

# KIC 009425107

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009425107-01	OBS	No	1.661114	131.880458	125.0	8.008	8.1	8.3	0.91	5587	1.21	1046.71
009425107-02	OBS	No	319.002424	328.292478	1907.6	5.343	7.8	7.1	0.91	5587	4.29	0.94

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009425107-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009425107-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—CENT_NOFITS

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

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

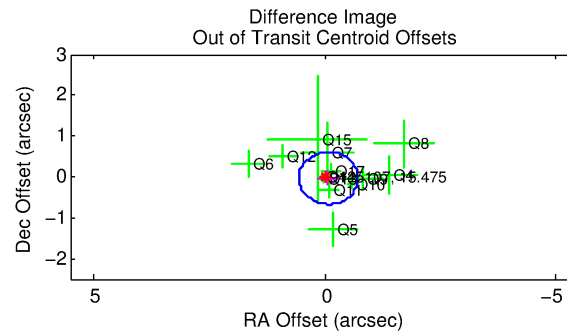
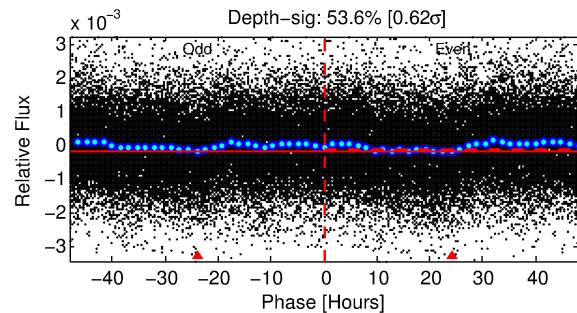
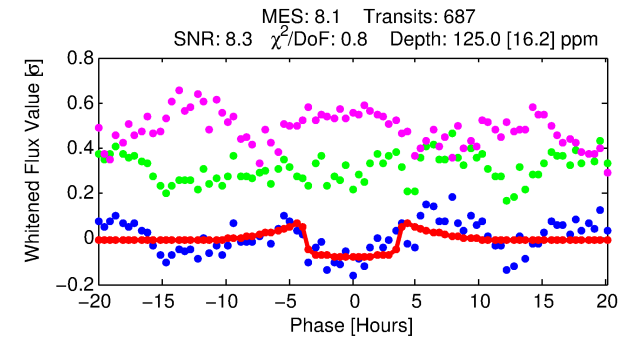
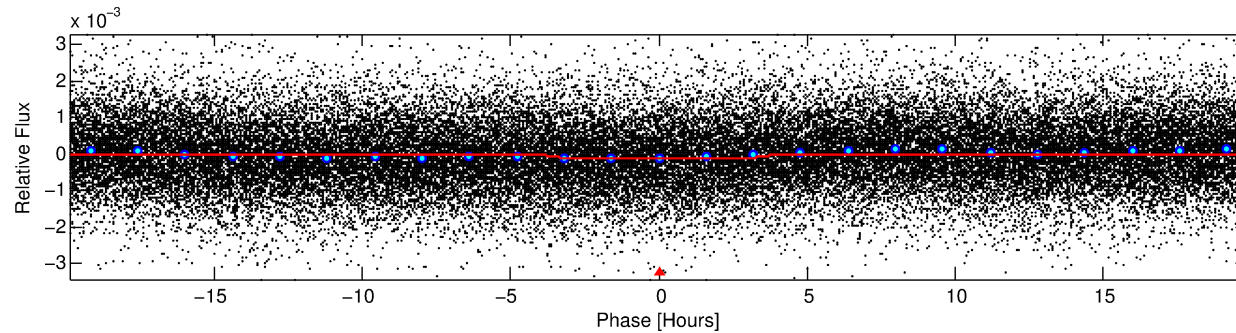
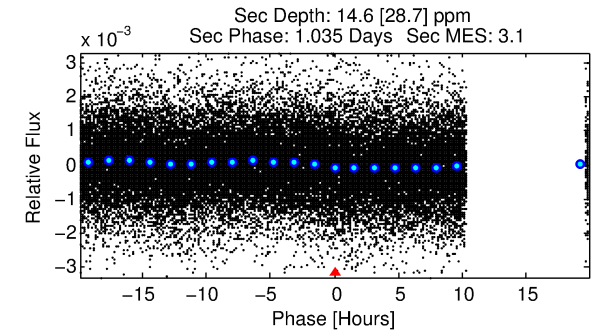
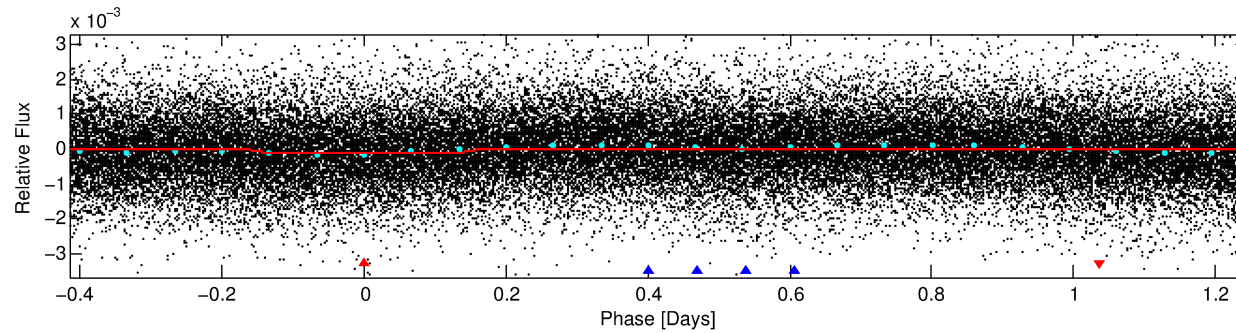
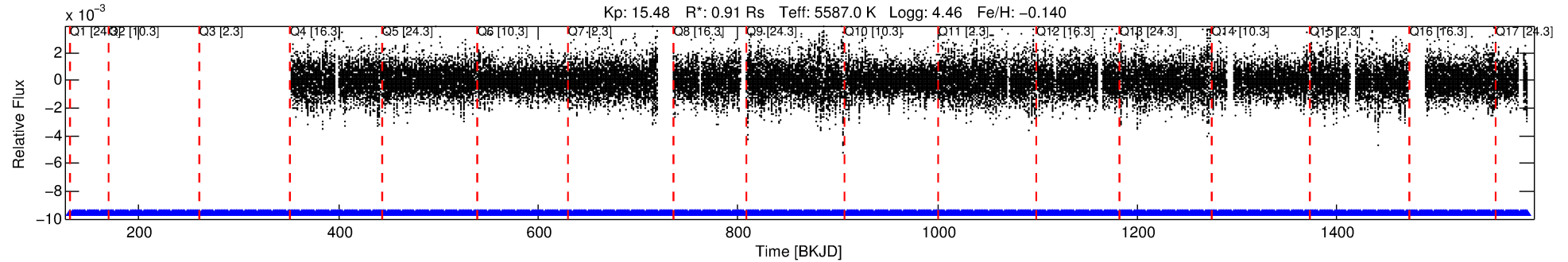
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009425107-01

No Significant Match Found

# DV One-Page Summary

KIC: 9425107 Candidate: 1 of 2 Period: 1.661 d



## DV Fit Results:

Period = 1.66111 [0.00002] d  
Epoch = 131.8805 [0.0056] BKJD  
Rp/R\* = 0.0122 [0.0022]  
a/R\* = 1.19 [0.27]  
b = 0.90 [0.16]  
Seff = 1046.72 [342.34]  
Teff = 1450 [119] K  
Rp = 1.21 [0.37] Re  
a = 0.0262 [0.0055] AU  
Ag = 3.76 [7.63] [0.36σ]  
Teffp = 3123 [1568] K [1.06σ]

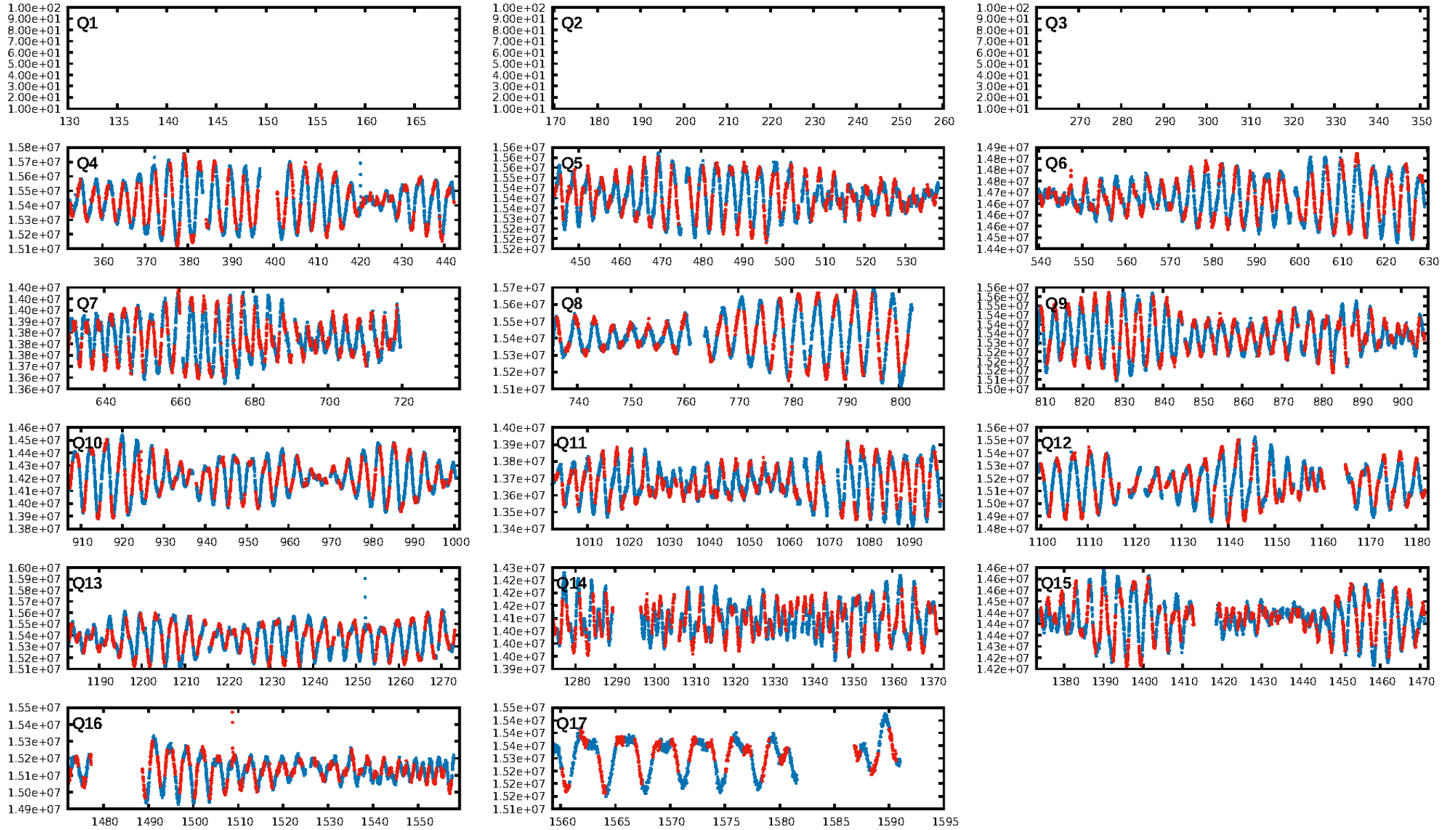
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [791.14σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 2.64e-11**  
RollingBand-fgt: 1.00 [671/671]  
GhostDiagnostic-chr: 3.044  
Centroid-sig: 32.0%  
Centroid-so: 0.799 arcsec [1.00σ]  
OotOffset-rm: 0.085 arcsec [0.40σ]  
KicOffset-st: 3/3/3/4 [13]  
KicOffset-st: 3/3/3/4 [13]  
DiffImageQuality-fgm: 0.54 [7/13]  
DiffImageOverlap-fno: 1.00 [14/14]

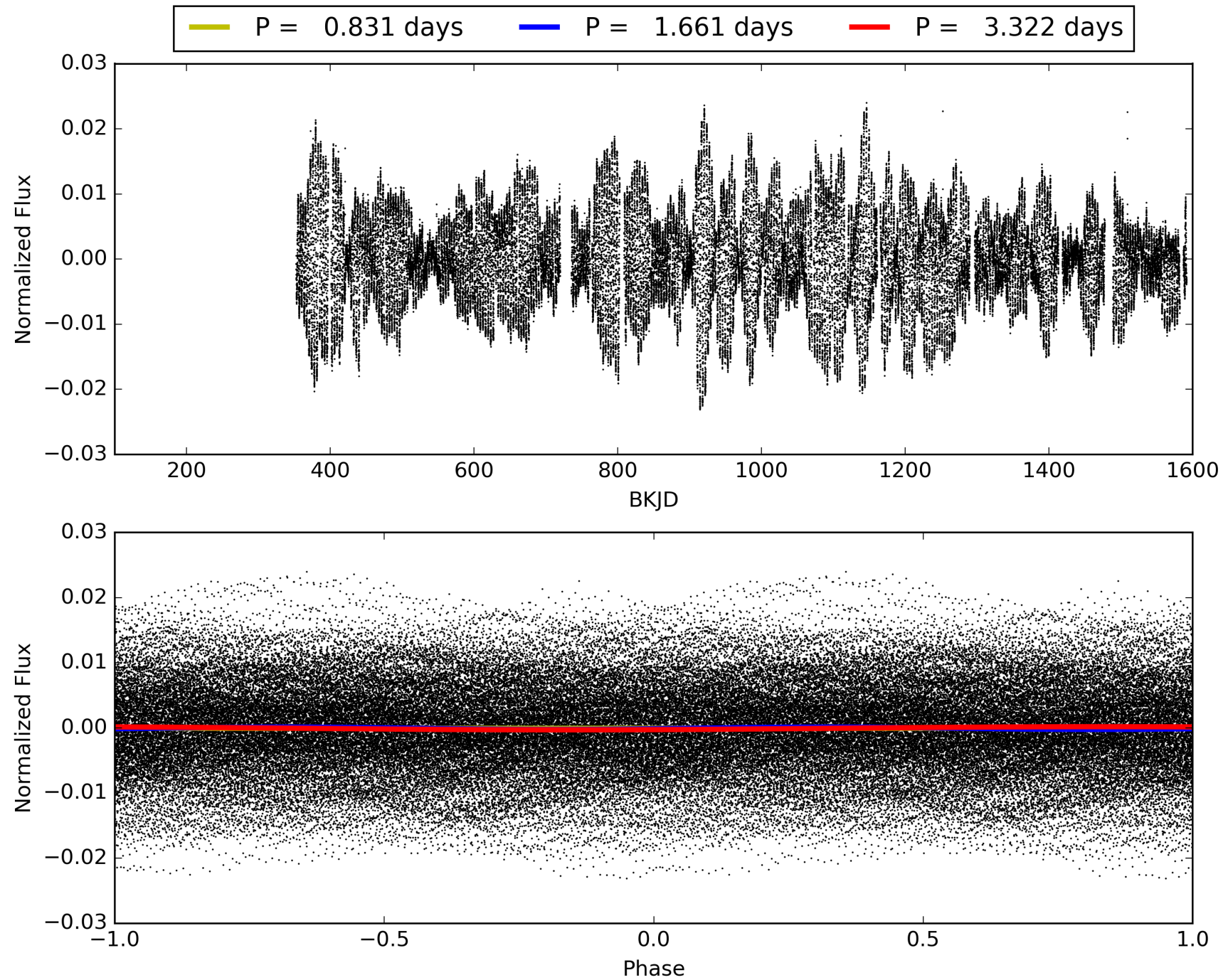
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:11:19 Z

