

# KIC 005215465

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005215465-01	OBS	No	5.320913	132.033808	103.2	19.213	8.8	7.2	1.02	6208	1.15	370.61
005215465-02	OBS	No	5.320932	134.602745	135.0	25.350	9.5	10.9	1.02	6208	1.19	370.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005215465-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005215465-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

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

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

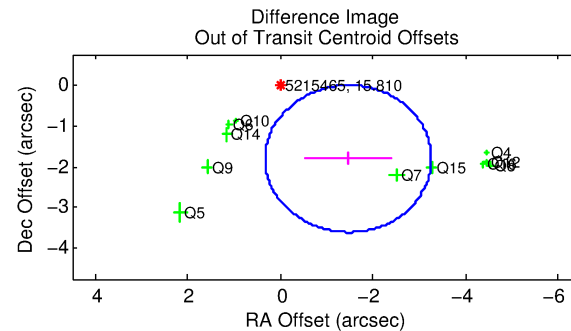
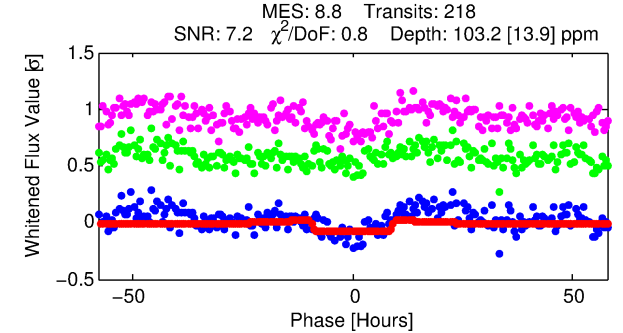
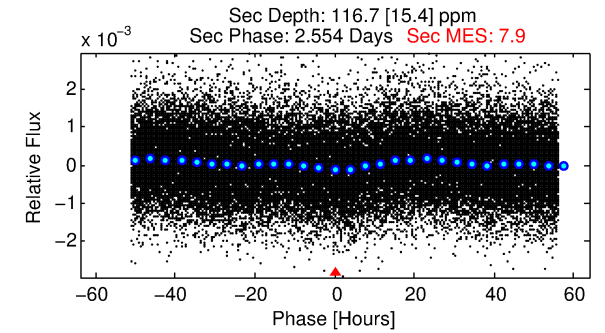
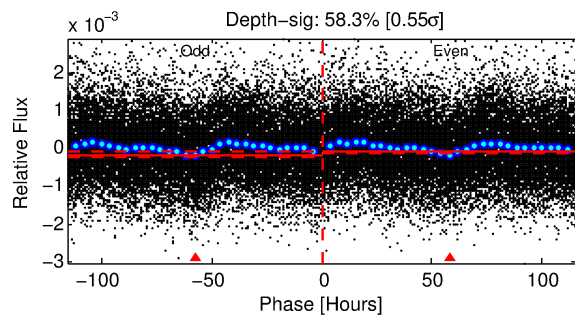
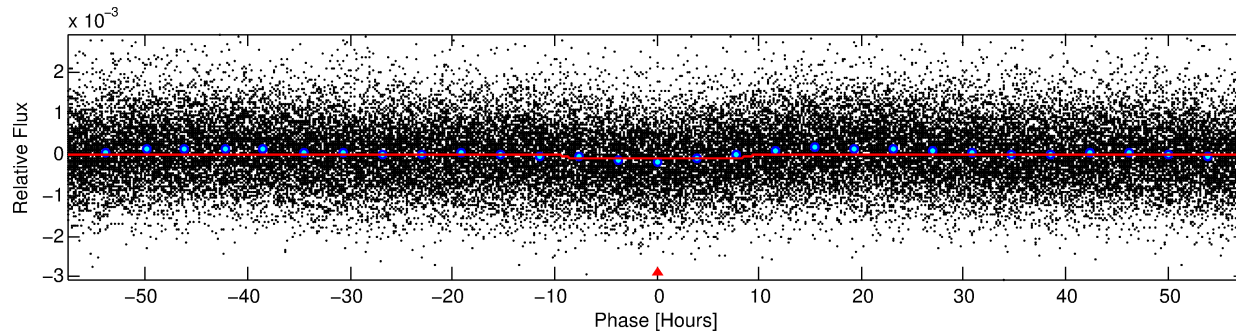
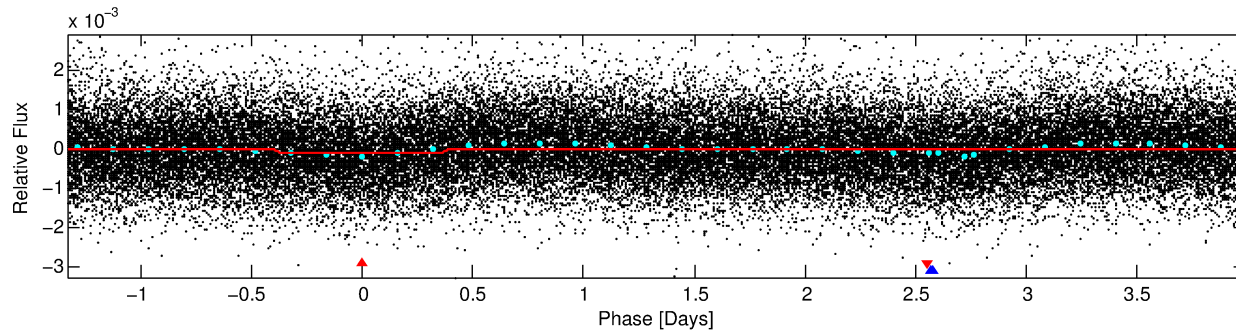
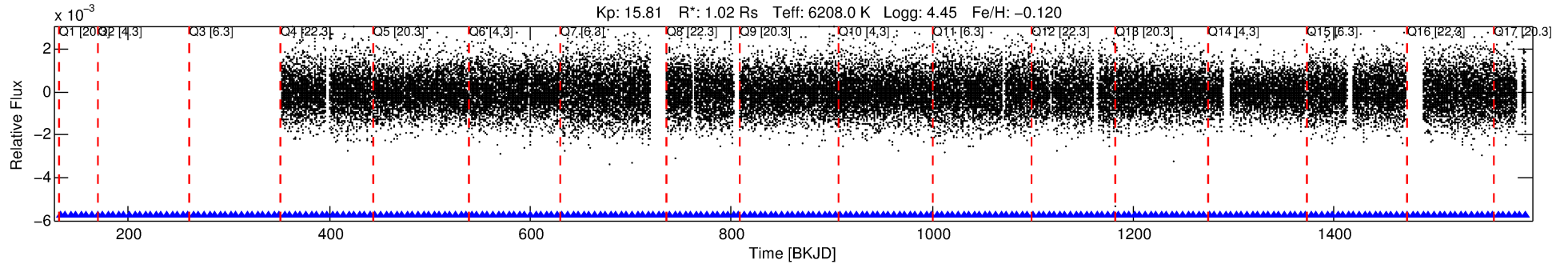
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005215465-01

No Significant Match Found

# DV One-Page Summary

KIC: 5215465 Candidate: 1 of 2 Period: 5.321 d



## DV Fit Results:

Period = 5.32091 [0.00017] d  
Epoch = 132.0338 [0.0250] BKJD  
Rp/R\* = 0.0103 [0.0030]  
a/R\* = 1.58 [1.44]  
b = 0.80 [0.70]  
Seff = 370.61 [137.04]  
Teq = 1119 [103] K  
Rp = 1.15 [0.46] Re  
a = 0.0614 [0.0139] AU  
Ag = 183.52 [126.56] [1.44 $\sigma$ ]  
Teff = 6367 [1000] K [5.22 $\sigma$ ]

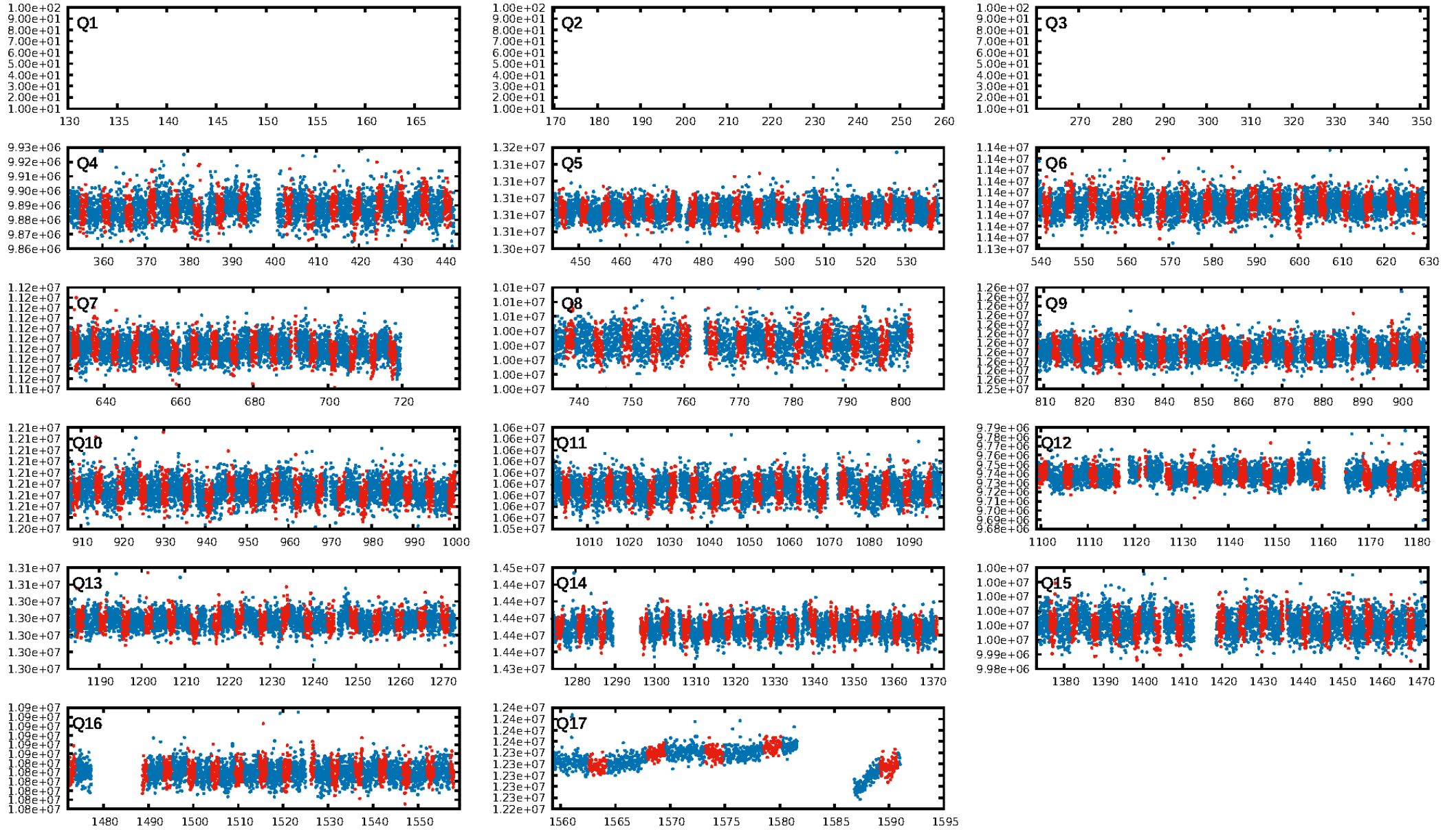
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [213/213]  
GhostDiagnostic-chr: 1.626  
Centroid-sig: 0.0%  
Centroid-so: 6.560 arcsec [7.78 $\sigma$ ]  
OotOffset-rm: 2.327 arcsec [3.88 $\sigma$ ]  
KicOffset-rm: 5.772 arcsec [10.58 $\sigma$ ]  
OotOffset-st: 3/2/4/2 [11]  
KicOffset-st: 3/2/4/2 [11]  
DiffImageQuality-fgm: 0.91 [10/11]  
DiffImageOverlap-fno: 1.00 [14/14]

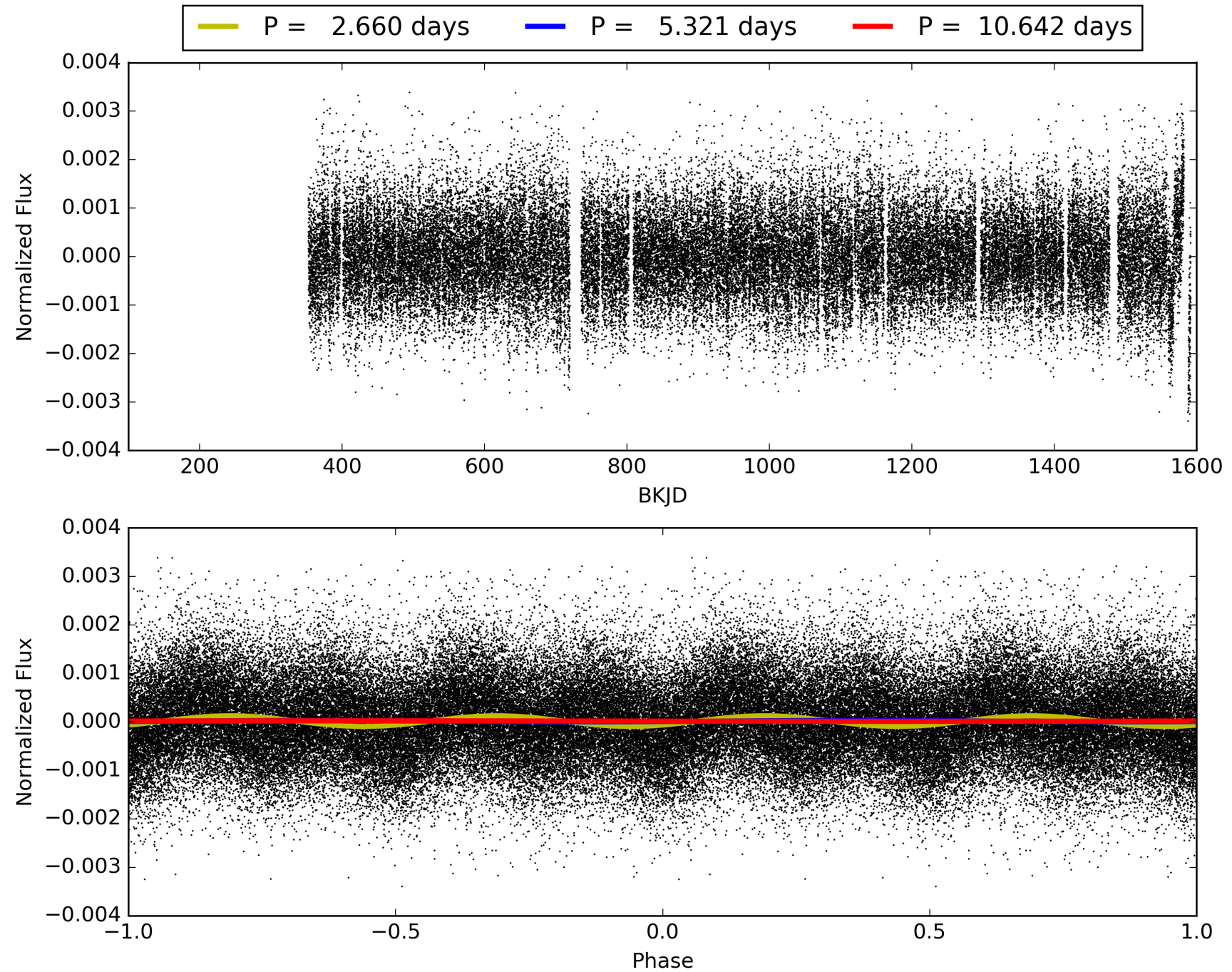
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005215465-01, PDC Light Curves

