

# KIC 009899193

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009899193-01	OBS	7244.01	1.332555	132.055627	26.9	4.996	10.7	10.3	1.68	6600	0.99	7795.94
009899193-02	OBS	No	357.617755	139.188060	179.5	8.811	11.6	3.0	1.68	6600	2.41	4.50
009899193-04	OBS	No	274.200911	283.381188	476.2	12.026	9.9	6.4	1.68	6600	4.32	6.42
009899193-05	OBS	No	268.456836	313.652382	363.0	5.741	8.8	5.9	1.68	6600	3.45	6.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009899193-01	OBS	FP	0.00	0	0	1	1	HALO_GHOST—EPHEM_MATCH
009899193-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009899193-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009899193-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—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.

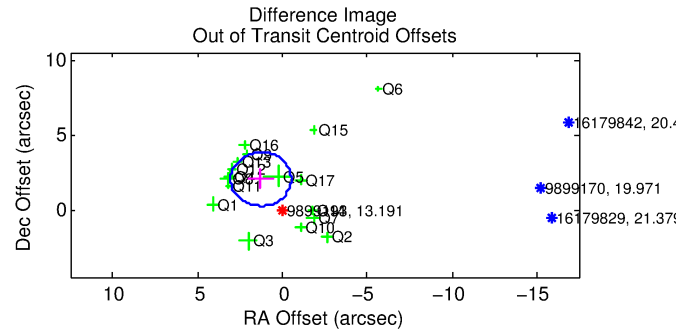
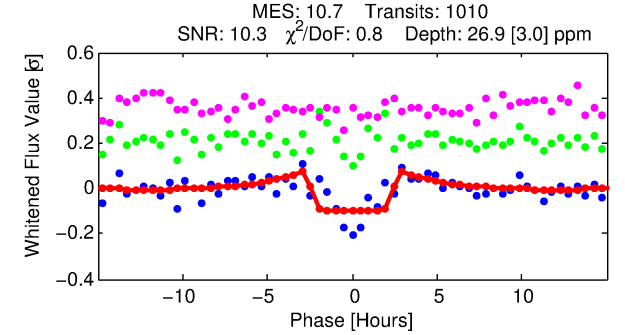
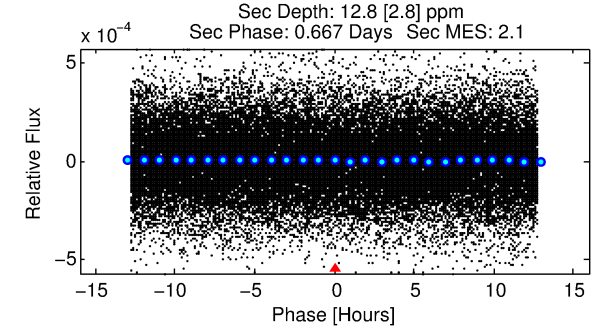
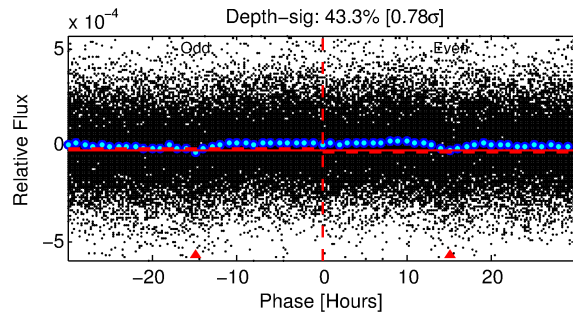
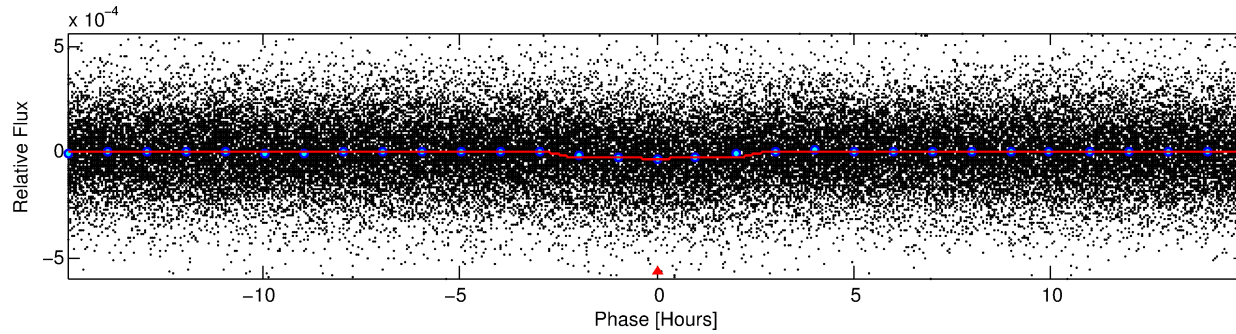
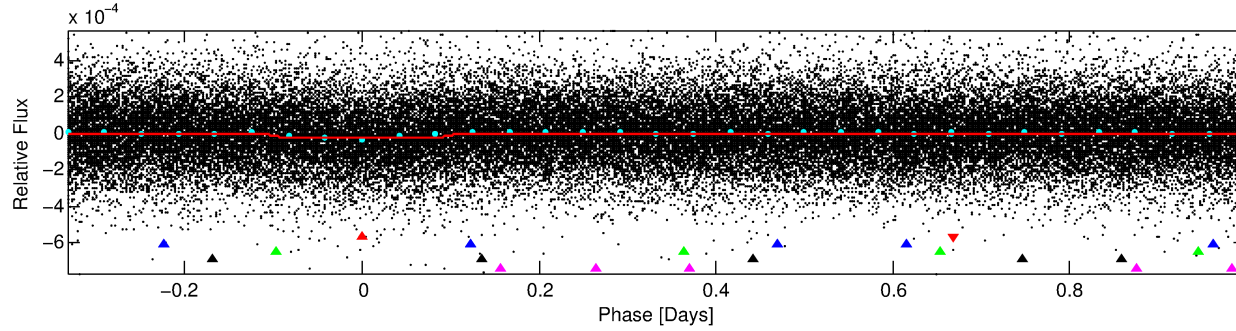
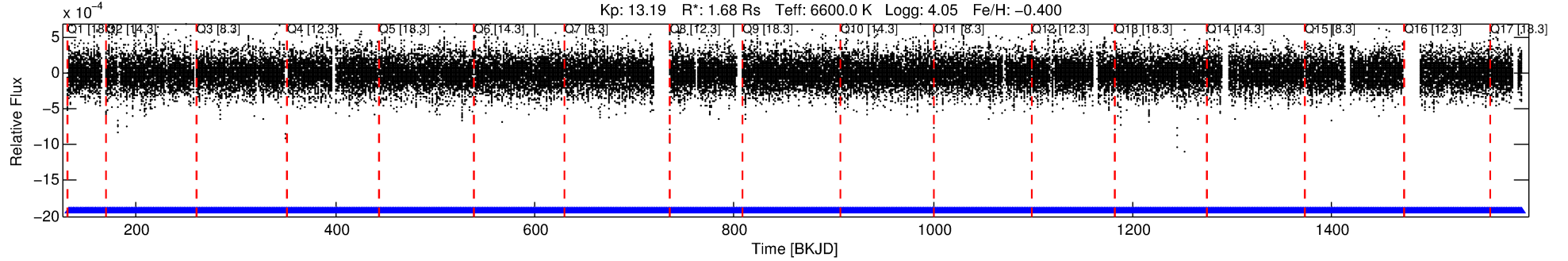
## Ephemeris Match Information For 009899193-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009899193-01	9899193	BR-Cyg-pri	9899416	1:1	250.7	61	15	10.03	13.19	24773.00	Direct-PRF	0	0.56	0.41

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 9899193 Candidate: 1 of 5 Period: 1.333 d  
KOI: K07244.01 Corr: 0.842



## DV Fit Results:

Period = 1.33255 [0.00001] d  
Epoch = 132.0556 [0.0031] BKJD  
Rp/R\* = 0.0054 [0.0014]  
a/R\* = 1.41 [1.03]  
b = 0.85 [0.46]  
Seff = 7795.94 [3233.83]  
Teq = 2396 [248] K  
Rp = 0.99 [0.36] Re  
a = 0.0248 [0.0062] AU  
Ag = 4.47 [3.06] [1.13 $\sigma$ ]  
Teffp = 5386 [762] K [3.73 $\sigma$ ]

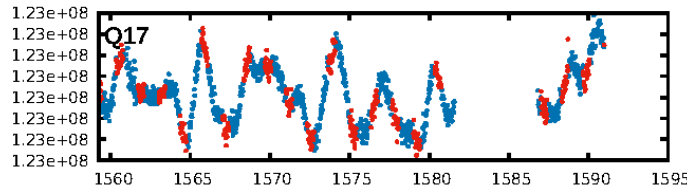
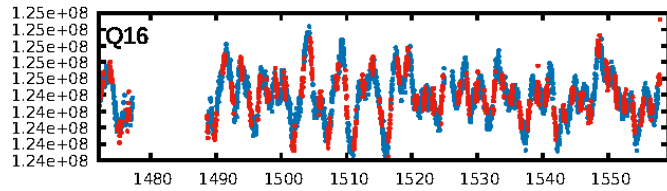
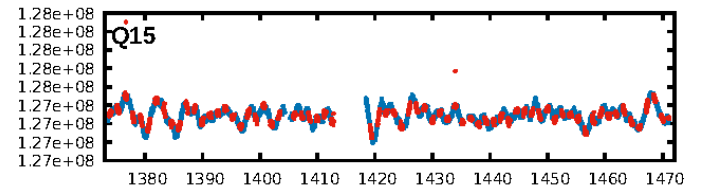
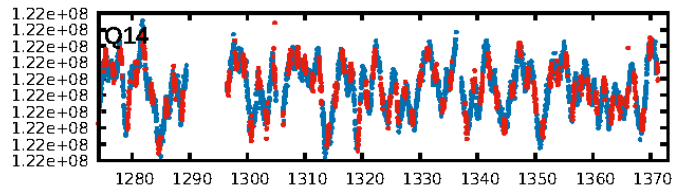
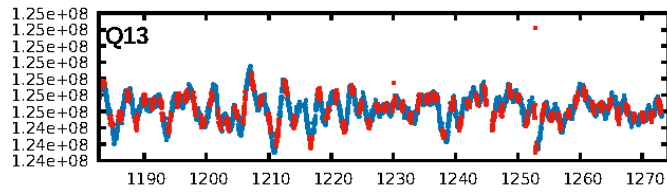
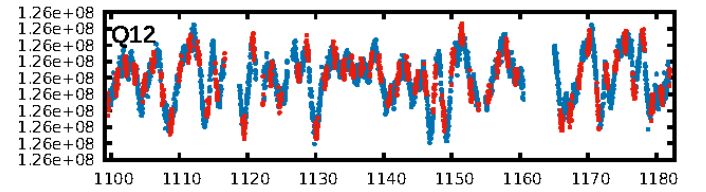
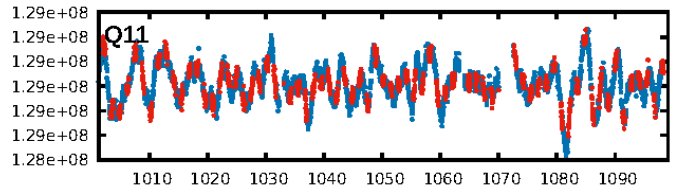
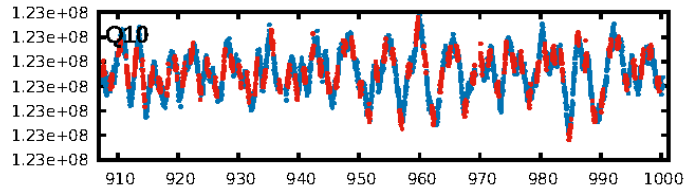
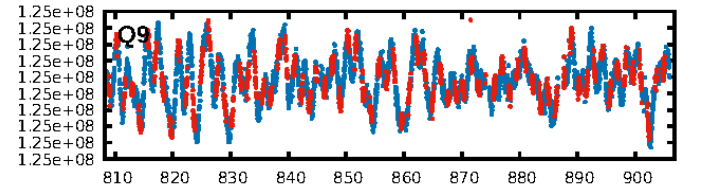
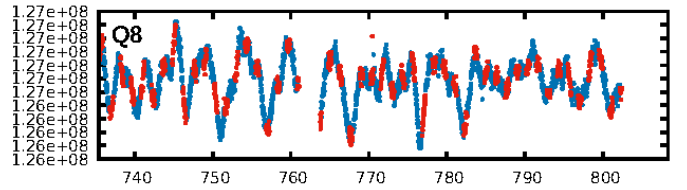
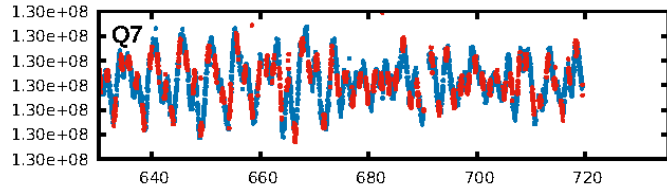
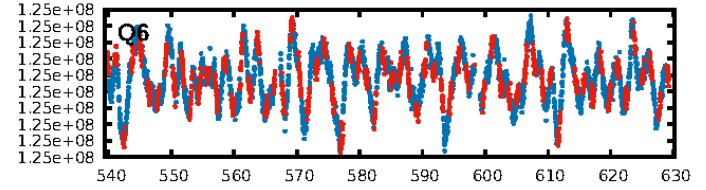
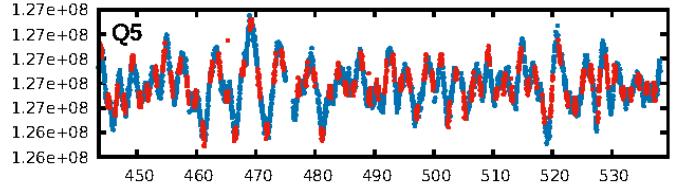
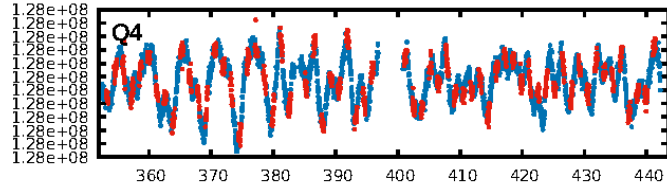
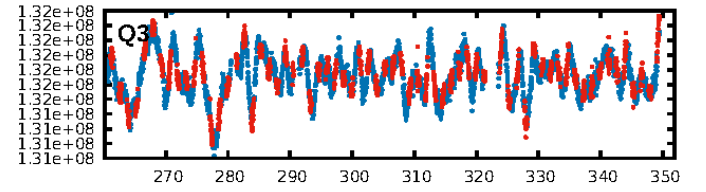
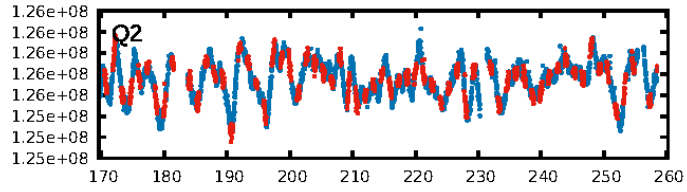
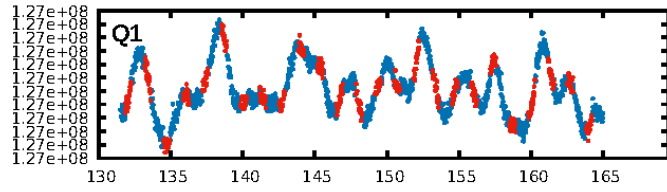
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [842.42 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.29e-23  
RollingBand-fgt: 1.00 [965/965]  
GhostDiagnostic-chr: -0.1862  
Centroid-sig: 0.0%  
Centroid-so: 2.784 arcsec [4.44 $\sigma$ ]  
OotOffset-rm: 2.388 arcsec [4.01 $\sigma$ ]  
KicOffset-rm: 2.366 arcsec [3.93 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.12 [2/17]  
DiffImageOverlap-fno: 1.00 [17/17]

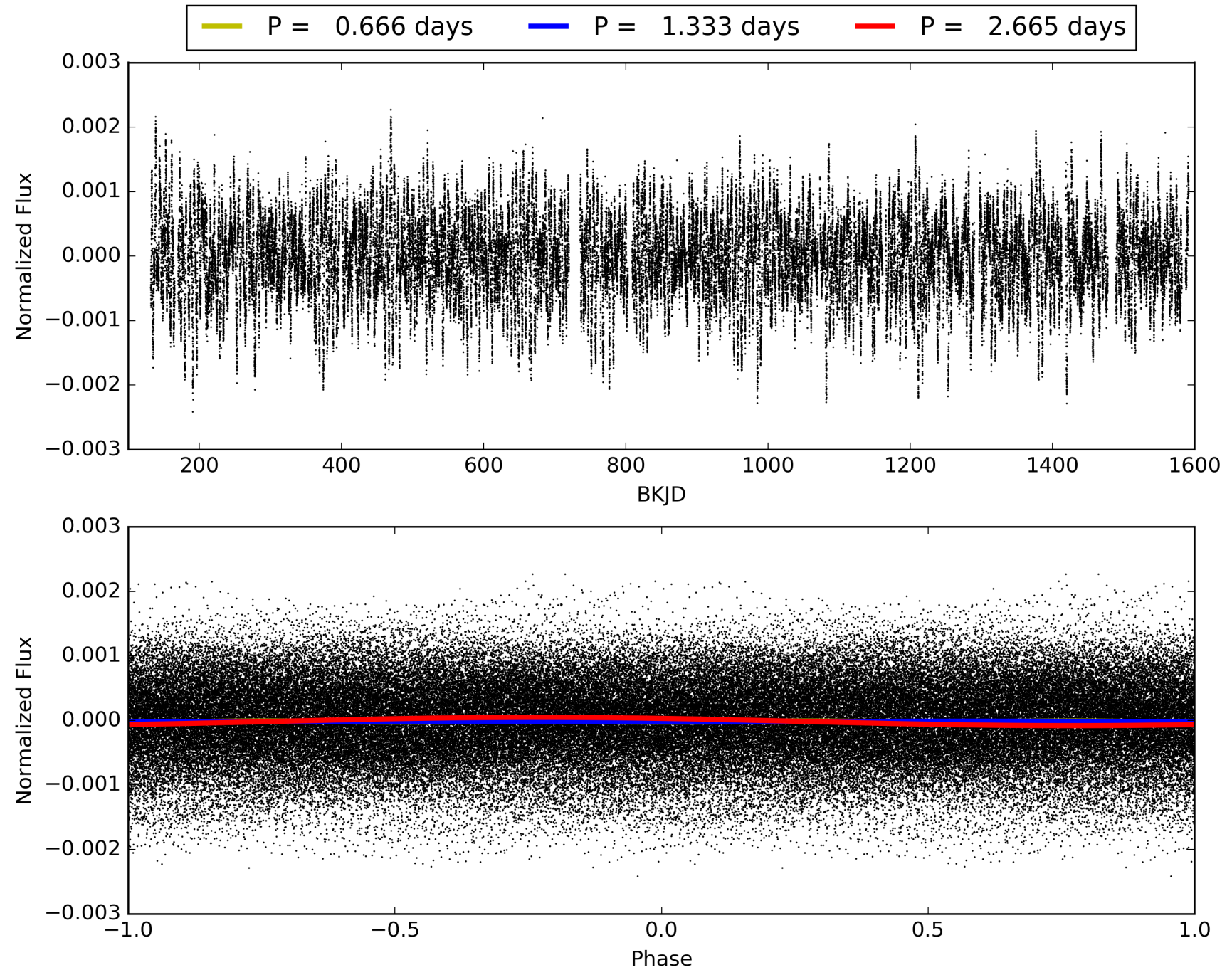
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

## TCE 009899193-01, PDC Light Curves



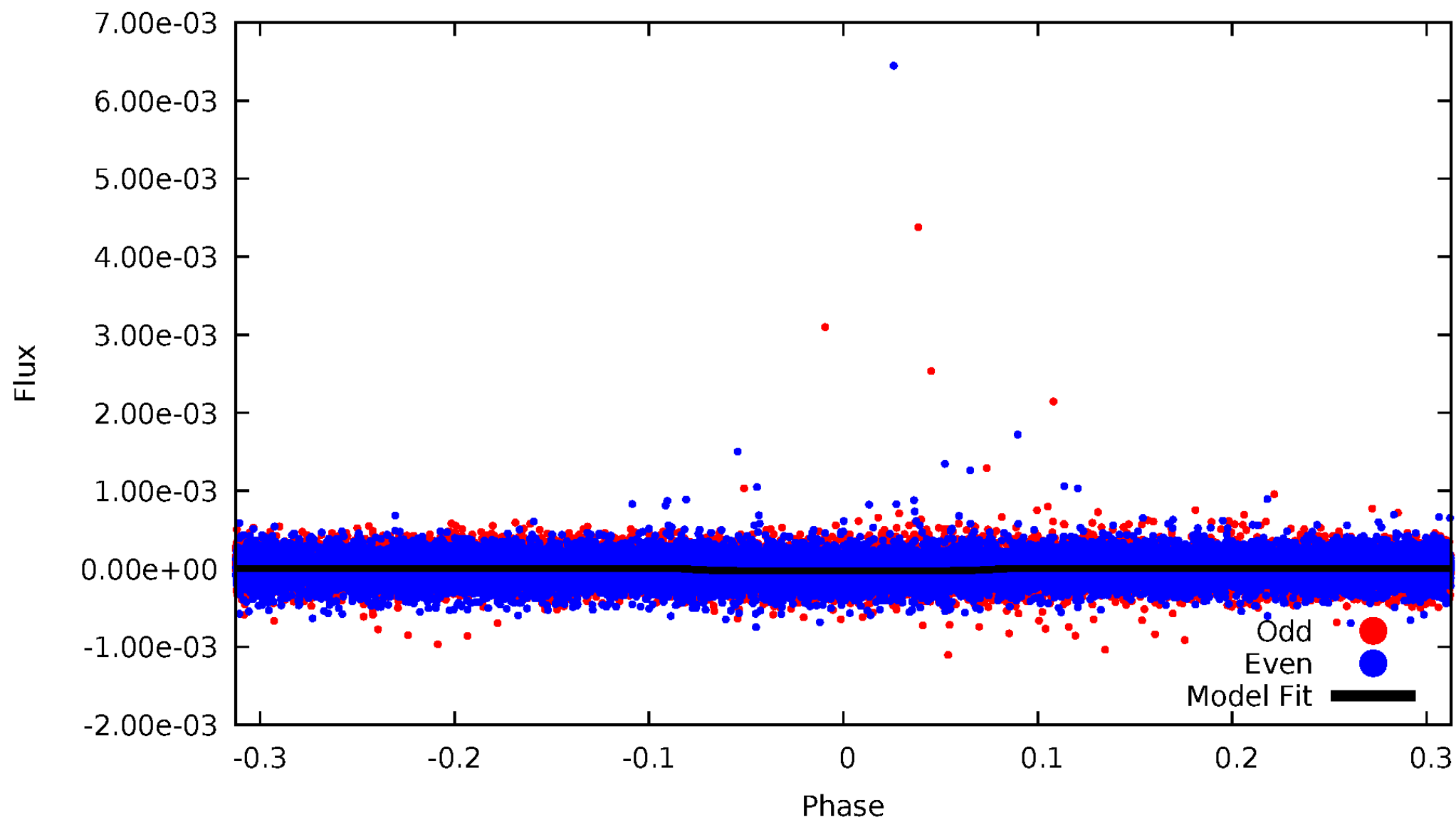
# TCE 009899193-01





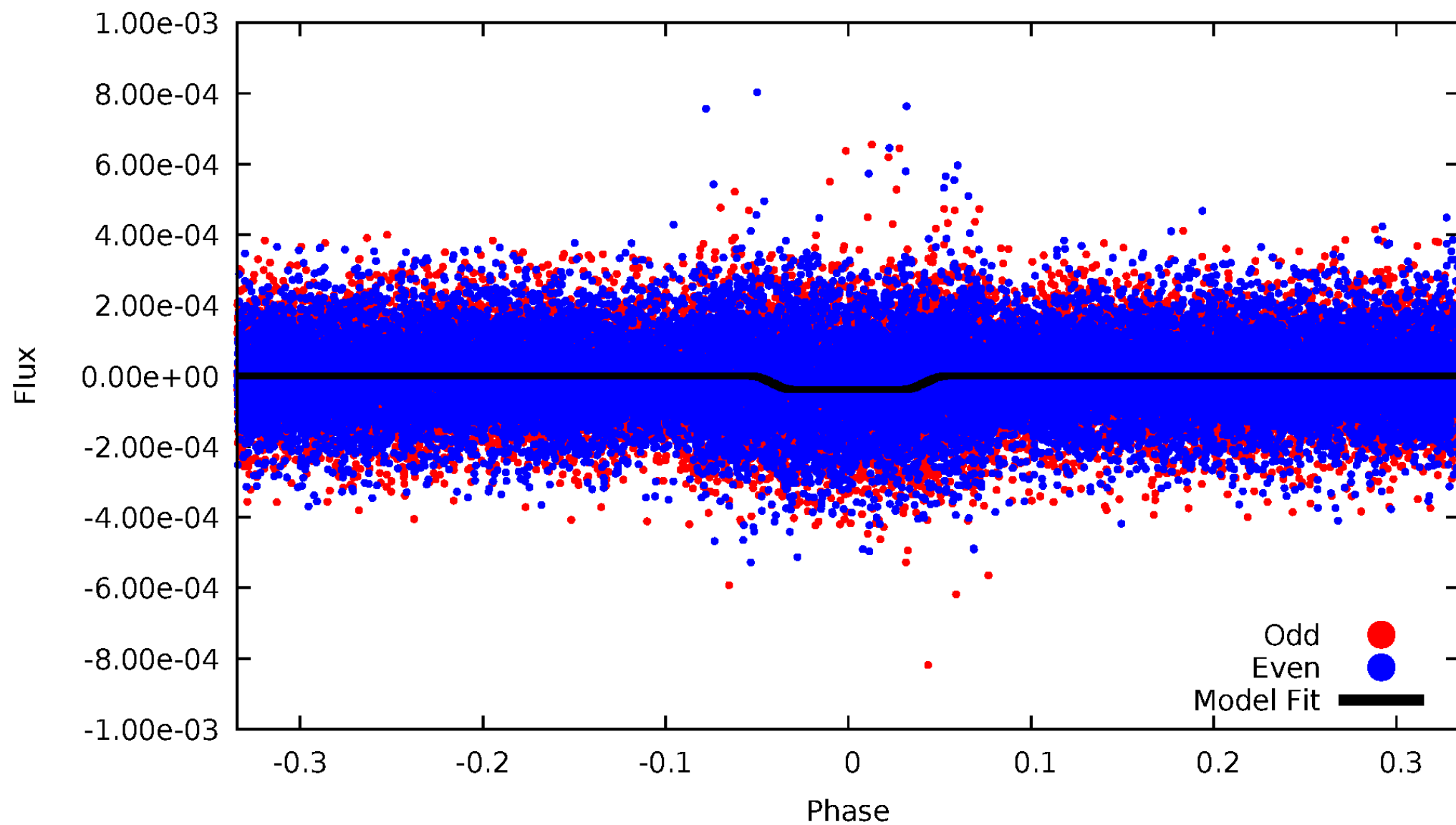
# DV Odd/Even

TCE 009899193-01

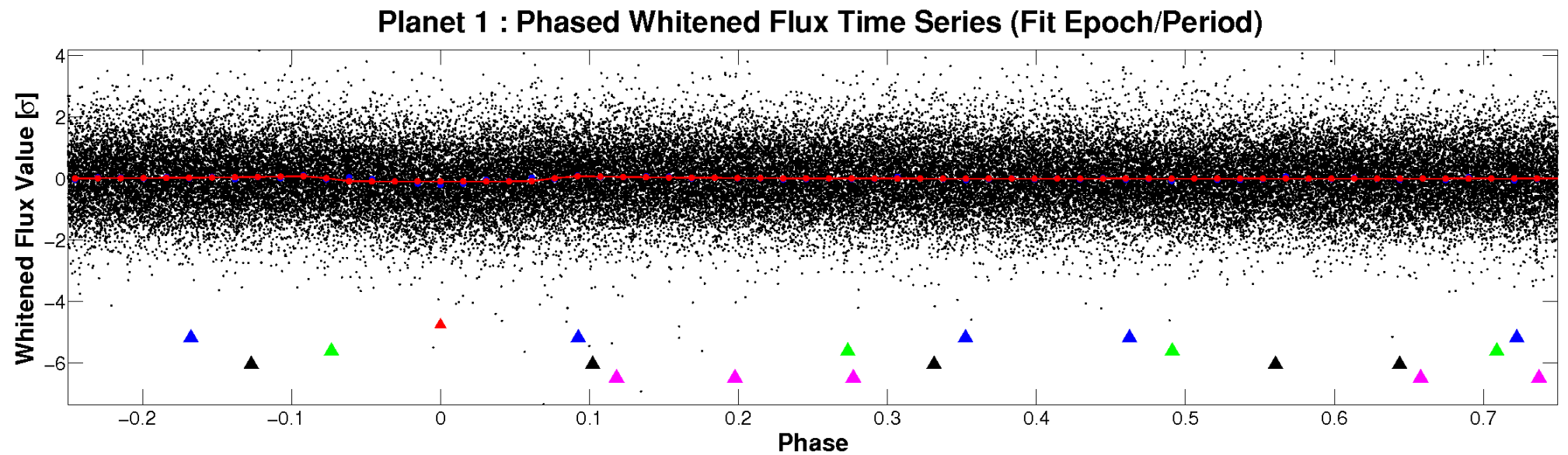
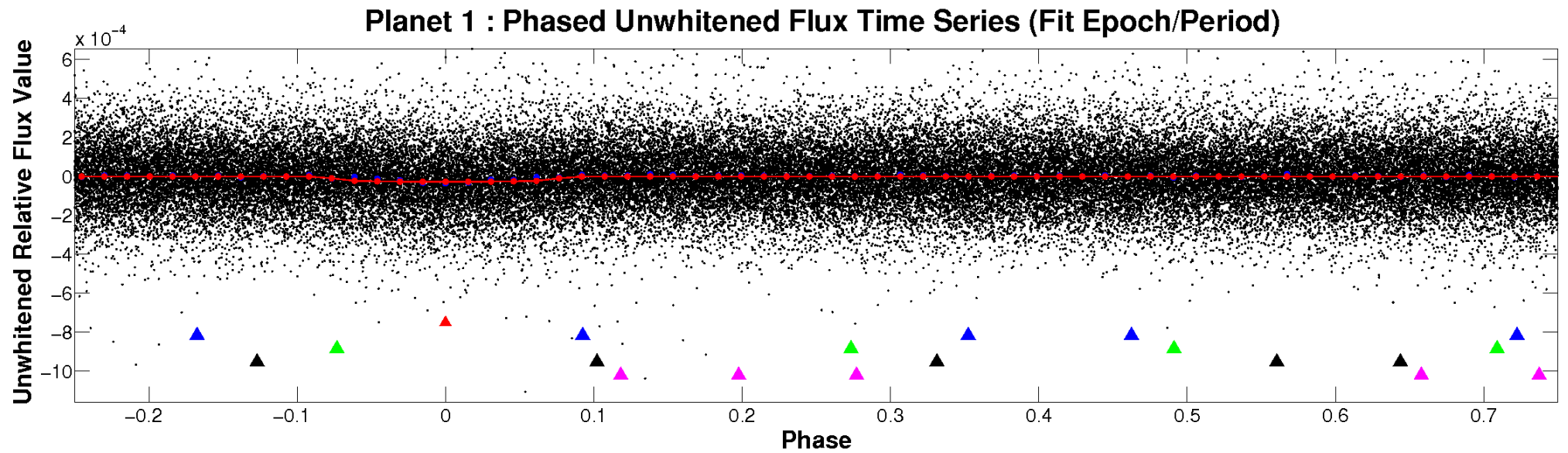


# ALT Odd/Even

TCE 009899193-01

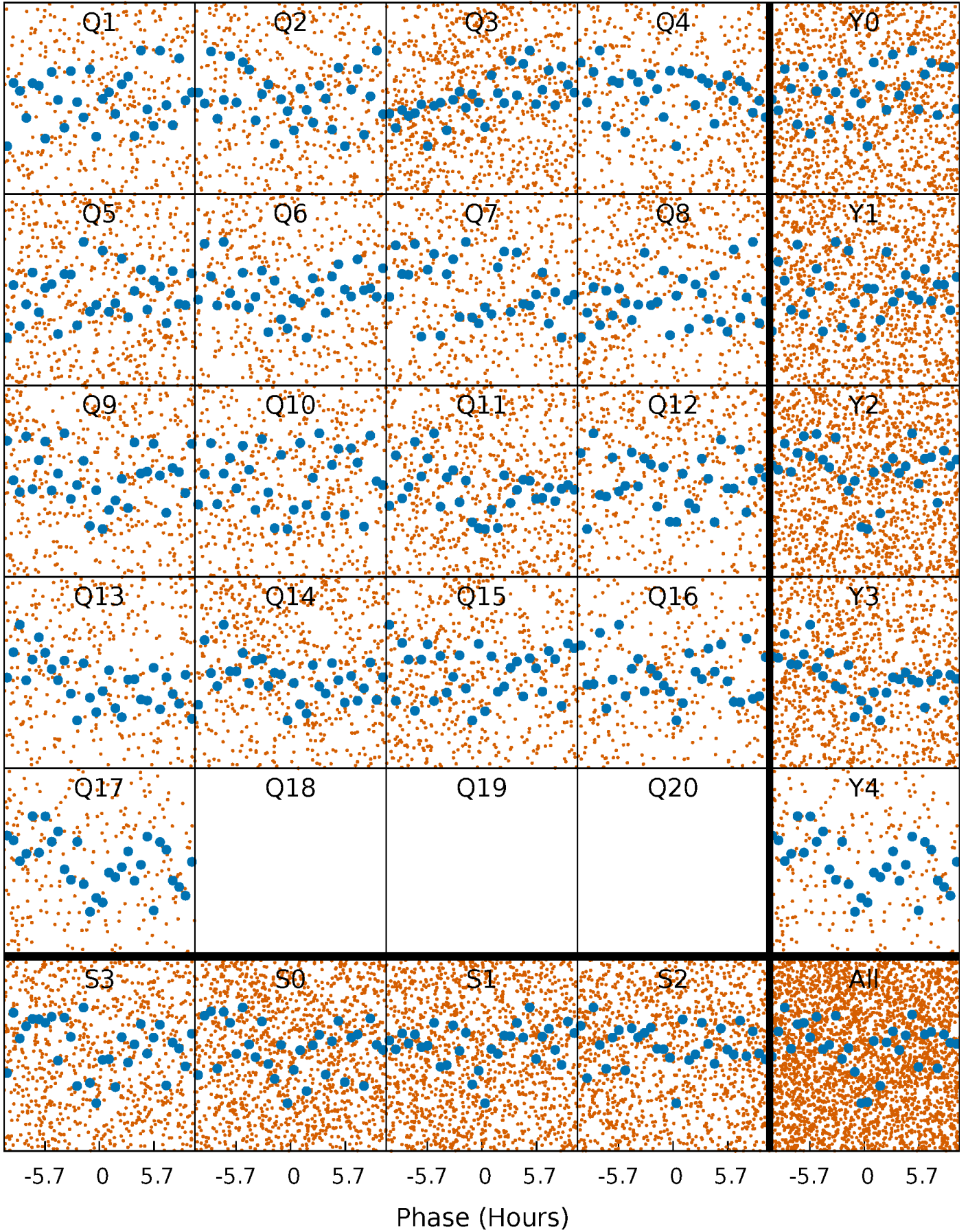


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

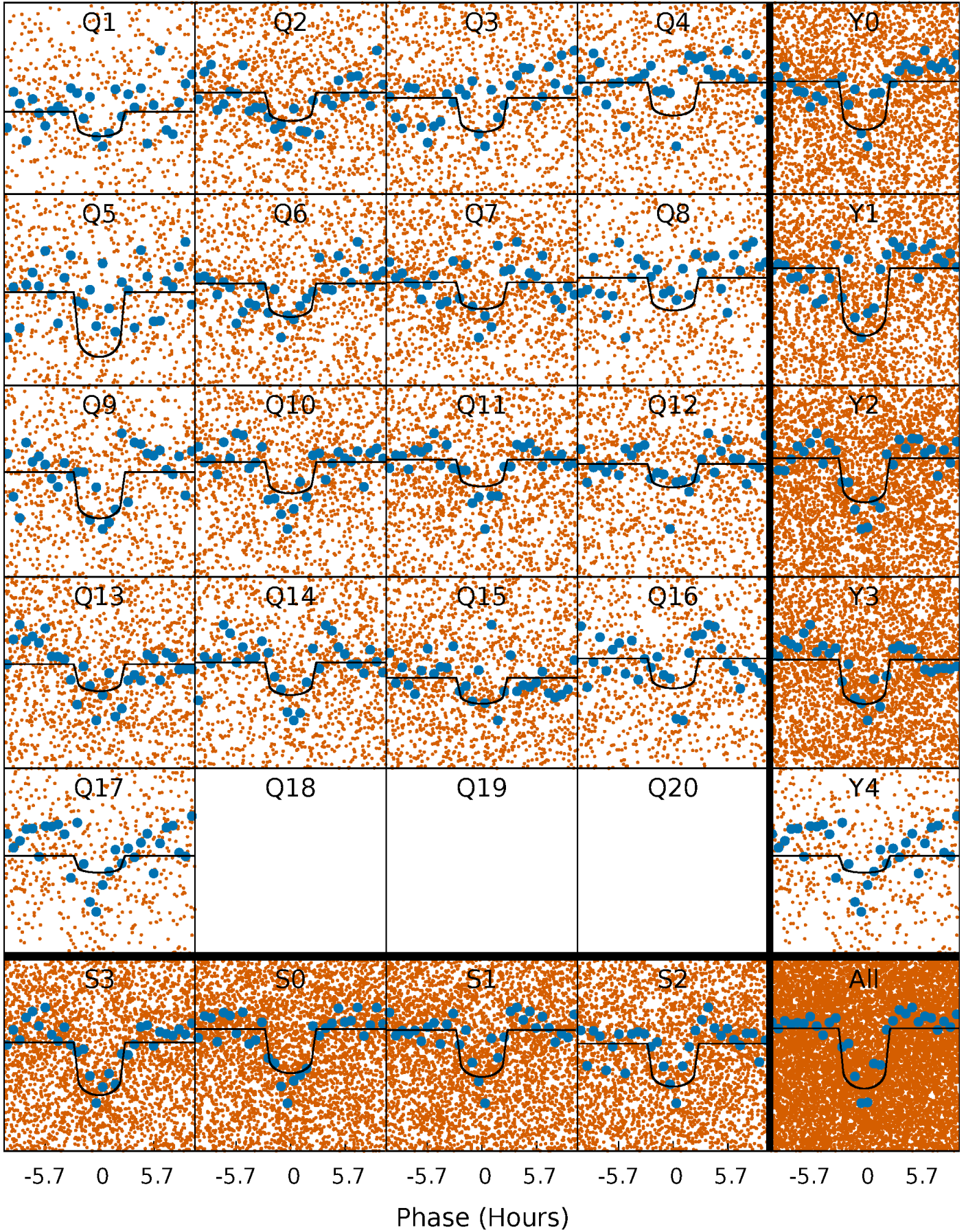
TCE 009899193-01   P= 1.332555 Days    $T_0=132.055627$  (BKJD)





