

# KIC 004077032

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004077032-01	OBS	No	1.253896	131.823203	270.2	4.445	10.9	11.6	1.84	6917	3.51	10771.83
004077032-02	OBS	No	1.082768	131.688322	450.3	12.993	8.6	15.9	1.84	6917	5.14	13099.59

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004077032-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED
004077032-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—CENT_SATURATED

**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.

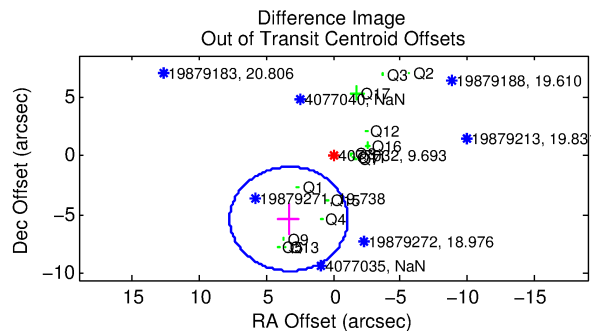
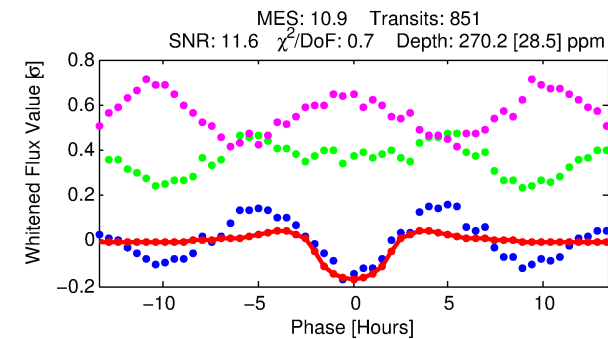
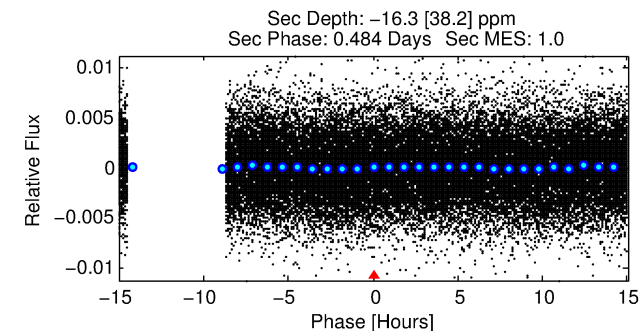
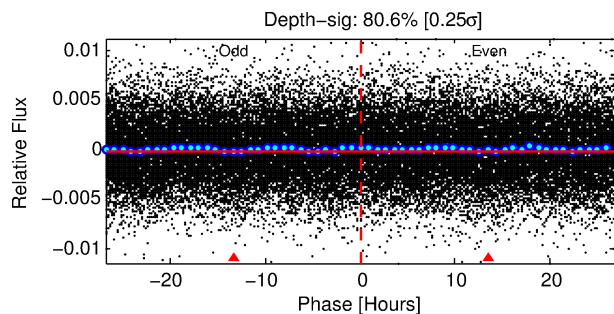
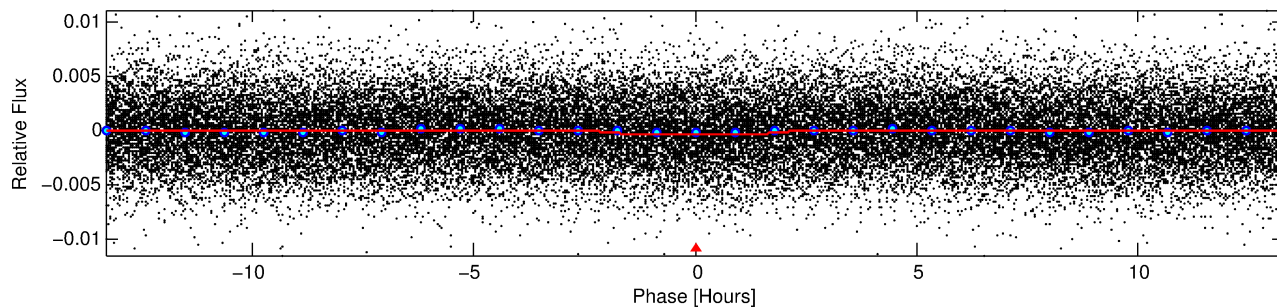
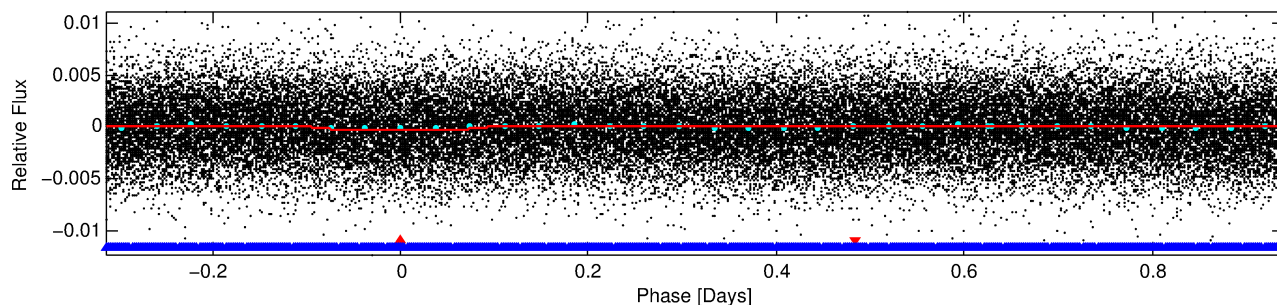
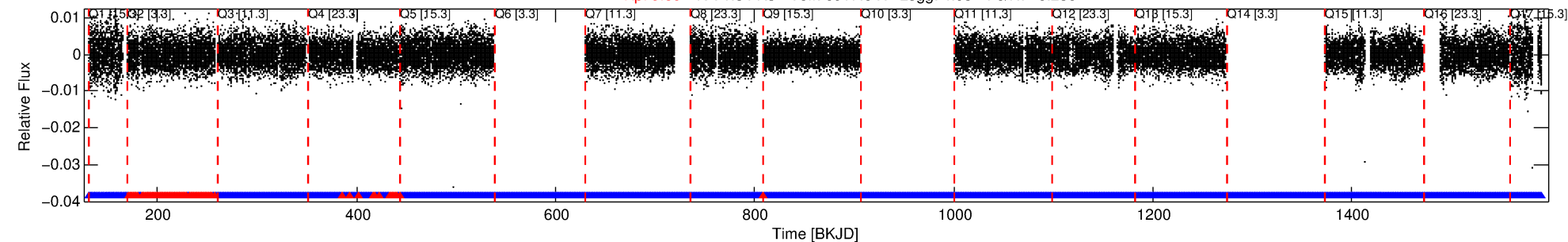
## Ephemeris Match Information For 004077032-01

No Significant Match Found

# DV One-Page Summary

KIC: 4077032 Candidate: 1 of 2 Period: 1.254 d

Kp: 9.69 R\*: 1.84 Rs Teff: 6917.0 K Logg: 4.05 Fe/H: -0.280



## DV Fit Results:

Period = 1.25390 [0.00001] d  
Epoch = 131.8232 [0.0057] BKJD  
Rp/R\* = 0.0175 [0.0058]  
a/R\* = 1.39 [1.33]  
b = 0.90 [0.43]  
Seff = 10771.83 [5176.06]  
Teff = 2598 [312] K  
Rp = 3.51 [1.63] Re  
a = 0.0253 [0.0073] AU  
Ag = N/A  
Teffp = N/A

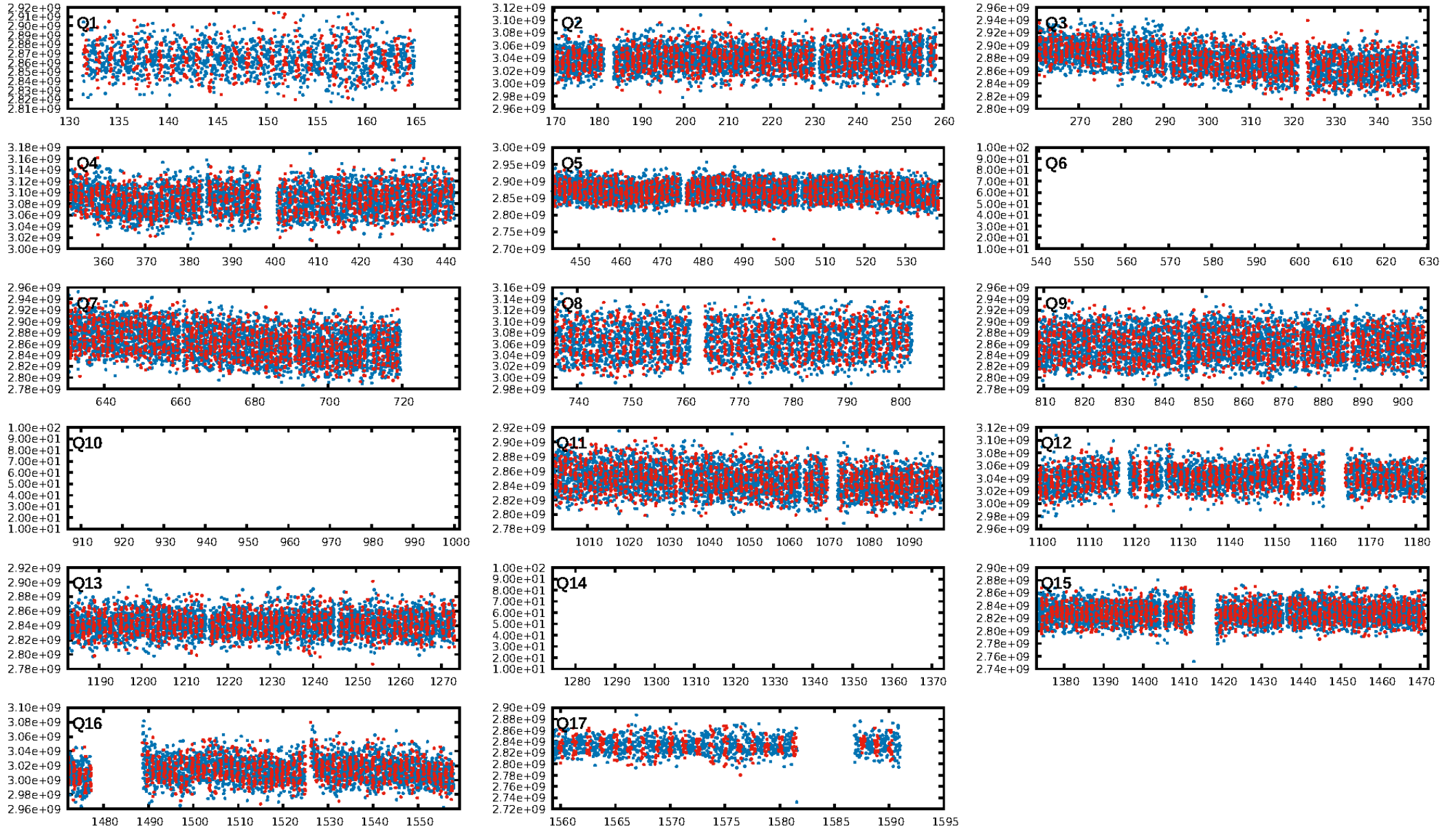
## DV Diagnostic Results:

ShortPeriod-sig: 23.5% [0.30σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.90 [720/803]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 0.514 arcsec [1.85σ]  
OotOffset-rm: 6.283 arcsec [4.28σ]  
KicOffset-rm: 4.566 arcsec [3.26σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 0.07 [1/14]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:25:35 Z

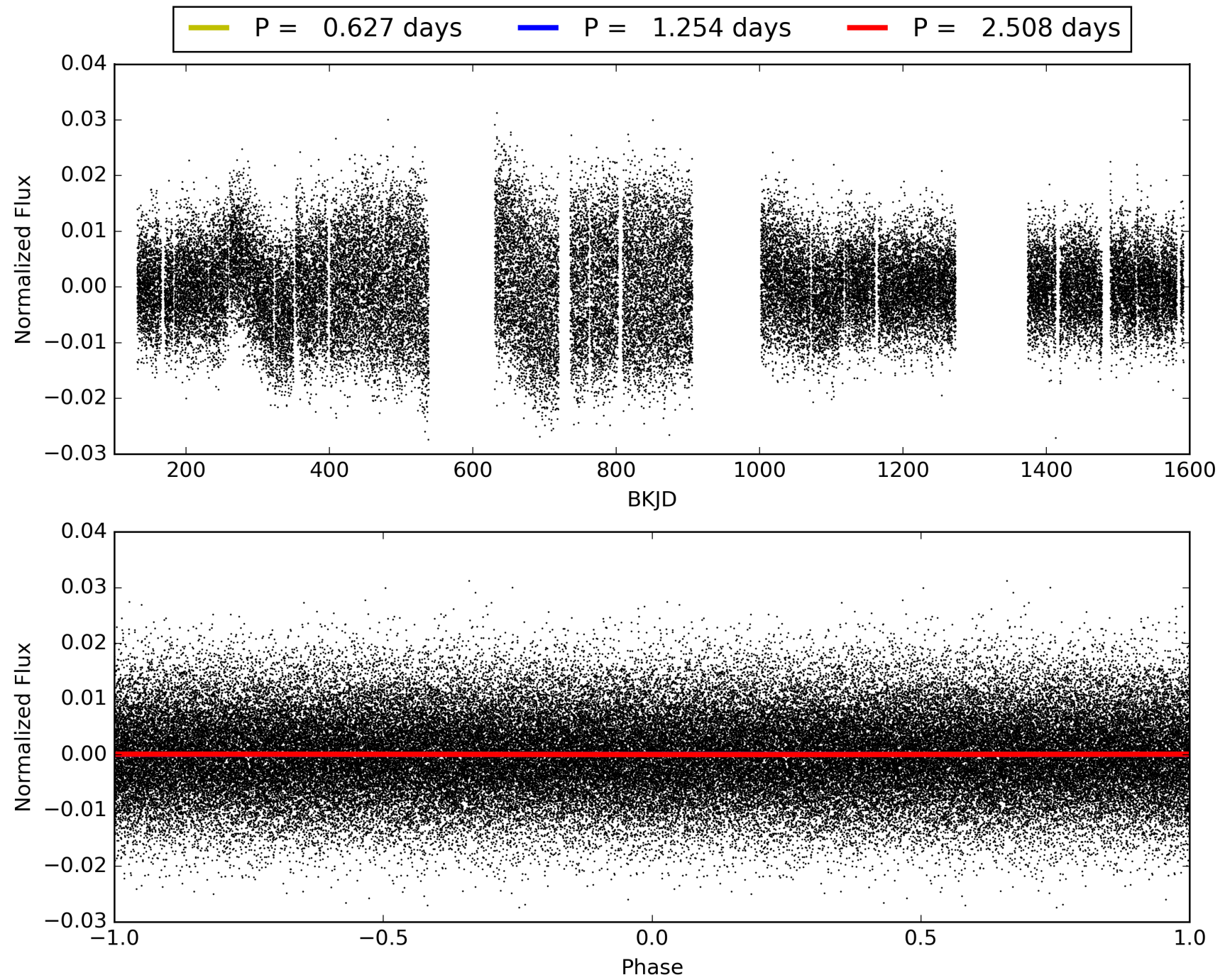
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004077032-01, PDC Light Curves



