

# KIC 008647777

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008647777-01	OBS	No	0.985307	131.565990	66.1	3.382	10.9	11.6	1.83	6279	1.72	11699.12
008647777-02	OBS	No	0.686370	131.787606	46.5	4.732	9.5	7.8	1.83	6279	1.30	18945.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008647777-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
008647777-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT

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

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

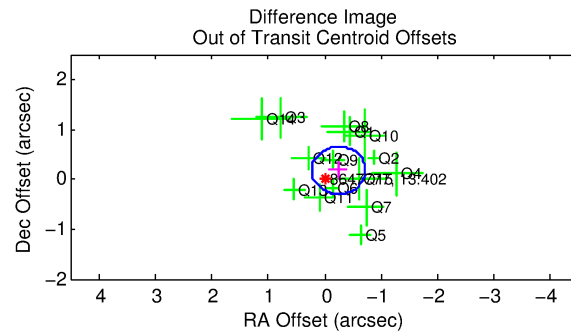
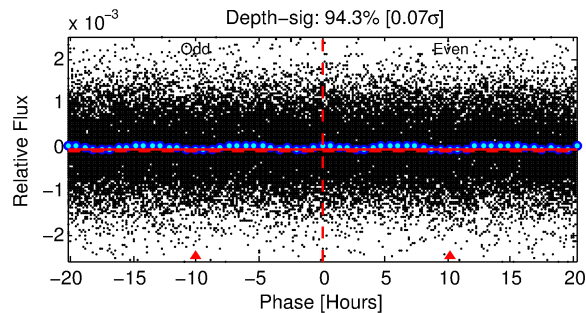
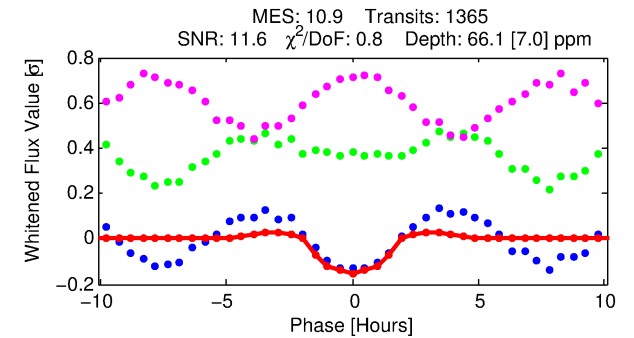
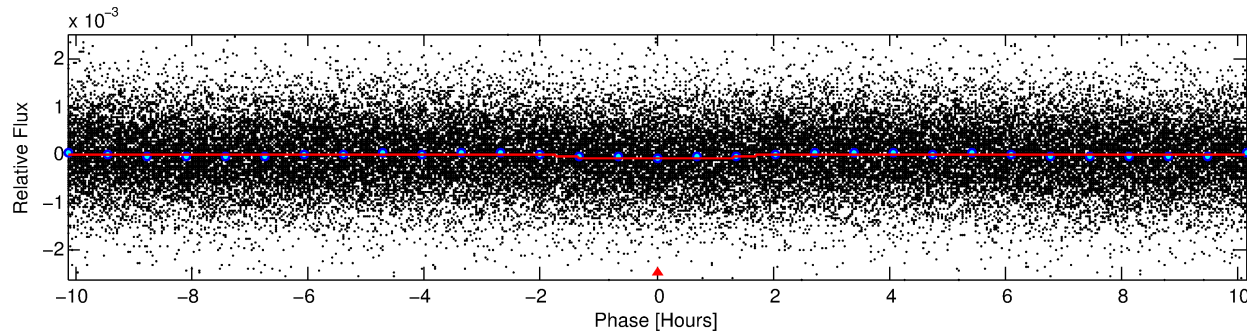
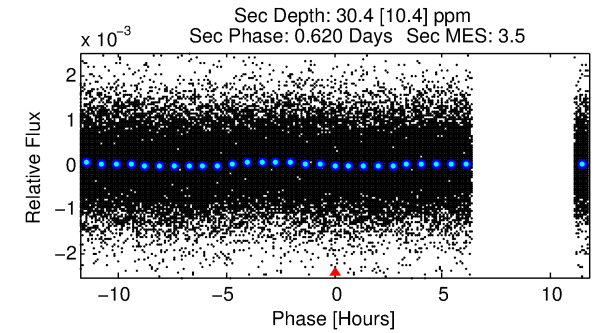
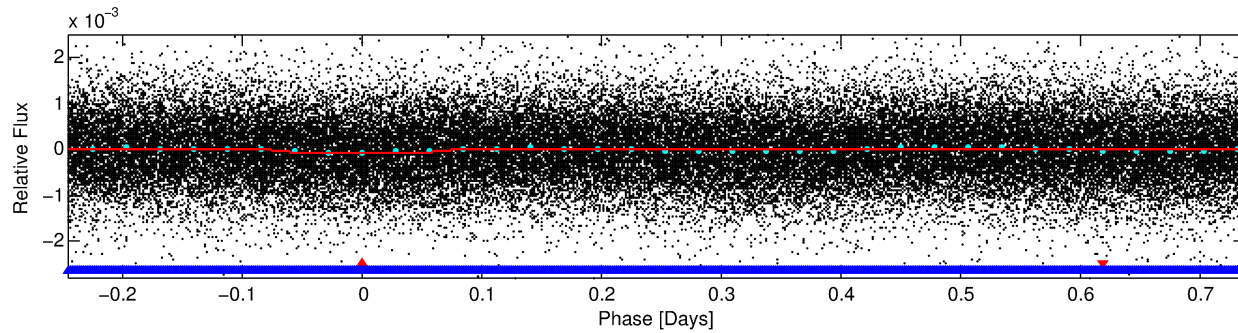
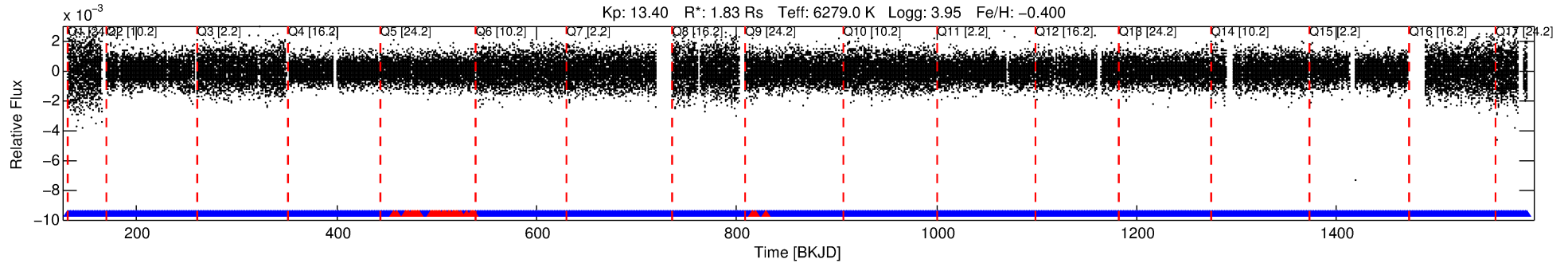
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008647777-01

No Significant Match Found

# DV One-Page Summary

KIC: 8647777 Candidate: 1 of 2 Period: 0.985 d



## DV Fit Results:

Period = 0.98531 [0.00001] d  
Epoch = 131.5660 [0.0039] BKJD  
Rp/R\* = 0.0086 [0.0048]  
a/R\* = 1.43 [2.30]  
b = 0.88 [0.81]  
Seff = 11699.12 [8338.70]  
Teq = 2652 [473] K  
Rp = 1.72 [1.19] Re  
a = 0.0200 [0.0084] AU  
Ag = 2.27 [3.08] [0.41σ]  
Teffp = 5030 [1478] K [1.53σ]

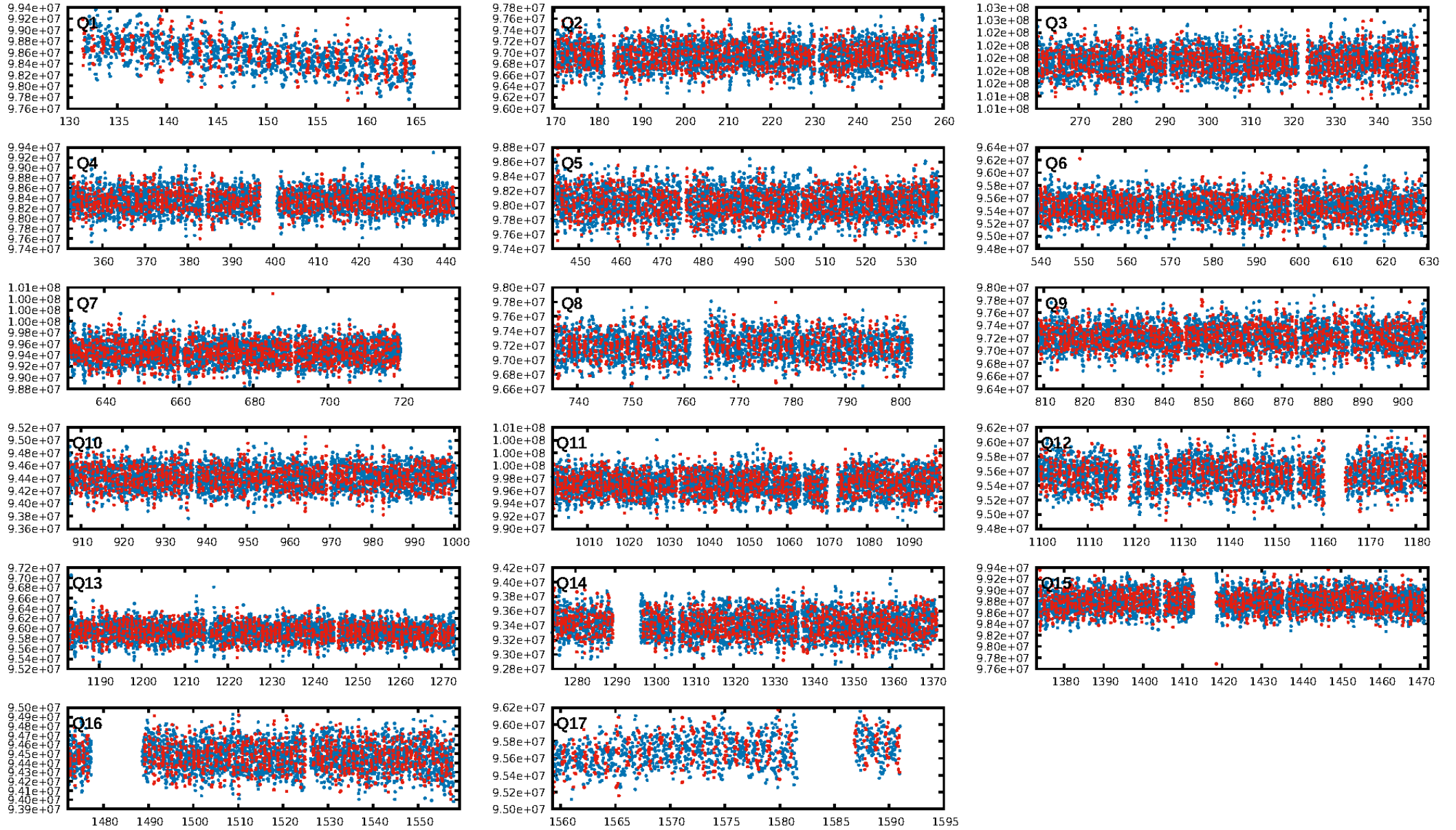
## DV Diagnostic Results:

ShortPeriod-sig: 78.3% [1.23σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.10e-13  
RollingBand-fgt: 0.97 [1264/1303]  
GhostDiagnostic-chr: 4.175  
Centroid-sig: 10.7%  
Centroid-so: 0.937 arcsec [2.06σ]  
OotOffset-rm: 0.302 arcsec [1.91σ]  
OotOffset-st: 4/4/3/4 [15]  
KicOffset-rm: 0.363 arcsec [2.30σ]  
KicOffset-st: 4/4/3/4 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:34:48 Z

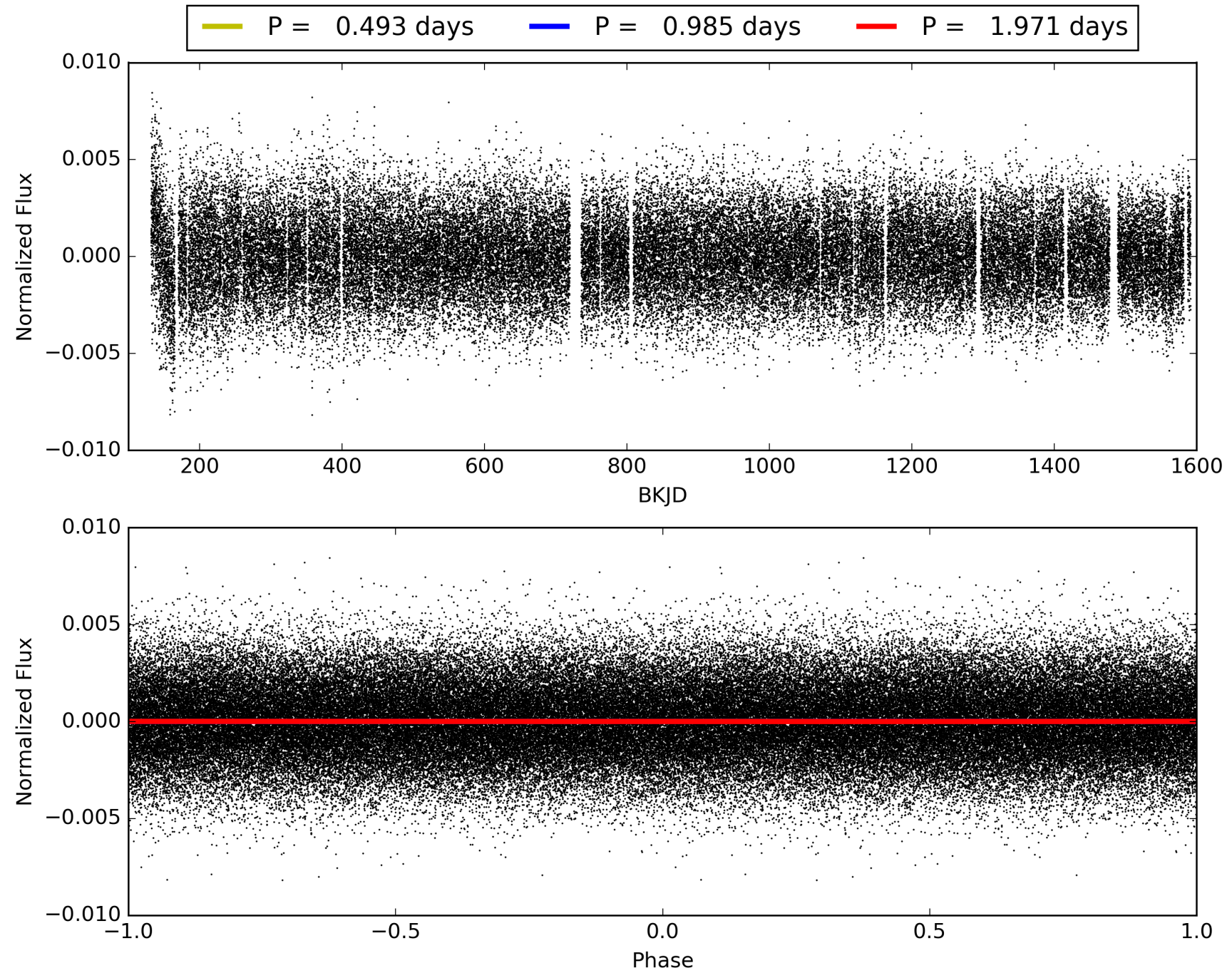
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008647777-01, PDC Light Curves



