

# KIC 005957002

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005957002-01	OBS	No	366.159132	152.684007	2471.2	22.405	11.1	11.1	0.67	5250	4.01	0.37
005957002-02	OBS	No	358.232687	164.254527	1783.2	23.272	8.6	8.7	0.67	5250	3.17	0.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005957002-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005957002-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—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.

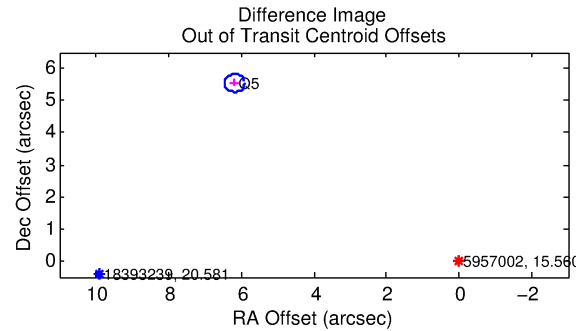
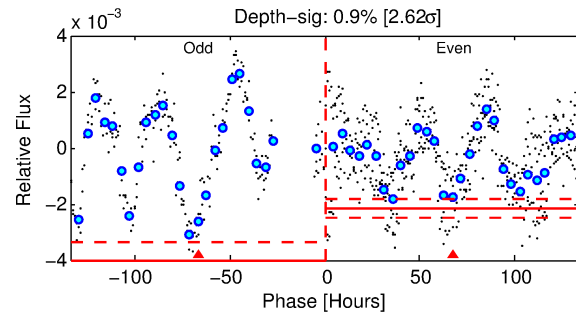
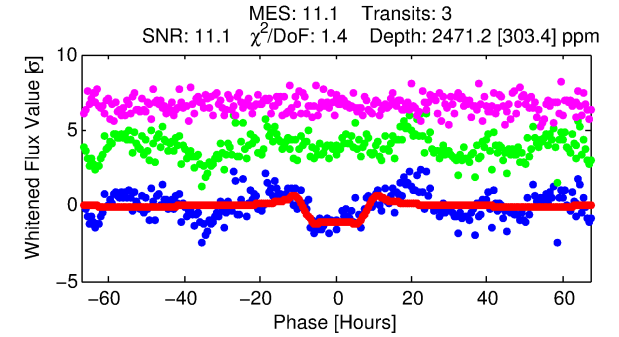
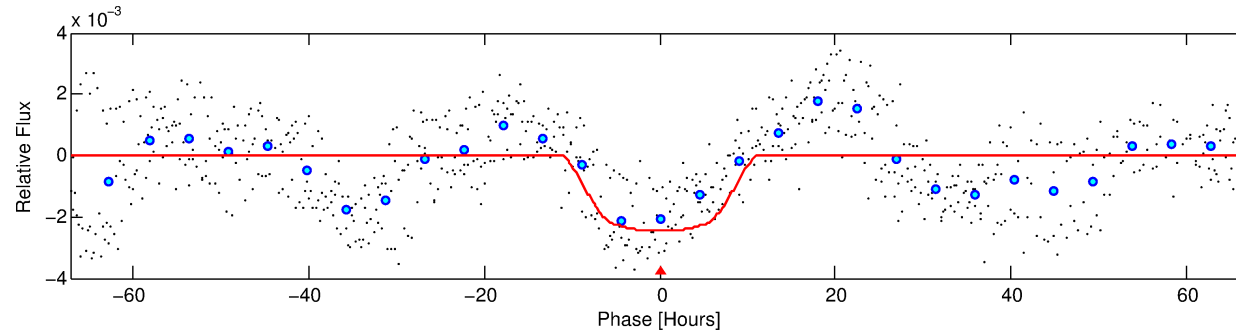
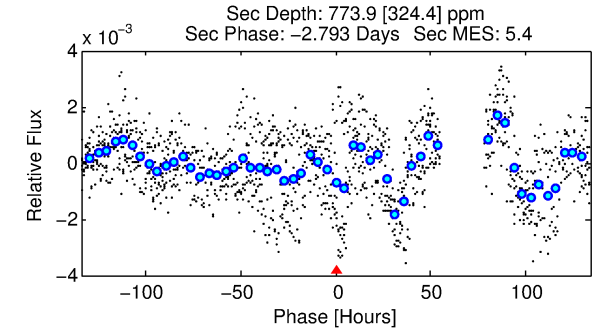
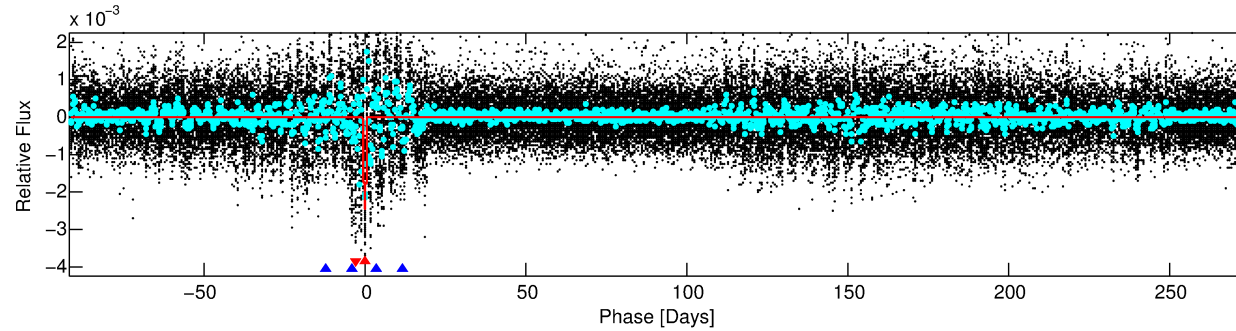
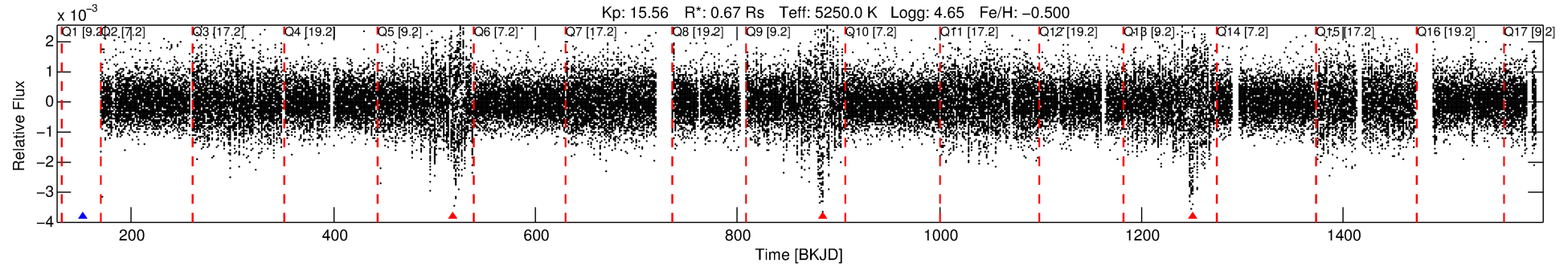
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005957002-01

No Significant Match Found

# DV One-Page Summary

KIC: 5957002 Candidate: 1 of 2 Period: 366.159 d



## DV Fit Results:

Period = 366.15913 [0.02142] d  
Epoch = 152.6840 [0.0466] BKJD  
Rp/R\* = 0.0549 [0.0041]  
a/R\* = 68.15 [8.98]  
b = 0.90 [0.03]  
Seff = 0.37 [0.08]  
Teq = 199 [10] K  
Rp = 4.01 [0.66] Re  
a = 0.9045 [0.1082] AU  
Ag = 21651.54 [10310.09] [2.10σ]  
Teff = 3736 [431] K [8.21σ]

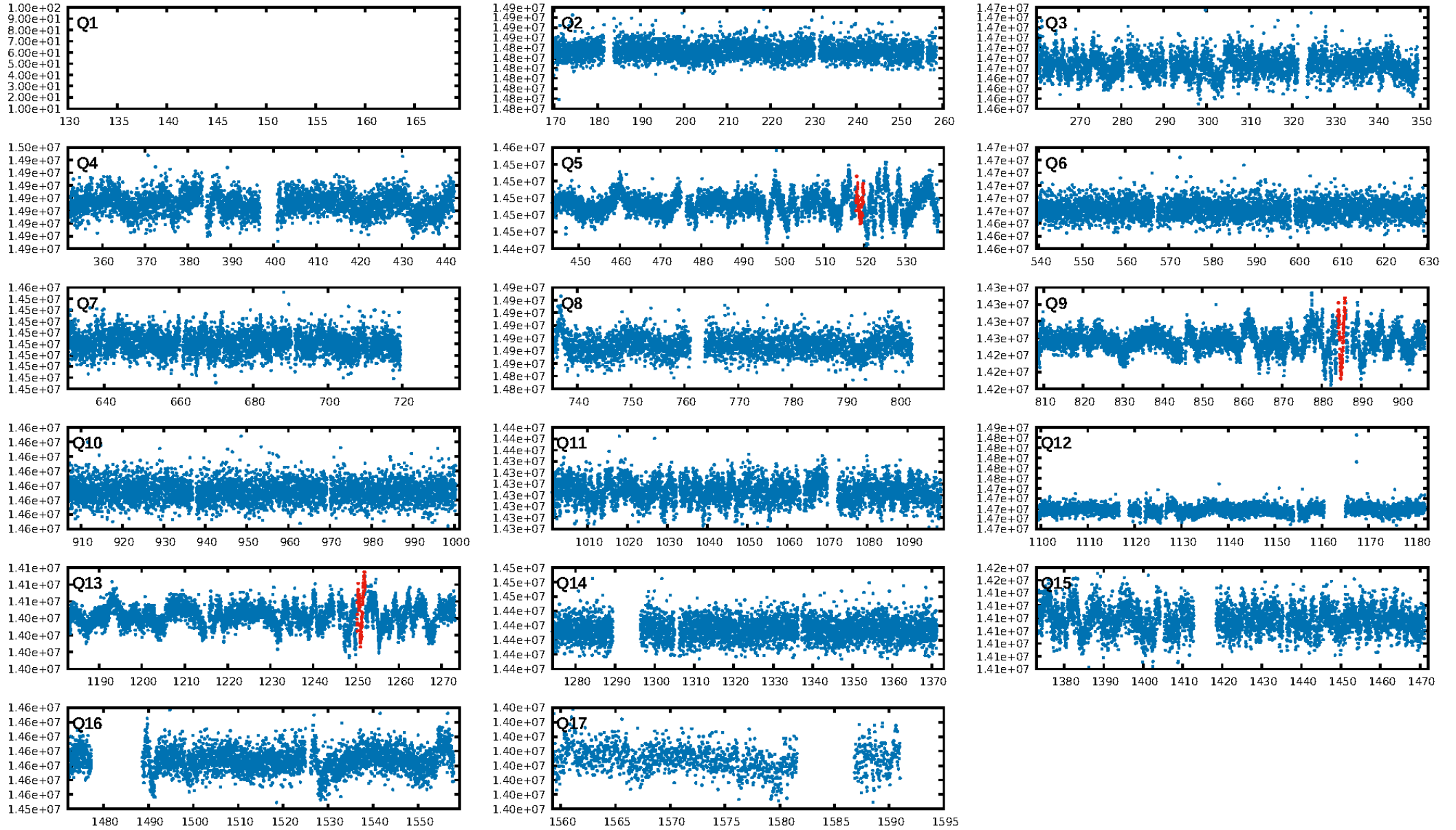
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.89σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.0%  
ModelChiSquareGoF-sig: 96.1%  
Bootstrap-pfa: 6.85e-16  
RollingBand-fgt: 0.00 [0/3]  
GhostDiagnostic-chr: -8.14  
Centroid-sig: 0.0%  
Centroid-so: 5.226 arcsec [4.47σ]  
OotOffset-rm: 8.309 arcsec [88.22σ]  
KicOffset-rm: 8.308 arcsec [88.21σ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [3/3]

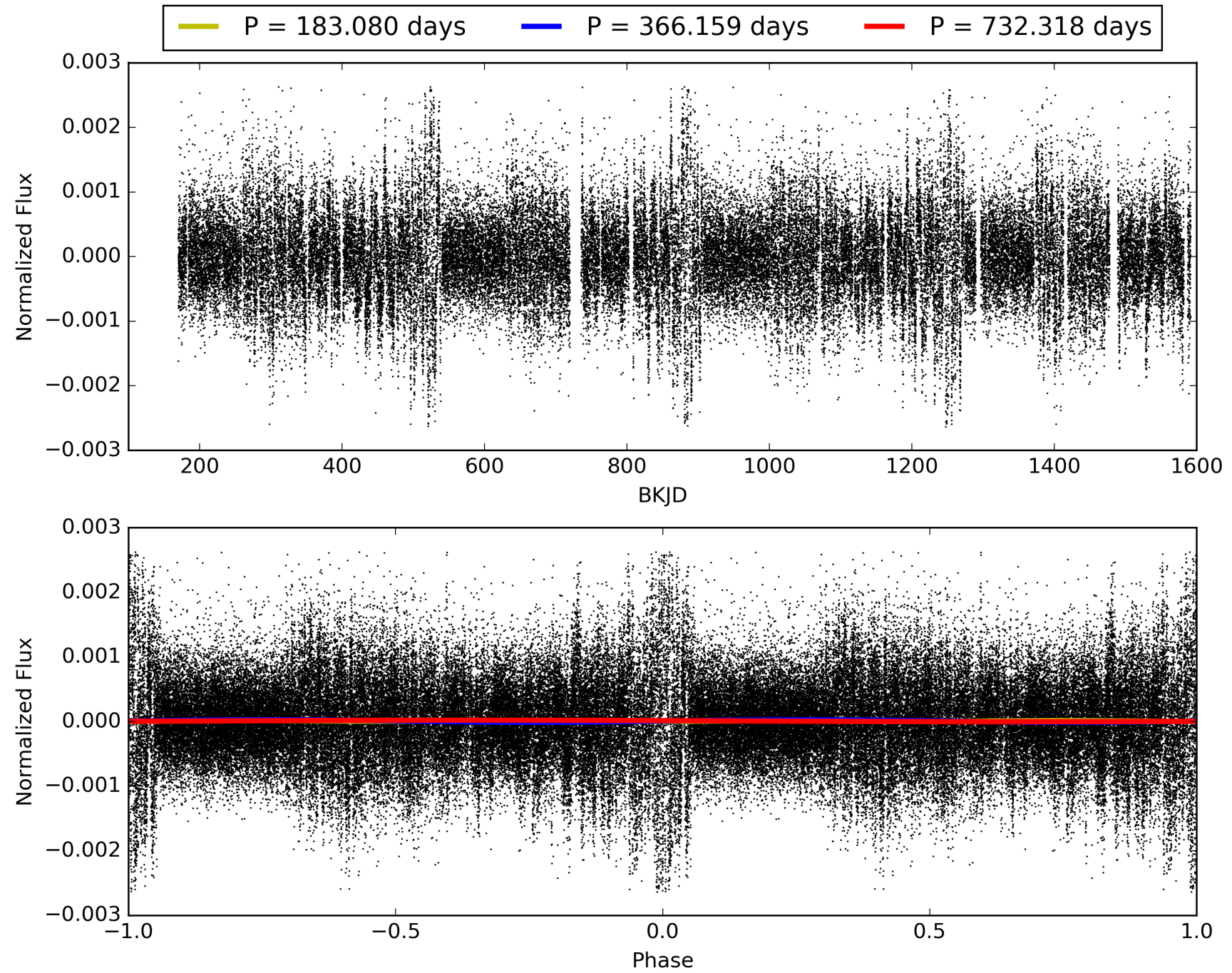
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 21:50:17 Z