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

# TCE 009425107-01, PDC Light Curves

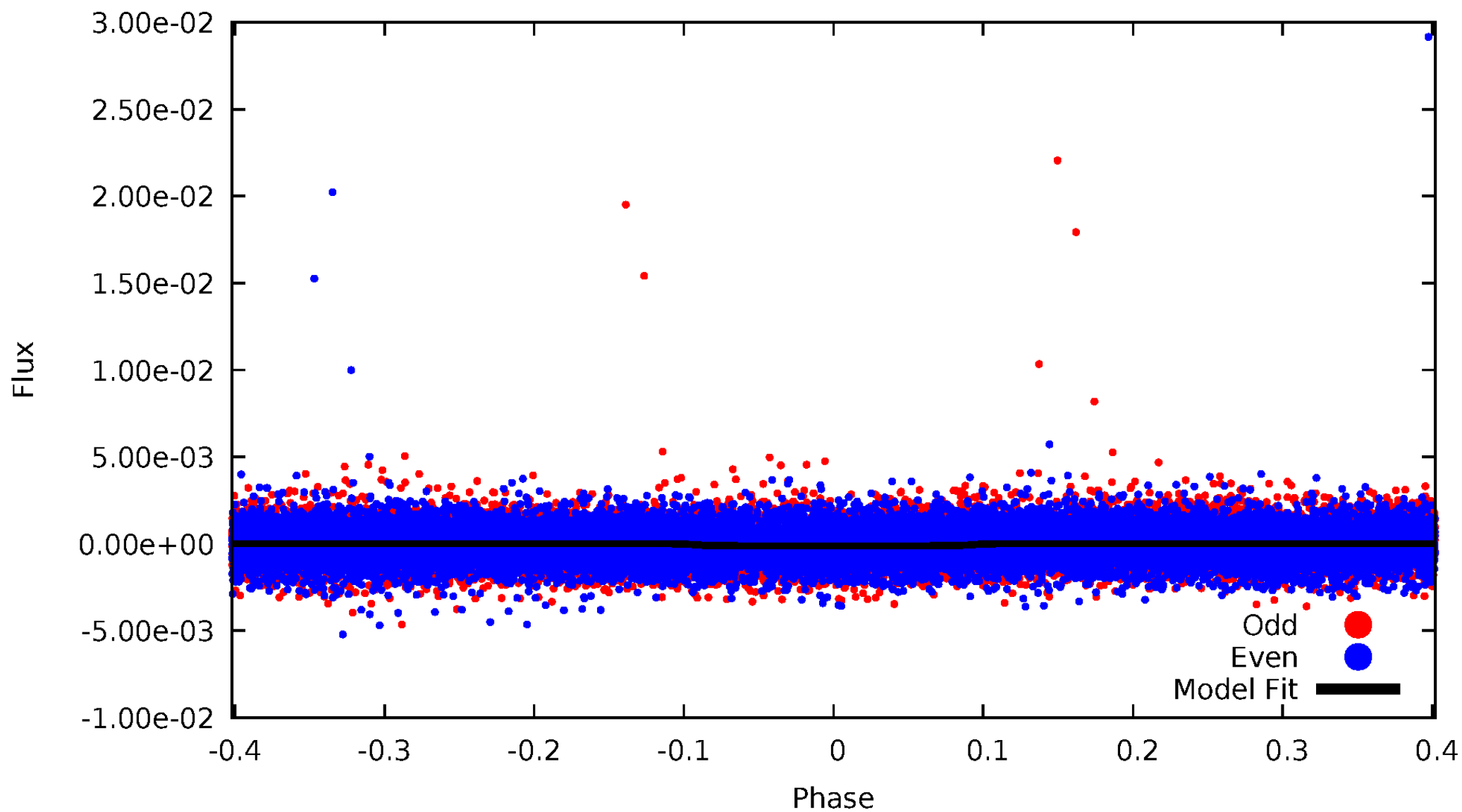


TCE 009425107-01



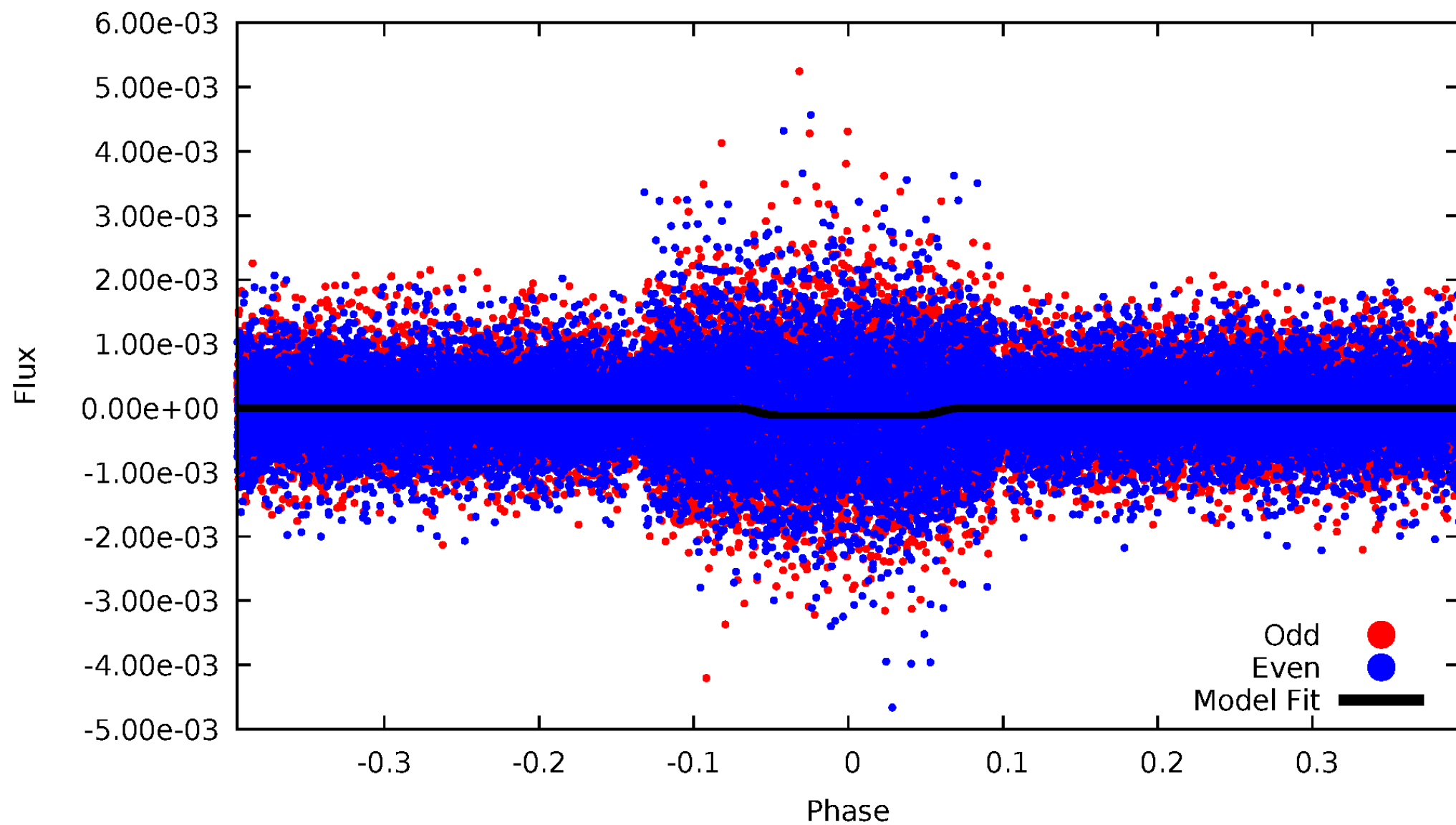
# DV Odd/Even

TCE 009425107-01



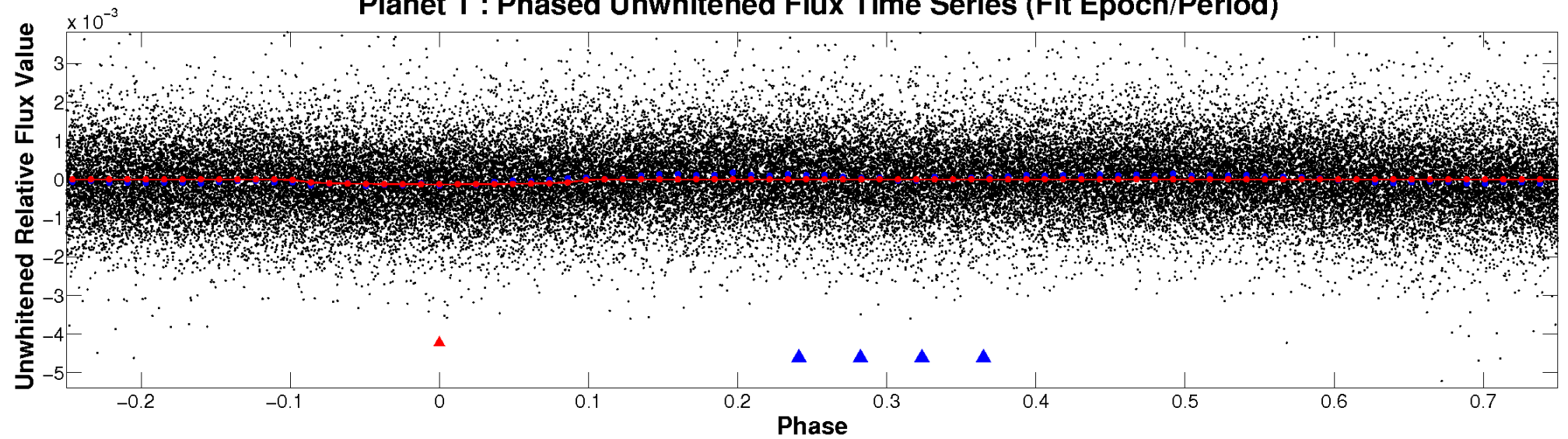
# ALT Odd/Even

TCE 009425107-01

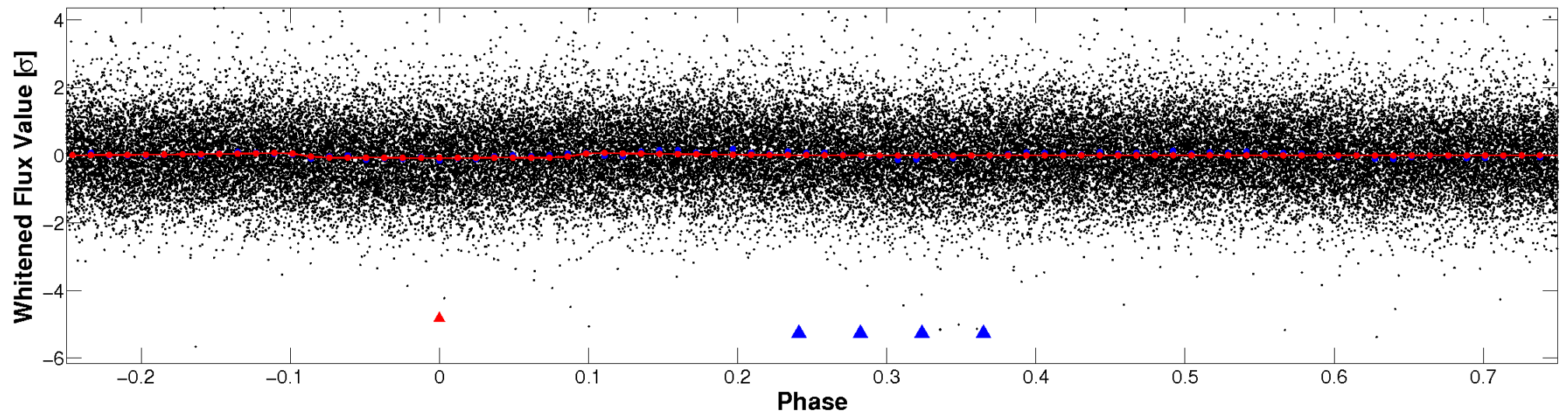


# Non-Whitened Vs. Whitened Light Curve

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

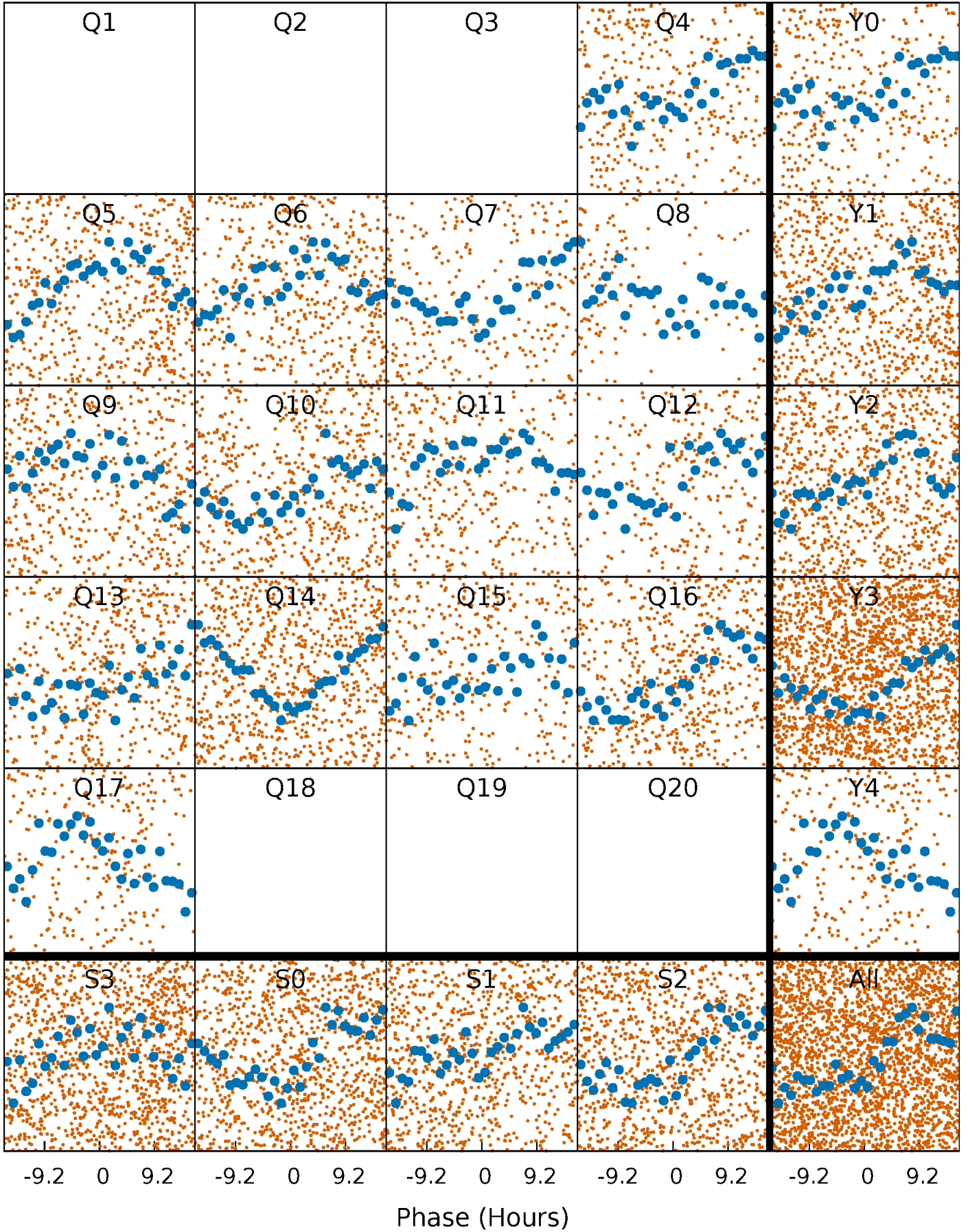


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



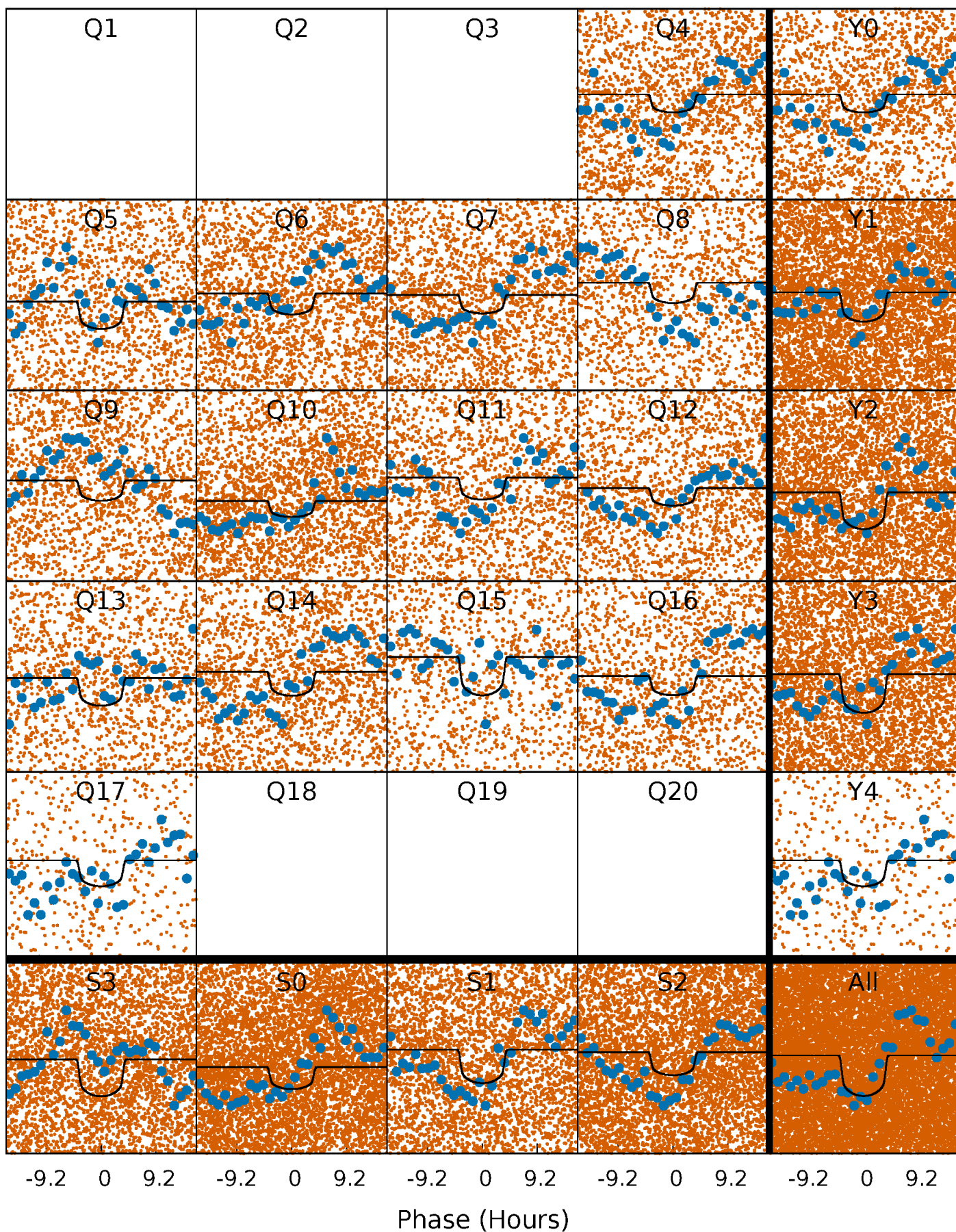
# PDC Quarter-Phased Transit Curves

TCE 009425107-01    P= 1.661114 Days     $T_0=131.880458$  (BKJD)



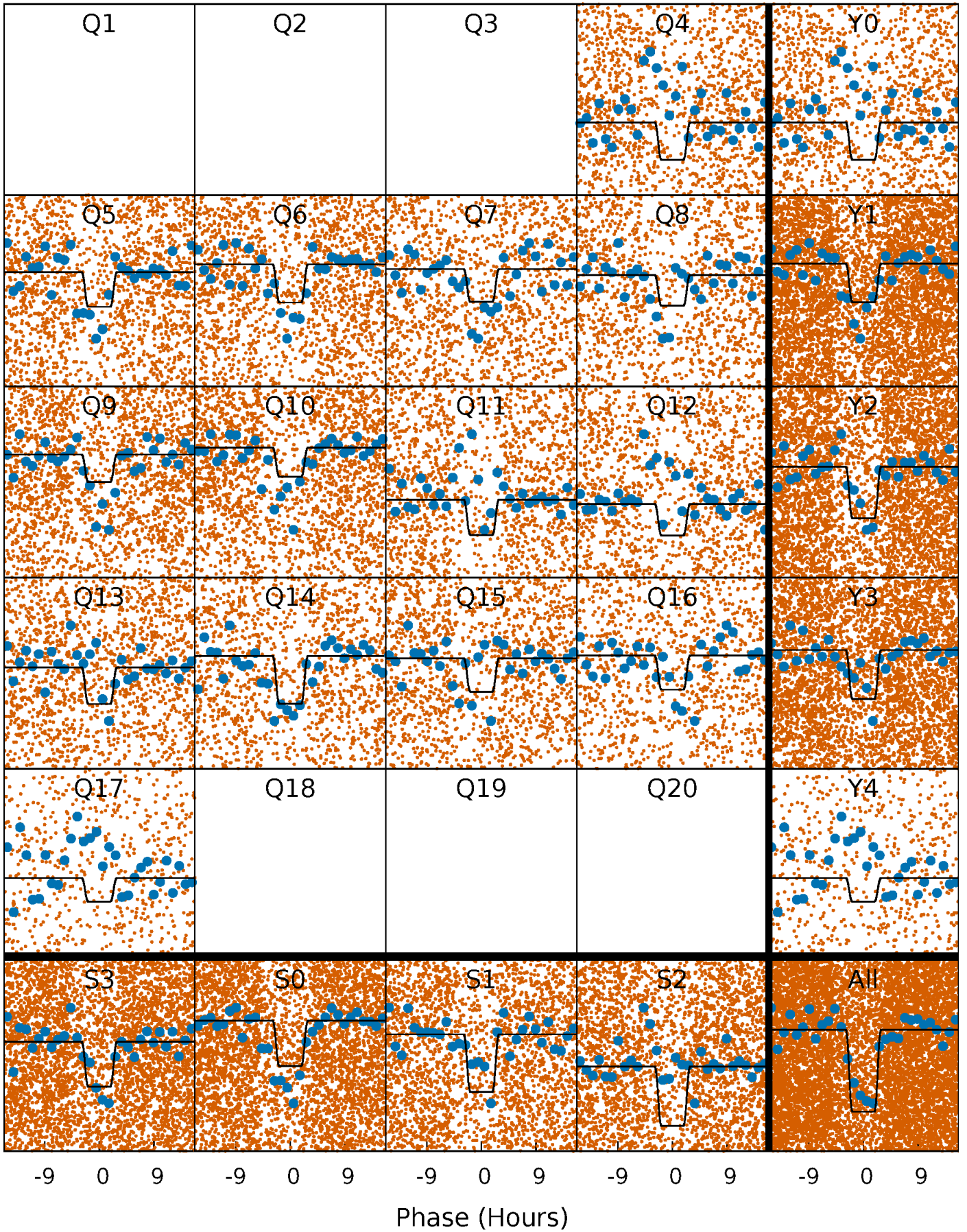
# DV Quarter-Phased Transit Curves

TCE 009425107-01 P= 1.661114 Days  $T_0=131.880458$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

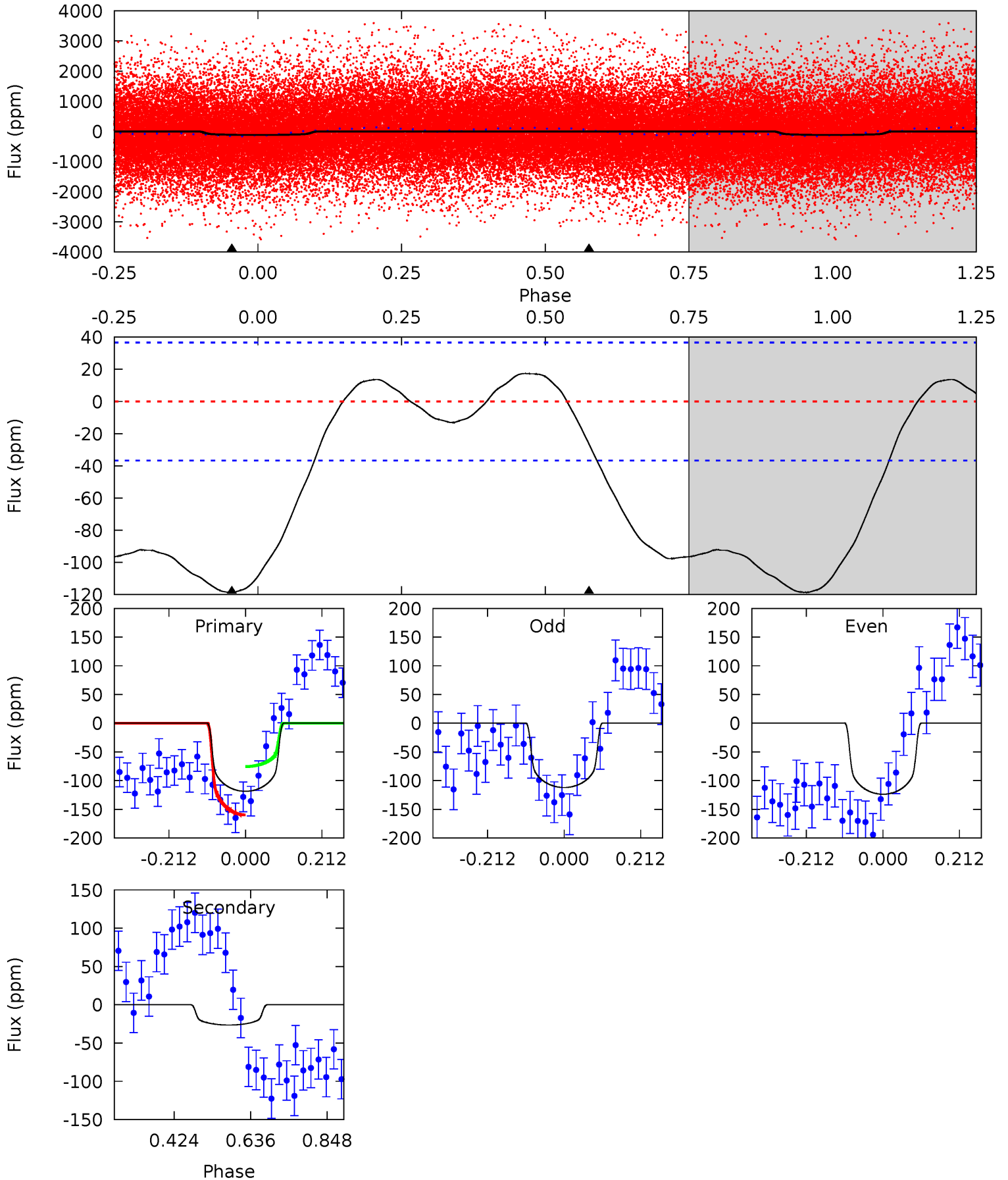
TCE 009425107-01 P= 1.661086 Days  $T_0=131.870256$  (BKJD)



