

# KIC 005602588

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005602588-01	OBS	2369.01	11.018167	139.879187	515.2	4.596	18.0	19.3	0.97	6075	2.54	118.16
005602588-02	OBS	2369.03	7.227377	134.483083	170.7	4.933	7.7	7.9	0.97	6075	1.55	207.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005602588-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005602588-02	OBS	PC	0.97	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 005602588-01

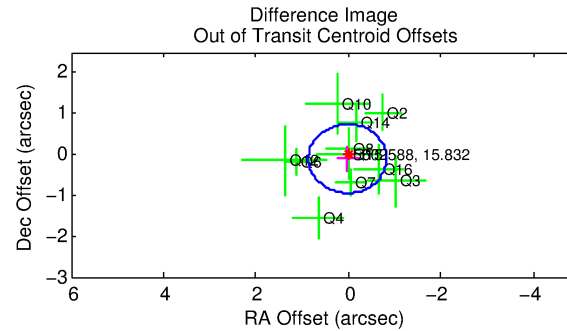
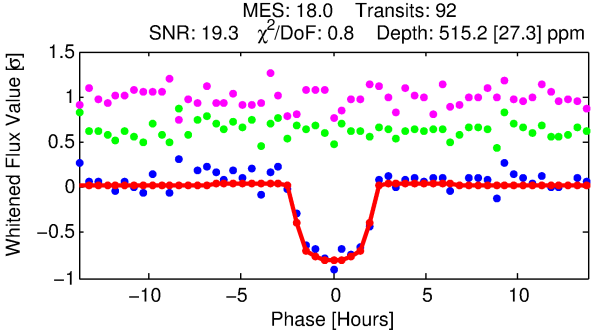
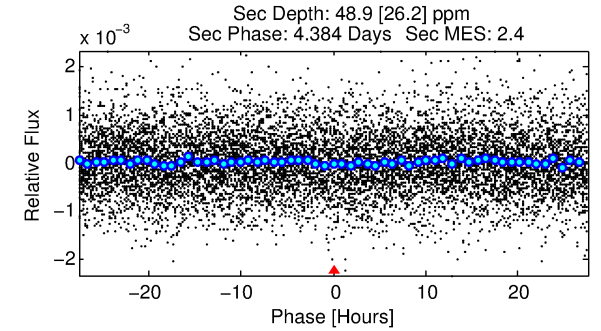
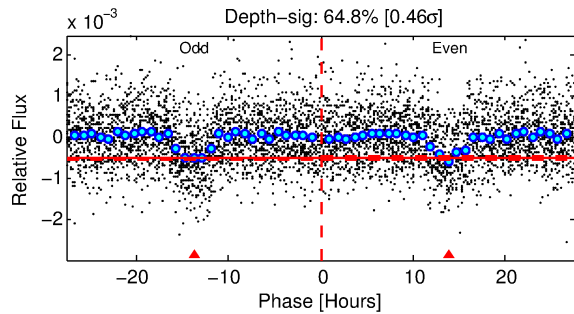
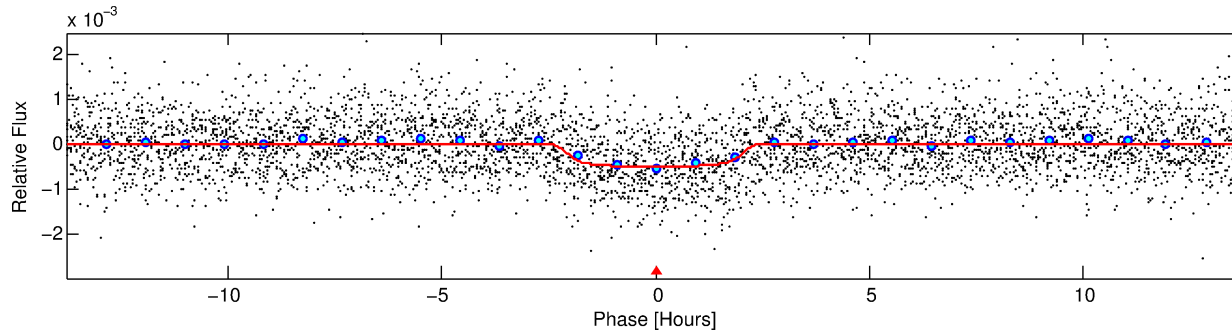
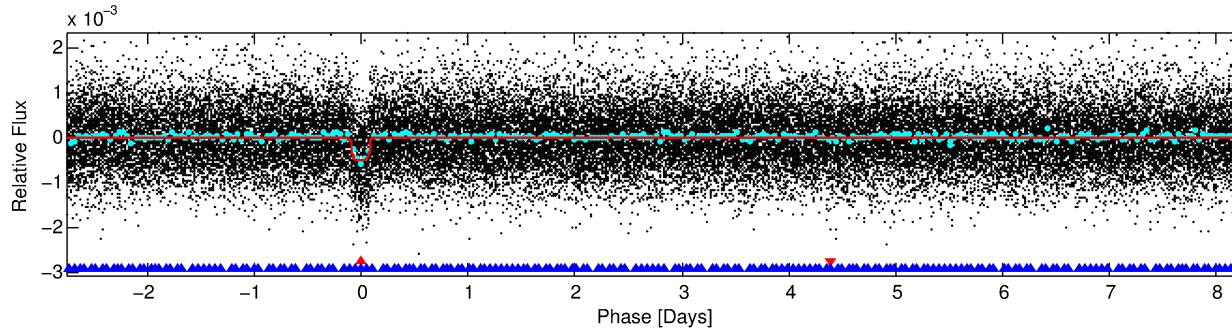
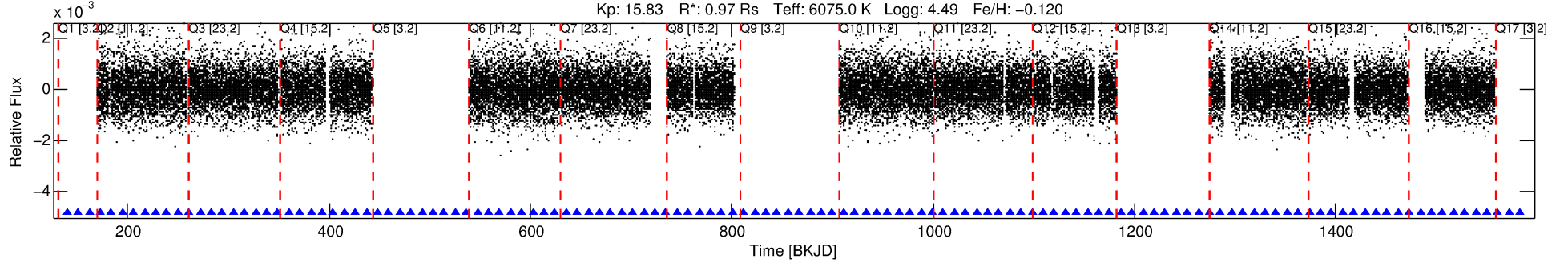
No Significant Match Found

# DV One-Page Summary

KIC: 5602588 Candidate: 1 of 2 Period: 11.018 d

KOI: K02369.01 Corr: 0.993

Kp: 15.83 R\*: 0.97 Rs Teff: 6075.0 K Logg: 4.49 Fe/H: -0.120



## DV Fit Results:

Period = 11.01817 [0.00007] d  
Epoch = 139.8792 [0.0047] BKJD  
Rp/R\* = 0.0241 [0.0034]  
a/R\* = 9.74 [6.74]  
b = 0.88 [0.19]  
Seff = 118.16 [47.80]  
Teq = 841 [85] K  
Rp = 2.54 [0.87] Re  
a = 0.0985 [0.0257] AU  
Ag = 40.36 [28.85] [1.36σ]  
Teffp = 3276 [509] K [4.72σ]

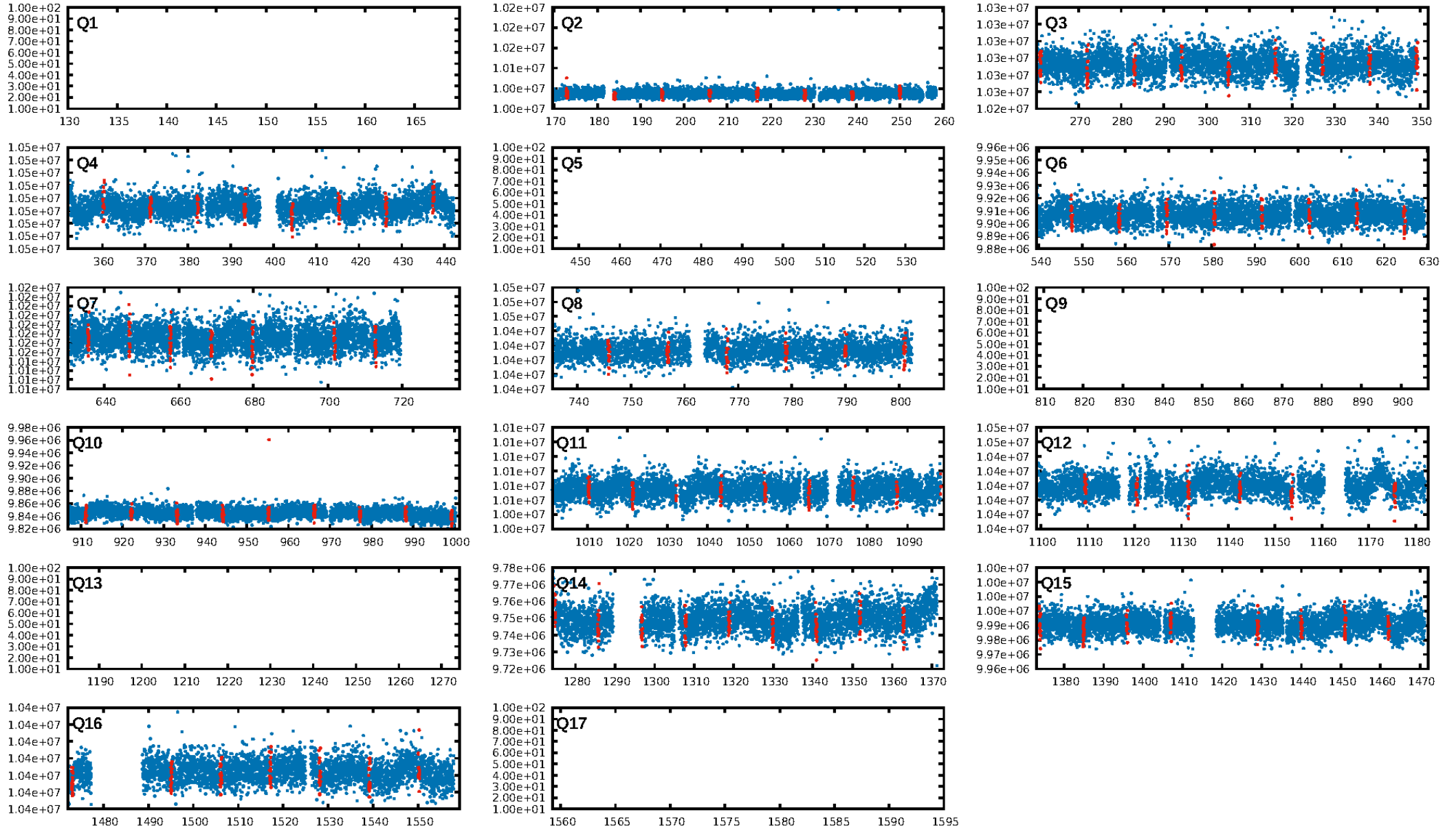
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [13.49σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.96e-71  
RollingBand-fgt: 1.00 [92/92]  
GhostDiagnostic-chr: 9.957  
Centroid-sig: 73.0%  
Centroid-so: 0.367 arcsec [0.43σ]  
OotOffset-rm: 0.109 arcsec [0.39σ]  
KicOffset-rm: 0.215 arcsec [0.70σ]  
OotOffset-st: 4/3/4/0 [11]  
KicOffset-st: 4/3/4/0 [11]  
DiffImageQuality-fgm: 0.91 [10/11]  
DiffImageOverlap-fno: 1.00 [12/12]

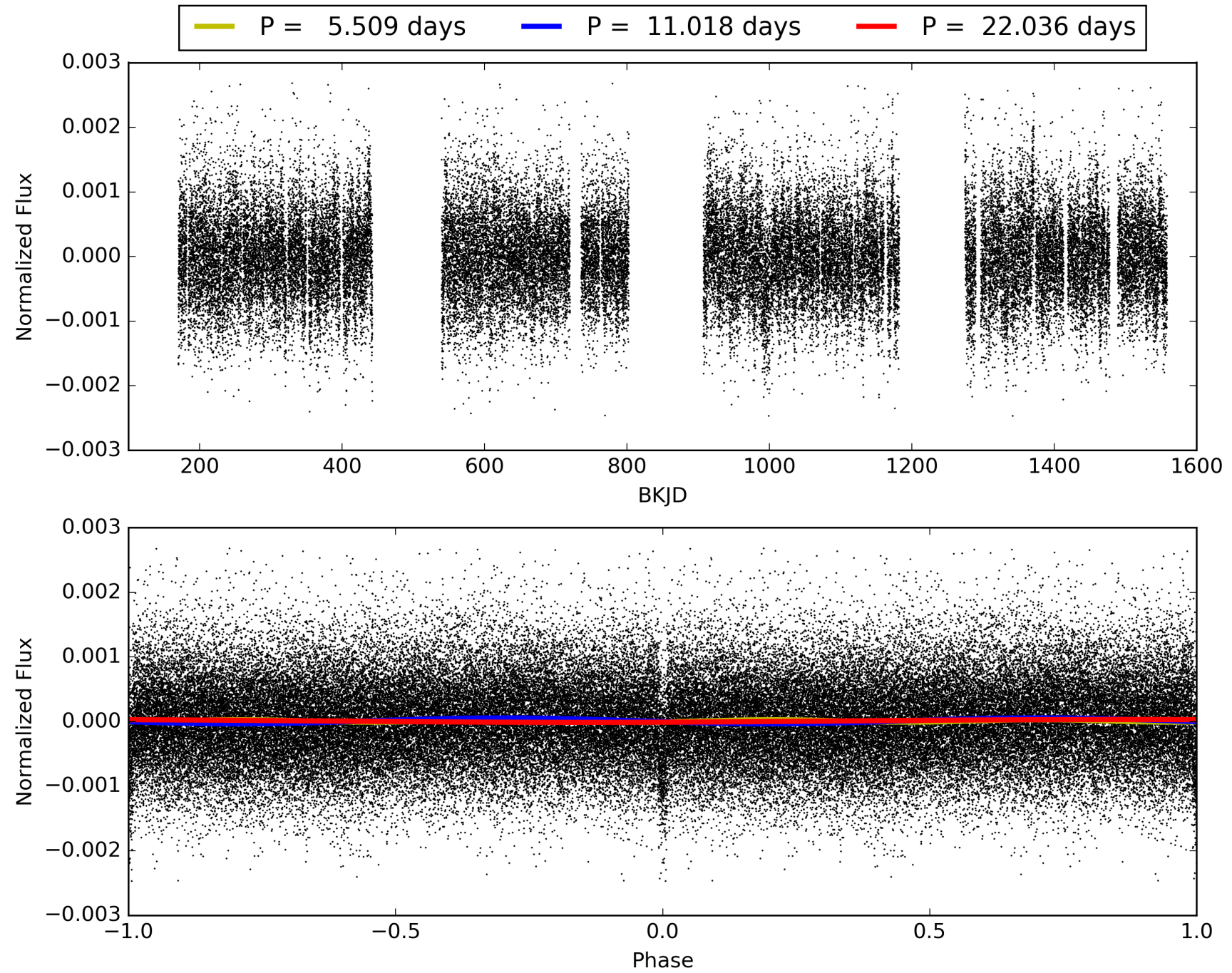
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:35:43 Z

