

# KIC 001431114

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001431114-01	OBS	No	419.411979	205.810635	223.5	22.040	7.5	7.6	0.79	4949	1.44	0.33
001431114-02	OBS	No	401.305551	242.181528	309.0	10.050	7.6	6.9	0.79	4949	1.63	0.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001431114-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
001431114-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

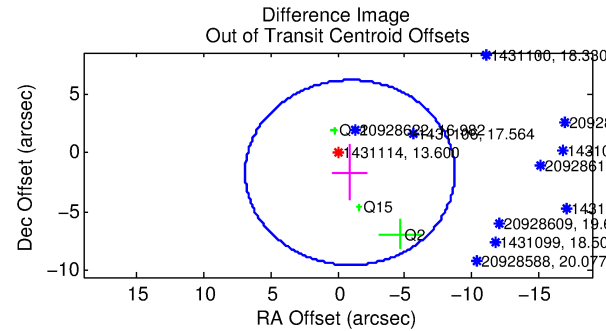
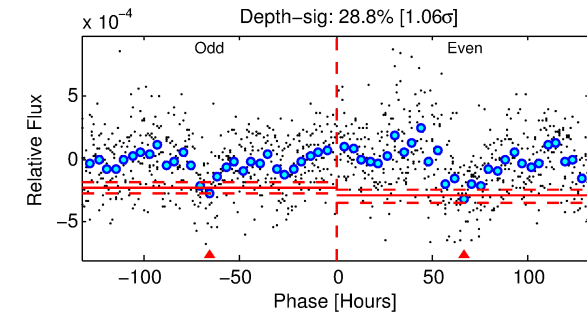
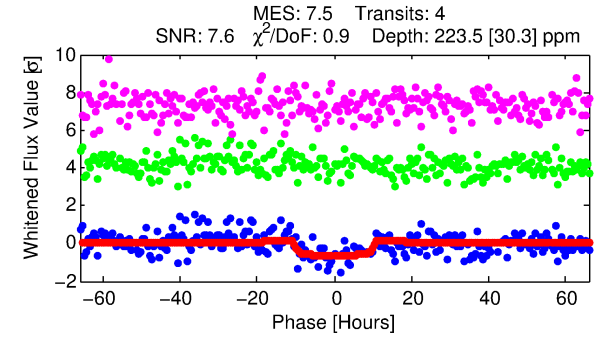
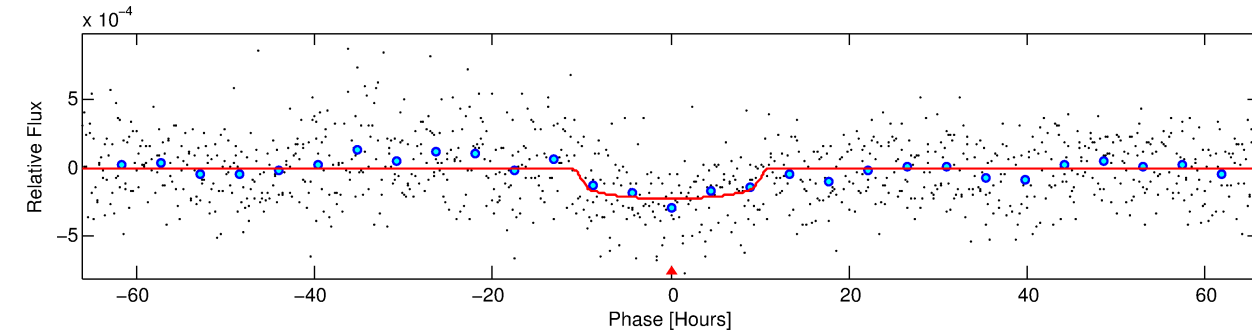
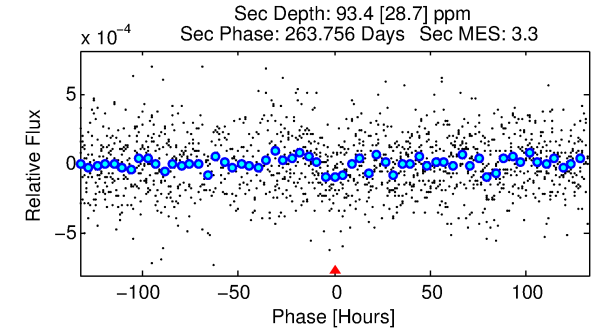
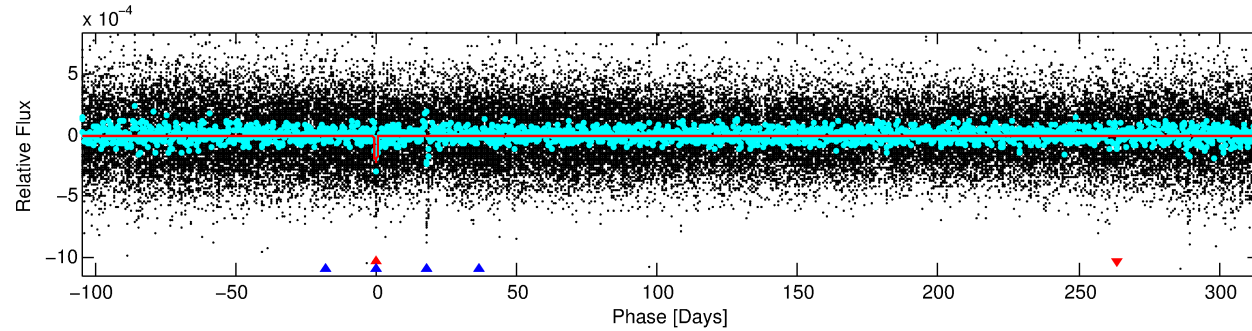
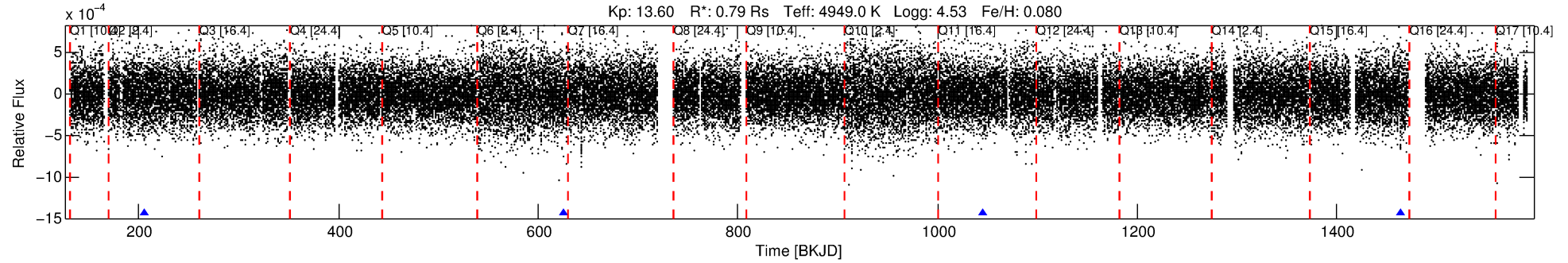
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 001431114-01

No Significant Match Found

# DV One-Page Summary

KIC: 1431114 Candidate: 1 of 2 Period: 419.412 d



## DV Fit Results:

Period = 419.41198 [0.01967] d  
Epoch = 205.8106 [0.0370] BKJD  
Rp/R\* = 0.0167 [0.0030]  
a/R\* = 69.01 [45.21]  
b = 0.90 [0.14]  
Seff = 0.33 [0.06]  
Teq = 193 [8] K  
Rp = 1.44 [0.29] Re  
a = 1.0083 [0.0840] AU  
Ag = 25099.77 [12313.43] [2.04σ]  
Teffp = 3766 [457] K [7.81σ]

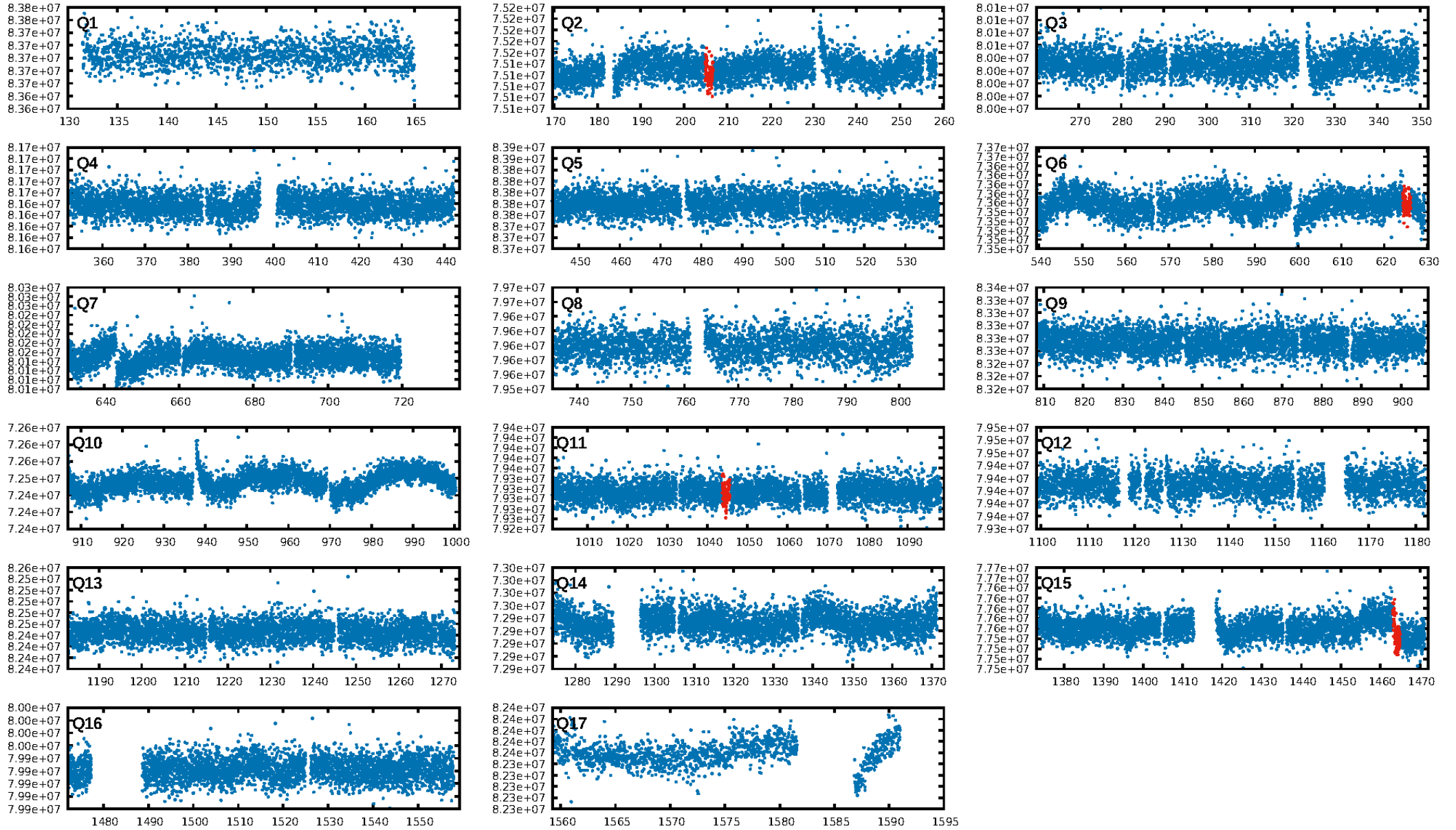
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [17.94σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 6.3%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 6.23e-10**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 2.442  
Centroid-sig: 35.4%  
Centroid-so: 2.659 arcsec [1.26σ]  
OotOffset-rm: 1.915 arcsec [0.73σ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-rm: 2.218 arcsec [0.95σ]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.75 [3/4]

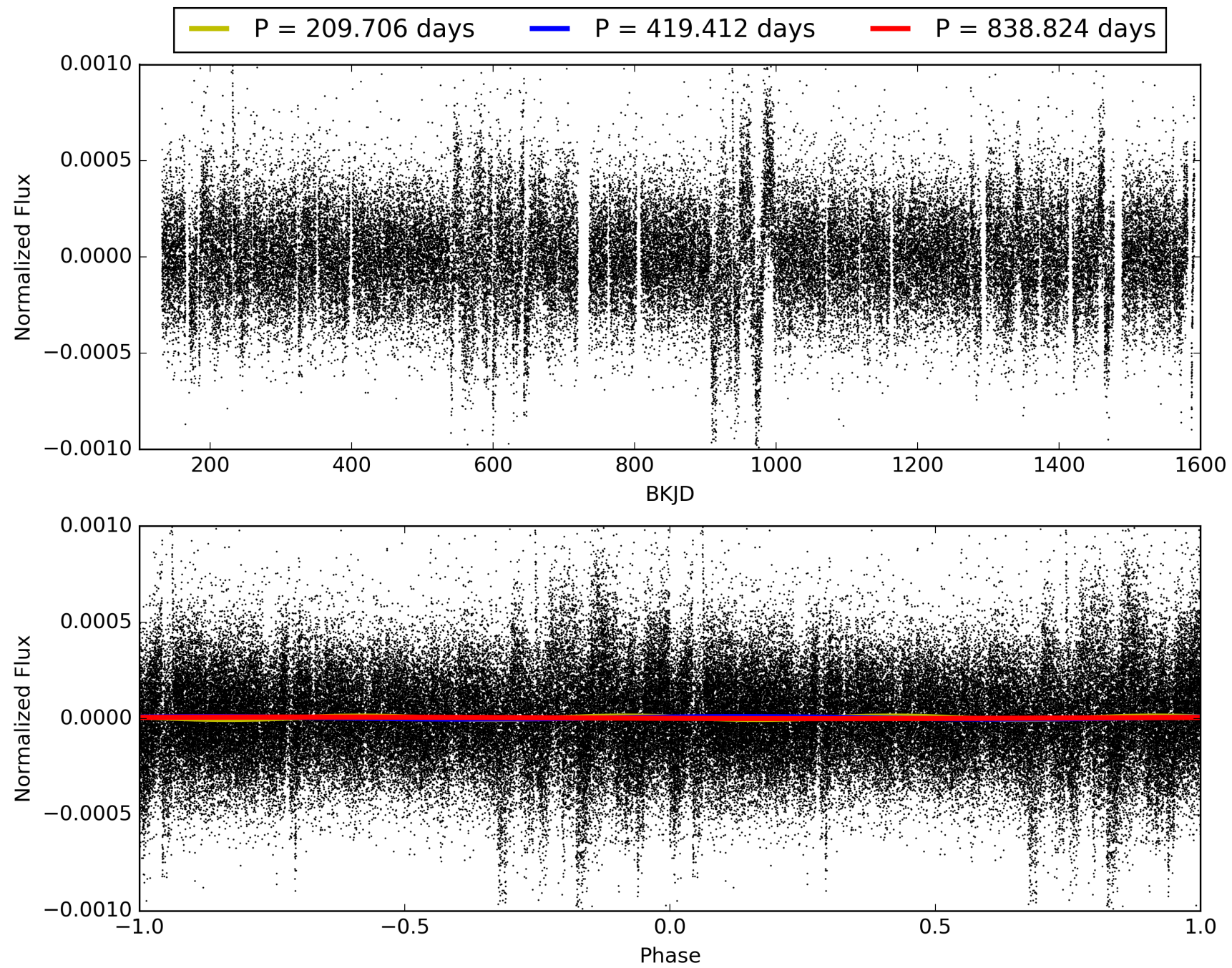
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:48:30 Z