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

# TCE 005957002-01, PDC Light Curves

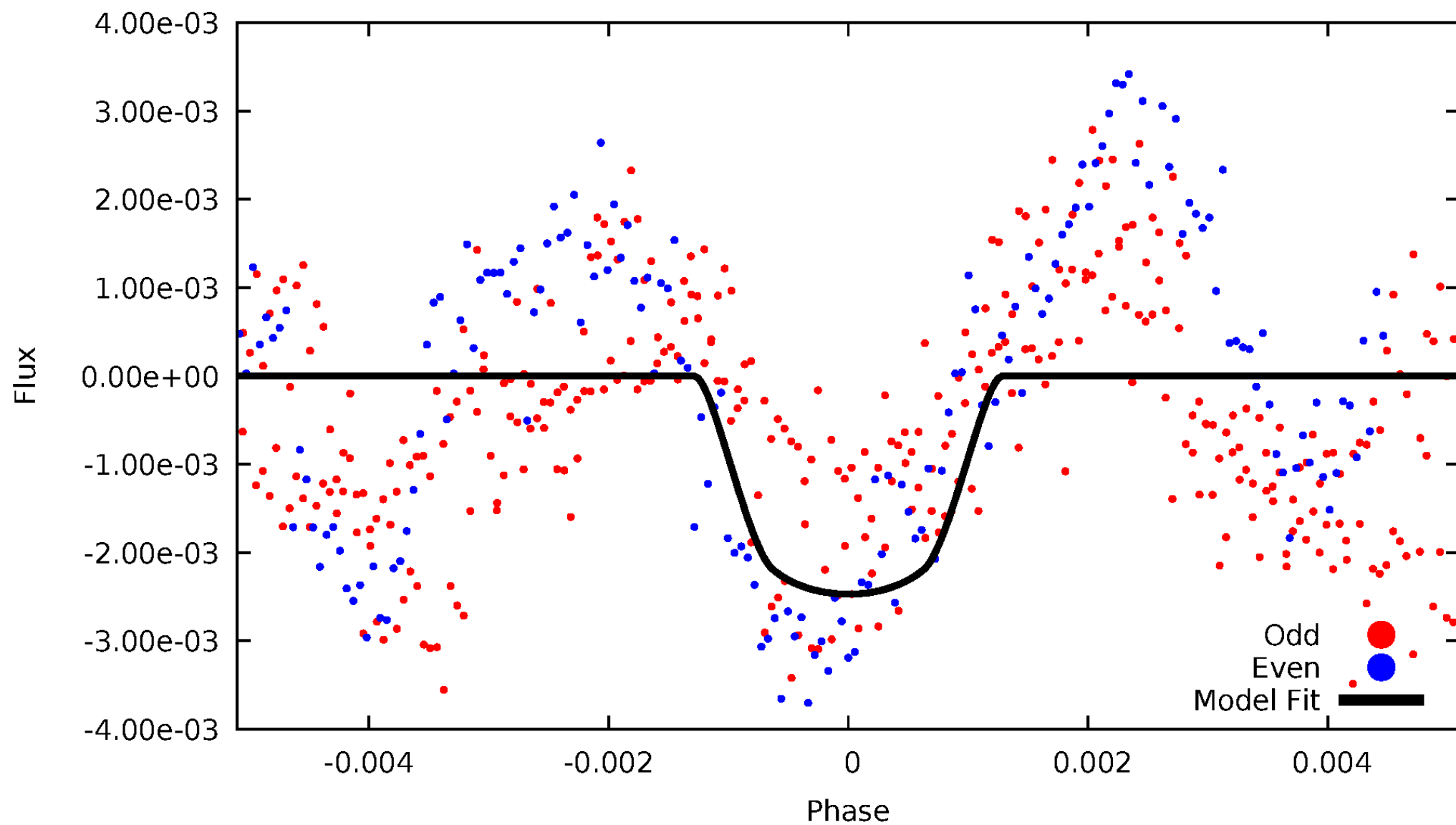


TCE 005957002-01



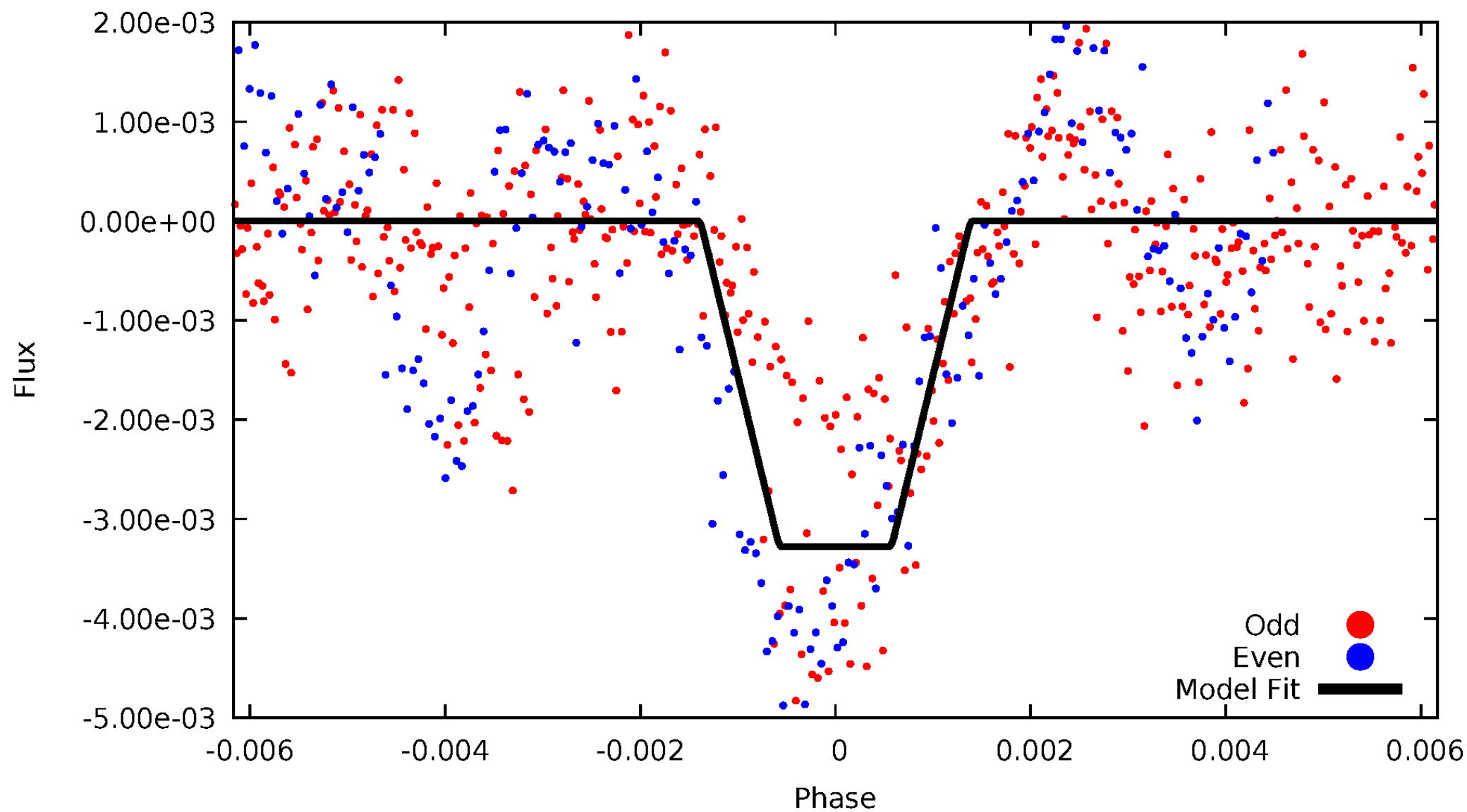
# DV Odd/Even

TCE 005957002-01



# ALT Odd/Even

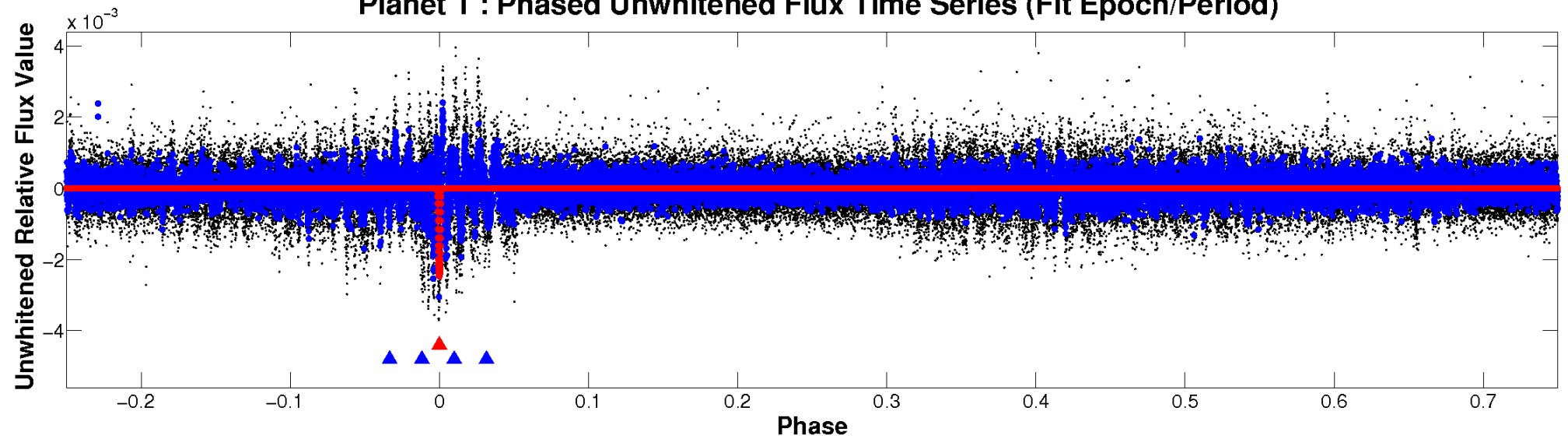
TCE 005957002-01



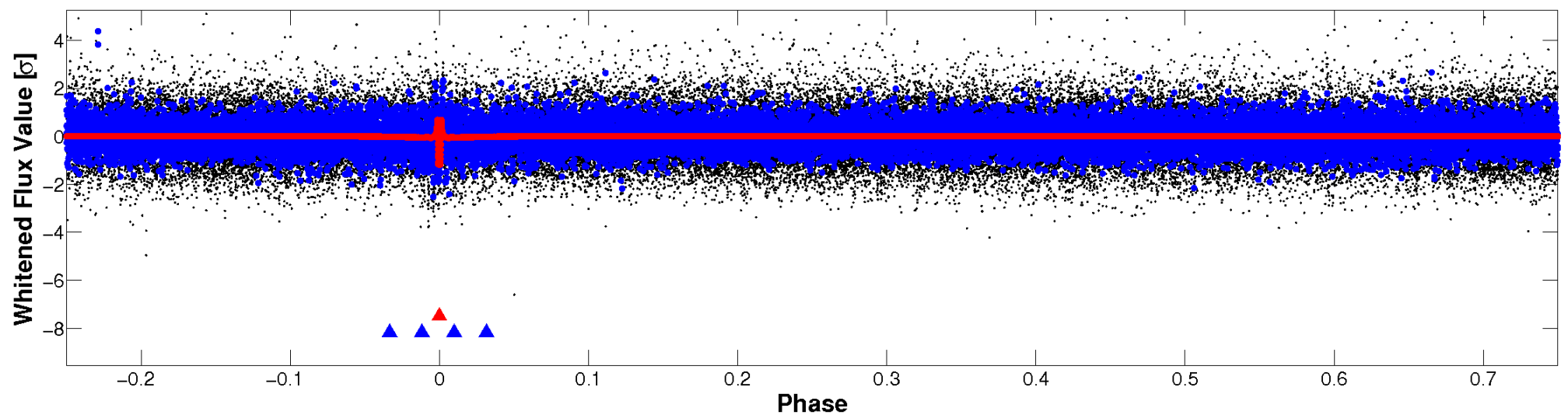


# Non-Whitened Vs. Whitened Light Curve

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

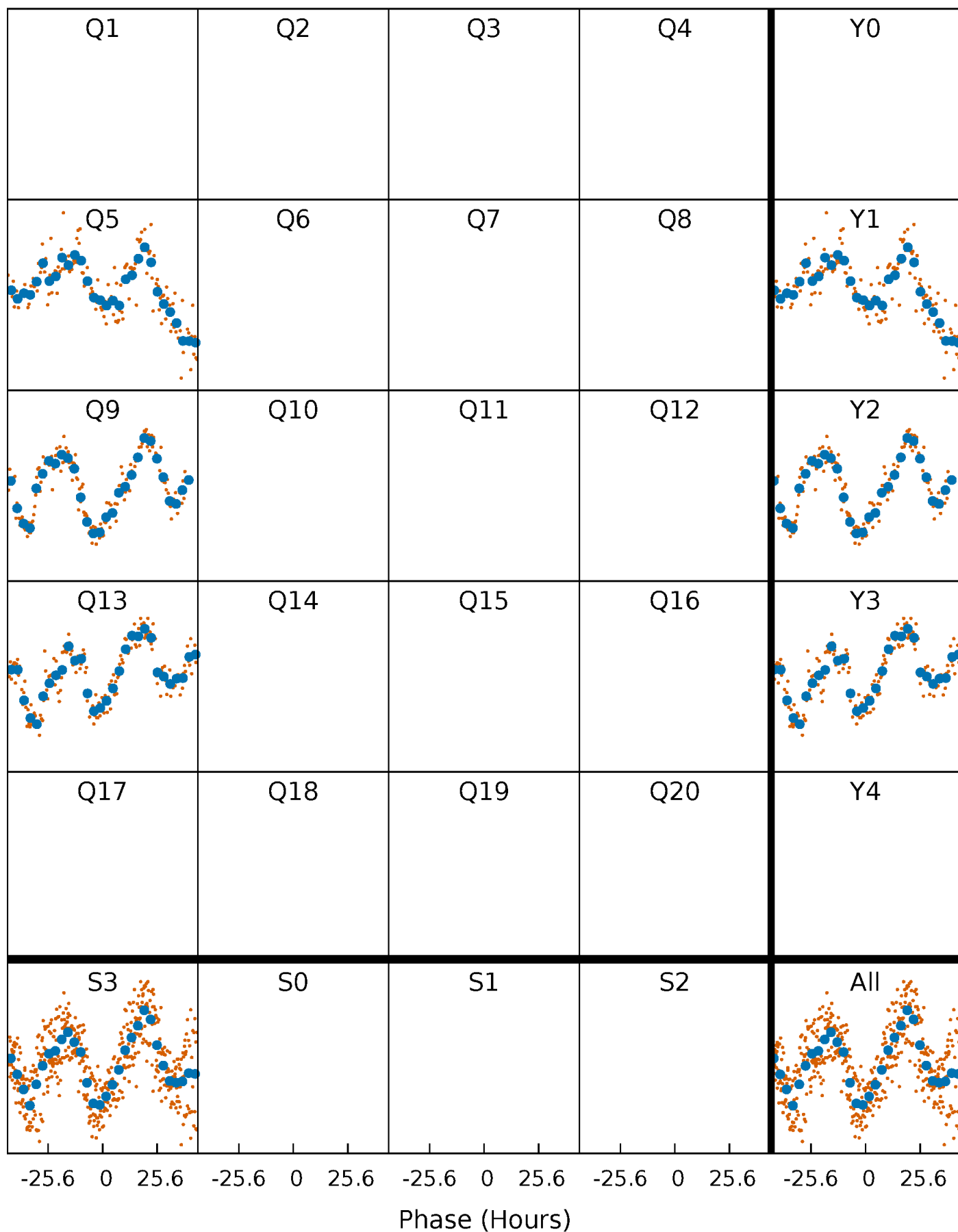


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

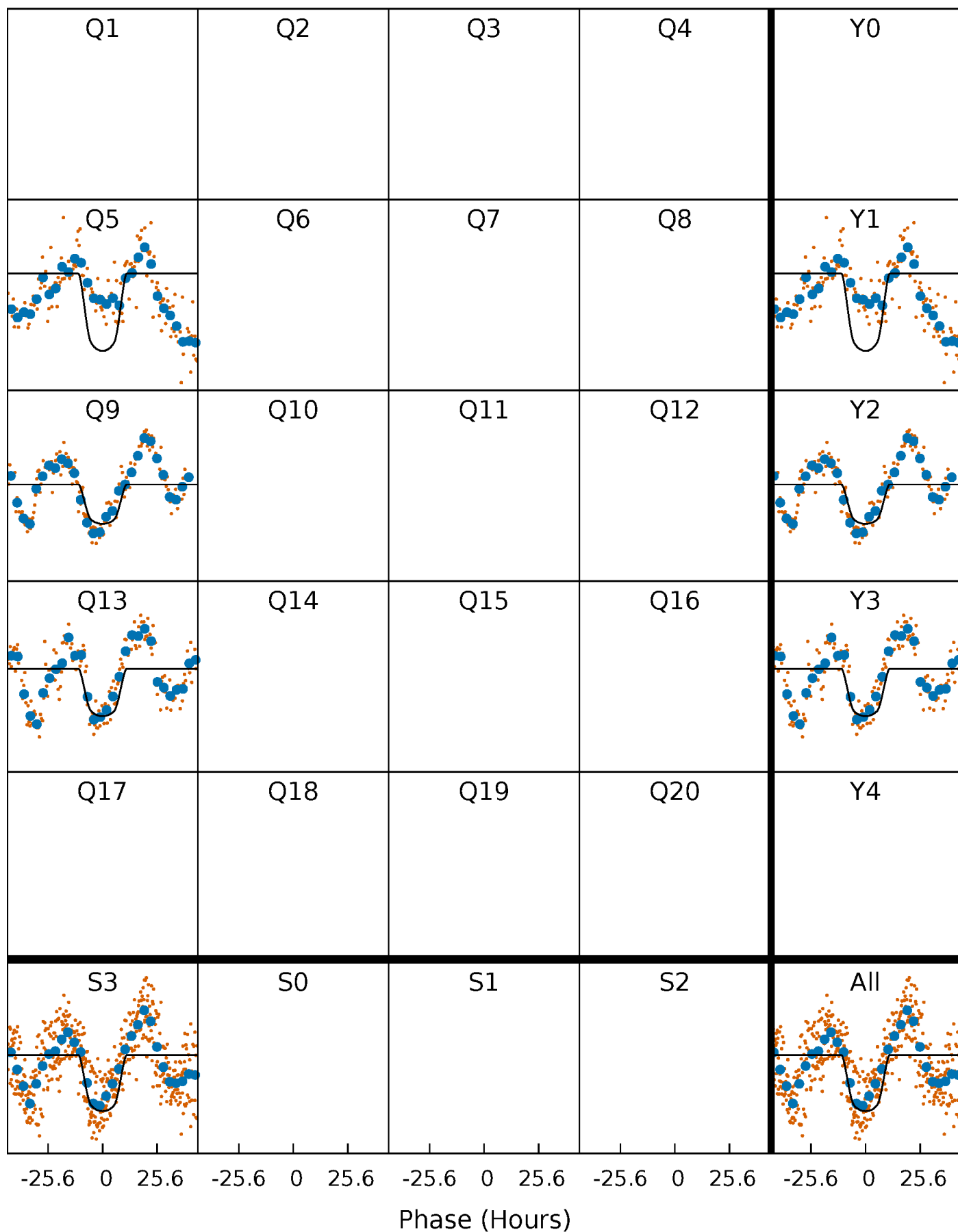
TCE 005957002-01 P=366.159132 Days  $T_0=152.684007$  (BKJD)





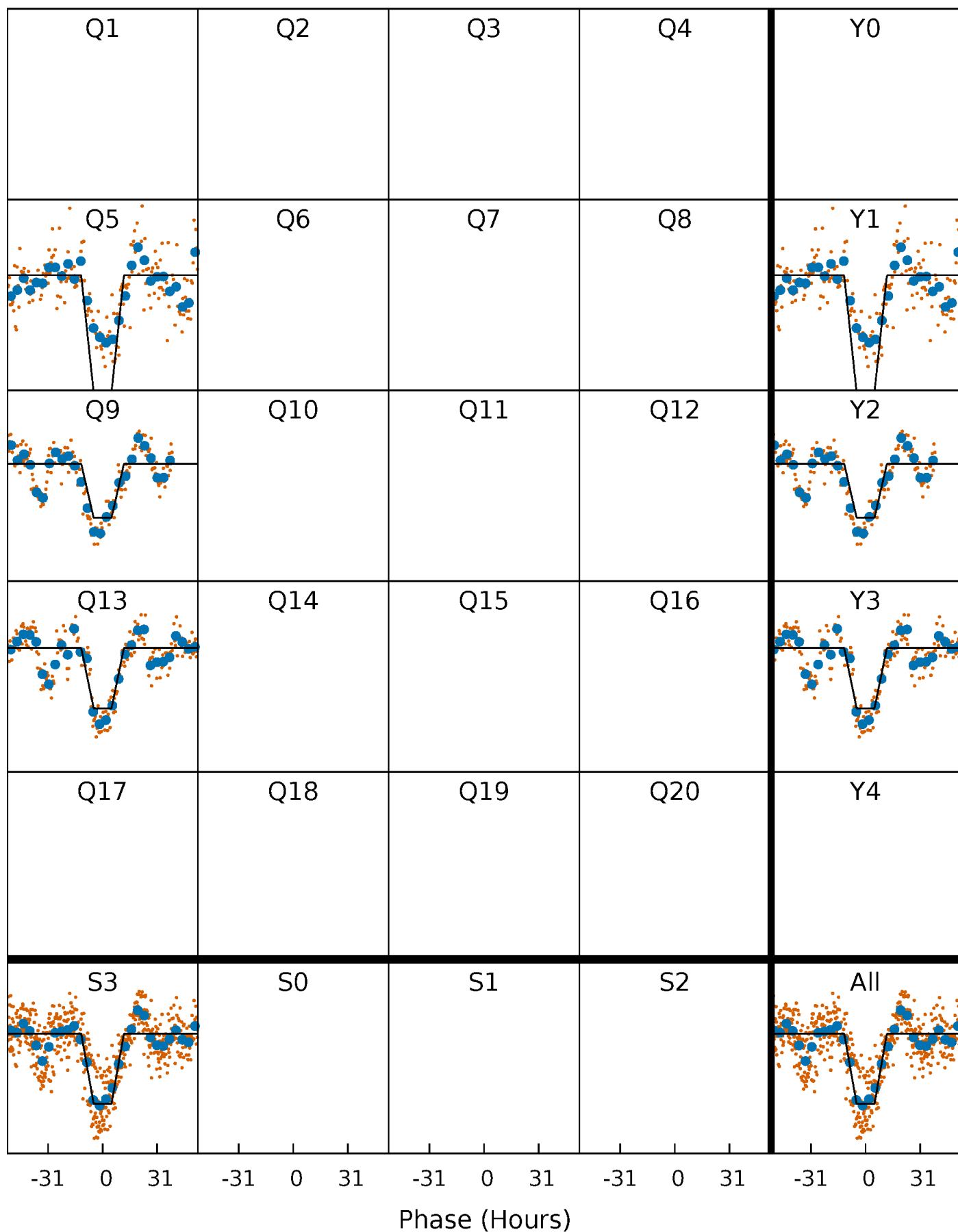
