

# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

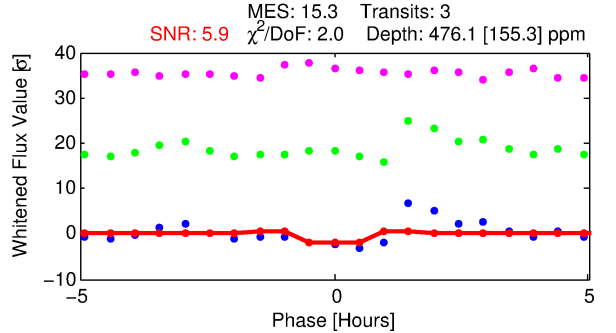
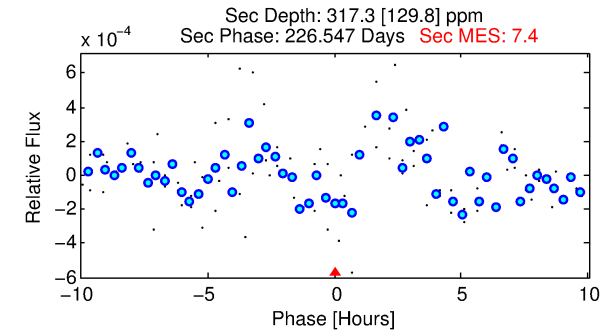
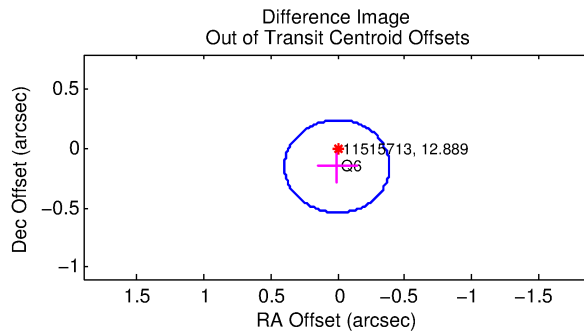
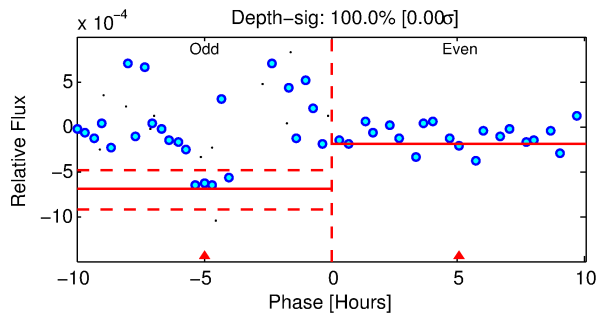
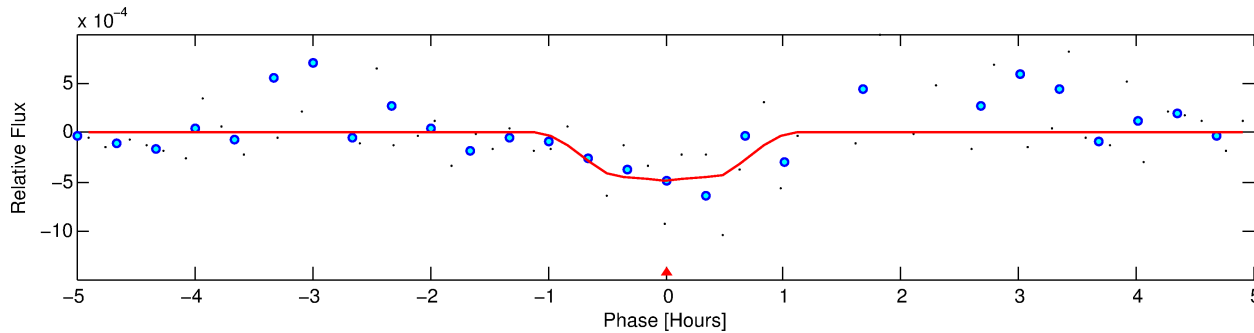
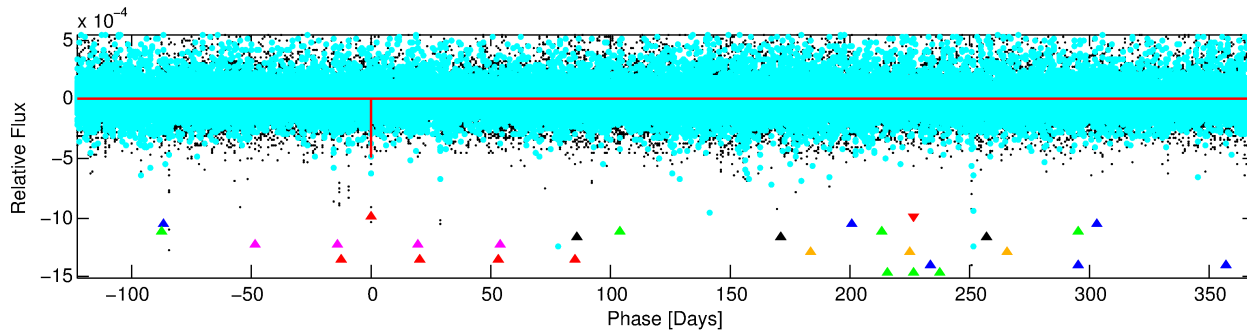
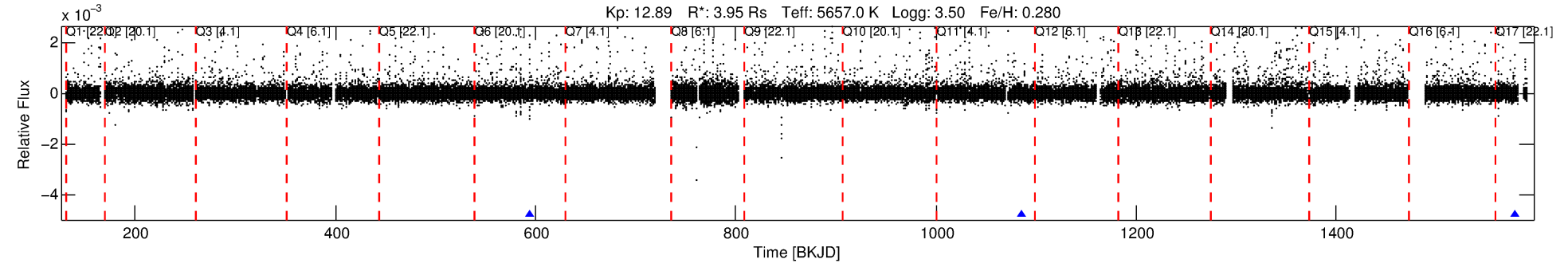
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011515713-01

No Significant Match Found

# DV One-Page Summary

KIC: 11515713 Candidate: 1 of 9 Period: 491.766 d



## DV Fit Results:

Period = 491.76644 [0.00715] d  
Epoch = 594.1307 [0.0099] BKJD  
Rp/R\* = 0.0228 [0.0685]  
a/R\* = 1321.34 [16881.19]  
b = 0.84 [4.67]  
Seff = 6.52 [8.61]  
Teq = 407 [135] K  
Rp = 9.82 [30.30] Re  
a = 1.4804 [1.1474] AU  
Ag = 3966.41 [24435.36] [0.16σ]  
Teffp = 5000 [7525] K [0.61σ]

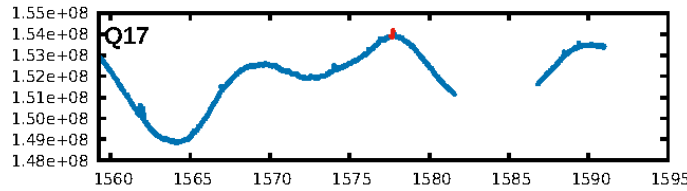
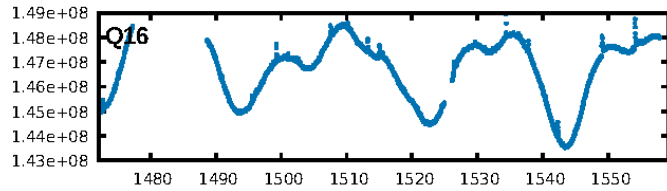
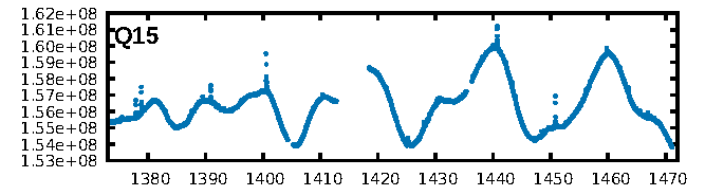
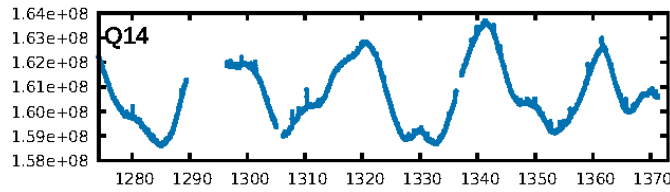
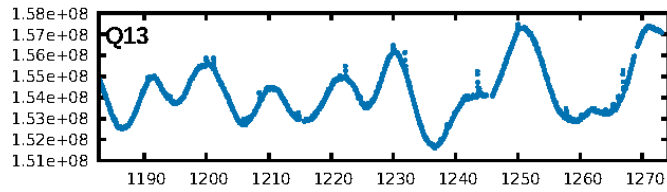
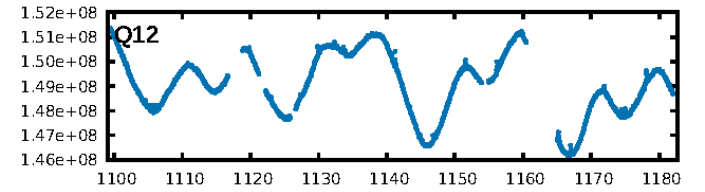
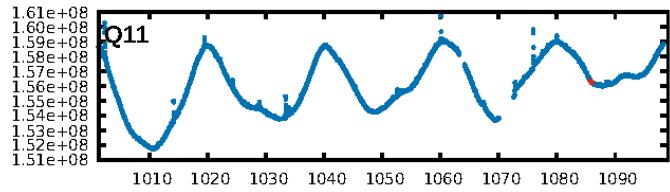
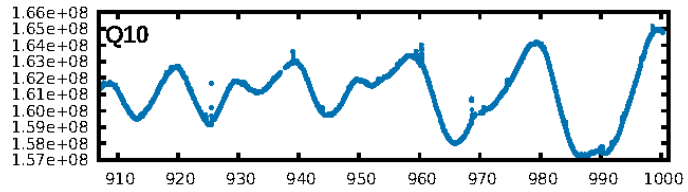
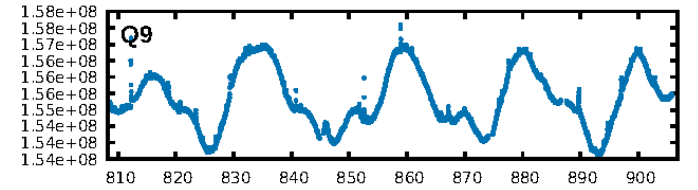
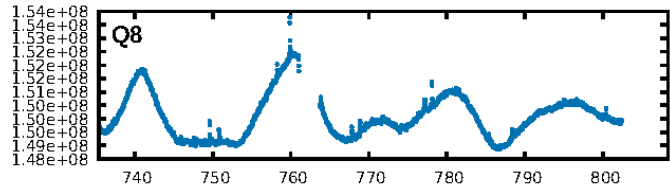
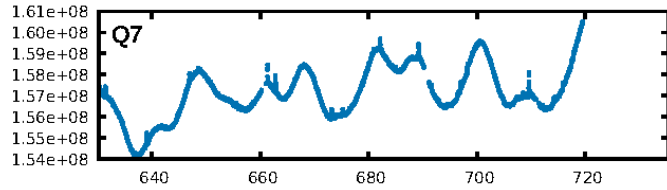
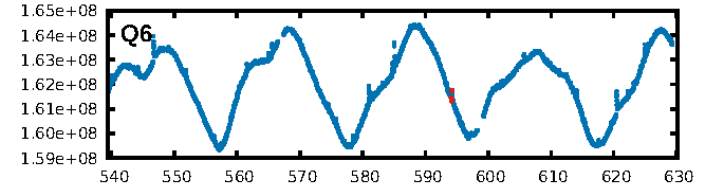
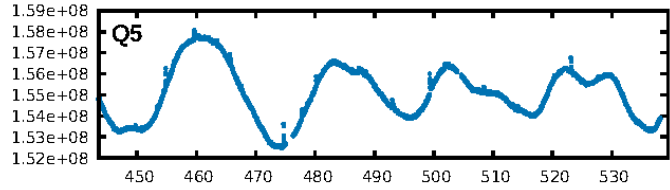
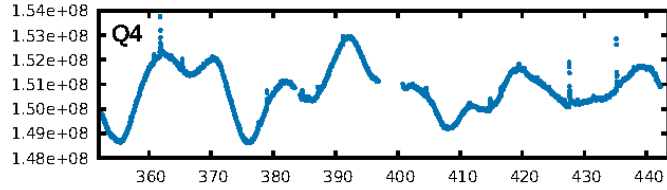
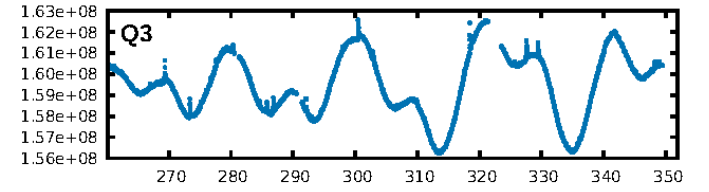
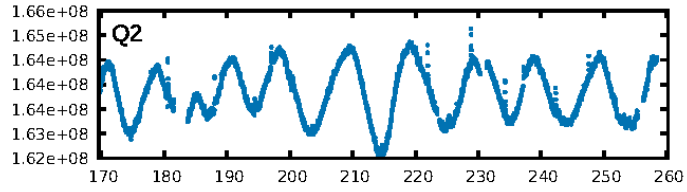
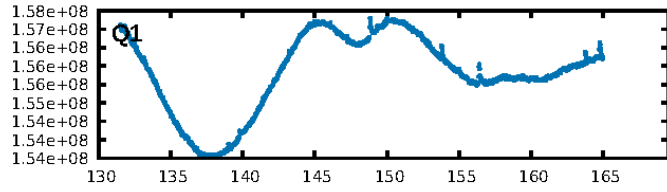
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [29.21σ]  
LongPeriod-sig: 100.0% [202.72σ]  
ModelChiSquare2-sig: 1.2%  
ModelChiSquareGof-sig: 23.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 0.7729  
Centroid-sig: 96.3%  
Centroid-so: 0.216 arcsec [0.15σ]  
OotOffset-rm: 0.148 arcsec [1.13σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-rm: 0.176 arcsec [1.31σ]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [3/3]

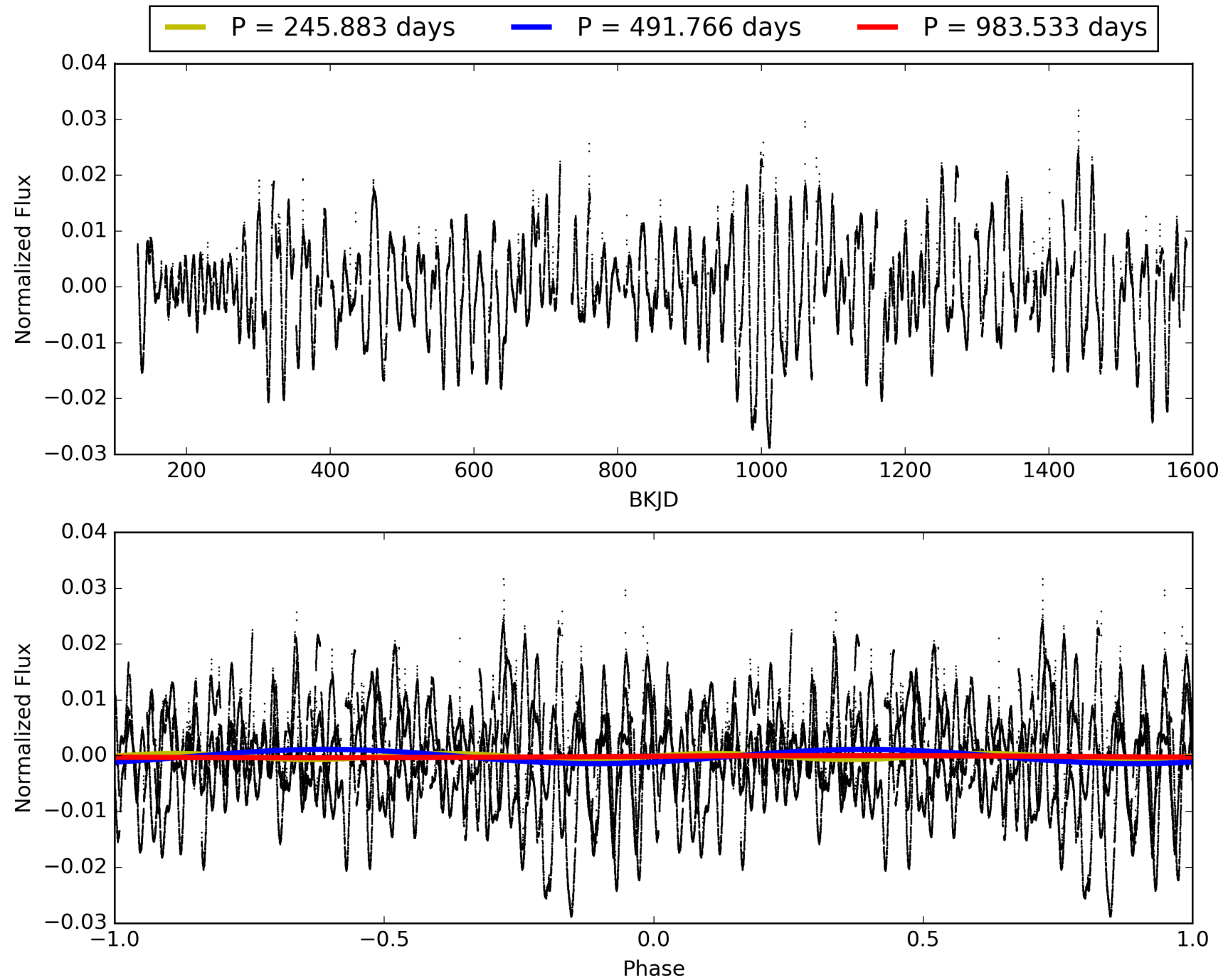
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:03:55 Z

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

## TCE 011515713-01, PDC Light Curves



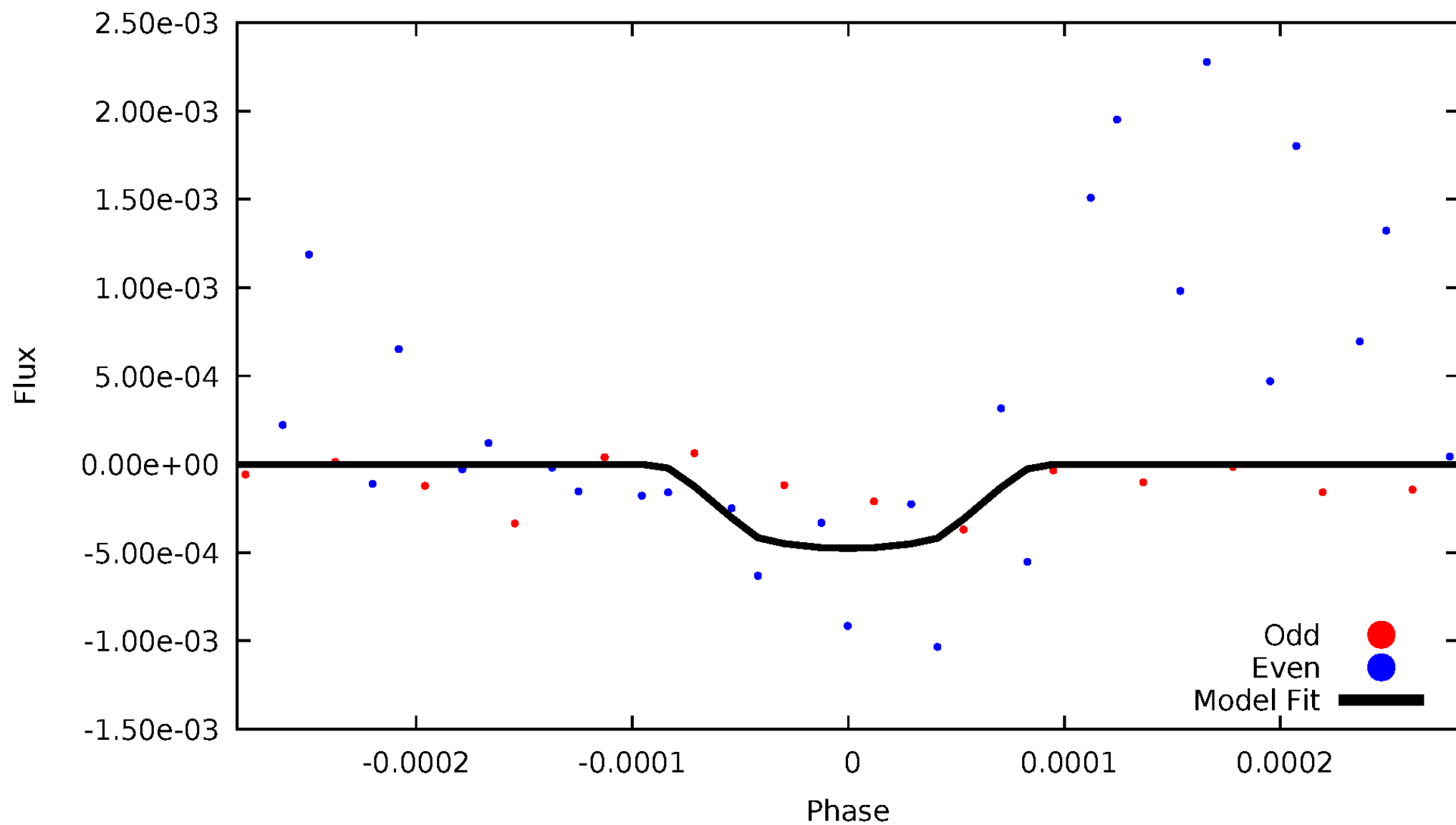
# TCE 011515713-01





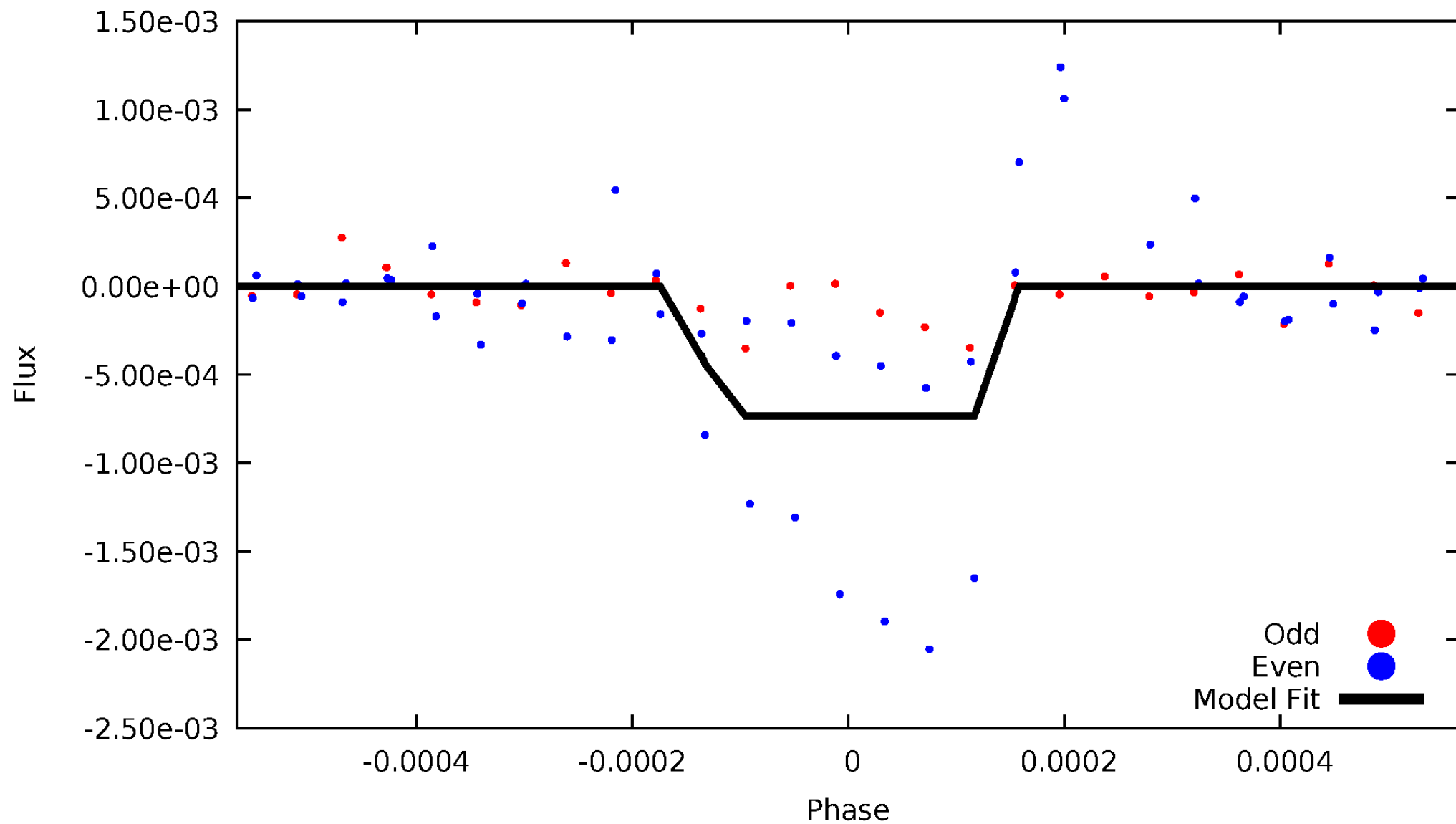
# DV Odd/Even

TCE 011515713-01



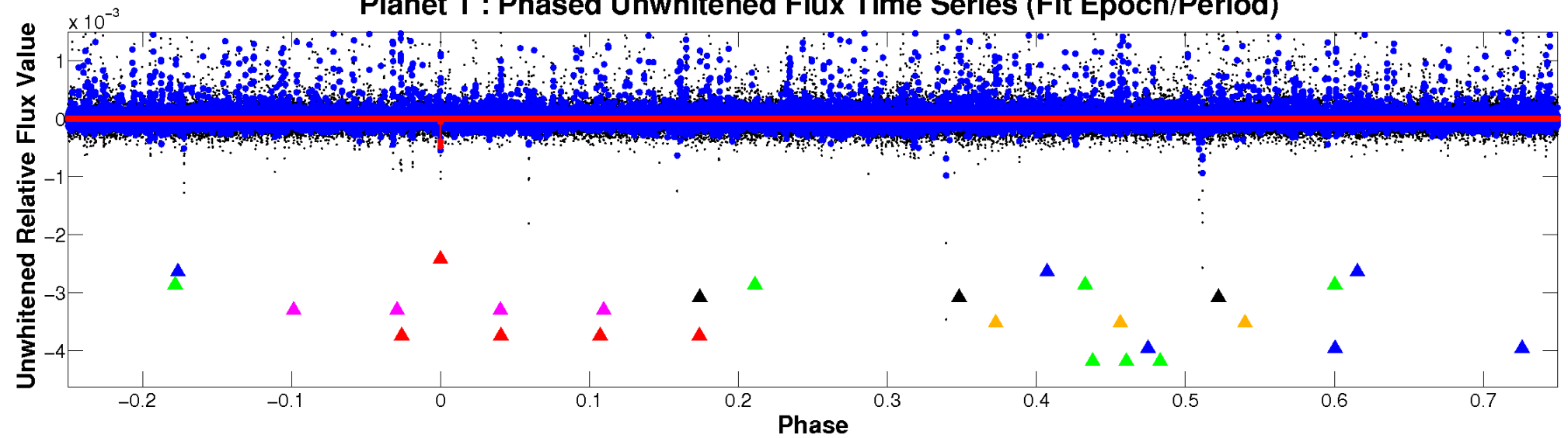
# ALT Odd/Even

TCE 011515713-01

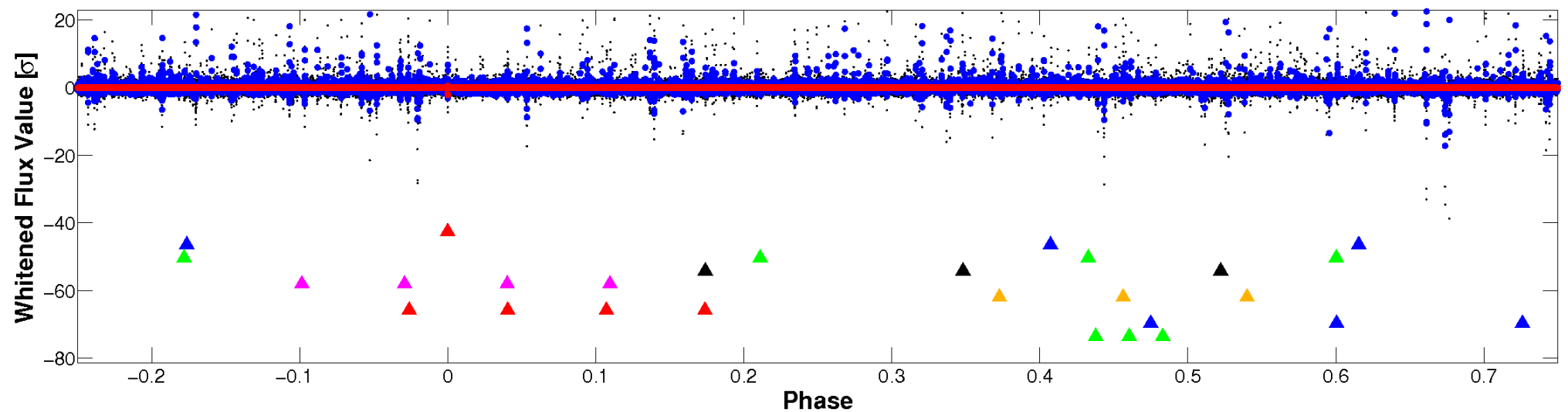


# Non-Whitened Vs. Whitened Light Curve

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

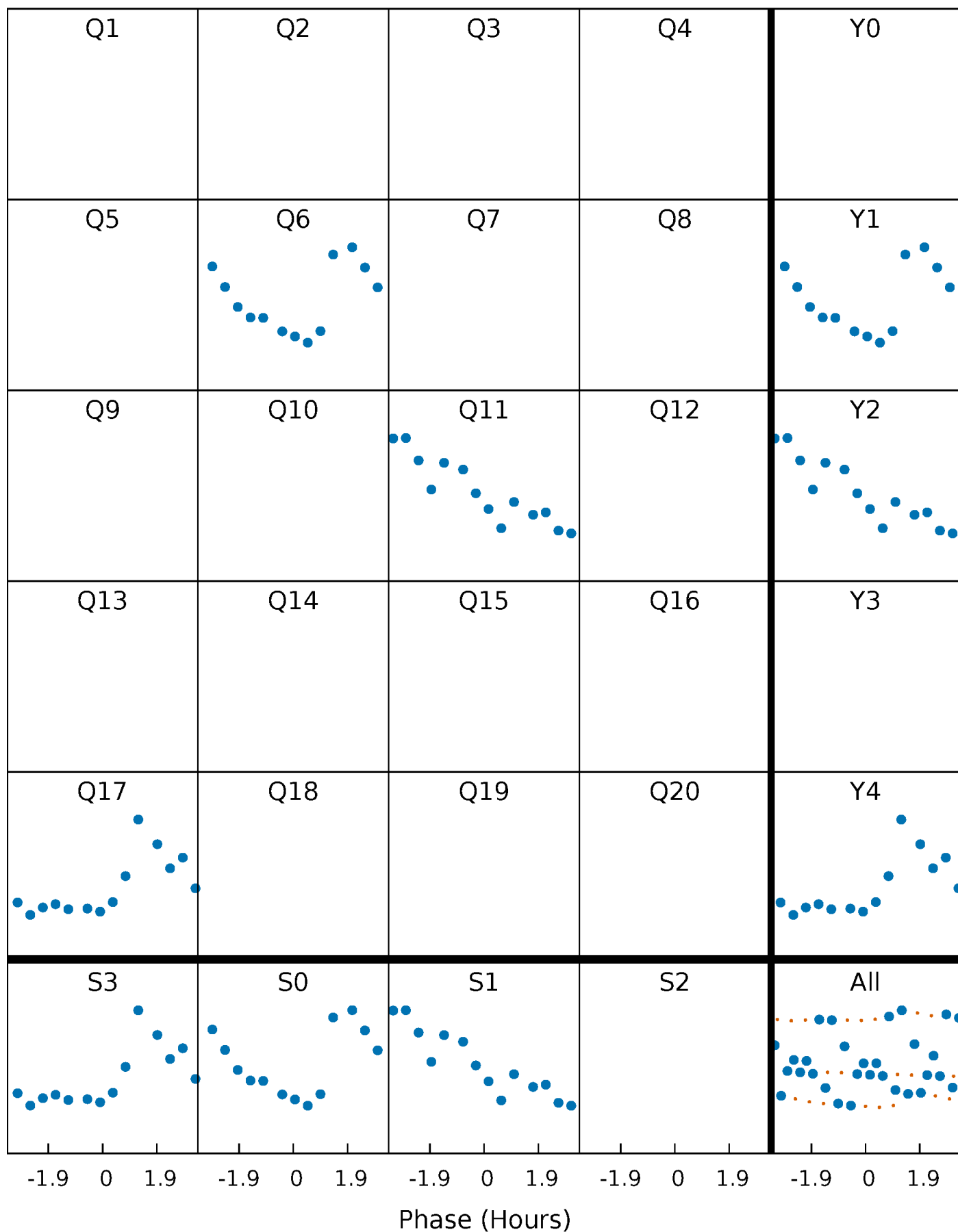


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



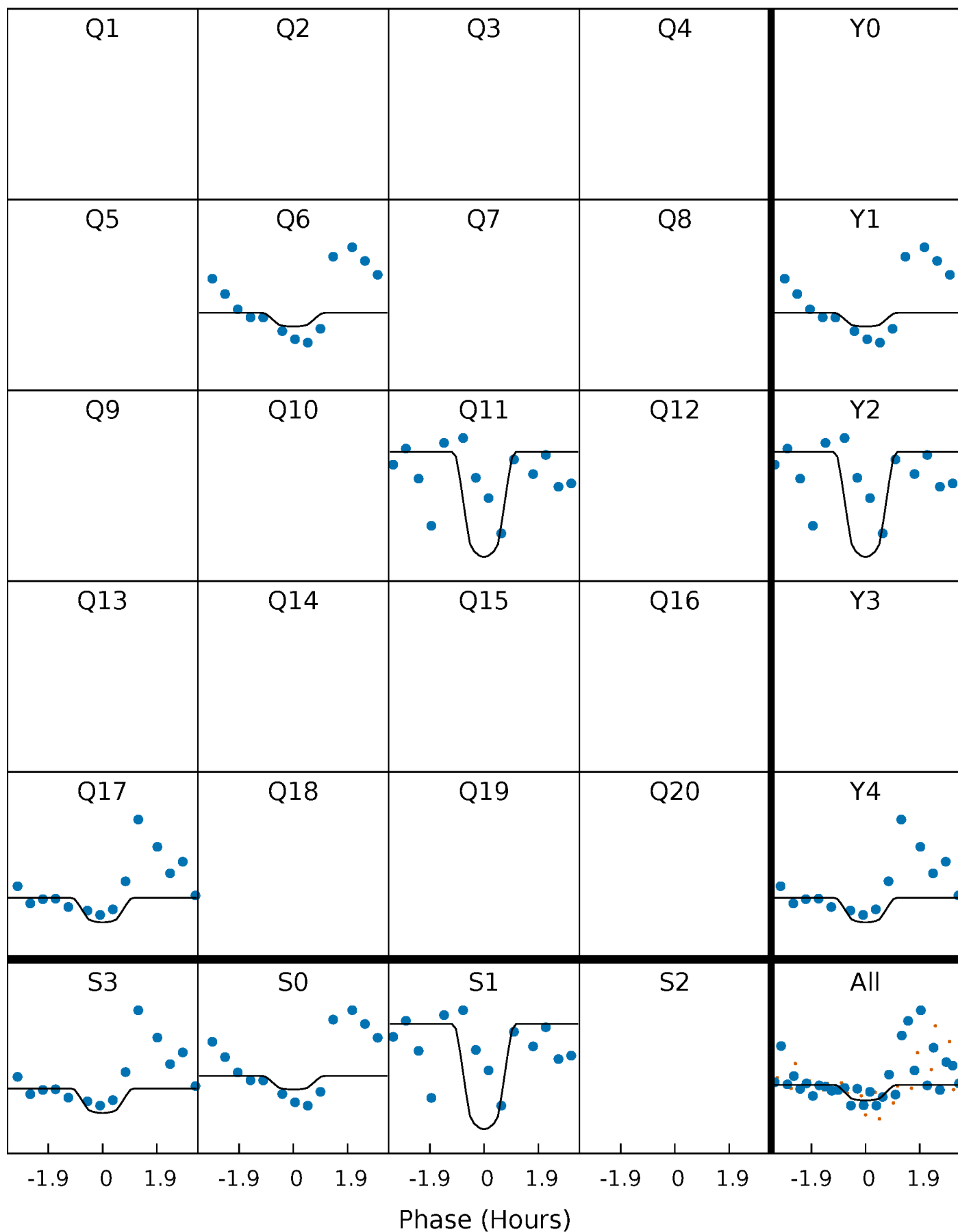
# PDC Quarter-Phased Transit Curves

TCE 011515713-01 P=491.766437 Days  $T_0=594.130740$  (BKJD)



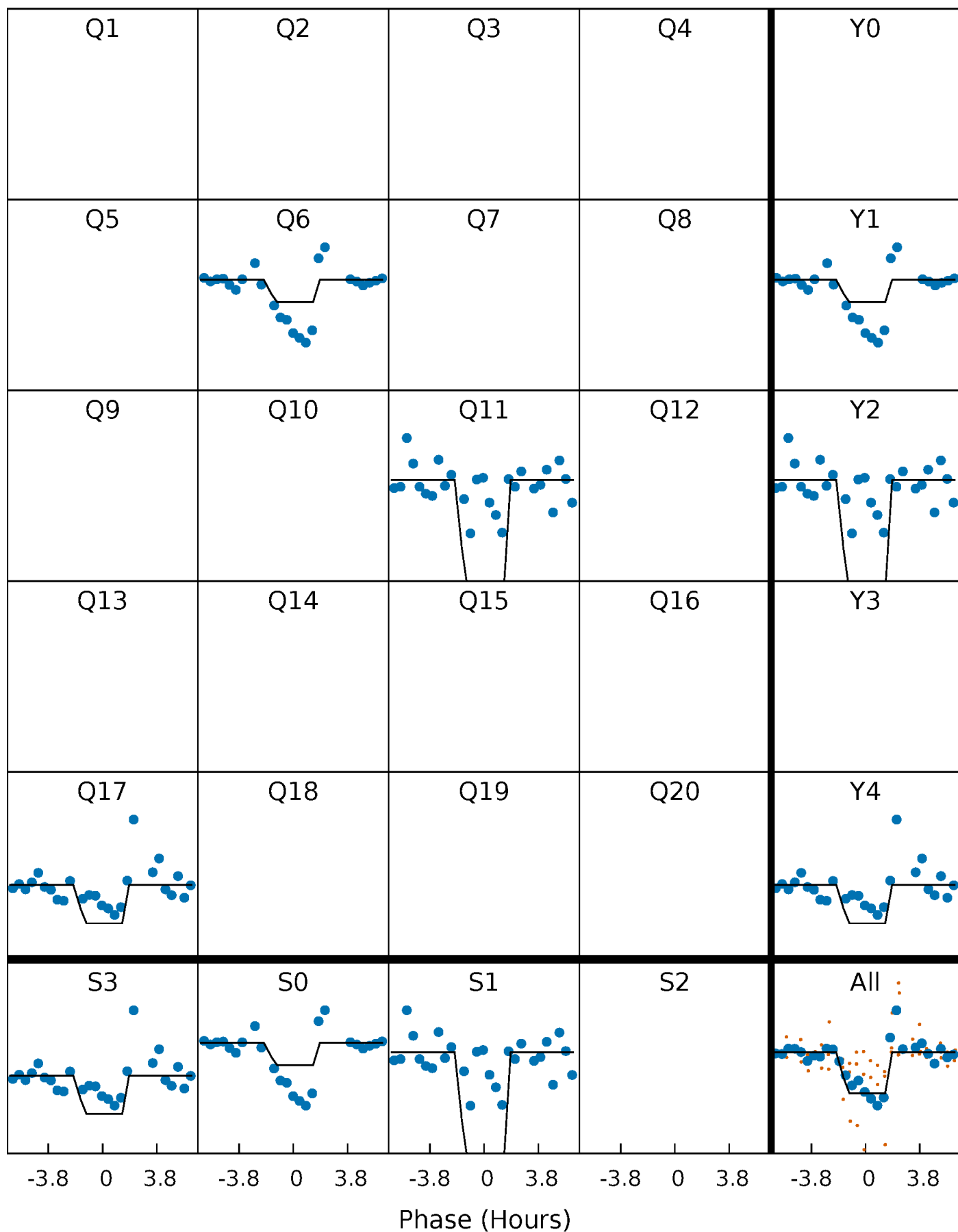
# DV Quarter-Phased Transit Curves

TCE 011515713-01 P=491.766437 Days  $T_0=594.130740$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 011515713-01 P=491.754055 Days  $T_0=594.114057$  (BKJD)

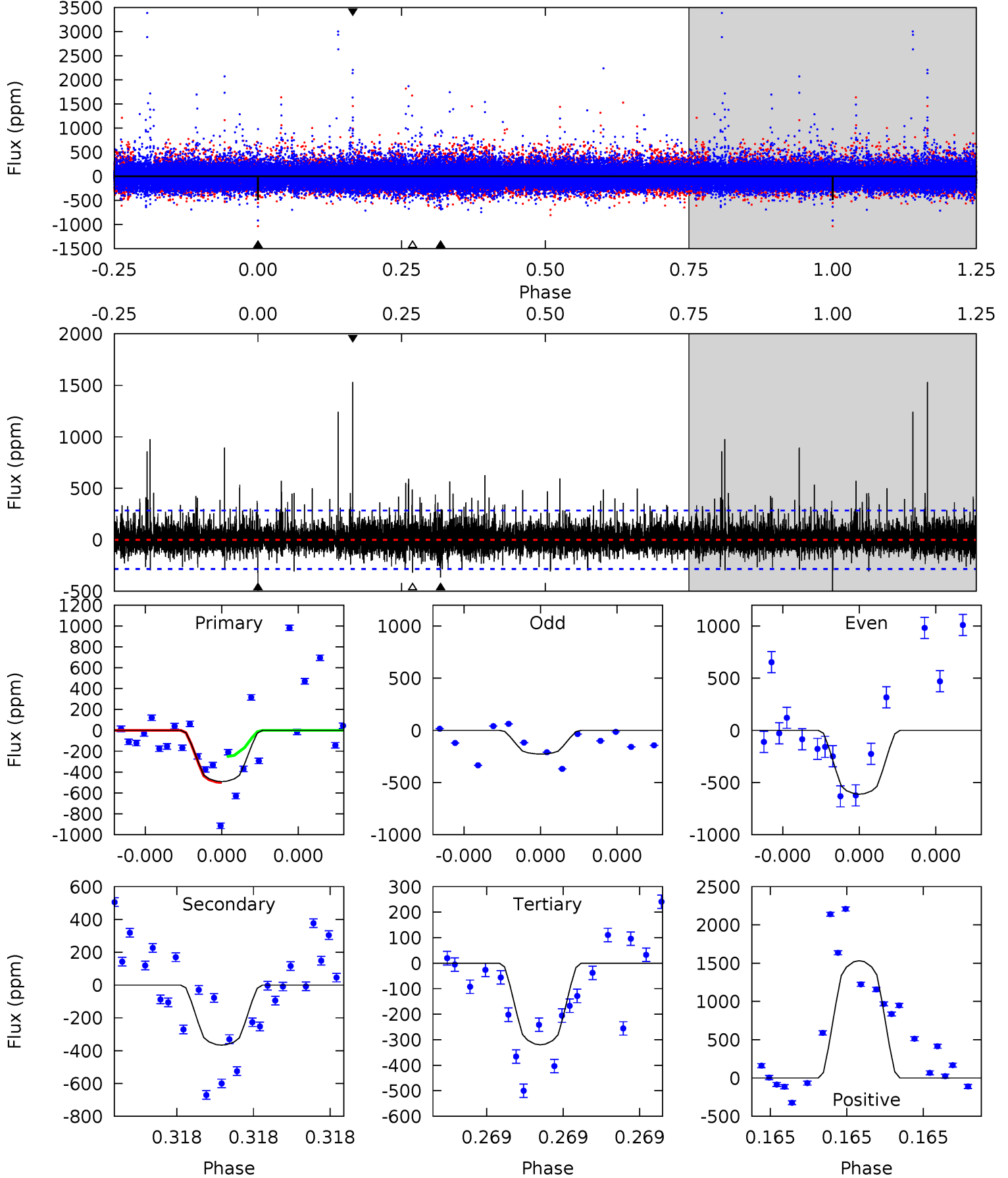




# DV Model-Shift Uniqueness Test

011515713-01, P = 491.766437 Days, E = 102.364303 Days

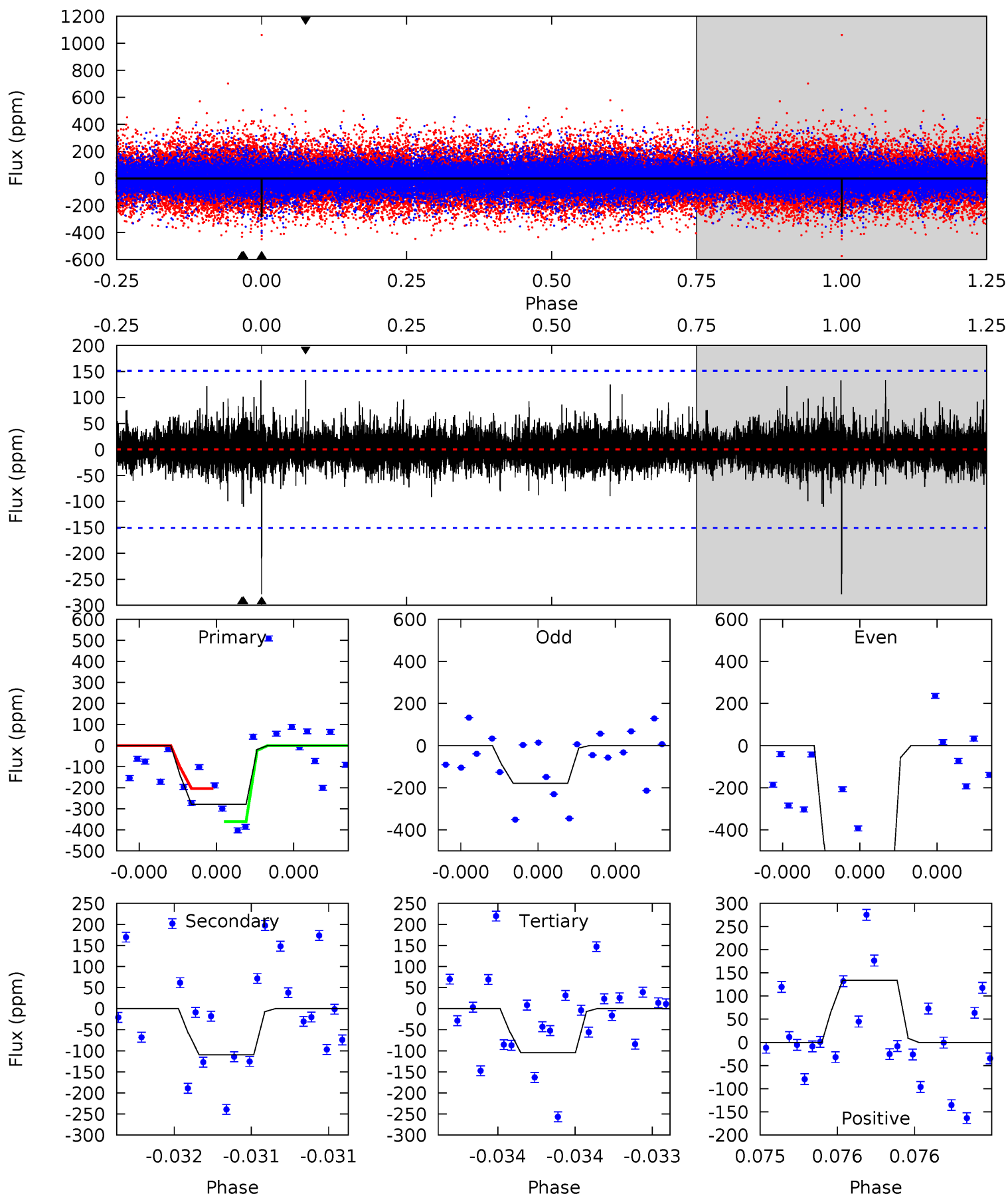
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.93	7.41	6.47	31.0	5.75	3.75	1.73	3.47	-21.1	0.94	-23.6	2.17	1.84	0.76	2.39



# Alt Model-Shift Uniqueness Test

011515713-01, P = 491.754055 Days, E = 102.360002 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
10.4	4.11	3.92	5.01	5.66	3.62	0.73	6.52	5.44	0.18	-0.90	13.0	1.93	0.32	0



### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-366 \pm 49$	$18.87^{+22.70}_{-13.43}$	$551^{+49}_{-105}$	$3748^{+2315}_{-733}$	$1213^{+12476}_{-962}$
Alt.	$-110 \pm 27$	$19.56^{+22.28}_{-13.90}$	$549^{+50}_{-107}$	$3073^{+1374}_{-499}$	$321^{+3558}_{-251}$

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

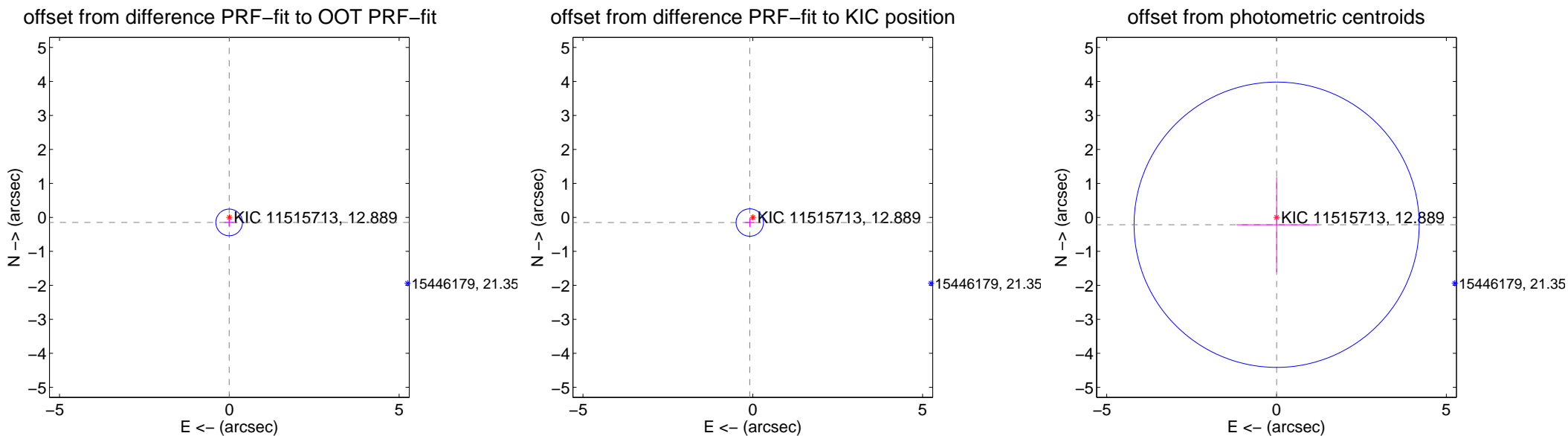
## DV Centroid Data

Supplemental centroid analysis for 011515713-01. Kepler magnitude: 12.89. Transit SNR 5.89

There are 1 quarters with good PRF difference image offsets

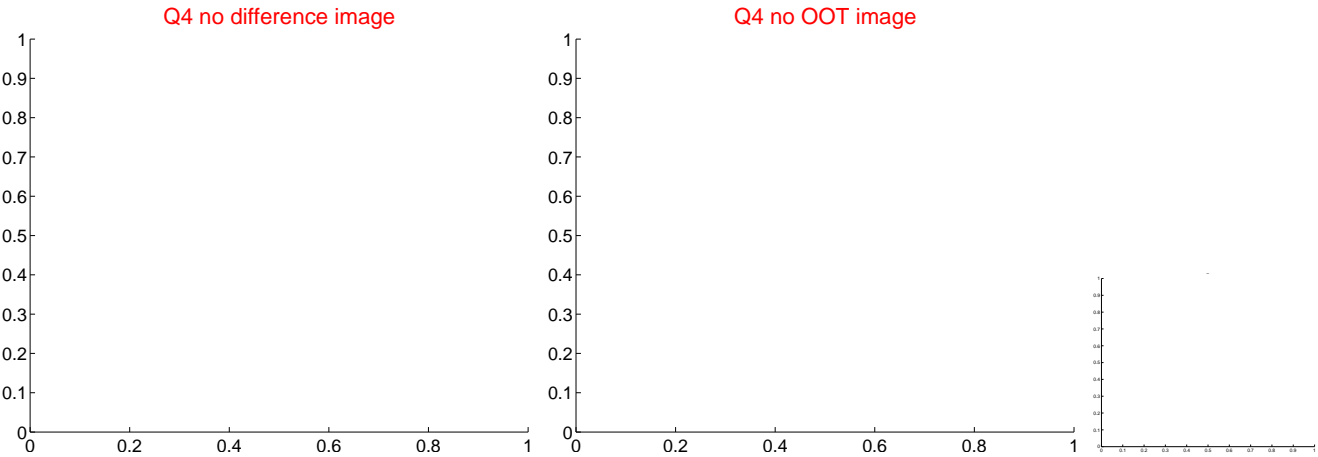
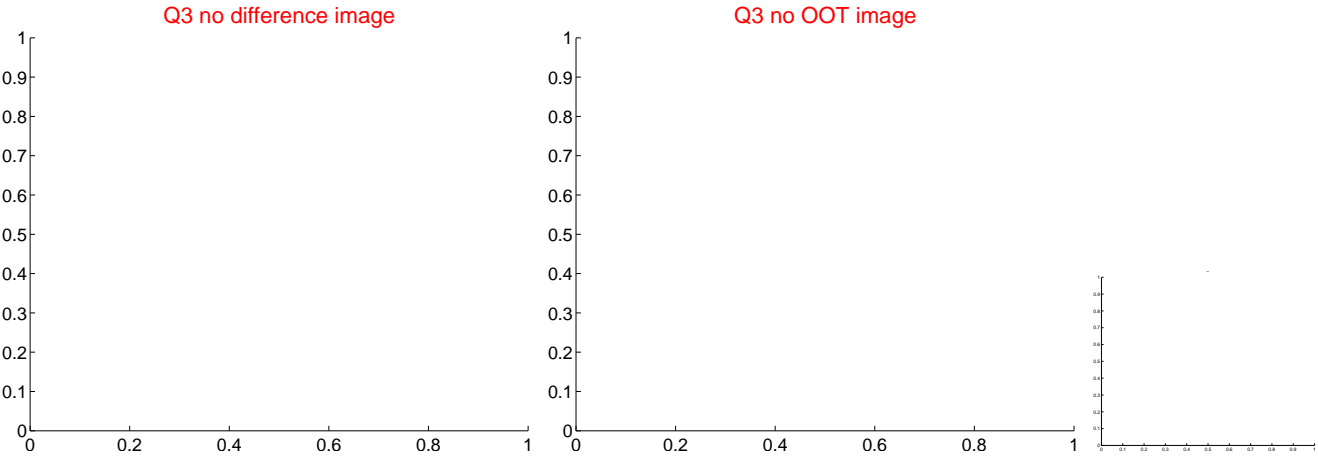
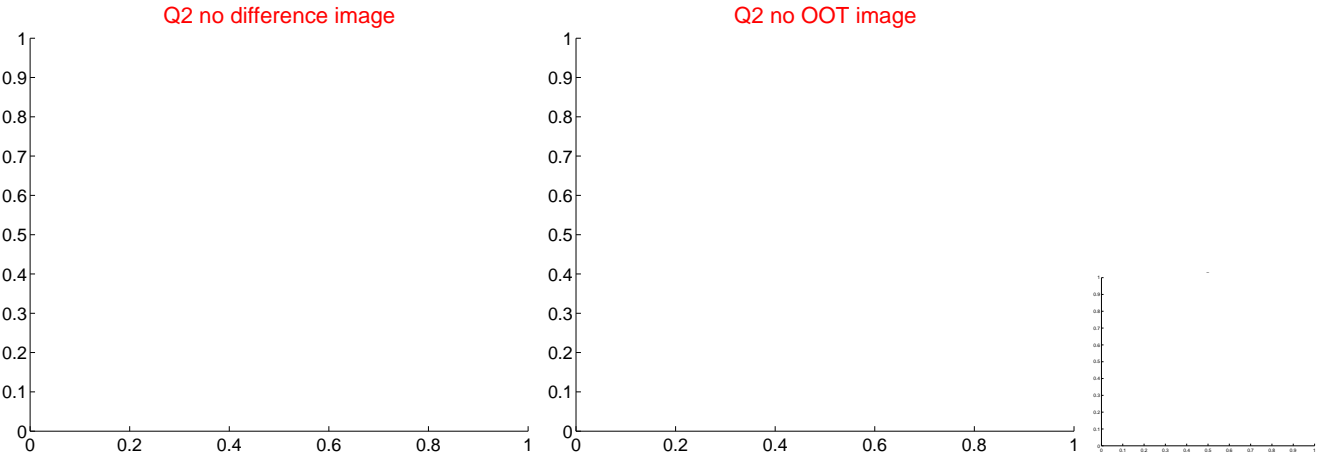
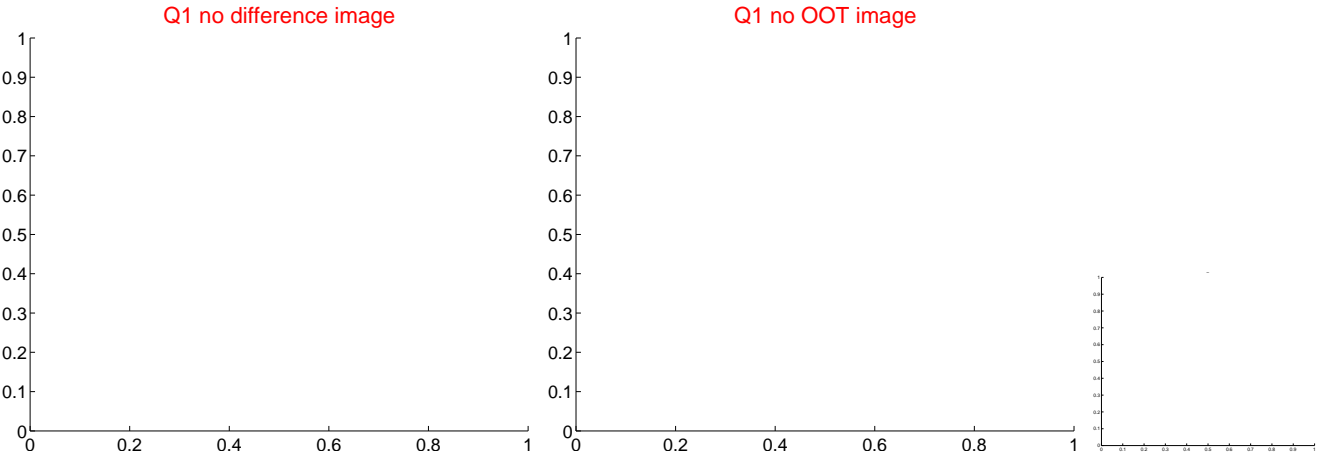
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.148 \pm 0.131$	1.13	$0.005 \pm 0.145$	$-0.148 \pm 0.131$
PRF-fit source offset from KIC position	$0.176 \pm 0.134$	1.31	$0.089 \pm 0.145$	$-0.151 \pm 0.131$
photometric centroid source offset	$0.22 \pm 1.40$	0.15	$-0.00 \pm 1.18$	$-0.22 \pm 1.40$

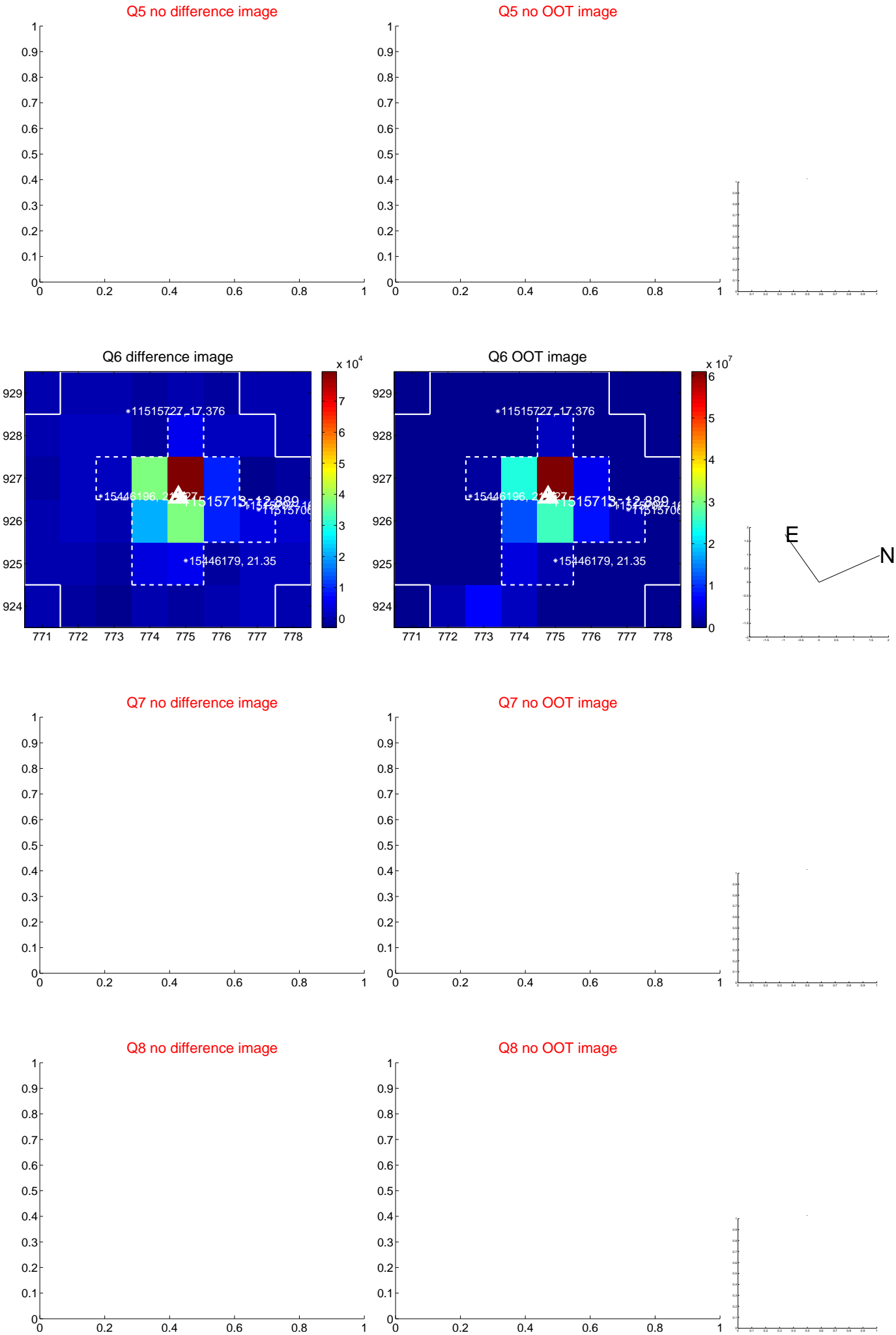


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



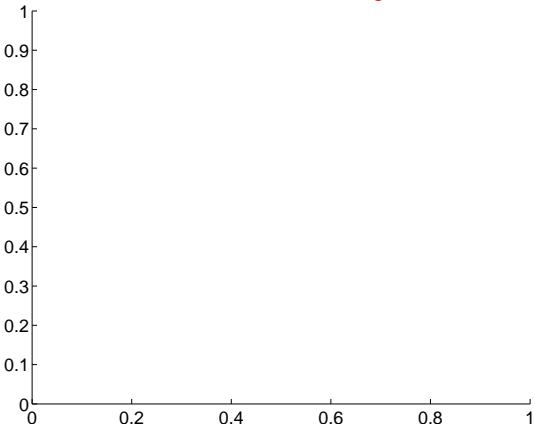
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



