

# KIC 007685981

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007685981-01	OBS	0893.01	4.408377	132.515418	528.7	5.325	37.4	41.6	0.96	6007	2.73	398.38
007685981-02	OBS	No	339.774945	175.817768	598.7	13.396	7.9	7.2	0.96	6007	2.44	1.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007685981-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
007685981-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

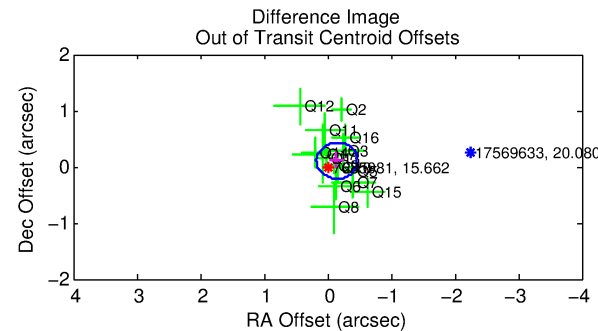
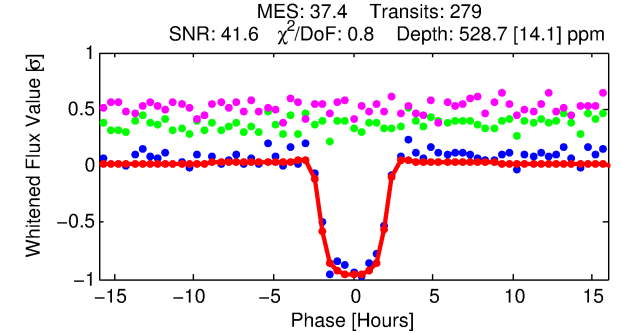
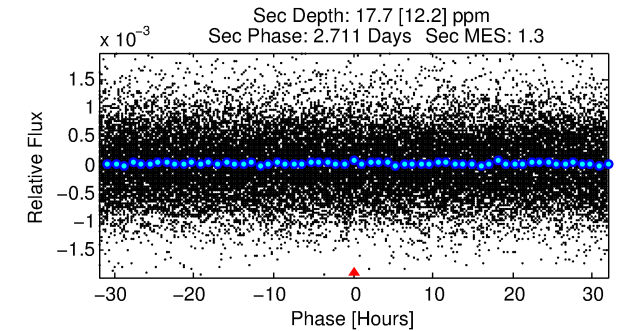
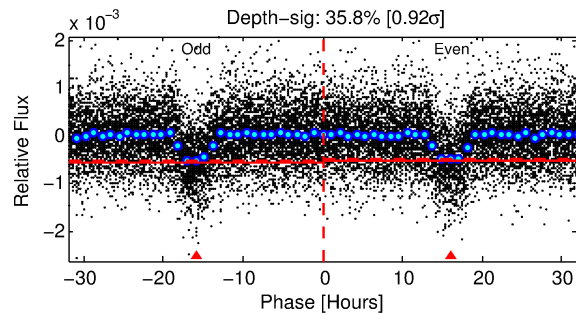
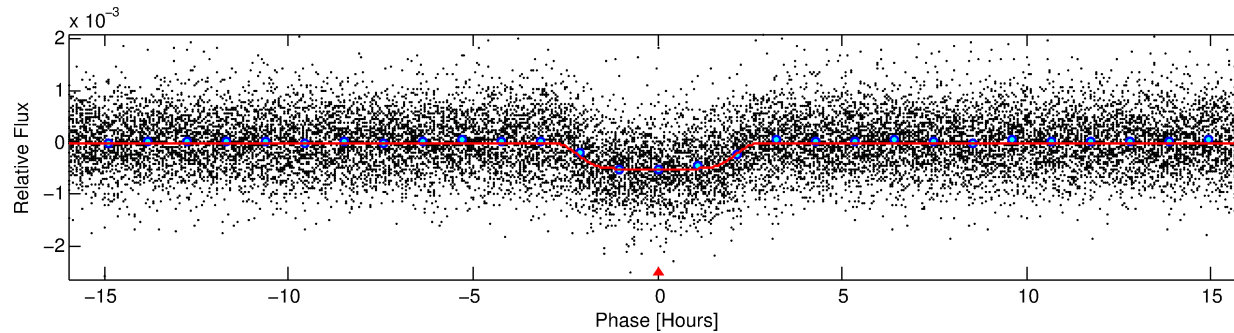
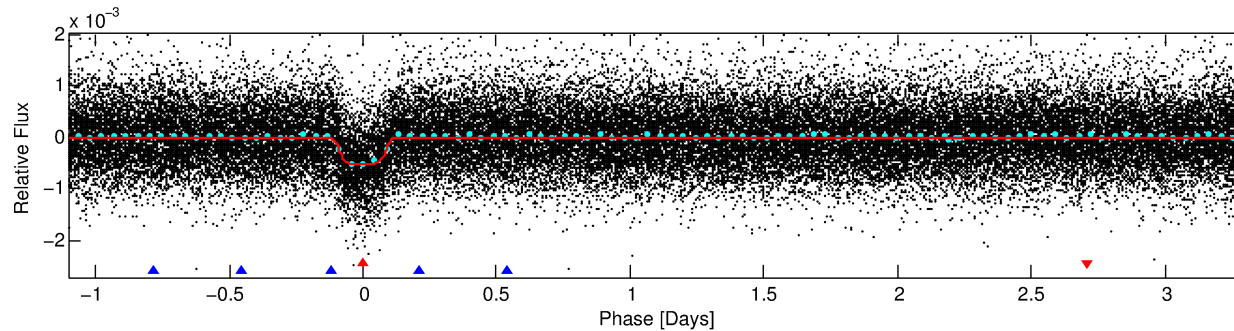
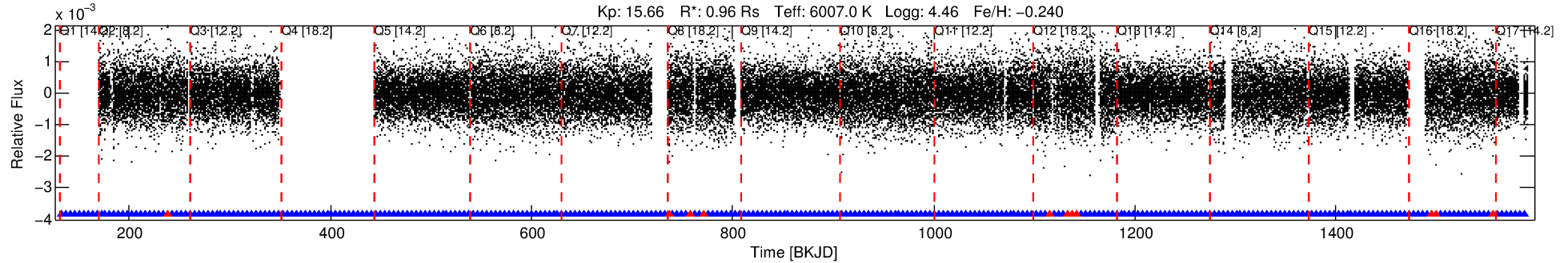
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007685981-01

No Significant Match Found

# DV One-Page Summary

KIC: 7685981 Candidate: 1 of 2 Period: 4.408 d  
KOI: K00893.01 Corr: 0.963



## DV Fit Results:

Period = 4.40838 [0.00001] d  
Epoch = 132.5154 [0.0026] BKJD  
Rp/R\* = 0.0260 [0.0007]  
a/R\* = 2.76 [0.26]  
b = 0.94 [0.01]  
Seff = 398.38 [154.85]  
Teq = 1139 [111] K  
Rp = 2.73 [0.81] Re  
a = 0.0520 [0.0131] AU  
Ag = 3.53 [2.76] [0.92 $\sigma$ ]  
Teffp = 2415 [423] K [2.92 $\sigma$ ]

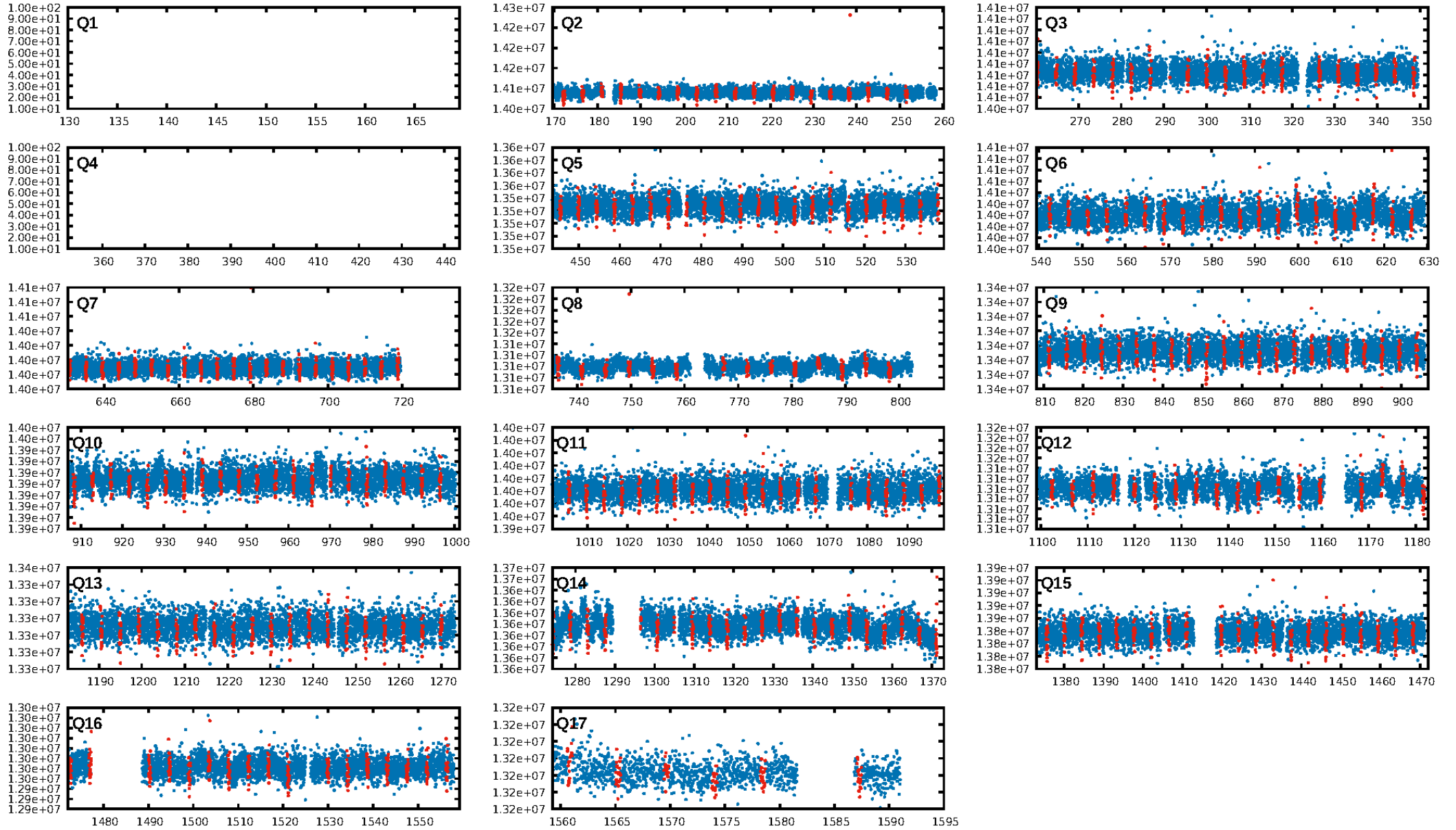
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [558.36 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 9.59e-291  
RollingBand-fgt: 0.96 [262/273]  
GhostDiagnostic-chr: 6.948  
Centroid-sig: 27.9%  
Centroid-so: 0.419 arcsec [1.03 $\sigma$ ]  
OotOffset-rm: 0.183 arcsec [1.70 $\sigma$ ]  
KicOffset-rm: 0.101 arcsec [0.91 $\sigma$ ]  
OotOffset-st: 4/4/3/4 [15]  
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DiffImageQuality-fgm: 0.93 [14/15]  
DiffImageOverlap-fno: 1.00 [15/15]

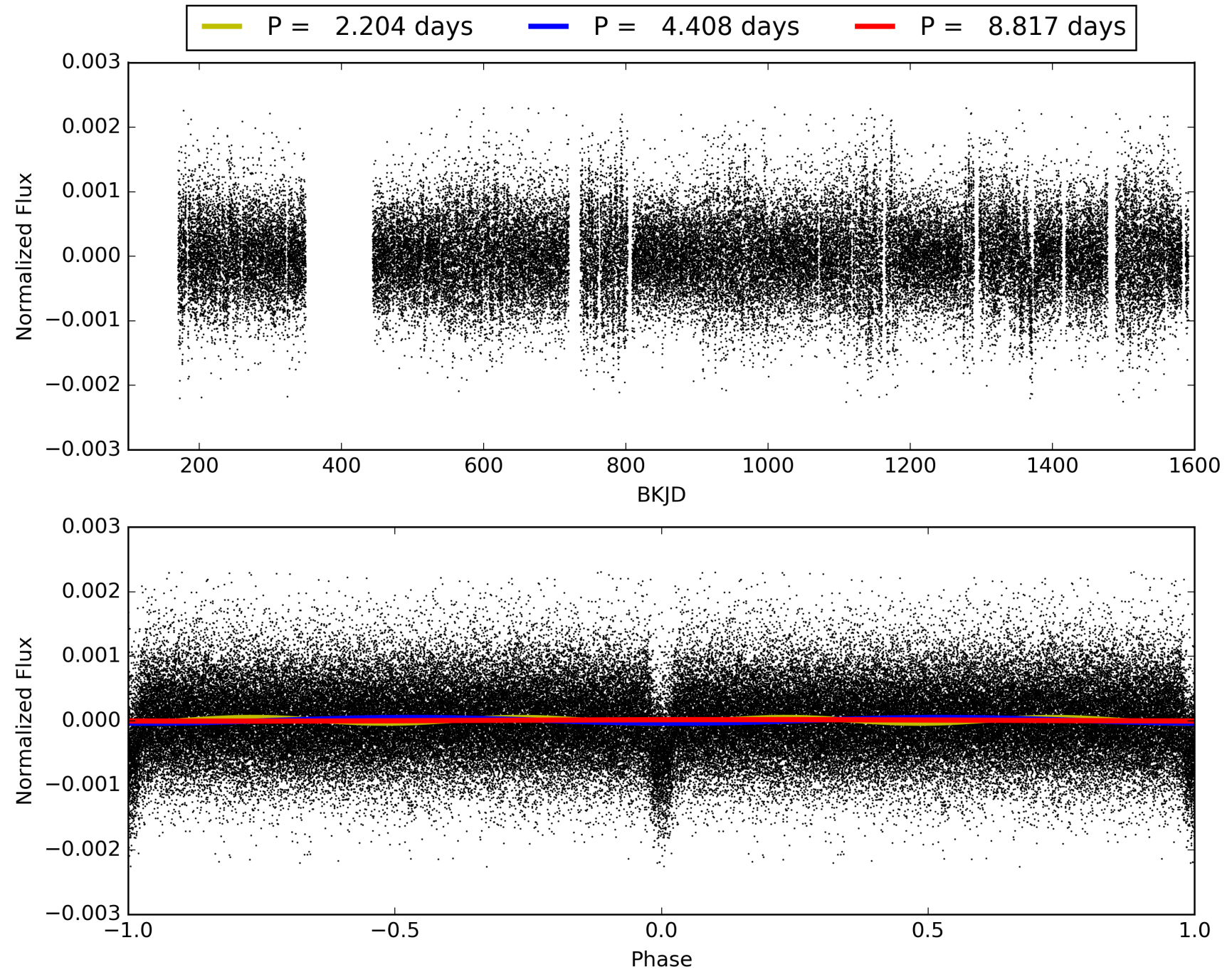
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:12:11 Z

