

# KIC 006060277

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006060277-01	OBS	No	0.541539	132.003087	40.4	1.760	12.6	13.9	1.92	7271	1.42	41677.44
006060277-02	OBS	No	0.541535	131.727677	30.6	2.672	11.4	11.5	1.92	7271	1.08	41677.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006060277-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
006060277-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

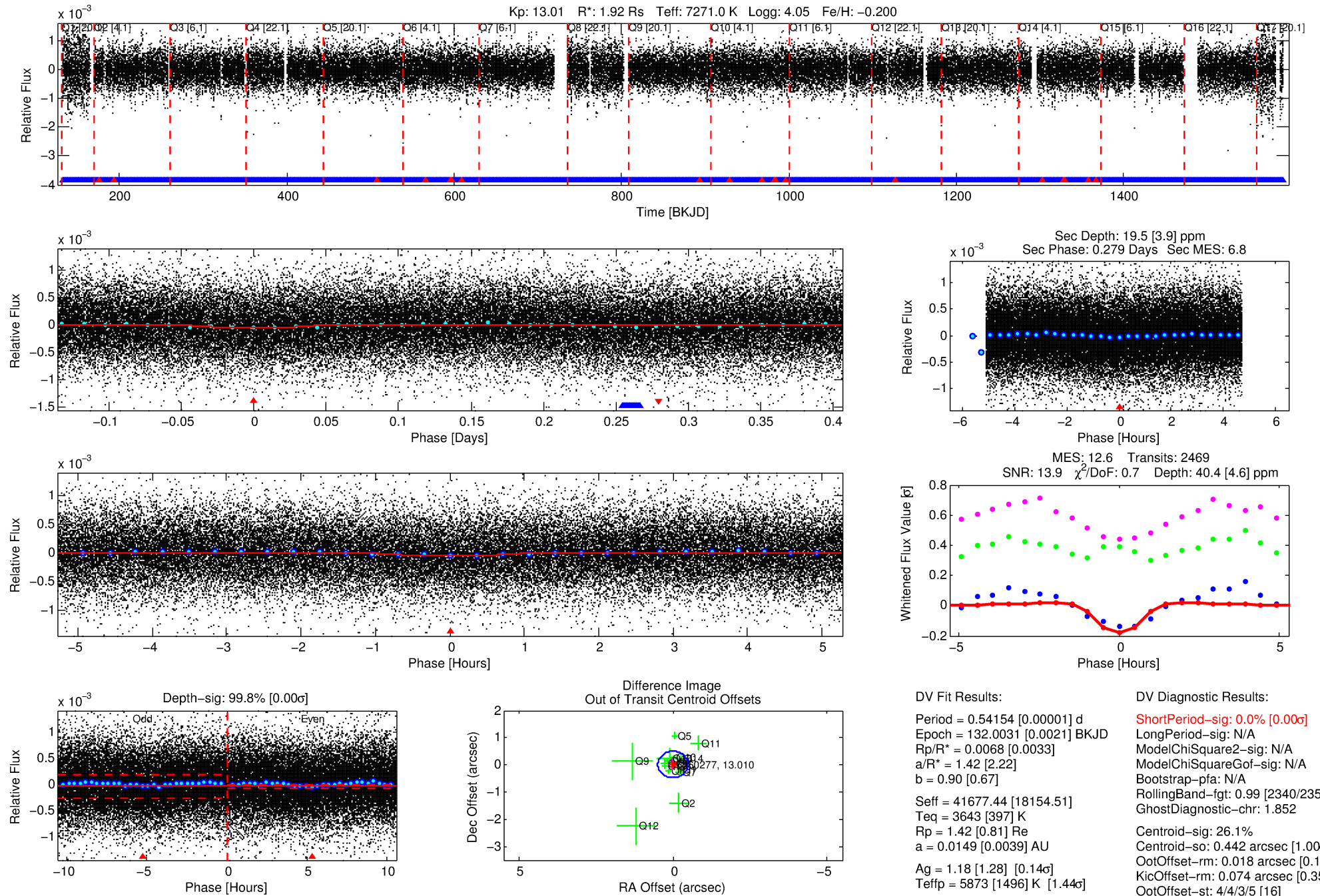
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006060277-01

No Significant Match Found

# DV One-Page Summary

KIC: 6060277 Candidate: 1 of 2 Period: 0.542 d



## DV Fit Results:

Period = 0.54154 [0.00001] d  
Epoch = 132.0031 [0.0021] BKJD  
Rp/R\* = 0.0068 [0.0033]  
a/R\* = 1.42 [2.22]  
b = 0.90 [0.67]  
Seff = 41677.44 [18154.51]  
Teff = 3643 [397] K  
Rp = 1.42 [0.81] Re  
a = 0.0149 [0.0039] AU  
Ag = 1.18 [1.28] [0.14 $\sigma$ ]  
Teffp = 5873 [1496] K [1.44 $\sigma$ ]

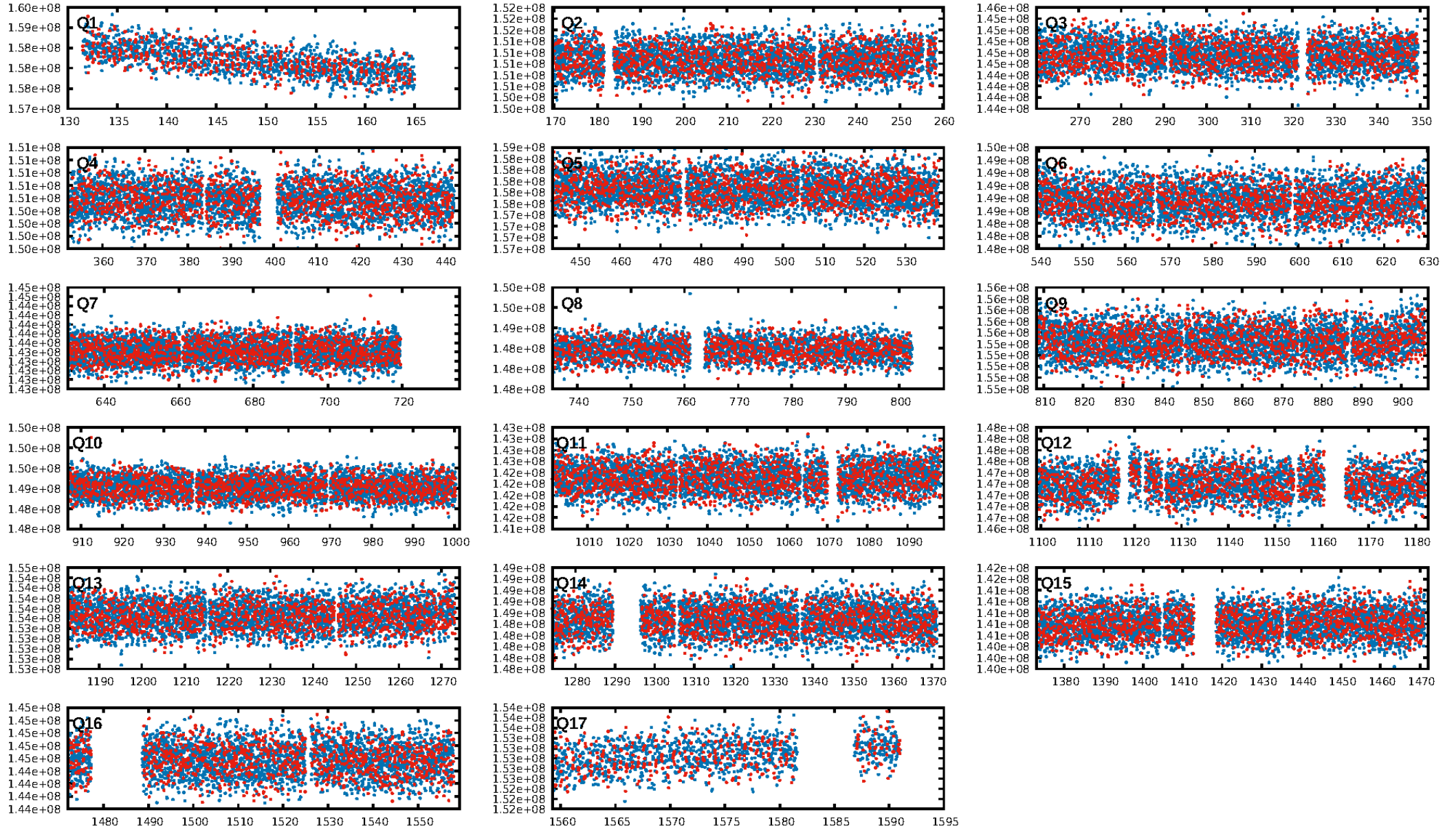
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [2340/2359]  
GhostDiagnostic-chr: 1.852  
Centroid-sig: 26.1%  
Centroid-so: 0.442 arcsec [1.00 $\sigma$ ]  
OotOffset-rm: 0.018 arcsec [0.11 $\sigma$ ]  
KicOffset-rm: 0.074 arcsec [0.35 $\sigma$ ]  
OotOffset-st: 4/4/3/5 [16]  
KicOffset-st: 4/4/3/5 [16]  
DiffImageQuality-fgm: 0.69 [11/16]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:48:38 Z

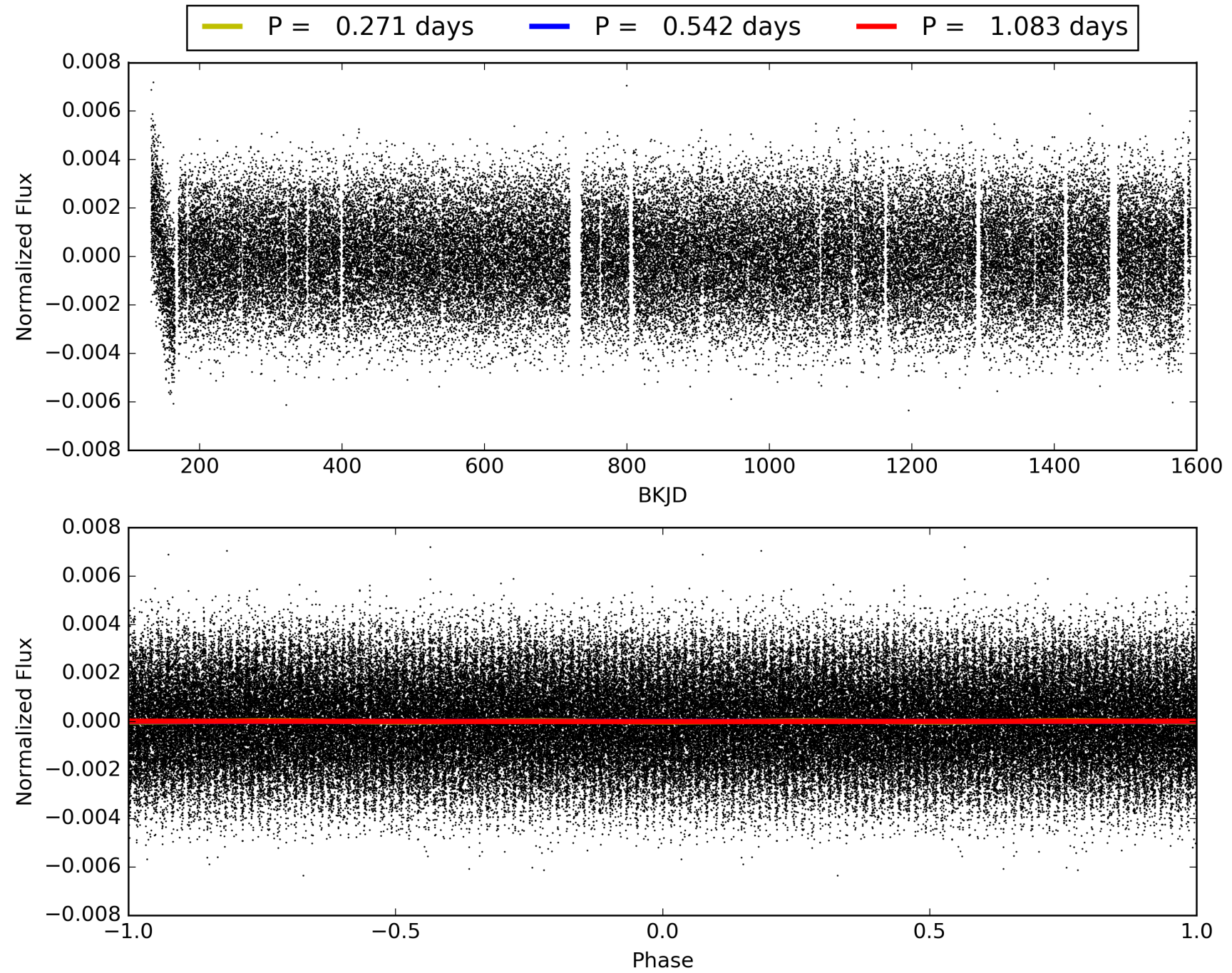
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006060277-01, PDC Light Curves



