

# KIC 010724429

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010724429-01	OBS	No	0.745021	131.895033	8.6	4.198	8.2	2.9	1.02	6191	0.32	5045.01
010724429-02	OBS	No	46.138868	171.424038	482.2	1.168	7.8	7.6	1.02	6191	2.72	20.59

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010724429-01	OBS	FP	0.00	1	0	1	1	LPP_DV—HALO_GHOST—EPHEM_MATCH
010724429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

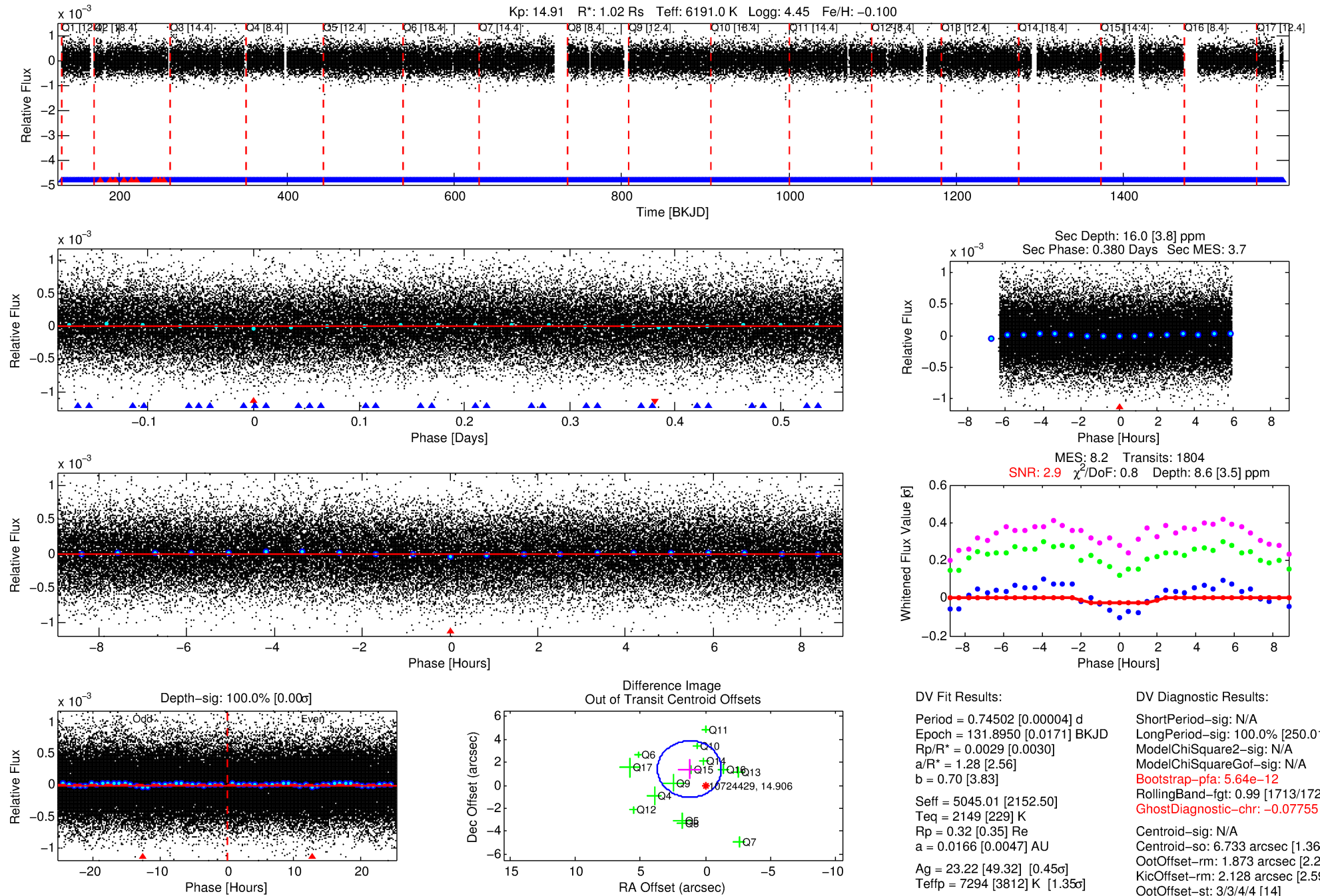
## Ephemeris Match Information For 010724429-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
010724429-01	10724429	010724379-01	10724379	1:1	69.7	16	-6	15.36	14.91	2.00	Direct-PRF	1	1.41	2.02

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

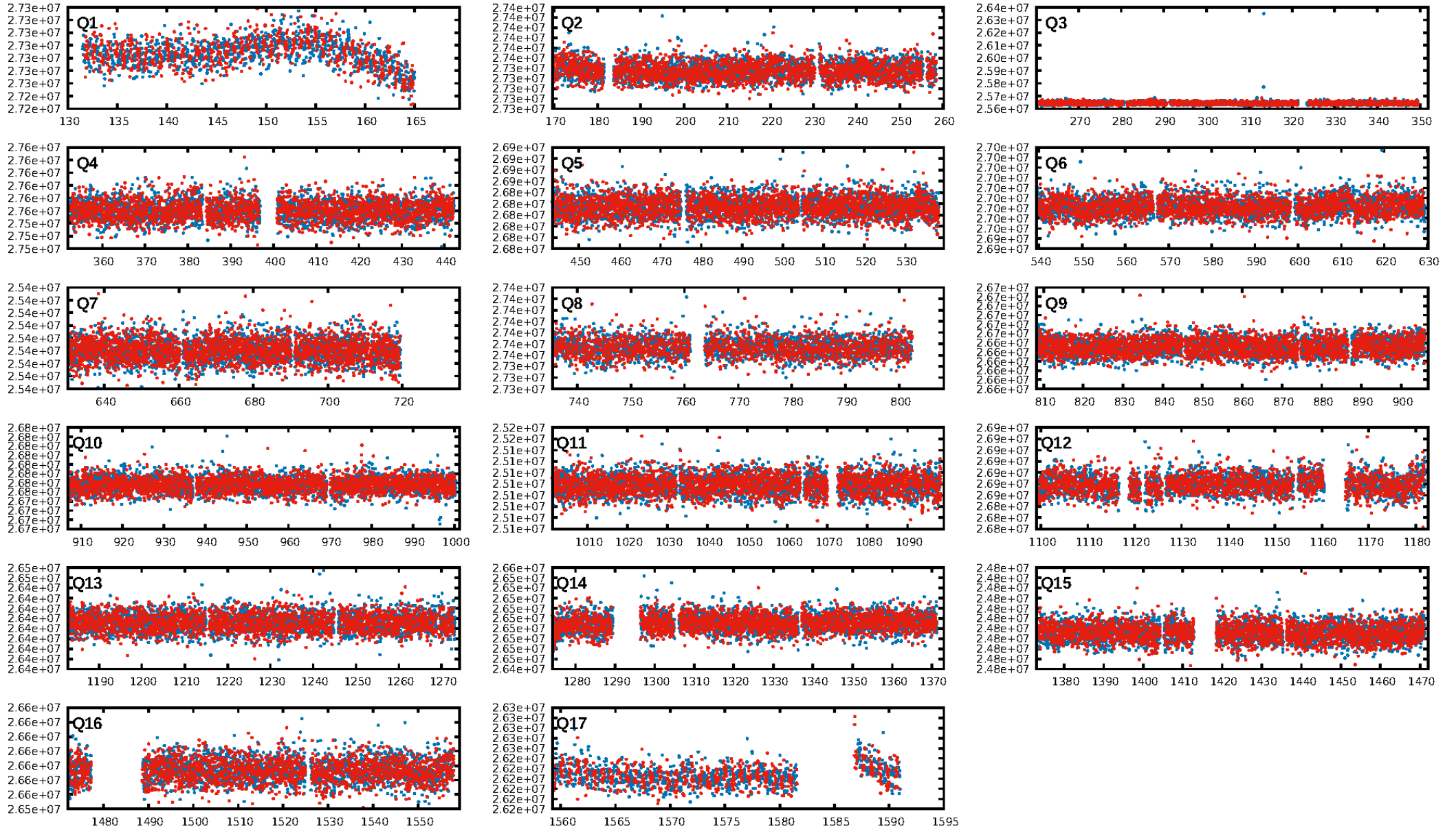
KIC: 10724429 Candidate: 1 of 2 Period: 0.745 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:09:22 Z

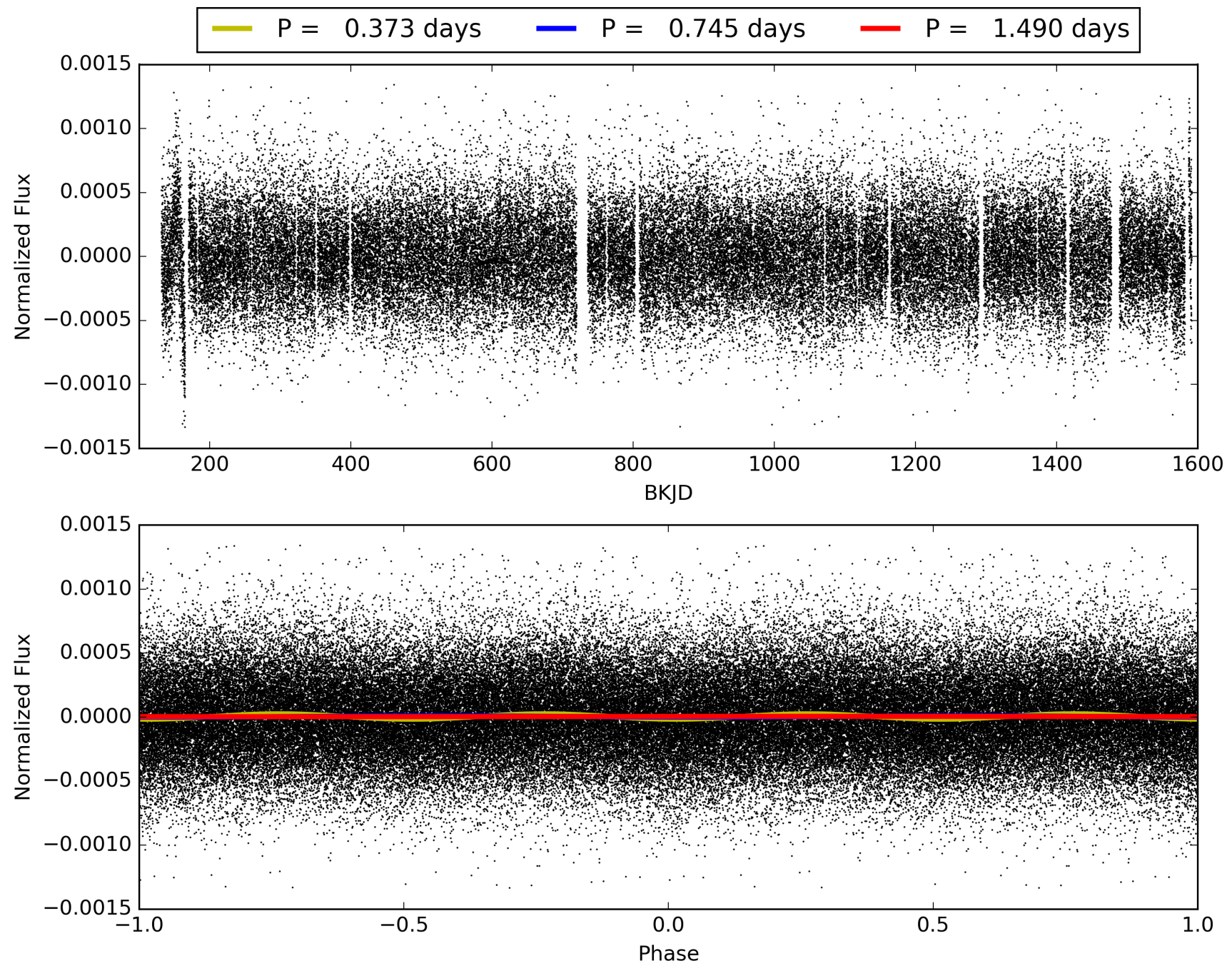
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010724429-01, PDC Light Curves