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

# TCE 001431114-01, PDC Light Curves

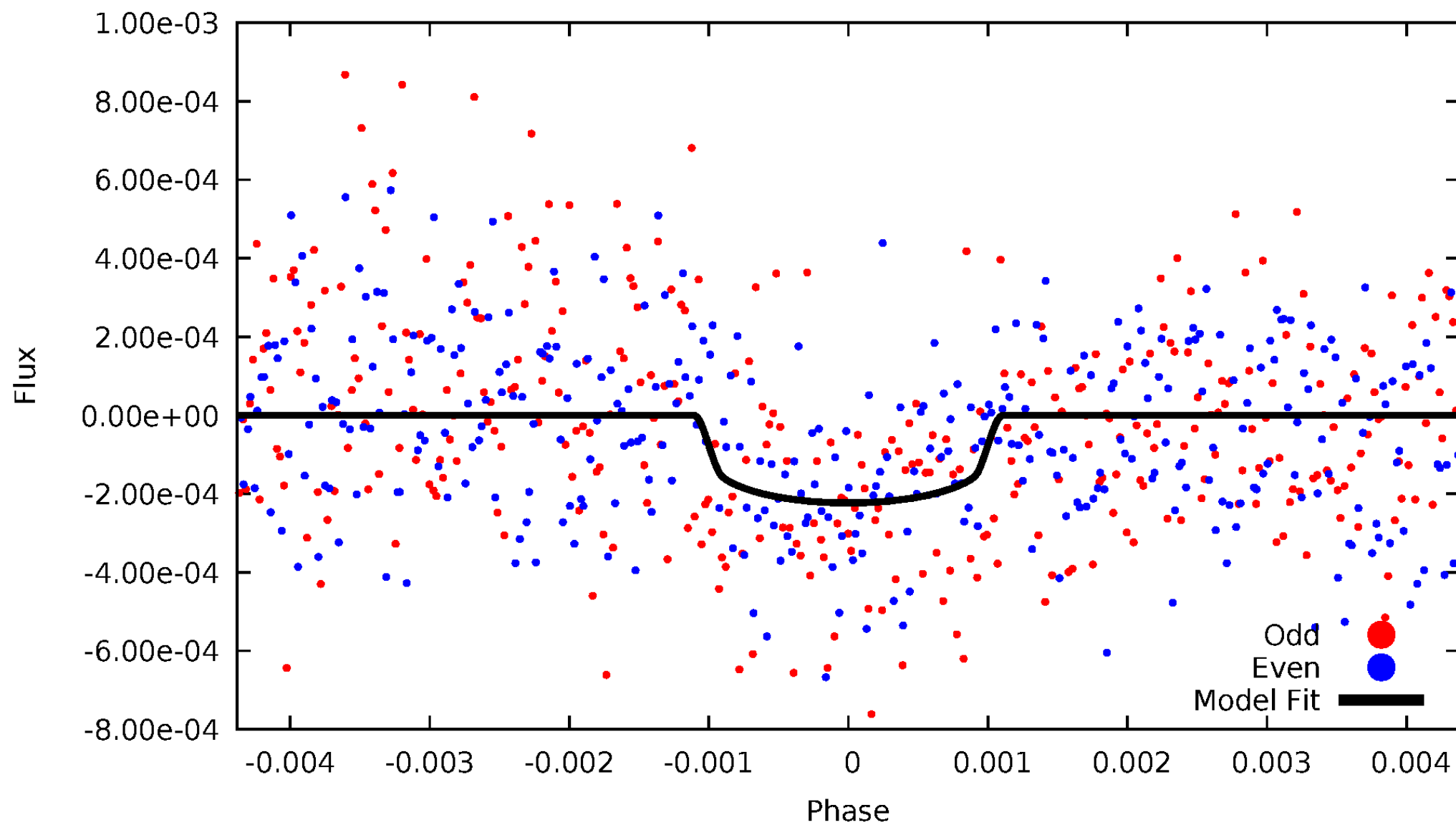


TCE 001431114-01



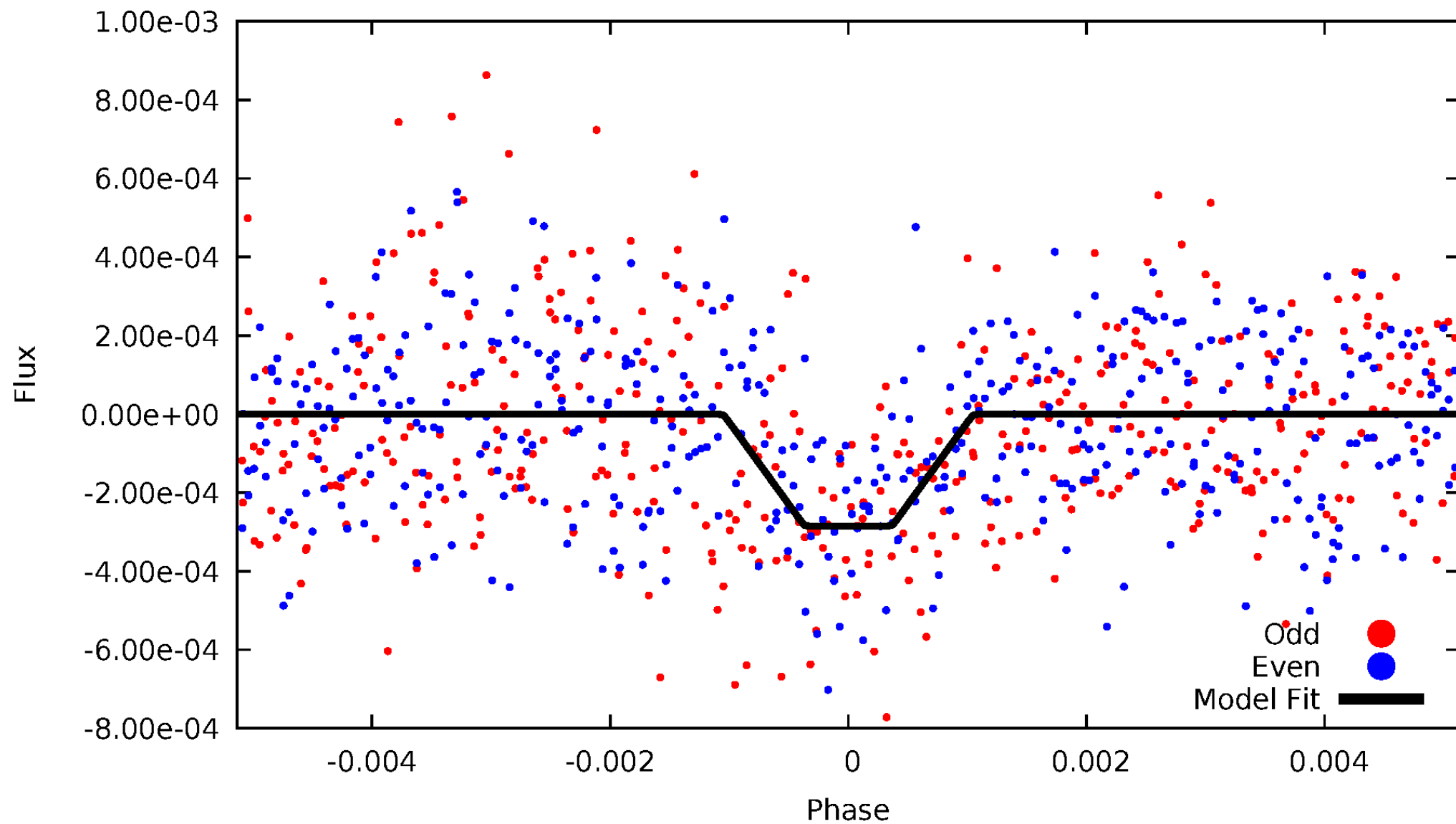
# DV Odd/Even

TCE 001431114-01



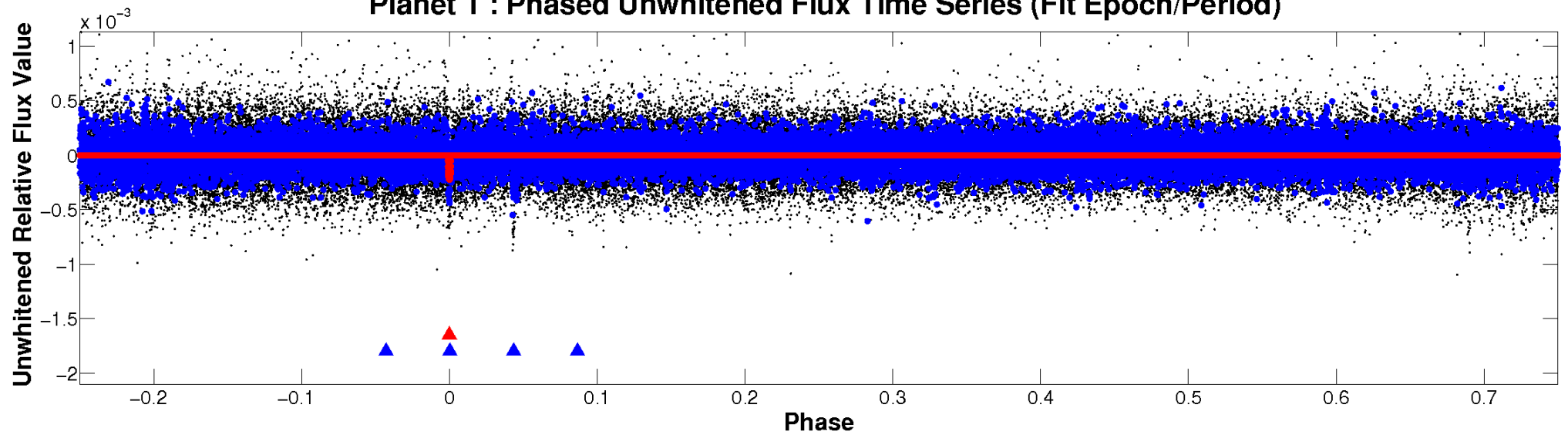
# ALT Odd/Even

TCE 001431114-01

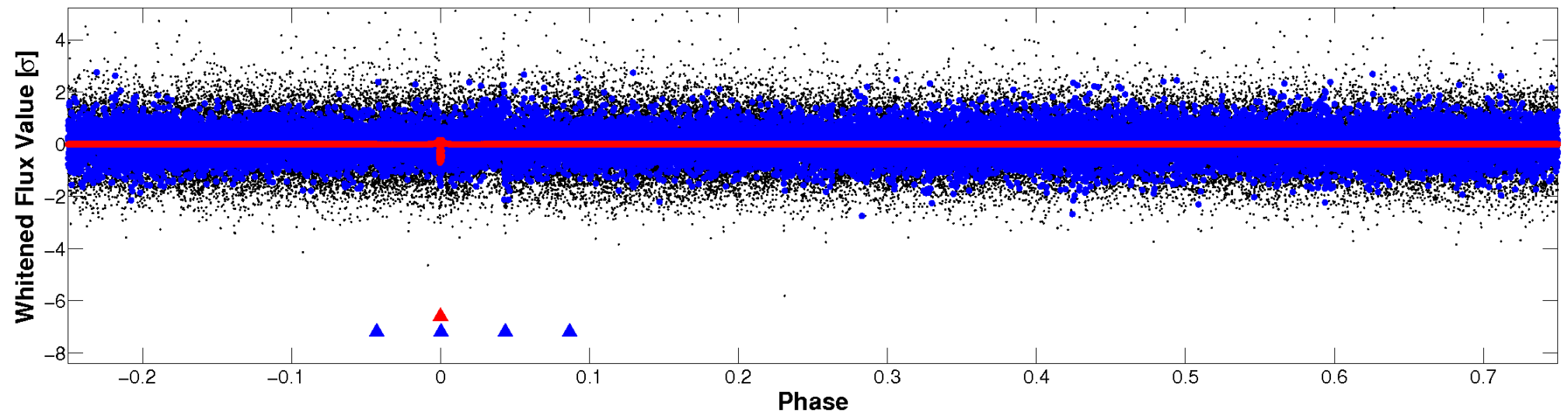


# Non-Whitened Vs. Whitened Light Curve

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

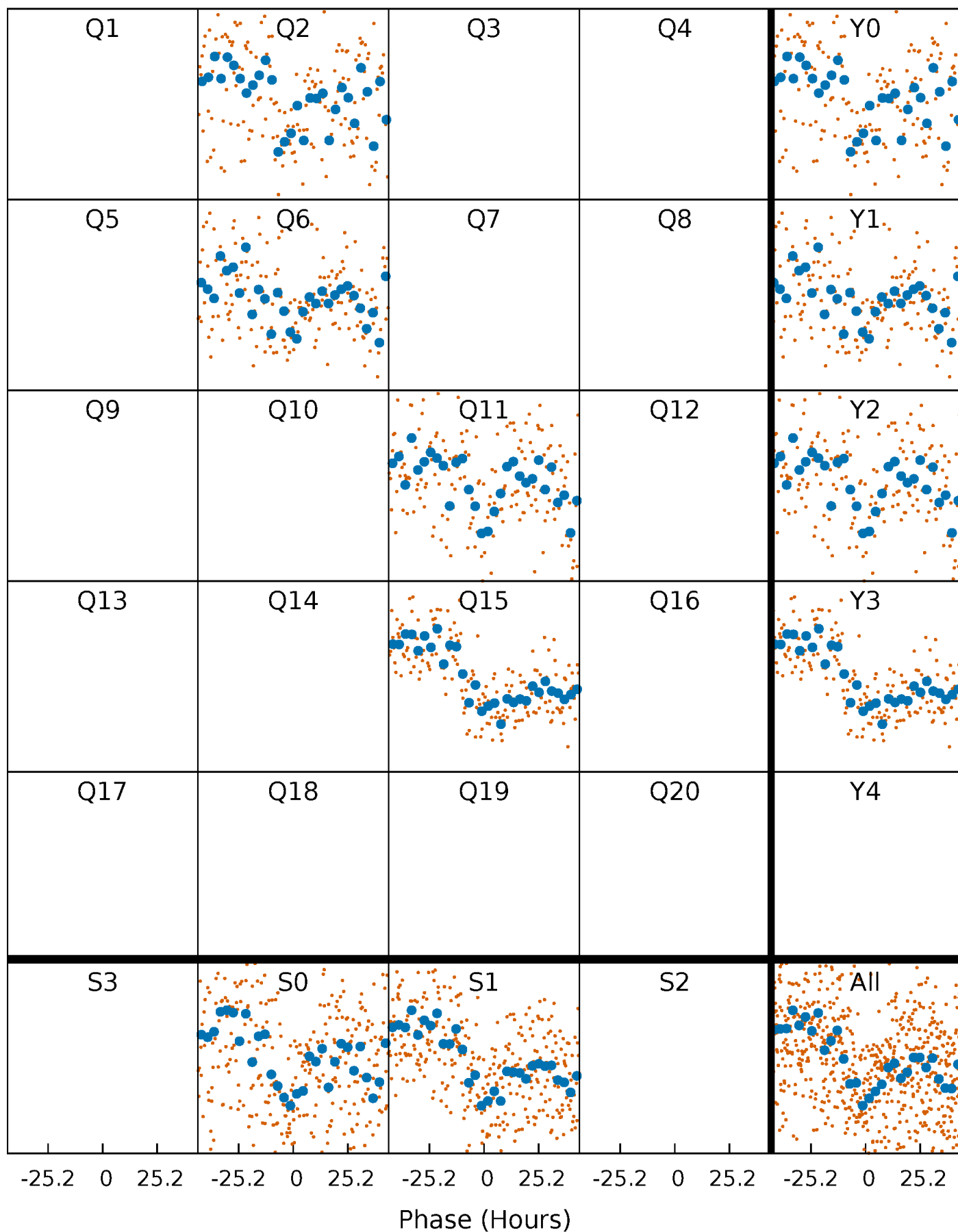


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



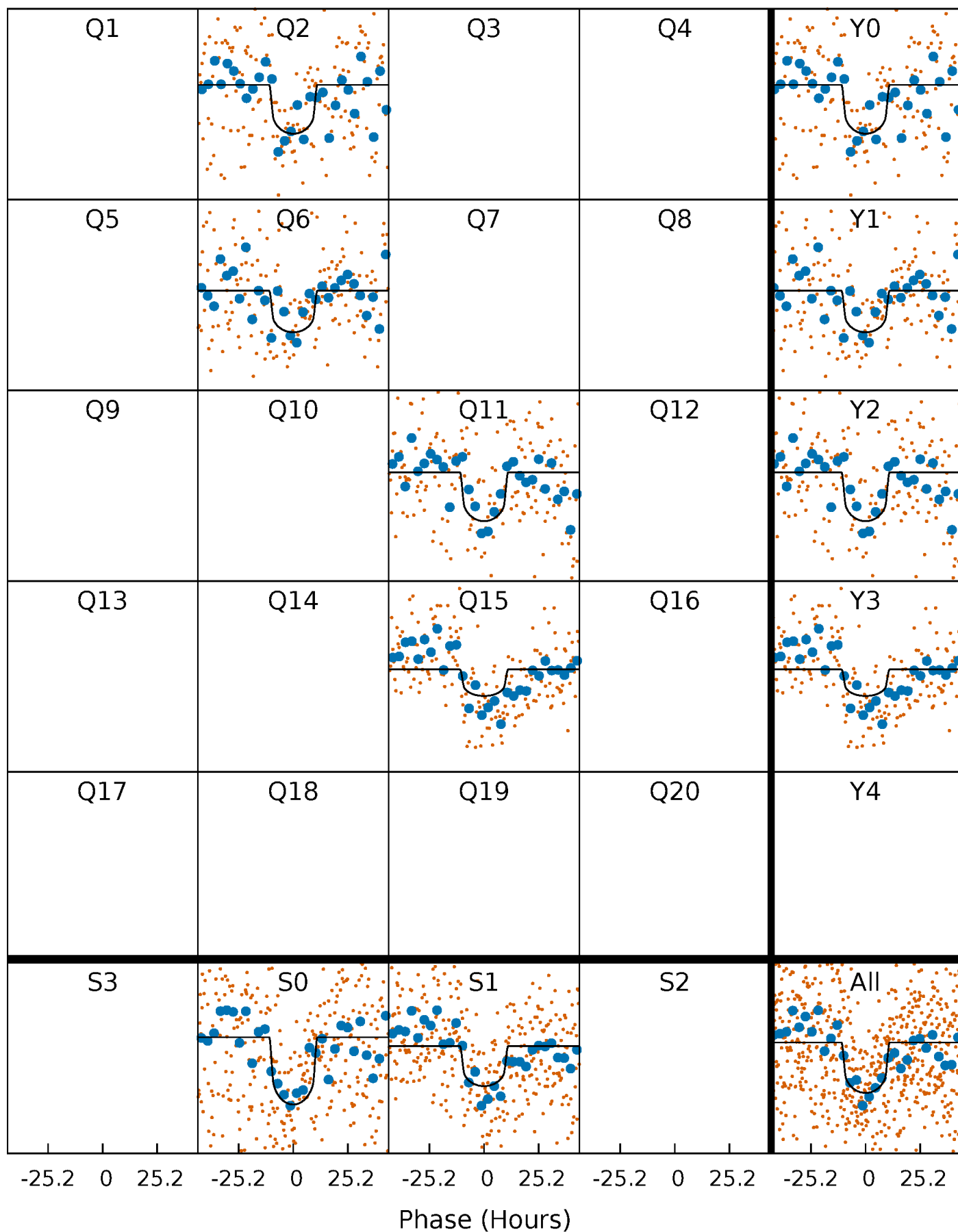
# PDC Quarter-Phased Transit Curves

TCE 001431114-01 P=419.411979 Days  $T_0=205.810635$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 001431114-01 P=419.411979 Days  $T_0=205.810635$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

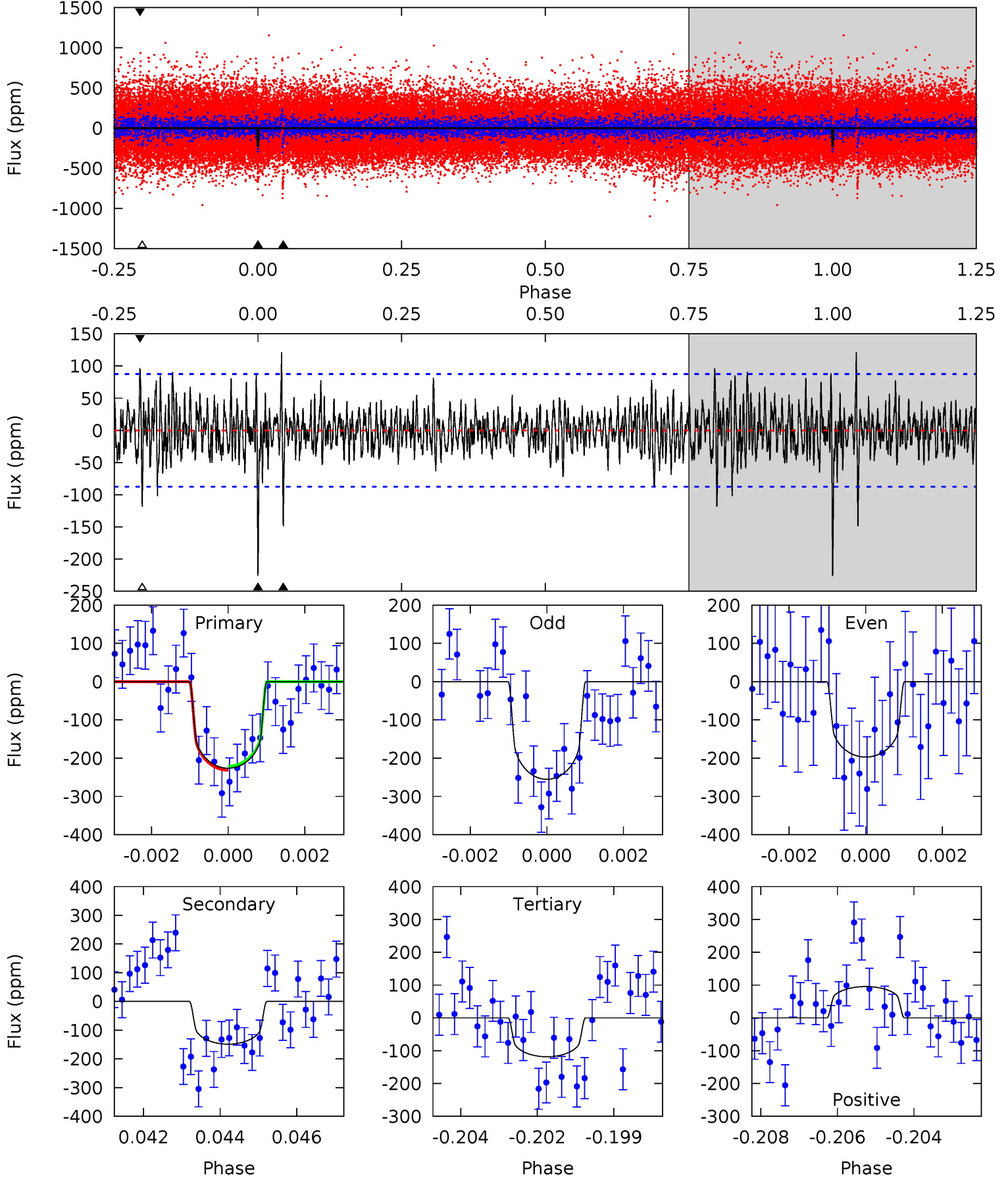
TCE 001431114-01 P=419.480553 Days  $T_0=205.676584$  (BKJD)



