

# KIC 009590976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009590976-01	OBS	0710.01	5.374912	133.310897	152.7	4.051	36.4	40.6	1.69	6167	2.33	942.86
009590976-02	OBS	0710.02	8.586052	137.954849	104.4	3.454	19.0	20.0	1.69	6167	1.98	504.92
009590976-03	OBS	0710.03	3.886830	132.508624	58.2	3.397	16.1	16.5	1.69	6167	1.43	1452.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009590976-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009590976-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009590976-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

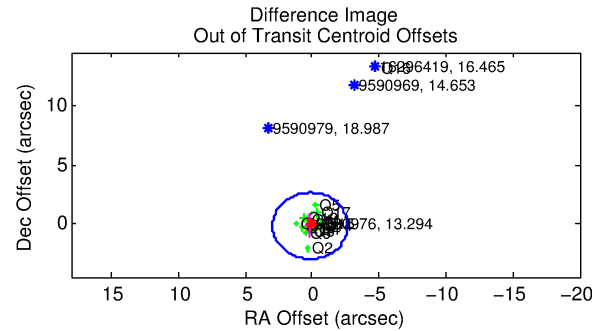
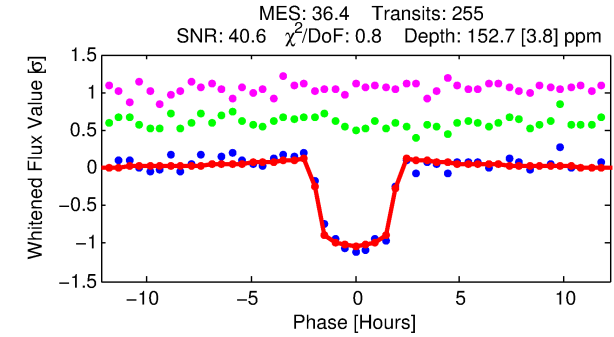
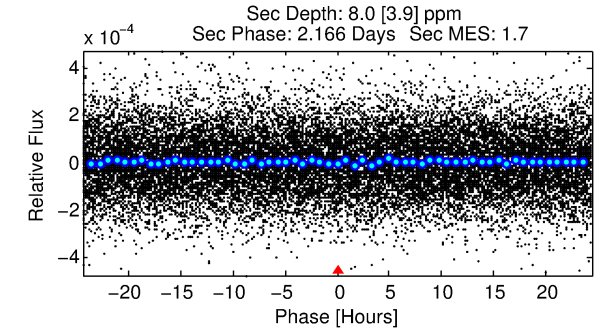
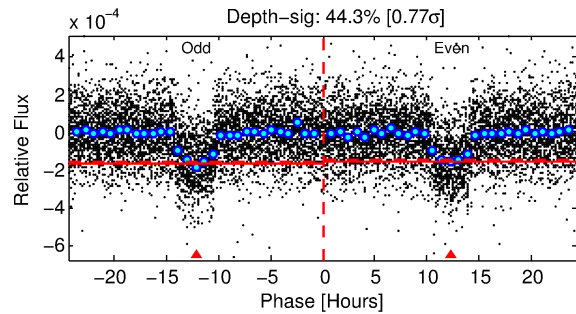
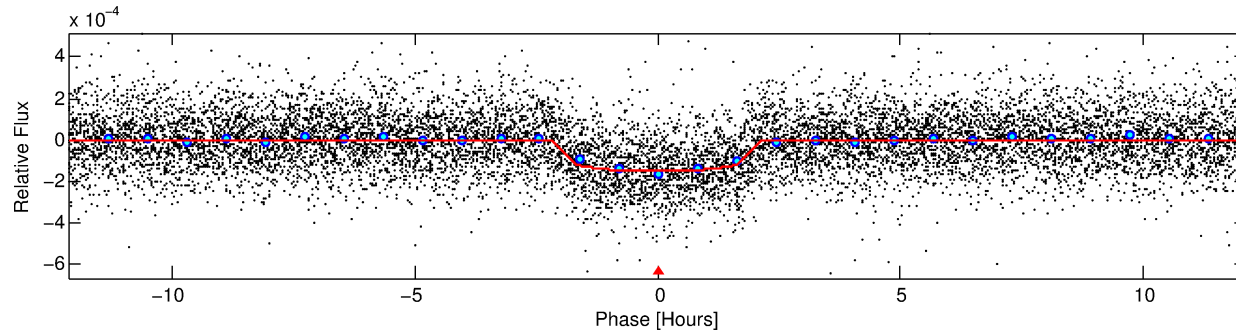
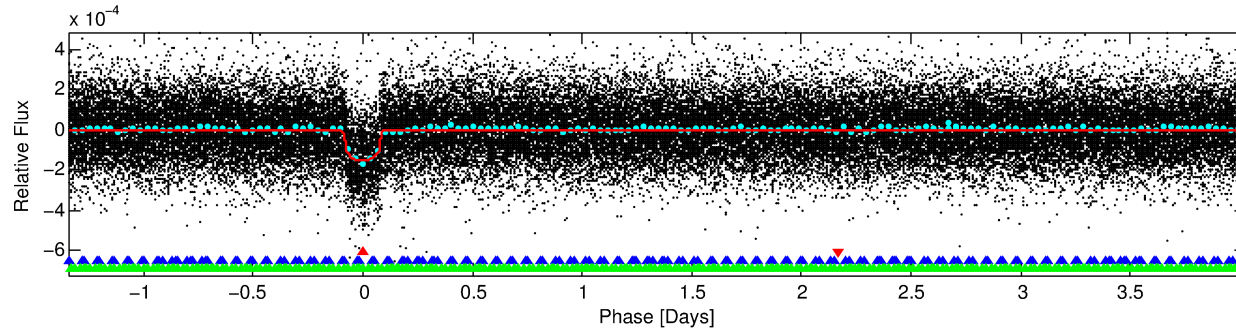
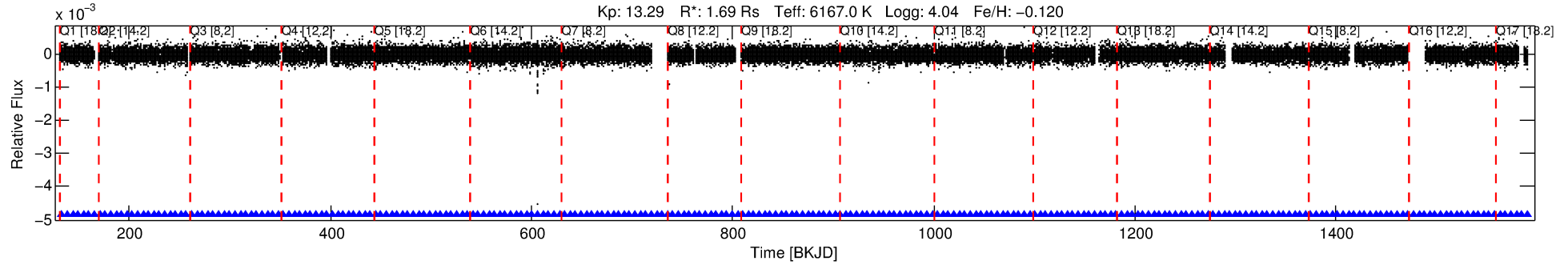
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009590976-01

No Significant Match Found

# DV One-Page Summary

KIC: 9590976 Candidate: 1 of 3 Period: 5.375 d  
KOI: K00710.01 Name: Kepler-217b Corr: 0.987



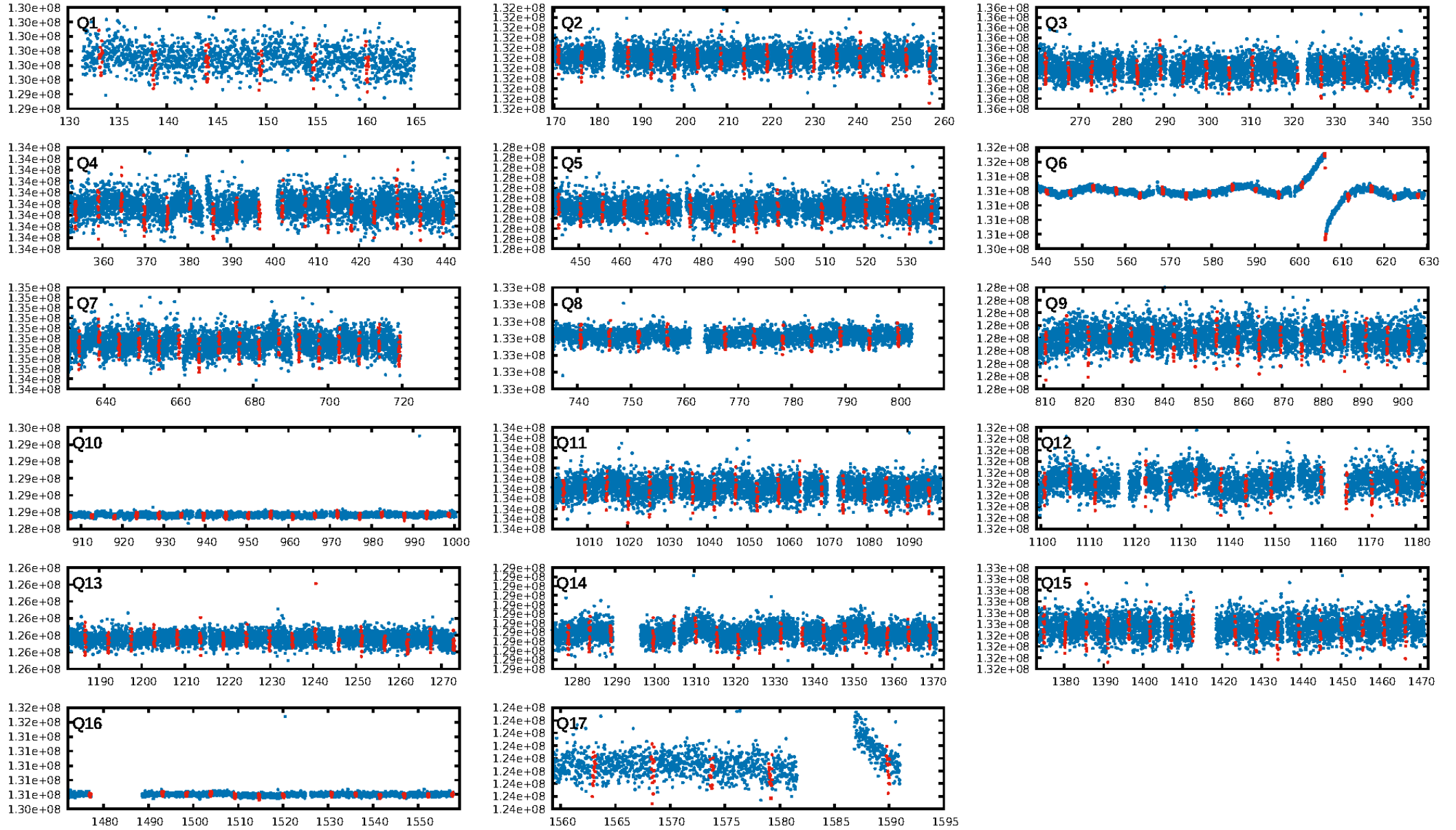
## DV Fit Results:

Period = 5.37491 [0.00001] d  
Epoch = 133.3109 [0.0015] BKJD  
Rp/R\* = 0.0127 [0.0019]  
a/R\* = 6.04 [4.70]  
b = 0.82 [0.32]  
Seff = 942.86 [302.38]  
Teff = 1413 [113] K  
Rp = 2.33 [0.59] Re  
a = 0.0626 [0.0122] AU  
Ag = 3.18 [2.08] [1.05 $\sigma$ ]  
Teffp = 2916 [425] K [3.42 $\sigma$ ]

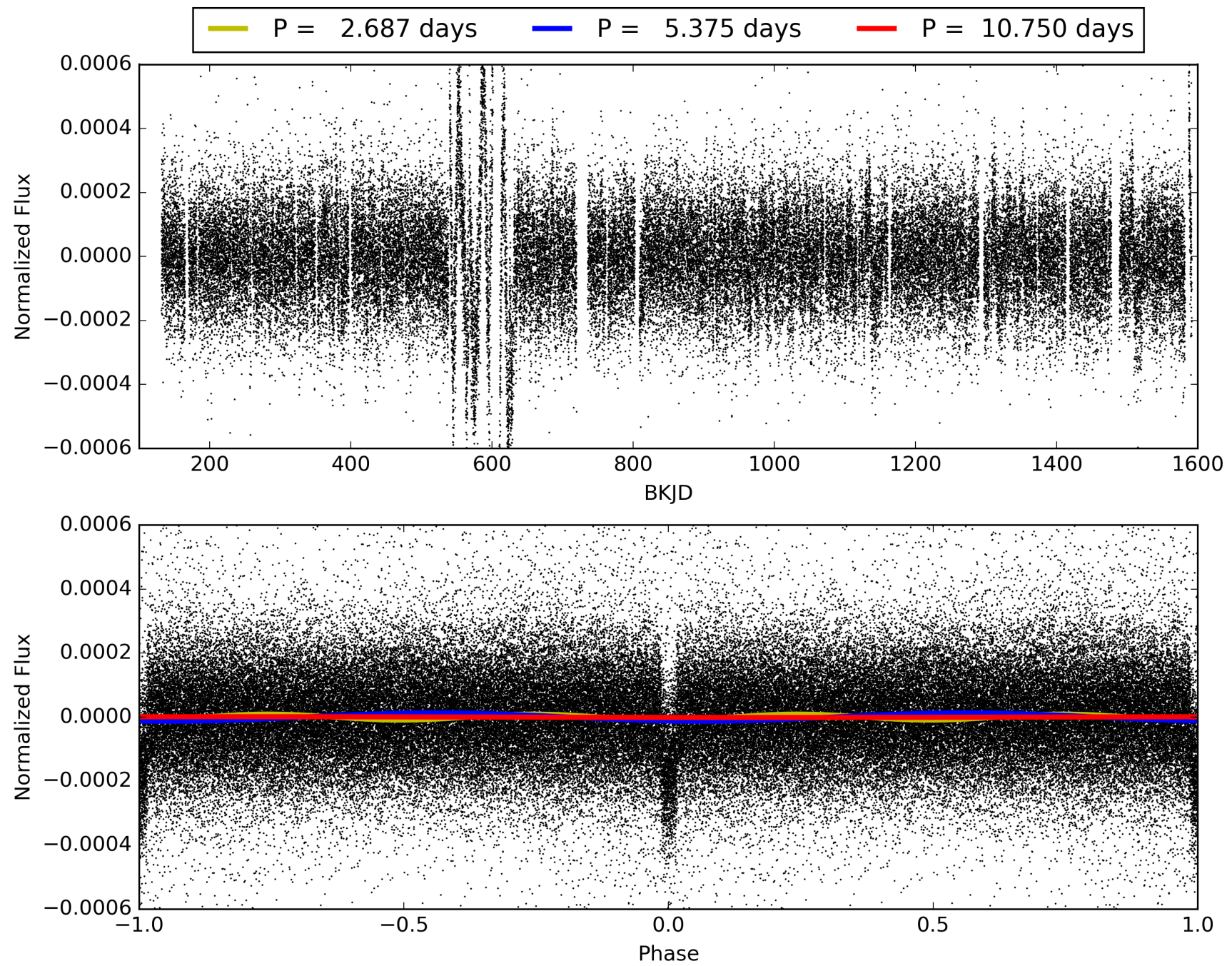
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.76 $\sigma$ ]  
LongPeriod-sig: 100.0% [14.48 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.43e-273  
RollingBand-fgt: 1.00 [244/244]  
GhostDiagnostic-chr: 55.97  
Centroid-sig: 0.0%  
Centroid-so: 0.032 arcsec [0.11 $\sigma$ ]  
OotOffset-rm: 0.232 arcsec [0.25 $\sigma$ ]  
KicOffset-rm: 0.180 arcsec [0.23 $\sigma$ ]  
OotOffset-st: 4/3/4/3 [14]  
KicOffset-st: 4/3/4/3 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009590976-01, PDC Light Curves