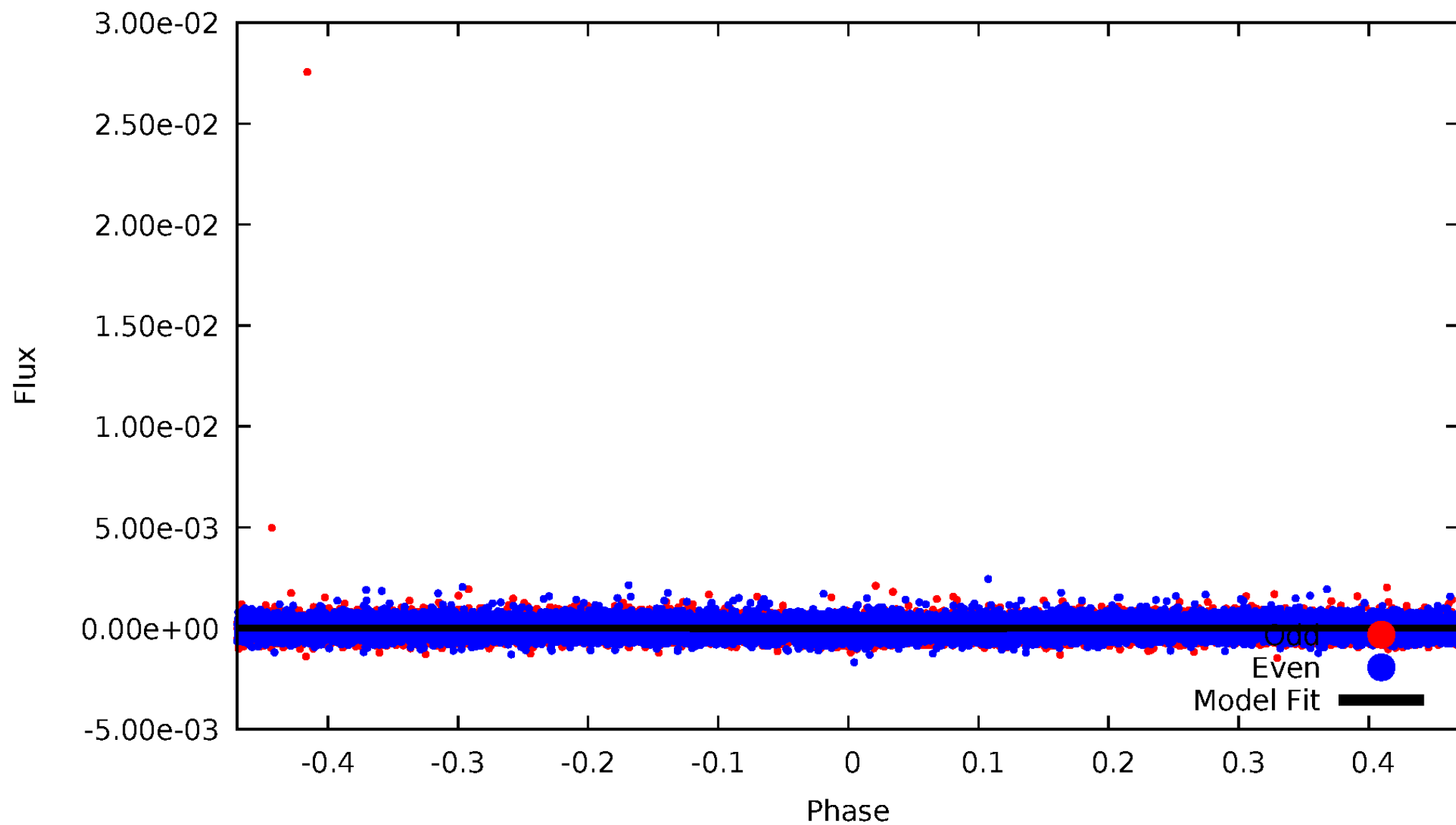


TCE 010724429-01



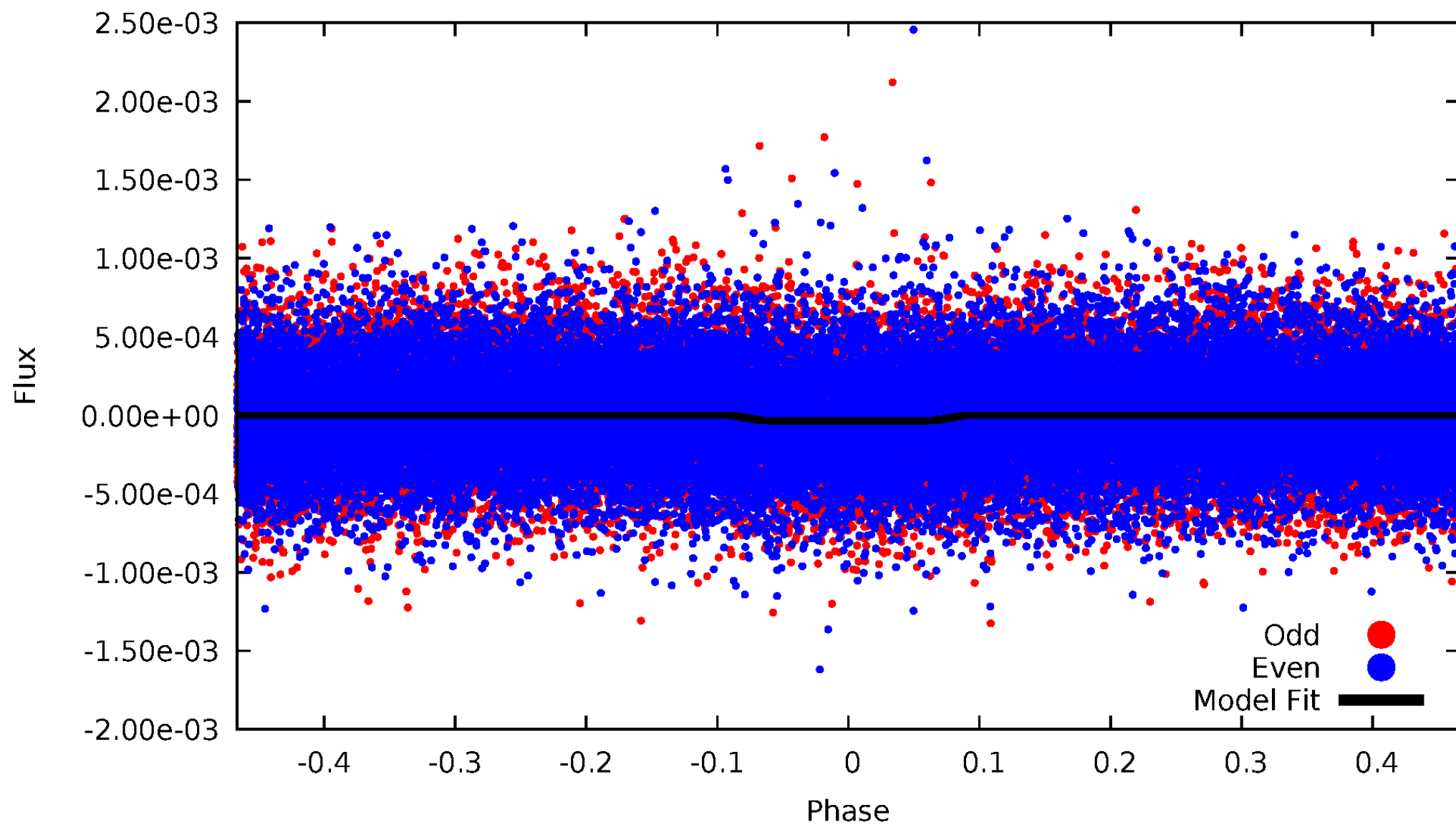
# DV Odd/Even

TCE 010724429-01



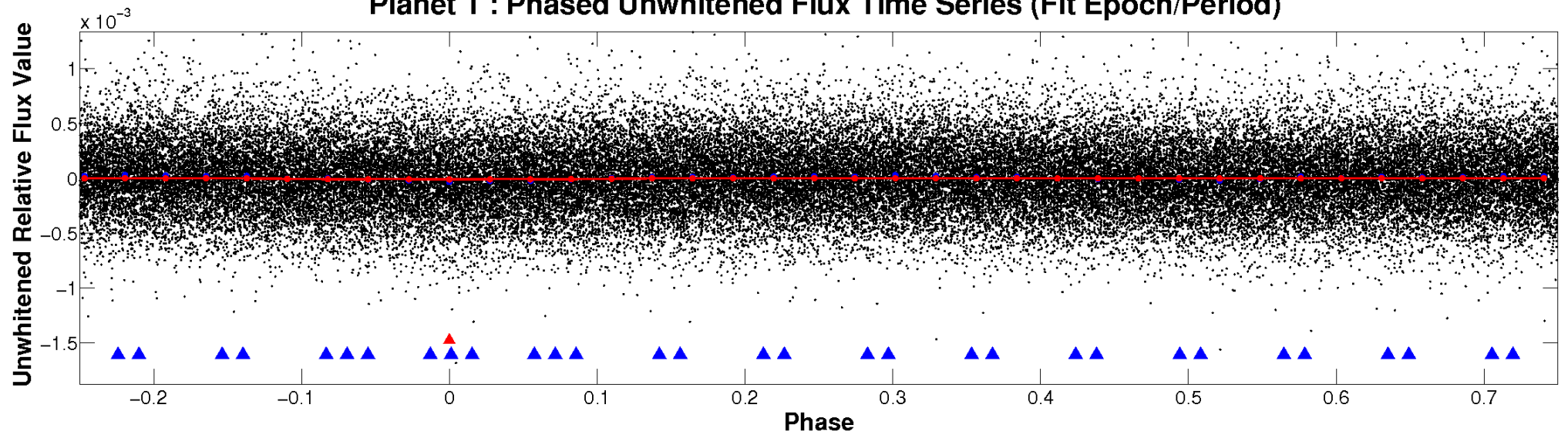
# ALT Odd/Even

TCE 010724429-01

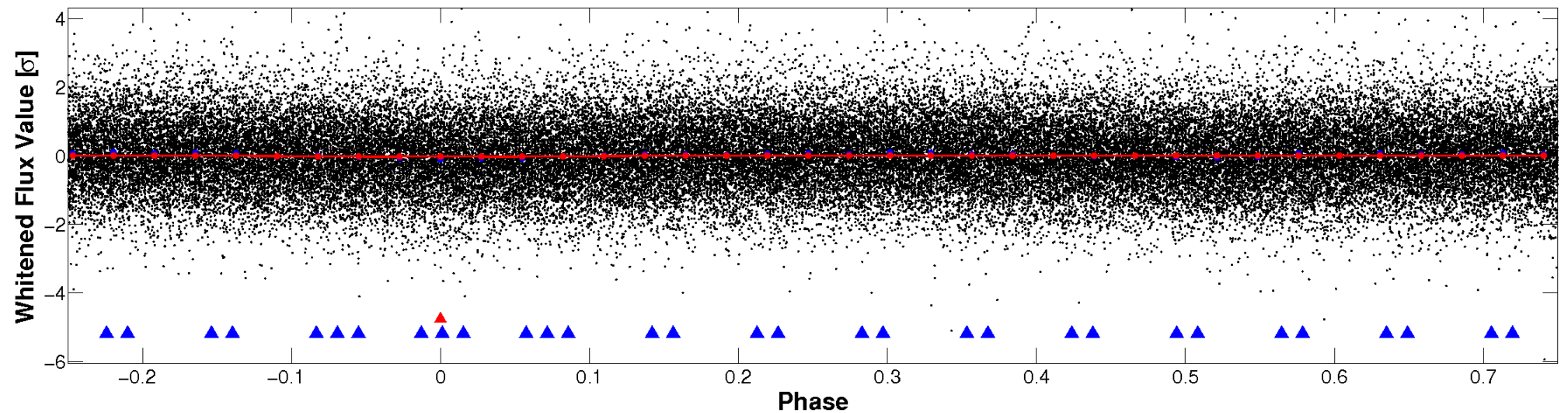


# Non-Whitened Vs. Whitened Light Curve

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



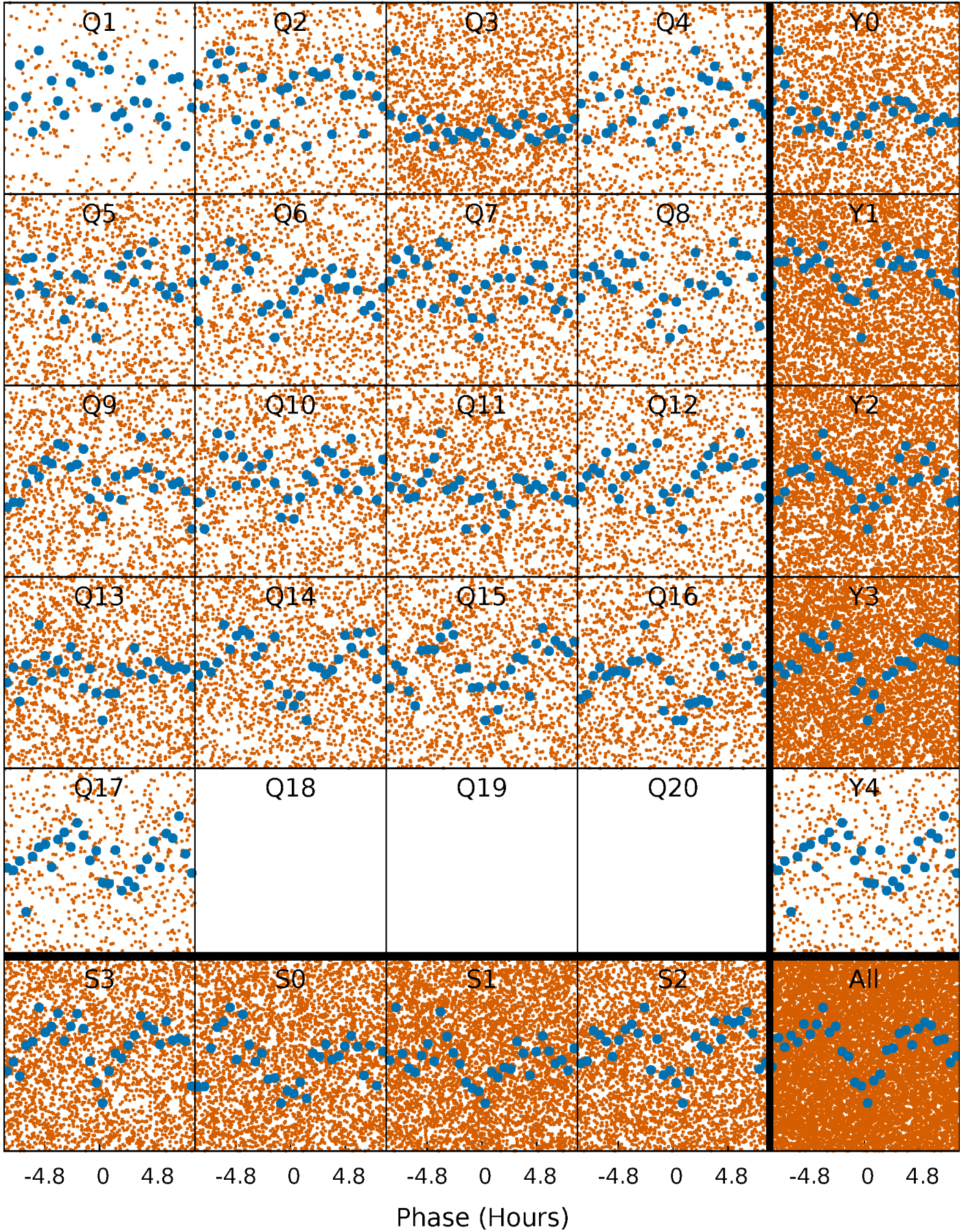
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

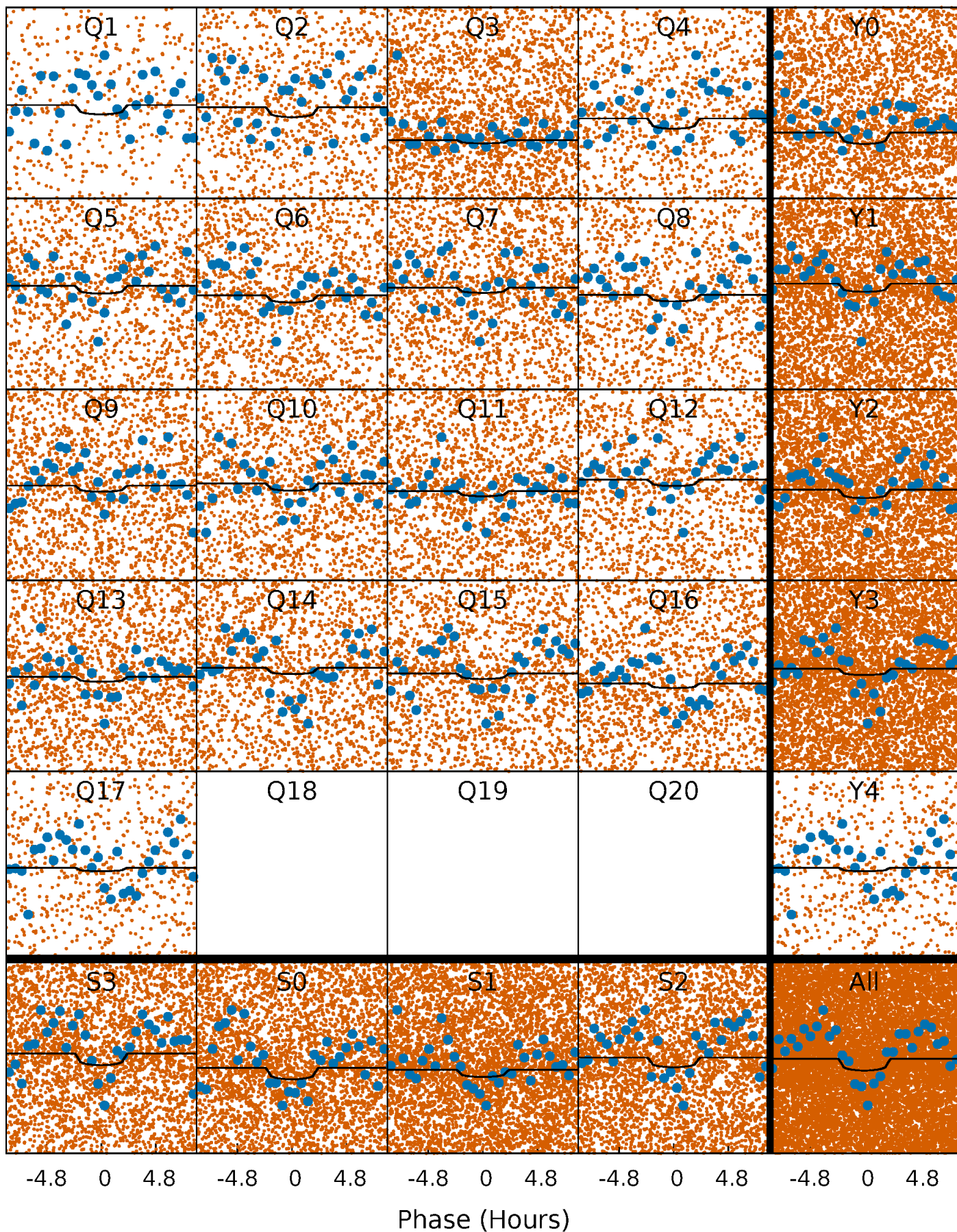
TCE 010724429-01 P= 0.745021 Days  $T_0=131.895033$  (BKJD)





# DV Quarter-Phased Transit Curves

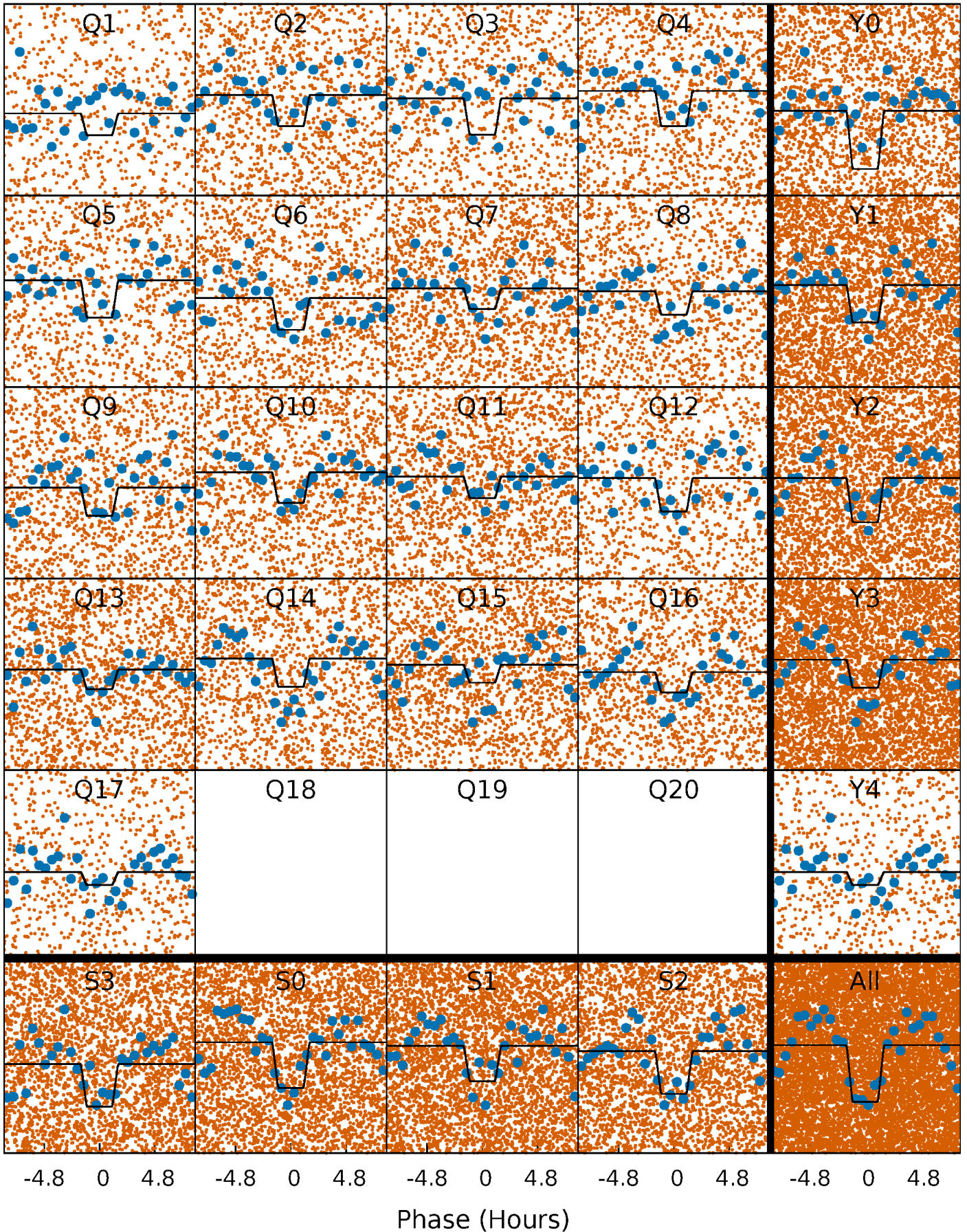
TCE 010724429-01 P= 0.745021 Days  $T_0=131.895033$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

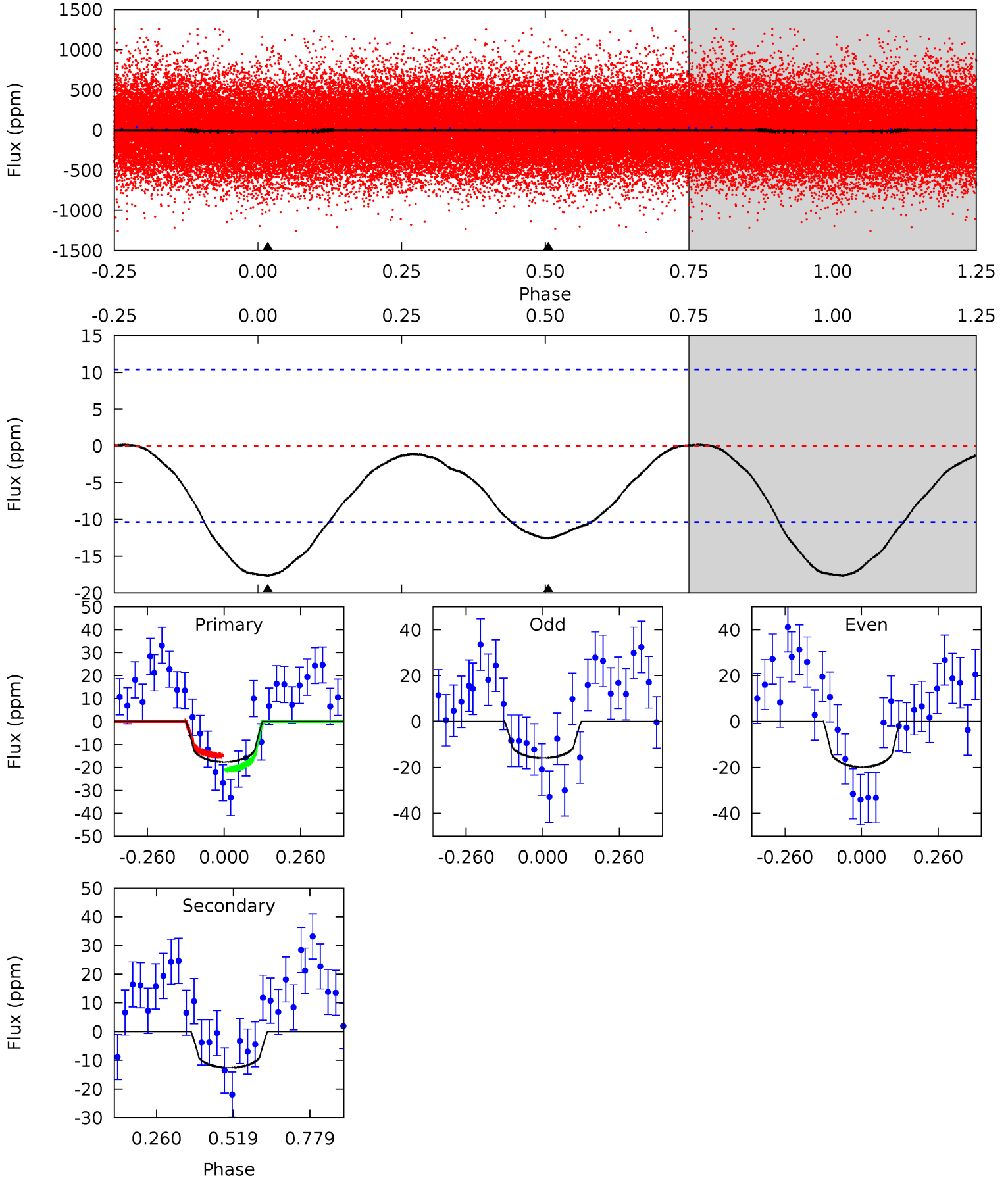
TCE 010724429-01 P= 0.745089 Days  $T_0=131.819907$  (BKJD)



# DV Model-Shift Uniqueness Test

010724429-01, P = 0.745021 Days, E = 131.150012 Days

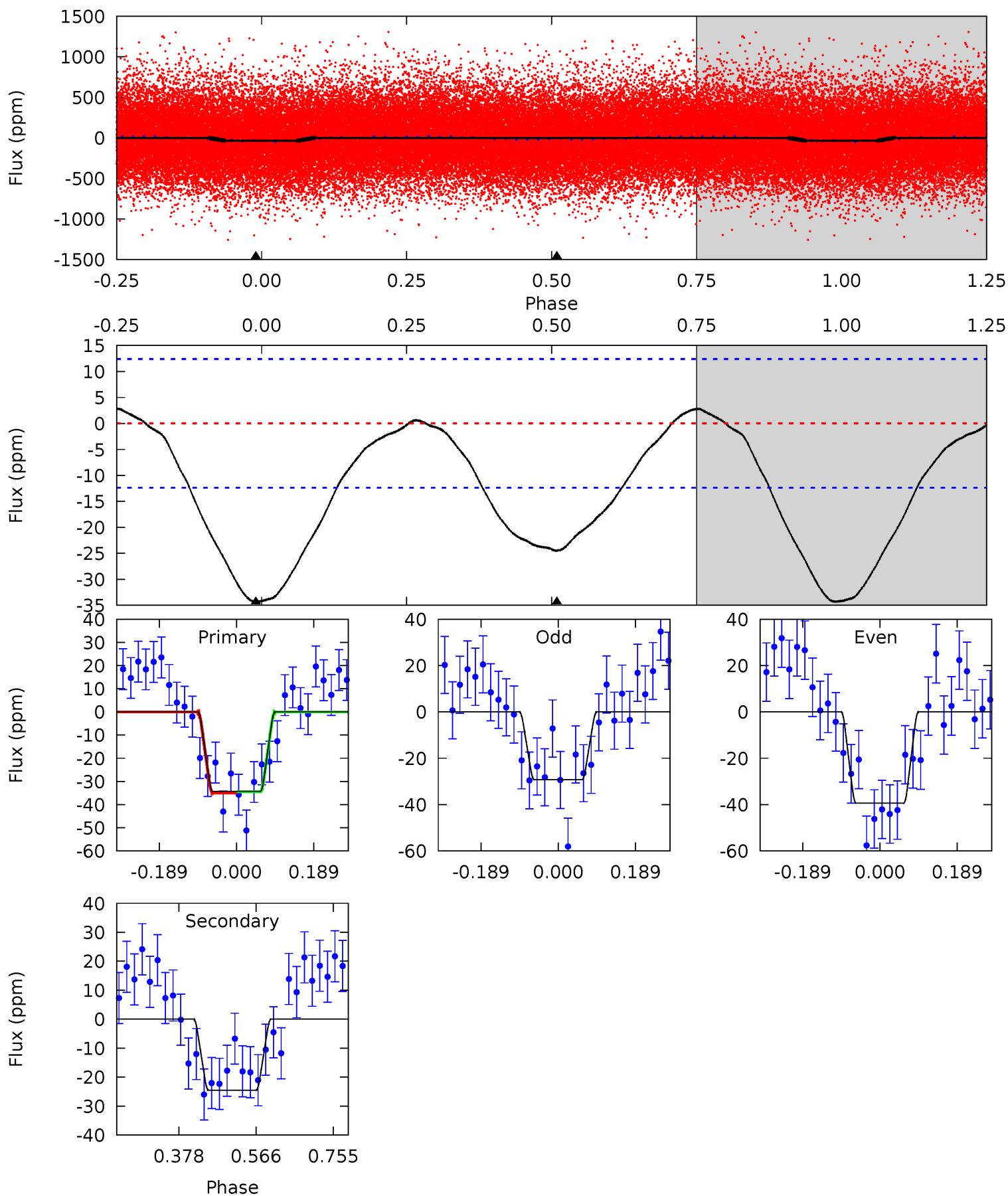
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.43	5.30	0	0	4.36	1.13	0.27	7.43	7.43	5.30	5.30	0.83	0.89	0.01	1.26



