

# KIC 005282477

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005282477-01	OBS	No	0.992754	132.228789	60.0	1.644	9.4	7.9	1.10	6055	1.01	3542.39
005282477-02	OBS	4736.01	0.992761	131.724457	48.4	1.713	8.6	6.5	1.10	6055	0.91	3542.36

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005282477-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005282477-02	OBS	FP	0.00	1	0	1	1	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 005282477-01

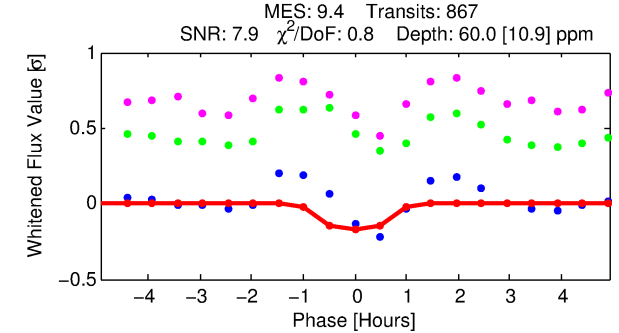
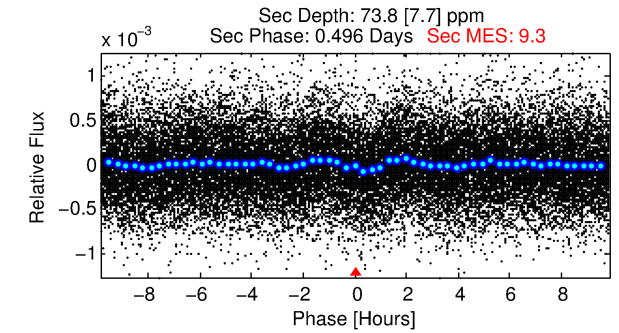
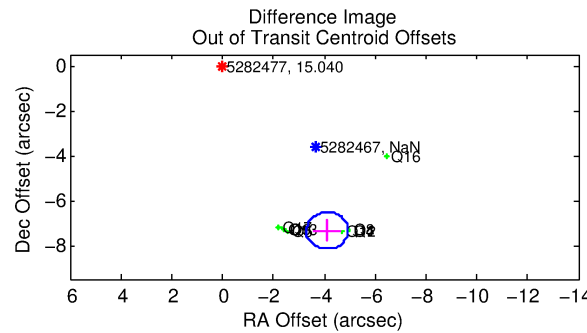
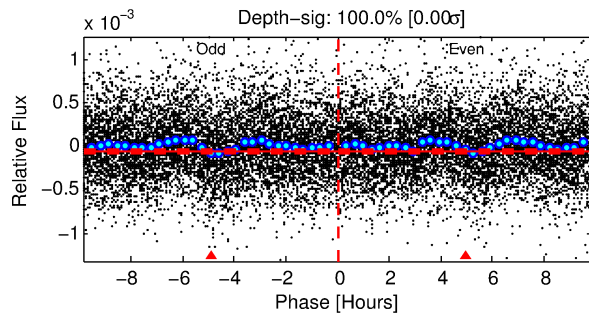
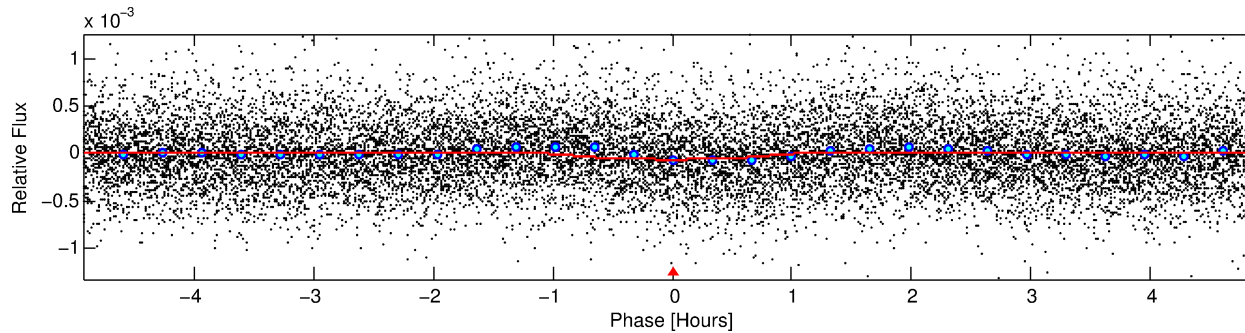
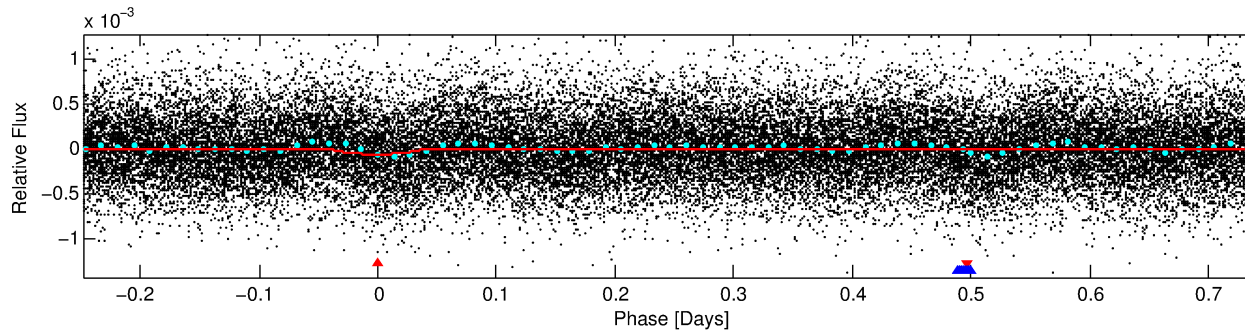
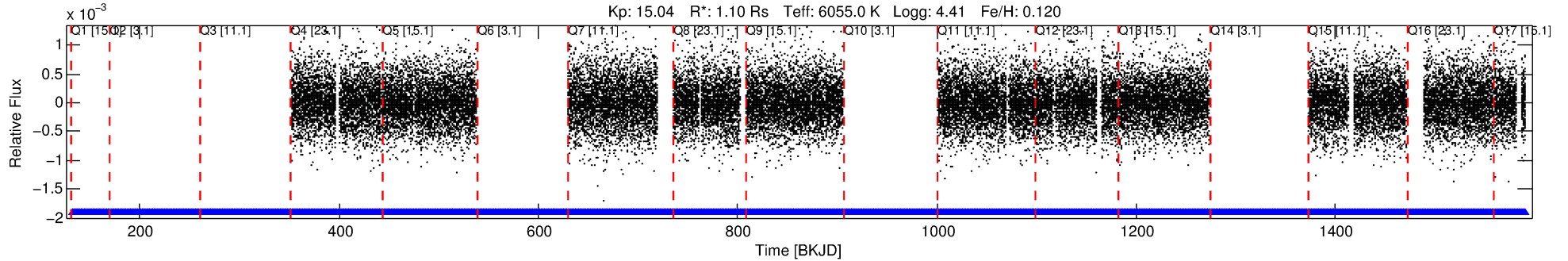
No Significant Match Found

# DV One-Page Summary

KIC: 5282477 Candidate: 1 of 2 Period: 0.993 d

KOI: K04736 Corr: No Ephemeris Match

Kp: 15.04 R\*: 1.10 Rs Teff: 6055.0 K Logg: 4.41 Fe/H: 0.120



## DV Fit Results:

Period = 0.99275 [0.00001] d  
Epoch = 132.2288 [0.0032] BKJD  
Rp/R\* = 0.0084 [0.0072]  
a/R\* = 2.29 [8.04]  
b = 0.90 [0.92]  
Seff = 3542.39 [1501.28]  
Teq = 1967 [208] K  
Rp = 1.01 [0.92] Re  
a = 0.0202 [0.0055] AU  
Ag = 16.36 [28.81] [0.53σ]  
Teffp = 6117 [2634] K [1.57σ]

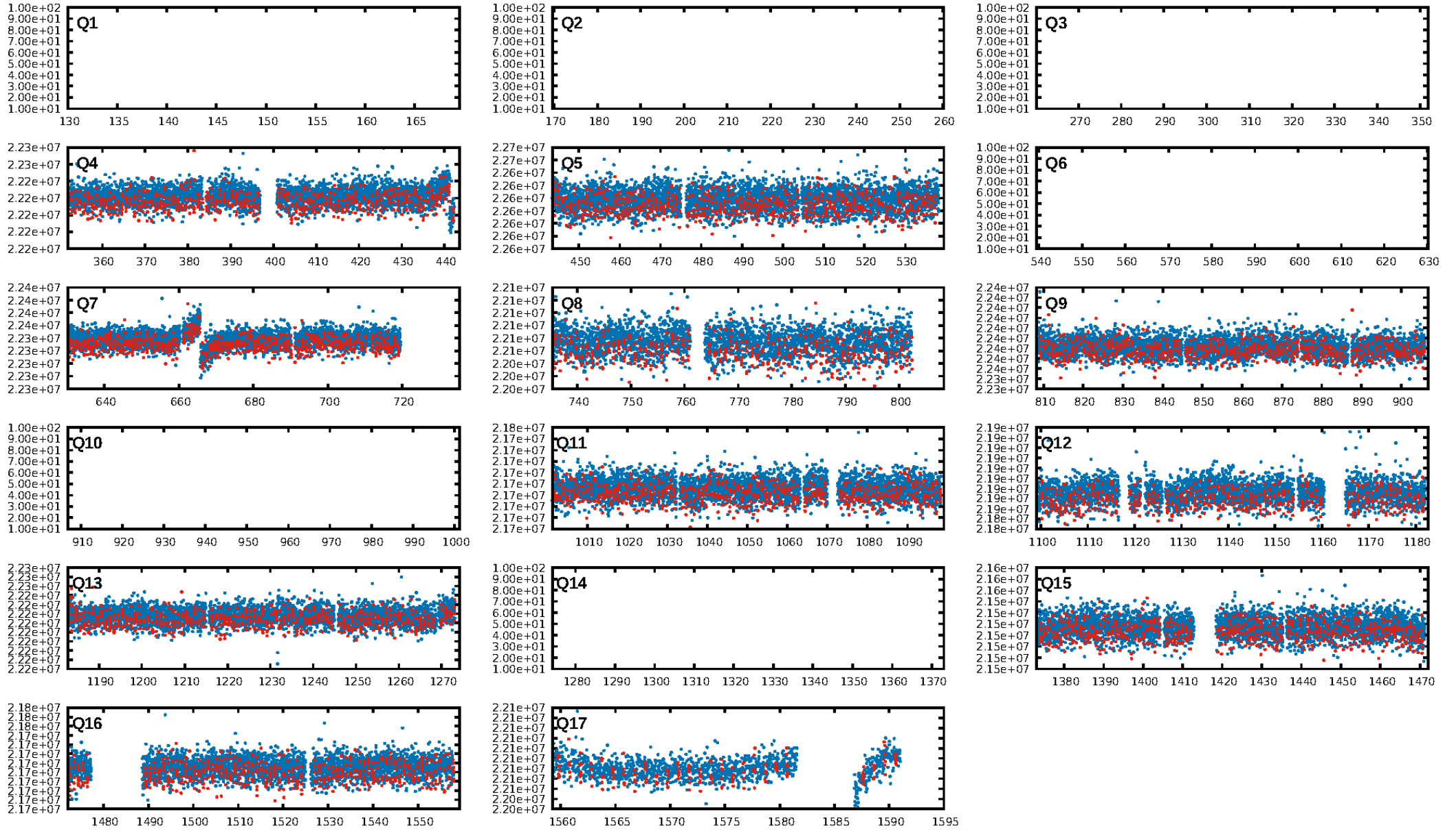
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.58e-22  
RollingBand-fgt: 1.00 [841/841]  
GhostDiagnostic-chr: -0.6473  
Centroid-sig: N/A  
Centroid-so: 3.900 arcsec [2.29σ]  
OotOffset-rm: 8.417 arcsec [31.03σ]  
KicOffset-rm: 8.570 arcsec [32.01σ]  
OotOffset-st: 0/0/4/4 [8]  
KicOffset-st: 0/0/4/4 [8]  
DiffImageQuality-fgm: 0.38 [3/8]  
DiffImageOverlap-fno: 1.00 [11/11]

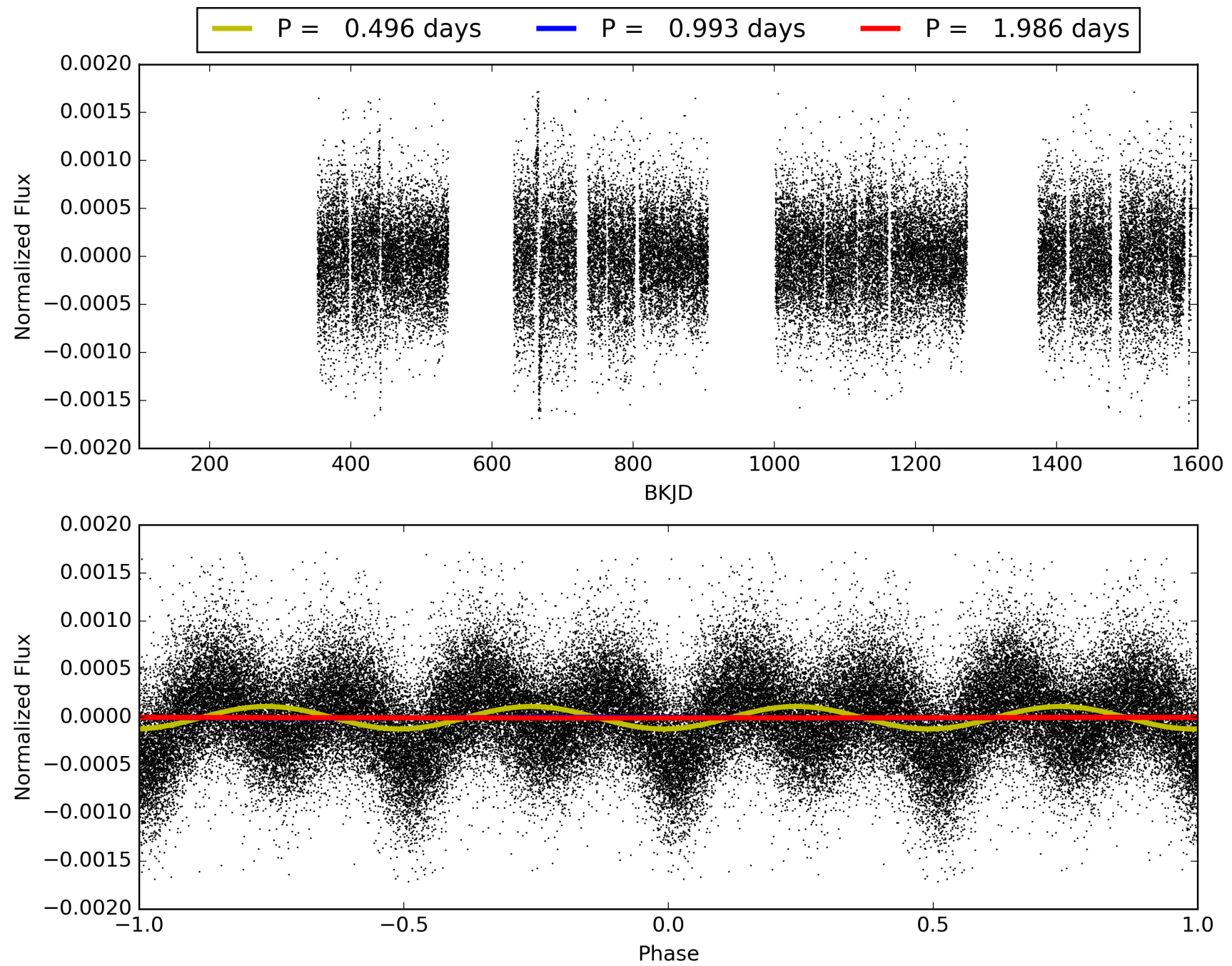
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 12:33:15 Z