# DV Quarter-Phased Transit Curves

TCE 005957002-01 P=366.159132 Days  $T_0=152.684007$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

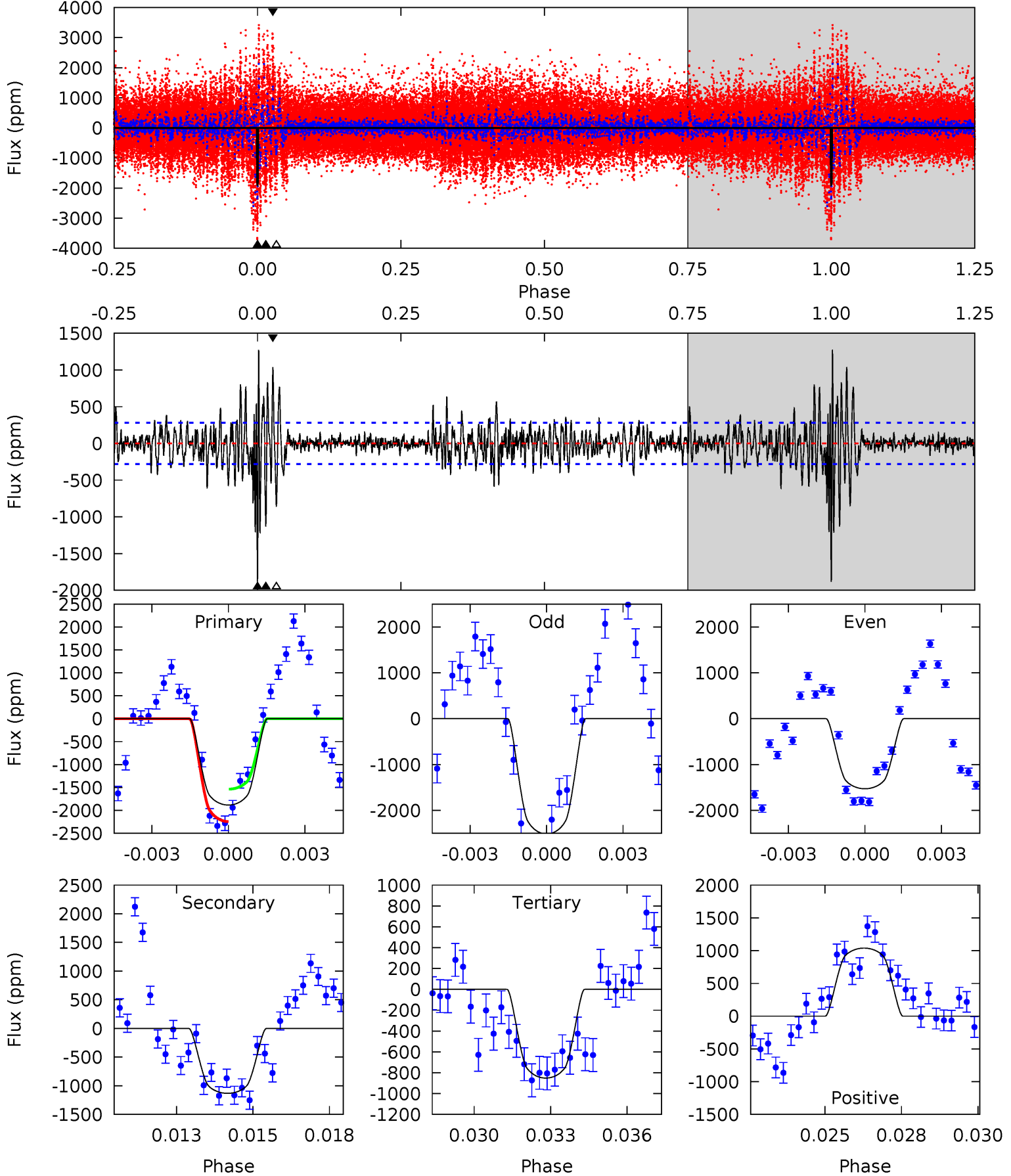
TCE 005957002-01 P=366.142150 Days  $T_0=152.709500$  (BKJD)



# DV Model-Shift Uniqueness Test

005957002-01, P = 366.159132 Days, E = 152.684007 Days

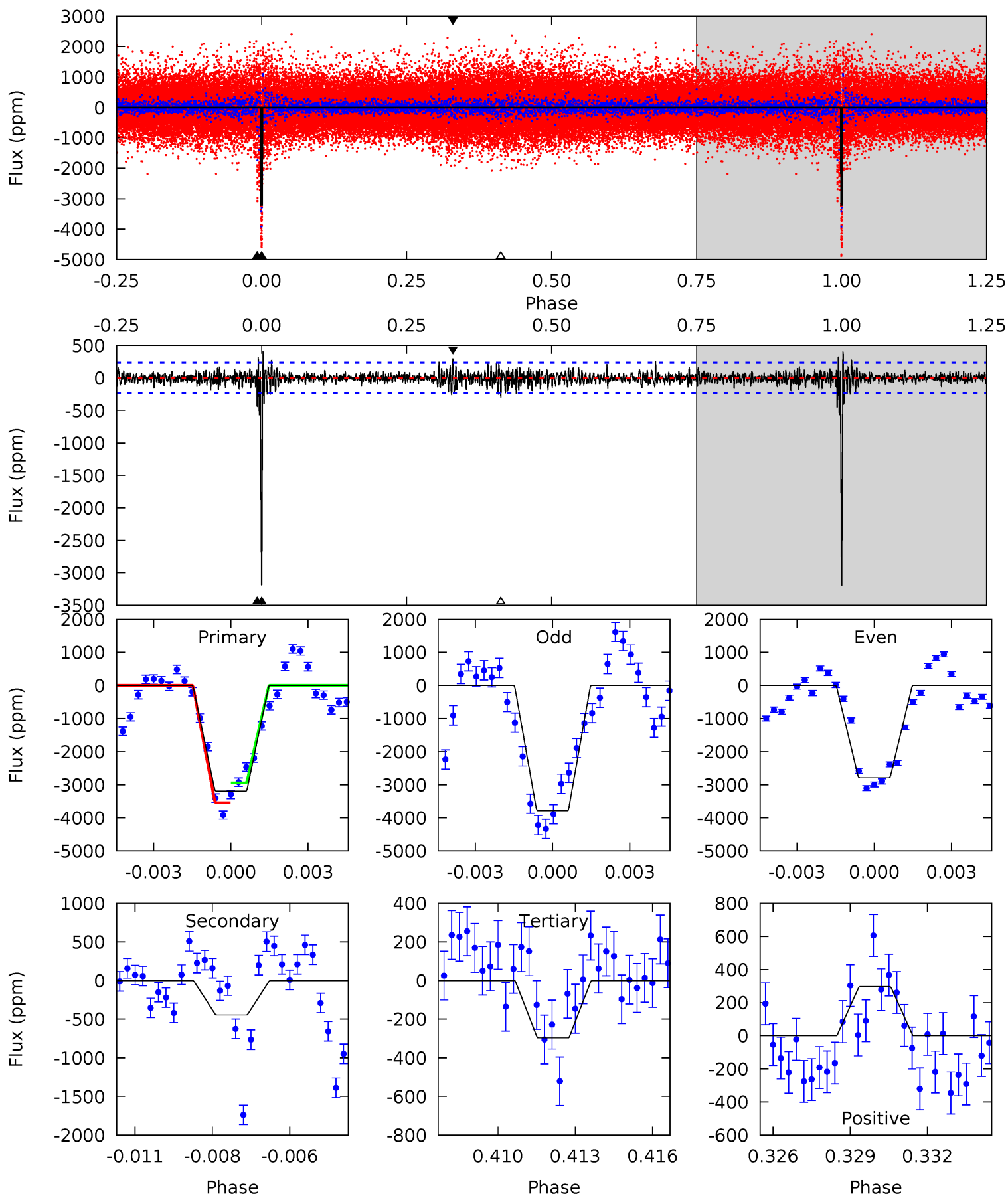
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
35.5	21.3	16.0	19.6	5.28	3.02	3.46	19.5	15.9	5.29	1.77	8.80	0.87	0.40	6.63



# Alt Model-Shift Uniqueness Test

005957002-01, P = 366.142150 Days, E = 152.709500 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
71.5	9.98	6.64	6.64	5.26	2.99	1.56	64.9	64.9	3.33	3.34	10.8	0.84	0.11	6.69