# Alt Model-Shift Uniqueness Test

010724429-01, P = 0.745089 Days, E = 131.074818 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
12.3	8.77	0	0	4.43	1.31	0.68	12.3	12.3	8.77	8.77	1.81	1.03	0.08	0.09





### Stellar Parameters For KIC 010724429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6191^{+166}_{-222}$	$4.454^{+0.054}_{-0.216}$	$-0.100^{+0.250}_{-0.300}$	$1.025^{+0.349}_{-0.116}$	$1.088^{+0.153}_{-0.137}$	$1.423^{+0.343}_{-0.796}$
	+3%/-4%	+1%/-5%	+250%/-300%	+34%/-11%	+14%/-13%	+24%/-56%
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 010724429-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-13 \pm 2$	$0.41^{+0.34}_{-0.26}$	$3073^{+223}_{-159}$	$6086^{+5545}_{-1441}$	$11^{+72}_{-8}$
Alt.	$-25 \pm 3$	$0.71^{+0.35}_{-0.32}$	$3063^{+220}_{-164}$	$5515^{+2135}_{-902}$	$7.270^{+16.593}_{-4.136}$

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

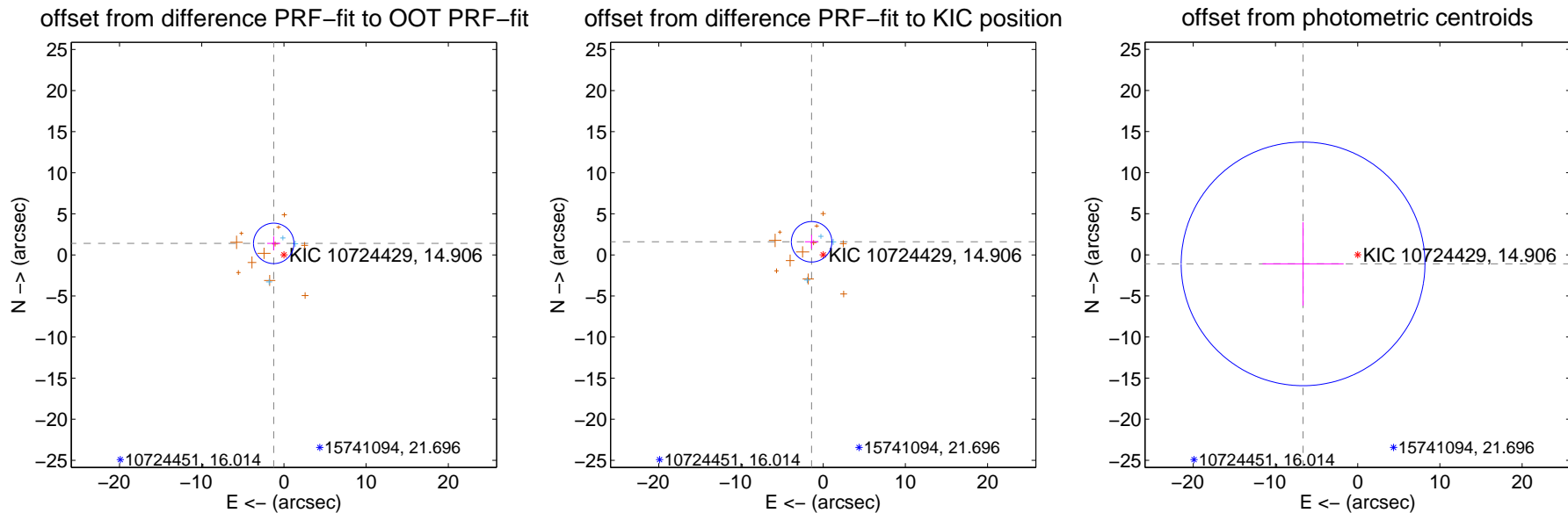
## DV Centroid Data

Supplemental centroid analysis for 010724429-01. Kepler magnitude: 14.91. Transit SNR 2.89

There are 3 quarters with good PRF difference image offsets

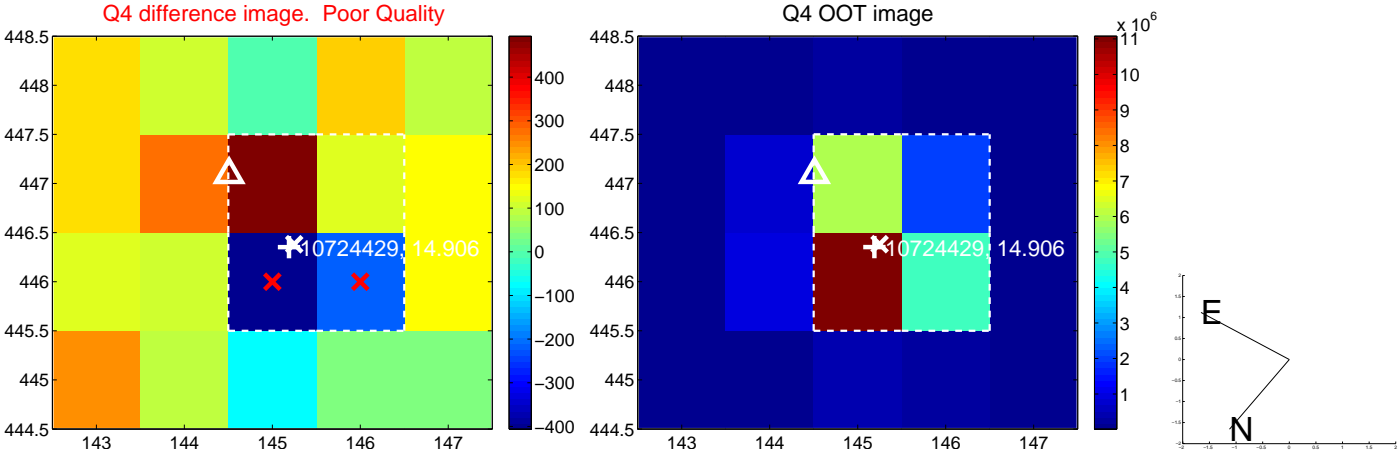
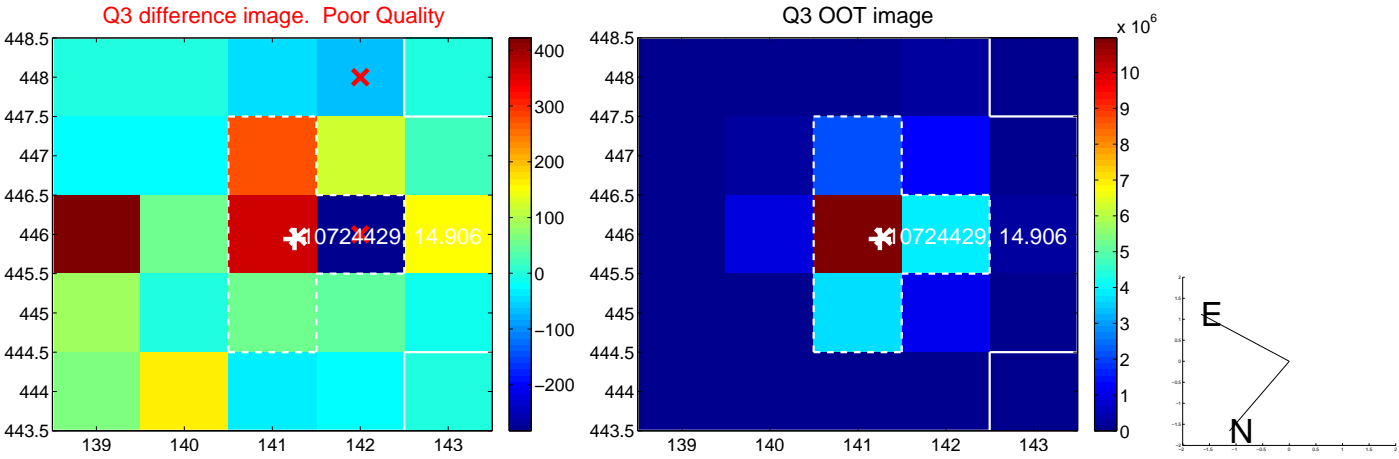
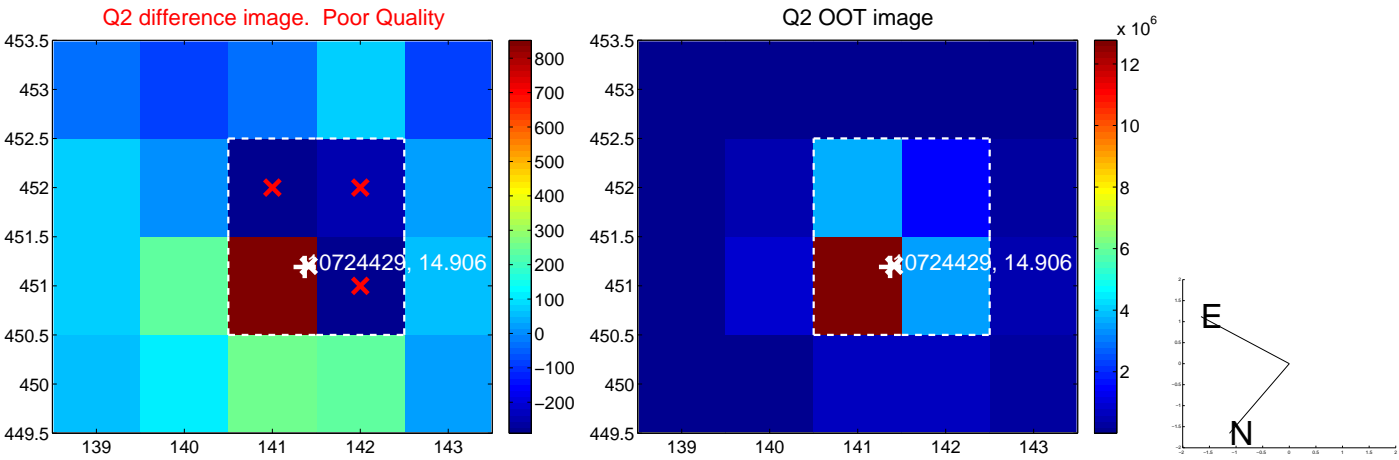
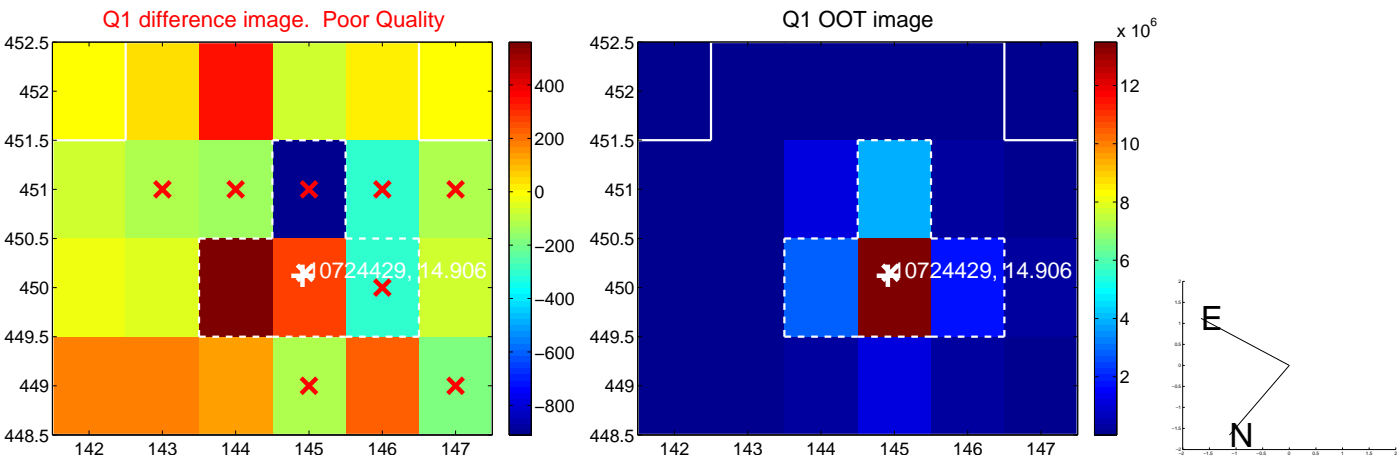
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.873 \pm 0.820$	2.28	$1.242 \pm 0.793$	$1.402 \pm 0.840$
PRF-fit source offset from KIC position	$2.128 \pm 0.821$	2.59	$1.408 \pm 0.800$	$1.596 \pm 0.837$
photometric centroid source offset	$6.73 \pm 4.94$	1.36	$6.64 \pm 4.94$	$-1.10 \pm 5.07$

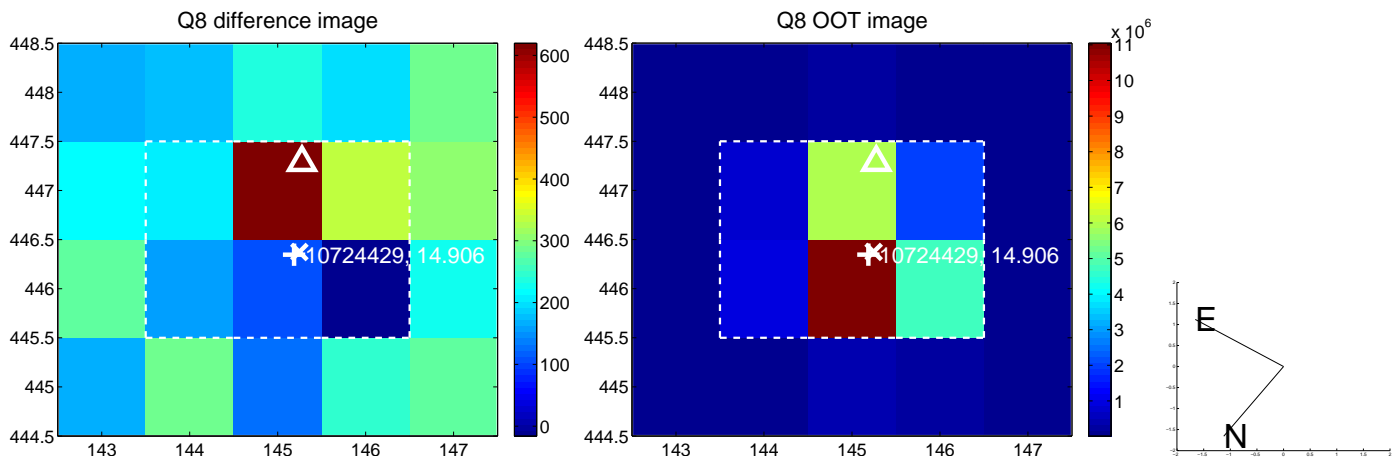
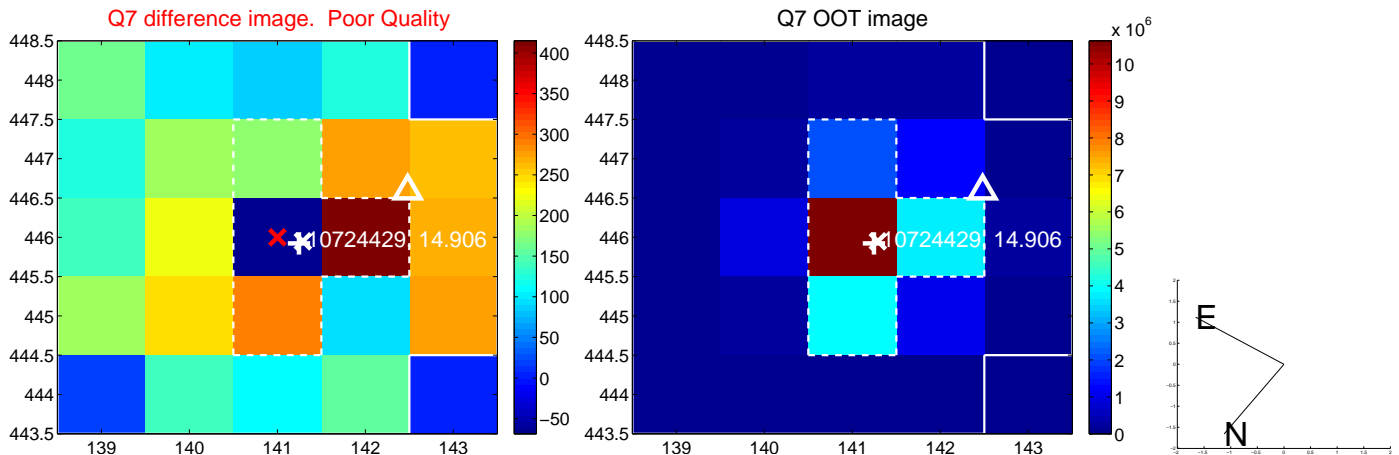
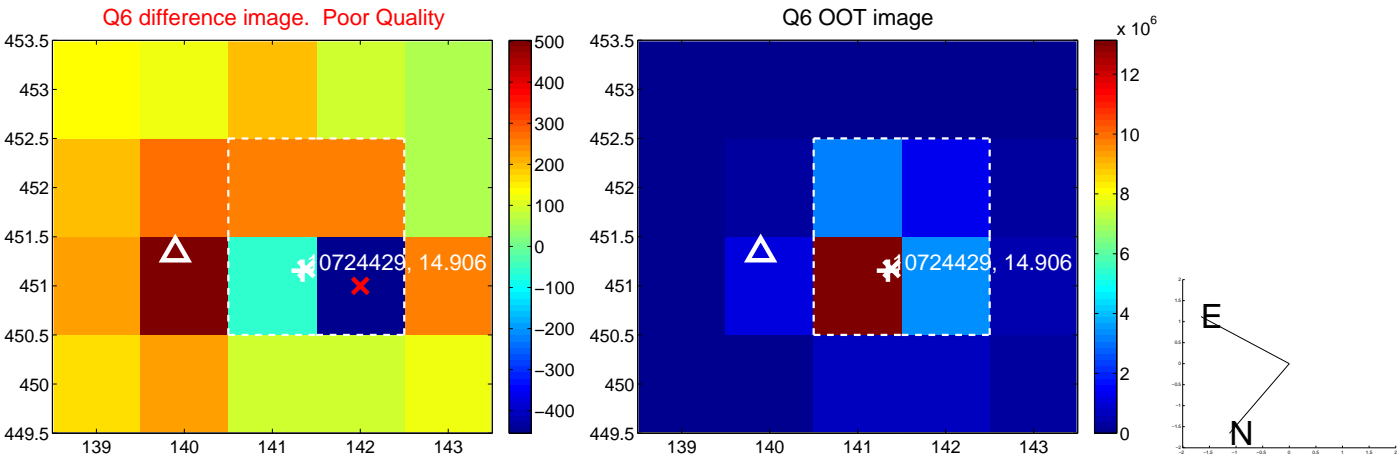
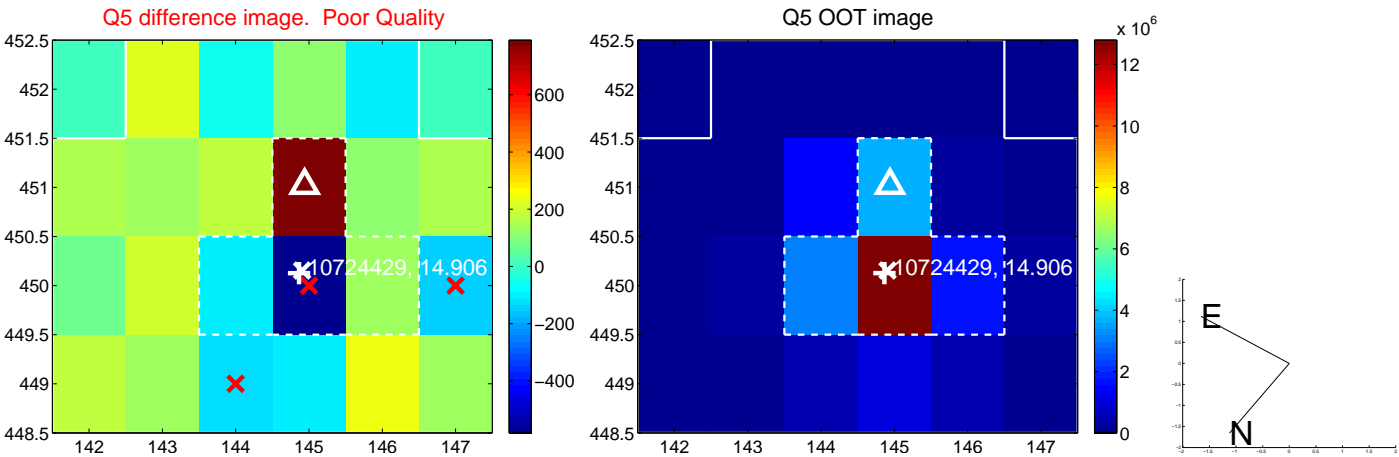