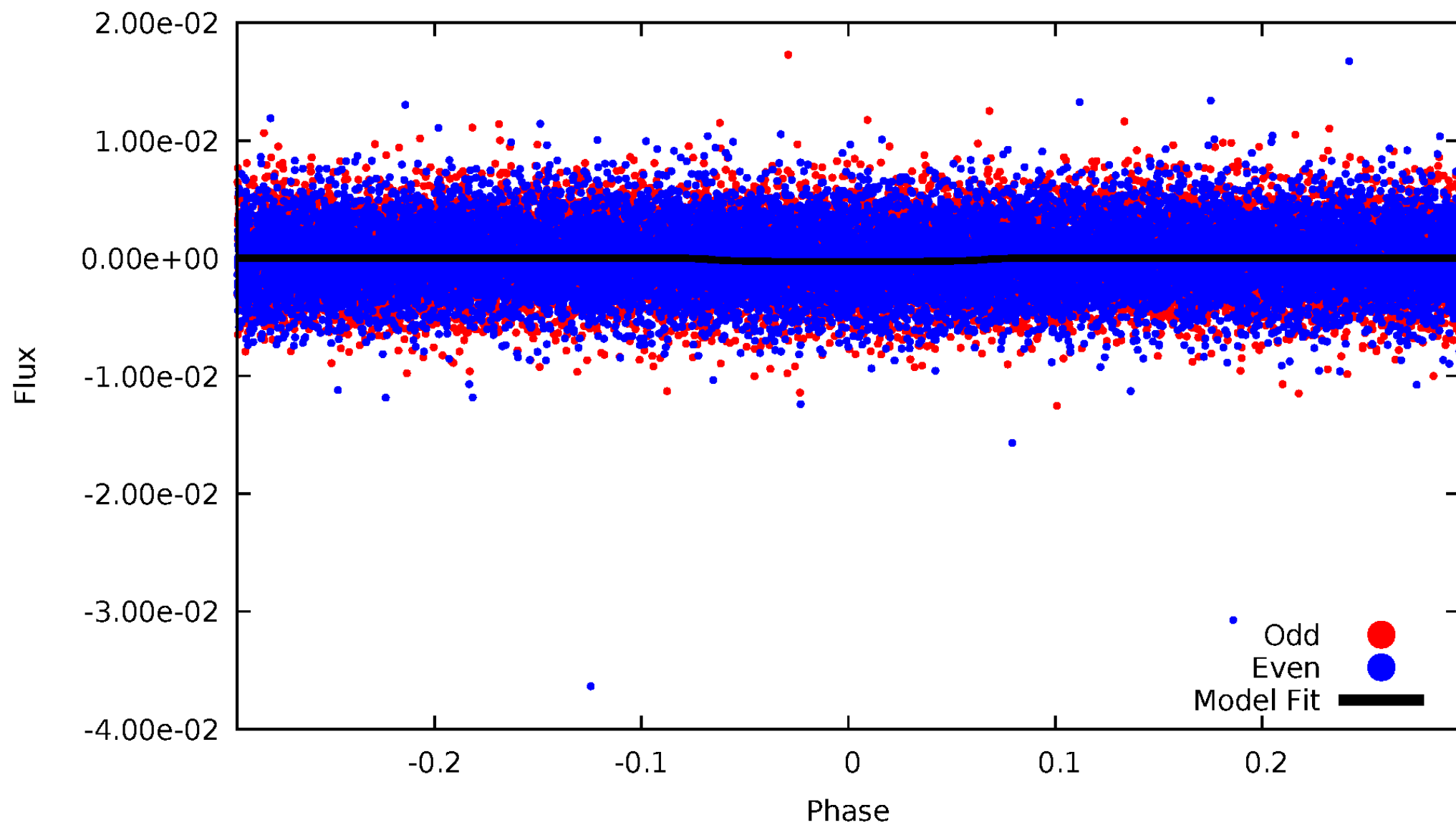


TCE 004077032-01



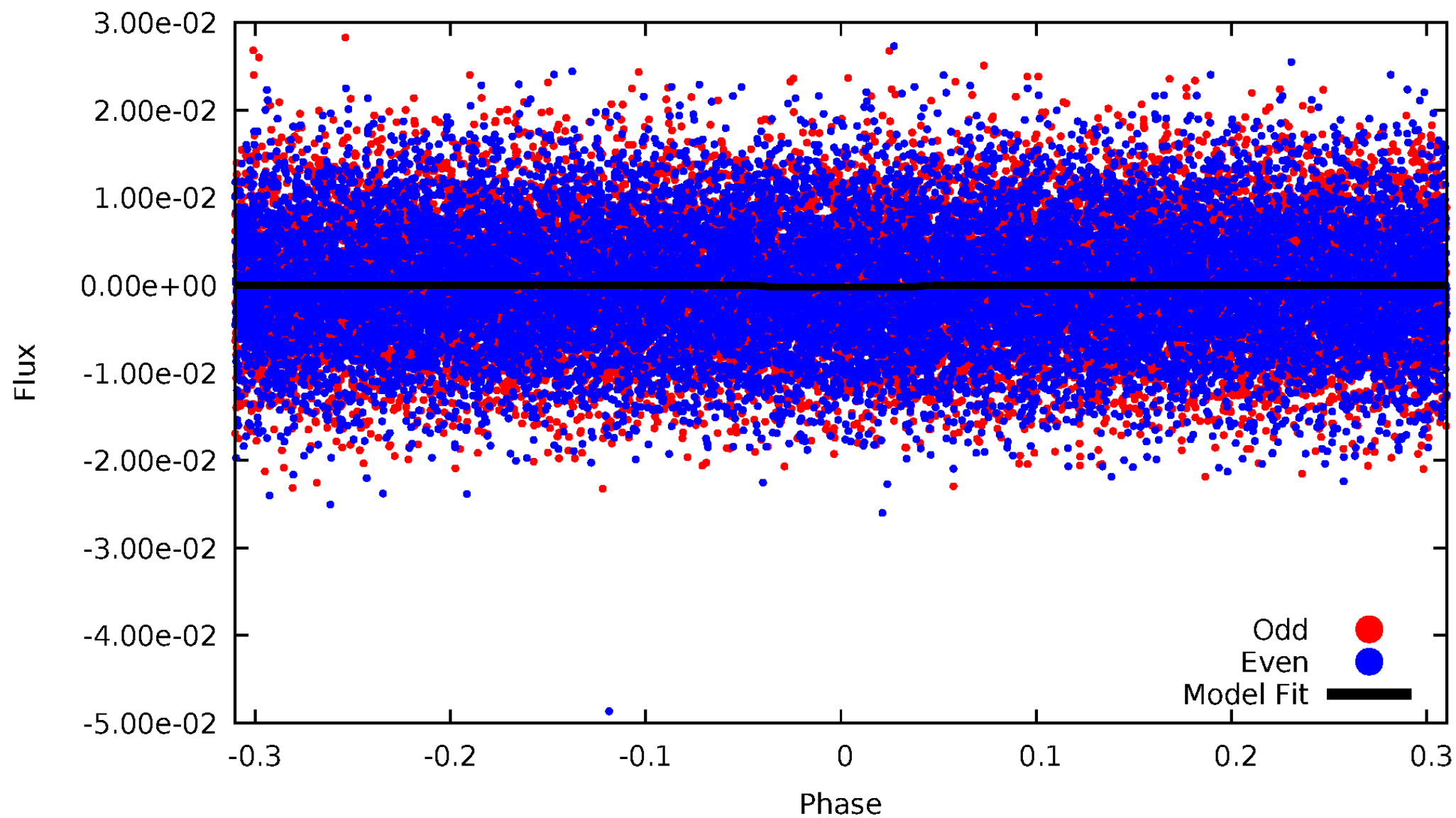
# DV Odd/Even

TCE 004077032-01



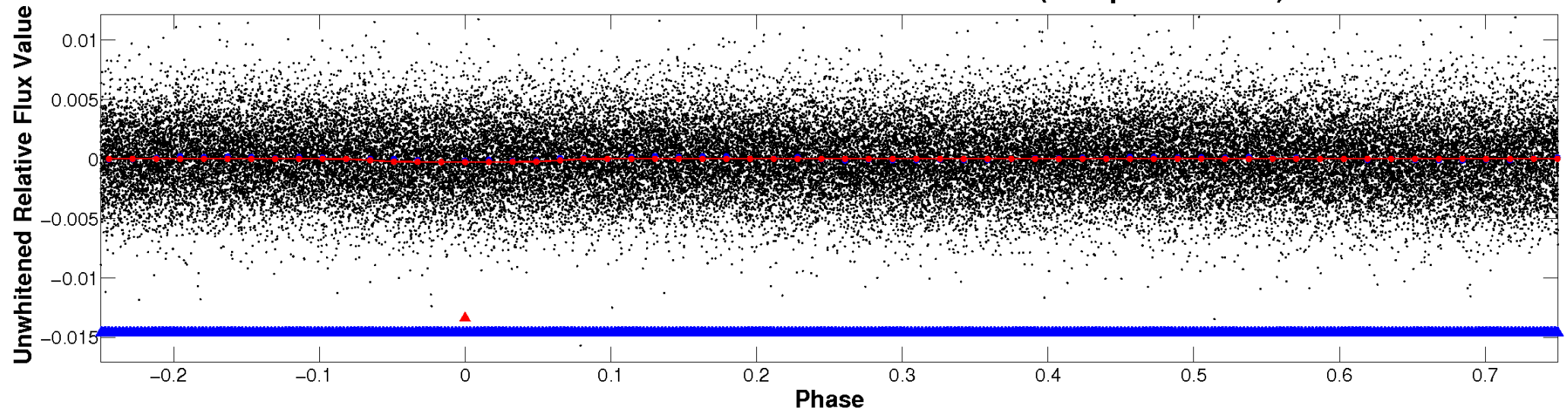
# ALT Odd/Even

TCE 004077032-01

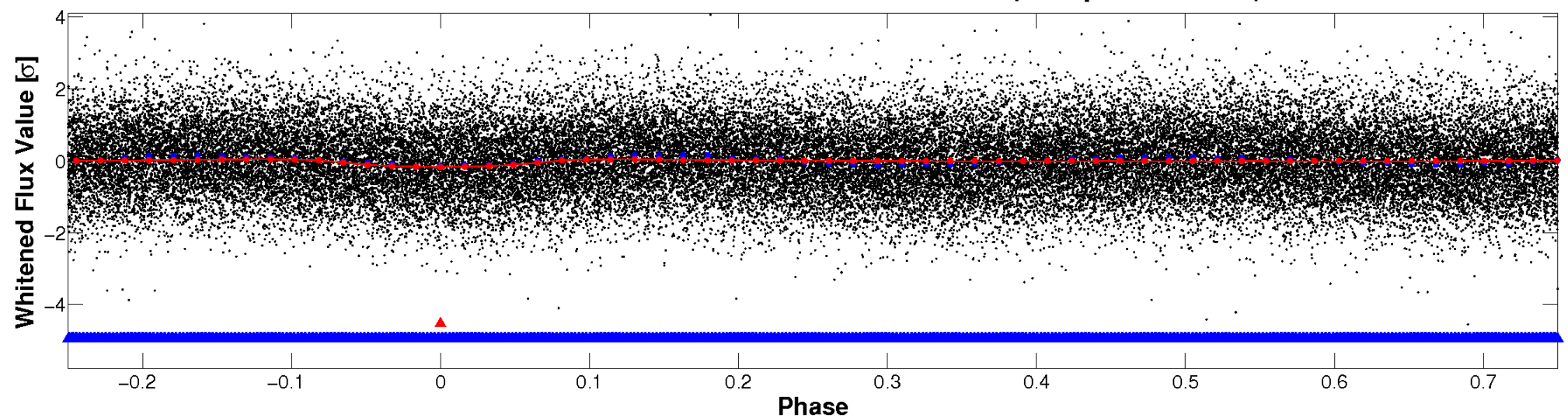


# Non-Whitened Vs. Whitened Light Curve

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



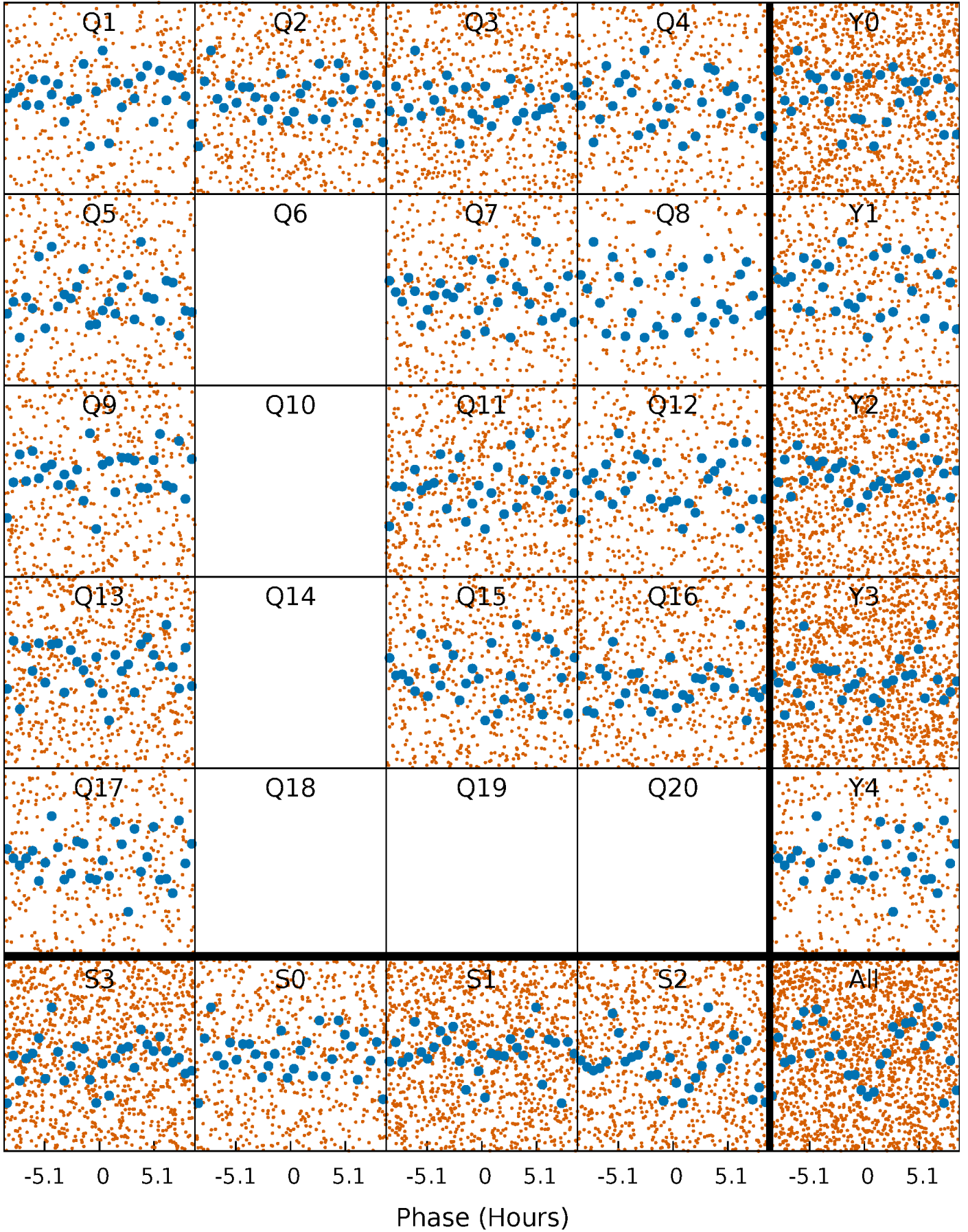
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

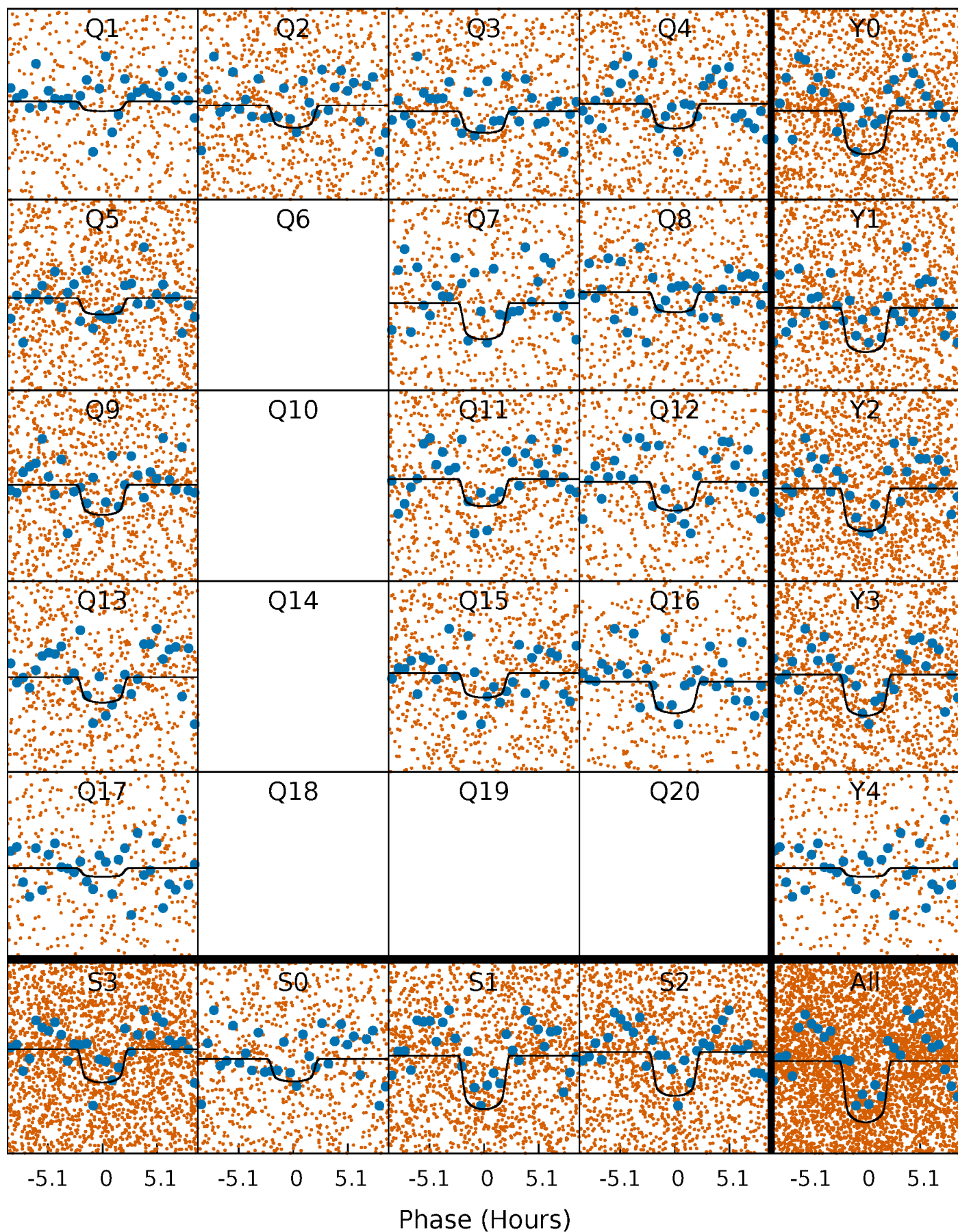
TCE 004077032-01   P= 1.253896 Days    $T_0=131.823203$  (BKJD)





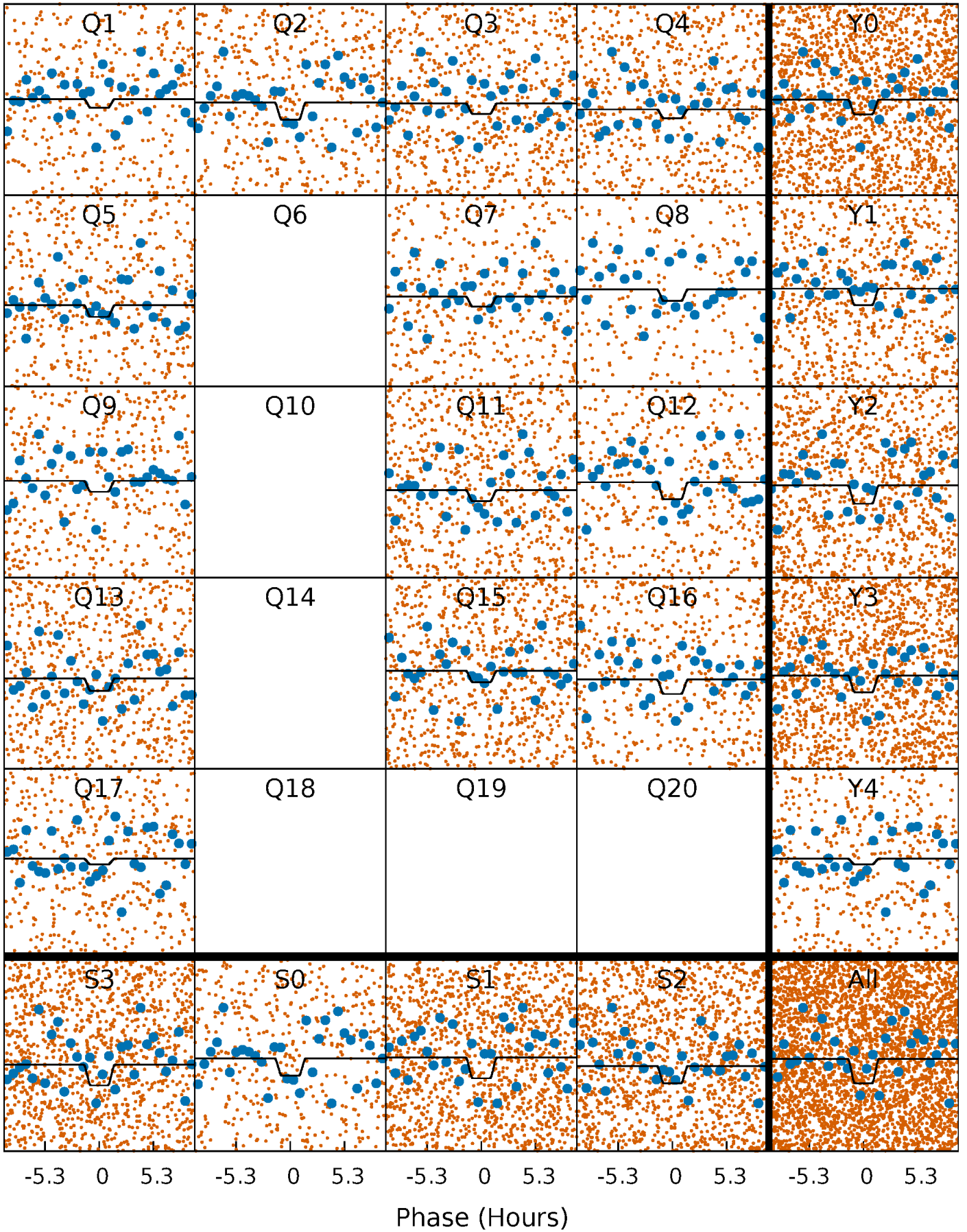
# DV Quarter-Phased Transit Curves

TCE 004077032-01 P= 1.253896 Days  $T_0=131.823203$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