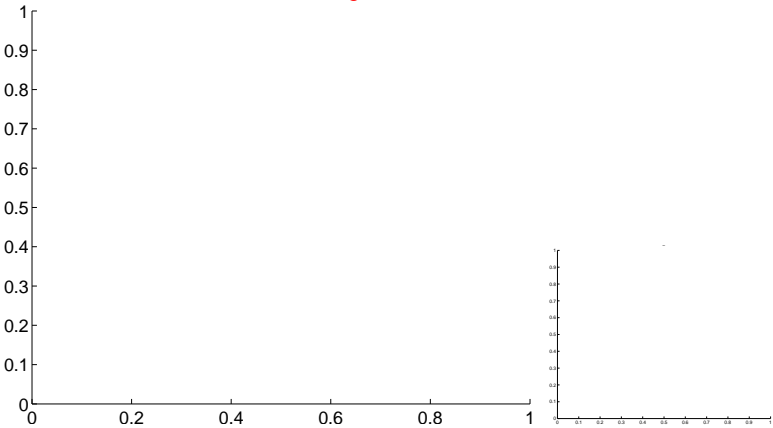


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

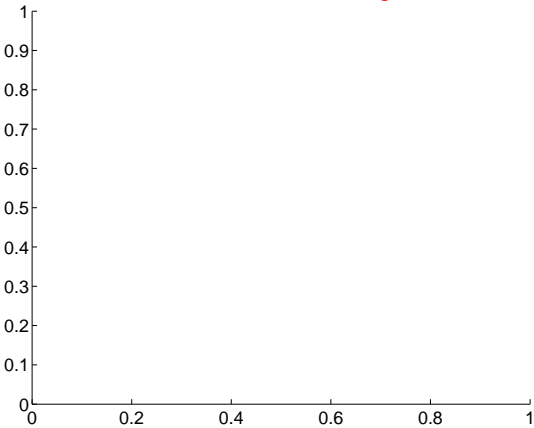
Q9 no difference image



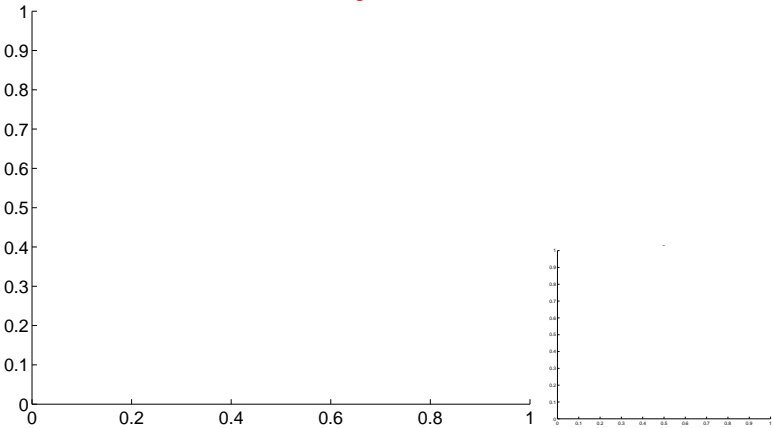
Q9 no OOT image



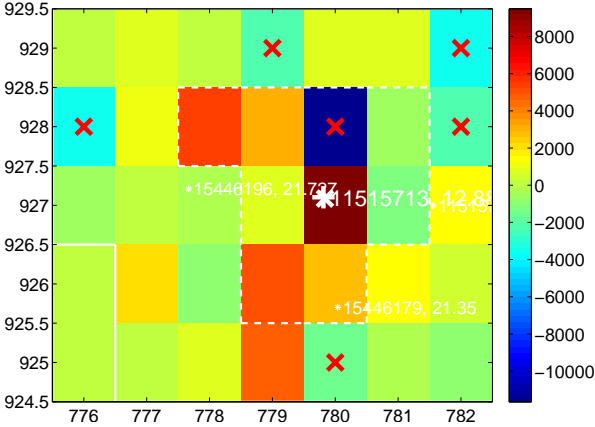
Q10 no difference image



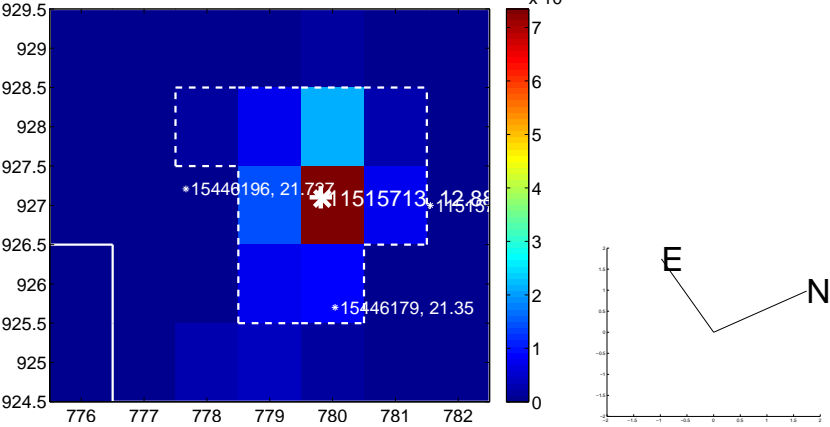
Q10 no OOT image



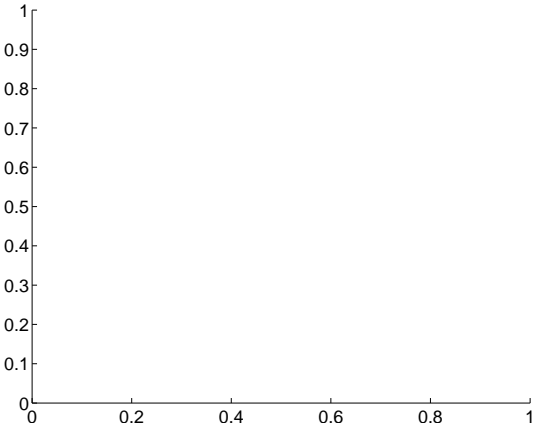
Q11 difference image. Poor Quality



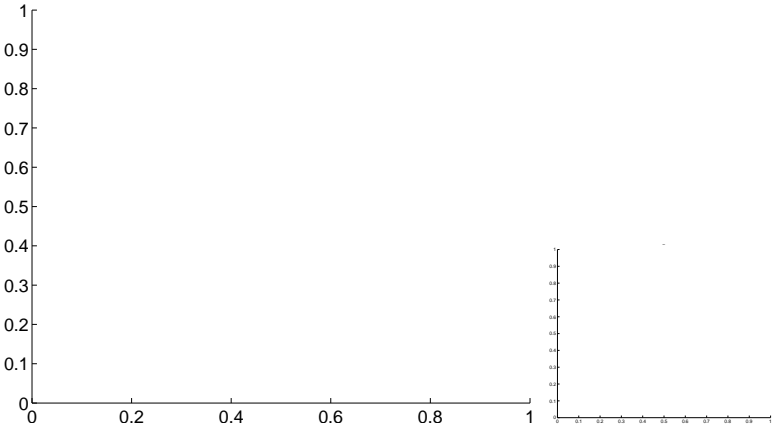
Q11 OOT image



Q12 no difference image



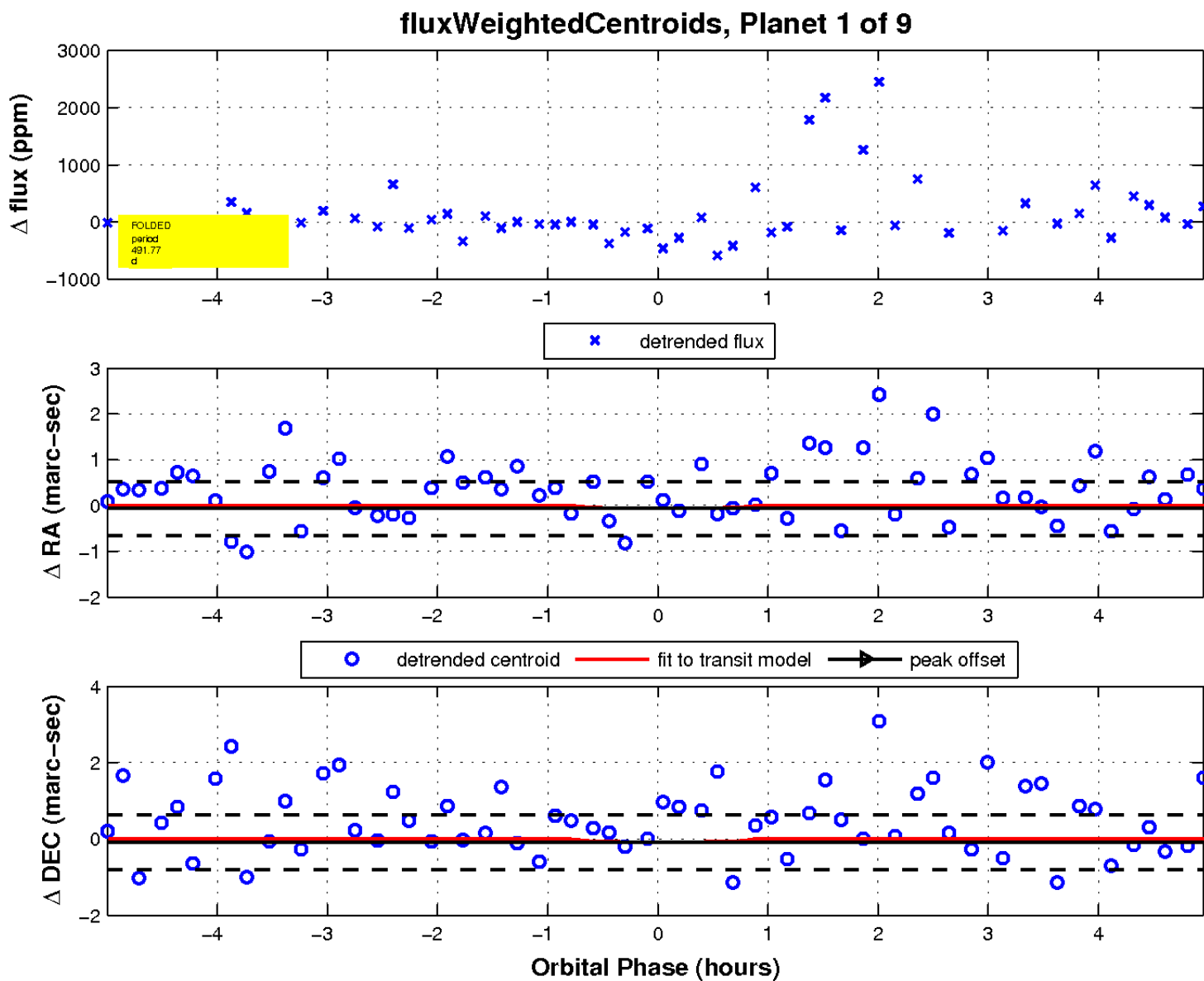
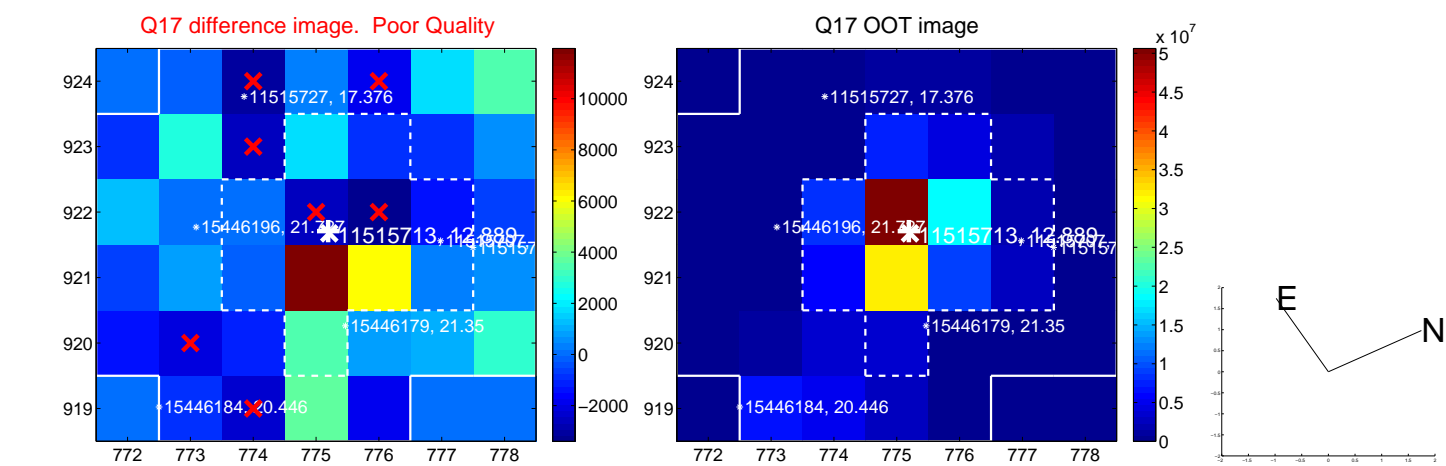
Q12 no OOT image



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

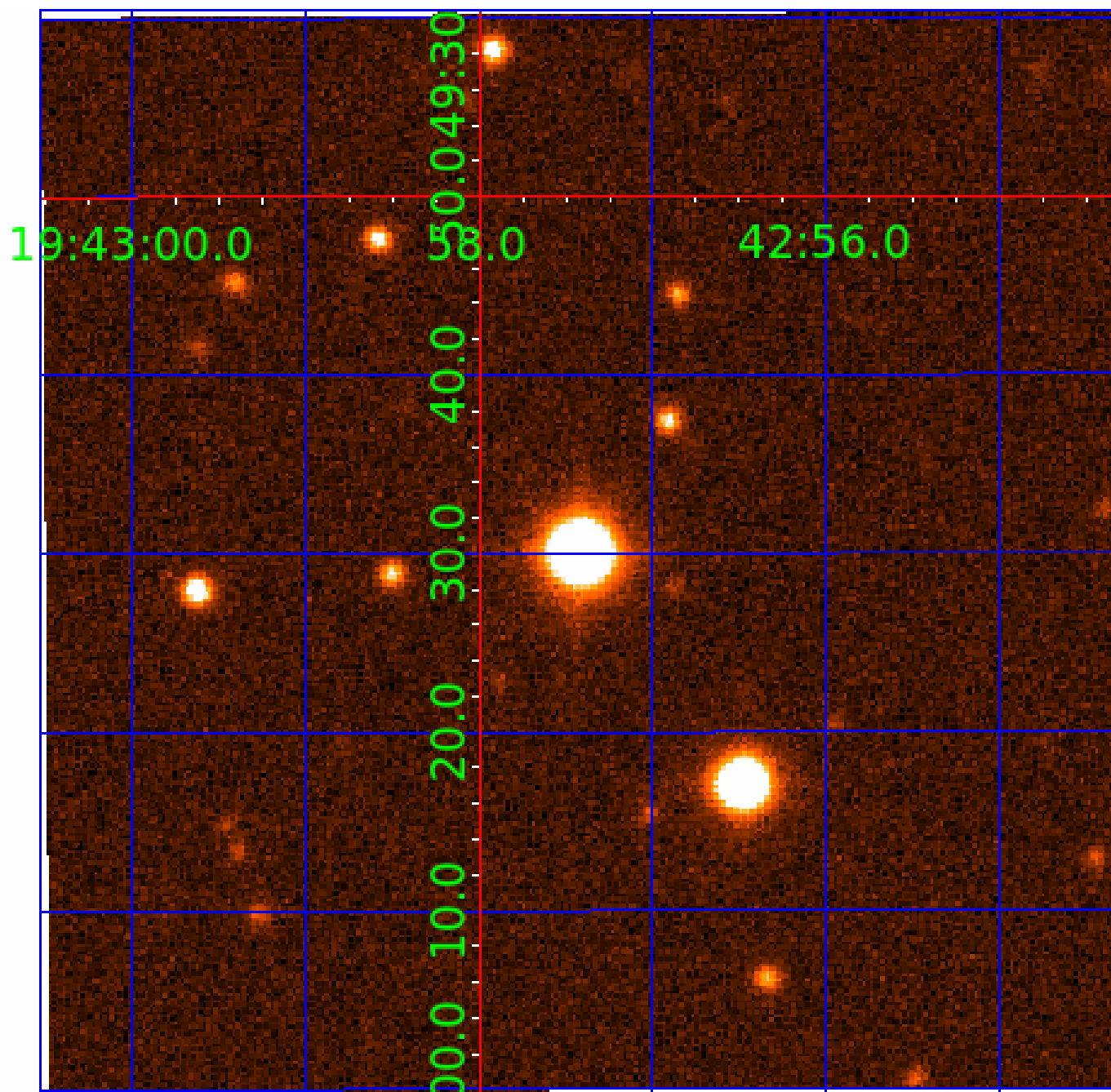


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

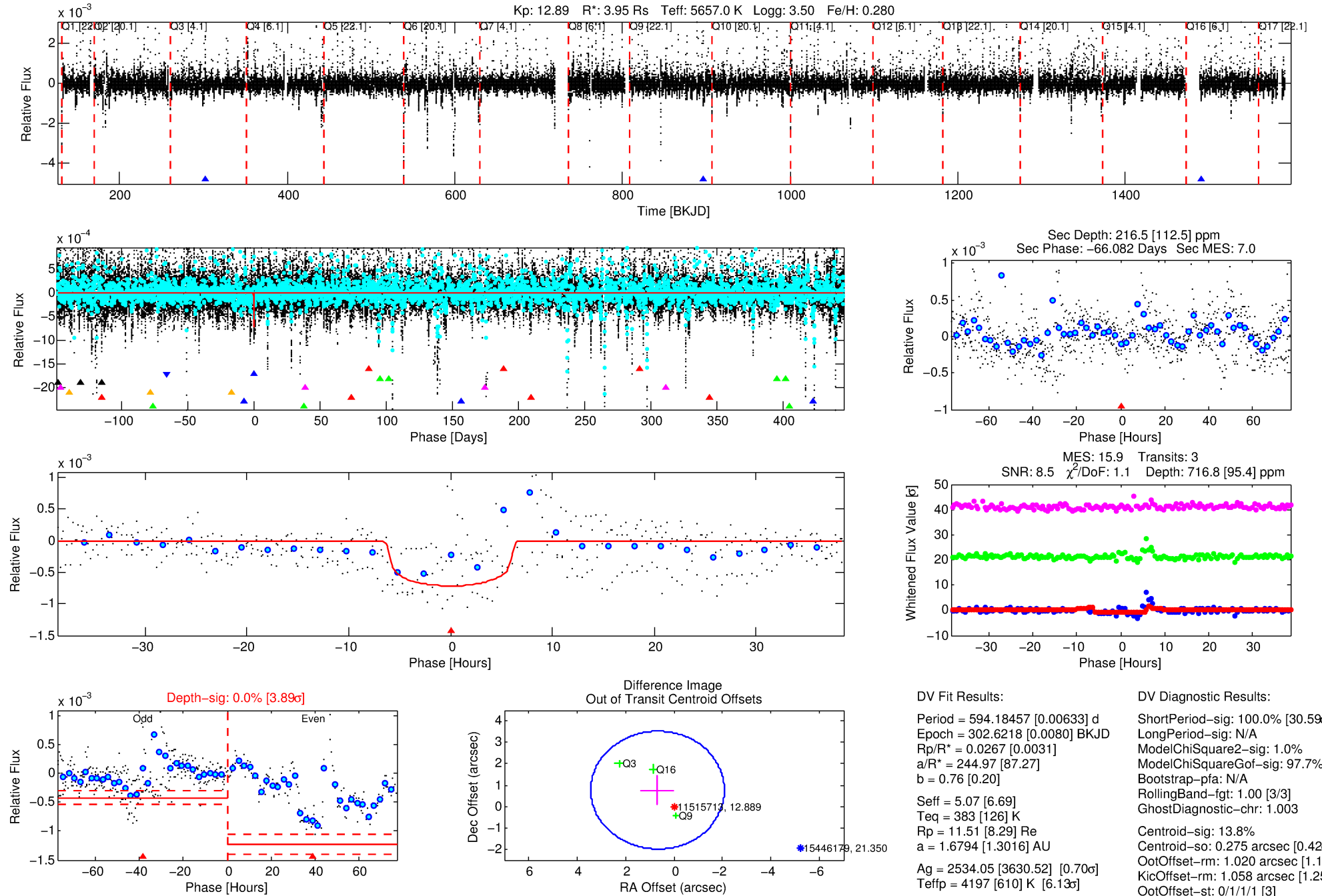
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011515713-02

No Significant Match Found

# DV One-Page Summary

KIC: 11515713 Candidate: 2 of 9 Period: 594.185 d

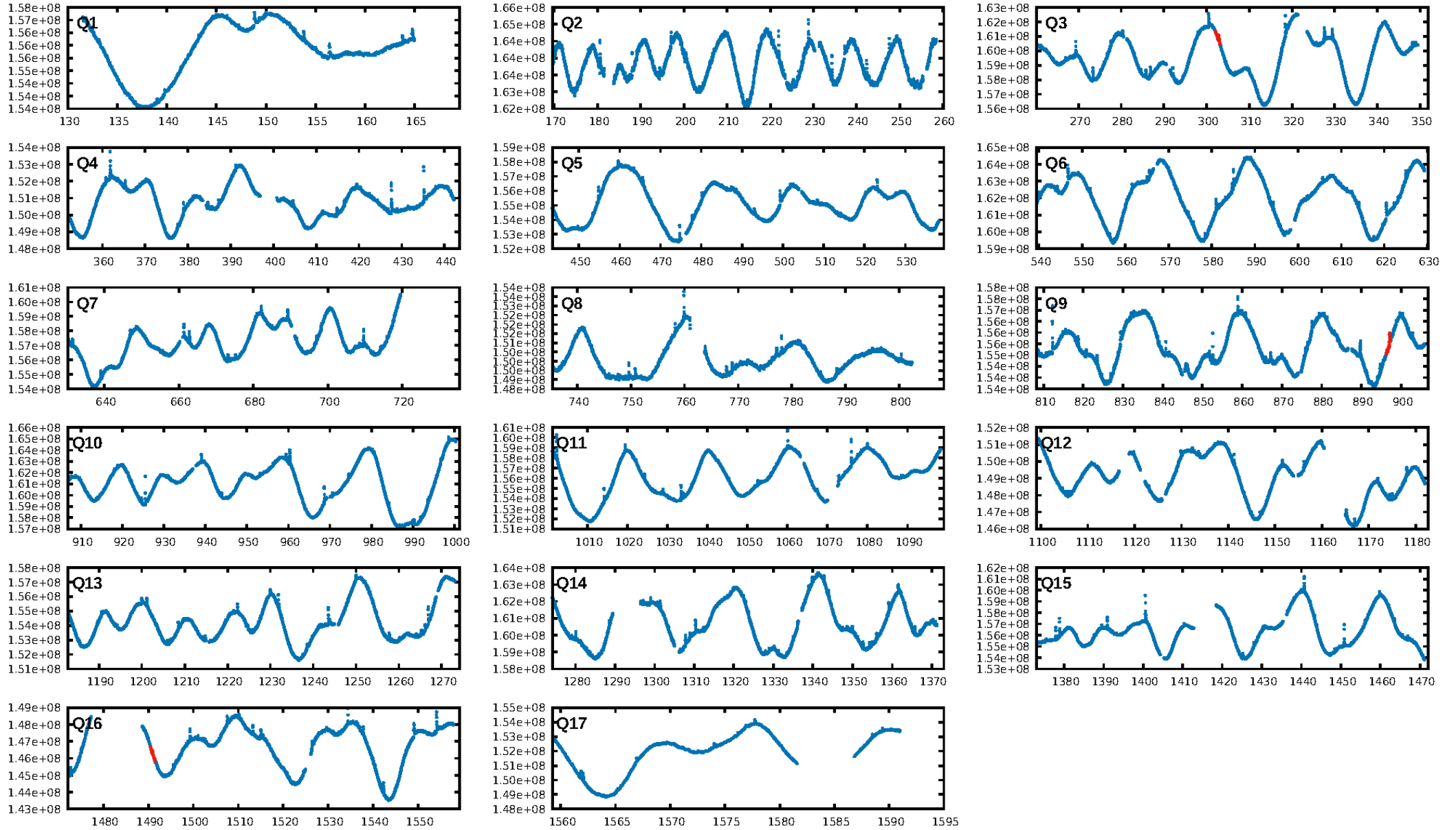


Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:04:06 Z

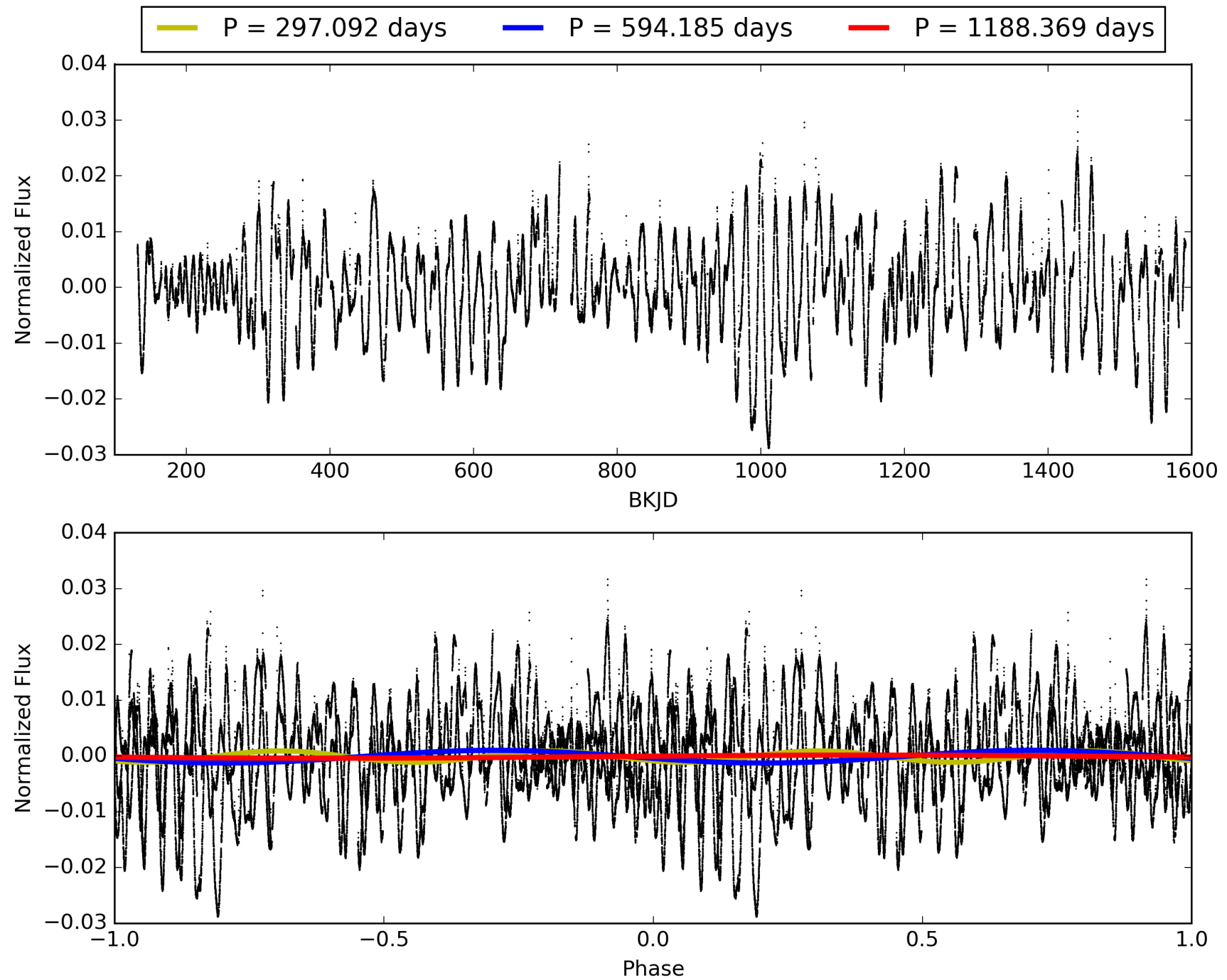
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 011515713-02, PDC Light Curves

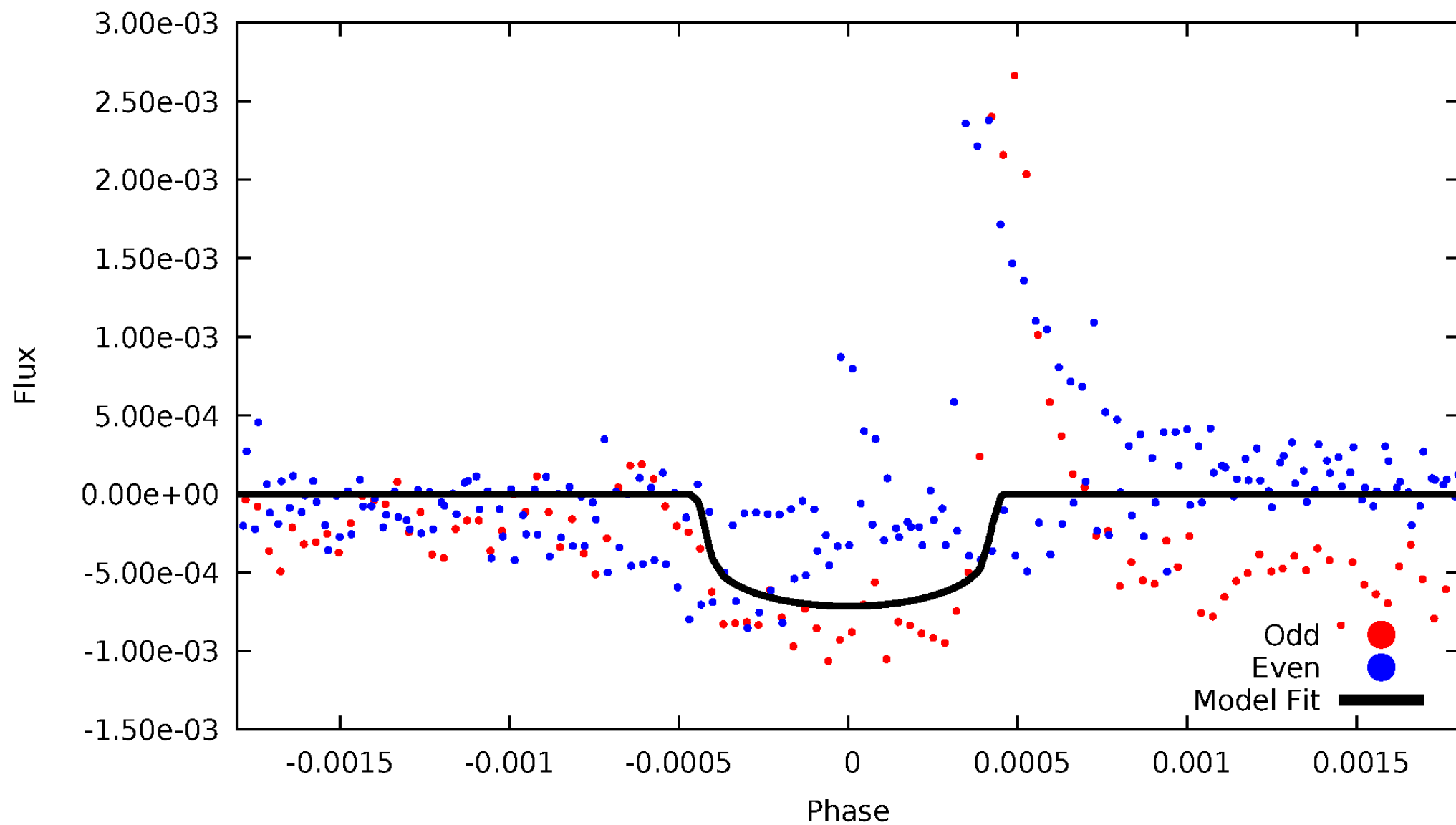


# TCE 011515713-02



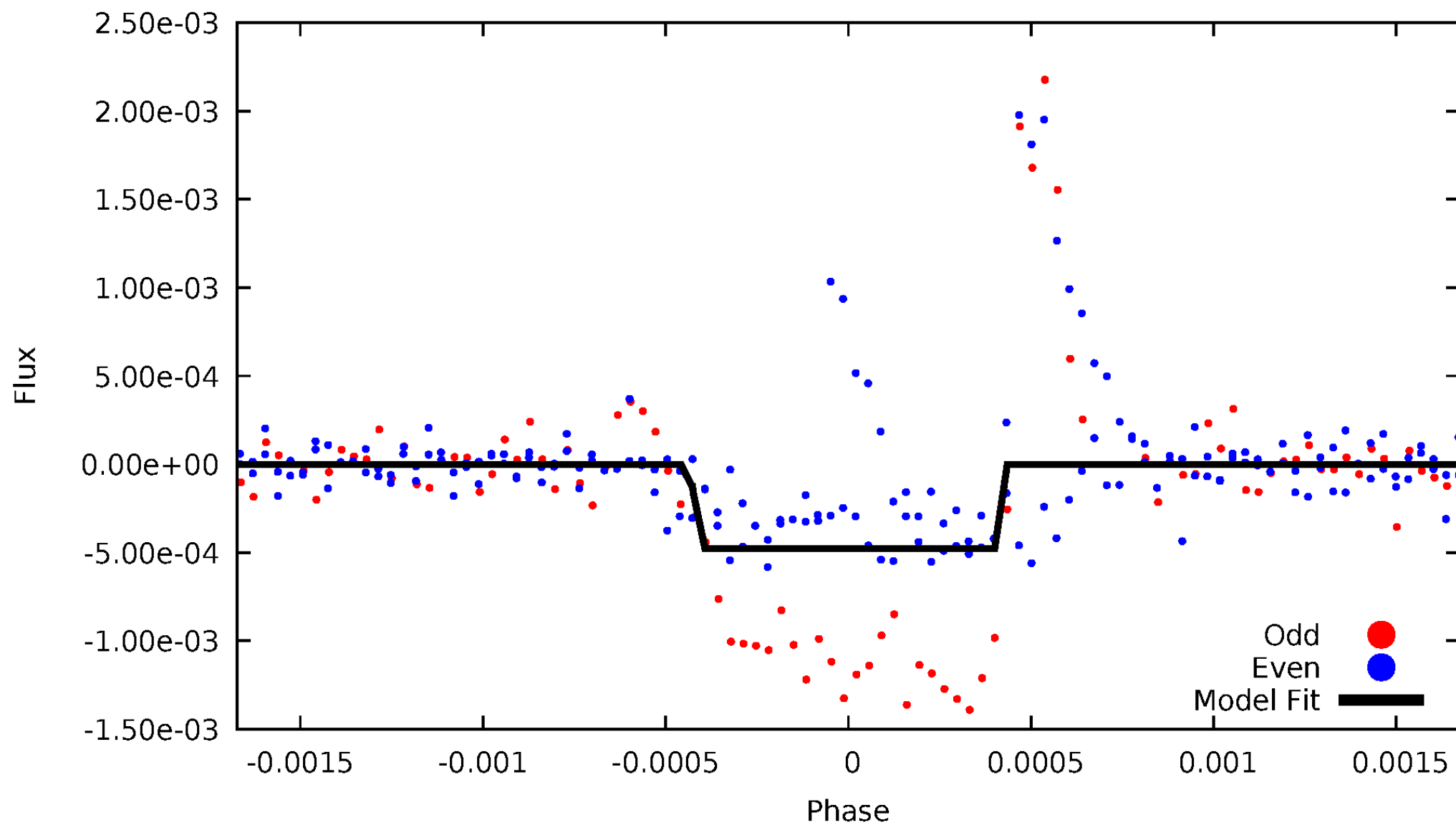
# DV Odd/Even

TCE 011515713-02



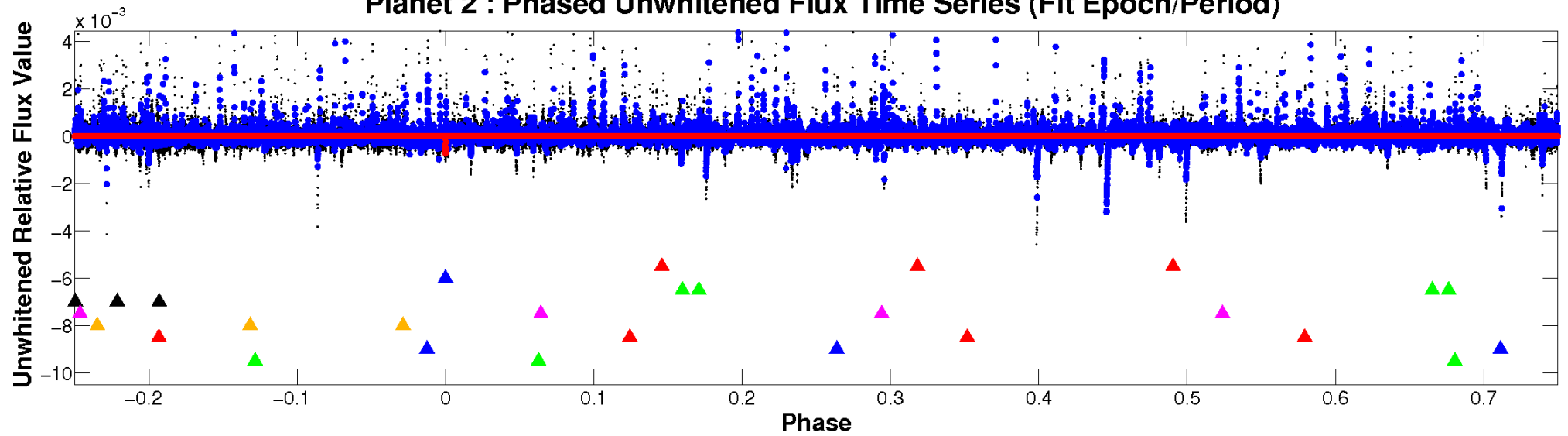
# ALT Odd/Even

TCE 011515713-02

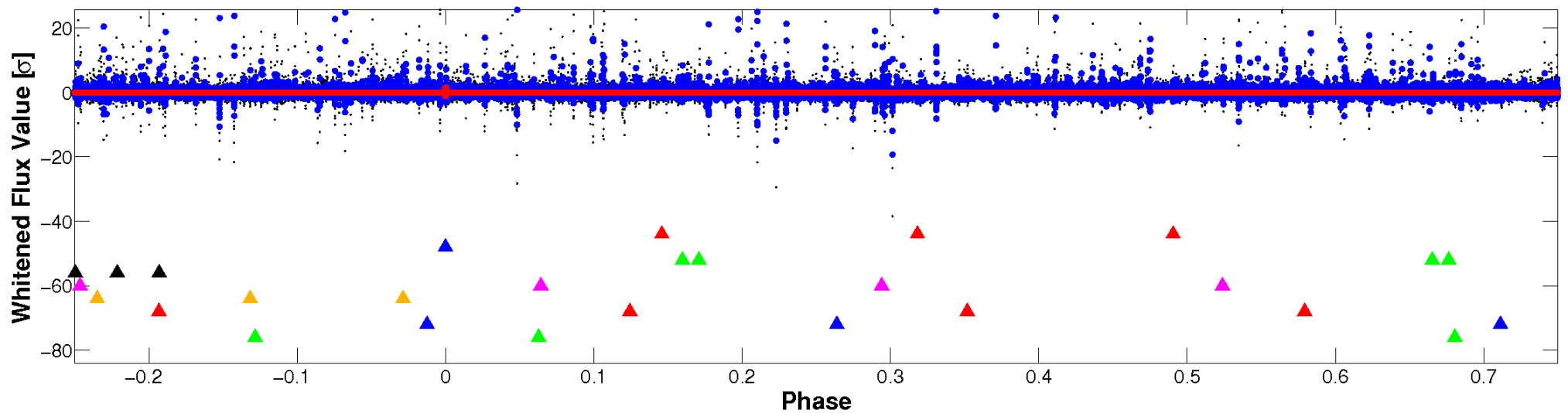


# Non-Whitened Vs. Whitened Light Curve

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

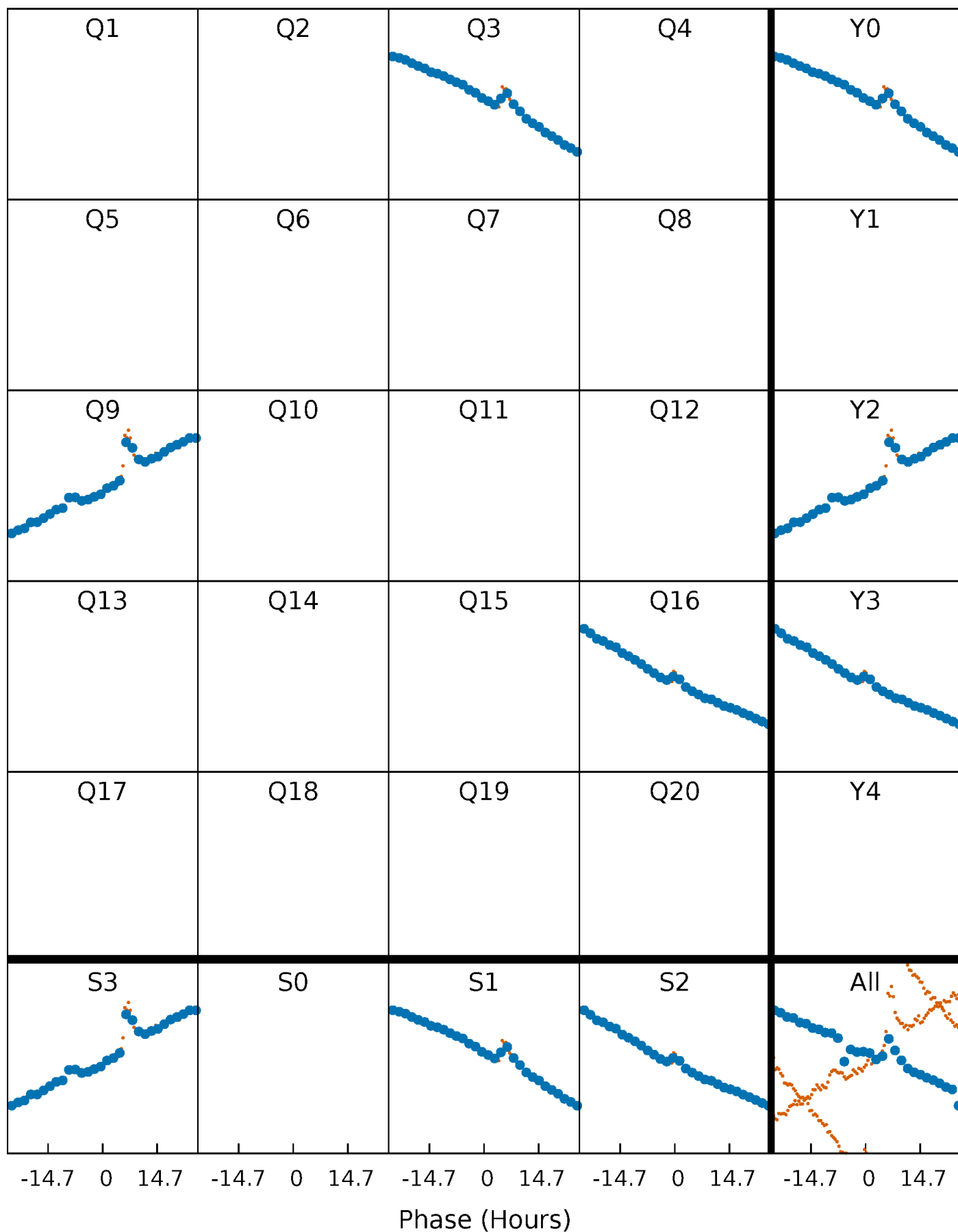


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

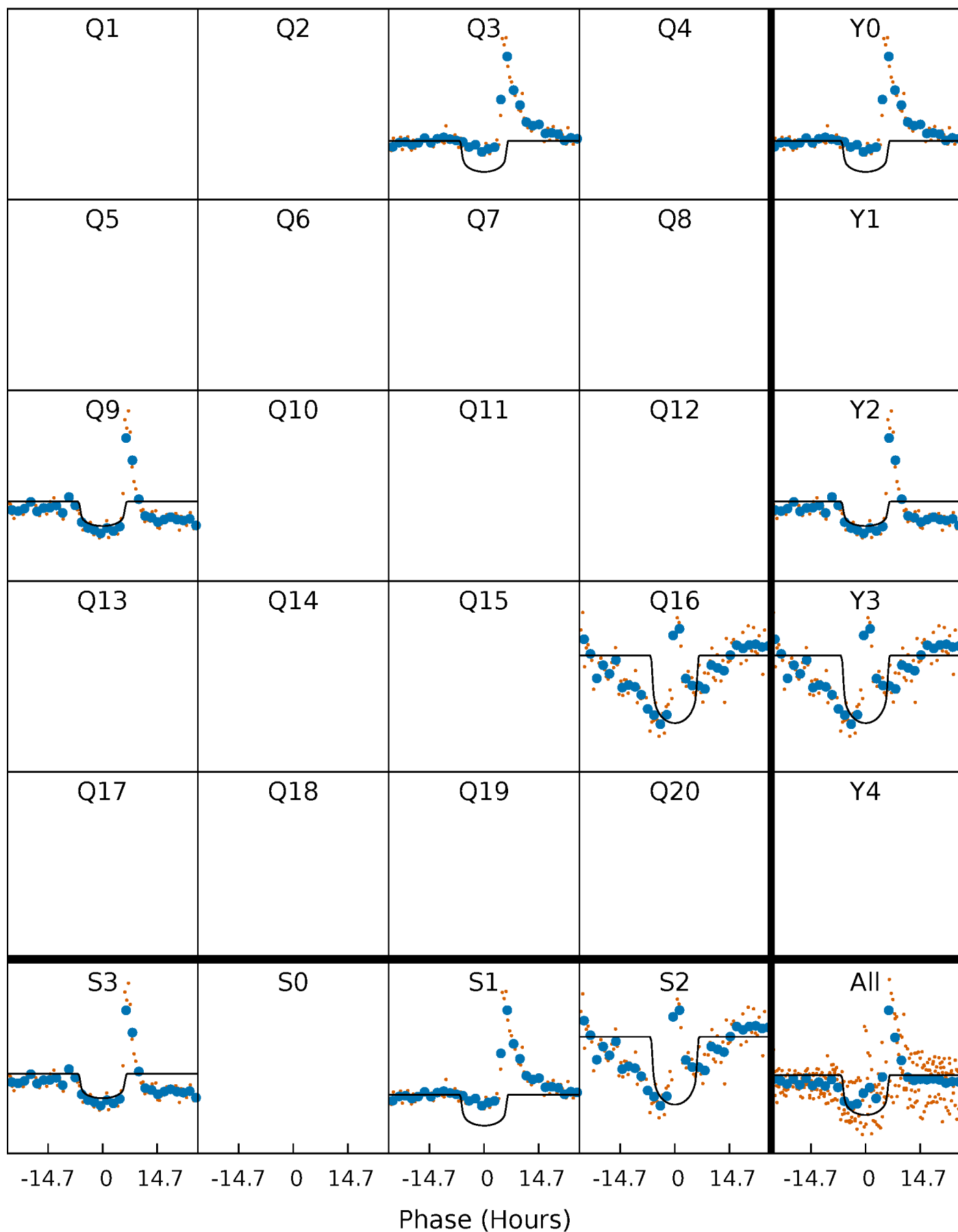
TCE 011515713-02 P=594.184565 Days  $T_0=302.621817$  (BKJD)





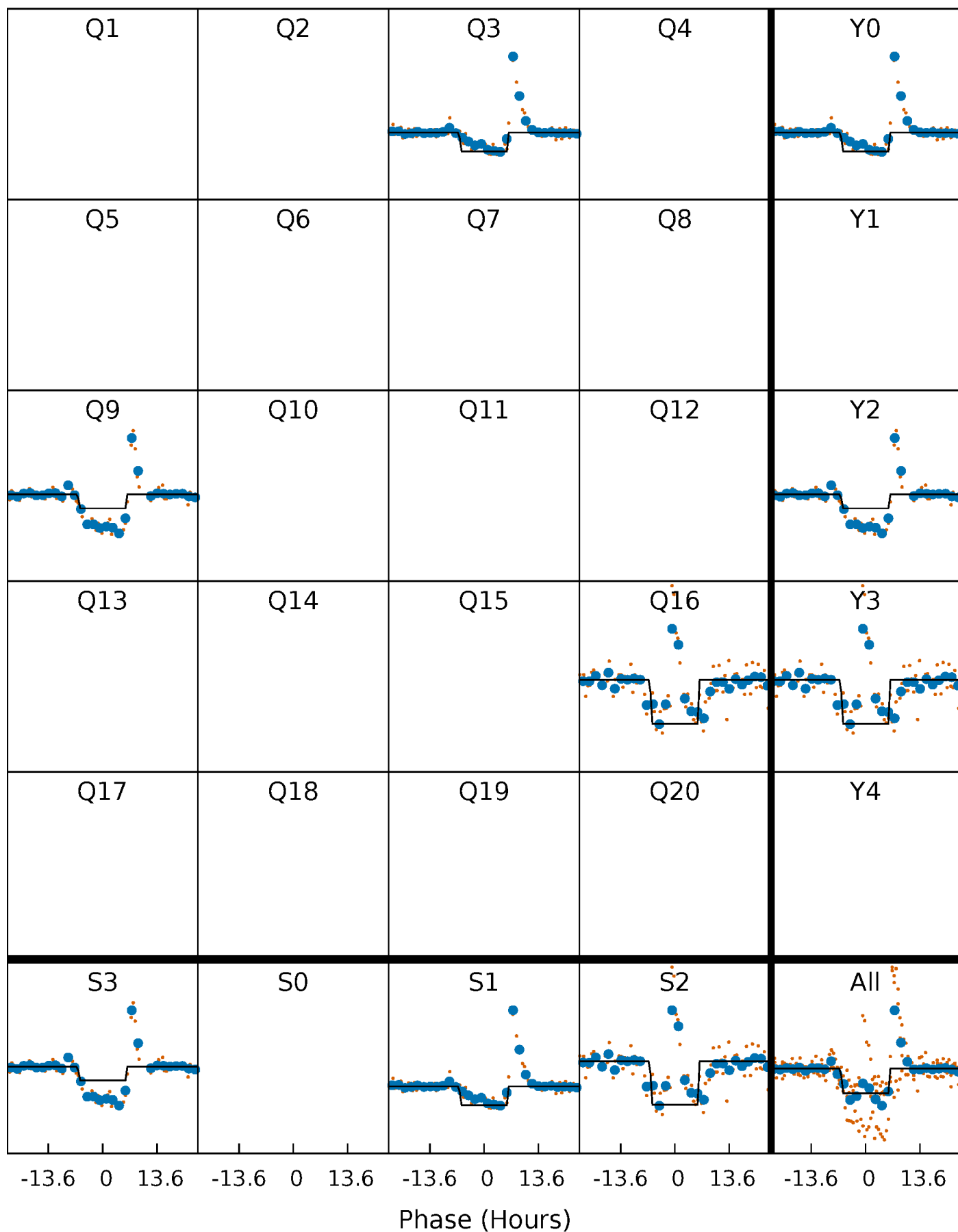
# DV Quarter-Phased Transit Curves

TCE 011515713-02     $P=594.184565$  Days     $T_0=302.621817$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

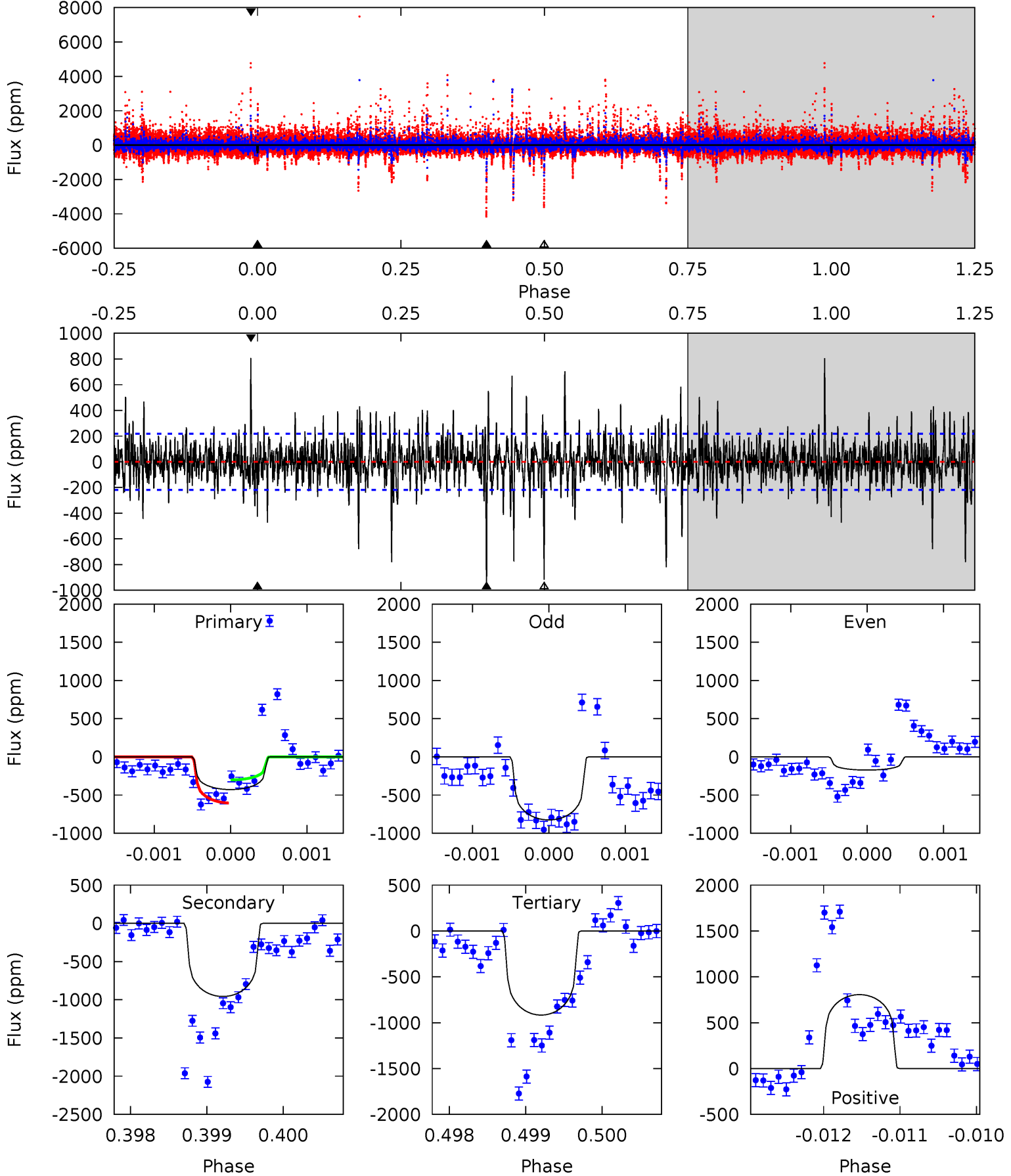
TCE 011515713-02 P=594.228358 Days  $T_0=302.550012$  (BKJD)



# DV Model-Shift Uniqueness Test

011515713-02, P = 594.184565 Days, E = 302.621817 Days

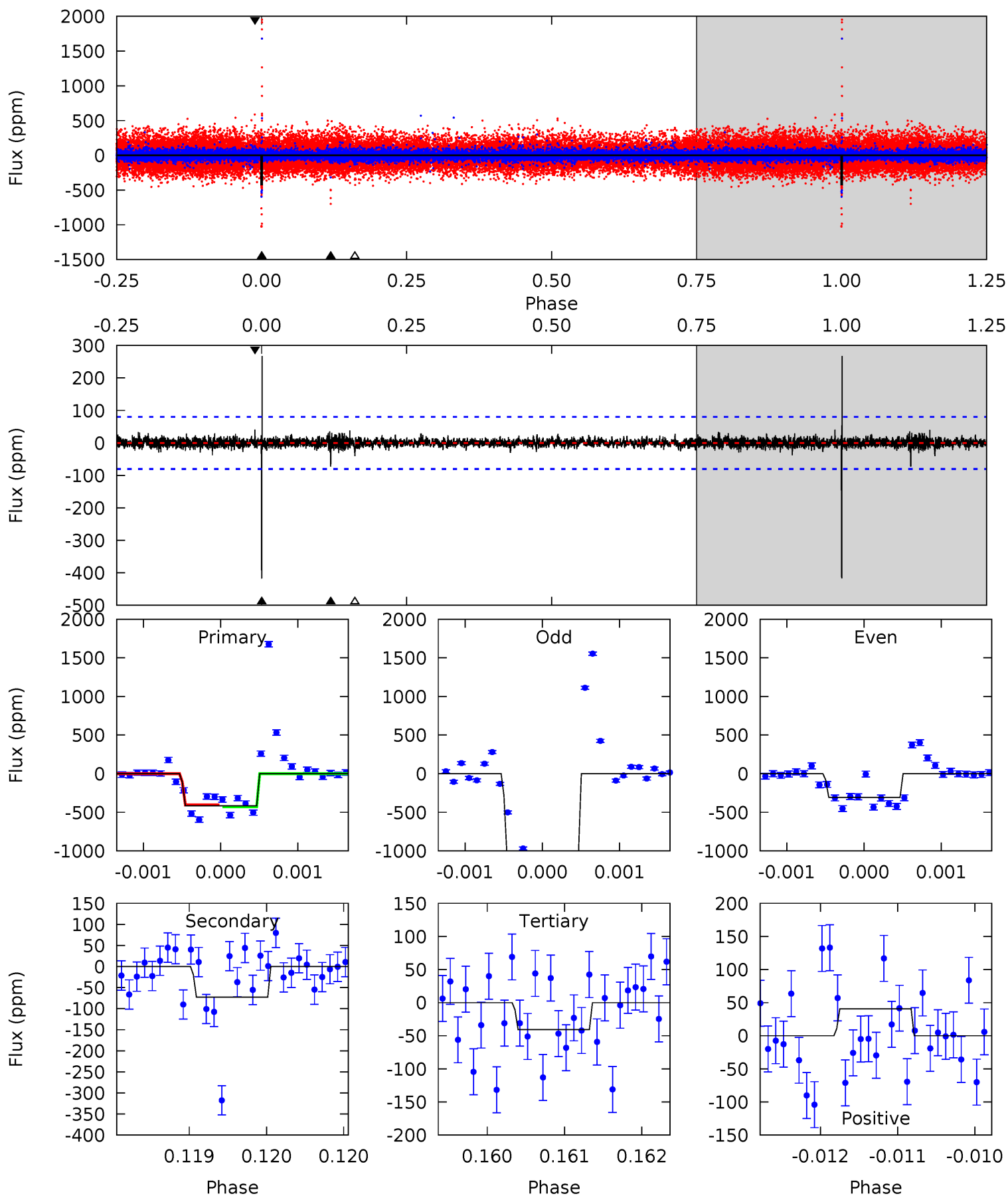
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	24.0	23.0	20.2	5.47	3.31	3.50	-12.2	-9.47	1.01	3.78	5.98	1.18	0.46	0



# Alt Model-Shift Uniqueness Test

011515713-02, P = 594.228358 Days, E = 302.550012 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
28.5	4.95	2.78	2.77	5.48	3.33	0.51	25.7	25.7	2.17	2.18	27.7	1.47	0.39	0



### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-957 \pm 40$	$10.22^{+3.04}_{-3.51}$	$511^{+54}_{-95}$	$6084^{+410}_{-384}$	$14264^{+16120}_{-5655}$
Alt.	$-72 \pm 15$	$8.32^{+2.59}_{-2.85}$	$516^{+50}_{-91}$	$3890^{+268}_{-241}$	$1577^{+1974}_{-649}$

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

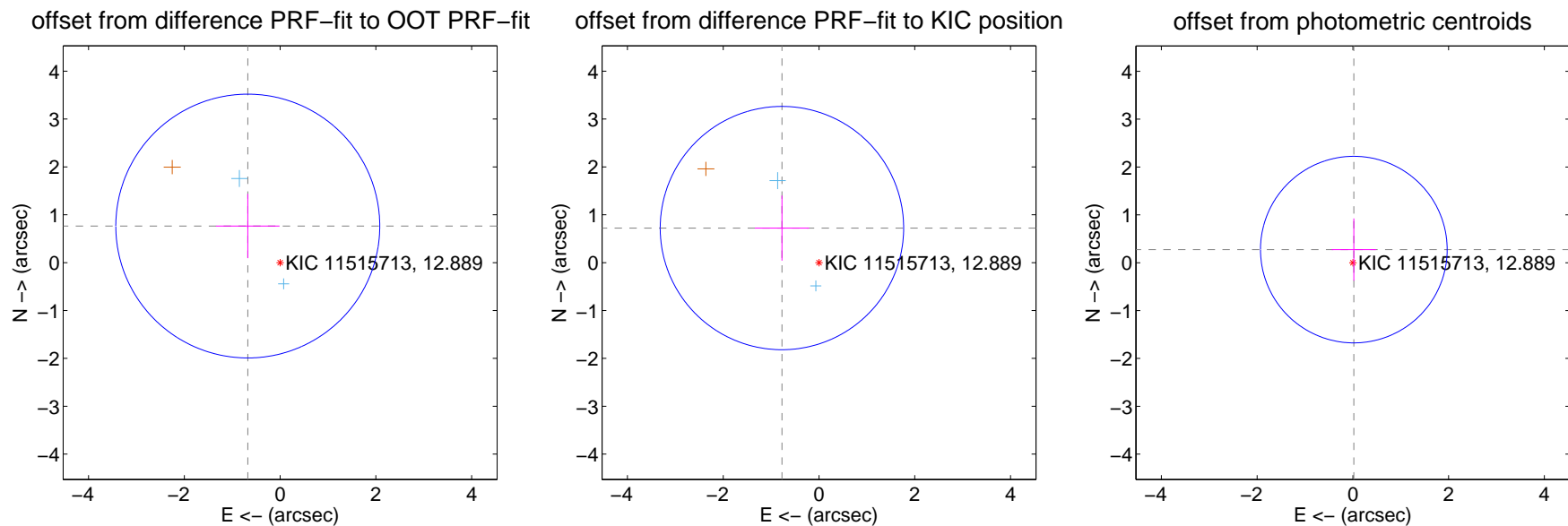
## DV Centroid Data

Supplemental centroid analysis for 011515713-02. Kepler magnitude: 12.89. Transit SNR 8.48

There are 2 quarters with good PRF difference image offsets

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

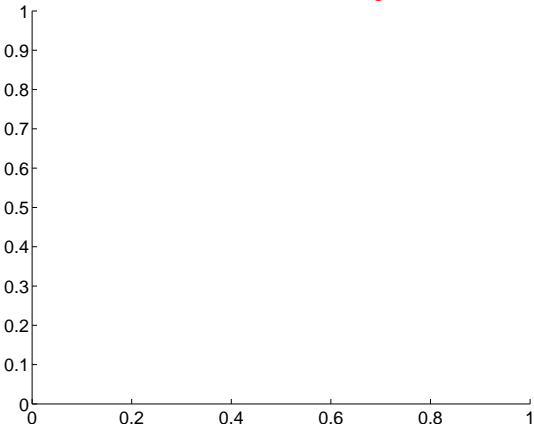
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.020 \pm 0.919$	1.11	$0.675 \pm 0.664$	$0.764 \pm 0.671$
PRF-fit source offset from KIC position	$1.058 \pm 0.847$	1.25	$0.774 \pm 0.566$	$0.722 \pm 0.679$
photometric centroid source offset	$0.27 \pm 0.65$	0.42	$-0.02 \pm 0.46$	$0.27 \pm 0.65$



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.