# DV Model-Shift Uniqueness Test

001431114-01, P = 419.411979 Days, E = 205.810635 Days

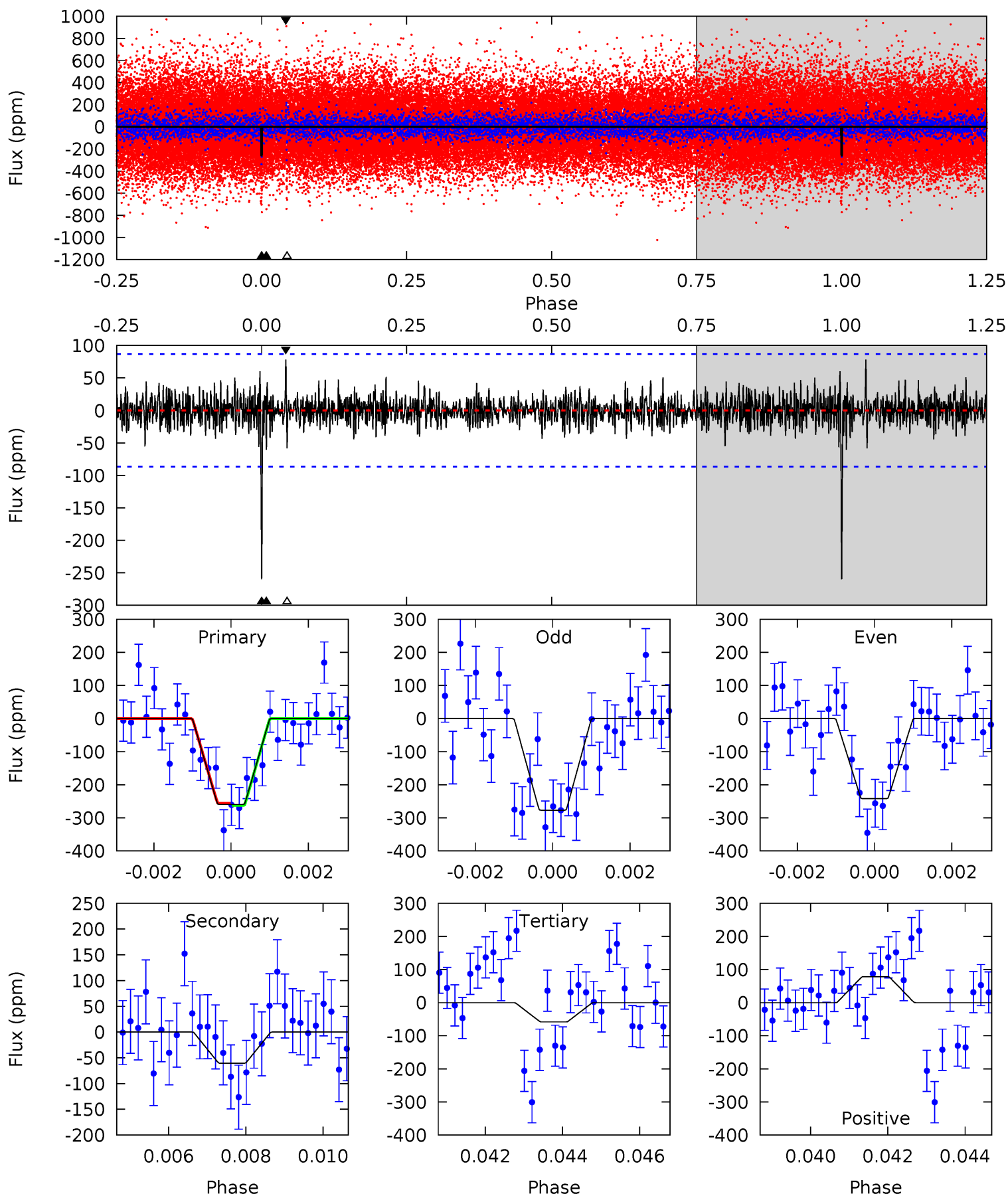
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.7	9.03	7.19	5.79	5.31	3.06	1.65	6.54	7.94	1.84	3.24	1.77	1.14	0.35	0.33



# Alt Model-Shift Uniqueness Test

001431114-01, P = 419.480553 Days, E = 205.676584 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
15.9	3.70	3.57	4.79	5.32	3.08	0.98	12.3	11.1	0.14	-1.09	1.07	1.07	0.23	0.19



### Stellar Parameters For KIC 001431114

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4949^{+133}_{-133}$	$4.531^{+0.072}_{-0.042}$	$0.080^{+0.250}_{-0.300}$	$0.792^{+0.059}_{-0.074}$	$0.777^{+0.073}_{-0.061}$	$2.199^{+0.626}_{-0.339}$
	+3%/-3%	+2%/-1%	+312%/-375%	+7%/-9%	+9%/-8%	+28%/-15%
Source	PHO1	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 001431114-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-149 \pm 16$	$1.44^{+0.27}_{-0.26}$	$269^{+9}_{-10}$	$4361^{+361}_{-297}$	$39942^{+21622}_{-11732}$
Alt.	$-60 \pm 16$	$1.45^{+0.27}_{-0.25}$	$269^{+10}_{-10}$	$3694^{+329}_{-263}$	$16105^{+9342}_{-5716}$

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

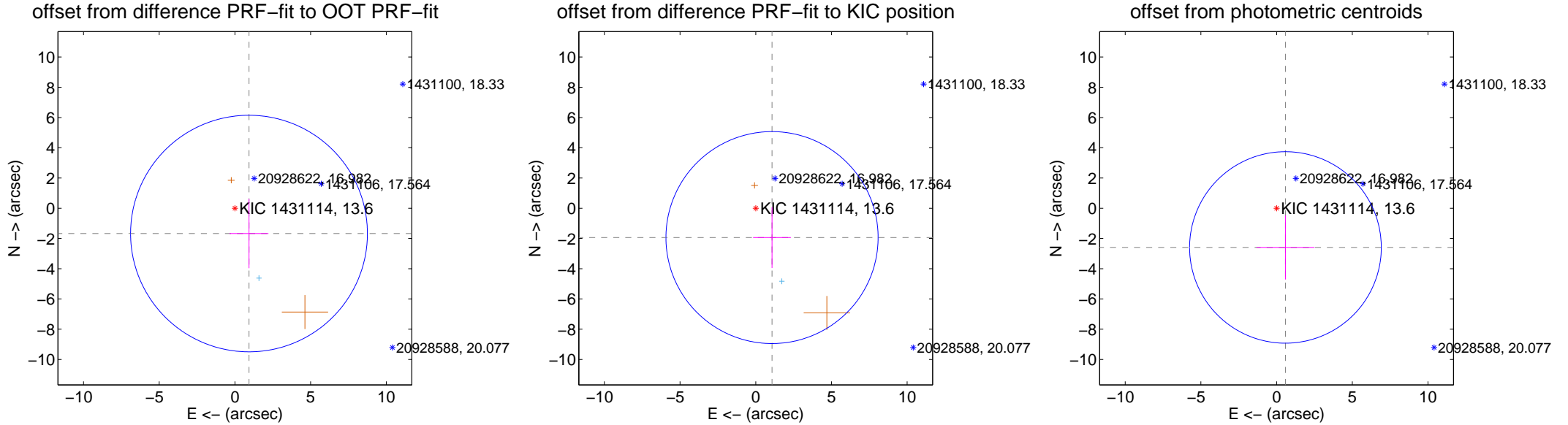
## DV Centroid Data

Supplemental centroid analysis for 001431114-01. Kepler magnitude: 13.60. Transit SNR 7.57

There are 1 quarters with good PRF difference image offsets

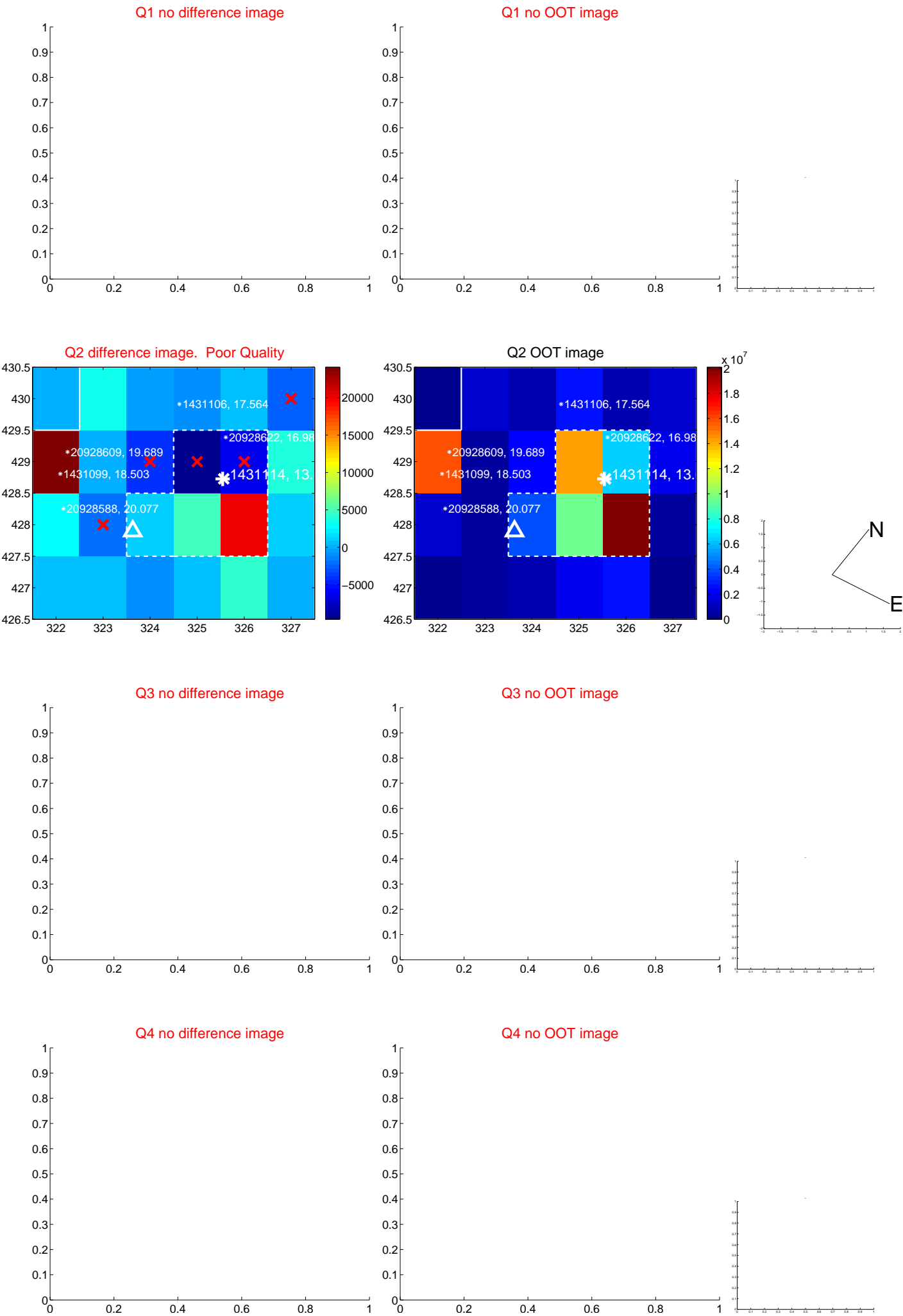
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.915 \pm 2.608$	0.73	$-0.931 \pm 1.285$	$-1.674 \pm 2.296$
PRF-fit source offset from KIC position	$2.218 \pm 2.337$	0.95	$-1.075 \pm 1.247$	$-1.940 \pm 2.014$
photometric centroid source offset	$2.66 \pm 2.11$	1.26	$-0.58 \pm 1.92$	$-2.59 \pm 2.12$

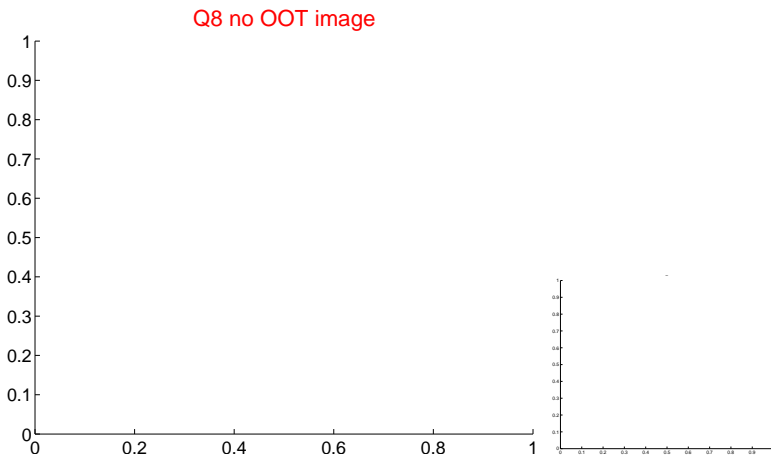
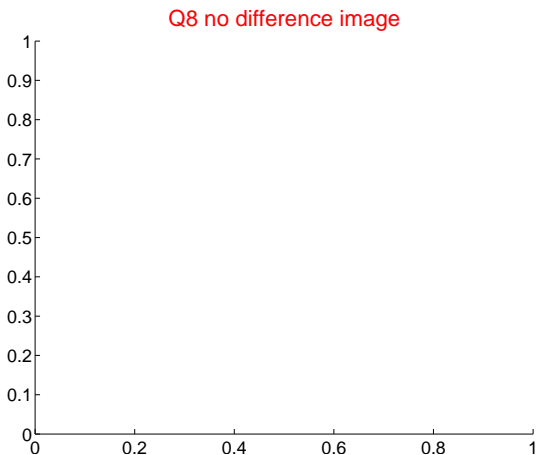
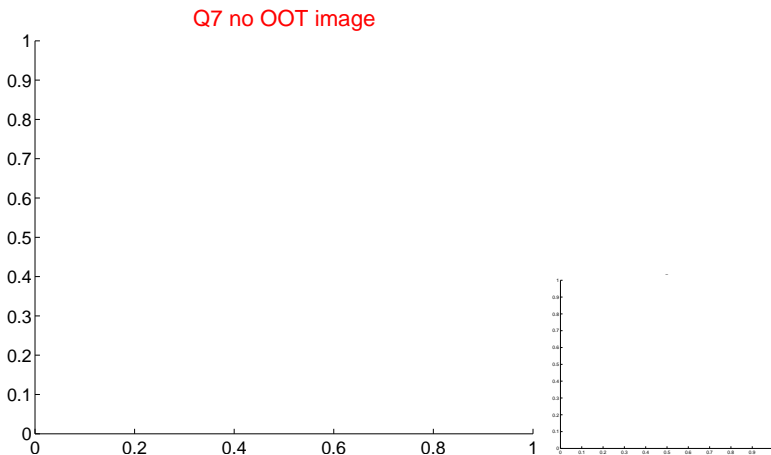
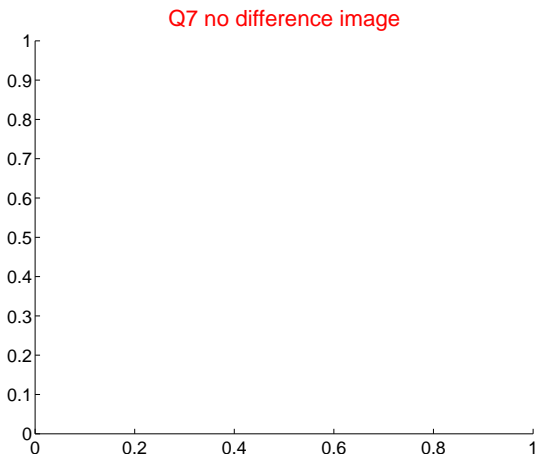
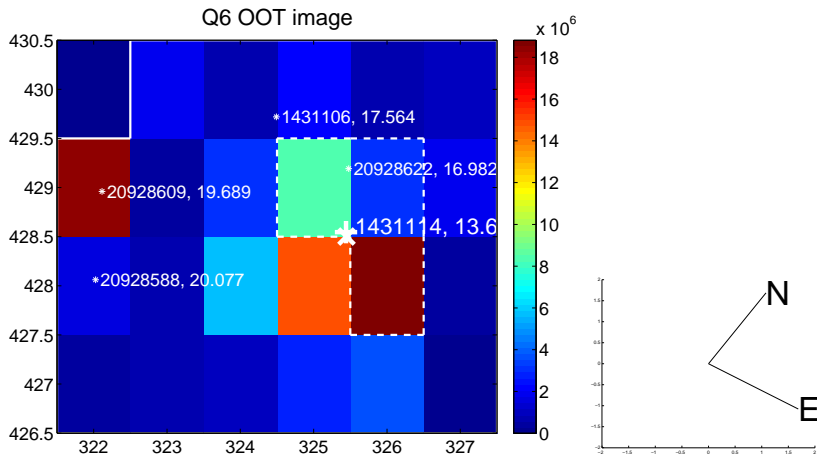
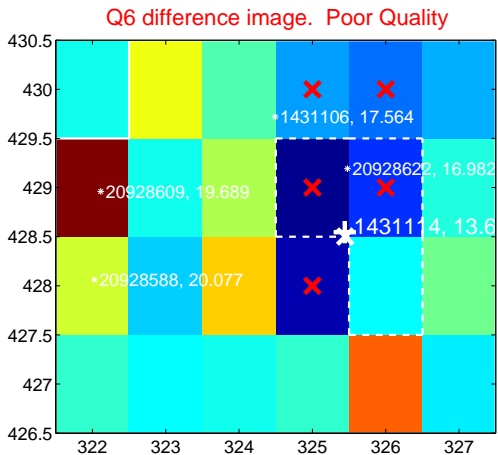
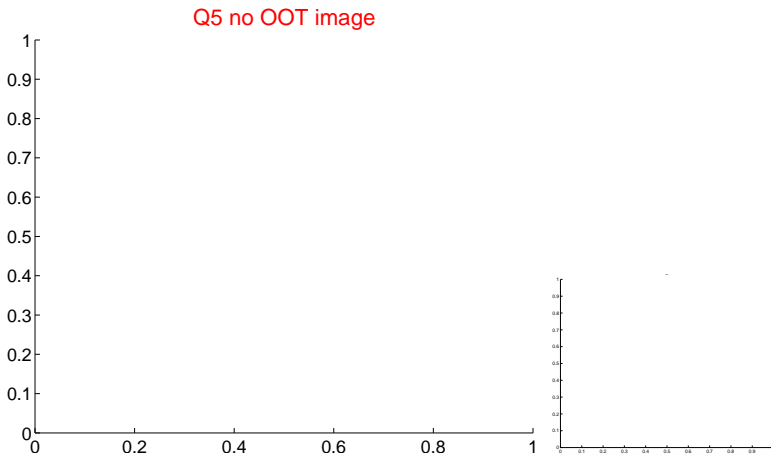
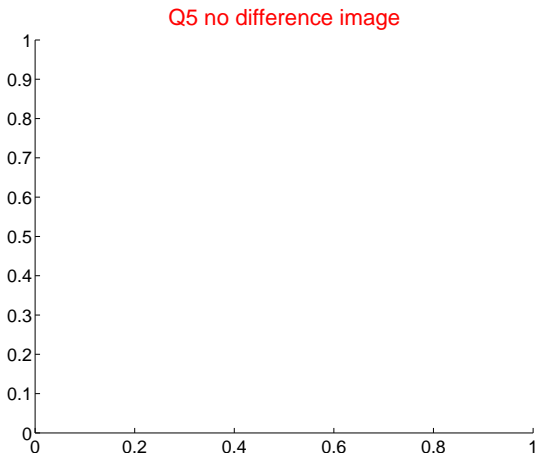