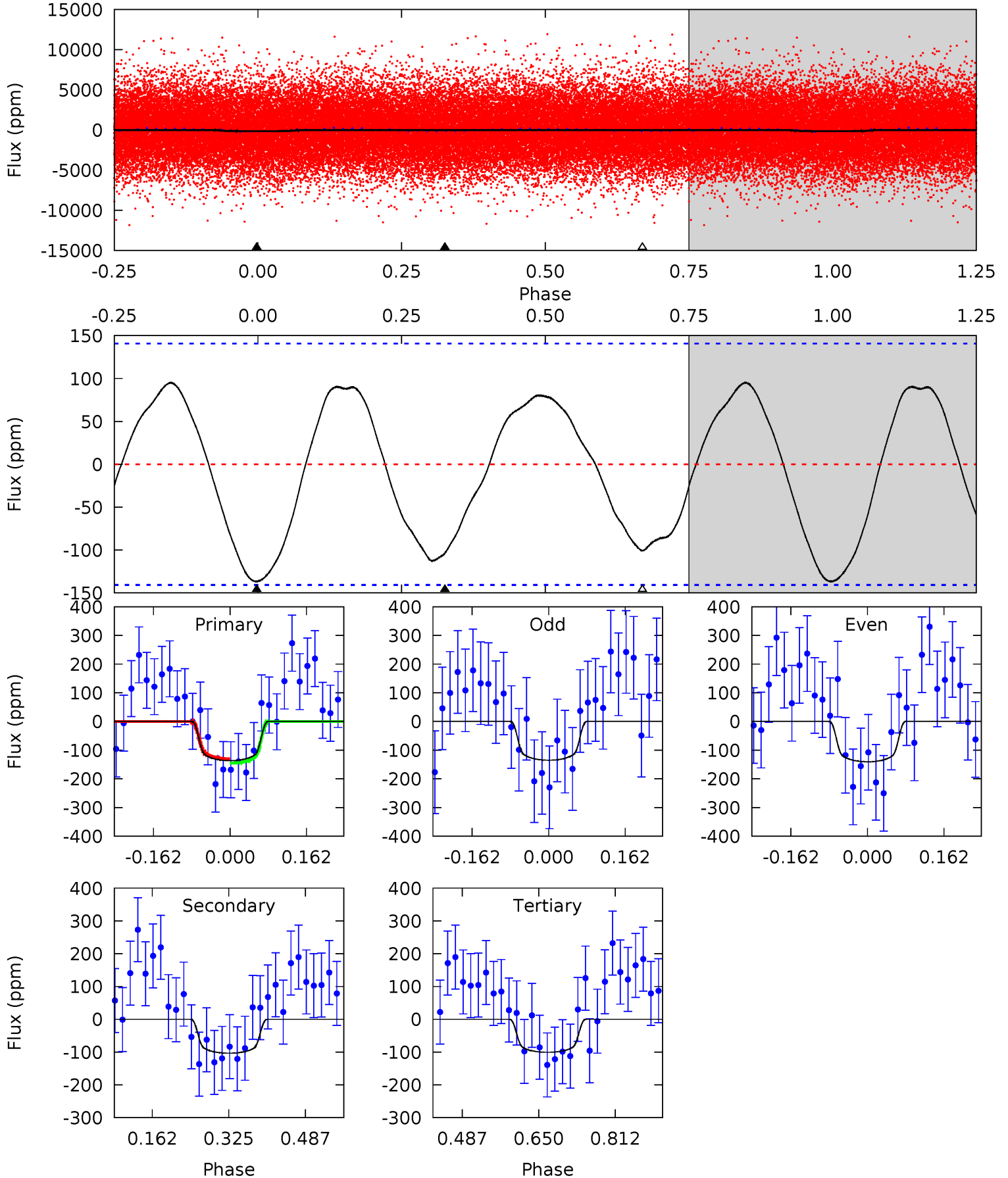
TCE 004077032-01 P= 1.253925 Days  $T_0=131.807378$  (BKJD)



# DV Model-Shift Uniqueness Test

004077032-01, P = 1.253896 Days, E = 130.569307 Days

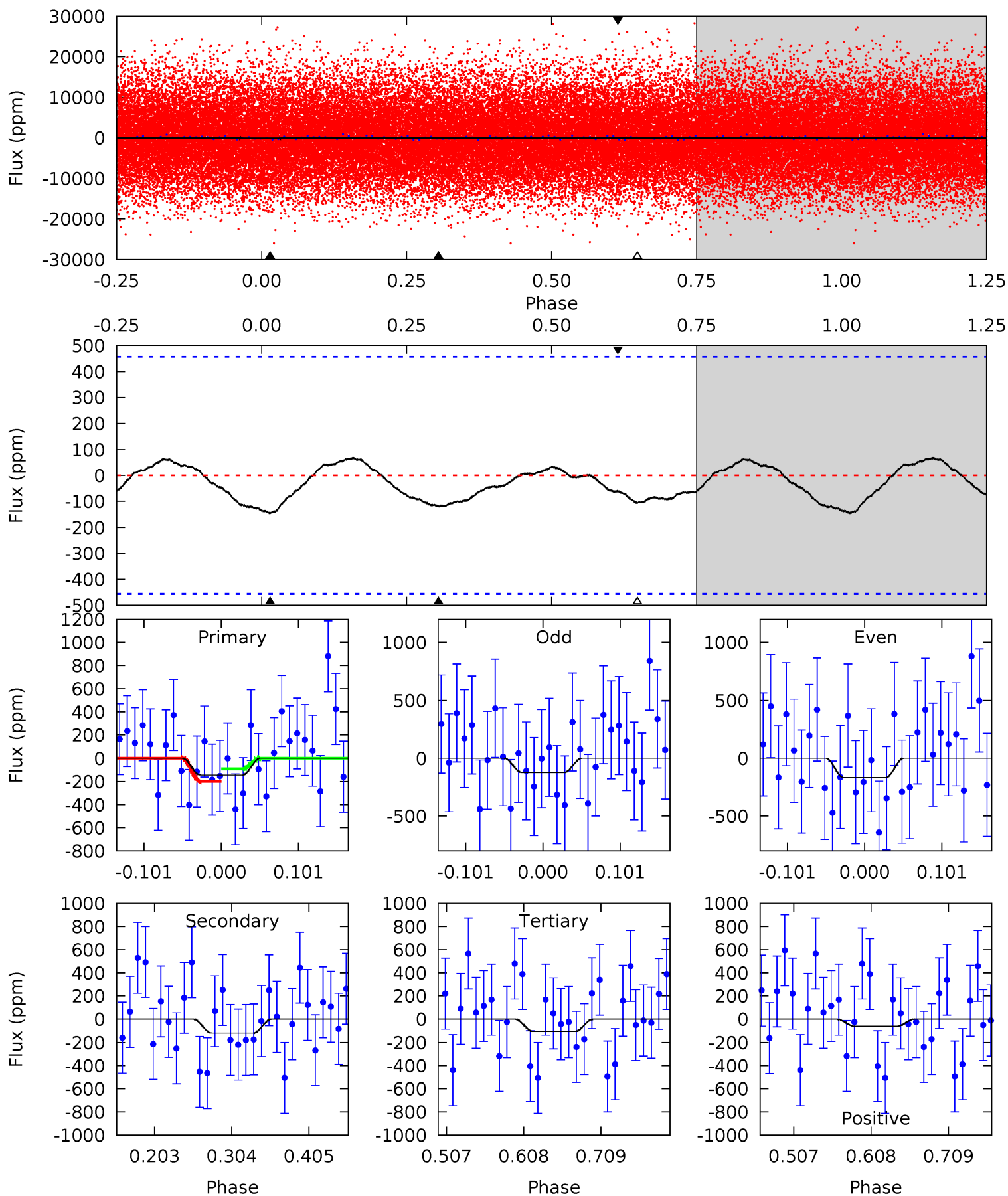
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.33	3.28	3.19	0	4.46	1.40	2.04	1.14	4.33	0.09	3.28	0.09	0.87	0.41	0.25



# Alt Model-Shift Uniqueness Test

004077032-01, P = 1.253925 Days, E = 130.553453 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
1.45	1.19	1.06	-0.61	4.56	1.64	0.50	0.39	2.06	0.13	1.80	0.22	0.82	0.32	0.54





### Stellar Parameters For KIC 004077032

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6917^{+245}_{-353}$	$4.050^{+0.246}_{-0.164}$	$-0.280^{+0.250}_{-0.300}$	$1.837^{+0.541}_{-0.595}$	$1.383^{+0.195}_{-0.292}$	$0.315^{+0.548}_{-0.142}$
	+4%/-5%	+6%/-4%	+89%/-107%	+29%/-32%	+14%/-21%	+174%/-45%
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 004077032-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-104 \pm 32$	$3.40^{+1.22}_{-1.27}$	$3590^{+320}_{-321}$	$5125^{+1366}_{-731}$	$3.125^{+4.398}_{-1.594}$
Alt.	$-119 \pm 100$	$2.92^{+1.33}_{-1.17}$	$3587^{+293}_{-315}$	$5610^{+2208}_{-2153}$	$4.297^{+10.881}_{-3.688}$

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

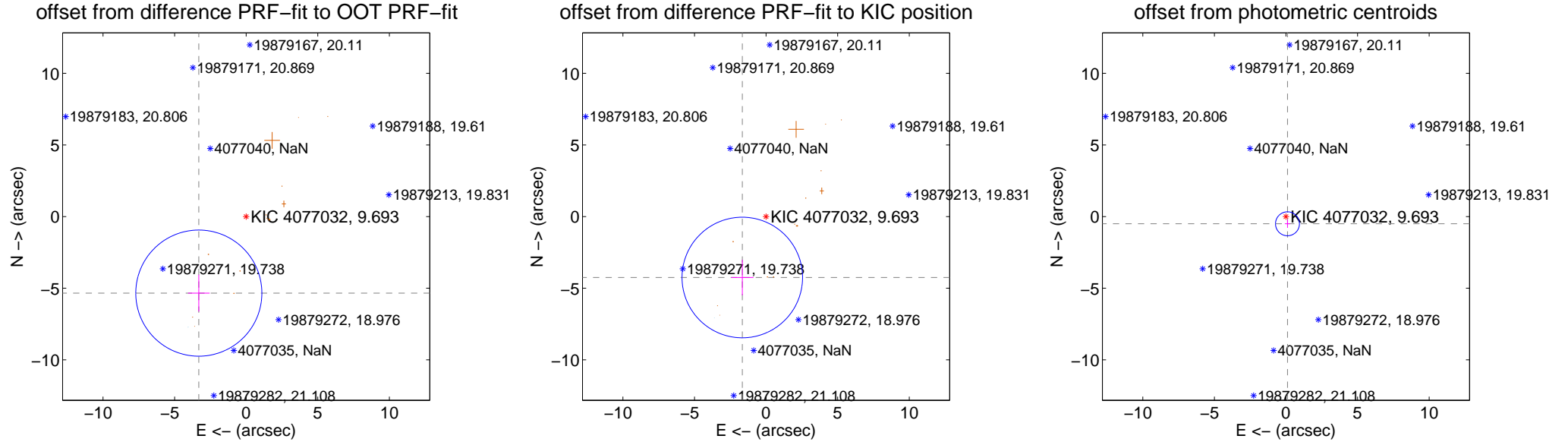
## DV Centroid Data

Supplemental centroid analysis for 004077032-01. **Kepler magnitude: 9.69.** Transit SNR 11.61

**There are 1 quarters with good PRF difference image offsets**

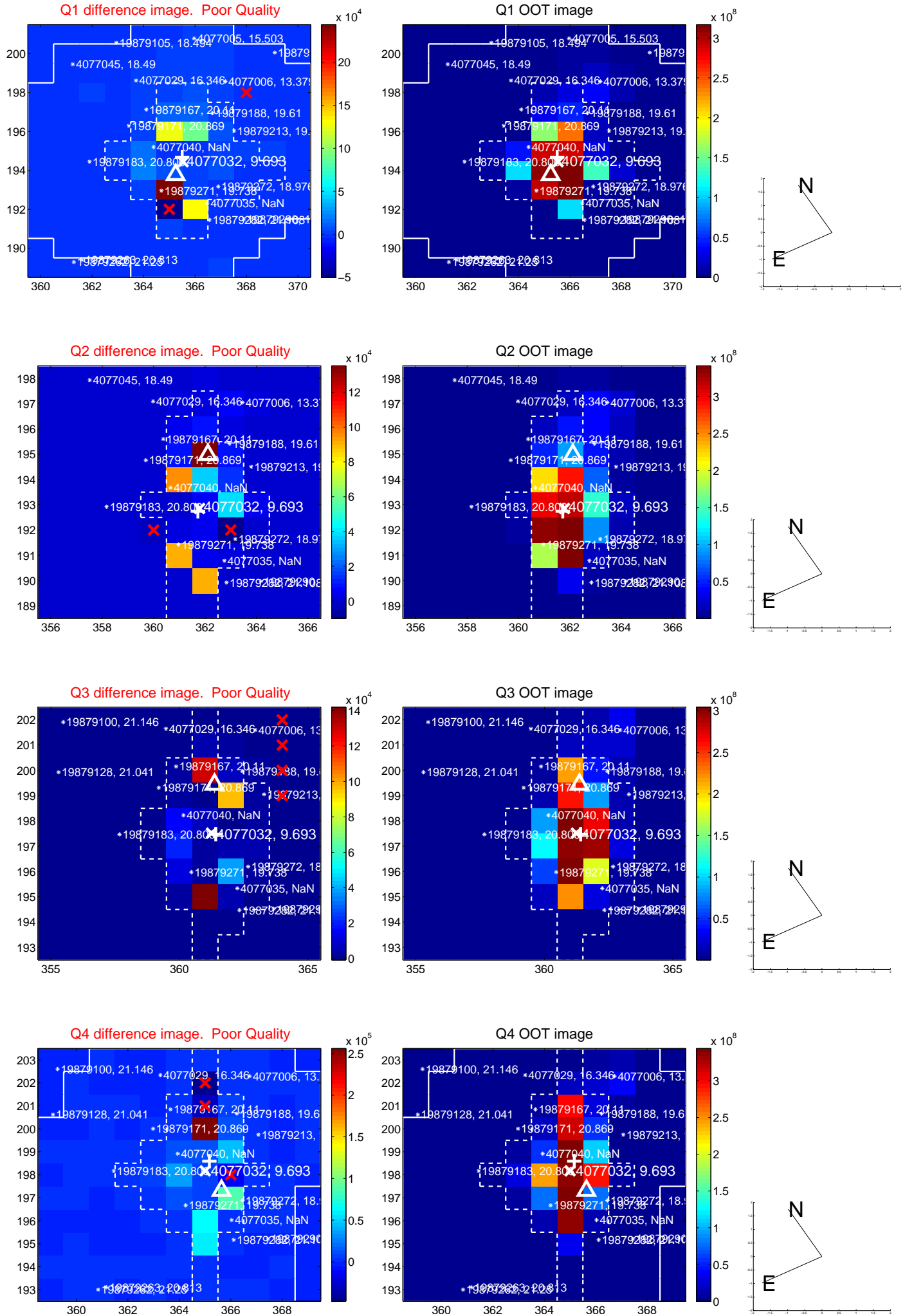
The direct PRF centroid is offset from the target star catalog position by about 0.82 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>6.283 \pm 1.467</math></b>	<b>4.28</b>	$3.308 \pm 0.754$	$-5.342 \pm 1.290$
PRF-fit source offset from KIC position	<b><math>4.566 \pm 1.402</math></b>	<b>3.26</b>	$1.662 \pm 0.777$	$-4.252 \pm 1.235$
photometric centroid source offset	$0.51 \pm 0.28$	1.85	$-0.10 \pm 0.18$	$-0.50 \pm 0.28$

