

# KIC 005621333

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005621333-01	OBS	3341.01	27.096805	139.342734	197.4	9.042	14.7	14.5	1.35	5775	2.30	56.91
005621333-02	OBS	3341.02	11.547510	139.977533	108.3	6.856	9.8	10.6	1.35	5775	1.66	177.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005621333-01	OBS	PC	0.98	0	0	0	0	NO_COMMENT
005621333-02	OBS	PC	0.94	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.

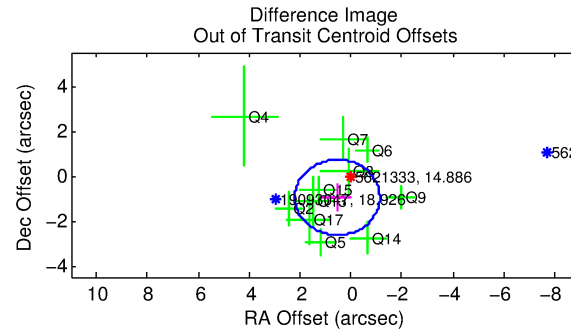
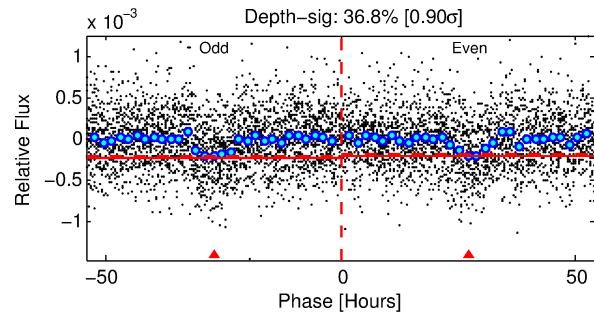
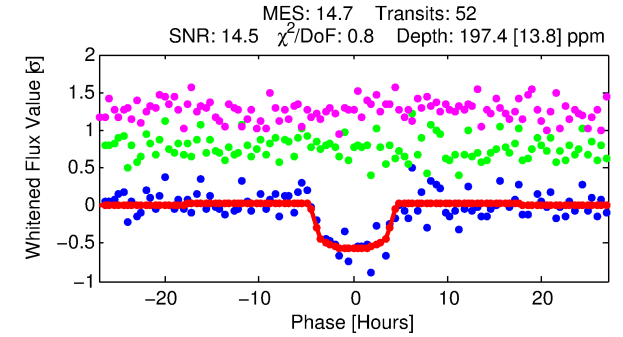
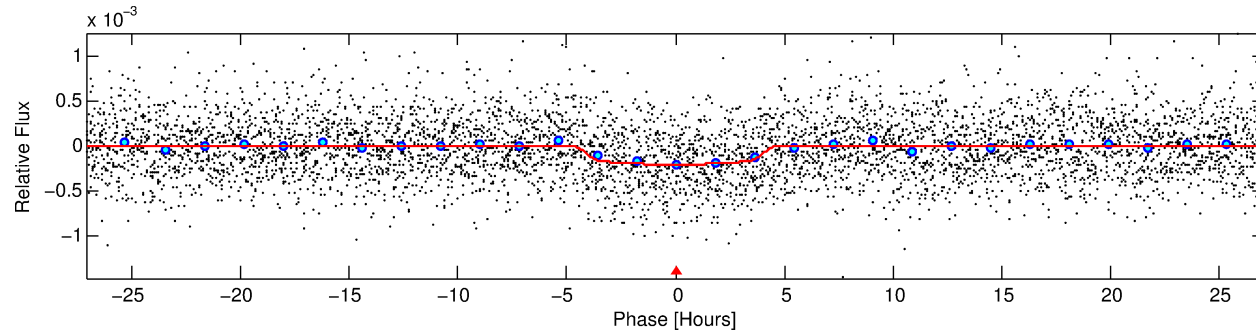
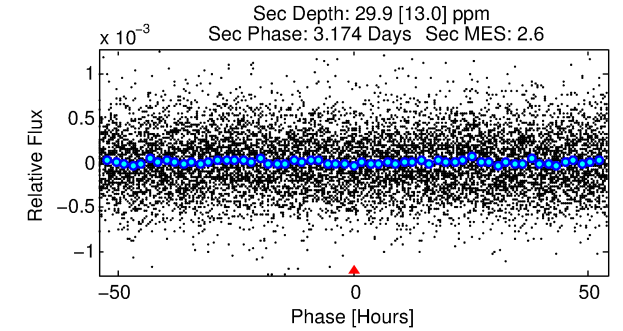
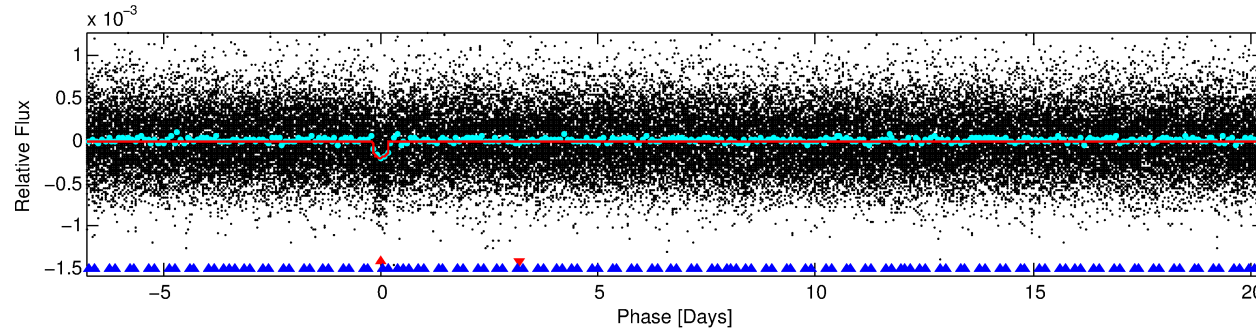
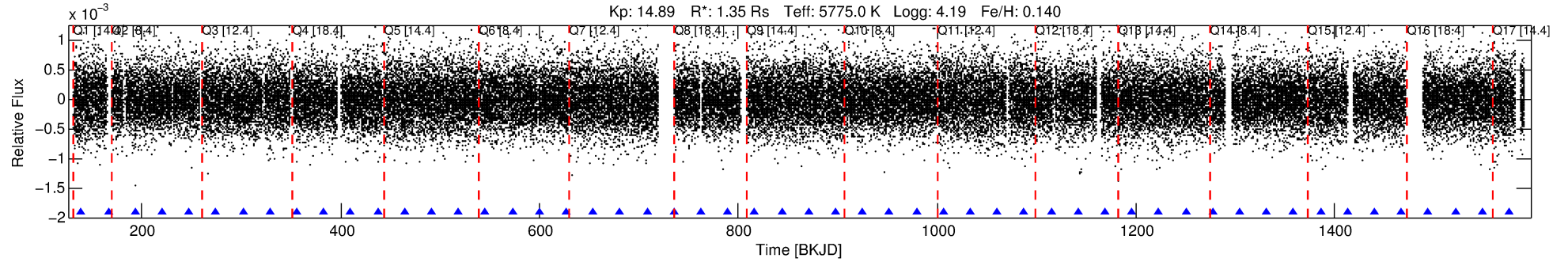
## Ephemeris Match Information For 005621333-01

No Significant Match Found

# DV One-Page Summary

KIC: 5621333 Candidate: 1 of 2 Period: 27.097 d

KOI: K03341.01 Corr: 0.959



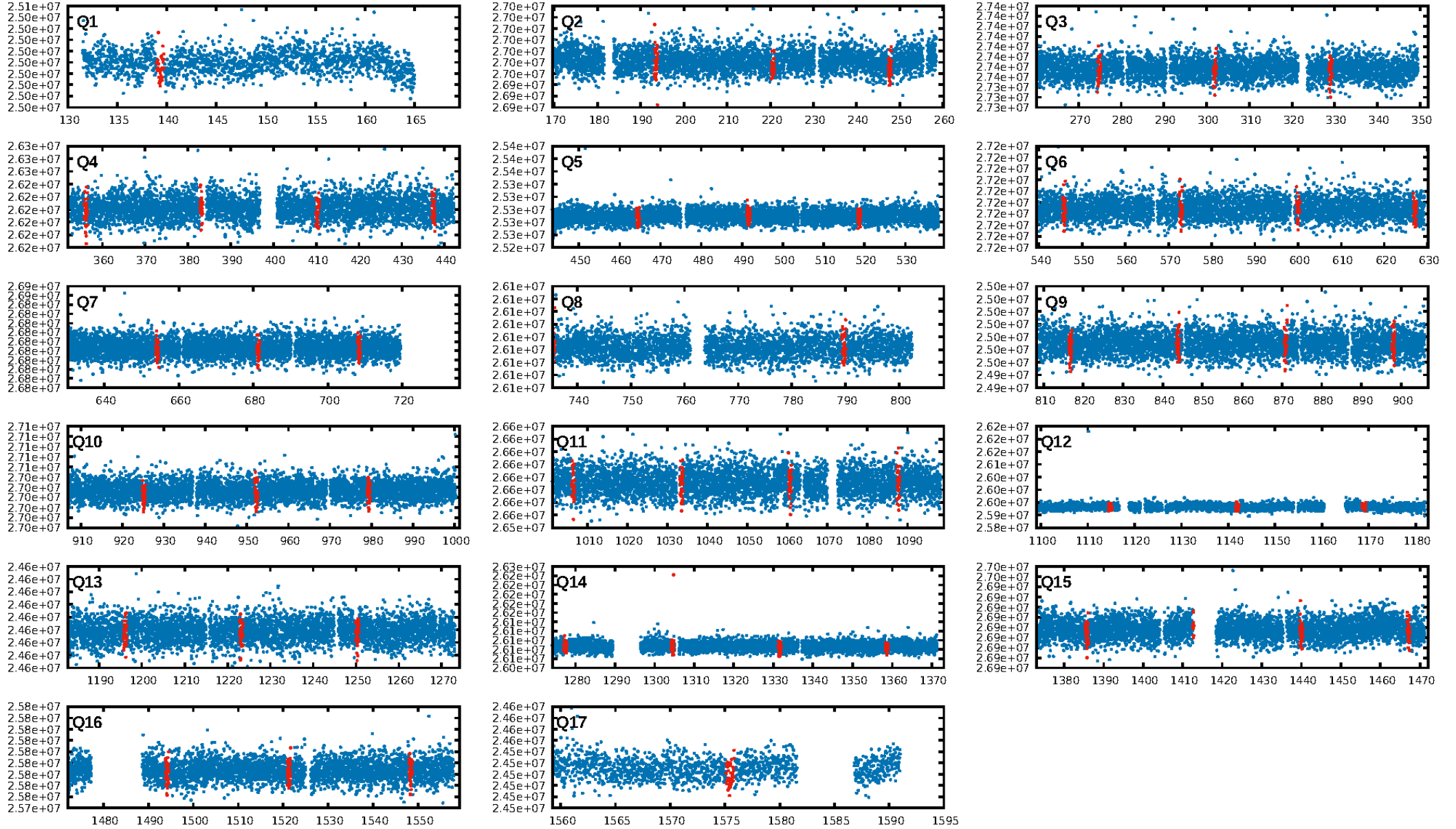
## DV Fit Results:

Period = 27.09680 [0.00039] d  
Epoch = 139.3427 [0.0120] BKJD  
Rp/R\* = 0.0156 [0.0018]  
a/R\* = 10.02 [5.14]  
b = 0.92 [0.09]  
Seff = 56.91 [16.32]  
Teq = 700 [50] K  
Rp = 2.30 [0.53] Re  
a = 0.1789 [0.0325] AU  
Ag = 99.41 [56.33] [1.75σ]  
Teffp = 3419 [423] K [6.39σ]

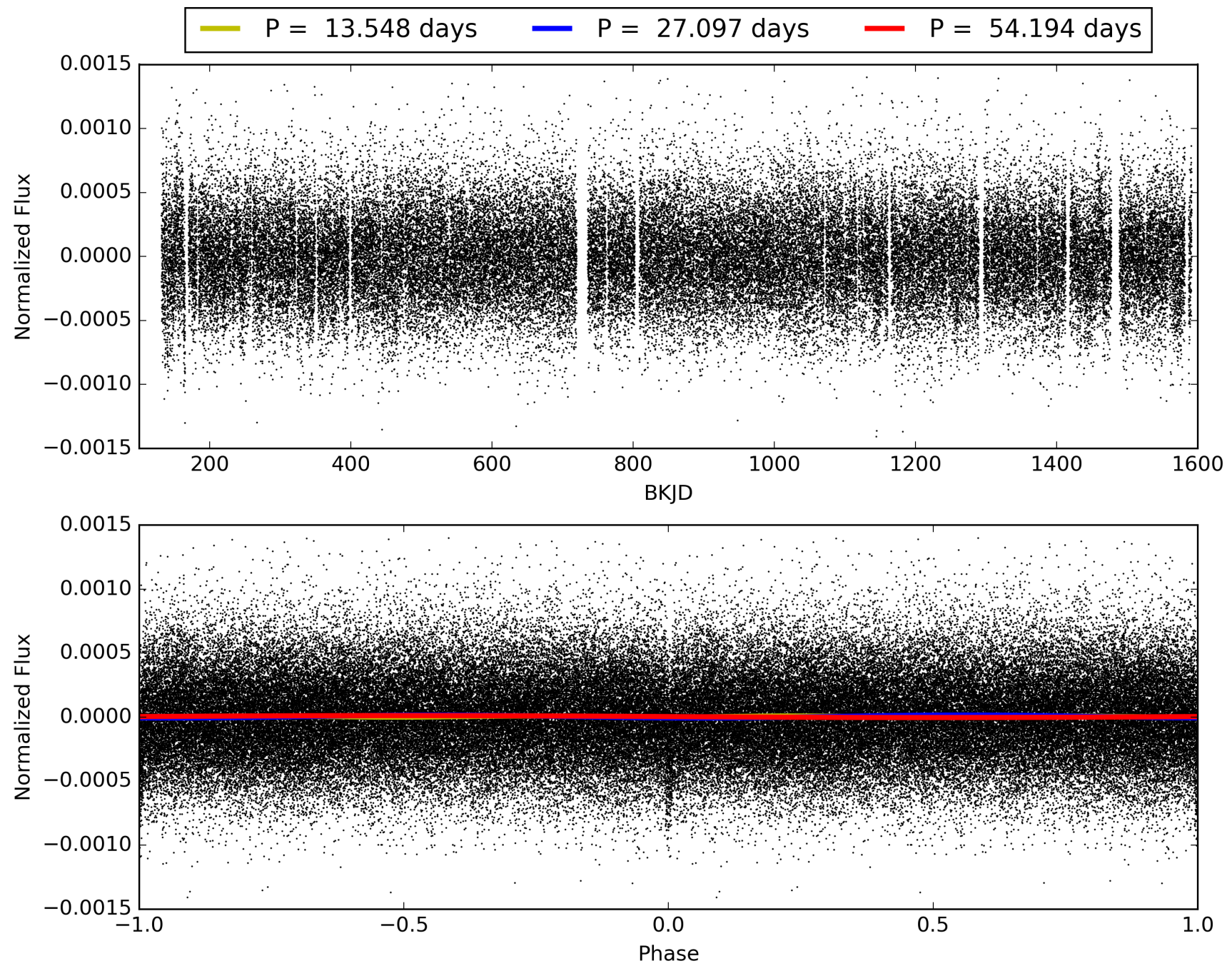
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [32.89σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 61.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.06e-49  
RollingBand-fgt: 1.00 [50/50]  
GhostDiagnostic-chr: 2.157  
Centroid-sig: 5.3%  
Centroid-so: 0.357 arcsec [0.46σ]  
OotOffset-rm: 1.099 arcsec [1.97σ]  
OotOffset-st: 3/2/2/4 [11]  
KicOffset-rm: 1.055 arcsec [1.92σ]  
KicOffset-st: 3/2/2/4 [11]  
DiffImageQuality-fgm: 0.64 [7/11]  
DiffImageOverlap-fno: 0.94 [16/17]

