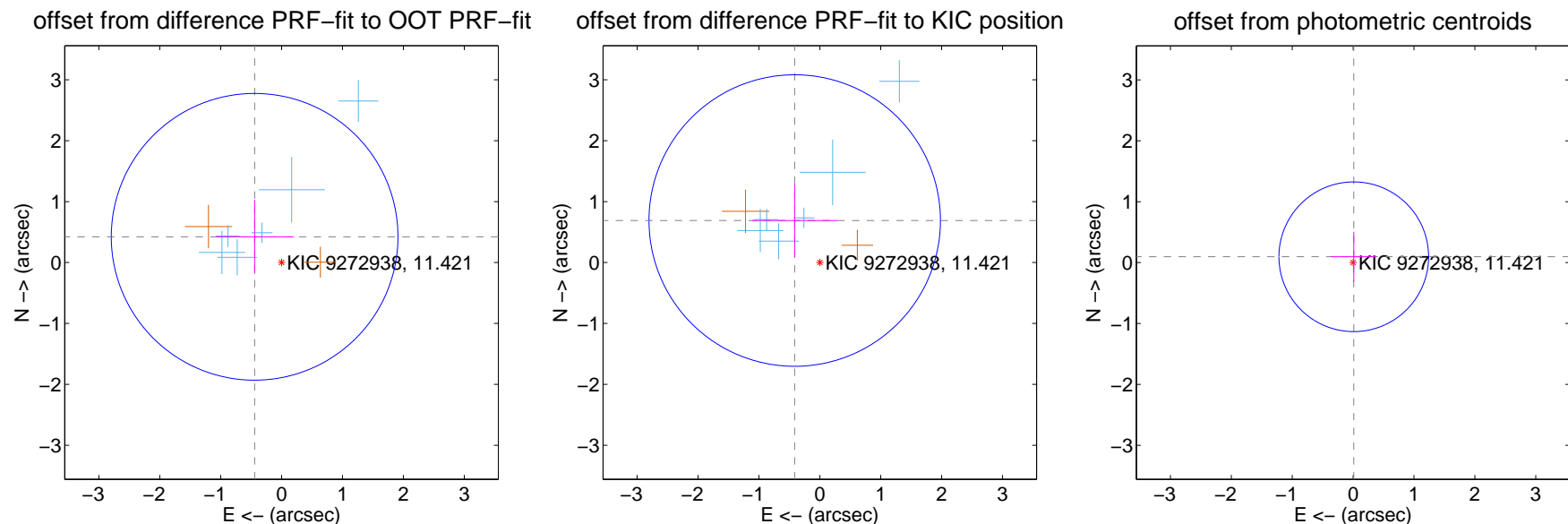
## DV Centroid Data

Supplemental centroid analysis for 009272938-02. **Kepler magnitude: 11.42.** Transit SNR 9.12