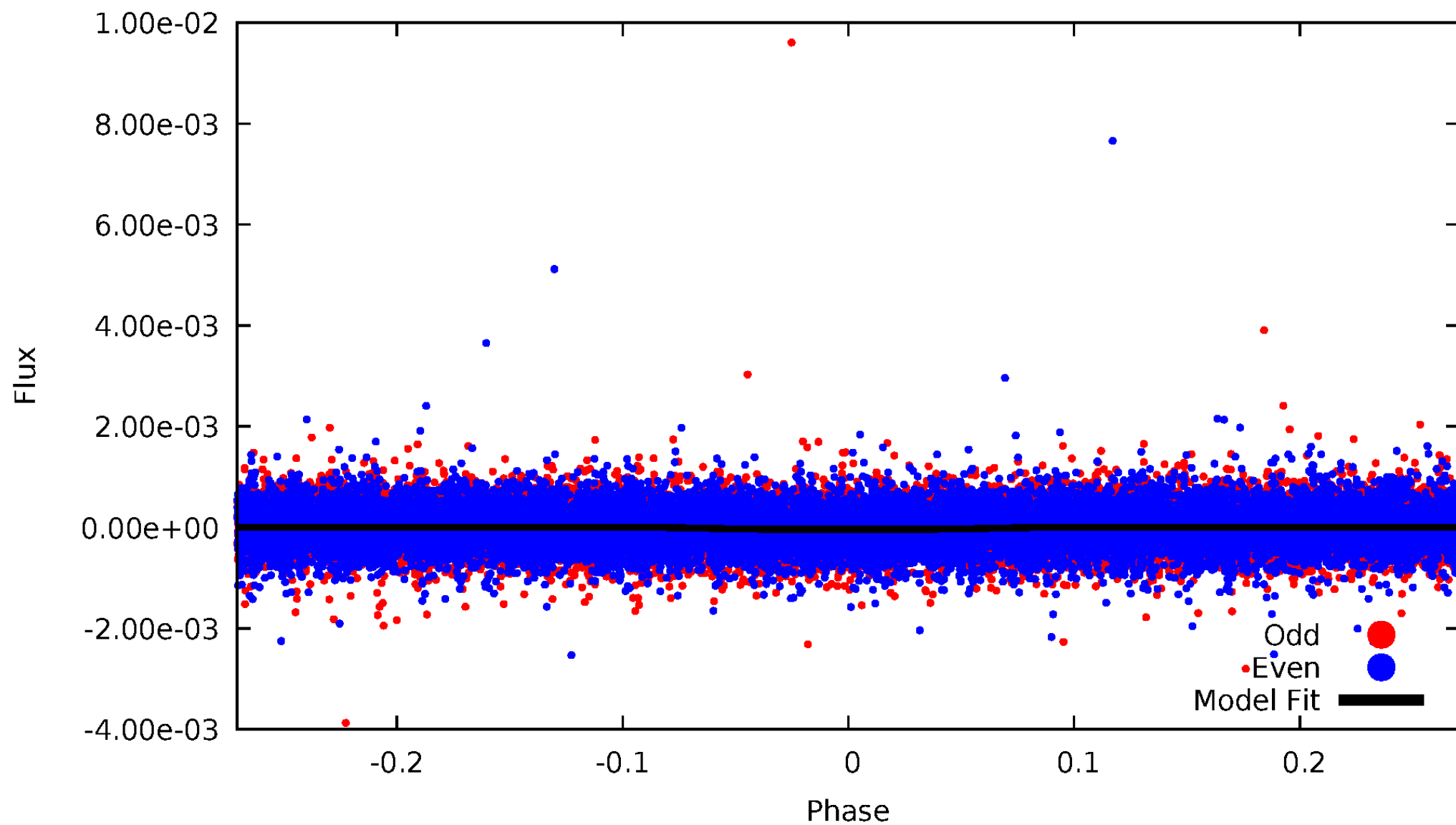


TCE 006060277-01



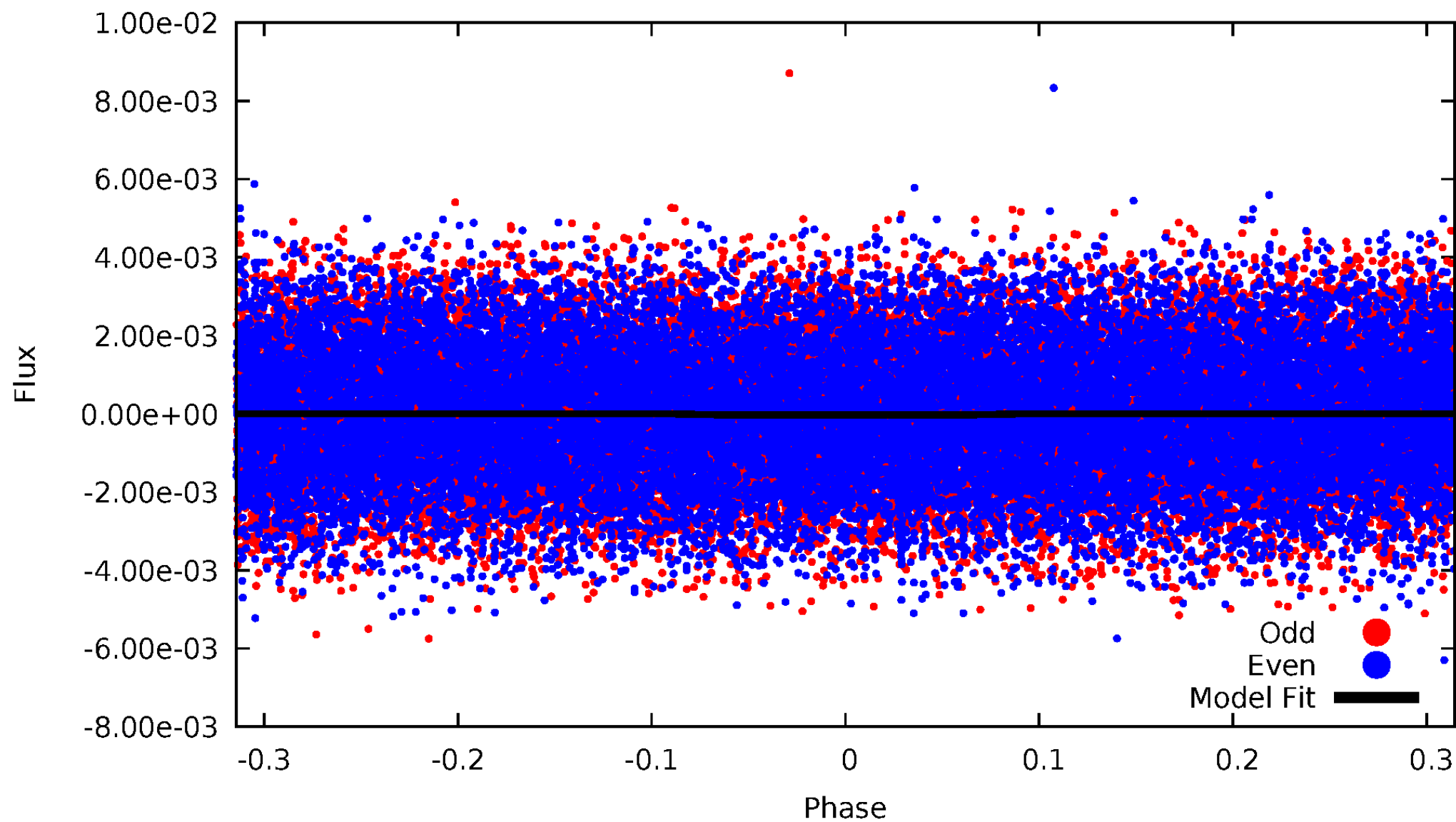
# DV Odd/Even

TCE 006060277-01



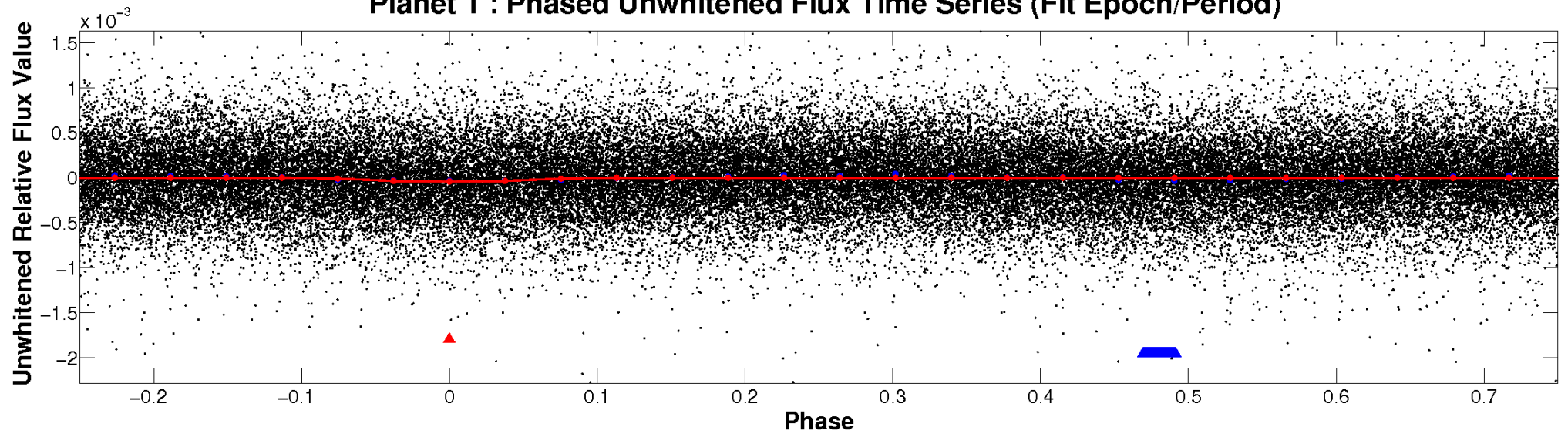
# ALT Odd/Even

TCE 006060277-01

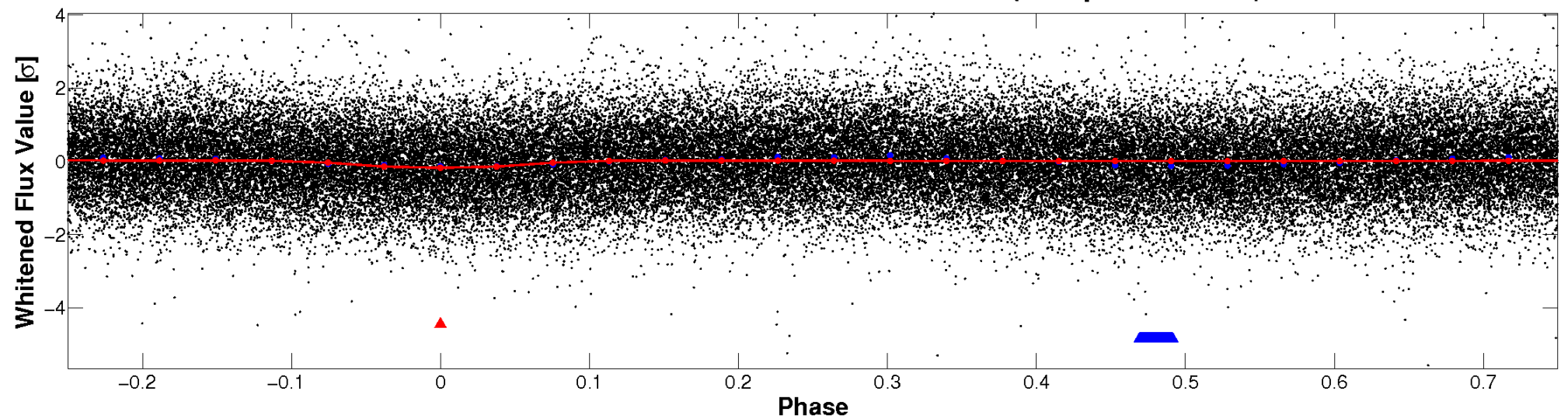


# Non-Whitened Vs. Whitened Light Curve

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



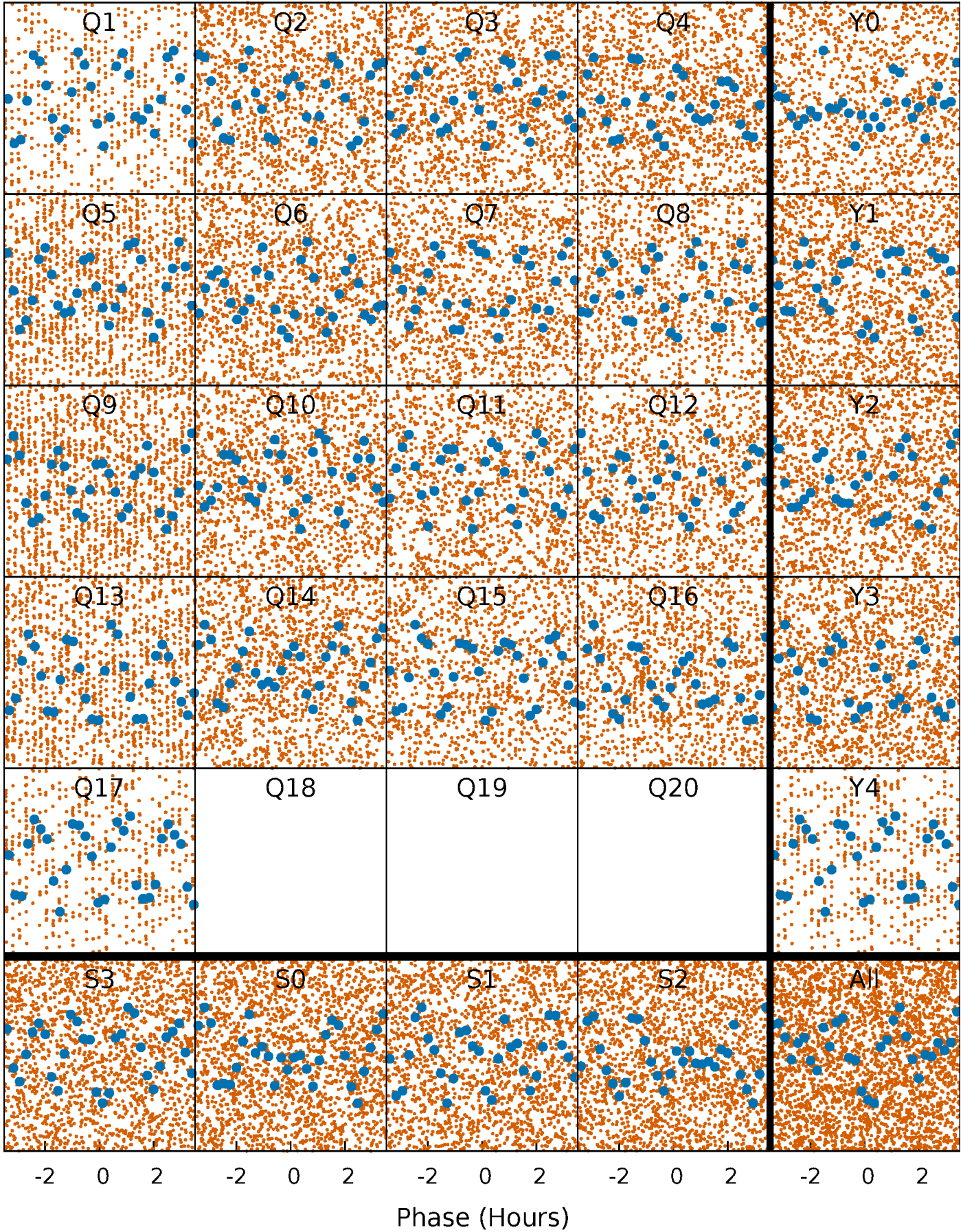
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

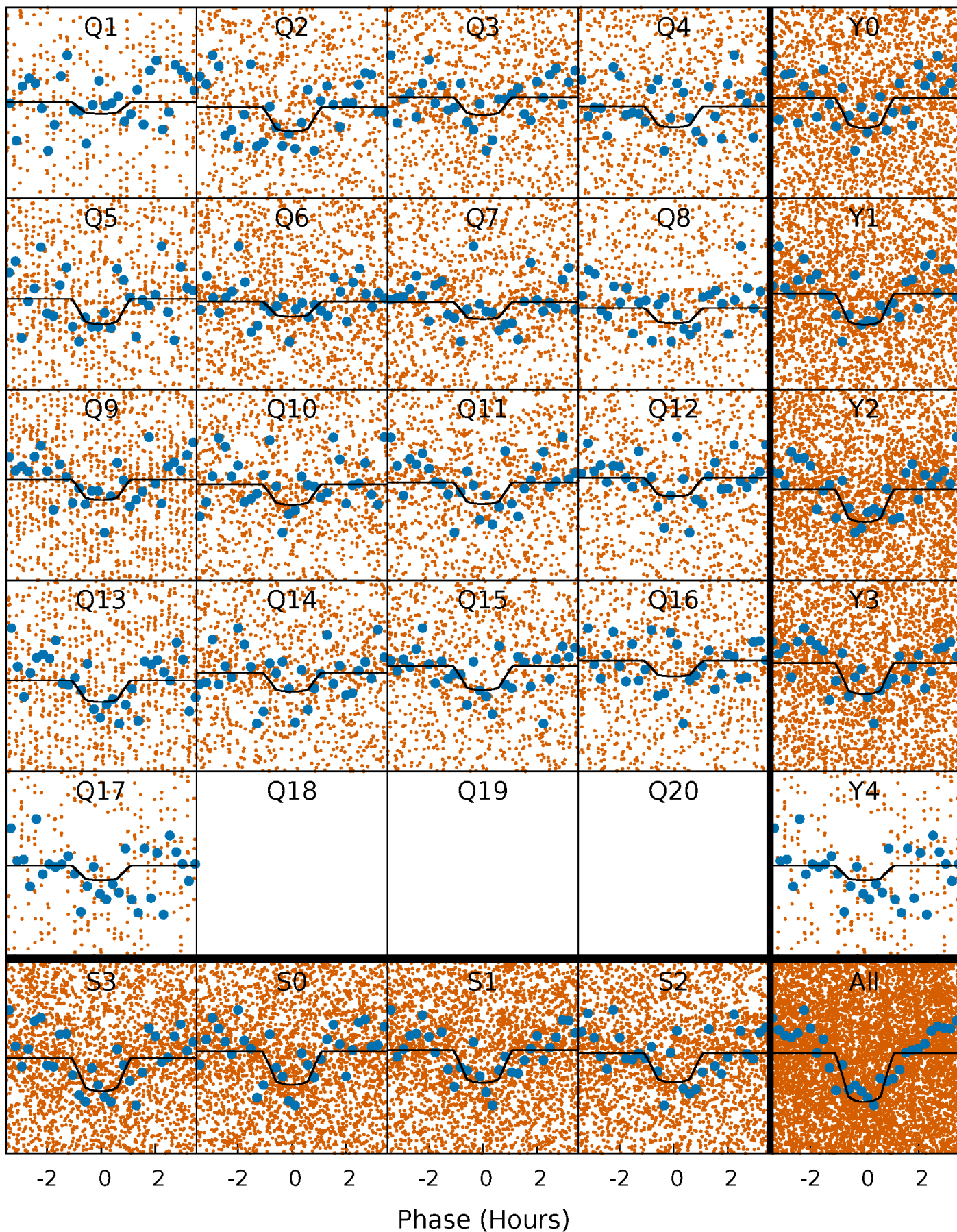
TCE 006060277-01 P= 0.541539 Days  $T_0=132.003087$  (BKJD)





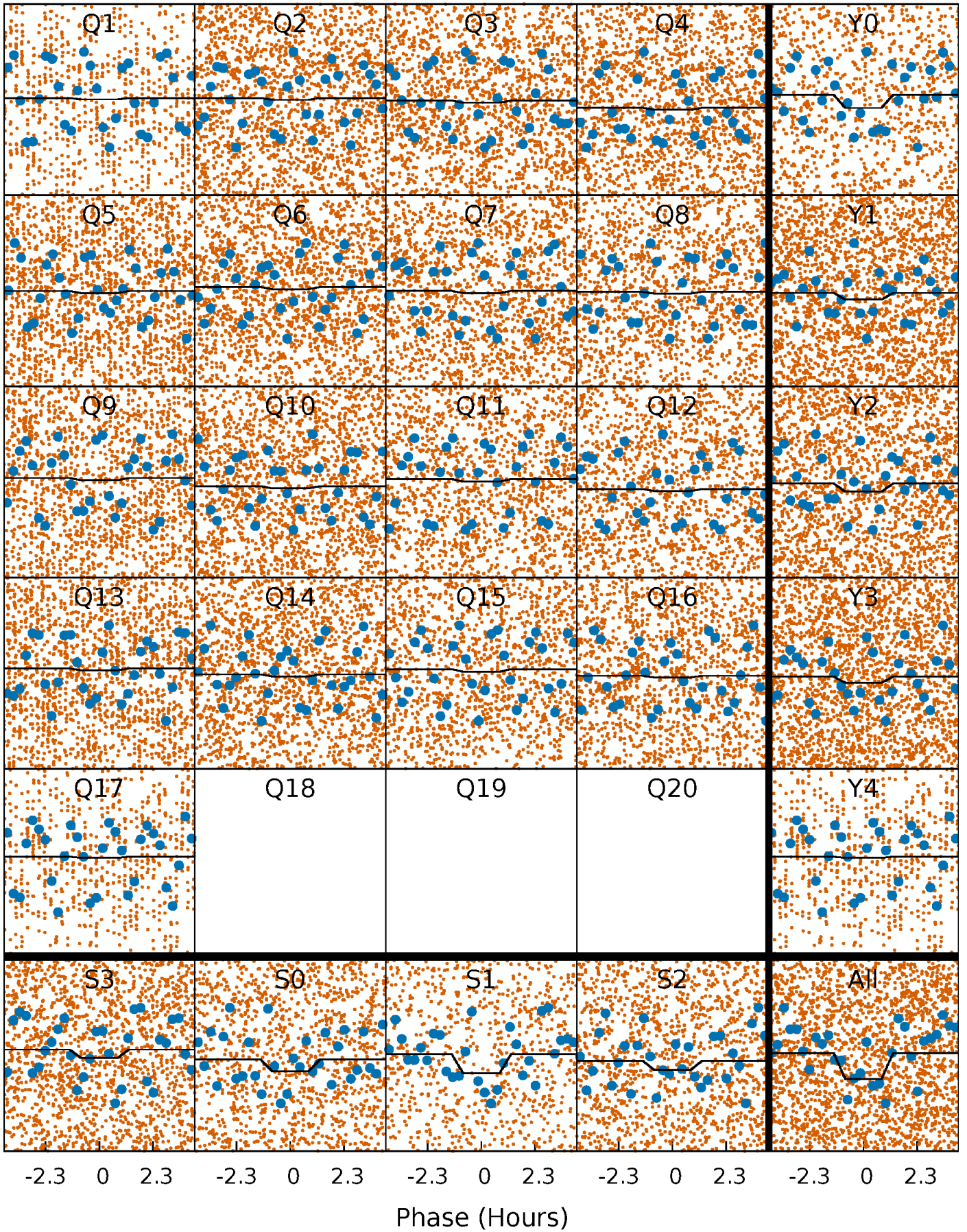
# DV Quarter-Phased Transit Curves

TCE 006060277-01 P= 0.541539 Days  $T_0=132.003087$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006060277-01 P= 0.541548 Days  $T_0=131.995899$  (BKJD)

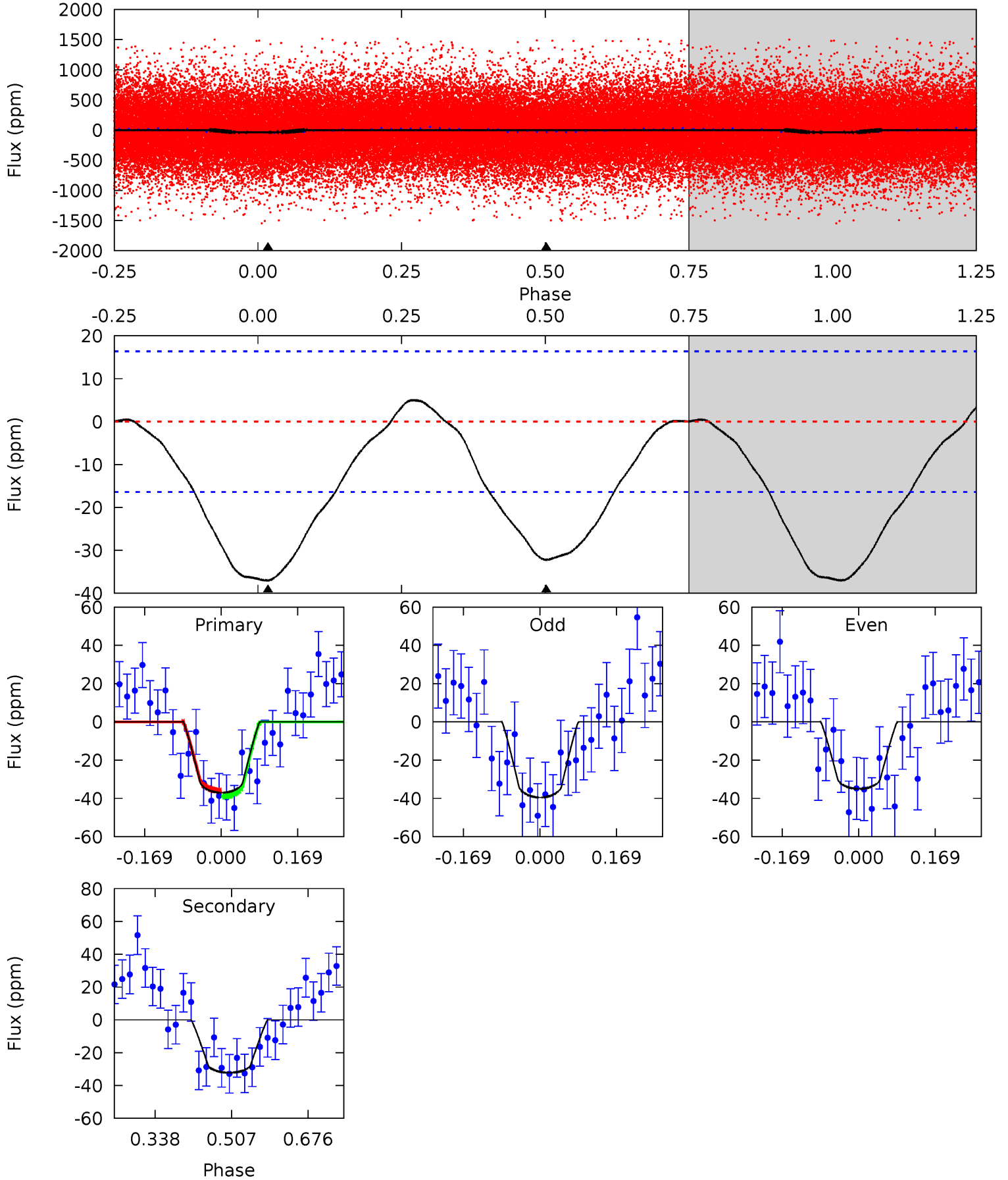




# DV Model-Shift Uniqueness Test

006060277-01, P = 0.541539 Days, E = 131.461548 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
10.1	8.76	0	0	4.45	1.38	0.84	10.1	10.1	8.76	8.76	0.61	0.90	0.12	0.41

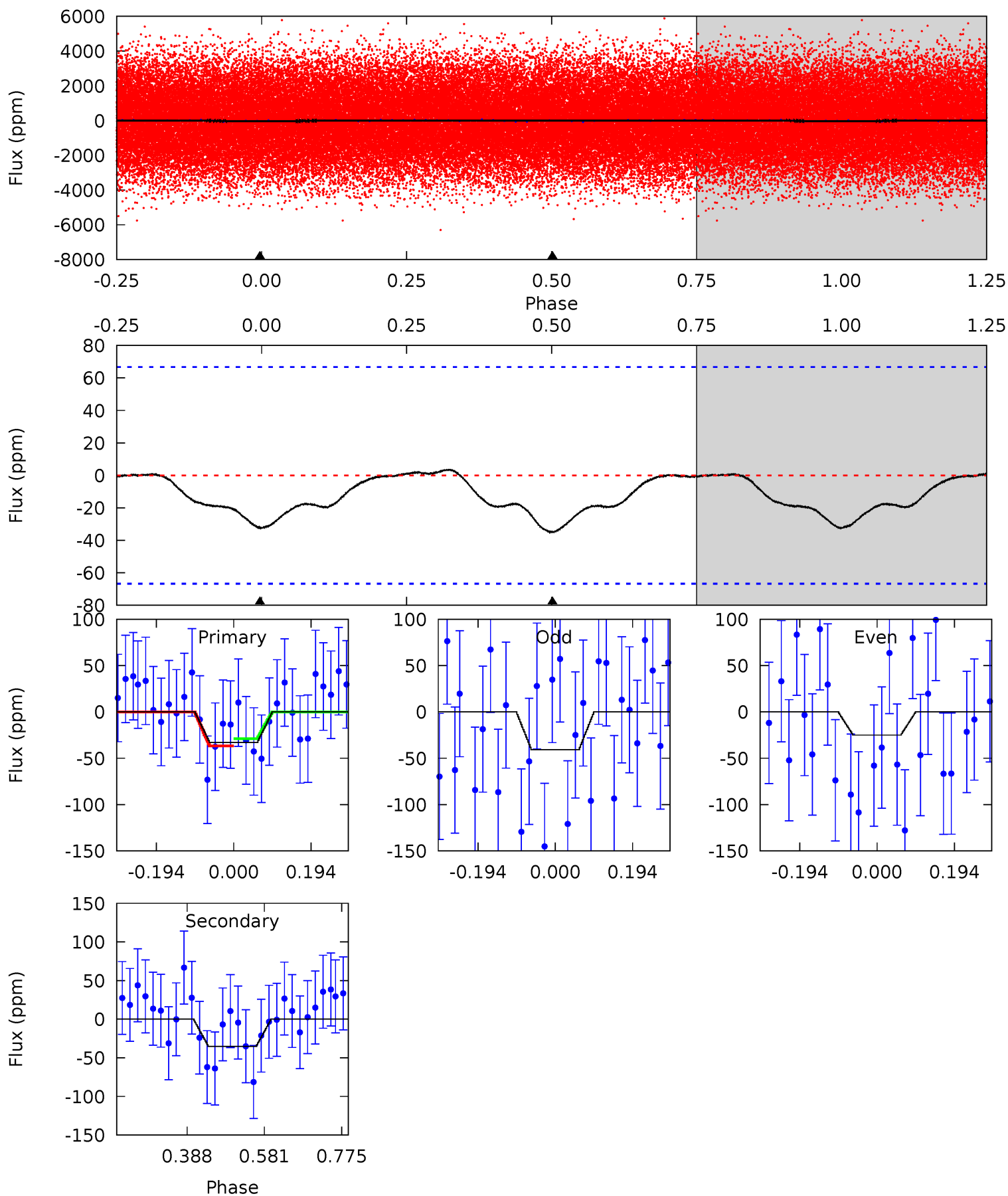




# Alt Model-Shift Uniqueness Test

006060277-01, P = 0.541548 Days, E = 131.454351 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
2.18	2.34	0	0	4.42	1.30	0.06	2.18	2.18	2.34	2.34	0.52	0.82	0.10	0.25