# DV Model-Shift Uniqueness Test

009425107-01, P = 1.661114 Days, E = 131.880458 Days

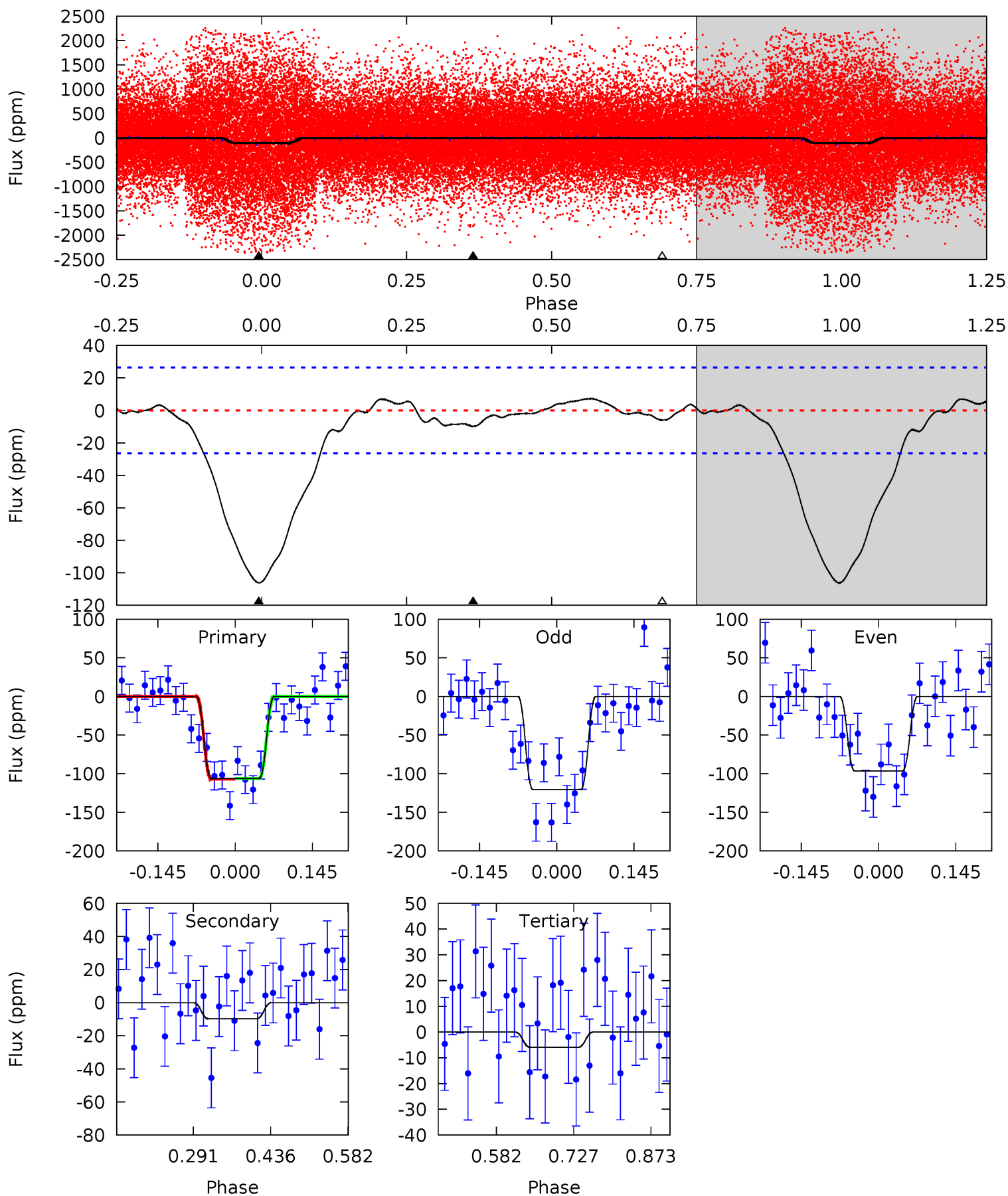
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.3	3.18	0	0	4.40	1.25	1.22	14.3	14.3	3.18	3.18	0.71	0.87	0.13	5.10



# Alt Model-Shift Uniqueness Test

009425107-01, P = 1.661086 Days, E = 131.870256 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
18.0	1.66	1.01	0	4.49	1.46	0.65	17.0	18.0	0.65	1.66	2.03	1.16	0.06	0.08



### Stellar Parameters For KIC 009425107

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5587^{+182}_{-182}$	$4.461^{+0.094}_{-0.162}$	$-0.140^{+0.300}_{-0.300}$	$0.906^{+0.228}_{-0.123}$	$0.865^{+0.111}_{-0.083}$	$1.638^{+0.668}_{-0.722}$
	+3%/-3%	+2%/-4%	+214%/-214%	+25%/-14%	+13%/-10%	+41%/-44%
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 009425107-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-26 \pm 8$	$1.24^{+0.30}_{-0.25}$	$2043^{+135}_{-101}$	$3914^{+389}_{-366}$	$6.481^{+4.832}_{-2.856}$
Alt.	$-10 \pm 6$	$1.06^{+0.24}_{-0.24}$	$2039^{+128}_{-100}$	$3464^{+423}_{-503}$	$3.226^{+3.206}_{-1.914}$

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

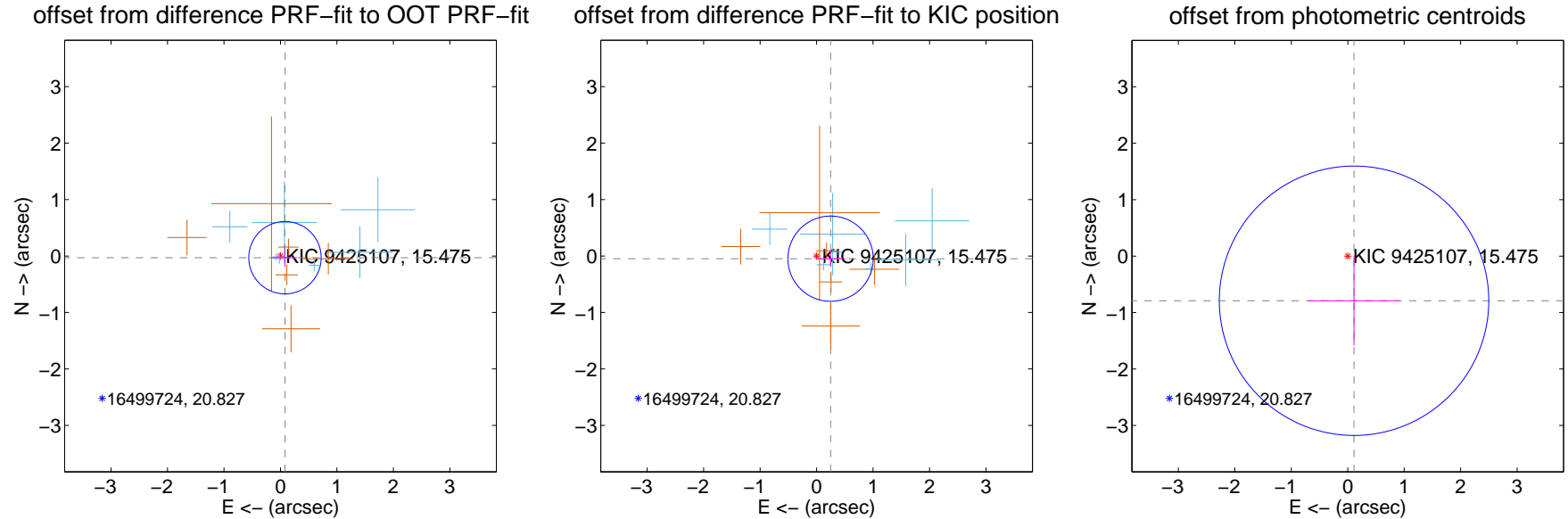
## DV Centroid Data

Supplemental centroid analysis for 009425107-01. Kepler magnitude: 15.47. Transit SNR 8.35

There are 7 quarters with good PRF difference image offsets

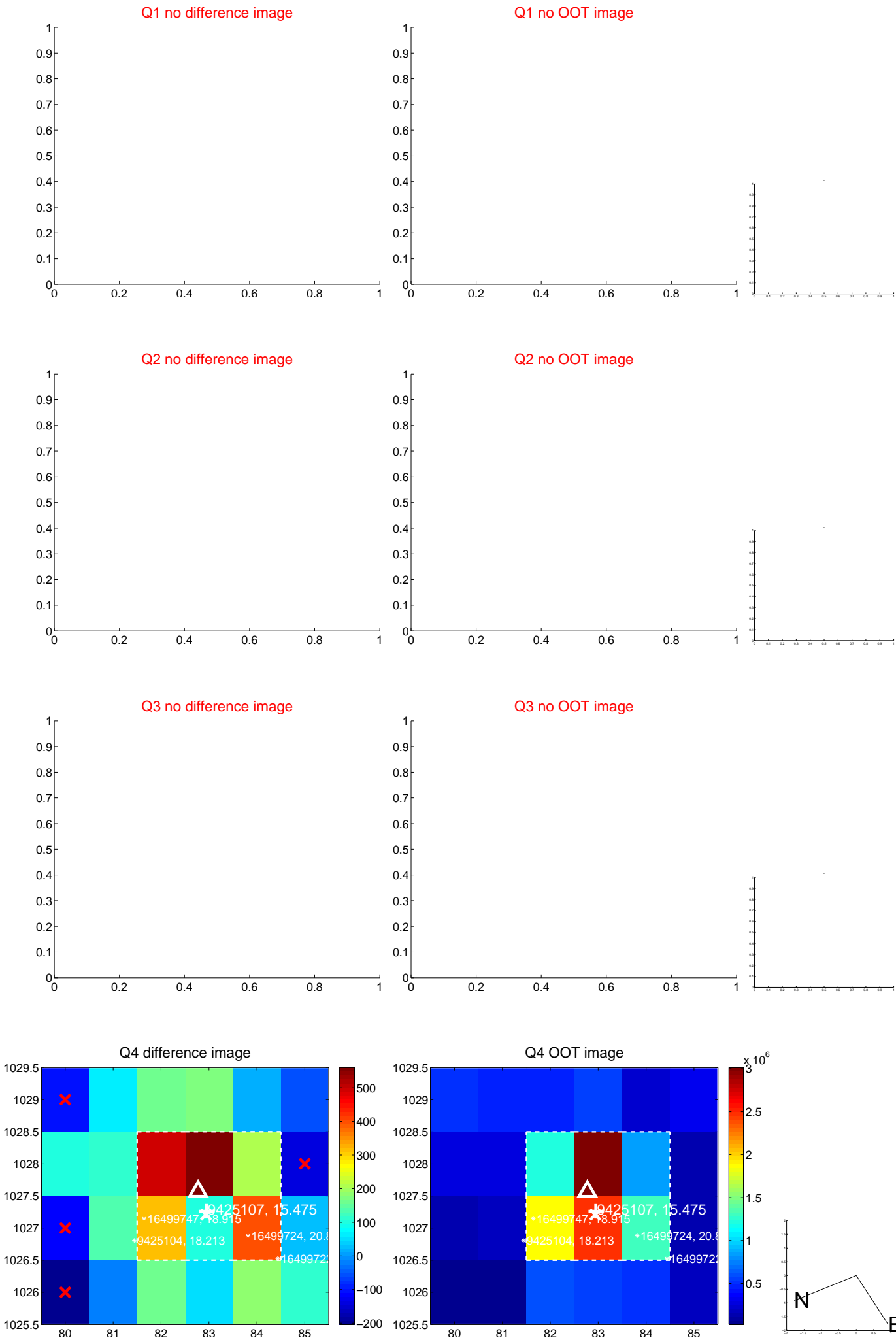
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.085 \pm 0.214$	0.40	$-0.080 \pm 0.216$	$-0.030 \pm 0.164$
PRF-fit source offset from KIC position	$0.252 \pm 0.252$	1.00	$-0.248 \pm 0.256$	$-0.047 \pm 0.142$
photometric centroid source offset	$0.80 \pm 0.80$	1.00	$-0.11 \pm 0.81$	$-0.79 \pm 0.79$

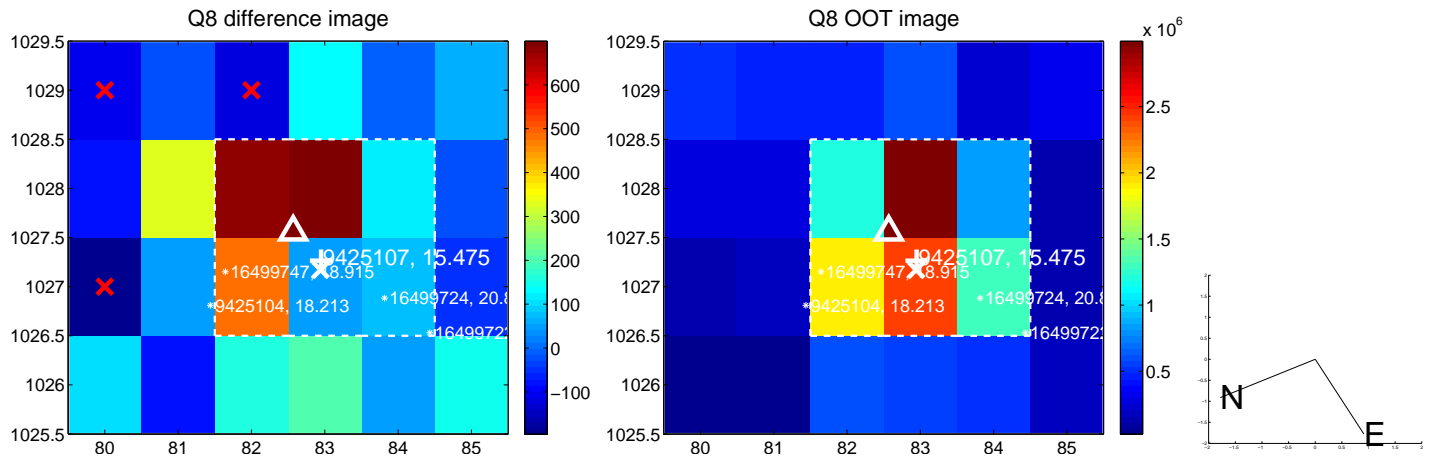
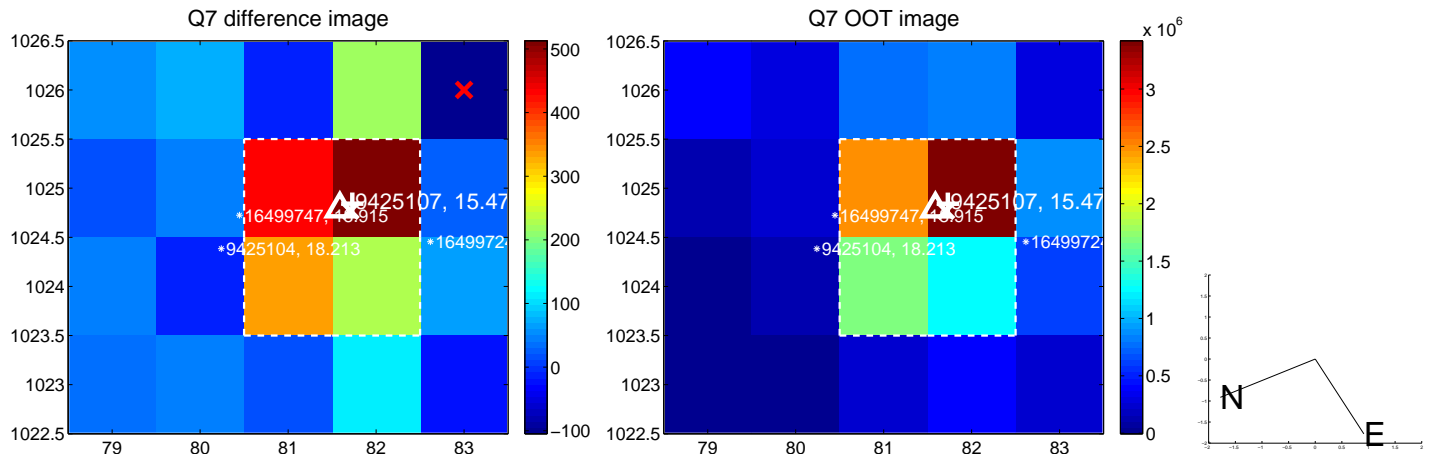
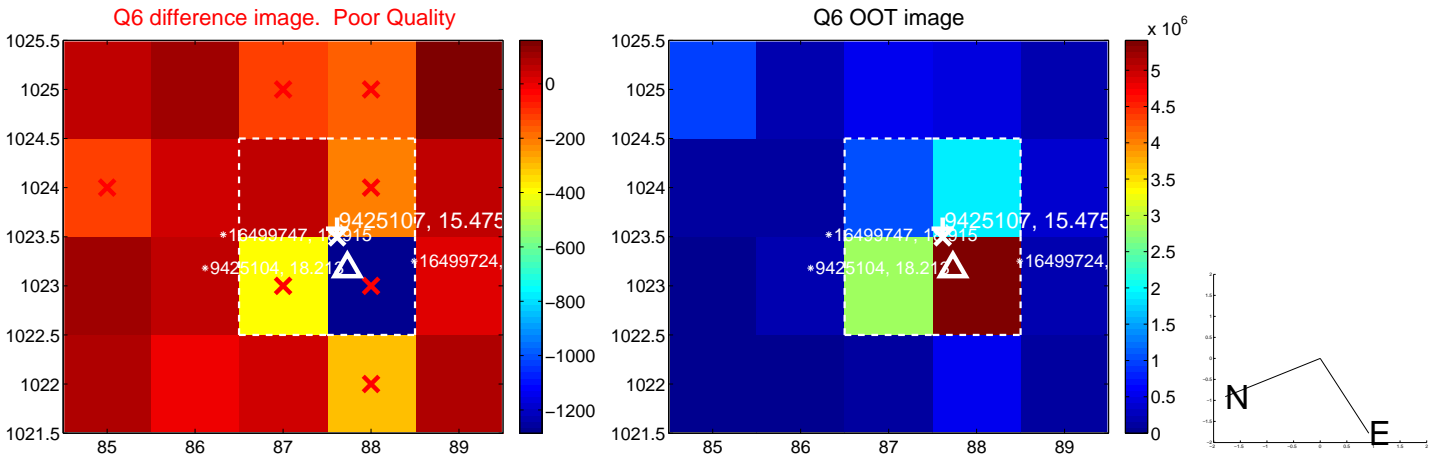
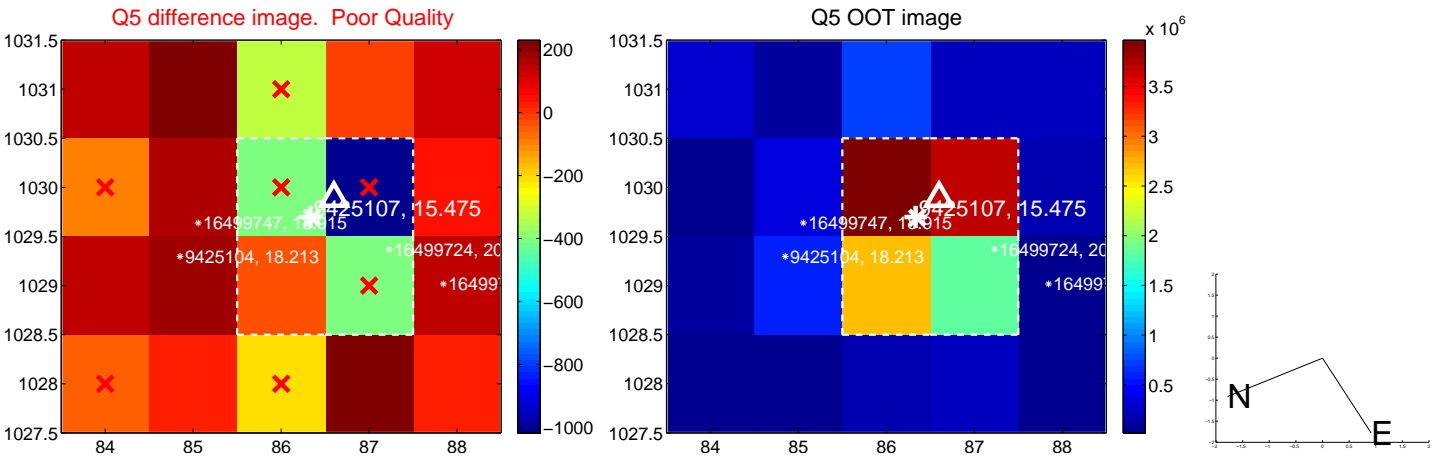