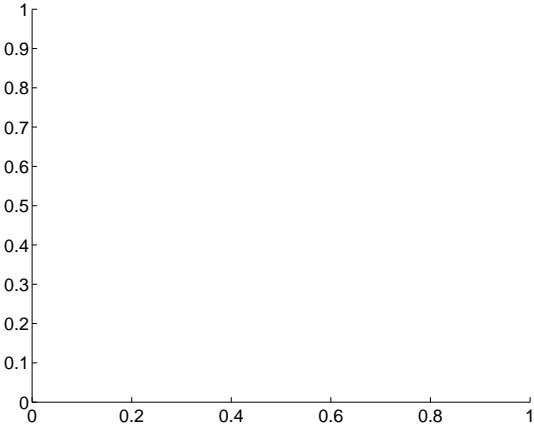
Q1 no difference image



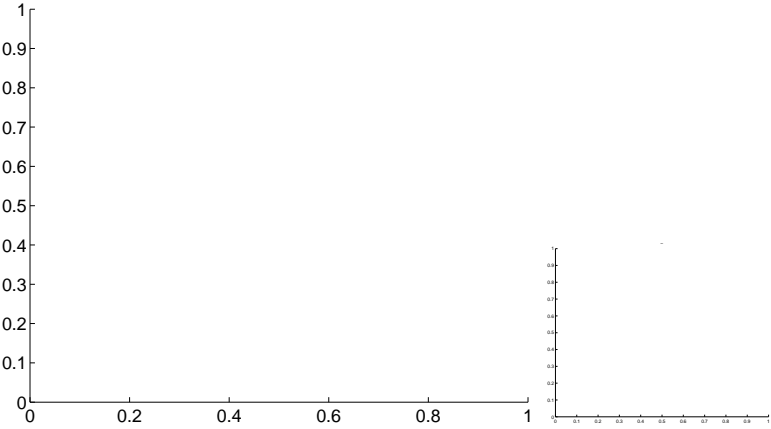
Q1 no OOT image



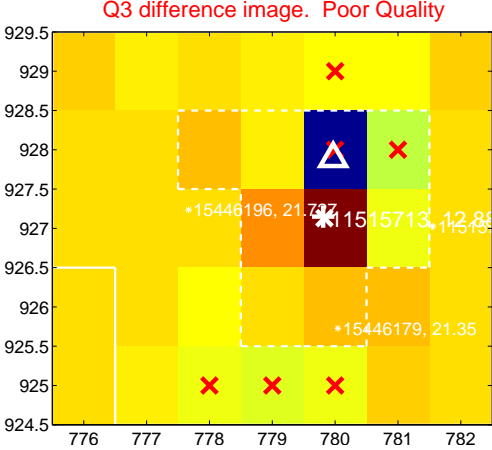
Q2 no difference image



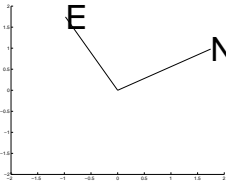
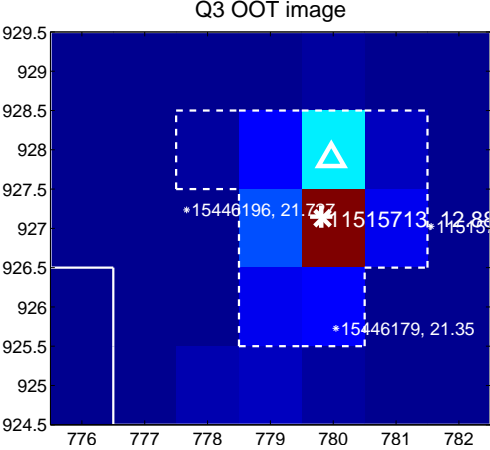
Q2 no OOT image



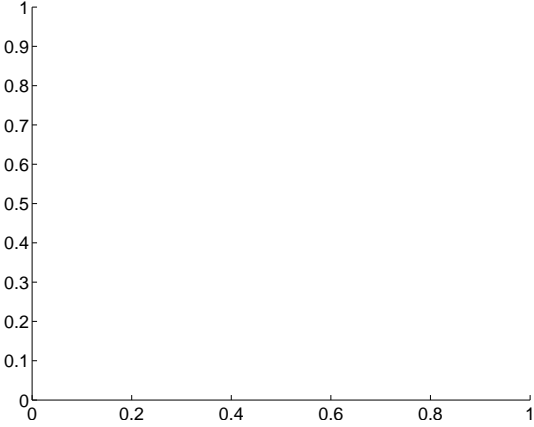
Q3 difference image. Poor Quality



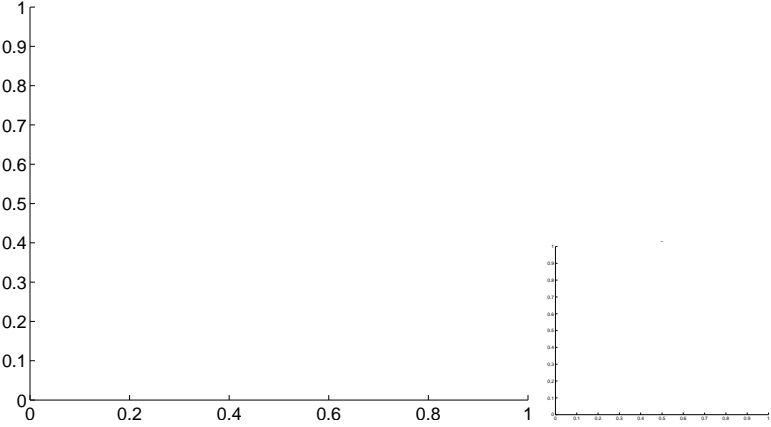
Q3 OOT image



Q4 no difference image



Q4 no OOT image

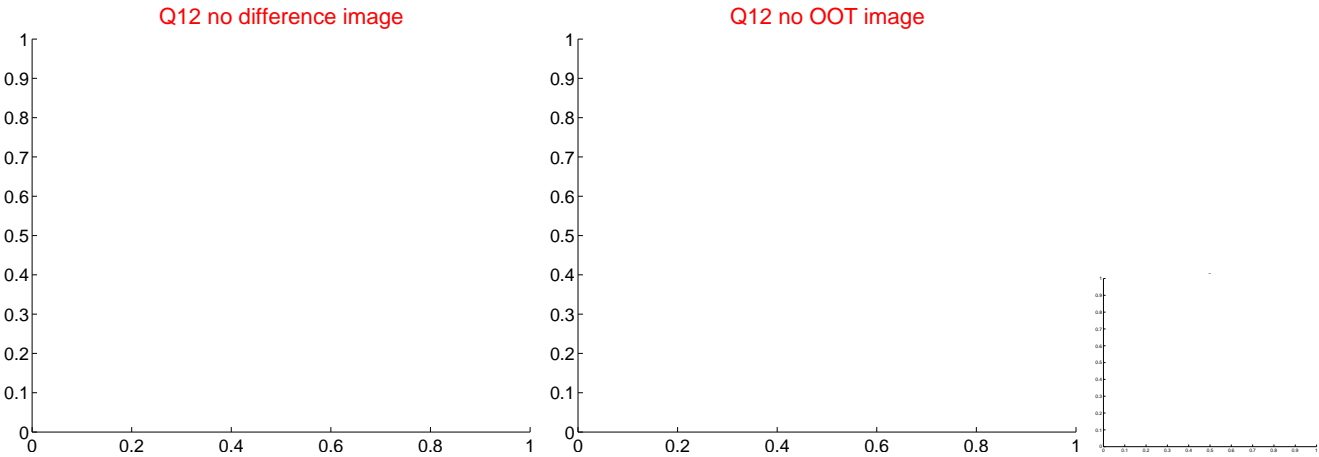
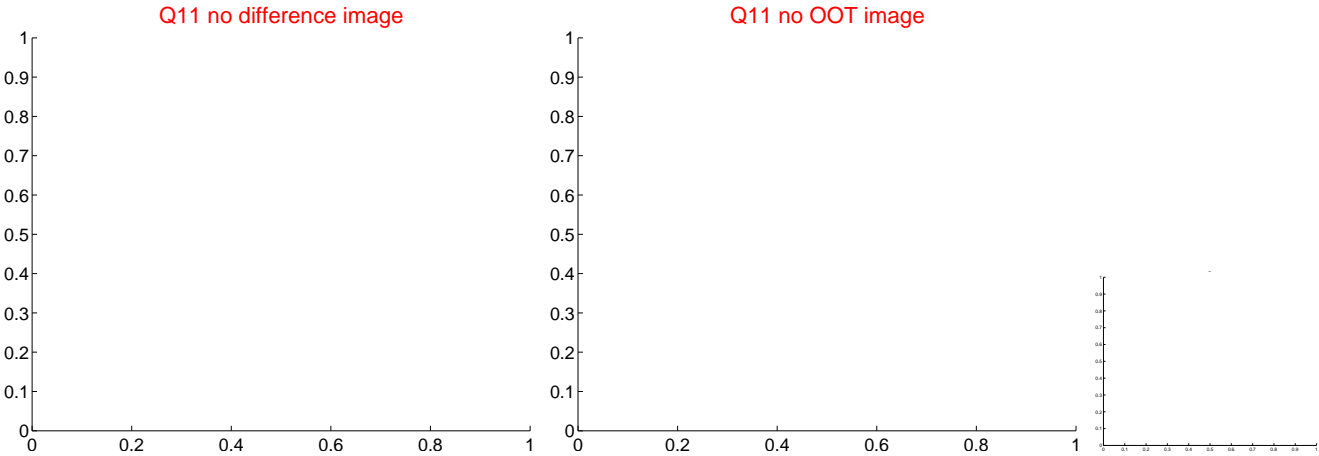
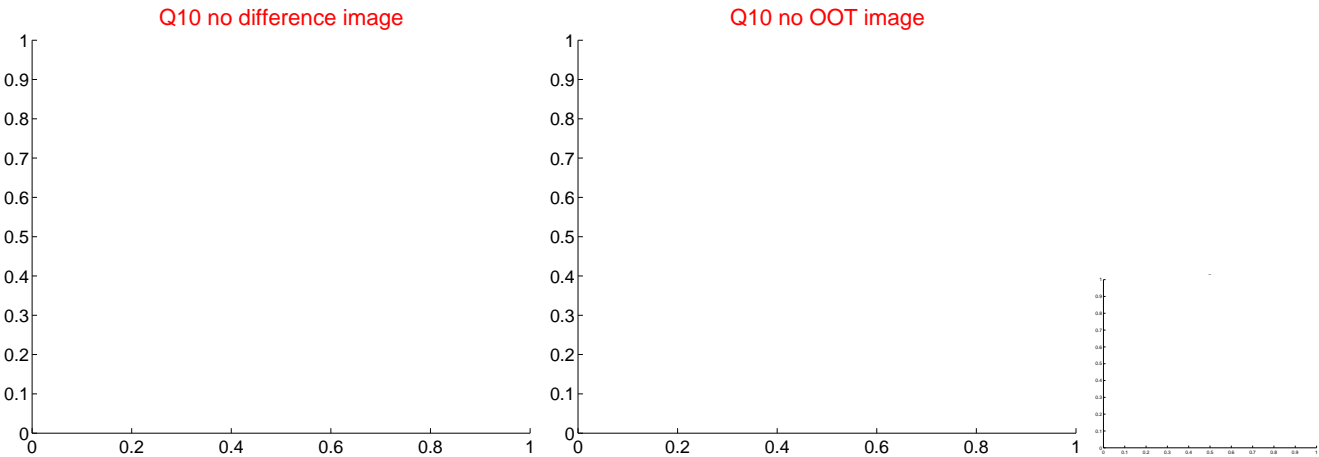
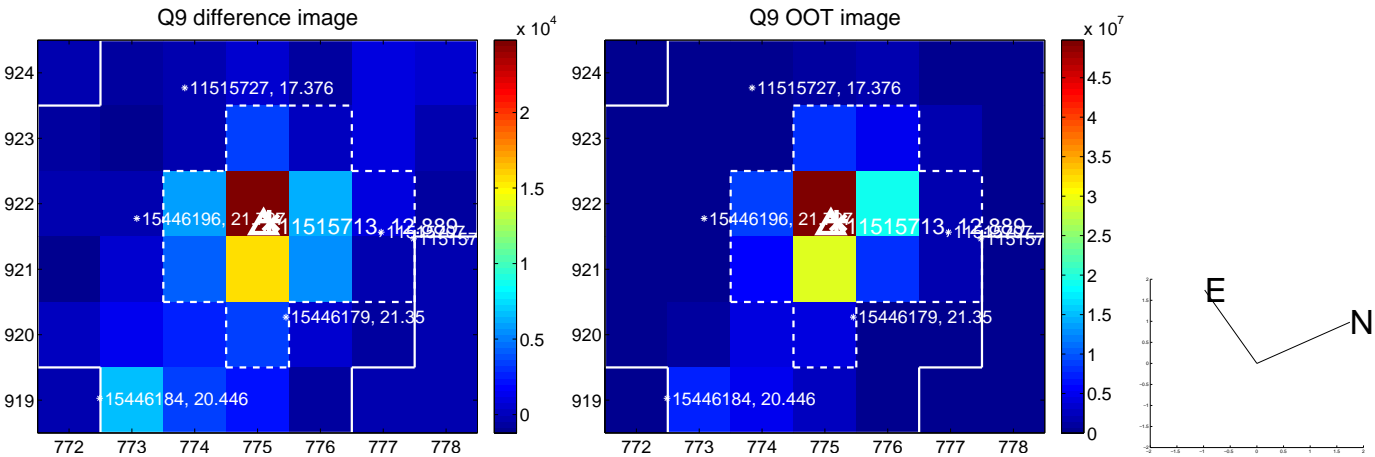


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

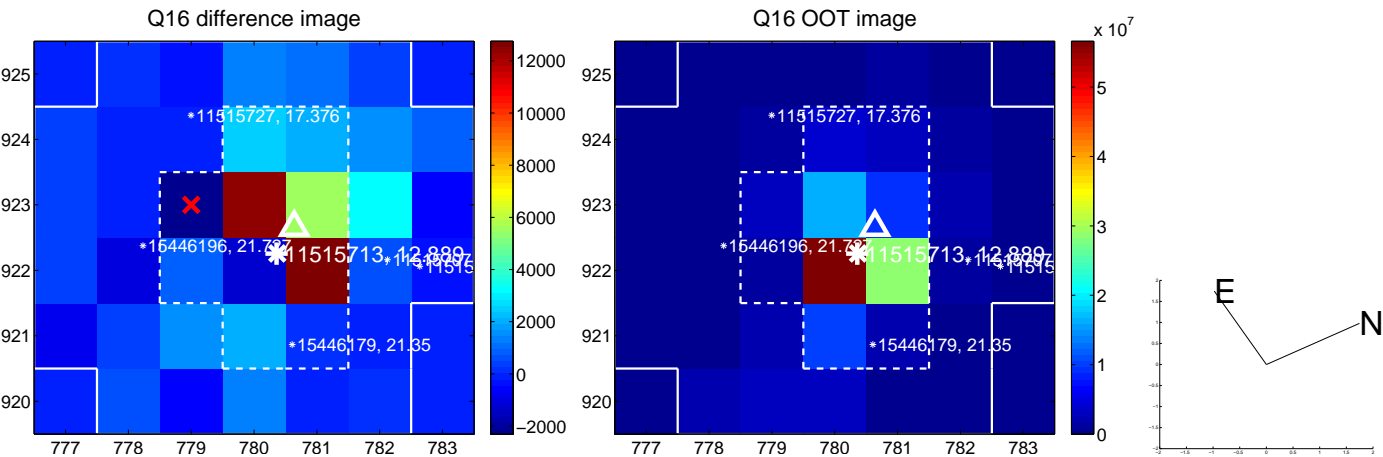




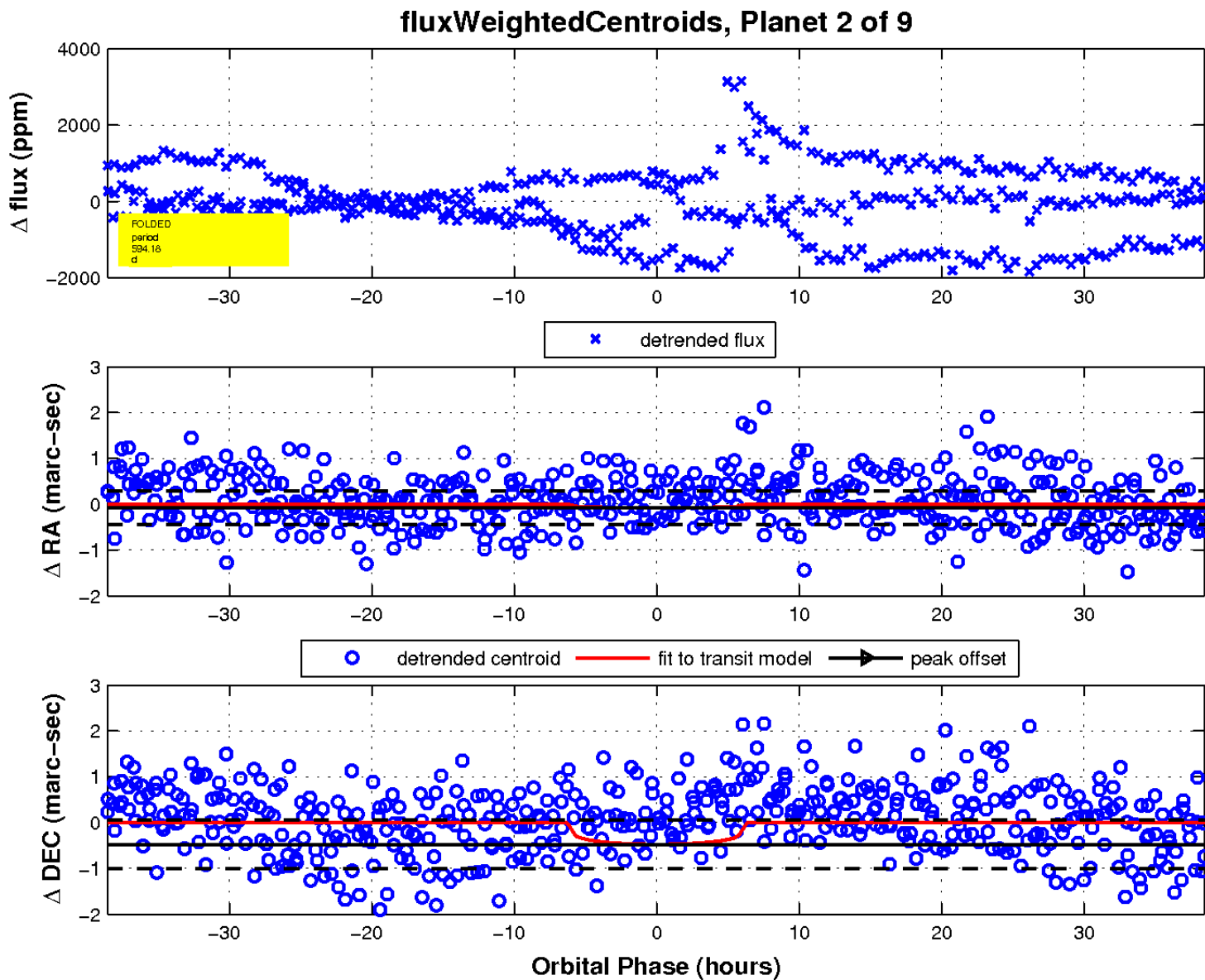
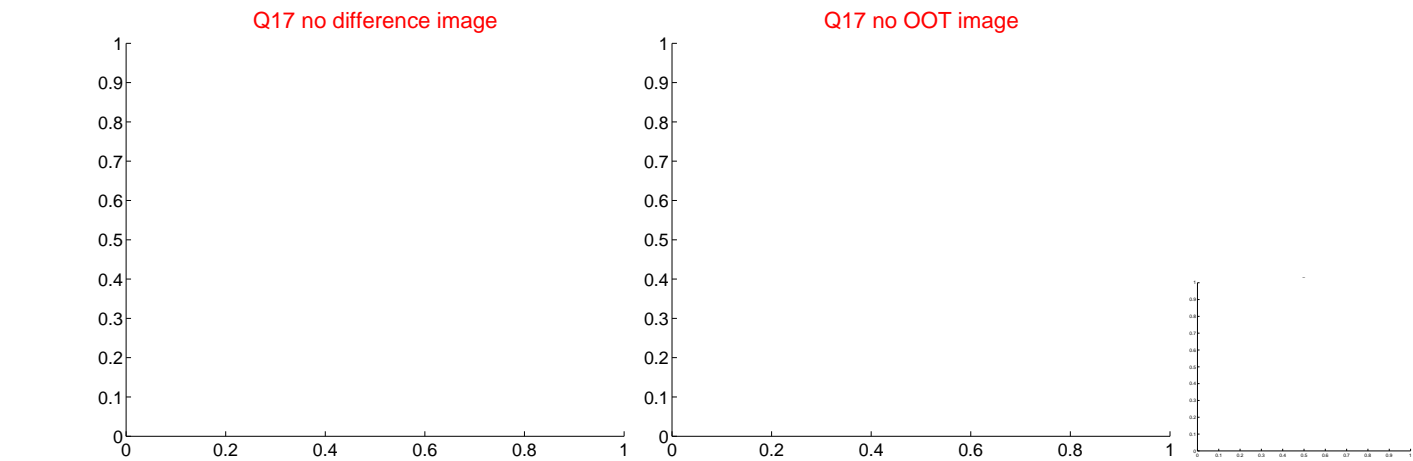
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

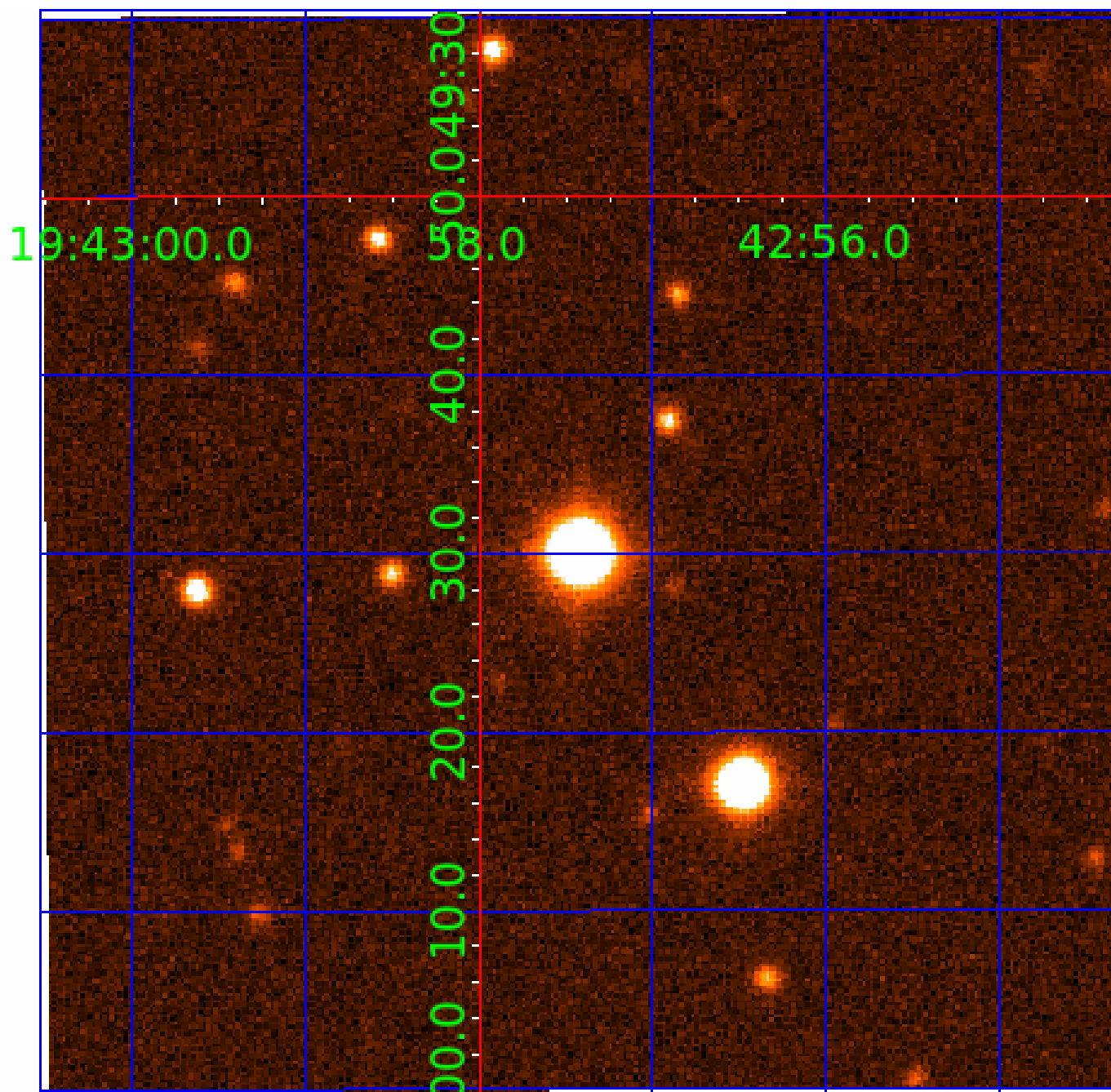


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

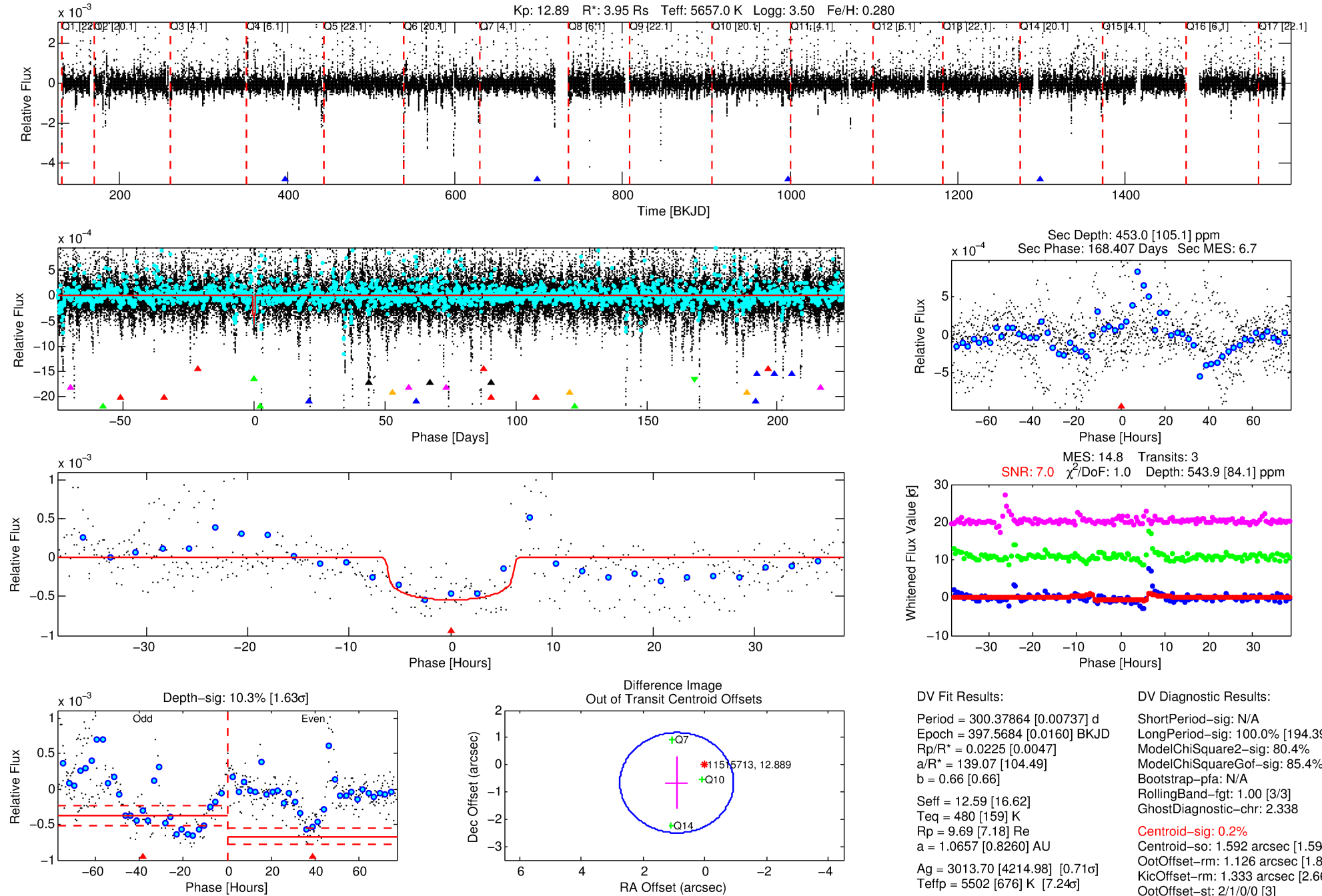
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011515713-03

No Significant Match Found

# DV One-Page Summary

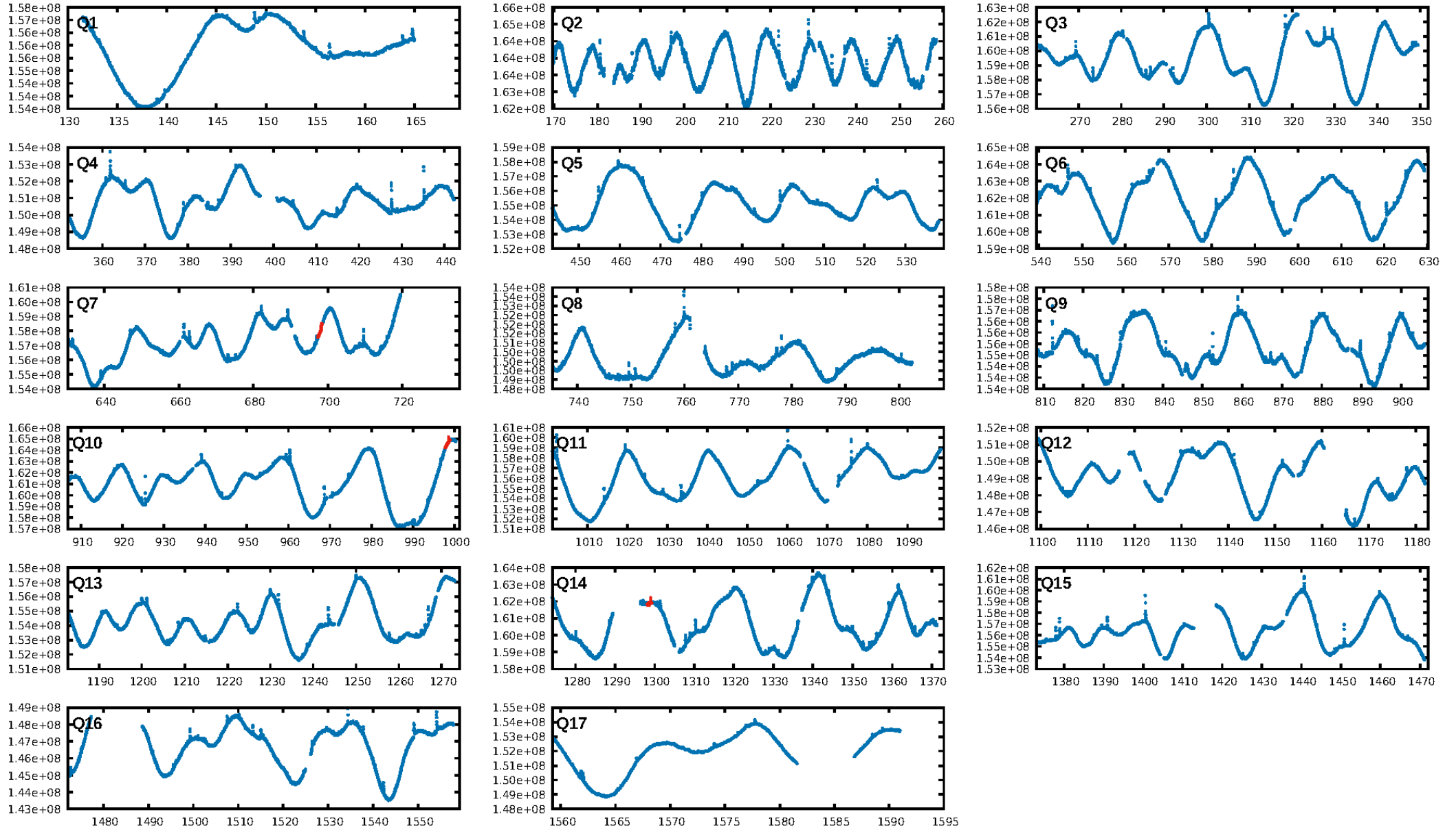
KIC: 11515713 Candidate: 3 of 9 Period: 300.379 d



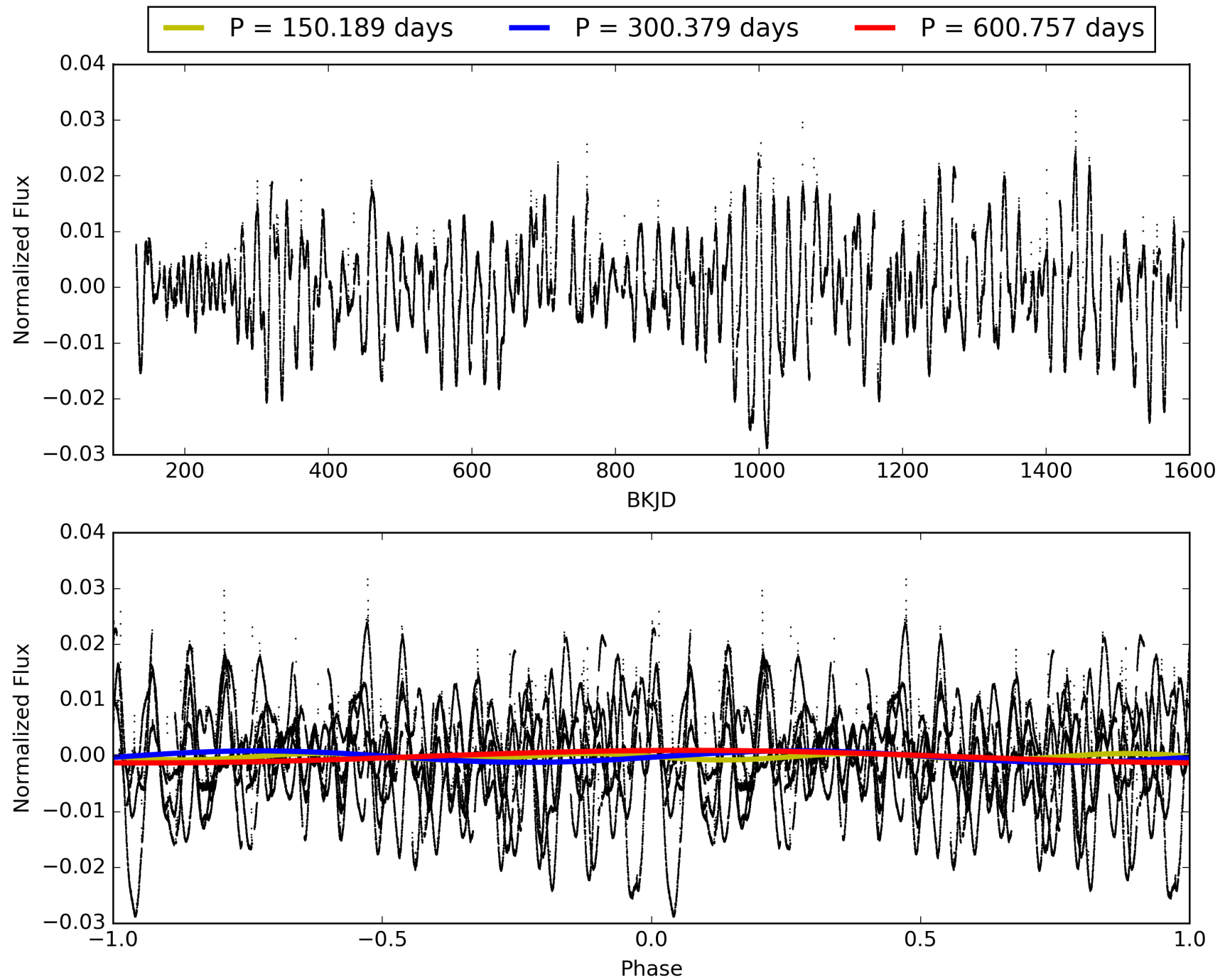
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:04:15 Z

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

# TCE 011515713-03, PDC Light Curves



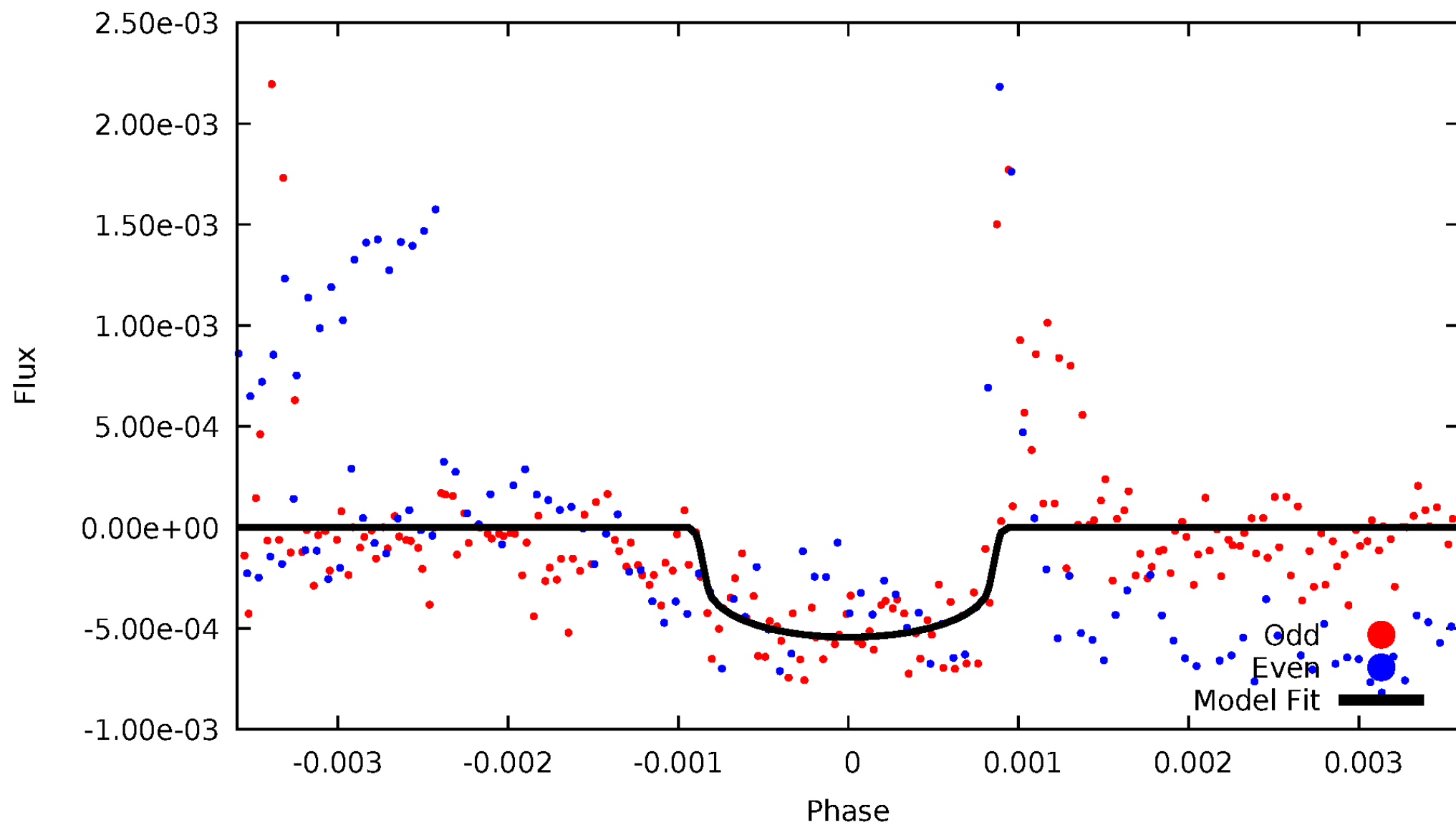
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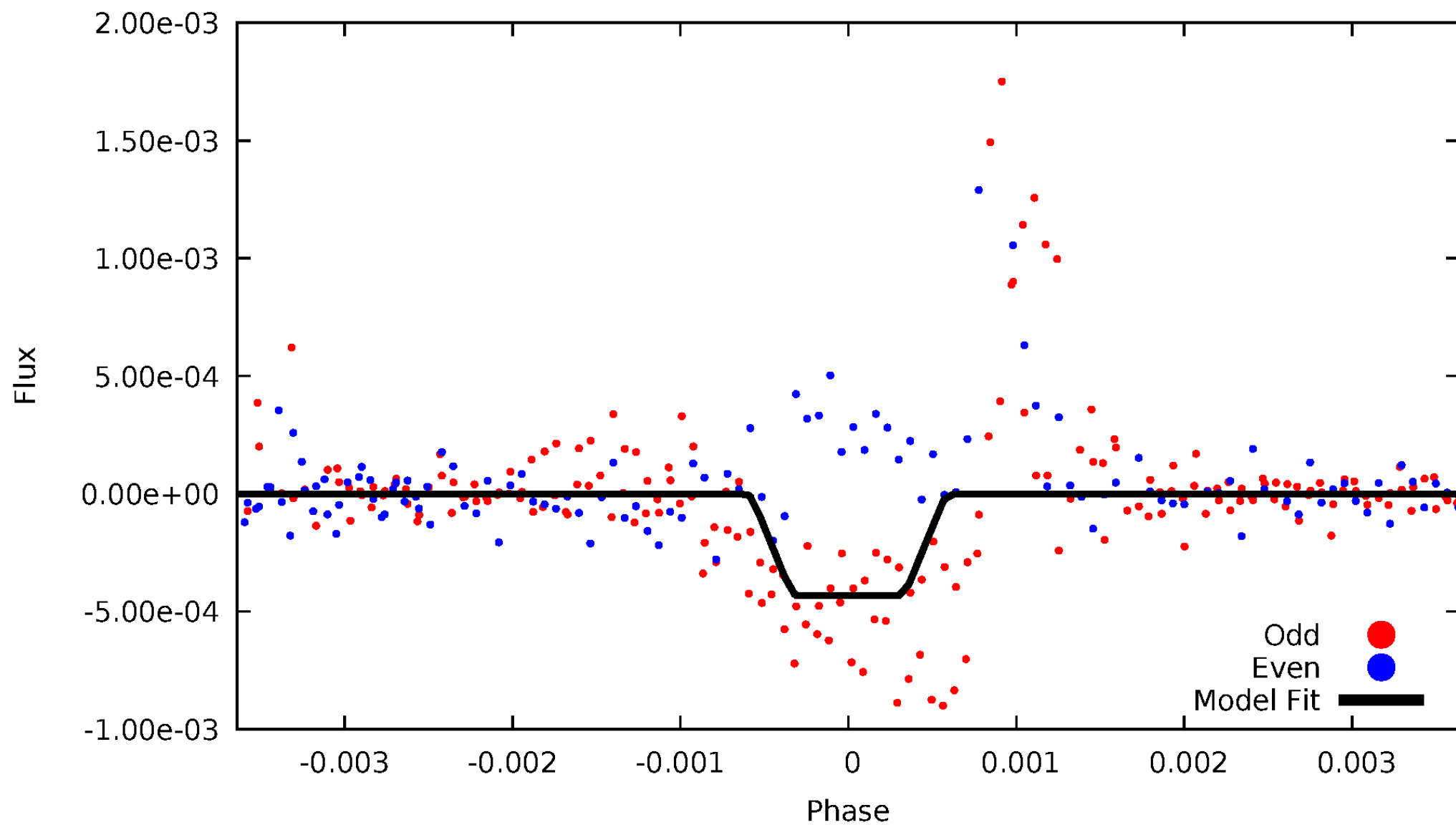
# DV Odd/Even

TCE 011515713-03



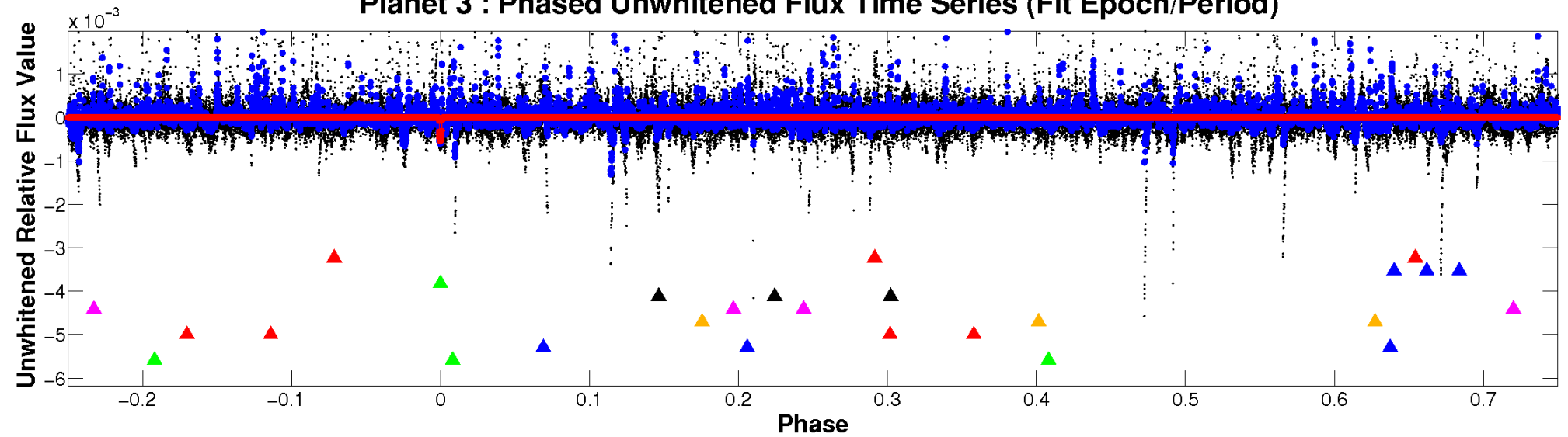
# ALT Odd/Even

TCE 011515713-03

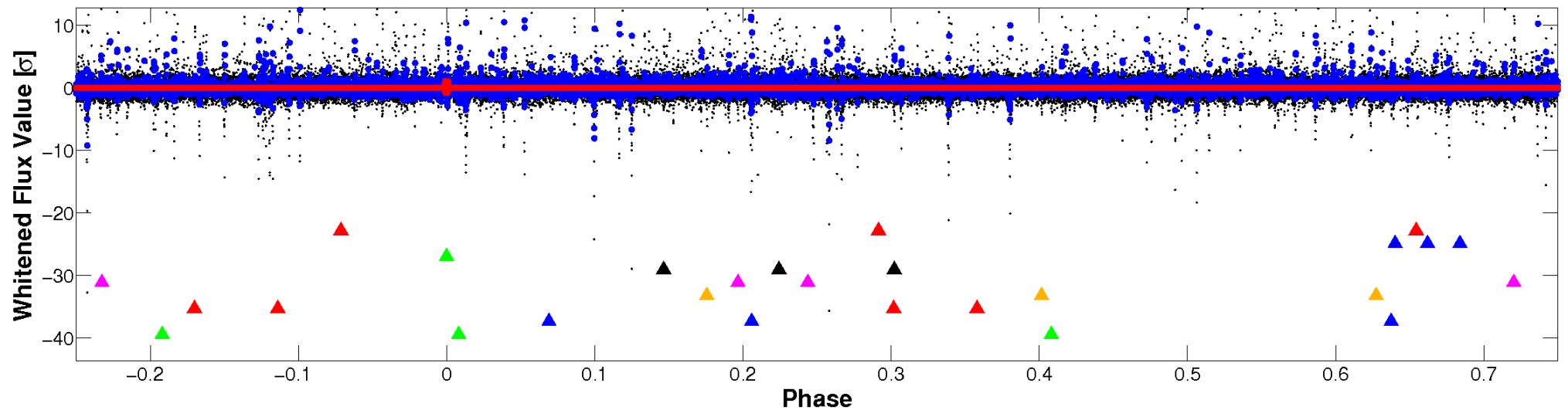


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

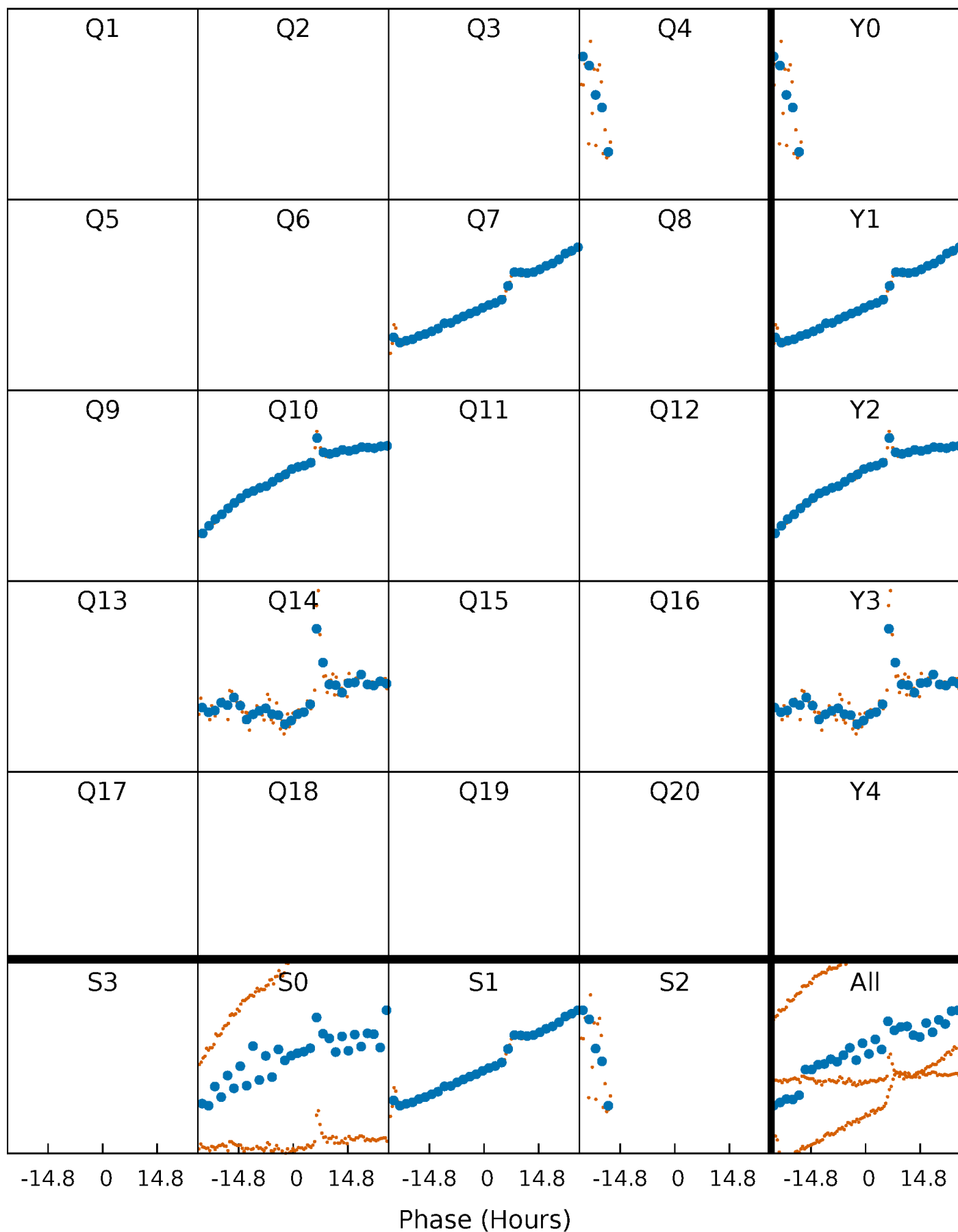


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



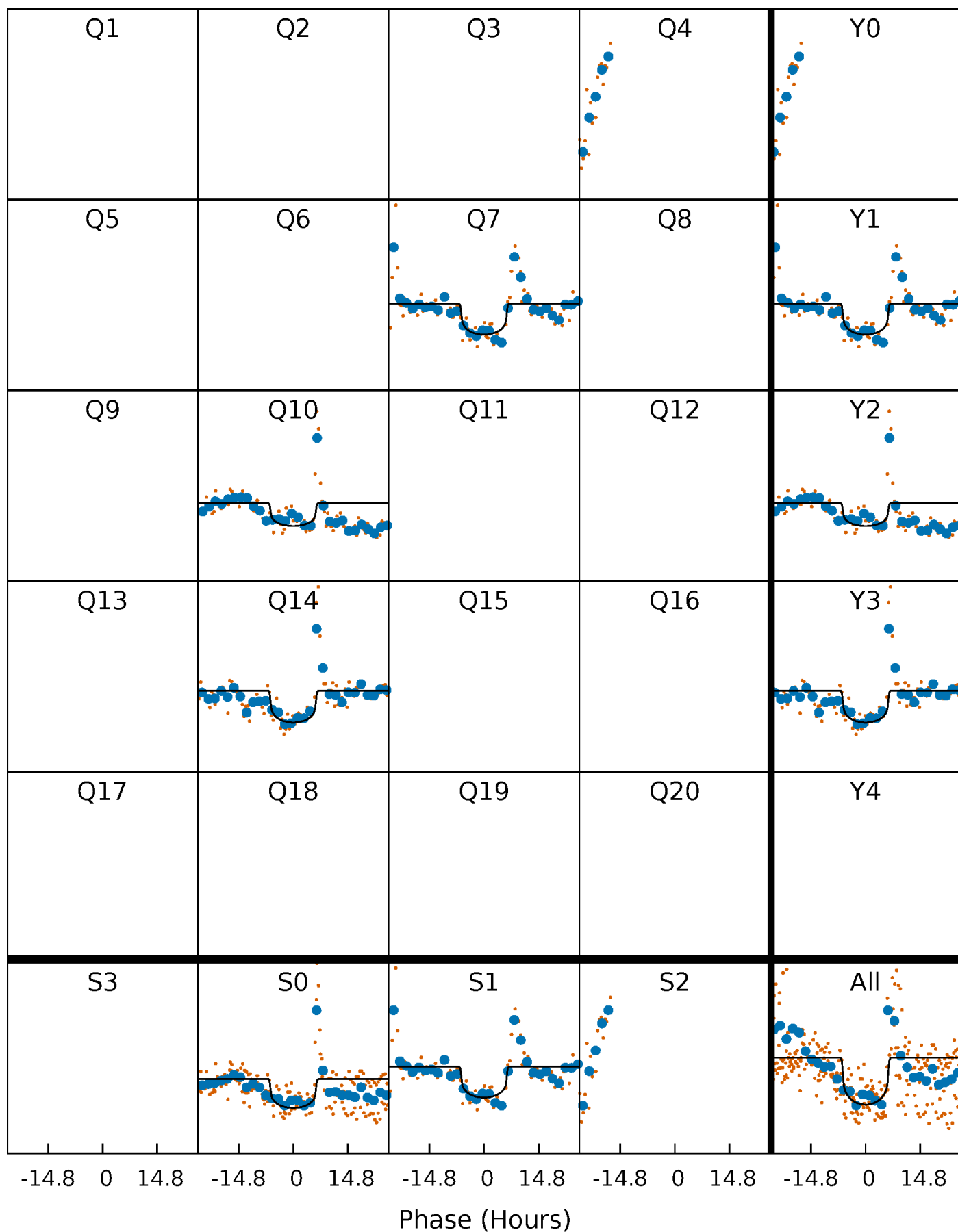
# PDC Quarter-Phased Transit Curves

TCE 011515713-03 P=300.378642 Days  $T_0=397.568428$  (BKJD)



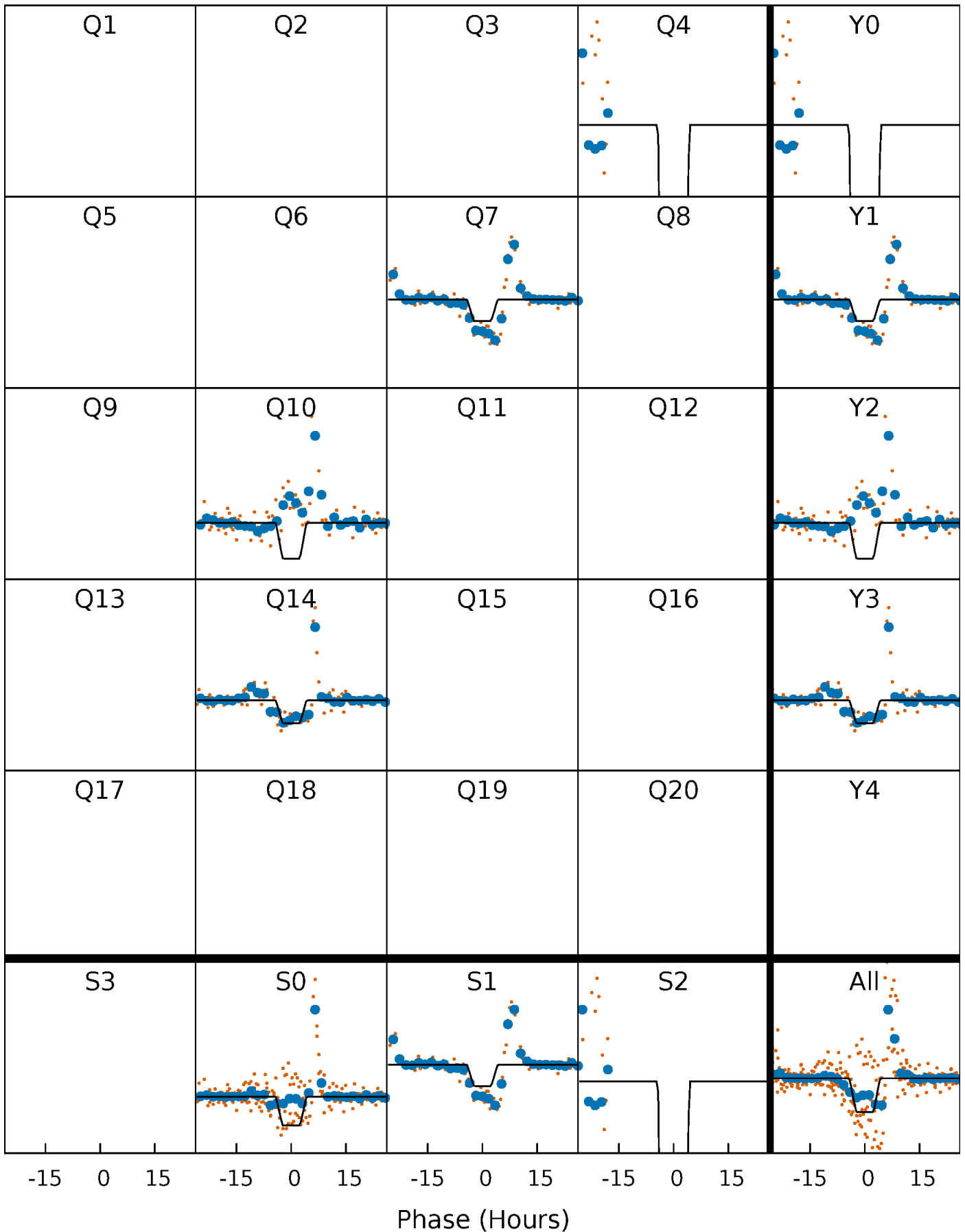
# DV Quarter-Phased Transit Curves

TCE 011515713-03     $P=300.378642$  Days     $T_0=397.568428$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

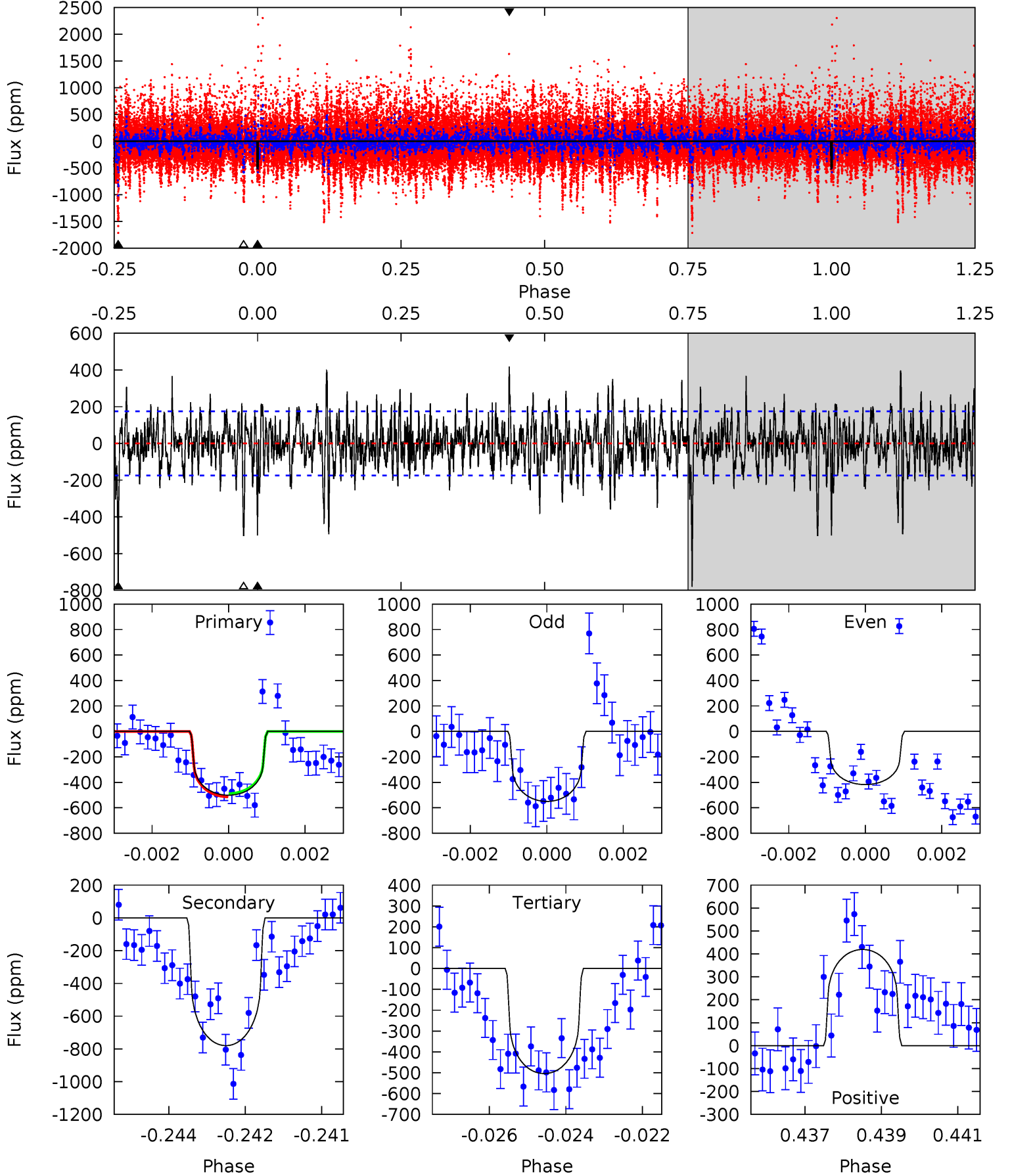
TCE 011515713-03 P=300.373332 Days  $T_0=397.592631$  (BKJD)



# DV Model-Shift Uniqueness Test

011515713-03, P = 300.378642 Days, E = 97.189786 Days

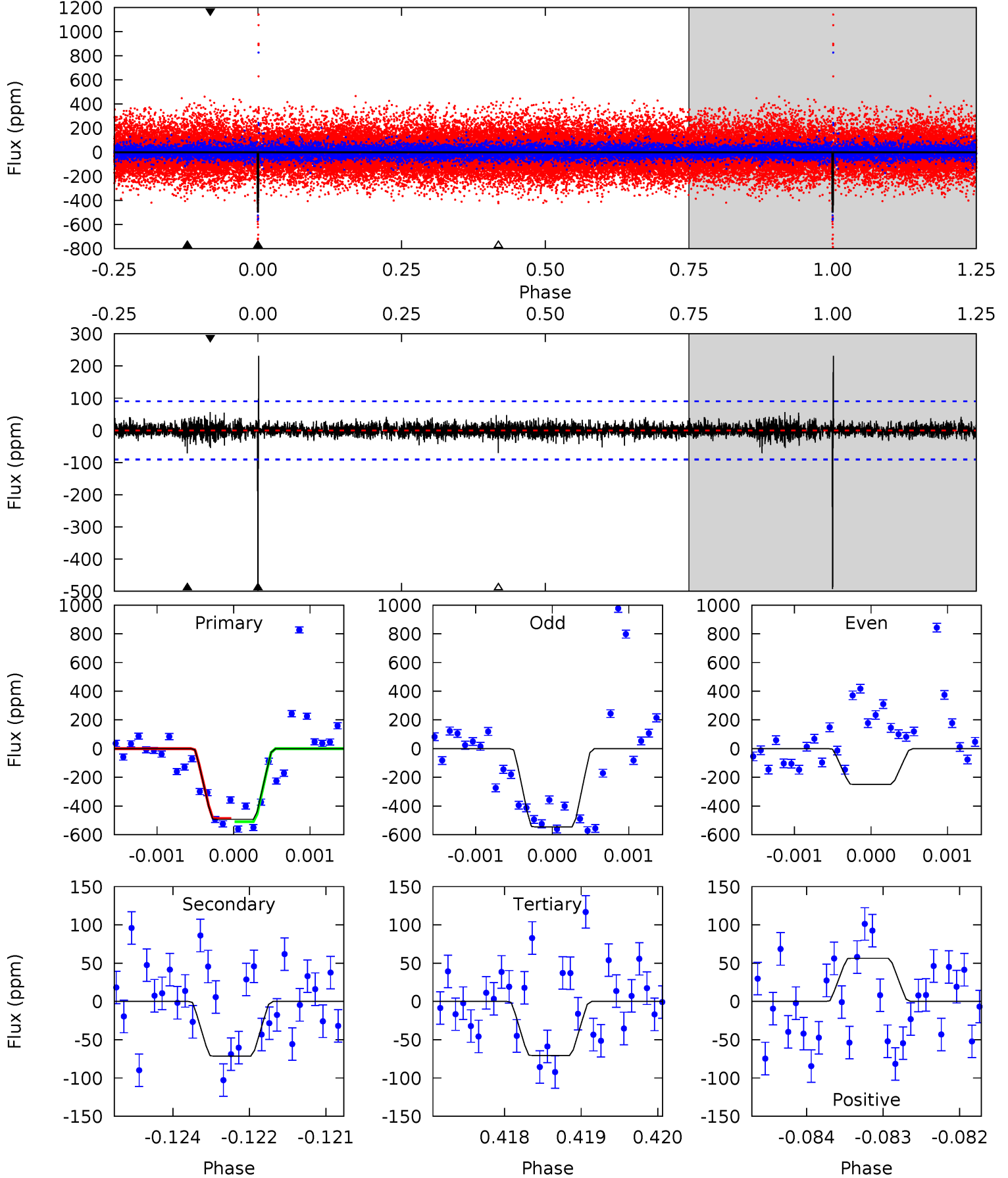
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	23.9	15.4	12.8	5.34	3.12	3.33	-0.10	2.50	8.45	11.0	1.62	1.03	0.35	0.39



# Alt Model-Shift Uniqueness Test

011515713-03,  $P = 300.373332$  Days,  $E = 97.219299$  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
29.6	4.28	4.24	3.39	5.42	3.25	0.73	25.4	26.2	0.05	0.90	9.90	0.70	0.32	0.67





### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-780 \pm 33$	$8.45^{+3.08}_{-3.34}$	$646^{+60}_{-114}$	$6296^{+934}_{-612}$	$6795^{+10113}_{-3037}$
Alt.	$-71 \pm 17$	$8.01^{+2.95}_{-3.42}$	$649^{+57}_{-123}$	$3916^{+405}_{-319}$	$670^{+1249}_{-319}$

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

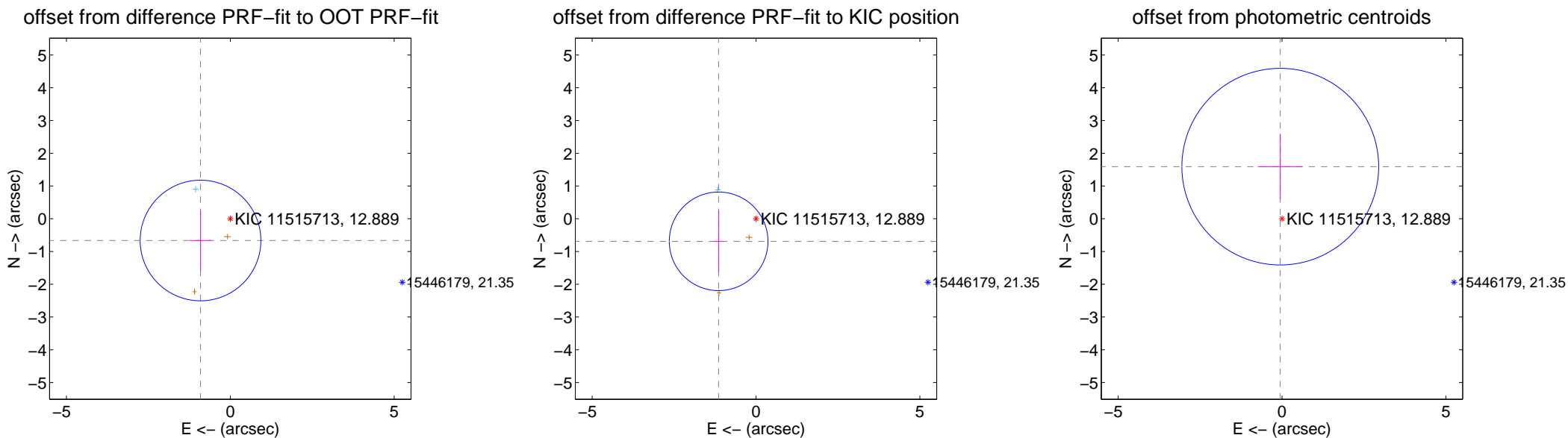
## DV Centroid Data

Supplemental centroid analysis for 011515713-03. Kepler magnitude: 12.89. Transit SNR 7.01

There are 1 quarters with good PRF difference image offsets

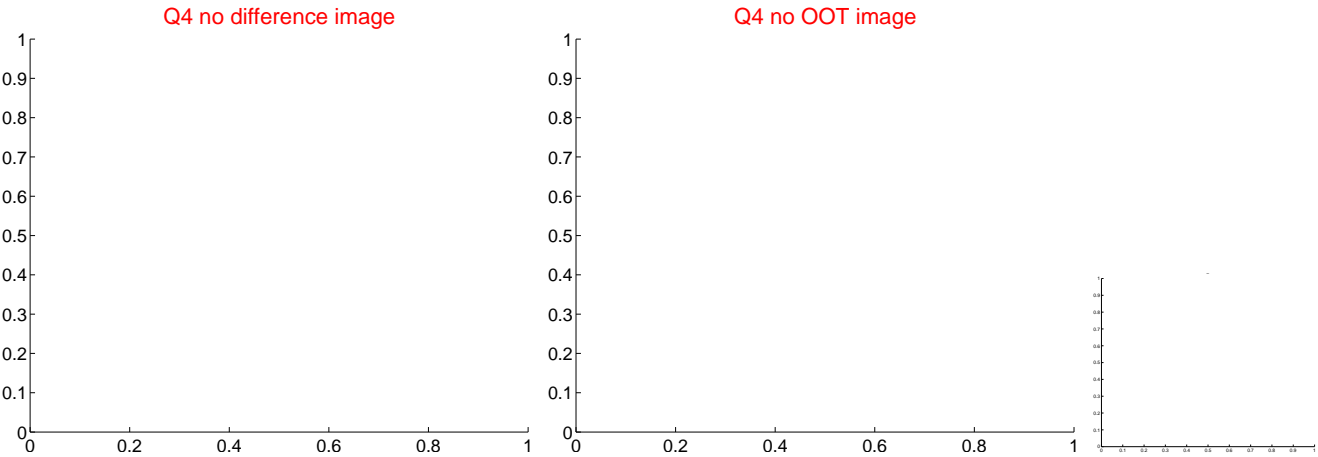
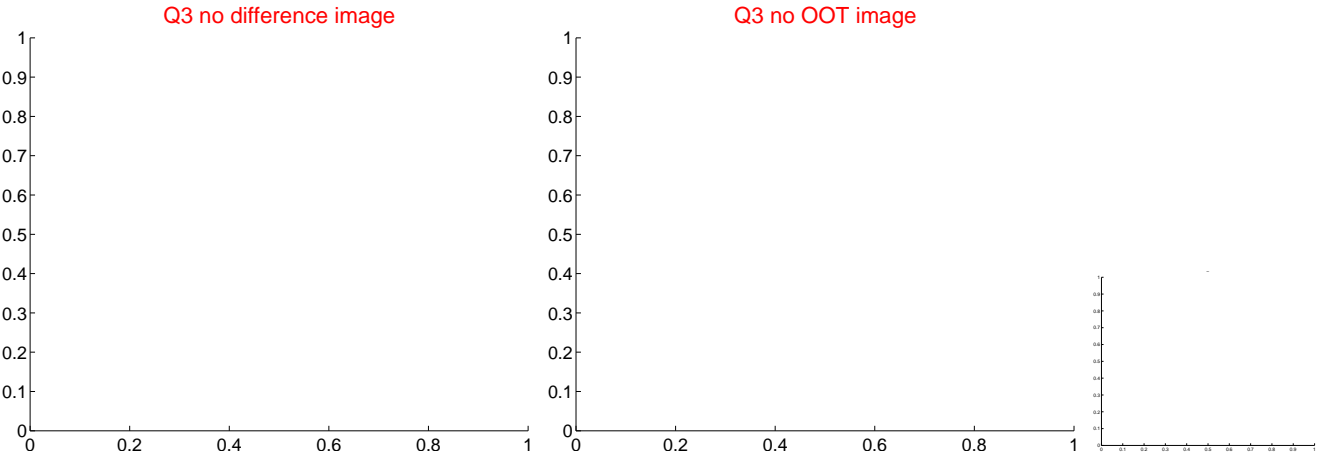
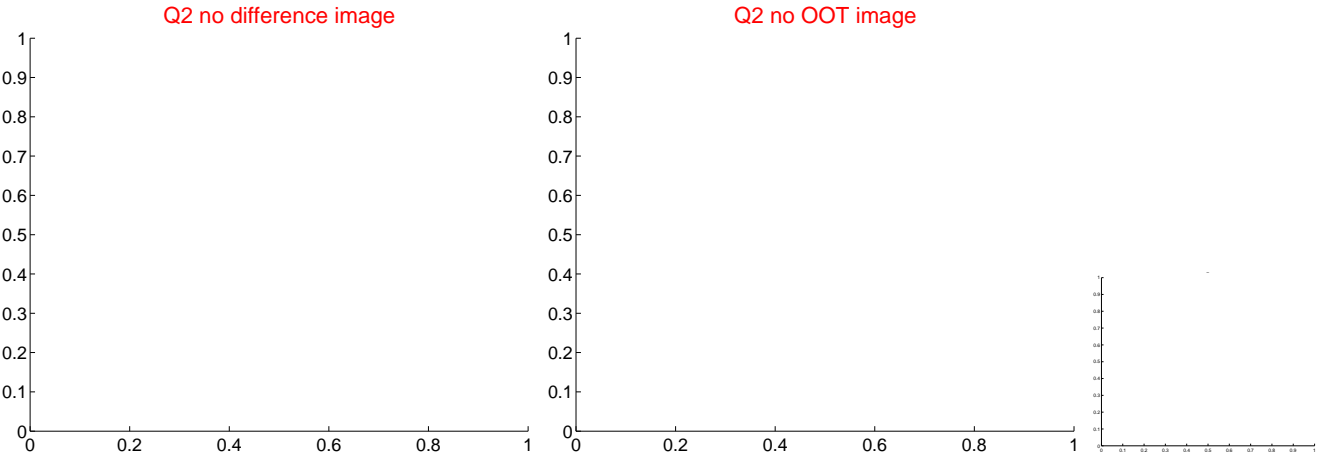
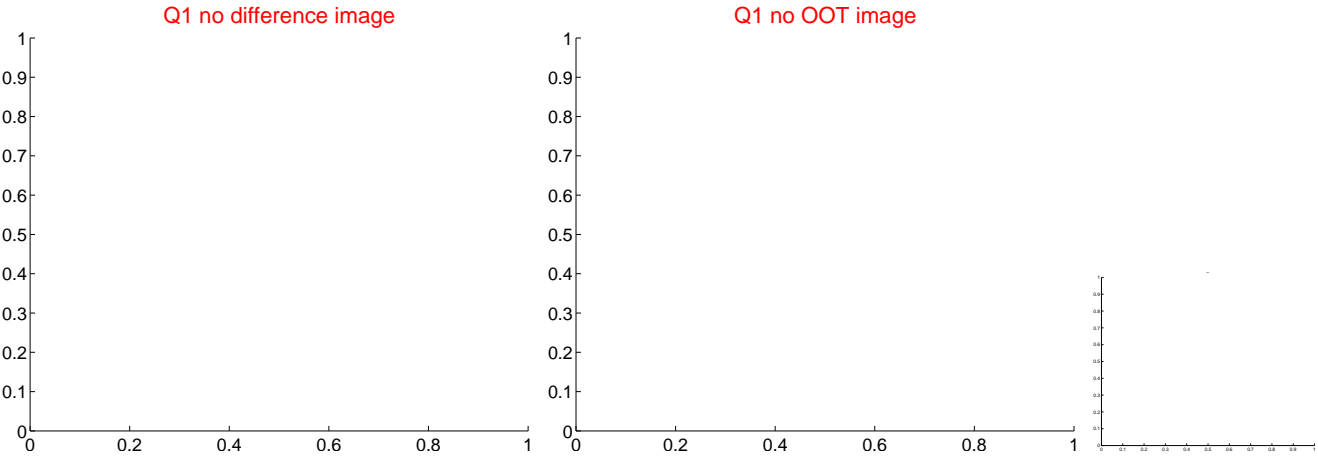
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.126 \pm 0.614$	1.83	$0.909 \pm 0.335$	$-0.664 \pm 0.934$
PRF-fit source offset from KIC position	$1.333 \pm 0.502$	2.66	$1.141 \pm 0.148$	$-0.689 \pm 0.939$
photometric centroid source offset	$1.59 \pm 1.00$	1.59	$0.05 \pm 0.68$	$1.59 \pm 1.00$



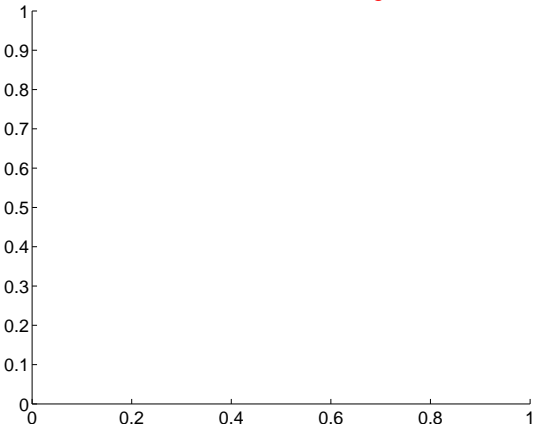
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

