

# KIC 003459199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003459199-01	OBS	3725.01	1.570526	132.337747	2032.9	3.125	365.5	321.5	11.82	5314	85.82	0.00
003459199-02	OBS	No	383.159128	432.597776	1863.7	8.722	16.7	10.1	11.82	5314	55.37	44.17

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003459199-01	OBS	FP	0.00	0	1	0	0	PLANET_IN_STAR—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—CENT_SATURATED
003459199-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED

**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 003459199-01

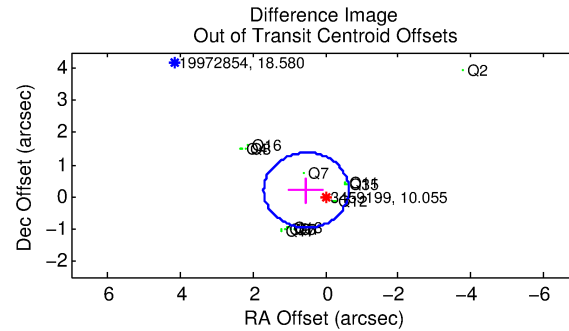
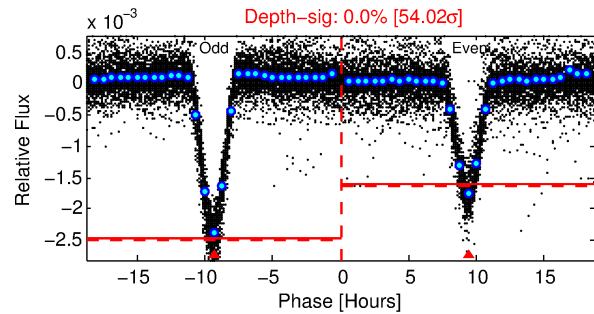
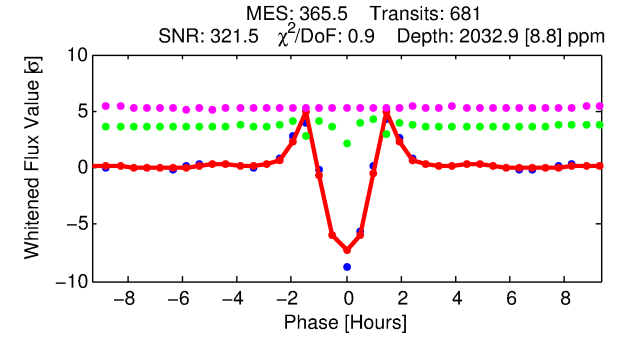
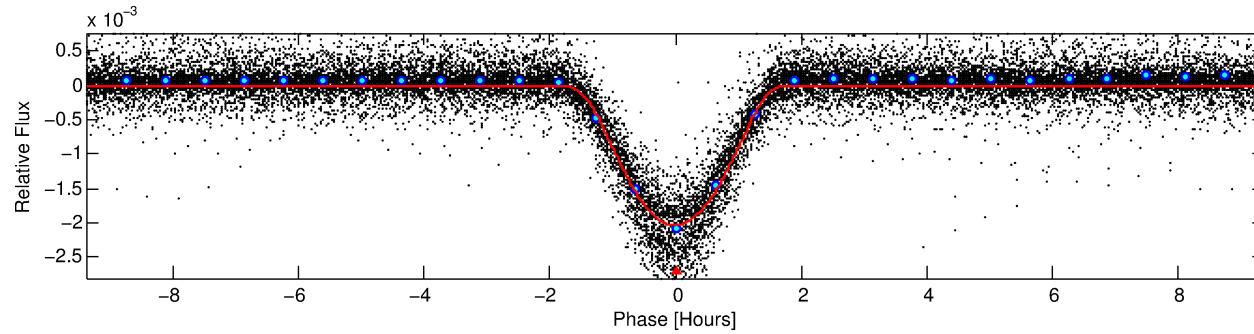
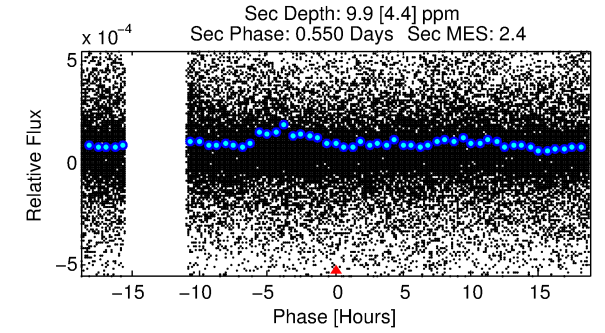
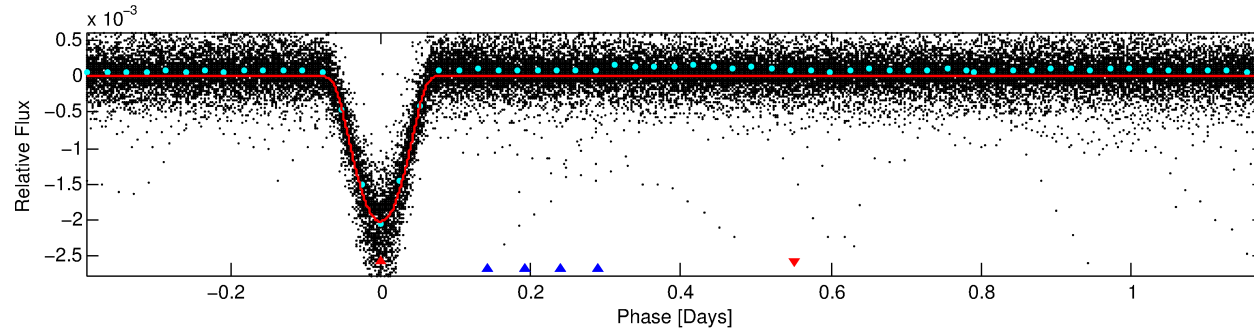
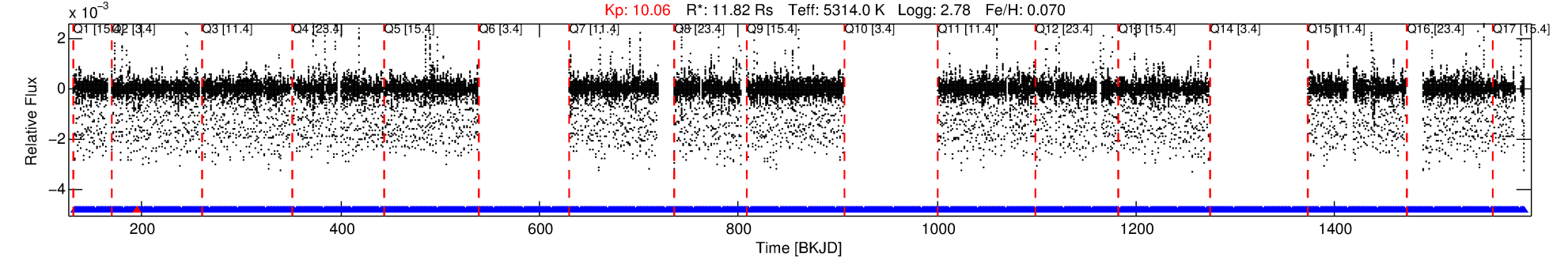
No Significant Match Found

# DV One-Page Summary

KIC: 3459199 Candidate: 1 of 2 Period: 1.571 d

KOI: K03725.01 Corr: 0.983

Kp: 10.06 R\*: 11.82 Rs Teff: 5314.0 K Logg: 2.78 Fe/H: 0.070



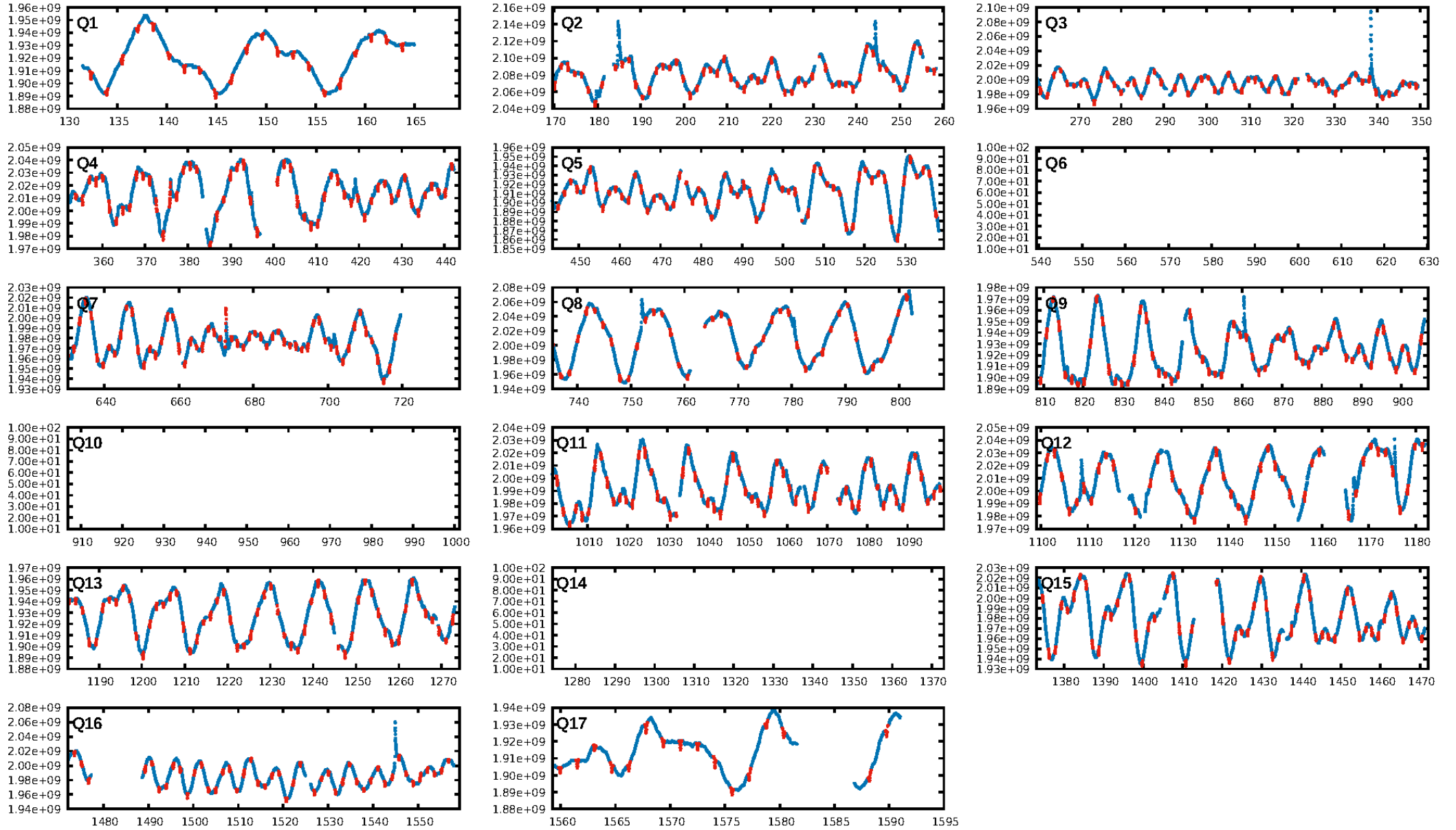
## DV Fit Results:

Period = 1.57053 [0.00000] d  
Epoch = 132.3377 [0.0001] BKJD  
Rp/R\* = 0.0665 [0.0011]  
a/R\* = 1.92 [0.01]  
b = 0.98 [0.00]  
Seff = N/A  
Teq = N/A  
Rp = 85.82 [34.36] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

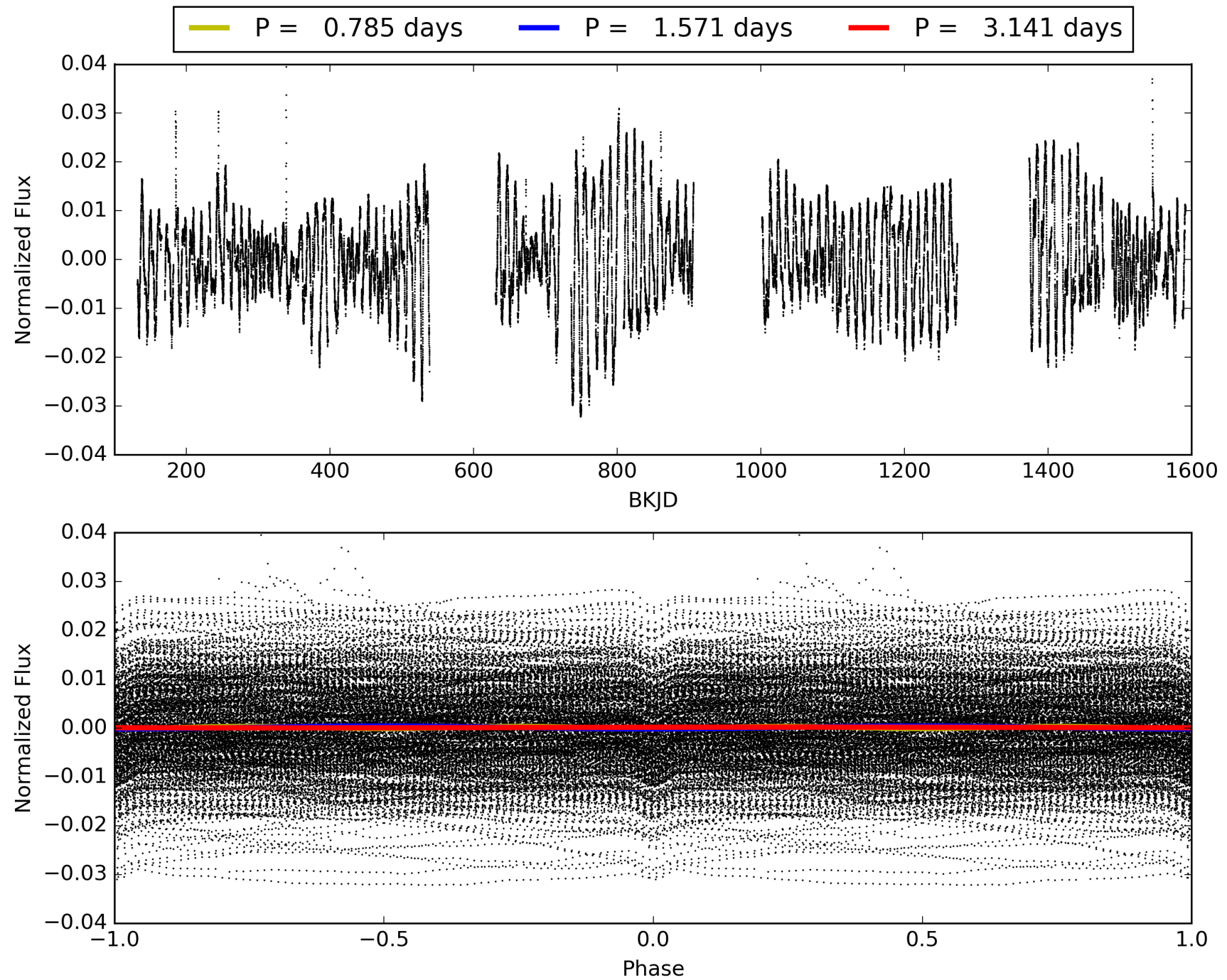
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [988.52σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [643/644]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 0.280 arcsec [18.36σ]  
OotOffset-rm: 0.566 arcsec [1.45σ]  
KicOffset-rm: 0.551 arcsec [1.12σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 0.07 [1/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 003459199-01, PDC Light Curves