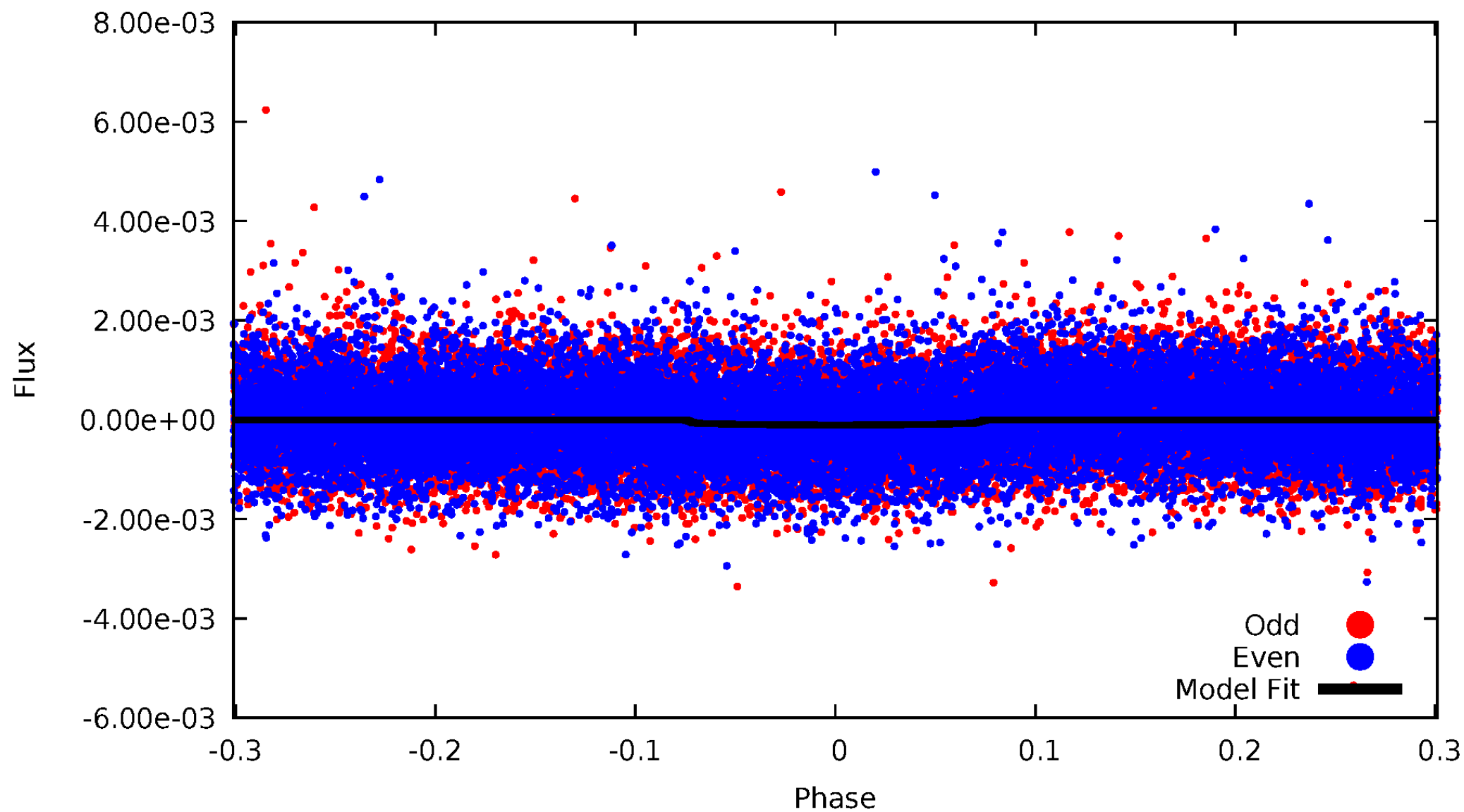


# TCE 005215465-01



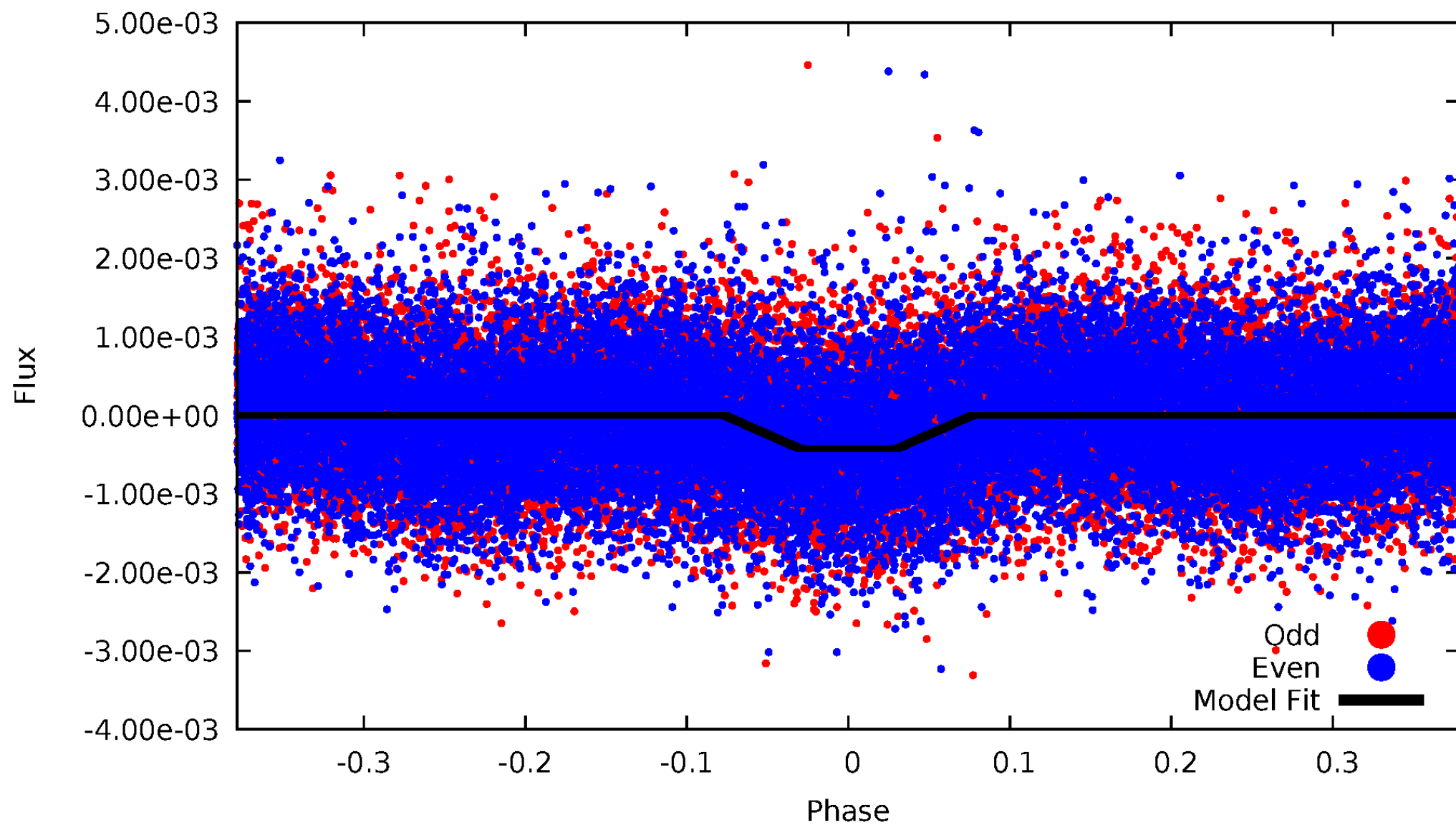
# DV Odd/Even

TCE 005215465-01

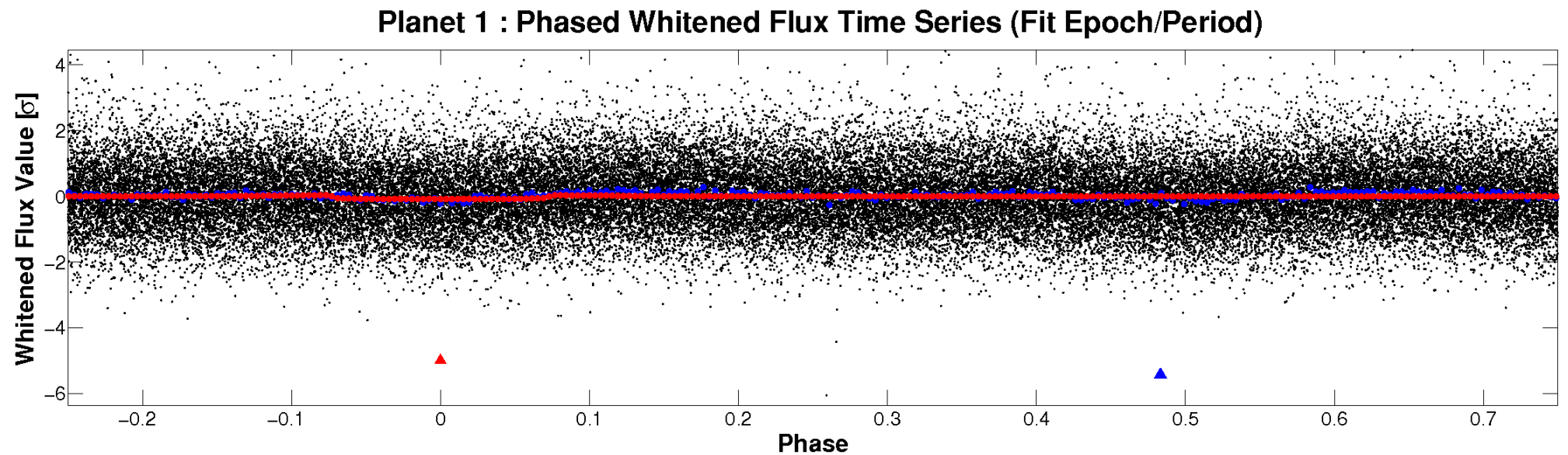
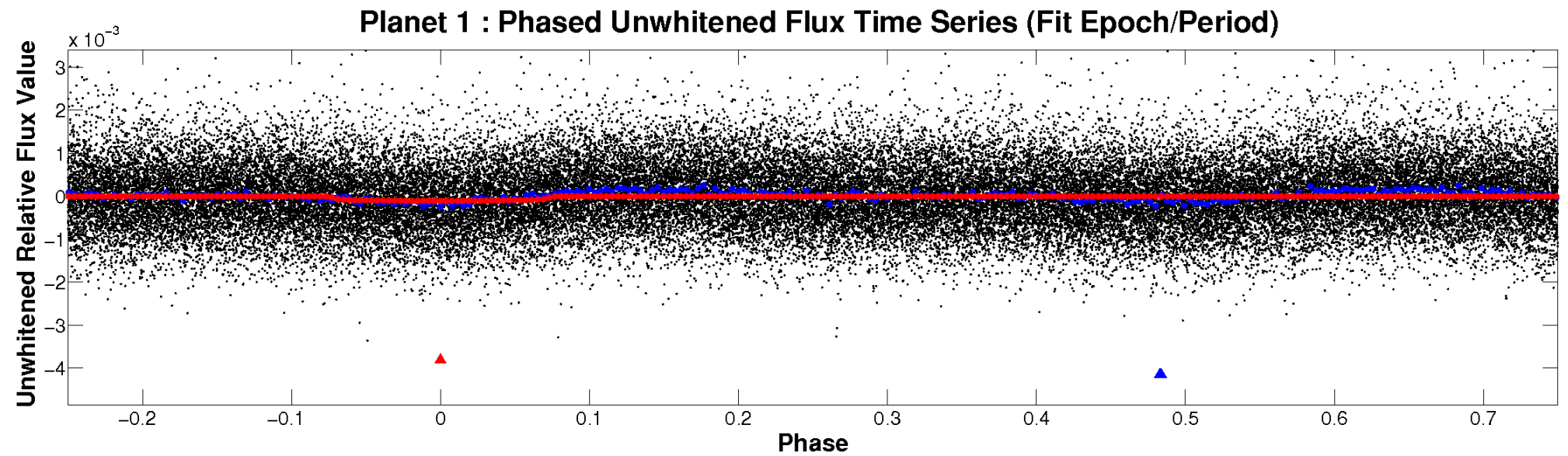


# ALT Odd/Even

TCE 005215465-01

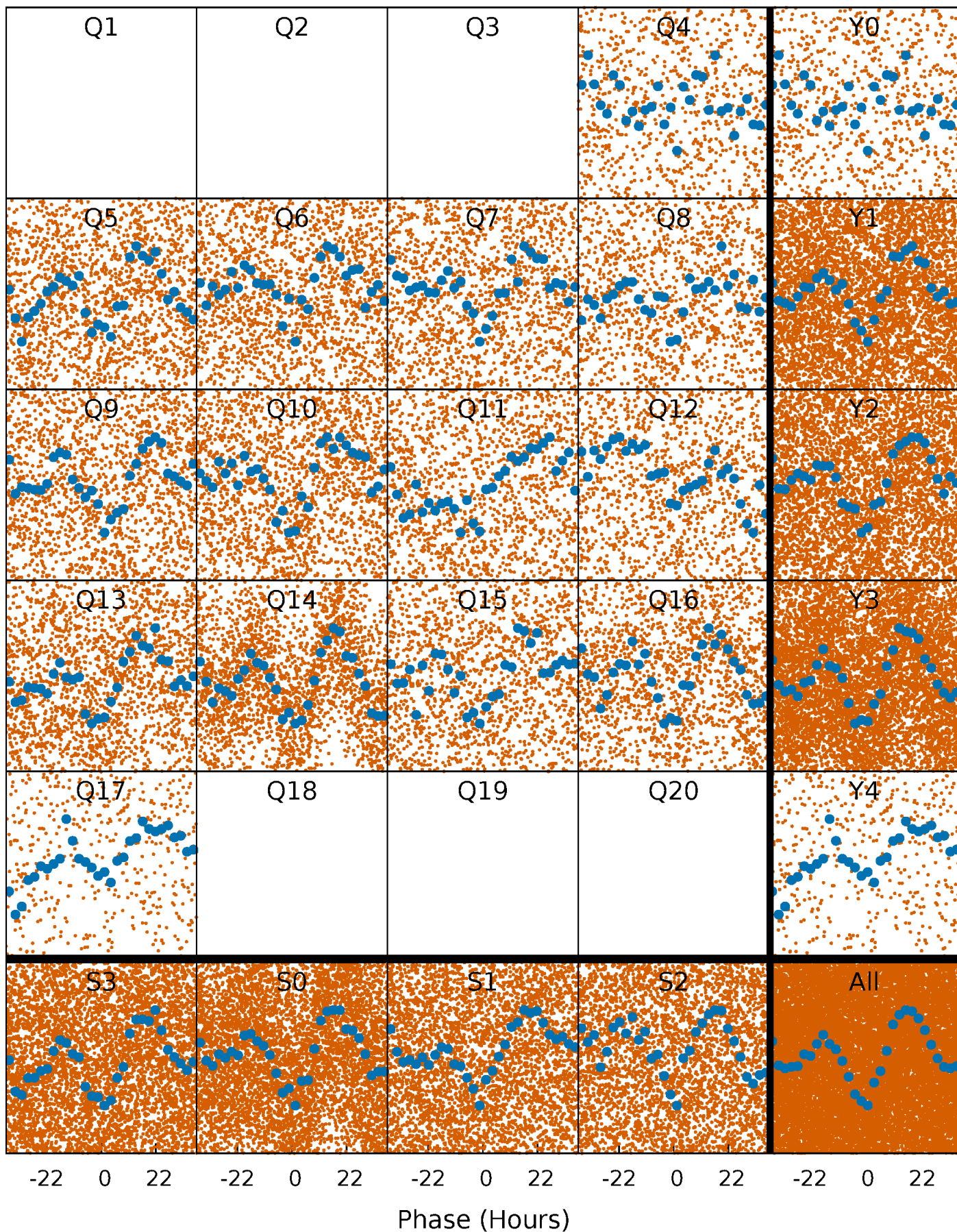


# Non-Whitened Vs. Whitened Light Curve



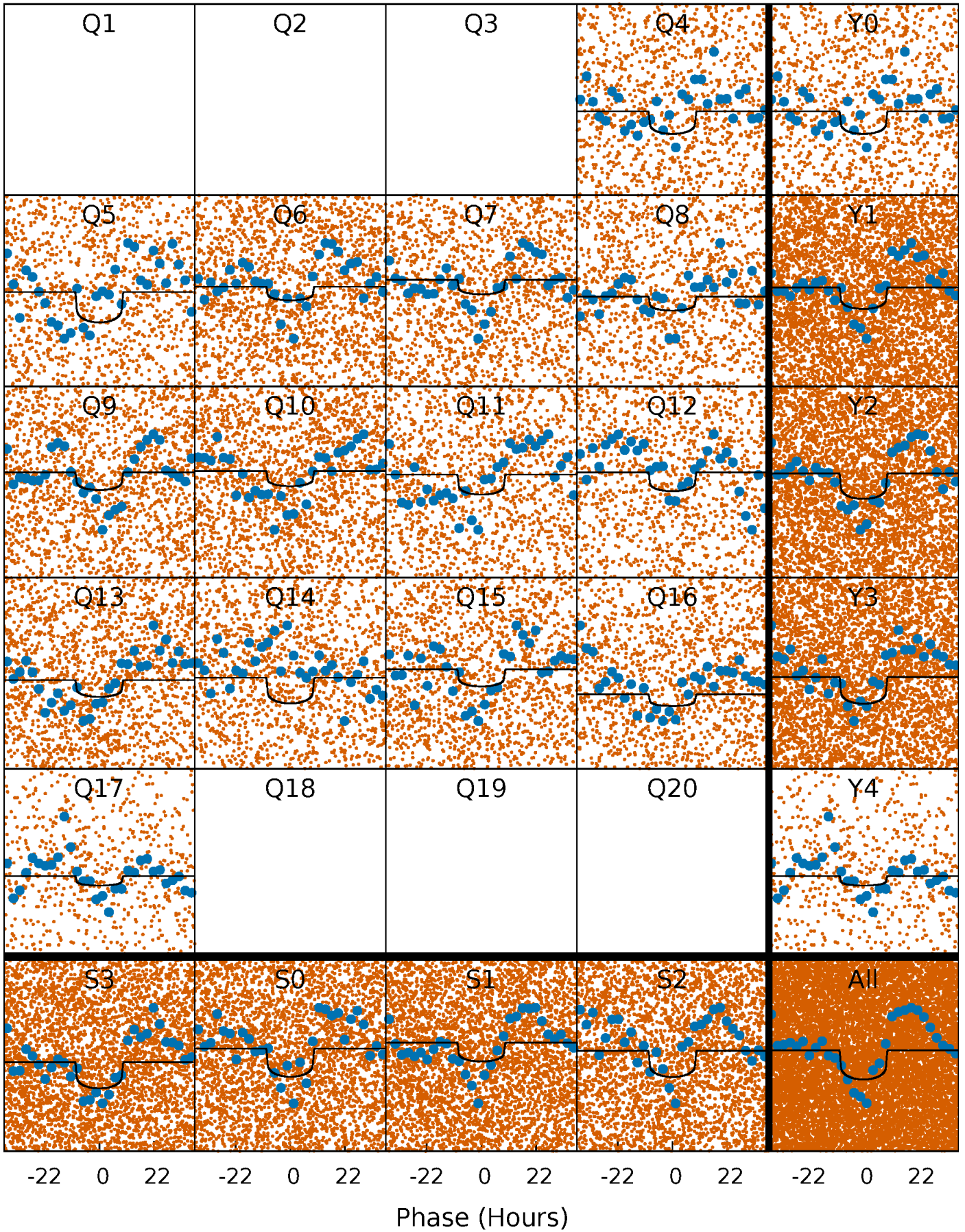
# PDC Quarter-Phased Transit Curves

TCE 005215465-01 P= 5.320913 Days  $T_0=132.033808$  (BKJD)



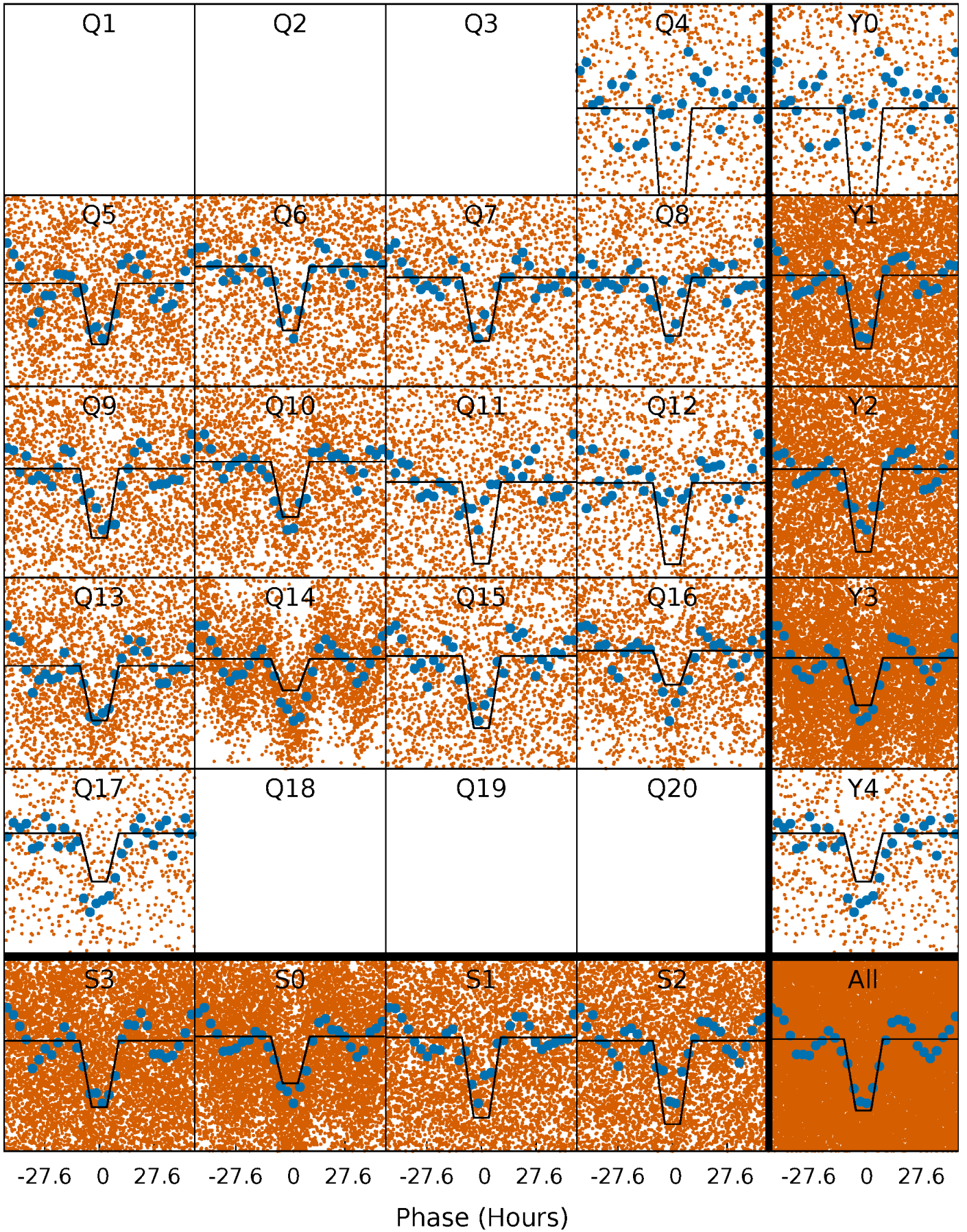
# DV Quarter-Phased Transit Curves

TCE 005215465-01 P= 5.320913 Days  $T_0=132.033808$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

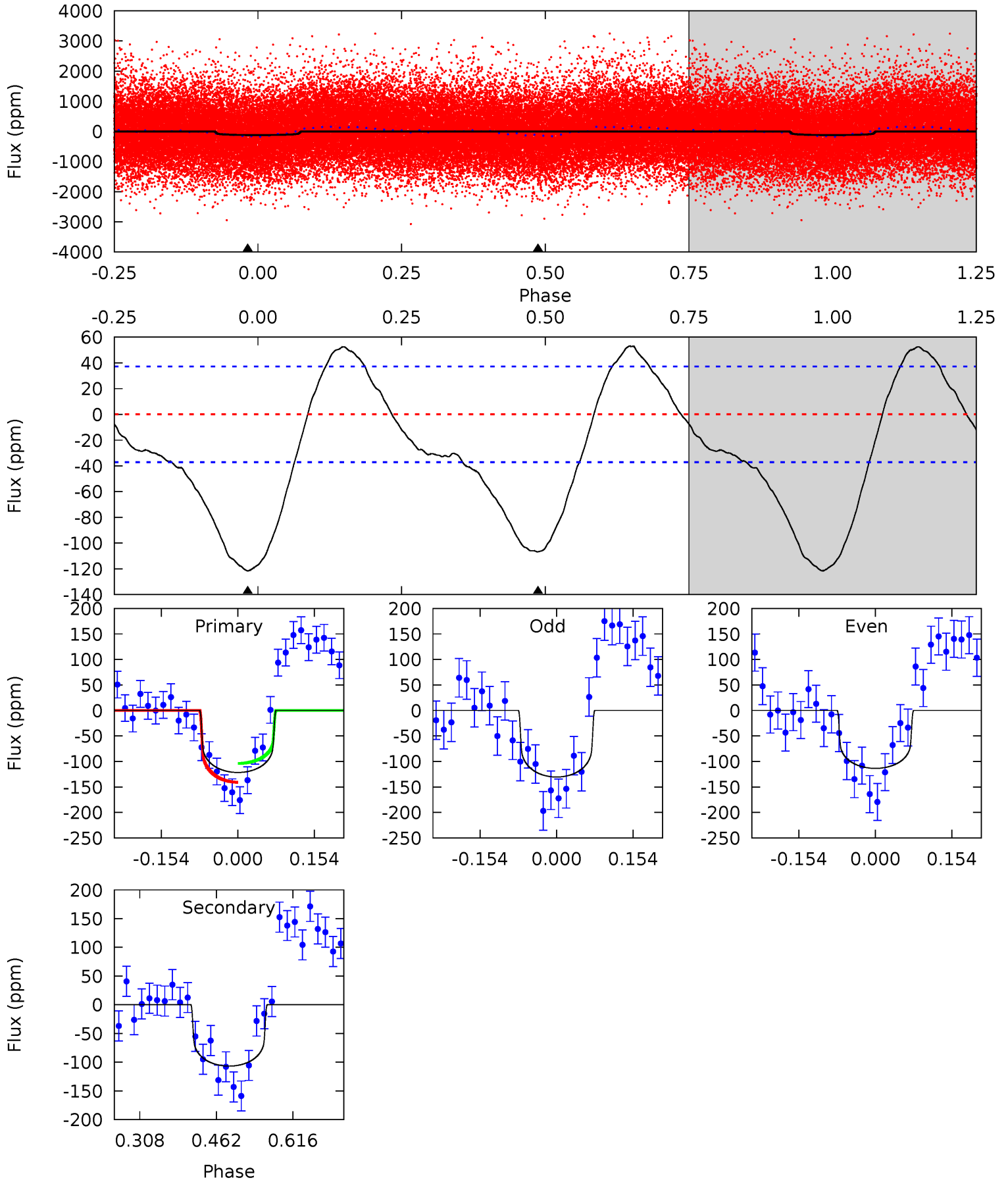
TCE 005215465-01 P= 5.320683 Days  $T_0=132.068487$  (BKJD)