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

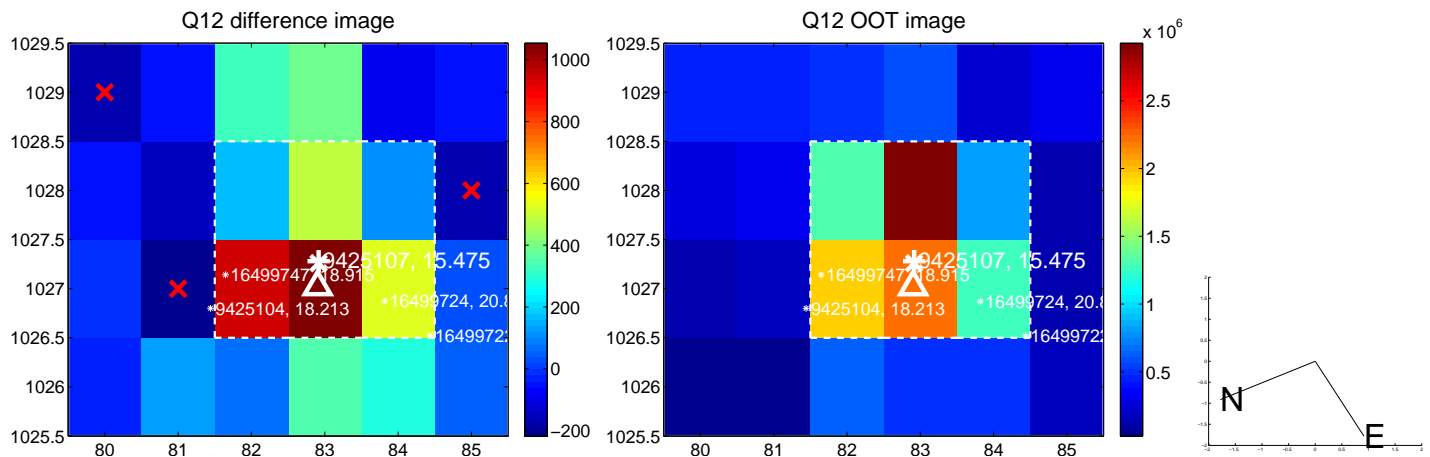
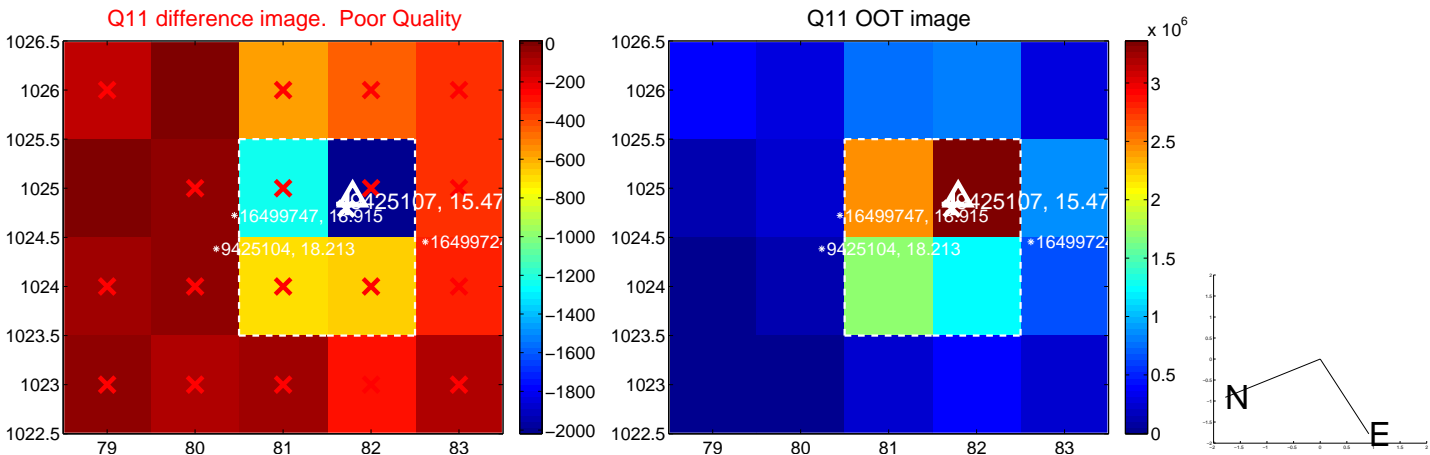
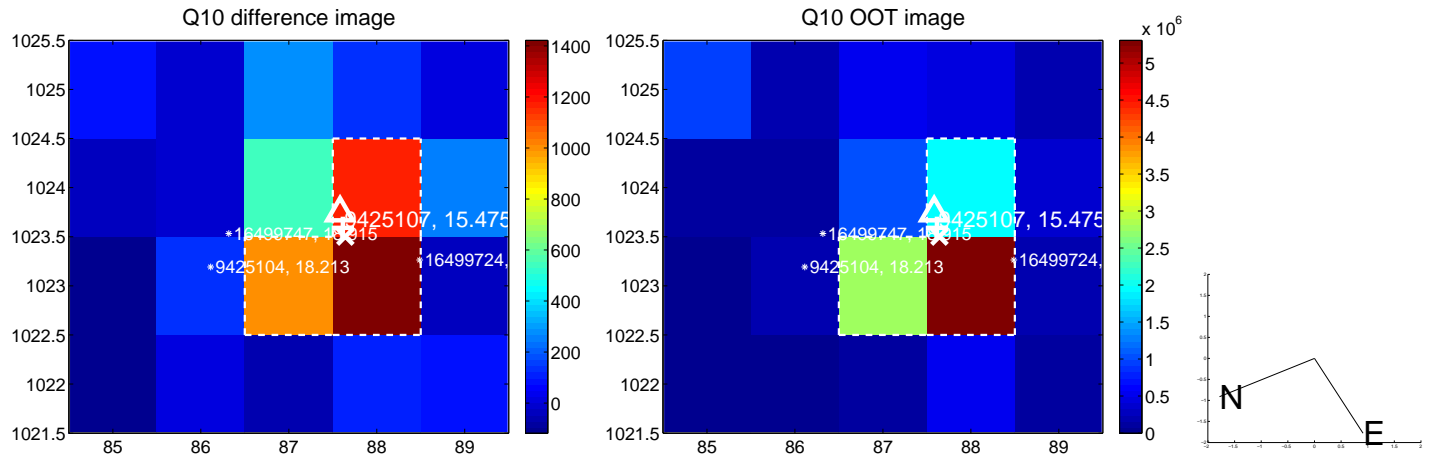
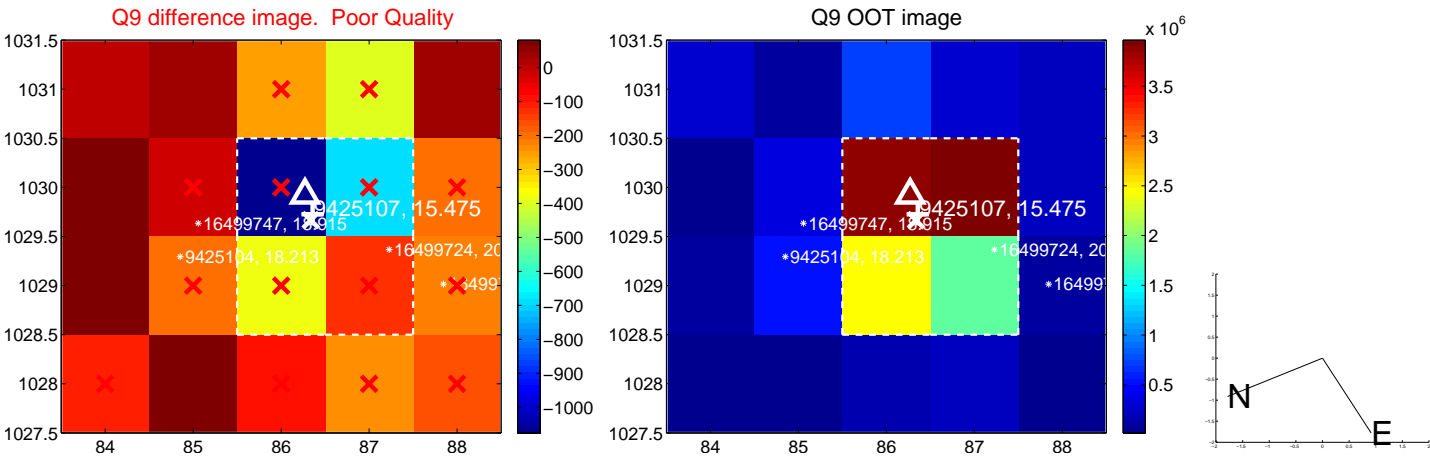
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



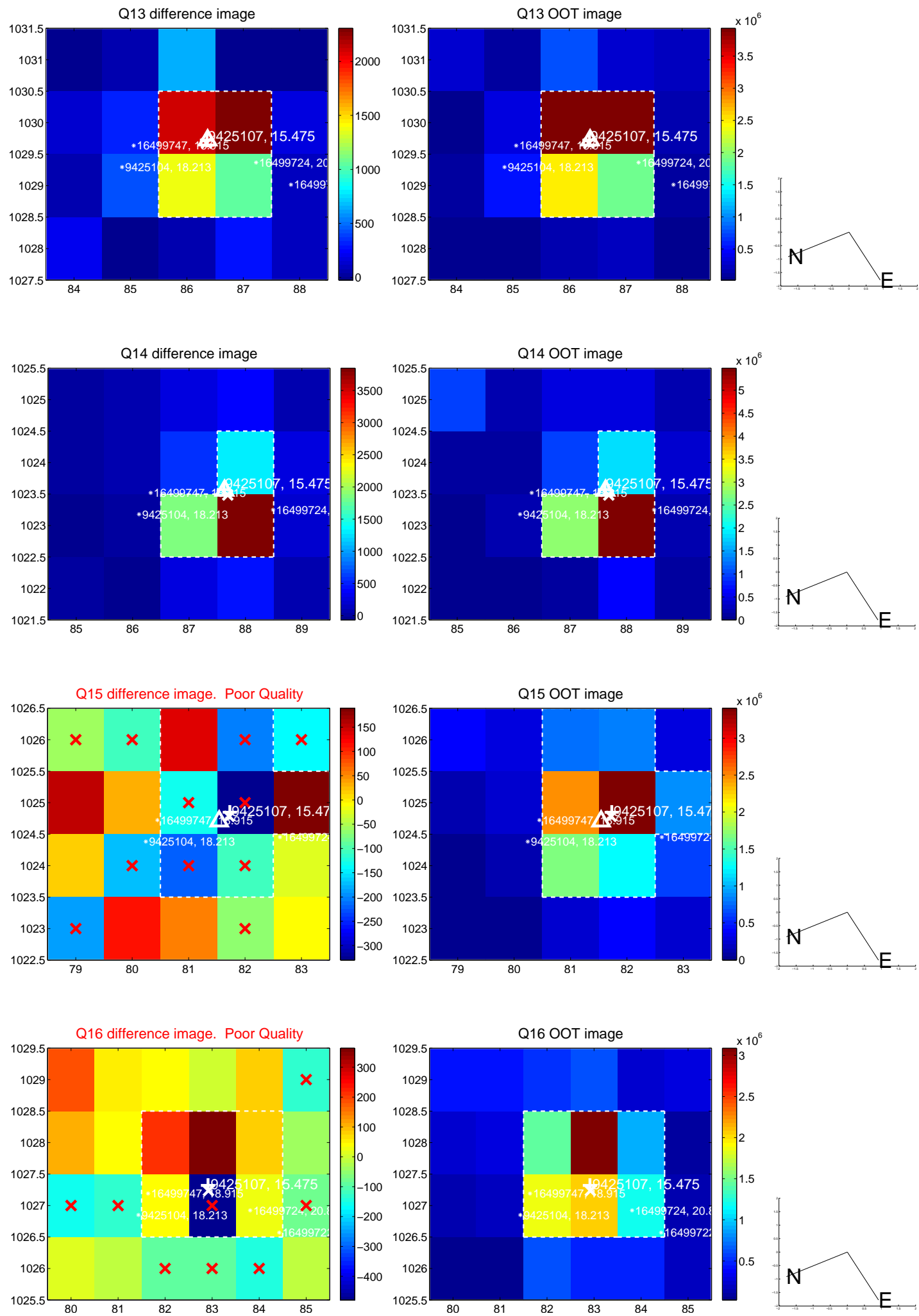
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



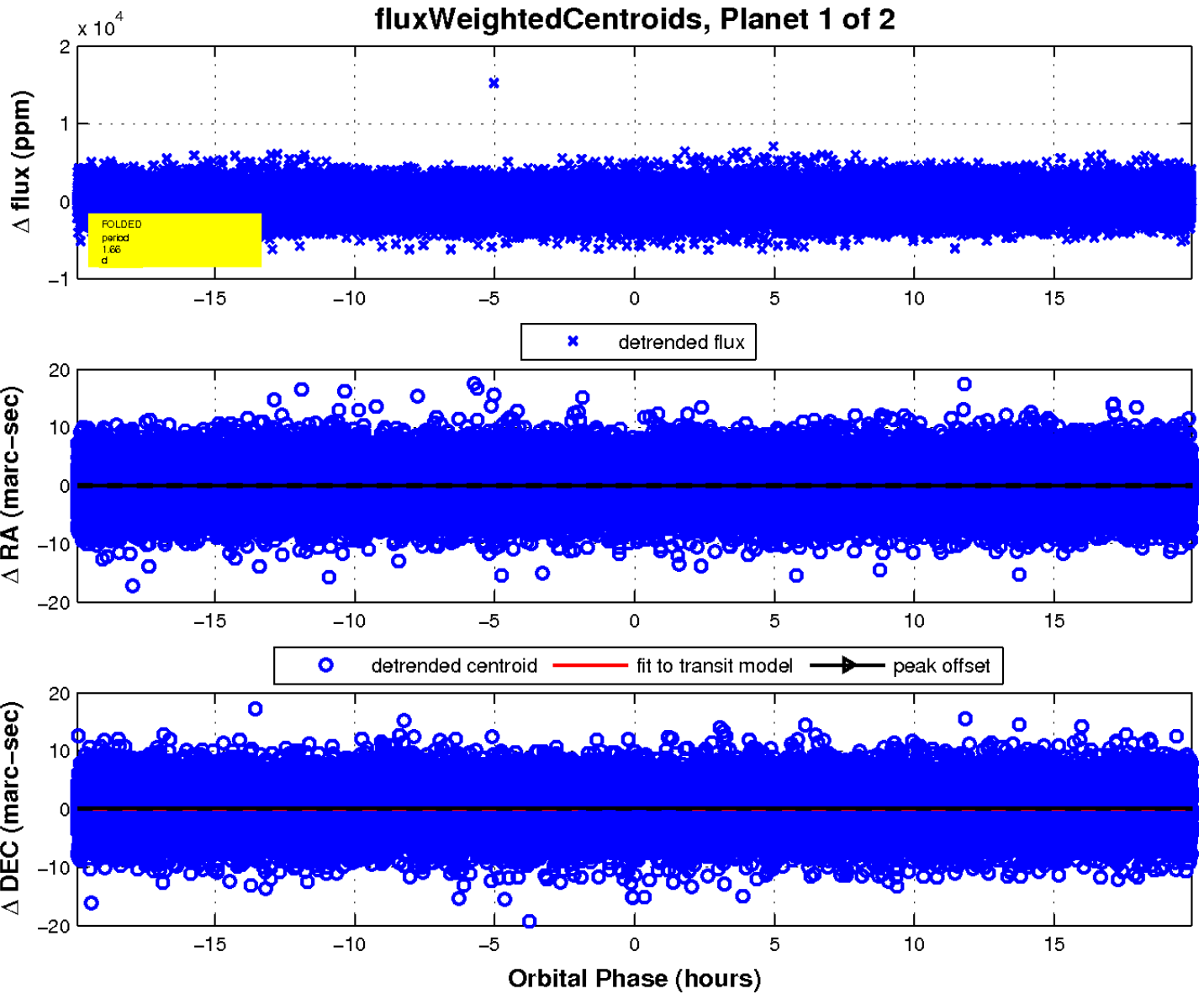
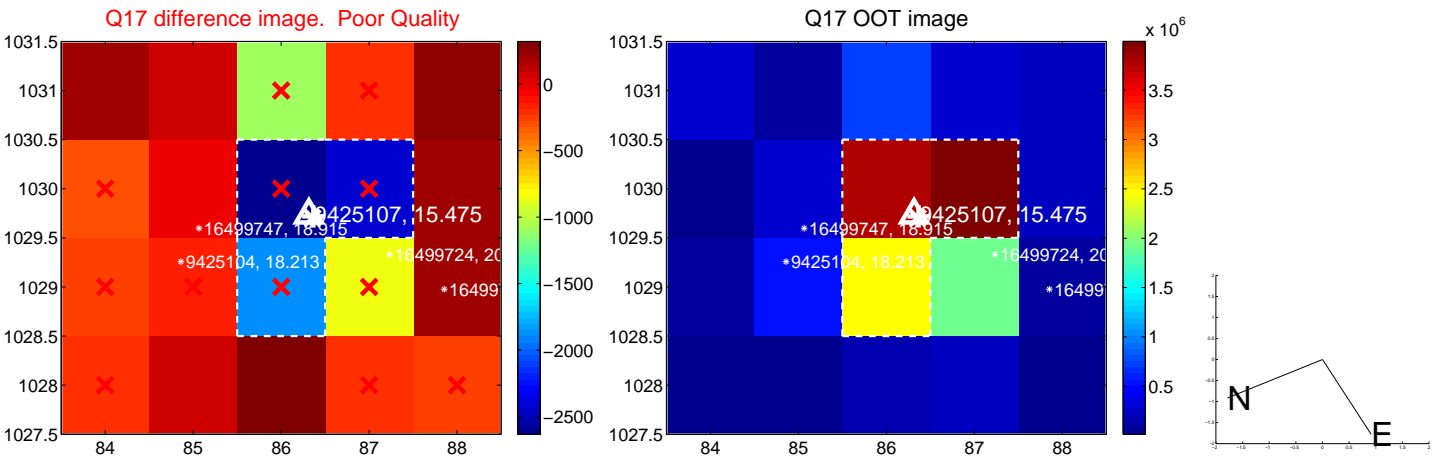
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