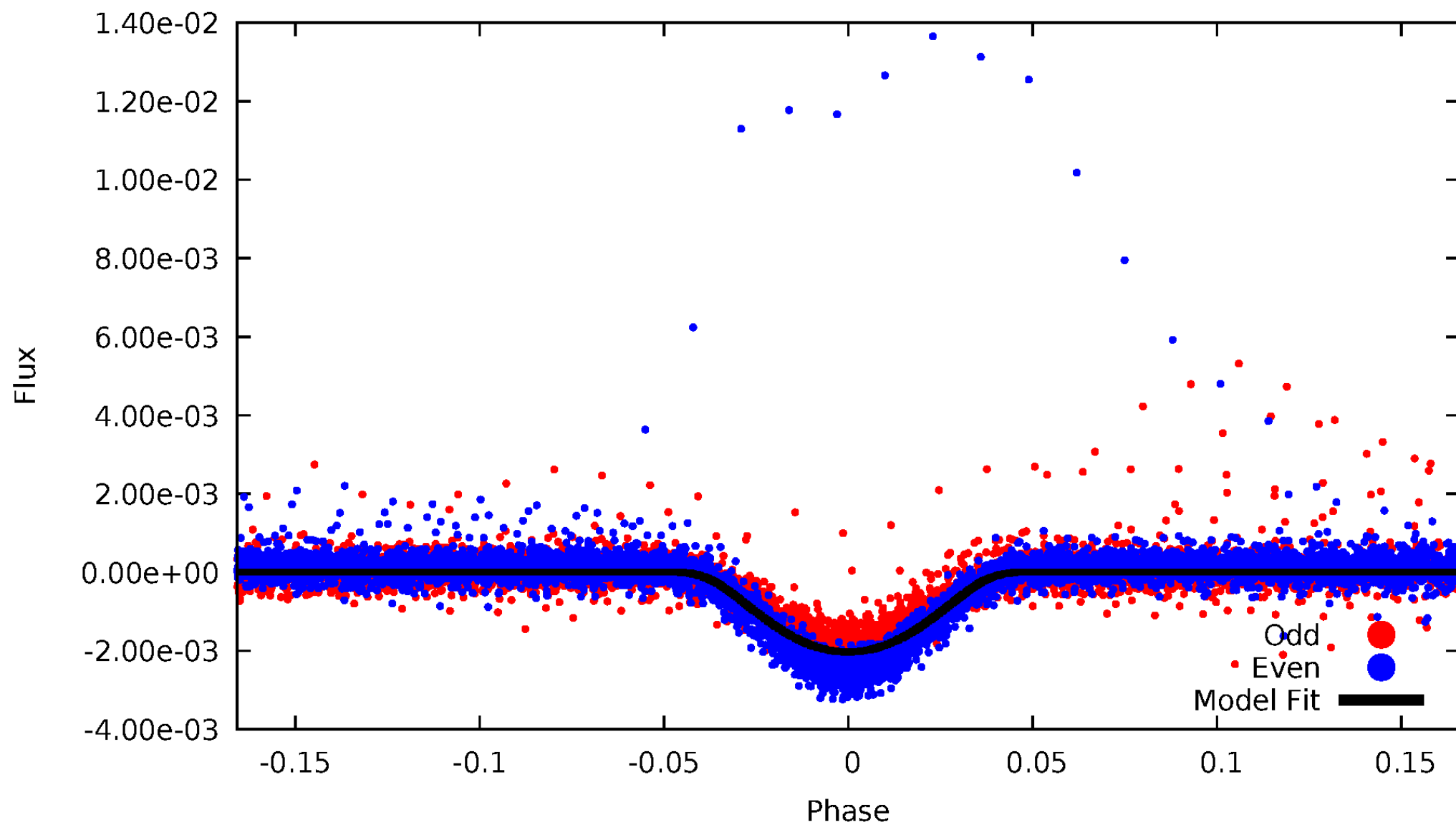


TCE 003459199-01



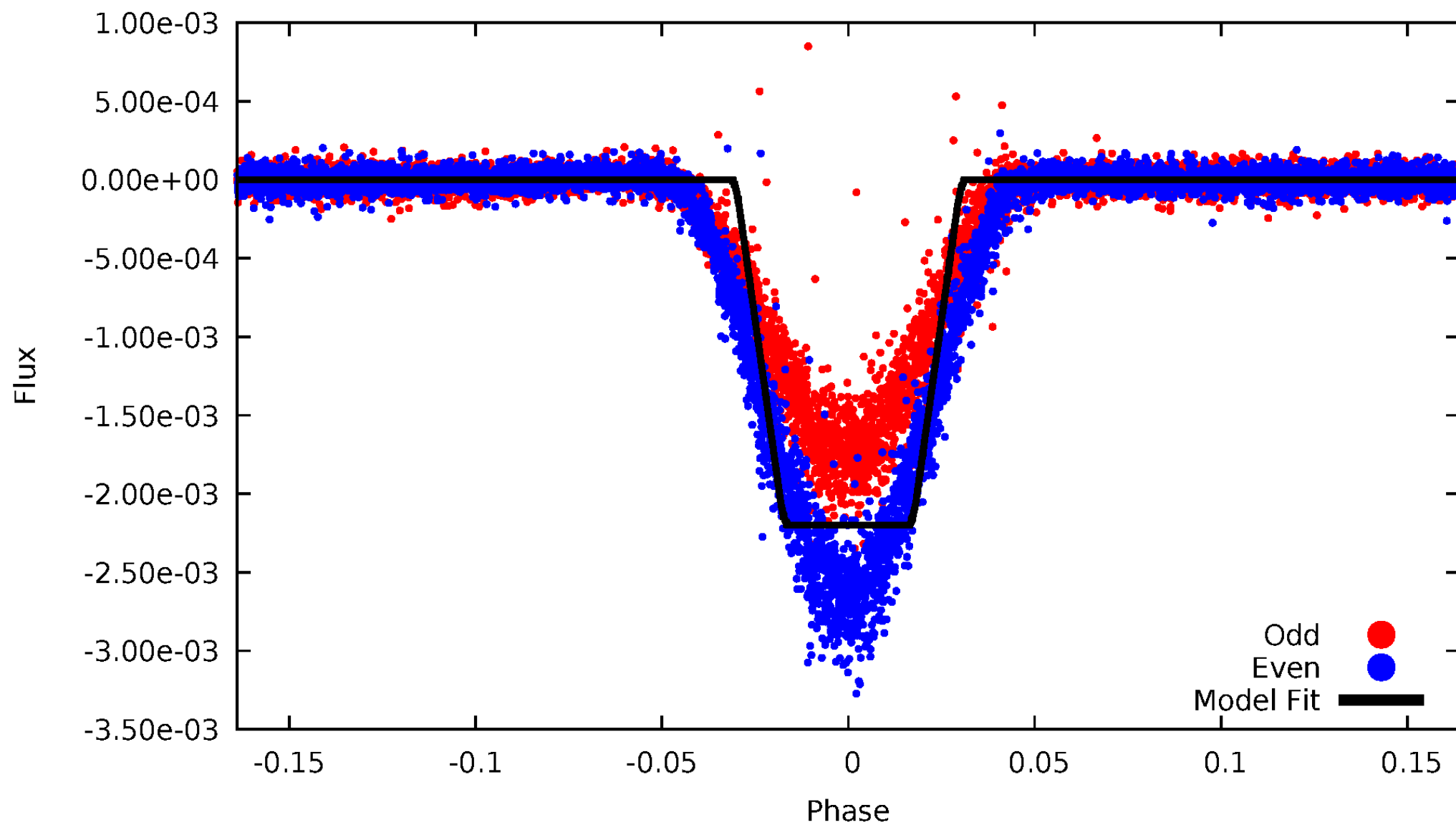
# DV Odd/Even

TCE 003459199-01



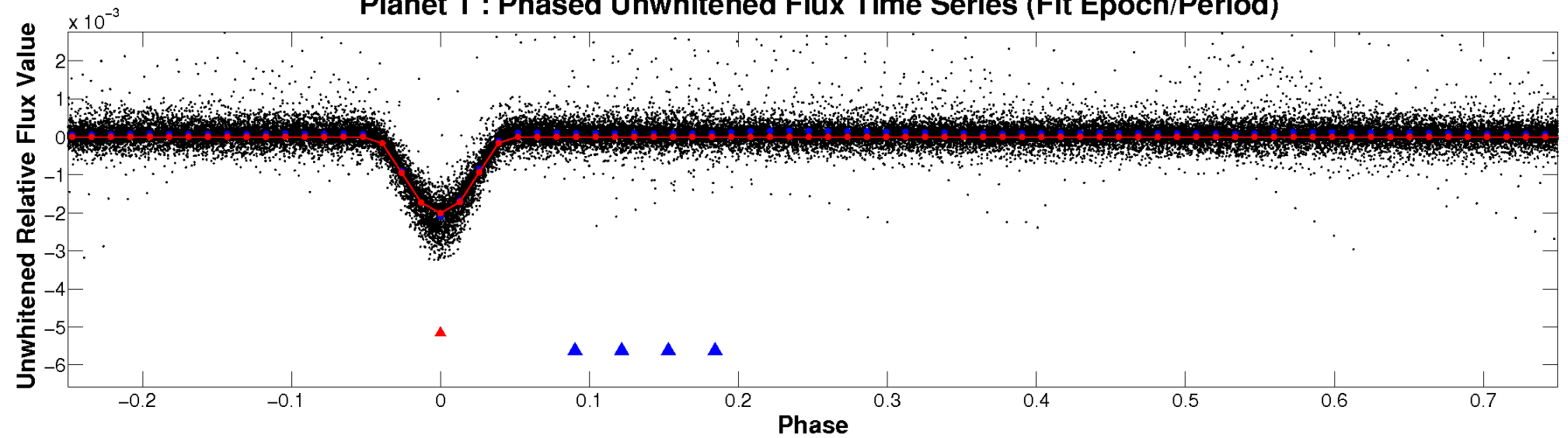
# ALT Odd/Even

TCE 003459199-01

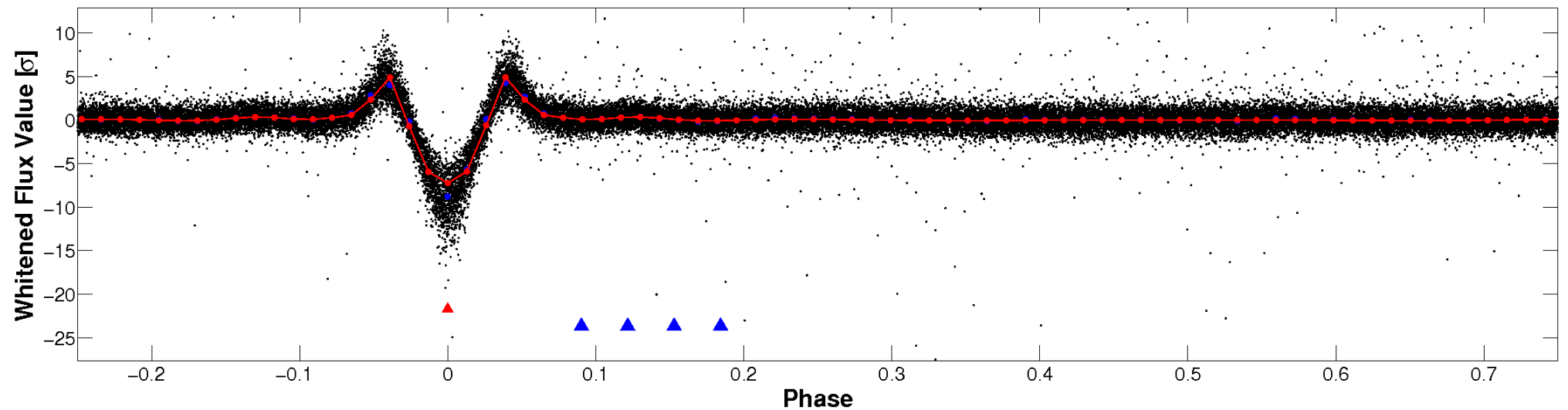


# Non-Whitened Vs. Whitened Light Curve

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



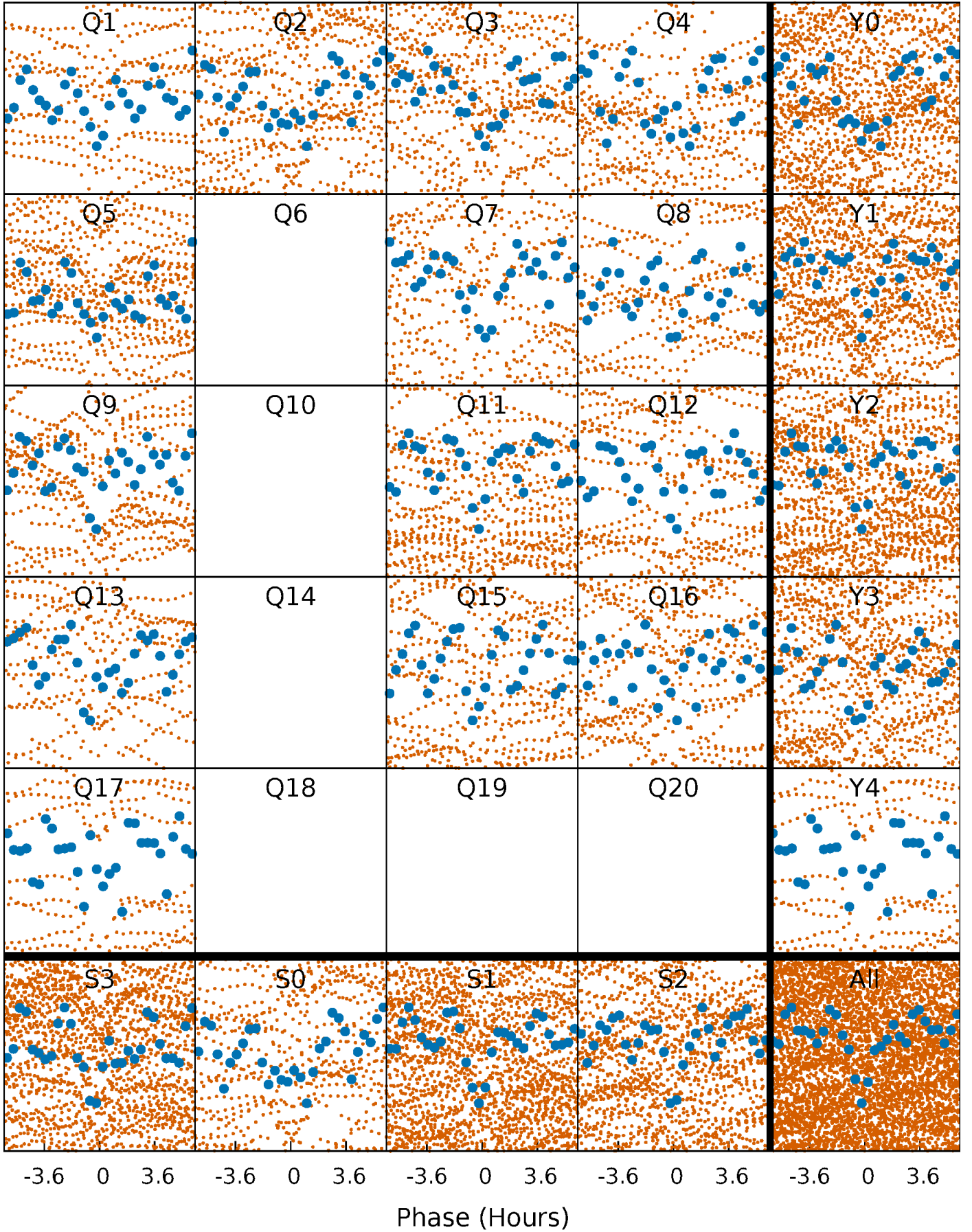
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

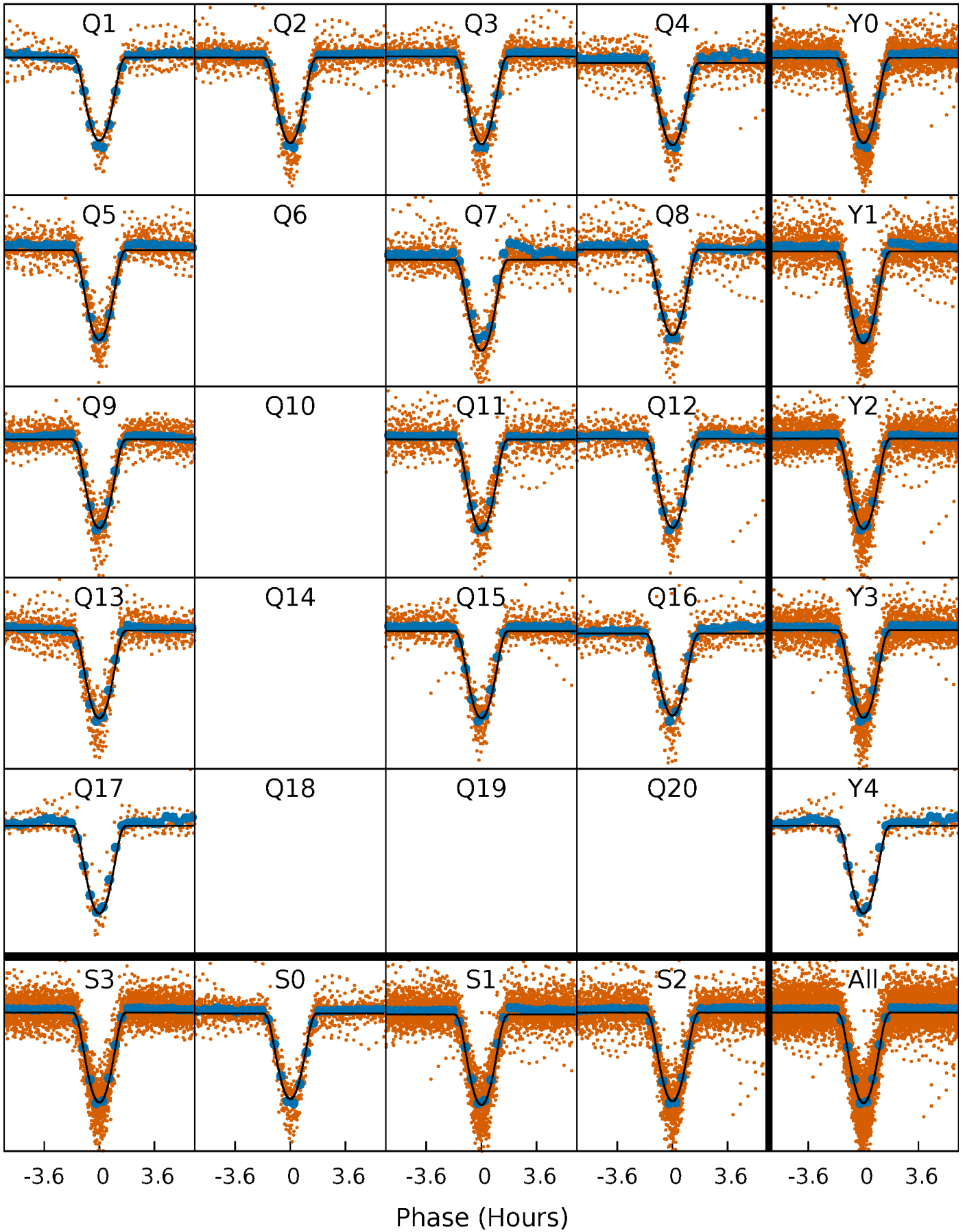
TCE 003459199-01   P= 1.570526 Days    $T_0=132.337747$  (BKJD)





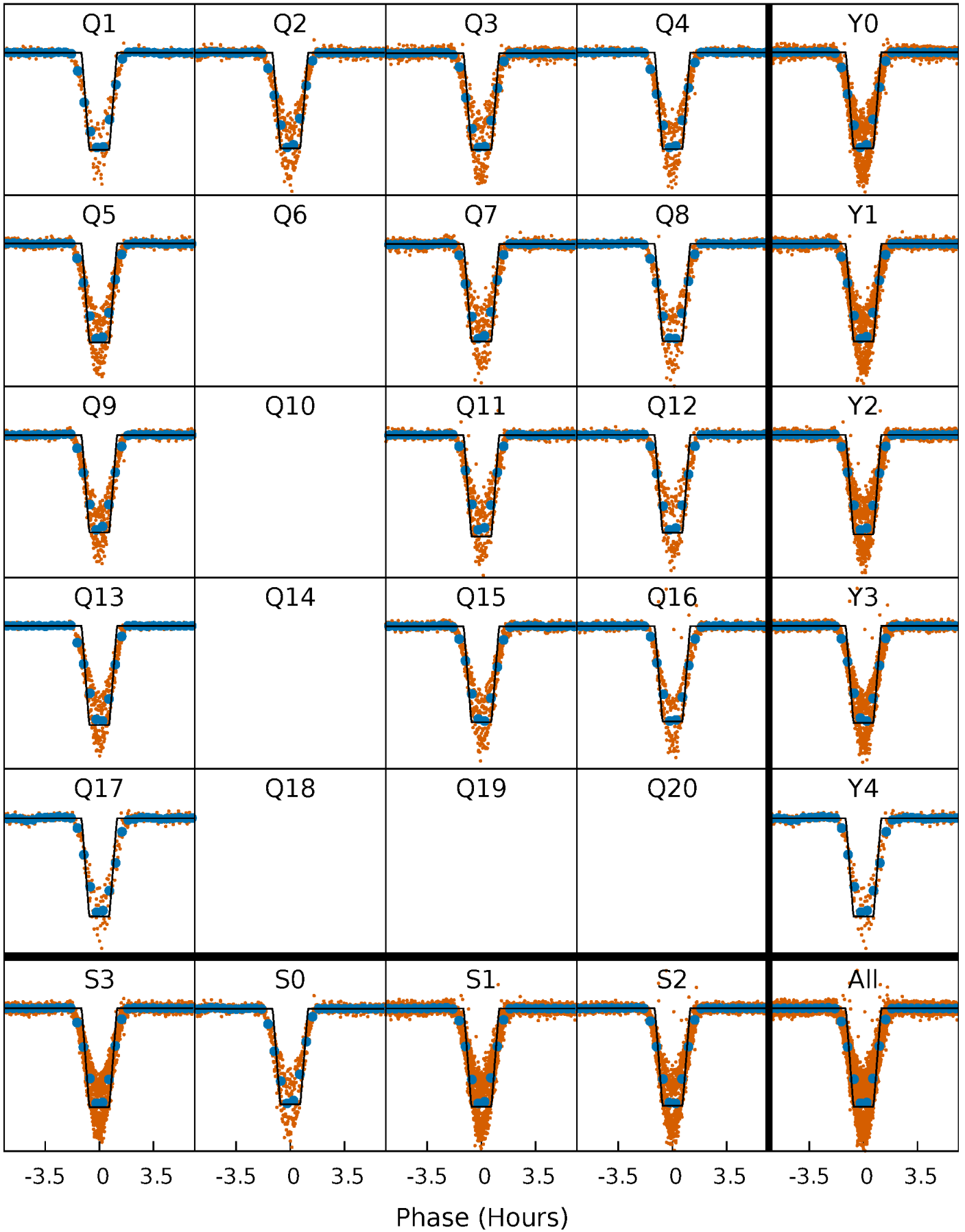
# DV Quarter-Phased Transit Curves

TCE 003459199-01   P= 1.570526 Days    $T_0=132.337747$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

