

# KIC 009209247

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009209247-01	OBS	No	393.127119	375.149752	656.1	17.671	16.1	16.4	1.68	7987	4.51	6.47
009209247-02	OBS	No	0.757148	131.882448	61.0	9.086	12.4	21.2	1.68	7987	2.16	27022.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009209247-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_SATURATED
009209247-02	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED

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

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

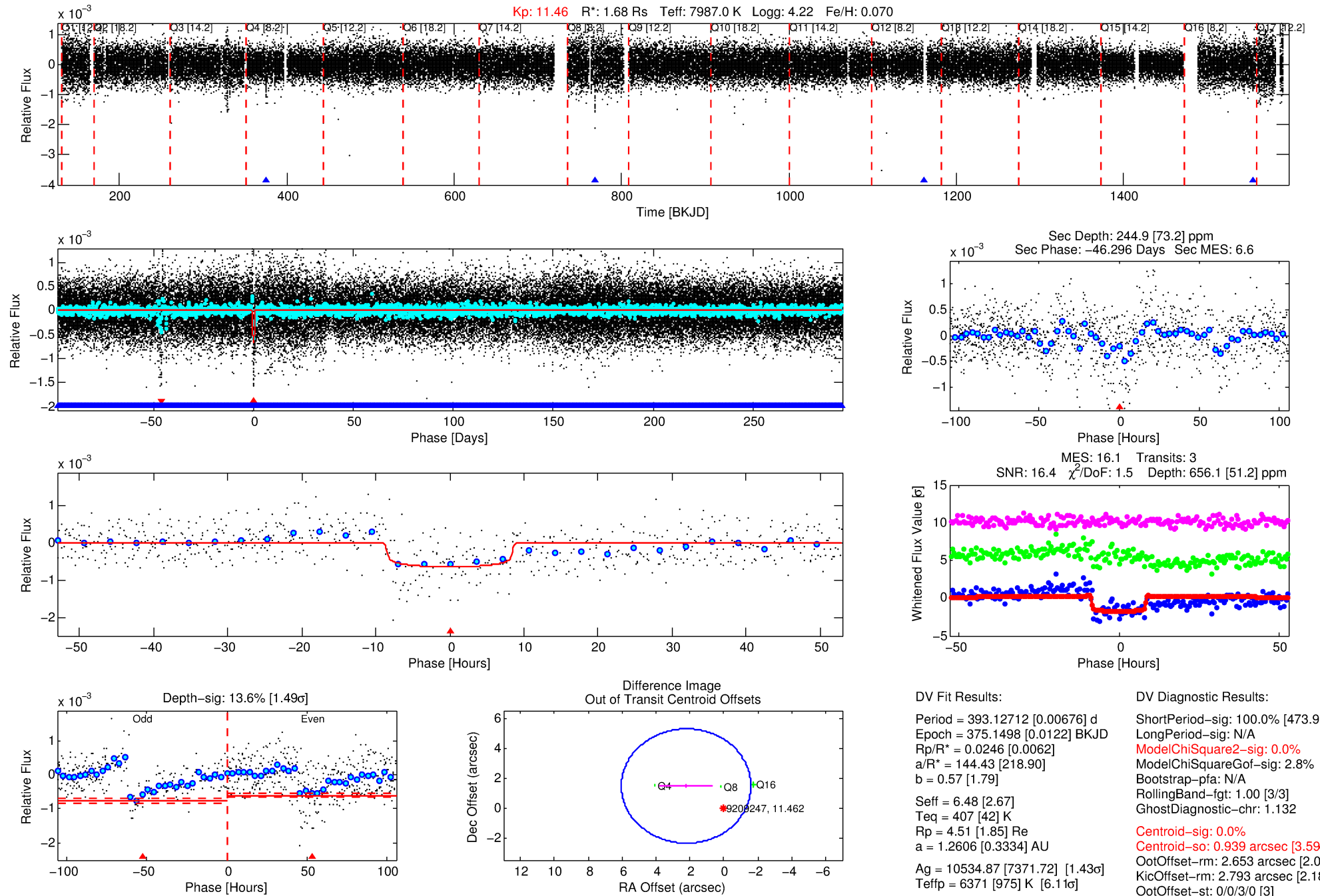
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009209247-01

No Significant Match Found

# DV One-Page Summary

KIC: 9209247 Candidate: 1 of 2 Period: 393.127 d



## DV Fit Results:

Period = 393.12712 [0.00676] d  
Epoch = 375.1498 [0.0122] BKJD  
Rp/R\* = 0.0246 [0.0062]  
a/R\* = 144.43 [218.90]  
b = 0.57 [1.79]  
Seff = 6.48 [2.67]  
Teq = 407 [42] K  
Rp = 4.51 [1.85] Re  
a = 1.2606 [0.3334] AU  
Ag = 10534.87 [7371.72] [1.43 $\sigma$ ]  
Teff = 6371 [975] K [6.1 $\sigma$ ]

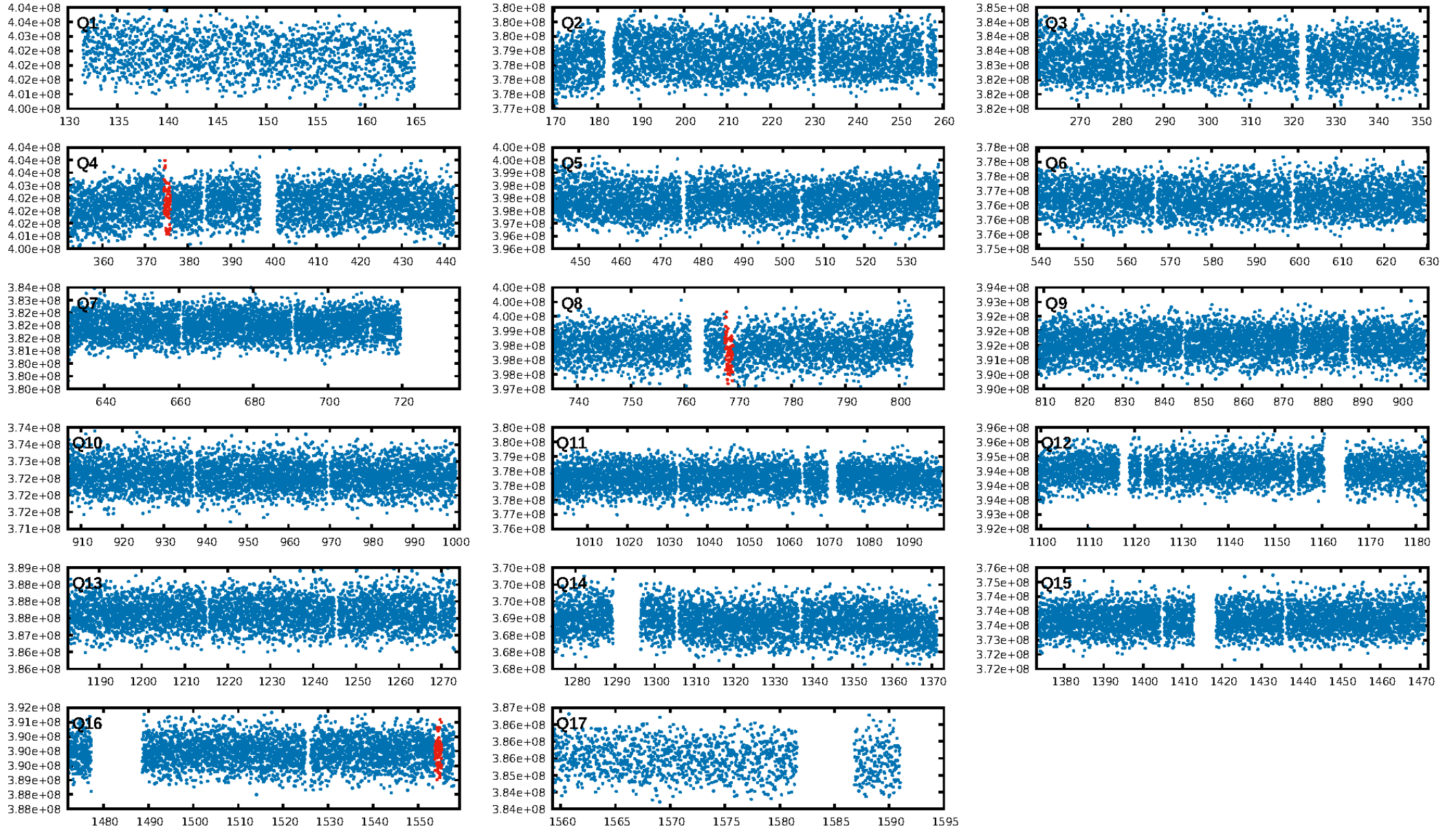
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [473.93 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 2.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.132  
Centroid-sig: 0.0%  
Centroid-so: 0.939 arcsec [3.59 $\sigma$ ]  
OotOffset-rm: 2.653 arcsec [2.08 $\sigma$ ]  
KicOffset-rm: 2.793 arcsec [2.18 $\sigma$ ]  
OotOffset-st: 0/0/3/0 [3]  
KicOffset-st: 0/0/3/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]

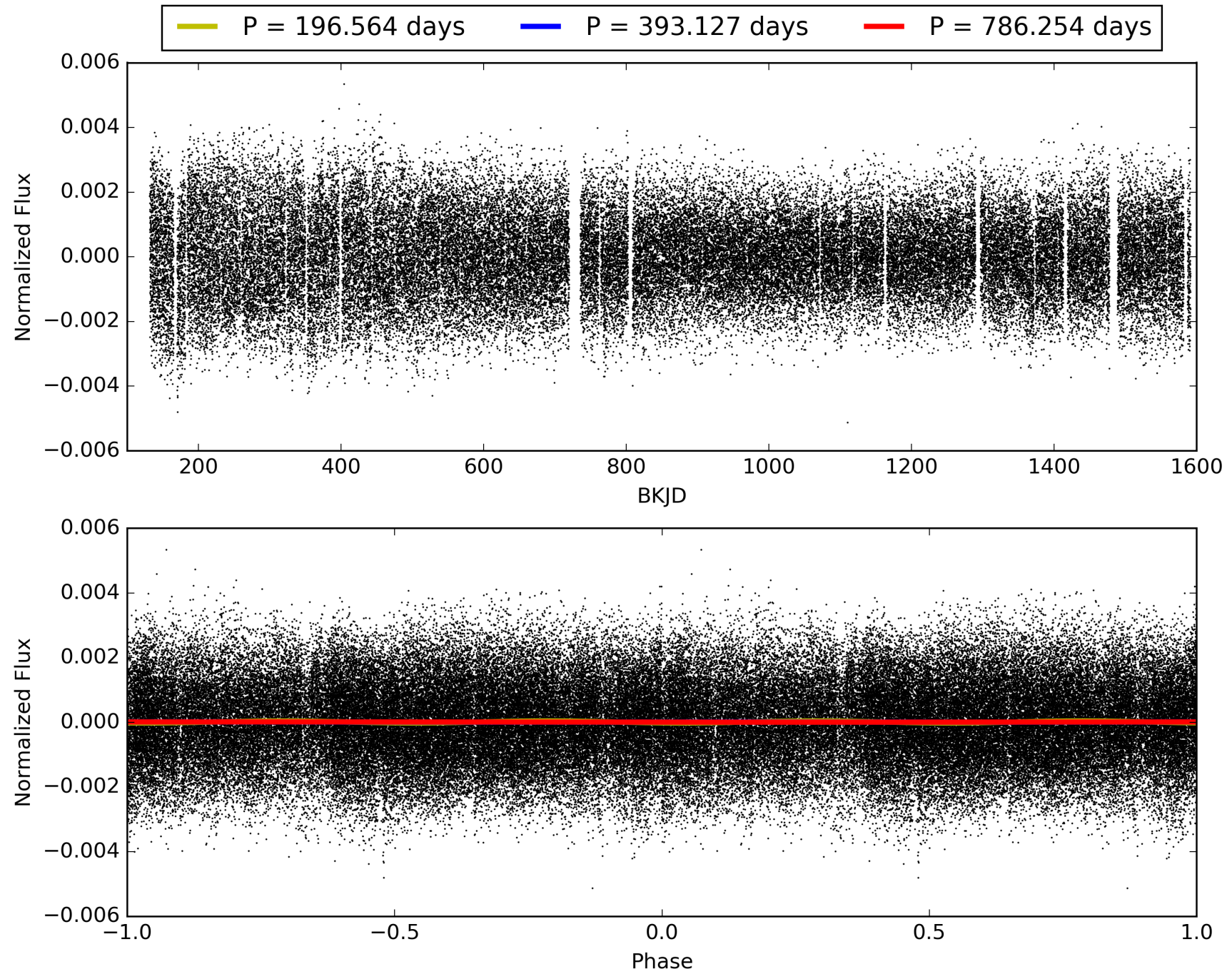
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:37:21 Z