There are 6 quarters with good PRF difference image offsets

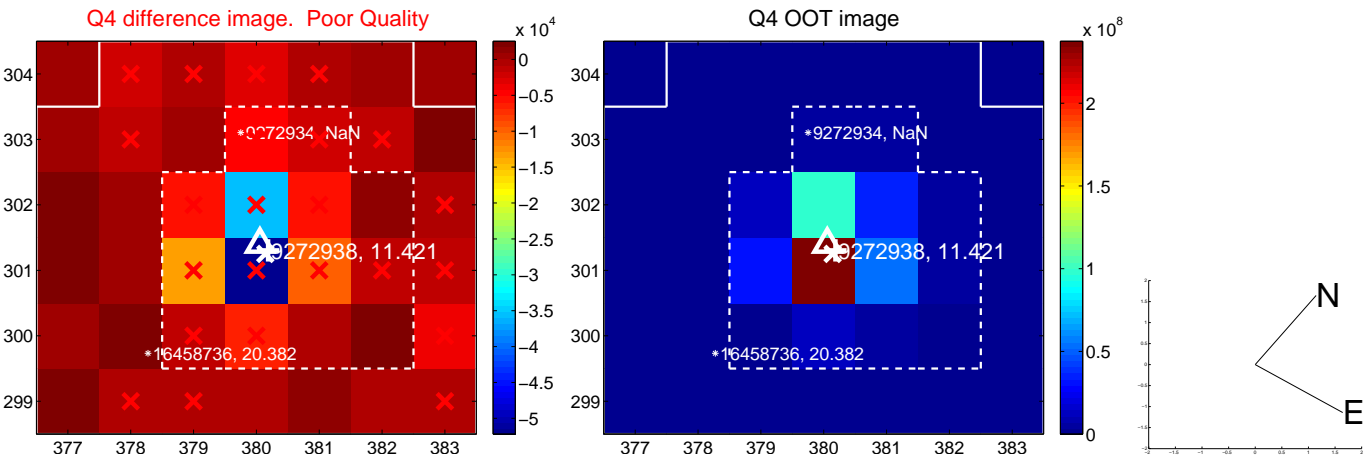
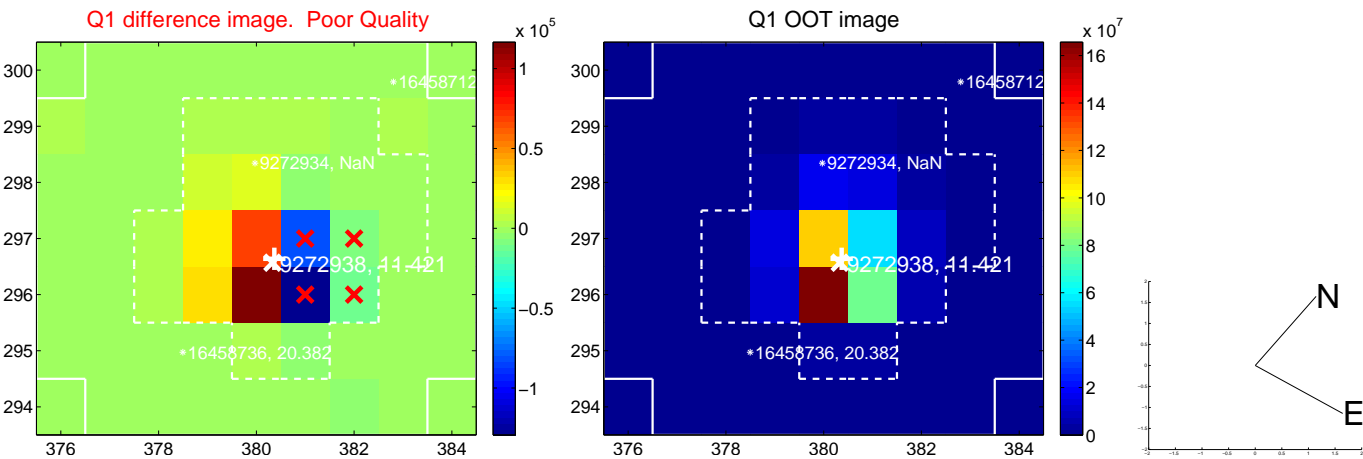