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

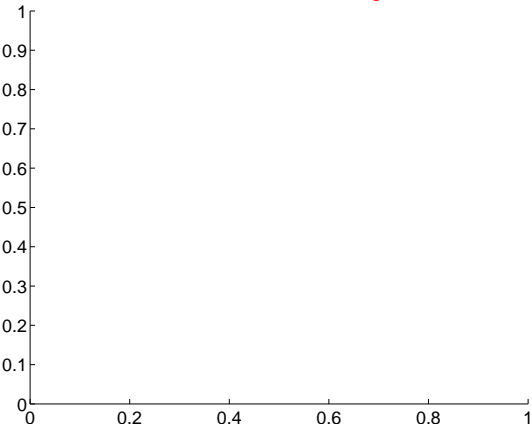


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

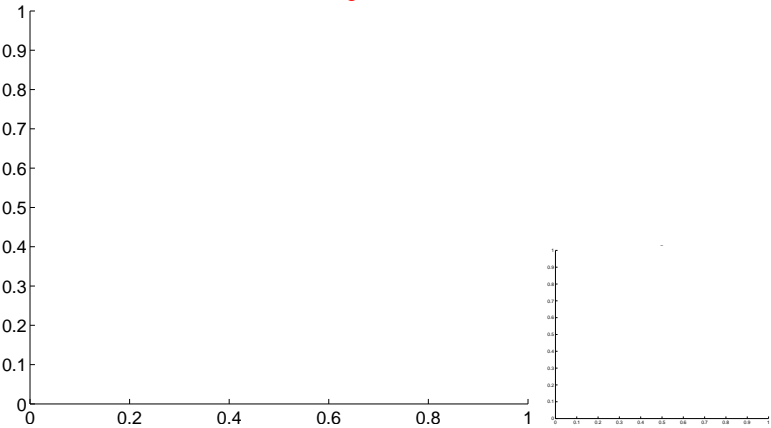


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

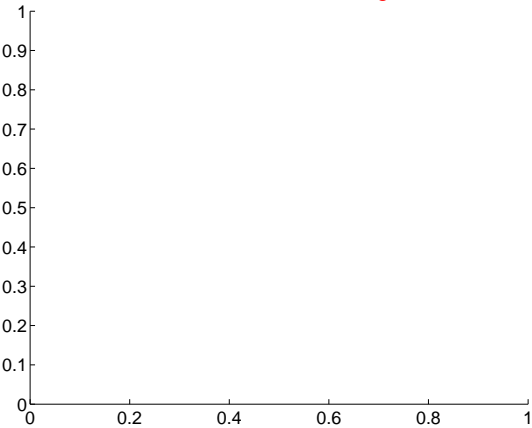
Q9 no difference image



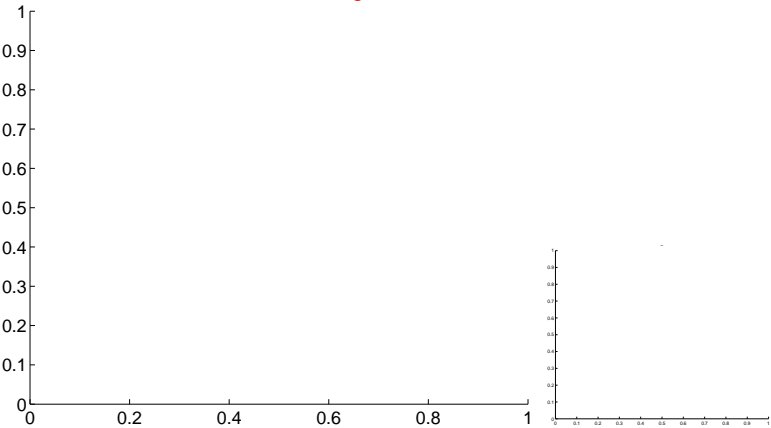
Q9 no OOT image



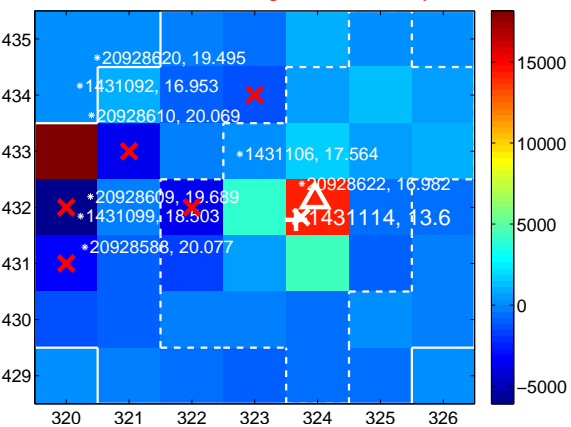
Q10 no difference image



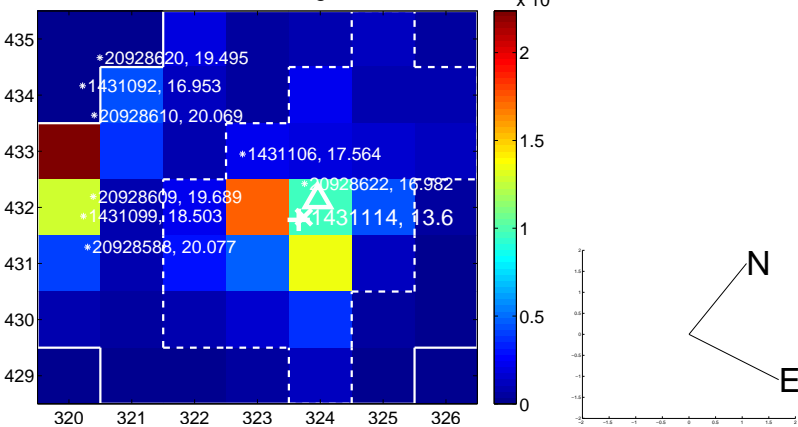
Q10 no OOT image



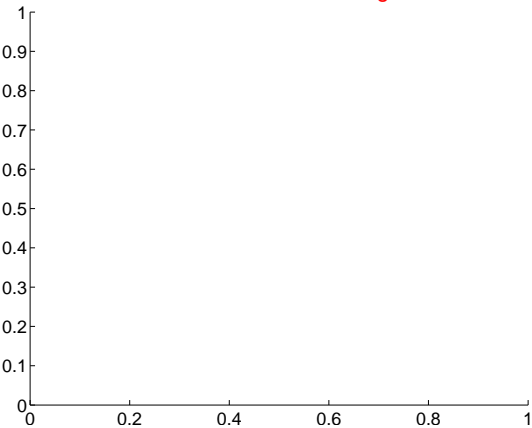
Q11 difference image. Poor Quality



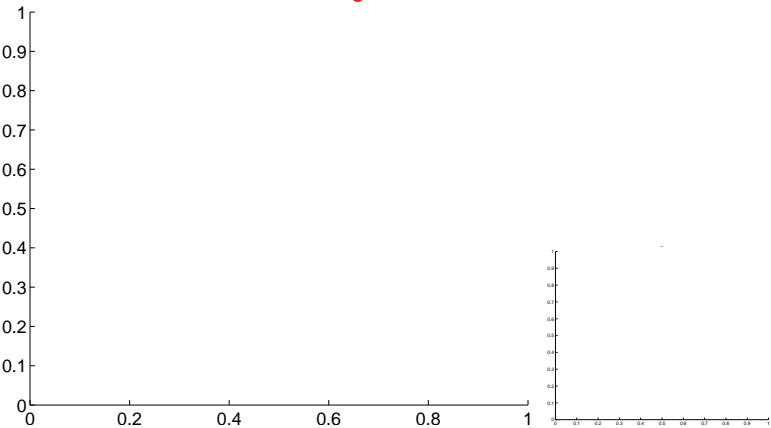
Q11 OOT image



Q12 no difference image

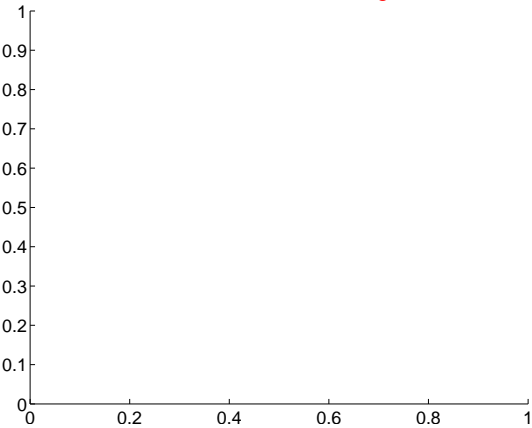


Q12 no OOT image

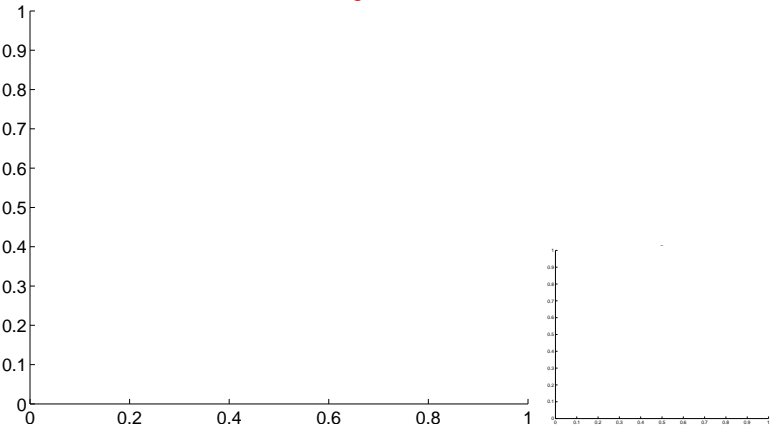


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

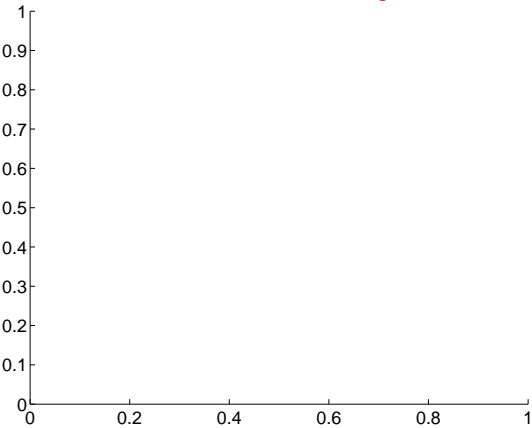
Q13 no difference image



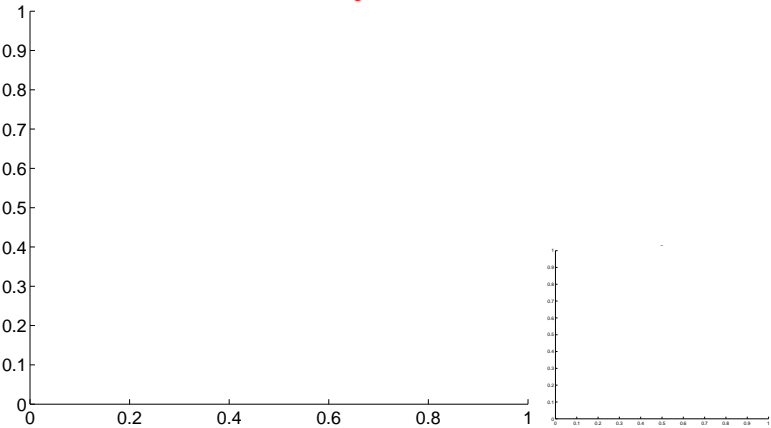
Q13 no OOT image



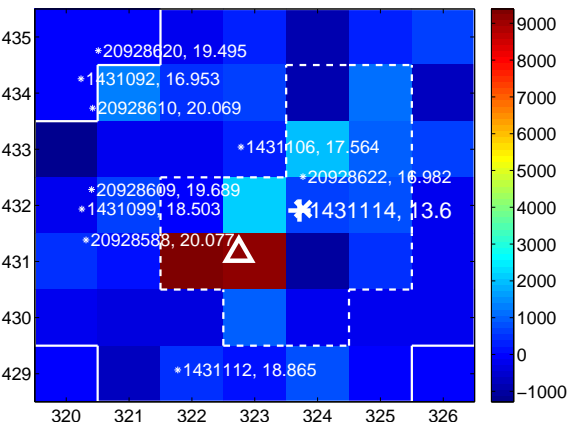
Q14 no difference image



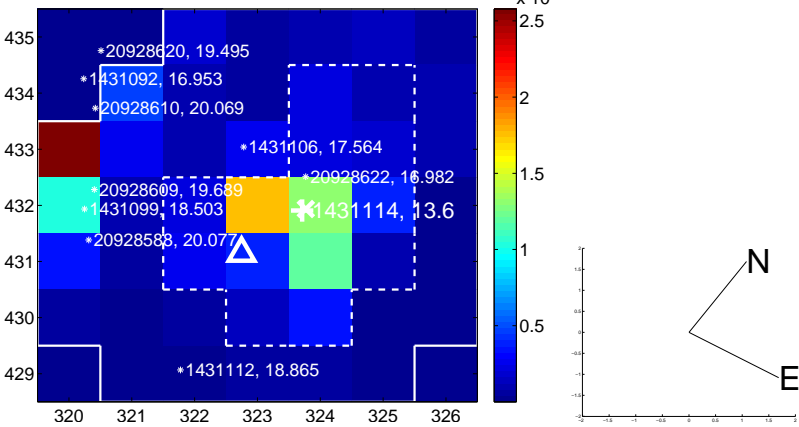
Q14 no OOT image



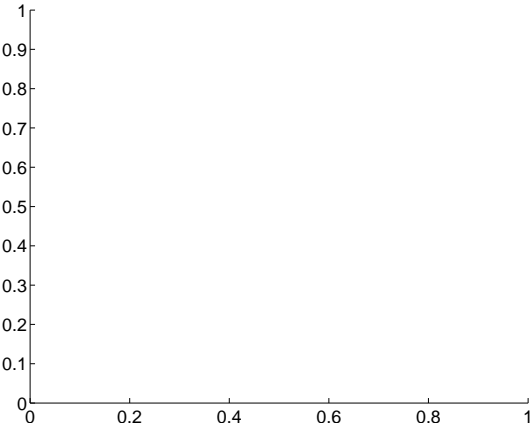
Q15 difference image



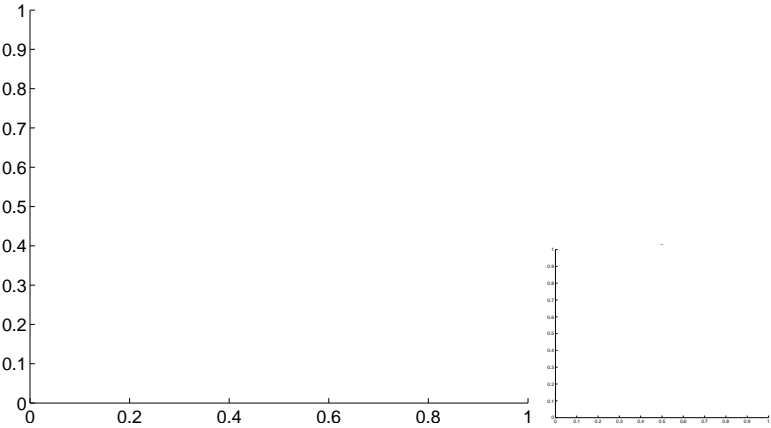
Q15 OOT image



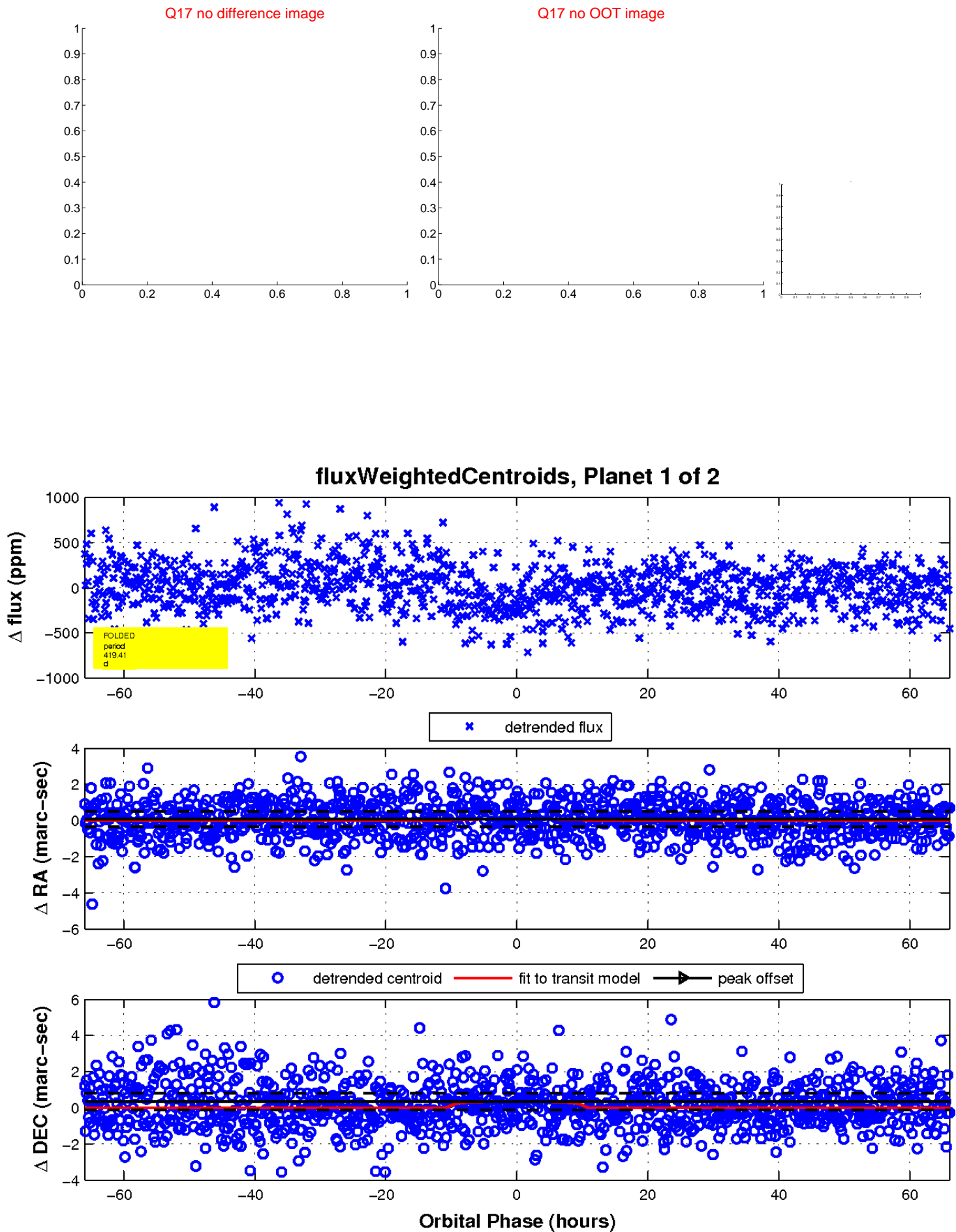
Q16 no difference image



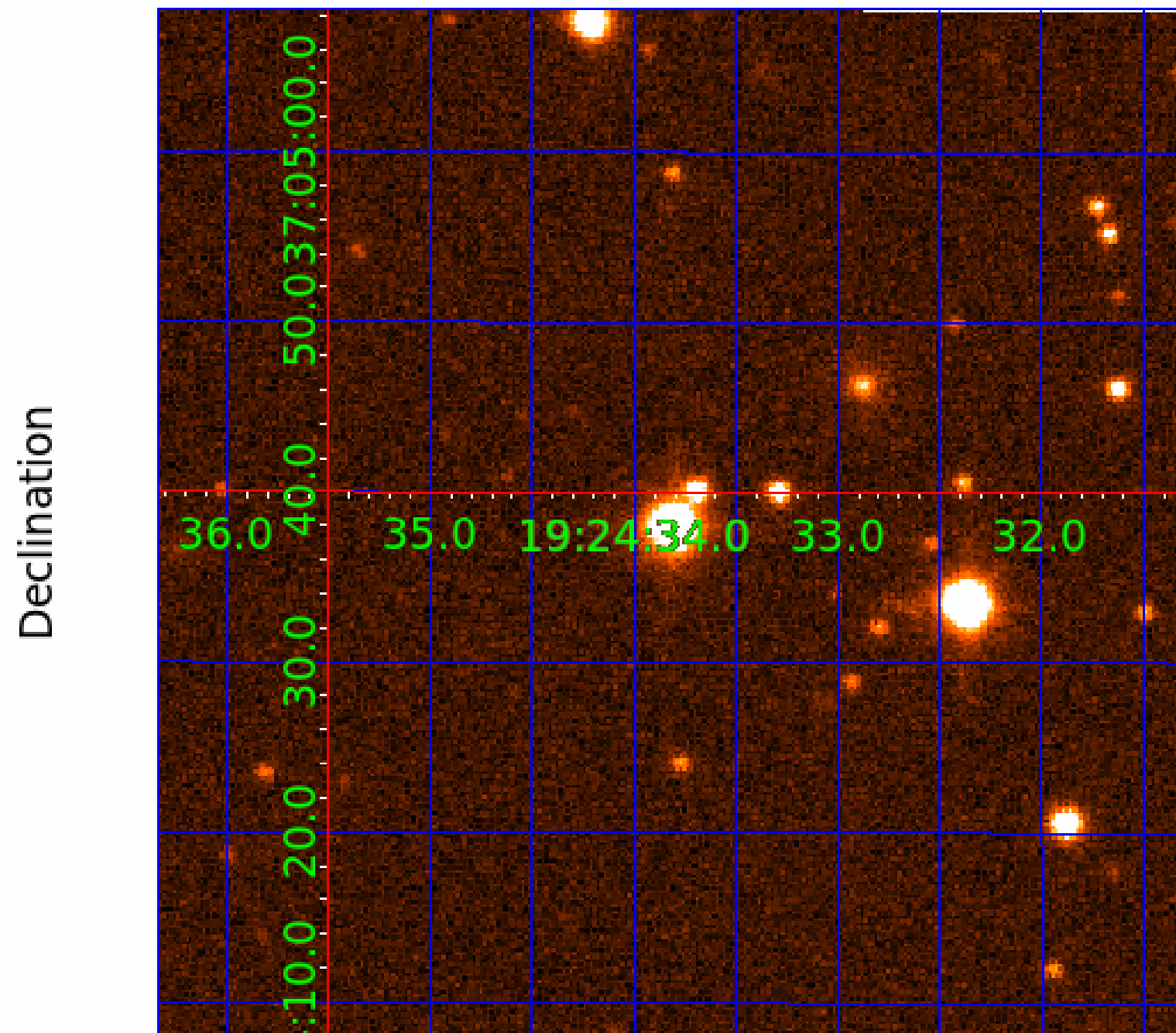
Q16 no OOT image



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



UKIRT Image



# KIC 001431114

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001431114-01	OBS	No	419.411979	205.810635	223.5	22.040	7.5	7.6	0.79	4949	1.44	0.33