# DV Quarter-Phased Transit Curves

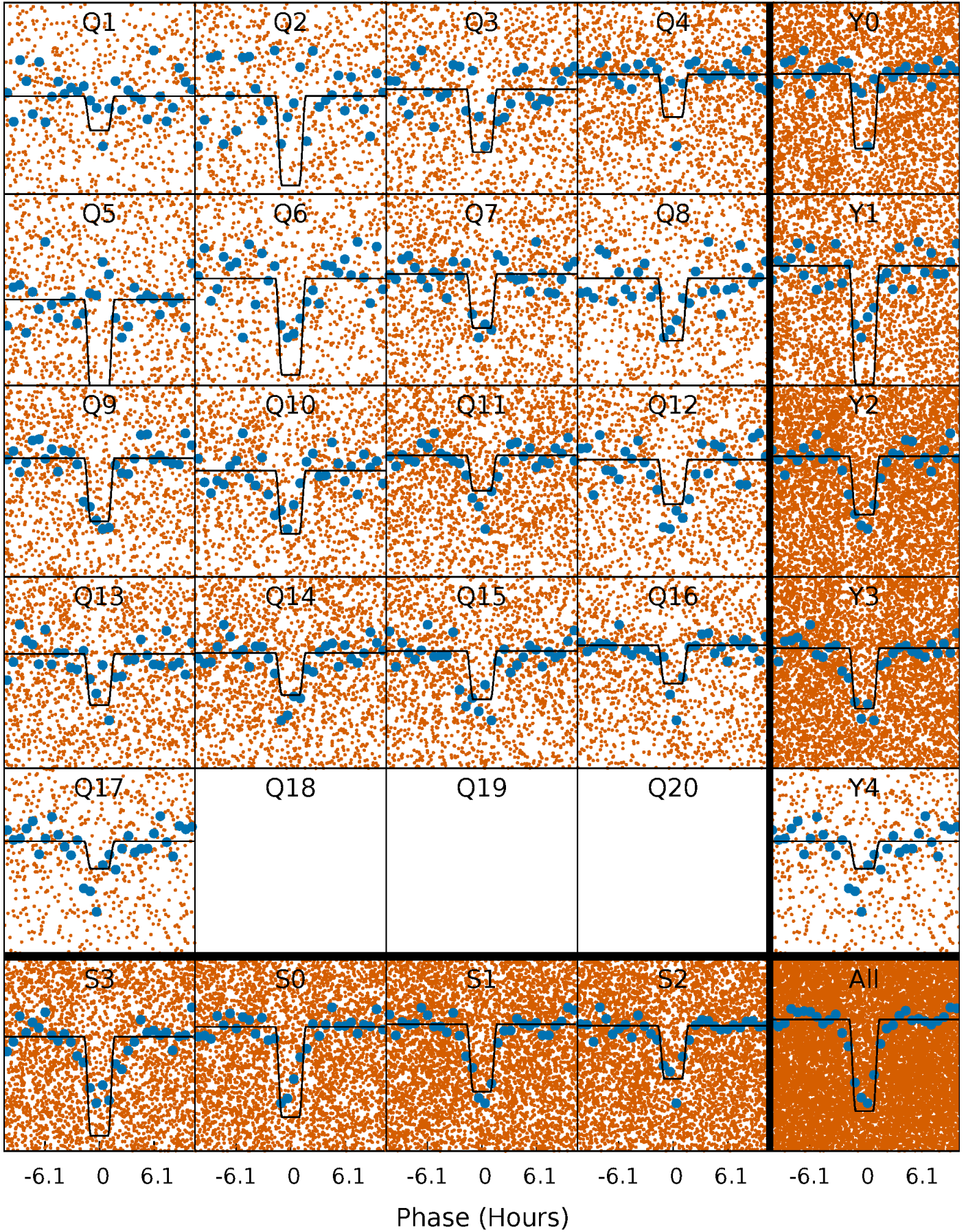
TCE 009899193-01 P= 1.332555 Days  $T_0=132.055627$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

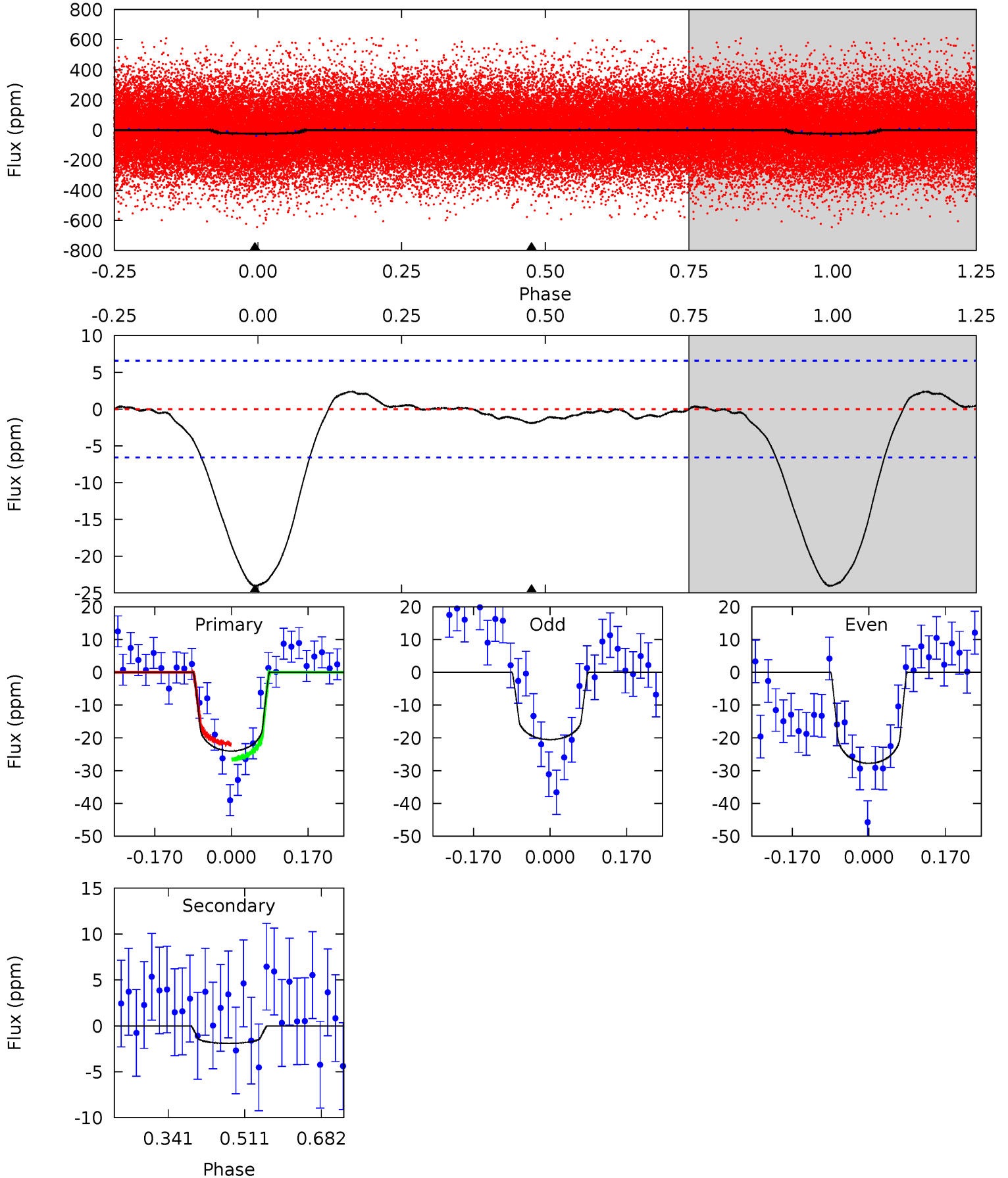
TCE 009899193-01 P= 1.332579 Days  $T_0=132.048491$  (BKJD)



# DV Model-Shift Uniqueness Test

009899193-01, P = 1.332555 Days, E = 130.723072 Days

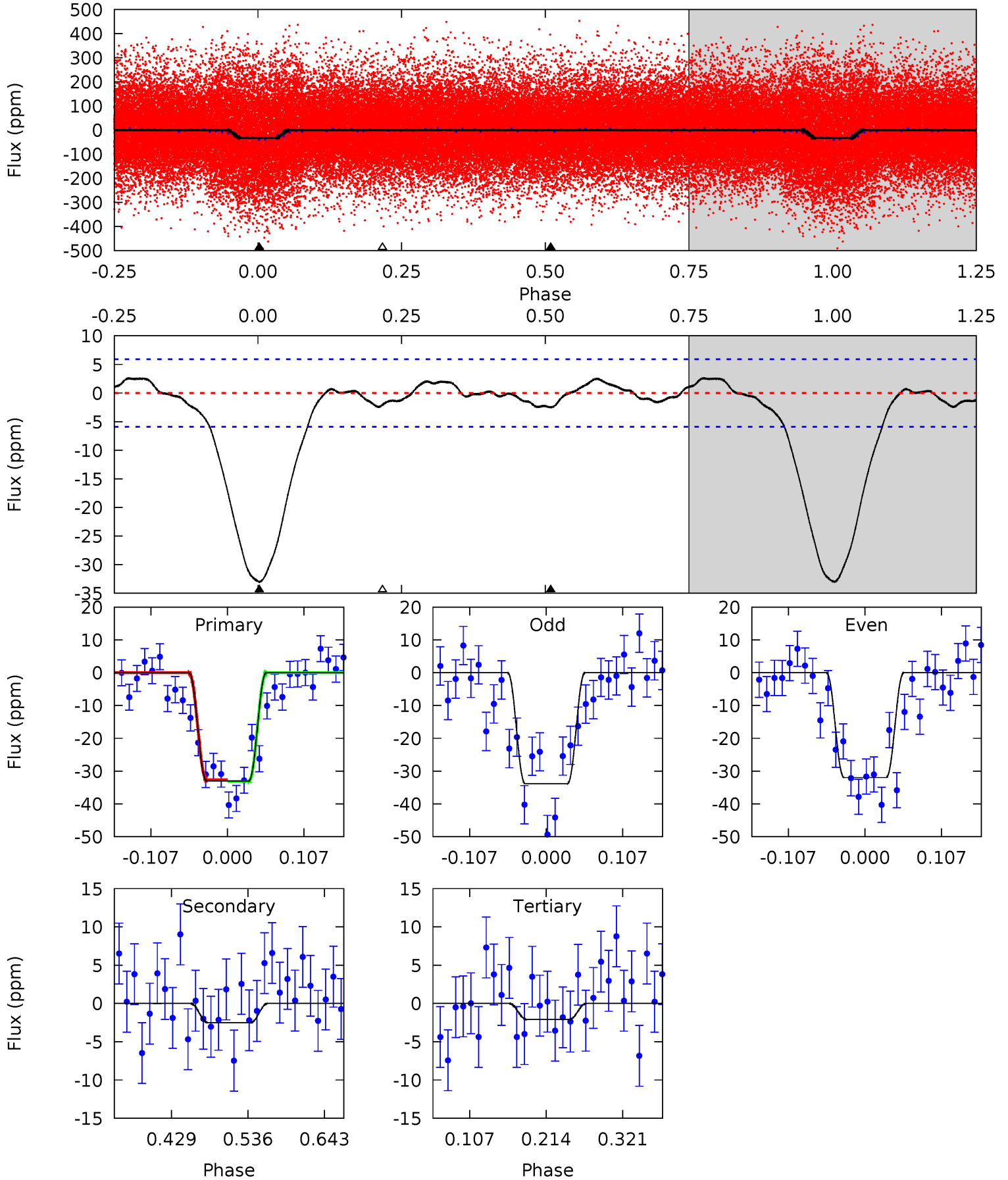
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.3	1.29	0	0	4.45	1.37	0.60	16.3	16.3	1.29	1.29	2.43	0.83	0.09	1.54



# Alt Model-Shift Uniqueness Test

009899193-01, P = 1.332579 Days, E = 130.715912 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
25.4	1.93	1.61	0	4.55	1.61	1.03	23.8	25.4	0.32	1.93	0.73	1.01	0.07	0.18





### Stellar Parameters For KIC 009899193

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$\rho_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6600^{+161}_{-181}$	$4.047^{+0.234}_{-0.126}$	$-0.400^{+0.300}_{-0.300}$	$1.681^{+0.363}_{-0.444}$	$1.148^{+0.196}_{-0.142}$	$0.341^{+0.442}_{-0.133}$
	+2%/-3%	+6%/-3%	+75%/-75%	+22%/-26%	+17%/-12%	+130%/-39%
Source	PHO1	FLK73	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 009899193-01 / KOI 7244.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2\pm 1$	$0.96^{+0.29}_{-0.27}$	$3321^{+207}_{-258}$	$3415^{+709}_{-6415}$	$0.706^{+0.905}_{-0.566}$
Alt.	$-3\pm 1$	$1.11^{+0.30}_{-0.29}$	$3321^{+211}_{-246}$	$3350^{+648}_{-1692}$	$0.657^{+0.757}_{-0.355}$

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

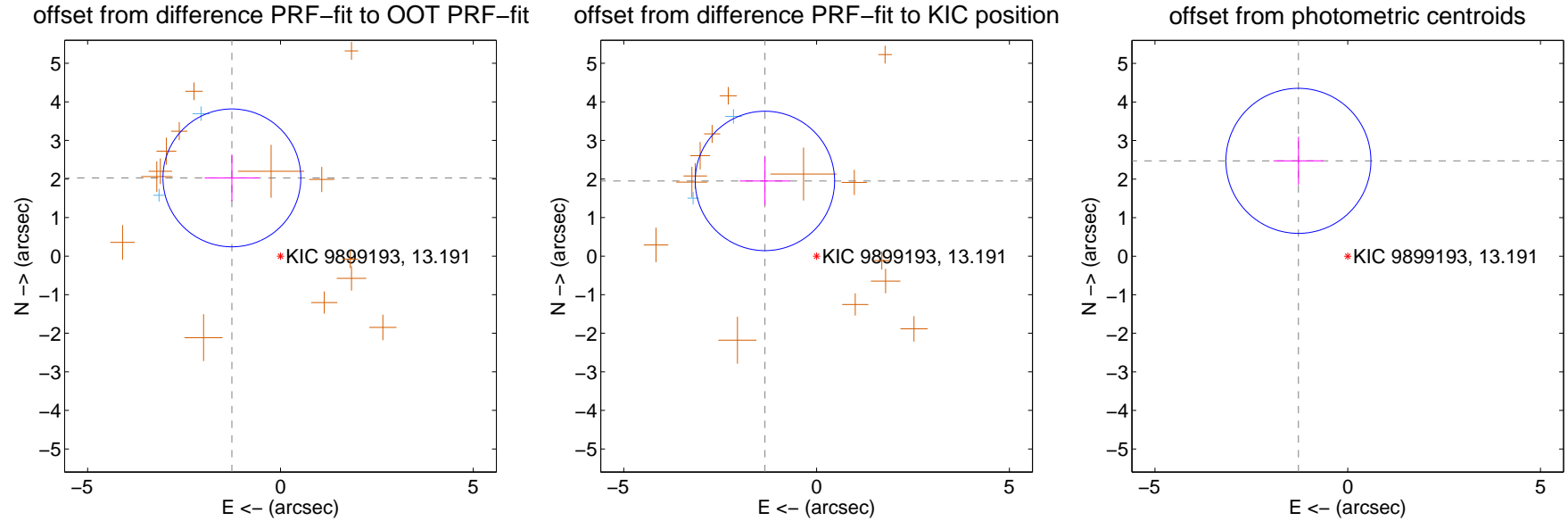
## DV Centroid Data

Supplemental centroid analysis for 009899193-01. Kepler magnitude: 13.19. Transit SNR 10.31

There are 2 quarters with good PRF difference image offsets

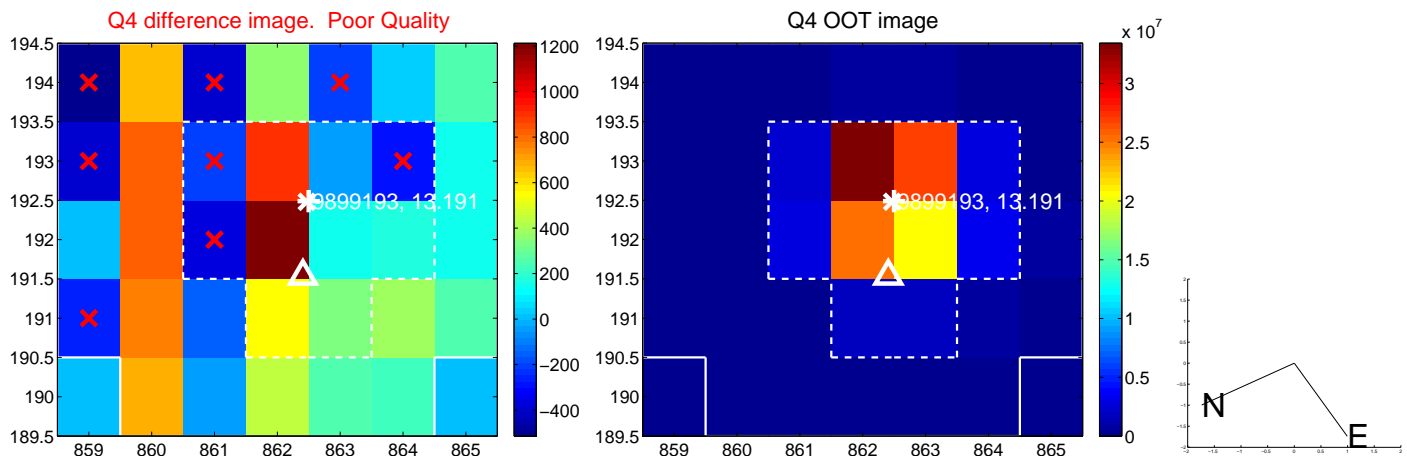
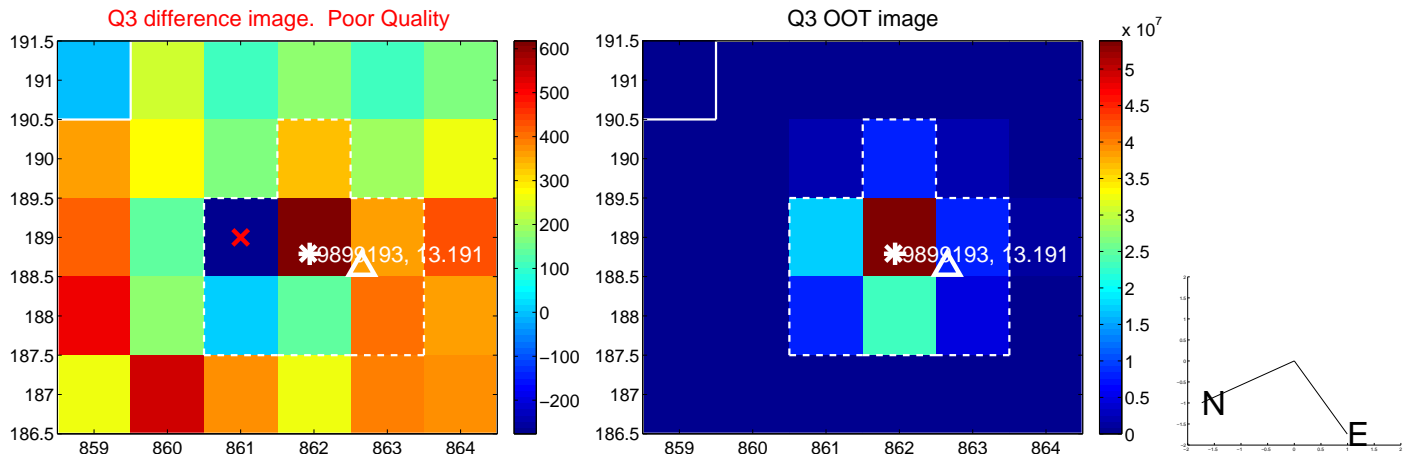
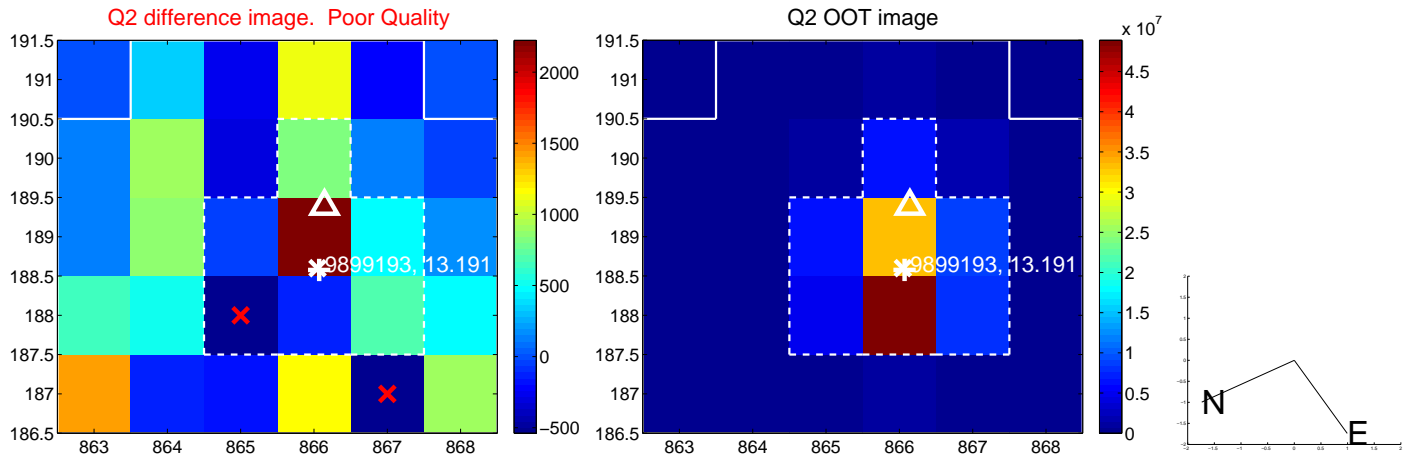
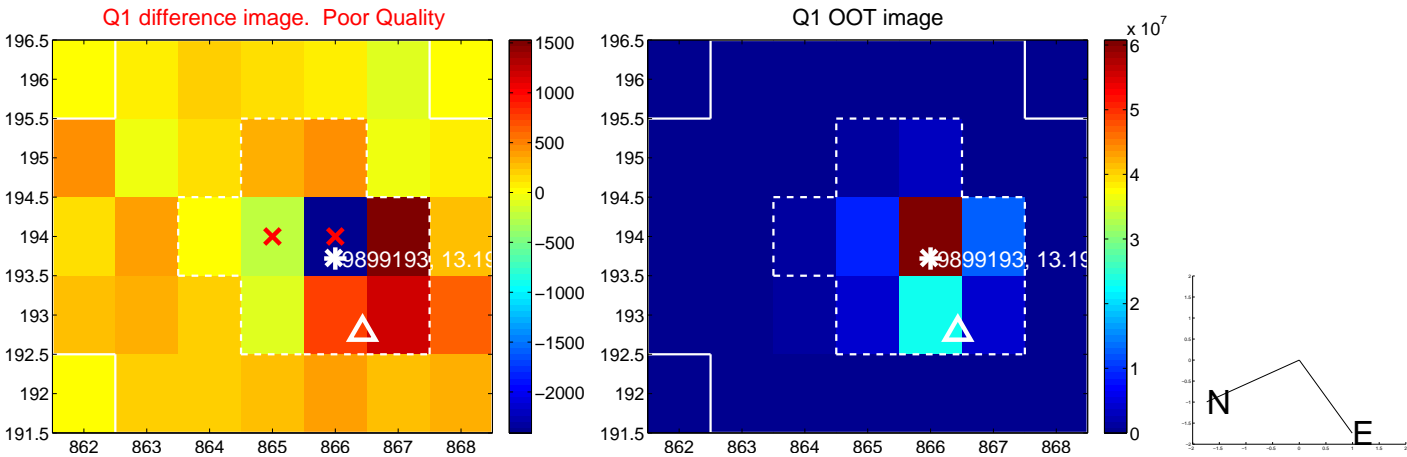
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.388 \pm 0.596$	4.01	$1.260 \pm 0.705$	$2.029 \pm 0.607$
PRF-fit source offset from KIC position	$2.366 \pm 0.602$	3.93	$1.340 \pm 0.654$	$1.950 \pm 0.621$
photometric centroid source offset	$2.78 \pm 0.63$	4.44	$1.28 \pm 0.65$	$2.47 \pm 0.62$

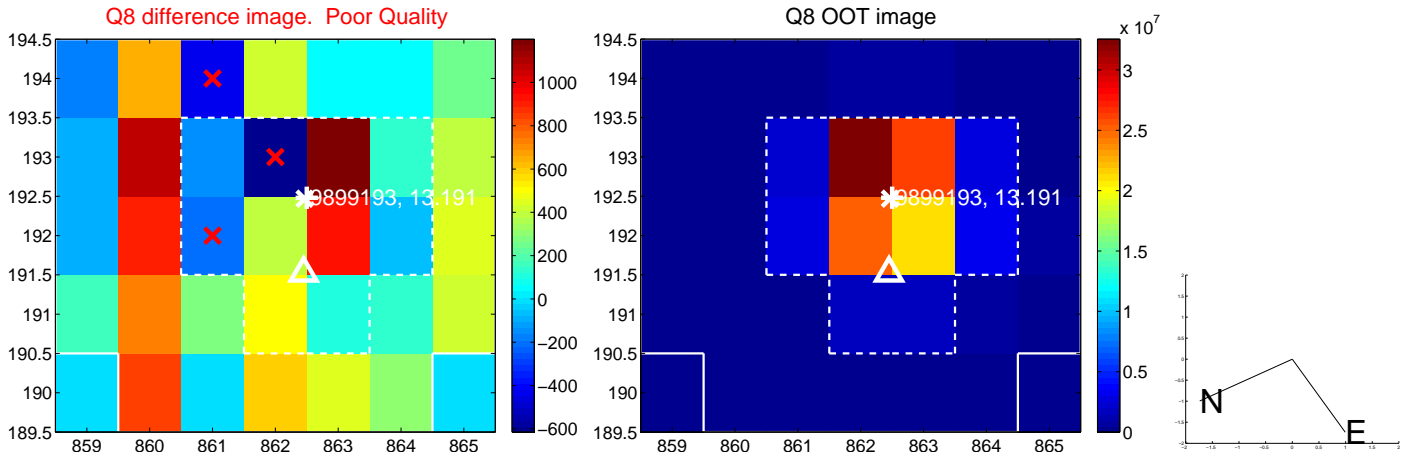
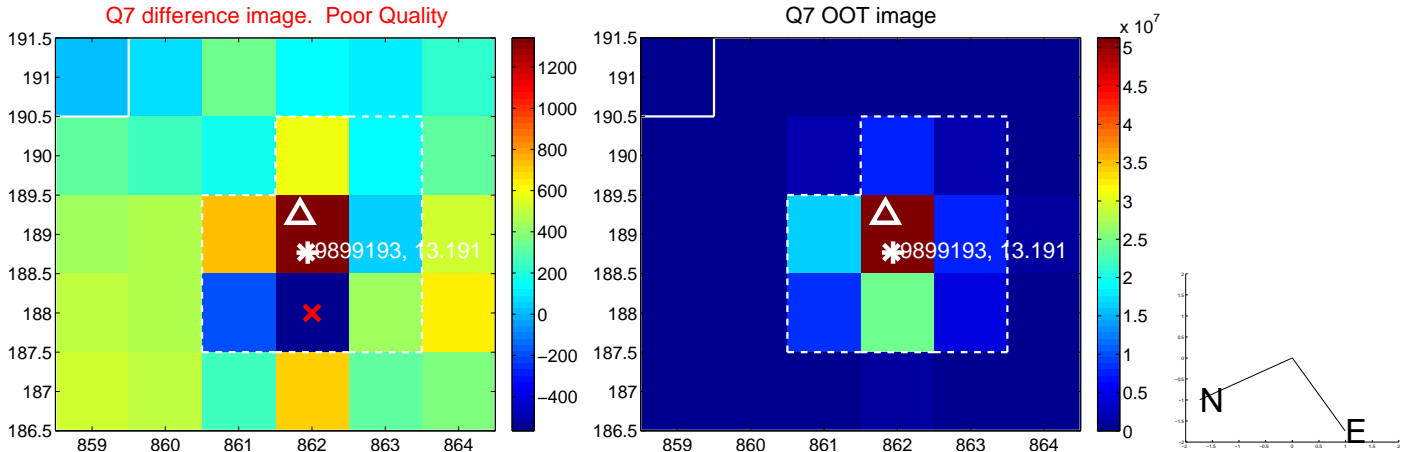
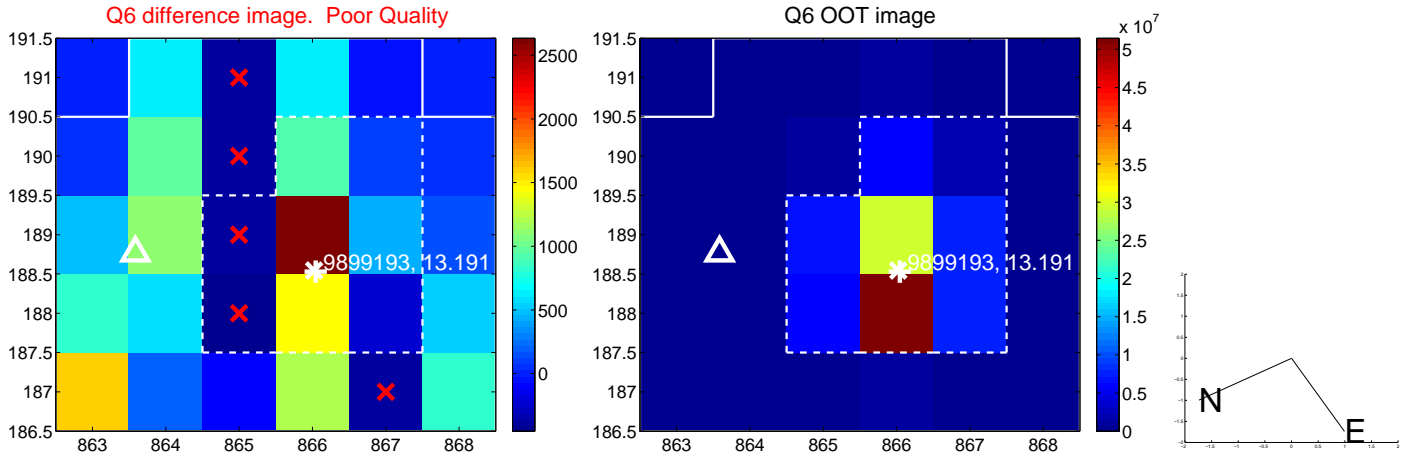
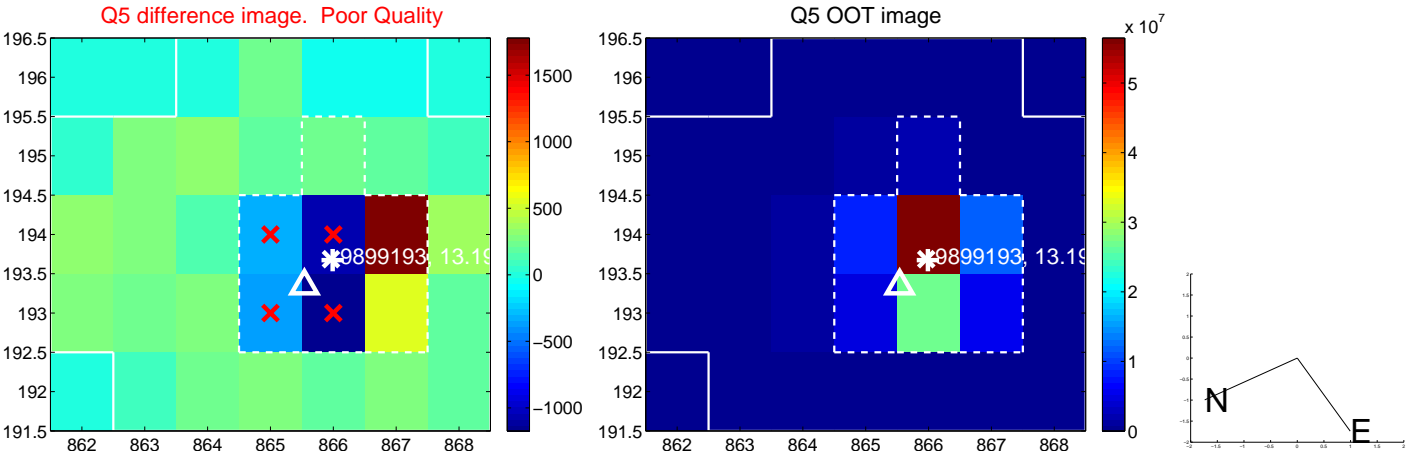


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



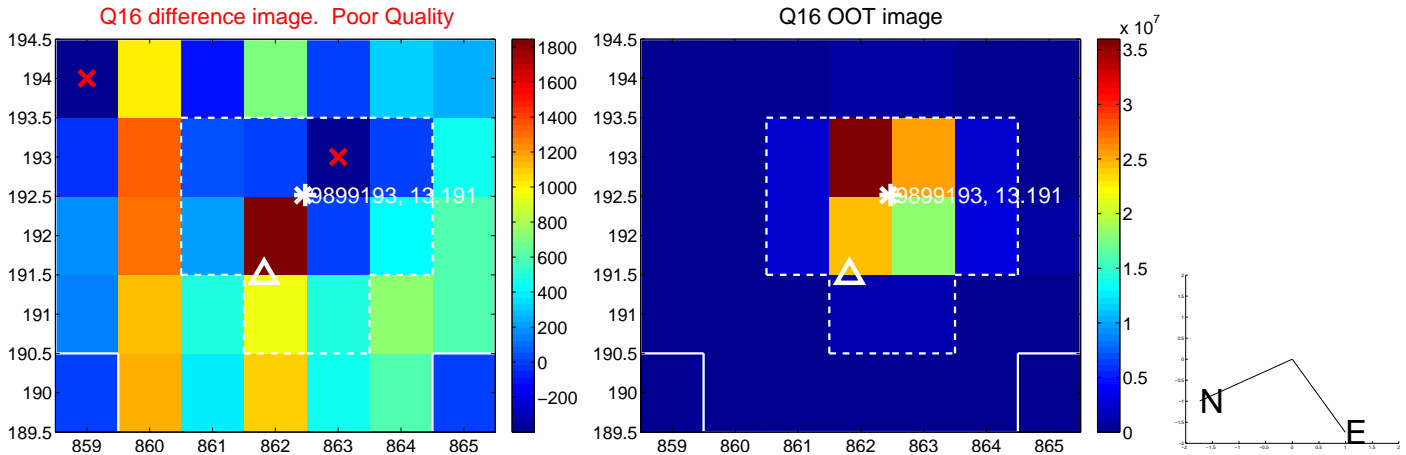
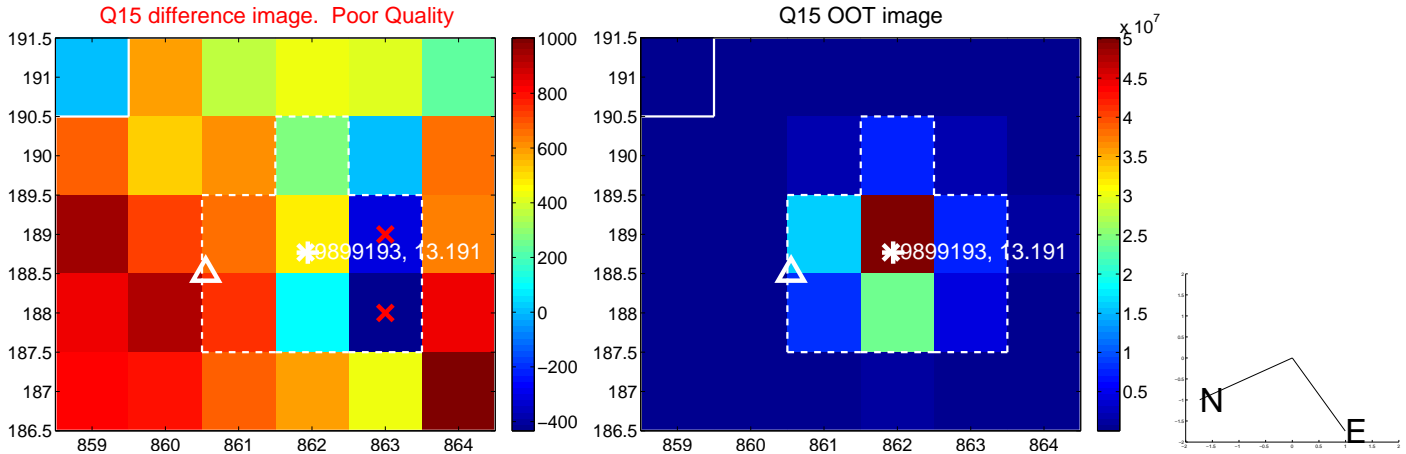
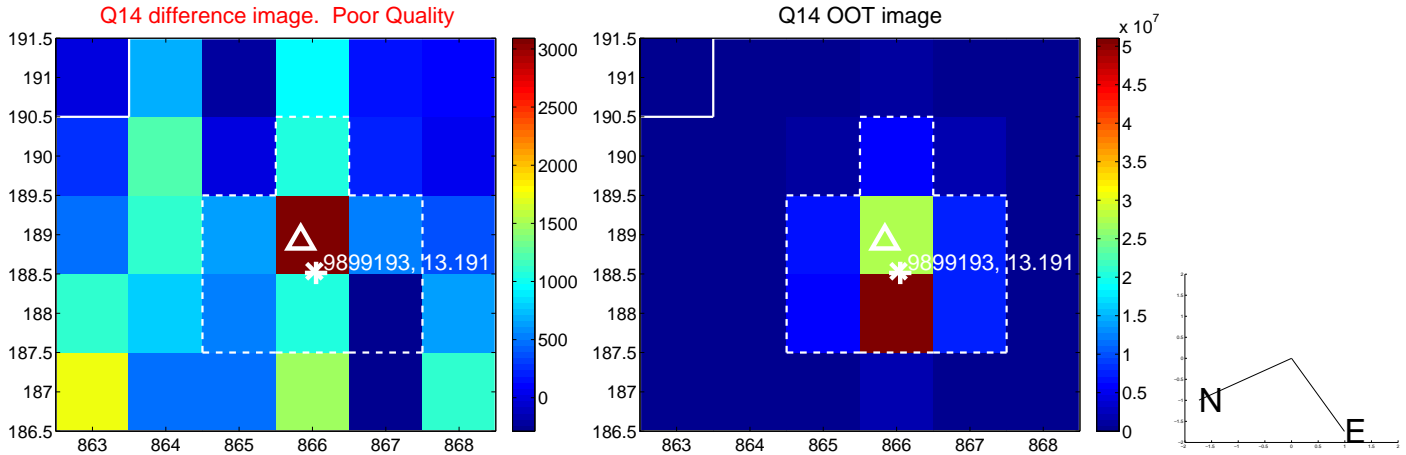
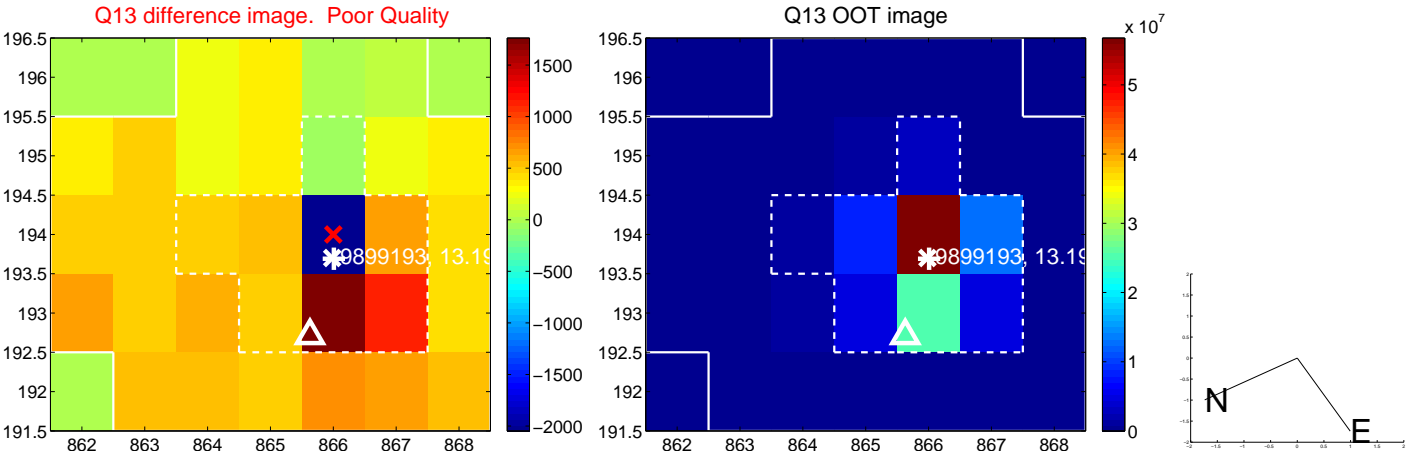
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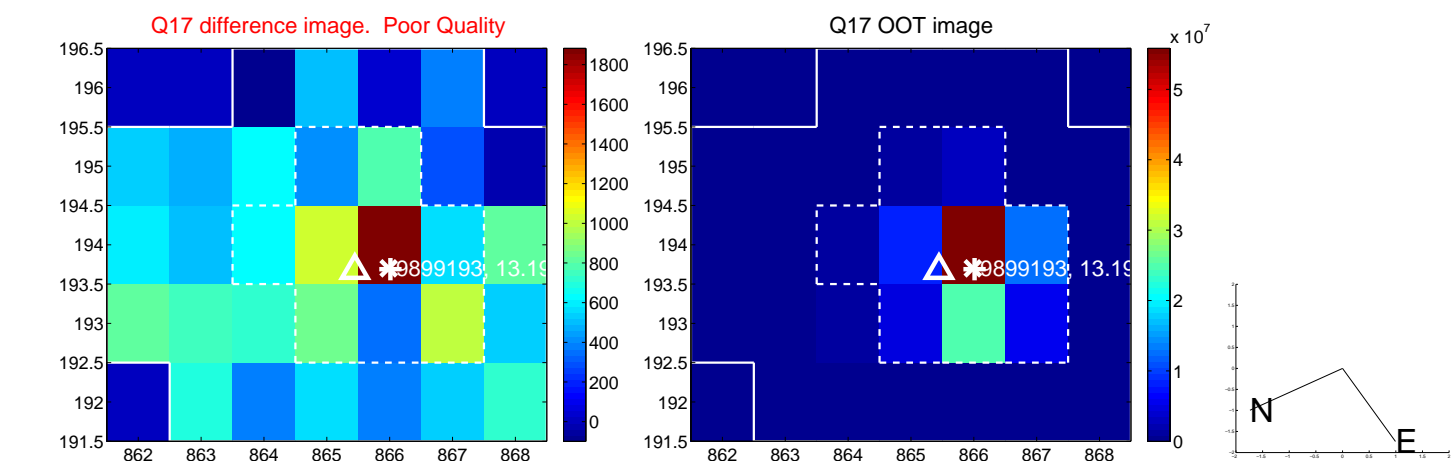