The direct PRF centroid is offset from the target star catalog position by about 0.36 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.612 \pm 0.784$	0.78	$0.443 \pm 0.644$	$0.422 \pm 0.607$
PRF-fit source offset from KIC position	$0.803 \pm 0.797$	1.01	$0.413 \pm 0.697$	$0.689 \pm 0.606$
photometric centroid source offset	$0.10 \pm 0.41$	0.24	$-0.01 \pm 0.38$	$0.10 \pm 0.41$

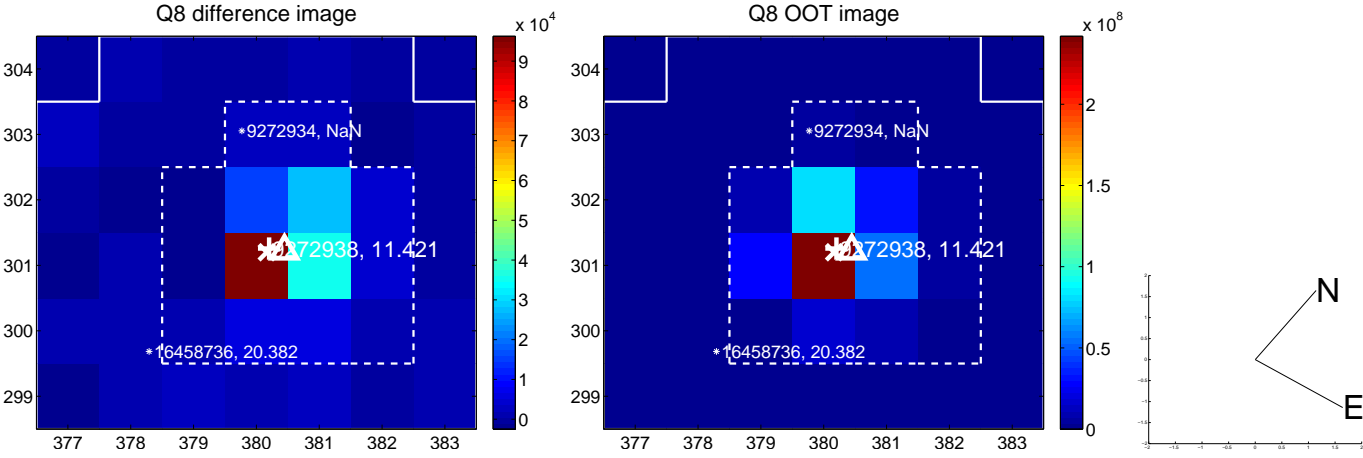
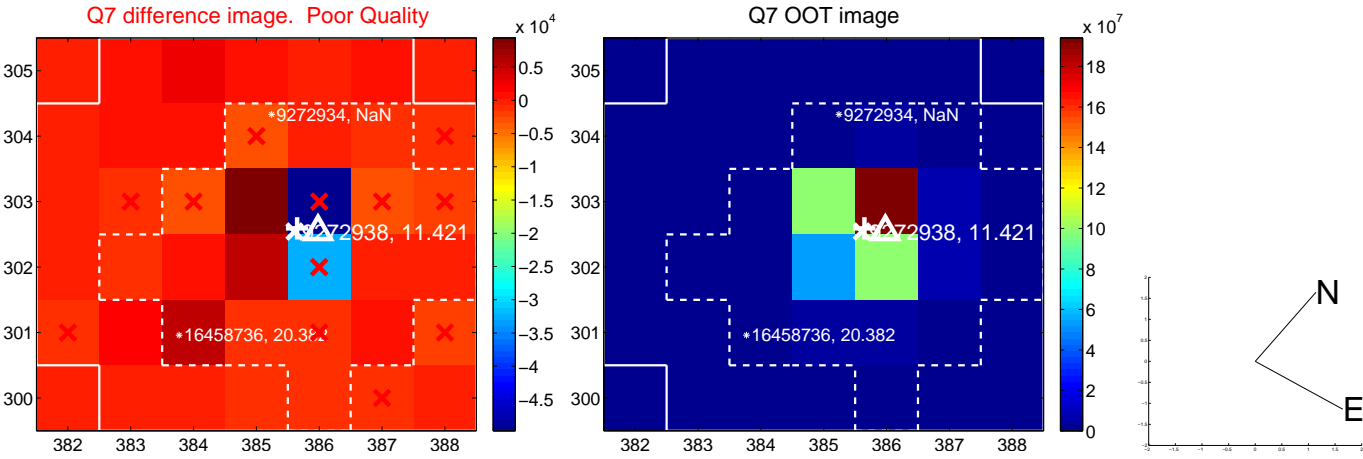
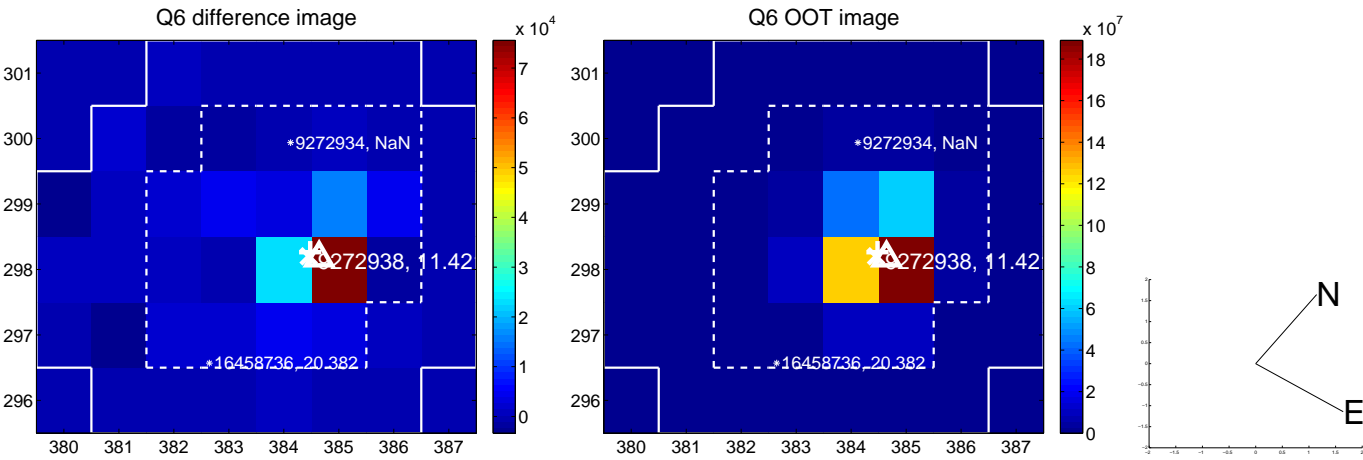
