

# KIC 005738431

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005738431-01	OBS	No	0.921183	131.974818	64.3	3.002	8.6	7.1	0.94	5318	0.92	1994.20
005738431-02	OBS	No	4.418474	133.846104	157.6	5.436	8.1	7.6	0.94	5318	1.47	246.53

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005738431-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
005738431-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS

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

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

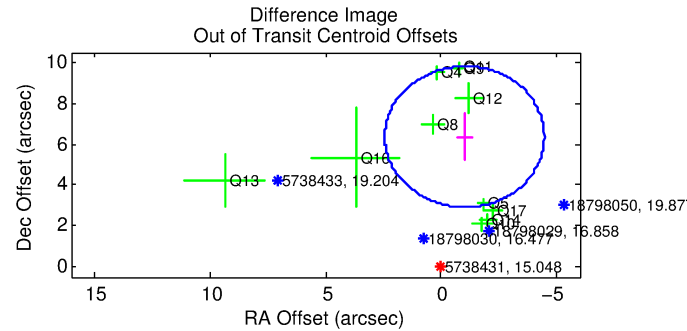
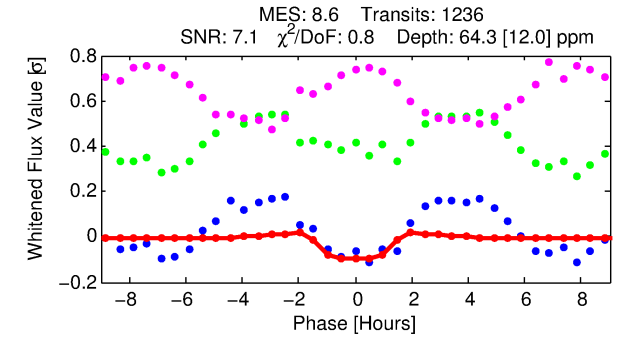
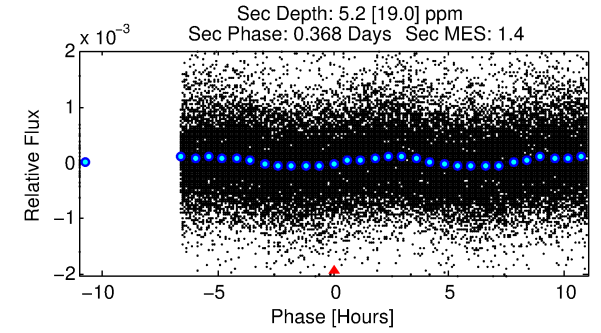
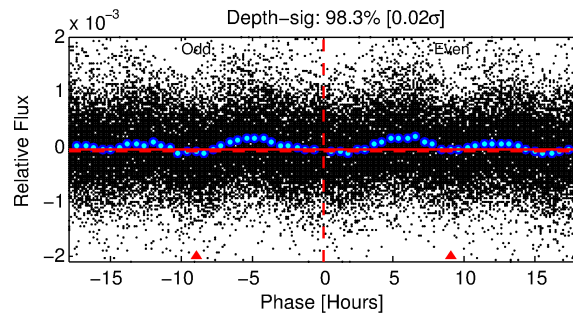
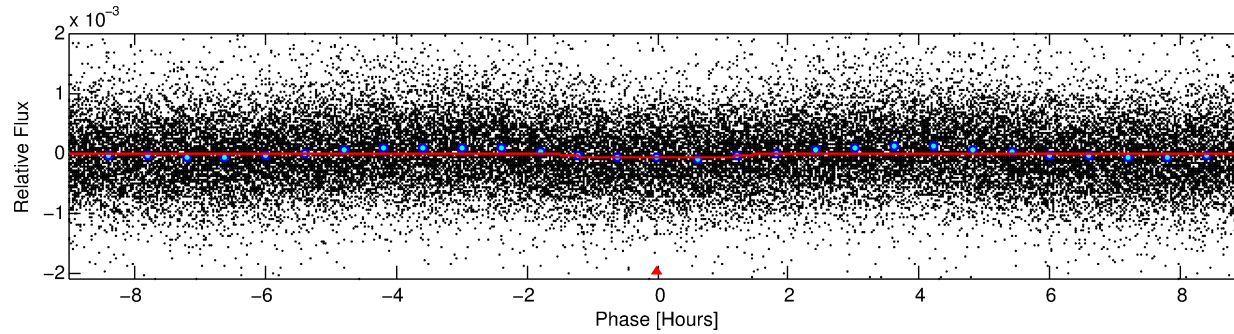
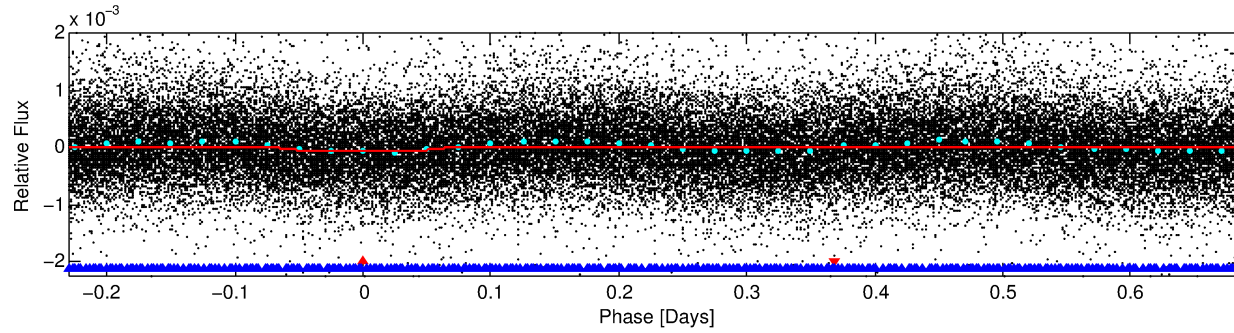
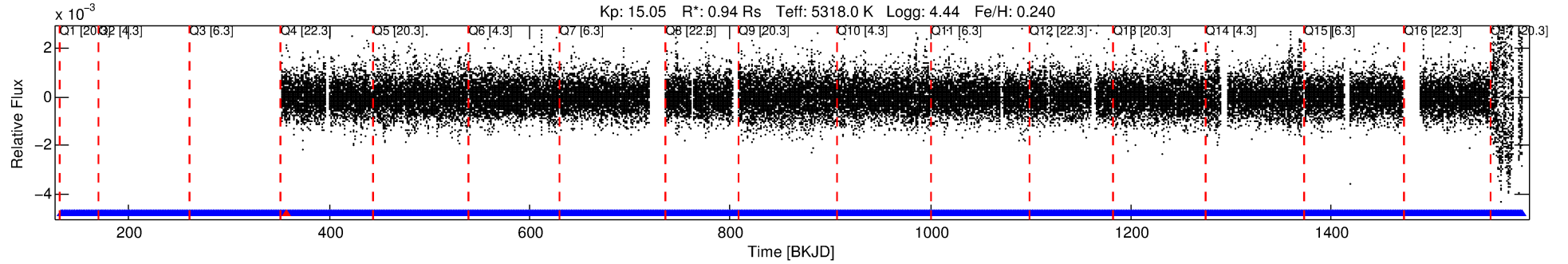
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005738431-01

No Significant Match Found

# DV One-Page Summary

KIC: 5738431 Candidate: 1 of 2 Period: 0.921 d



## DV Fit Results:

Period = 0.92118 [0.00001] d  
Epoch = 131.9748 [0.0041] BKJD  
Rp/R\* = 0.0089 [0.0072]  
a/R\* = 1.42 [2.49]  
b = 0.90 [0.75]  
Seff = 1994.20 [633.42]  
Teq = 1704 [135] K  
Rp = 0.91 [0.77] Re  
a = 0.0179 [0.0035] AU  
Ag = 1.10 [4.38] [0.02σ]  
Teffp = 2695 [2688] K [0.37σ]

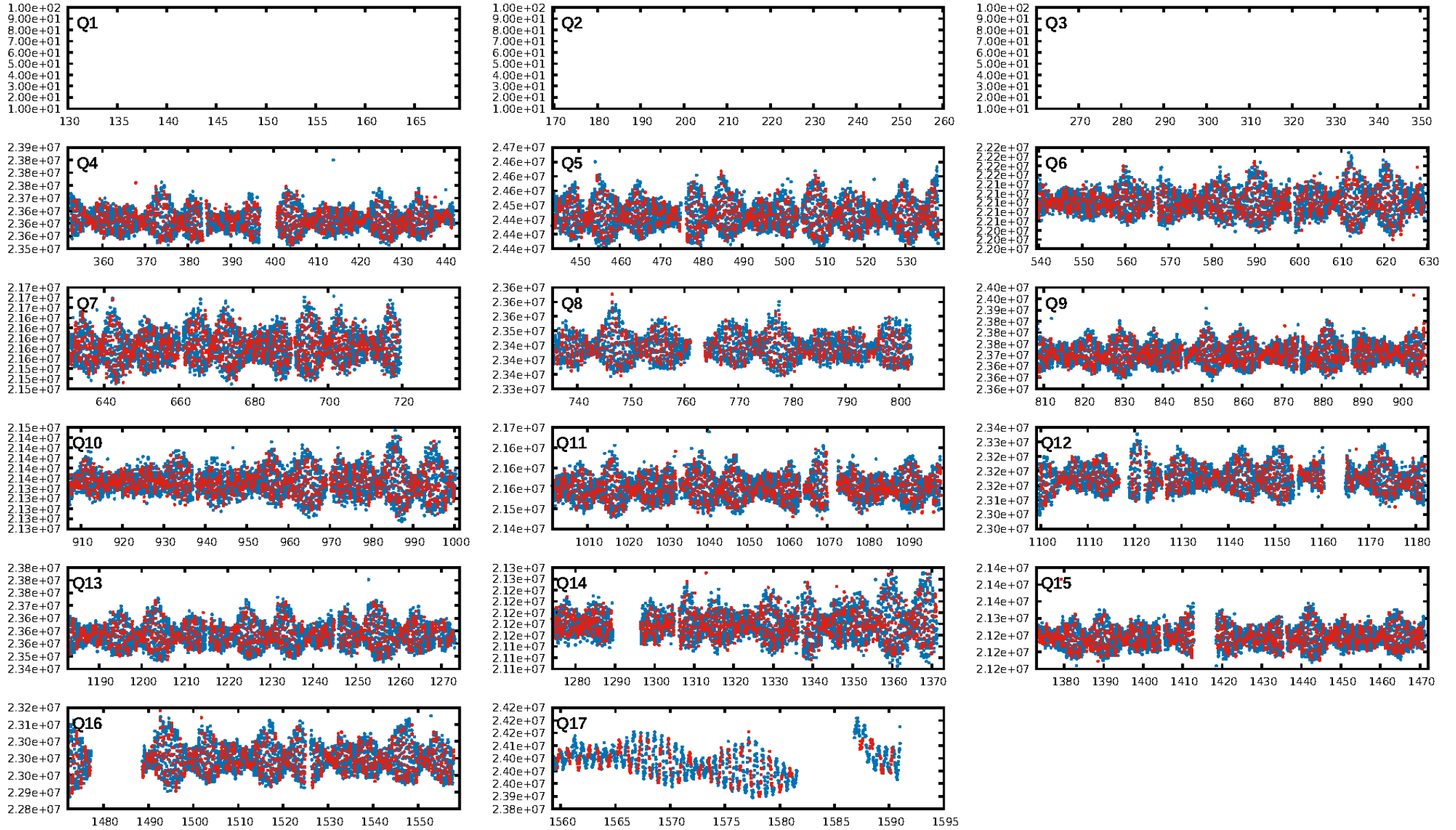
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [13.52σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.83e-15  
RollingBand-fgt: 1.00 [1207/1208]  
**GhostDiagnostic-chr: 0.355**  
**Centroid-sig: 0.0%**  
Centroid-so: 0.709 arcsec [0.94σ]  
**OotOffset-rm: 6.447 arcsec [5.61σ]**  
KicOffset-rm: 2.634 arcsec [2.30σ]  
OotOffset-st: 2/1/4/4 [11]  
KicOffset-st: 2/1/4/4 [11]  
DiffImageQuality-fgm: 0.73 [8/11]  
DiffImageOverlap-fno: 1.00 [14/14]

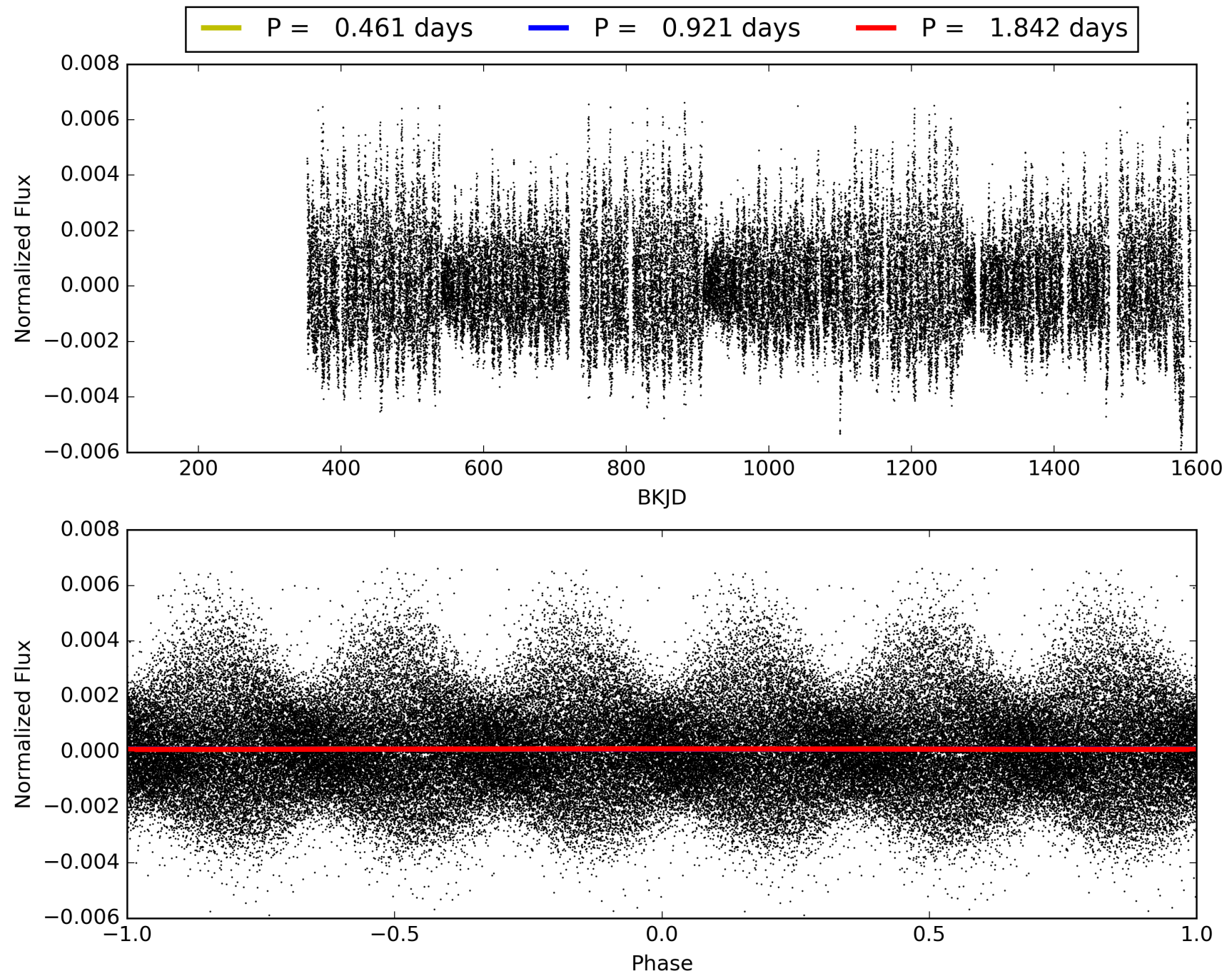
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005738431-01, PDC Light Curves