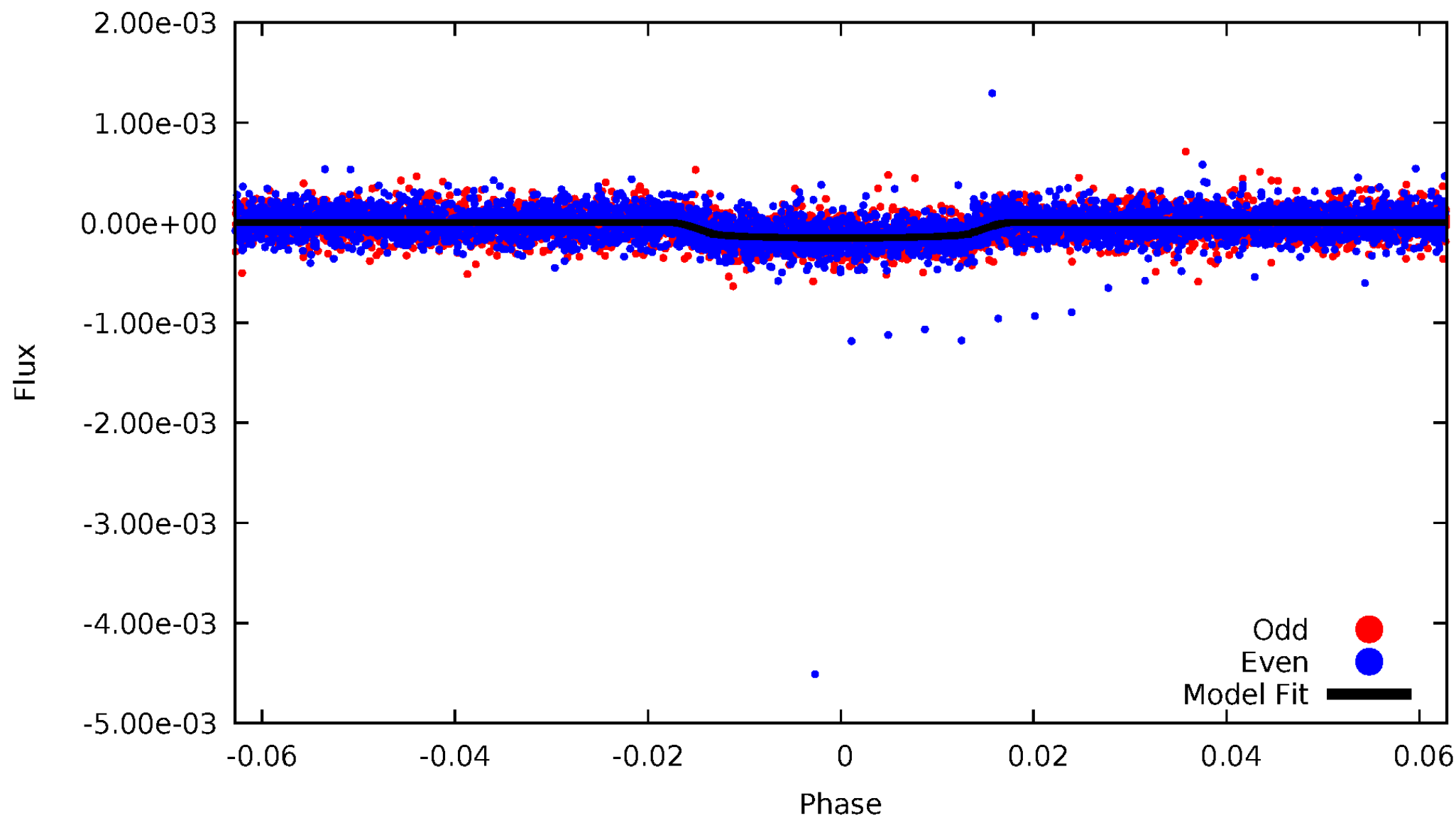
TCE 009590976-01





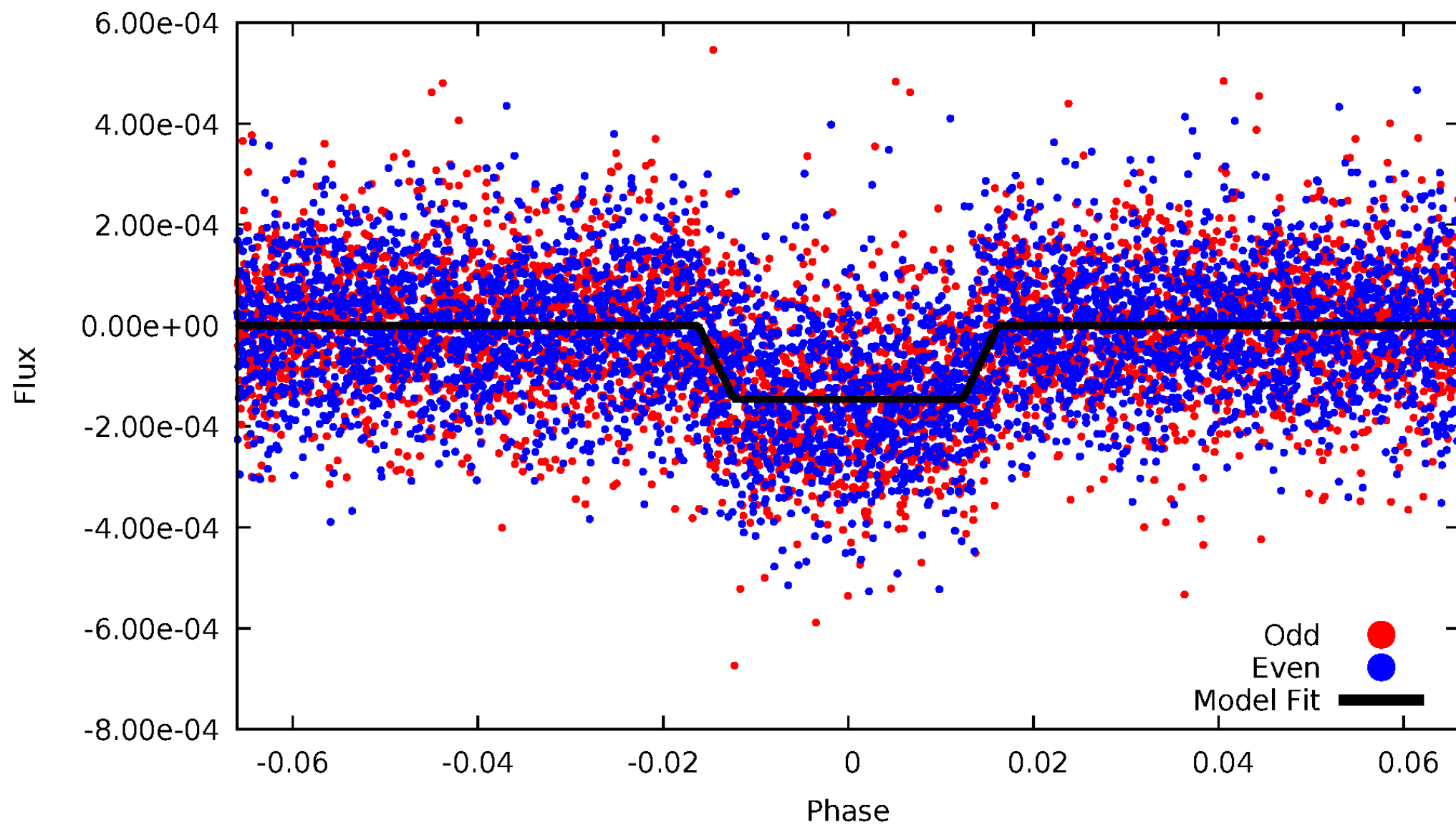
# DV Odd/Even

TCE 009590976-01



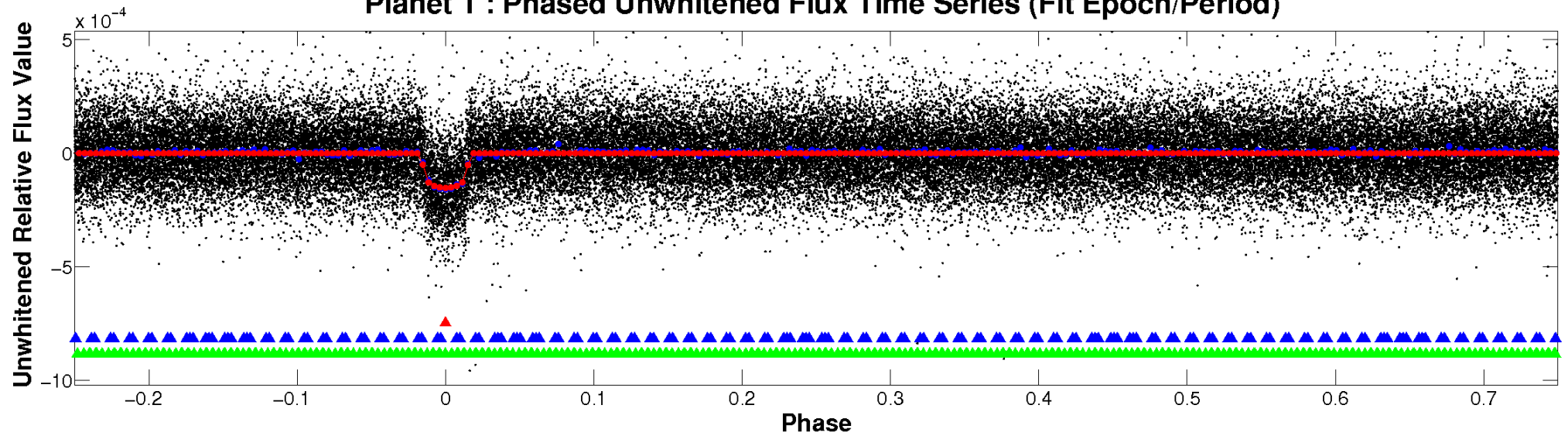
# ALT Odd/Even

TCE 009590976-01

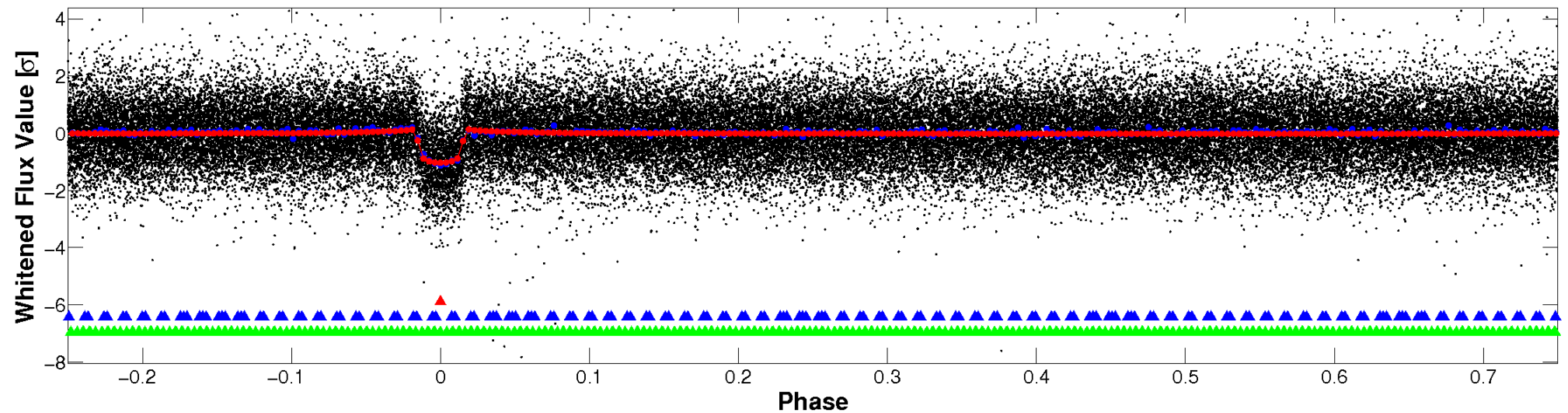


# Non-Whitened Vs. Whitened Light Curve

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

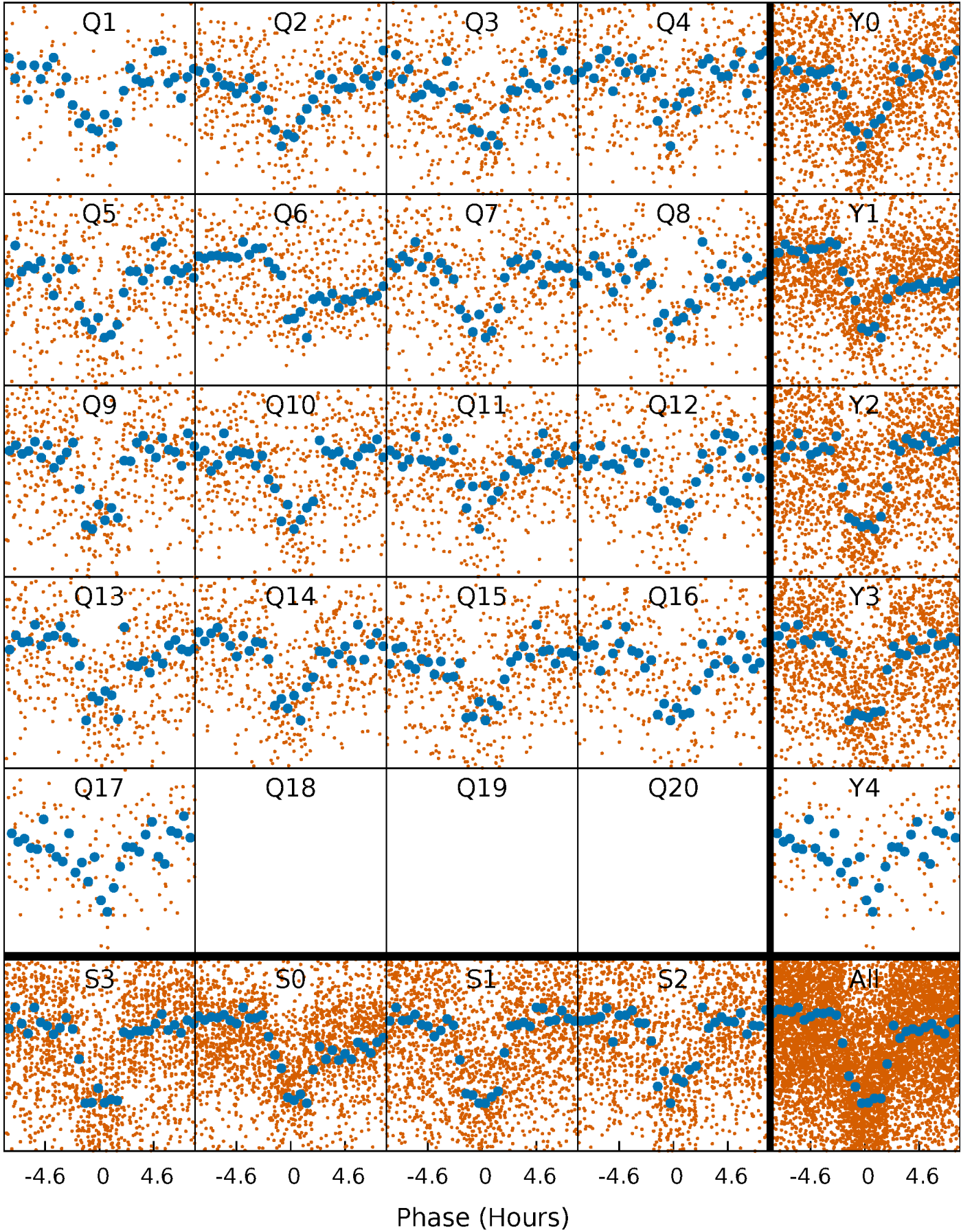


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

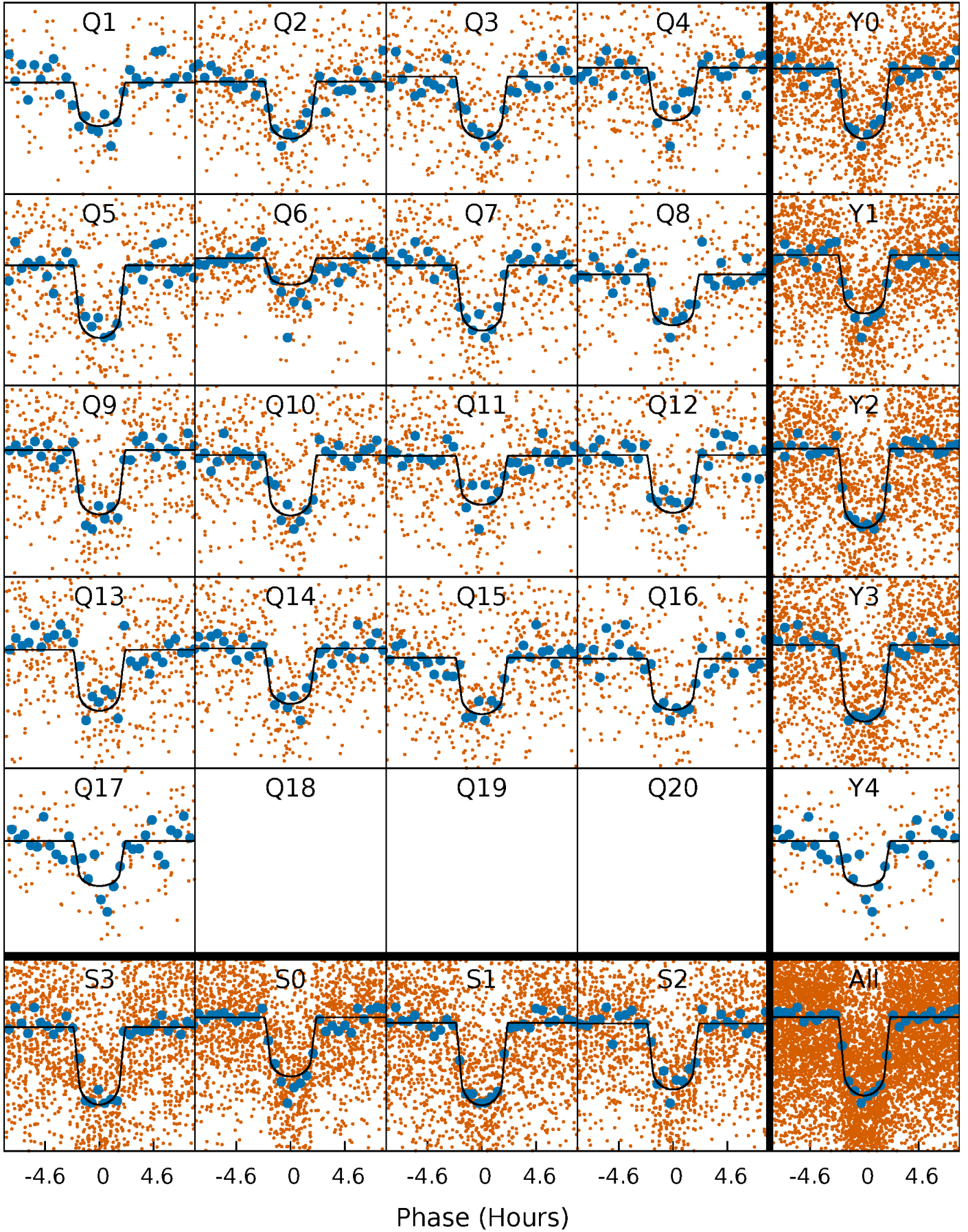
TCE 009590976-01   P= 5.374912 Days    $T_0=133.310897$  (BKJD)





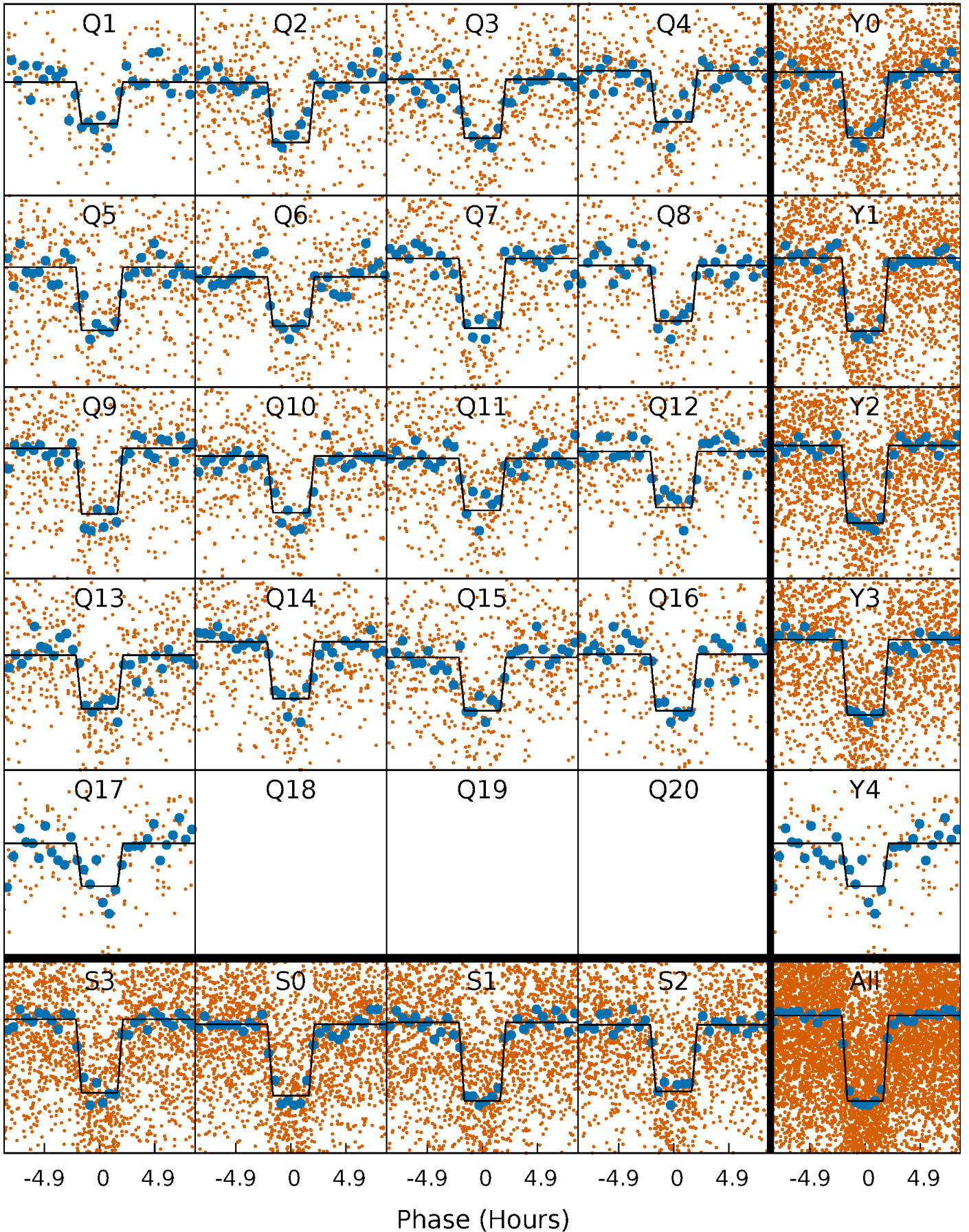
# DV Quarter-Phased Transit Curves

TCE 009590976-01 P= 5.374912 Days  $T_0=133.310897$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

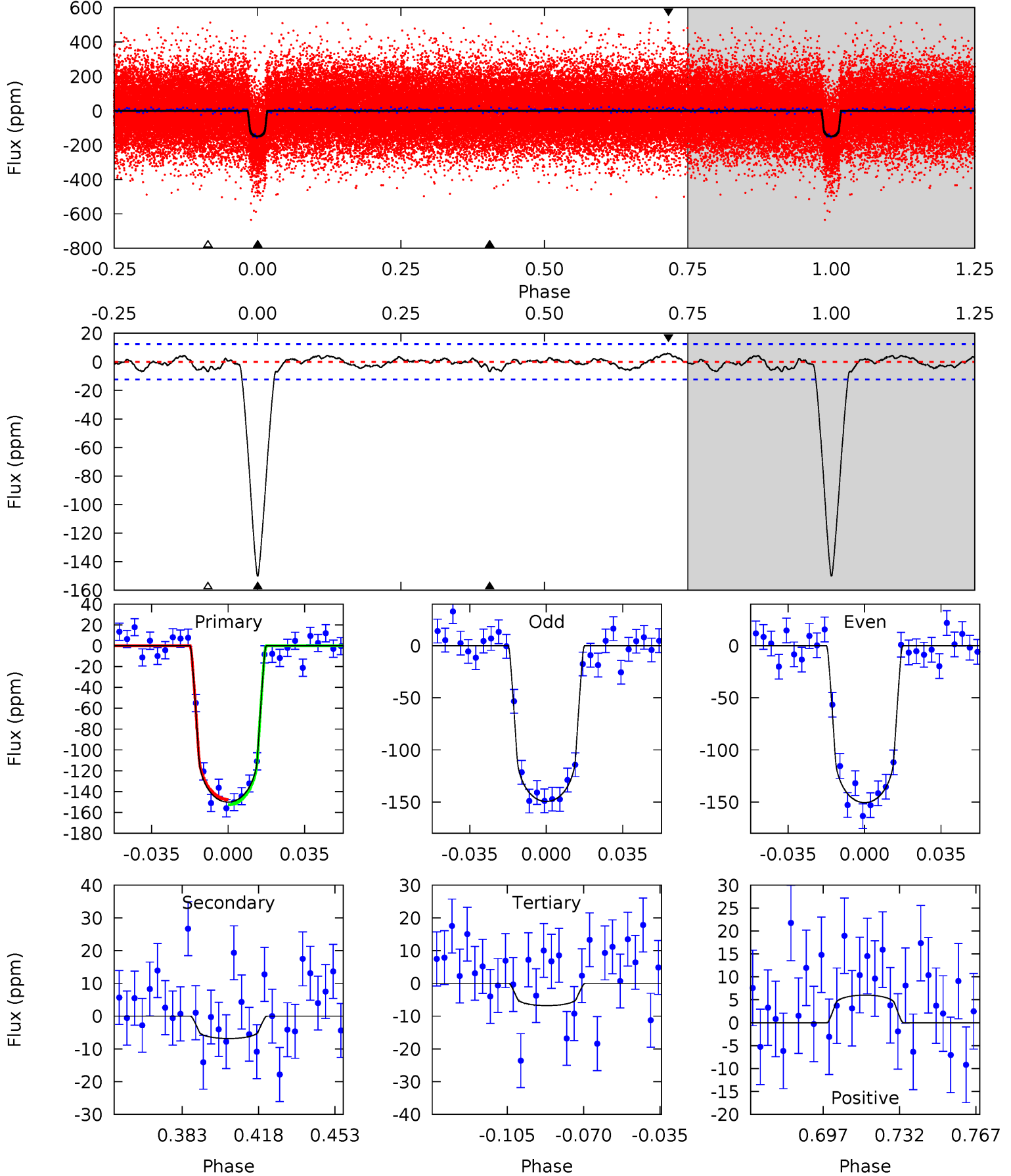
TCE 009590976-01 P= 5.374872 Days  $T_0=133.317951$  (BKJD)



# DV Model-Shift Uniqueness Test

009590976-01, P = 5.374912 Days, E = 127.935985 Days

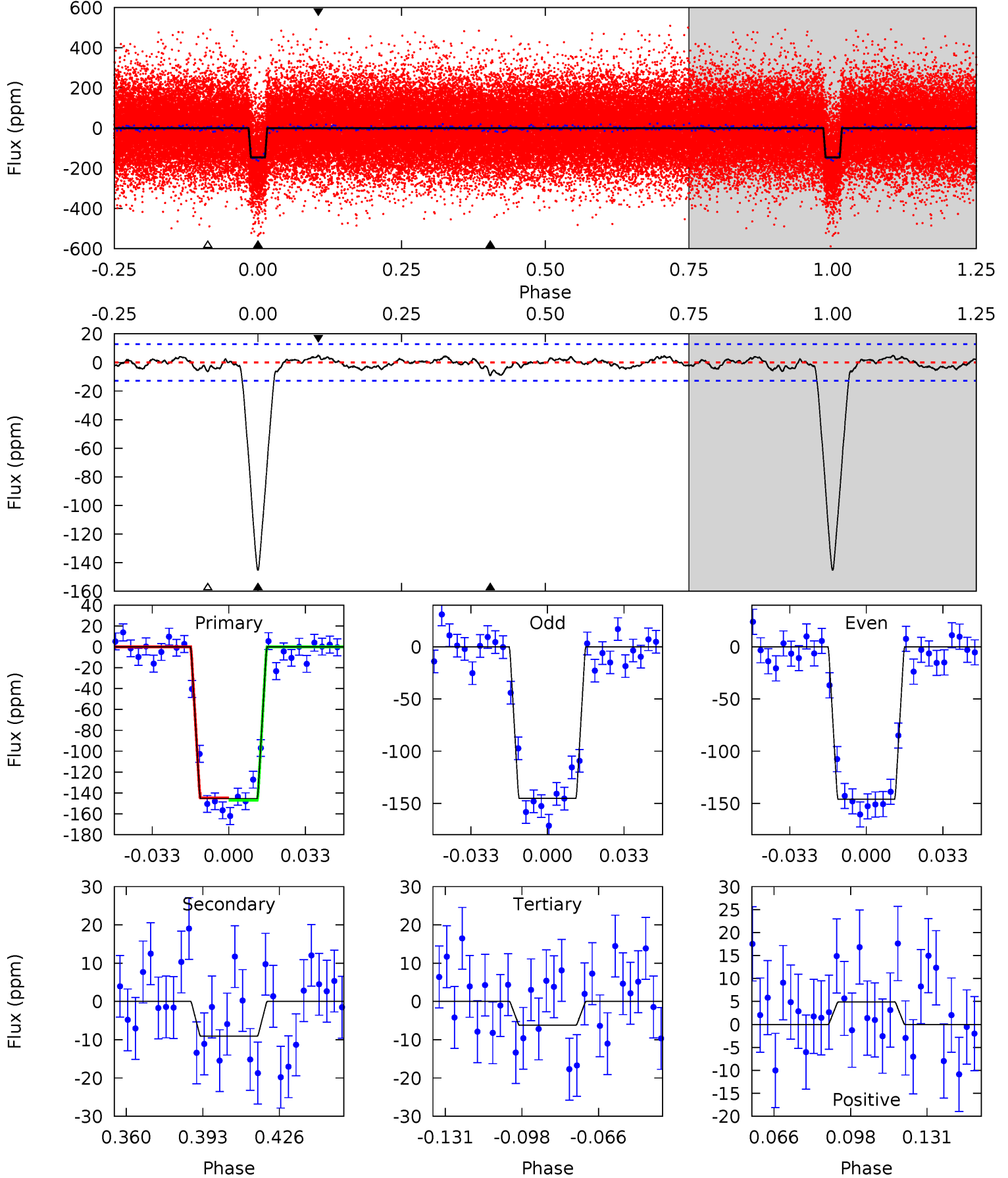
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
57.7	2.63	2.61	2.31	4.78	2.11	1.01	55.1	55.4	0.02	0.32	0.21	1.04	0.04	0.97



# Alt Model-Shift Uniqueness Test

009590976-01, P = 5.374872 Days, E = 127.943079 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
54.5	3.40	2.33	1.83	4.79	2.14	0.89	52.2	52.7	1.08	1.58	0.13	0.97	0.03	0.44





### Stellar Parameters For KIC 009590976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6167^{+124}_{-124}$	$4.037^{+0.182}_{-0.098}$	$-0.120^{+0.150}_{-0.150}$	$1.689^{+0.281}_{-0.343}$	$1.135^{+0.142}_{-0.103}$	$0.331^{+0.308}_{-0.099}$
	+2%/-2%	+5%/-2%	+125%/-125%	+17%/-20%	+13%/-9%	+93%/-30%
Source	SPE58	SPE58	SPE58	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009590976-01 / KOI 0710.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-7 \pm 3$	$2.31^{+0.41}_{-0.44}$	$1950^{+95}_{-101}$	$3277^{+257}_{-311}$	$2.798^{+1.788}_{-1.295}$
Alt.	$-9 \pm 3$	$2.21^{+0.45}_{-0.43}$	$1961^{+93}_{-118}$	$3487^{+284}_{-252}$	$3.991^{+2.499}_{-1.521}$

$T_{max}$  = 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

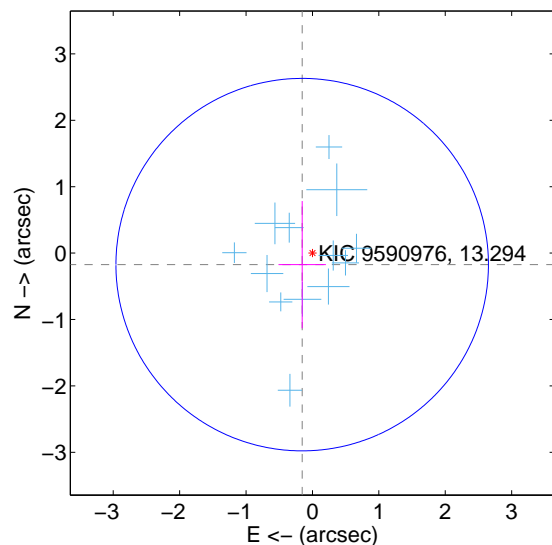
Supplemental centroid analysis for 009590976-01. Kepler magnitude: 13.29. Transit SNR 40.62

There are 14 quarters with good PRF difference image offsets

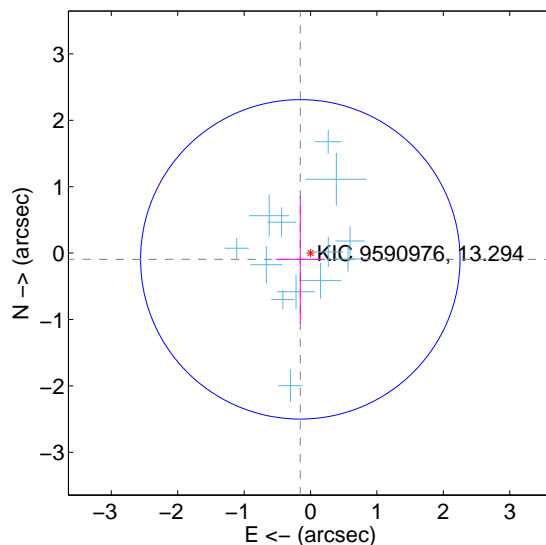
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.232 \pm 0.935$	0.25	$0.155 \pm 0.357$	$-0.174 \pm 0.958$
PRF-fit source offset from KIC position	$0.180 \pm 0.802$	0.23	$0.154 \pm 0.371$	$-0.094 \pm 0.962$
photometric centroid source offset	$0.03 \pm 0.30$	0.11	$0.00 \pm 0.22$	$0.03 \pm 0.30$

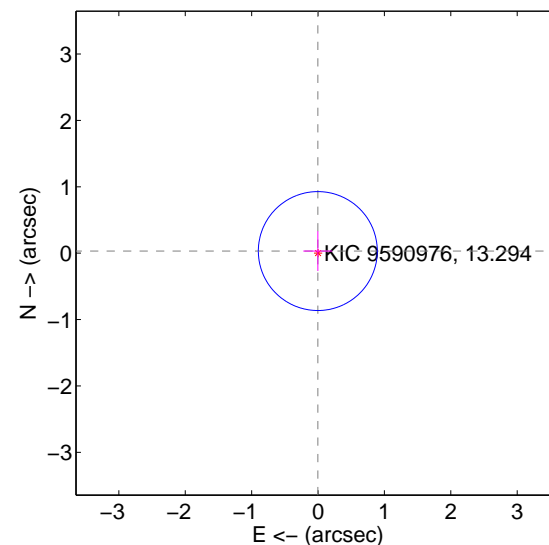
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

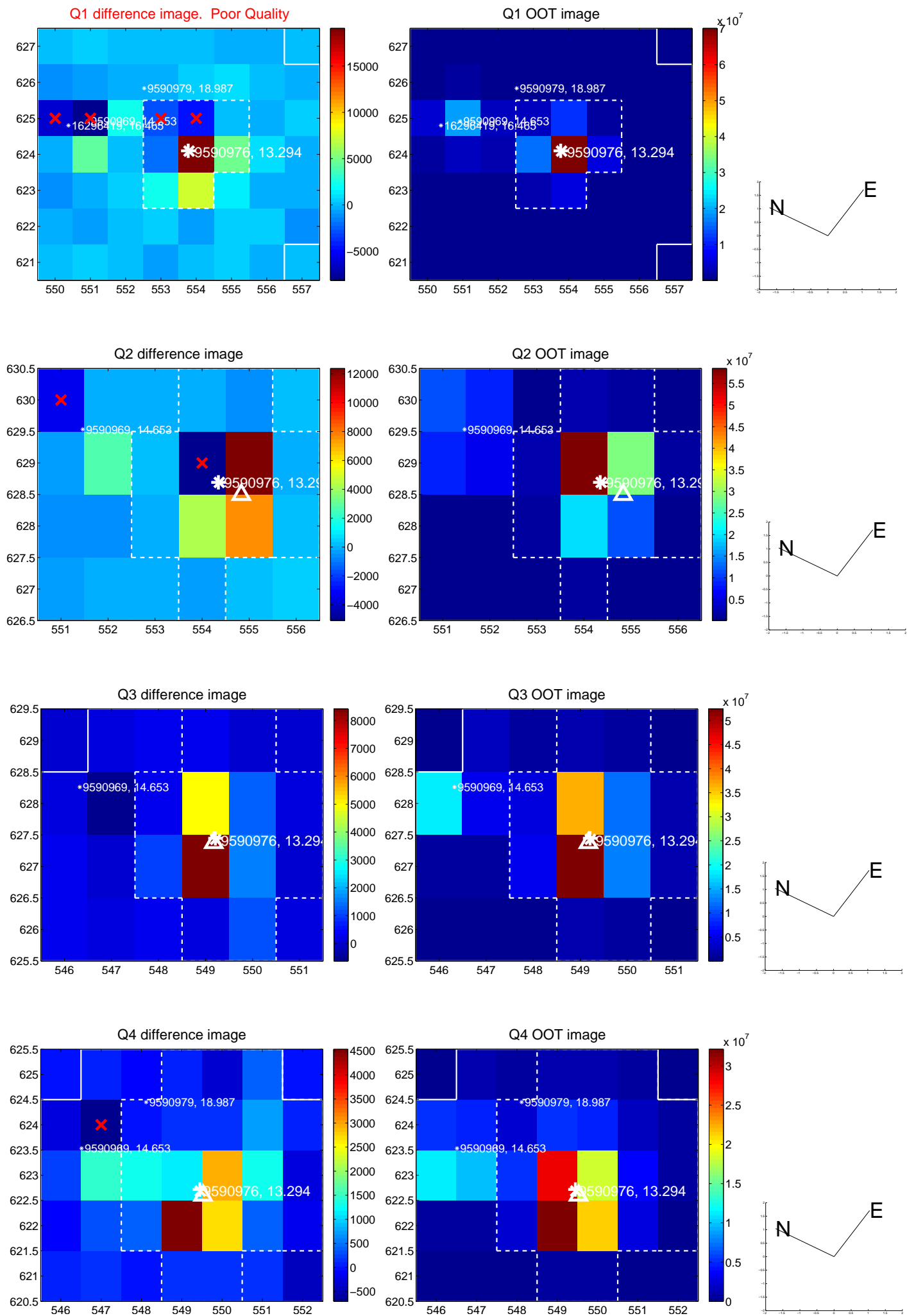


offset from photometric centroids

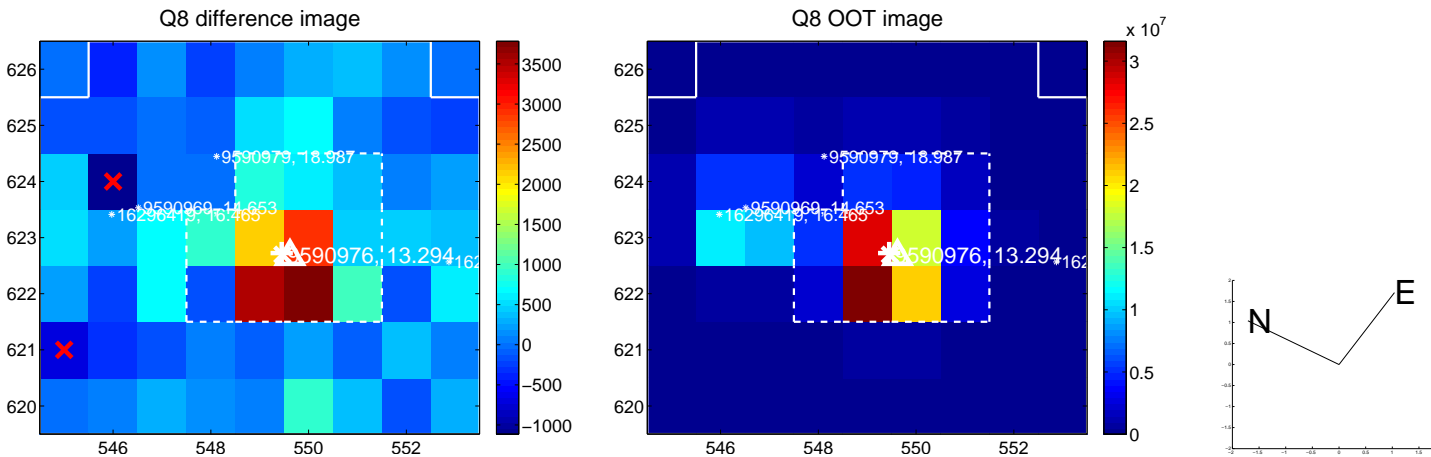
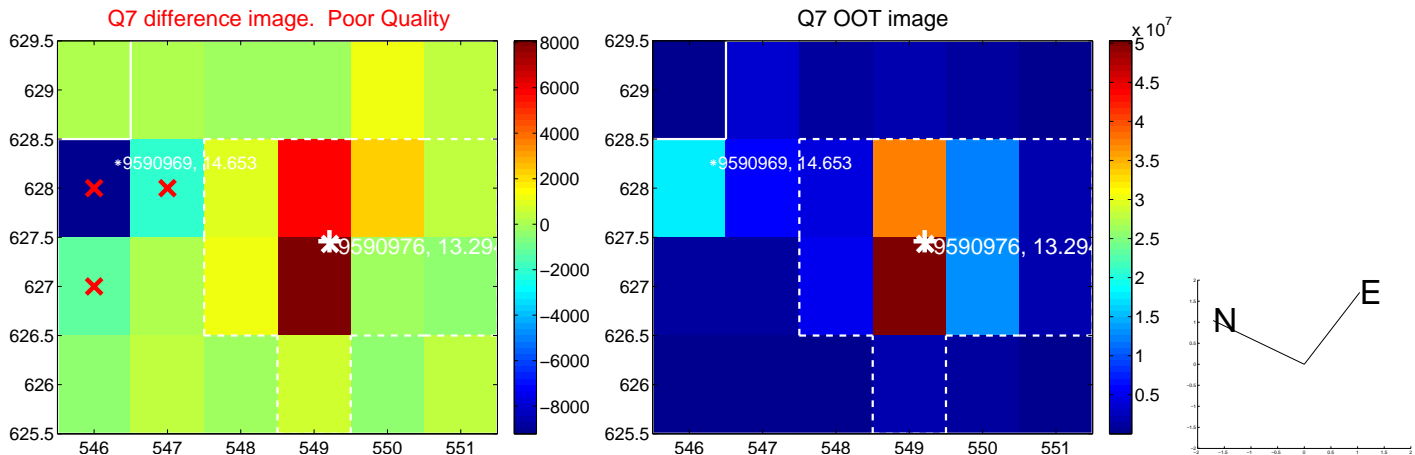
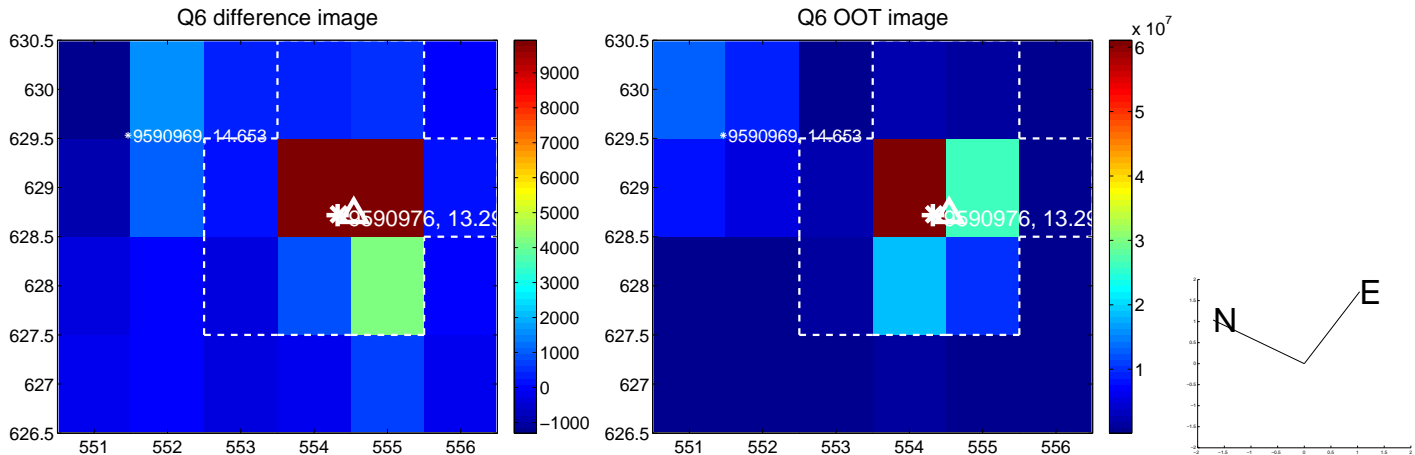
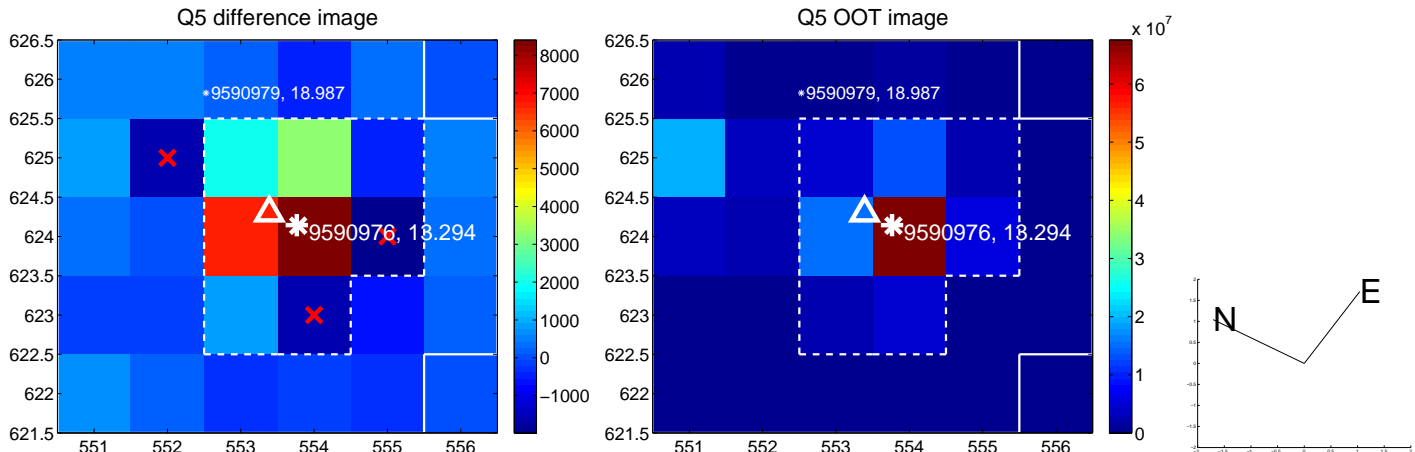