### Stellar Parameters For KIC 005957002

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5250^{+158}_{-142}$	$4.654^{+0.030}_{-0.090}$	$-0.500^{+0.300}_{-0.300}$	$0.669^{+0.098}_{-0.042}$	$0.756^{+0.066}_{-0.081}$	$3.558^{+0.438}_{-1.049}$
	+3%/-3%	+1%/-2%	+60%/-60%	+15%/-6%	+9%/-11%	+12%/-29%
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 005957002-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1133 \pm 53$	$4.12^{+0.44}_{-0.37}$	$282^{+10}_{-10}$	$4293^{+185}_{-147}$	$29996^{+5738}_{-5358}$
Alt.	$-446 \pm 45$	$4.26^{+0.44}_{-0.36}$	$281^{+12}_{-9}$	$3605^{+128}_{-118}$	$10898^{+2429}_{-1960}$

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

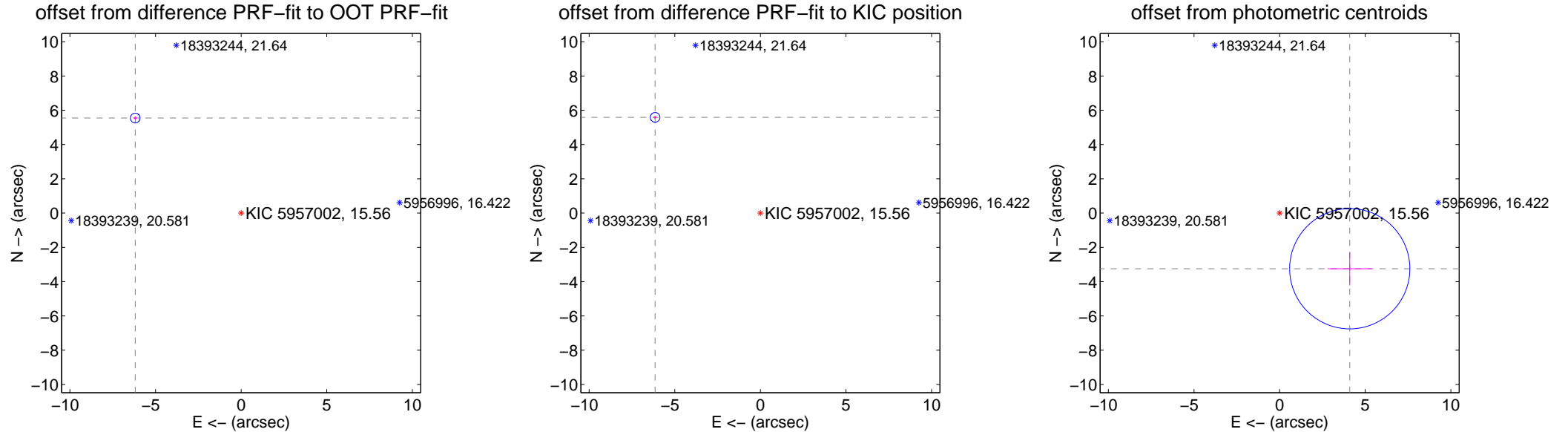
## DV Centroid Data

Supplemental centroid analysis for 005957002-01. Kepler magnitude: 15.56. Transit SNR 11.11

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$8.309 \pm 0.094$	88.22	$6.186 \pm 0.094$	$5.547 \pm 0.094$
PRF-fit source offset from KIC position	$8.308 \pm 0.094$	88.21	$6.149 \pm 0.094$	$5.587 \pm 0.094$
photometric centroid source offset	$5.23 \pm 1.17$	4.47	$-4.10 \pm 1.28$	$-3.25 \pm 0.97$



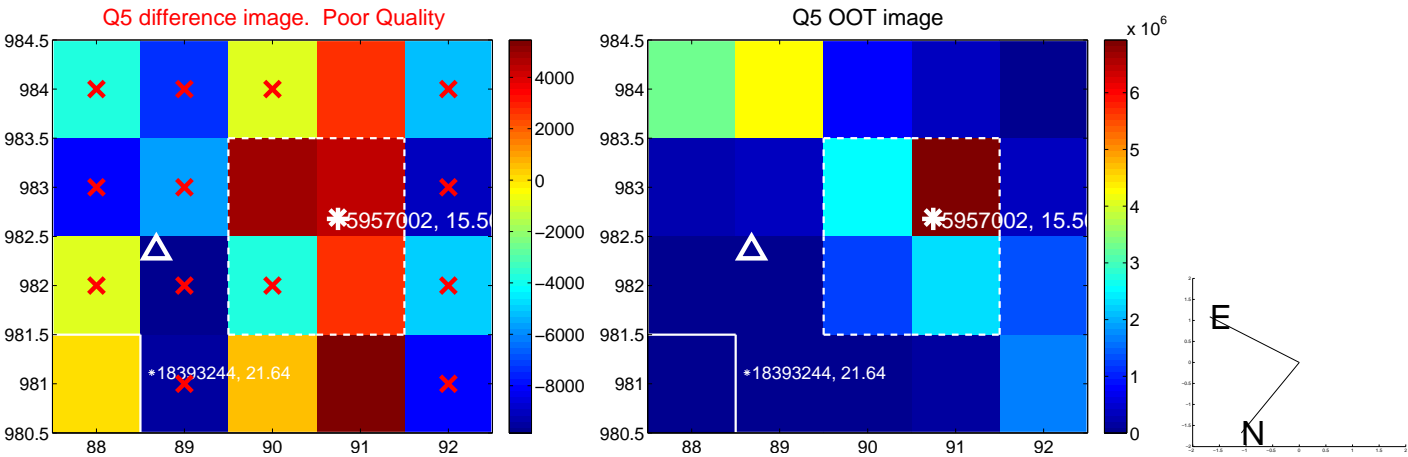
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



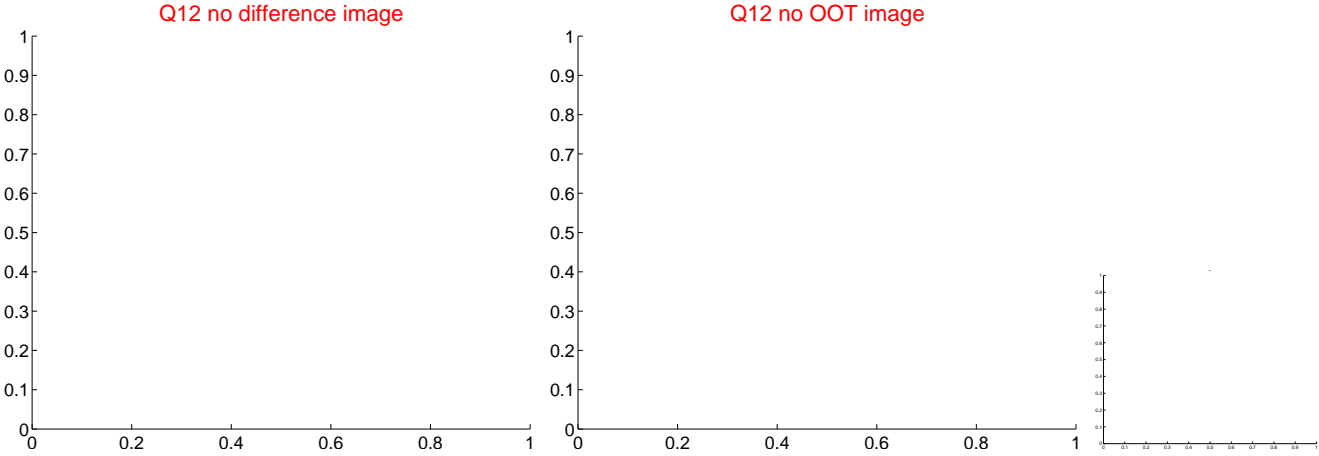
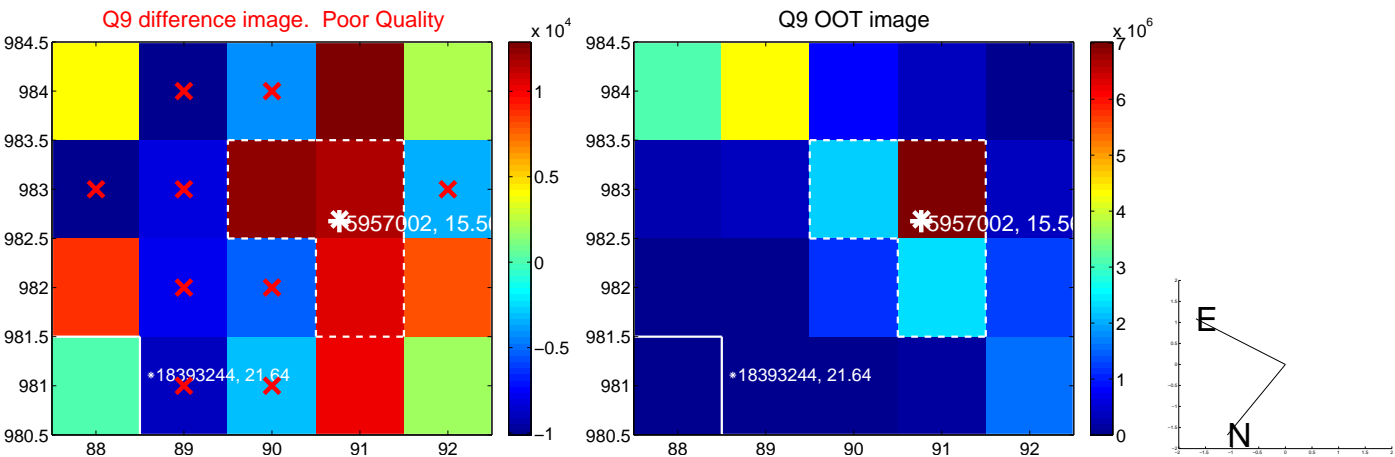
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



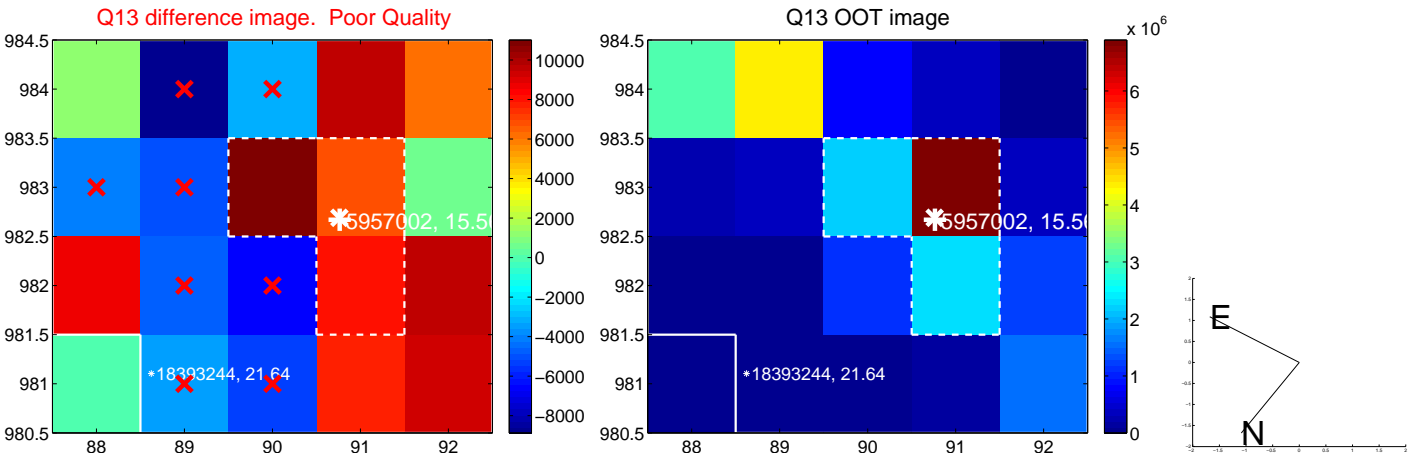
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



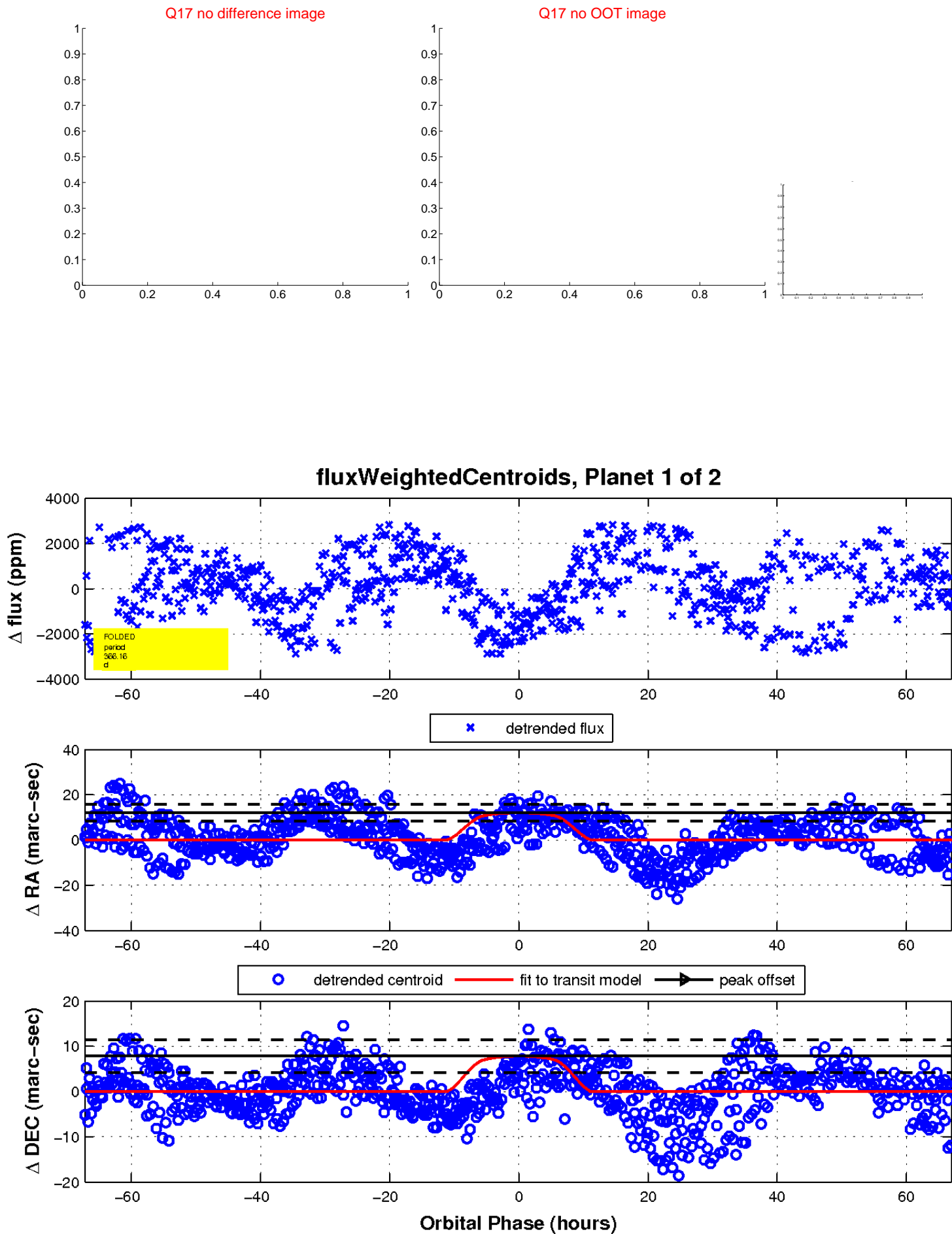
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