### Stellar Parameters For KIC 006060277

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7271^{+232}_{-319}$	$4.048^{+0.228}_{-0.171}$	$-0.200^{+0.250}_{-0.350}$	$1.924^{+0.551}_{-0.551}$	$1.505^{+0.199}_{-0.273}$	$0.298^{+0.406}_{-0.140}$
	+3%/-4%	+6%/-4%	+125%/-175%	+29%/-29%	+13%/-18%	+136%/-47%
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 006060277-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-32 \pm 4$	$1.38^{+0.72}_{-0.68}$	$5038^{+425}_{-478}$	$6264^{+3308}_{-1281}$	$2.016^{+5.562}_{-1.134}$
Alt.	$-35 \pm 15$	$1.19^{+0.69}_{-0.59}$	$5051^{+418}_{-454}$	$6933^{+4921}_{-1831}$	$2.800^{+9.230}_{-1.836}$

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

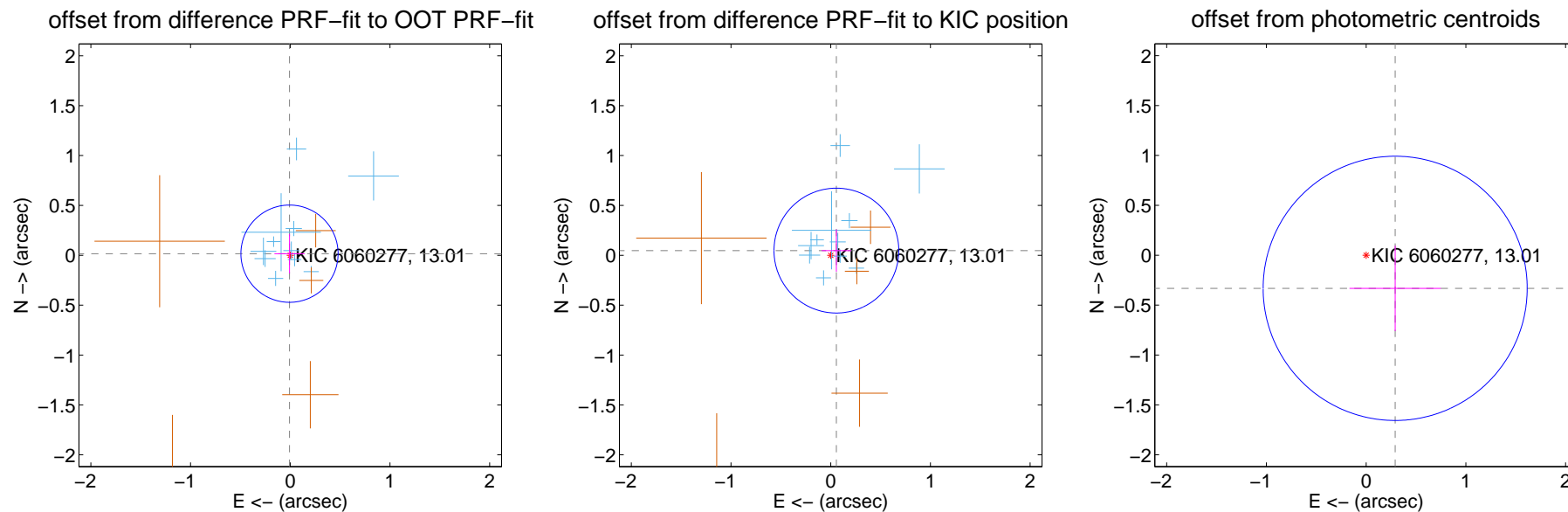
## DV Centroid Data

Supplemental centroid analysis for 006060277-01. Kepler magnitude: 13.01. Transit SNR 13.94

There are 11 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

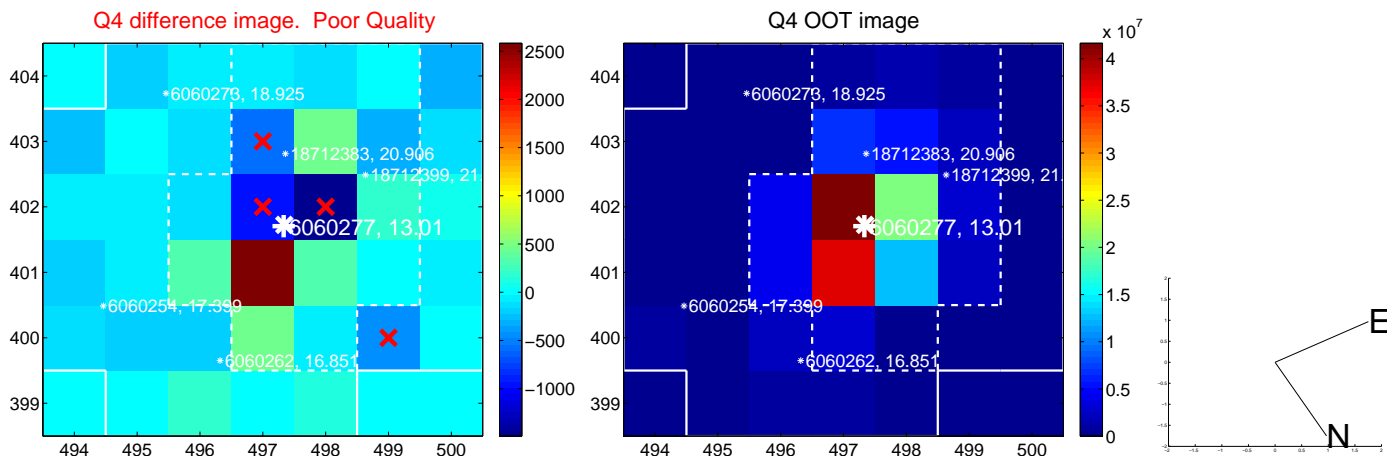
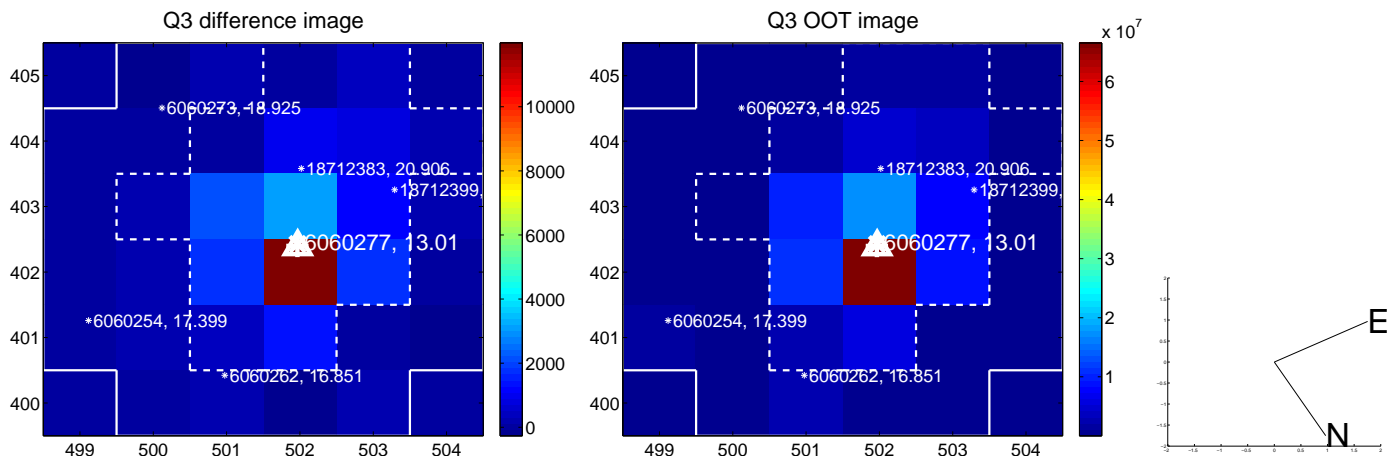
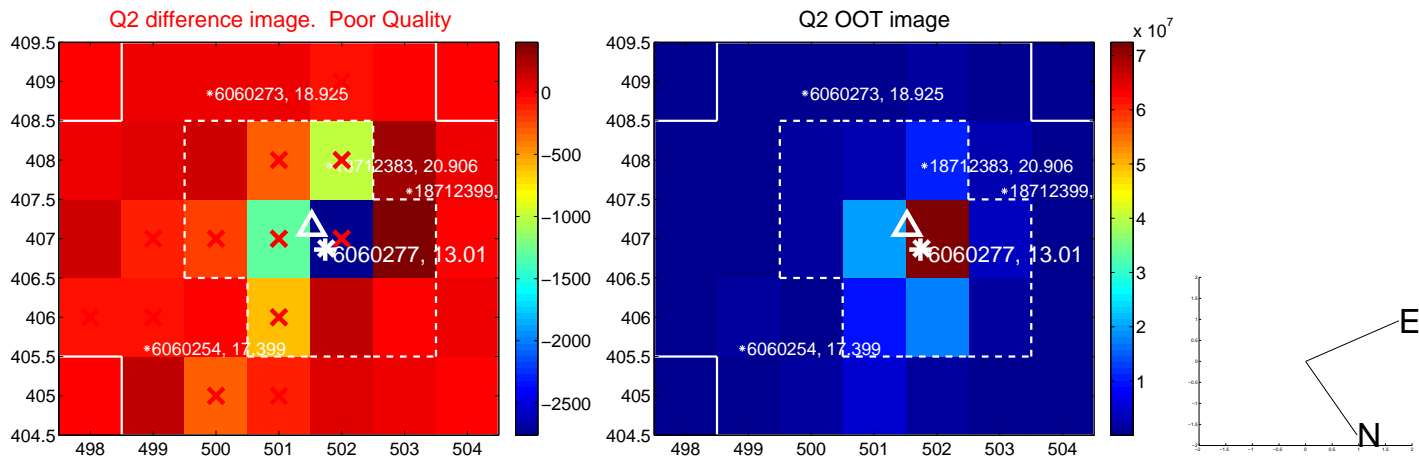
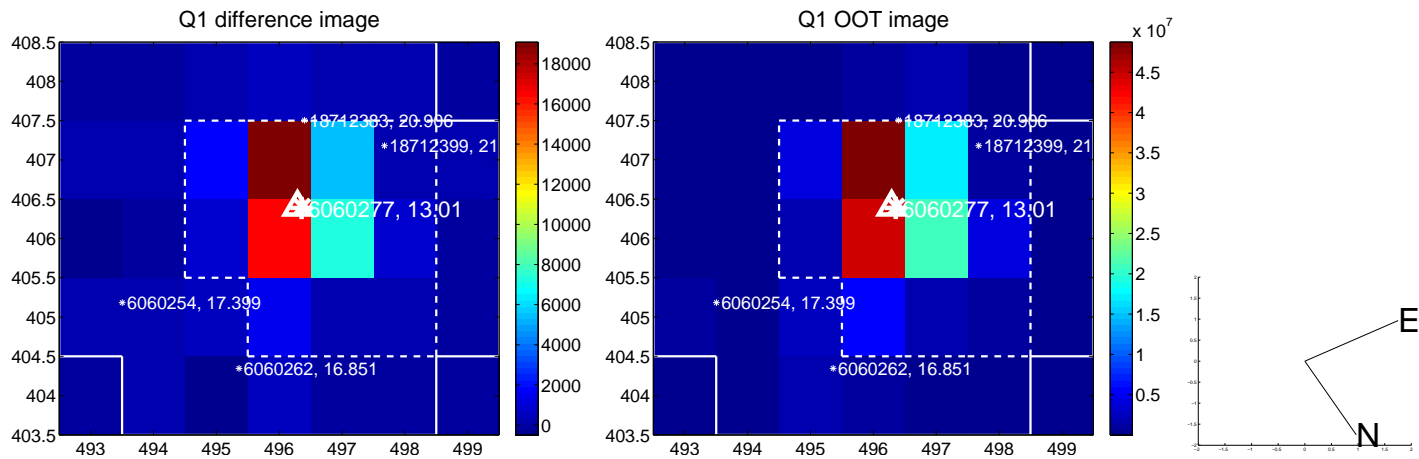
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.018 \pm 0.163$	0.11	$0.008 \pm 0.151$	$0.016 \pm 0.197$
PRF-fit source offset from KIC position	$0.074 \pm 0.209$	0.35	$-0.057 \pm 0.148$	$0.047 \pm 0.212$
photometric centroid source offset	$0.44 \pm 0.44$	1.00	$-0.29 \pm 0.46$	$-0.33 \pm 0.43$



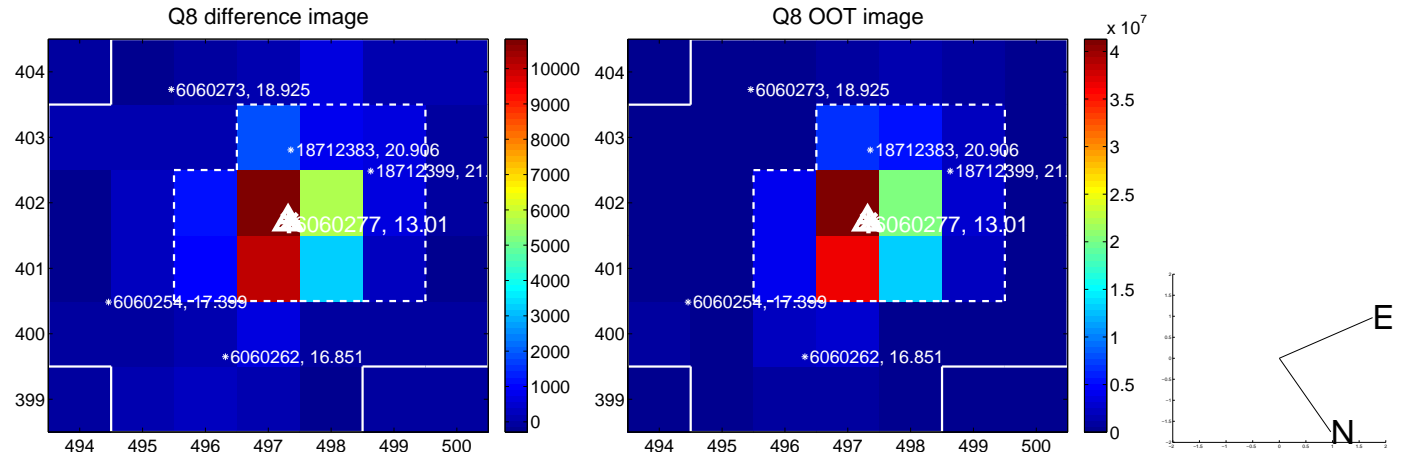
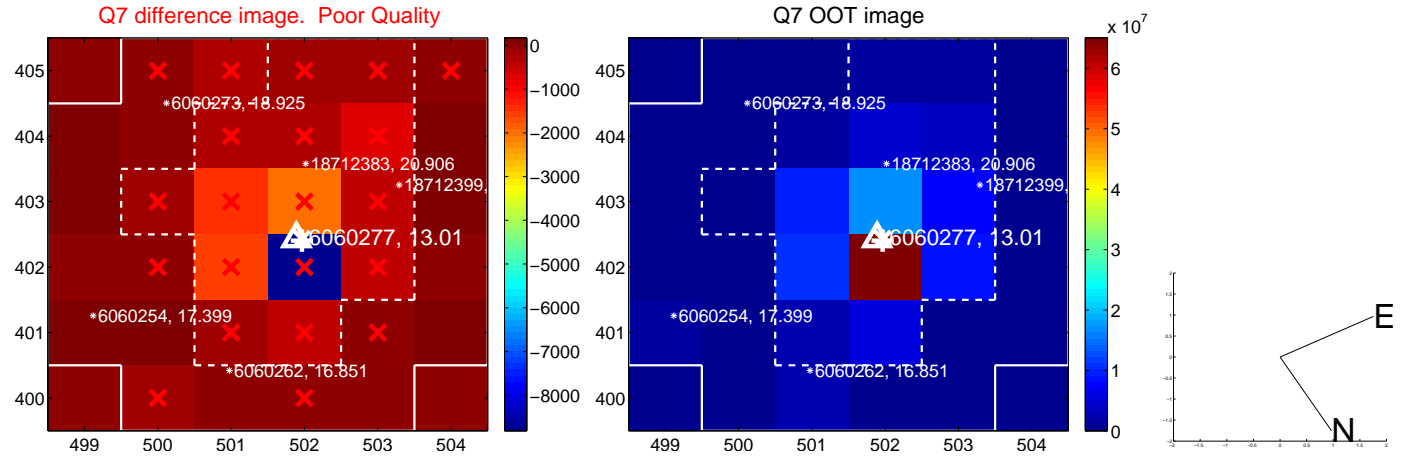
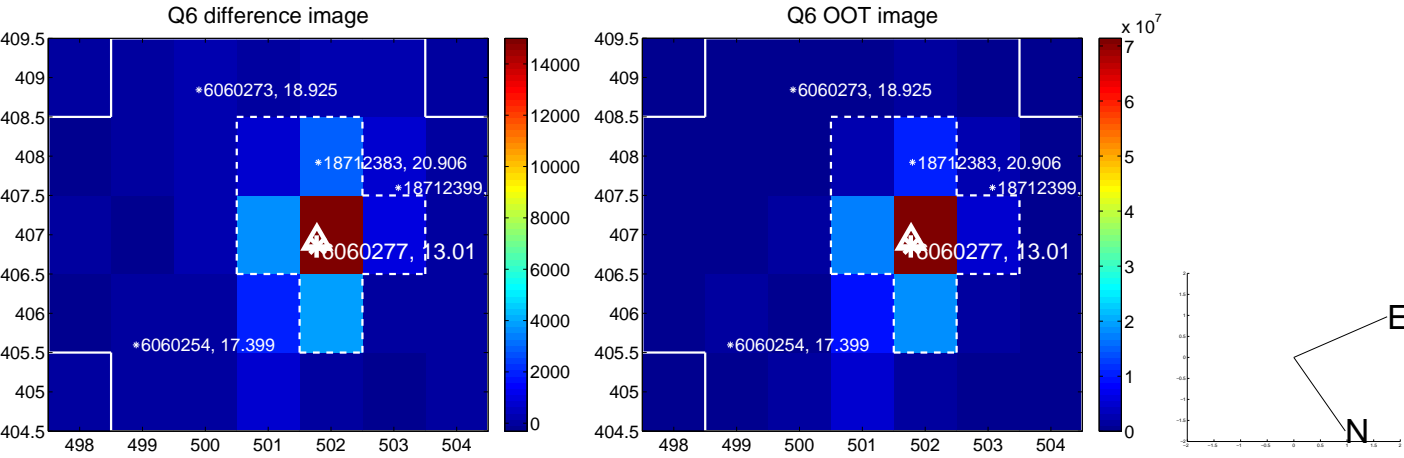
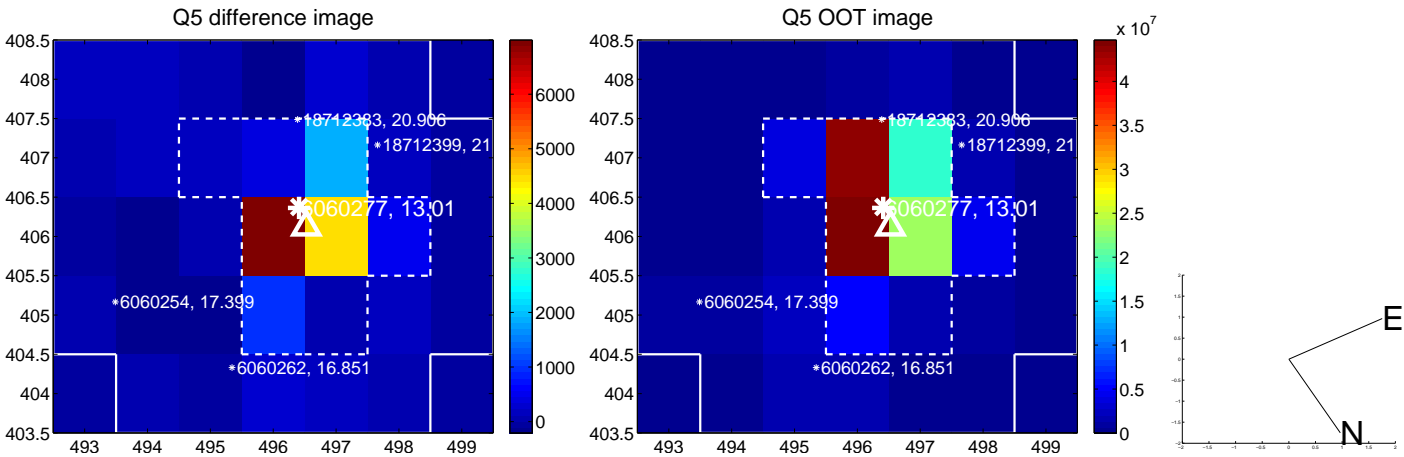
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