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

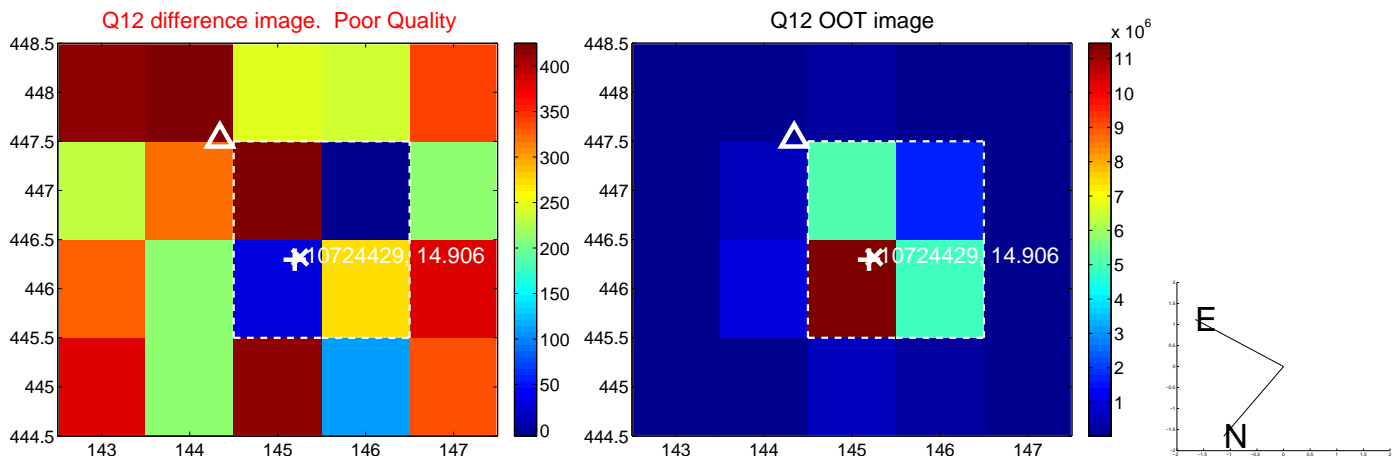
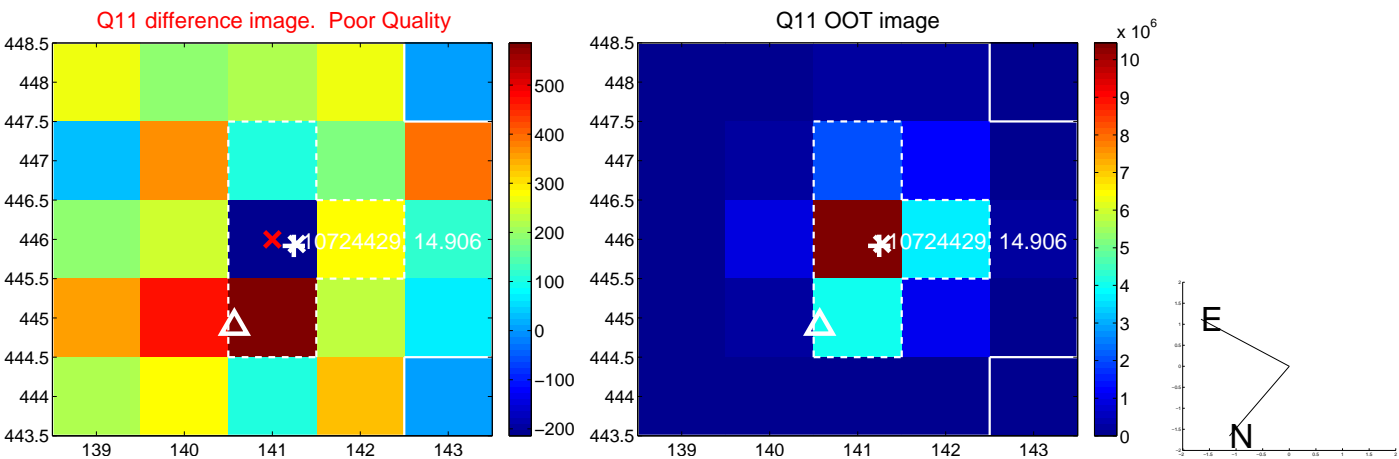
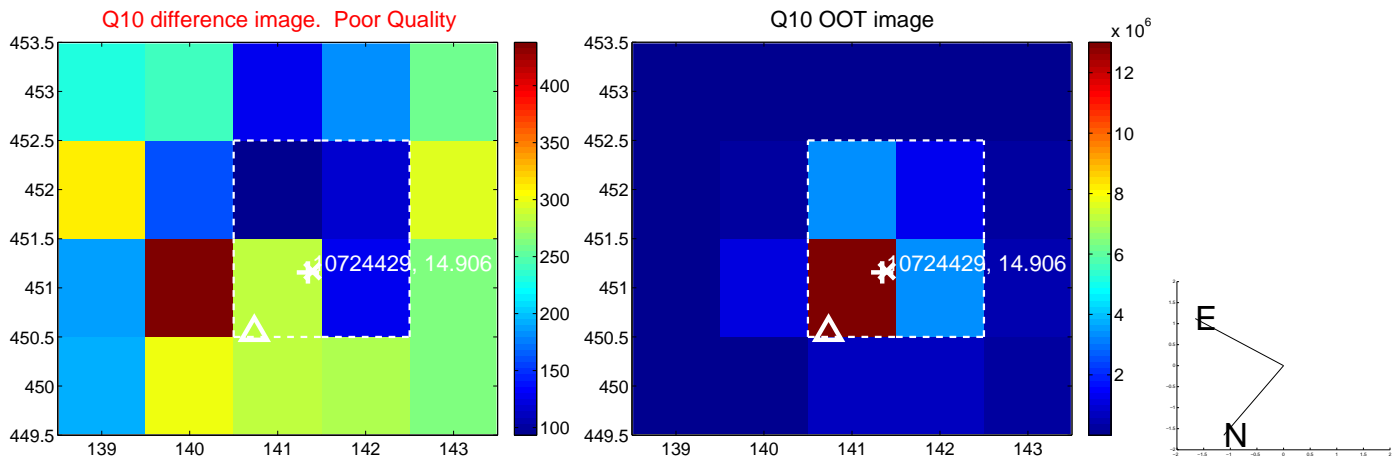
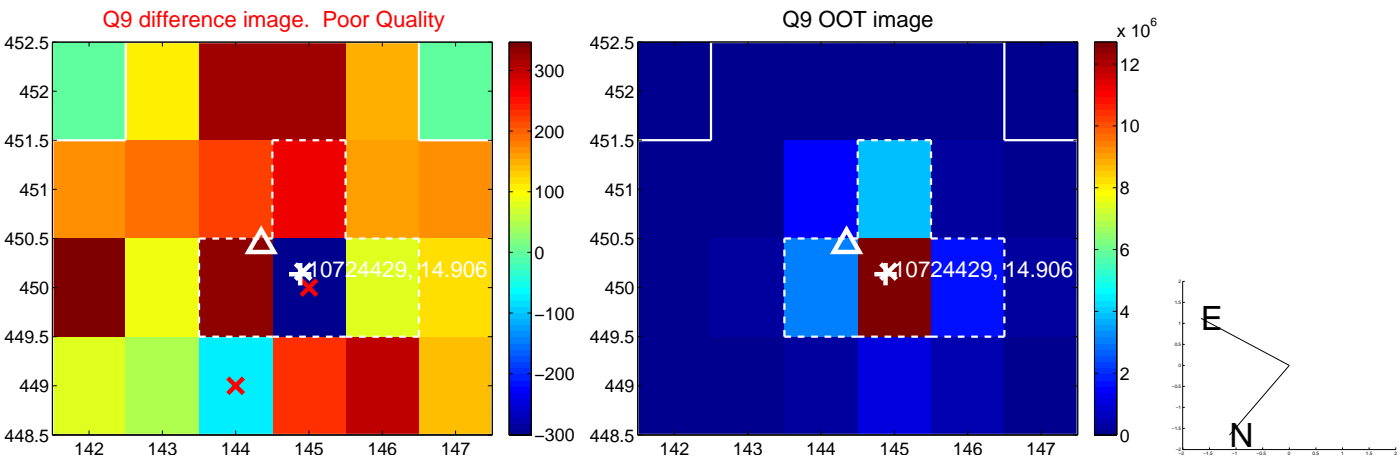


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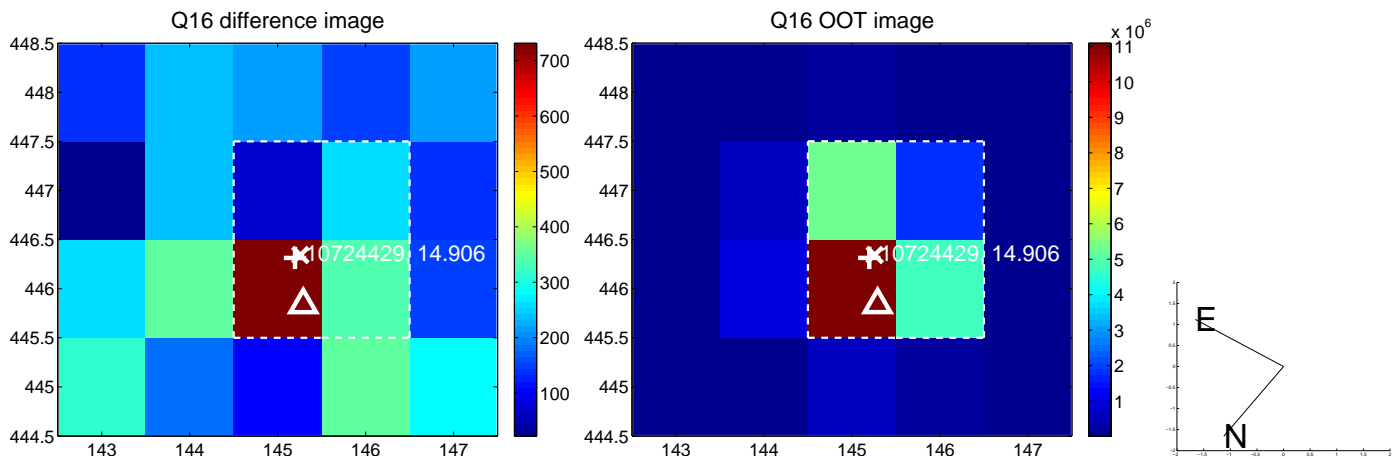
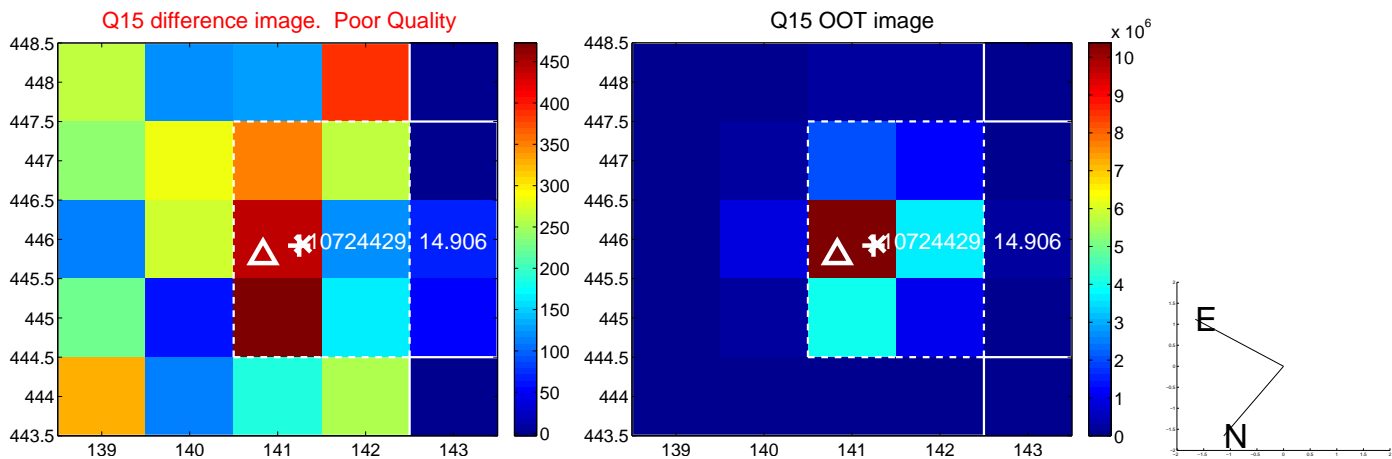
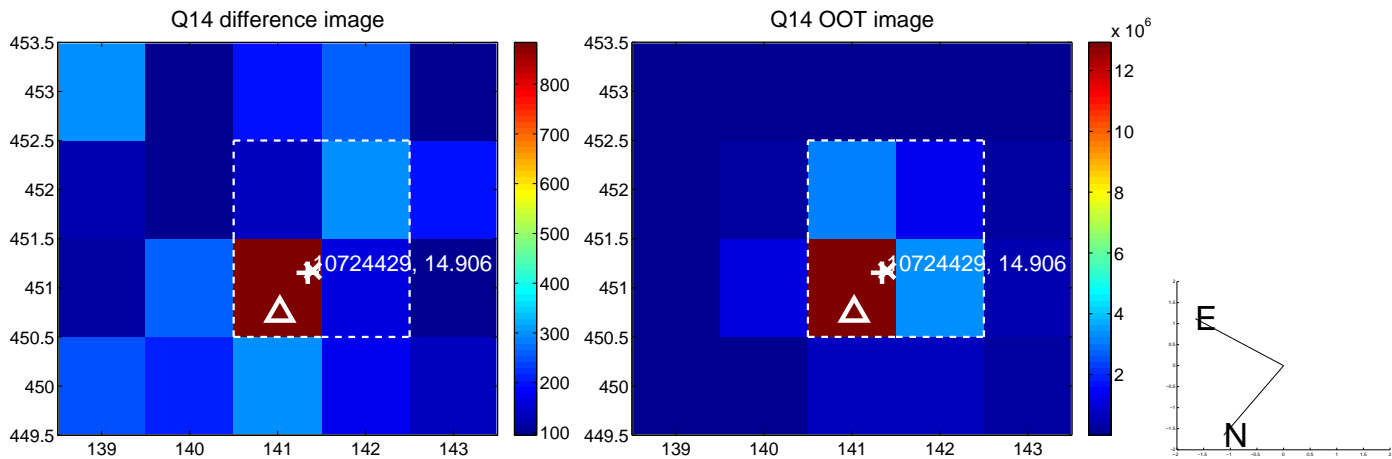
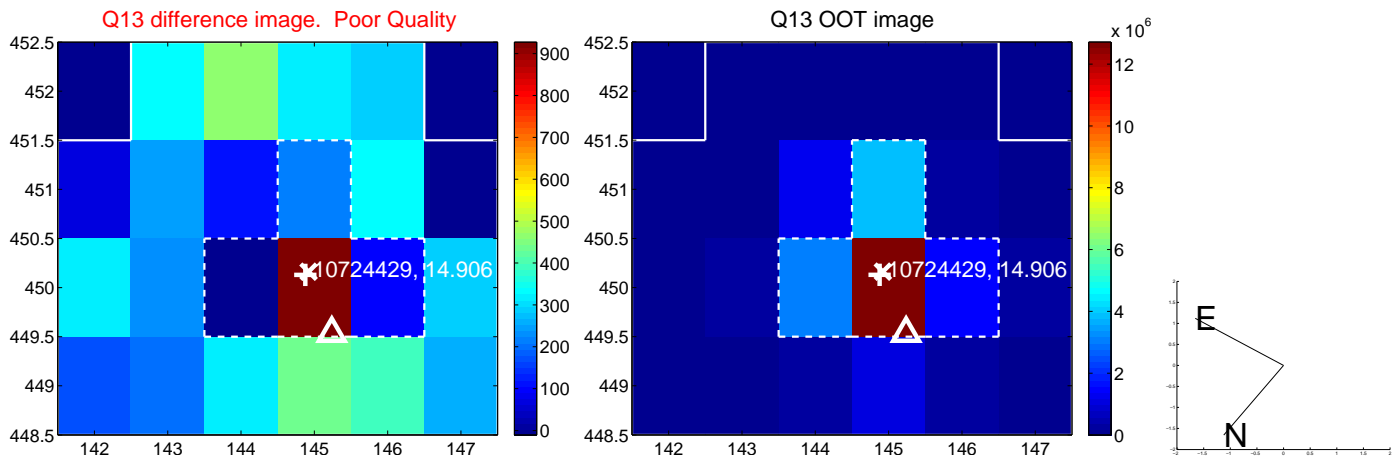




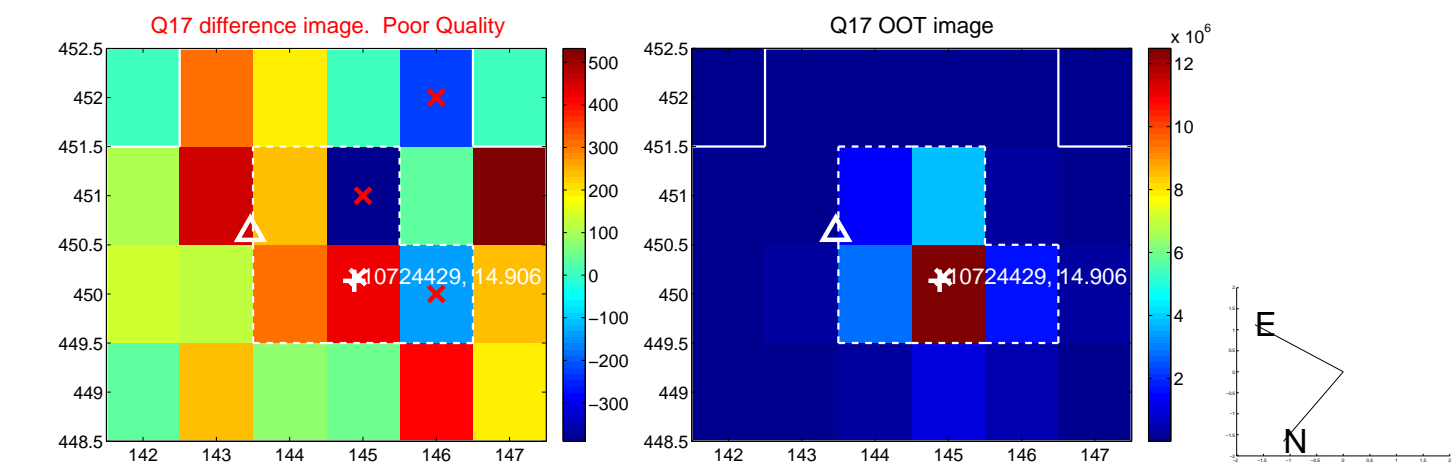
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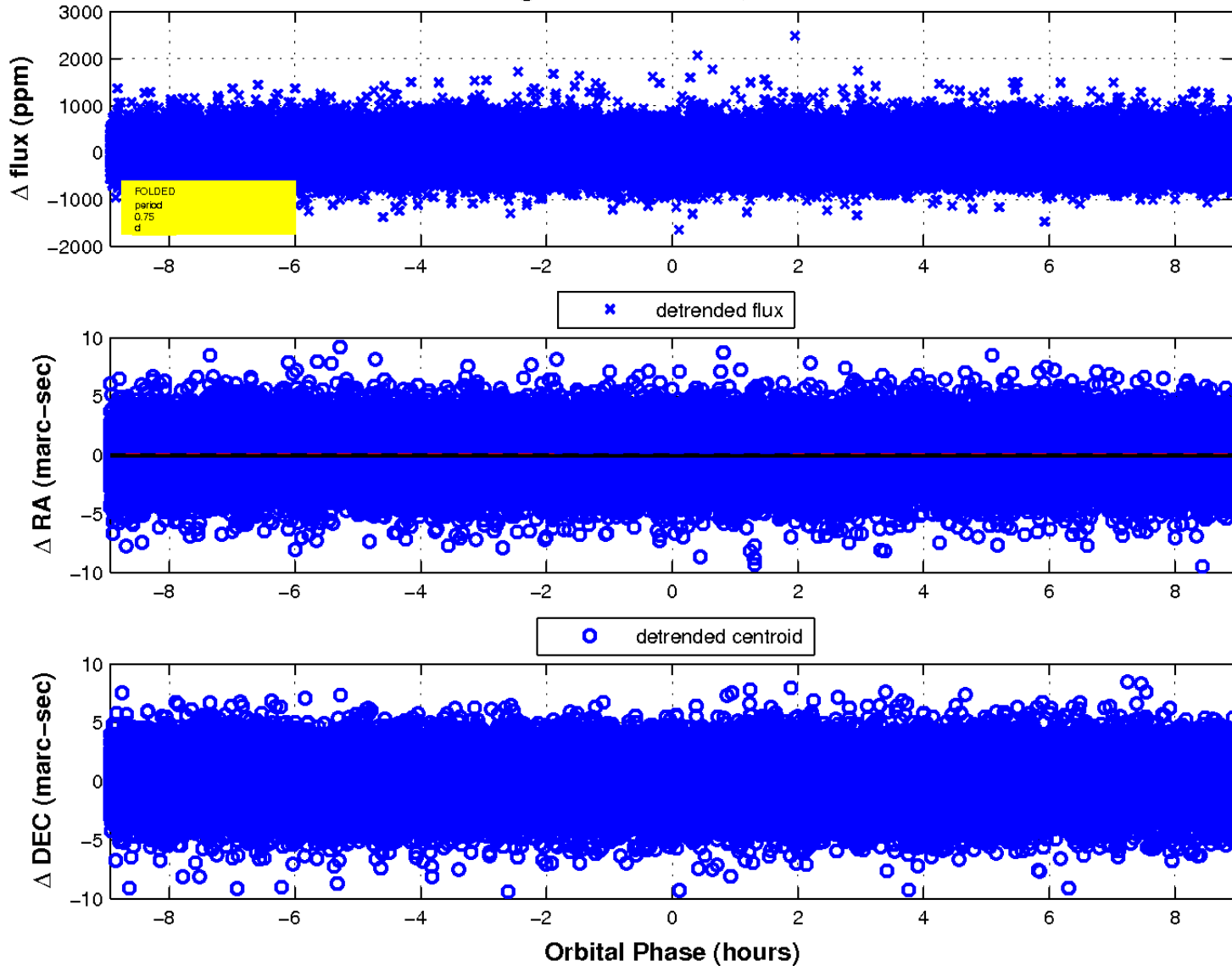
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