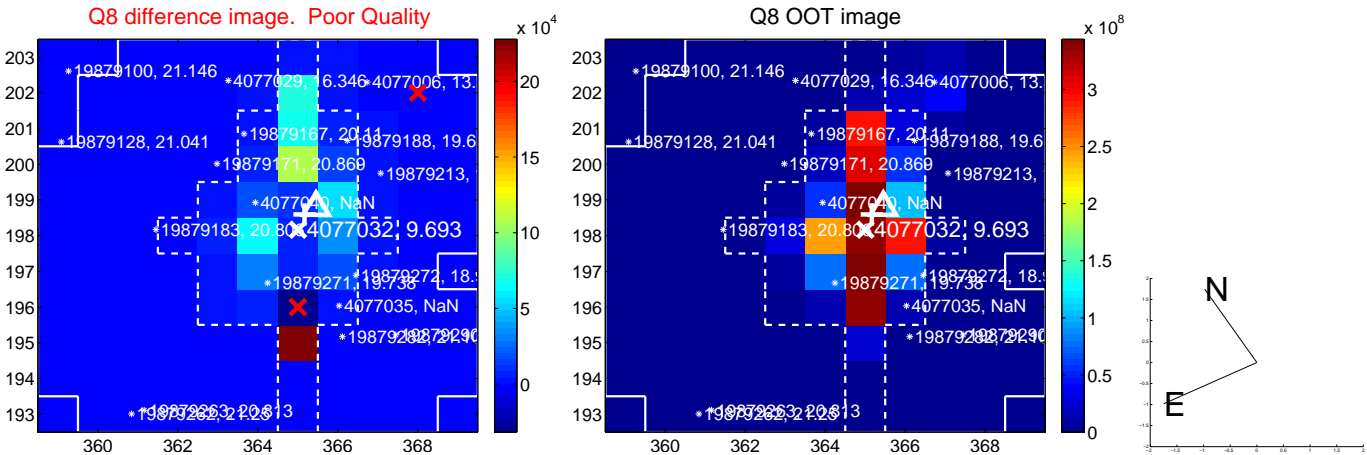
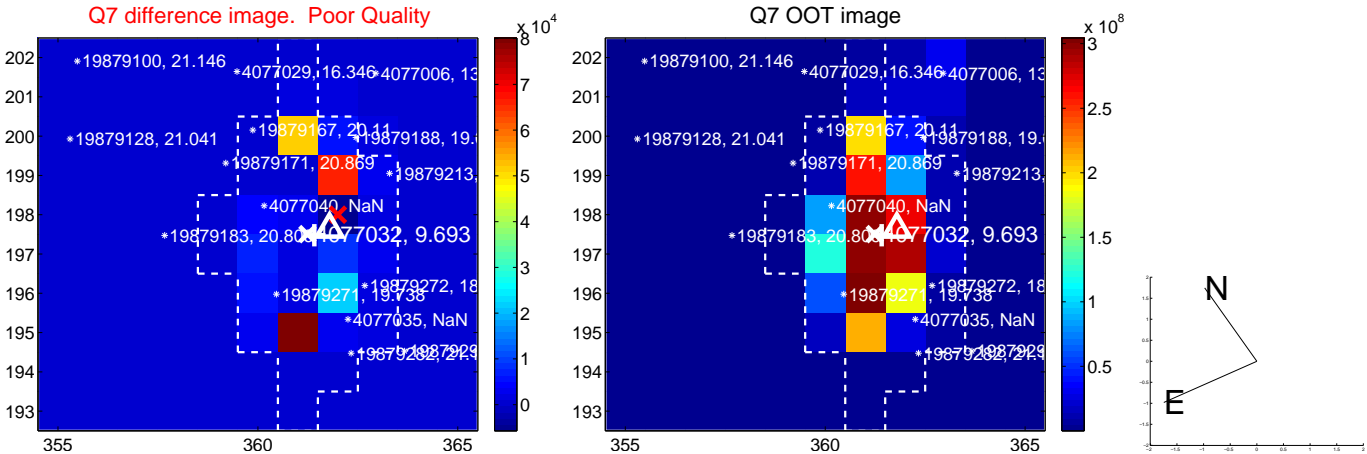
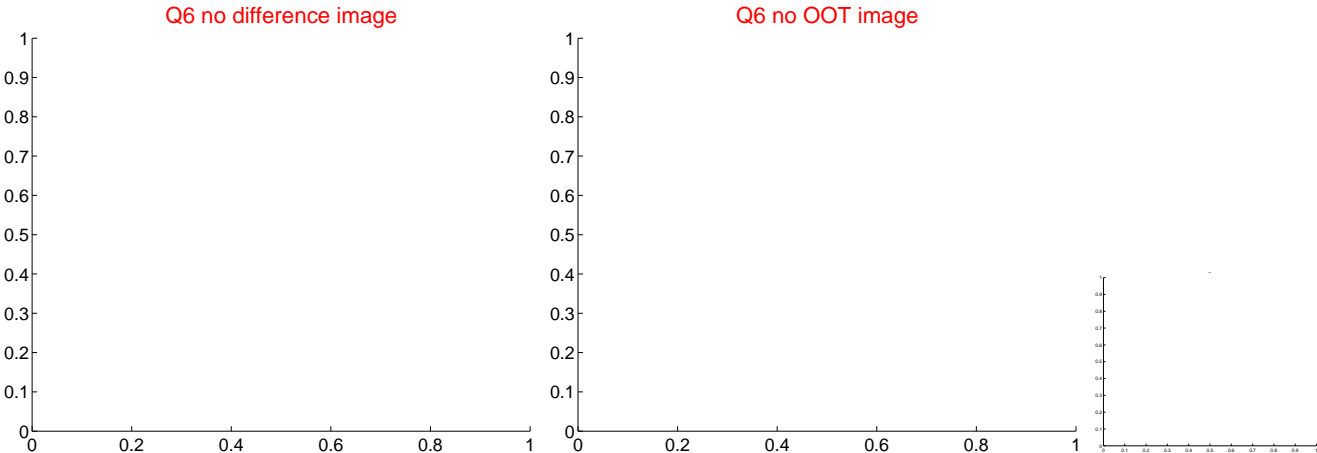
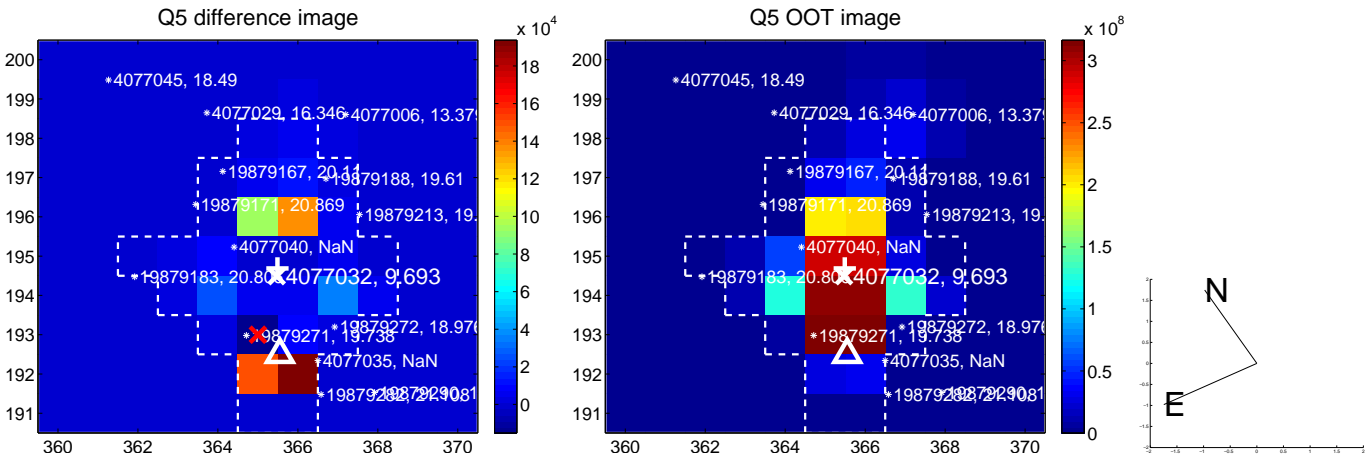


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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

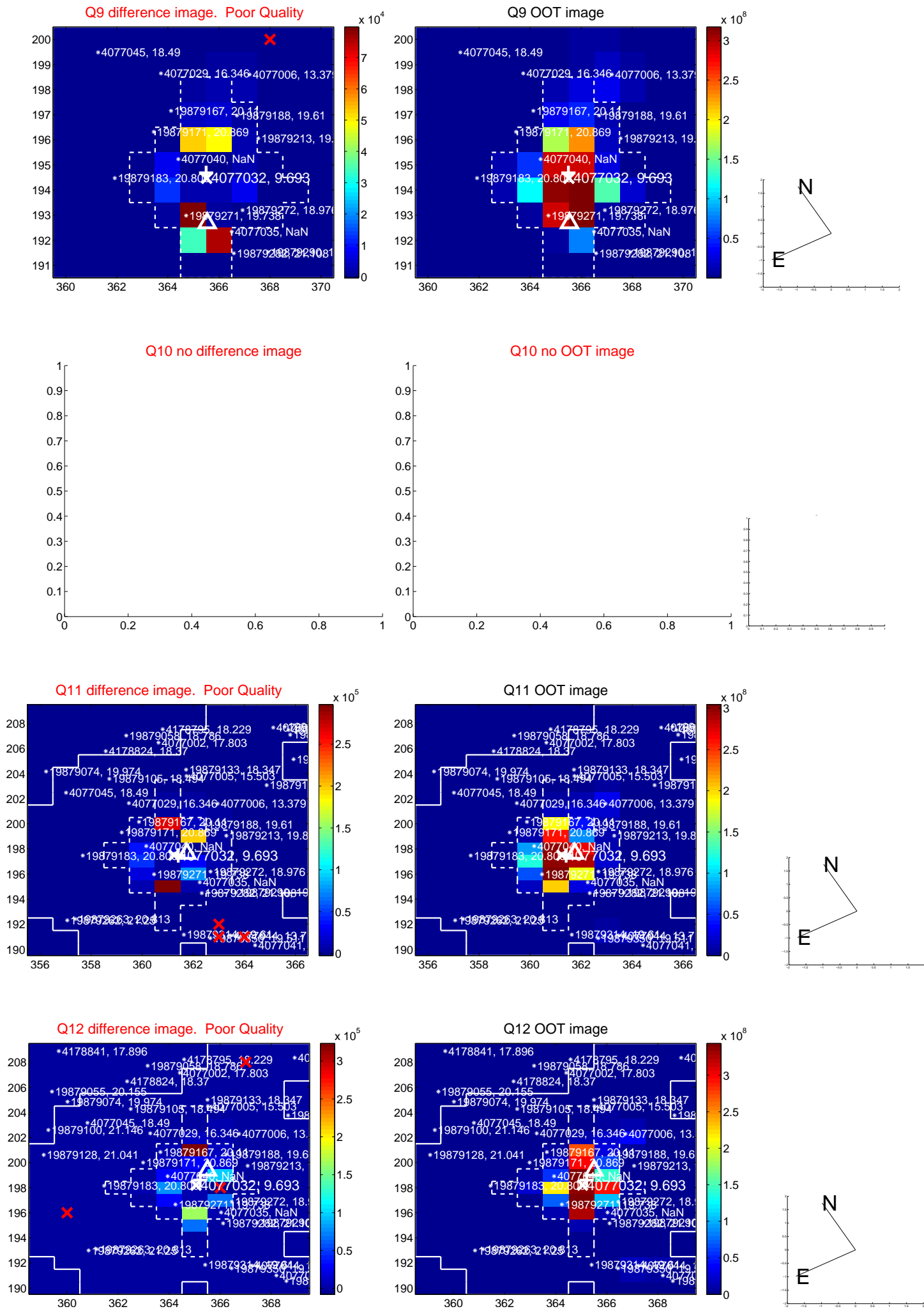


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

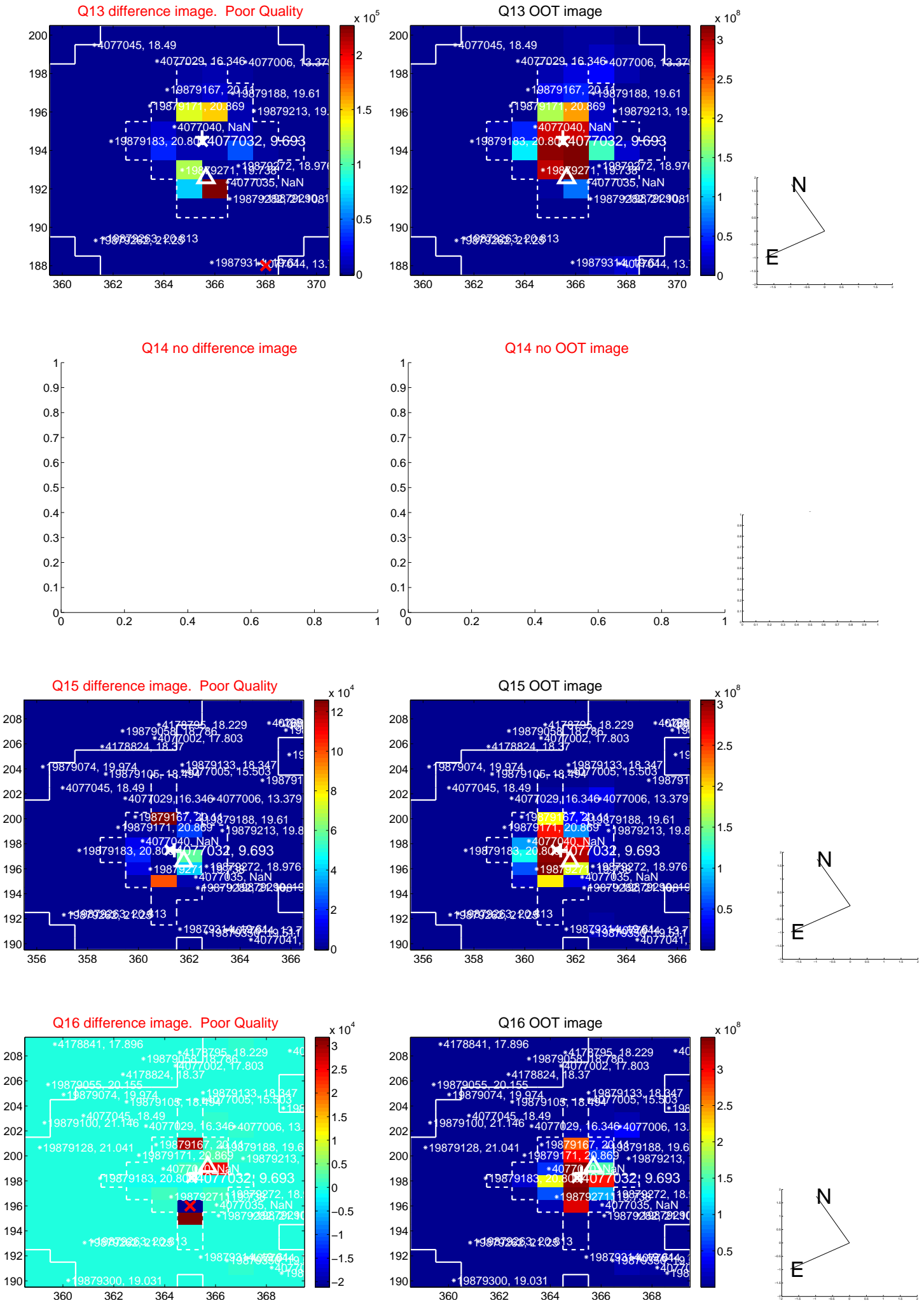




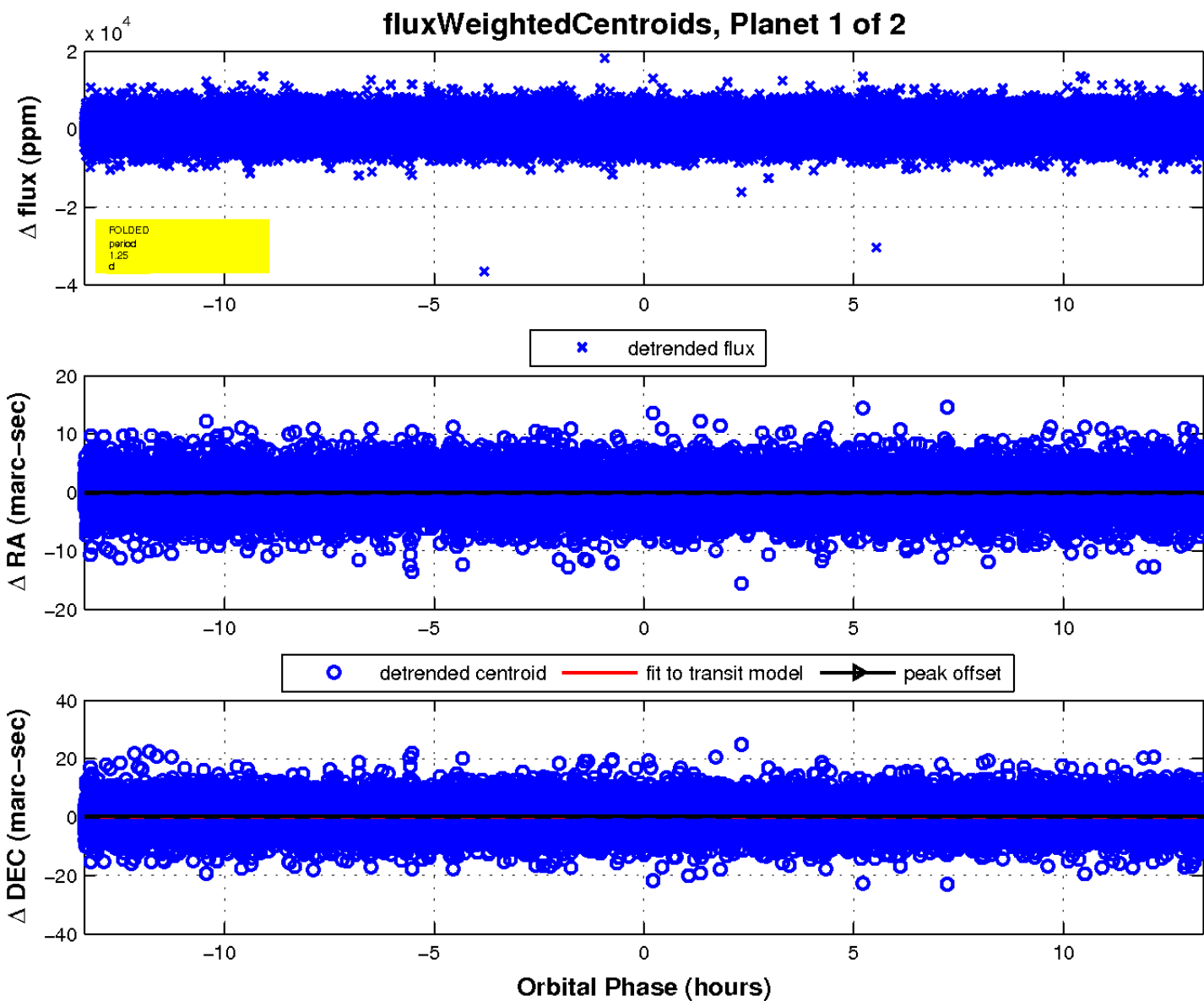
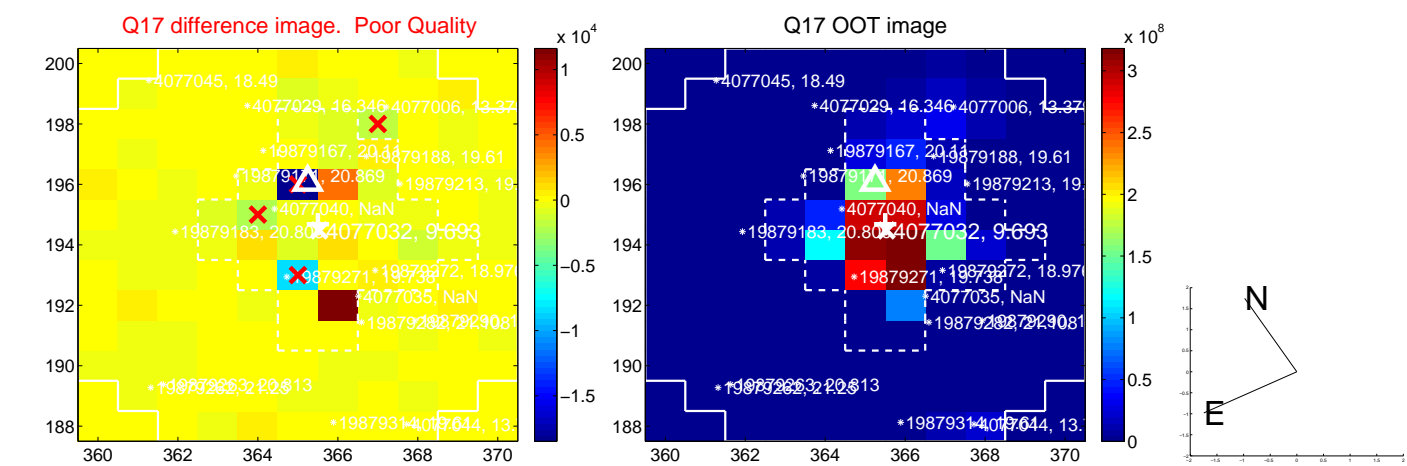
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