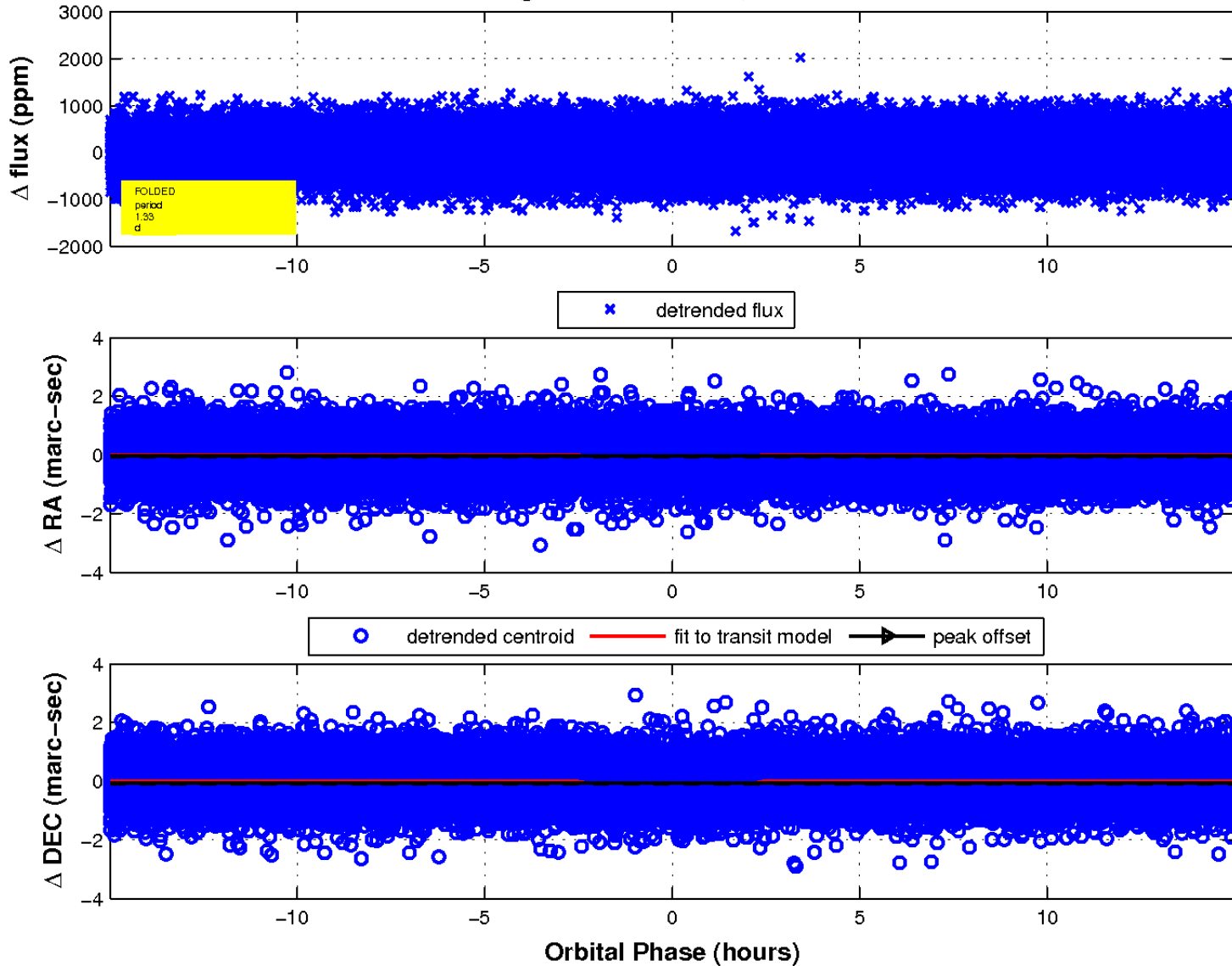
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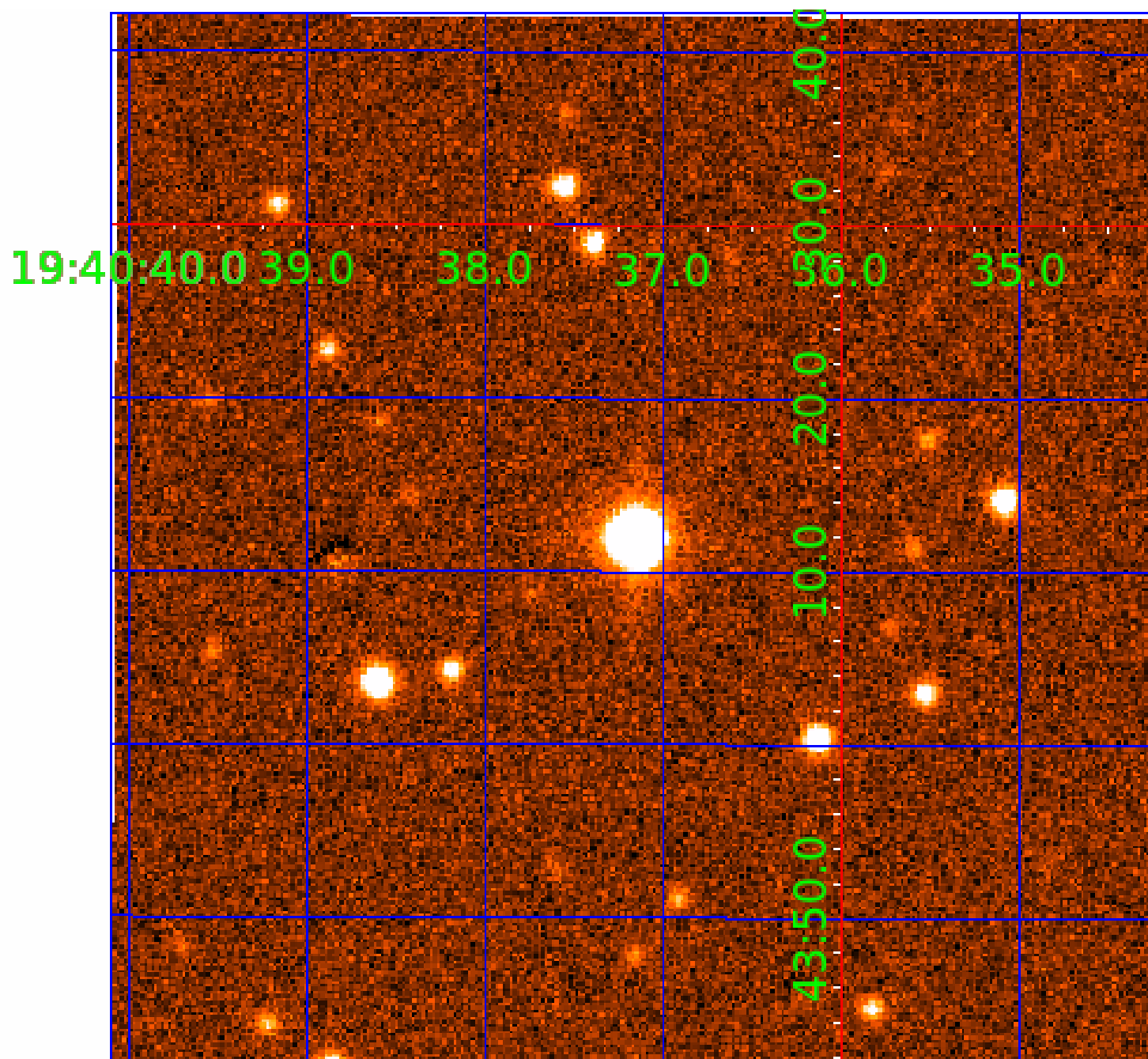


fluxWeightedCentroids, Planet 1 of 5



UKIRT Image

Declination





# KIC 009899193

## Q1-17 DR25 TCE Parameters

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009899193-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
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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.

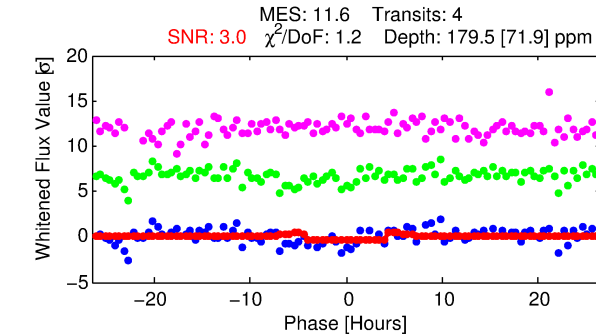
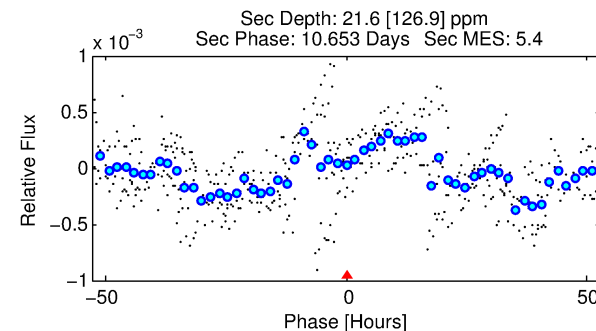
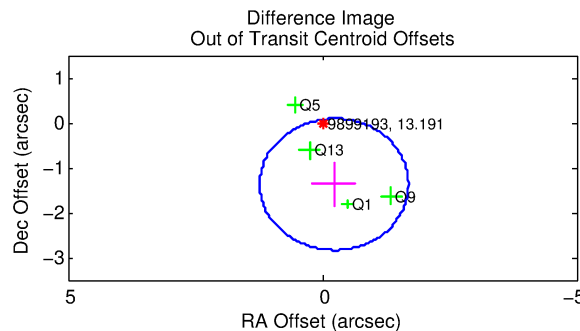
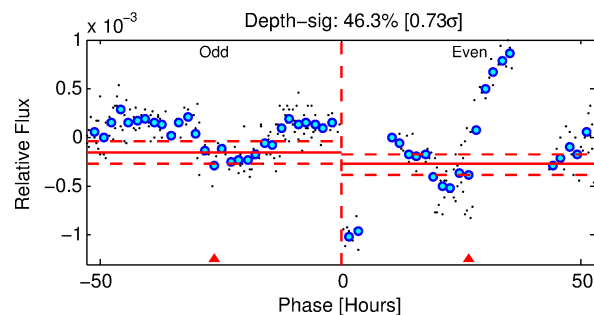
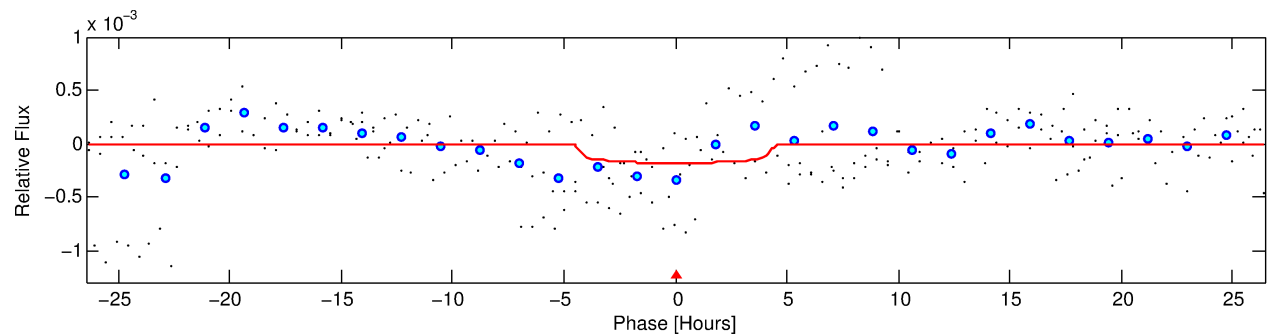
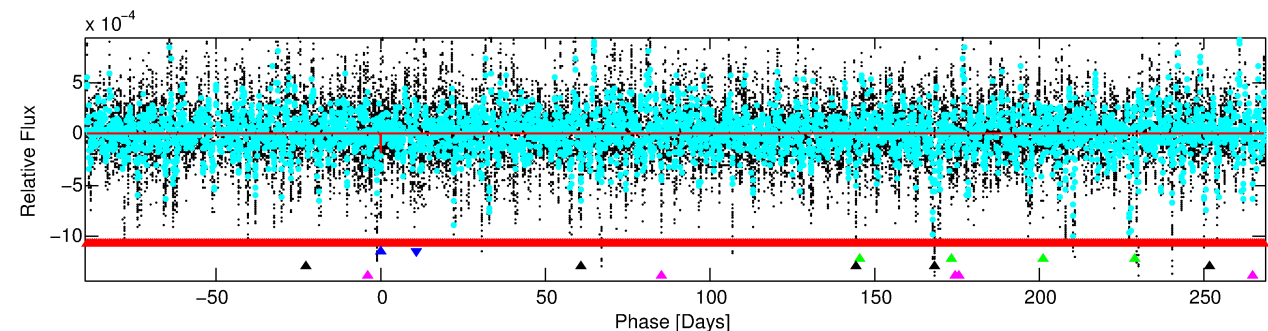
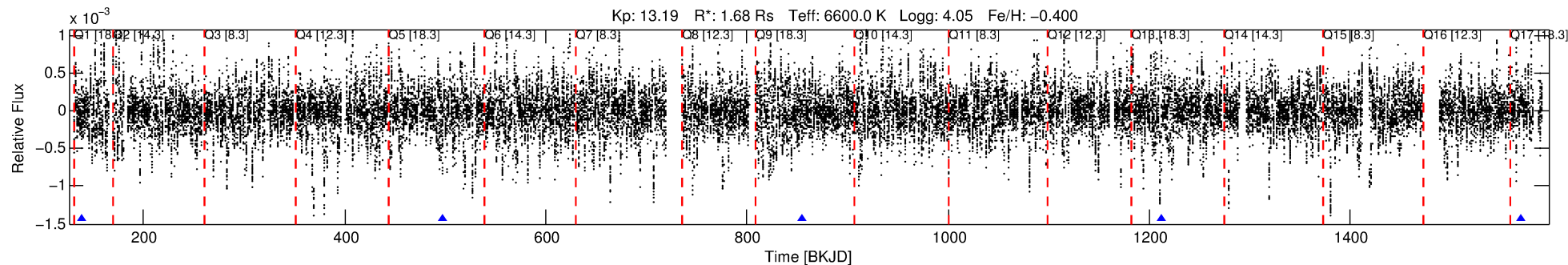
Ephemeris Match Information For 009899193-02

No Significant Match Found

# DV One-Page Summary

KIC: 9899193 Candidate: 2 of 5 Period: 357.618 d  
KOI: K07244 Corr: No Ephemeris Match

Kp: 13.19 R\*: 1.68 Rs Teff: 6600.0 K Logg: 4.05 Fe/H: -0.400



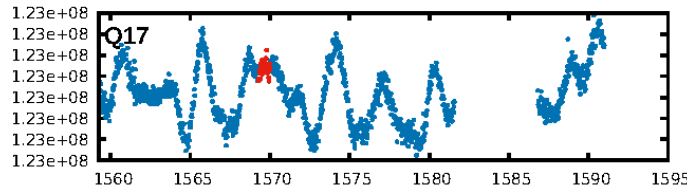
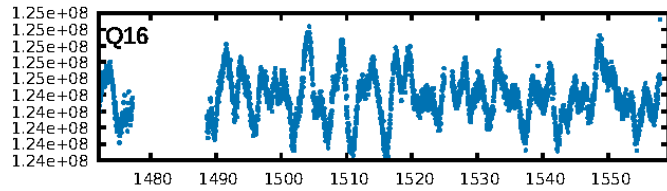
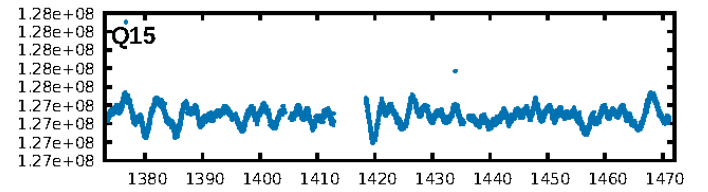
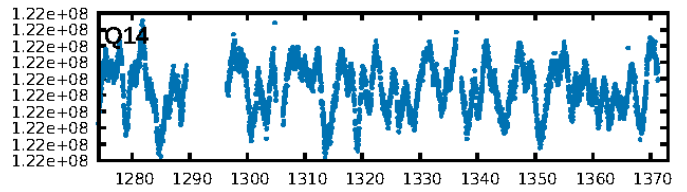
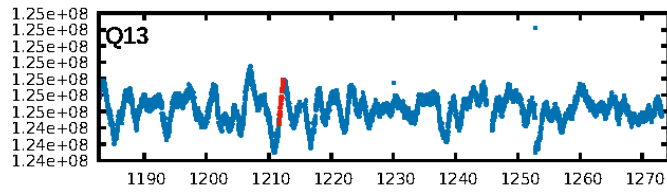
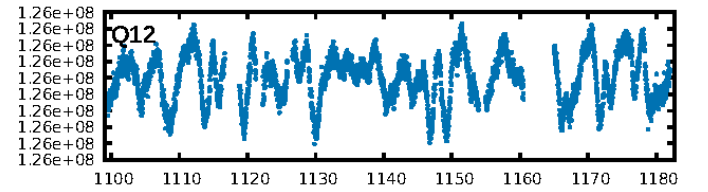
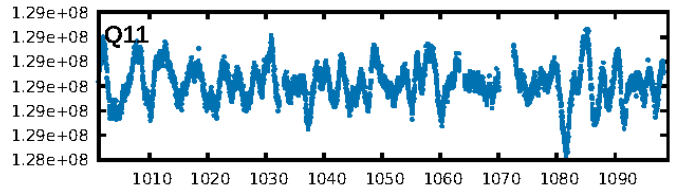
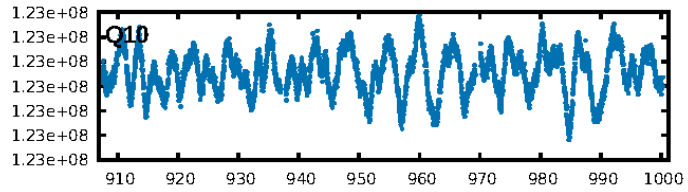
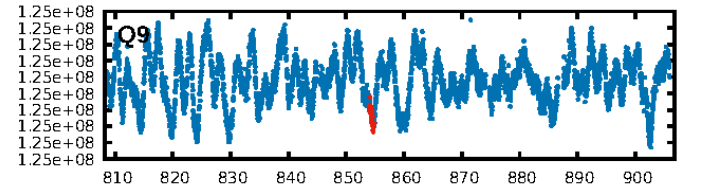
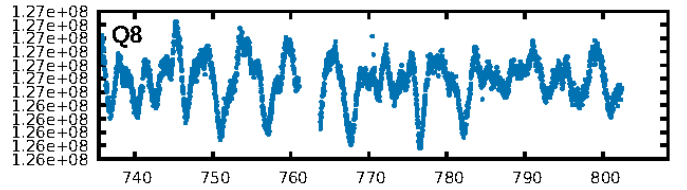
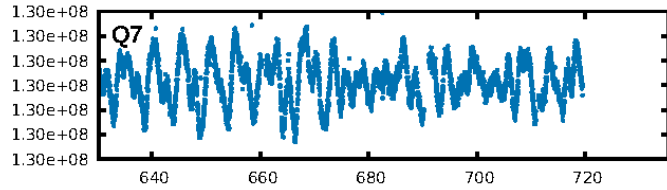
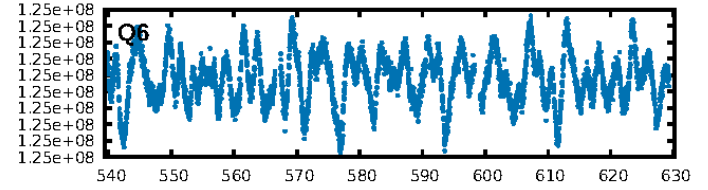
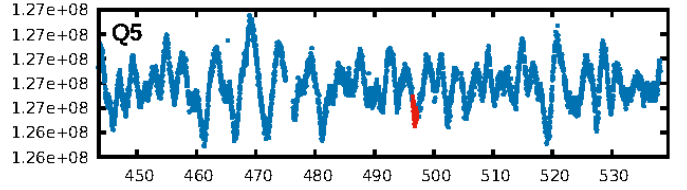
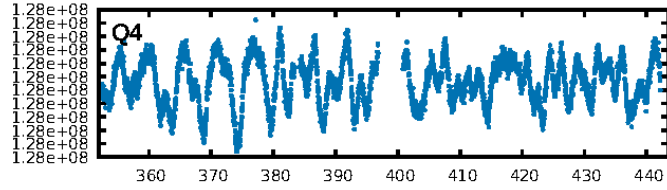
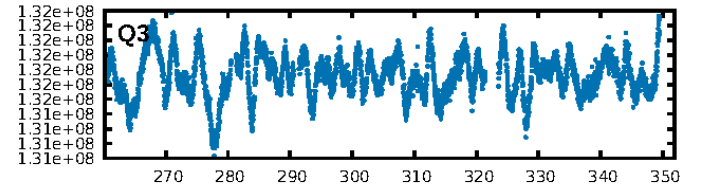
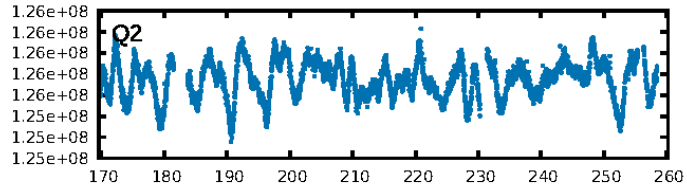
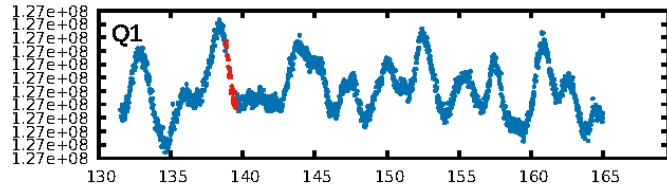
## DV Fit Results:

Period = 357.61775 [0.01033] d  
Epoch = 139.1881 [0.0289] BKJD  
Rp/R\* = 0.0132 [0.0137]  
a/R\* = 226.08 [1271.79]  
b = 0.70 [4.05]  
Seff = 4.50 [1.87]  
Teff = 371 [39] K  
Rp = 2.41 [2.59] Re  
a = 1.0328 [0.2598] AU  
Ag = 2171.91 [13596.82] [0.16σ]  
Teffp = 3921 [6125] K [0.58σ]

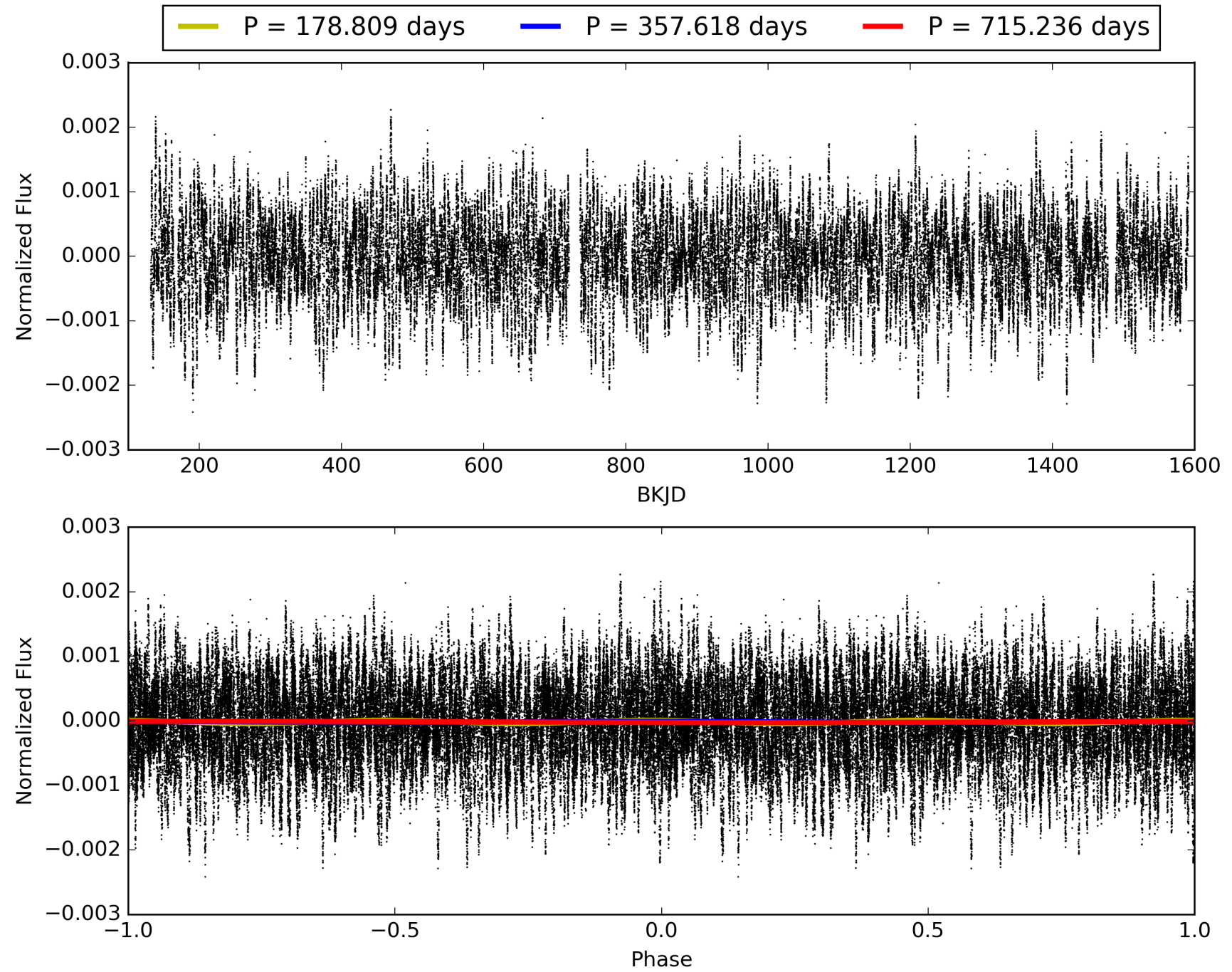
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [134.28σ]  
LongPeriod-sig: 100.0% [43.23σ]  
ModelChiSquare2-sig: 2.7%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 5.72e-13  
RollingBand-fgt: 1.00 [2/2]  
**GhostDiagnostic-chr: 1.583**  
Centroid-sig: 11.5%  
Centroid-so: 1.314 arcsec [1.19σ]  
OotOffset-rm: 1.392 arcsec [2.85σ]  
KicOffset-rm: 1.446 arcsec [2.83σ]  
OotOffset-st: 0/0/0/4 [4]  
KicOffset-st: 0/0/0/4 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 0.00 [0/5]

## TCE 009899193-02, PDC Light Curves

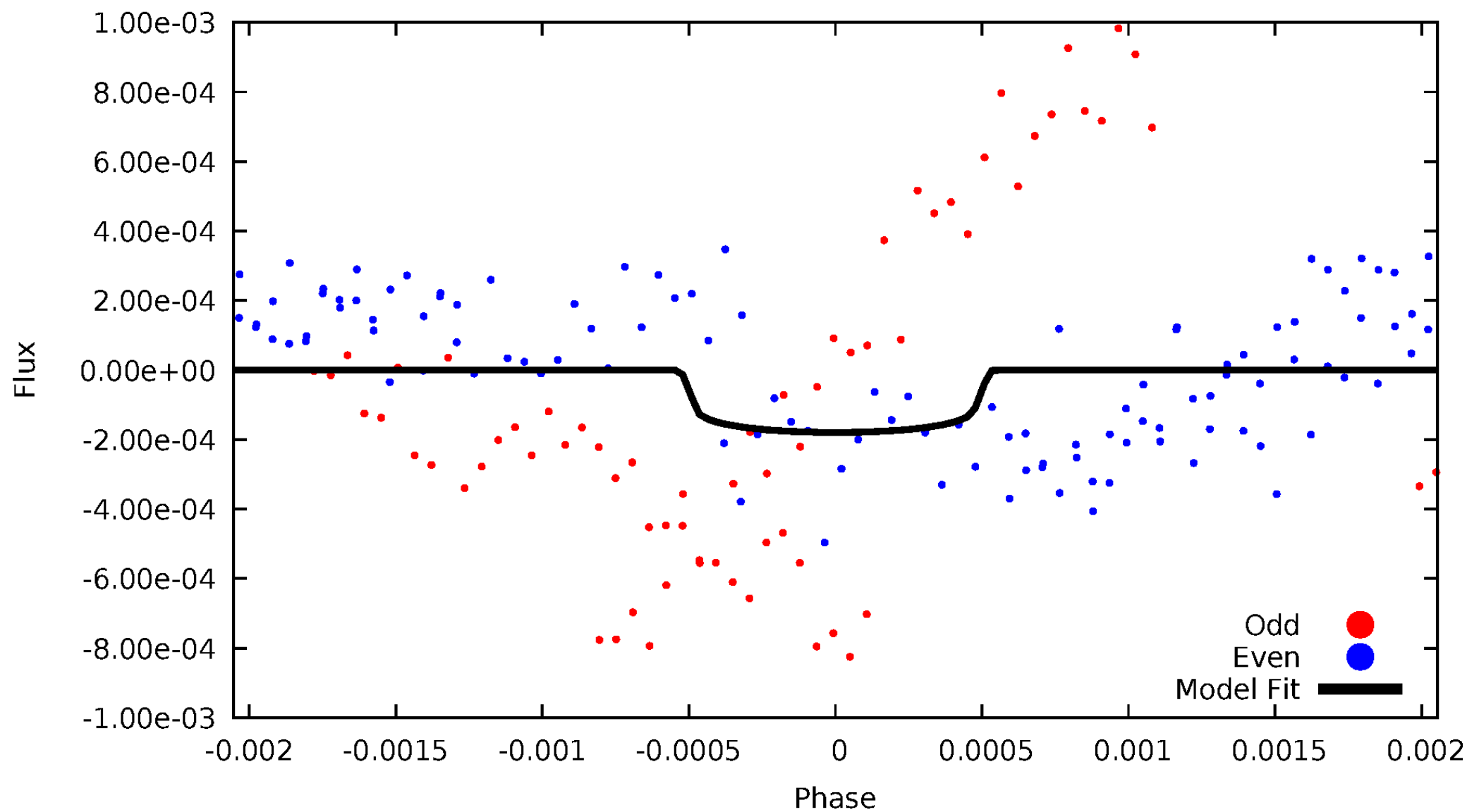


# TCE 009899193-02



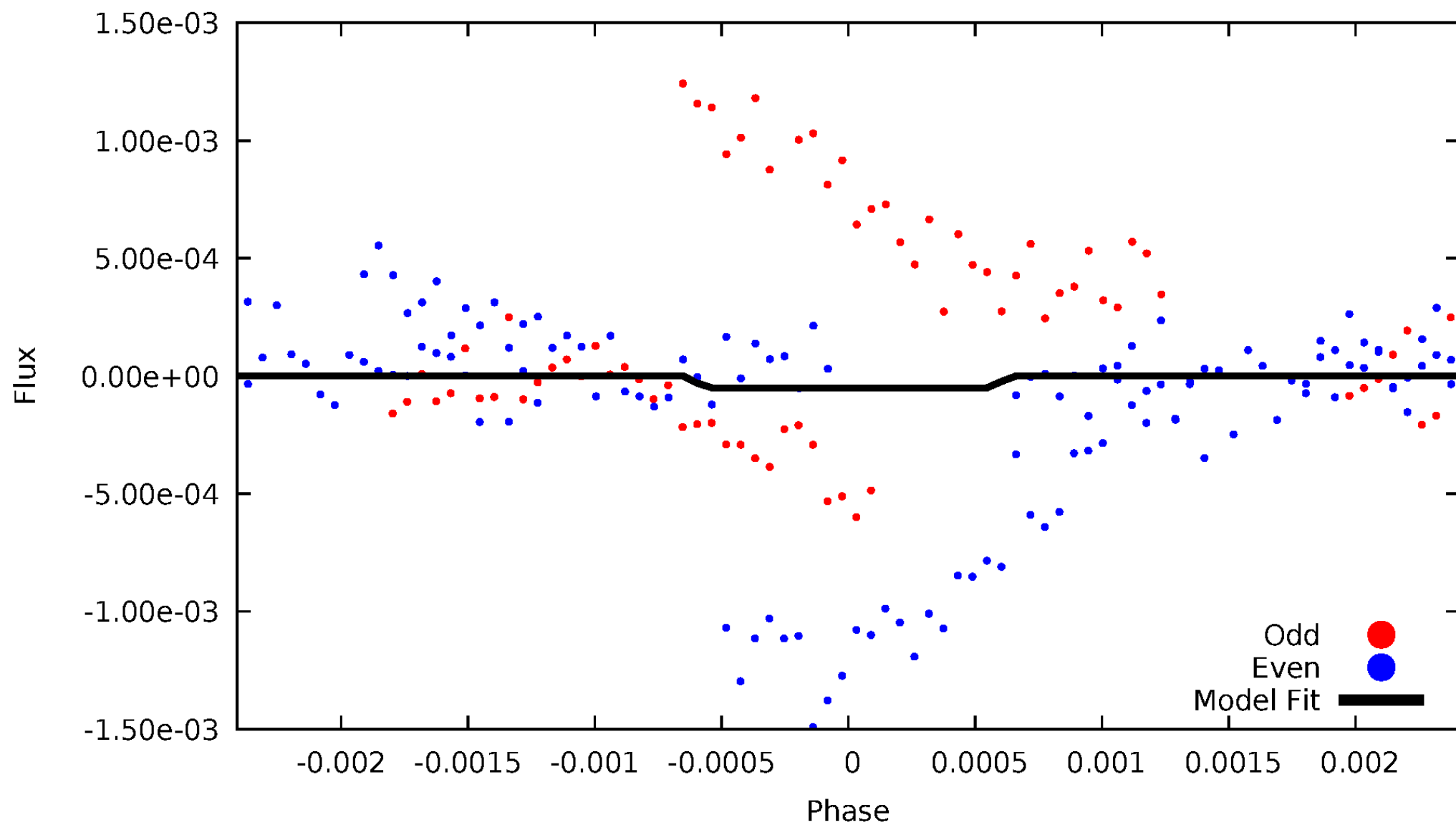
# DV Odd/Even

TCE 009899193-02



# ALT Odd/Even

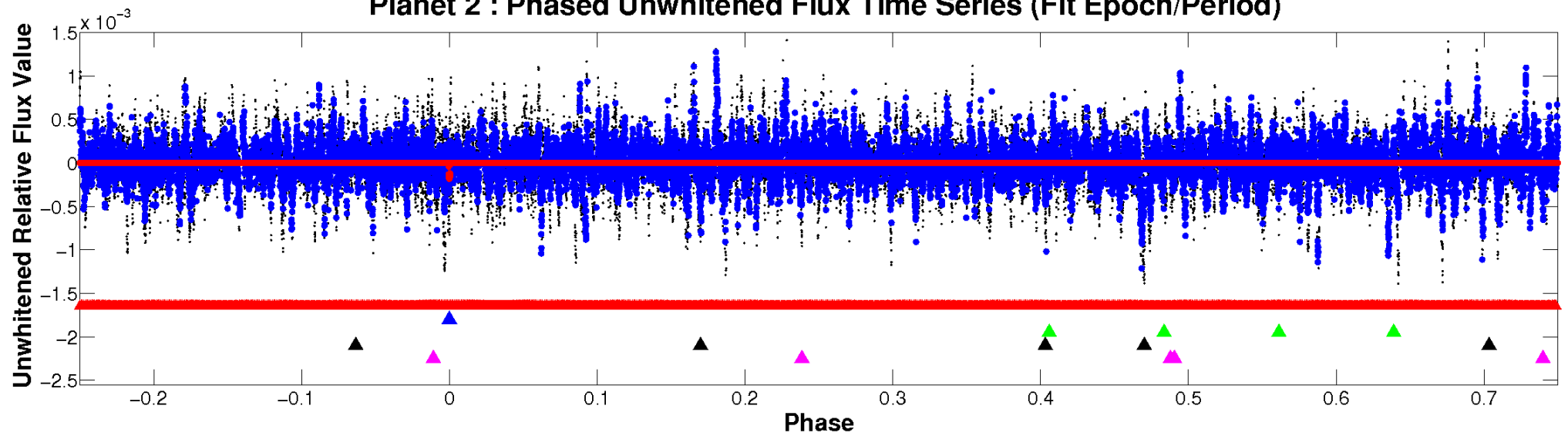
TCE 009899193-02



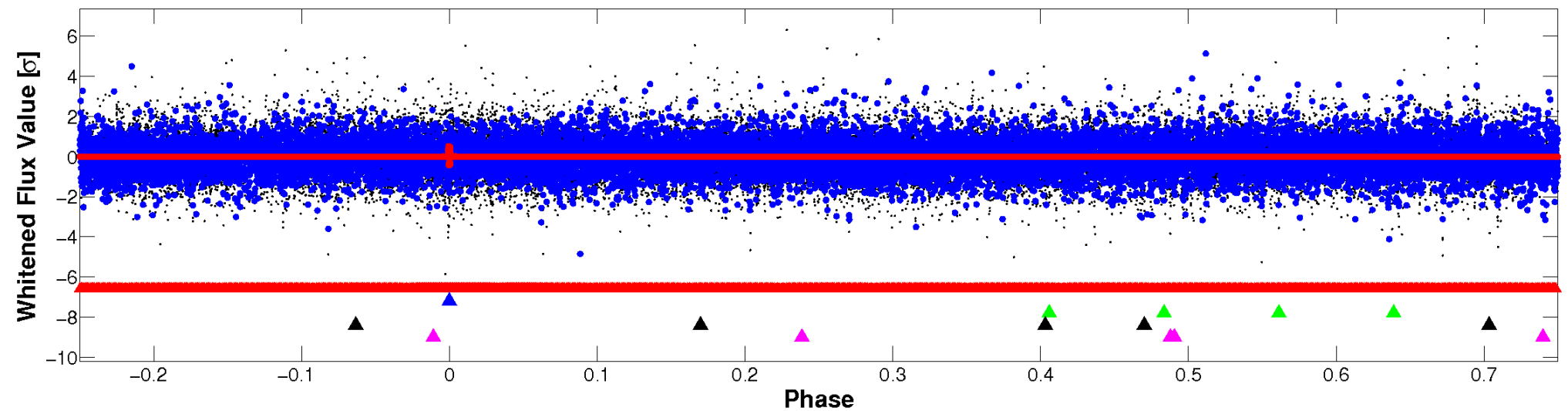


# Non-Whitened Vs. Whitened Light Curve

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

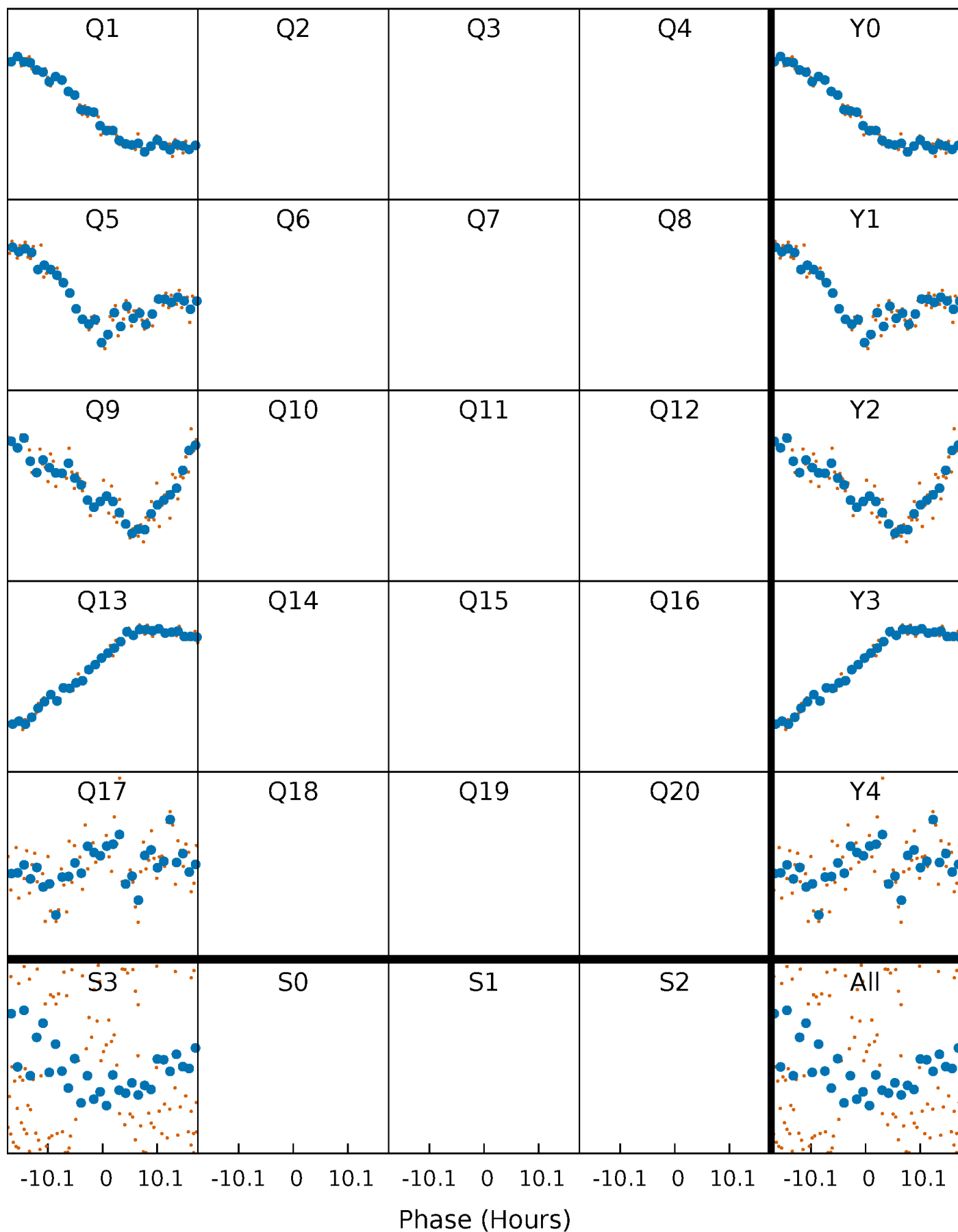


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



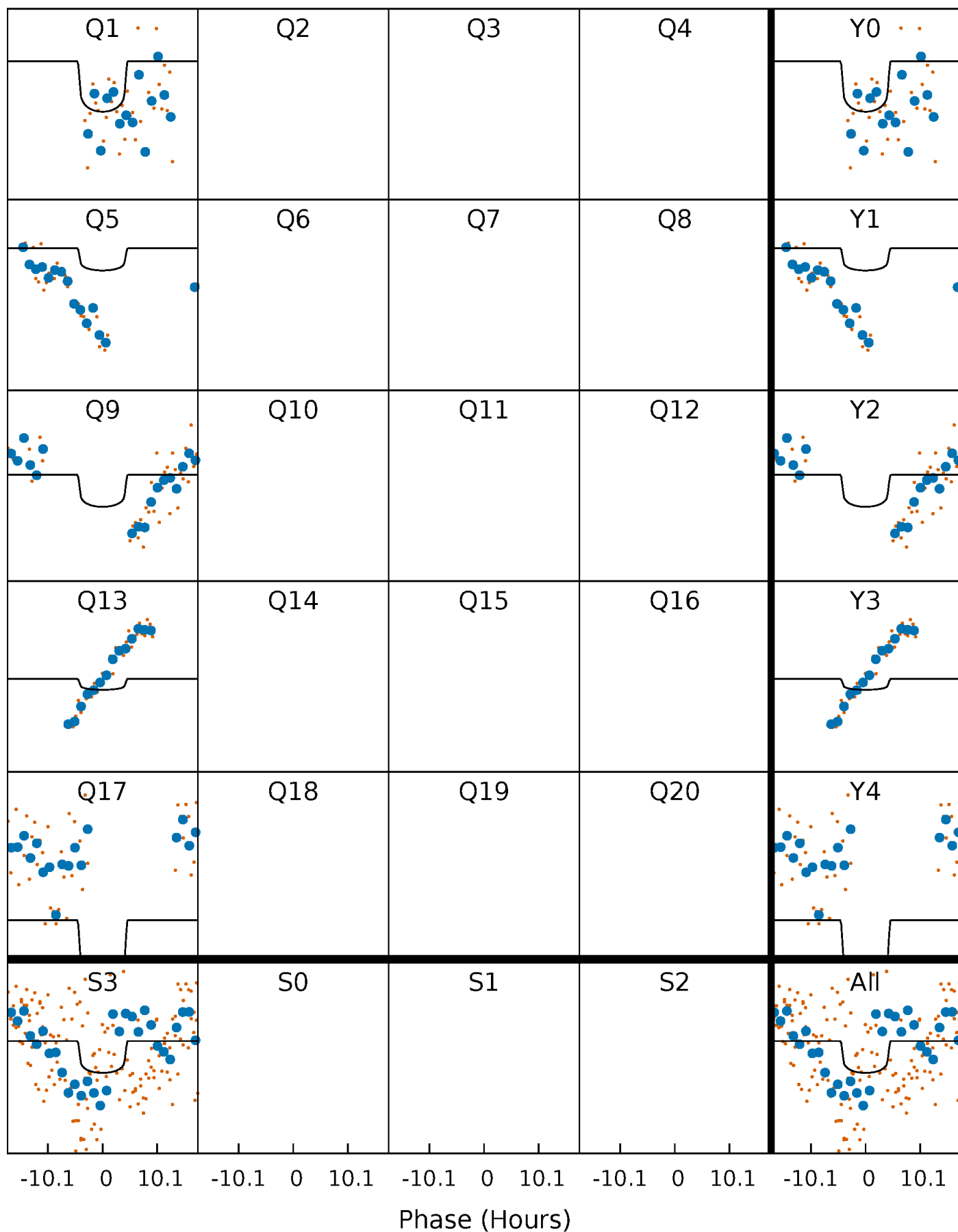
# PDC Quarter-Phased Transit Curves

TCE 009899193-02     $P=357.617755$  Days     $T_0=139.188060$  (BKJD)