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

# TCE 007685981-01, PDC Light Curves

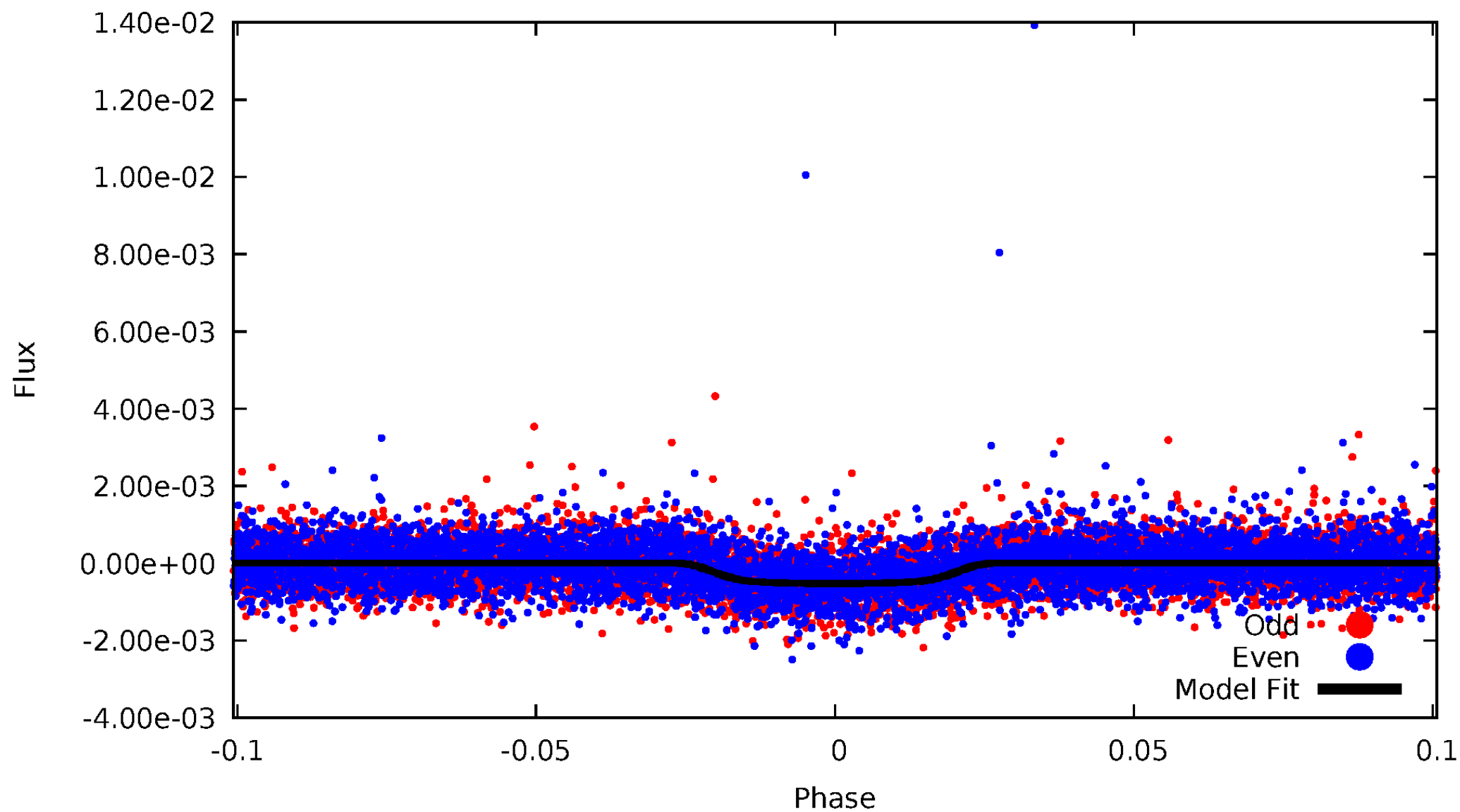


# TCE 007685981-01



# DV Odd/Even

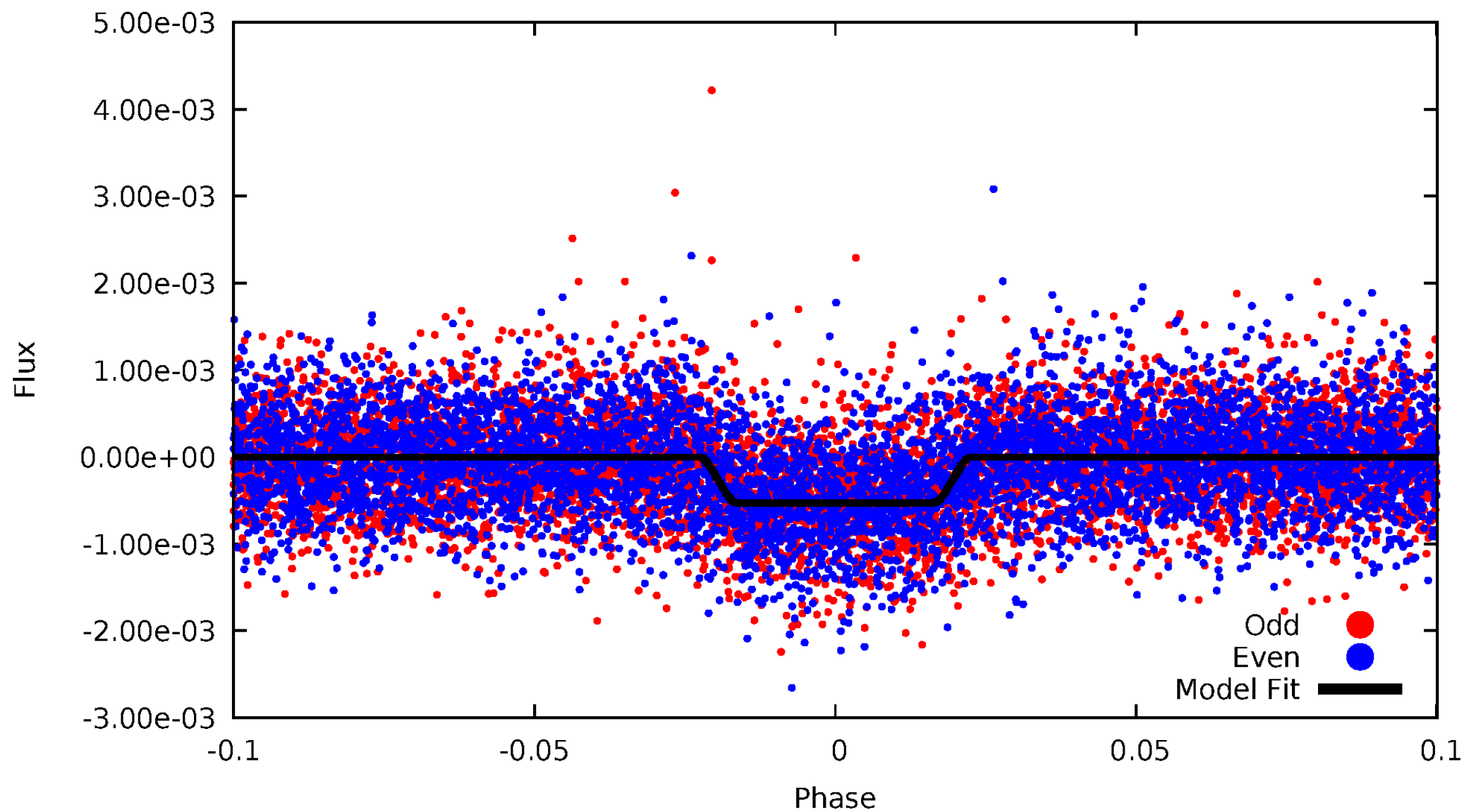
TCE 007685981-01





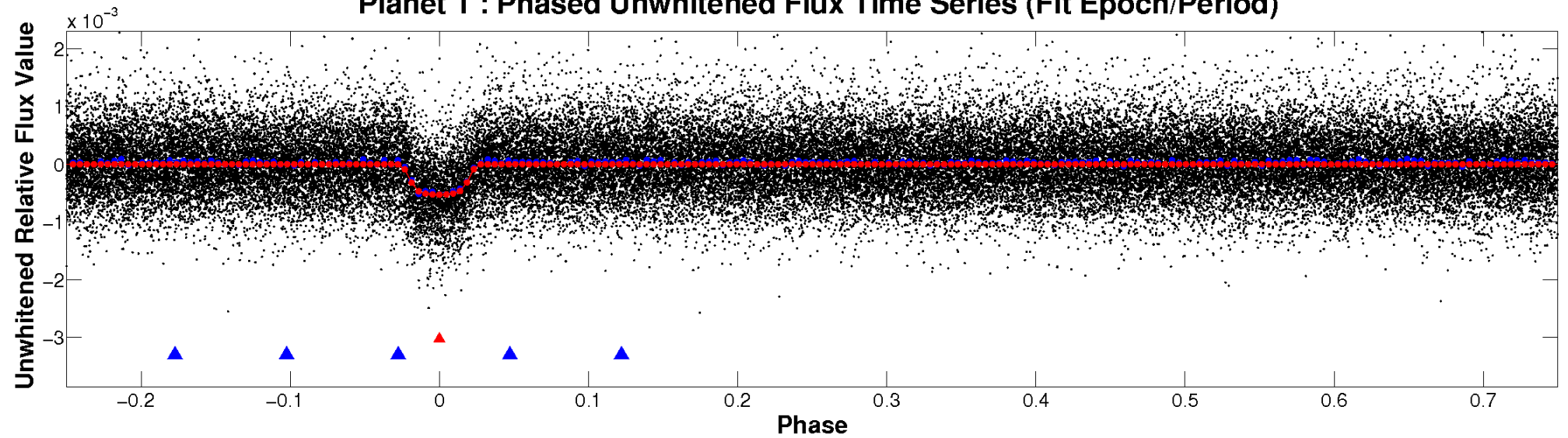
# ALT Odd/Even

TCE 007685981-01

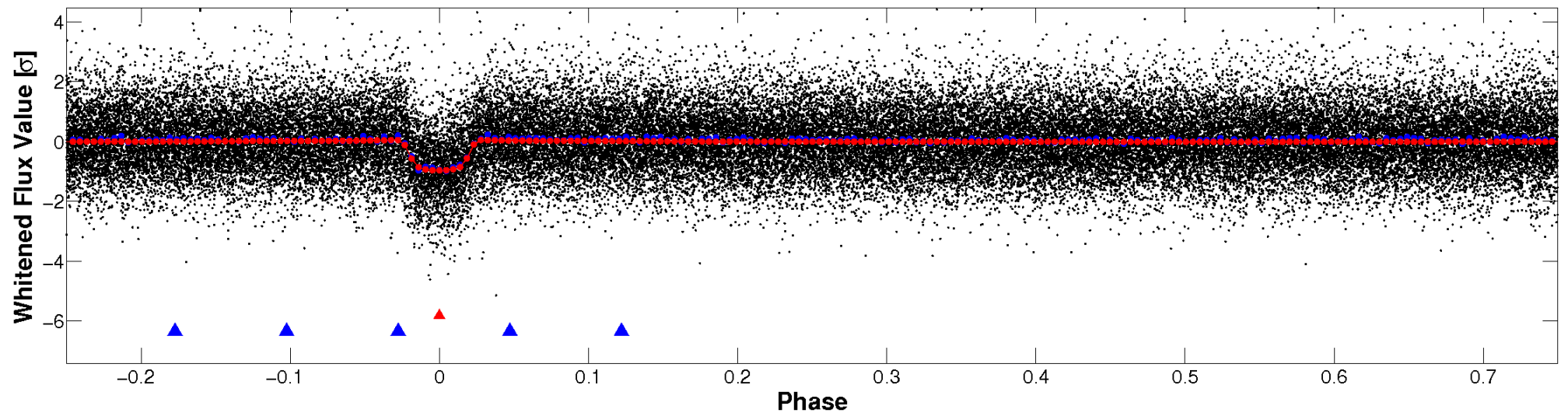


# Non-Whitened Vs. Whitened Light Curve

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

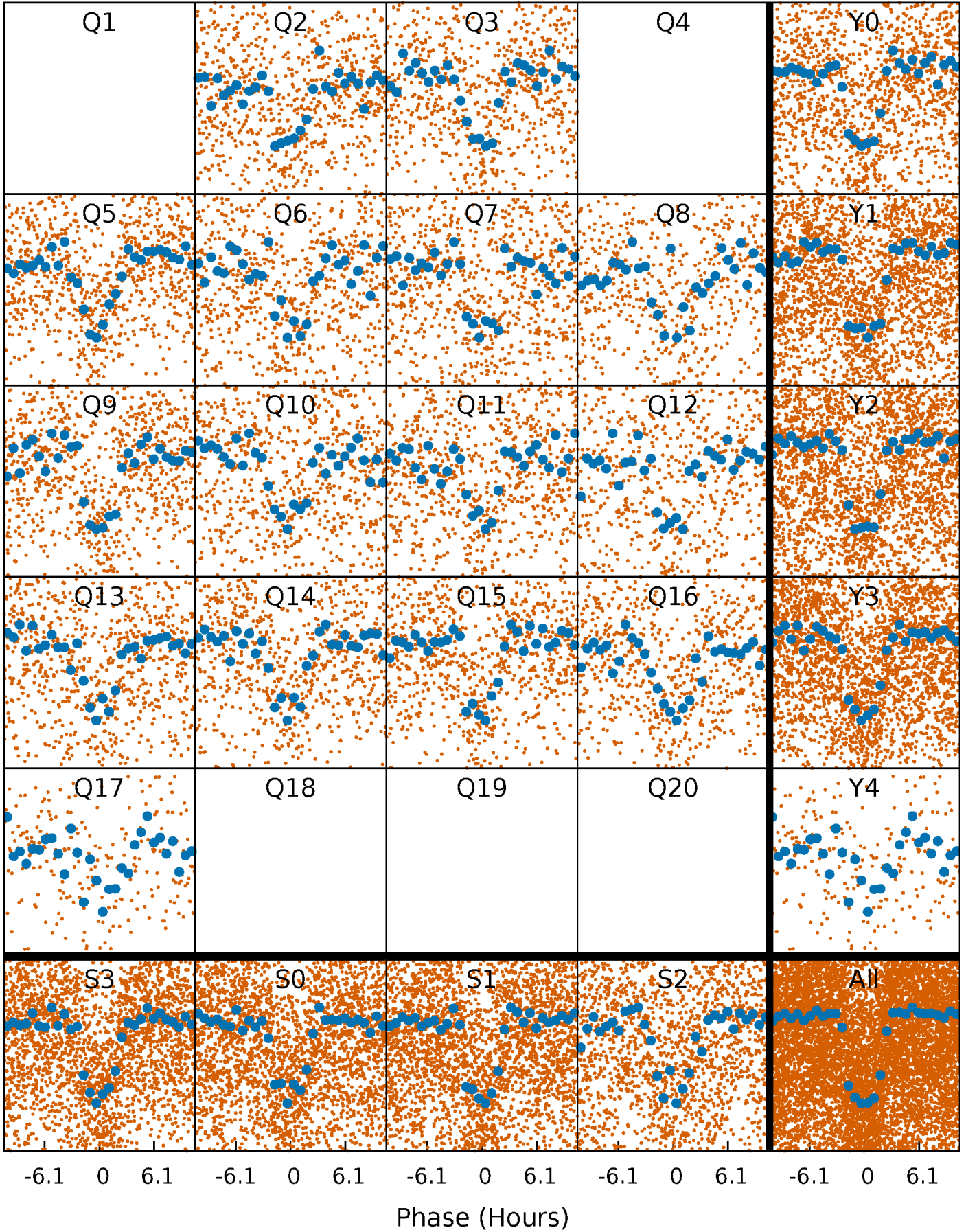


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

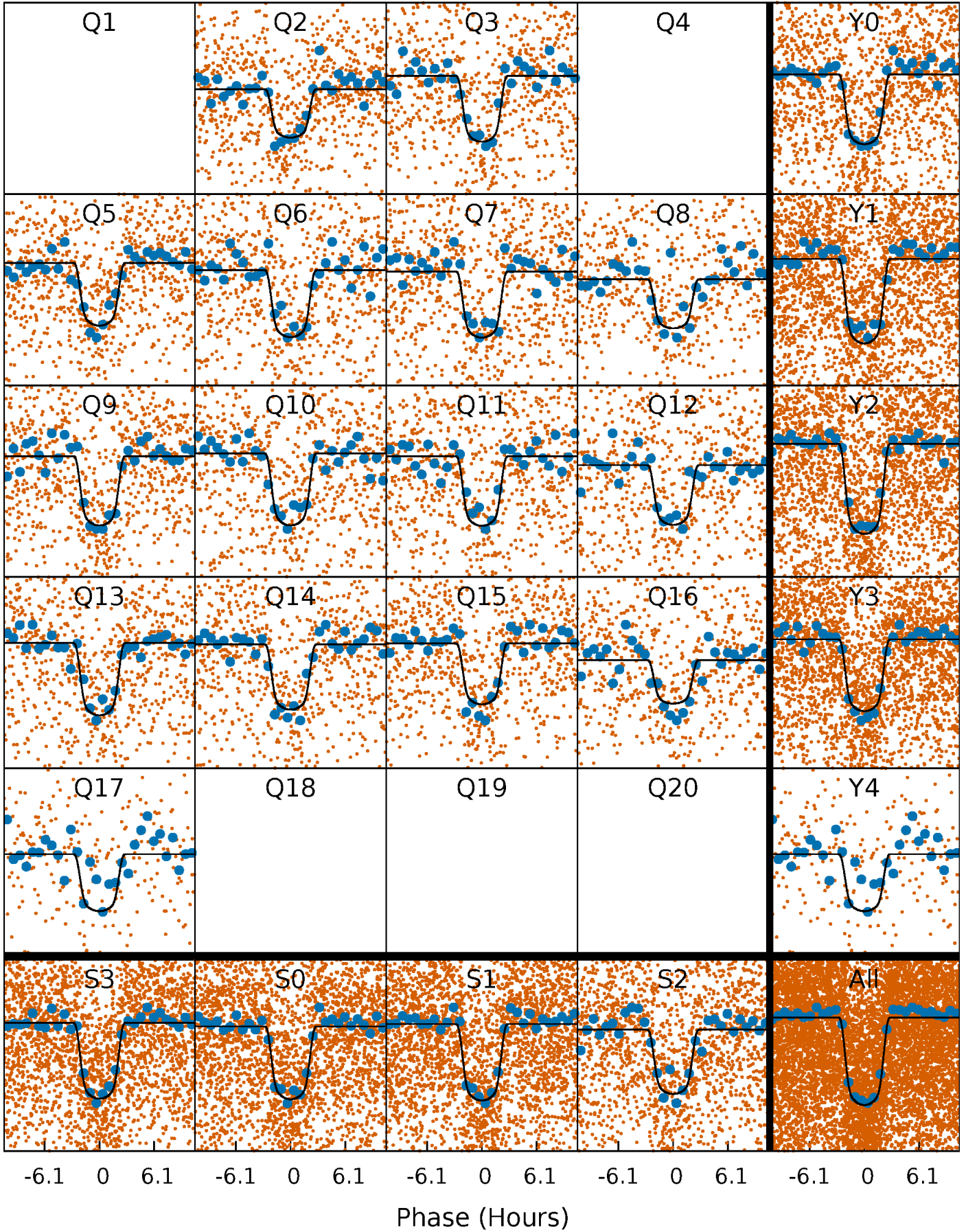
TCE 007685981-01   P= 4.408377 Days    $T_0=132.515418$  (BKJD)





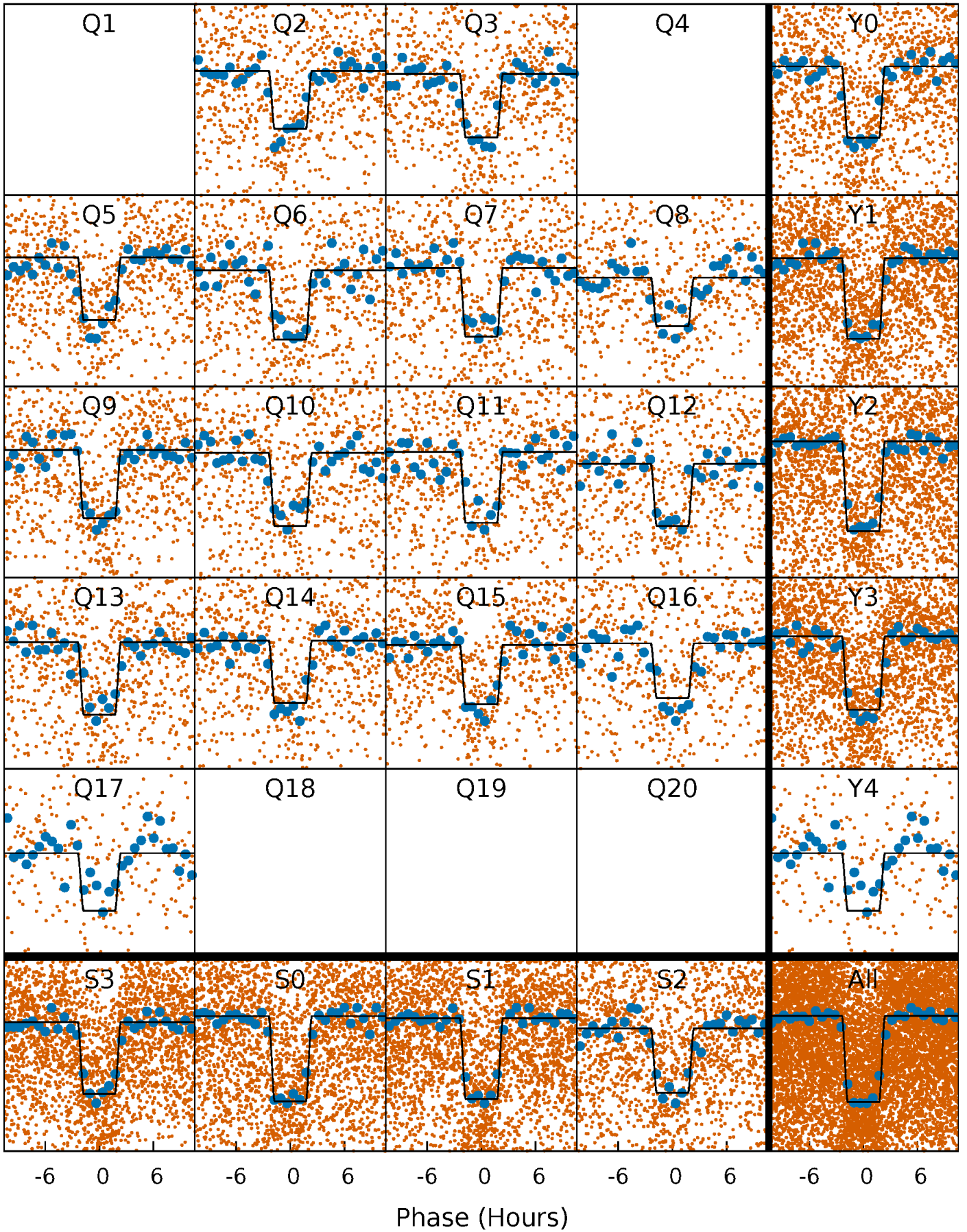
# DV Quarter-Phased Transit Curves

TCE 007685981-01 P= 4.408377 Days  $T_0=132.515418$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