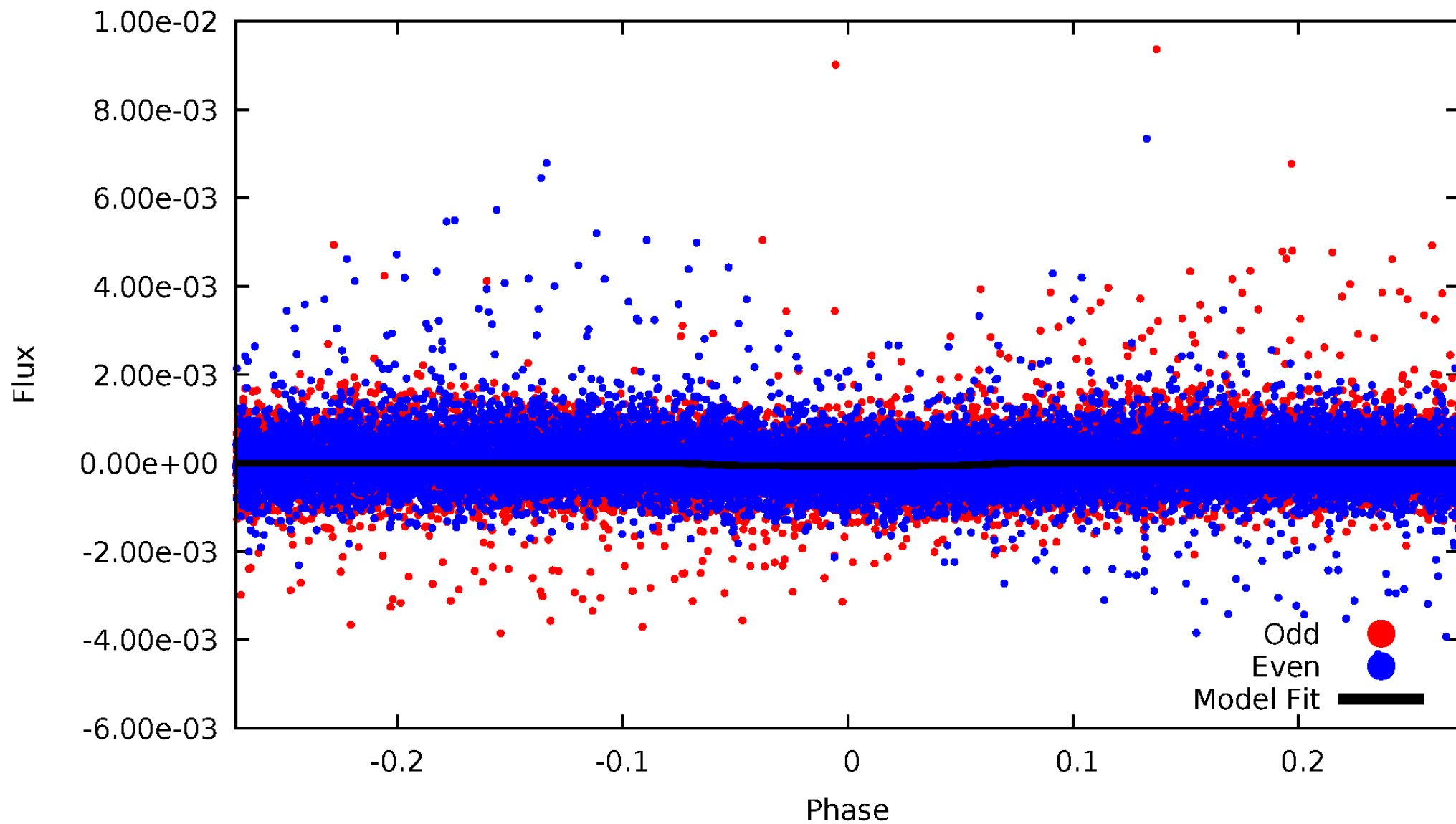
TCE 005738431-01





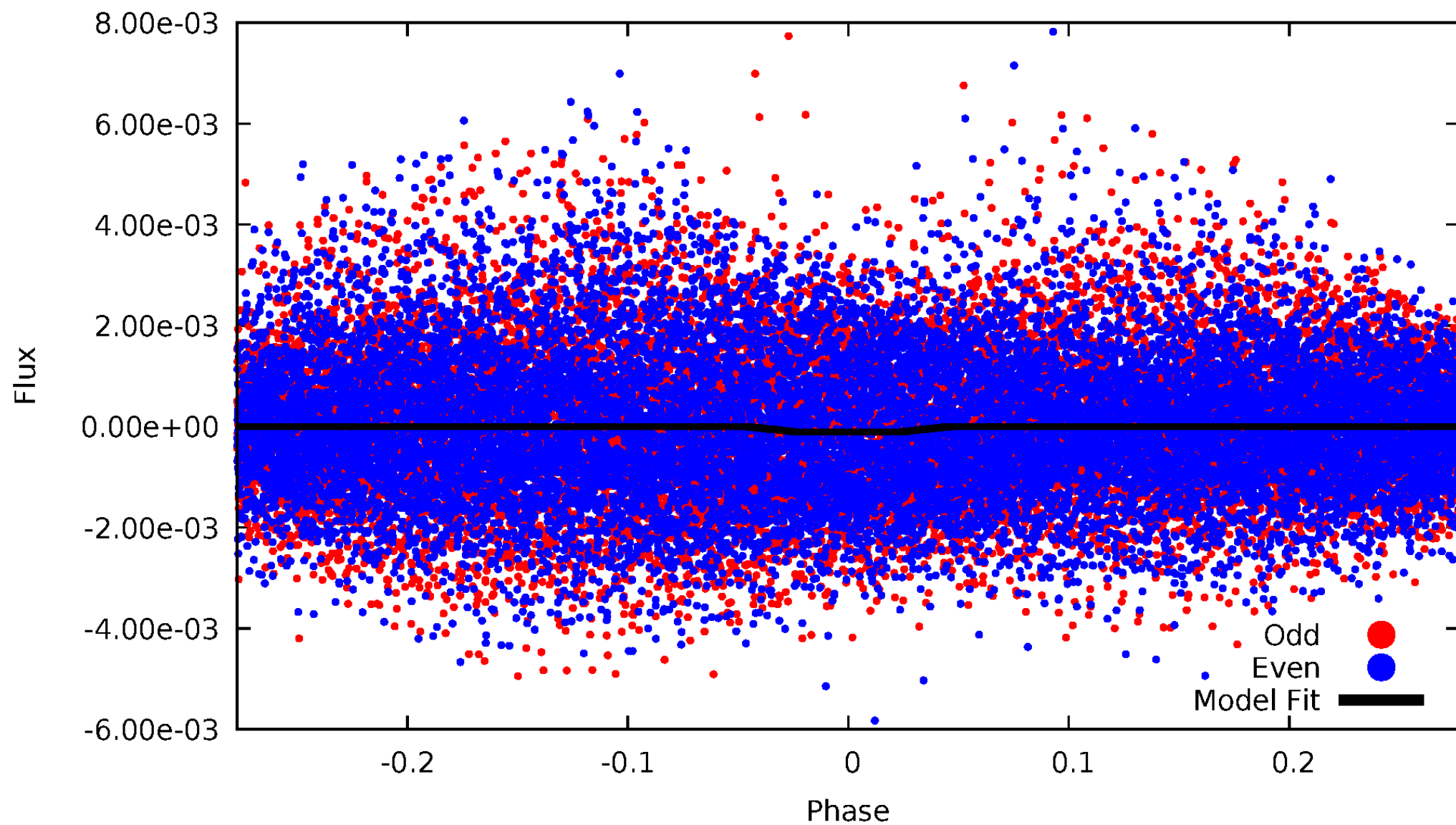
# DV Odd/Even

TCE 005738431-01

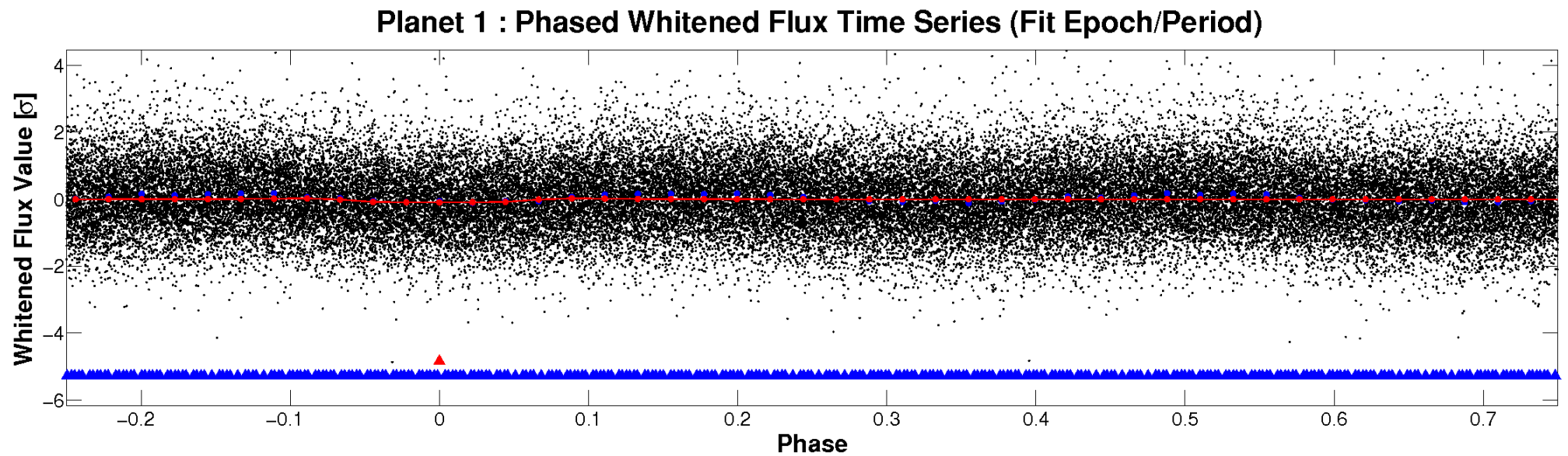
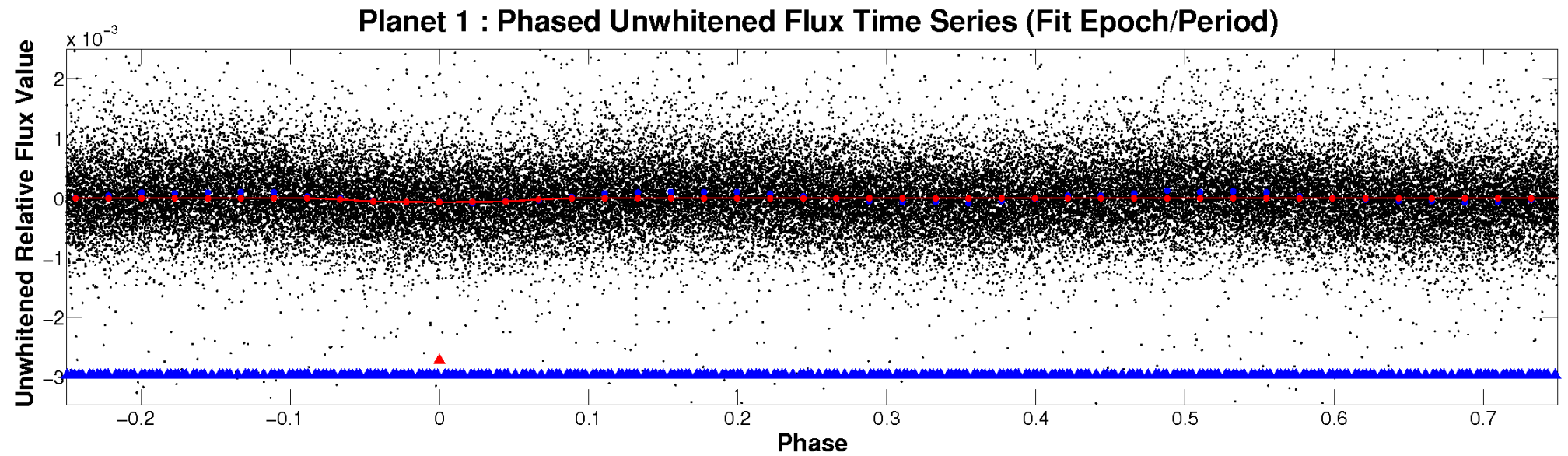


# ALT Odd/Even

TCE 005738431-01

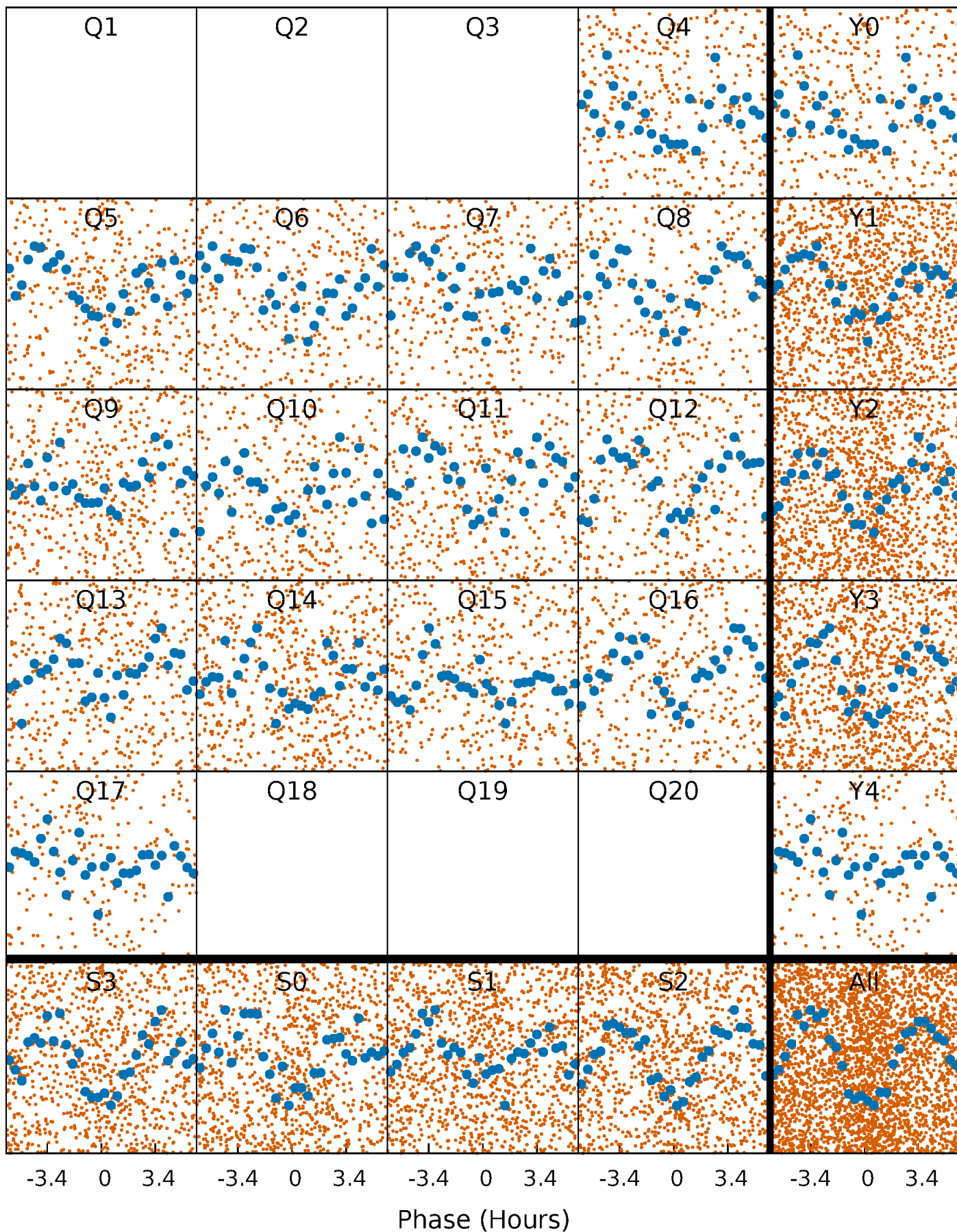


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

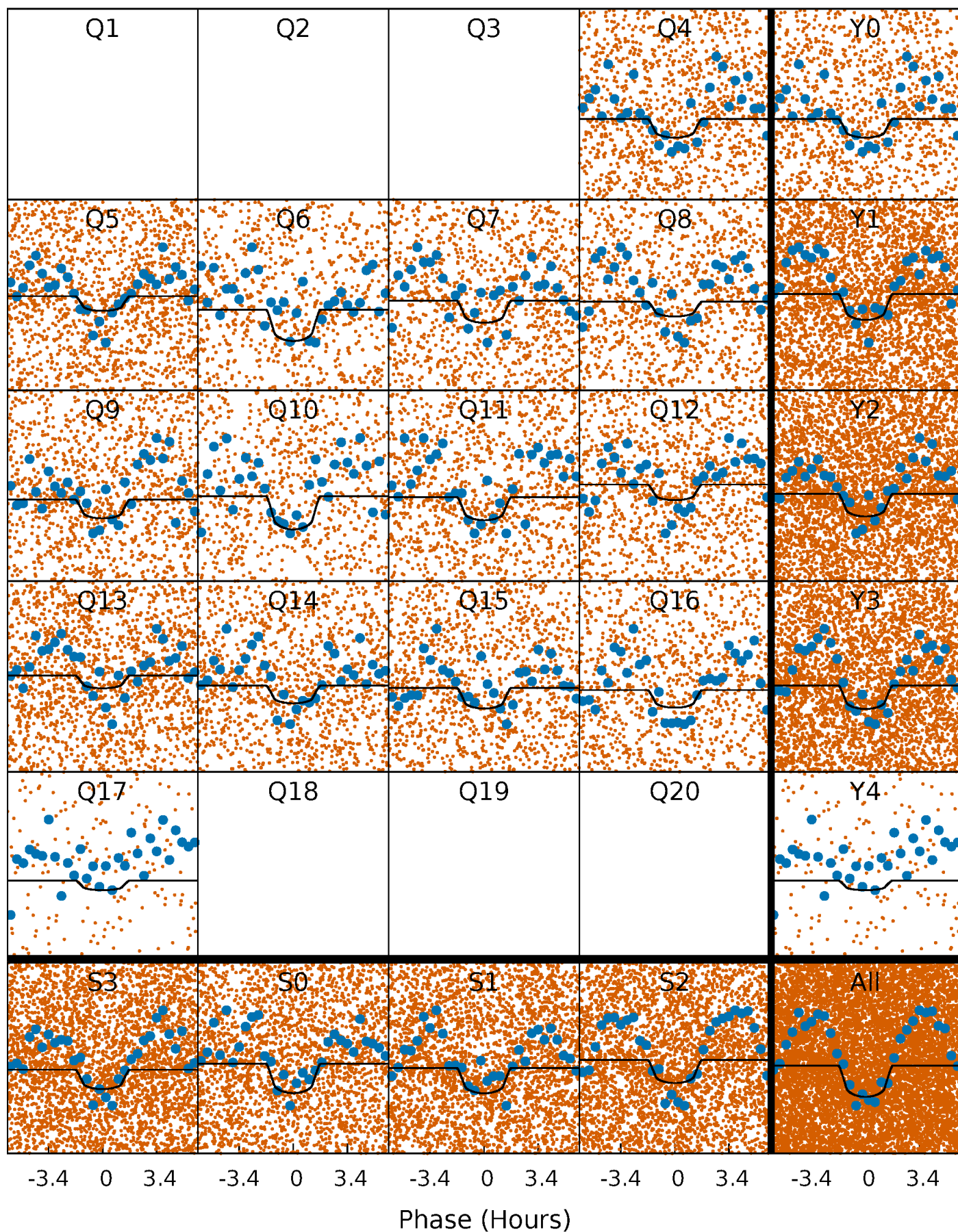
TCE 005738431-01 P= 0.921183 Days  $T_0=131.974818$  (BKJD)





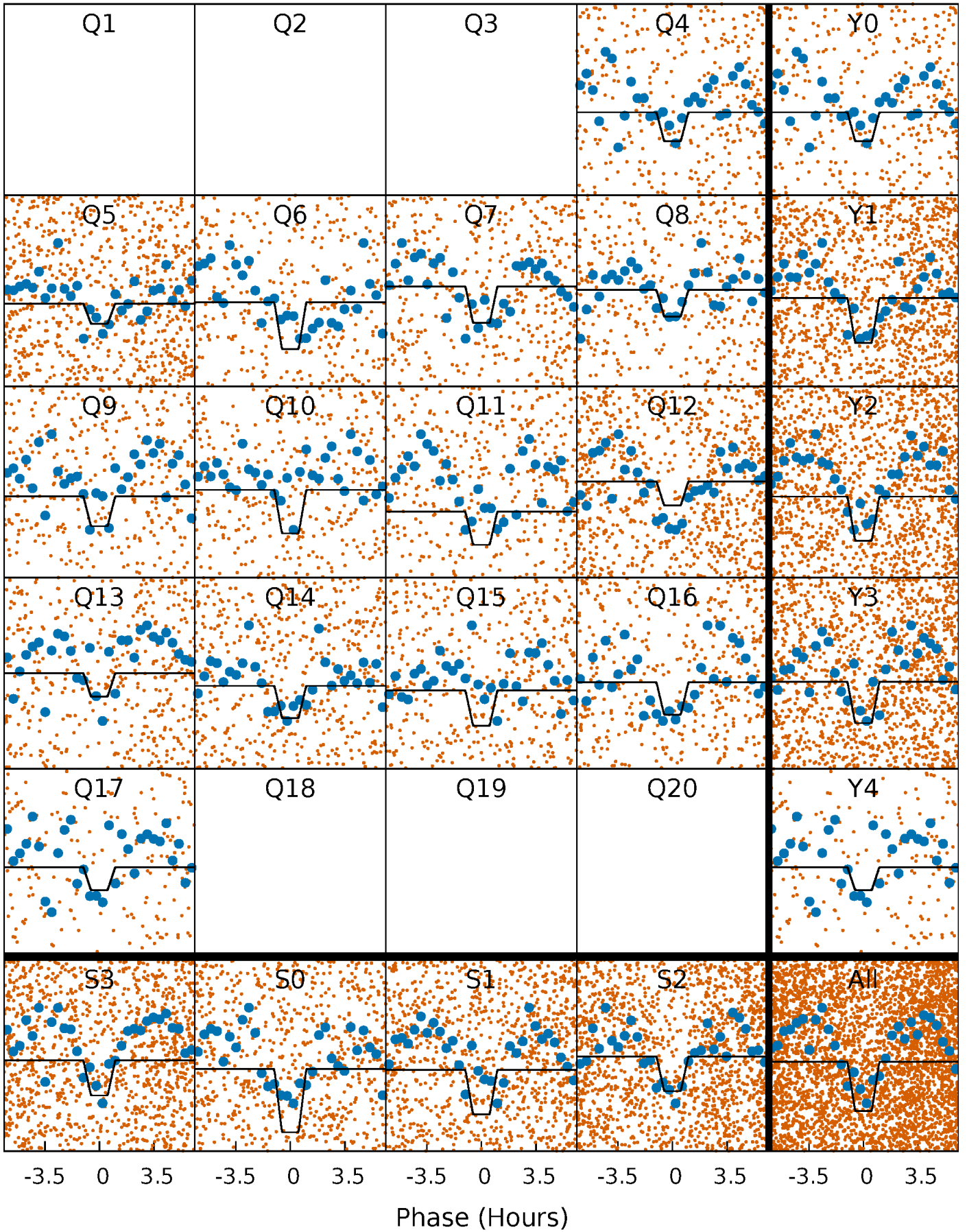
# DV Quarter-Phased Transit Curves

TCE 005738431-01 P= 0.921183 Days  $T_0=131.974818$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

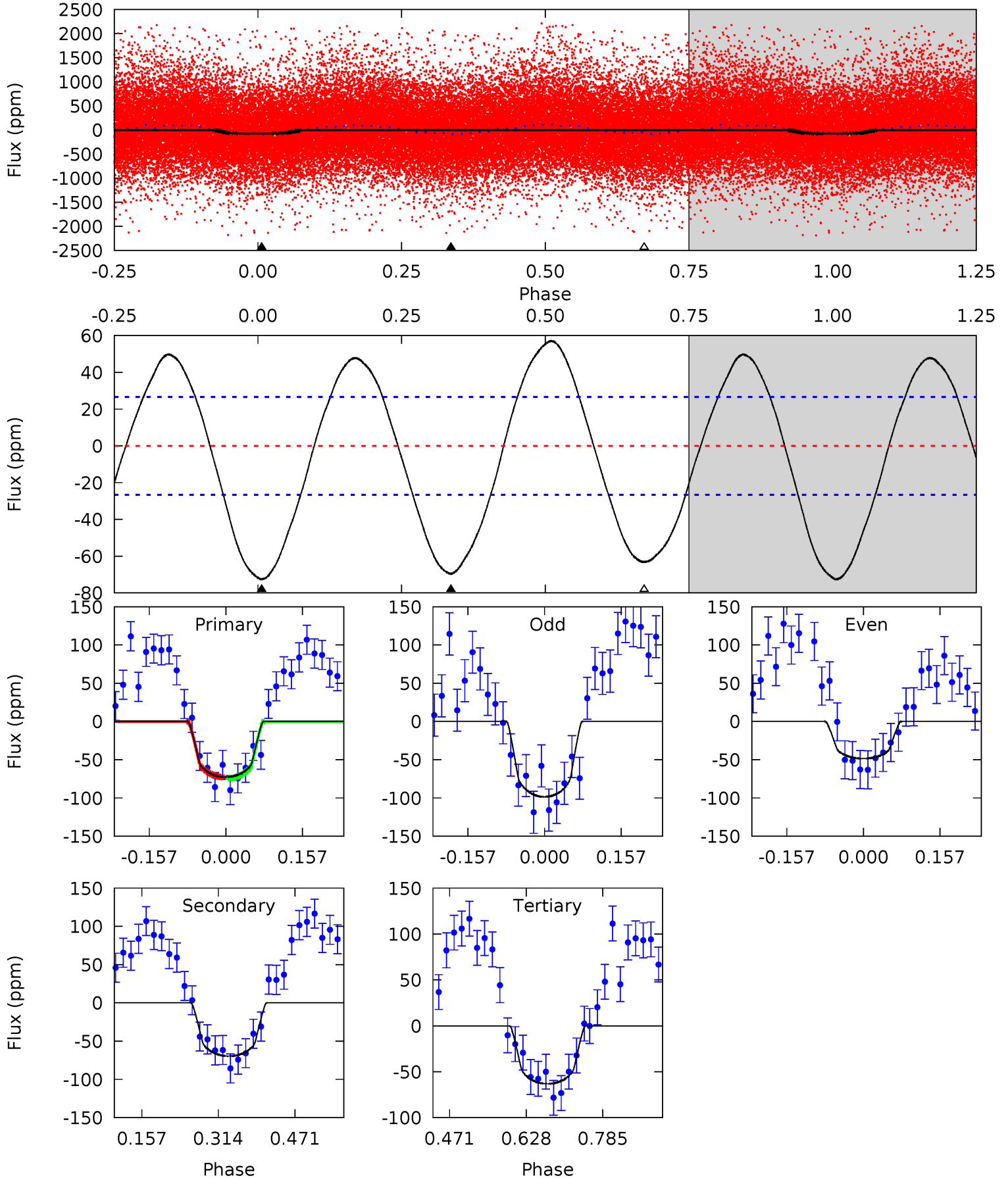
TCE 005738431-01 P= 0.921197 Days  $T_0=131.975232$  (BKJD)



# DV Model-Shift Uniqueness Test

005738431-01, P = 0.921183 Days, E = 131.974818 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
12.2	11.7	10.6	0	4.47	1.42	7.13	1.58	12.2	1.08	11.7	4.23	1.22	0.44	0.14