# TCE 005621333-01, PDC Light Curves



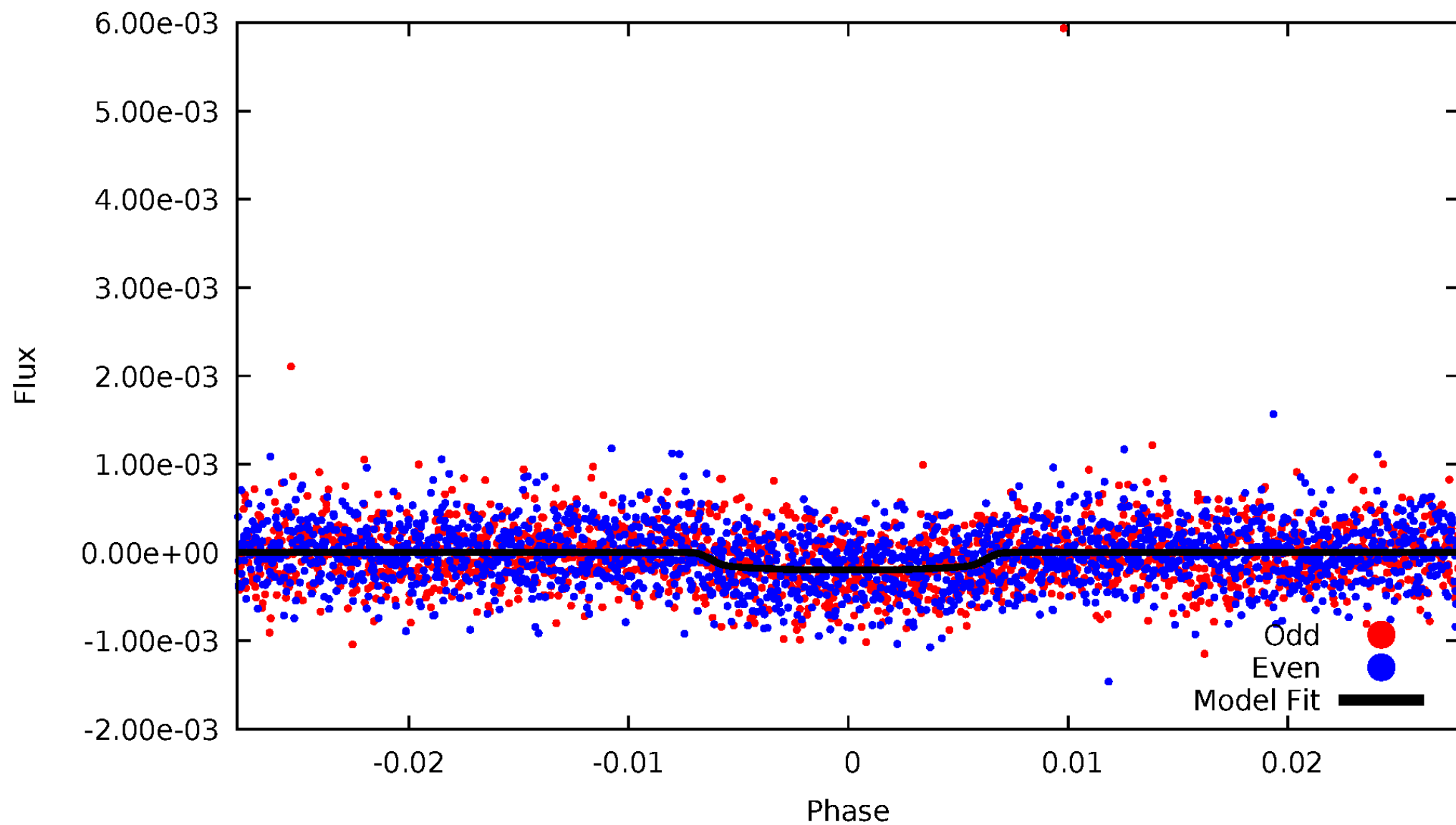
TCE 005621333-01





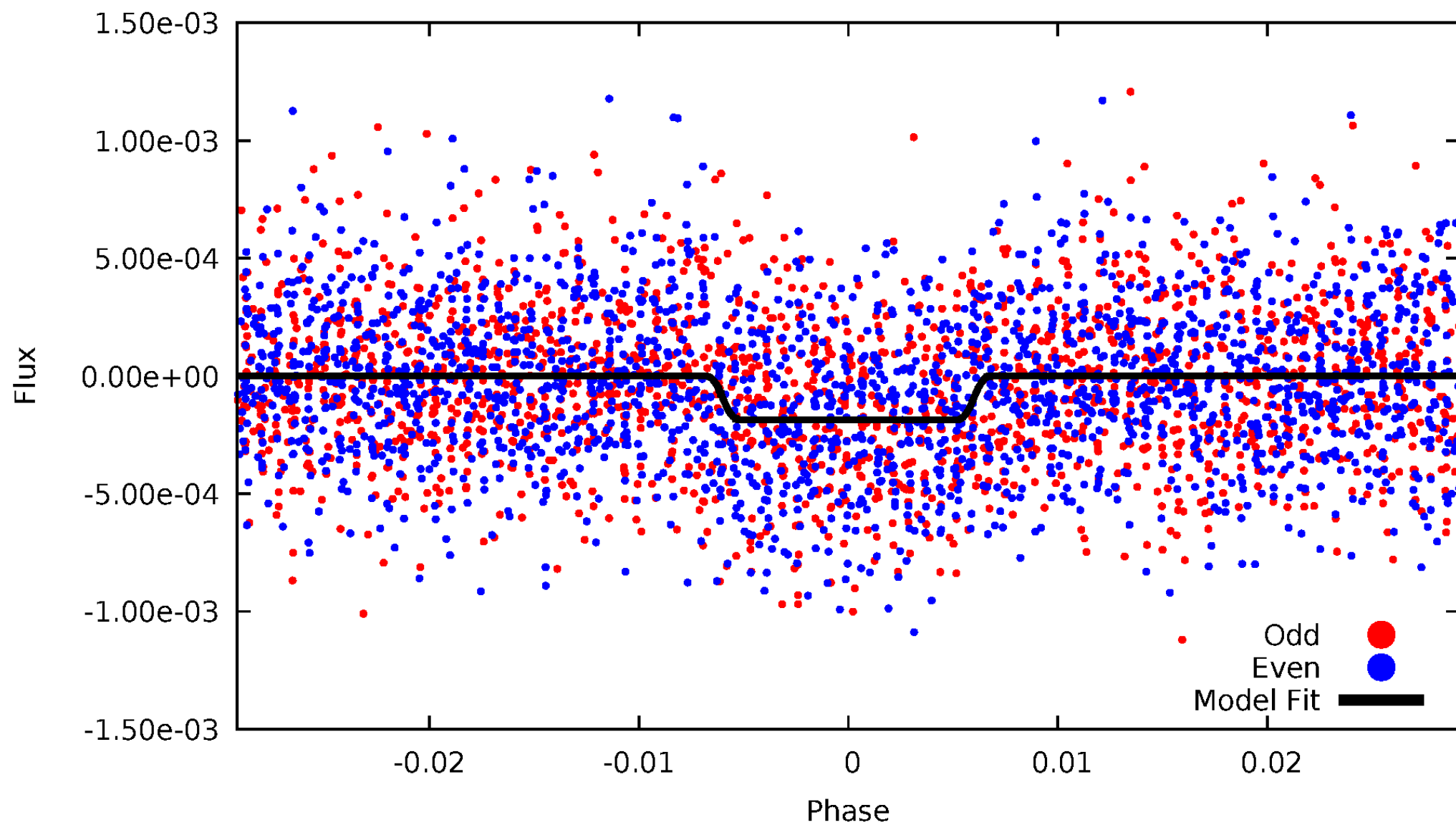
# DV Odd/Even

TCE 005621333-01



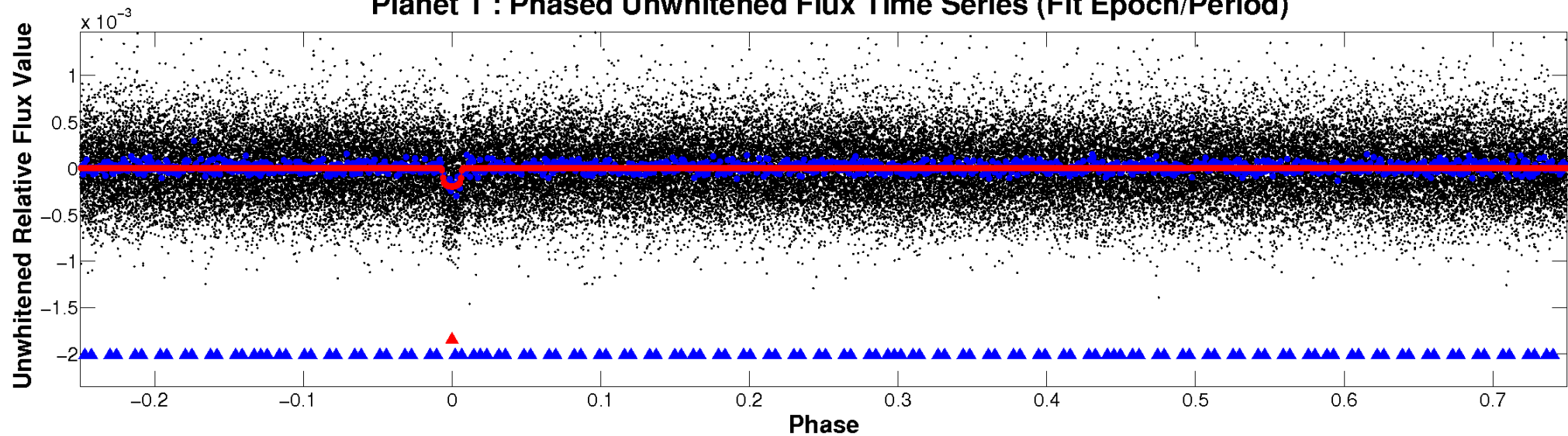
# ALT Odd/Even

TCE 005621333-01

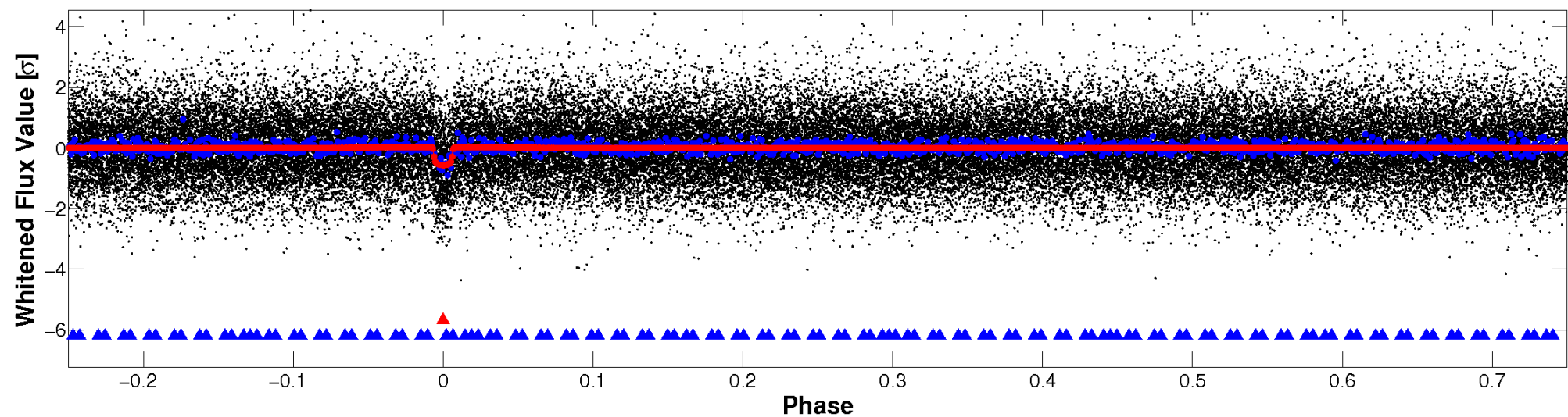


# Non-Whitened Vs. Whitened Light Curve

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

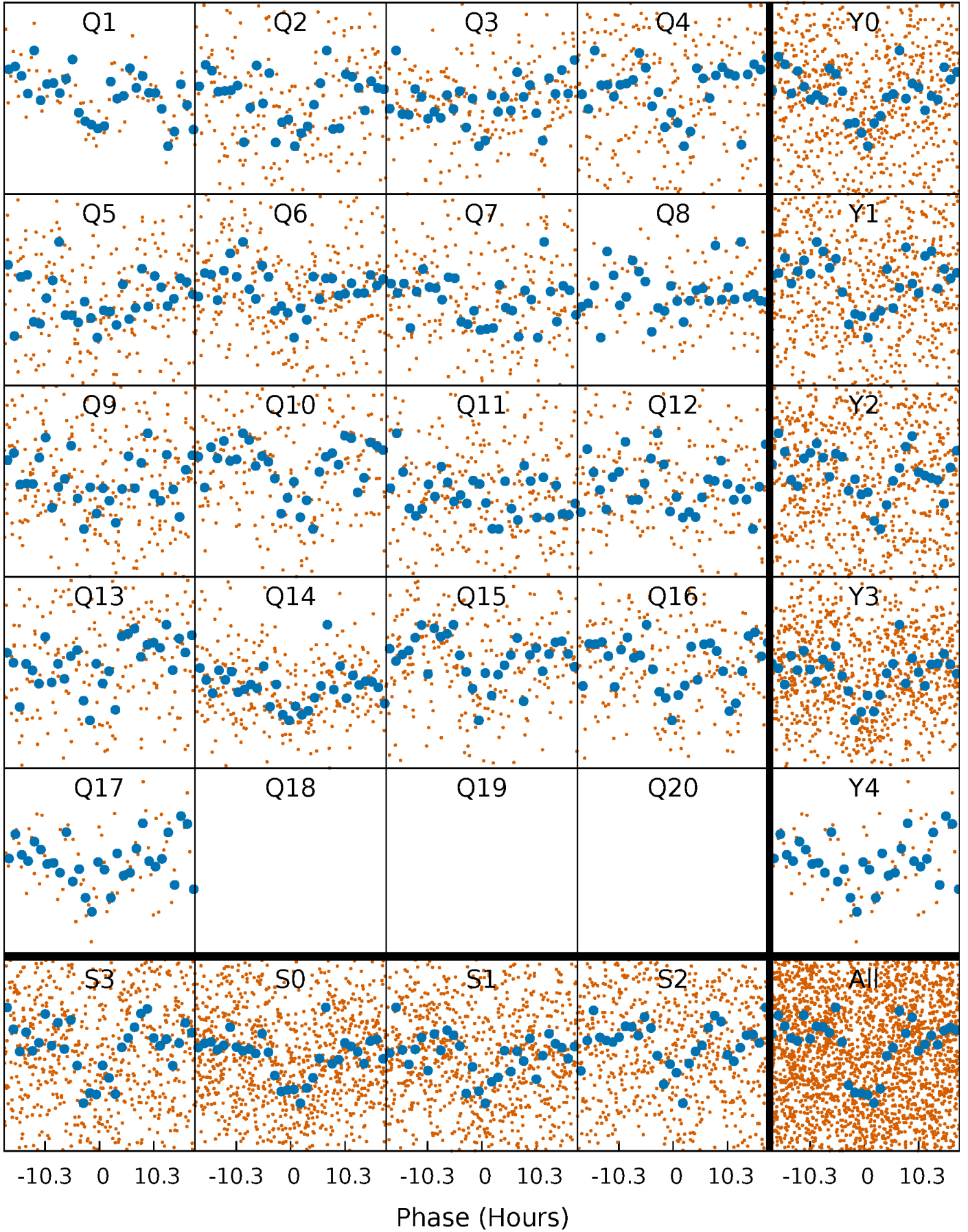


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

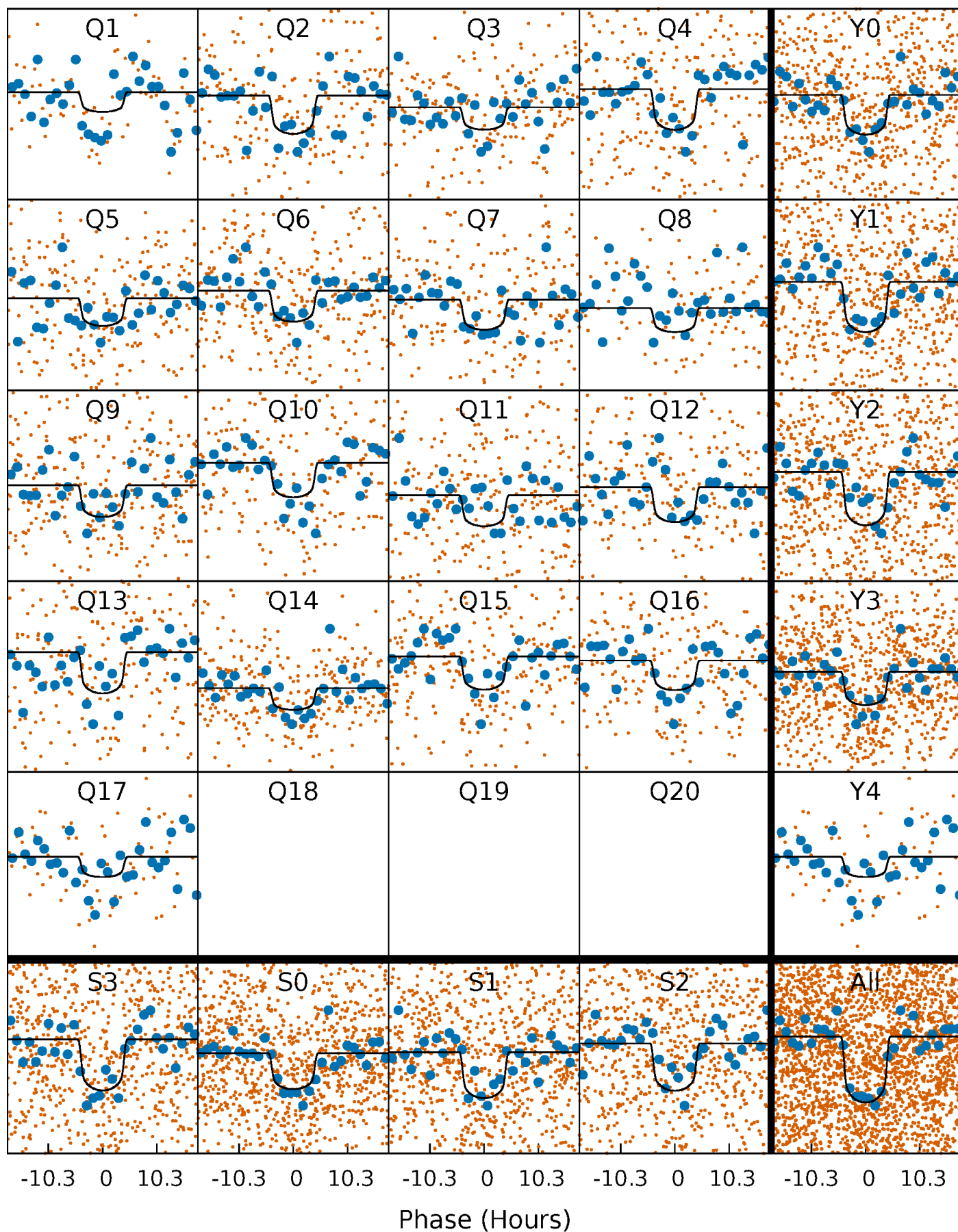
TCE 005621333-01   P= 27.096805 Days    $T_0=139.342734$  (BKJD)





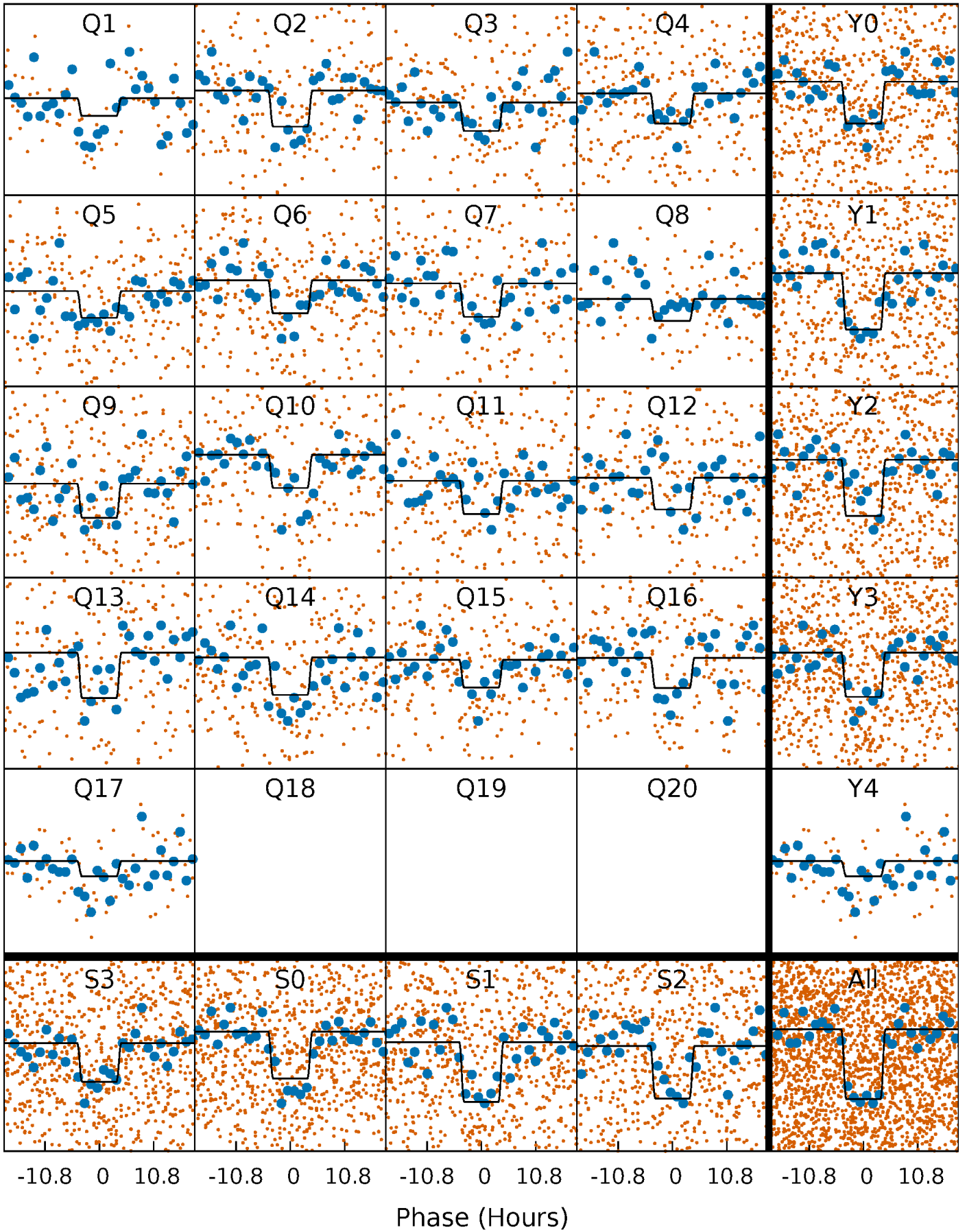
# DV Quarter-Phased Transit Curves

TCE 005621333-01 P= 27.096805 Days  $T_0=139.342734$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

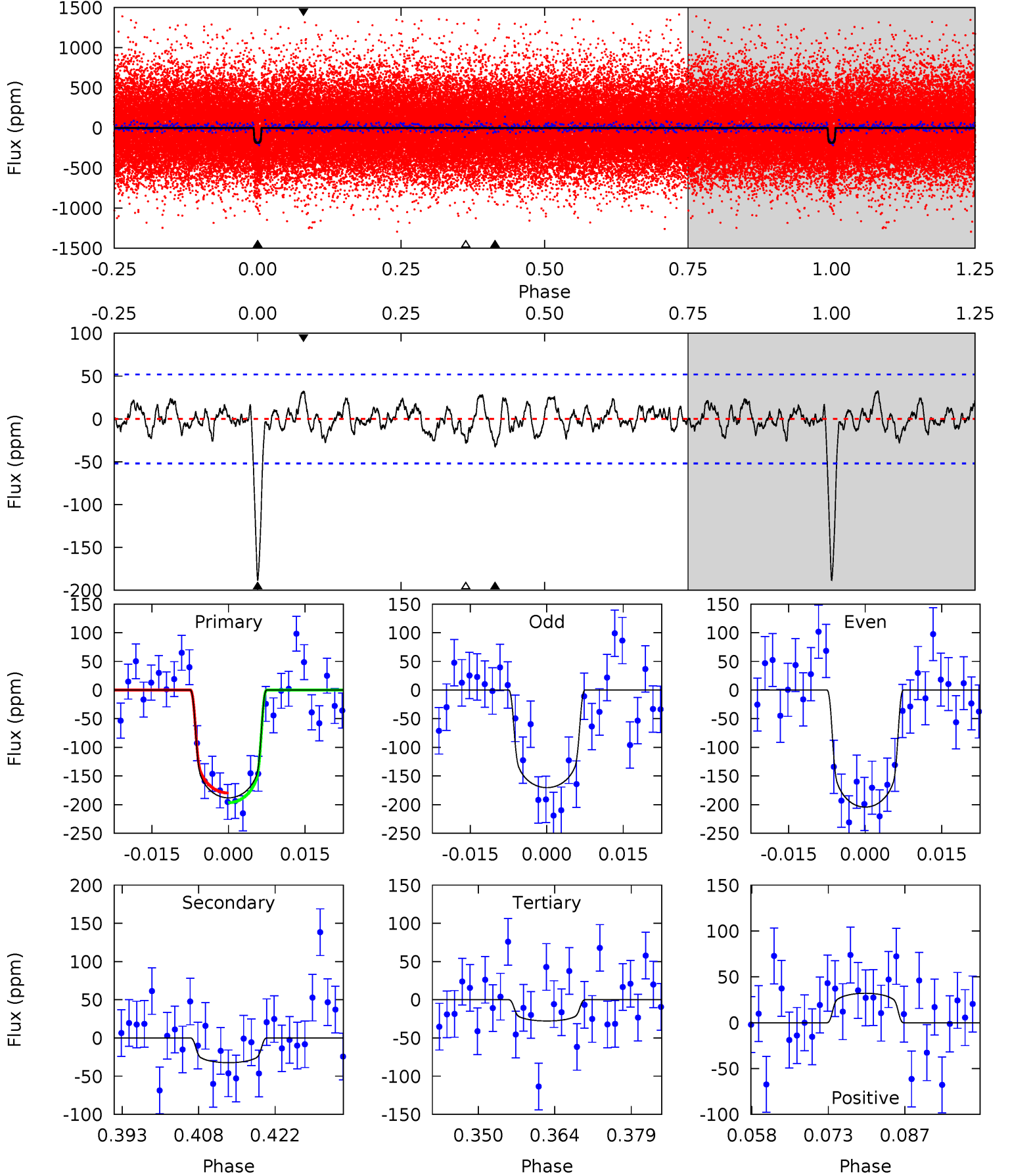
TCE 005621333-01 P= 27.096503 Days  $T_0=139.360638$  (BKJD)



# DV Model-Shift Uniqueness Test

005621333-01, P = 27.096805 Days, E = 112.245929 Days

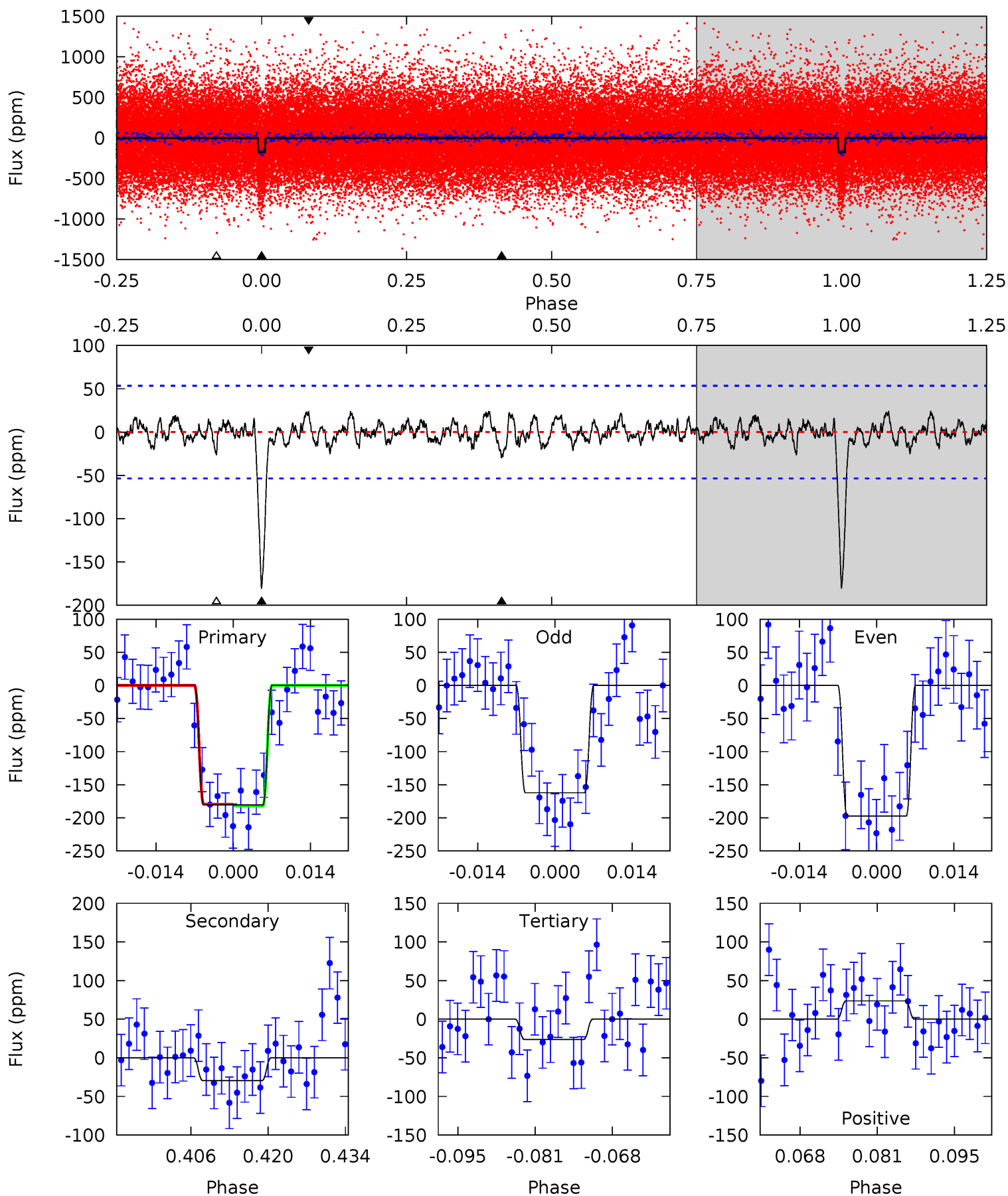
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.0	3.09	2.65	3.06	4.95	2.44	1.11	15.3	14.9	0.44	0.03	1.63	1.02	0.15	0.81