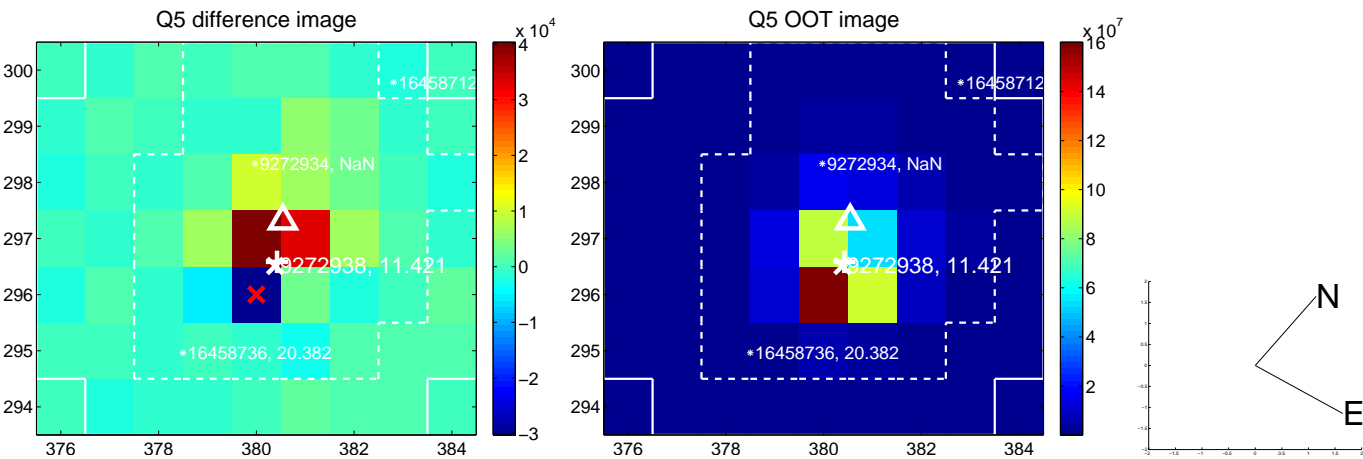


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

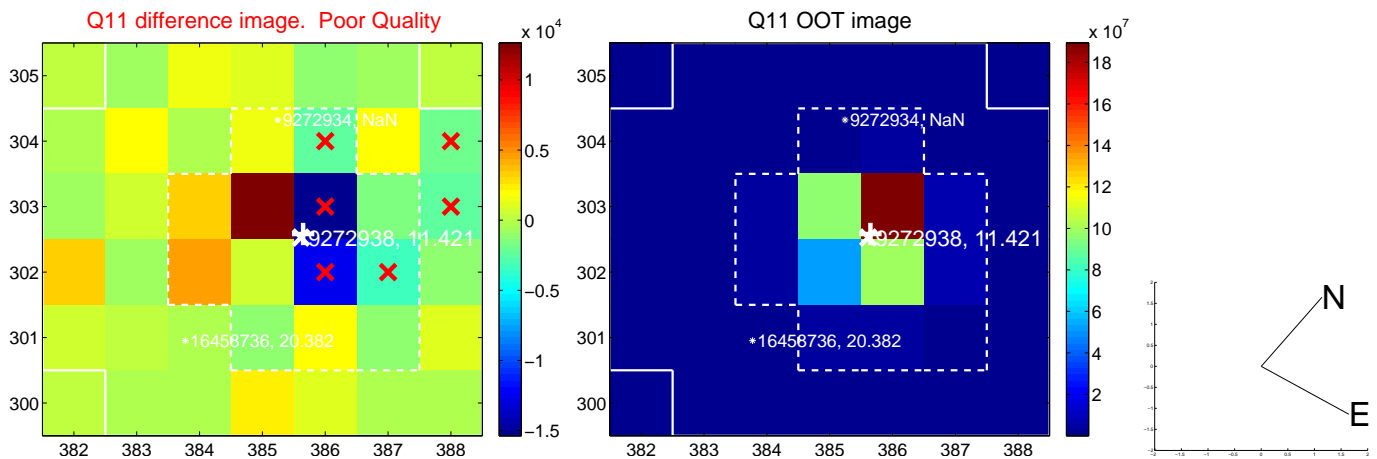