# DV Model-Shift Uniqueness Test

005215465-01, P = 5.320913 Days, E = 132.033808 Days

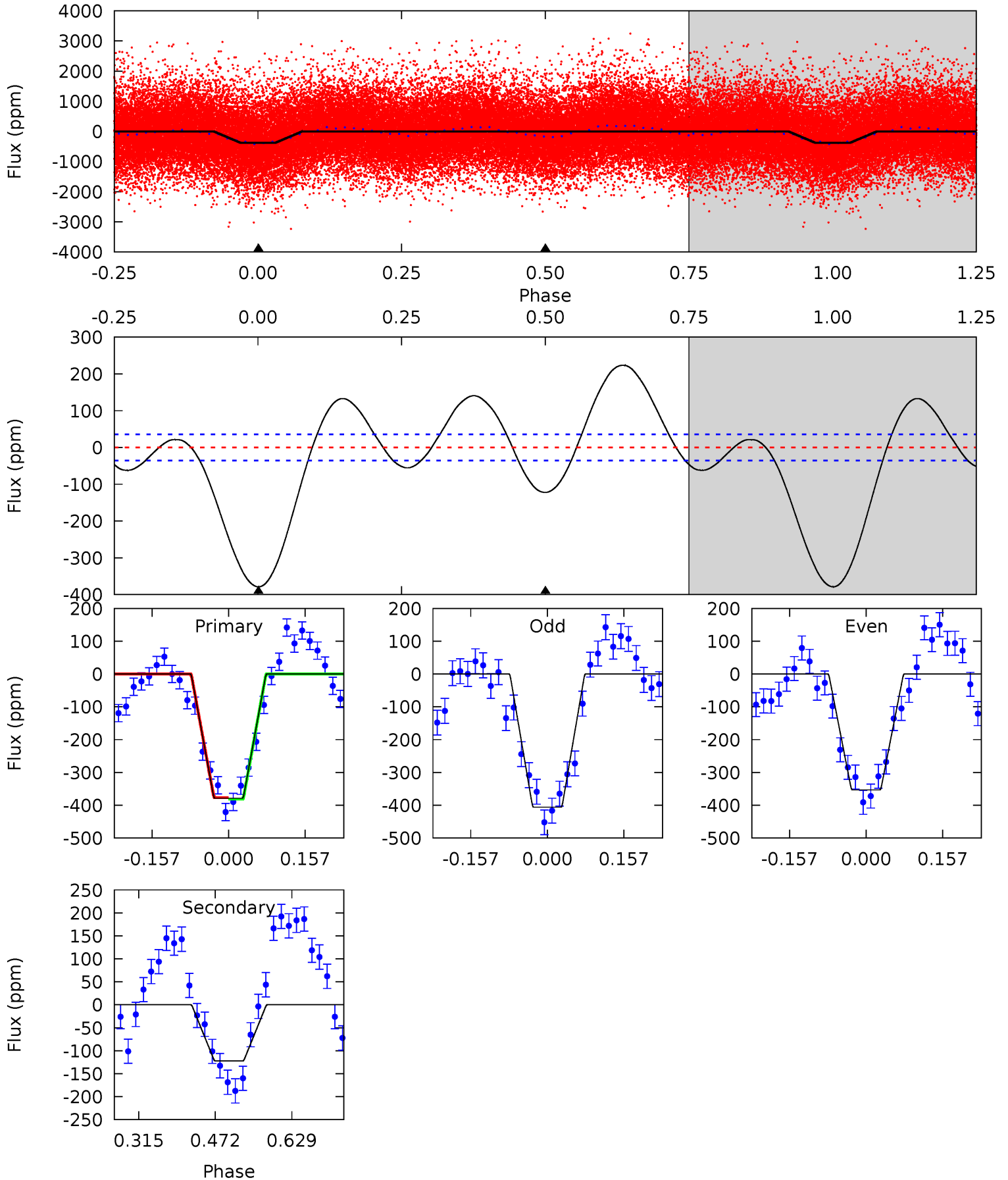
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.6	12.8	0	0	4.47	1.43	3.66	14.6	14.6	12.8	12.8	1.02	1.00	0.30	2.22



# Alt Model-Shift Uniqueness Test

005215465-01, P = 5.320683 Days, E = 132.068487 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
47.5	15.3	0	0	4.47	1.41	8.61	47.5	47.5	15.3	15.3	3.30	0.96	0.37	0.32



### Stellar Parameters For KIC 005215465

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6208^{+194}_{-259}$	$4.454^{+0.060}_{-0.180}$	$-0.120^{+0.250}_{-0.300}$	$1.024^{+0.277}_{-0.119}$	$1.086^{+0.141}_{-0.141}$	$1.423^{+0.450}_{-0.713}$
	+3%/-4%	+1%/-4%	+208%/-250%	+27%/-12%	+13%/-13%	+32%/-50%
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 005215465-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-107 \pm 8$	$1.19^{+0.39}_{-0.37}$	$1589^{+108}_{-86}$	$6195^{+1401}_{-774}$	$156^{+169}_{-67}$
Alt.	$-122 \pm 8$	$2.38^{+0.47}_{-0.37}$	$1585^{+102}_{-85}$	$4658^{+362}_{-290}$	$44^{+19}_{-13}$

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

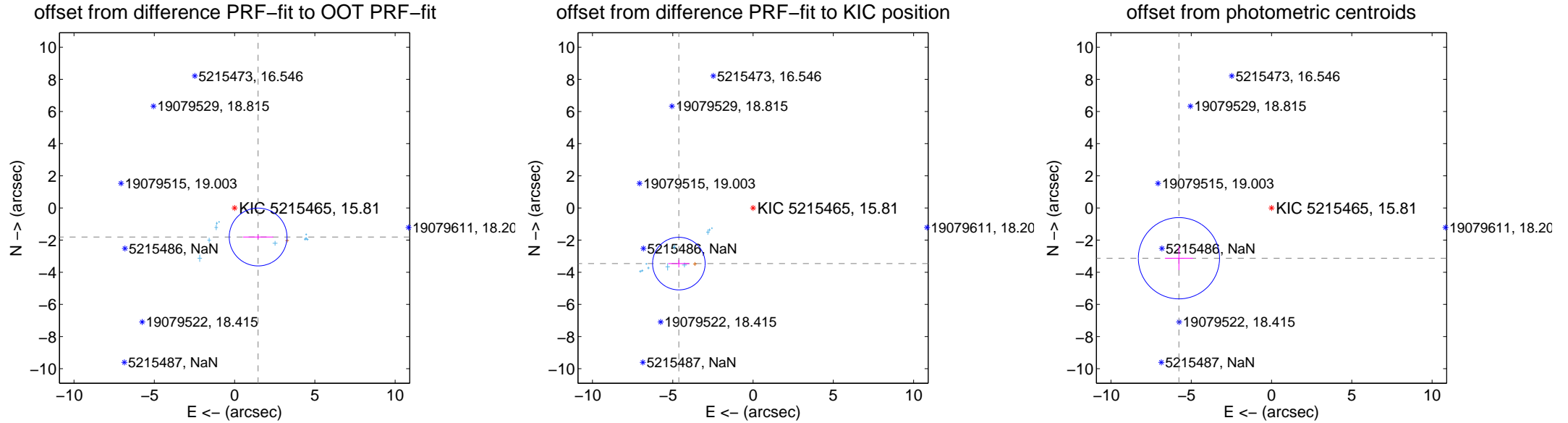
## DV Centroid Data

Supplemental centroid analysis for 005215465-01. Kepler magnitude: 15.81. Transit SNR 7.17

There are 10 quarters with good PRF difference image offsets

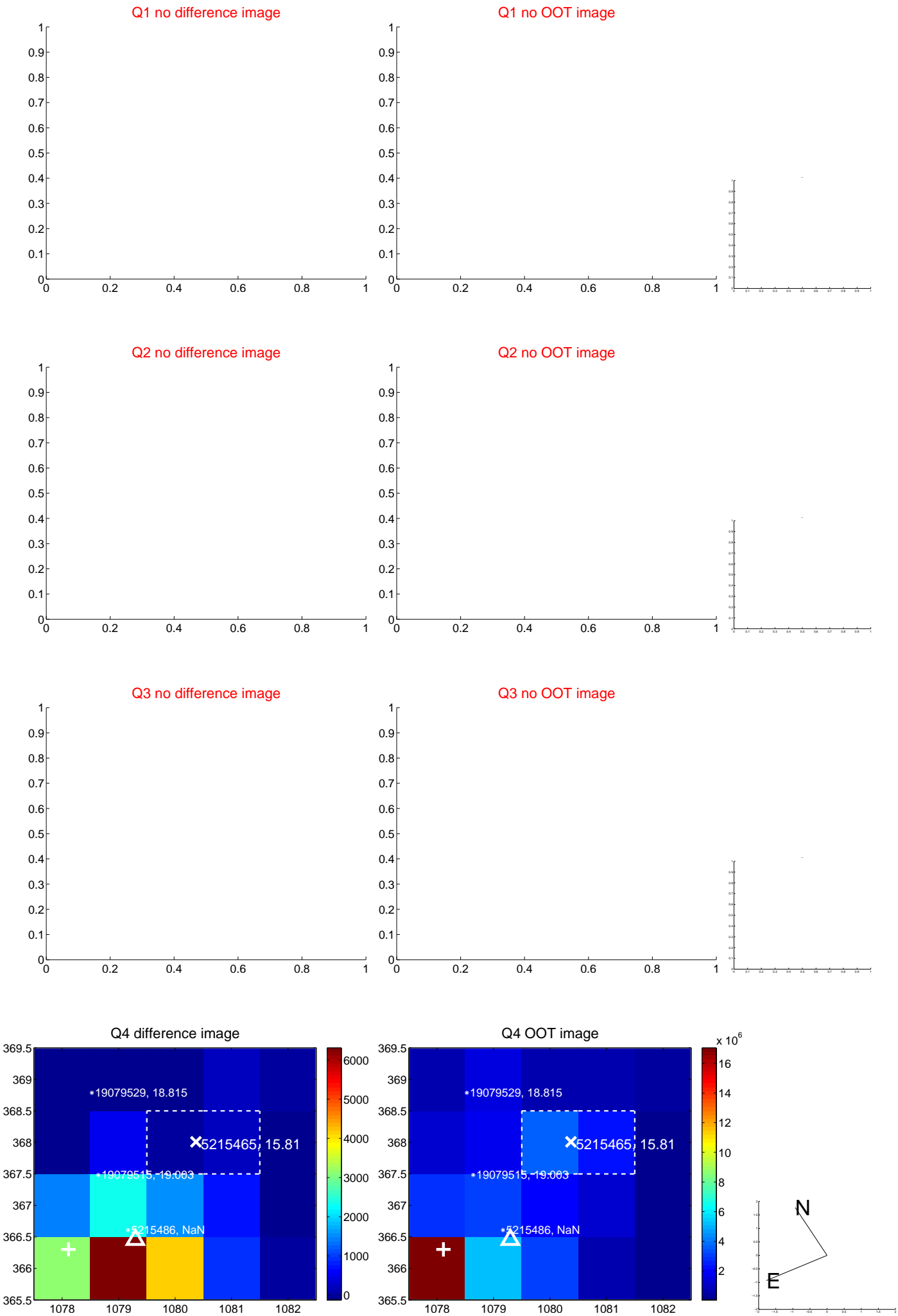
The OOT PRF centroid is offset from the target star catalog position by about 11.59 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.327 \pm 0.599$	3.88	$-1.465 \pm 0.937$	$-1.808 \pm 0.136$
PRF-fit source offset from KIC position	$5.772 \pm 0.546$	10.58	$4.620 \pm 0.657$	$-3.461 \pm 0.244$
photometric centroid source offset	$6.56 \pm 0.84$	7.78	$5.77 \pm 0.87$	$-3.13 \pm 0.74$

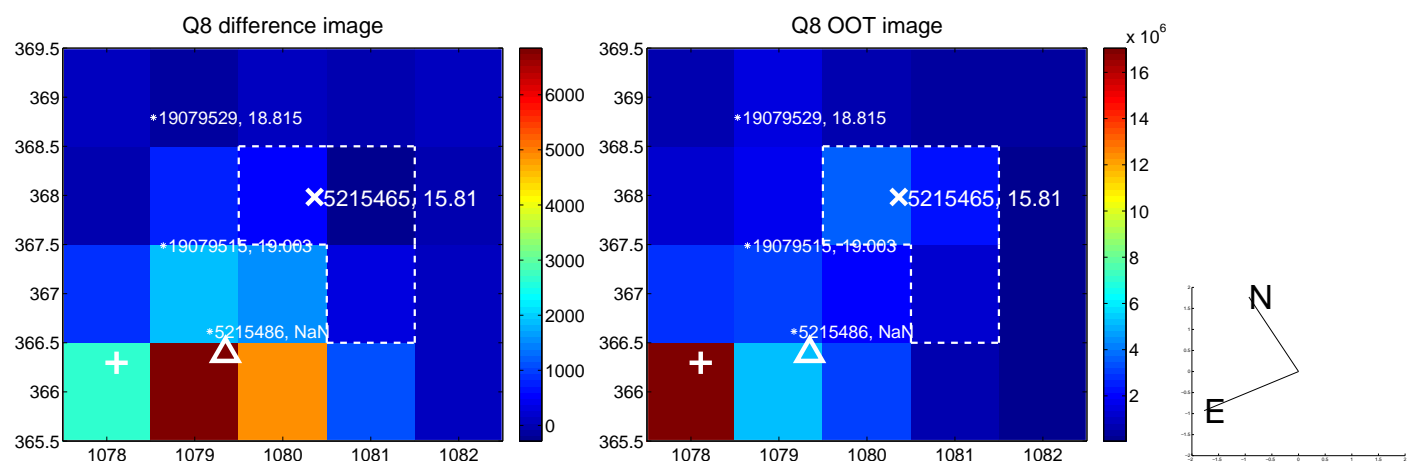
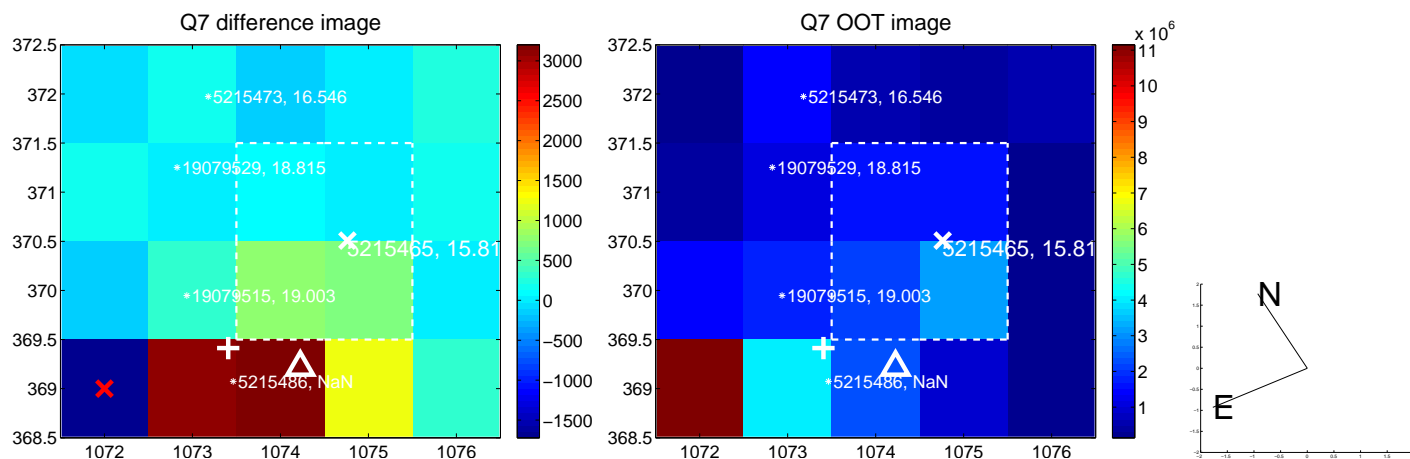
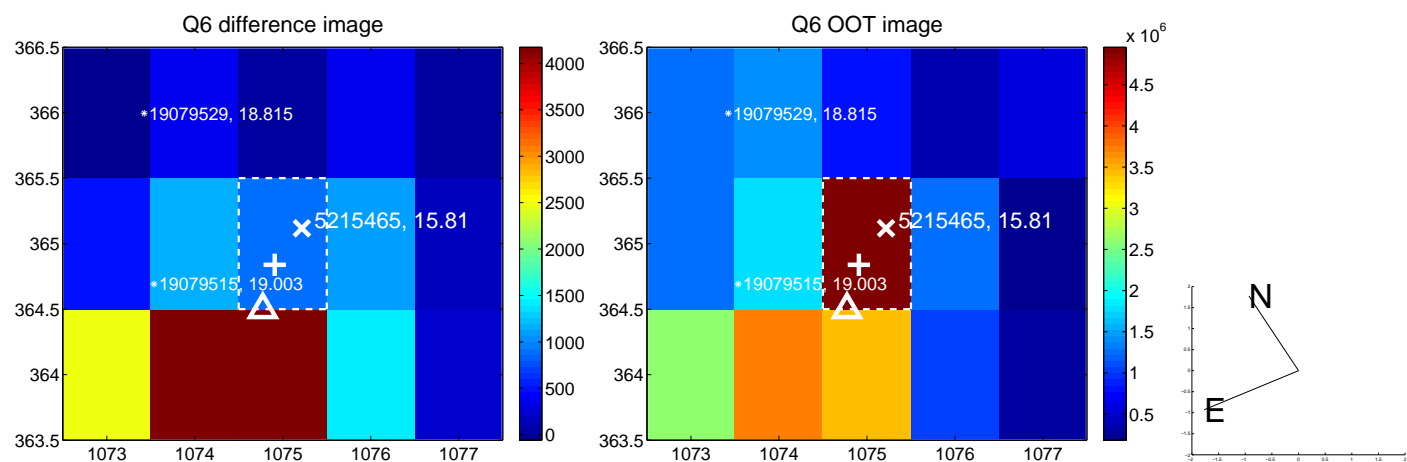
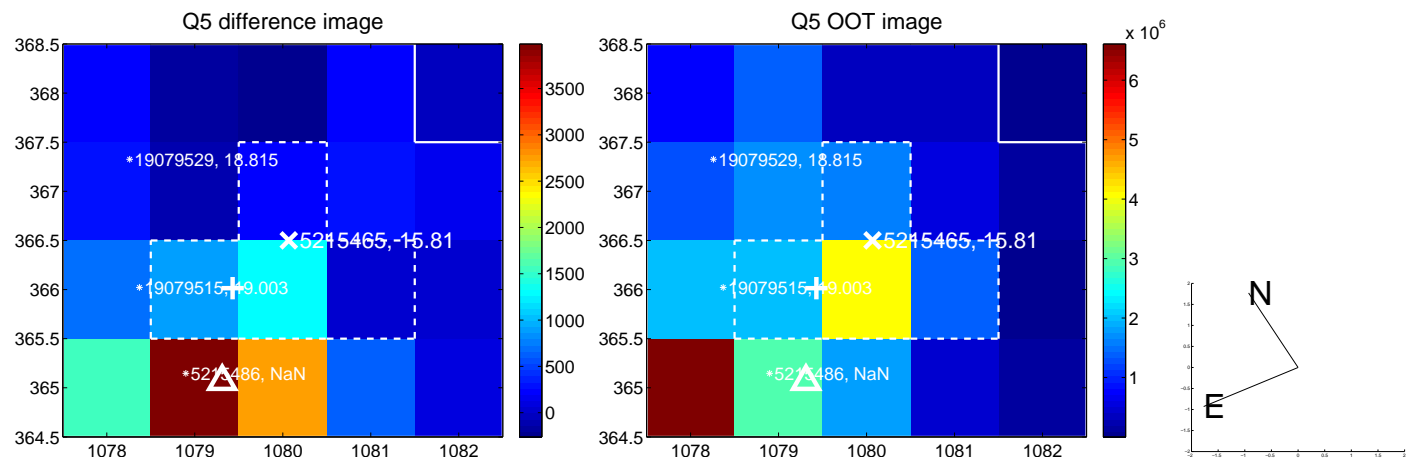