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

# TCE 005602588-01, PDC Light Curves

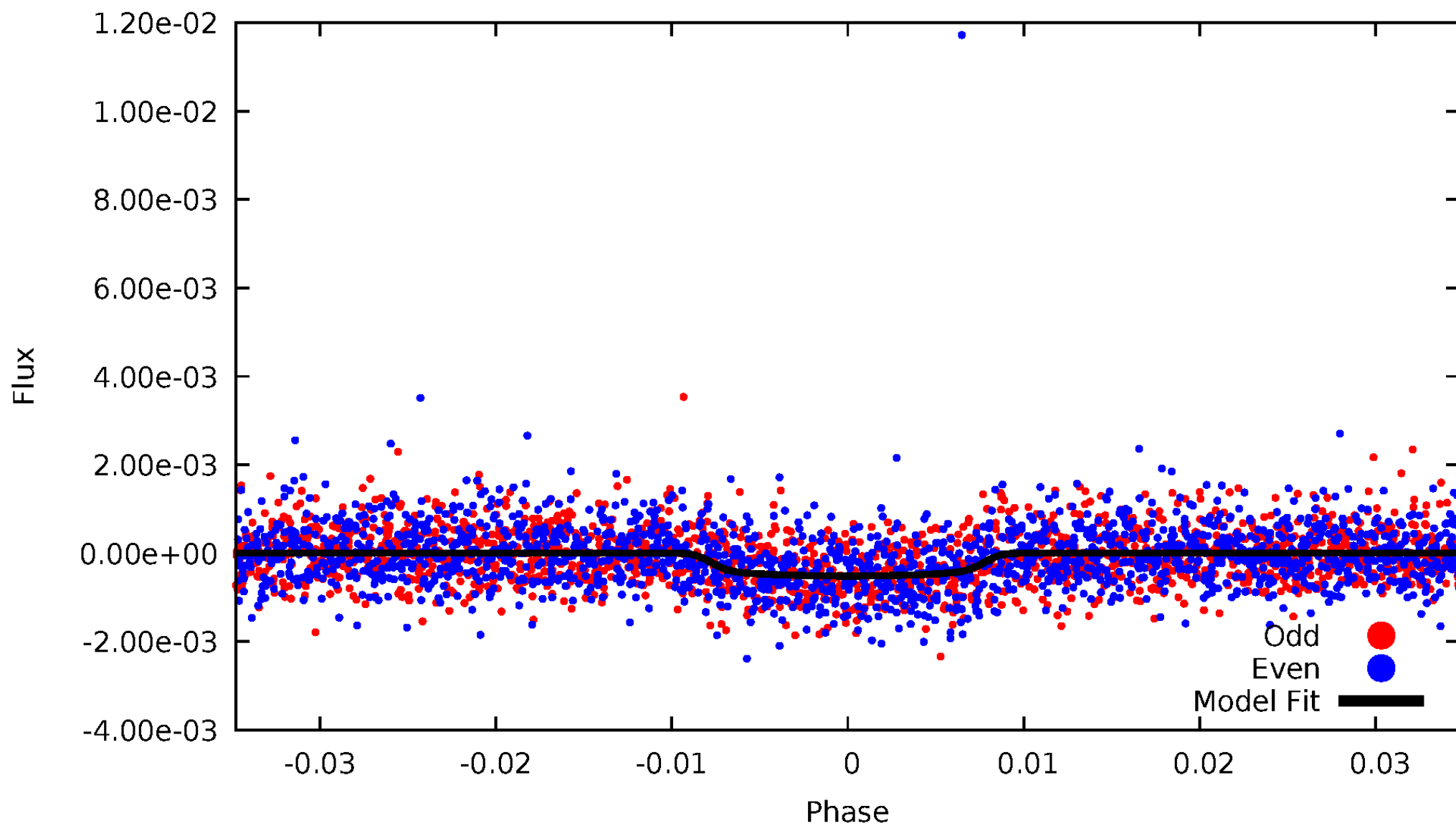


TCE 005602588-01



# DV Odd/Even

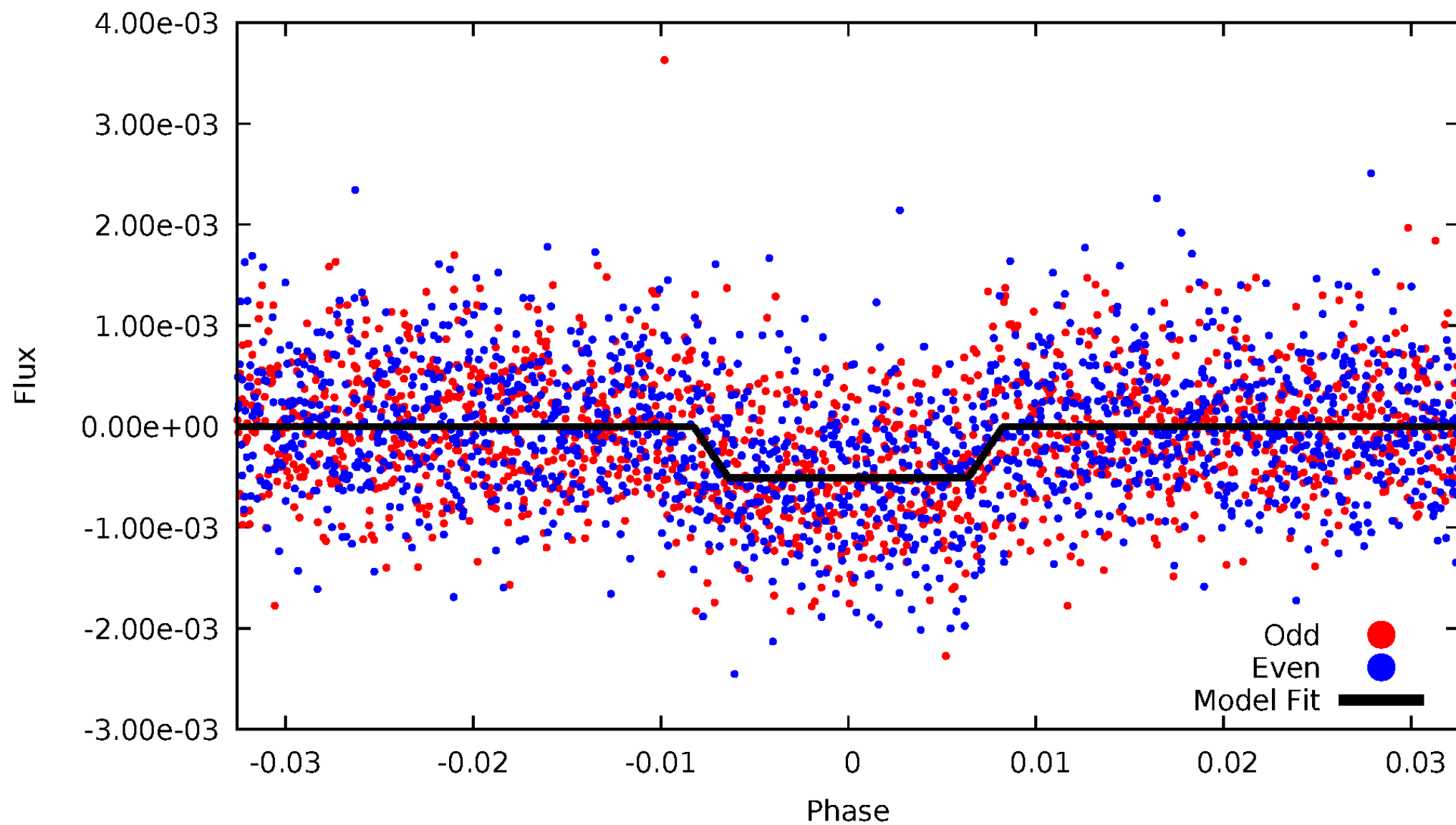
TCE 005602588-01



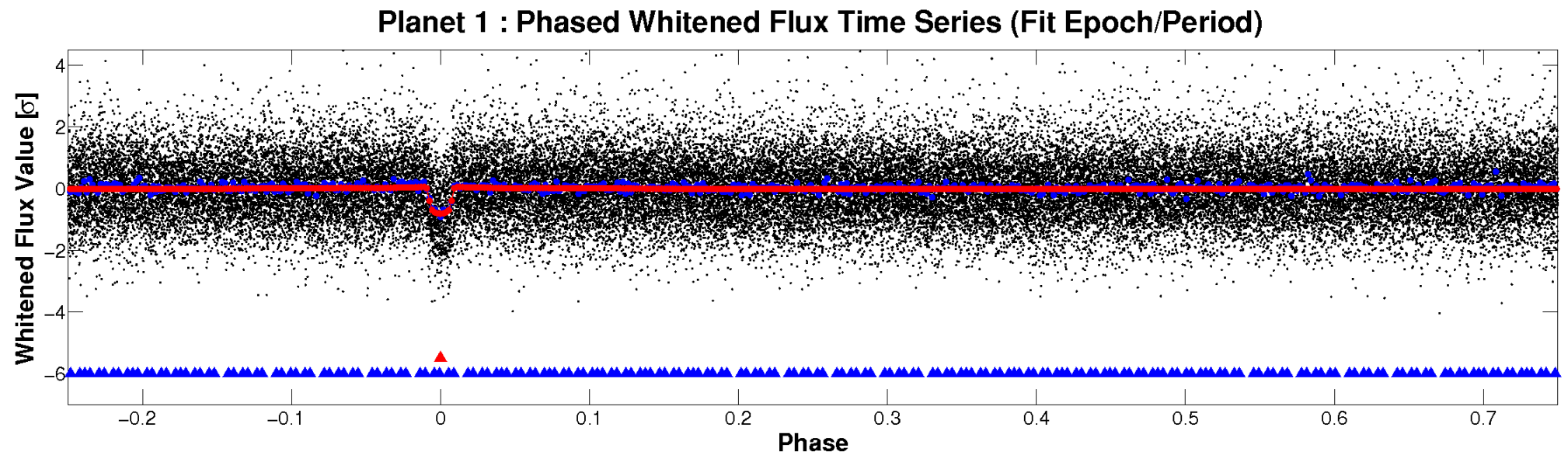
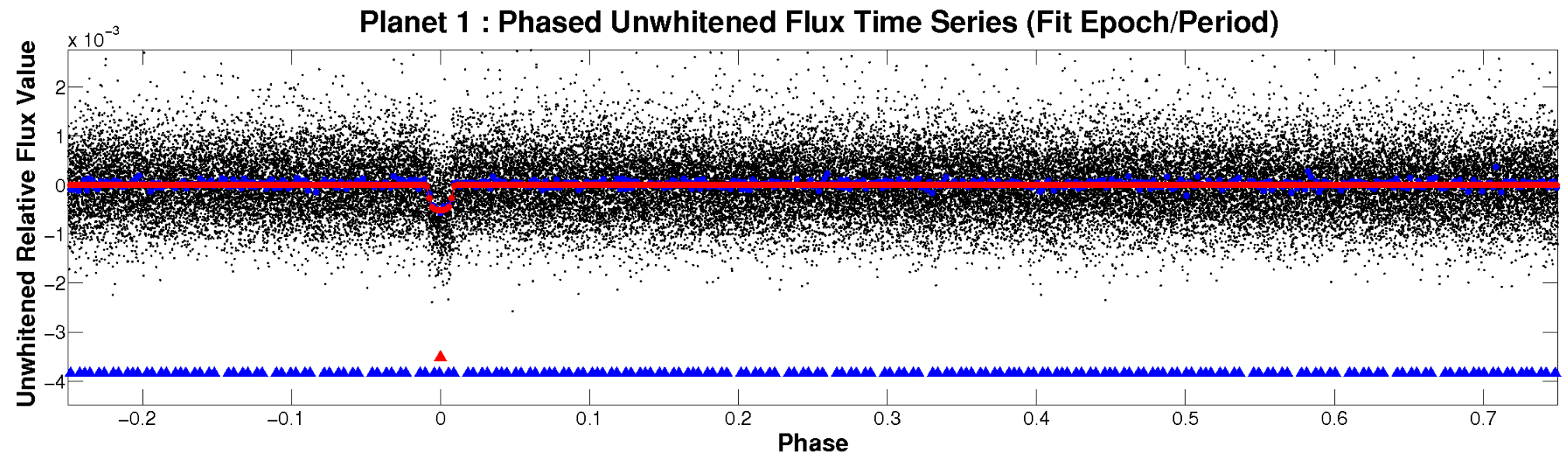


# ALT Odd/Even

TCE 005602588-01

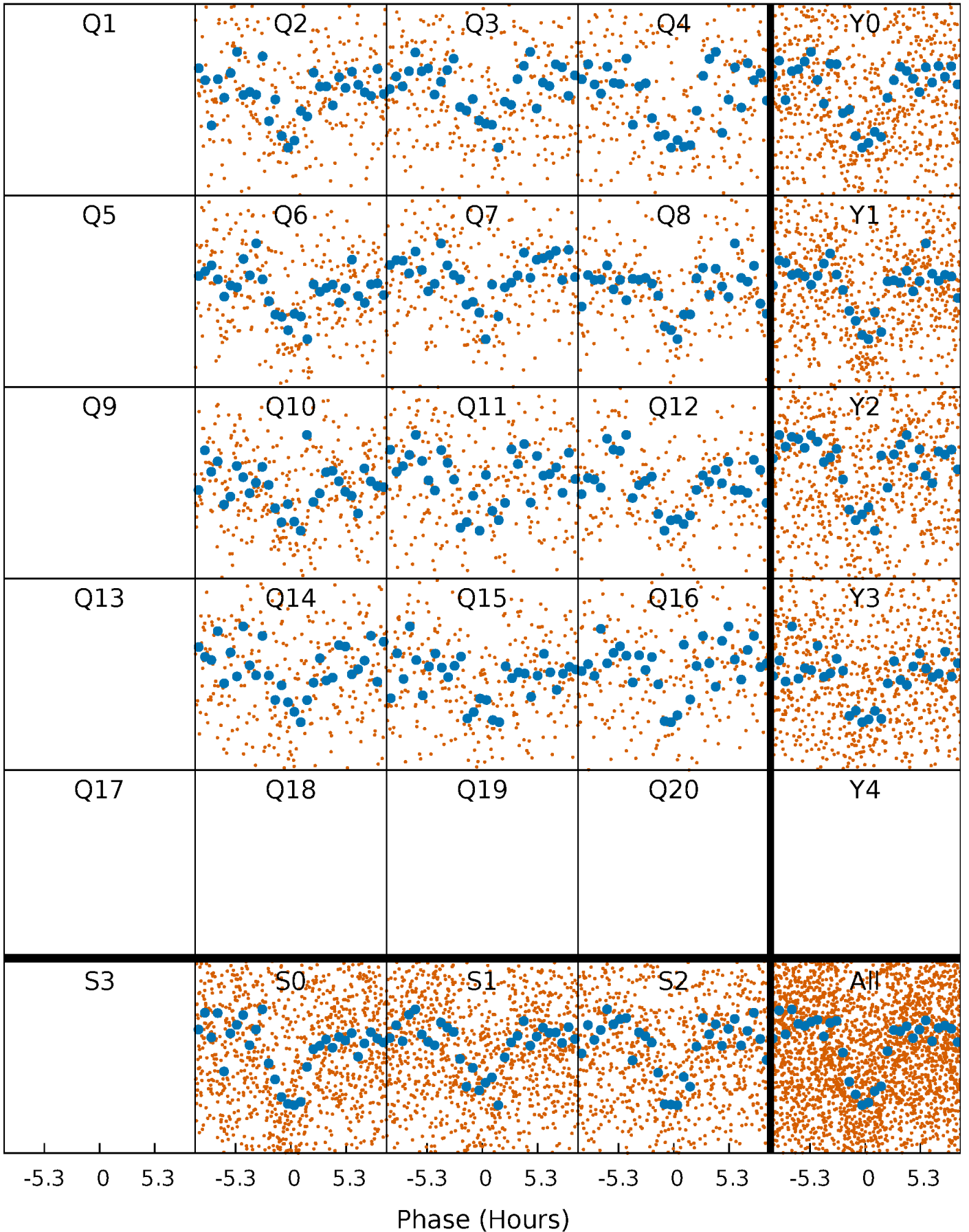


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

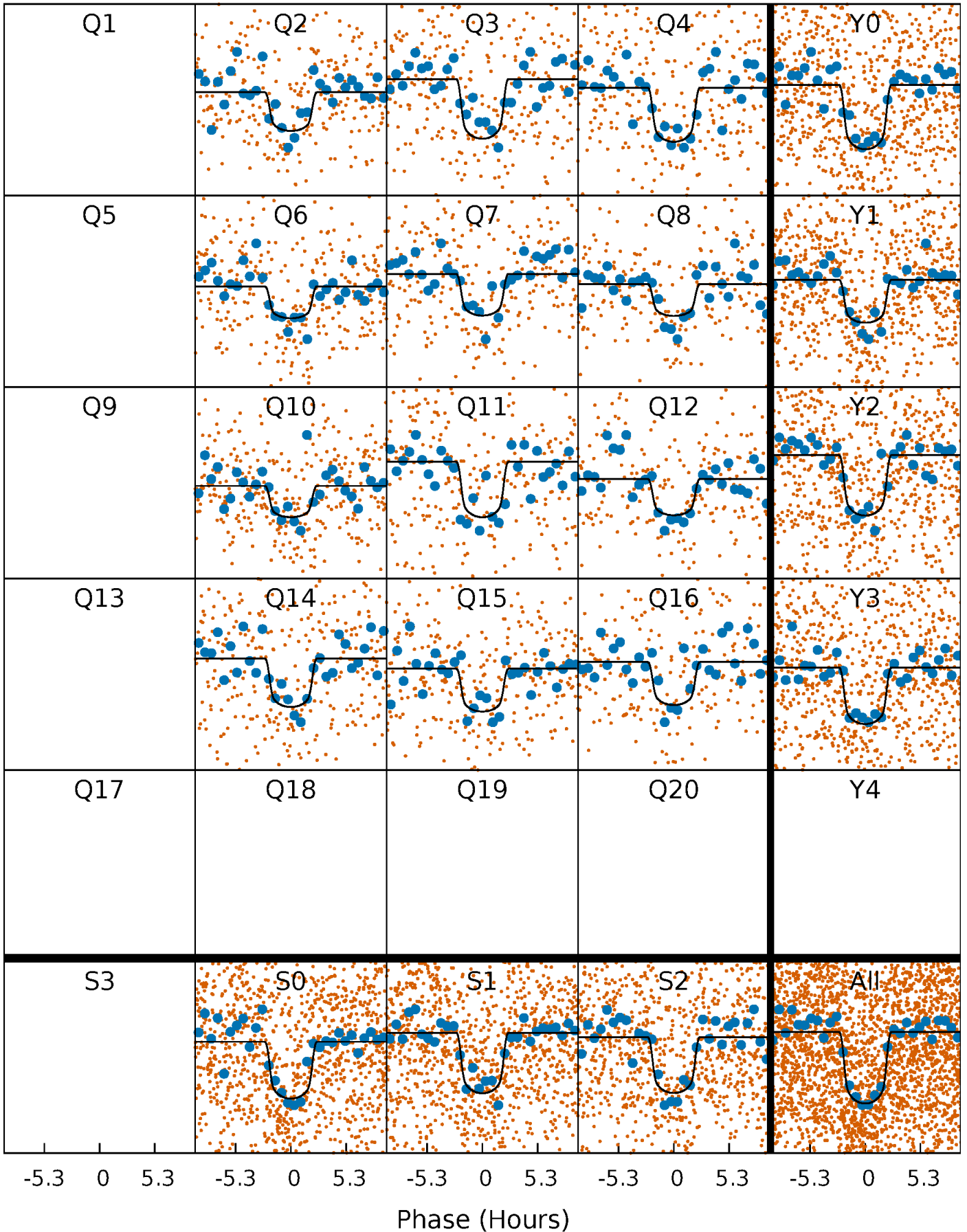
TCE 005602588-01 P= 11.018167 Days  $T_0=139.879187$  (BKJD)