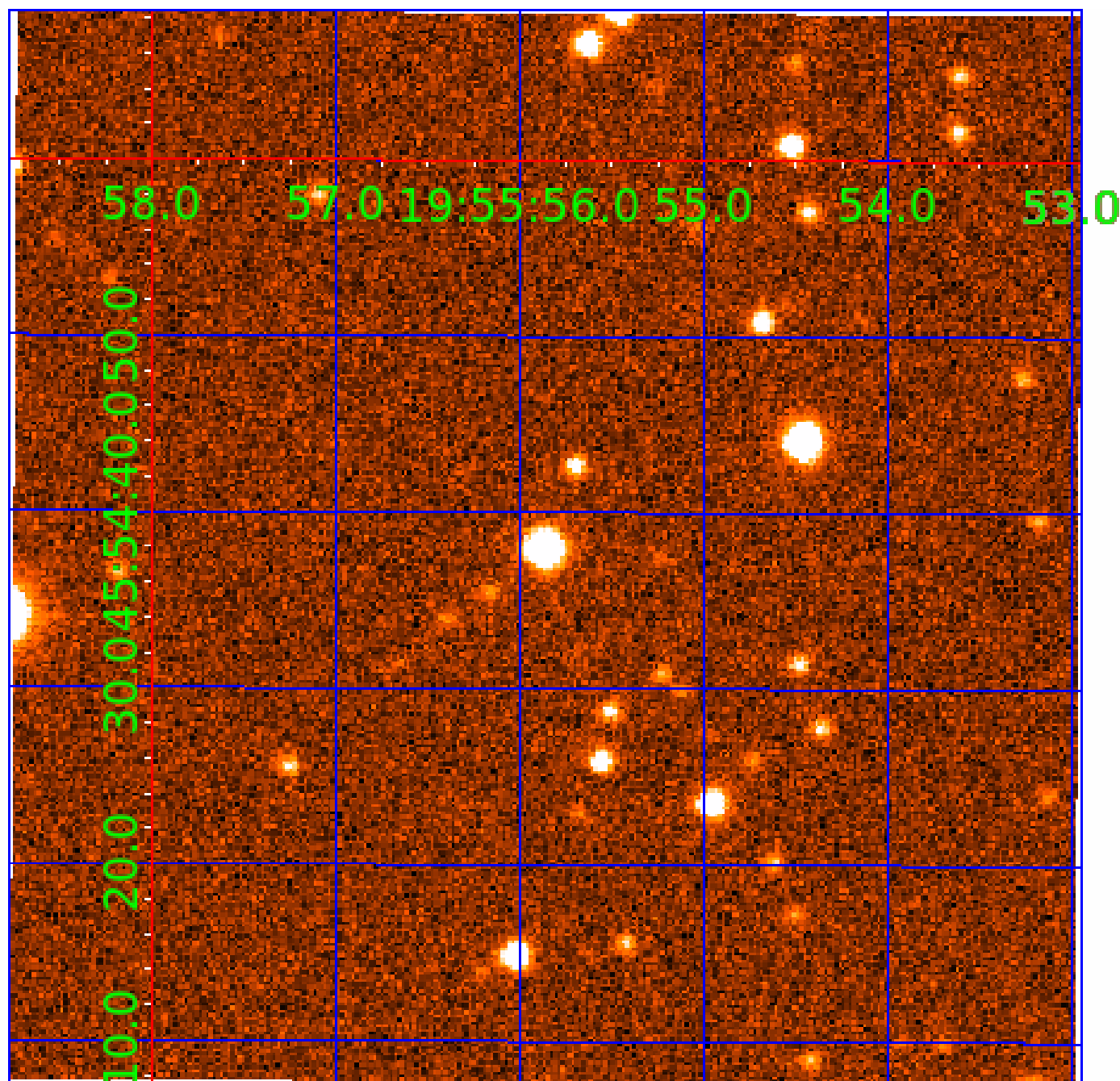


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009425107

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009425107-01	OBS	No	1.661114	131.880458	125.0	8.008	8.1	8.3	0.91	5587	1.21	1046.71
009425107-02	OBS	No	319.002424	328.292478	1907.6	5.343	7.8	7.1	0.91	5587	4.29	0.94

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009425107-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009425107-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—CENT_NOFITS

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

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

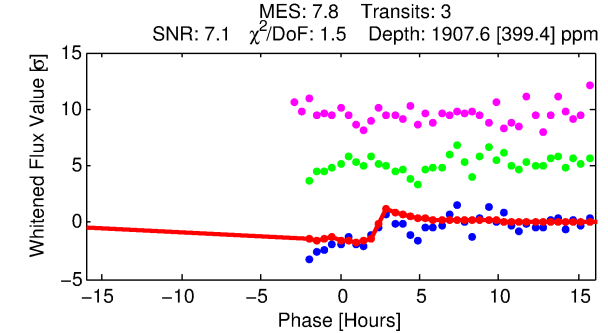
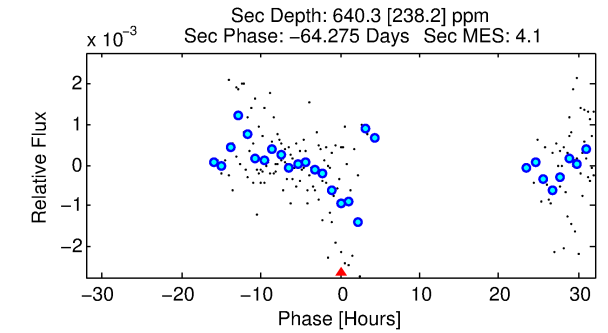
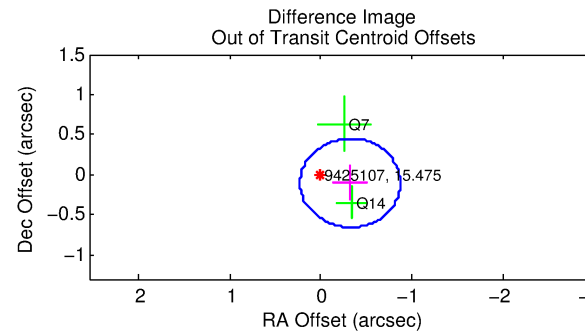
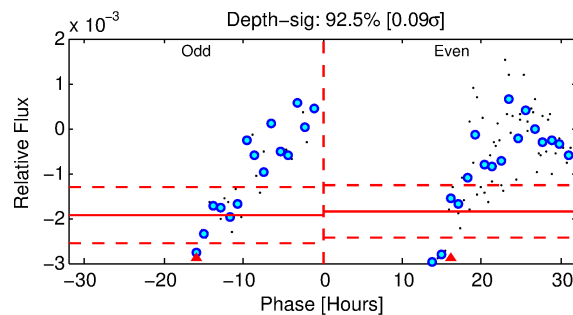
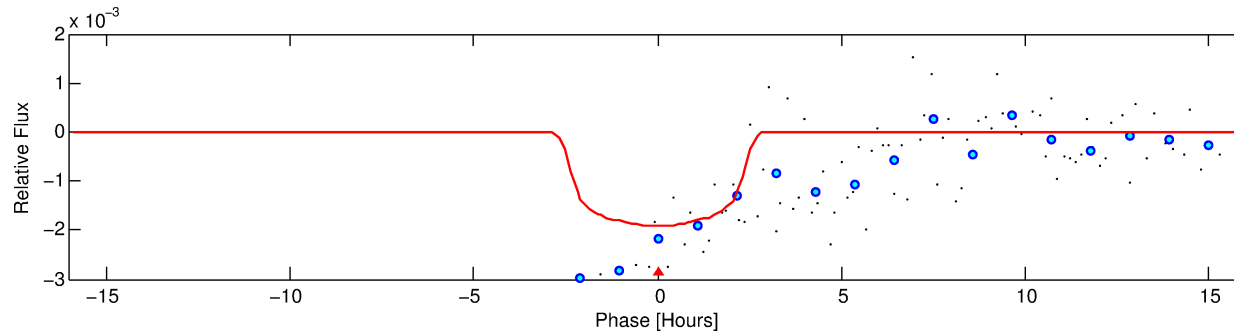
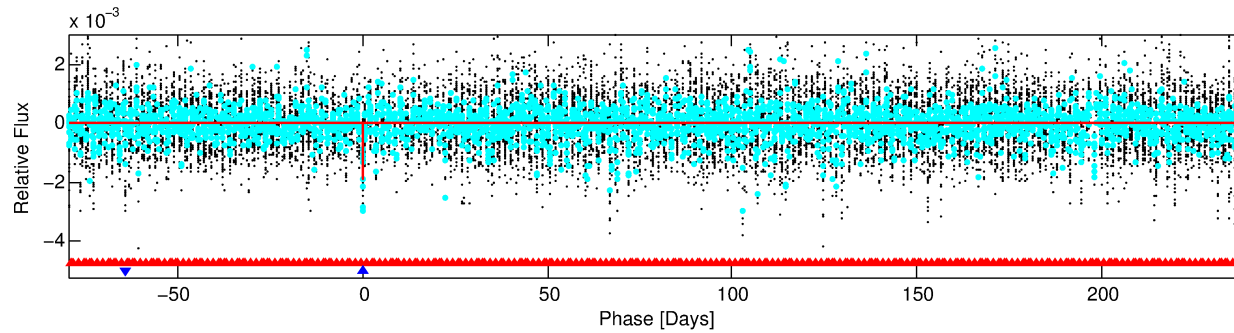
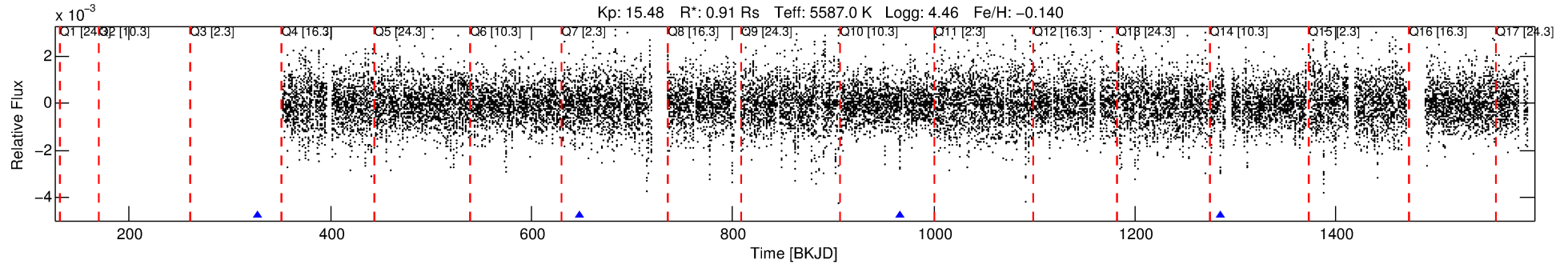
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009425107-02

No Significant Match Found

# DV One-Page Summary

KIC: 9425107 Candidate: 2 of 2 Period: 319.002 d



## DV Fit Results:

Period = 319.00242 [0.00852] d  
Epoch = 328.2925 [0.0266] BKJD  
Rp/R\* = 0.0434 [0.0252]  
a/R\* = 334.21 [783.62]  
b = 0.74 [1.38]  
Seff = 0.94 [0.31]  
Teq = 251 [21] K  
Rp = 4.29 [2.72] Re  
a = 0.8709 [0.1819] AU  
Ag = 14519.37 [18239.24] [0.80 $\sigma$ ]  
Teffp = 4267 [1309] K [3.07 $\sigma$ ]

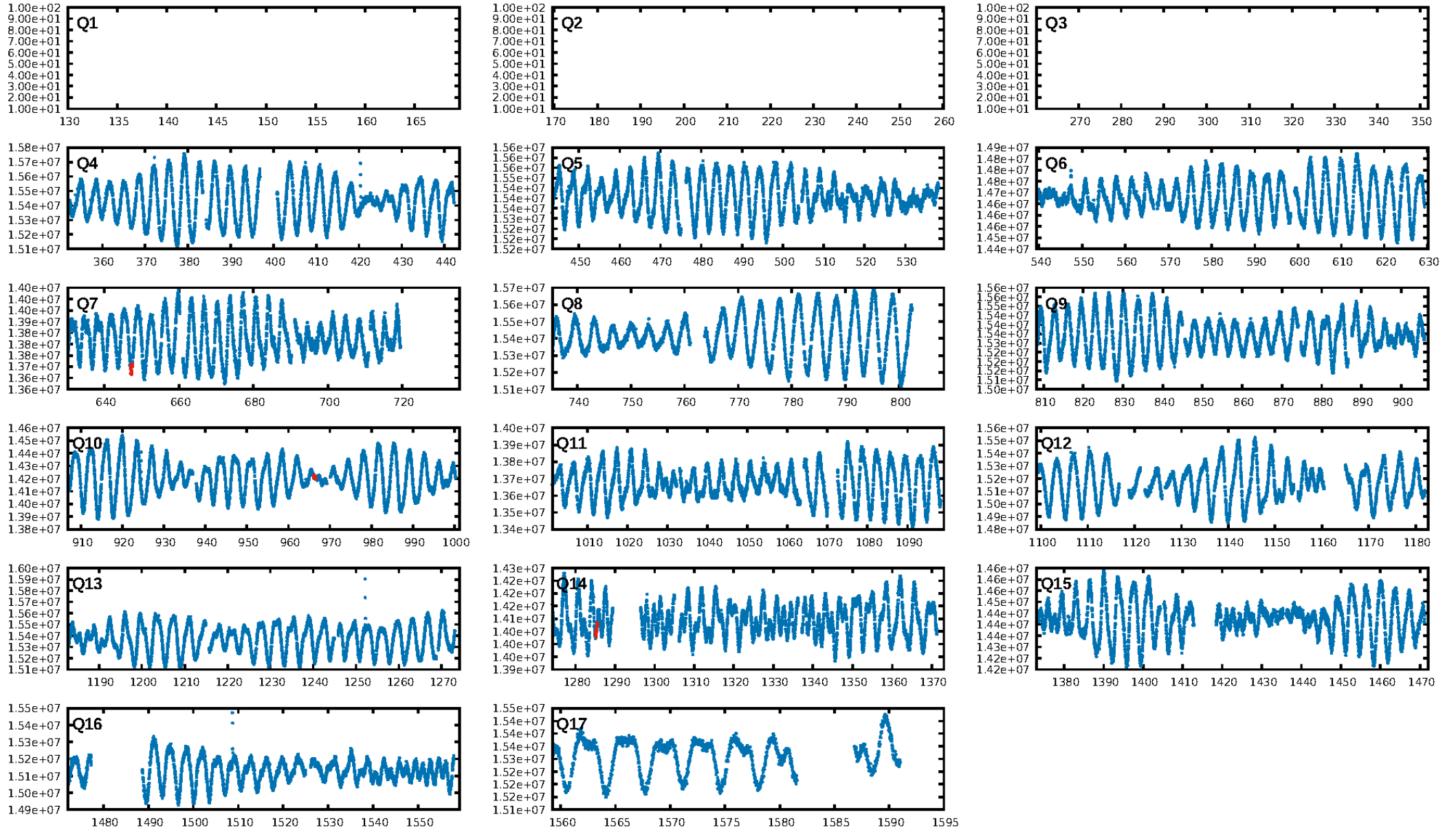
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [791.14 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 42.7%  
ModelChiSquareGof-sig: 99.2%  
**Bootstrap-pfa: 9.56e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.135  
Centroid-sig: 76.9%  
Centroid-so: 0.473 arcsec [0.55 $\sigma$ ]  
OotOffset-rm: 0.340 arcsec [1.85 $\sigma$ ]  
OotOffset-st: 1/1/0/0 [2]  
**KicOffset-rm: 0.650 arcsec [3.56 $\sigma$ ]**  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/3]

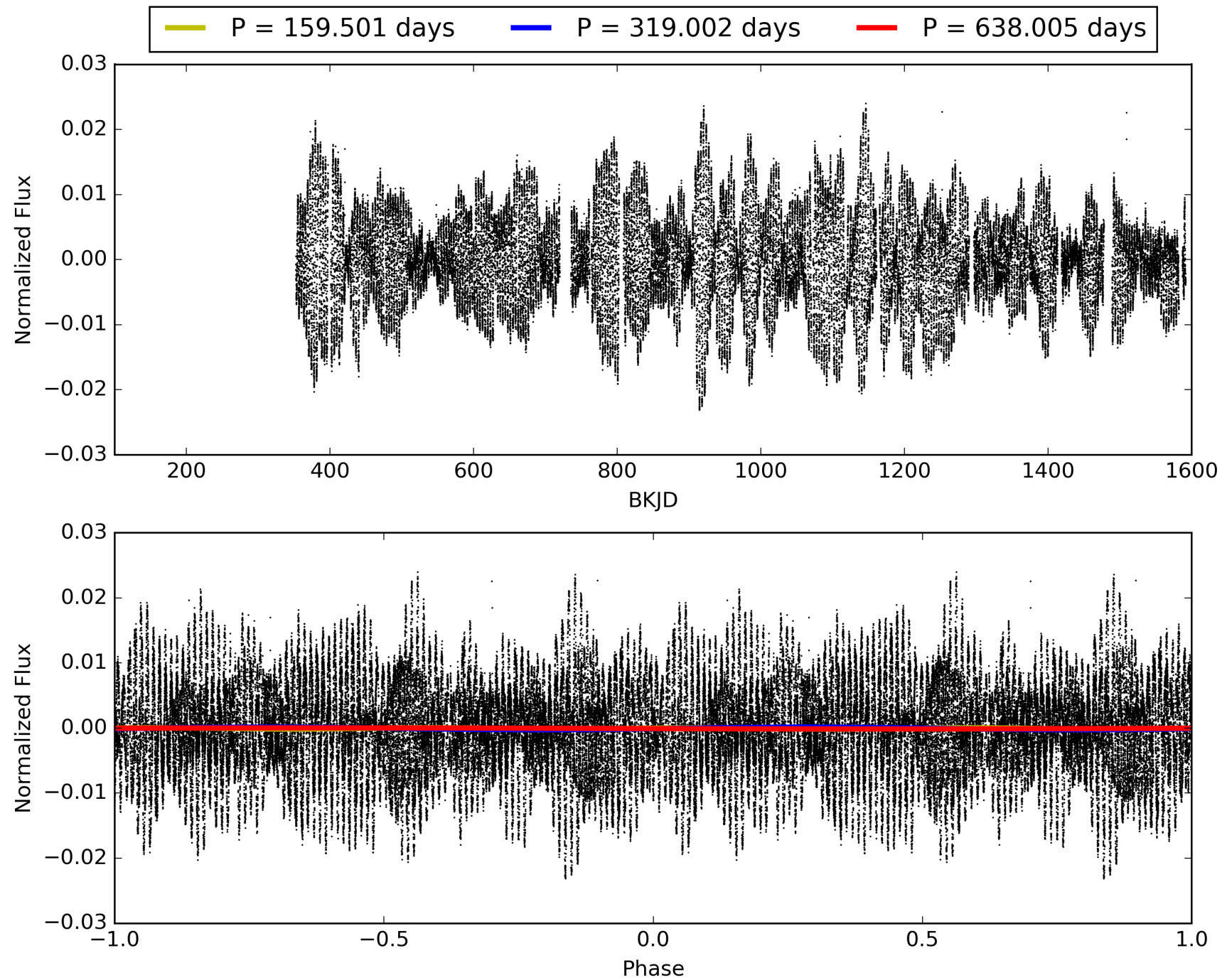
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:11:30 Z