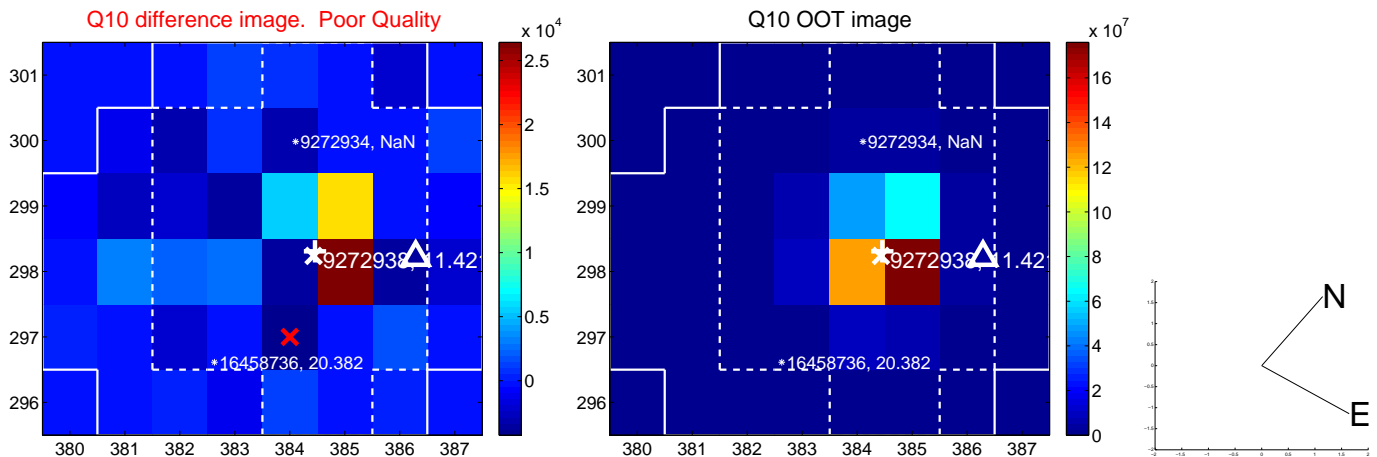
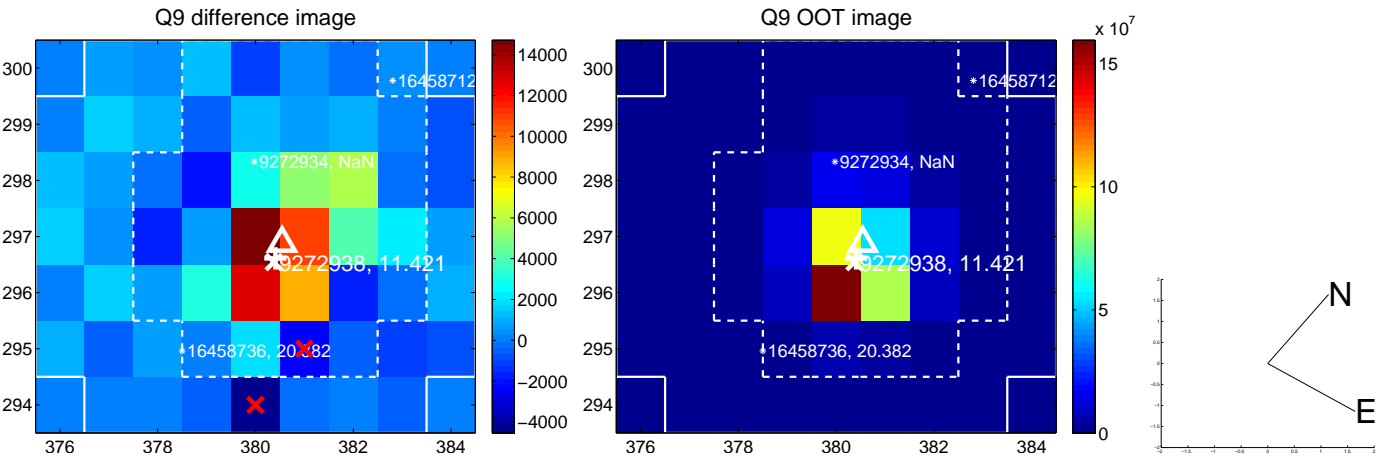


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

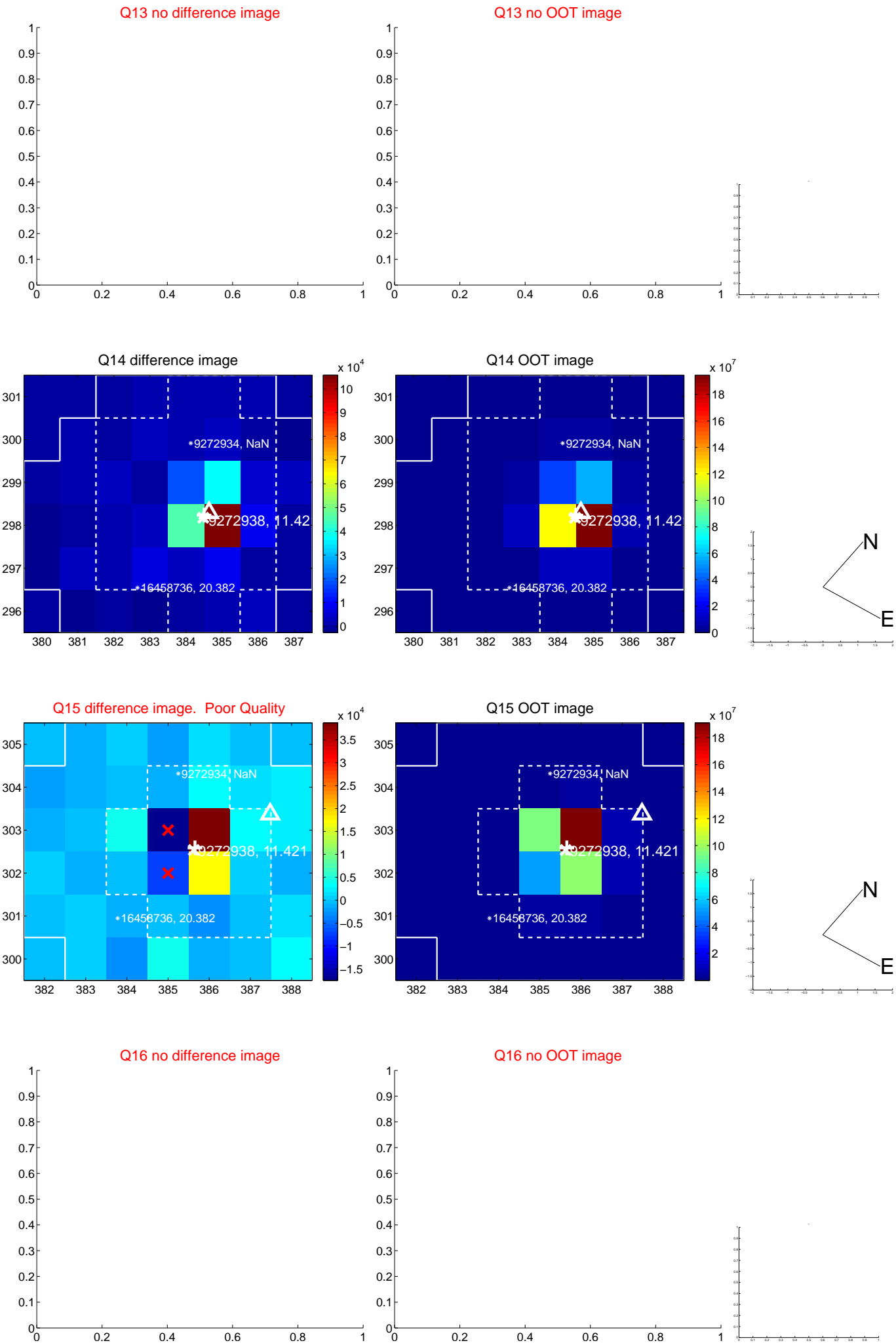