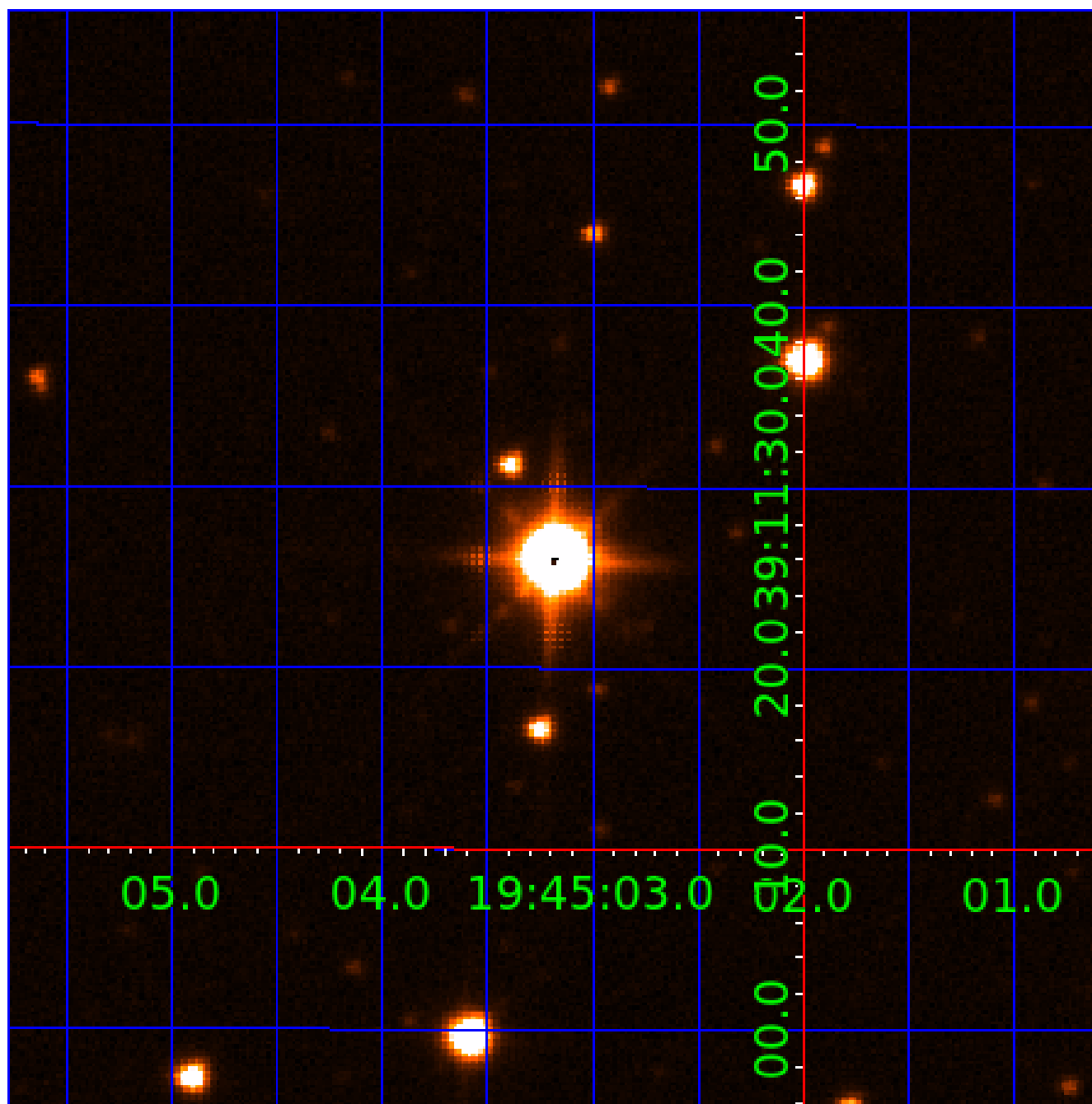


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 004077032

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004077032-01	OBS	No	1.253896	131.823203	270.2	4.445	10.9	11.6	1.84	6917	3.51	10771.83
004077032-02	OBS	No	1.082768	131.688322	450.3	12.993	8.6	15.9	1.84	6917	5.14	13099.59

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004077032-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED
004077032-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—CENT_SATURATED

**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.

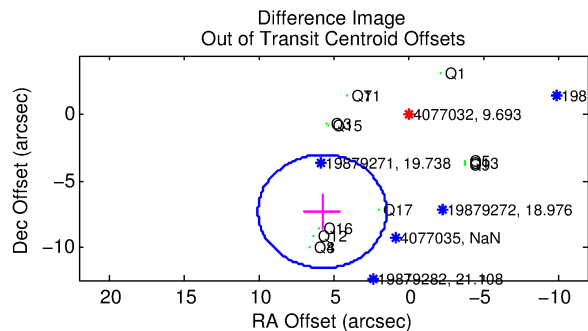
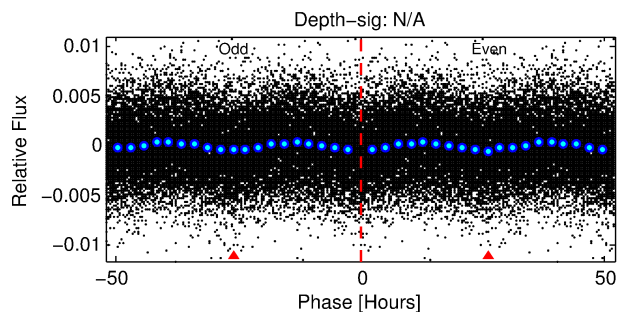
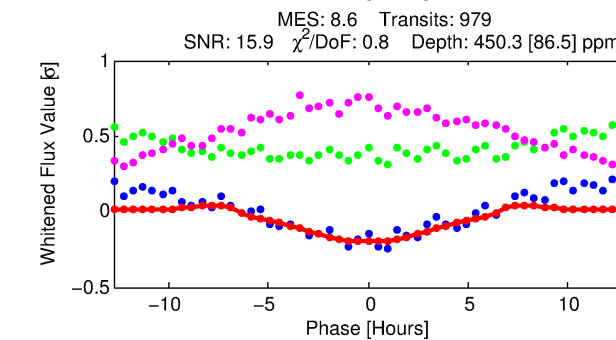
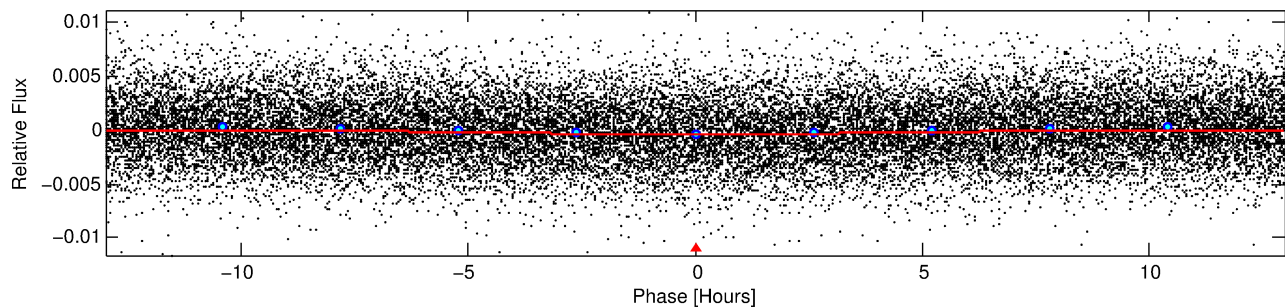
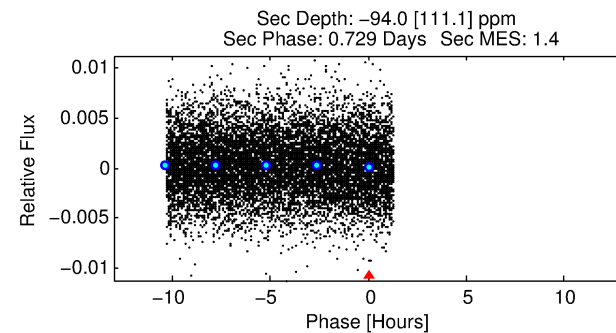
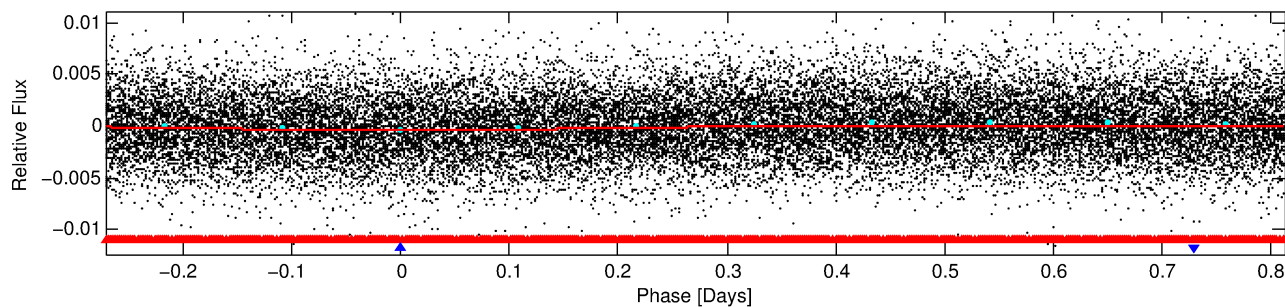
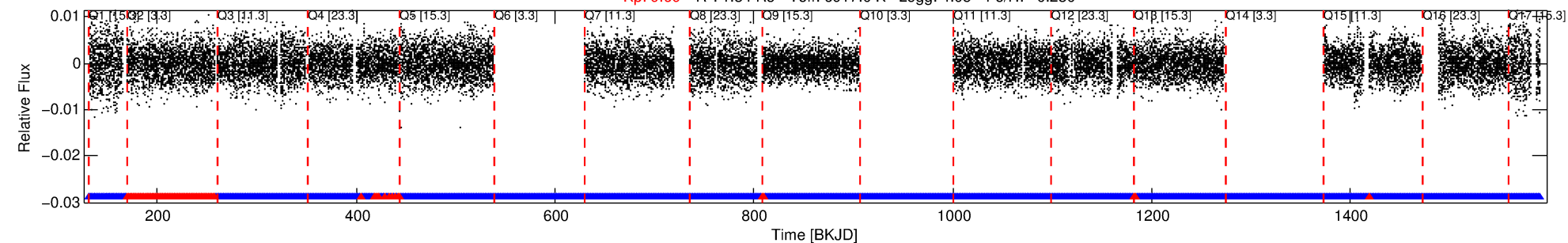
## Ephemeris Match Information For 004077032-02

No Significant Match Found

# DV One-Page Summary

KIC: 4077032 Candidate: 2 of 2 Period: 1.083 d

Kp: 9.69 R\*: 1.84 Rs Teff: 6917.0 K Logg: 4.05 Fe/H: -0.280



## DV Fit Results:

Period = 1.08277 [0.00002] d  
Epoch = 131.6883 [0.0101] BKJD  
Rp/R\* = 0.0256 [0.0046]  
a/R\* = 1.01 [0.01]  
b = 0.98 [0.02]  
Seff = 13099.59 [6294.59]  
Teq = 2728 [328] K  
Rp = 5.14 [1.90] Re  
a = 0.0230 [0.0066] AU  
Ag = N/A  
Teffp = N/A

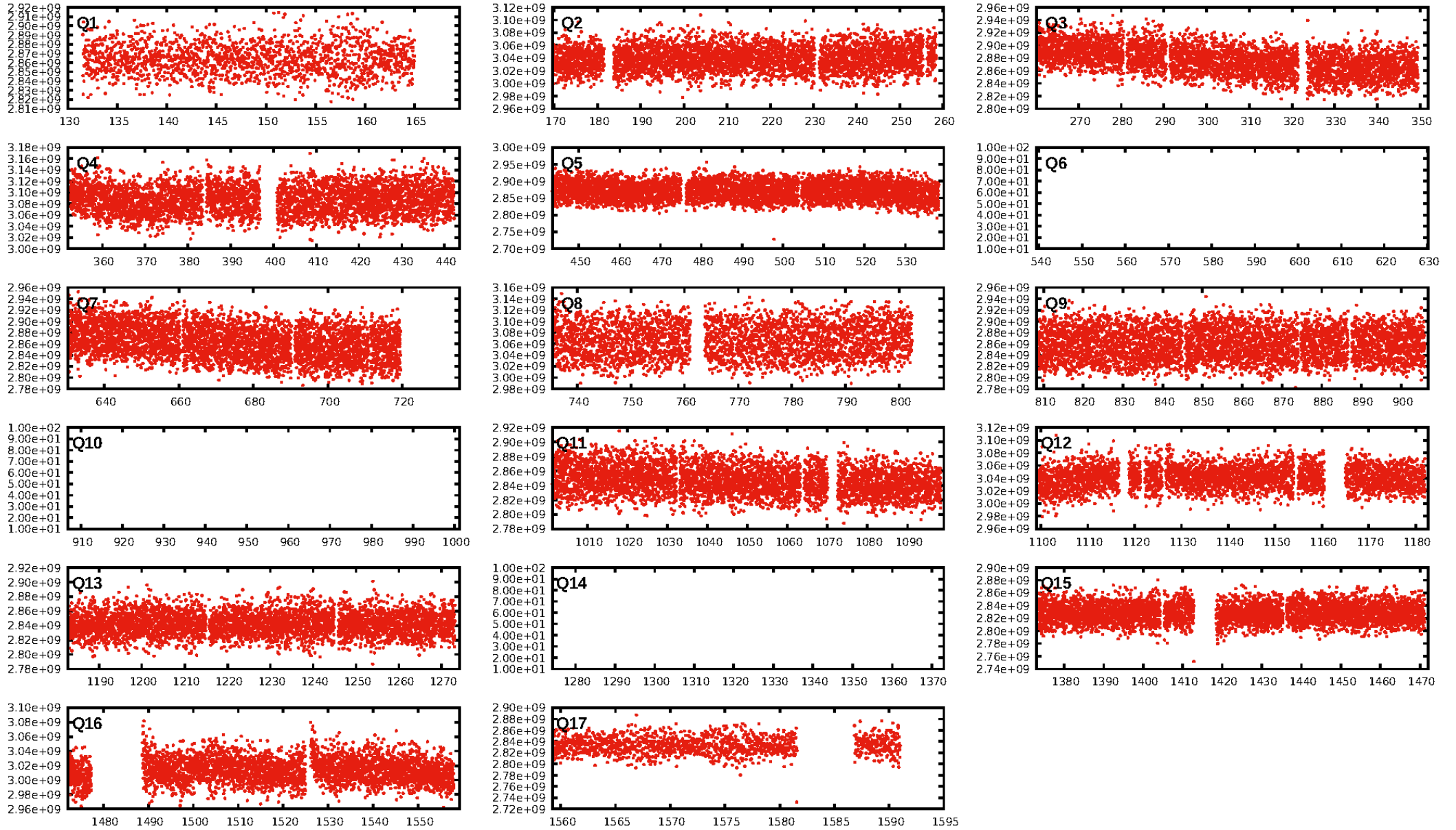
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 23.5% [0.30σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.89 [822/922]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 0.140 arcsec [1.33σ]  
OotOffset-rm: 9.284 arcsec [6.49σ]  
KicOffset-rm: 7.948 arcsec [6.55σ]  
OotOffset-st: 0/4/4/5 [13]  
KicOffset-st: 0/4/4/5 [13]  
DiffImageQuality-fgm: 0.23 [3/13]  
DiffImageOverlap-fno: 0.00 [0/14]

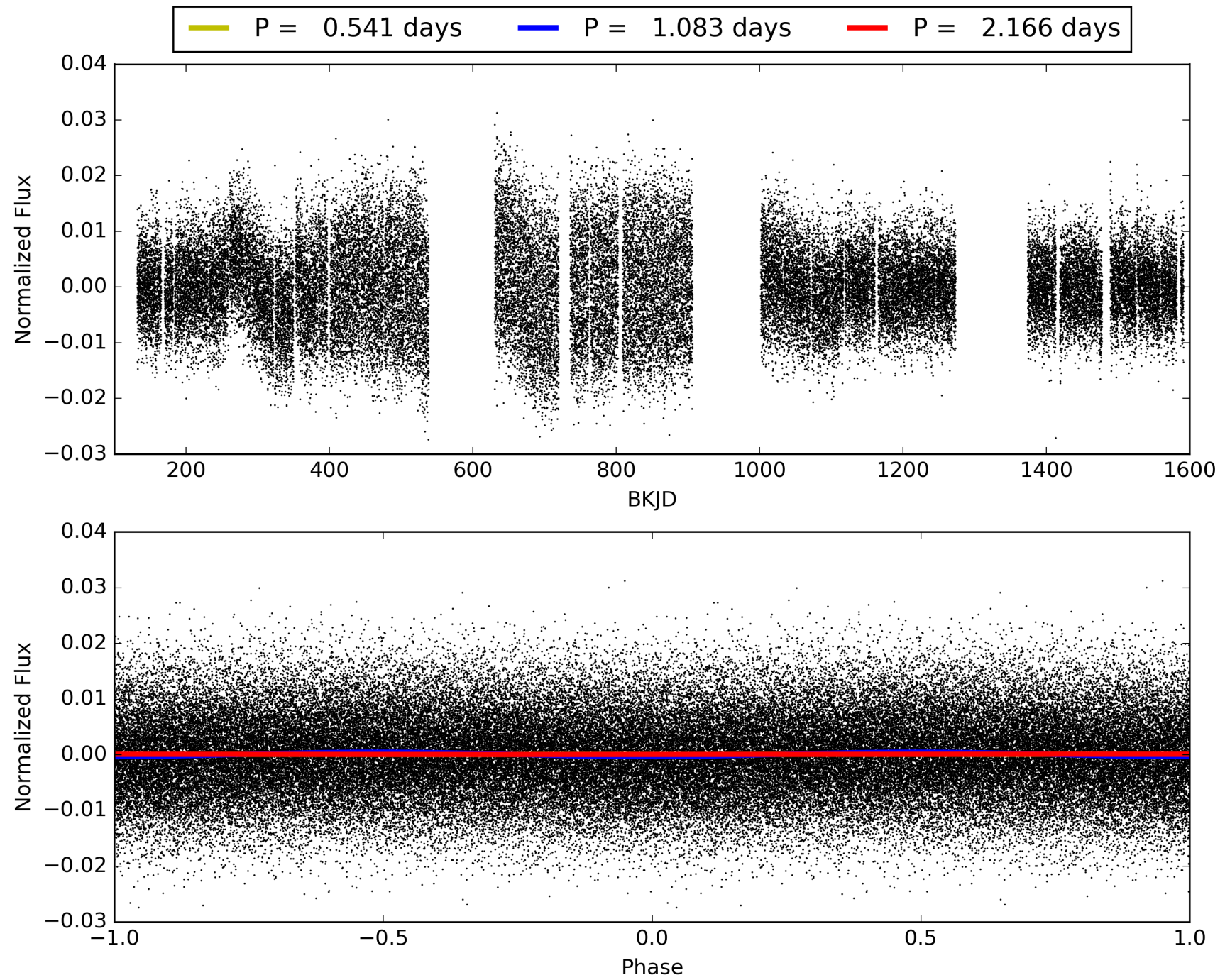
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:25:51 Z