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

# TCE 009425107-02, PDC Light Curves

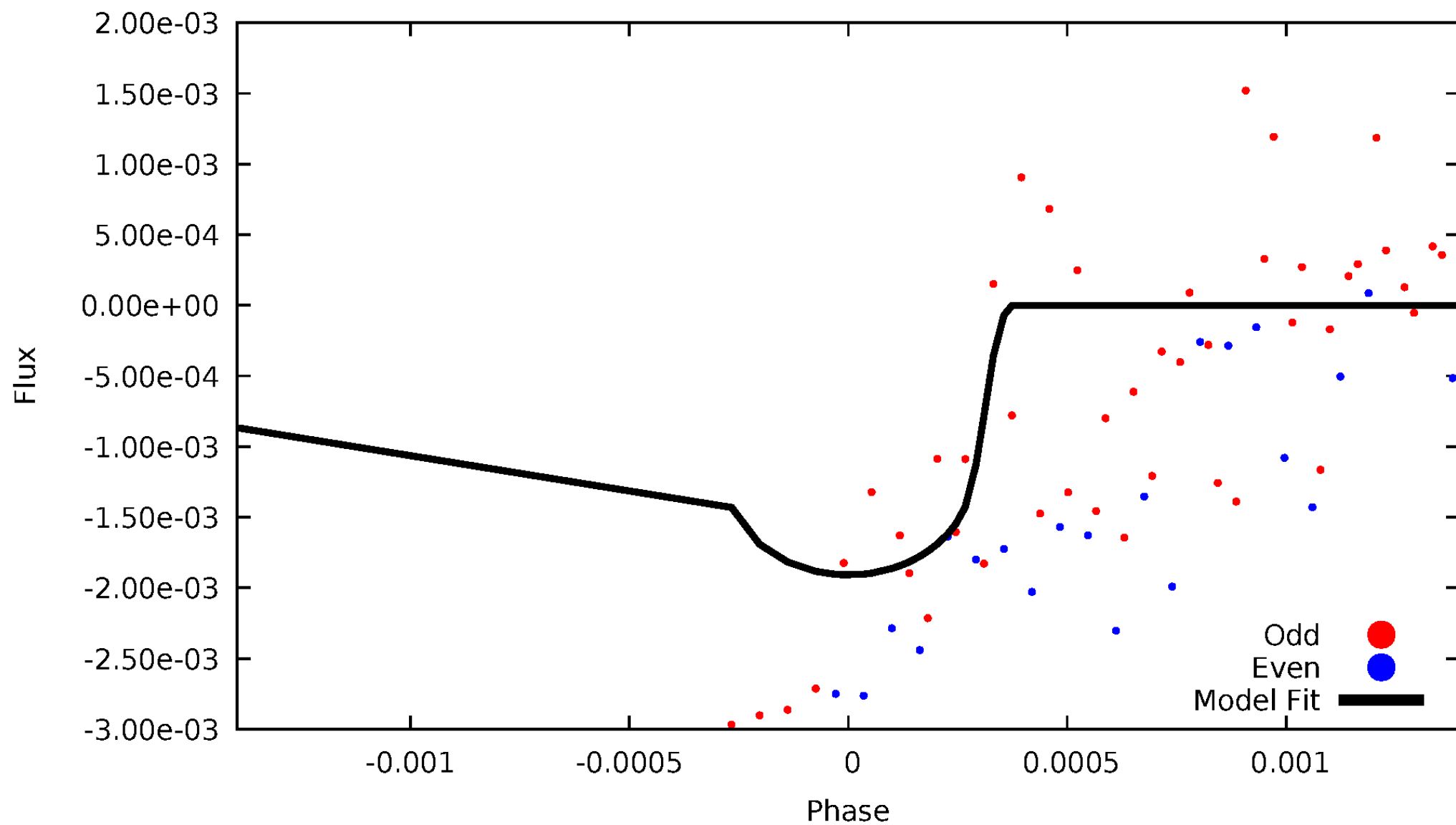


TCE 009425107-02



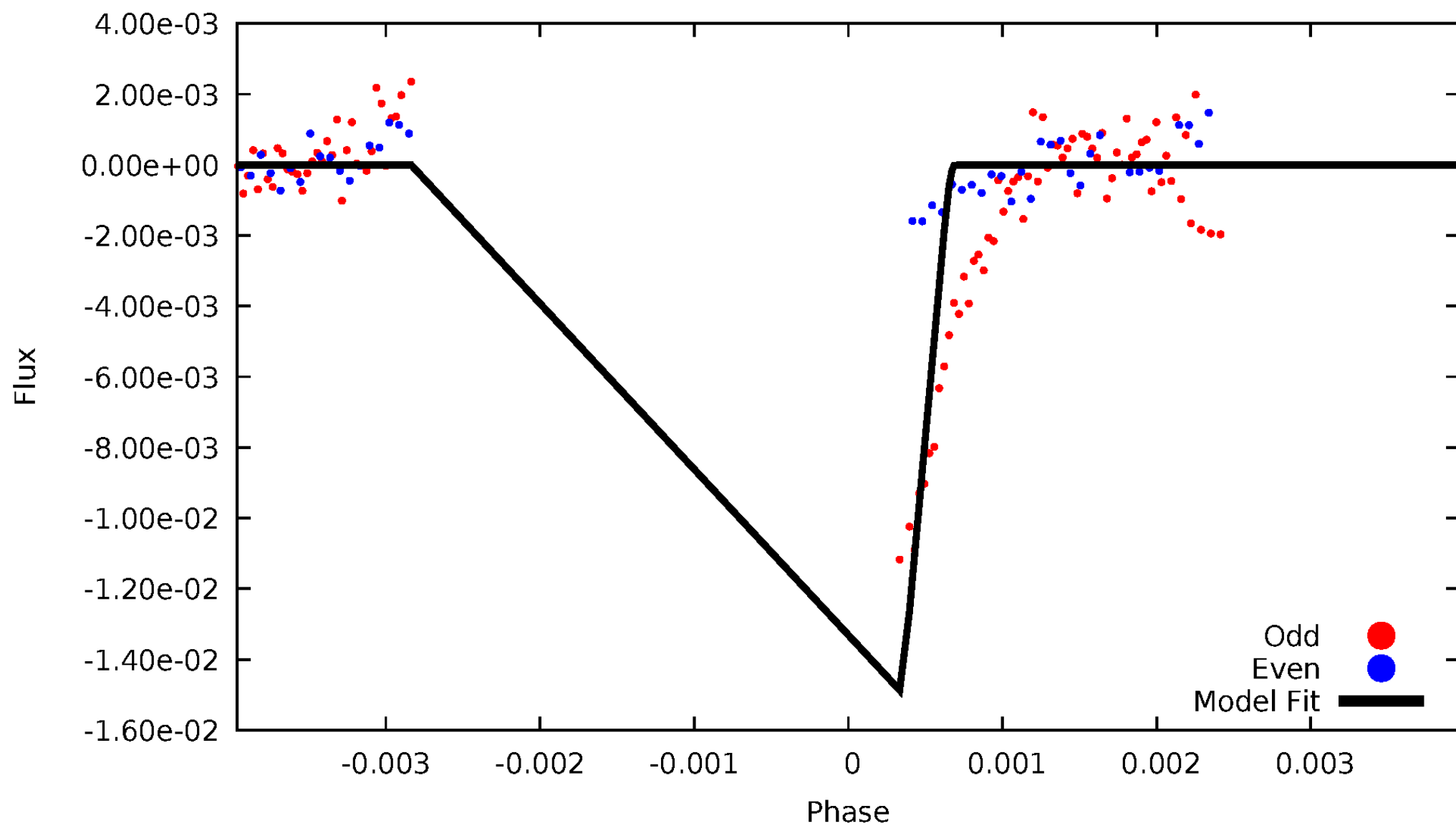
# DV Odd/Even

TCE 009425107-02



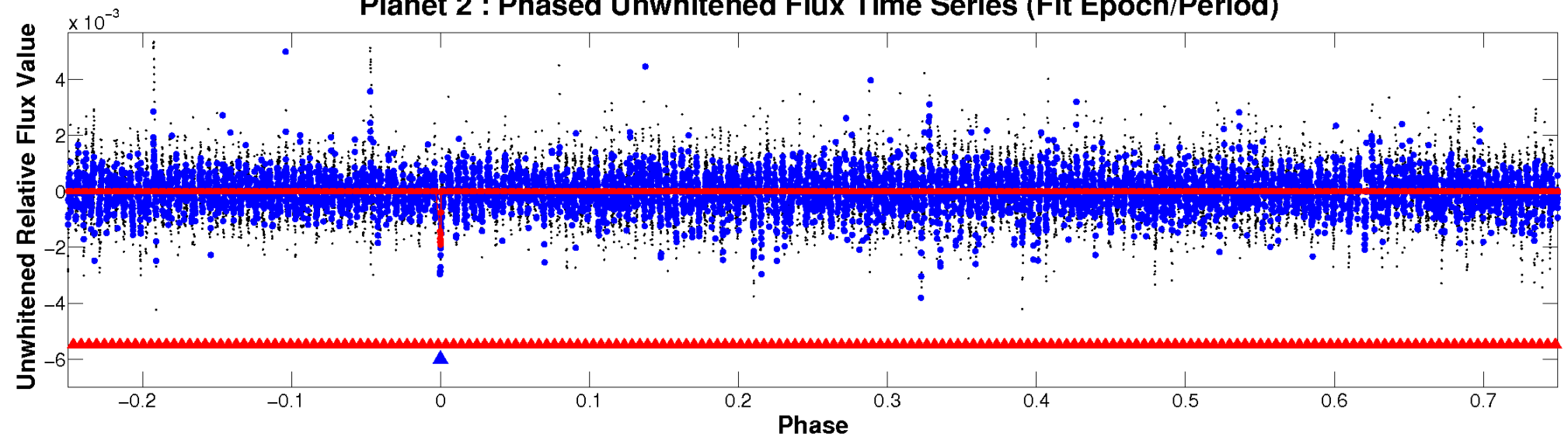
# ALT Odd/Even

TCE 009425107-02

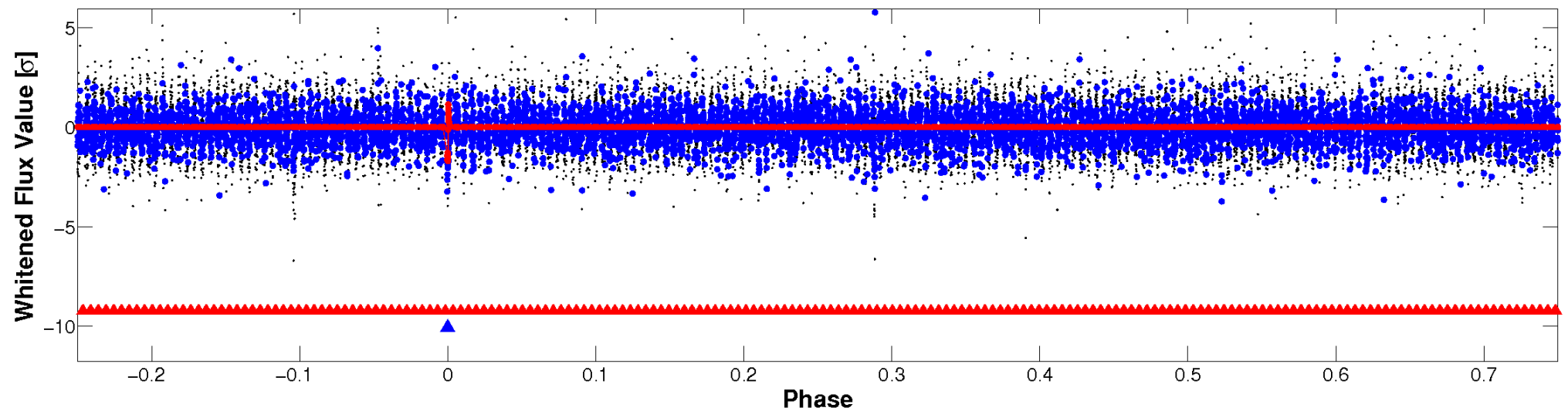


# Non-Whitened Vs. Whitened Light Curve

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

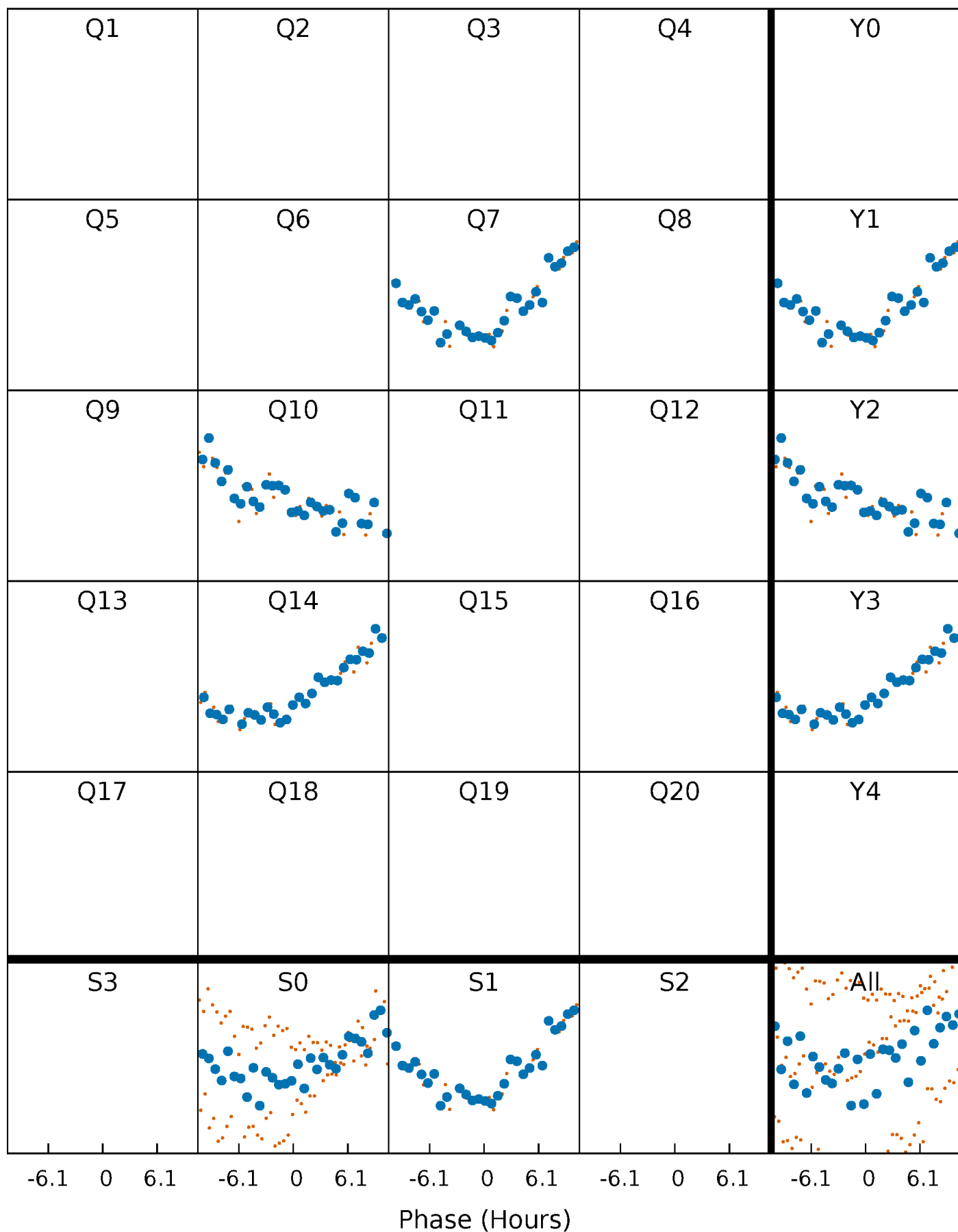


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



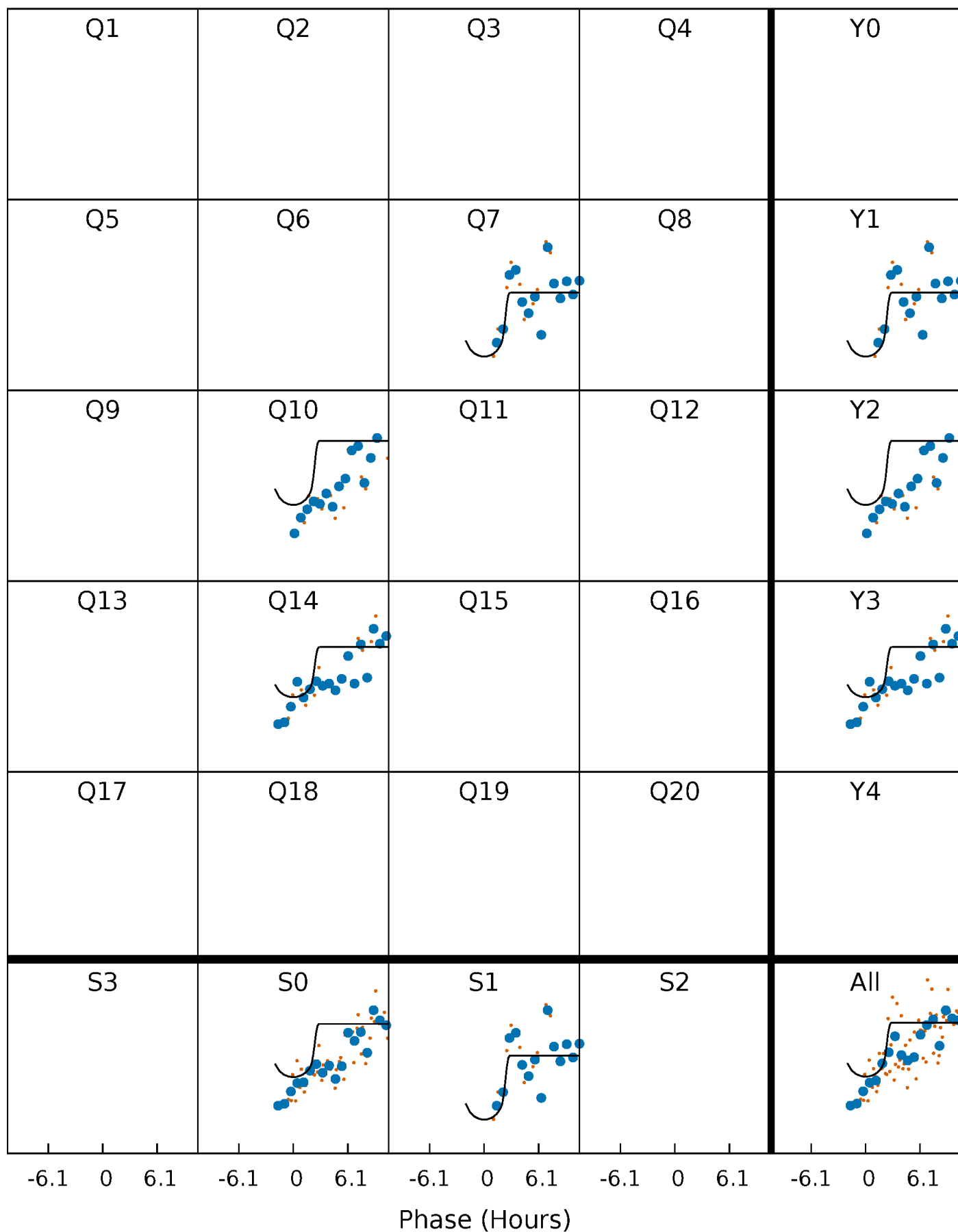
# PDC Quarter-Phased Transit Curves

TCE 009425107-02     $P=319.002424$  Days     $T_0=328.292478$  (BKJD)



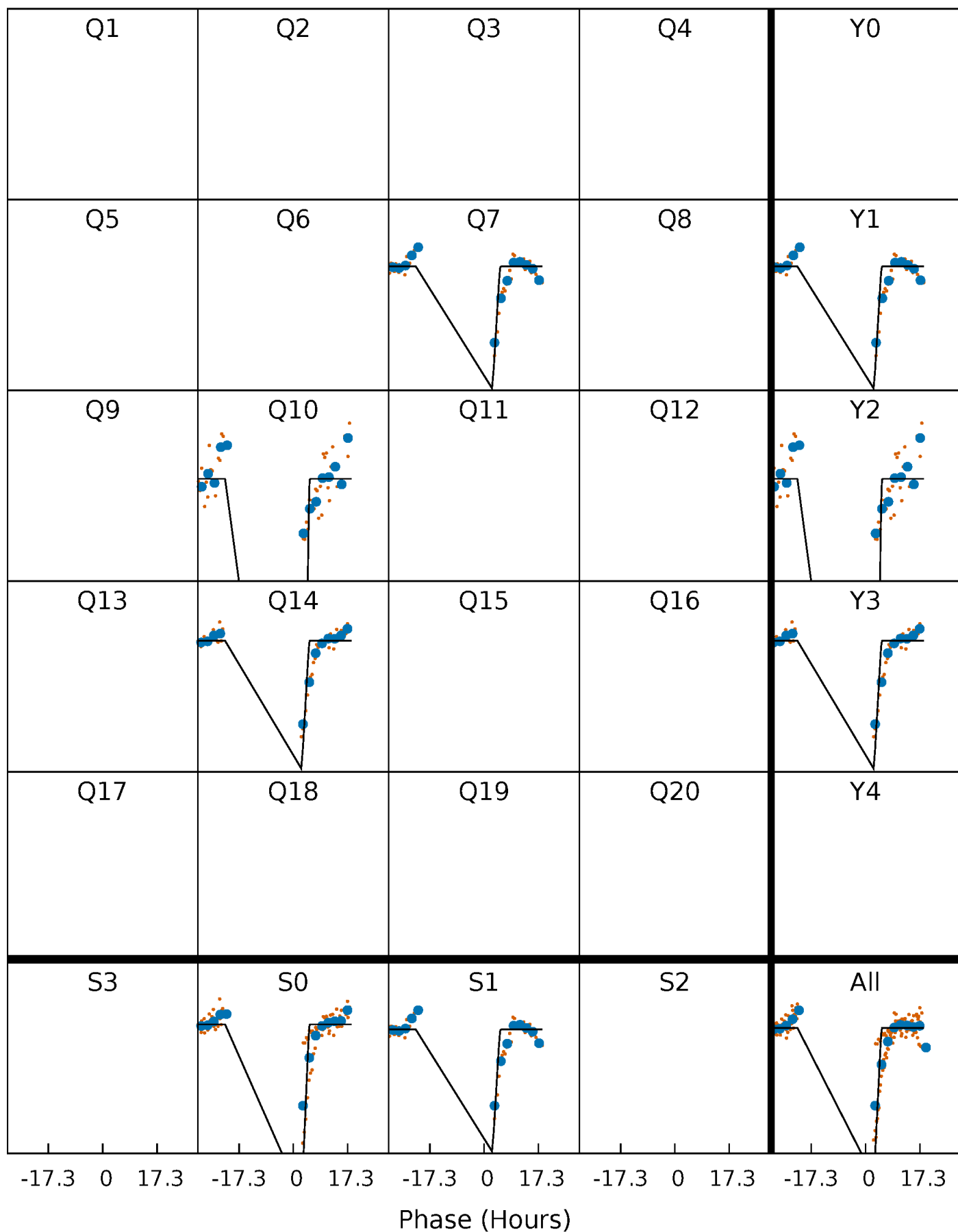
# DV Quarter-Phased Transit Curves

TCE 009425107-02 P=319.002424 Days  $T_0=328.292478$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