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

# TCE 009209247-01, PDC Light Curves

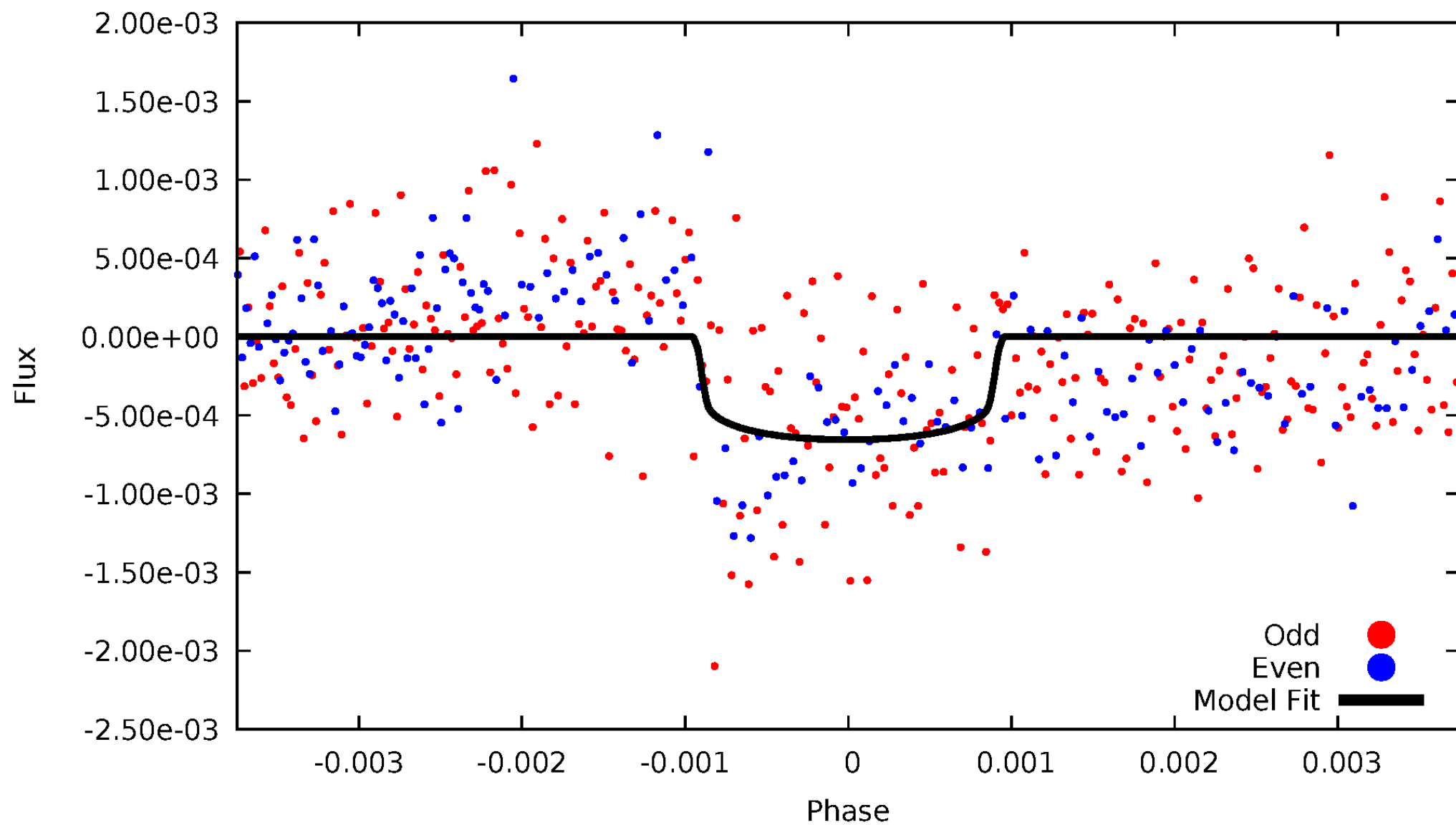


TCE 009209247-01



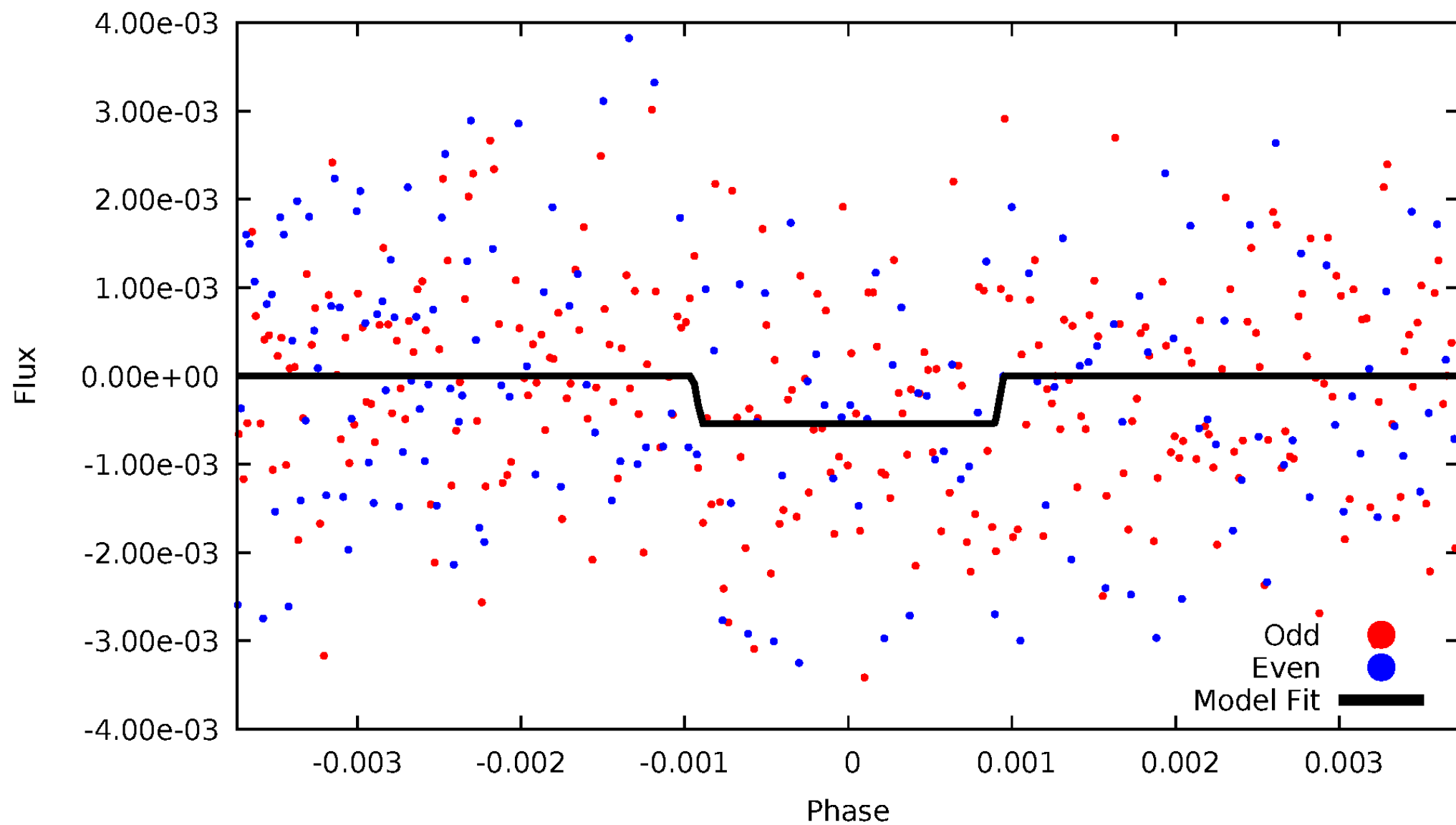
# DV Odd/Even

TCE 009209247-01



# ALT Odd/Even

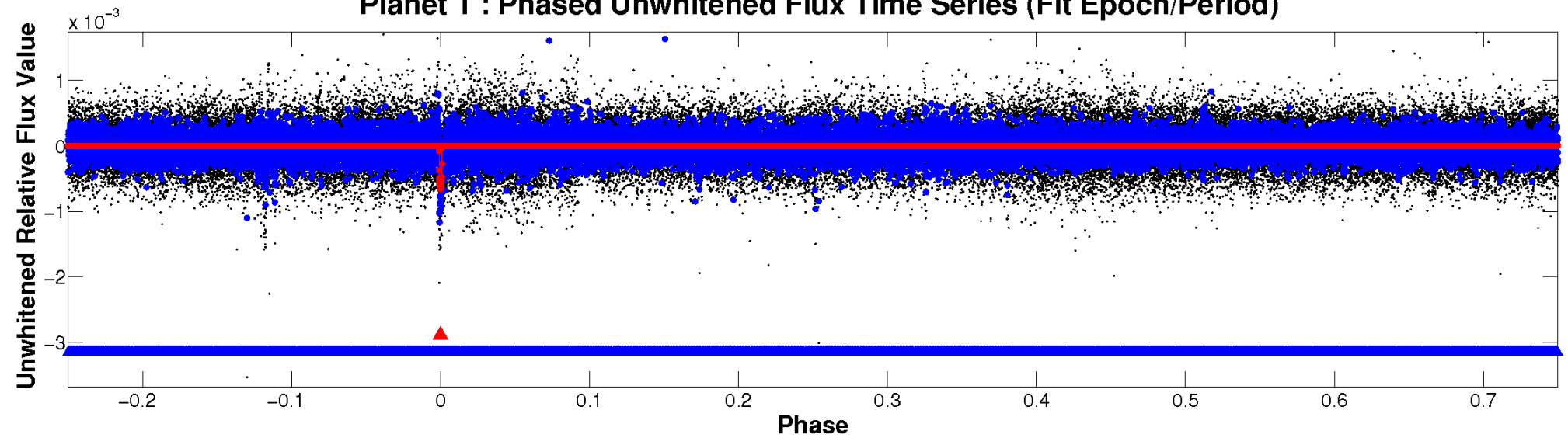
TCE 009209247-01



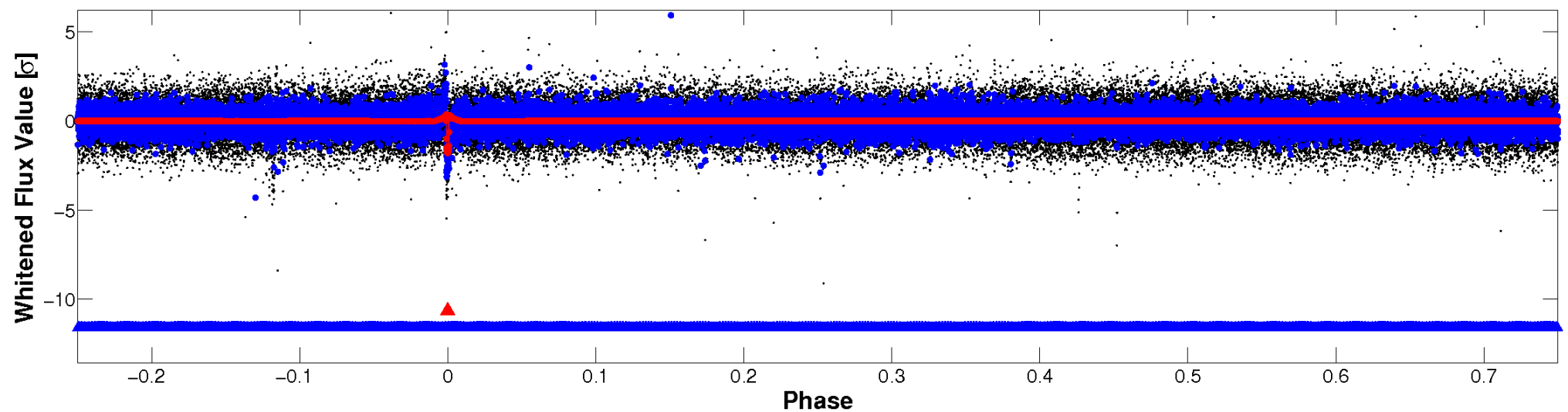


# Non-Whitened Vs. Whitened Light Curve

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

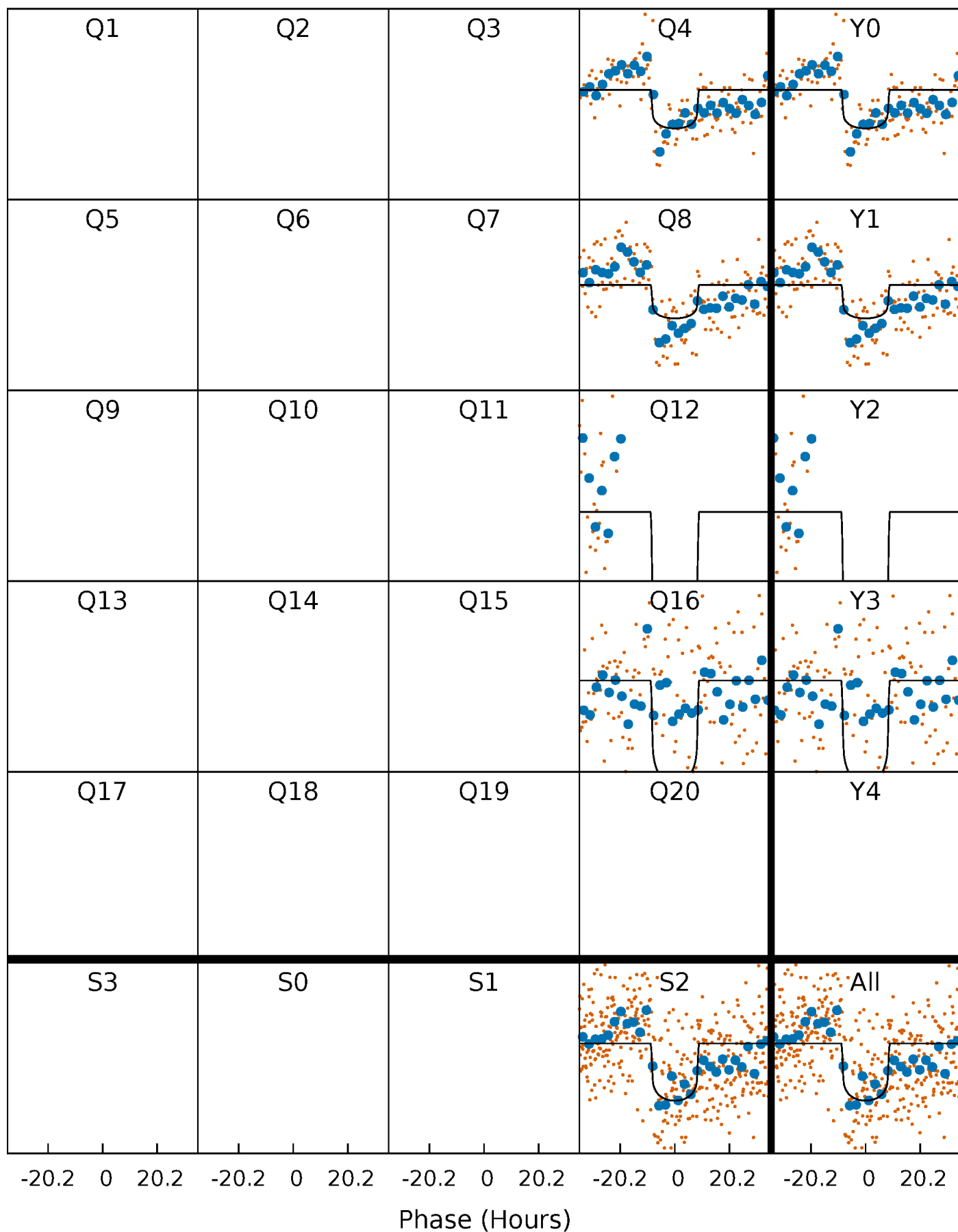
TCE 009209247-01 P=393.127119 Days  $T_0=375.149752$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 009209247-01 P=393.127119 Days  $T_0=375.149752$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

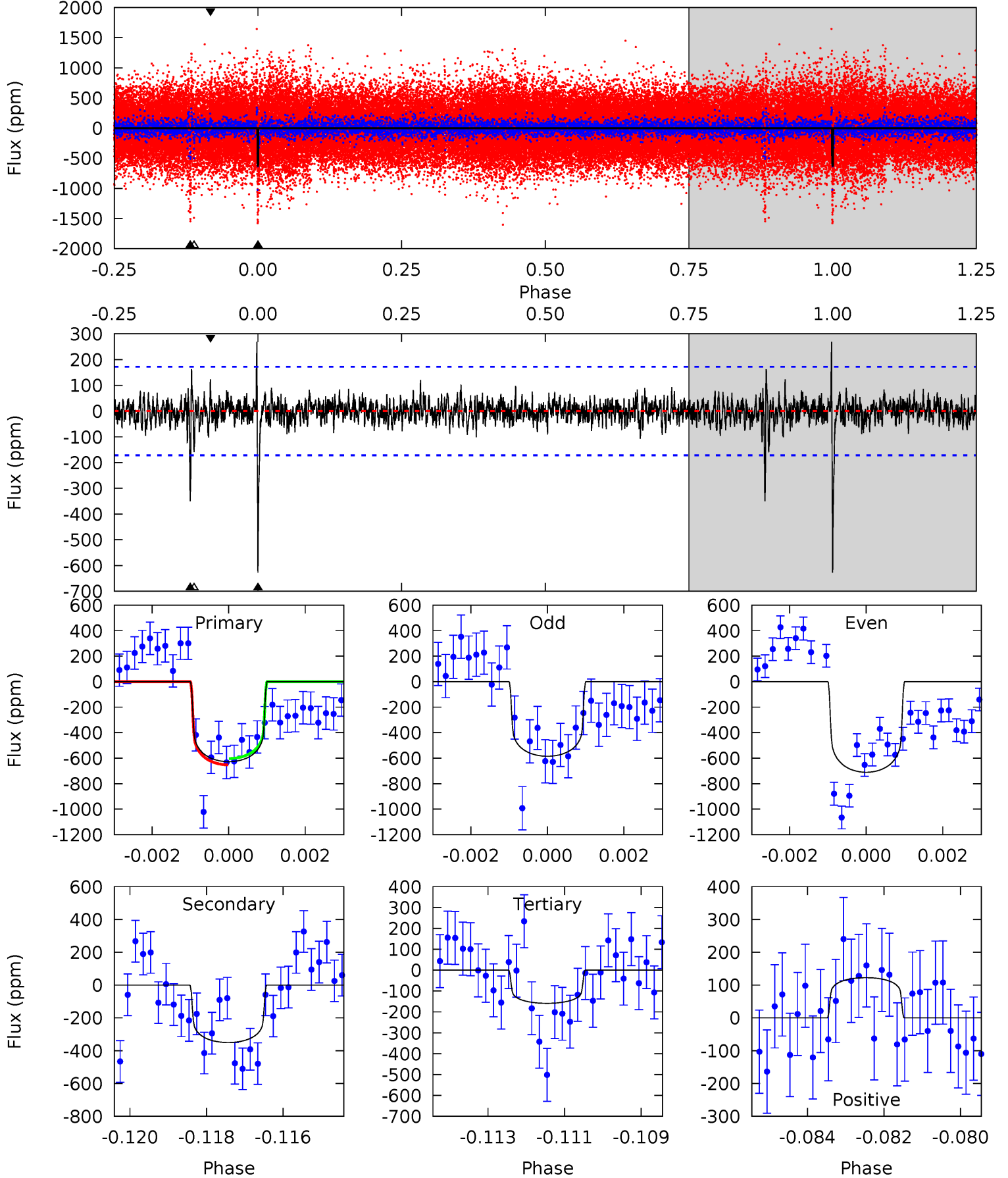
TCE 009209247-01 P=393.128072 Days  $T_0=375.155378$  (BKJD)