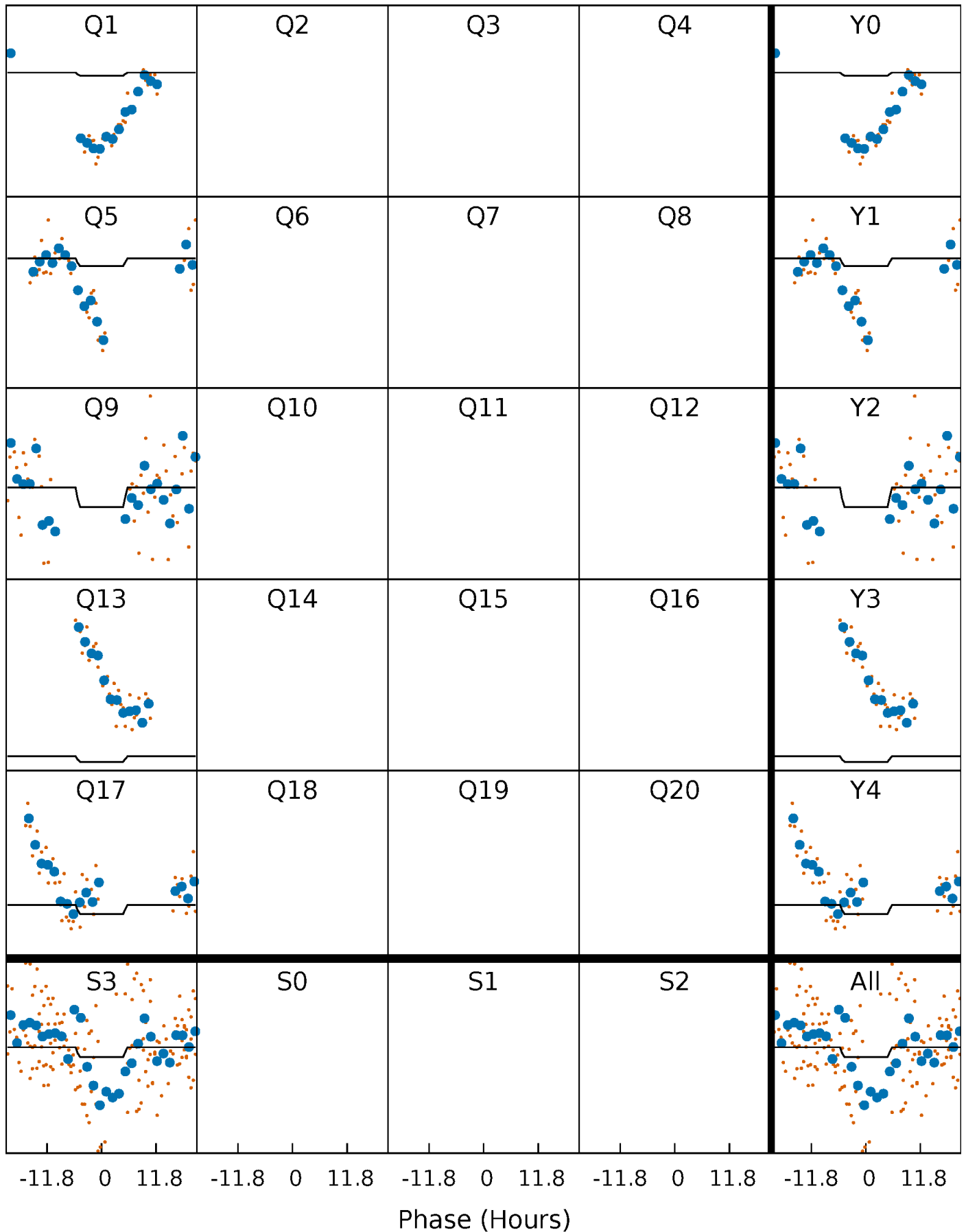
# DV Quarter-Phased Transit Curves

TCE 009899193-02     $P=357.617755$  Days     $T_0=139.188060$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

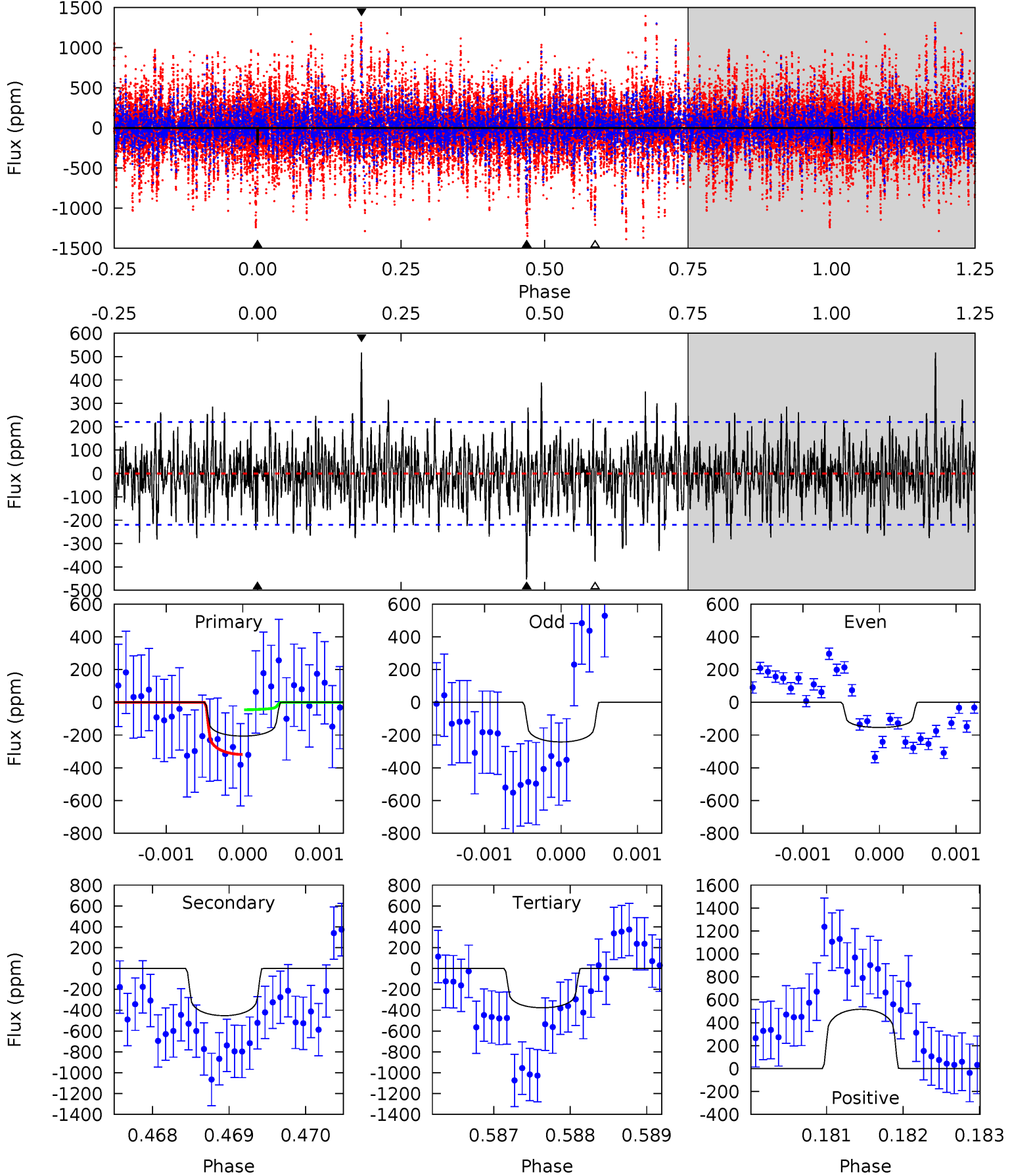
TCE 009899193-02     $P=357.587300$  Days     $T_0=139.224708$  (BKJD)



# DV Model-Shift Uniqueness Test

009899193-02, P = 357.617755 Days, E = 139.188060 Days

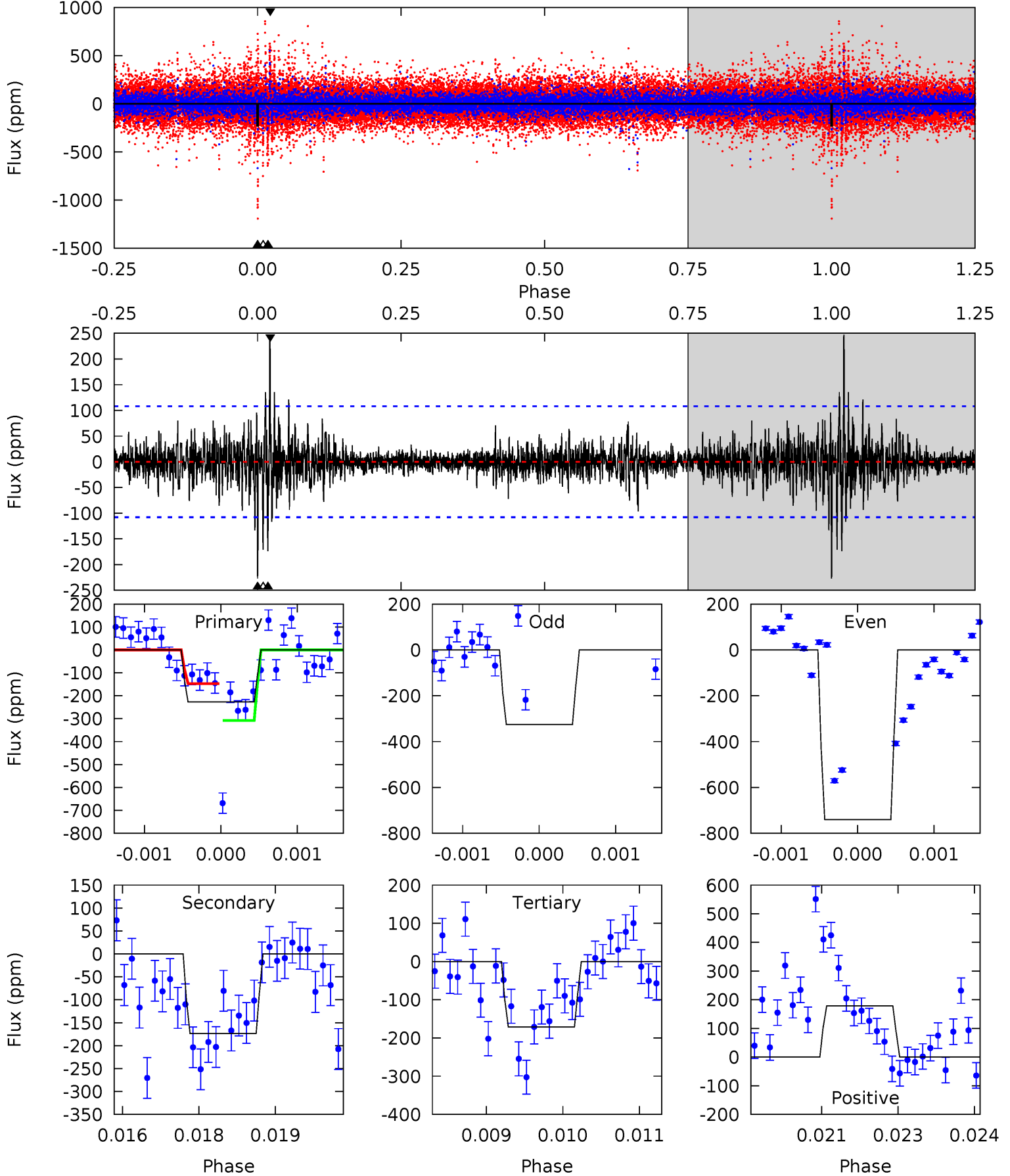
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.10	11.2	9.32	12.8	5.44	3.27	2.45	-4.22	-7.67	1.87	-1.58	1.07	1.82	0.53	3.35



# Alt Model-Shift Uniqueness Test

009899193-02, P = 357.587300 Days, E = 139.224708 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
11.4	8.71	8.58	8.96	5.41	3.23	1.26	2.80	2.42	0.13	-0.25	11.9	1.02	0.52	0



### Stellar Parameters For KIC 009899193

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6600^{+161}_{-181}$	$4.047^{+0.234}_{-0.126}$	$-0.400^{+0.300}_{-0.300}$	$1.681^{+0.363}_{-0.444}$	$1.148^{+0.196}_{-0.142}$	$0.341^{+0.442}_{-0.133}$
	+2%/-3%	+6%/-3%	+75%/-75%	+22%/-26%	+17%/-12%	+130%/-39%
Source	PHO1	FLK73	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 009899193-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-453 \pm 40$	$2.82^{+2.28}_{-1.79}$	$513^{+36}_{-36}$	$7755^{+9473}_{-2047}$	$34141^{+210337}_{-24115}$
Alt.	$-174 \pm 20$	$2.21^{+2.19}_{-1.53}$	$514^{+32}_{-39}$	$6835^{+8851}_{-1910}$	$21400^{+200227}_{-16027}$

$T_{max}$  = 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

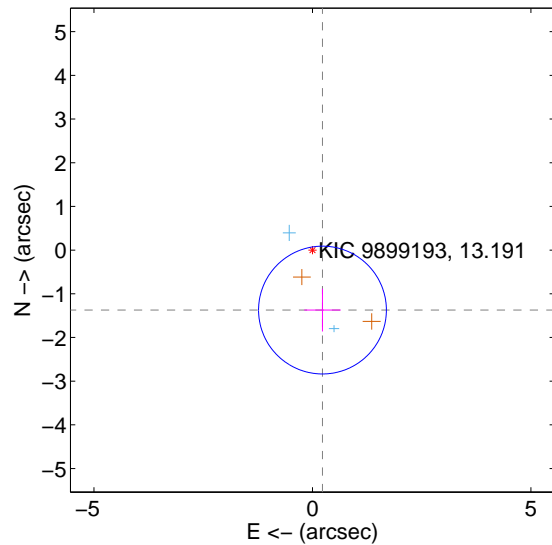
Supplemental centroid analysis for 009899193-02. Kepler magnitude: 13.19. Transit SNR 2.96

There are 2 quarters with good PRF difference image offsets

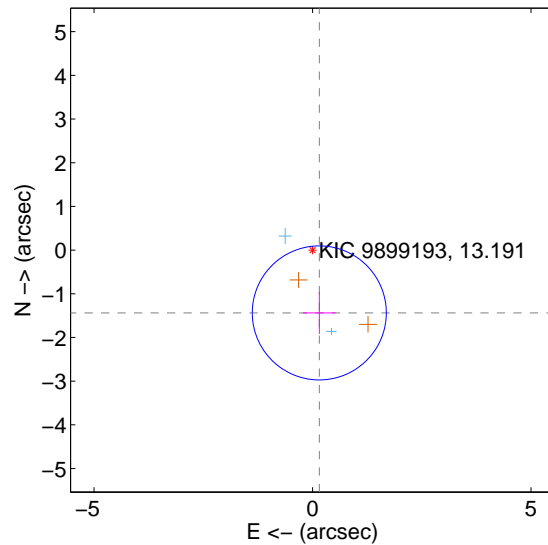
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.392 \pm 0.488$	2.85	$-0.230 \pm 0.417$	$-1.373 \pm 0.489$
PRF-fit source offset from KIC position	$1.446 \pm 0.511$	2.83	$-0.155 \pm 0.375$	$-1.438 \pm 0.479$
photometric centroid source offset	$1.31 \pm 1.10$	1.19	$0.58 \pm 1.11$	$1.18 \pm 1.10$

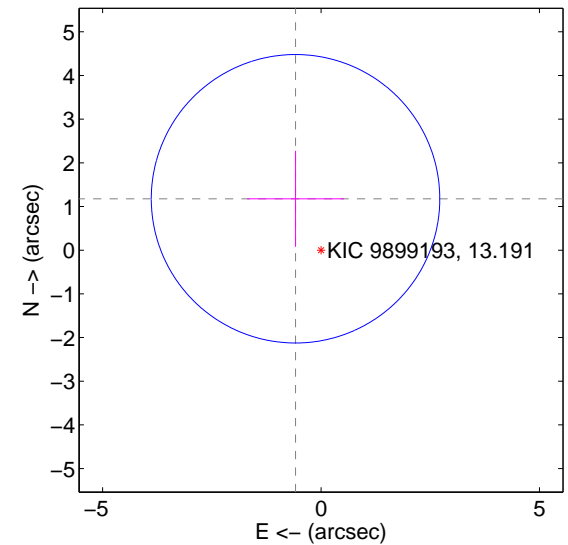
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

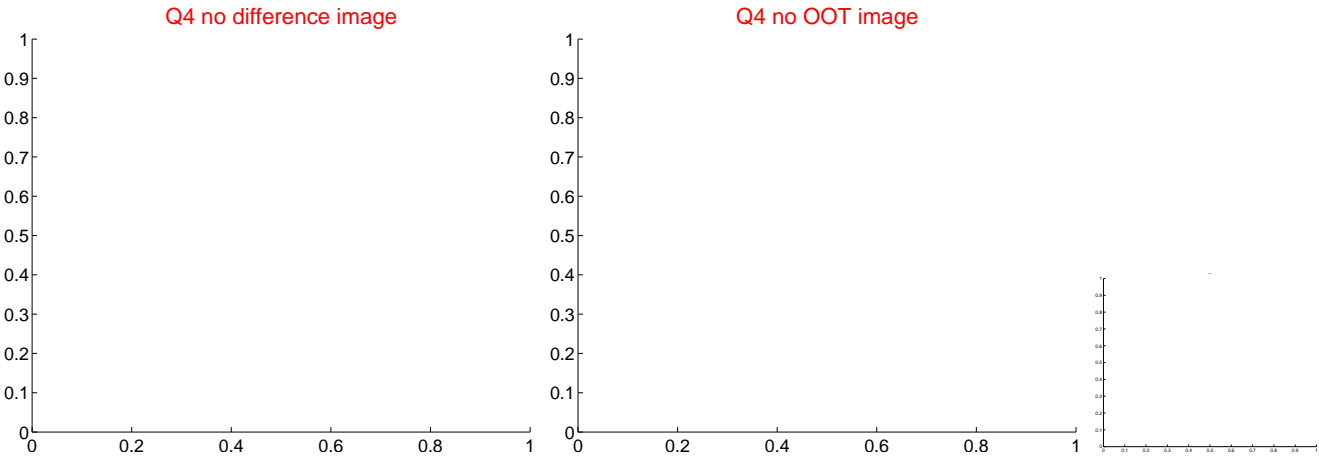
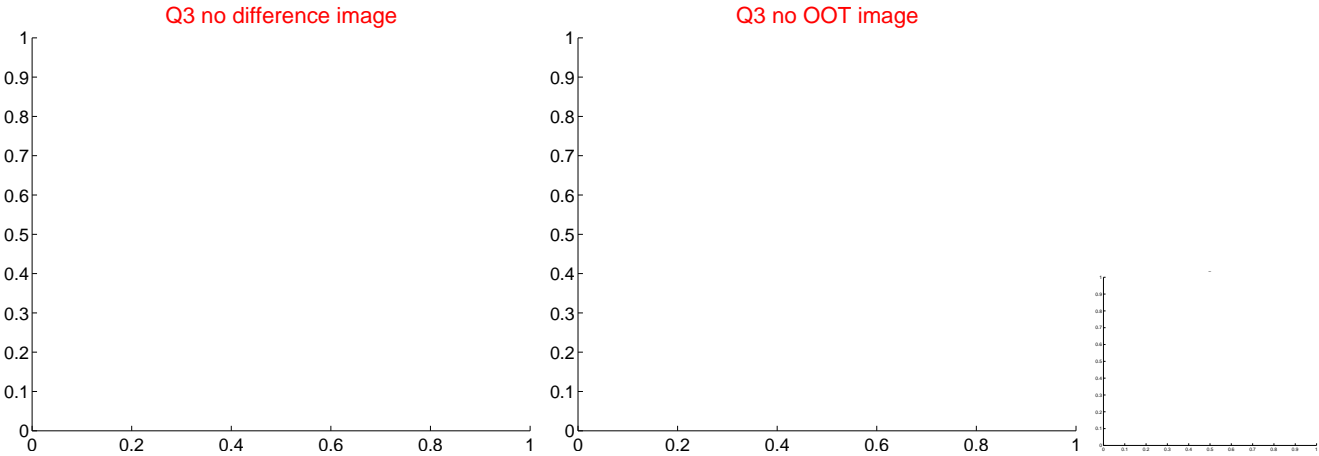
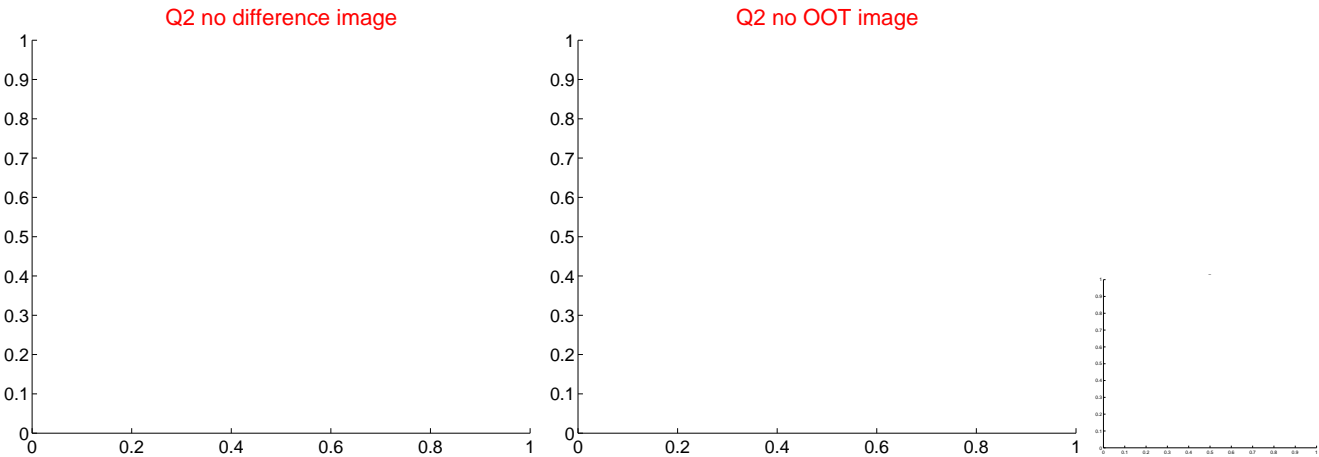
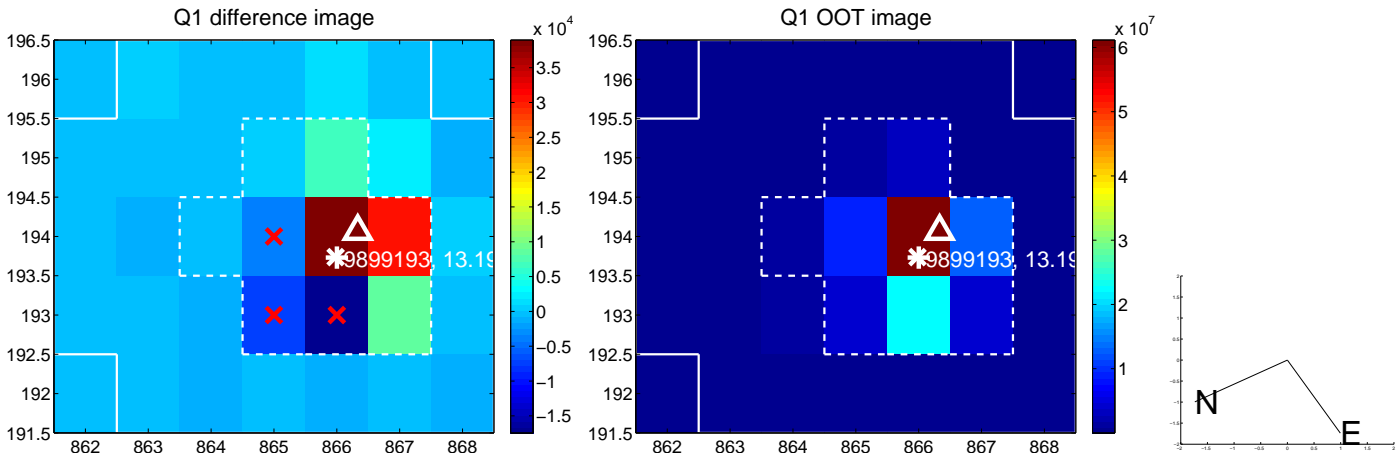


offset from photometric centroids

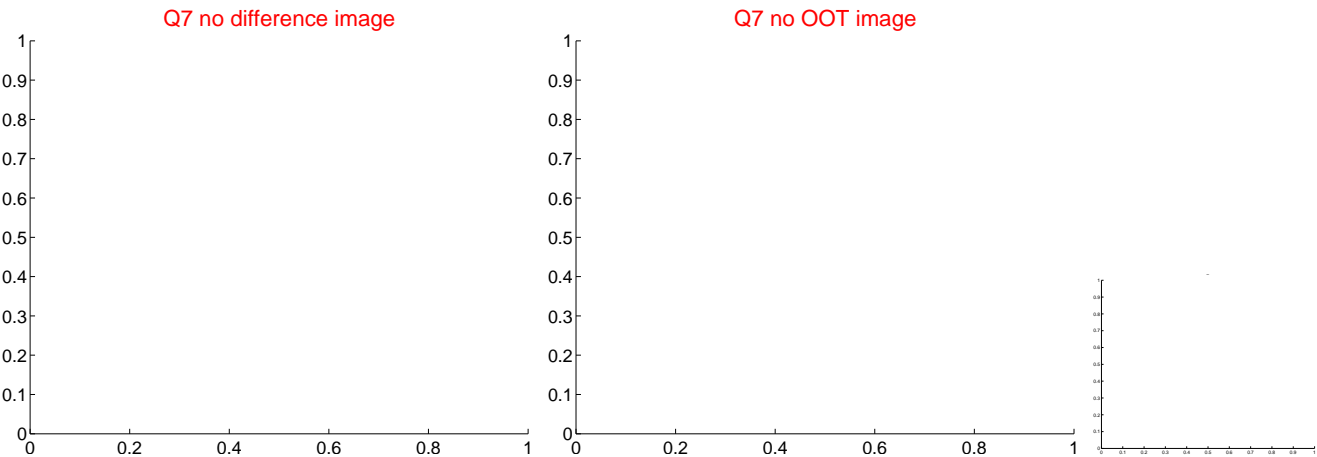
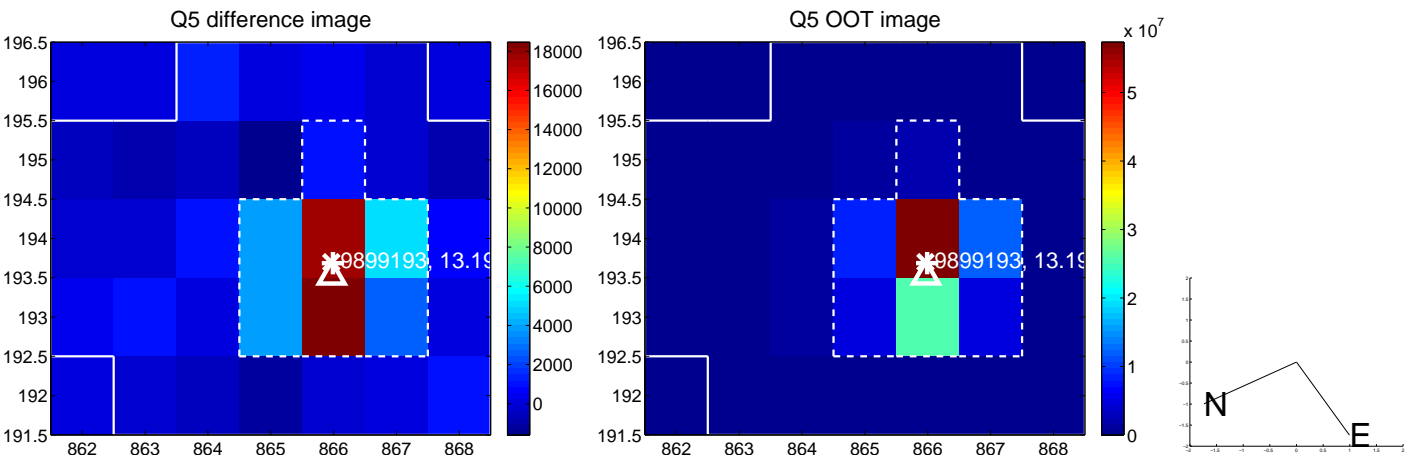


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

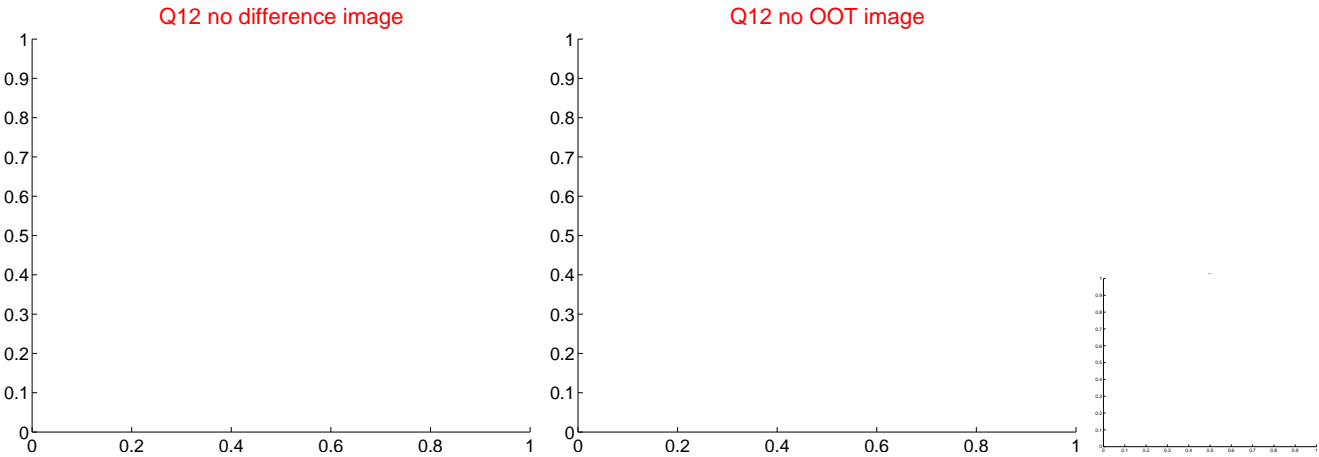
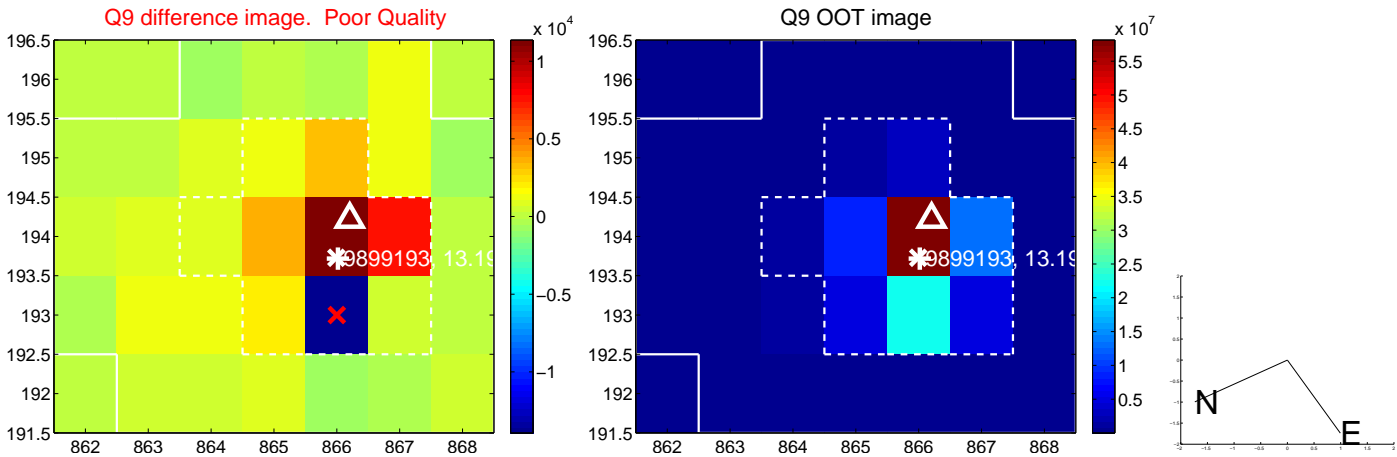
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