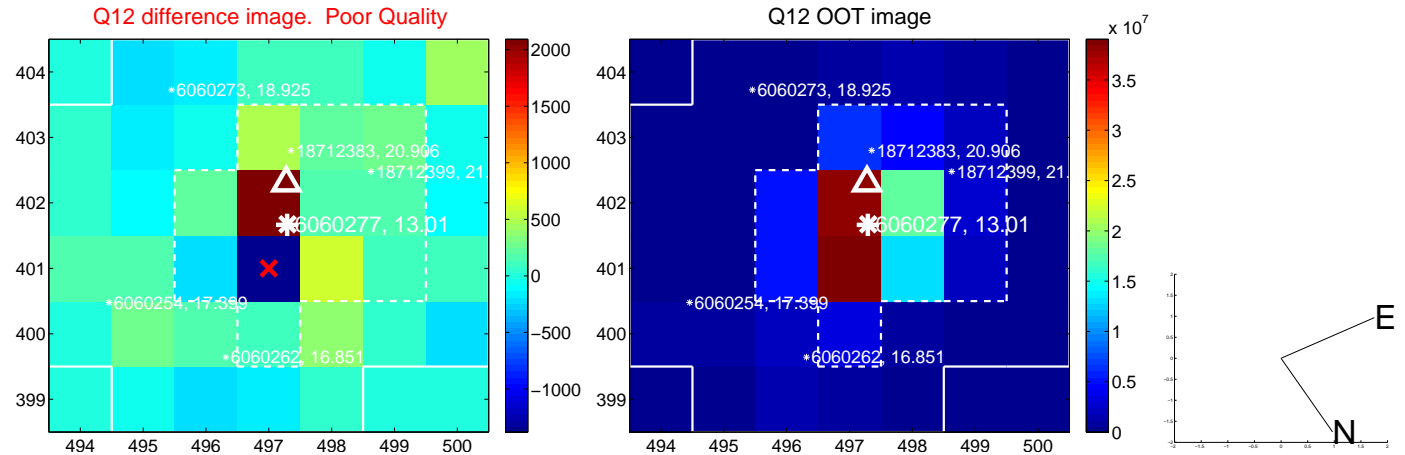
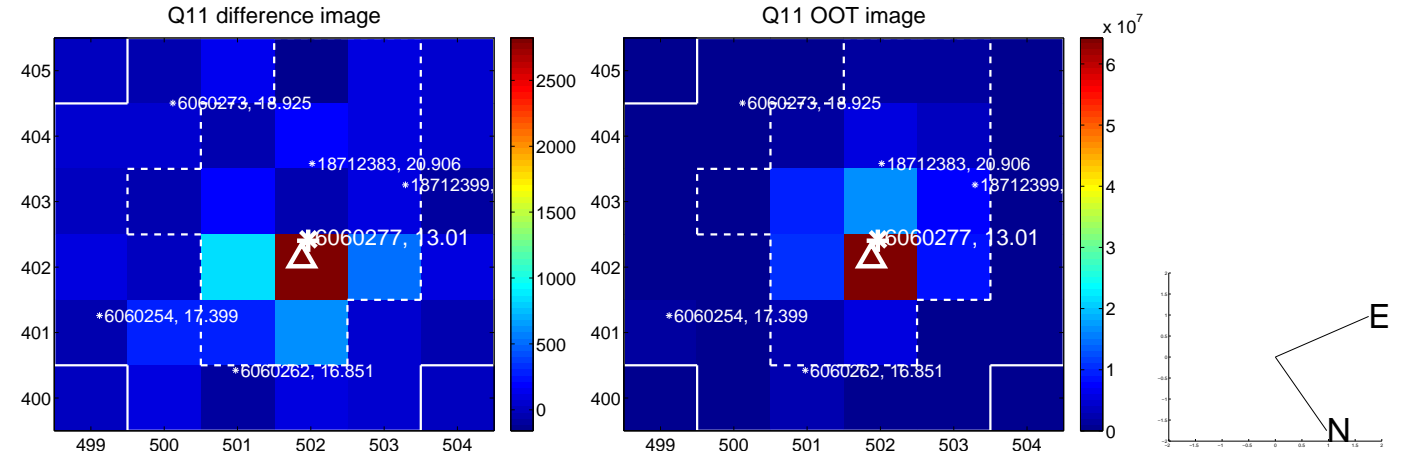
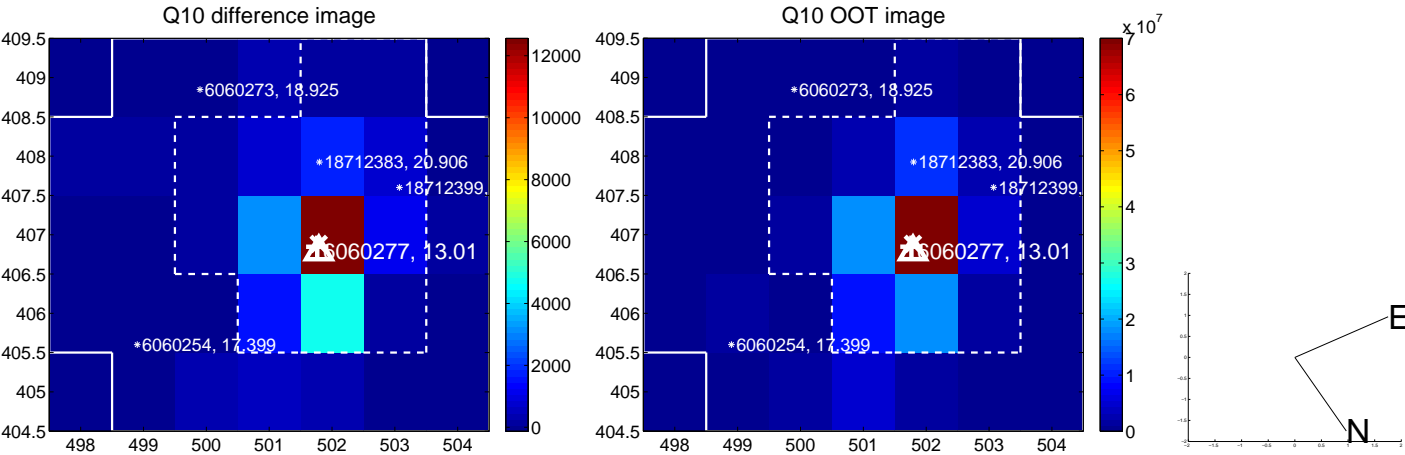
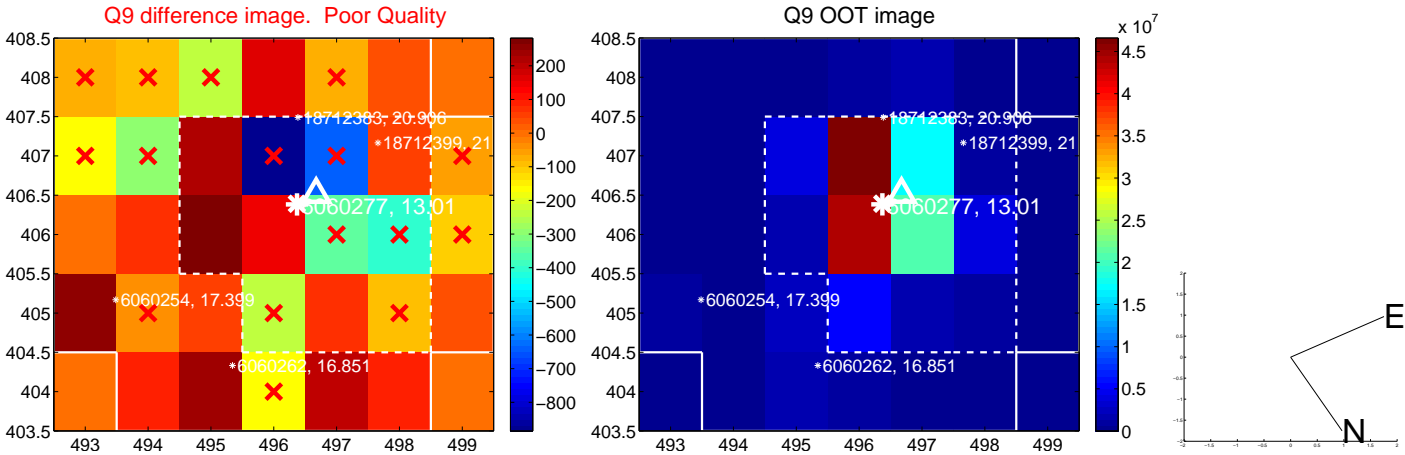
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

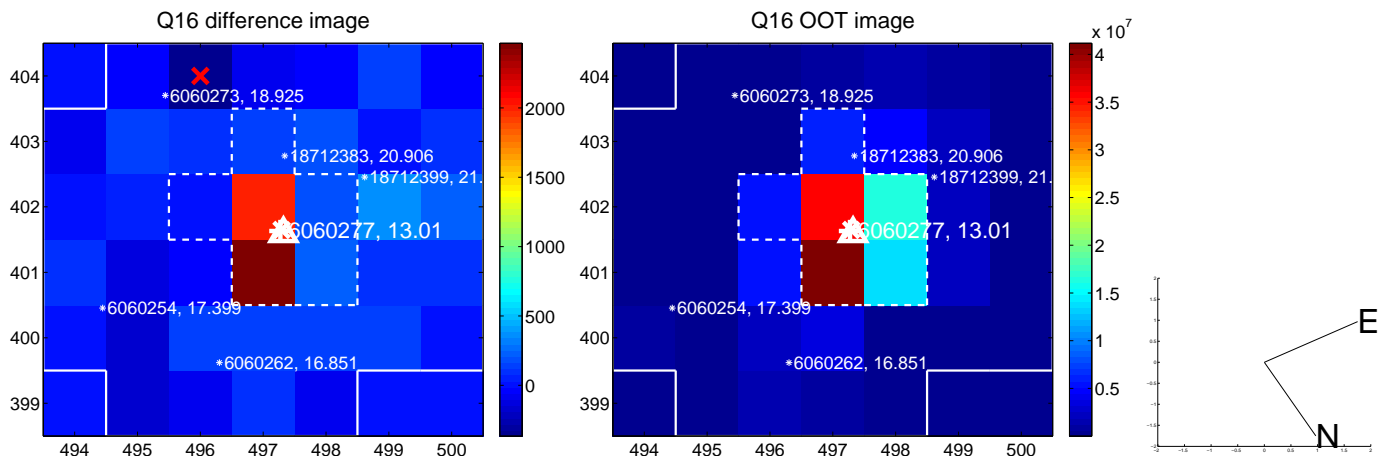
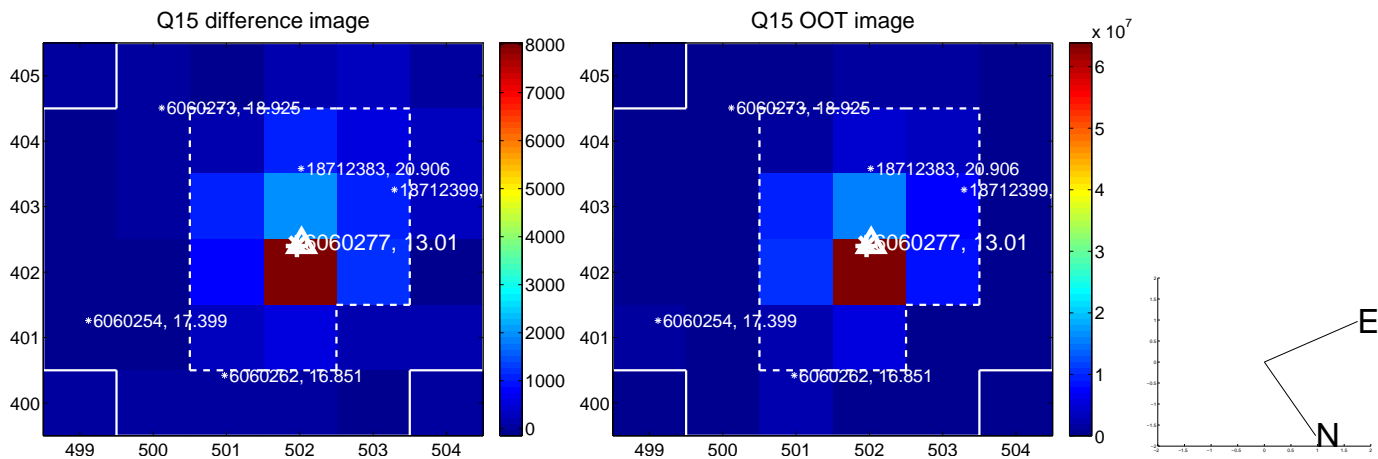
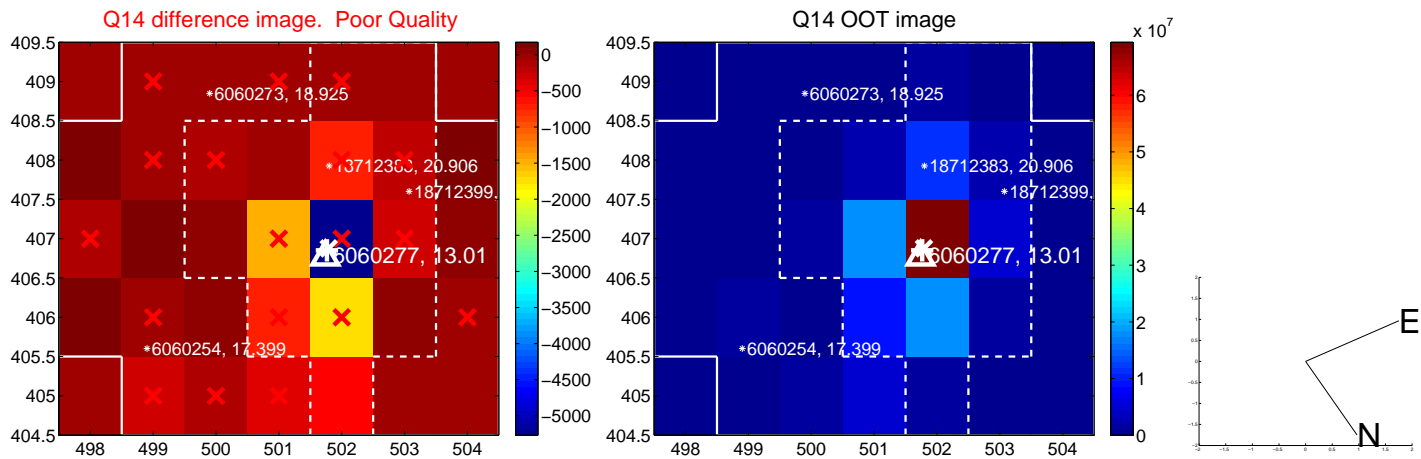
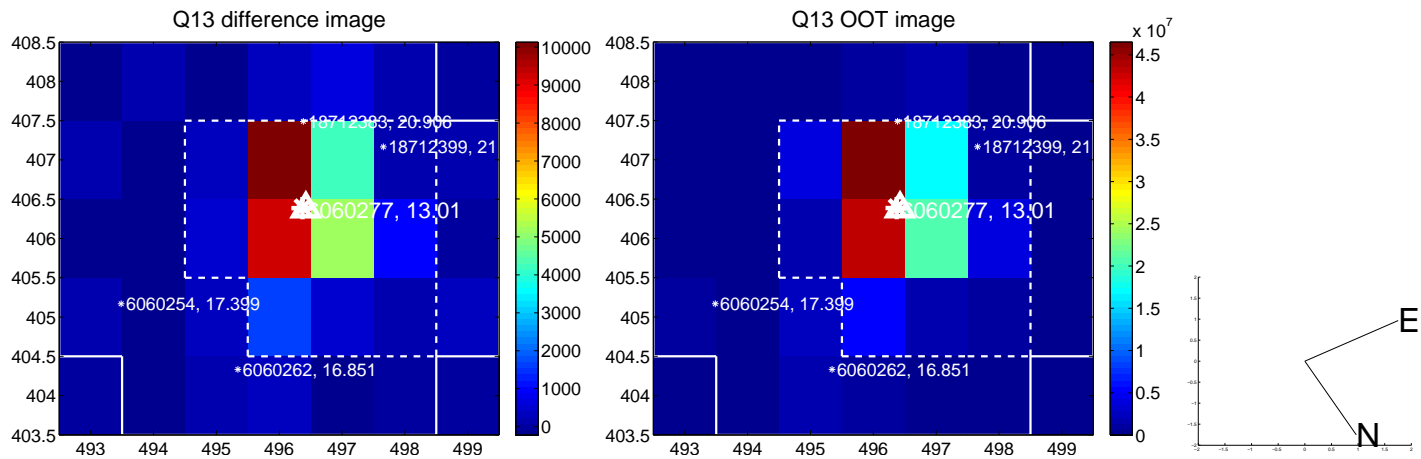


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

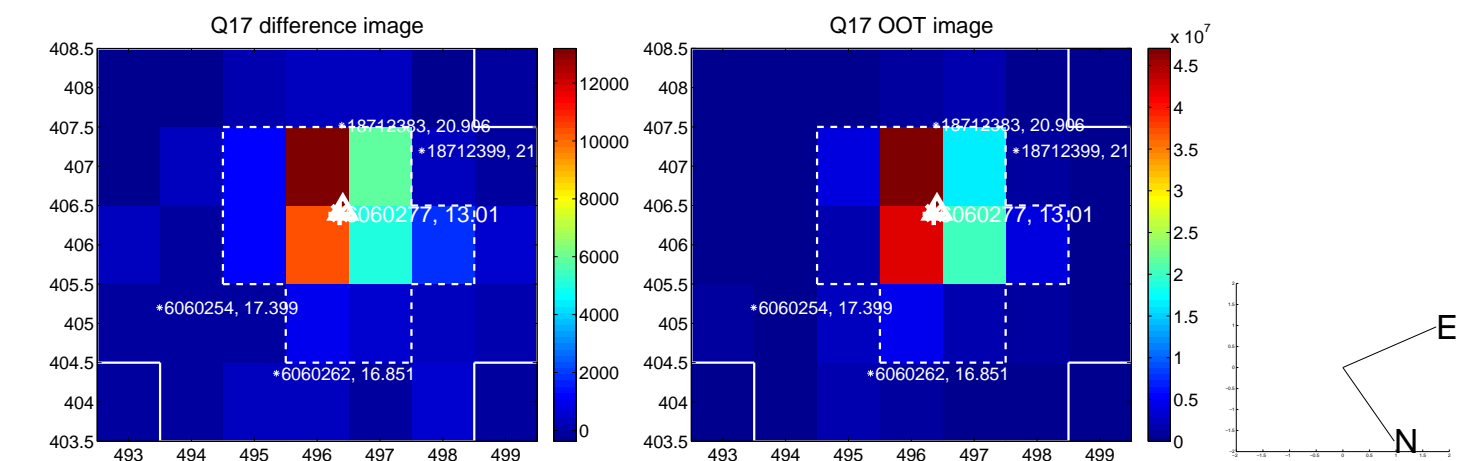




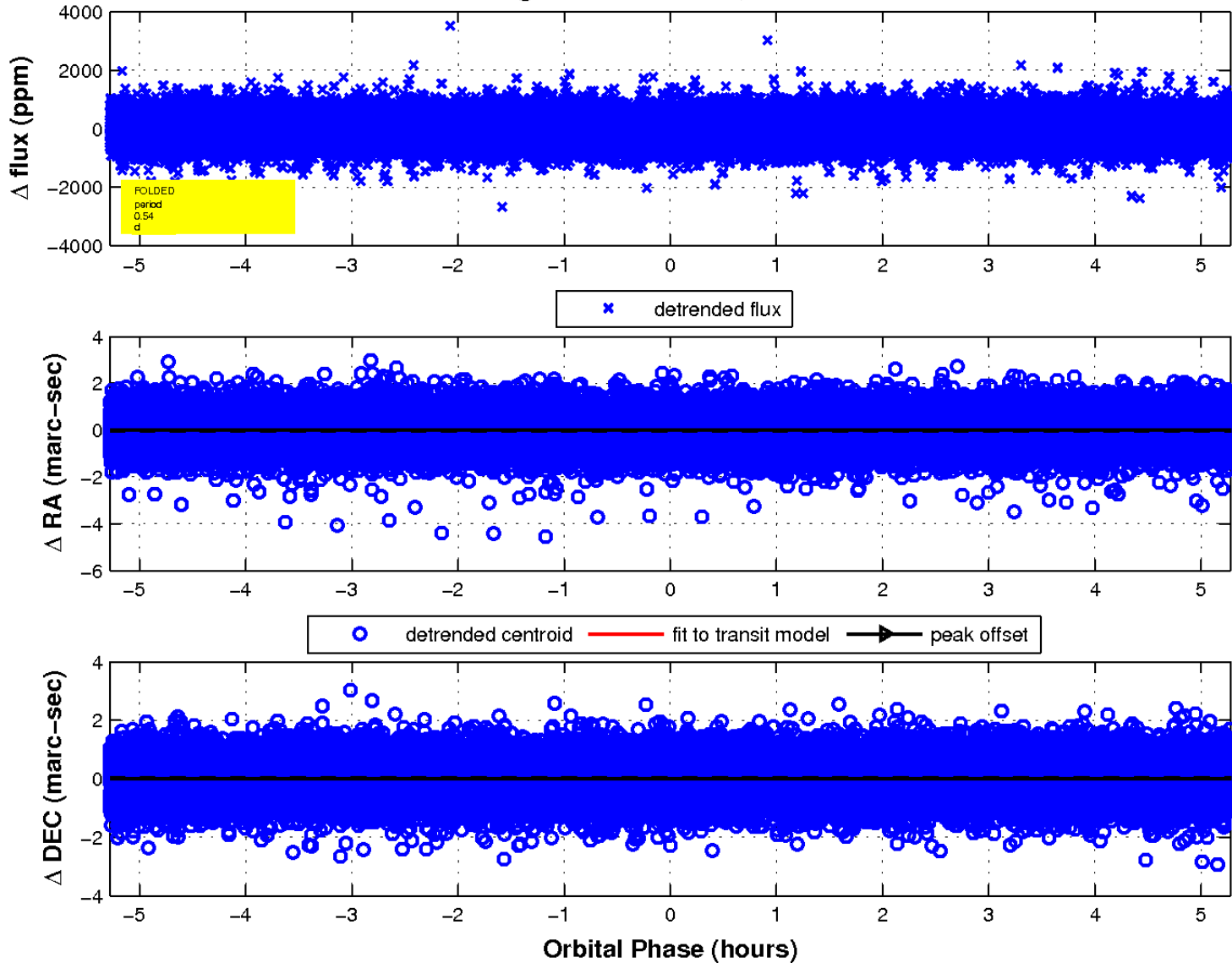
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