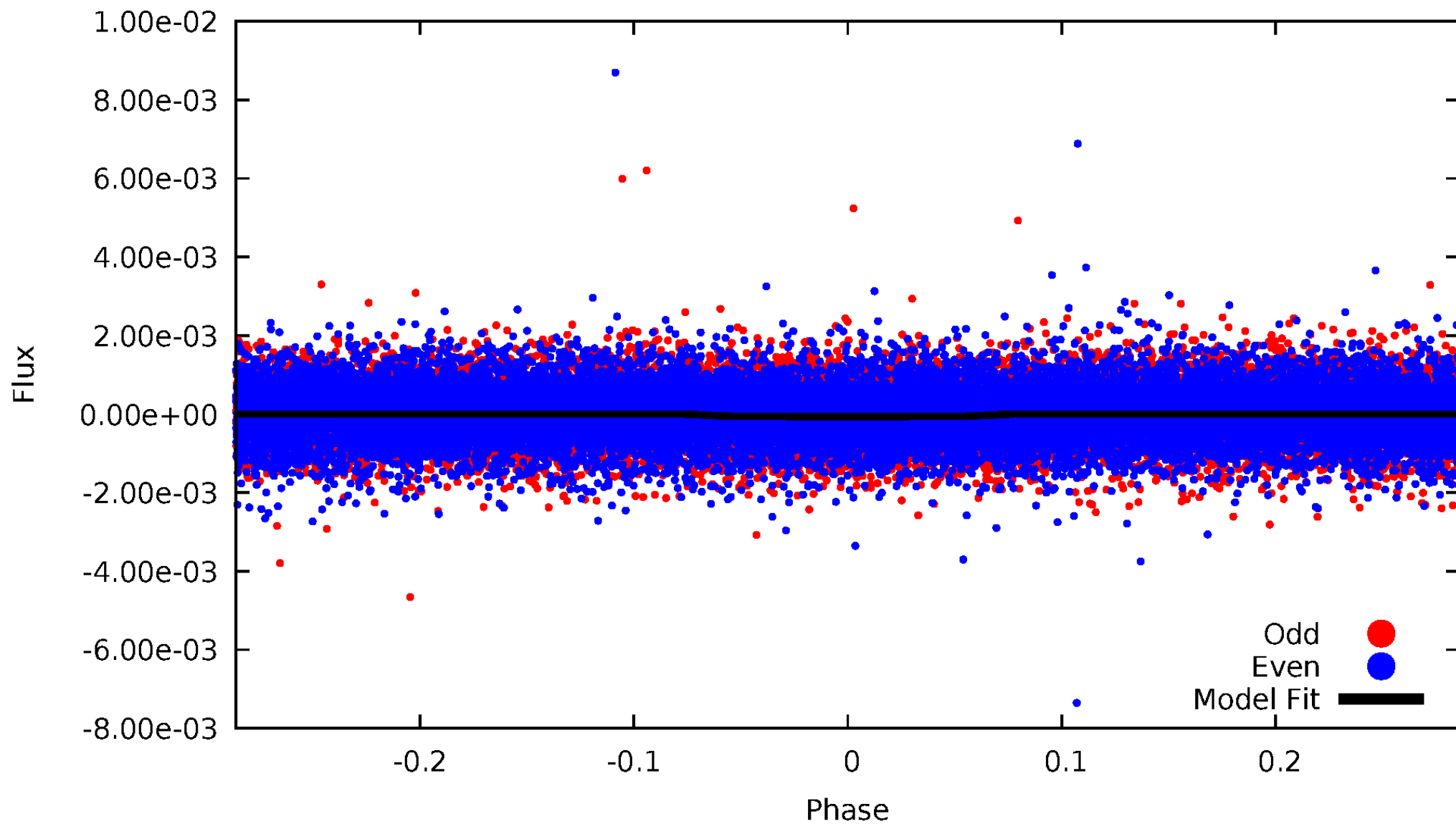


TCE 008647777-01



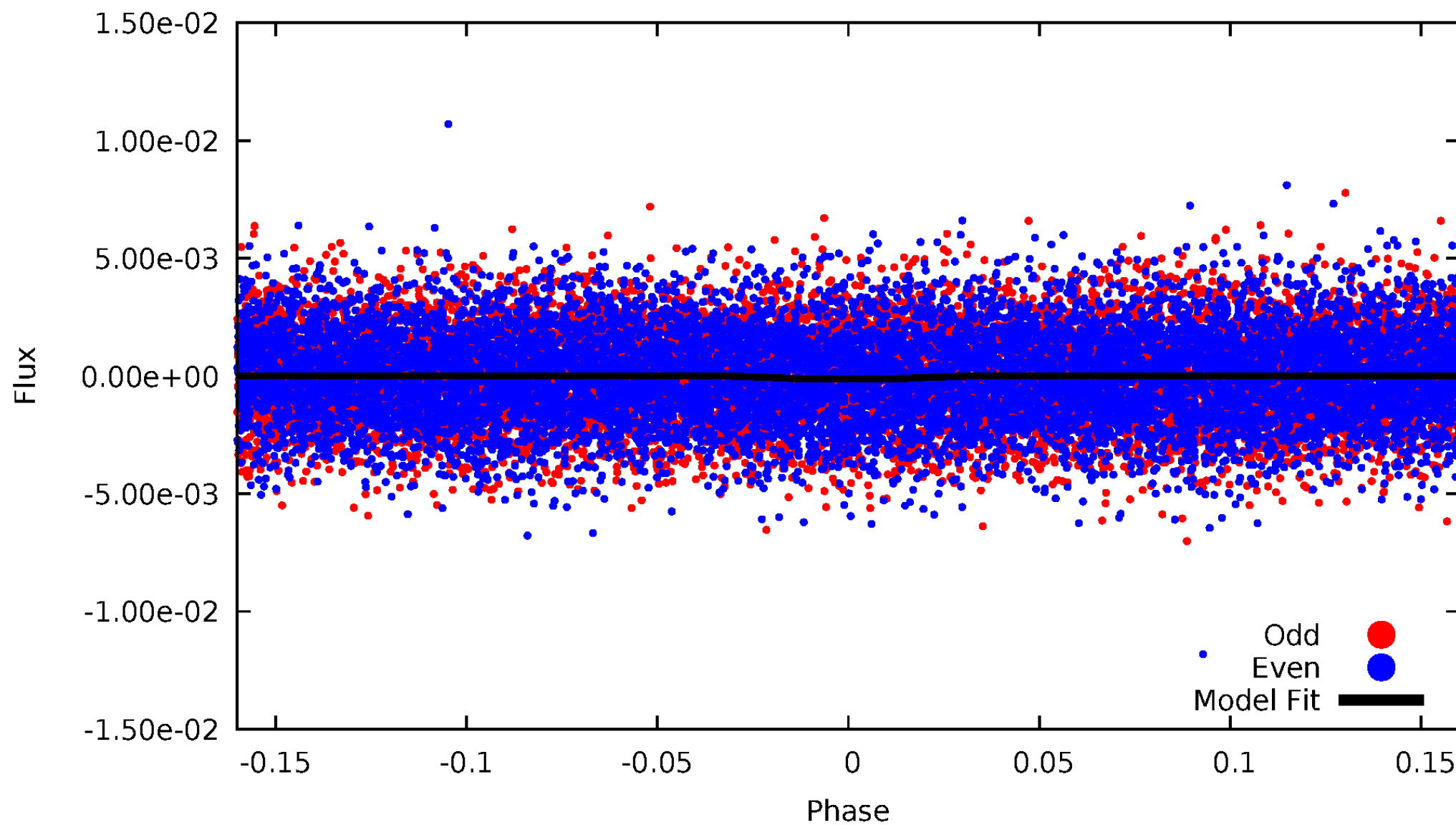
# DV Odd/Even

TCE 008647777-01

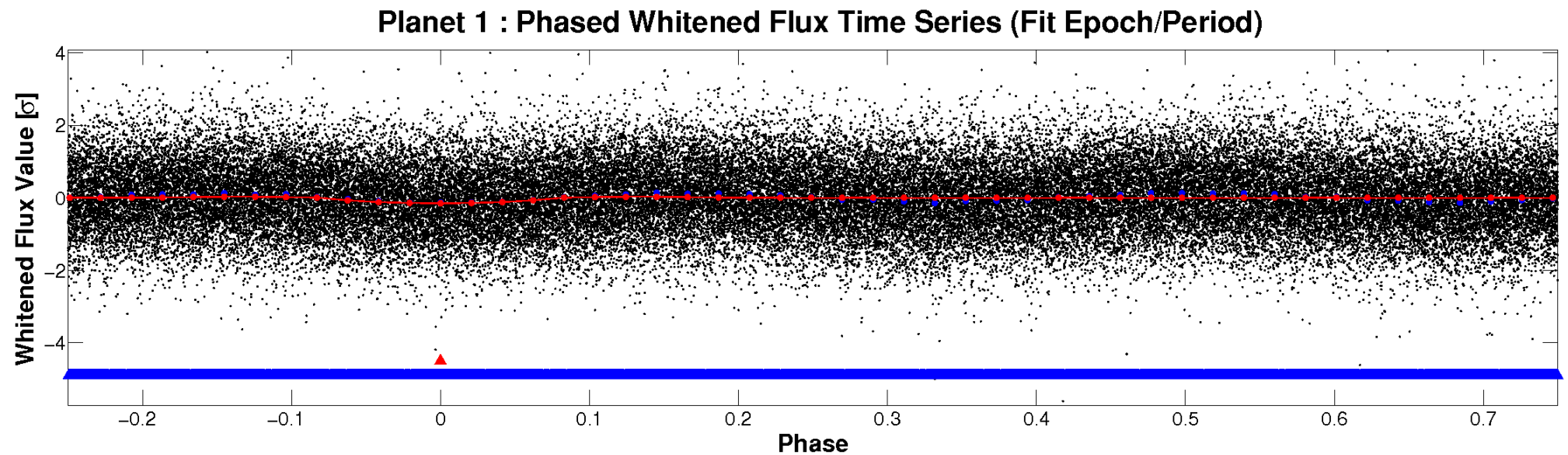
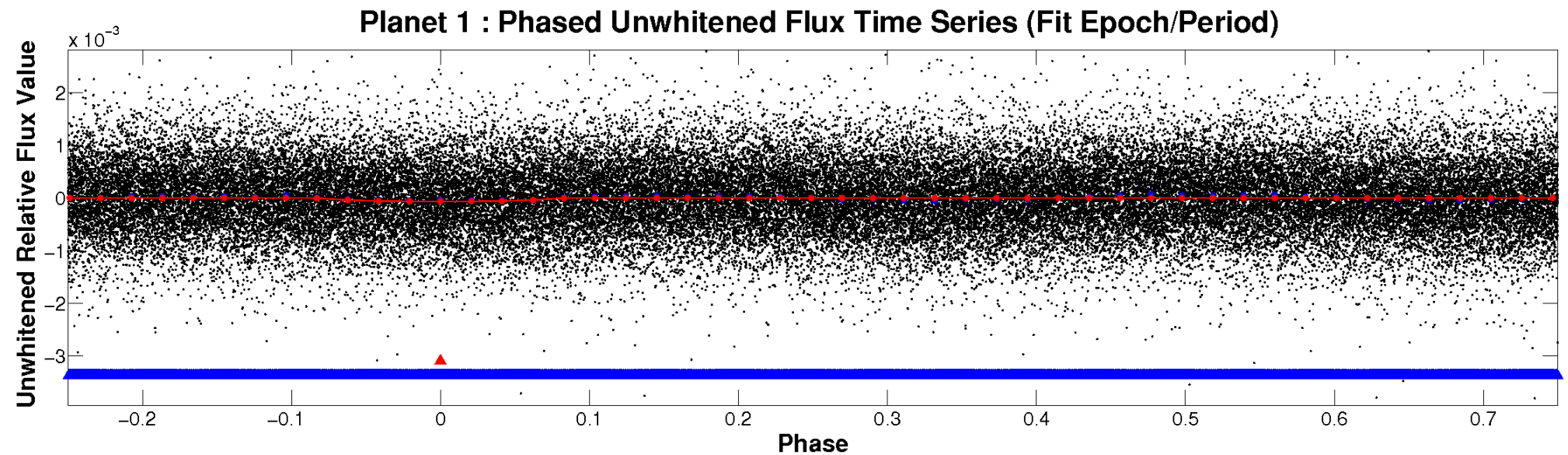


# ALT Odd/Even

TCE 008647777-01



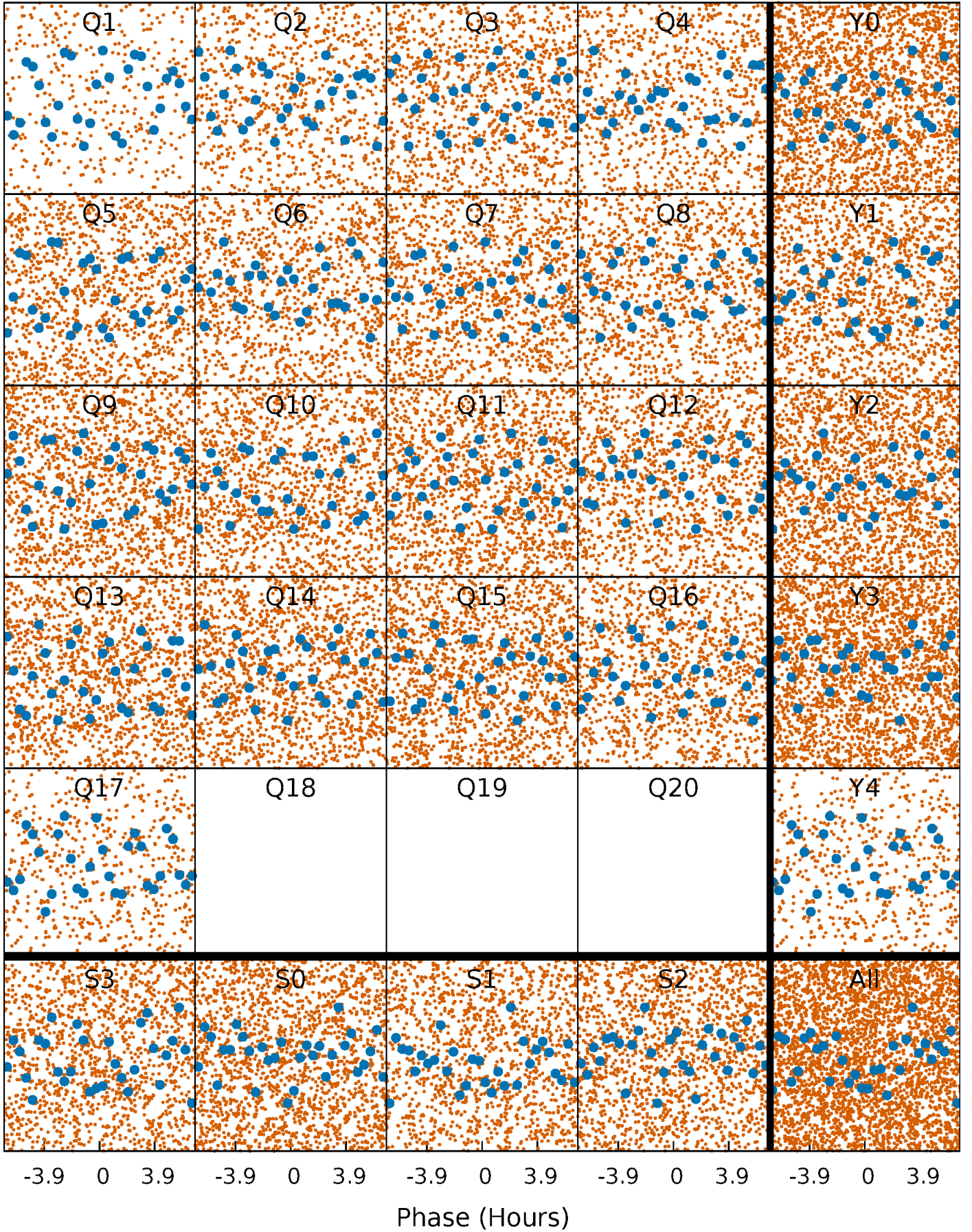
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

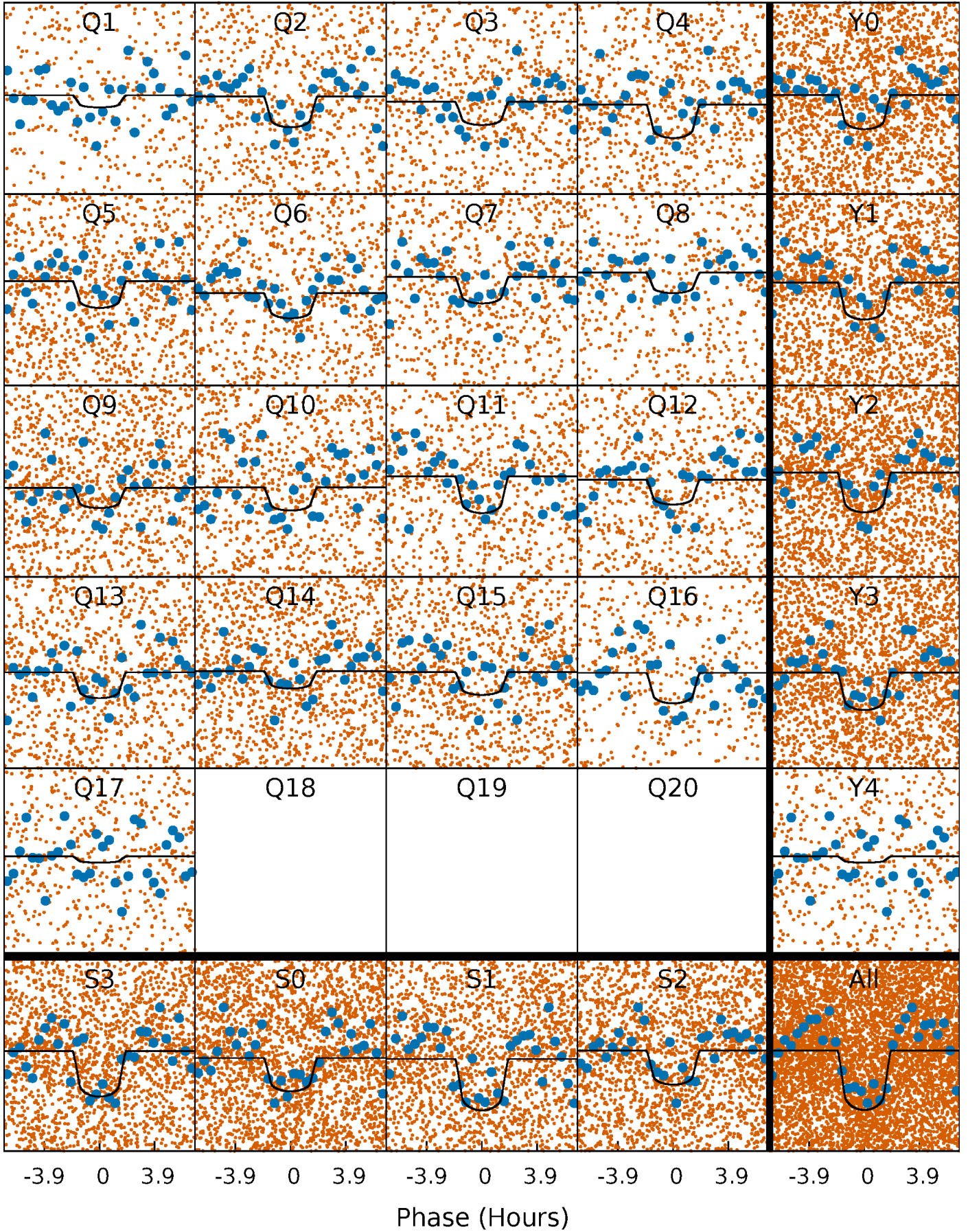
TCE 008647777-01 P= 0.985307 Days  $T_0=131.565990$  (BKJD)





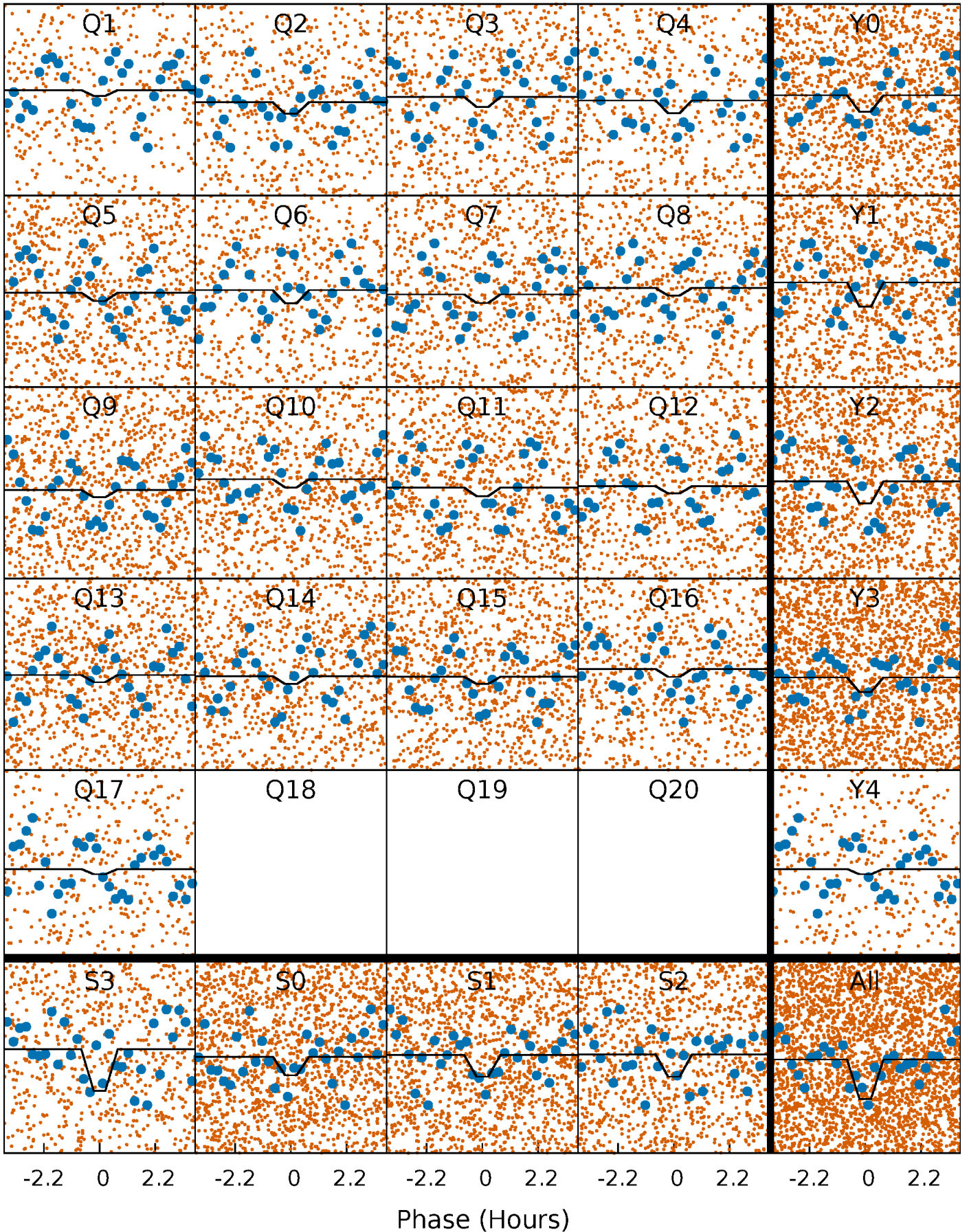
# DV Quarter-Phased Transit Curves

TCE 008647777-01 P= 0.985307 Days  $T_0=131.565990$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

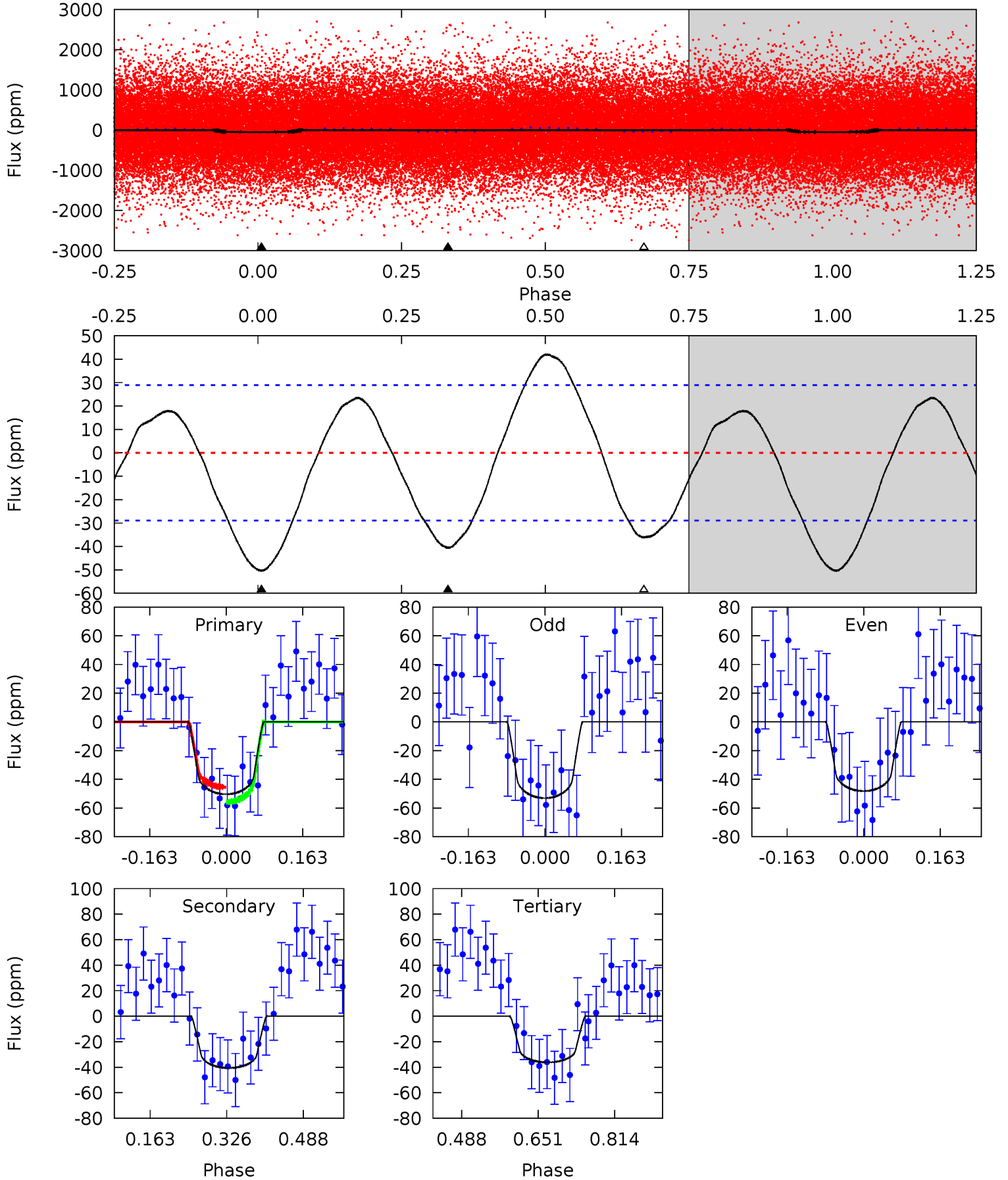
TCE 008647777-01 P= 0.985330 Days  $T_0=131.548757$  (BKJD)



# DV Model-Shift Uniqueness Test

008647777-01, P = 0.985307 Days, E = 130.580683 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
7.77	6.26	5.57	0	4.46	1.40	3.89	2.19	7.77	0.69	6.26	0.38	0.95	0.45	0.80