# Alt Model-Shift Uniqueness Test

005621333-01, P = 27.096503 Days, E = 112.264135 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
16.8	2.74	2.44	2.20	4.97	2.47	0.87	14.3	14.6	0.30	0.54	1.64	0.95	0.12	0.11



### Stellar Parameters For KIC 005621333

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5775^{+78}_{-78}$	$4.193^{+0.162}_{-0.108}$	$0.140^{+0.150}_{-0.150}$	$1.352^{+0.219}_{-0.268}$	$1.038^{+0.090}_{-0.065}$	$0.592^{+0.481}_{-0.194}$
	+1%/-1%	+4%/-3%	+107%/-107%	+16%/-20%	+9%/-6%	+81%/-33%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 005621333-01 / KOI 3341.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-32 \pm 10$	$2.26^{+0.37}_{-0.35}$	$974^{+44}_{-53}$	$3834^{+278}_{-262}$	$110^{+58}_{-43}$
Alt.	$-29 \pm 11$	$1.99^{+0.36}_{-0.31}$	$975^{+44}_{-49}$	$3963^{+309}_{-348}$	$129^{+78}_{-54}$

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



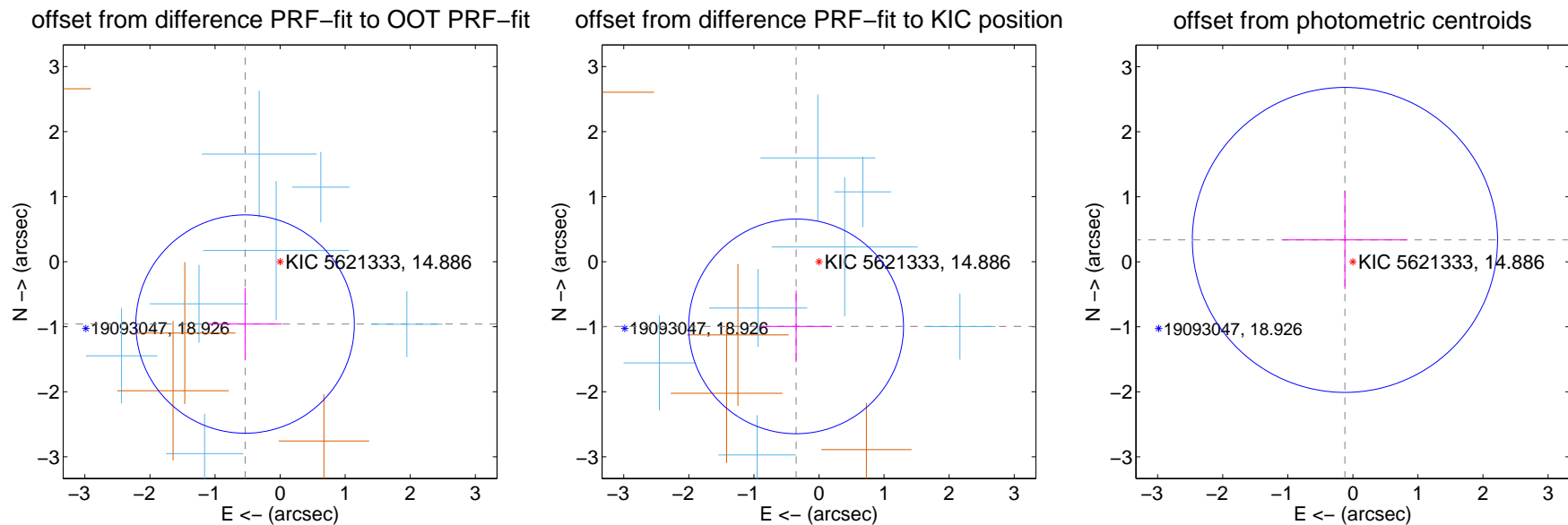
## DV Centroid Data

Supplemental centroid analysis for 005621333-01. Kepler magnitude: 14.89. Transit SNR 14.46

There are 7 quarters with good PRF difference image offsets

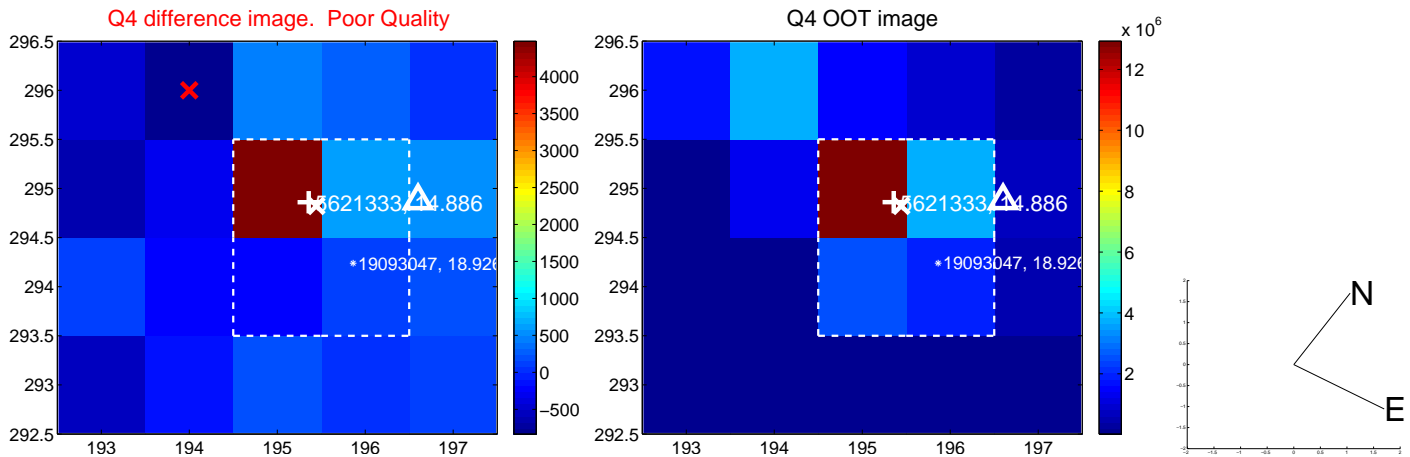
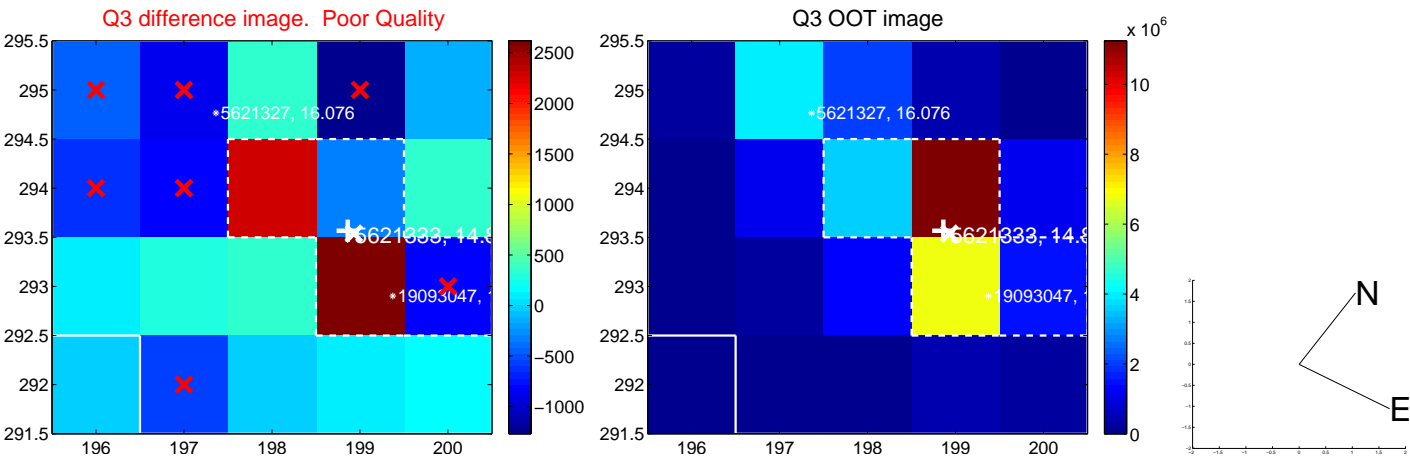
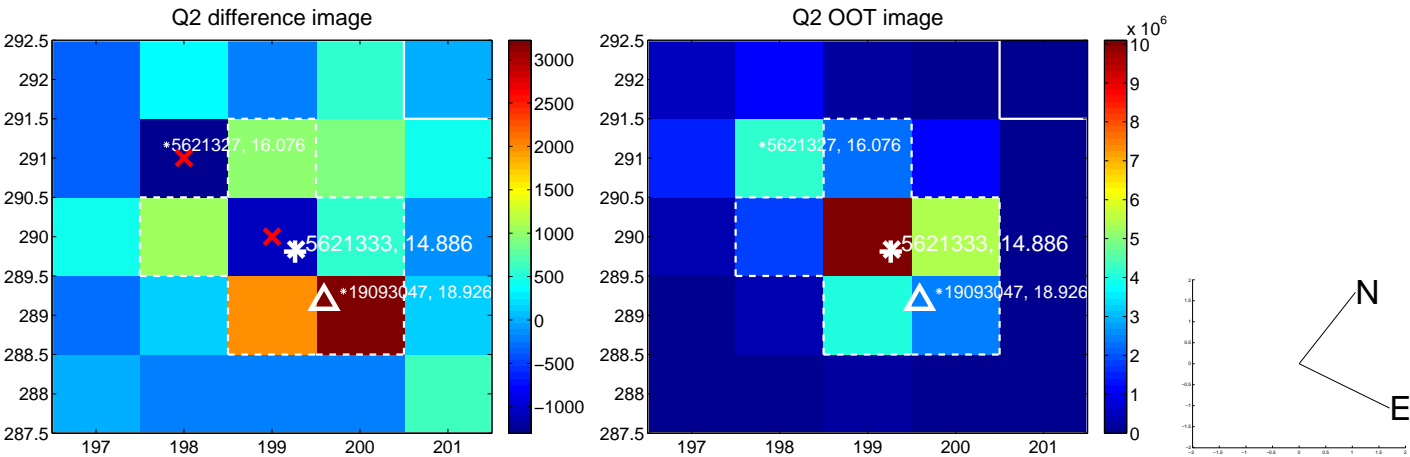
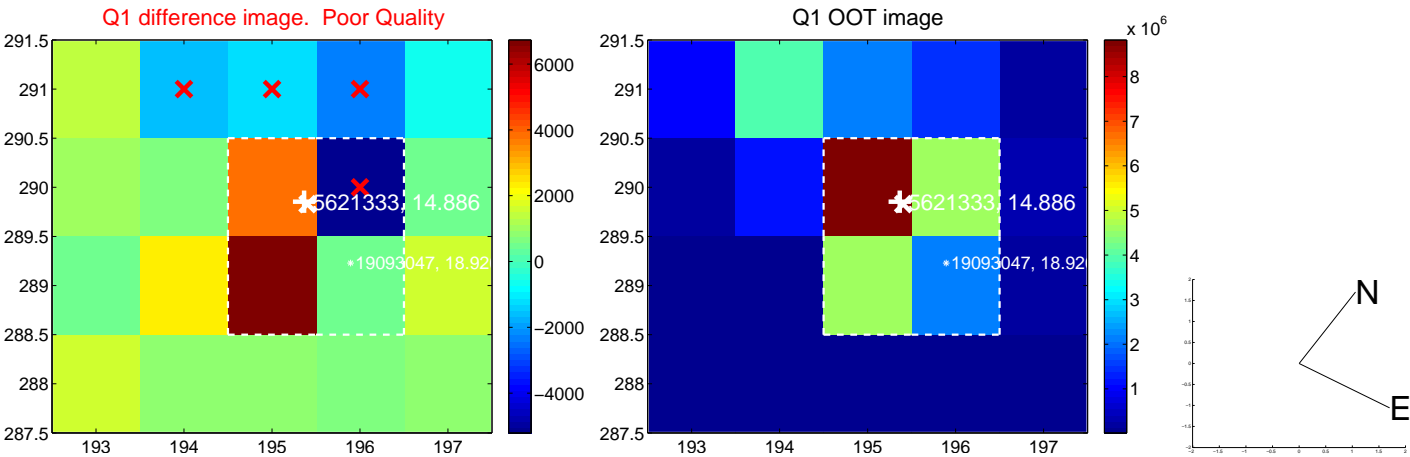
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.099 \pm 0.559$	1.97	$0.538 \pm 0.564$	$-0.959 \pm 0.558$
PRF-fit source offset from KIC position	$1.055 \pm 0.550$	1.92	$0.352 \pm 0.551$	$-0.994 \pm 0.550$
photometric centroid source offset	$0.36 \pm 0.78$	0.46	$0.12 \pm 0.96$	$0.34 \pm 0.76$

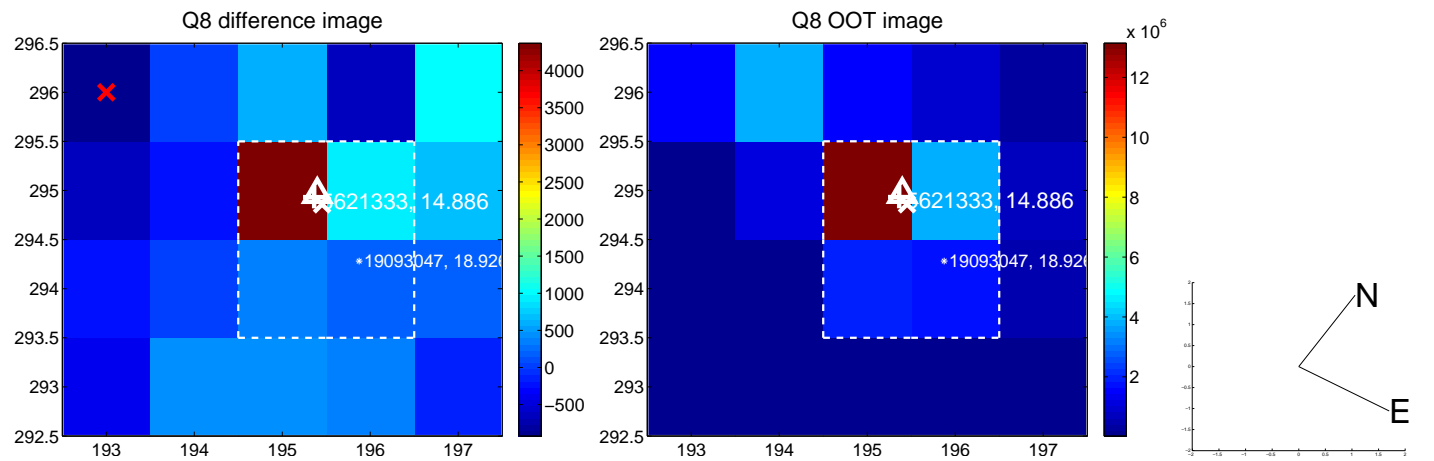
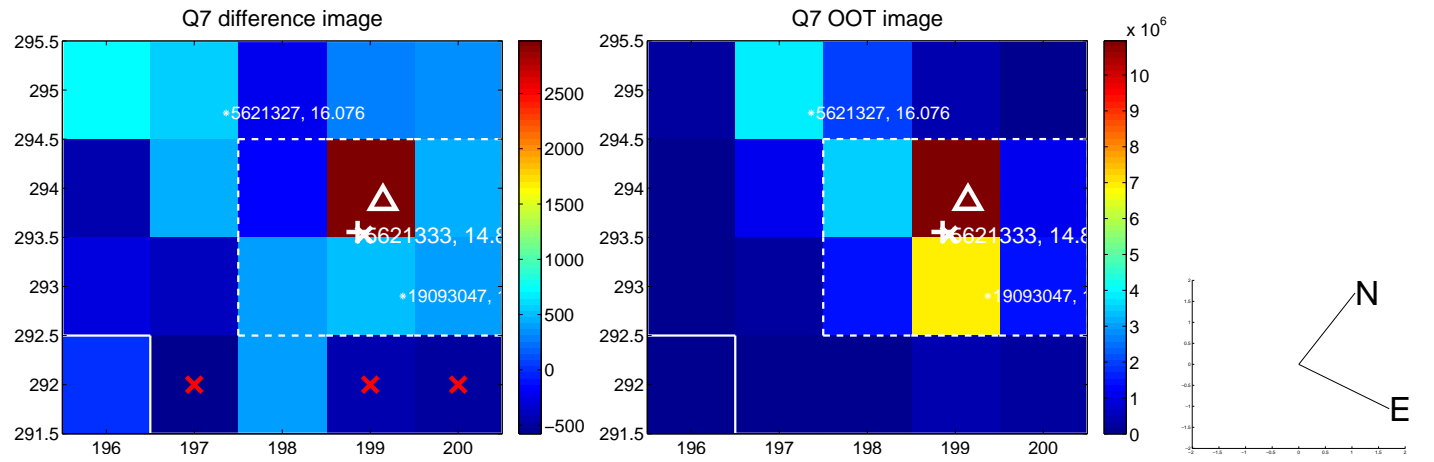
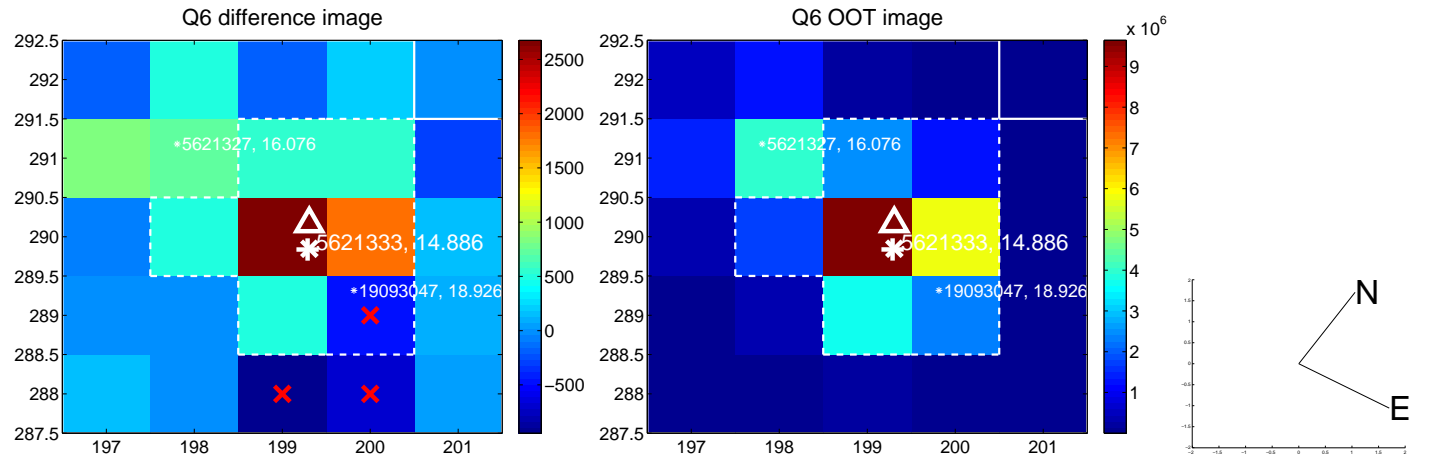
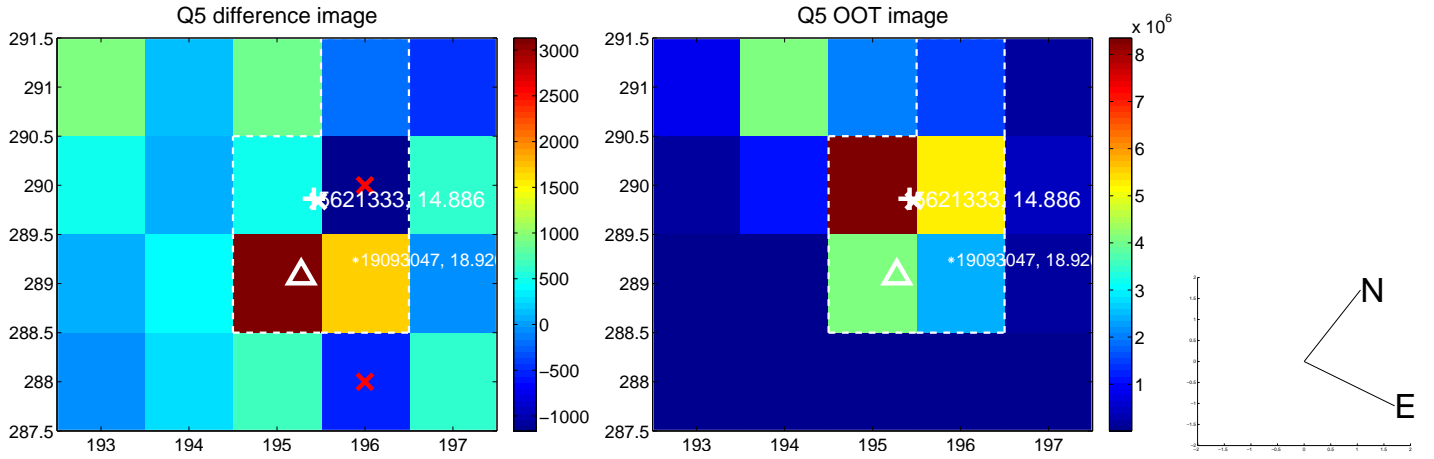