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

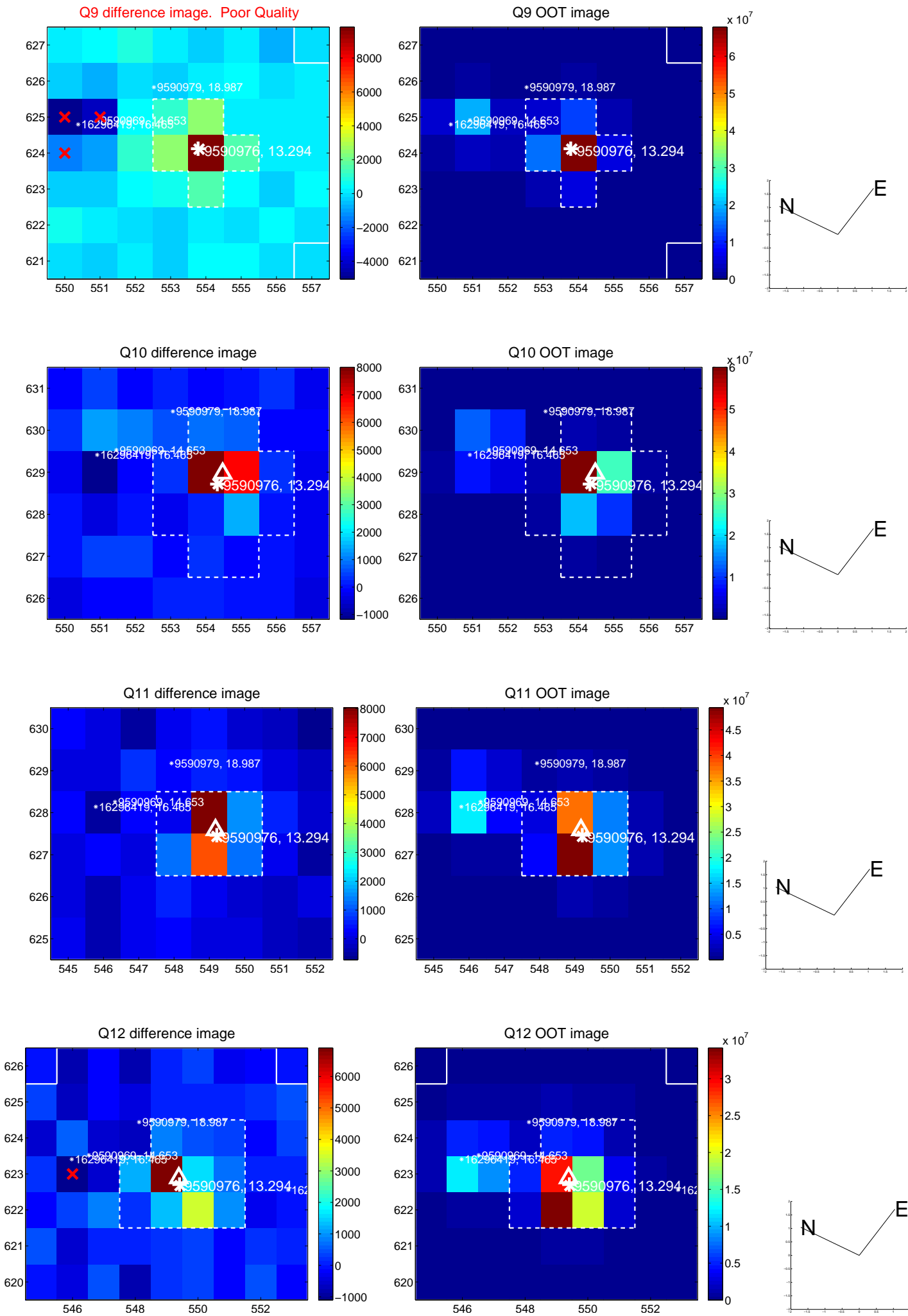


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

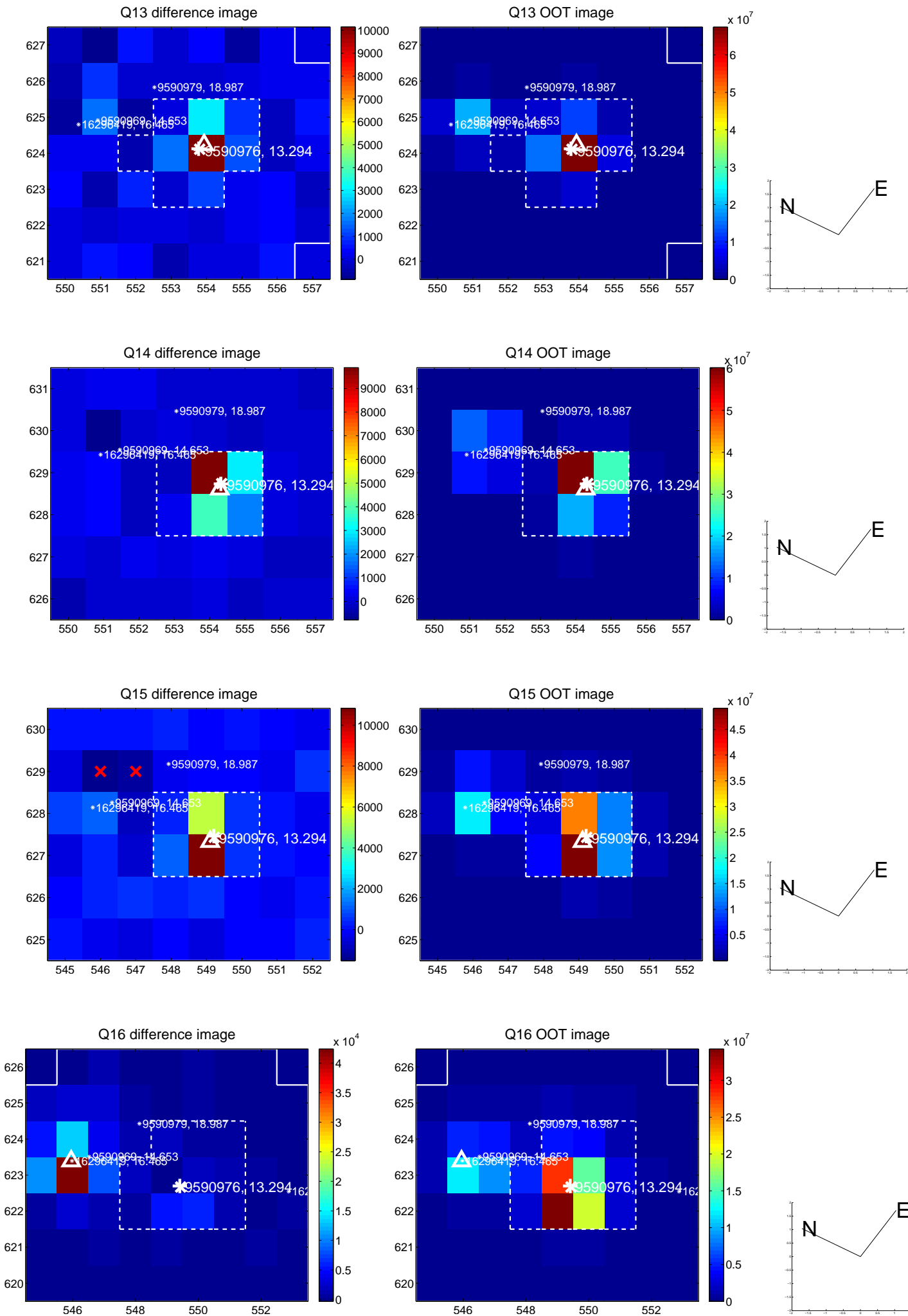




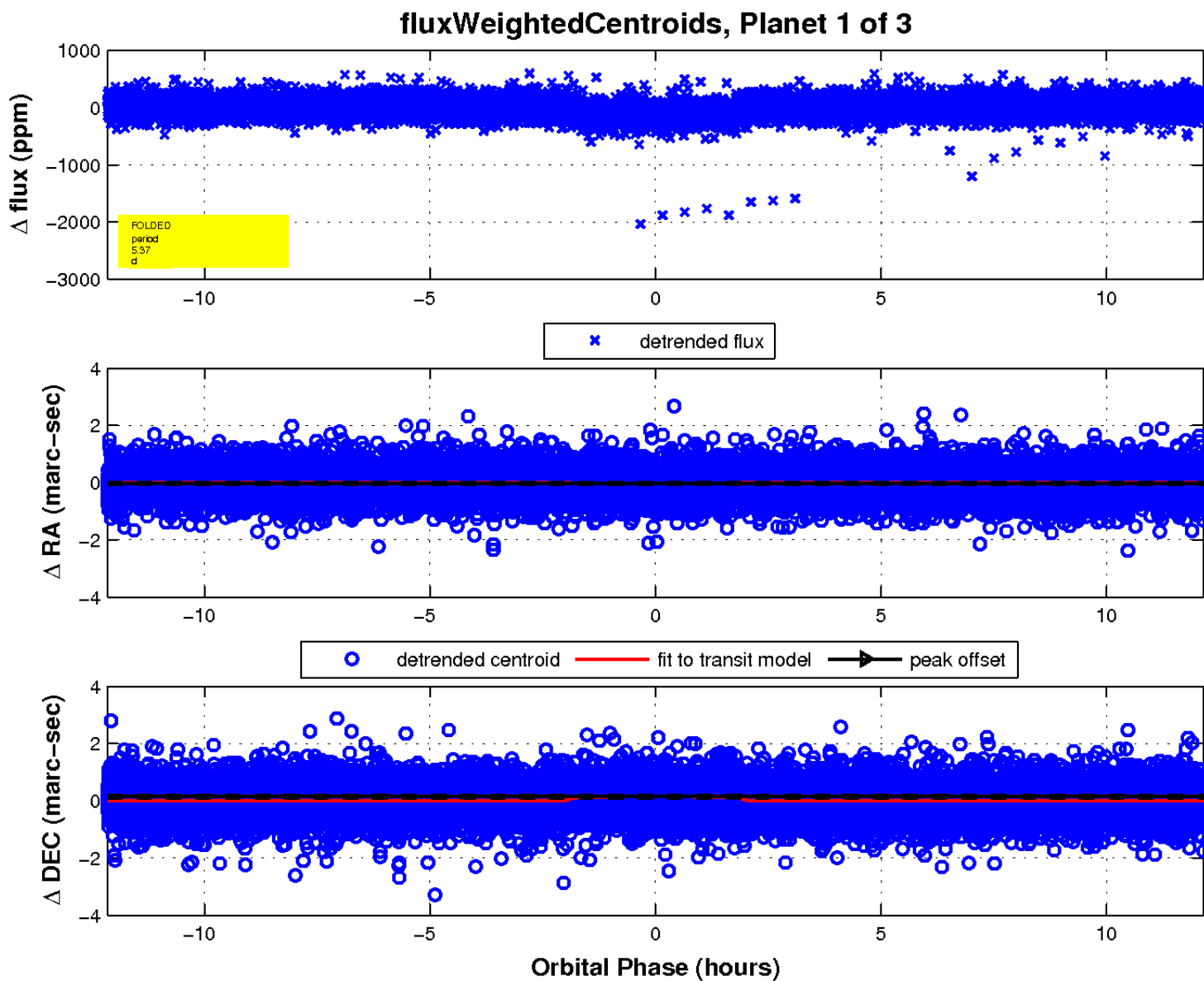
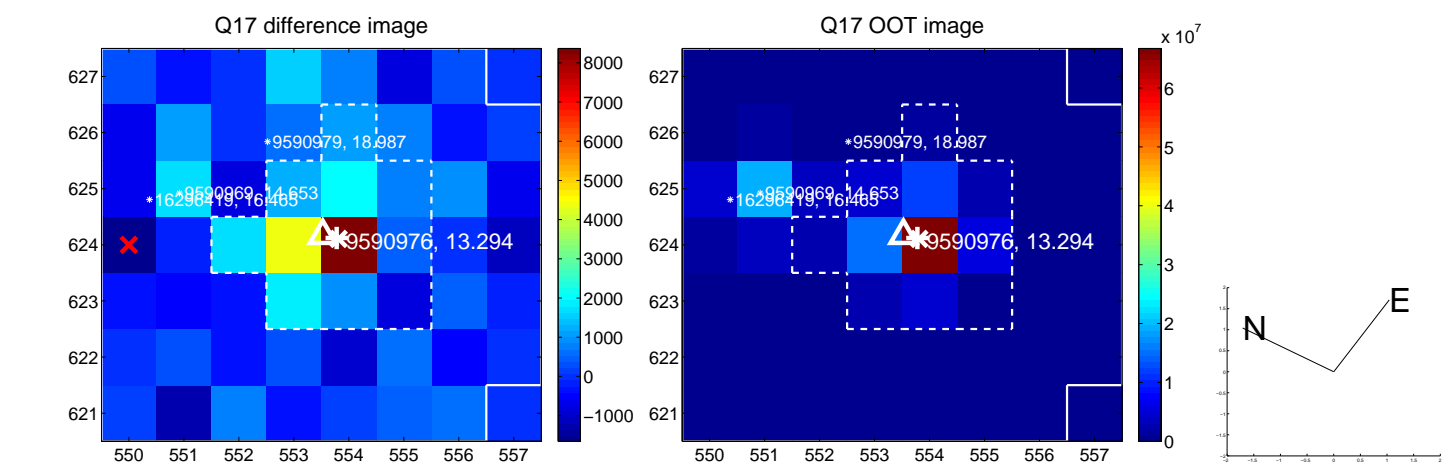
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

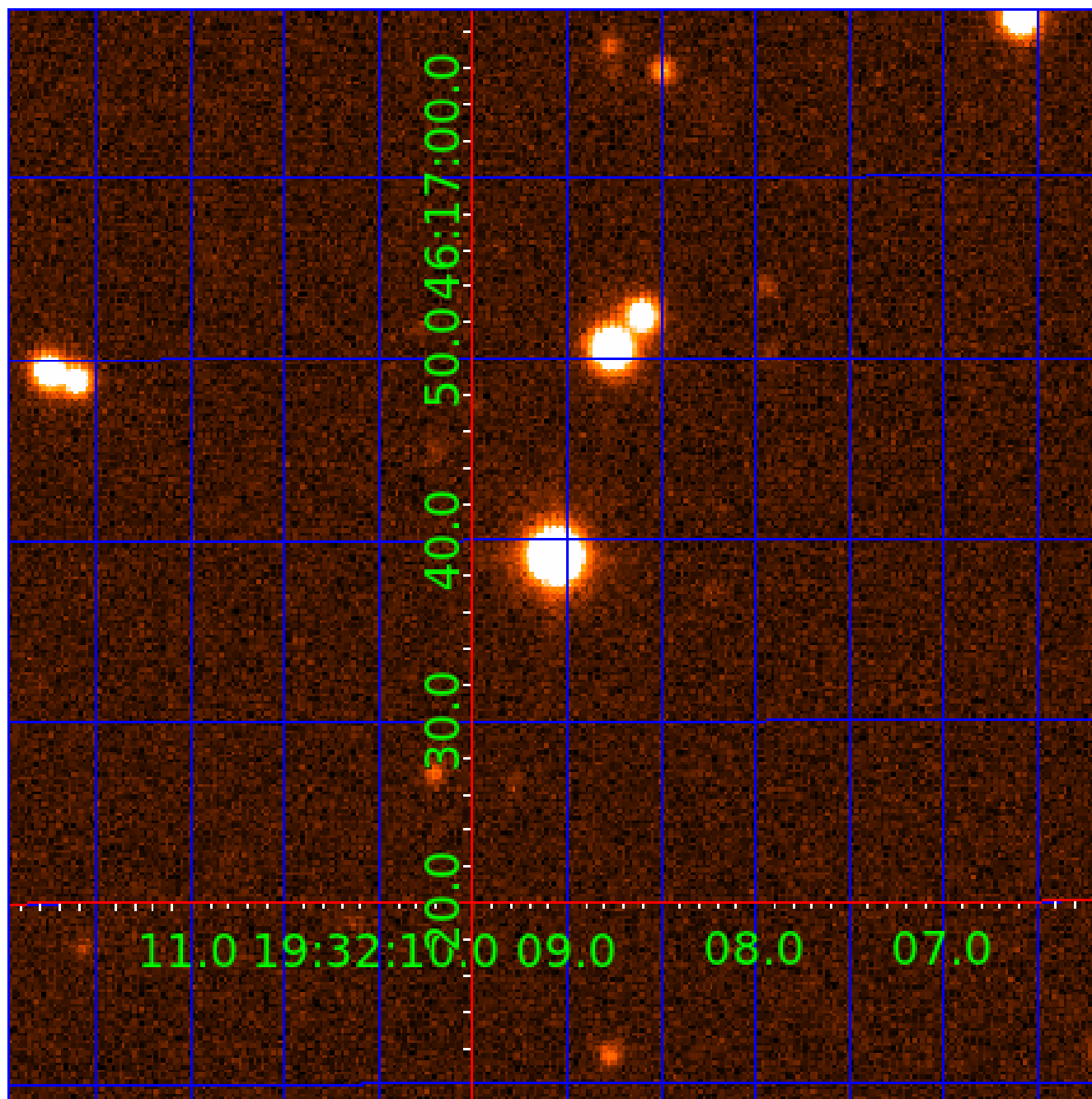


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009590976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009590976-01	OBS	0710.01	5.374912	133.310897	152.7	4.051	36.4	40.6	1.69	6167	2.33	942.86
009590976-02	OBS	0710.02	8.586052	137.954849	104.4	3.454	19.0	20.0	1.69	6167	1.98	504.92
009590976-03	OBS	0710.03	3.886830	132.508624	58.2	3.397	16.1	16.5	1.69	6167	1.43	1452.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009590976-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009590976-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009590976-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

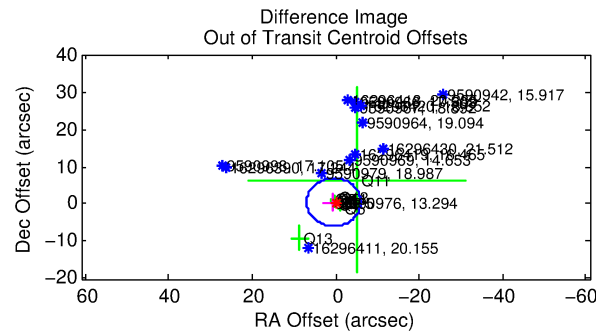
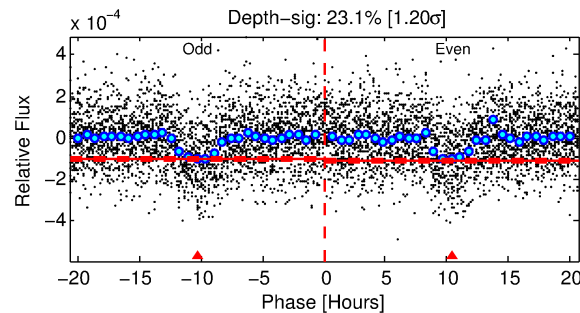
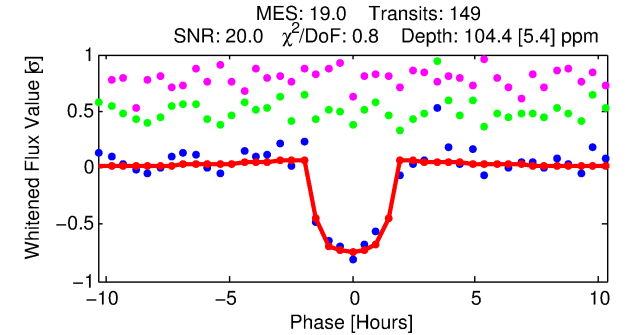
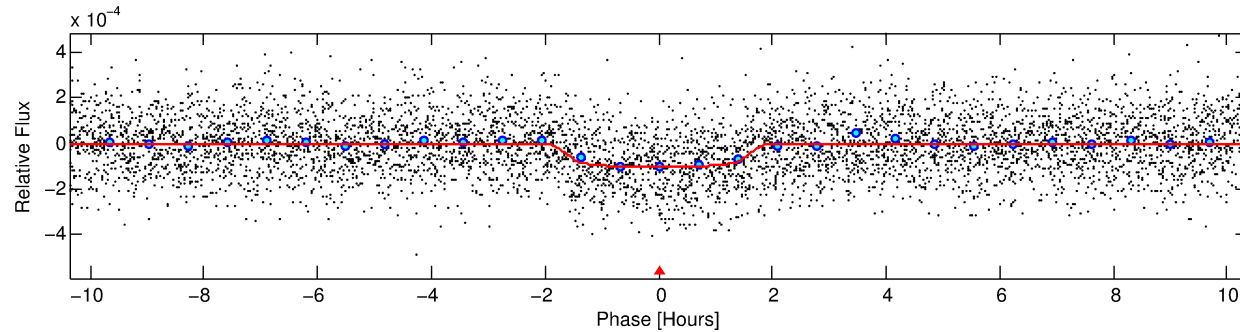
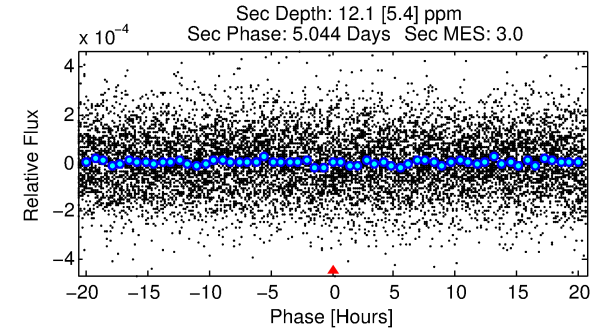
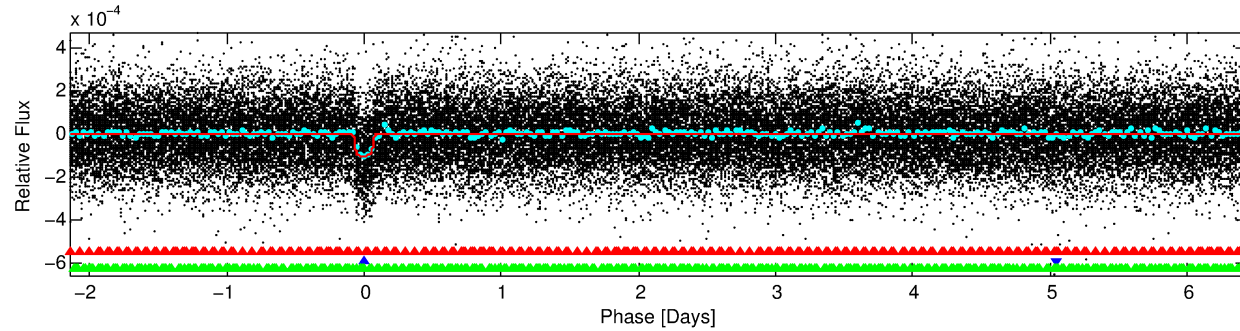
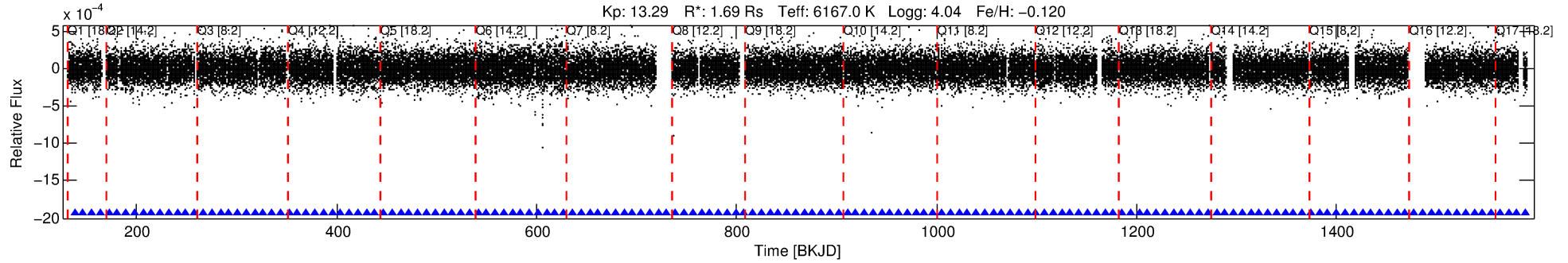
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009590976-02

No Significant Match Found

# DV One-Page Summary

KIC: 9590976 Candidate: 2 of 3 Period: 8.586 d  
KOI: K00710.02 Name: Kepler-217c Corr: 0.976



## DV Fit Results:

Period = 8.58605 [0.00003] d  
Epoch = 137.9548 [0.0032] BKJD  
Rp/R\* = 0.0107 [0.0031]  
a/R\* = 9.85 [14.77]  
b = 0.87 [0.43]  
Seff = 504.92 [161.93]  
Teq = 1209 [97] K  
Rp = 1.98 [0.69] Re  
a = 0.0856 [0.0166] AU  
Ag = 12.46 [9.81] [1.17σ]  
Teffp = 3511 [639] K [3.56σ]