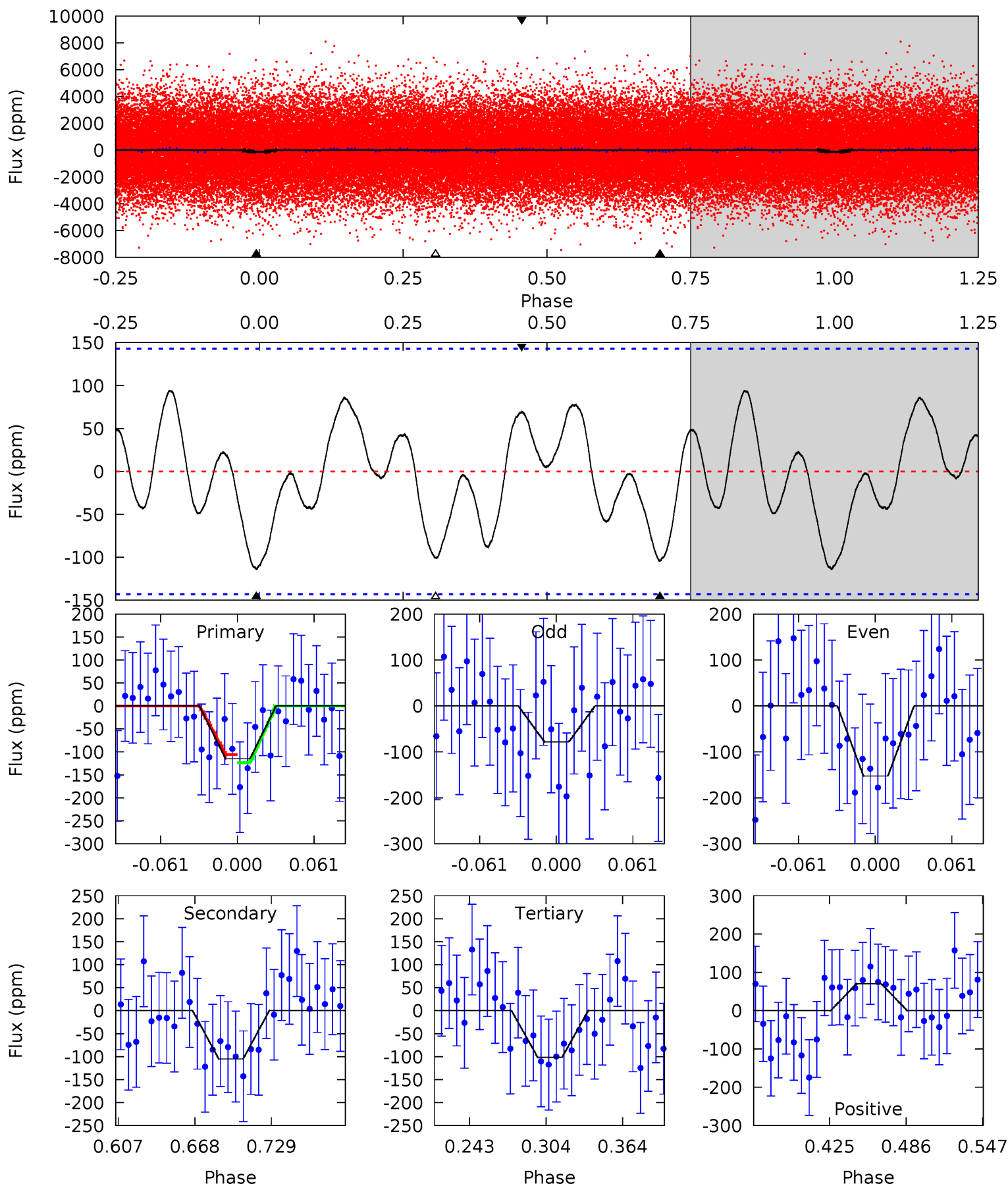




# Alt Model-Shift Uniqueness Test

008647777-01, P = 0.985330 Days, E = 130.563427 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
3.75	3.43	3.31	2.30	4.67	1.88	1.59	0.44	1.45	0.12	1.13	1.21	1.43	0.45	0.29





### Stellar Parameters For KIC 008647777

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6279^{+194}_{-214}$	$3.952^{+0.420}_{-0.140}$	$-0.400^{+0.300}_{-0.300}$	$1.831^{+0.497}_{-0.746}$	$1.093^{+0.174}_{-0.174}$	$0.251^{+0.842}_{-0.121}$
	+3%/-3%	+11%/-4%	+75%/-75%	+27%/-41%	+16%/-16%	+335%/-48%
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 008647777-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-41 \pm 6$	$1.63^{+1.04}_{-0.89}$	$3609^{+293}_{-453}$	$5212^{+2463}_{-973}$	$3.350^{+13.321}_{-2.081}$
Alt.	$-105 \pm 31$	$2.13^{+1.09}_{-0.89}$	$3613^{+311}_{-415}$	$5732^{+1903}_{-963}$	$4.976^{+10.214}_{-3.046}$

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

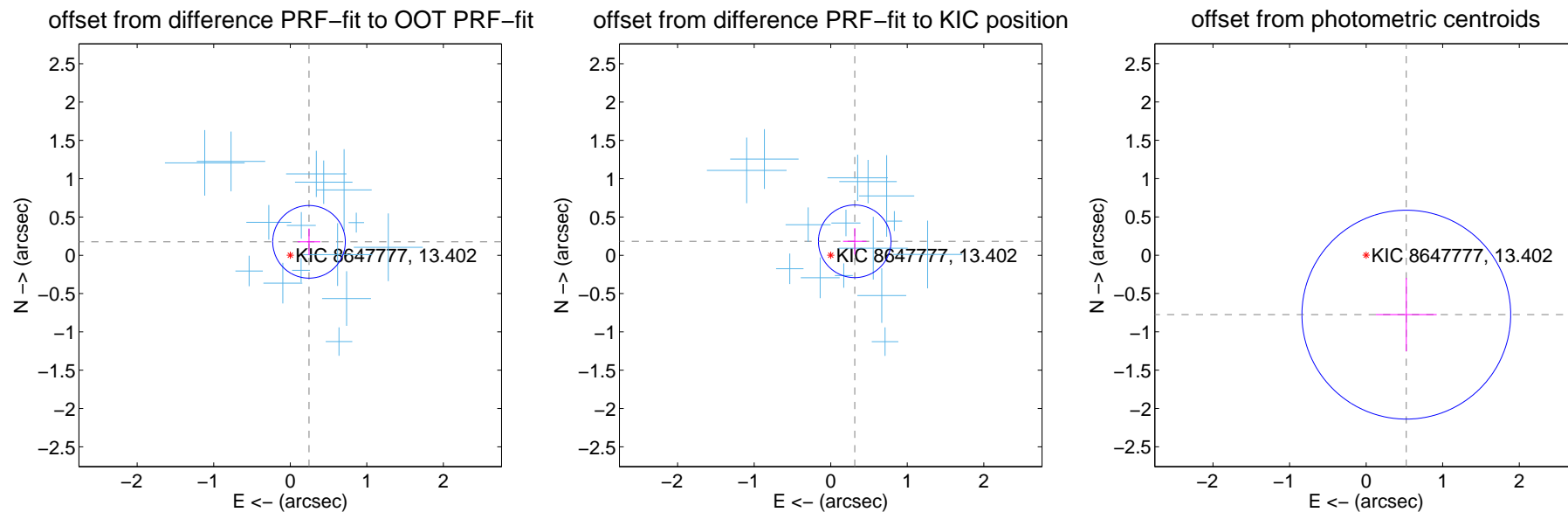
## DV Centroid Data

Supplemental centroid analysis for 008647777-01. Kepler magnitude: 13.40. Transit SNR 11.63

There are 15 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

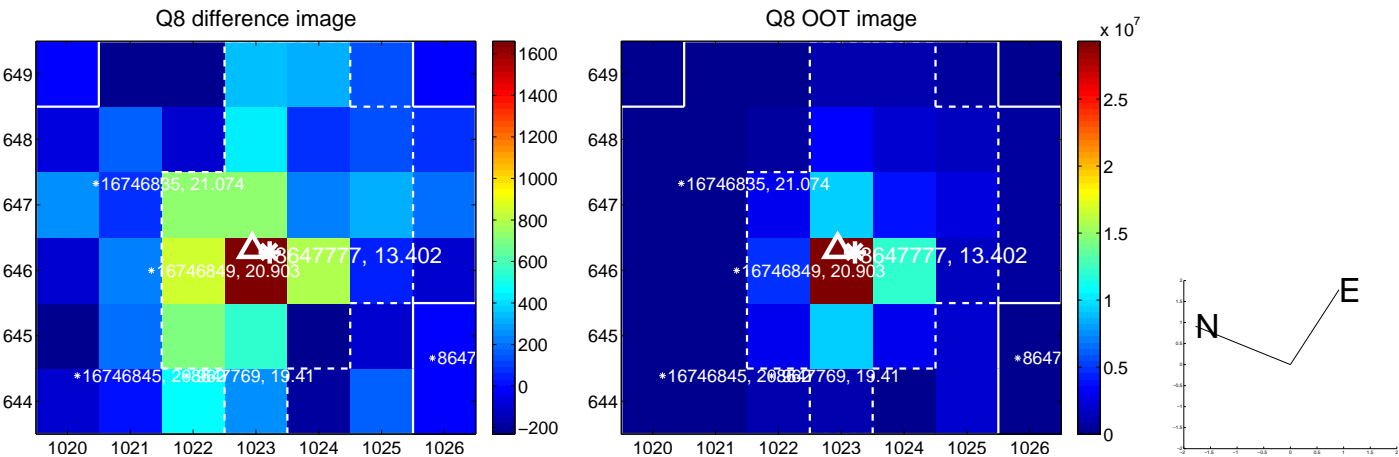
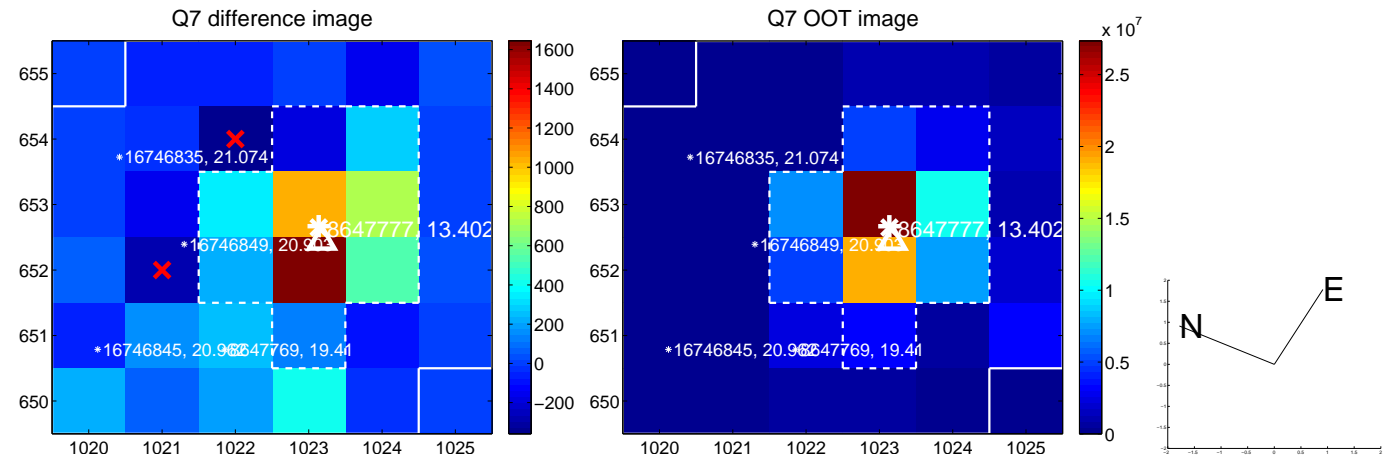
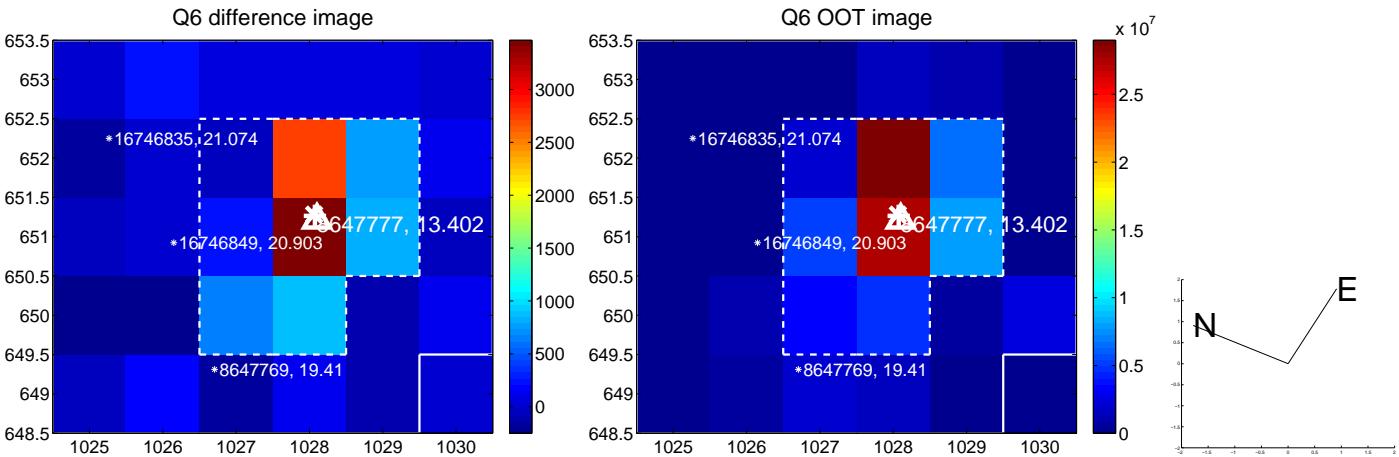
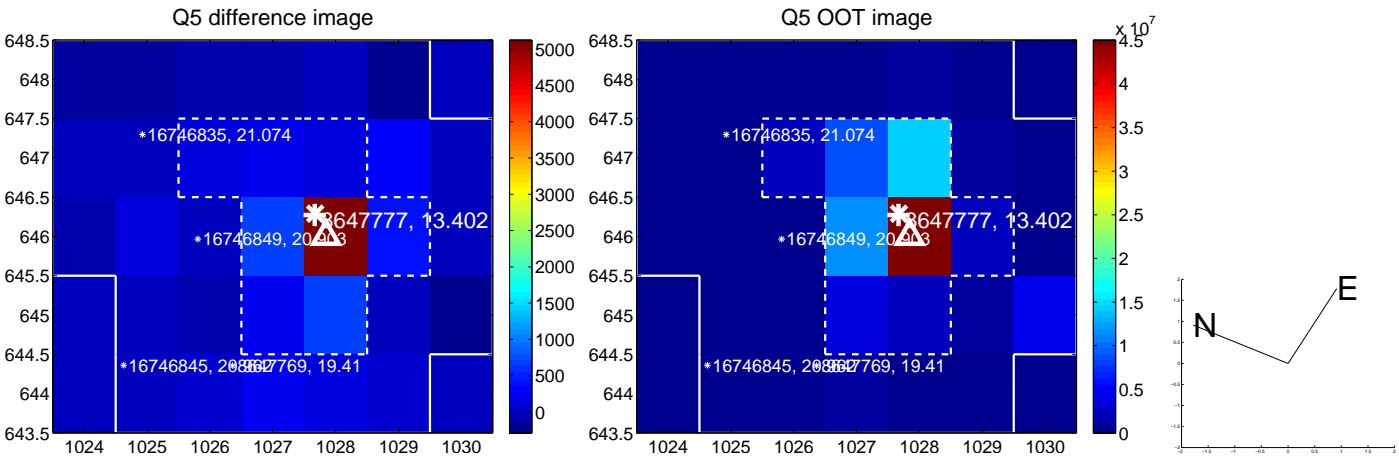
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.302 \pm 0.158$	1.91	$-0.245 \pm 0.149$	$0.176 \pm 0.174$
PRF-fit source offset from KIC position	$0.363 \pm 0.158$	2.30	$-0.314 \pm 0.153$	$0.183 \pm 0.173$
photometric centroid source offset	$0.94 \pm 0.45$	2.06	$-0.52 \pm 0.40$	$-0.78 \pm 0.48$



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.

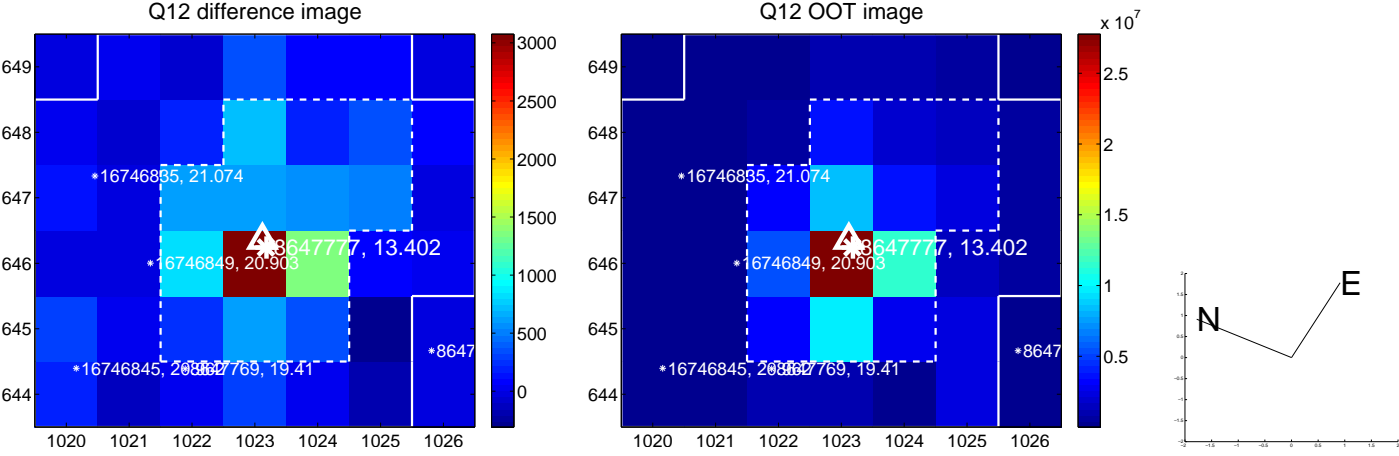
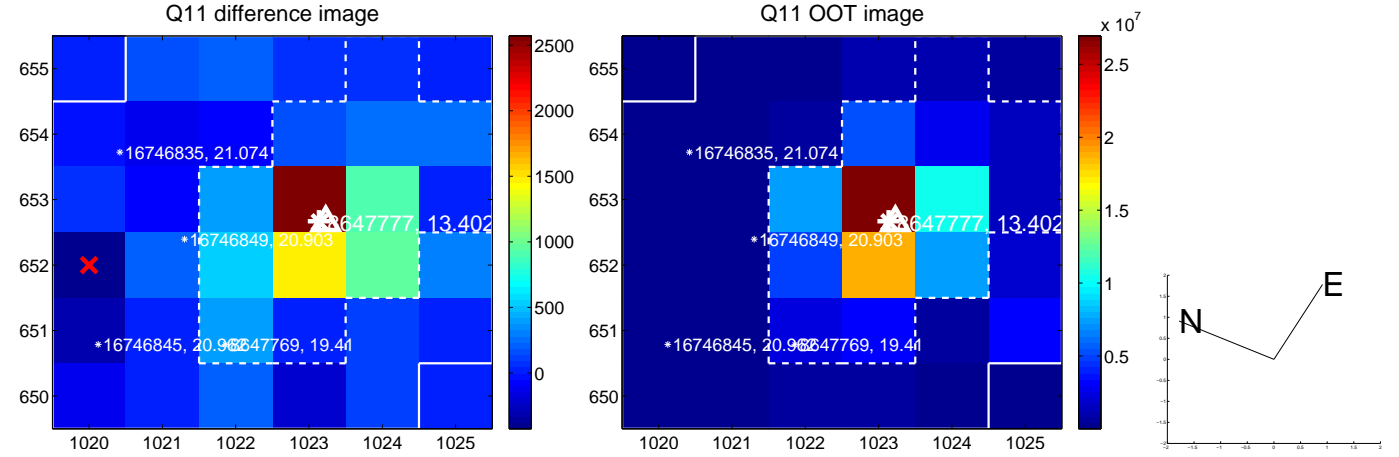
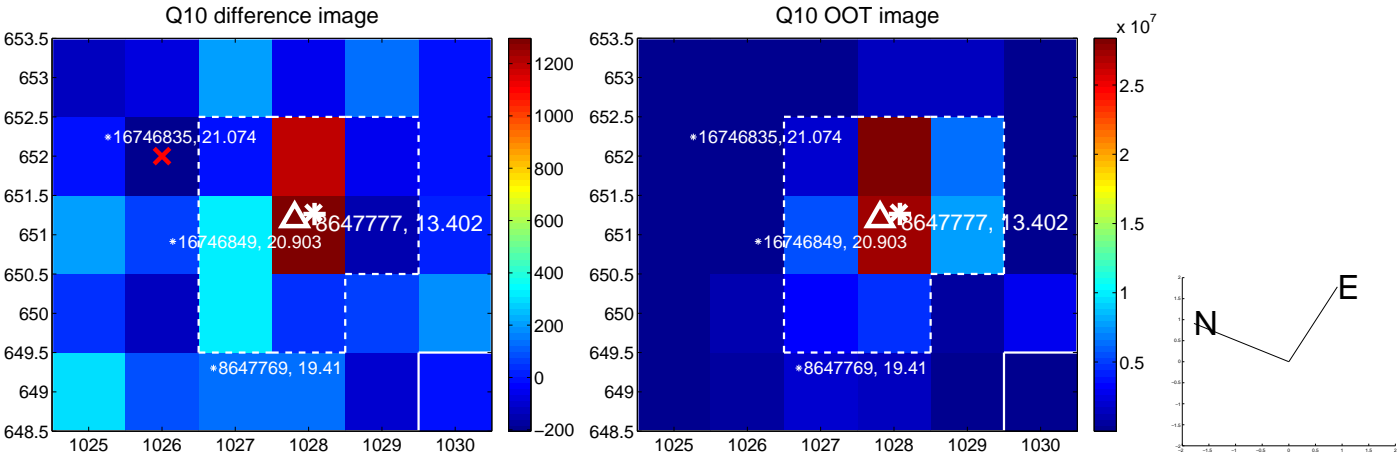
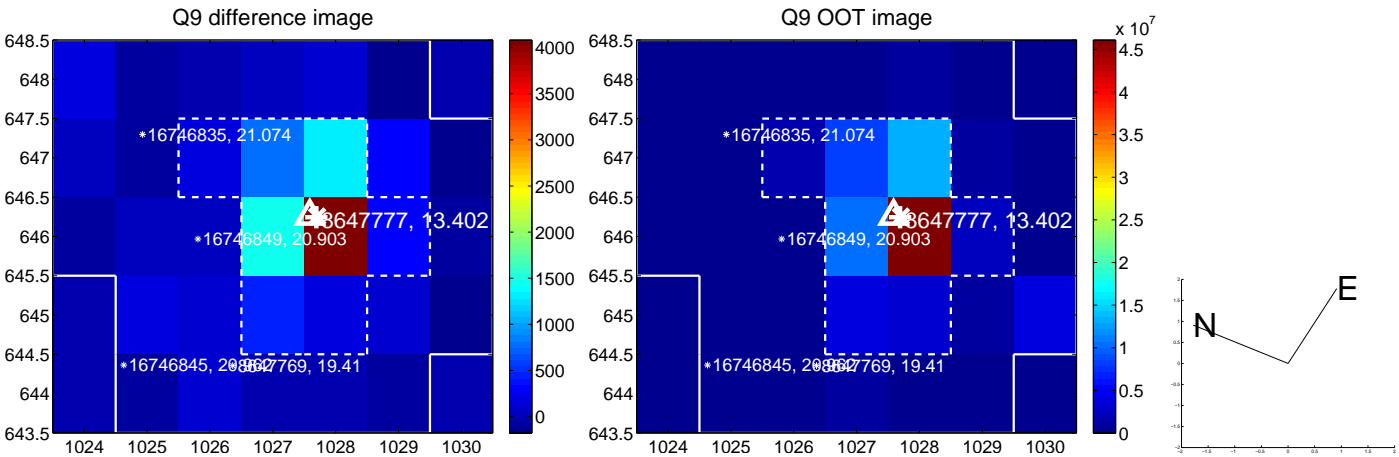