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

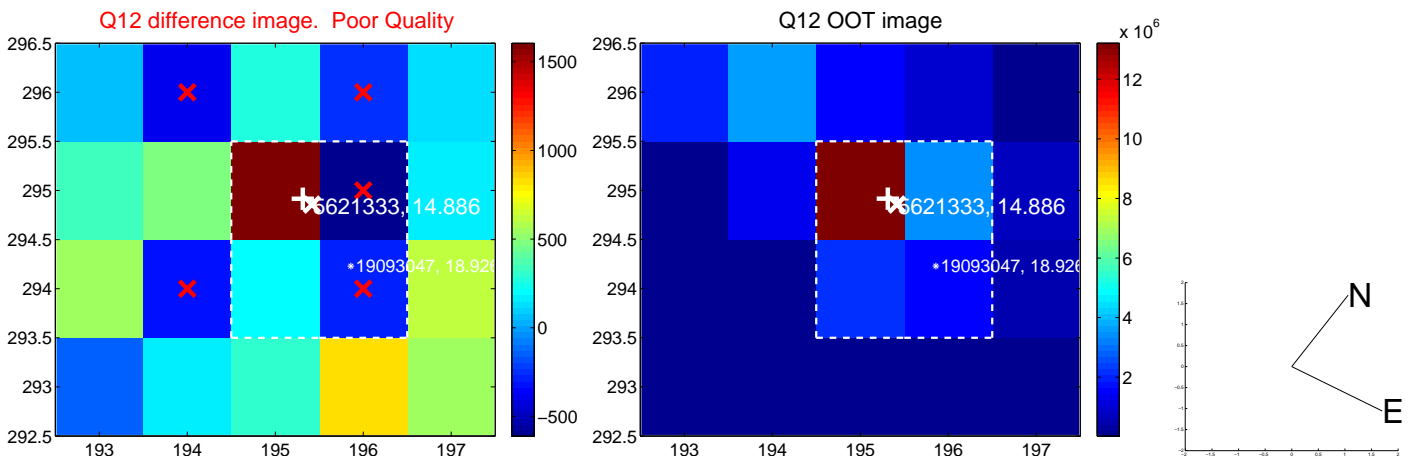
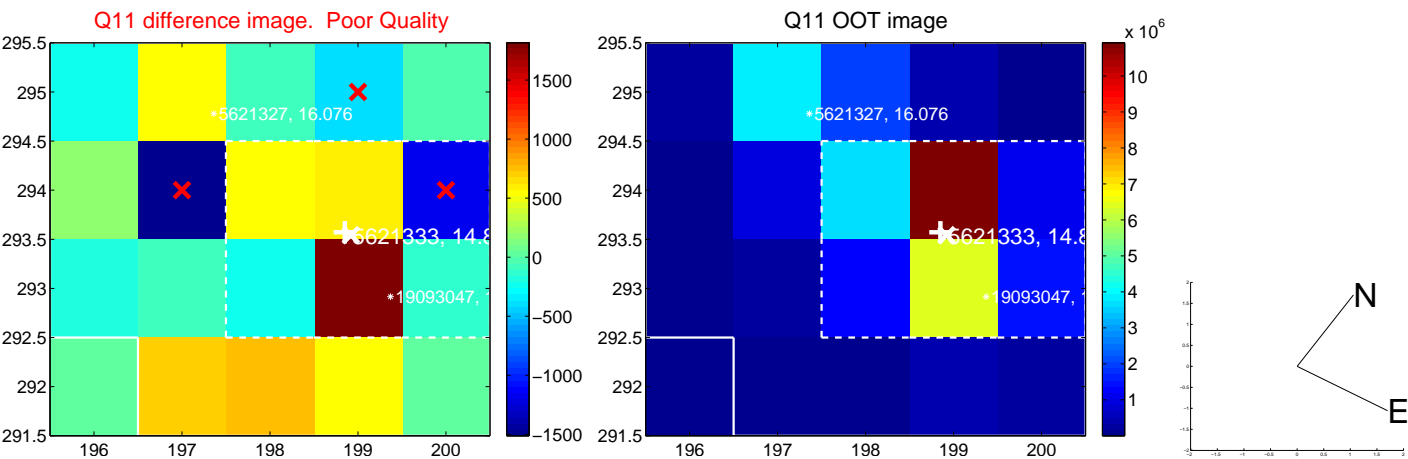
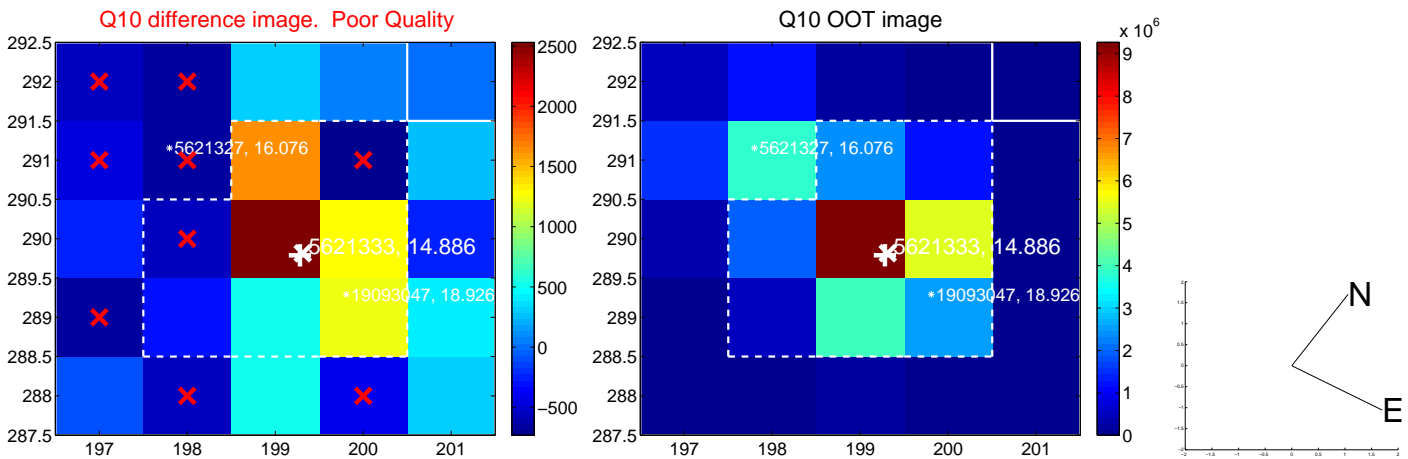
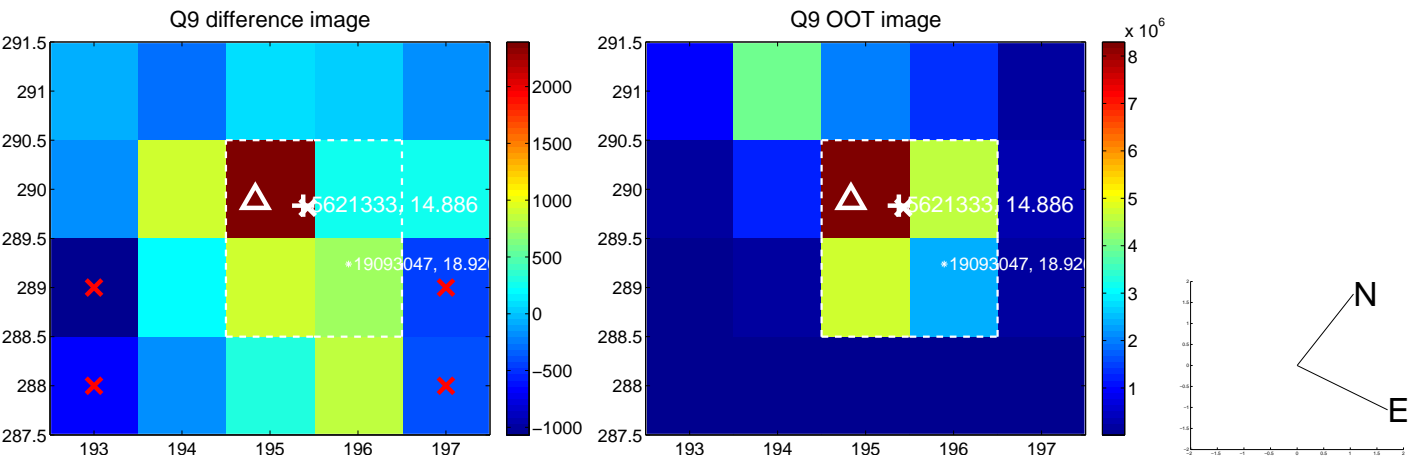
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



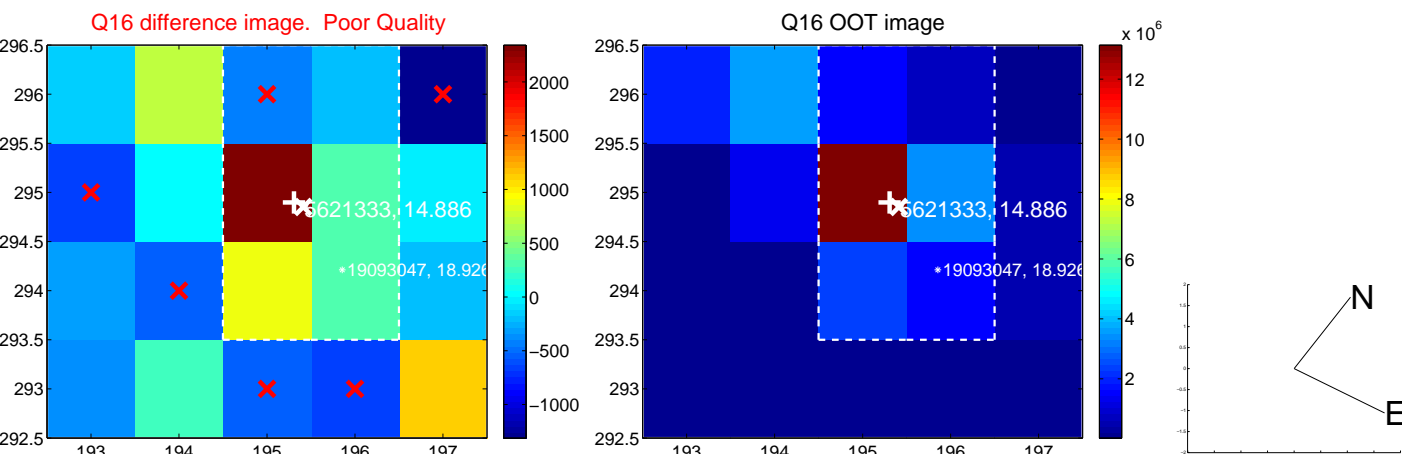
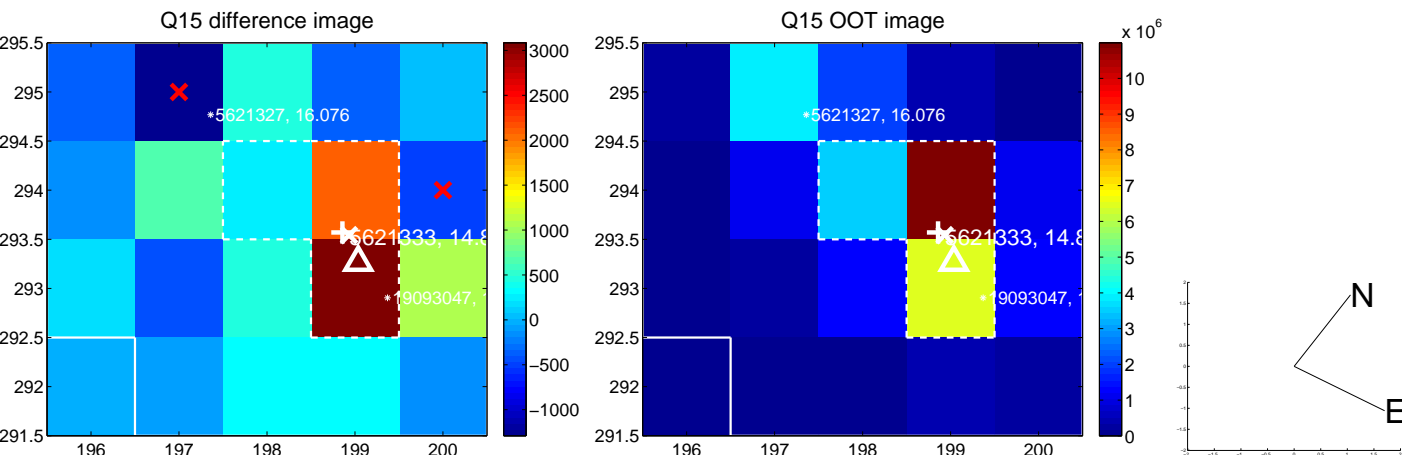
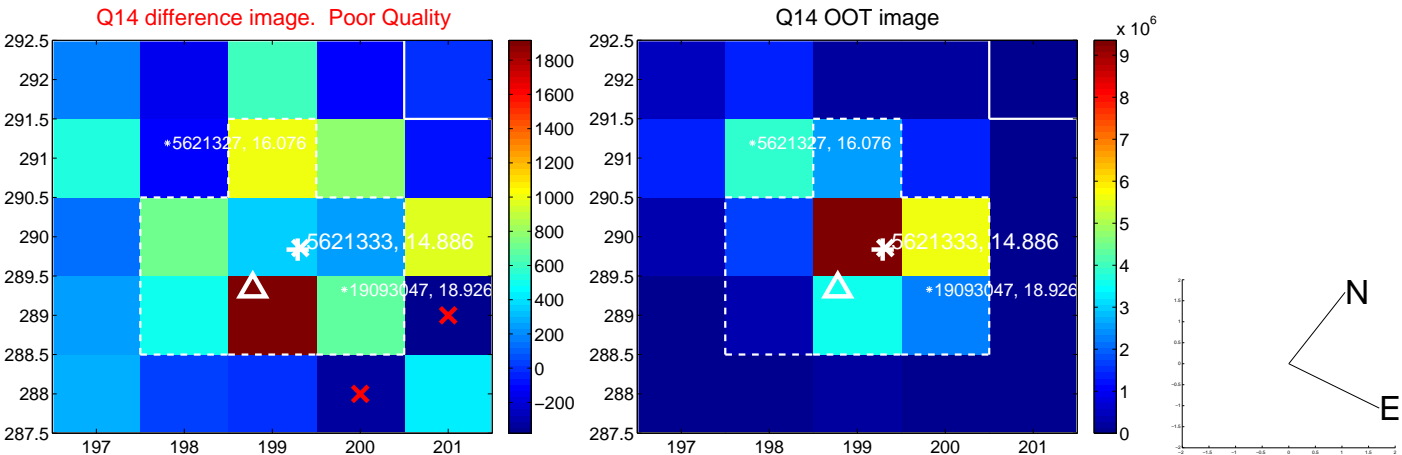
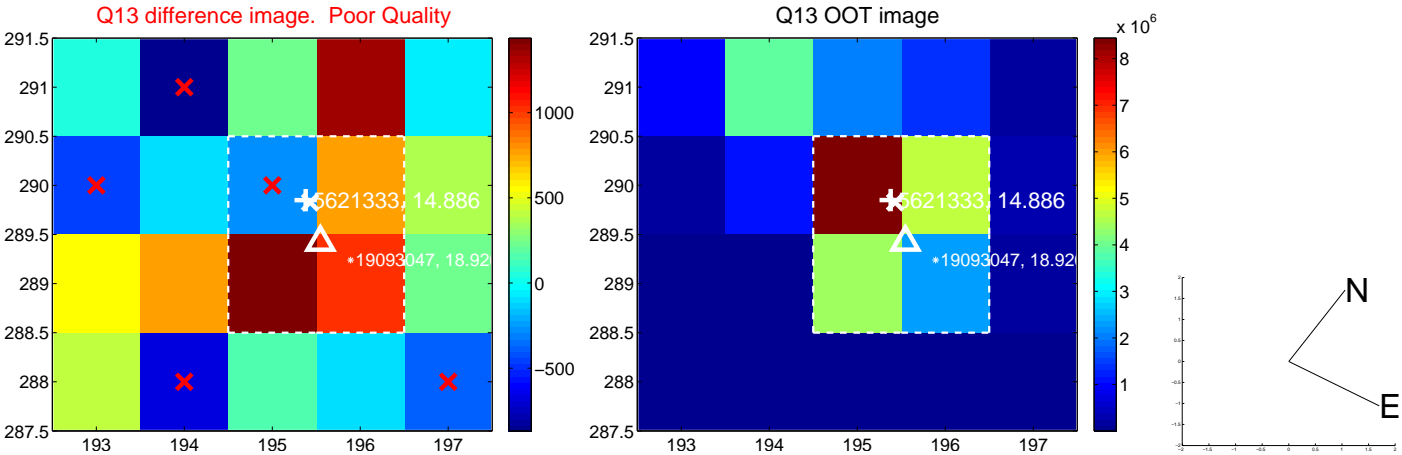
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

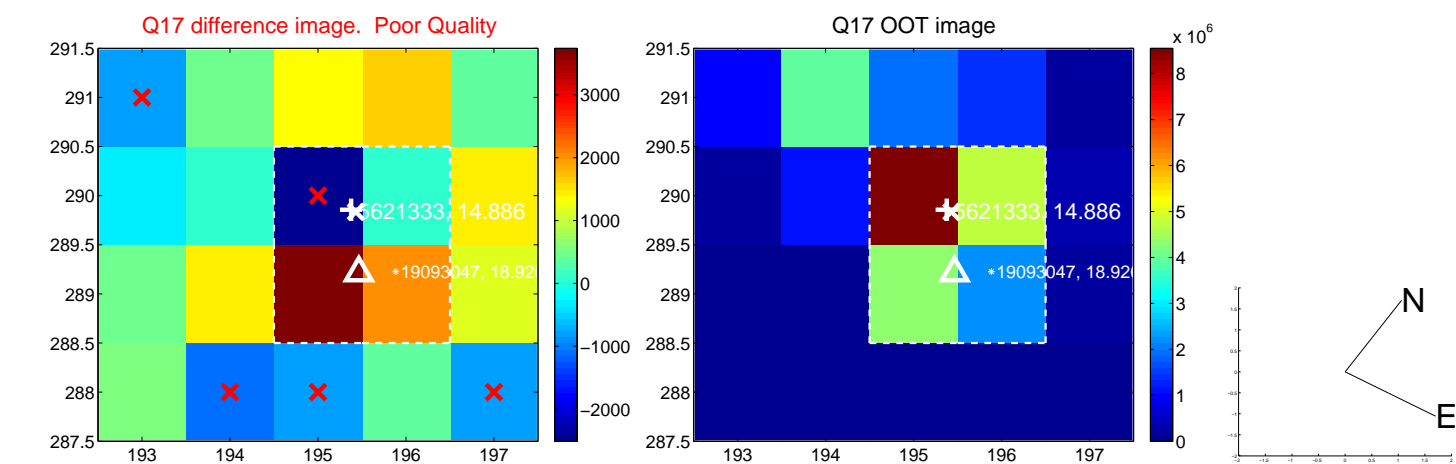


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

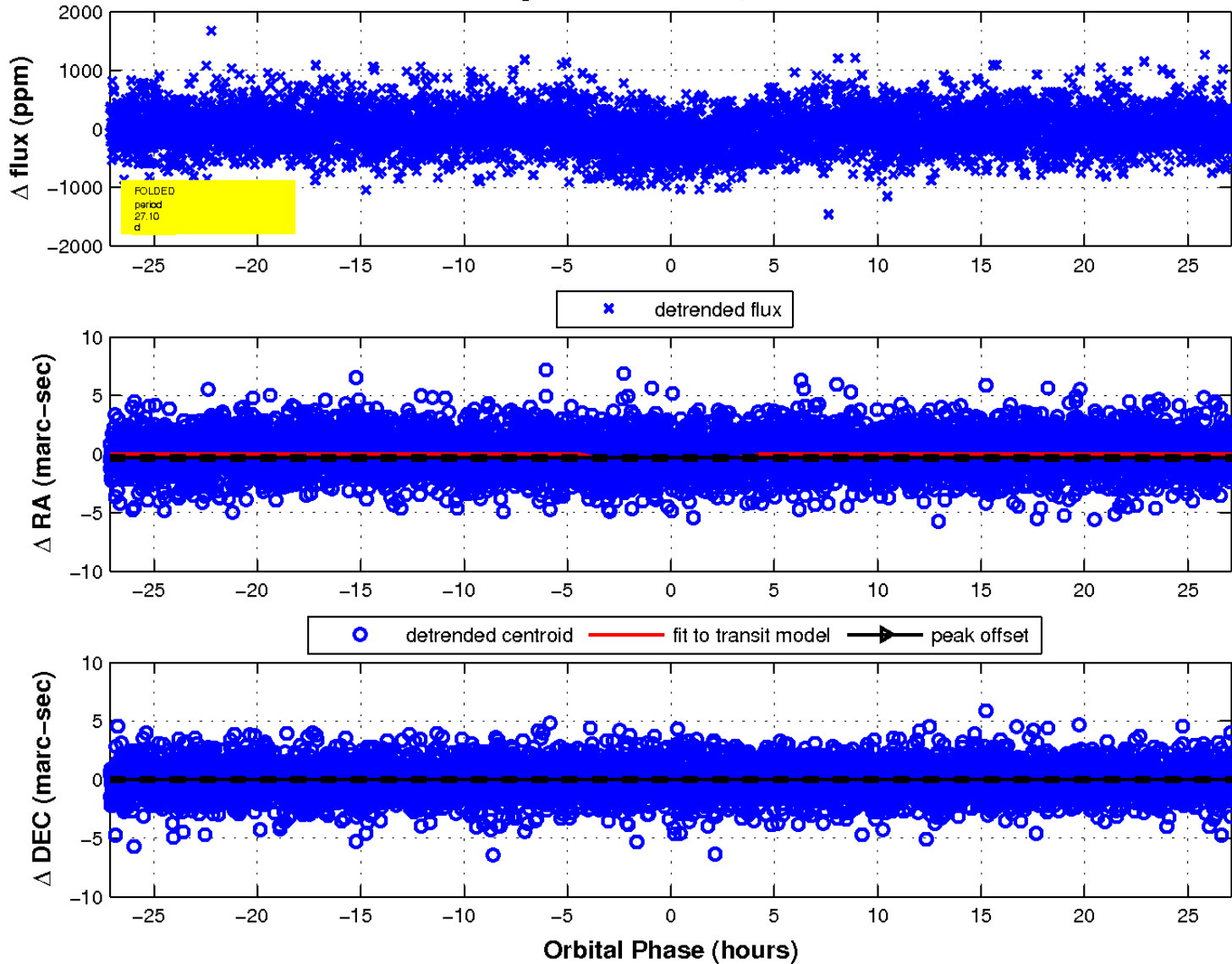




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.