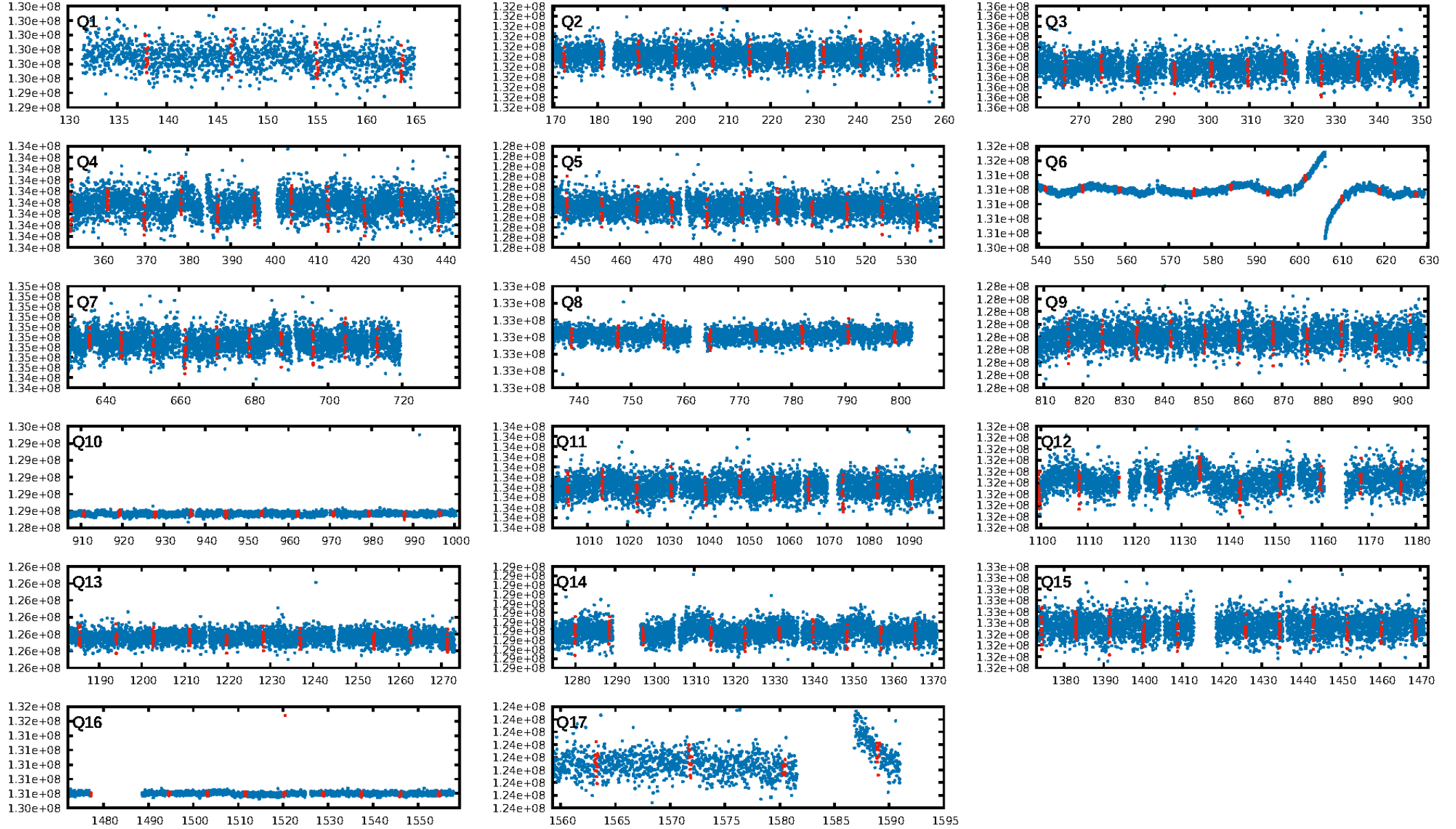
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [14.48σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.22e-76  
RollingBand-fgt: 1.00 [141/141]  
GhostDiagnostic-chr: -67.31  
Centroid-sig: 67.9%  
Centroid-so: 0.842 arcsec [1.48σ]  
OotOffset-rm: 0.624 arcsec [0.29σ]  
KicOffset-rm: 0.663 arcsec [0.31σ]  
OotOffset-st: 4/3/2/3 [12]  
KicOffset-st: 4/3/2/3 [12]  
DiffImageQuality-fgm: 0.83 [10/12]  
DiffImageOverlap-fno: 1.00 [17/17]

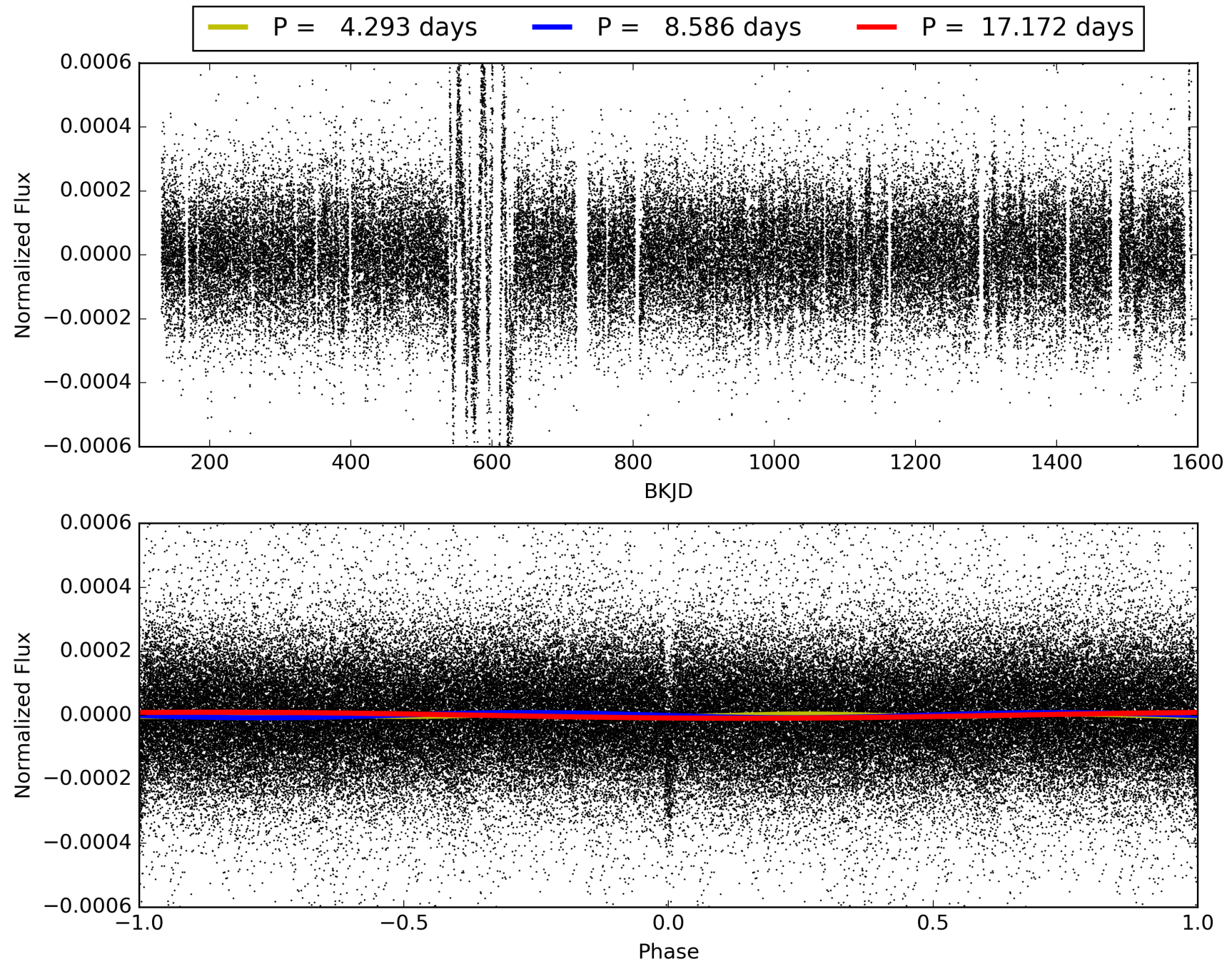
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 03:24:05 Z

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

# TCE 009590976-02, PDC Light Curves

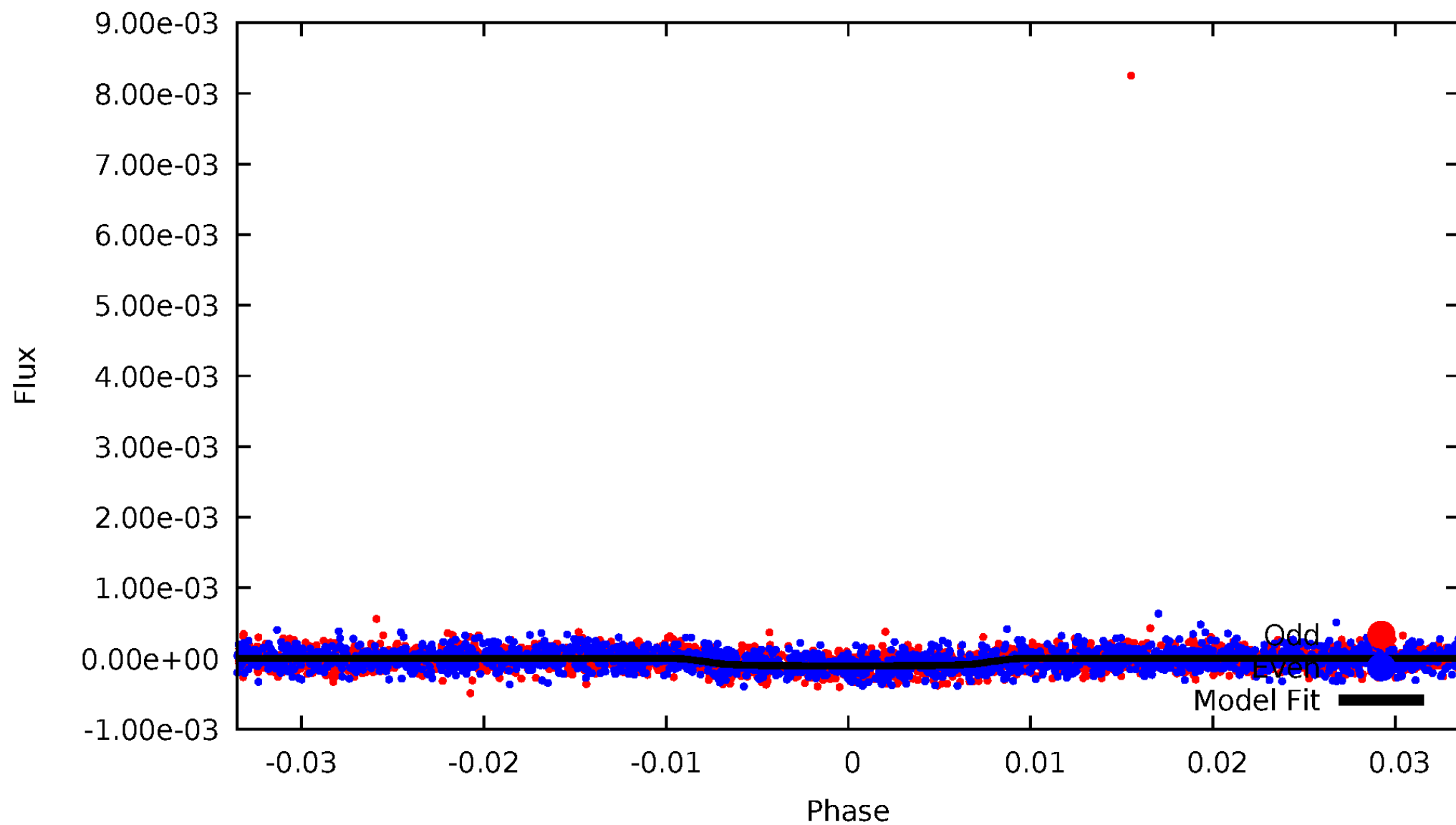


TCE 009590976-02



# DV Odd/Even

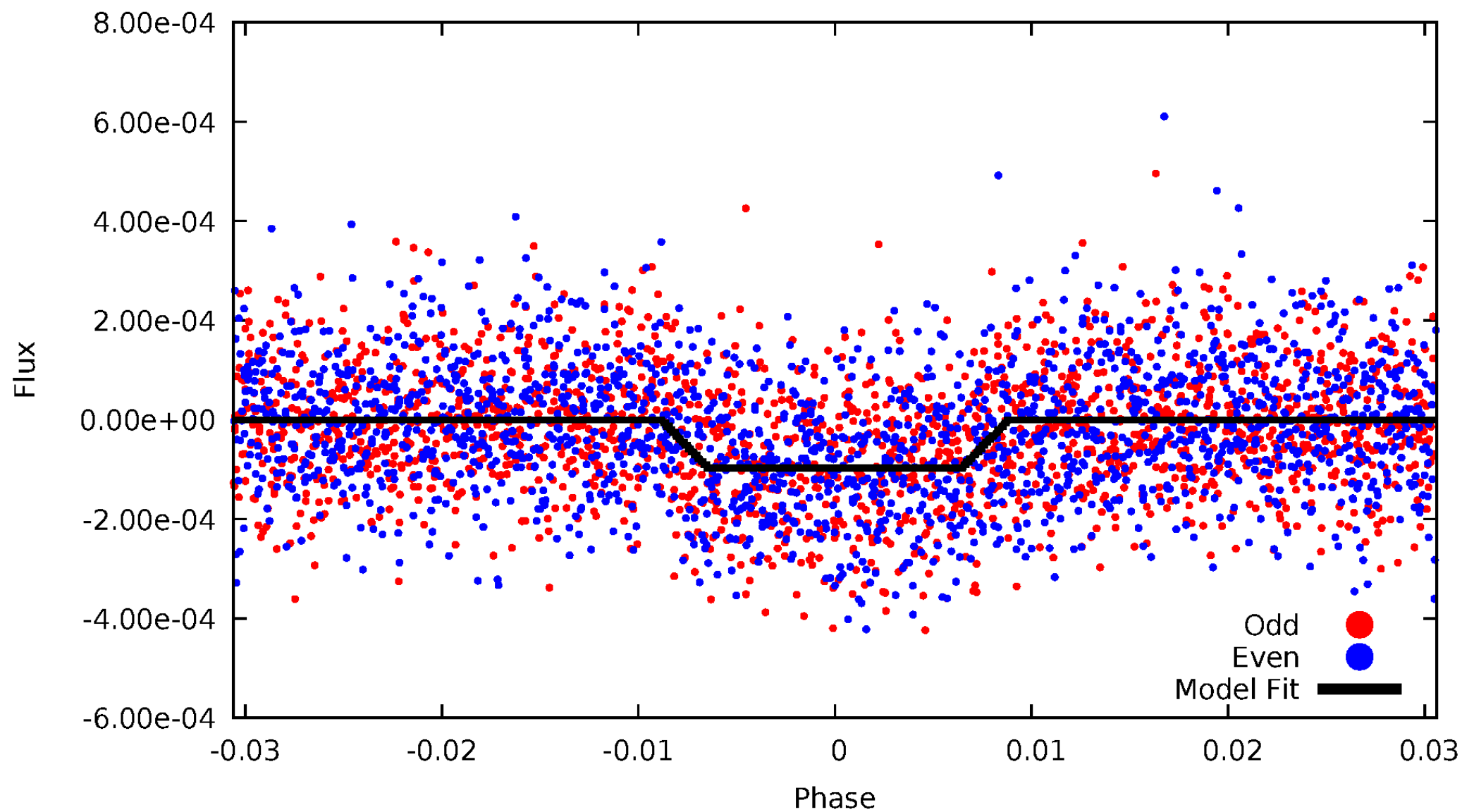
TCE 009590976-02





# ALT Odd/Even

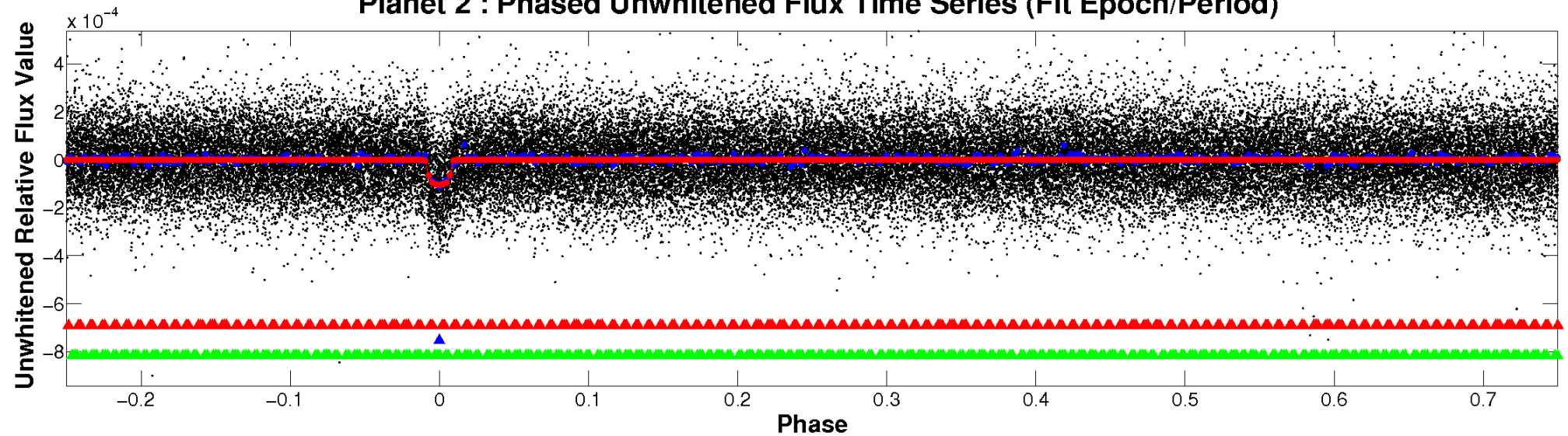
TCE 009590976-02



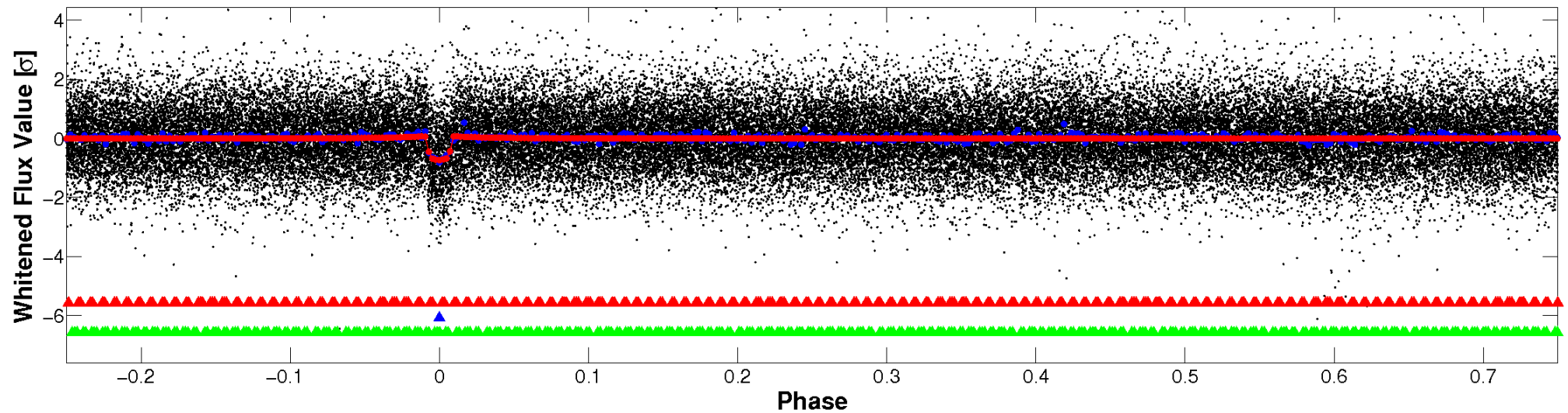


# Non-Whitened Vs. Whitened Light Curve

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

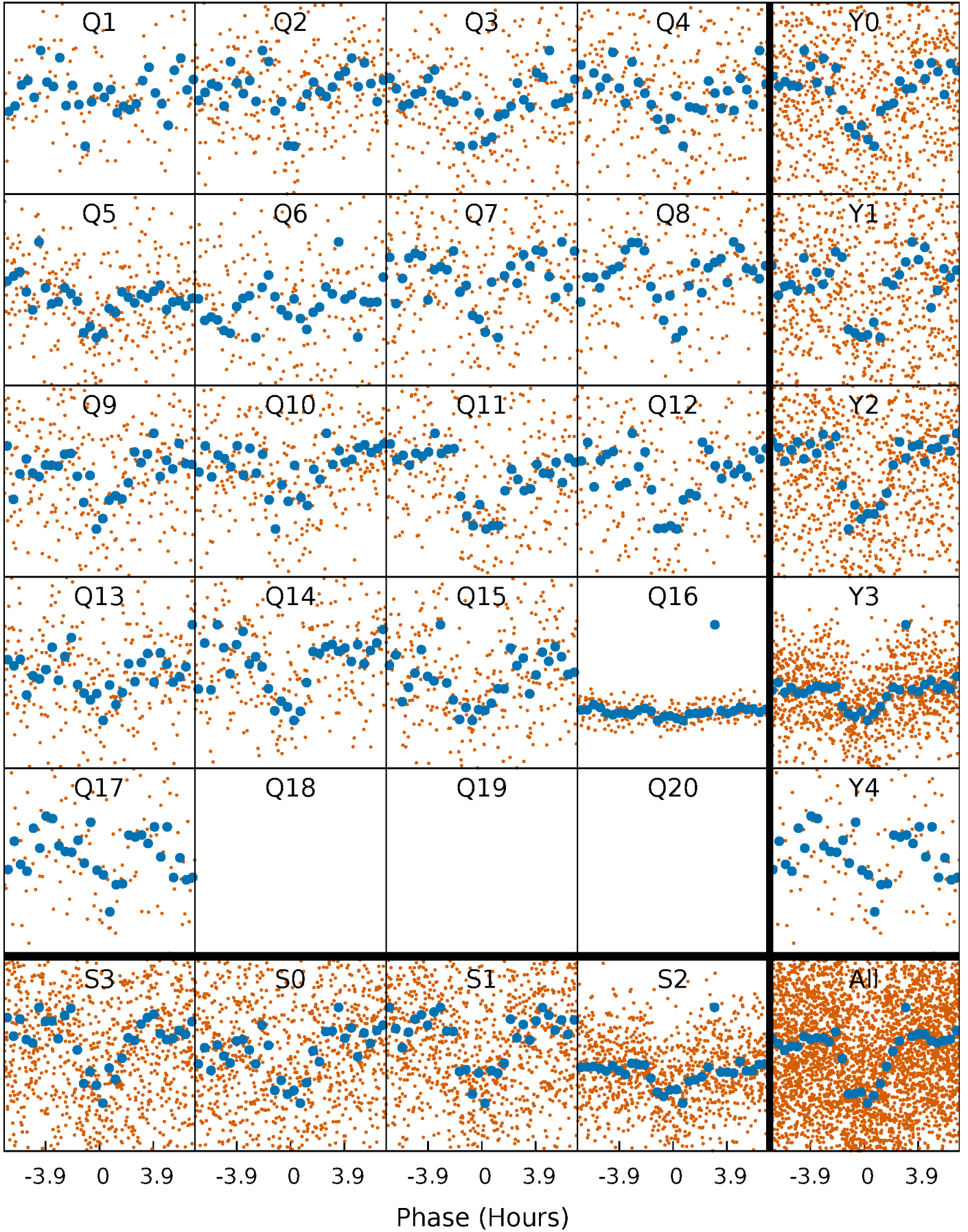


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



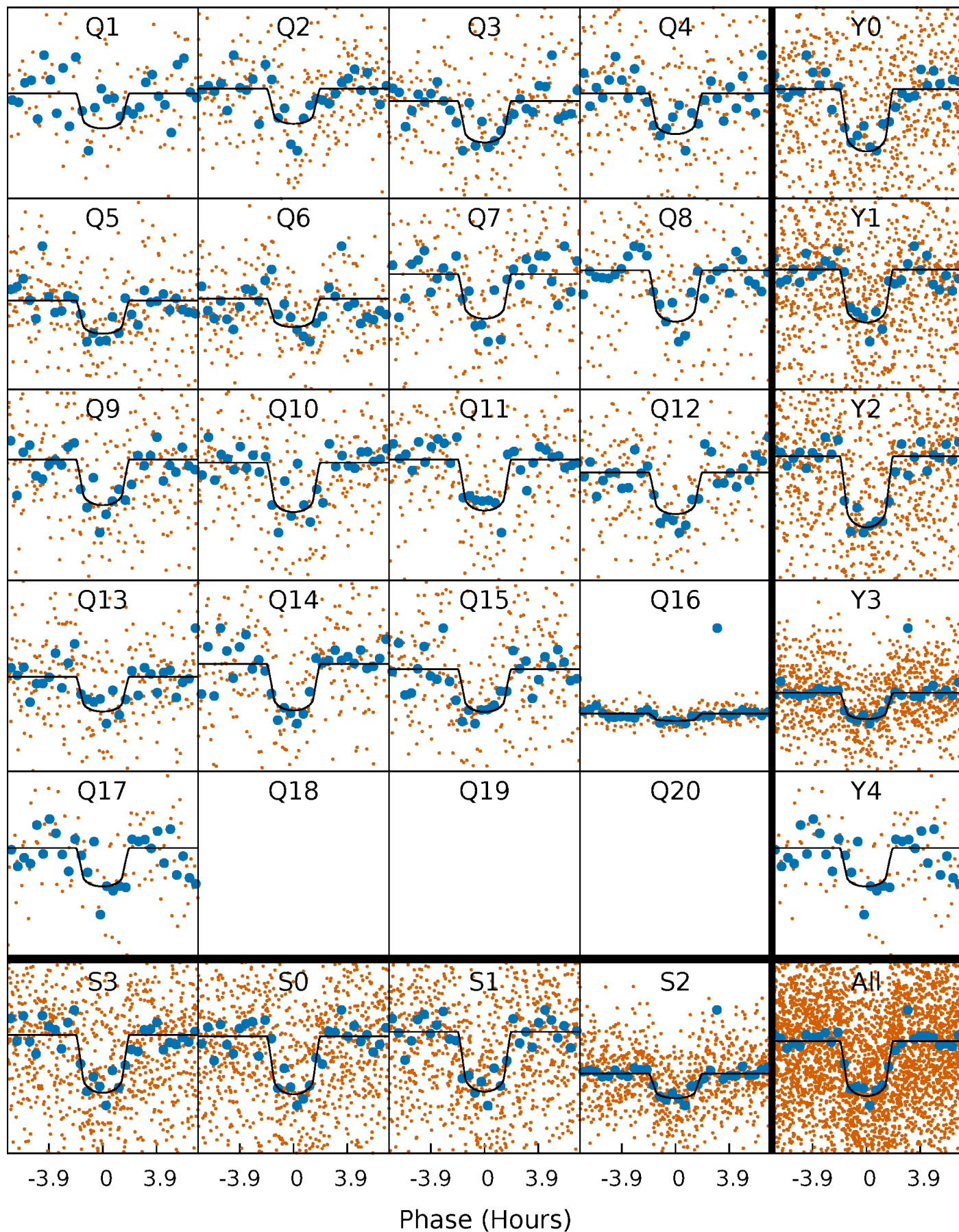
# PDC Quarter-Phased Transit Curves

TCE 009590976-02   P= 8.586052 Days    $T_0=137.954849$  (BKJD)



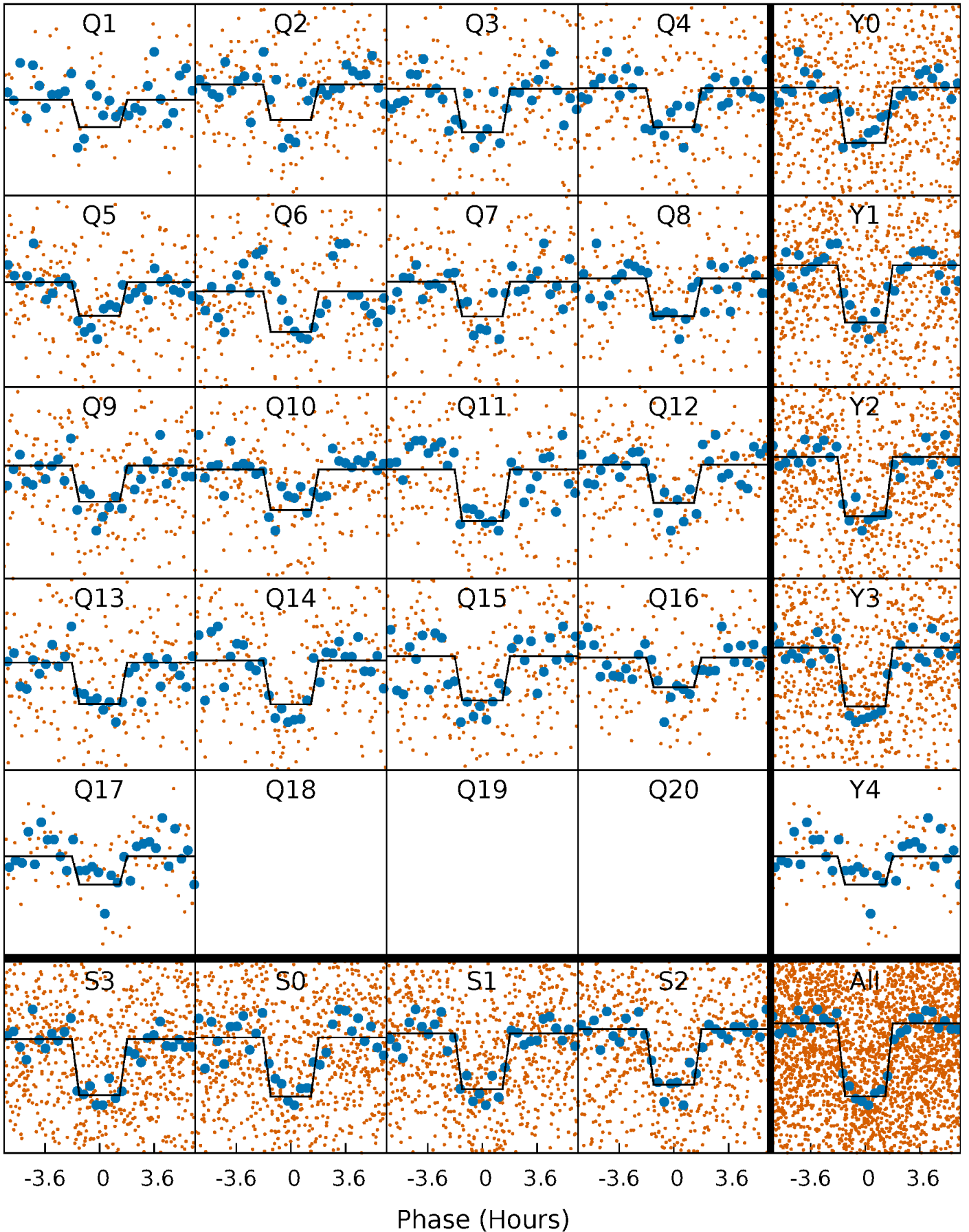
# DV Quarter-Phased Transit Curves

TCE 009590976-02   P= 8.586052 Days    $T_0=137.954849$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009590976-02   P= 8.585964 Days    $T_0=137.961502$  (BKJD)