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

# TCE 004077032-02, PDC Light Curves

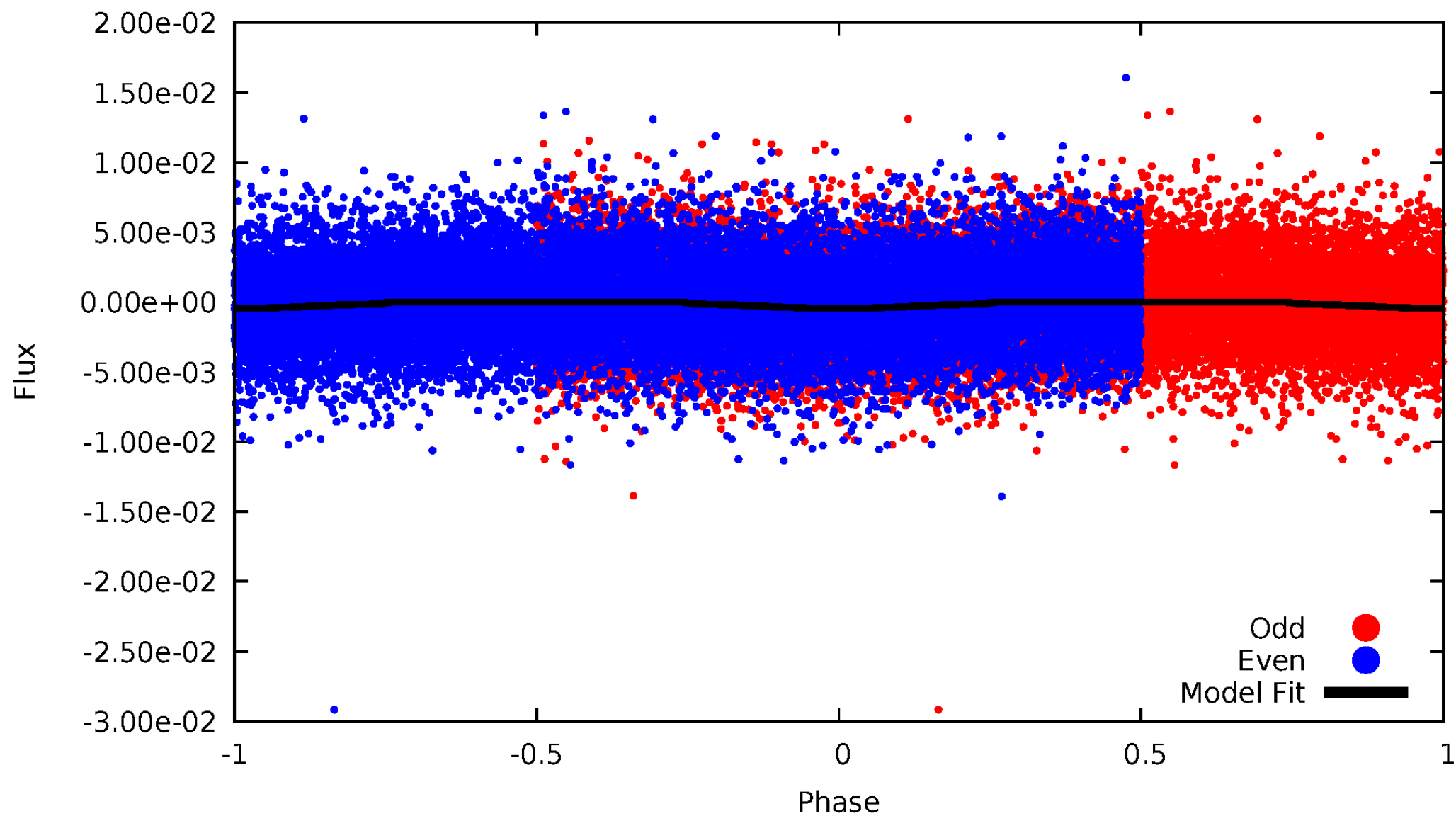


TCE 004077032-02



# DV Odd/Even

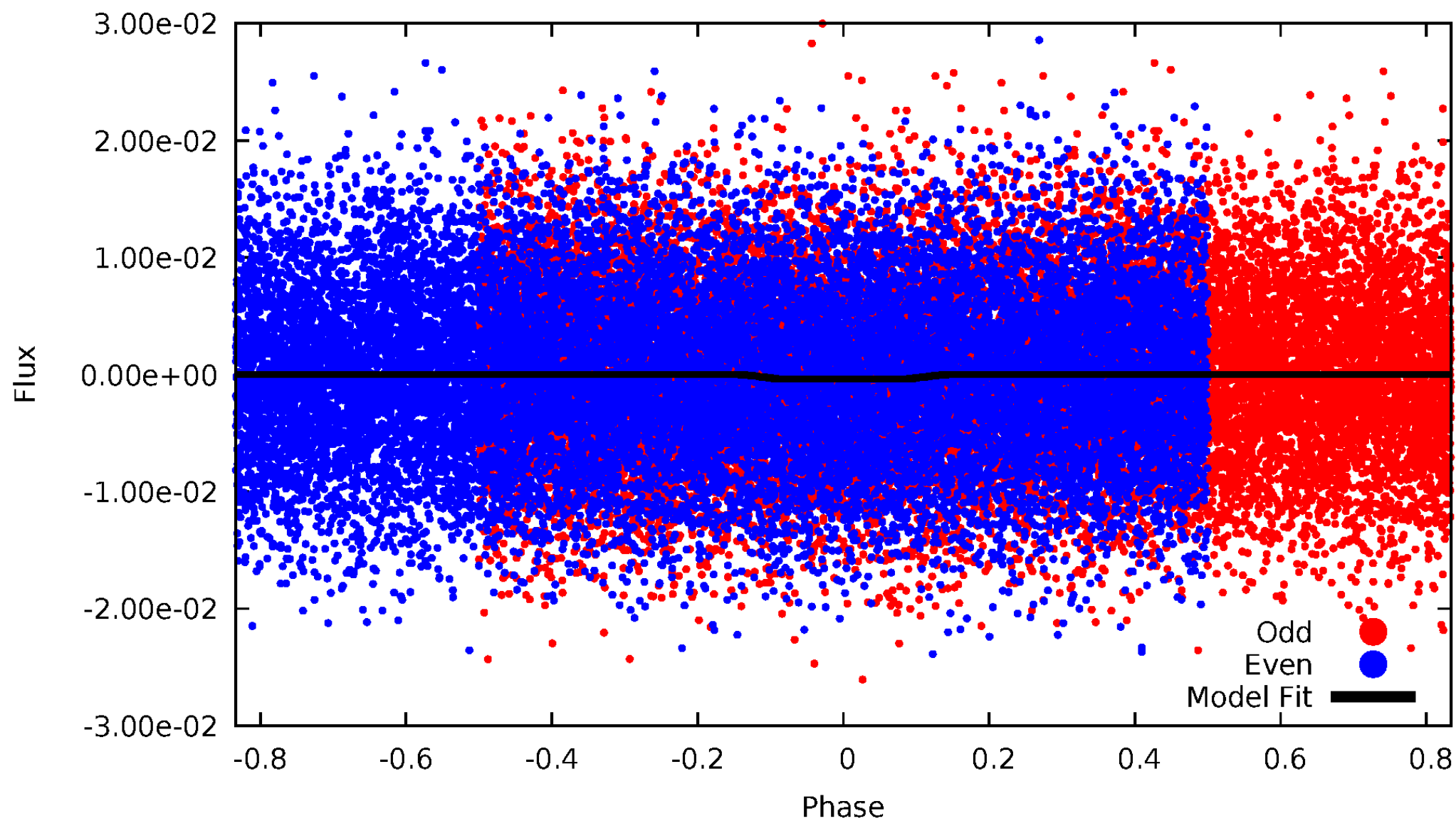
TCE 004077032-02





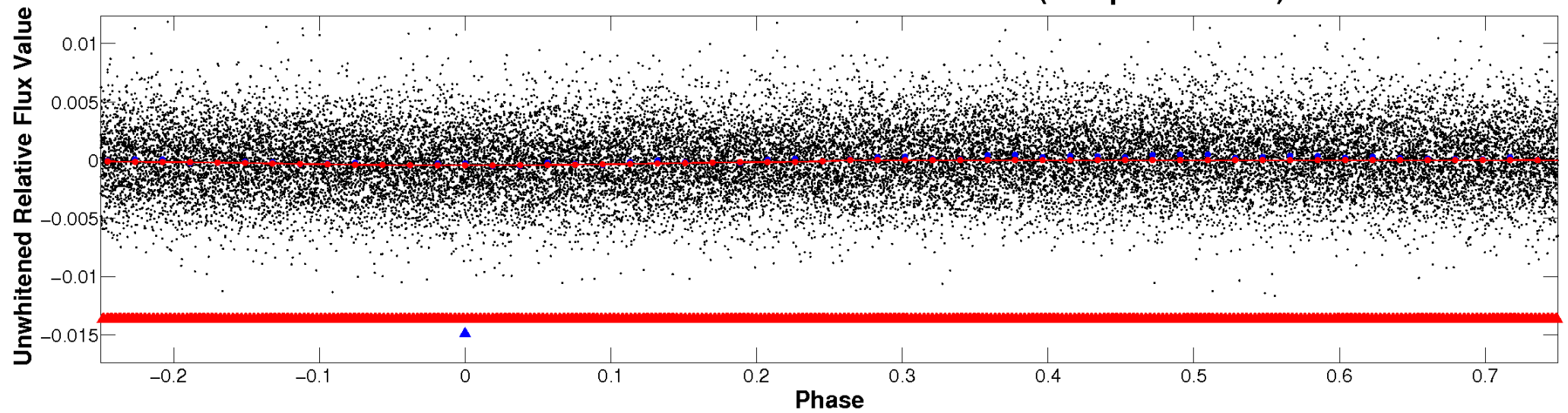
# ALT Odd/Even

TCE 004077032-02

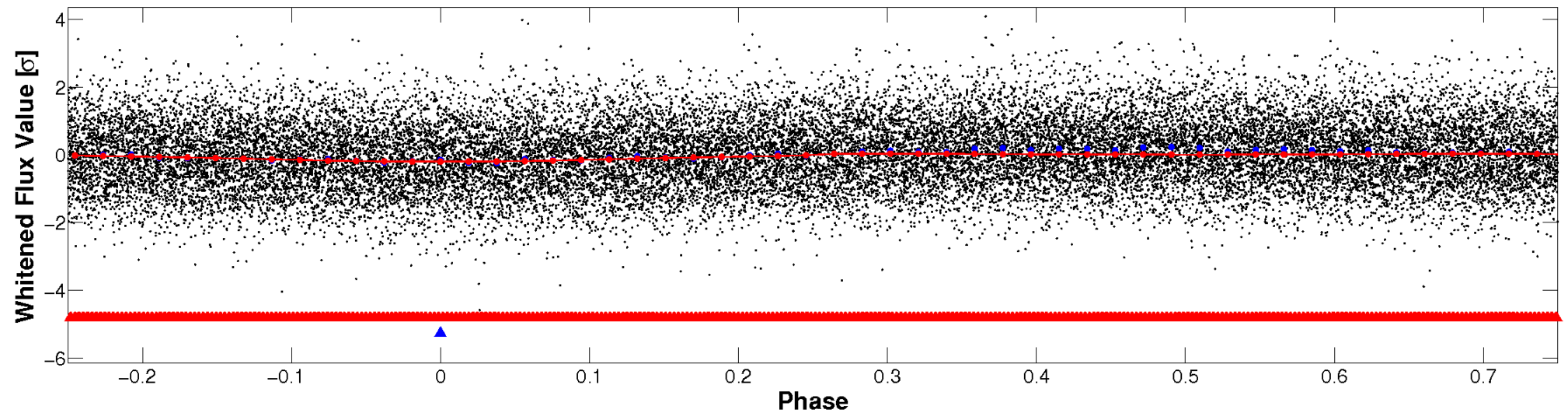


# Non-Whitened Vs. Whitened Light Curve

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

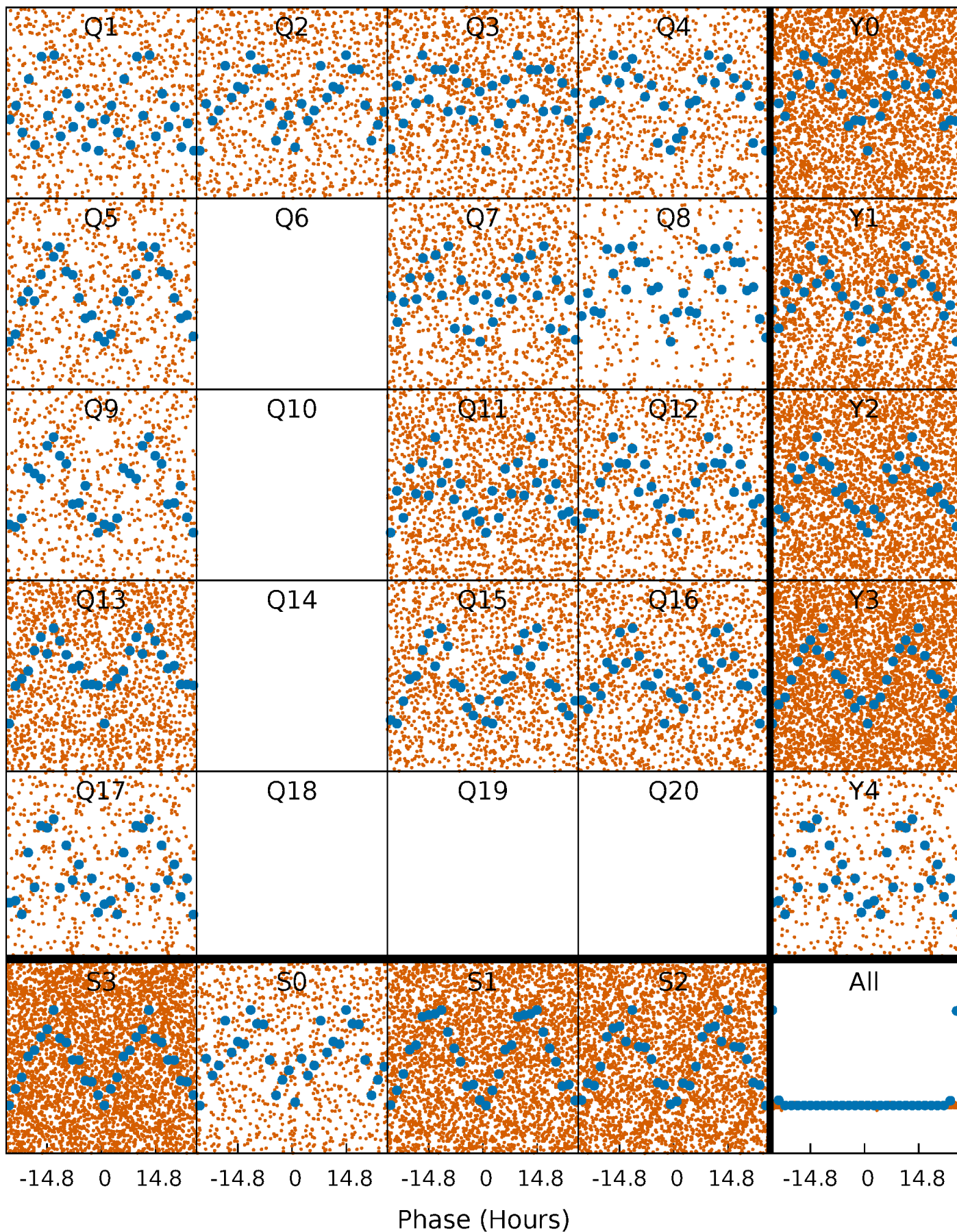


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

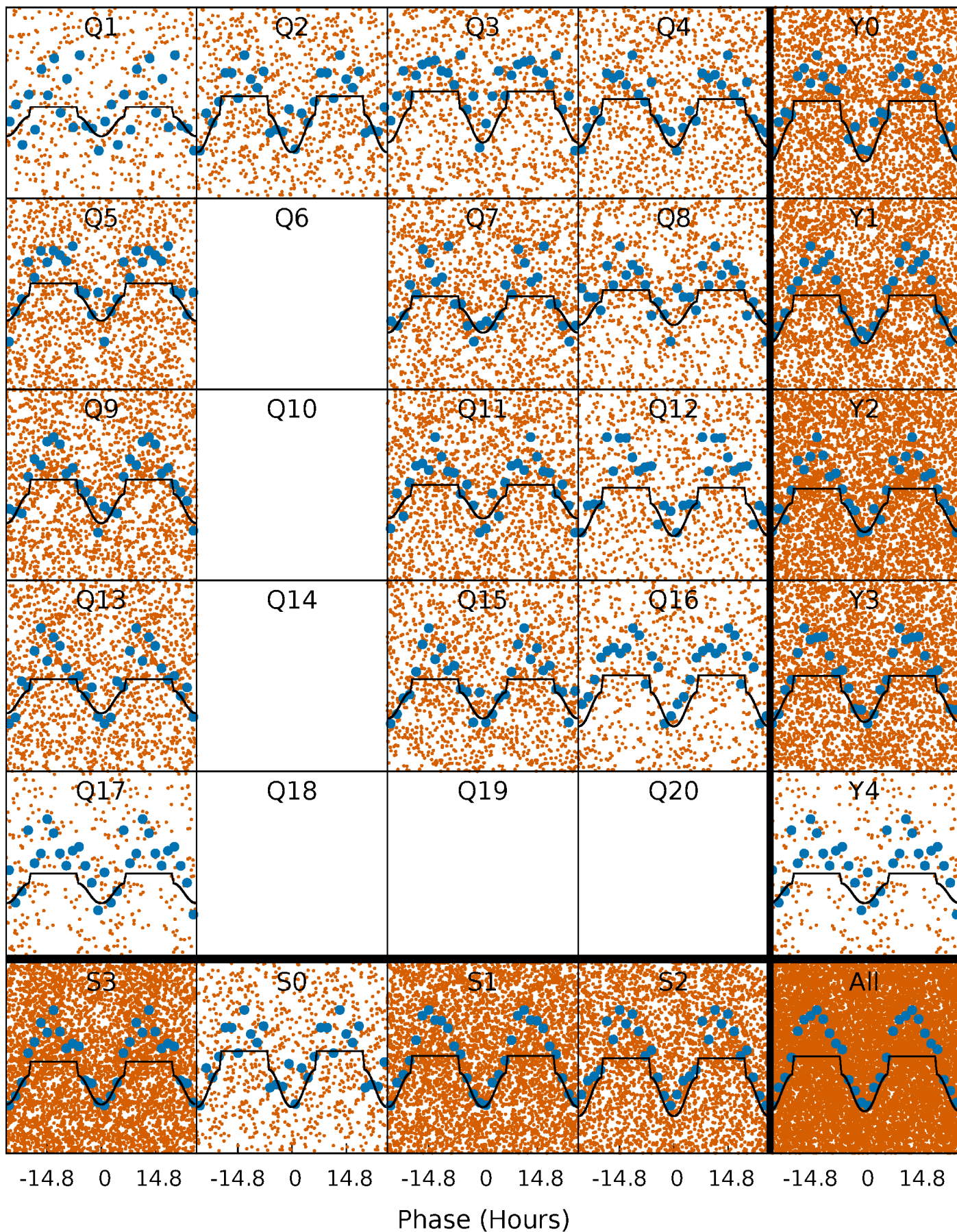
TCE 004077032-02   P= 1.082768 Days    $T_0=131.688322$  (BKJD)