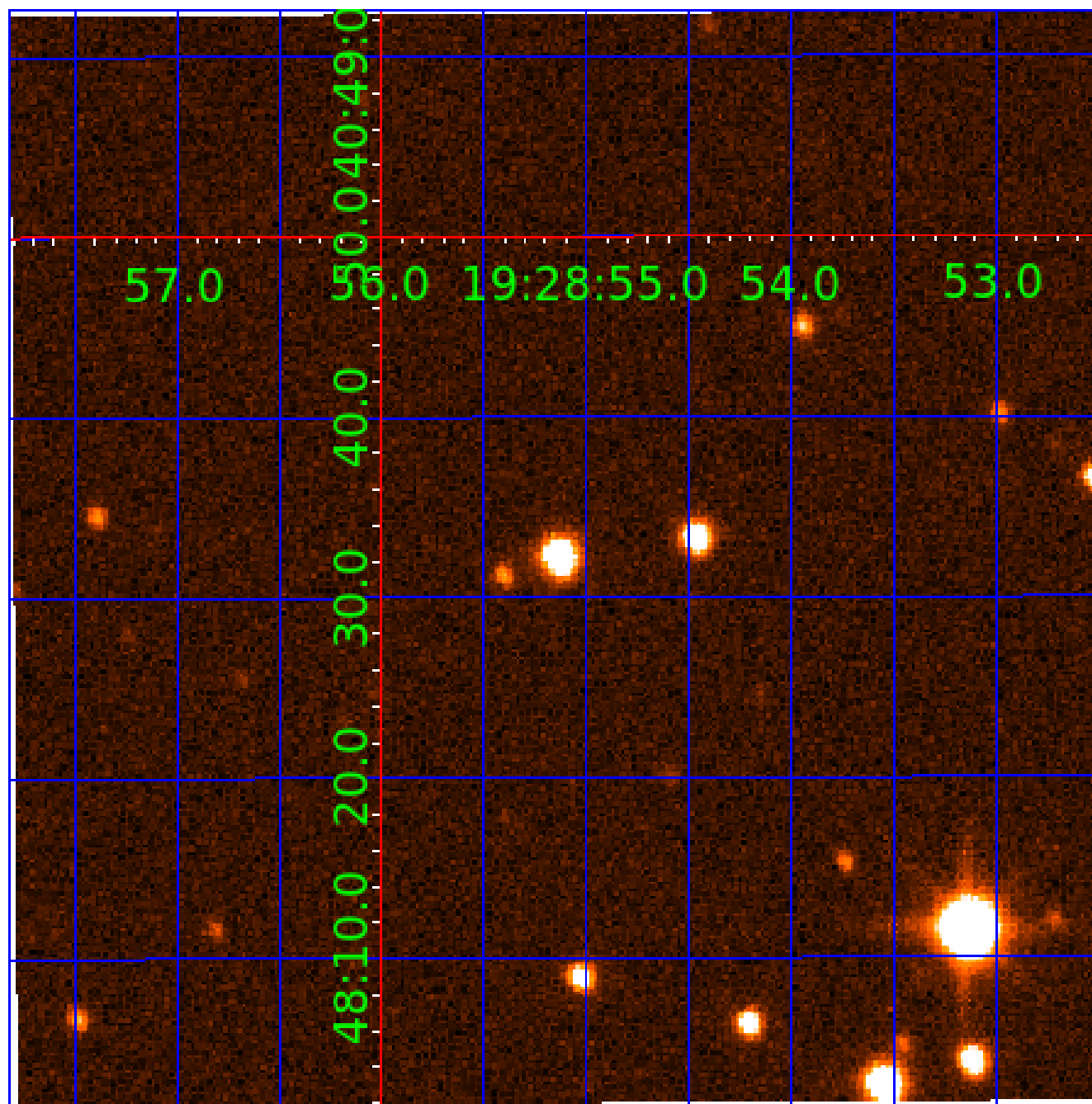


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 005621333

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005621333-01	OBS	3341.01	27.096805	139.342734	197.4	9.042	14.7	14.5	1.35	5775	2.30	56.91
005621333-02	OBS	3341.02	11.547510	139.977533	108.3	6.856	9.8	10.6	1.35	5775	1.66	177.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005621333-01	OBS	PC	0.98	0	0	0	0	NO_COMMENT
005621333-02	OBS	PC	0.94	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.

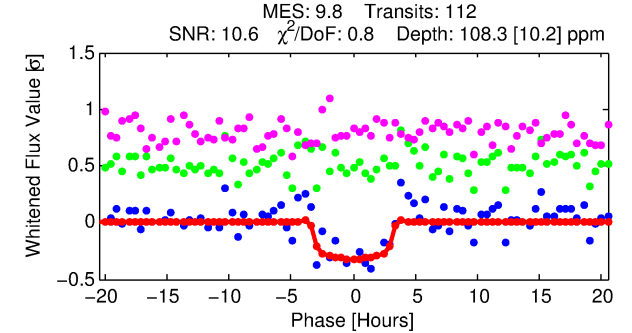
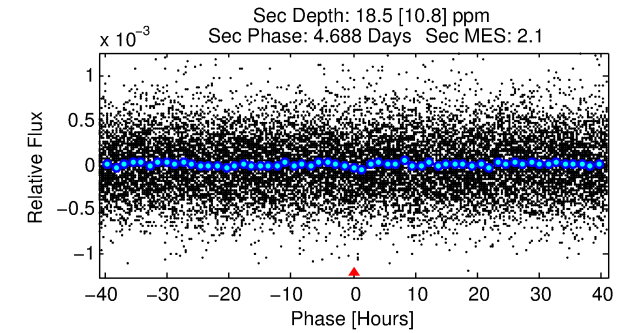
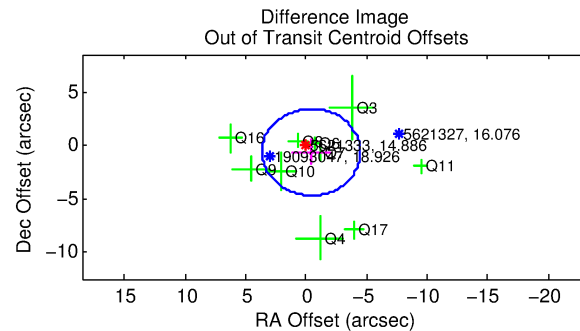
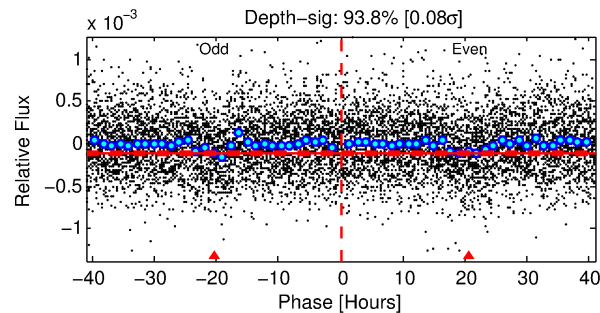
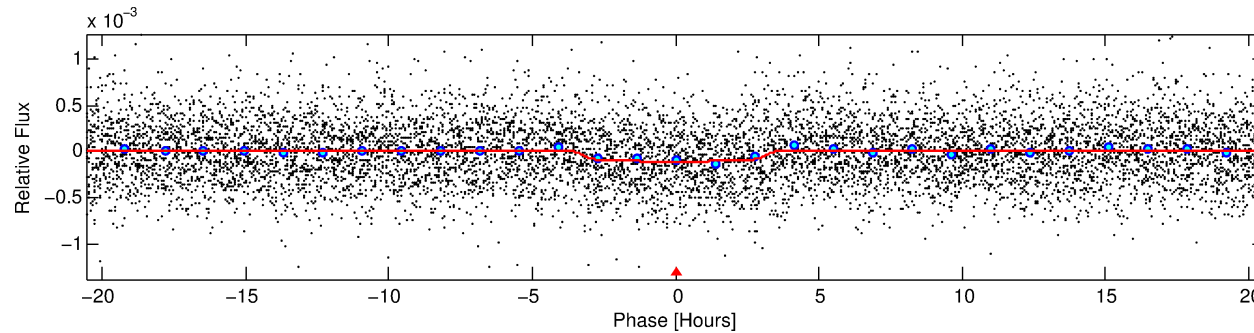
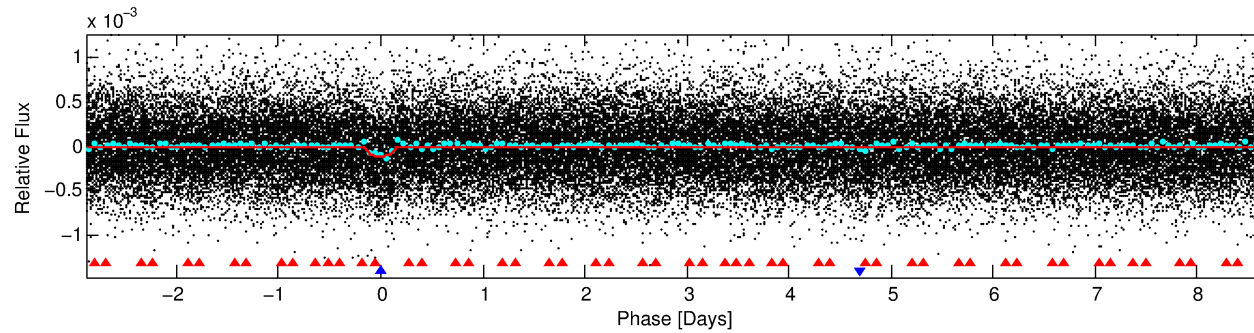
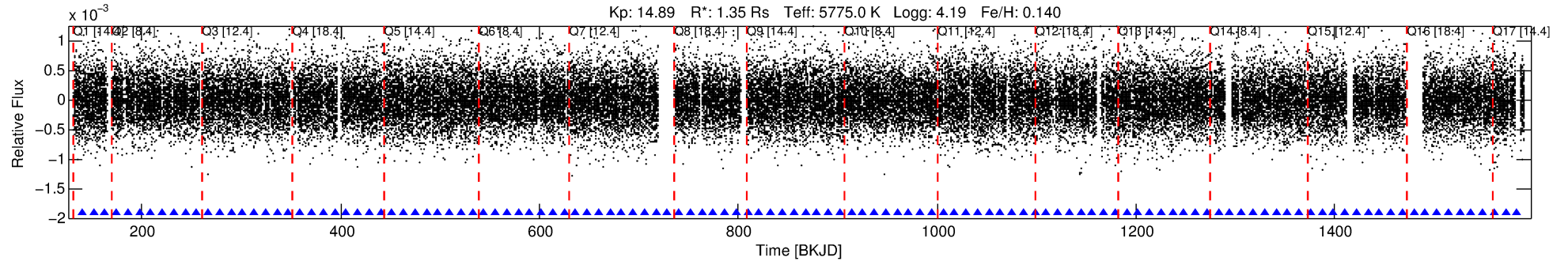
## Ephemeris Match Information For 005621333-02

No Significant Match Found

# DV One-Page Summary

KIC: 5621333 Candidate: 2 of 2 Period: 11.548 d

KOI: K03341.02 Corr: 0.975



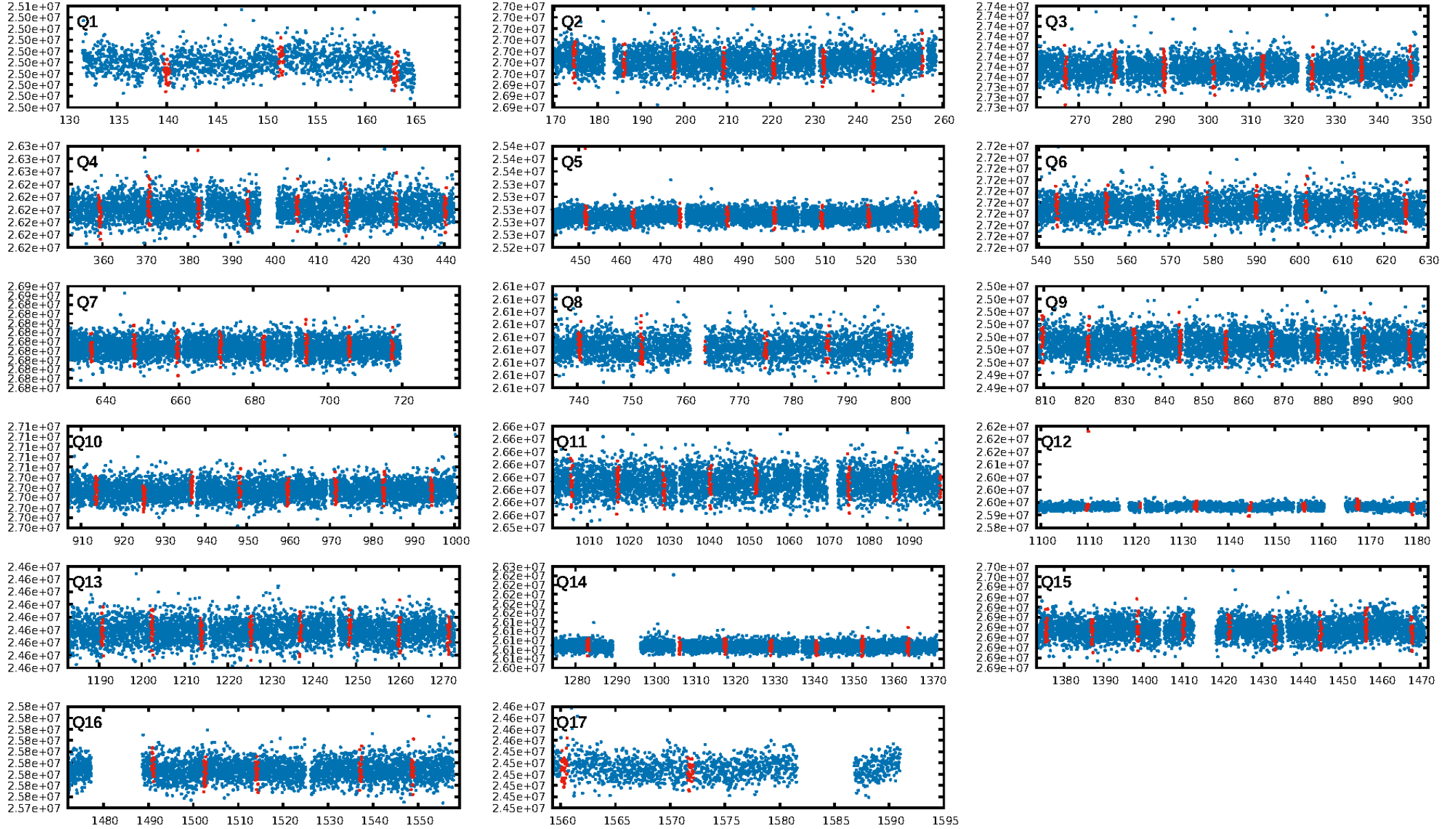
## DV Fit Results:

Period = 11.54751 [0.00017] d  
Epoch = 139.9775 [0.0119] BKJD  
Rp/R\* = 0.0113 [0.0041]  
a/R\* = 6.16 [10.35]  
b = 0.89 [0.39]  
Seff = 177.46 [50.89]  
Teff = 931 [67] K  
Rp = 1.66 [0.69] Re  
a = 0.1013 [0.0184] AU  
Ag = 37.73 [36.80] [1.00 $\sigma$ ]  
Teffp = 3566 [834] K [3.15 $\sigma$ ]

## DV Diagnostic Results:

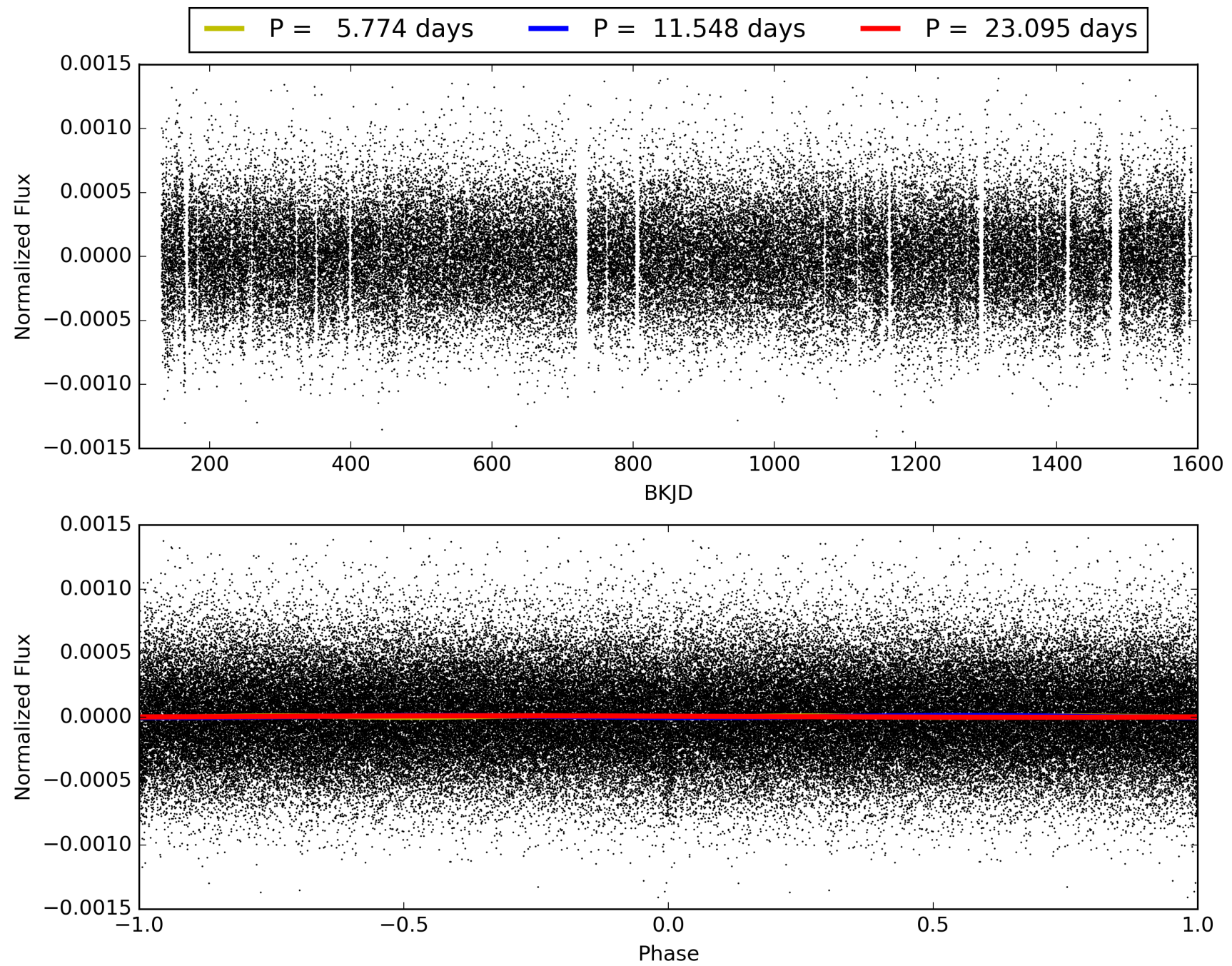
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [32.89 $\sigma$ ]  
ModelChiSquare2-sig: 99.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 9.63e-23  
RollingBand-fgt: 1.00 [107/107]  
GhostDiagnostic-chr: 3.069  
Centroid-sig: 90.0%  
Centroid-so: 1.388 arcsec [1.08 $\sigma$ ]  
OotOffset-rm: 0.771 arcsec [0.57 $\sigma$ ]  
KicOffset-rm: 0.914 arcsec [0.68 $\sigma$ ]  
OotOffset-st: 2/3/3/2 [10]  
KicOffset-st: 2/3/3/2 [10]  
DiffImageQuality-fgm: 0.20 [2/10]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005621333-02, PDC Light Curves