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001431114-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
001431114-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

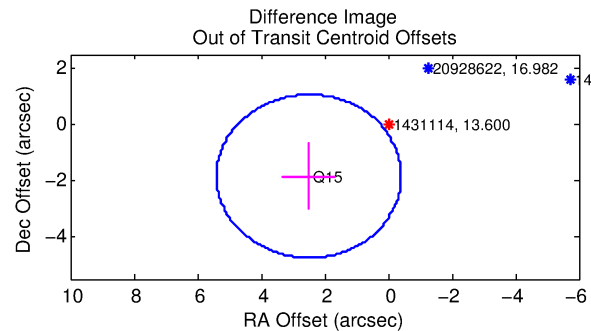
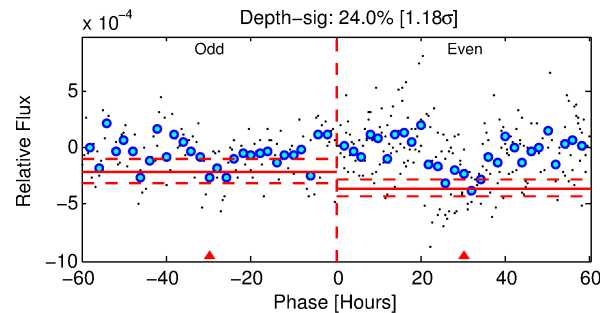
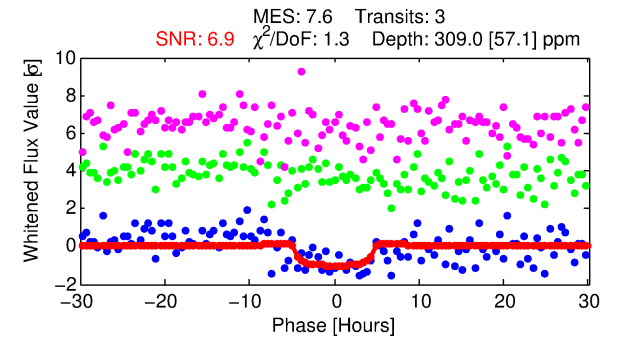
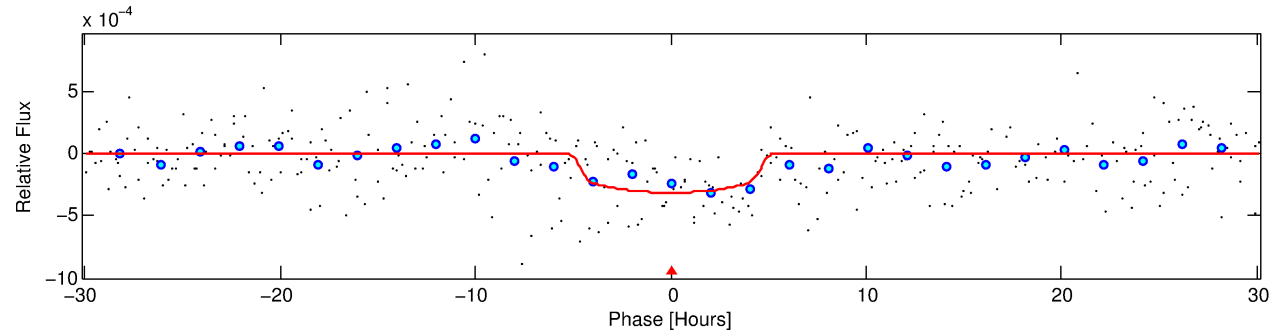
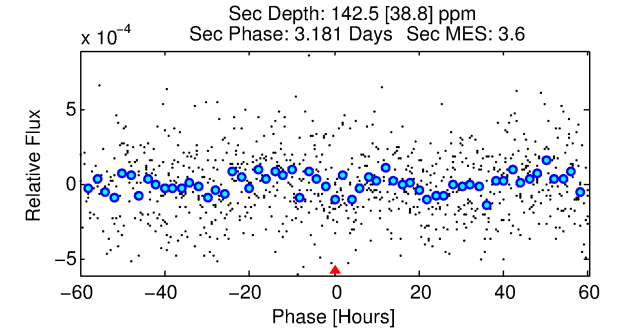
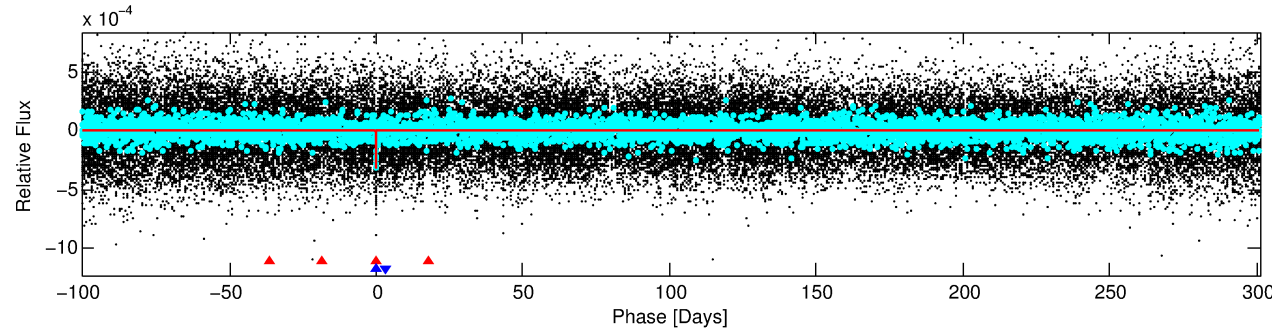
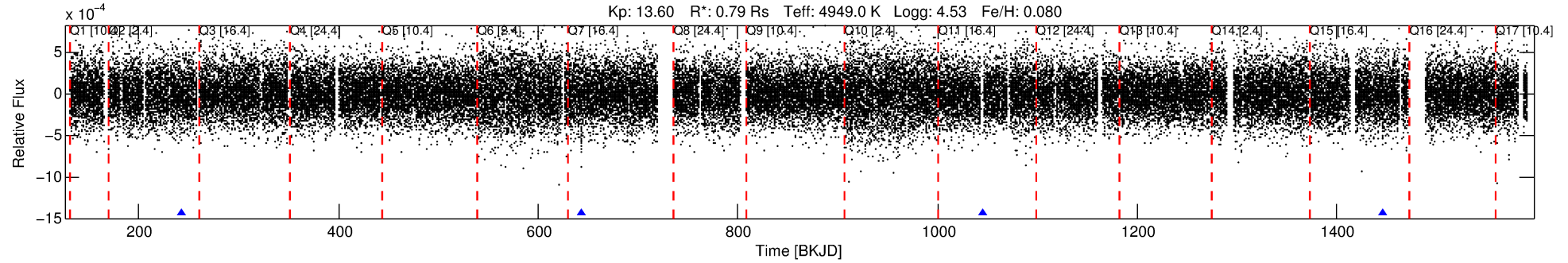
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 001431114-02

No Significant Match Found

# DV One-Page Summary

KIC: 1431114 Candidate: 2 of 2 Period: 401.306 d



## DV Fit Results:

Period = 401.30555 [0.01138] d  
Epoch = 242.1815 [0.0216] BKJD  
Rp/R\* = 0.0188 [0.0083]  
a/R\* = 167.63 [273.71]  
b = 0.86 [0.51]  
Seff = 0.35 [0.06]  
Teq = 196 [8] K  
Rp = 1.63 [0.74] Re  
a = 0.9791 [0.0815] AU  
Ag = 28350.19 [26510.50] [1.07 $\sigma$ ]  
Teffp = 3940 [919] K [4.07 $\sigma$ ]

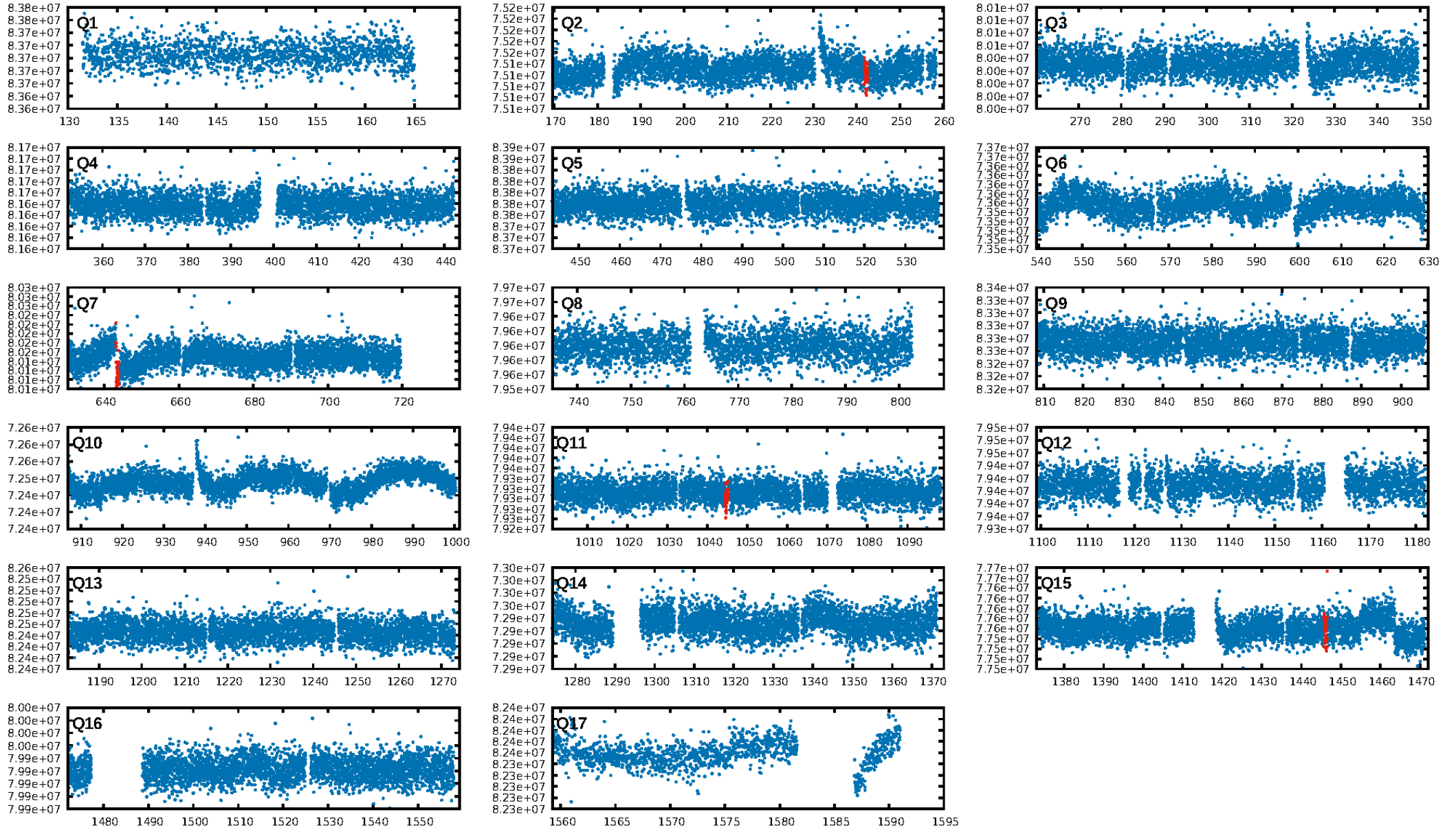
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [17.94 $\sigma$ ]  
ModelChiSquare2-sig: 0.3%  
ModelChiSquareGof-sig: 87.0%  
Bootstrap-pfa: 4.04e-13  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.598  
Centroid-sig: 5.7%  
Centroid-so: 2.883 arcsec [1.65 $\sigma$ ]  
OotOffset-rm: 3.102 arcsec [3.20 $\sigma$ ]  
KicOffset-rm: 3.146 arcsec [3.16 $\sigma$ ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 0.67 [2/3]

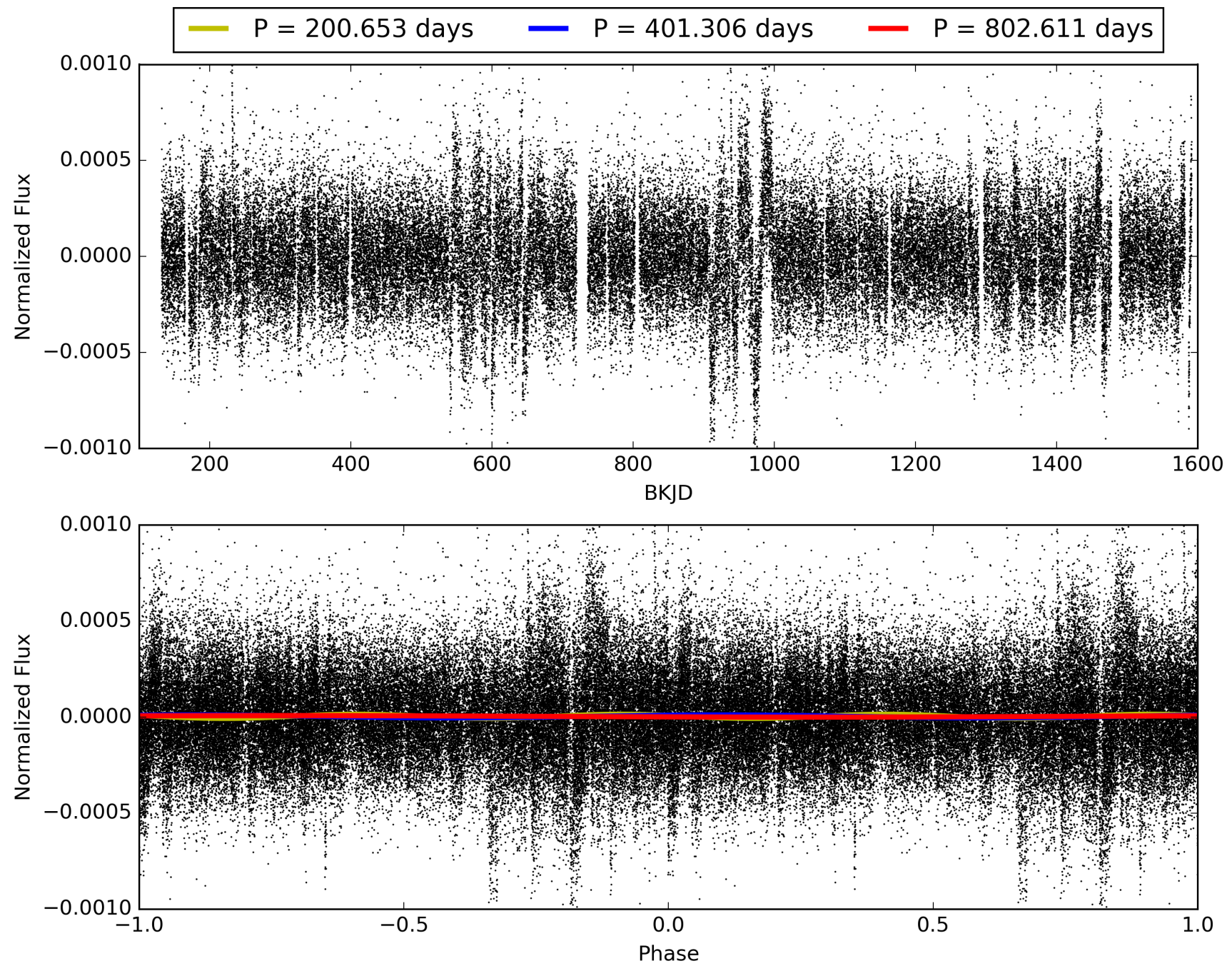
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:48:40 Z