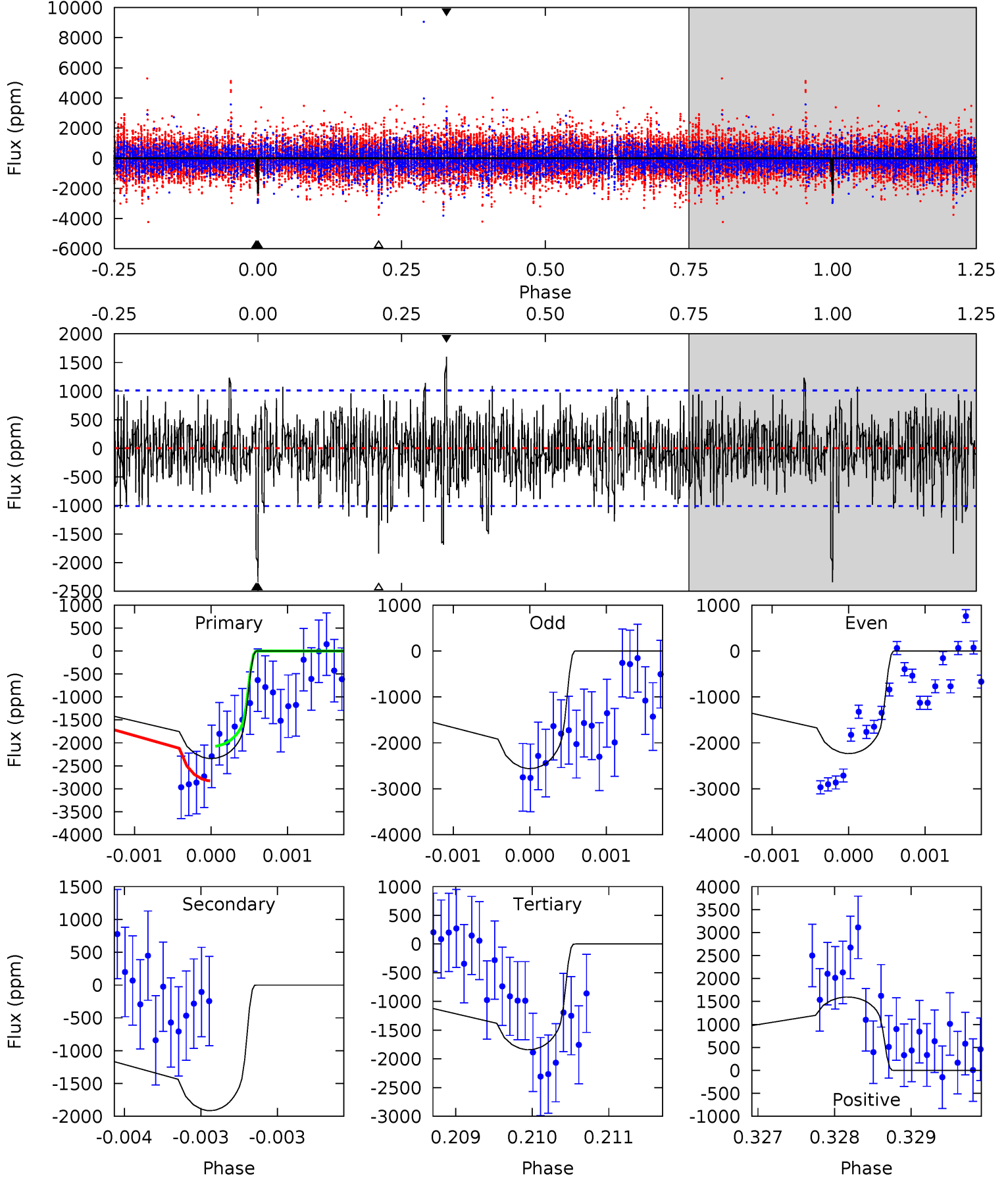
TCE 009425107-02 P=318.953176 Days  $T_0=328.248973$  (BKJD)



# DV Model-Shift Uniqueness Test

009425107-02, P = 319.002424 Days, E = 328.292478 Days

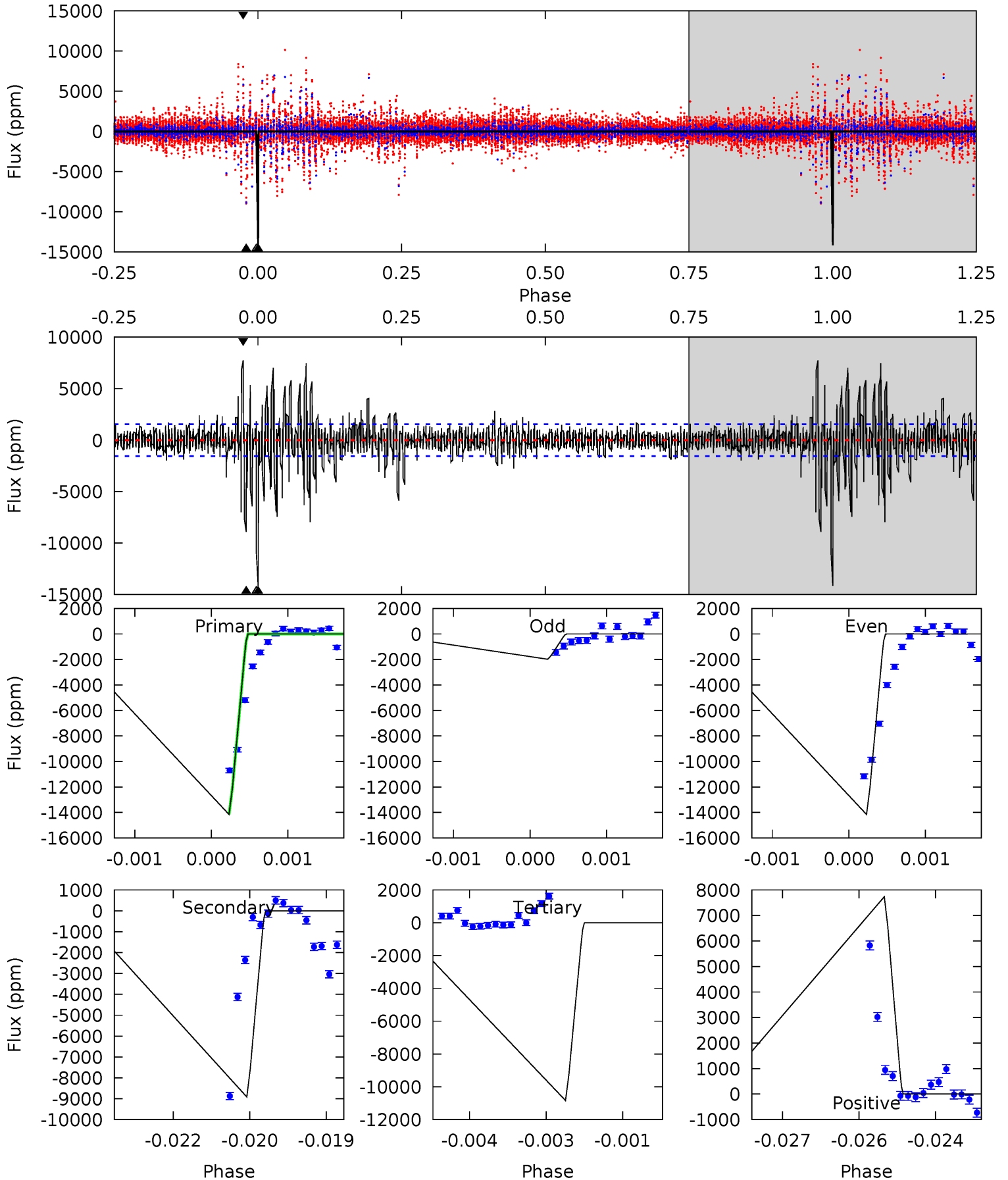
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	10.5	10.1	8.73	5.53	3.41	1.97	2.74	4.07	0.40	1.74	0.83	0.90	0.41	1.81



# Alt Model-Shift Uniqueness Test

009425107-02, P = 318.953176 Days, E = 328.248973 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
49.3	31.0	37.7	26.9	5.39	3.19	2.82	11.5	22.3	-6.69	4.11	17.5	0.83	0.35	0



### Stellar Parameters For KIC 009425107

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5587^{+182}_{-182}$	$4.461^{+0.094}_{-0.162}$	$-0.140^{+0.300}_{-0.300}$	$0.906^{+0.228}_{-0.123}$	$0.865^{+0.111}_{-0.083}$	$1.638^{+0.668}_{-0.722}$
	+3%/-3%	+2%/-4%	+214%/-214%	+25%/-14%	+13%/-10%	+41%/-44%
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 009425107-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	-1914±183	$4.36^{+2.66}_{-2.31}$	$354^{+24}_{-18}$	$5571^{+2957}_{-1010}$	$40288^{+148601}_{-24034}$
Alt.	-8914±287	$12.42^{+2.89}_{-2.66}$	$354^{+24}_{-18}$	$4978^{+552}_{-365}$	$23873^{+15153}_{-7962}$

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

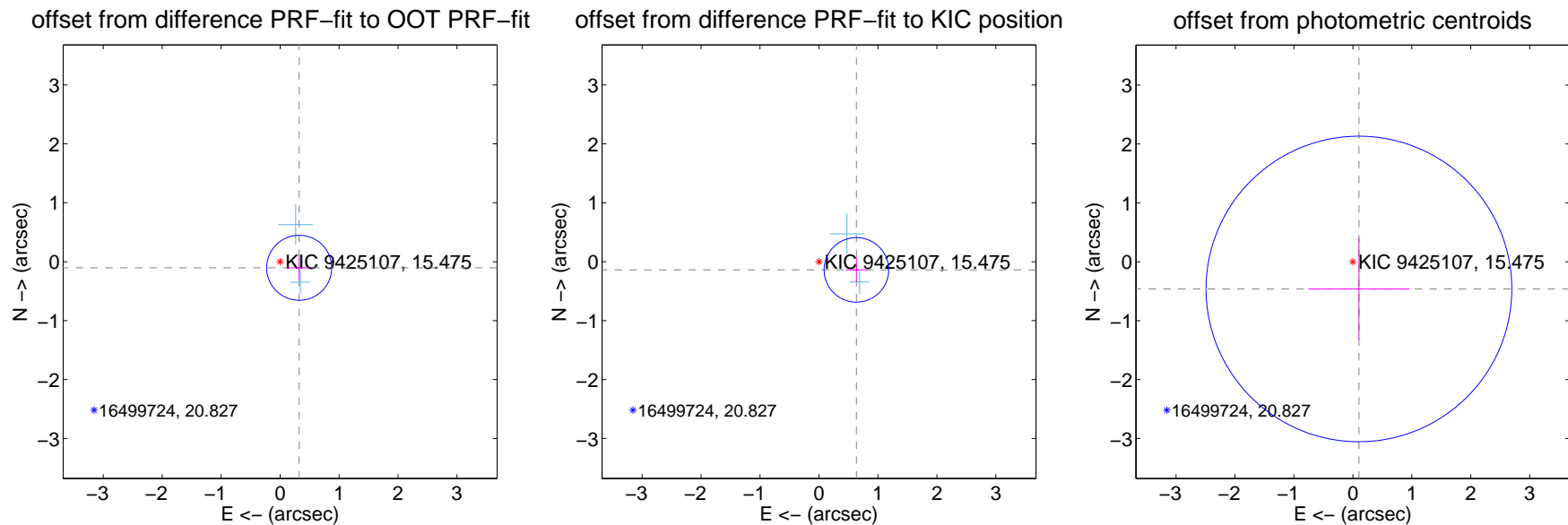
## DV Centroid Data

Supplemental centroid analysis for 009425107-02. Kepler magnitude: 15.47. Transit SNR 7.11

There are 2 quarters with good PRF difference image offsets

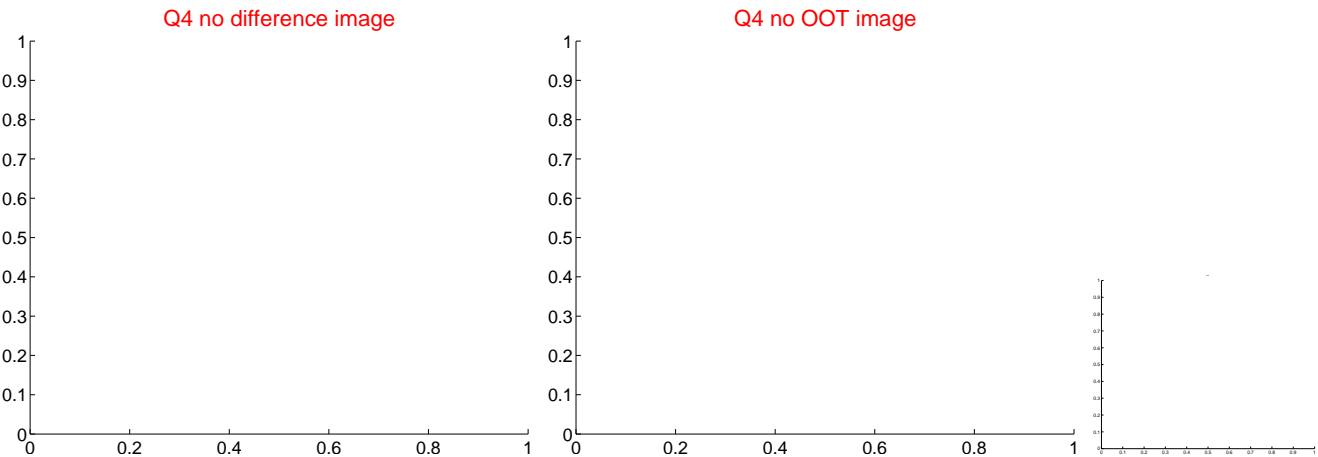
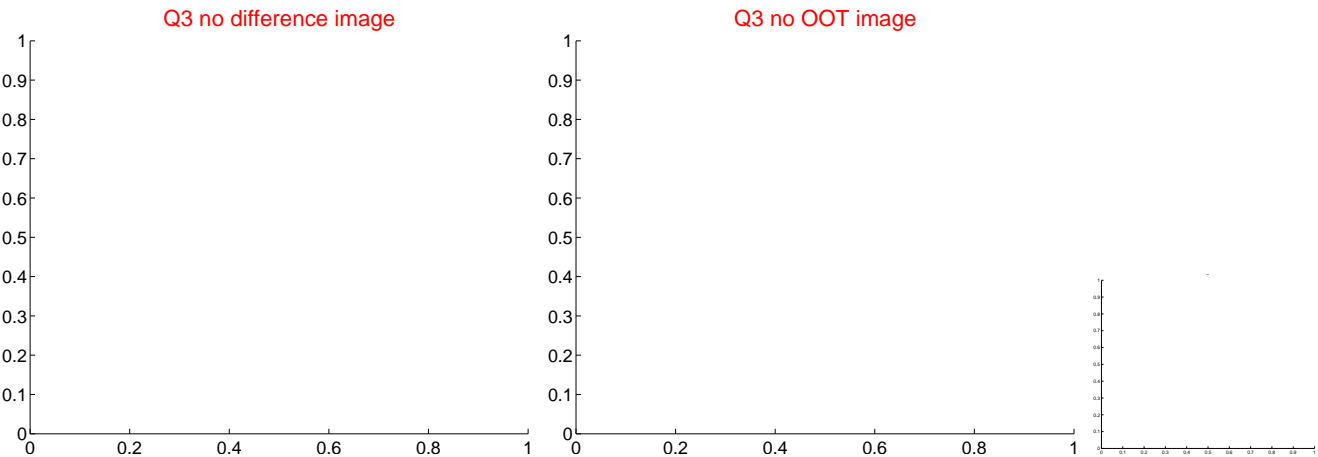
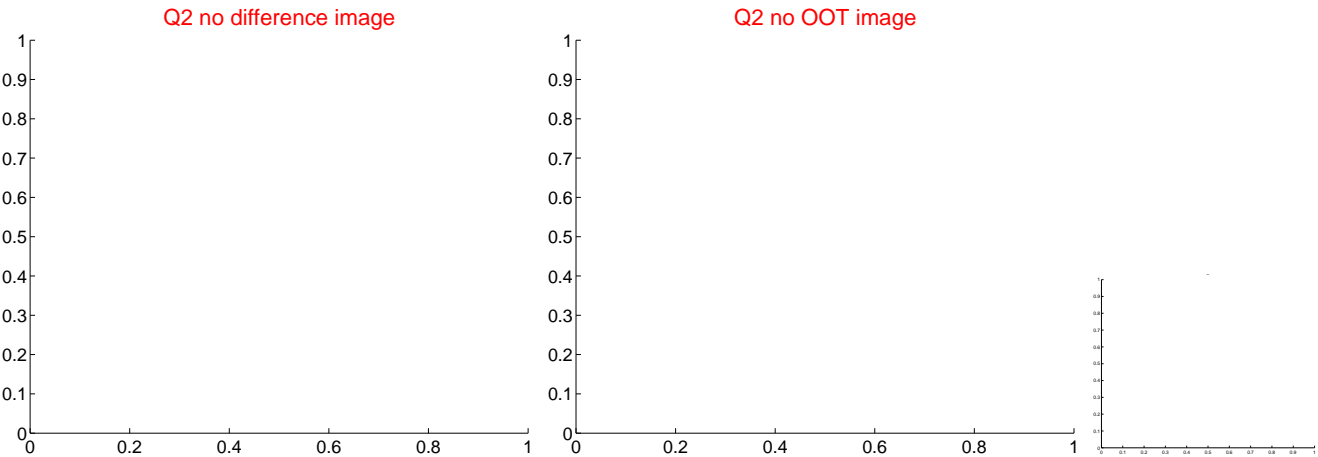
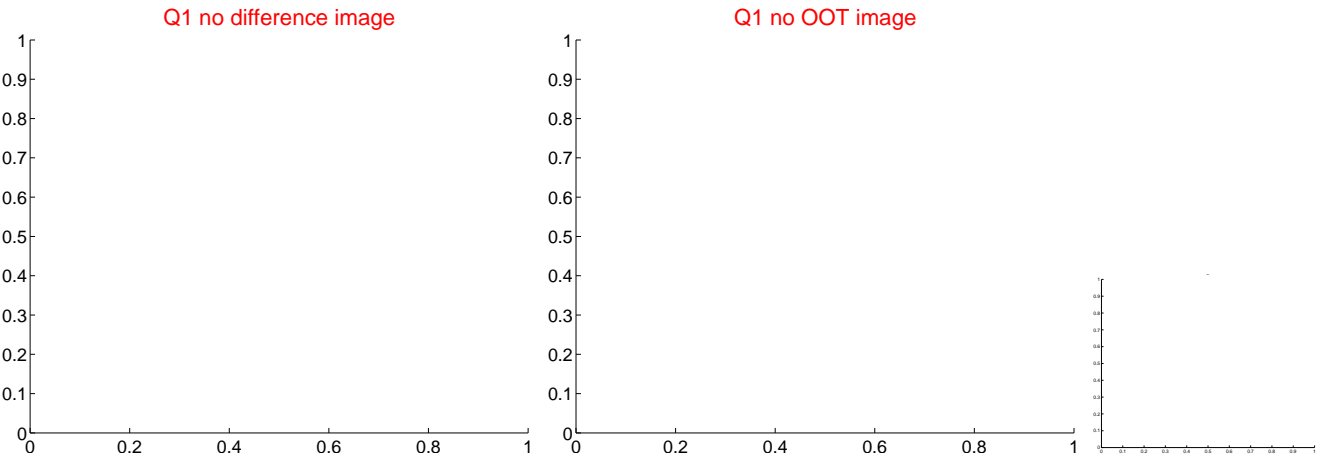
The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.340 \pm 0.184$	1.85	$-0.323 \pm 0.181$	$-0.103 \pm 0.208$
PRF-fit source offset from KIC position	$0.650 \pm 0.183$	3.56	$-0.635 \pm 0.181$	$-0.139 \pm 0.208$
photometric centroid source offset	$0.47 \pm 0.86$	0.55	$-0.10 \pm 0.86$	$-0.46 \pm 0.87$



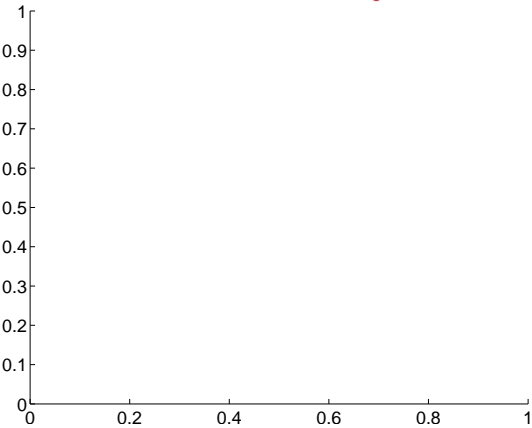
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