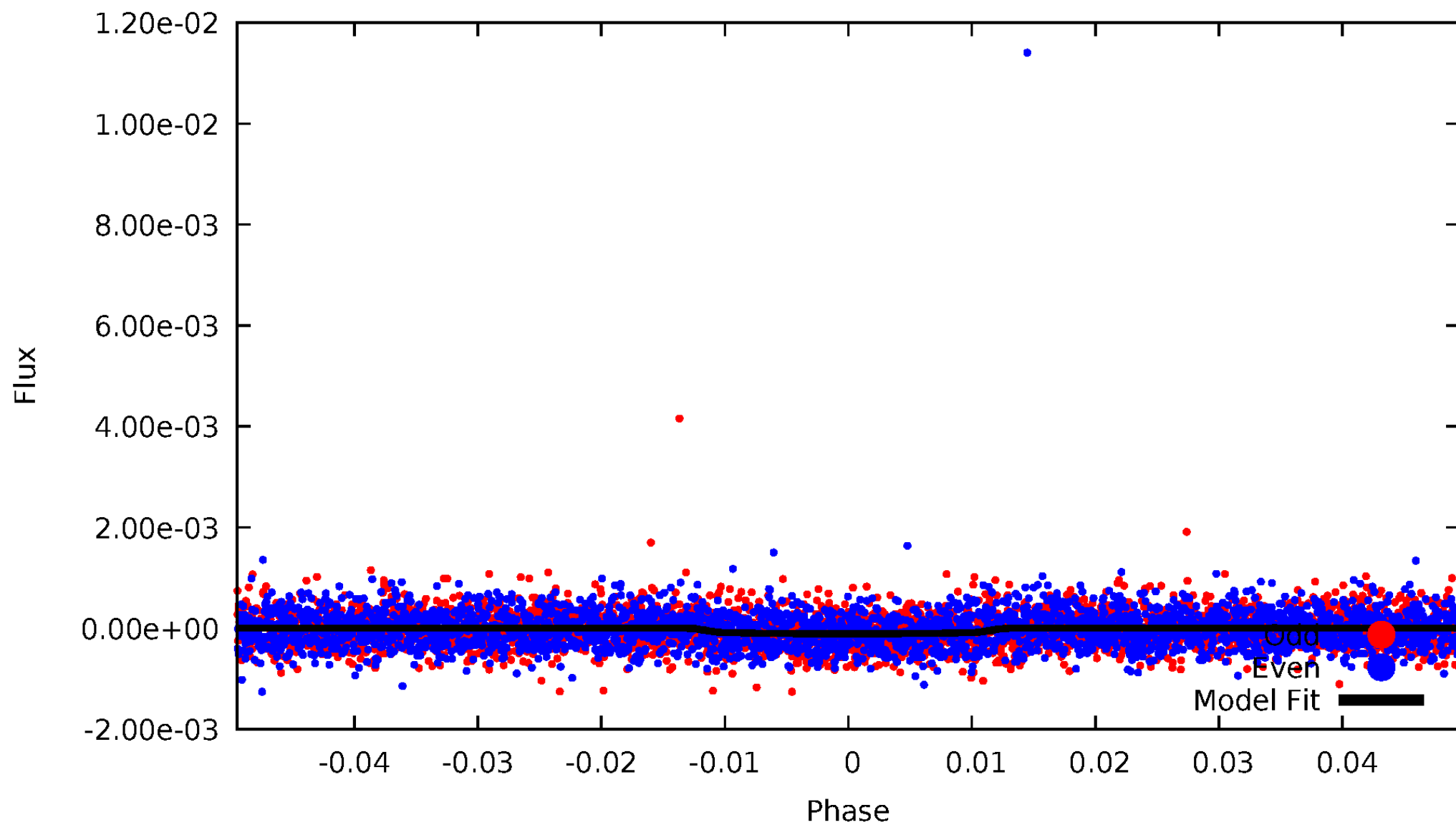


# TCE 005621333-02



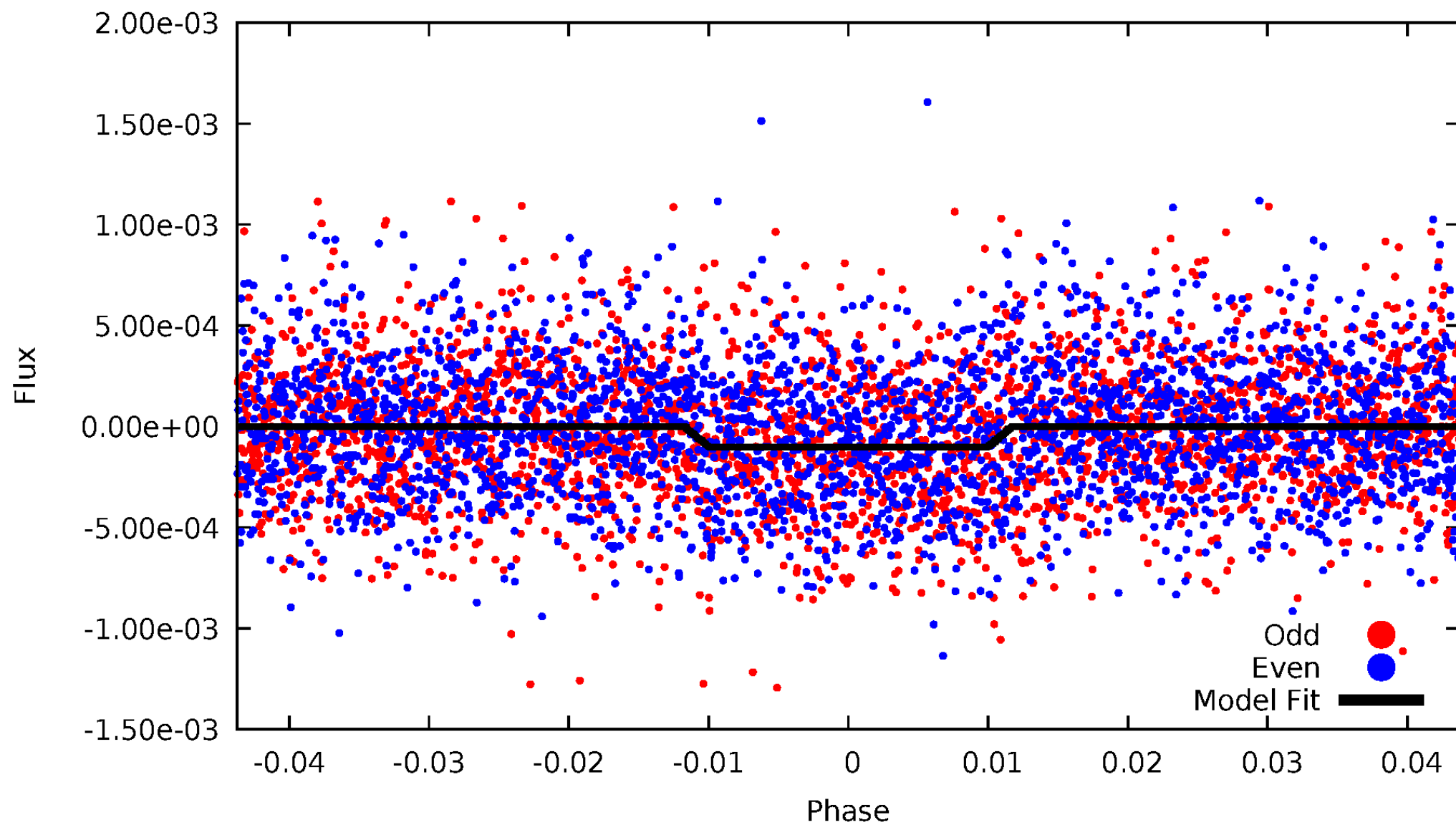
# DV Odd/Even

TCE 005621333-02



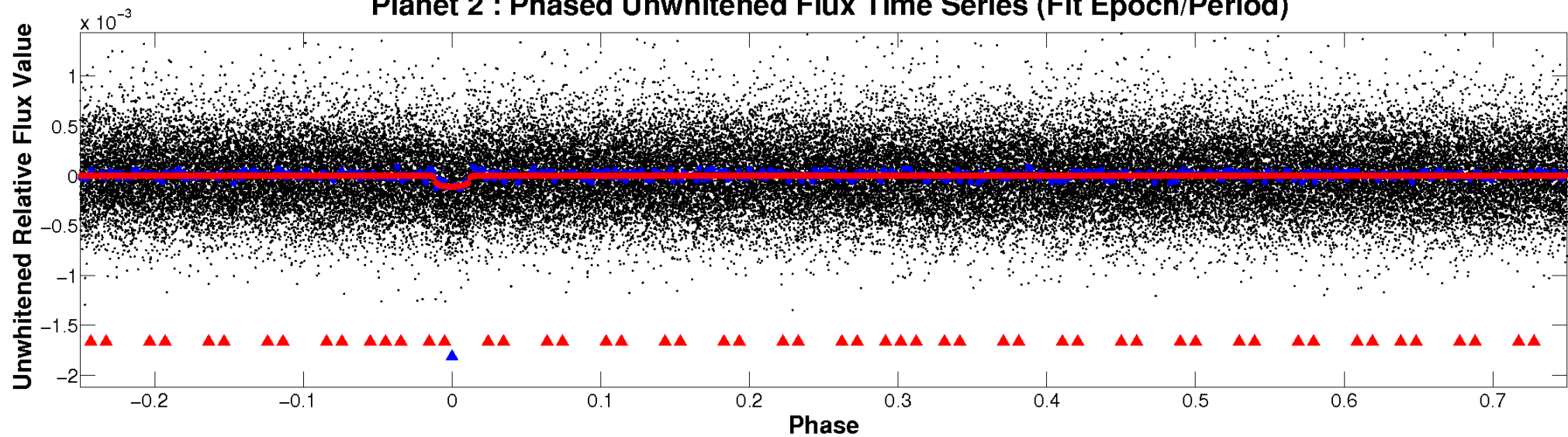
# ALT Odd/Even

TCE 005621333-02

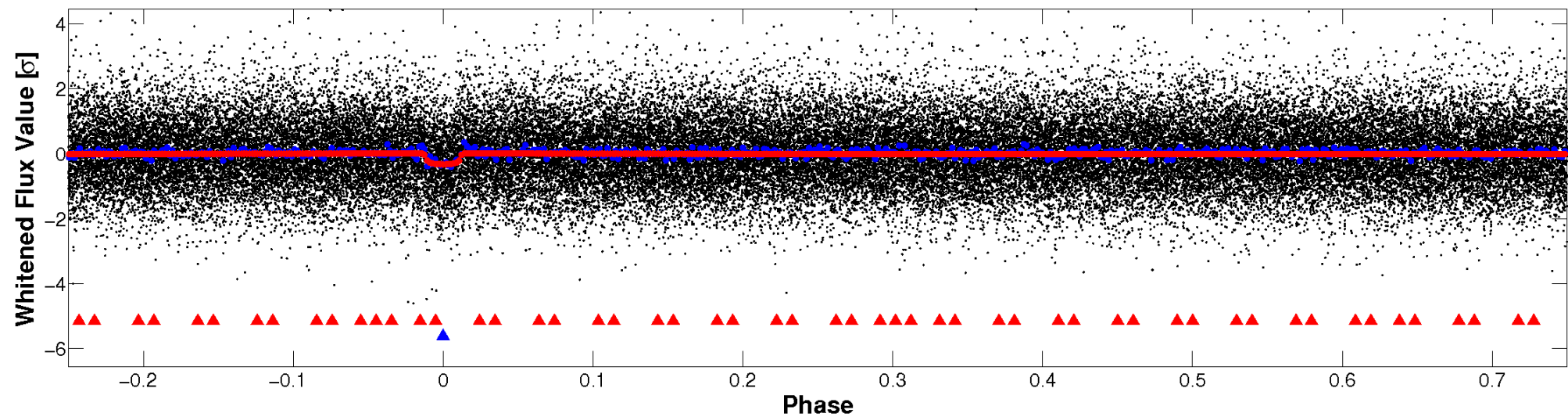


# Non-Whitened Vs. Whitened Light Curve

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



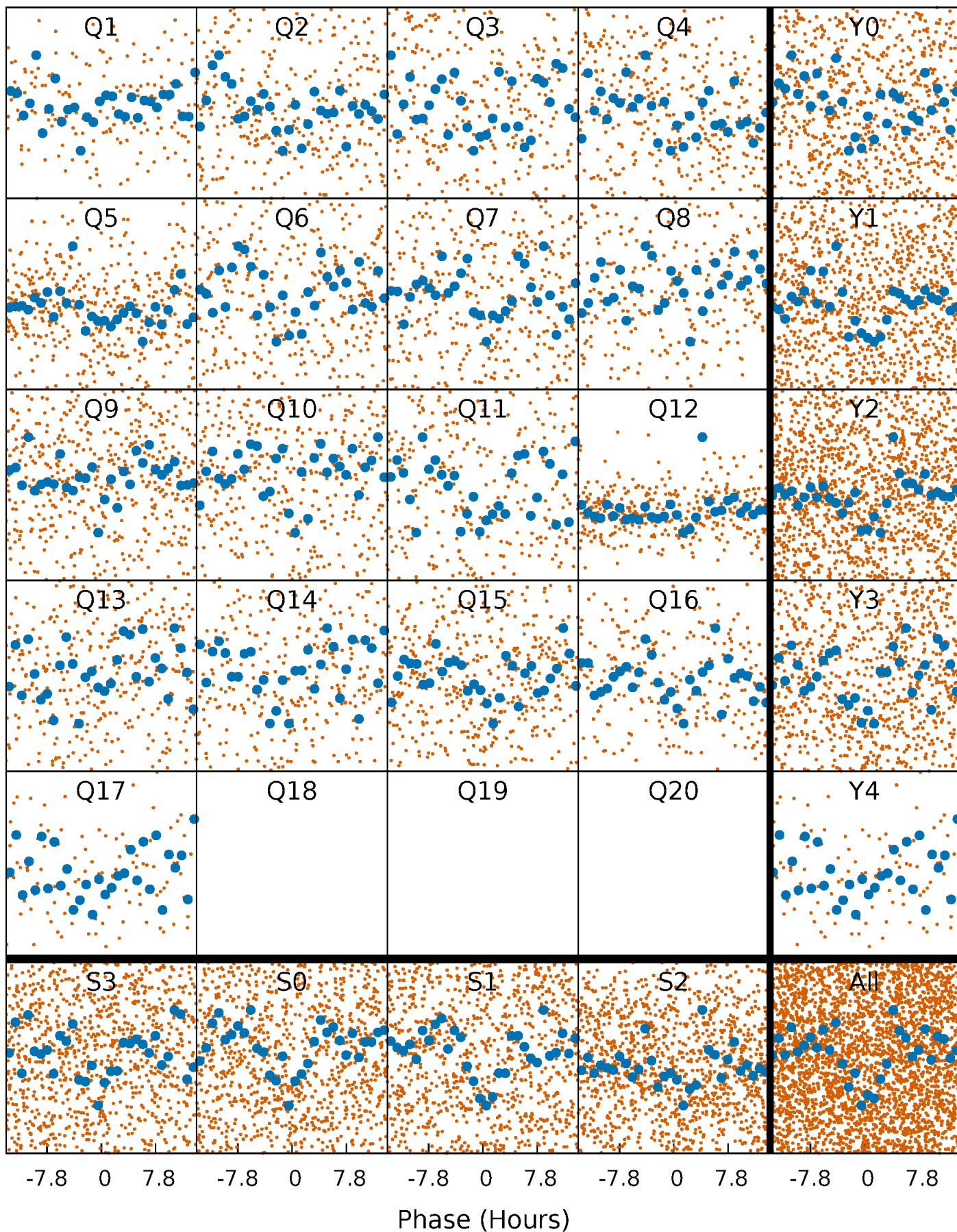
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

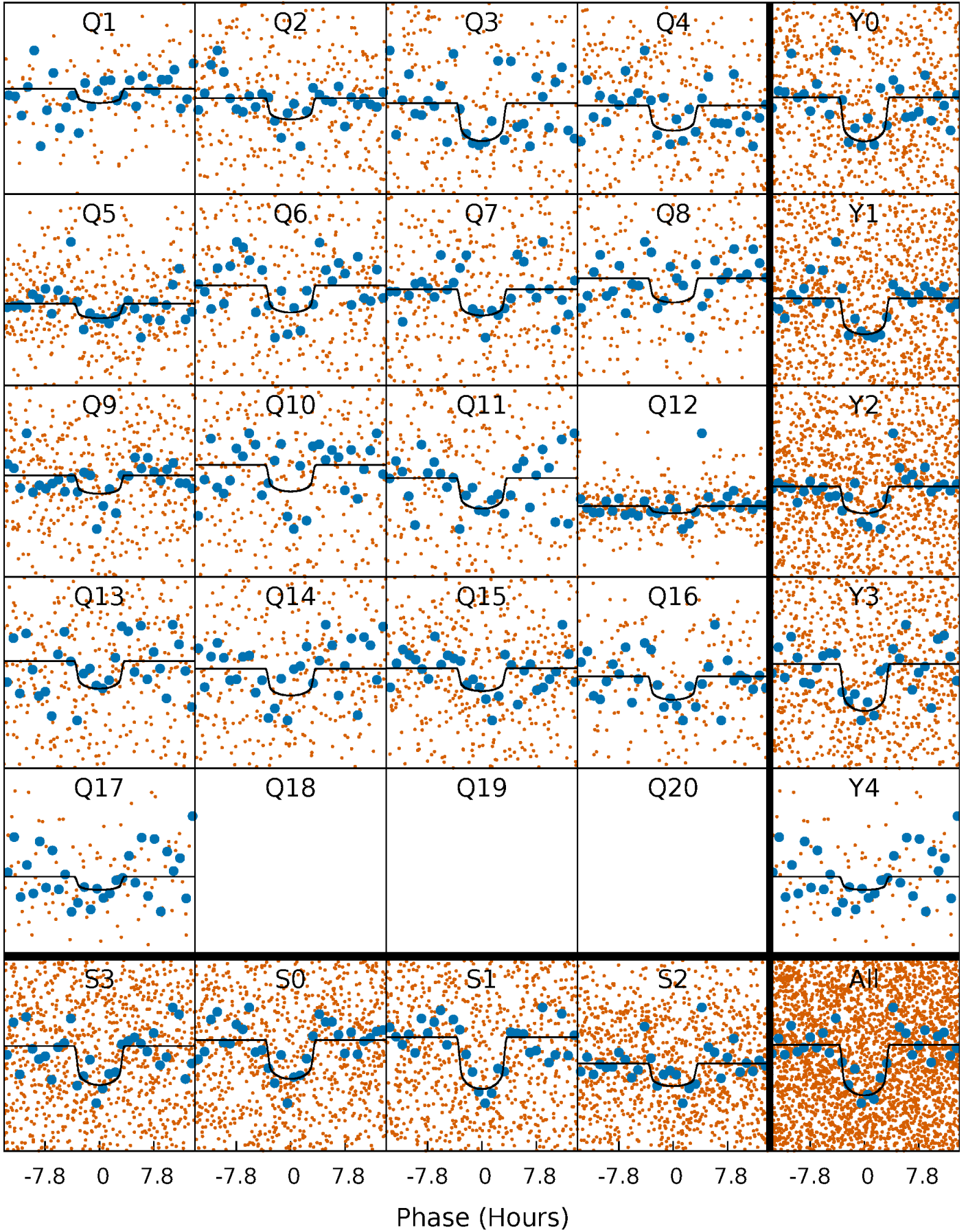
TCE 005621333-02 P= 11.547510 Days  $T_0=139.977533$  (BKJD)





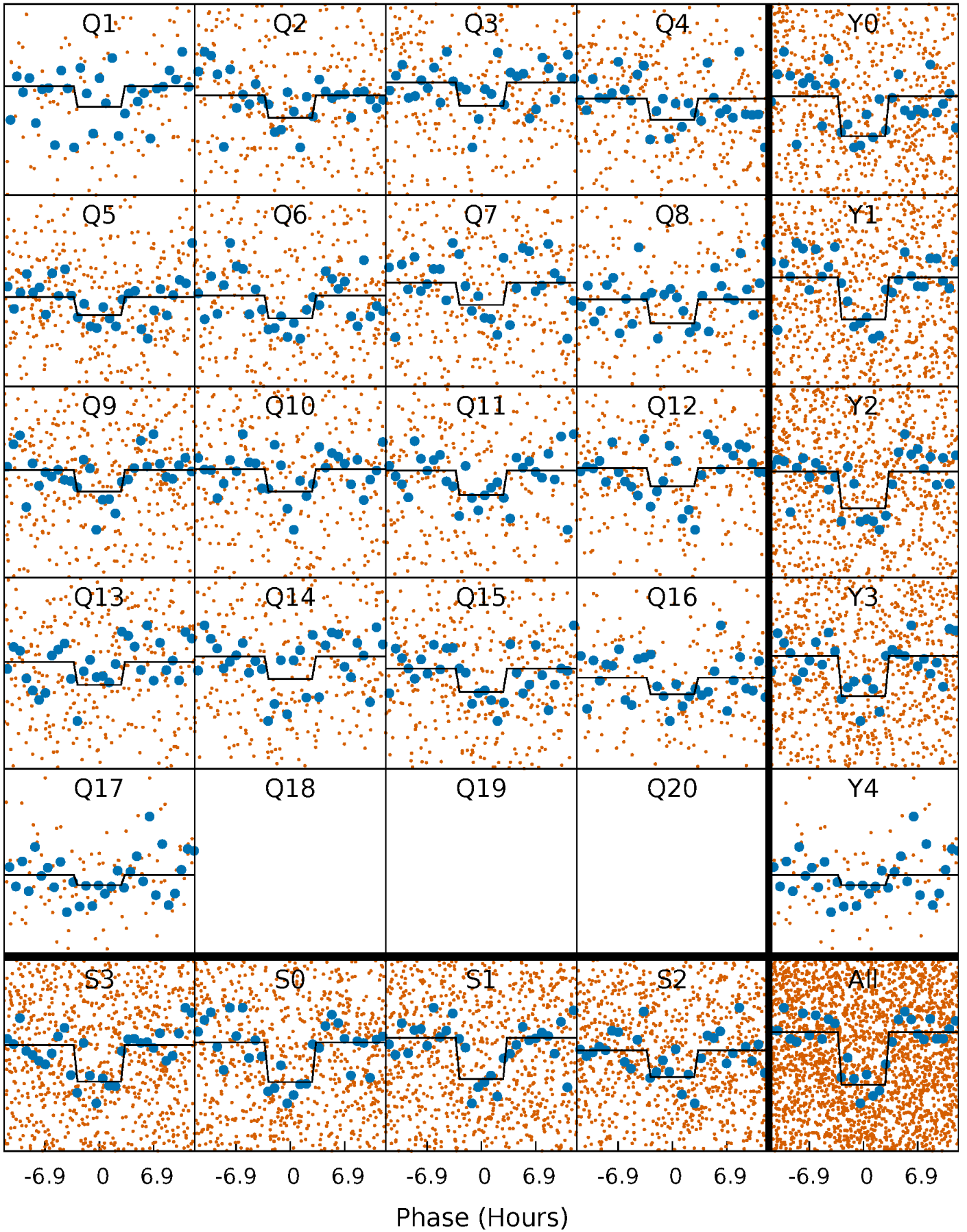
# DV Quarter-Phased Transit Curves

TCE 005621333-02 P= 11.547510 Days  $T_0=139.977533$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

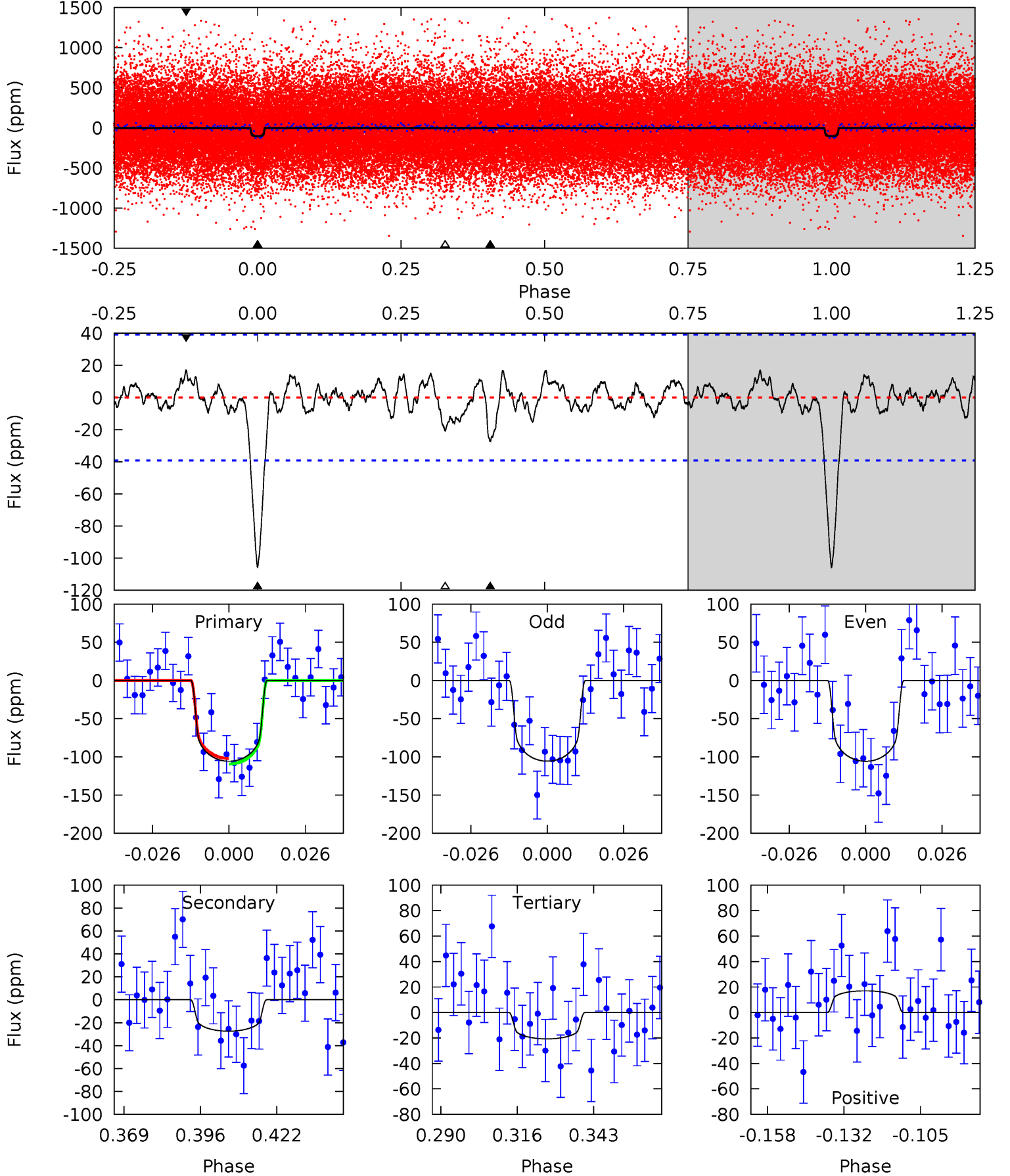
TCE 005621333-02 P= 11.547338 Days  $T_0=139.985575$  (BKJD)