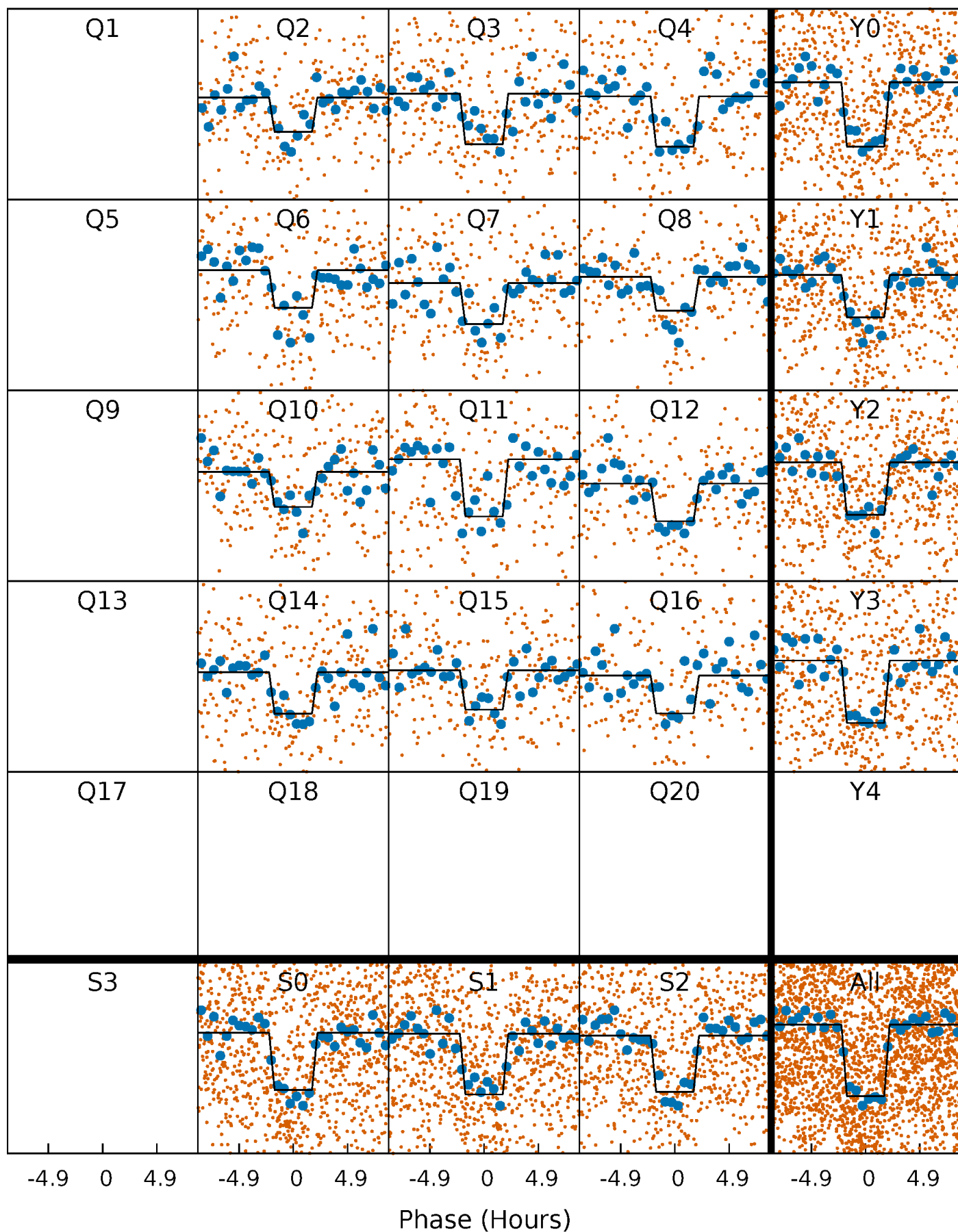
# DV Quarter-Phased Transit Curves

TCE 005602588-01 P= 11.018167 Days  $T_0=139.879187$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

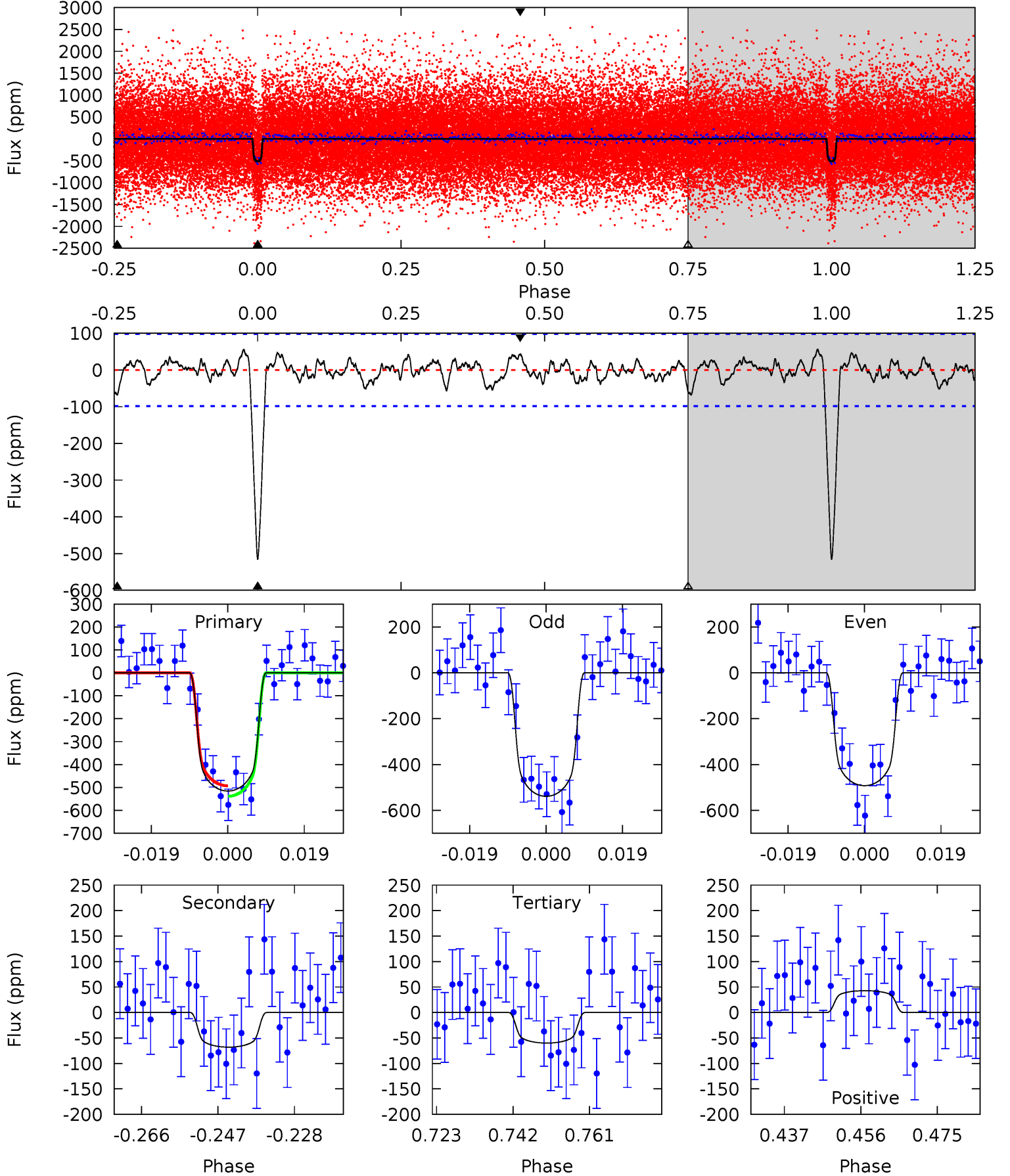
TCE 005602588-01 P= 11.018129 Days  $T_0=139.884410$  (BKJD)



# DV Model-Shift Uniqueness Test

005602588-01, P = 11.018167 Days, E = 139.879187 Days

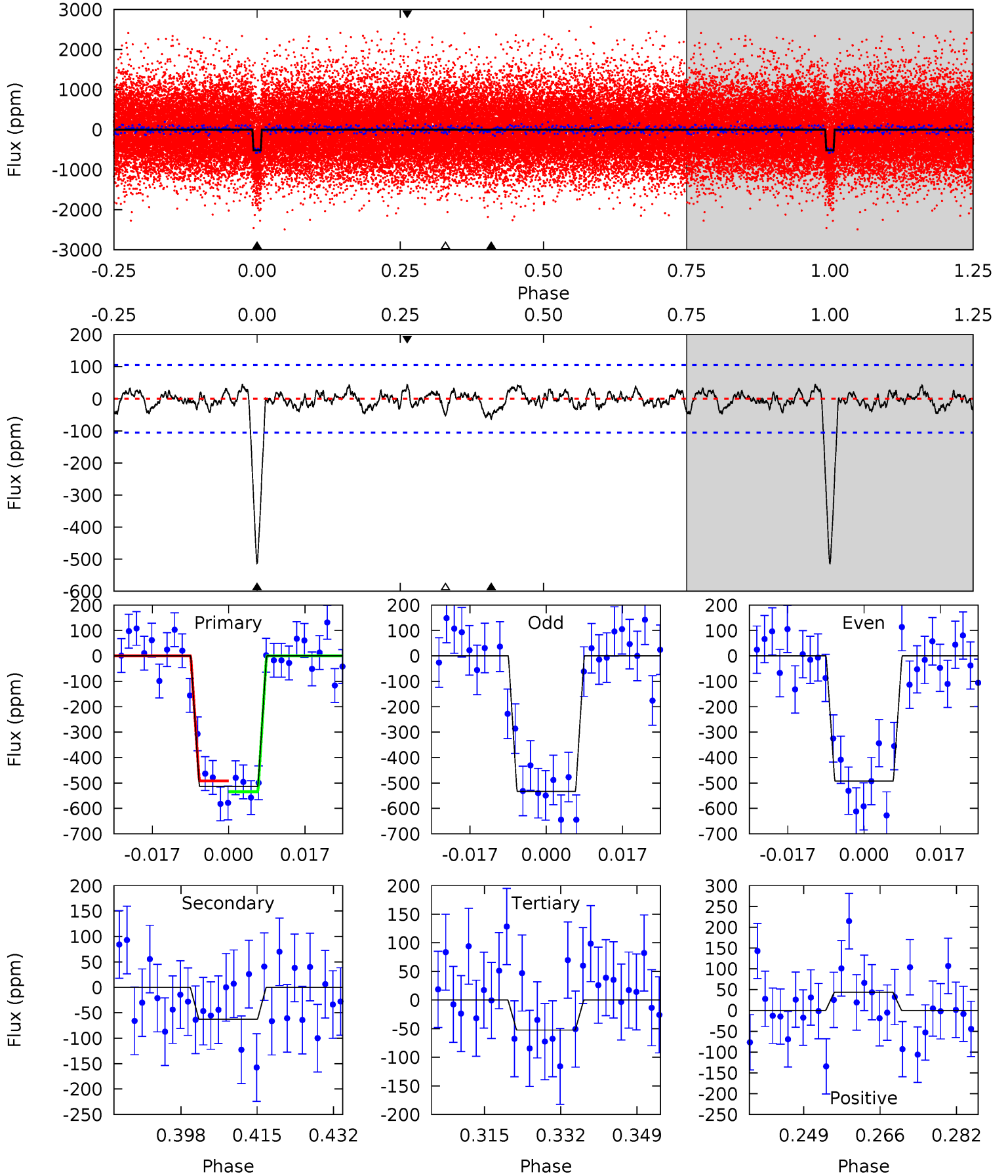
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.7	3.39	2.99	2.13	4.90	2.35	1.06	22.7	23.5	0.40	1.25	1.16	0.99	0.10	1.14



# Alt Model-Shift Uniqueness Test

005602588-01,  $P = 11.018129$  Days,  $E = 139.884410$  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
24.0	2.93	2.45	2.05	4.93	2.40	0.87	21.5	21.9	0.49	0.88	0.95	1.00	0.08	0.98



### Stellar Parameters For KIC 005602588

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6075^{+168}_{-210}$	$4.486^{+0.052}_{-0.208}$	$-0.120^{+0.250}_{-0.350}$	$0.969^{+0.300}_{-0.100}$	$1.048^{+0.139}_{-0.139}$	$1.622^{+0.455}_{-0.850}$
	+3%/-3%	+1%/-5%	+208%/-292%	+31%/-10%	+13%/-13%	+28%/-52%
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 005602588-01 / KOI 2369.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-68 \pm 20$	$2.65^{+0.57}_{-0.47}$	$1198^{+88}_{-61}$	$3884^{+290}_{-290}$	$49^{+28}_{-20}$
Alt.	$-63 \pm 21$	$2.47^{+0.53}_{-0.43}$	$1196^{+79}_{-61}$	$3903^{+330}_{-314}$	$51^{+31}_{-21}$

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



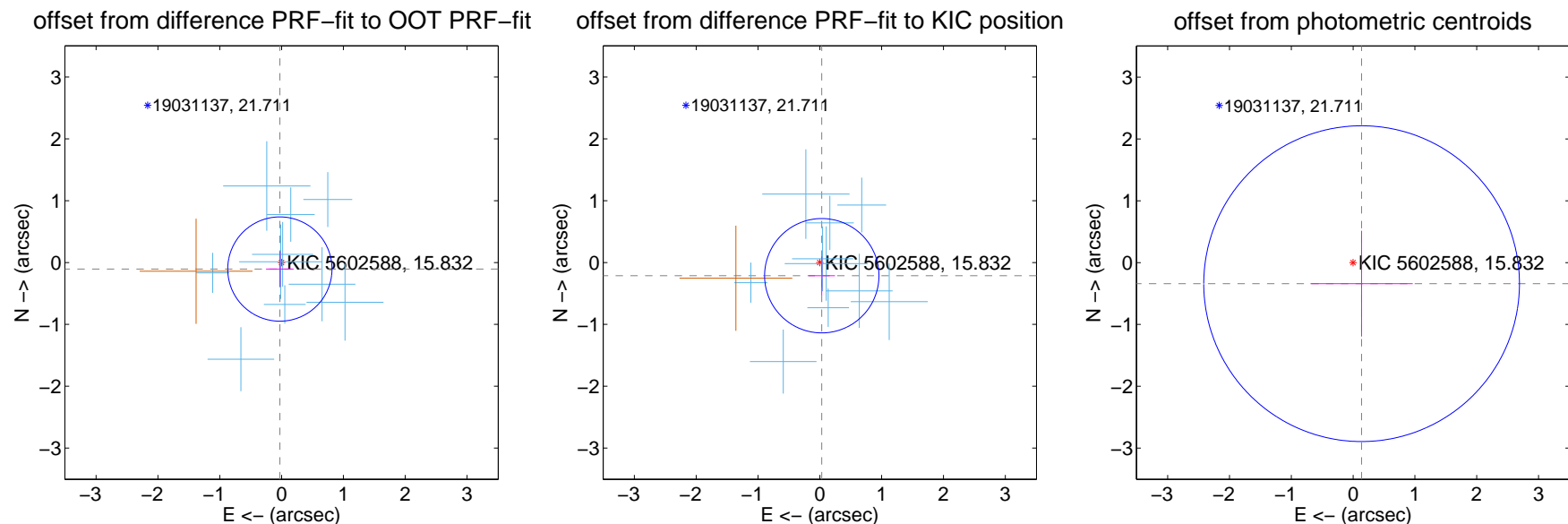
## DV Centroid Data

Supplemental centroid analysis for 005602588-01. Kepler magnitude: 15.83. Transit SNR 19.34

There are 10 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

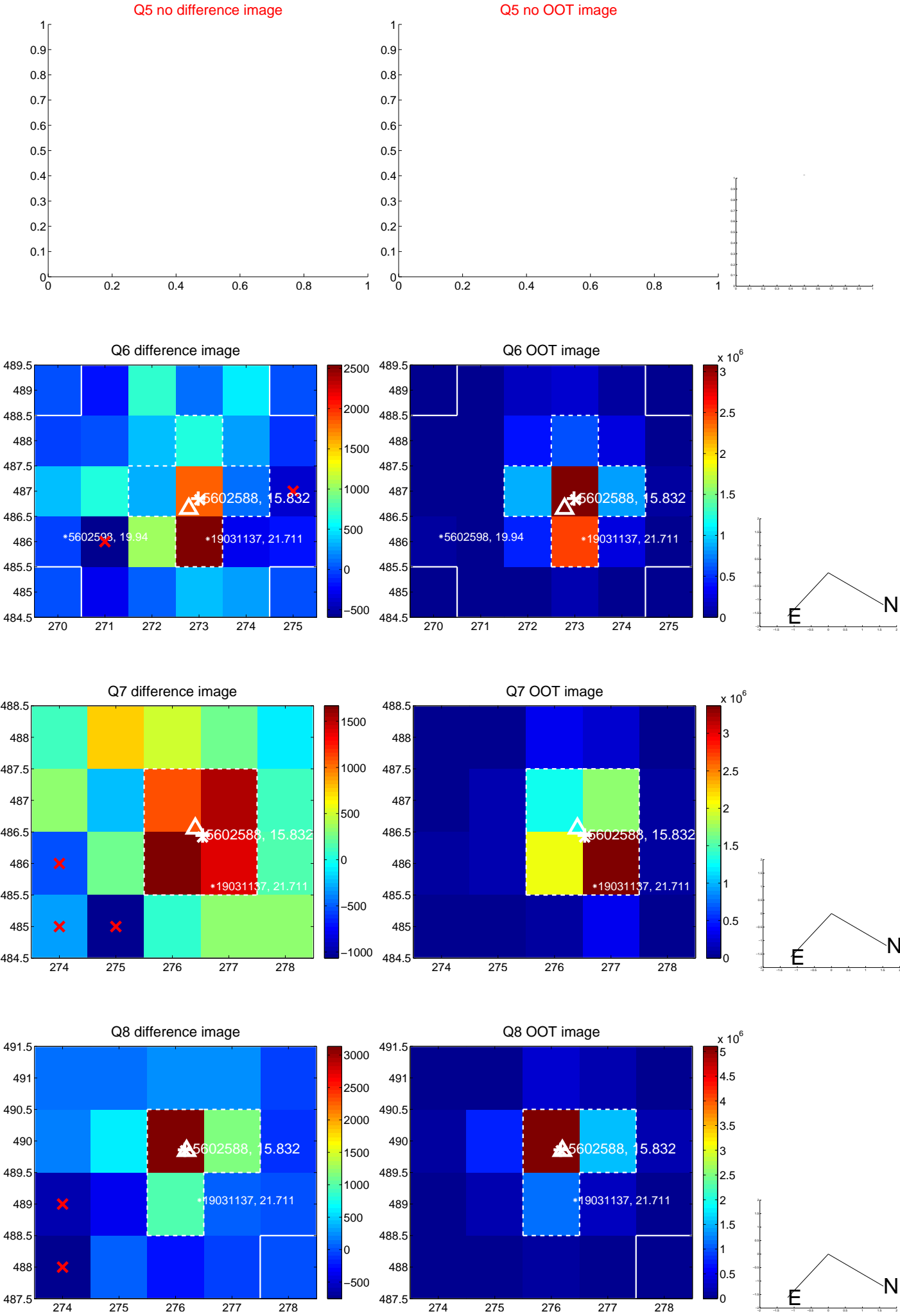
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.109 \pm 0.281$	0.39	$0.028 \pm 0.223$	$-0.105 \pm 0.285$
PRF-fit source offset from KIC position	$0.215 \pm 0.308$	0.70	$-0.031 \pm 0.214$	$-0.213 \pm 0.310$
photometric centroid source offset	$0.37 \pm 0.85$	0.43	$-0.14 \pm 0.83$	$-0.34 \pm 0.85$