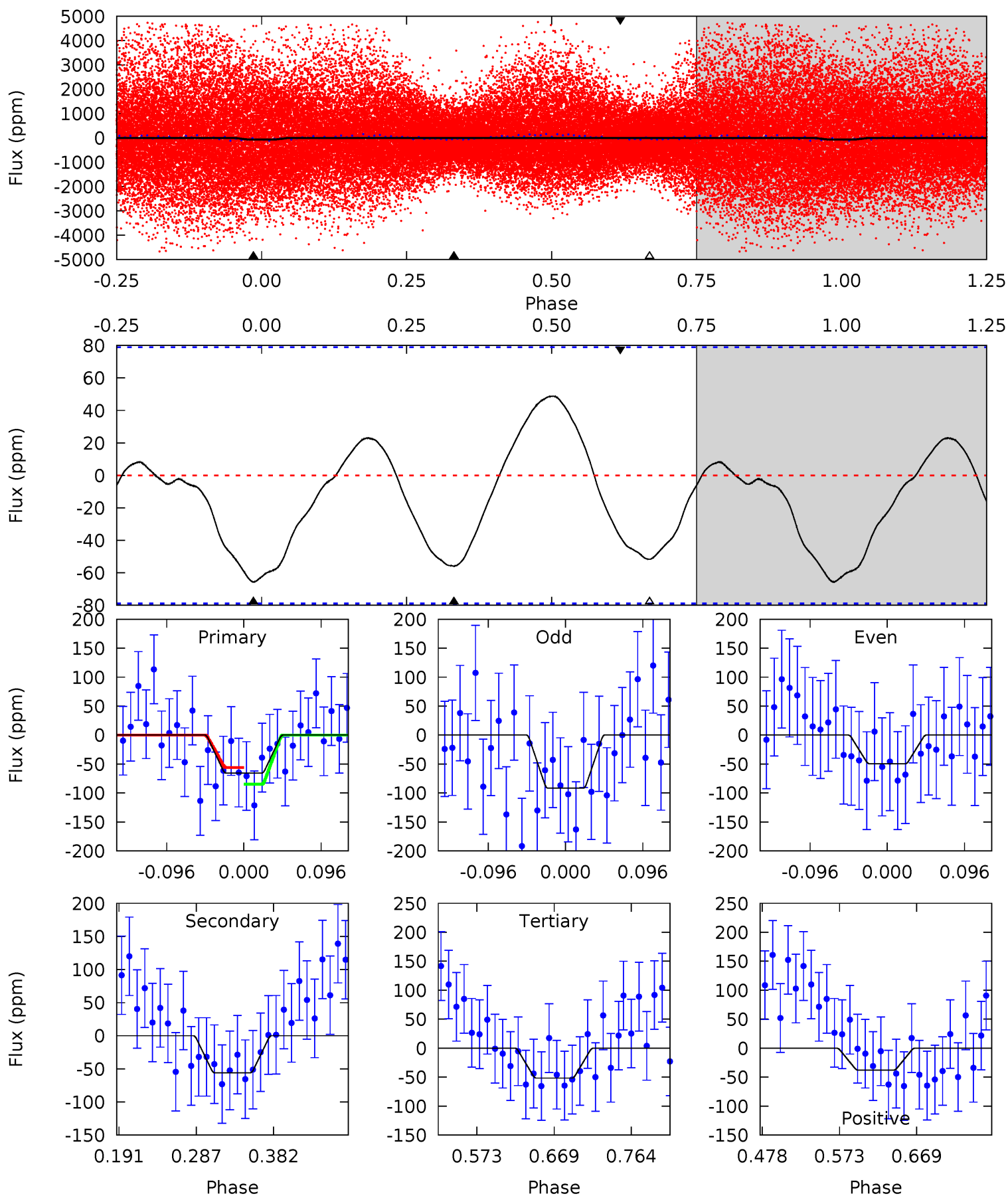




# Alt Model-Shift Uniqueness Test

005738431-01, P = 0.921197 Days, E = 131.975232 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
3.80	3.24	2.99	-2.19	4.57	1.67	1.59	0.80	5.99	0.25	5.43	1.24	0.45	0.43	0.89





### Stellar Parameters For KIC 005738431

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5318^{+186}_{-167}$	$4.442^{+0.104}_{-0.156}$	$0.240^{+0.200}_{-0.300}$	$0.943^{+0.219}_{-0.135}$	$0.897^{+0.079}_{-0.071}$	$1.505^{+0.674}_{-0.635}$
	+3%/-3%	+2%/-4%	+83%/-125%	+23%/-14%	+9%/-8%	+45%/-42%
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 005738431-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-70 \pm 6$	$1.09^{+0.71}_{-0.67}$	$2392^{+167}_{-129}$	$4822^{+2877}_{-884}$	$10^{+55}_{-6}$
Alt.	$-56 \pm 17$	$1.10^{+0.80}_{-0.63}$	$2399^{+158}_{-124}$	$4532^{+2280}_{-876}$	$7.520^{+39.019}_{-5.044}$

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

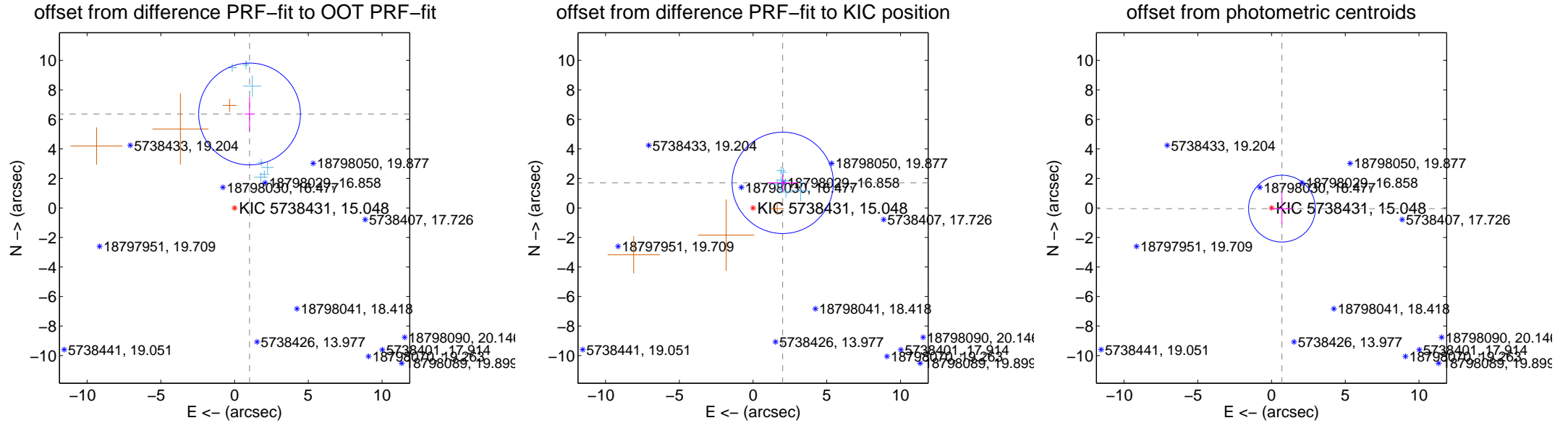
## DV Centroid Data

Supplemental centroid analysis for 005738431-01. Kepler magnitude: 15.05. Transit SNR 7.10

There are 8 quarters with good PRF difference image offsets

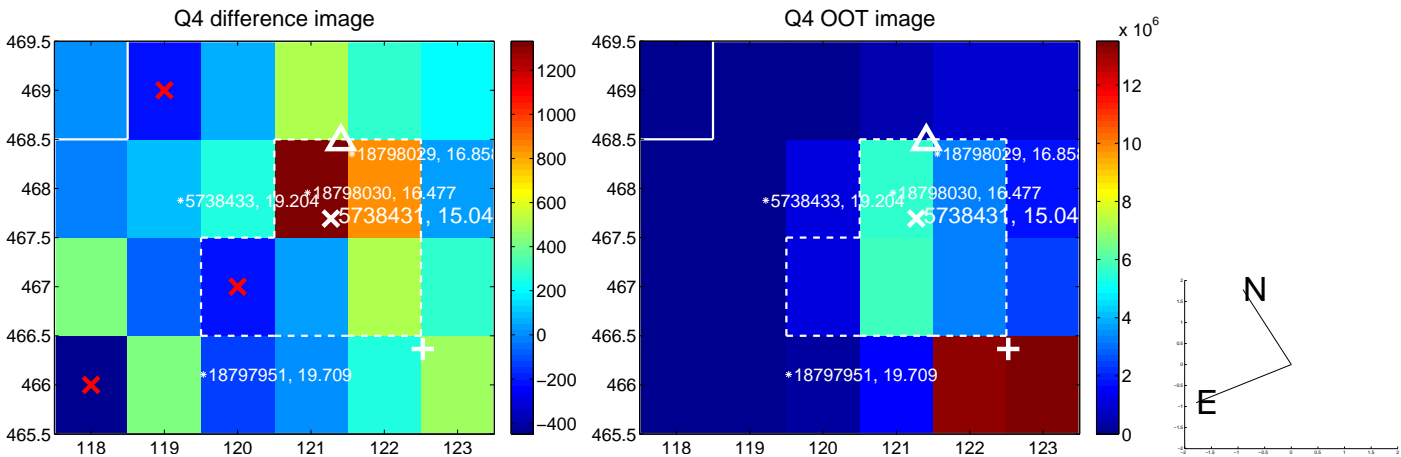
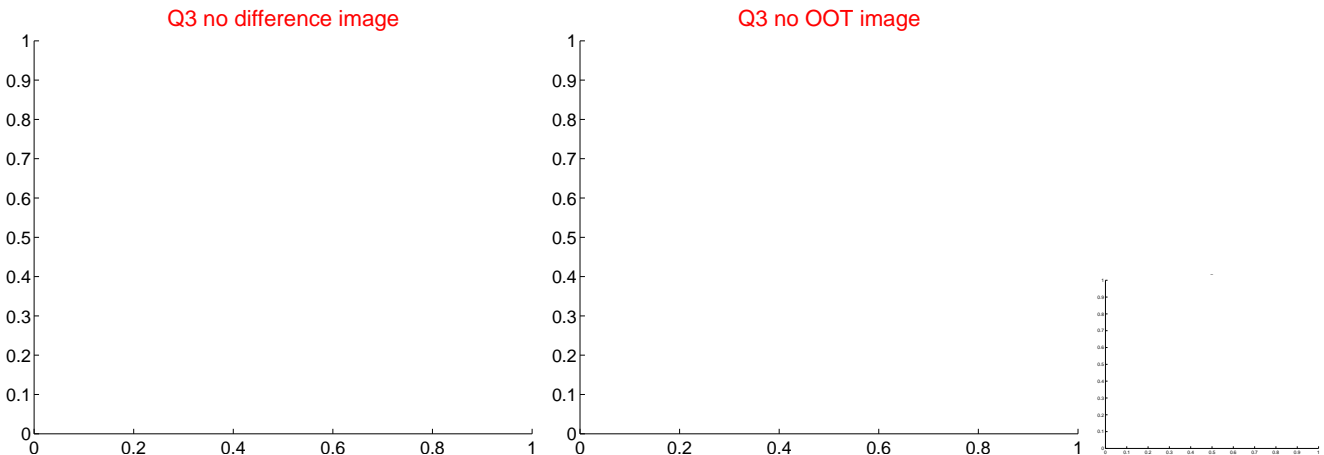
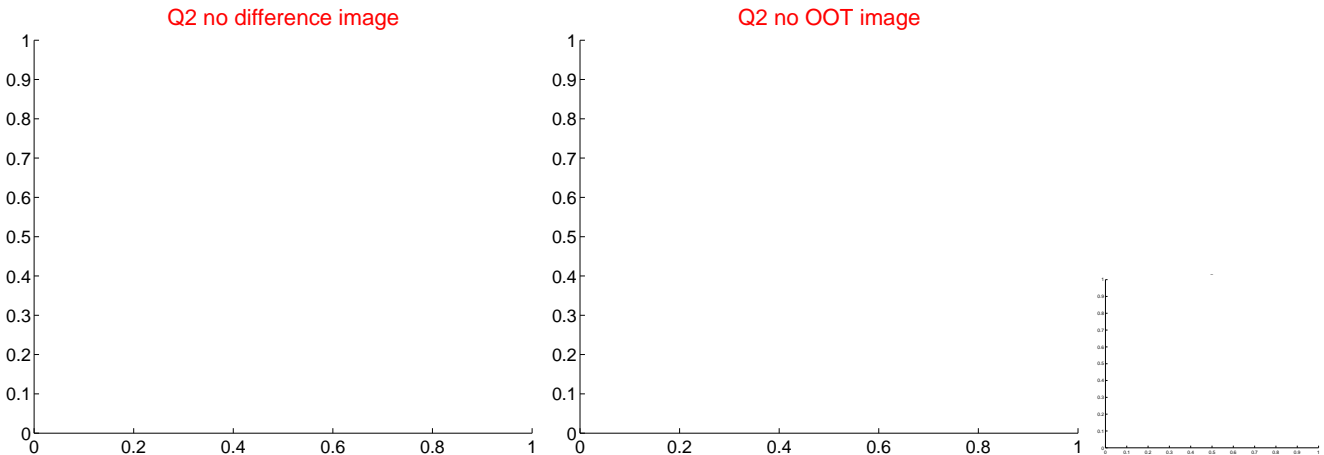
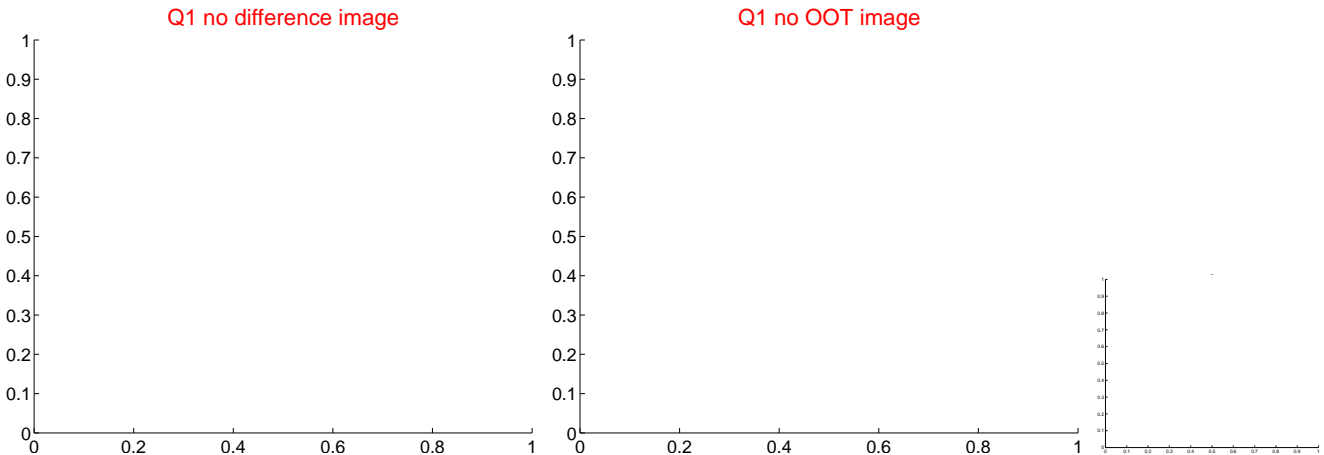
The direct PRF centroid is offset from the target star catalog position by about 1.67 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>6.447 \pm 1.150</math></b>	<b>5.61</b>	$-1.016 \pm 0.336$	$6.366 \pm 1.163$
PRF-fit source offset from KIC position	$2.634 \pm 1.145$	2.30	$-2.012 \pm 1.045$	$1.700 \pm 0.579$
photometric centroid source offset	$0.71 \pm 0.75$	0.94	$-0.71 \pm 0.75$	$-0.05 \pm 1.07$

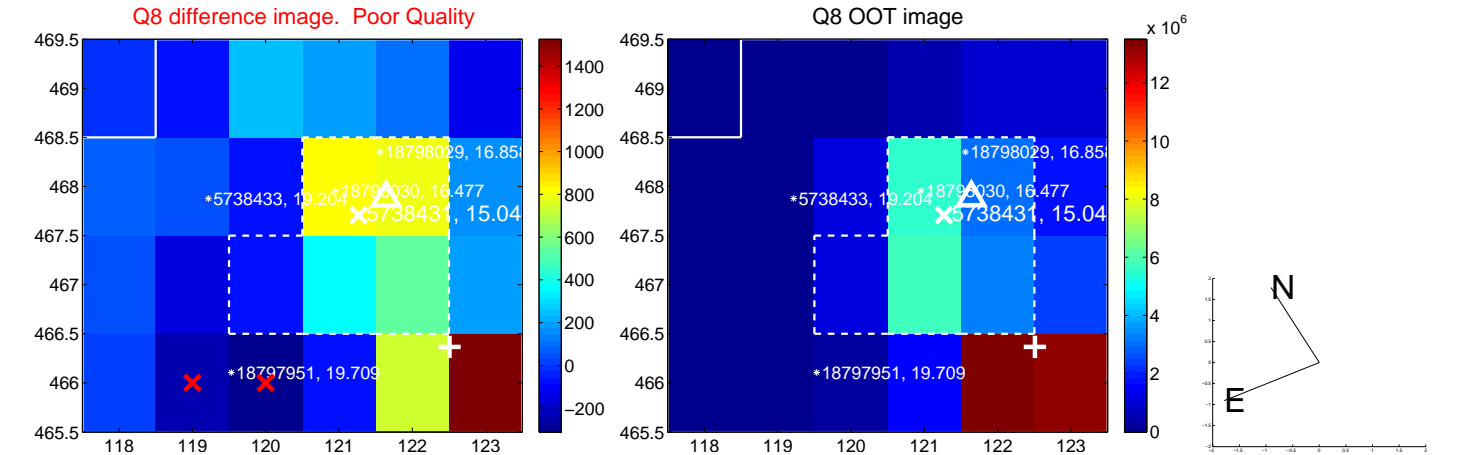
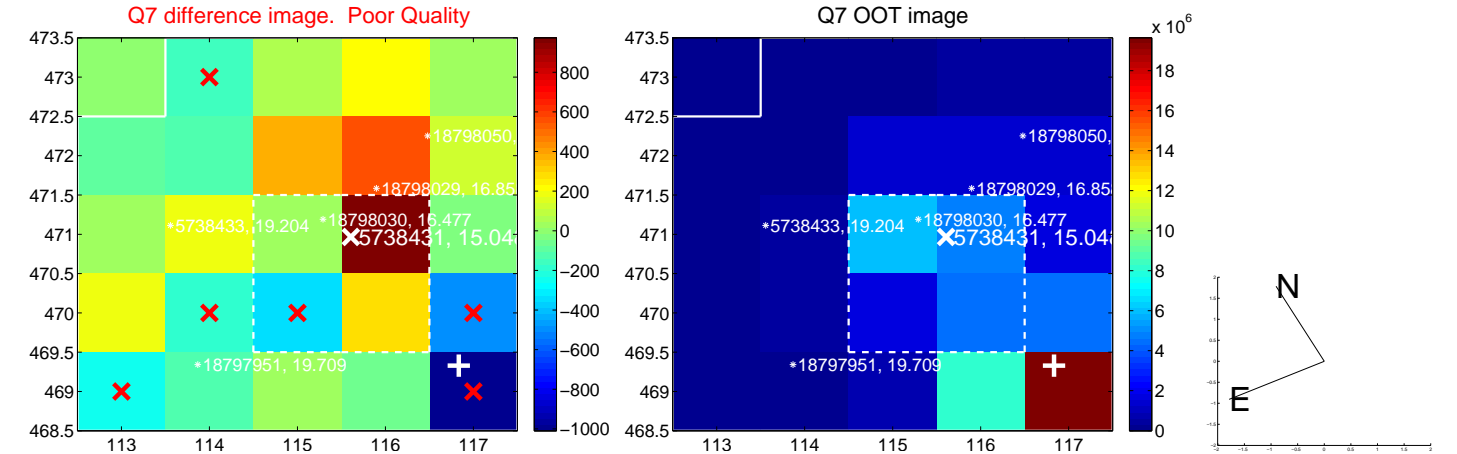
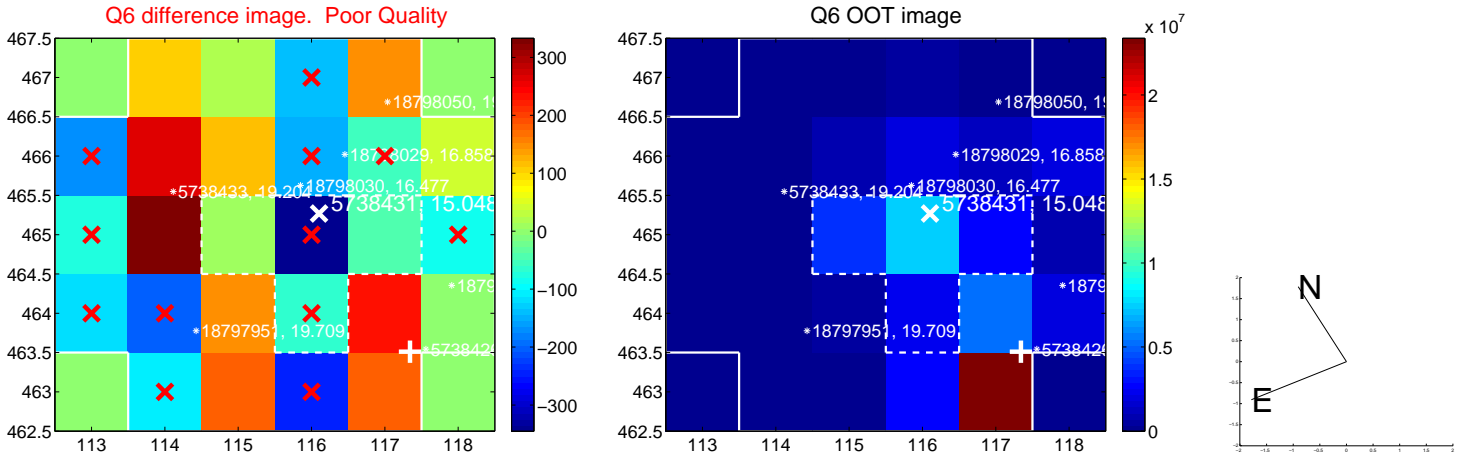
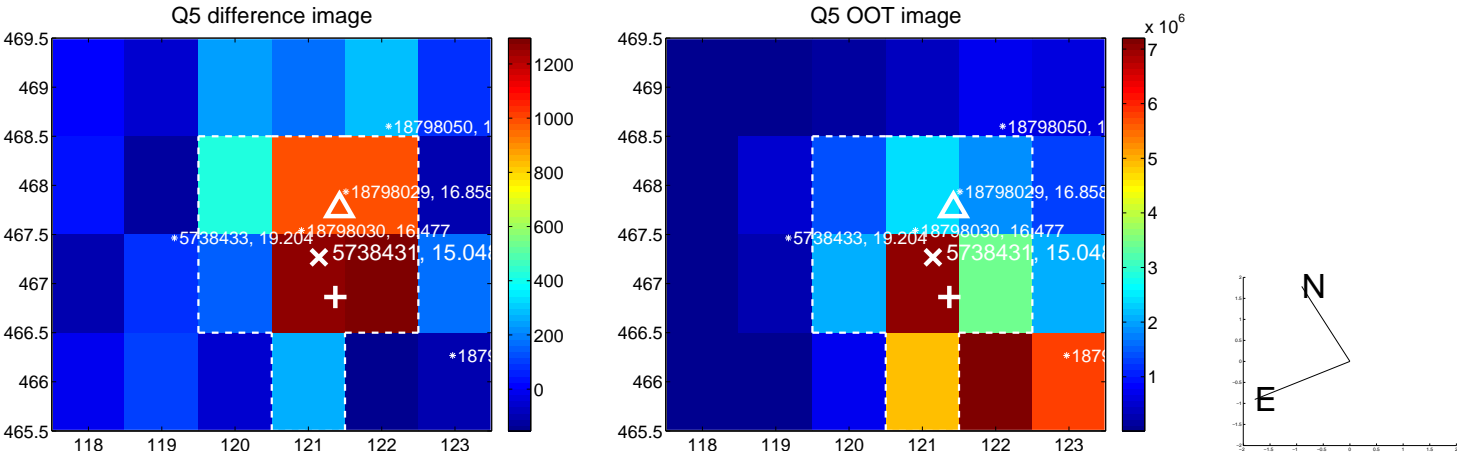