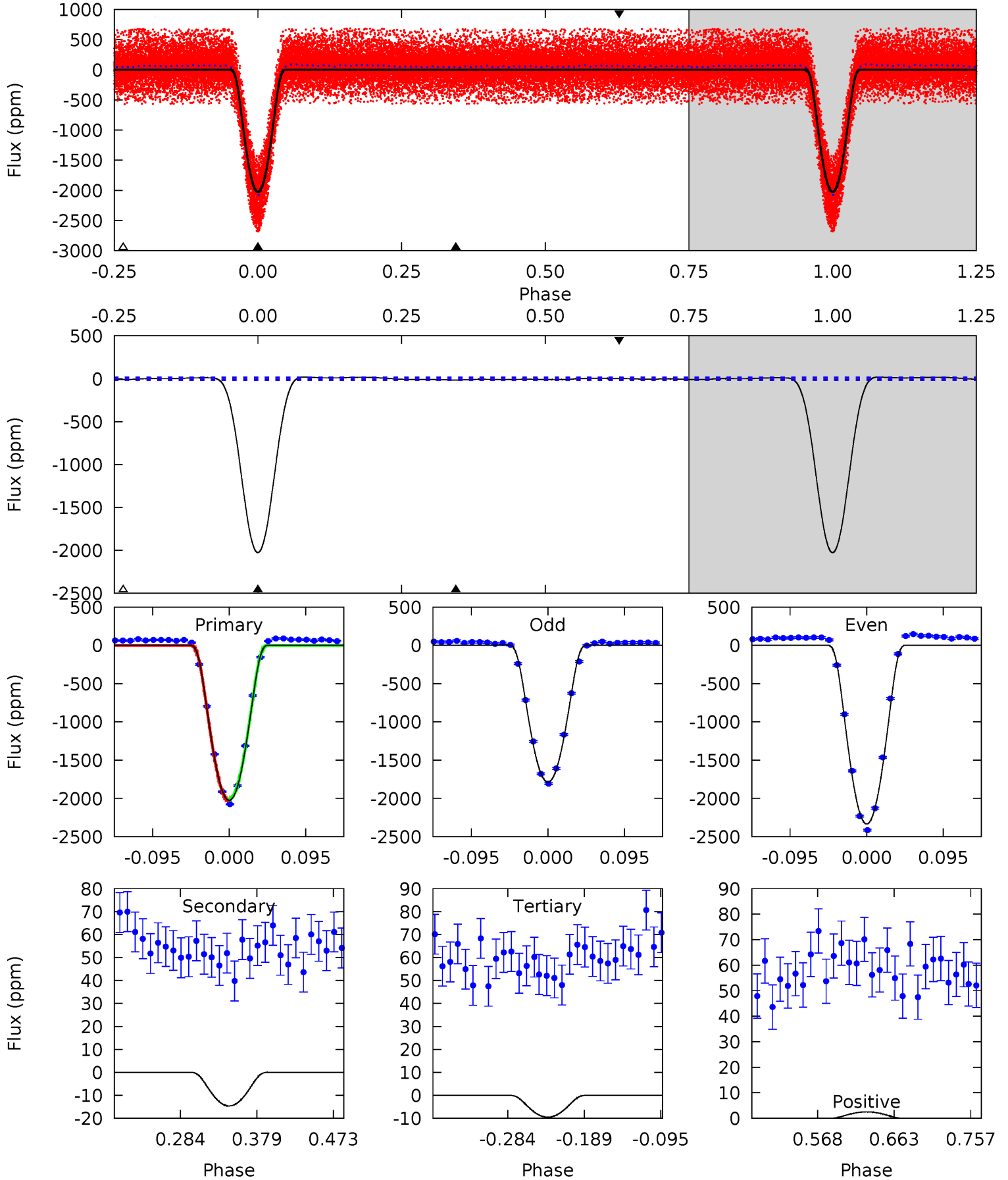
TCE 003459199-01 P= 1.570514 Days  $T_0=132.343041$  (BKJD)



# DV Model-Shift Uniqueness Test

003459199-01, P = 1.570526 Days, E = 130.767221 Days

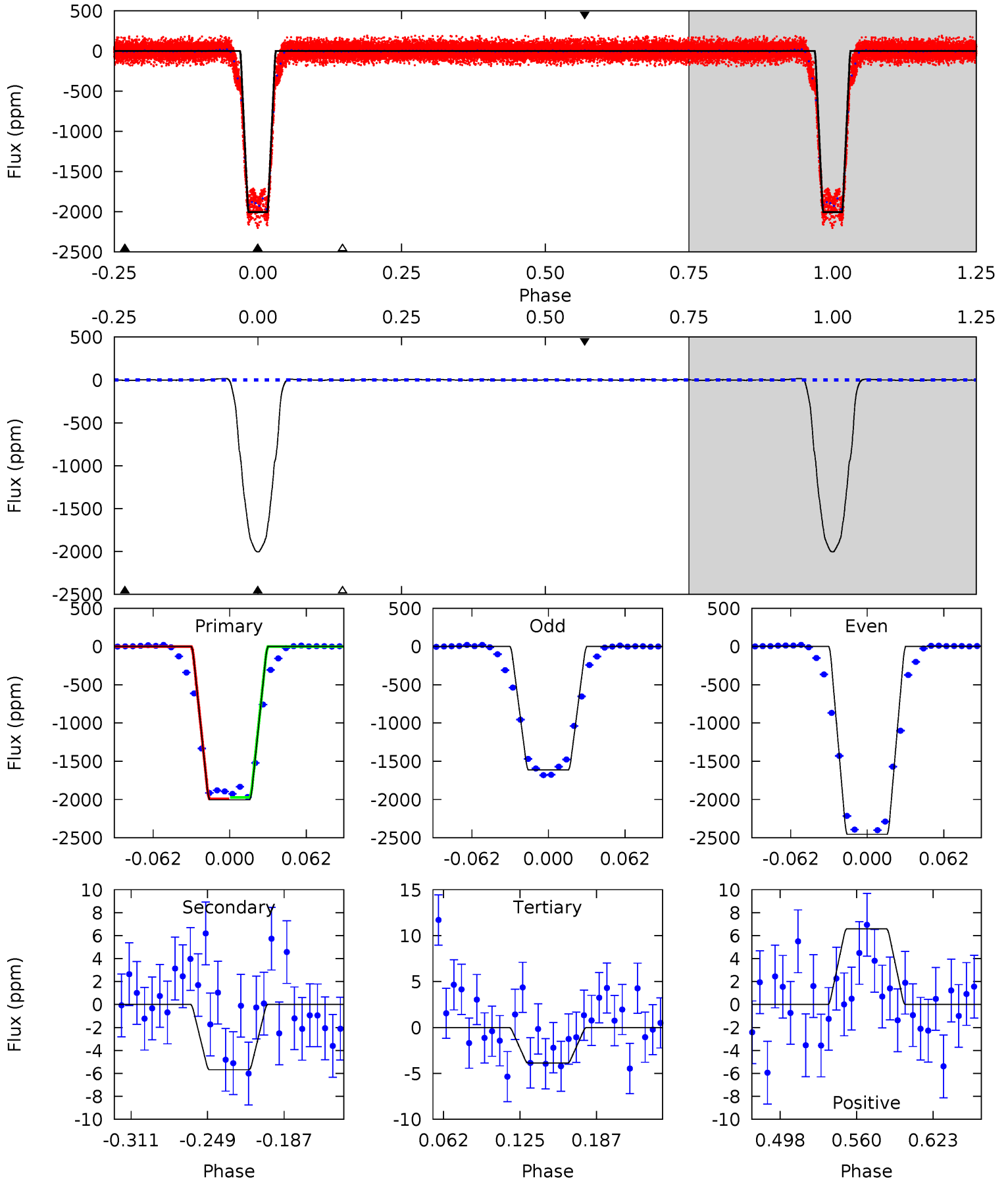
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
682.6	4.93	3.20	0.85	4.58	1.67	2.61	679.3	681.7	1.72	4.08	96.1	1.01	0.01	5.08



# Alt Model-Shift Uniqueness Test

003459199-01, P = 1.570514 Days, E = 130.772527 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
1263	3.58	2.44	4.15	4.66	1.86	1.80	1261	1259	1.14	-0.57	353.1	1.02	0.01	0



### Stellar Parameters For KIC 003459199

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5314^{+95}_{-116}$	$2.782^{+0.304}_{-0.076}$	$0.070^{+0.150}_{-0.350}$	$11.820^{+1.477}_{-4.728}$	$3.083^{+0.185}_{-0.694}$	$0.003^{+0.005}_{-0.001}$
	+2%/-2%	+11%/-3%	+214%/-500%	+12%/-40%	+6%/-23%	+205%/-25%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003459199-01 / KOI 3725.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-15 \pm 3$	$84.33^{+7.27}_{-18.14}$	$5662^{+263}_{-550}$	$-4723^{+367}_{-191}$	$0.002^{+0.001}_{-0.000}$
Alt.	$-6 \pm 2$	$59.07^{+5.20}_{-12.28}$	$5635^{+288}_{-542}$	$-4711^{+358}_{-201}$	$0.001^{+0.001}_{-0.000}$

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

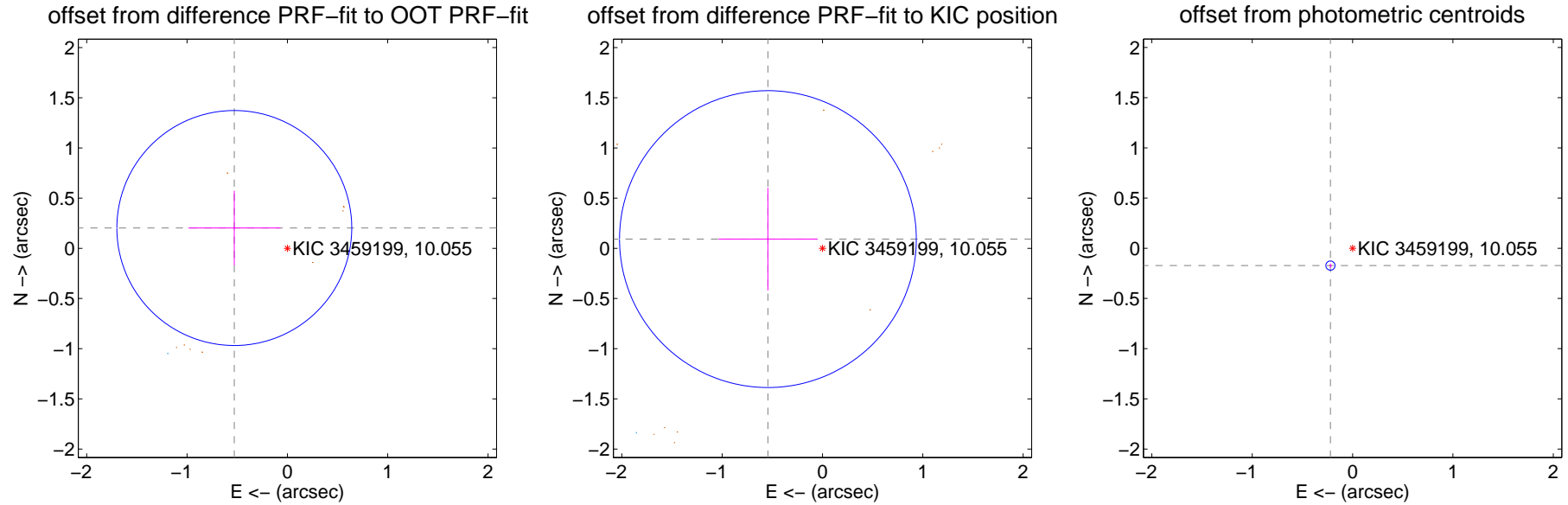
## DV Centroid Data

Supplemental centroid analysis for 003459199-01. **Kepler magnitude: 10.05.** Transit SNR 321.50

**There are 1 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 1.03 arcsec

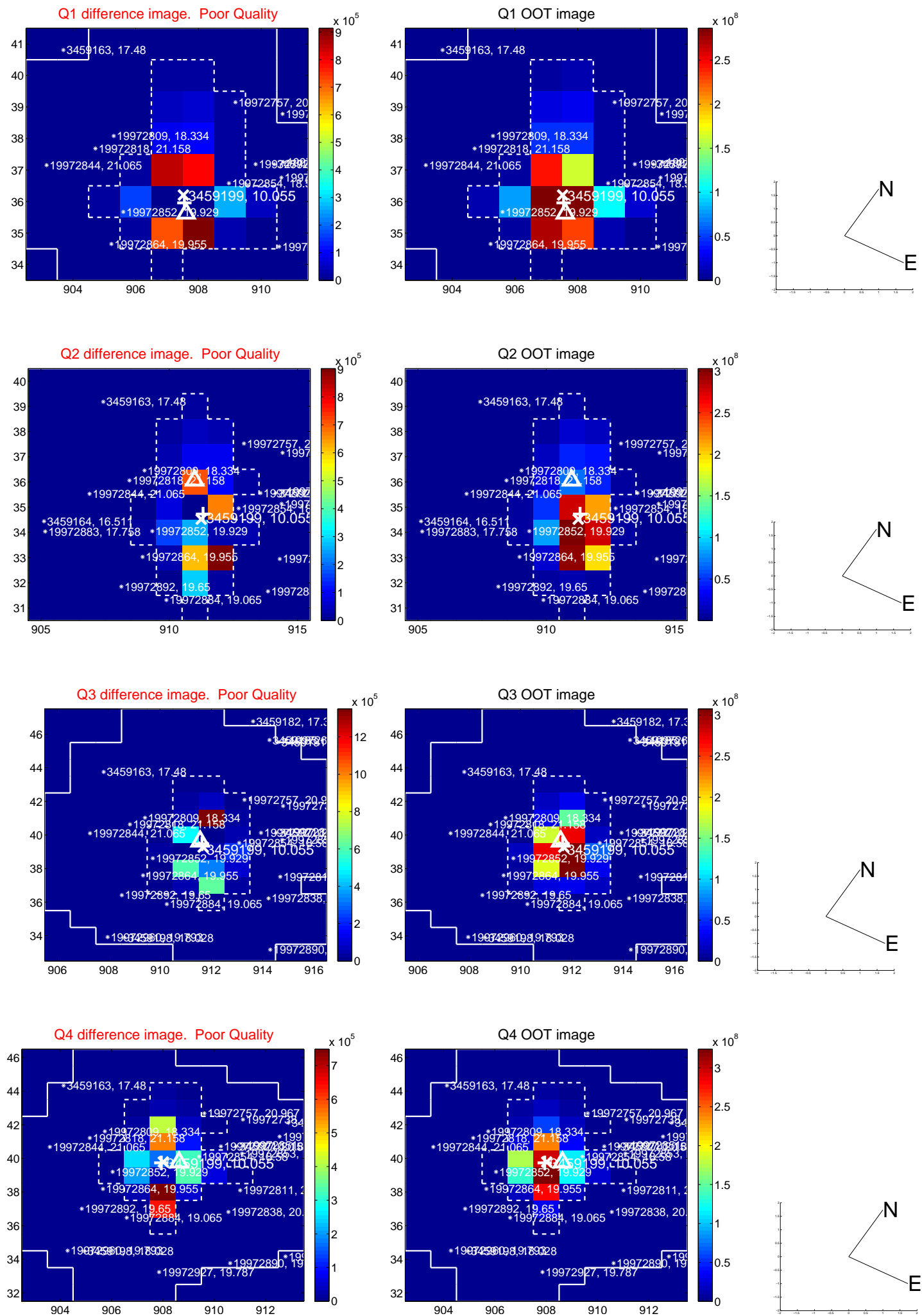
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.566 \pm 0.390$	1.45	$0.529 \pm 0.458$	$0.202 \pm 0.371$
PRF-fit source offset from KIC position	$0.551 \pm 0.493$	1.12	$0.544 \pm 0.492$	$0.092 \pm 0.511$
photometric centroid source offset	$0.28 \pm 0.02$	<b>18.36</b>	$0.22 \pm 0.01$	$-0.17 \pm 0.02$



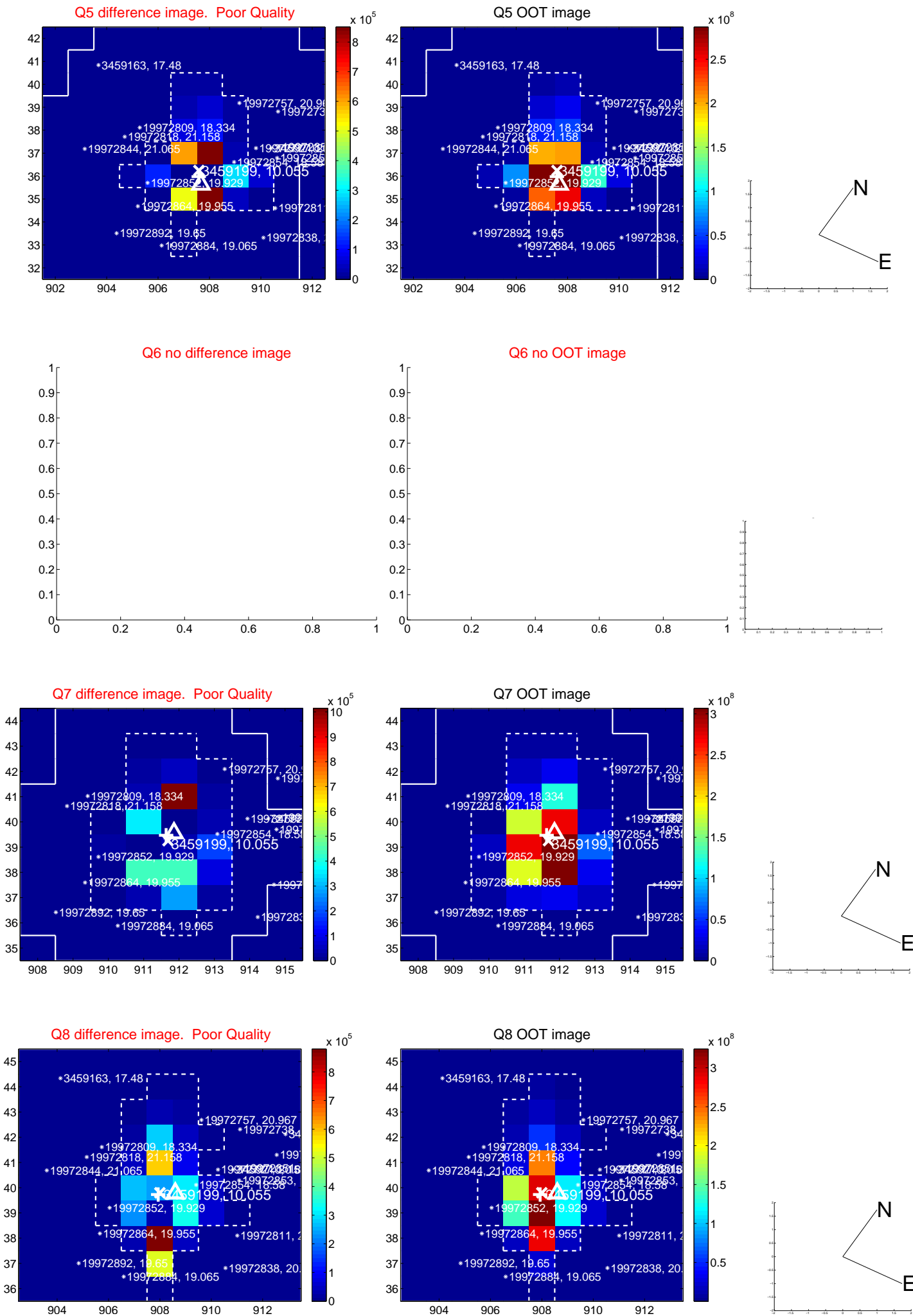
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