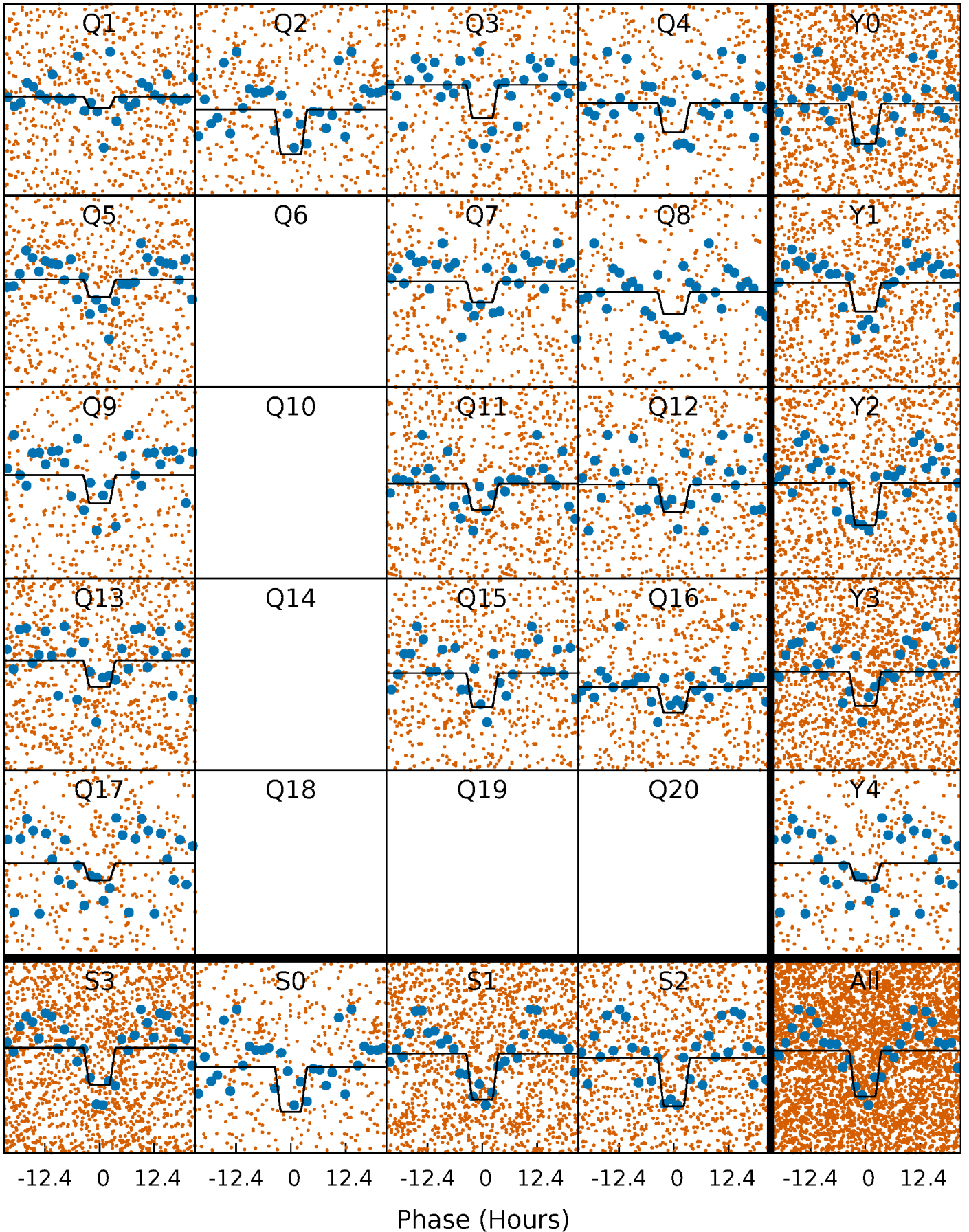
# DV Quarter-Phased Transit Curves

TCE 004077032-02     $P = 1.082768$  Days     $T_0 = 131.688322$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004077032-02 P= 1.082888 Days  $T_0=131.608704$  (BKJD)

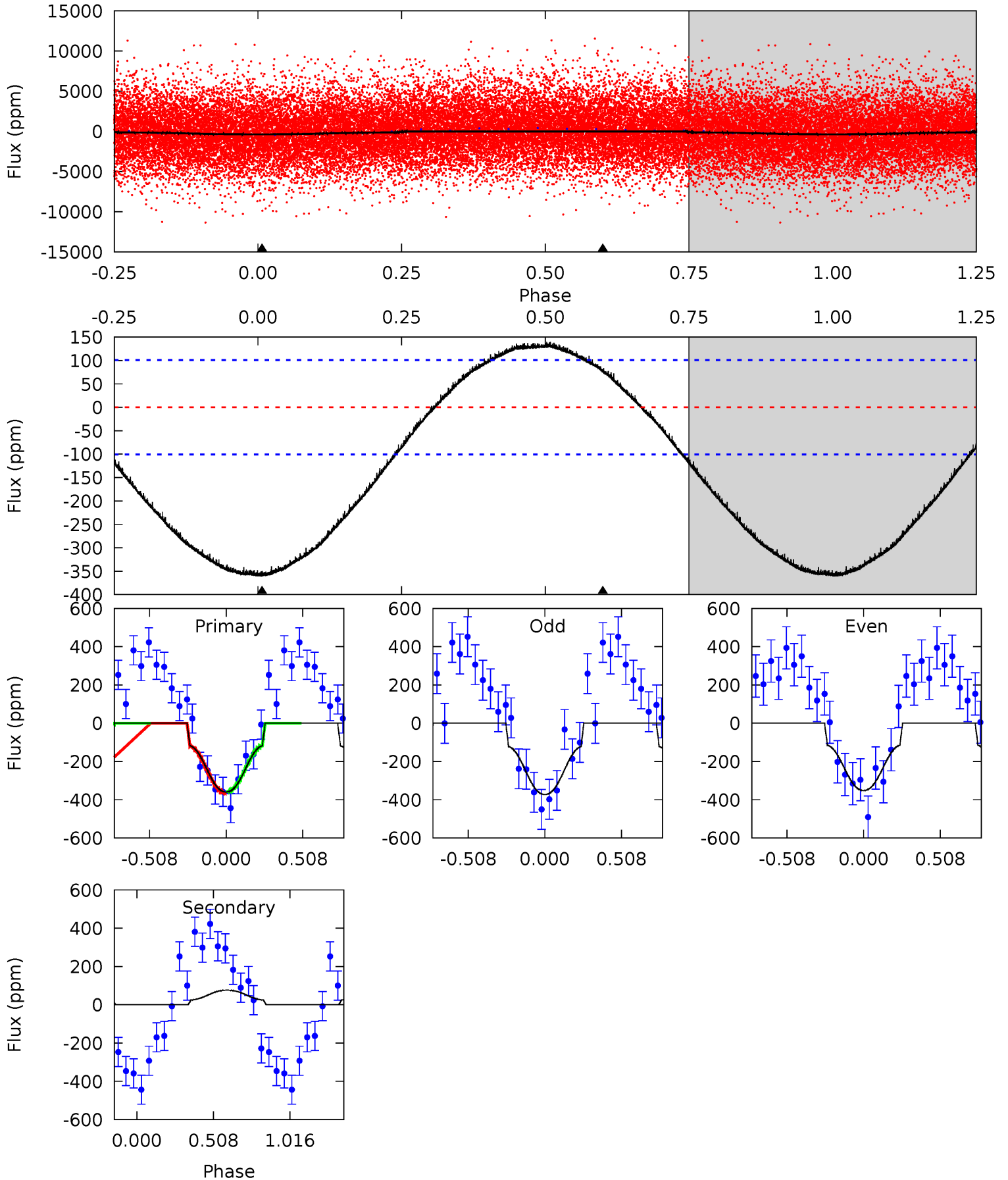




# DV Model-Shift Uniqueness Test

004077032-02, P = 1.082768 Days, E = 130.605554 Days

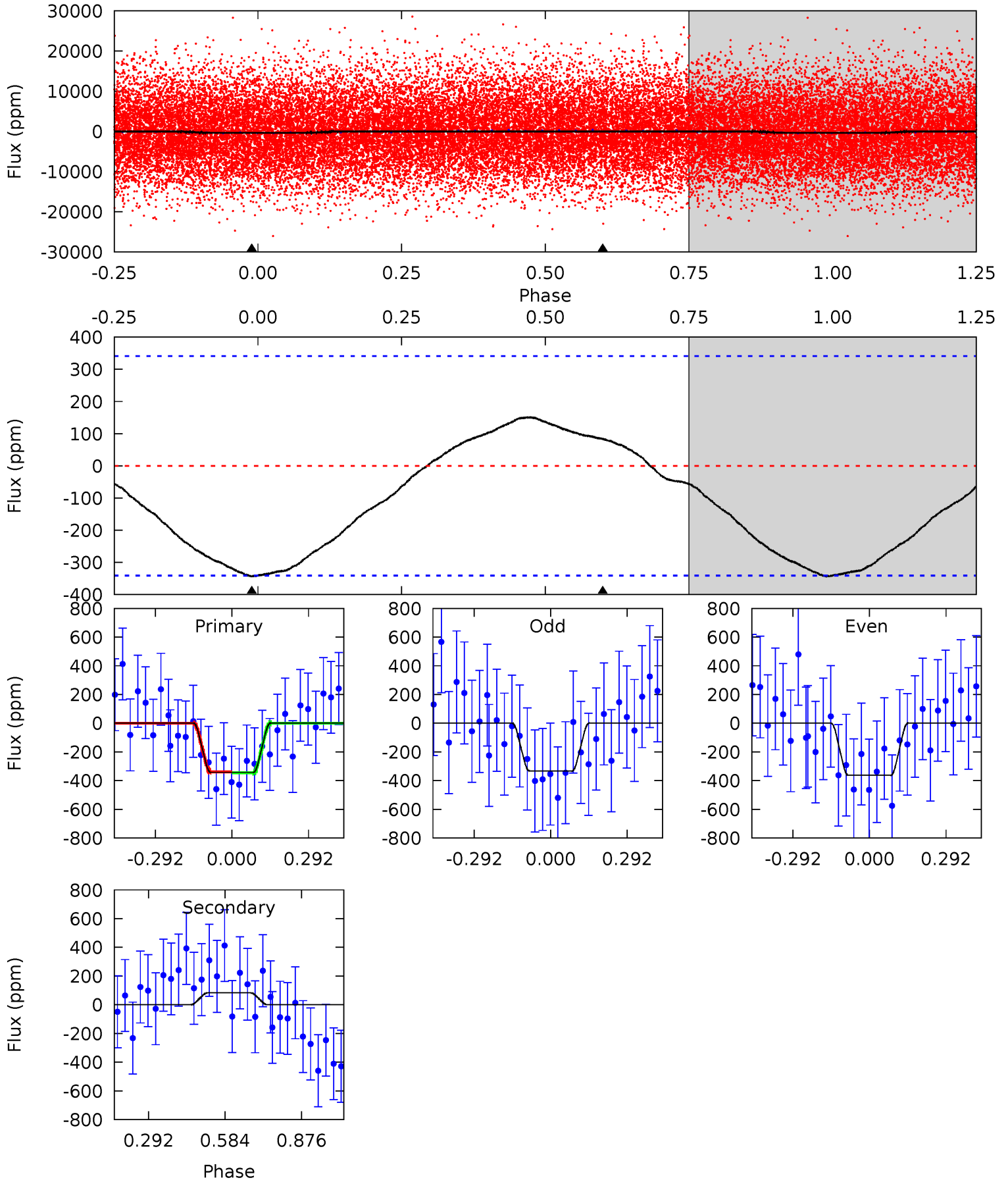
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	-3.19	0	0	4.21	0.66	1.70	15.0	15.0	-3.19	-3.19	0.44	0.92	0.28	0.13



# Alt Model-Shift Uniqueness Test

004077032-02, P = 1.082888 Days, E = 130.525816 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
4.35	-1.06	0	0	4.33	1.05	0.50	4.35	4.35	-1.06	-1.06	0.19	1.08	0.31	0.04



### Stellar Parameters For KIC 004077032

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6917^{+245}_{-353}$	$4.050^{+0.246}_{-0.164}$	$-0.280^{+0.250}_{-0.300}$	$1.837^{+0.541}_{-0.595}$	$1.383^{+0.195}_{-0.292}$	$0.315^{+0.548}_{-0.142}$
	+4%/-5%	+6%/-4%	+89%/-107%	+29%/-32%	+14%/-21%	+174%/-45%
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 004077032-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$76 \pm 24$	$4.96^{+1.29}_{-1.19}$	$3772^{+318}_{-349}$	$-4499^{+337}_{-374}$	$-0.868^{+0.382}_{-0.754}$
Alt.	$83 \pm 79$	$3.71^{+1.21}_{-1.09}$	$3779^{+293}_{-334}$	$-5008^{+1097}_{-1045}$	$-1.645^{+1.396}_{-2.795}$

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

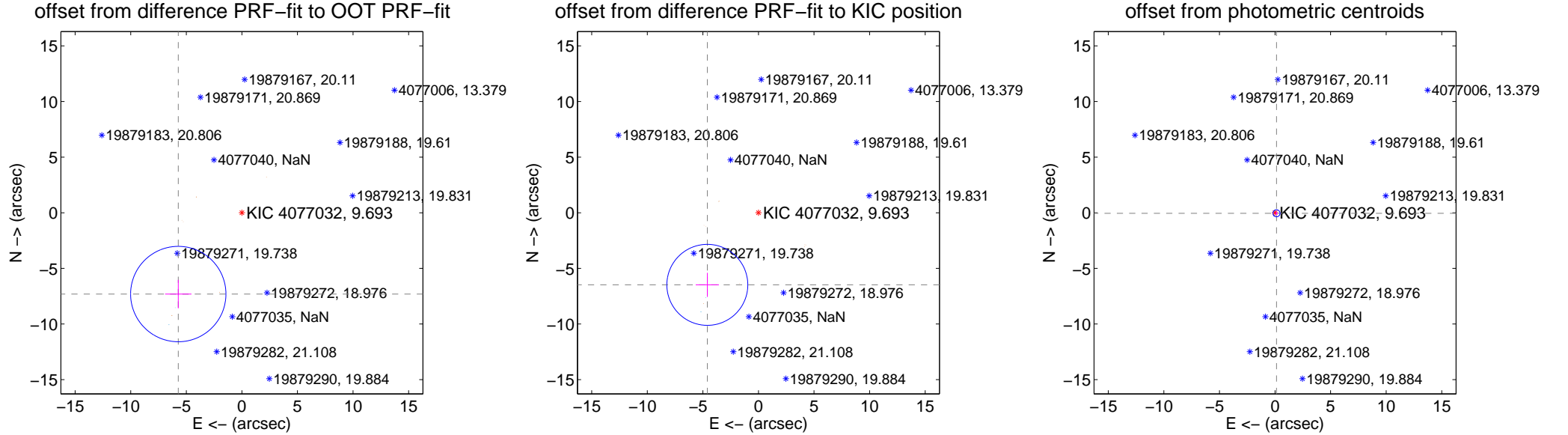
## DV Centroid Data

Supplemental centroid analysis for 004077032-02. **Kepler magnitude: 9.69.** Transit SNR 15.92

**There are 3 quarters with good PRF difference image offsets**

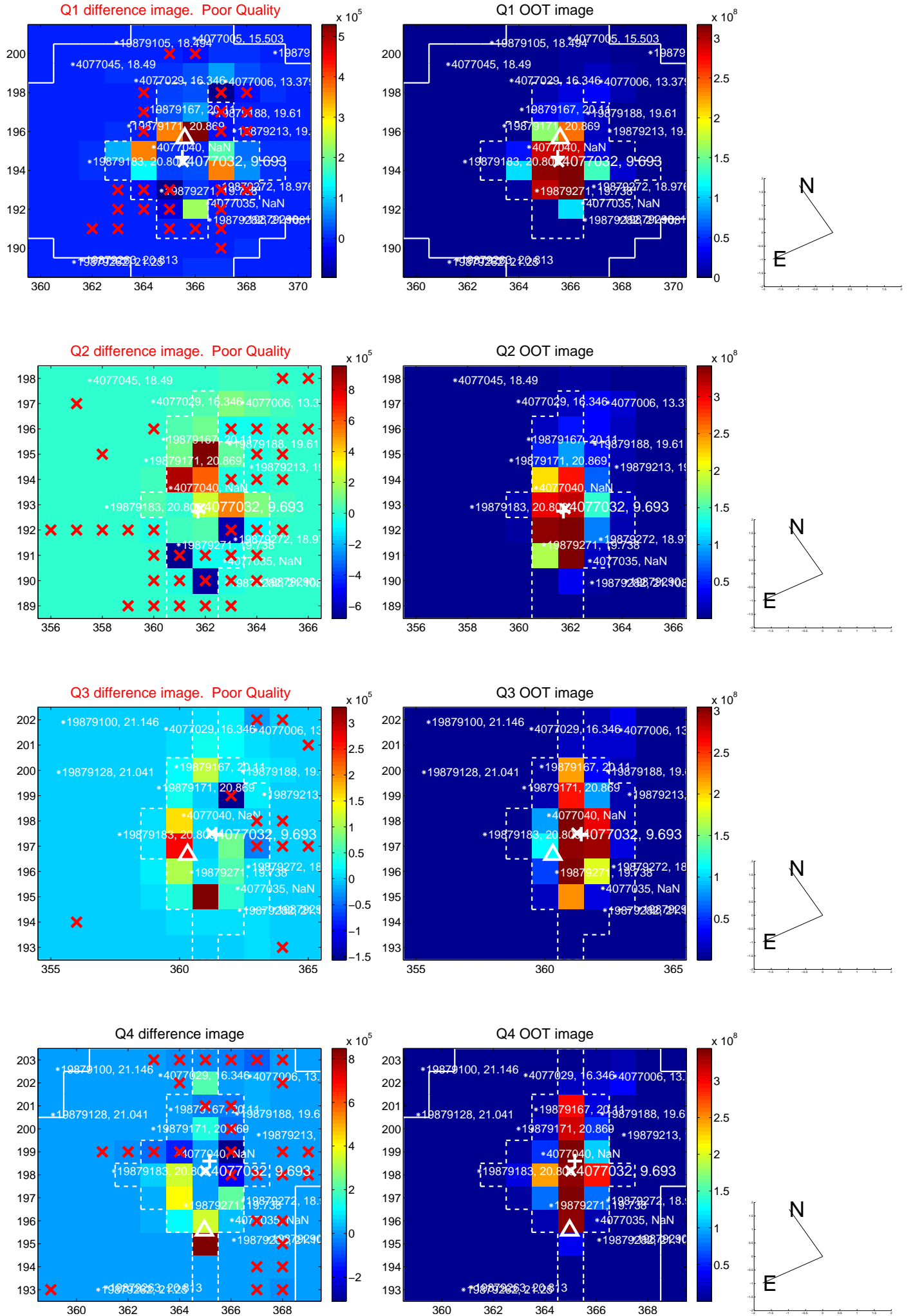
The direct PRF centroid is offset from the target star catalog position by about 0.82 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>9.284 \pm 1.430</math></b>	<b>6.49</b>	$5.724 \pm 1.185$	$-7.309 \pm 1.281$
PRF-fit source offset from KIC position	<b><math>7.948 \pm 1.214</math></b>	<b>6.55</b>	$4.600 \pm 1.046$	$-6.481 \pm 1.081$
photometric centroid source offset	$0.14 \pm 0.11$	1.33	$-0.13 \pm 0.10$	$-0.05 \pm 0.15$