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

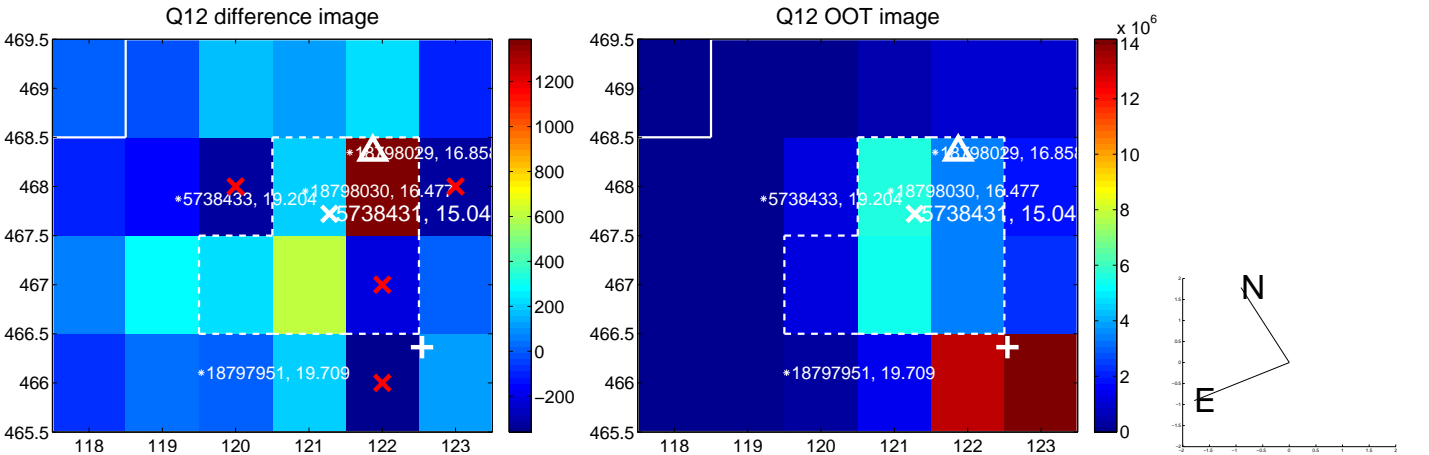
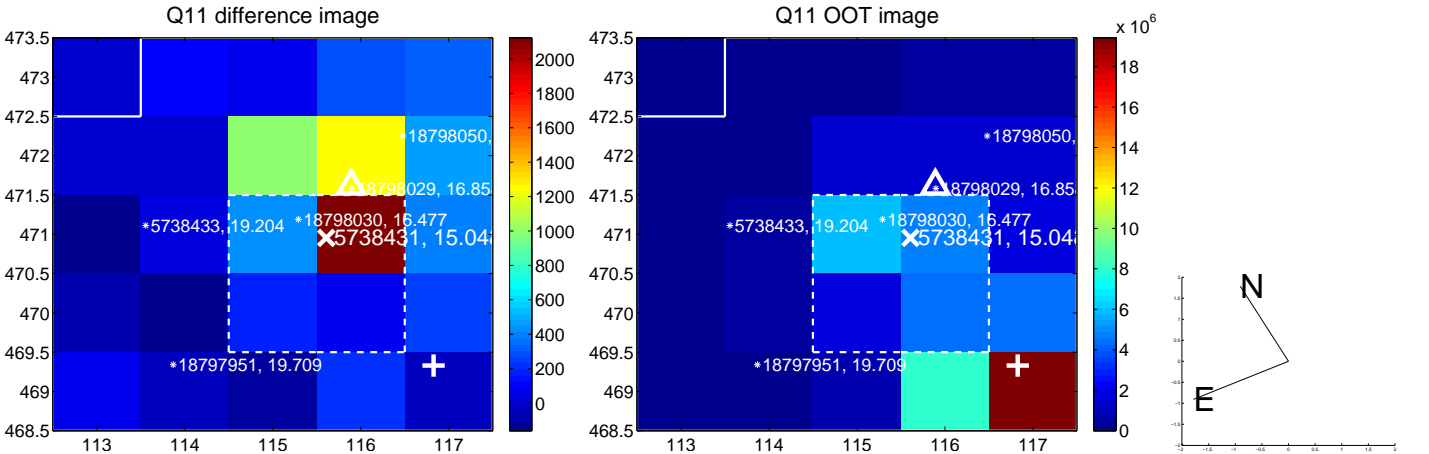
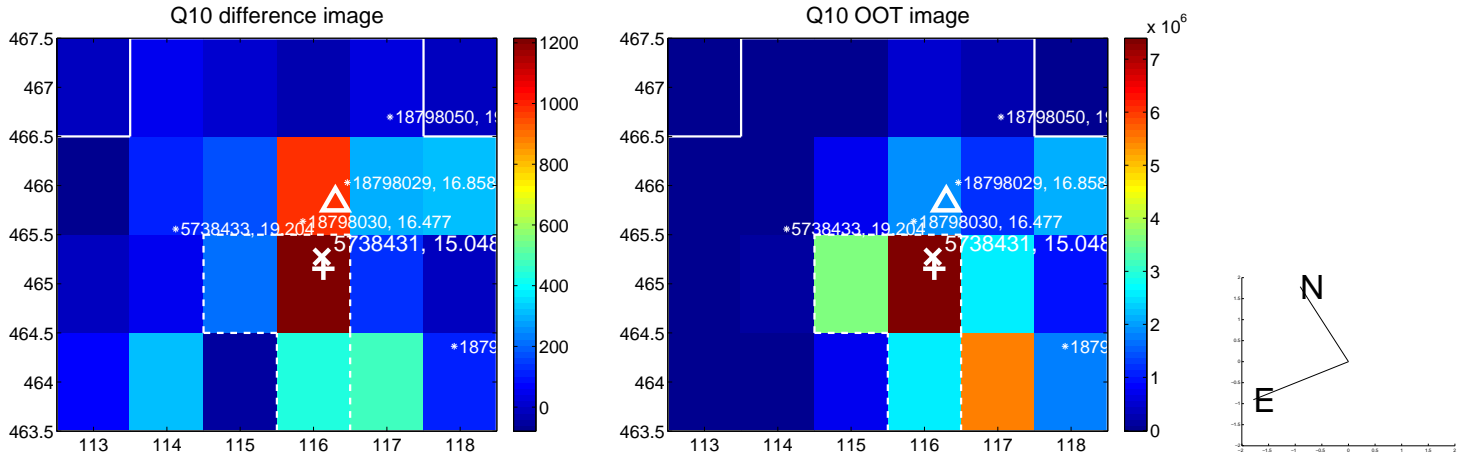
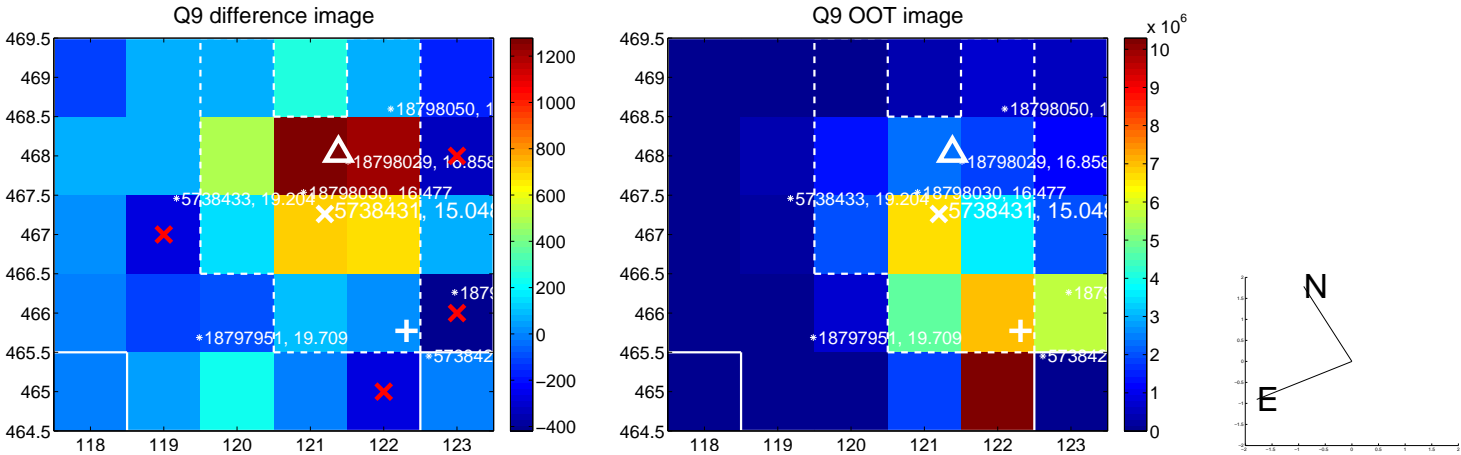


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

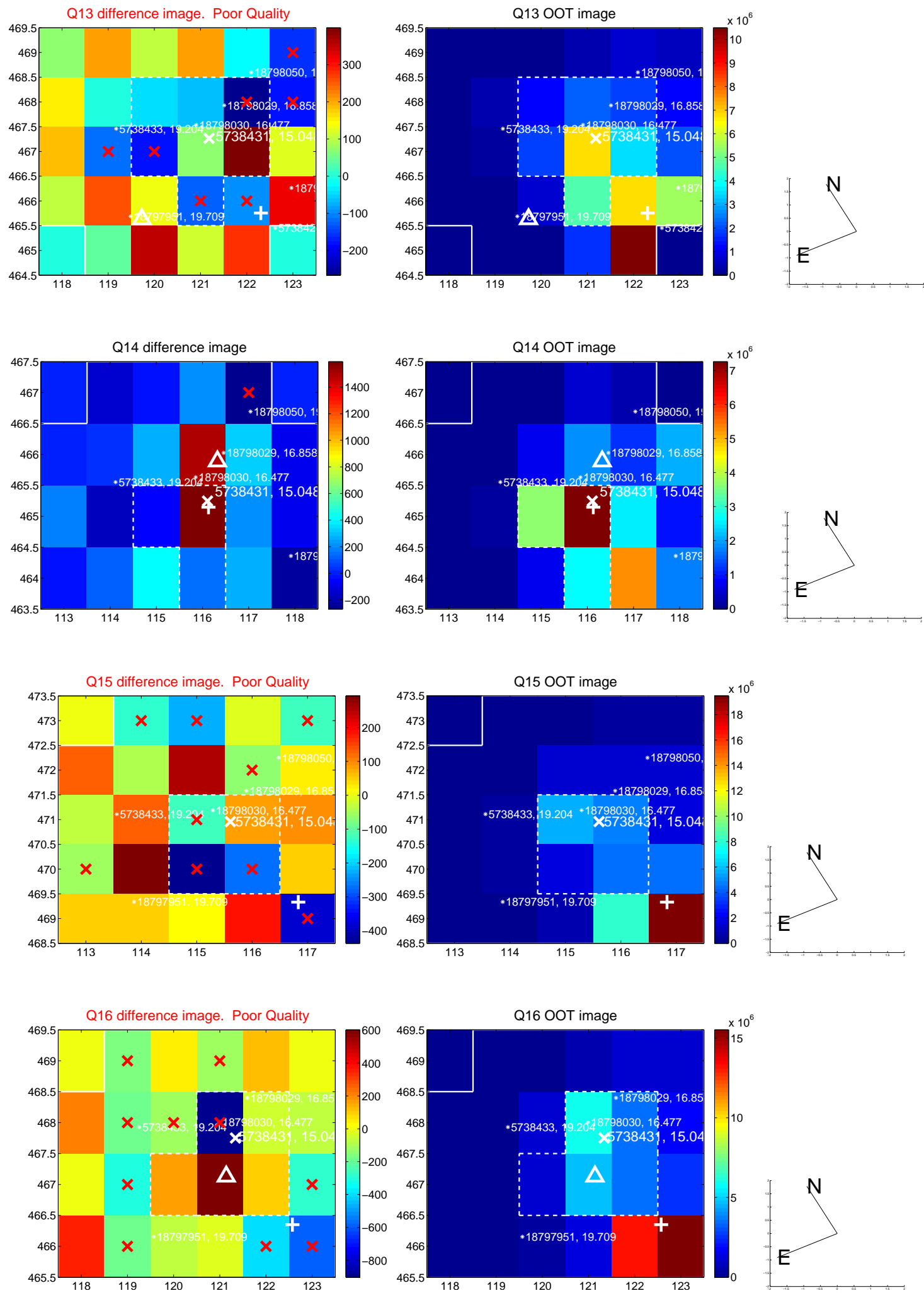




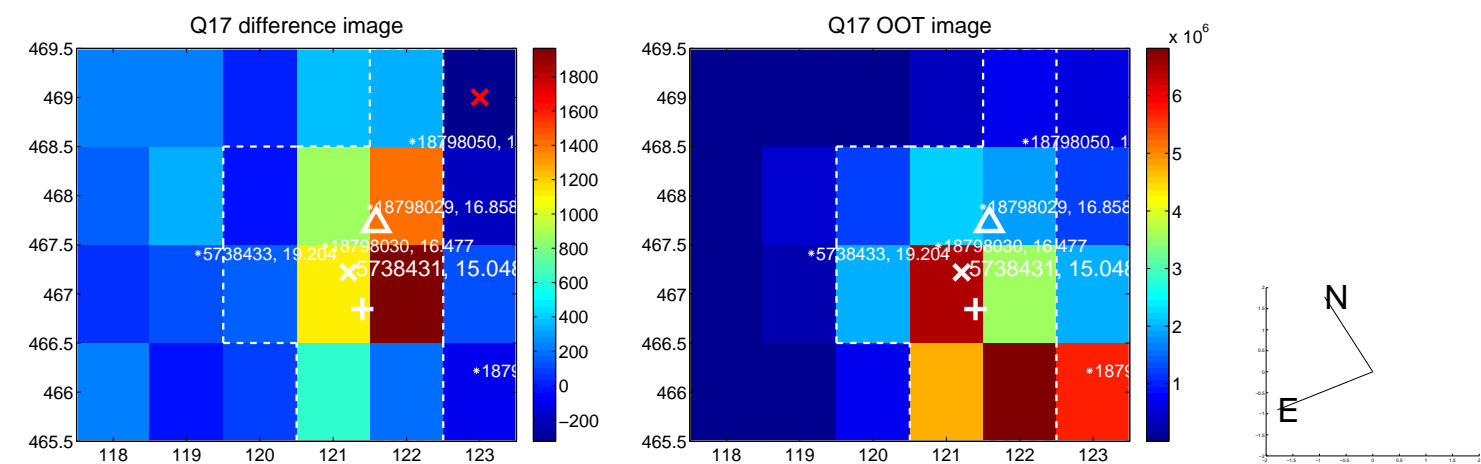
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



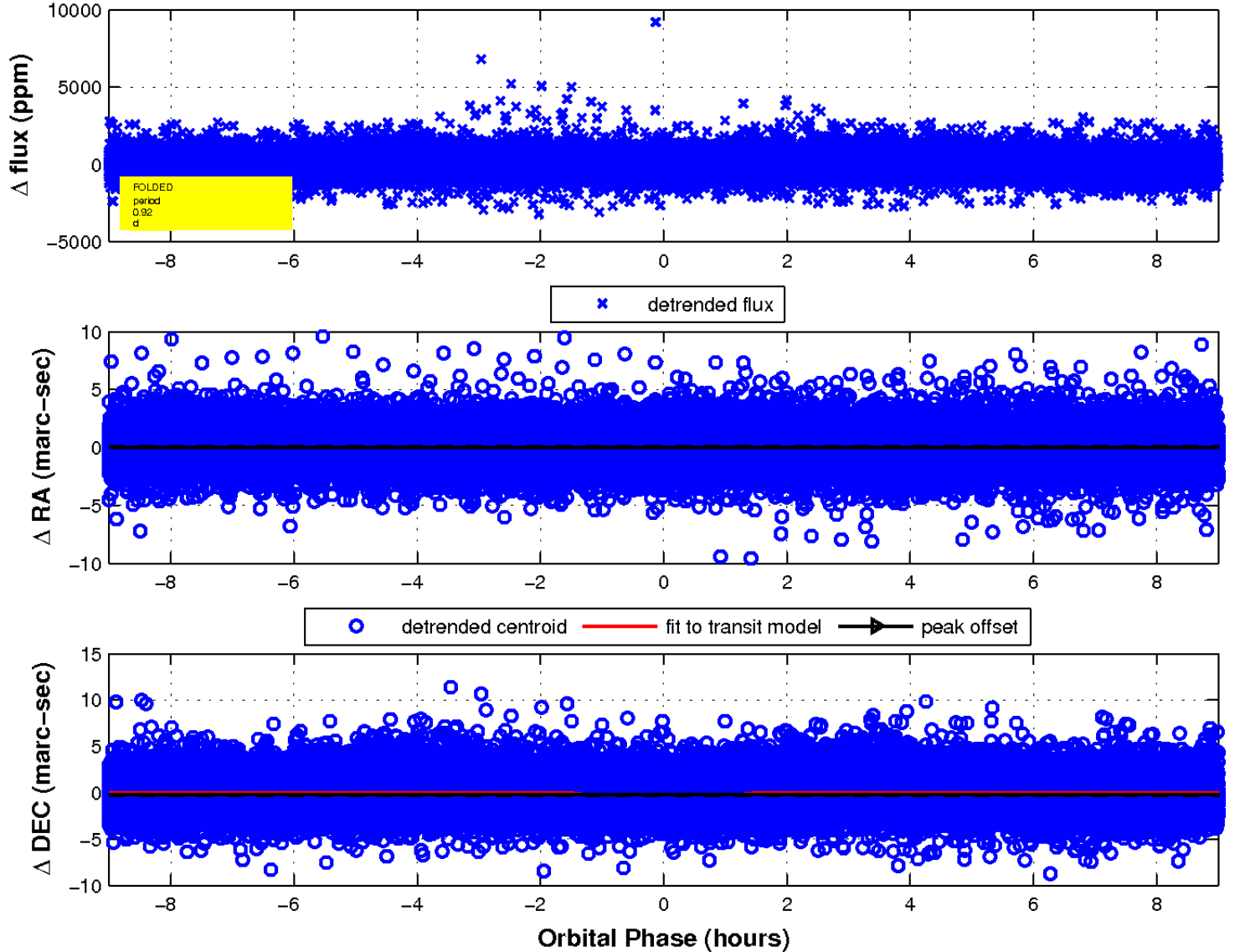
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

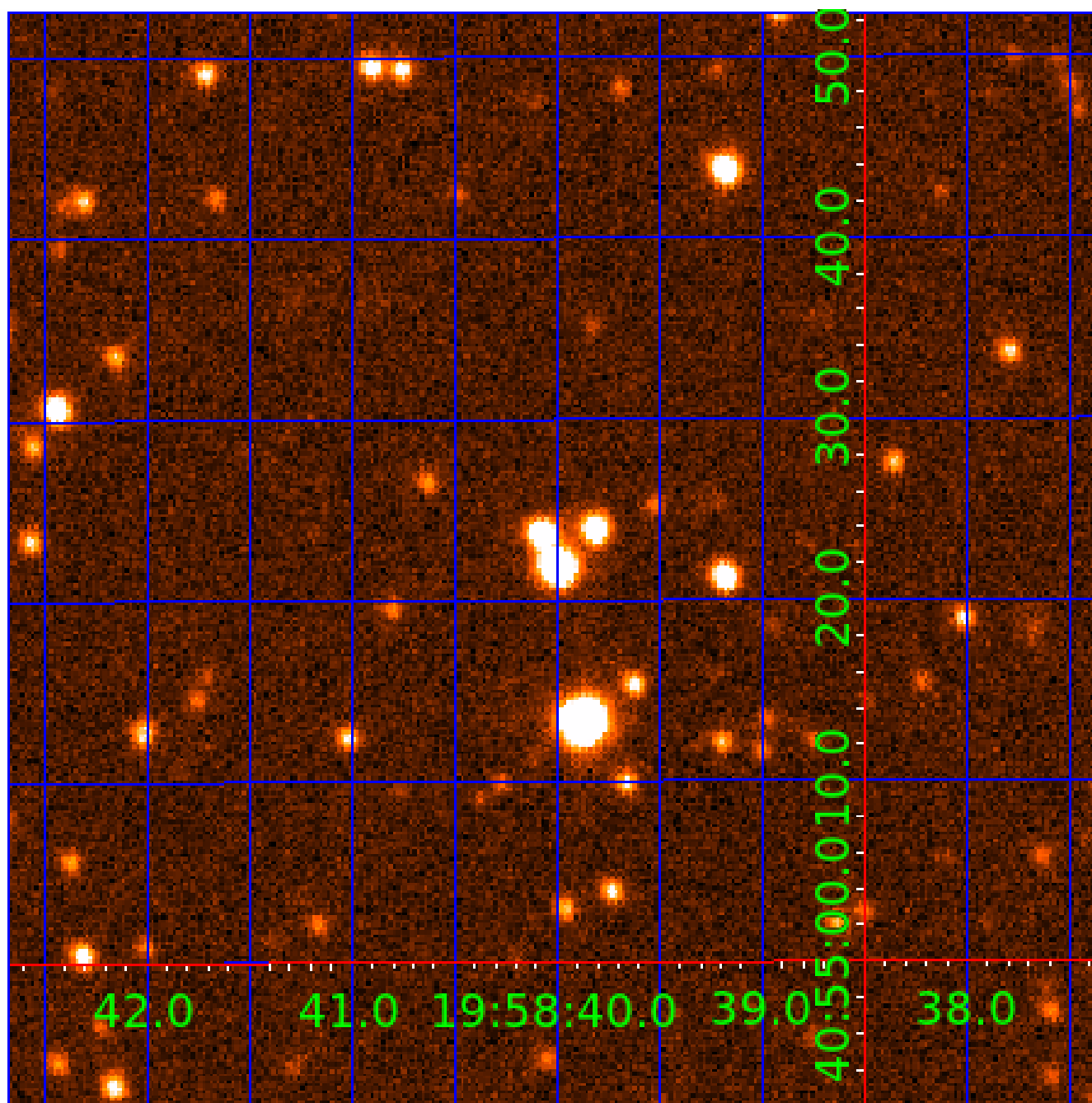


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 005738431

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005738431-01	OBS	No	0.921183	131.974818	64.3	3.002	8.6	7.1	0.94	5318	0.92	1994.20
005738431-02	OBS	No	4.418474	133.846104	157.6	5.436	8.1	7.6	0.94	5318	1.47	246.53