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

# TCE 005282477-01, PDC Light Curves



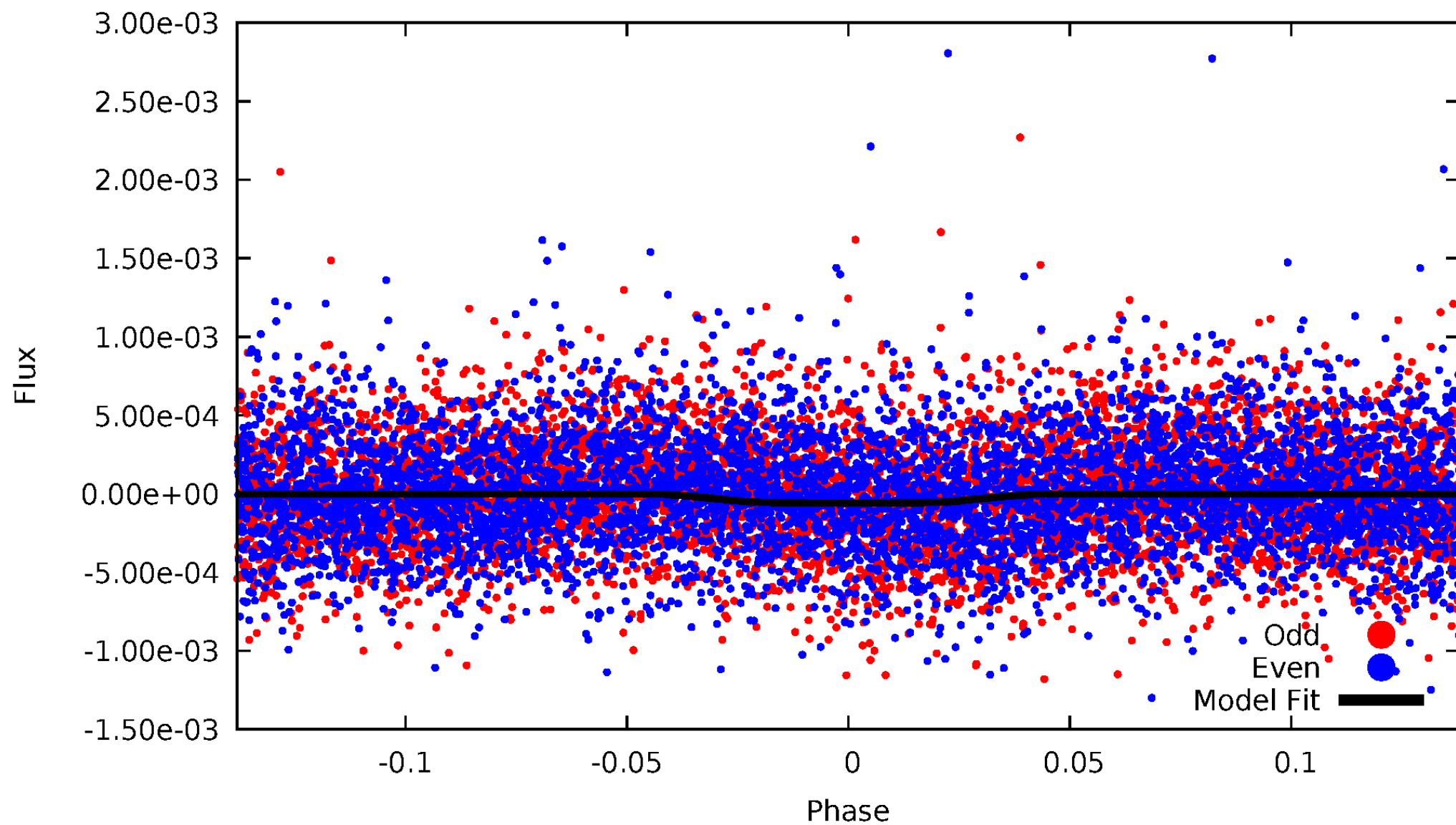
# TCE 005282477-01





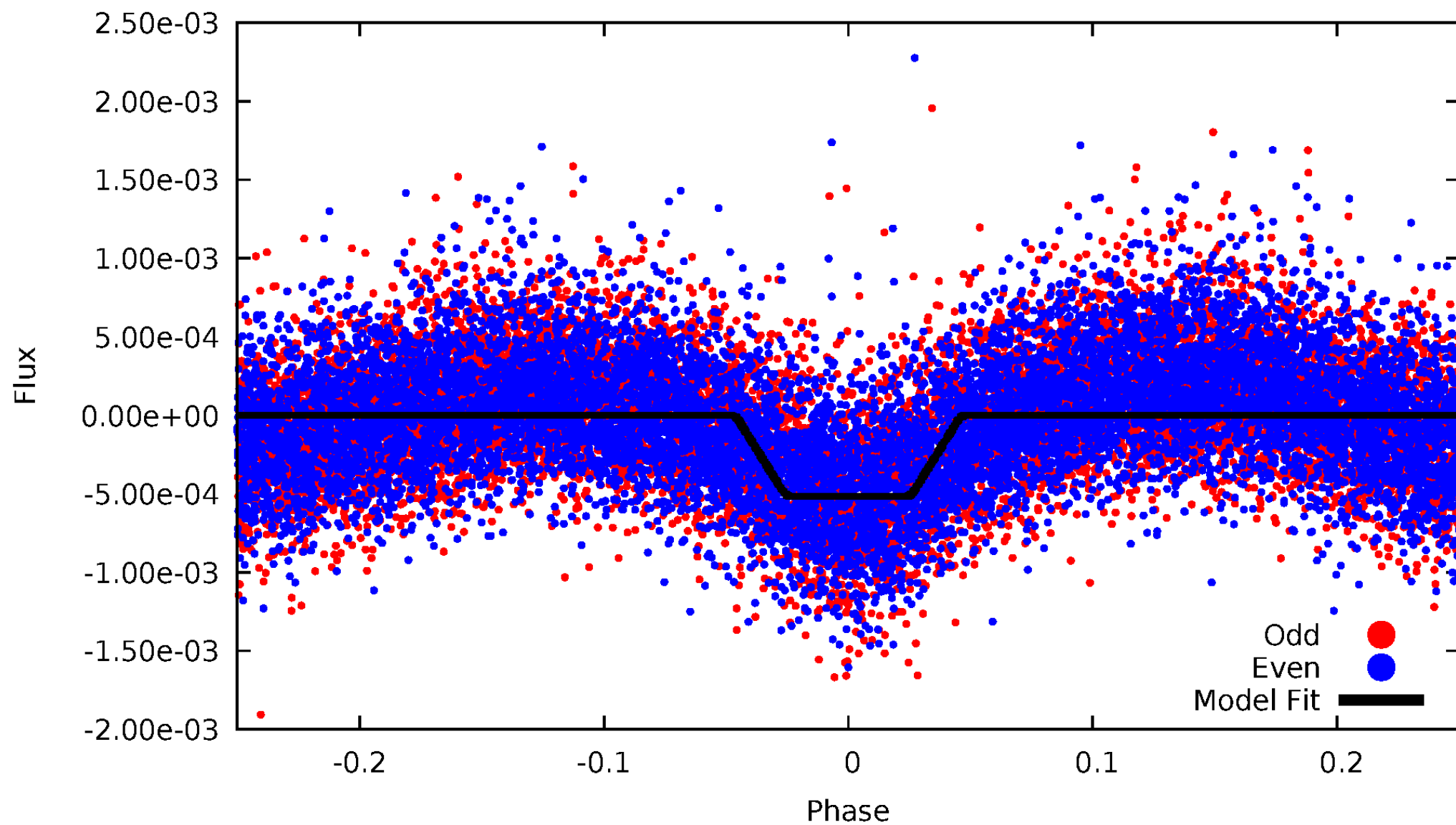
# DV Odd/Even

TCE 005282477-01



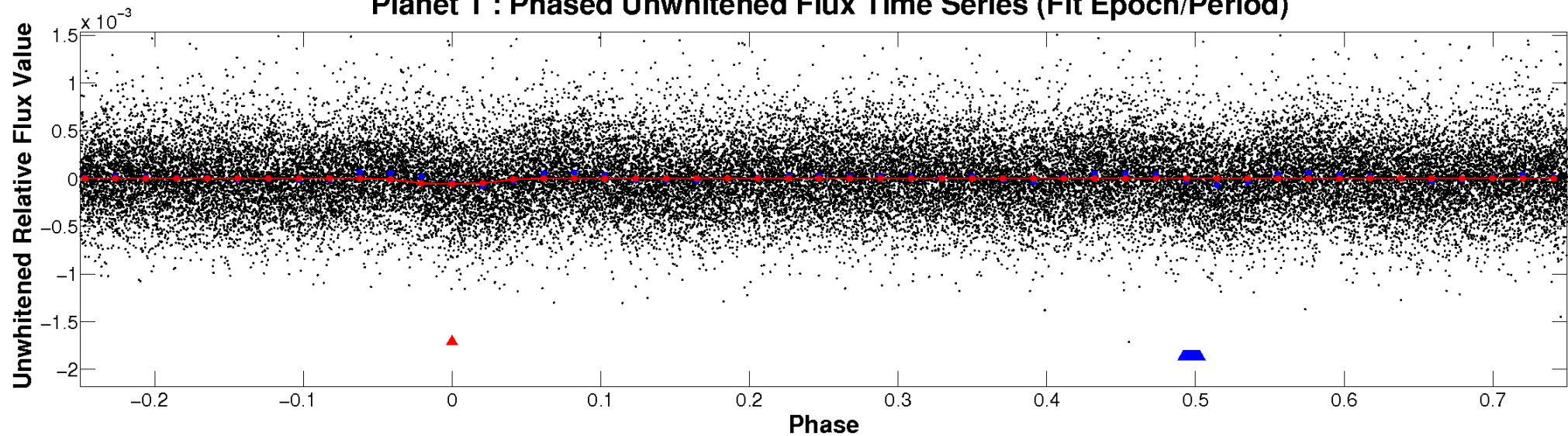
# ALT Odd/Even

TCE 005282477-01

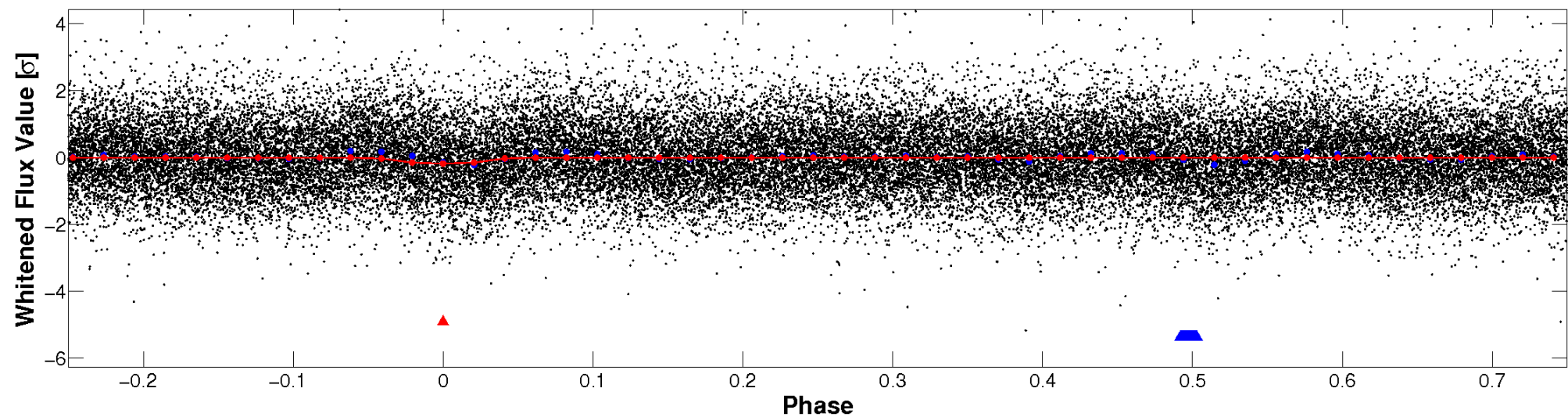


# Non-Whitened Vs. Whitened Light Curve

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

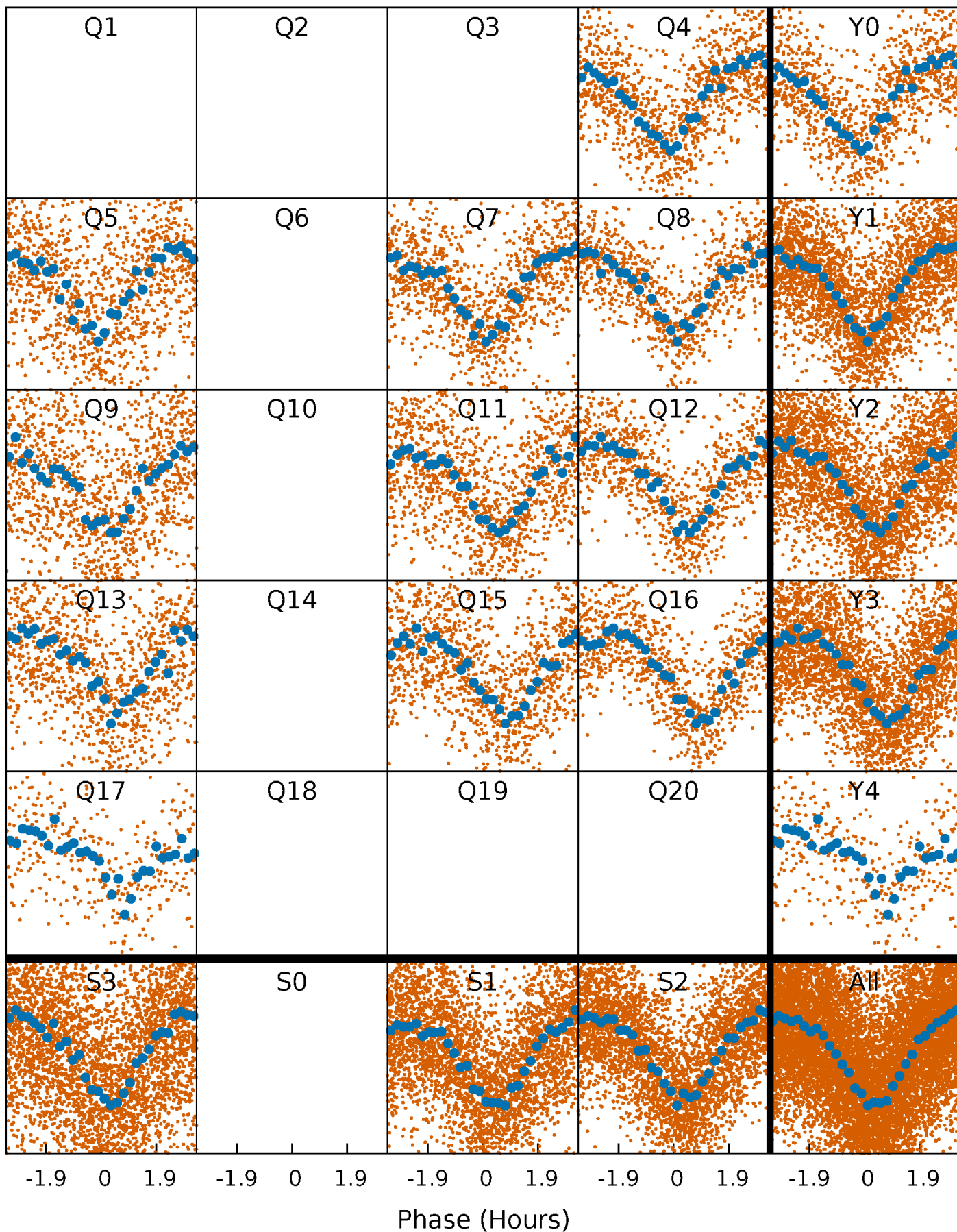


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

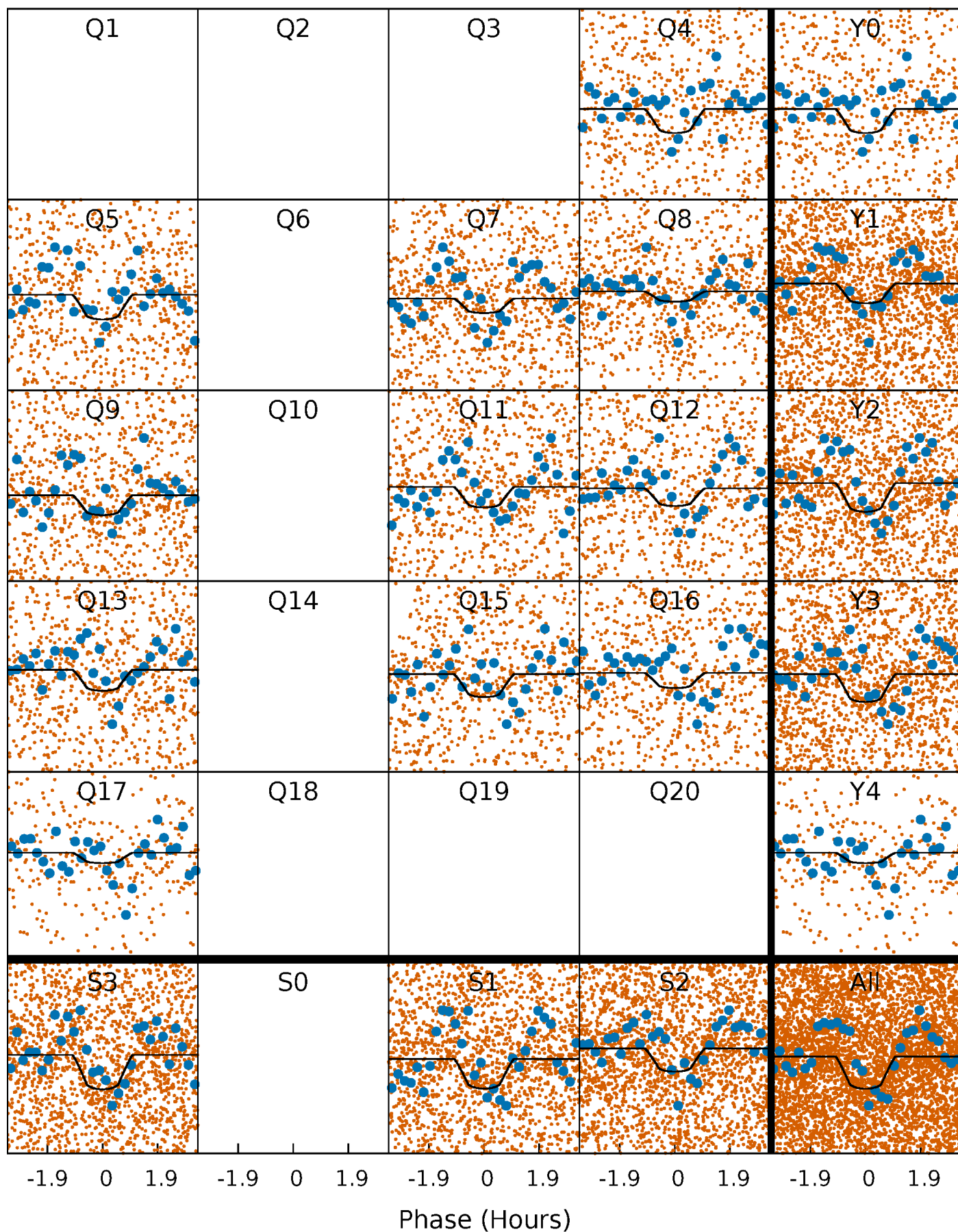
TCE 005282477-01   P= 0.992754 Days    $T_0=132.228789$  (BKJD)





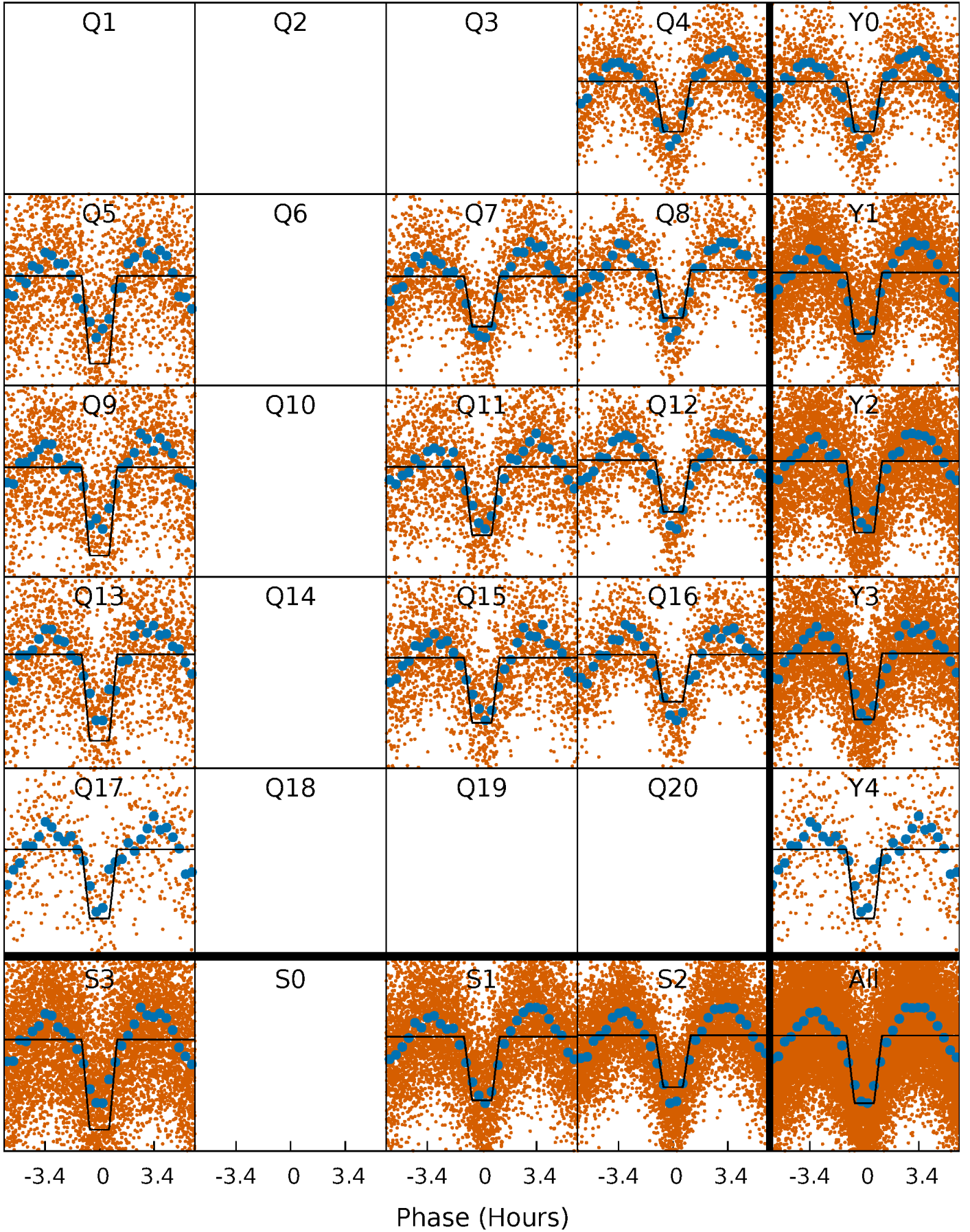
# DV Quarter-Phased Transit Curves

TCE 005282477-01   P= 0.992754 Days    $T_0=132.228789$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

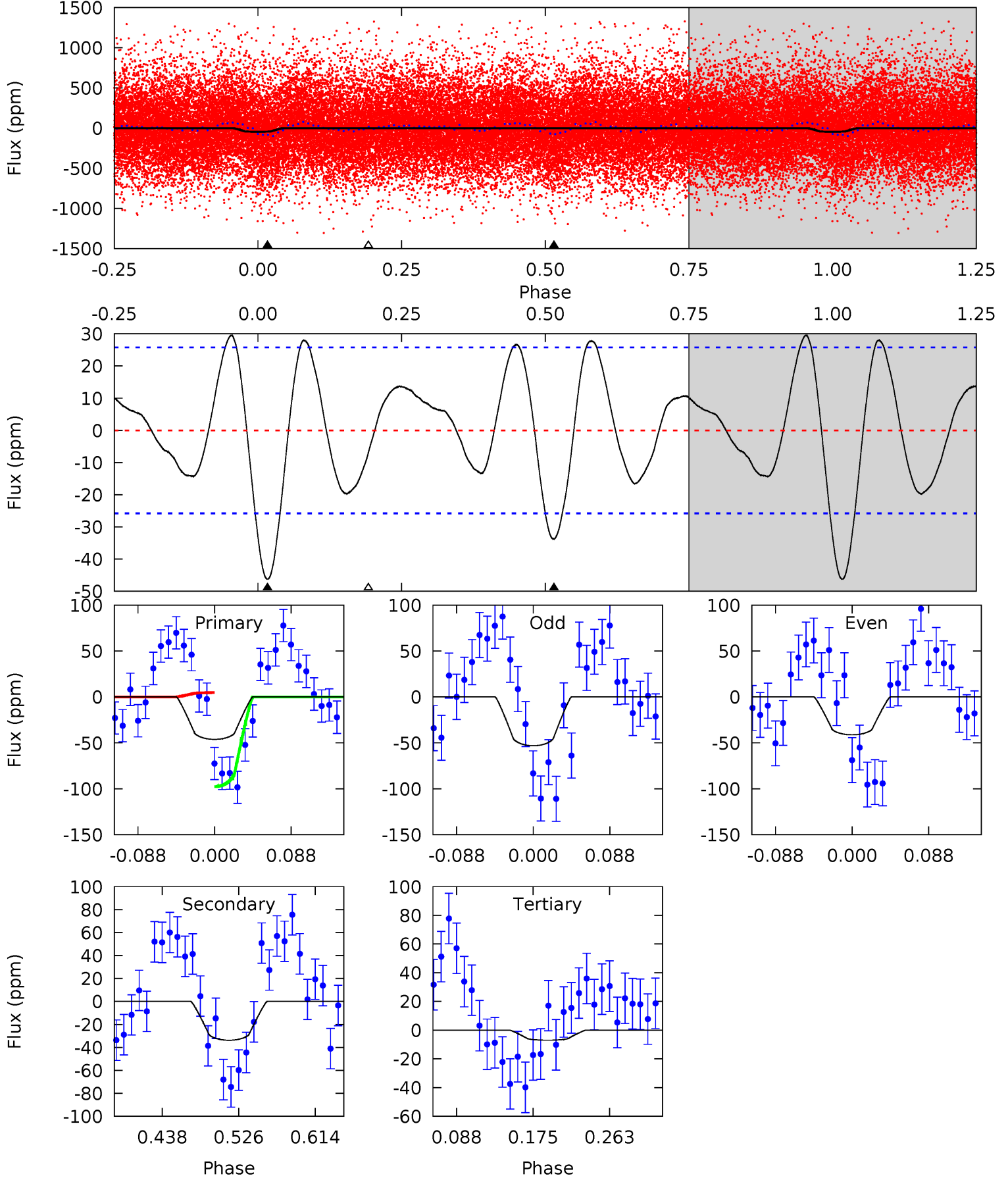
TCE 005282477-01 P= 0.992786 Days  $T_0=132.216020$  (BKJD)