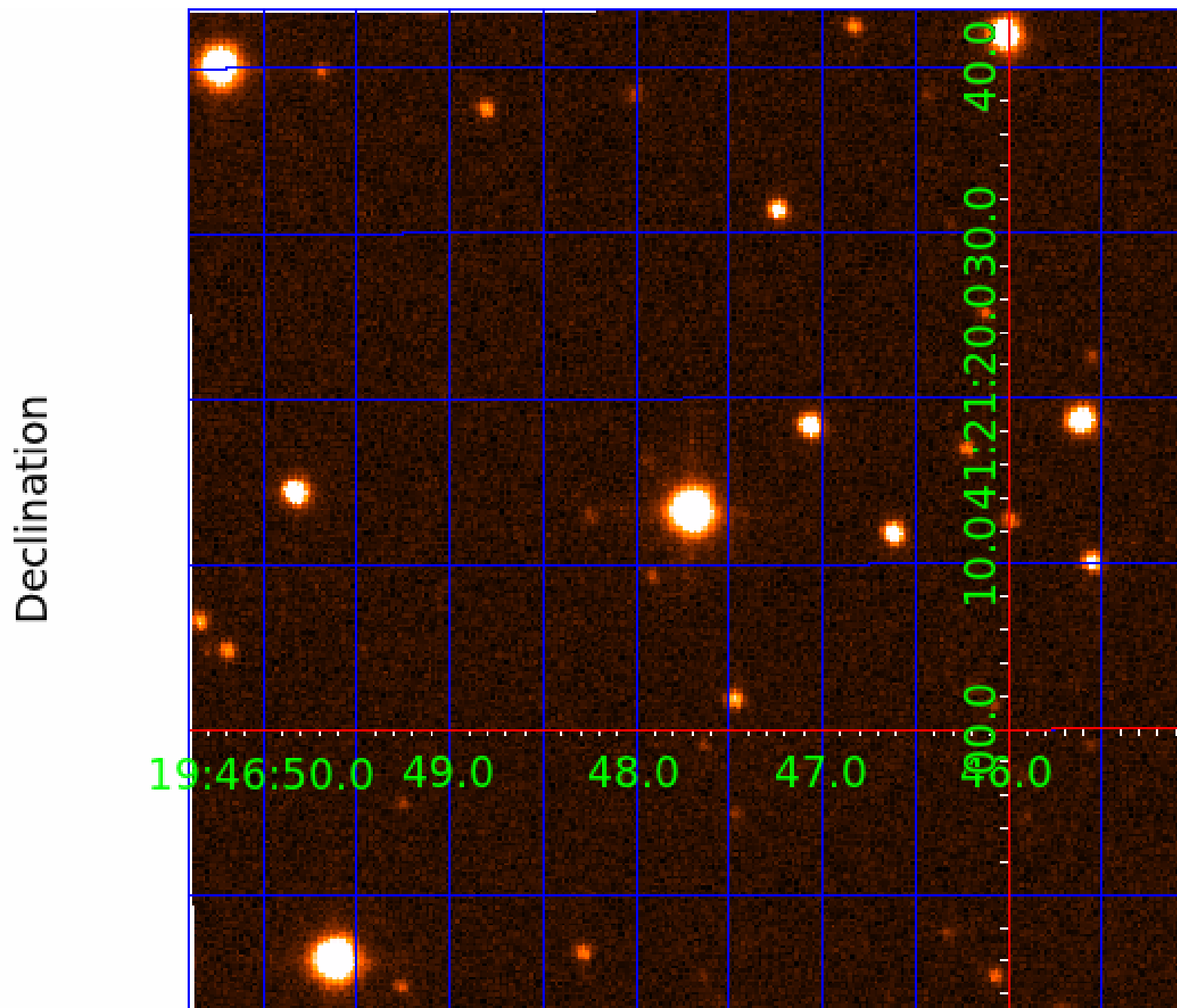
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image





# KIC 006060277

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006060277-01	OBS	No	0.541539	132.003087	40.4	1.760	12.6	13.9	1.92	7271	1.42	41677.44
006060277-02	OBS	No	0.541535	131.727677	30.6	2.672	11.4	11.5	1.92	7271	1.08	41677.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006060277-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
006060277-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

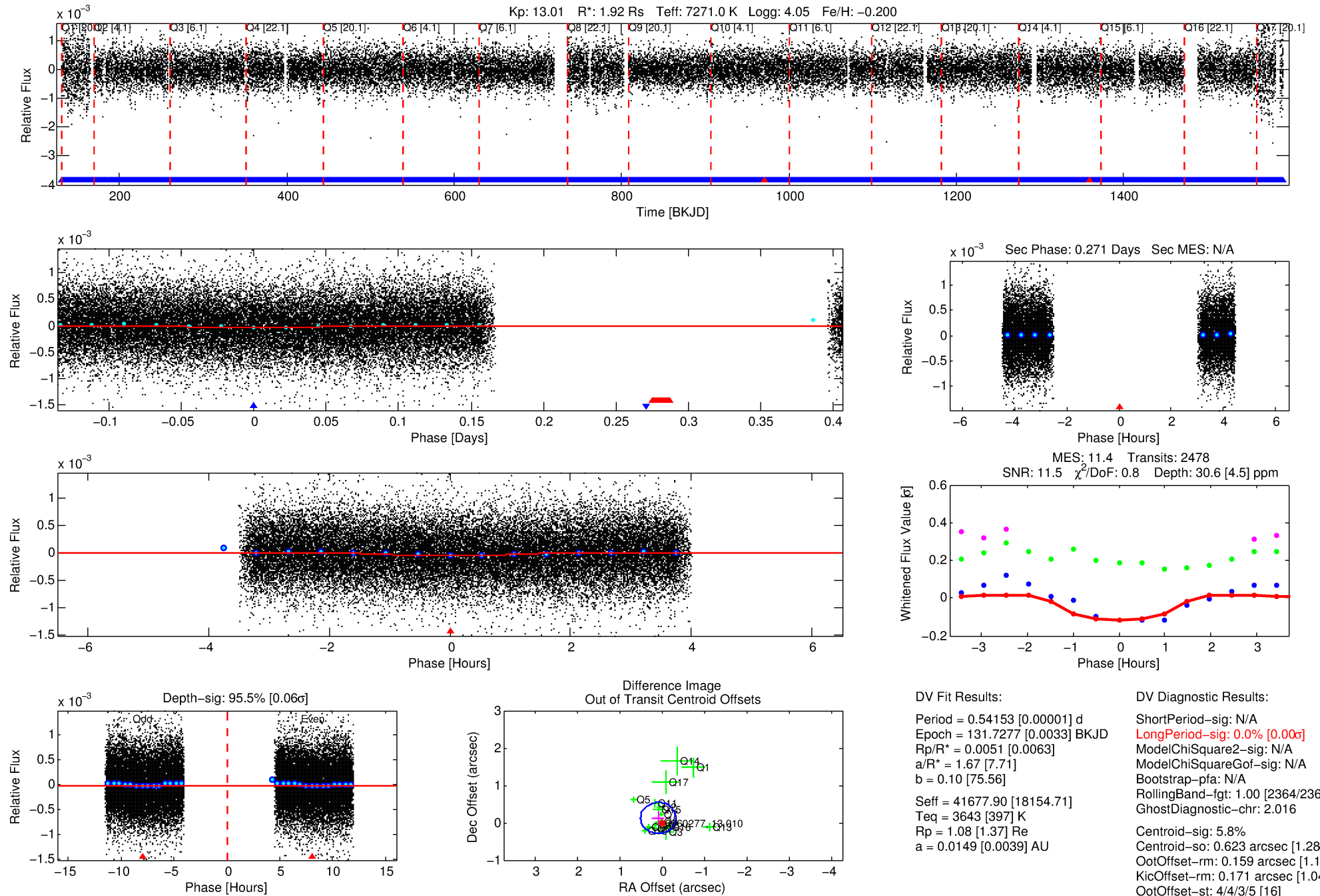
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006060277-02

No Significant Match Found

# DV One-Page Summary

KIC: 6060277 Candidate: 2 of 2 Period: 0.542 d



## DV Fit Results:

Period = 0.54153 [0.00001] d  
Epoch = 131.7277 [0.0033] BKJD  
Rp/R\* = 0.0051 [0.0063]  
a/R\* = 1.67 [7.71]  
b = 0.10 [75.56]  
Seff = 41677.90 [18154.71]  
Teff = 3643 [397] K  
Rp = 1.08 [1.37] Re  
a = 0.0149 [0.0039] AU

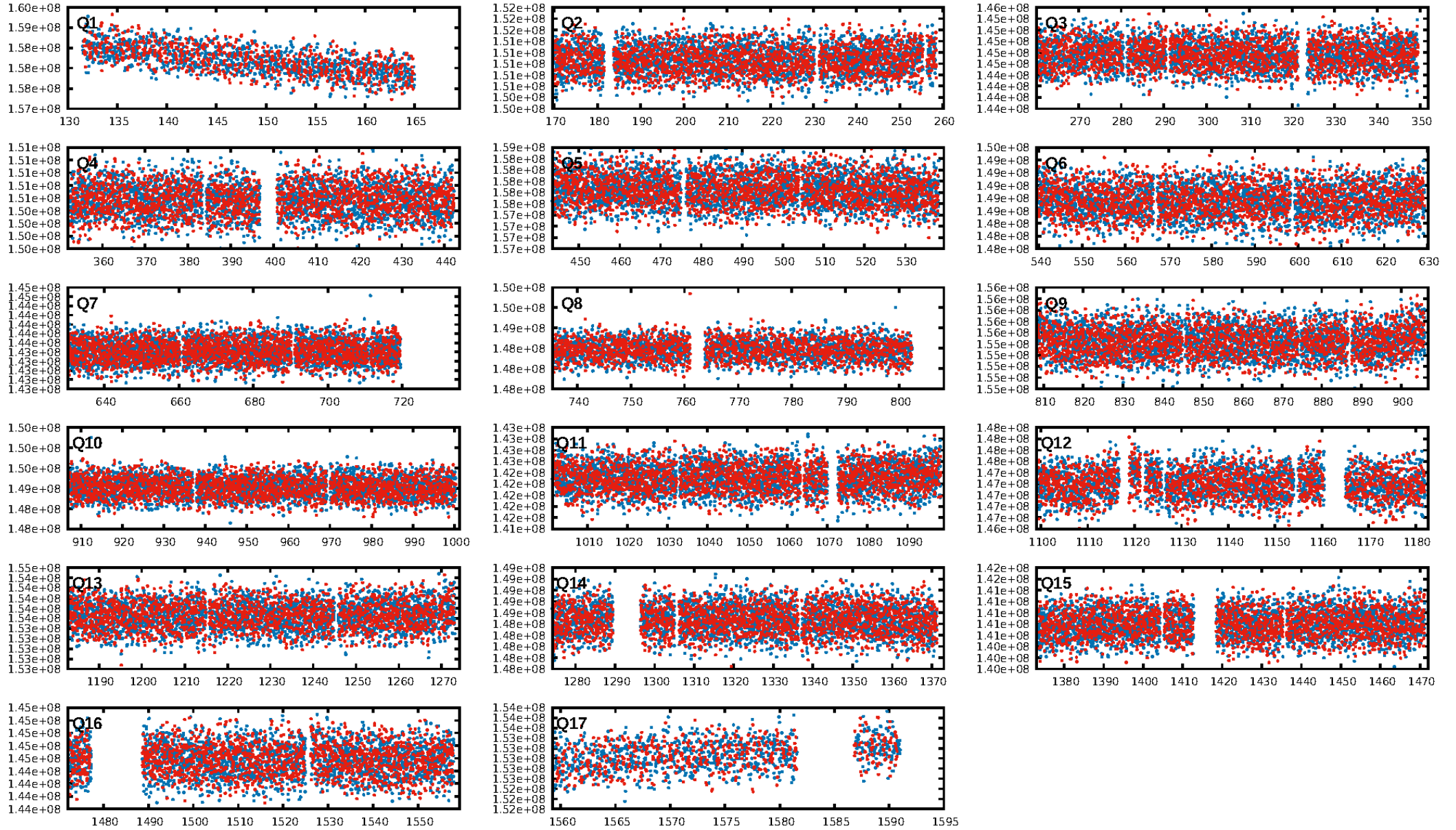
## DV Diagnostic Results:

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 [2364/2366]  
GhostDiagnostic-chr: 2.016  
Centroid-sig: 5.8%  
Centroid-so: 0.623 arcsec [1.28 $\sigma$ ]  
OotOffset-rm: 0.159 arcsec [1.15 $\sigma$ ]  
KicOffset-rm: 0.171 arcsec [1.04 $\sigma$ ]  
OotOffset-st: 4/4/3/5 [16]  
KicOffset-st: 4/4/3/5 [16]  
DiffImageQuality-fgm: 0.56 [9/16]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:48:51 Z

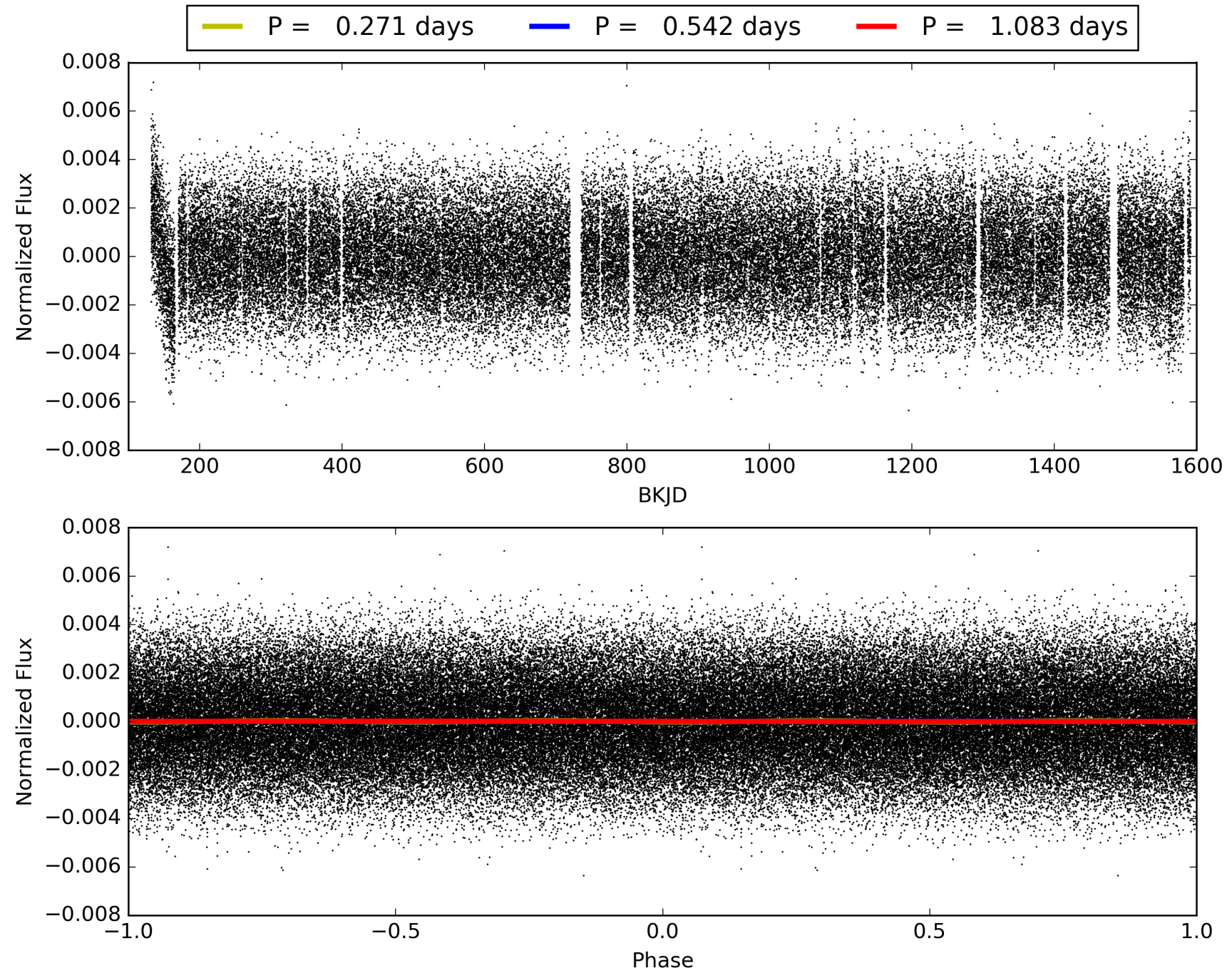
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006060277-02, PDC Light Curves