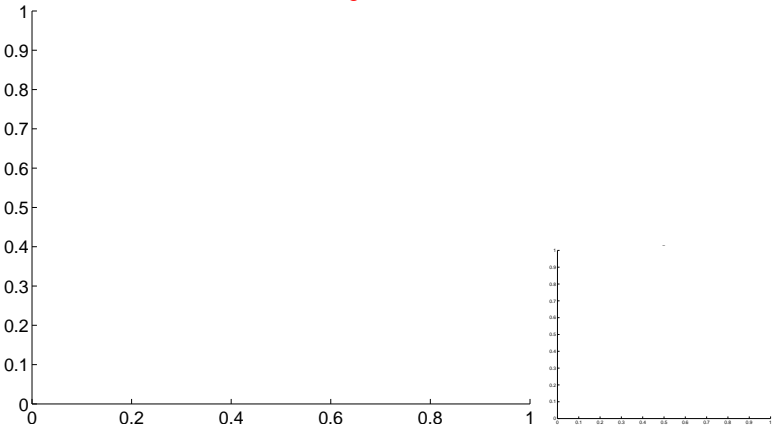


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

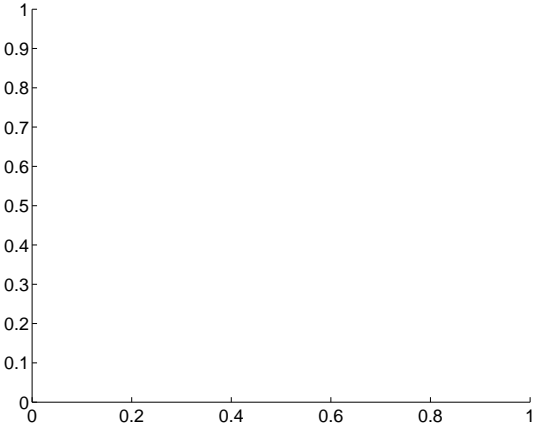
Q5 no difference image



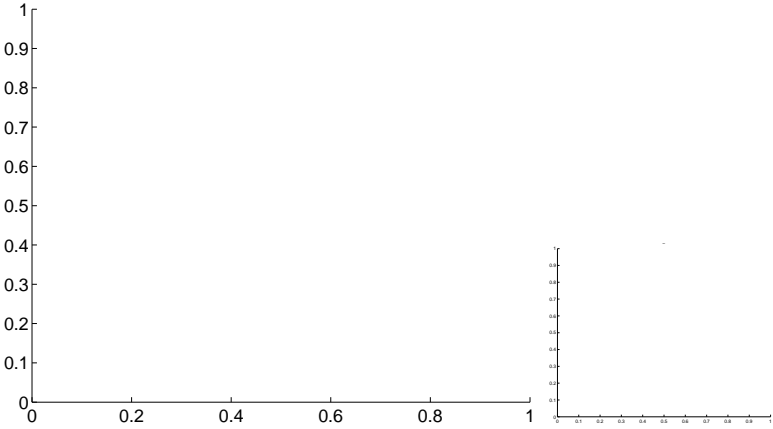
Q5 no OOT image



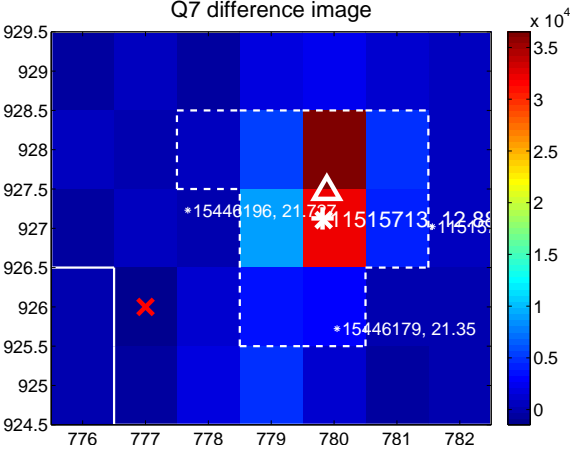
Q6 no difference image



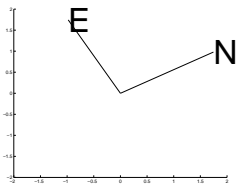
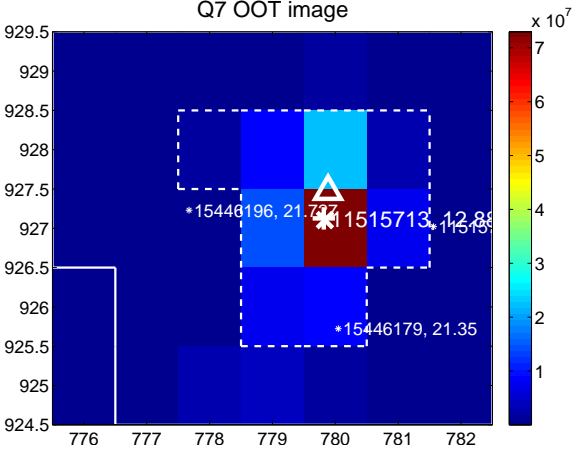
Q6 no OOT image



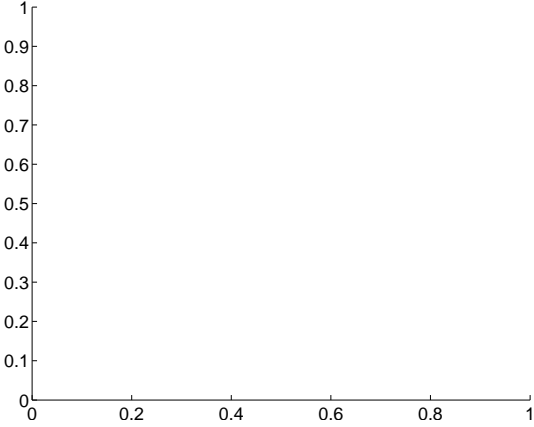
Q7 difference image



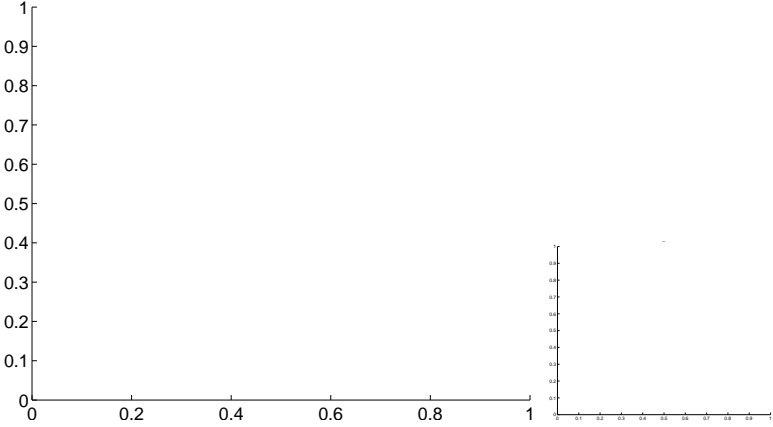
Q7 OOT image



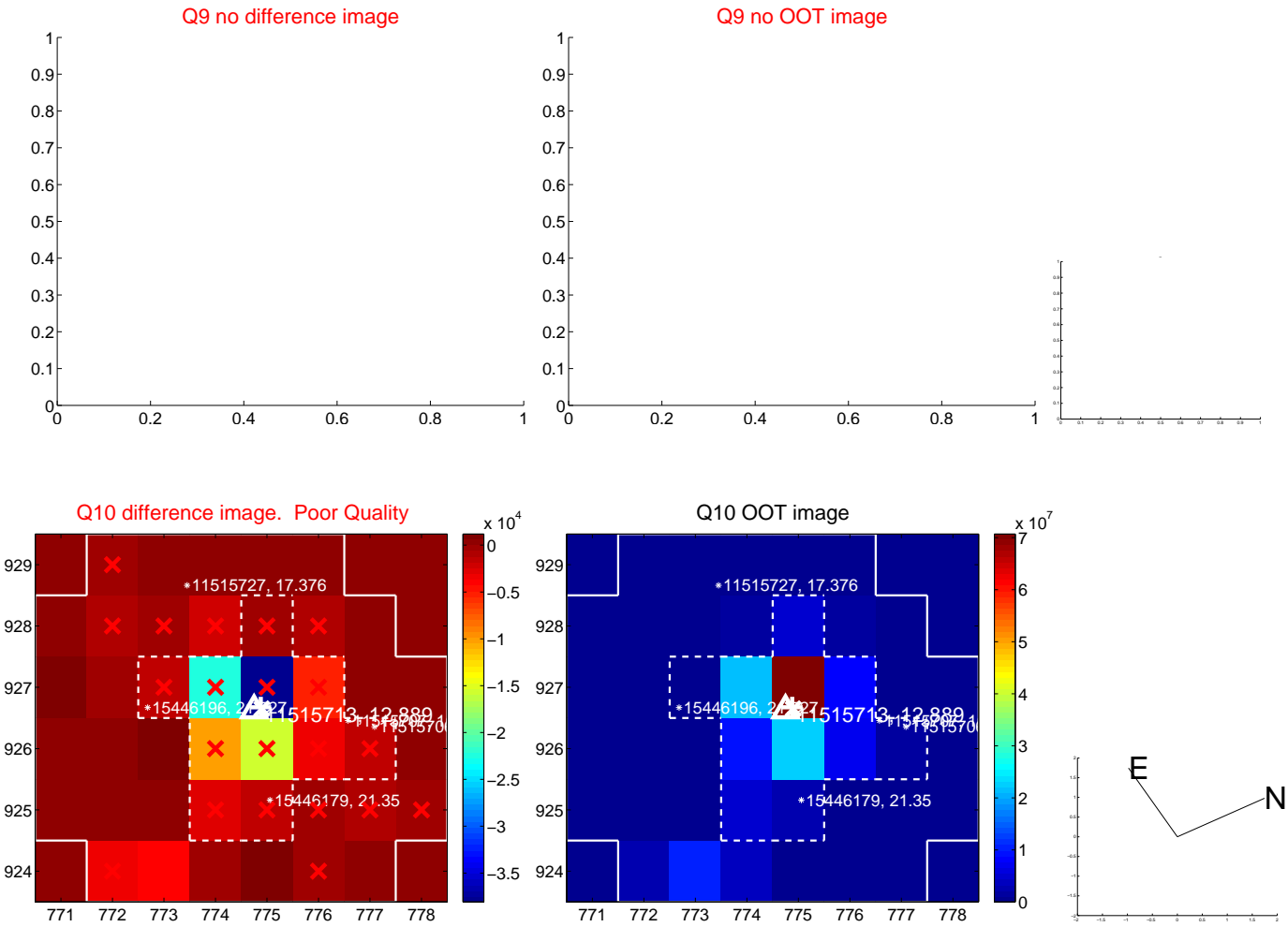
Q8 no difference image



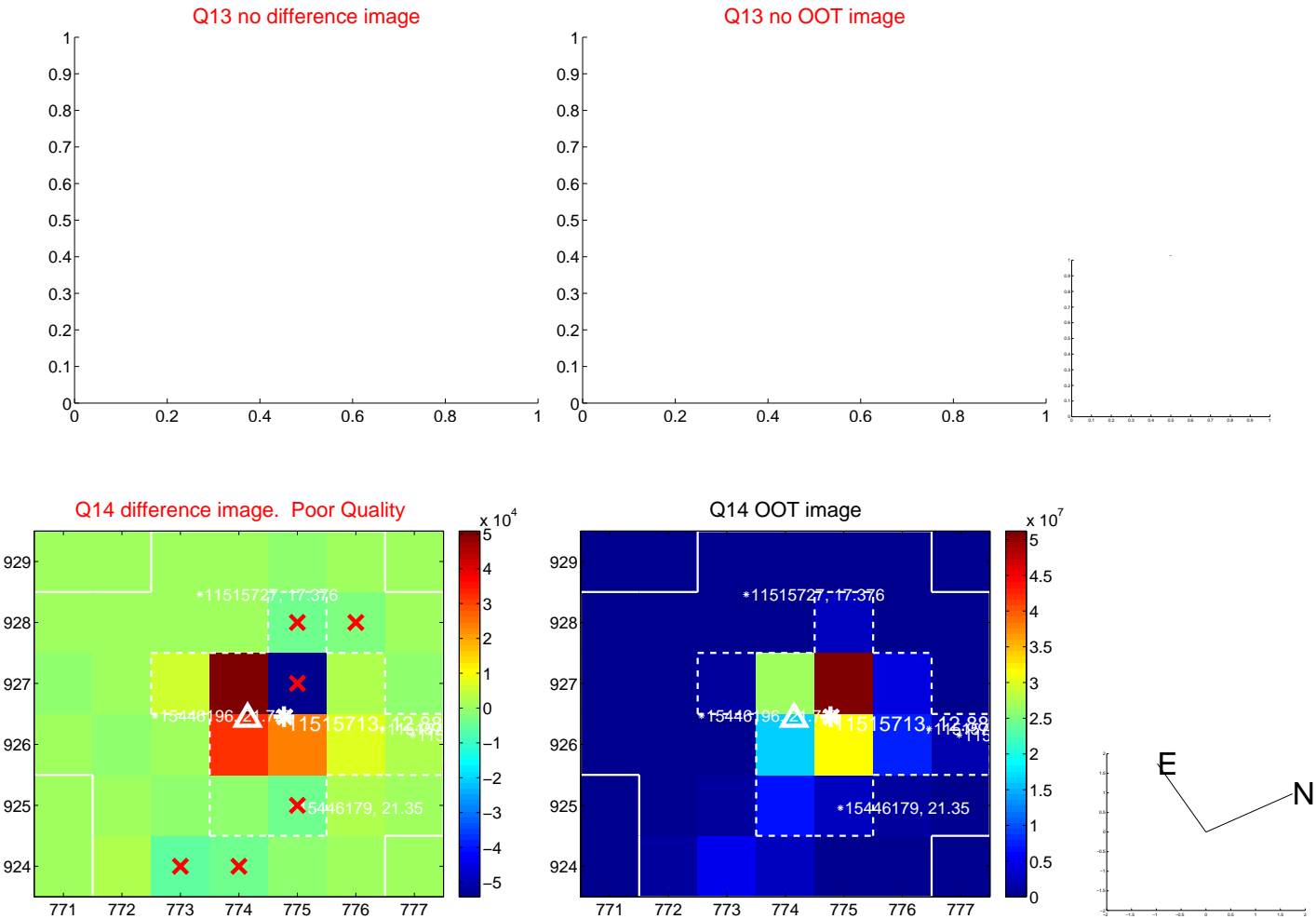
Q8 no OOT image



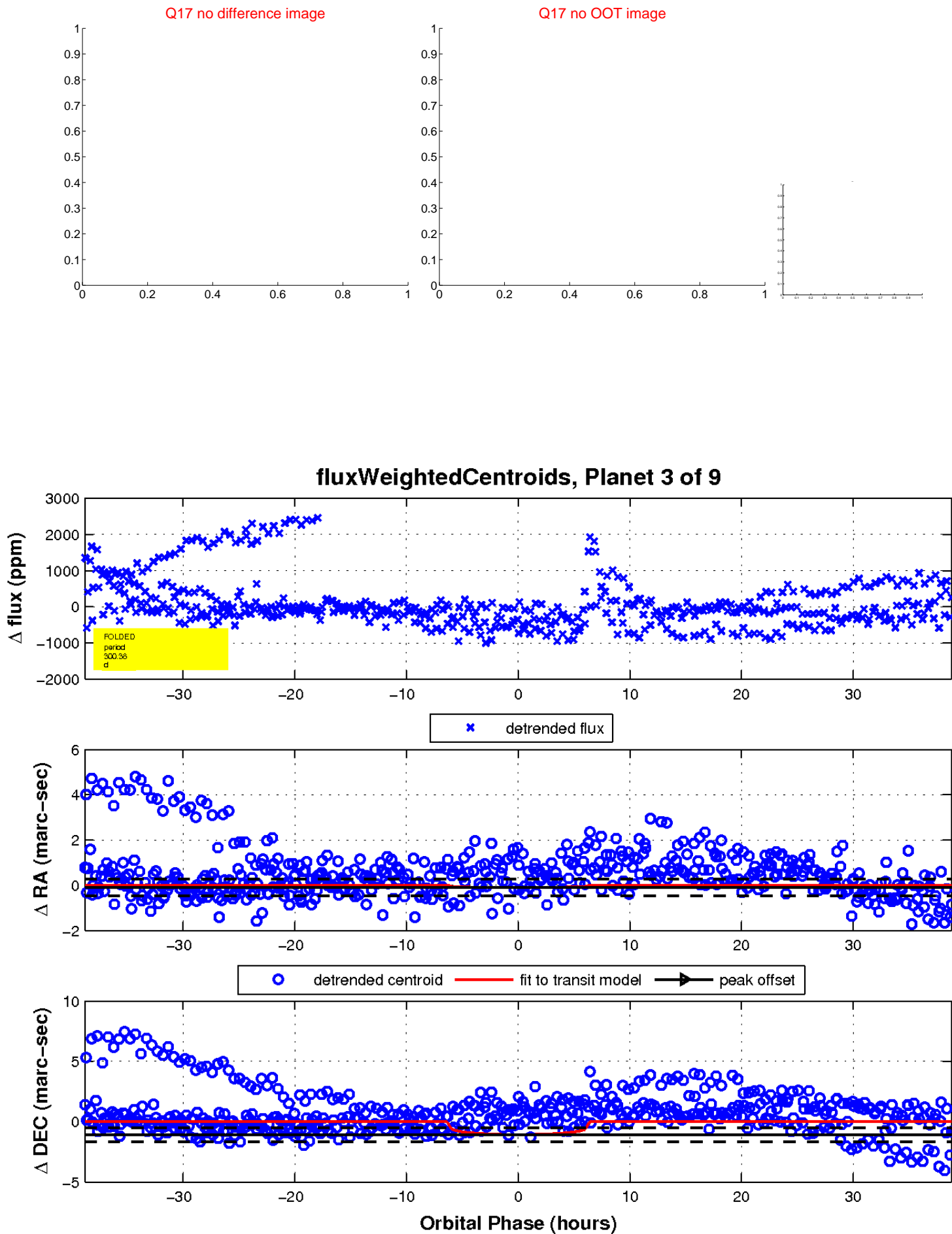
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

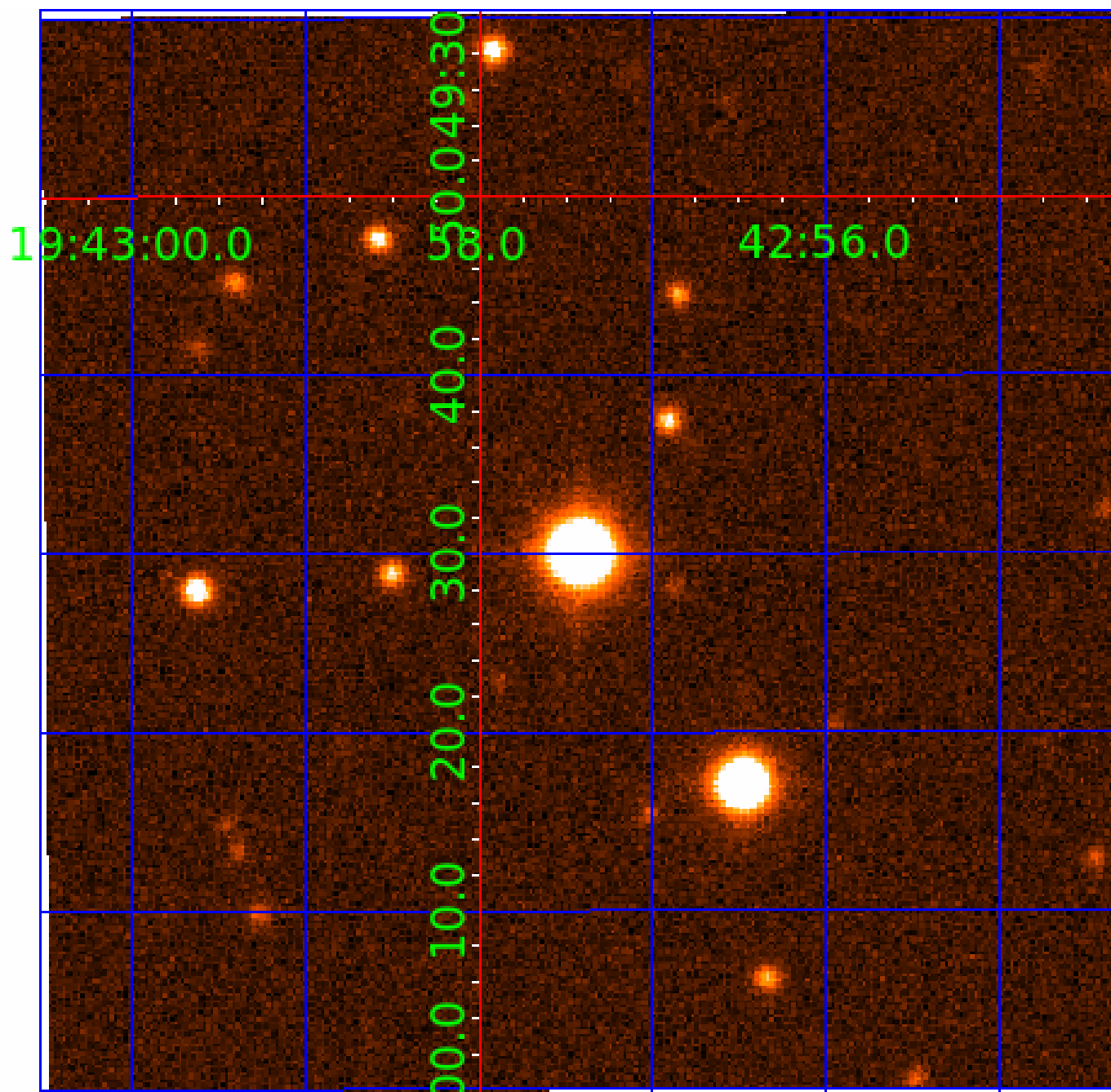


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

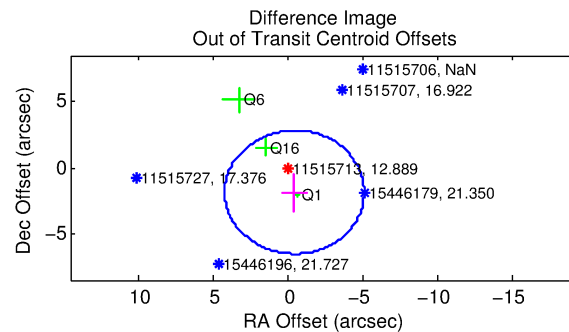
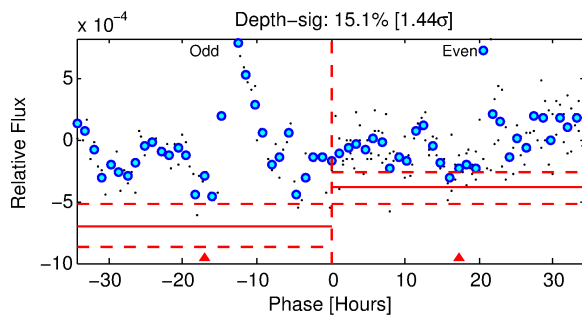
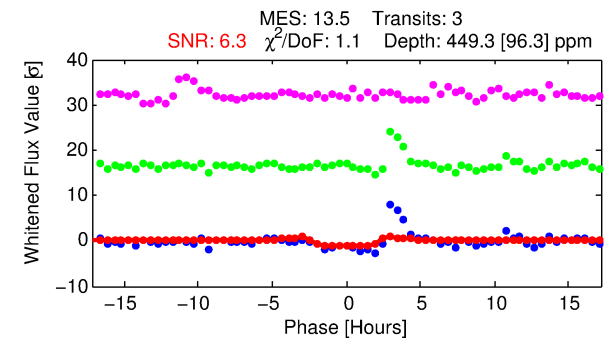
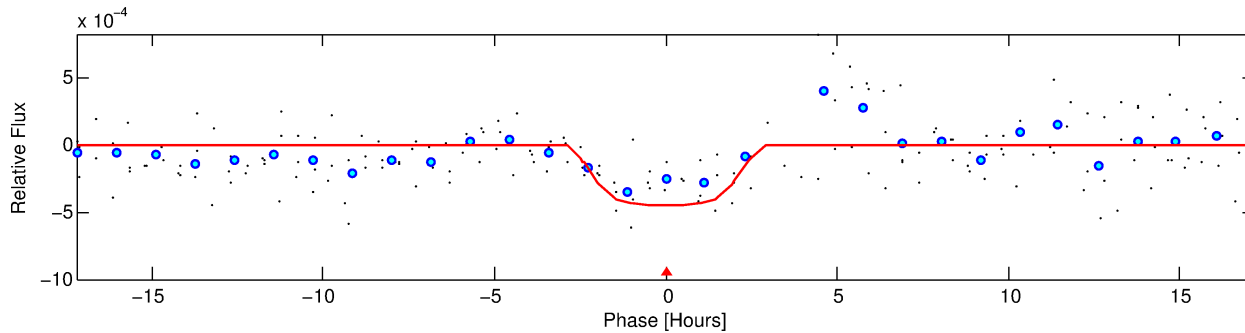
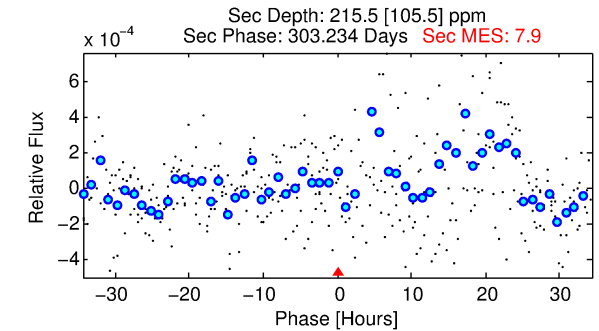
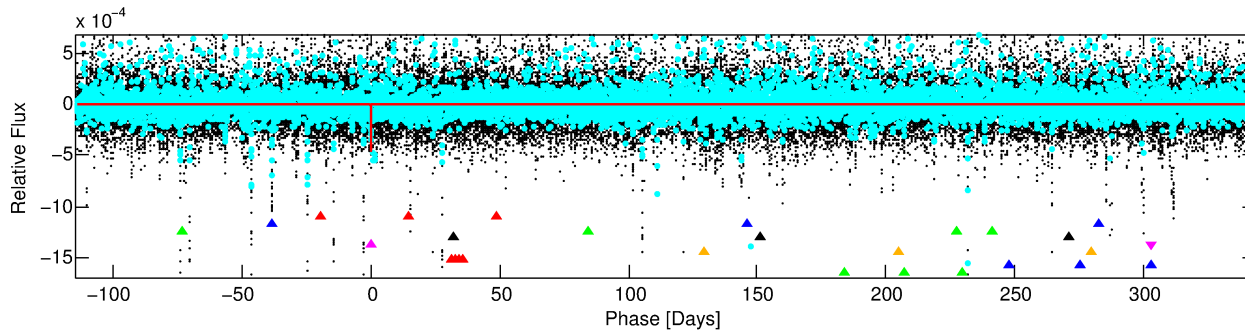
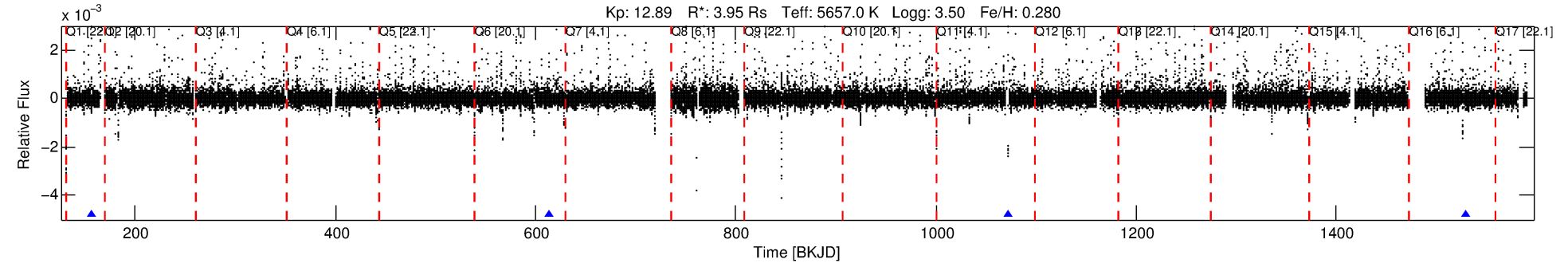
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011515713-05

No Significant Match Found

# DV One-Page Summary

KIC: 11515713 Candidate: 5 of 9 Period: 457.649 d



## DV Fit Results:

Period = 457.64938 [0.00655] d  
Epoch = 156.2589 [0.0130] BKJD  
Rp/R\* = 0.0251 [0.0037]  
a/R\* = 227.34 [80.47]  
b = 0.95 [0.03]  
Seff = 7.18 [9.48]  
Teq = 417 [138] K  
Rp = 10.83 [7.86] Re  
a = 1.4111 [1.0937] AU  
Ag = 2012.33 [2883.68] [0.70σ]  
Teffp = 4322 [629] K [6.07σ]

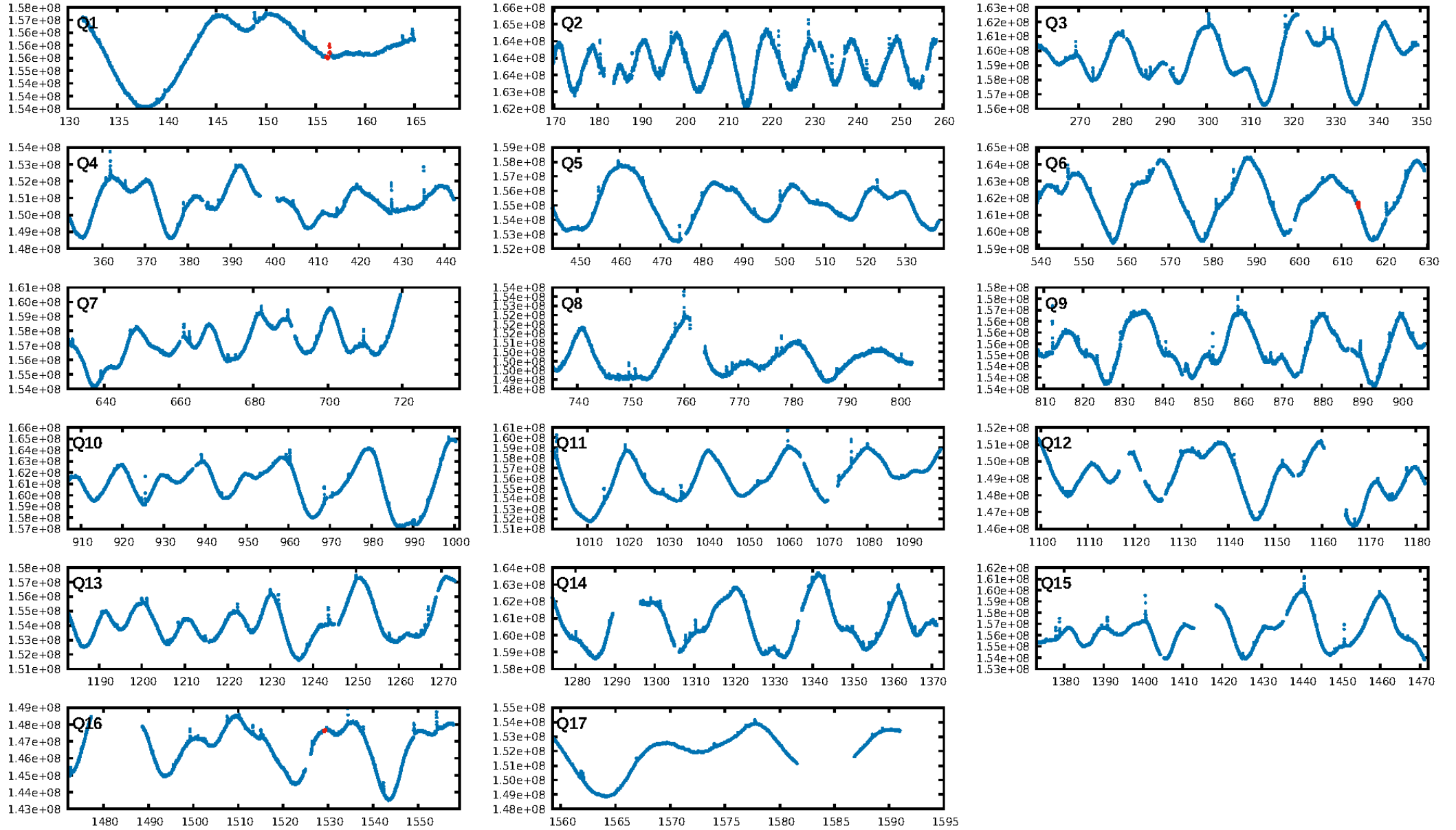
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [60.12σ]  
LongPeriod-sig: 100.0% [4.26σ]  
ModelChiSquare2-sig: 13.8%  
ModelChiSquareGof-sig: 93.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 0.617  
Centroid-sig: 75.1%  
Centroid-so: 0.553 arcsec [0.54σ]  
OotOffset-rm: 1.921 arcsec [1.23σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-rm: 1.902 arcsec [0.84σ]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

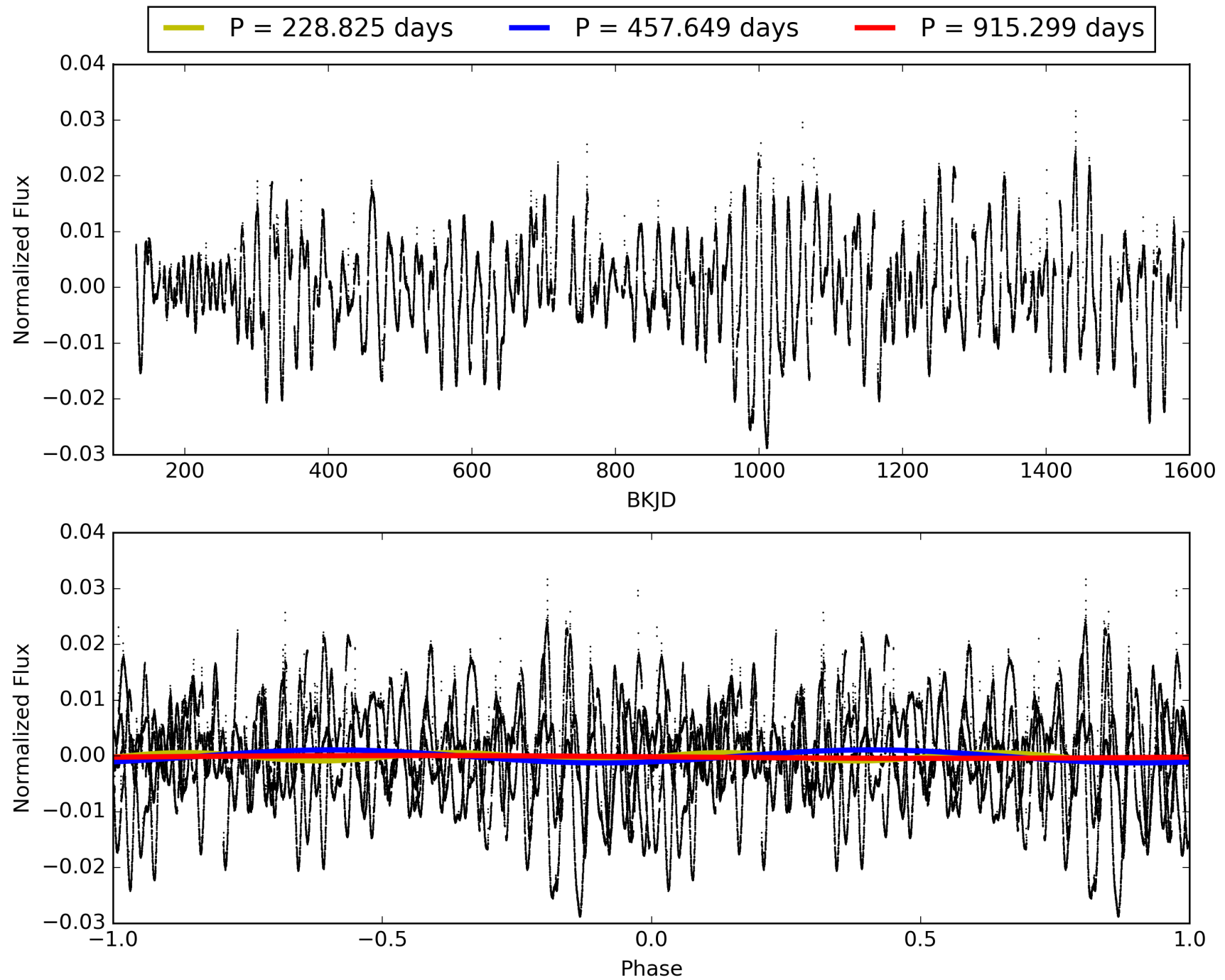
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:04:54 Z

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

# TCE 011515713-05, PDC Light Curves

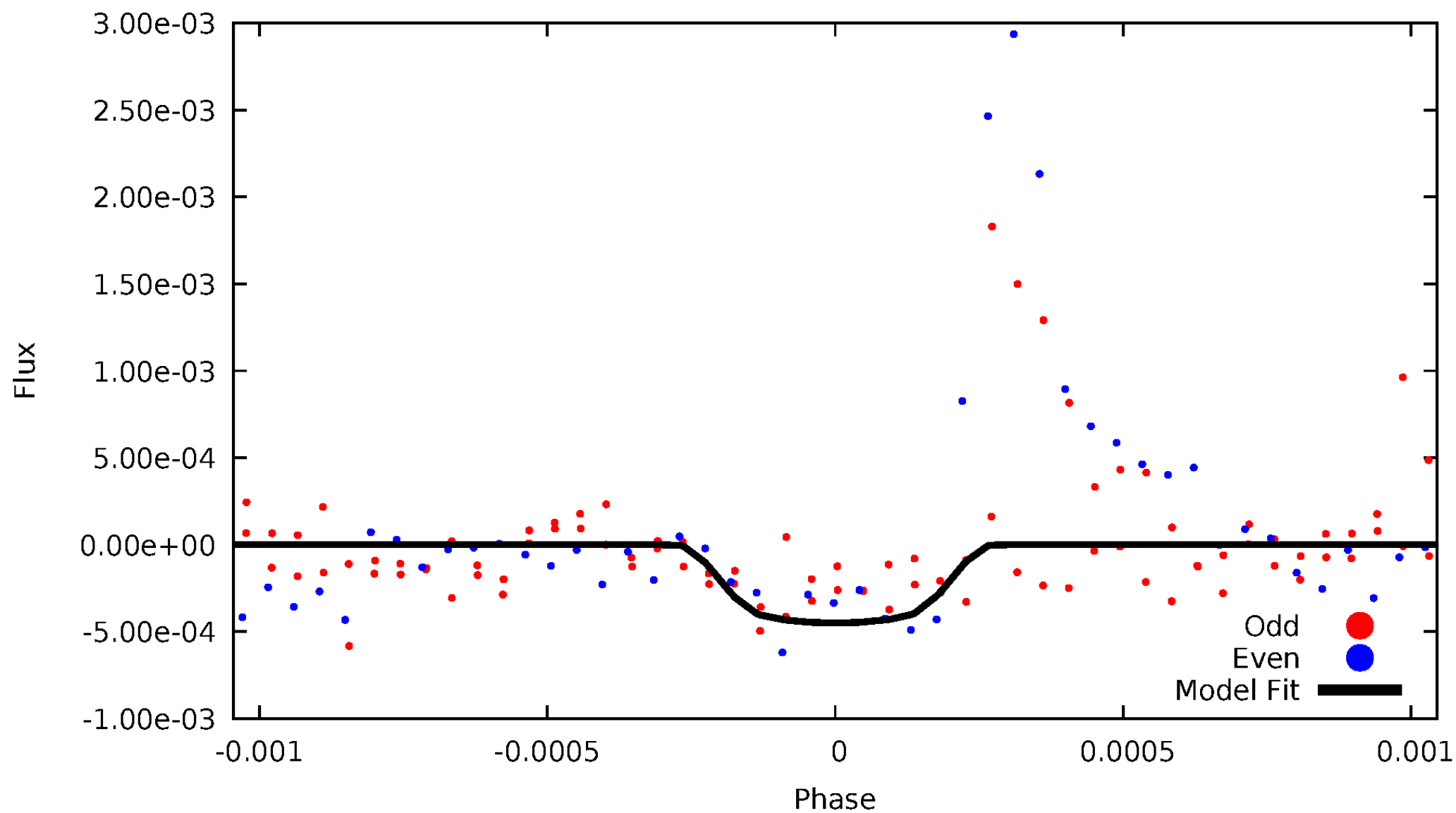


# TCE 011515713-05



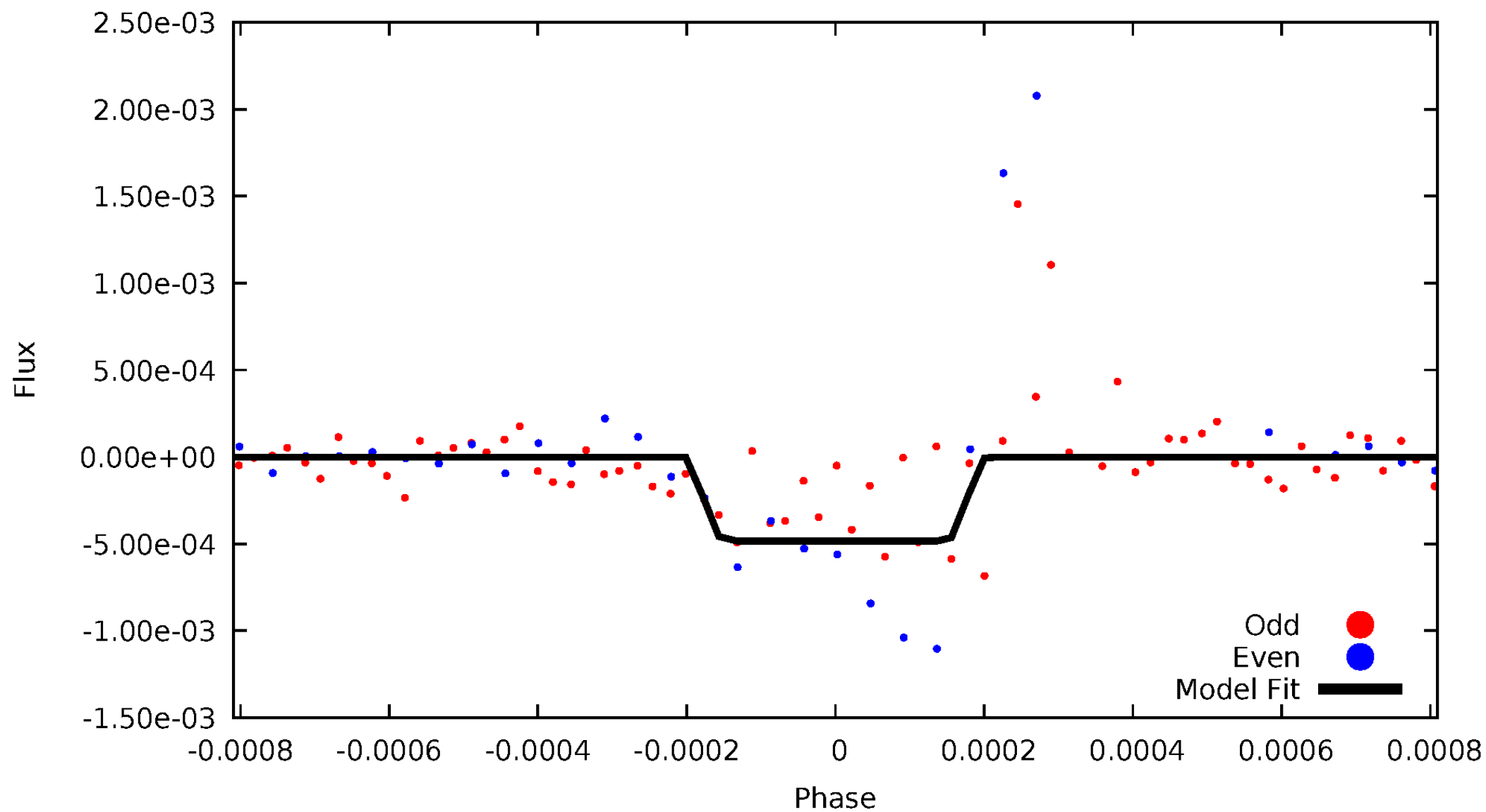
# DV Odd/Even

TCE 011515713-05



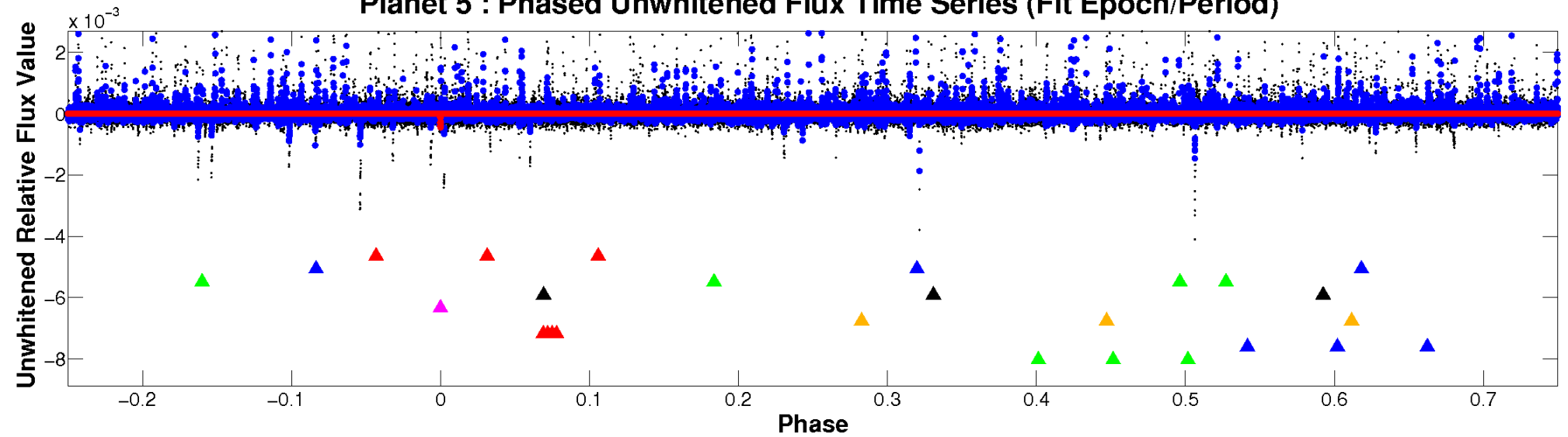
# ALT Odd/Even

TCE 011515713-05

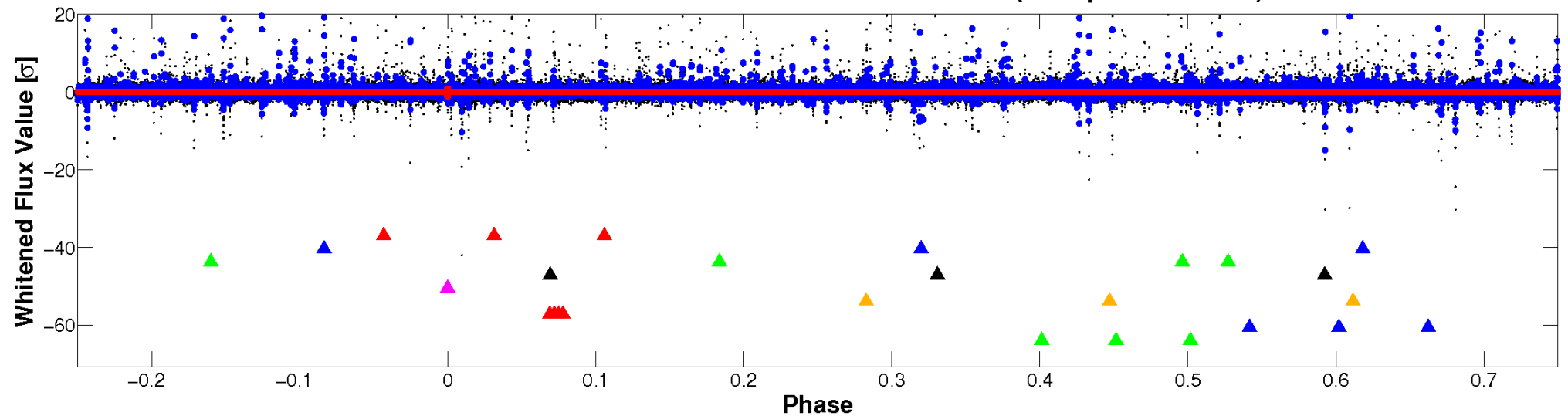


# Non-Whitened Vs. Whitened Light Curve

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

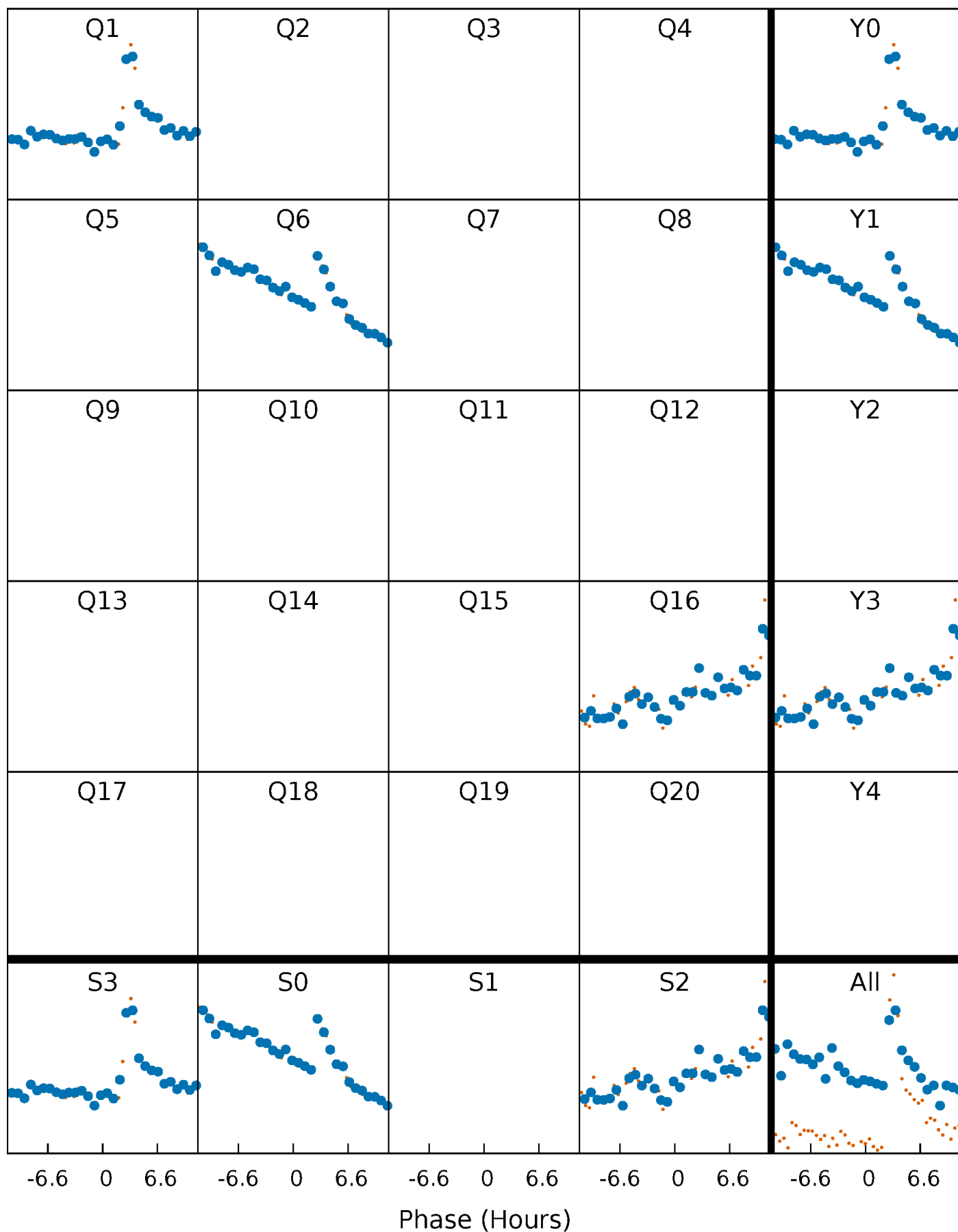


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

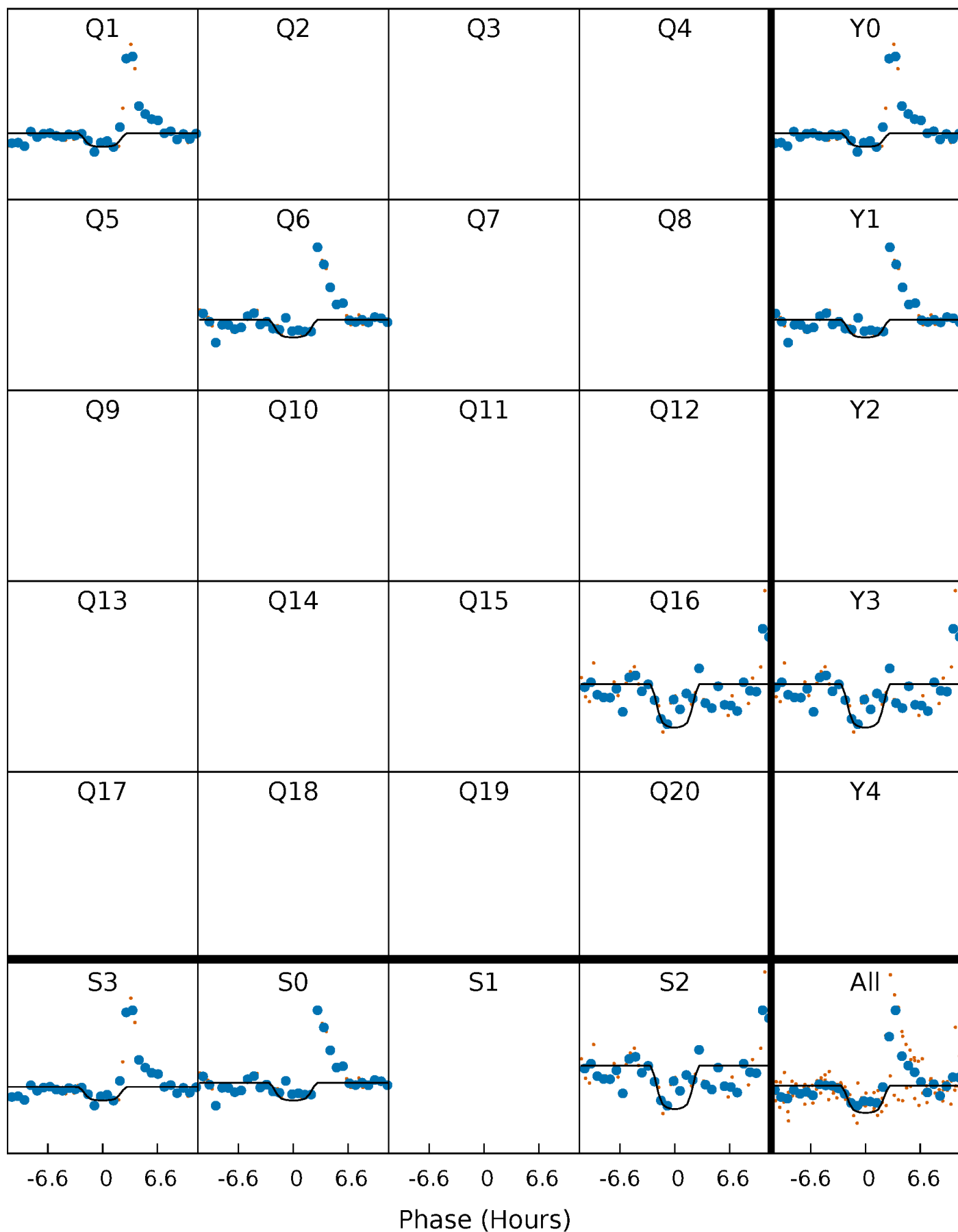
TCE 011515713-05     $P=457.649376$  Days     $T_0=156.258853$  (BKJD)





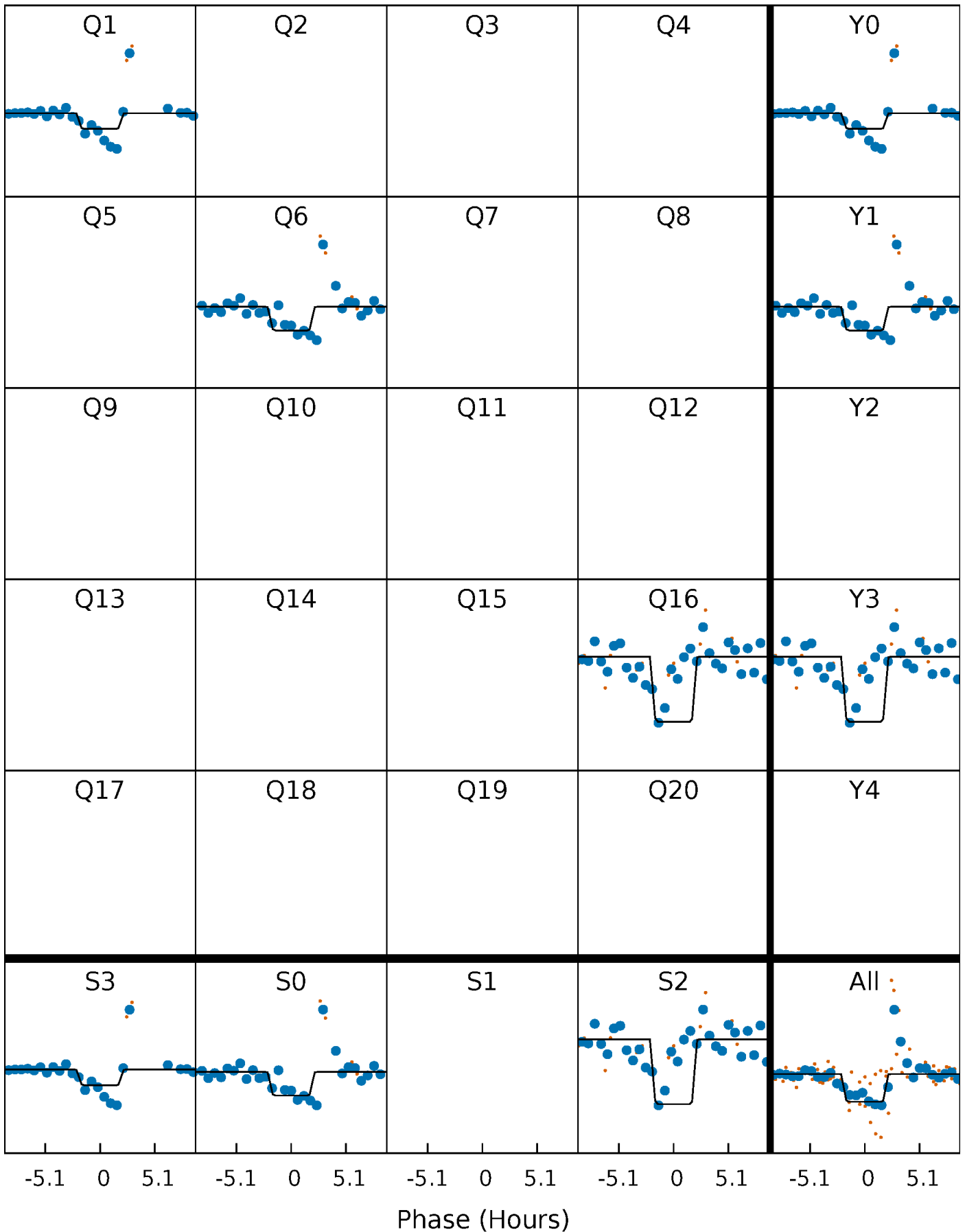
# DV Quarter-Phased Transit Curves

TCE 011515713-05     $P=457.649376$  Days     $T_0=156.258853$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

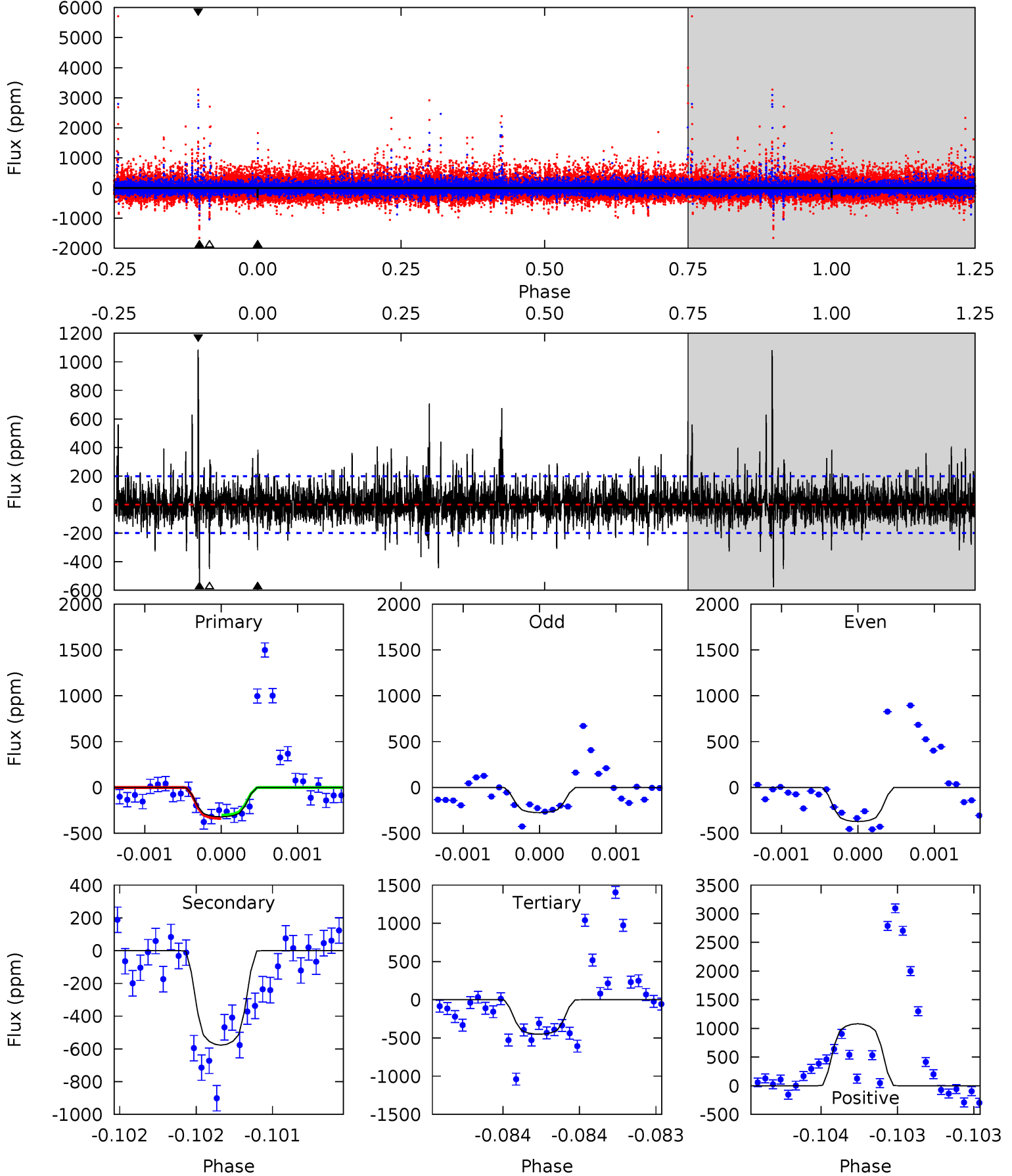
TCE 011515713-05     $P=457.643632$  Days     $T_0=156.276964$  (BKJD)



# DV Model-Shift Uniqueness Test

011515713-05, P = 457.649376 Days, E = 156.258853 Days

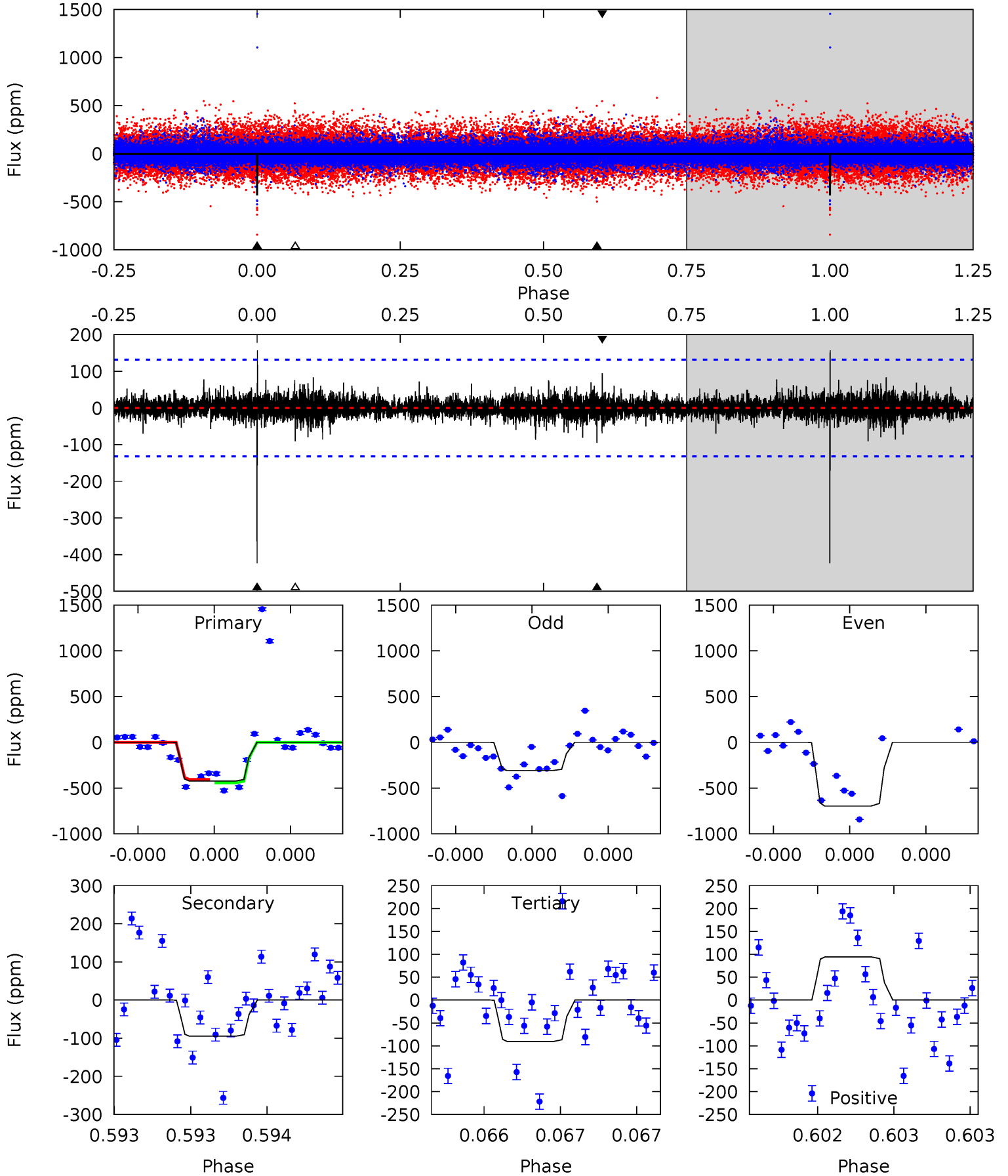
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.94	16.1	12.6	30.2	5.55	3.44	2.55	-3.65	-21.3	3.55	-14.1	0.84	1.08	0.65	0.53



# Alt Model-Shift Uniqueness Test

011515713-05, P = 457.643632 Days, E = 156.276964 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
18.0	4.03	3.85	4.02	5.61	3.54	0.67	14.1	14.0	0.18	0.01	8.52	1.08	0.27	0.82



### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-577 \pm 36$	$9.54^{+3.13}_{-3.55}$	$563^{+52}_{-107}$	$5541^{+480}_{-375}$	$6744^{+9476}_{-2776}$
Alt.	$-95 \pm 24$	$8.56^{+2.55}_{-3.13}$	$566^{+50}_{-101}$	$4045^{+352}_{-312}$	$1417^{+1703}_{-654}$