# DV Model-Shift Uniqueness Test

009209247-01, P = 393.127119 Days, E = 375.149752 Days

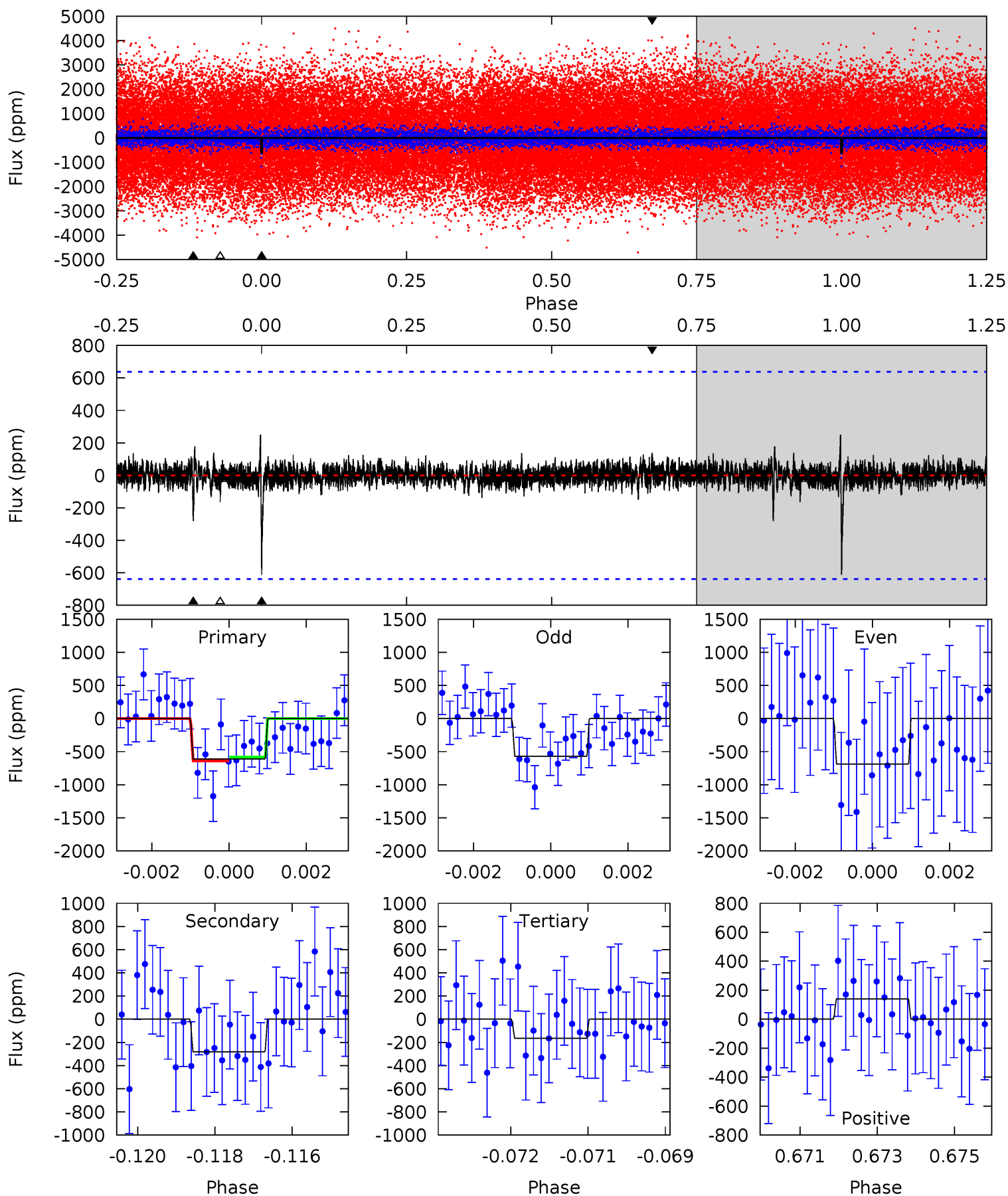
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.5	10.9	4.94	3.81	5.34	3.10	1.03	14.6	15.7	5.95	7.08	1.86	0.91	0.30	0.76



# Alt Model-Shift Uniqueness Test

009209247-01, P = 393.128072 Days, E = 375.155378 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
5.11	2.35	1.37	1.16	5.34	3.10	0.32	3.74	3.95	0.98	1.18	0.45	0.88	0.29	0.22



### Stellar Parameters For KIC 009209247

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7987^{+221}_{-331}$	$4.225^{+0.067}_{-0.202}$	$0.070^{+0.250}_{-0.450}$	$1.680^{+0.540}_{-0.216}$	$1.728^{+0.211}_{-0.232}$	$0.514^{+0.184}_{-0.261}$
	+3%/-4%	+2%/-5%	+357%/-643%	+32%/-13%	+12%/-13%	+36%/-51%
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 009209247-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-350 \pm 32$	$4.72^{+1.43}_{-1.23}$	$579^{+41}_{-34}$	$6820^{+1231}_{-806}$	$13768^{+11712}_{-5664}$
Alt.	$-281 \pm 120$	$4.40^{+1.47}_{-1.18}$	$578^{+41}_{-33}$	$6586^{+1519}_{-1113}$	$11782^{+12749}_{-6257}$

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

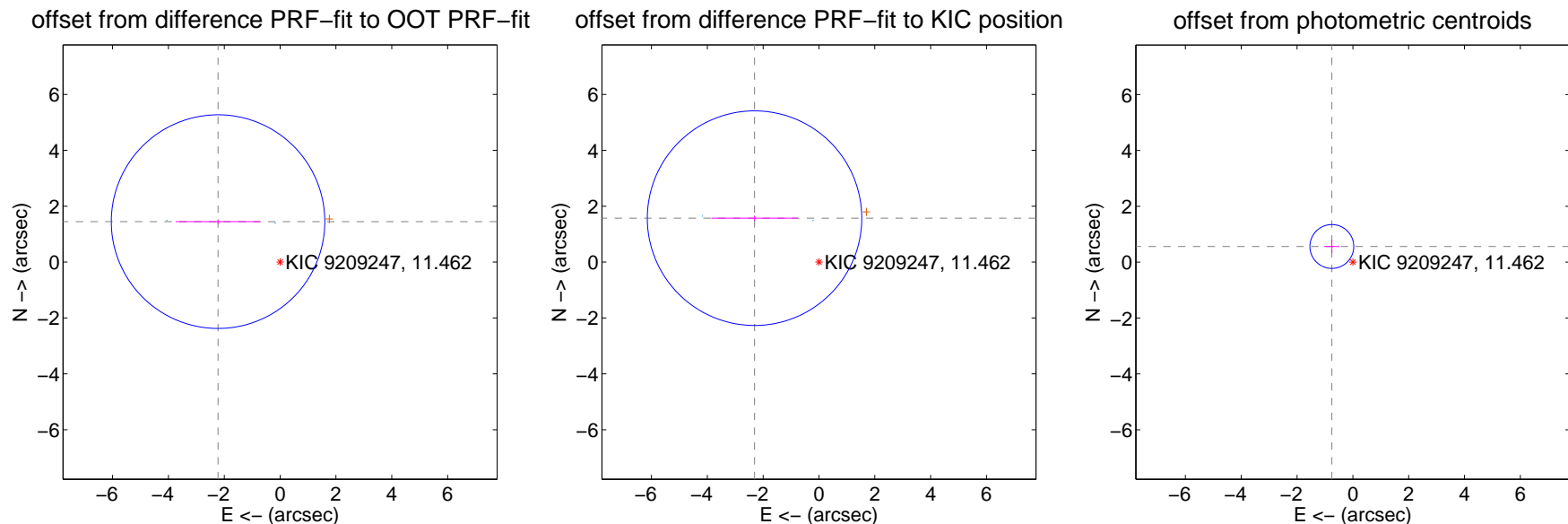
## DV Centroid Data

Supplemental centroid analysis for 009209247-01. **Kepler magnitude: 11.46.** Transit SNR 16.45

**There are 2 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

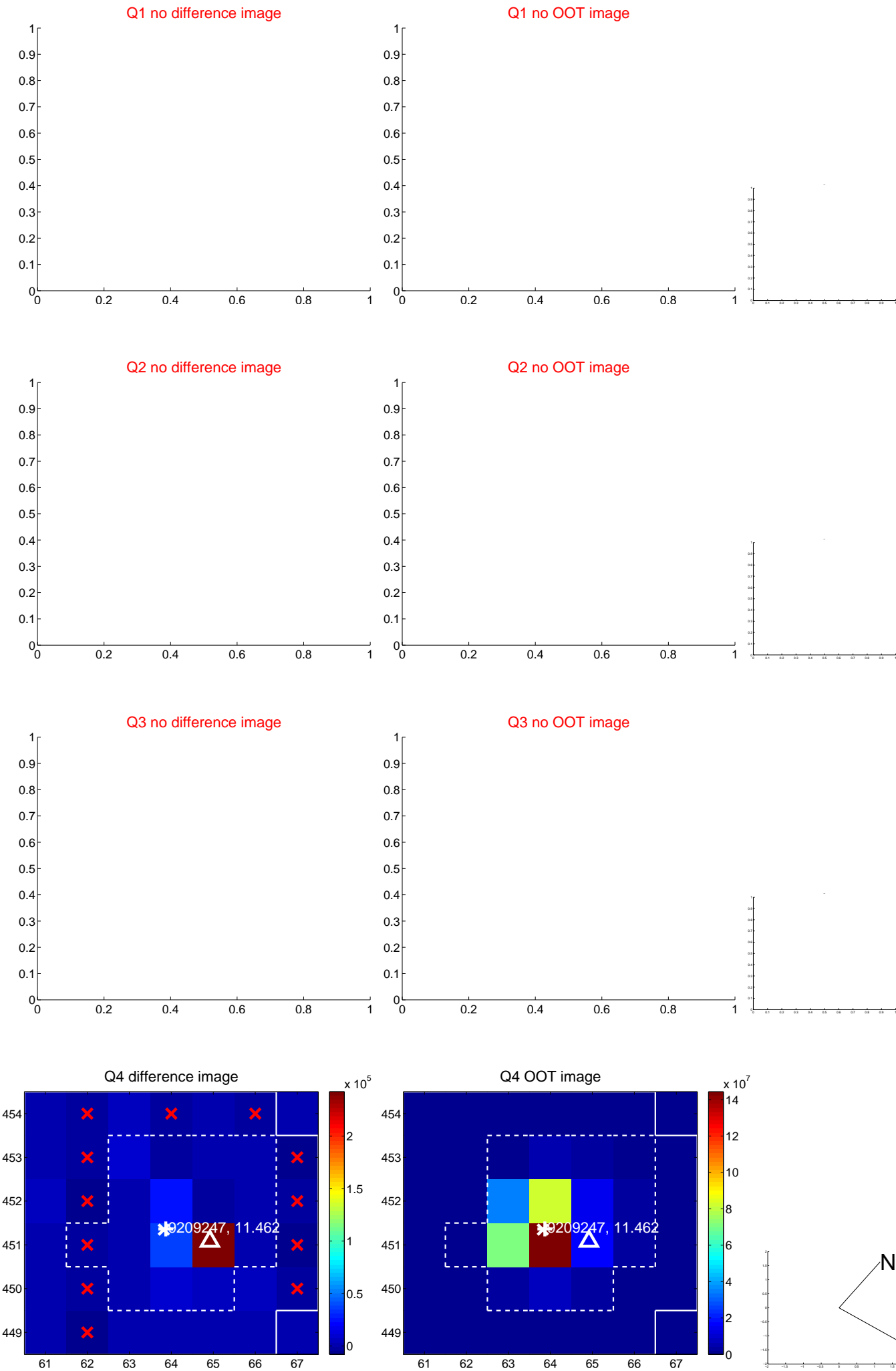
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.653 \pm 1.274$	2.08	$2.223 \pm 1.520$	$1.448 \pm 0.075$
PRF-fit source offset from KIC position	$2.793 \pm 1.280$	2.18	$2.308 \pm 1.547$	$1.572 \pm 0.094$
photometric centroid source offset	$0.94 \pm 0.26$	<b>3.59</b>	$0.75 \pm 0.28$	$0.56 \pm 0.23$



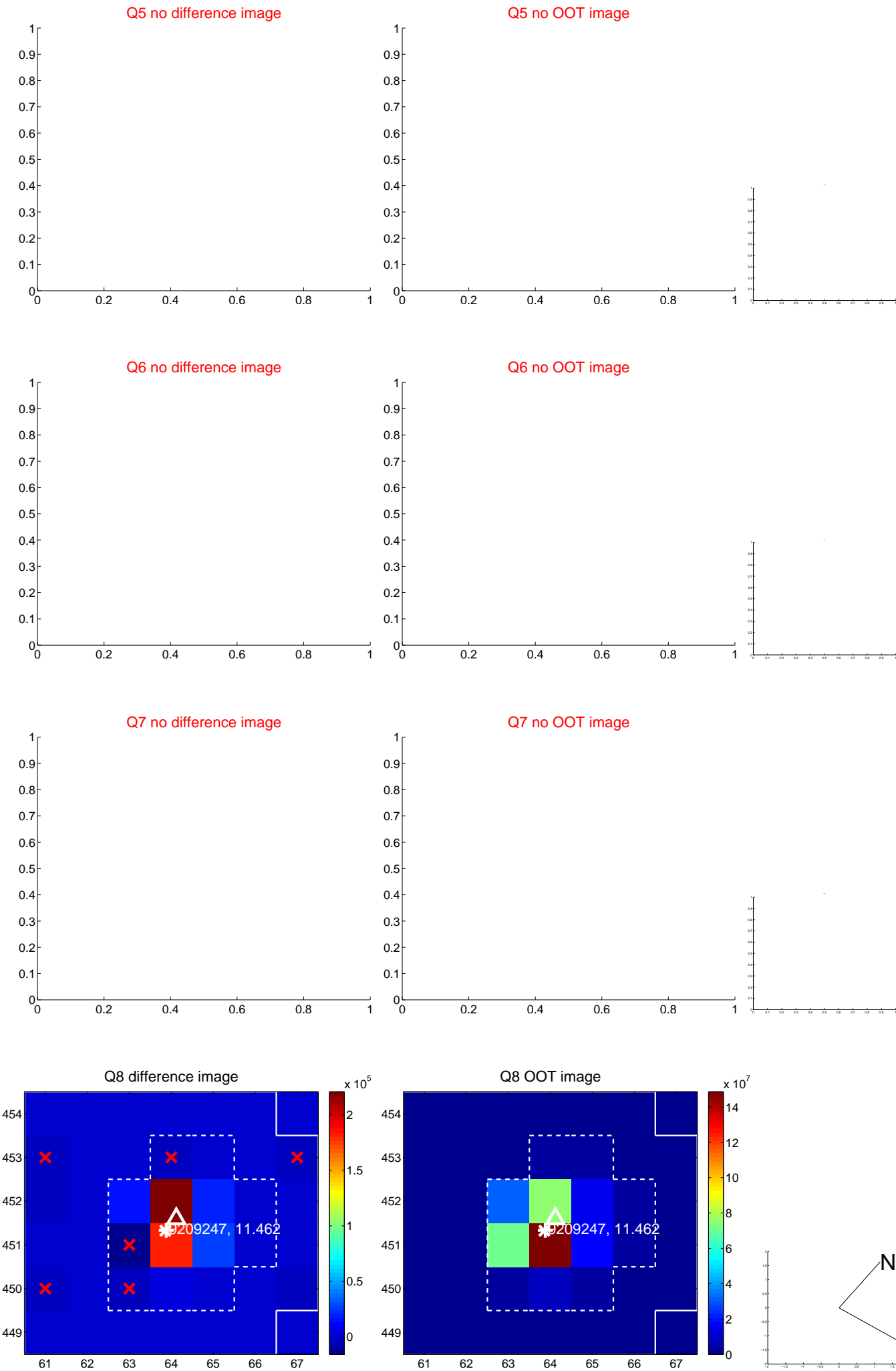
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