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005738431-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
005738431-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS

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

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

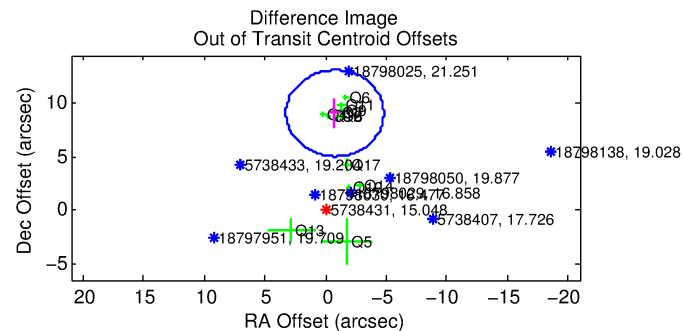
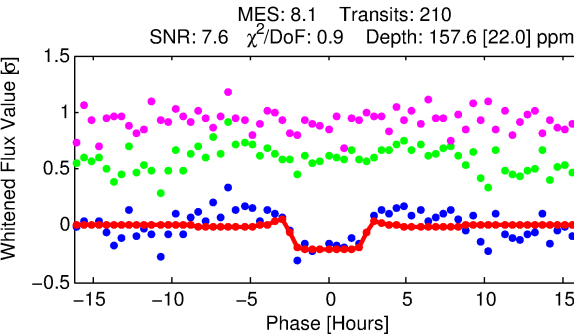
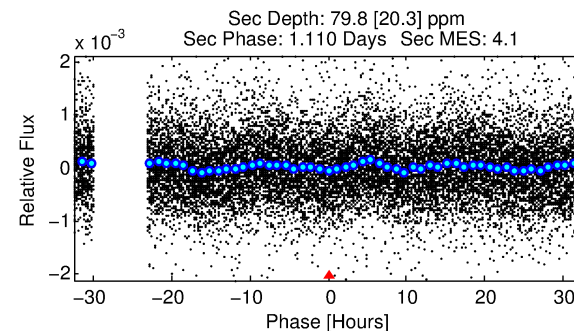
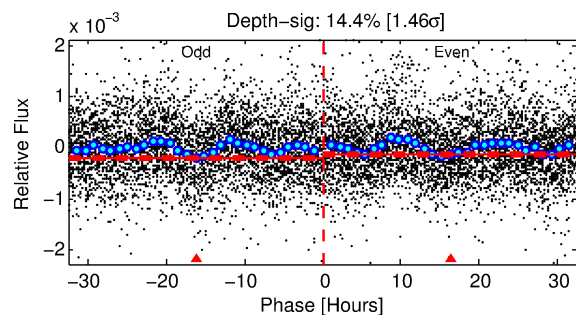
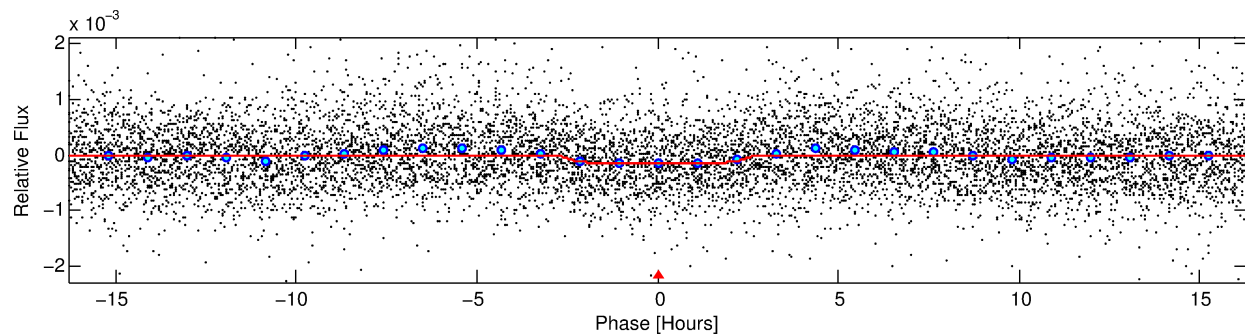
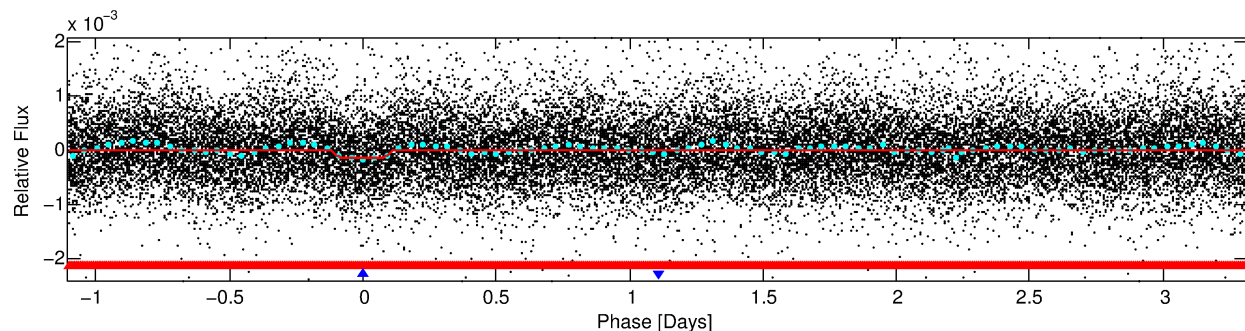
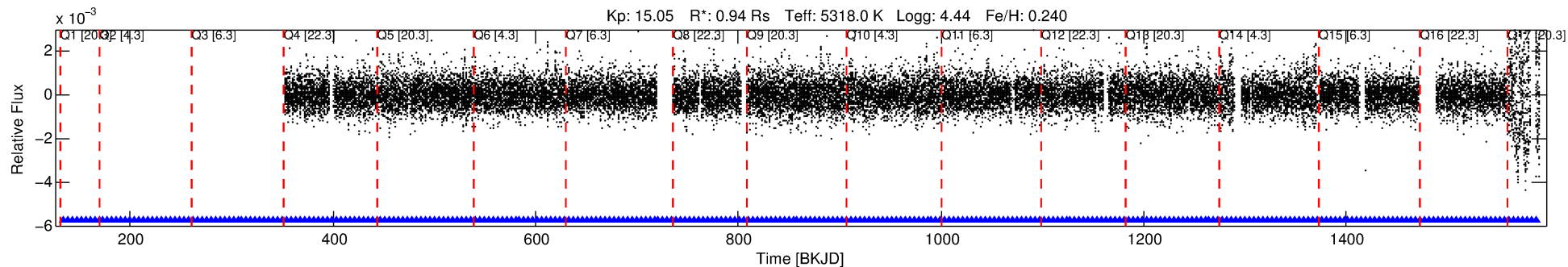
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005738431-02

No Significant Match Found

# DV One-Page Summary

KIC: 5738431 Candidate: 2 of 2 Period: 4.418 d



## DV Fit Results:

Period = 4.41847 [0.00006] d  
Epoch = 133.8461 [0.0091] BKJD  
Rp/R\* = 0.0143 [0.0041]  
a/R\* = 2.79 [2.97]  
b = 0.92 [0.20]  
Seff = 246.53 [78.30]  
Teff = 1010 [80] K  
Rp = 1.47 [0.54] Re  
a = 0.0508 [0.0100] AU  
Ag = 52.46 [36.14] [1.42 $\sigma$ ]  
Teffp = 4204 [675] K [4.70 $\sigma$ ]

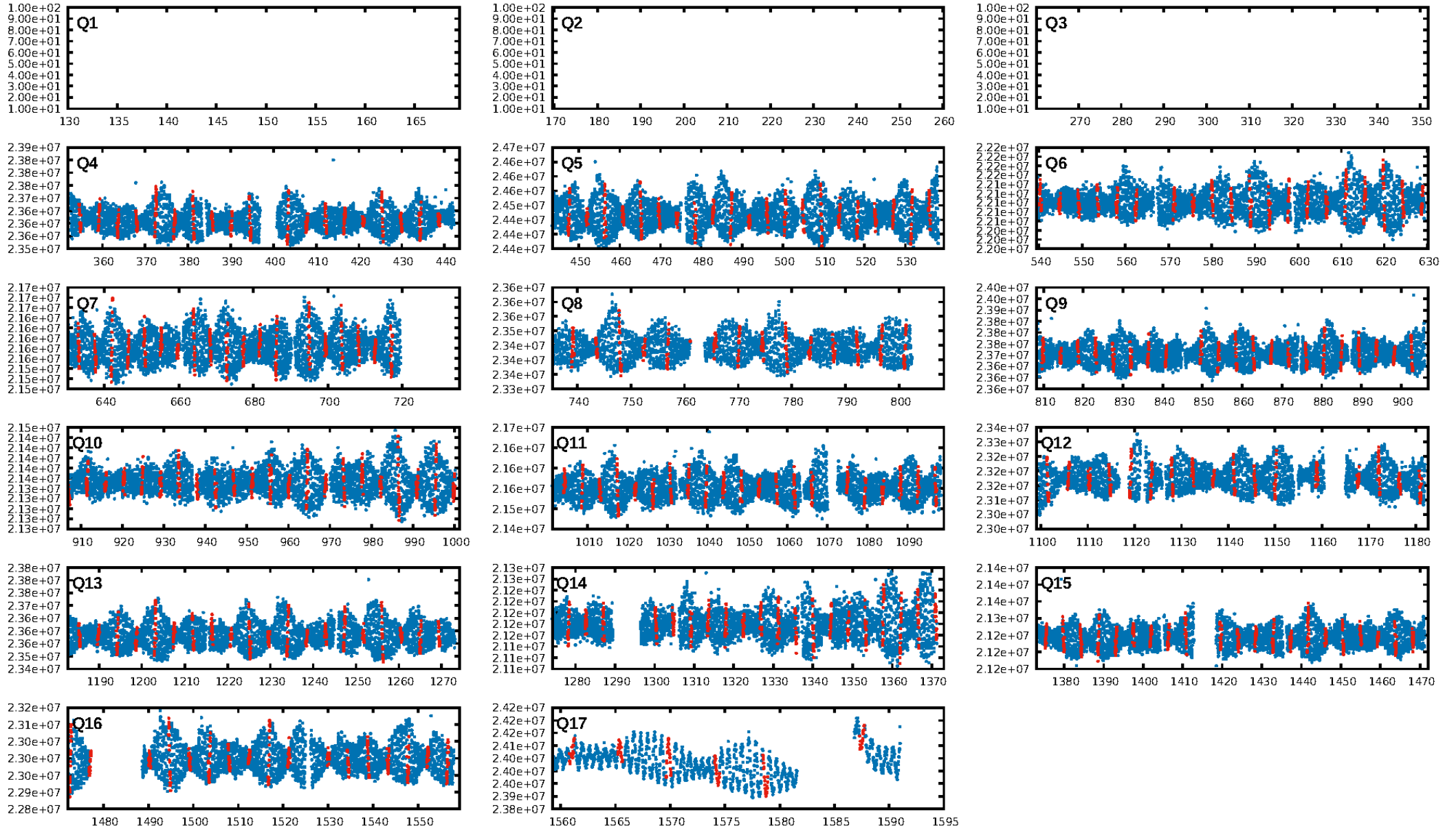
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [13.52 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.58e-14  
RollingBand-fgt: 1.00 [205/205]  
GhostDiagnostic-chr: 2.323  
Centroid-sig: 0.1%  
Centroid-so: 2.240 arcsec [2.65 $\sigma$ ]  
OotOffset-rm: 9.118 arcsec [6.77 $\sigma$ ]  
KicOffset-rm: 2.896 arcsec [3.53 $\sigma$ ]  
OotOffset-st: 3/2/4/4 [13]  
KicOffset-st: 3/2/4/4 [13]  
DiffImageQuality-fgm: 0.54 [7/13]  
DiffImageOverlap-fno: 0.00 [0/14]

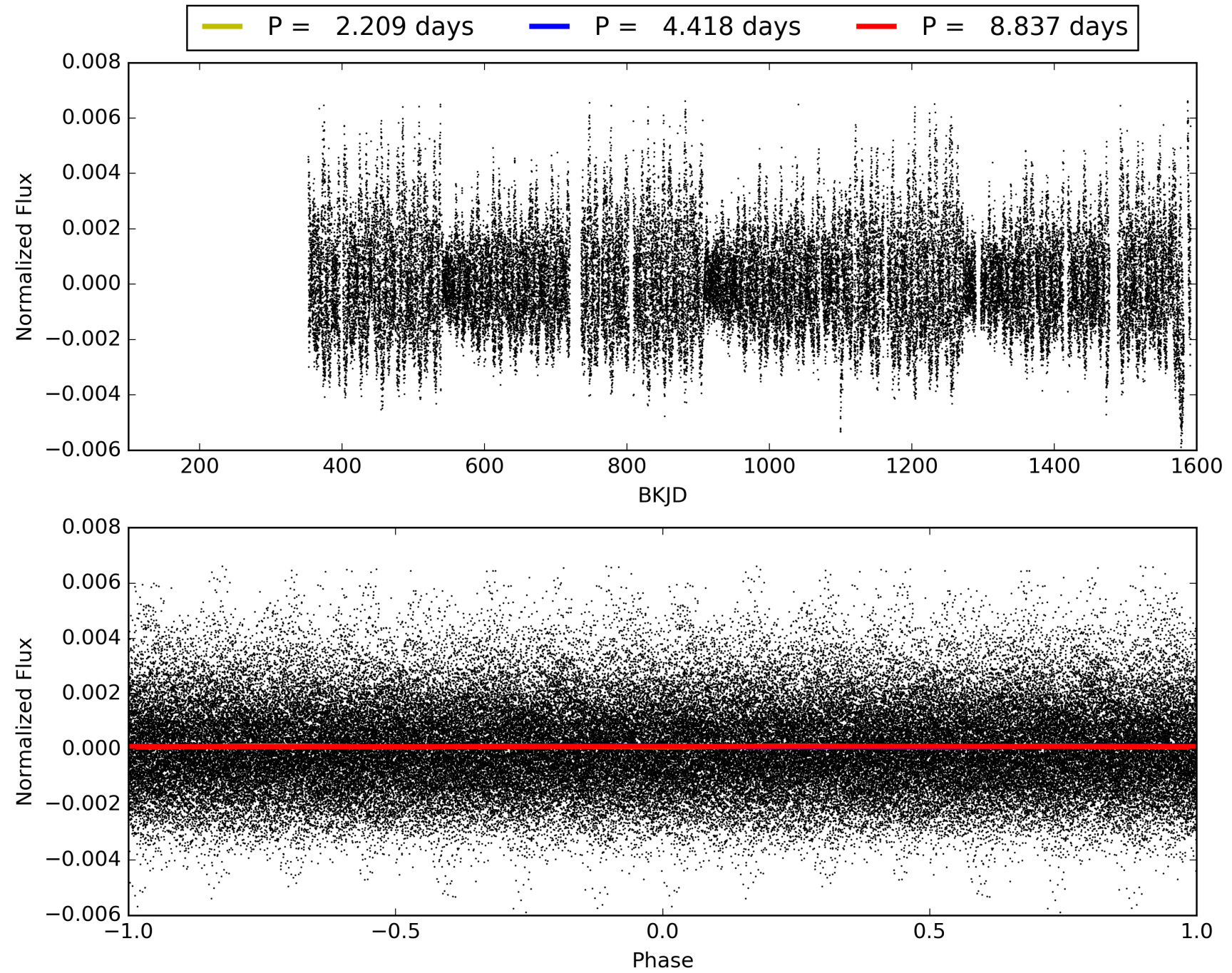
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:02:52 Z