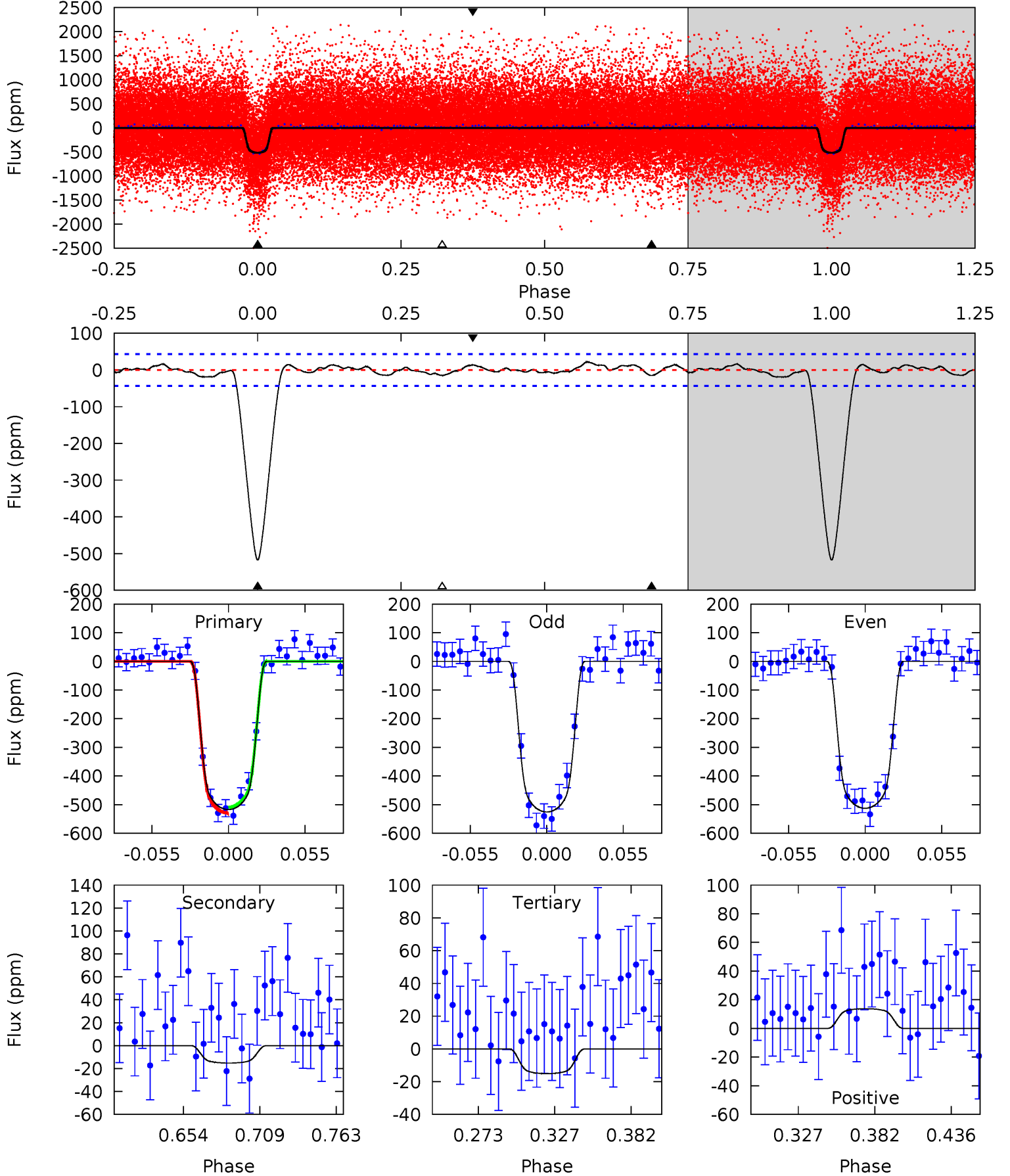
TCE 007685981-01   P= 4.408348 Days    $T_0=132.520834$  (BKJD)



# DV Model-Shift Uniqueness Test

007685981-01, P = 4.408377 Days, E = 132.515418 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
56.1	1.65	1.64	1.49	4.69	1.92	0.94	54.5	54.6	0.01	0.16	0.70	0.97	0.04	1.14

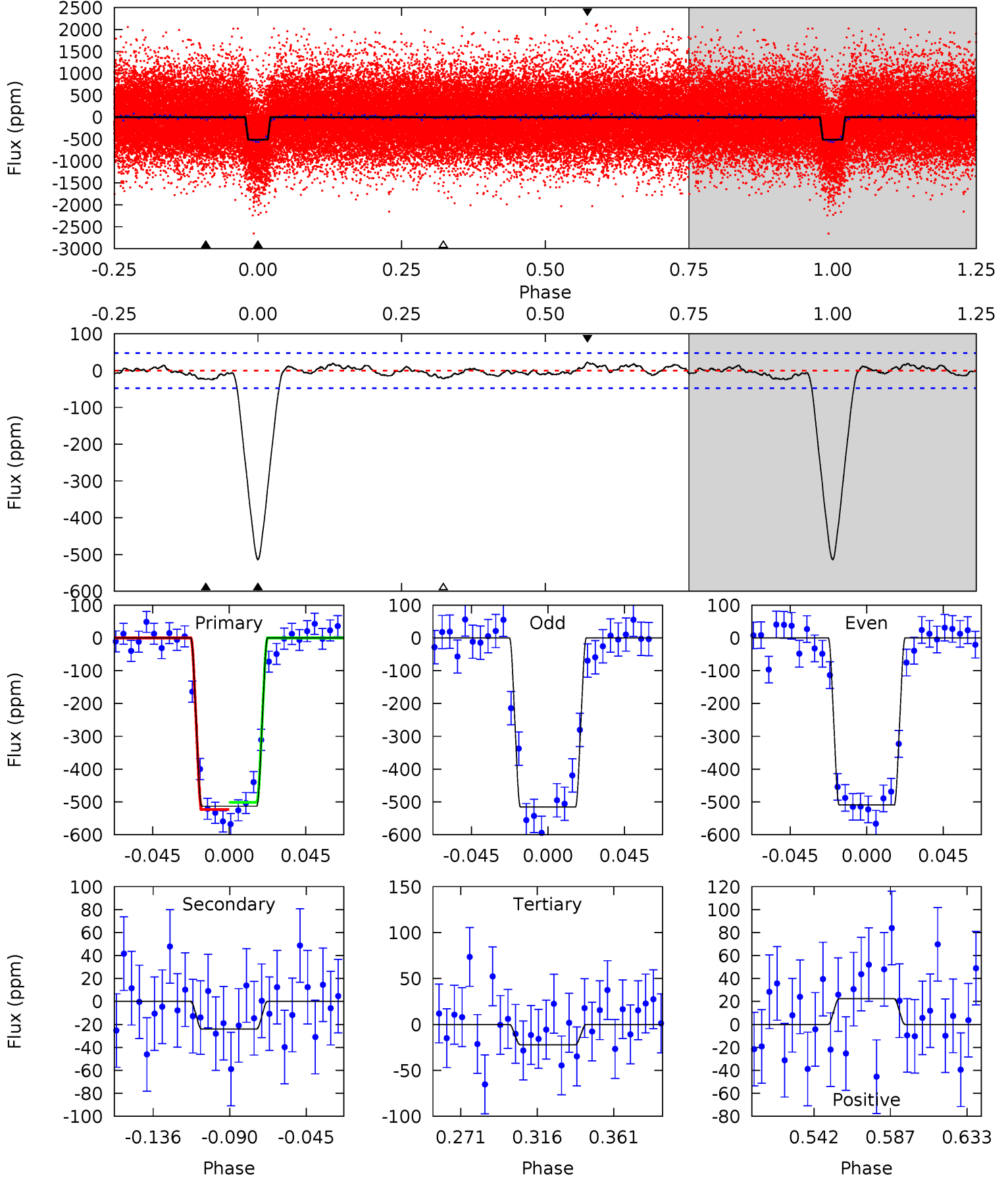




# Alt Model-Shift Uniqueness Test

007685981-01, P = 4.408348 Days, E = 132.520834 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
51.0	2.38	2.21	2.22	4.73	2.00	0.91	48.7	48.7	0.17	0.16	0.28	0.99	0.04	1.07





### Stellar Parameters For KIC 007685981

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6007^{+189}_{-189}$	$4.457^{+0.081}_{-0.202}$	$-0.240^{+0.300}_{-0.300}$	$0.961^{+0.285}_{-0.122}$	$0.968^{+0.132}_{-0.120}$	$1.534^{+0.553}_{-0.792}$
	+3%/-3%	+2%/-5%	+125%/-125%	+30%/-13%	+14%/-12%	+36%/-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 007685981-01 / KOI 0893.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-15 \pm 9$	$2.77^{+0.47}_{-0.24}$	$1617^{+117}_{-86}$	$2938^{+241}_{-409}$	$2.716^{+1.879}_{-1.672}$
Alt.	$-24 \pm 10$	$2.47^{+0.41}_{-0.25}$	$1615^{+127}_{-83}$	$3309^{+187}_{-283}$	$5.639^{+2.805}_{-2.418}$

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

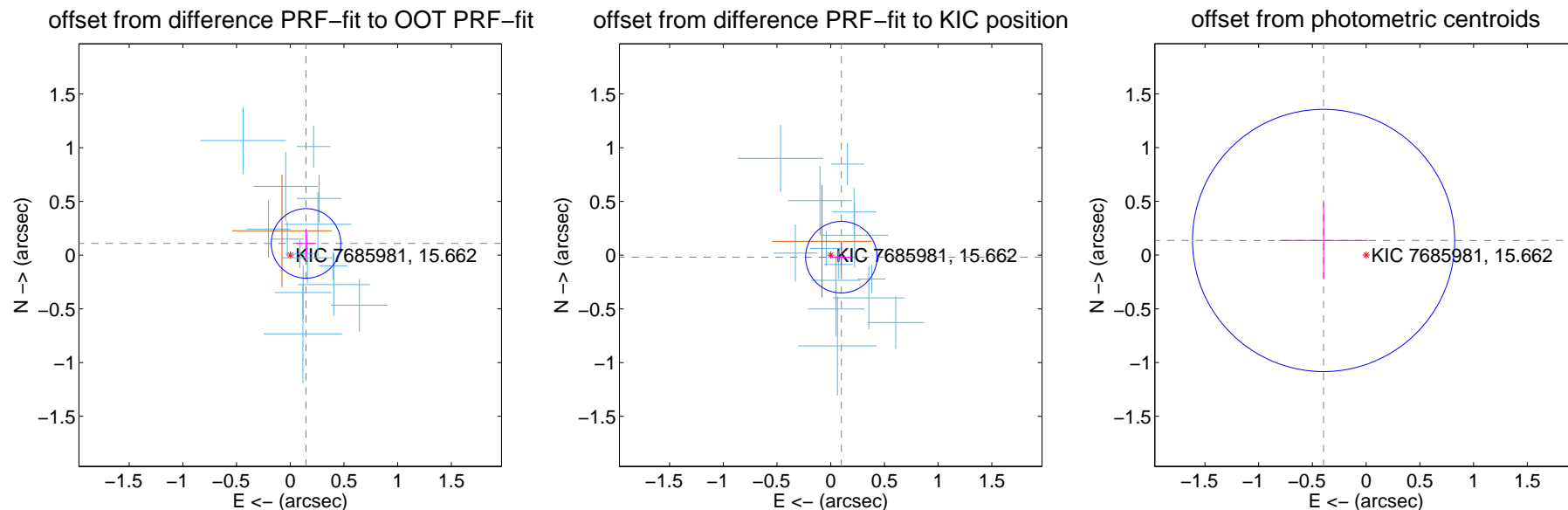
## DV Centroid Data

Supplemental centroid analysis for 007685981-01. Kepler magnitude: 15.66. Transit SNR 41.59

There are 14 quarters with good PRF difference image offsets

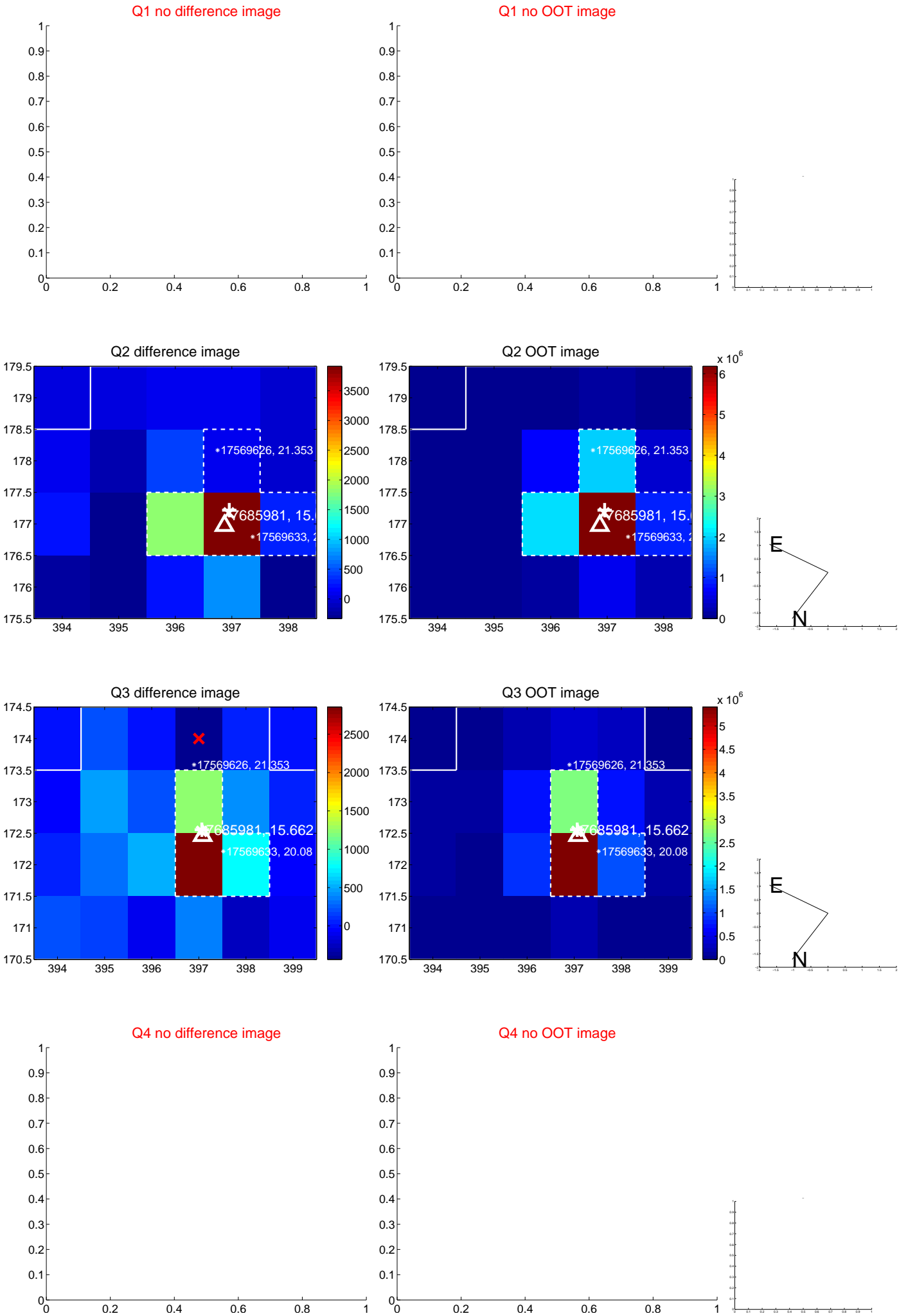
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.183 \pm 0.108$	1.70	$-0.147 \pm 0.092$	$0.109 \pm 0.131$
PRF-fit source offset from KIC position	$0.101 \pm 0.111$	0.91	$-0.099 \pm 0.101$	$-0.019 \pm 0.143$
photometric centroid source offset	$0.42 \pm 0.41$	1.03	$0.40 \pm 0.41$	$0.14 \pm 0.35$

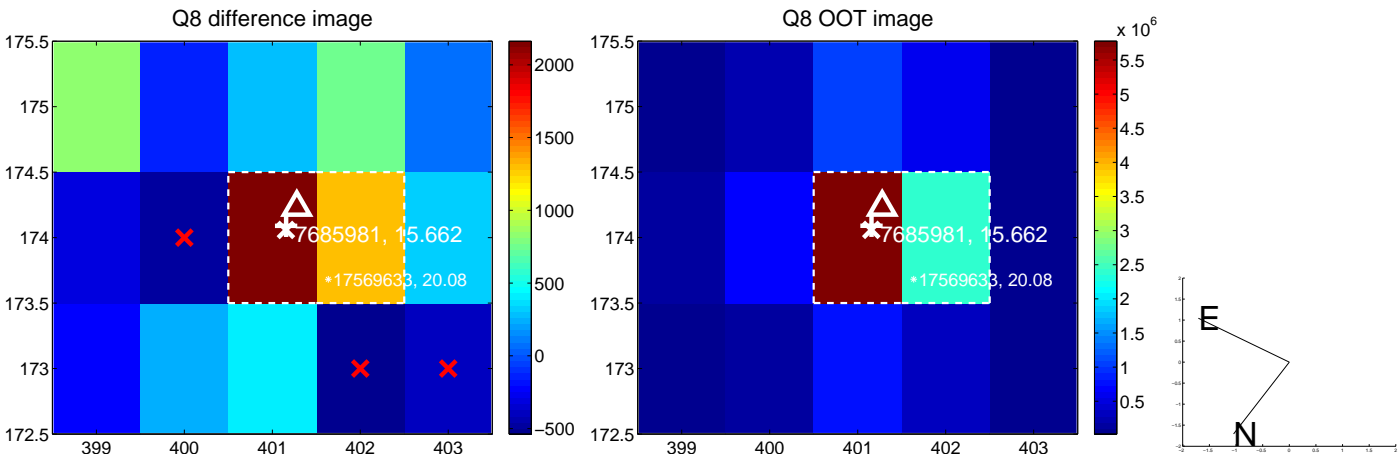
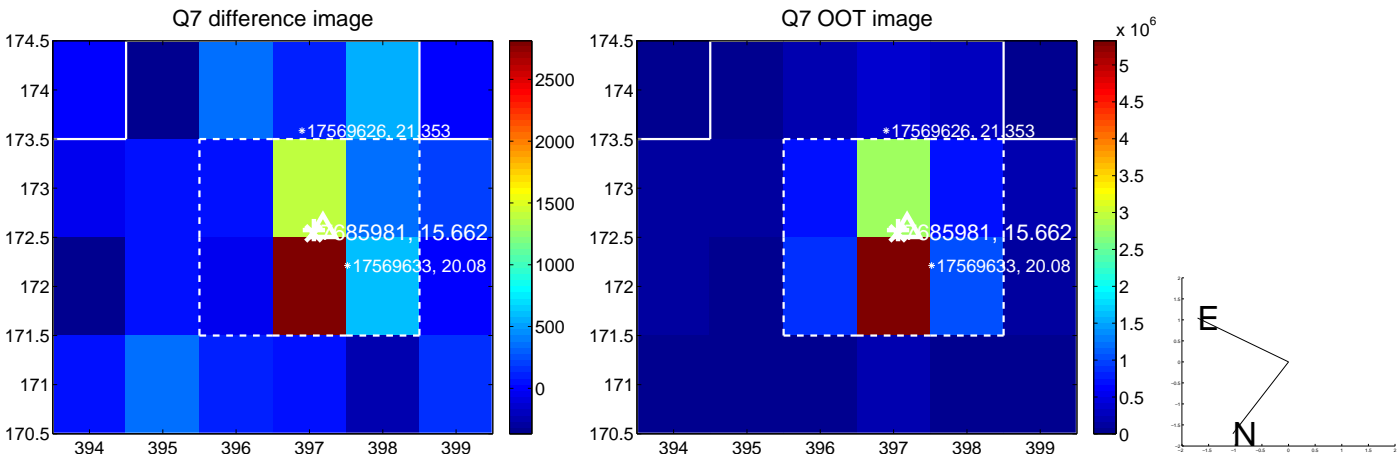
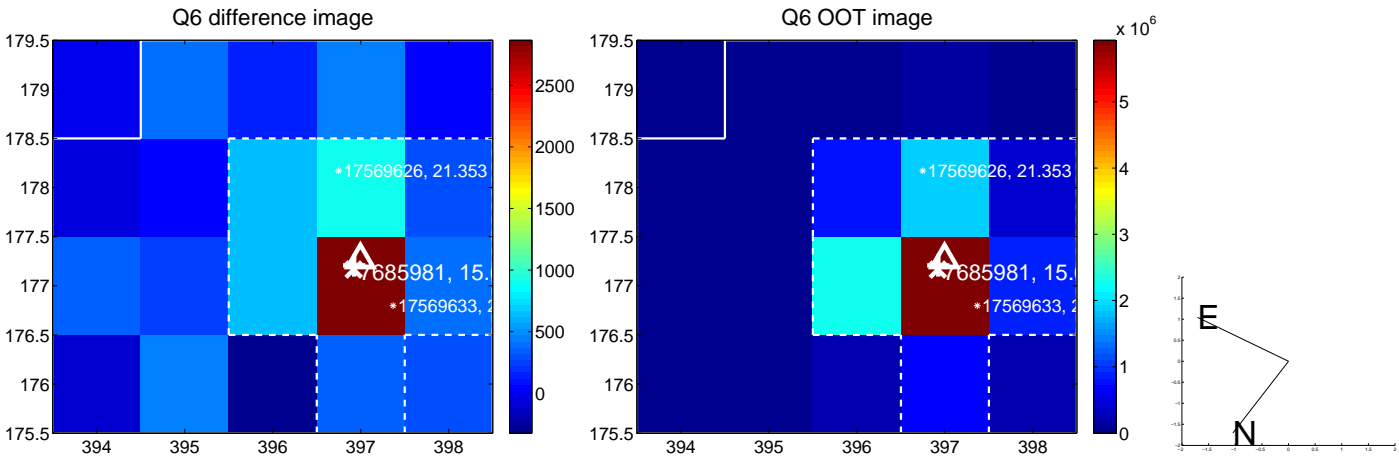
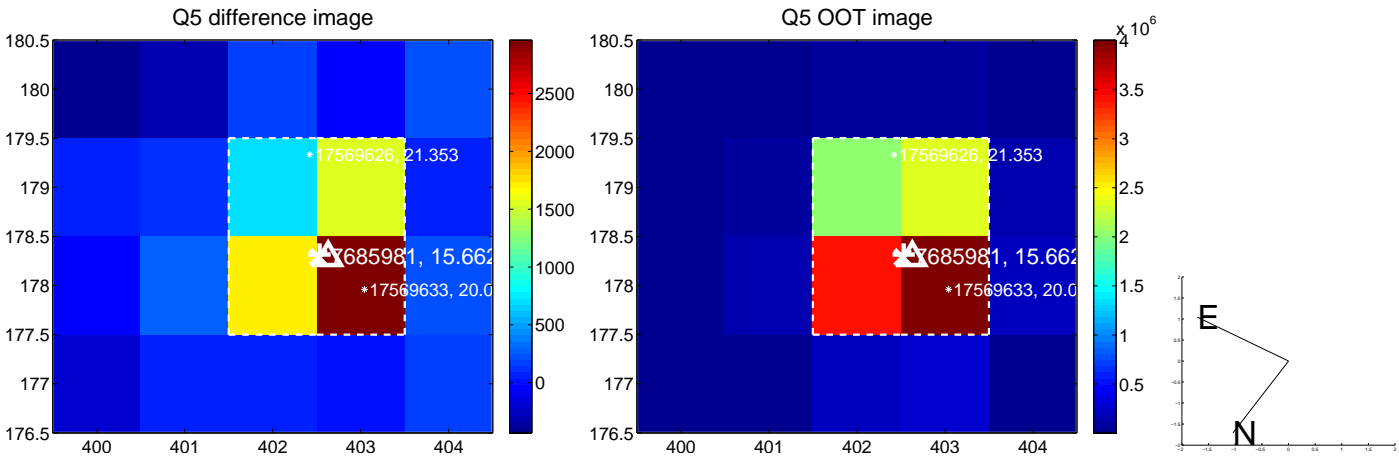