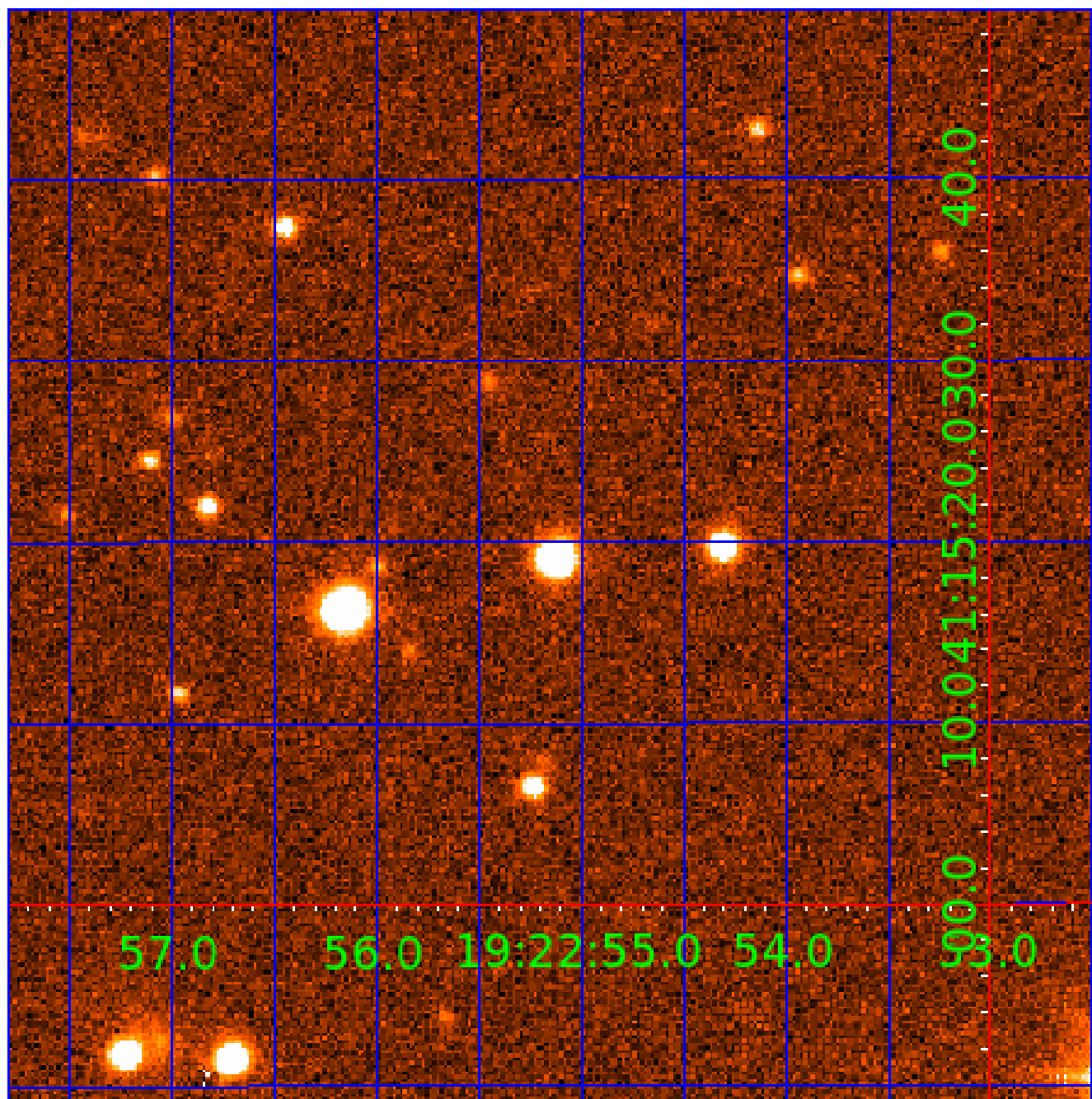


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005957002

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005957002-01	OBS	No	366.159132	152.684007	2471.2	22.405	11.1	11.1	0.67	5250	4.01	0.37
005957002-02	OBS	No	358.232687	164.254527	1783.2	23.272	8.6	8.7	0.67	5250	3.17	0.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005957002-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005957002-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—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.

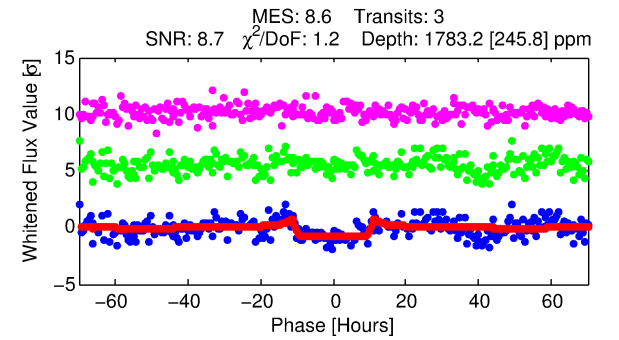
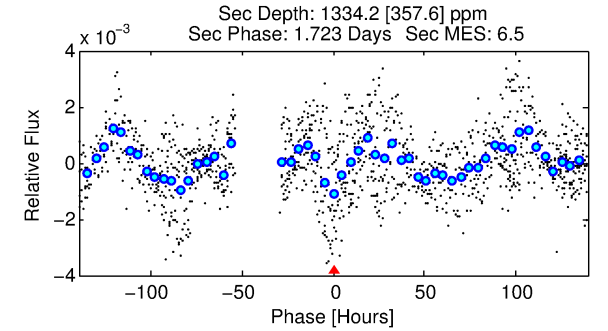
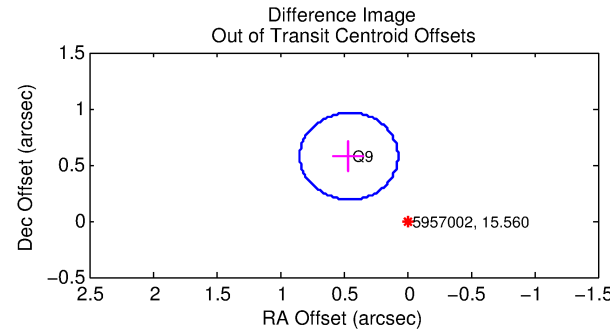
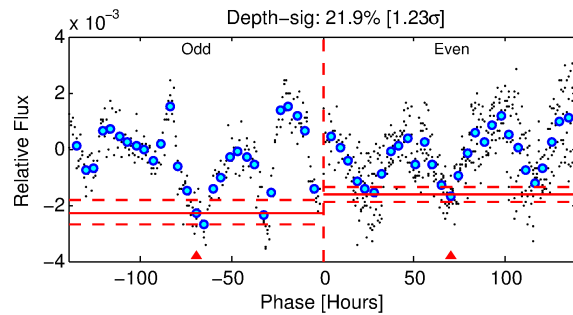
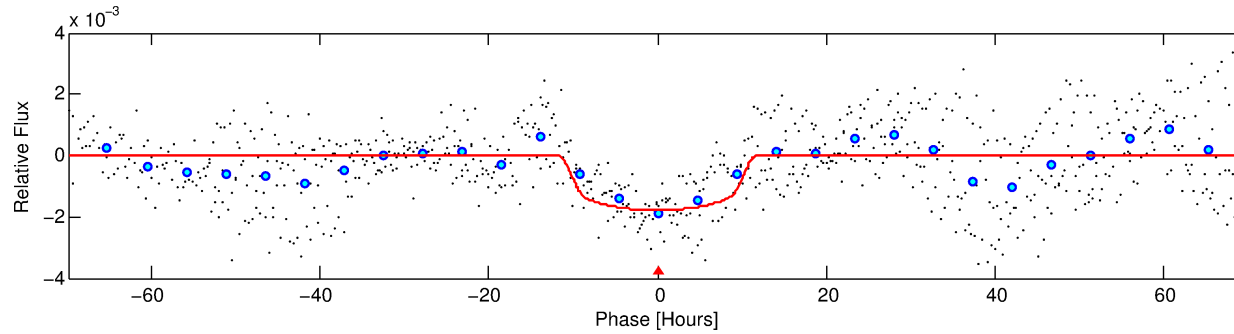
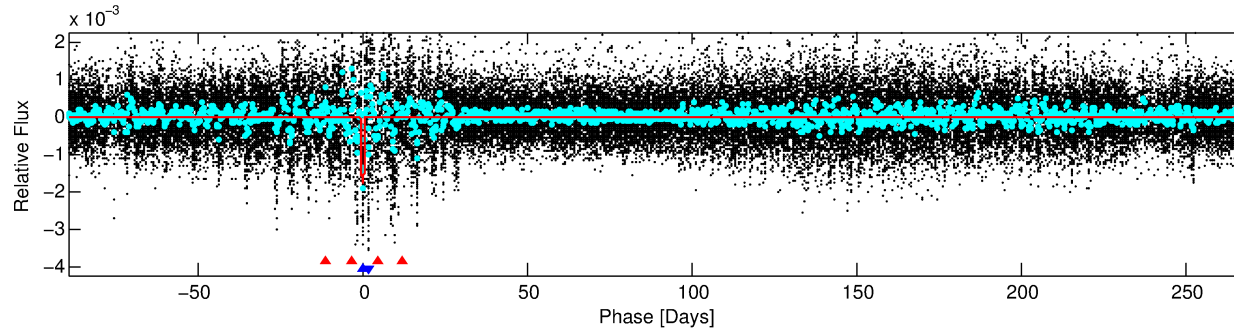
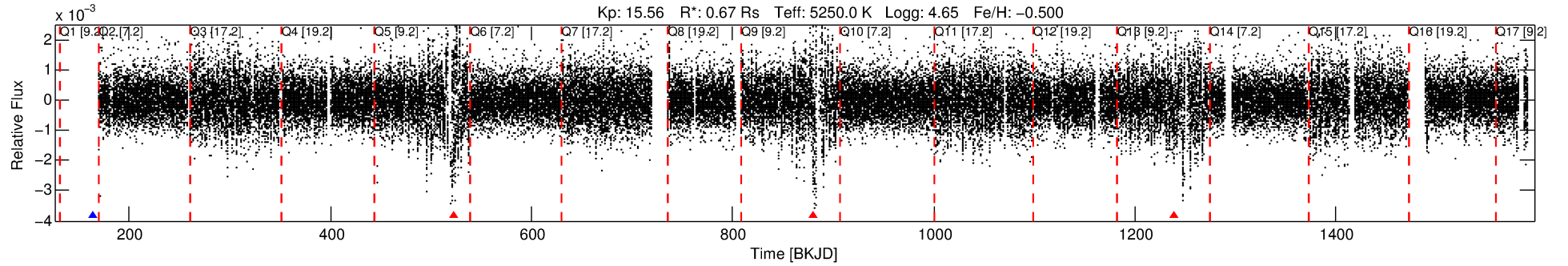
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005957002-02

No Significant Match Found

# DV One-Page Summary

KIC: 5957002 Candidate: 2 of 2 Period: 358.233 d



## DV Fit Results:

Period = 358.23269 [0.01712] d  
Epoch = 164.2545 [0.0388] BKJD  
Rp/R\* = 0.0434 [0.0041]  
a/R\* = 76.60 [17.70]  
b = 0.82 [0.10]  
Seff = 0.38 [0.08]  
Teq = 201 [10] K  
Rp = 3.17 [0.55] Re  
a = 0.8914 [0.1066] AU  
Ag = 57991.16 [21444.75] [2.70 $\sigma$ ]  
Teffp = 4814 [421] K [10.94 $\sigma$ ]

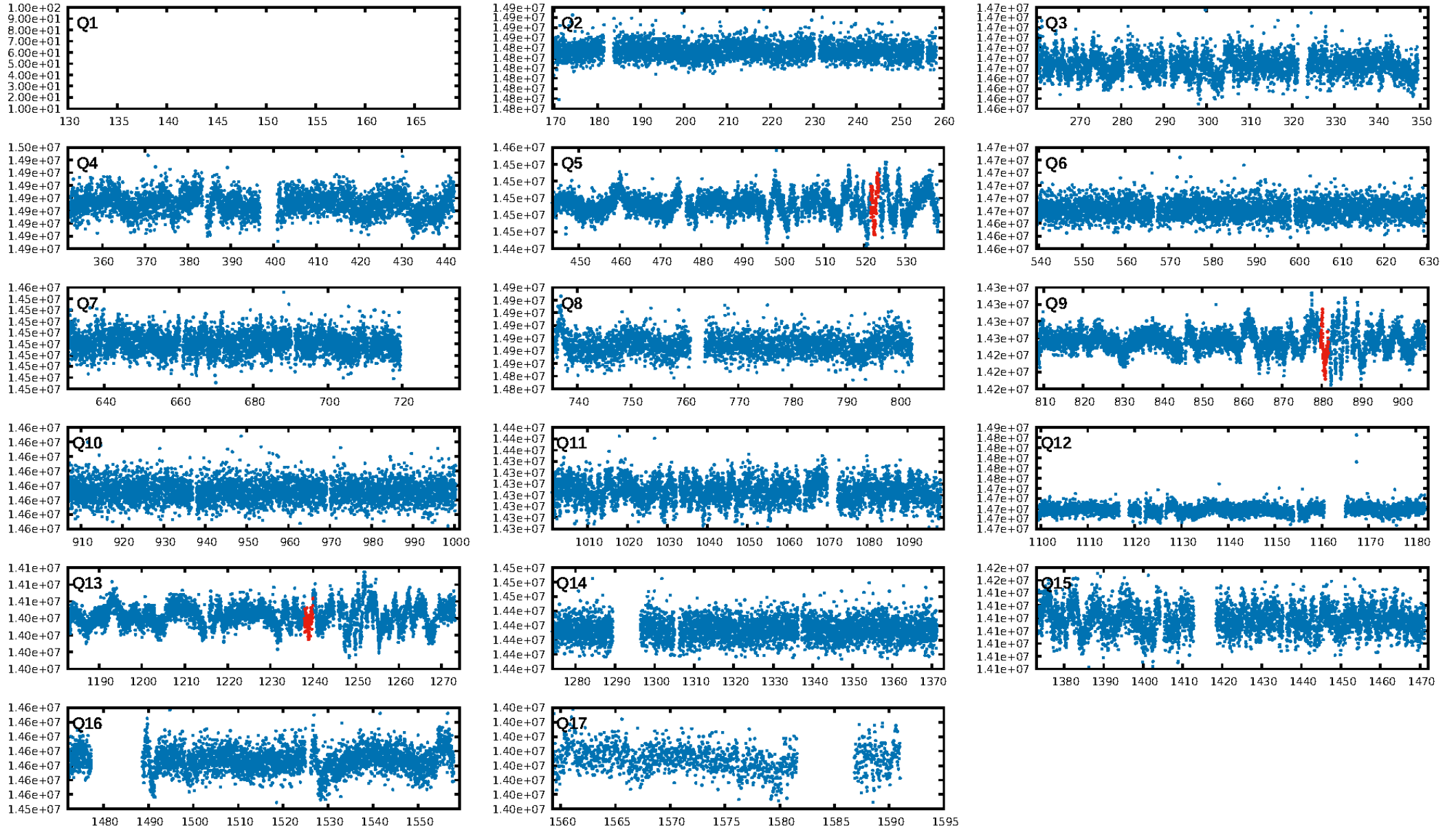
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [5.89 $\sigma$ ]  
ModelChiSquare2-sig: 8.9%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 1.51e-10  
RollingBand-fgt: 0.00 [0/3]  
GhostDiagnostic-chr: -4.139  
Centroid-sig: 0.0%  
Centroid-so: 4.278 arcsec [3.23 $\sigma$ ]  
OotOffset-rm: 0.735 arcsec [5.71 $\sigma$ ]  
KicOffset-rm: 0.763 arcsec [5.88 $\sigma$ ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [3/3]