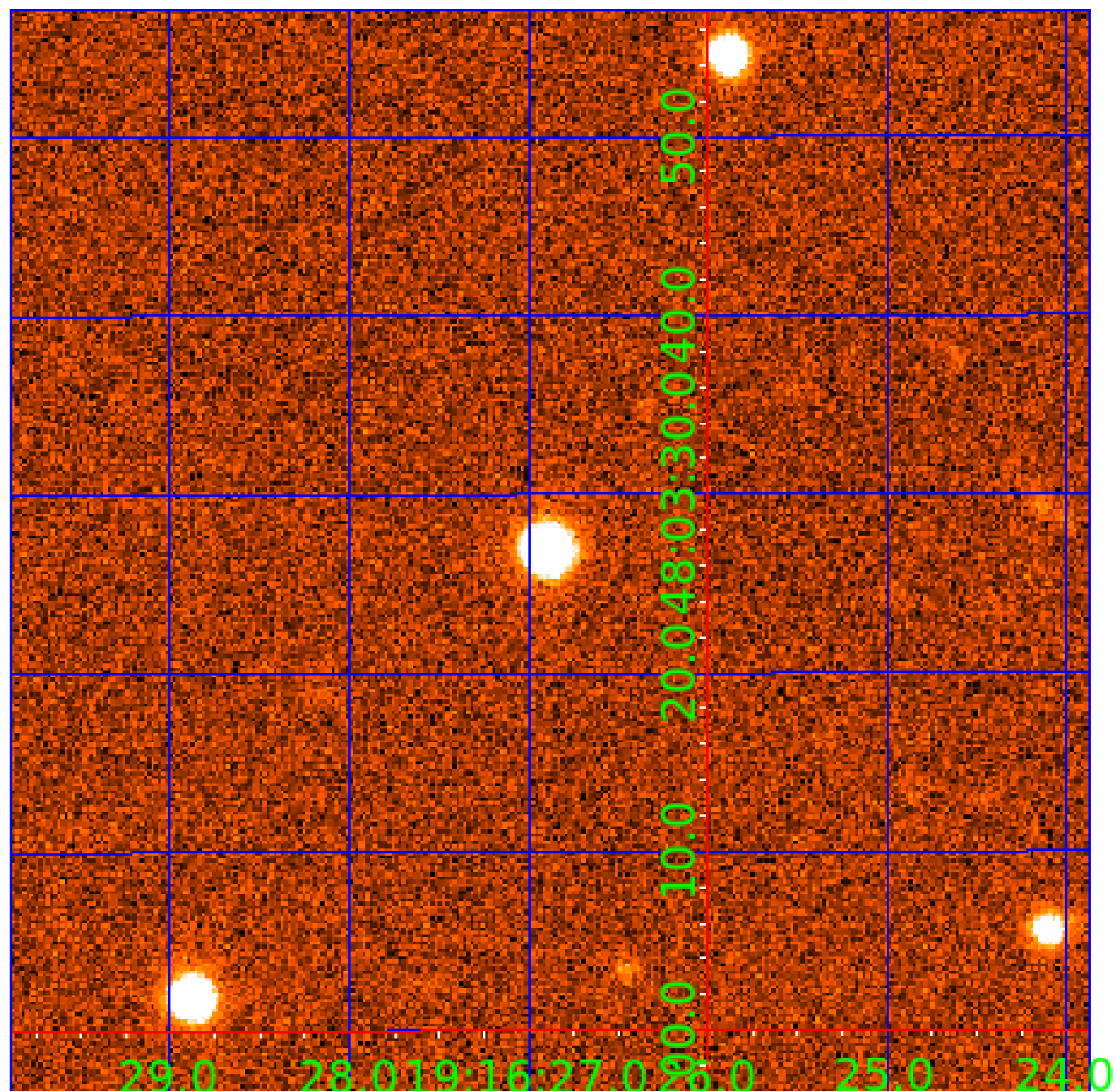


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 010724429

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010724429-01	OBS	No	0.745021	131.895033	8.6	4.198	8.2	2.9	1.02	6191	0.32	5045.01
010724429-02	OBS	No	46.138868	171.424038	482.2	1.168	7.8	7.6	1.02	6191	2.72	20.59

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010724429-01	OBS	FP	0.00	1	0	1	1	LPP_DV—HALO_GHOST—EPHEM_MATCH
010724429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

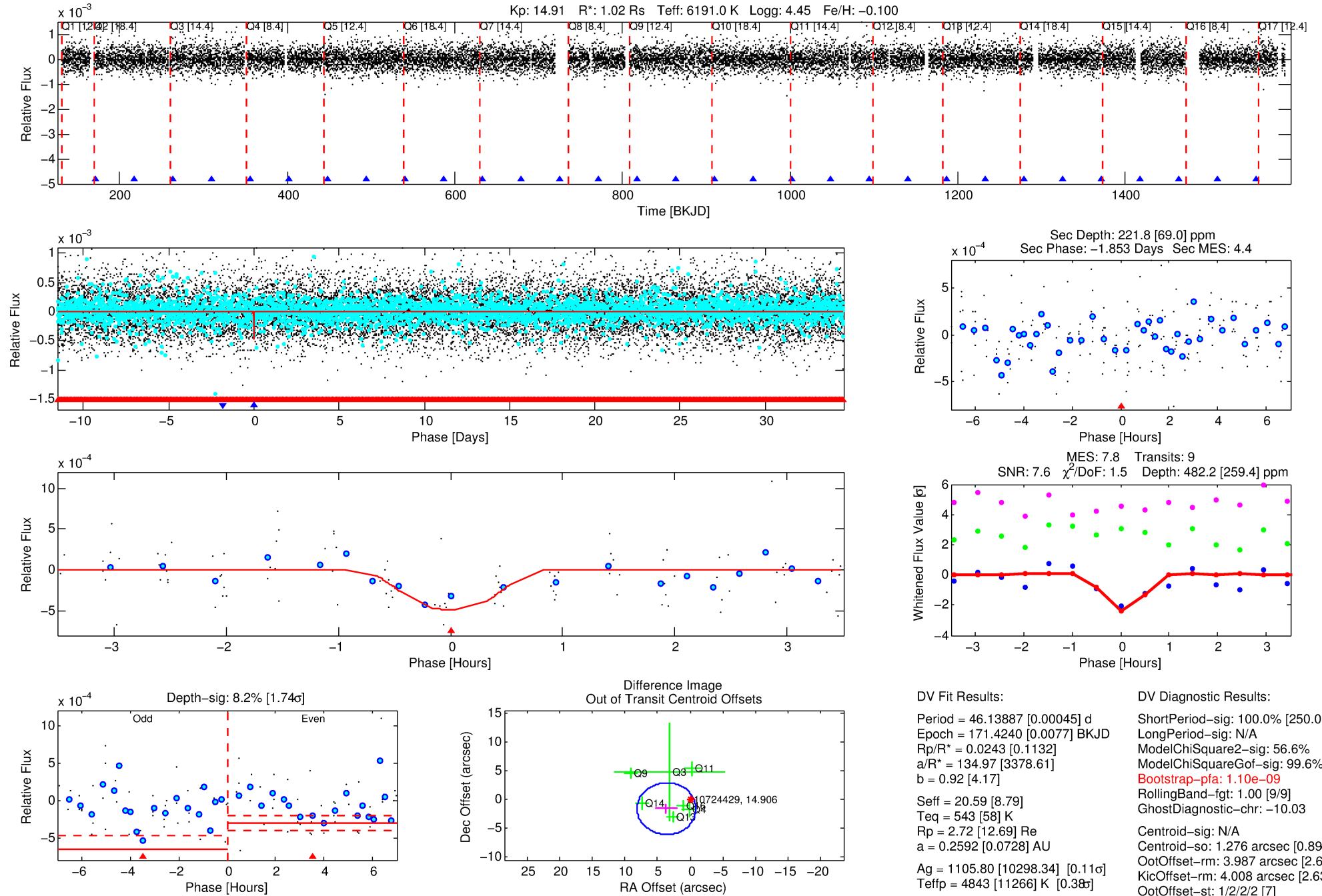
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010724429-02

No Significant Match Found

# DV One-Page Summary

KIC: 10724429 Candidate: 2 of 2 Period: 46.139 d



## DV Fit Results:

Period = 46.13887 [0.00045] d  
Epoch = 171.4240 [0.0077] BKJD  
Rp/R\* = 0.0243 [0.1132]  
a/R\* = 134.97 [3378.61]  
b = 0.92 [4.17]  
Seff = 20.59 [8.79]  
Teff = 543 [58] K  
Rp = 2.72 [12.69] Re  
a = 0.2592 [0.0728] AU  
Ag = 1105.80 [10298.34] [0.11 $\sigma$ ]  
Teffp = 4843 [11266] K [0.38 $\sigma$ ]

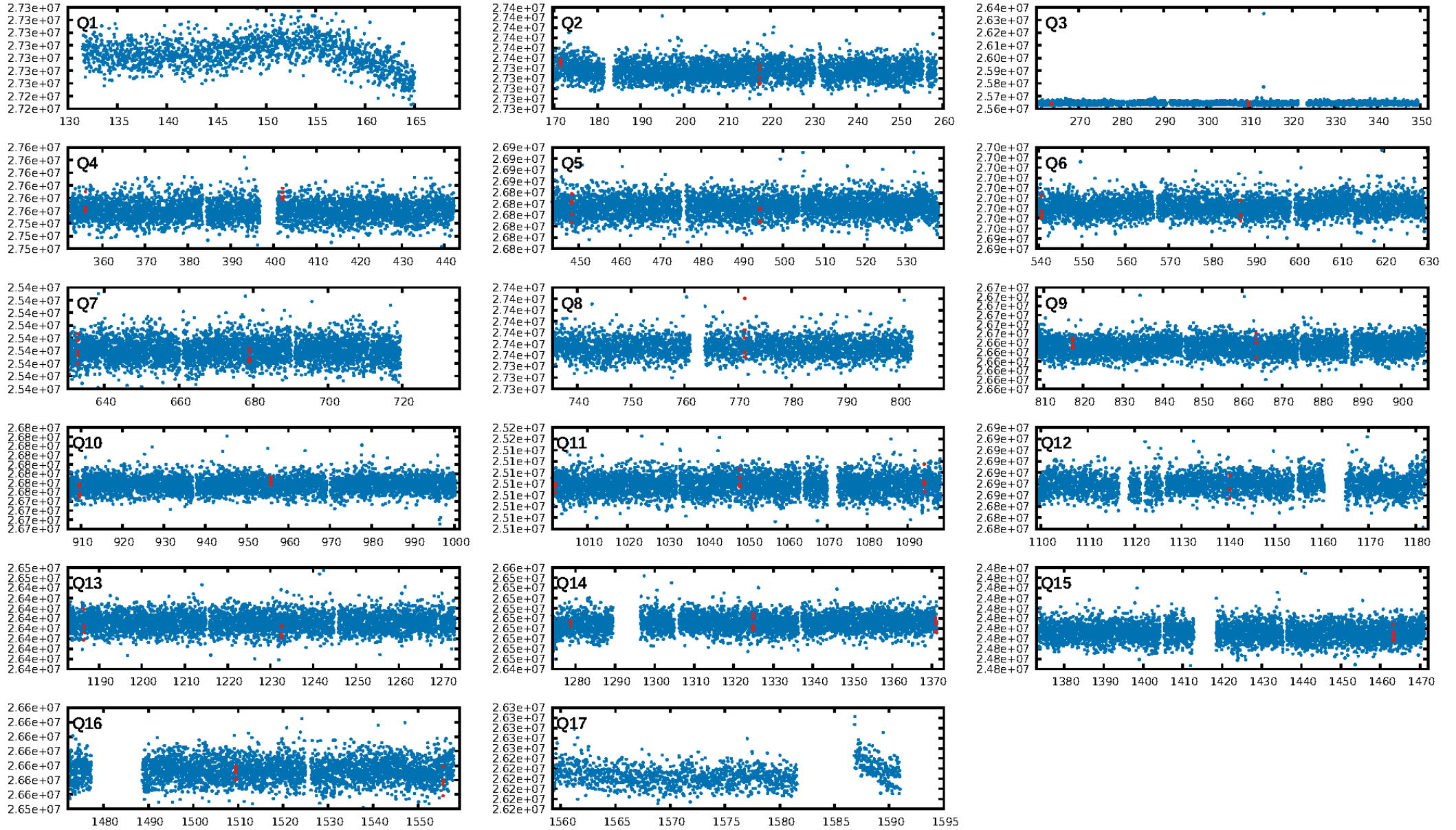
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [250.01 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 56.6%  
ModelChiSquareGof-sig: 99.6%  
**Bootstrap-pfa: 1.10e-09**  
RollingBand-fgt: 1.00 [9/9]  
GhostDiagnostic-chr: -10.03  
Centroid-sig: N/A  
Centroid-so: 1.276 arcsec [0.89 $\sigma$ ]  
OotOffset-rm: 3.987 arcsec [2.66 $\sigma$ ]  
KicOffset-rm: 4.008 arcsec [2.63 $\sigma$ ]  
OotOffset-st: 1/2/2/2 [7]  
KicOffset-st: 1/2/2/2 [7]  
DiffImageQuality-fgm: 0.00 [0/7]  
DiffImageOverlap-fno: 0.13 [2/15]

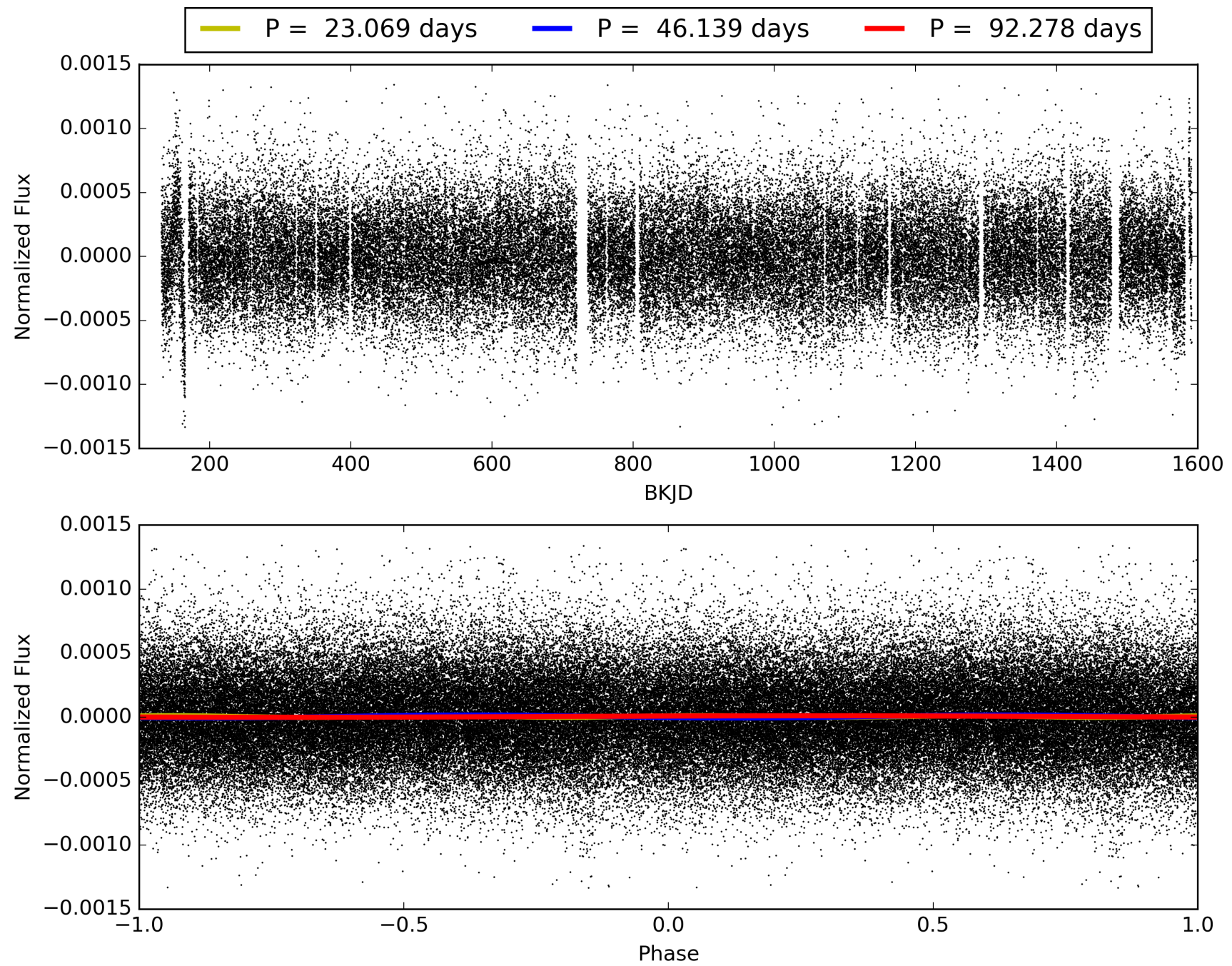
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:09:34 Z