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

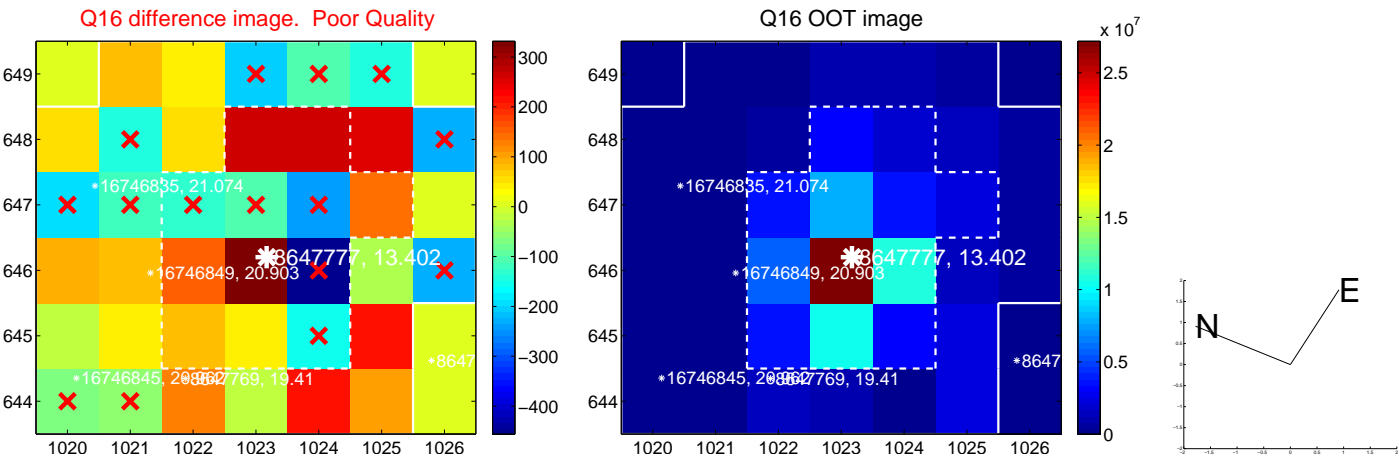
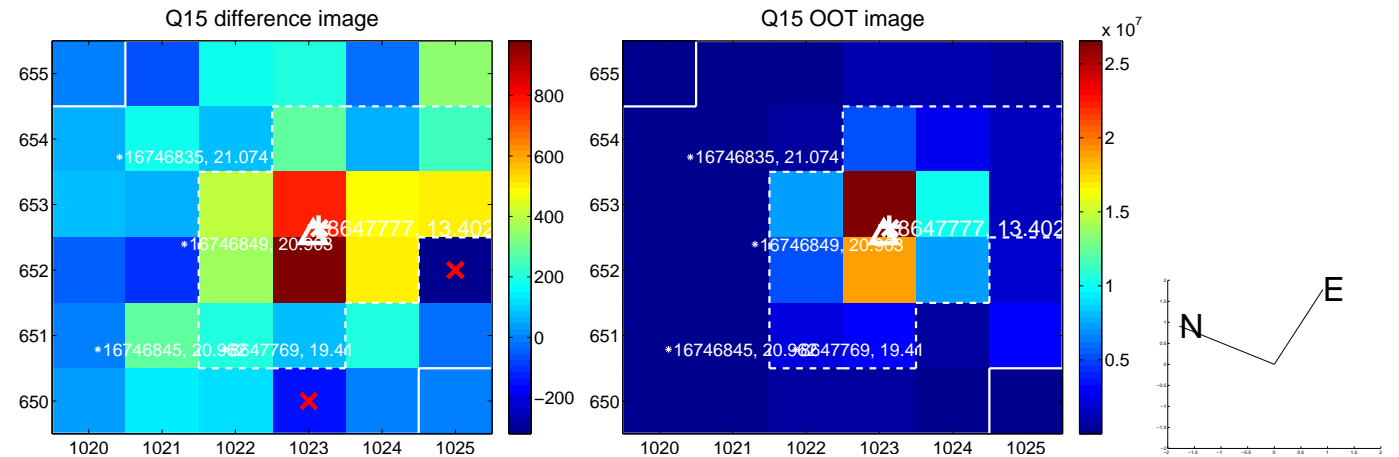
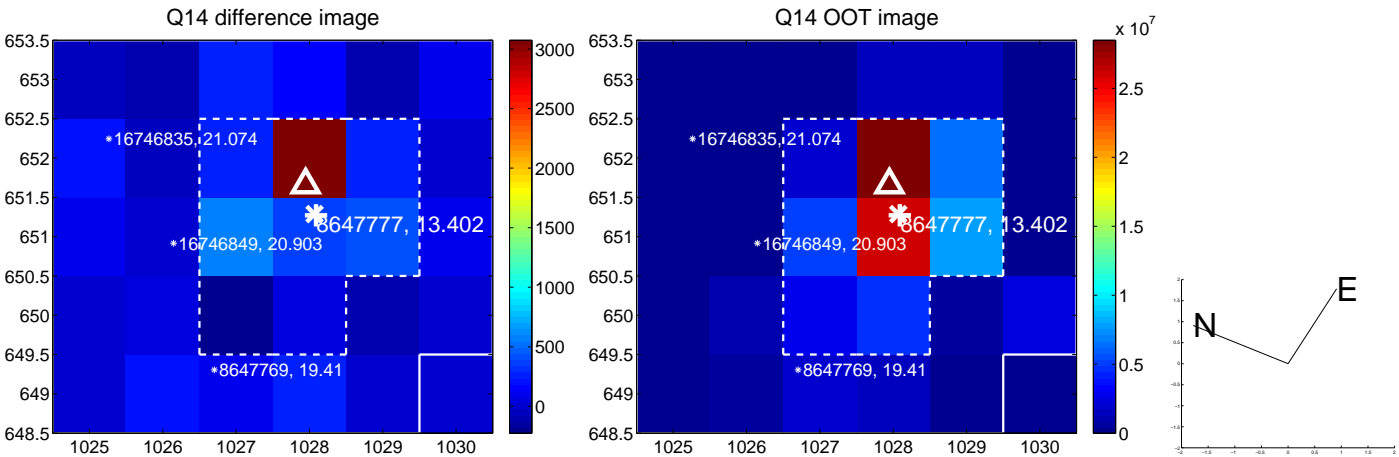
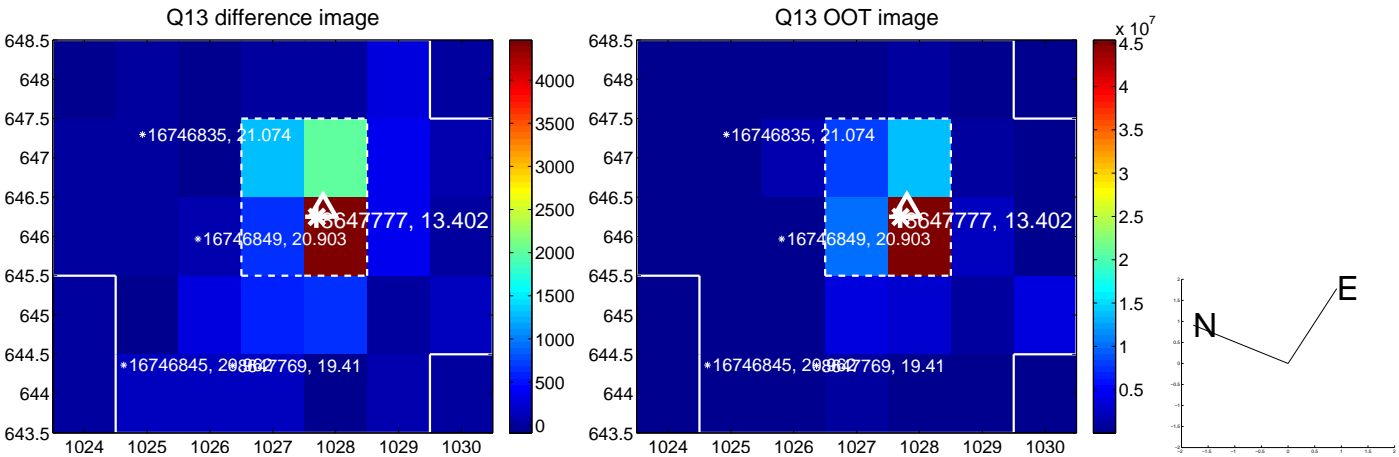




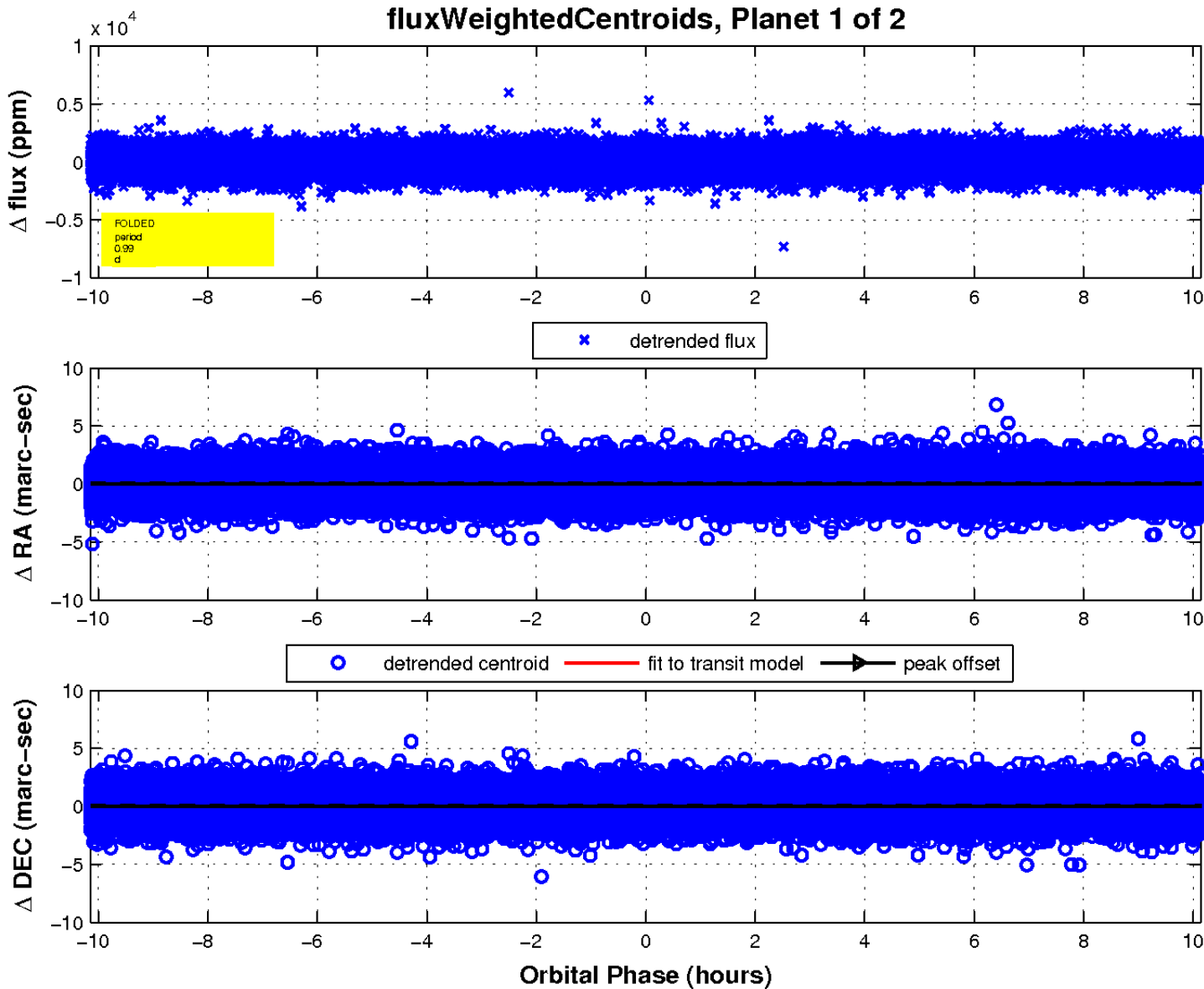
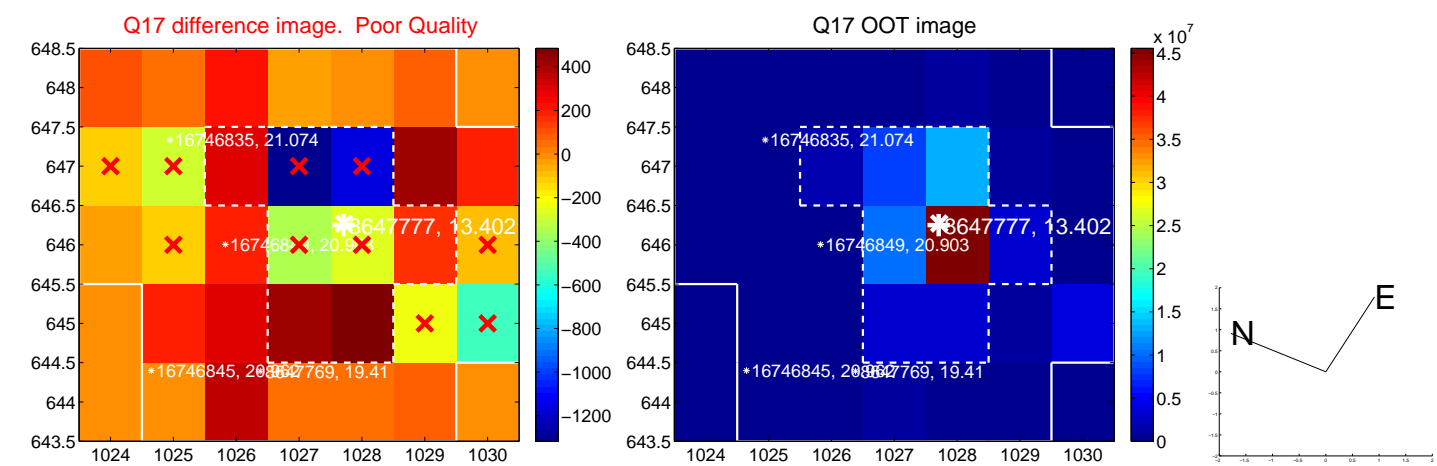
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

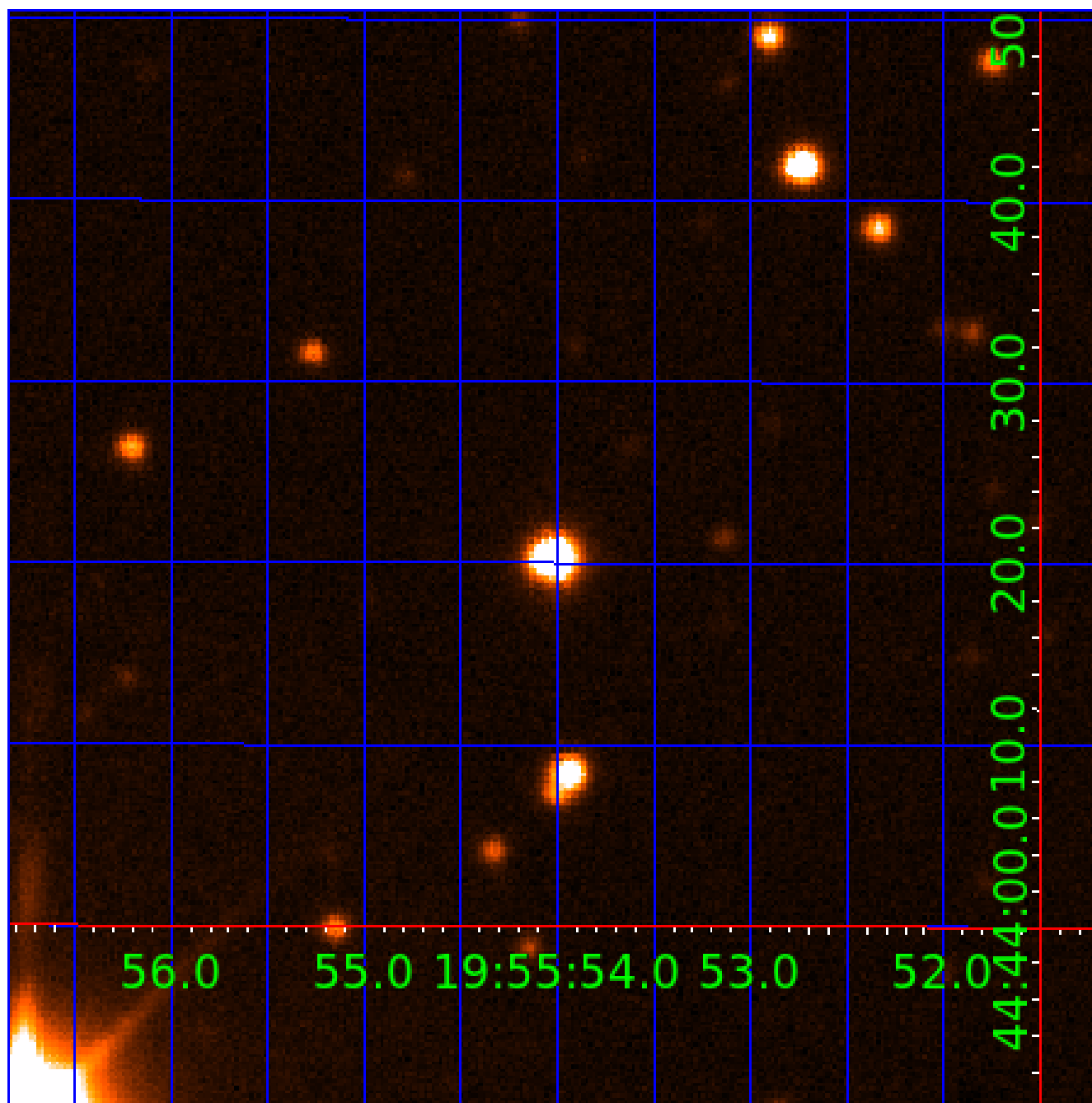


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 008647777

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008647777-01	OBS	No	0.985307	131.565990	66.1	3.382	10.9	11.6	1.83	6279	1.72	11699.12
008647777-02	OBS	No	0.686370	131.787606	46.5	4.732	9.5	7.8	1.83	6279	1.30	18945.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008647777-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
008647777-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT