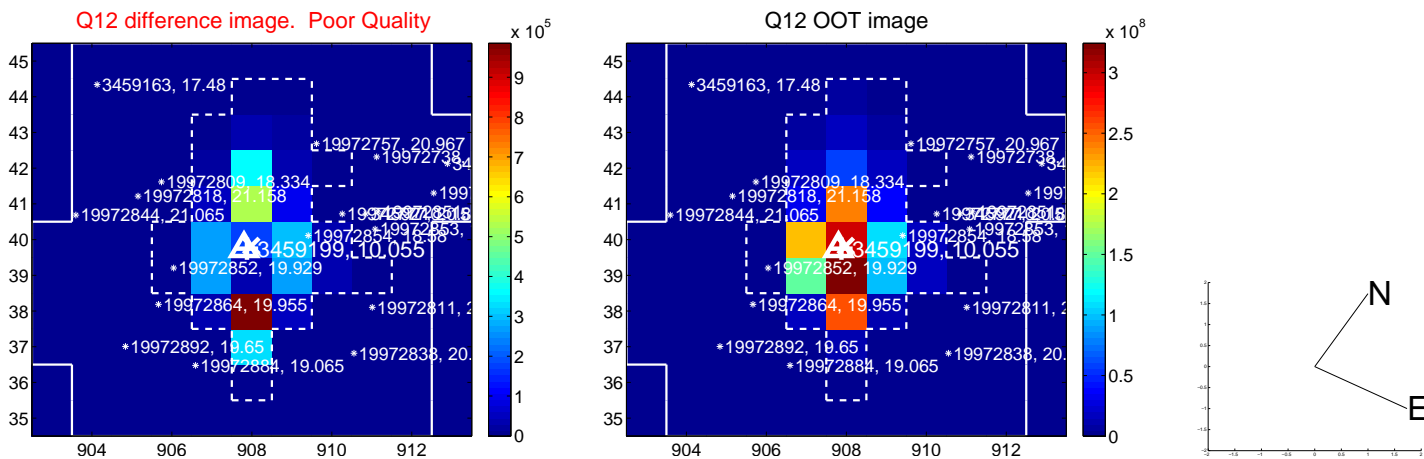
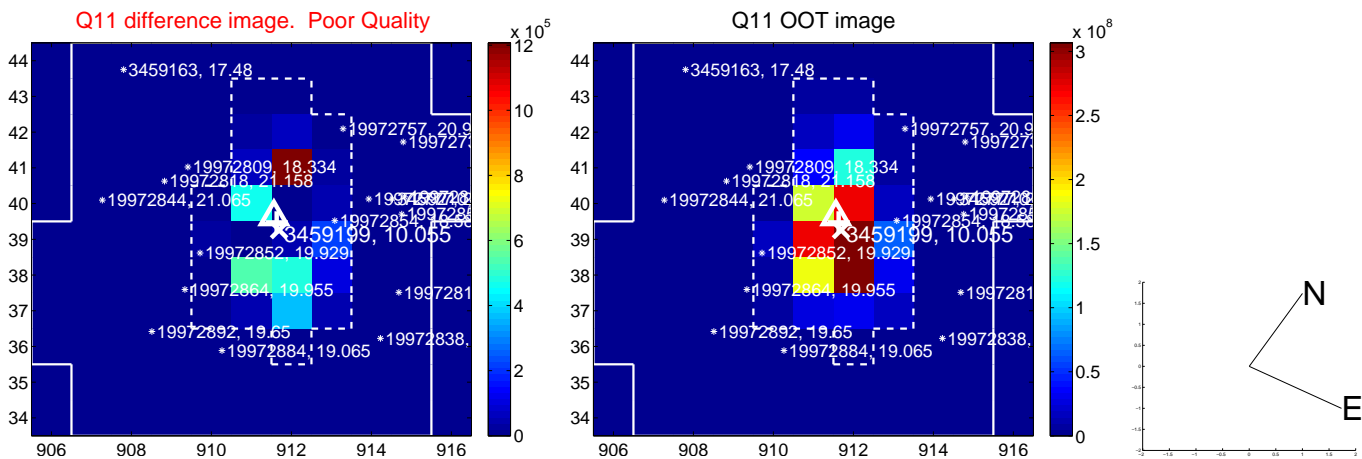
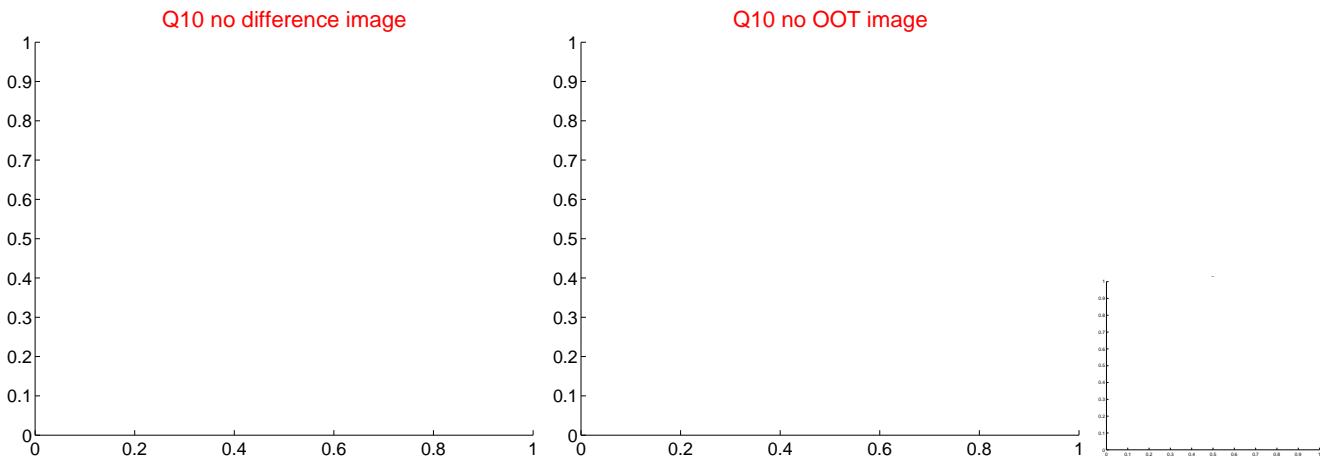
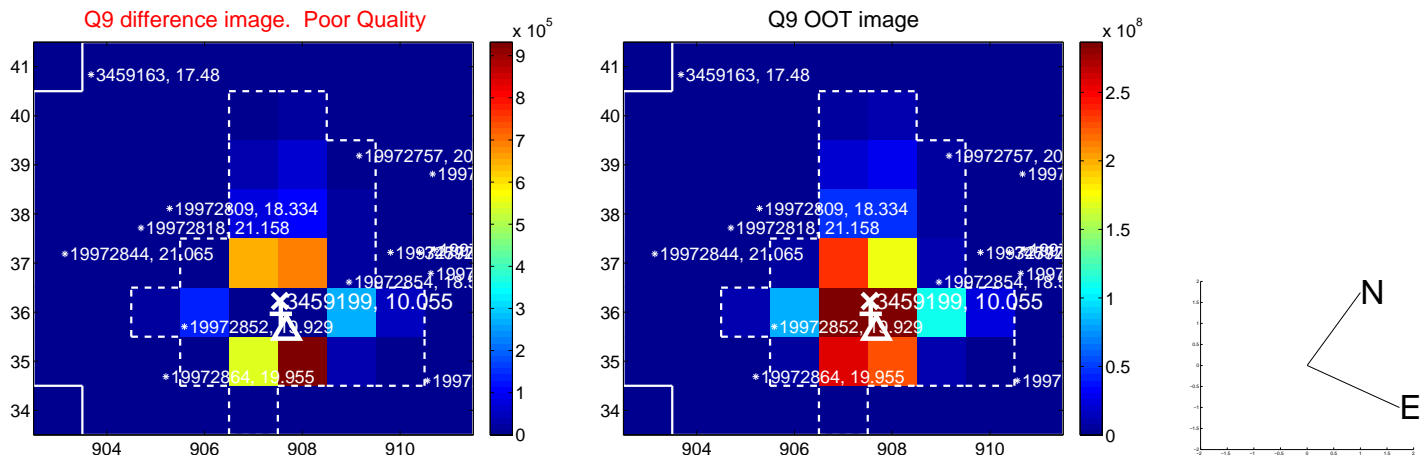
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



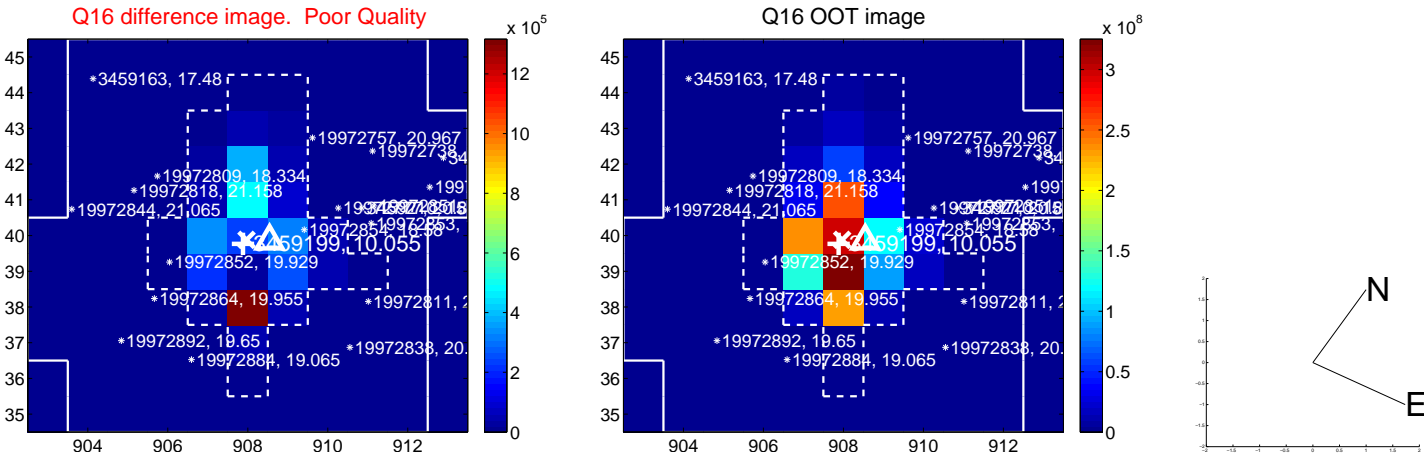
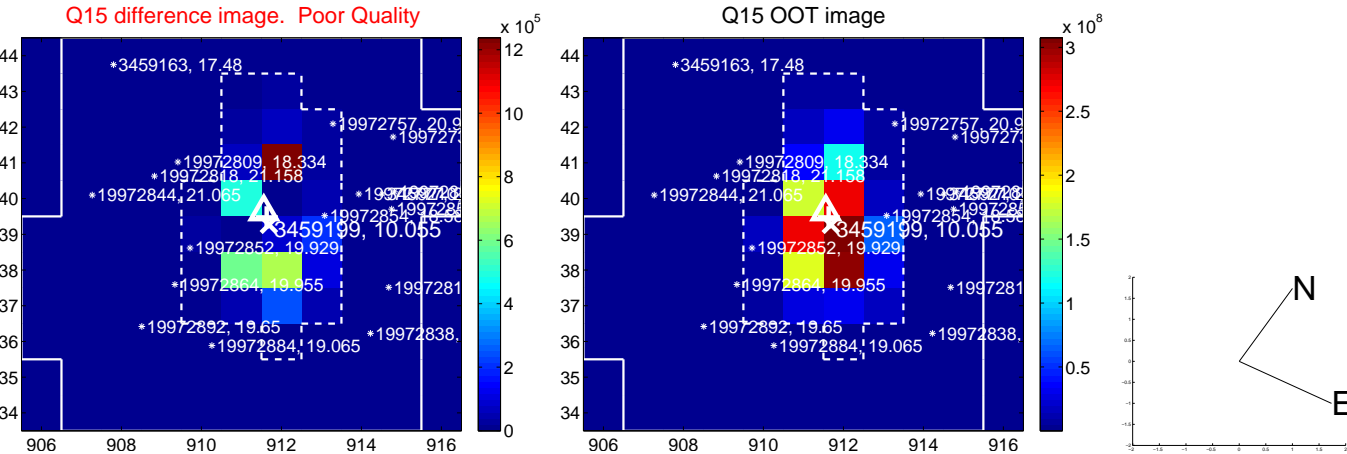
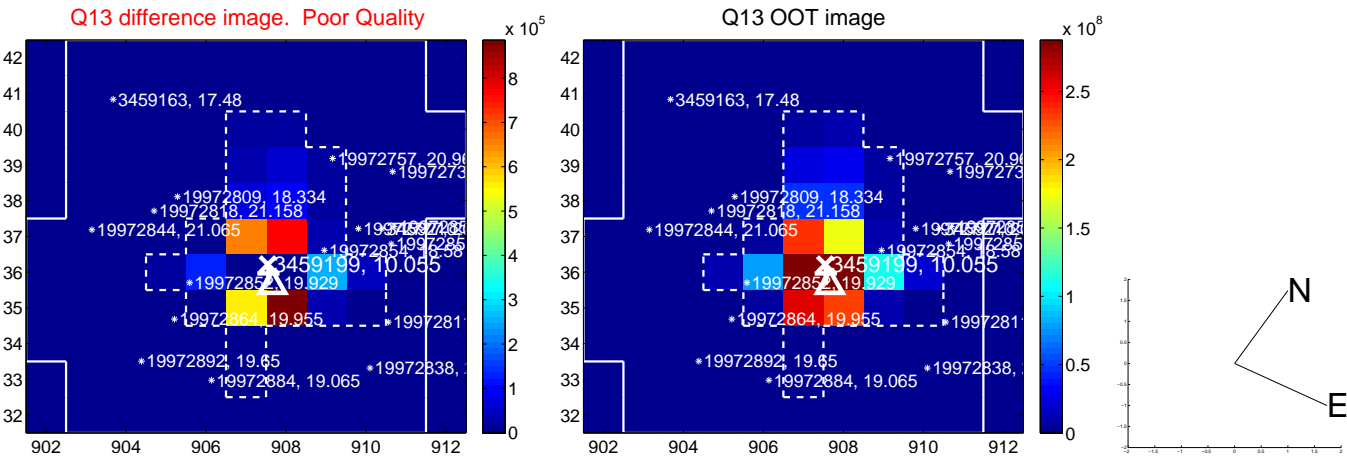
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



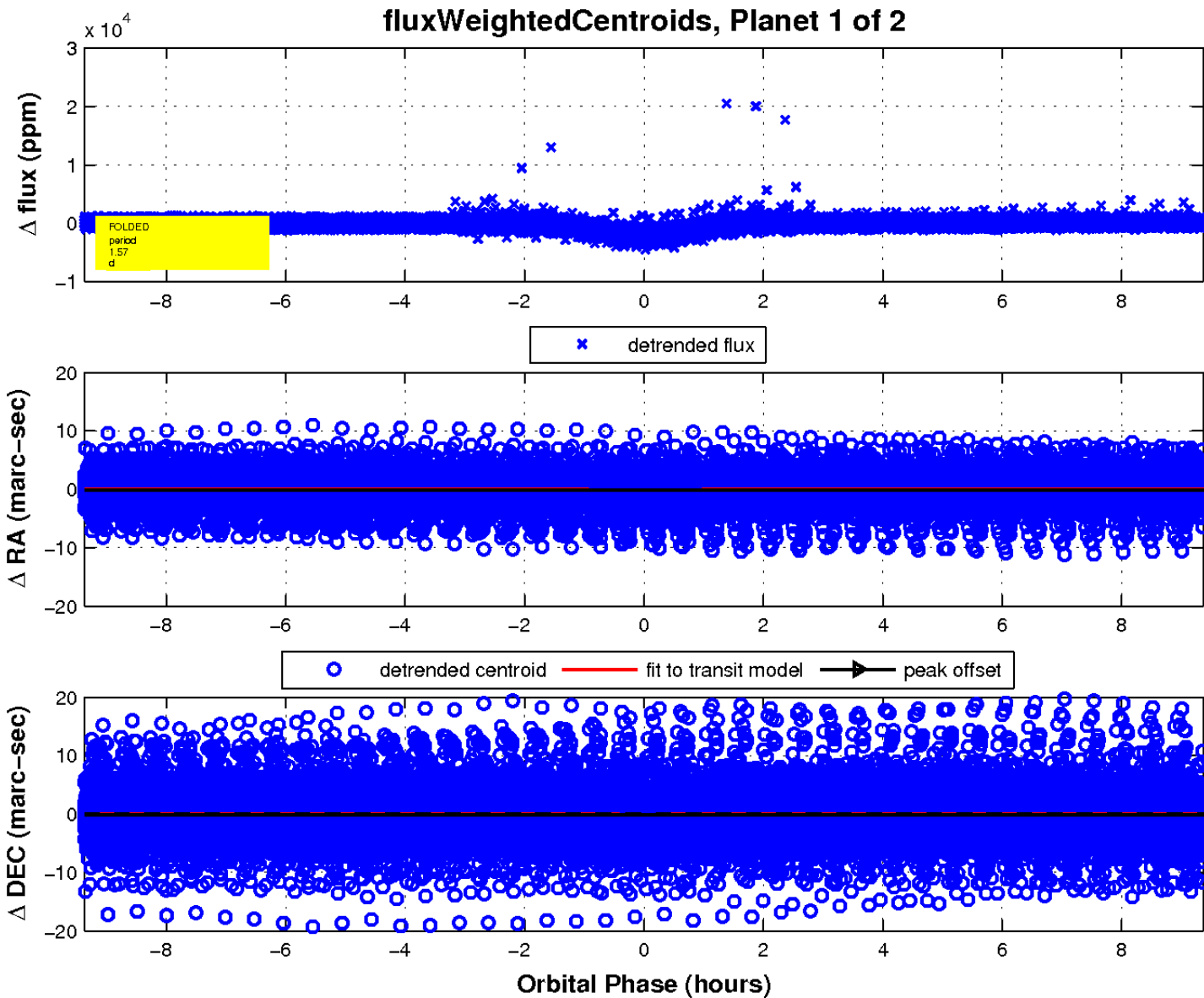
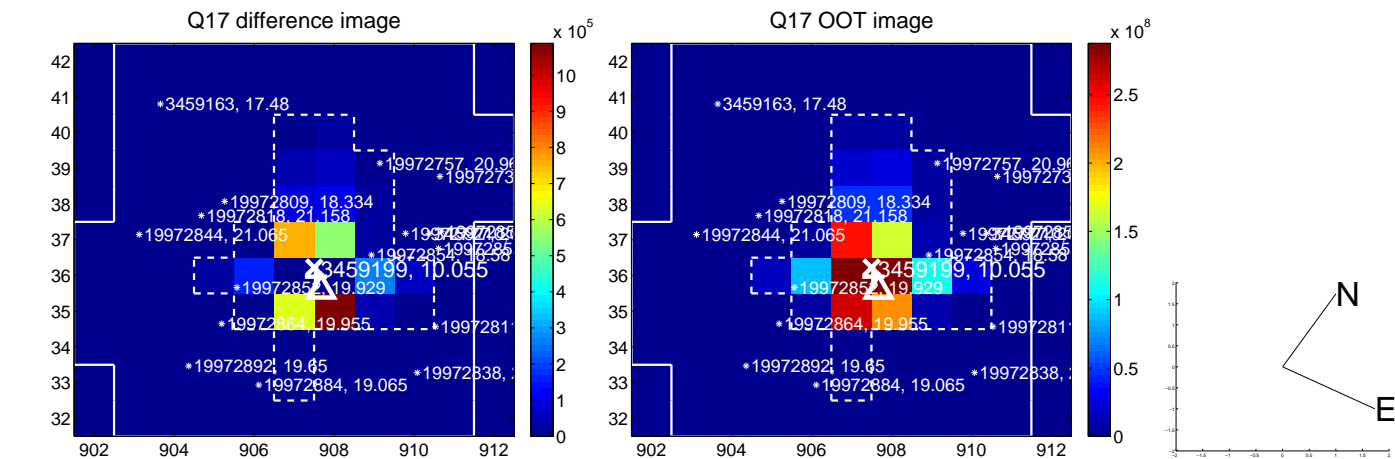
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