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

# TCE 001431114-02, PDC Light Curves

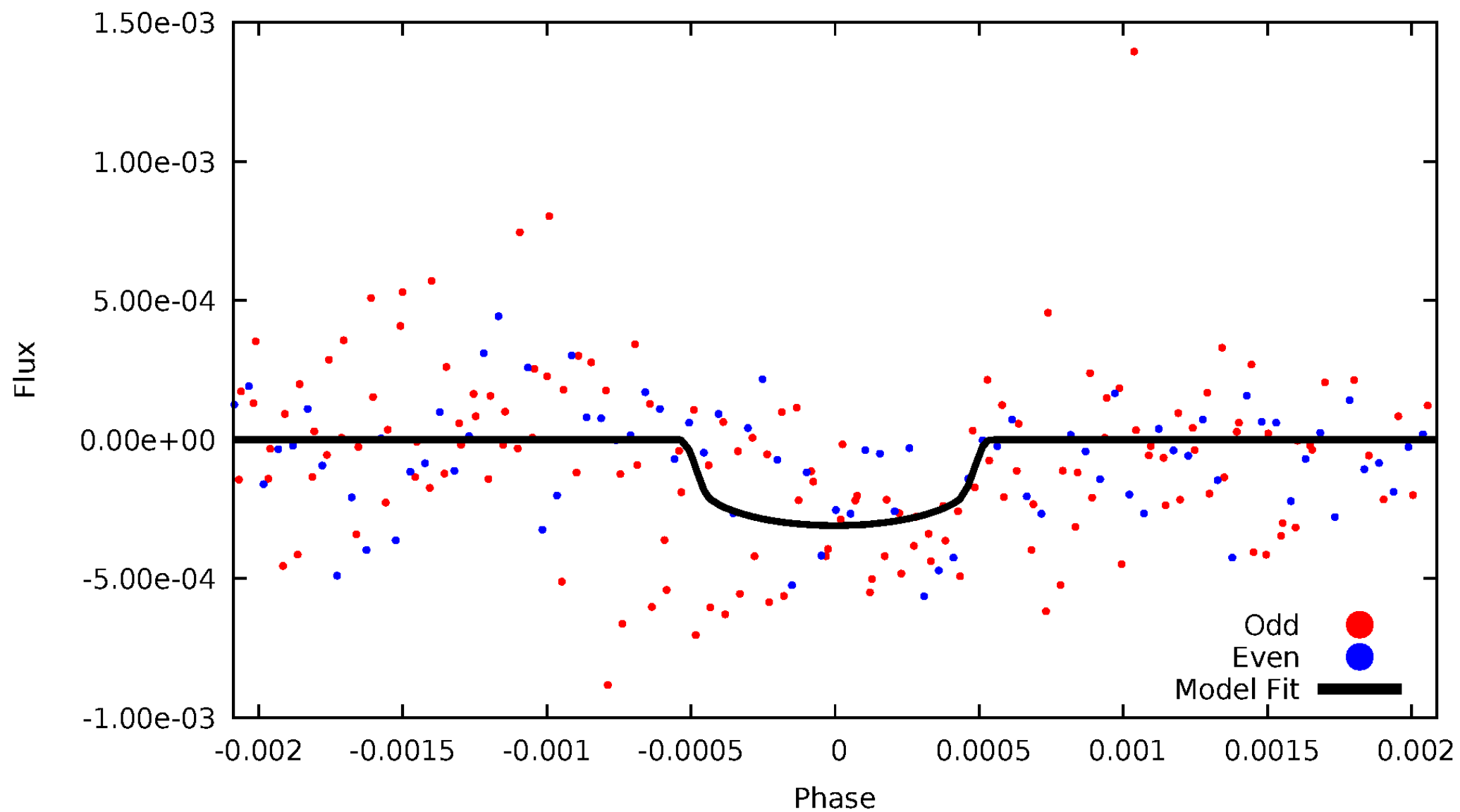


TCE 001431114-02



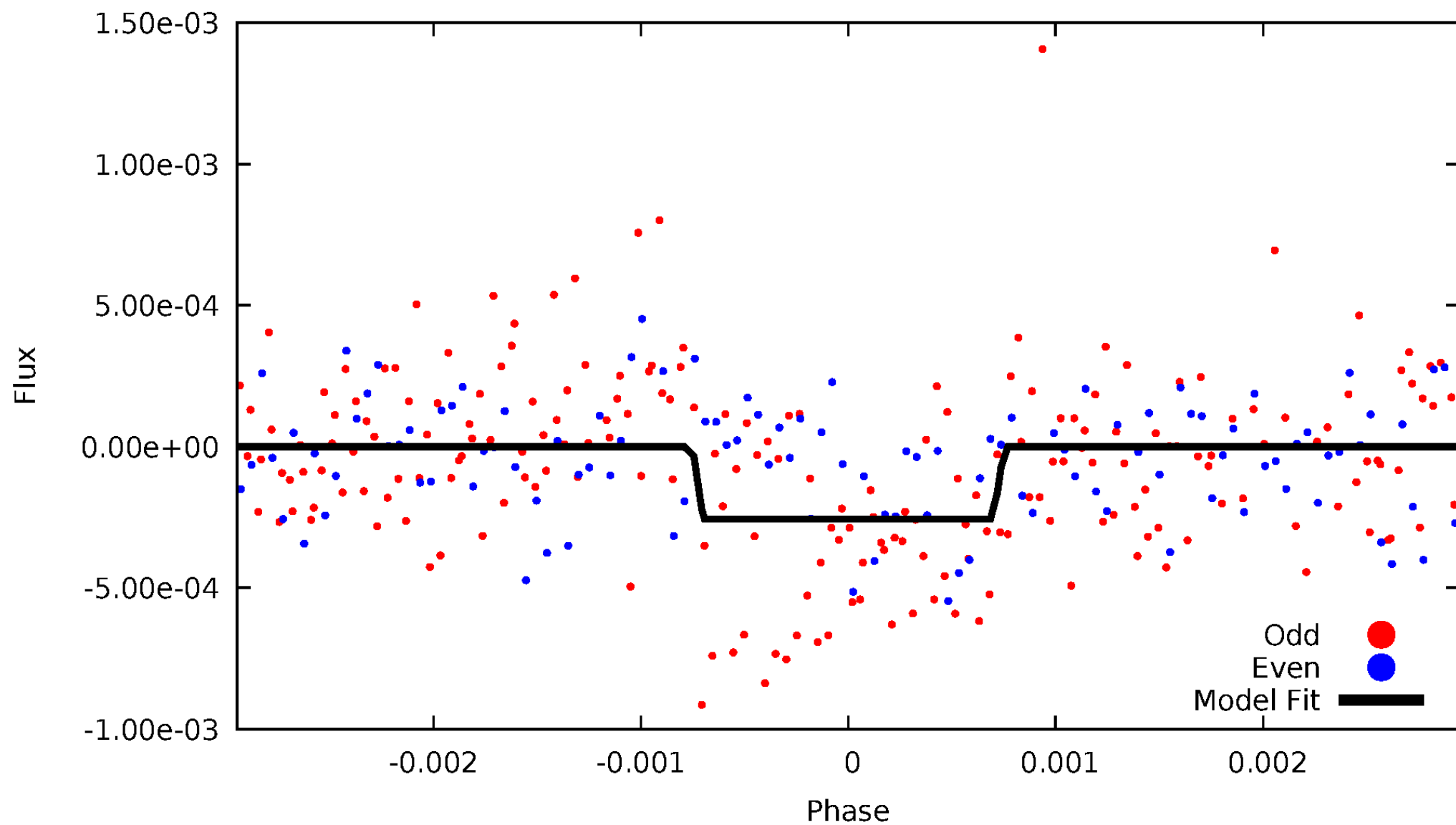
# DV Odd/Even

TCE 001431114-02



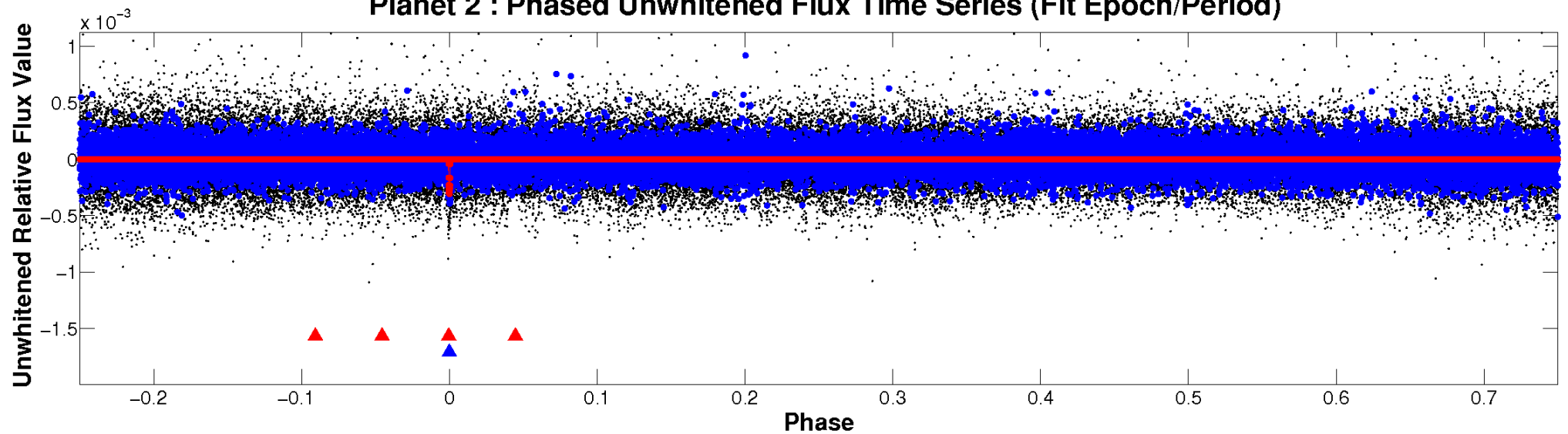
# ALT Odd/Even

TCE 001431114-02

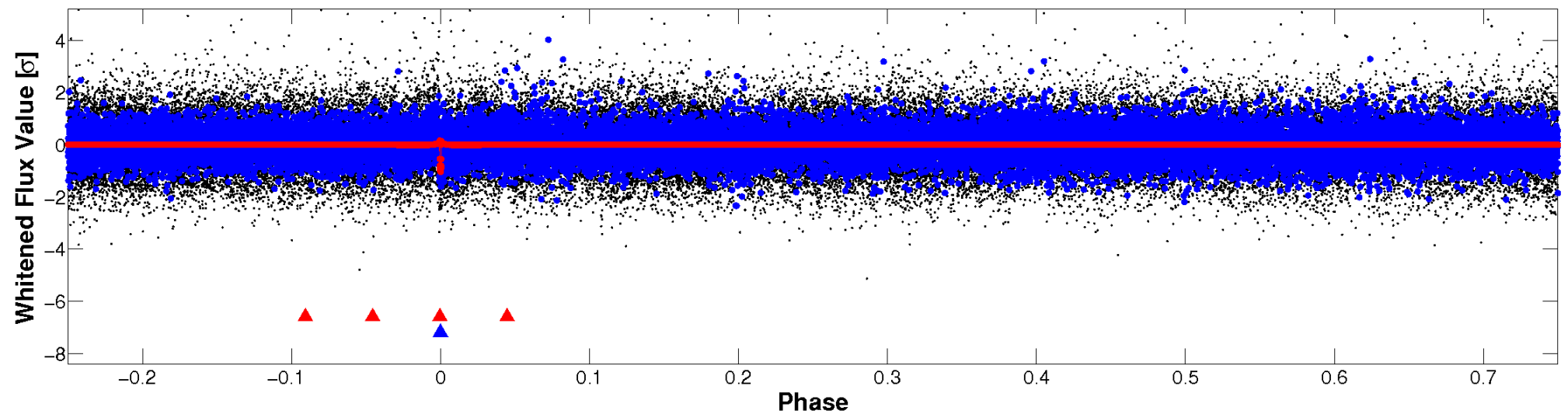


# Non-Whitened Vs. Whitened Light Curve

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

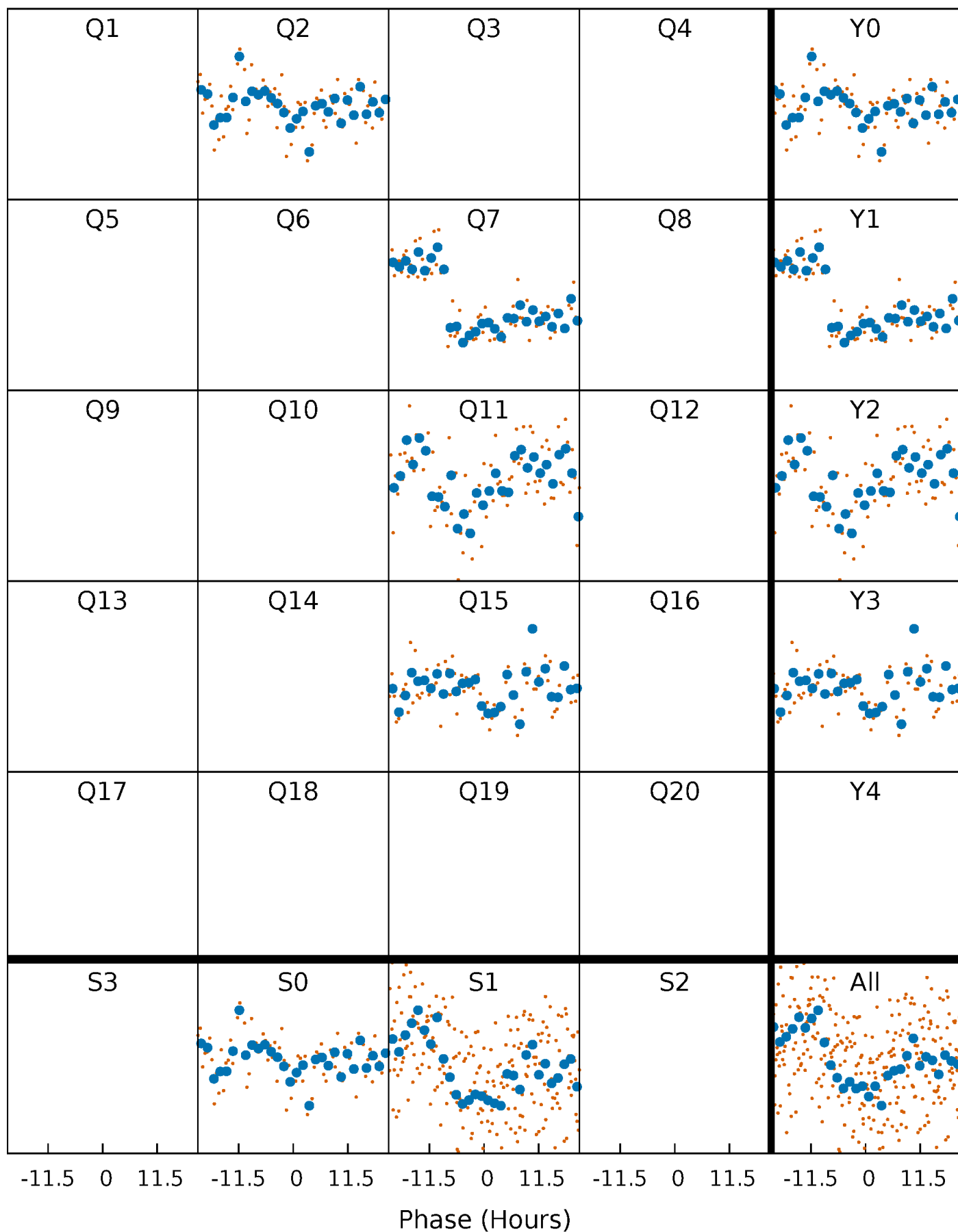


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 001431114-02 P=401.305551 Days  $T_0=242.181528$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 001431114-02 P=401.305551 Days  $T_0=242.181528$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

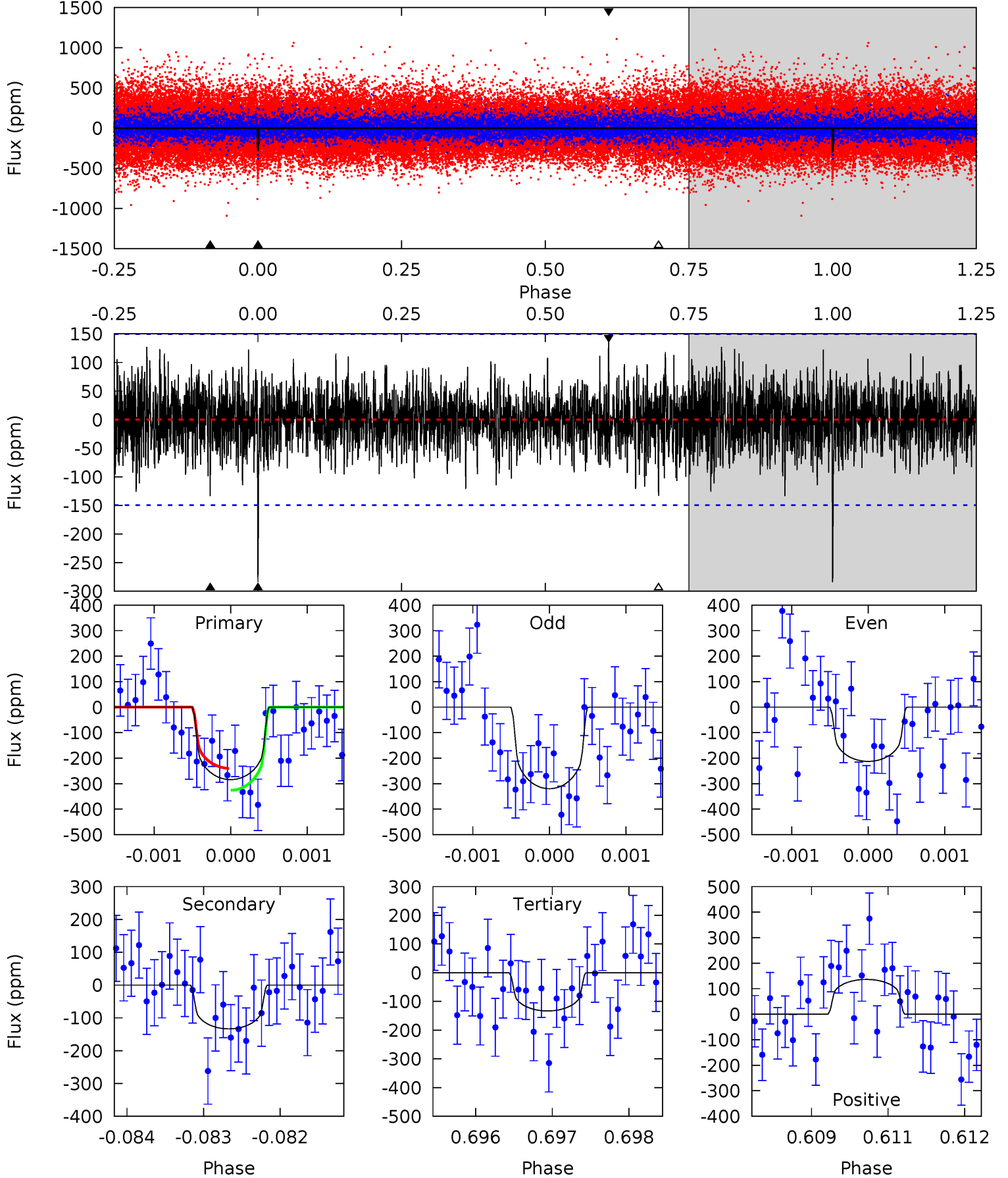
TCE 001431114-02 P=401.342363 Days  $T_0=242.111986$  (BKJD)