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

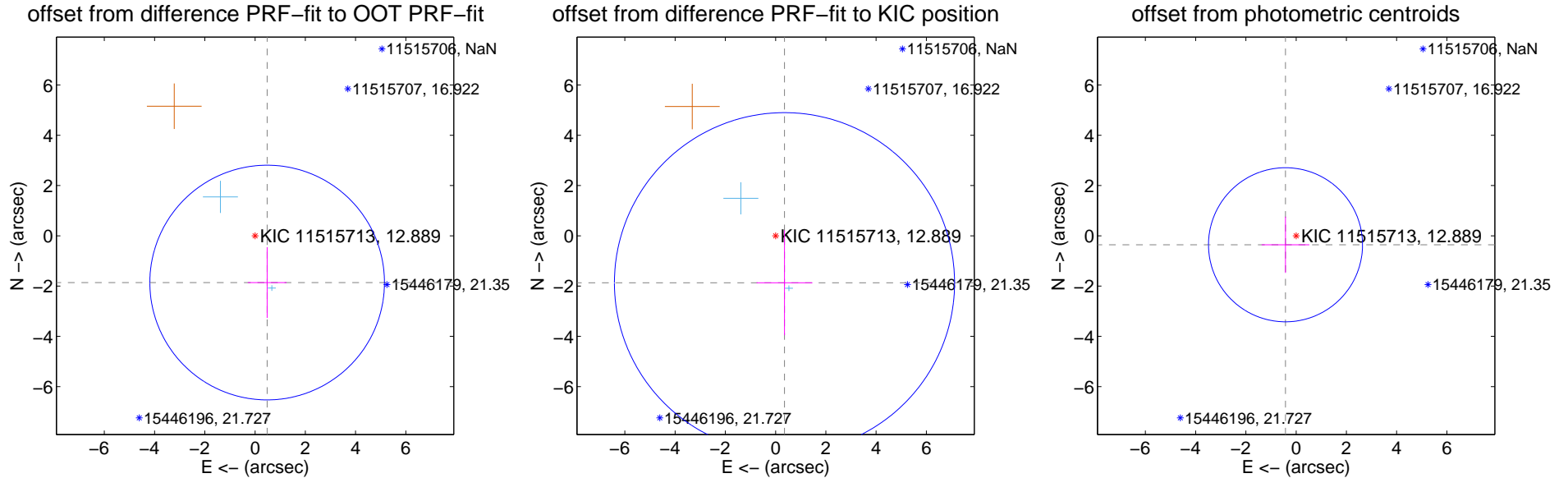
## DV Centroid Data

Supplemental centroid analysis for 011515713-05. Kepler magnitude: 12.89. Transit SNR 6.32

There are 2 quarters with good PRF difference image offsets

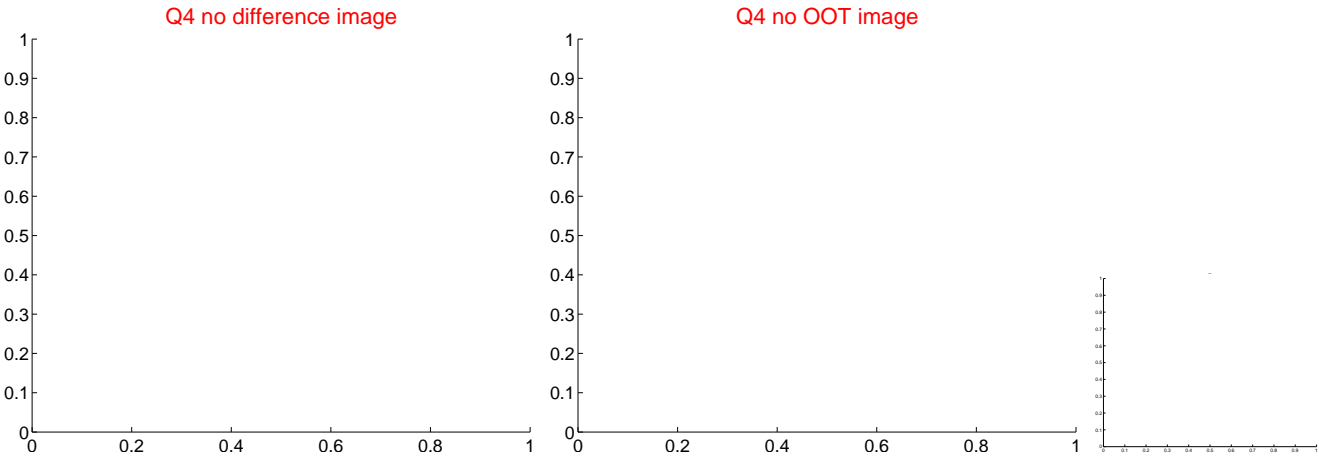
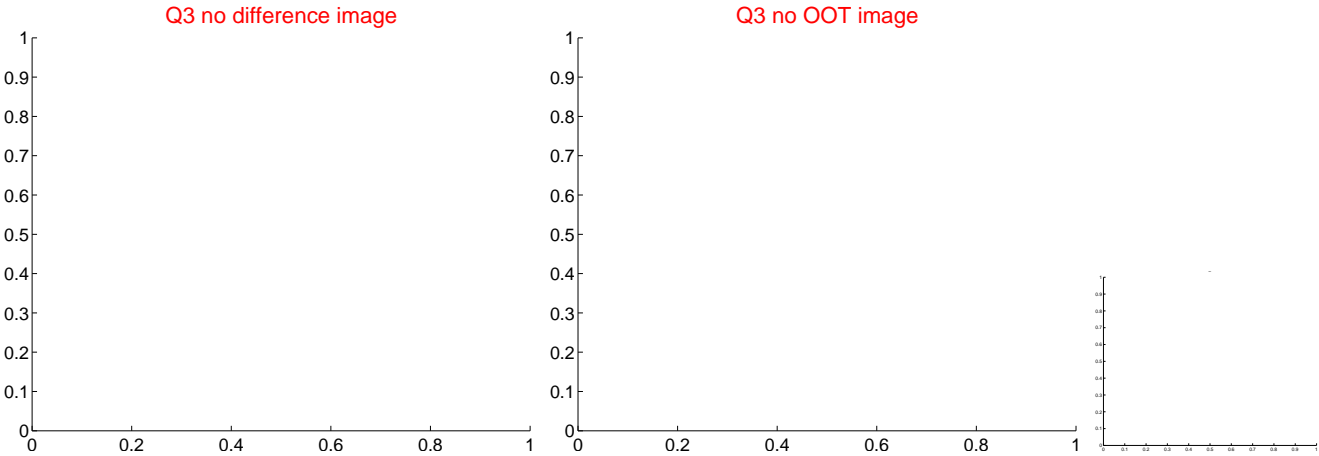
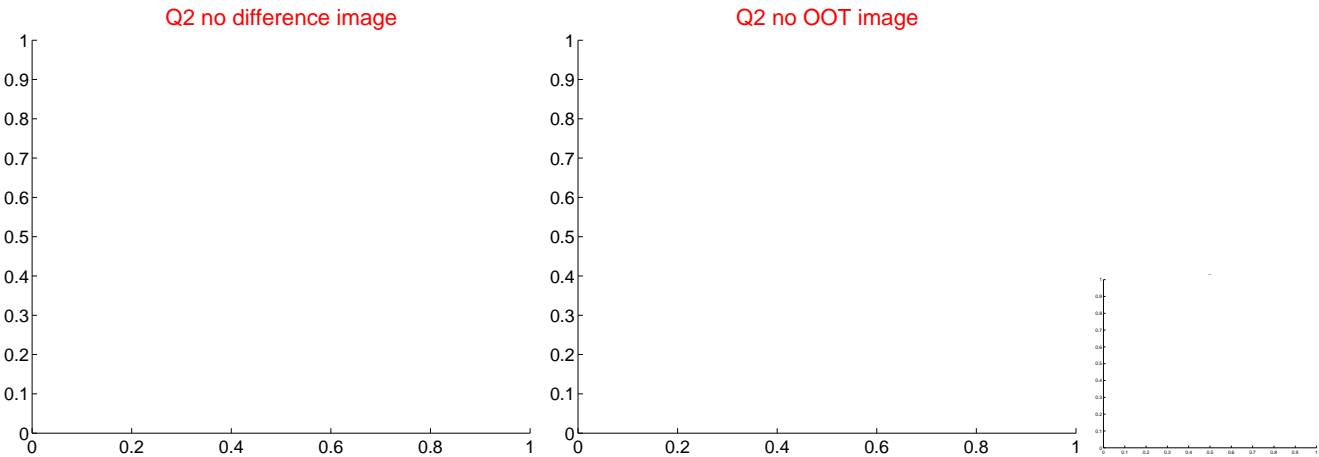
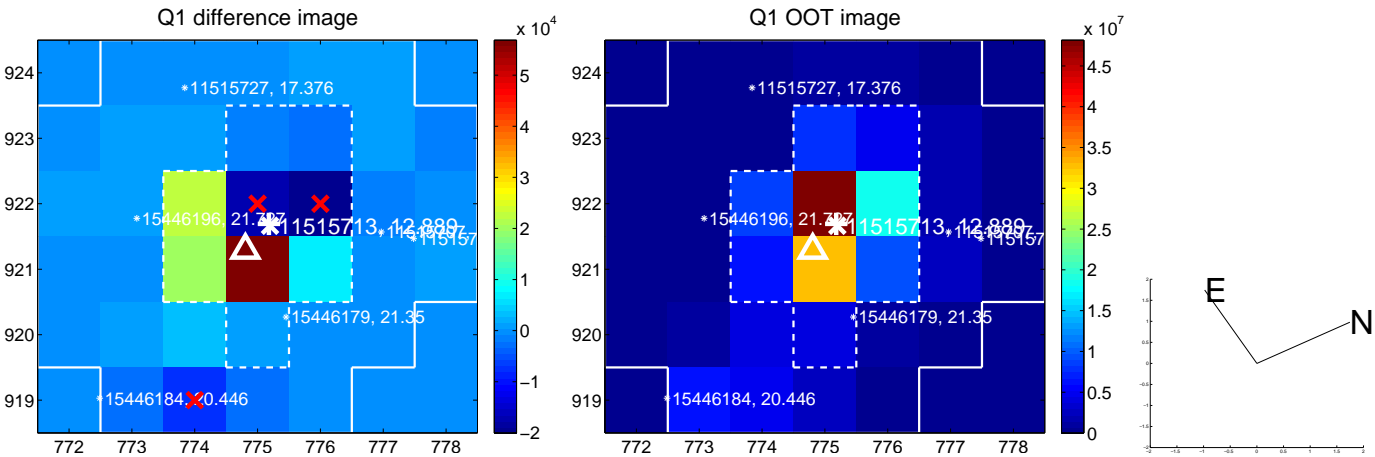
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.921 \pm 1.556$	1.23	$-0.481 \pm 0.770$	$-1.860 \pm 1.409$
PRF-fit source offset from KIC position	$1.902 \pm 2.256$	0.84	$-0.354 \pm 1.112$	$-1.869 \pm 2.086$
photometric centroid source offset	$0.55 \pm 1.02$	0.54	$0.42 \pm 0.95$	$-0.36 \pm 1.12$

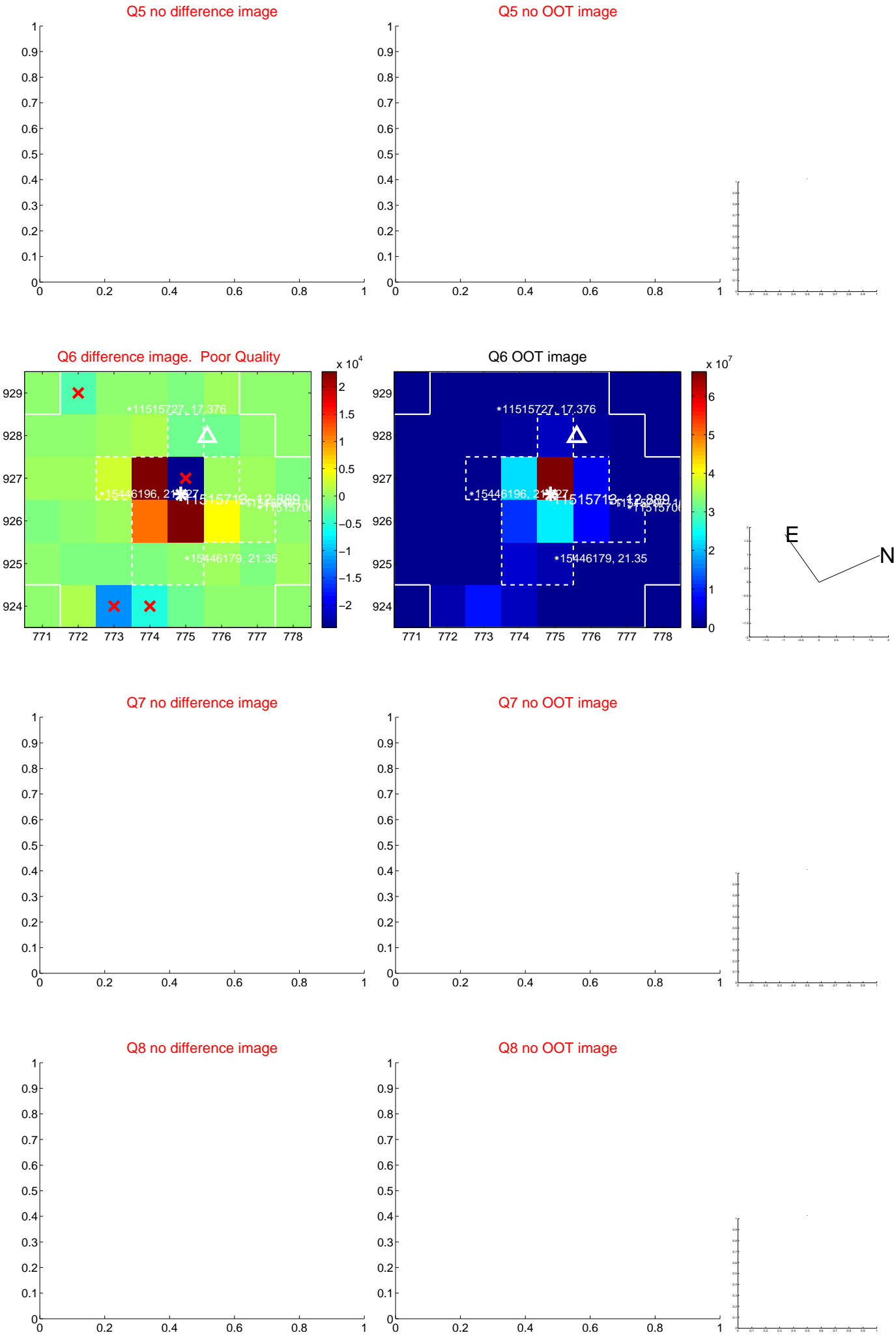


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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



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

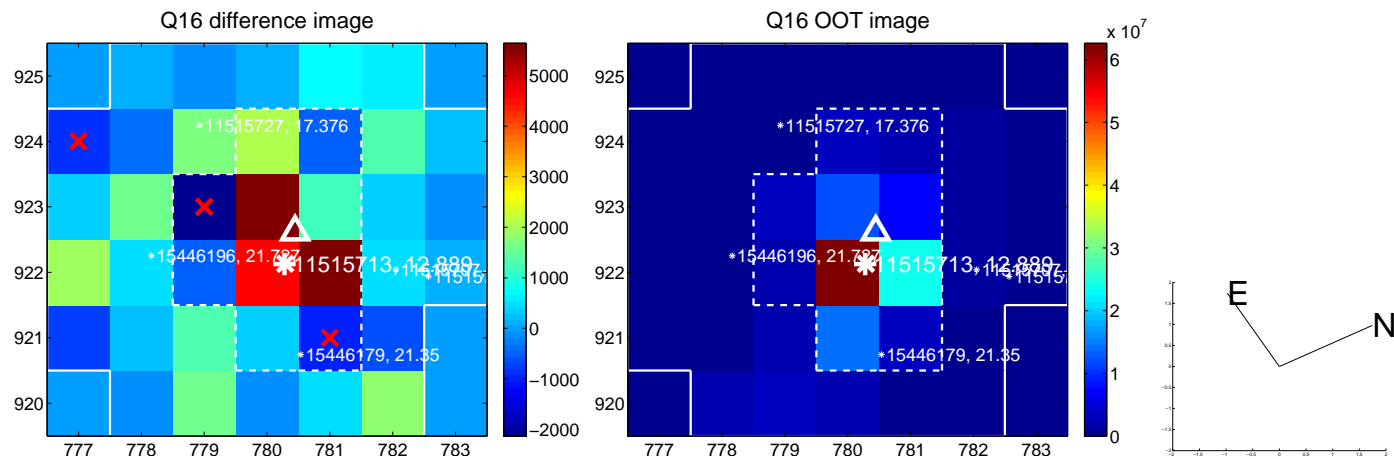
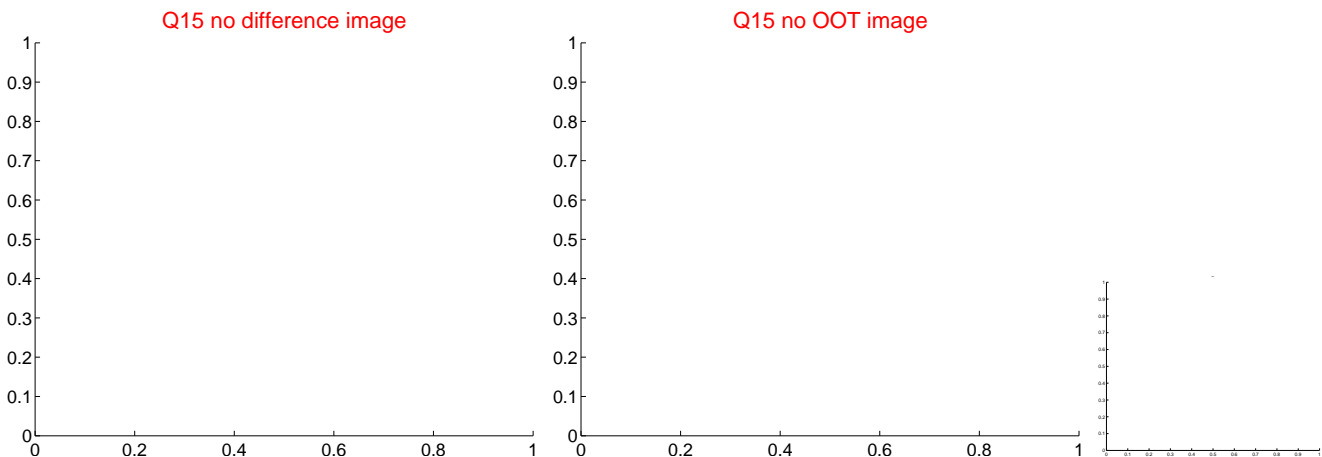
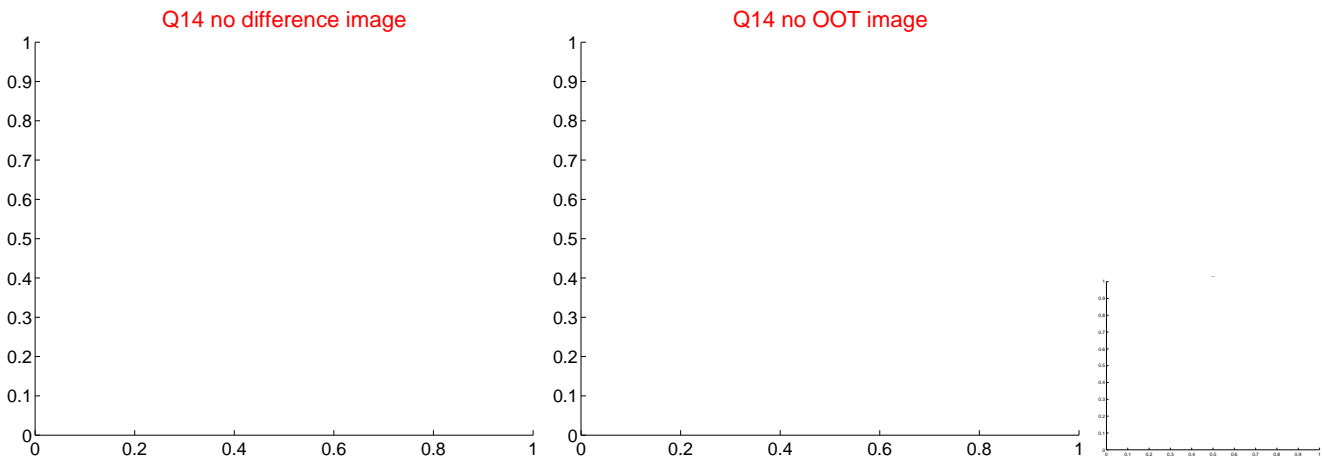
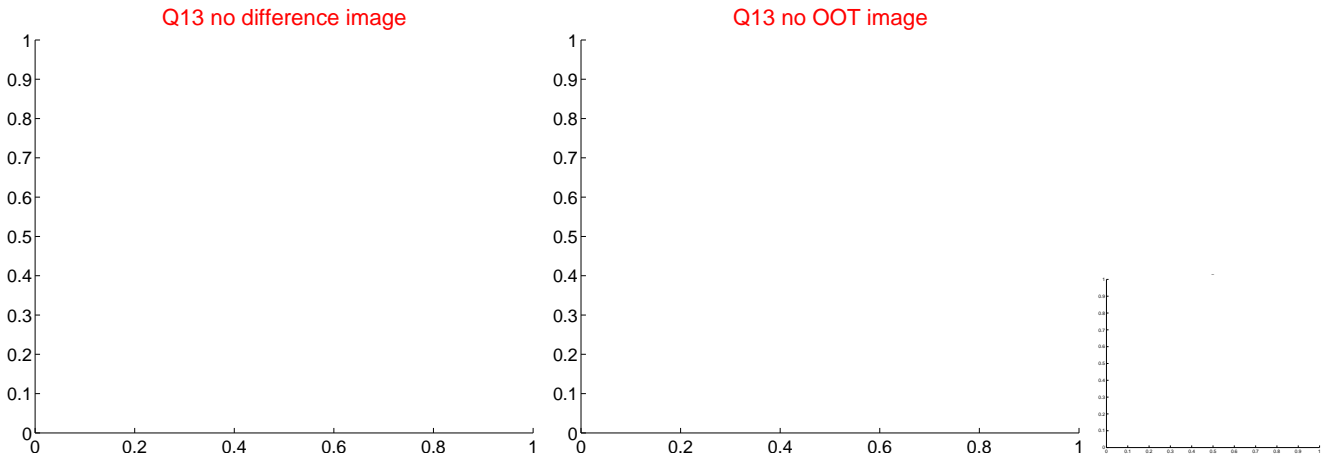




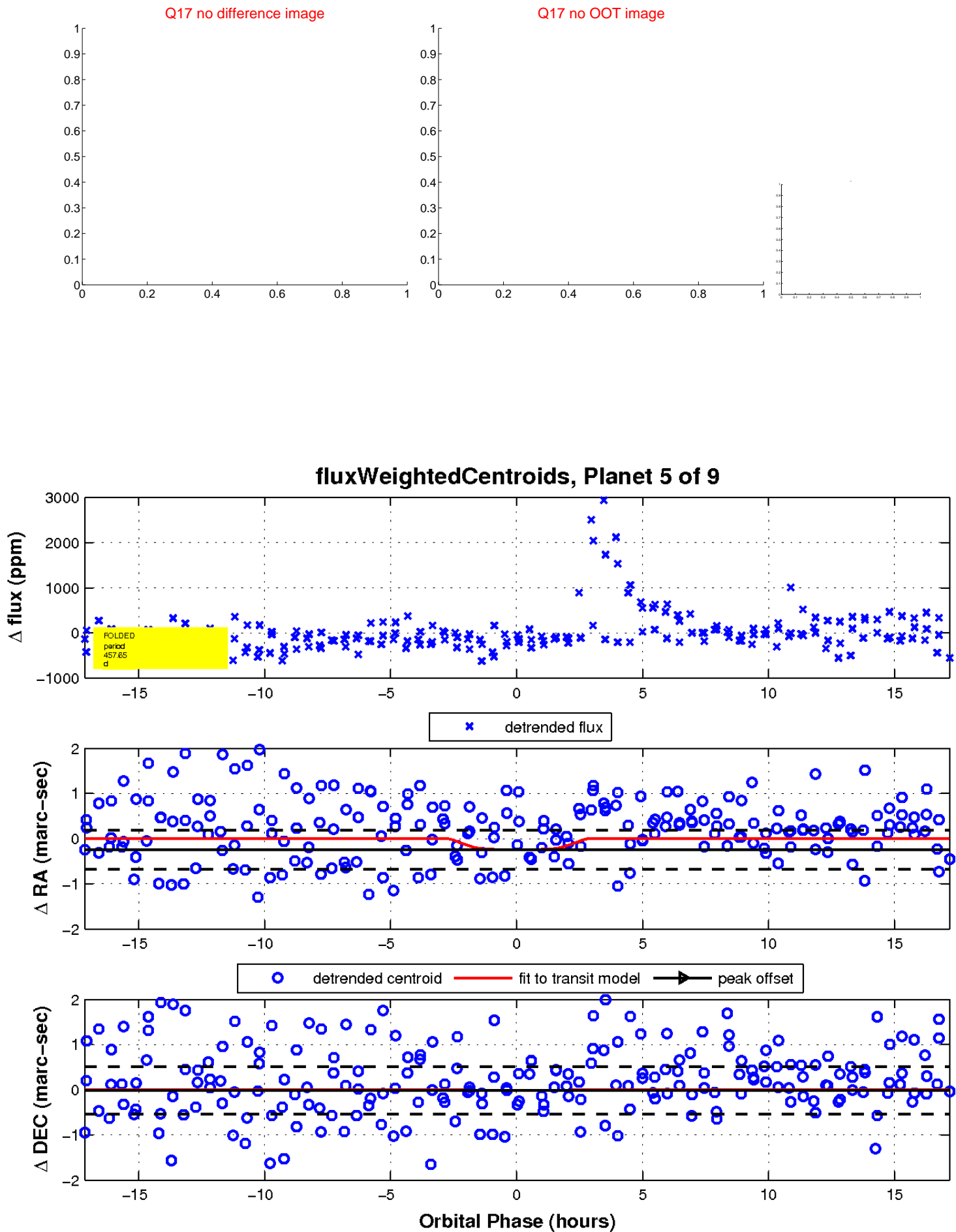
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

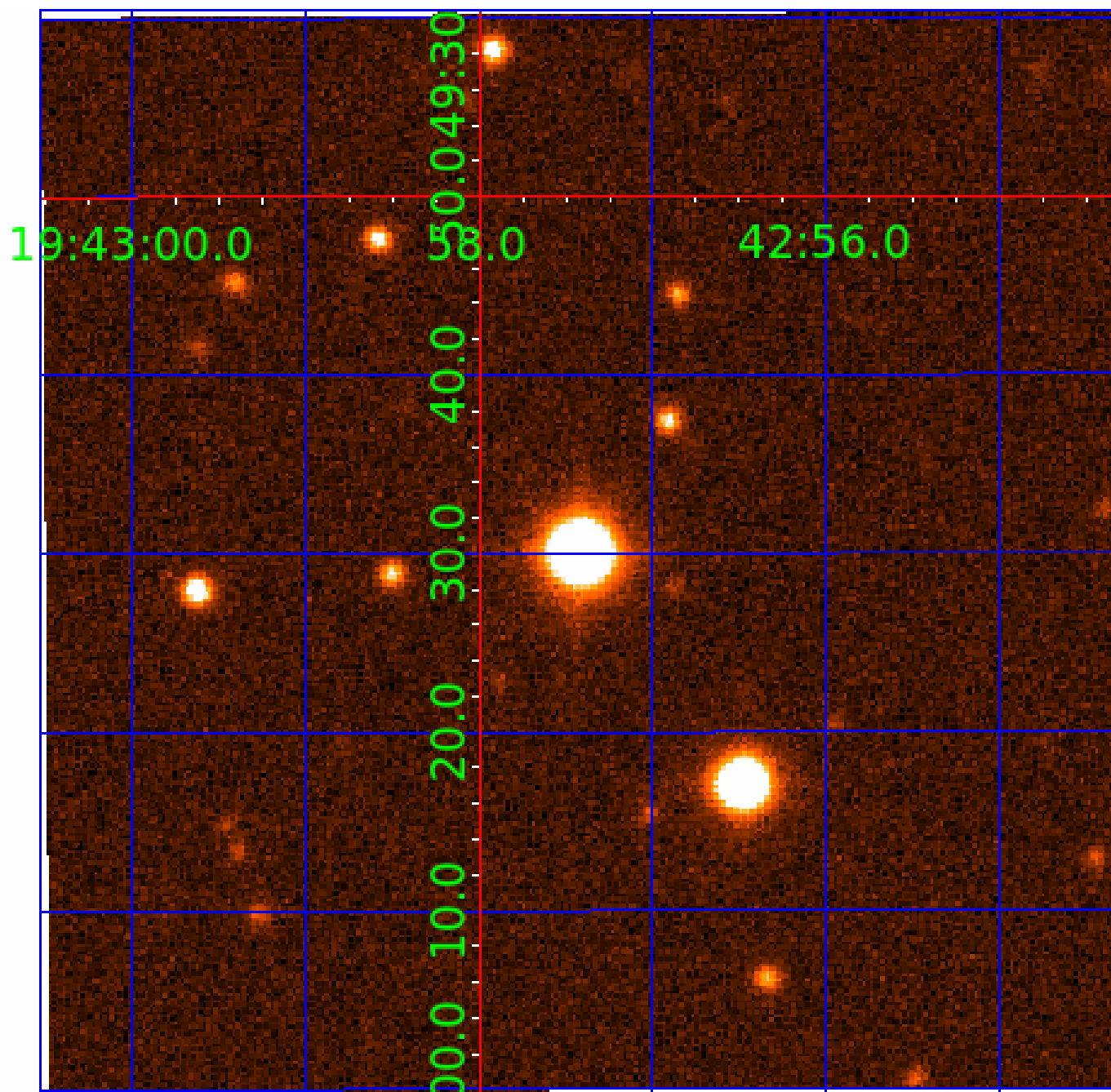


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

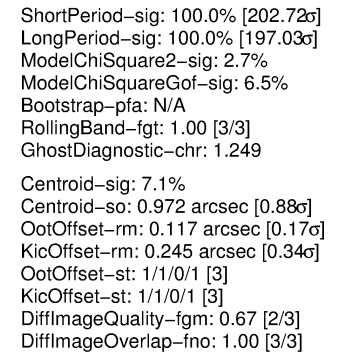
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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.

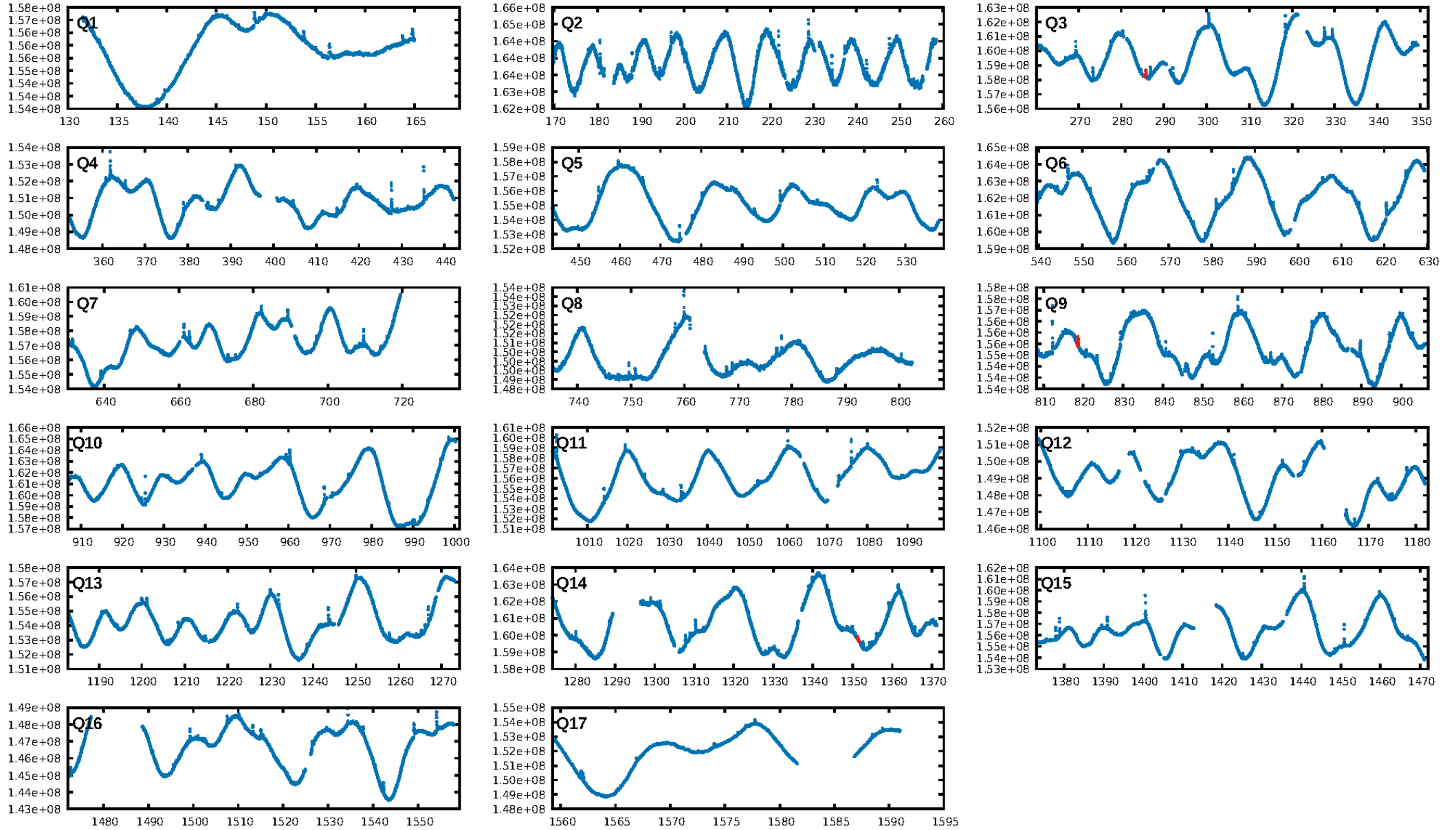
Ephemeris Match Information For 011515713-06

No Significant Match Found

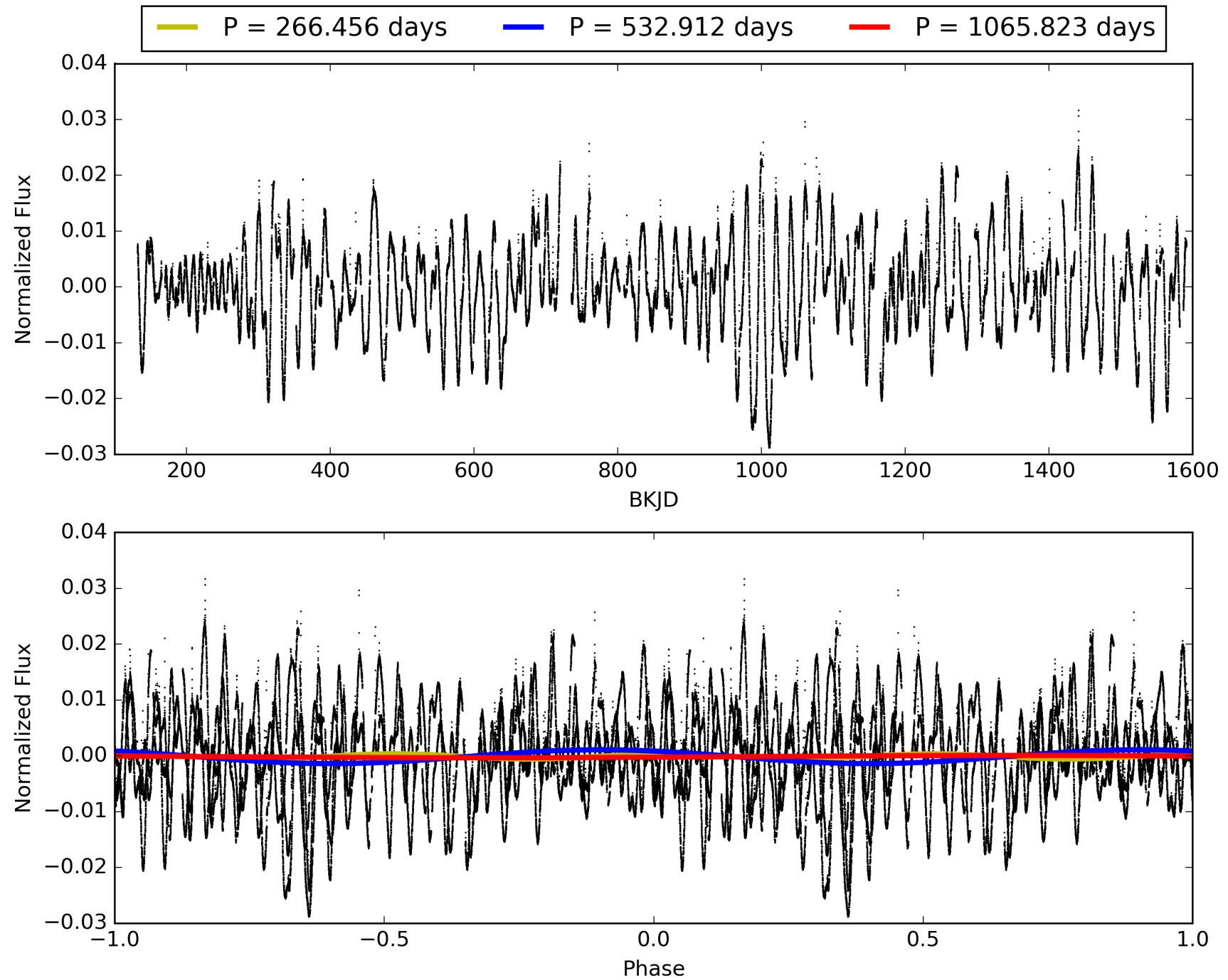
## KIC: 11515713    Candidate: 6 of 9    Period: 532.912 d



# TCE 011515713-06, PDC Light Curves



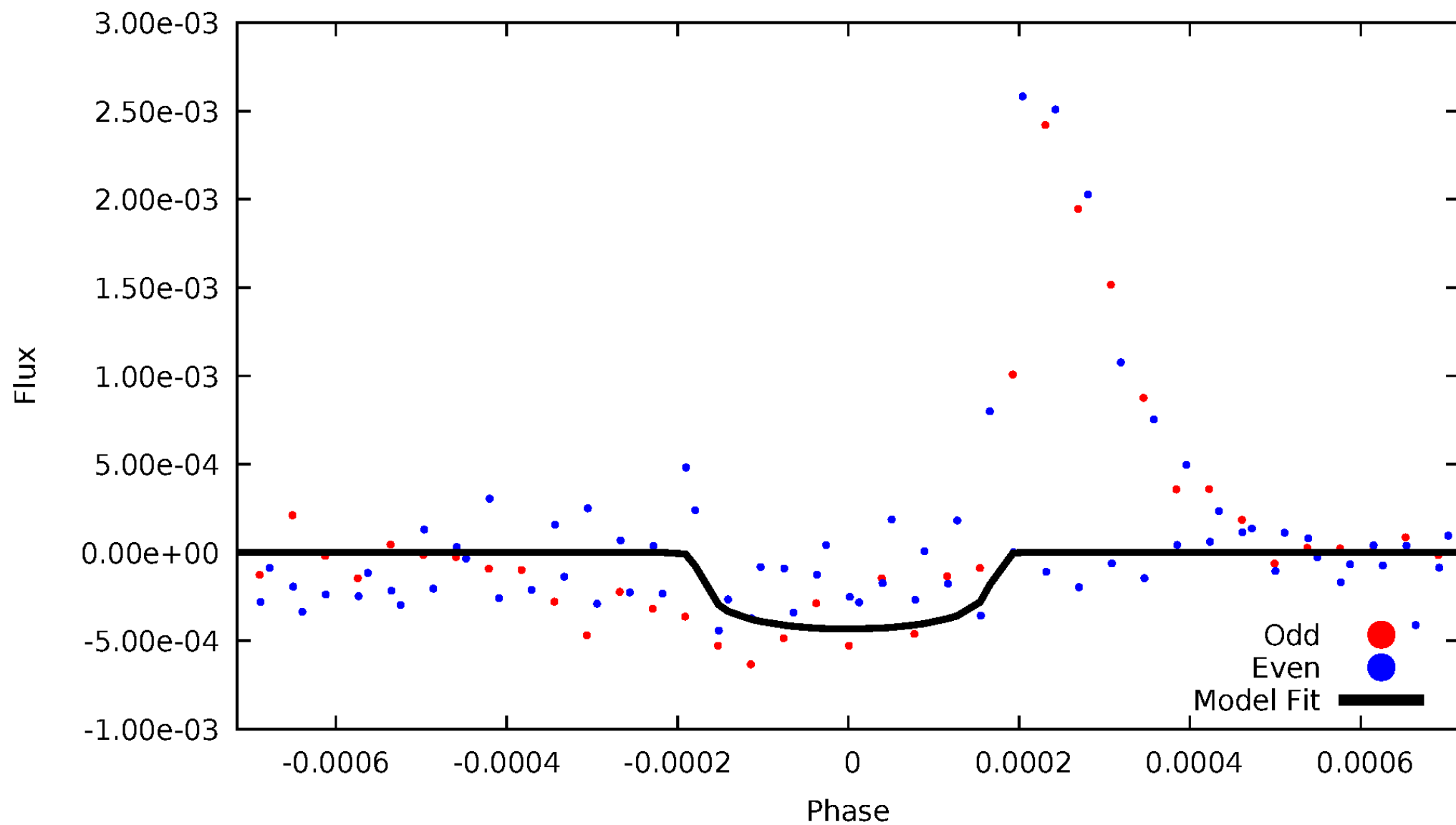
# TCE 011515713-06





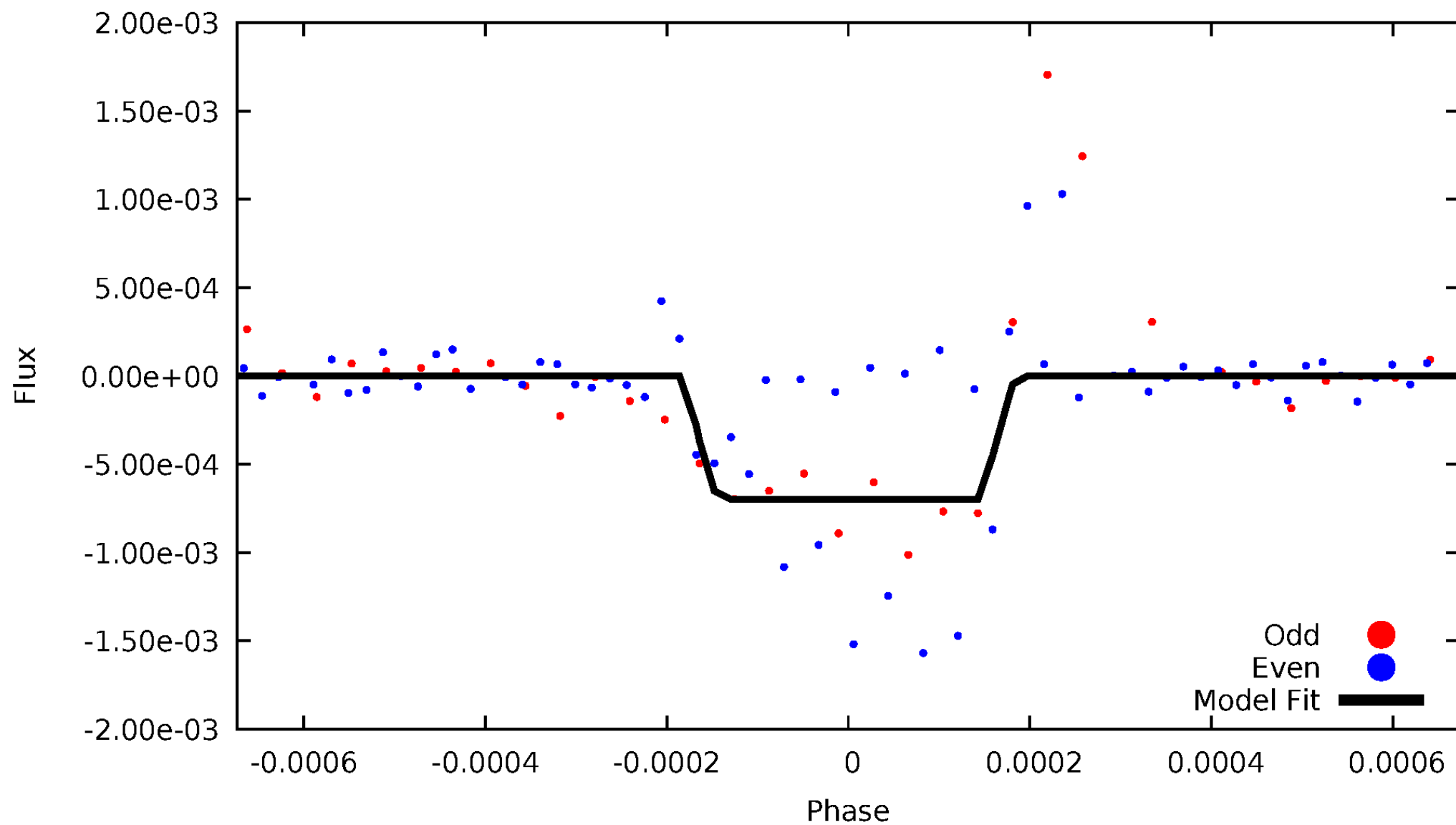
# DV Odd/Even

TCE 011515713-06



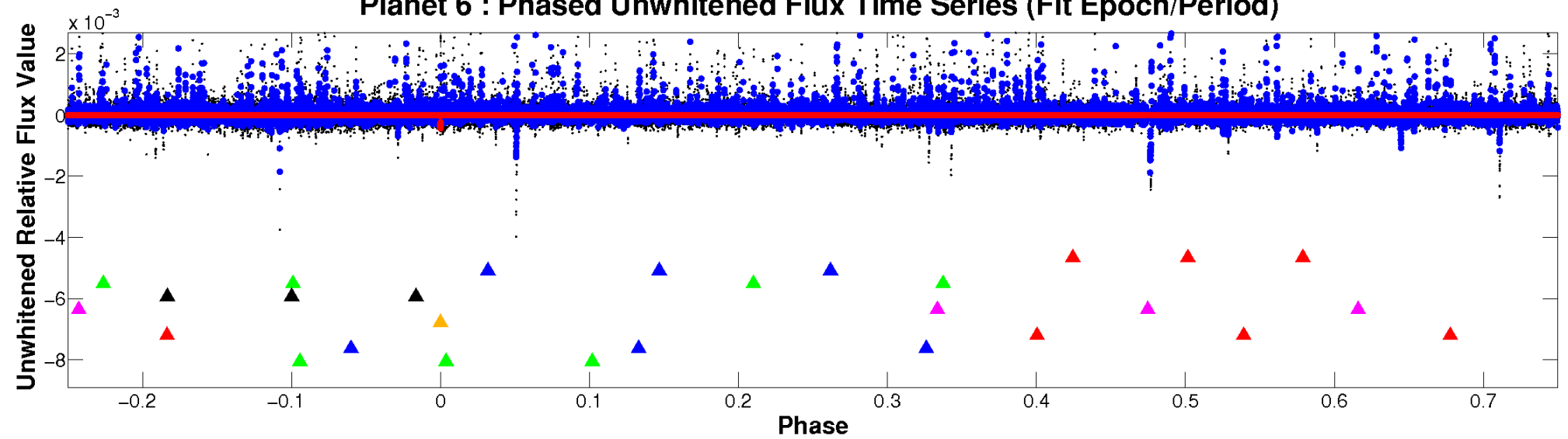
# ALT Odd/Even

TCE 011515713-06

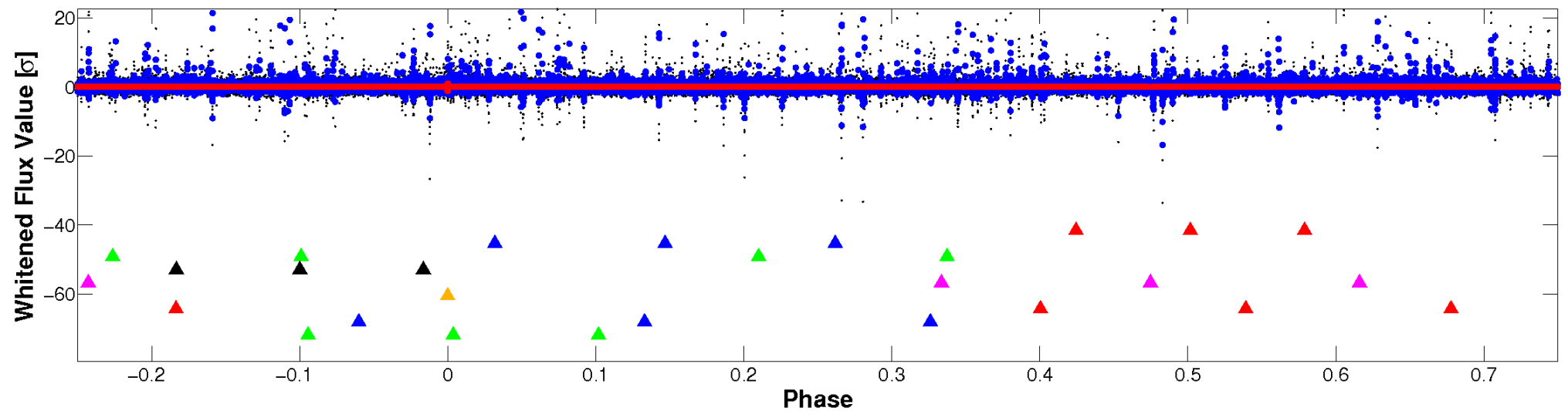


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

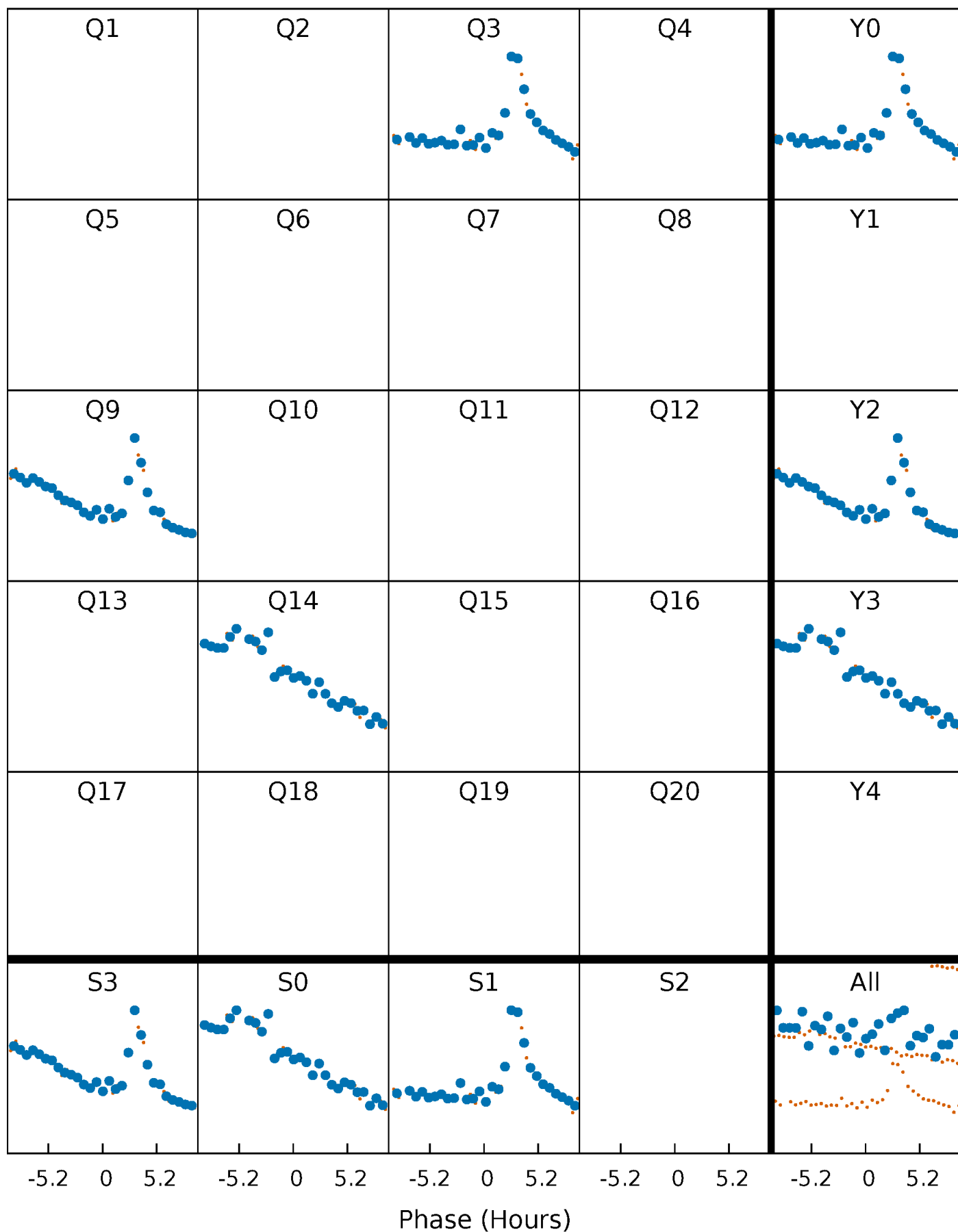


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



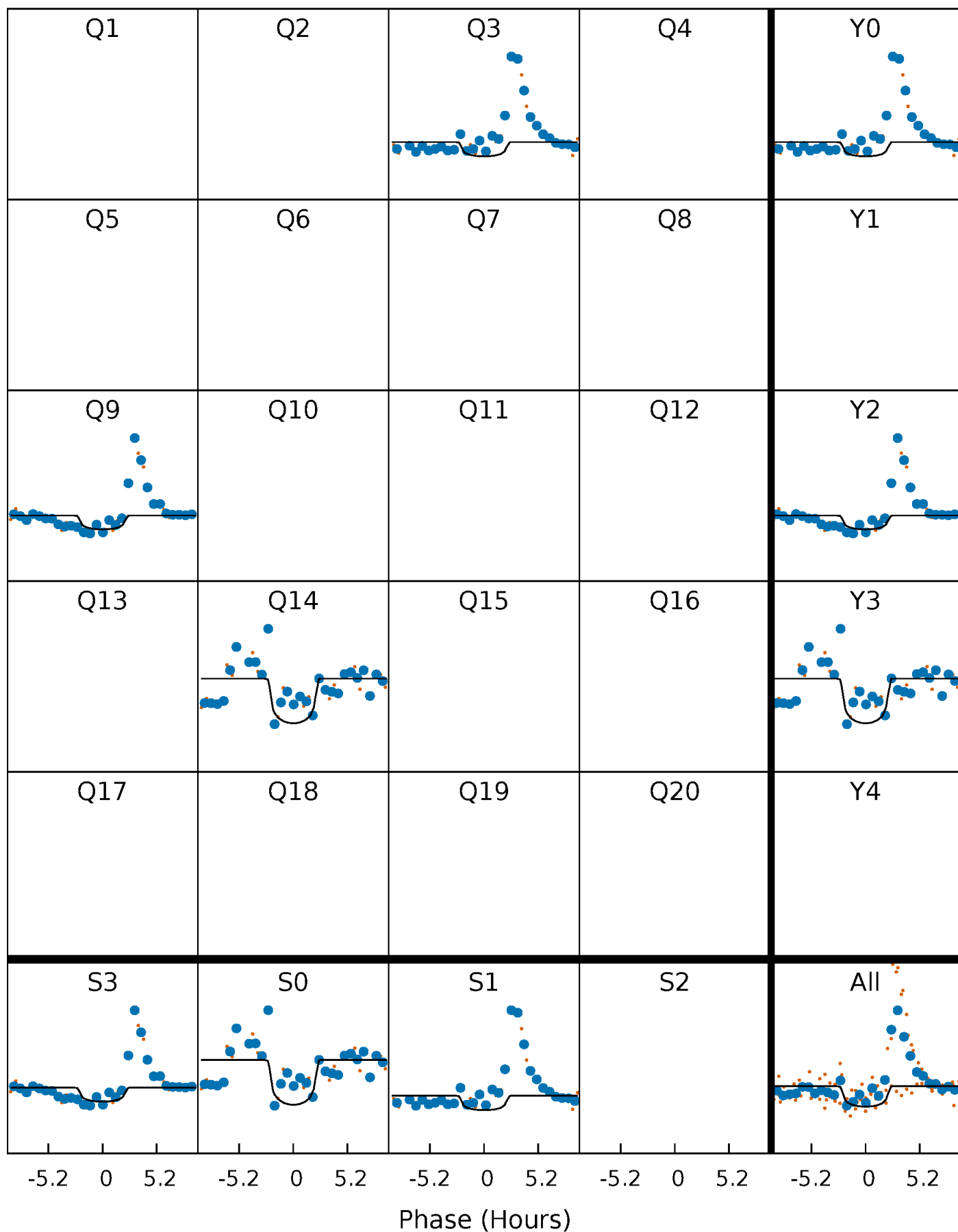
# PDC Quarter-Phased Transit Curves

TCE 011515713-06 P=532.911607 Days  $T_0=285.636933$  (BKJD)



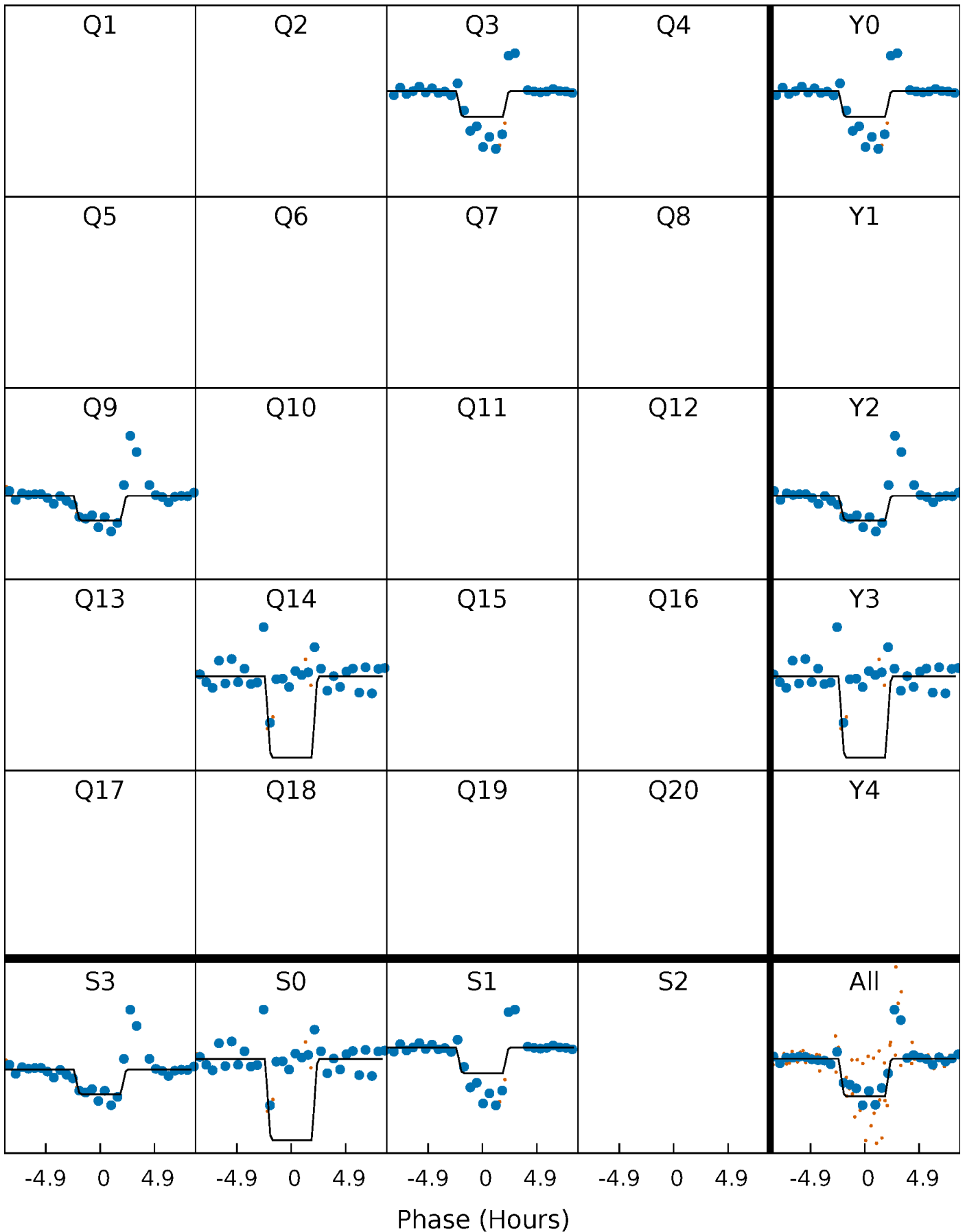
# DV Quarter-Phased Transit Curves

TCE 011515713-06 P=532.911607 Days  $T_0=285.636933$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

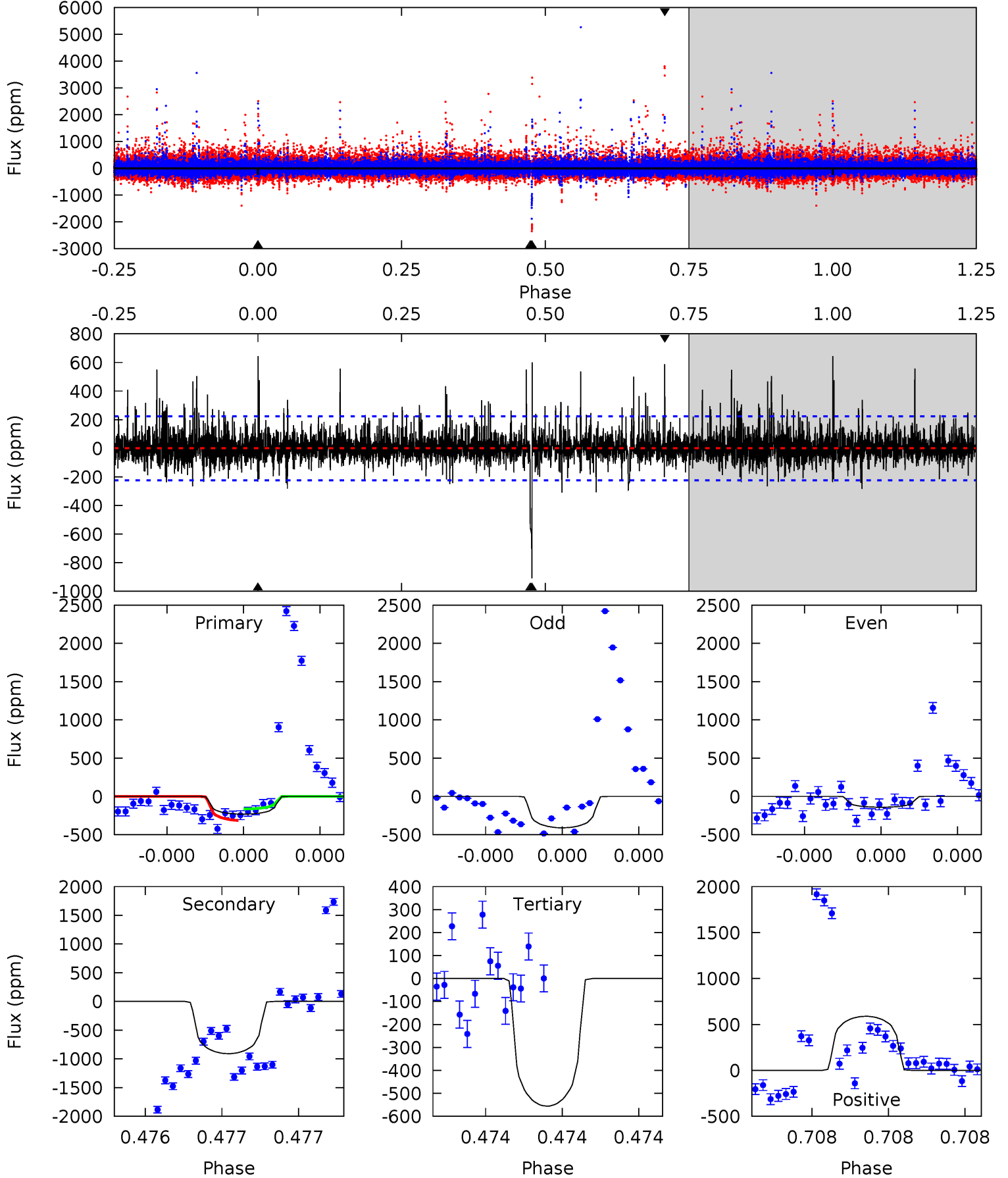
TCE 011515713-06 P=532.914056 Days  $T_0=285.640528$  (BKJD)



# DV Model-Shift Uniqueness Test

011515713-06, P = 532.911607 Days, E = 285.636933 Days

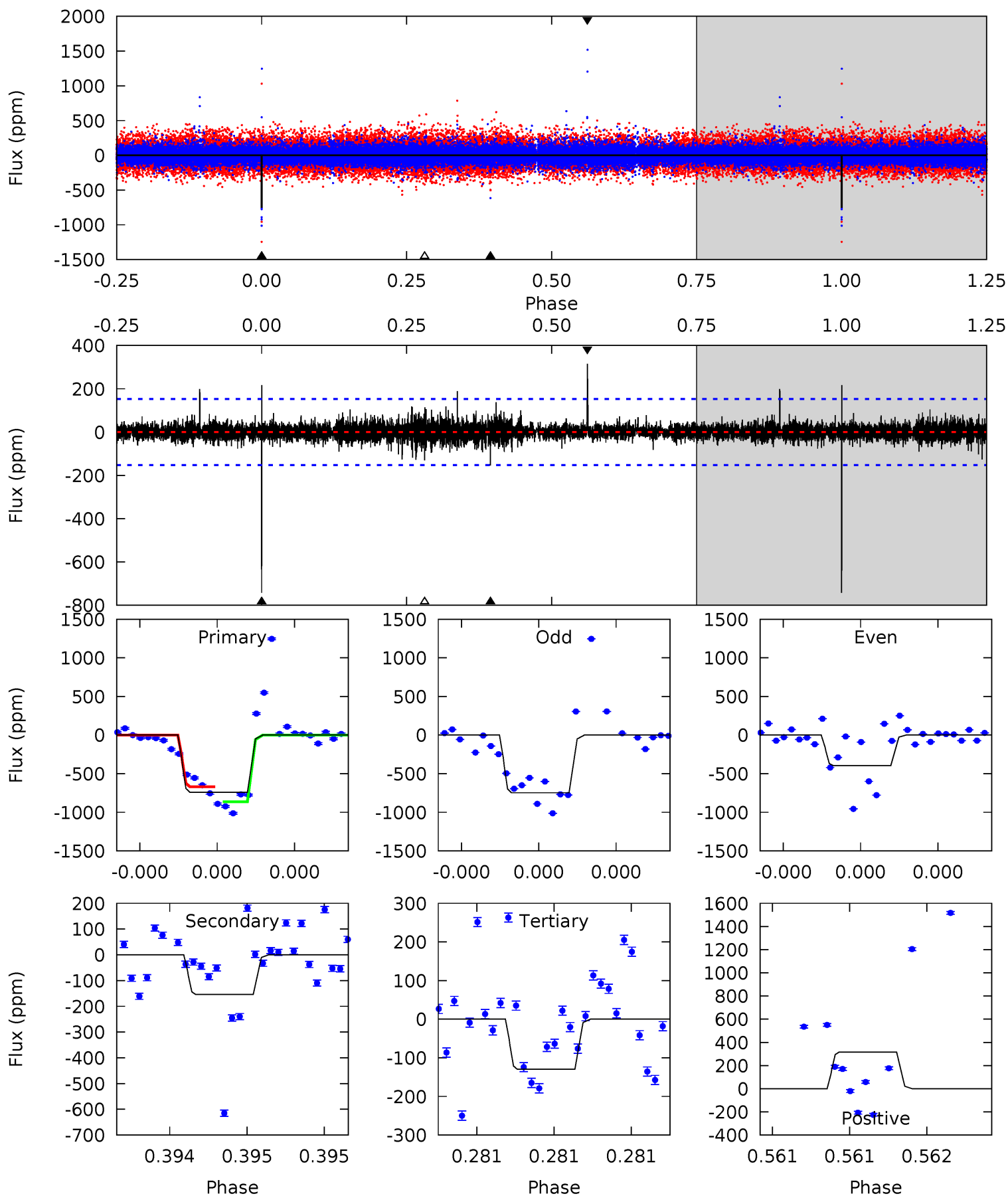
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.82	22.8	14.0	14.8	5.62	3.55	1.93	-8.14	-8.95	8.87	8.05	1.84	0.88	0.41	1.85



# Alt Model-Shift Uniqueness Test

011515713-06, P = 532.914056 Days, E = 285.640528 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
27.4	5.68	4.79	11.6	5.63	3.56	0.82	22.6	15.7	0.89	-5.97	7.50	0.87	0.30	3.59





### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-909 \pm 40$	$8.67^{+9.42}_{-5.91}$	$538^{+46}_{-97}$	$6276^{+6462}_{-1500}$	$15598^{+144829}_{-11687}$
Alt.	$-154 \pm 27$	$10.02^{+9.01}_{-6.29}$	$536^{+48}_{-99}$	$4033^{+1715}_{-664}$	$1985^{+11380}_{-1442}$