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

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

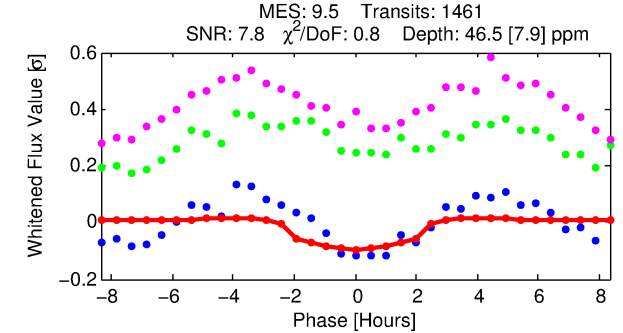
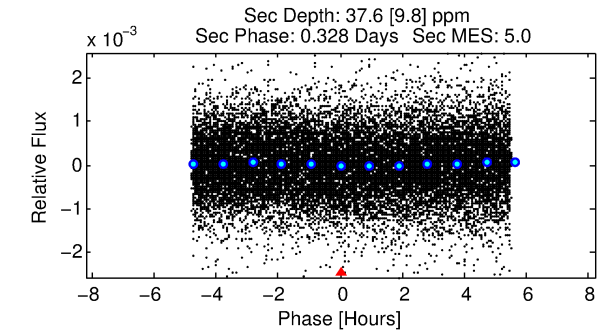
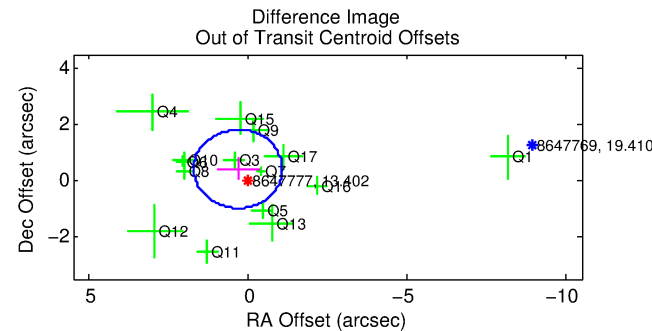
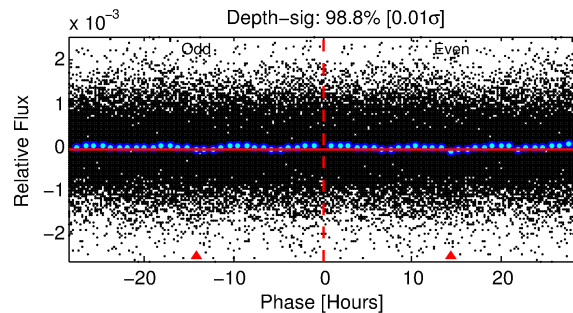
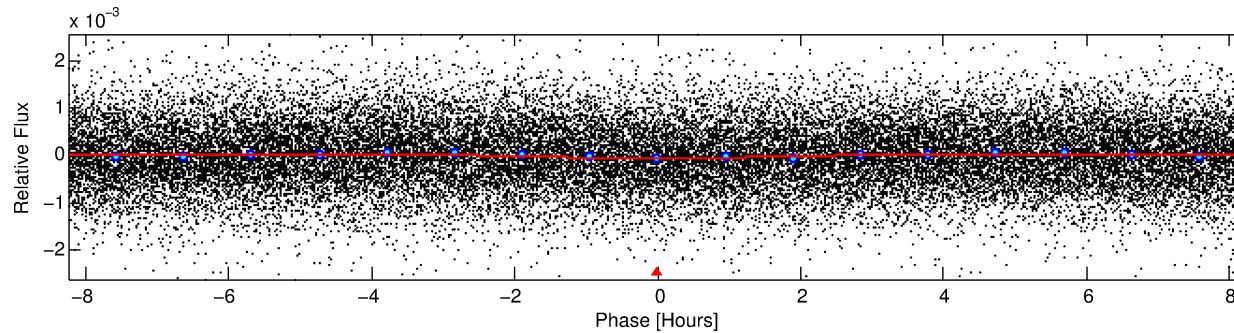
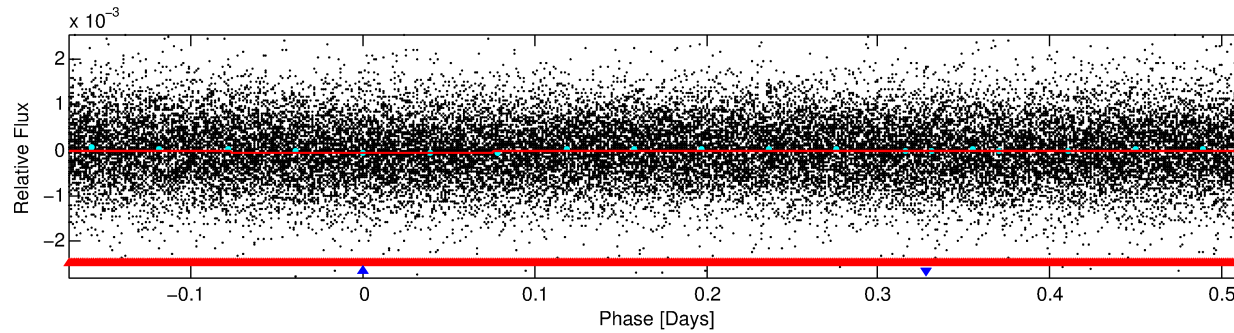
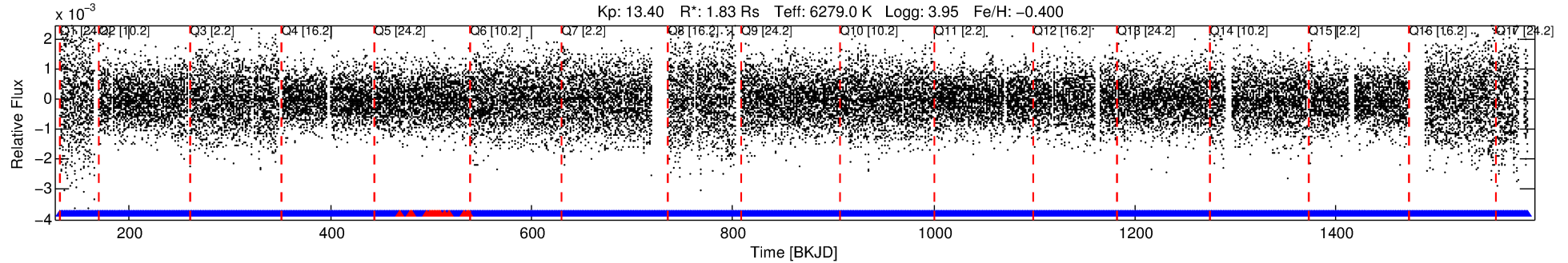
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008647777-02

No Significant Match Found

# DV One-Page Summary

KIC: 8647777 Candidate: 2 of 2 Period: 0.686 d



## DV Fit Results:

Period = 0.68637 [0.00001] d  
Epoch = 131.7876 [0.0073] BKJD  
Rp/R\* = 0.0065 [0.0116]  
a/R\* = 1.21 [3.52]  
b = 0.55 [11.98]  
Seff = 18945.42 [13503.59]  
Teq = 2992 [533] K  
Rp = 1.30 [2.37] Re  
a = 0.0157 [0.0066] AU  
Ag = 3.03 [11.02] [0.18 $\sigma$ ]  
Teffp = 6101 [5455] K [0.57 $\sigma$ ]

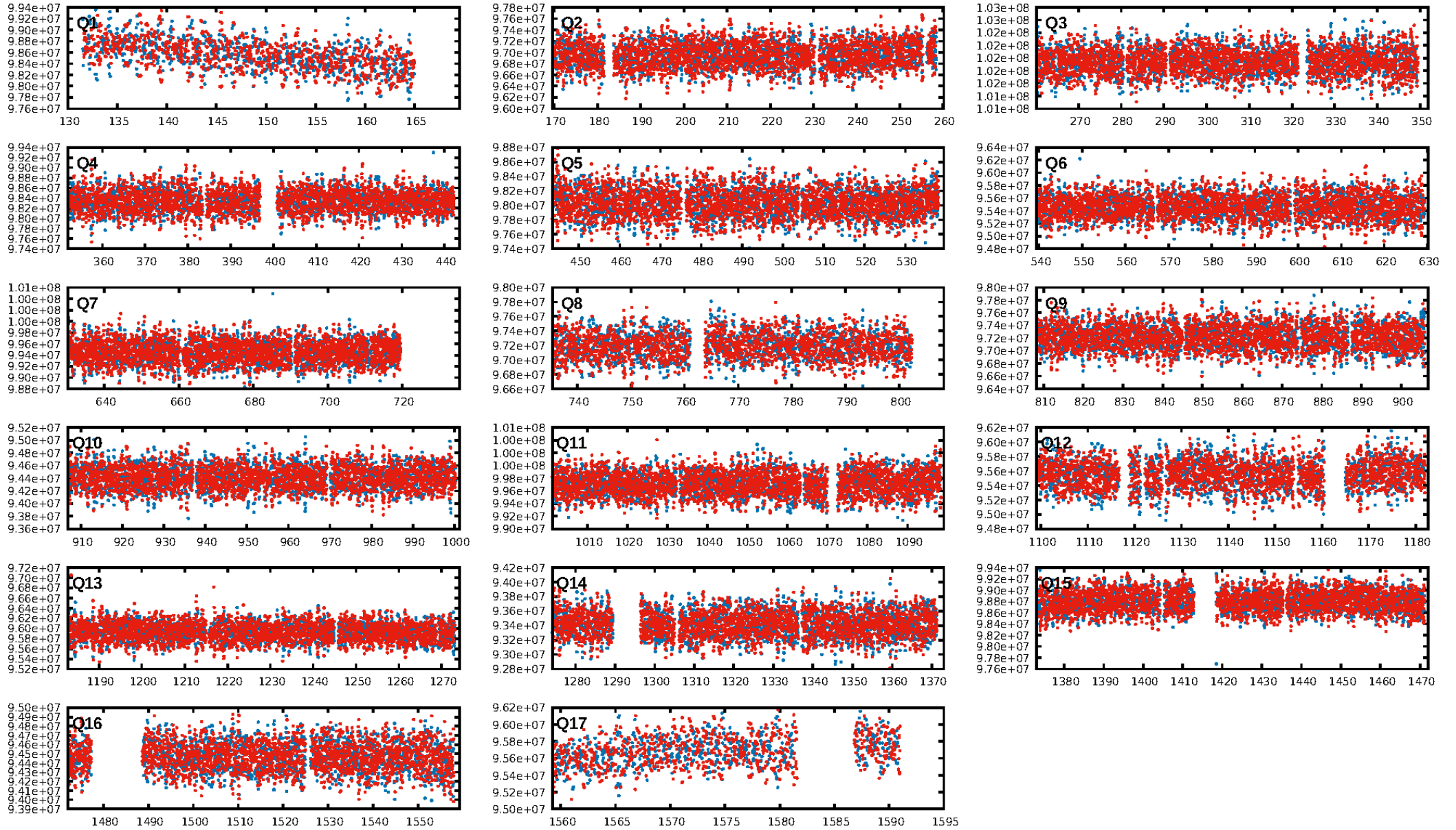
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 78.3% [1.23 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 4.39e-05**  
RollingBand-fgt: 0.99 [1377/1396]  
GhostDiagnostic-chr: 2.533  
Centroid-sig: 1.8%  
Centroid-so: 0.994 arcsec [2.18 $\sigma$ ]  
OotOffset-rm: 0.521 arcsec [1.12 $\sigma$ ]  
KicOffset-rm: 0.539 arcsec [1.00 $\sigma$ ]  
OotOffset-st: 2/4/4/5 [15]  
KicOffset-st: 2/4/4/5 [15]  
DiffImageQuality-fgm: 0.40 [6/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:35:02 Z

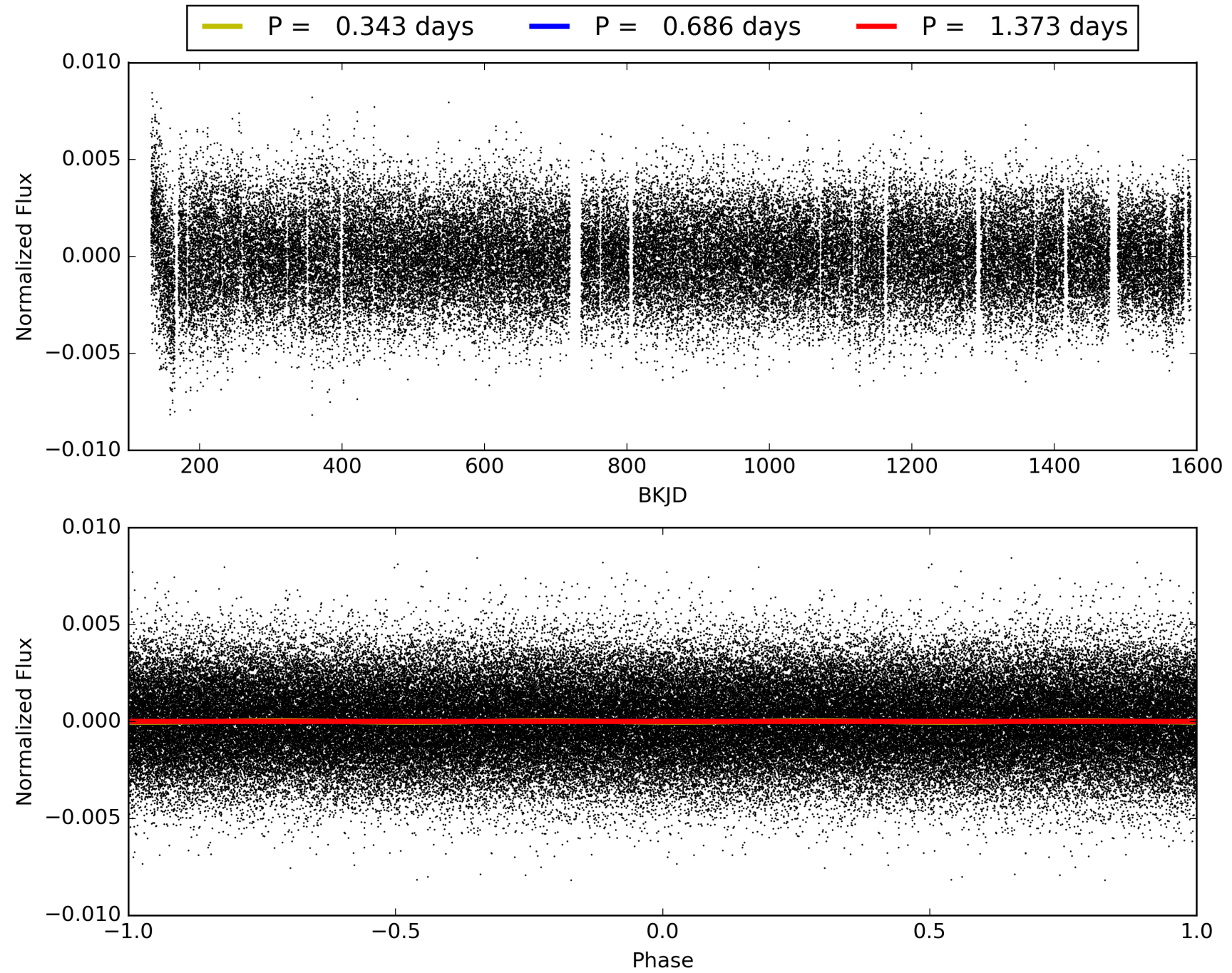
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008647777-02, PDC Light Curves