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

# TCE 010724429-02, PDC Light Curves



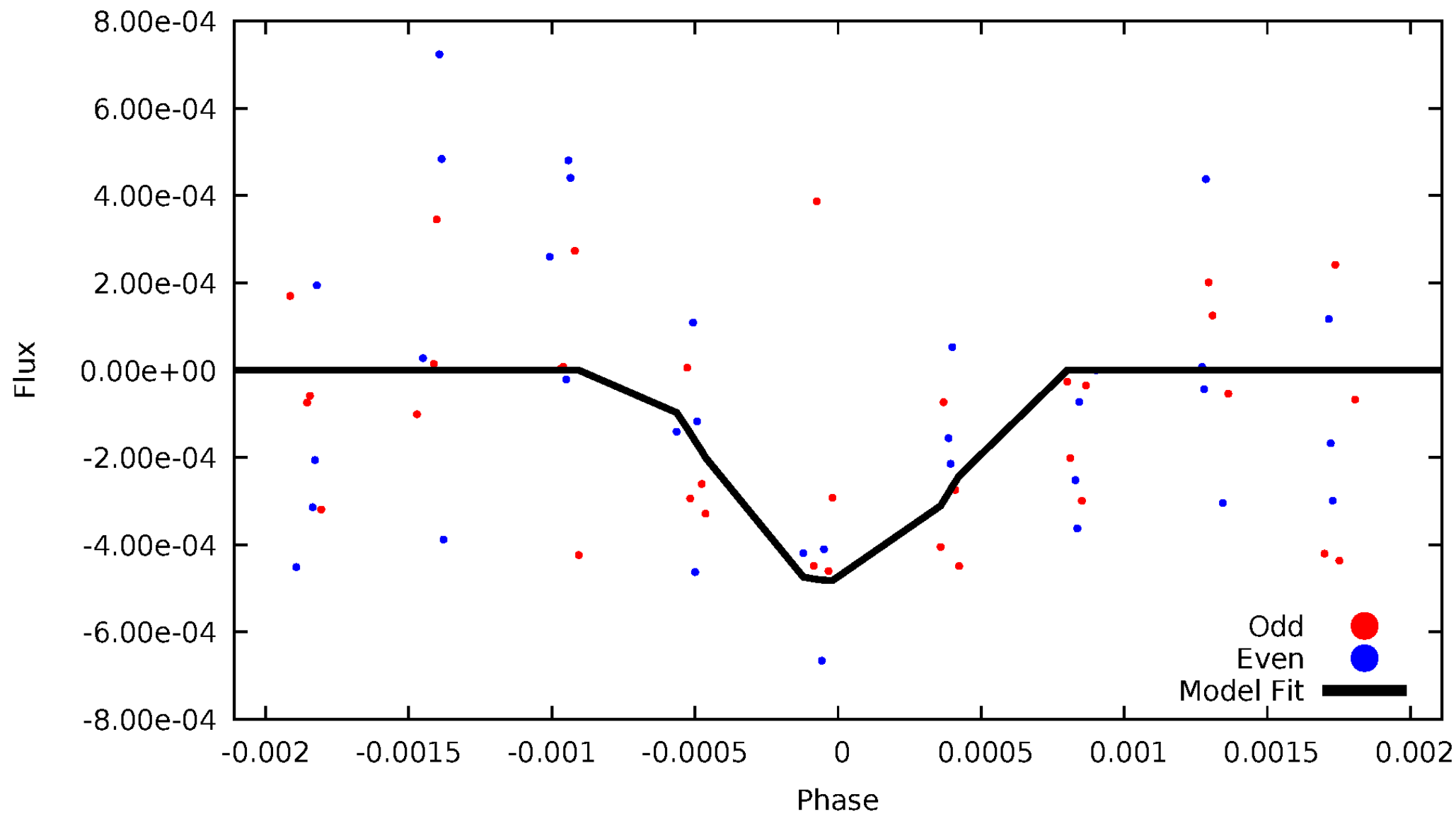
# TCE 010724429-02





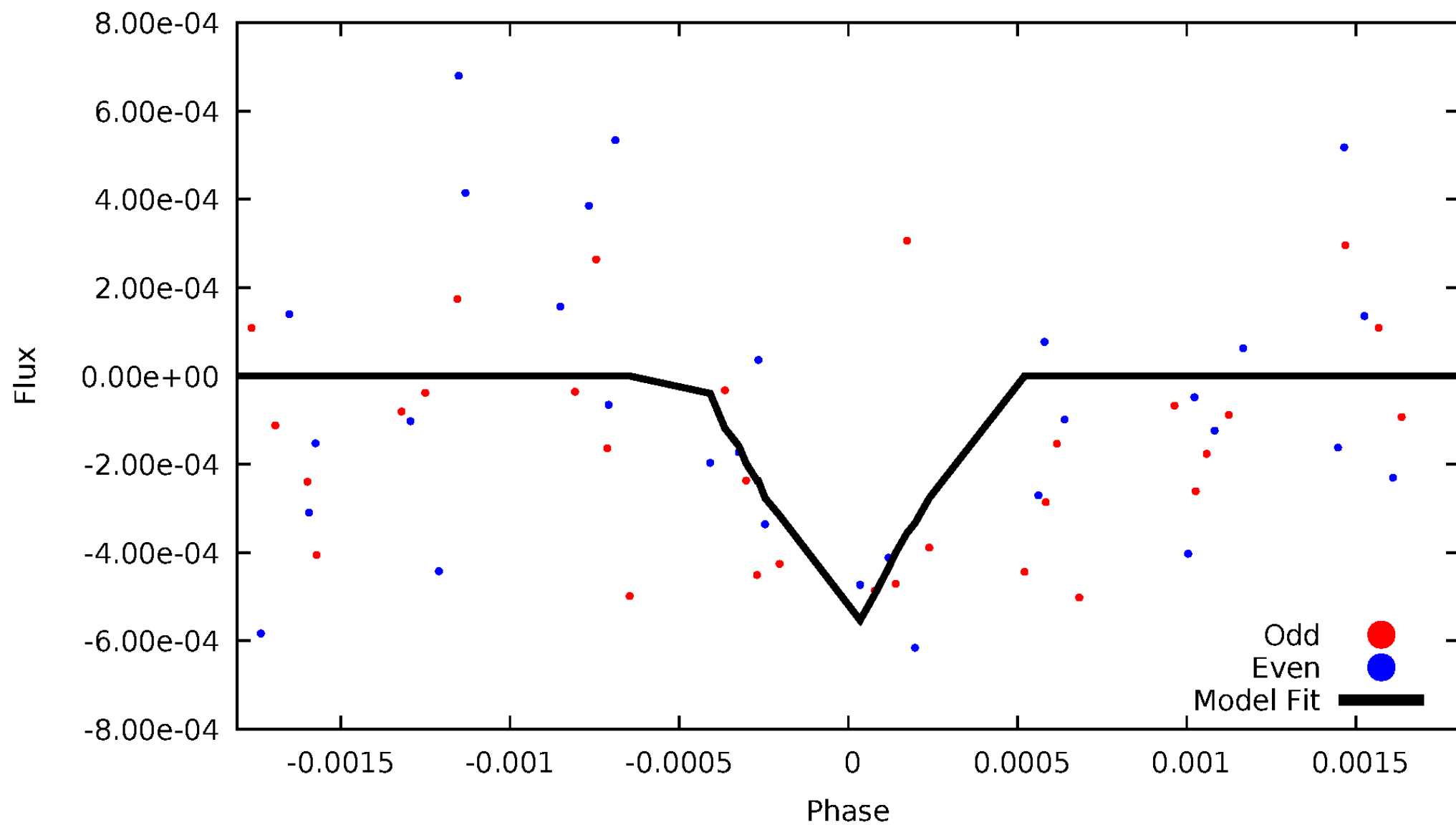
# DV Odd/Even

TCE 010724429-02



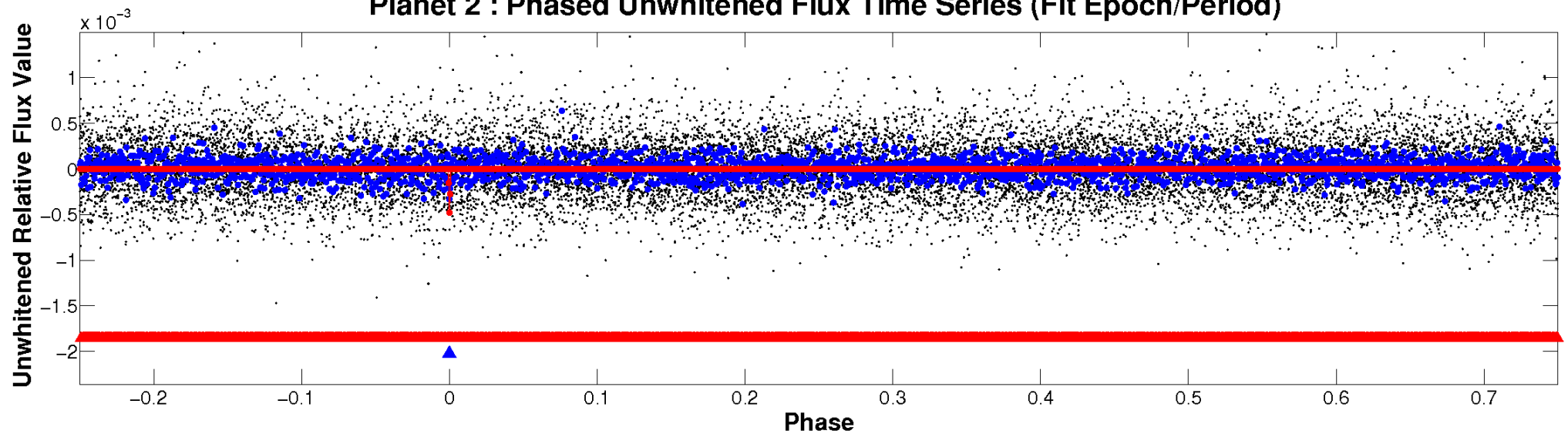
# ALT Odd/Even

TCE 010724429-02

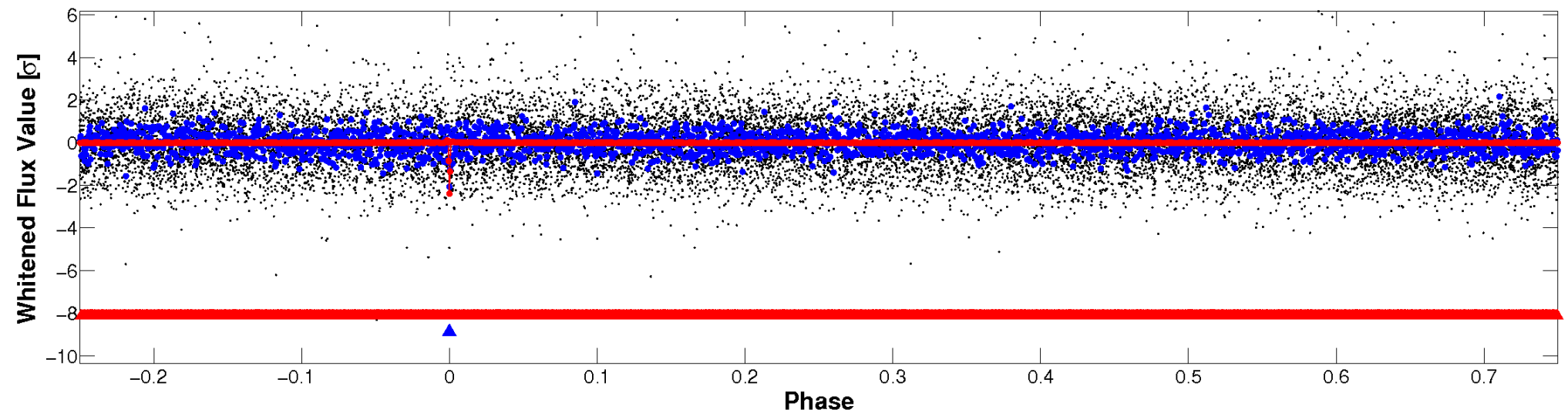


# Non-Whitened Vs. Whitened Light Curve

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

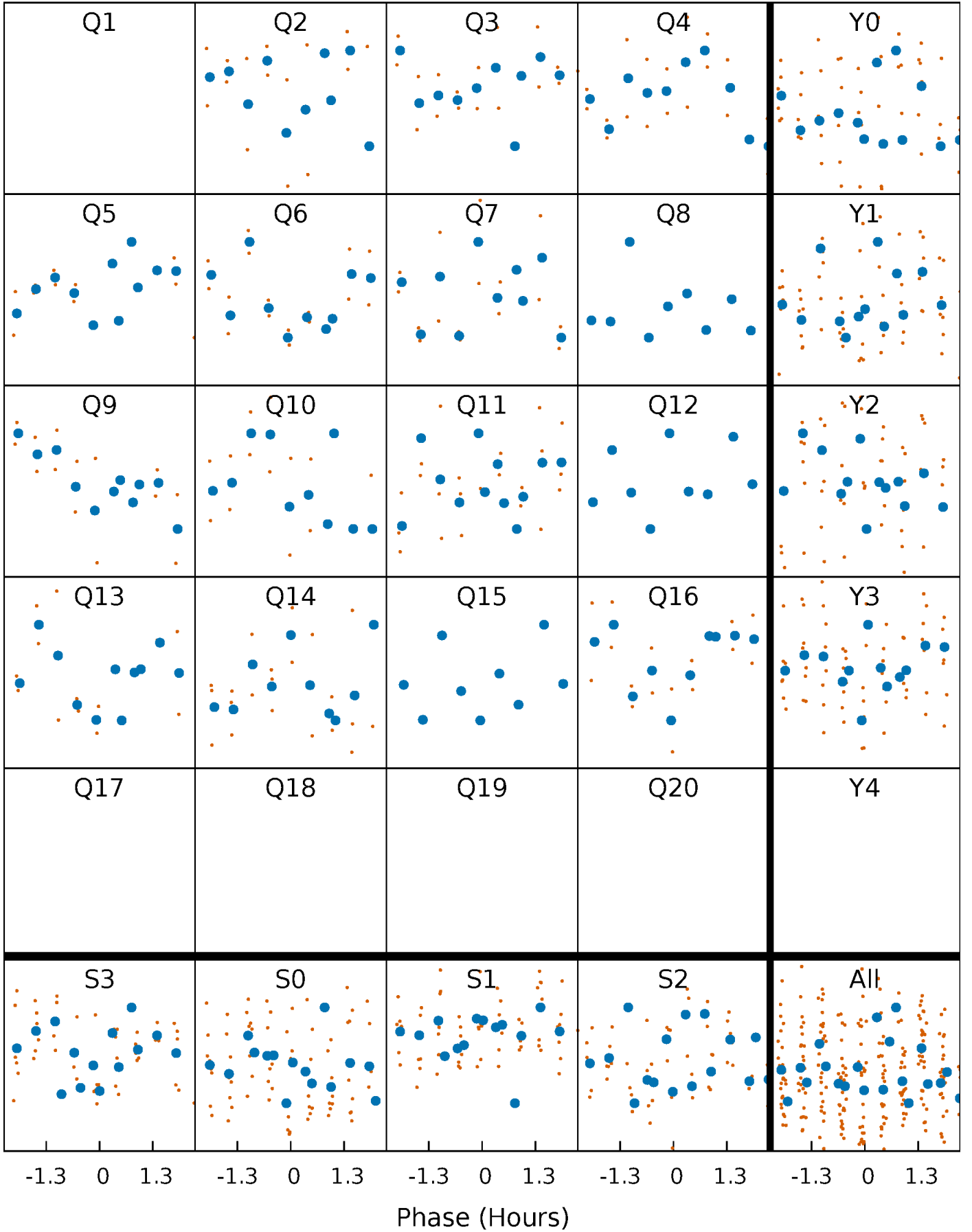


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



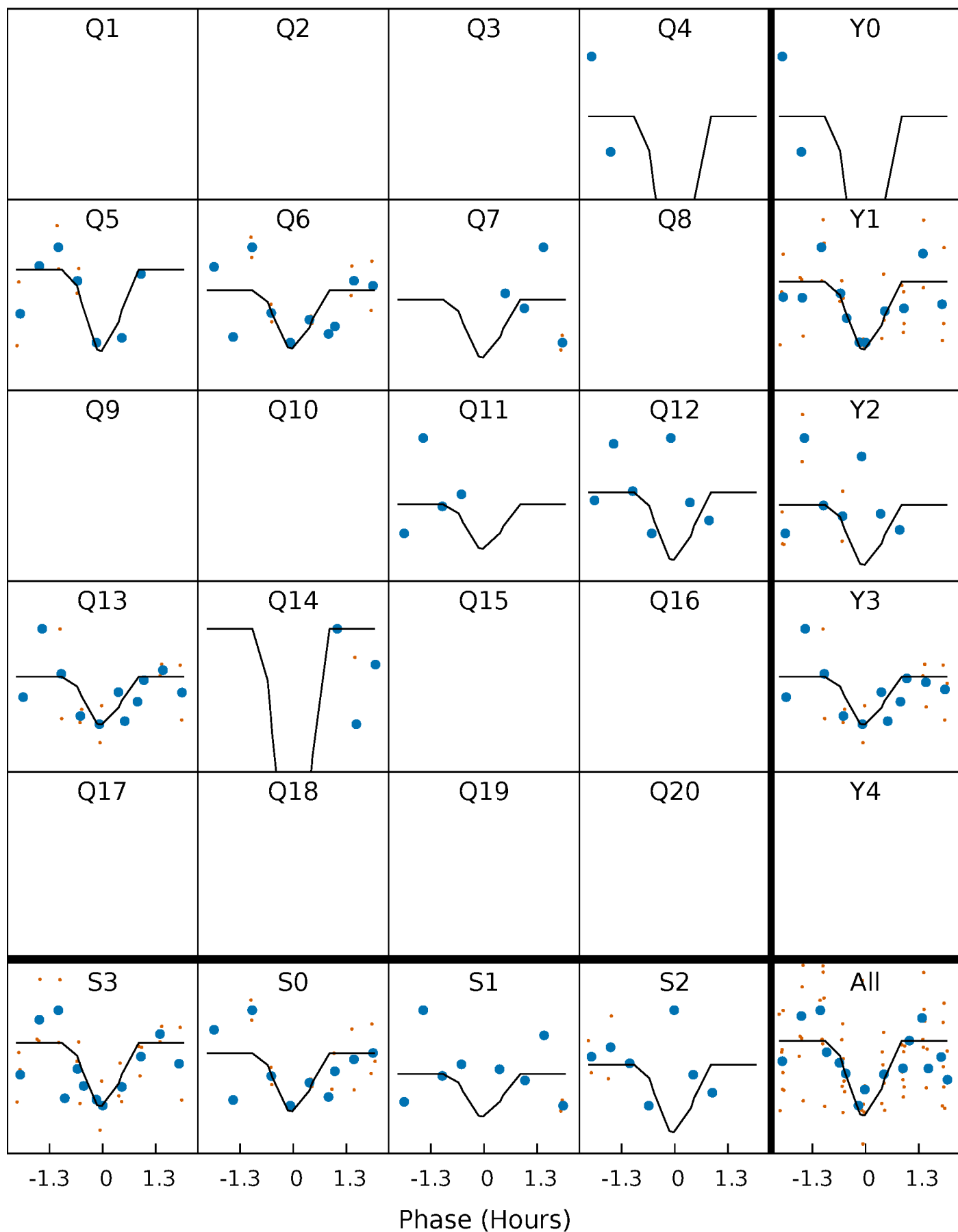
# PDC Quarter-Phased Transit Curves

TCE 010724429-02   P= 46.138868 Days    $T_0=171.424038$  (BKJD)



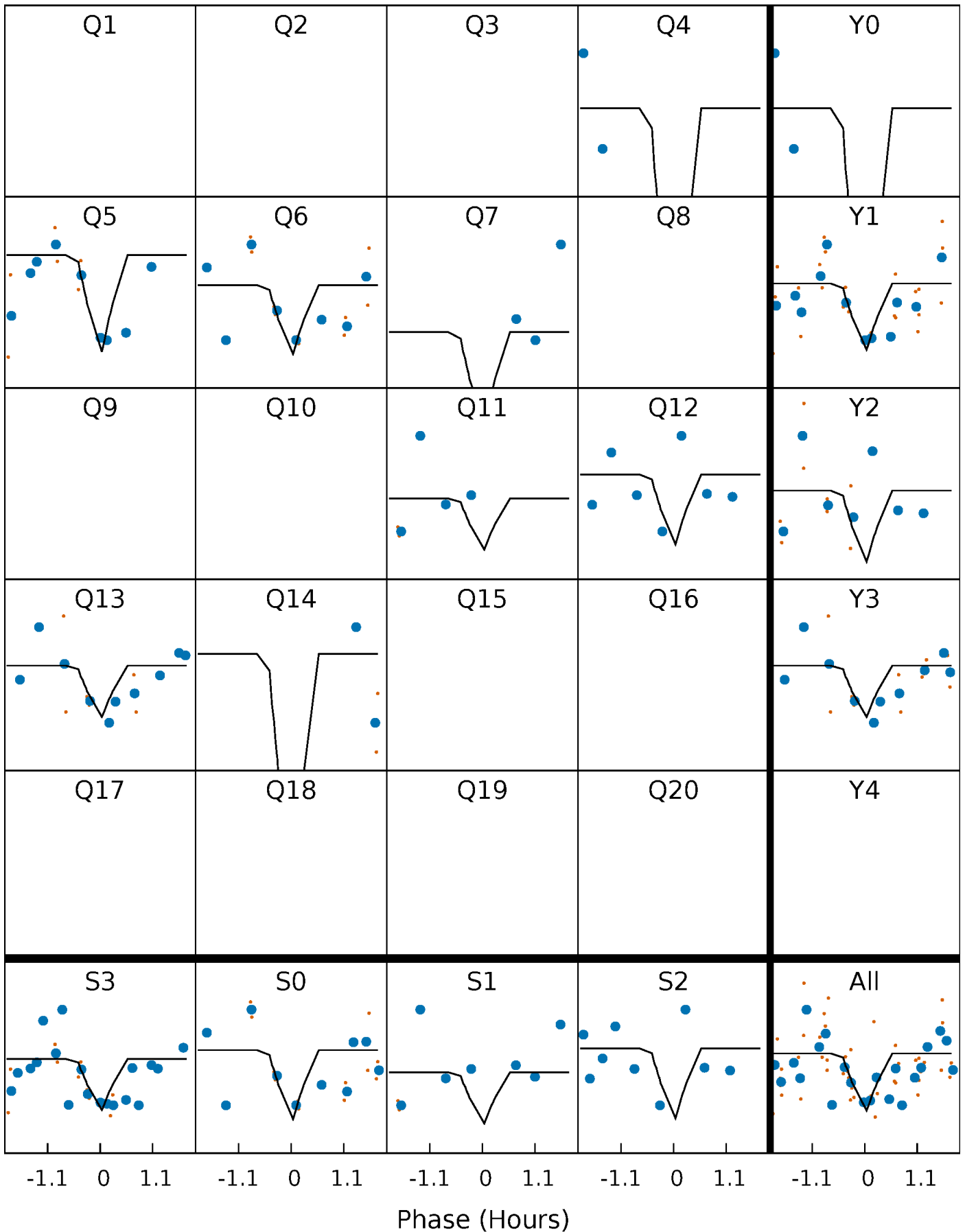
# DV Quarter-Phased Transit Curves

TCE 010724429-02   P= 46.138868 Days    $T_0=171.424038$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010724429-02 P= 46.138588 Days  $T_0=171.418517$  (BKJD)