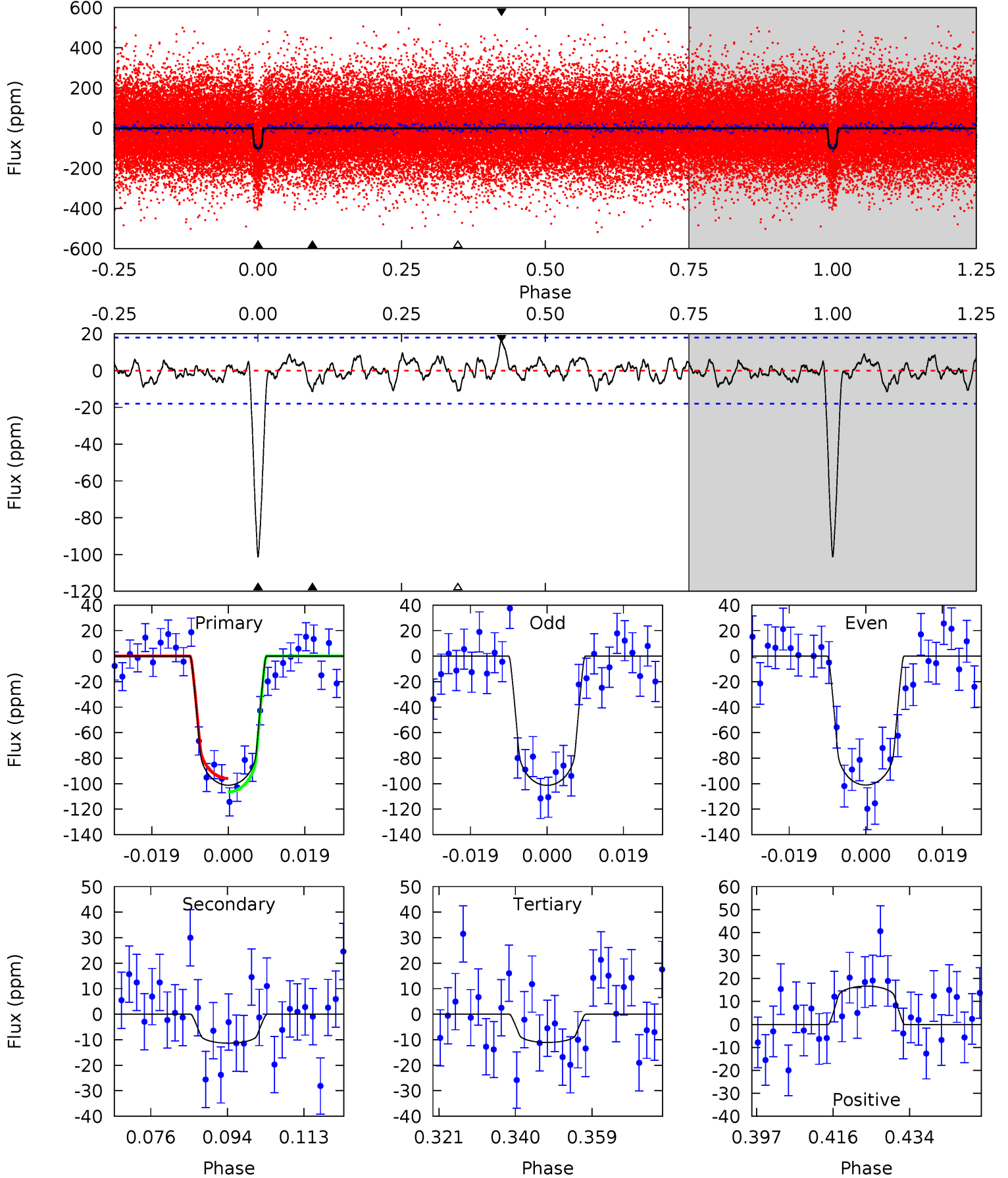




# DV Model-Shift Uniqueness Test

009590976-02, P = 8.586052 Days, E = 129.368797 Days

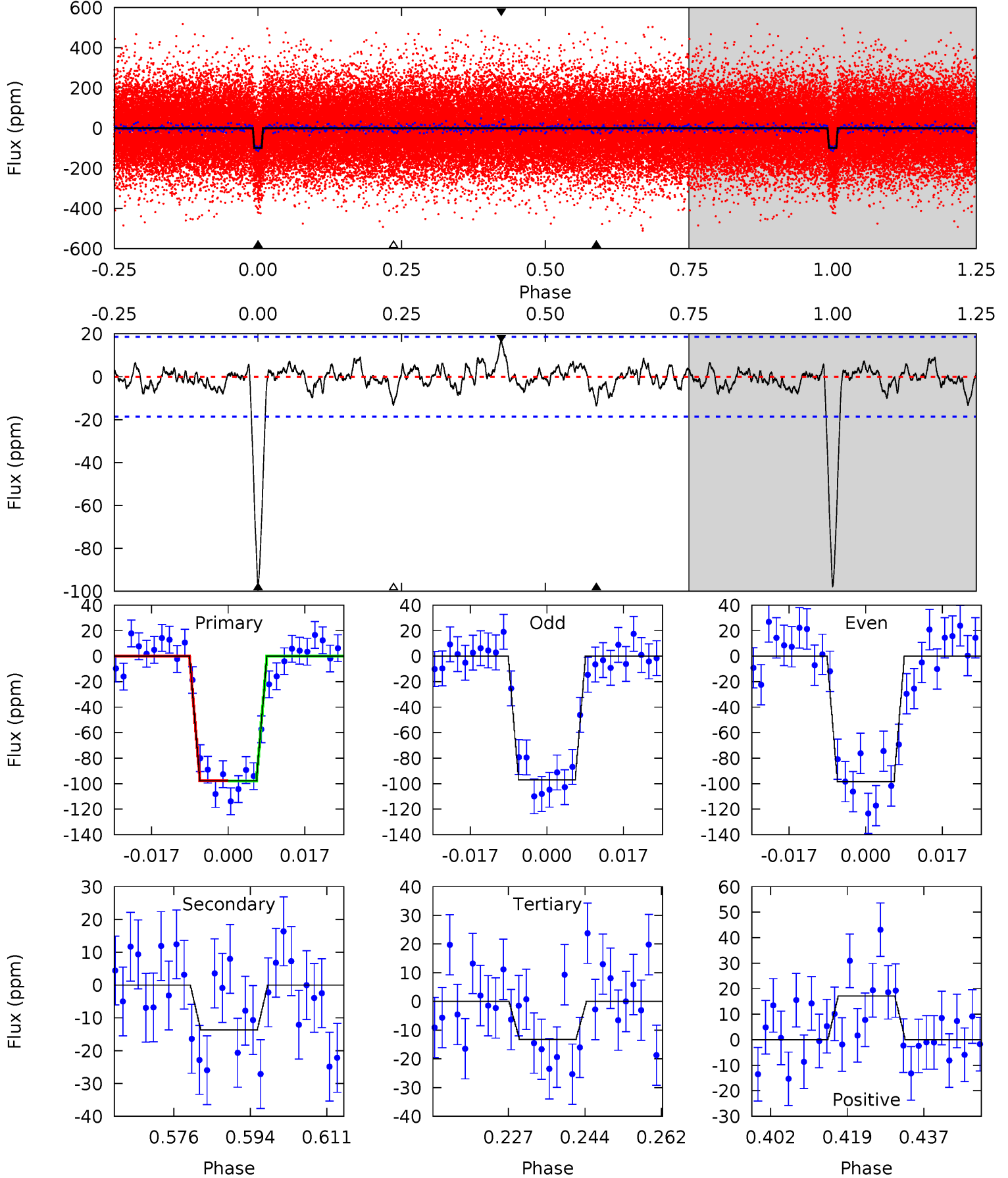
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.6	3.10	3.02	4.55	4.90	2.35	1.18	24.6	23.1	0.08	-1.45	0.03	0.98	0.14	1.43



# Alt Model-Shift Uniqueness Test

009590976-02, P = 8.585964 Days, E = 129.375538 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
25.8	3.61	3.49	4.53	4.92	2.38	1.10	22.3	21.3	0.12	-0.92	0.20	0.99	0.15	0.04





### Stellar Parameters For KIC 009590976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6167^{+124}_{-124}$	$4.037^{+0.182}_{-0.098}$	$-0.120^{+0.150}_{-0.150}$	$1.689^{+0.281}_{-0.343}$	$1.135^{+0.142}_{-0.103}$	$0.331^{+0.308}_{-0.099}$
	+2%/-2%	+5%/-2%	+125%/-125%	+17%/-20%	+13%/-9%	+93%/-30%
Source	SPE58	SPE58	SPE58	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009590976-02 / KOI 0710.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-11 \pm 4$	$1.90^{+0.60}_{-0.57}$	$1673^{+86}_{-97}$	$3820^{+567}_{-382}$	$12^{+16}_{-6}$
Alt.	$-14 \pm 4$	$1.80^{+0.58}_{-0.60}$	$1676^{+81}_{-93}$	$4050^{+673}_{-432}$	$17^{+22}_{-8}$

$T_{\text{max}}$  = 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

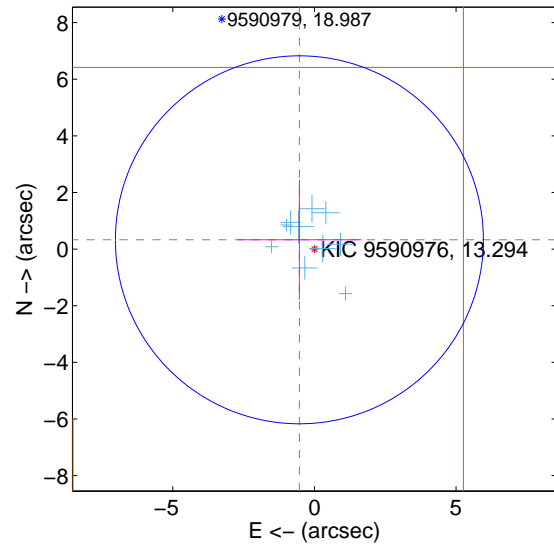
Supplemental centroid analysis for 009590976-02. Kepler magnitude: 13.29. Transit SNR 20.04

There are 10 quarters with good PRF difference image offsets

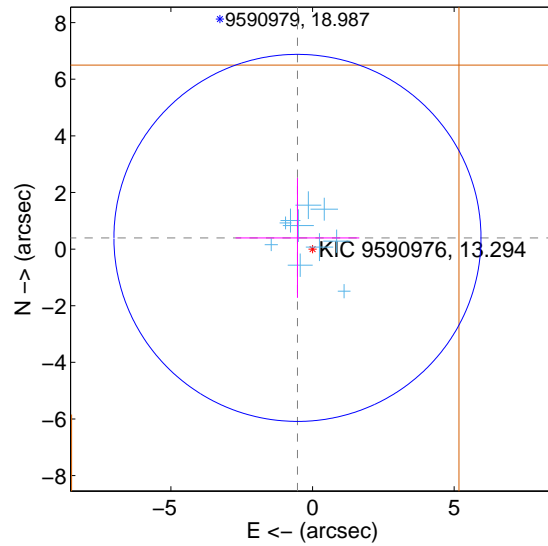
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.624 \pm 2.166$	0.29	$0.531 \pm 2.184$	$0.328 \pm 2.116$
PRF-fit source offset from KIC position	$0.663 \pm 2.160$	0.31	$0.532 \pm 2.184$	$0.396 \pm 2.116$
photometric centroid source offset	$0.84 \pm 0.57$	1.48	$-0.37 \pm 0.44$	$0.76 \pm 0.60$

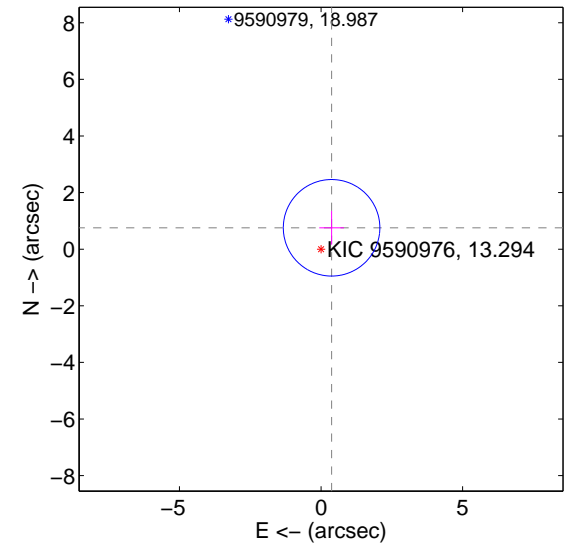
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

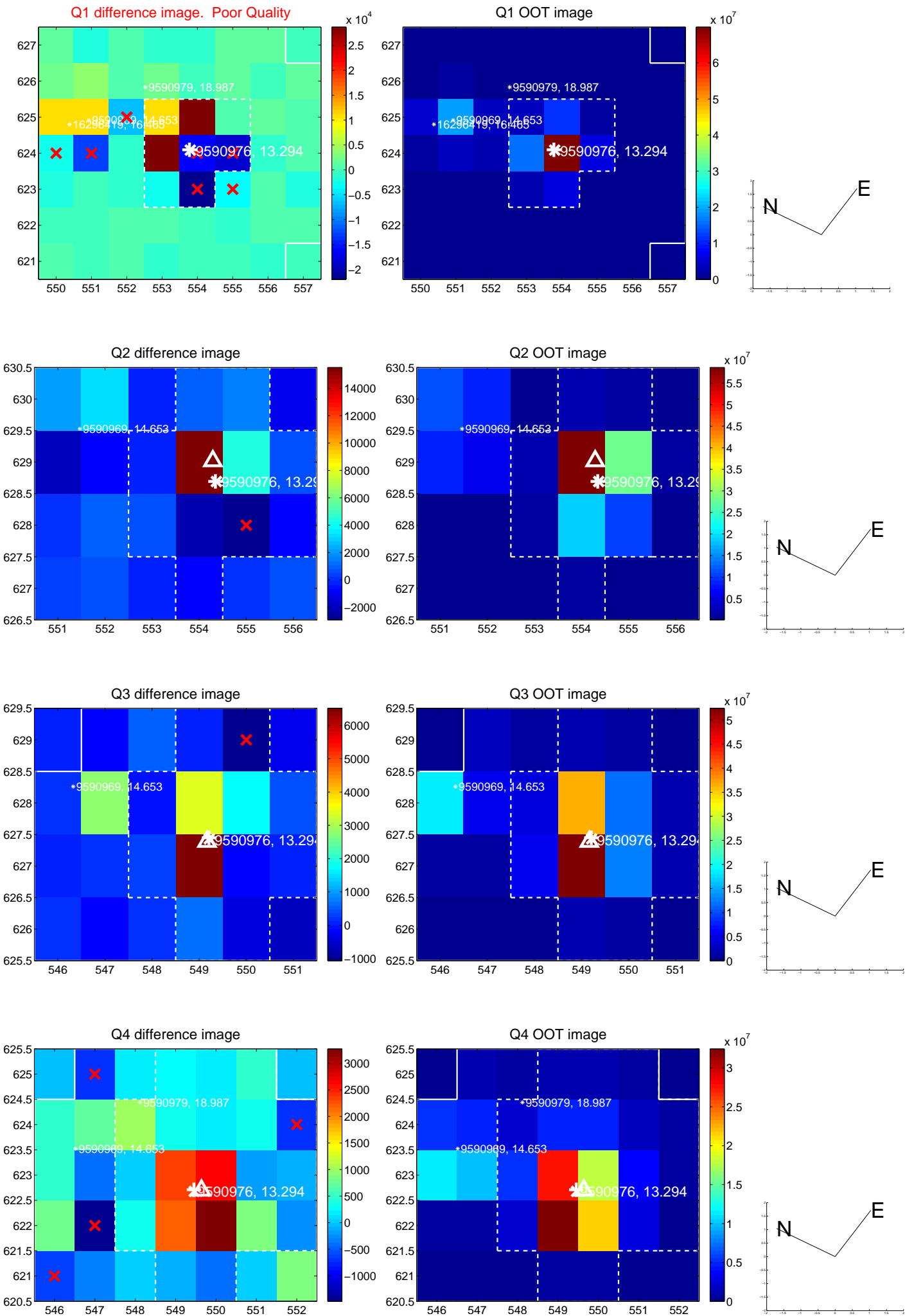


offset from photometric centroids

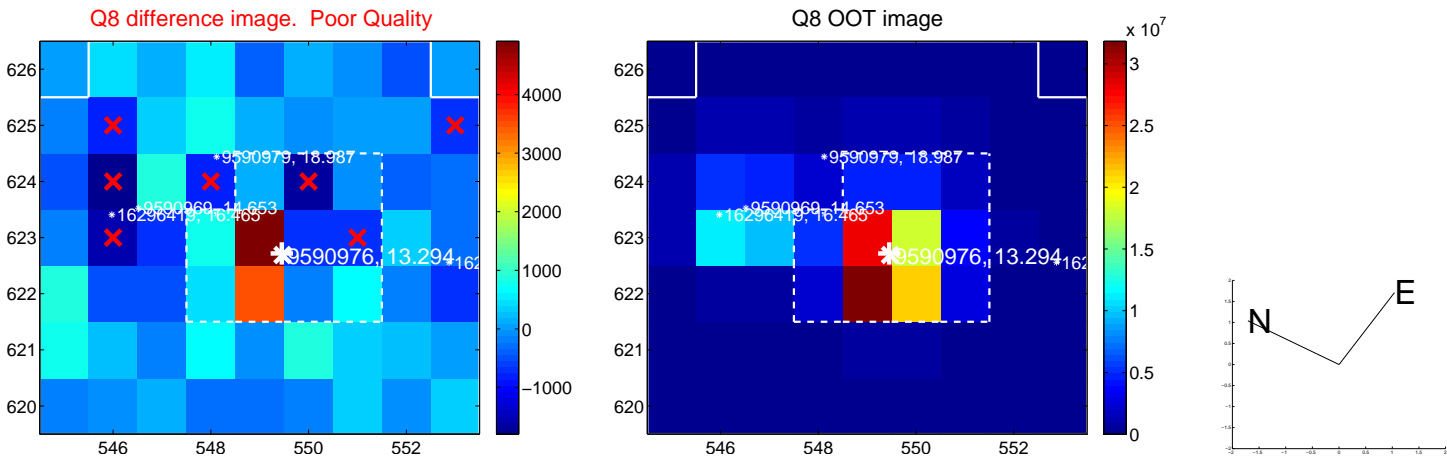
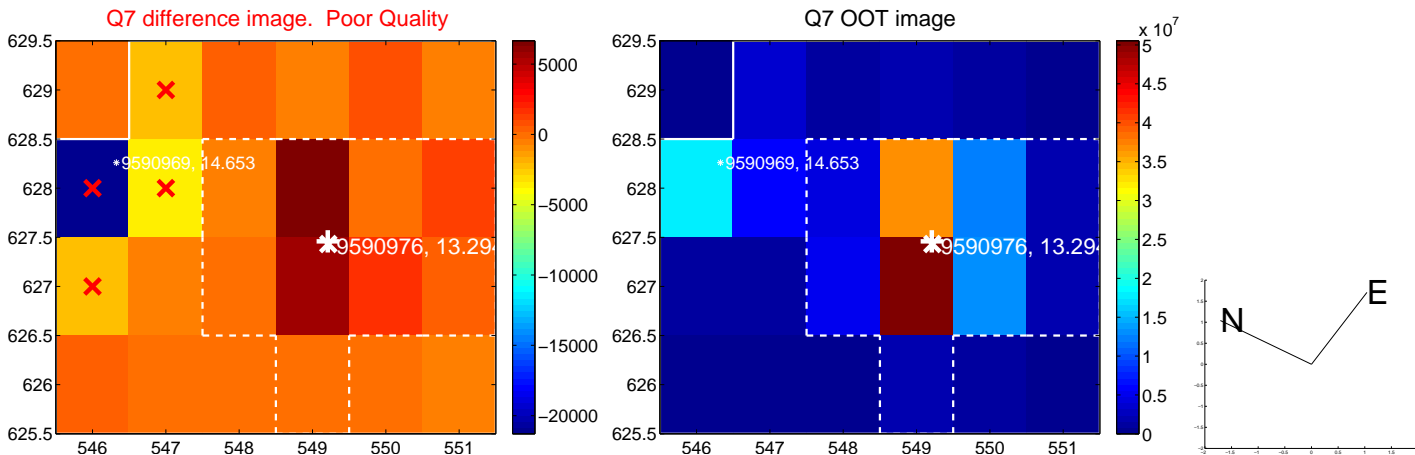
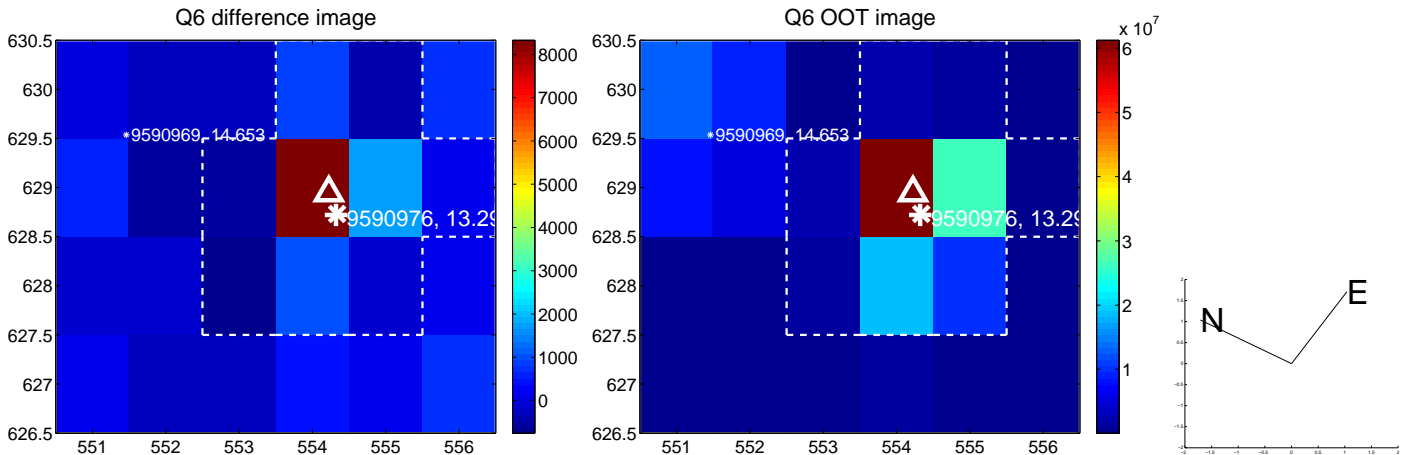
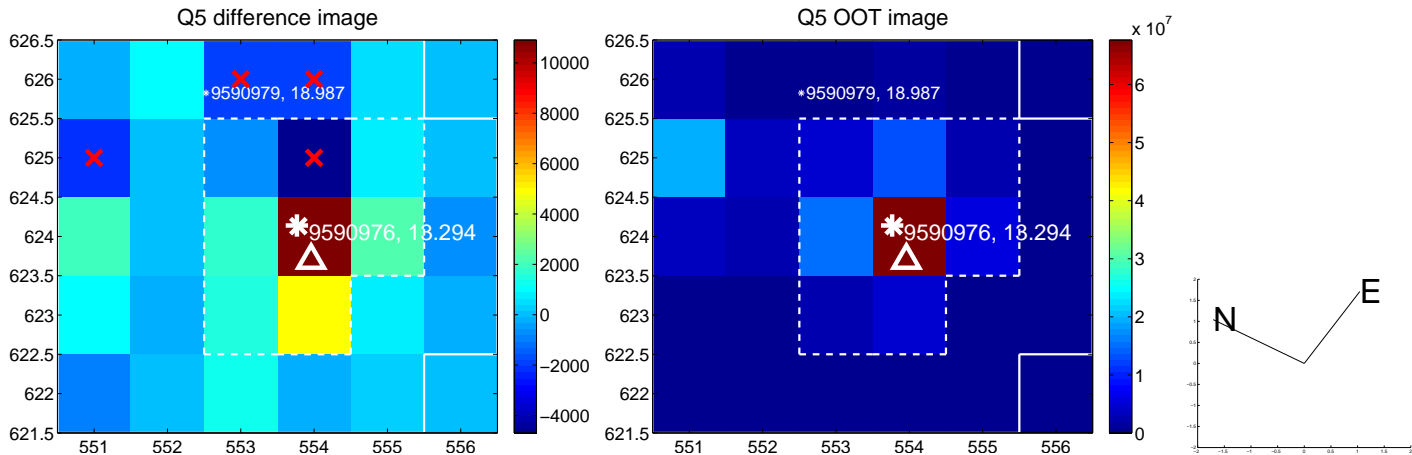


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

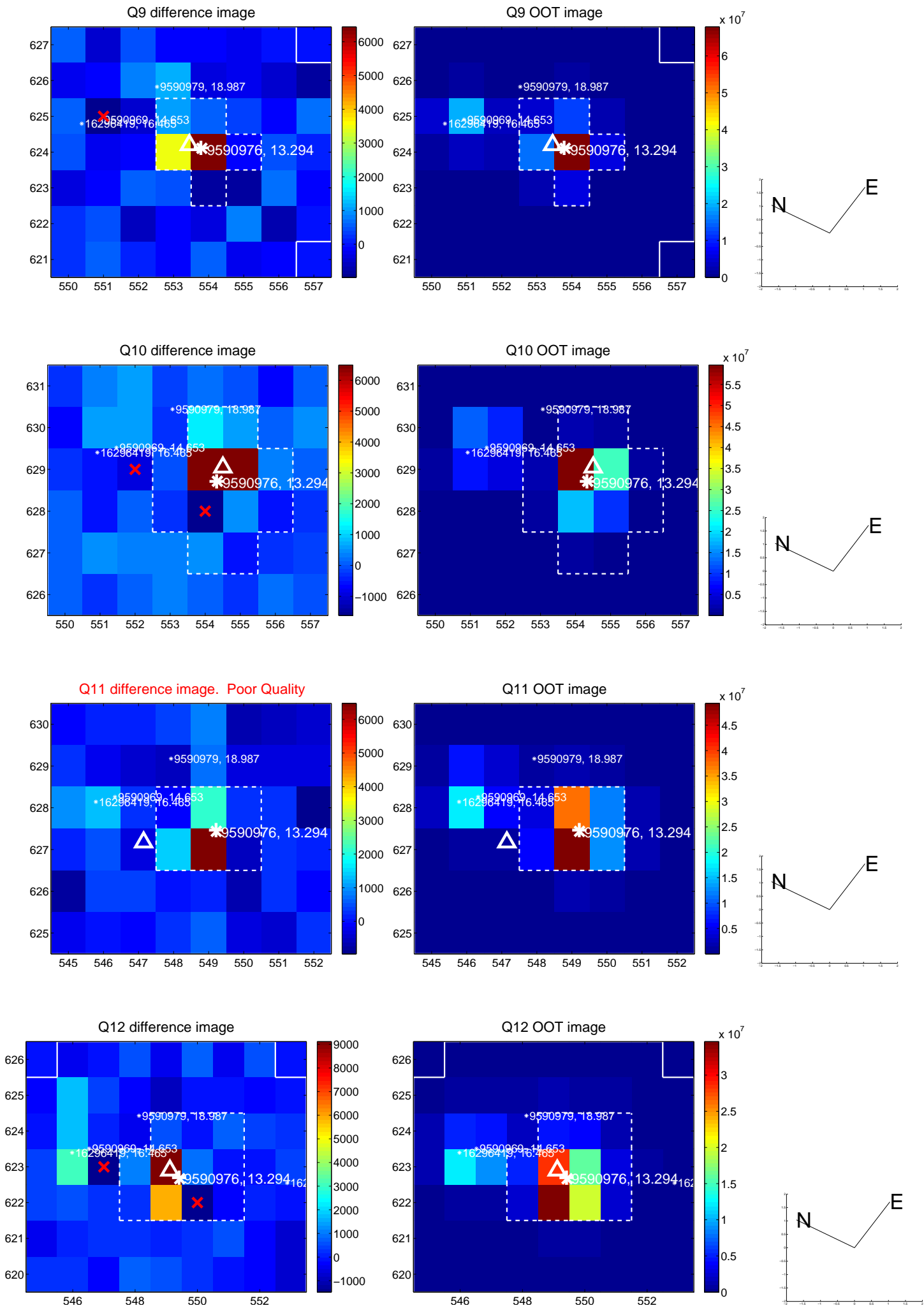
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