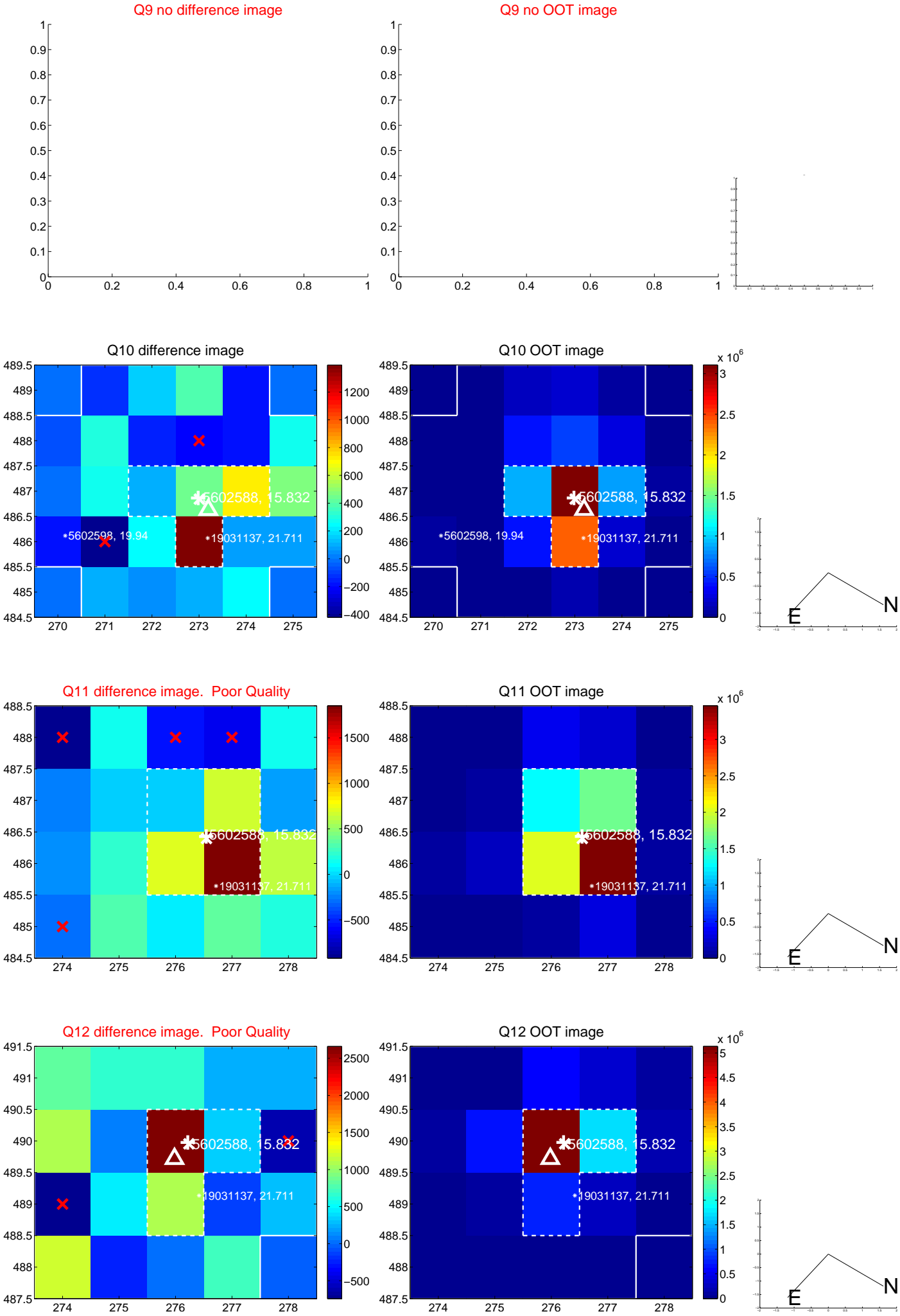
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



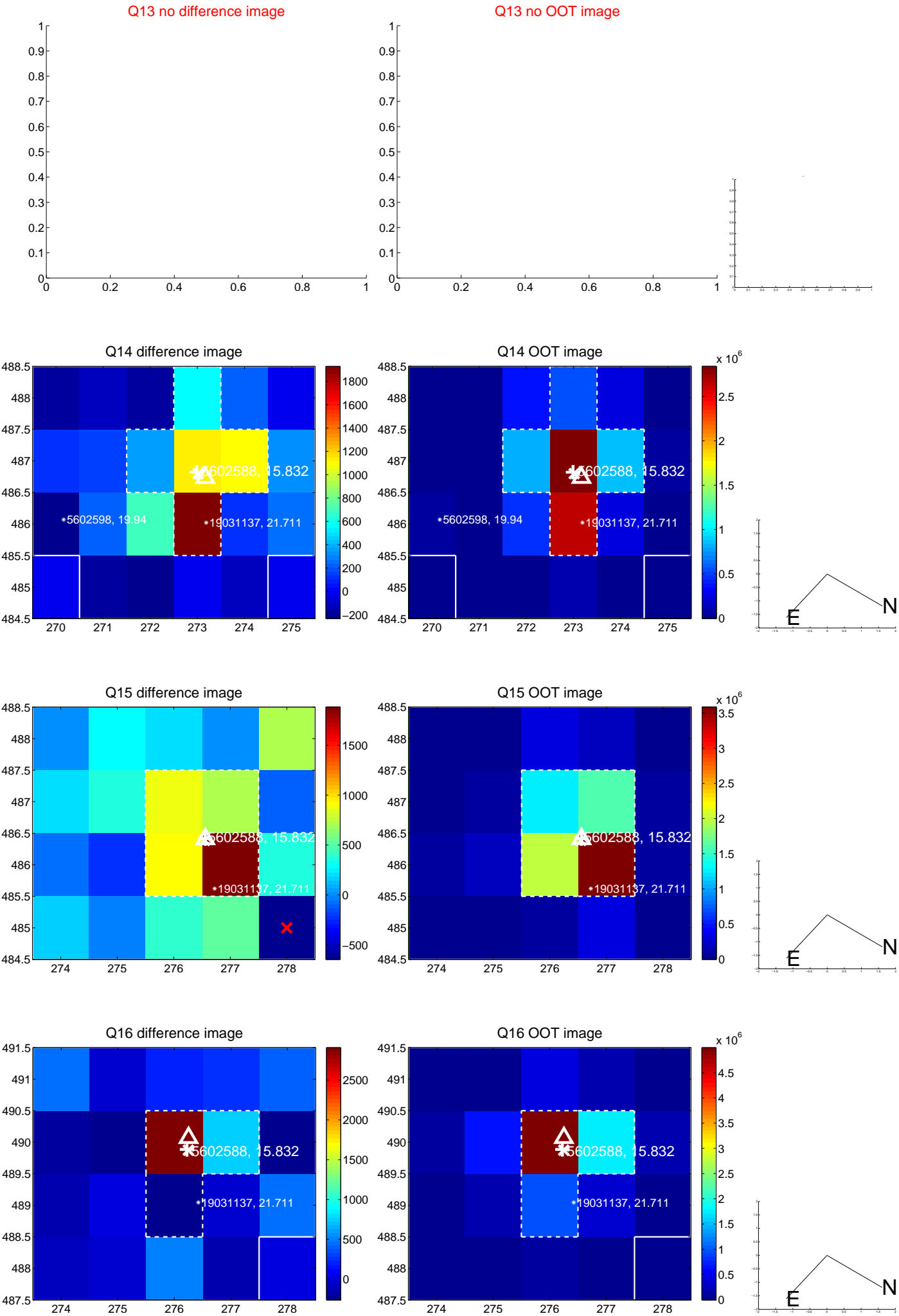
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

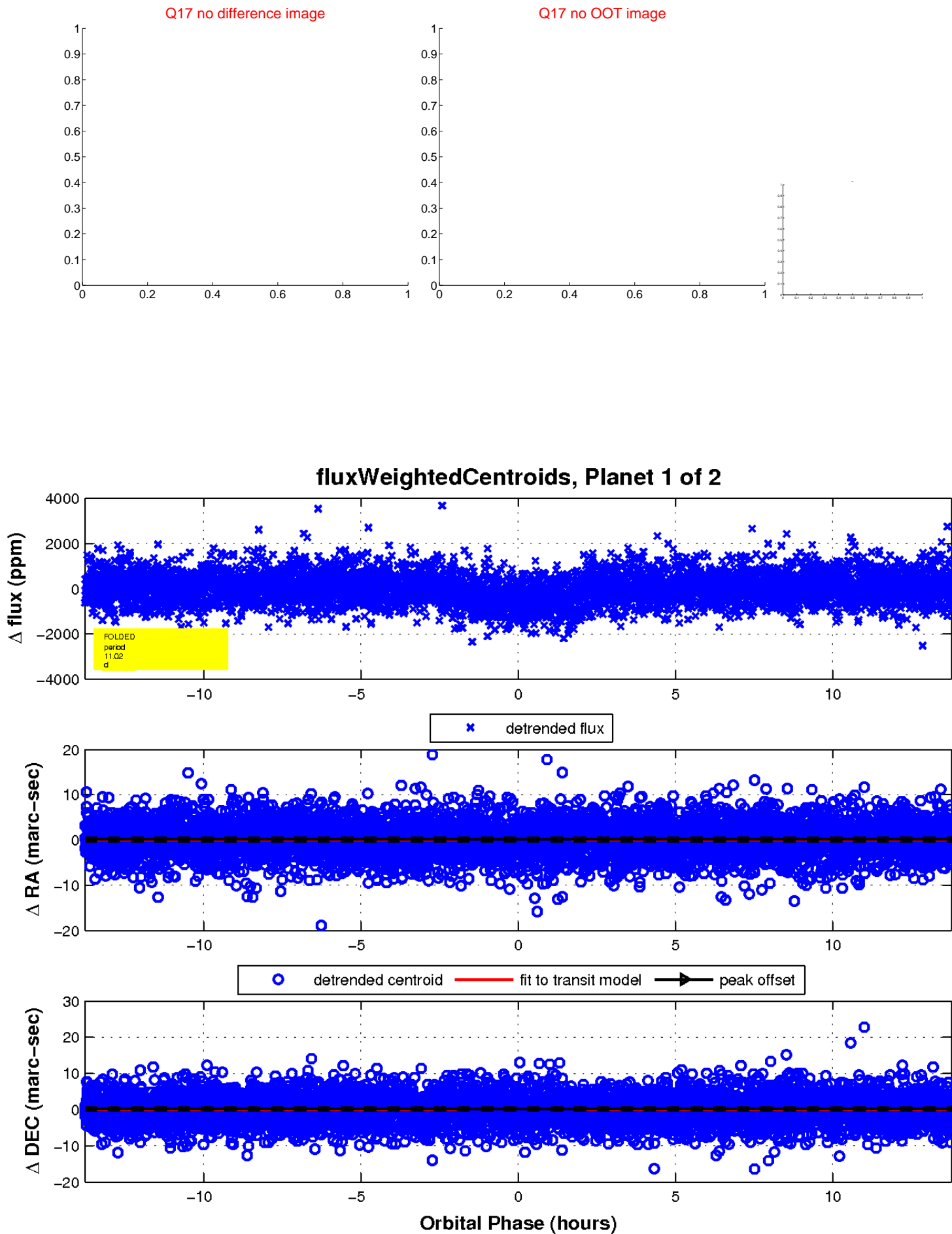


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



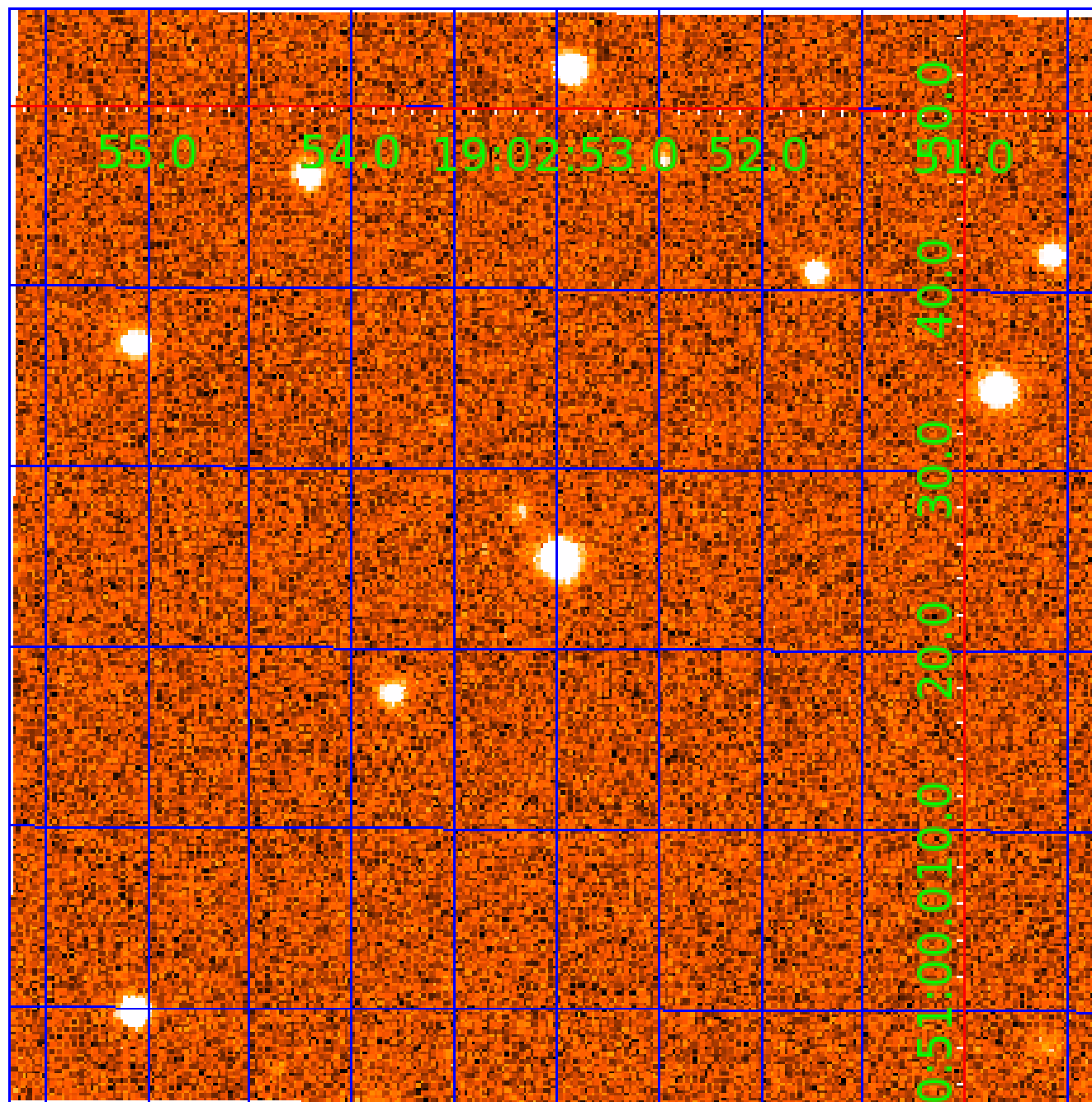


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 005602588

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005602588-01	OBS	2369.01	11.018167	139.879187	515.2	4.596	18.0	19.3	0.97	6075	2.54	118.16
005602588-02	OBS	2369.03	7.227377	134.483083	170.7	4.933	7.7	7.9	0.97	6075	1.55	207.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005602588-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005602588-02	OBS	PC	0.97	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 005602588-02