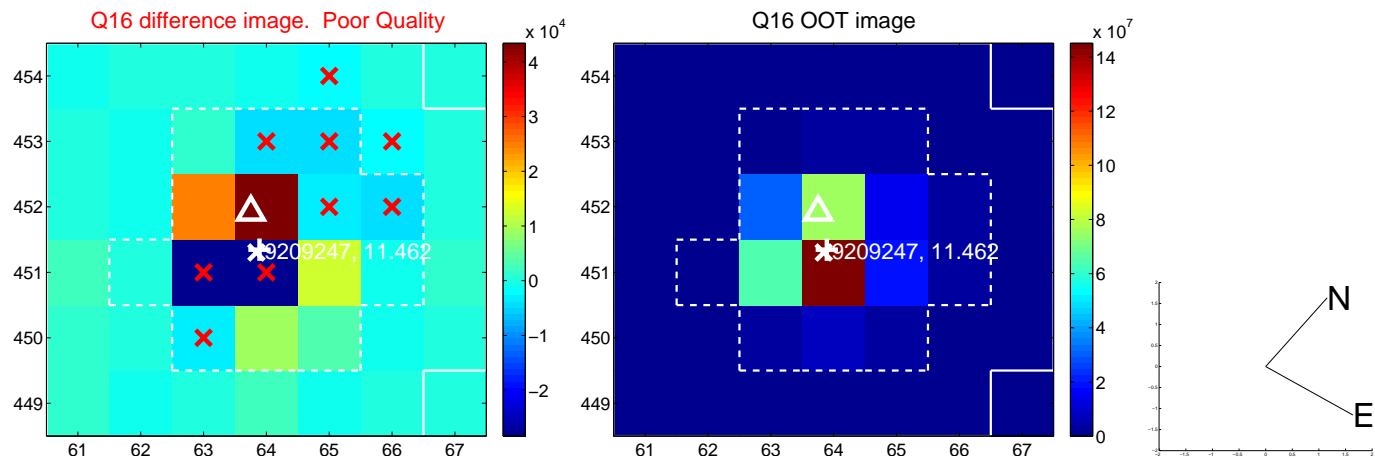
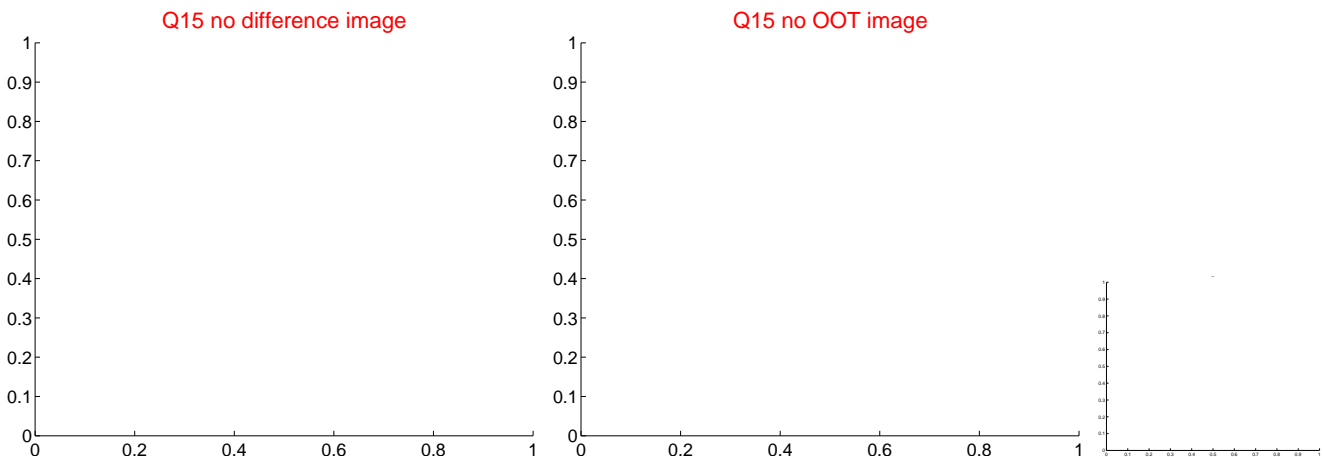
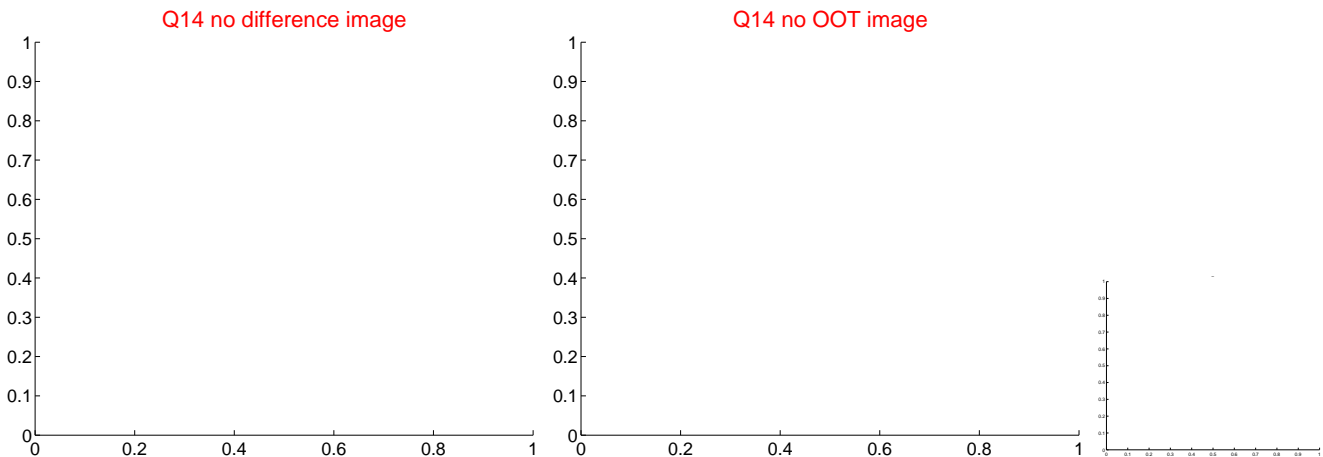
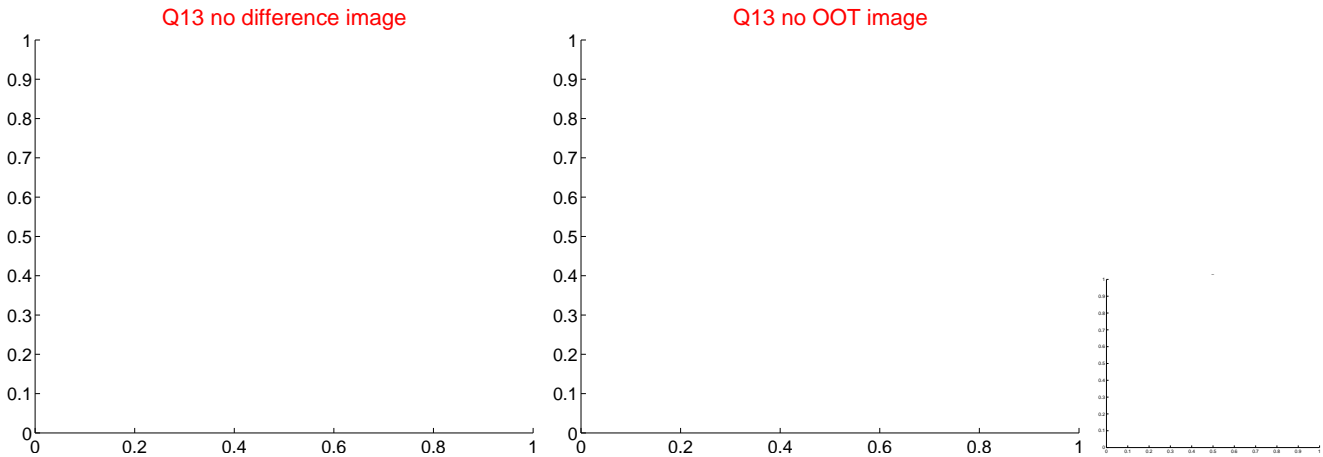
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



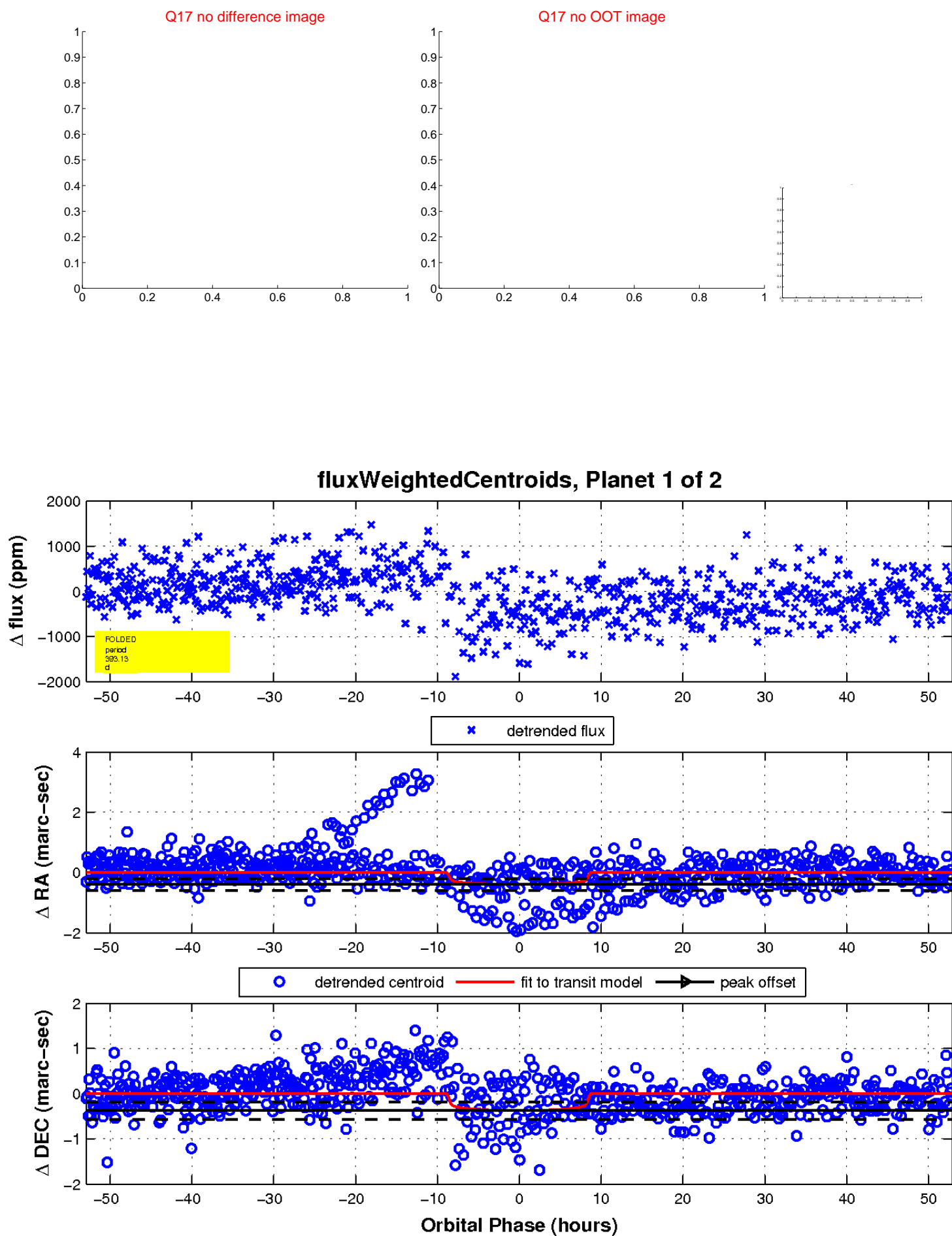
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

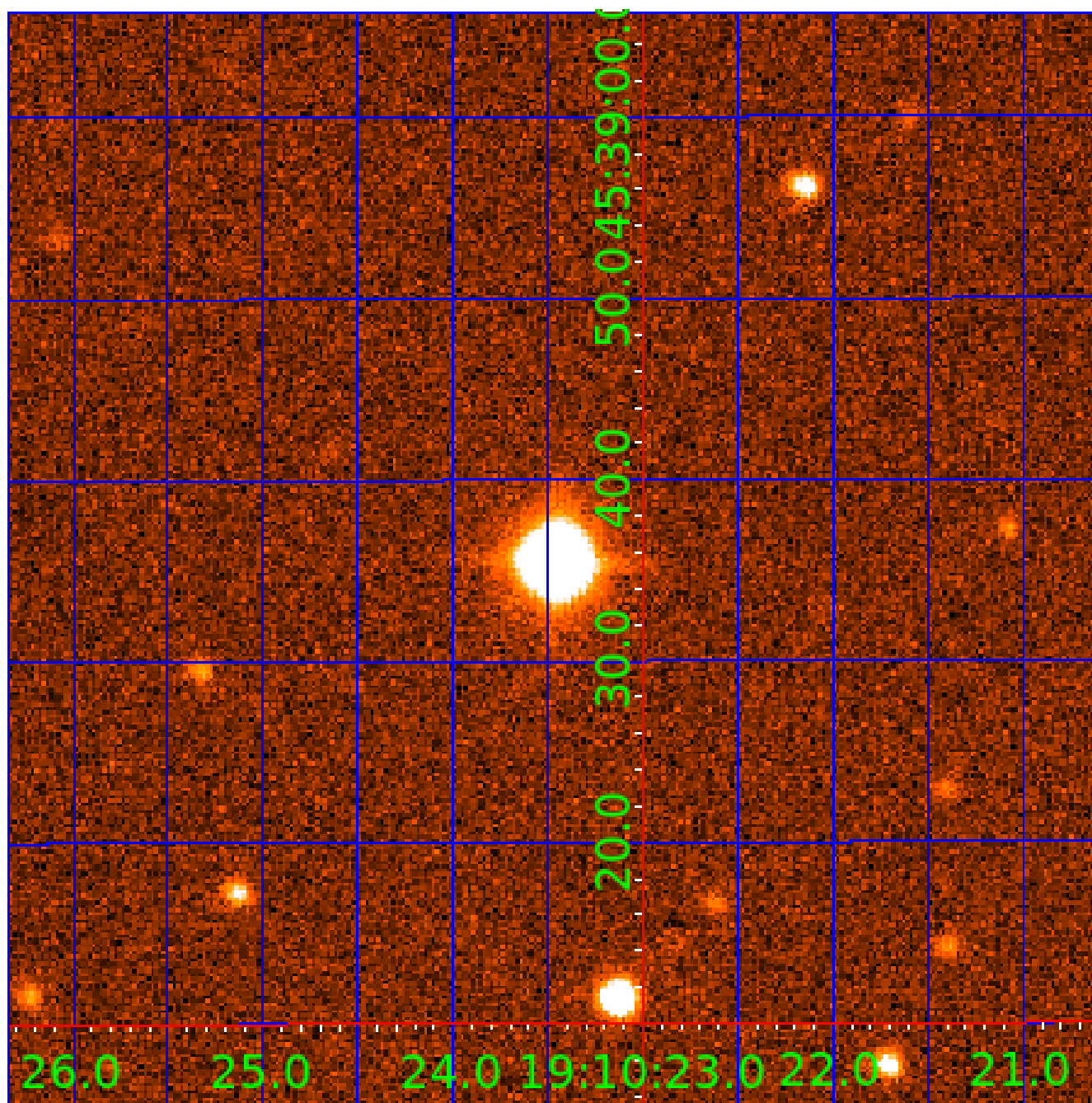


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009209247

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009209247-01	OBS	No	393.127119	375.149752	656.1	17.671	16.1	16.4	1.68	7987	4.51	6.47
009209247-02	OBS	No	0.757148	131.882448	61.0	9.086	12.4	21.2	1.68	7987	2.16	27022.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009209247-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_SATURATED
009209247-02	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED