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

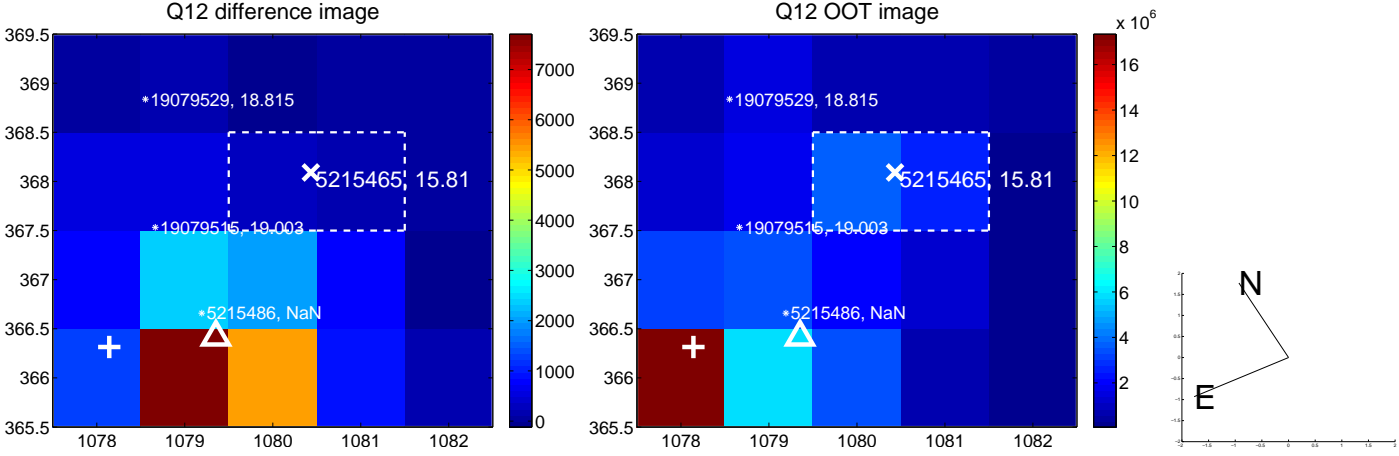
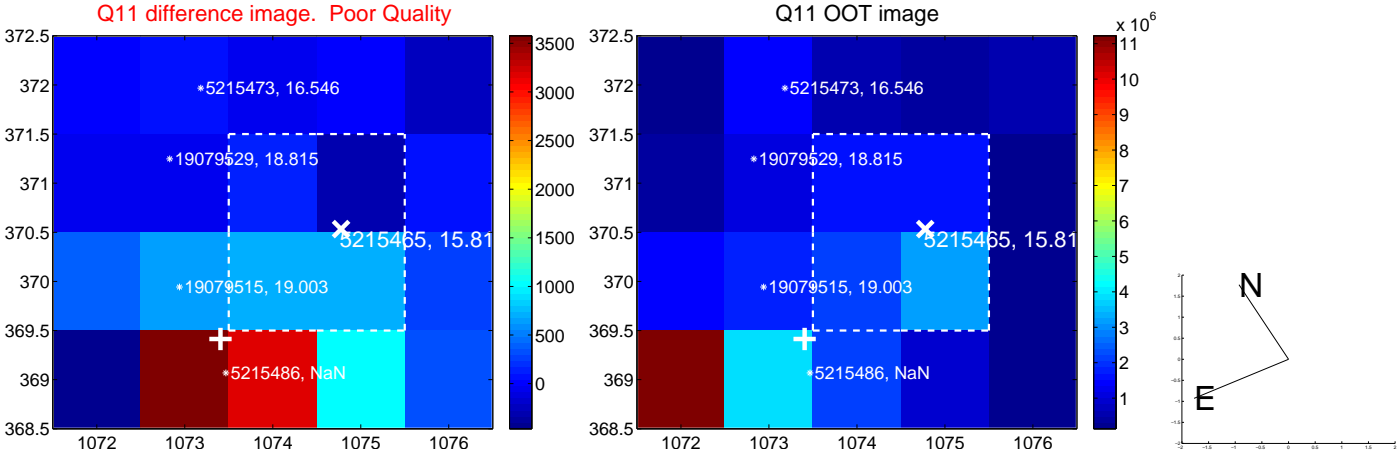
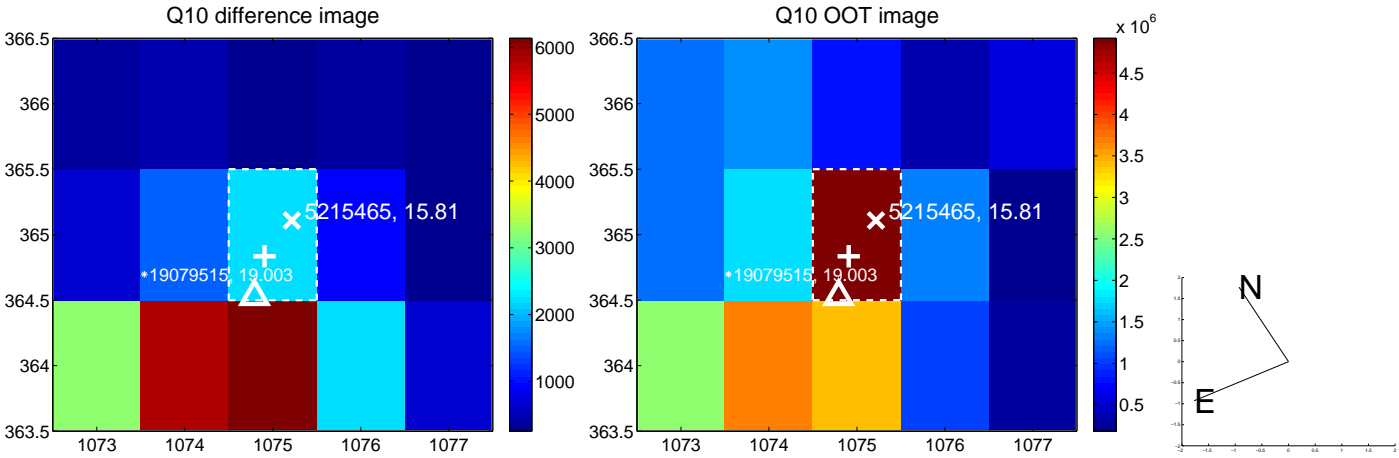
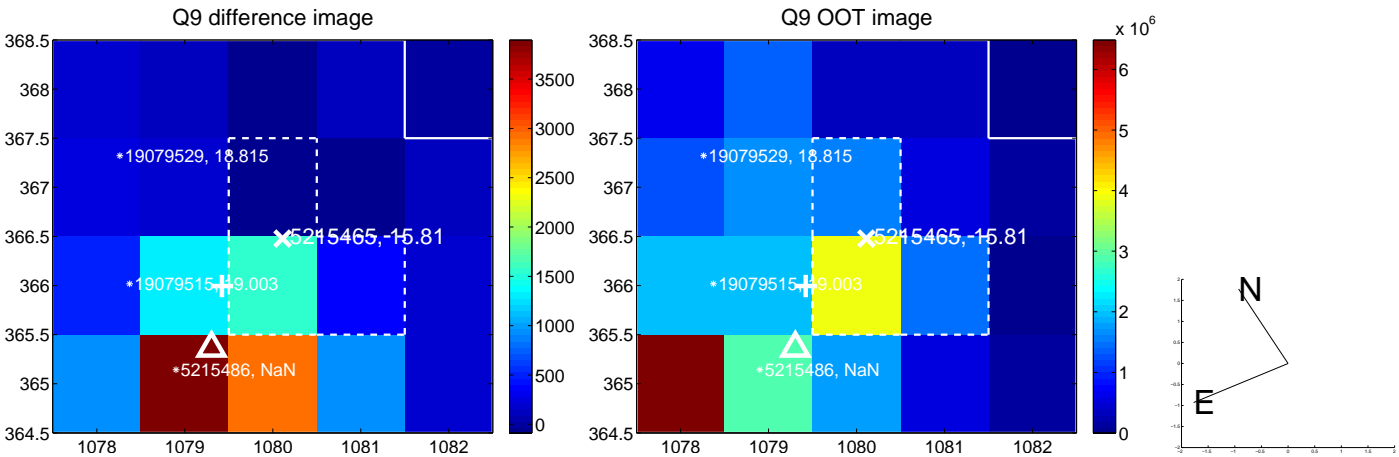
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



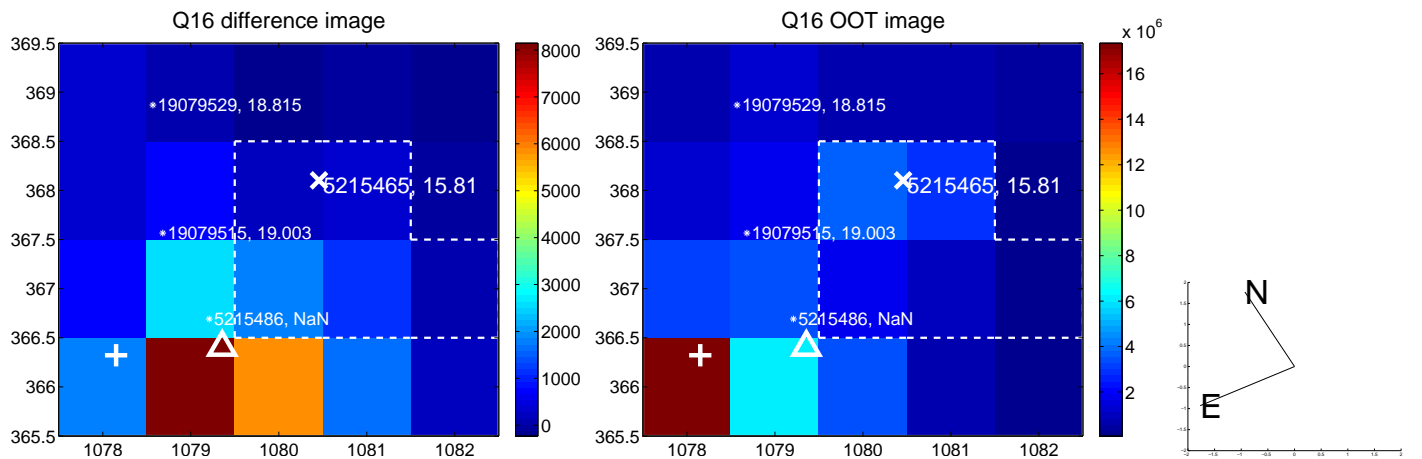
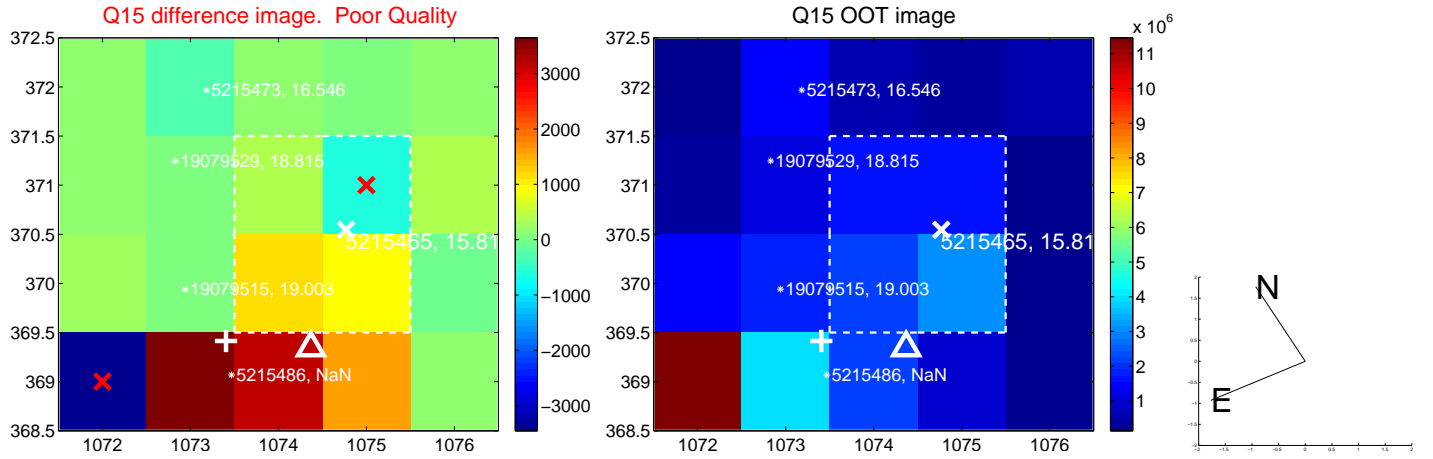
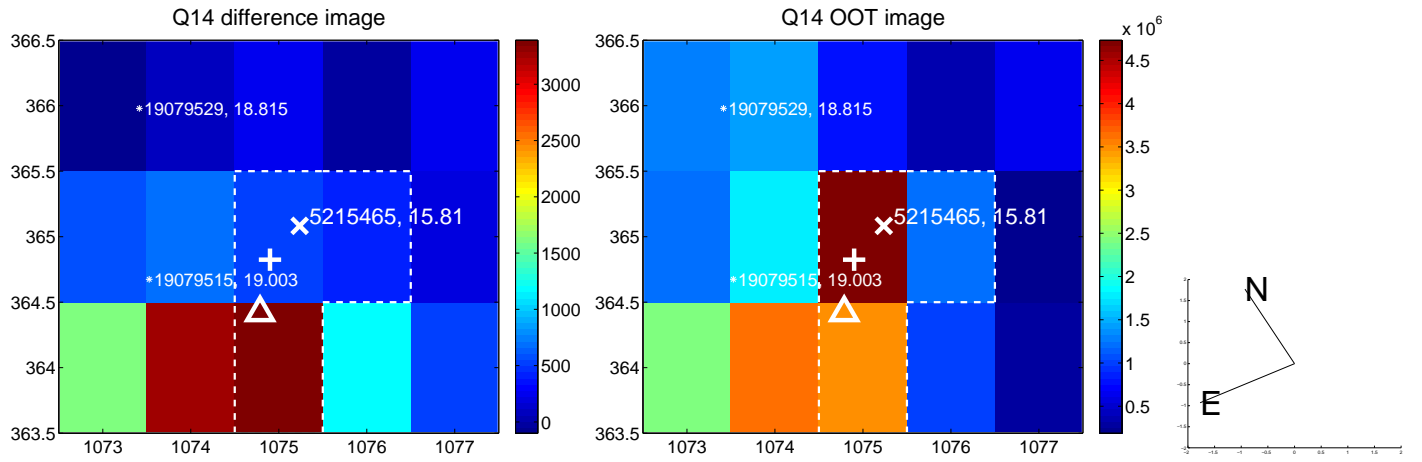
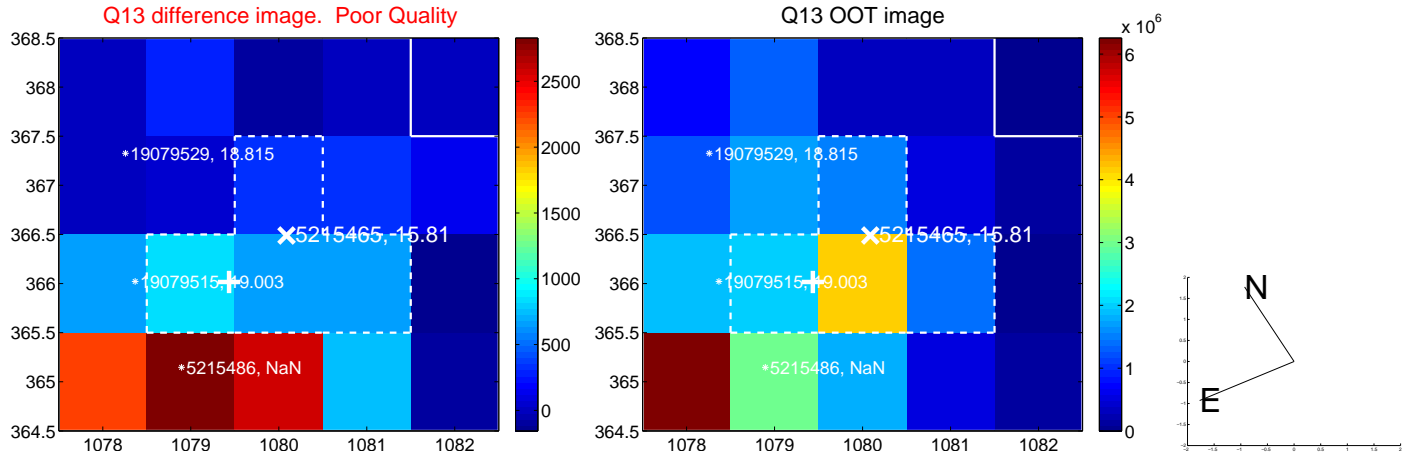
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



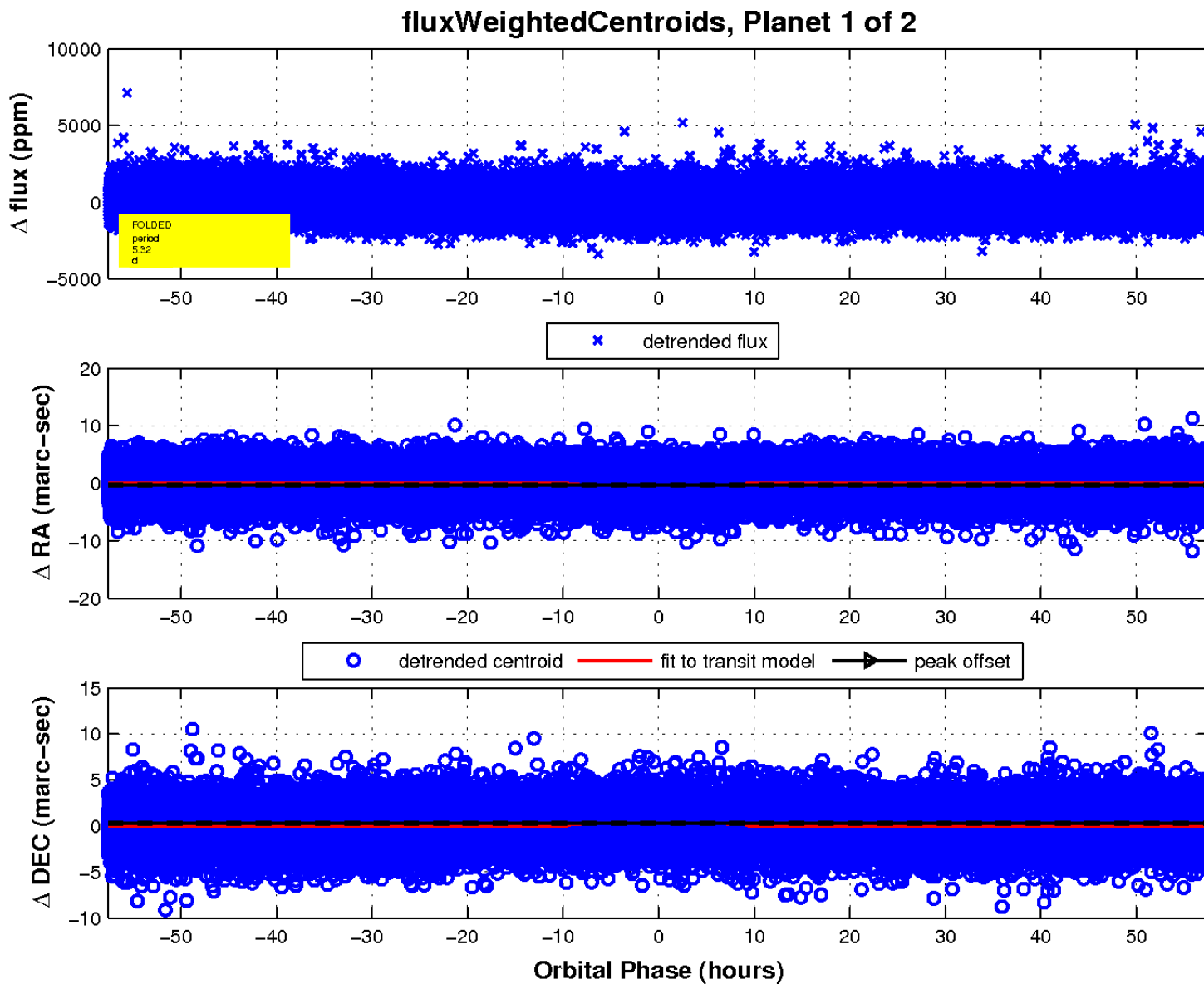
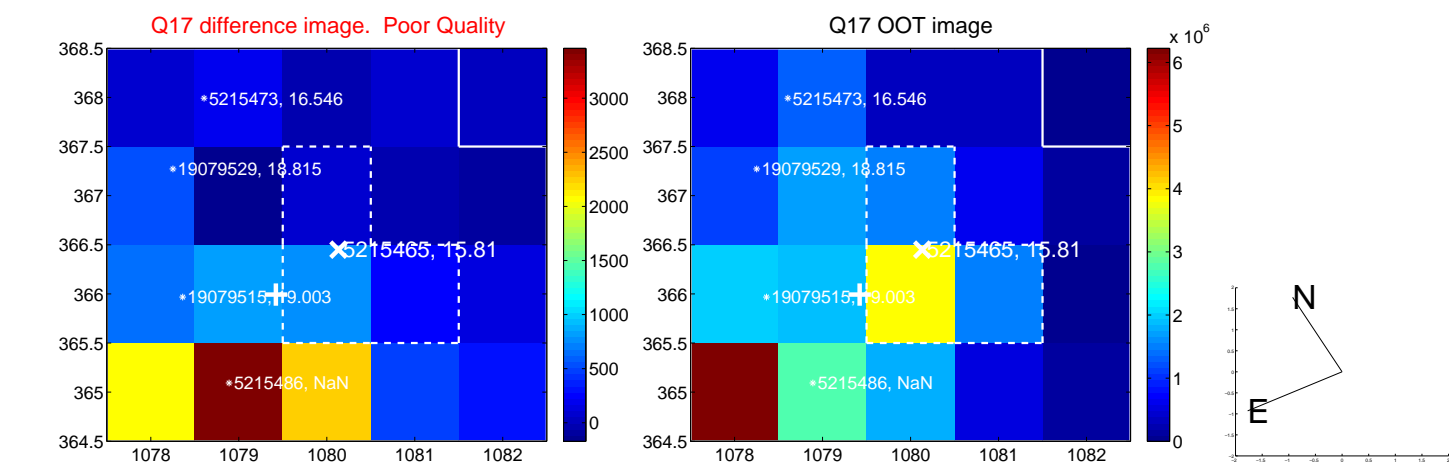
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