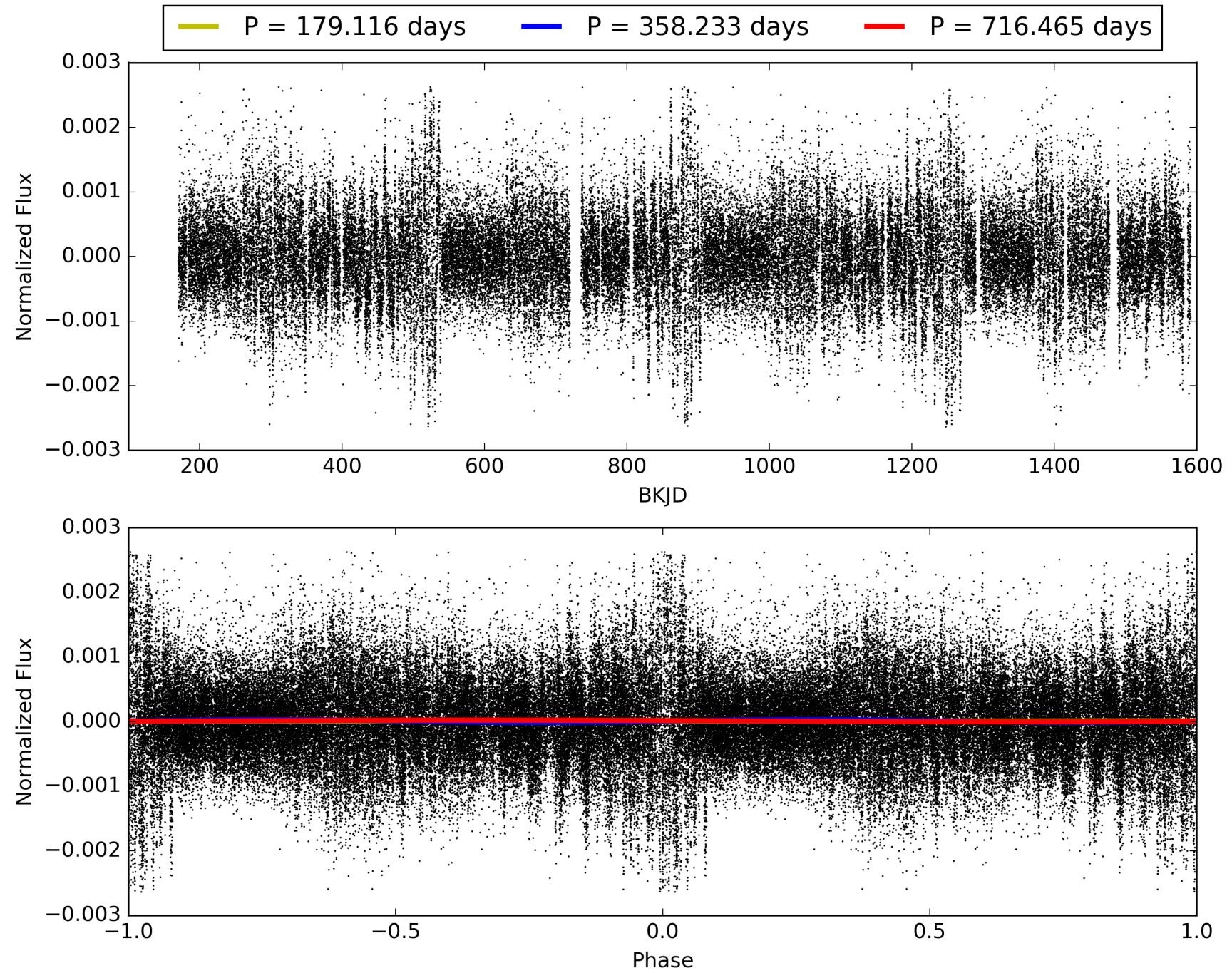
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 21:50:25 Z

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

# TCE 005957002-02, PDC Light Curves

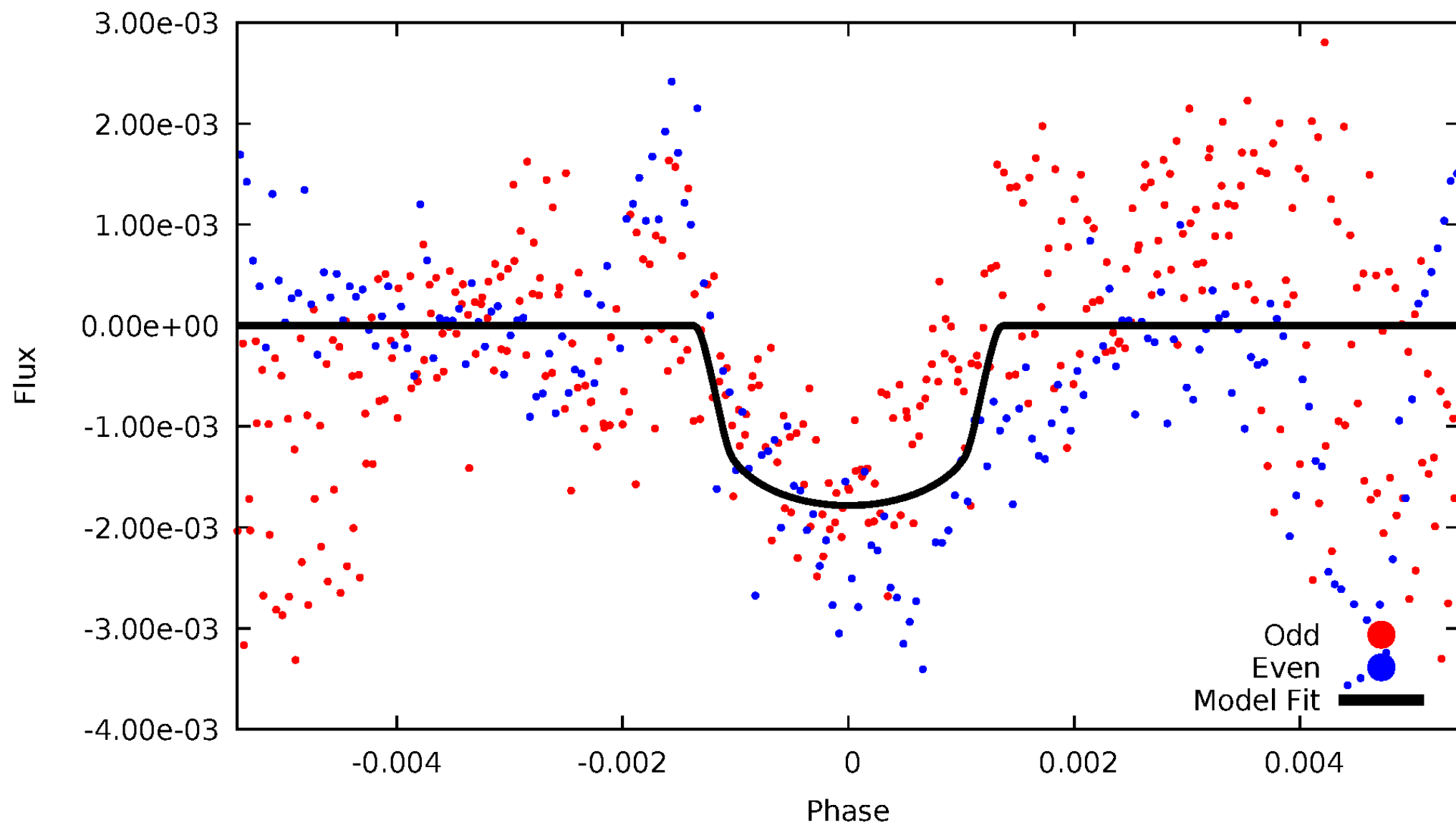


TCE 005957002-02



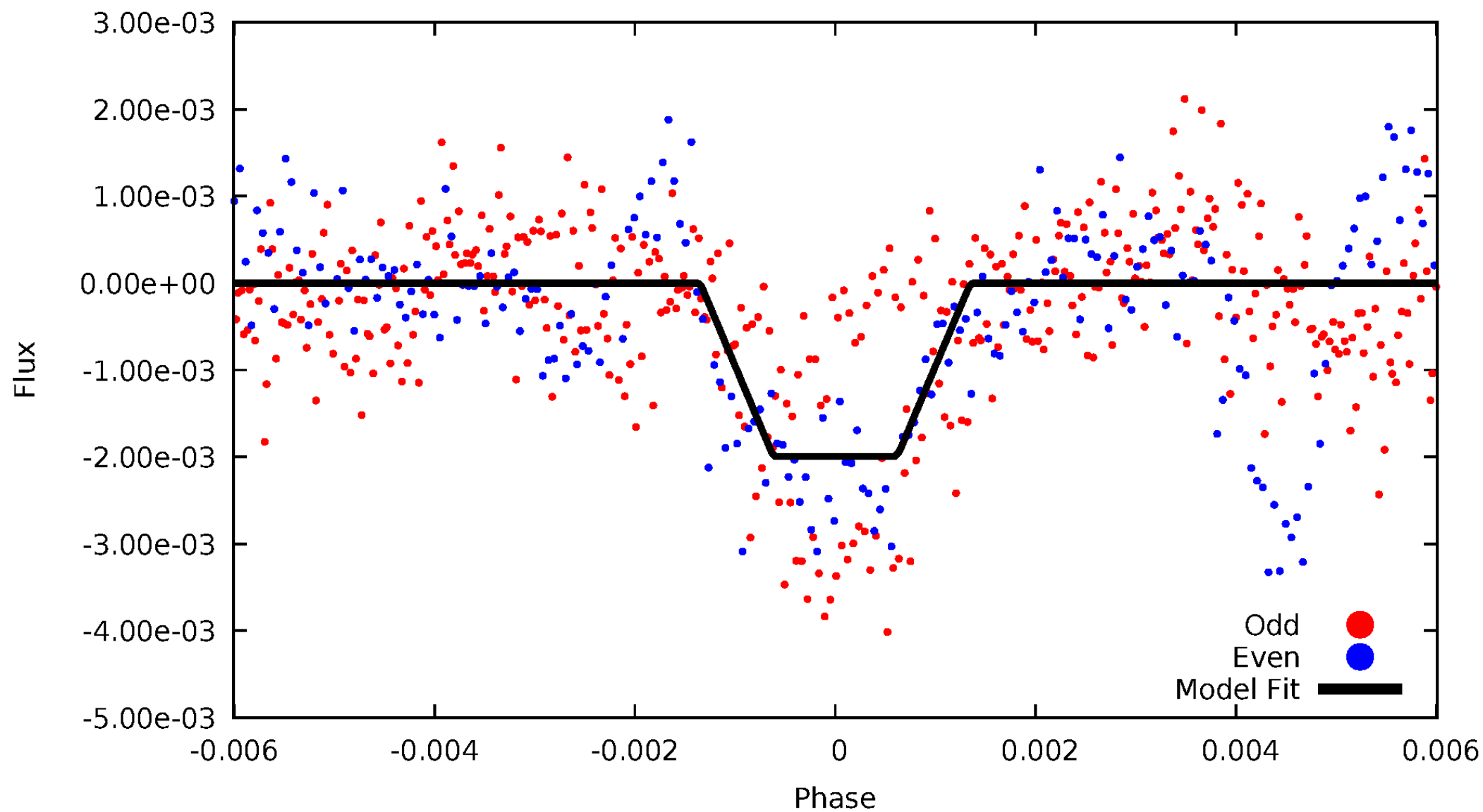
# DV Odd/Even

TCE 005957002-02



# ALT Odd/Even

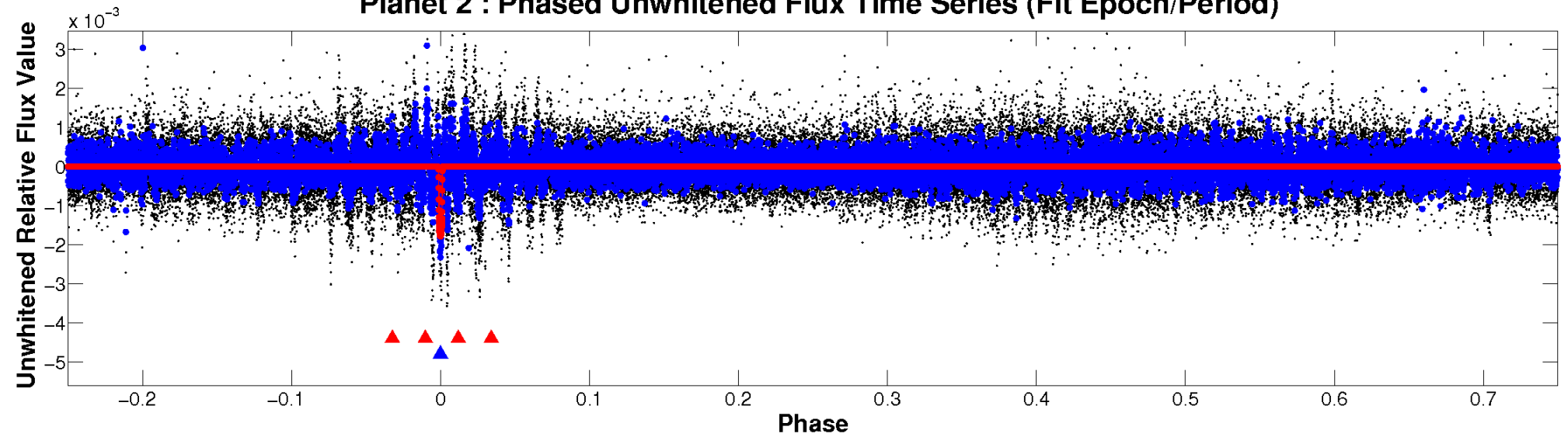
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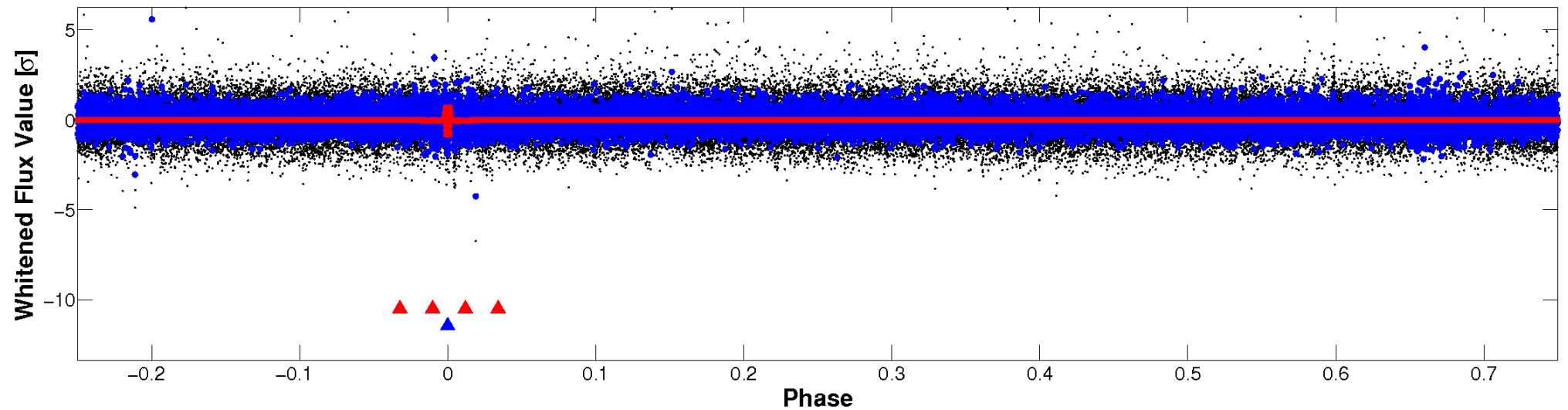


# Non-Whitened Vs. Whitened Light Curve

## 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 005957002-02     $P=358.232687$  Days     $T_0=164.254527$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 005957002-02     $P=358.232687$  Days     $T_0=164.254527$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