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

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

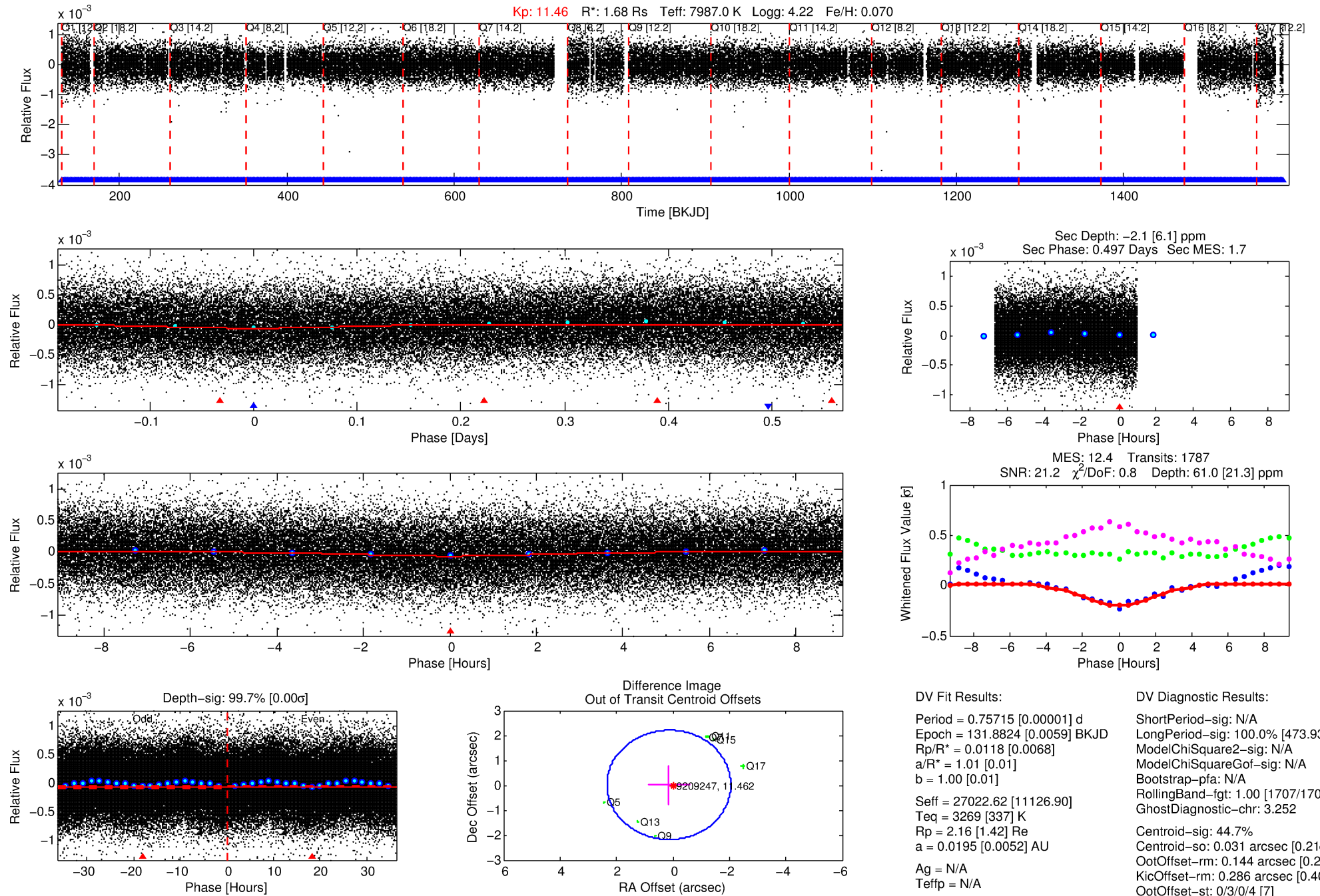
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009209247-02

No Significant Match Found

# DV One-Page Summary

KIC: 9209247 Candidate: 2 of 2 Period: 0.757 d



## DV Fit Results:

Period = 0.75715 [0.00001] d  
Epoch = 131.8824 [0.0059] BKJD  
Rp/R\* = 0.0118 [0.0068]  
a/R\* = 1.01 [0.01]  
b = 1.00 [0.01]  
Seff = 27022.62 [11126.90]  
Teq = 3269 [337] K  
Rp = 2.16 [1.42] Re  
a = 0.0195 [0.0052] AU  
Ag = N/A  
Teffp = N/A

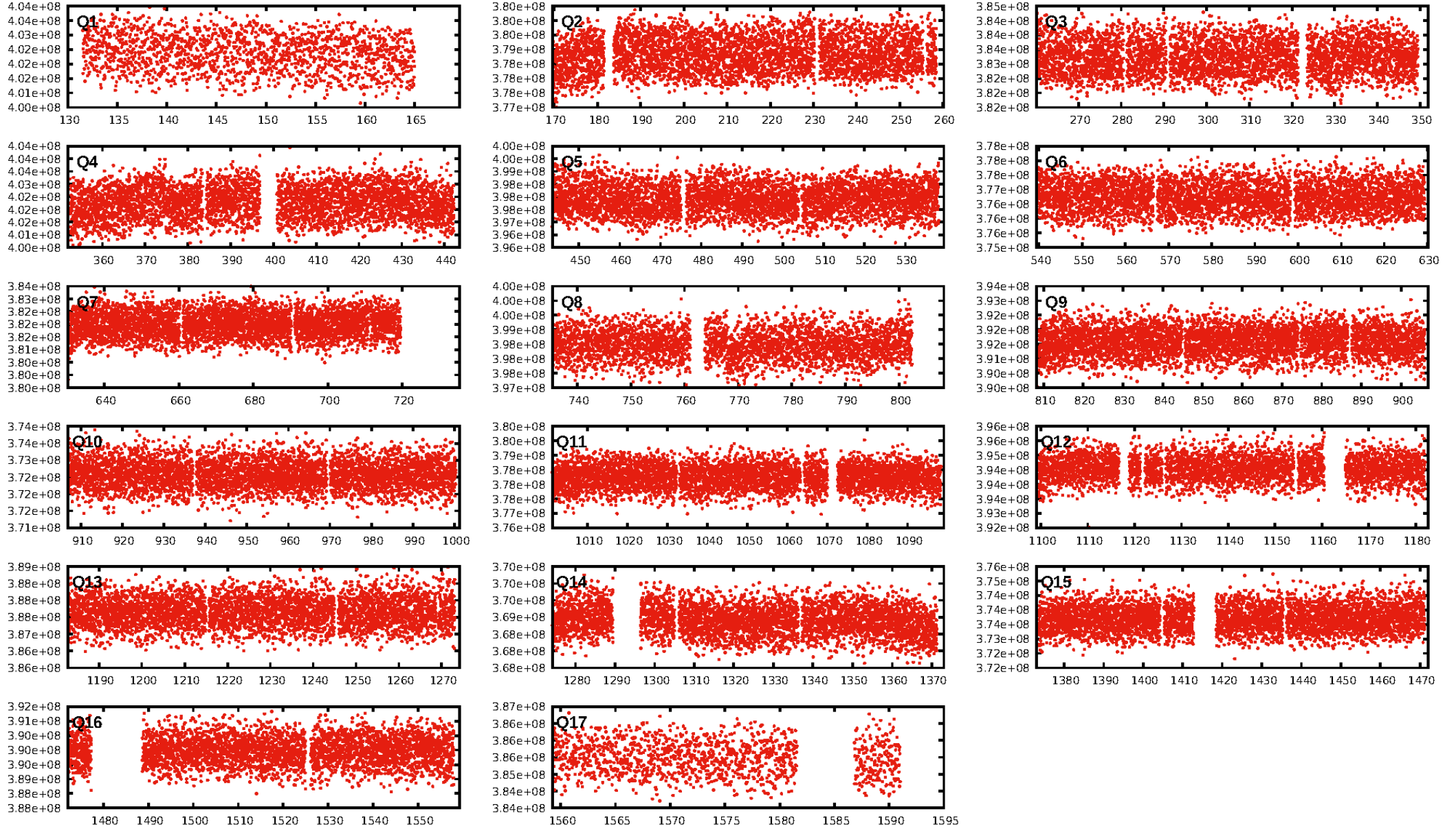
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [473.93σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1707/1707]  
GhostDiagnostic-chr: 3.252  
Centroid-sig: 44.7%  
Centroid-so: 0.031 arcsec [0.21σ]  
OotOffset-rm: 0.144 arcsec [0.20σ]  
KicOffset-rm: 0.286 arcsec [0.40σ]  
OotOffset-st: 0/3/0/4 [7]  
KicOffset-st: 0/3/0/4 [7]  
DiffImageQuality-fgm: 0.14 [1/7]  
DiffImageOverlap-fno: 1.00 [17/17]

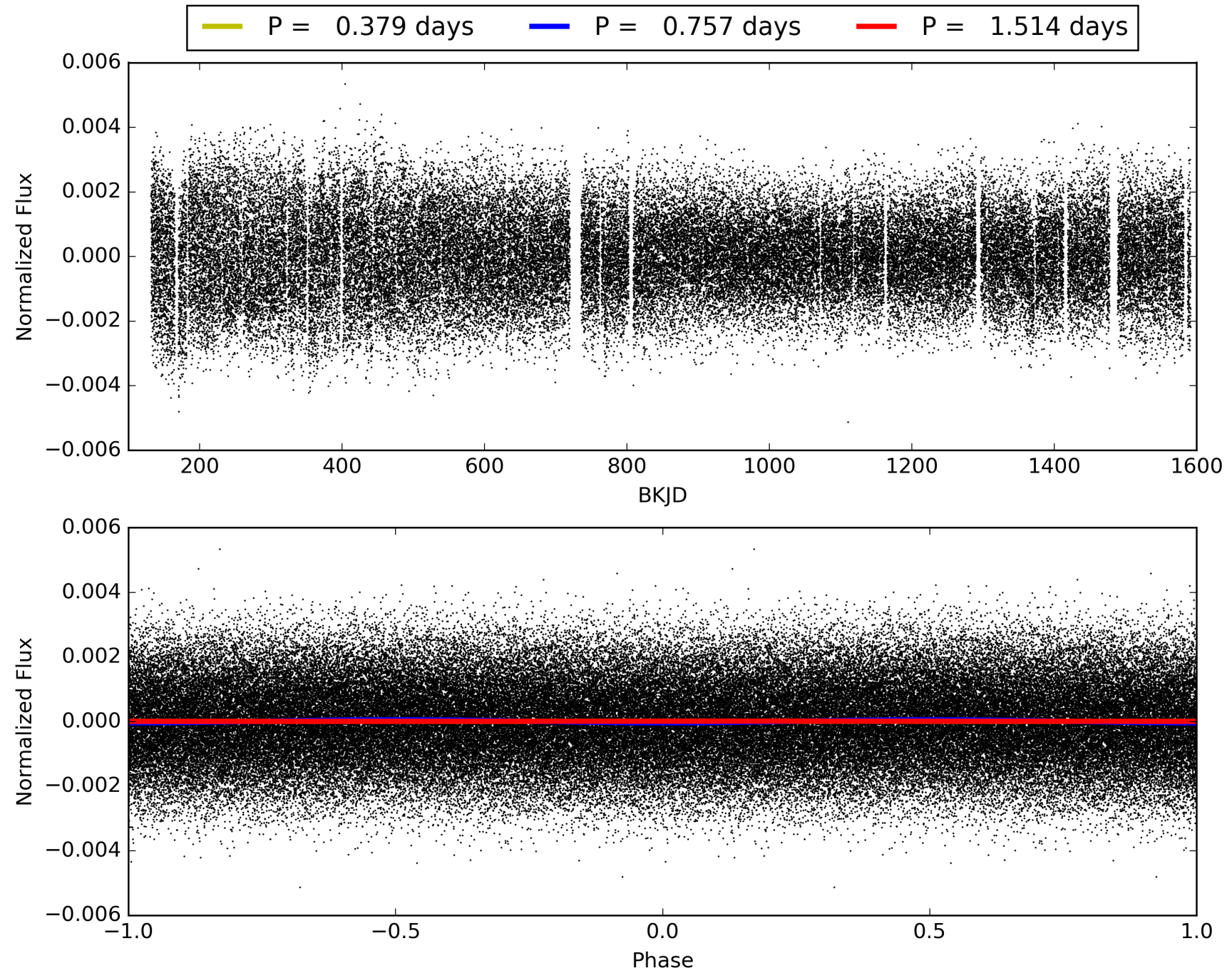
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:37:33 Z