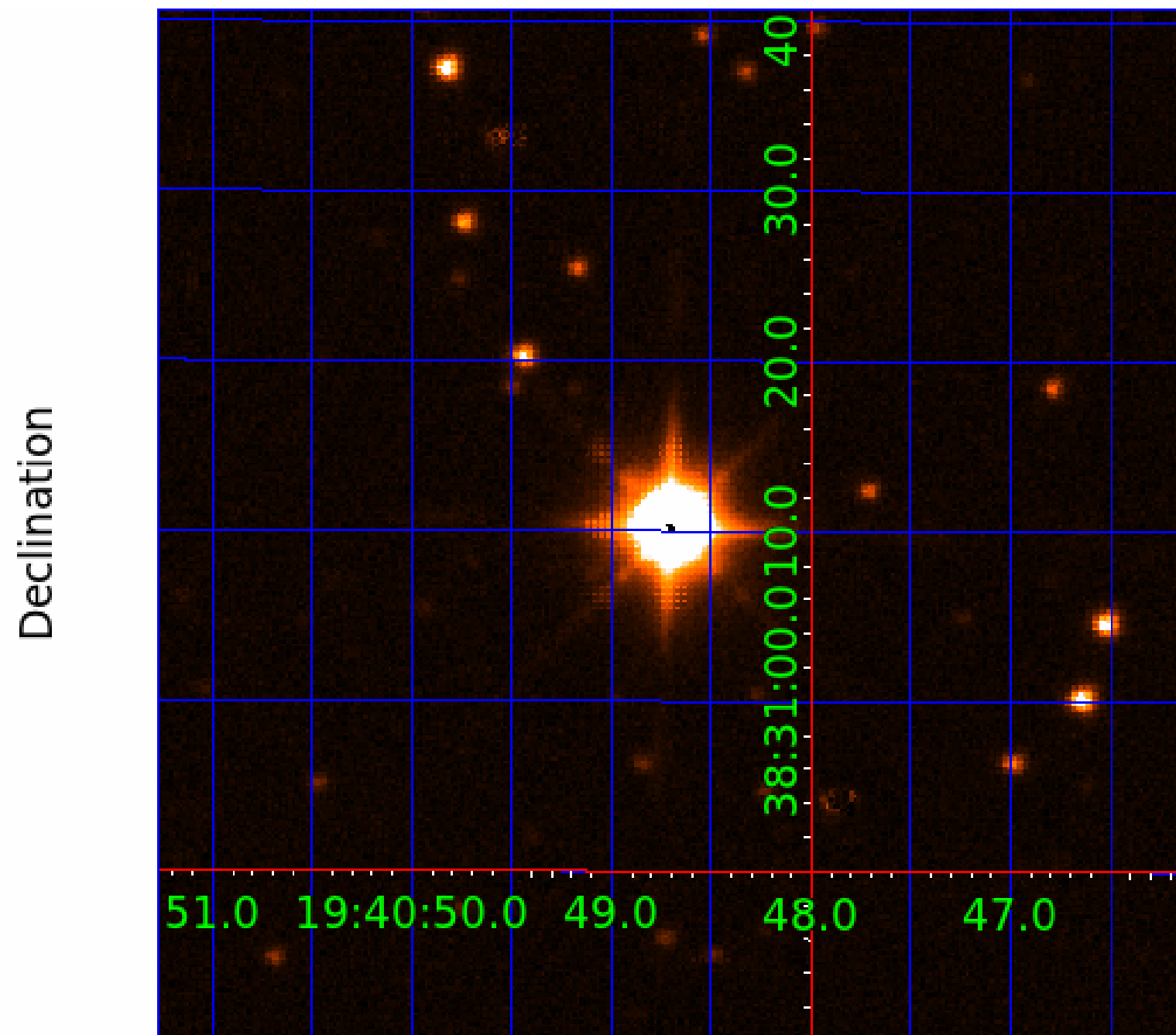
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 003459199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003459199-01	OBS	3725.01	1.570526	132.337747	2032.9	3.125	365.5	321.5	11.82	5314	85.82	0.00
003459199-02	OBS	No	383.159128	432.597776	1863.7	8.722	16.7	10.1	11.82	5314	55.37	44.17

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003459199-01	OBS	FP	0.00	0	1	0	0	PLANET_IN_STAR—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—CENT_SATURATED
003459199-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED

**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.

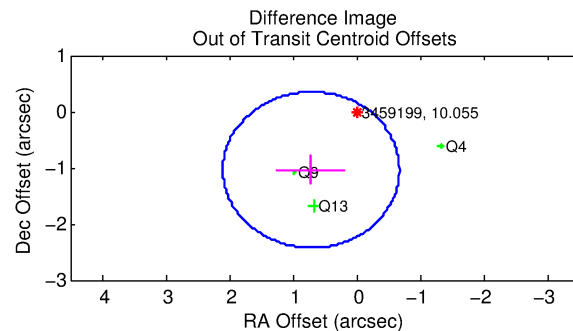
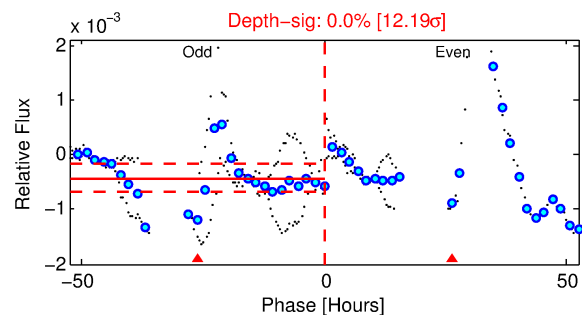
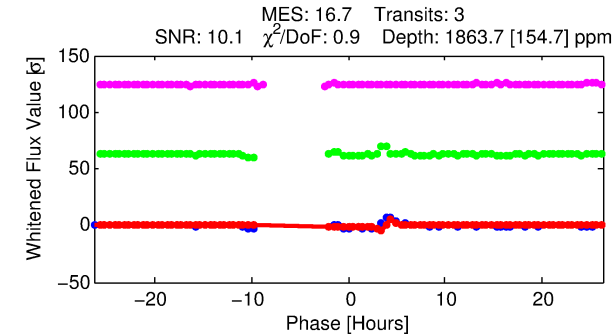
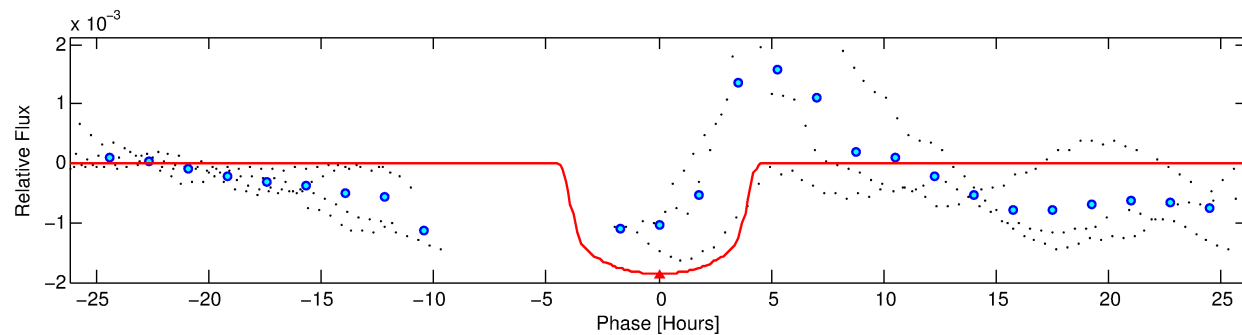
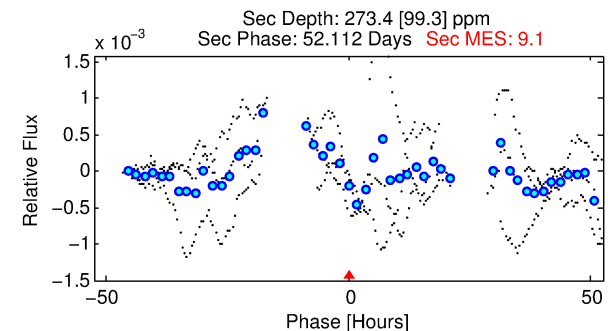
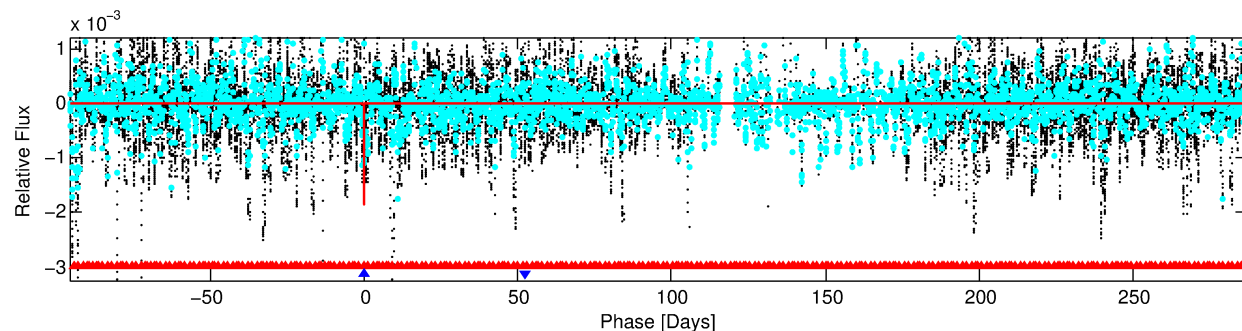
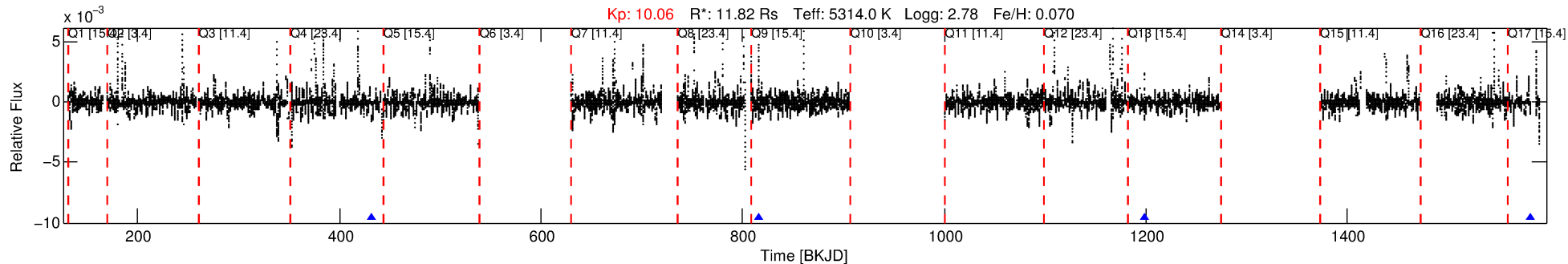
## Ephemeris Match Information For 003459199-02

No Significant Match Found

# DV One-Page Summary

KIC: 3459199 Candidate: 2 of 2 Period: 383.159 d  
KOI: K03725 Corr: No Ephemeris Match

Kp: 10.06 R\*: 11.82 Rs Teff: 5314.0 K Logg: 2.78 Fe/H: 0.070



## DV Fit Results:

Period = 383.15913 [0.00151] d  
Epoch = 432.5978 [0.0154] BKJD  
Rp/R\* = 0.0429 [0.0031]  
a/R\* = 245.33 [64.85]  
b = 0.74 [0.11]  
Seff = 44.17 [24.05]  
Teq = 657 [89] K  
Rp = 55.37 [22.50] Re  
a = 1.5032 [0.5327] AU  
Ag = 110.86 [73.66] [1.49σ]  
Teffp = 3298 [330] K [7.72σ]

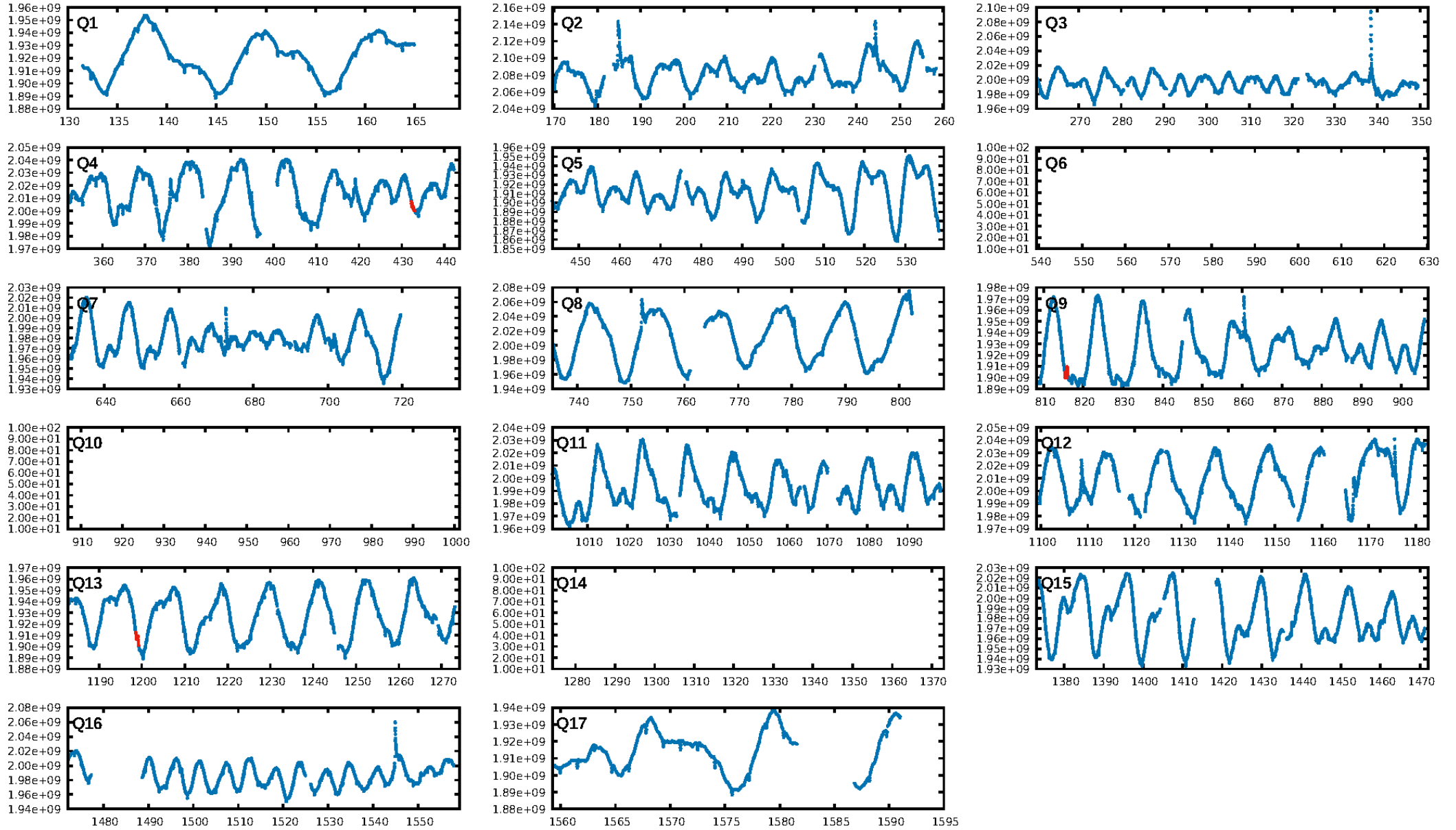
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [988.52σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.89e-14  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 27.5%  
Centroid-so: 0.103 arcsec [0.45σ]  
OotOffset-rm: 1.260 arcsec [2.72σ]  
KicOffset-rm: 2.250 arcsec [3.33σ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]

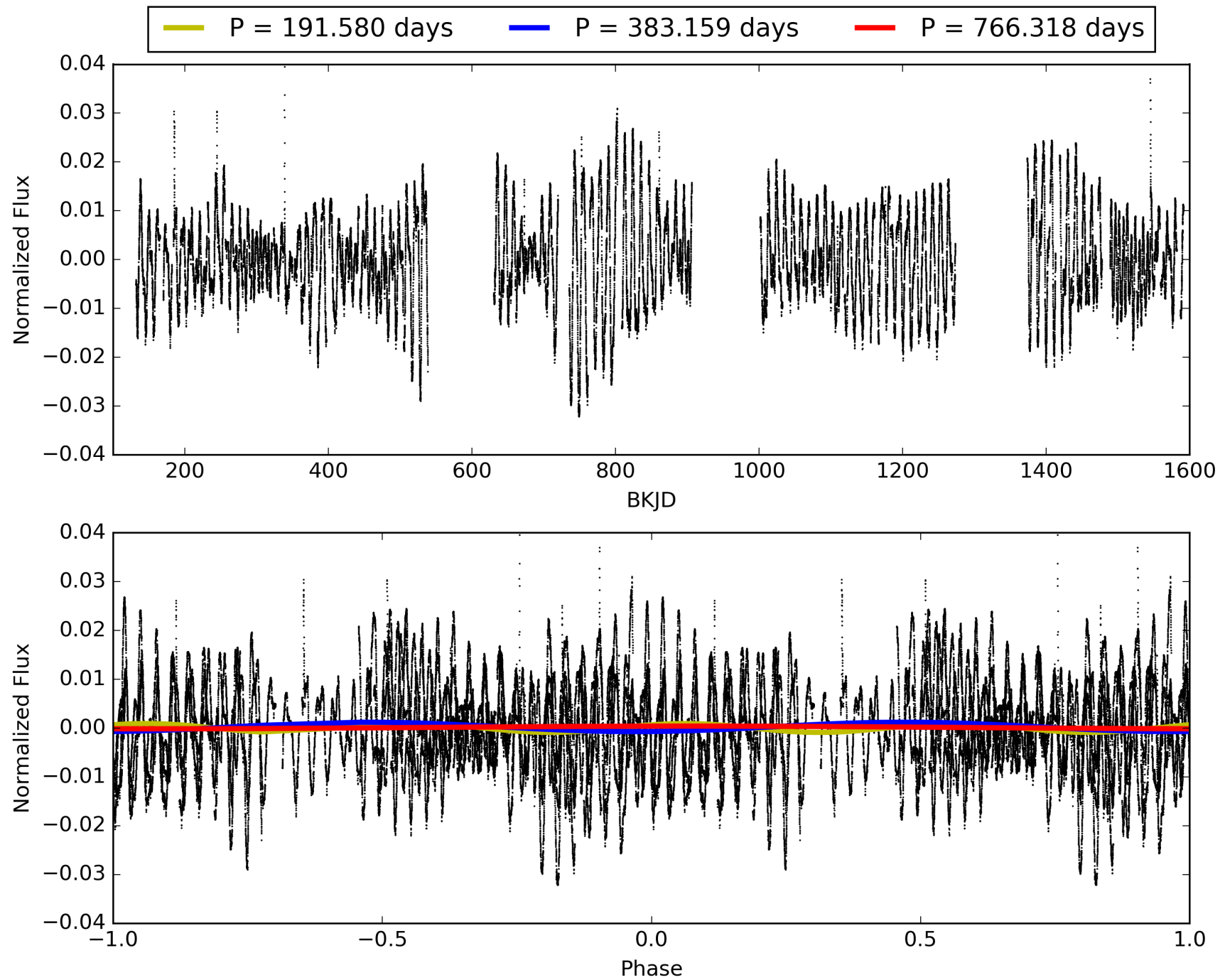
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:35:04 Z