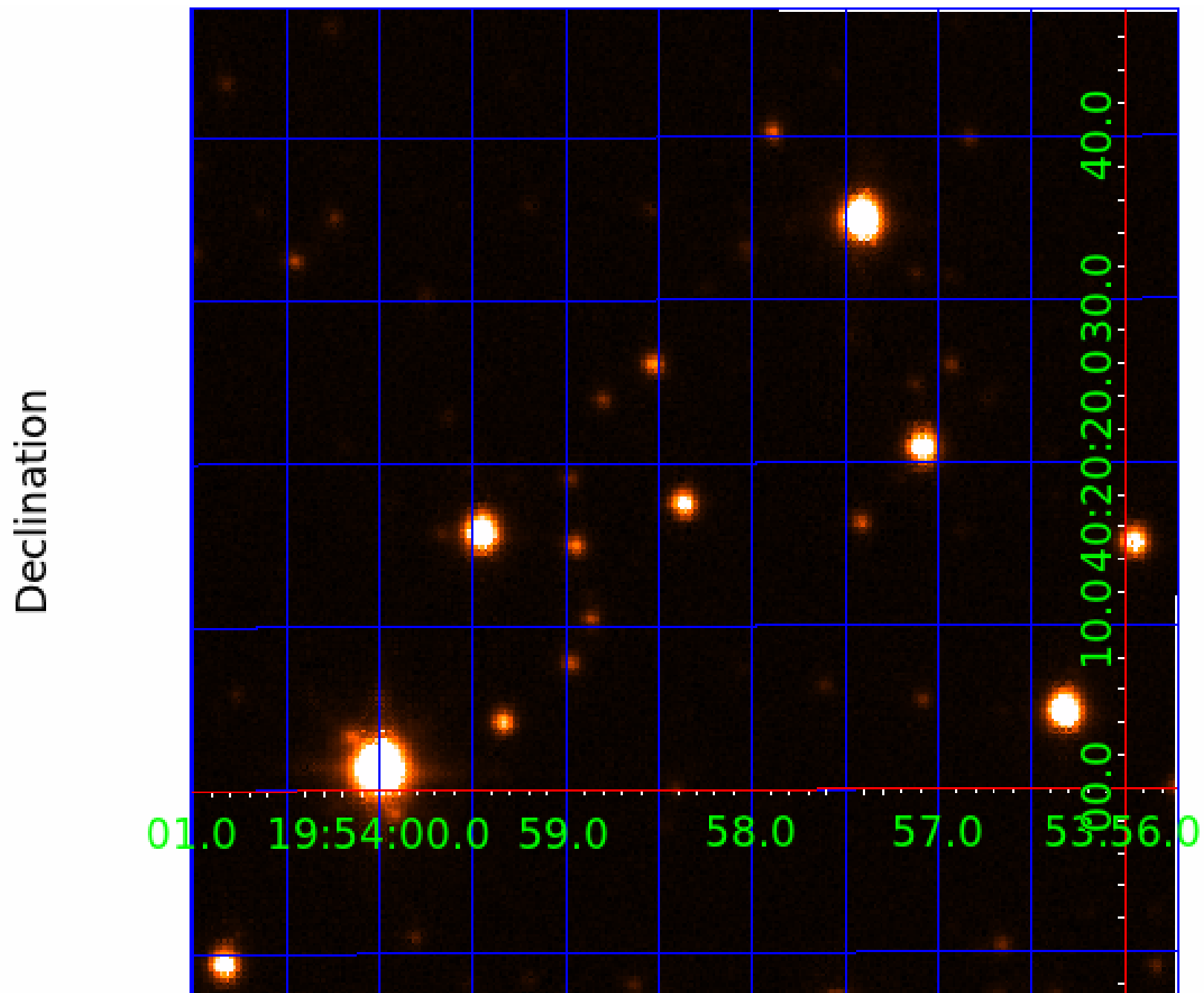
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 005215465

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005215465-01	OBS	No	5.320913	132.033808	103.2	19.213	8.8	7.2	1.02	6208	1.15	370.61
005215465-02	OBS	No	5.320932	134.602745	135.0	25.350	9.5	10.9	1.02	6208	1.19	370.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005215465-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005215465-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

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

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

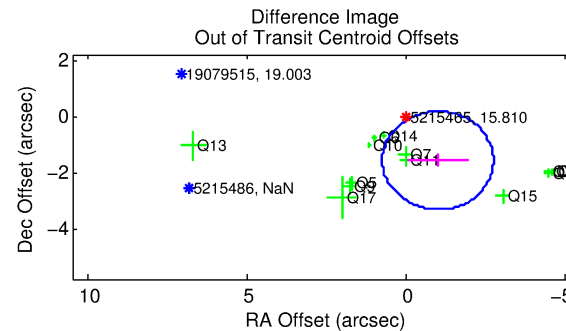
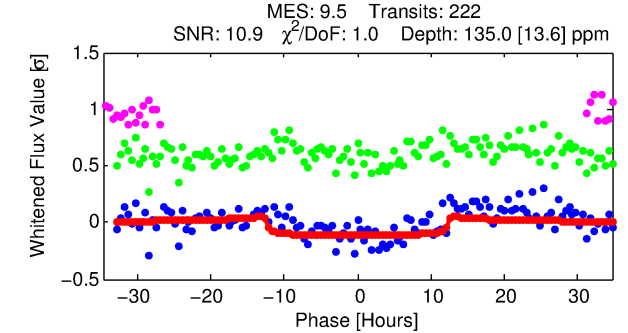
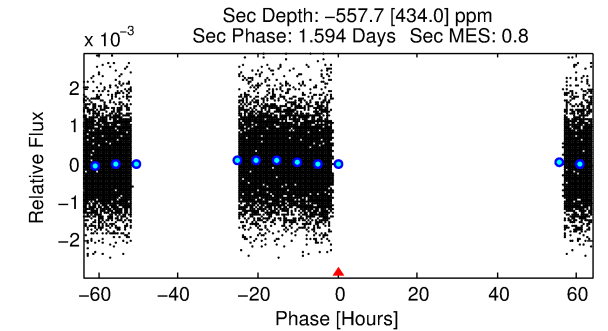
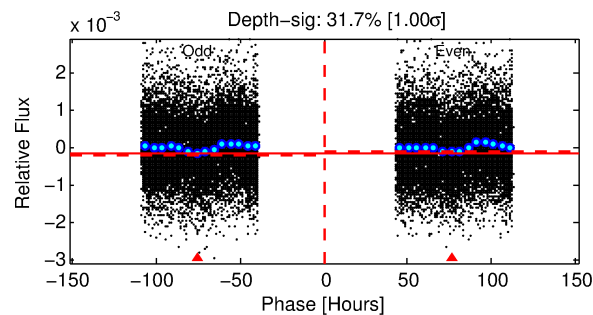
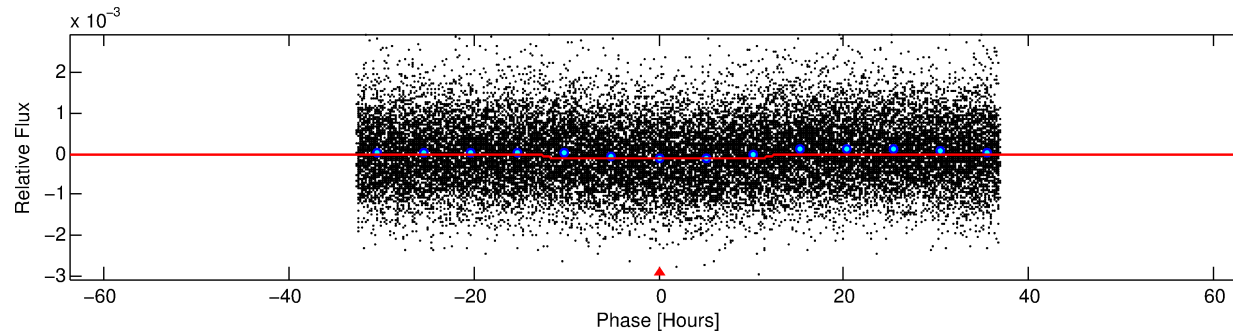
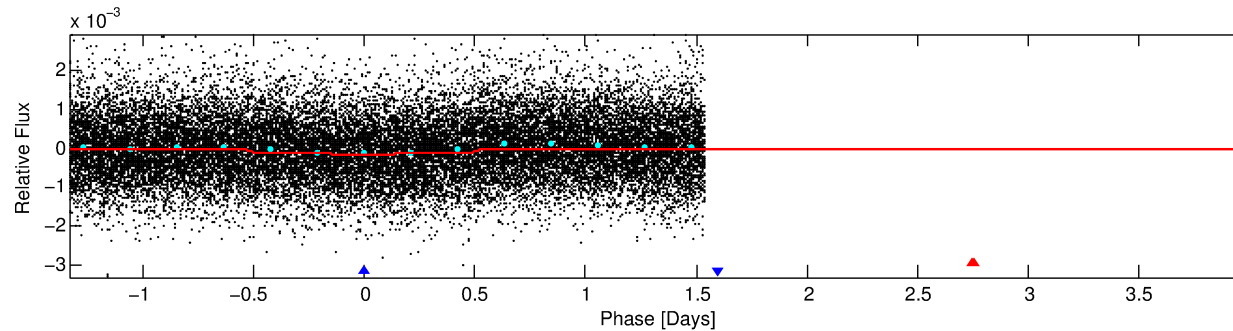
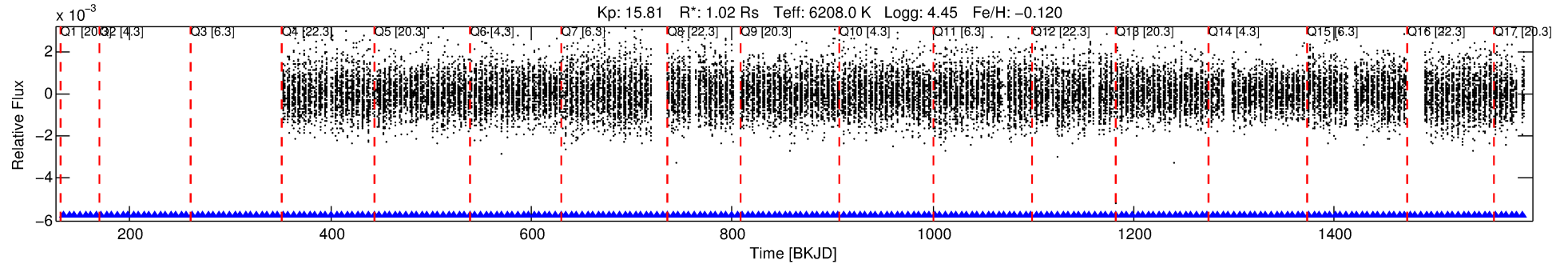
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005215465-02

No Significant Match Found

# DV One-Page Summary

KIC: 5215465 Candidate: 2 of 2 Period: 5.321 d



## DV Fit Results:

Period = 5.32093 [0.00012] d  
Epoch = 134.6027 [0.0180] BKJD  
Rp/R\* = 0.0107 [0.0089]  
a/R\* = 1.71 [4.74]  
b = 0.18 [22.68]  
Seff = 370.61 [137.04]  
Teq = 1119 [103] K  
Rp = 1.19 [1.05] Re  
a = 0.0614 [0.0139] AU  
Ag = N/A  
Teffp = N/A

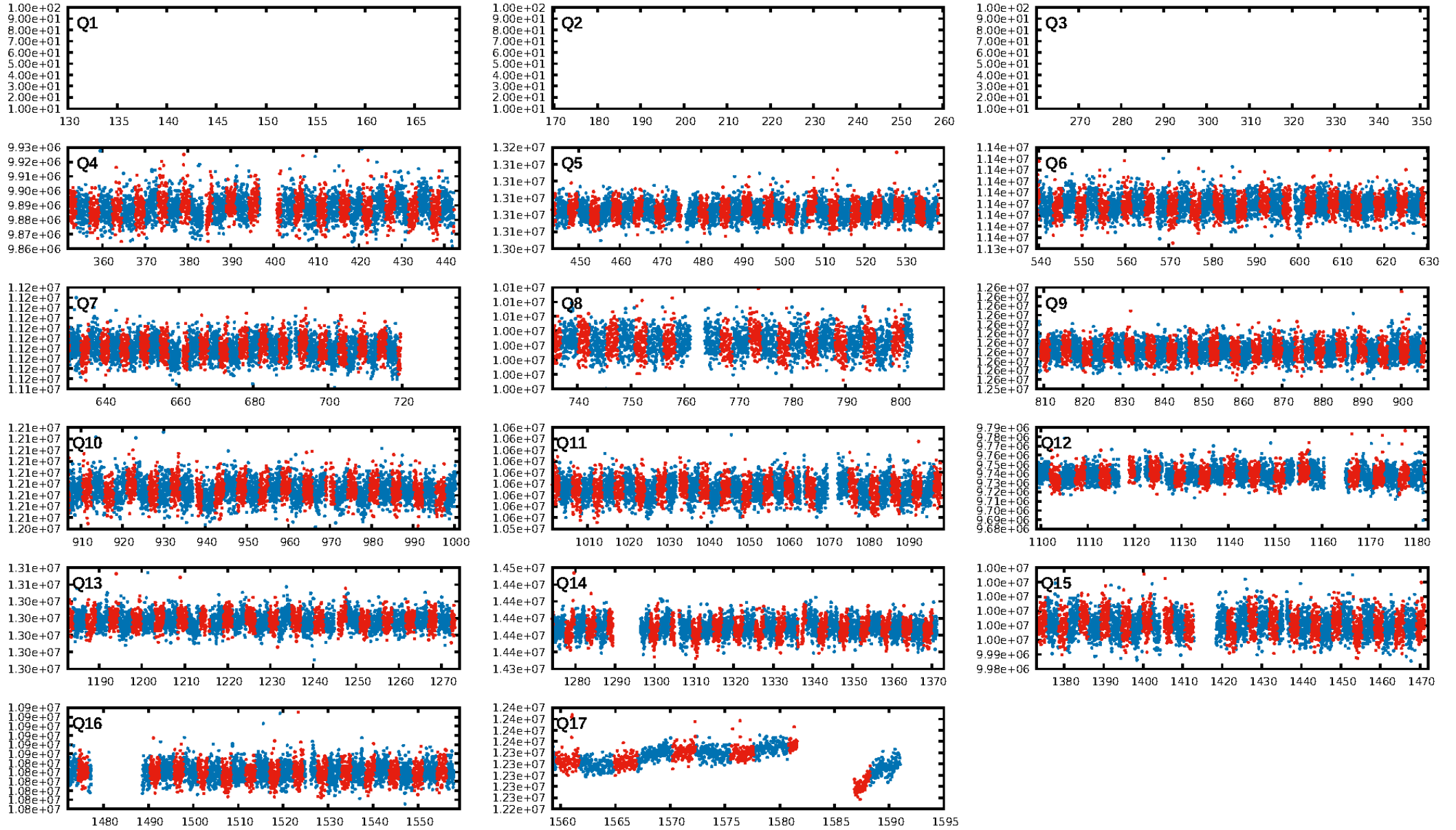
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [216/216]  
GhostDiagnostic-chr: -1.106  
Centroid-sig: 0.0%  
Centroid-so: 5.089 arcsec [8.61σ]  
OotOffset-rm: 1.828 arcsec [3.14σ]  
KicOffset-rm: 5.812 arcsec [10.56σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 0.86 [12/14]  
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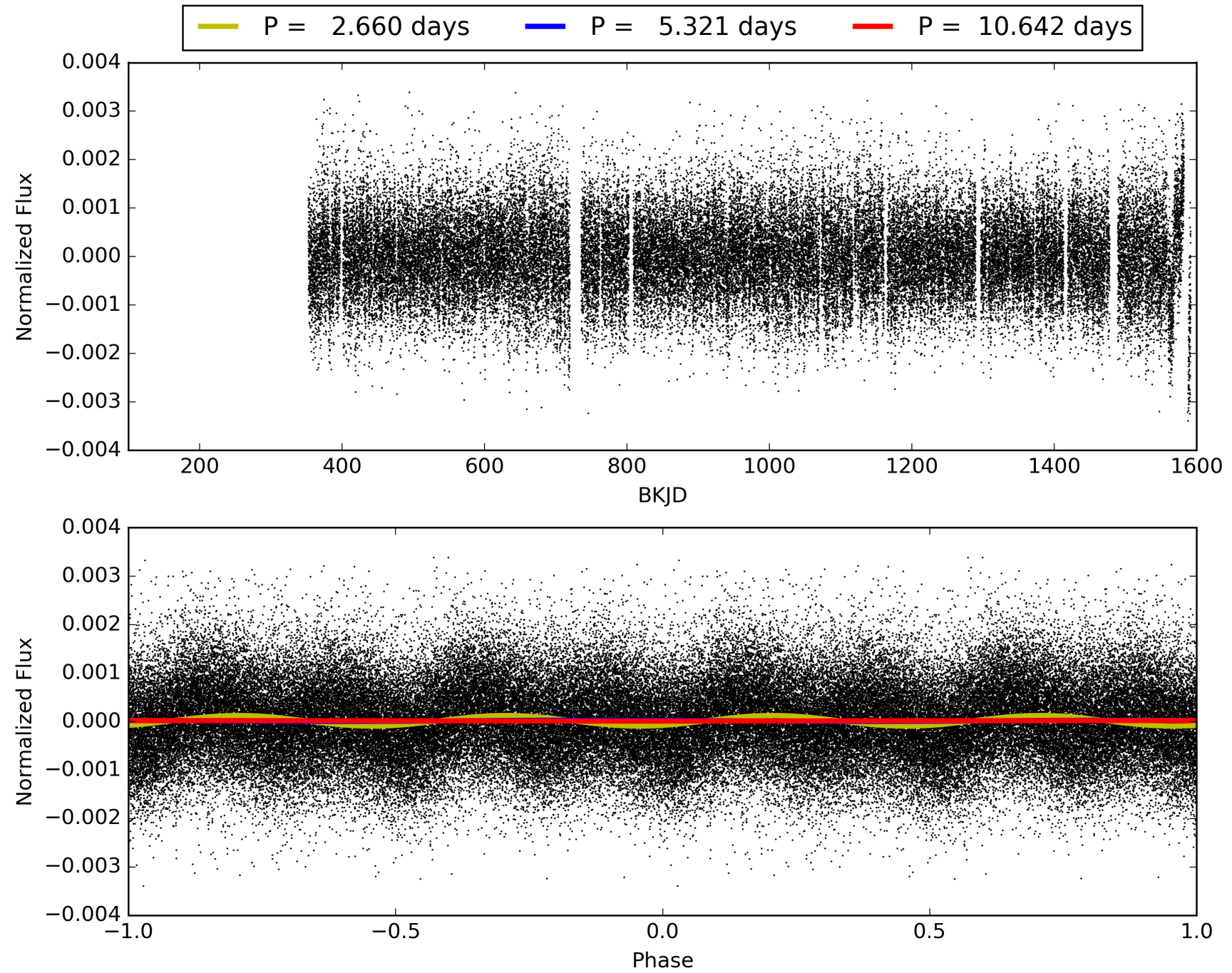
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005215465-02, PDC Light Curves