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

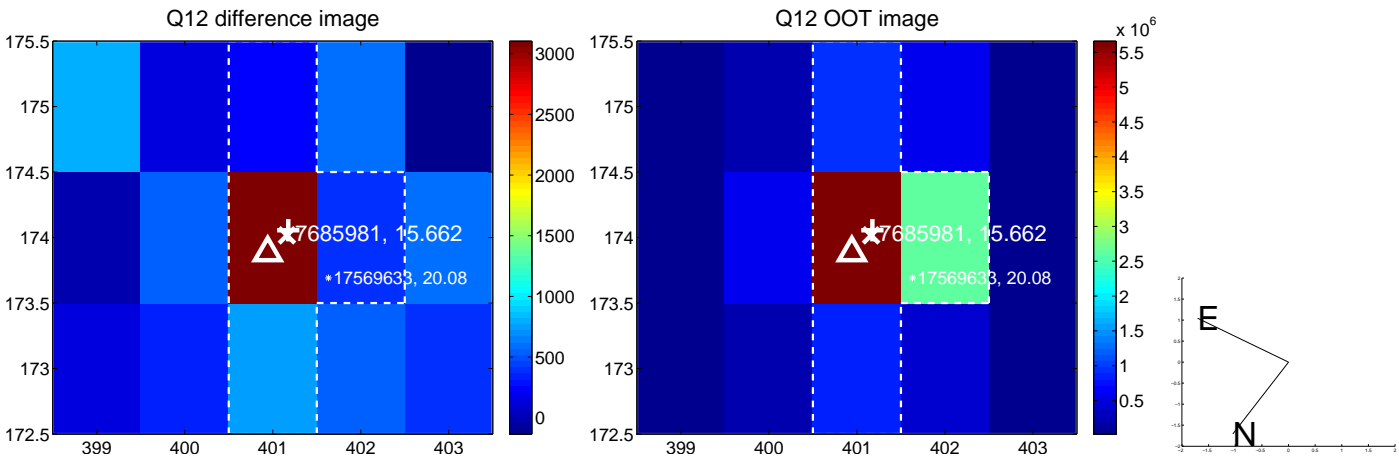
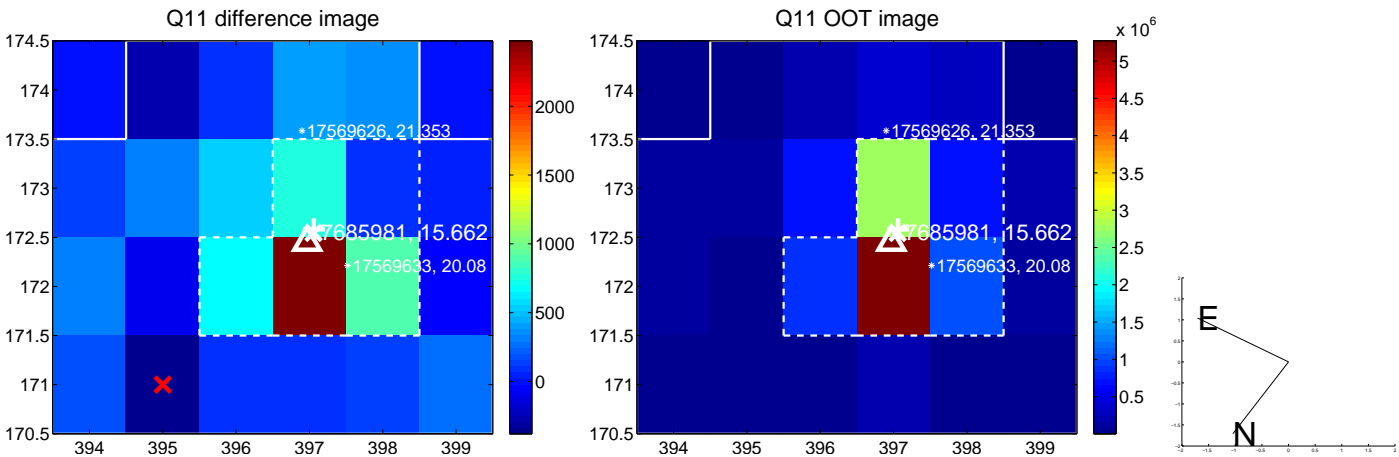
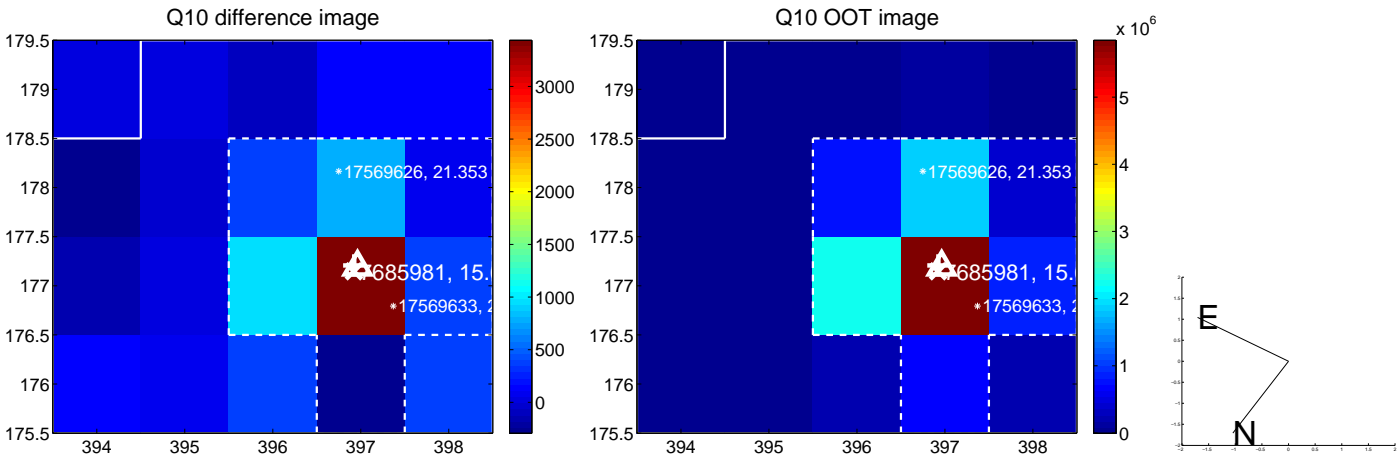
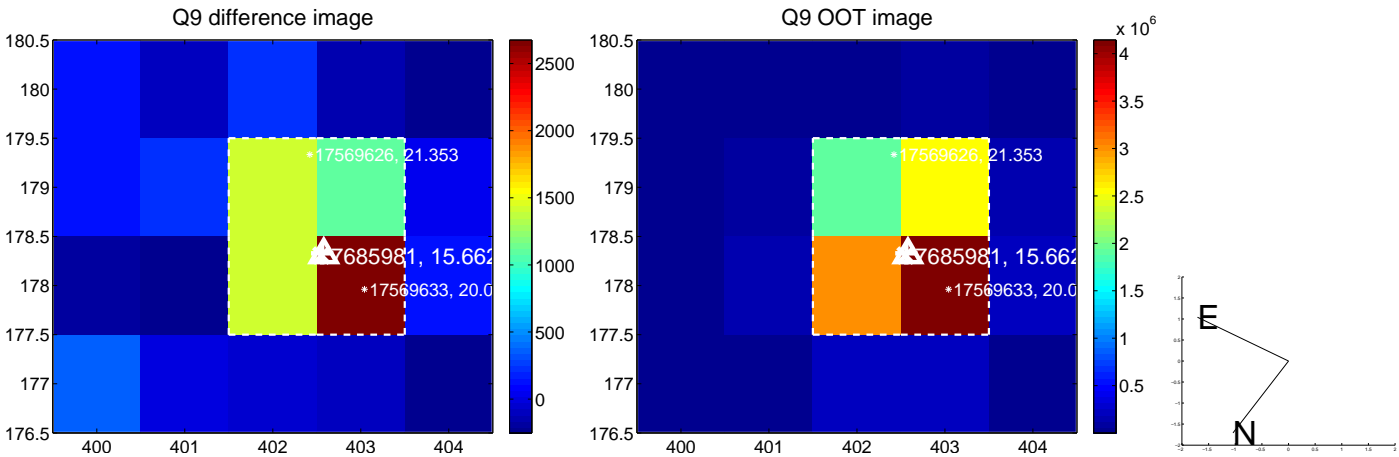


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

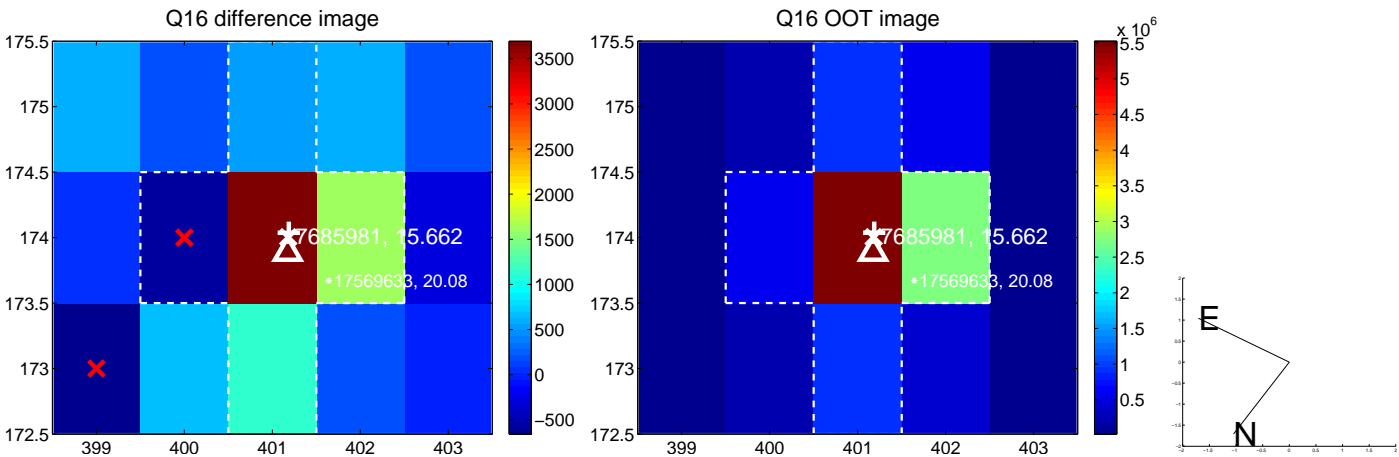
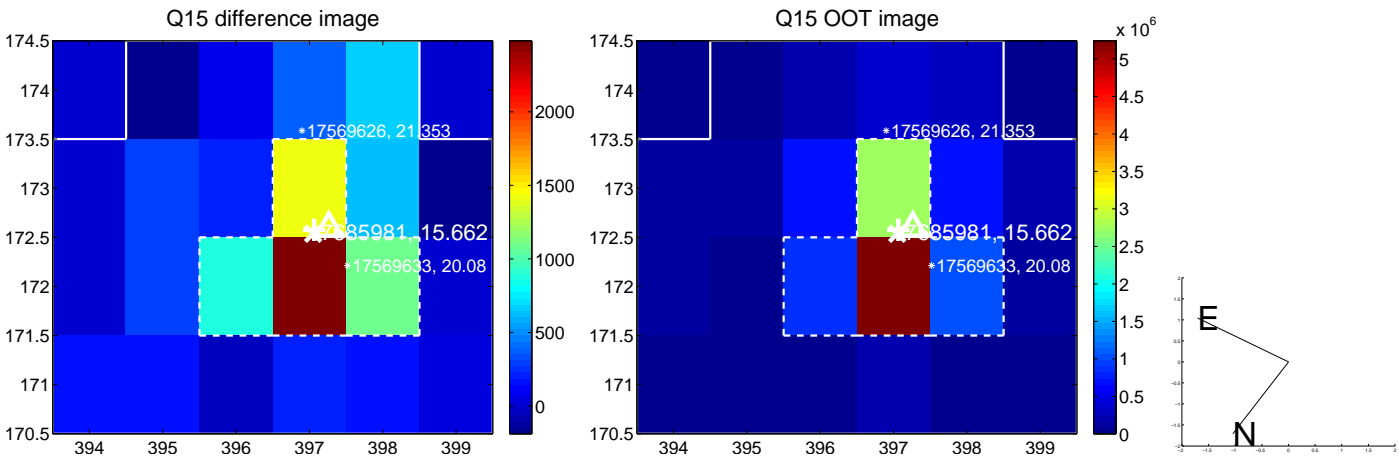
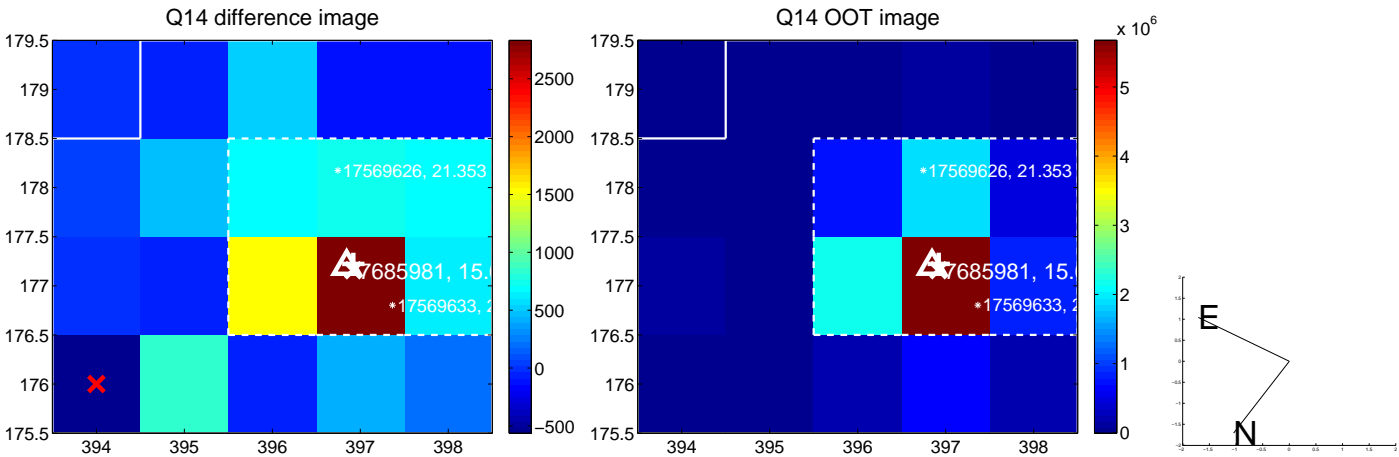
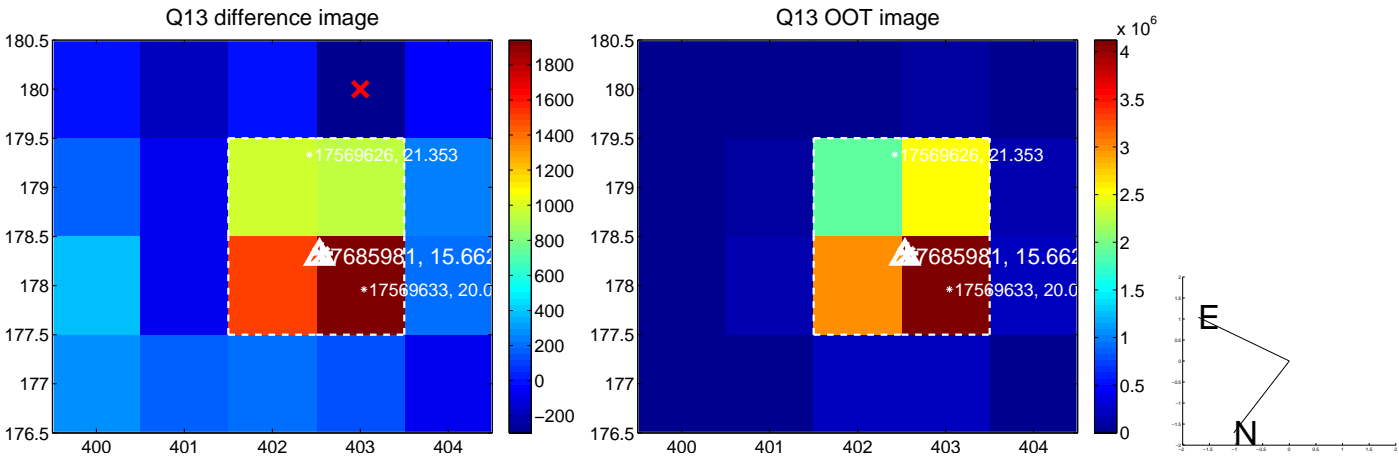




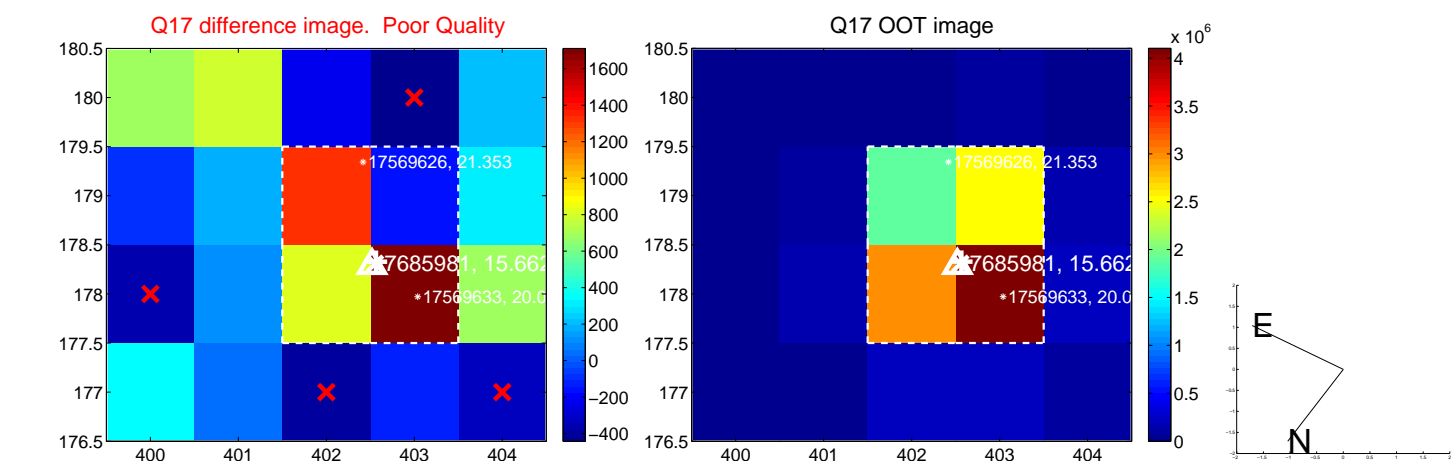
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