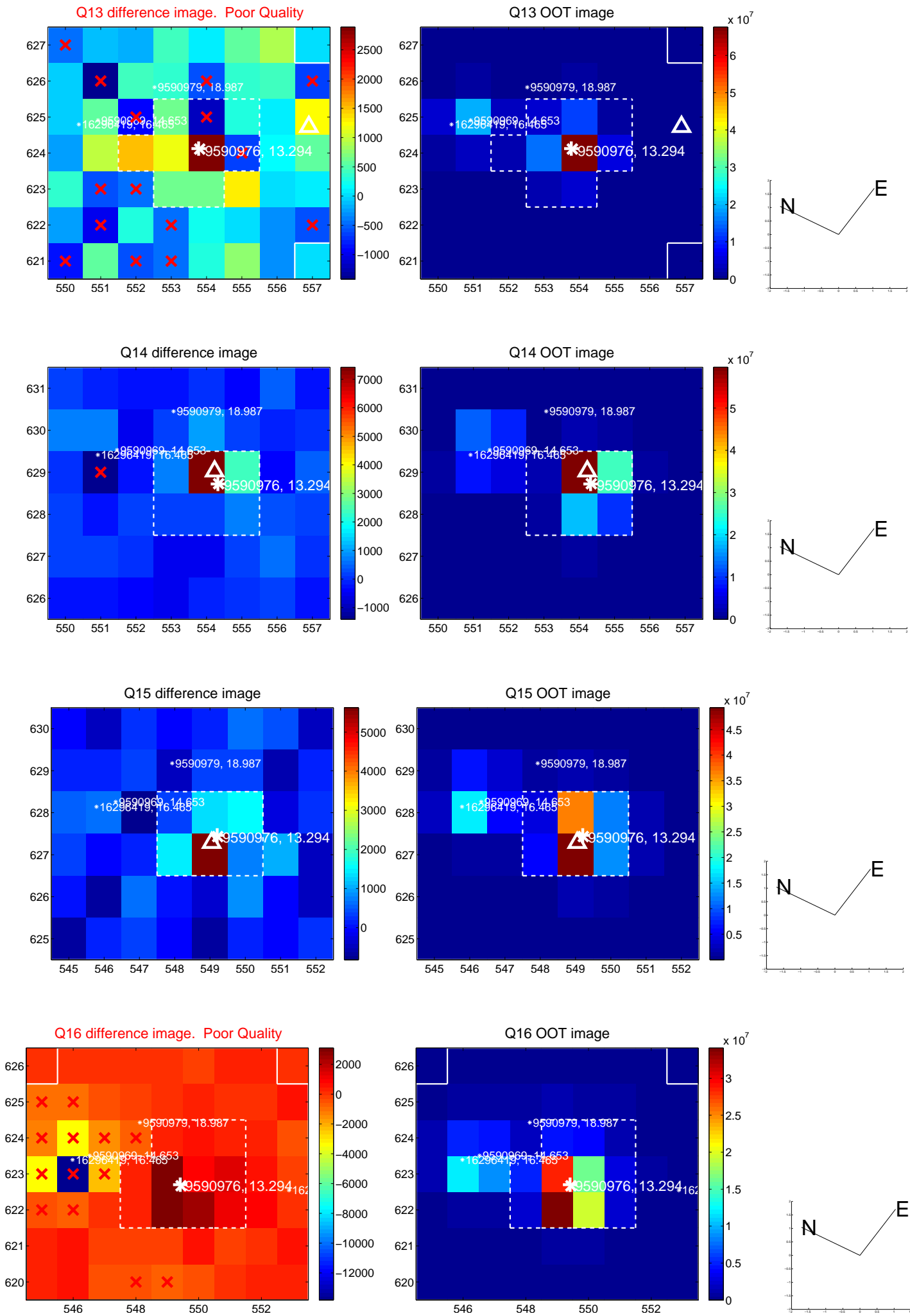
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

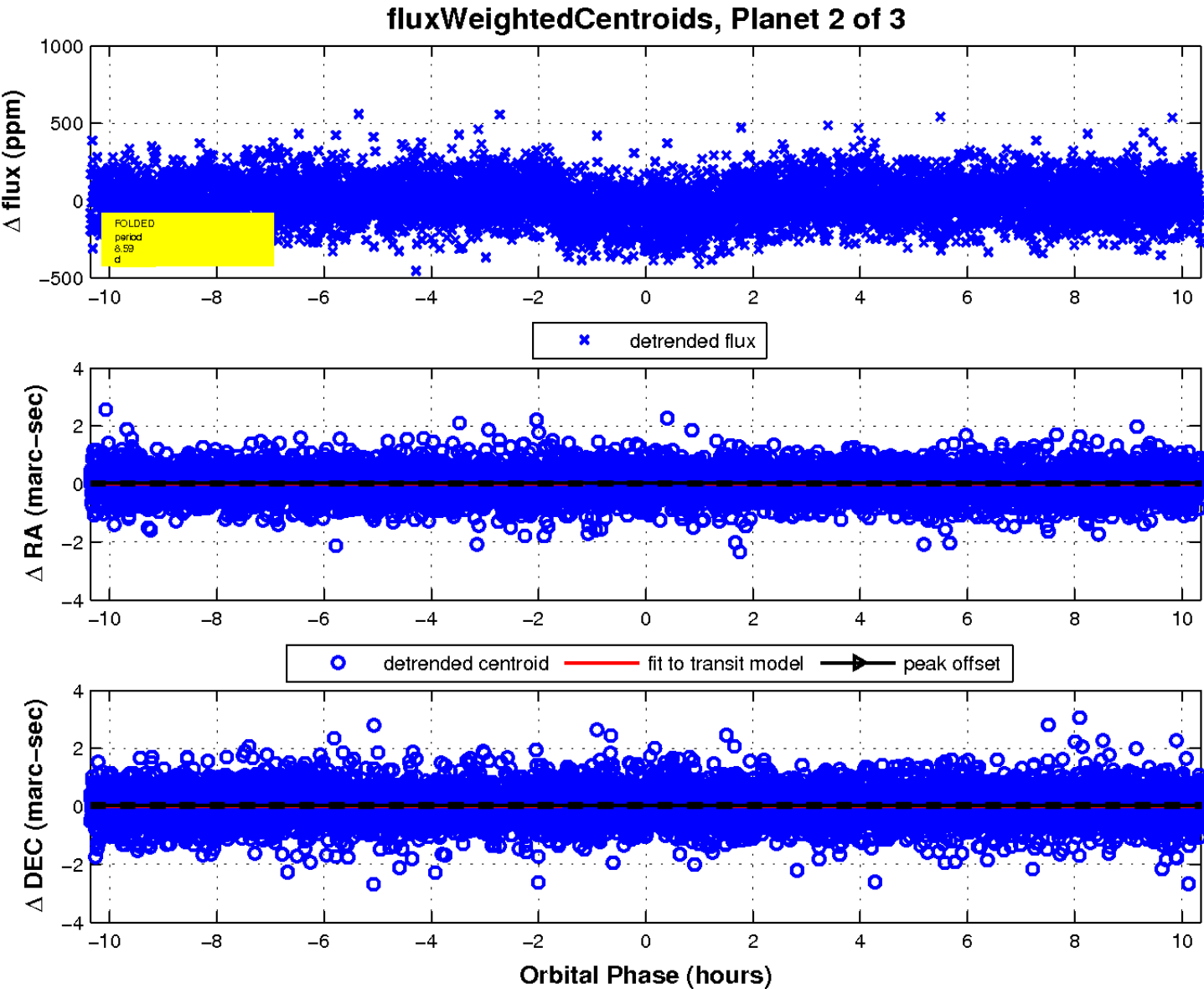
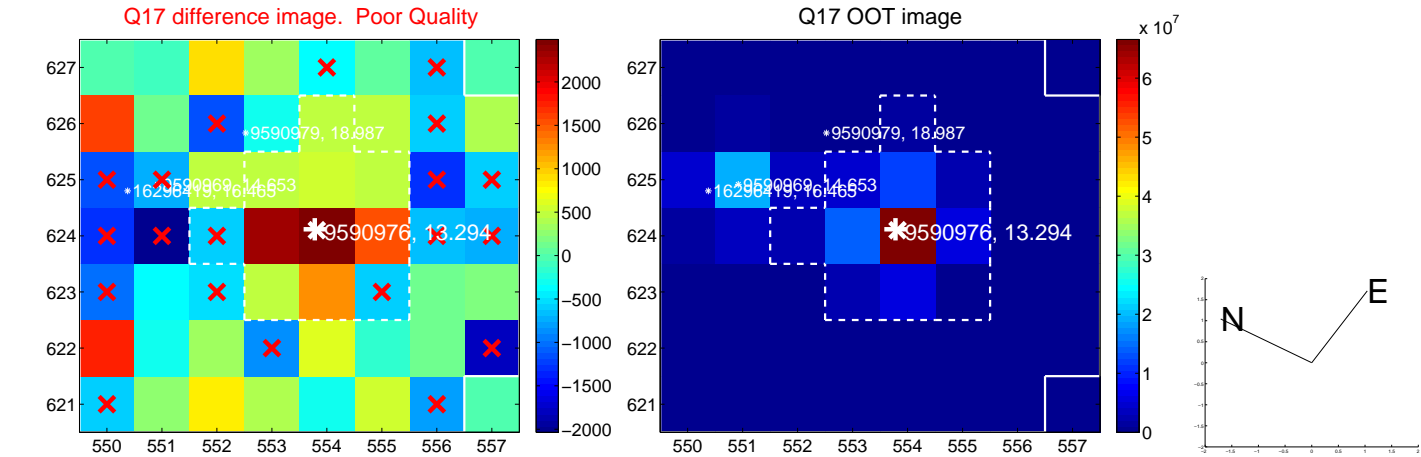


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



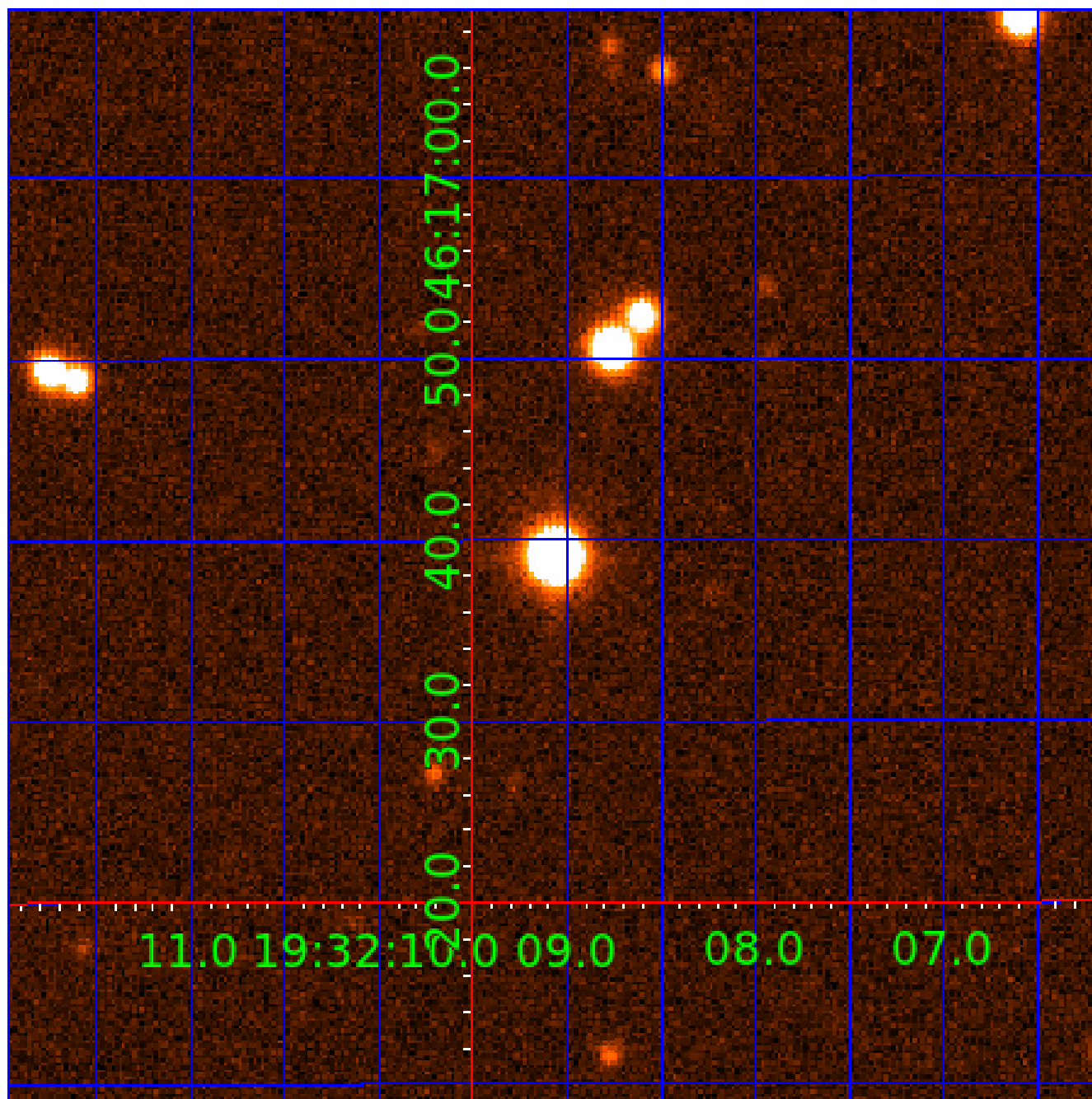


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009590976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009590976-01	OBS	0710.01	5.374912	133.310897	152.7	4.051	36.4	40.6	1.69	6167	2.33	942.86
009590976-02	OBS	0710.02	8.586052	137.954849	104.4	3.454	19.0	20.0	1.69	6167	1.98	504.92
009590976-03	OBS	0710.03	3.886830	132.508624	58.2	3.397	16.1	16.5	1.69	6167	1.43	1452.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009590976-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009590976-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009590976-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

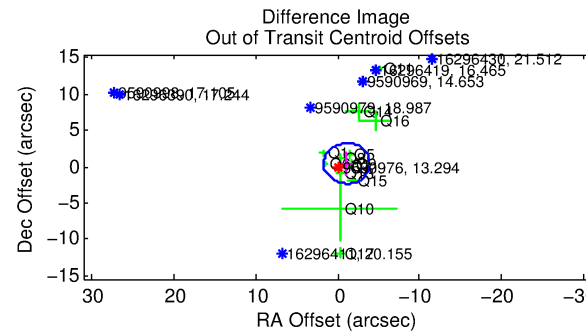
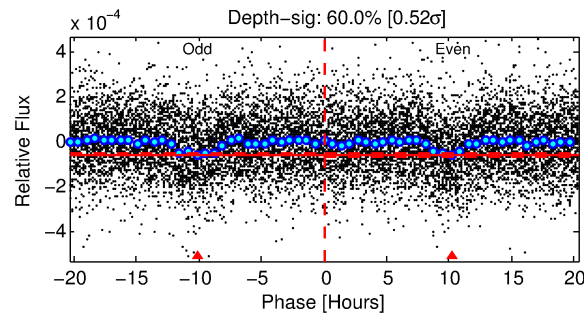
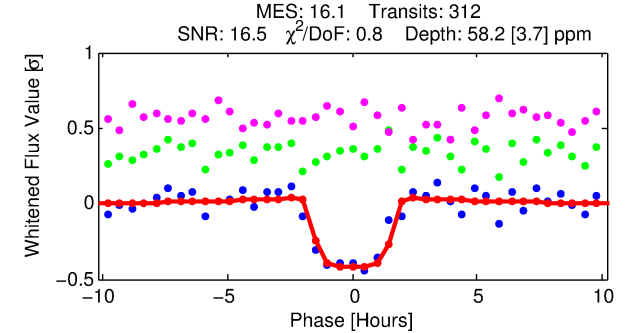
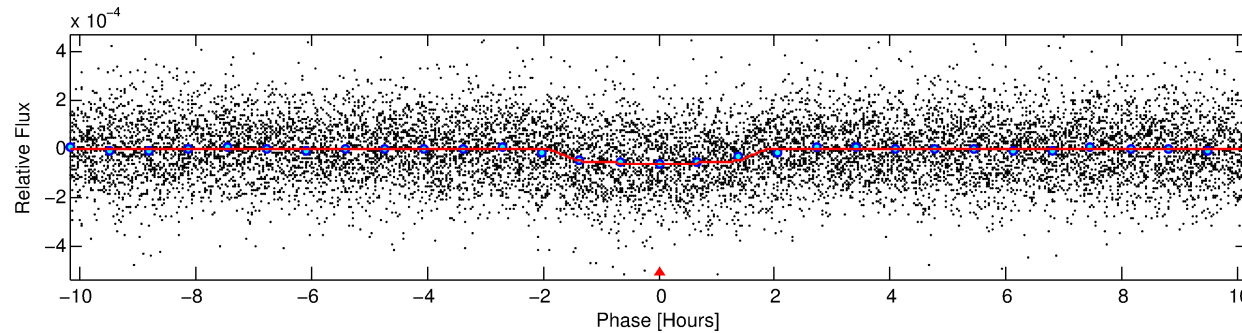
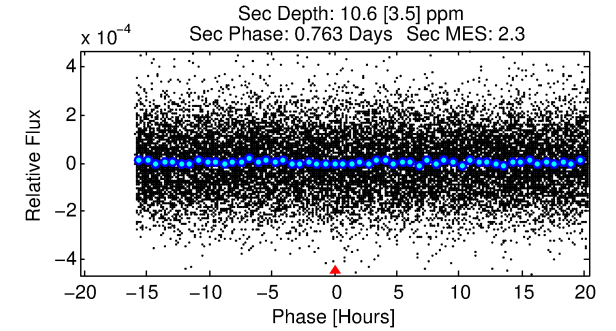
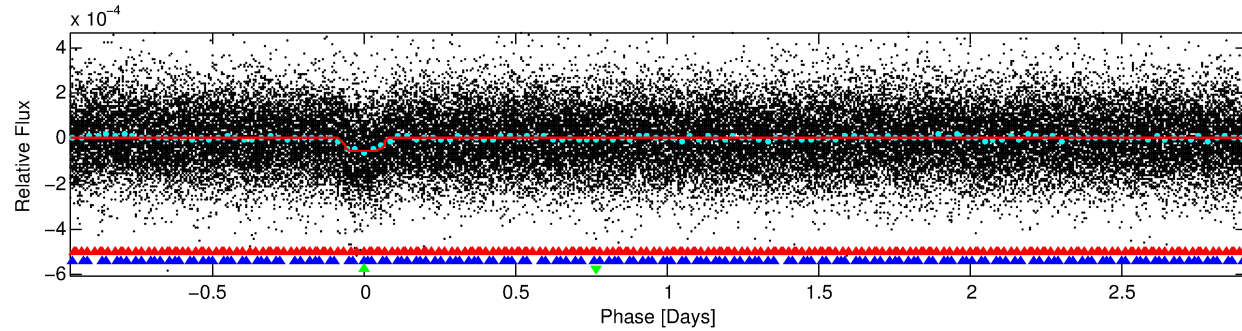
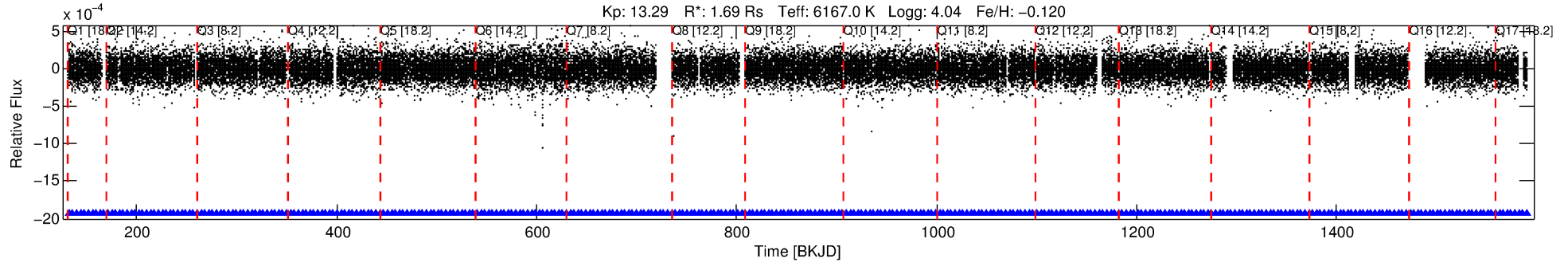
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009590976-03

No Significant Match Found

# DV One-Page Summary

KIC: 9590976 Candidate: 3 of 3 Period: 3.887 d  
KOI: K00710.03 Corr: 0.949



## DV Fit Results:

Period = 3.88683 [0.00002] d  
Epoch = 132.5086 [0.0030] BKJD  
Rp/R\* = 0.0078 [0.0021]  
a/R\* = 5.37 [7.32]  
b = 0.80 [0.62]  
Seff = 1452.61 [465.86]  
Teq = 1574 [126] K  
Rp = 1.43 [0.49] Re  
a = 0.0504 [0.0098] AU  
Ag = 7.27 [5.15] [1.22σ]  
Teffp = 3997 [641] K [3.71σ]

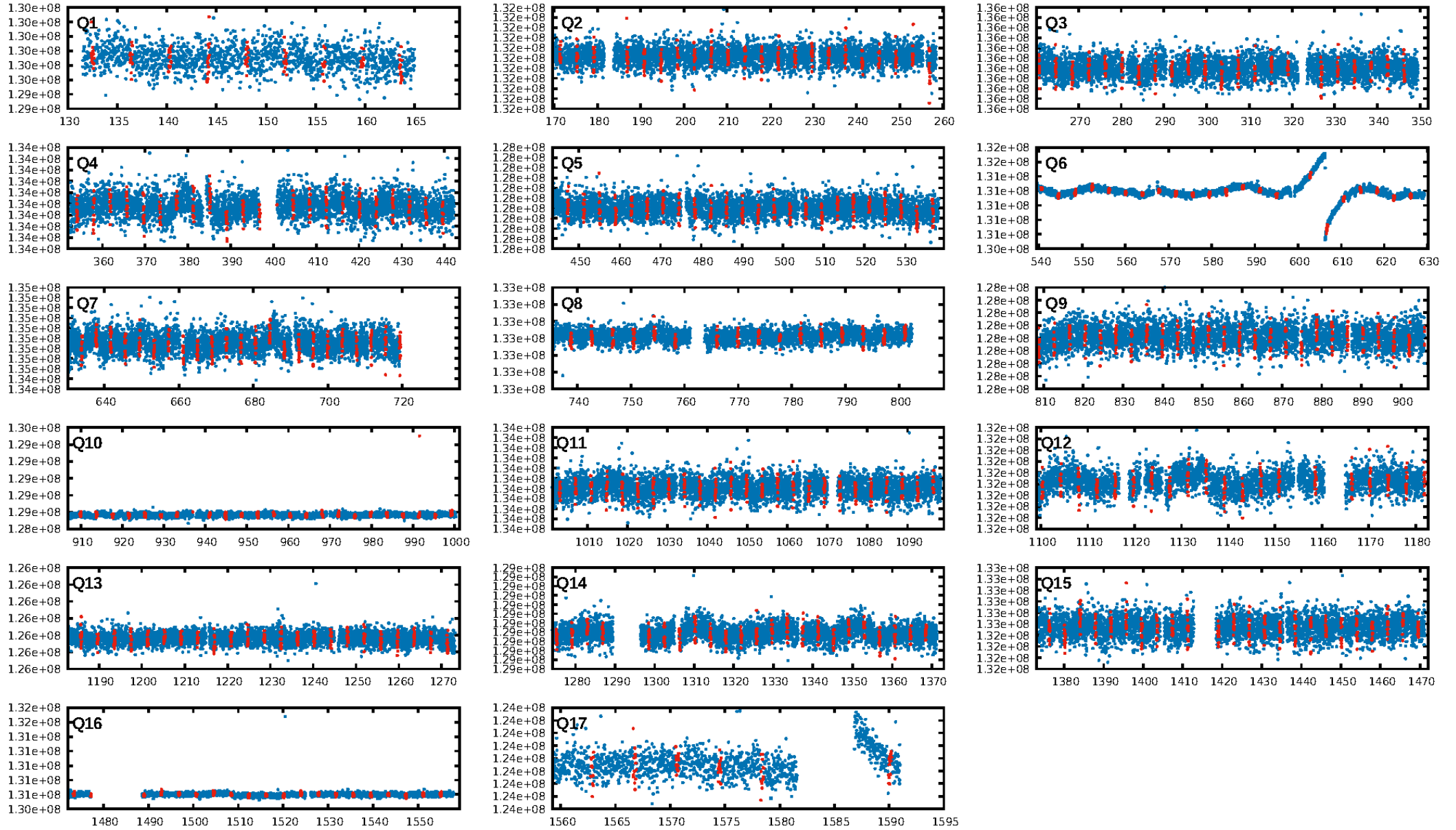
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [6.76σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.28e-56  
RollingBand-fgt: 1.00 [301/301]  
GhostDiagnostic-chr: 6.726  
Centroid-sig: 0.0%  
Centroid-so: 0.468 arcsec [0.66σ]  
OotOffset-rm: 1.182 arcsec [1.27σ]  
KicOffset-rm: 1.189 arcsec [1.28σ]  
OotOffset-st: 3/4/2/5 [14]  
KicOffset-st: 3/4/2/5 [14]  
DiffImageQuality-fgm: 0.64 [9/14]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 03:24:12 Z

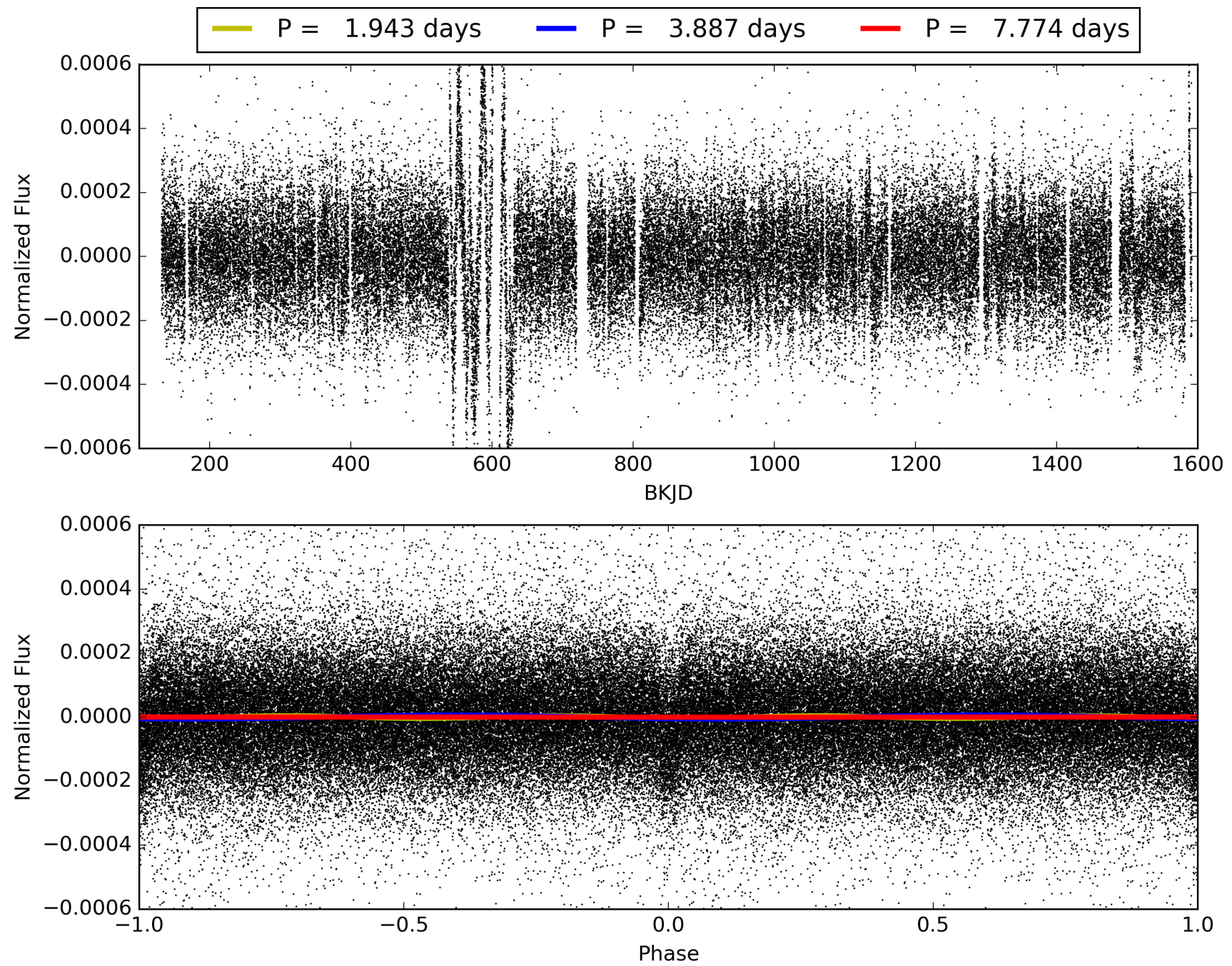
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009590976-03, PDC Light Curves