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

# TCE 003459199-02, PDC Light Curves

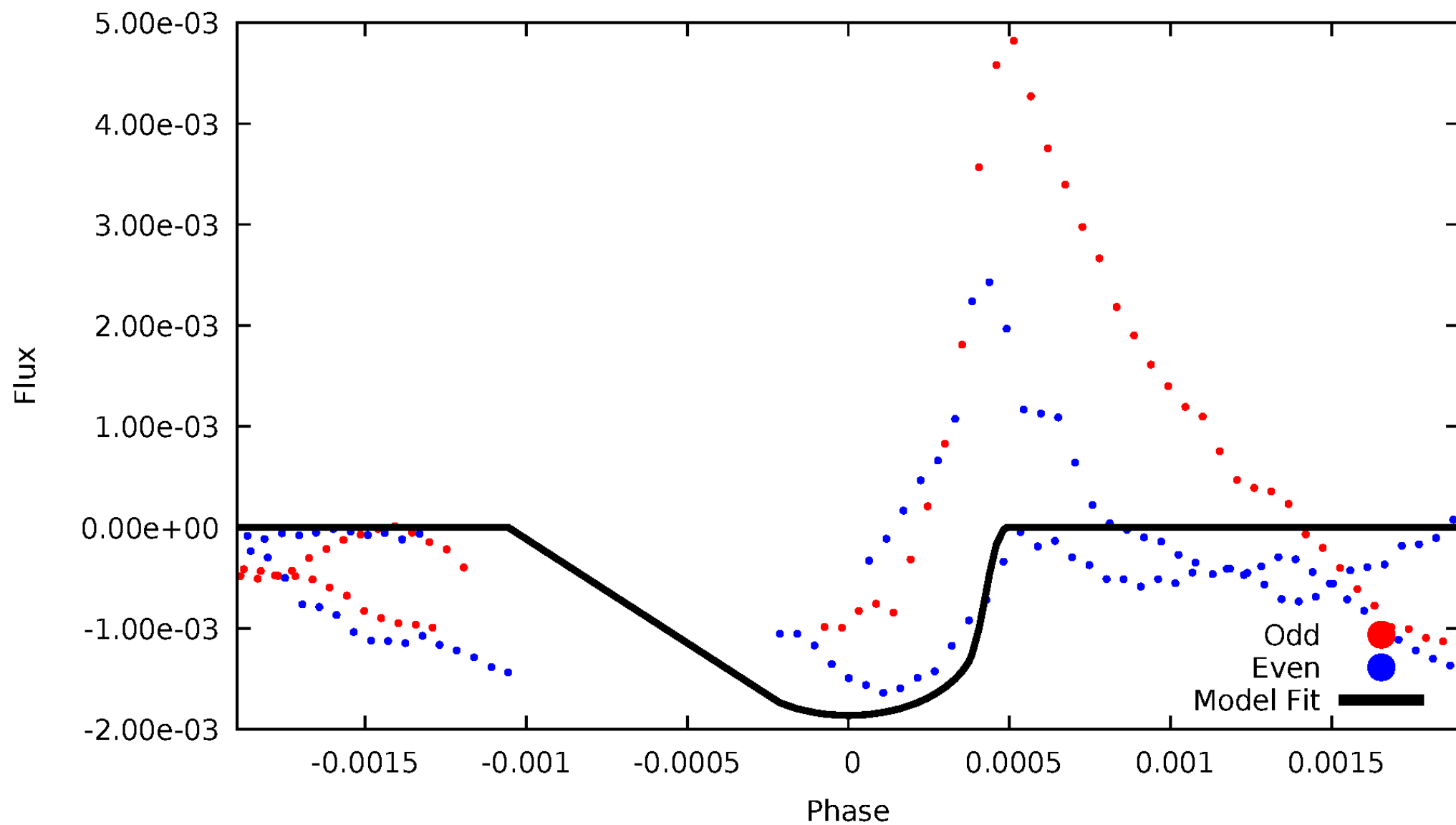


TCE 003459199-02



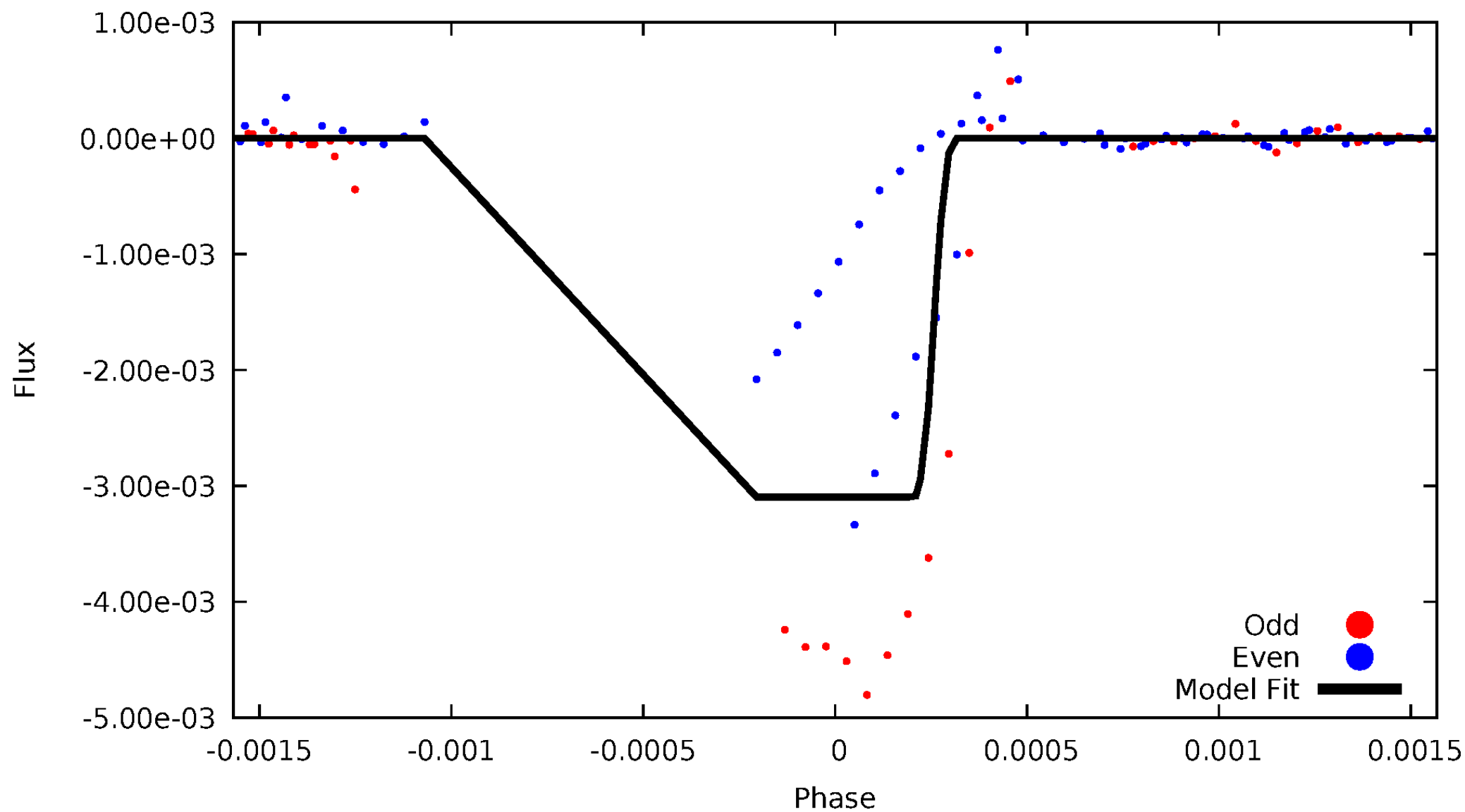
# DV Odd/Even

TCE 003459199-02



# ALT Odd/Even

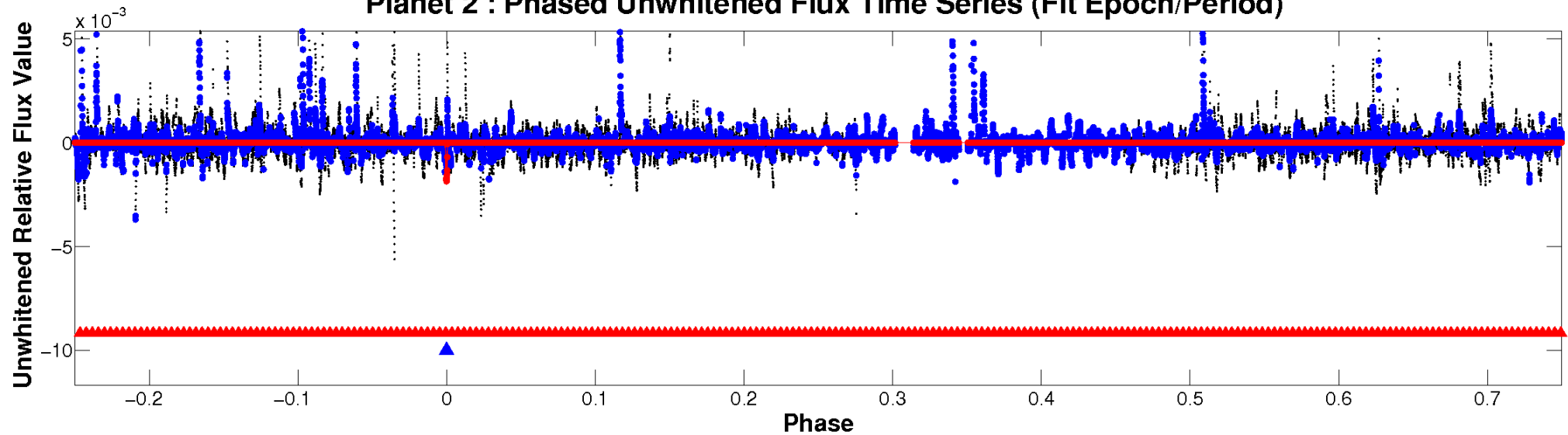
TCE 003459199-02



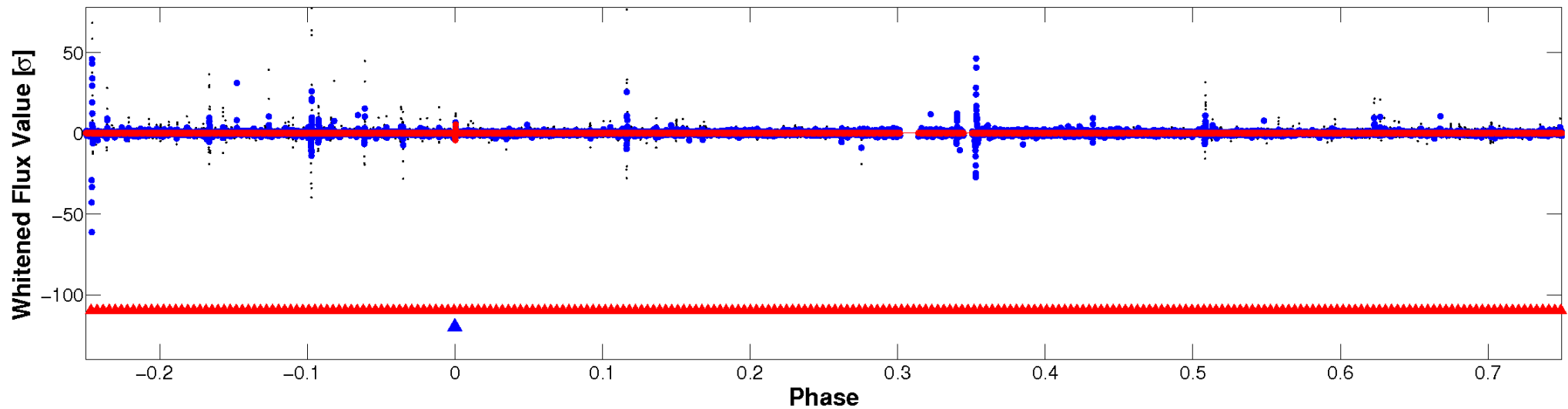


# Non-Whitened Vs. Whitened Light Curve

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

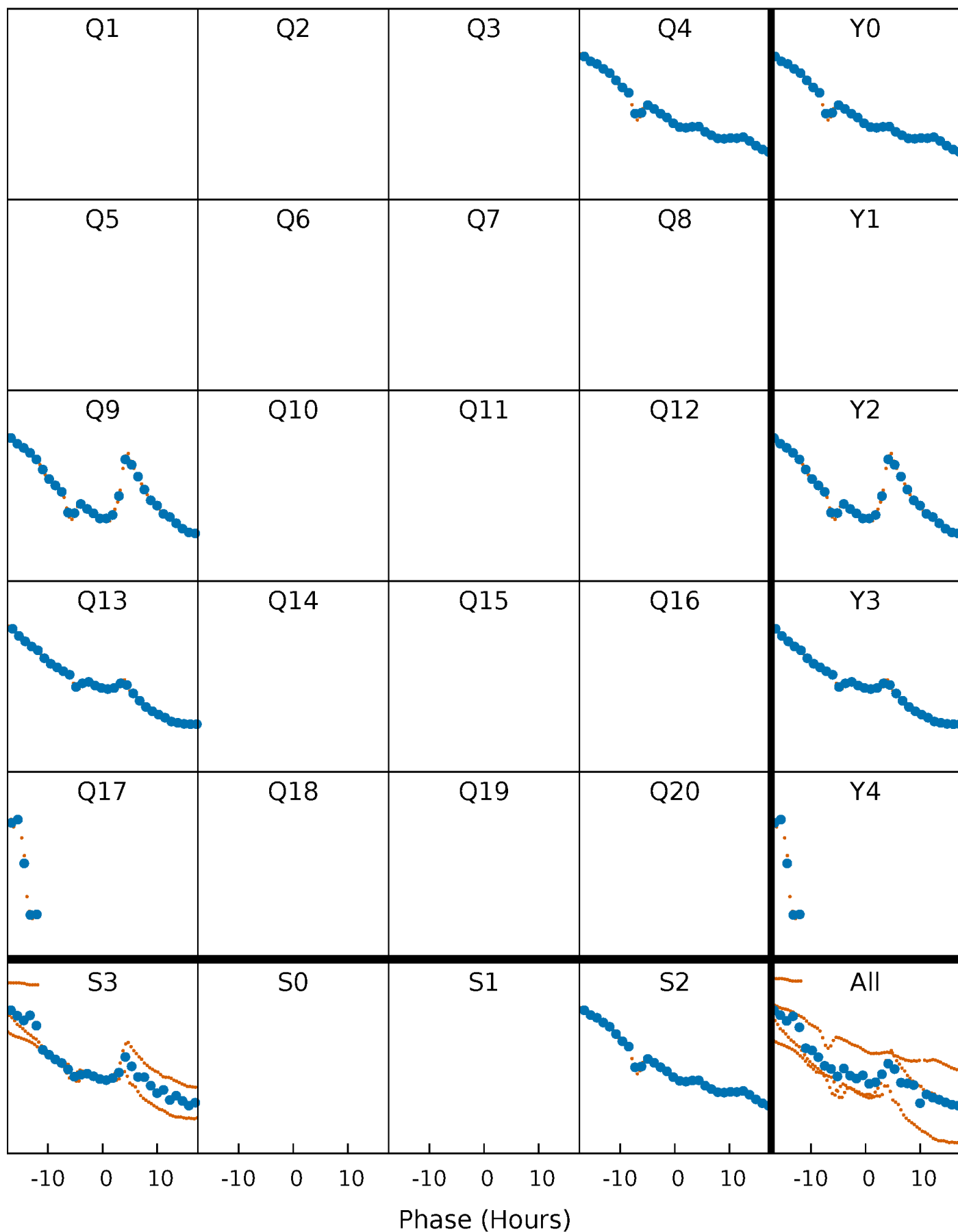


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



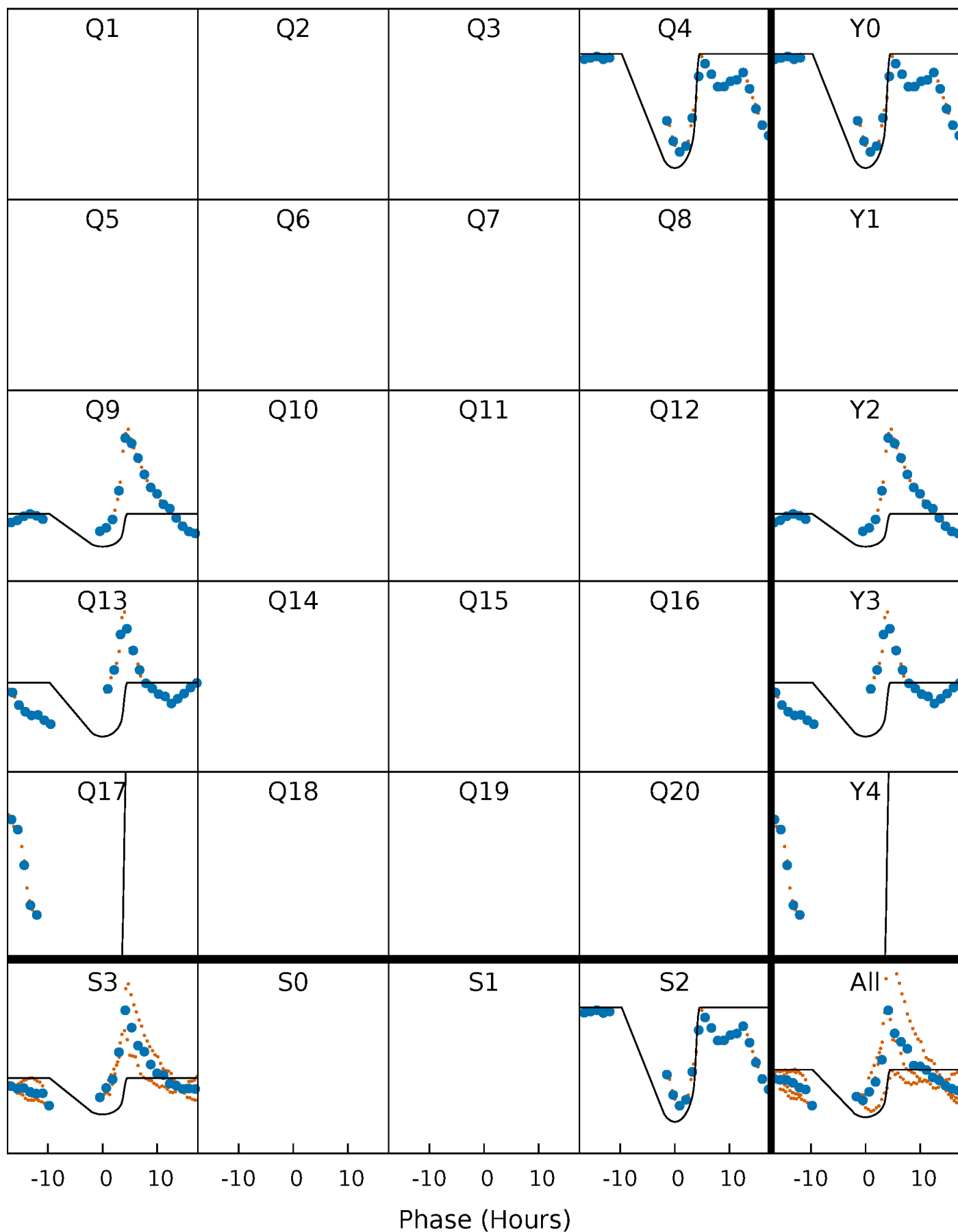
# PDC Quarter-Phased Transit Curves

TCE 003459199-02     $P=383.159128$  Days     $T_0=432.597776$  (BKJD)