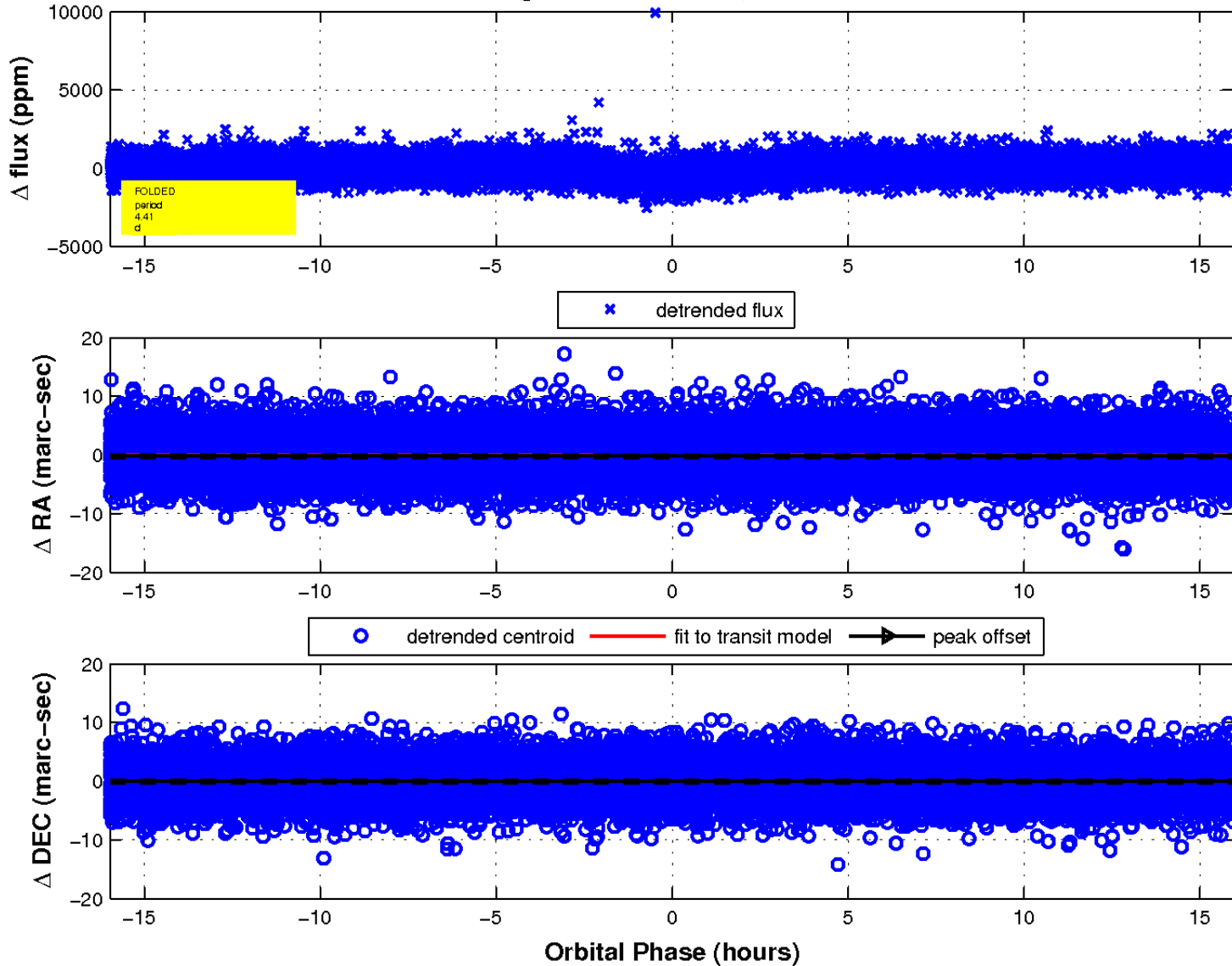
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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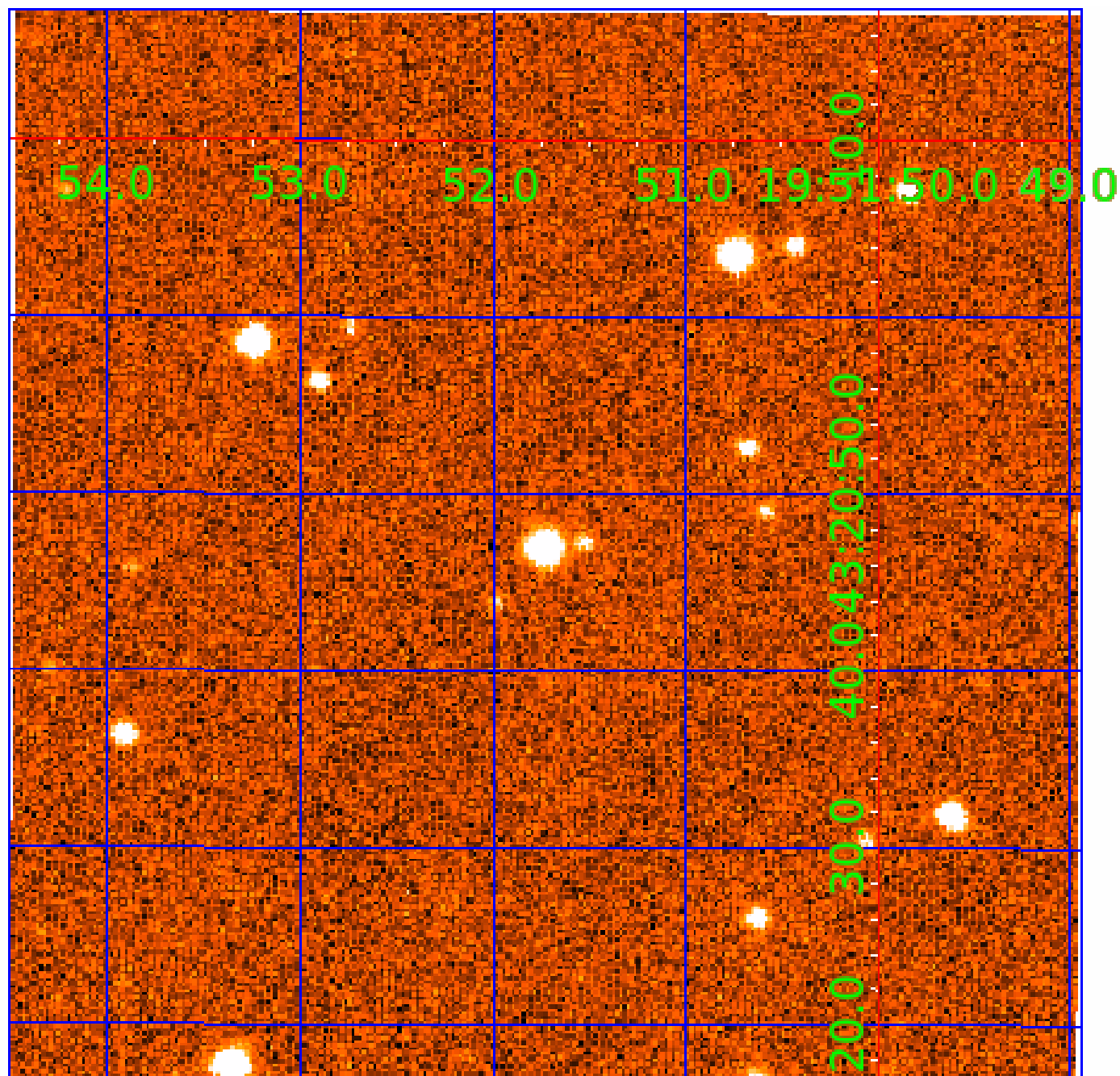


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 007685981

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007685981-01	OBS	0893.01	4.408377	132.515418	528.7	5.325	37.4	41.6	0.96	6007	2.73	398.38
007685981-02	OBS	No	339.774945	175.817768	598.7	13.396	7.9	7.2	0.96	6007	2.44	1.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007685981-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
007685981-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—MOD_NONUNIQU_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

**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.

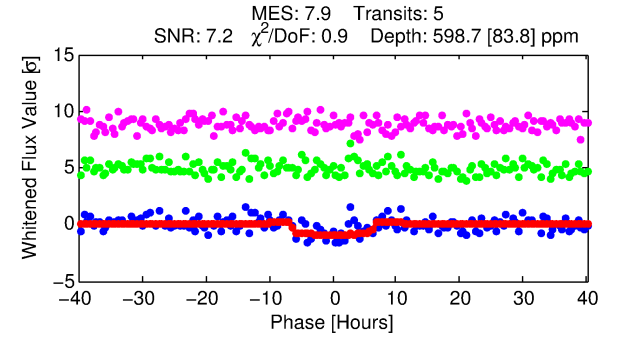
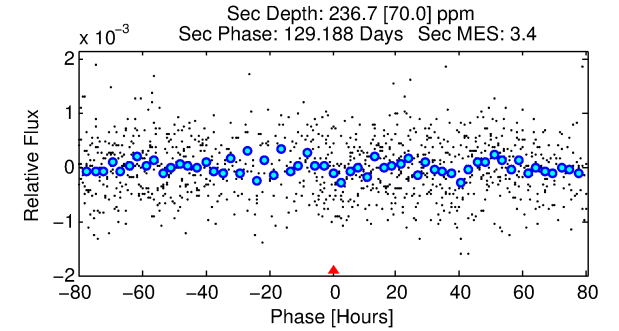
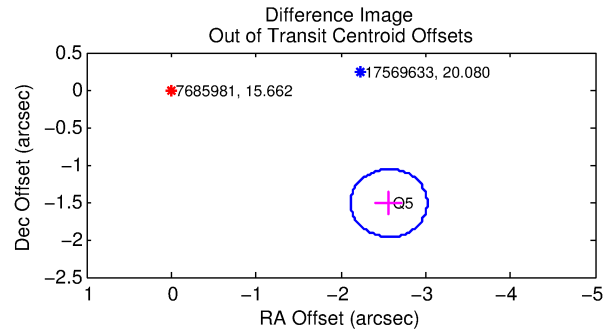
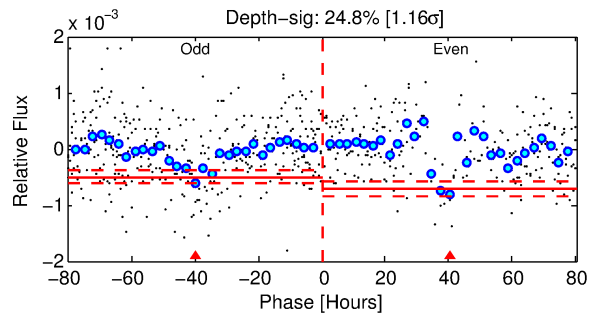
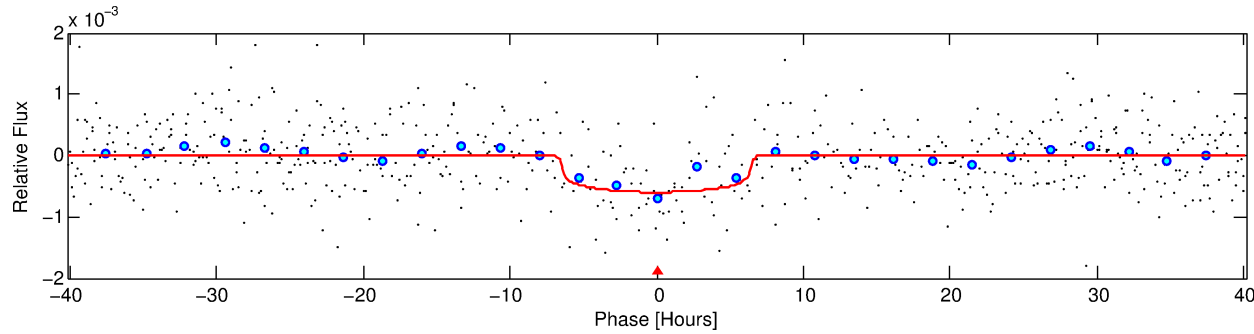
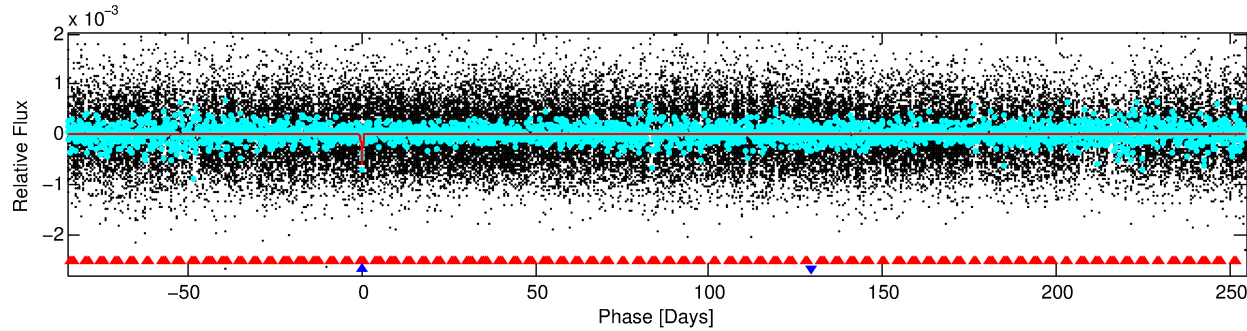
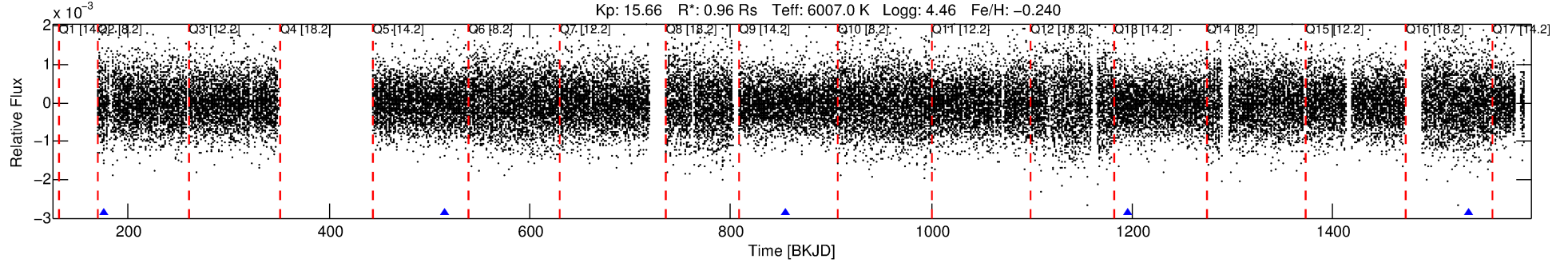
## Ephemeris Match Information For 007685981-02

No Significant Match Found

# DV One-Page Summary

KIC: 7685981 Candidate: 2 of 2 Period: 339.775 d  
KOI: K00893 Corr: No Ephemeris Match

Kp: 15.66 R\*: 0.96 Rs Teff: 6007.0 K Logg: 4.46 Fe/H: -0.240



## DV Fit Results:

Period = 339.77494 [0.01066] d  
Epoch = 175.8178 [0.0229] BKJD  
Rp/R\* = 0.0232 [0.0128]  
a/R\* = 166.09 [440.93]  
b = 0.56 [3.28]  
Seff = 1.21 [0.47]  
Teq = 268 [26] K  
Rp = 2.44 [1.53] Re  
a = 0.9418 [0.2366] AU  
Ag = 19450.75 [23360.85] [0.83σ]  
Teff = 4888 [1406] K [3.29σ]

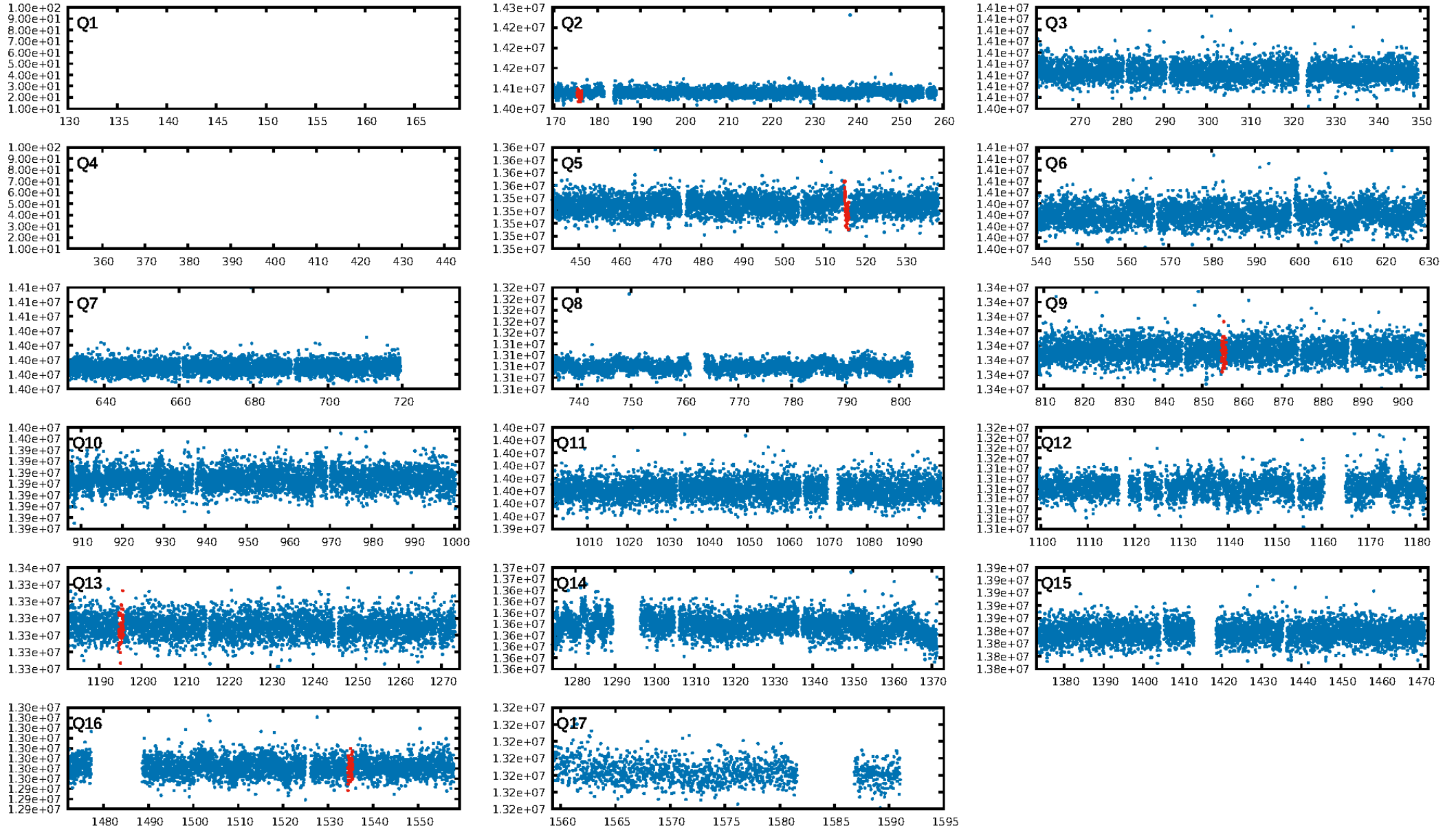
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [558.36σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 11.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 2.83e-11**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 9.779  
Centroid-sig: 4.5%  
Centroid-so: 2.628 arcsec [1.71σ]  
**OotOffset-rm: 2.979 arcsec [19.74σ]**  
**KicOffset-rm: 3.030 arcsec [20.10σ]**  
OotOffset-st: 0/0/0/1 [1]  
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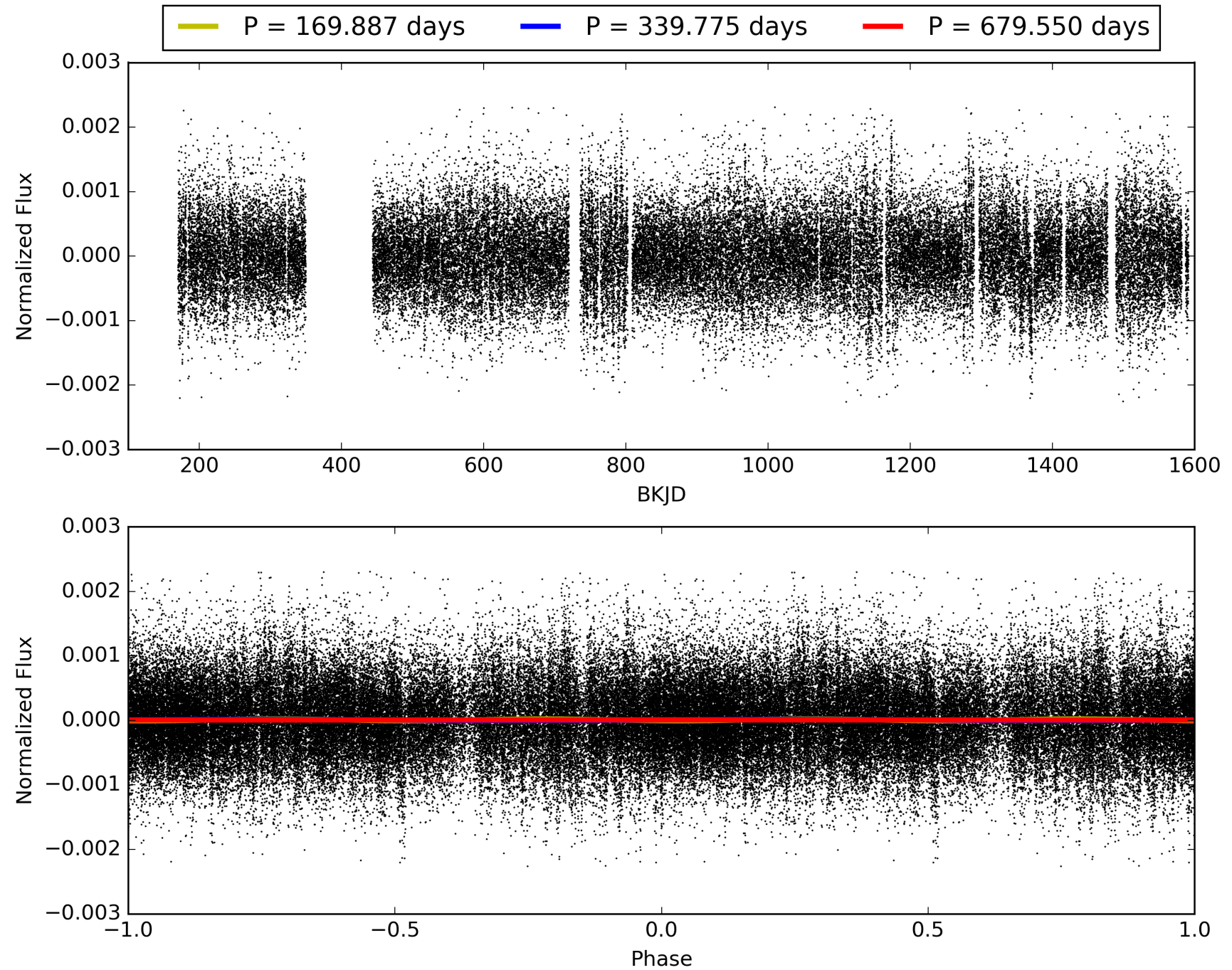
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:12:21 Z