# DV Model-Shift Uniqueness Test

001431114-02, P = 401.305551 Days, E = 242.181528 Days

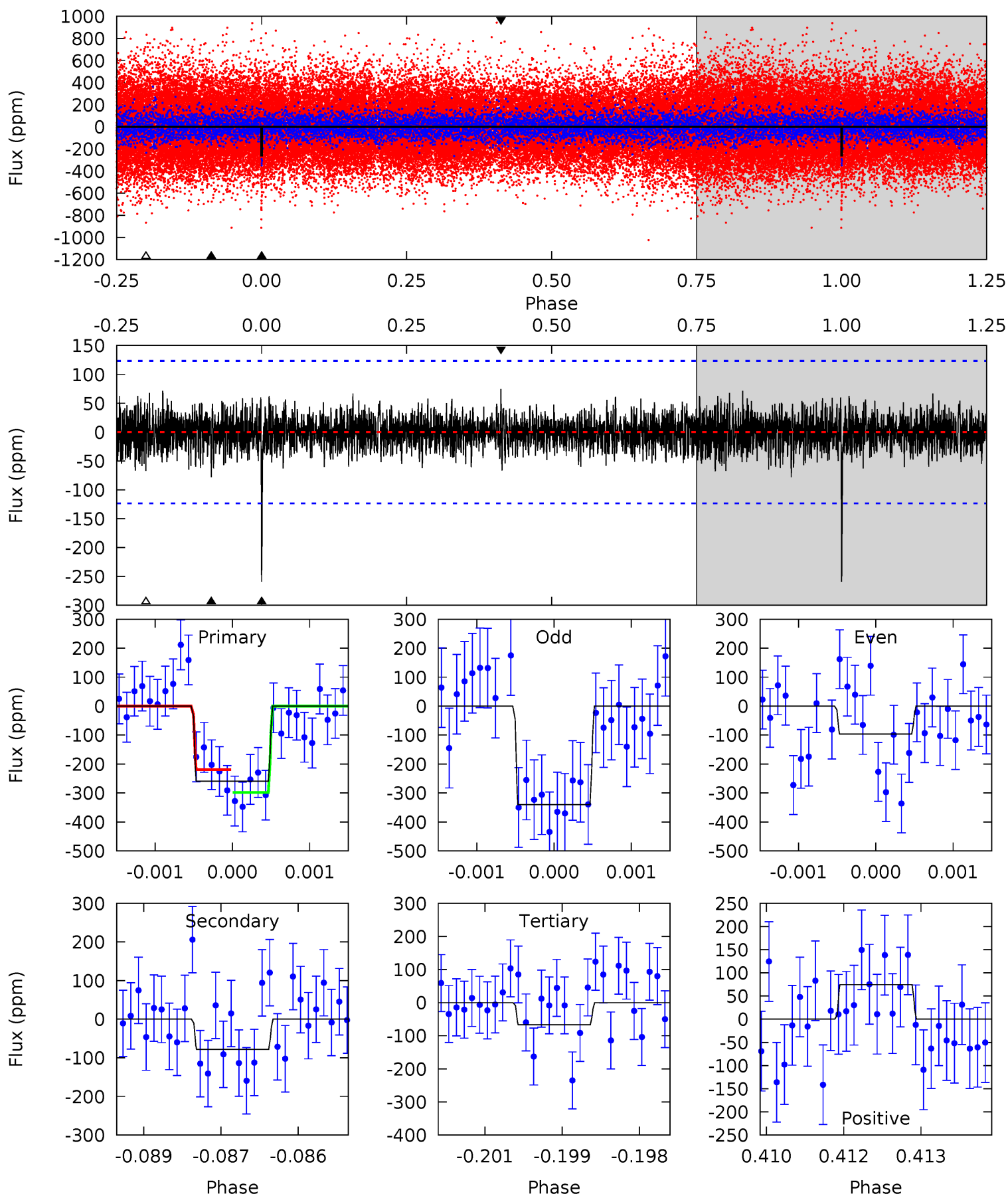
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	4.86	4.84	4.96	5.44	3.27	1.35	5.49	5.37	0.02	-0.10	1.84	1.34	0.32	1.56



# Alt Model-Shift Uniqueness Test

001431114-02, P = 401.342363 Days, E = 242.111986 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
11.3	3.40	2.91	3.25	5.38	3.18	0.91	8.38	8.05	0.49	0.16	4.99	1.49	0.22	1.71



### Stellar Parameters For KIC 001431114

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4949^{+133}_{-133}$	$4.531^{+0.072}_{-0.042}$	$0.080^{+0.250}_{-0.300}$	$0.792^{+0.059}_{-0.074}$	$0.777^{+0.073}_{-0.061}$	$2.199^{+0.626}_{-0.339}$
	+3%/-3%	+2%/-1%	+312%/-375%	+7%/-9%	+9%/-8%	+28%/-15%
Source	PHO1	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 001431114-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-134 \pm 27$	$1.62^{+0.68}_{-0.63}$	$274^{+9}_{-9}$	$4113^{+842}_{-528}$	$26893^{+44290}_{-14489}$
Alt.	$-78 \pm 23$	$1.38^{+0.70}_{-0.65}$	$274^{+9}_{-9}$	$3922^{+1079}_{-550}$	$21245^{+54592}_{-12831}$

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

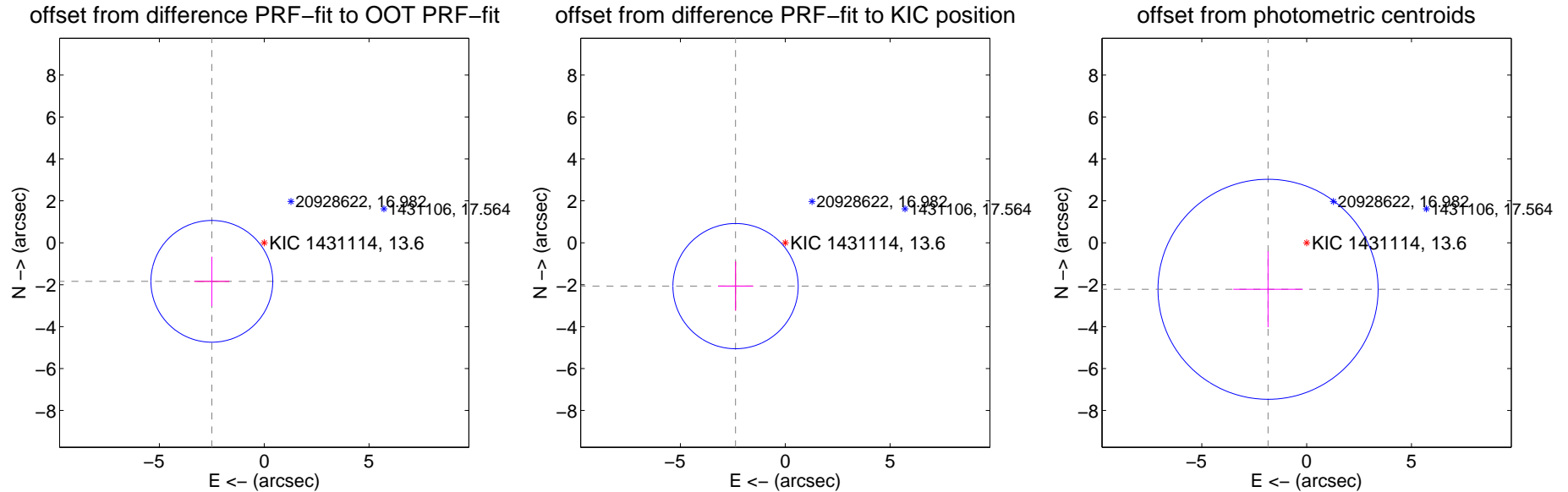
## DV Centroid Data

Supplemental centroid analysis for 001431114-02. Kepler magnitude: 13.60. Transit SNR 6.87

There are 0 quarters with good PRF difference image offsets

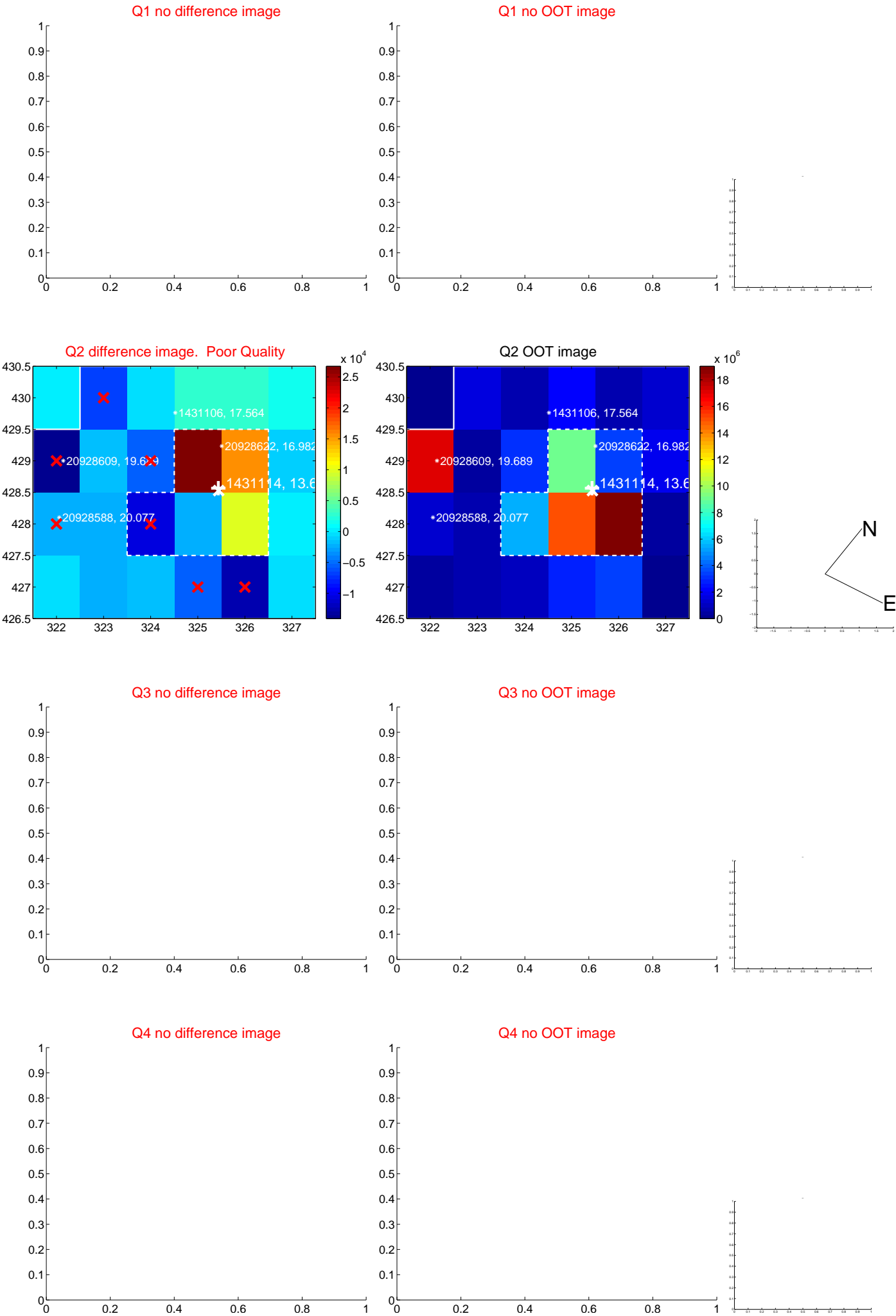
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.102 \pm 0.968$	3.20	$2.497 \pm 0.837$	$-1.840 \pm 1.172$
PRF-fit source offset from KIC position	$3.146 \pm 0.996$	3.16	$2.371 \pm 0.837$	$-2.068 \pm 1.172$
photometric centroid source offset	$2.88 \pm 1.75$	1.65	$1.84 \pm 1.66$	$-2.22 \pm 1.81$

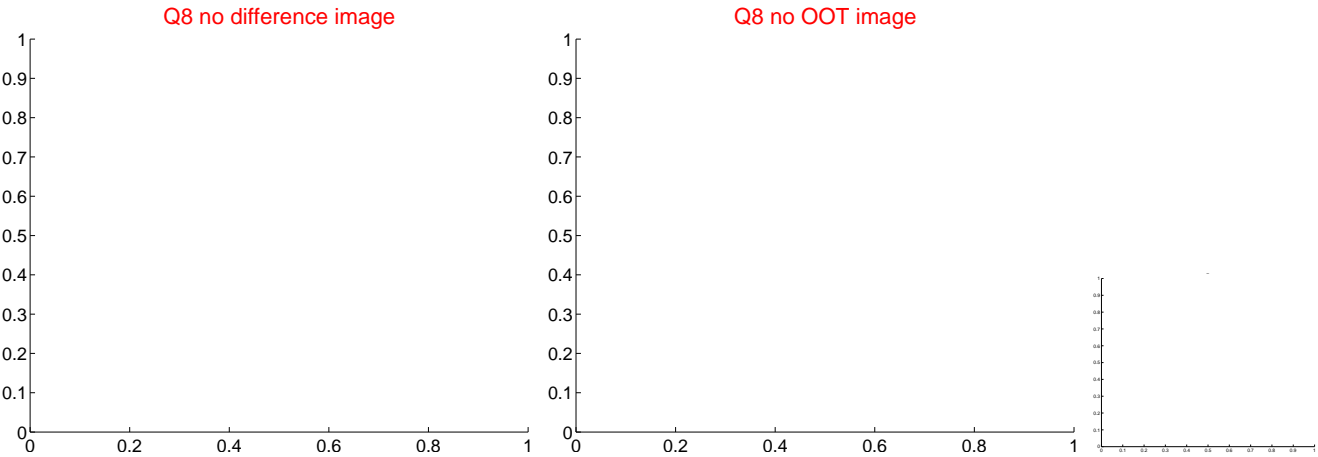
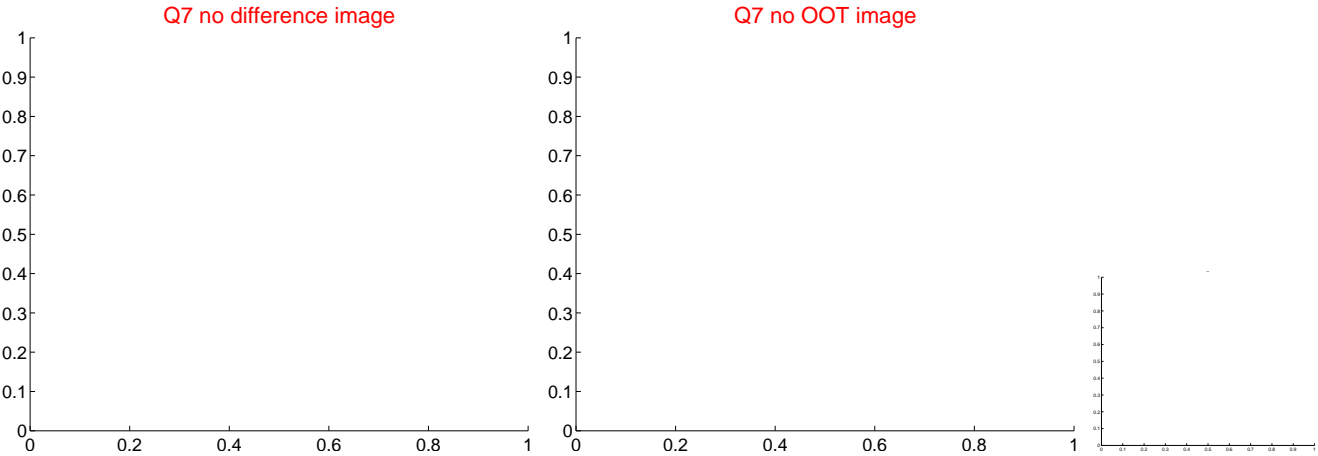
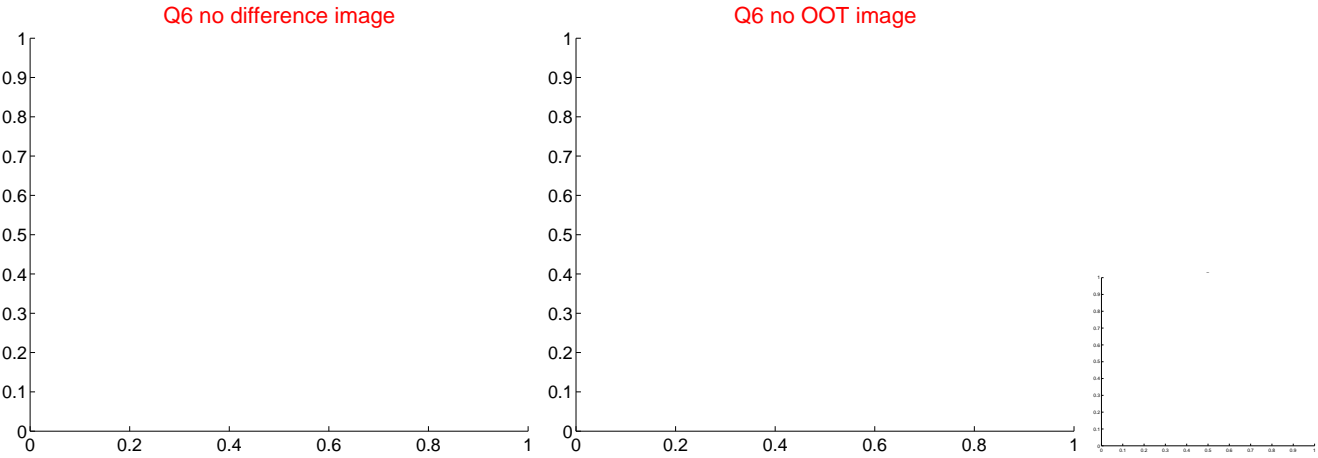
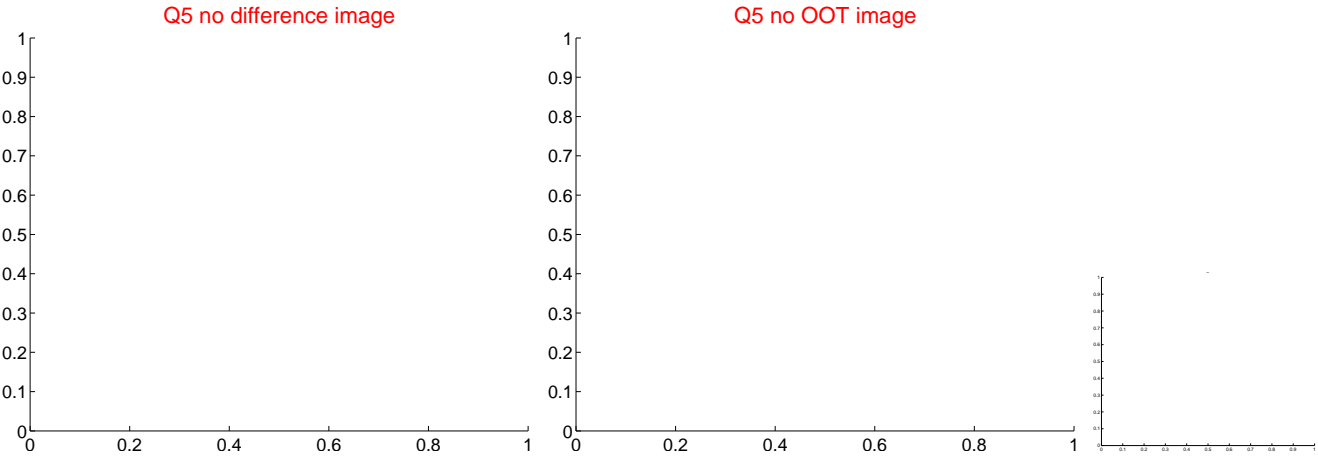