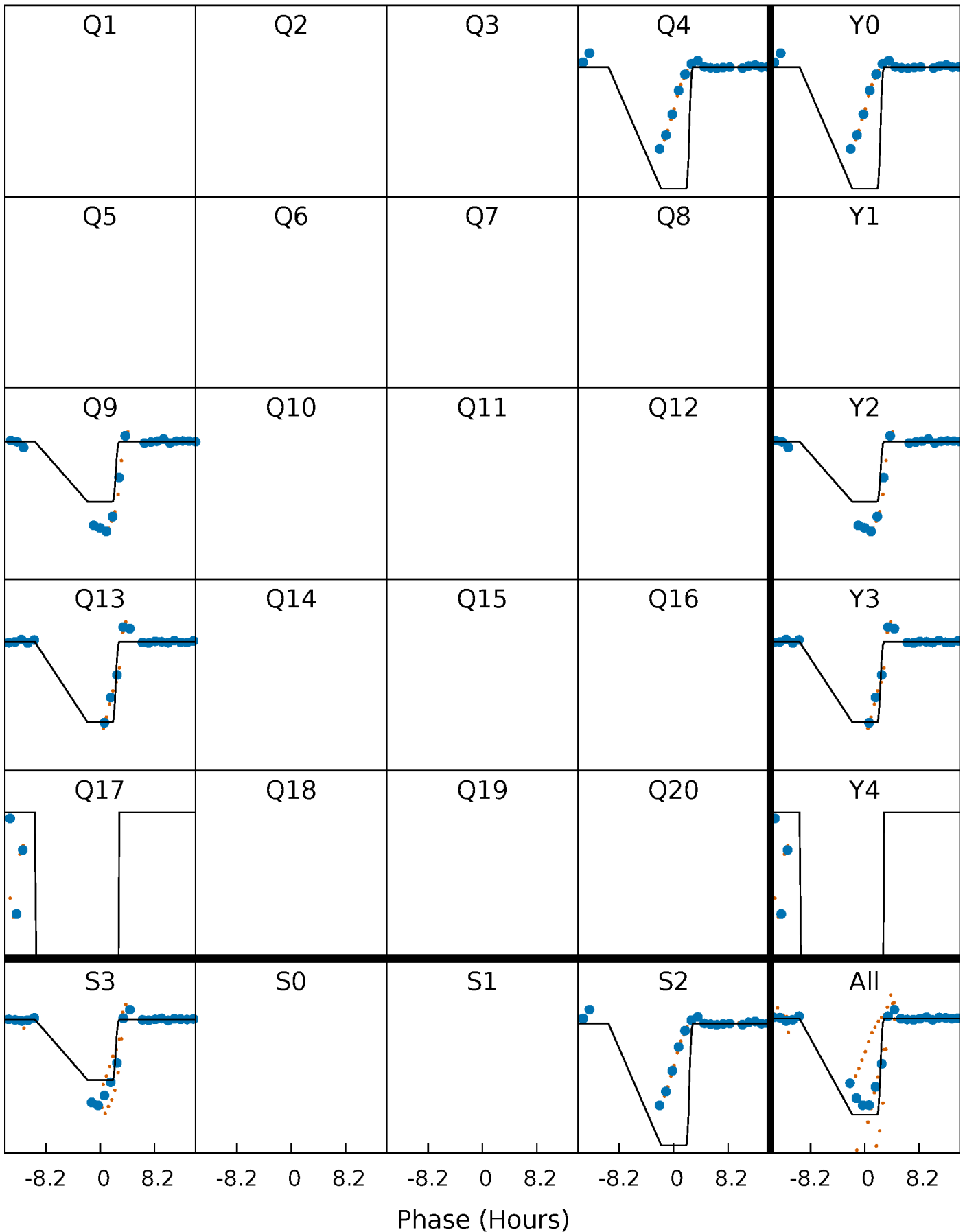
# DV Quarter-Phased Transit Curves

TCE 003459199-02     $P=383.159128$  Days     $T_0=432.597776$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

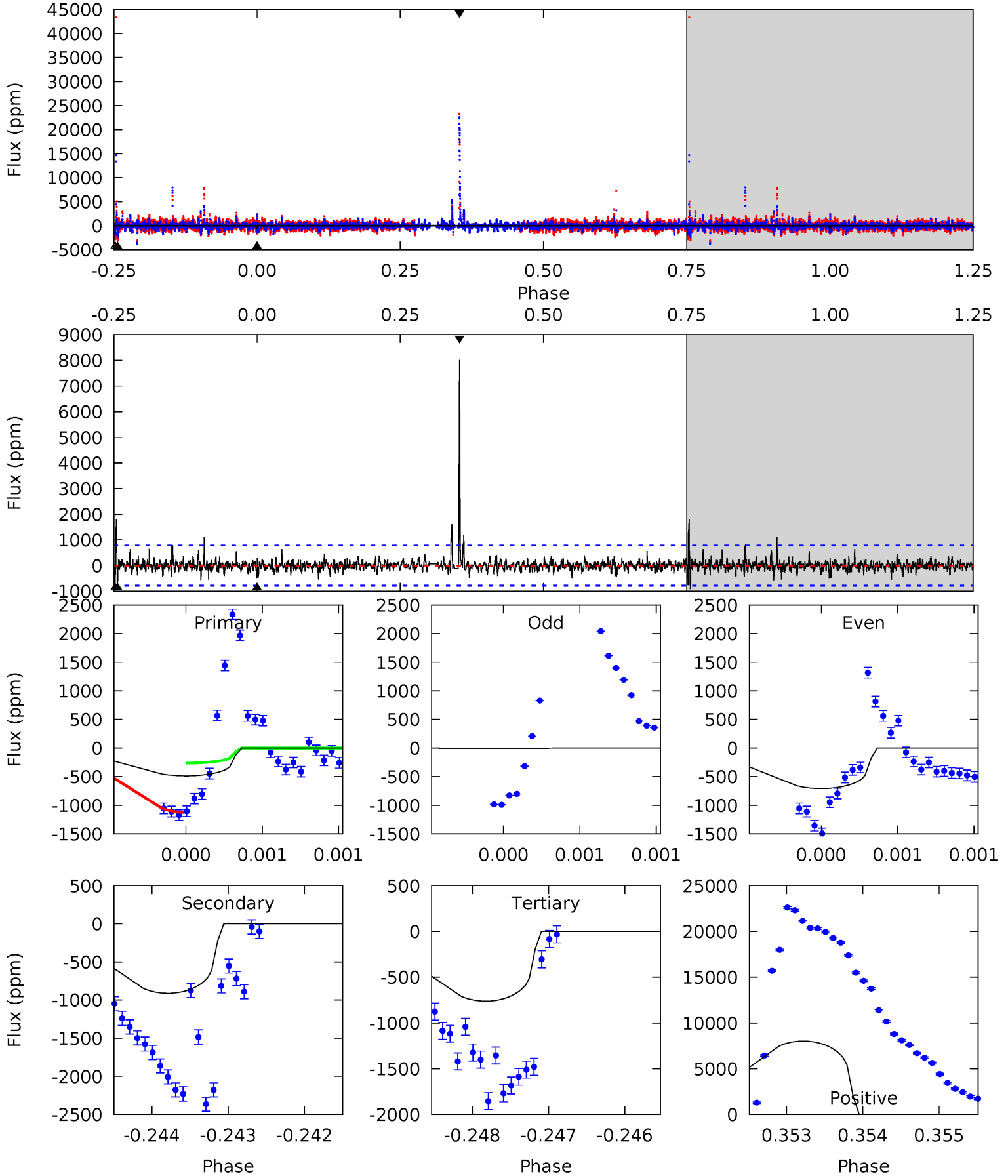
TCE 003459199-02     $P=383.142872$  Days     $T_0=432.635724$  (BKJD)



# DV Model-Shift Uniqueness Test

003459199-02, P = 383.159128 Days, E = 49.438648 Days

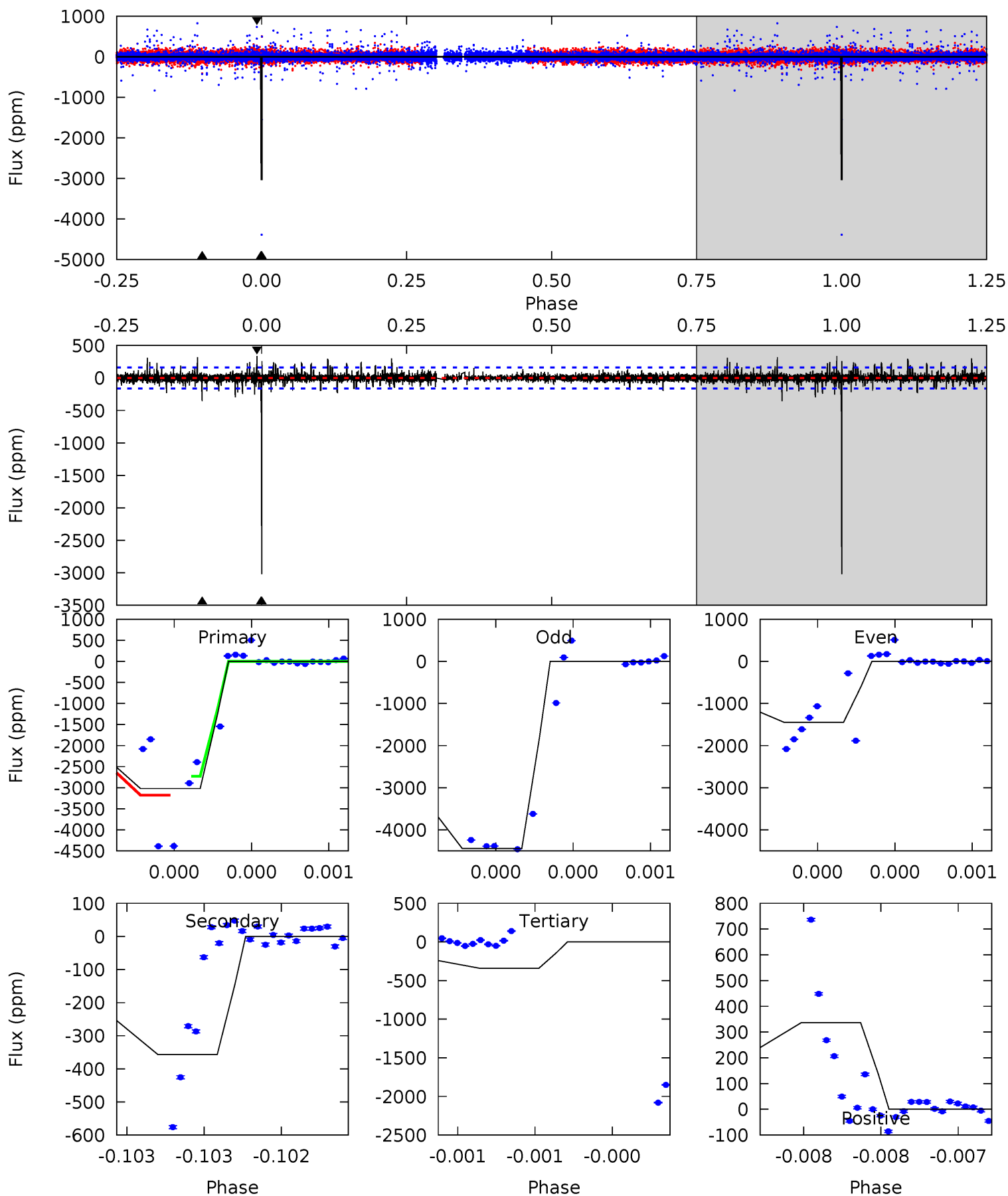
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.44	6.43	5.38	56.6	5.52	3.40	1.64	-1.94	-53.2	1.05	-50.2	2.09	34.6	0.90	2.45



# Alt Model-Shift Uniqueness Test

003459199-02, P = 383.142872 Days, E = 49.492852 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
103.8	12.3	11.7	11.6	5.58	3.50	1.11	92.2	92.3	0.56	0.70	60.4	1.02	0.10	7.53





### Stellar Parameters For KIC 003459199

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5314^{+95}_{-116}$	$2.782^{+0.304}_{-0.076}$	$0.070^{+0.150}_{-0.350}$	$11.820^{+1.477}_{-4.728}$	$3.083^{+0.185}_{-0.694}$	$0.003^{+0.005}_{-0.001}$
	+2%/-2%	+11%/-3%	+214%/-500%	+12%/-40%	+6%/-23%	+205%/-25%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003459199-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-911 \pm 142$	$52.76^{+7.62}_{-10.98}$	$903^{+41}_{-79}$	$4585^{+209}_{-209}$	$405^{+204}_{-103}$
Alt.	$-356 \pm 29$	$68.89^{+8.08}_{-12.65}$	$901^{+46}_{-79}$	$3532^{+97}_{-92}$	$93^{+41}_{-19}$

$T_{max}$  = 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

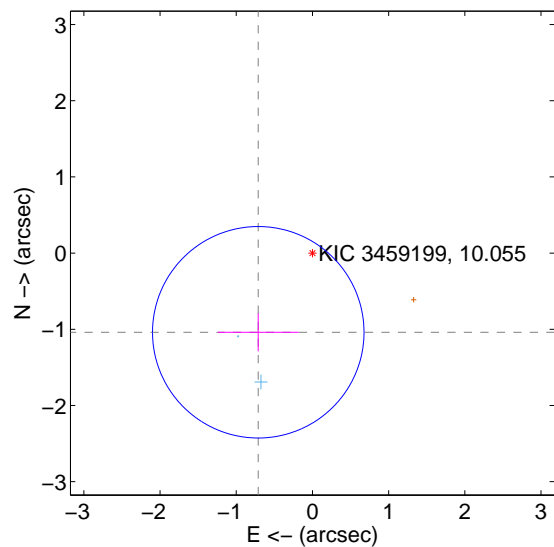
Supplemental centroid analysis for 003459199-02. **Kepler magnitude: 10.05.** Transit SNR 10.05

**There are 2 quarters with good PRF difference image offsets**

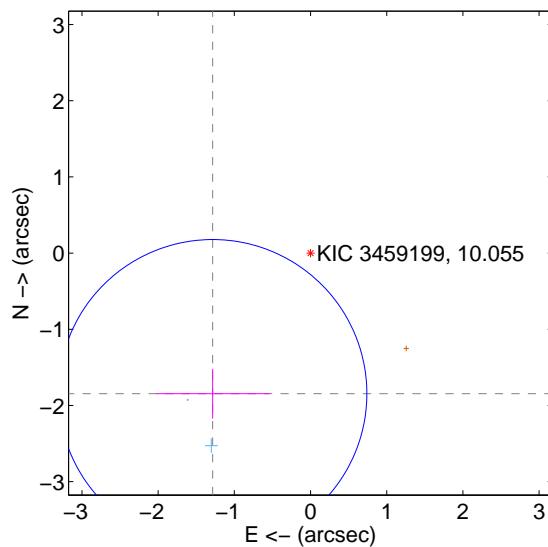
The direct PRF centroid is offset from the target star catalog position by about 1.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.260 \pm 0.463$	2.72	$0.711 \pm 0.531$	$-1.040 \pm 0.250$
PRF-fit source offset from KIC position	<b><math>2.250 \pm 0.675</math></b>	<b>3.33</b>	$1.285 \pm 0.744$	$-1.847 \pm 0.327$
photometric centroid source offset	$0.10 \pm 0.23$	0.45	$-0.01 \pm 0.14$	$-0.10 \pm 0.23$

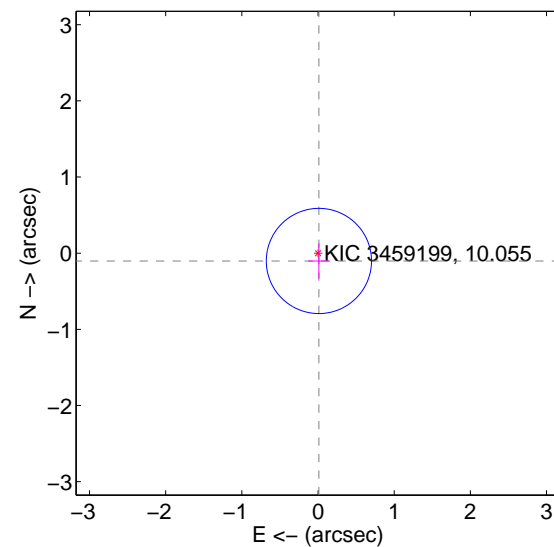
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

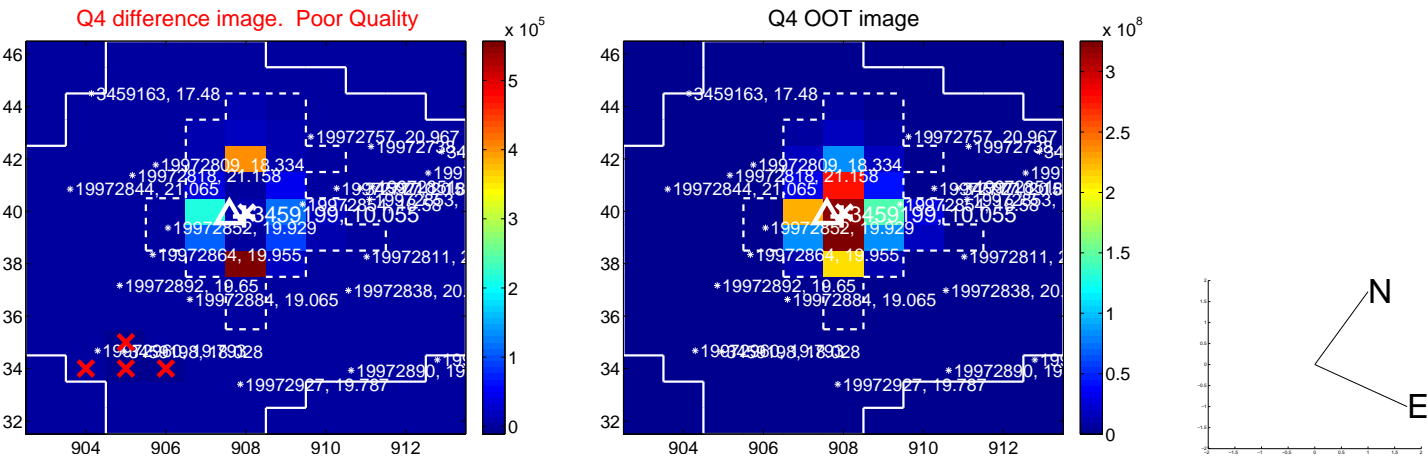


offset from photometric centroids



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.