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

# TCE 007685981-02, PDC Light Curves

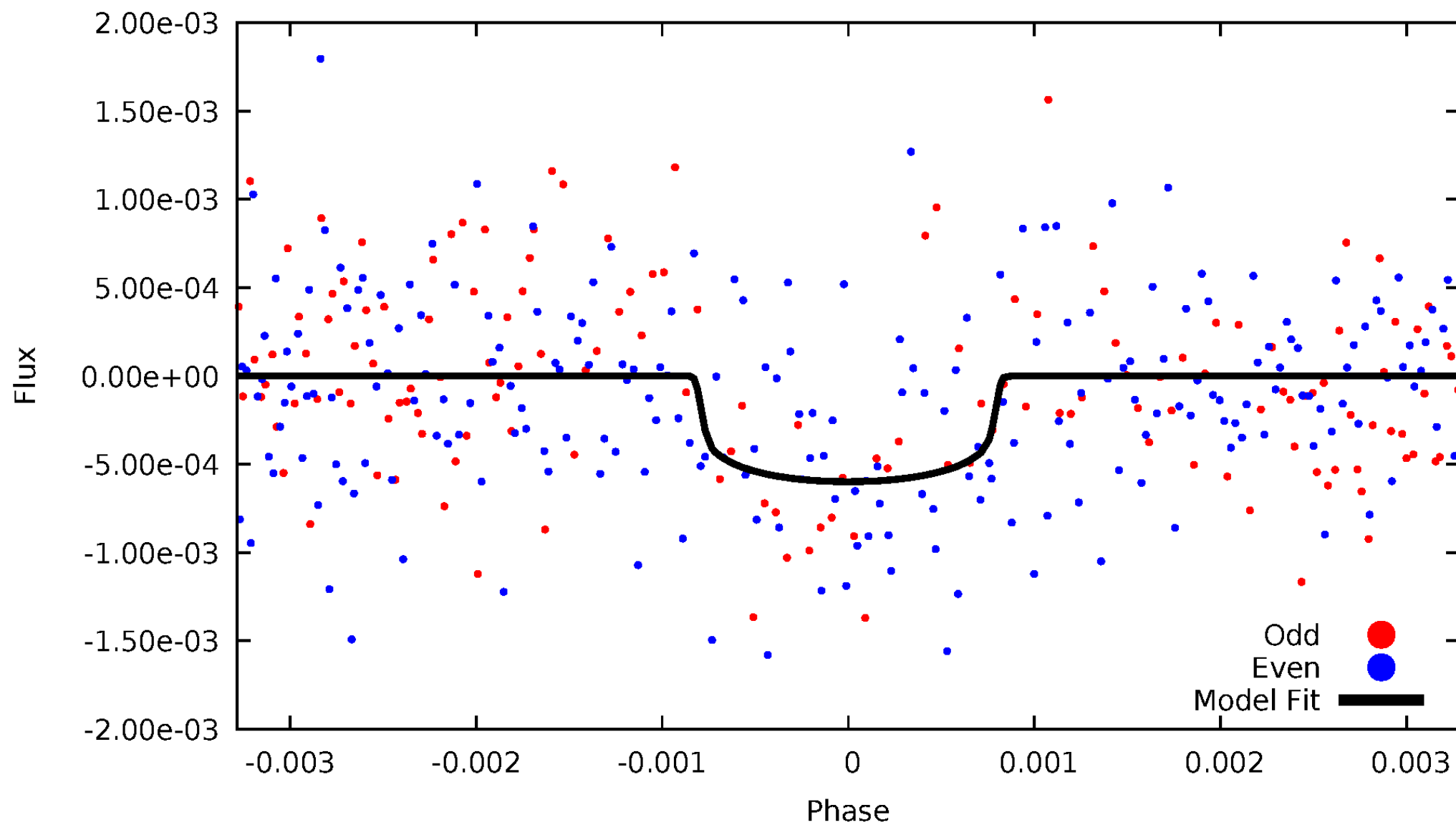


# TCE 007685981-02



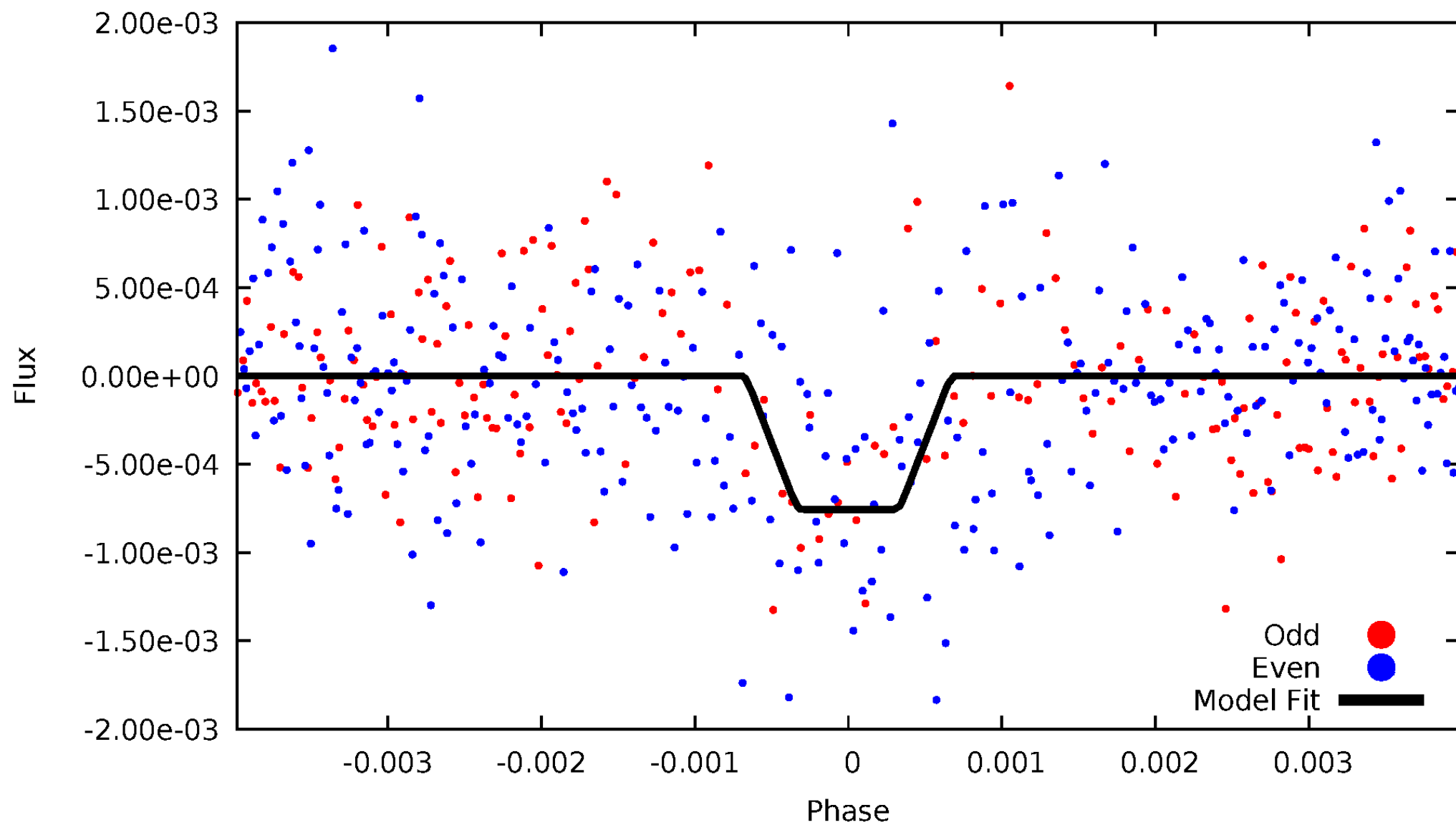
# DV Odd/Even

TCE 007685981-02



# ALT Odd/Even

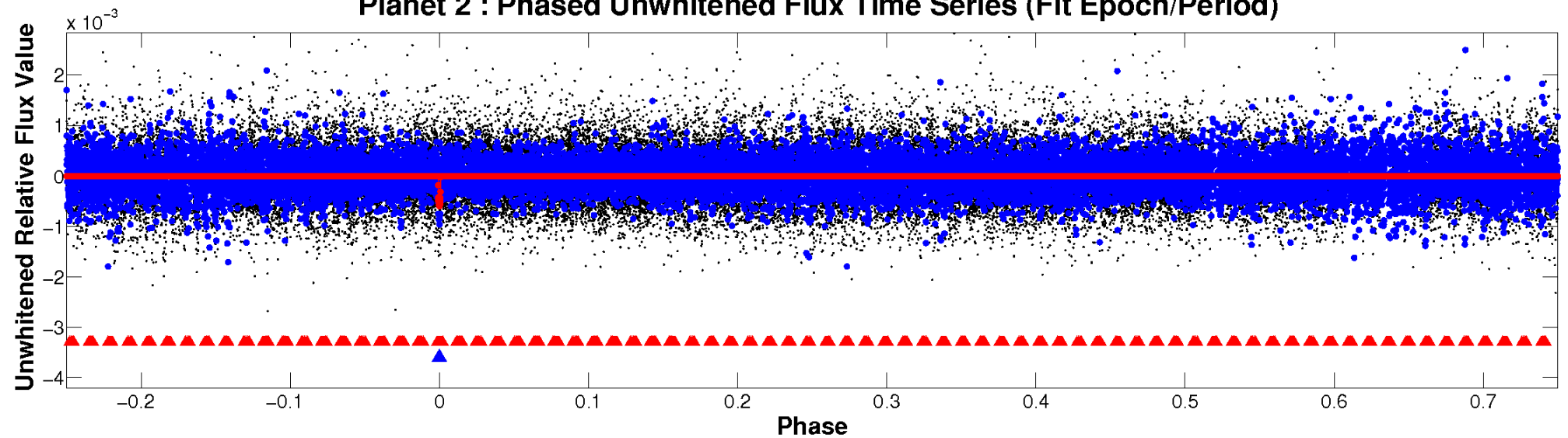
TCE 007685981-02



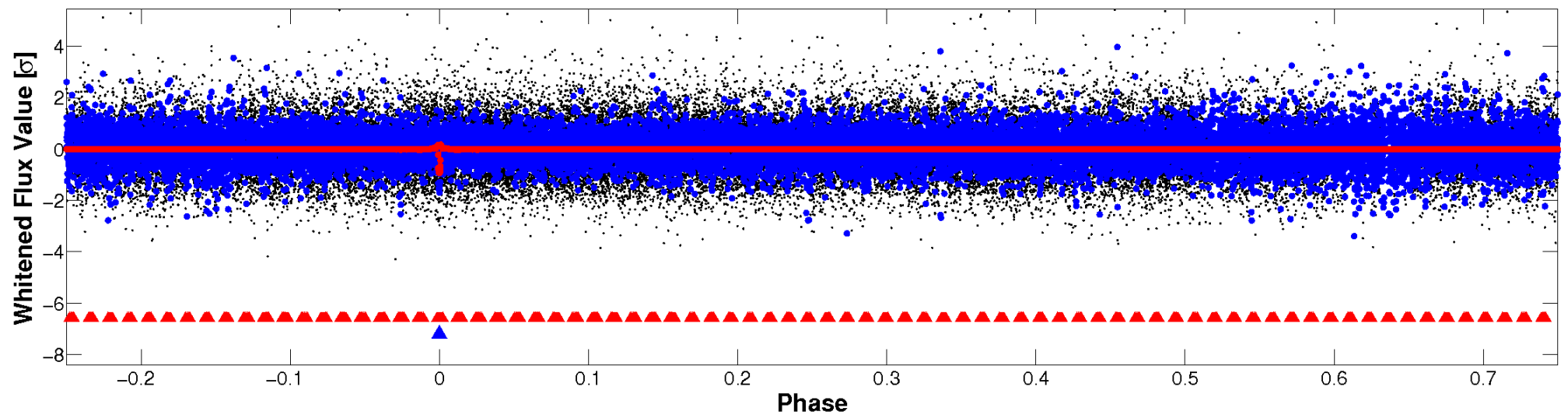


# Non-Whitened Vs. Whitened Light Curve

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

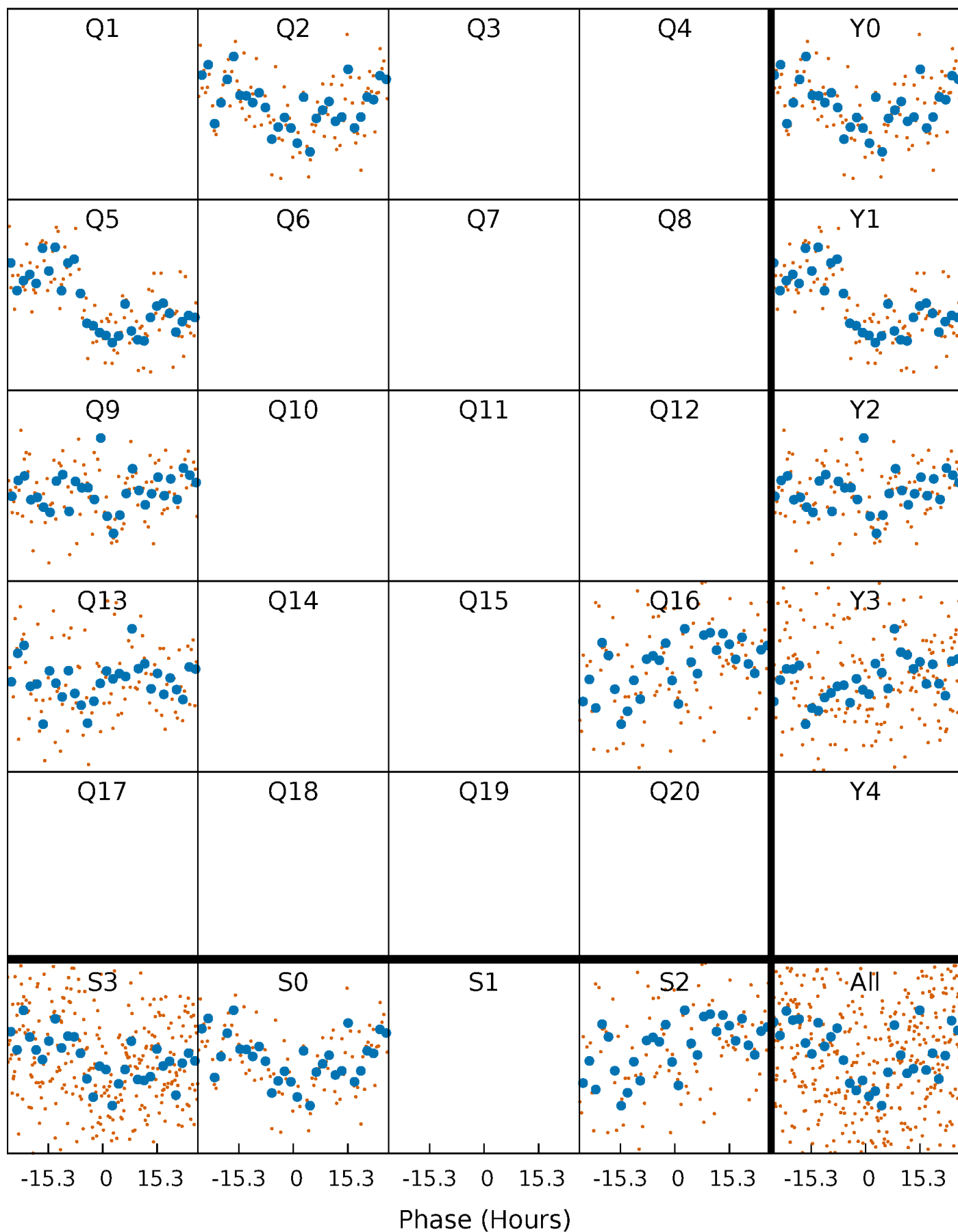


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



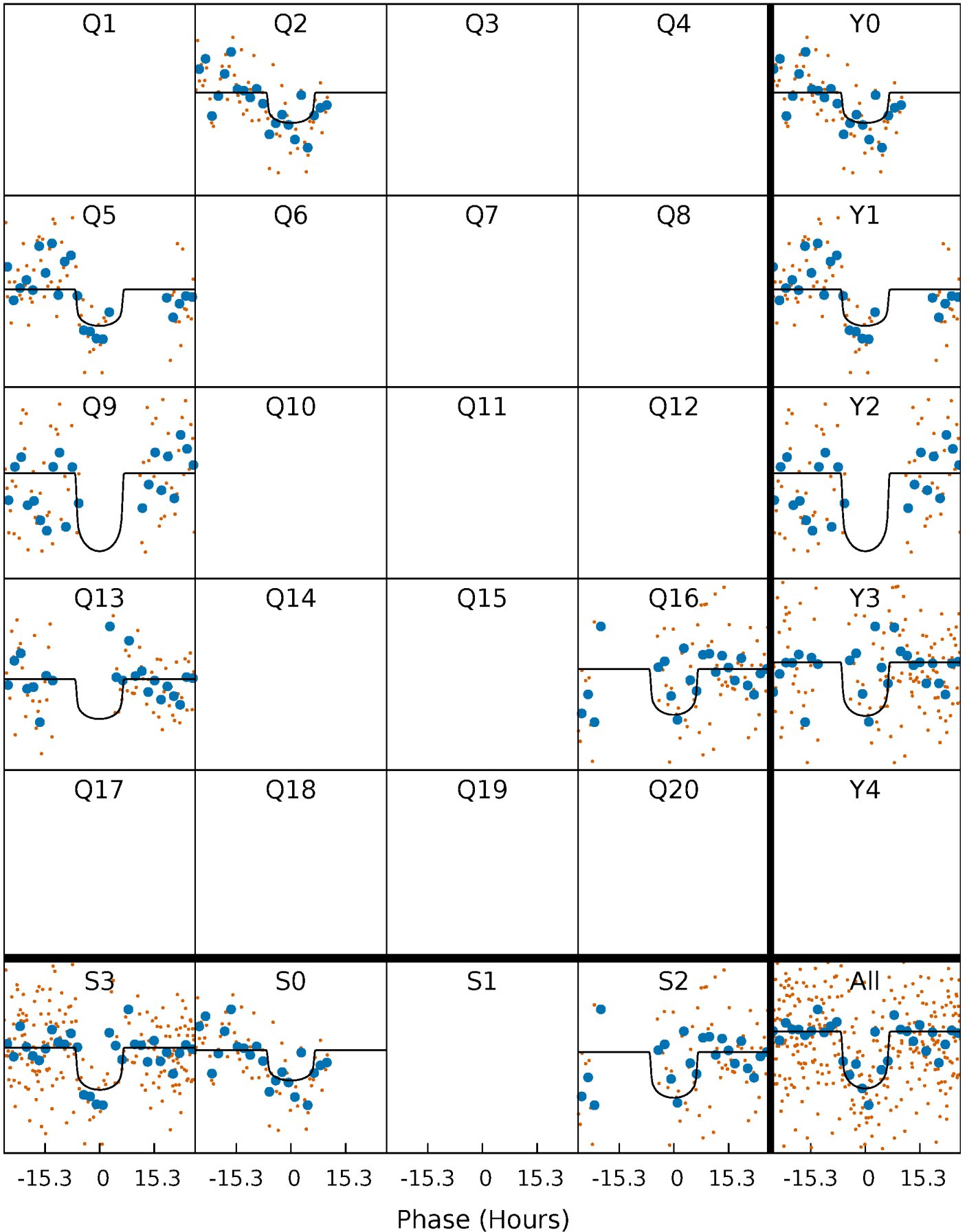
# PDC Quarter-Phased Transit Curves

TCE 007685981-02     $P=339.774945$  Days     $T_0=175.817768$  (BKJD)