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

# TCE 009209247-02, PDC Light Curves



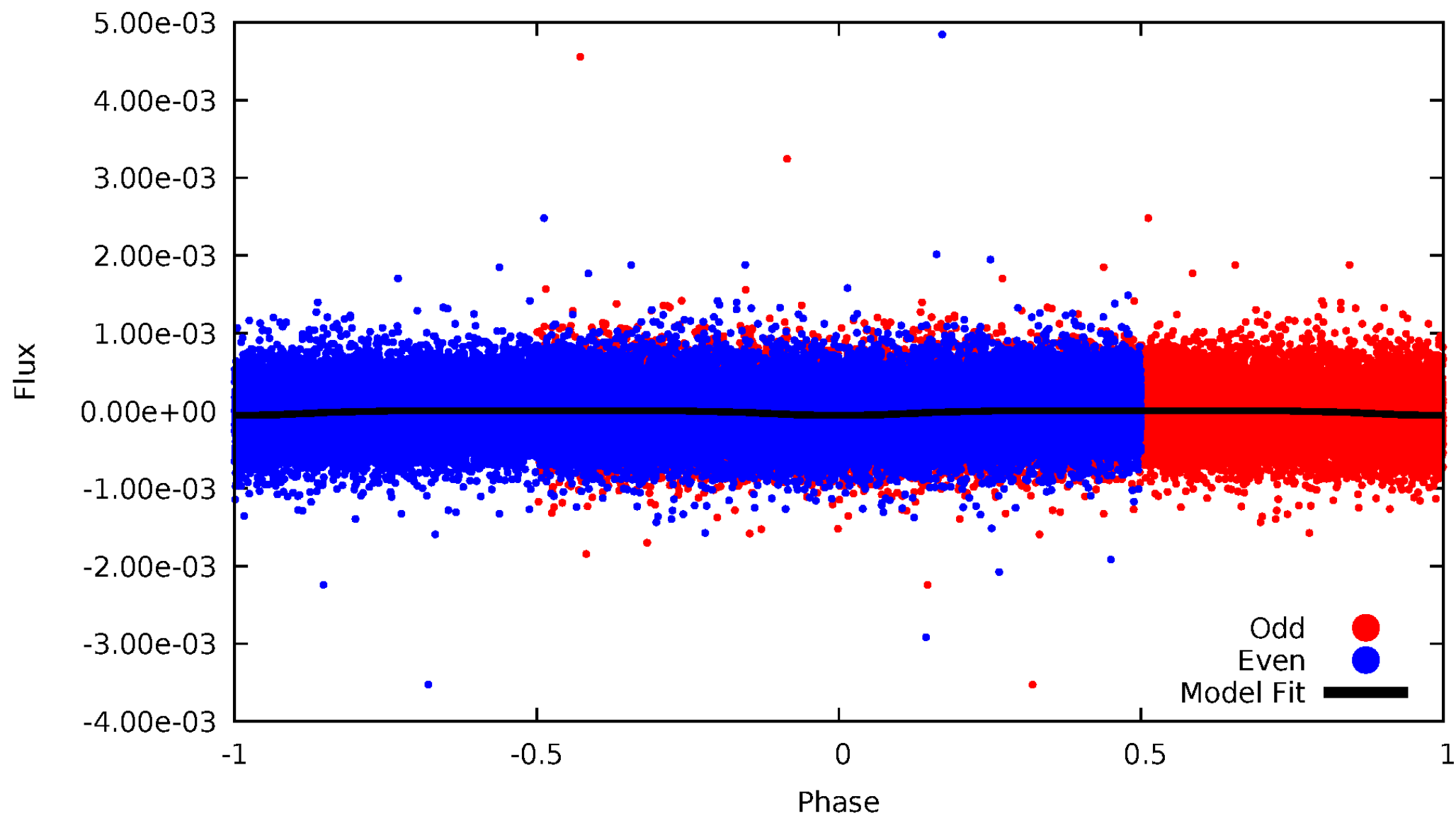
TCE 009209247-02





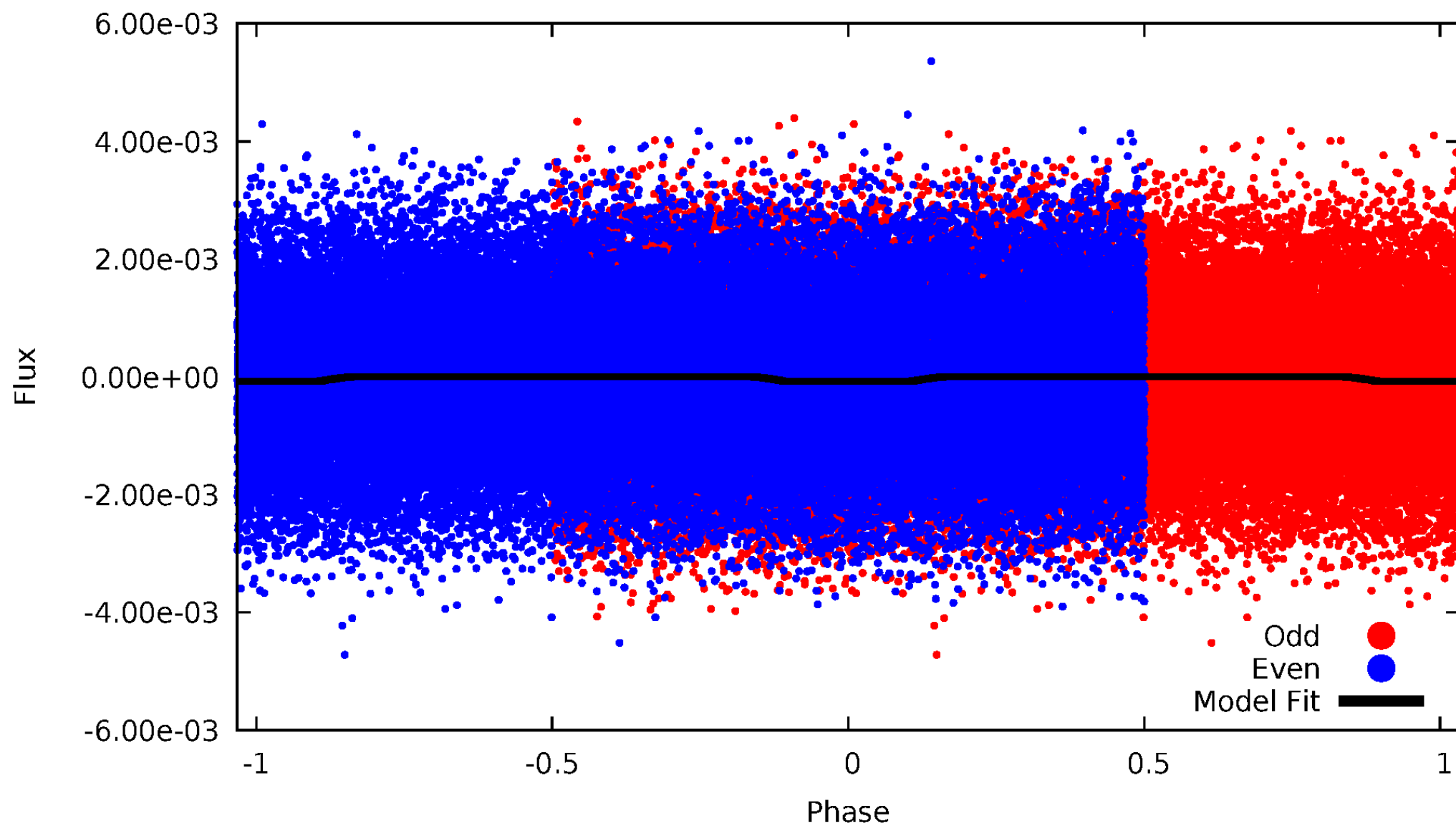
# DV Odd/Even

TCE 009209247-02



# ALT Odd/Even

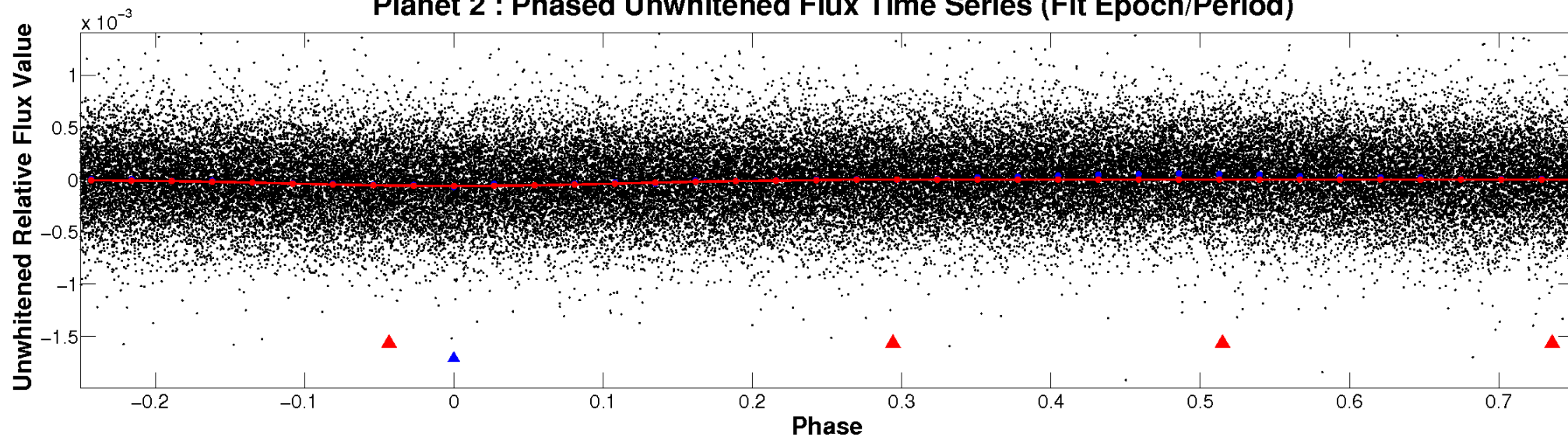
TCE 009209247-02



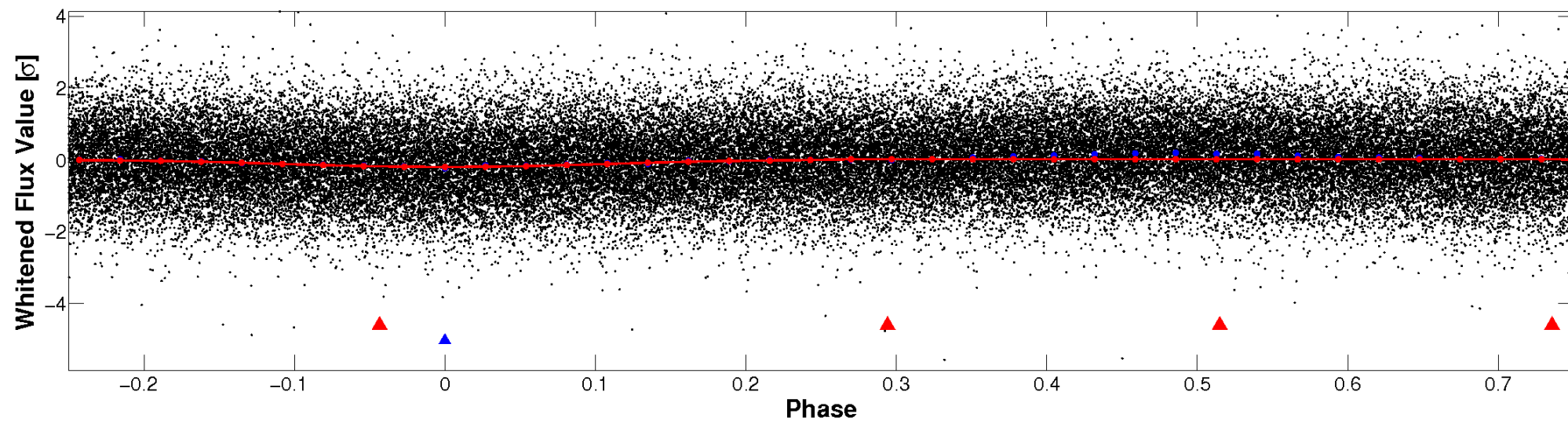


# Non-Whitened Vs. Whitened Light Curve

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

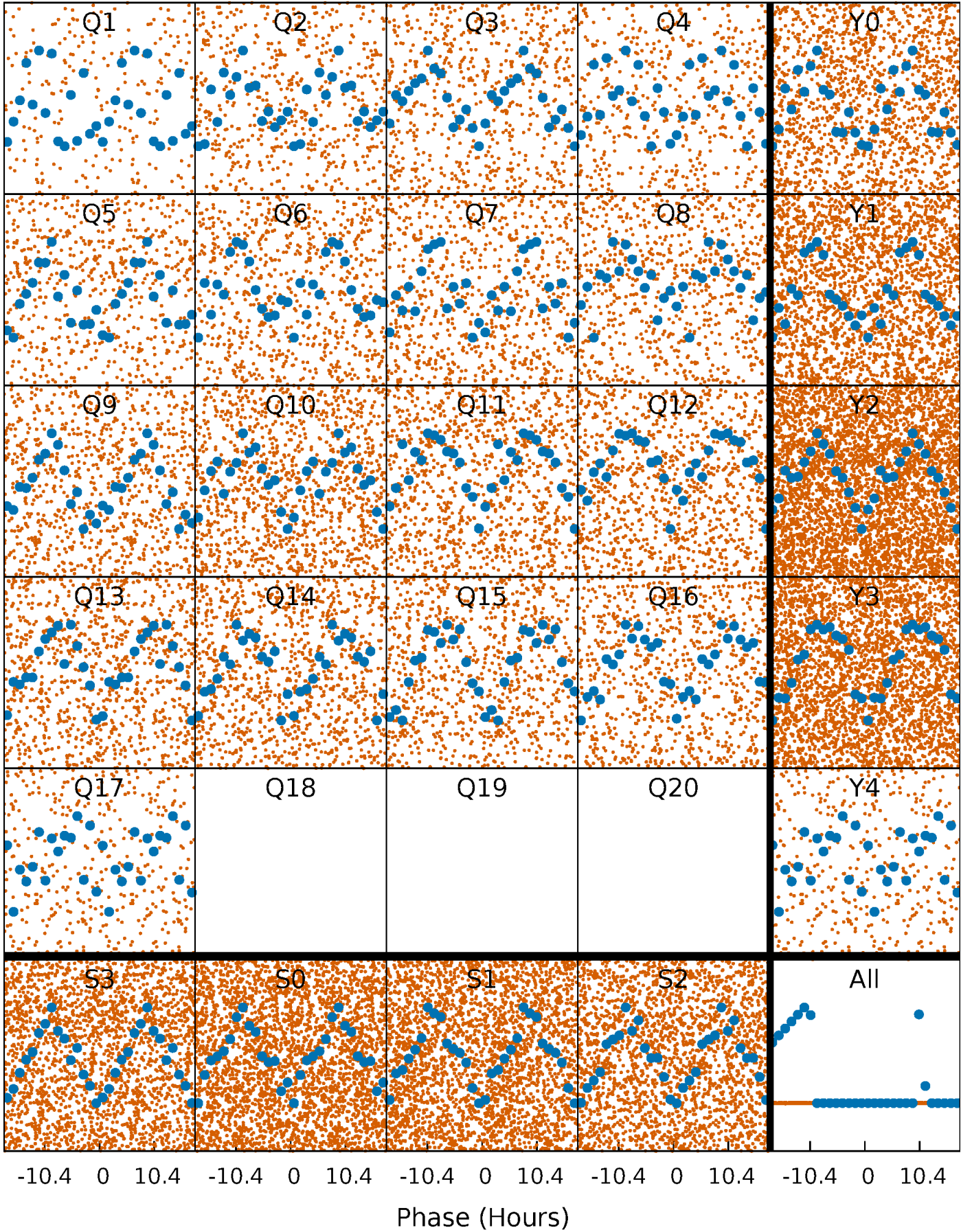


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

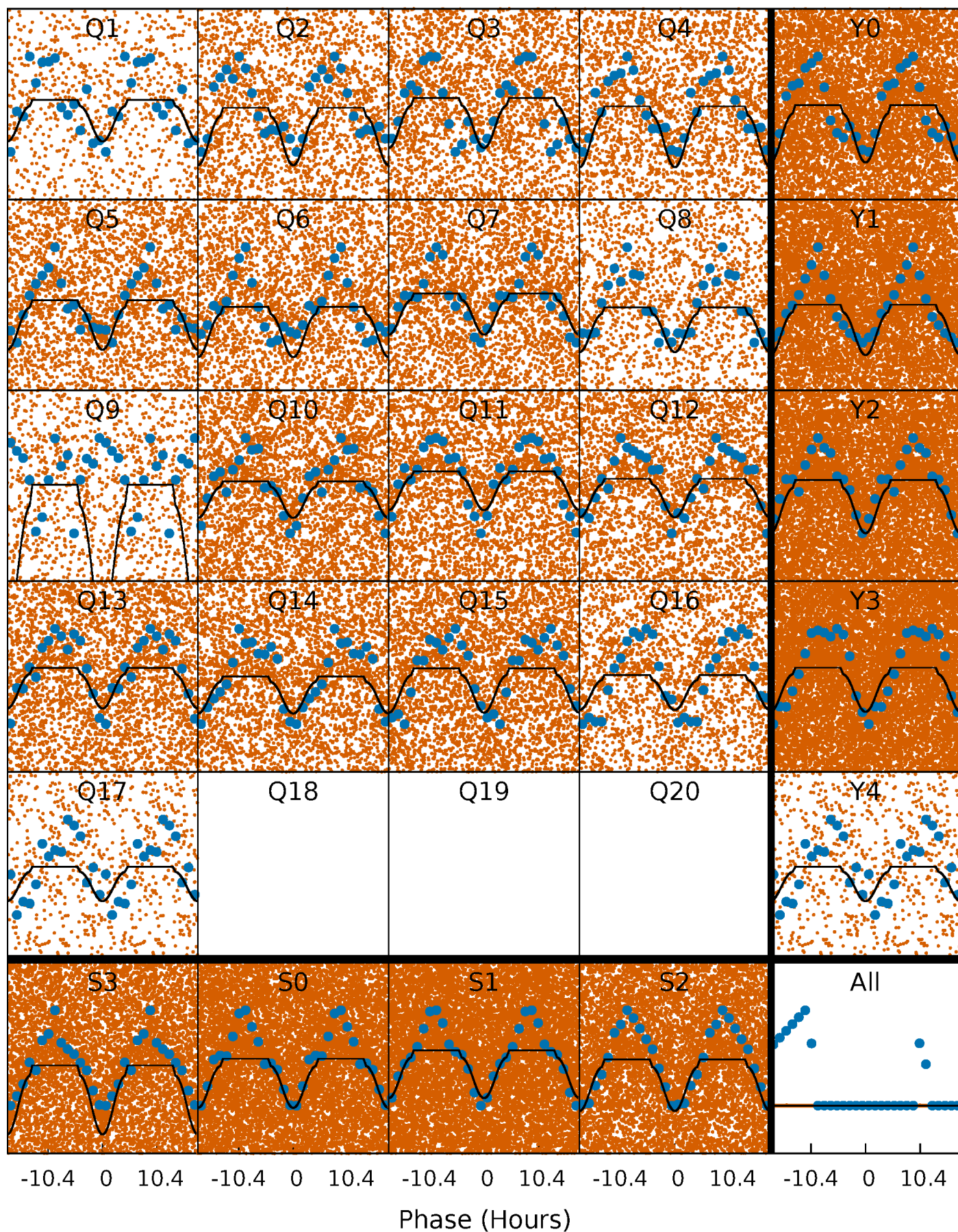
TCE 009209247-02   P= 0.757148 Days    $T_0=131.882448$  (BKJD)