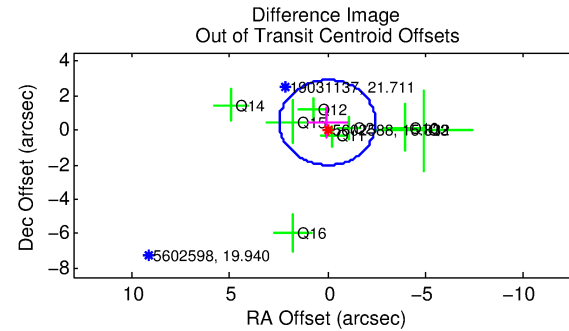
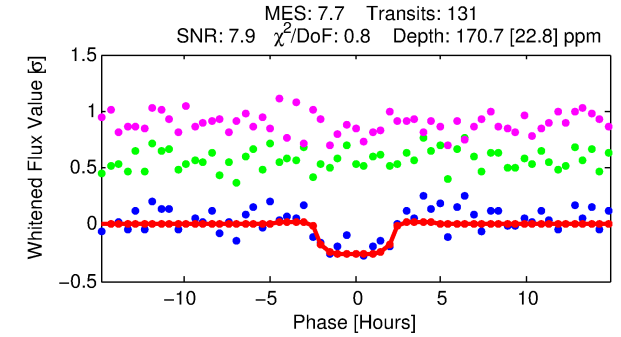
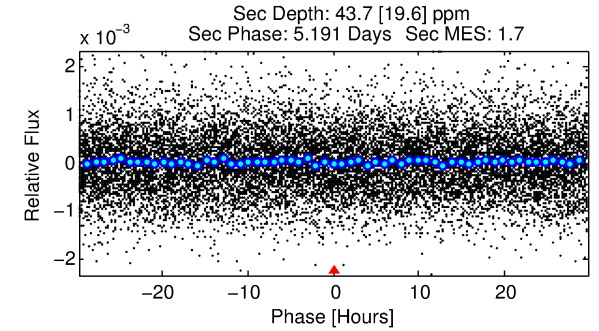
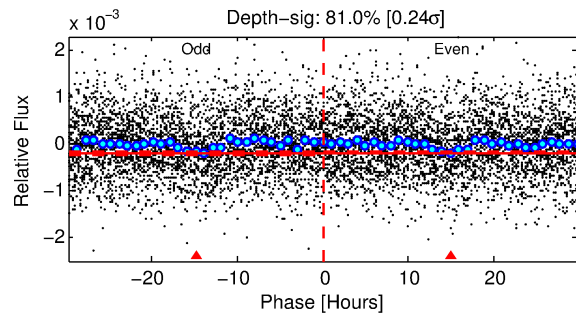
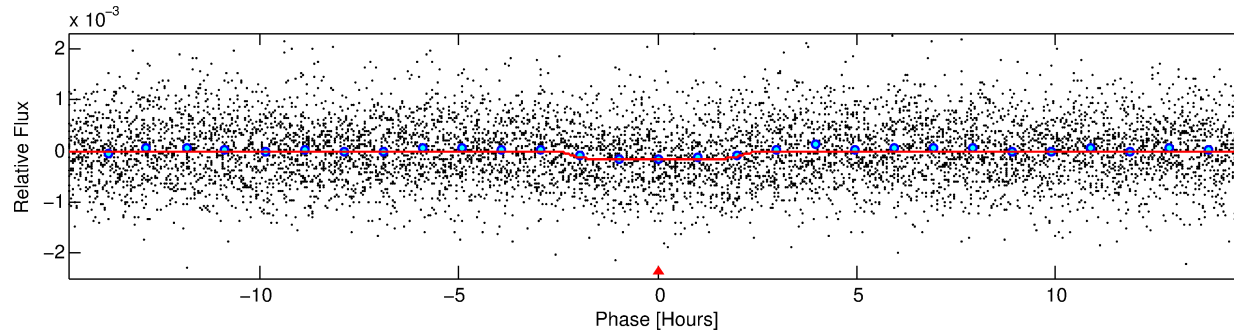
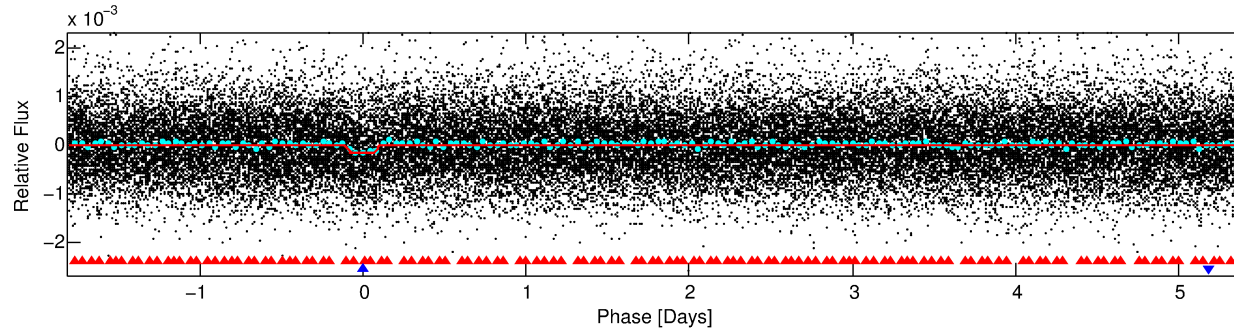
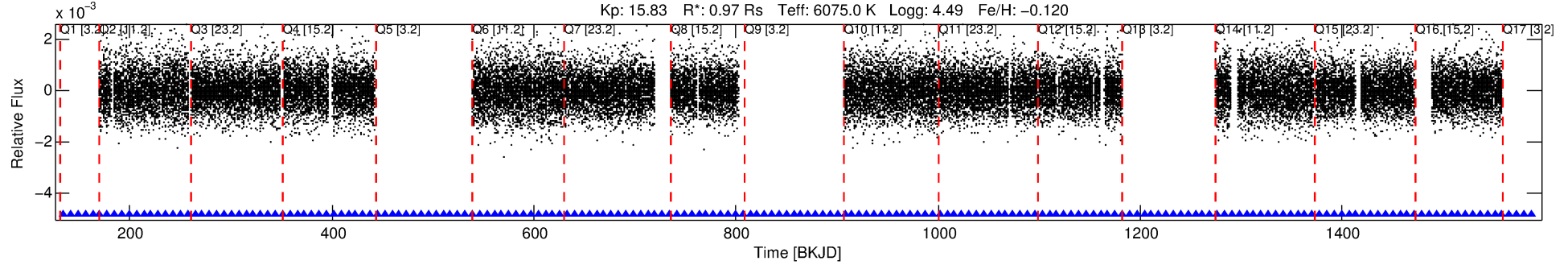
No Significant Match Found

# DV One-Page Summary

KIC: 5602588 Candidate: 2 of 2 Period: 7.227 d

KOI: K02369.03 Corr: 0.958

Kp: 15.83 R\*: 0.97 Rs Teff: 6075.0 K Logg: 4.49 Fe/H: -0.120



## DV Fit Results:

Period = 7.22738 [0.00011] d  
Epoch = 134.4831 [0.0117] BKJD  
Rp/R\* = 0.0147 [0.0034]  
a/R\* = 4.46 [4.92]  
b = 0.94 [0.15]  
Seff = 207.33 [83.88]  
Teq = 968 [98] K  
Rp = 1.55 [0.60] Re  
a = 0.0743 [0.0194] AU  
Ag = 55.05 [40.96] [1.32σ]  
Teffp = 4075 [667] K [4.61σ]

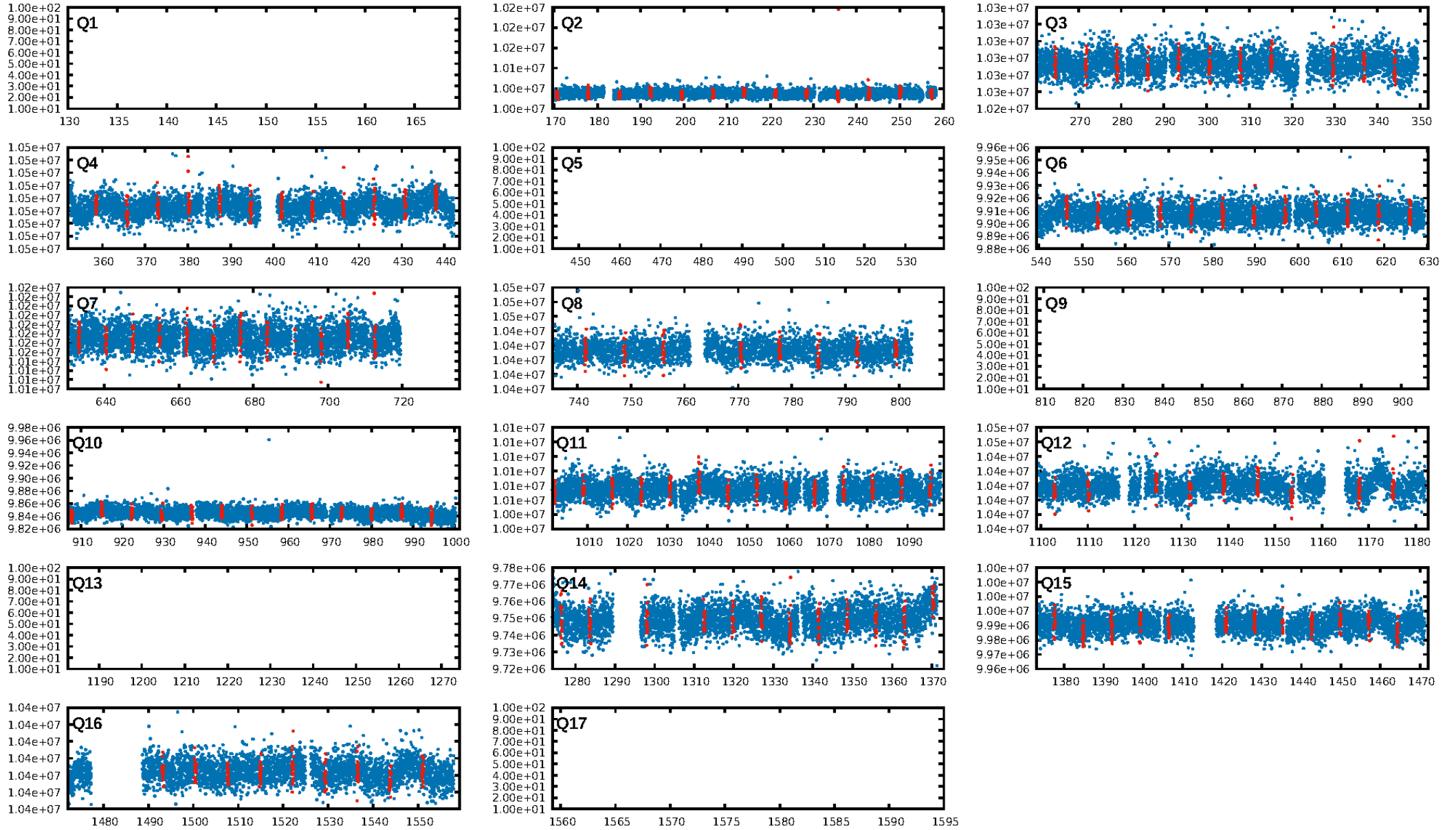
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [13.49σ]  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.43e-14  
RollingBand-fgt: 1.00 [131/131]  
GhostDiagnostic-chr: 137.1  
Centroid-sig: 83.2%  
Centroid-so: 0.866 arcsec [0.44σ]  
OotOffset-rm: 0.435 arcsec [0.53σ]  
KicOffset-rm: 0.335 arcsec [0.42σ]  
OotOffset-st: 3/3/2/0 [8]  
KicOffset-st: 3/3/2/0 [8]  
DiffImageQuality-fgm: 0.38 [3/8]  
DiffImageOverlap-fno: 1.00 [12/12]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:35:50 Z

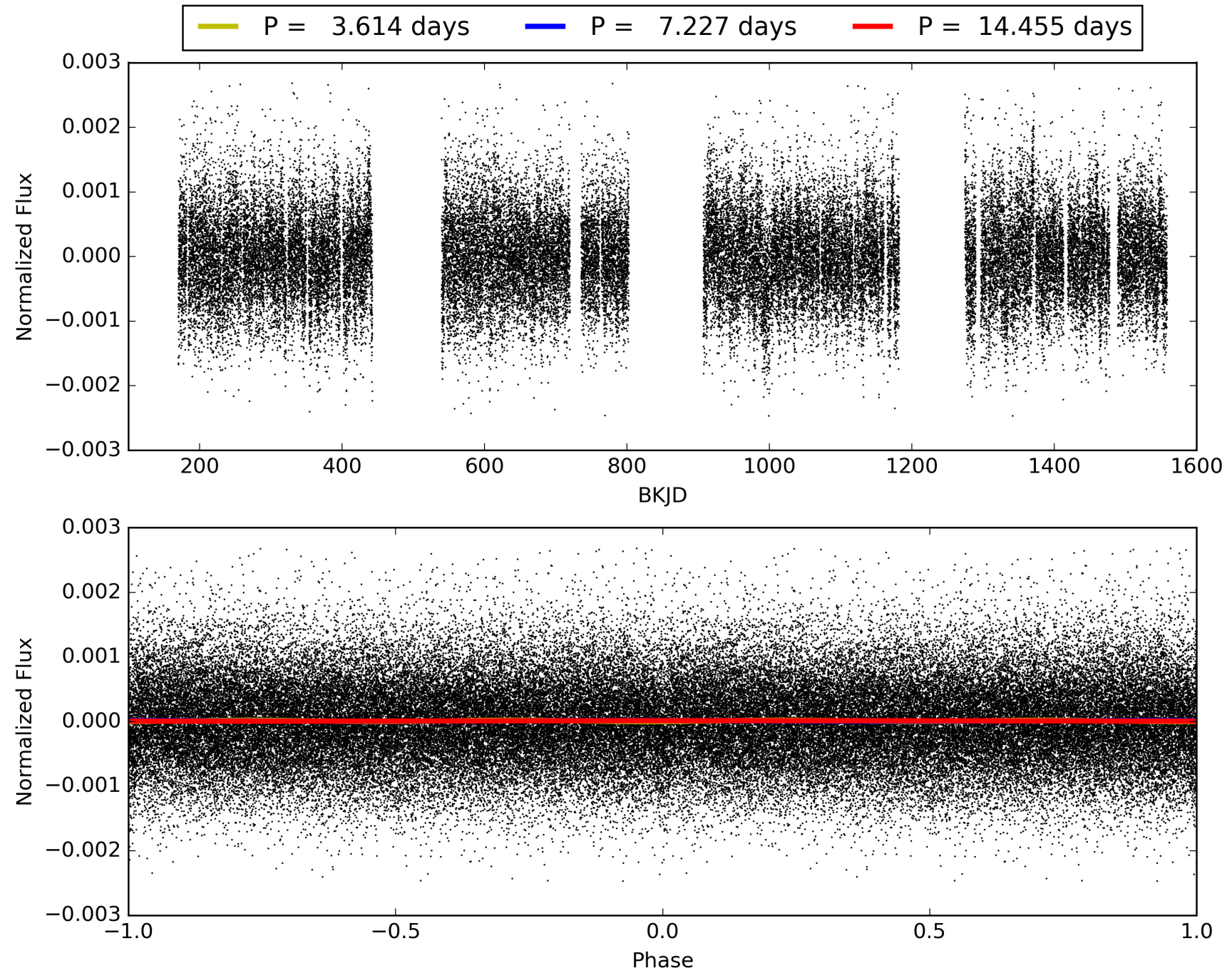
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005602588-02, PDC Light Curves