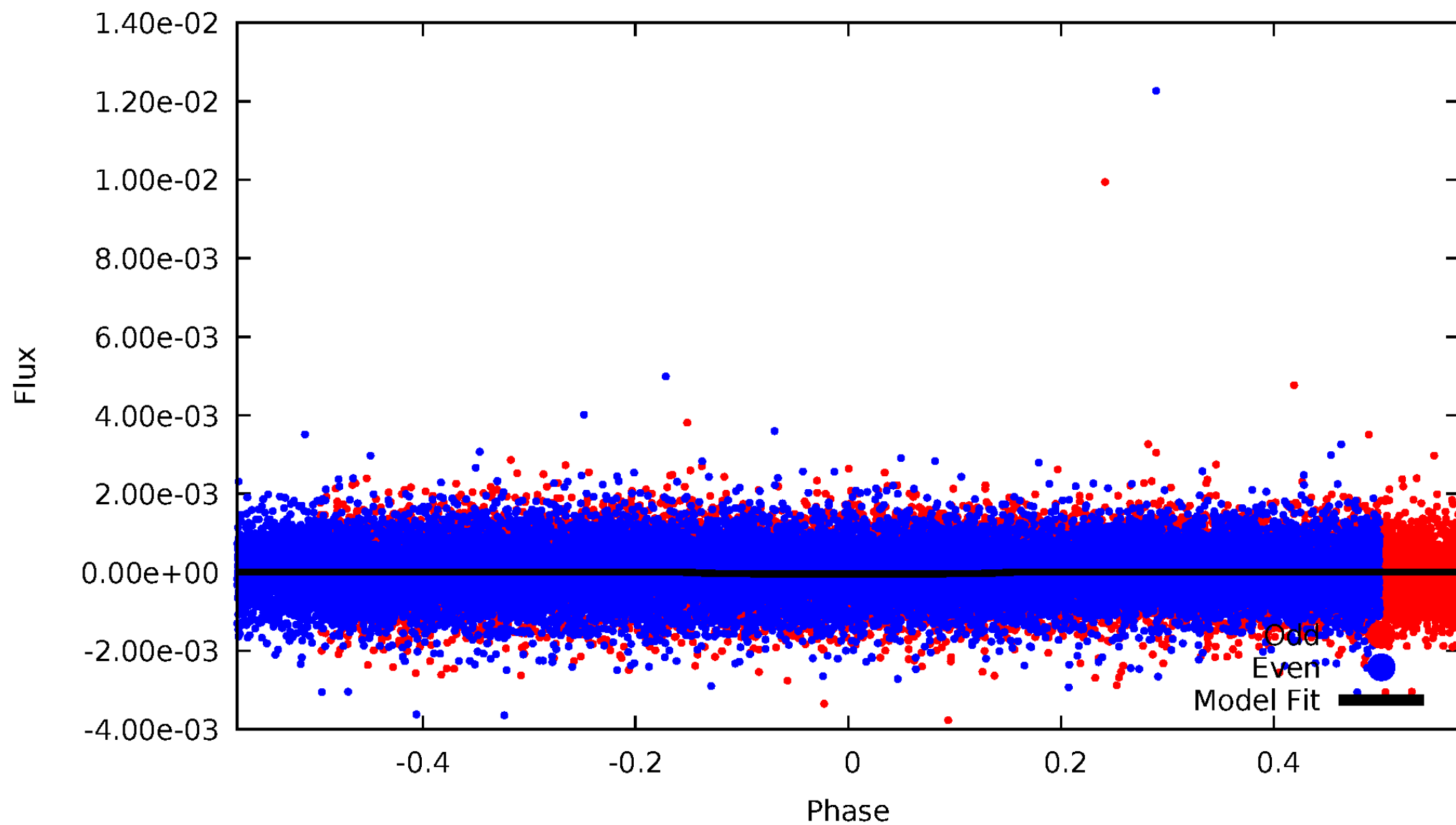
TCE 008647777-02





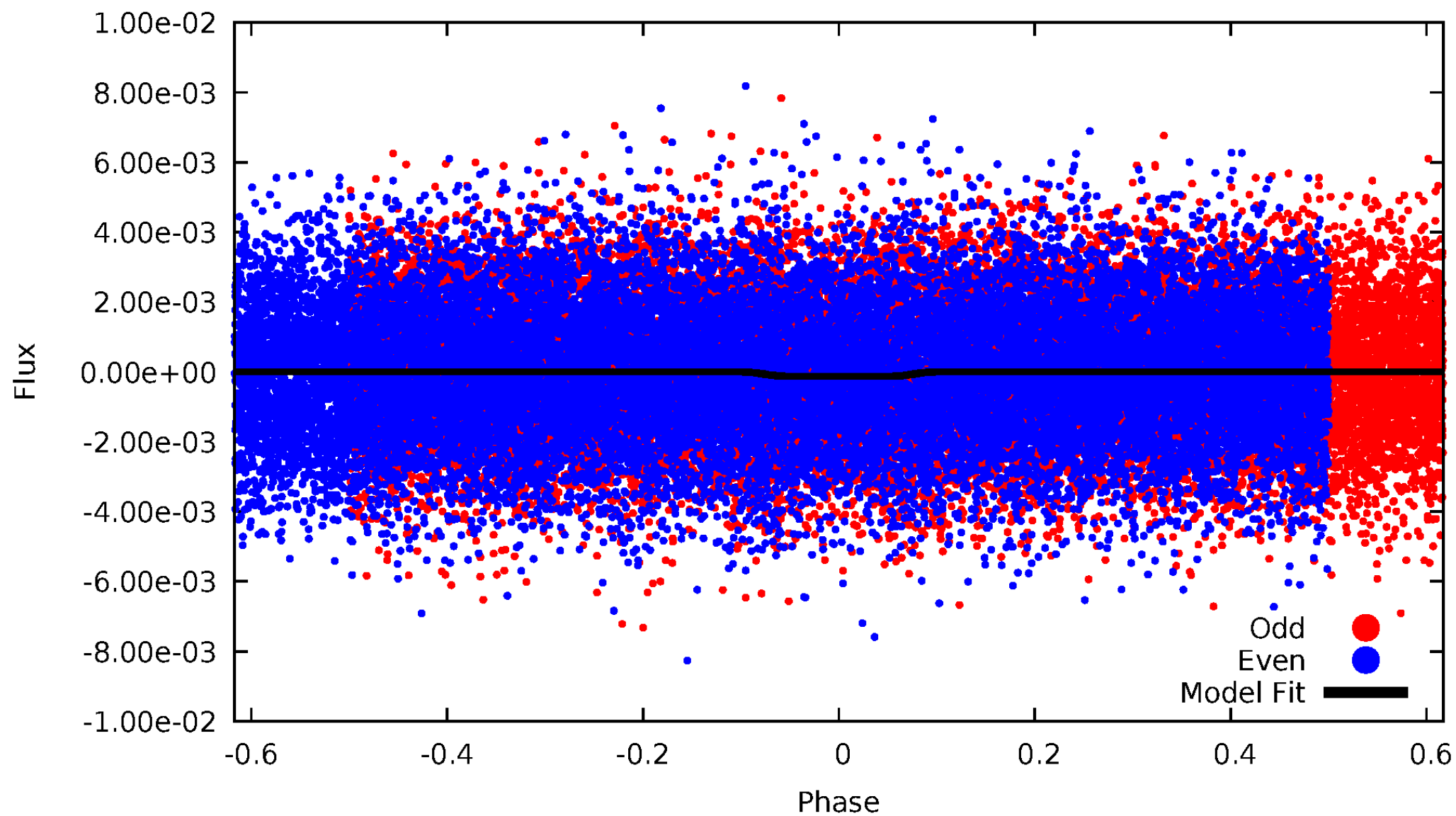
# DV Odd/Even

TCE 008647777-02



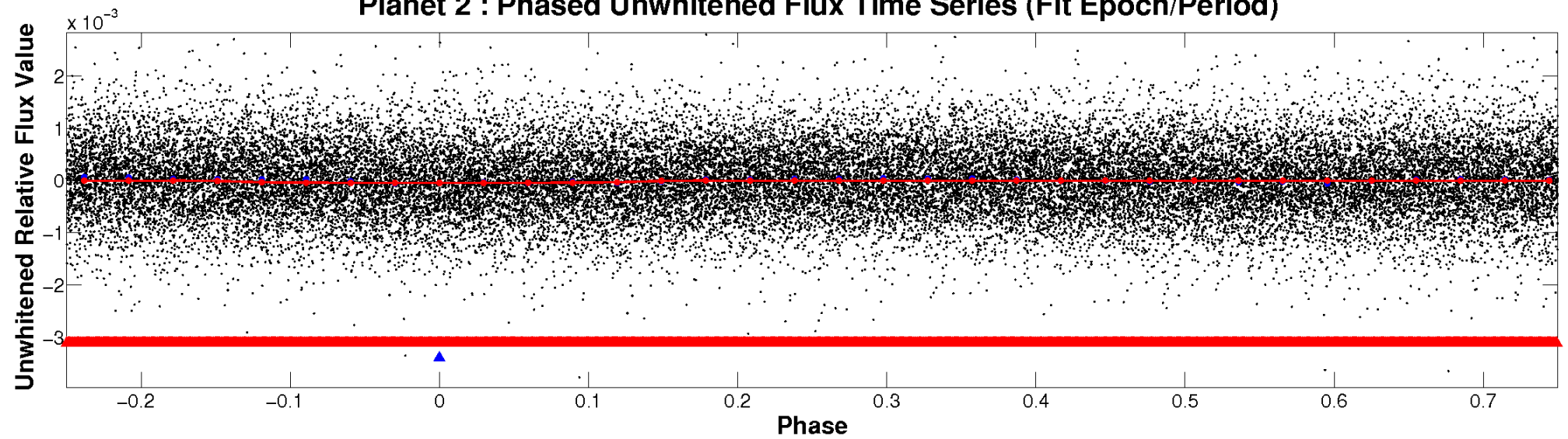
# ALT Odd/Even

TCE 008647777-02

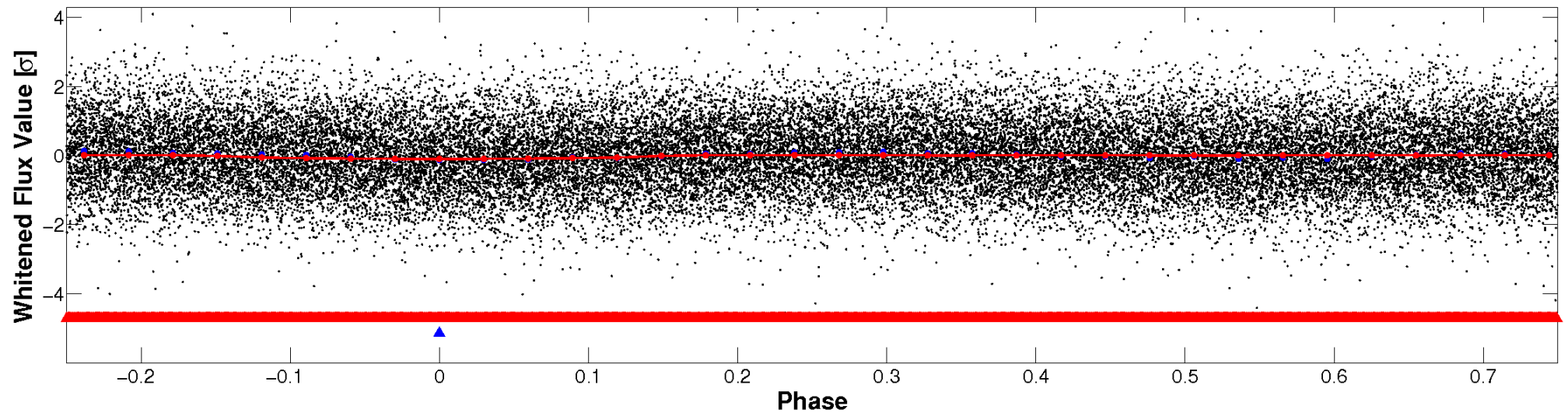


# Non-Whitened Vs. Whitened Light Curve

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

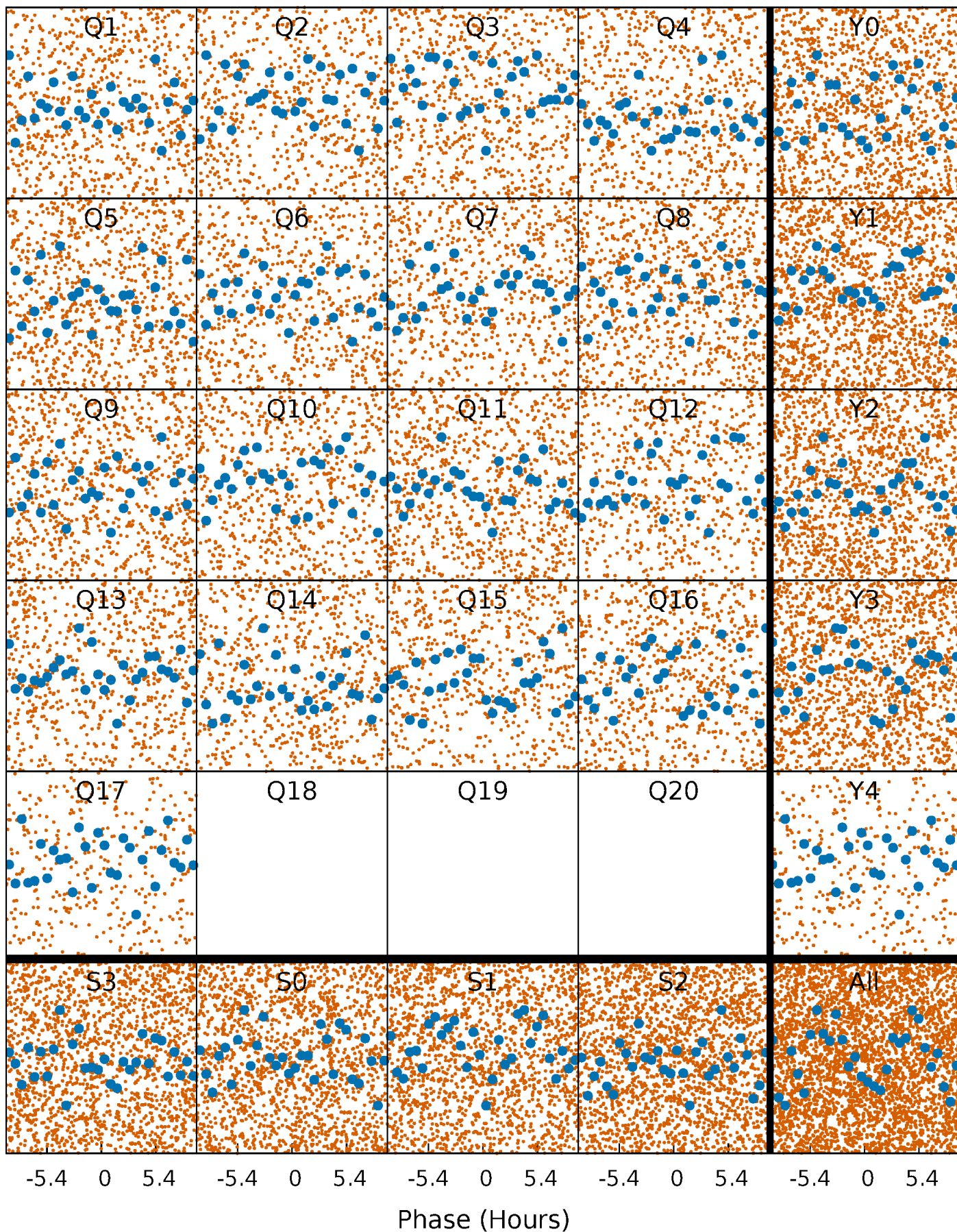


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

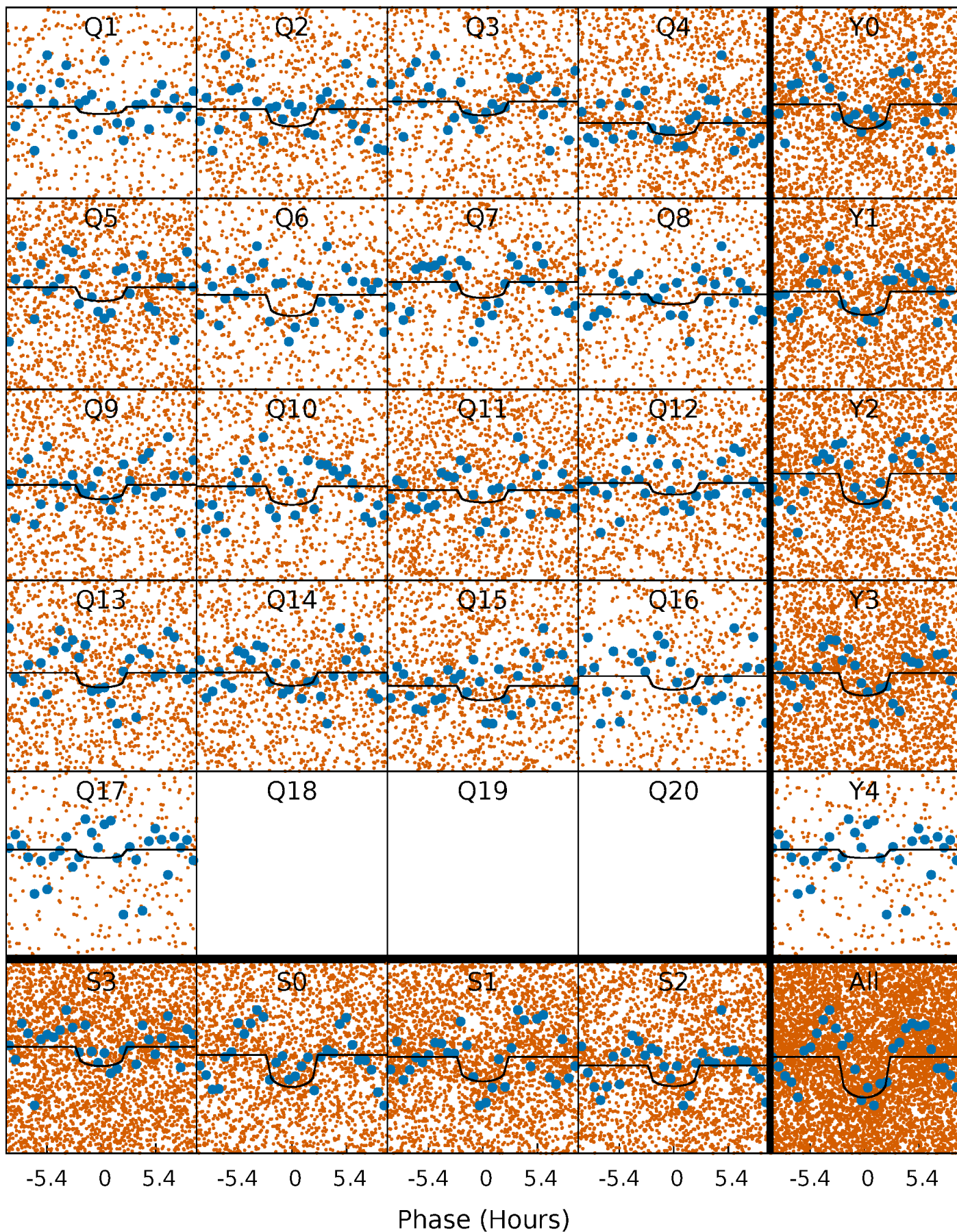
TCE 008647777-02   P= 0.686370 Days    $T_0=131.787606$  (BKJD)





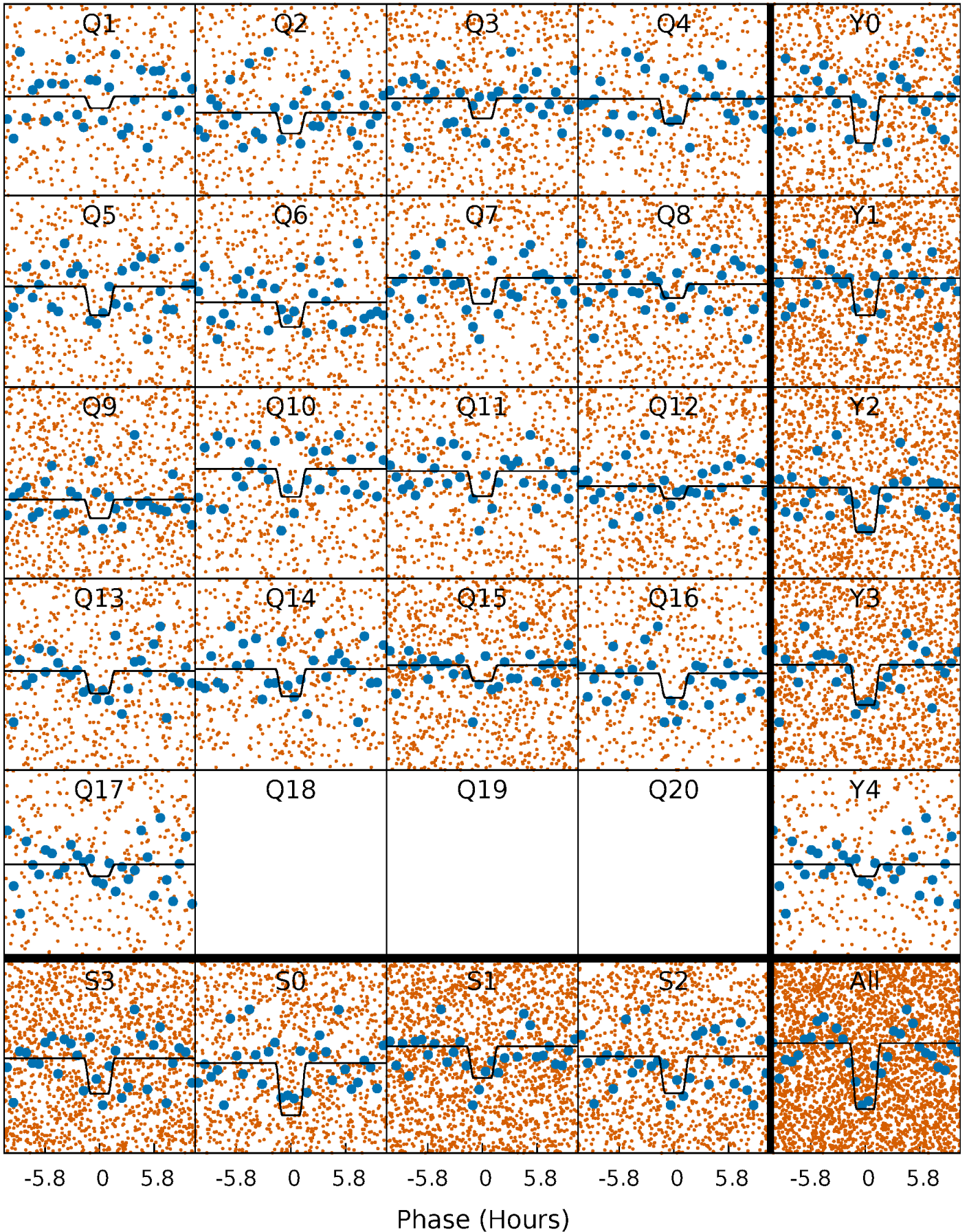
# DV Quarter-Phased Transit Curves

TCE 008647777-02   P= 0.686370 Days    $T_0=131.787606$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008647777-02 P= 0.686420 Days  $T_0=131.759267$  (BKJD)

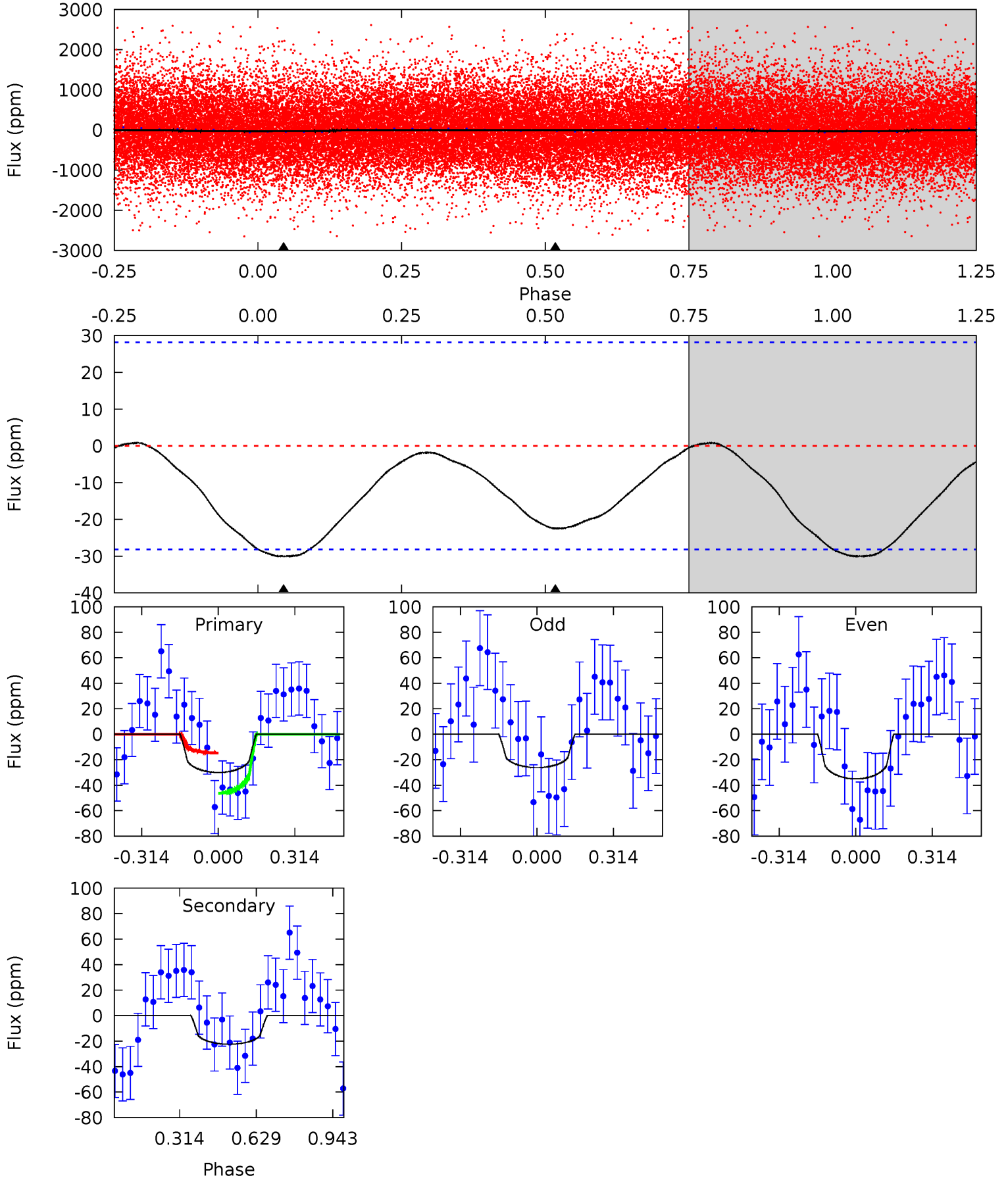




# DV Model-Shift Uniqueness Test

008647777-02, P = 0.686370 Days, E = 131.787606 Days

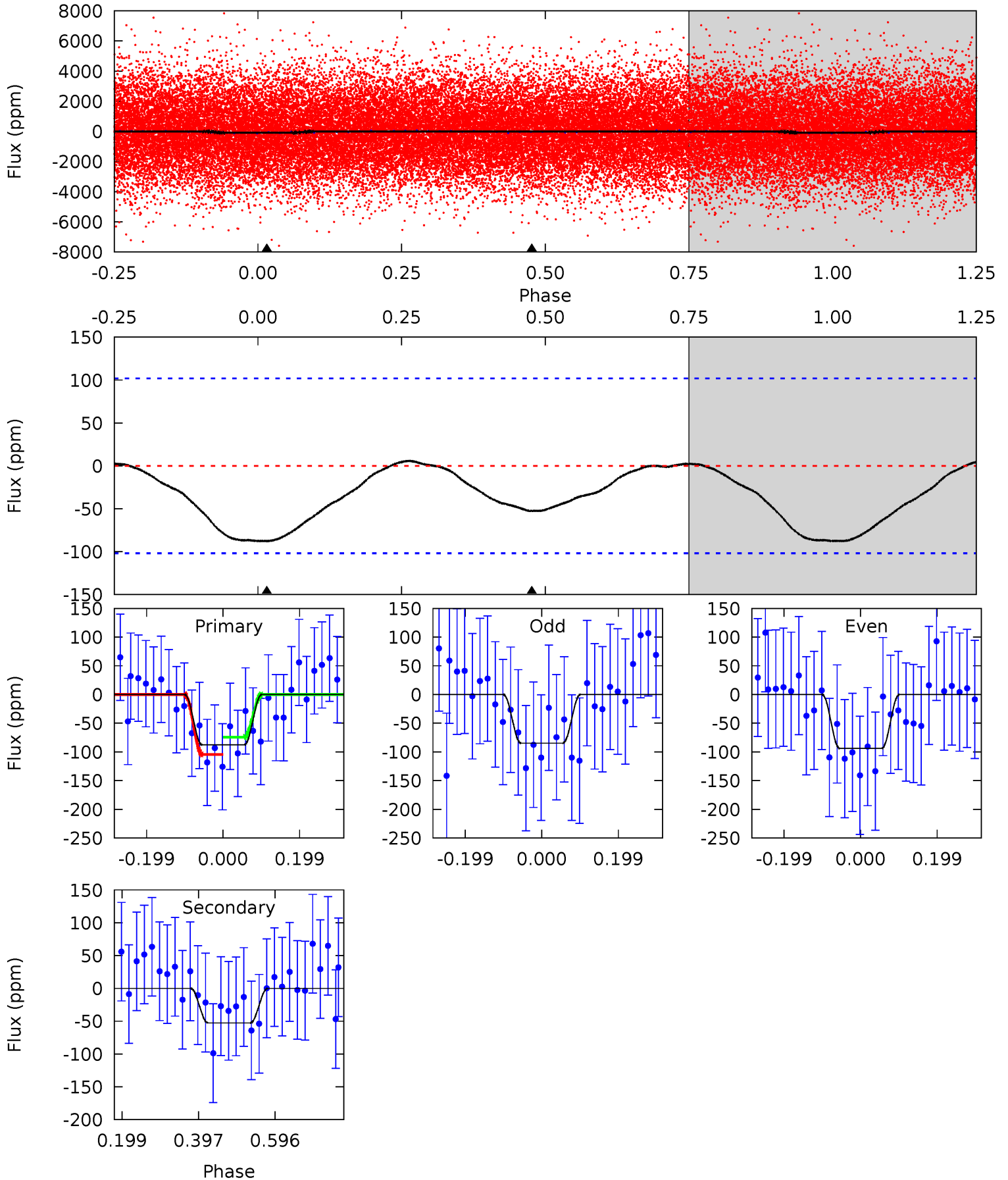
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.61	3.44	0	0	4.32	1.01	0.17	4.61	4.61	3.44	3.44	0.68	0.65	0.03	2.56