# DV Model-Shift Uniqueness Test

005621333-02,  $P = 11.547510$  Days,  $E = 128.430023$  Days

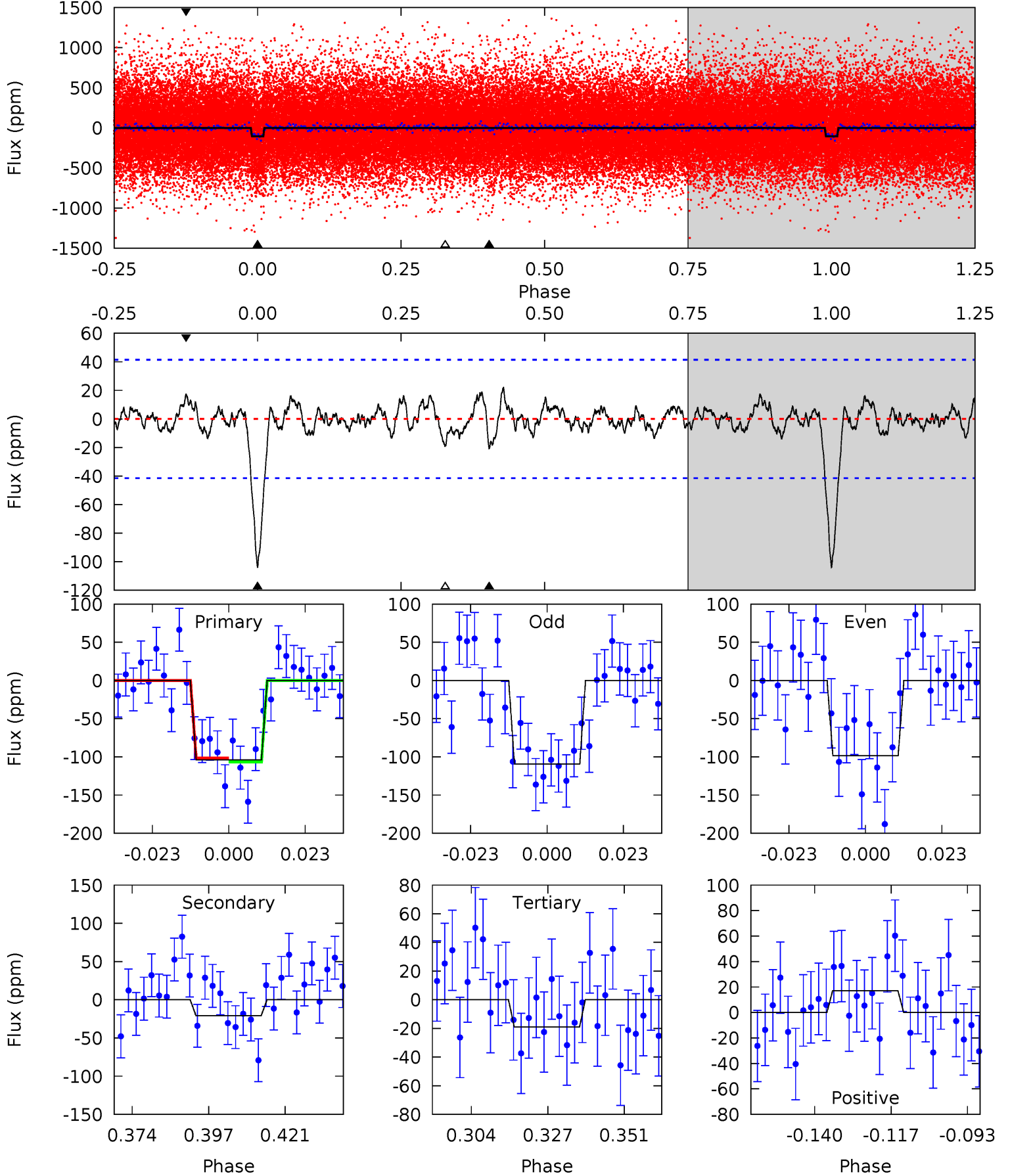
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	3.38	2.56	2.10	4.84	2.22	0.89	10.5	10.9	0.82	1.28	0.01	0.92	0.14	0.45



# Alt Model-Shift Uniqueness Test

005621333-02,  $P = 11.547338$  Days,  $E = 128.438237$  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
12.2	2.44	2.23	2.00	4.86	2.27	0.79	9.96	10.2	0.21	0.44	0.65	1.14	0.18	0.31



### Stellar Parameters For KIC 005621333

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5775^{+78}_{-78}$	$4.193^{+0.162}_{-0.108}$	$0.140^{+0.150}_{-0.150}$	$1.352^{+0.219}_{-0.268}$	$1.038^{+0.090}_{-0.065}$	$0.592^{+0.481}_{-0.194}$
	+1%/-1%	+4%/-3%	+107%/-107%	+16%/-20%	+9%/-6%	+81%/-33%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 005621333-02 / KOI 3341.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-27 \pm 8$	$1.62^{+0.68}_{-0.59}$	$1292^{+61}_{-66}$	$4183^{+817}_{-526}$	$58^{+89}_{-32}$
Alt.	$-21 \pm 9$	$1.49^{+0.64}_{-0.58}$	$1291^{+65}_{-74}$	$4094^{+994}_{-565}$	$52^{+106}_{-30}$

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

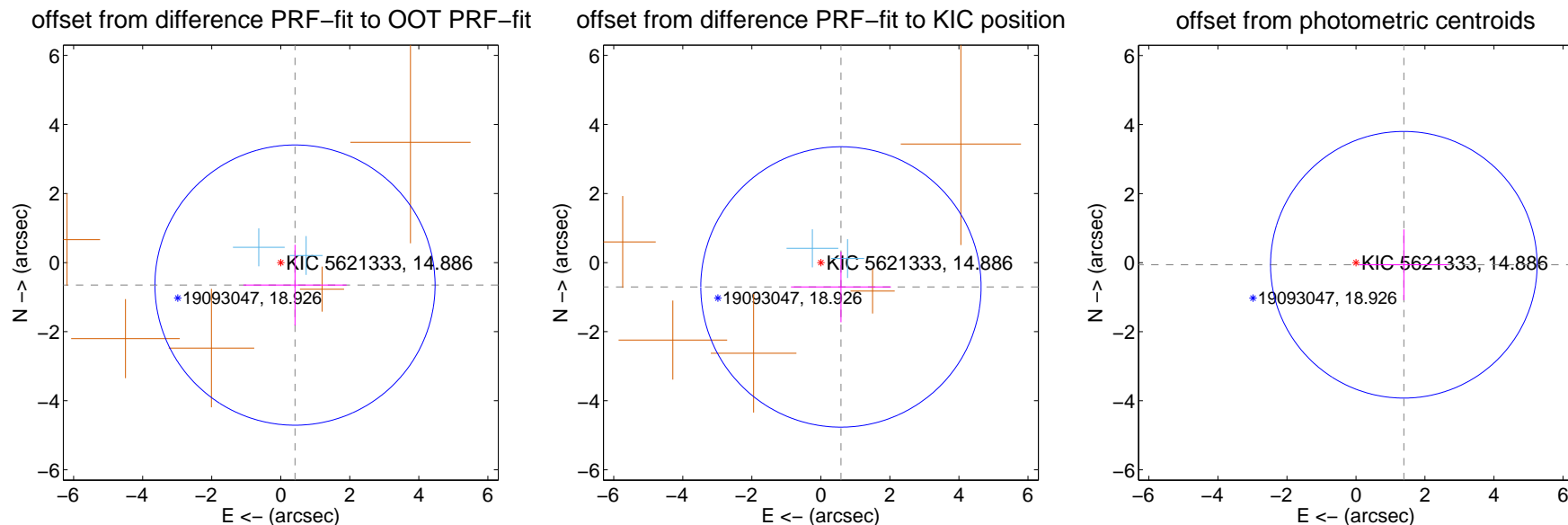
## DV Centroid Data

Supplemental centroid analysis for 005621333-02. Kepler magnitude: 14.89. Transit SNR 10.63

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

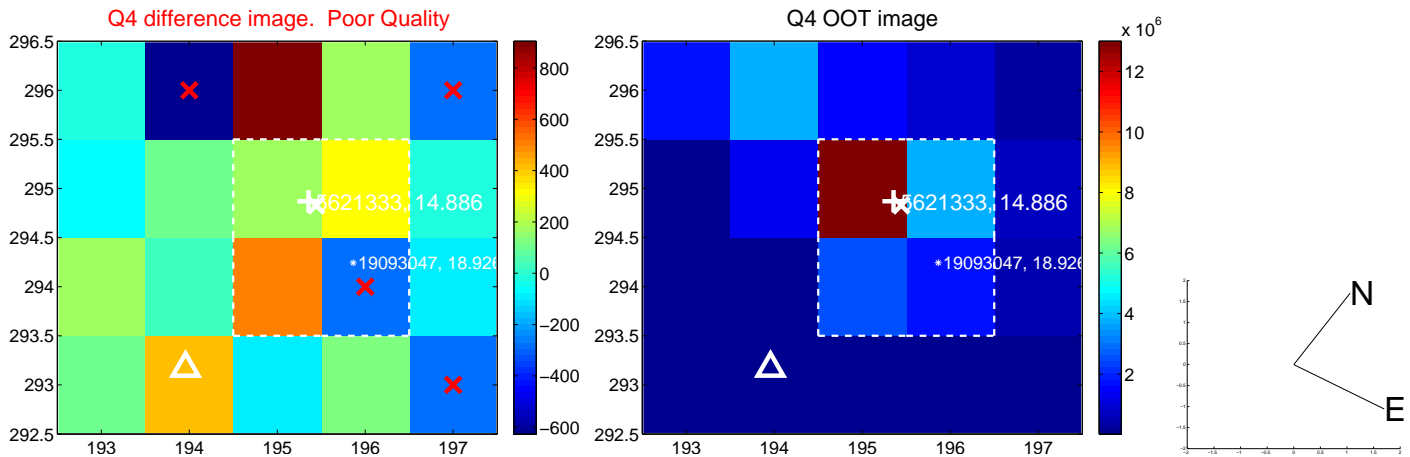
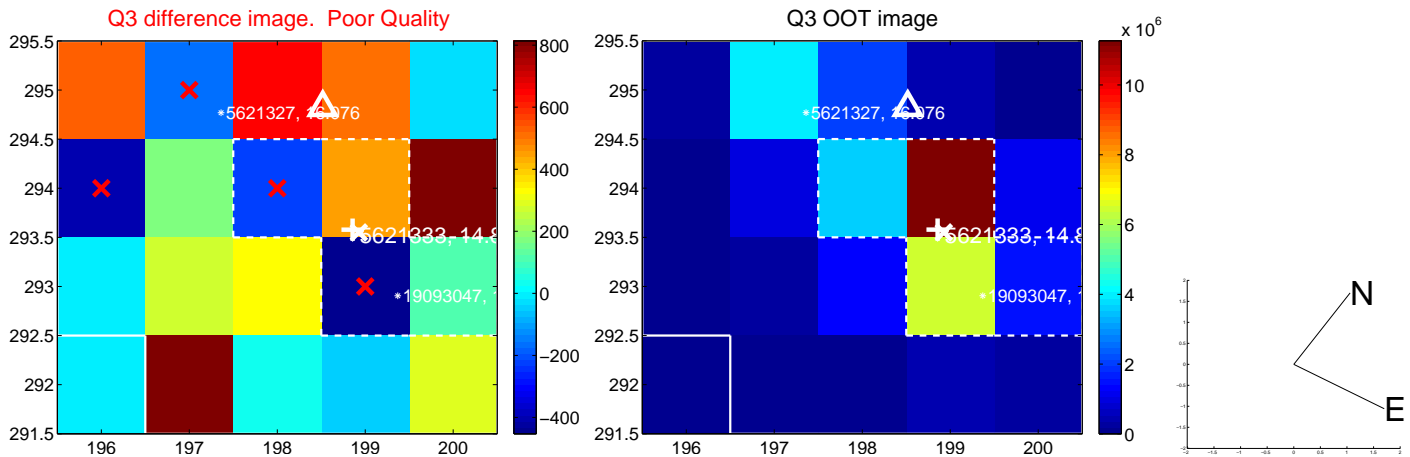
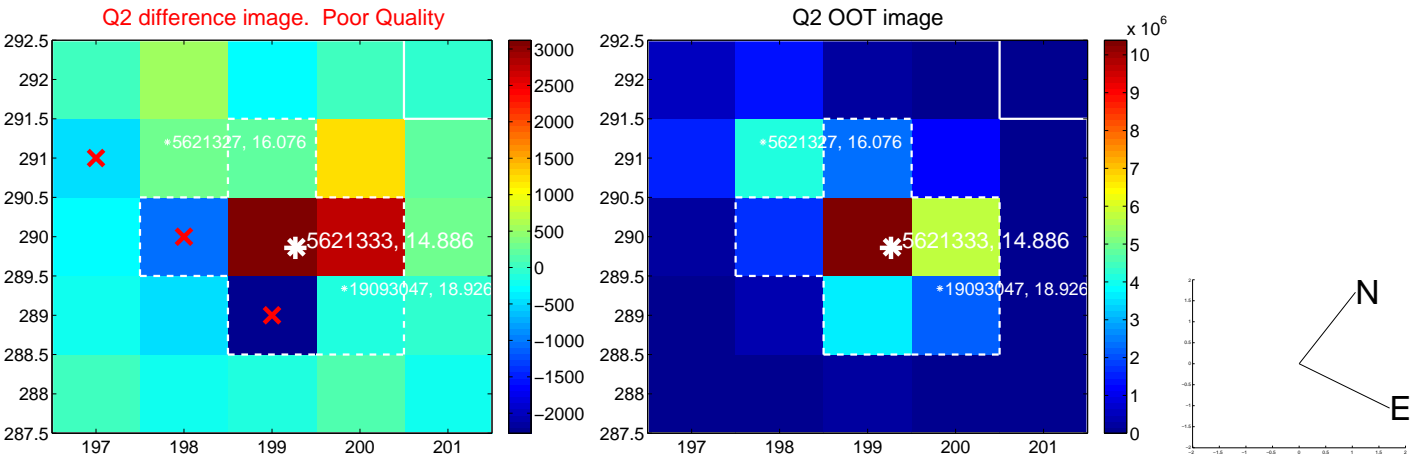
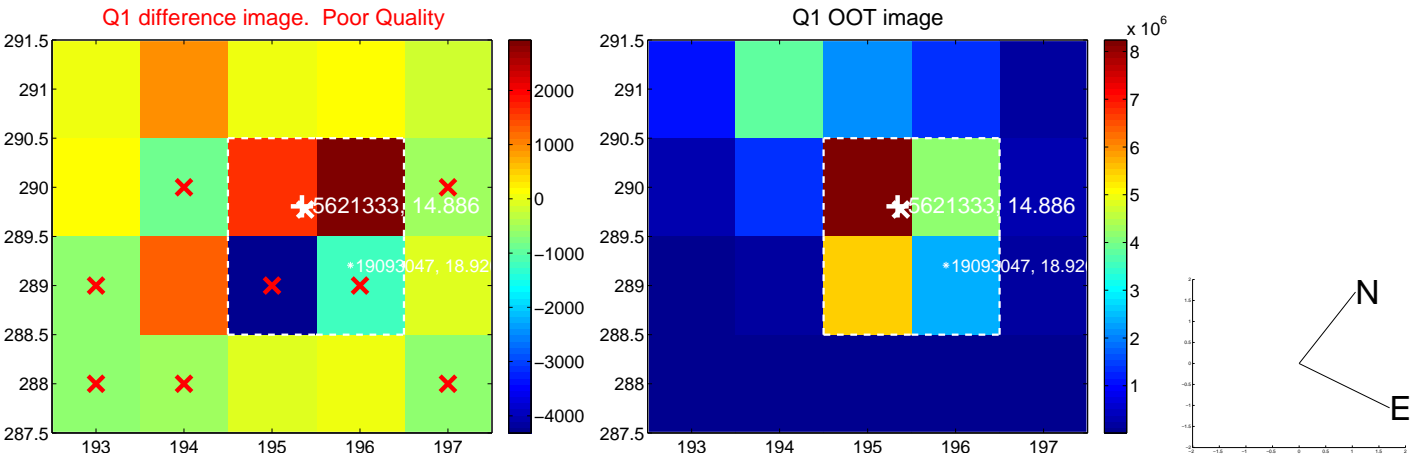
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.771 \pm 1.352$	0.57	$-0.413 \pm 1.494$	$-0.651 \pm 1.169$
PRF-fit source offset from KIC position	$0.914 \pm 1.353$	0.68	$-0.581 \pm 1.448$	$-0.705 \pm 1.021$
photometric centroid source offset	$1.39 \pm 1.29$	1.08	$-1.39 \pm 1.29$	$-0.06 \pm 1.03$



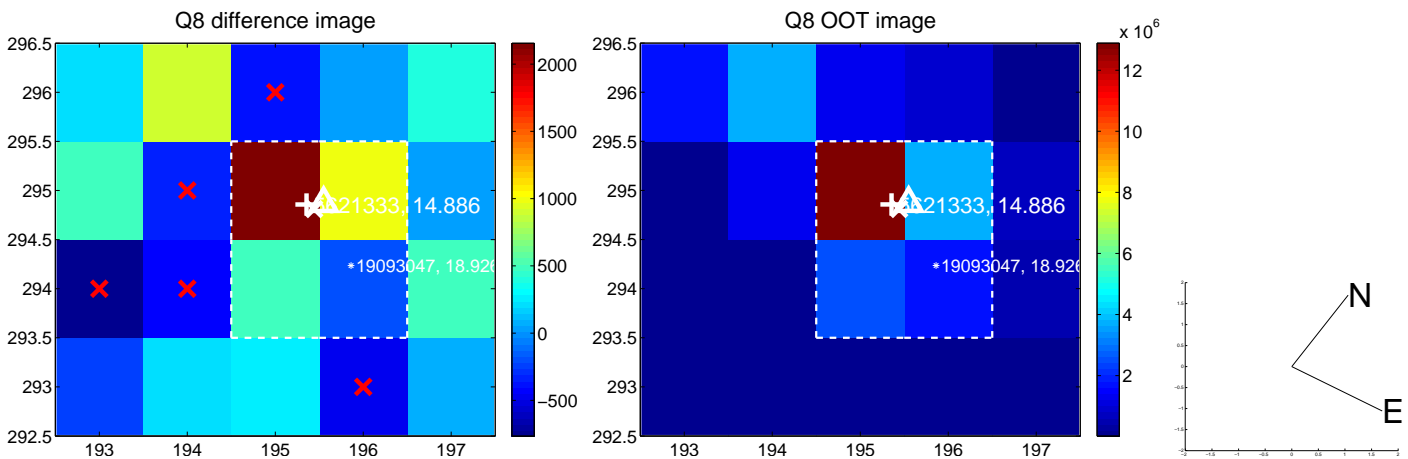
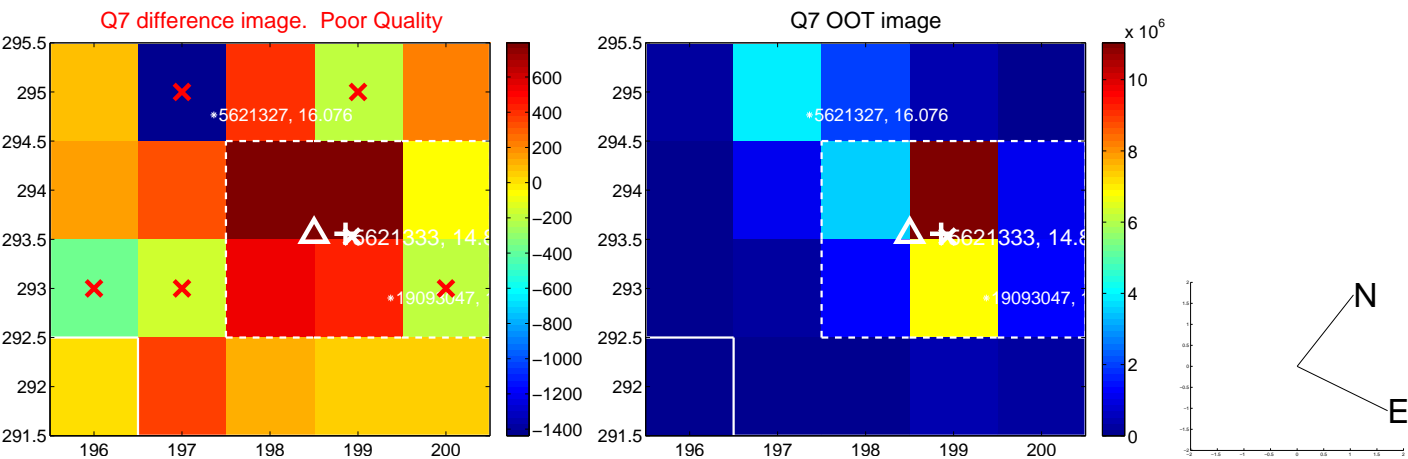
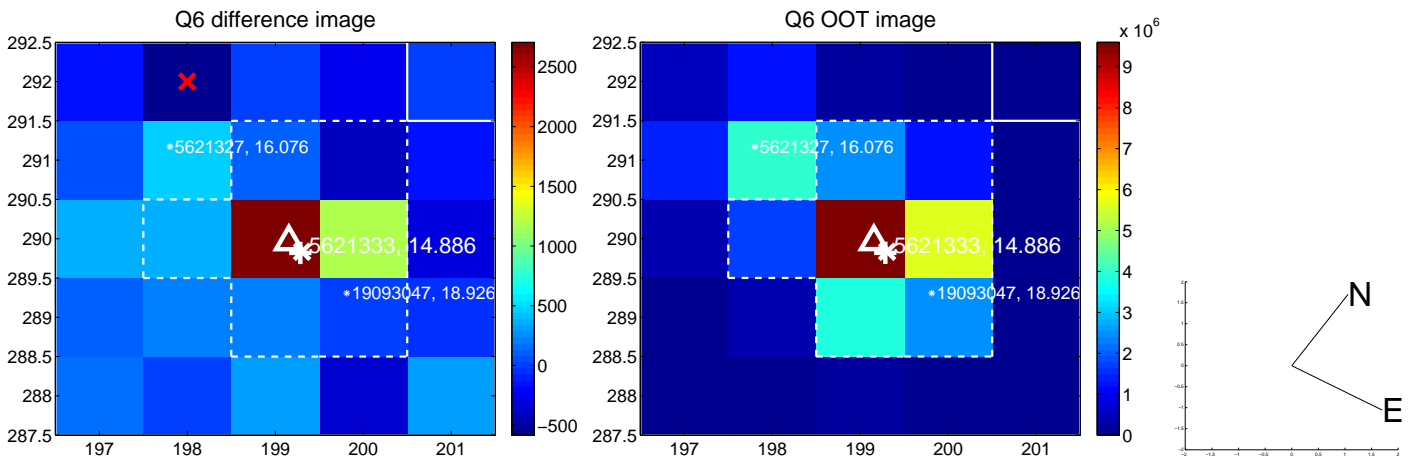
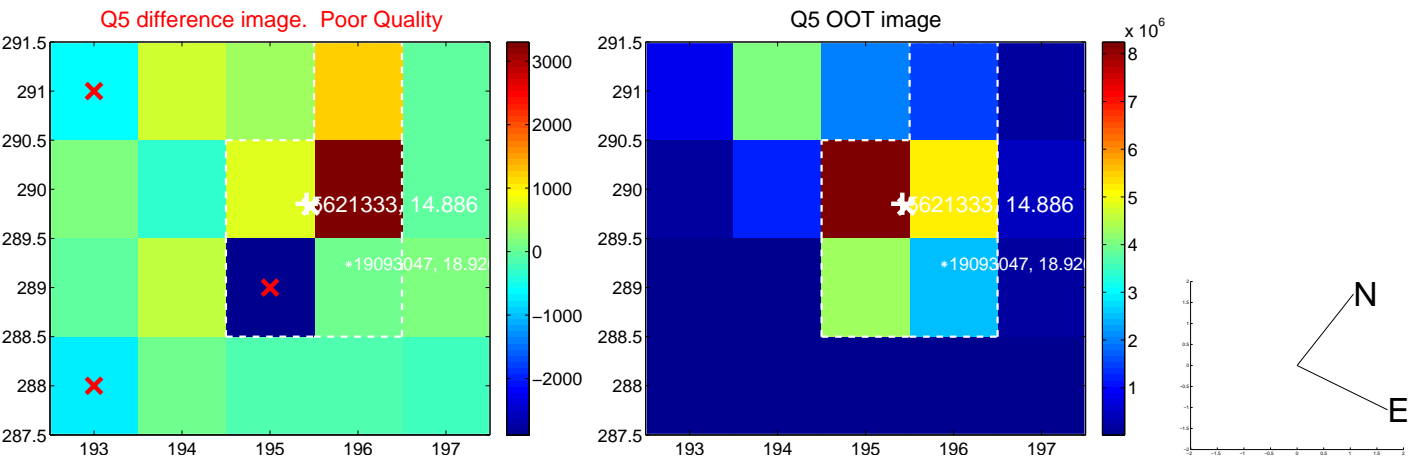
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