# DV Model-Shift Uniqueness Test

005282477-01, P = 0.992754 Days, E = 132.228789 Days

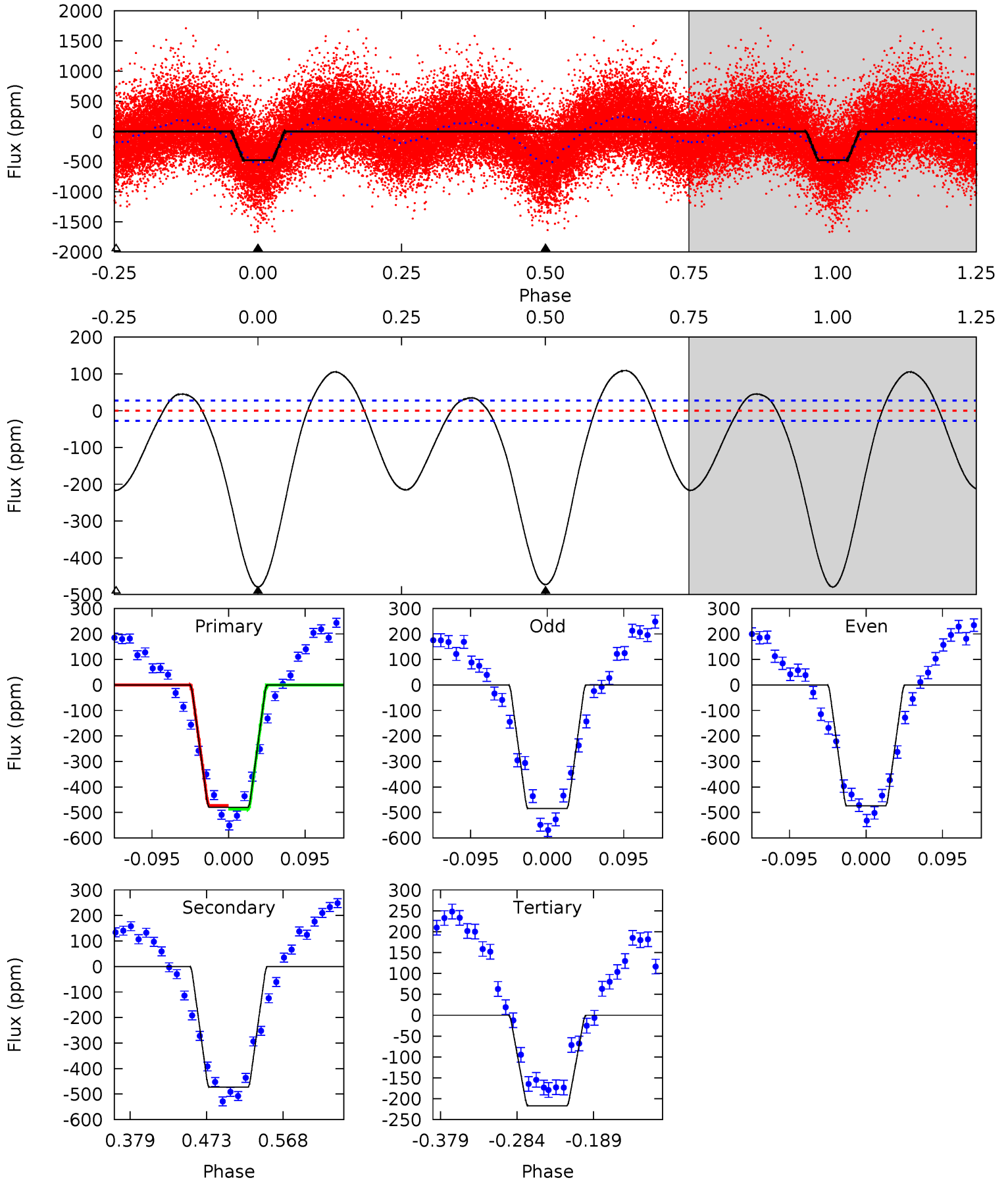
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.23	6.02	1.24	0	4.59	1.71	1.78	6.99	8.23	4.77	6.02	1.06	0.75	0.39	8.28



# Alt Model-Shift Uniqueness Test

005282477-01, P = 0.992786 Days, E = 132.216020 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
79.9	78.8	36.1	0	4.58	1.67	17.6	43.7	79.9	42.6	78.8	0.85	1.00	0.19	1.24





### Stellar Parameters For KIC 005282477

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6055^{+190}_{-232}$	$4.407^{+0.072}_{-0.217}$	$0.120^{+0.200}_{-0.300}$	$1.098^{+0.350}_{-0.150}$	$1.126^{+0.151}_{-0.166}$	$1.197^{+0.447}_{-0.619}$
	+3%/-4%	+2%/-5%	+167%/-250%	+32%/-14%	+13%/-15%	+37%/-52%
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 005282477-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-34 \pm 6$	$1.16^{+0.89}_{-0.68}$	$2809^{+204}_{-167}$	$4794^{+2719}_{-975}$	$5.449^{+26.772}_{-3.725}$
Alt.	$-473 \pm 6$	$2.88^{+0.94}_{-0.94}$	$2807^{+212}_{-157}$	$5834^{+1295}_{-674}$	$13^{+14}_{-5}$

$T_{\text{max}}$  = 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

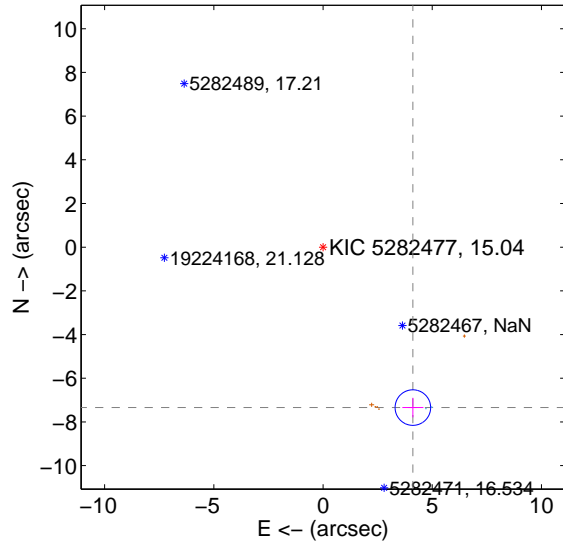
Supplemental centroid analysis for 005282477-01. Kepler magnitude: 15.04. Transit SNR 7.88

There are 3 quarters with good PRF difference image offsets

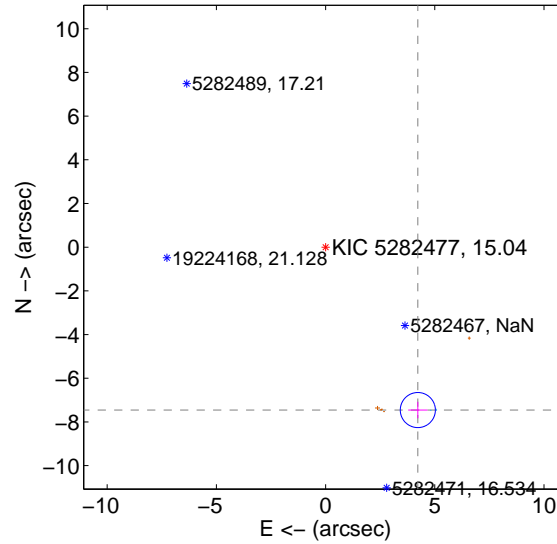
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$8.417 \pm 0.271$	31.03	$-4.112 \pm 0.482$	$-7.344 \pm 0.448$
PRF-fit source offset from KIC position	$8.570 \pm 0.268$	32.01	$-4.223 \pm 0.441$	$-7.457 \pm 0.377$
photometric centroid source offset	$3.90 \pm 1.70$	2.29	$-2.64 \pm 1.68$	$-2.87 \pm 1.71$

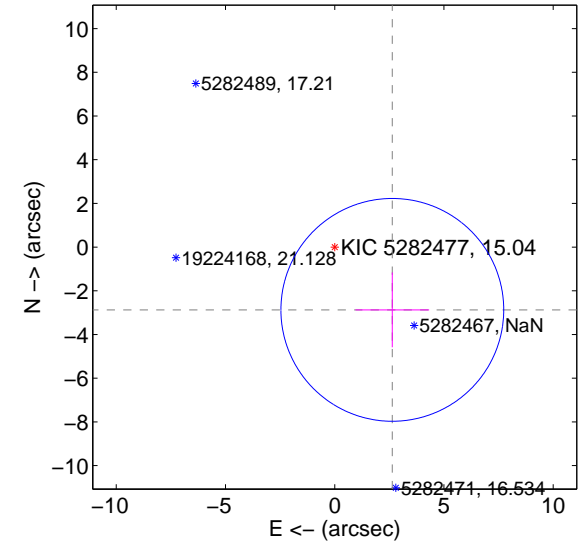
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

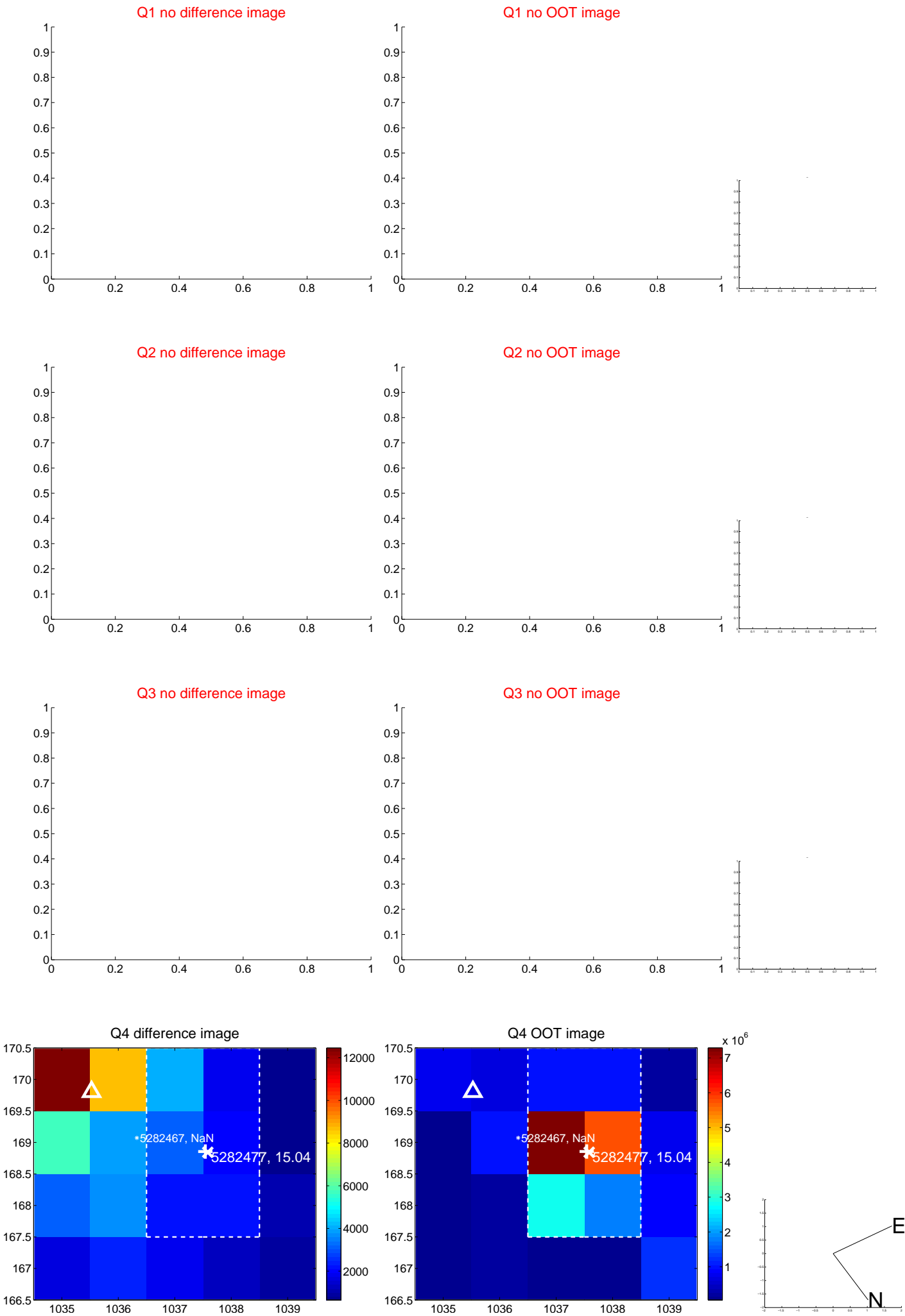


offset from photometric centroids

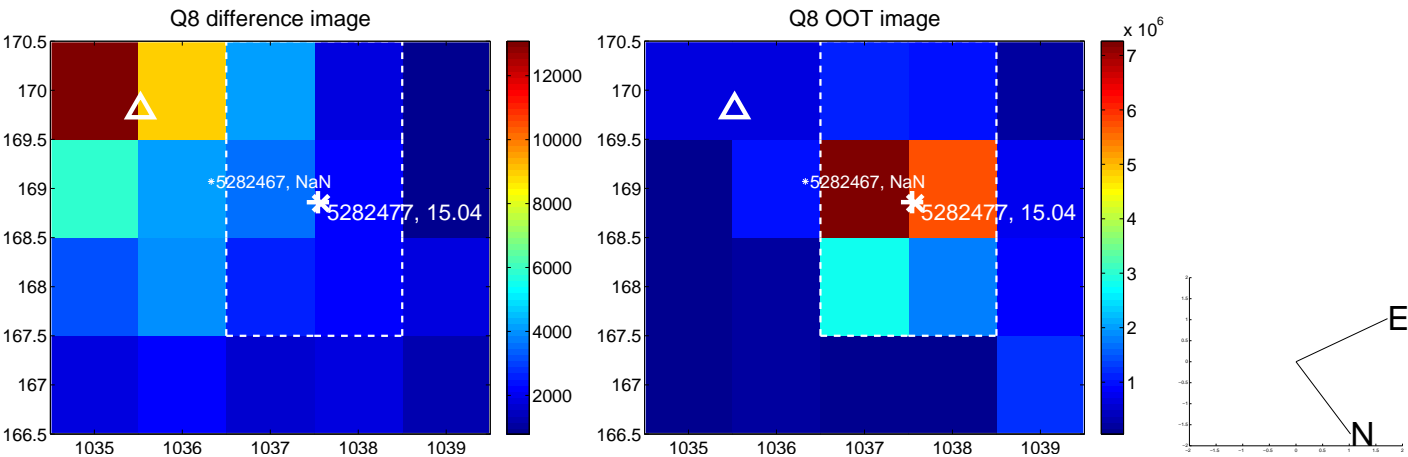
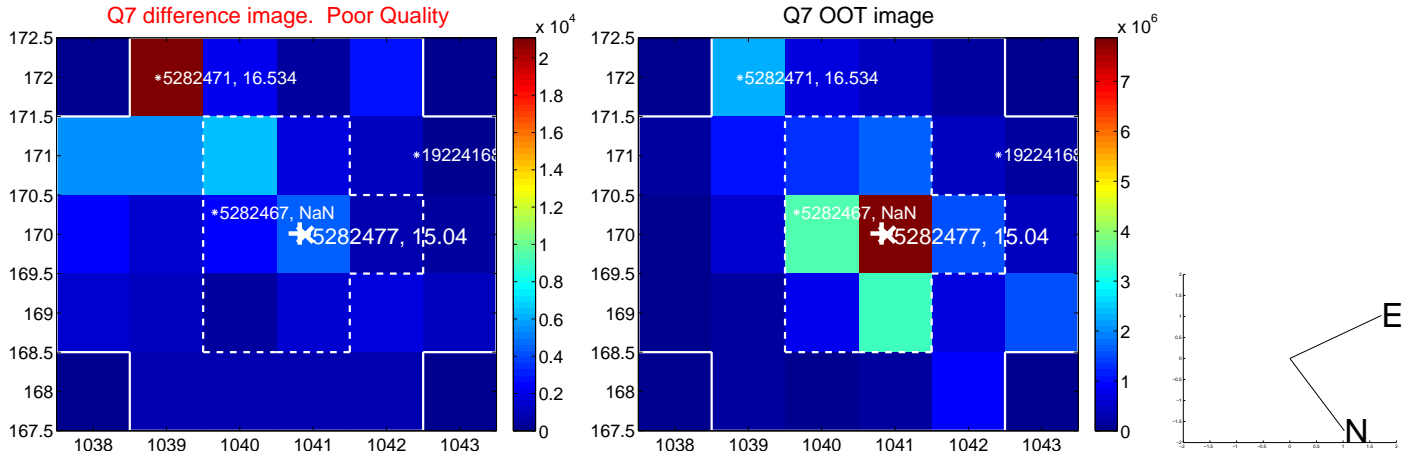
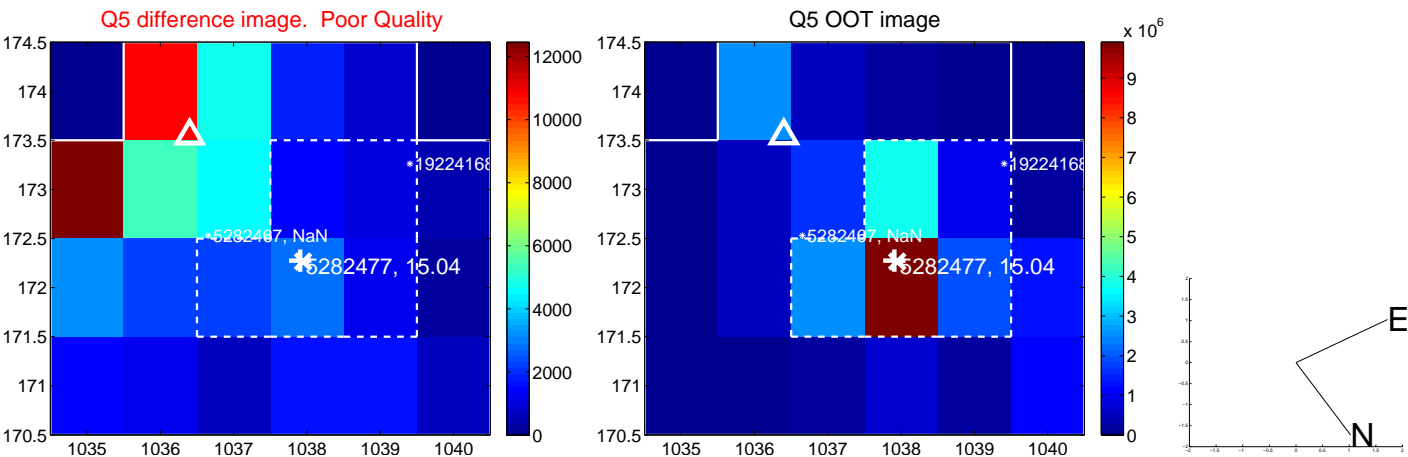