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

# TCE 005738431-02, PDC Light Curves



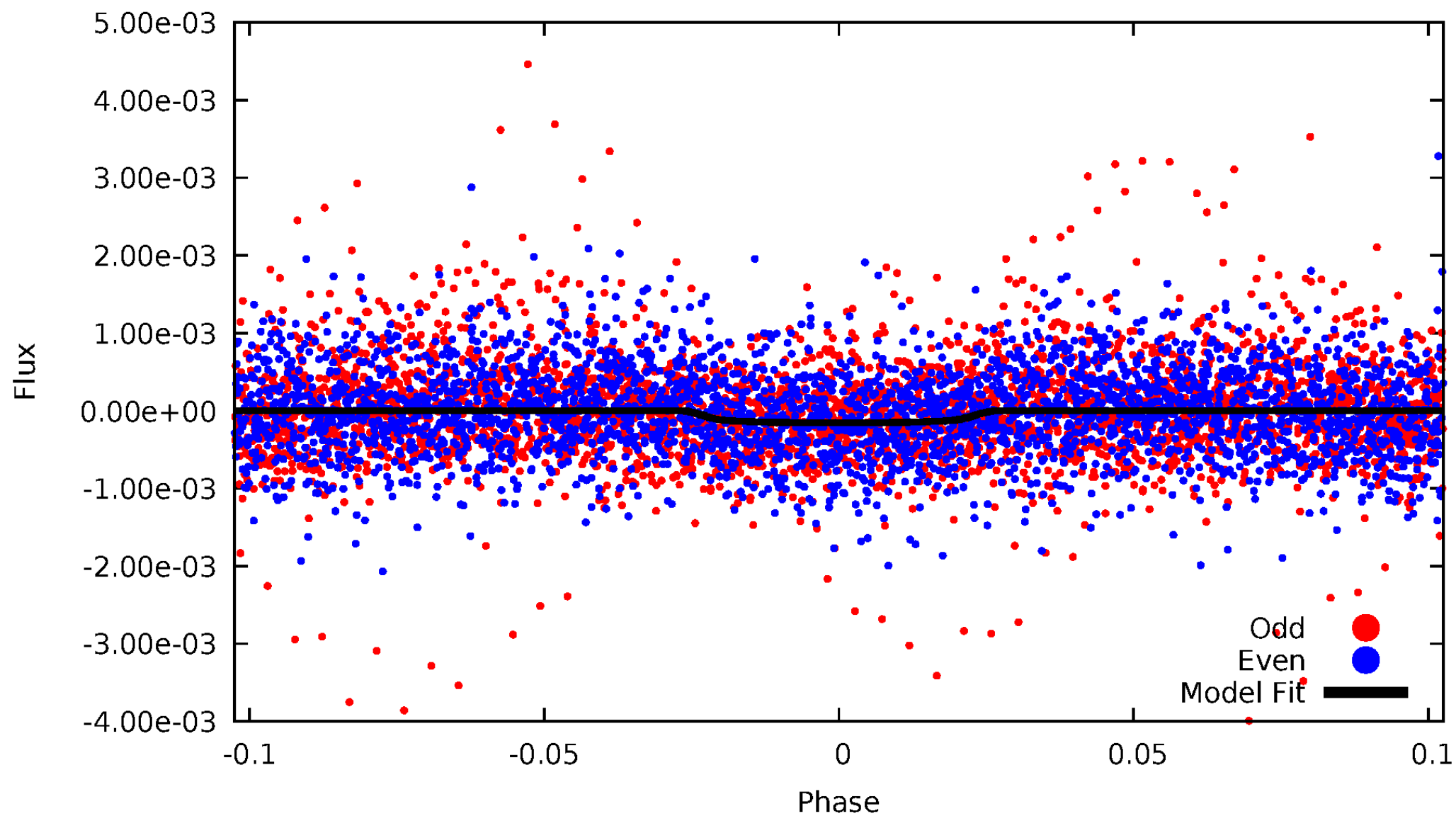
TCE 005738431-02





# DV Odd/Even

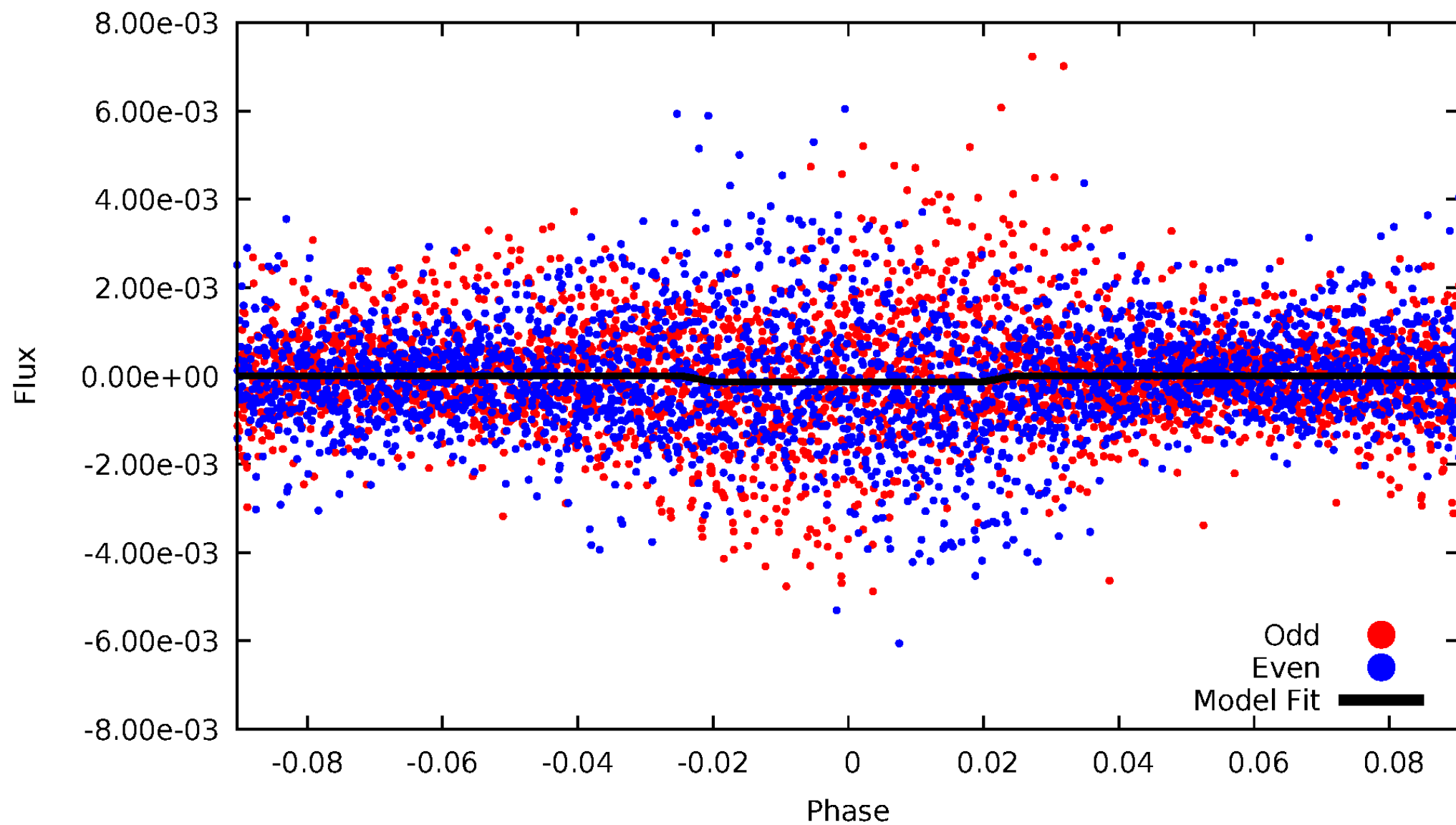
TCE 005738431-02





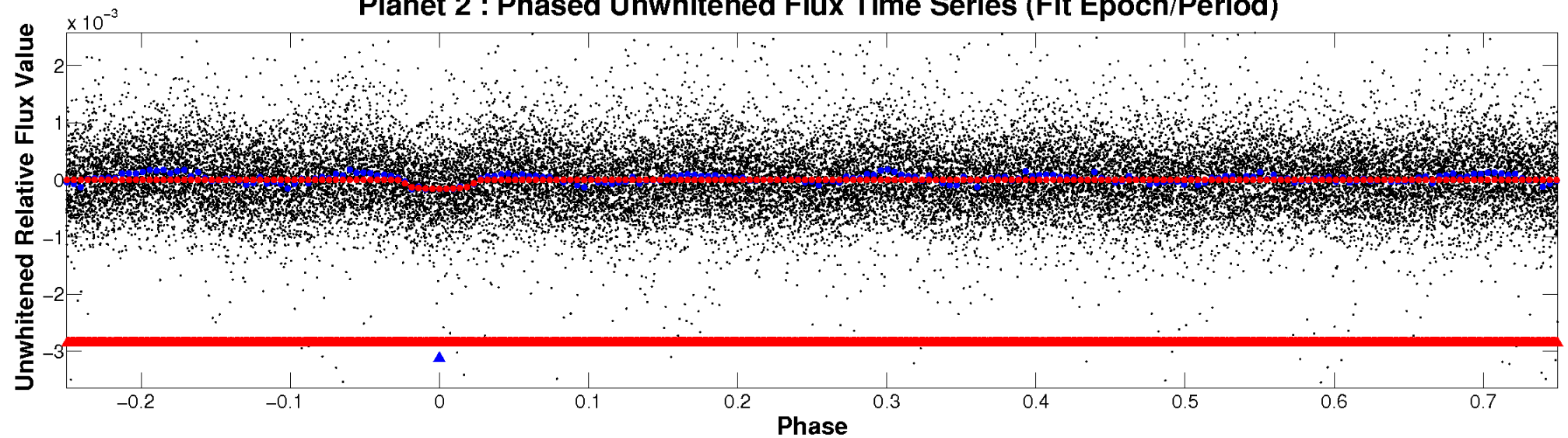
# ALT Odd/Even

TCE 005738431-02

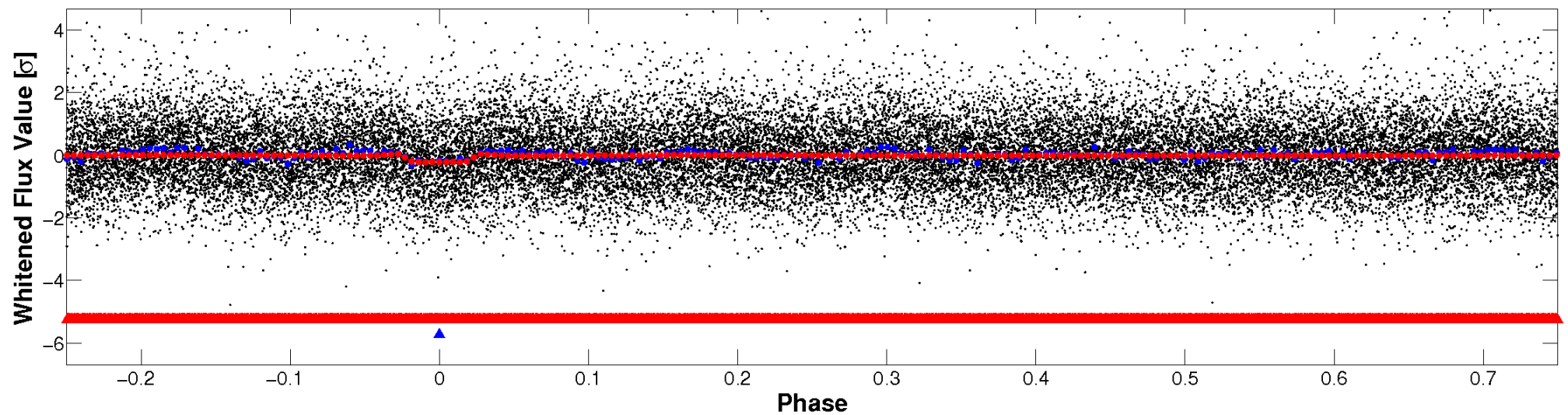


# Non-Whitened Vs. Whitened Light Curve

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

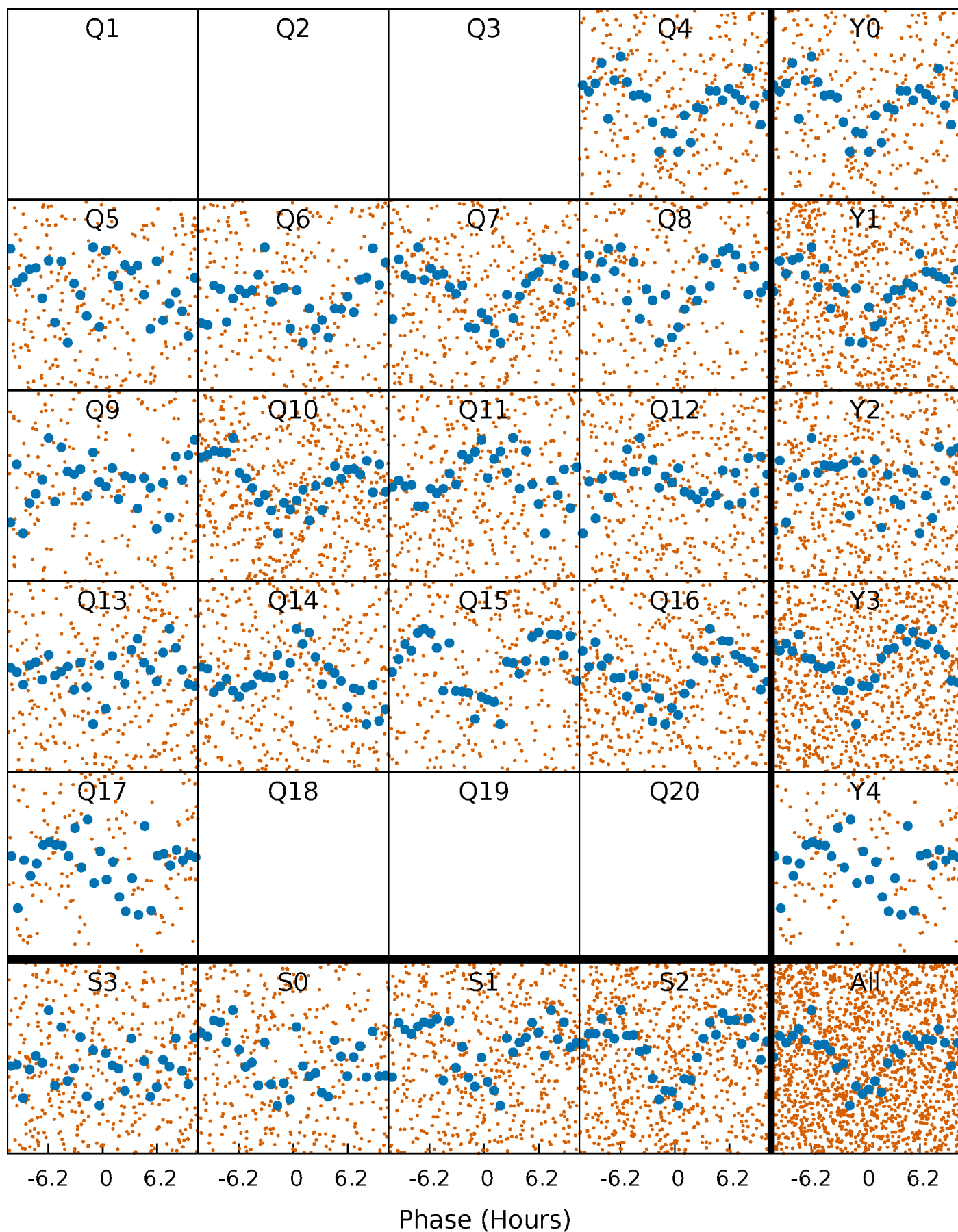


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



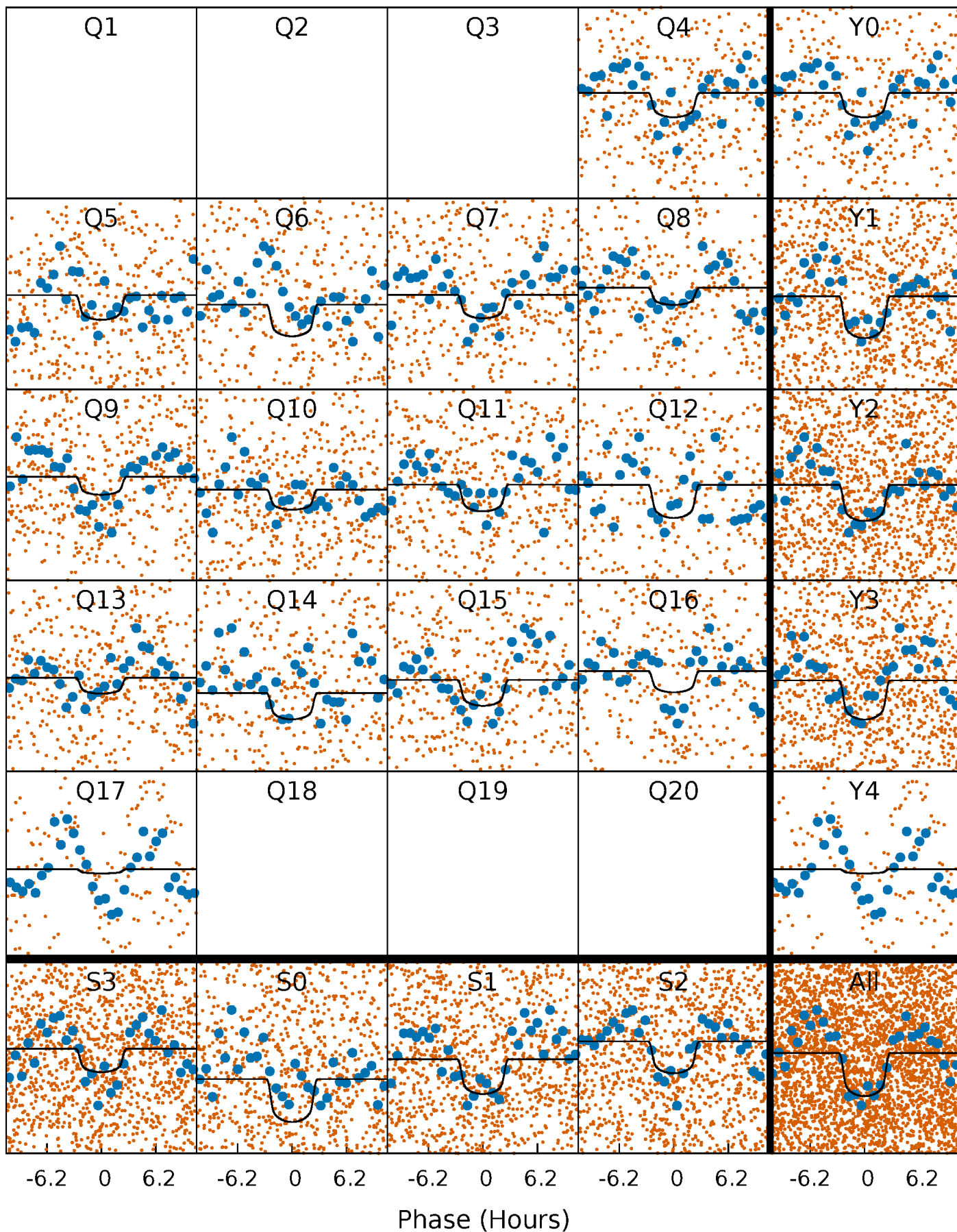
# PDC Quarter-Phased Transit Curves

TCE 005738431-02 P= 4.418474 Days  $T_0=133.846104$  (BKJD)



# DV Quarter-Phased Transit Curves

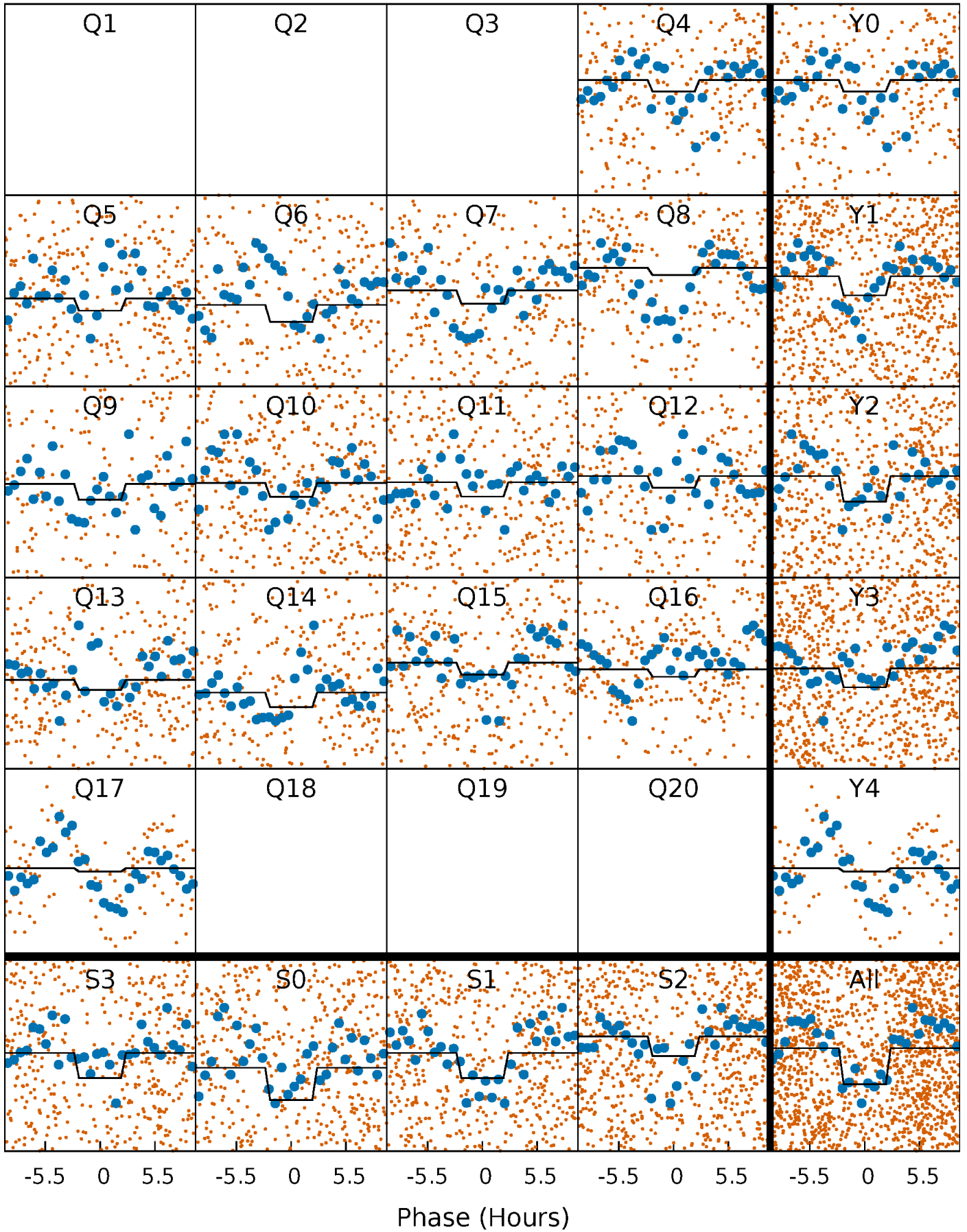
TCE 005738431-02   P= 4.418474 Days    $T_0=133.846104$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 005738431-02   P= 4.418404 Days    $T_0=133.857550$  (BKJD)

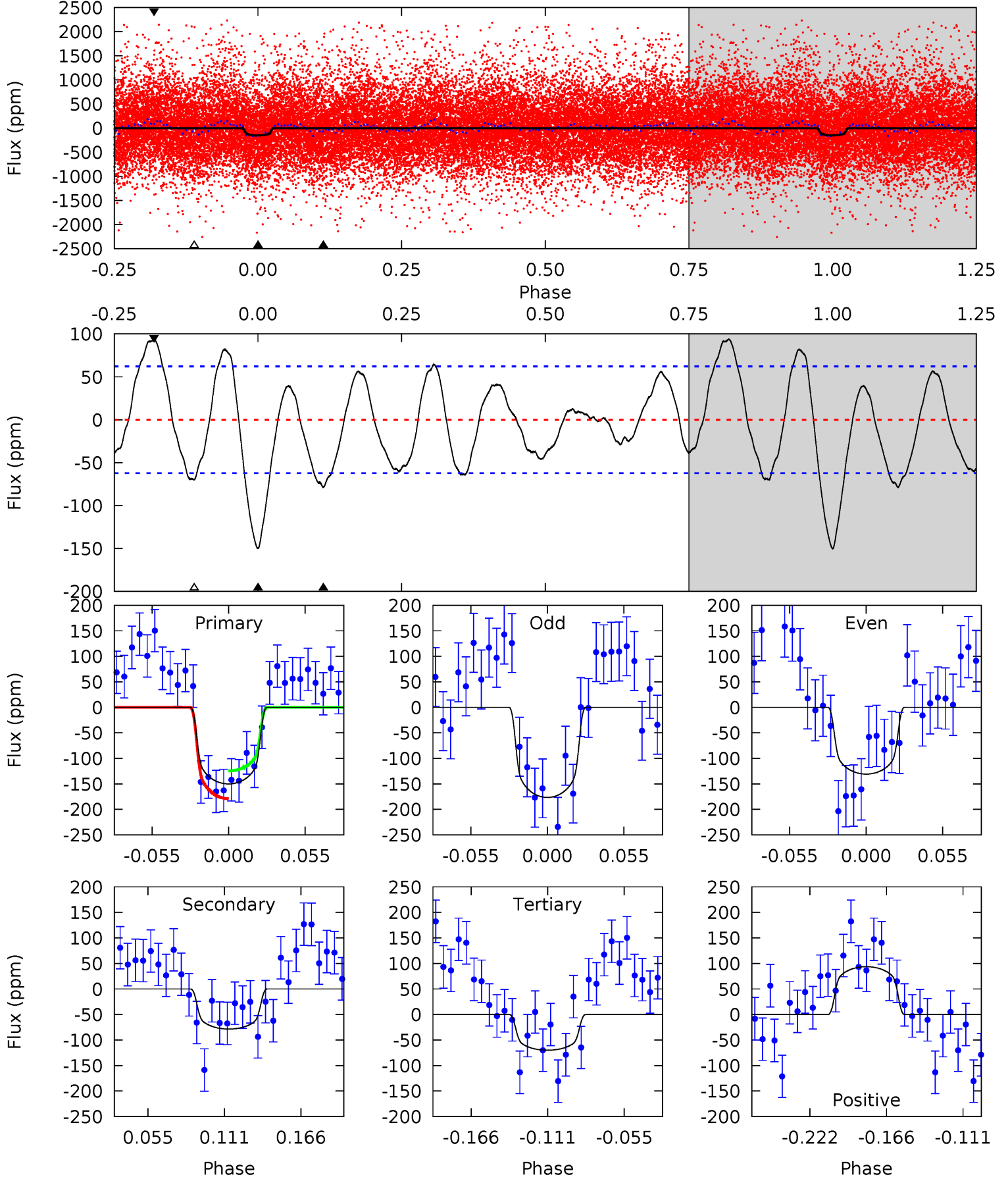




# DV Model-Shift Uniqueness Test

005738431-02, P = 4.418474 Days, E = 133.846104 Days

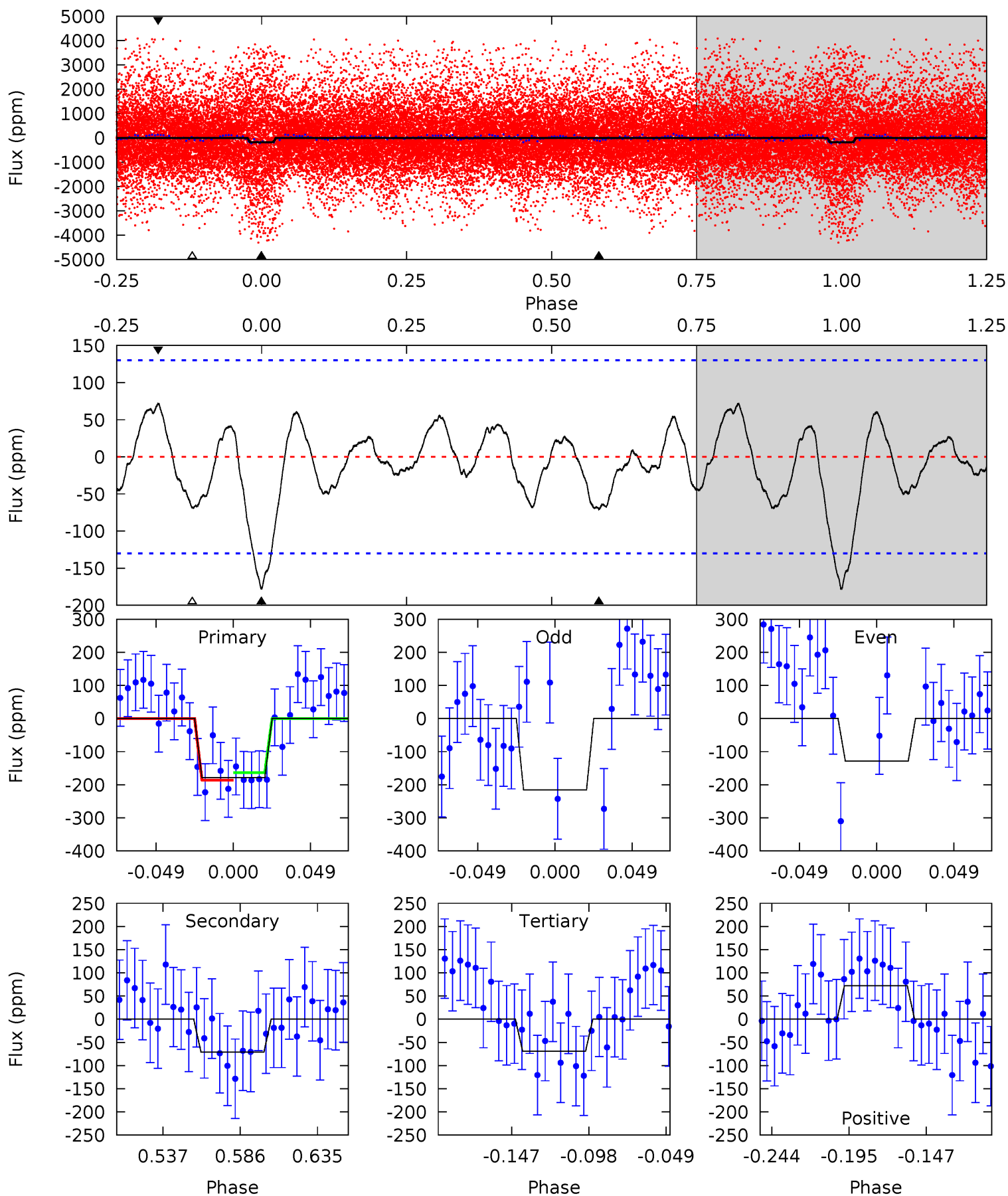
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	5.92	5.27	7.05	4.69	1.92	3.08	6.03	4.25	0.64	-1.14	1.73	0.88	0.38	2.07