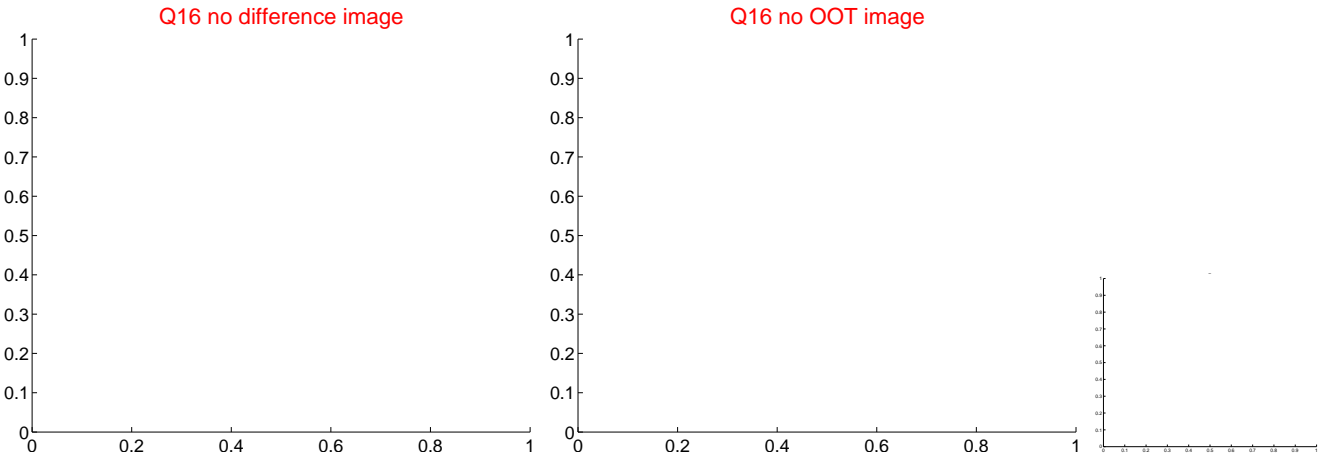
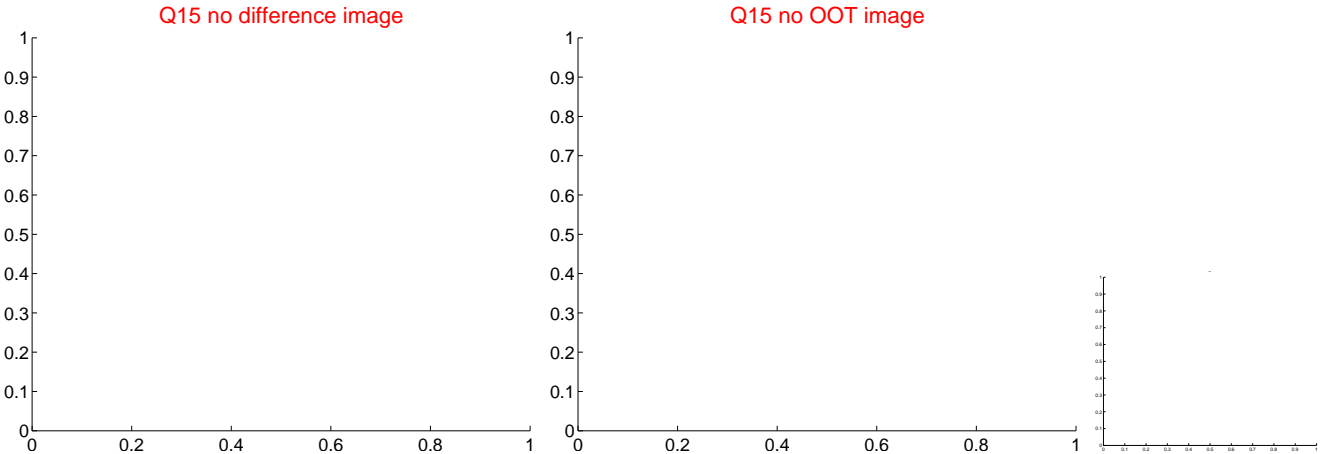
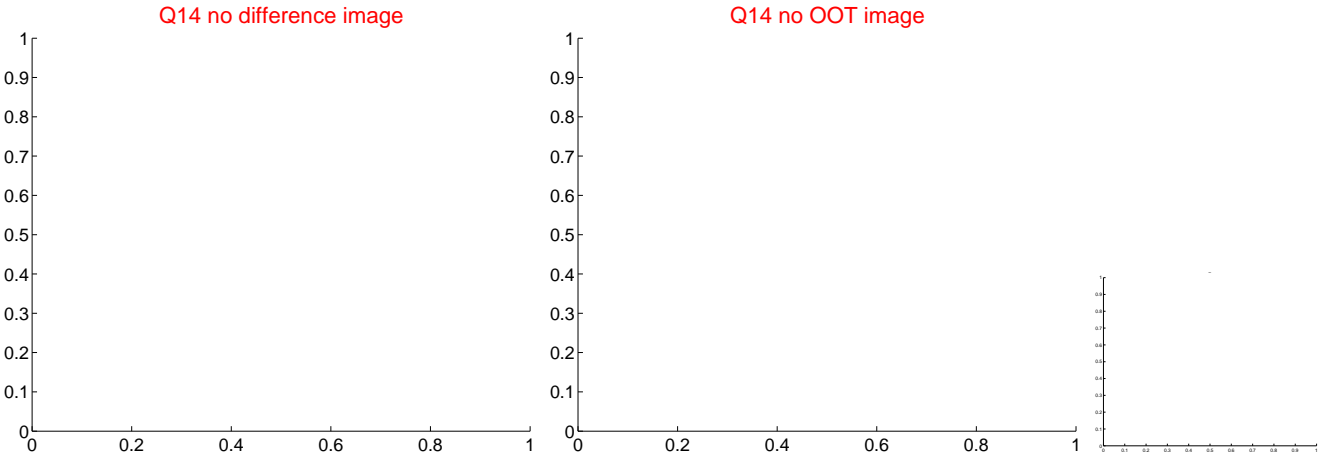
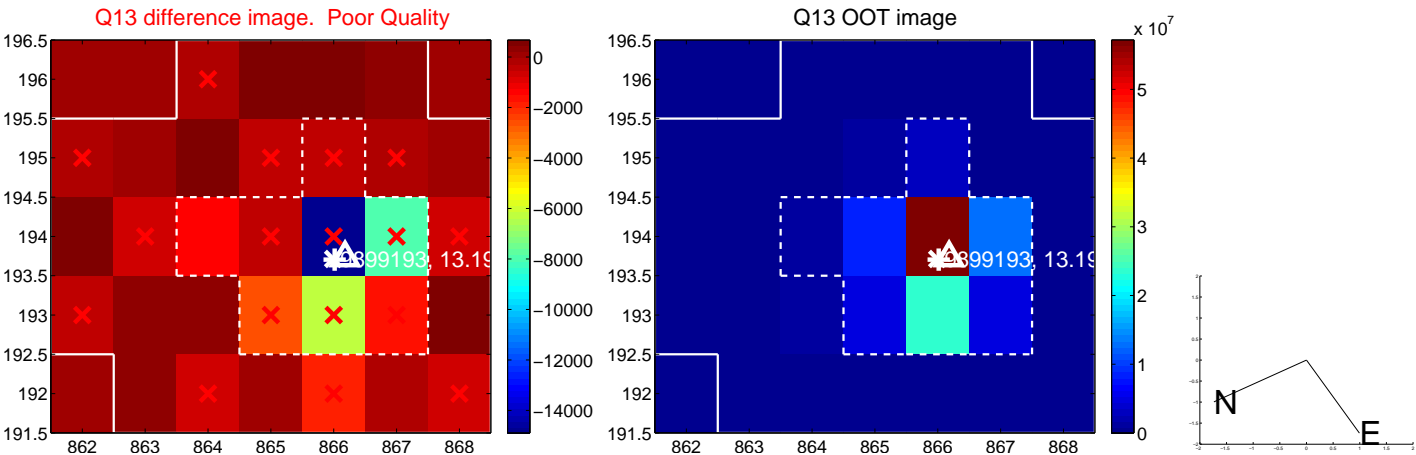
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



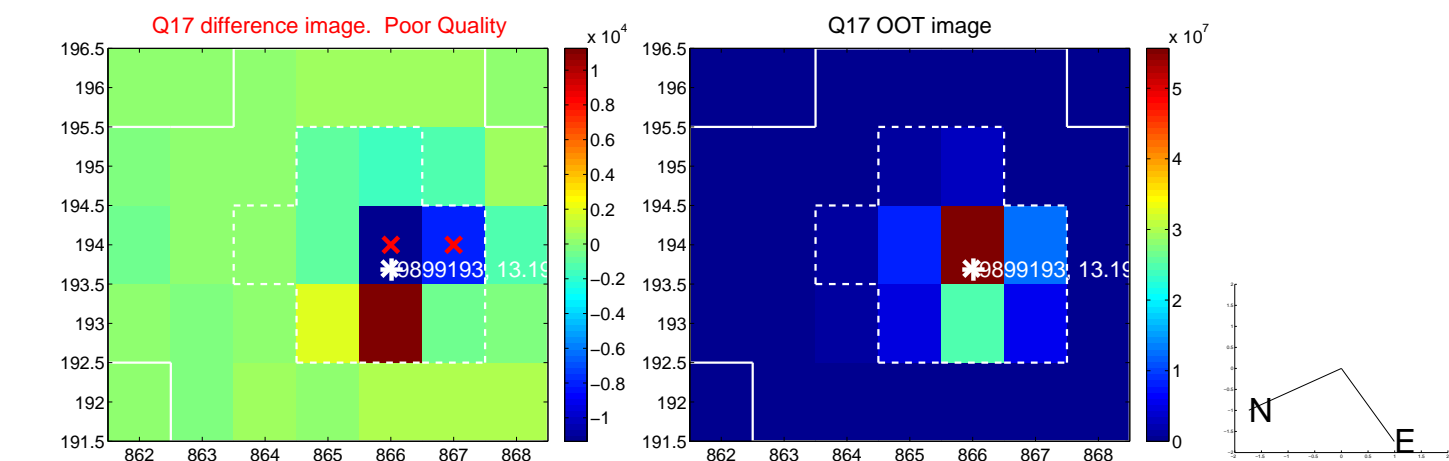
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



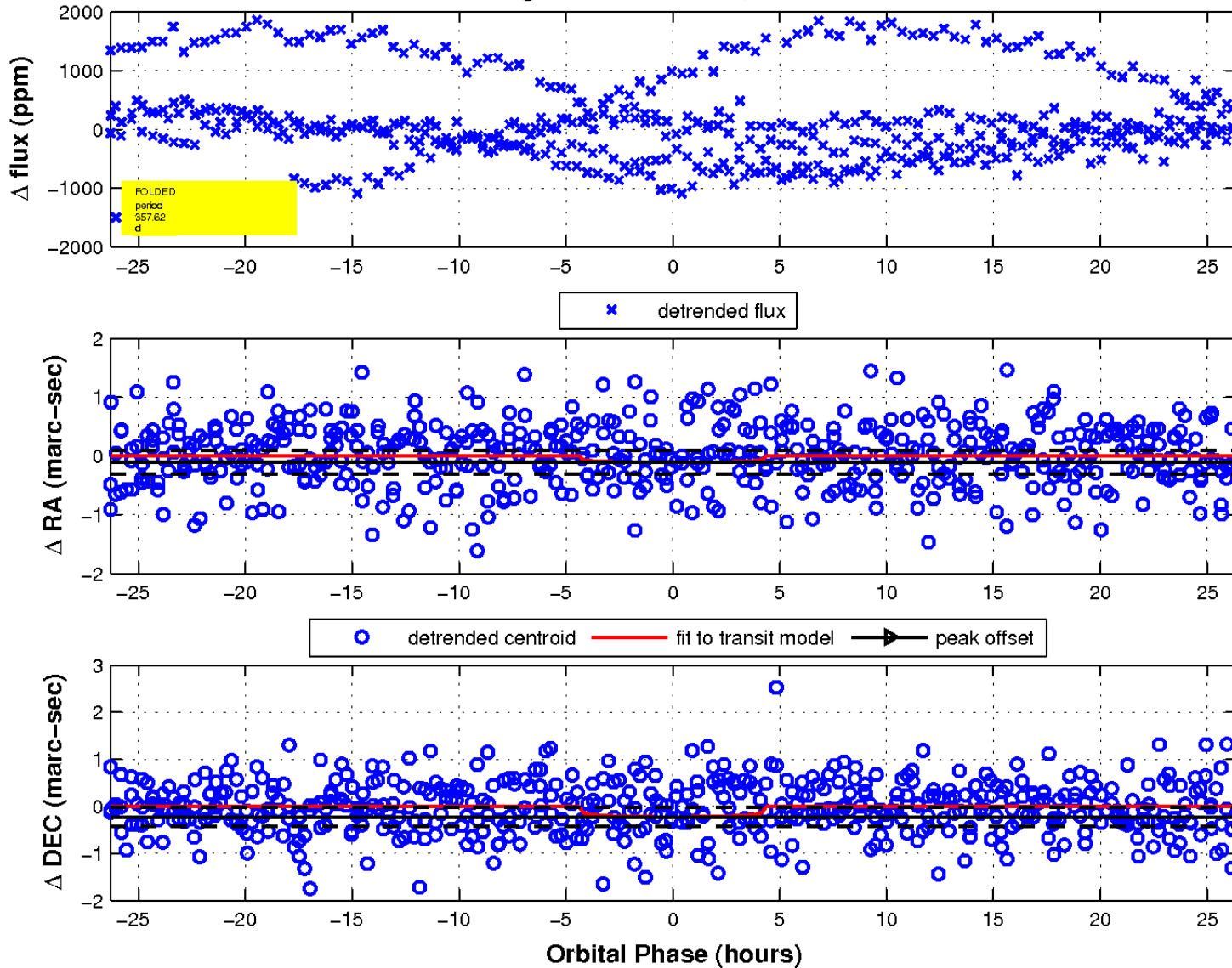
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

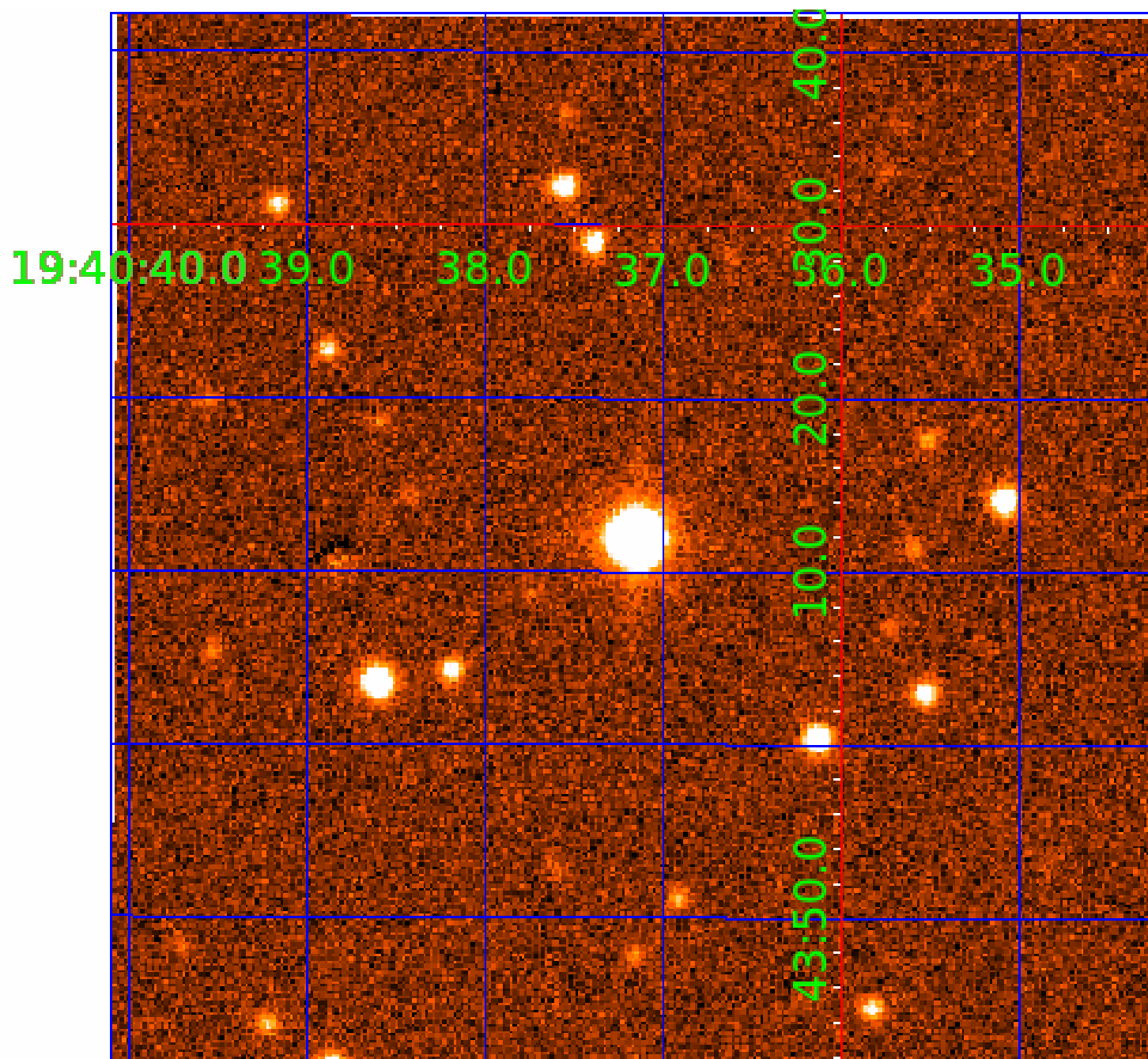


fluxWeightedCentroids, Planet 2 of 5



UKIRT Image

Declination





# KIC 009899193

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009899193-01	OBS	7244.01	1.332555	132.055627	26.9	4.996	10.7	10.3	1.68	6600	0.99	7795.94
009899193-02	OBS	No	357.617755	139.188060	179.5	8.811	11.6	3.0	1.68	6600	2.41	4.50
009899193-04	OBS	No	274.200911	283.381188	476.2	12.026	9.9	6.4	1.68	6600	4.32	6.42
009899193-05	OBS	No	268.456836	313.652382	363.0	5.741	8.8	5.9	1.68	6600	3.45	6.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009899193-01	OBS	FP	0.00	0	0	1	1	HALO_GHOST—EPHEM_MATCH
009899193-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009899193-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009899193-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—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.

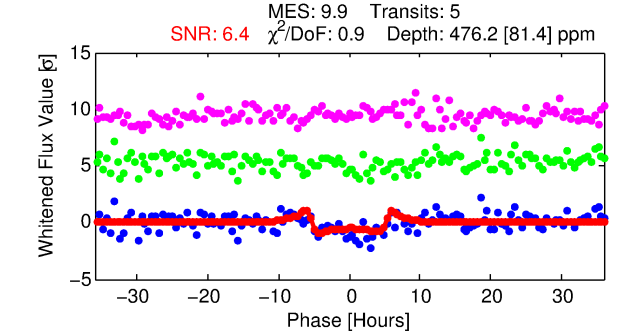
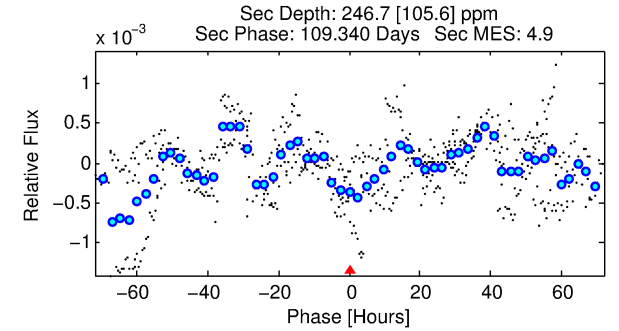
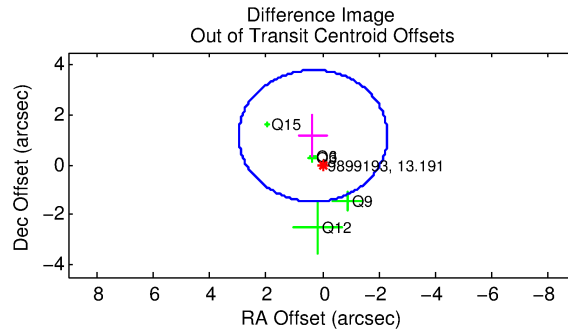
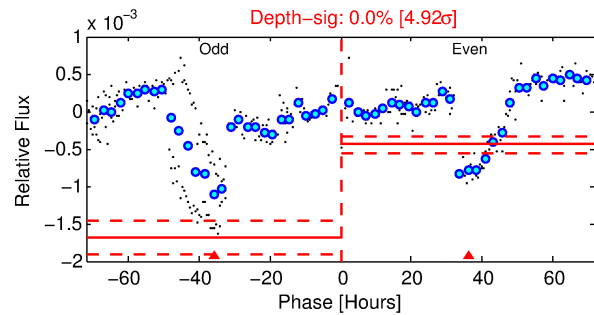
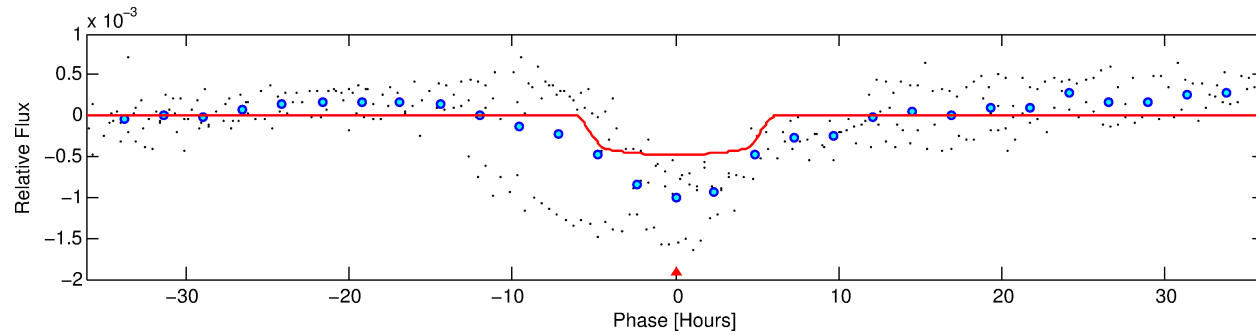
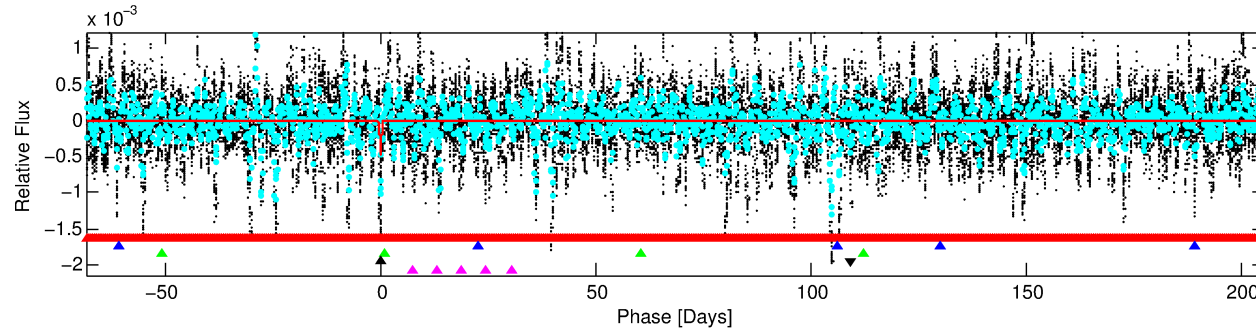
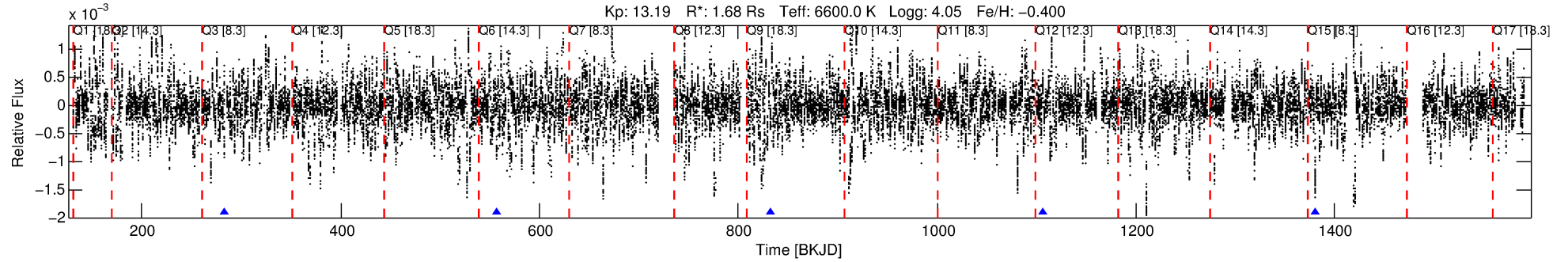
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009899193-04

No Significant Match Found

# DV One-Page Summary

KIC: 9899193 Candidate: 4 of 5 Period: 274.201 d  
KOI: K07244 Corr: No Ephemeris Match



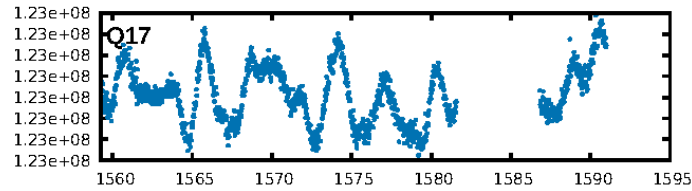
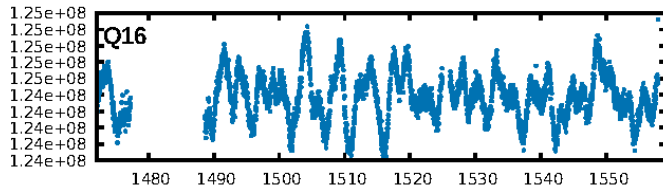
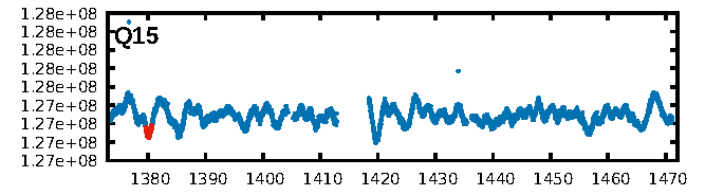
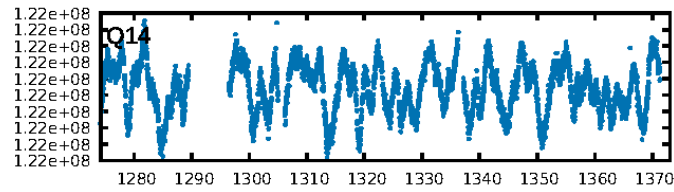
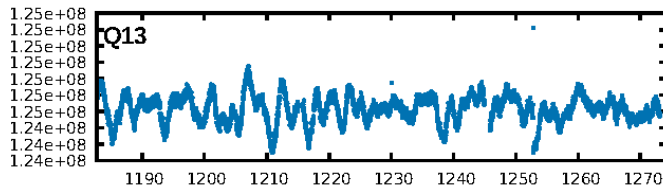
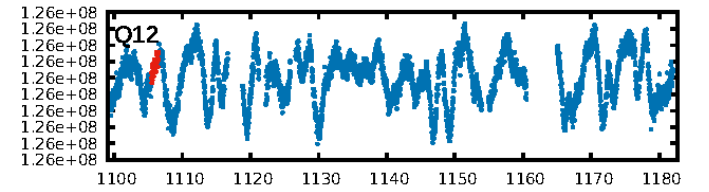
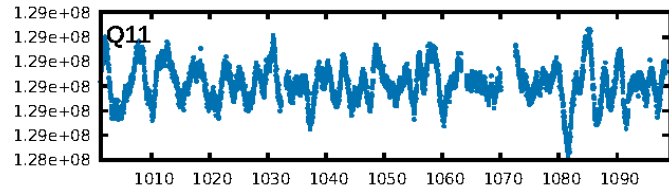
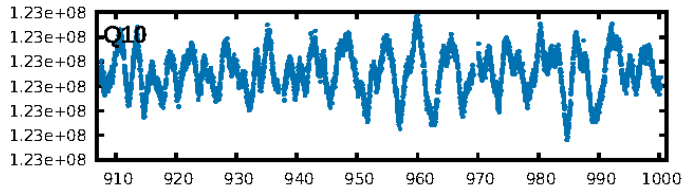
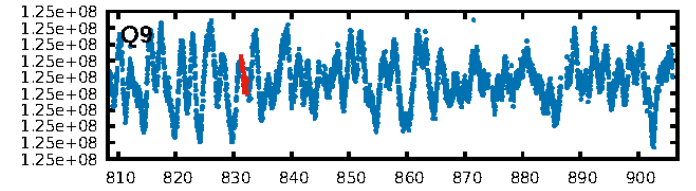
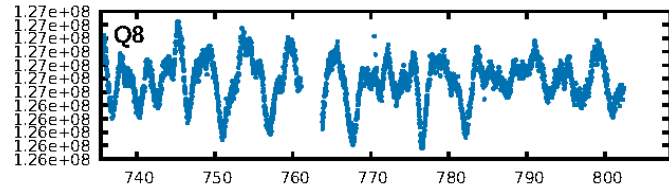
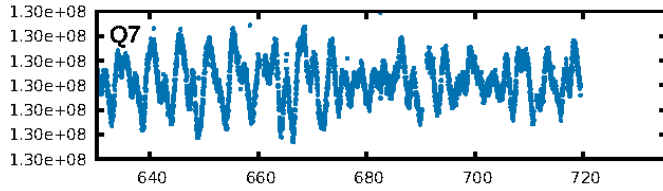
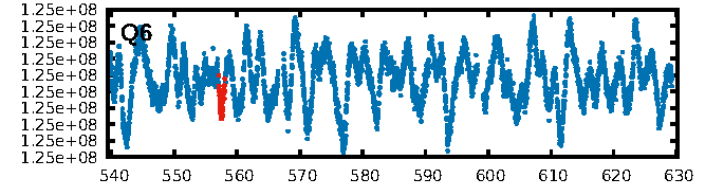
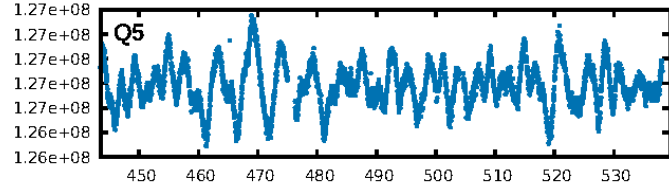
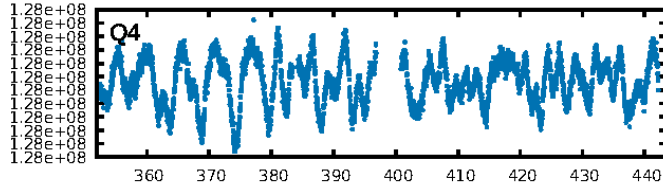
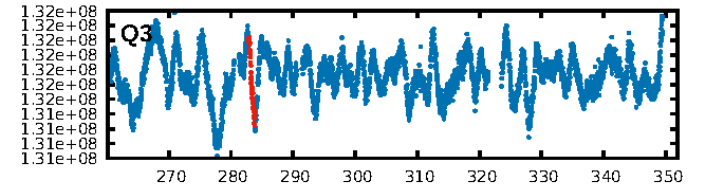
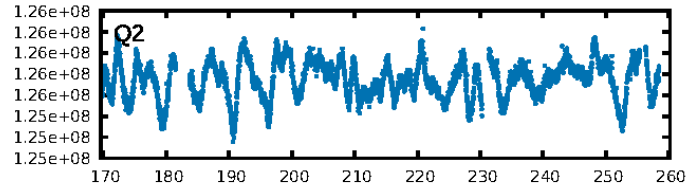
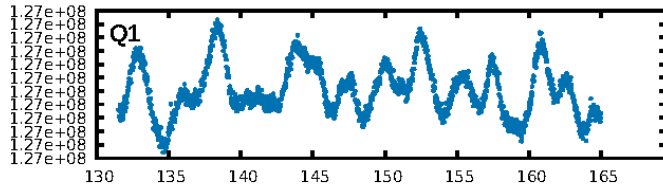
## DV Fit Results:

Period = 274.20091 [0.00501] d  
Epoch = 283.3812 [0.0122] BKJD  
Rp/R\* = 0.0235 [0.0024]  
a/R\* = 81.23 [18.74]  
b = 0.91 [0.04]  
Seff = 6.42 [2.66]  
Teq = 406 [42] K  
Rp = 4.32 [1.22] Re  
a = 0.8652 [0.2176] AU  
Ag = 5452.37 [3383.12] [1.61σ]  
Teffp = 5392 [656] K [7.58σ]

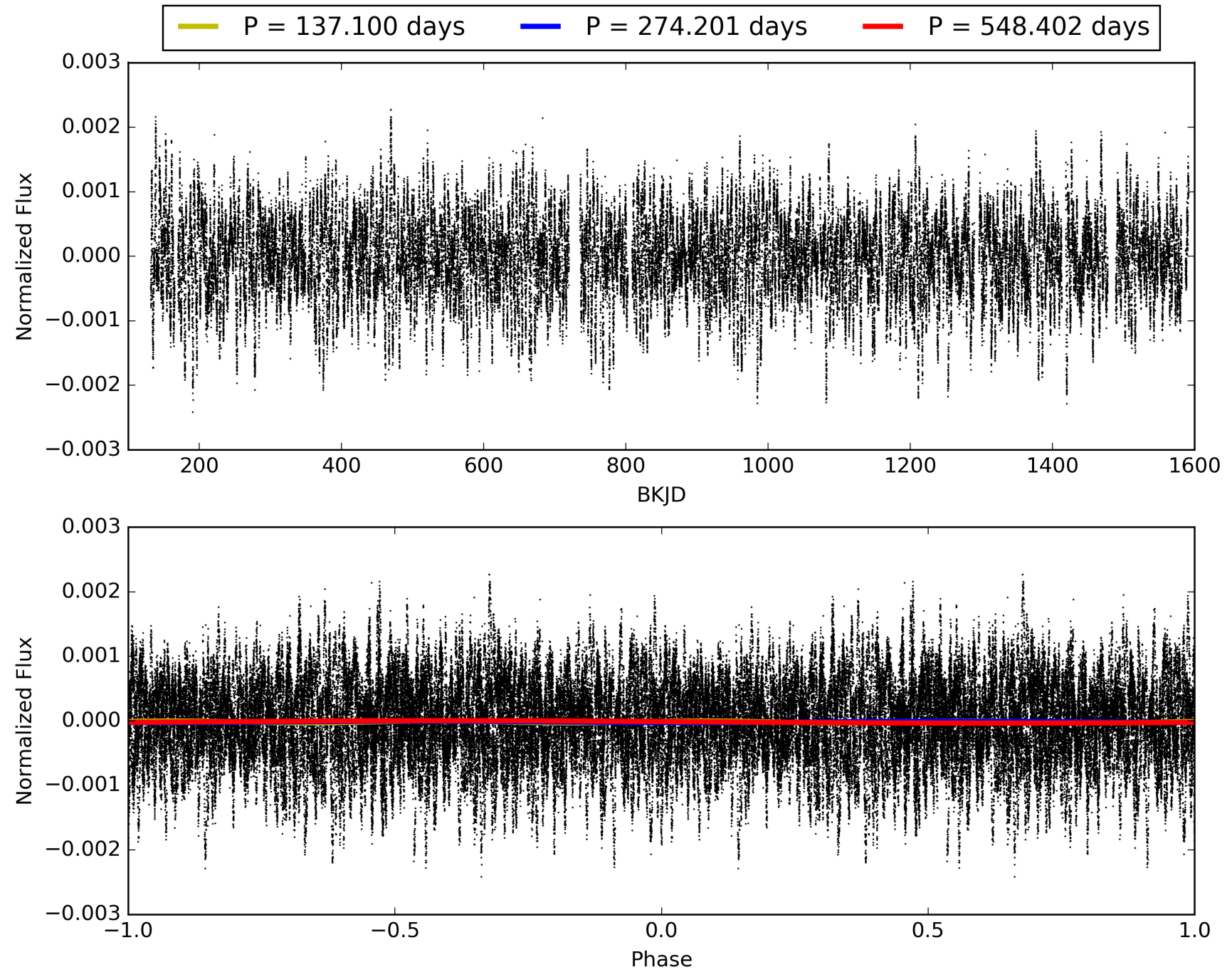
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [10.34σ]  
LongPeriod-sig: 100.0% [134.28σ]  
ModelChiSquare2-sig: 57.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 8.29e-11**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.07452  
Centroid-sig: 43.9%  
Centroid-so: 0.318 arcsec [0.87σ]  
OotOffset-rm: 1.201 arcsec [1.37σ]  
KicOffset-rm: 1.169 arcsec [2.23σ]  
OotOffset-st: 1/2/1/1 [5]  
KicOffset-st: 1/2/1/1 [5]  
DiffImageQuality-fgm: 0.60 [3/5]  
DiffImageOverlap-fno: 0.00 [0/5]