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

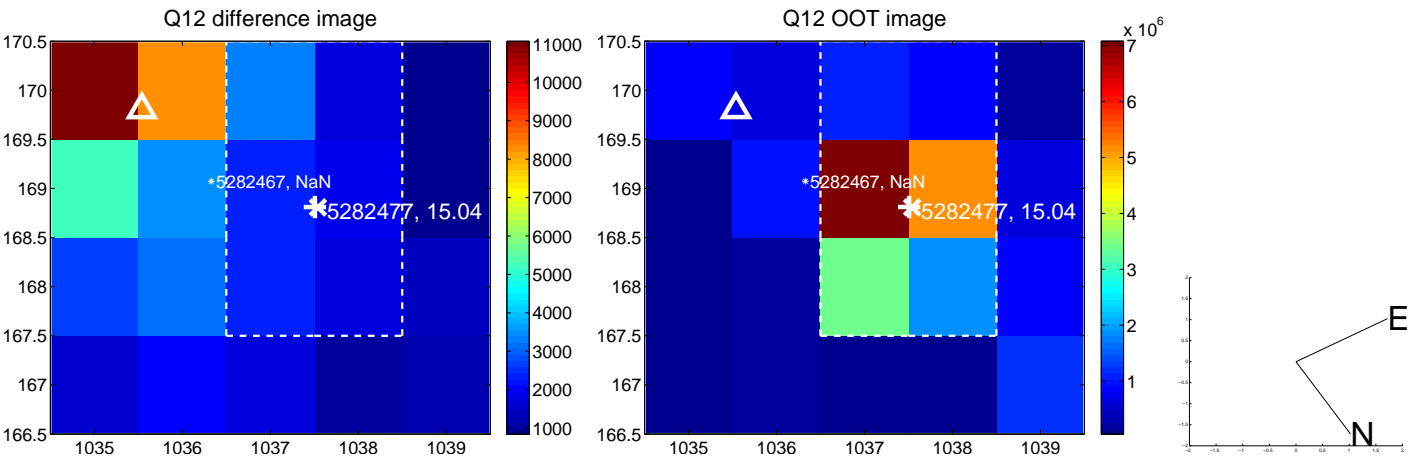
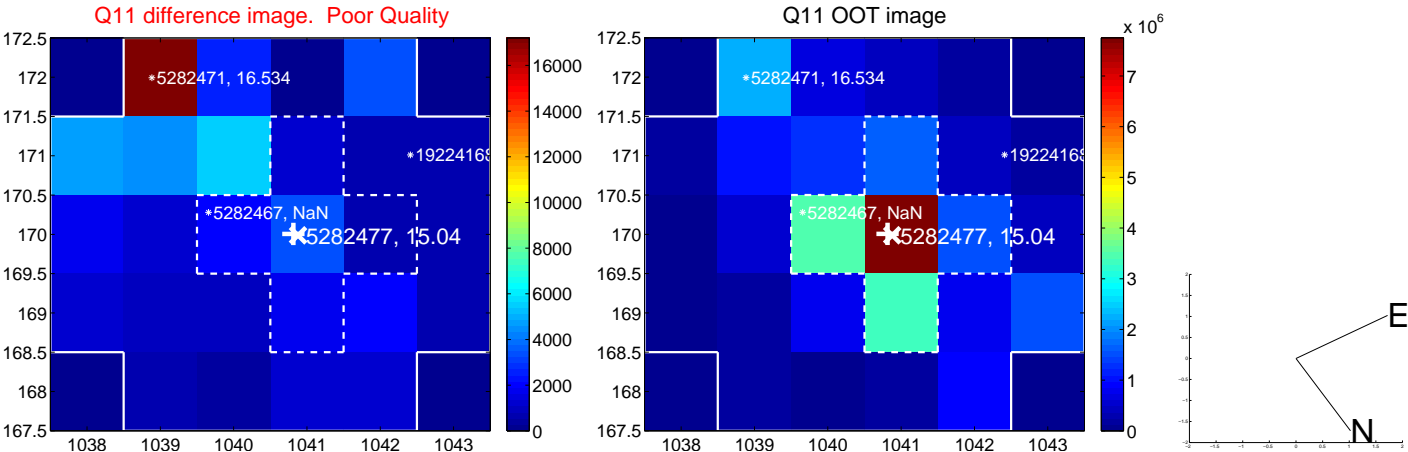
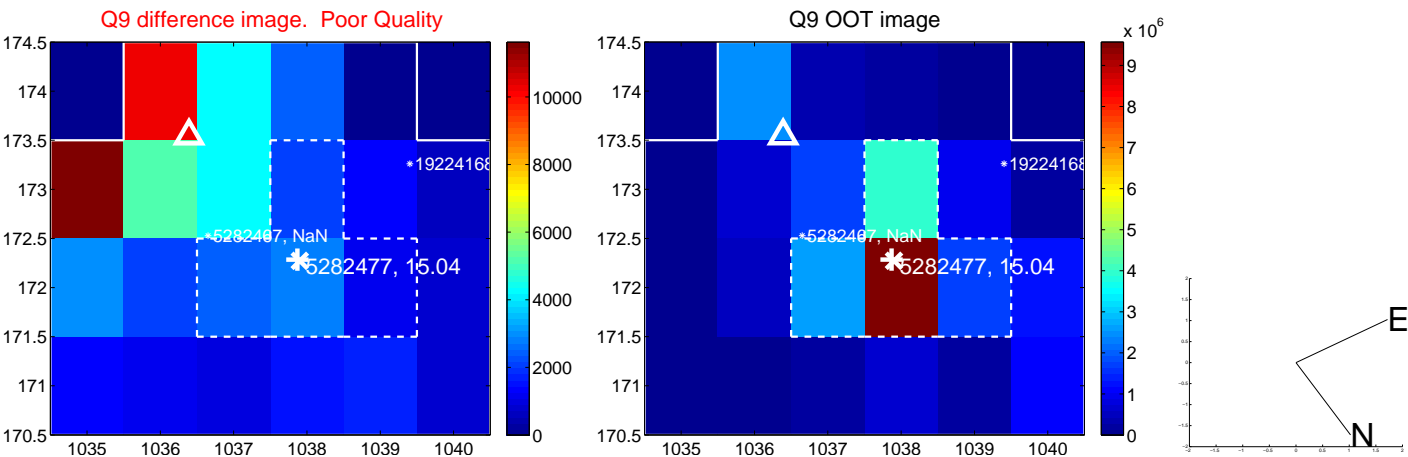


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

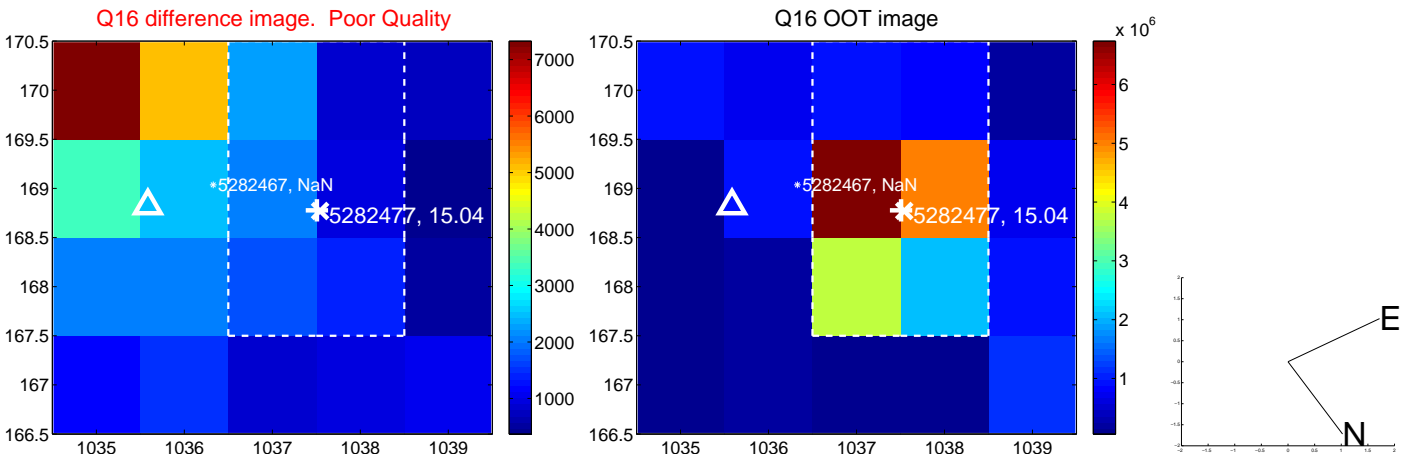
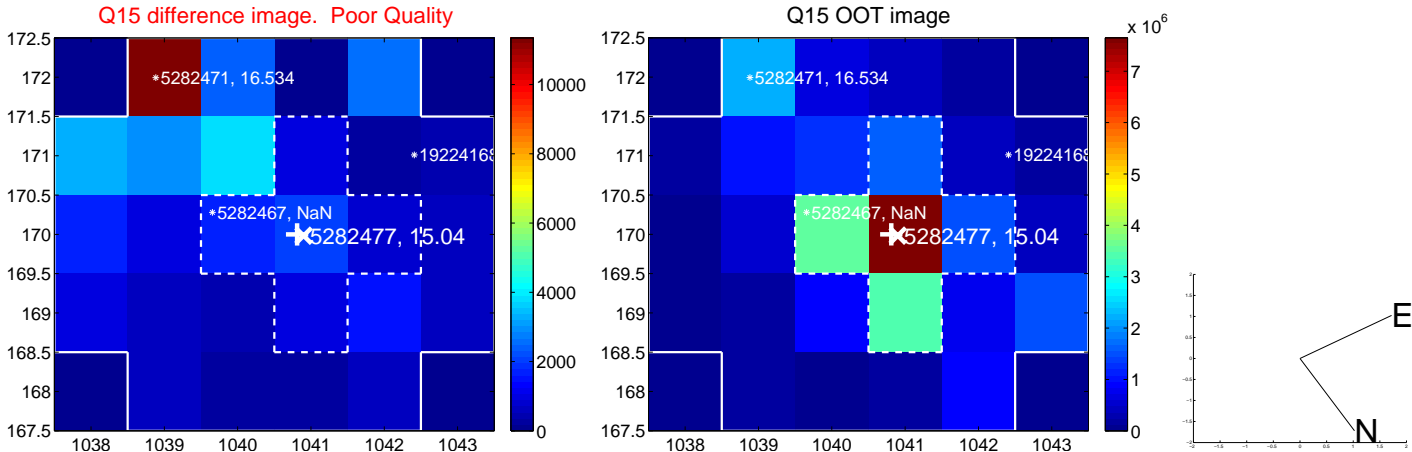
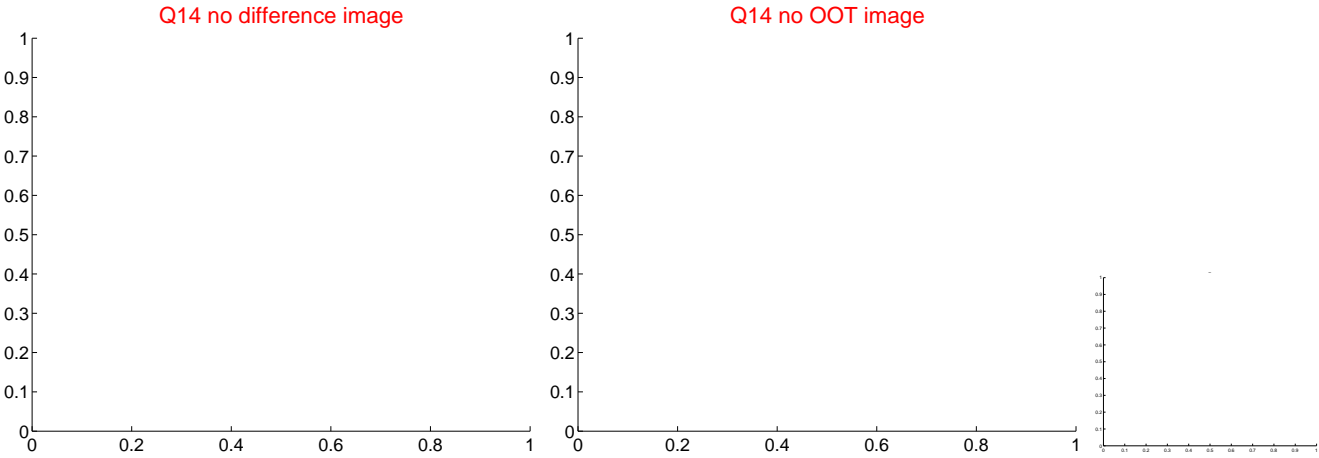
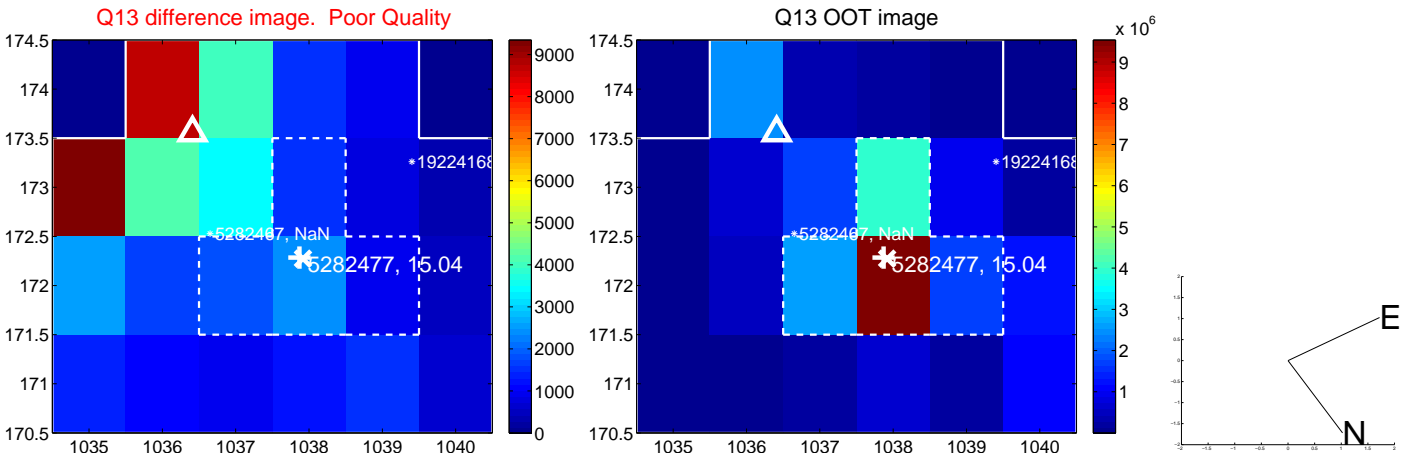




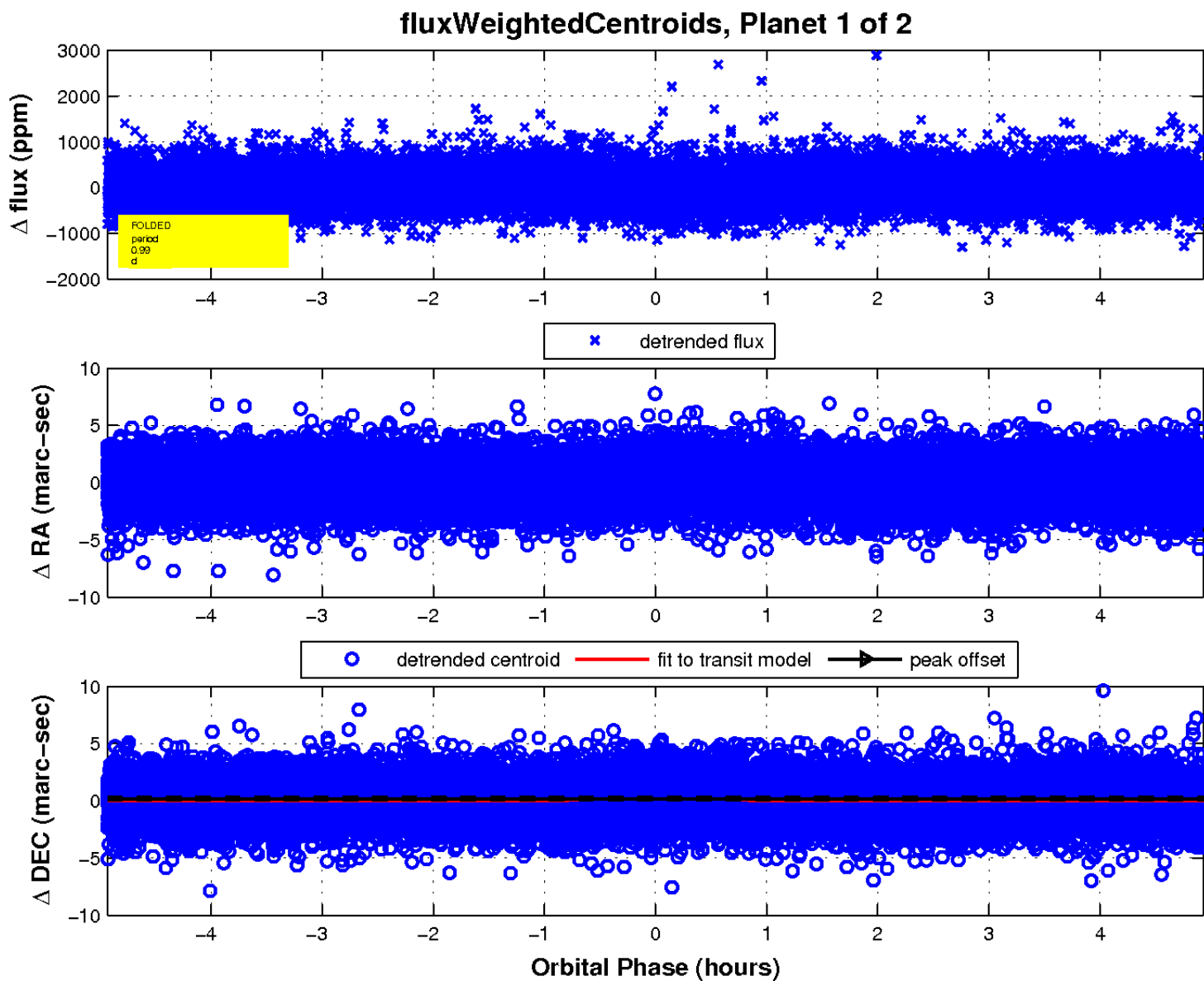
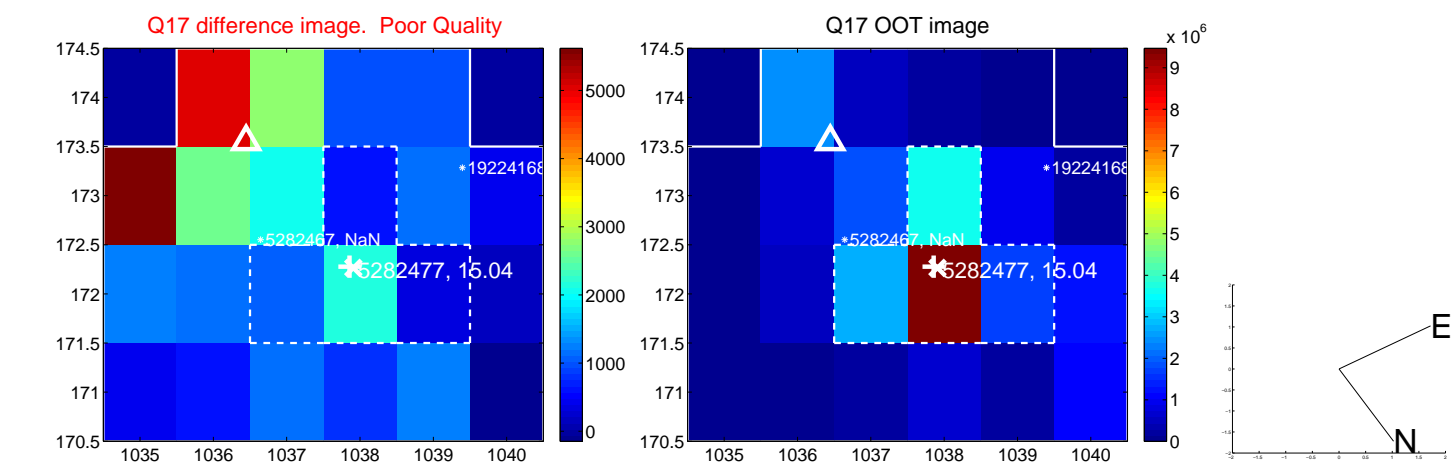
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



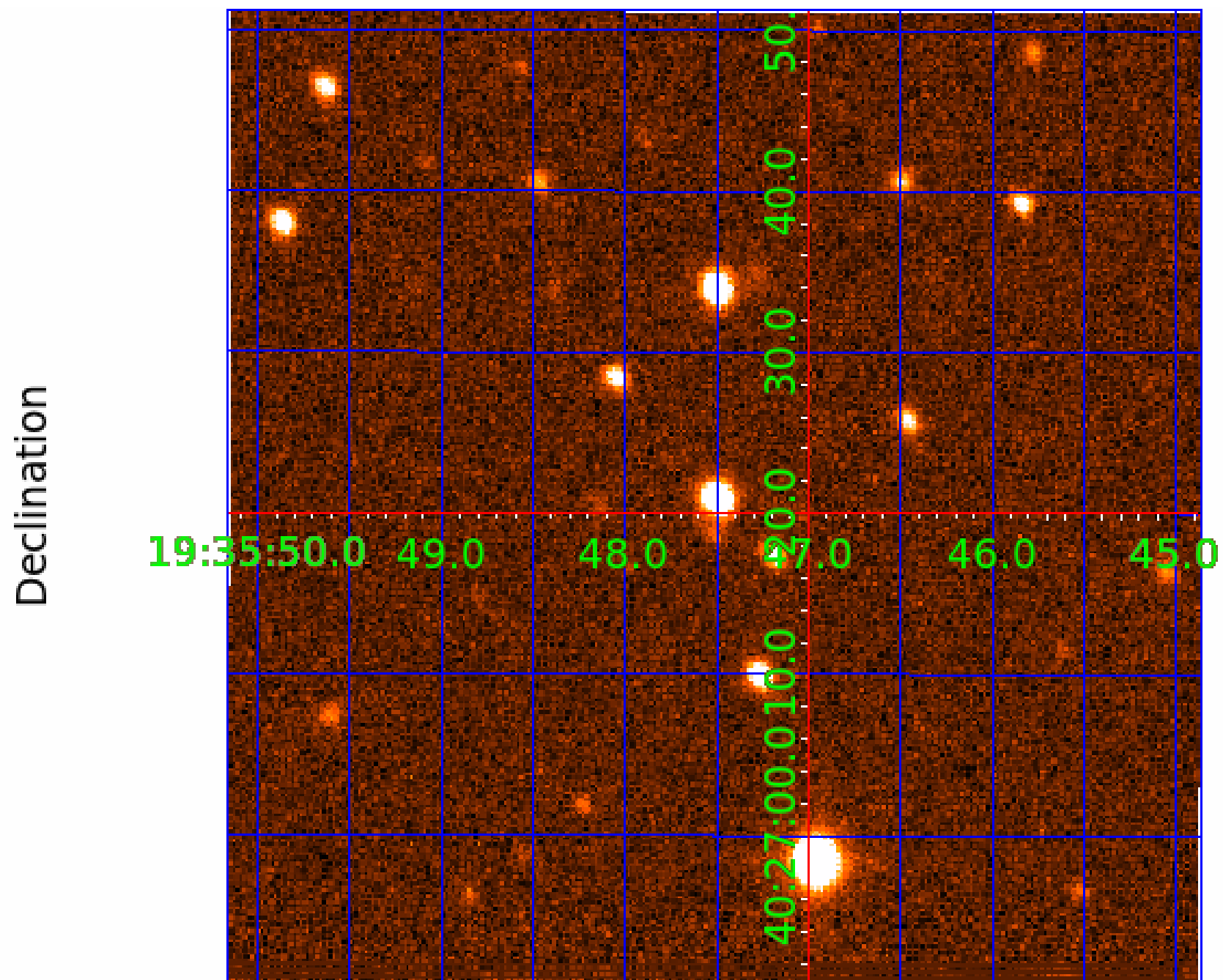
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 005282477