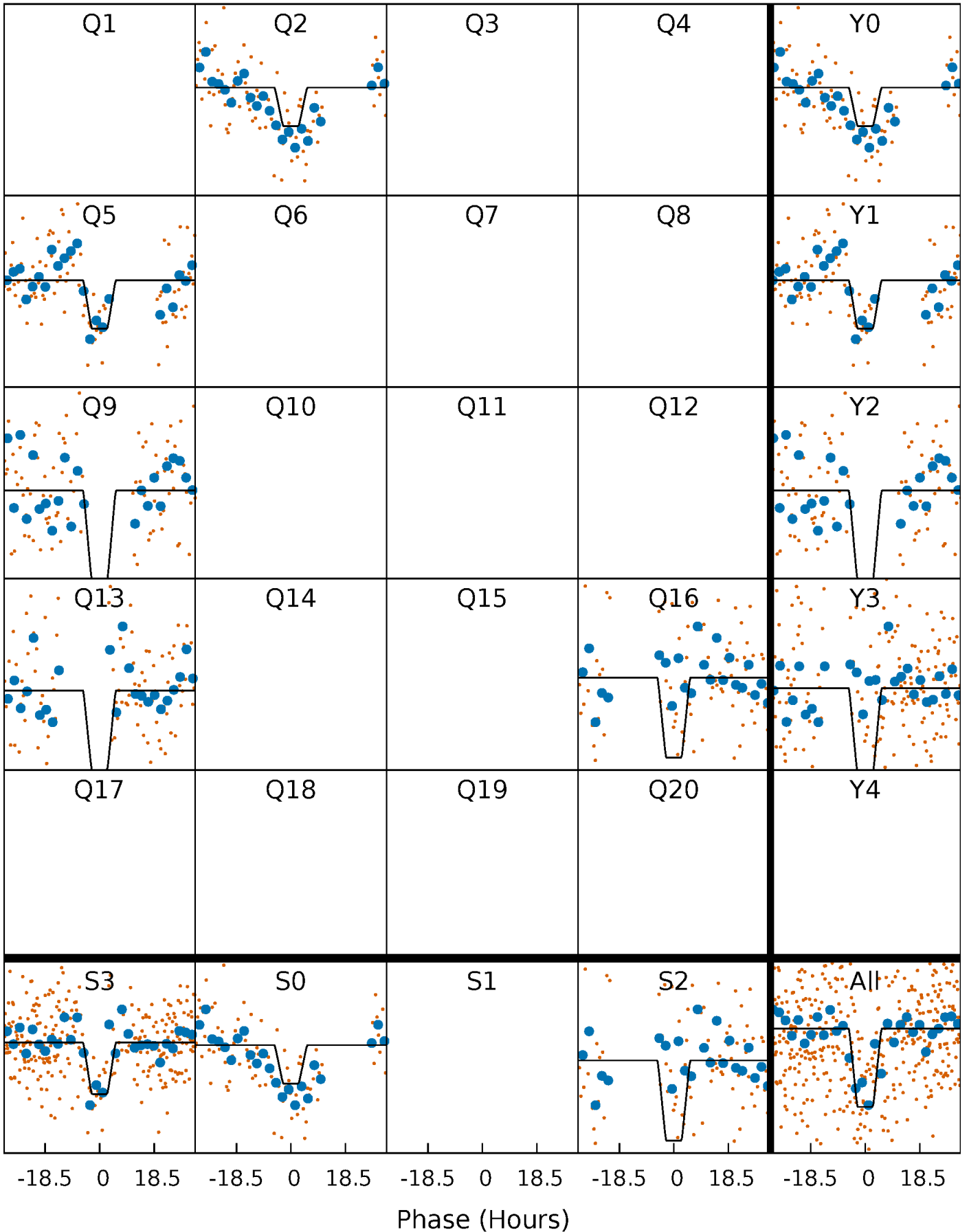
# DV Quarter-Phased Transit Curves

TCE 007685981-02     $P=339.774945$  Days     $T_0=175.817768$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

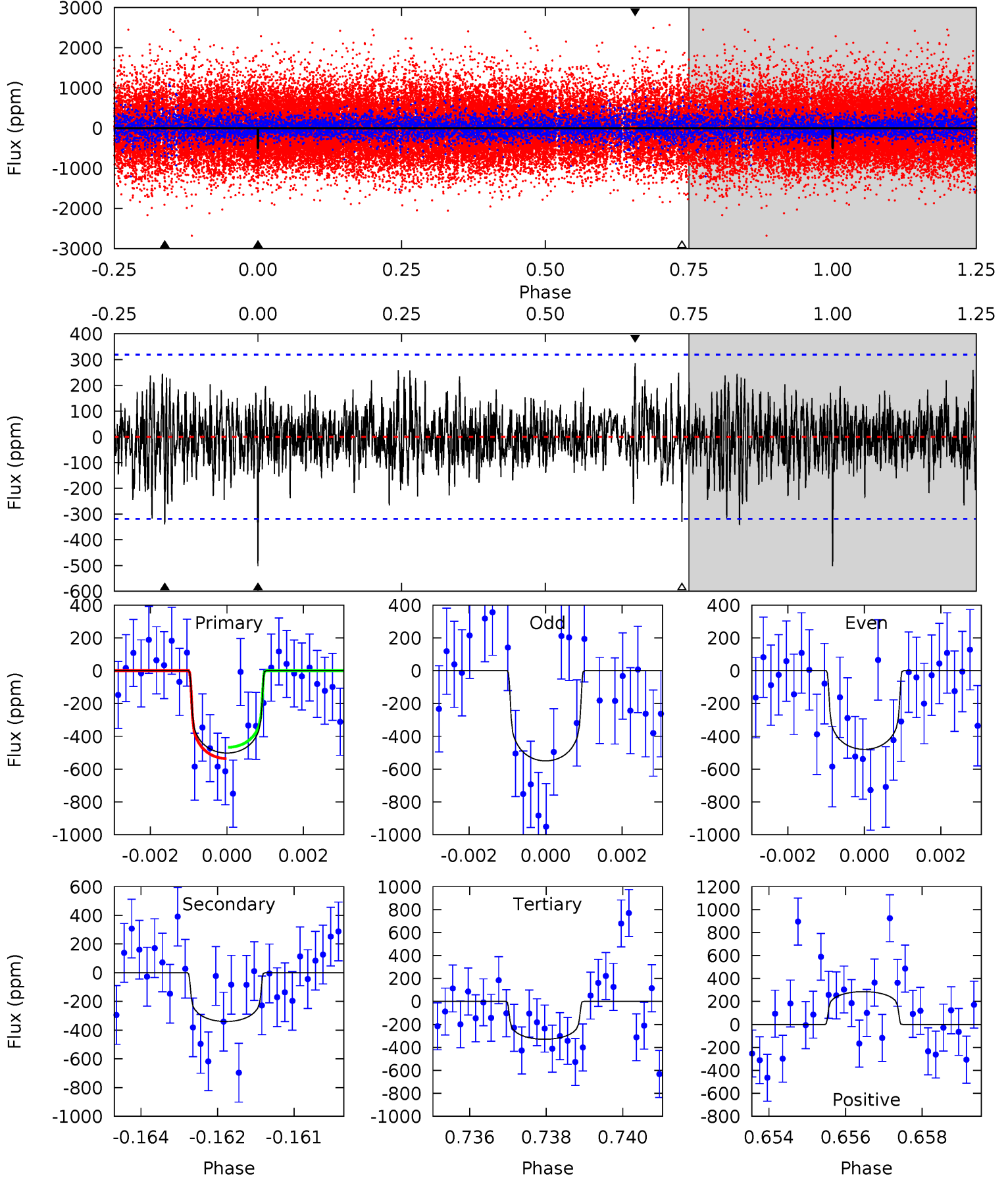
TCE 007685981-02 P=339.782858 Days  $T_0=175.802670$  (BKJD)



# DV Model-Shift Uniqueness Test

007685981-02,  $P = 339.774945$  Days,  $E = 175.817768$  Days

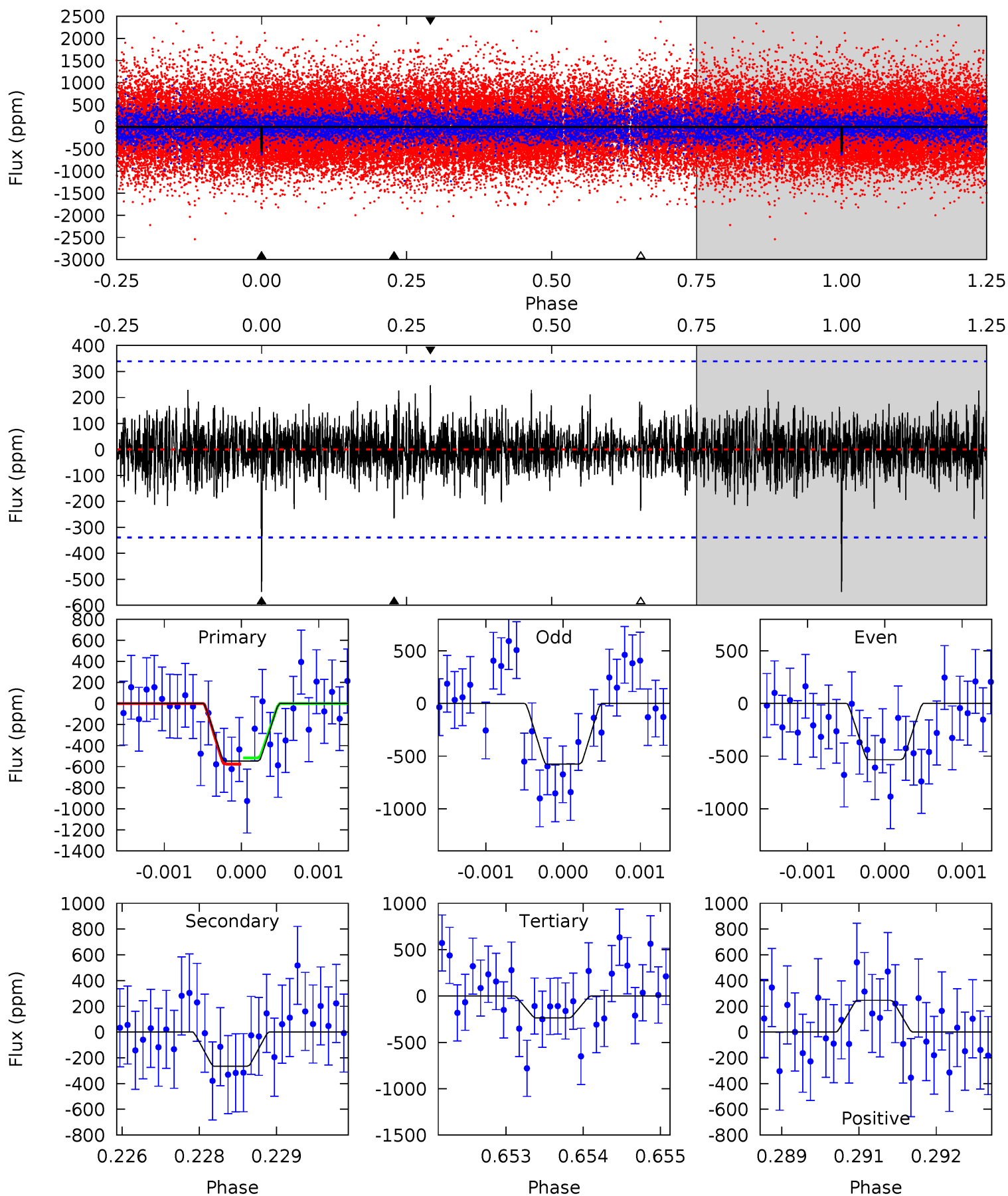
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.44	5.71	5.53	4.79	5.36	3.14	1.32	2.91	3.65	0.18	0.91	0.55	1.33	0.36	0.57



# Alt Model-Shift Uniqueness Test

007685981-02, P = 339.782858 Days, E = 175.802670 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
8.71	4.22	3.76	3.92	5.39	3.20	1.04	4.95	4.79	0.46	0.30	0.31	0.65	0.31	0.46





### Stellar Parameters For KIC 007685981

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6007^{+189}_{-189}$	$4.457^{+0.081}_{-0.202}$	$-0.240^{+0.300}_{-0.300}$	$0.961^{+0.285}_{-0.122}$	$0.968^{+0.132}_{-0.120}$	$1.534^{+0.553}_{-0.792}$
	+3%/-3%	+2%/-5%	+125%/-125%	+30%/-13%	+14%/-12%	+36%/-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 007685981-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-340 \pm 60$	$2.61^{+1.52}_{-1.30}$	$381^{+26}_{-21}$	$5309^{+2217}_{-868}$	$23885^{+73782}_{-14460}$
Alt.	$-265 \pm 63$	$3.00^{+1.42}_{-1.34}$	$380^{+27}_{-20}$	$4737^{+1481}_{-664}$	$13990^{+30839}_{-7855}$

$T_{\text{max}}$  = 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

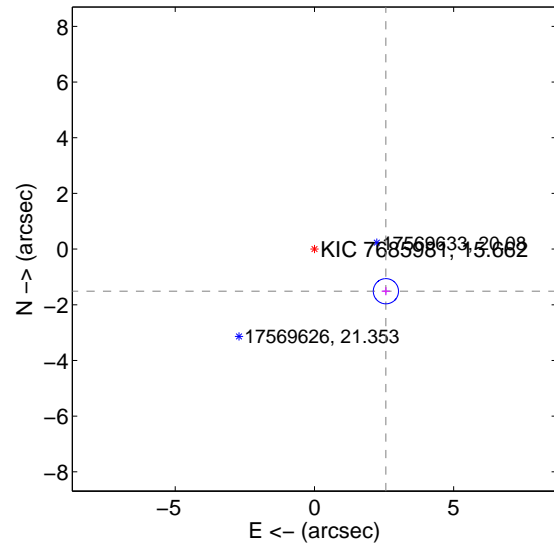
Supplemental centroid analysis for 007685981-02. Kepler magnitude: 15.66. Transit SNR 7.21

There are 1 quarters with good PRF difference image offsets

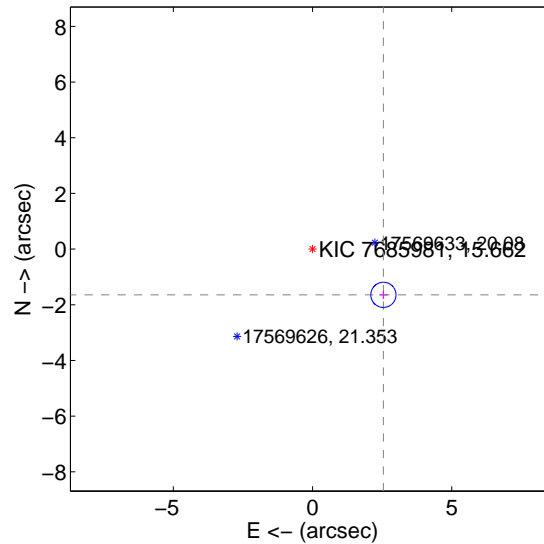
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.979 \pm 0.151$	19.74	$-2.566 \pm 0.152$	$-1.513 \pm 0.148$
PRF-fit source offset from KIC position	$3.030 \pm 0.151$	20.10	$-2.546 \pm 0.152$	$-1.643 \pm 0.148$
photometric centroid source offset	$2.63 \pm 1.54$	1.71	$-2.56 \pm 1.55$	$0.60 \pm 1.36$

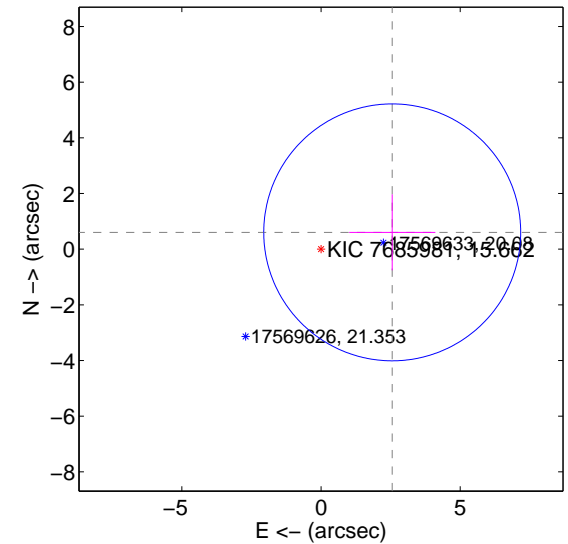
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