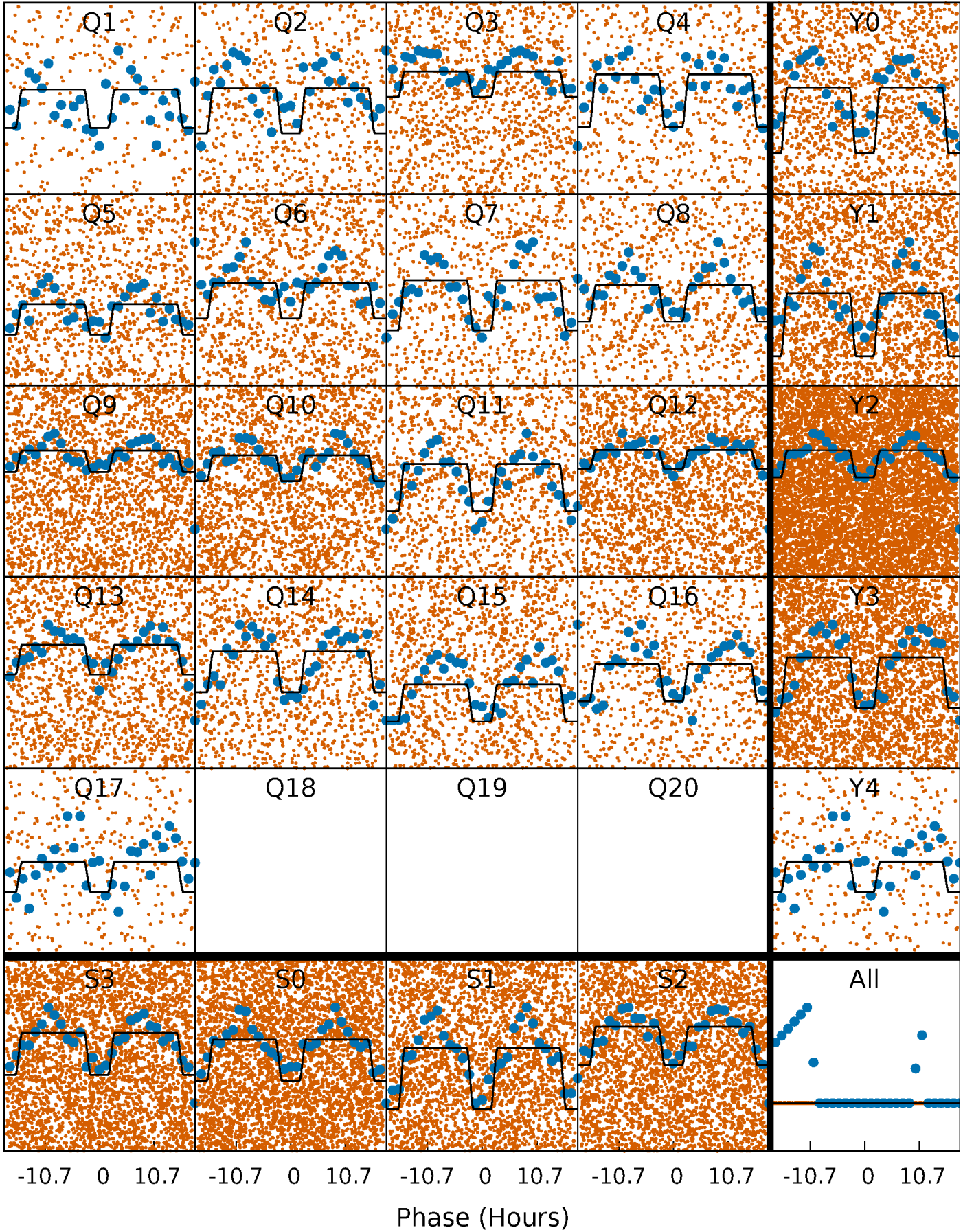
# DV Quarter-Phased Transit Curves

TCE 009209247-02   P= 0.757148 Days    $T_0=131.882448$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009209247-02   P= 0.757125 Days    $T_0=131.914215$  (BKJD)

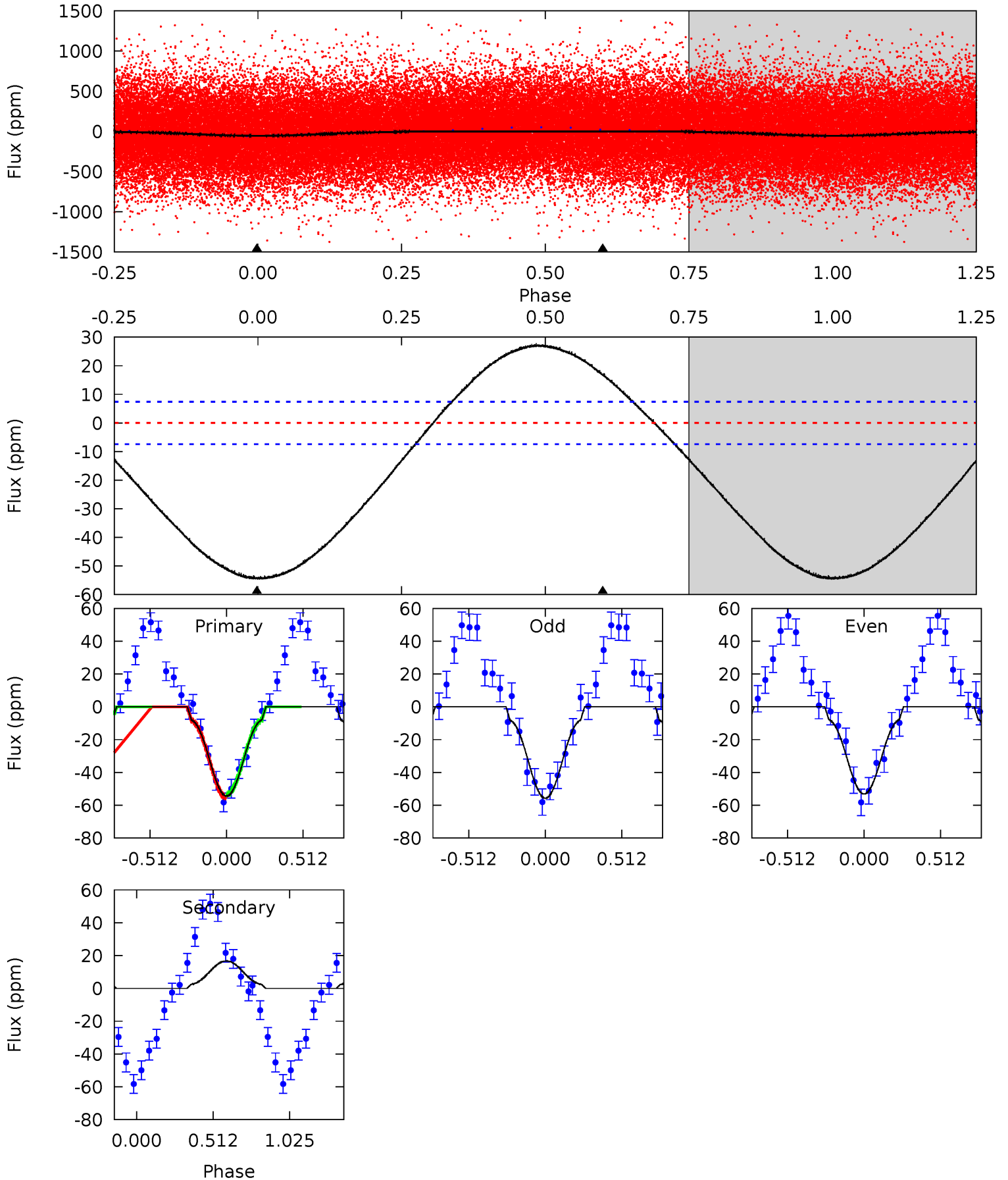




# DV Model-Shift Uniqueness Test

009209247-02, P = 0.757148 Days, E = 131.125300 Days

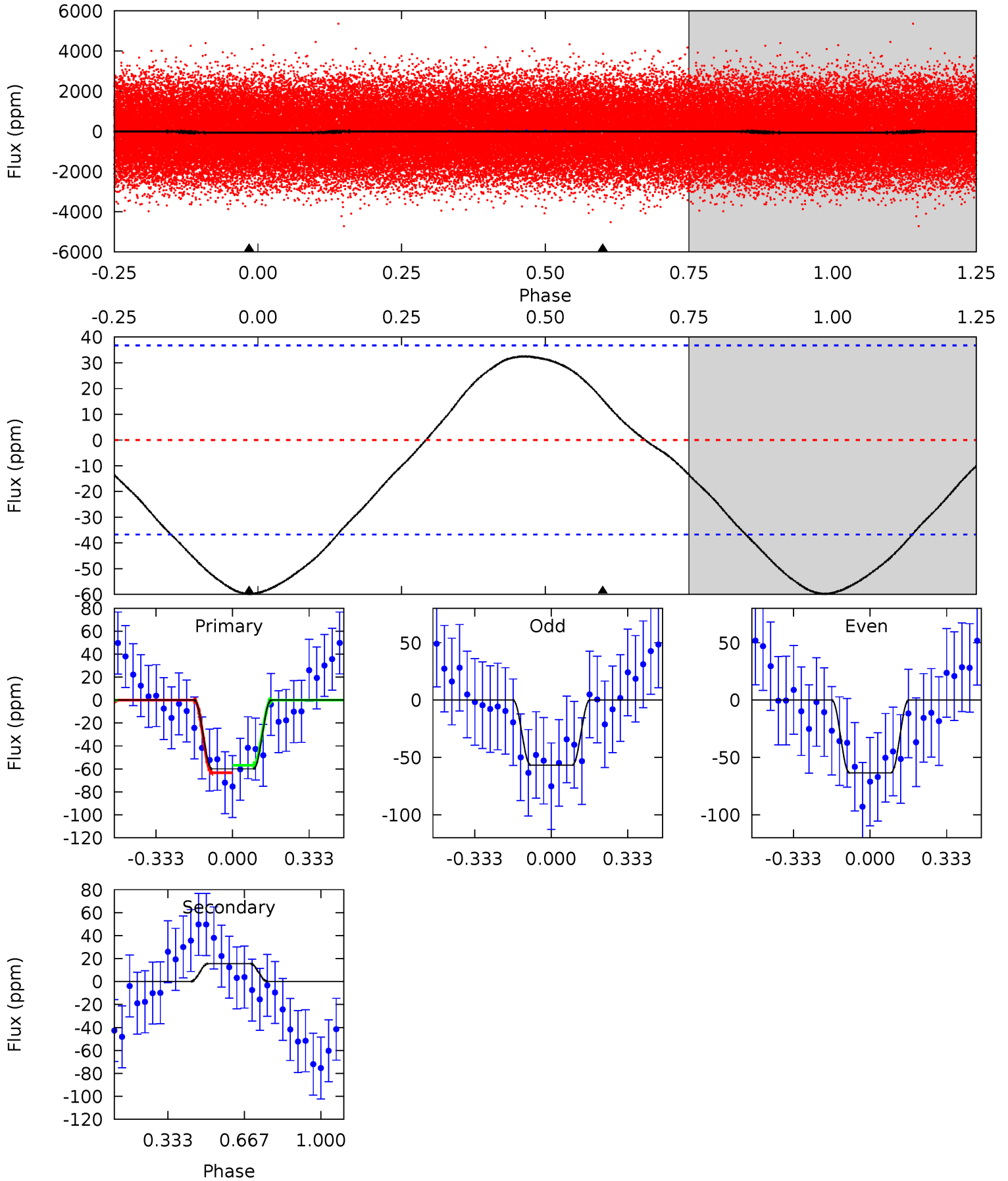
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.9	-9.47	0	0	4.21	0.66	3.81	30.9	30.9	-9.47	-9.47	0.74	0.88	0.34	0.56



# Alt Model-Shift Uniqueness Test

009209247-02, P = 0.757125 Days, E = 131.157090 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
7.02	-1.83	0	0	4.31	0.97	0.86	7.02	7.02	-1.83	-1.83	0.39	0.95	0.35	0.39





### Stellar Parameters For KIC 009209247

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7987^{+221}_{-331}$	$4.225^{+0.067}_{-0.202}$	$0.070^{+0.250}_{-0.450}$	$1.680^{+0.540}_{-0.216}$	$1.728^{+0.211}_{-0.232}$	$0.514^{+0.184}_{-0.261}$
	+3%/-4%	+2%/-5%	+357%/-643%	+32%/-13%	+12%/-13%	+36%/-51%
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 009209247-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$17 \pm 2$	$2.27^{+1.39}_{-1.12}$	$4636^{+368}_{-239}$	$-5083^{+517}_{-1601}$	$-0.664^{+0.410}_{-1.960}$
Alt.	$16 \pm 9$	$1.89^{+1.30}_{-1.09}$	$4647^{+325}_{-277}$	$-5178^{+711}_{-2837}$	$-0.771^{+0.555}_{-4.758}$

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

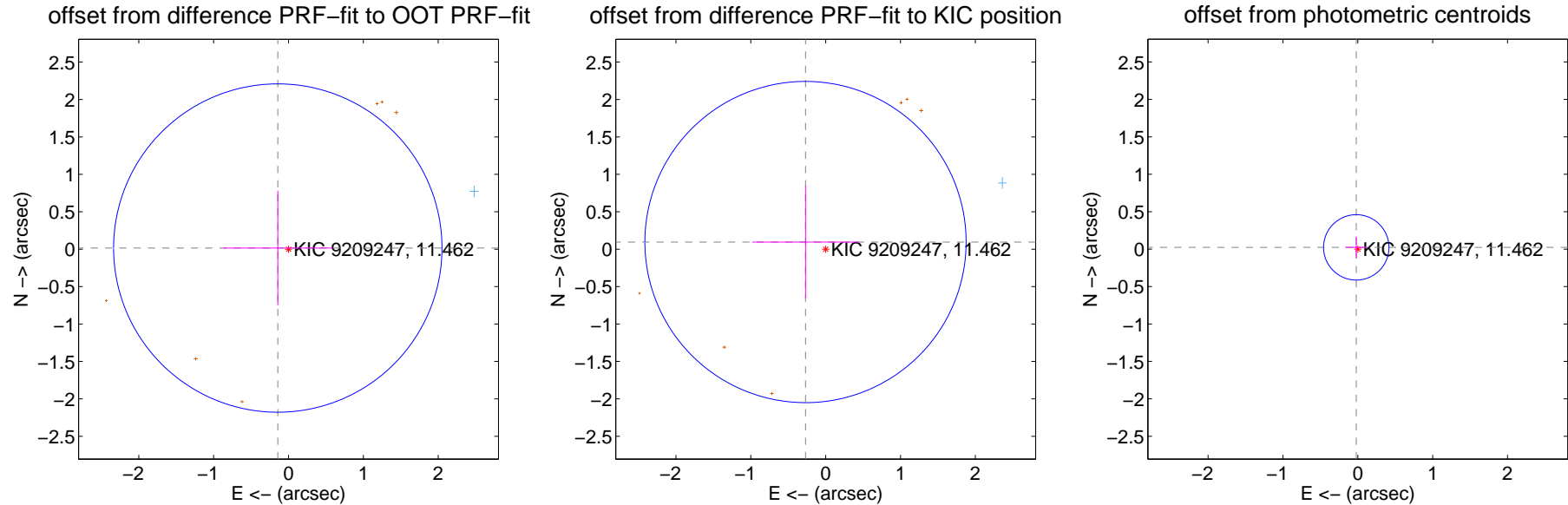
## DV Centroid Data

Supplemental centroid analysis for 009209247-02. **Kepler magnitude: 11.46.** Transit SNR 21.15

**There are 1 quarters with good PRF difference image offsets**

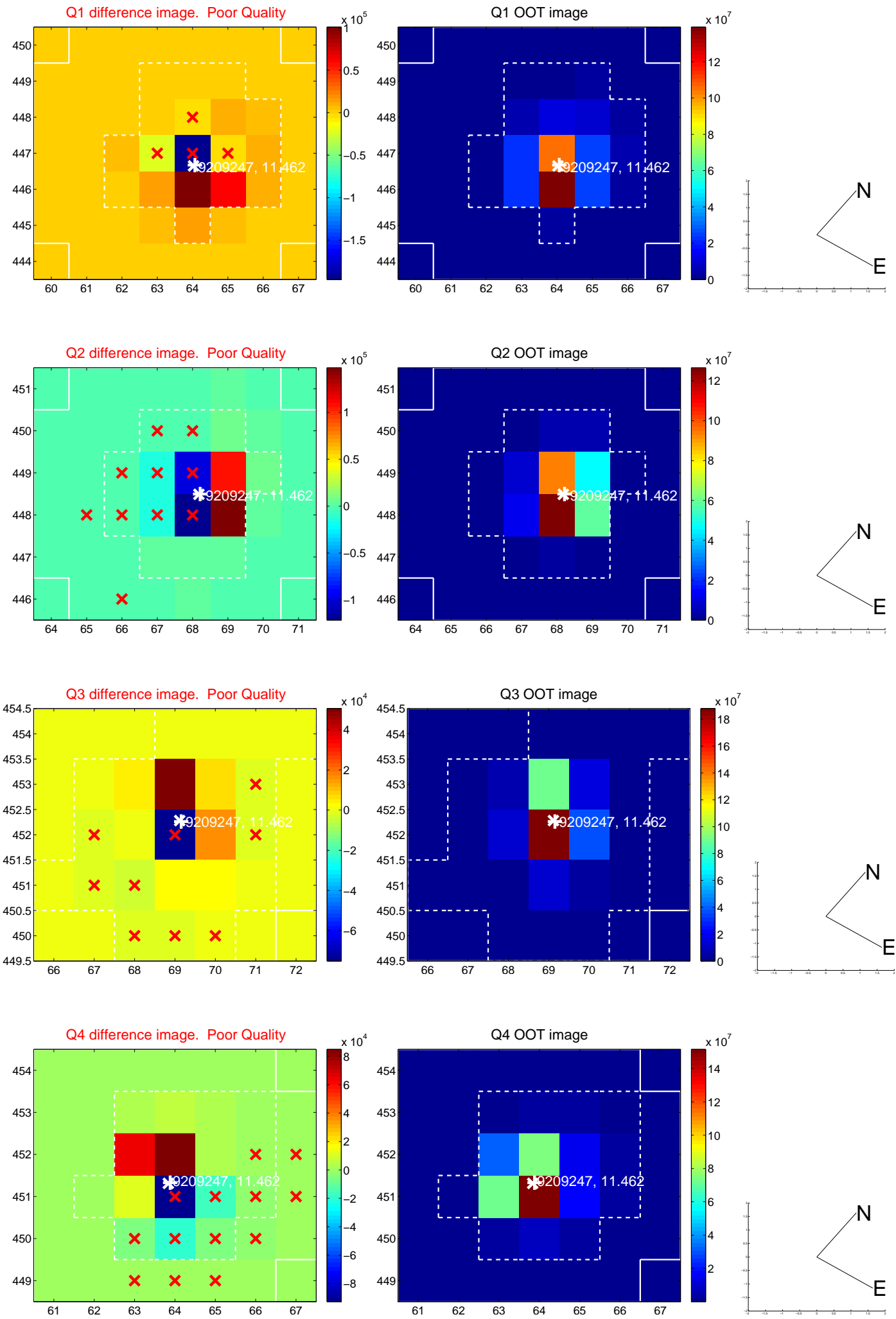
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.144 \pm 0.731$	0.20	$0.143 \pm 0.731$	$0.015 \pm 0.767$
PRF-fit source offset from KIC position	$0.286 \pm 0.715$	0.40	$0.269 \pm 0.711$	$0.095 \pm 0.747$
photometric centroid source offset	$0.03 \pm 0.15$	0.21	$0.02 \pm 0.15$	$0.02 \pm 0.14$