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005282477-01	OBS	No	0.992754	132.228789	60.0	1.644	9.4	7.9	1.10	6055	1.01	3542.39
005282477-02	OBS	4736.01	0.992761	131.724457	48.4	1.713	8.6	6.5	1.10	6055	0.91	3542.36

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005282477-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005282477-02	OBS	FP	0.00	1	0	1	1	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 005282477-02

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	$\sigma_P$	$\sigma_T$
005282477-02	5282477	4560.01	5282437	1:1	37.7	-4	9	15.11	15.04	34.44	Direct-PRF	0	3.52	1.17

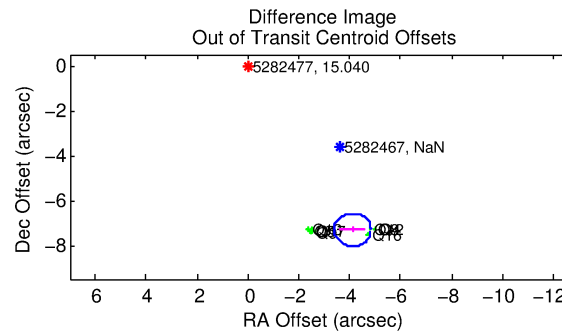
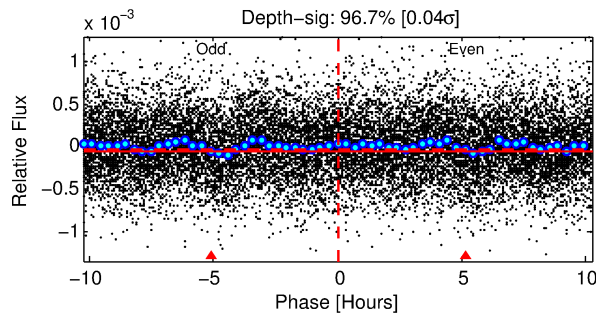
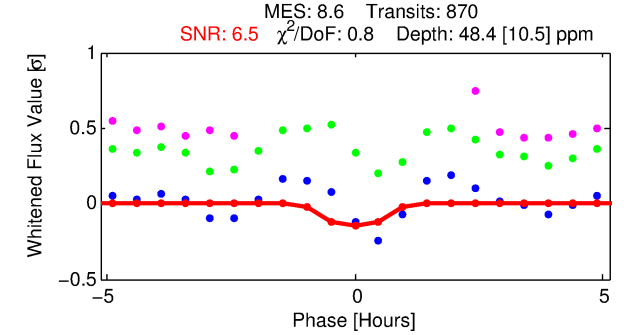
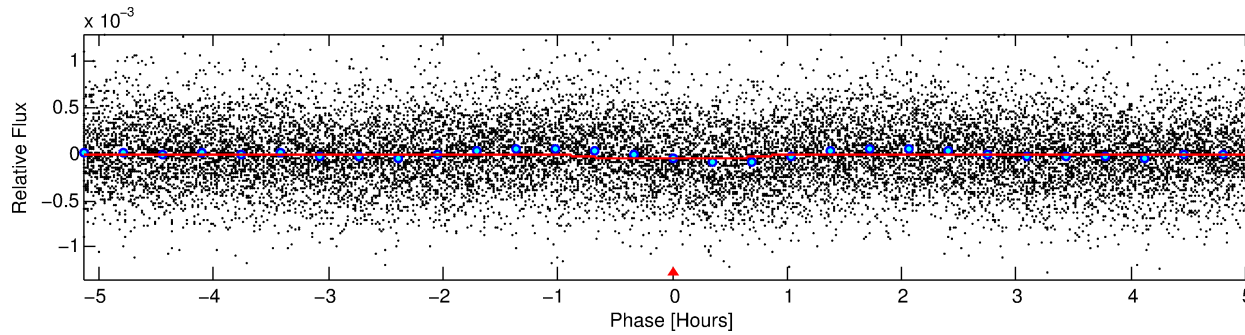
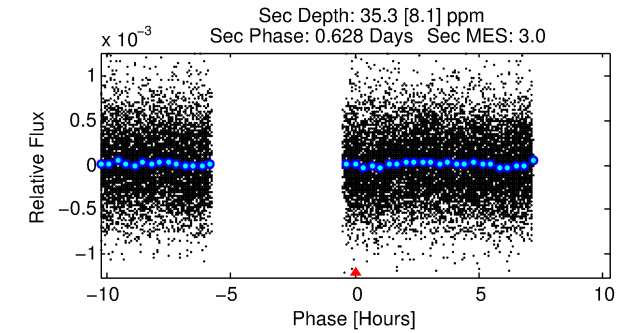
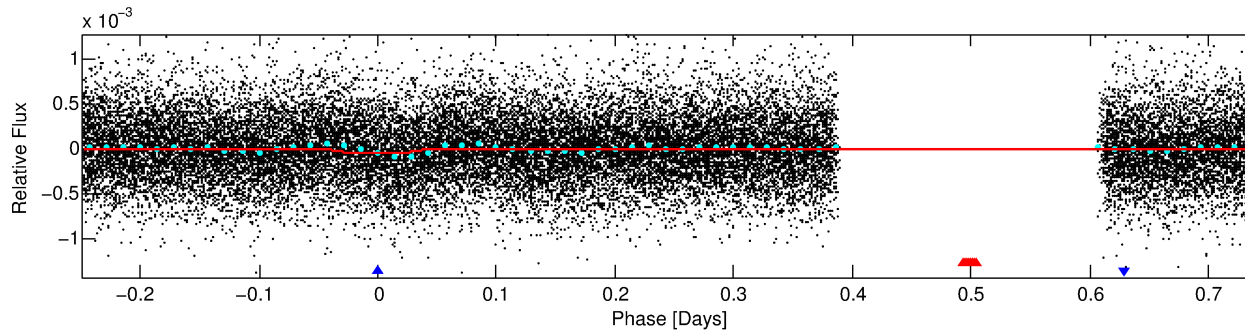
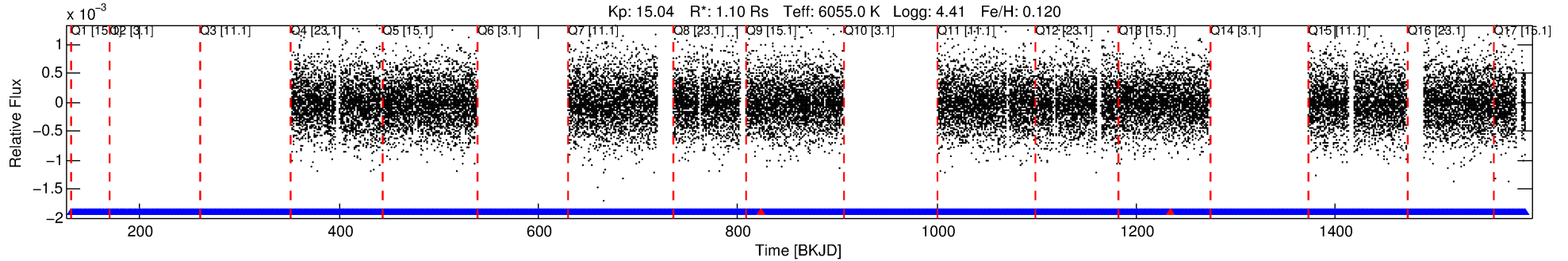
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  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: 5282477 Candidate: 2 of 2 Period: 0.993 d

KOI: K04736 Corr: No Ephemeris Match

Kp: 15.04 R\*: 1.10 Rs Teff: 6055.0 K Logg: 4.41 Fe/H: 0.120



## DV Fit Results:

Period = 0.99276 [0.00002] d  
Epoch = 131.7245 [0.0040] BKJD  
Rp/R\* = 0.0076 [0.0075]  
a/R\* = 2.17 [8.68]  
b = 0.91 [1.03]  
Seff = 3542.36 [1501.26]  
Teq = 1967 [208] K  
Rp = 0.91 [0.95] Re  
a = 0.0202 [0.0055] AU  
Ag = 9.62 [19.59] [0.44σ]  
Teffp = 5357 [2682] K [1.26σ]

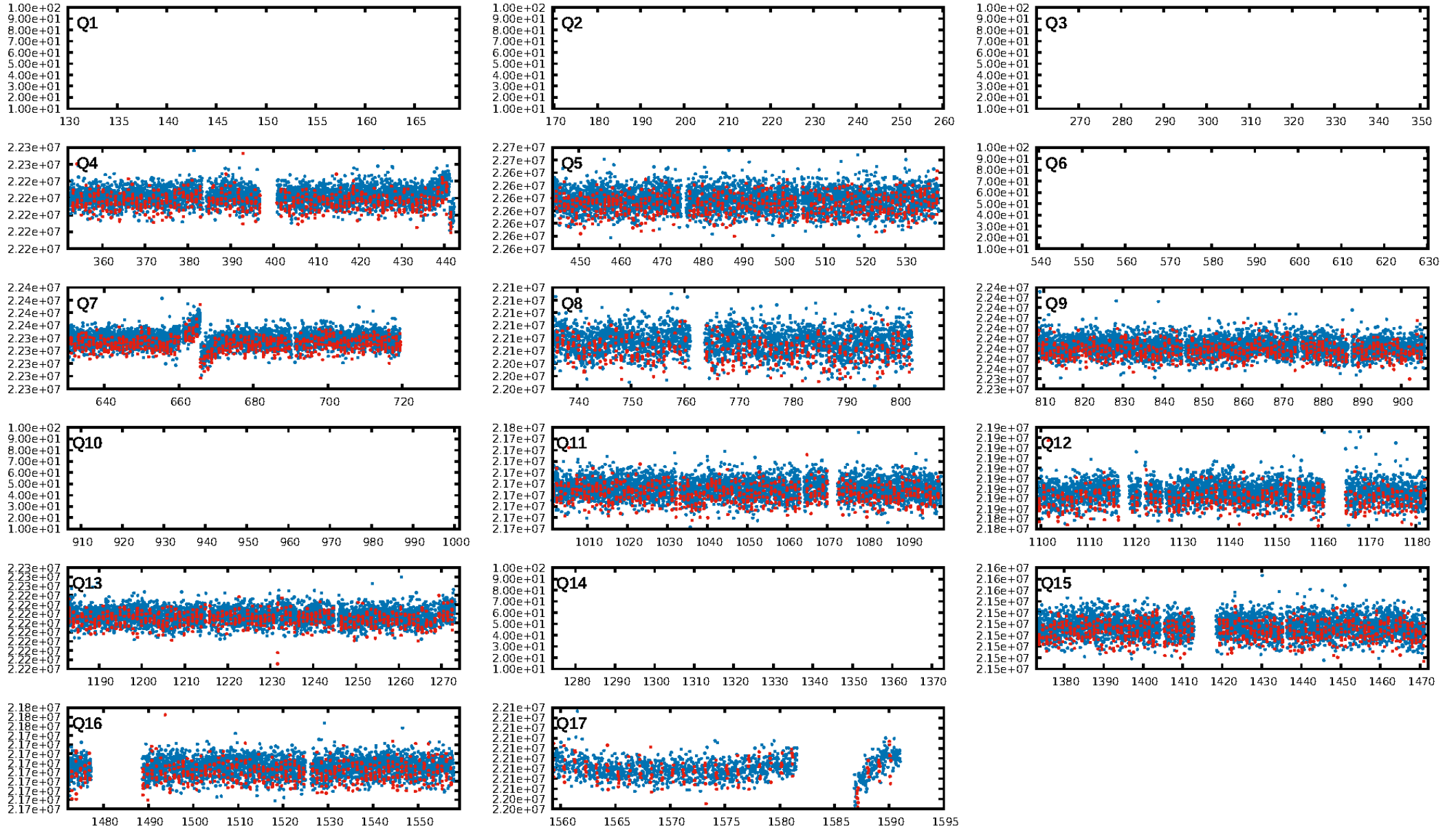
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.10e-19  
RollingBand-fgt: 1.00 [841/843]  
GhostDiagnostic-chr: -0.3384  
Centroid-sig: N/A  
Centroid-so: 6.699 arcsec [3.24σ]  
OotOffset-rm: 8.397 arcsec [34.48σ]  
KicOffset-rm: 8.553 arcsec [35.01σ]  
OotOffset-st: 0/0/4/4 [8]  
KicOffset-st: 0/0/4/4 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 1.00 [11/11]

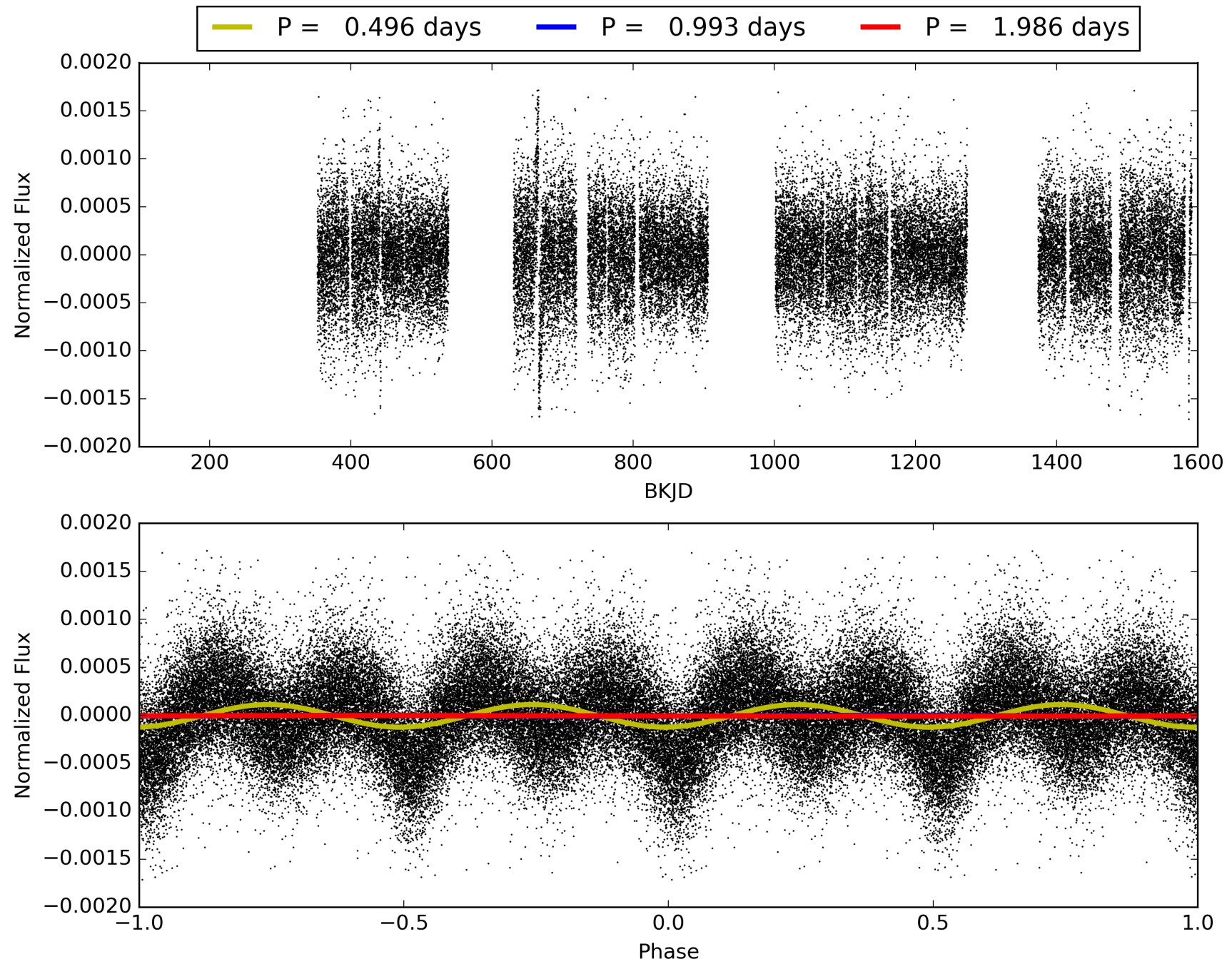
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 12:33:23 Z