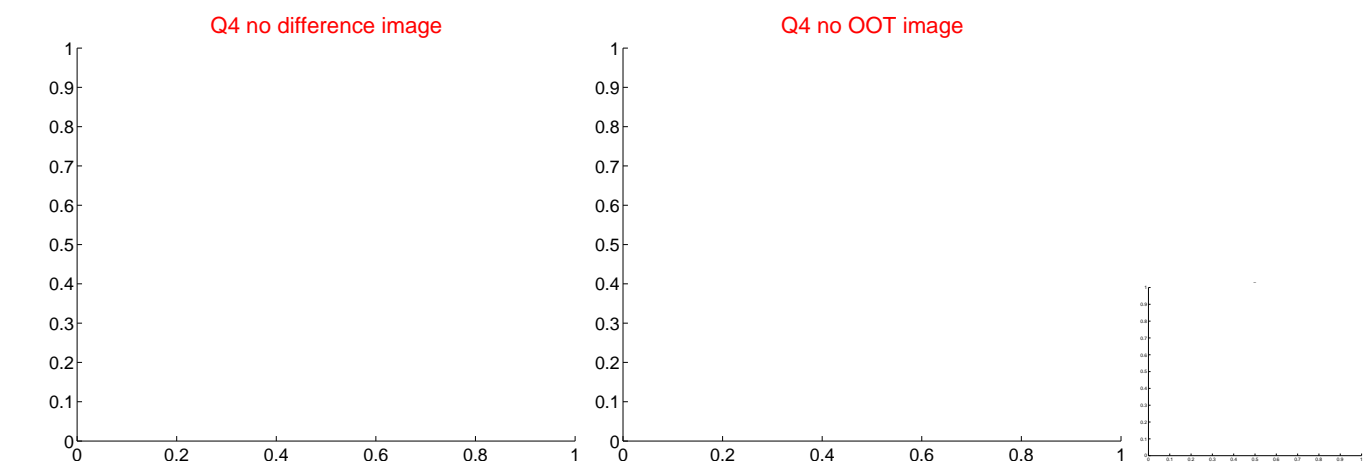
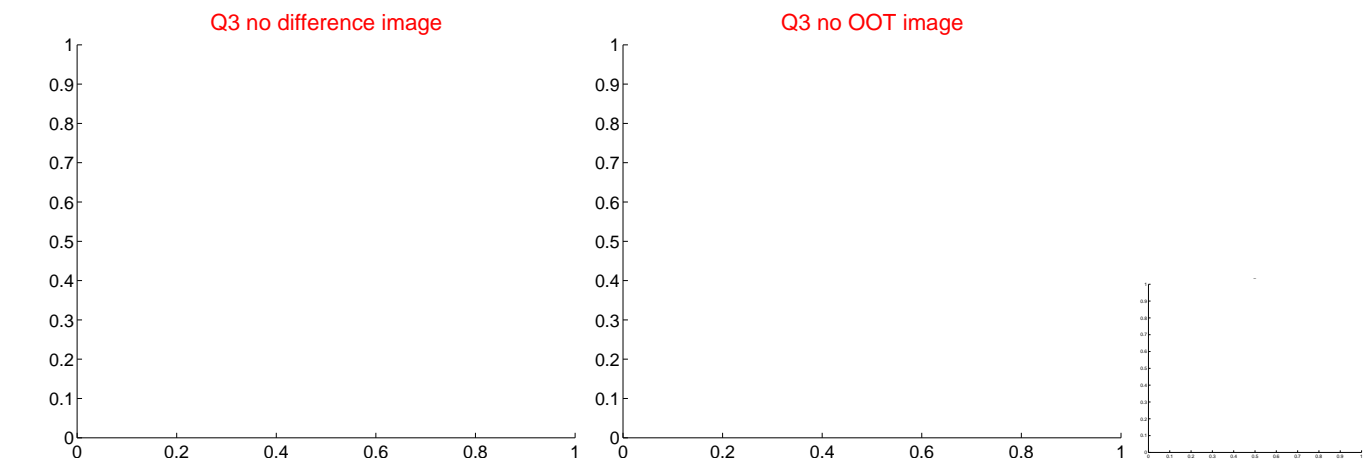
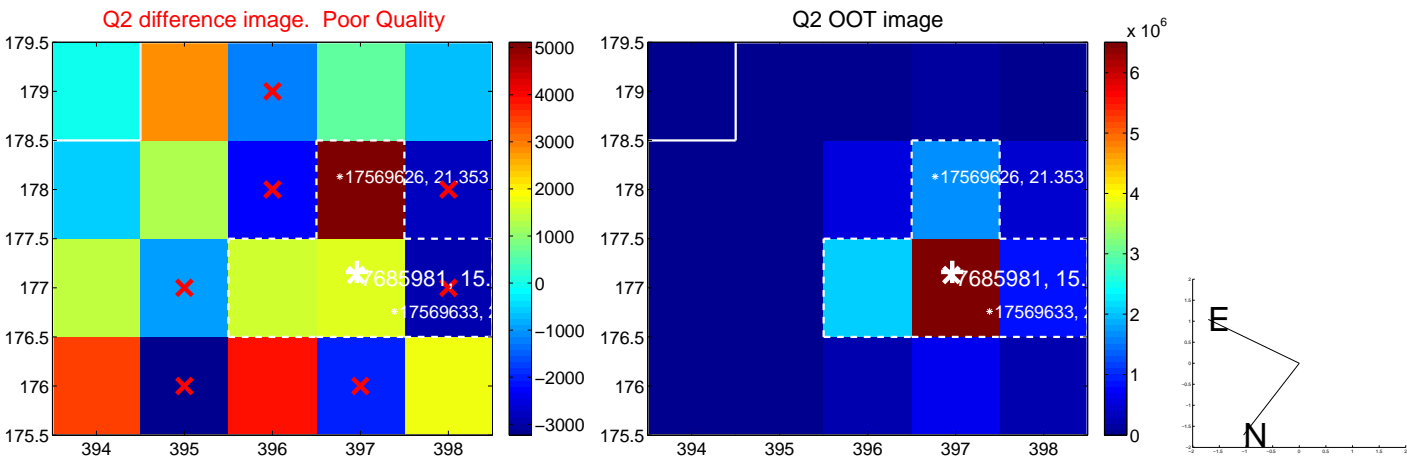
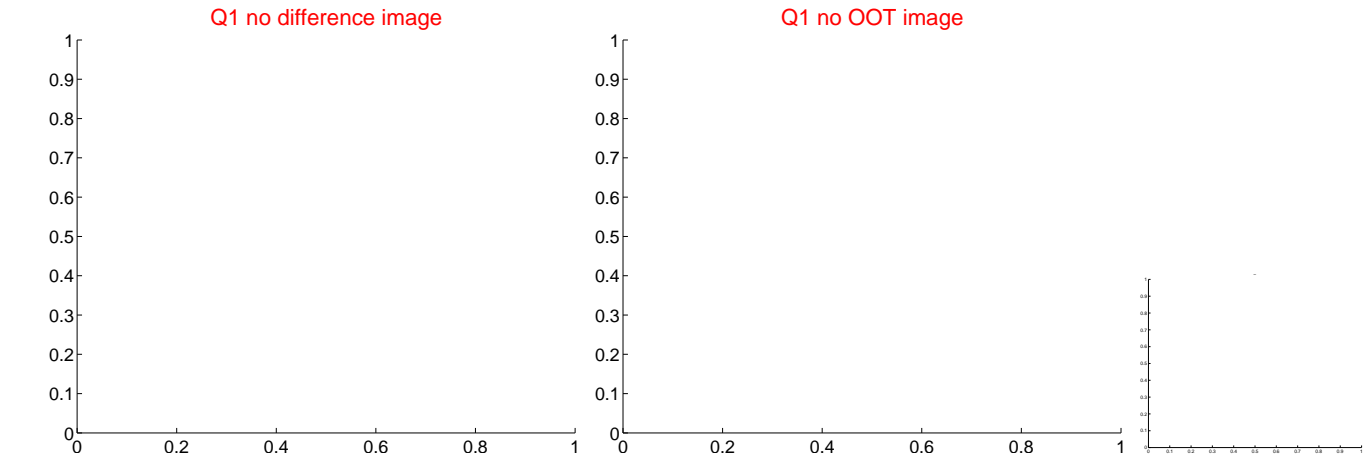


offset from photometric centroids

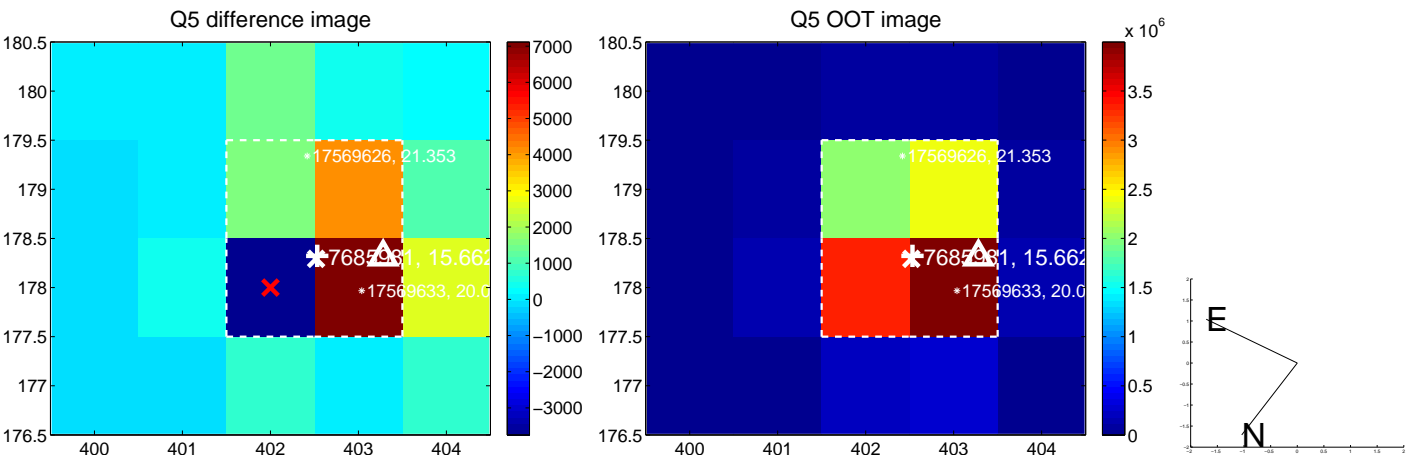


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

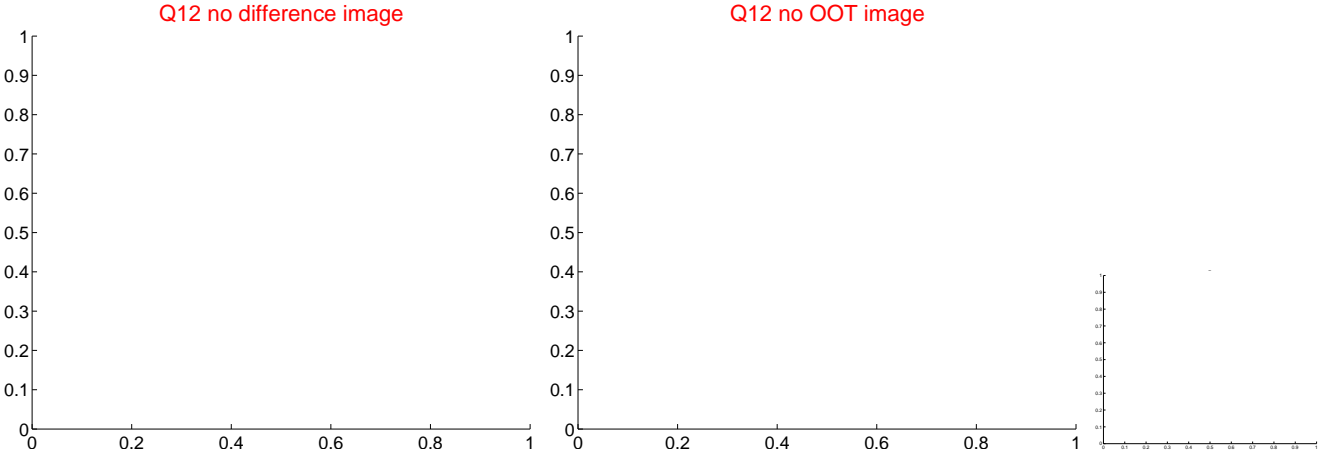
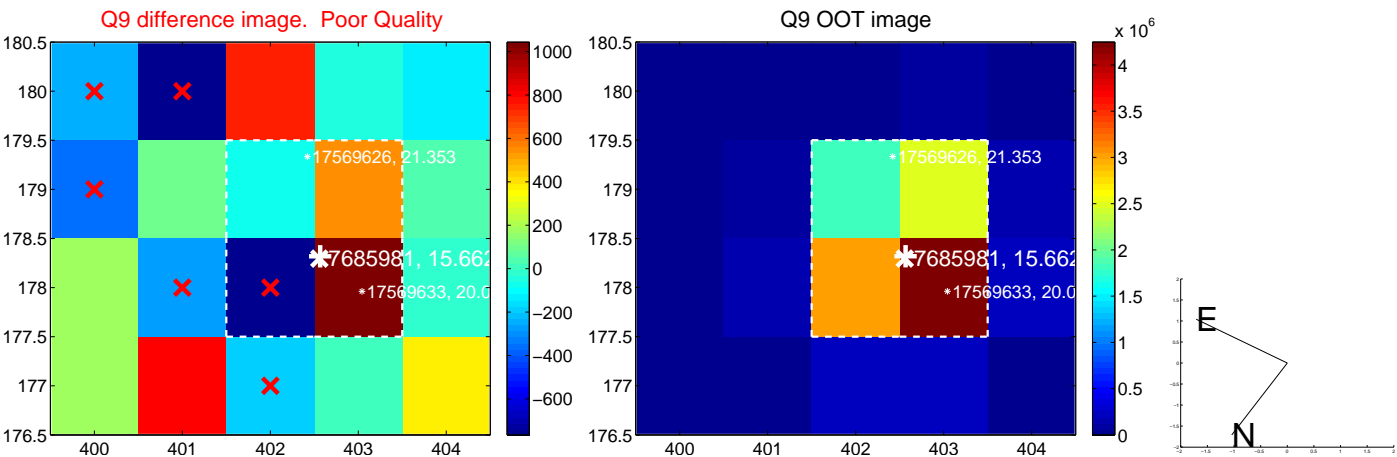
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



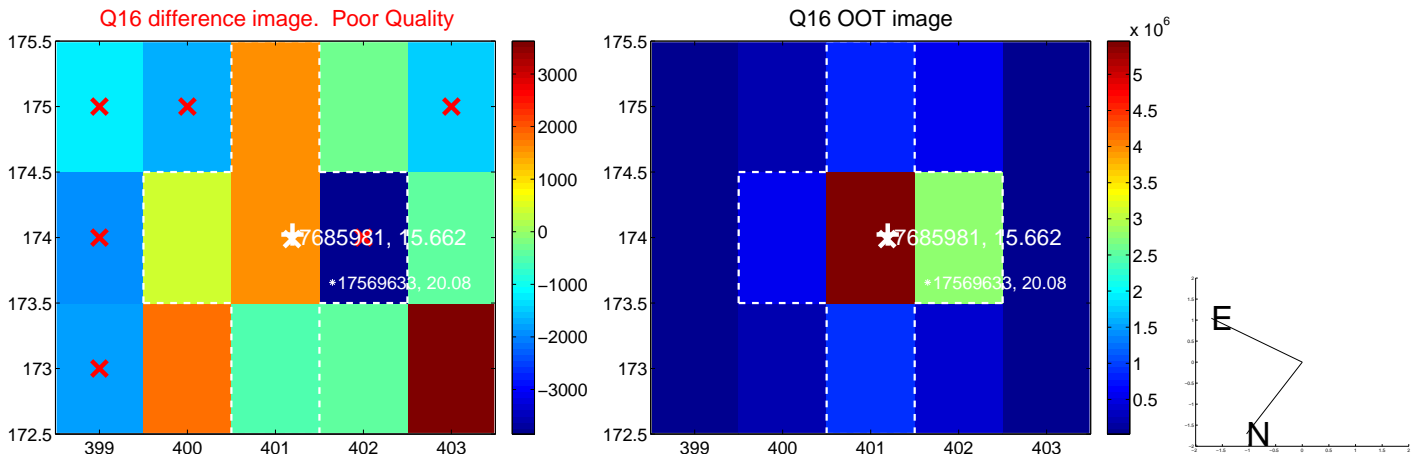
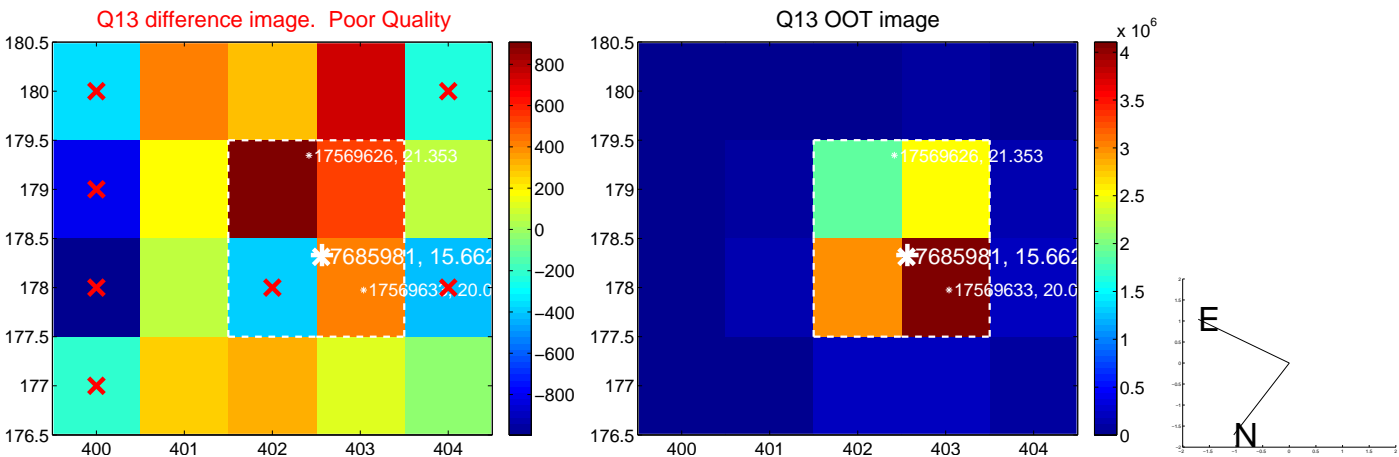
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

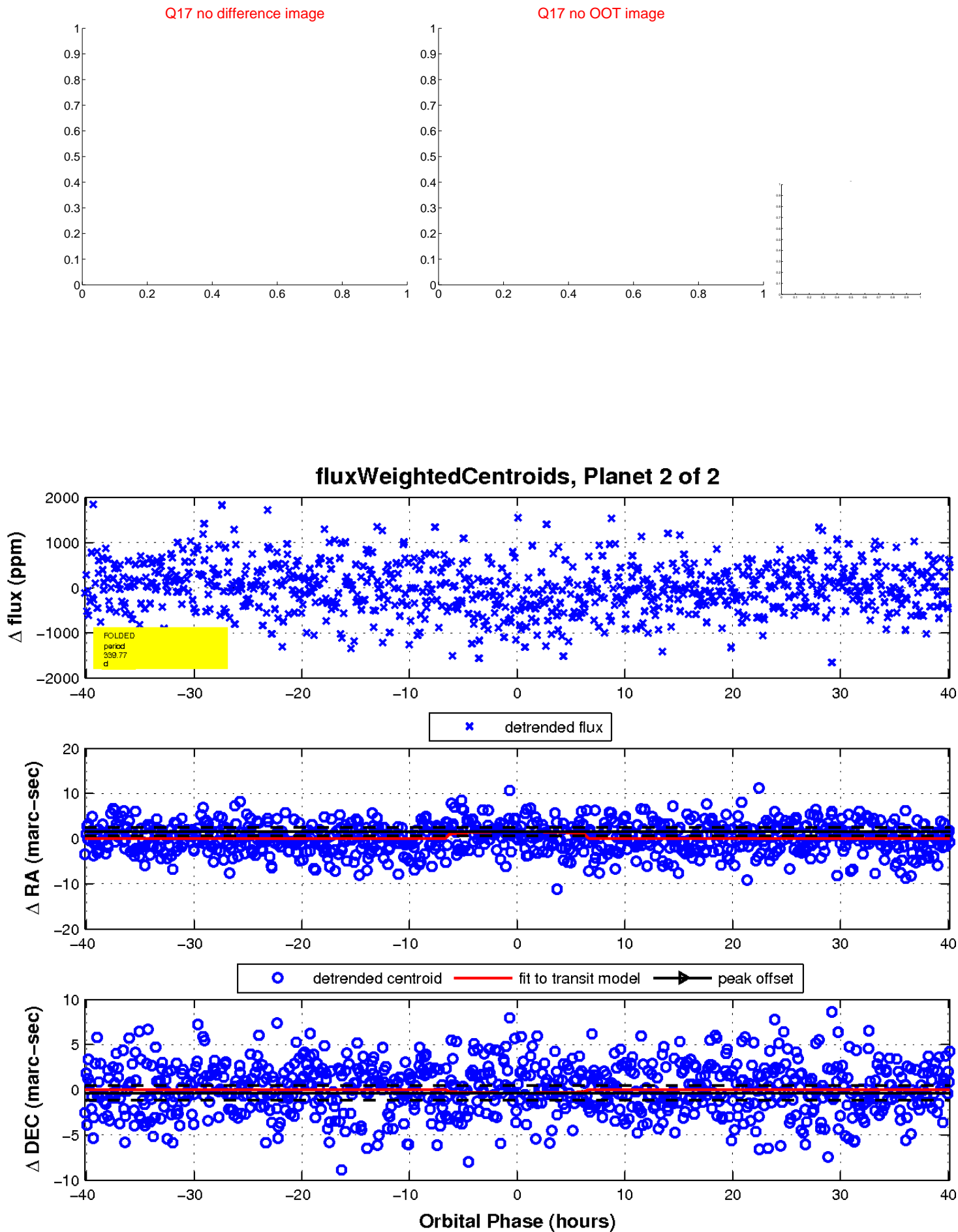


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





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



# UKIRT Image

Declination