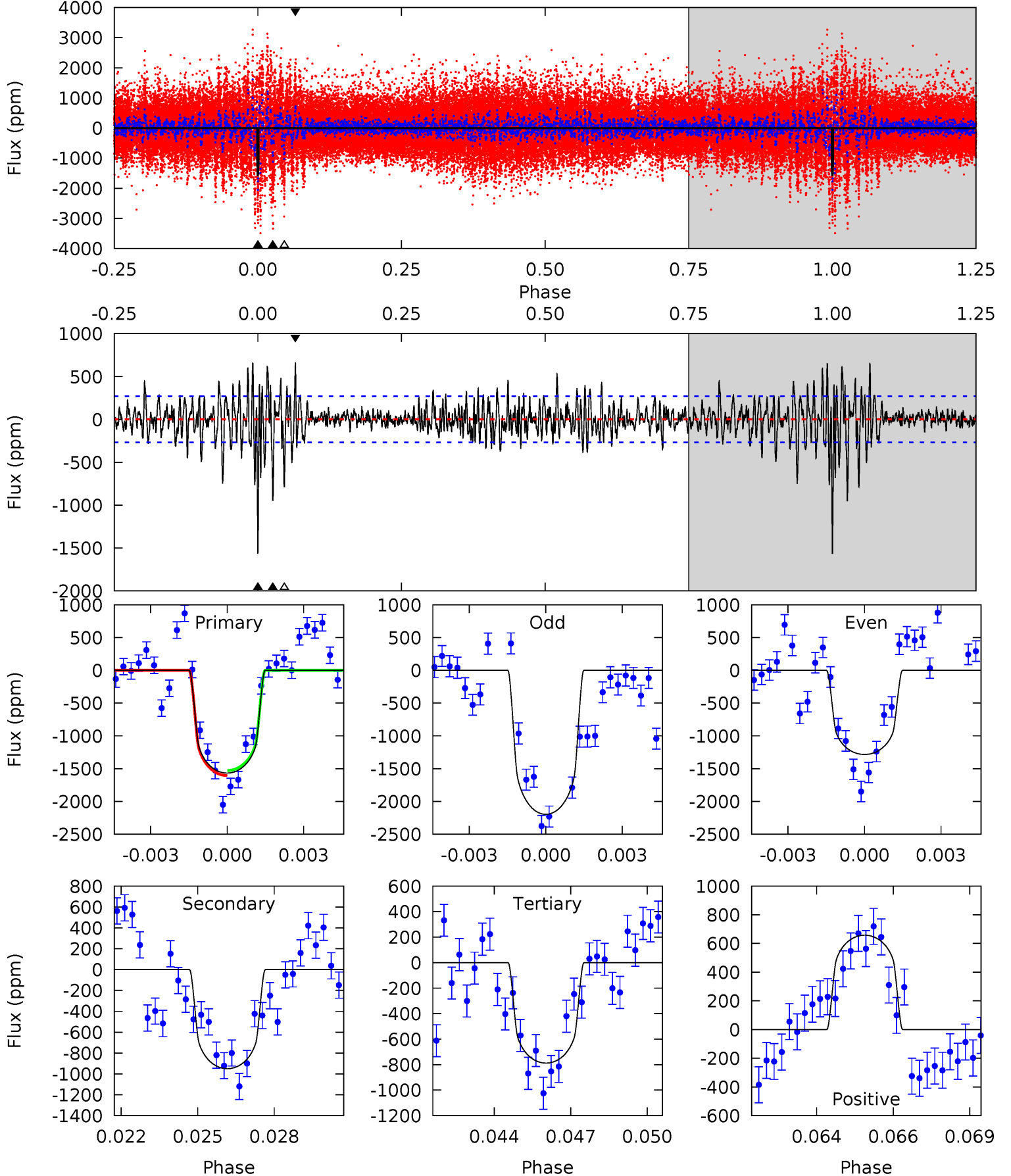
TCE 005957002-02     $P=358.329719$  Days     $T_0=164.096032$  (BKJD)



# DV Model-Shift Uniqueness Test

005957002-02,  $P = 358.232687$  Days,  $E = 164.254527$  Days

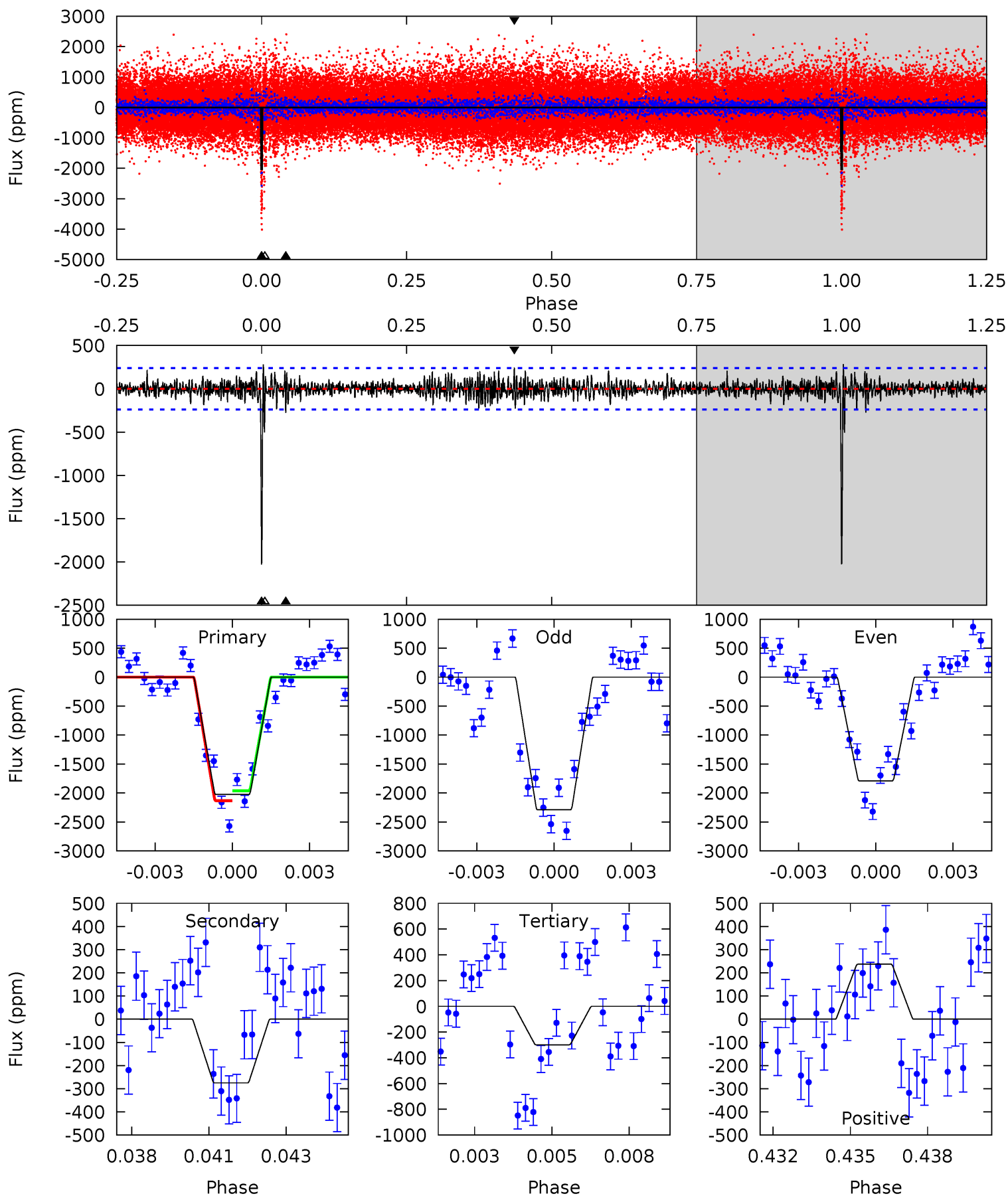
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.7	18.6	15.4	12.9	5.27	2.99	3.14	15.3	17.8	3.17	5.72	8.40	1.11	0.30	0.74



# Alt Model-Shift Uniqueness Test

005957002-02, P = 358.329719 Days, E = 164.096032 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
44.6	6.06	6.58	5.23	5.27	3.00	1.42	38.0	39.4	-0.52	0.84	5.23	0.85	0.12	1.88





### Stellar Parameters For KIC 005957002

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5250^{+158}_{-142}$	$4.654^{+0.030}_{-0.090}$	$-0.500^{+0.300}_{-0.300}$	$0.669^{+0.098}_{-0.042}$	$0.756^{+0.066}_{-0.081}$	$3.558^{+0.438}_{-1.049}$
	+3%/-3%	+1%/-2%	+60%/-60%	+15%/-6%	+9%/-11%	+12%/-29%
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 005957002-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-950 \pm 51$	$3.26^{+0.39}_{-0.33}$	$284^{+12}_{-10}$	$4541^{+240}_{-188}$	$39119^{+9822}_{-7878}$
Alt.	$-275 \pm 45$	$3.35^{+0.40}_{-0.37}$	$283^{+12}_{-9}$	$3601^{+180}_{-149}$	$10527^{+3450}_{-2489}$

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

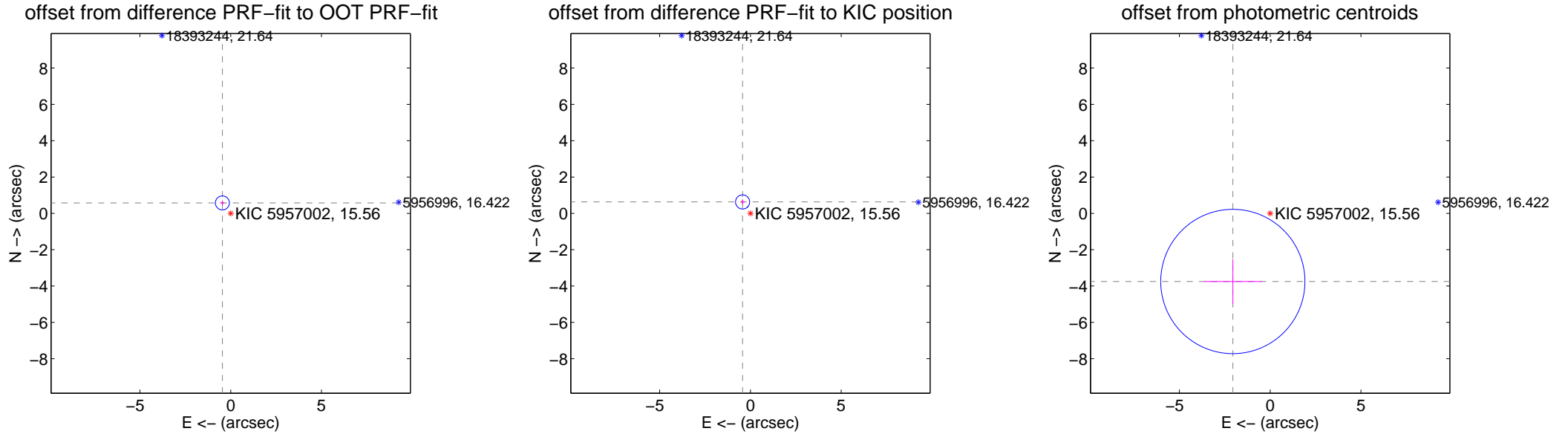
## DV Centroid Data

Supplemental centroid analysis for 005957002-02. Kepler magnitude: 15.56. Transit SNR 8.74

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.735 \pm 0.129$	5.71	$0.458 \pm 0.118$	$0.575 \pm 0.135$
PRF-fit source offset from KIC position	$0.763 \pm 0.130$	5.88	$0.432 \pm 0.118$	$0.629 \pm 0.135$
photometric centroid source offset	$4.28 \pm 1.32$	3.23	$2.06 \pm 1.59$	$-3.75 \pm 1.23$

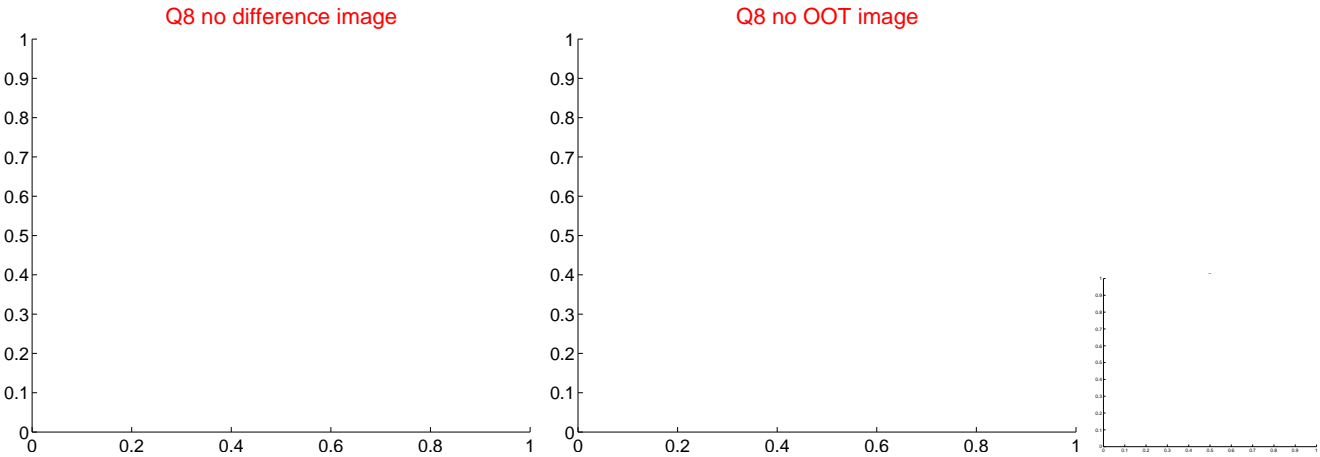
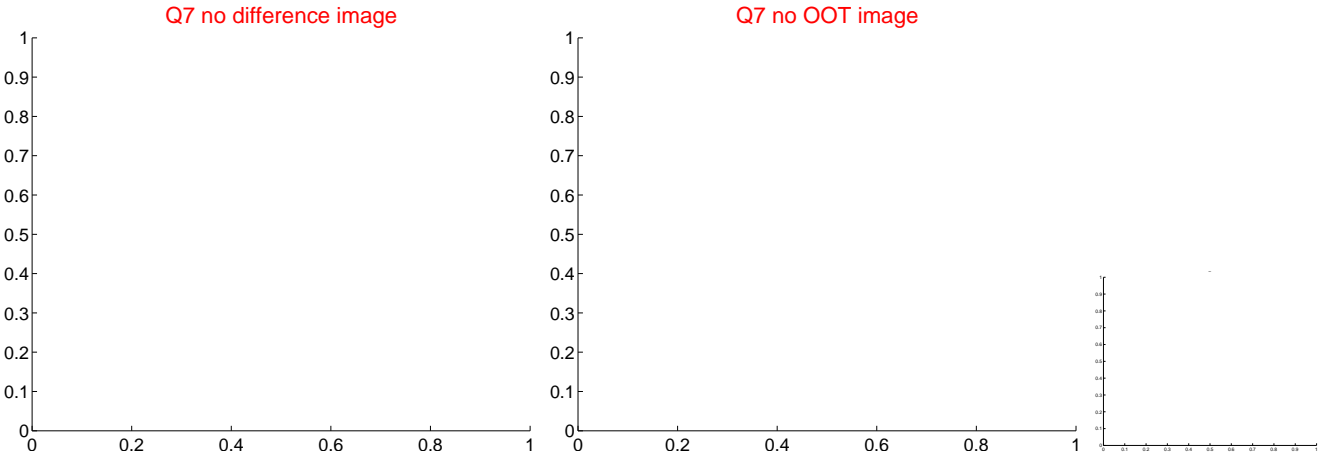
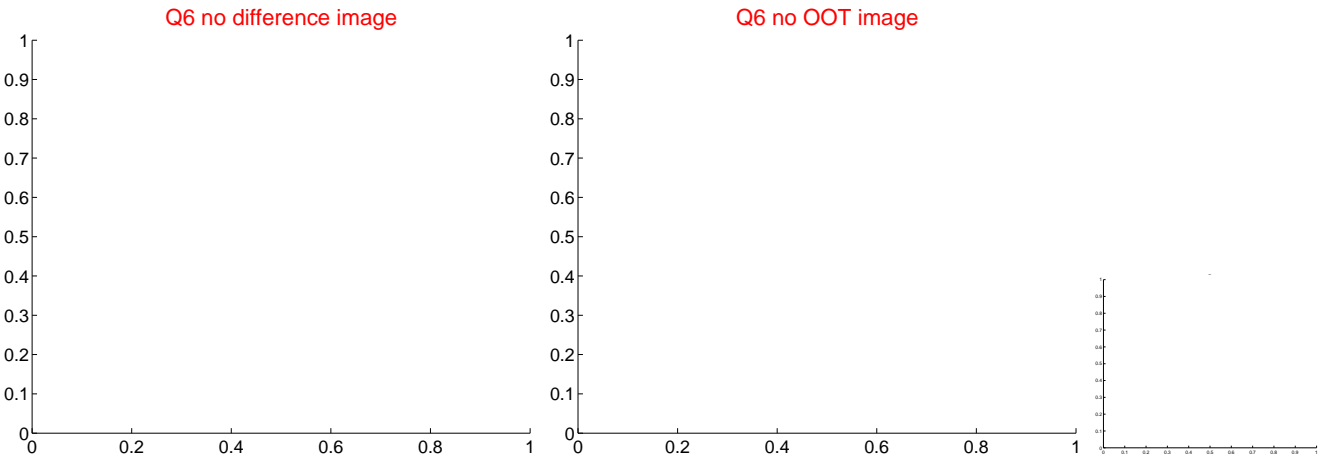
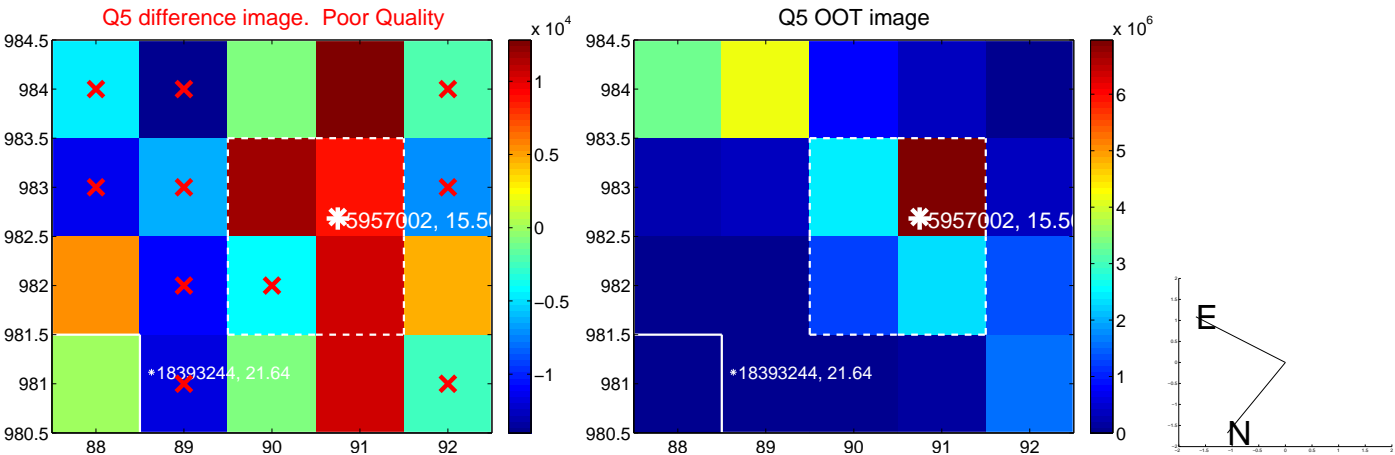