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

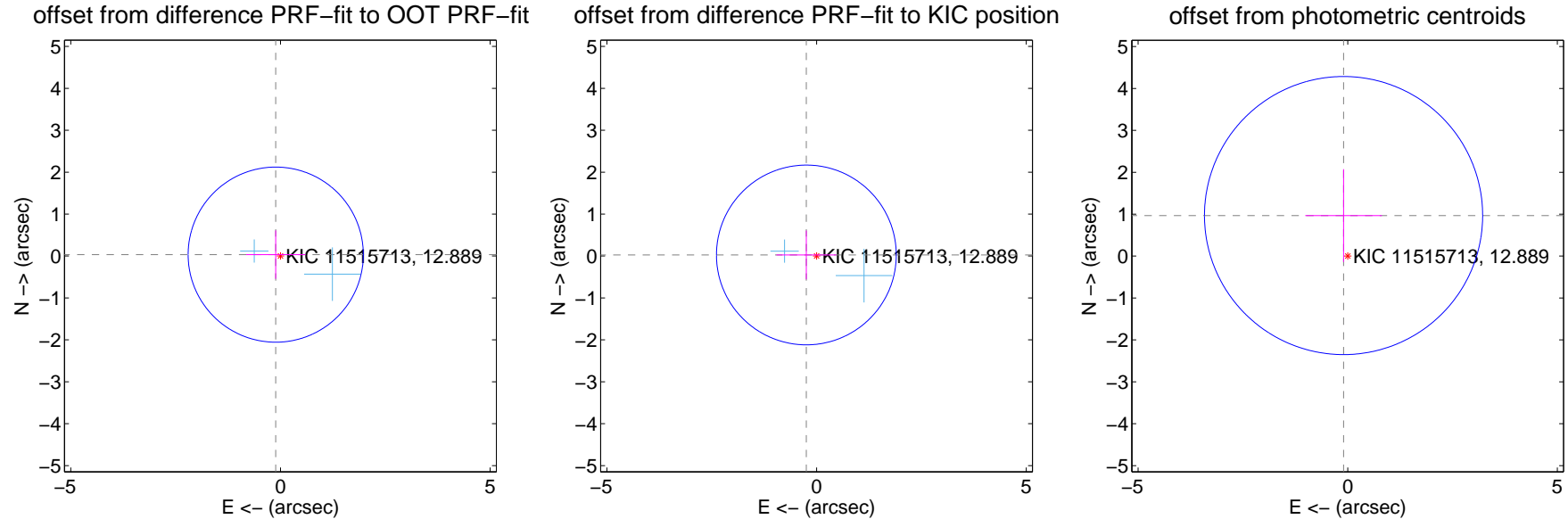
## DV Centroid Data

Supplemental centroid analysis for 011515713-06. Kepler magnitude: 12.89. Transit SNR 6.15

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

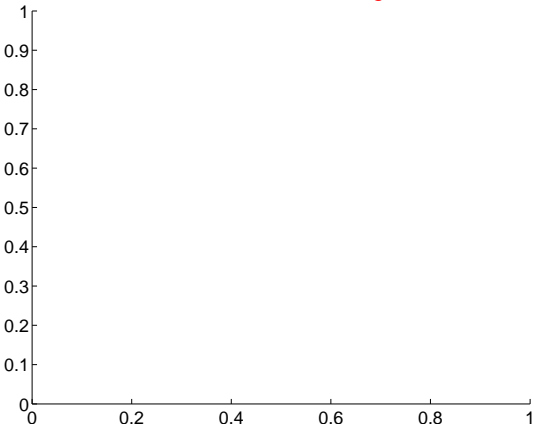
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.117 \pm 0.696$	0.17	$0.113 \pm 0.705$	$0.033 \pm 0.577$
PRF-fit source offset from KIC position	$0.245 \pm 0.715$	0.34	$0.244 \pm 0.716$	$0.025 \pm 0.582$
photometric centroid source offset	$0.97 \pm 1.11$	0.88	$0.10 \pm 0.91$	$0.97 \pm 1.11$



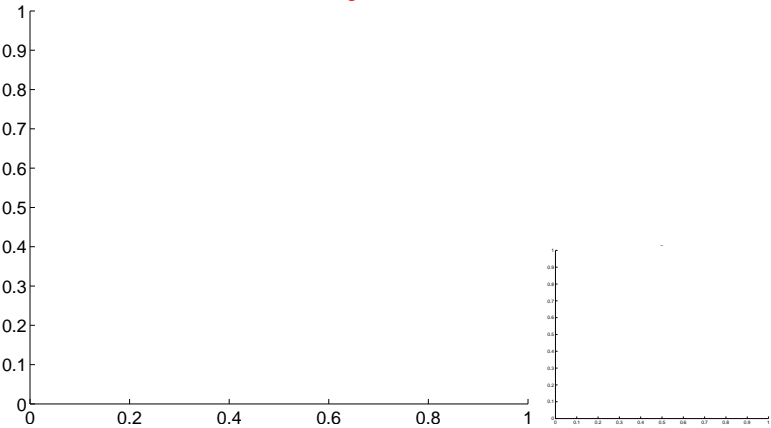
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

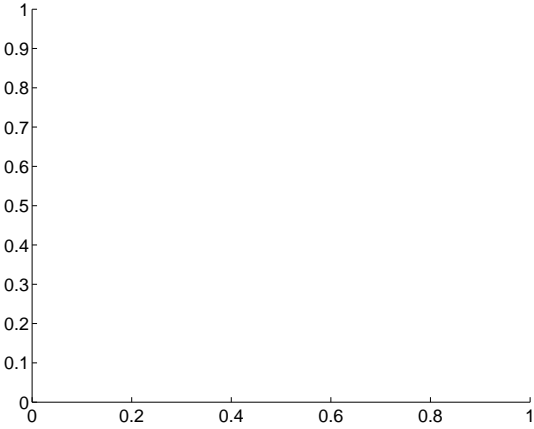
Q1 no difference image



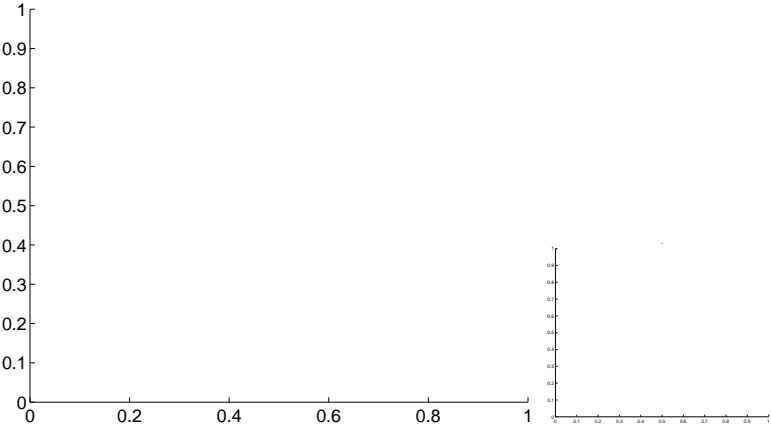
Q1 no OOT image



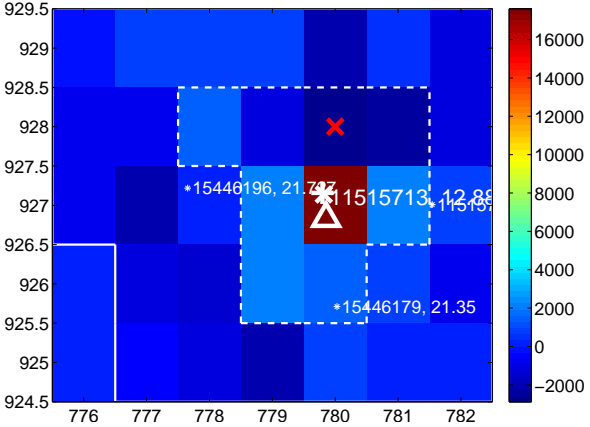
Q2 no difference image



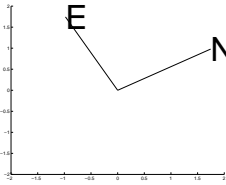
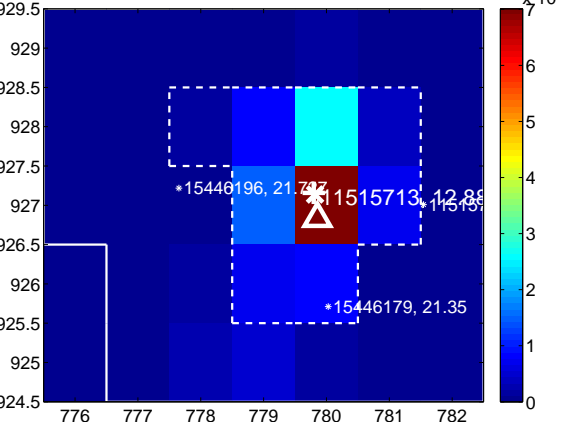
Q2 no OOT image



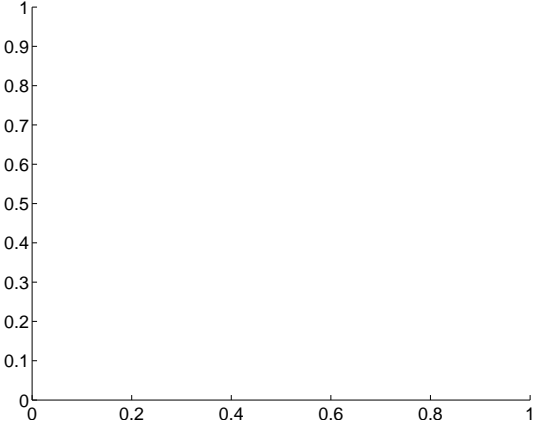
Q3 difference image



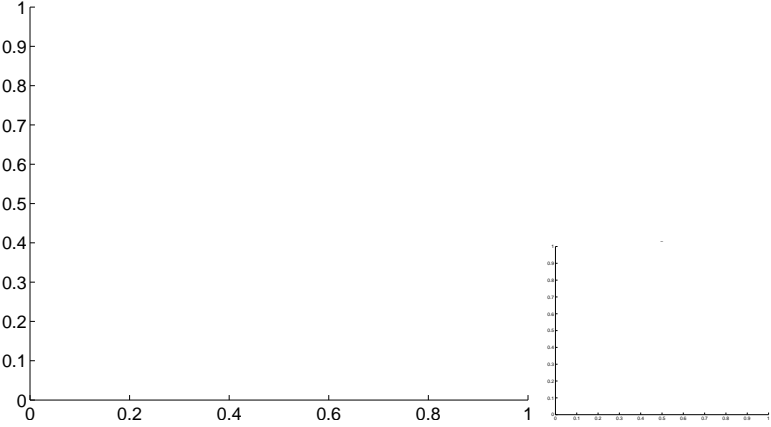
Q3 OOT image



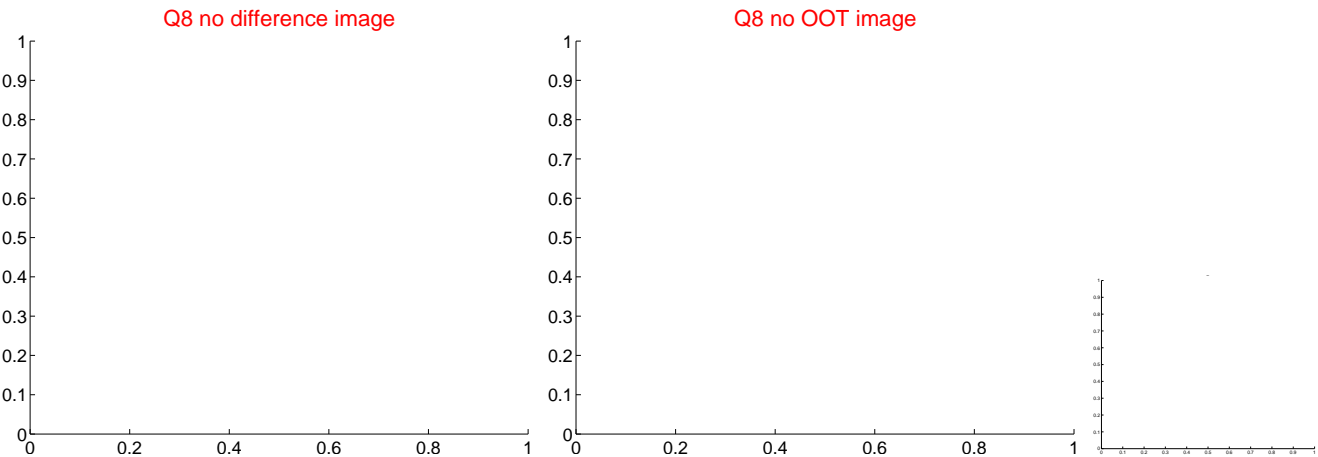
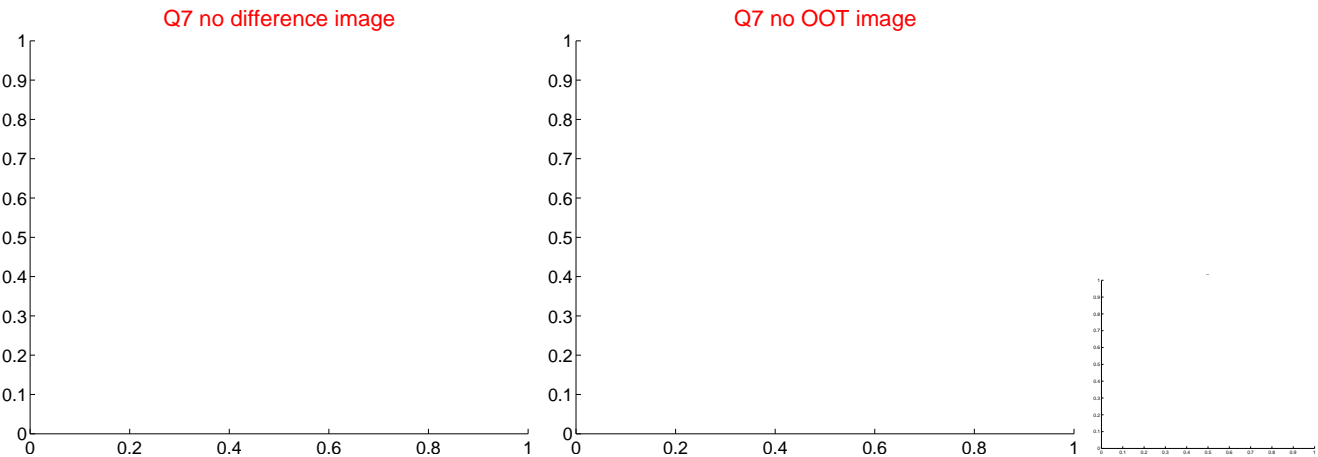
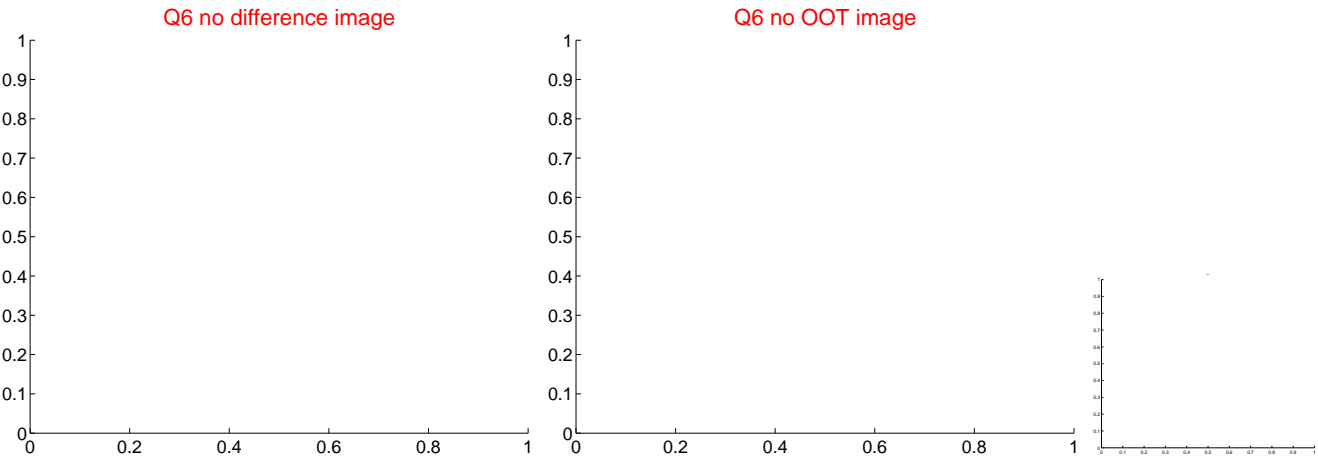
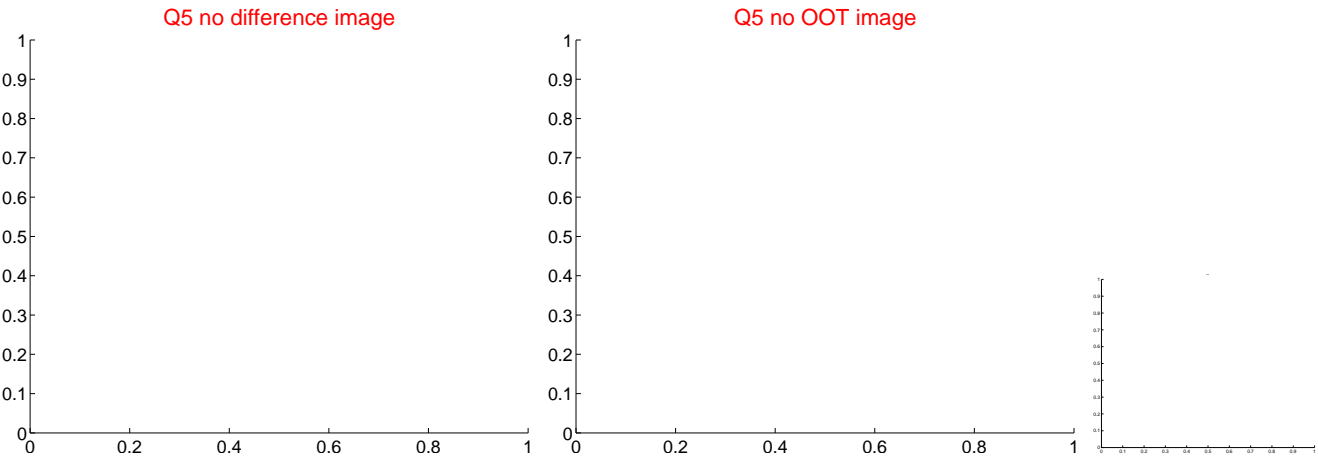
Q4 no difference image



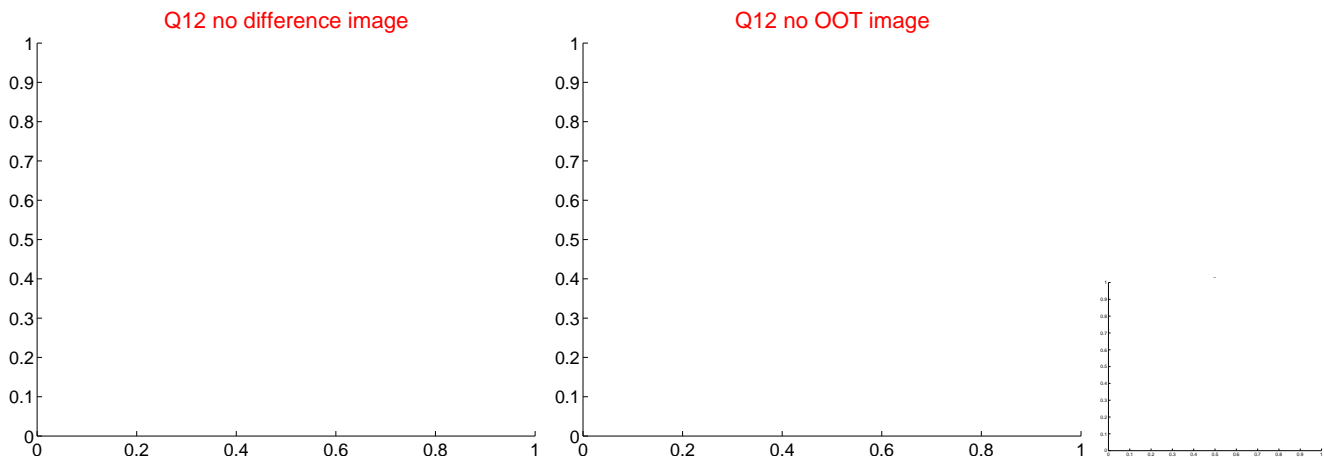
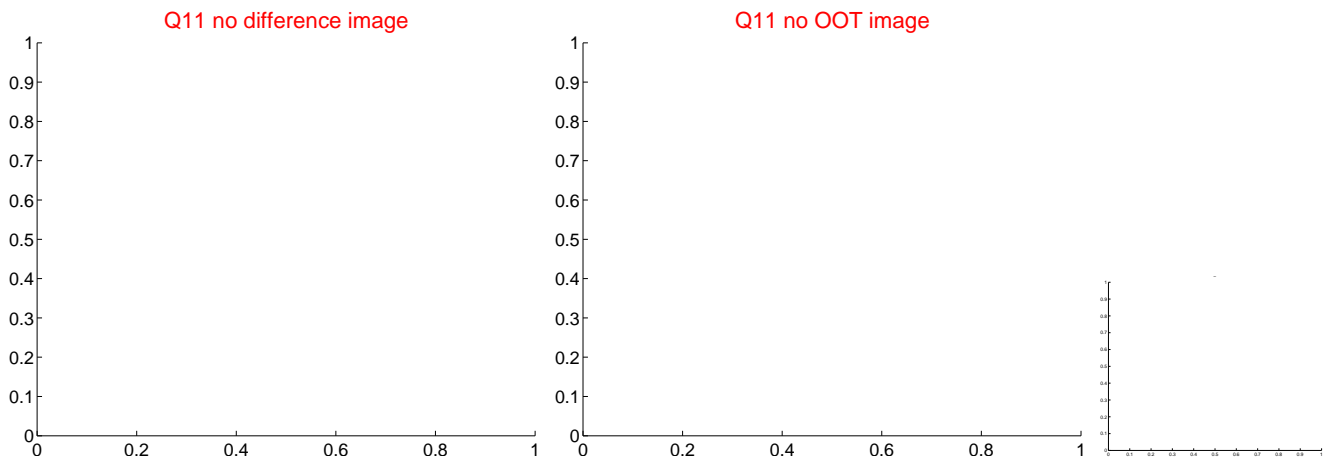
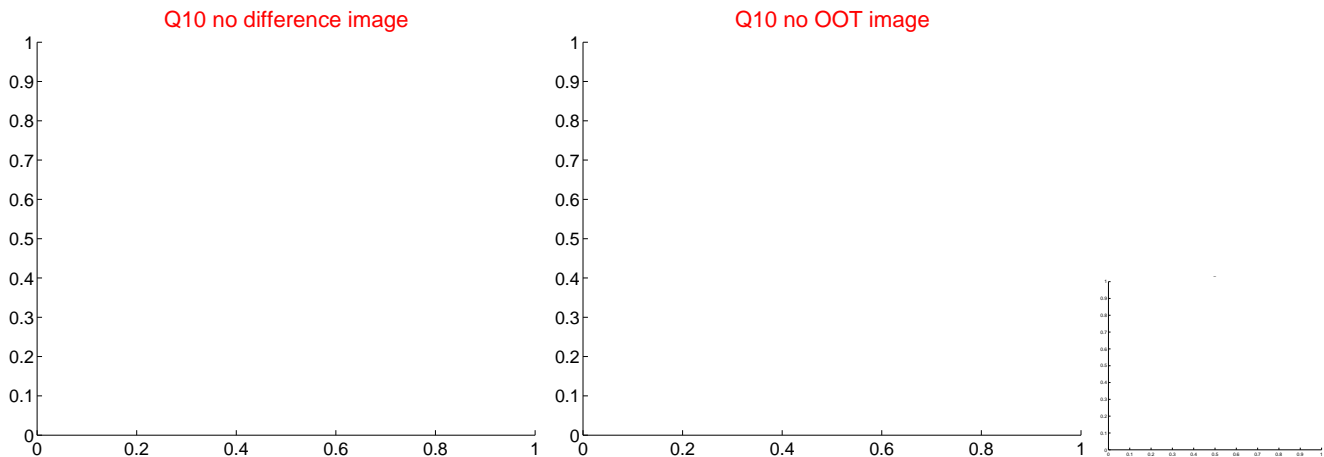
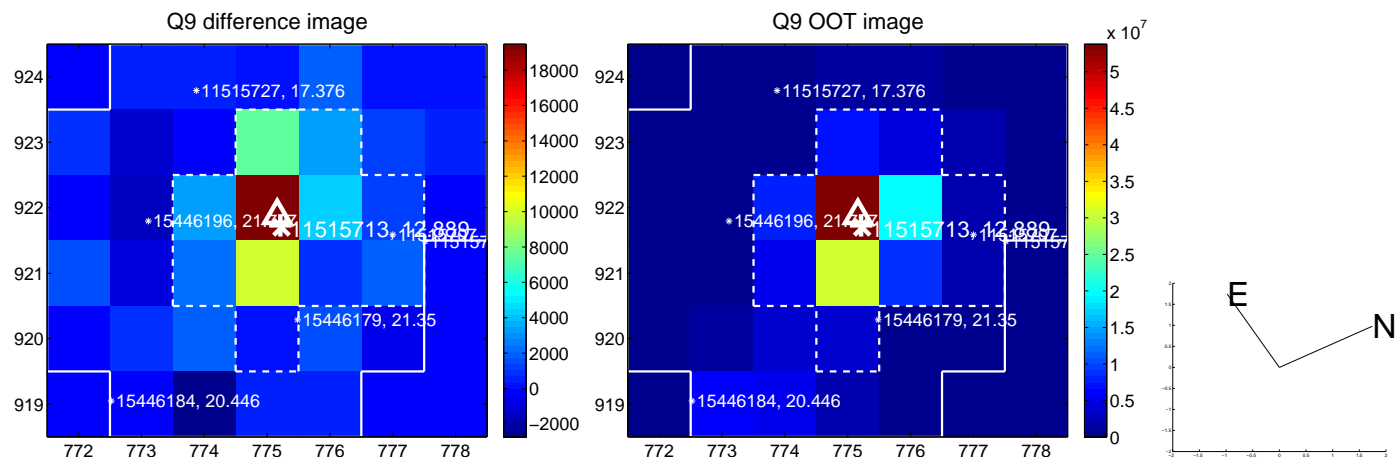
Q4 no OOT image



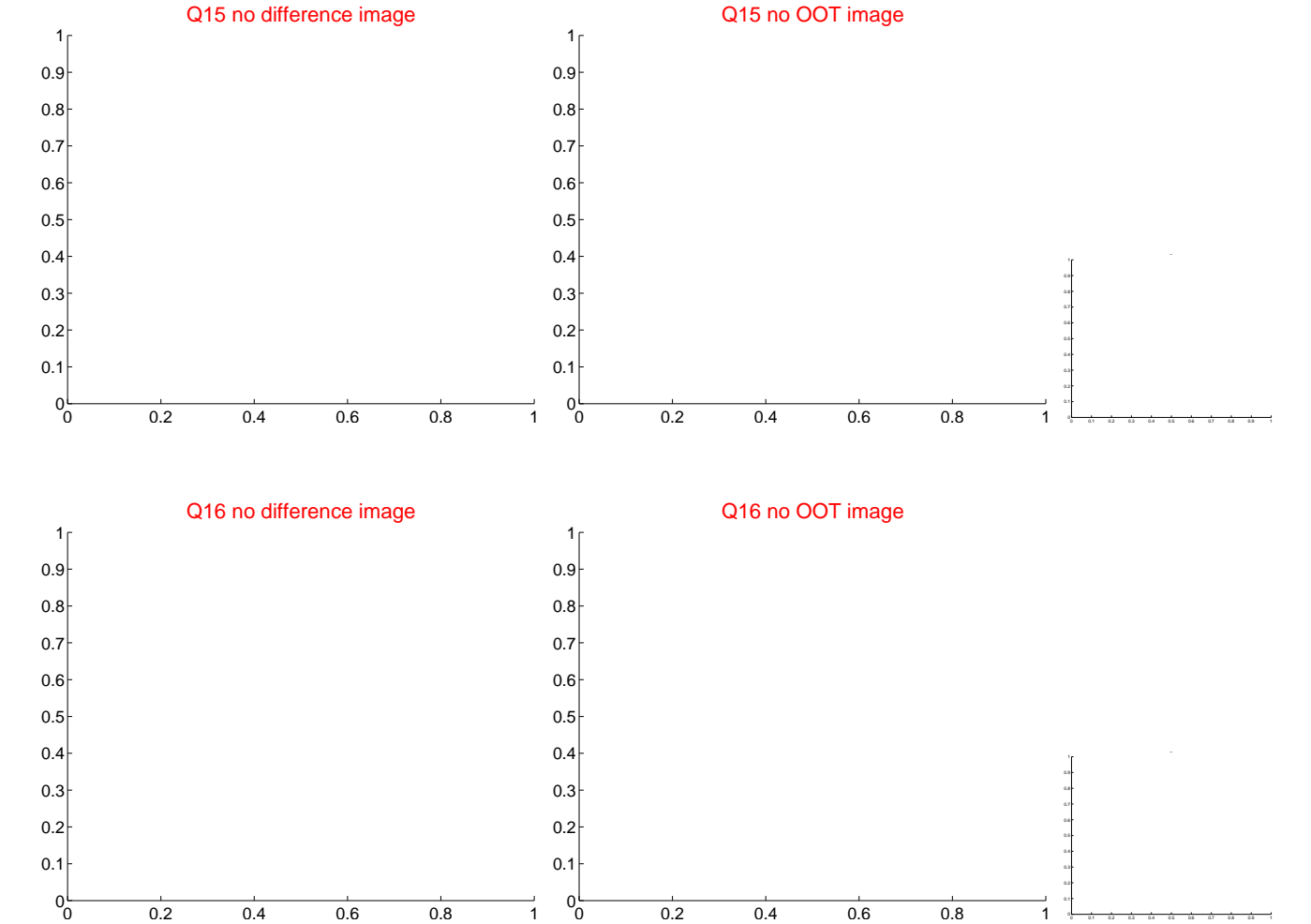
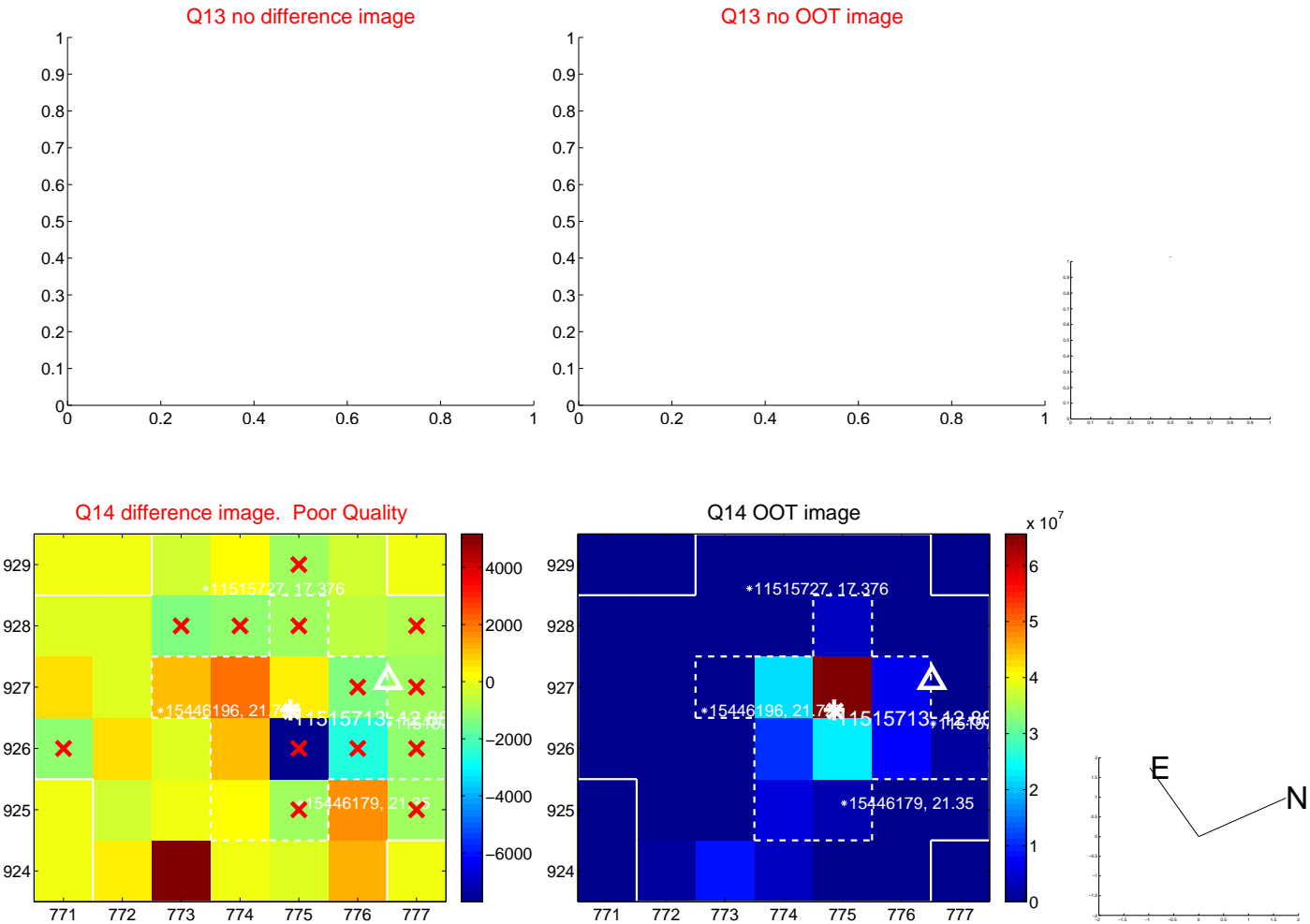
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



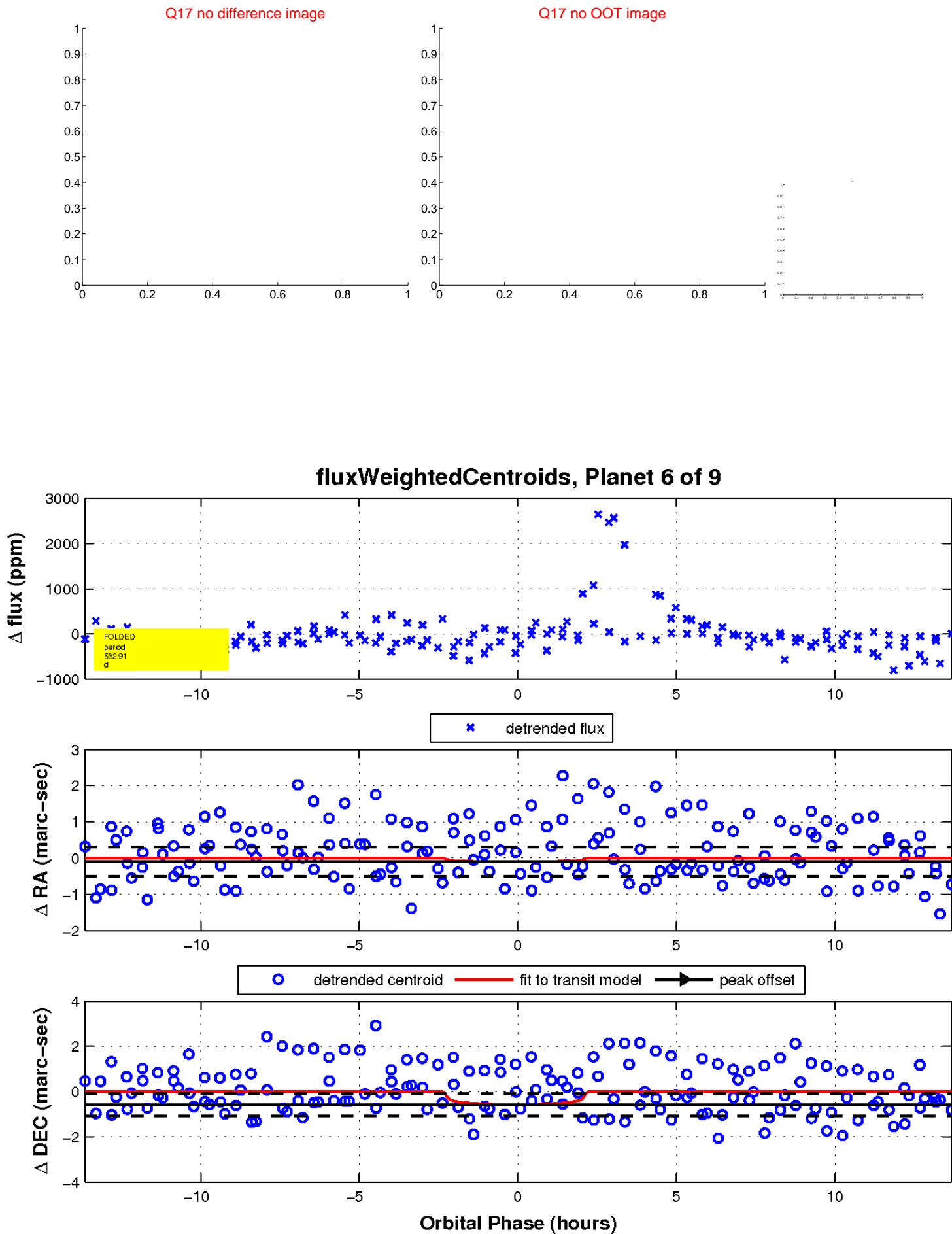
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

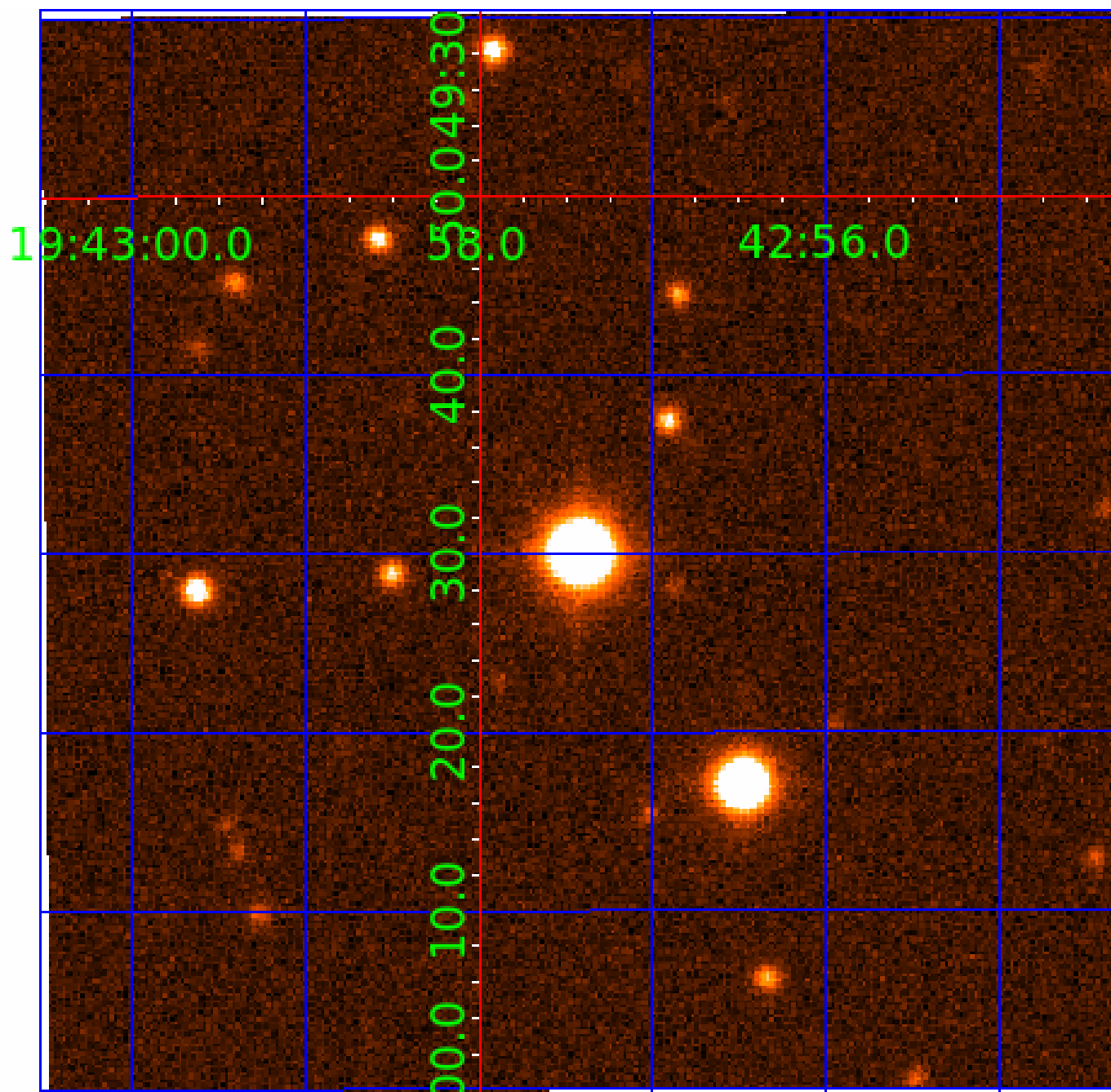


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

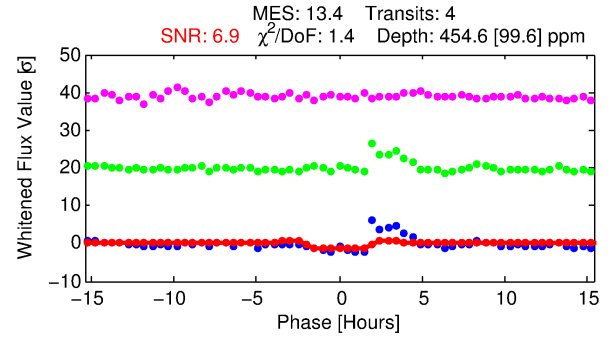
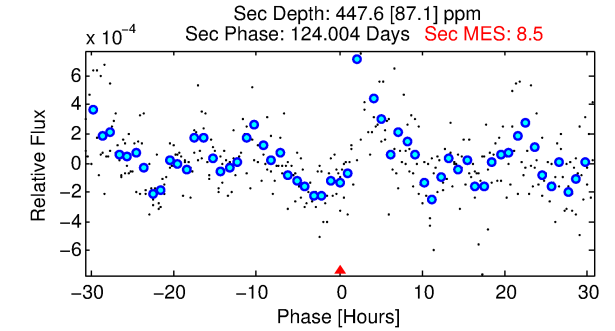
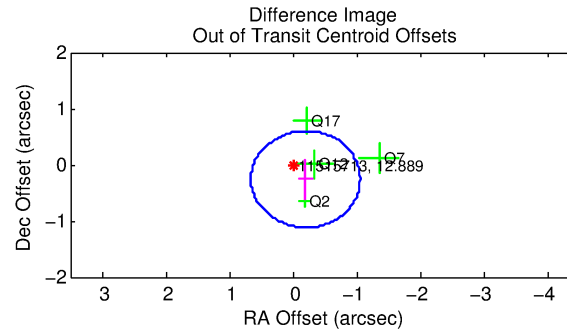
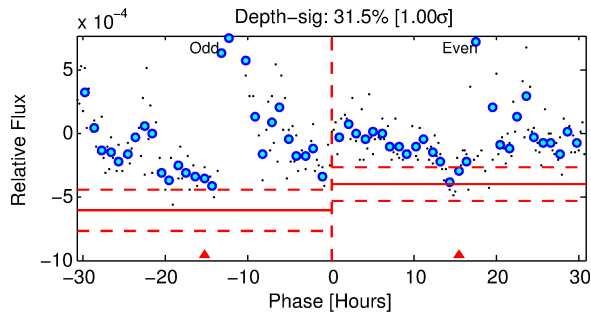
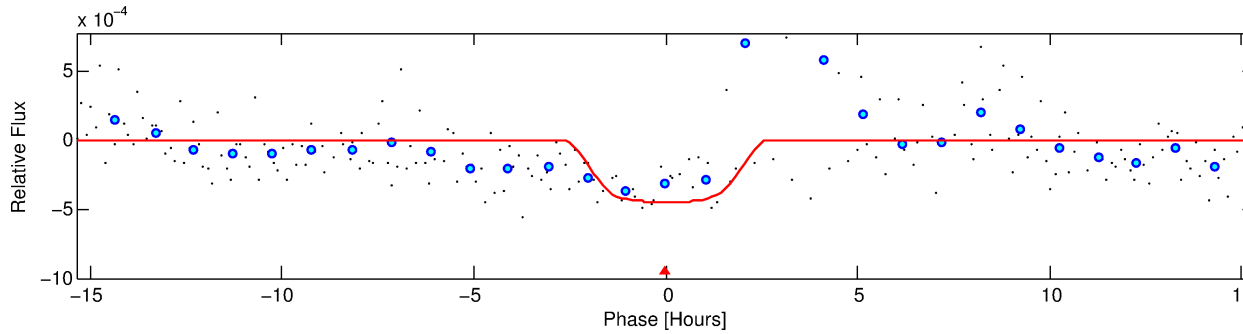
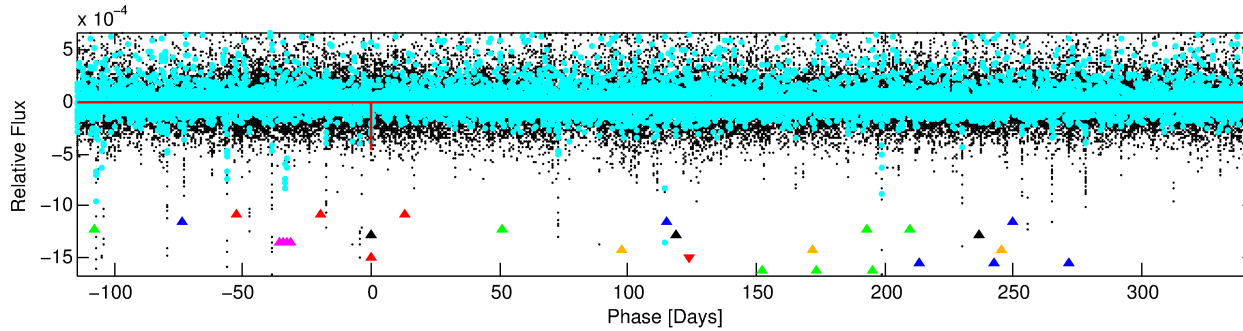
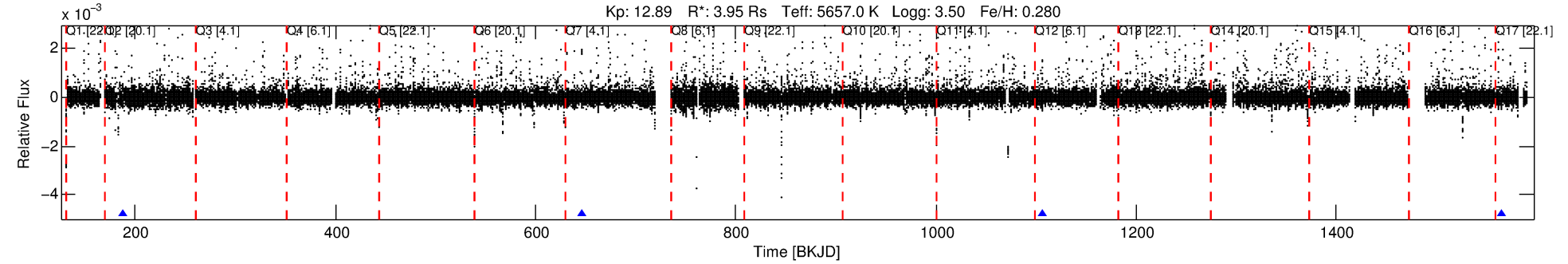
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011515713-07

No Significant Match Found

# DV One-Page Summary

KIC: 11515713 Candidate: 7 of 9 Period: 459.014 d



## DV Fit Results:

Period = 459.01367 [0.00825] d  
Epoch = 187.8306 [0.0174] BKJD  
Rp/R\* = 0.0253 [0.0036]  
a/R\* = 256.40 [82.33]  
b = 0.95 [0.03]  
Seff = 7.15 [9.44]  
Teq = 417 [138] K  
Rp = 10.89 [7.90] Re  
a = 1.4139 [1.0959] AU  
Ag = 4151.43 [5643.48] [0.74σ]  
**Teffp = 5175 [472] K [9.68σ]**

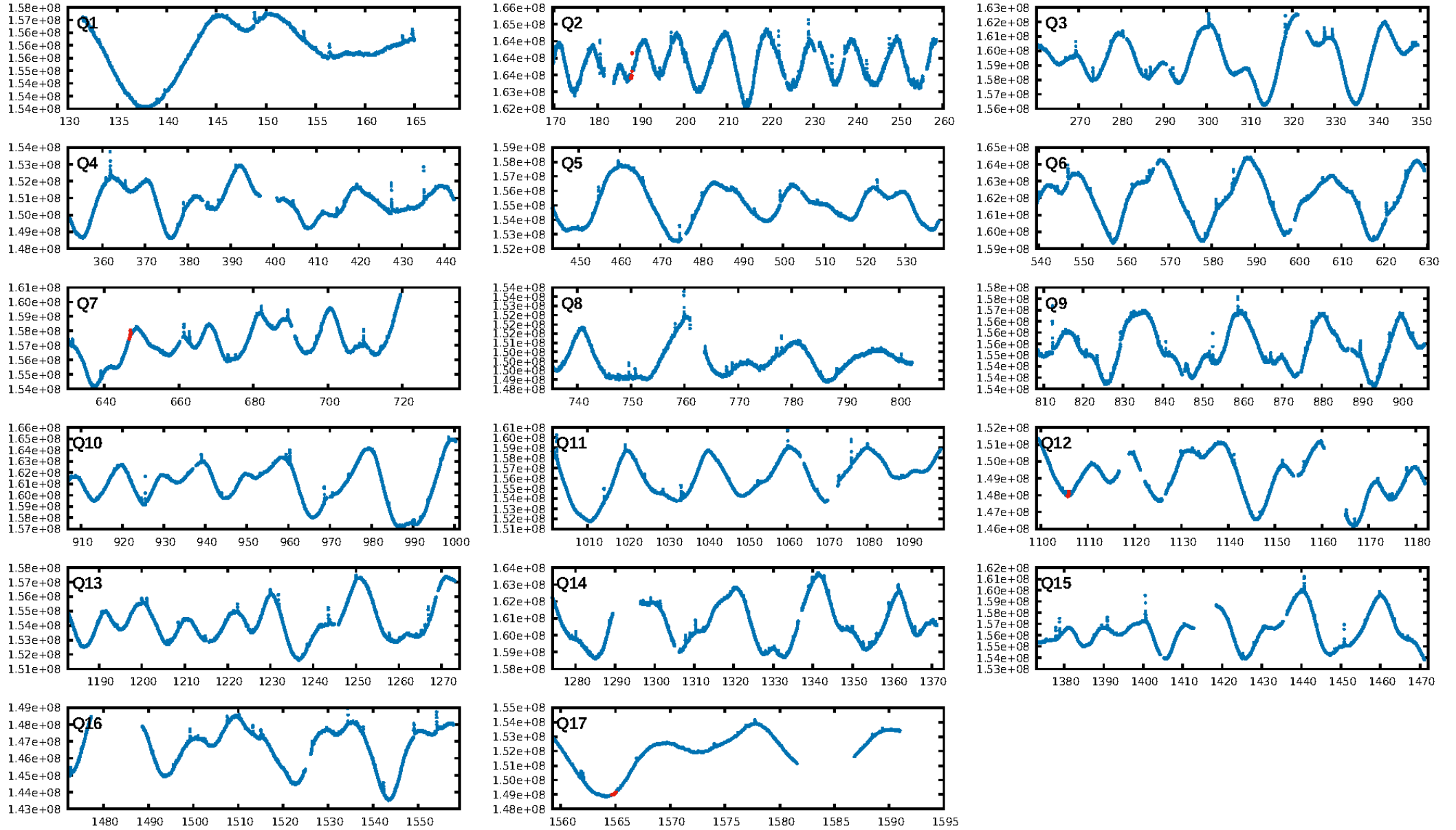
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.26σ]  
LongPeriod-sig: 100.0% [50.09σ]  
ModelChiSquare2-sig: 9.9%  
ModelChiSquareGof-sig: 95.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: -1.184**  
Centroid-sig: 13.7%  
Centroid-so: 1.406 arcsec [1.51σ]  
OotOffset-rm: 0.329 arcsec [1.15σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-rm: 0.301 arcsec [0.92σ]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 0.75 [3/4]

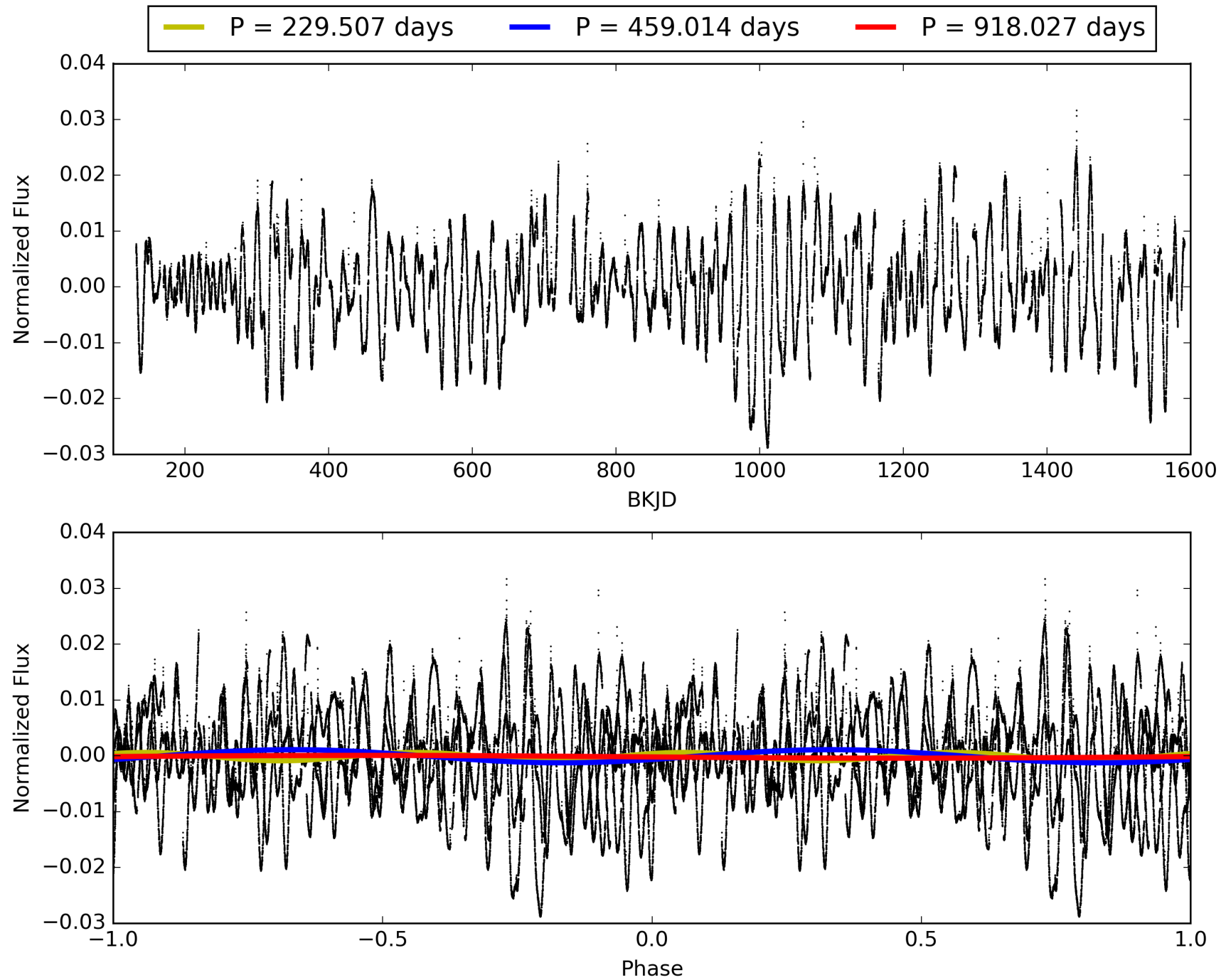
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:05:26 Z

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

# TCE 011515713-07, PDC Light Curves

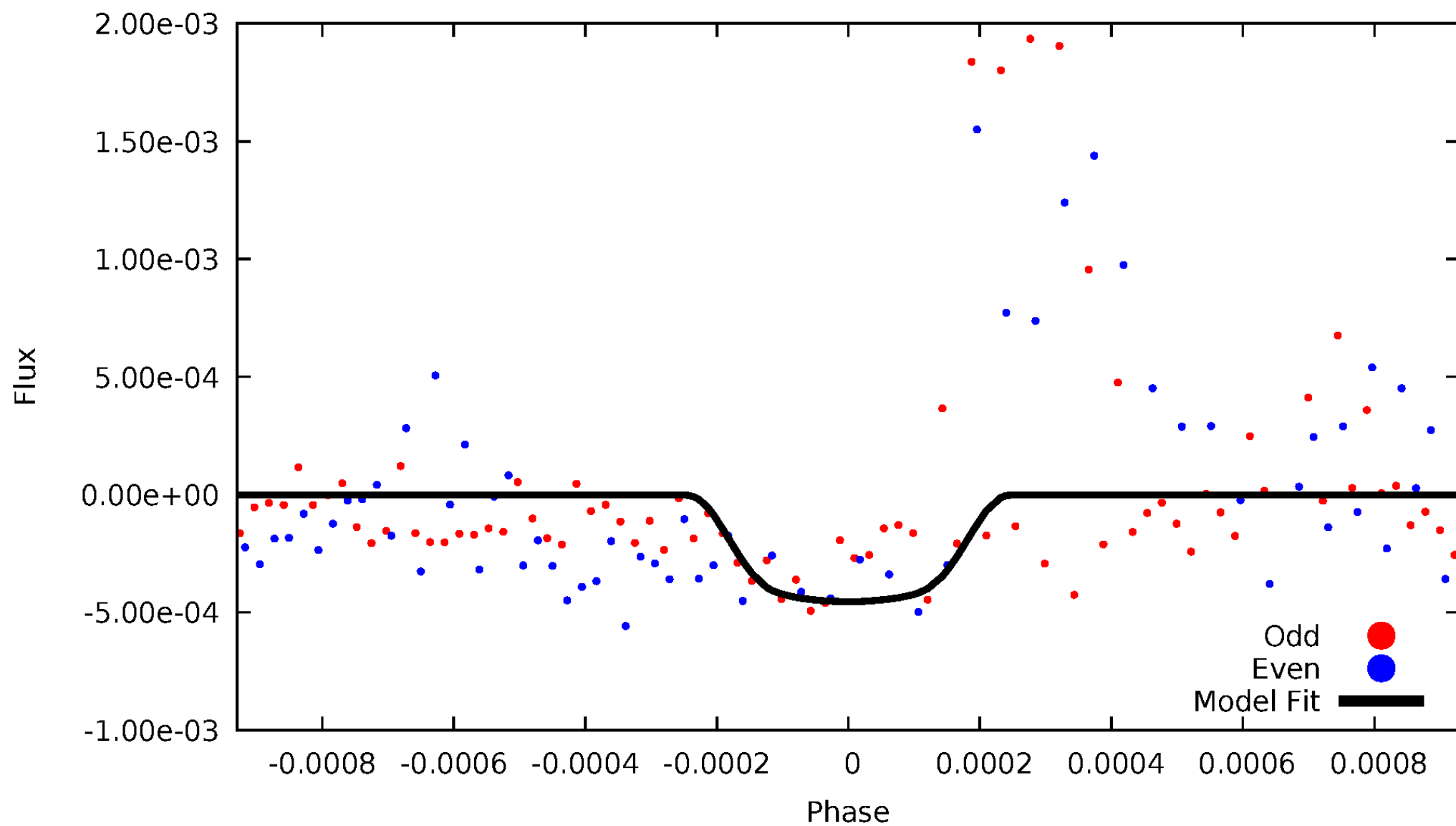


# TCE 011515713-07



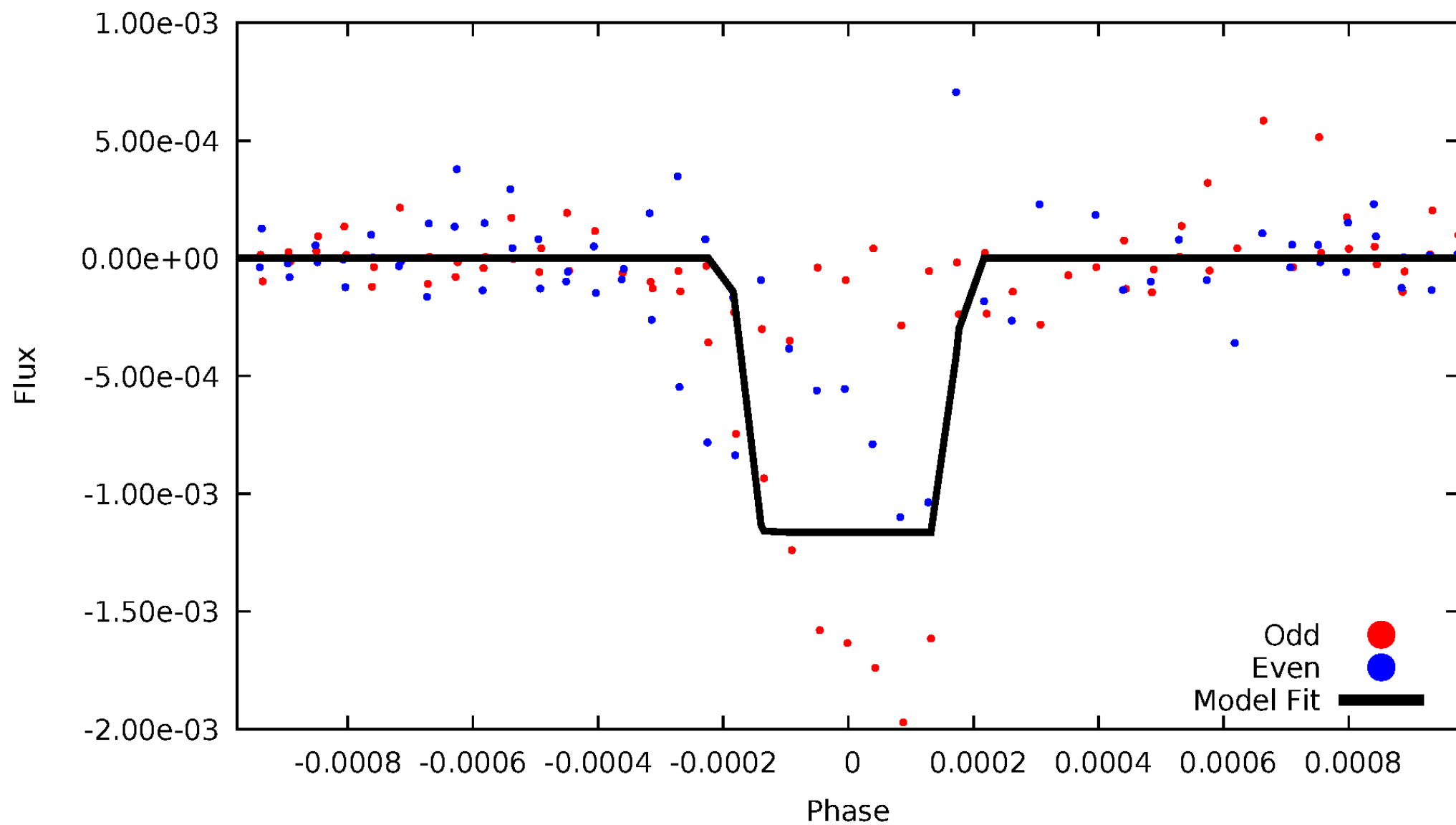
# DV Odd/Even

TCE 011515713-07



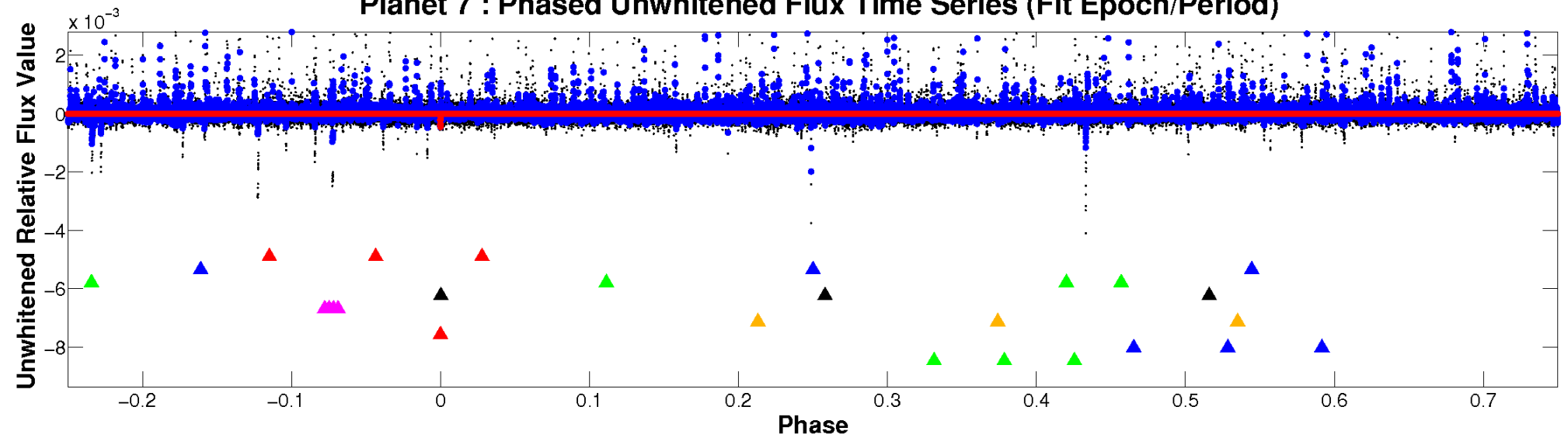
# ALT Odd/Even

TCE 011515713-07

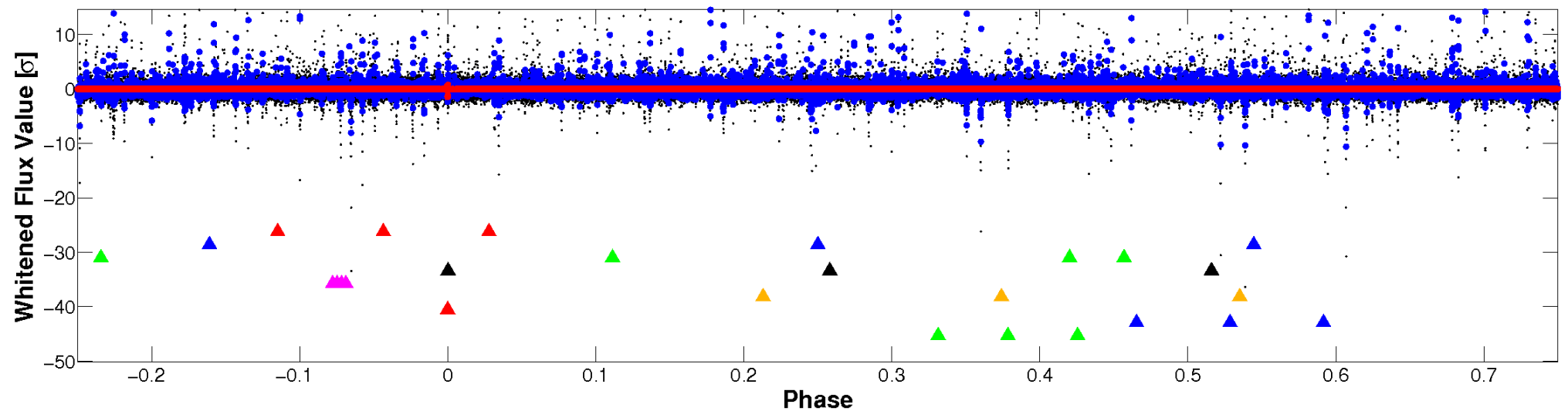


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

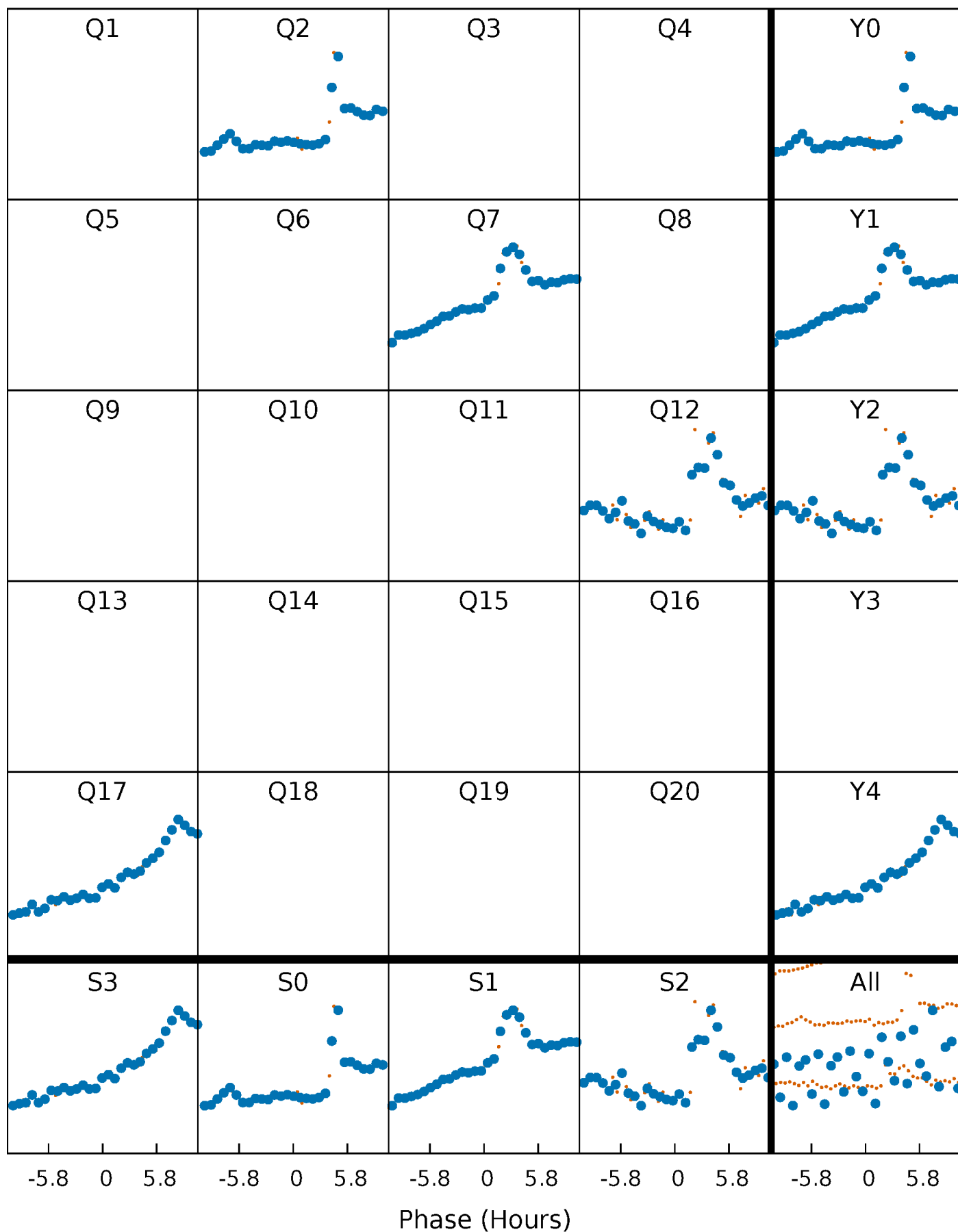


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

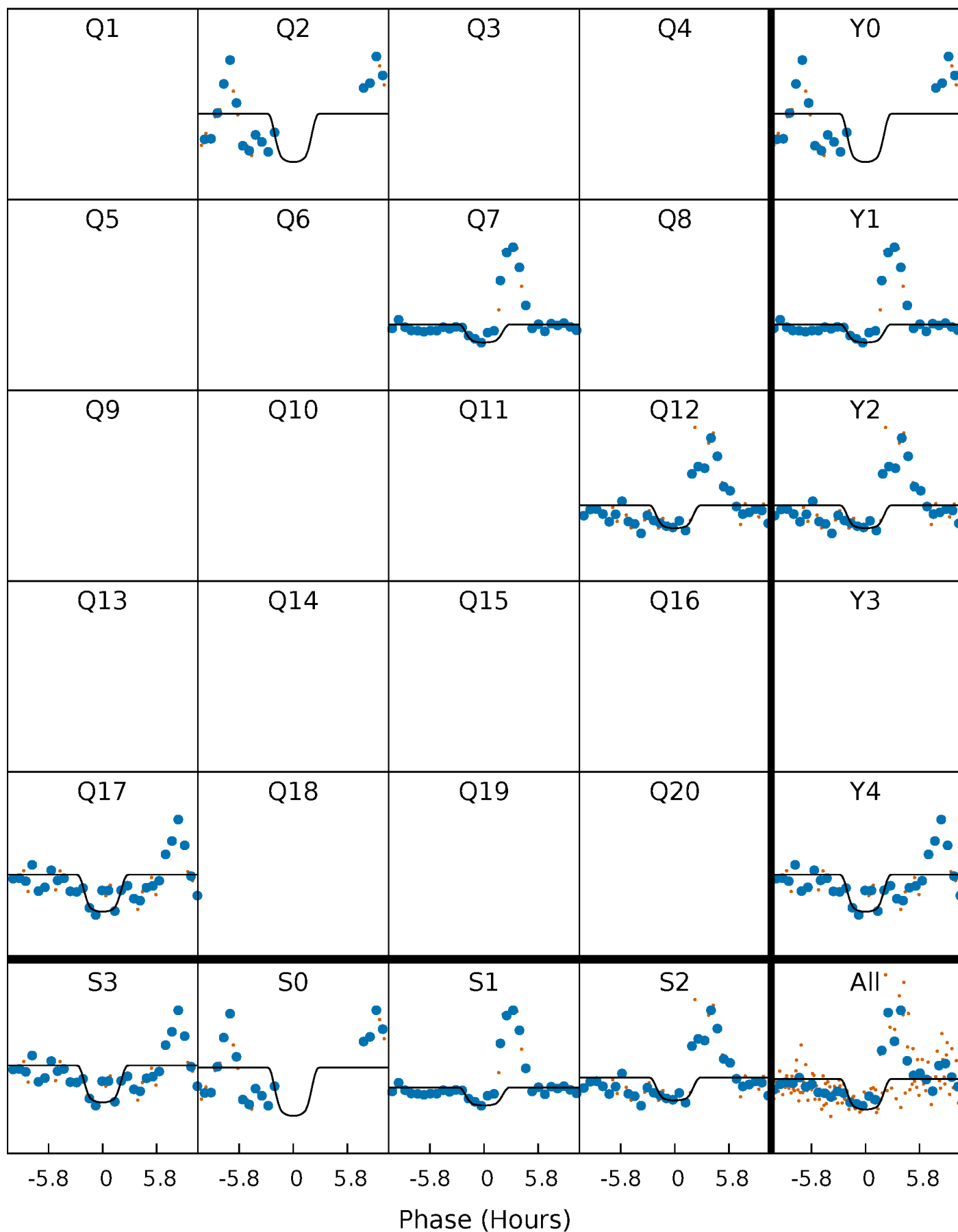
TCE 011515713-07 P=459.013671 Days  $T_0=187.830603$  (BKJD)