# TCE 009899193-04, PDC Light Curves

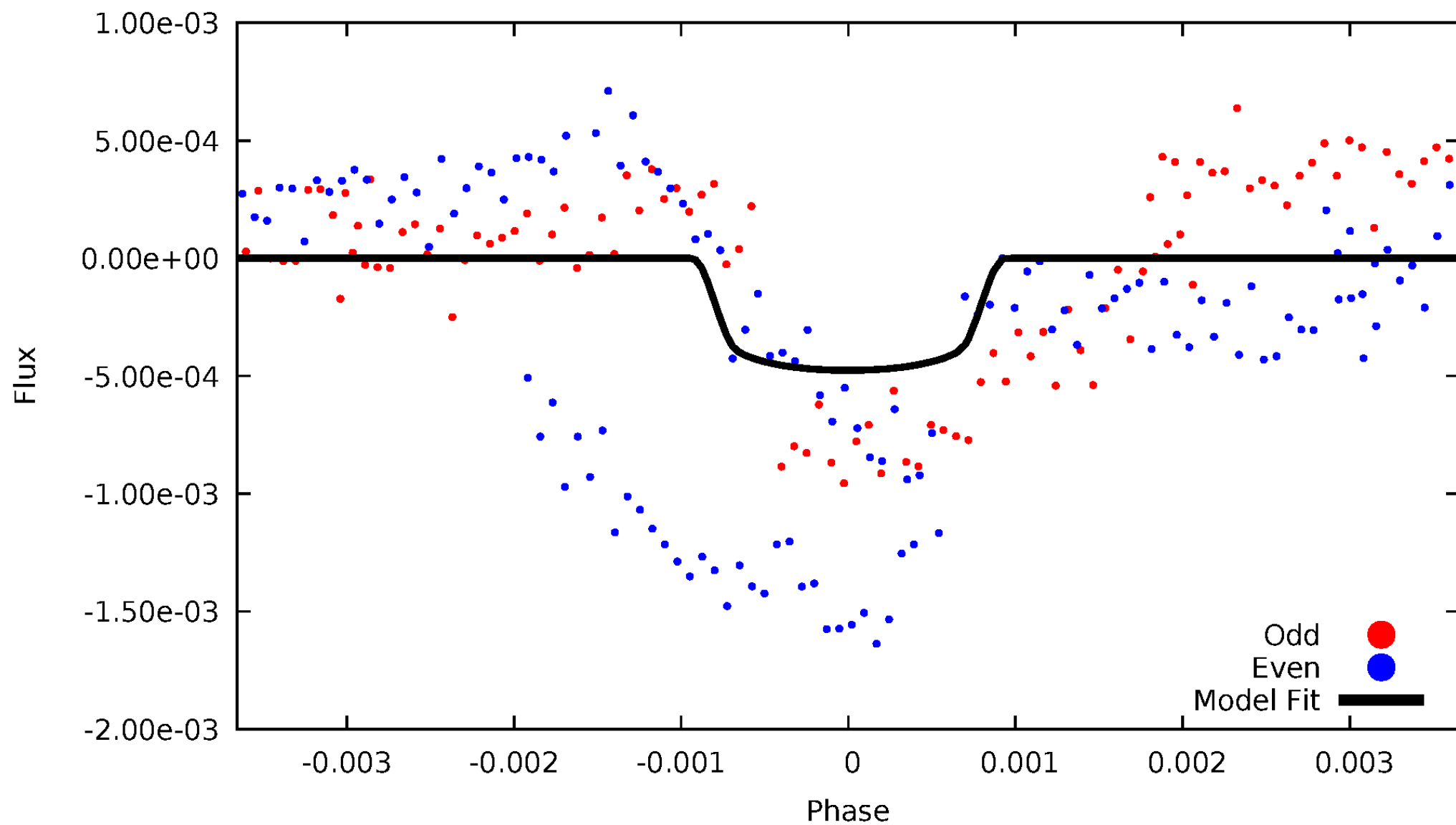


# TCE 009899193-04



# DV Odd/Even

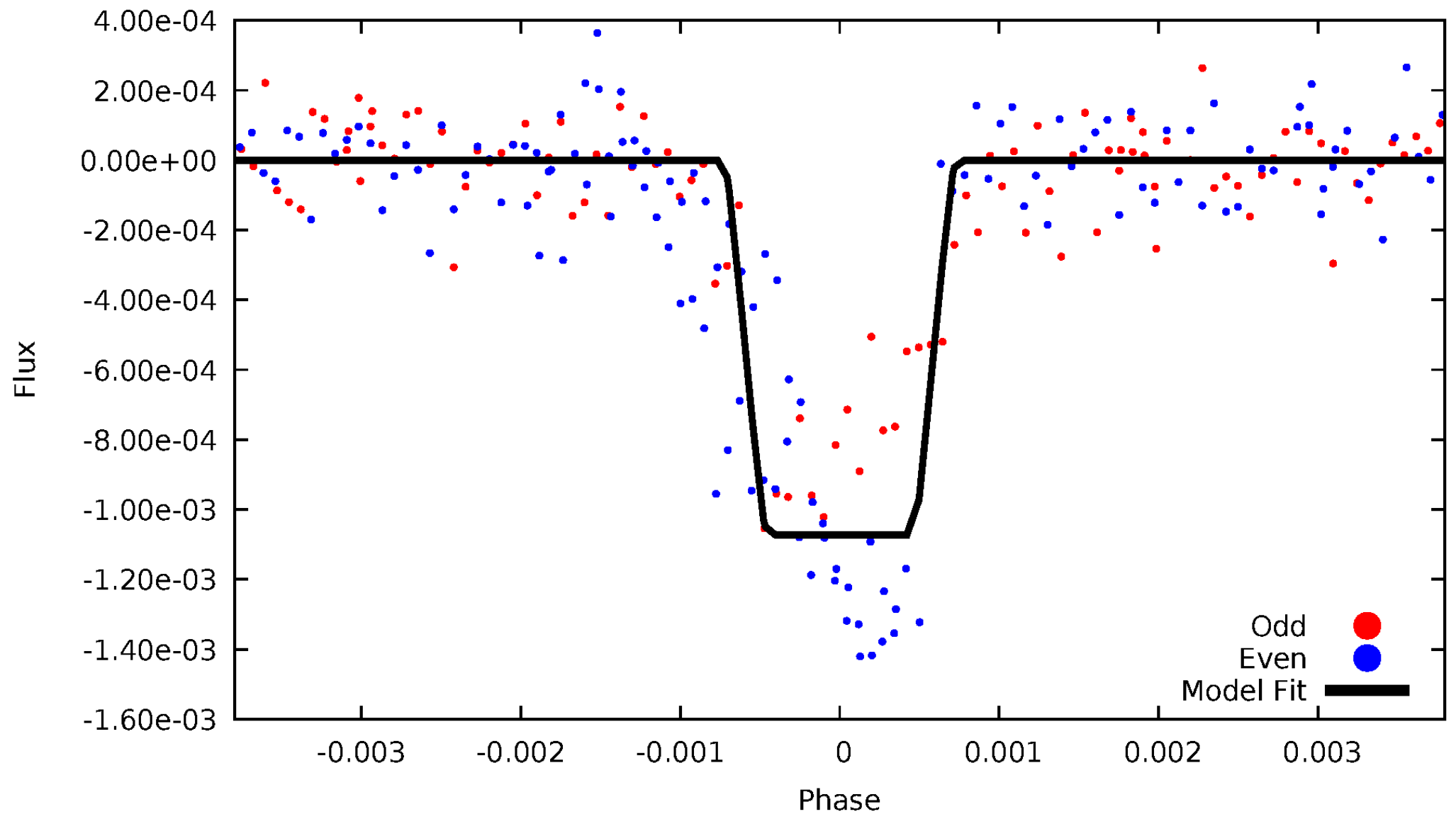
TCE 009899193-04





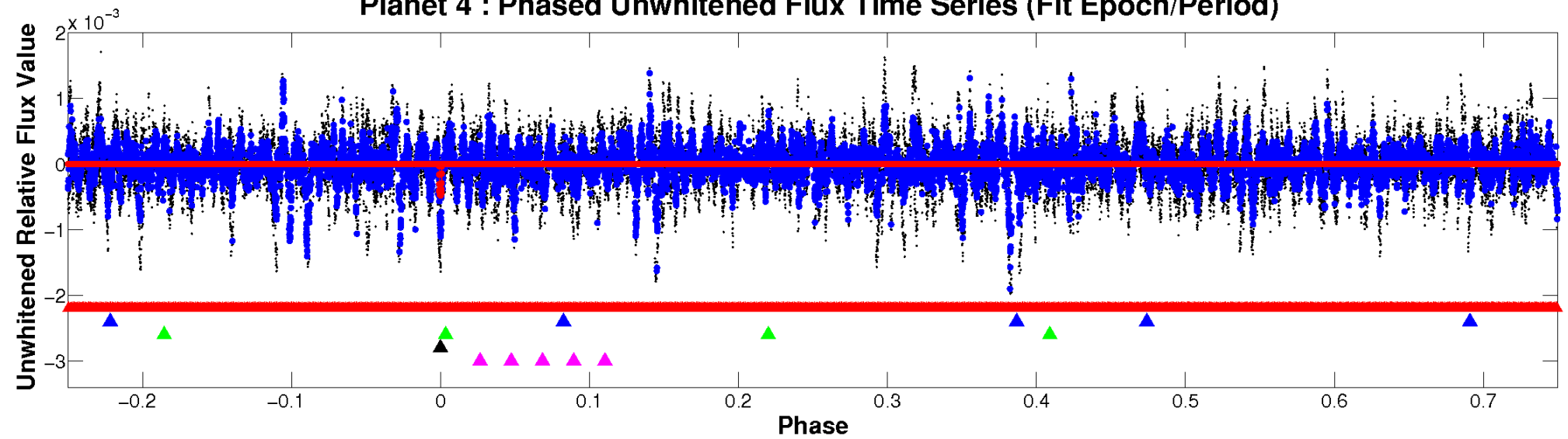
# ALT Odd/Even

TCE 009899193-04

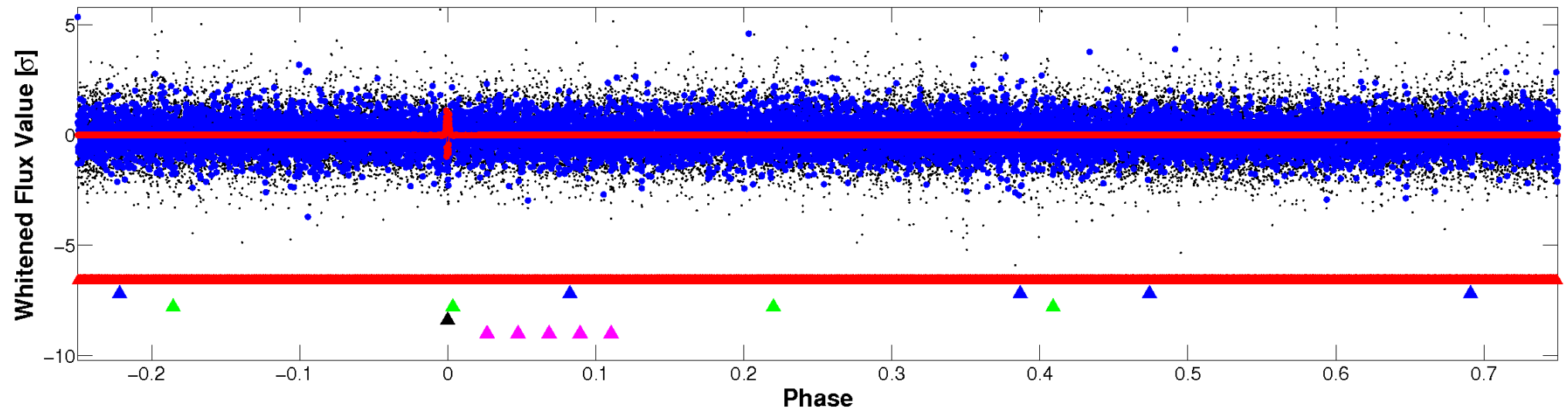


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

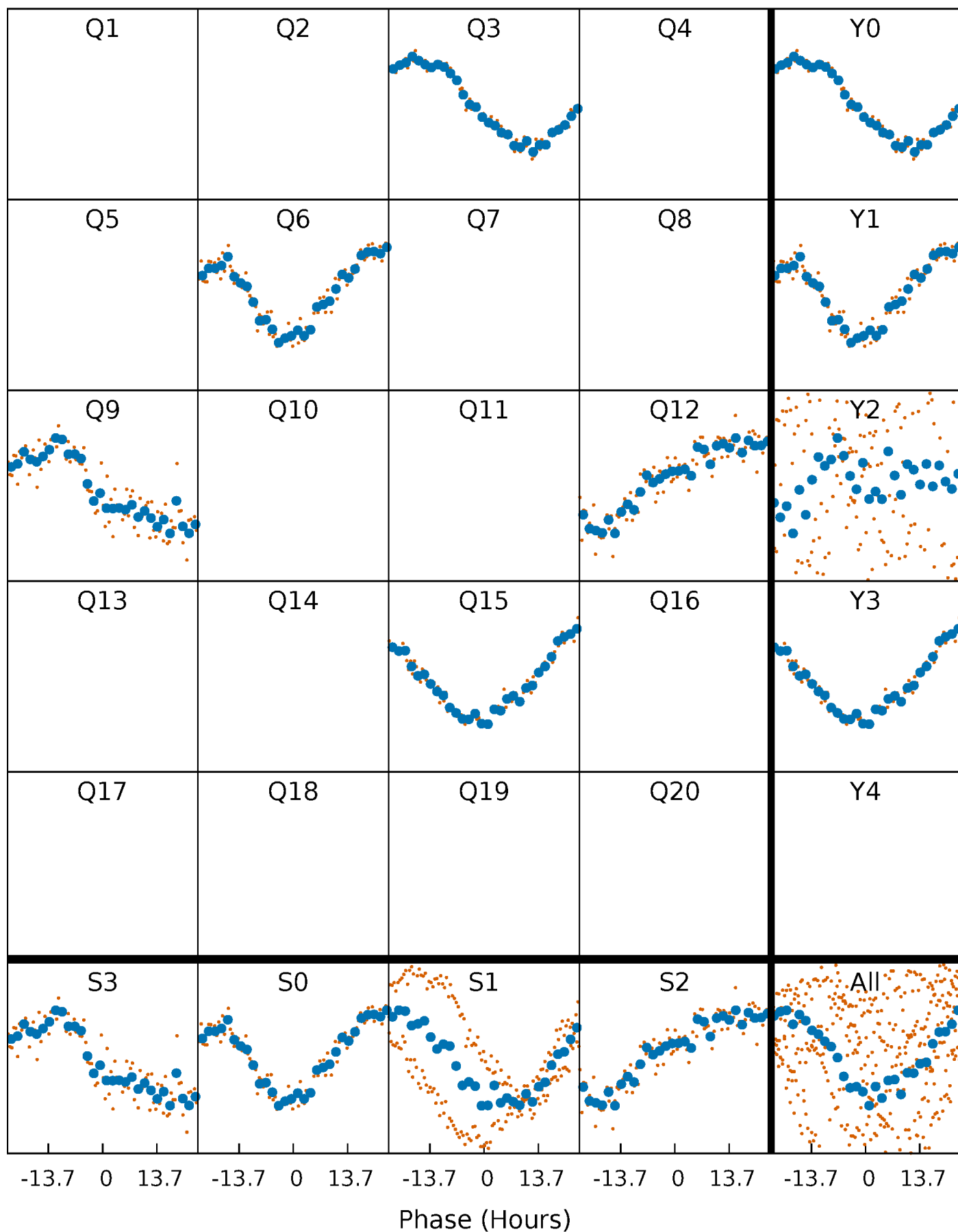


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



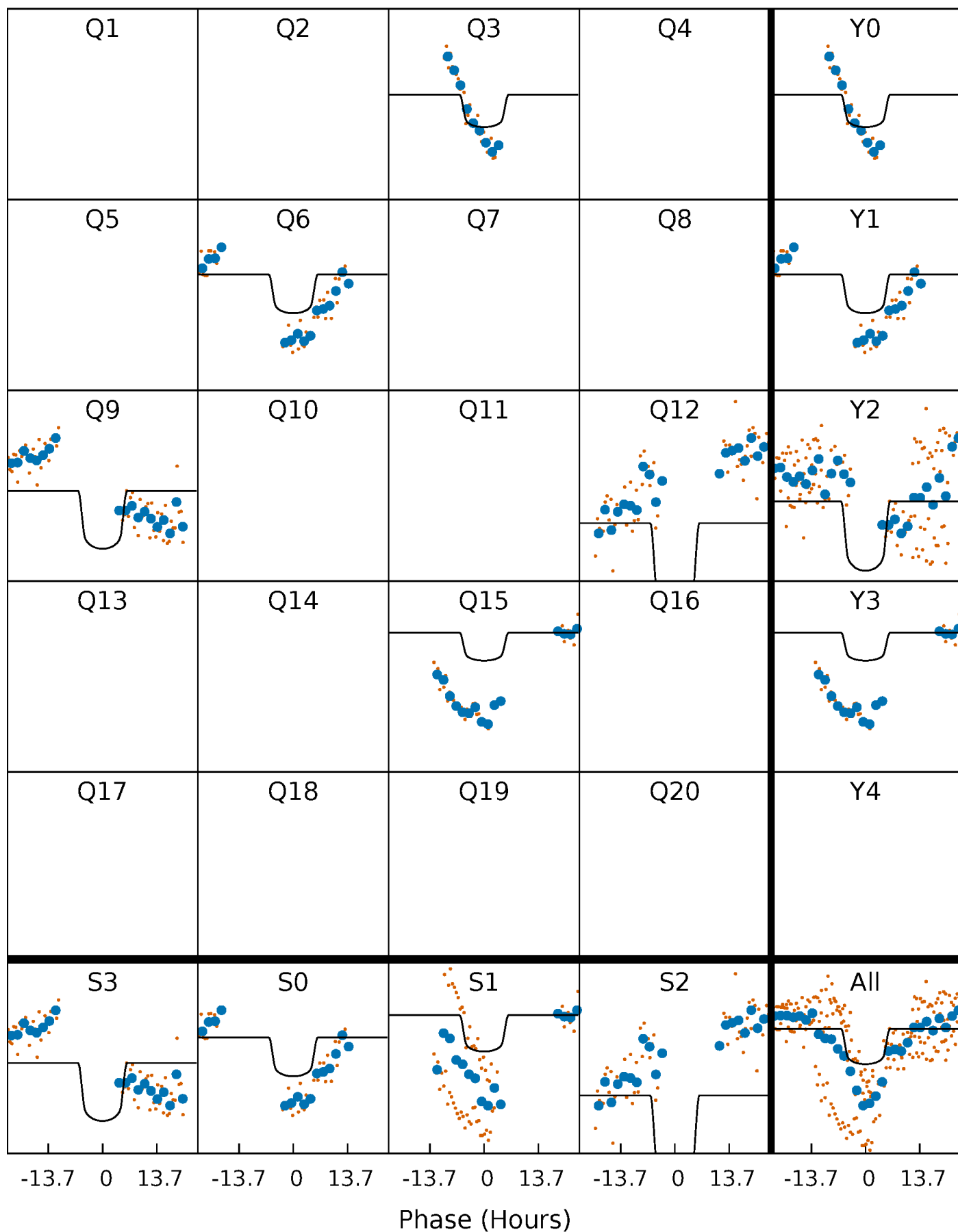
# PDC Quarter-Phased Transit Curves

TCE 009899193-04 P=274.200911 Days  $T_0=283.381188$  (BKJD)



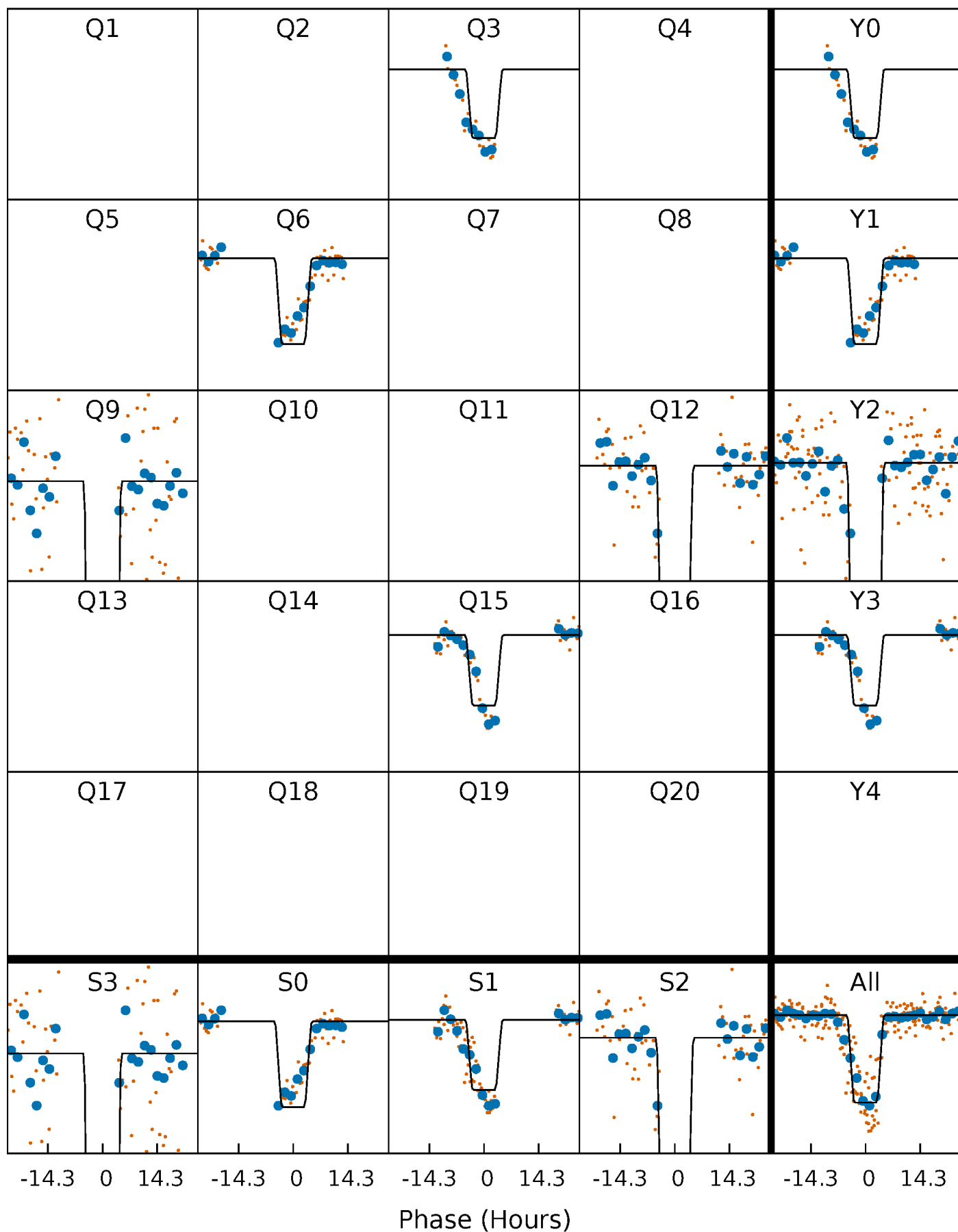
# DV Quarter-Phased Transit Curves

TCE 009899193-04 P=274.200911 Days  $T_0=283.381188$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

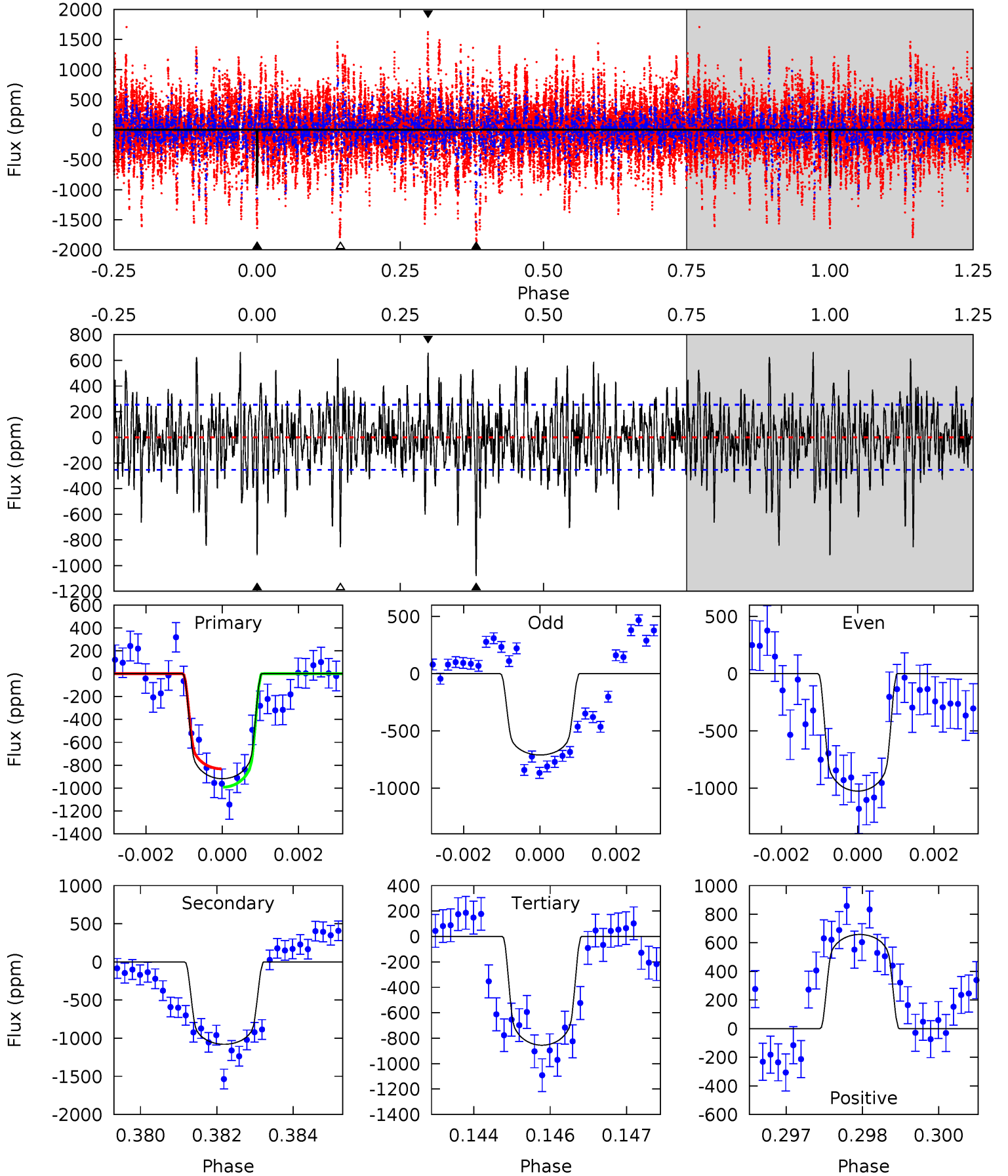
TCE 009899193-04     $P=274.197942$  Days     $T_0=283.404222$  (BKJD)



# DV Model-Shift Uniqueness Test

009899193-04, P = 274.200911 Days, E = 9.180277 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
19.3	22.7	18.0	13.9	5.34	3.12	4.36	1.32	5.47	4.73	8.87	3.17	1.03	0.38	1.67

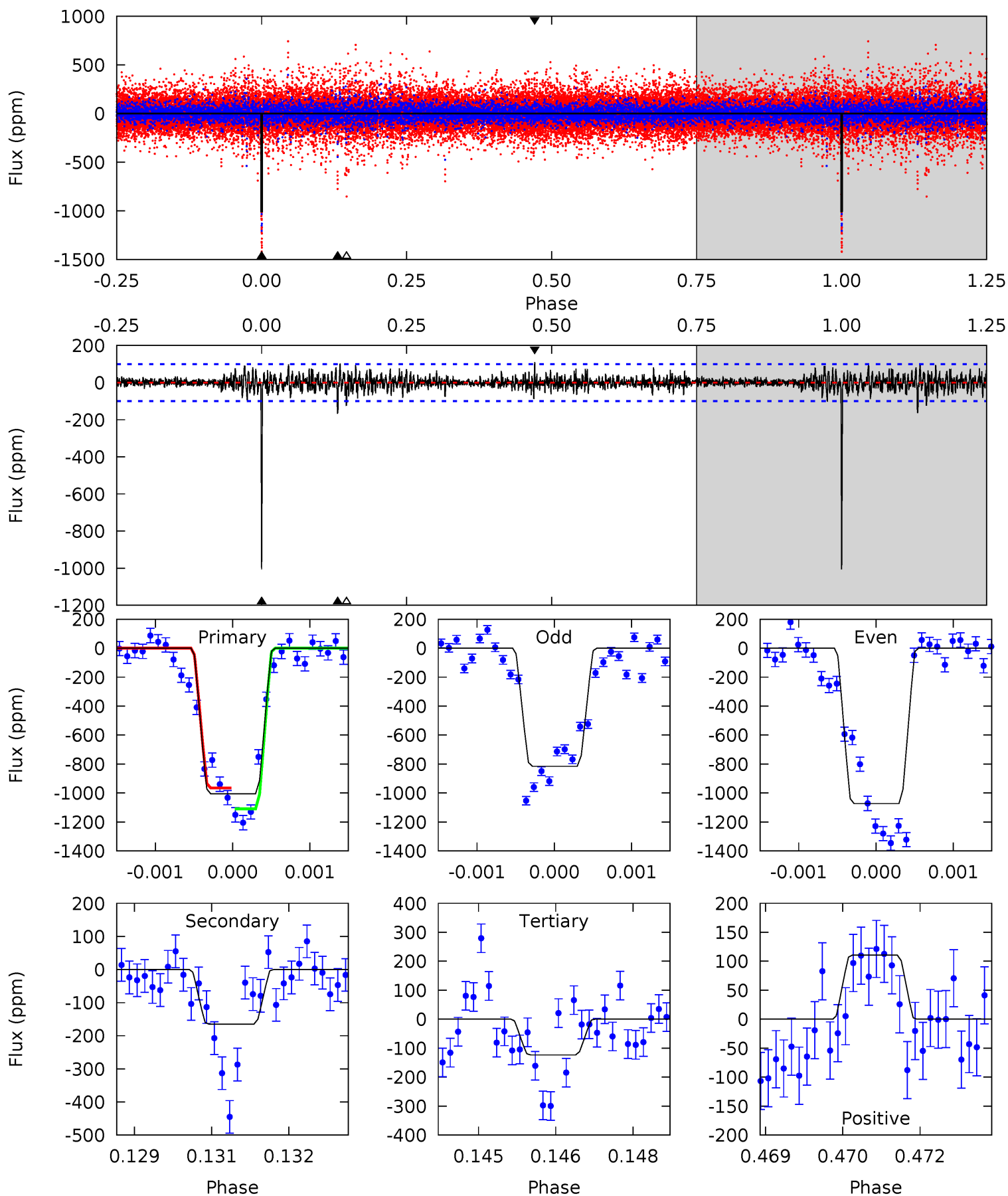




# Alt Model-Shift Uniqueness Test

009899193-04, P = 274.197942 Days, E = 9.206280 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
54.5	8.95	6.69	6.00	5.39	3.19	1.32	47.8	48.5	2.26	2.95	6.59	0.87	0.10	3.75



### Stellar Parameters For KIC 009899193

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6600^{+161}_{-181}$	$4.047^{+0.234}_{-0.126}$	$-0.400^{+0.300}_{-0.300}$	$1.681^{+0.363}_{-0.444}$	$1.148^{+0.196}_{-0.142}$	$0.341^{+0.442}_{-0.133}$
	+2%/-3%	+6%/-3%	+75%/-75%	+22%/-26%	+17%/-12%	+130%/-39%
Source	PHO1	FLK73	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 009899193-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1080 \pm 47$	$4.27^{+0.75}_{-0.71}$	$561^{+38}_{-41}$	$7976^{+663}_{-519}$	$24911^{+10134}_{-6713}$
Alt.	$-165 \pm 18$	$5.85^{+0.89}_{-0.89}$	$557^{+35}_{-42}$	$4337^{+170}_{-153}$	$2029^{+673}_{-524}$

$T_{max}$  = 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

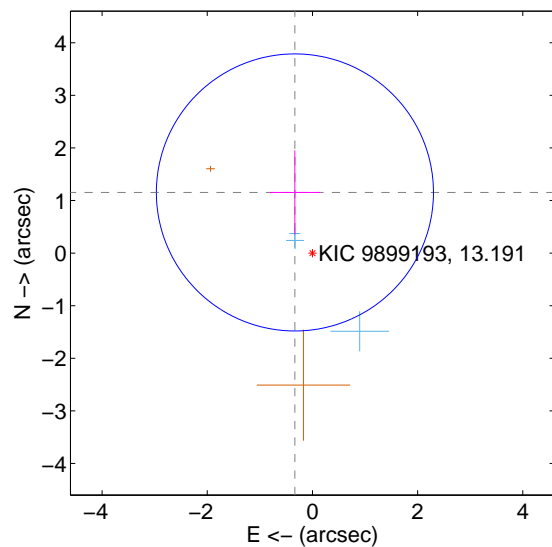
Supplemental centroid analysis for 009899193-04. Kepler magnitude: 13.19. Transit SNR 6.40

There are 3 quarters with good PRF difference image offsets

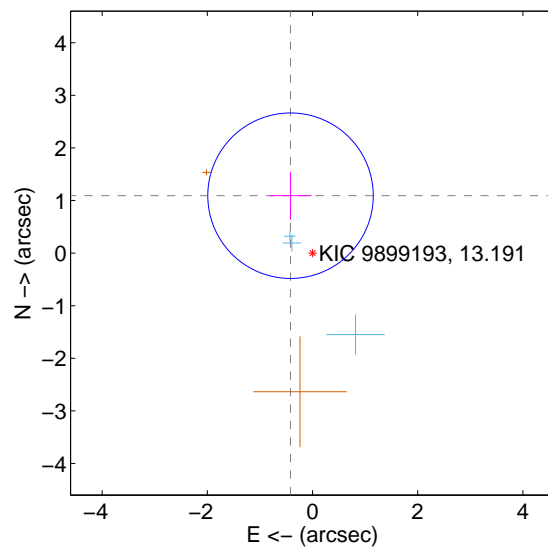
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.201 \pm 0.878$	1.37	$0.333 \pm 0.476$	$1.153 \pm 0.799$
PRF-fit source offset from KIC position	$1.169 \pm 0.524$	2.23	$0.418 \pm 0.395$	$1.091 \pm 0.455$
photometric centroid source offset	$0.32 \pm 0.36$	0.87	$0.07 \pm 0.37$	$-0.31 \pm 0.36$

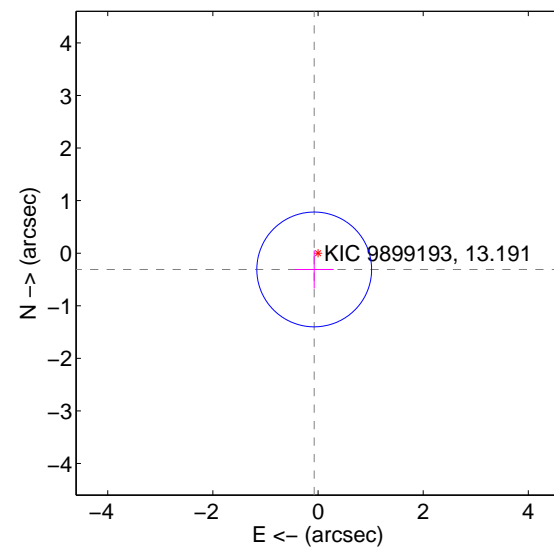
offset from difference PRF-fit to OOT PRF-fit



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

Q1 no difference image



Q1 no OOT image



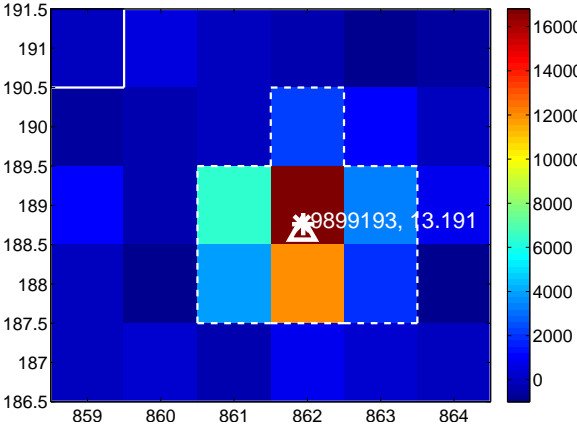
Q2 no difference image



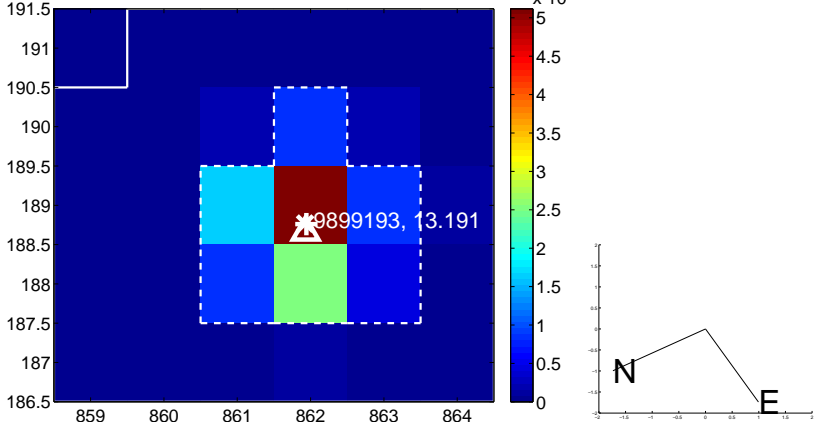
Q2 no OOT image



Q3 difference image



Q3 OOT image



Q4 no difference image



Q4 no OOT image



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

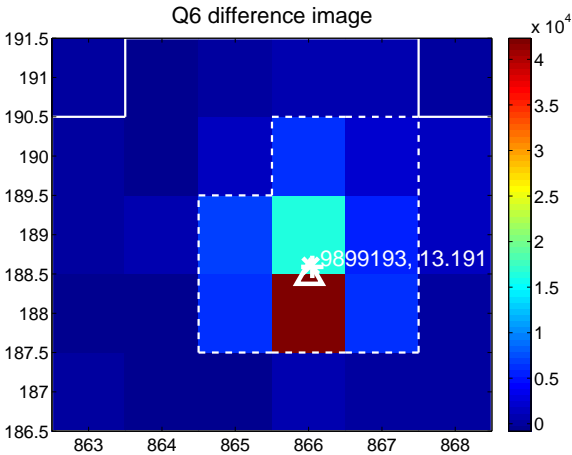
Q5 no difference image



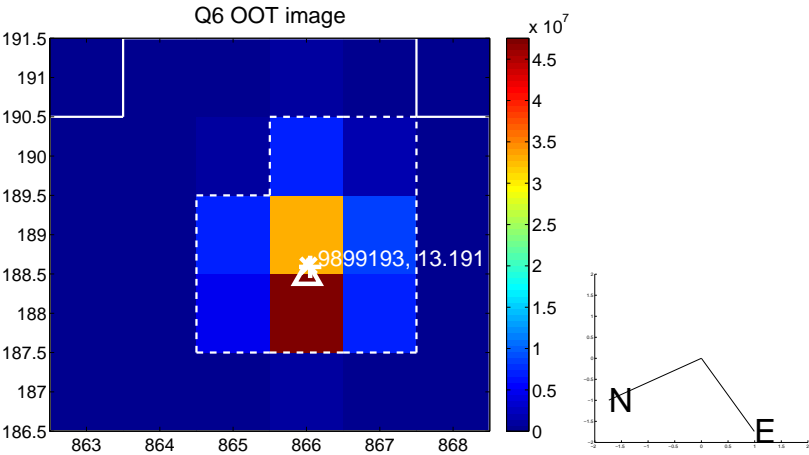
Q5 no OOT image



Q6 difference image



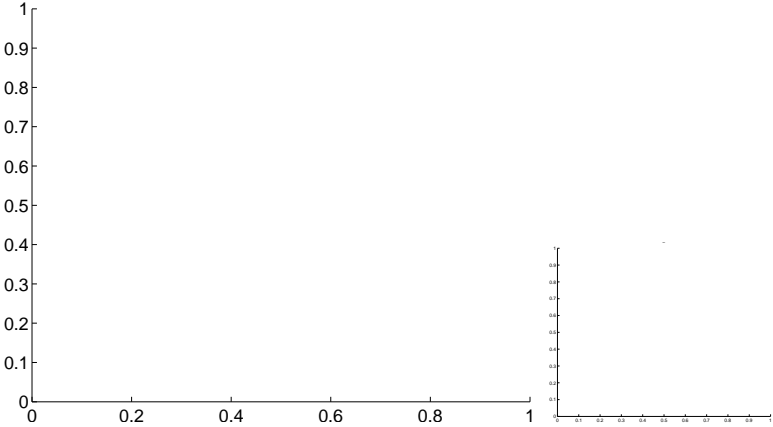
Q6 OOT image



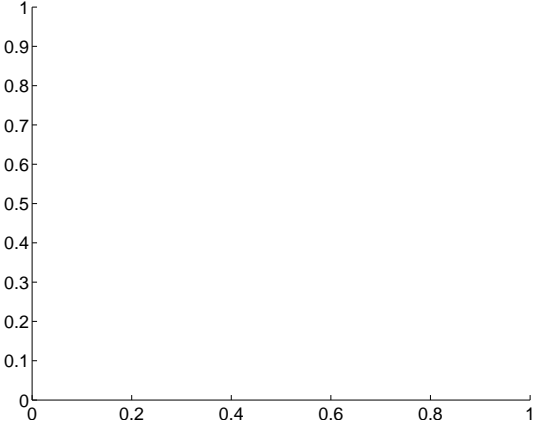
Q7 no difference image



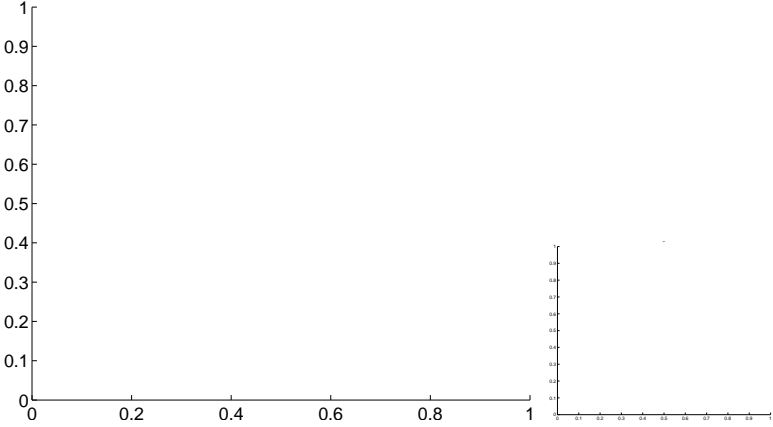
Q7 no OOT image



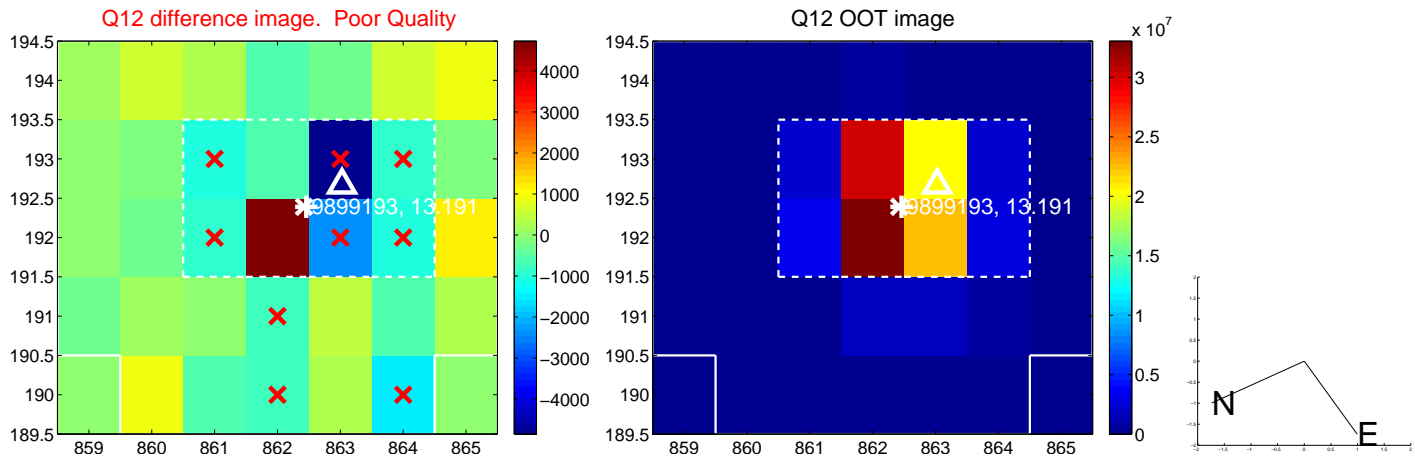
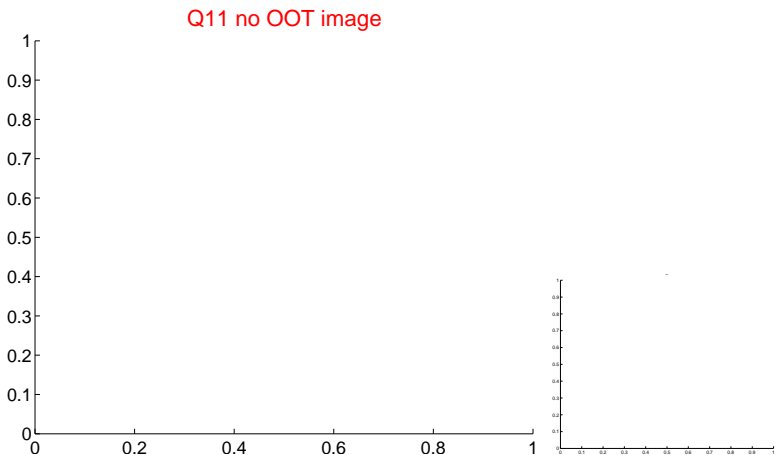
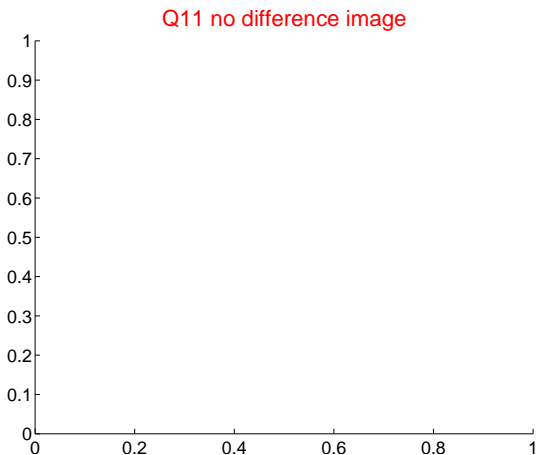
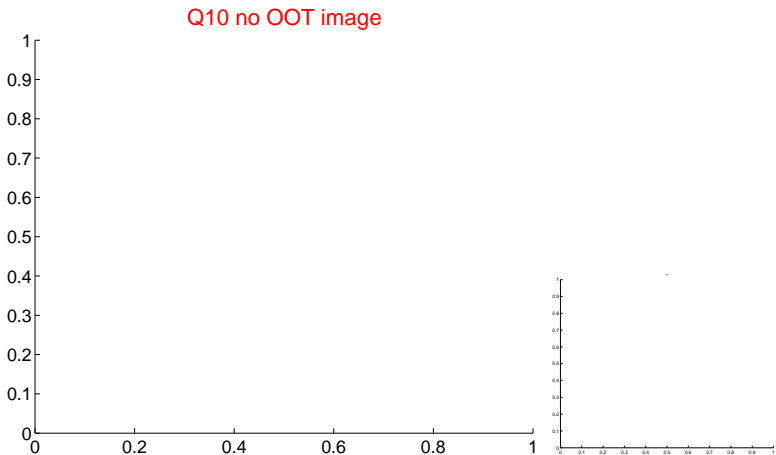
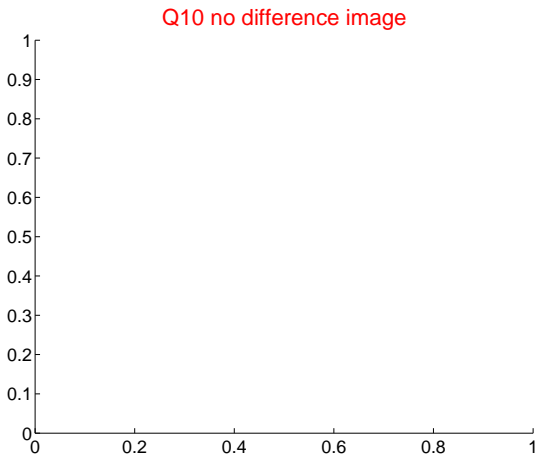
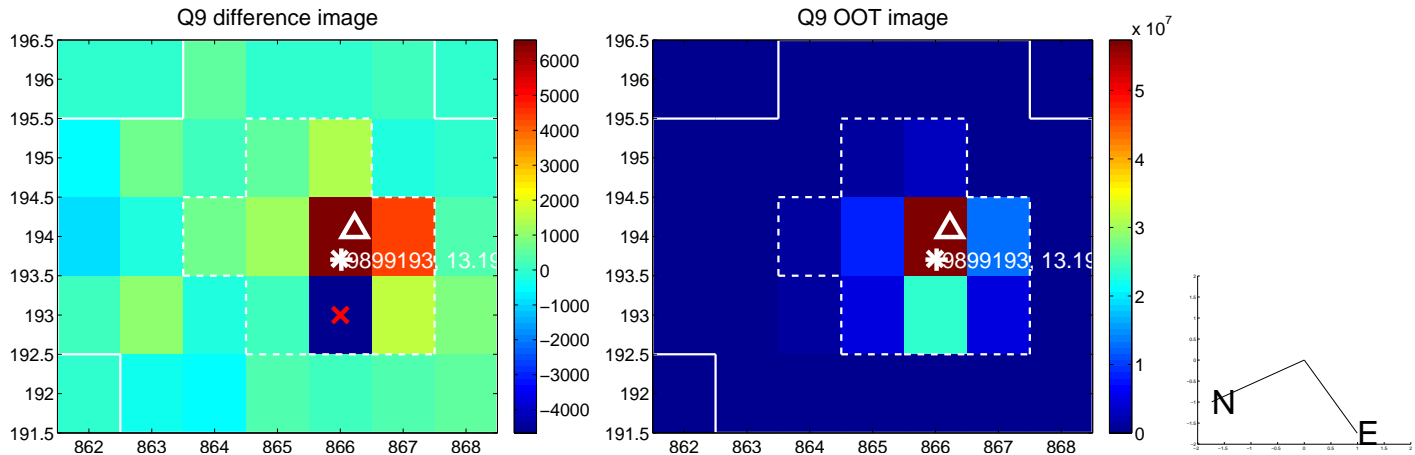
Q8 no difference image