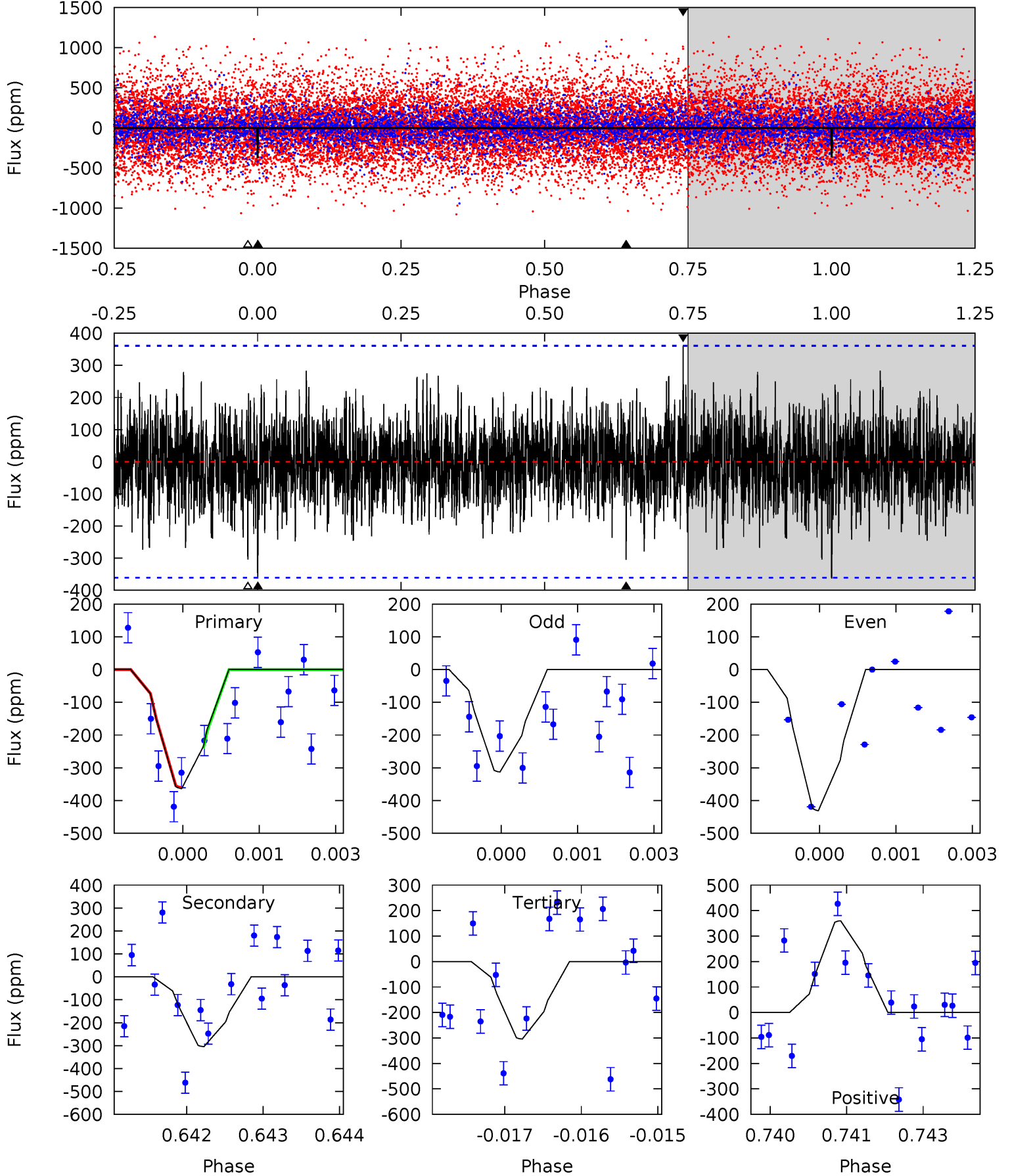




# DV Model-Shift Uniqueness Test

010724429-02, P = 46.138868 Days, E = 125.285170 Days

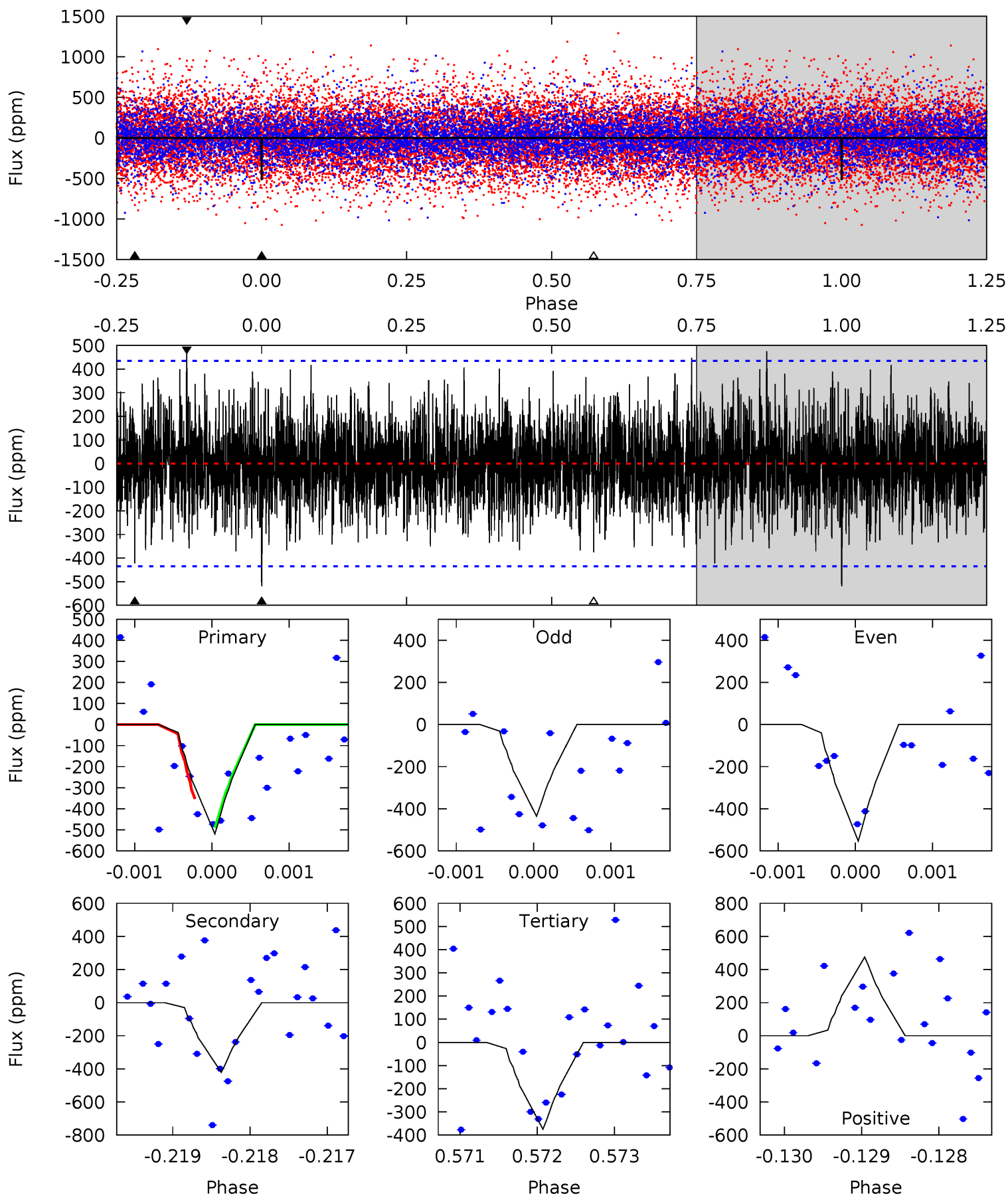
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.44	4.55	4.55	5.39	5.40	3.21	1.27	0.89	0.05	0.00	-0.84	0.88	0.85	0.50	0.86



# Alt Model-Shift Uniqueness Test

010724429-02, P = 46.138588 Days, E = 125.279929 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
6.52	5.30	4.71	5.97	5.46	3.31	1.55	1.81	0.55	0.59	-0.68	0.73	1.02	0.48	0.86



### Stellar Parameters For KIC 010724429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$\rho_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6191^{+166}_{-222}$	$4.454^{+0.054}_{-0.216}$	$-0.100^{+0.250}_{-0.300}$	$1.025^{+0.349}_{-0.116}$	$1.088^{+0.153}_{-0.137}$	$1.423^{+0.343}_{-0.796}$
	+3%/-4%	+1%/-5%	+250%/-300%	+34%/-11%	+14%/-13%	+24%/-56%
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 010724429-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-304 \pm 67$	$10.42^{+10.45}_{-7.33}$	$775^{+58}_{-43}$	$3297^{+1880}_{-608}$	$102^{+1049}_{-78}$
Alt.	$-422 \pm 80$	$10.05^{+10.89}_{-7.05}$	$780^{+59}_{-41}$	$3497^{+2046}_{-669}$	$144^{+1623}_{-110}$

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

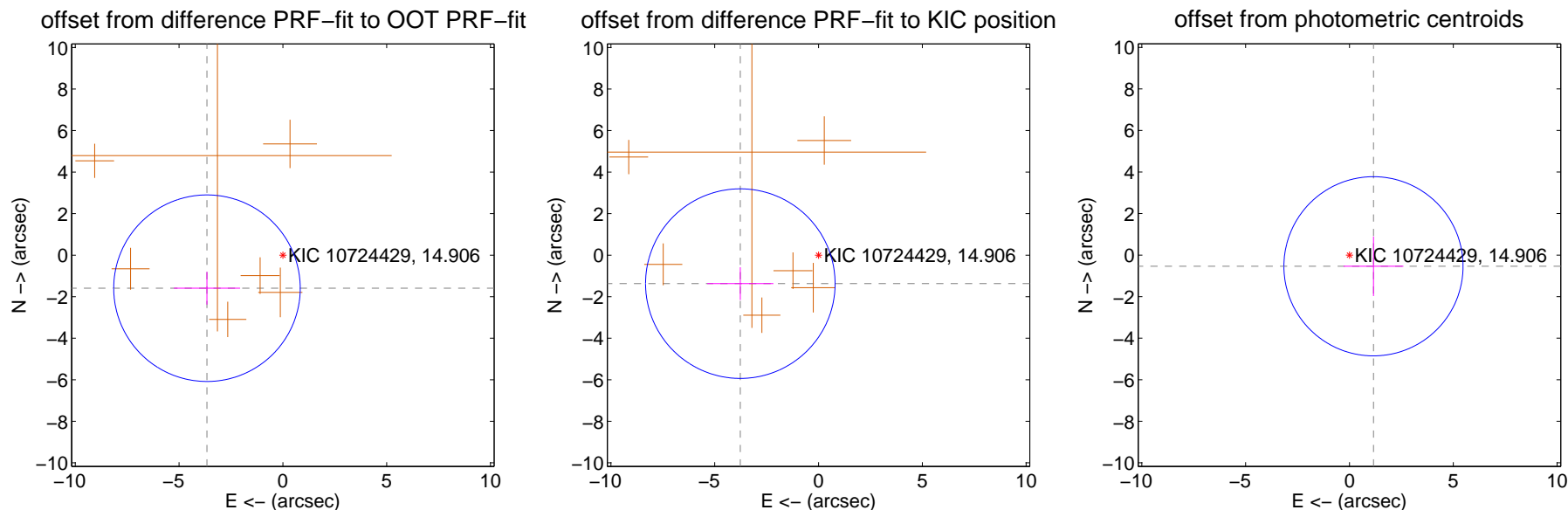
## DV Centroid Data

Supplemental centroid analysis for 010724429-02. Kepler magnitude: 14.91. Transit SNR 7.64

There are 0 quarters with good PRF difference image offsets

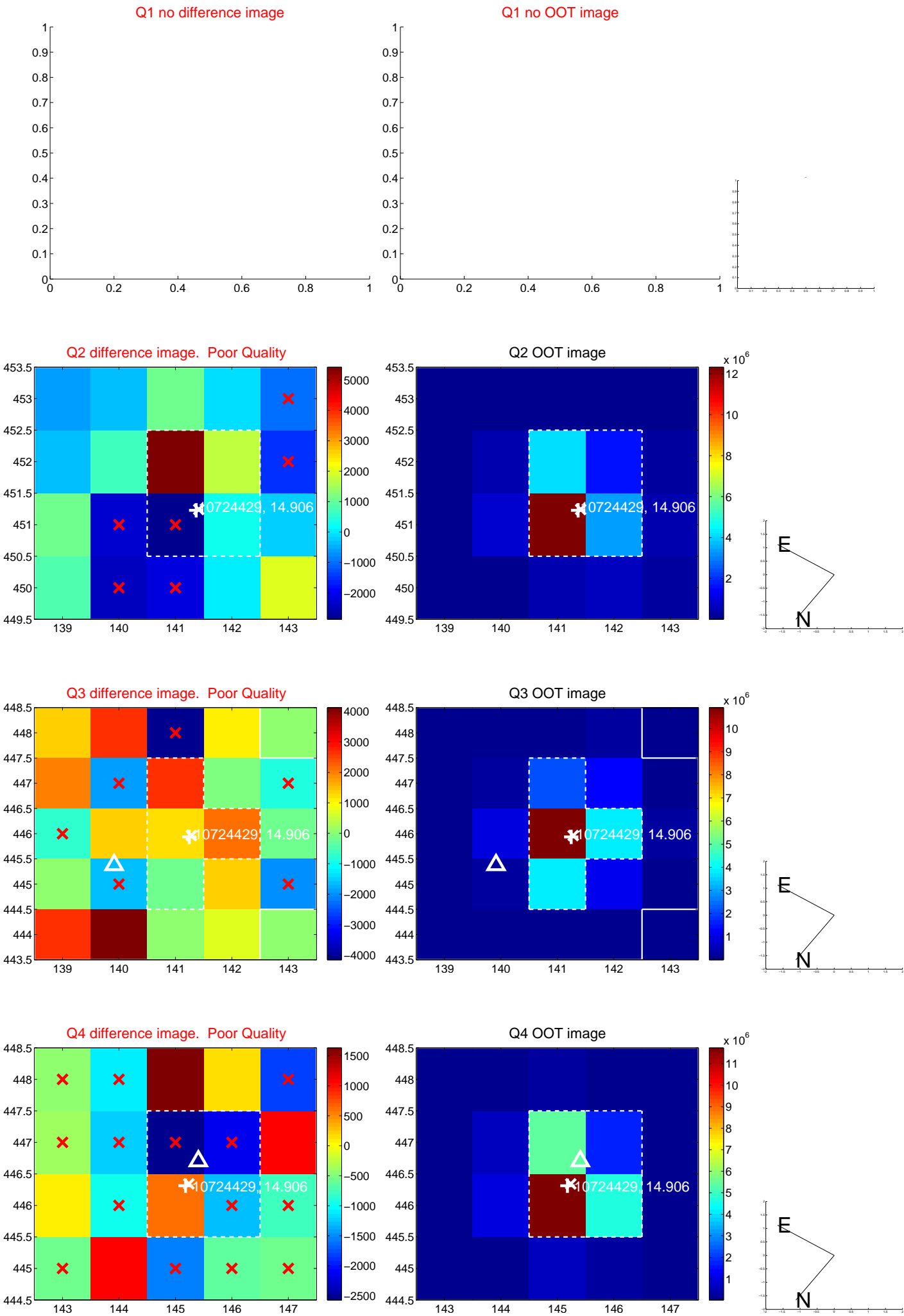
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.987 \pm 1.497$	2.66	$3.655 \pm 1.596$	$-1.591 \pm 0.788$
PRF-fit source offset from KIC position	$4.008 \pm 1.521$	2.63	$3.766 \pm 1.593$	$-1.371 \pm 0.790$
photometric centroid source offset	$1.28 \pm 1.44$	0.89	$-1.16 \pm 1.44$	$-0.54 \pm 1.43$

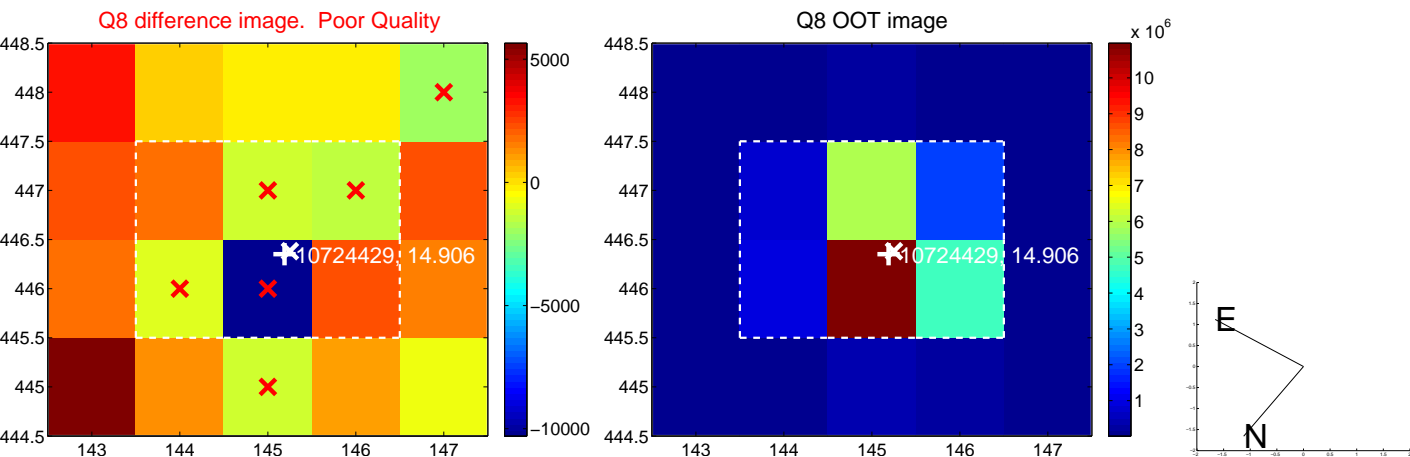
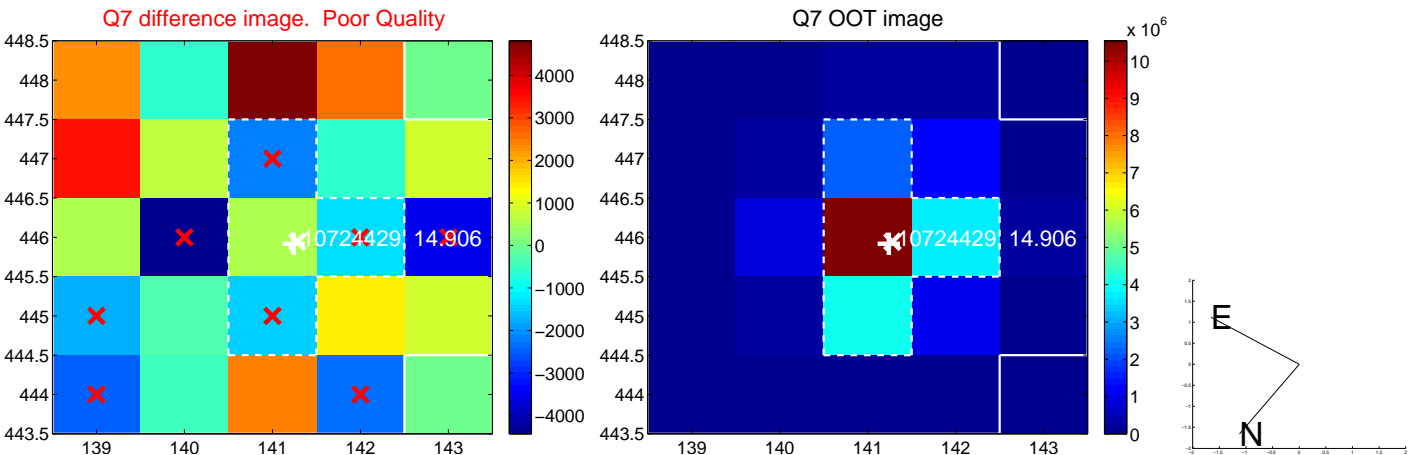
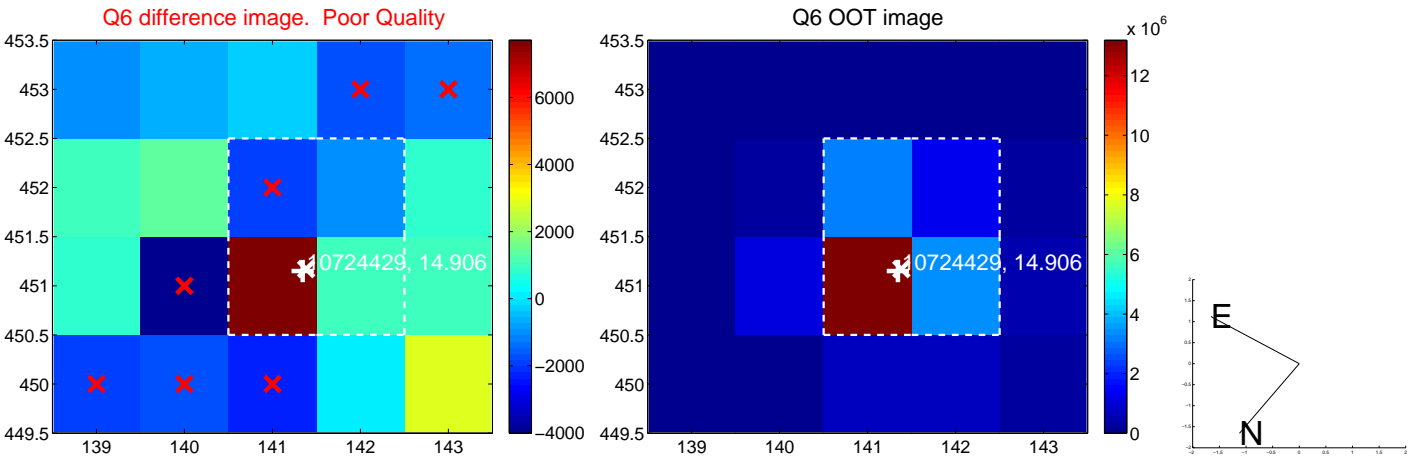
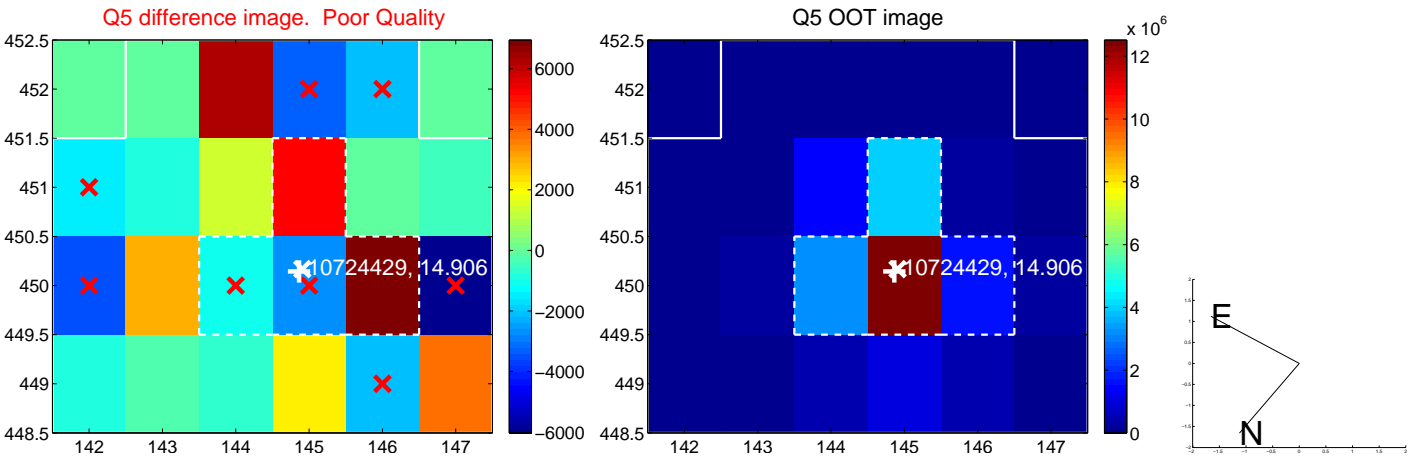