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

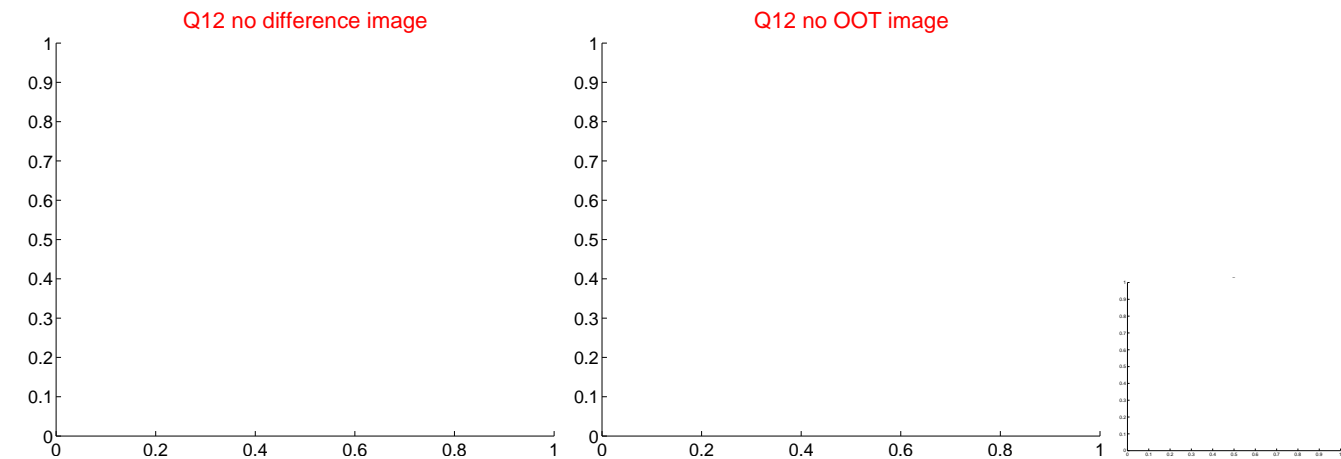
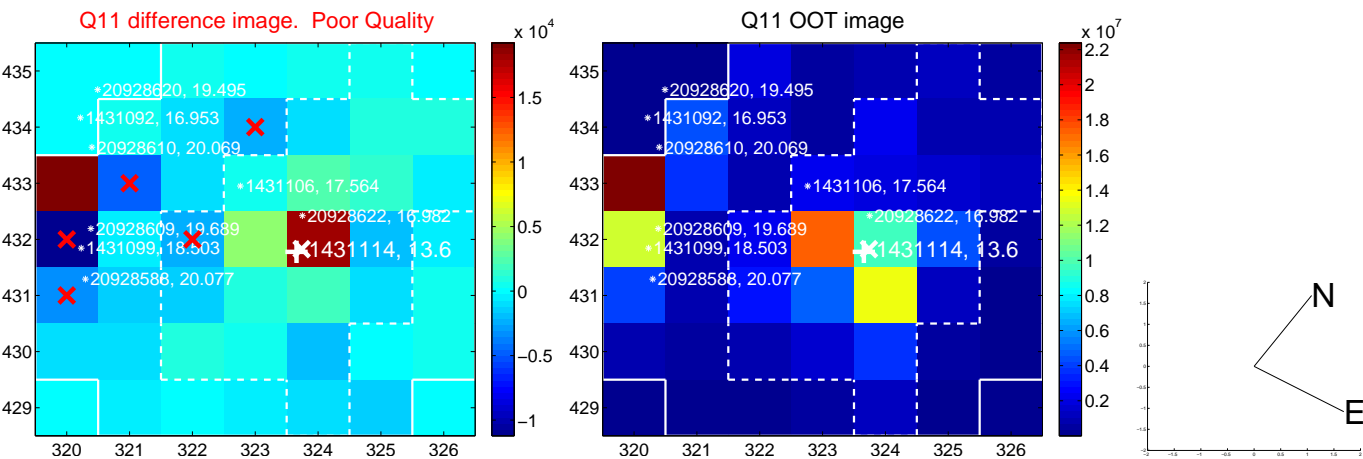
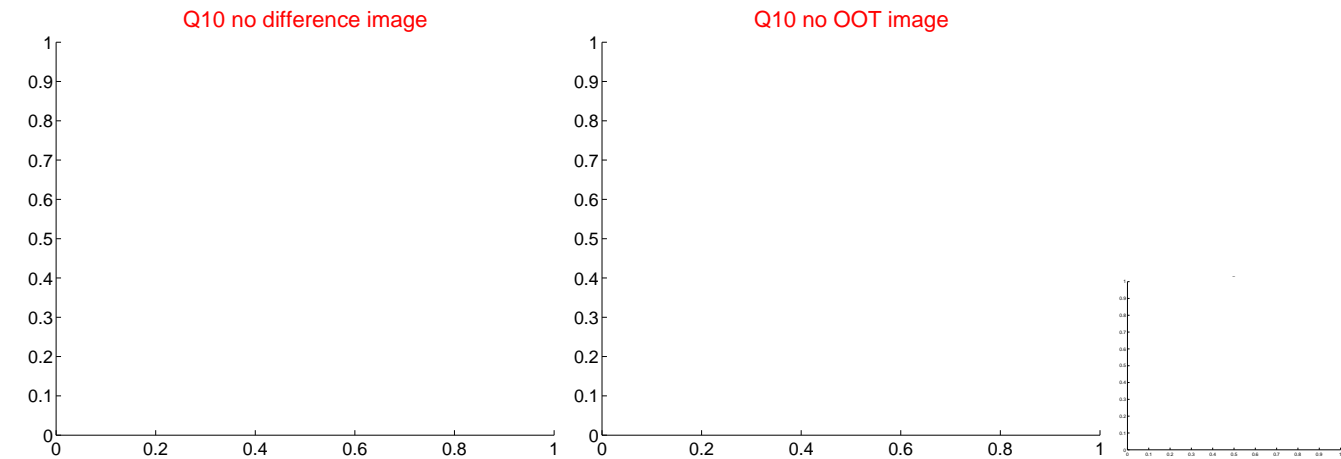
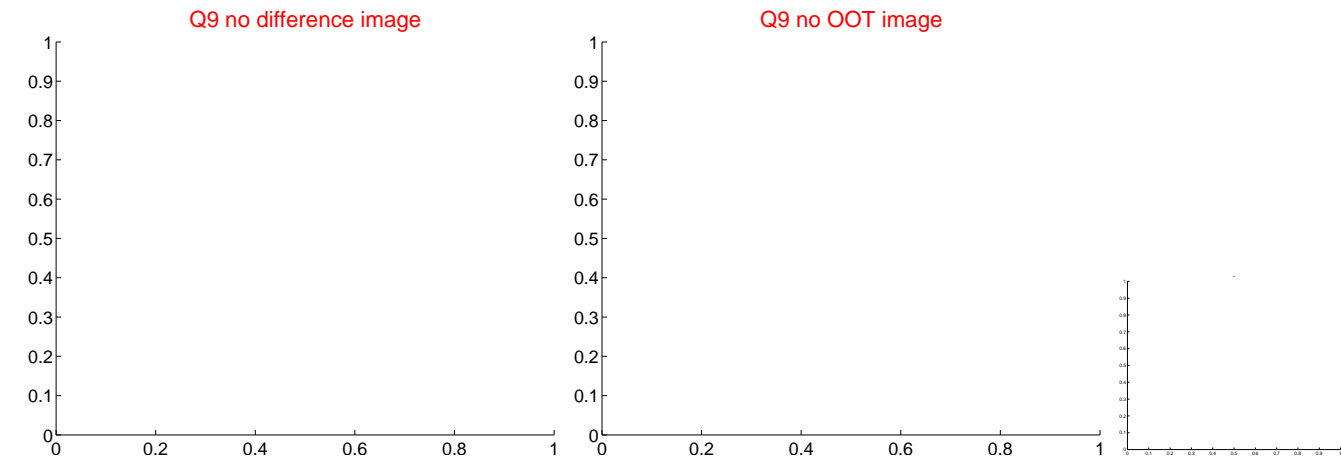
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

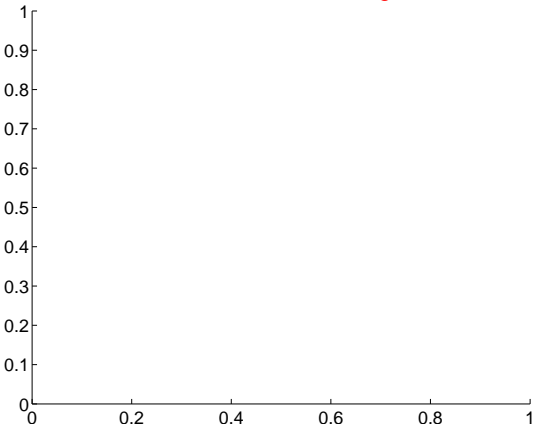


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

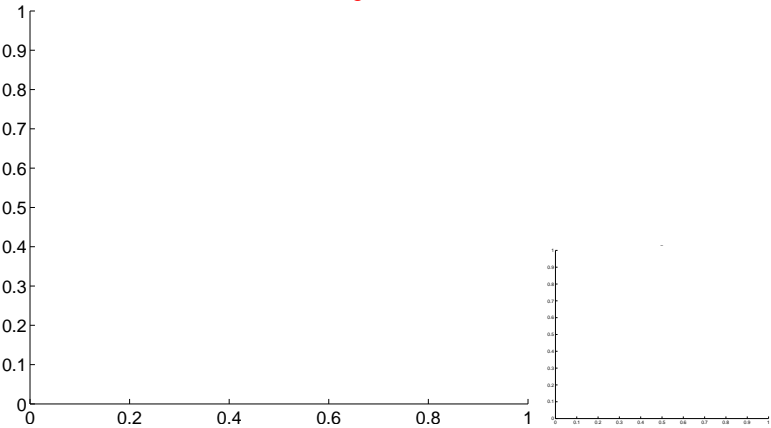


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

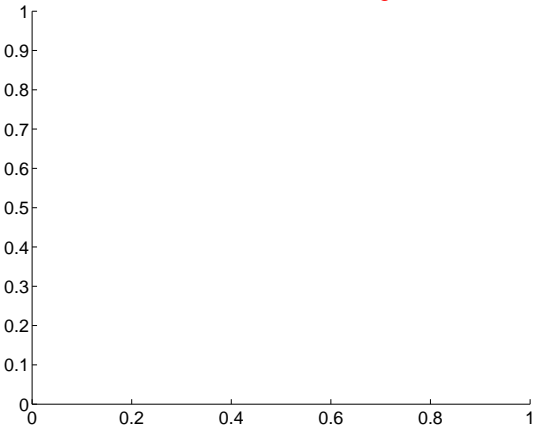
Q13 no difference image



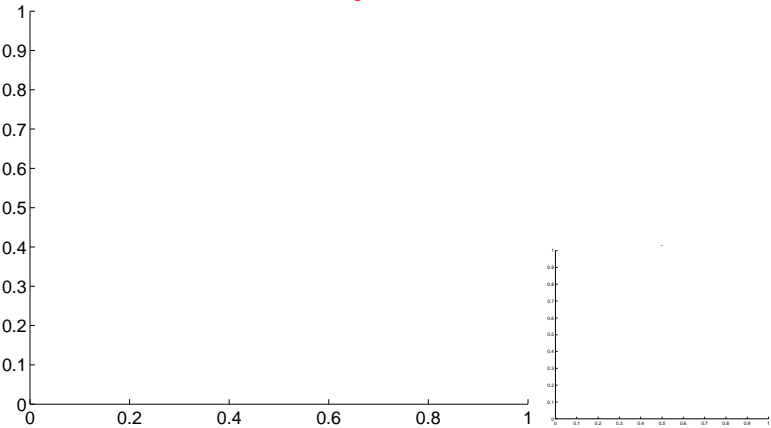
Q13 no OOT image



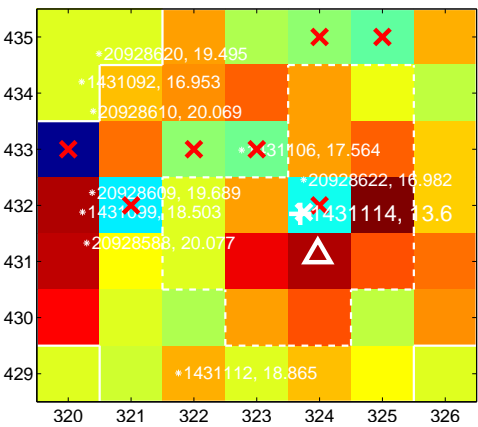
Q14 no difference image



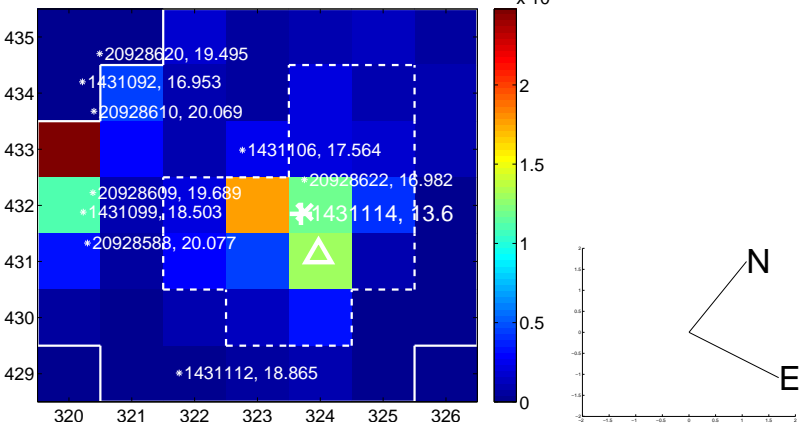
Q14 no OOT image



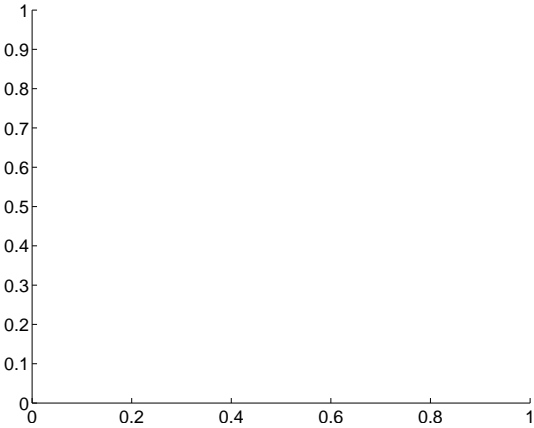
Q15 difference image. Poor Quality



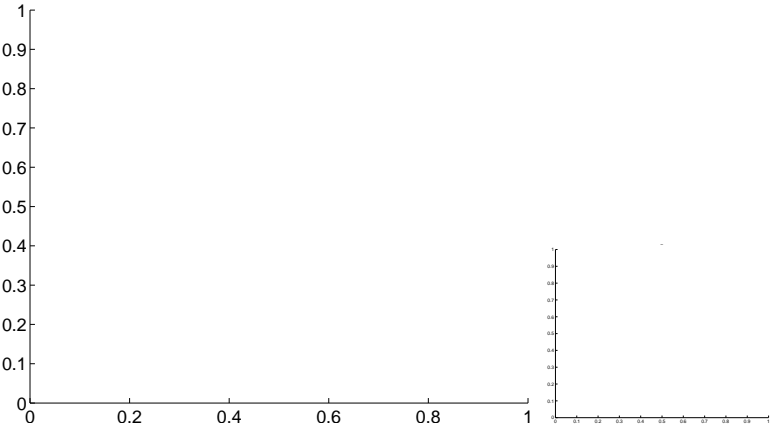
Q15 OOT image



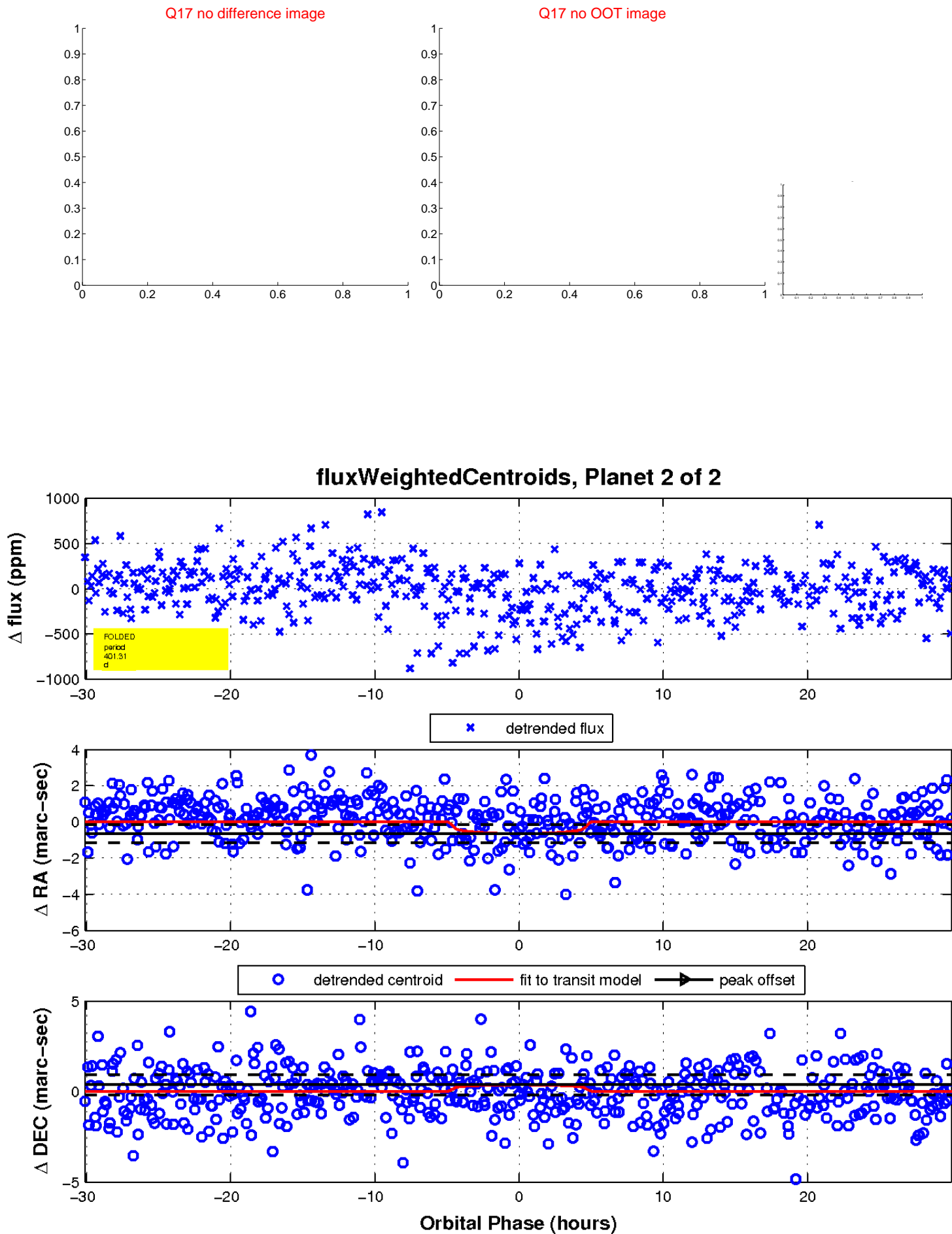
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