Q8 no OOT image



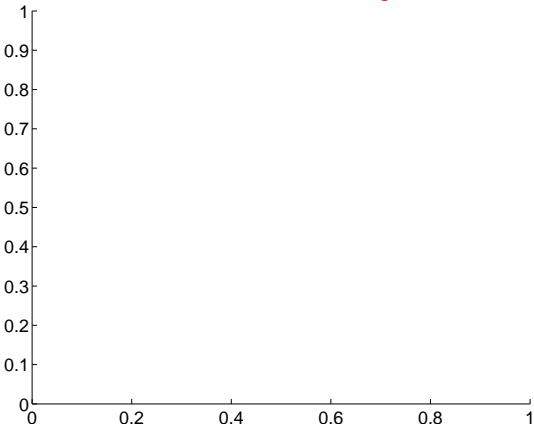
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



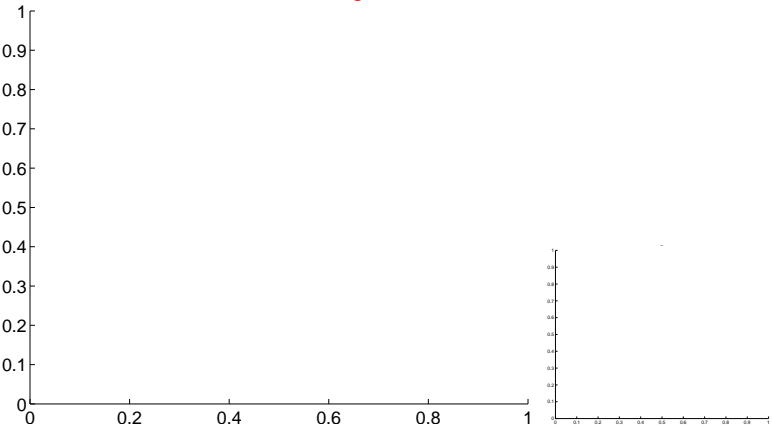


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q13 no difference image



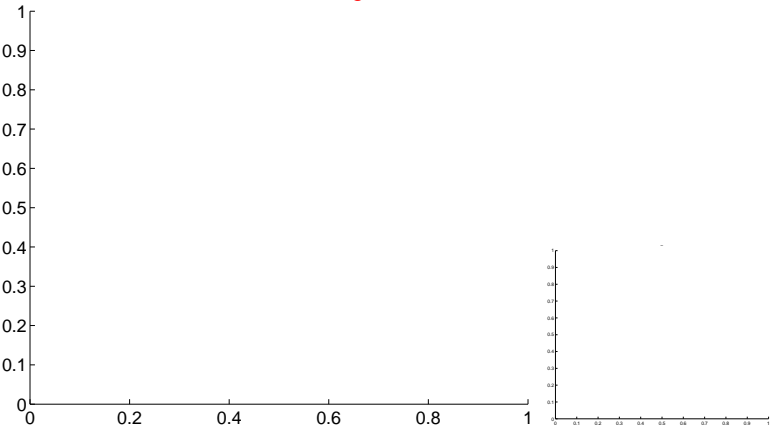
Q13 no OOT image



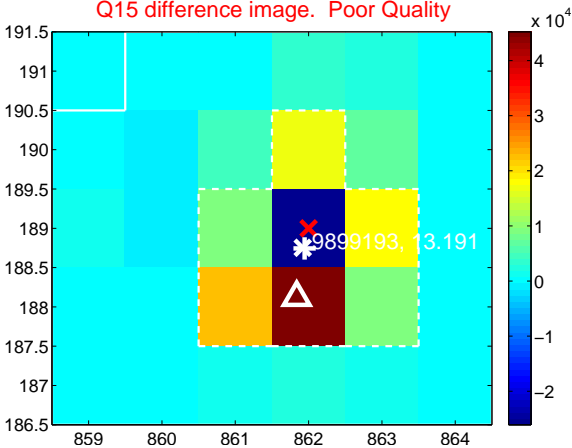
Q14 no difference image



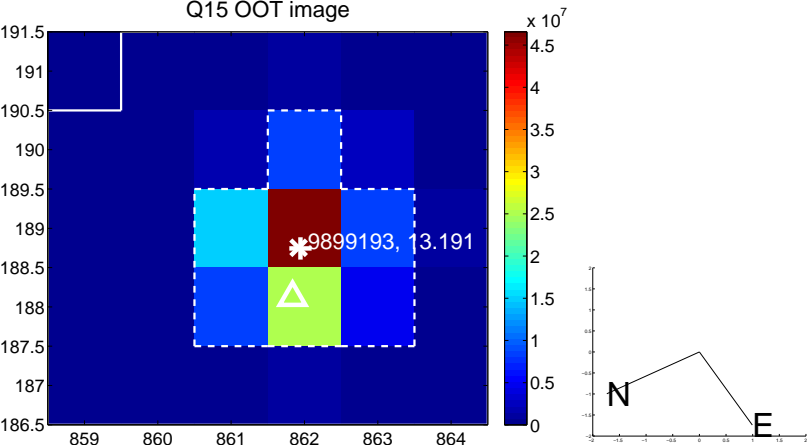
Q14 no OOT image



Q15 difference image. Poor Quality



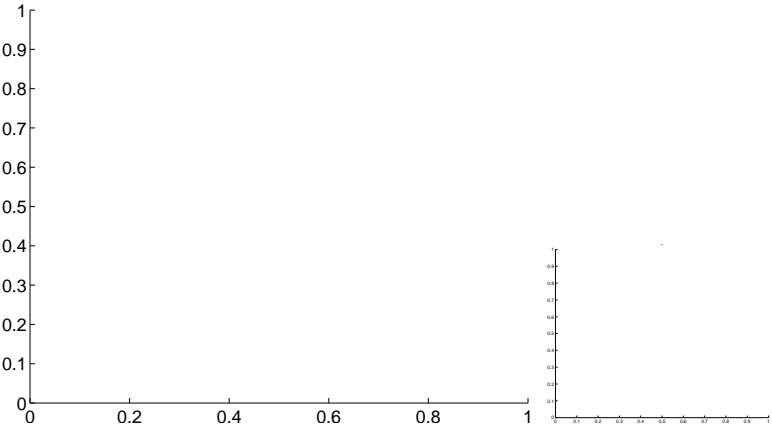
Q15 OOT image



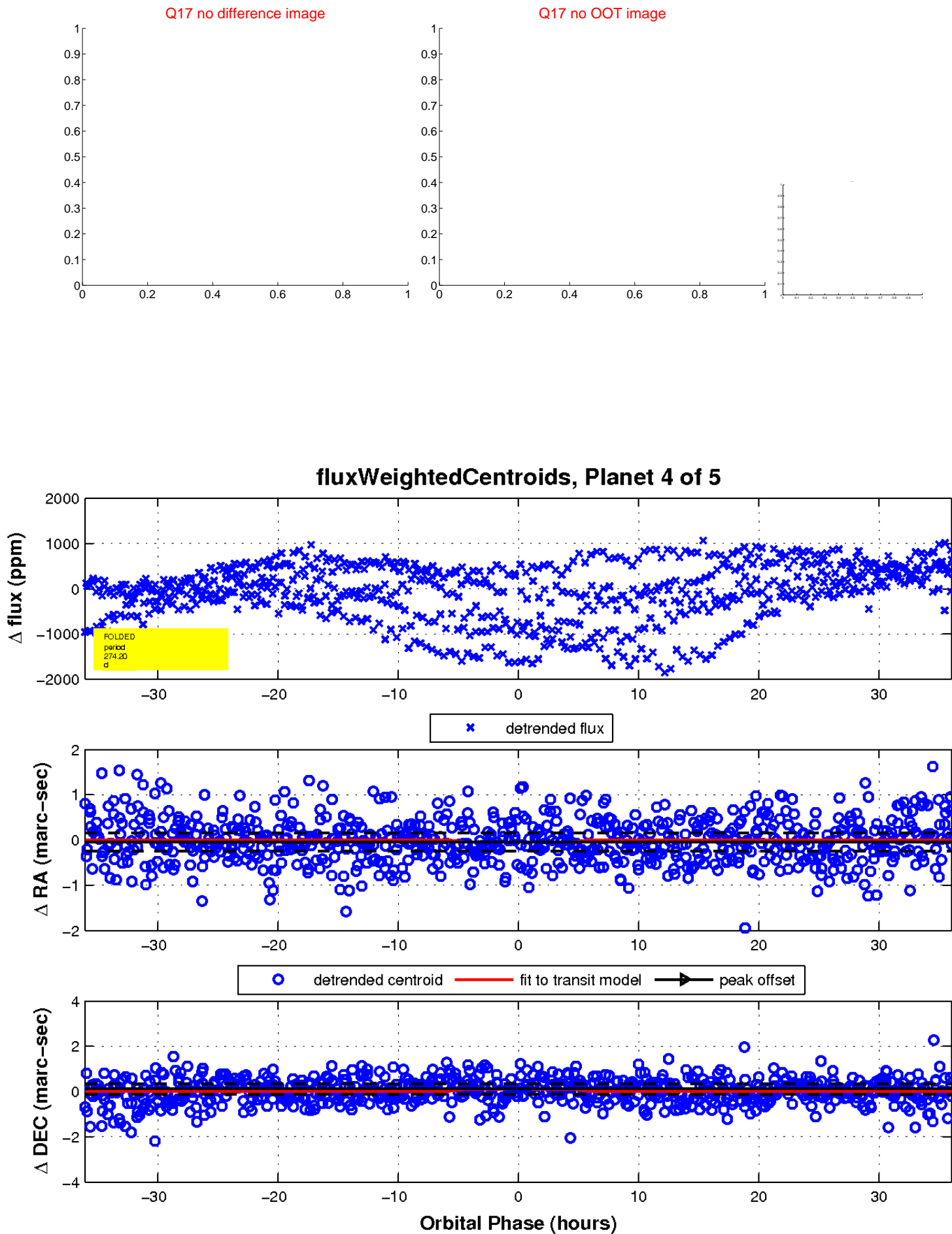
Q16 no difference image



Q16 no OOT image

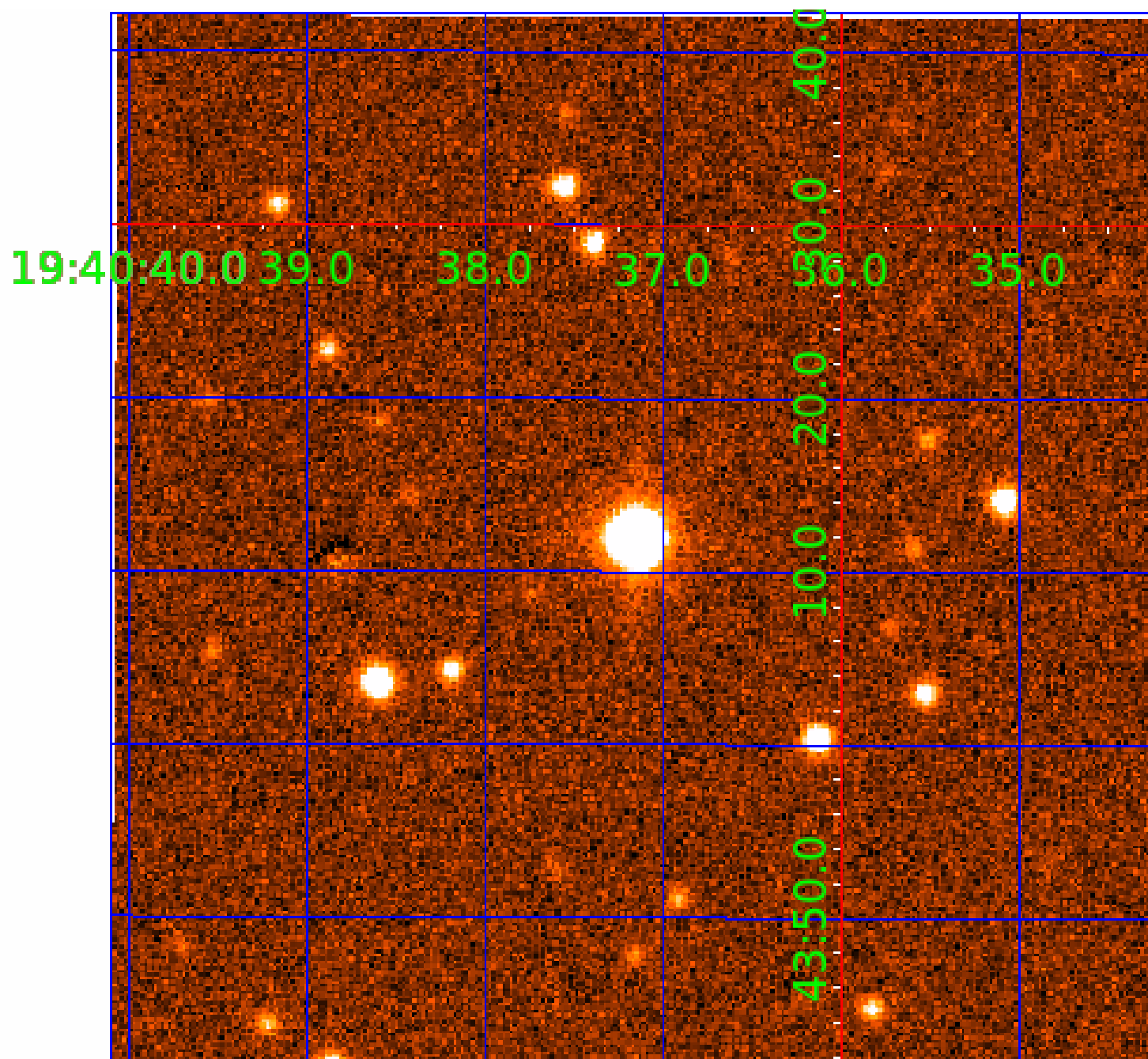


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009899193

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009899193-01	OBS	7244.01	1.332555	132.055627	26.9	4.996	10.7	10.3	1.68	6600	0.99	7795.94
009899193-02	OBS	No	357.617755	139.188060	179.5	8.811	11.6	3.0	1.68	6600	2.41	4.50
009899193-04	OBS	No	274.200911	283.381188	476.2	12.026	9.9	6.4	1.68	6600	4.32	6.42
009899193-05	OBS	No	268.456836	313.652382	363.0	5.741	8.8	5.9	1.68	6600	3.45	6.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009899193-01	OBS	FP	0.00	0	0	1	1	HALO_GHOST—EPHEM_MATCH
009899193-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009899193-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009899193-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—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.

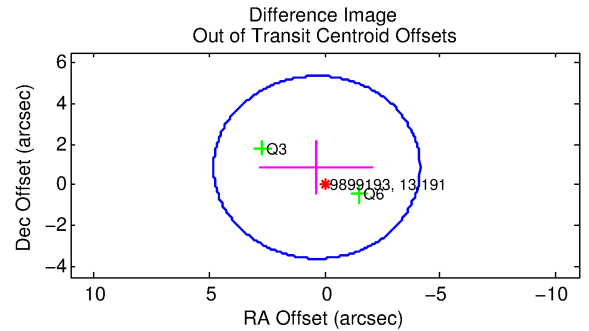
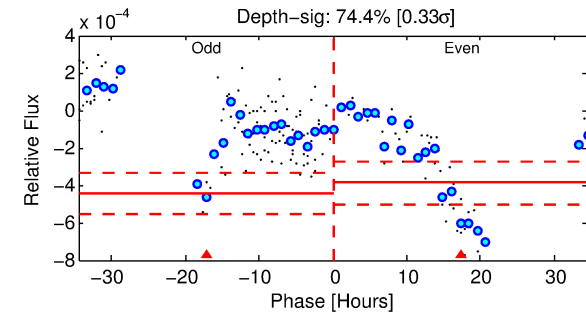
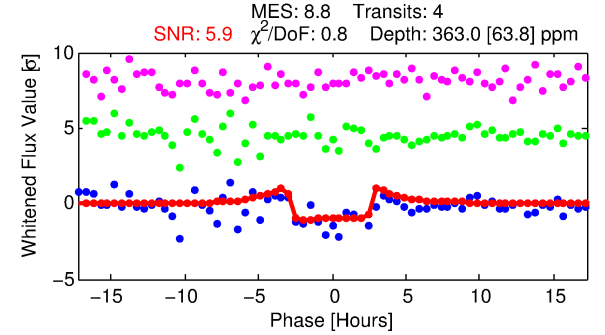
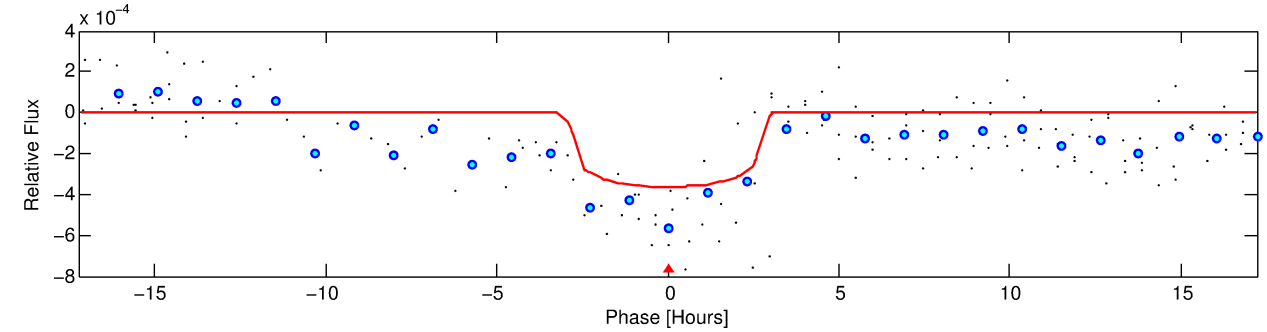
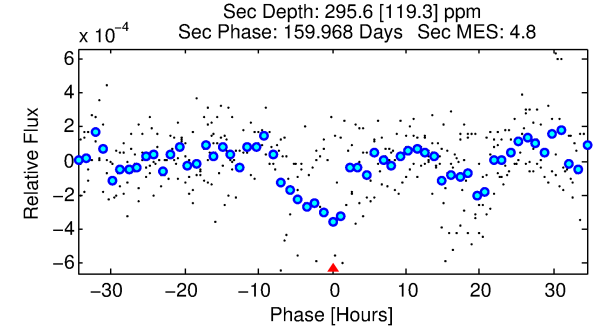
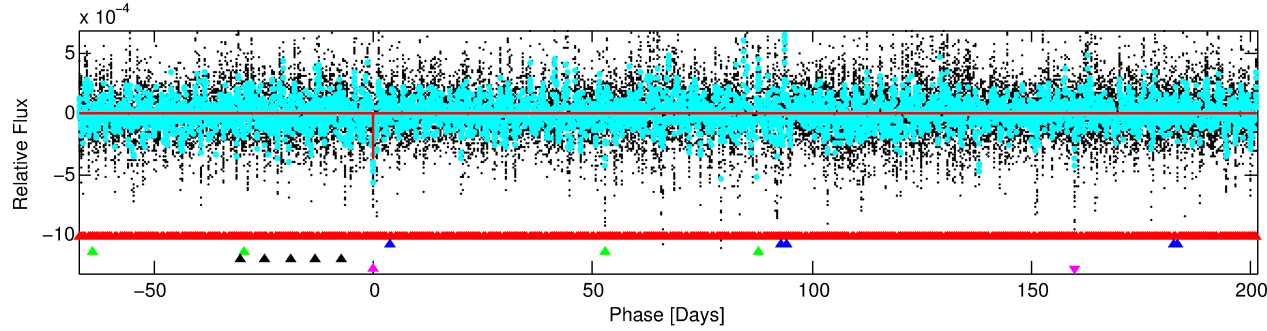
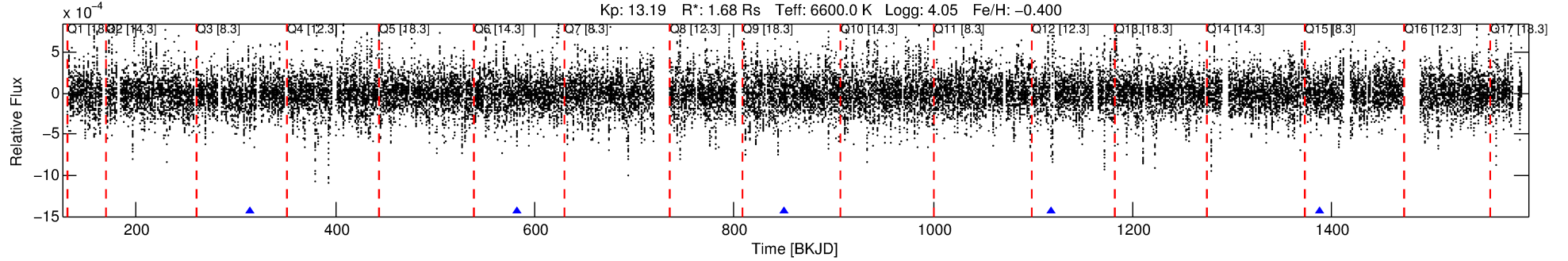
Ephemeris Match Information For 009899193-05

No Significant Match Found

# DV One-Page Summary

KIC: 9899193 Candidate: 5 of 5 Period: 268.457 d  
KOI: K07244 Corr: No Ephemeris Match

Kp: 13.19 R\*: 1.68 Rs Teff: 6600.0 K Logg: 4.05 Fe/H: -0.400



## DV Fit Results:

Period = 268.45684 [0.00466] d  
Epoch = 313.6524 [0.0101] BKJD  
Rp/R\* = 0.0188 [0.0086]  
a/R\* = 255.76 [626.13]  
b = 0.72 [1.60]  
Seff = 6.60 [2.74]  
Teq = 409 [42] K  
Rp = 3.45 [1.83] Re  
a = 0.8531 [0.2146] AU  
Ag = 9934.99 [10720.39] [0.93σ]  
Teffp = 6309 [1590] K [3.71σ]

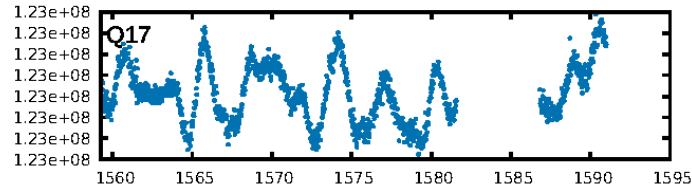
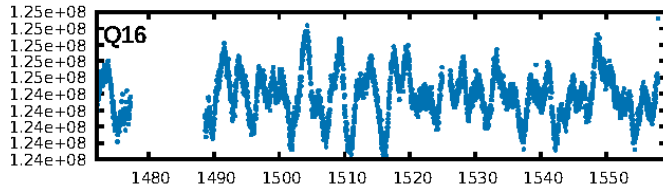
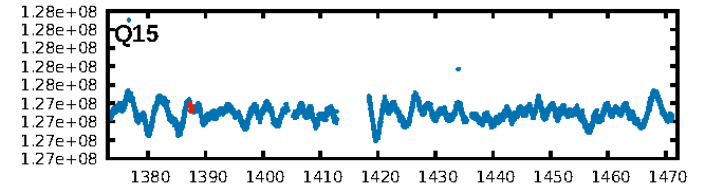
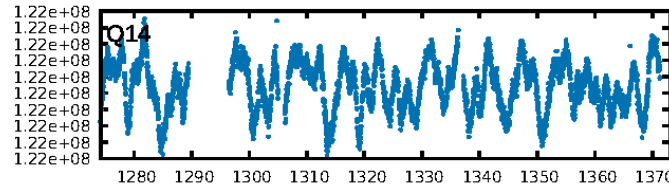
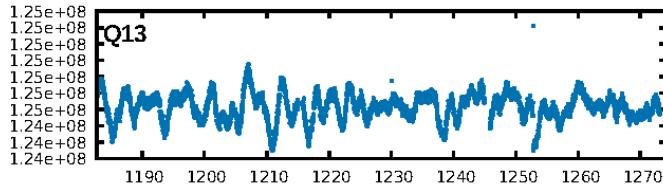
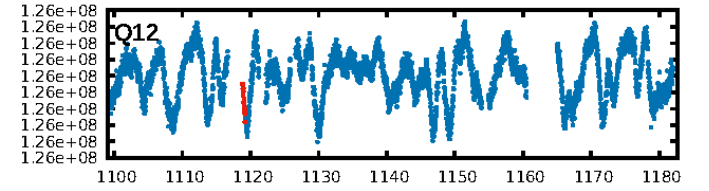
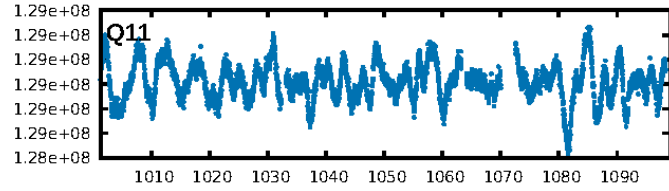
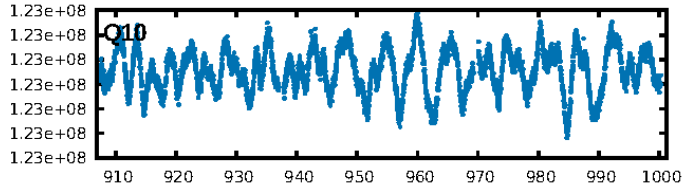
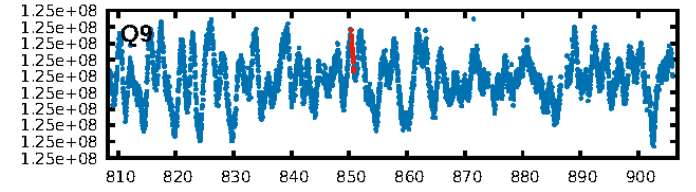
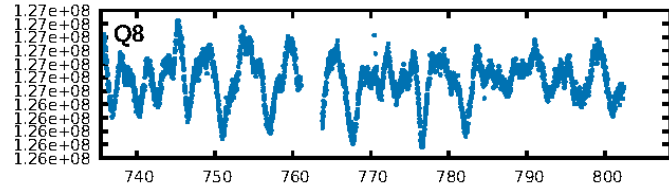
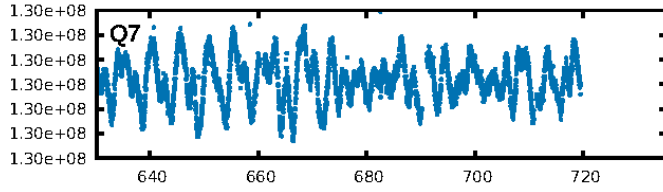
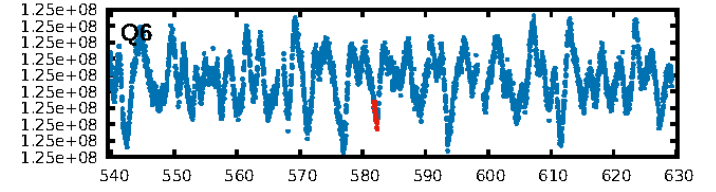
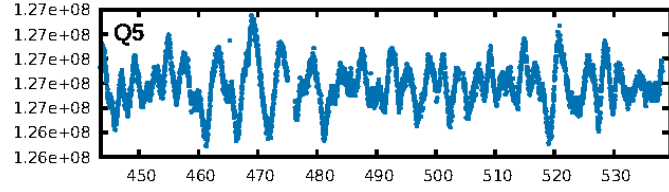
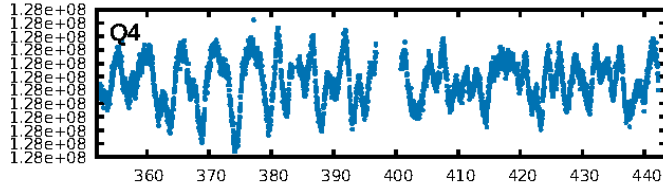
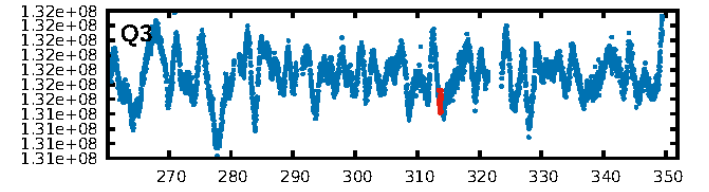
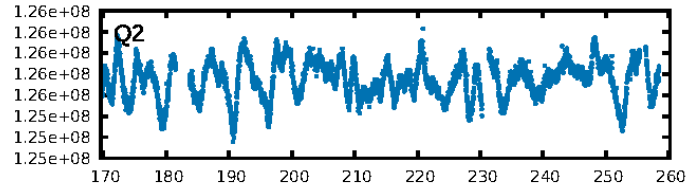
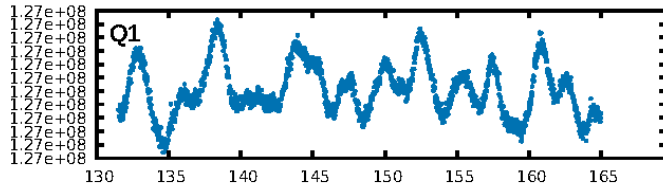
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [842.42σ]  
LongPeriod-sig: 100.0% [10.34σ]  
ModelChiSquare2-sig: 6.8%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 2.84e-10**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.4759  
Centroid-sig: 38.1%  
Centroid-so: 0.592 arcsec [0.93σ]  
OotOffset-rm: 0.931 arcsec [0.62σ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-rm: 0.911 arcsec [0.58σ]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 15:26:10 Z

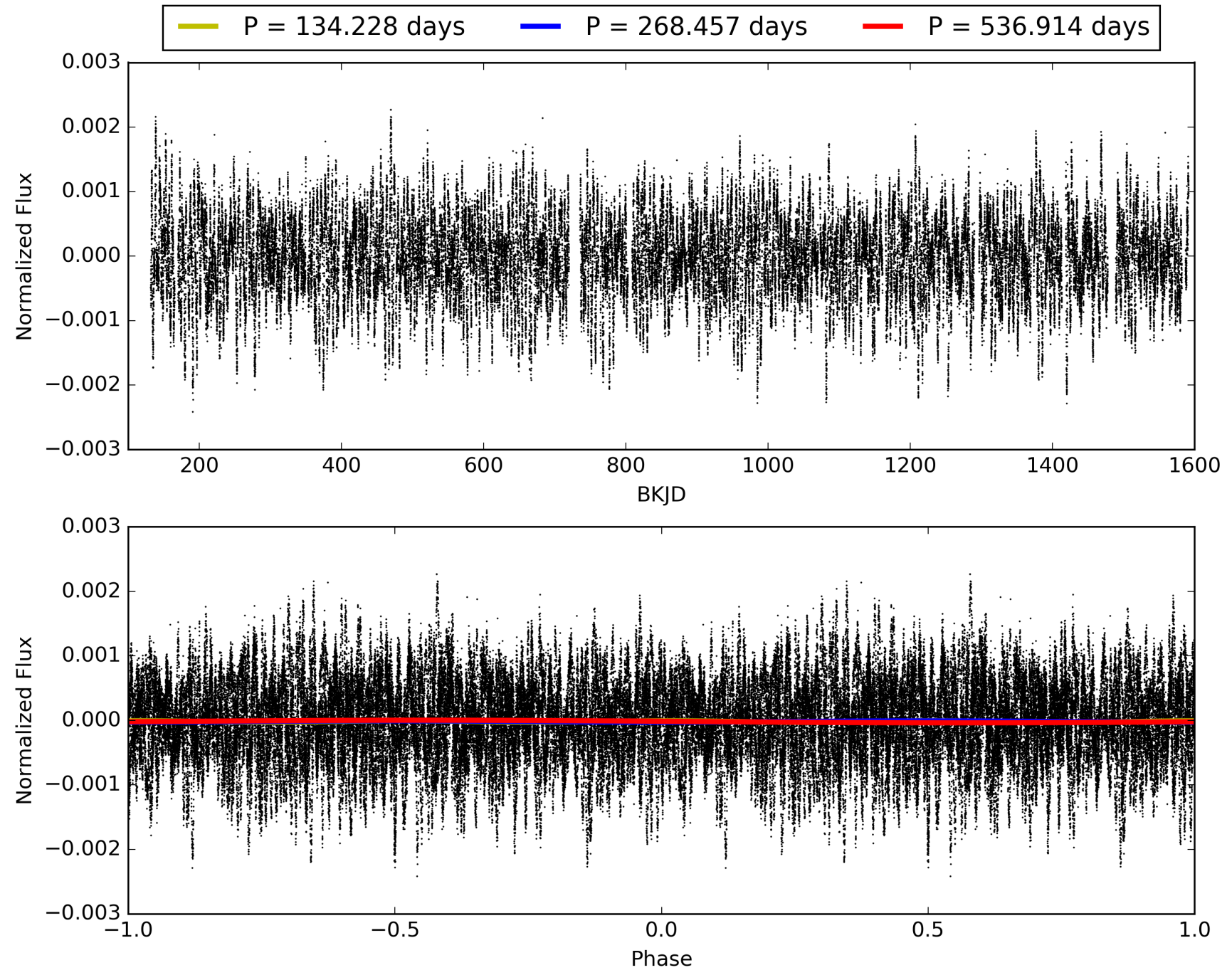
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009899193-05, PDC Light Curves