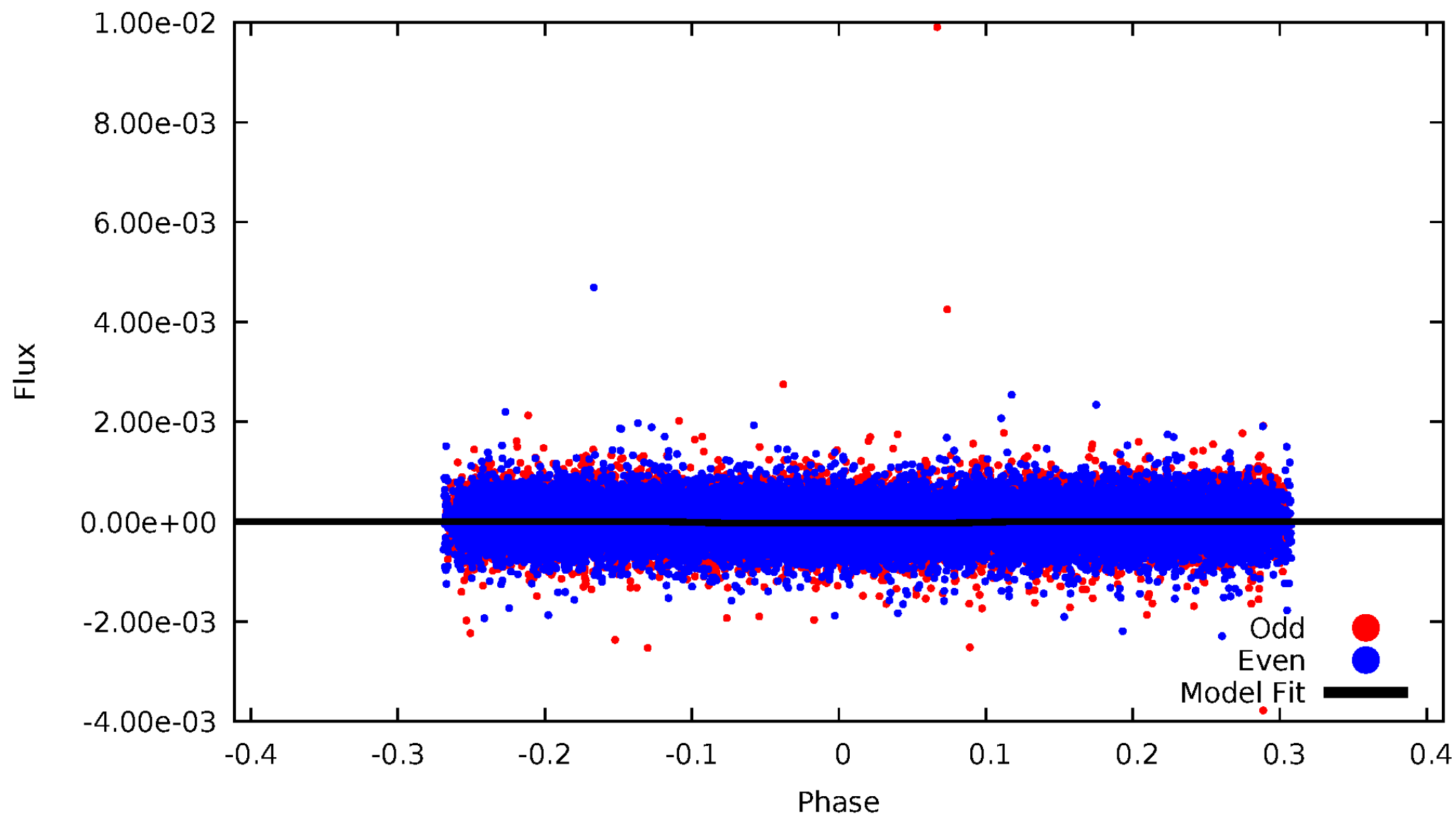


TCE 006060277-02



# DV Odd/Even

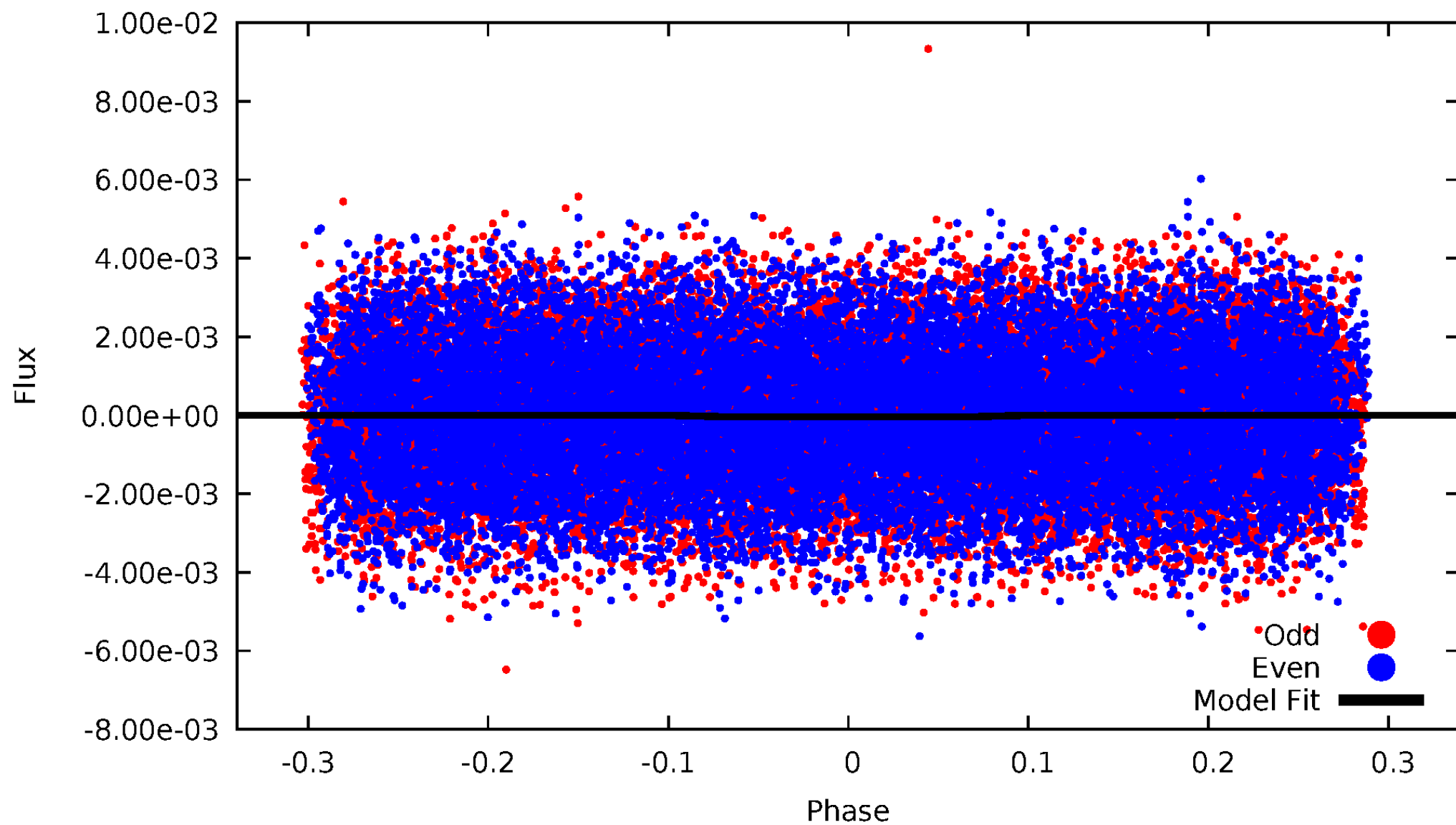
TCE 006060277-02





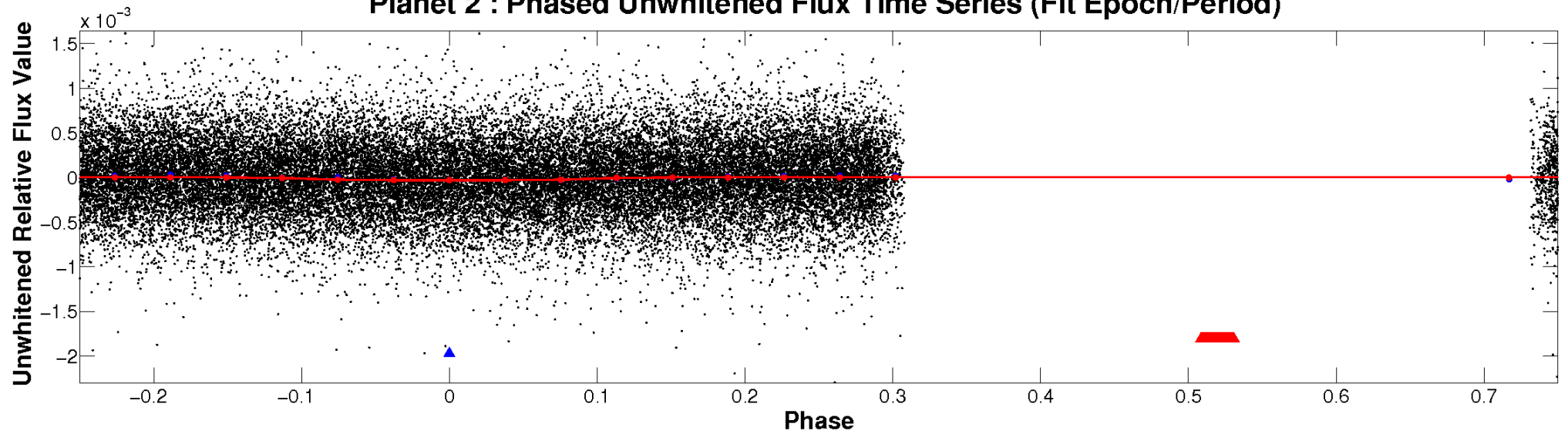
# ALT Odd/Even

TCE 006060277-02

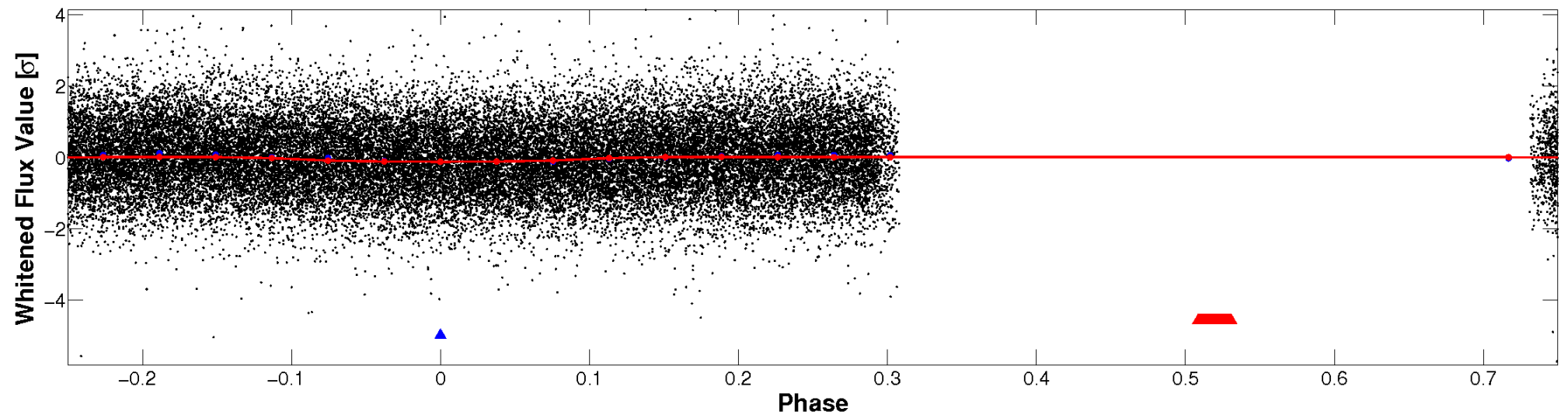


# Non-Whitened Vs. Whitened Light Curve

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

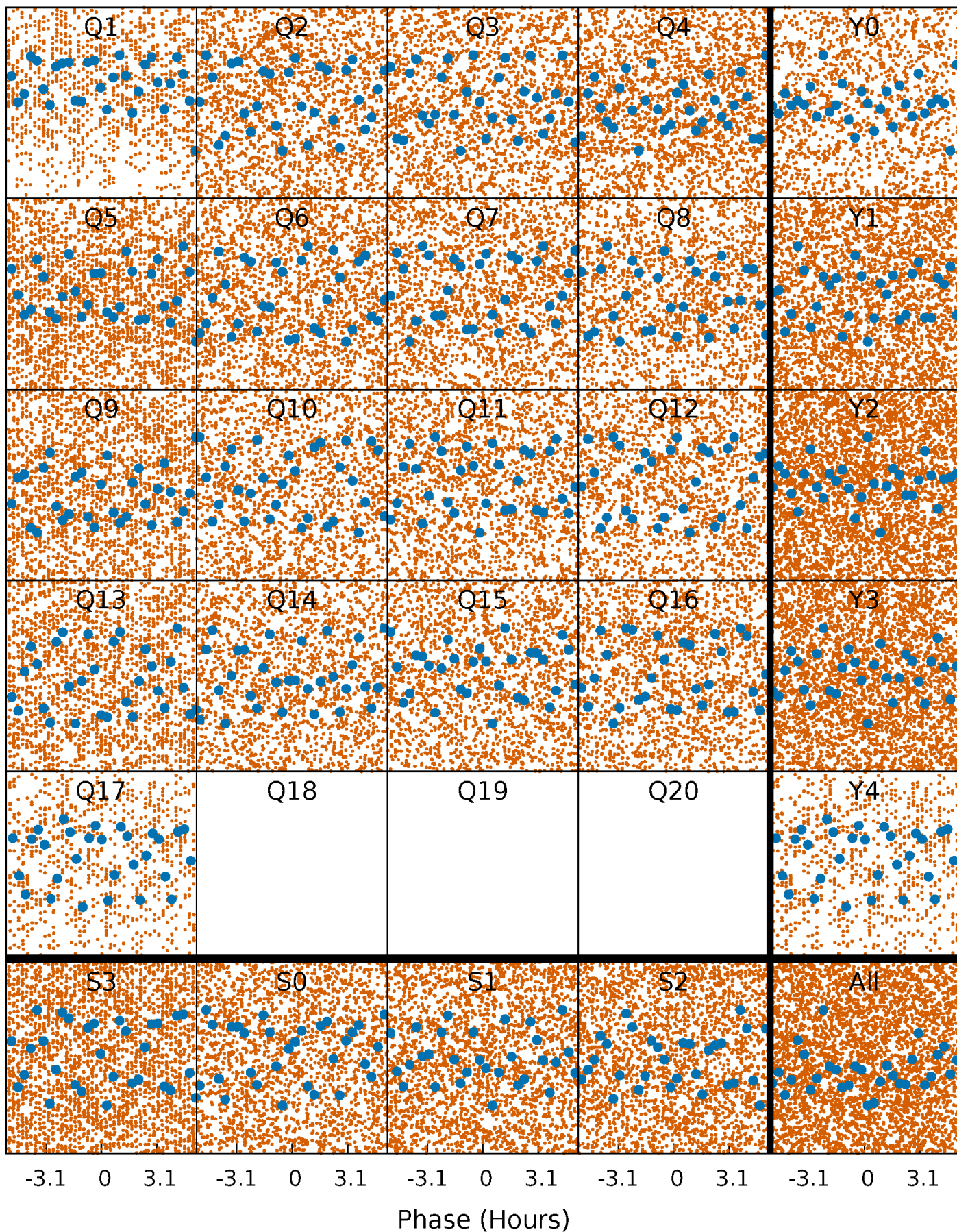


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

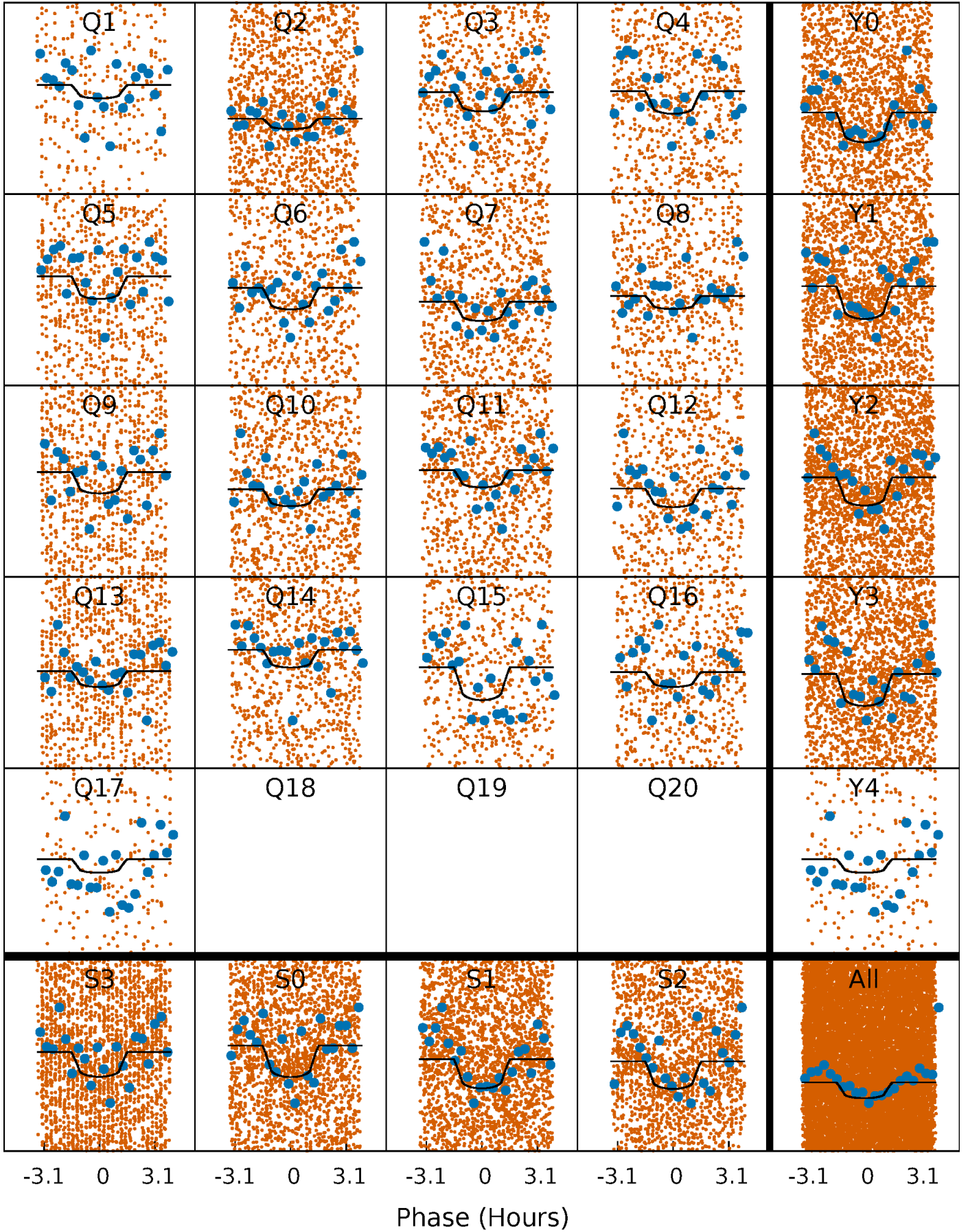
TCE 006060277-02 P= 0.541535 Days  $T_0=131.727677$  (BKJD)





# DV Quarter-Phased Transit Curves

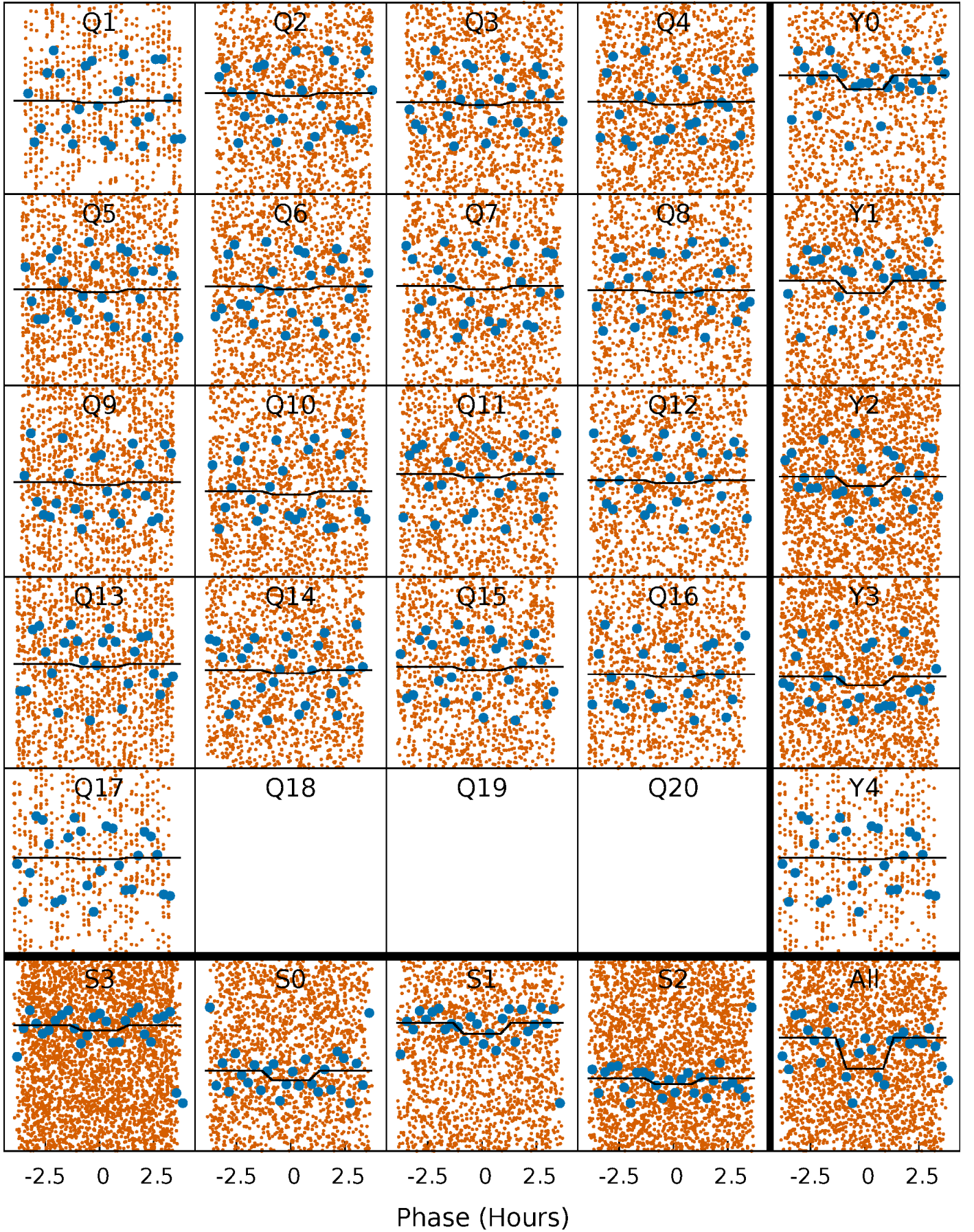
TCE 006060277-02    P= 0.541535 Days     $T_0=131.727677$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

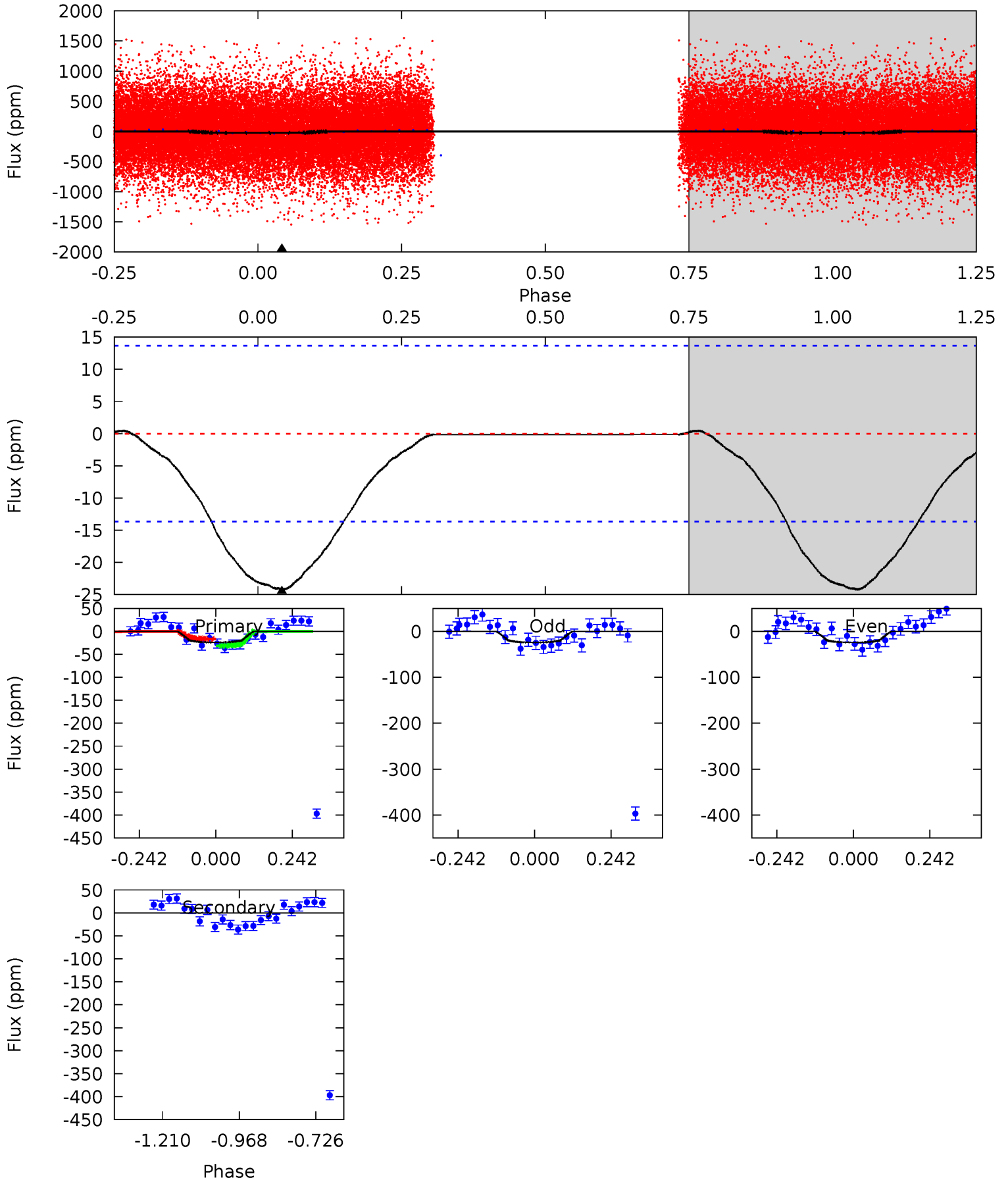
TCE 006060277-02     $P = 0.541548$  Days     $T_0 = 131.724682$  (BKJD)