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

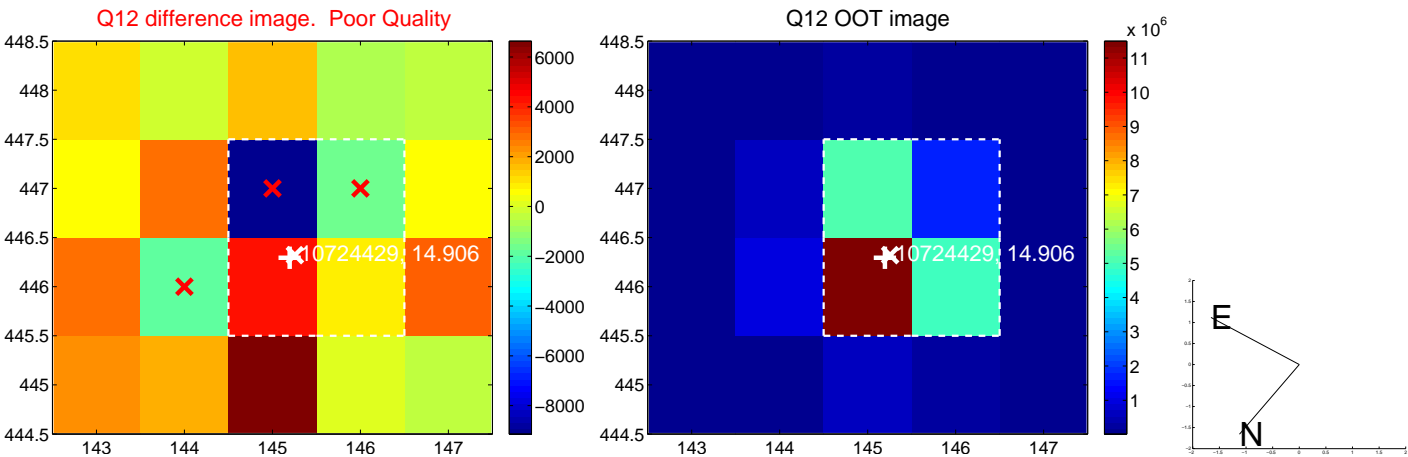
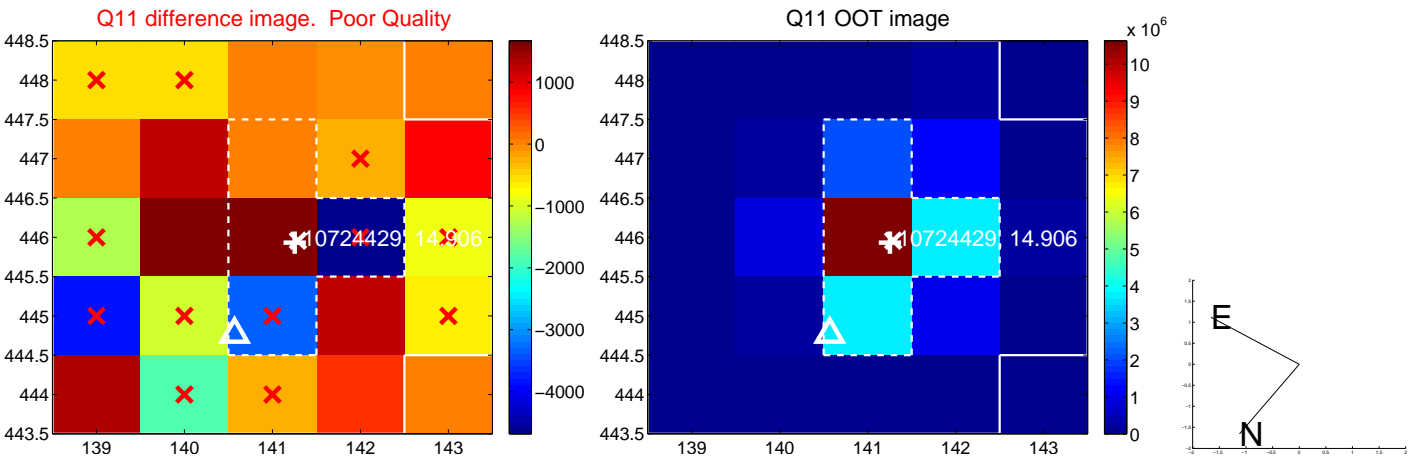
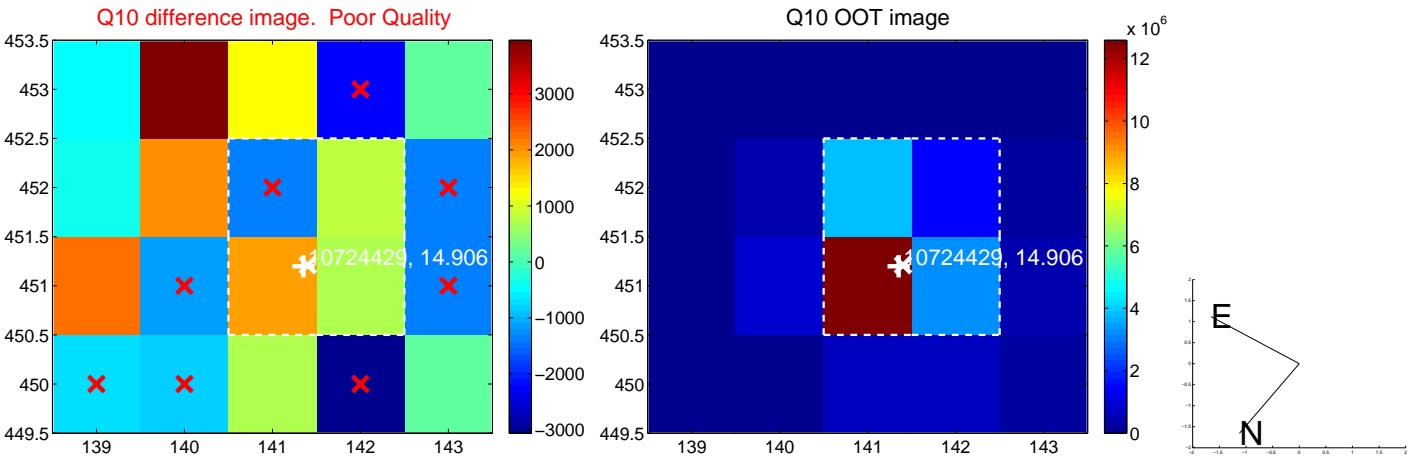
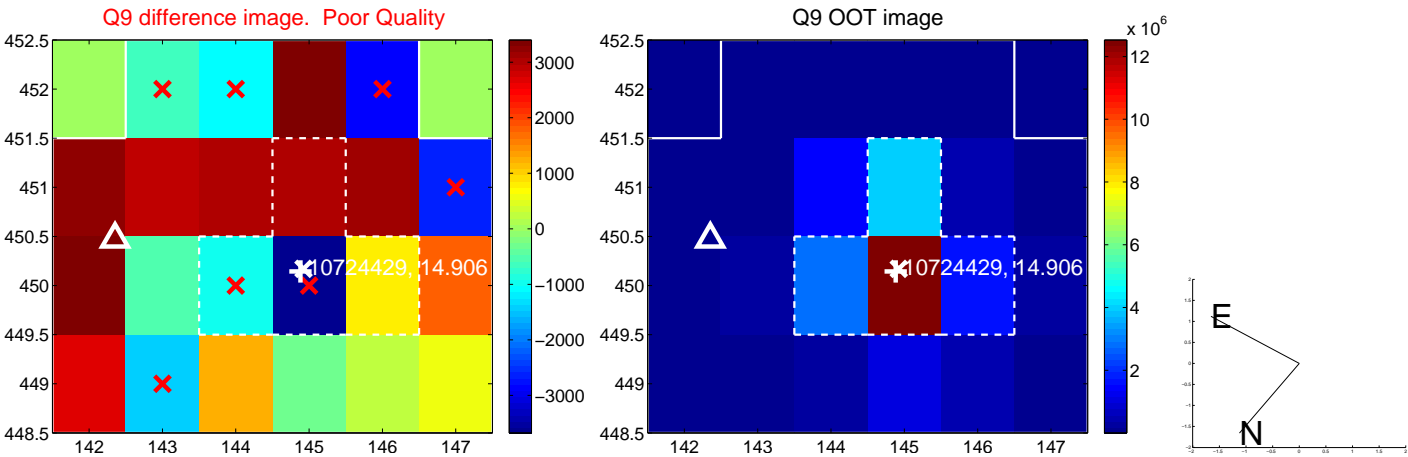


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

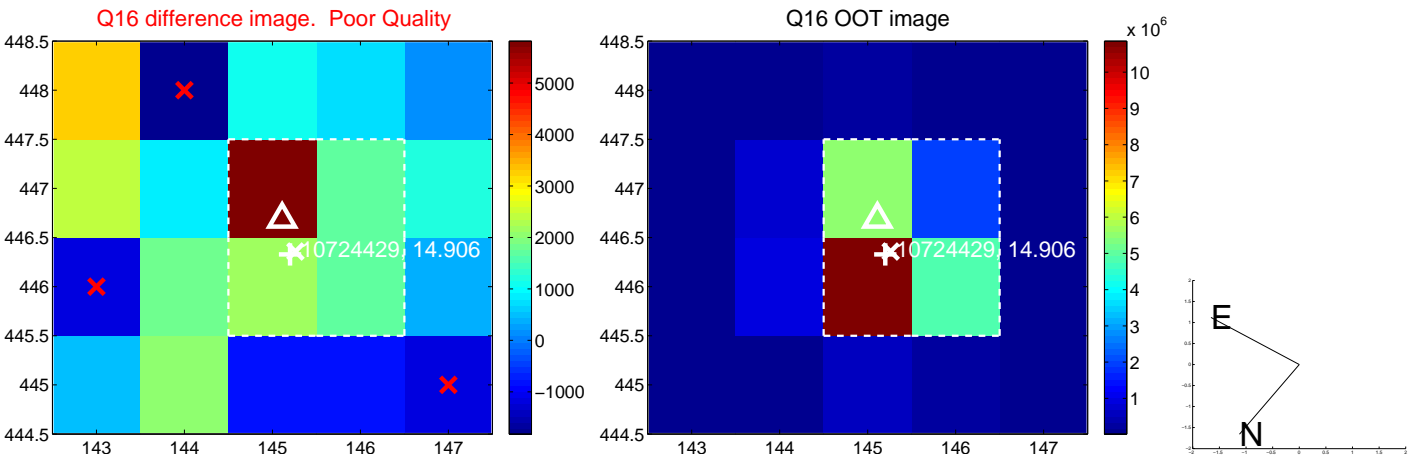
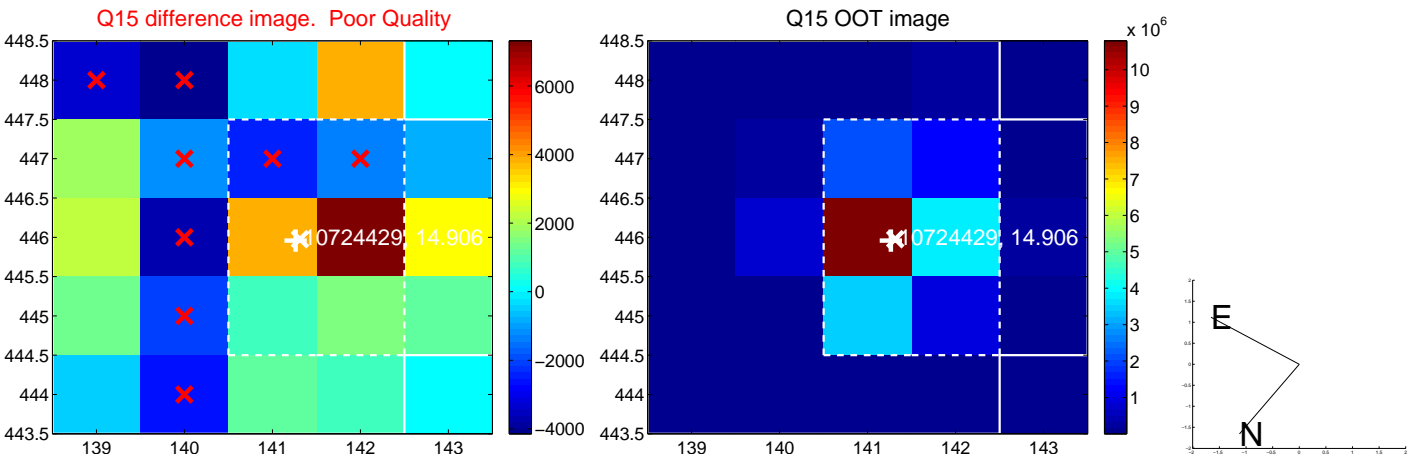
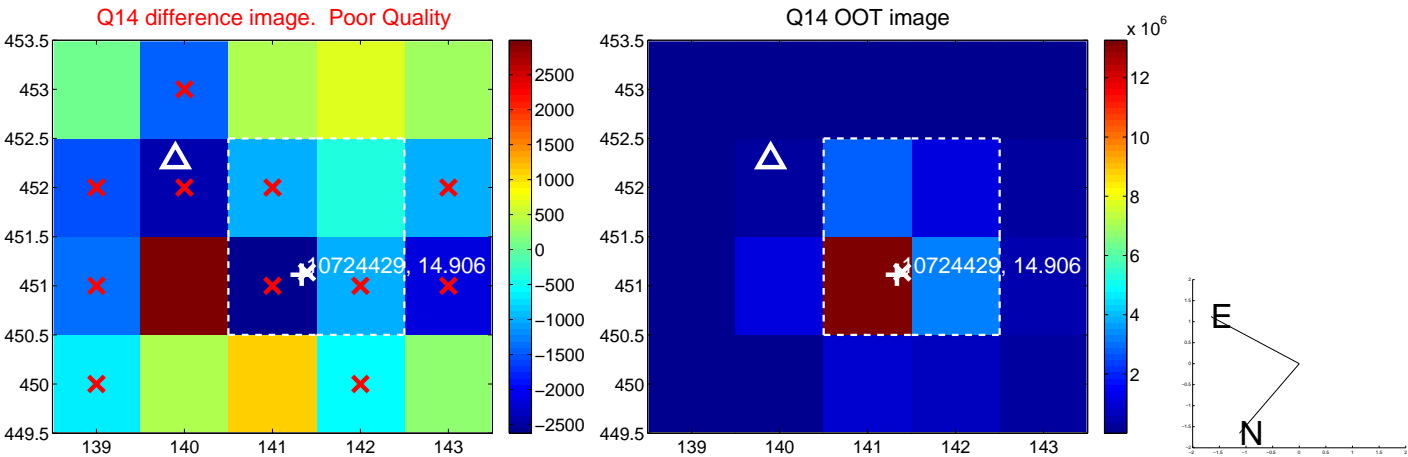
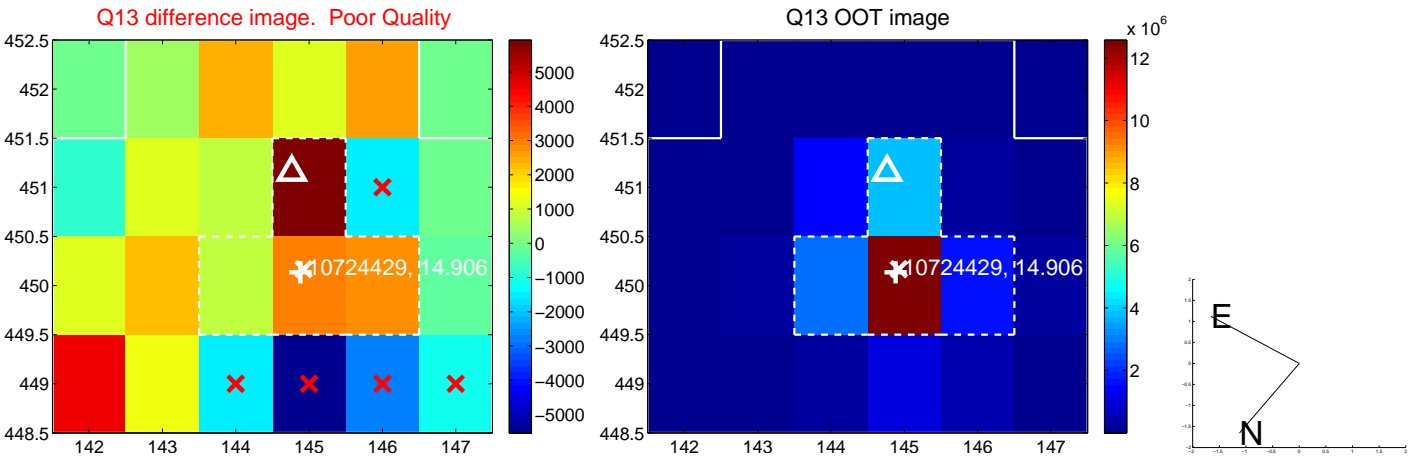




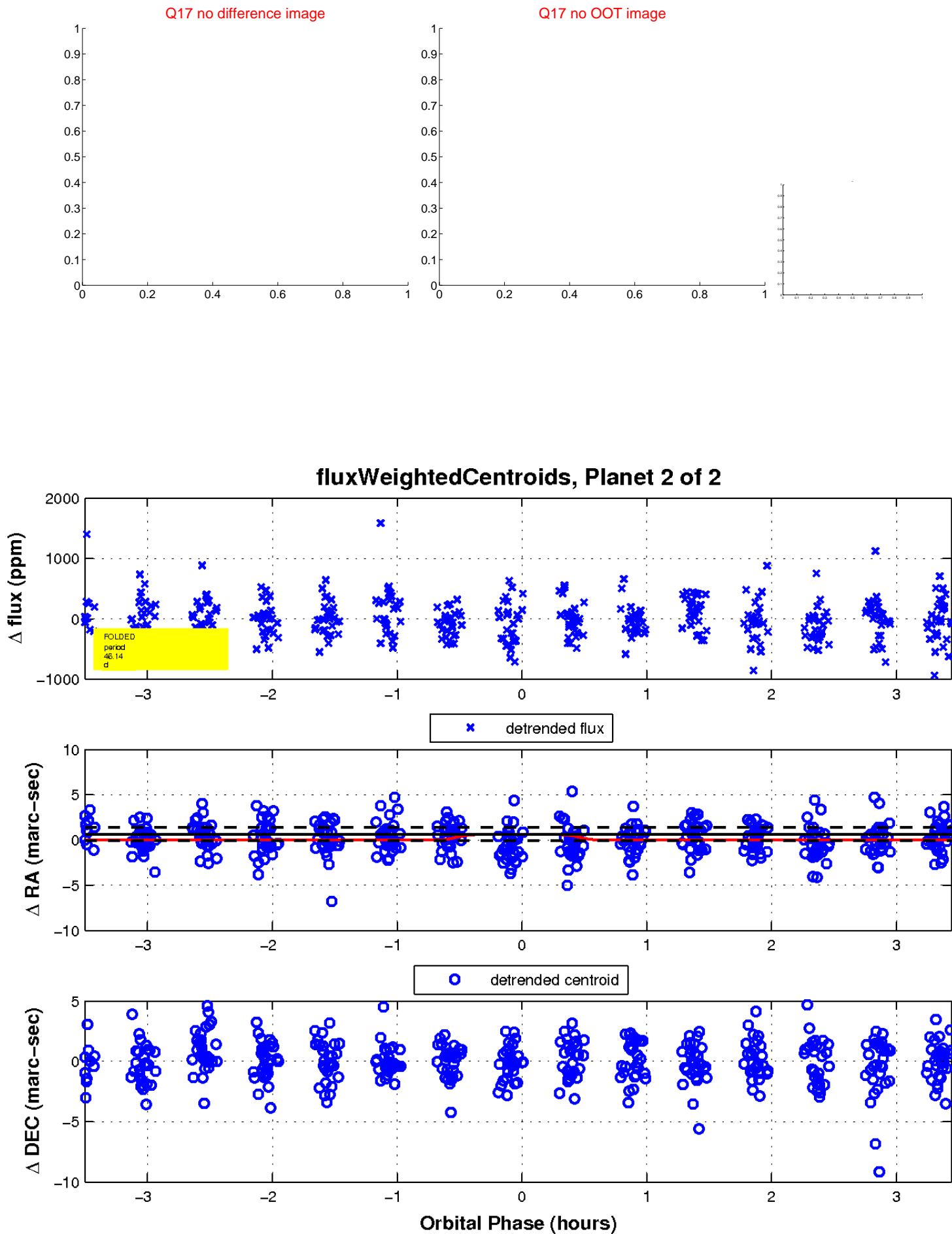
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