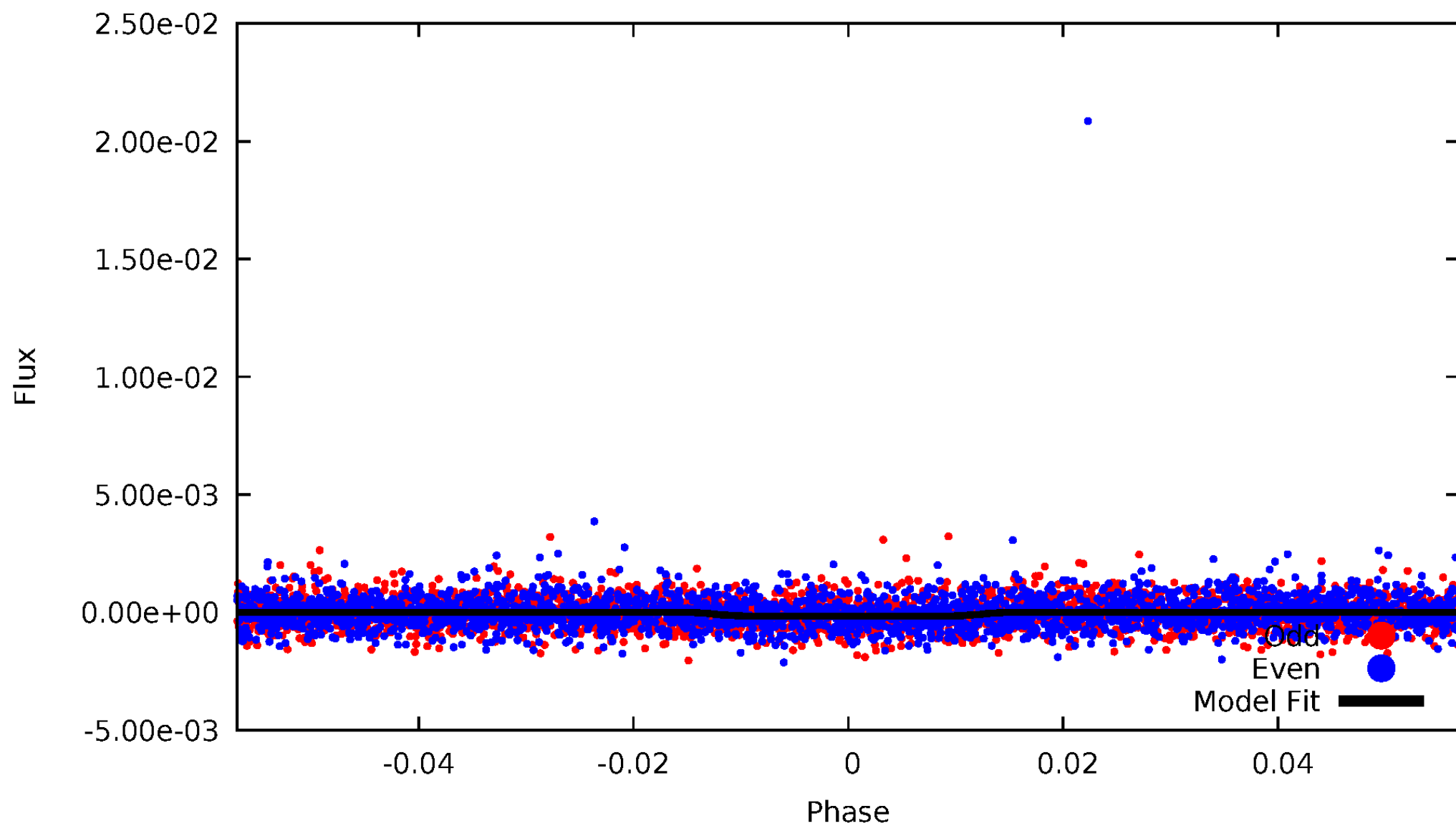


TCE 005602588-02



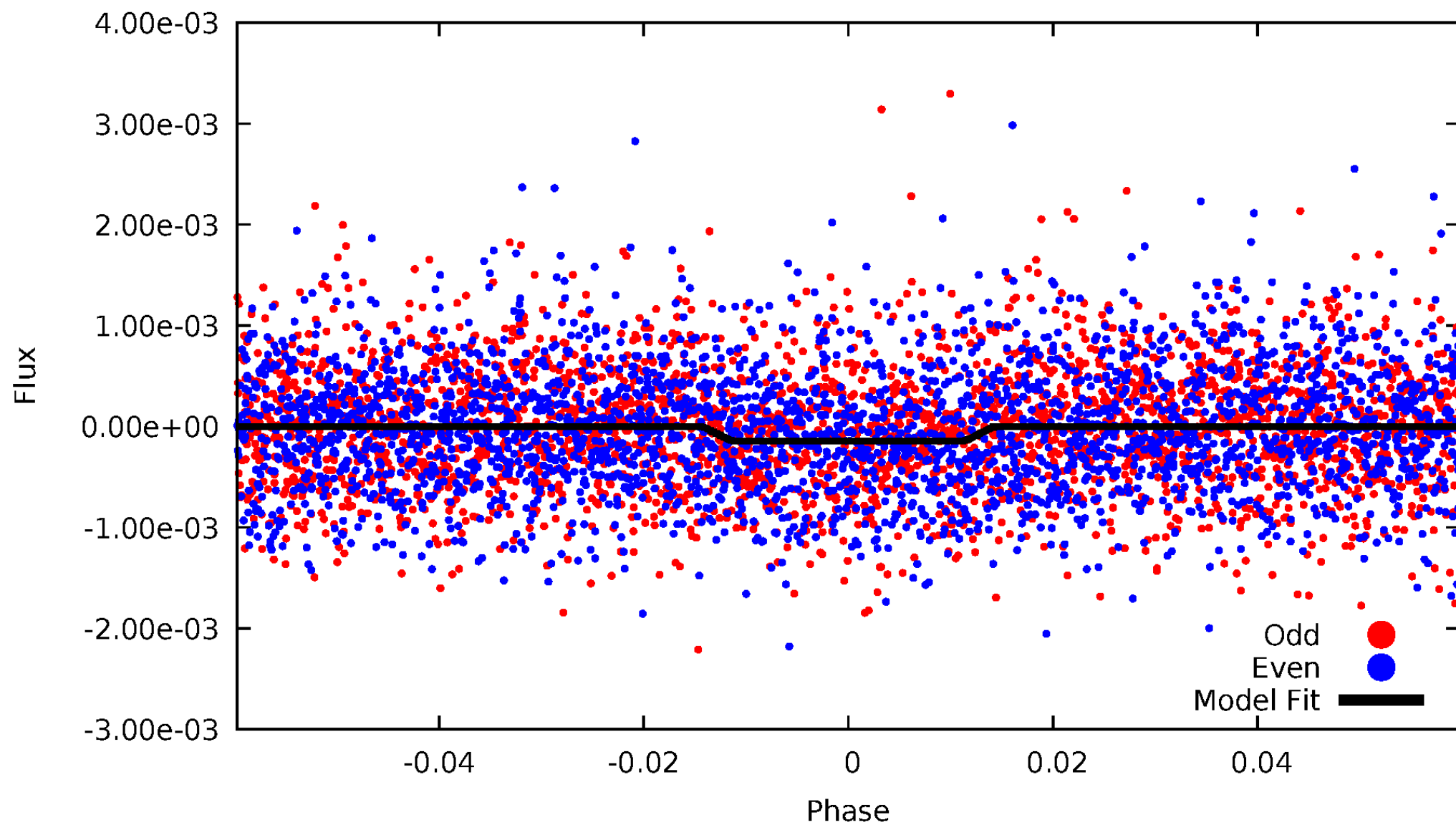
# DV Odd/Even

TCE 005602588-02



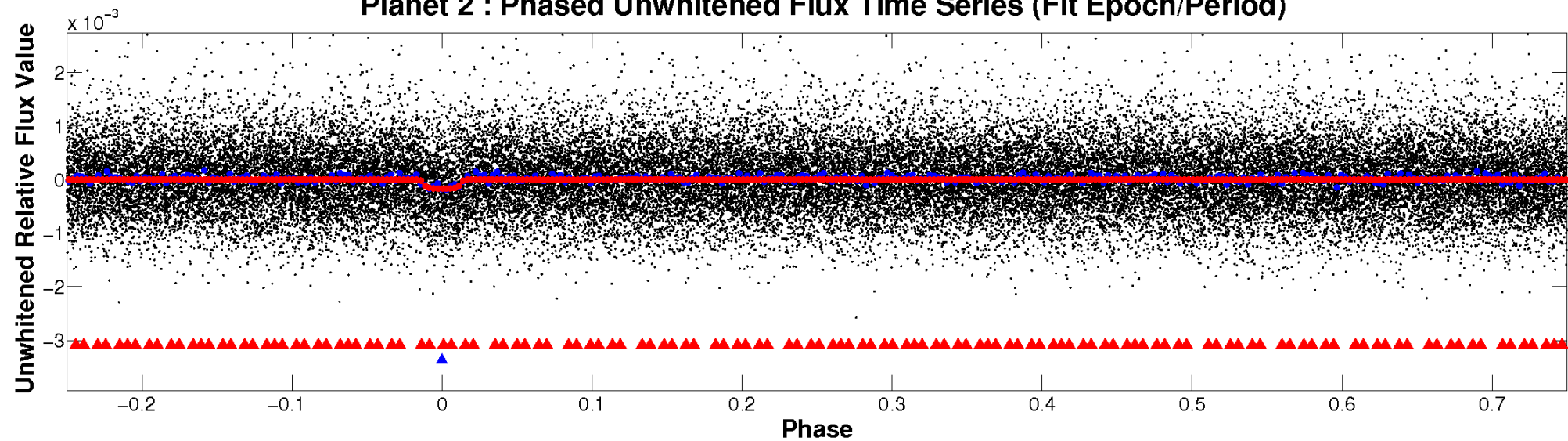
# ALT Odd/Even

TCE 005602588-02

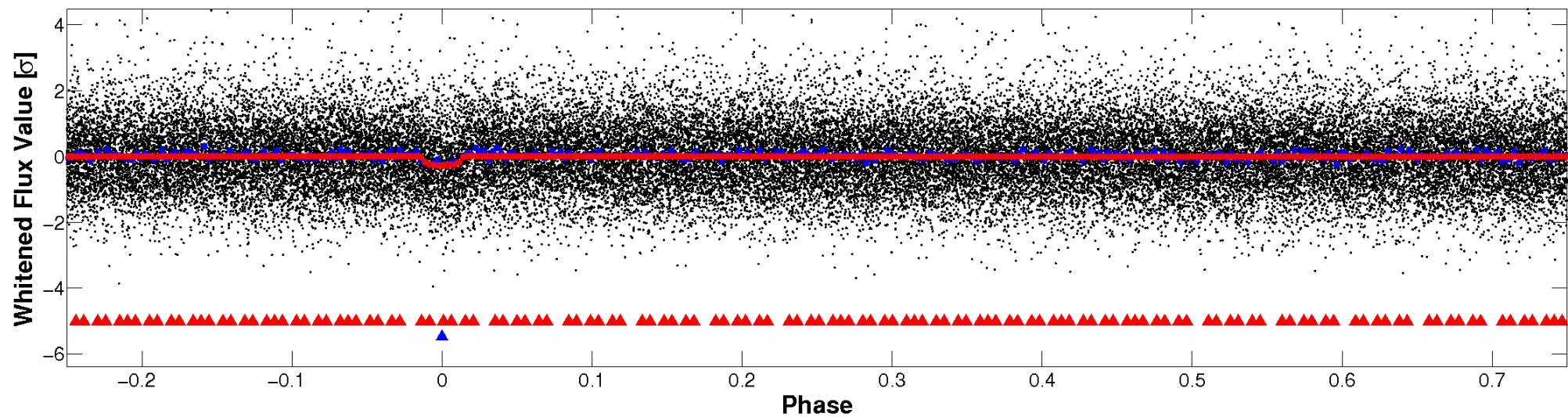


# Non-Whitened Vs. Whitened Light Curve

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

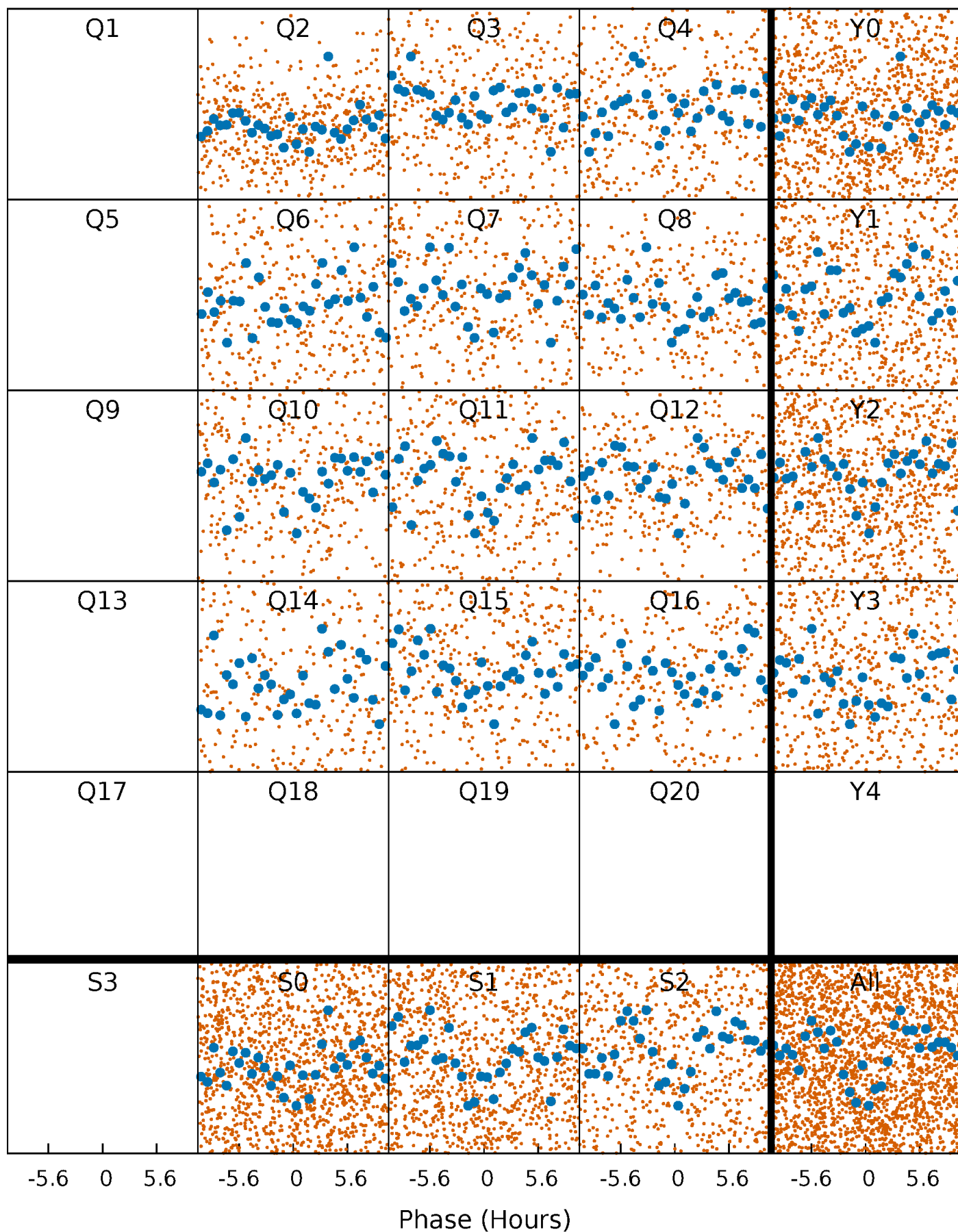


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

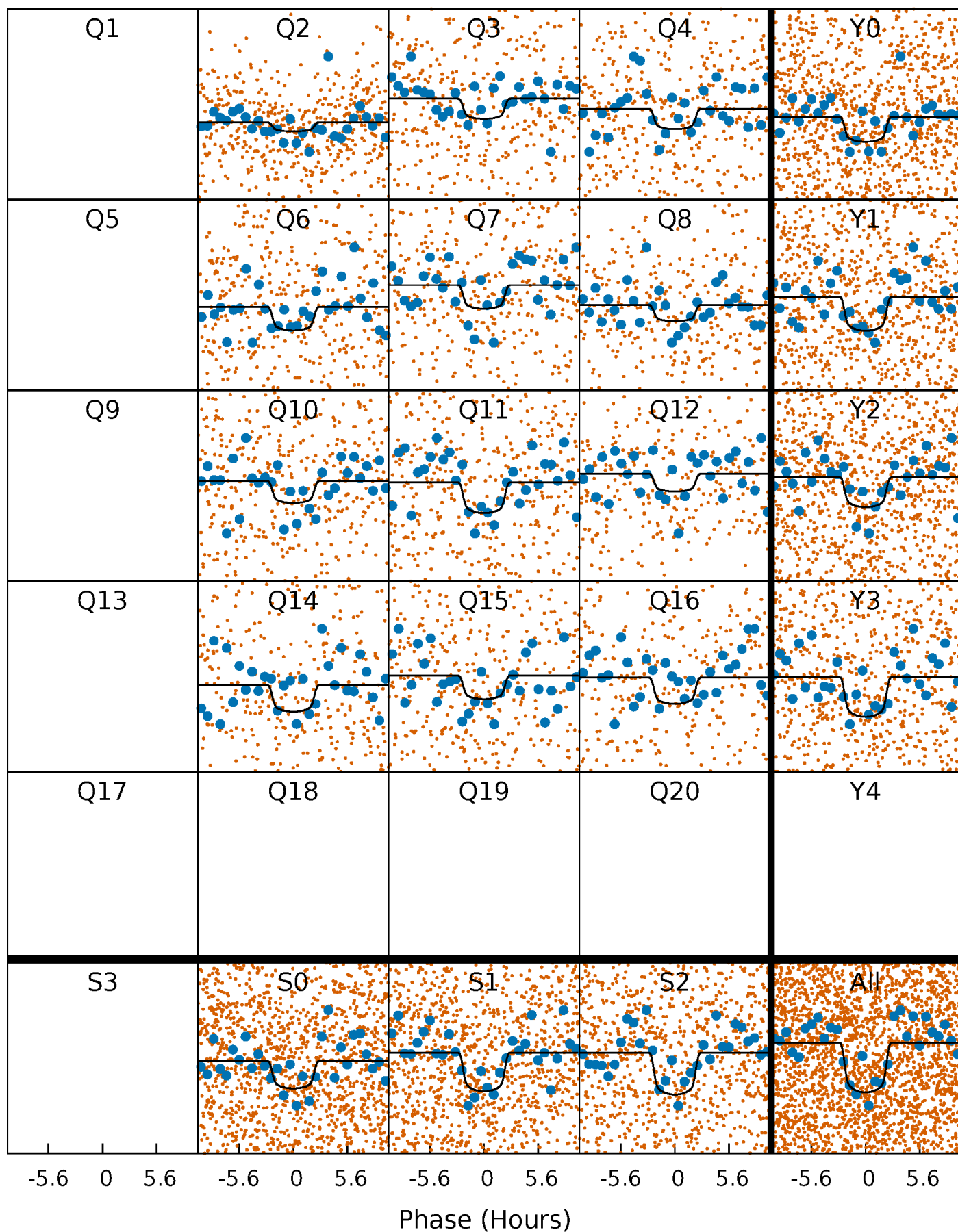
TCE 005602588-02   P= 7.227377 Days    $T_0=134.483083$  (BKJD)





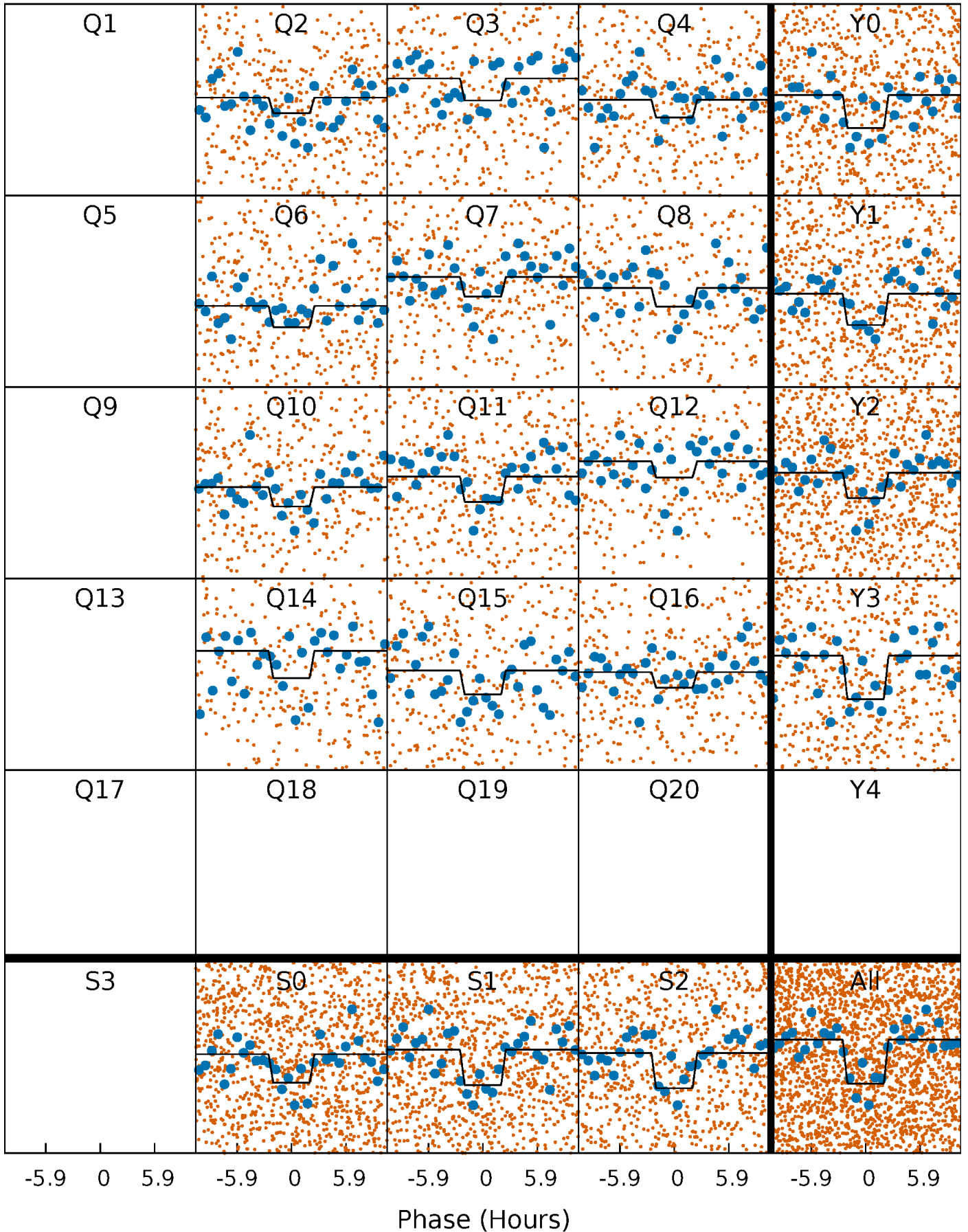
# DV Quarter-Phased Transit Curves

TCE 005602588-02   P= 7.227377 Days    $T_0=134.483083$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