# Alt Model-Shift Uniqueness Test

008647777-02, P = 0.686420 Days, E = 131.759267 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
3.81	2.29	0	0	4.42	1.29	0.17	3.81	3.81	2.29	2.29	0.20	1.04	0.06	0.66



### Stellar Parameters For KIC 008647777

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6279^{+194}_{-214}$	$3.952^{+0.420}_{-0.140}$	$-0.400^{+0.300}_{-0.300}$	$1.831^{+0.497}_{-0.746}$	$1.093^{+0.174}_{-0.174}$	$0.251^{+0.842}_{-0.121}$
	+3%/-3%	+11%/-4%	+75%/-75%	+27%/-41%	+16%/-16%	+335%/-48%
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 008647777-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-22 \pm 7$	$1.99^{+1.88}_{-1.34}$	$4079^{+351}_{-410}$	$3888^{+3605}_{-7155}$	$0.732^{+6.604}_{-0.552}$
Alt.	$-53 \pm 23$	$2.42^{+2.19}_{-1.50}$	$4098^{+312}_{-487}$	$4404^{+2921}_{-7185}$	$1.111^{+7.212}_{-0.847}$

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

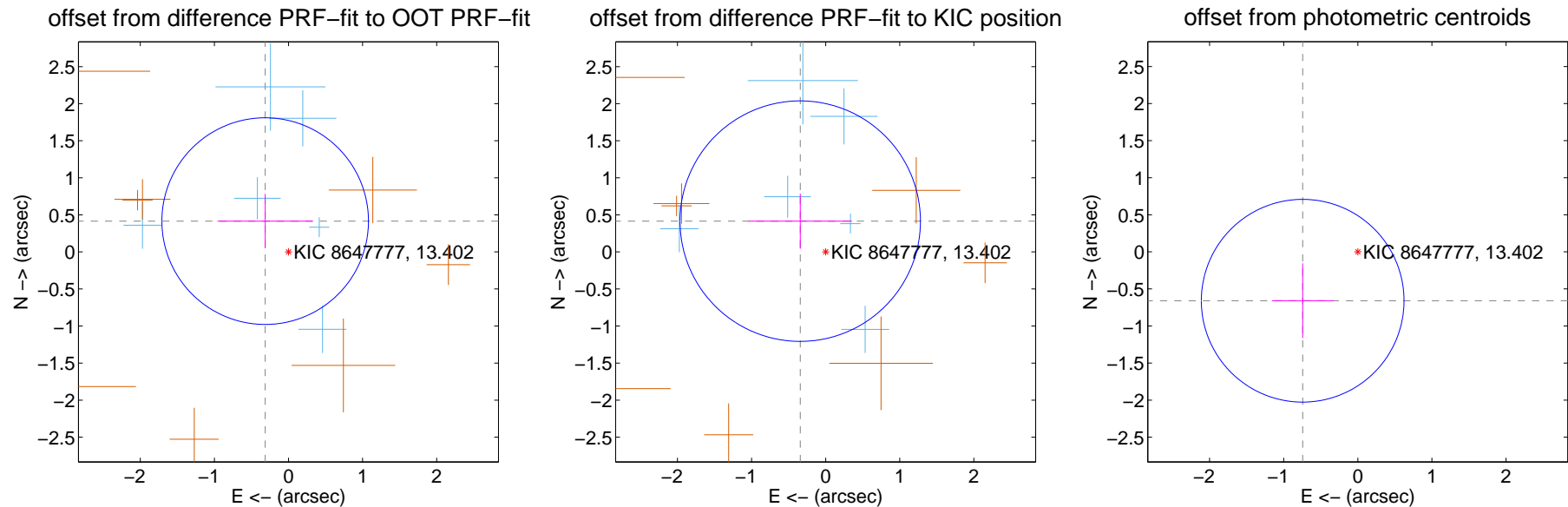
## DV Centroid Data

Supplemental centroid analysis for 008647777-02. Kepler magnitude: 13.40. Transit SNR 7.81

There are 6 quarters with good PRF difference image offsets

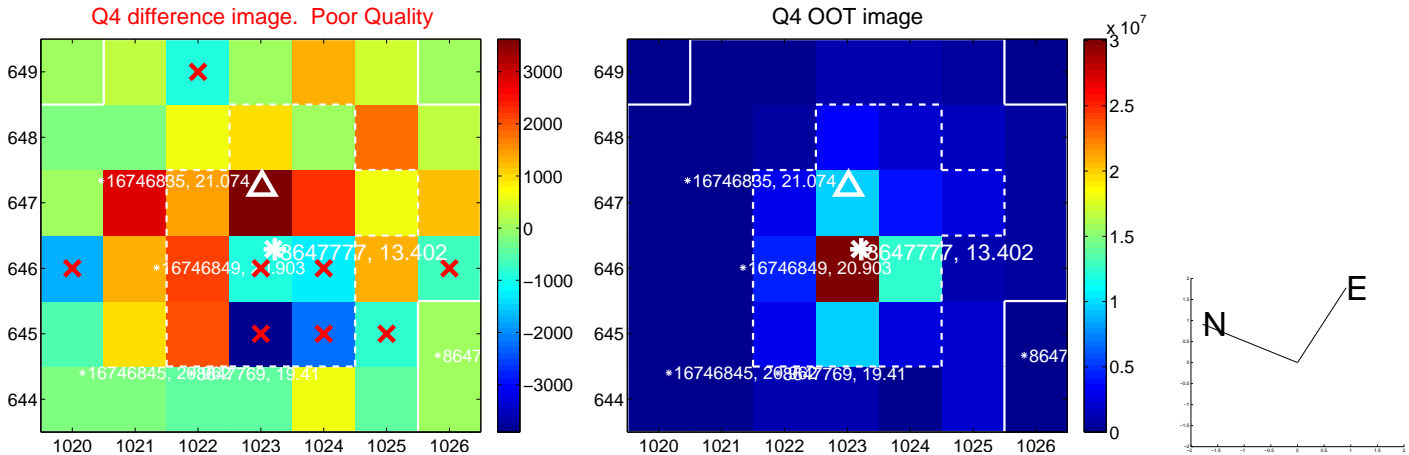
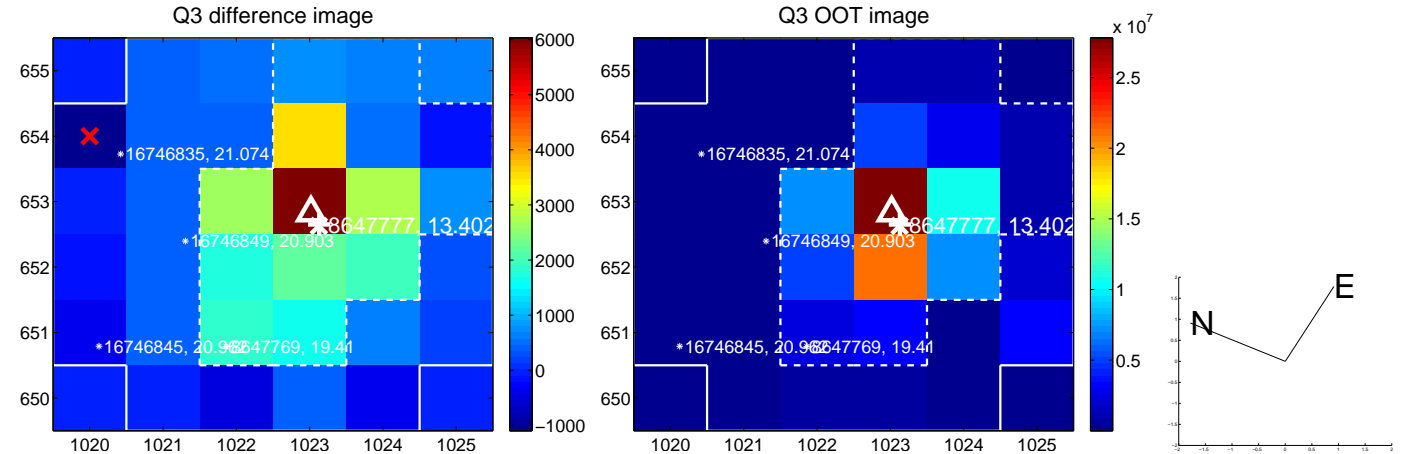
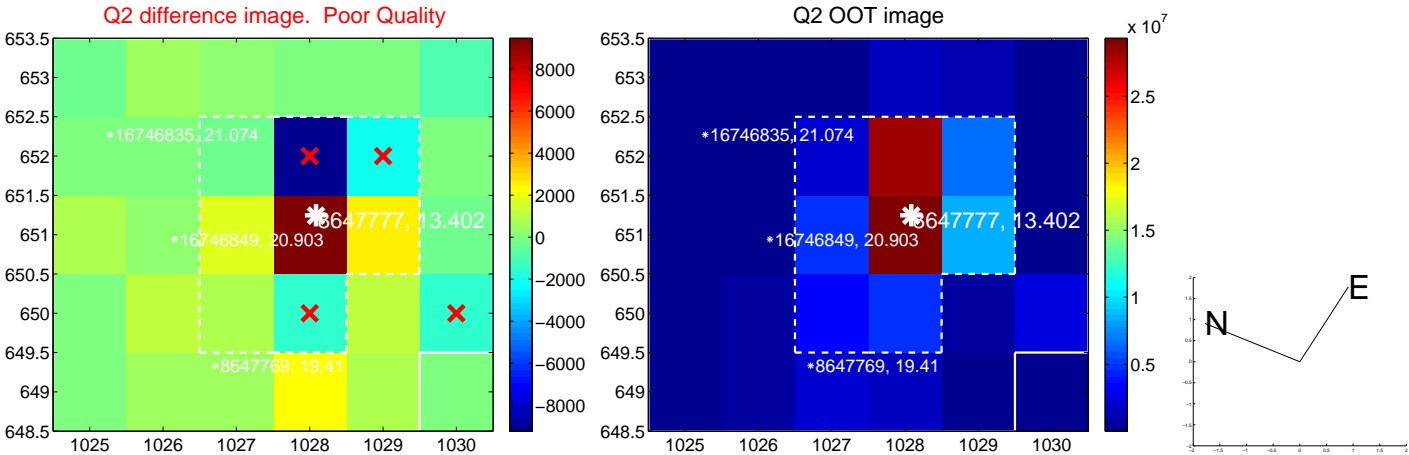
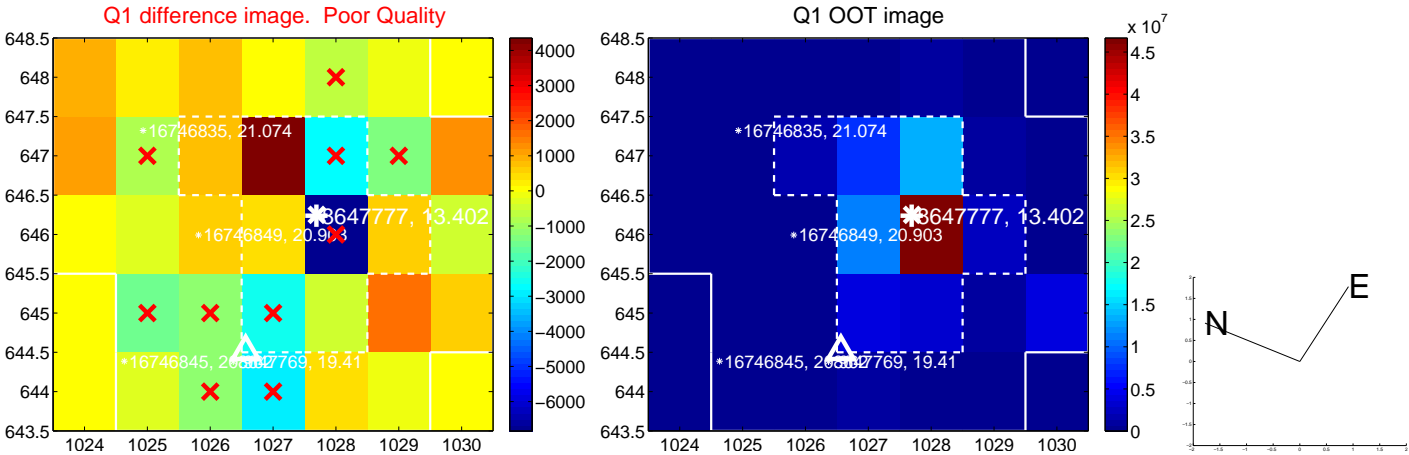
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.521 \pm 0.465$	1.12	$0.315 \pm 0.645$	$0.416 \pm 0.367$
PRF-fit source offset from KIC position	$0.539 \pm 0.541$	1.00	$0.343 \pm 0.699$	$0.415 \pm 0.372$
photometric centroid source offset	$0.99 \pm 0.46$	2.18	$0.74 \pm 0.41$	$-0.66 \pm 0.50$

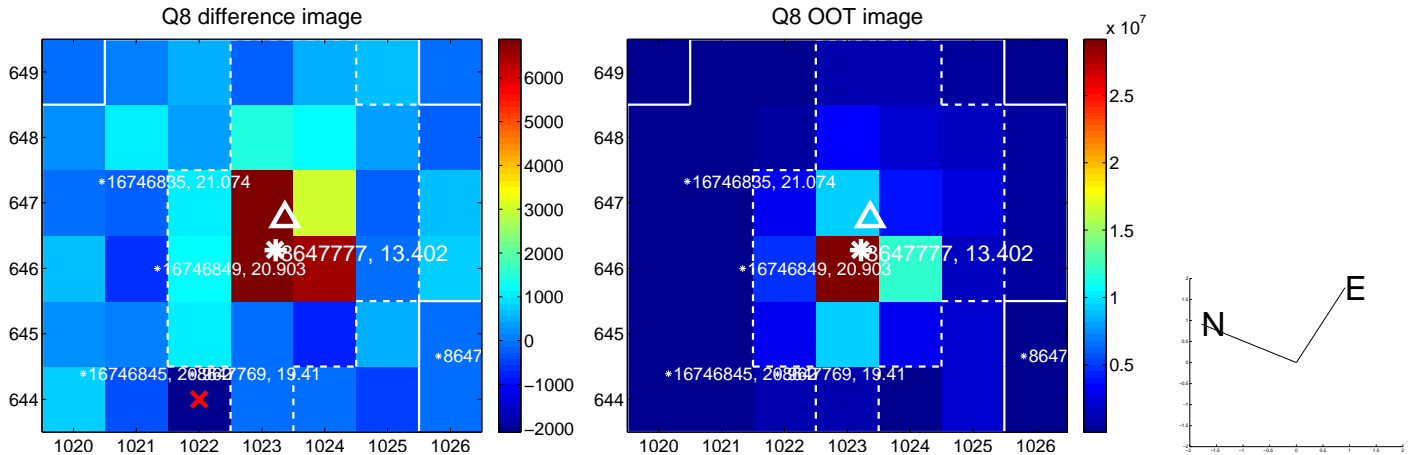
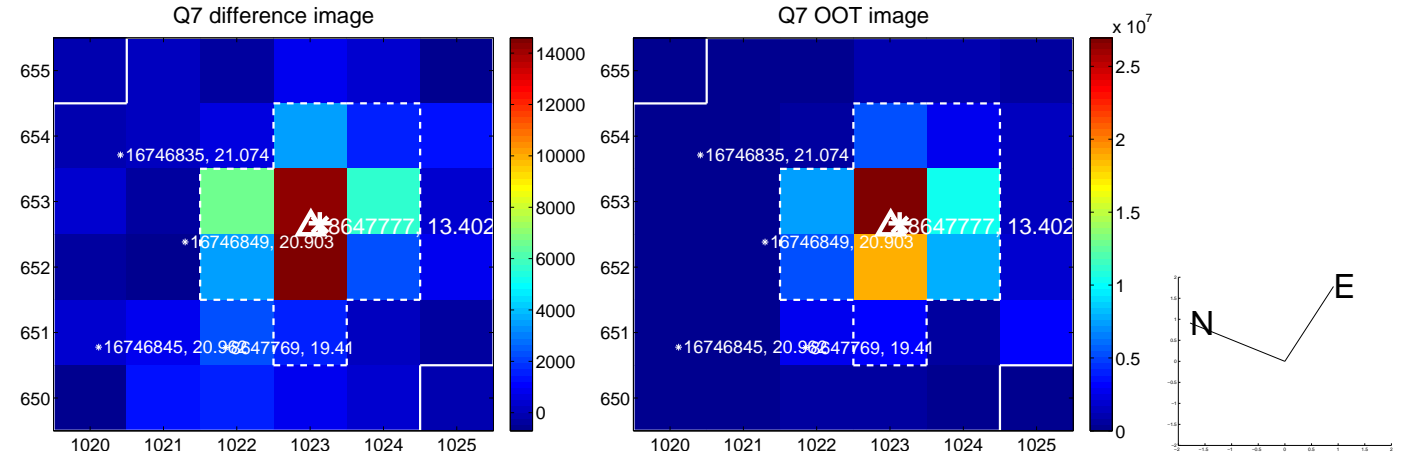
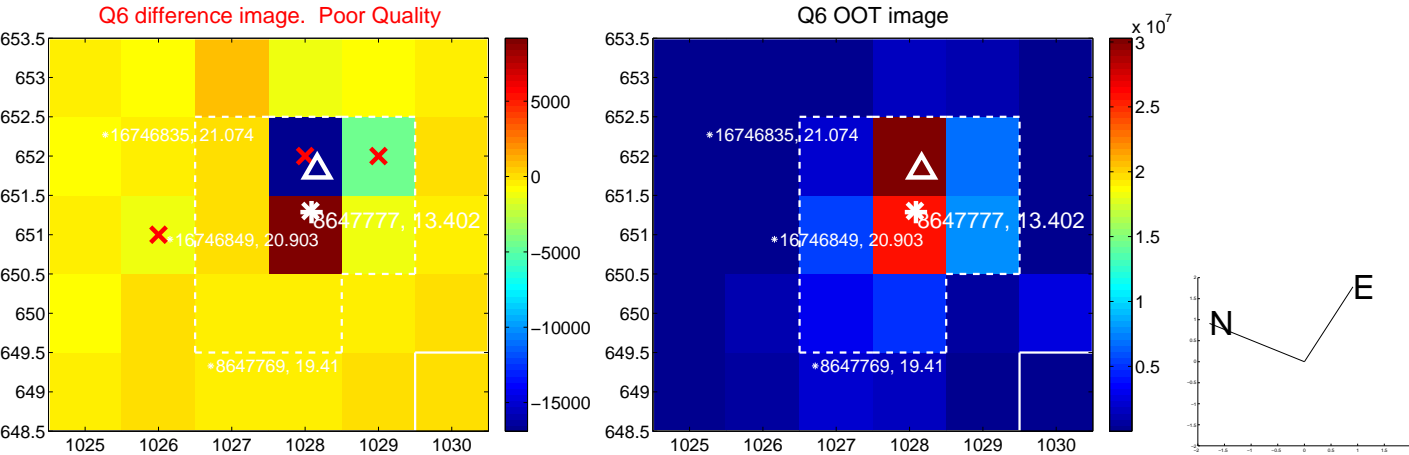
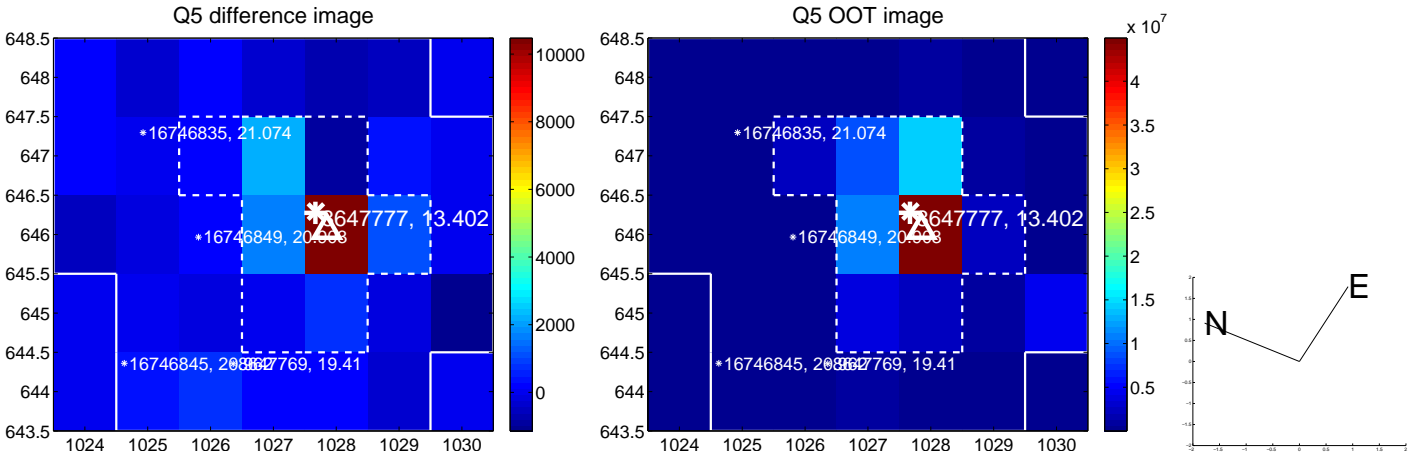