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

# TCE 005282477-02, PDC Light Curves



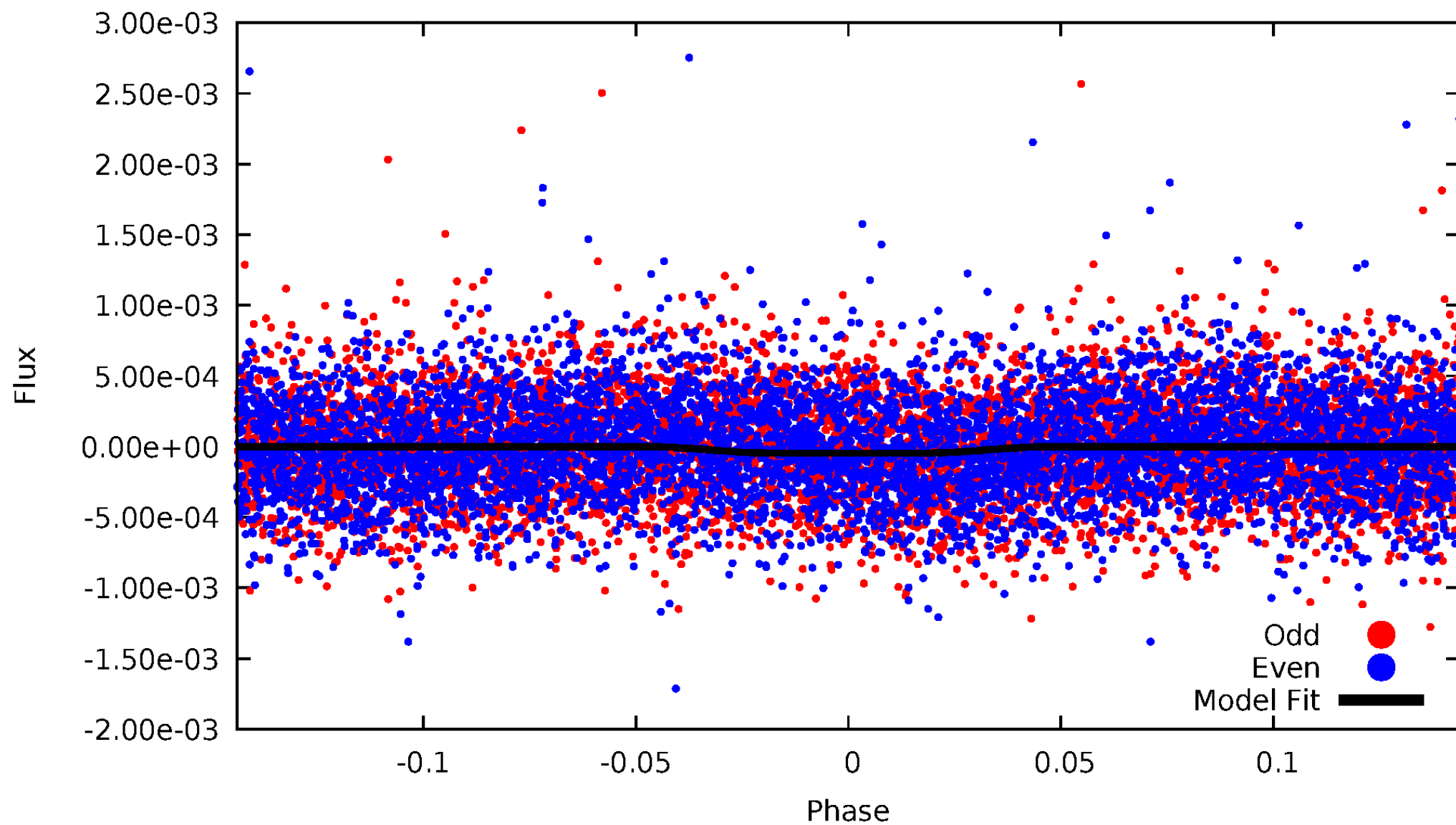
TCE 005282477-02





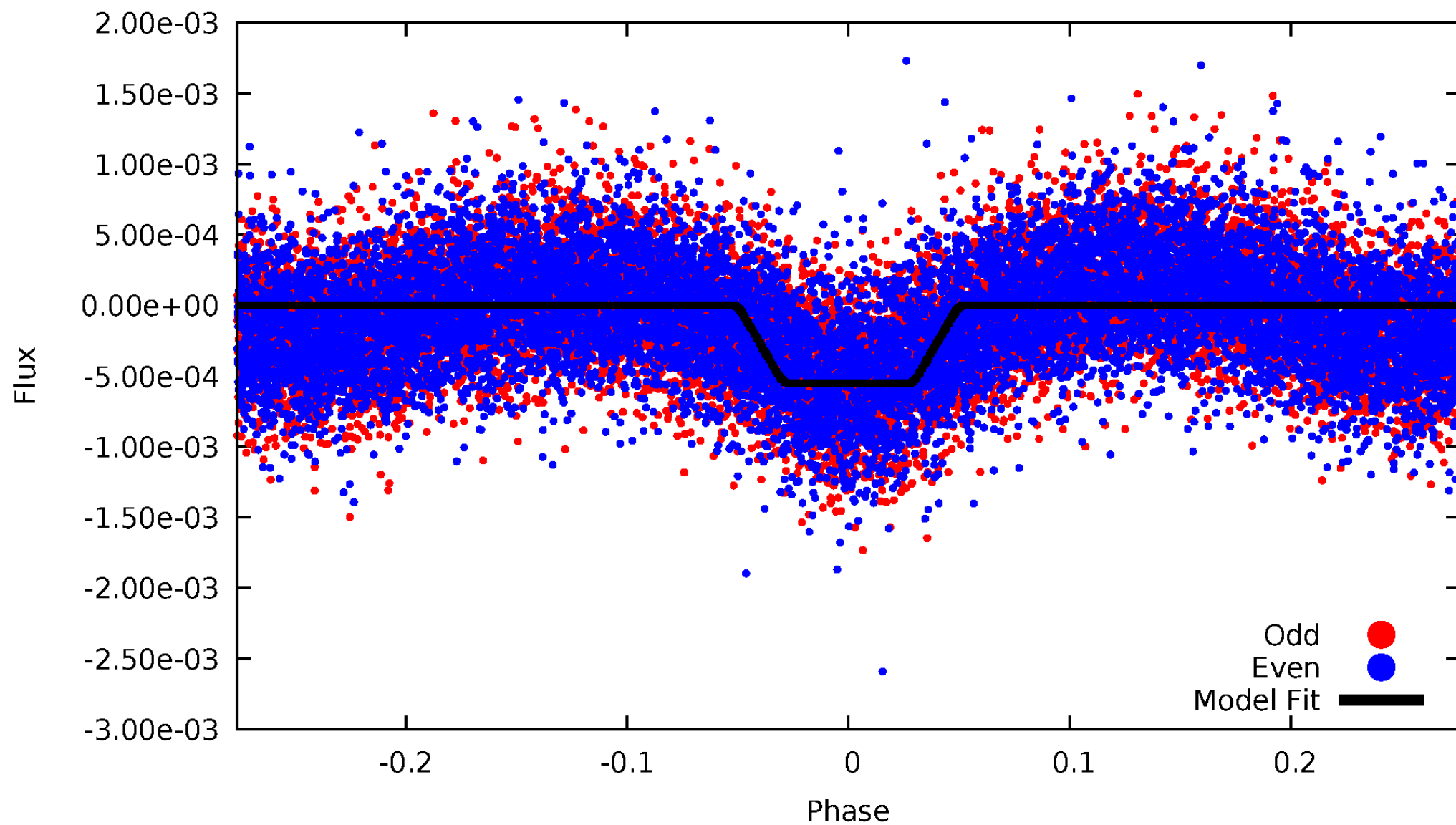
# DV Odd/Even

TCE 005282477-02



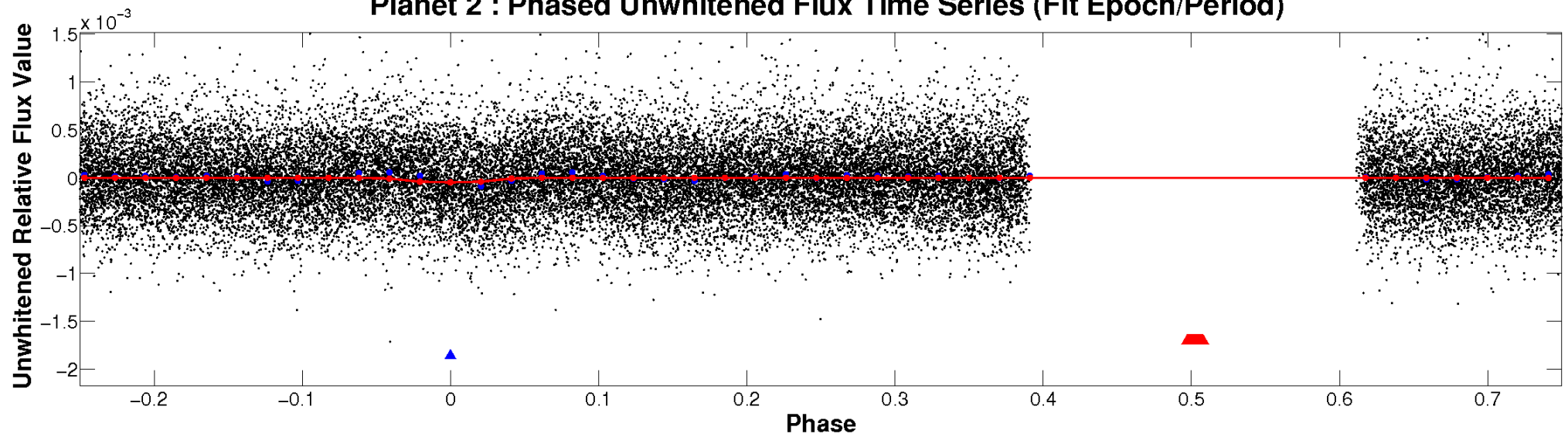
# ALT Odd/Even

TCE 005282477-02

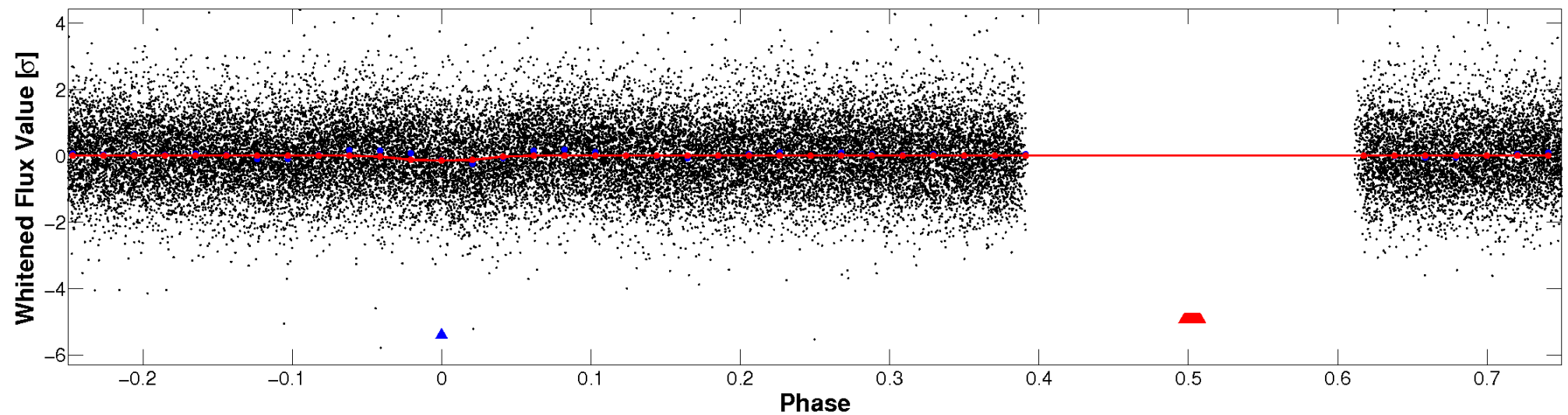


# Non-Whitened Vs. Whitened Light Curve

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

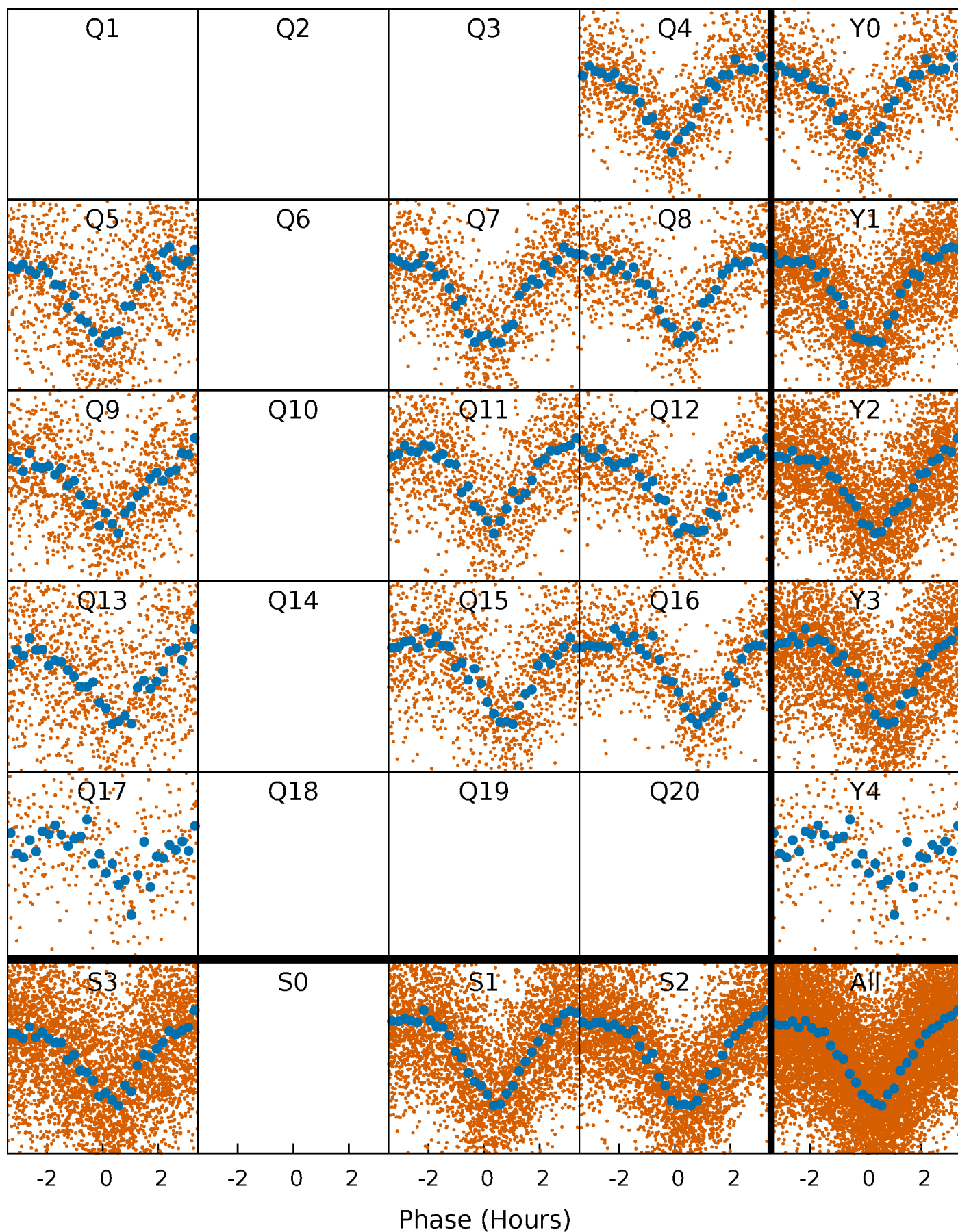


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

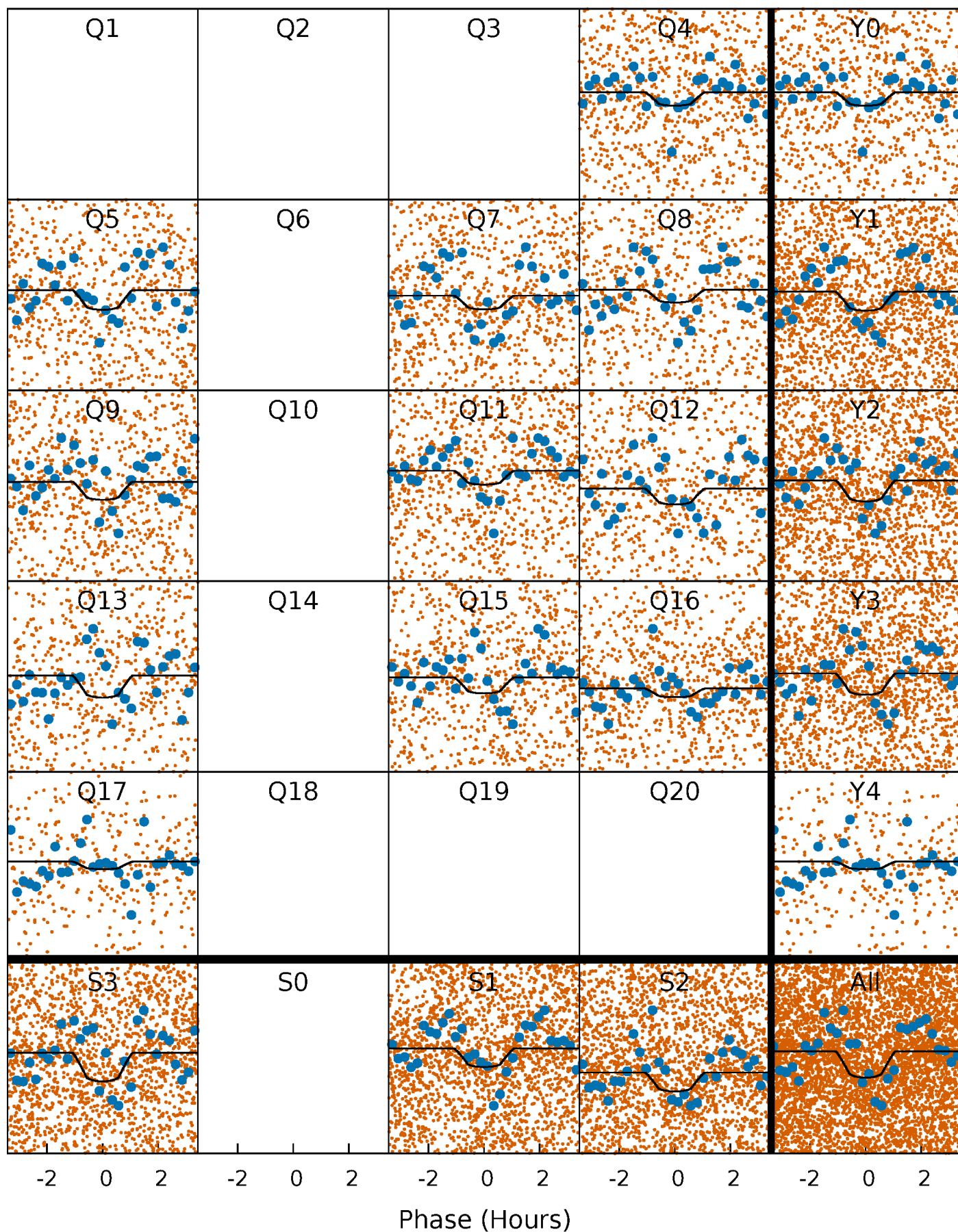
TCE 005282477-02   P= 0.992761 Days    $T_0=131.724457$  (BKJD)





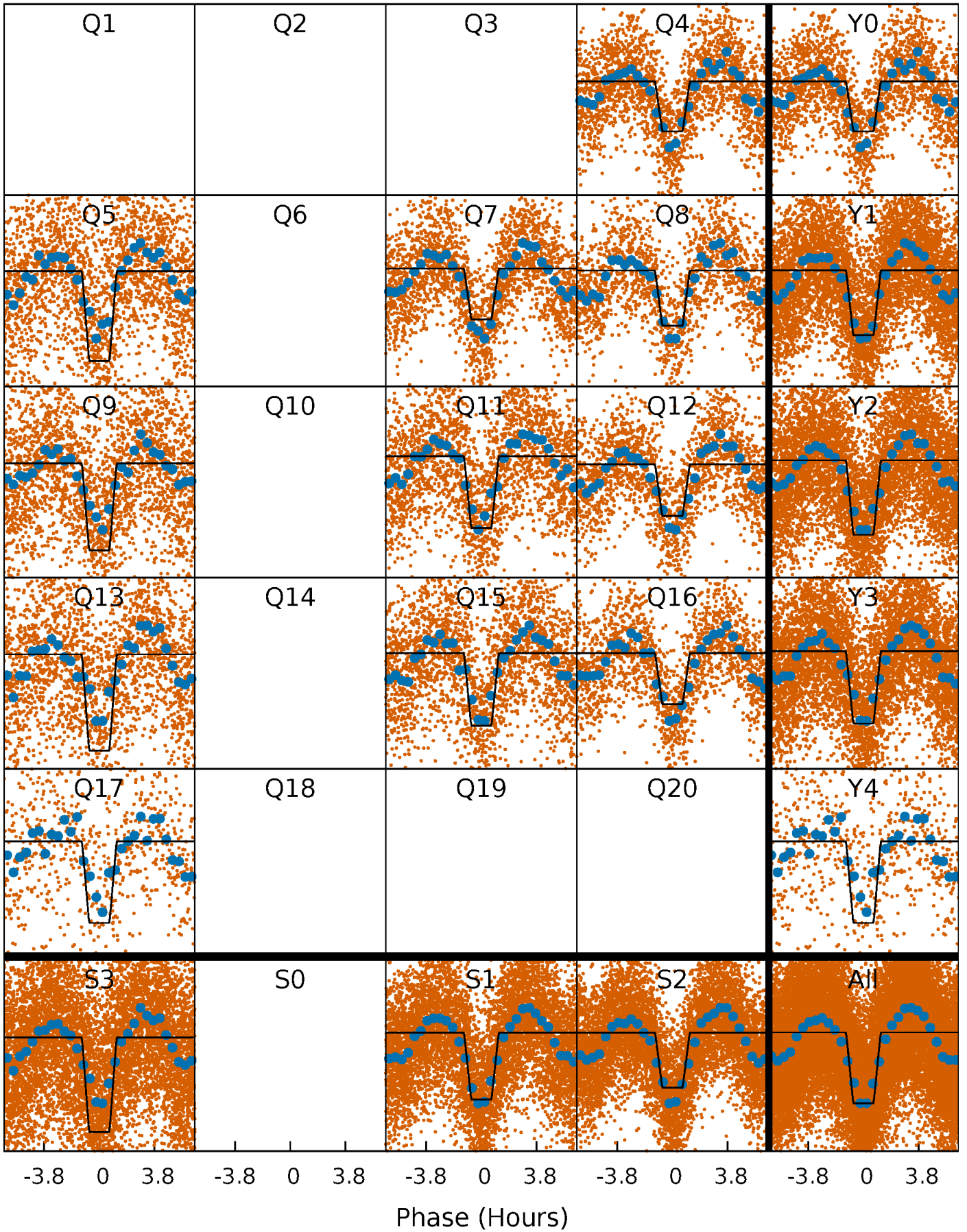
# DV Quarter-Phased Transit Curves

TCE 005282477-02   P= 0.992761 Days    $T_0=131.724457$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

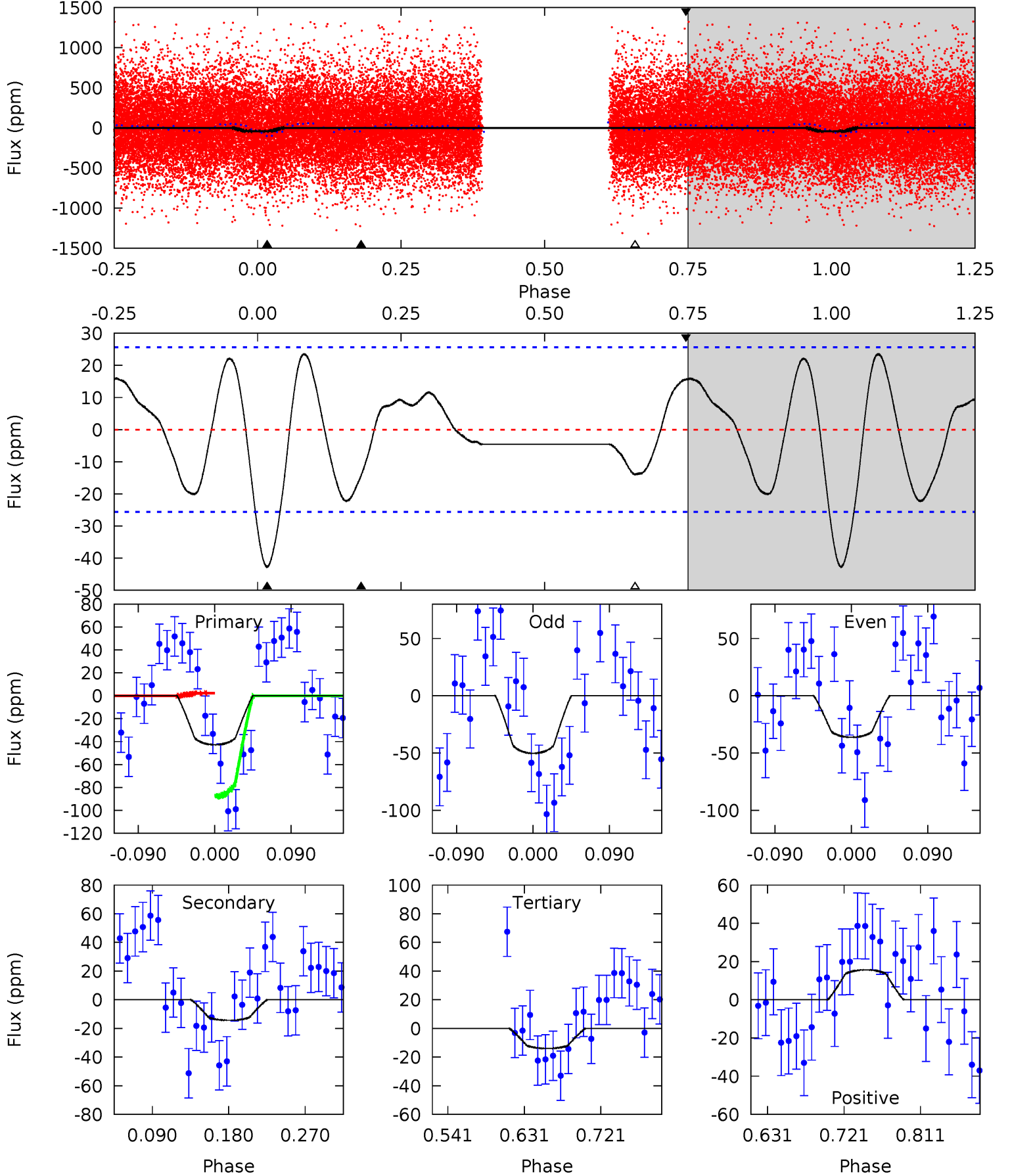
TCE 005282477-02   P= 0.992795 Days    $T_0=131.712126$  (BKJD)