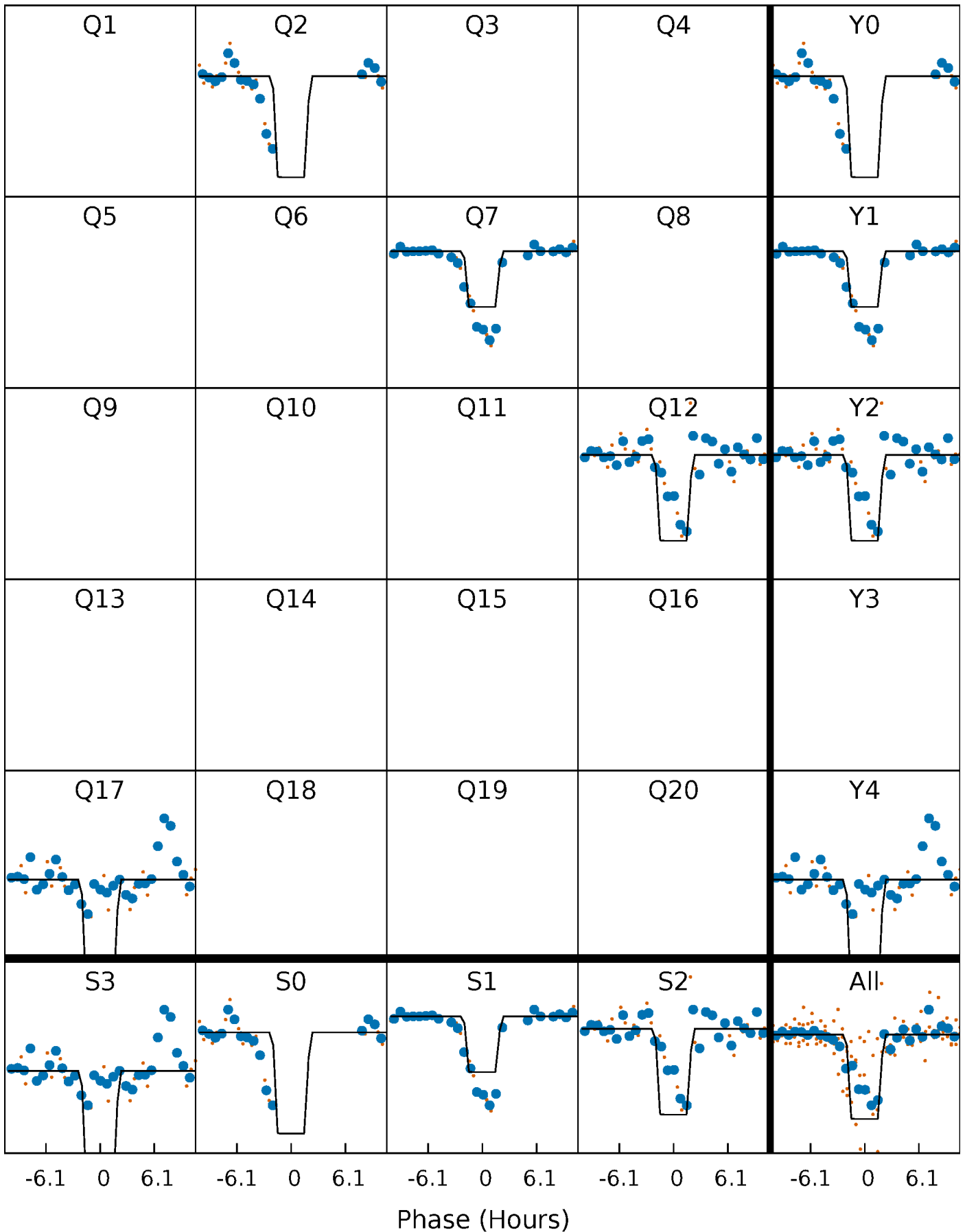
# DV Quarter-Phased Transit Curves

TCE 011515713-07 P=459.013671 Days  $T_0=187.830603$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

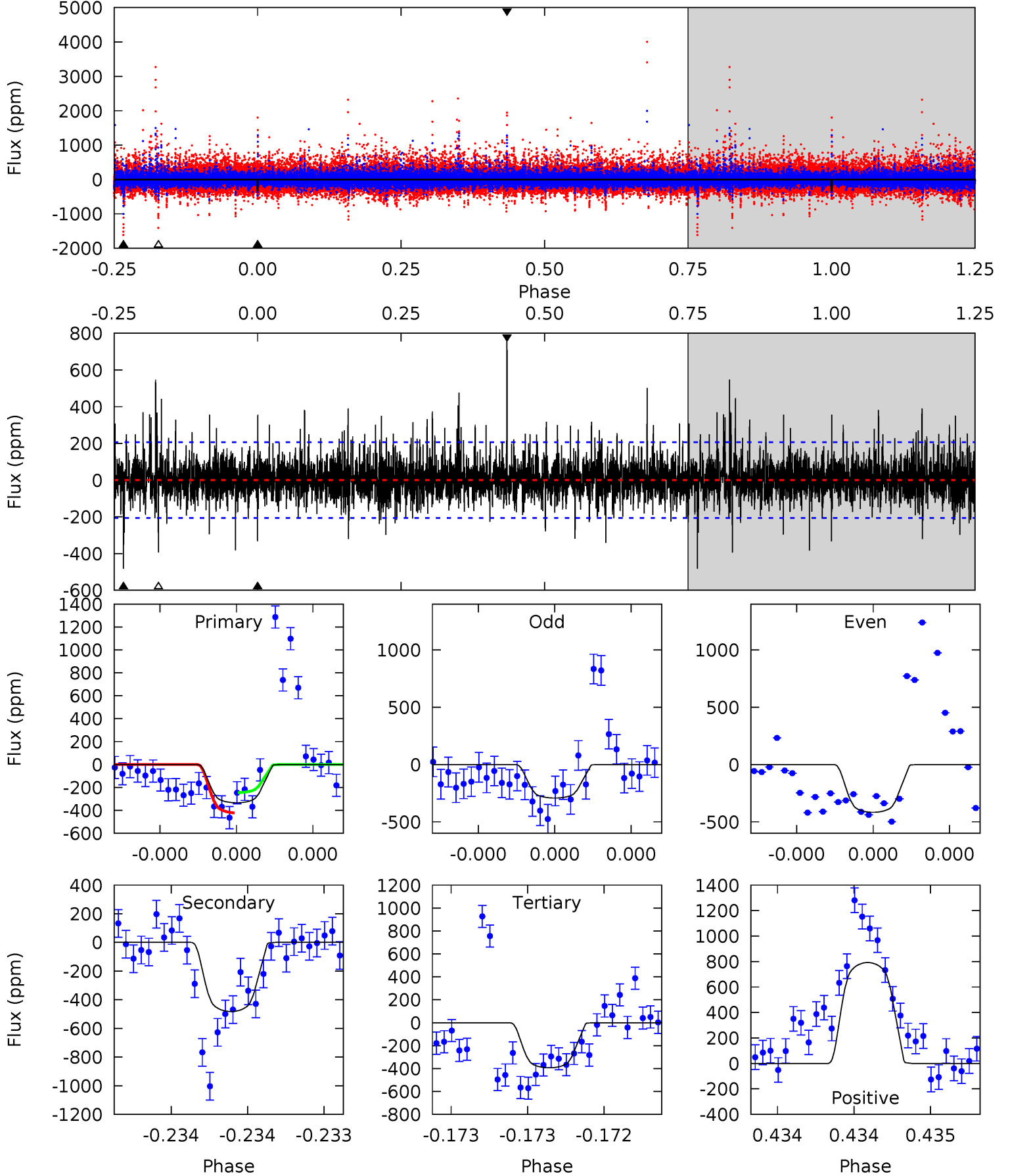
TCE 011515713-07 P=459.019492 Days  $T_0=187.829707$  (BKJD)



# DV Model-Shift Uniqueness Test

011515713-07, P = 459.013671 Days, E = 187.830603 Days

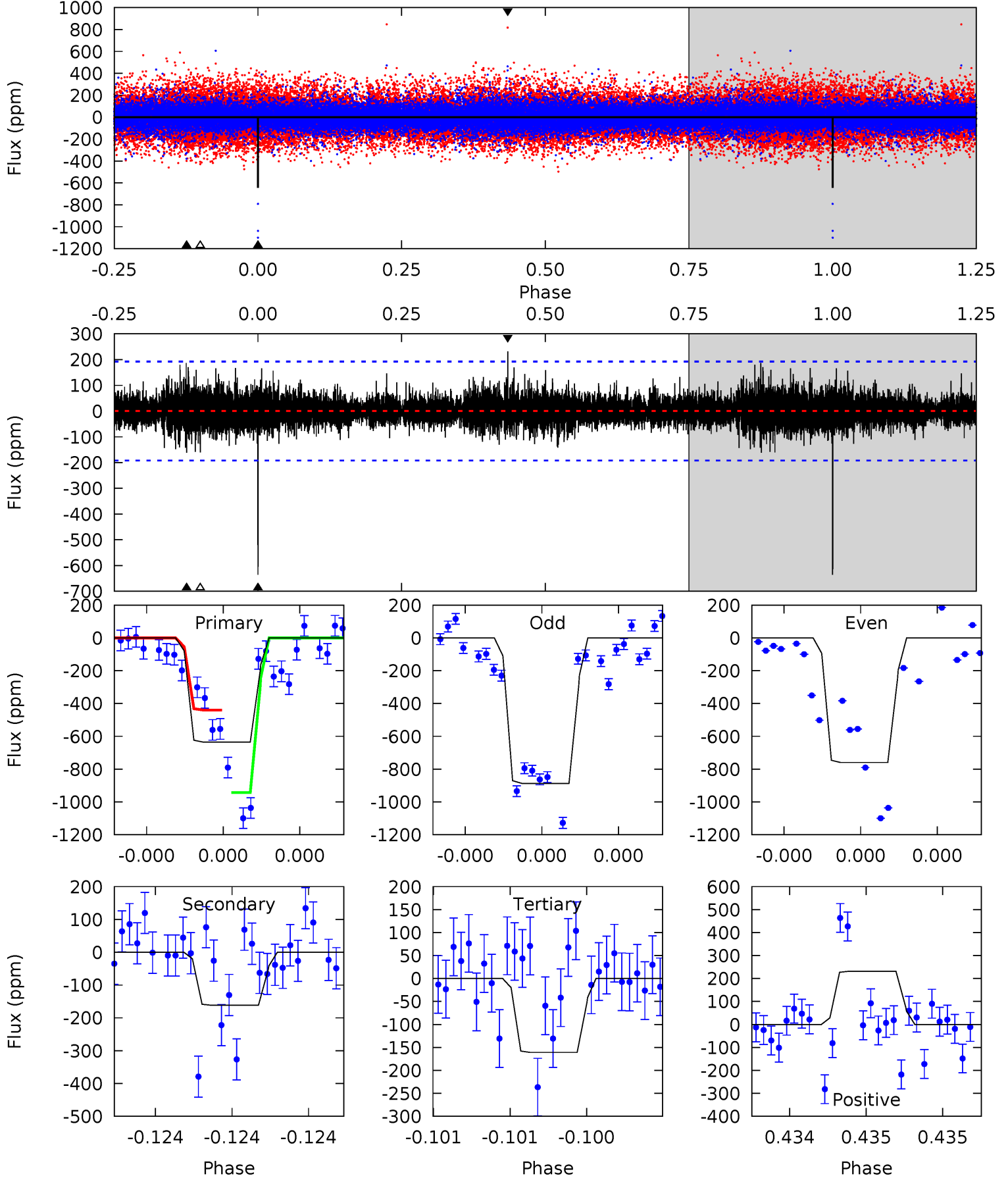
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.03	13.0	10.6	21.4	5.58	3.49	2.21	-1.62	-12.4	2.38	-8.38	1.11	0.96	0.62	2.36



# Alt Model-Shift Uniqueness Test

011515713-07, P = 459.019492 Days, E = 187.829707 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
18.6	4.74	4.72	6.78	5.63	3.57	0.96	13.9	11.8	0.02	-2.04	2.42	1.27	0.27	0



### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-482 \pm 37$	$9.81^{+2.75}_{-3.70}$	$563^{+54}_{-103}$	$5321^{+437}_{-326}$	$5469^{+7847}_{-2113}$
Alt.	$-162 \pm 34$	$13.47^{+3.35}_{-4.98}$	$563^{+53}_{-97}$	$3820^{+211}_{-202}$	$979^{+1164}_{-364}$

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

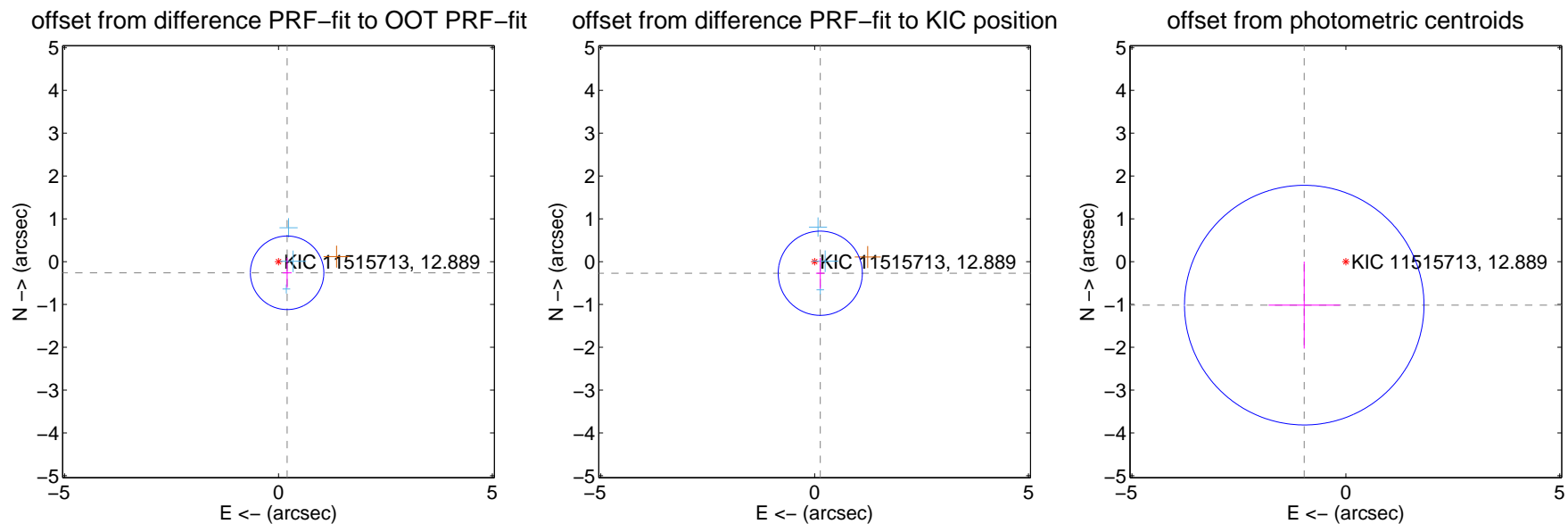
## DV Centroid Data

Supplemental centroid analysis for 011515713-07. Kepler magnitude: 12.89. Transit SNR 6.89

There are 3 quarters with good PRF difference image offsets

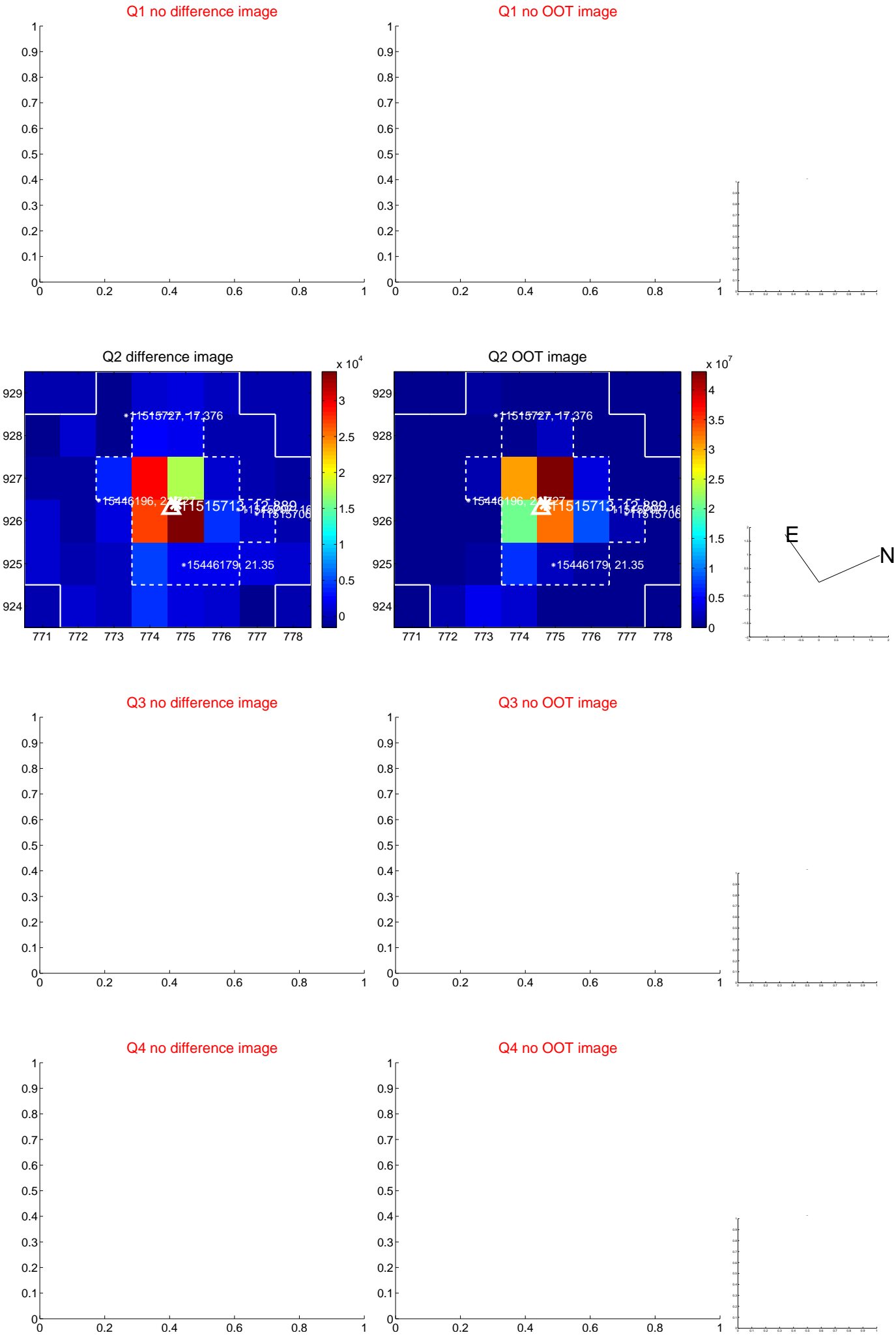
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.329 \pm 0.286$	1.15	$-0.201 \pm 0.104$	$-0.261 \pm 0.353$
PRF-fit source offset from KIC position	$0.301 \pm 0.328$	0.92	$-0.132 \pm 0.101$	$-0.271 \pm 0.361$
photometric centroid source offset	$1.41 \pm 0.93$	1.51	$0.97 \pm 0.83$	$-1.02 \pm 1.02$



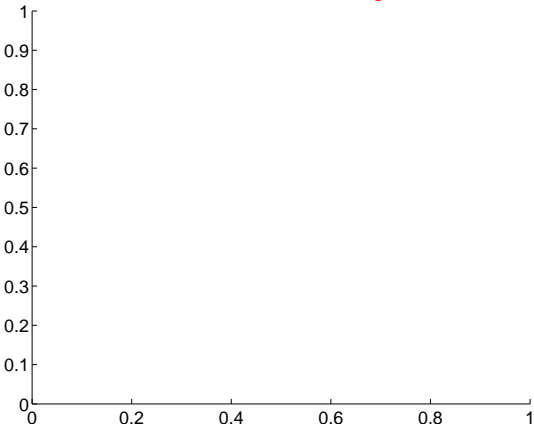
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

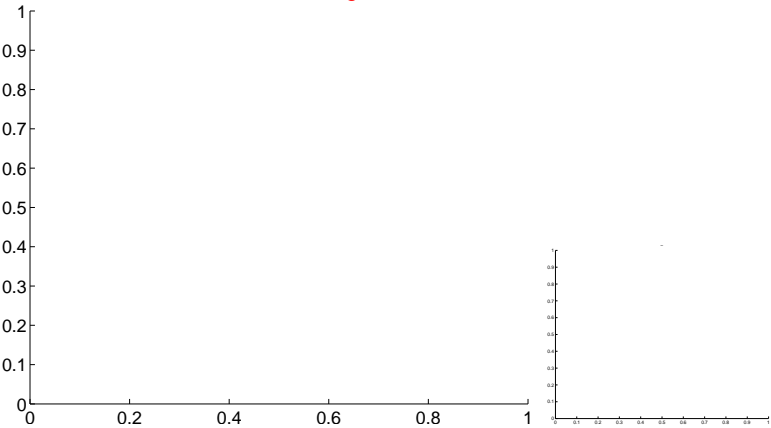


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

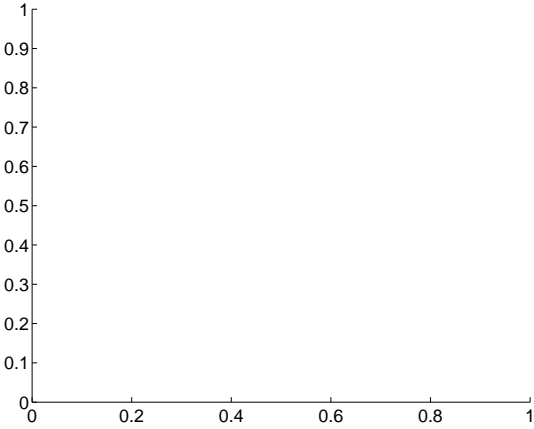
Q5 no difference image



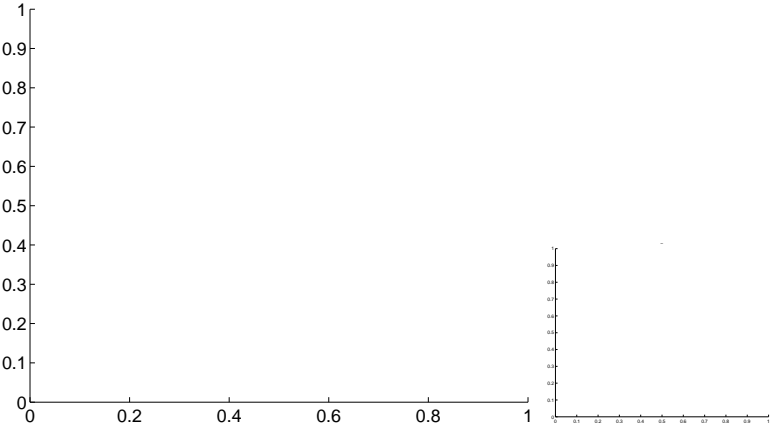
Q5 no OOT image



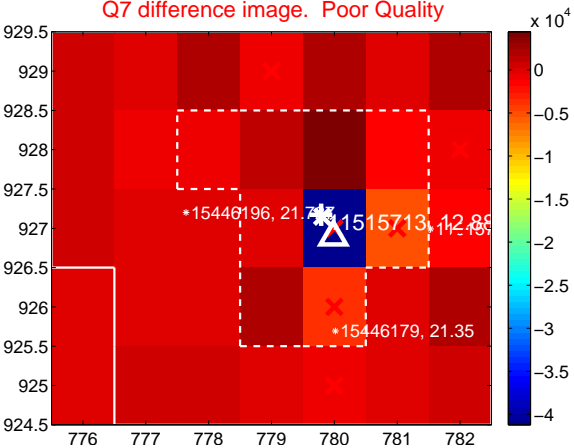
Q6 no difference image



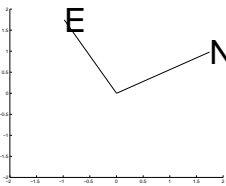
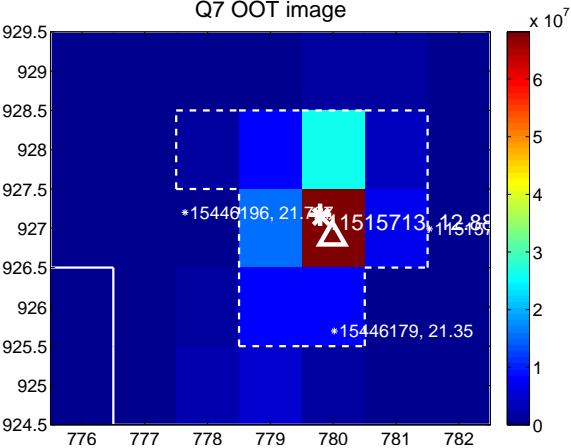
Q6 no OOT image



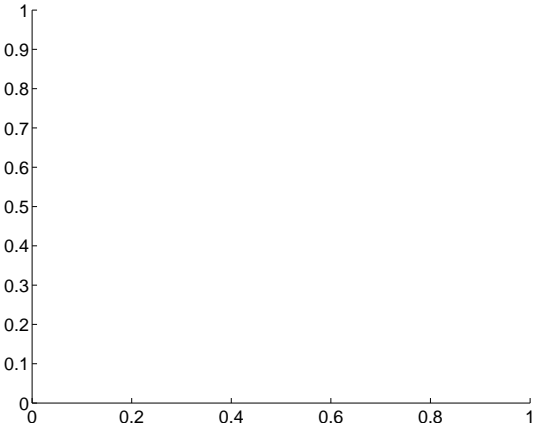
Q7 difference image. Poor Quality



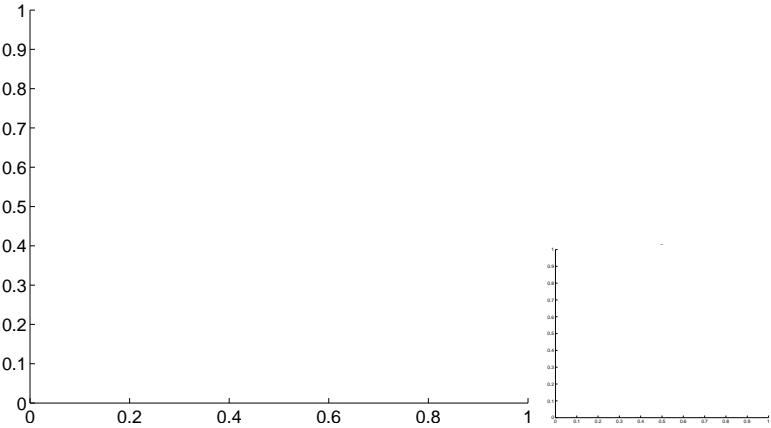
Q7 OOT image



Q8 no difference image

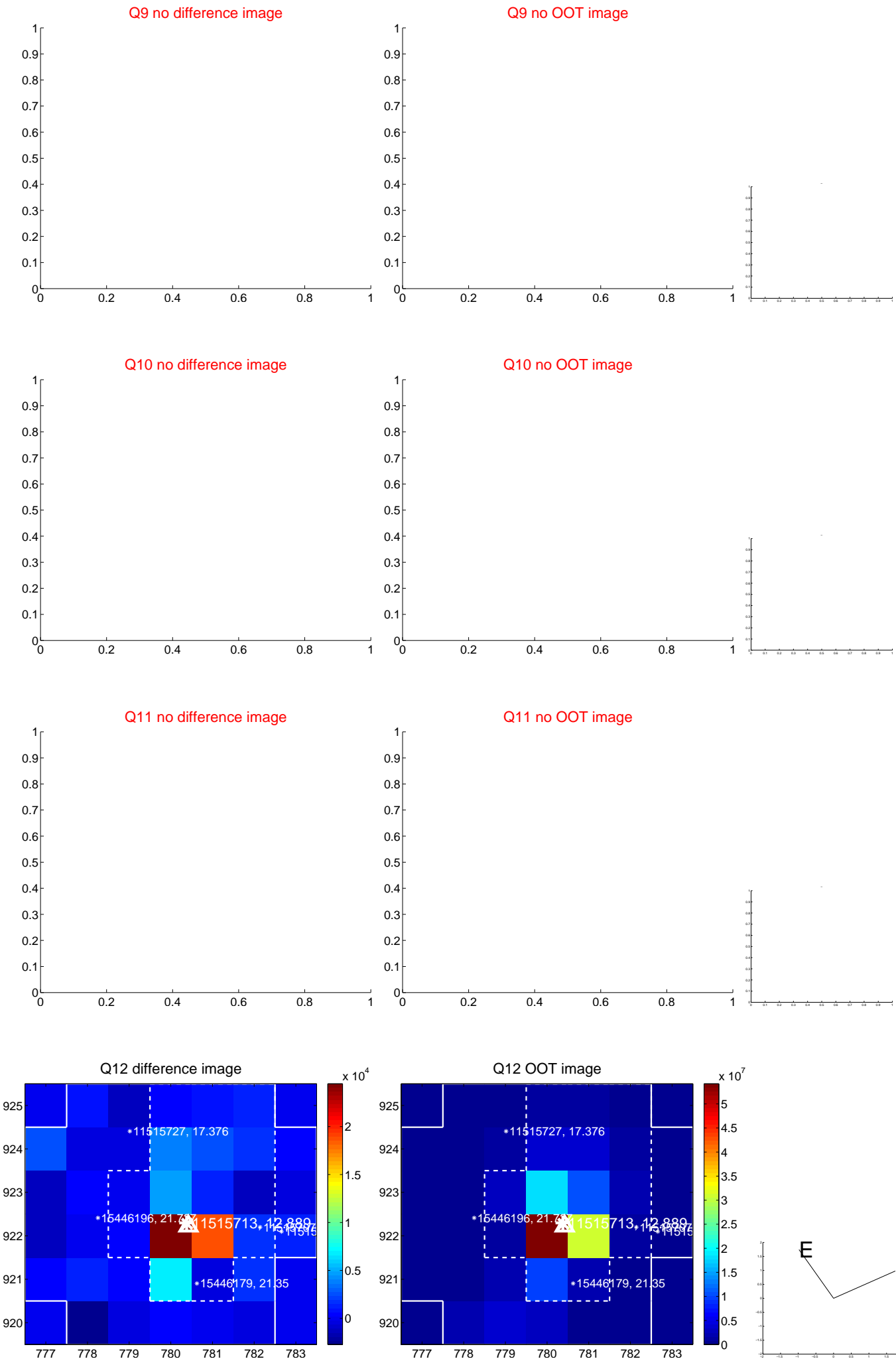


Q8 no OOT image





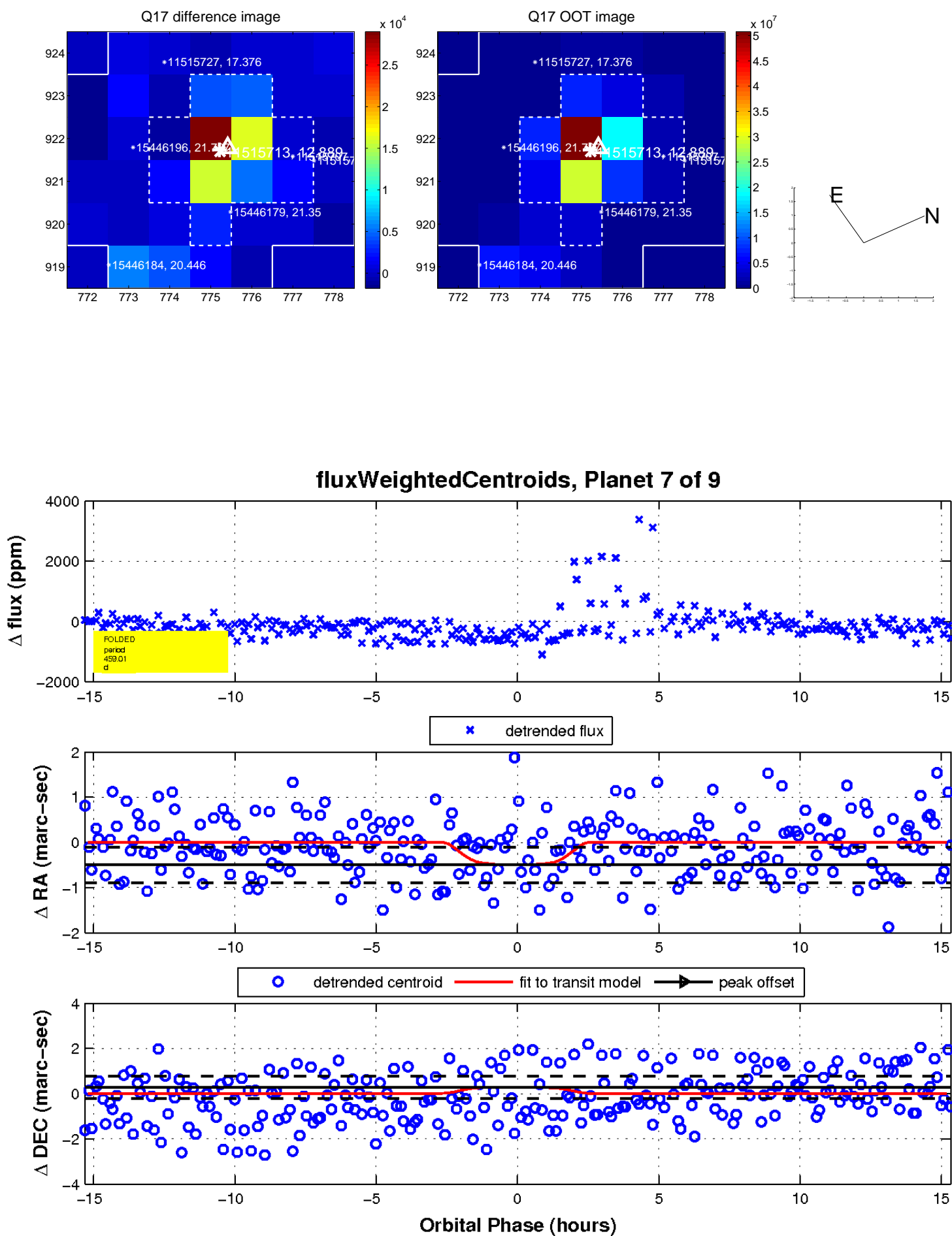
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

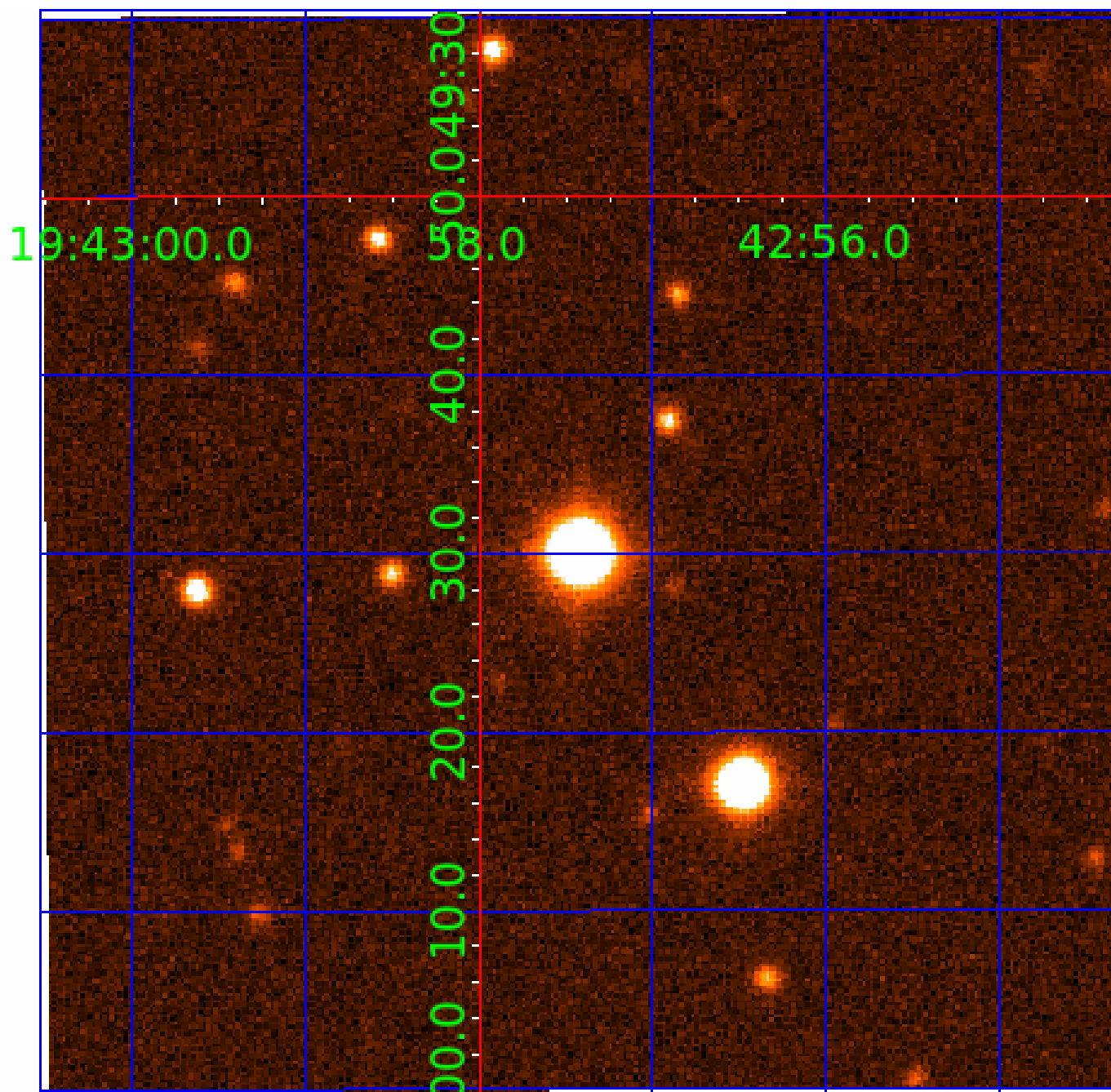


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

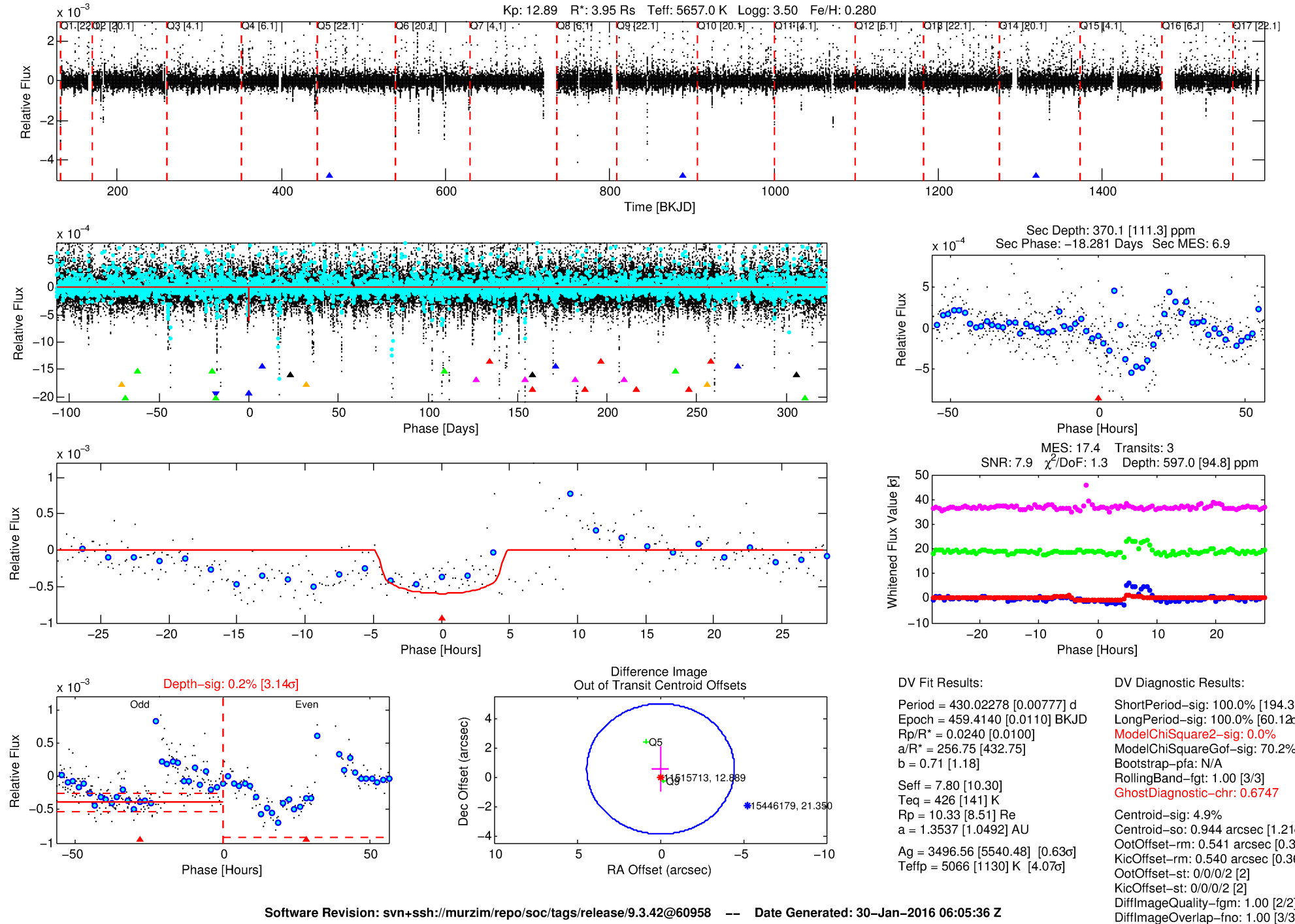
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011515713-08

No Significant Match Found

# DV One-Page Summary

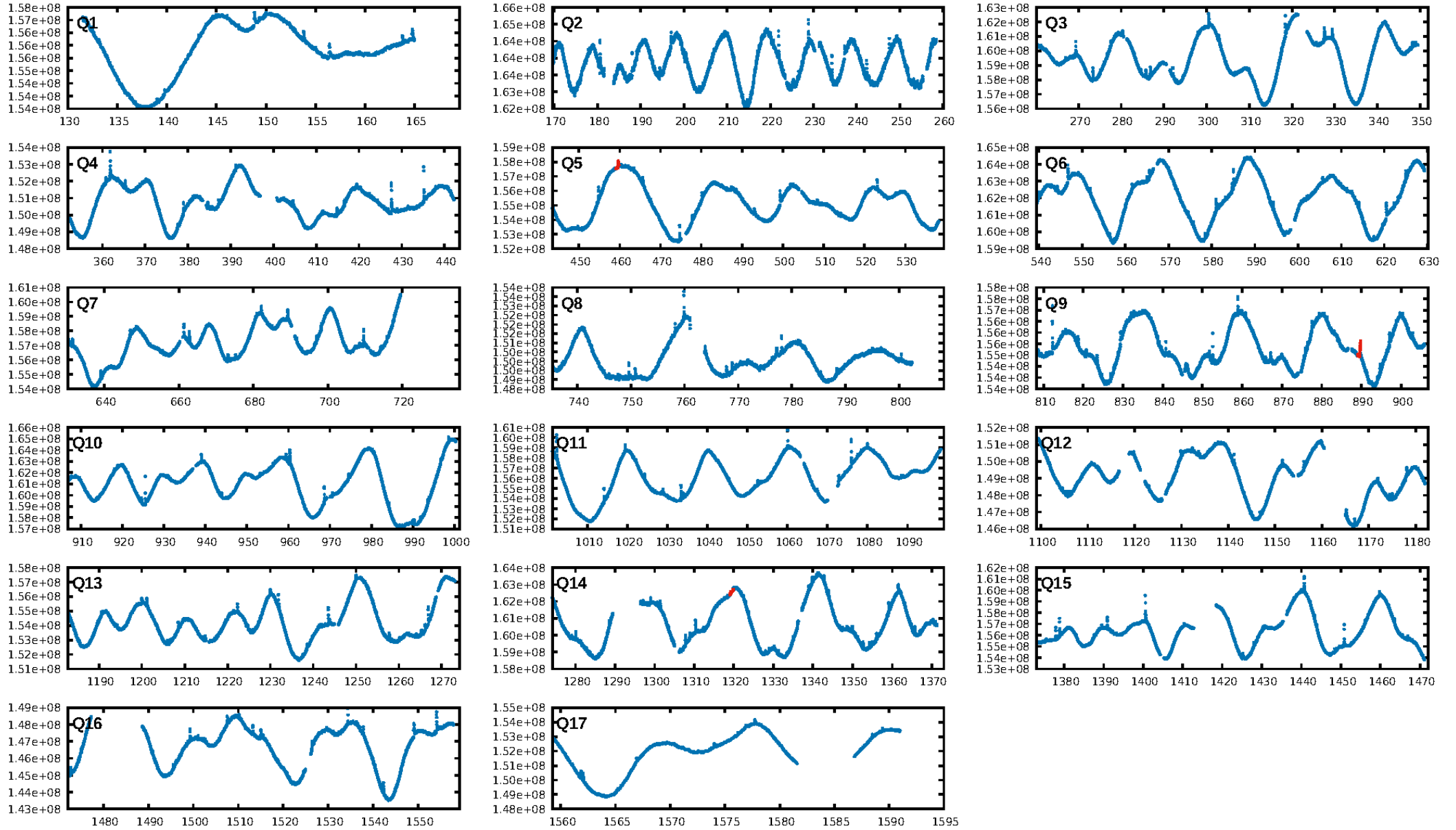
KIC: 11515713 Candidate: 8 of 9 Period: 430.023 d



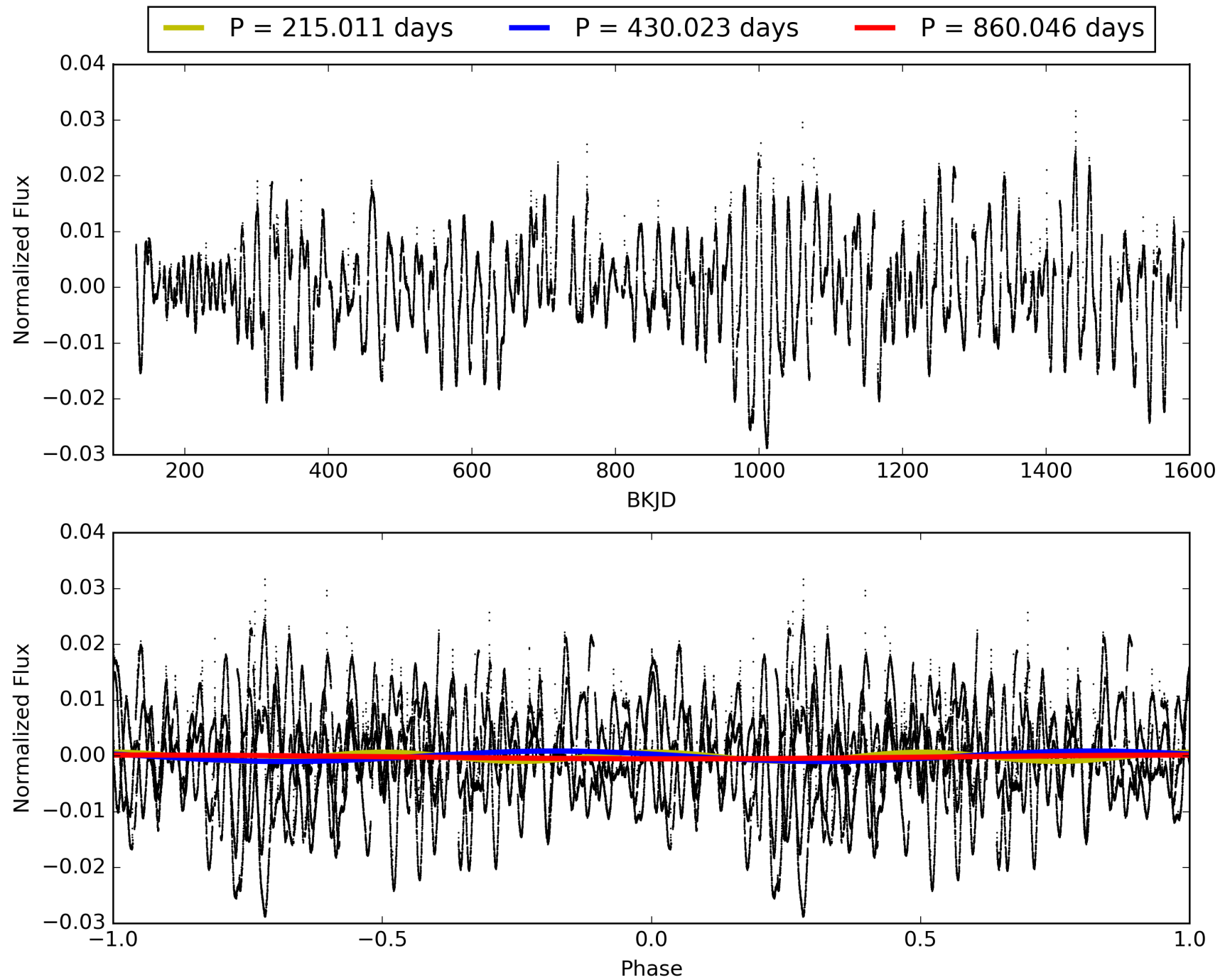
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:05:36 Z

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

# TCE 011515713-08, PDC Light Curves



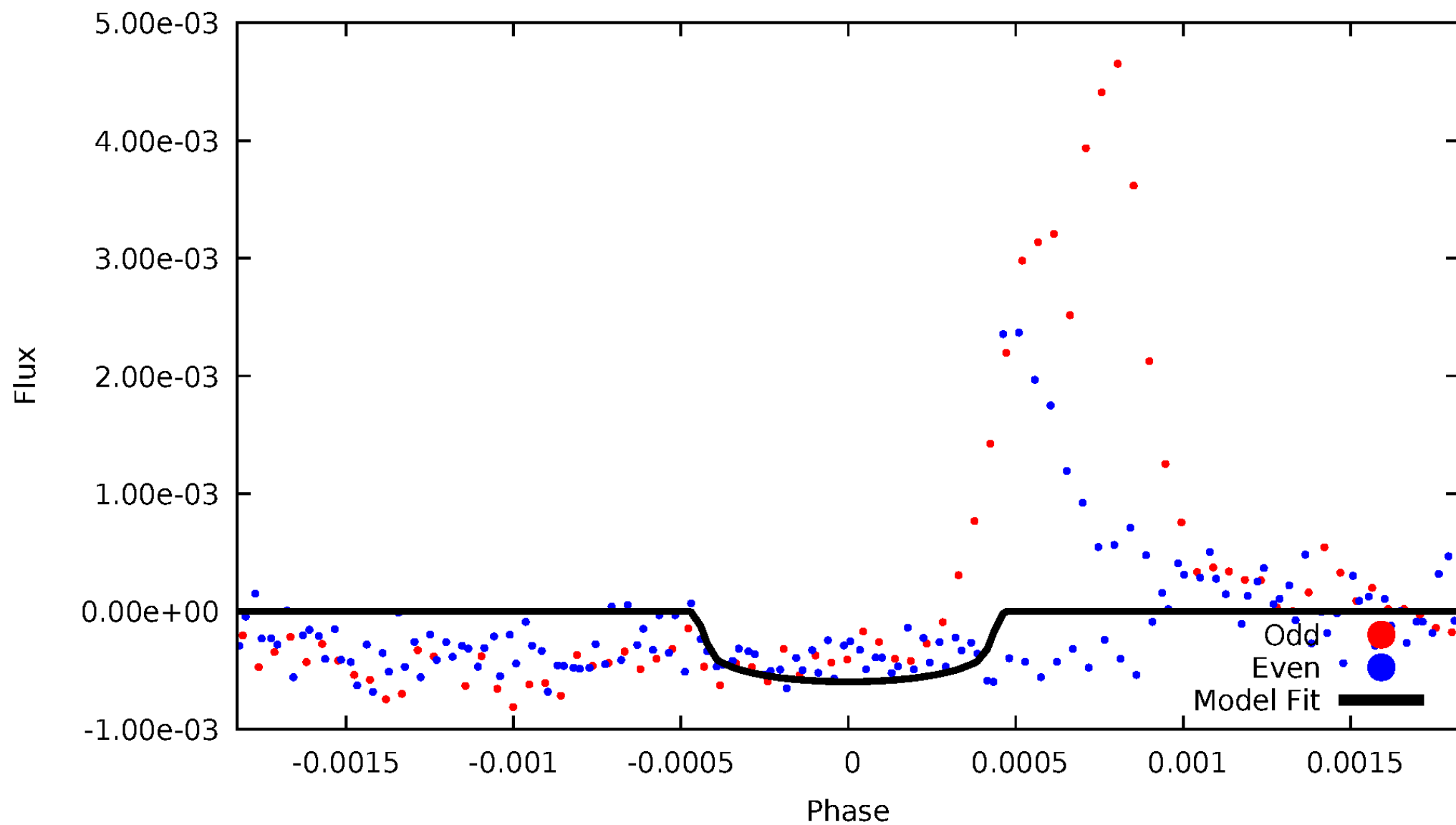
# TCE 011515713-08





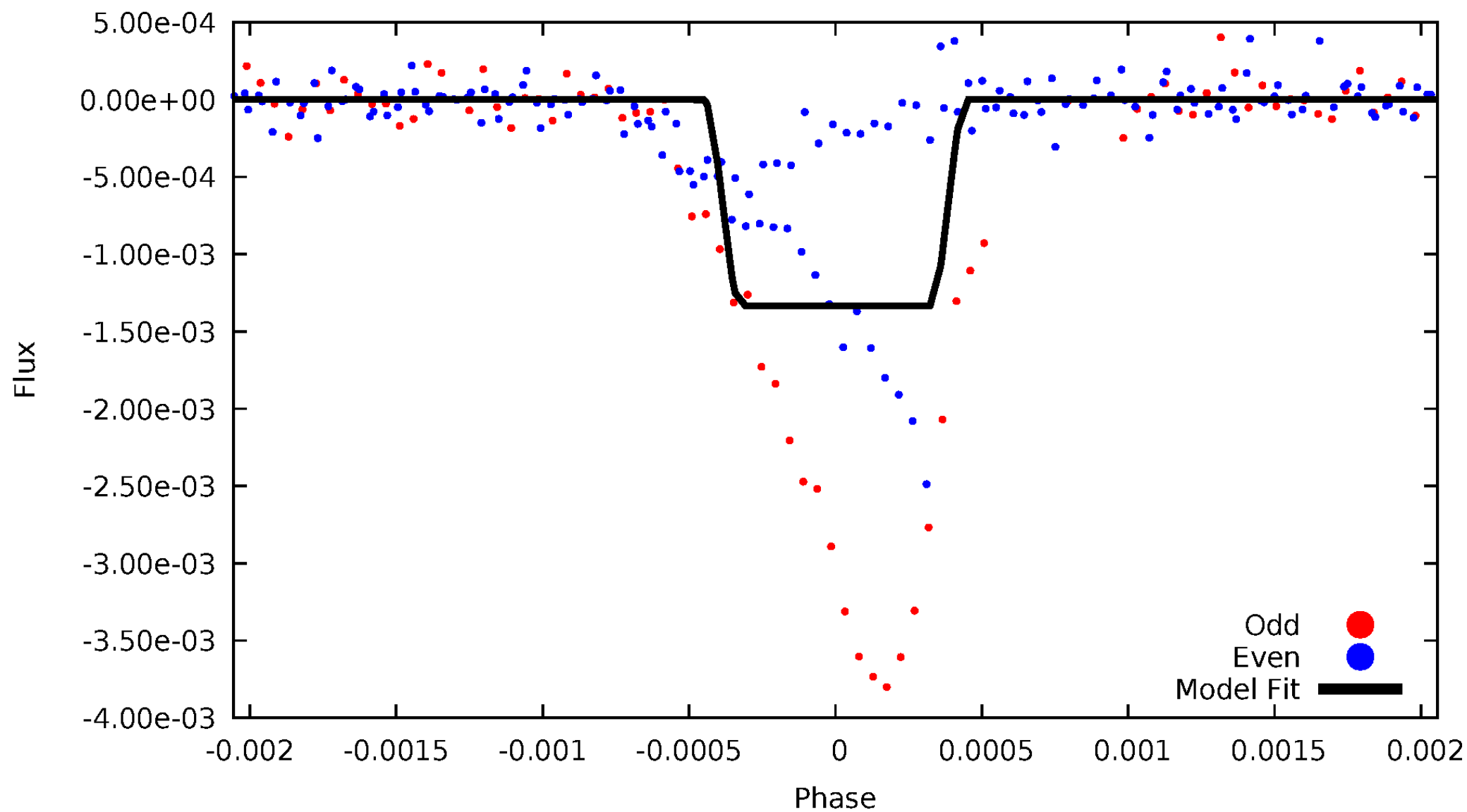
# DV Odd/Even

TCE 011515713-08



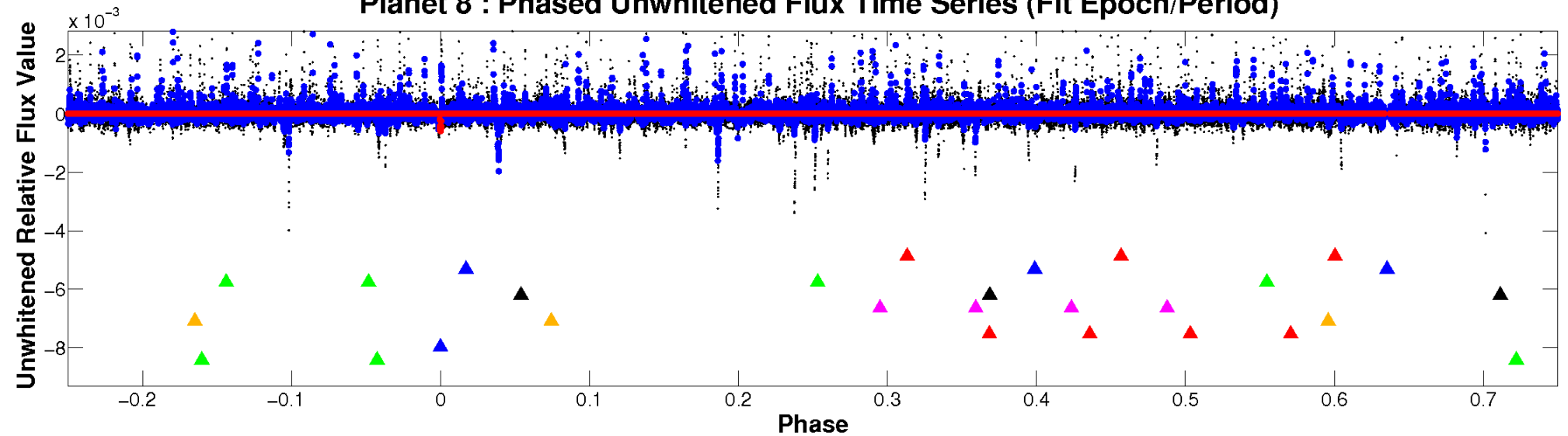
# ALT Odd/Even

TCE 011515713-08

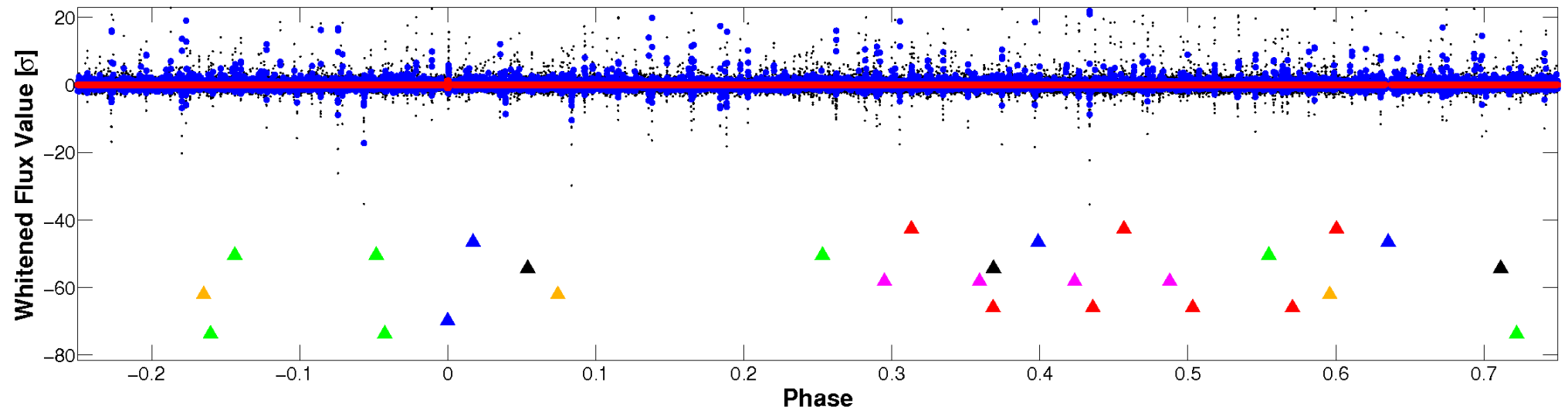


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

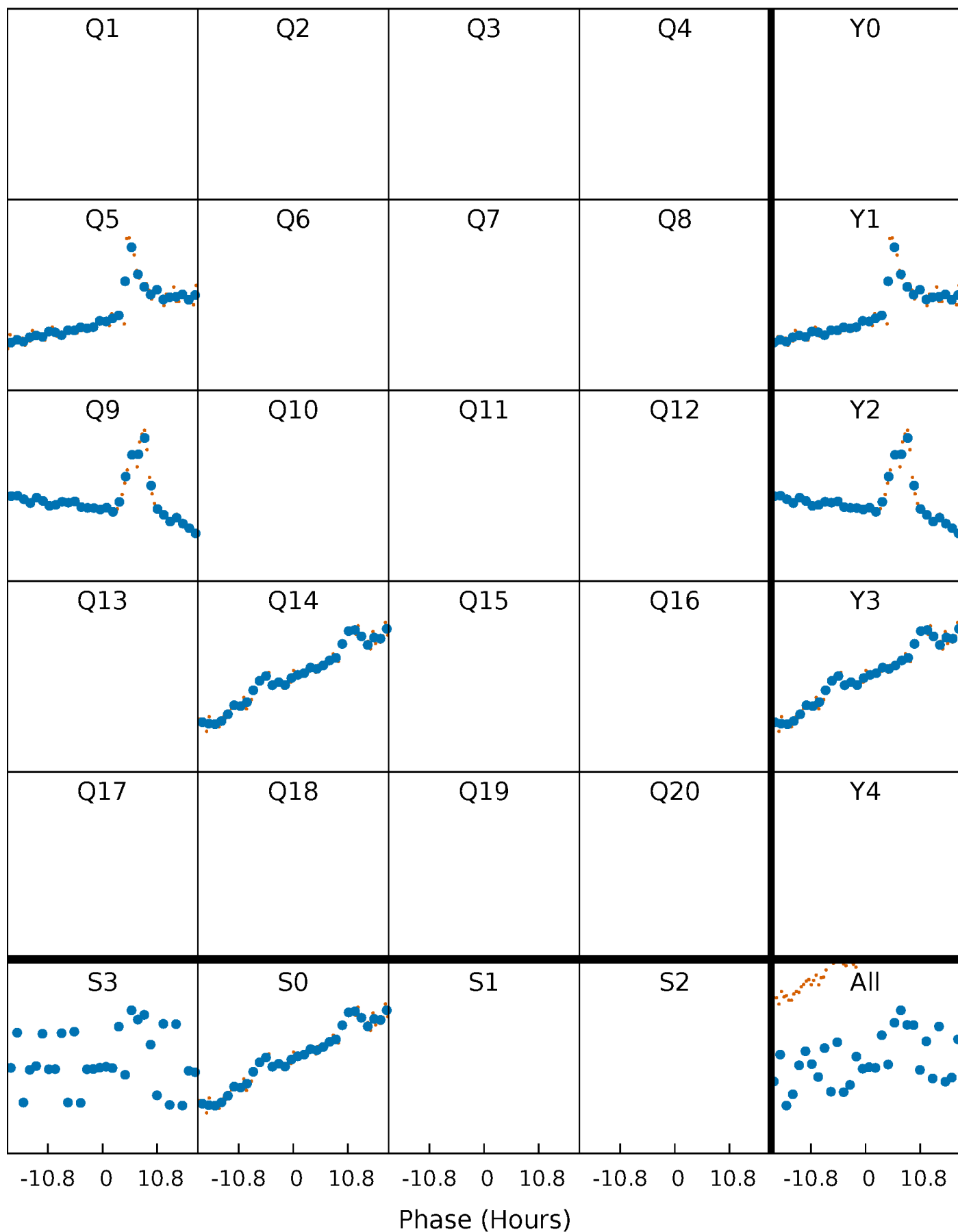


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



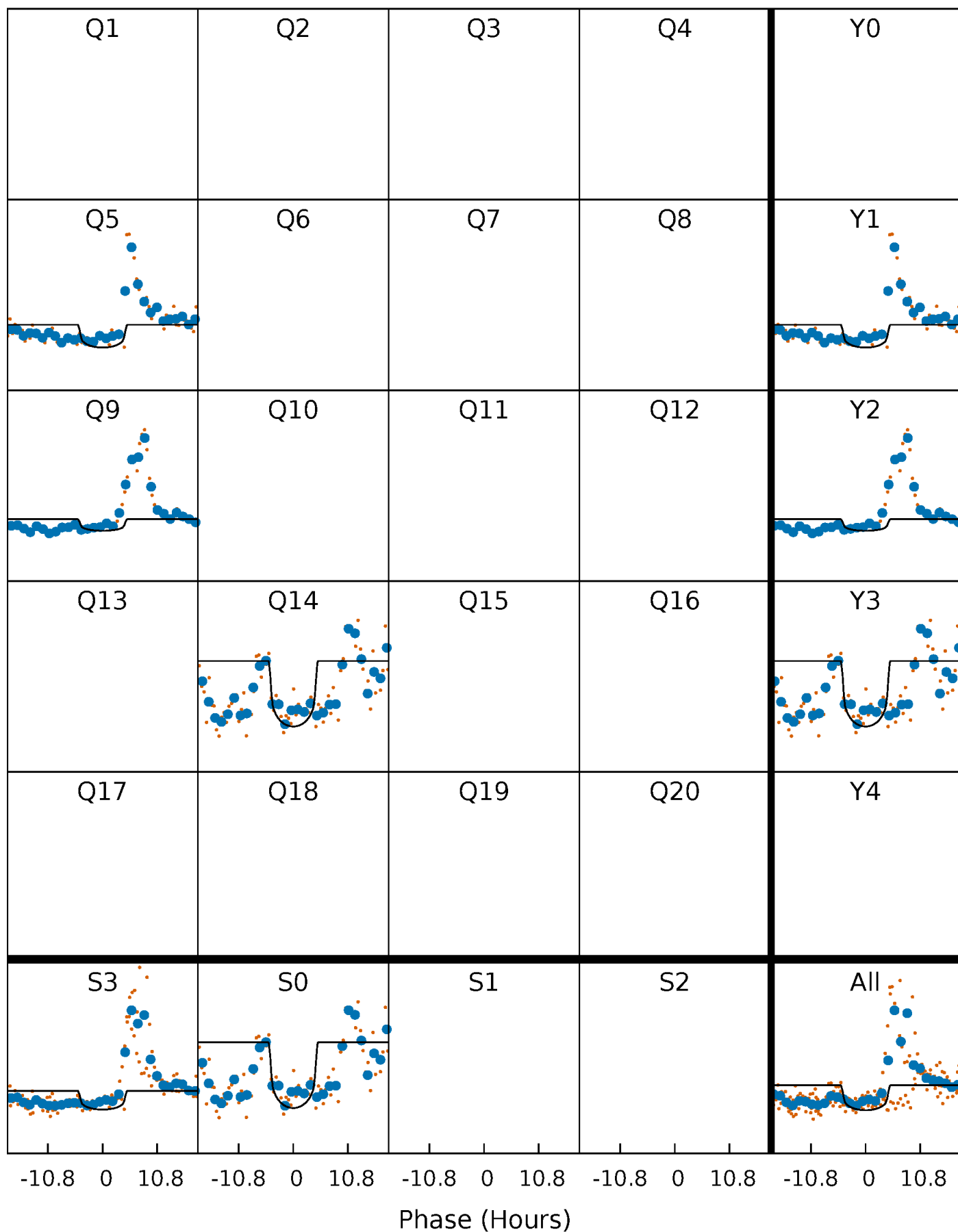
# PDC Quarter-Phased Transit Curves

TCE 011515713-08     $P=430.022782$  Days     $T_0=459.413976$  (BKJD)