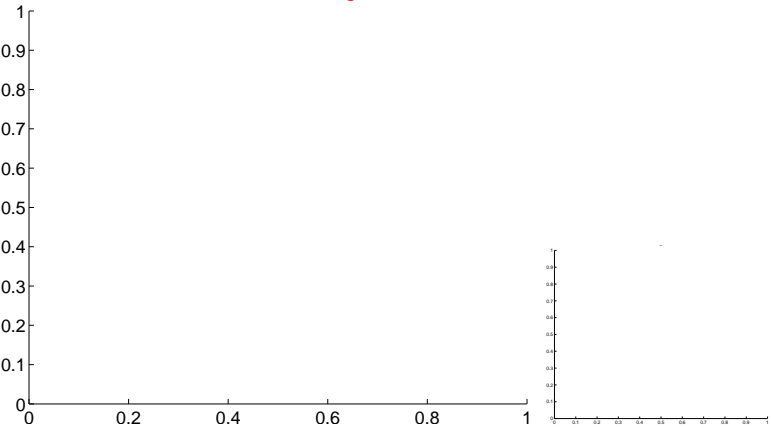


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

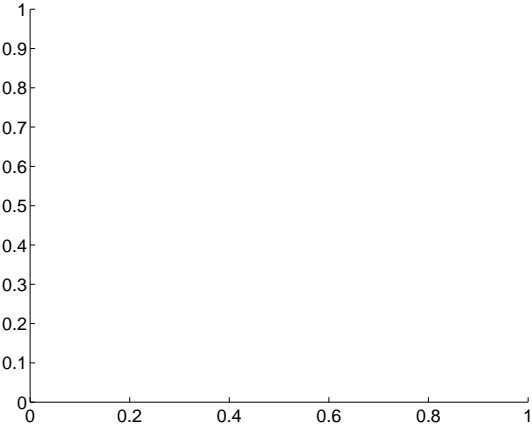
Q5 no difference image



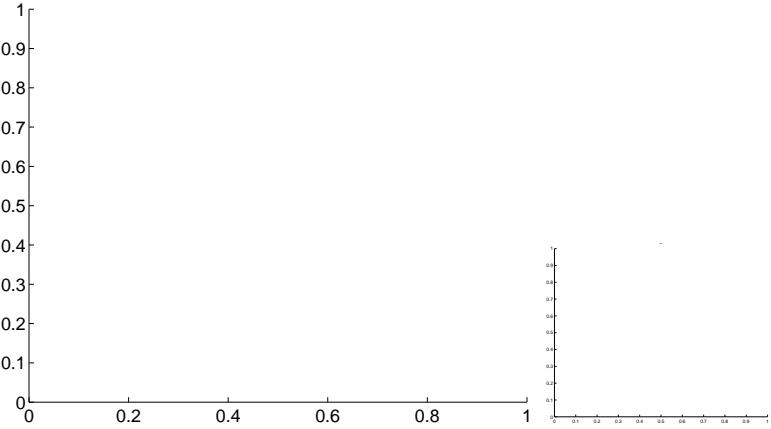
Q5 no OOT image



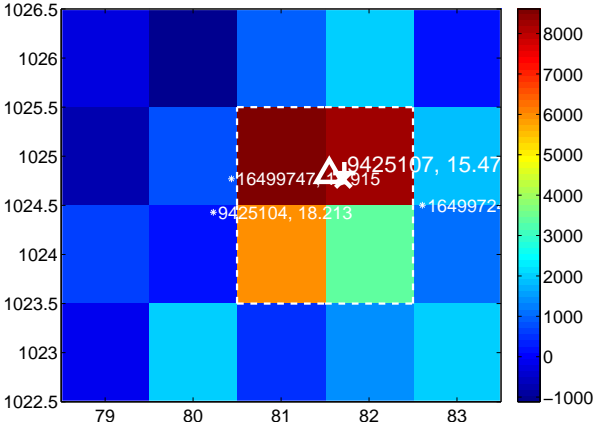
Q6 no difference image



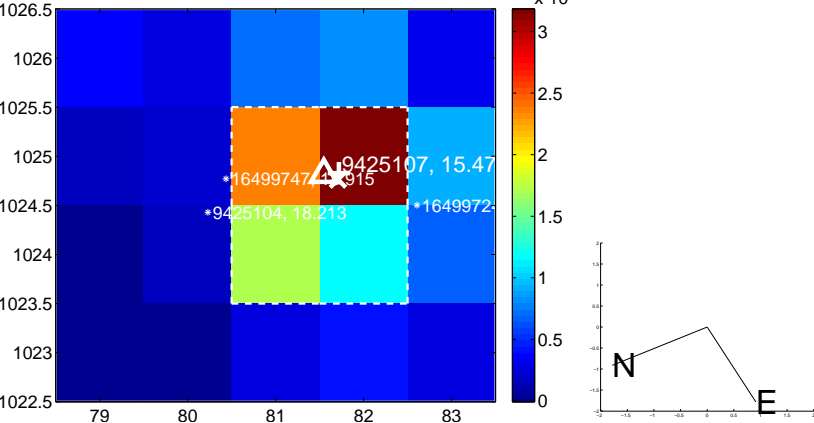
Q6 no OOT image



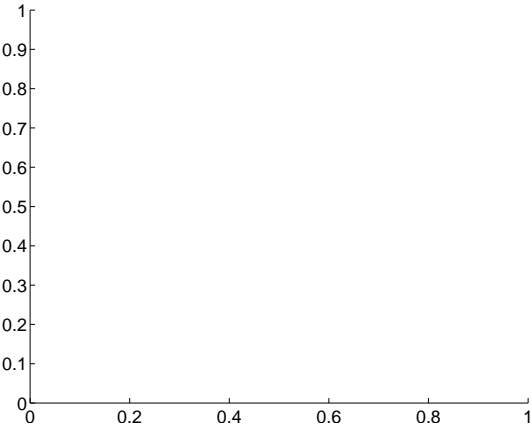
Q7 difference image



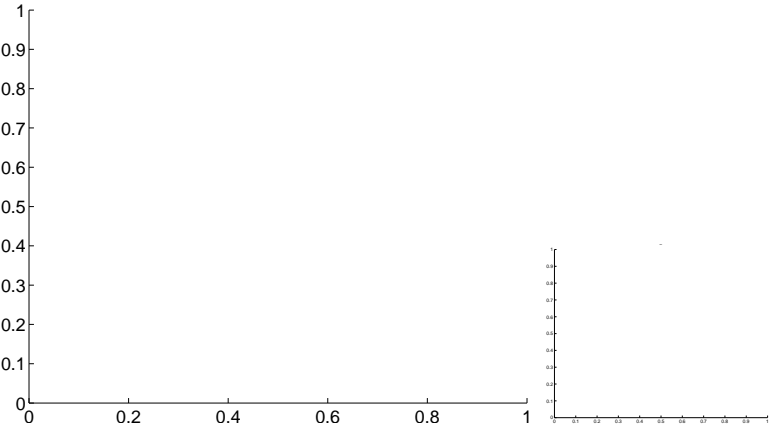
Q7 OOT image



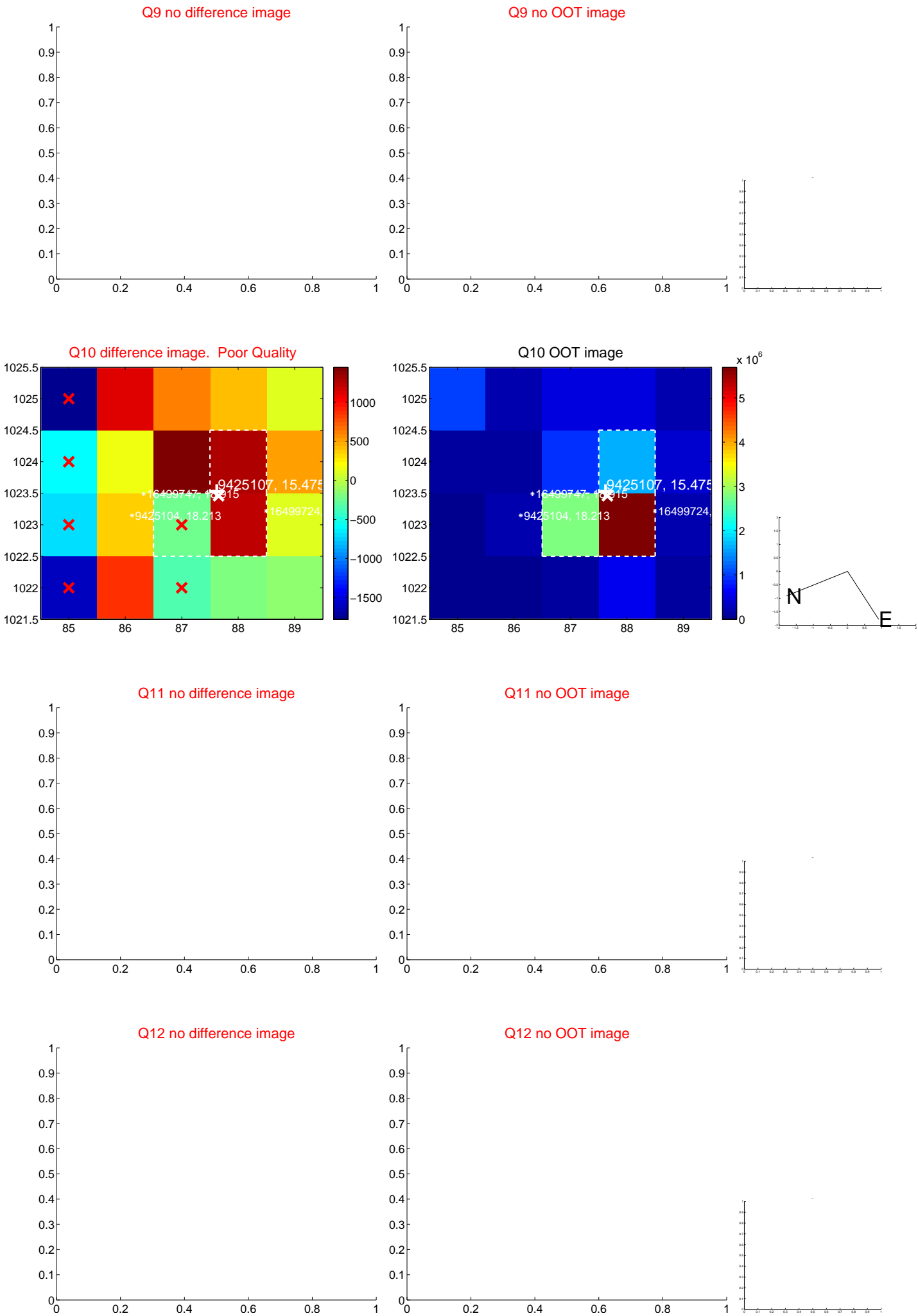
Q8 no difference image



Q8 no OOT image

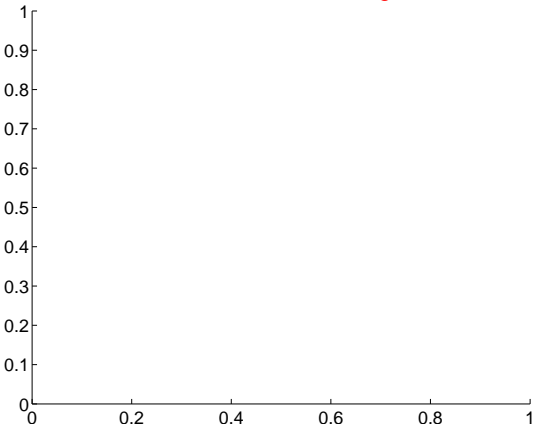


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

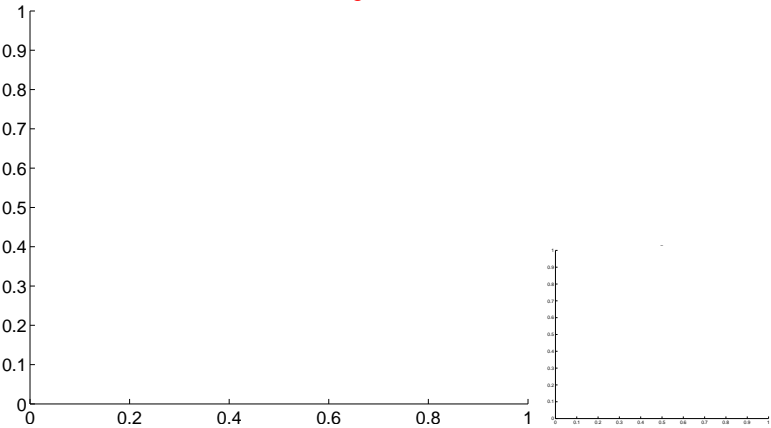


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

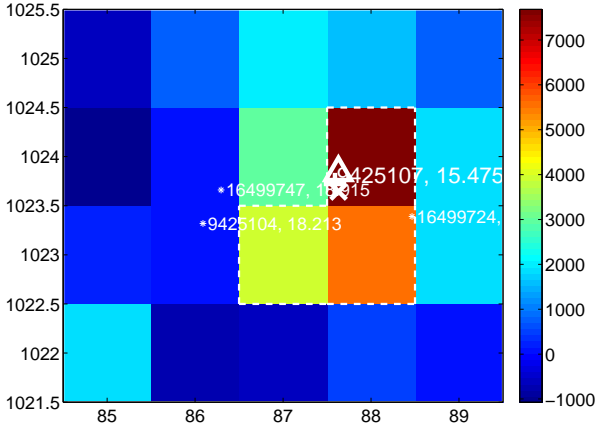
Q13 no difference image



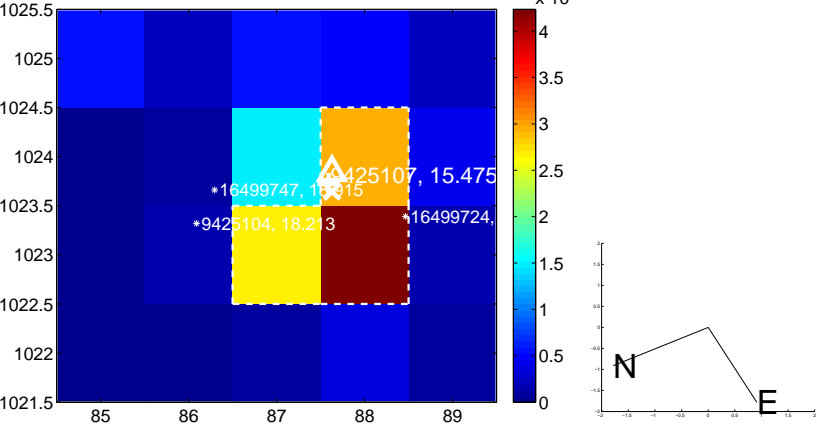
Q13 no OOT image



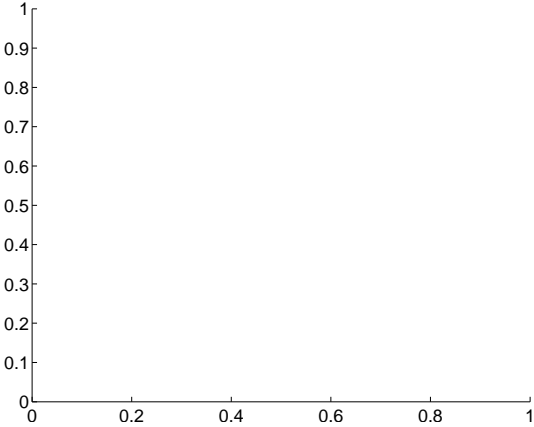
Q14 difference image



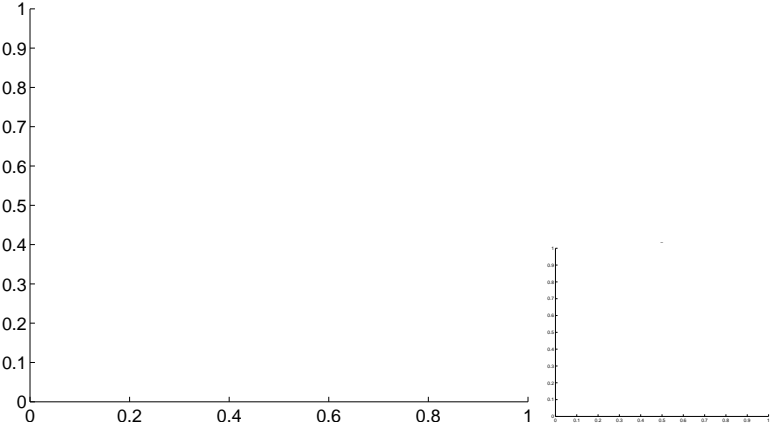
Q14 OOT image



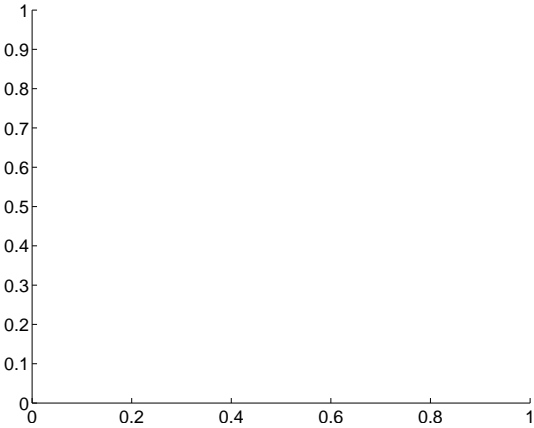
Q15 no difference image



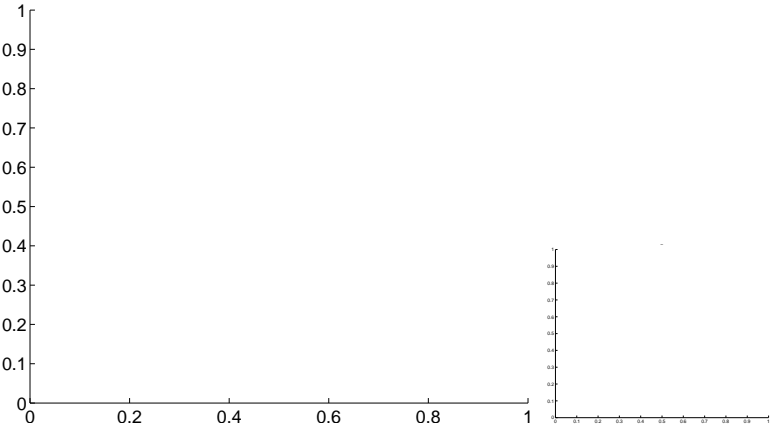
Q15 no OOT image



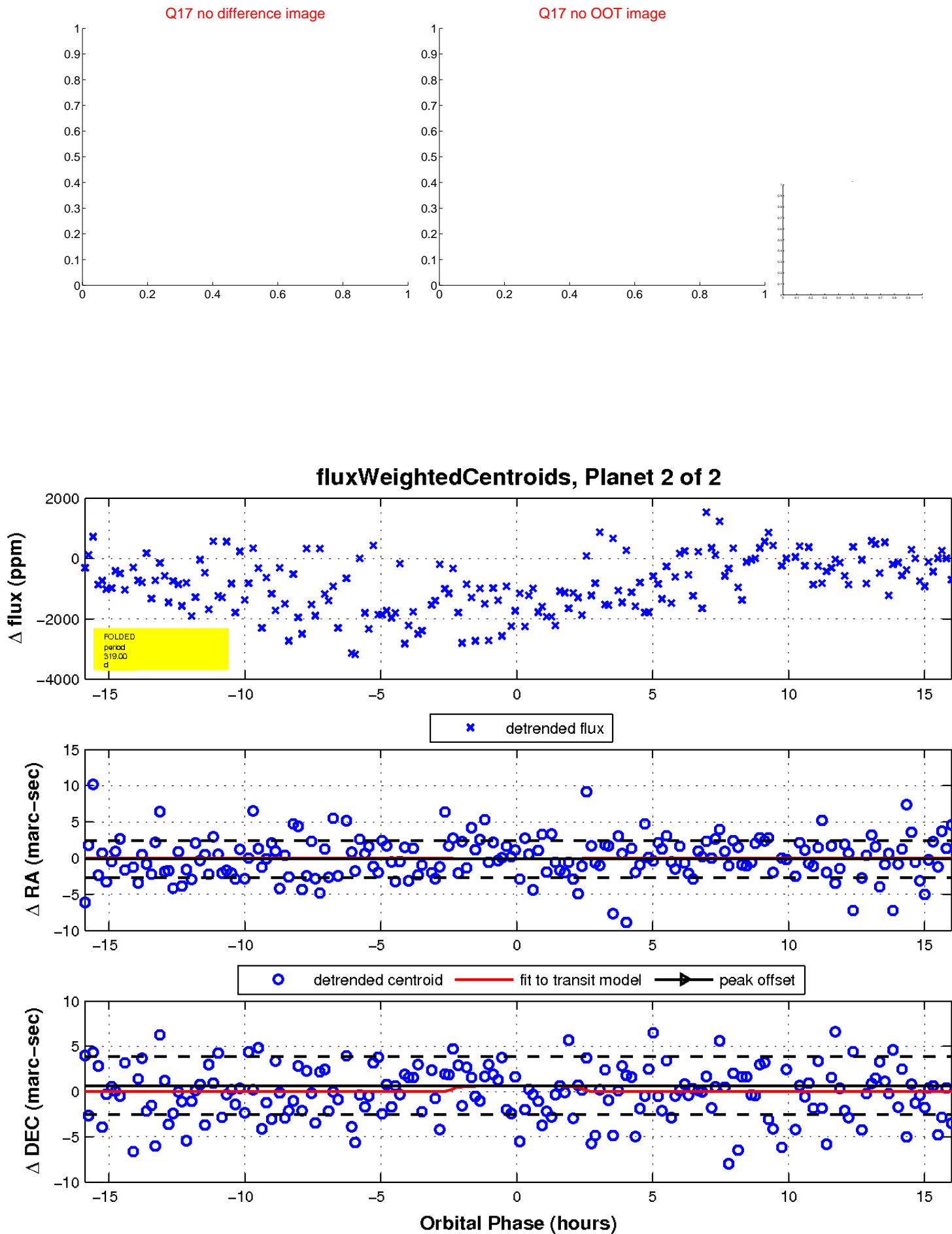
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