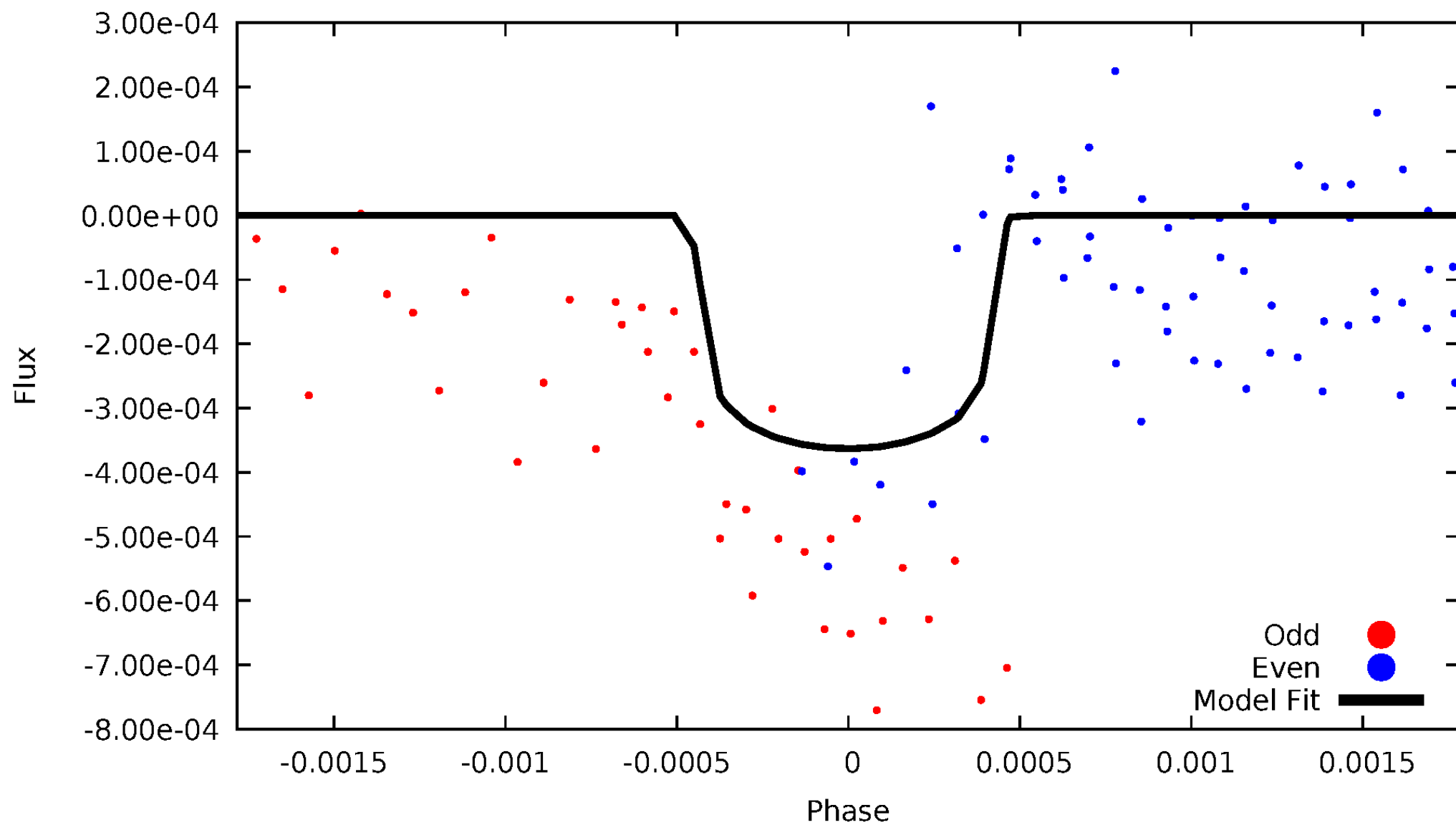
# TCE 009899193-05





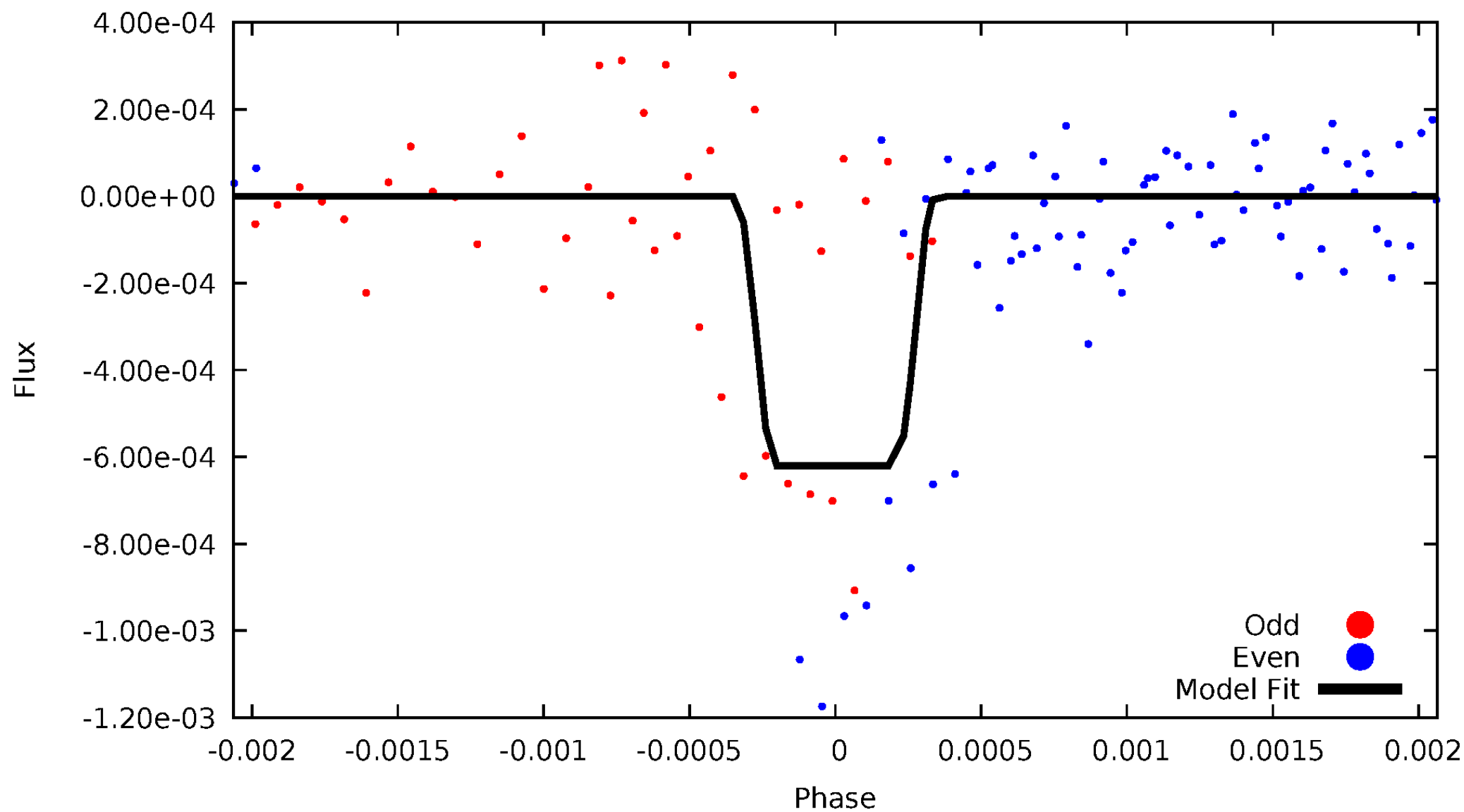
# DV Odd/Even

TCE 009899193-05



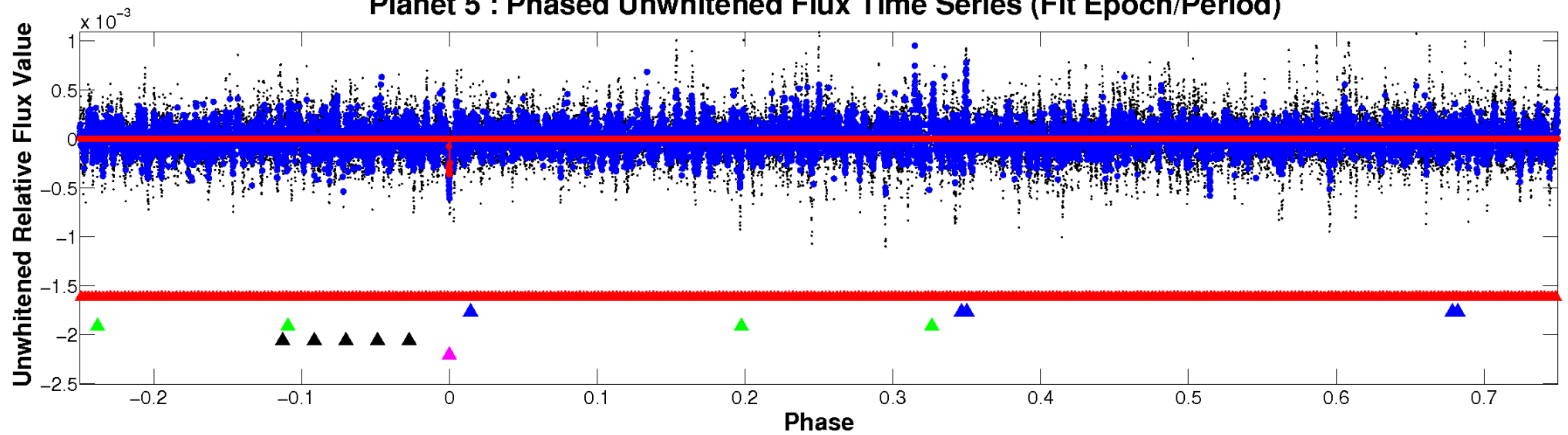
# ALT Odd/Even

TCE 009899193-05

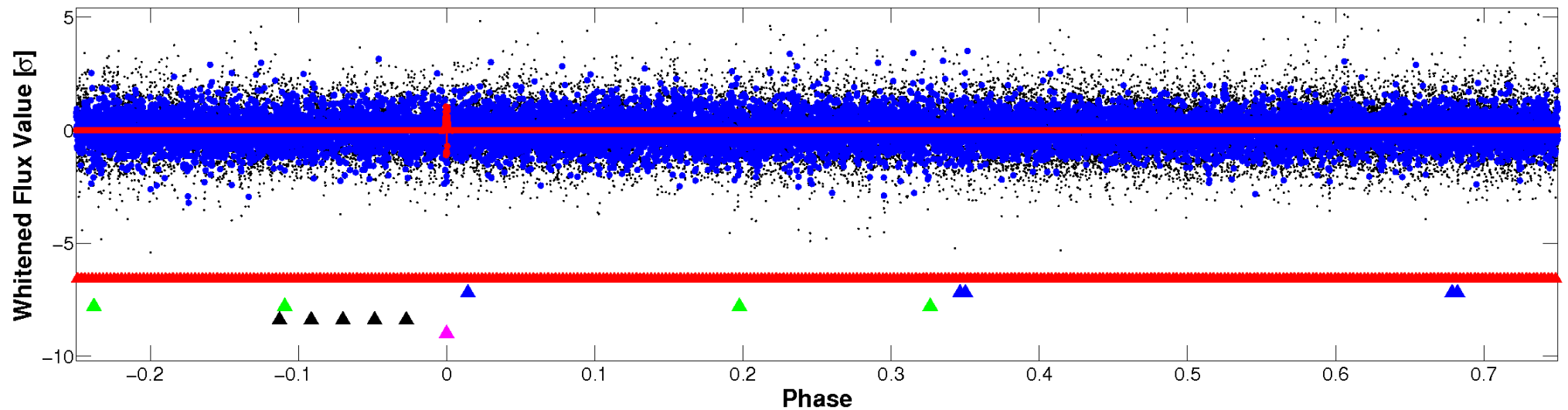


# Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

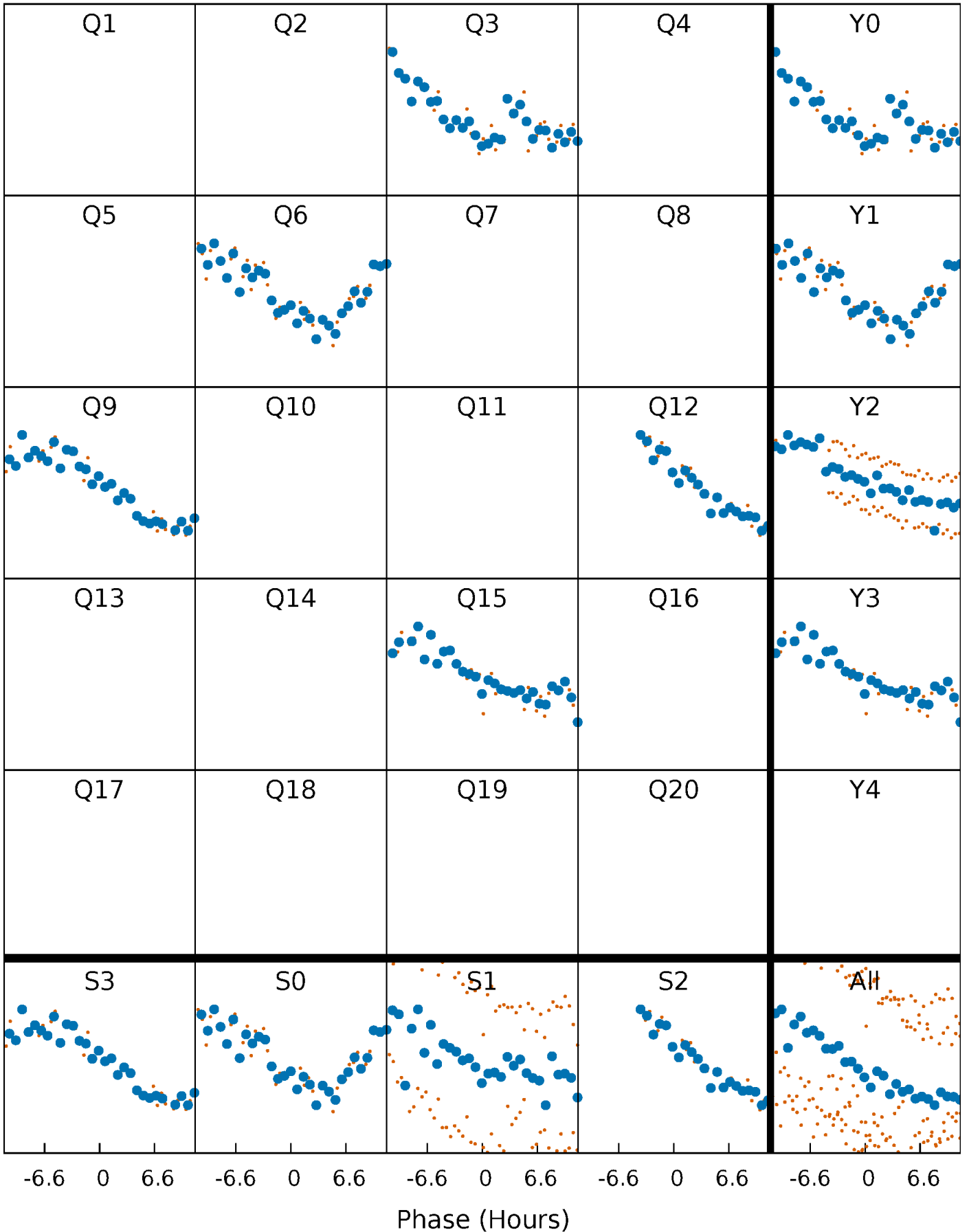


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



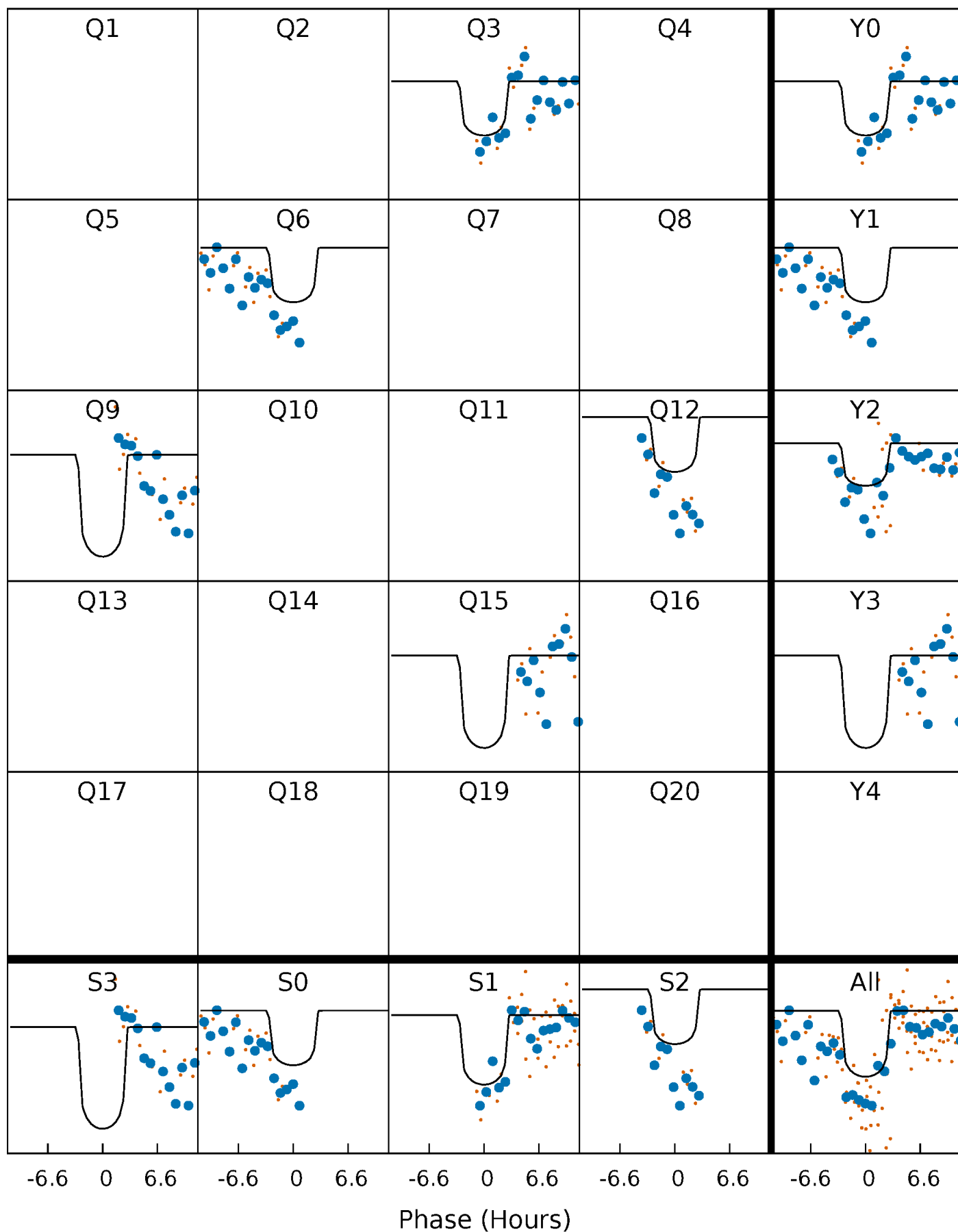
# PDC Quarter-Phased Transit Curves

TCE 009899193-05     $P=268.456836$  Days     $T_0=313.652382$  (BKJD)



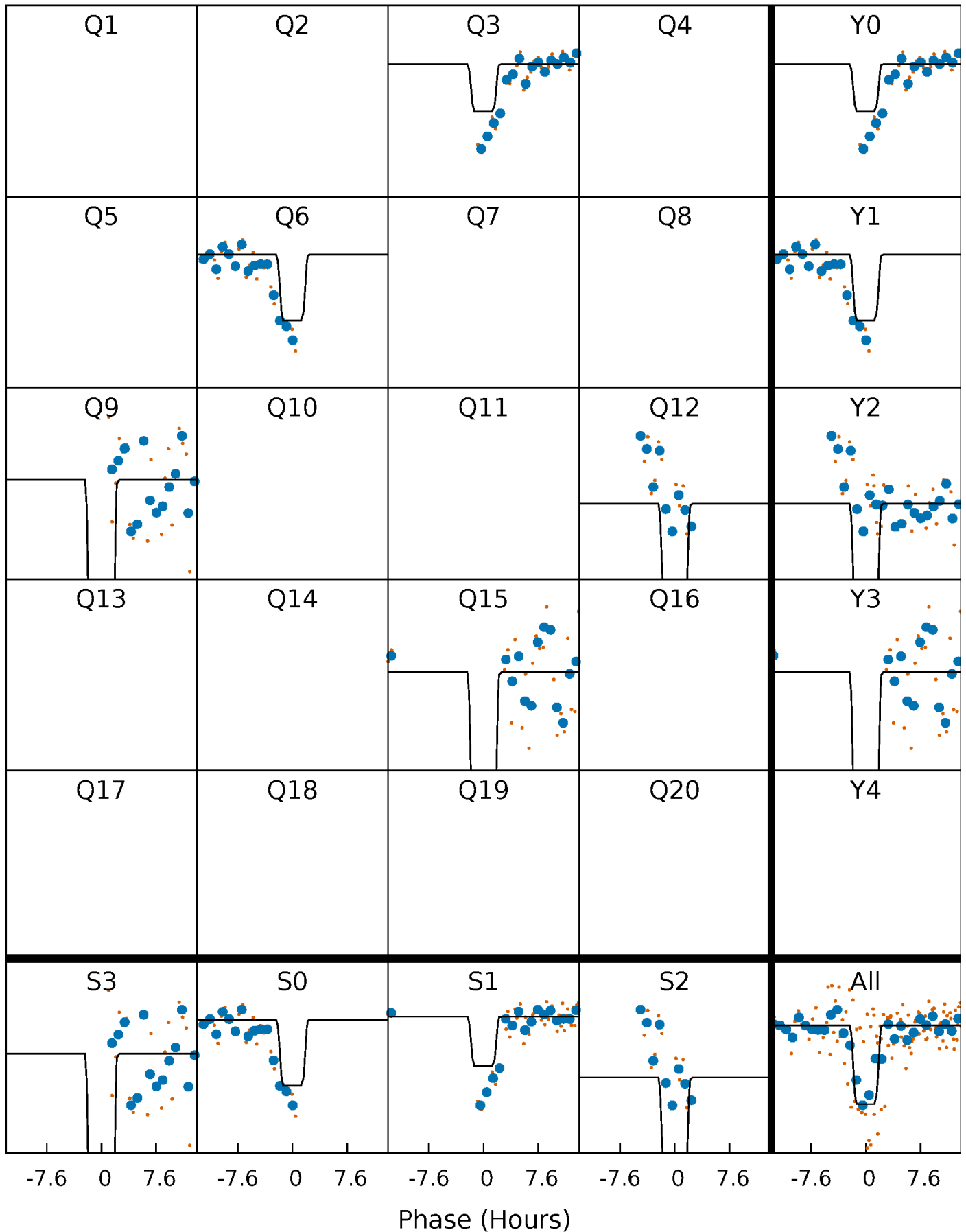
# DV Quarter-Phased Transit Curves

TCE 009899193-05     $P=268.456836$  Days     $T_0=313.652382$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

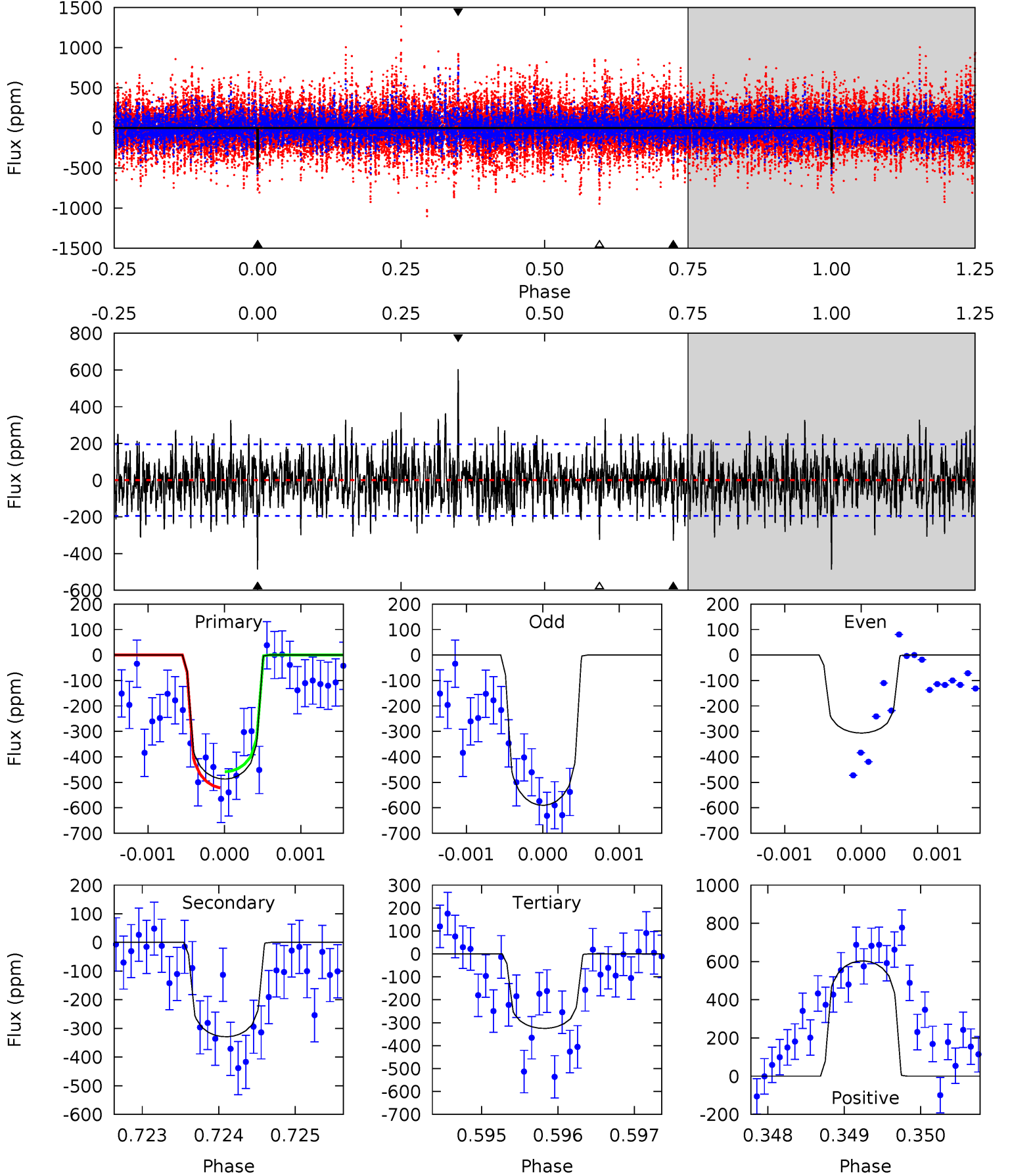
TCE 009899193-05     $P=268.469734$  Days     $T_0=313.648755$  (BKJD)



# DV Model-Shift Uniqueness Test

009899193-05,  $P = 268.456836$  Days,  $E = 45.195546$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.7	9.23	9.12	16.9	5.47	3.31	2.76	4.55	-3.26	0.12	-7.70	3.93	0.79	0.55	0.87

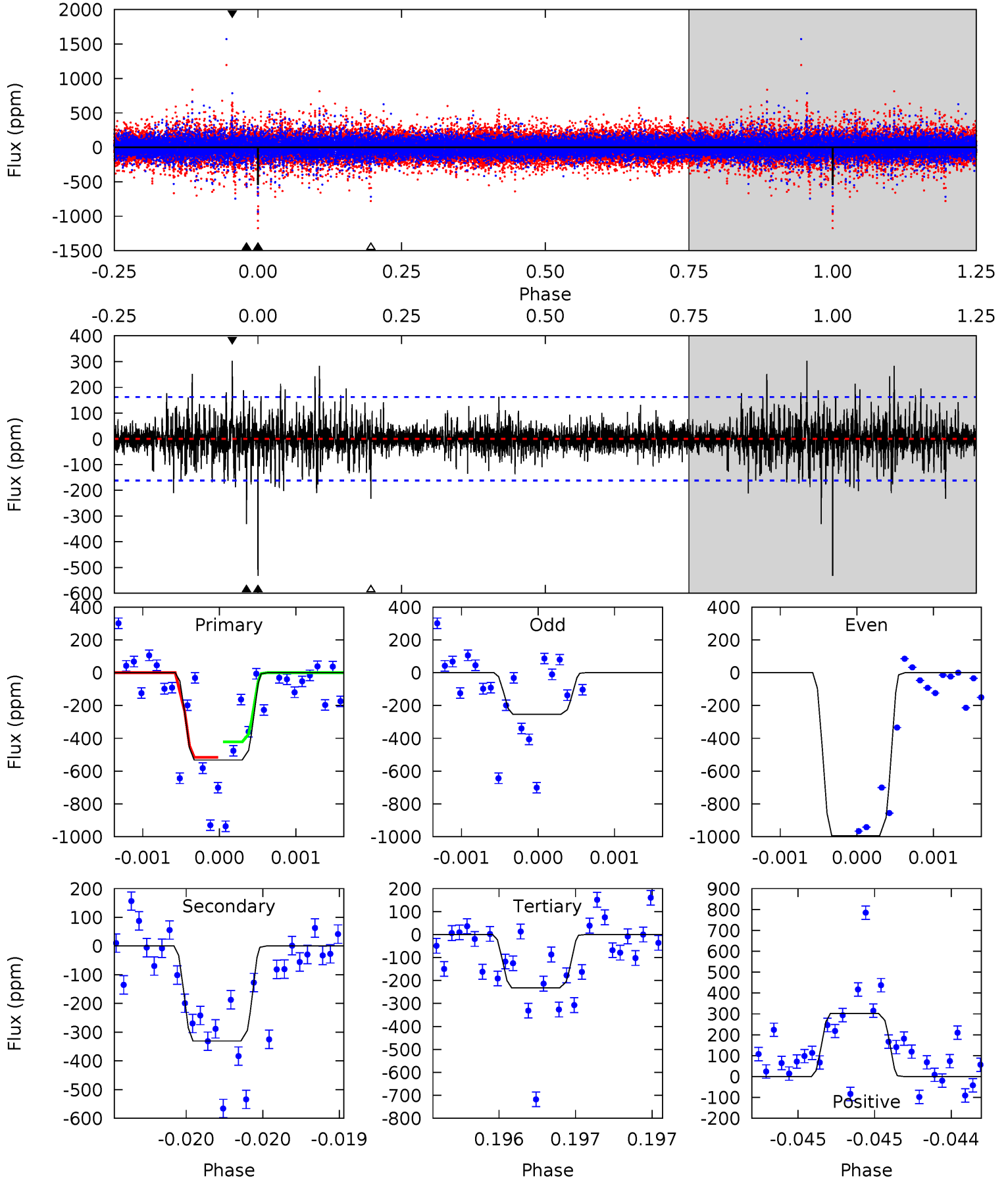




# Alt Model-Shift Uniqueness Test

009899193-05, P = 268.469734 Days, E = 45.179021 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.2	11.3	7.94	10.3	5.54	3.43	1.43	10.3	7.86	3.37	0.96	11.7	1.15	0.36	1.50



### Stellar Parameters For KIC 009899193

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6600^{+161}_{-181}$	$4.047^{+0.234}_{-0.126}$	$-0.400^{+0.300}_{-0.300}$	$1.681^{+0.363}_{-0.444}$	$1.148^{+0.196}_{-0.142}$	$0.341^{+0.442}_{-0.133}$
	+2%/-3%	+6%/-3%	+75%/-75%	+22%/-26%	+17%/-12%	+130%/-39%
Source	PHO1	FLK73	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 009899193-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-329 \pm 36$	$3.33^{+1.69}_{-1.55}$	$567^{+32}_{-41}$	$6465^{+3196}_{-1148}$	$11706^{+28147}_{-6454}$
Alt.	$-331 \pm 29$	$4.50^{+1.74}_{-1.65}$	$564^{+37}_{-43}$	$5614^{+1433}_{-711}$	$6639^{+9796}_{-3182}$

$T_{\text{max}}$  = 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

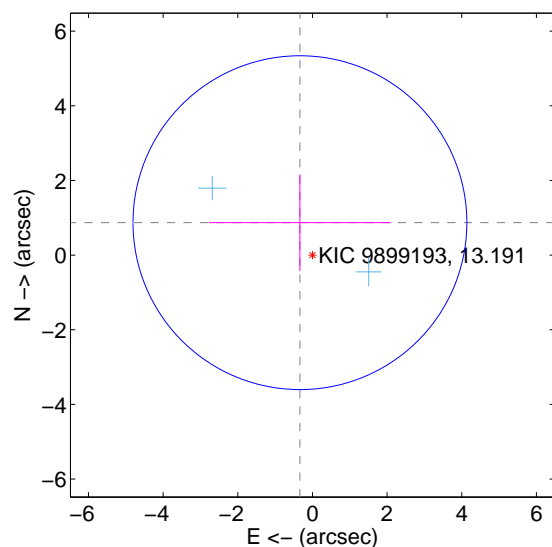
Supplemental centroid analysis for 009899193-05. Kepler magnitude: 13.19. Transit SNR 5.88

There are 2 quarters with good PRF difference image offsets

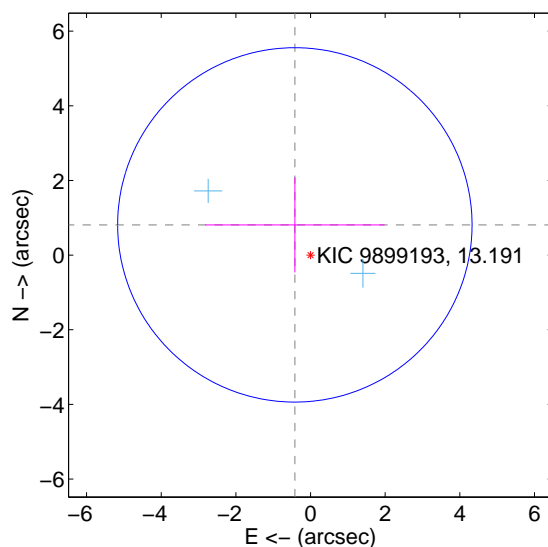
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.931 \pm 1.490$	0.62	$0.335 \pm 2.432$	$0.868 \pm 1.293$
PRF-fit source offset from KIC position	$0.911 \pm 1.582$	0.58	$0.420 \pm 2.405$	$0.809 \pm 1.272$
photometric centroid source offset	$0.59 \pm 0.63$	0.93	$-0.43 \pm 0.64$	$-0.40 \pm 0.63$

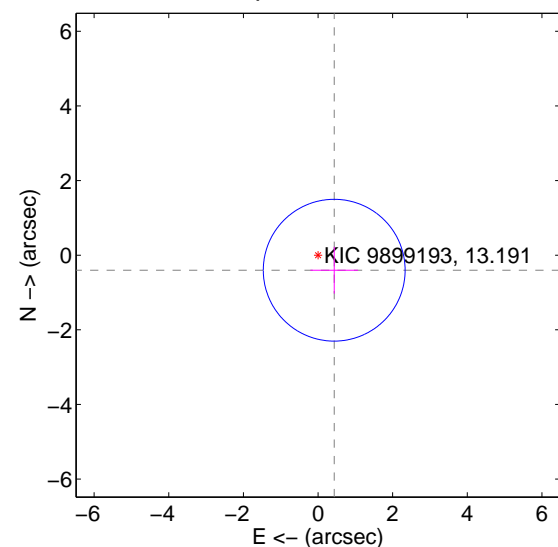
offset from difference PRF-fit to OOT PRF-fit



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.

Q1 no difference image



Q1 no OOT image



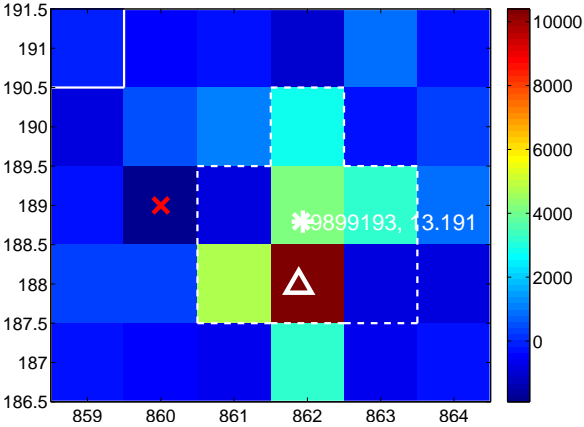
Q2 no difference image



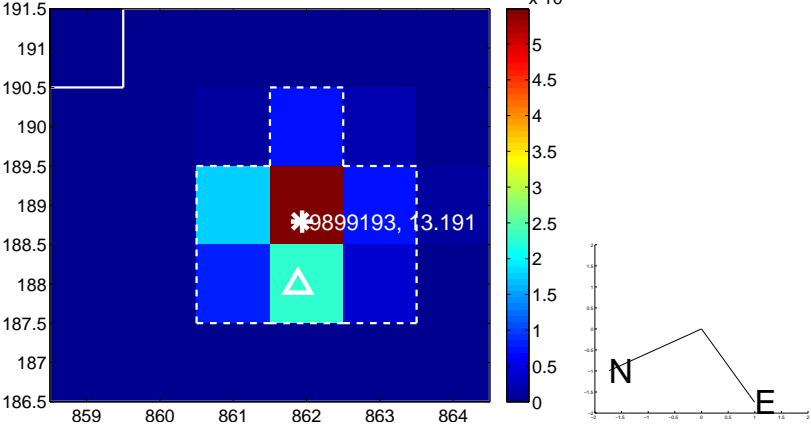
Q2 no OOT image



Q3 difference image



Q3 OOT image



Q4 no difference image



Q4 no OOT image



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

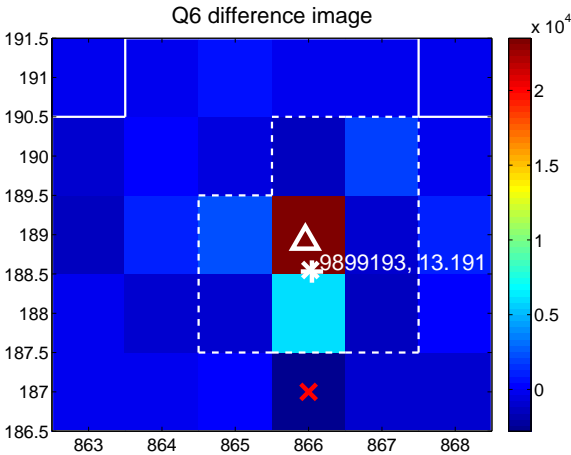
Q5 no difference image



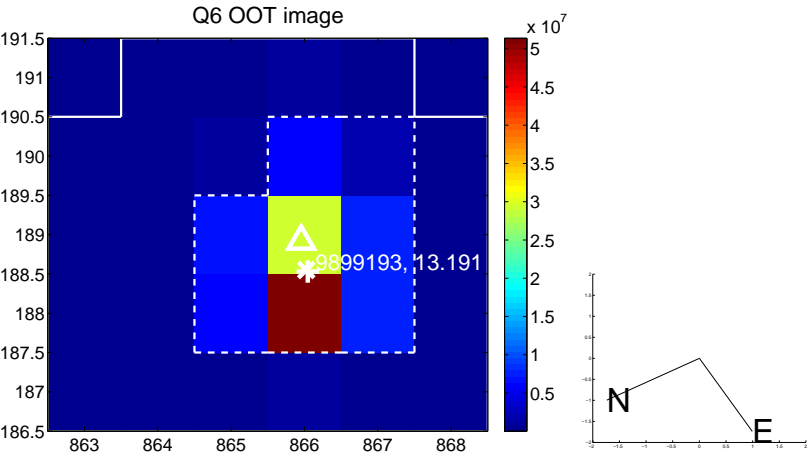
Q5 no OOT image



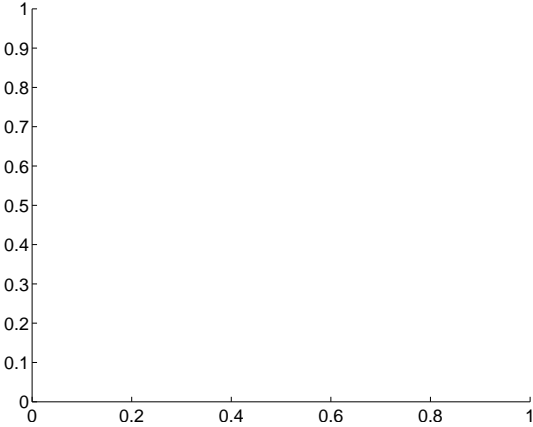
Q6 difference image



Q6 OOT image



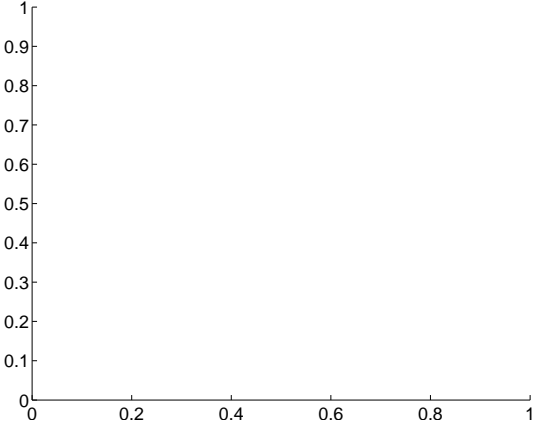
Q7 no difference image



Q7 no OOT image



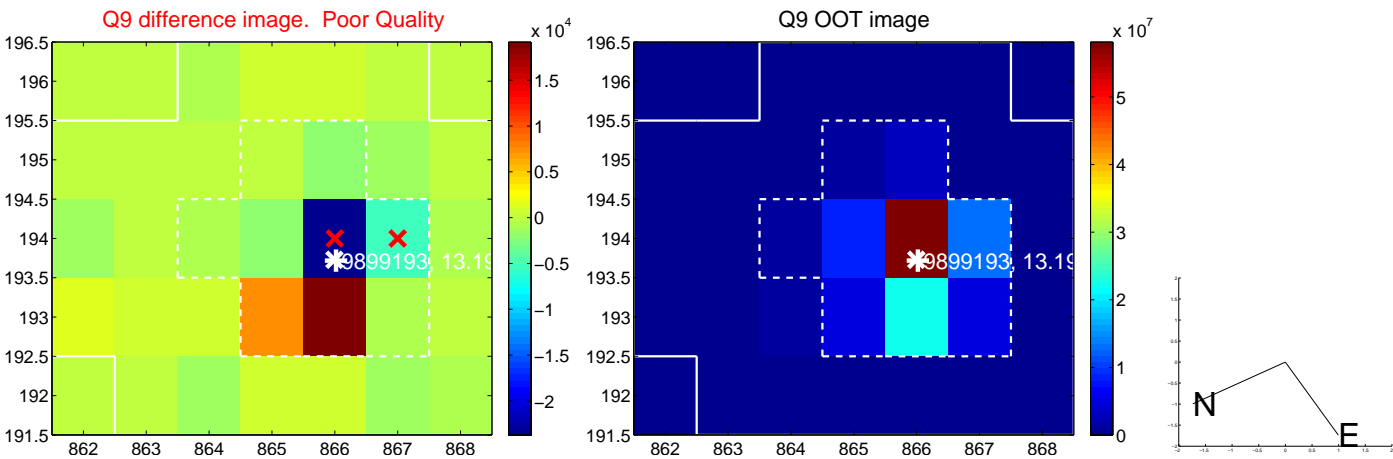
Q8 no difference image



Q8 no OOT image



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

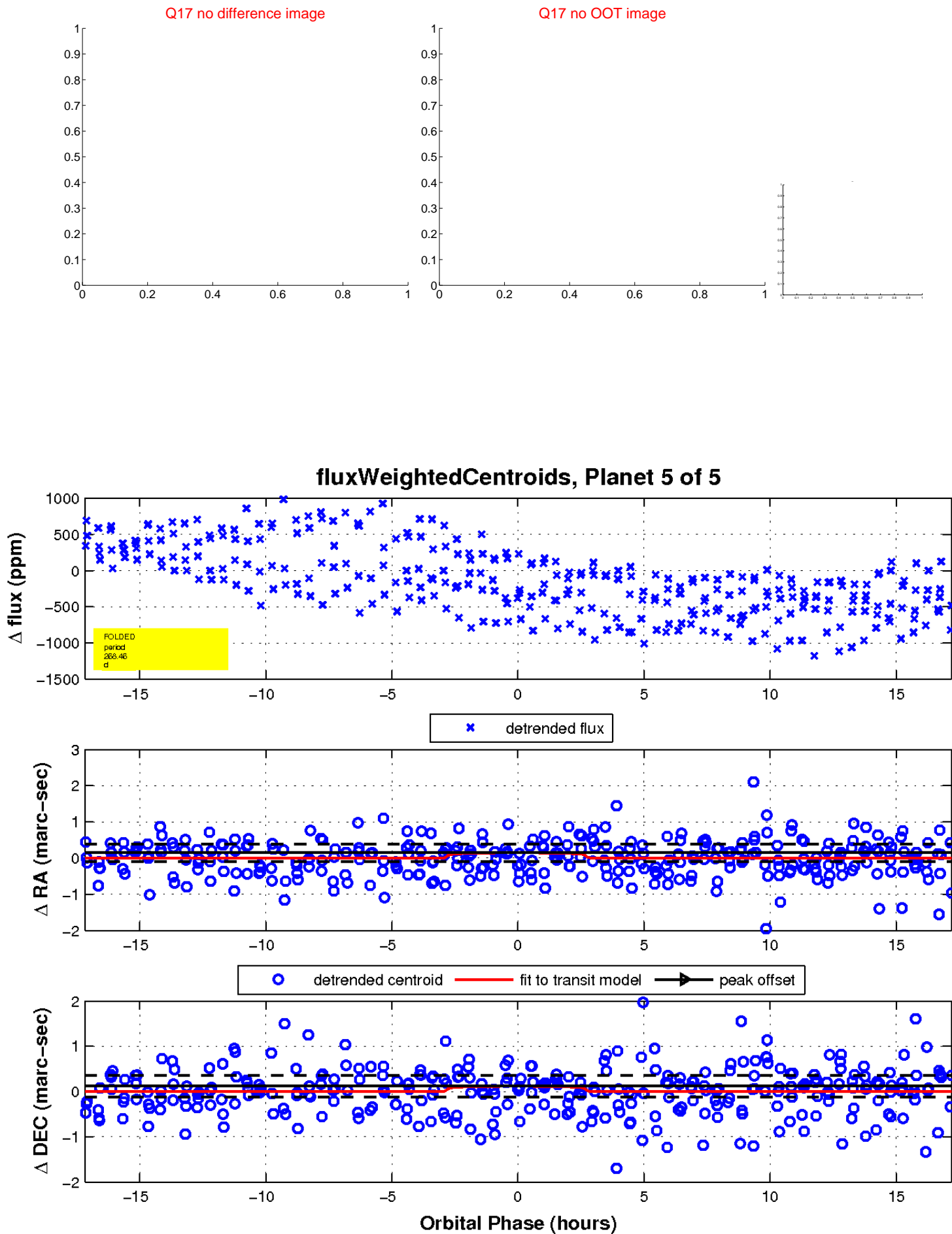


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