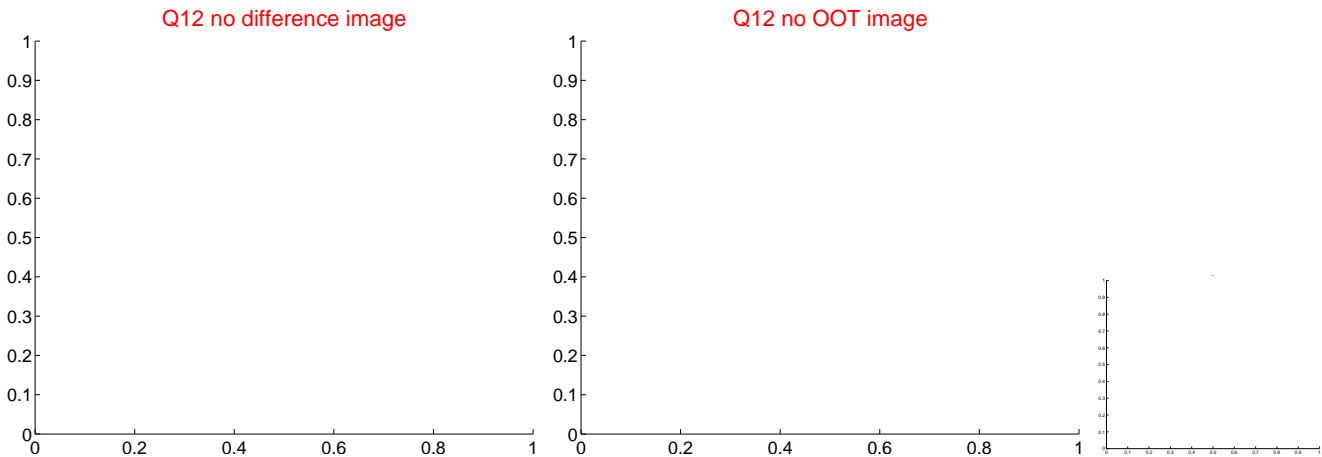
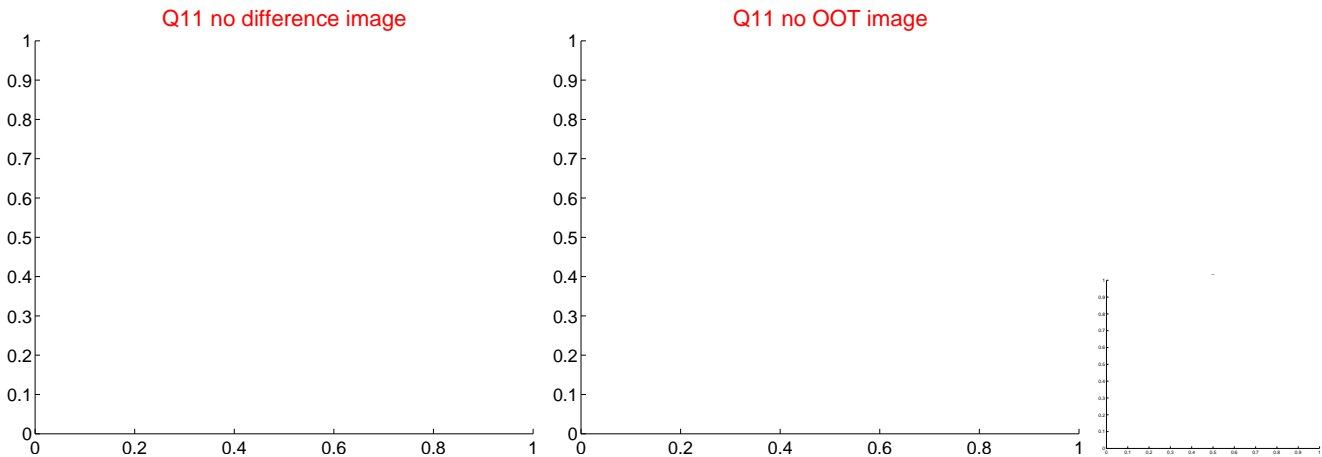
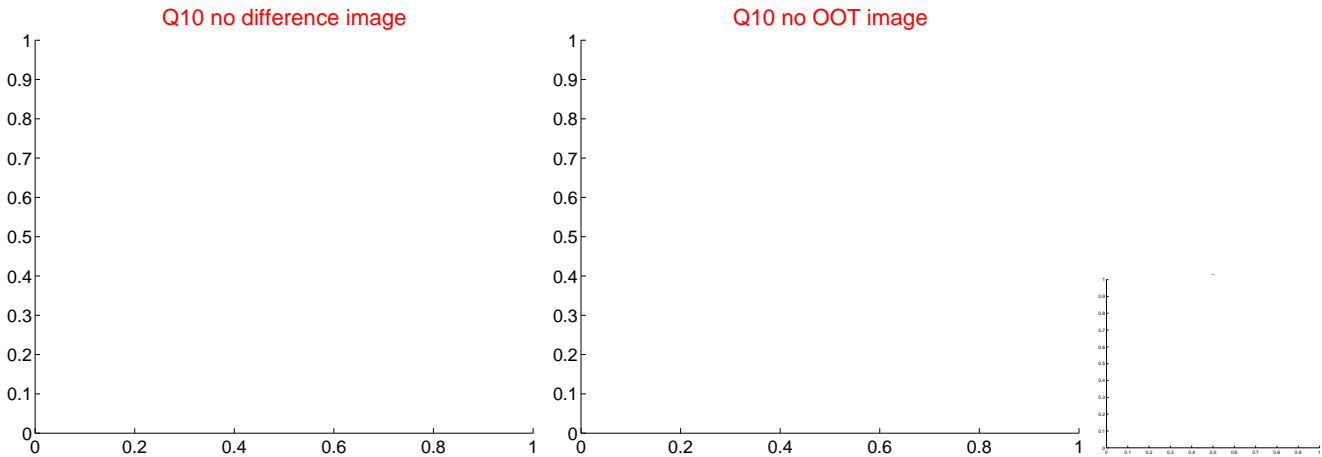
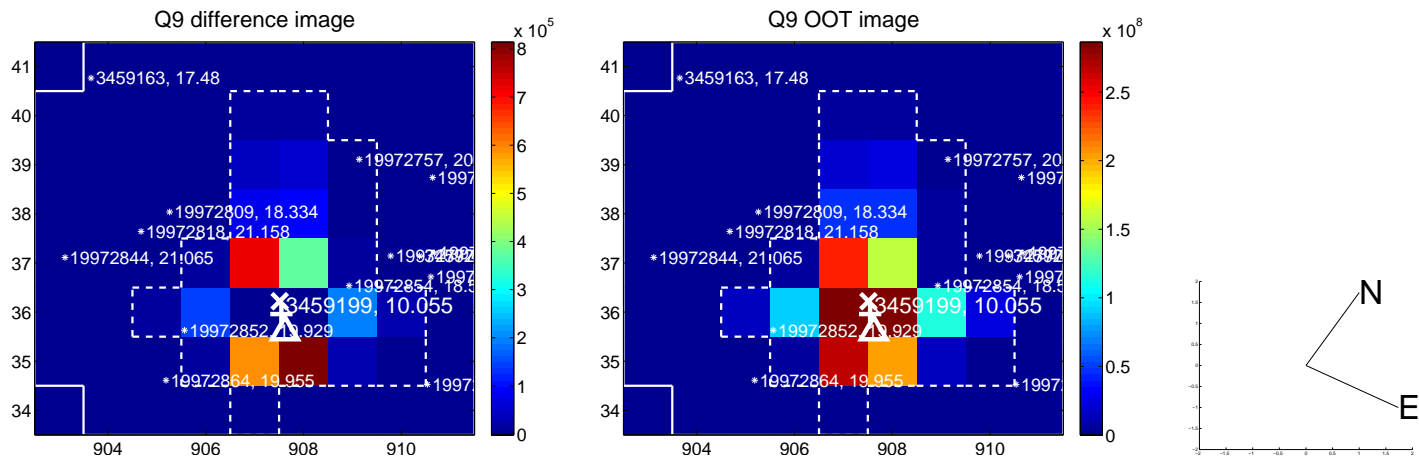
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



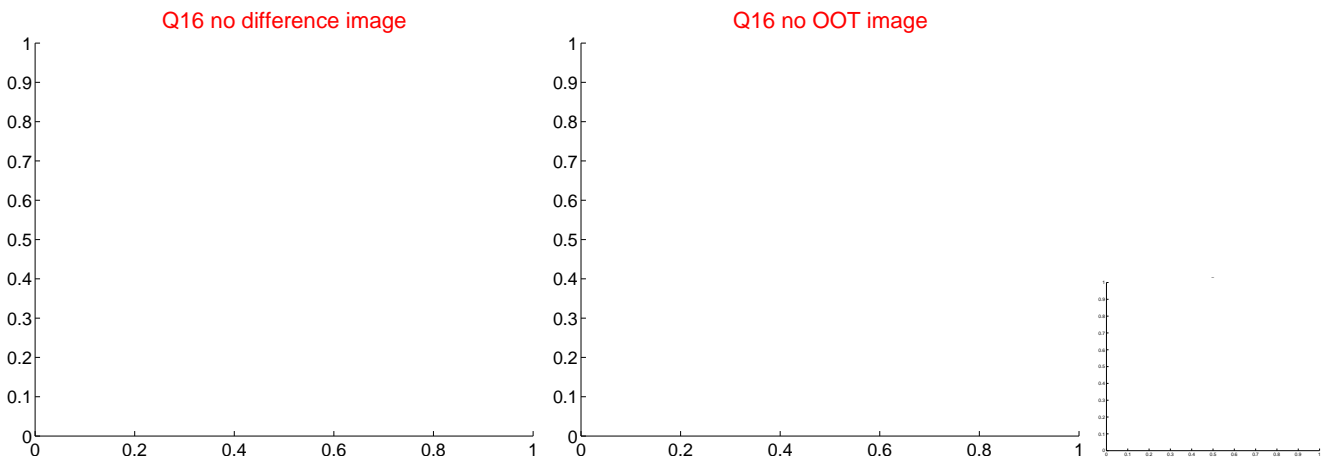
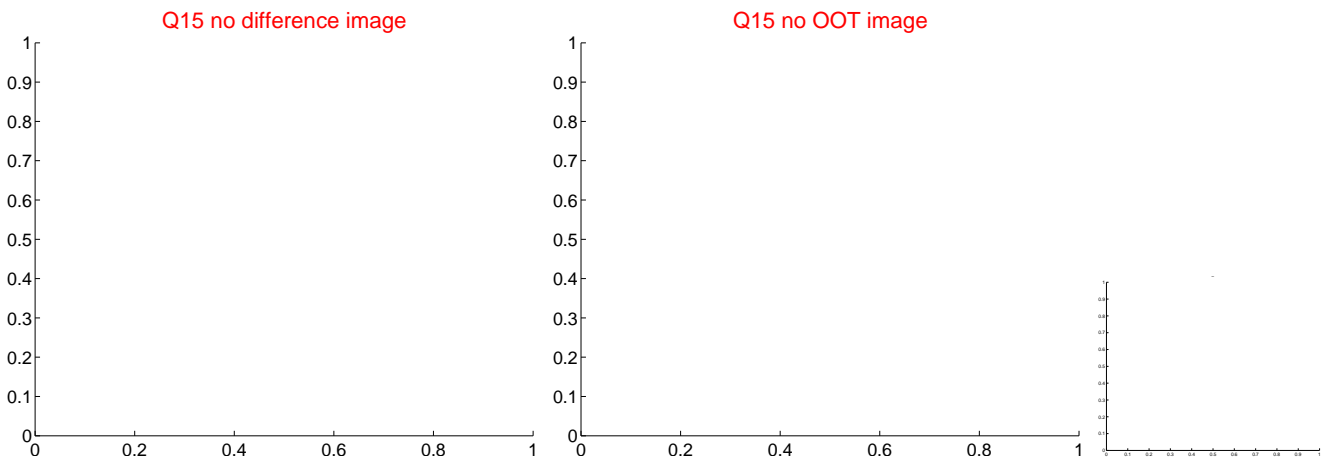
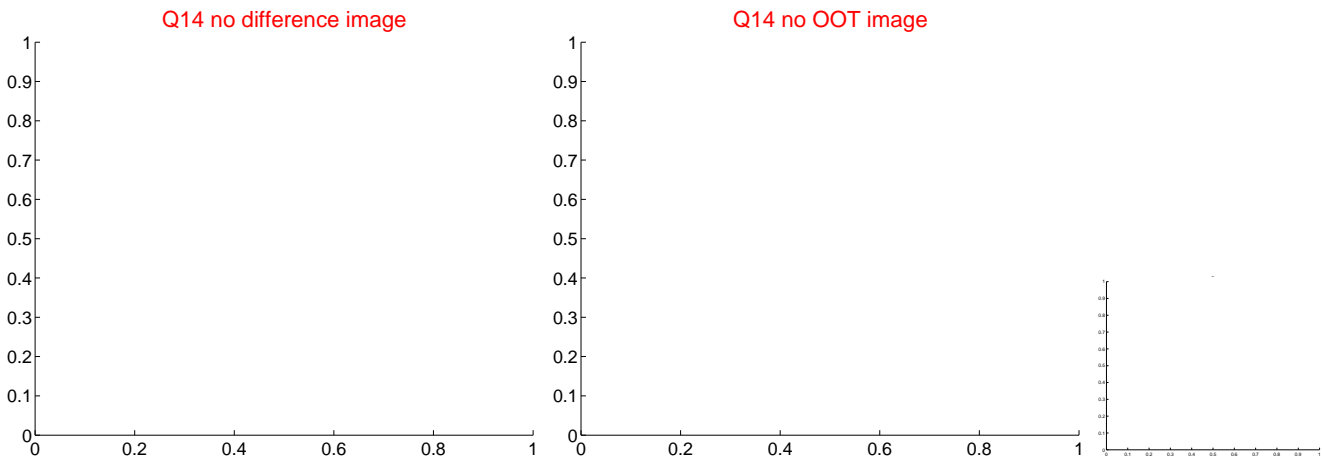
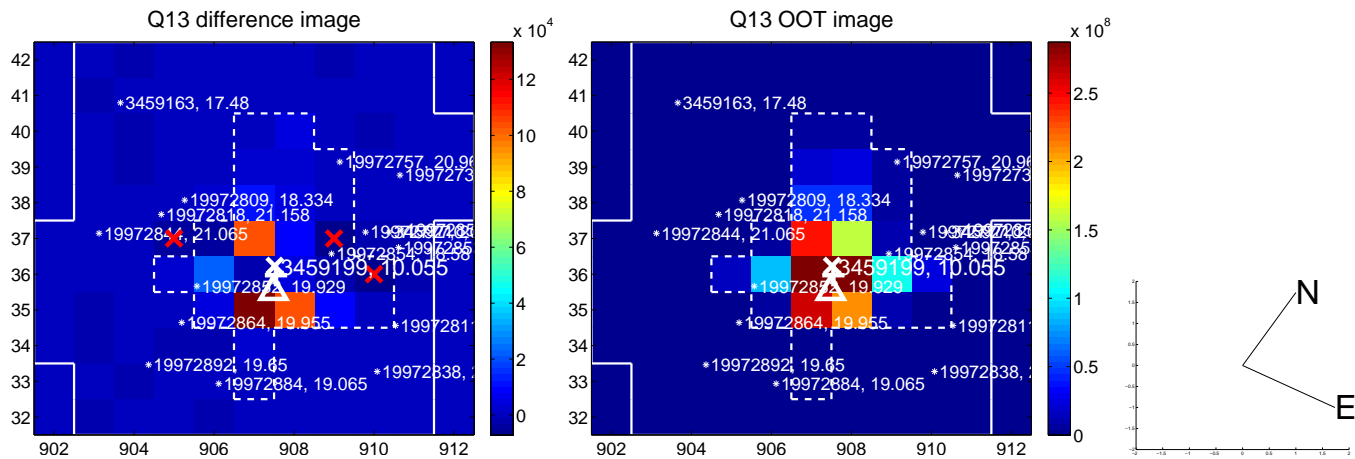
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



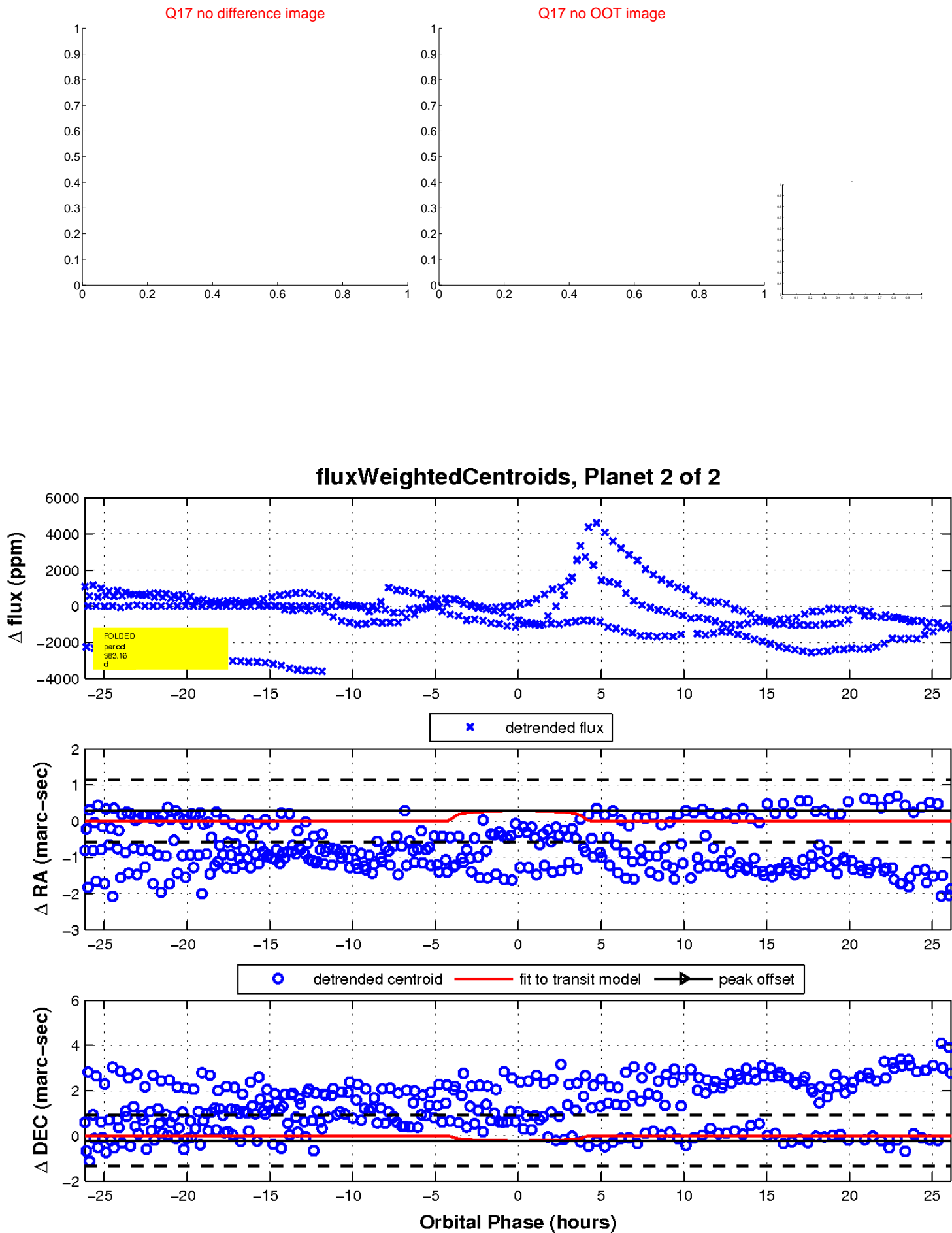
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