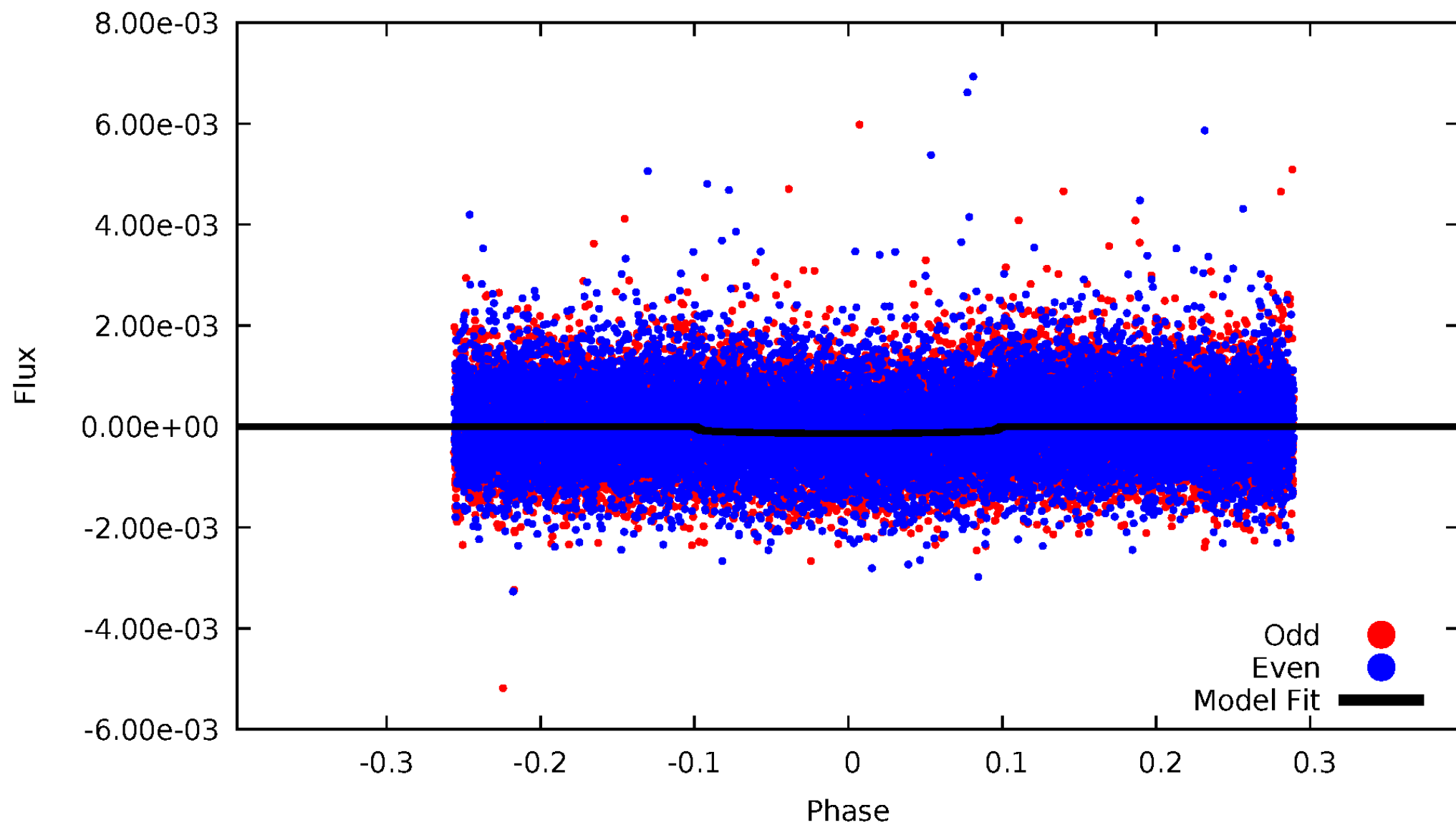


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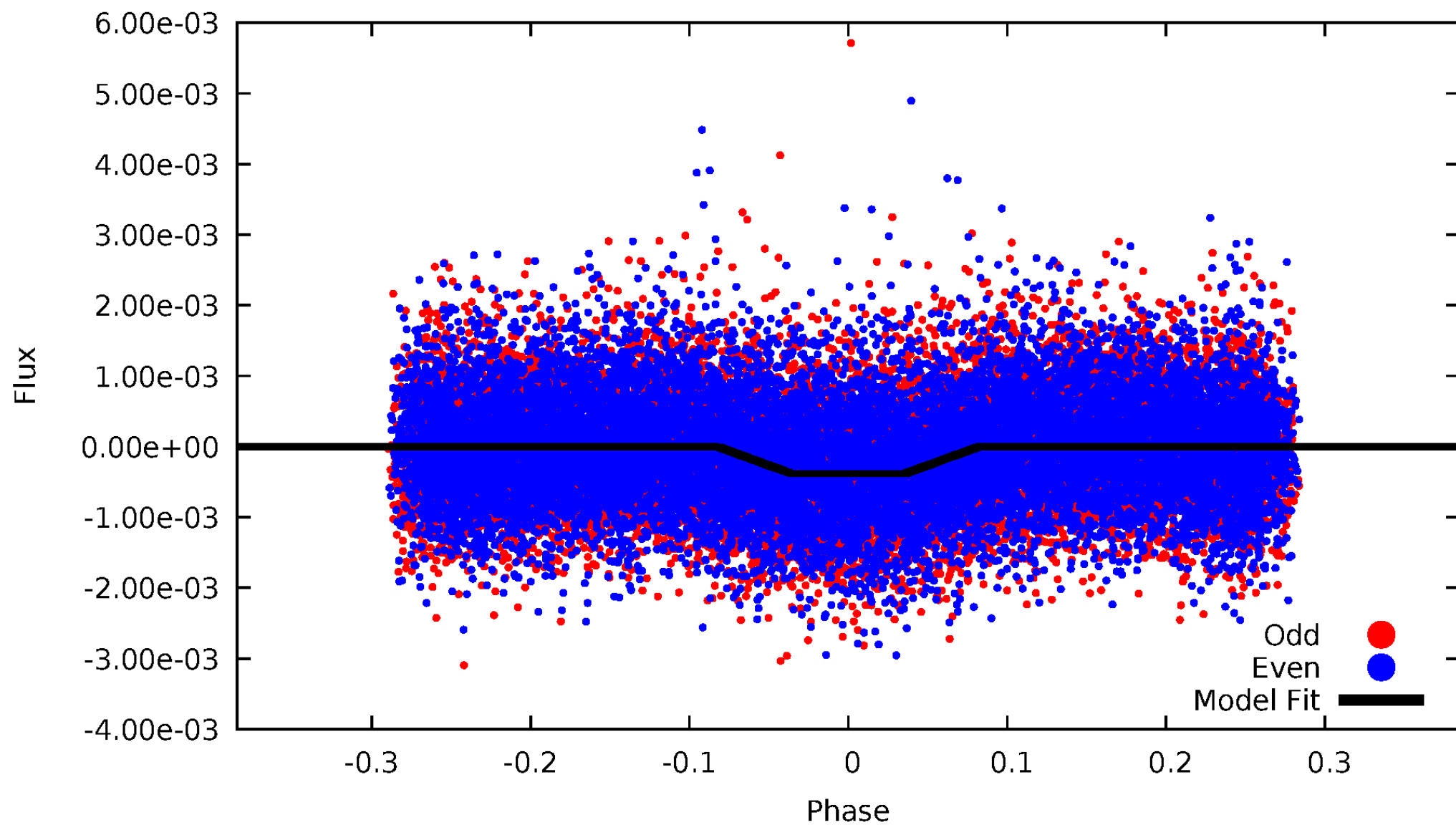
# DV Odd/Even

TCE 005215465-02



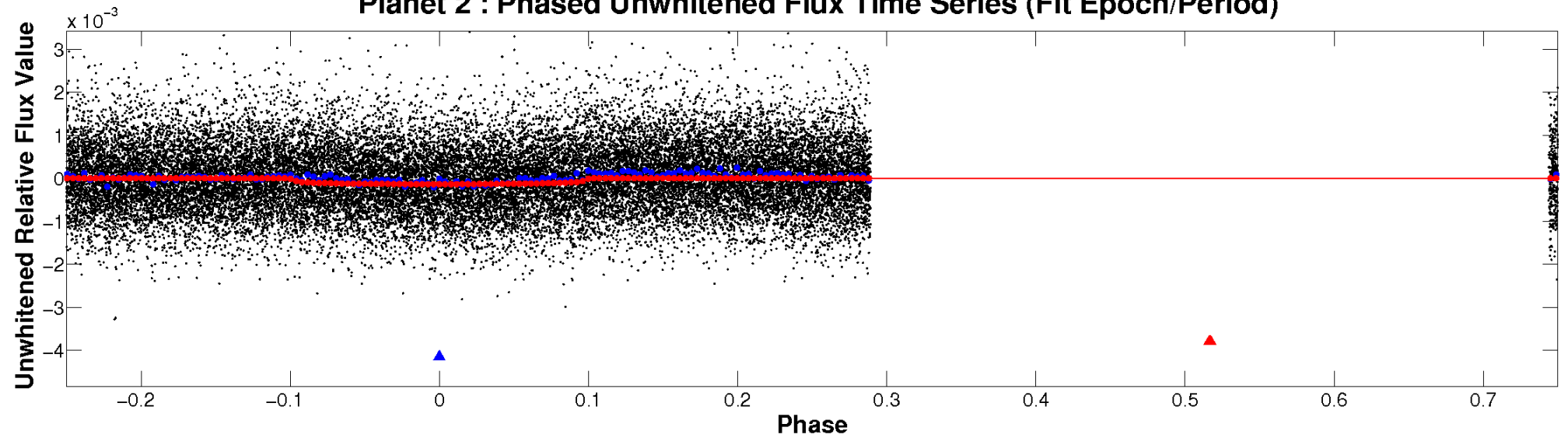
# ALT Odd/Even

TCE 005215465-02

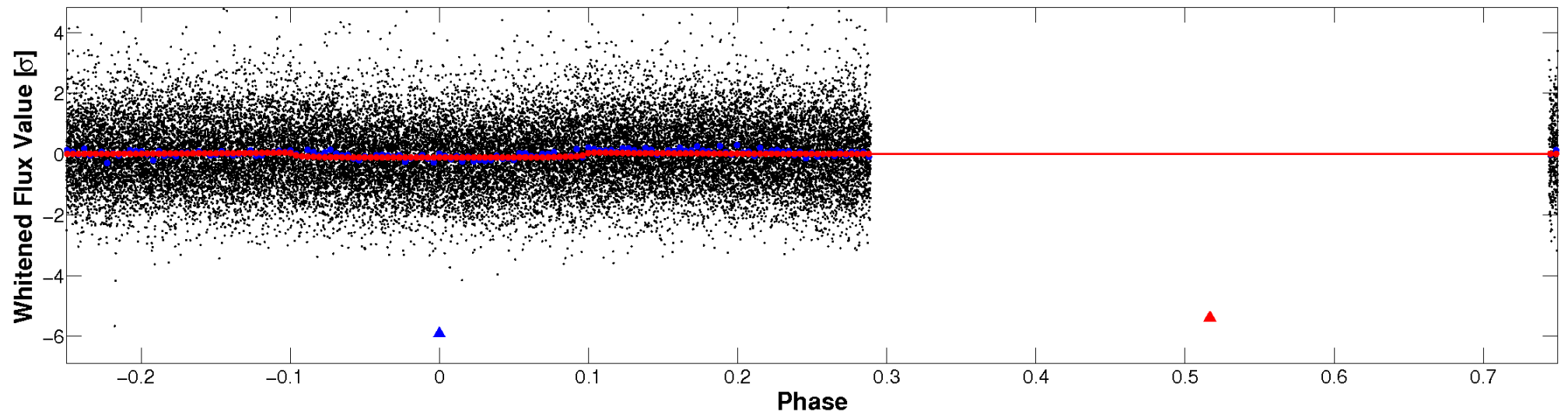


# Non-Whitened Vs. Whitened Light Curve

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

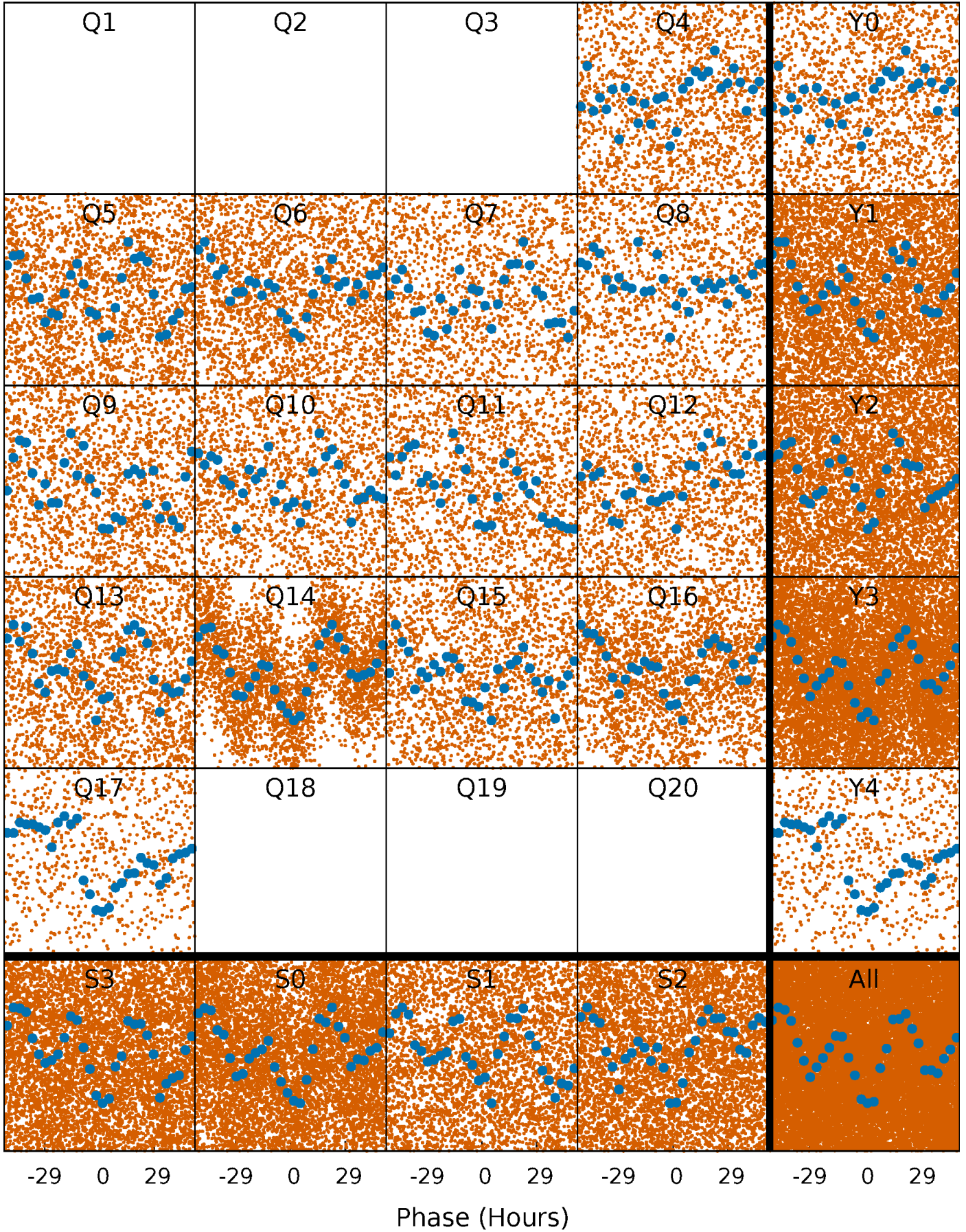


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



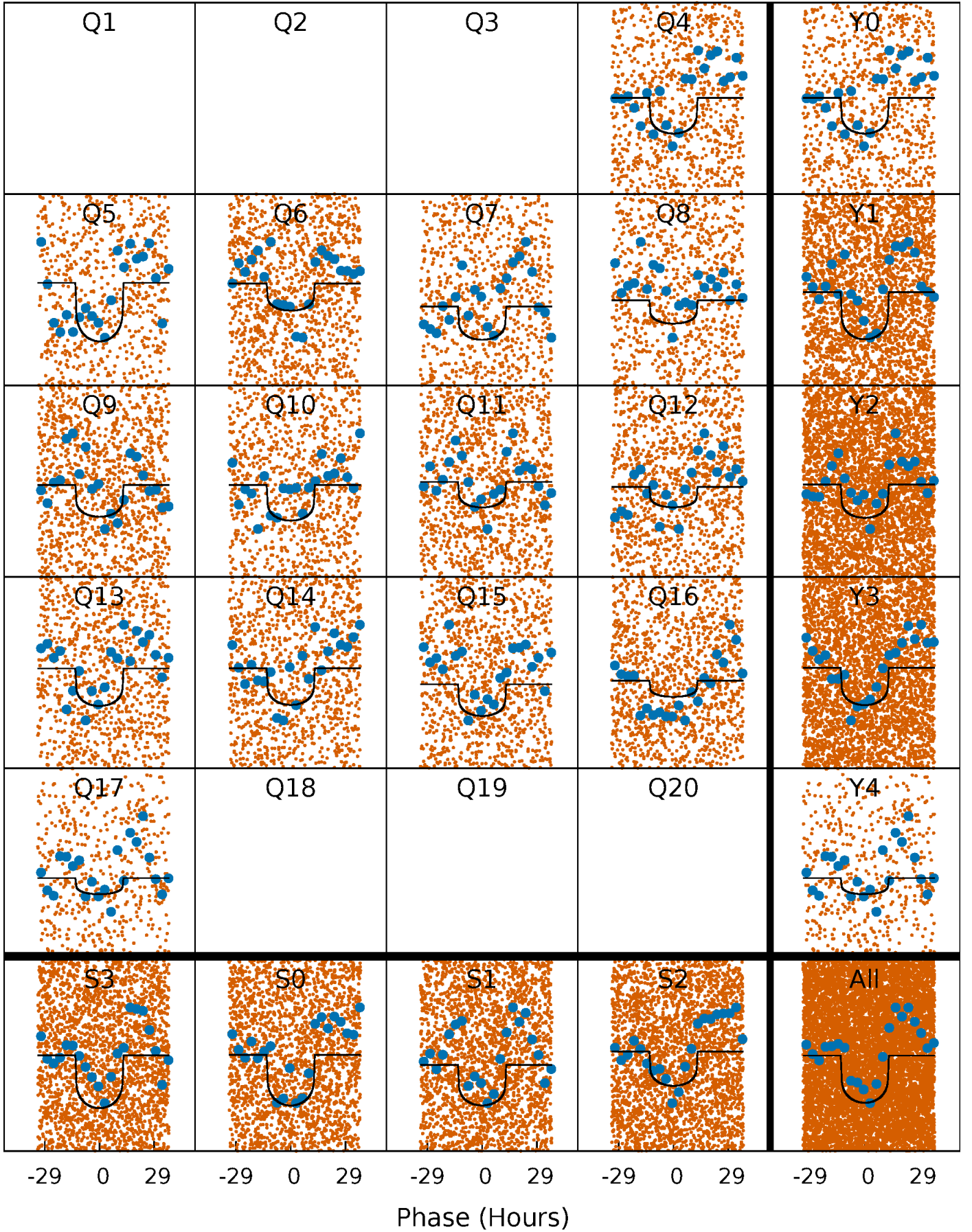
# PDC Quarter-Phased Transit Curves

TCE 005215465-02 P= 5.320932 Days  $T_0=134.602745$  (BKJD)



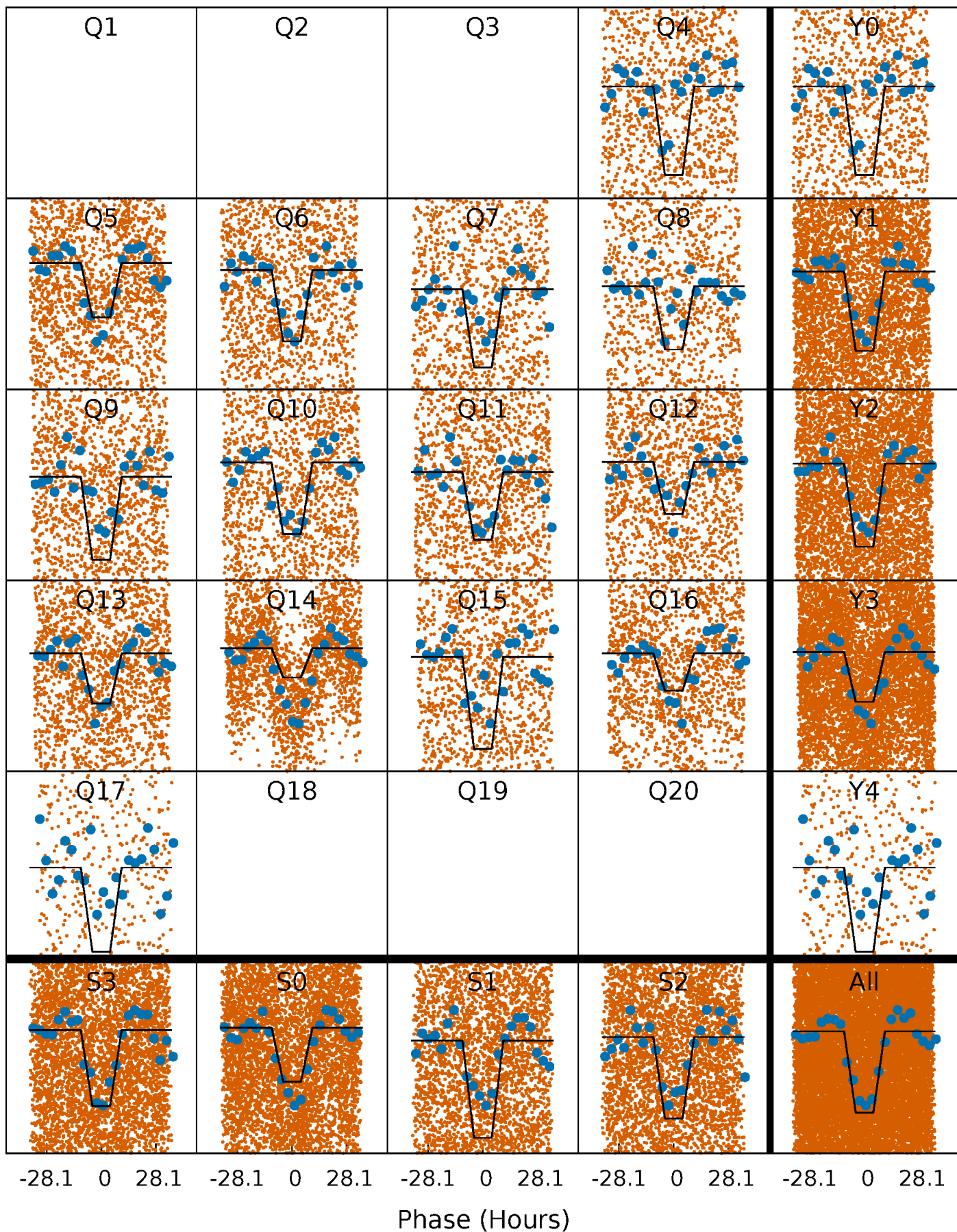
# DV Quarter-Phased Transit Curves

TCE 005215465-02   P= 5.320932 Days    $T_0=134.602745$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