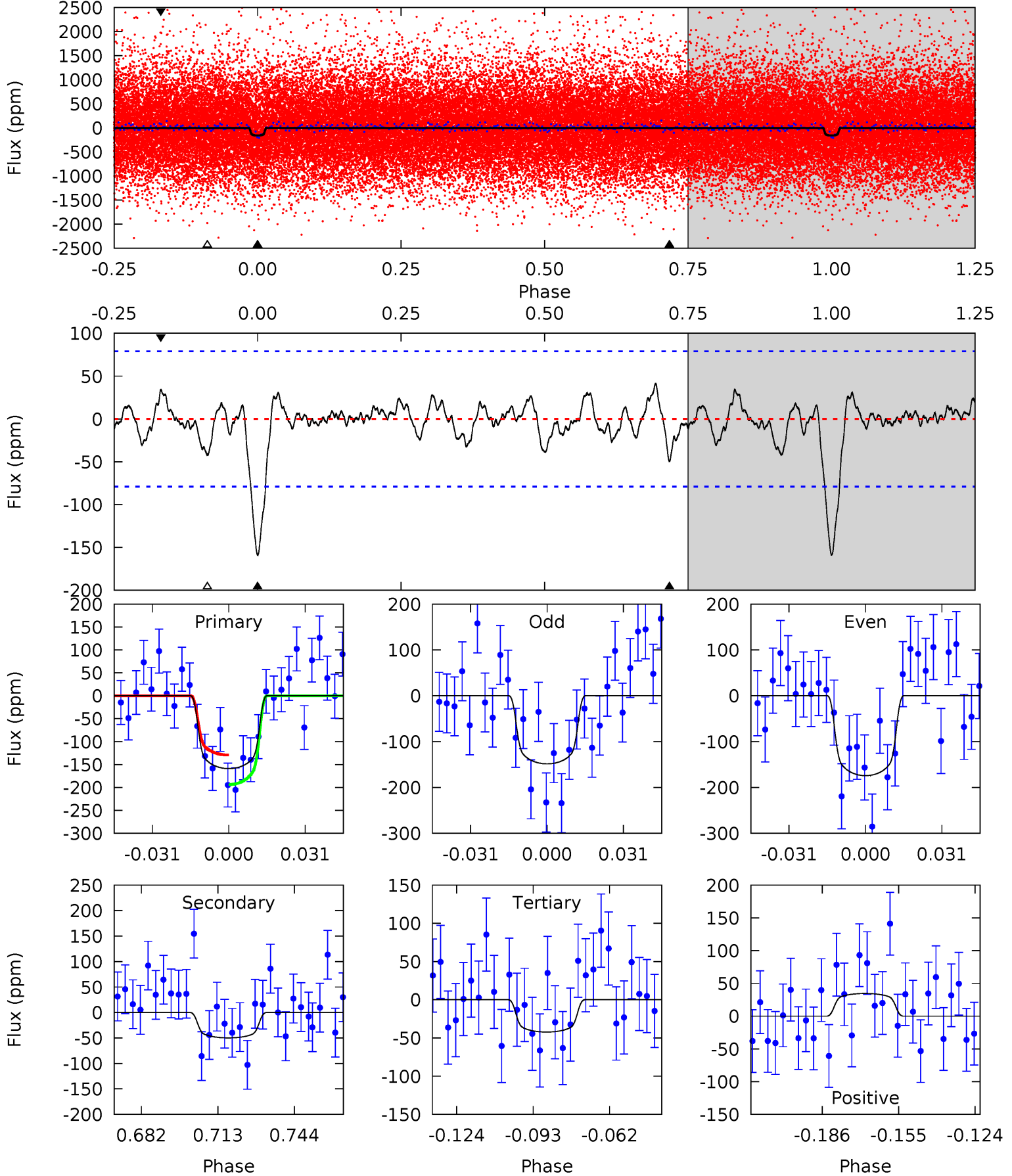
TCE 005602588-02   P= 7.227334 Days    $T_0=134.484709$  (BKJD)



# DV Model-Shift Uniqueness Test

005602588-02, P = 7.227377 Days, E = 134.483083 Days

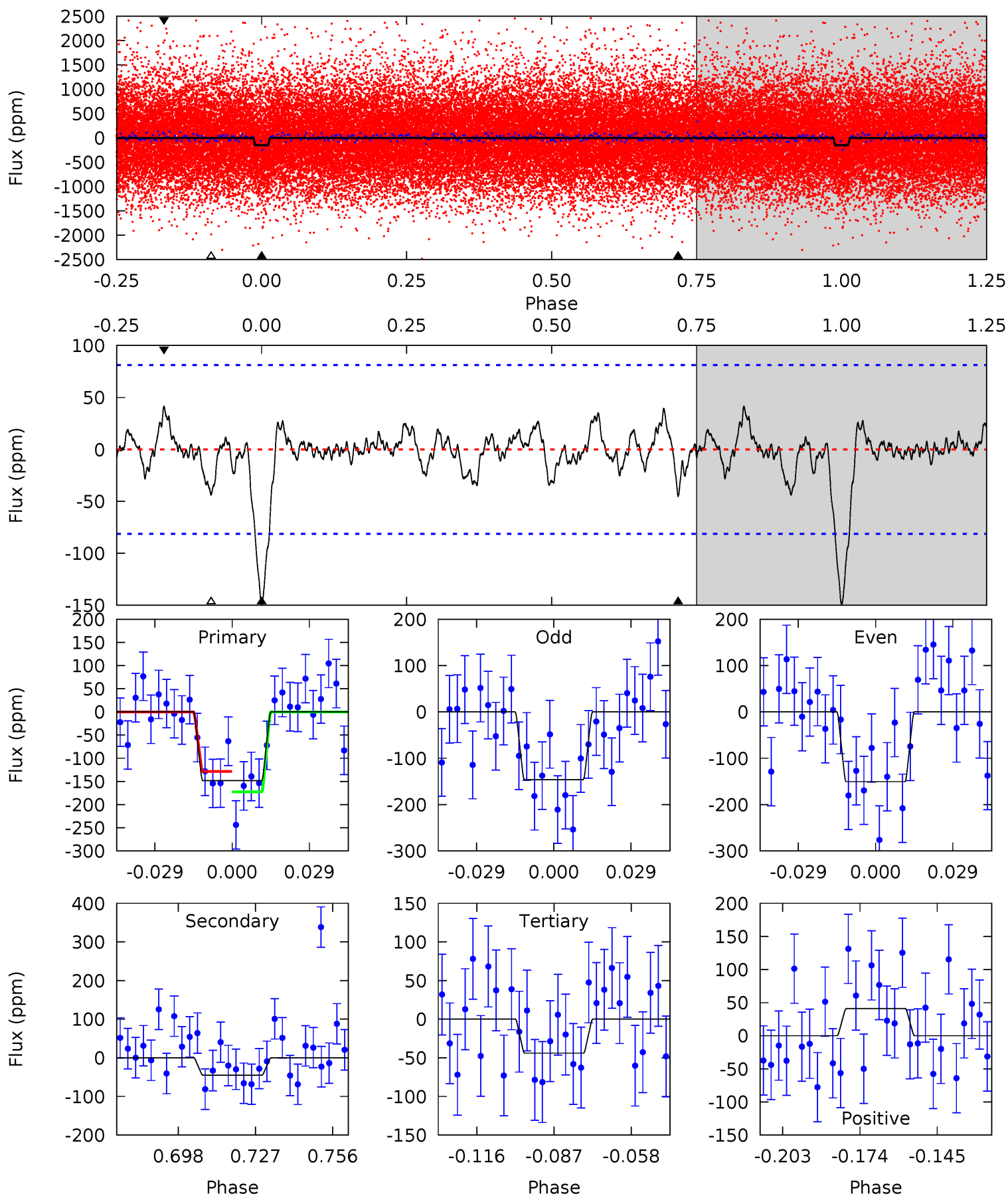
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.66	3.03	2.57	2.10	4.80	2.16	0.90	7.10	7.56	0.46	0.93	0.79	1.04	0.21	1.97



# Alt Model-Shift Uniqueness Test

005602588-02, P = 7.227334 Days, E = 134.484709 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.80	2.67	2.61	2.44	4.82	2.18	0.85	6.19	6.36	0.06	0.23	0.13	0.98	0.22	1.30



### Stellar Parameters For KIC 005602588

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6075^{+168}_{-210}$	$4.486^{+0.052}_{-0.208}$	$-0.120^{+0.250}_{-0.350}$	$0.969^{+0.300}_{-0.100}$	$1.048^{+0.139}_{-0.139}$	$1.622^{+0.455}_{-0.850}$
	+3%/-3%	+1%/-5%	+208%/-292%	+31%/-10%	+13%/-13%	+28%/-52%
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 005602588-02 / KOI 2369.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-50 \pm 16$	$1.64^{+0.43}_{-0.41}$	$1374^{+108}_{-65}$	$4369^{+580}_{-434}$	$53^{+48}_{-24}$
Alt.	$-45 \pm 17$	$1.33^{+0.45}_{-0.40}$	$1380^{+103}_{-70}$	$4637^{+826}_{-628}$	$74^{+84}_{-41}$

$T_{max}$  = 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

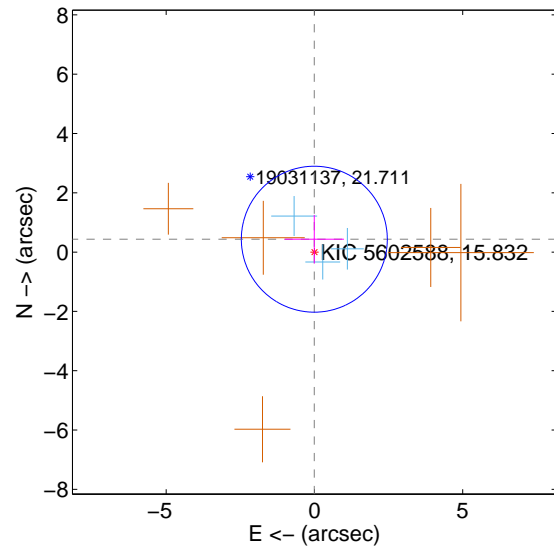
Supplemental centroid analysis for 005602588-02. Kepler magnitude: 15.83. Transit SNR 7.85

There are 3 quarters with good PRF difference image offsets

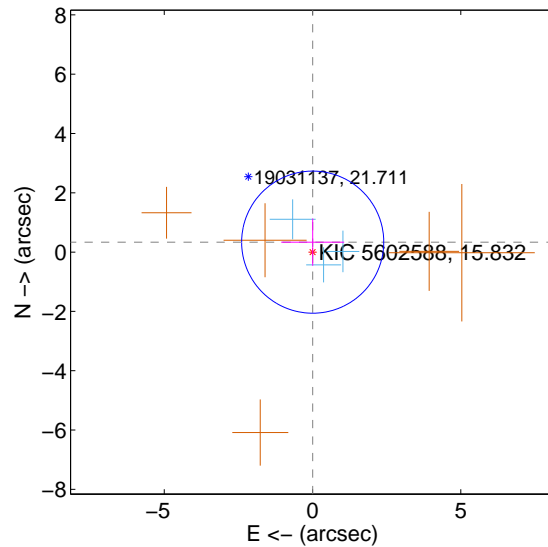
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.435 \pm 0.820$	0.53	$0.004 \pm 0.998$	$0.435 \pm 0.820$
PRF-fit source offset from KIC position	$0.335 \pm 0.799$	0.42	$-0.006 \pm 1.062$	$0.335 \pm 0.799$
photometric centroid source offset	$0.87 \pm 1.98$	0.44	$0.80 \pm 1.97$	$-0.33 \pm 2.04$

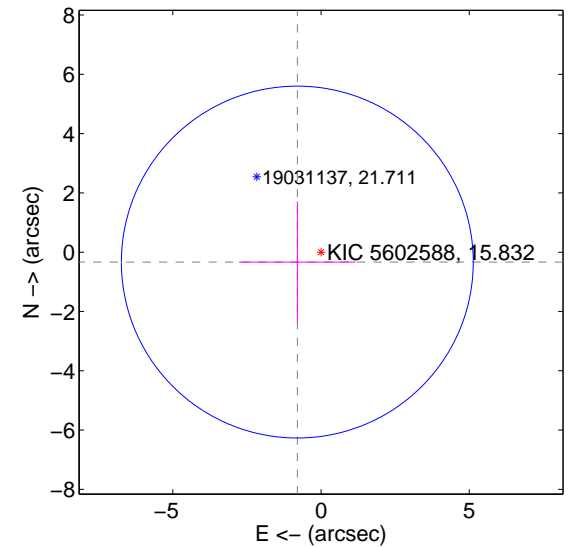
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