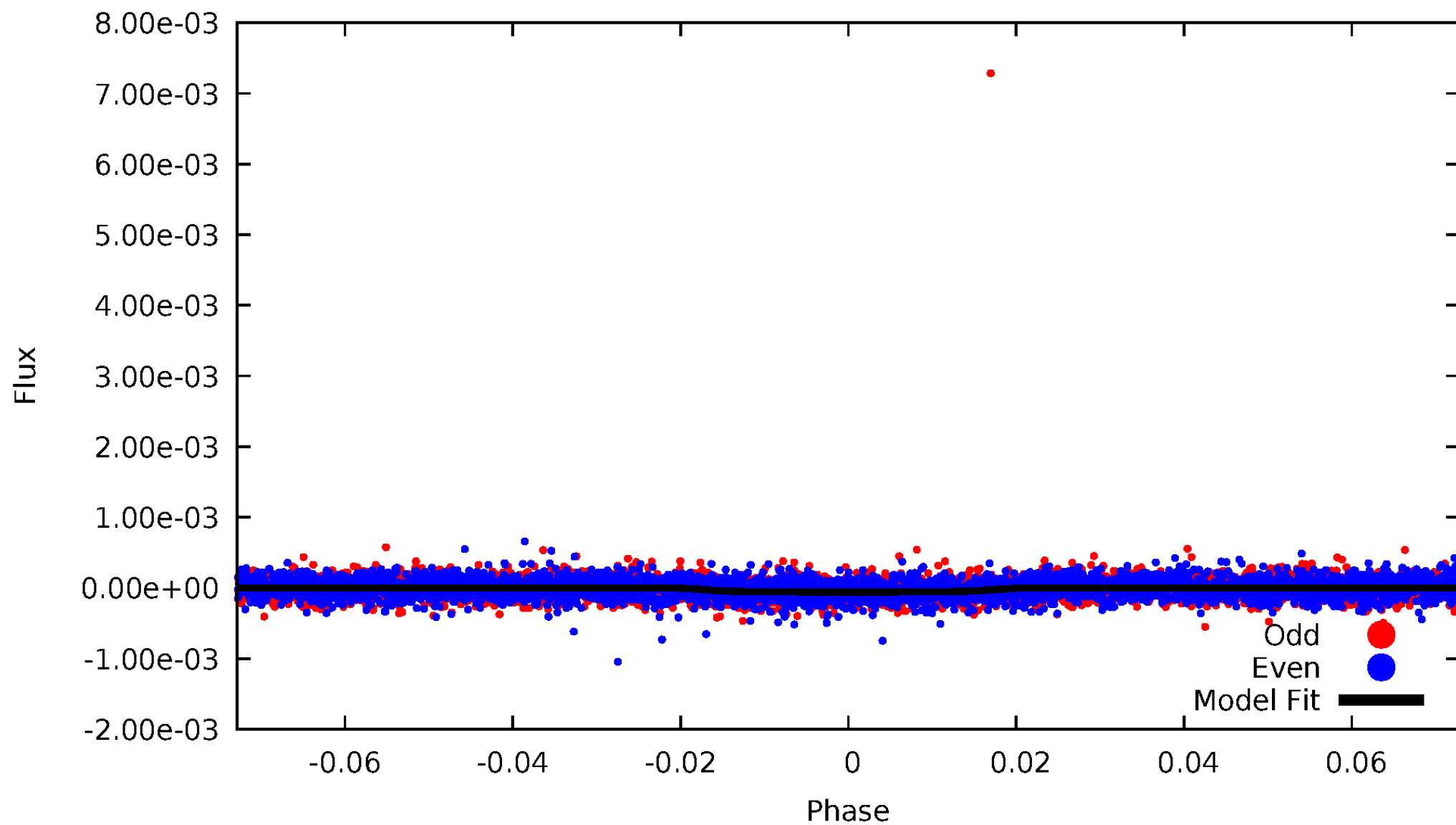
TCE 009590976-03





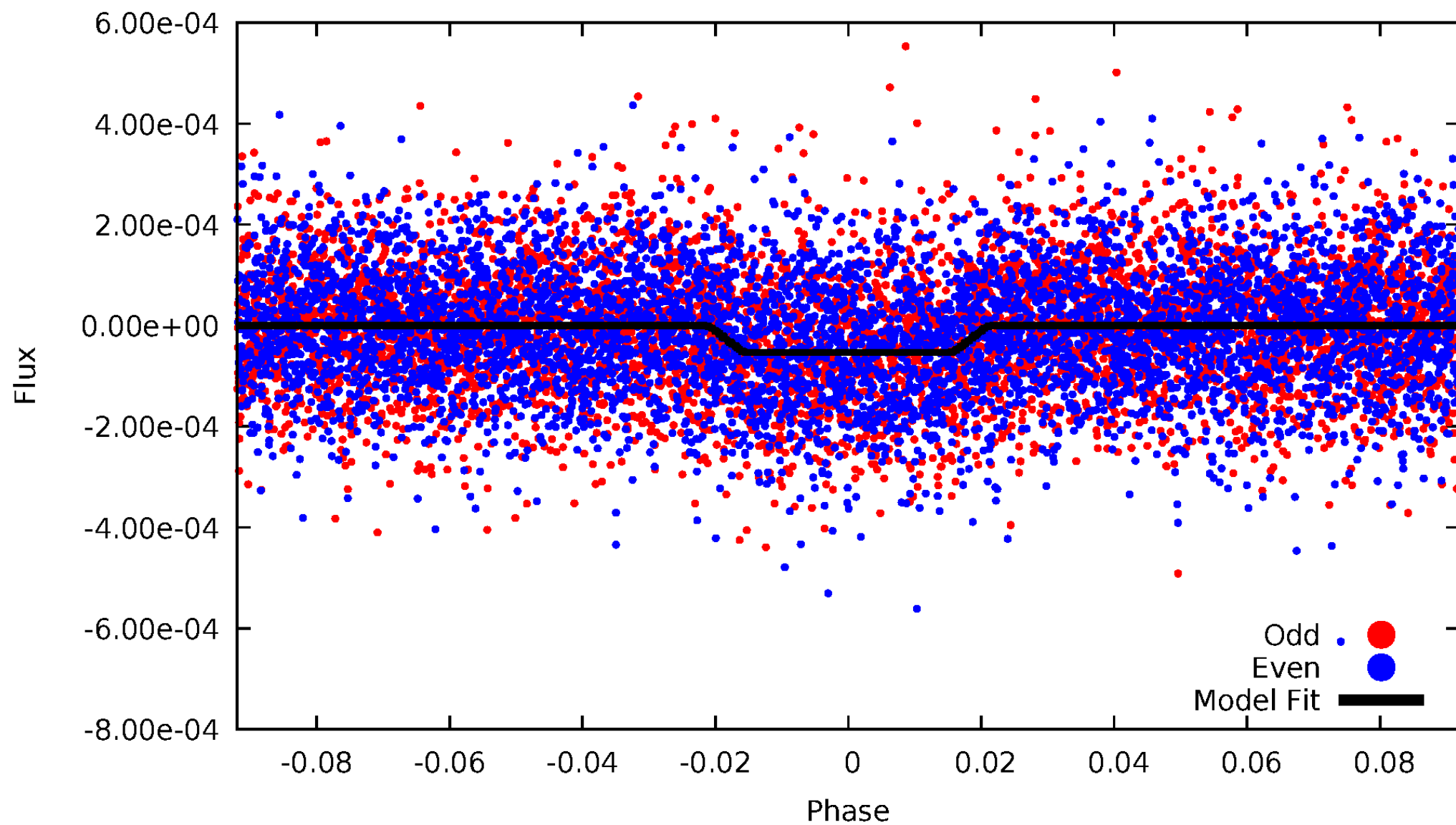
# DV Odd/Even

TCE 009590976-03

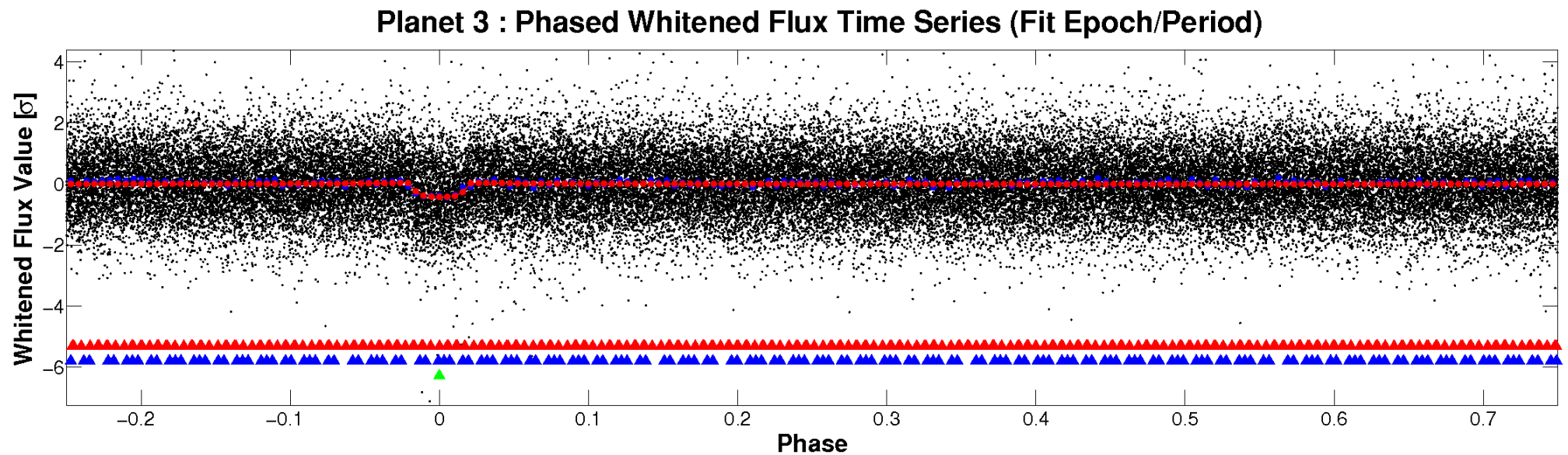
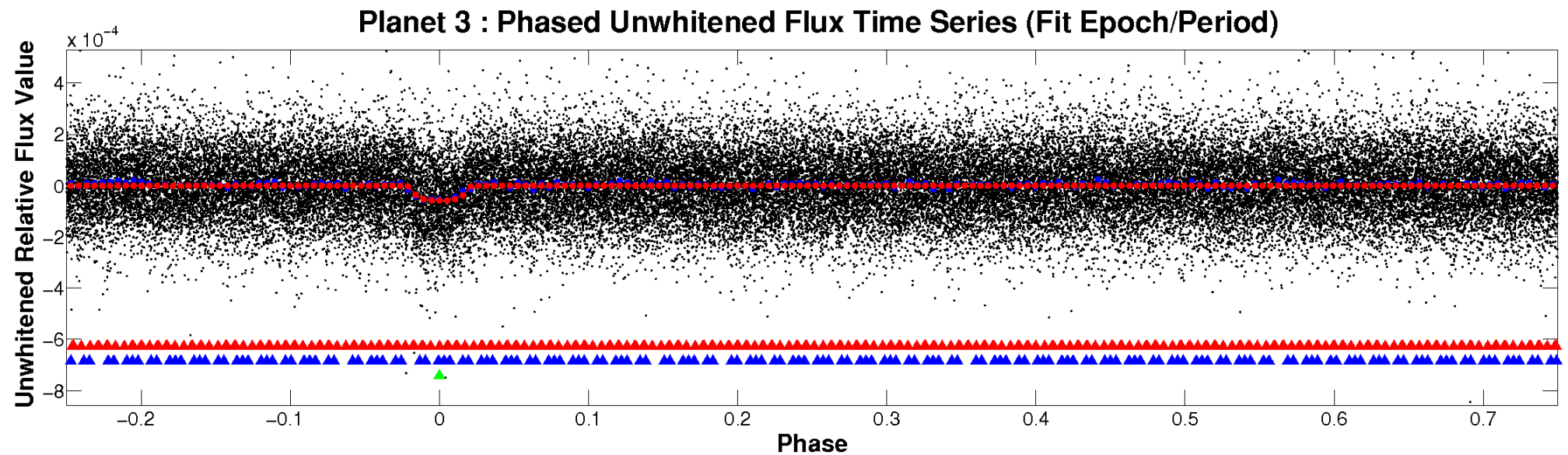


# ALT Odd/Even

TCE 009590976-03

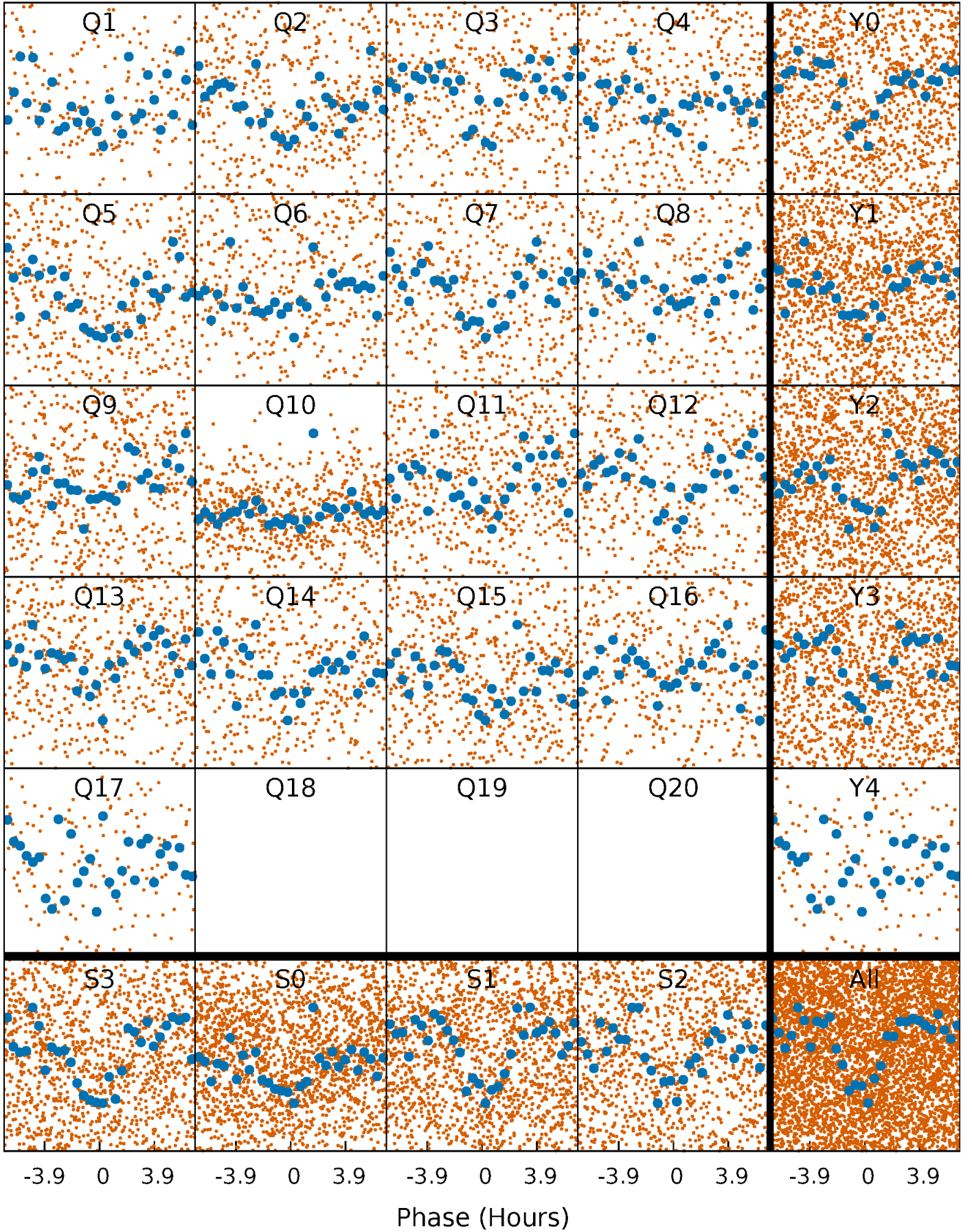


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

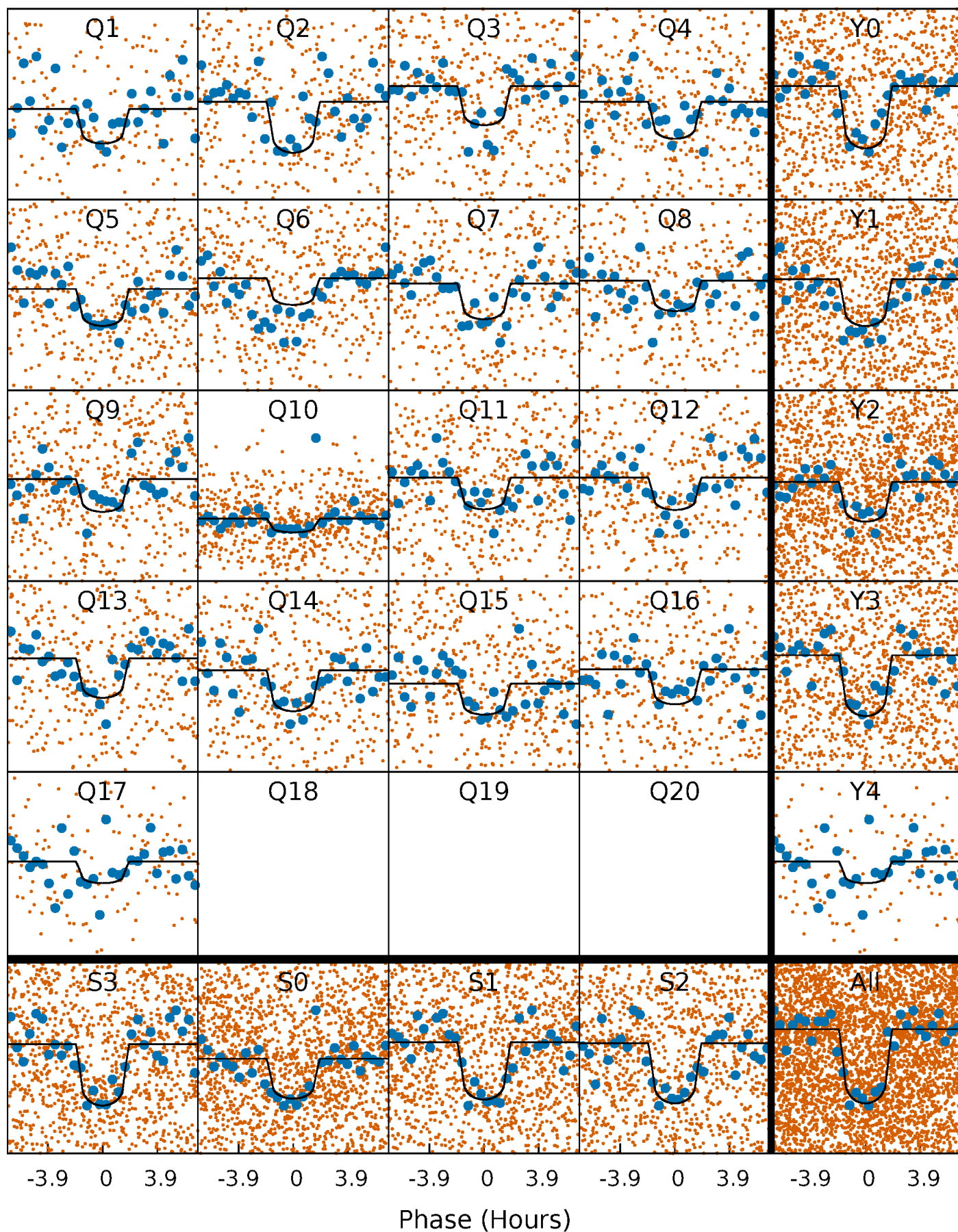
TCE 009590976-03    P= 3.886830 Days     $T_0=132.508623$  (BKJD)





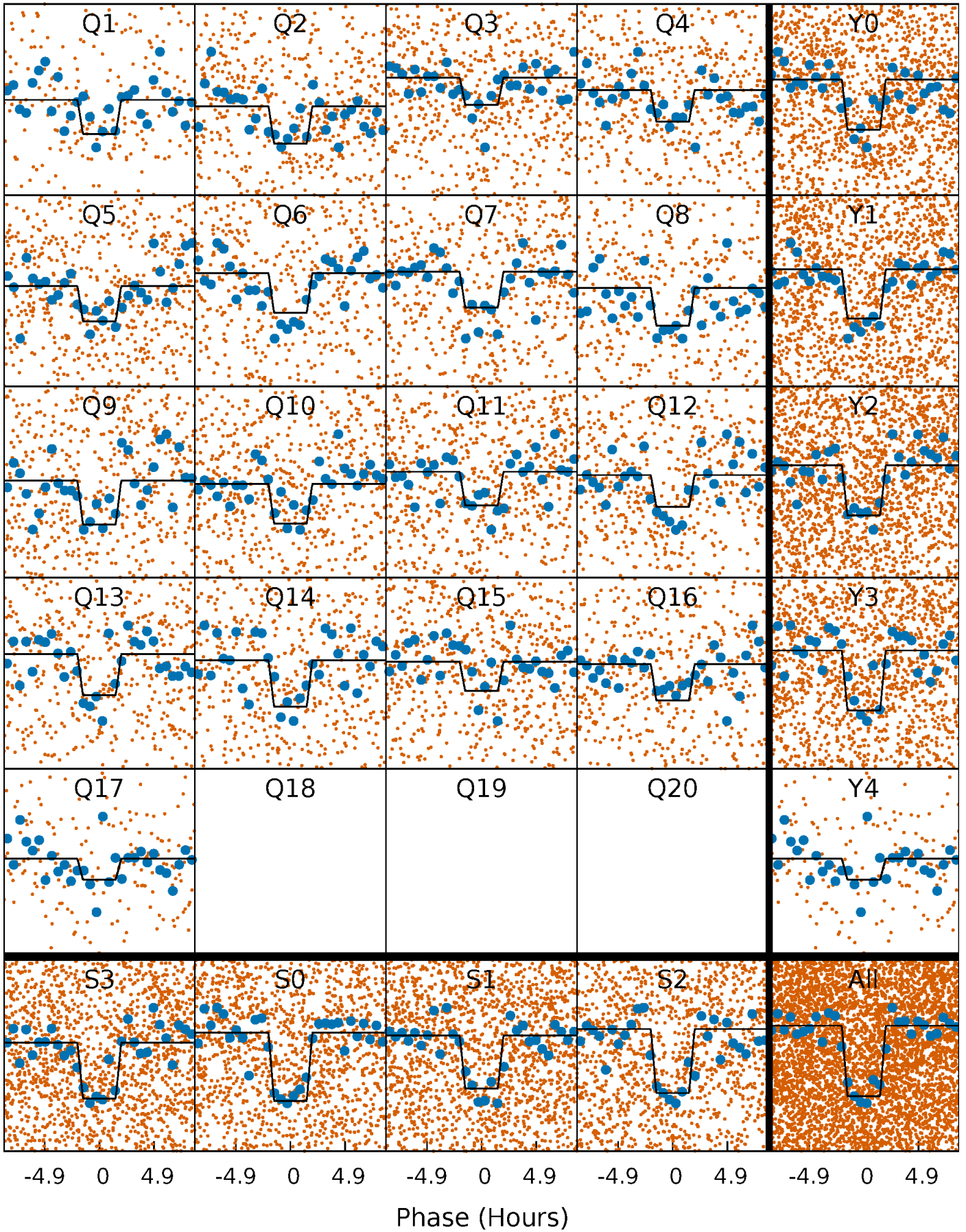
# DV Quarter-Phased Transit Curves

TCE 009590976-03   P= 3.886830 Days    $T_0=132.508623$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009590976-03 P= 3.886809 Days  $T_0=132.513598$  (BKJD)

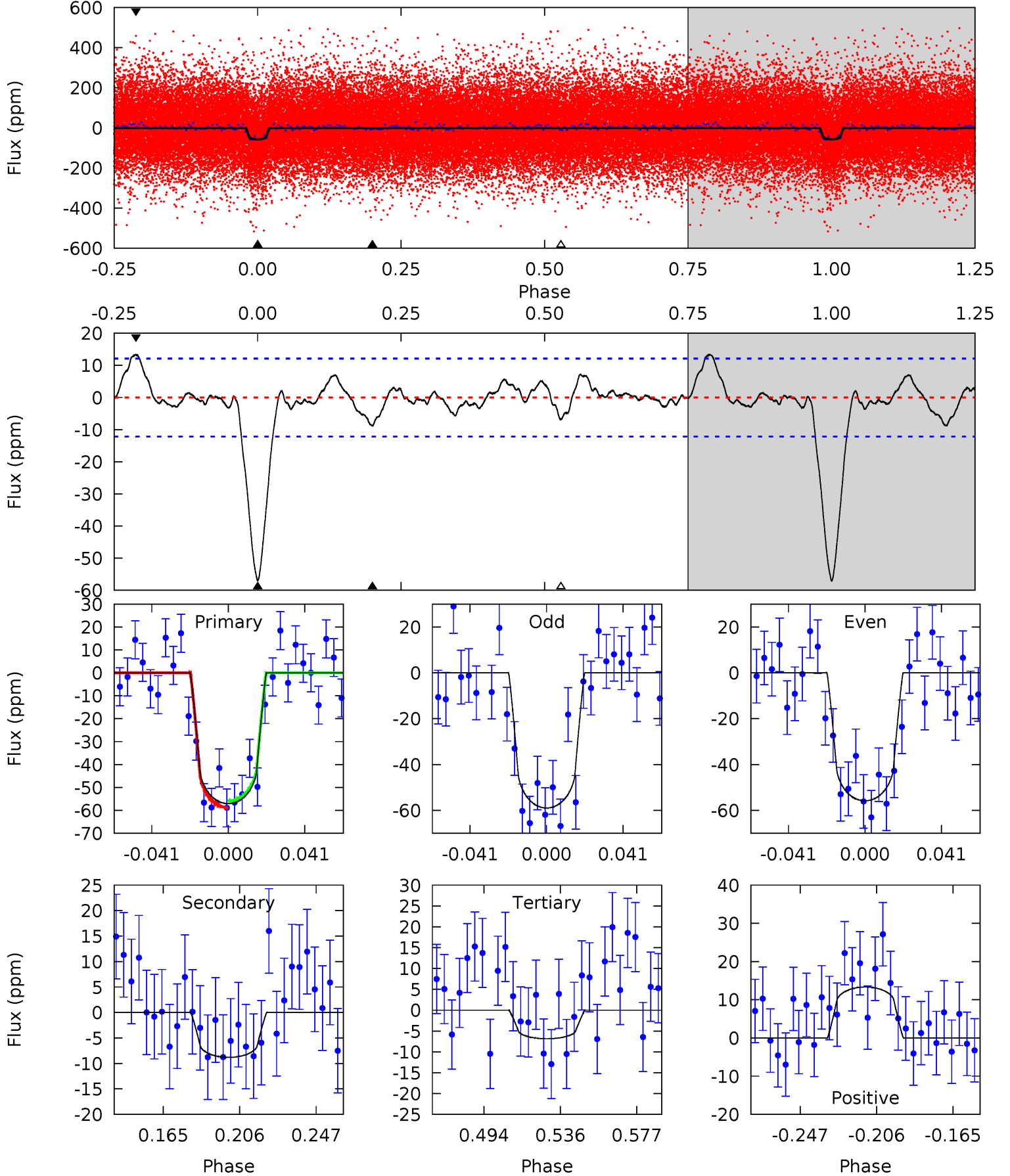




# DV Model-Shift Uniqueness Test

009590976-03, P = 3.886830 Days, E = 128.621793 Days

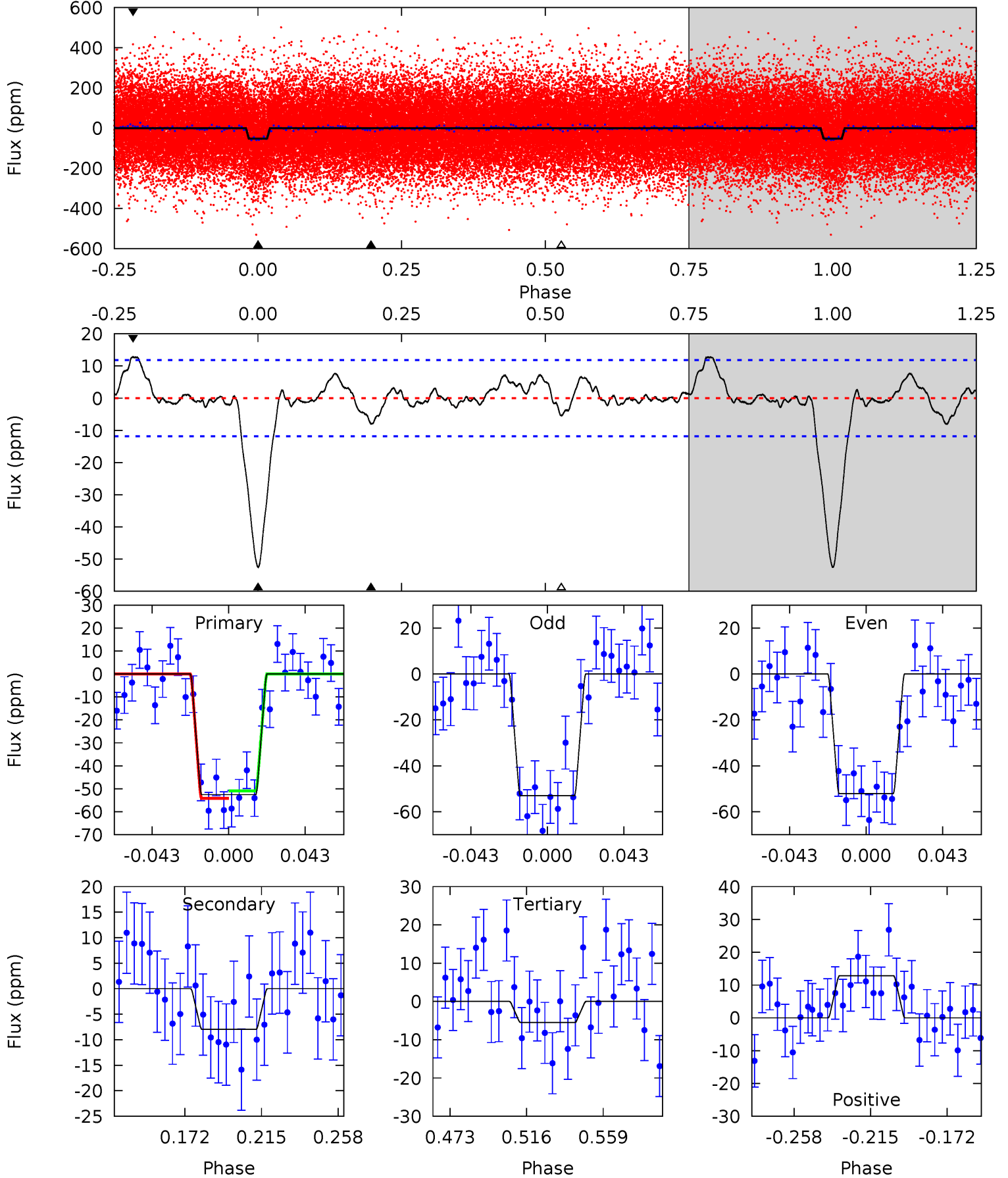
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.3	3.45	2.68	5.22	4.75	2.04	1.35	19.7	17.1	0.77	-1.77	0.61	0.98	0.19	0.56