# Alt Model-Shift Uniqueness Test

005738431-02, P = 4.418404 Days, E = 133.857550 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
6.45	2.57	2.50	2.61	4.71	1.97	1.23	3.95	3.85	0.07	-0.04	1.58	0.55	0.29	0.41



### Stellar Parameters For KIC 005738431

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5318^{+186}_{-167}$	$4.442^{+0.104}_{-0.156}$	$0.240^{+0.200}_{-0.300}$	$0.943^{+0.219}_{-0.135}$	$0.897^{+0.079}_{-0.071}$	$1.505^{+0.674}_{-0.635}$
	+3%/-3%	+2%/-4%	+83%/-125%	+23%/-14%	+9%/-8%	+45%/-42%
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 005738431-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-79 \pm 13$	$1.49^{+0.46}_{-0.44}$	$1414^{+97}_{-74}$	$4380^{+690}_{-449}$	$51^{+51}_{-23}$
Alt.	$-71 \pm 28$	$1.21^{+0.43}_{-0.43}$	$1417^{+90}_{-69}$	$4600^{+1074}_{-657}$	$65^{+107}_{-36}$

$T_{max}$  = 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

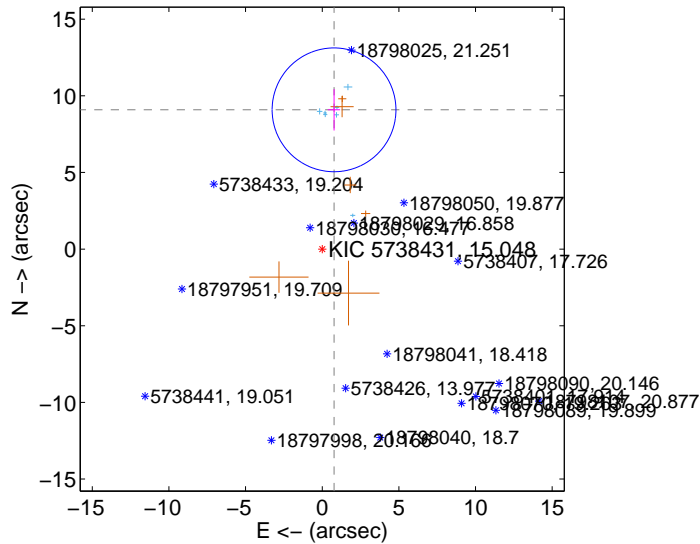
Supplemental centroid analysis for 005738431-02. Kepler magnitude: 15.05. Transit SNR 7.60

There are 7 quarters with good PRF difference image offsets

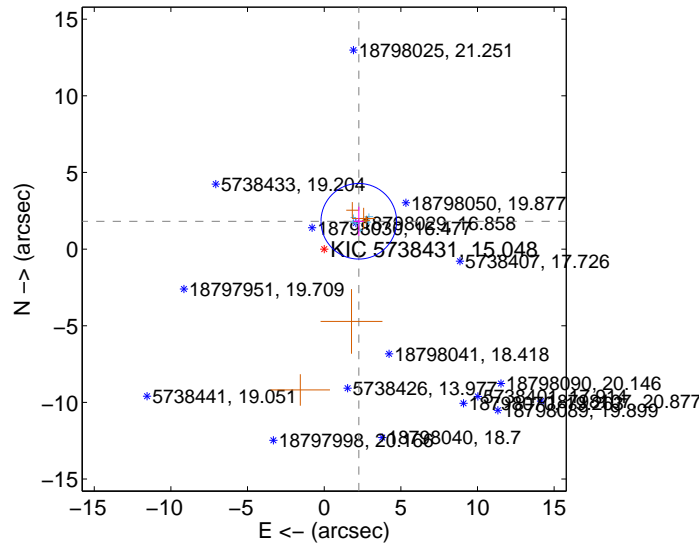
The direct PRF centroid is offset from the target star catalog position by about 1.65 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>9.118 <math>\pm</math> 1.346</b>	<b>6.77</b>	-0.771 $\pm$ 0.401	9.085 $\pm$ 1.350
PRF-fit source offset from KIC position	<b>2.896 <math>\pm</math> 0.822</b>	<b>3.53</b>	-2.257 $\pm$ 0.324	1.815 $\pm$ 0.951
photometric centroid source offset	2.24 $\pm$ 0.84	2.65	0.20 $\pm$ 0.54	-2.23 $\pm$ 0.85

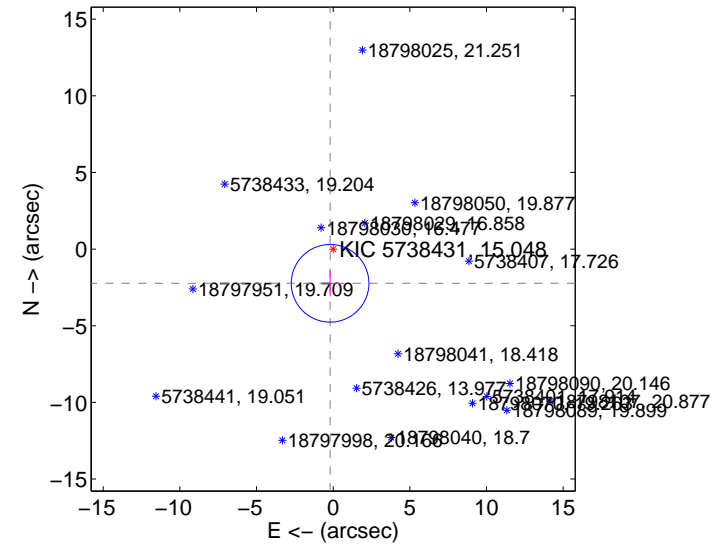
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

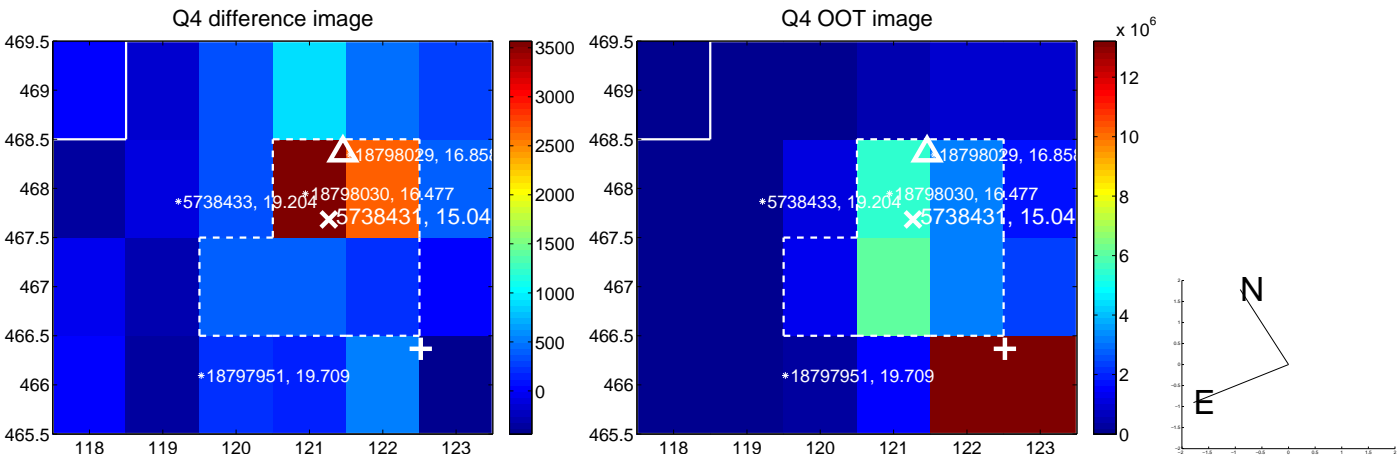
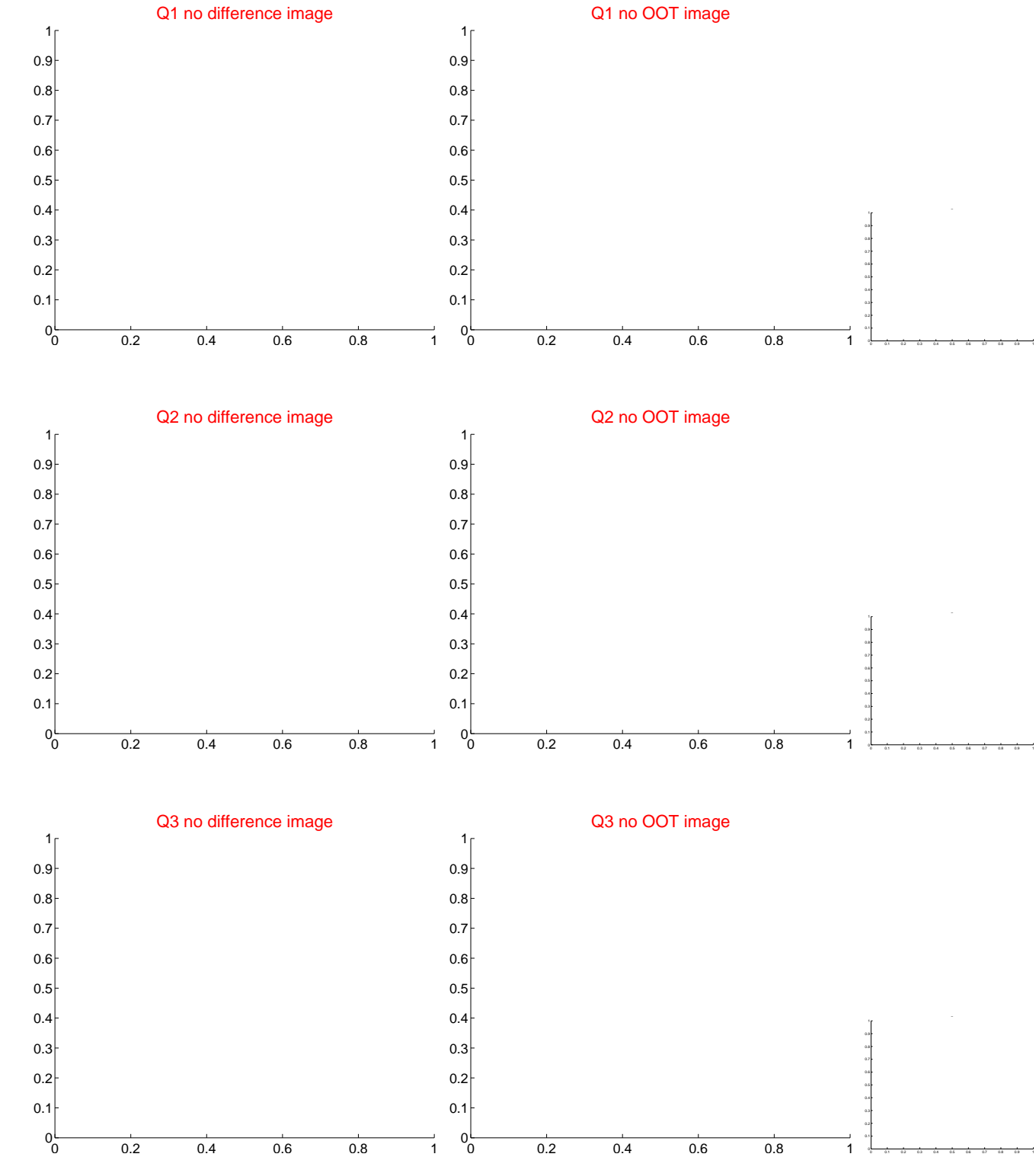


offset from photometric centroids



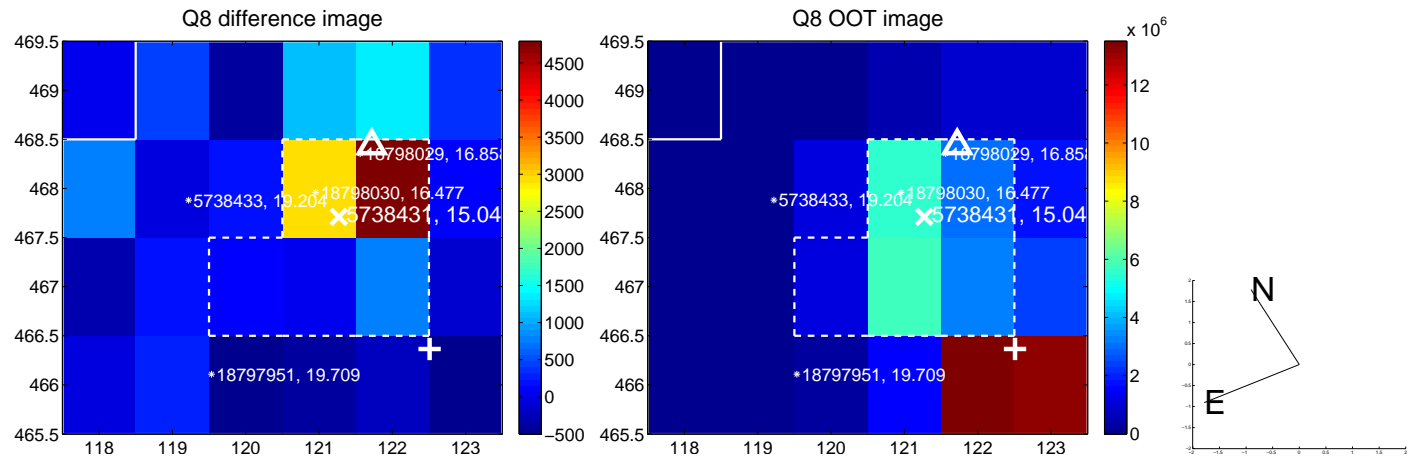
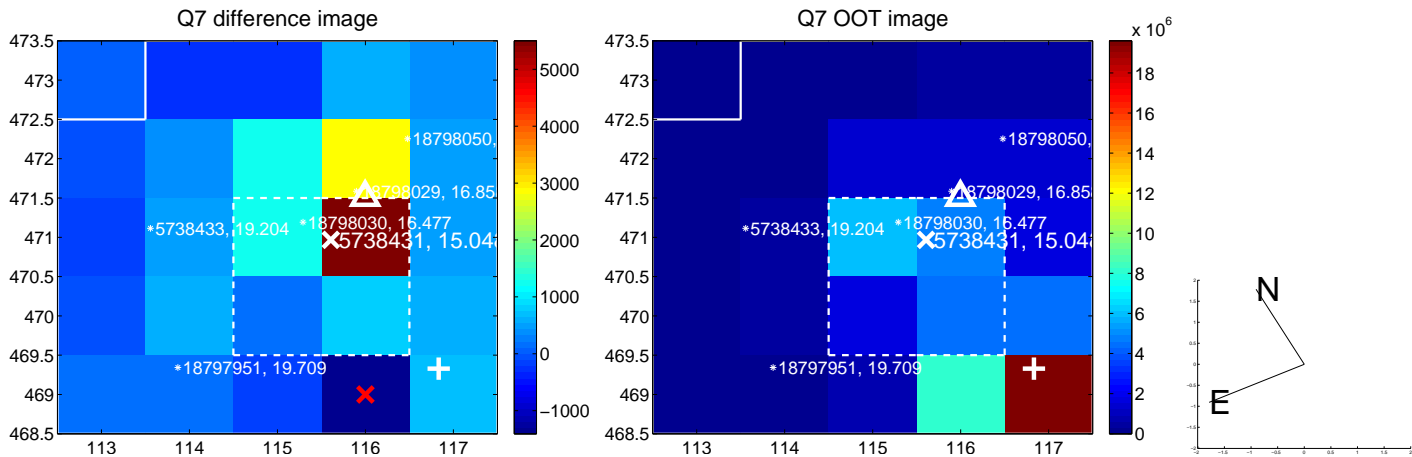
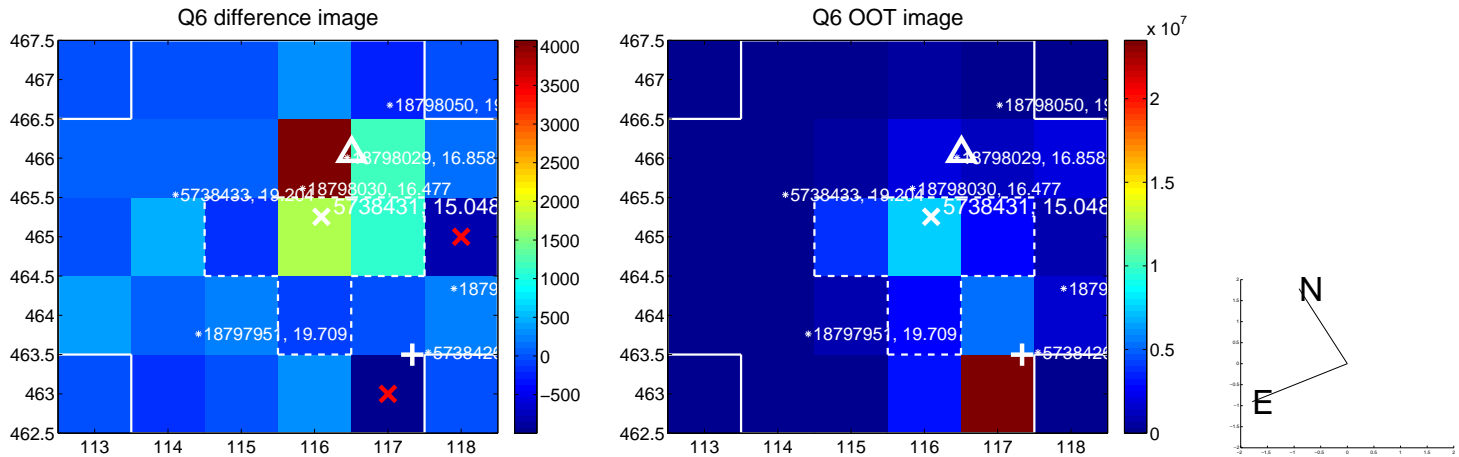
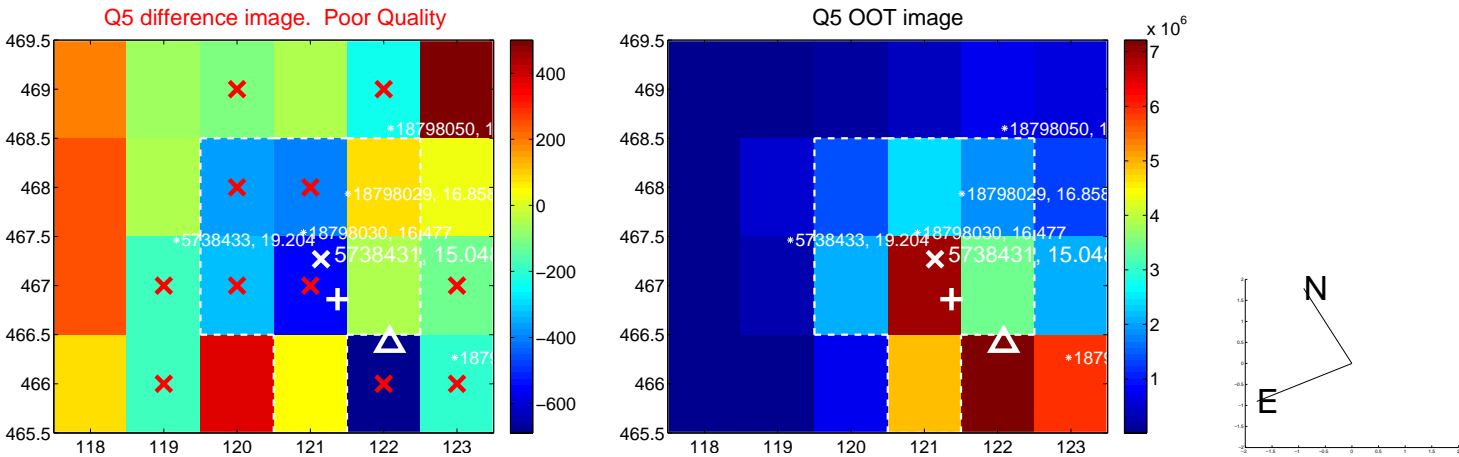
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