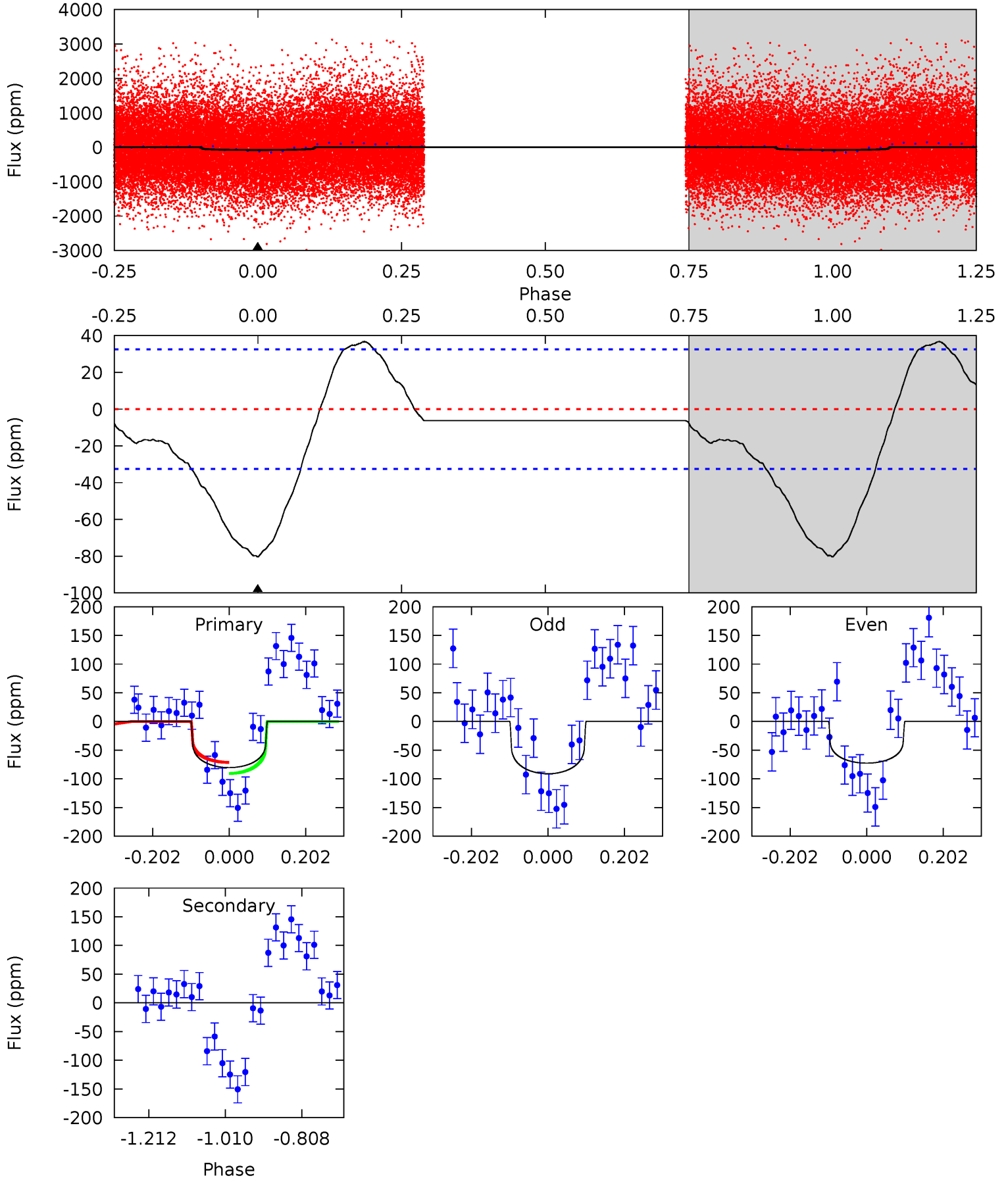
TCE 005215465-02 P= 5.320229 Days  $T_0=134.815732$  (BKJD)



# DV Model-Shift Uniqueness Test

005215465-02, P = 5.320932 Days, E = 134.602745 Days

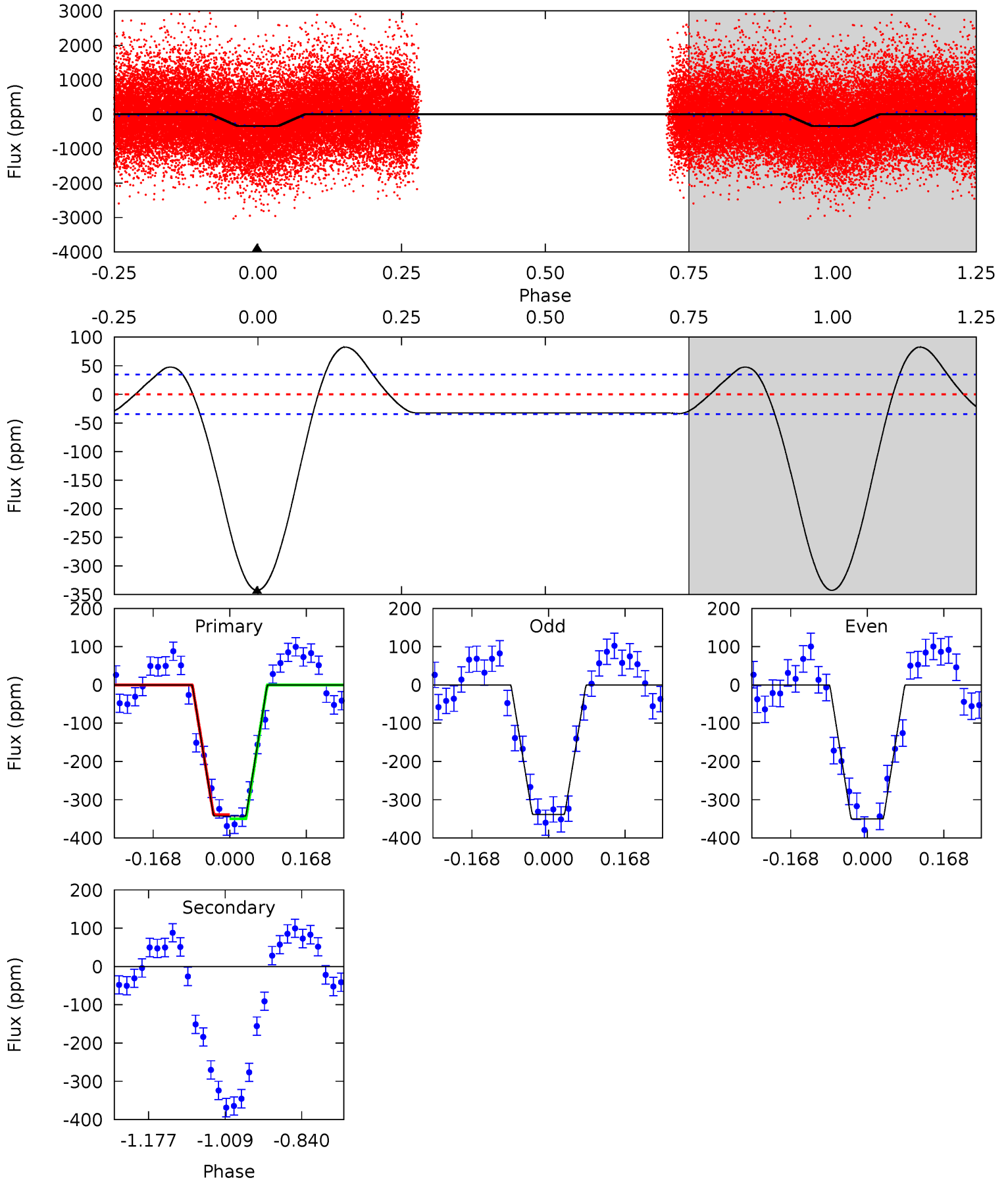
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.9	0	0	0	4.42	1.28	2.22	10.9	10.9	0	0	1.26	1.14	0.31	1.35



# Alt Model-Shift Uniqueness Test

005215465-02, P = 5.320229 Days, E = 134.815732 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
44.3	0	0	0	4.45	1.38	4.01	44.3	44.3	0	0	0.77	1.10	0.19	0.69



### Stellar Parameters For KIC 005215465

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6208^{+194}_{-259}$	$4.454^{+0.060}_{-0.180}$	$-0.120^{+0.250}_{-0.300}$	$1.024^{+0.277}_{-0.119}$	$1.086^{+0.141}_{-0.141}$	$1.423^{+0.450}_{-0.713}$
	+3%/-4%	+1%/-4%	+208%/-250%	+27%/-12%	+13%/-13%	+32%/-50%
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 005215465-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 7$	$1.33^{+1.02}_{-0.75}$	$1586^{+113}_{-86}$	$-2377^{+5949}_{-1428}$	$-0.139^{+10.462}_{-13.718}$
Alt.	$0 \pm 8$	$2.31^{+1.04}_{-1.02}$	$1592^{+107}_{-81}$	$-2323^{+5463}_{-795}$	$-0.088^{+4.214}_{-3.584}$

$T_{\text{max}}$  = 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

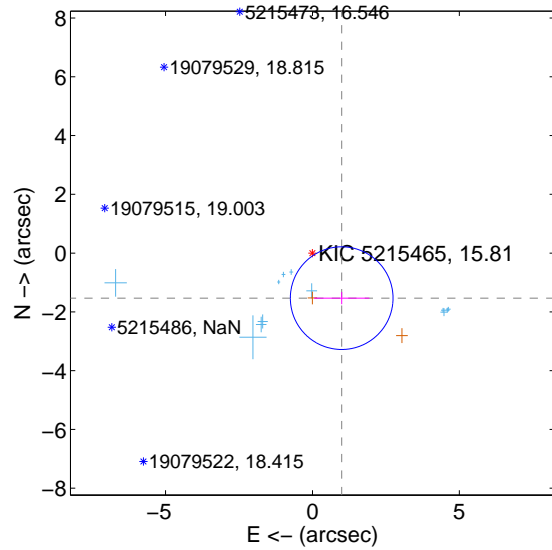
Supplemental centroid analysis for 005215465-02. Kepler magnitude: 15.81. Transit SNR 10.88

There are 12 quarters with good PRF difference image offsets

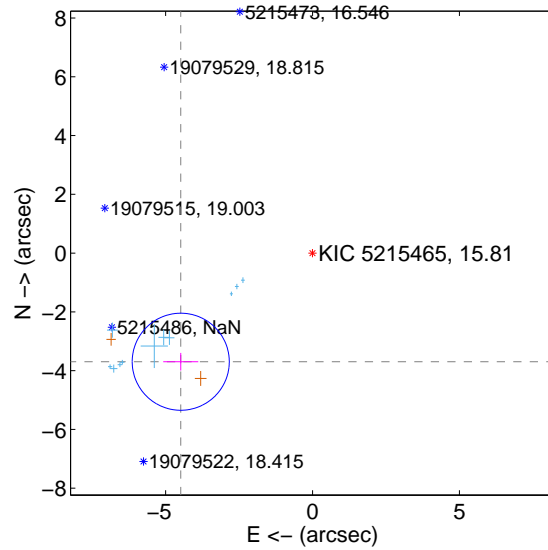
The OOT PRF centroid is offset from the target star catalog position by about 3.37 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.828 \pm 0.582$	3.14	$-0.995 \pm 0.943$	$-1.533 \pm 0.209$
PRF-fit source offset from KIC position	$5.812 \pm 0.550$	10.56	$4.484 \pm 0.597$	$-3.697 \pm 0.300$
photometric centroid source offset	$5.09 \pm 0.59$	8.61	$4.82 \pm 0.60$	$-1.63 \pm 0.51$

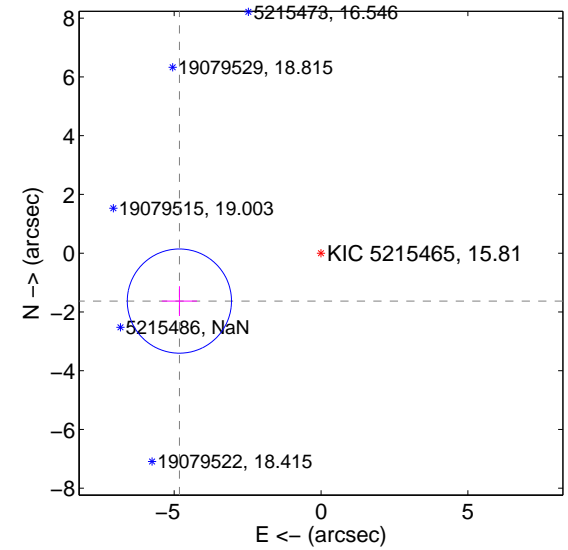
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