# DV Model-Shift Uniqueness Test

005282477-02, P = 0.992761 Days, E = 131.724457 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
7.65	2.57	2.50	2.80	4.59	1.69	1.87	5.16	4.85	0.07	-0.23	1.26	1.01	0.36	7.72

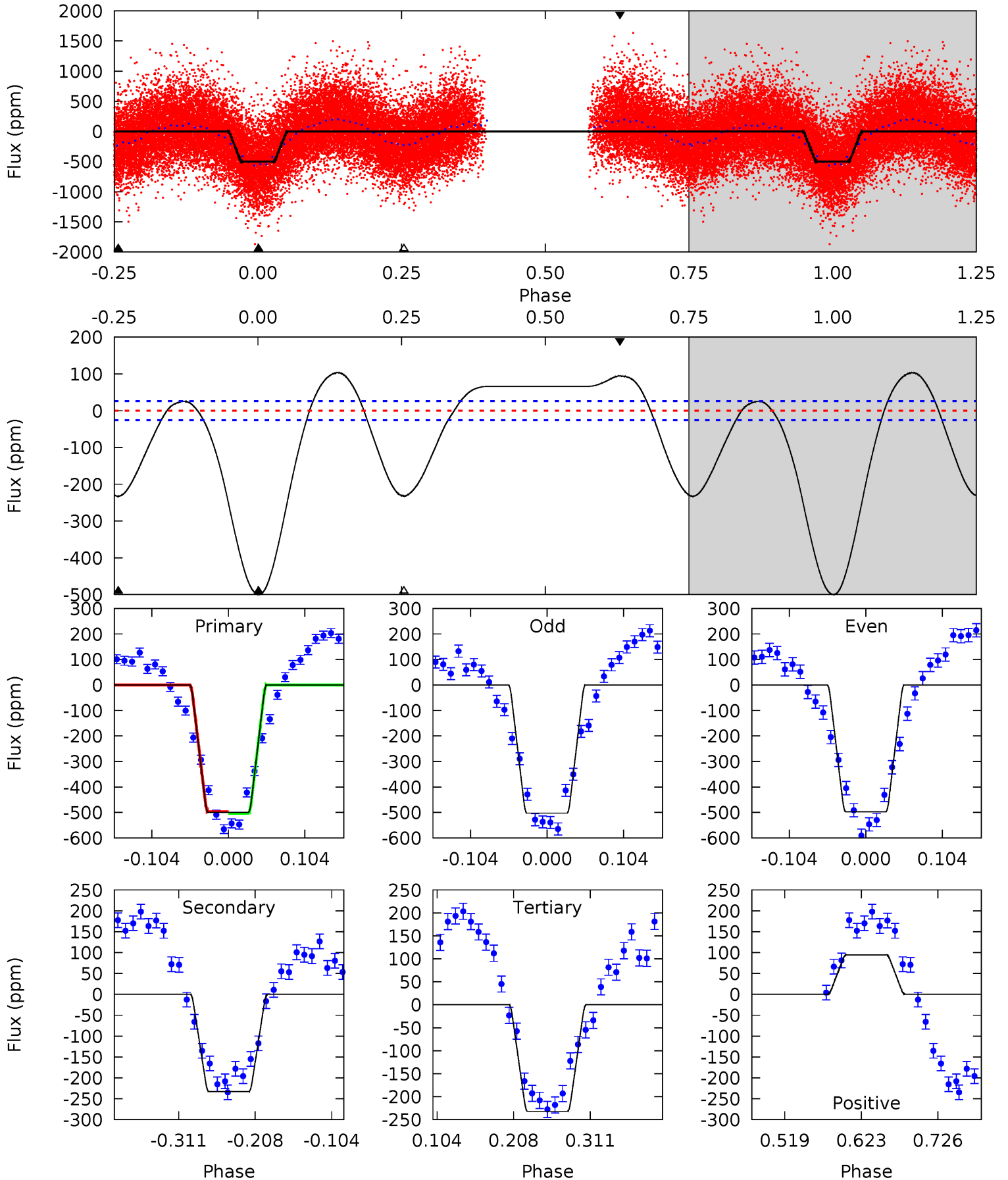




# Alt Model-Shift Uniqueness Test

005282477-02, P = 0.992795 Days, E = 131.712126 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
88.0	40.9	40.8	16.6	4.56	1.63	19.9	47.1	71.3	0.12	24.3	0.47	1.00	0.17	0.56



### Stellar Parameters For KIC 005282477

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6055^{+190}_{-232}$	$4.407^{+0.072}_{-0.217}$	$0.120^{+0.200}_{-0.300}$	$1.098^{+0.350}_{-0.150}$	$1.126^{+0.151}_{-0.166}$	$1.197^{+0.447}_{-0.619}$
	+3%/-4%	+2%/-5%	+167%/-250%	+32%/-14%	+13%/-15%	+37%/-52%
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 005282477-02 / KOI 4736.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-14 \pm 6$	$1.11^{+0.82}_{-0.73}$	$2803^{+208}_{-168}$	$4088^{+2651}_{-956}$	$2.614^{+18.214}_{-1.896}$
Alt.	$-233 \pm 6$	$2.93^{+1.04}_{-0.97}$	$2802^{+208}_{-157}$	$4898^{+970}_{-545}$	$5.975^{+7.169}_{-2.615}$

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

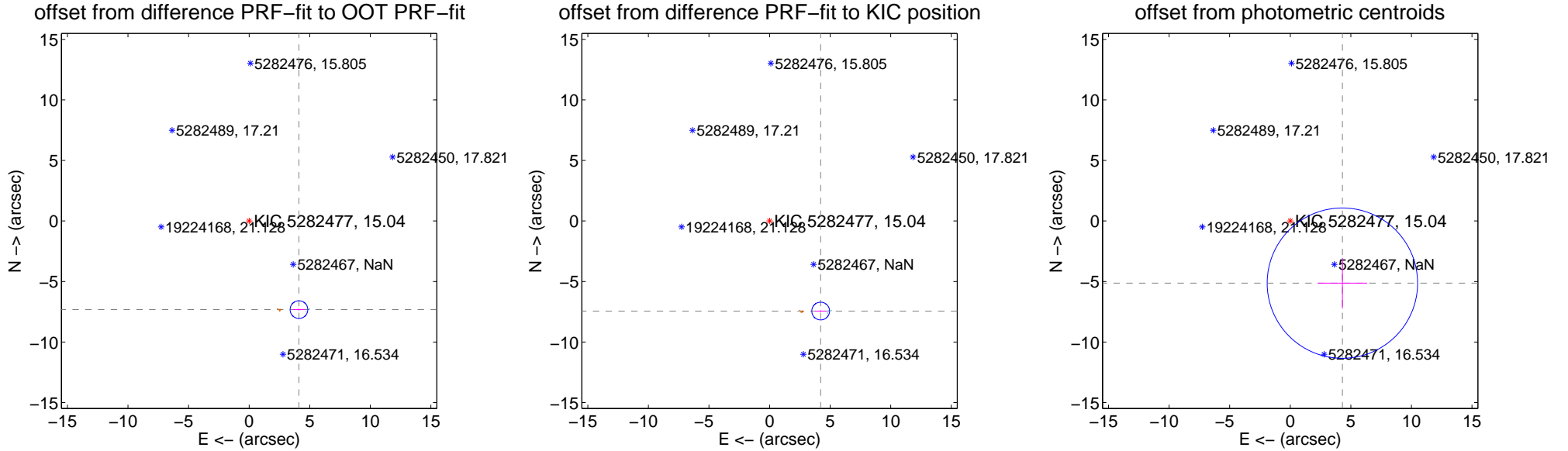
## DV Centroid Data

Supplemental centroid analysis for 005282477-02. Kepler magnitude: 15.04. Transit SNR 6.54

There are 4 quarters with good PRF difference image offsets

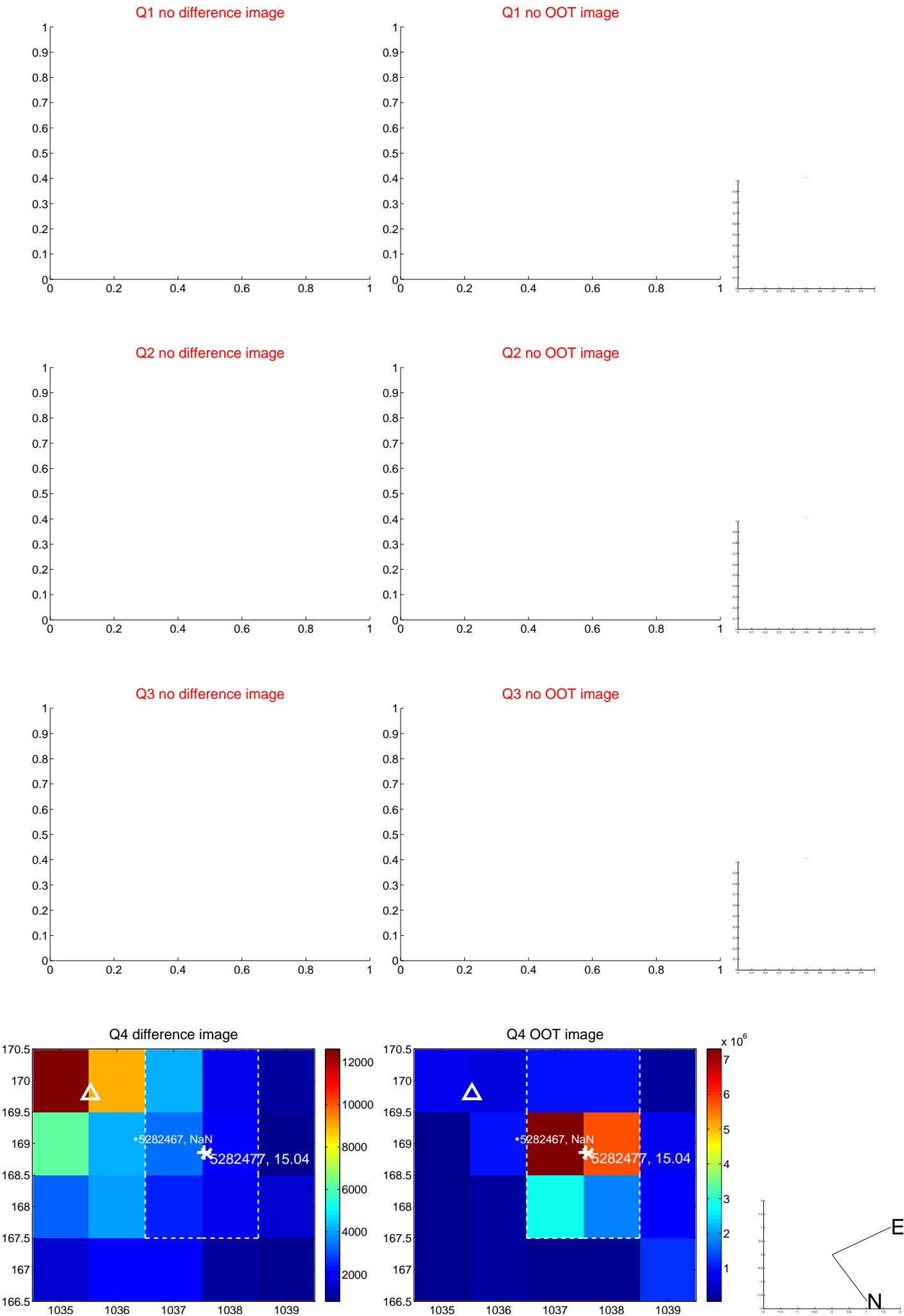
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$8.397 \pm 0.244$	34.48	$-4.111 \pm 0.479$	$-7.321 \pm 0.075$
PRF-fit source offset from KIC position	$8.553 \pm 0.244$	35.01	$-4.220 \pm 0.478$	$-7.440 \pm 0.073$
photometric centroid source offset	$6.70 \pm 2.07$	3.24	$-4.30 \pm 2.05$	$-5.13 \pm 2.08$

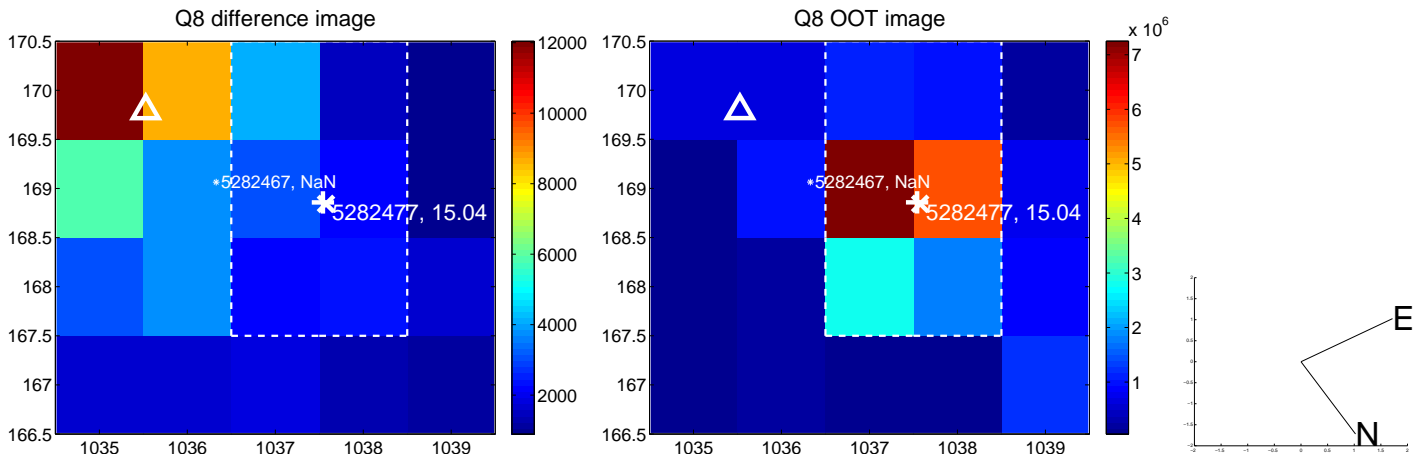
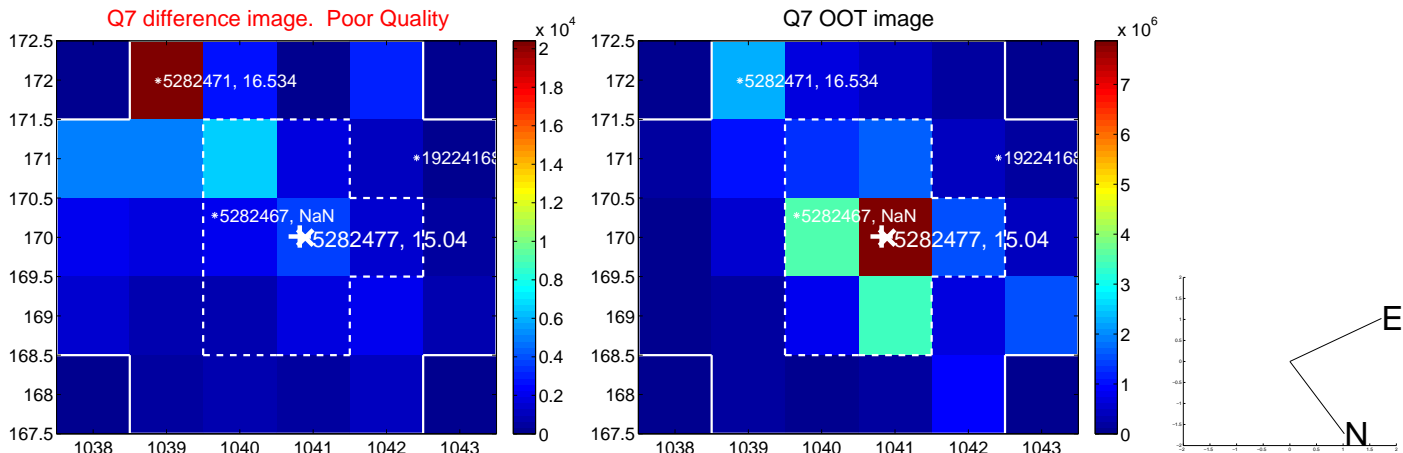
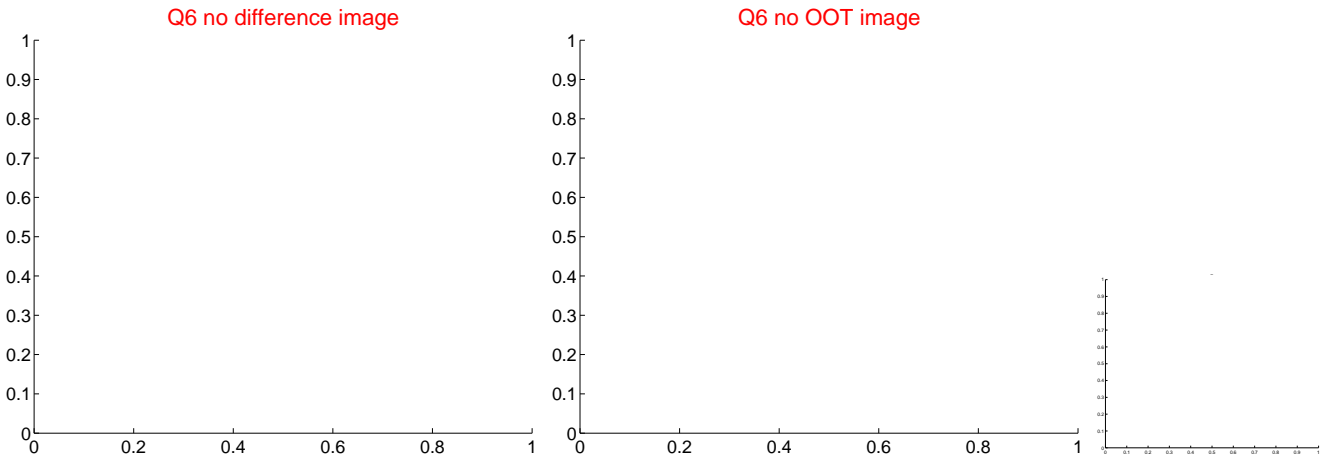
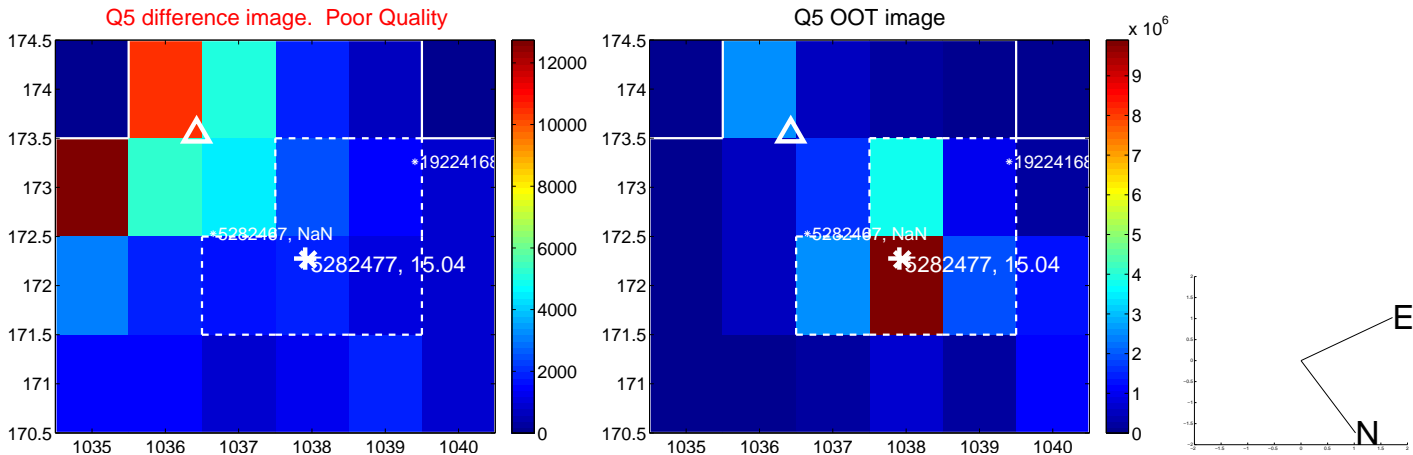