# DV Model-Shift Uniqueness Test

006060277-02, P = 0.541535 Days, E = 131.186142 Days

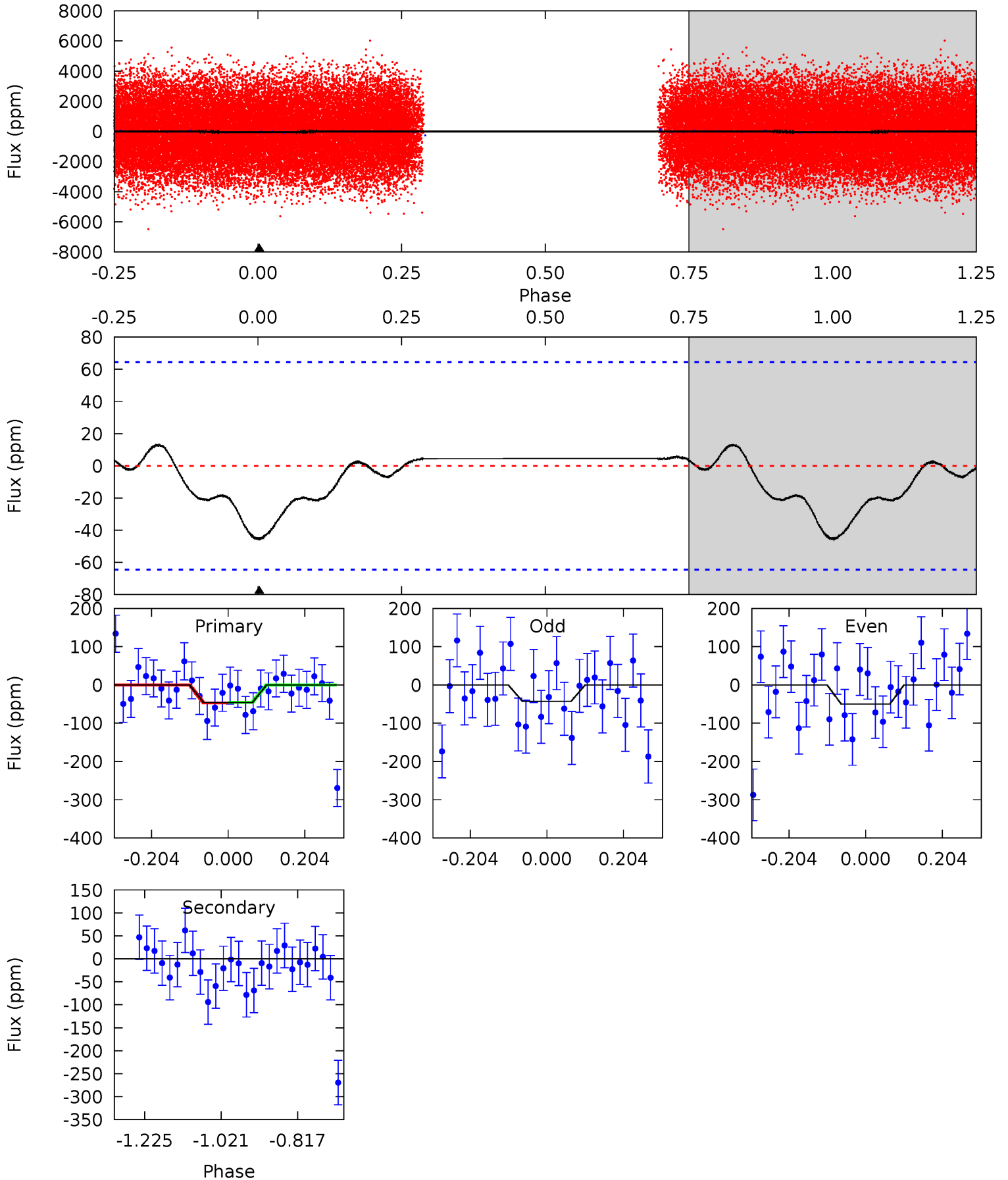
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.75	0	0	0	4.38	1.17	0.15	7.75	7.75	0	0	0.01	0.82	0.02	2.41



# Alt Model-Shift Uniqueness Test

006060277-02, P = 0.541548 Days, E = 131.183134 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
3.16	0	0	0	4.41	1.27	0.27	3.16	3.16	0	0	0.24	0.90	0.23	0.06



### Stellar Parameters For KIC 006060277

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7271^{+232}_{-319}$	$4.048^{+0.228}_{-0.171}$	$-0.200^{+0.250}_{-0.350}$	$1.924^{+0.551}_{-0.551}$	$1.505^{+0.199}_{-0.273}$	$0.298^{+0.406}_{-0.140}$
	+3%/-4%	+6%/-4%	+125%/-175%	+29%/-29%	+13%/-18%	+136%/-47%
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 006060277-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 3$	$1.36^{+1.26}_{-0.89}$	$5022^{+418}_{-365}$	$-4318^{+6723}_{-806}$	$0.002^{+0.304}_{-0.386}$
Alt.	$0 \pm 15$	$1.60^{+1.28}_{-0.92}$	$5052^{+400}_{-407}$	$-4322^{+9217}_{-1548}$	$-0.009^{+0.886}_{-1.003}$

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

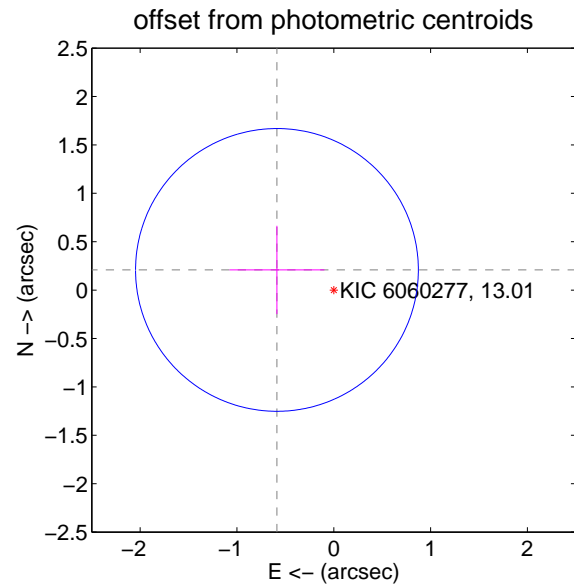
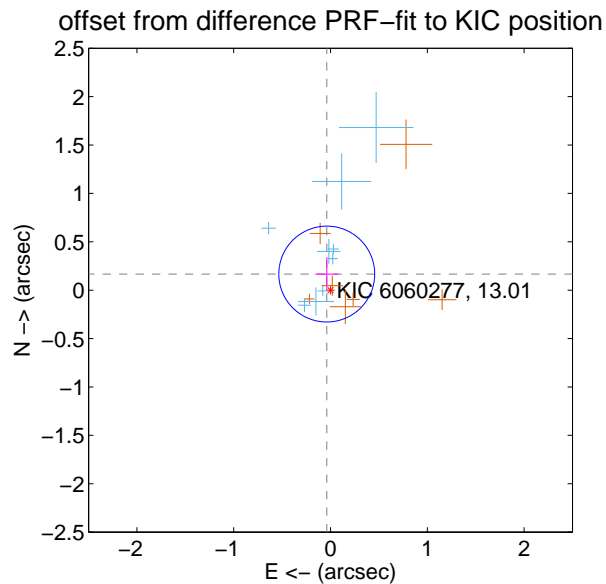
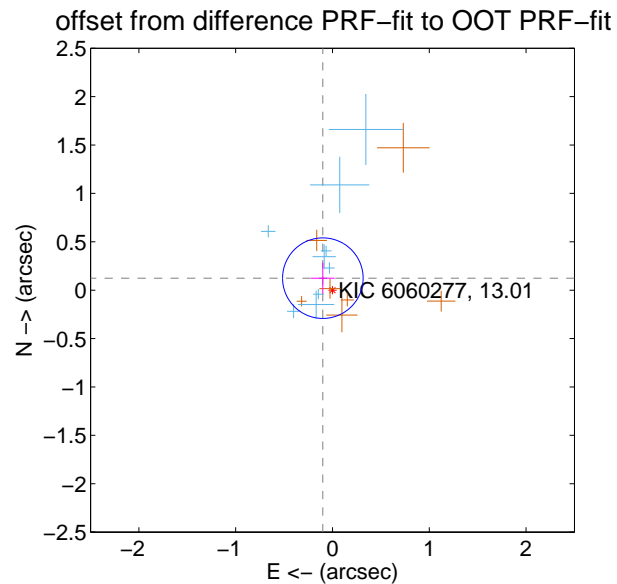
## DV Centroid Data

Supplemental centroid analysis for 006060277-02. Kepler magnitude: 13.01. Transit SNR 11.54

There are 9 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

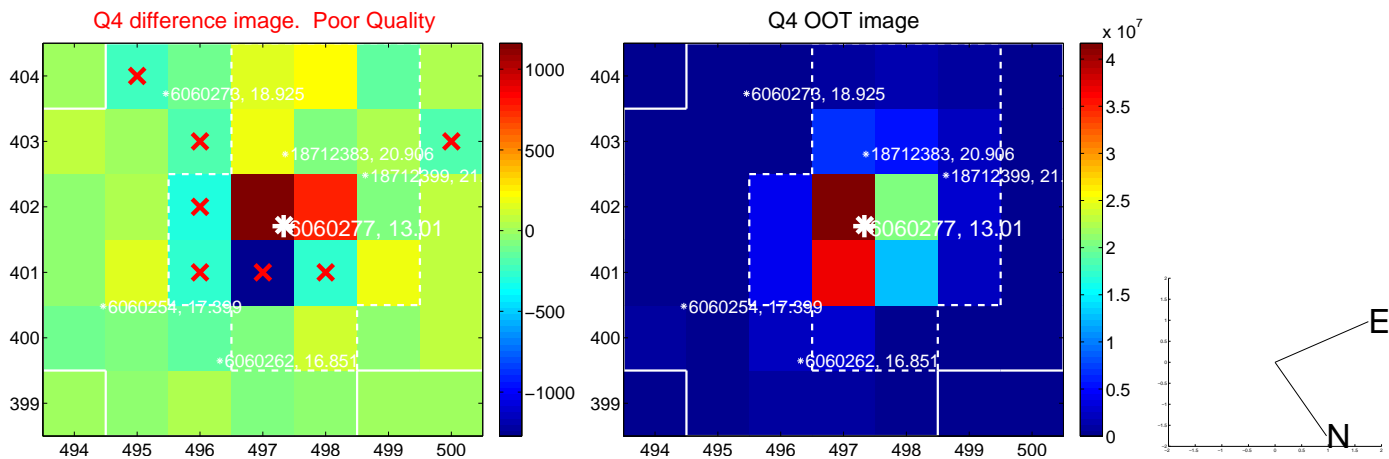
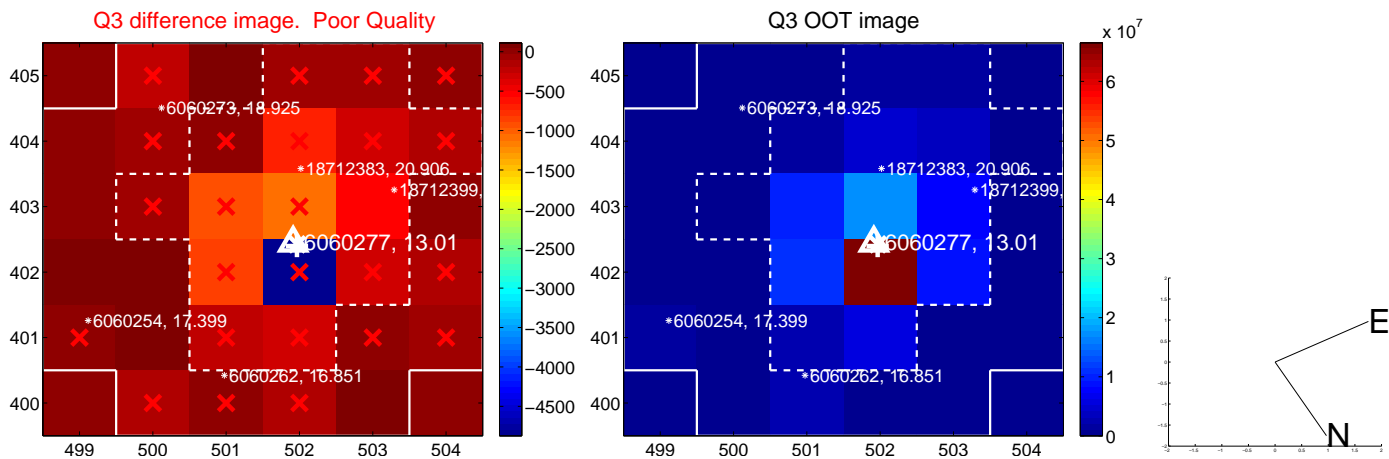
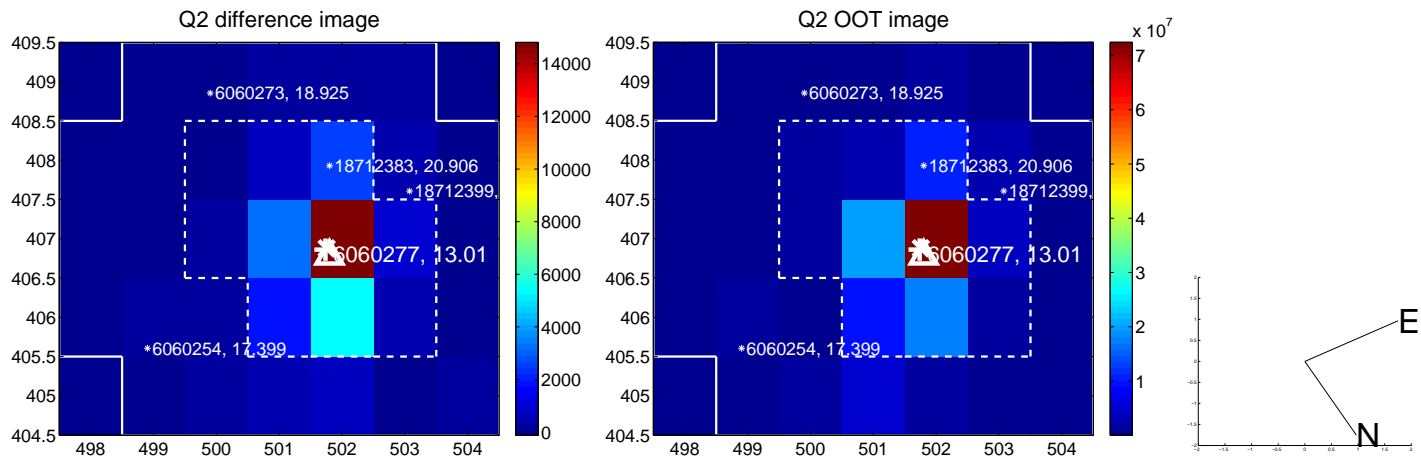
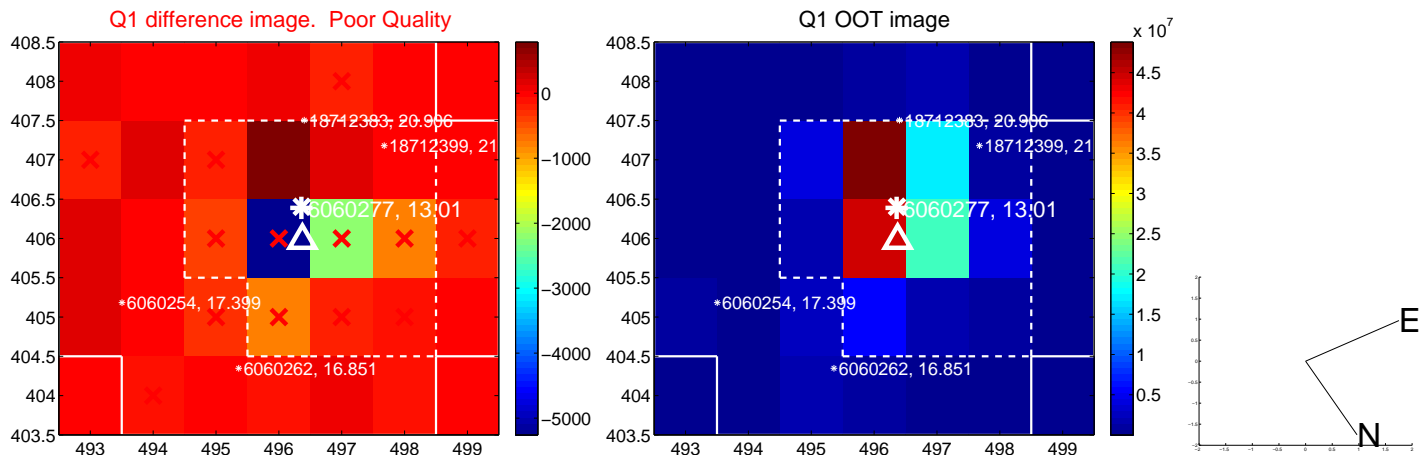
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.159 \pm 0.139$	1.15	$0.100 \pm 0.123$	$0.124 \pm 0.160$
PRF-fit source offset from KIC position	$0.171 \pm 0.165$	1.04	$0.039 \pm 0.119$	$0.167 \pm 0.173$
photometric centroid source offset	$0.62 \pm 0.49$	1.28	$0.59 \pm 0.49$	$0.21 \pm 0.46$