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

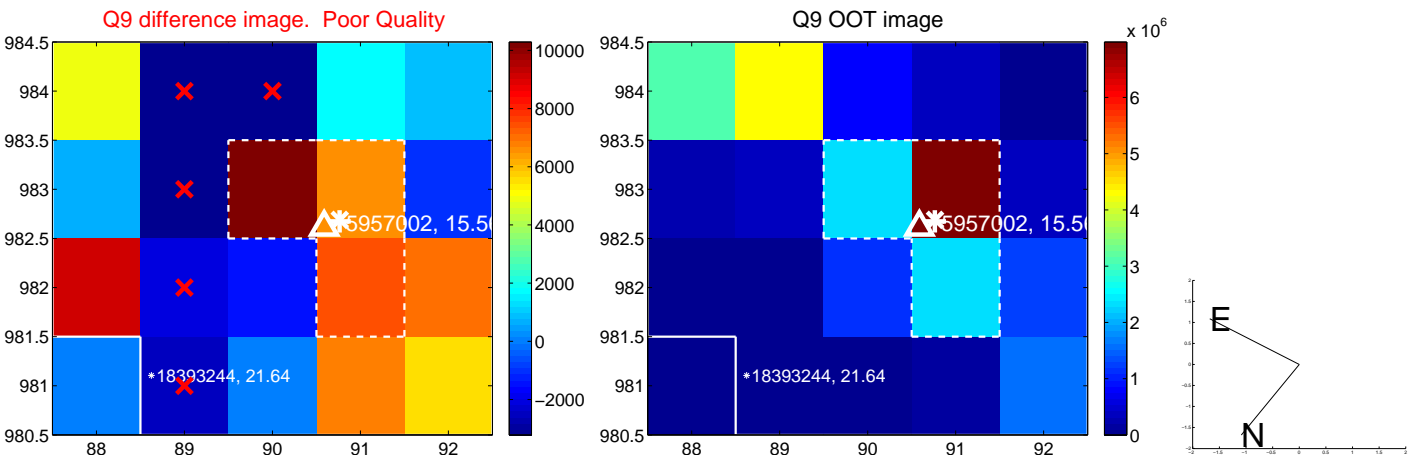
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



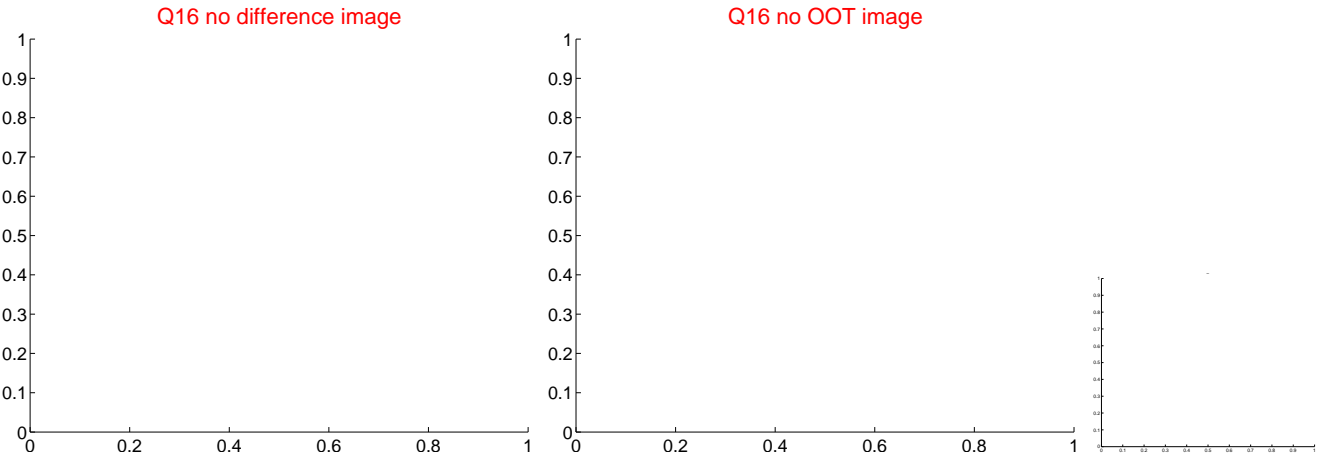
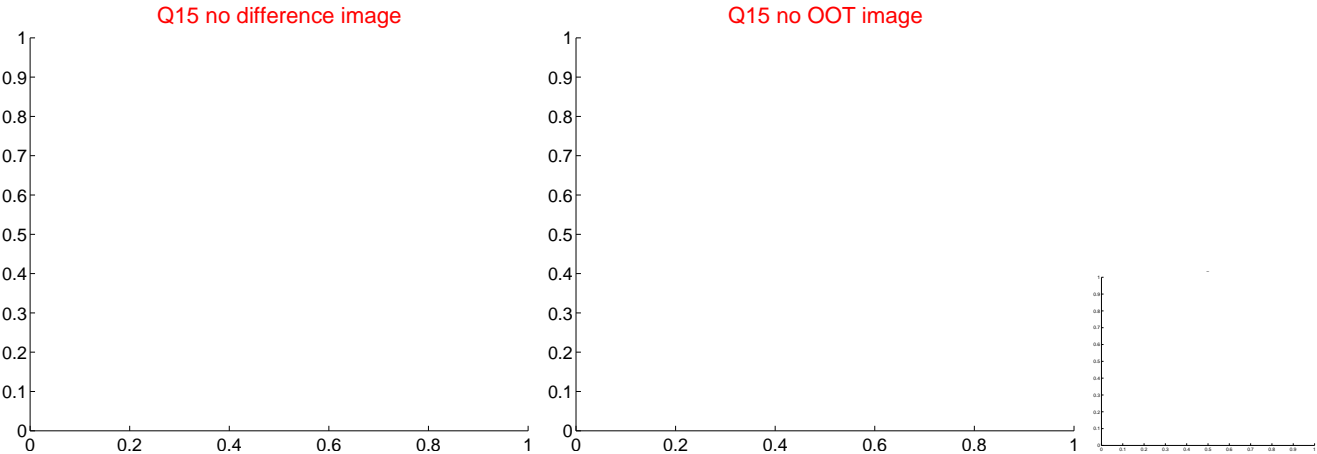
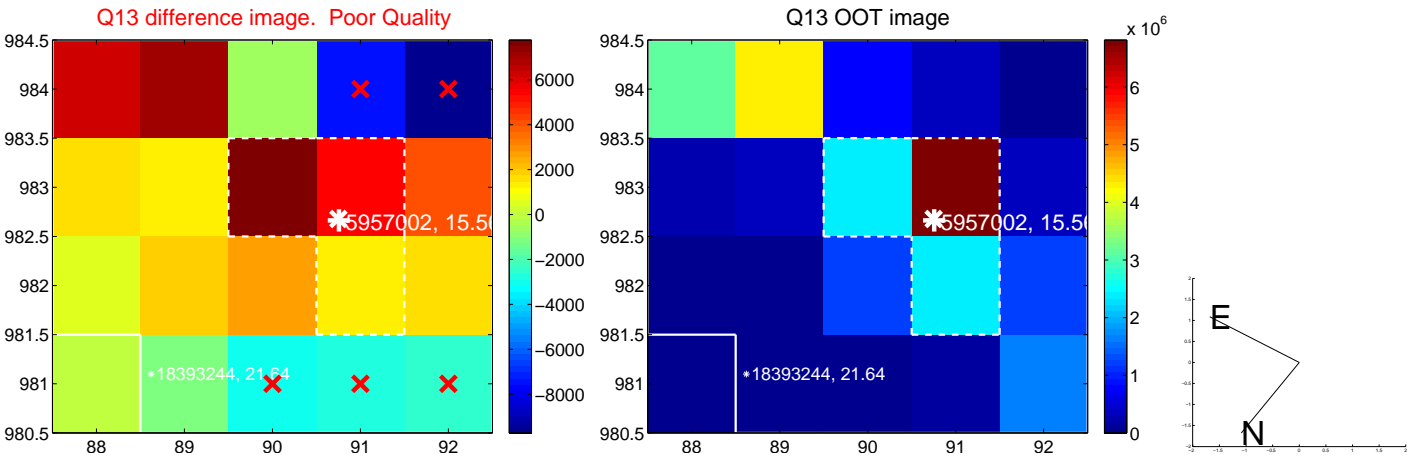
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



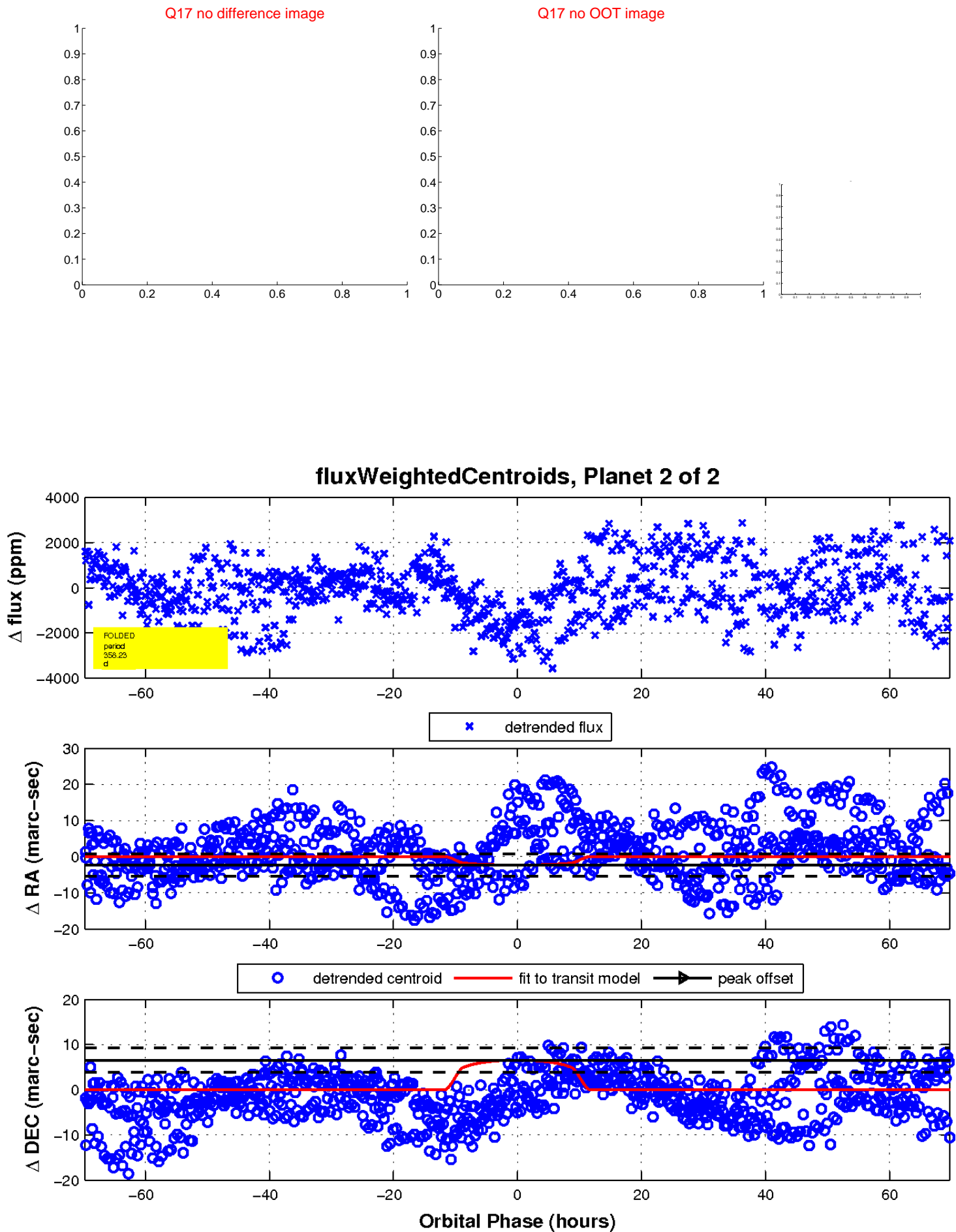
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