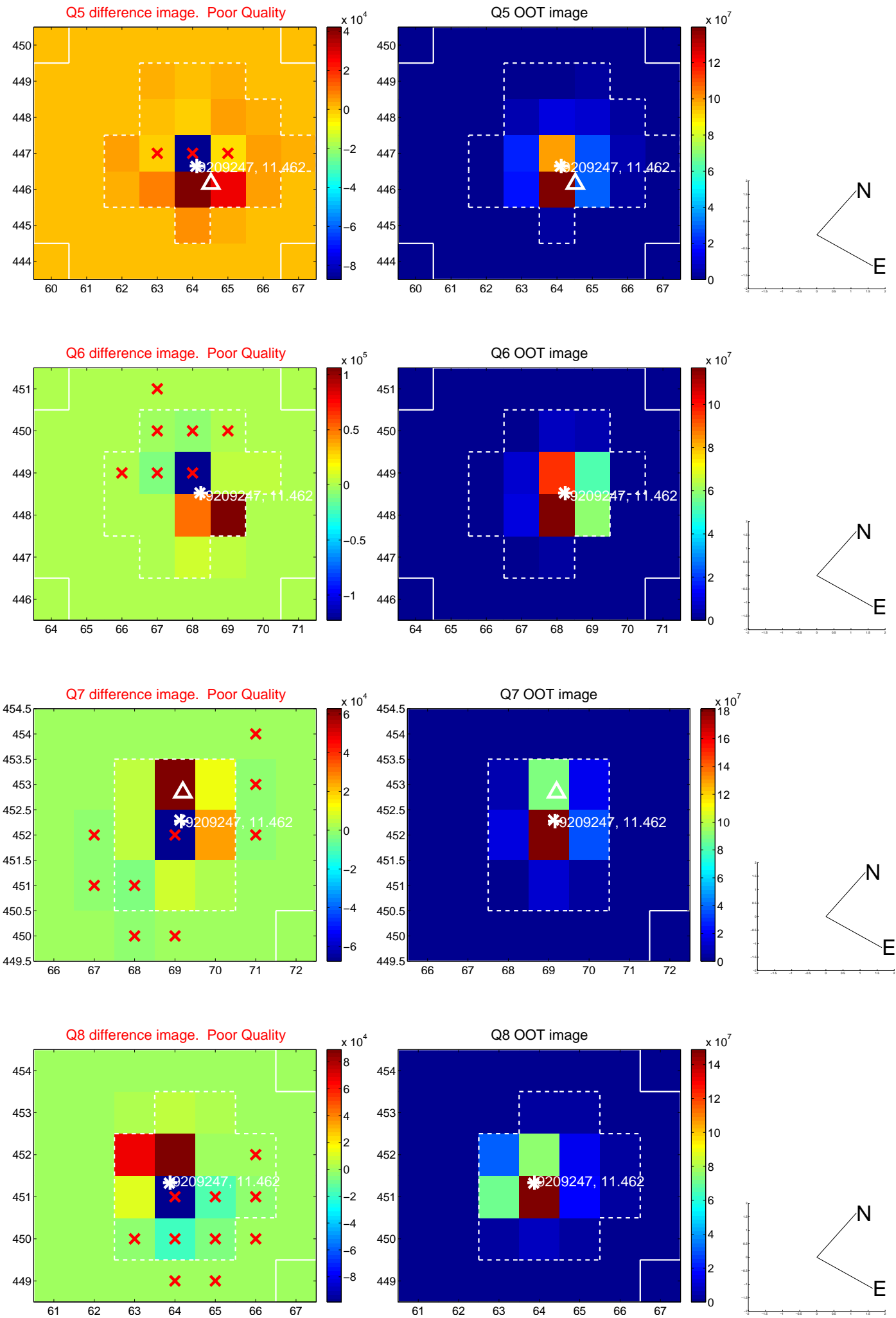


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

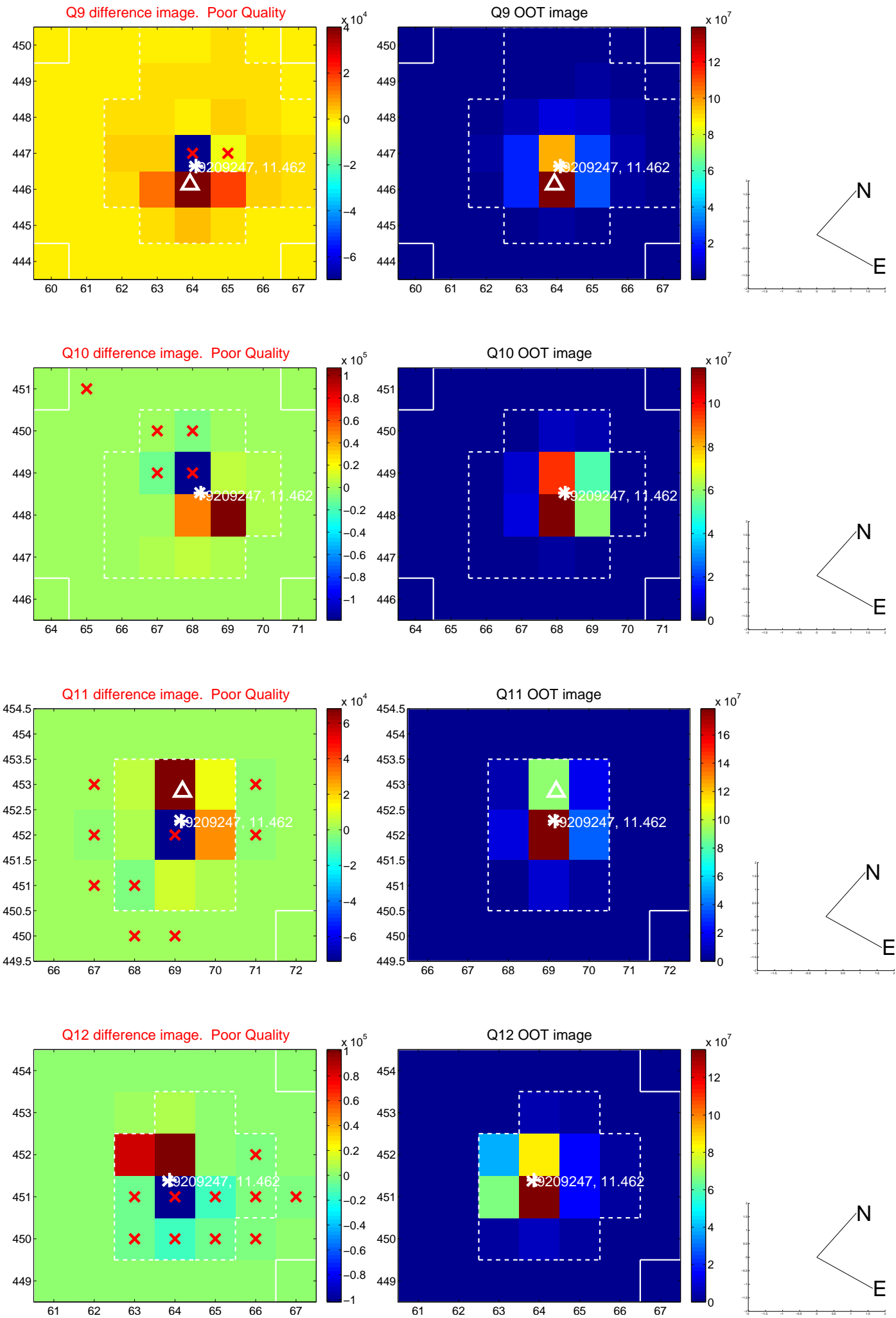
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



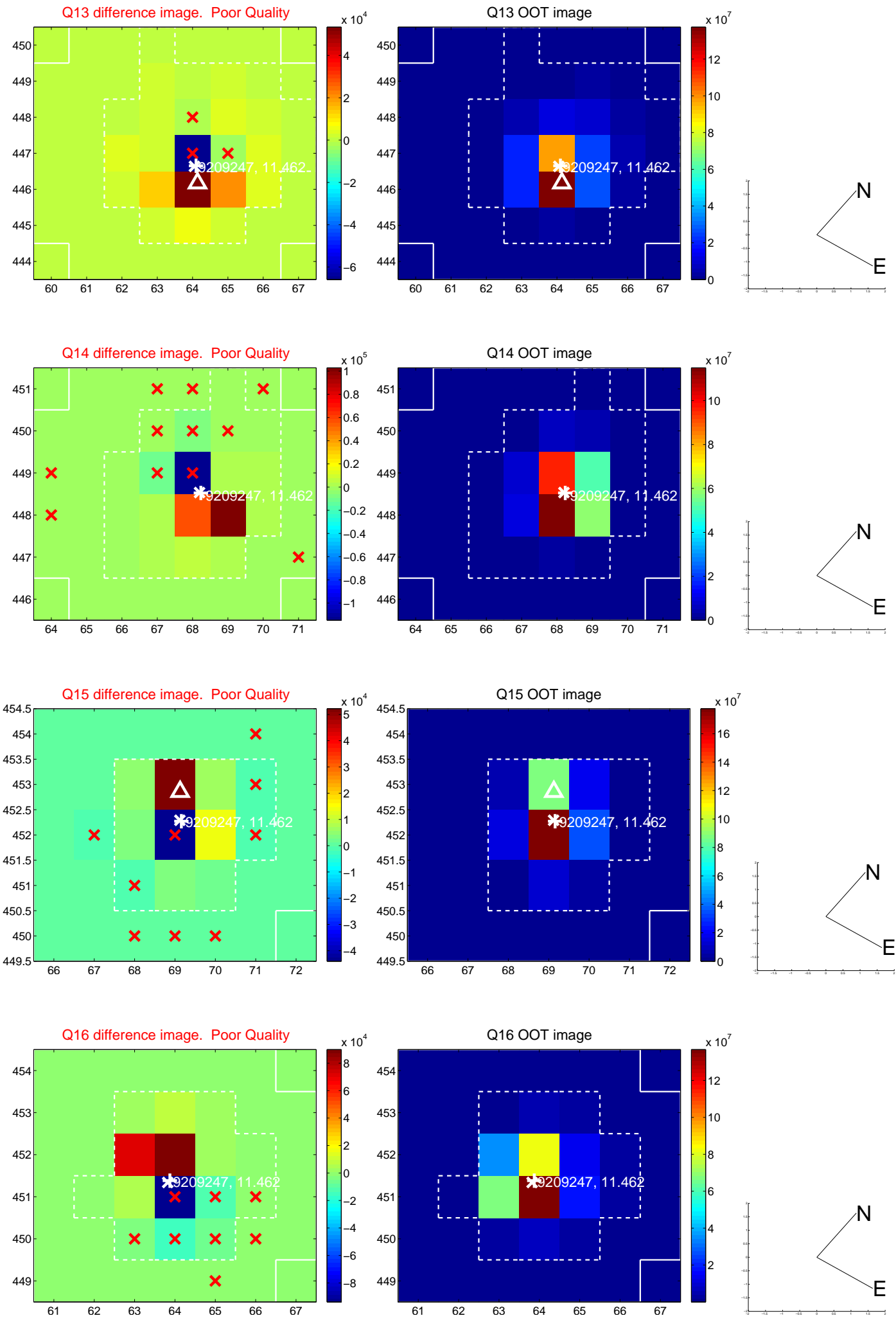
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



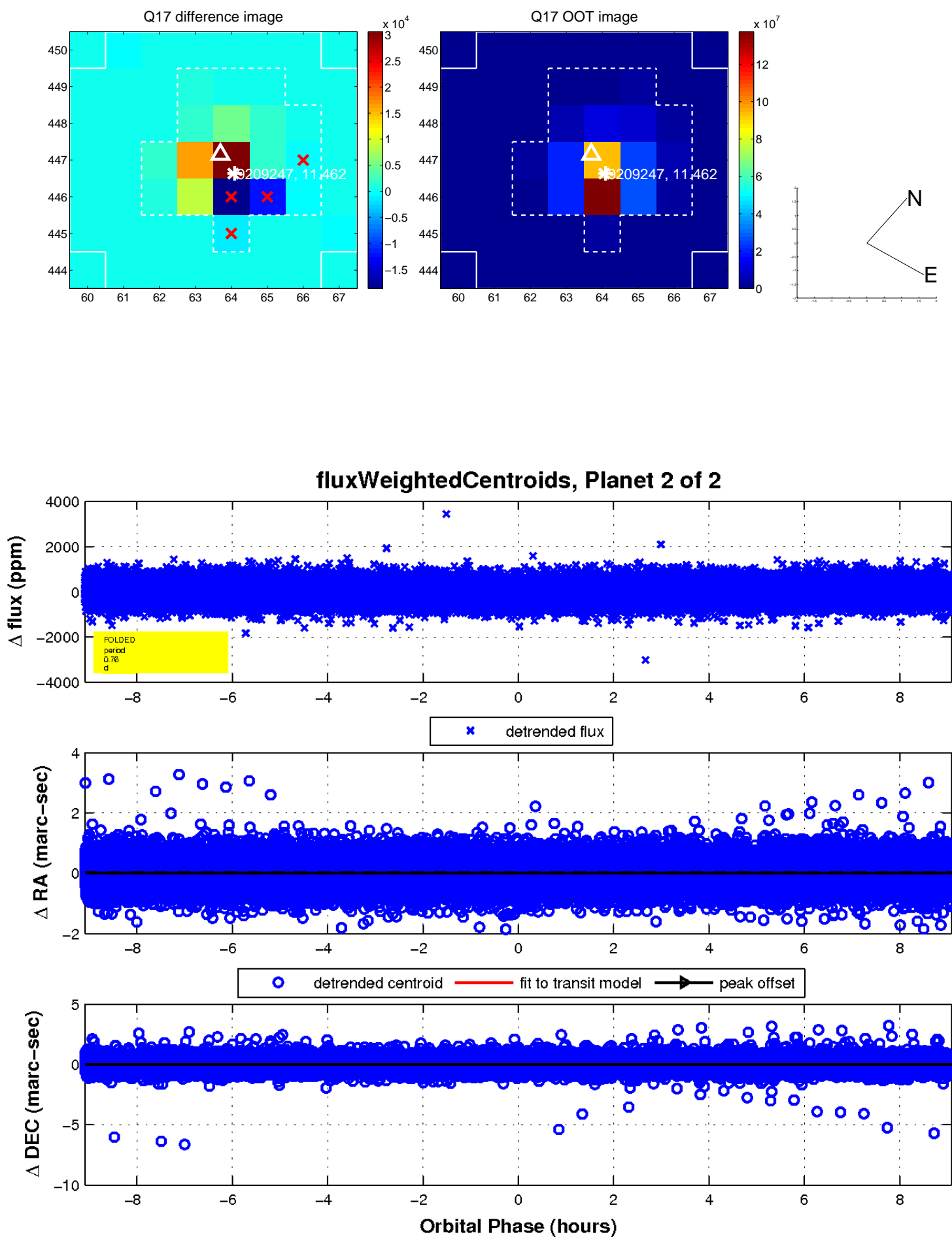
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