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

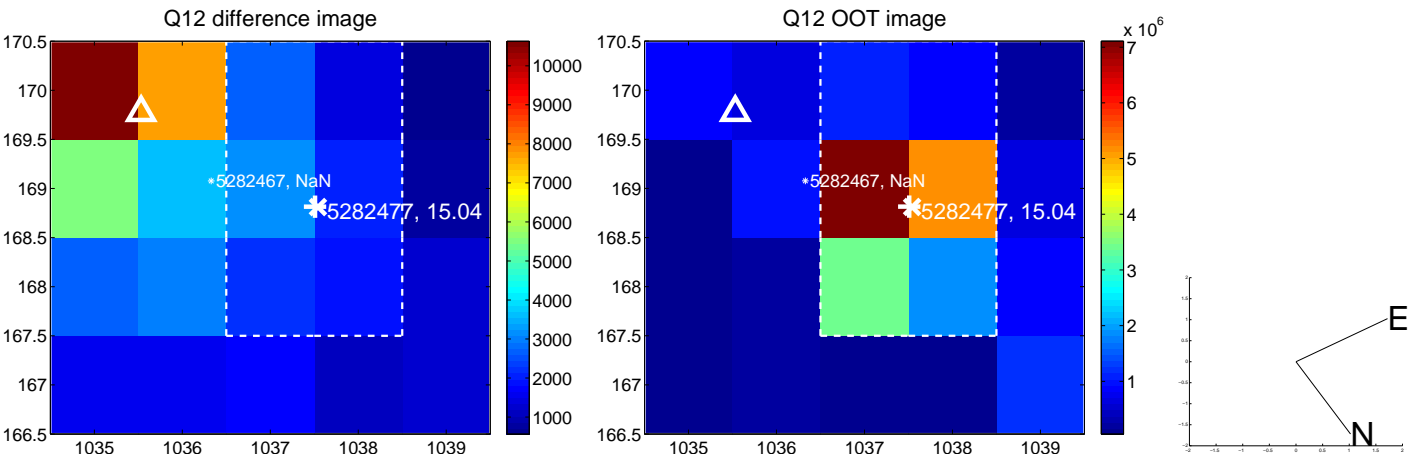
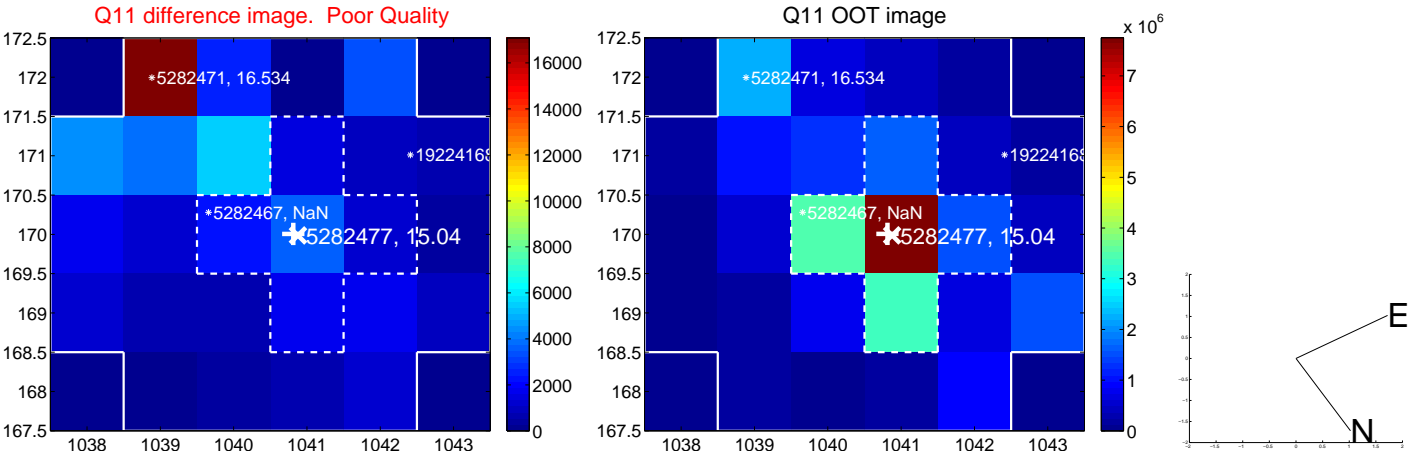
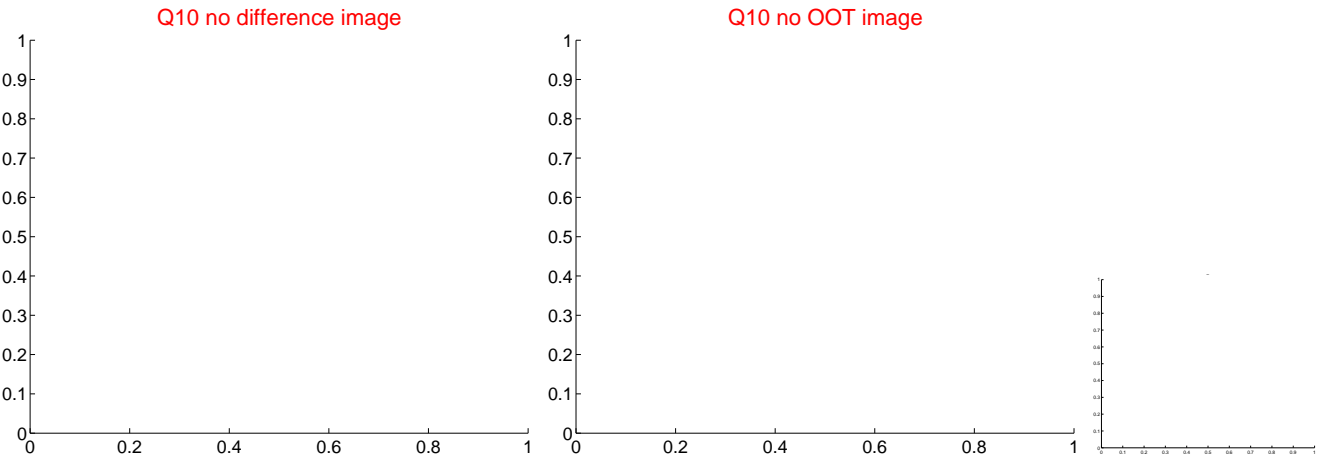
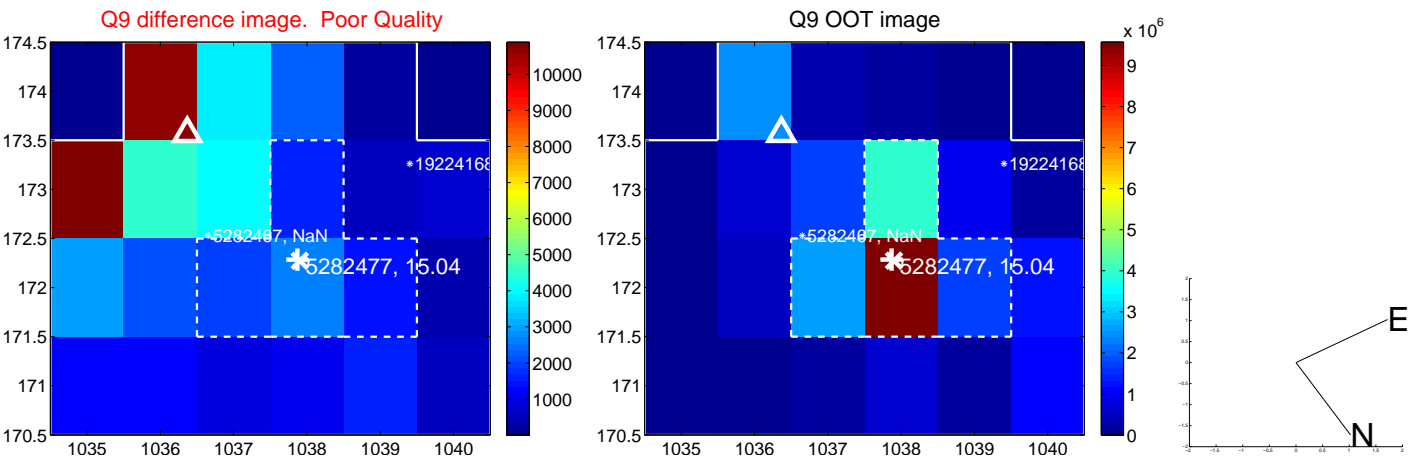
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



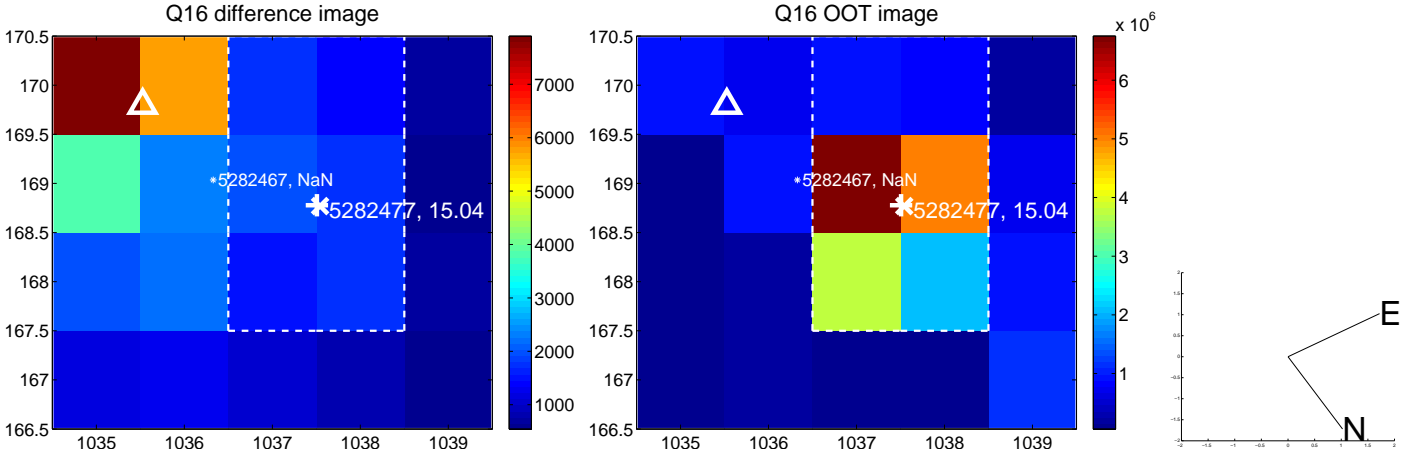
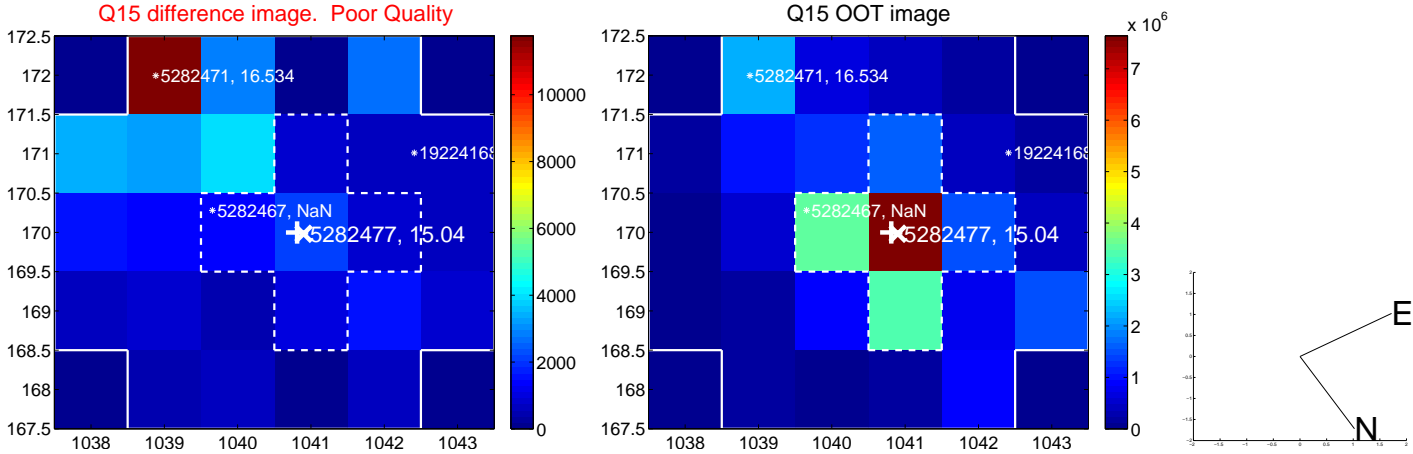
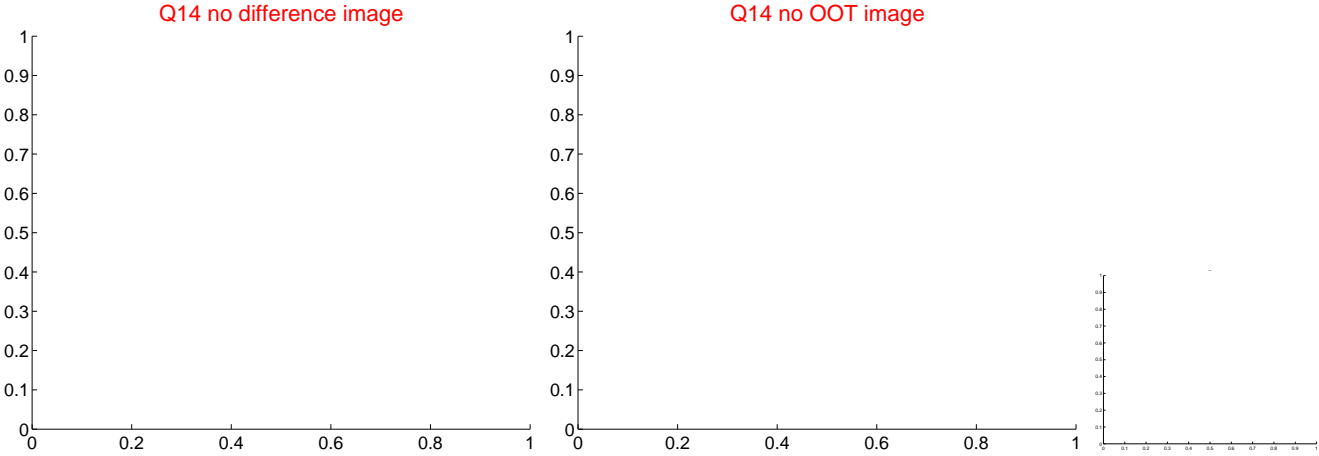
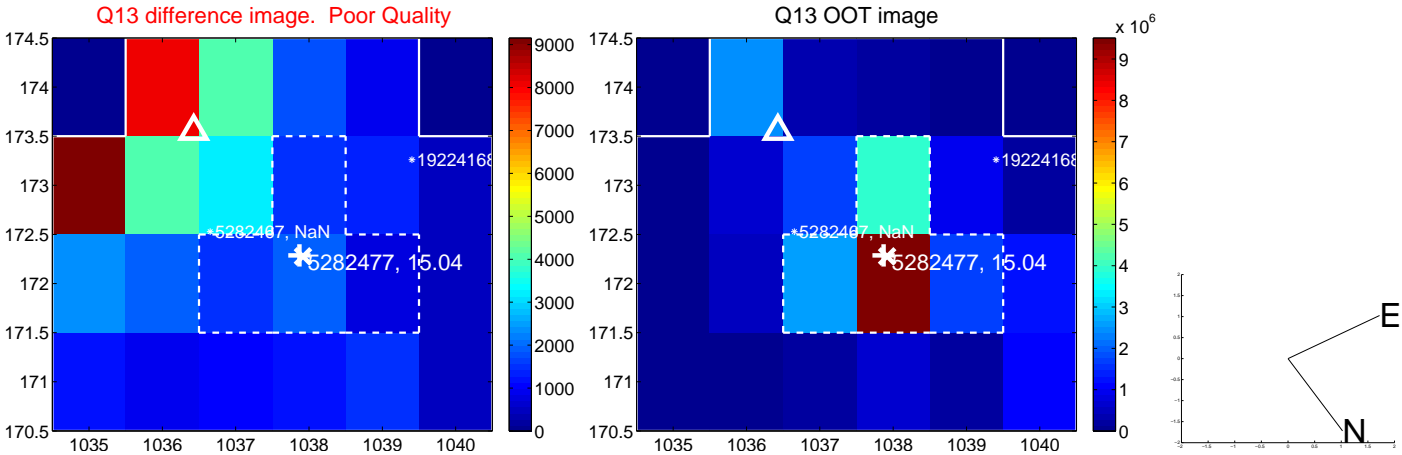
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

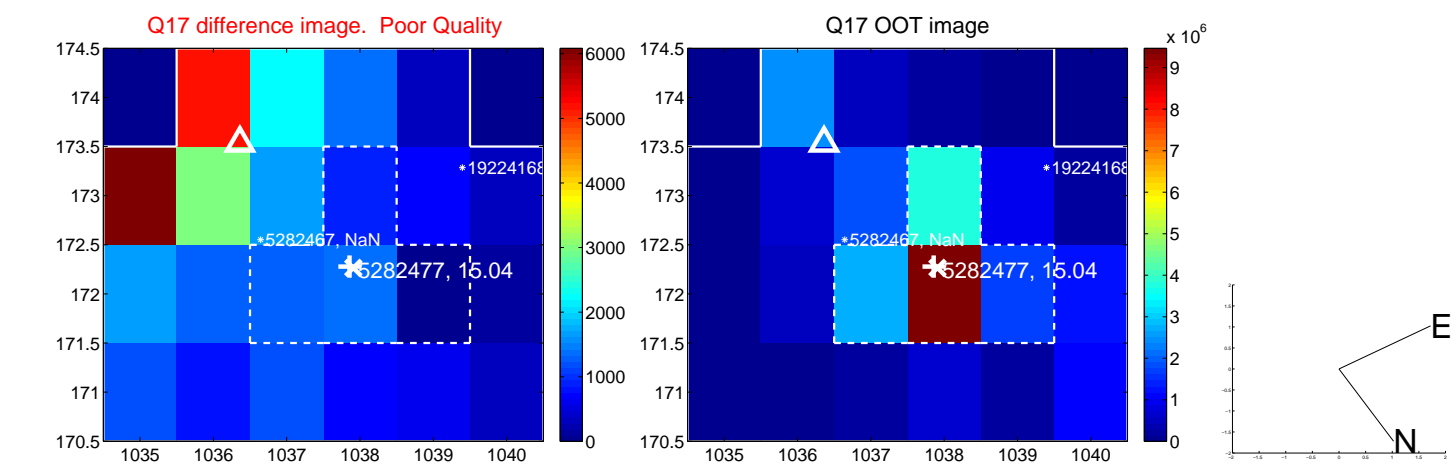


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

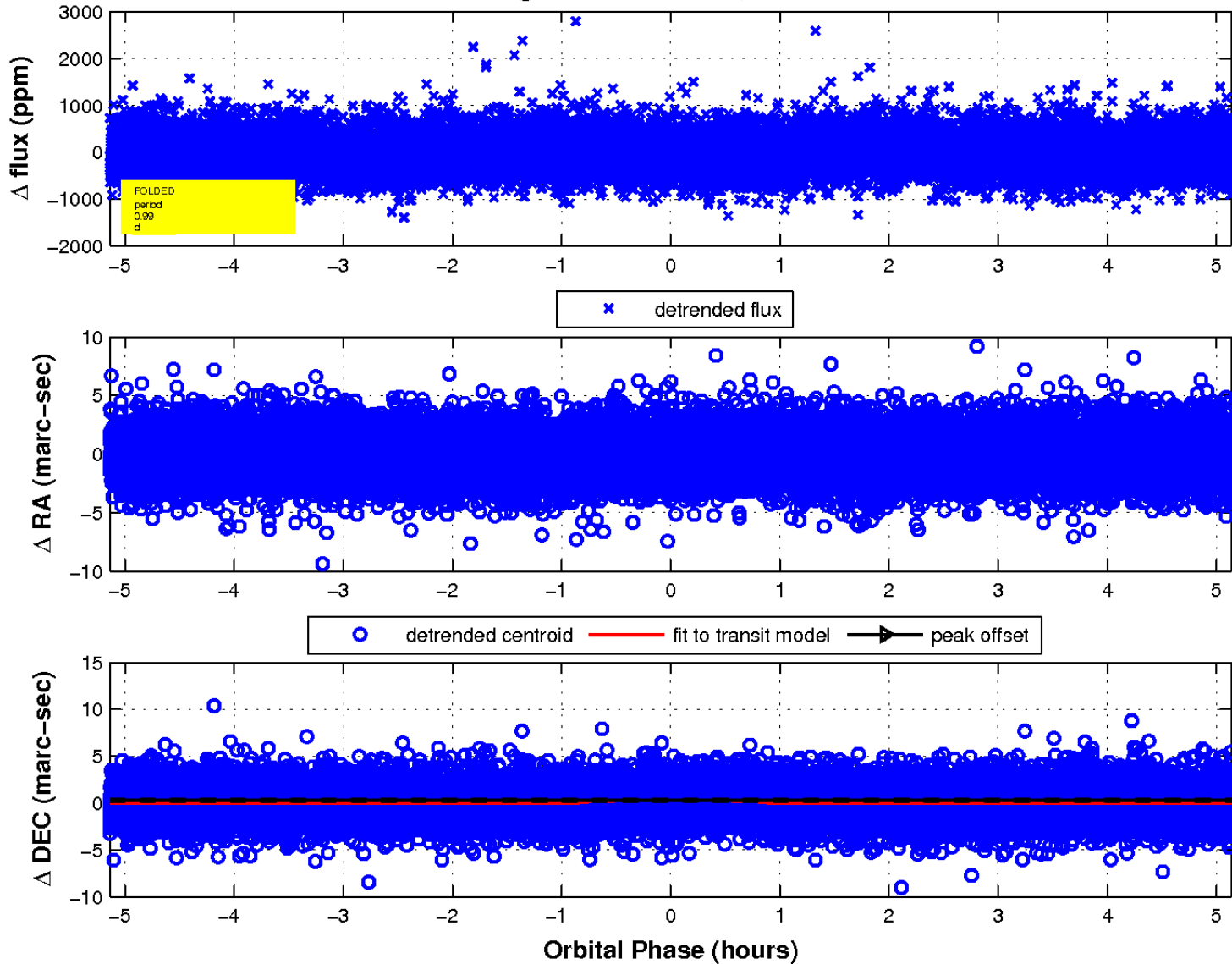




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