# Alt Model-Shift Uniqueness Test

009590976-03, P = 3.886809 Days, E = 128.626789 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
21.0	3.18	2.20	5.12	4.74	2.02	1.35	18.8	15.9	0.98	-1.94	0.17	1.05	0.20	0.64



### Stellar Parameters For KIC 009590976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6167^{+124}_{-124}$	$4.037^{+0.182}_{-0.098}$	$-0.120^{+0.150}_{-0.150}$	$1.689^{+0.281}_{-0.343}$	$1.135^{+0.142}_{-0.103}$	$0.331^{+0.308}_{-0.099}$
	+2%/-2%	+5%/-2%	+125%/-125%	+17%/-20%	+13%/-9%	+93%/-30%
Source	SPE58	SPE58	SPE58	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009590976-03 / KOI 0710.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-9 \pm 3$	$1.38^{+0.46}_{-0.36}$	$2175^{+115}_{-110}$	$4060^{+579}_{-437}$	$6.359^{+6.865}_{-3.148}$
Alt.	$-8 \pm 3$	$1.31^{+0.46}_{-0.39}$	$2178^{+110}_{-119}$	$4093^{+604}_{-474}$	$6.437^{+7.280}_{-3.175}$

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

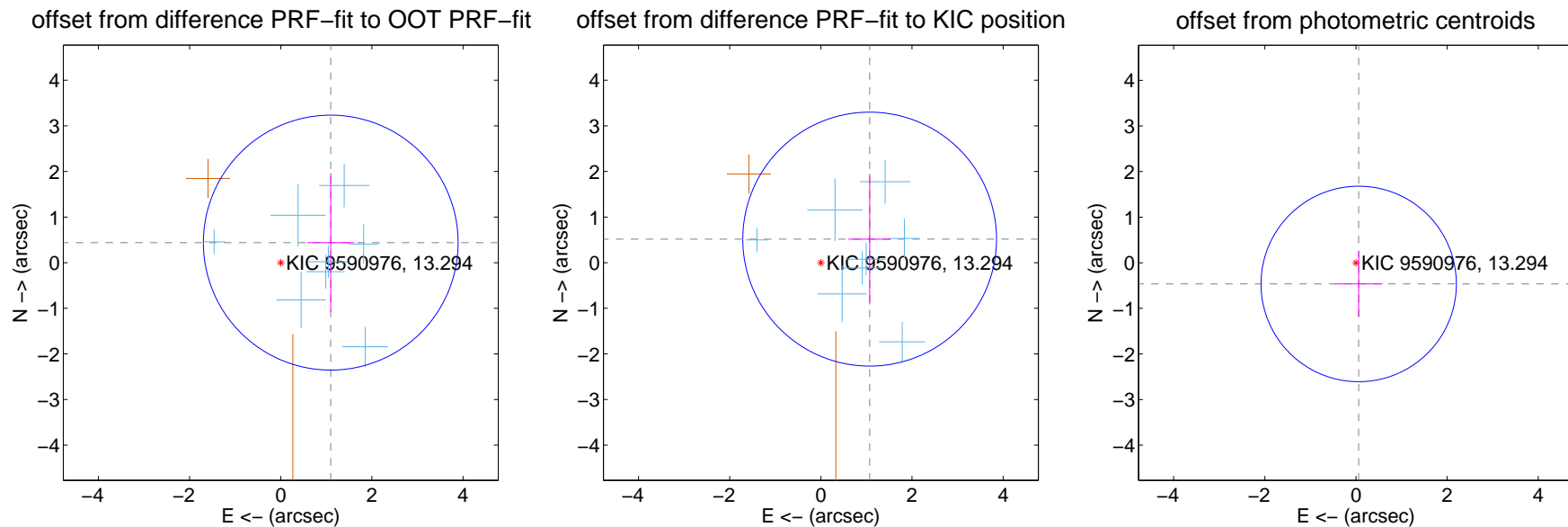
## DV Centroid Data

Supplemental centroid analysis for 009590976-03. Kepler magnitude: 13.29. Transit SNR 16.54

There are 9 quarters with good PRF difference image offsets

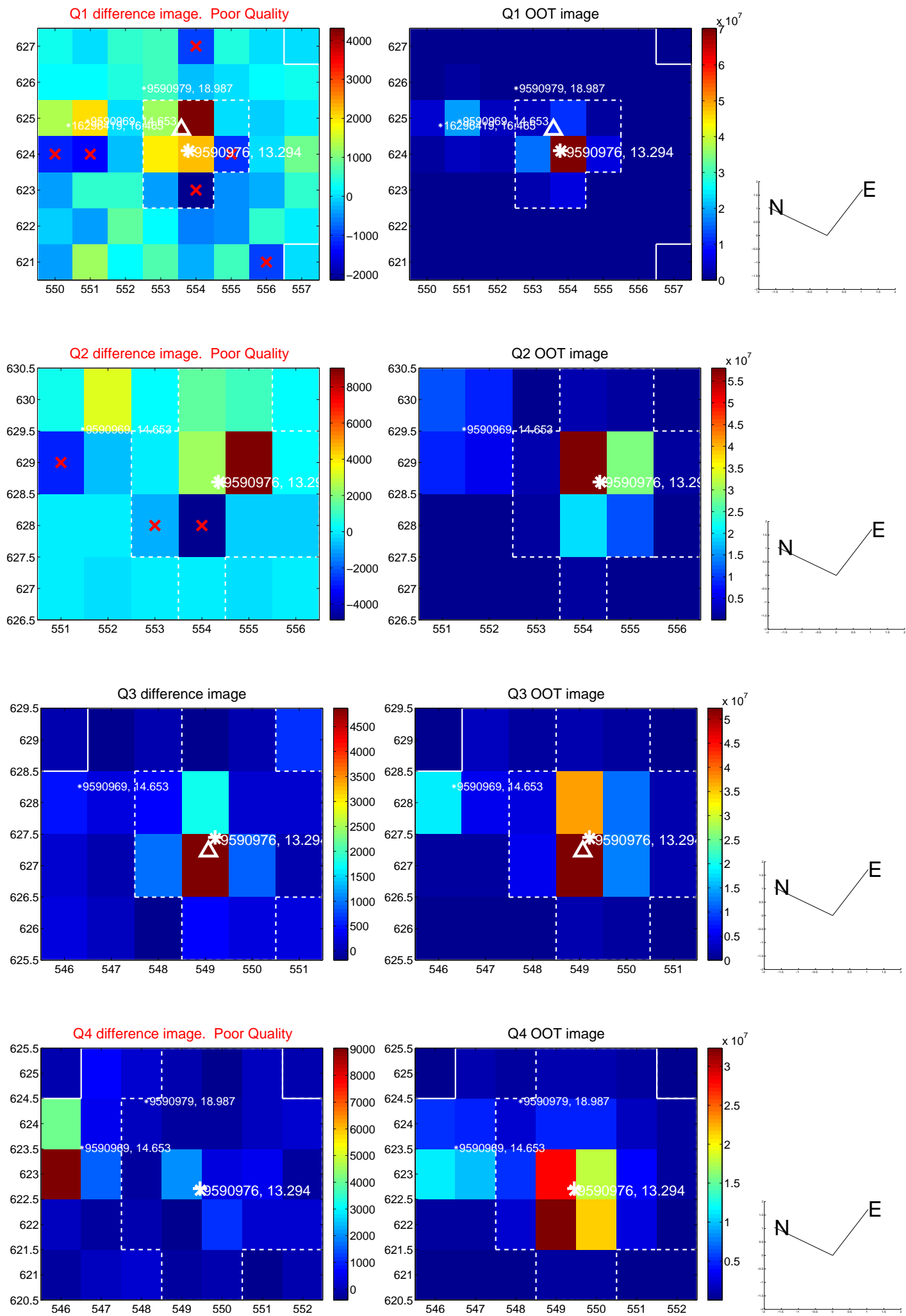
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.182 \pm 0.931$	1.27	$-1.097 \pm 0.517$	$0.440 \pm 1.521$
PRF-fit source offset from KIC position	$1.189 \pm 0.928$	1.28	$-1.070 \pm 0.466$	$0.517 \pm 1.431$
photometric centroid source offset	$0.47 \pm 0.71$	0.66	$-0.06 \pm 0.52$	$-0.46 \pm 0.72$

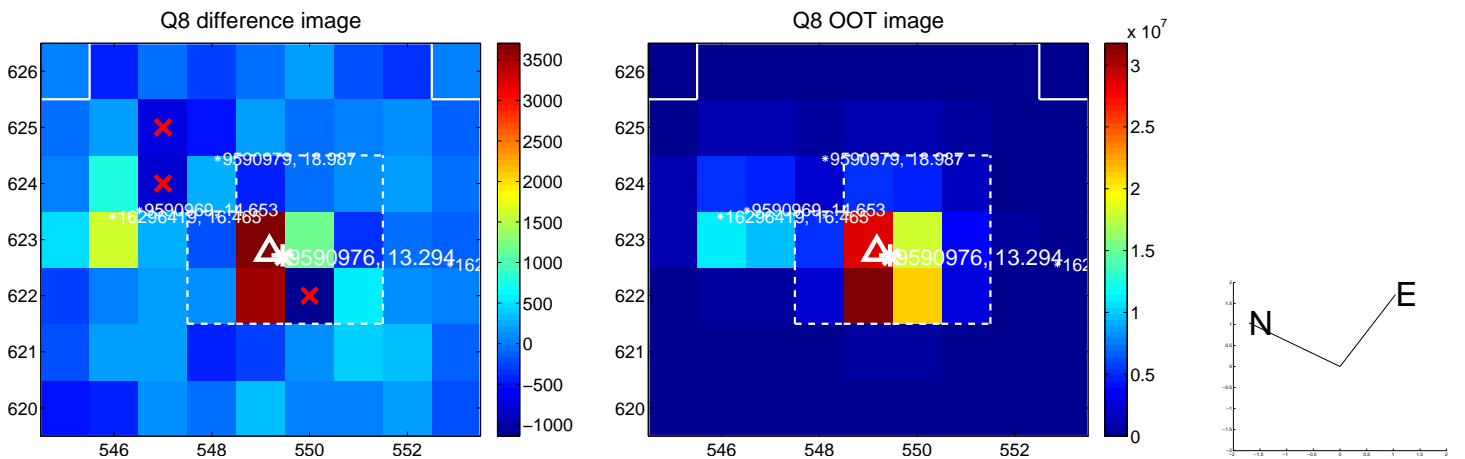
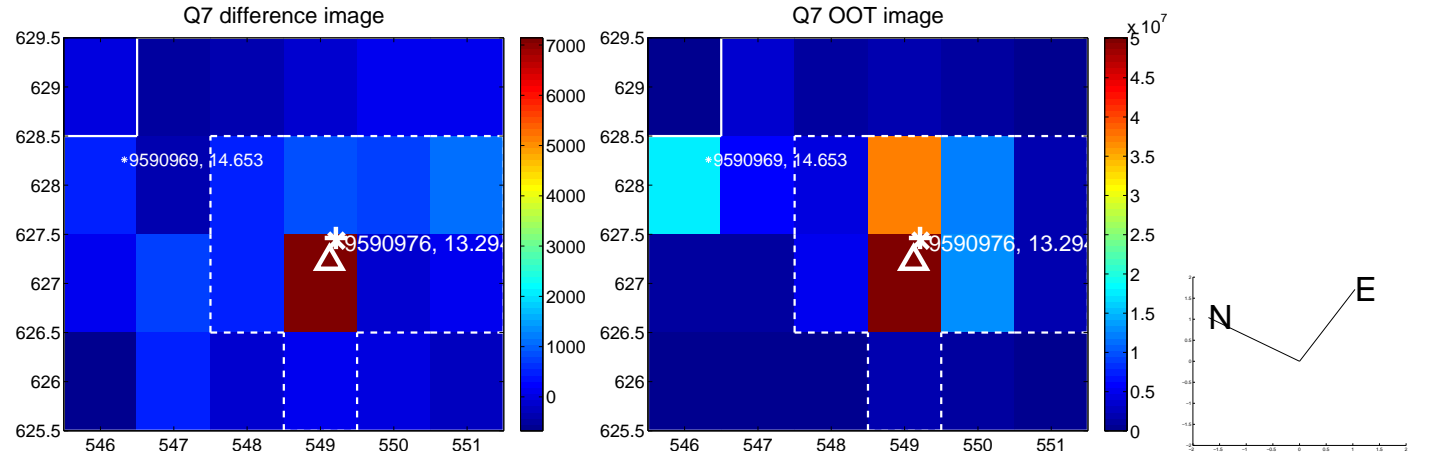
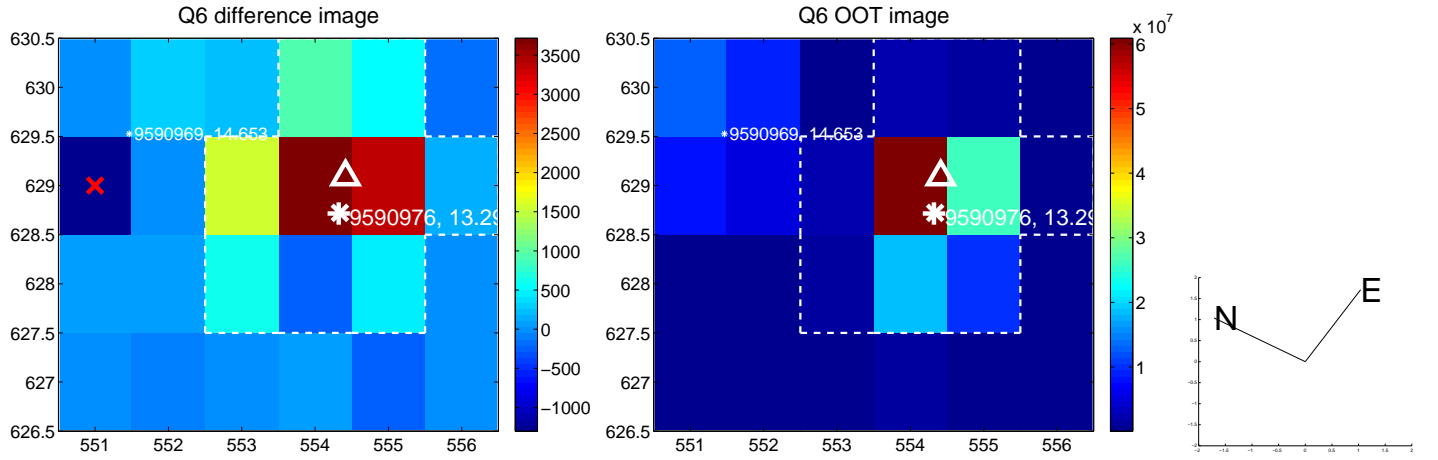
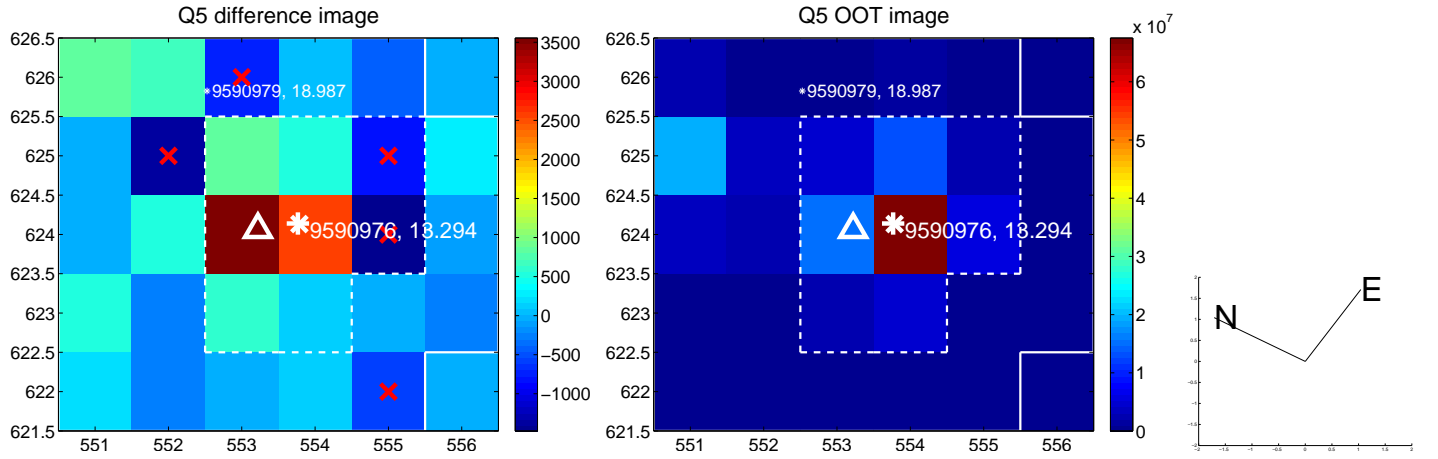


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

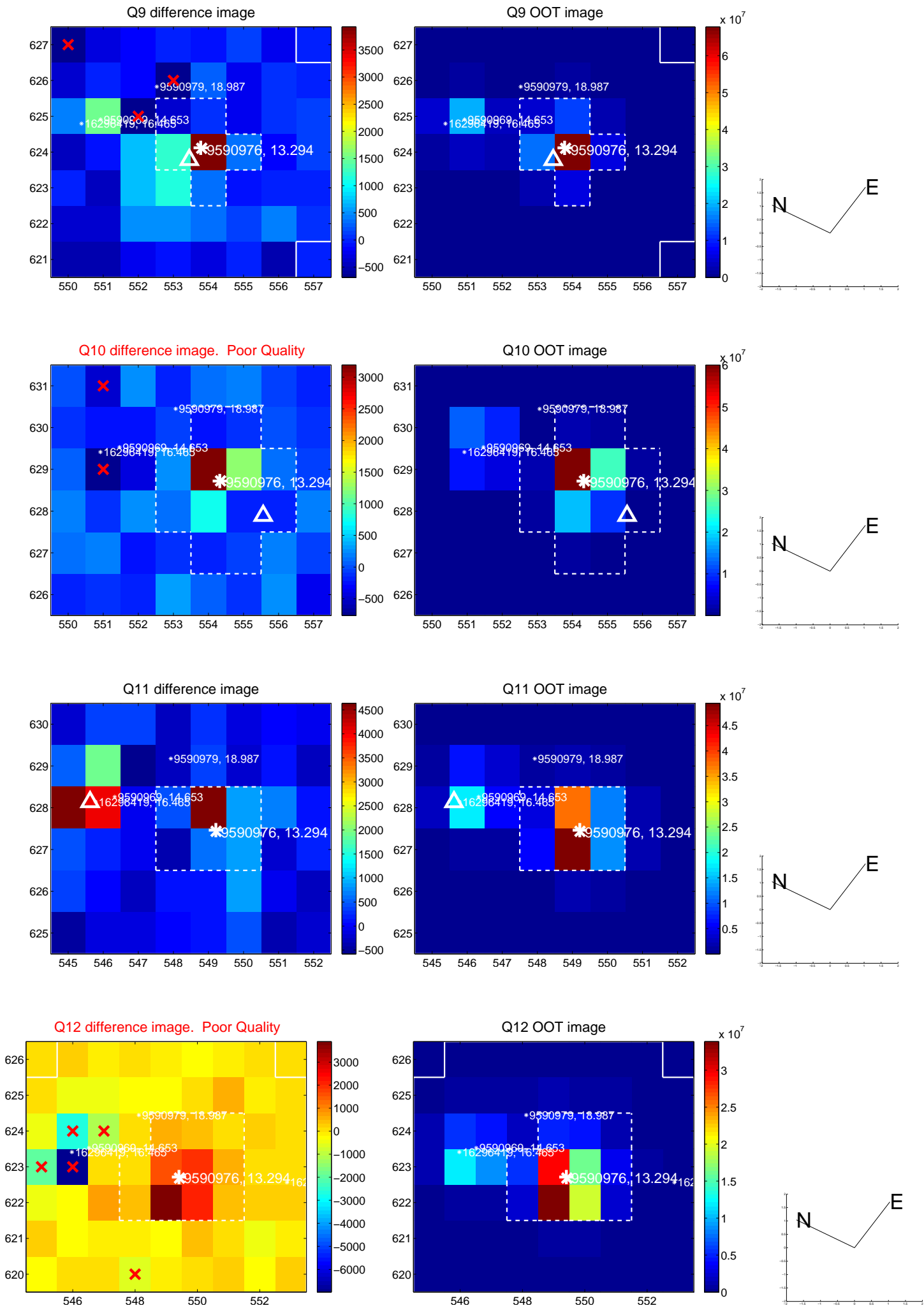


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

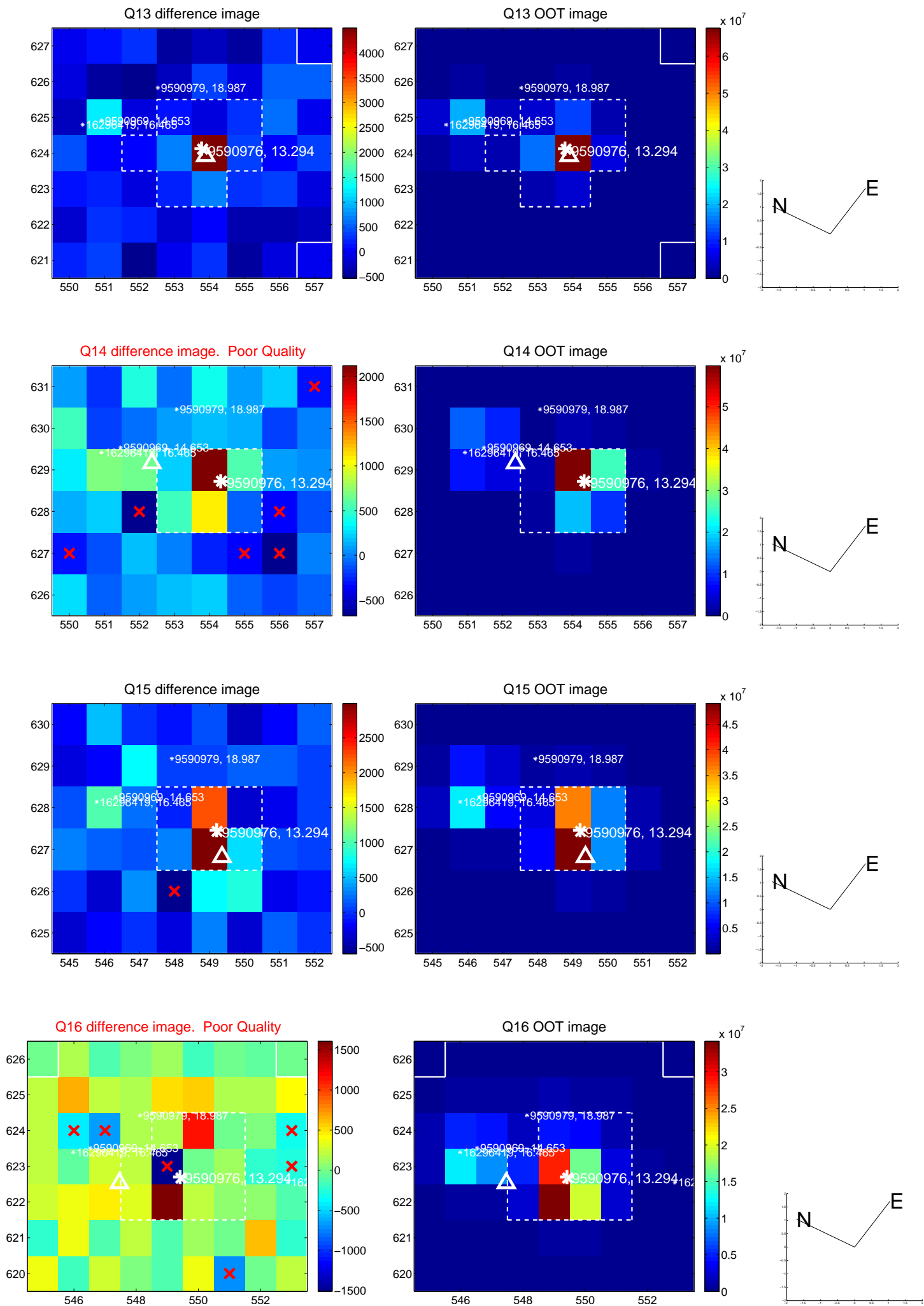




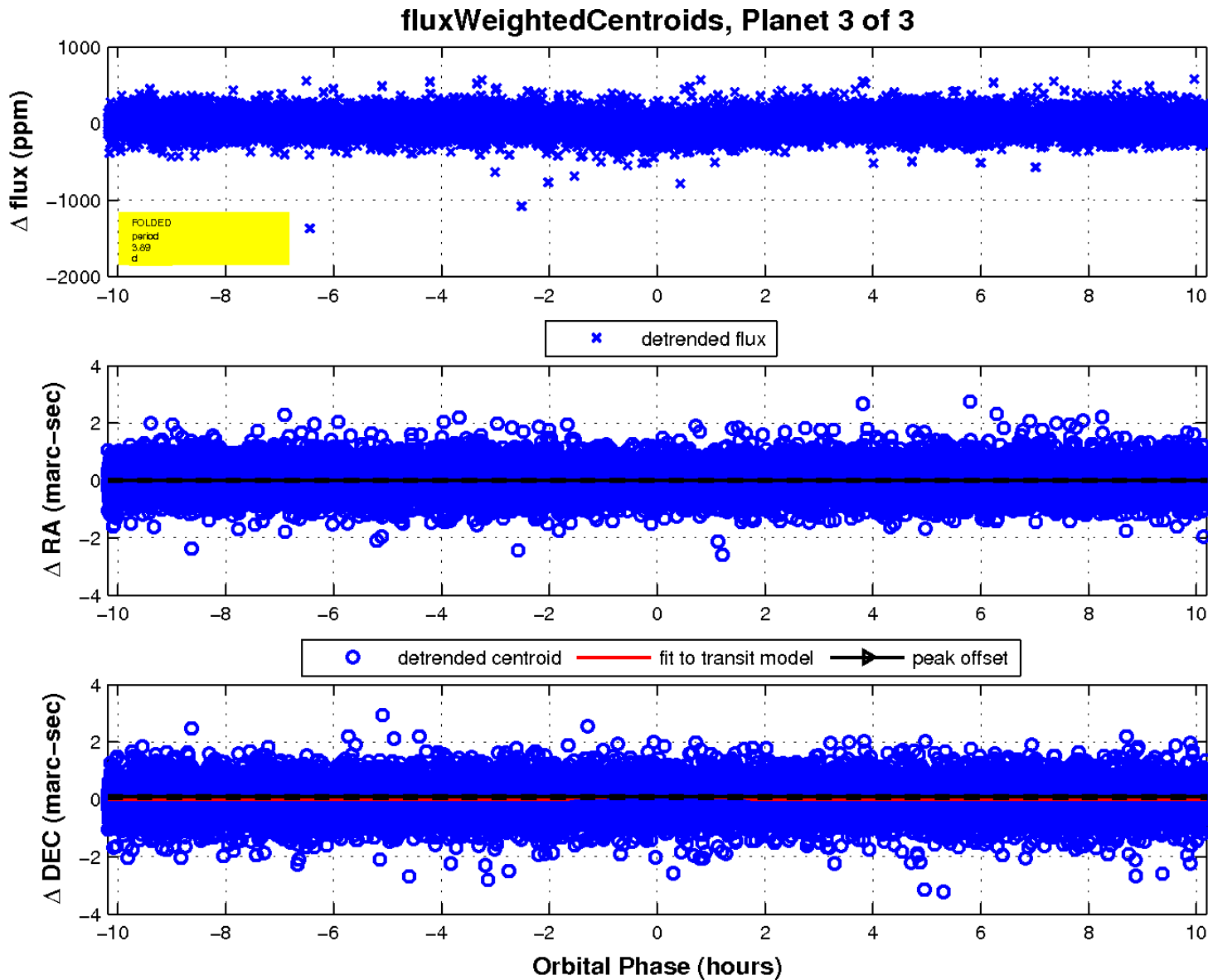
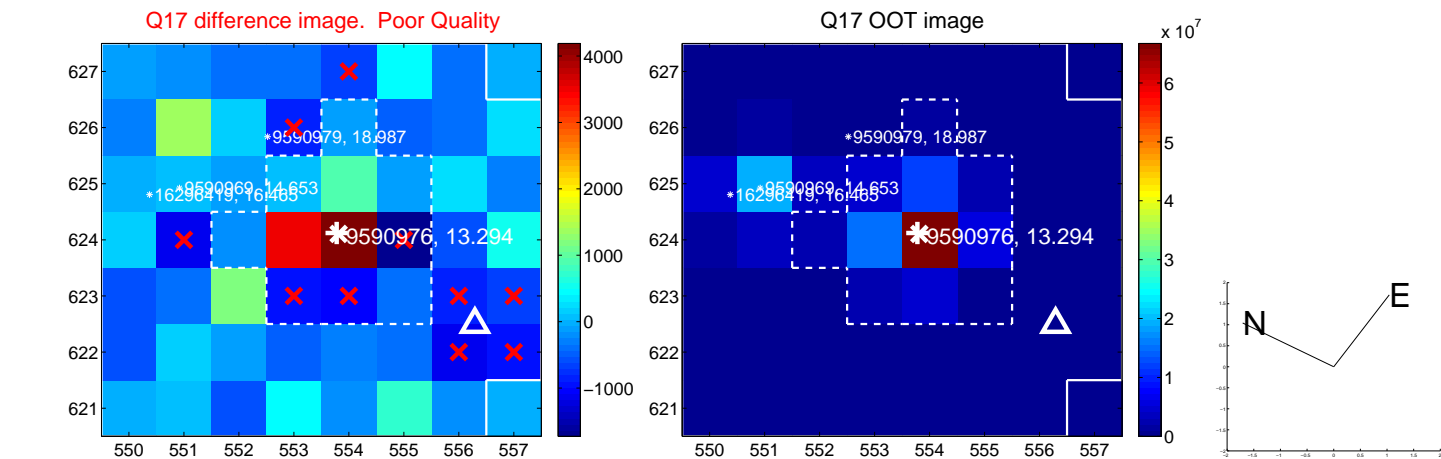
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