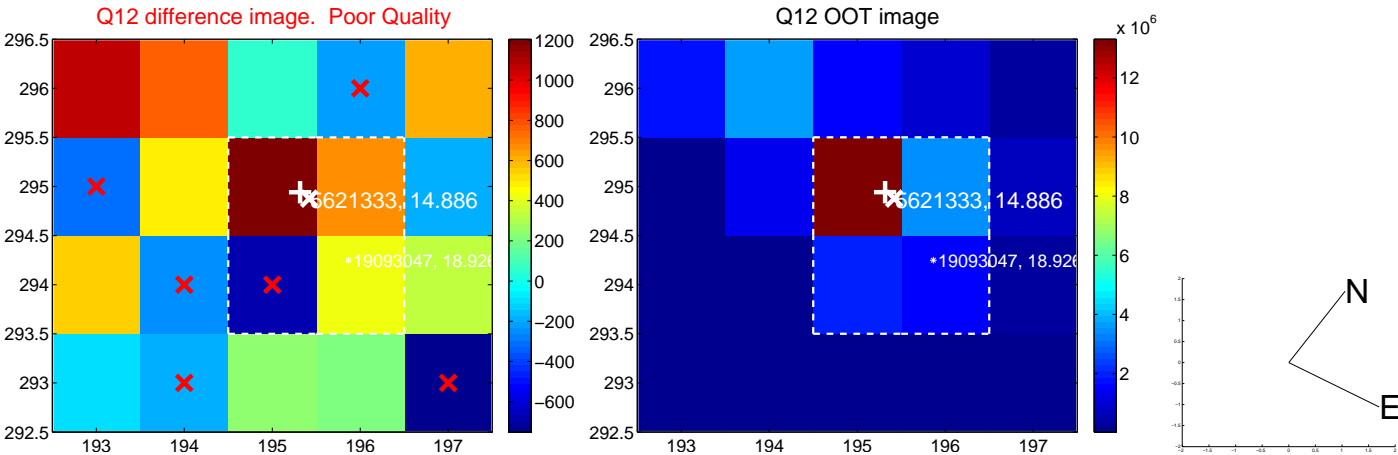
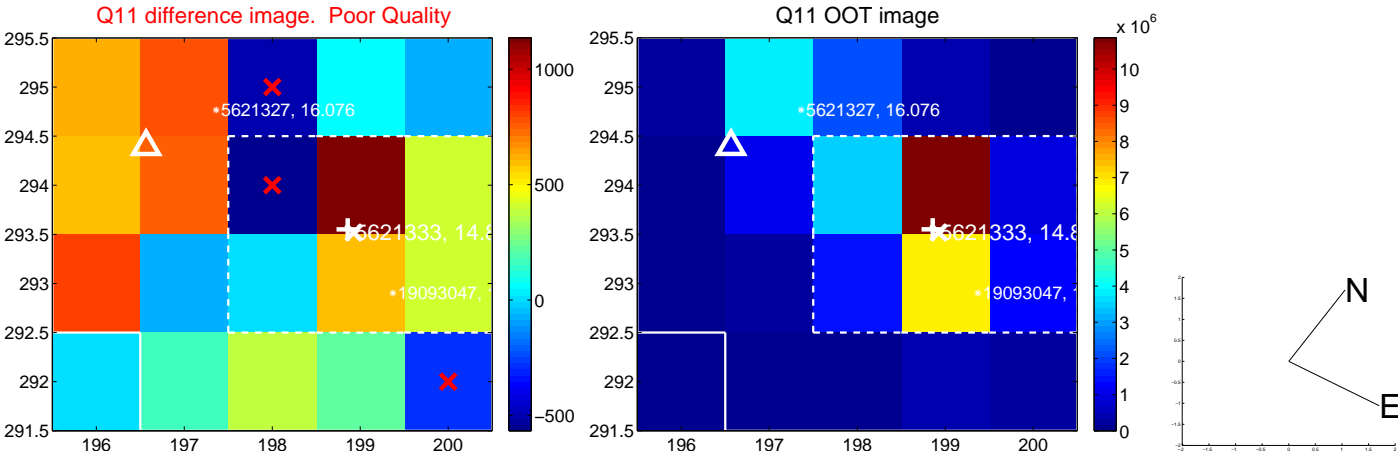
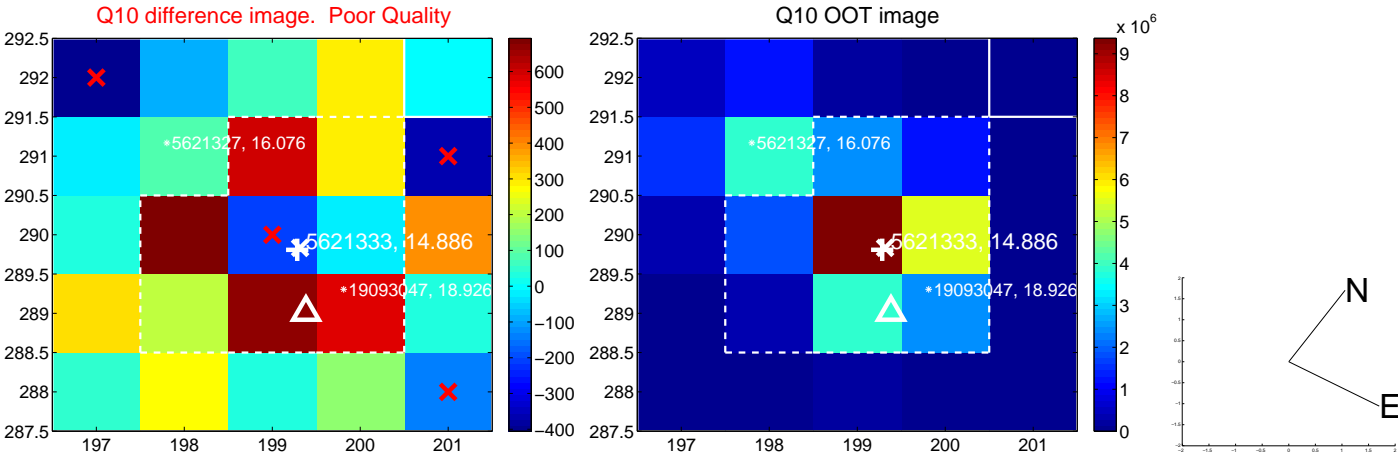
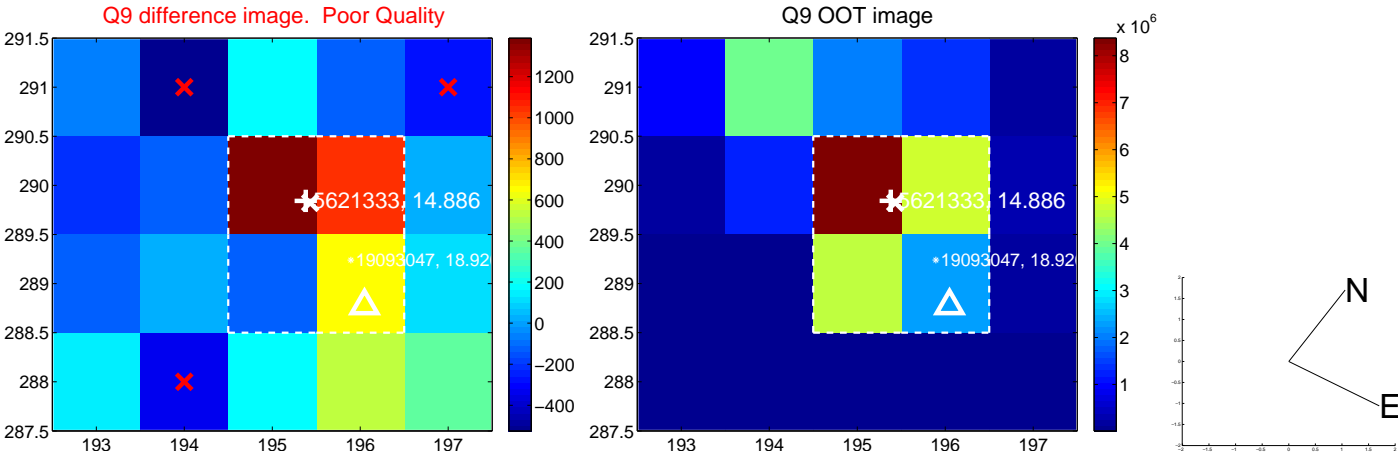
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



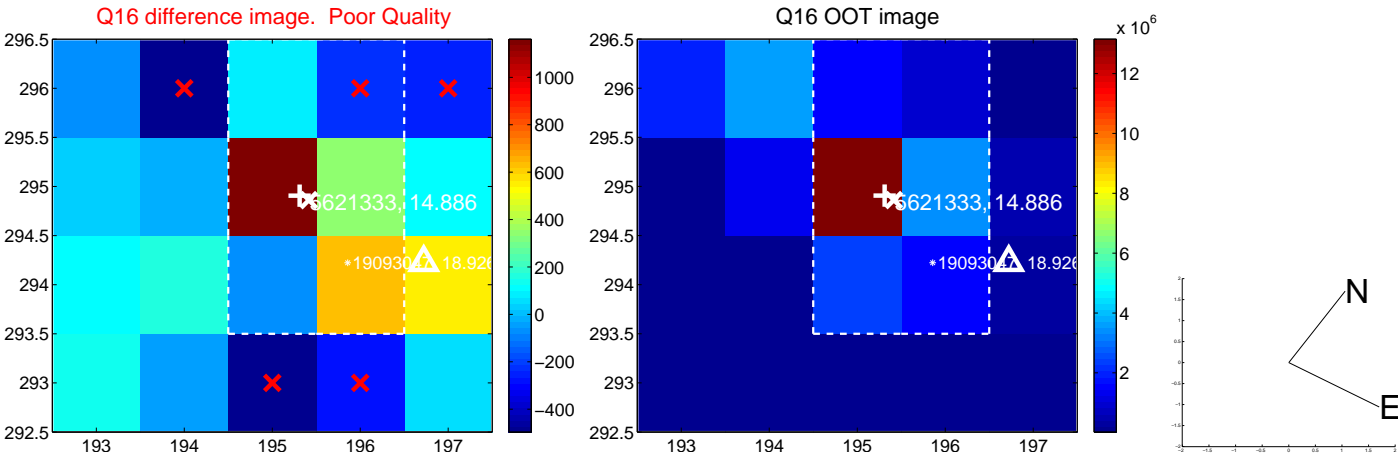
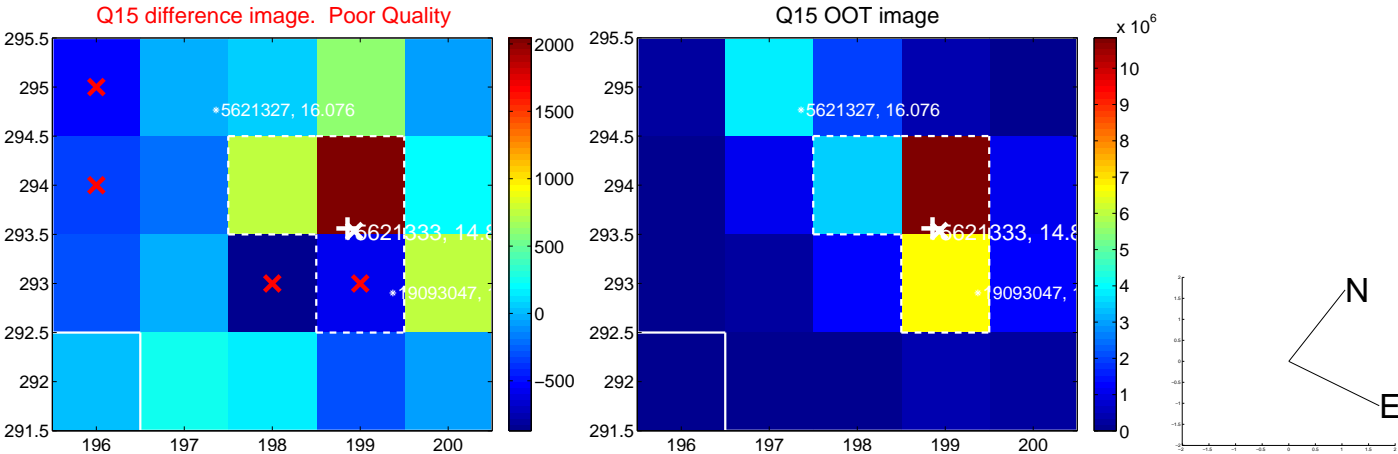
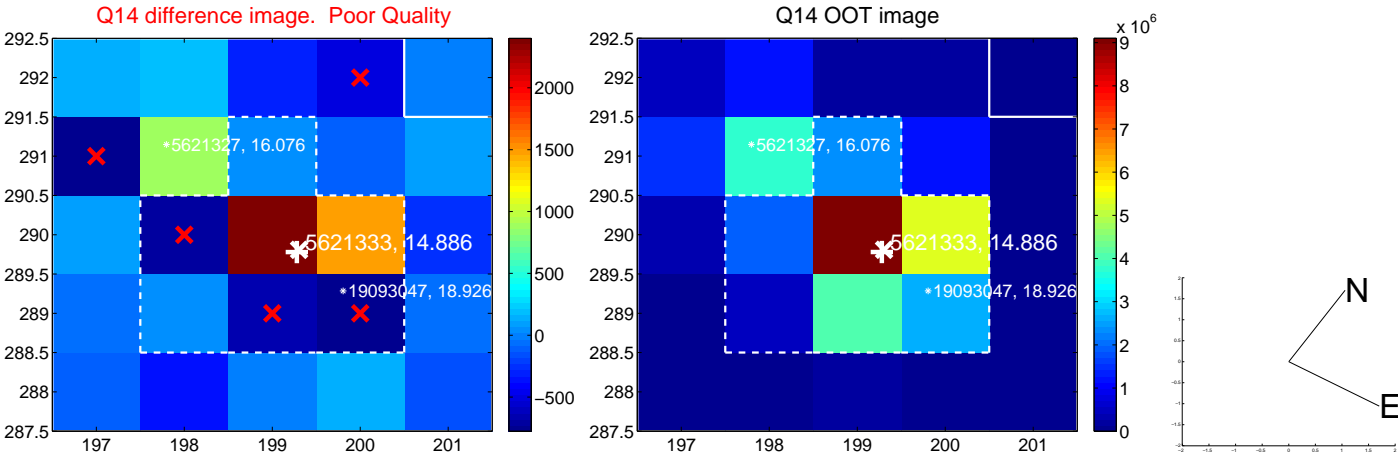
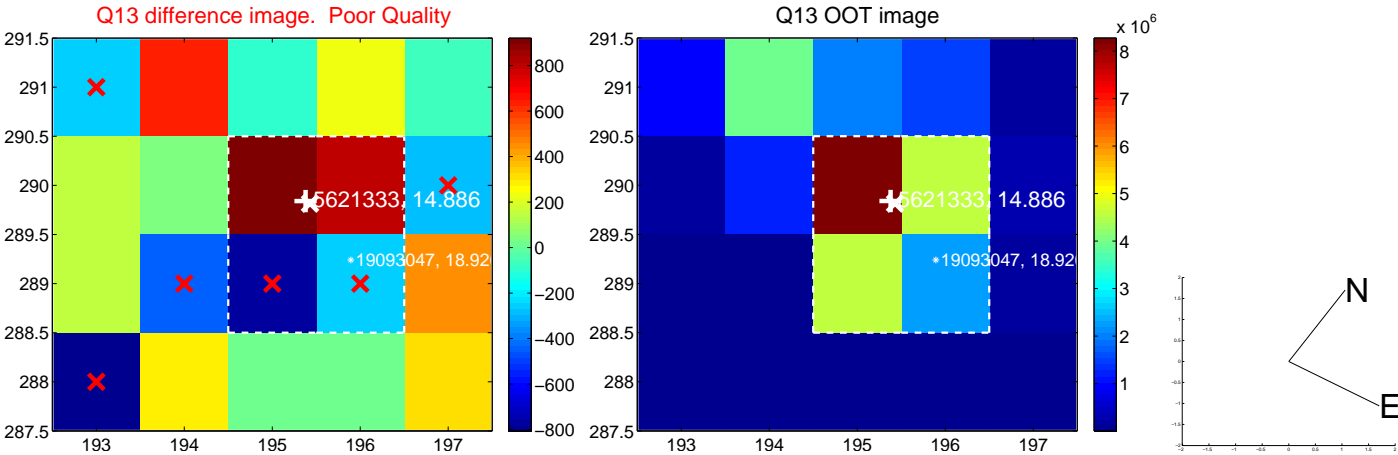
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



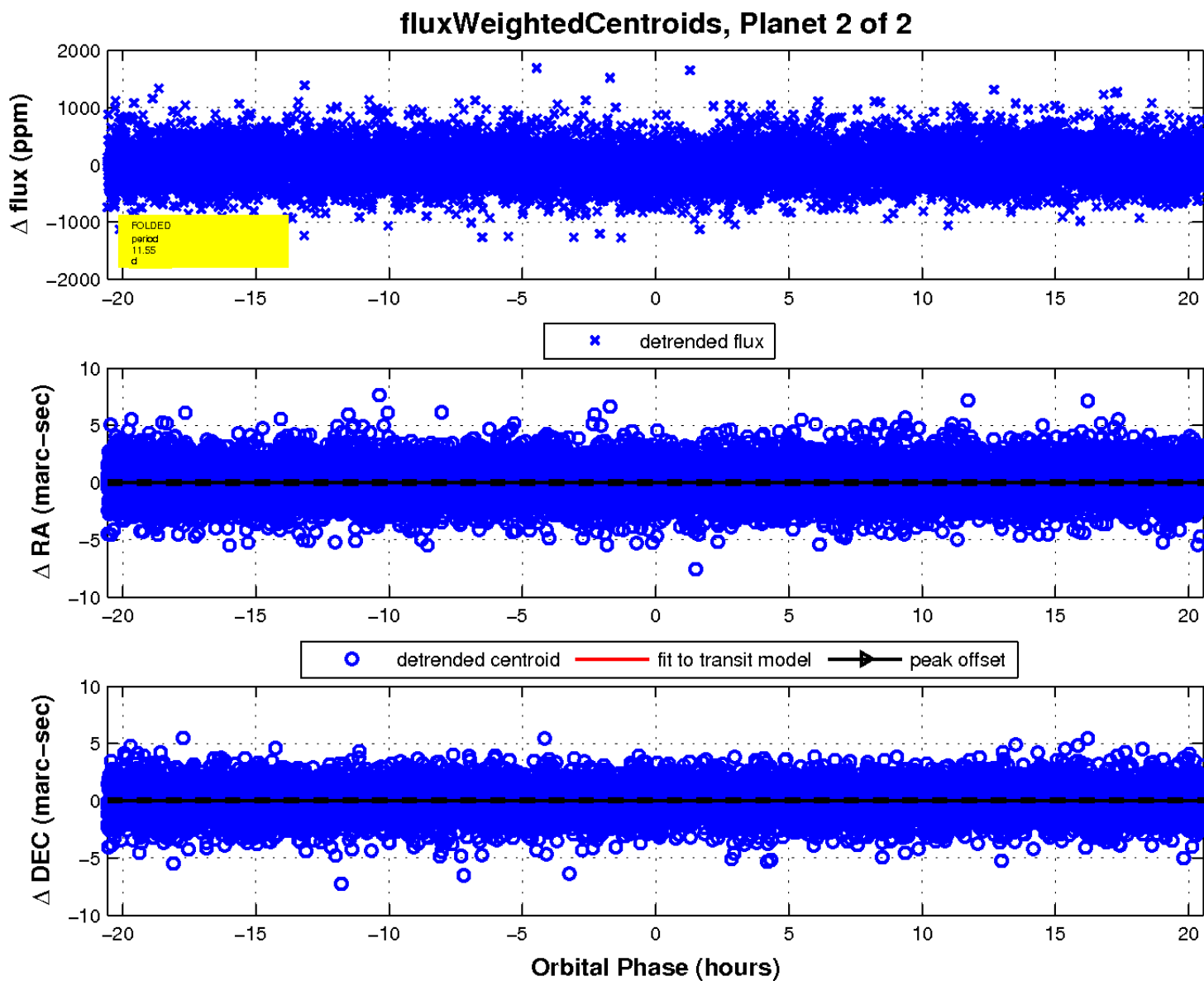
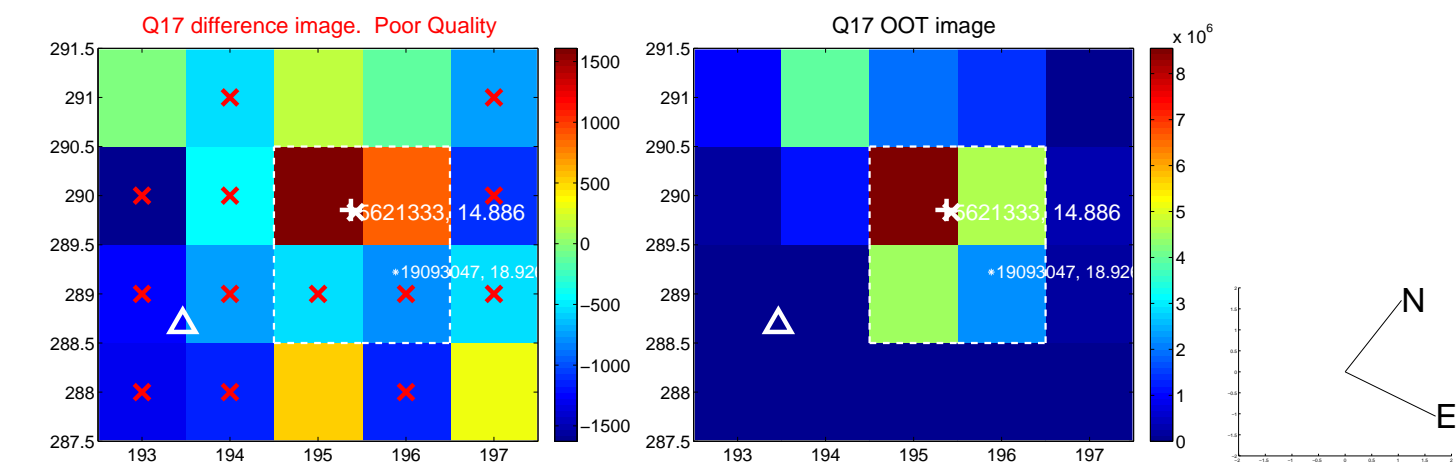
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