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

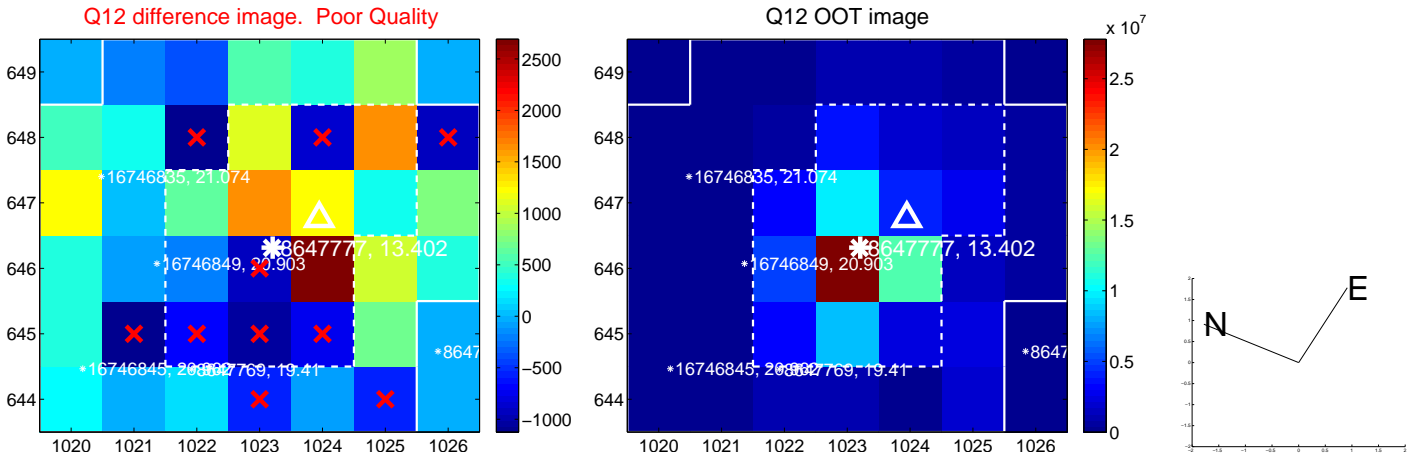
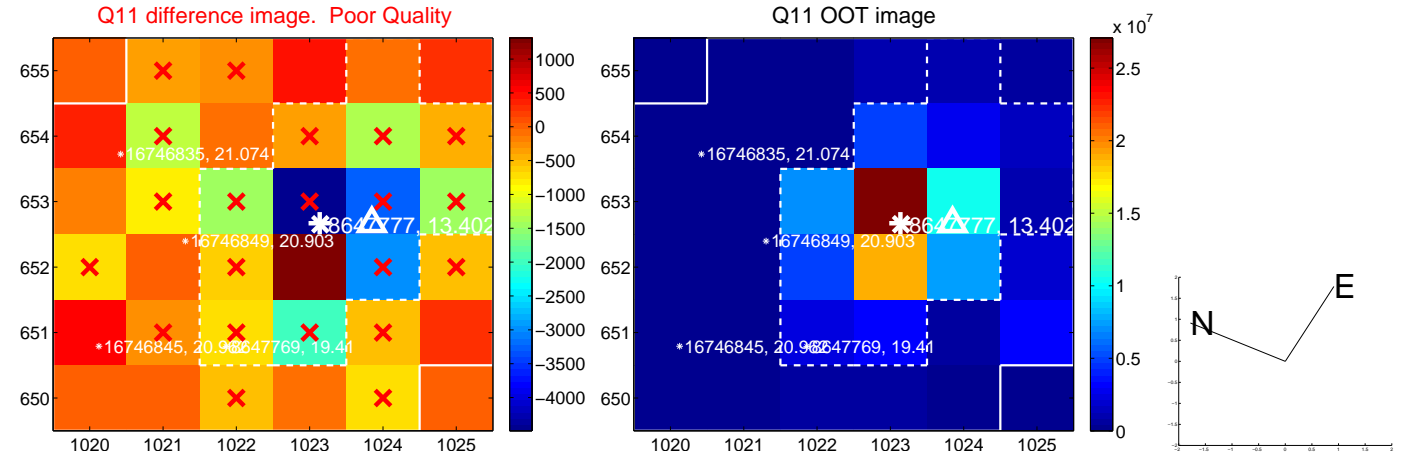
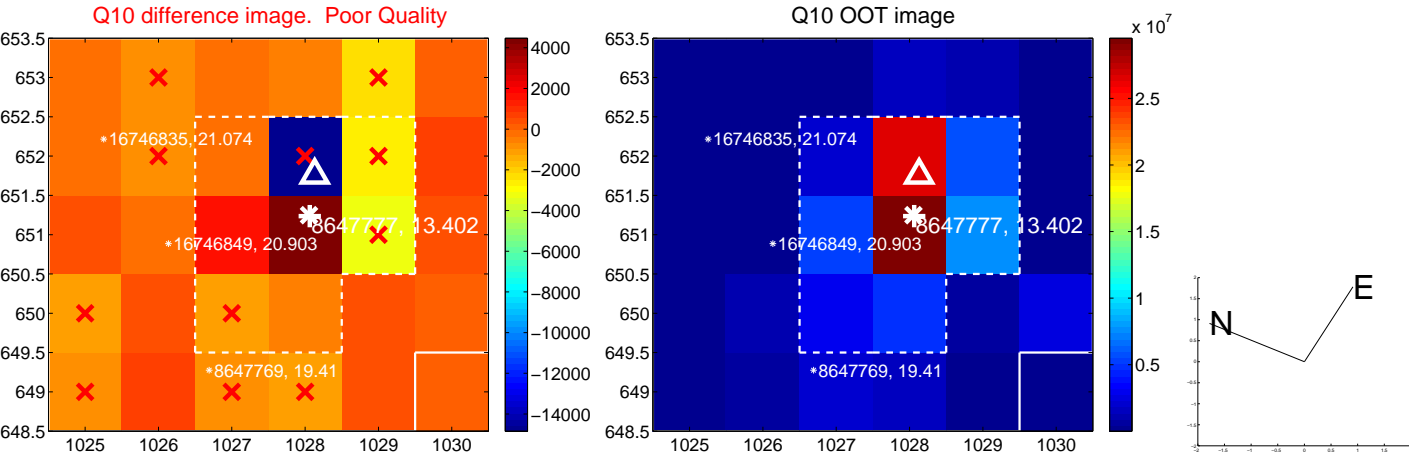
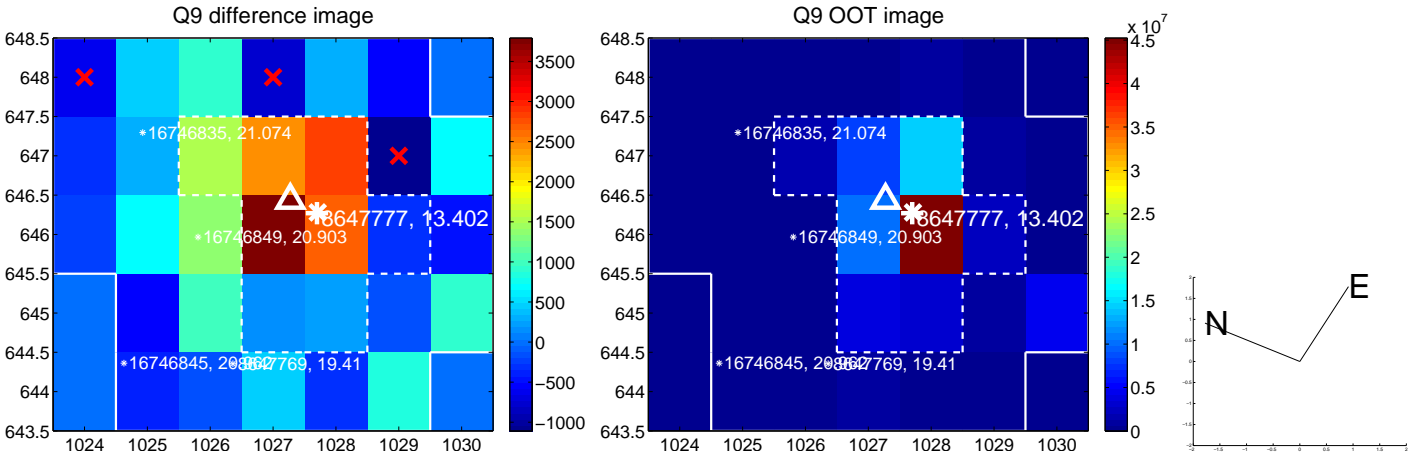


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

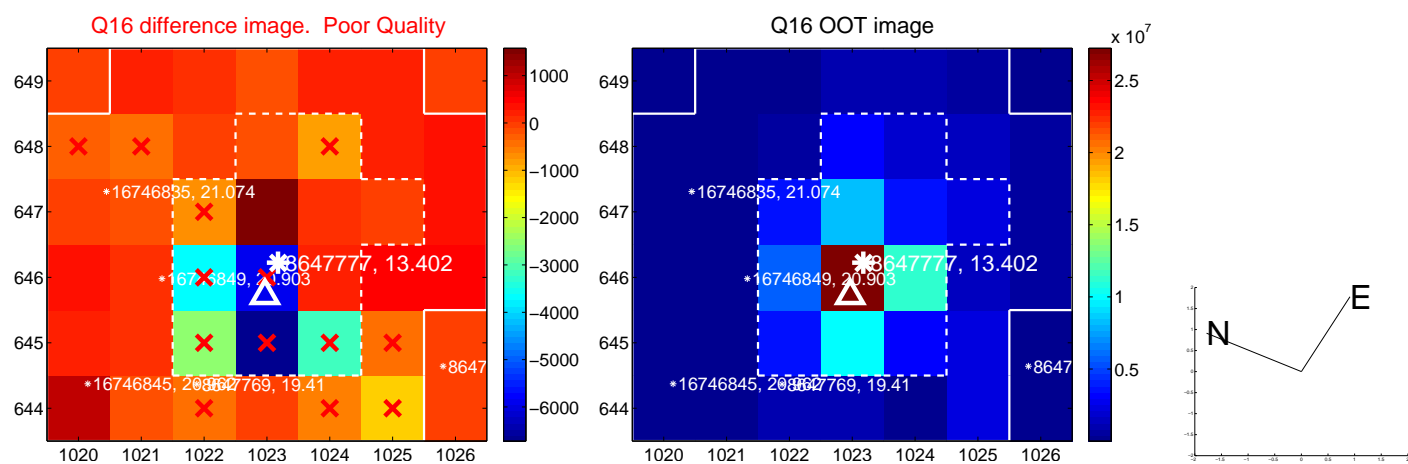
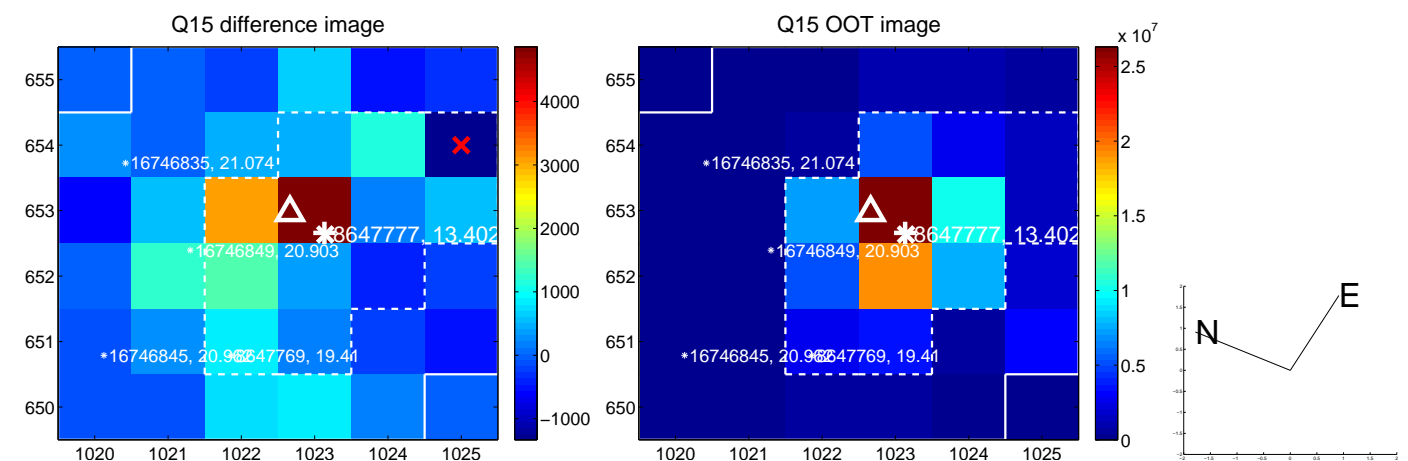
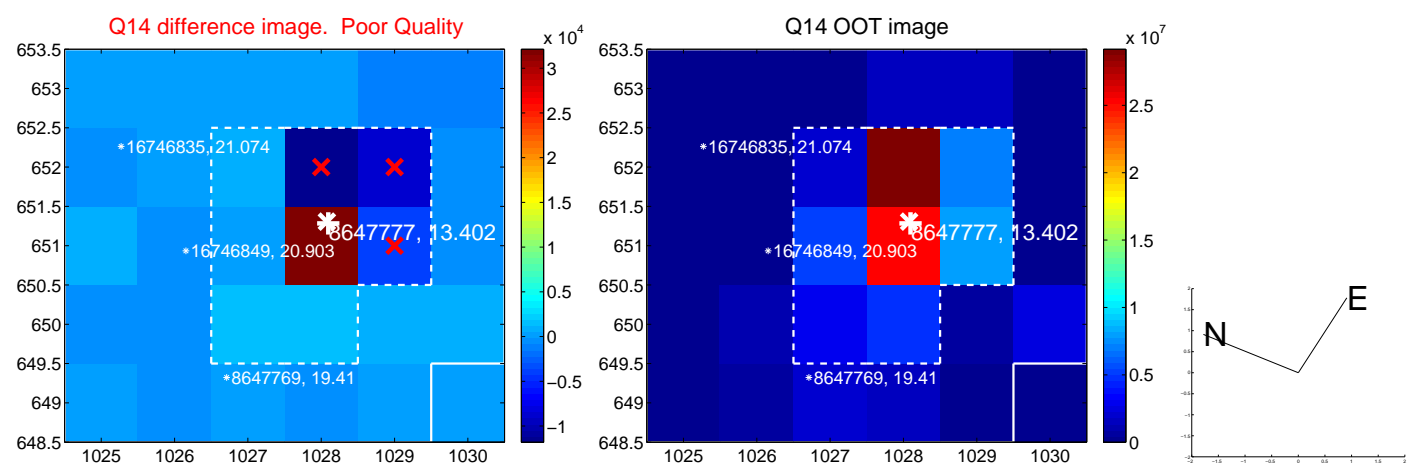
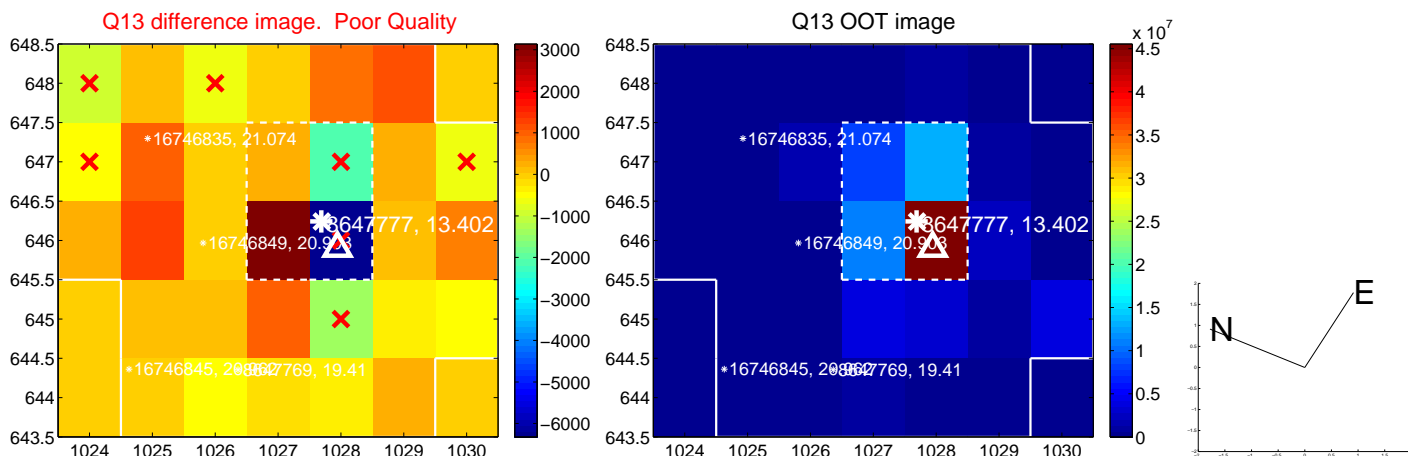




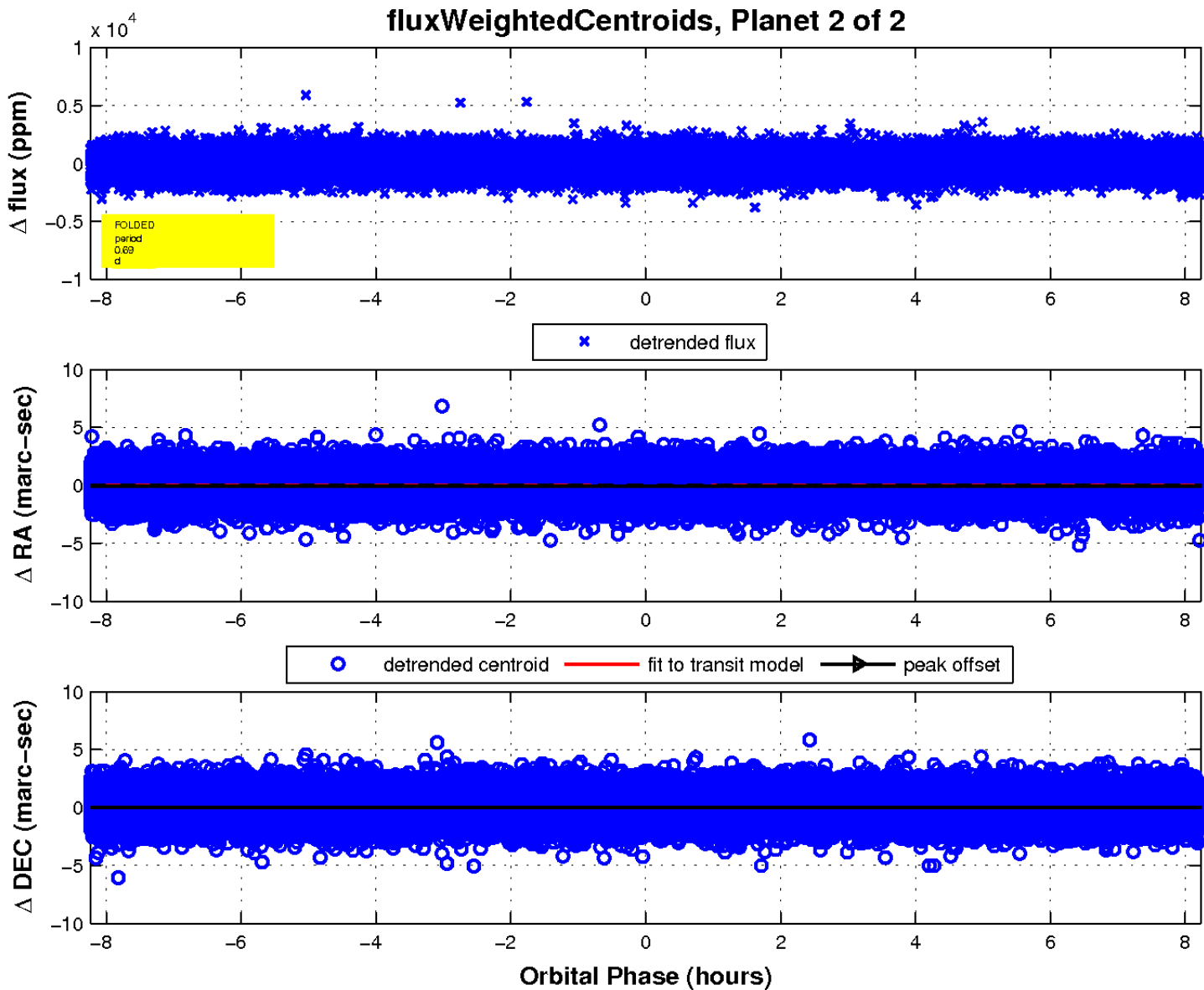
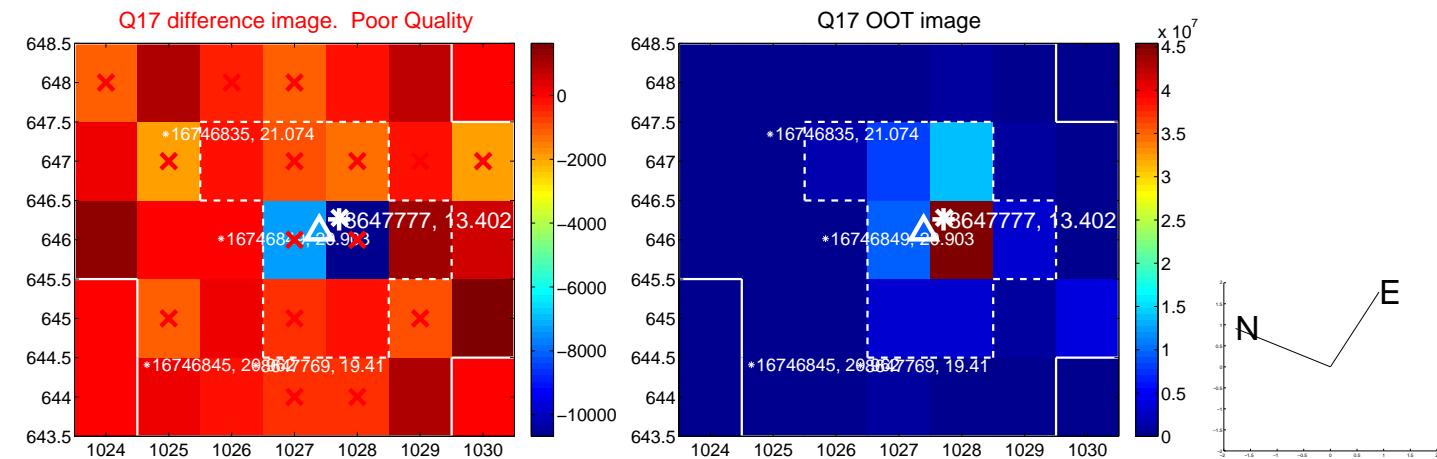
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