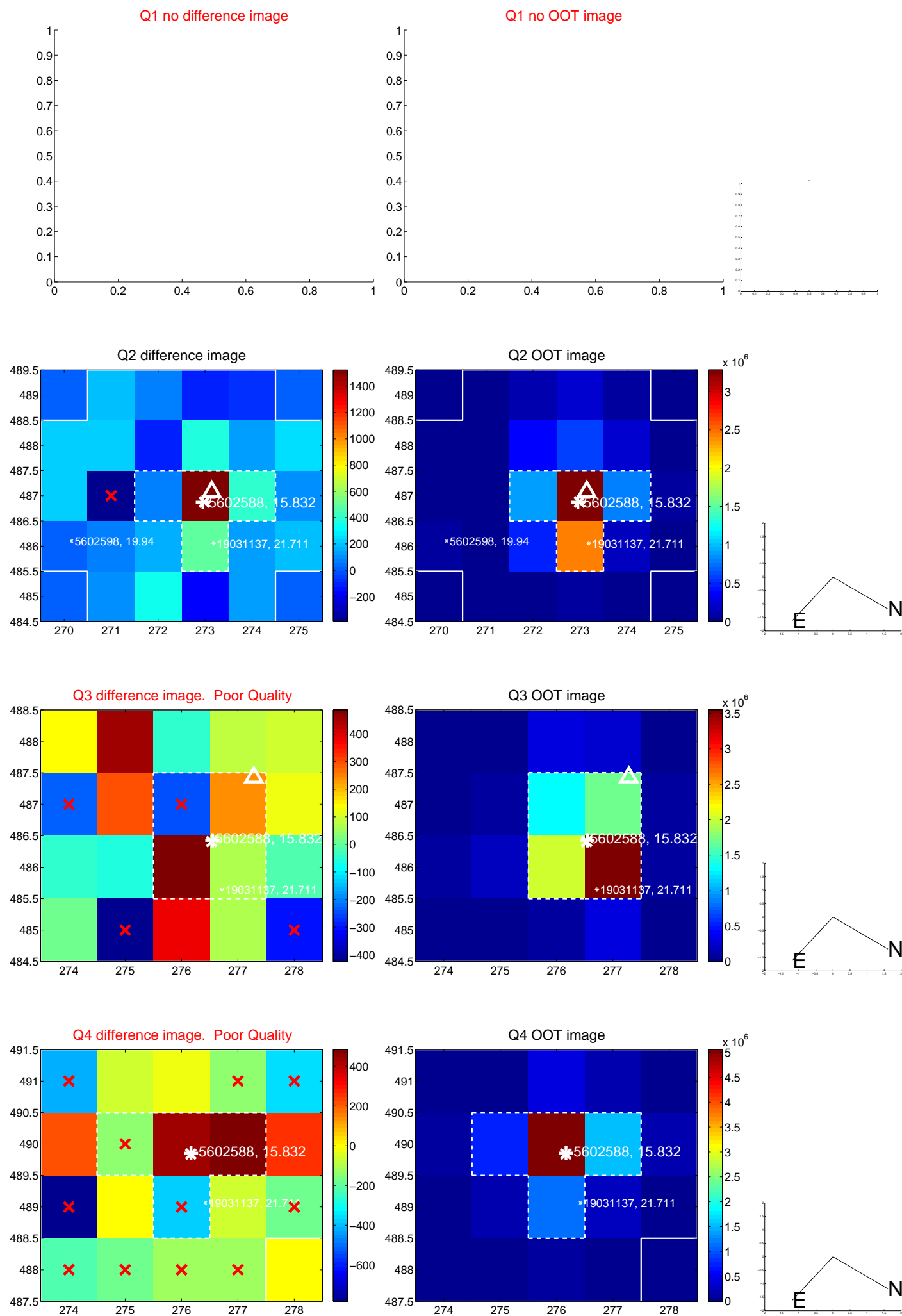
offset from photometric centroids



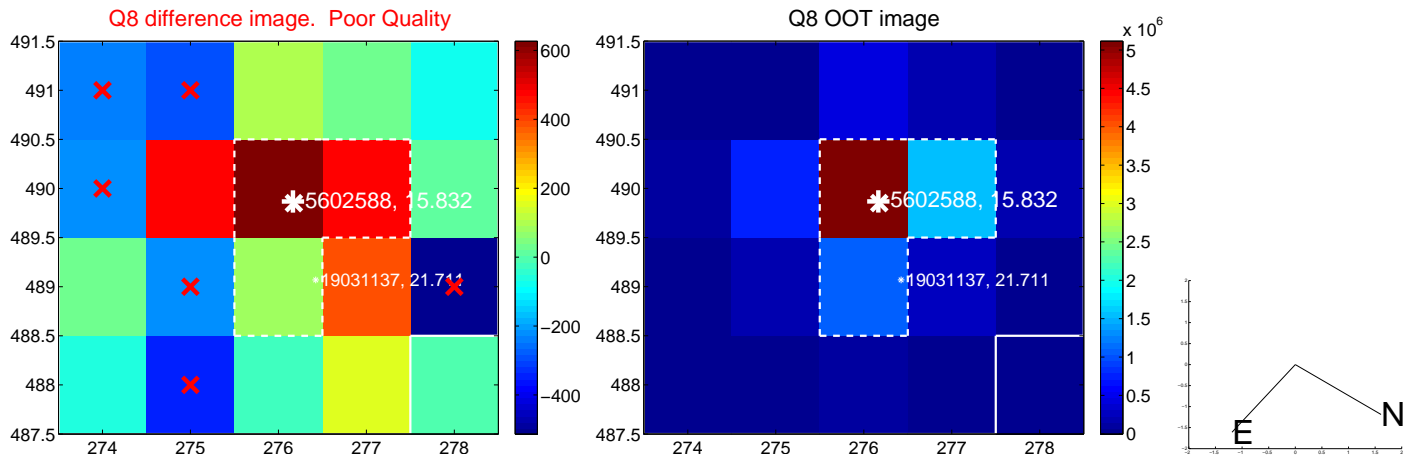
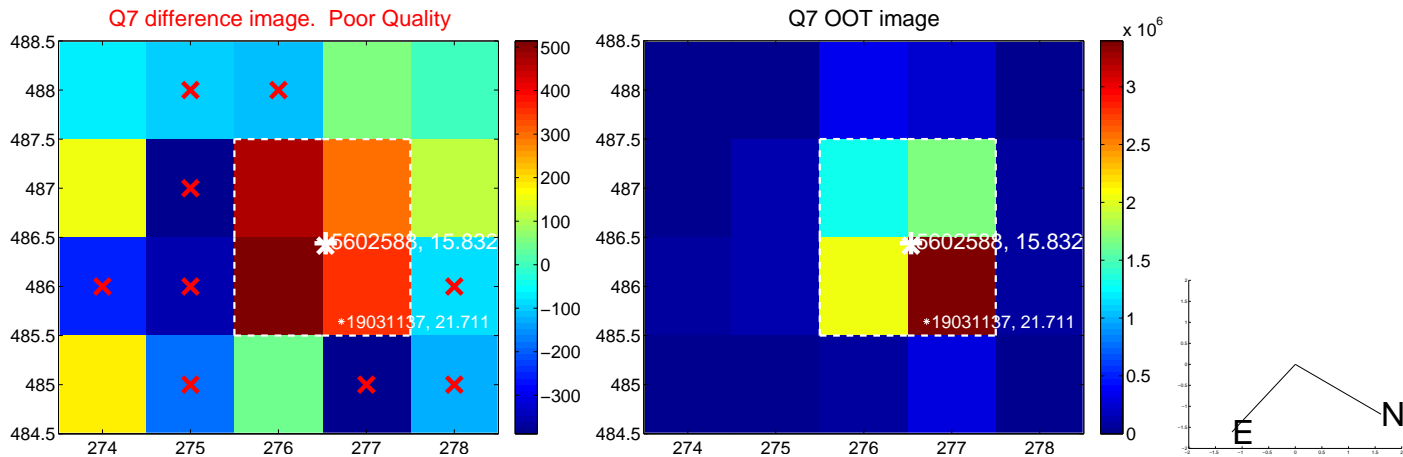
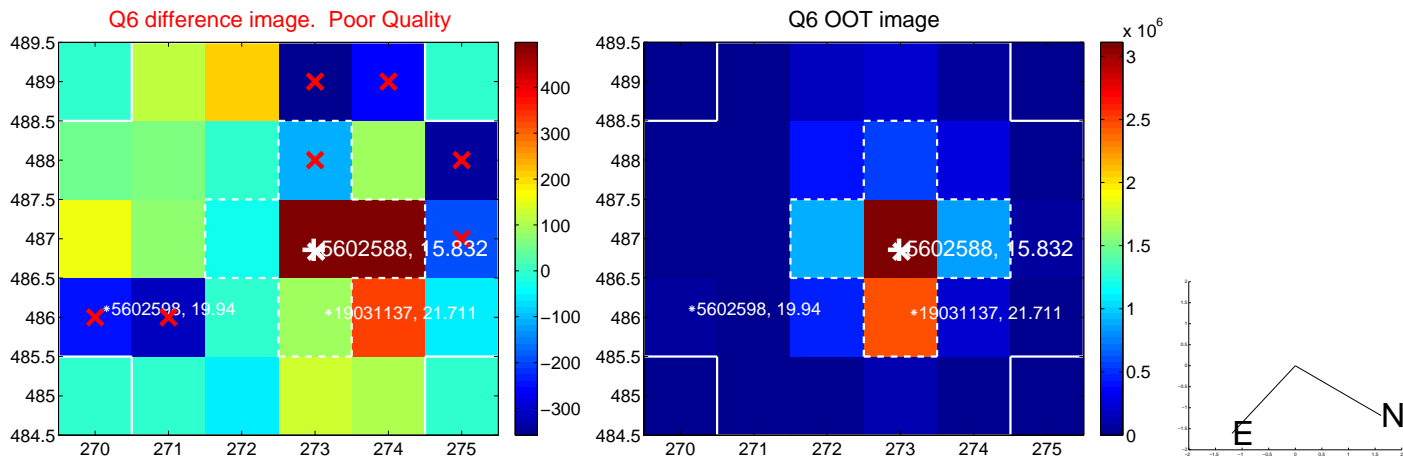
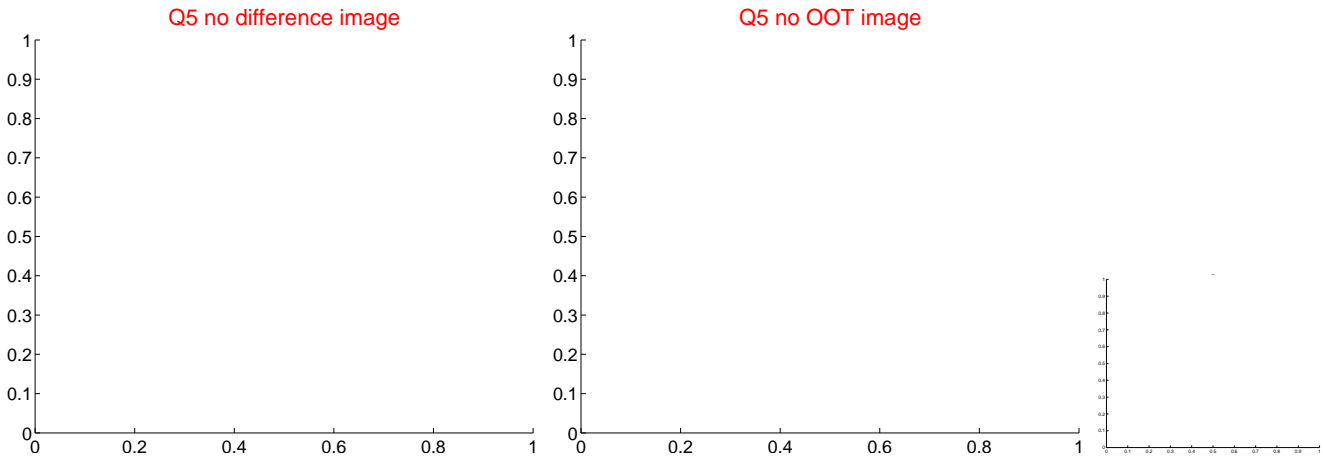
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



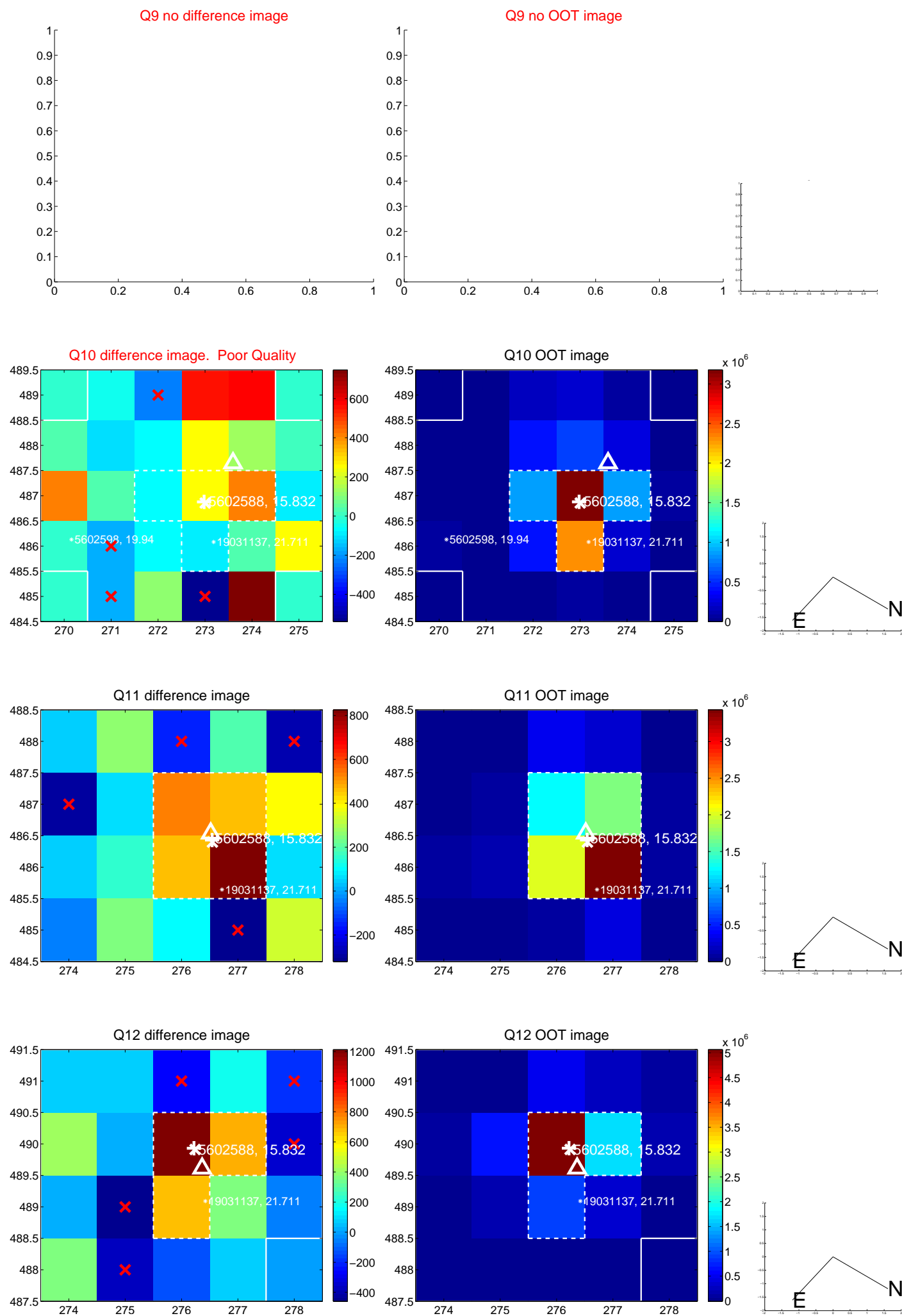
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



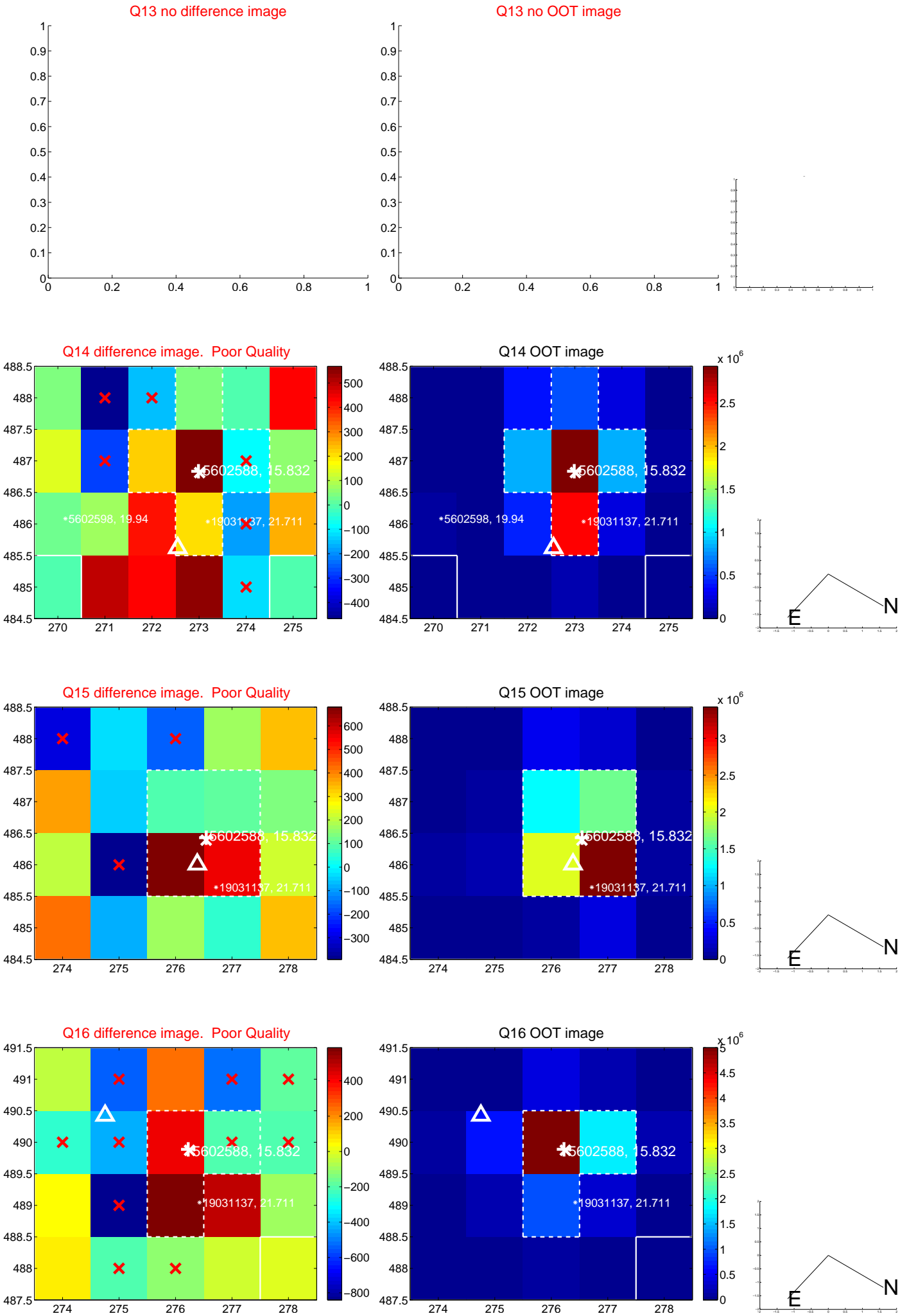
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



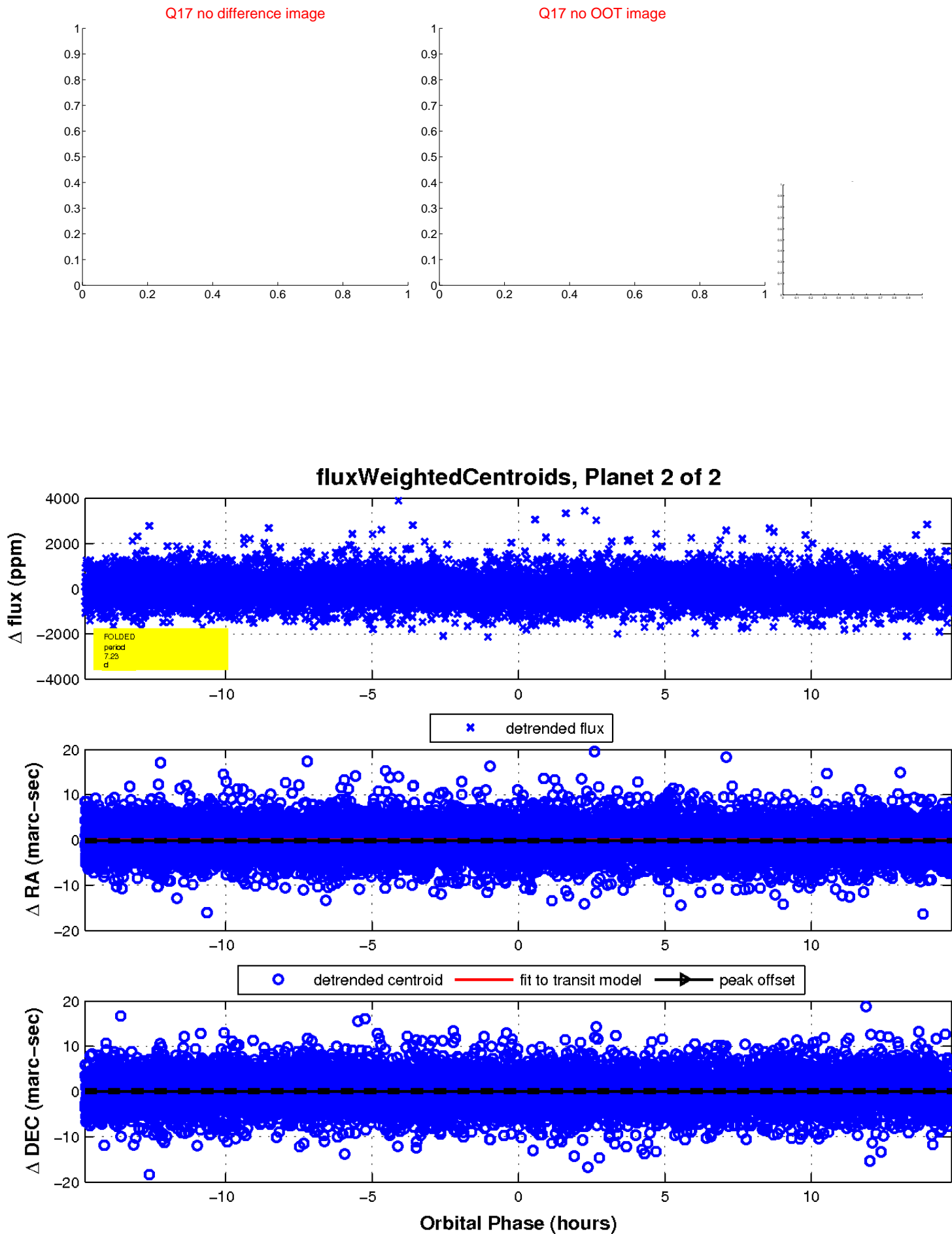
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