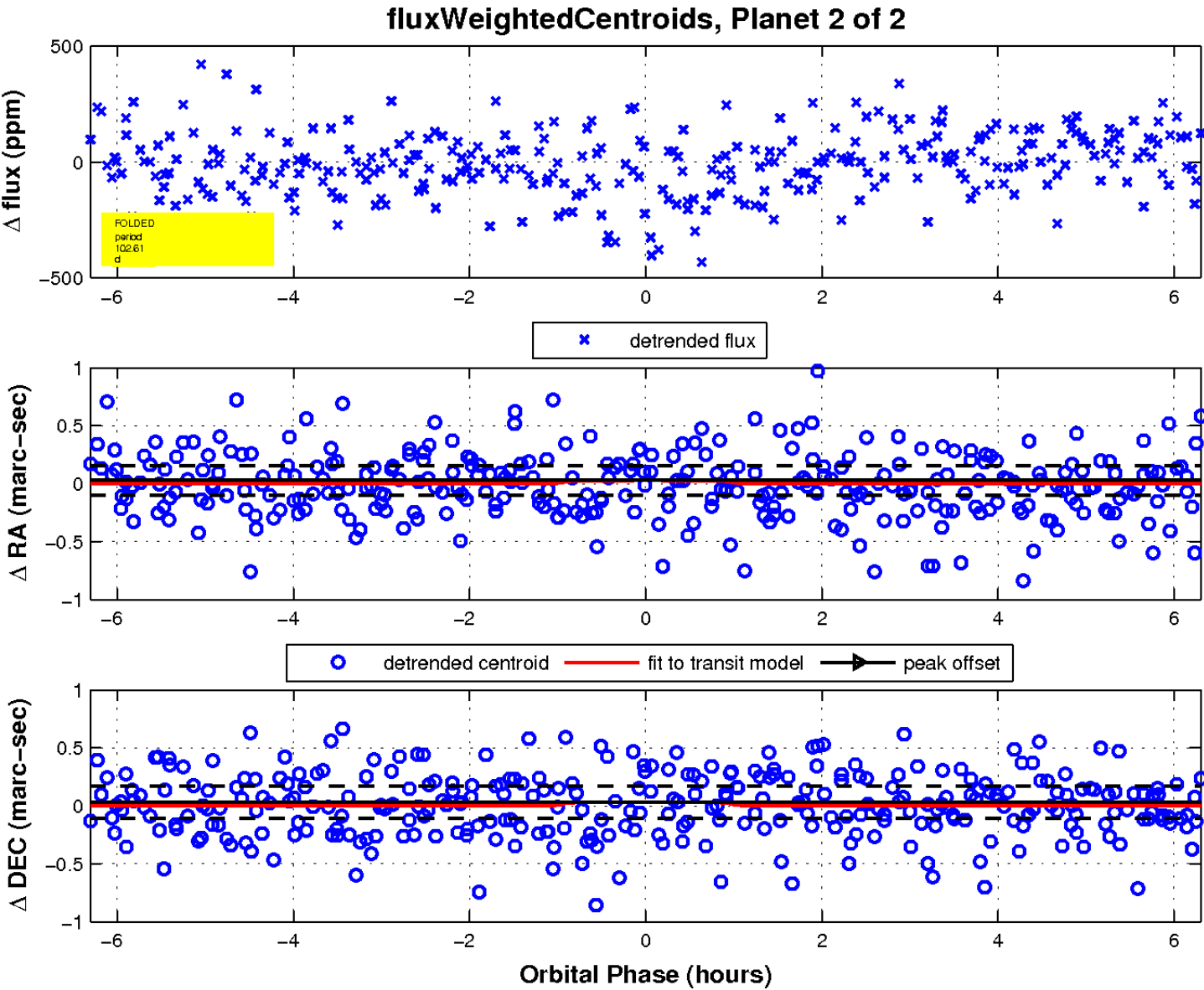
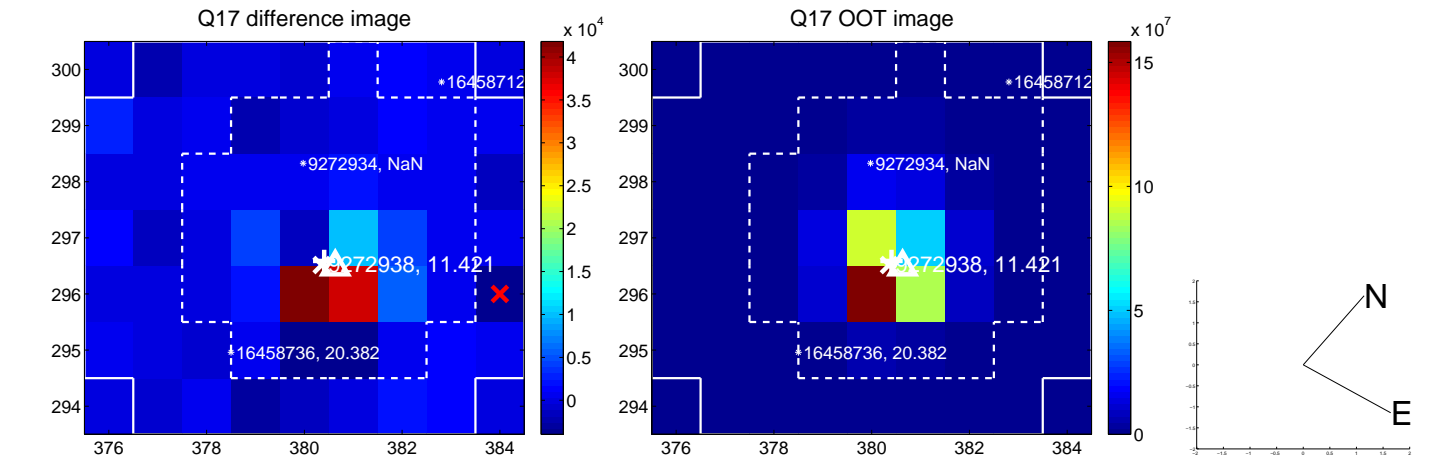
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