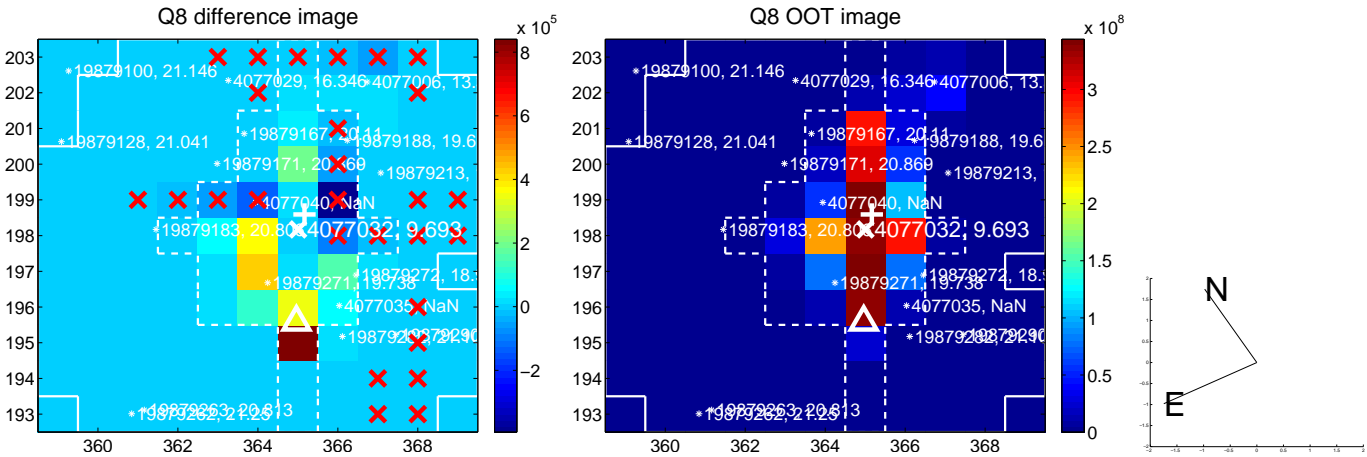
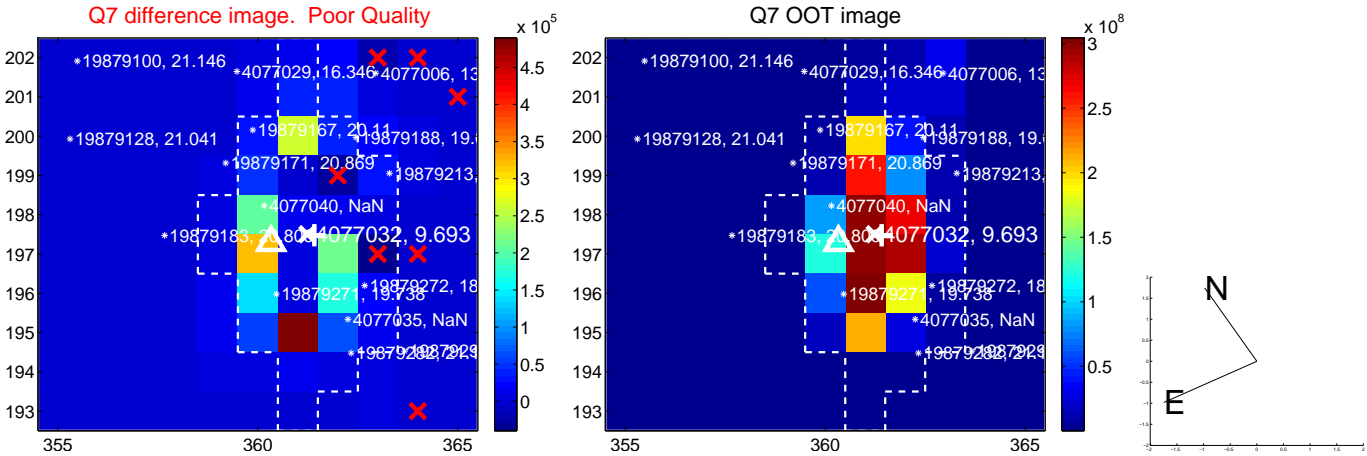
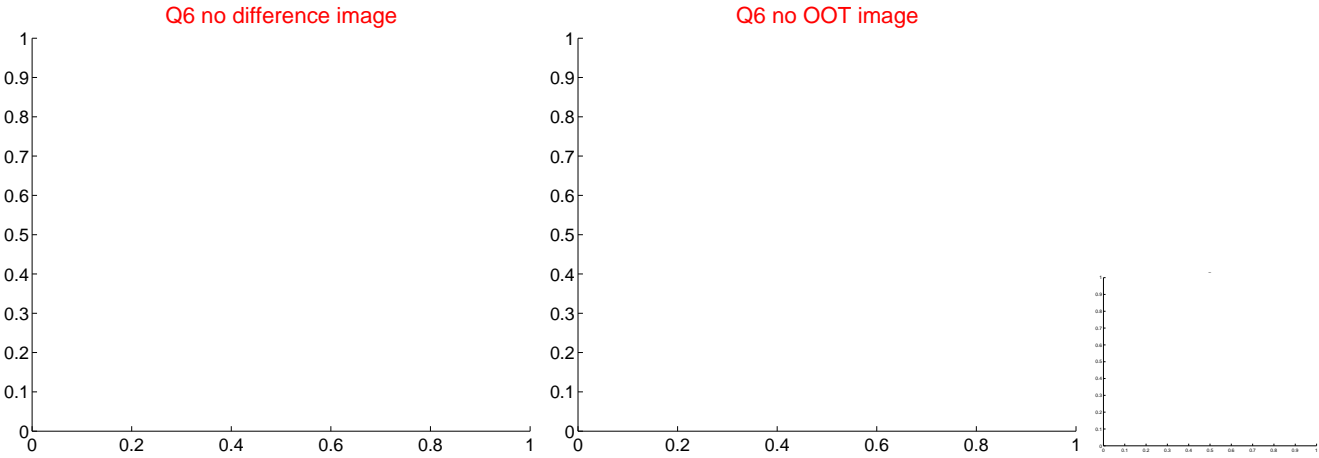
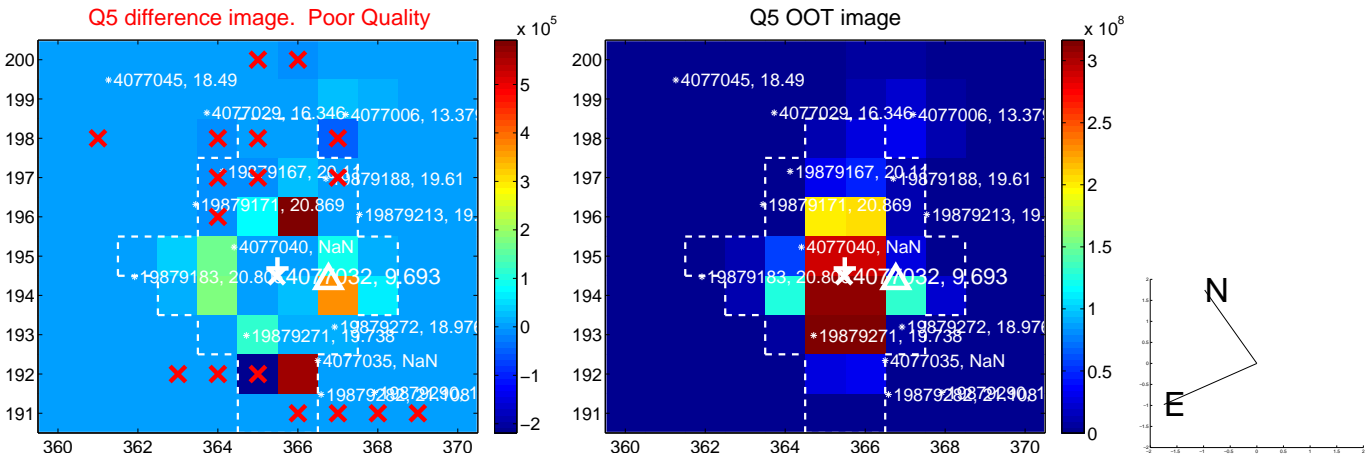
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

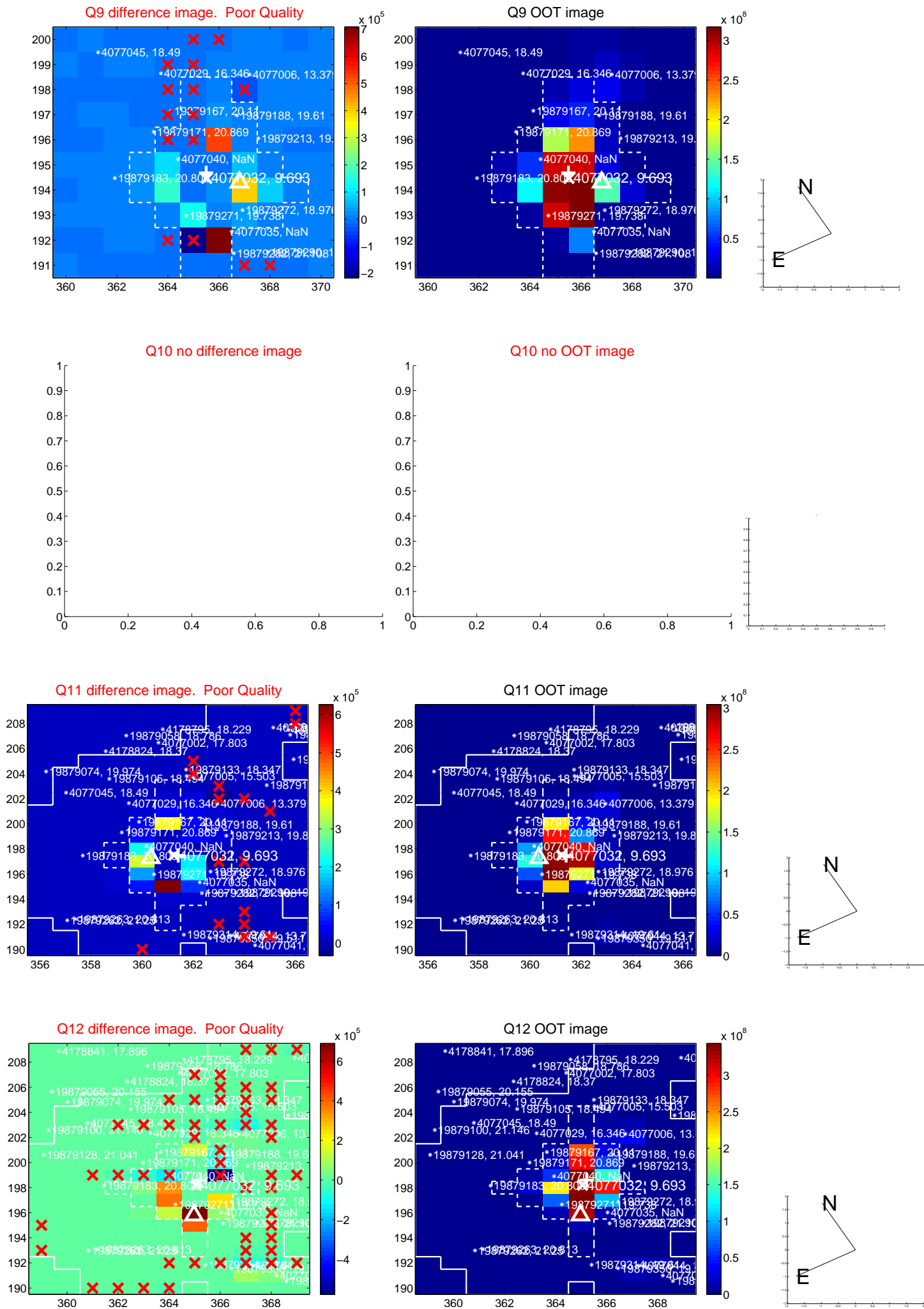




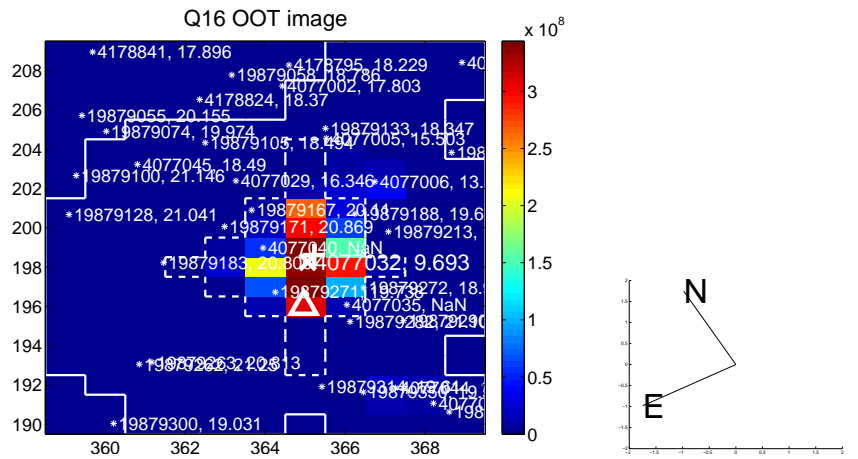
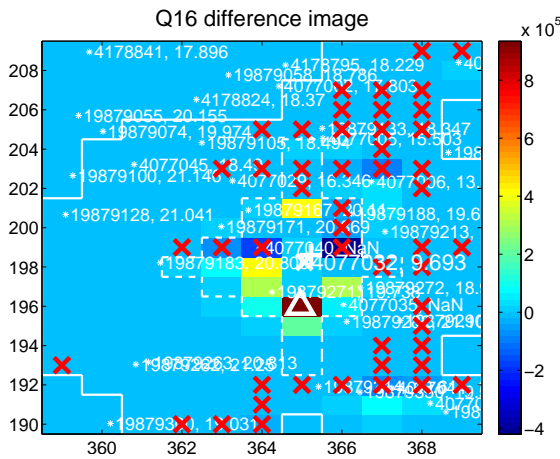
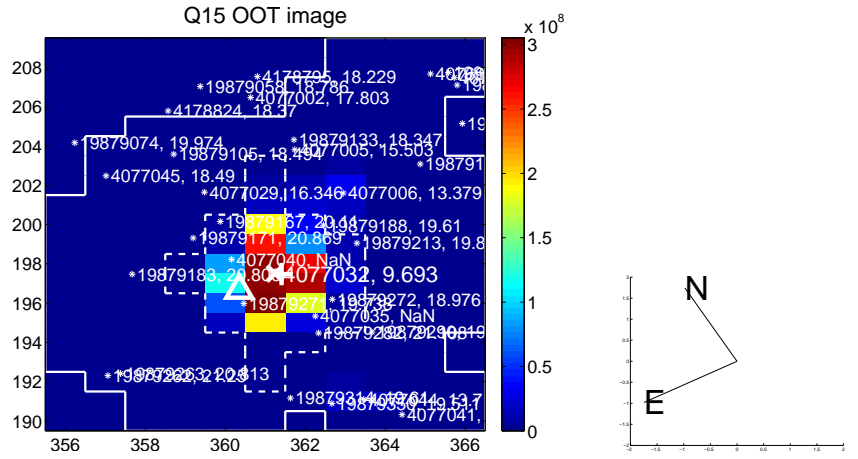
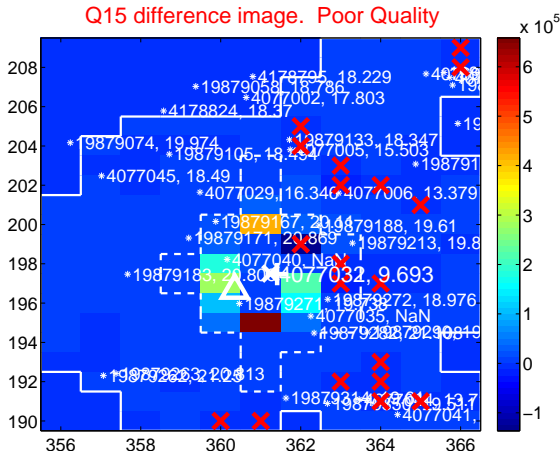
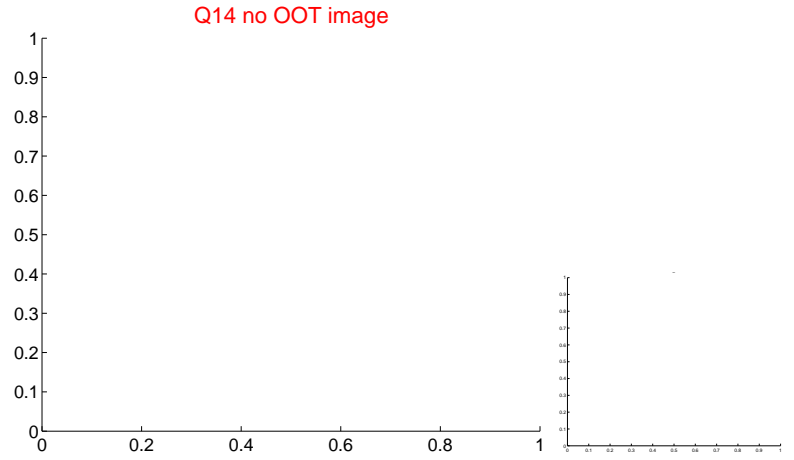
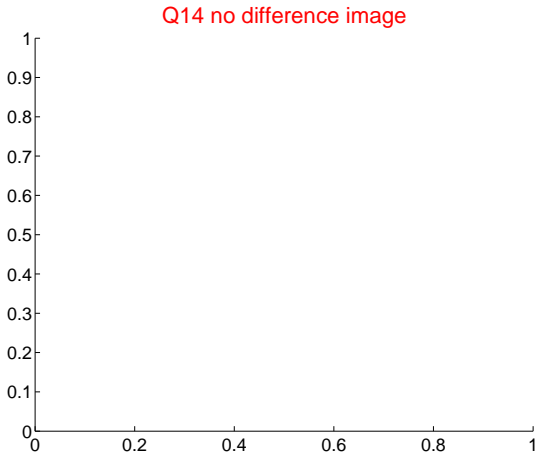
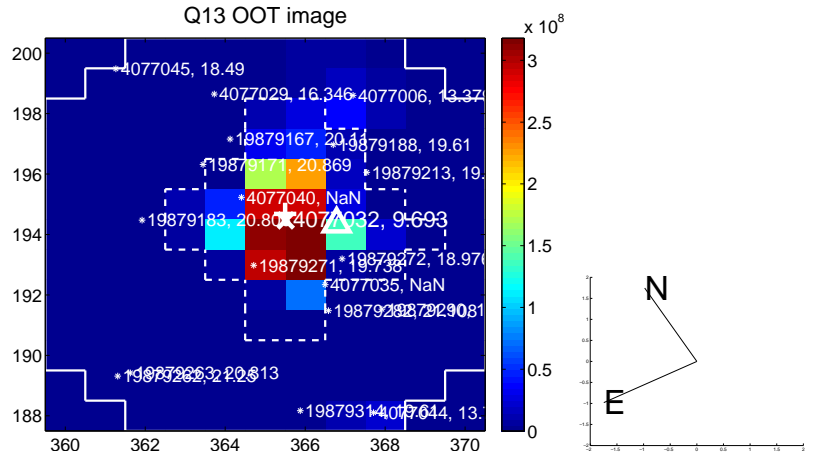
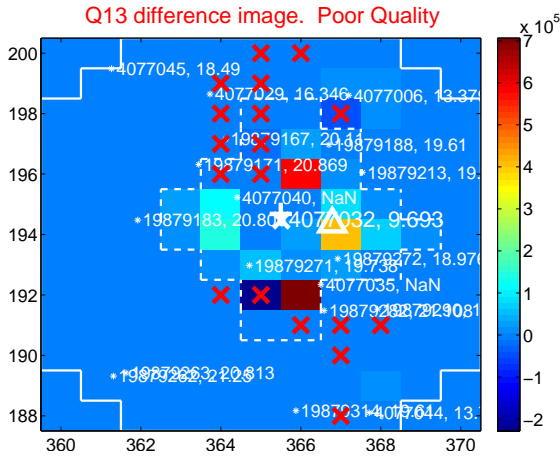
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.





UKIRT Image

Declination