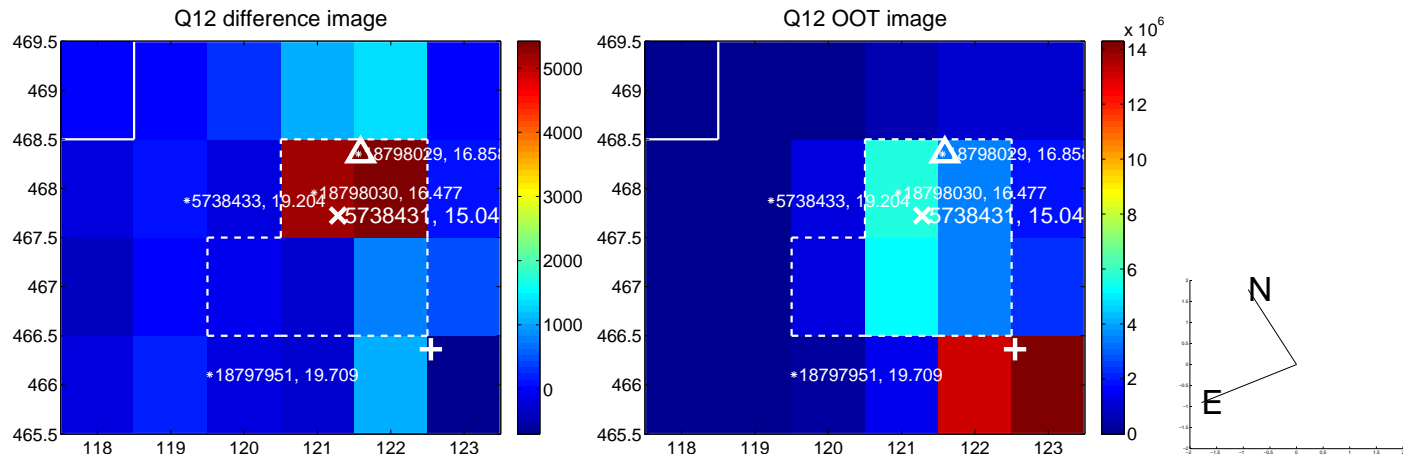
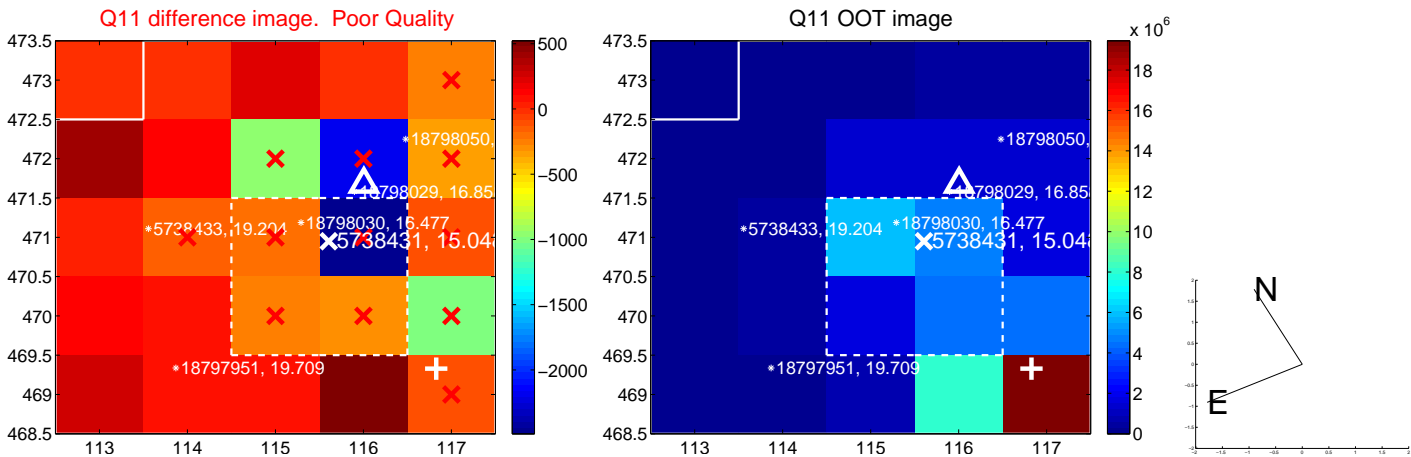
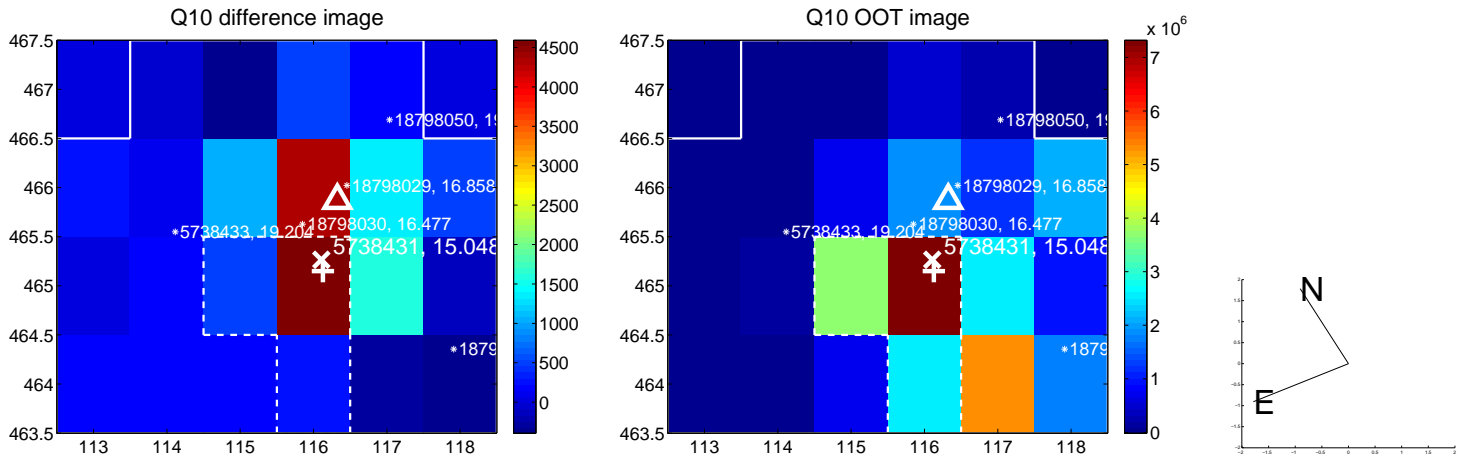
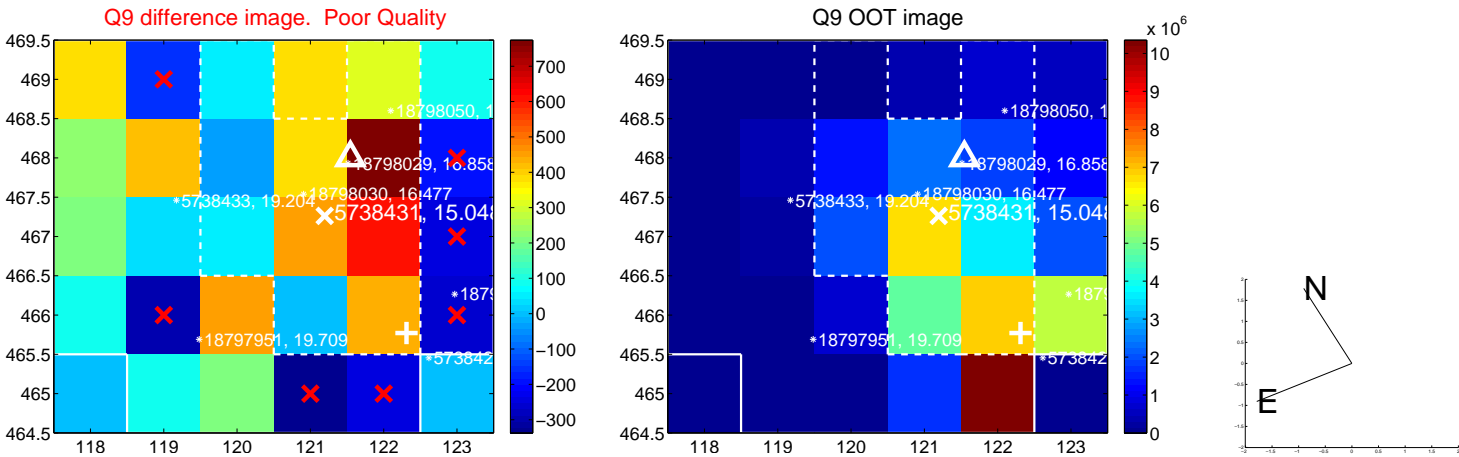




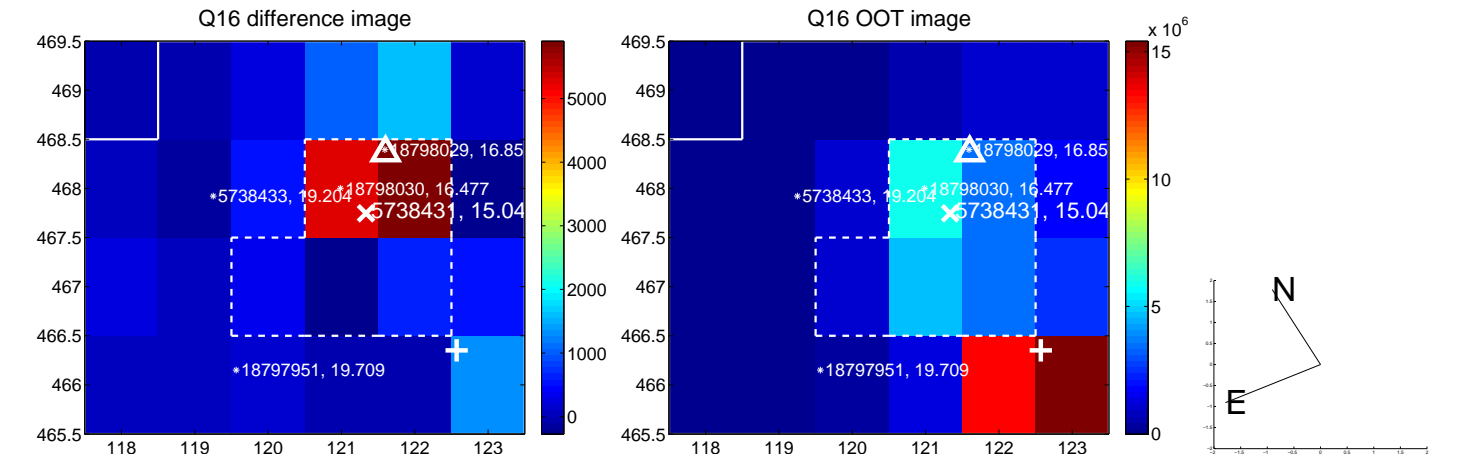
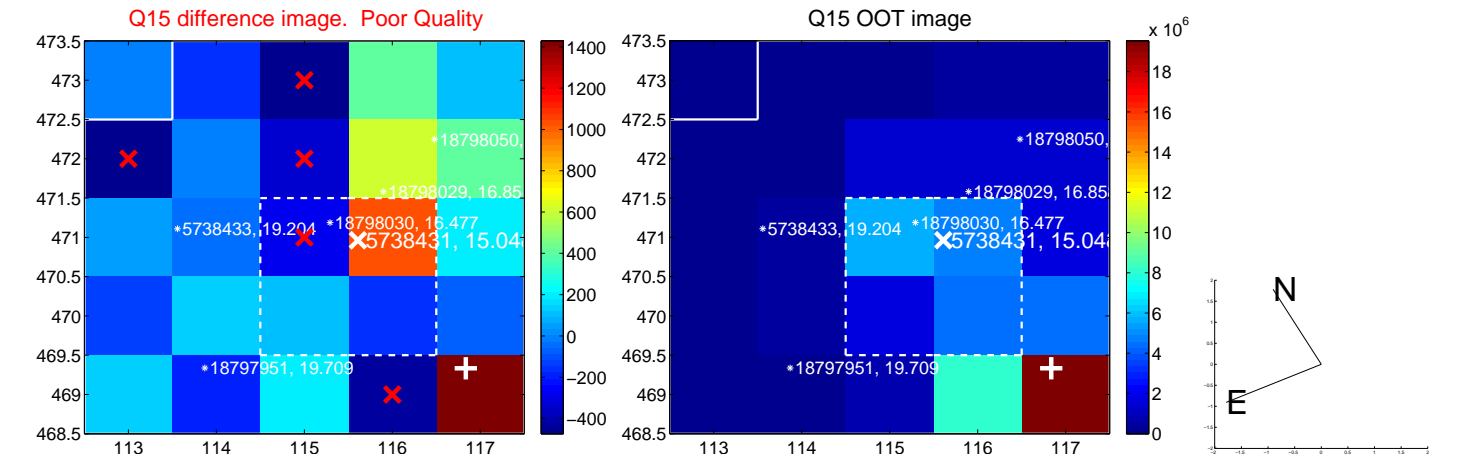
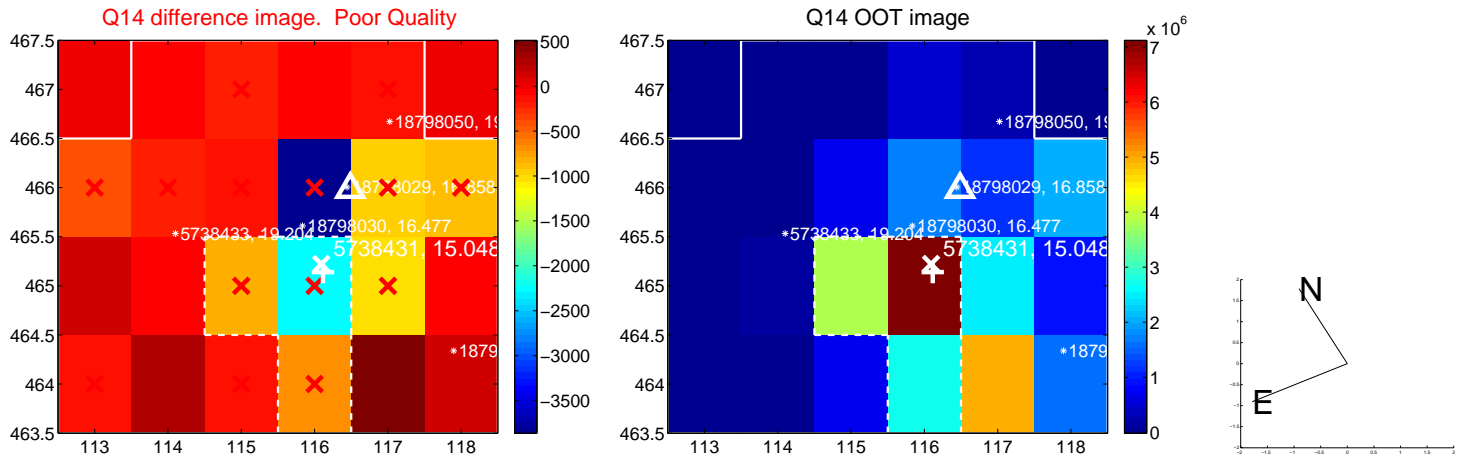
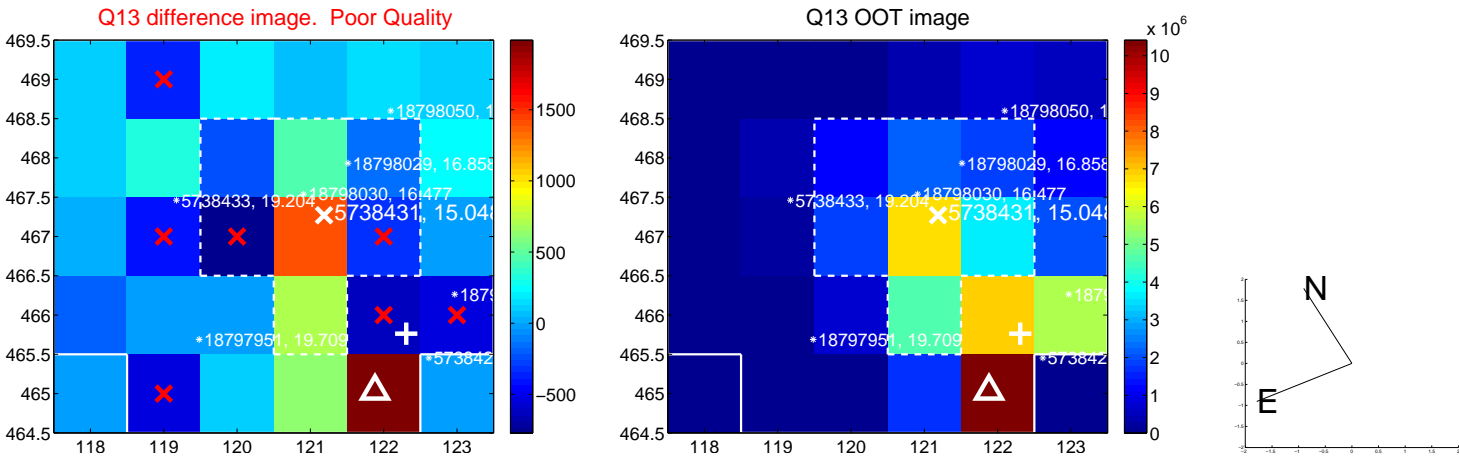
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



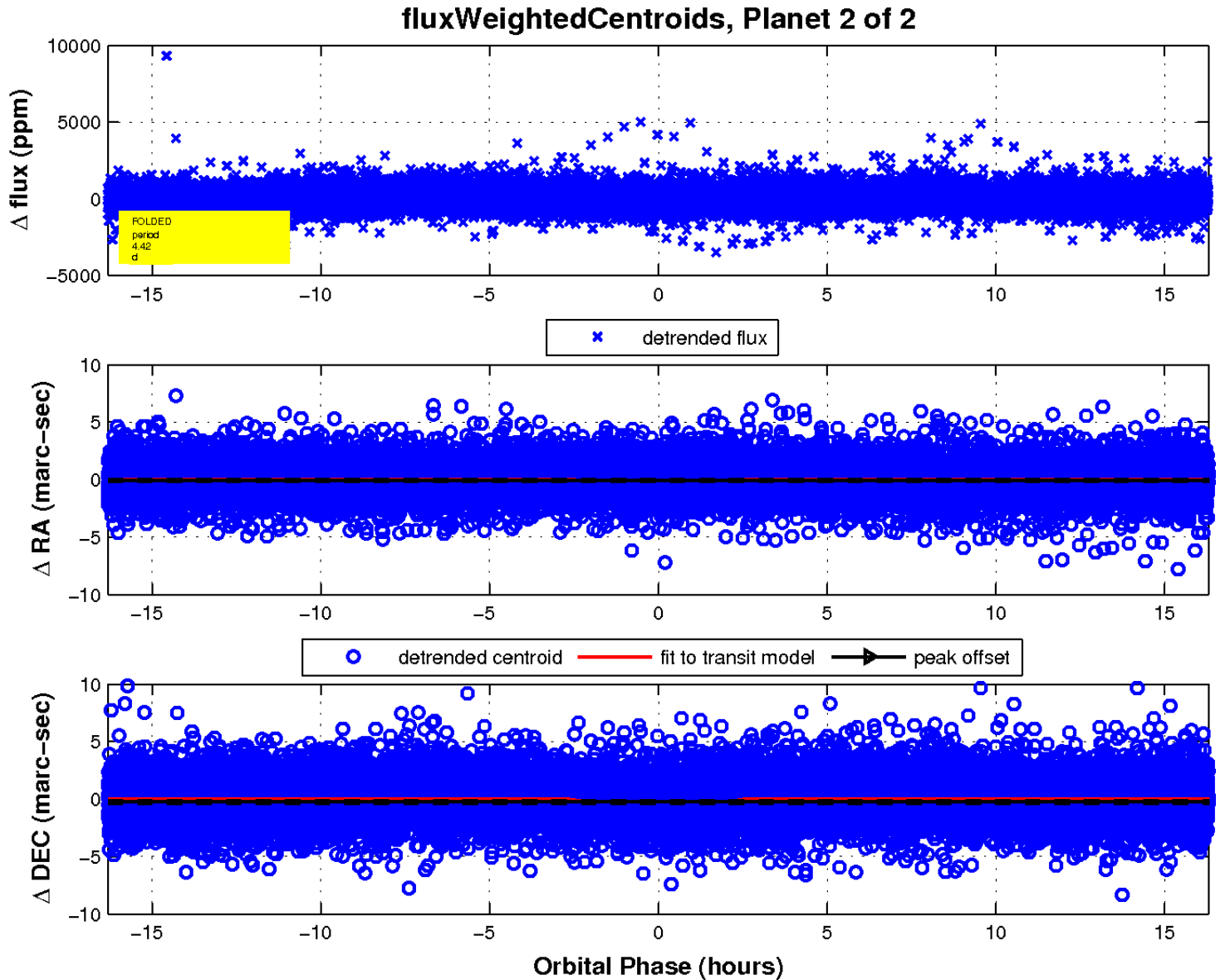
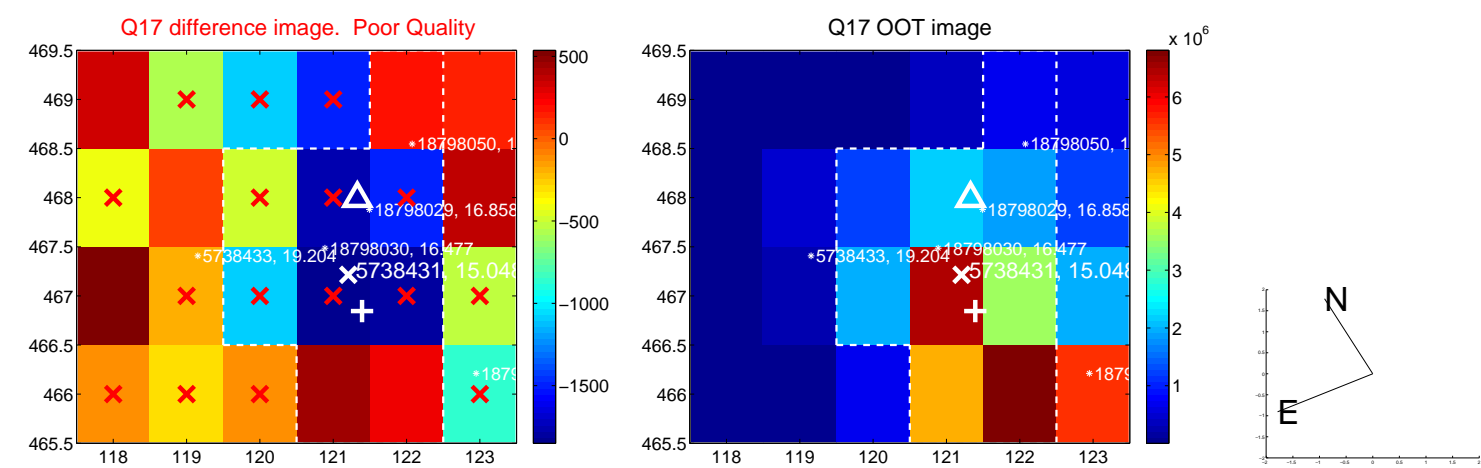
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