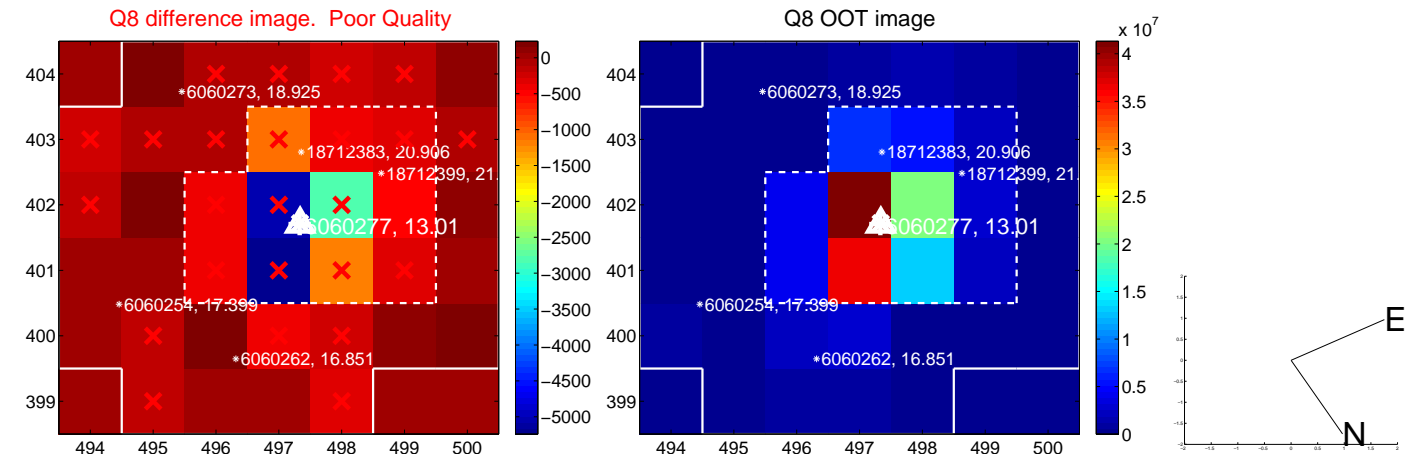
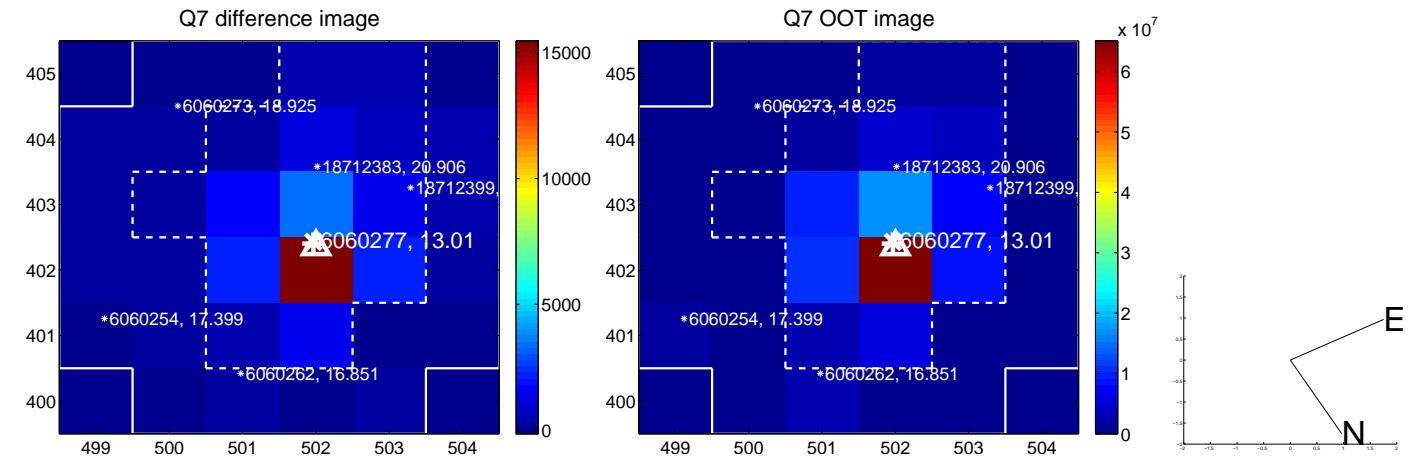
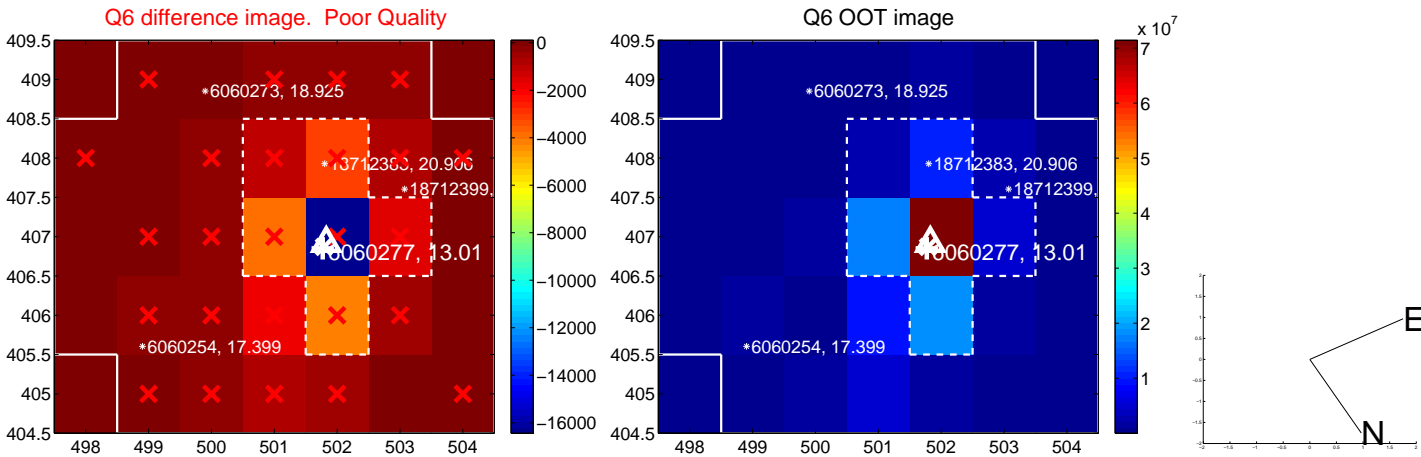
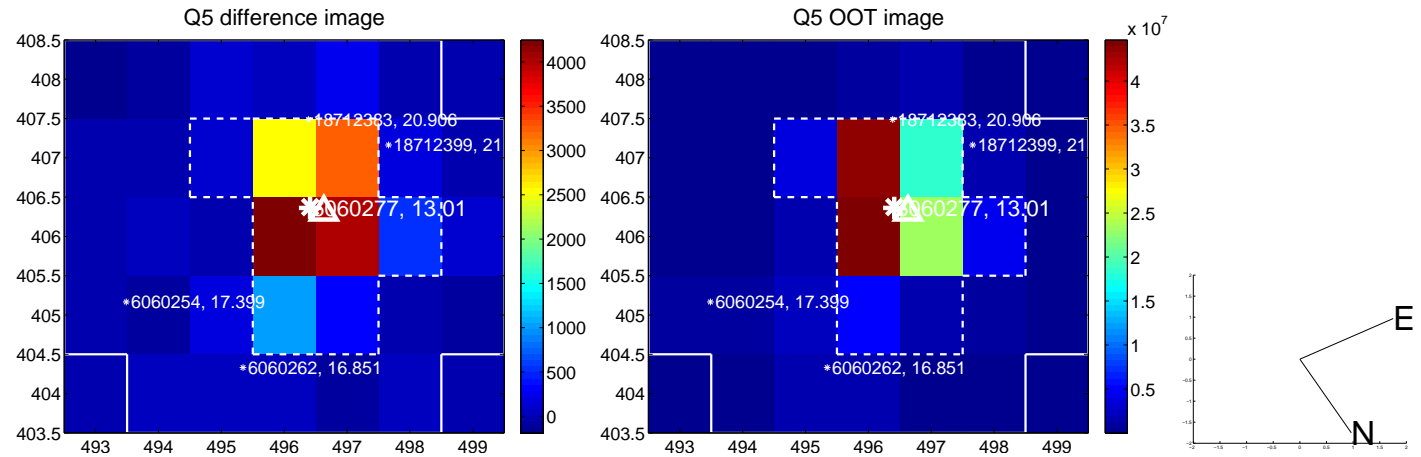
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



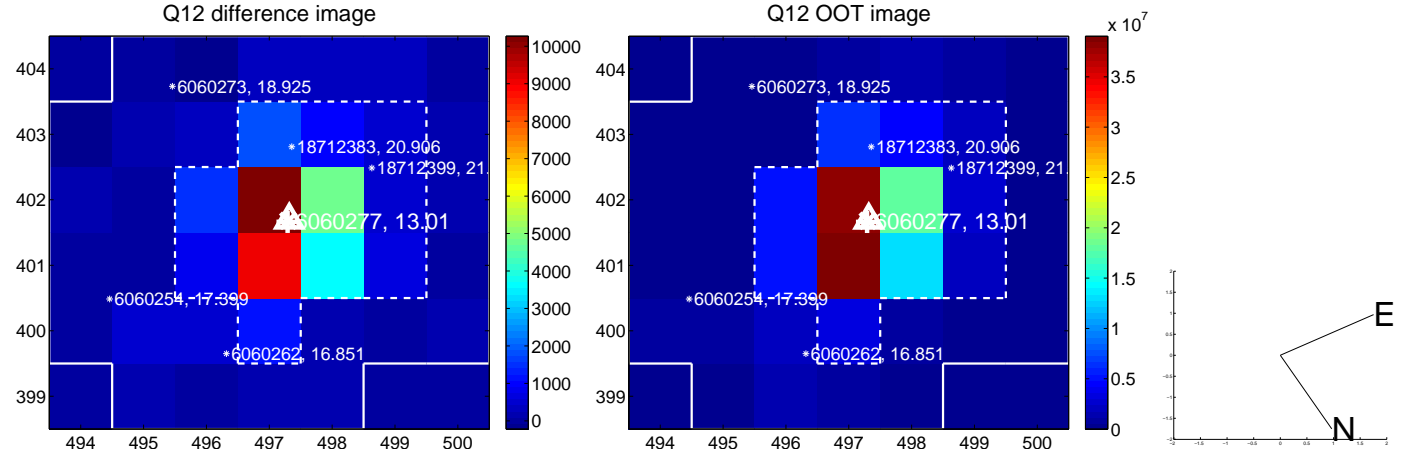
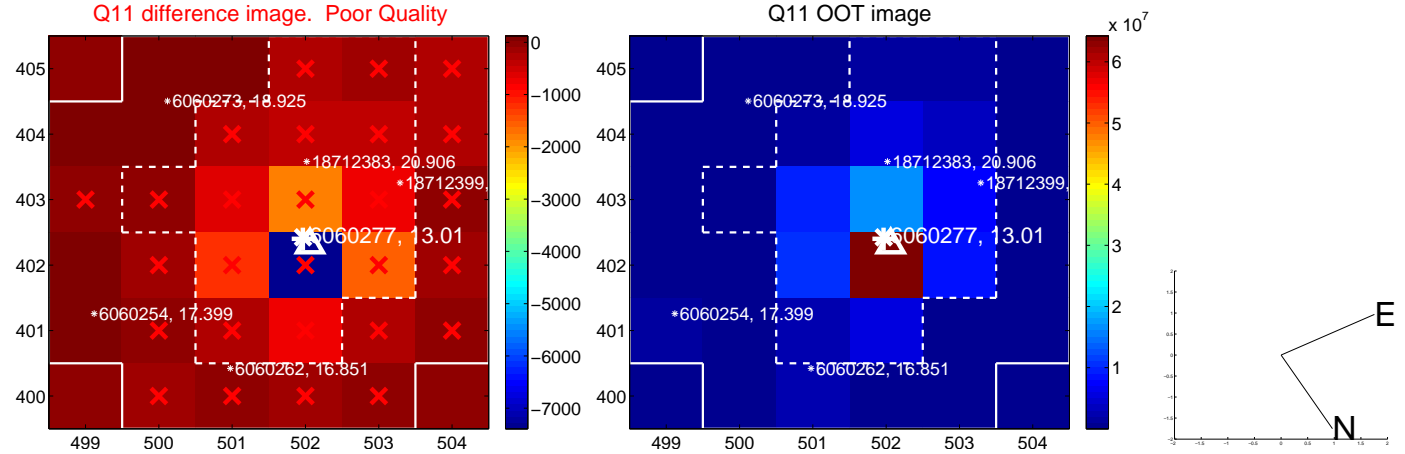
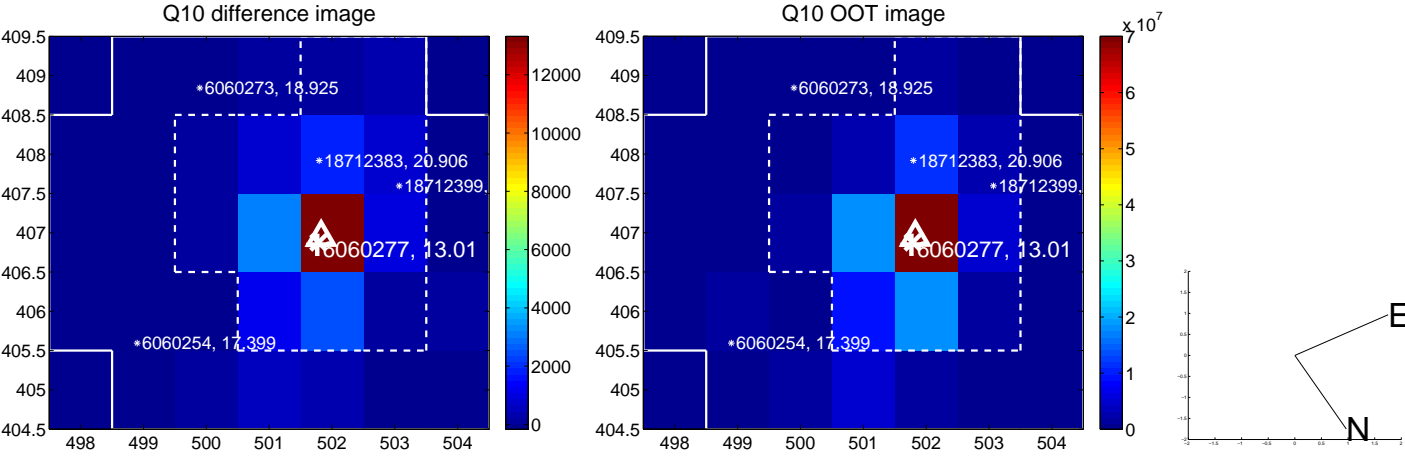
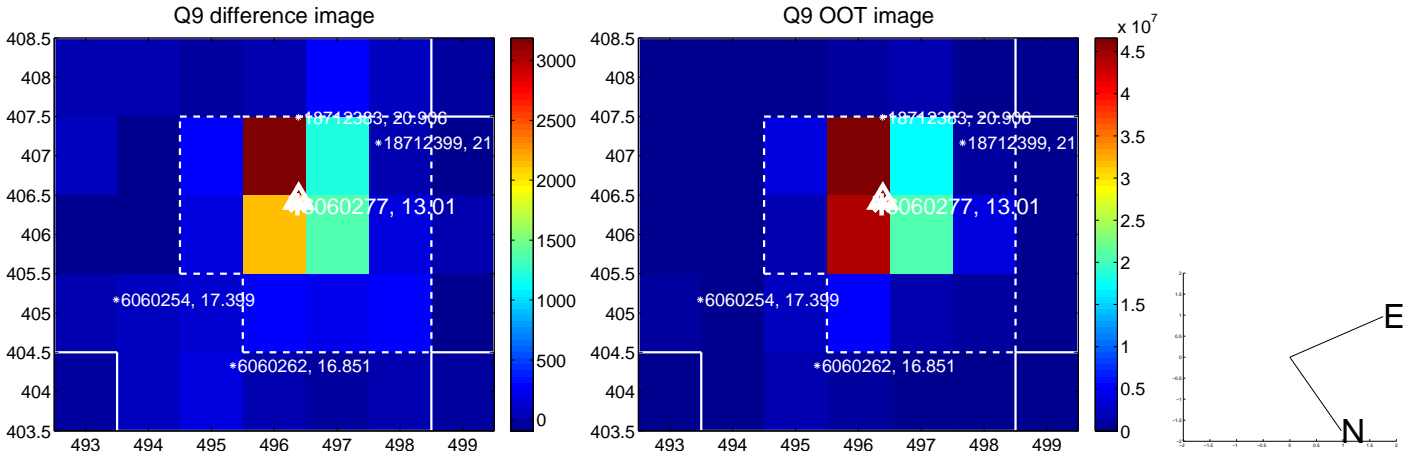
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



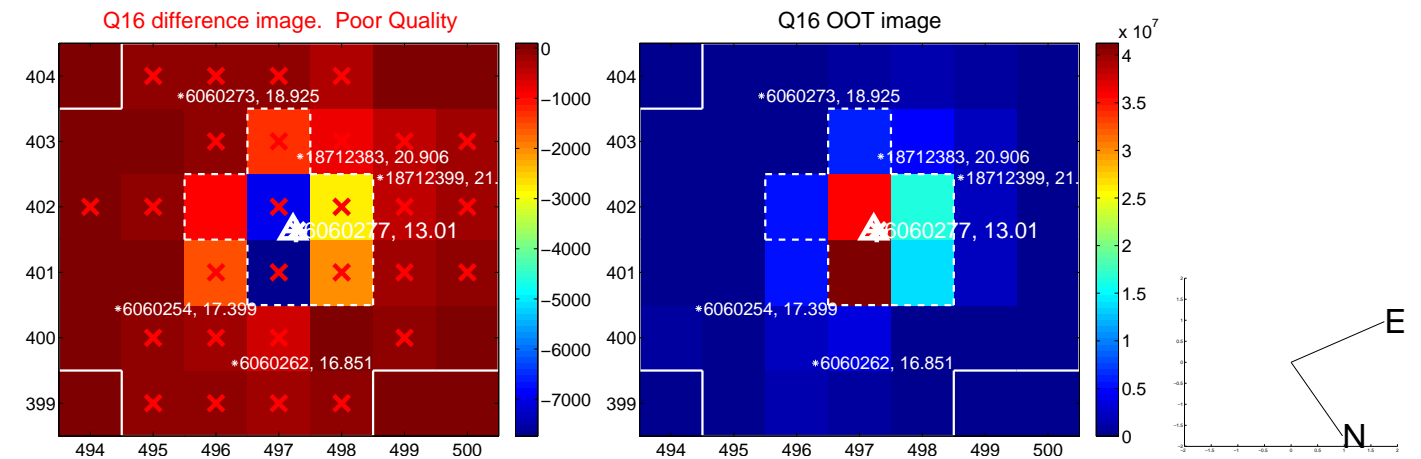
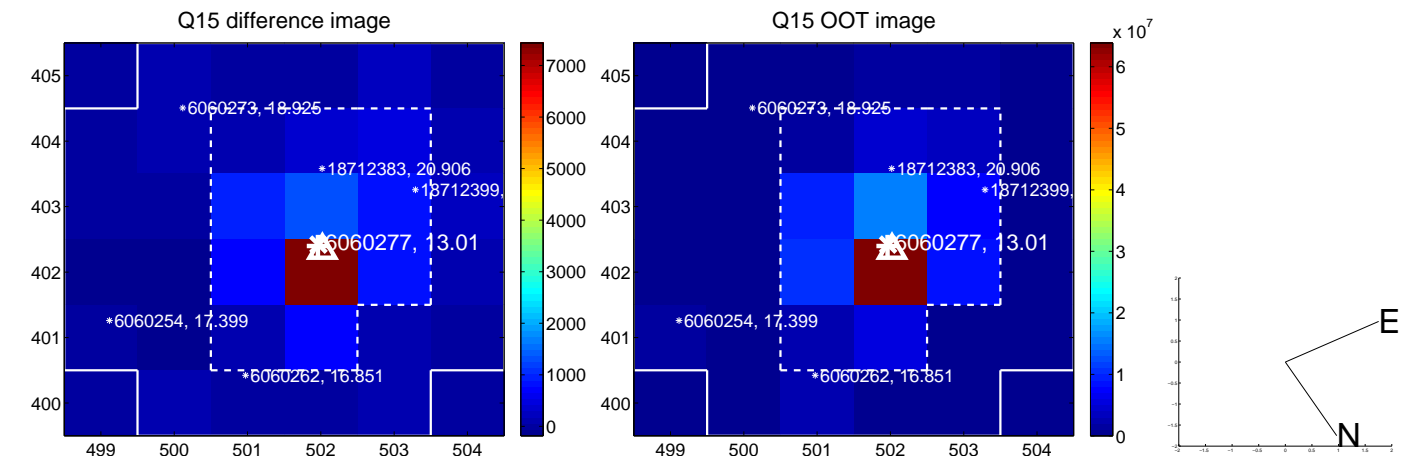
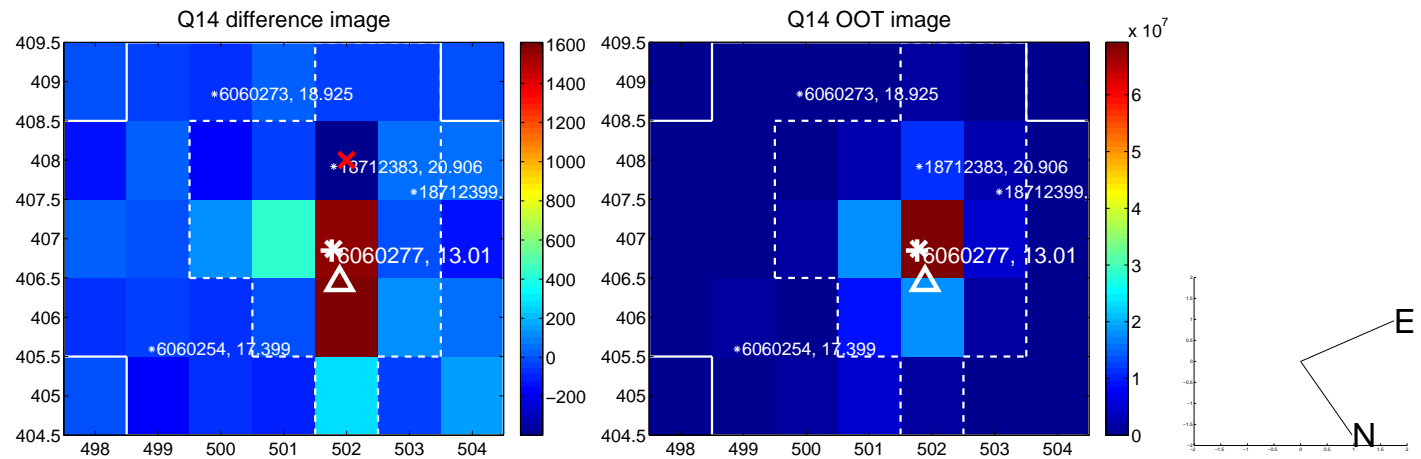
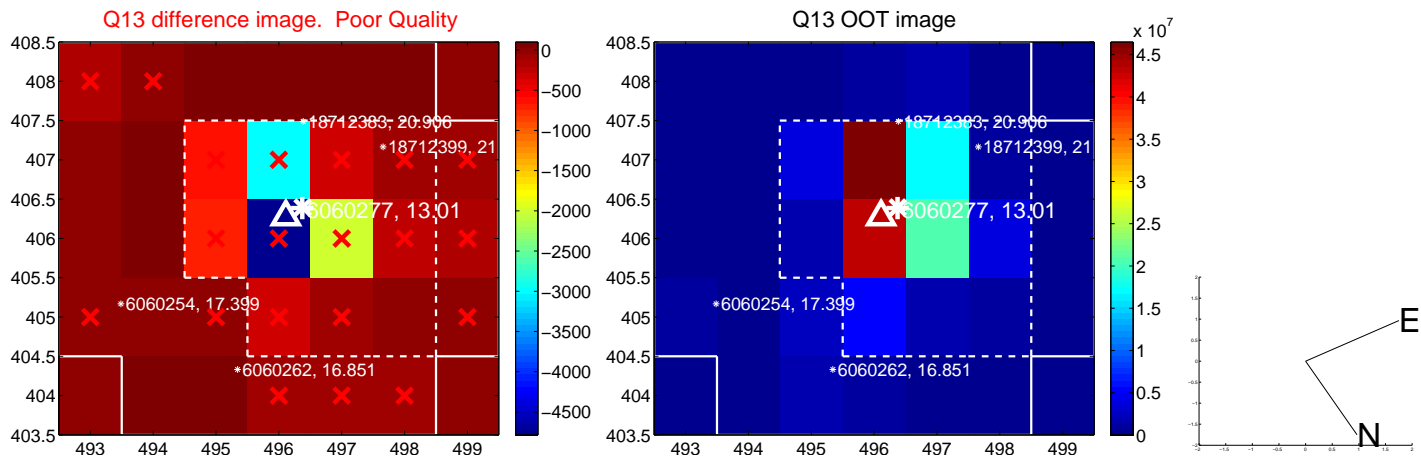
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