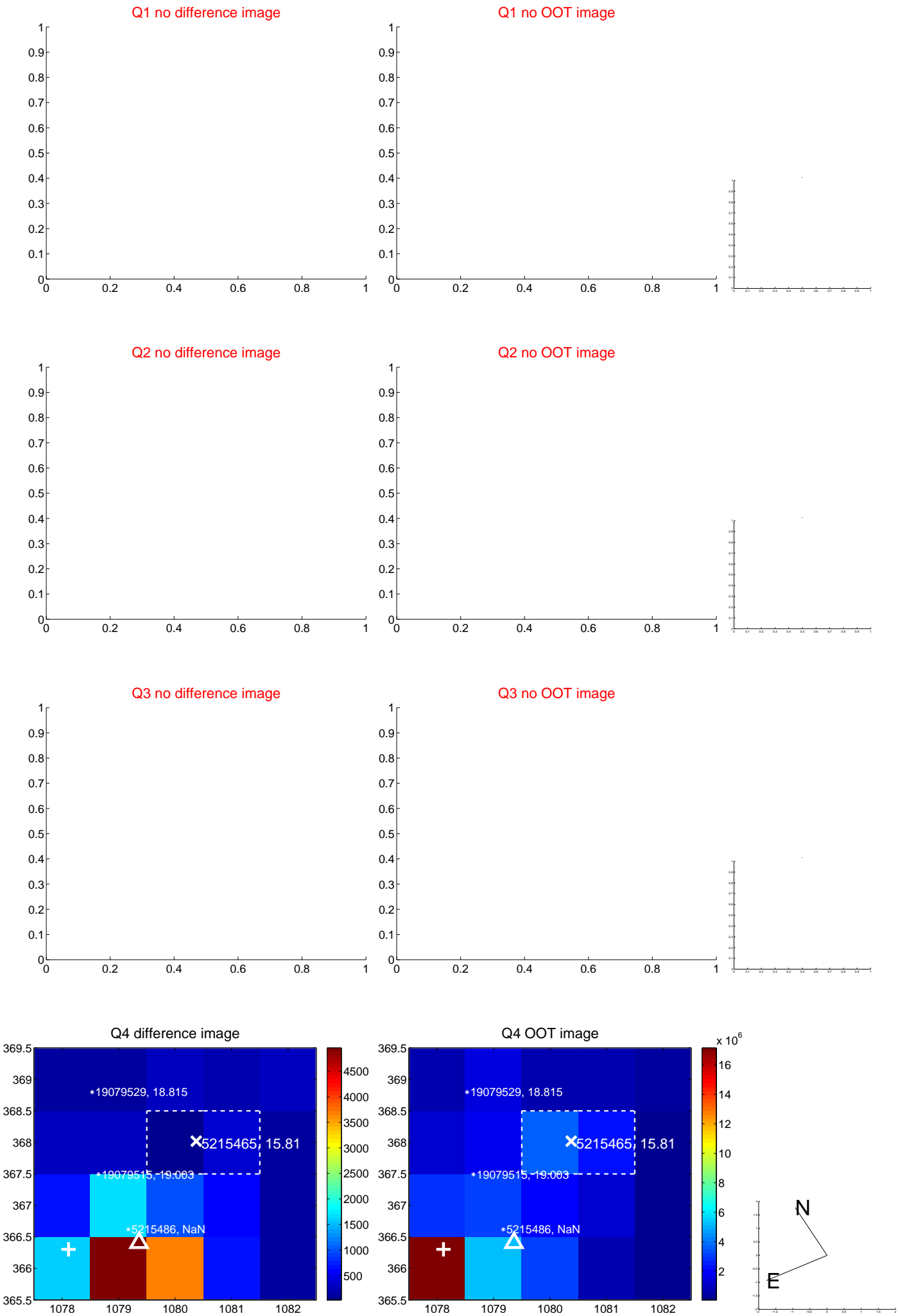


offset from photometric centroids

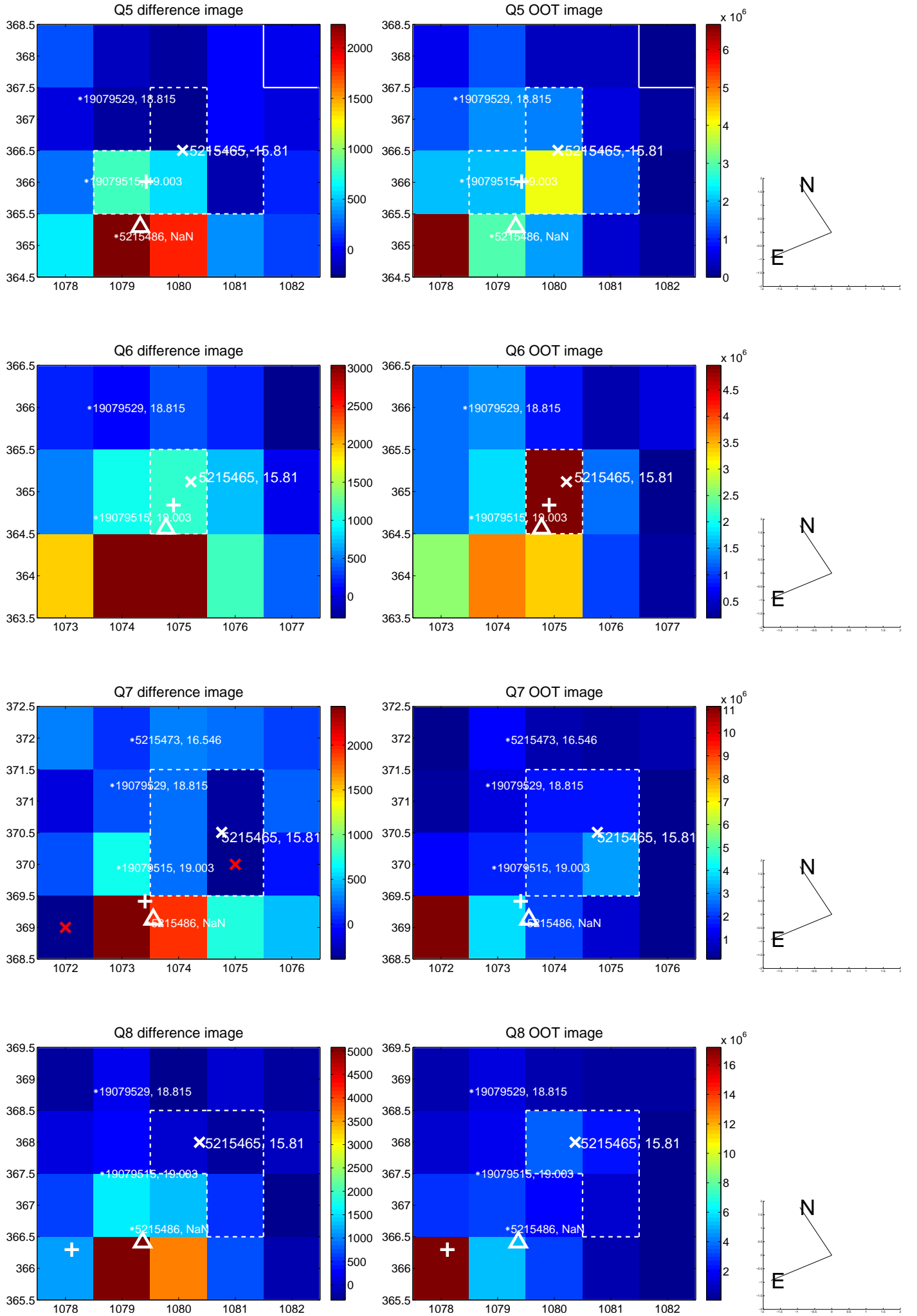


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

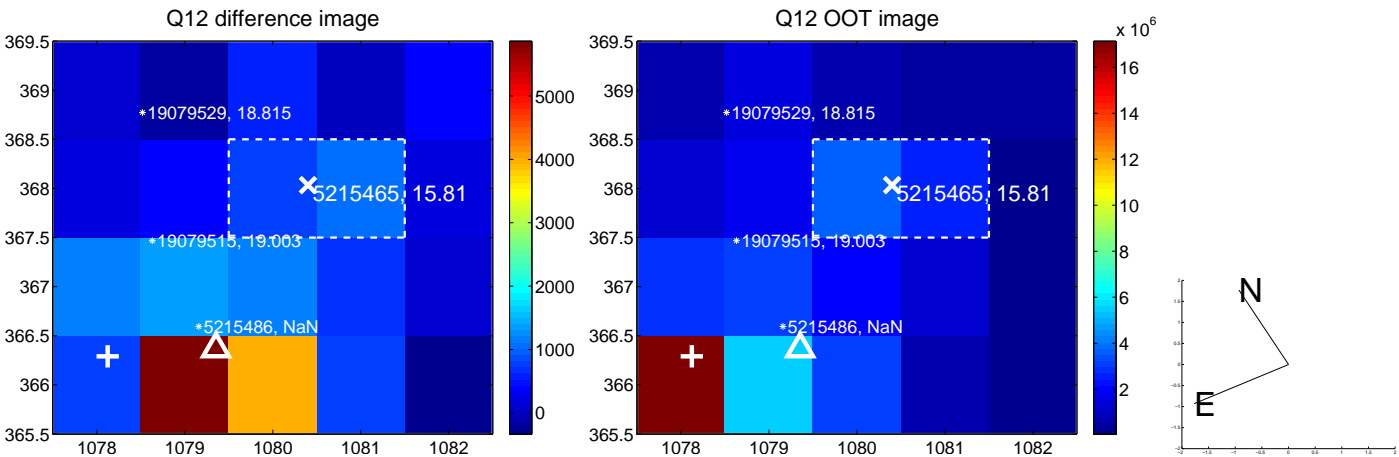
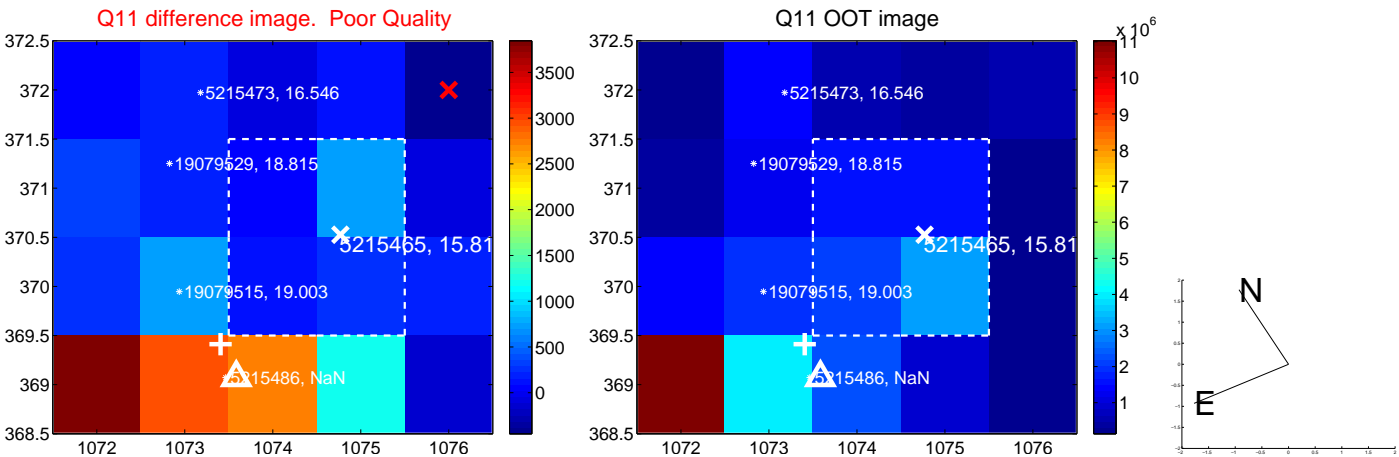
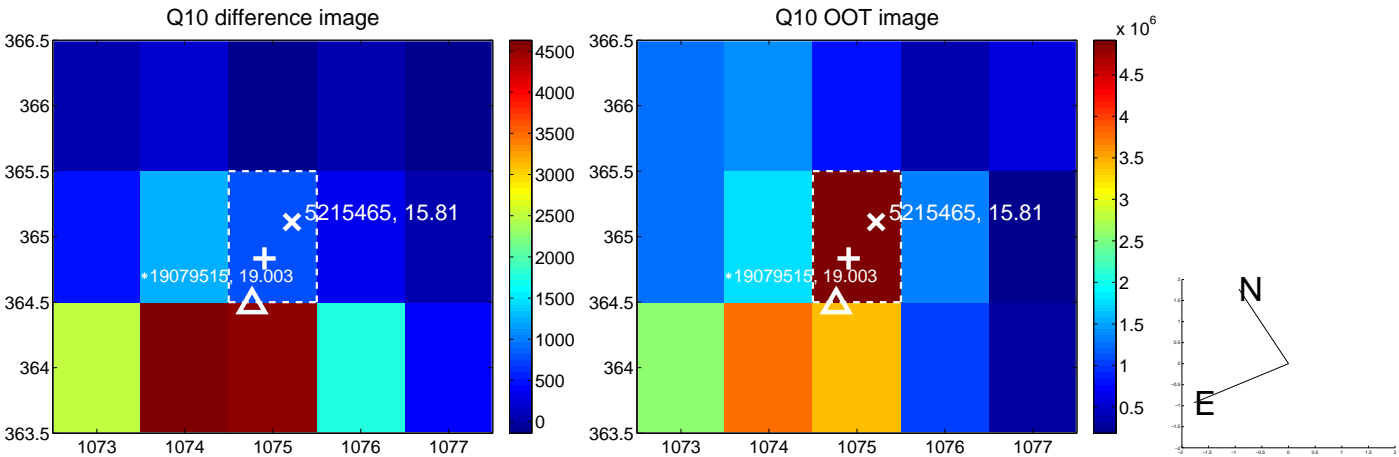
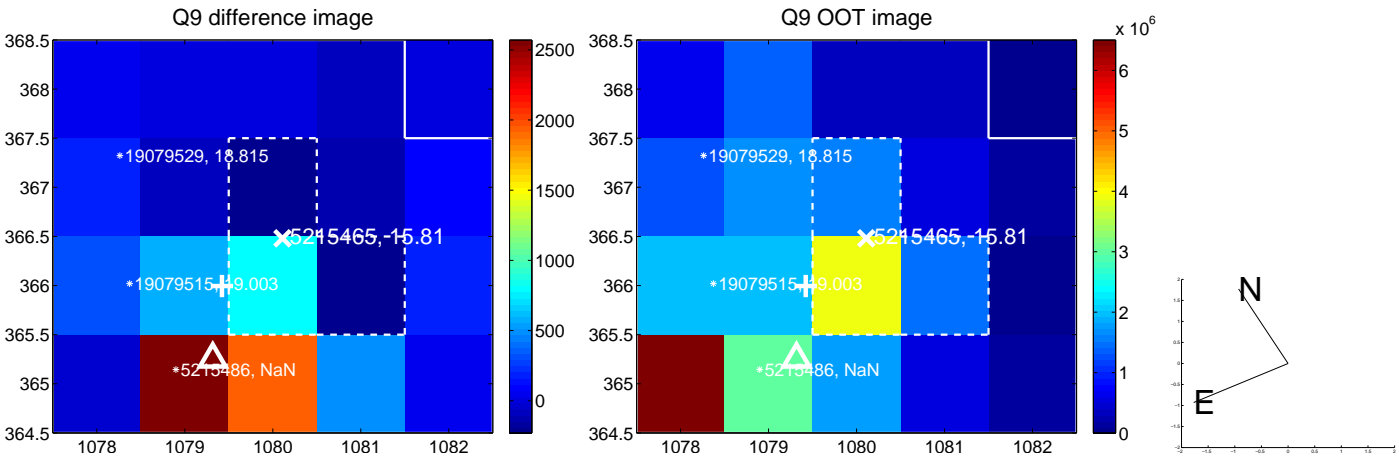
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



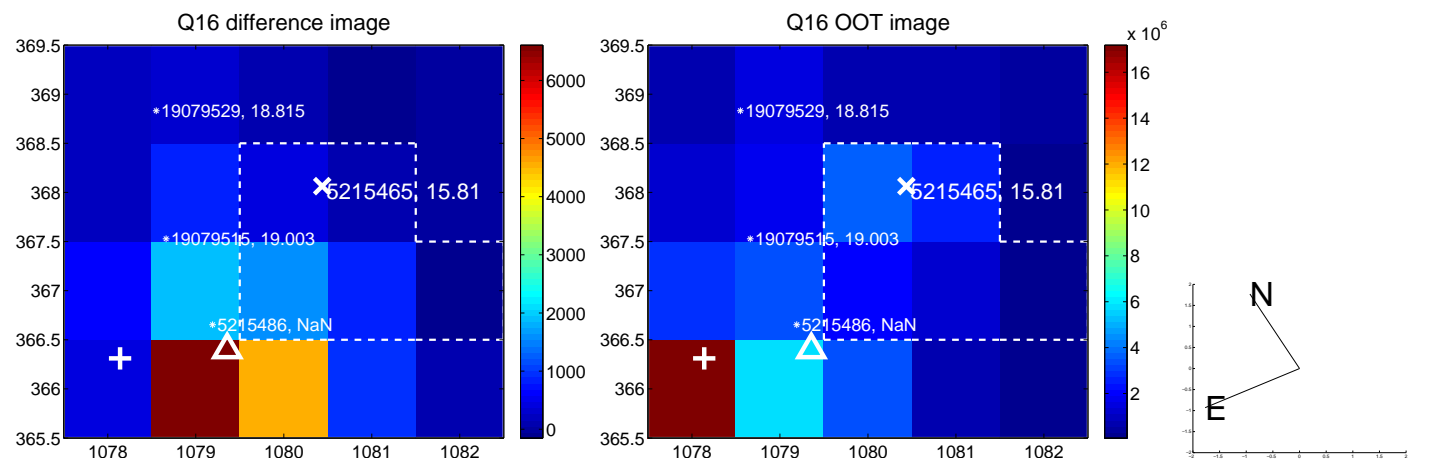
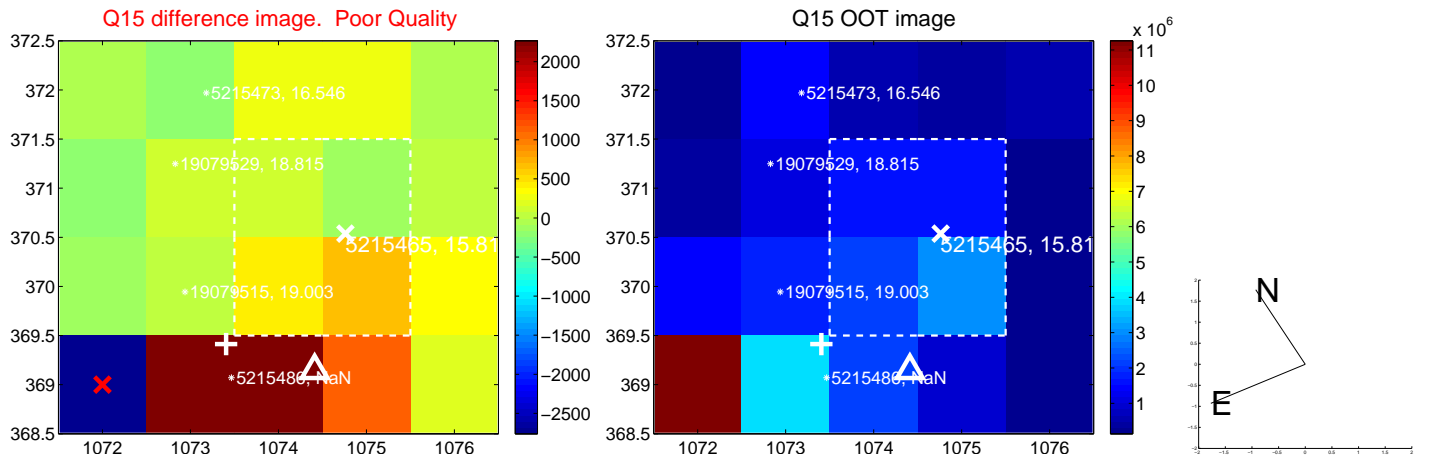
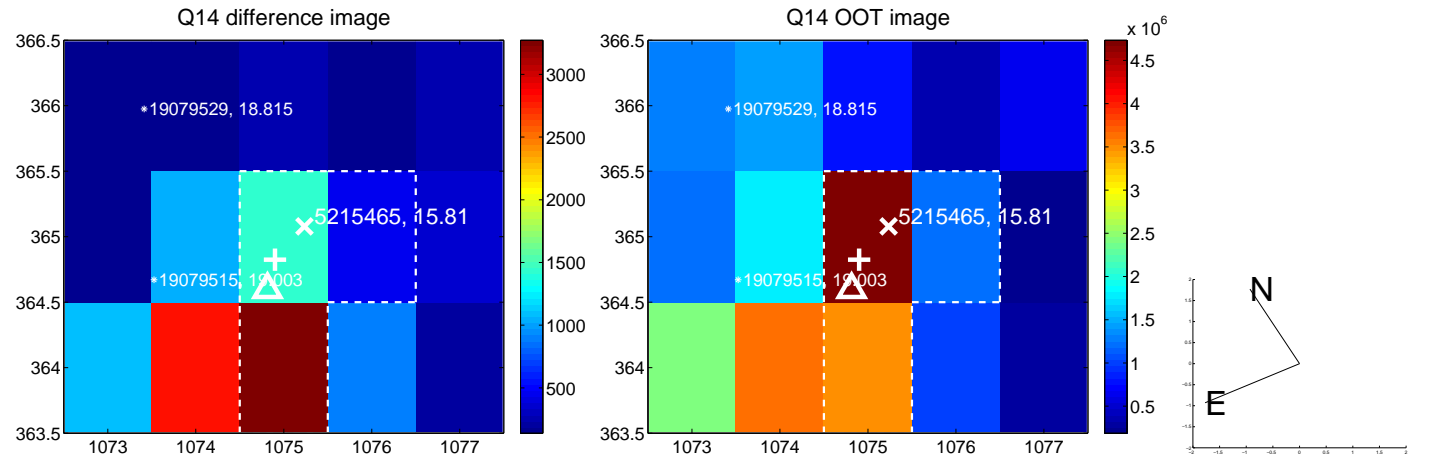
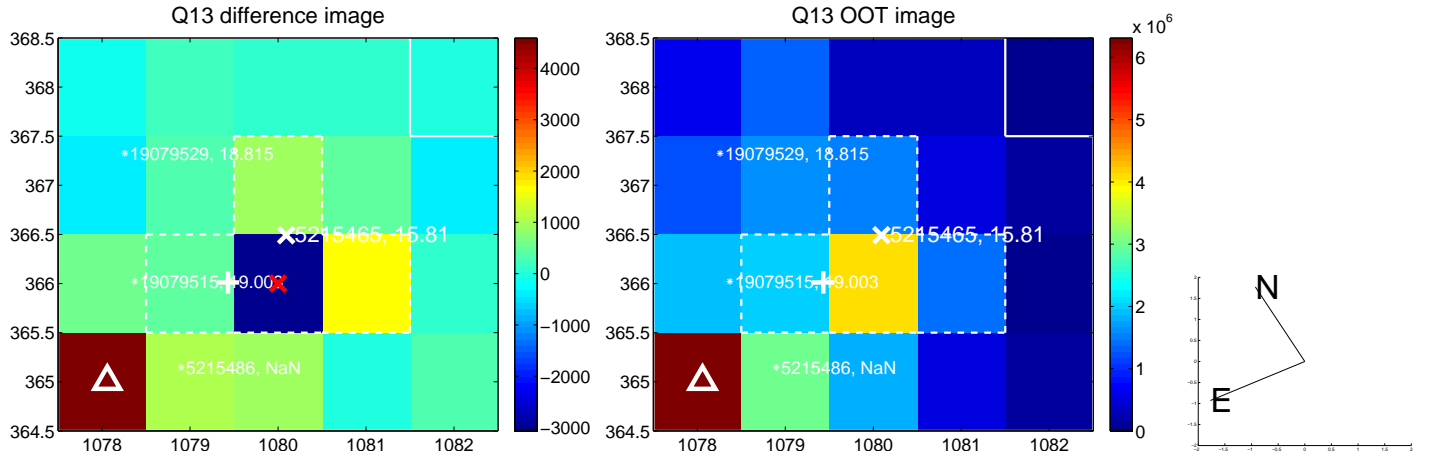
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



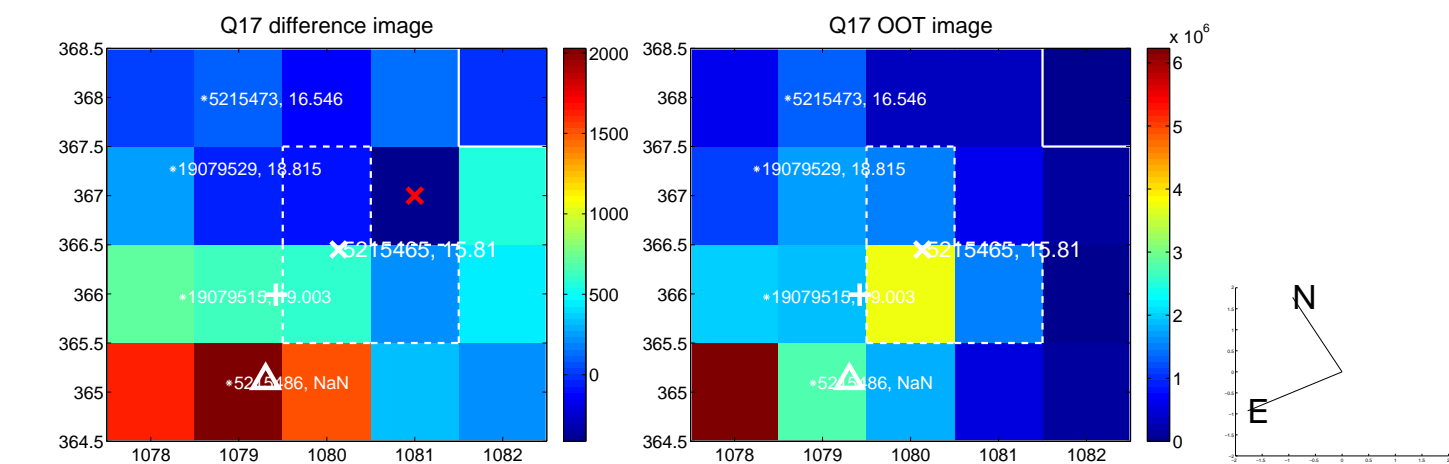
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



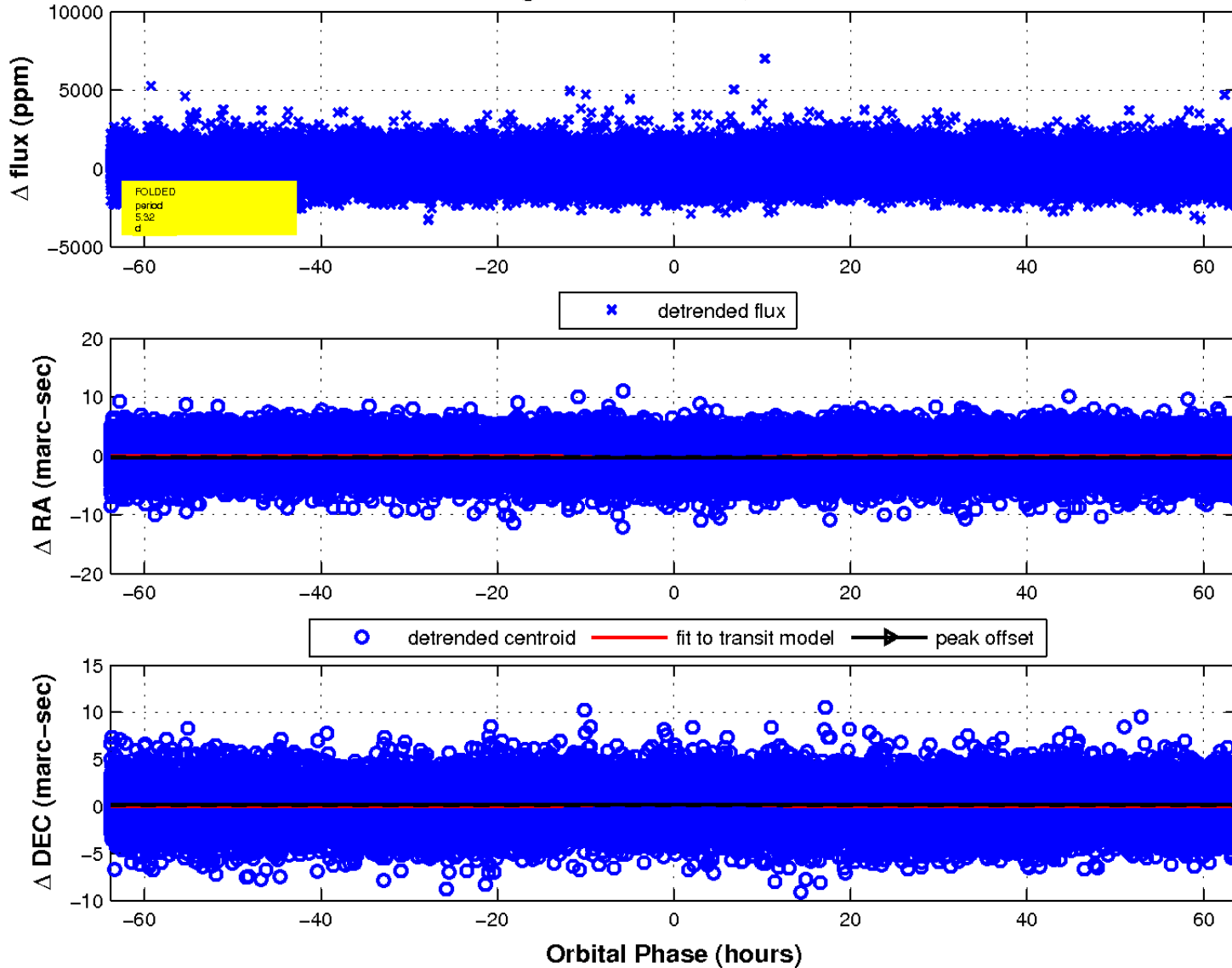
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