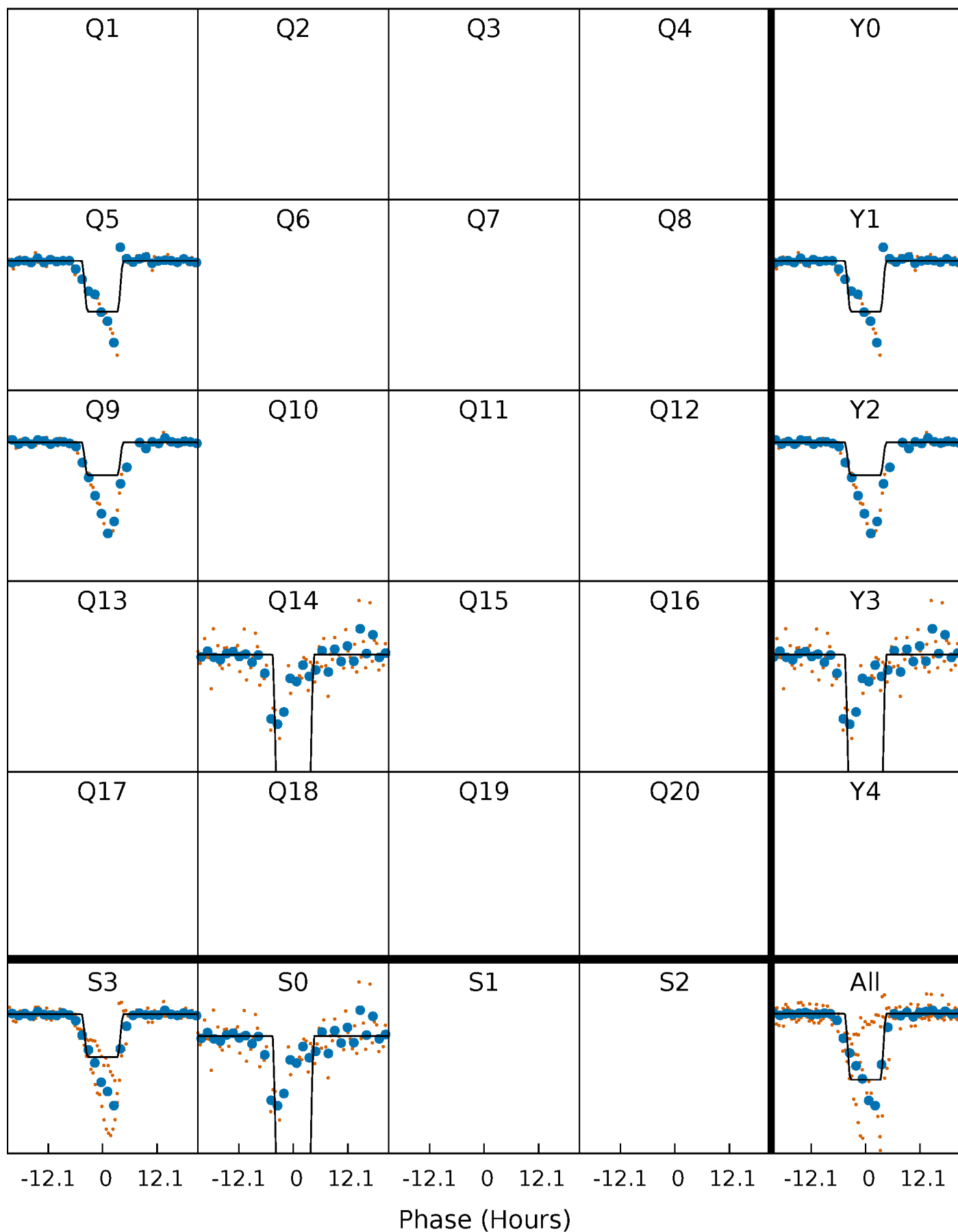
# DV Quarter-Phased Transit Curves

TCE 011515713-08     $P=430.022782$  Days     $T_0=459.413976$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

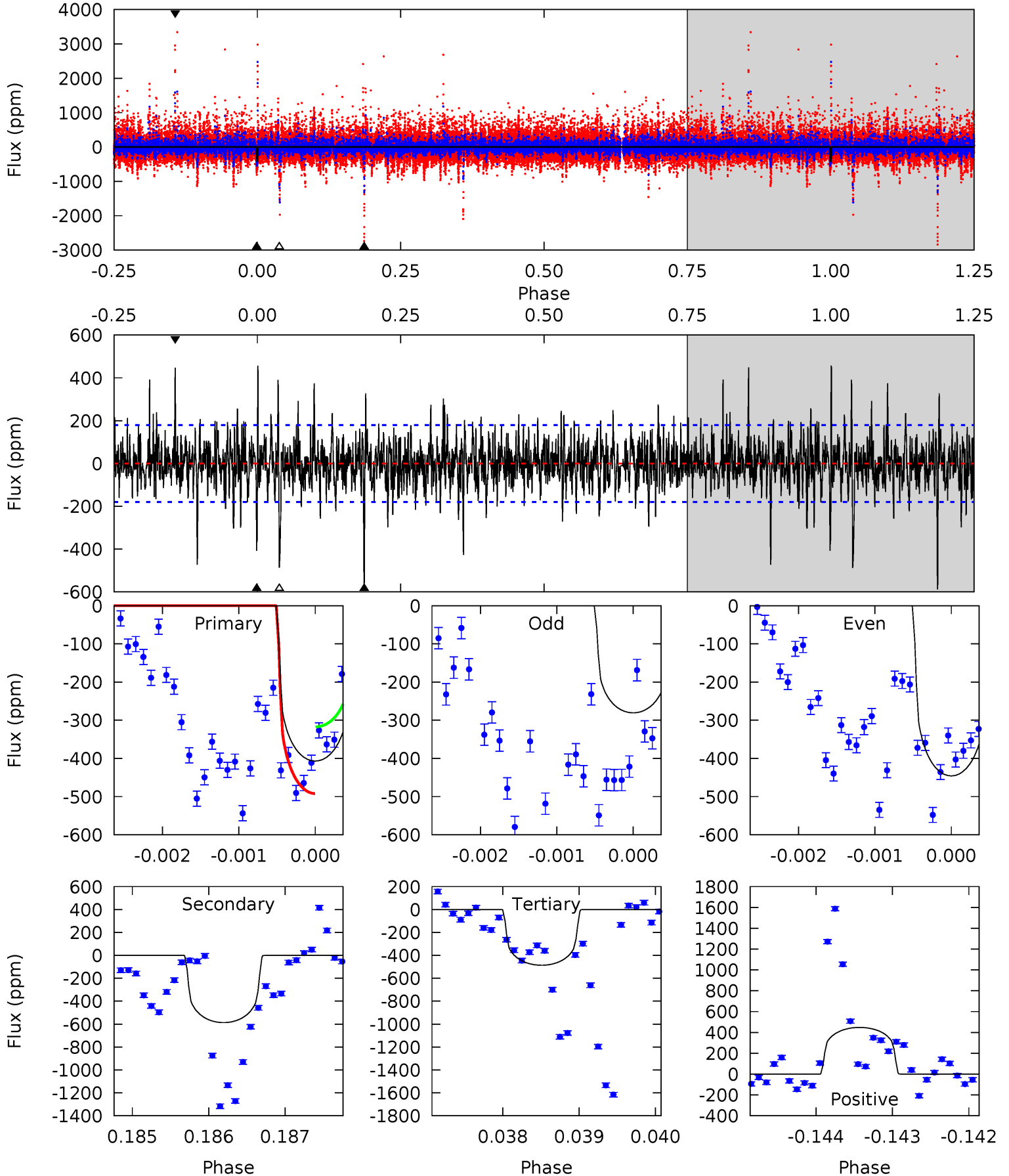
TCE 011515713-08 P=430.024270 Days  $T_0=459.458303$  (BKJD)



# DV Model-Shift Uniqueness Test

011515713-08,  $P = 430.022782$  Days,  $E = 29.391194$  Days

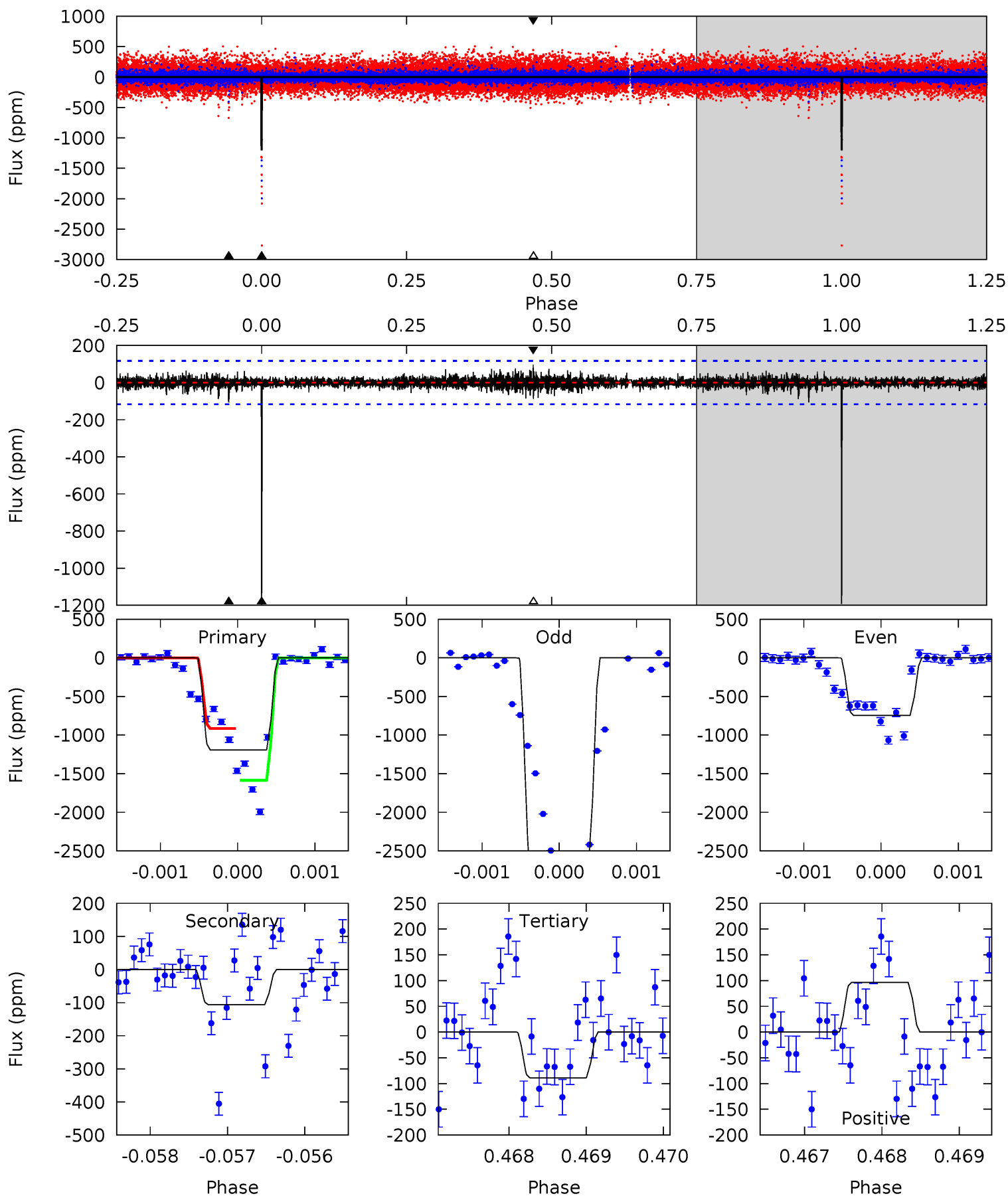
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.4	17.9	14.8	13.6	5.47	3.31	2.68	-2.43	-1.25	3.07	4.25	1.69	1.01	0.44	2.70



# Alt Model-Shift Uniqueness Test

011515713-08,  $P = 430.024270$  Days,  $E = 29.434033$  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
55.8	4.97	4.16	4.52	5.48	3.33	0.72	51.6	51.2	0.81	0.45	60.1	1.11	0.07	0





### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-08 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-587 \pm 33$	$8.61^{+4.97}_{-4.13}$	$584^{+48}_{-103}$	$5711^{+1907}_{-806}$	$7578^{+20167}_{-4409}$
Alt.	$-106 \pm 21$	$13.58^{+5.28}_{-5.78}$	$568^{+56}_{-105}$	$3477^{+393}_{-260}$	$565^{+1069}_{-275}$

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

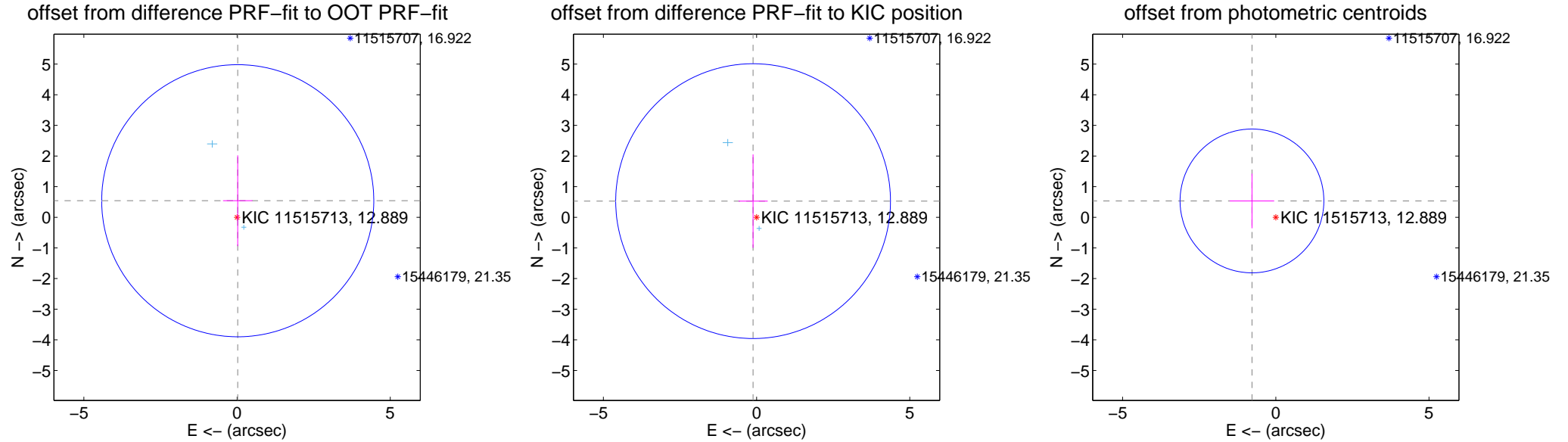
## DV Centroid Data

Supplemental centroid analysis for 011515713-08. Kepler magnitude: 12.89. Transit SNR 7.86

There are 2 quarters with good PRF difference image offsets

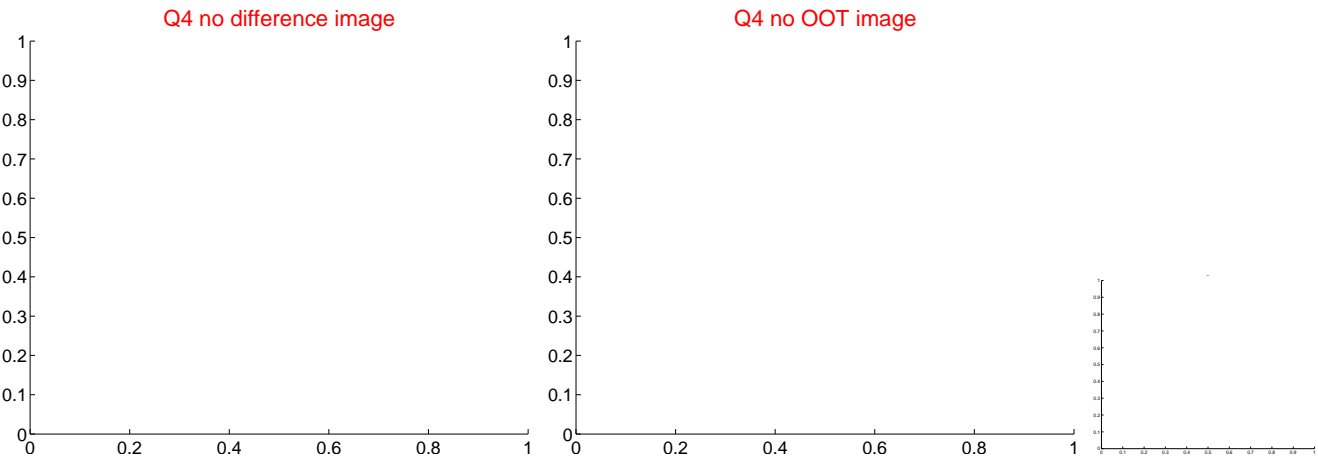
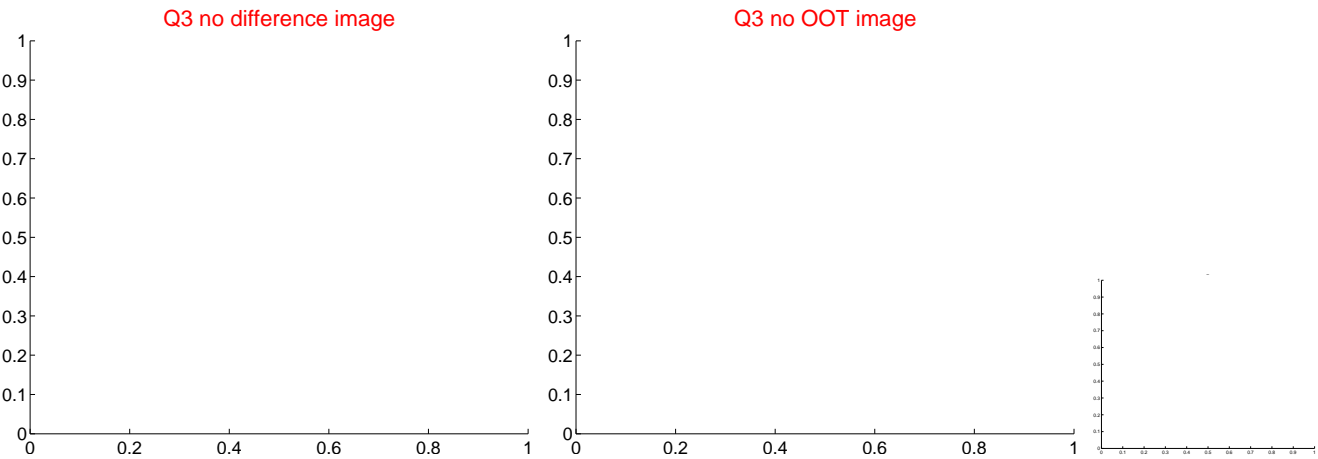
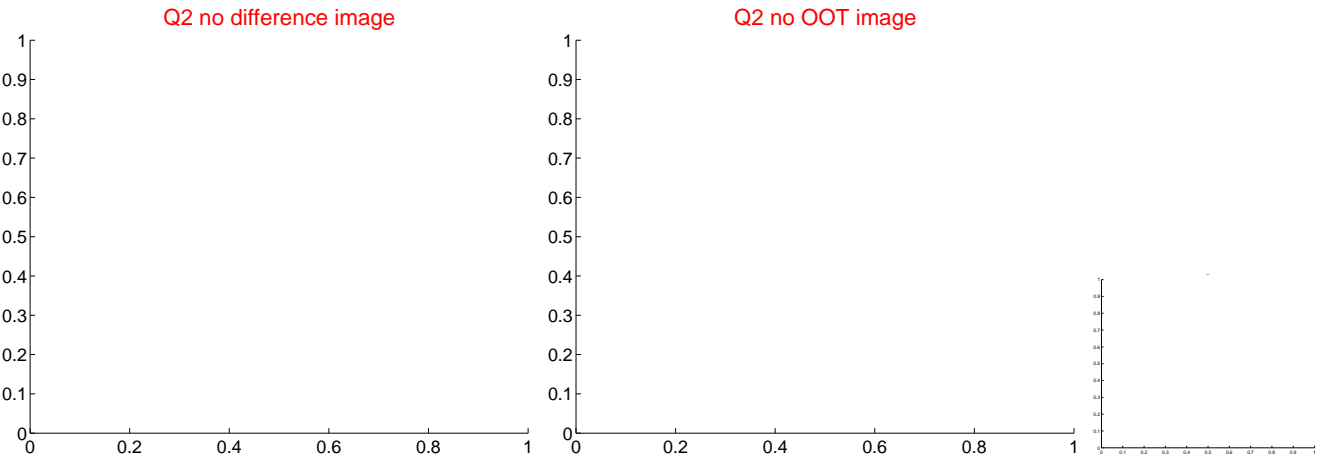
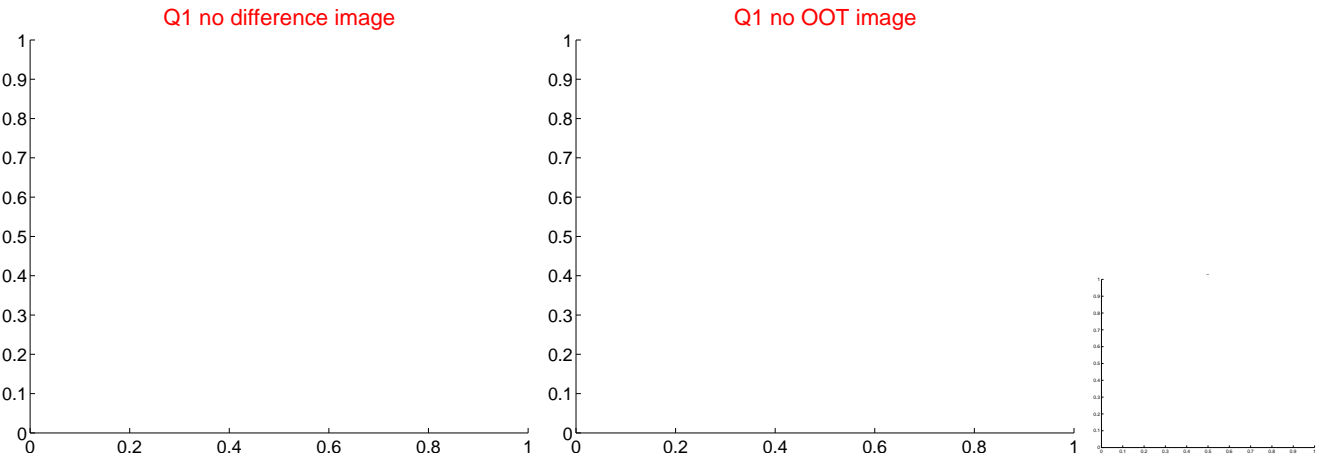
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.541 \pm 1.480$	0.37	$-0.022 \pm 0.480$	$0.541 \pm 1.481$
PRF-fit source offset from KIC position	$0.540 \pm 1.495$	0.36	$0.113 \pm 0.476$	$0.528 \pm 1.526$
photometric centroid source offset	$0.94 \pm 0.78$	1.21	$0.78 \pm 0.73$	$0.53 \pm 0.89$

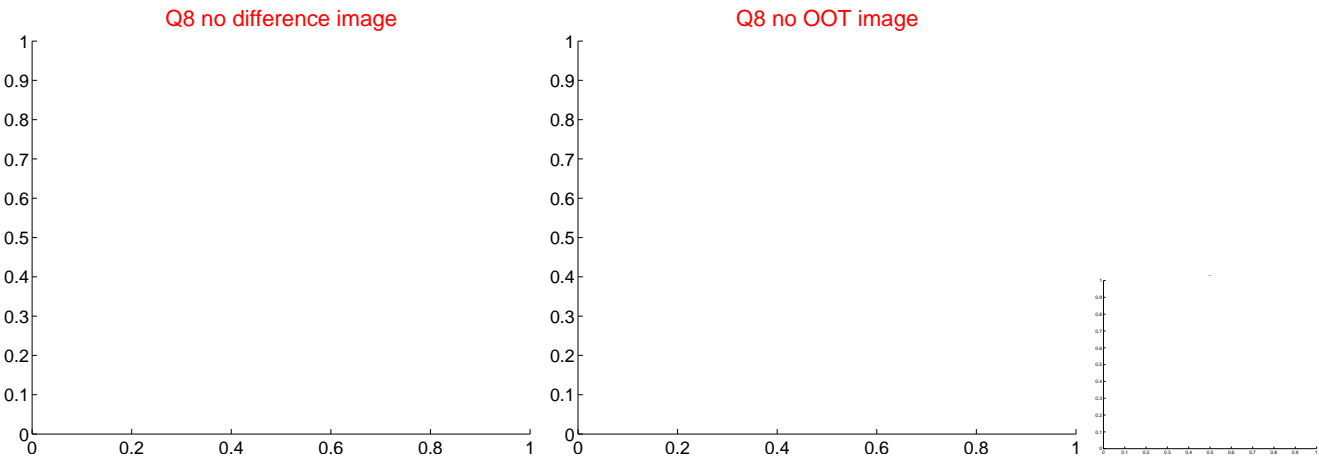
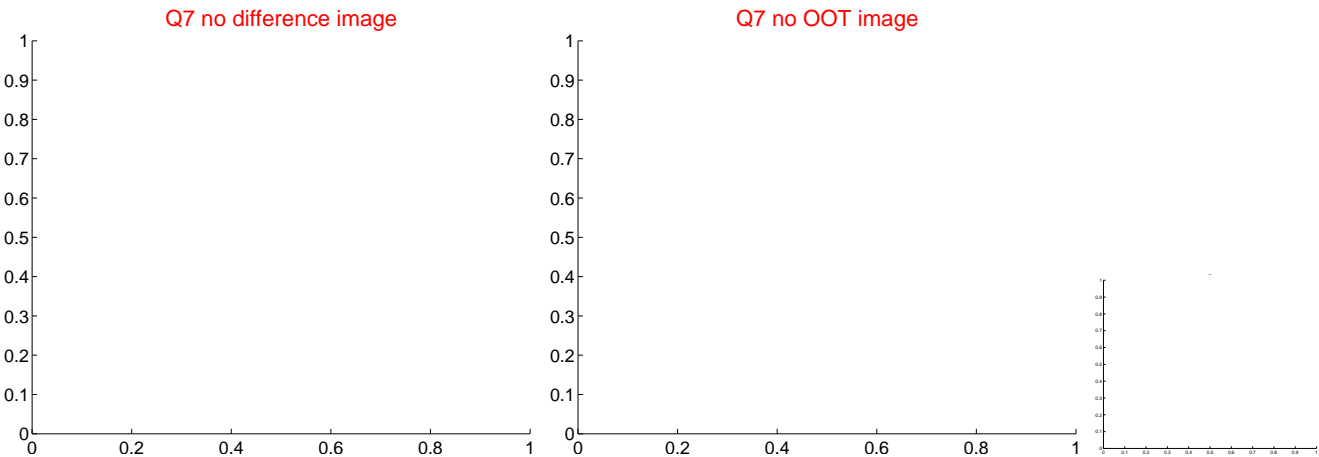
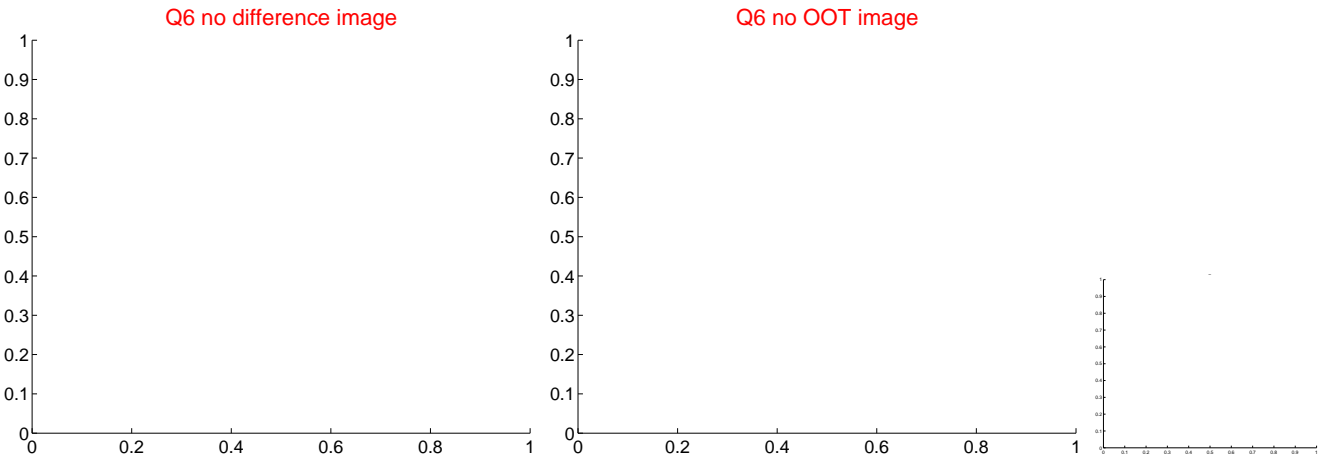
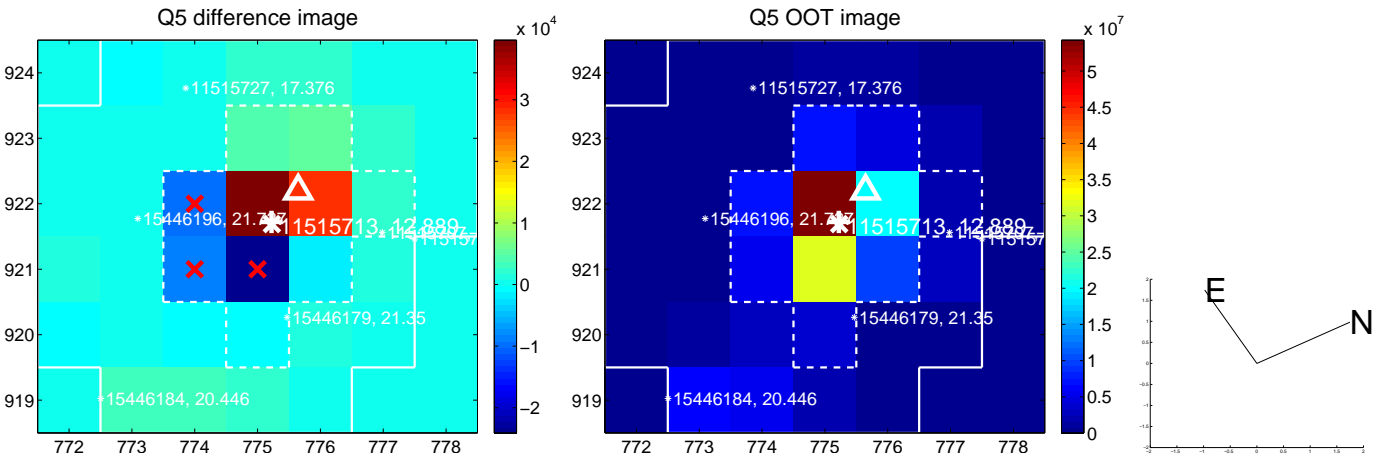


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

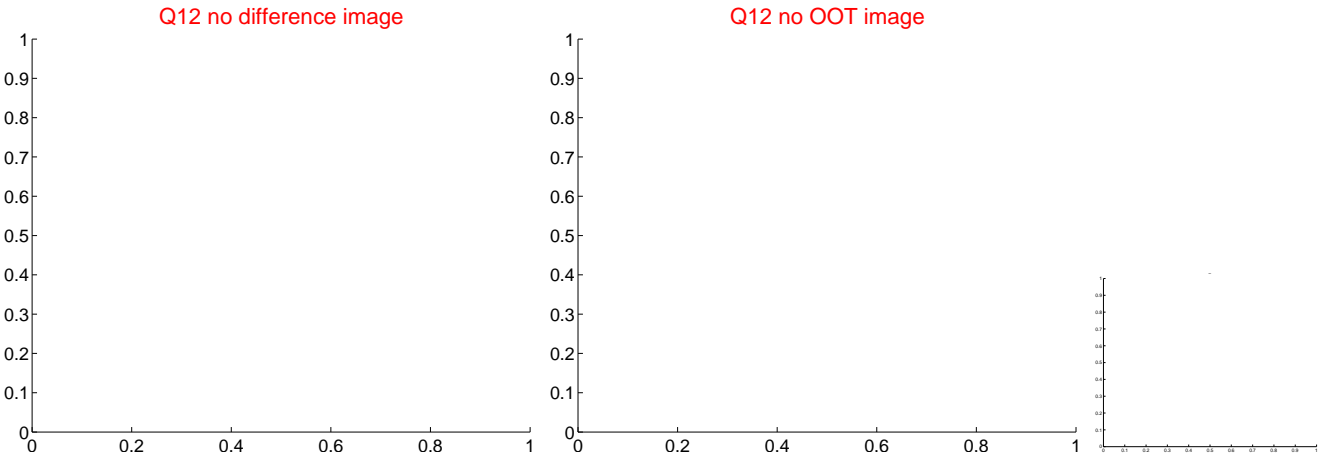
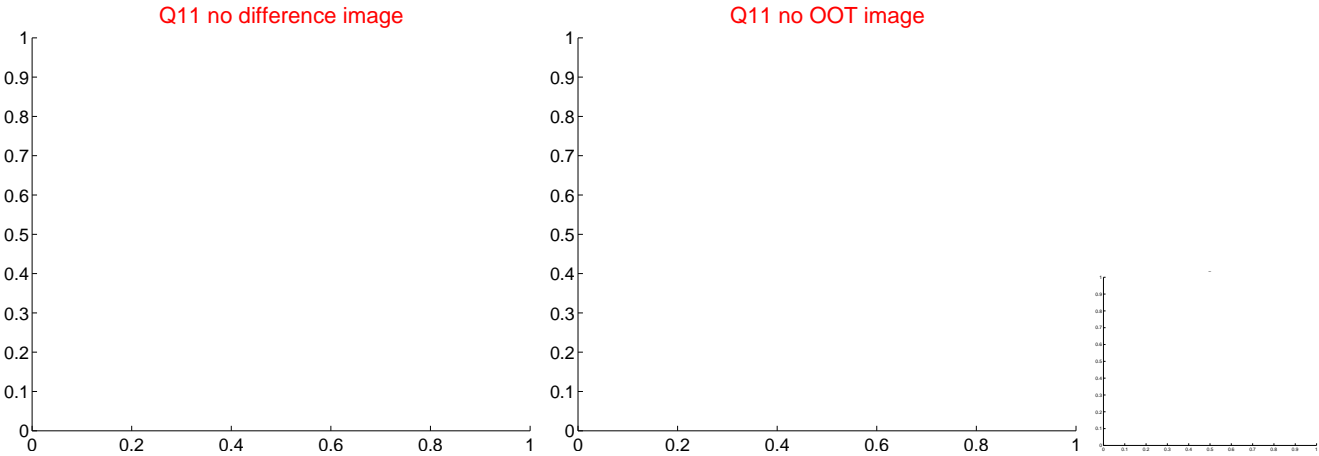
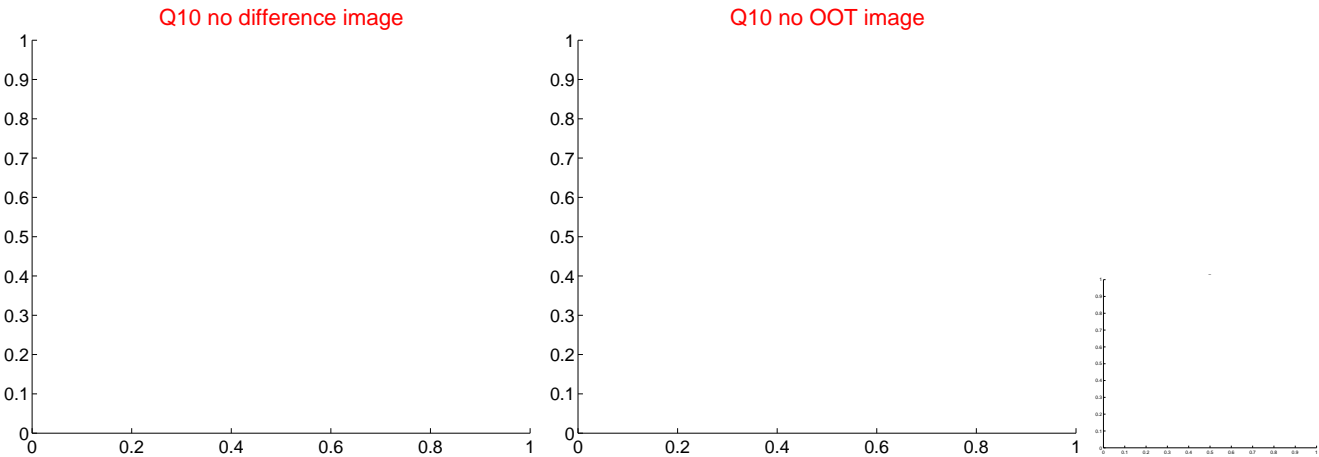
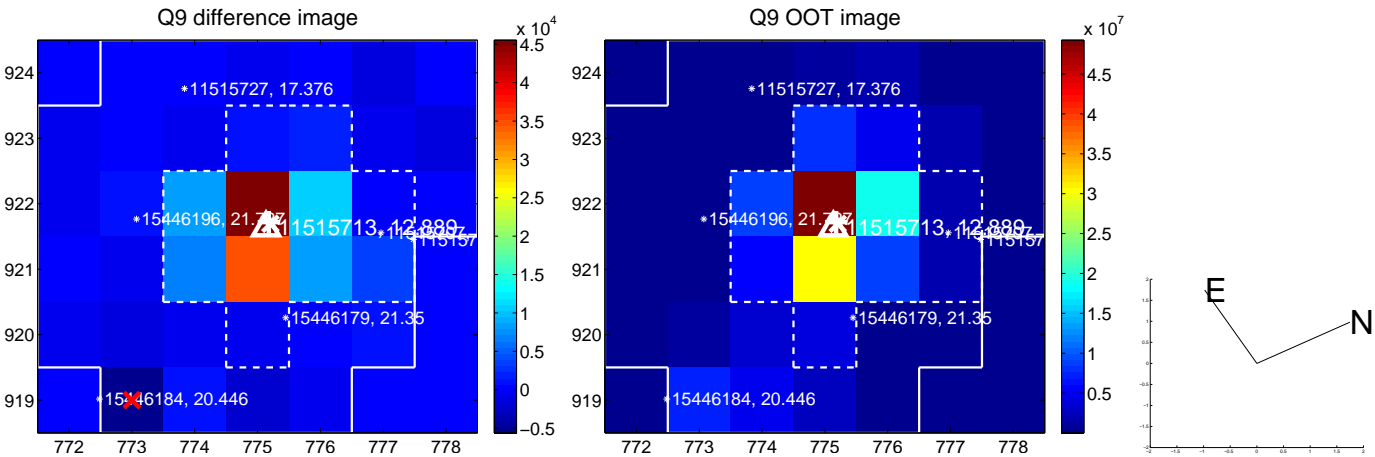
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



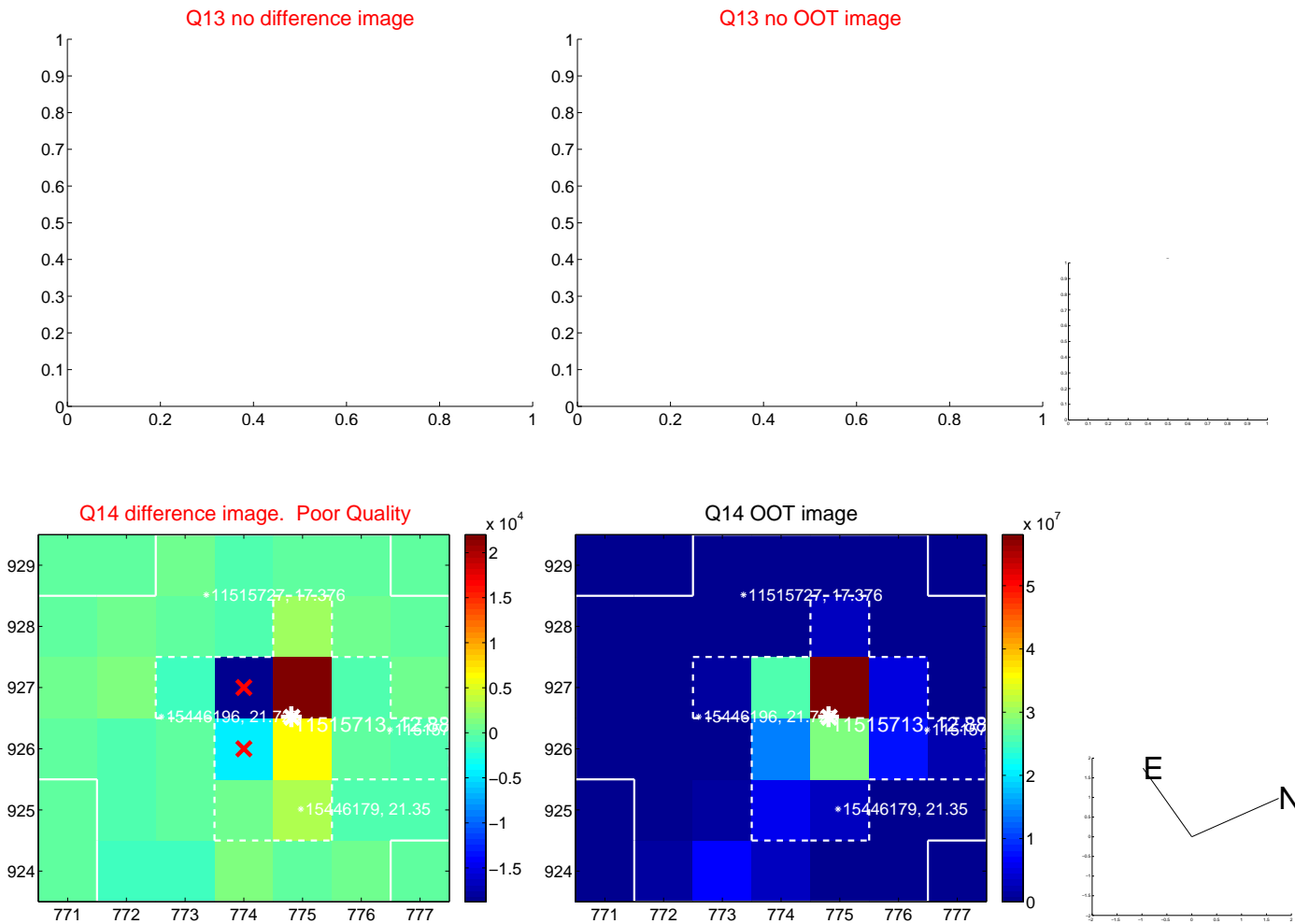
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



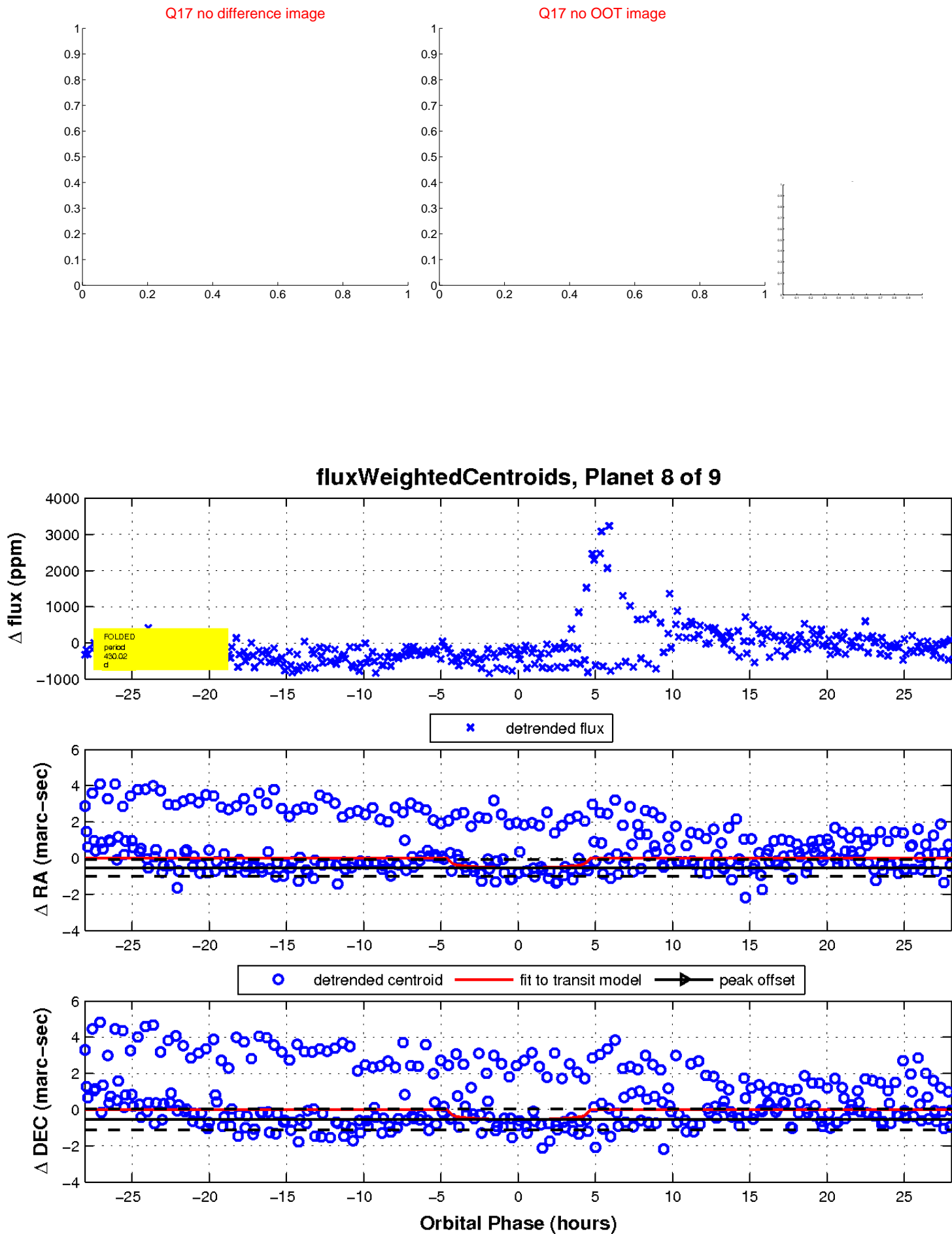
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

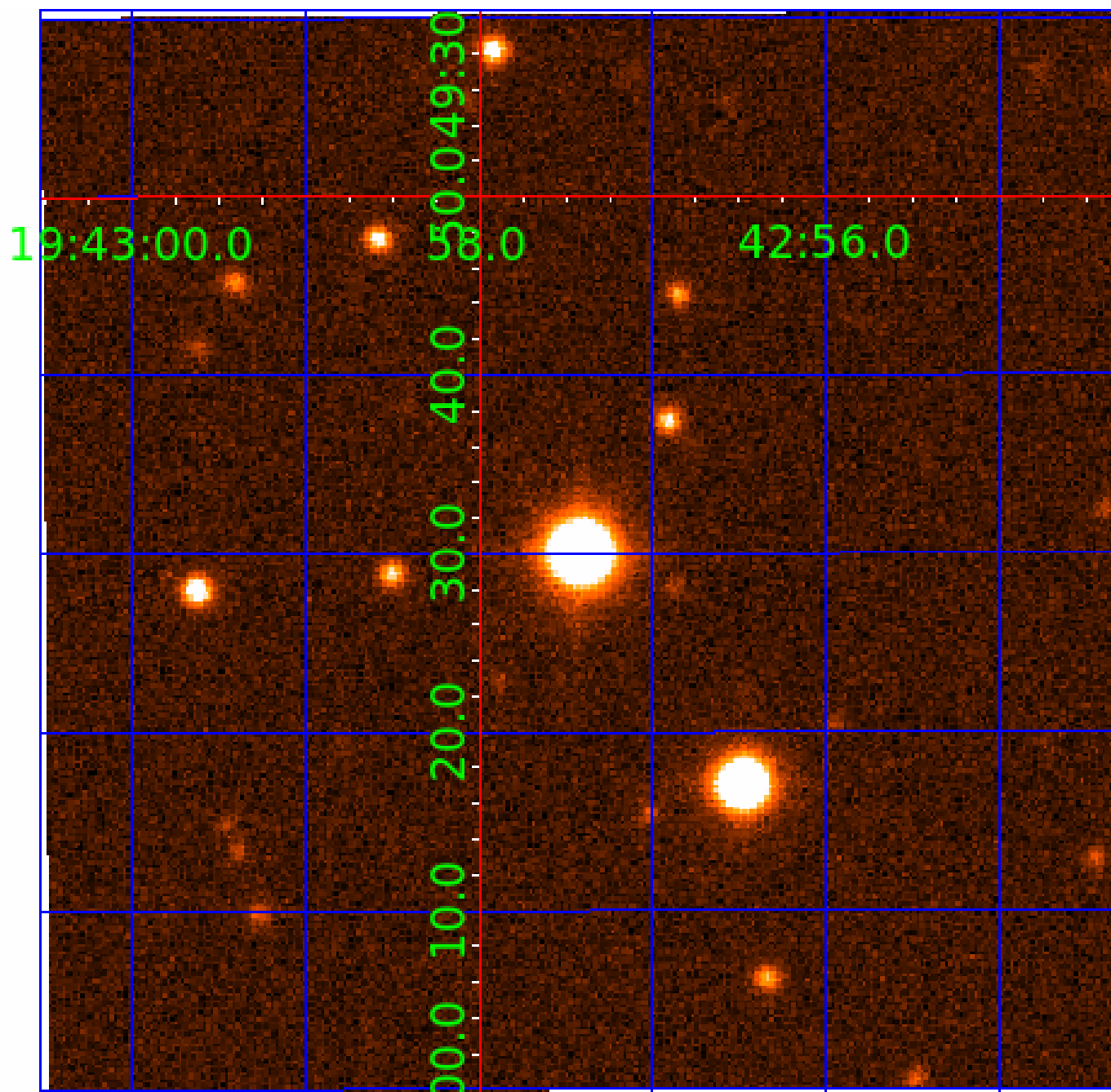


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011515713

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011515713-01	OBS	No	491.766437	594.130740	476.1	1.669	15.3	5.9	3.95	5657	9.82	6.52
011515713-02	OBS	No	594.184565	302.621817	716.8	12.860	15.9	8.5	3.95	5657	11.51	5.07
011515713-03	OBS	No	300.378642	397.568428	543.9	12.941	14.8	7.0	3.95	5657	9.69	12.59
011515713-05	OBS	No	457.649376	156.258853	449.3	5.737	13.5	6.3	3.95	5657	10.83	7.18
011515713-06	OBS	No	532.911607	285.636932	432.7	4.576	13.6	6.1	3.95	5657	8.81	5.86
011515713-07	OBS	No	459.013671	187.830603	454.6	5.118	13.4	6.9	3.95	5657	10.89	7.15
011515713-08	OBS	No	430.022782	459.413976	597.0	9.420	17.4	7.9	3.95	5657	10.33	7.80
011515713-09	OBS	No	480.624576	339.923089	328.1	9.000	13.1	-1.0	3.95	5657	7.04	6.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011515713-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—CENT_FEW_DIFFS
011515713-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011515713-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011515713-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

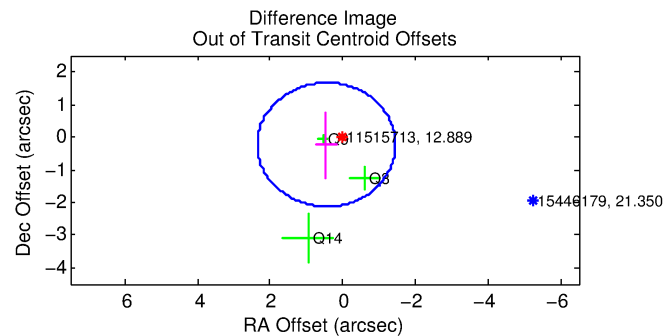
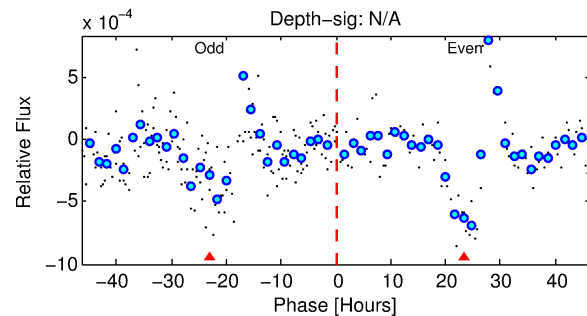
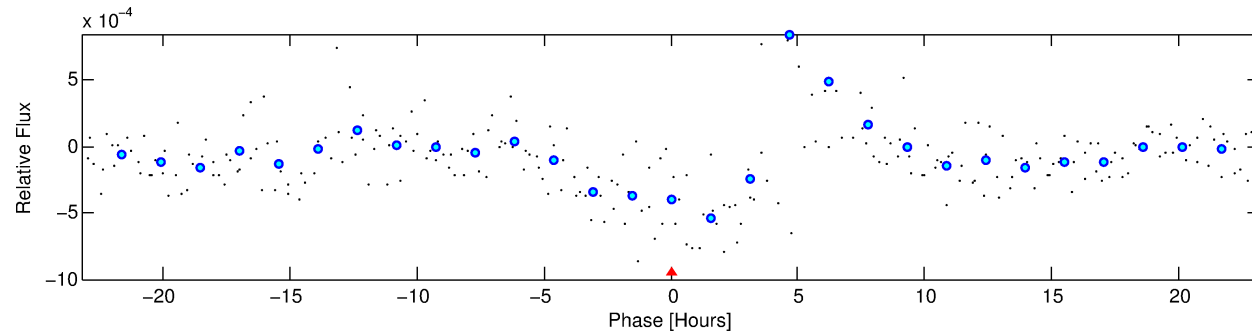
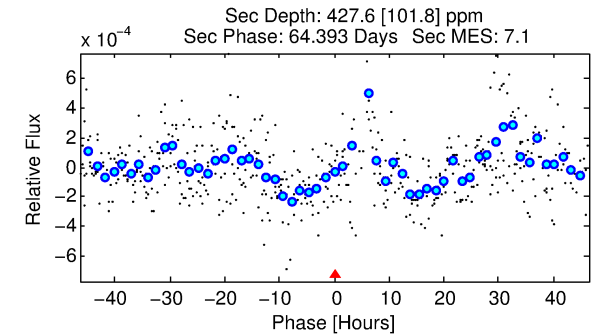
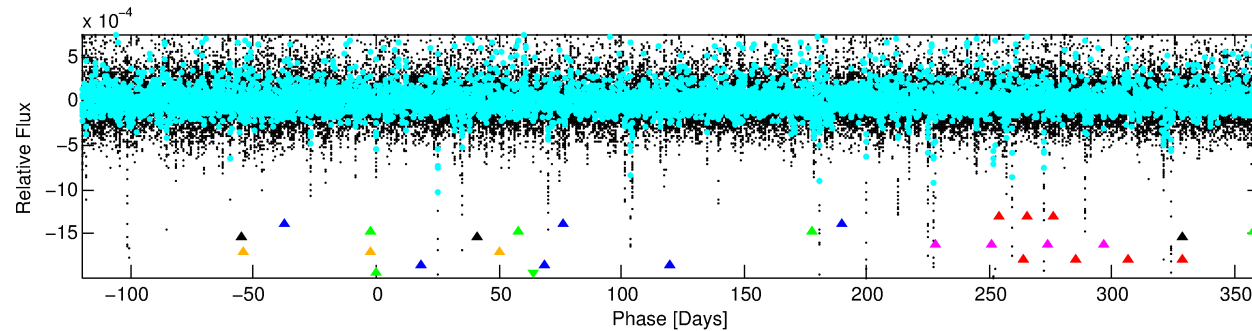
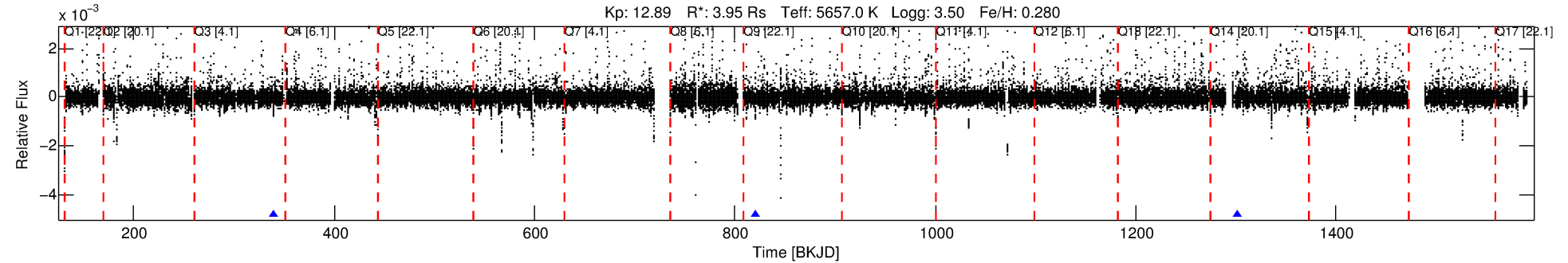
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011515713-09

No Significant Match Found

# DV One-Page Summary

KIC: 11515713 Candidate: 9 of 9 Period: 480.625 d



## TPS TCE Results:

Period = 480.62458 d  
Epoch = 339.9231 BKJD

DV fit results are unavailable

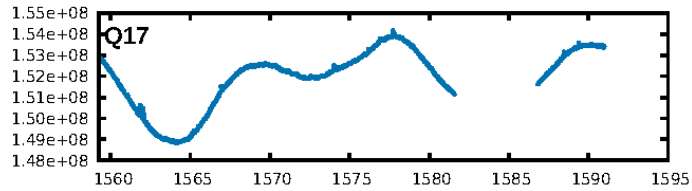
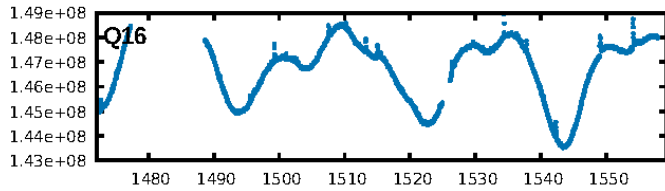
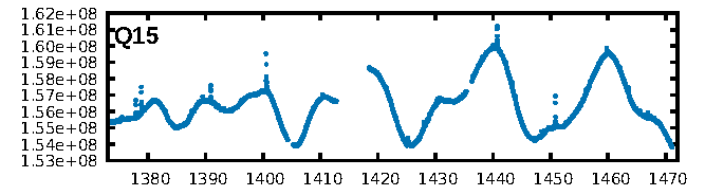
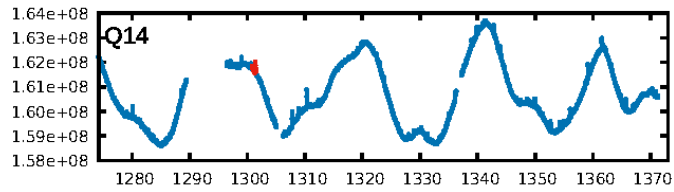
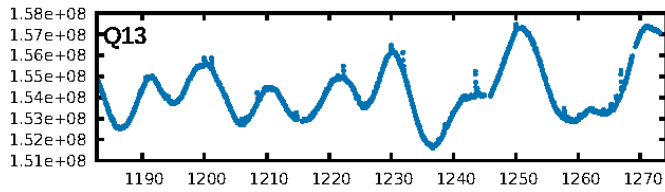
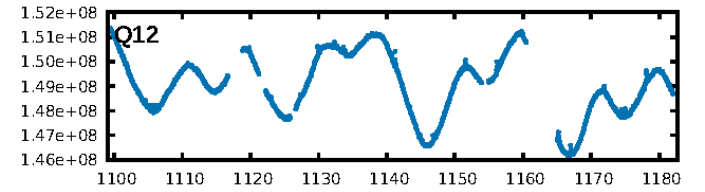
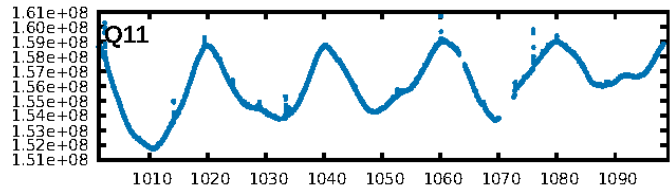
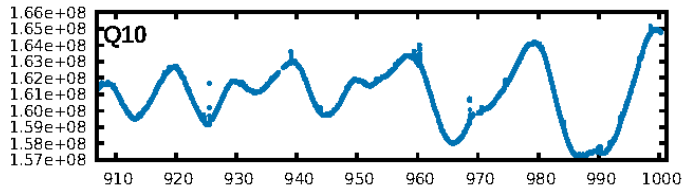
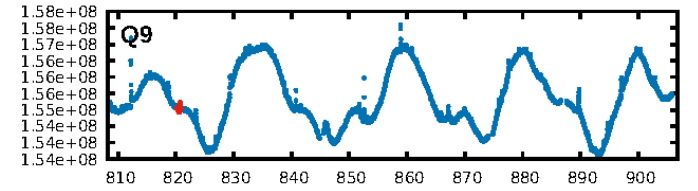
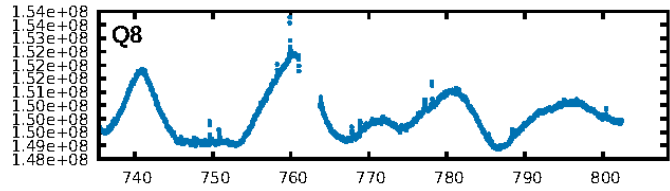
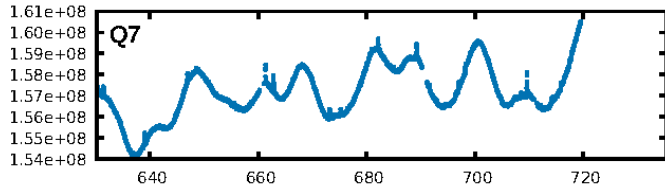
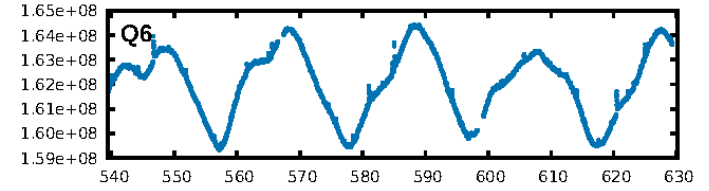
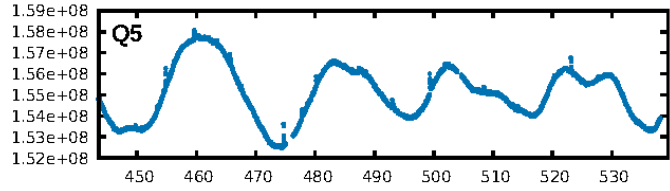
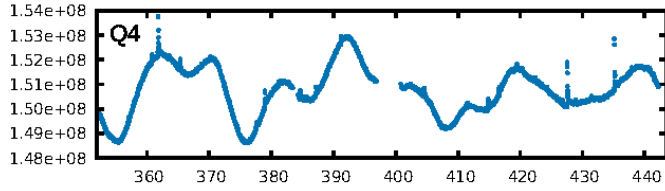
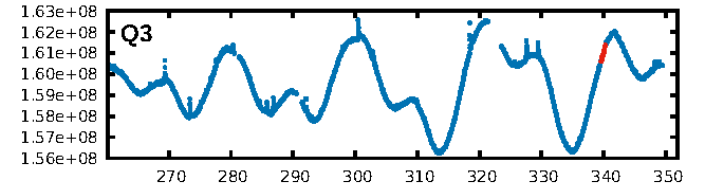
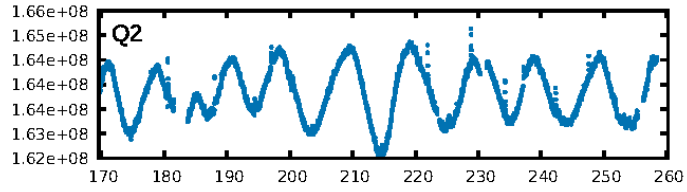
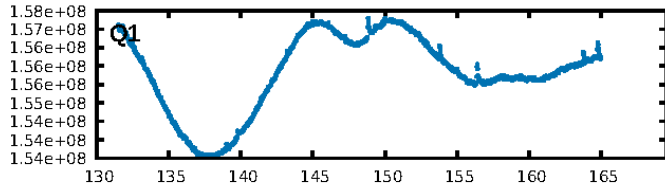
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [50.09 $\sigma$ ]  
LongPeriod-sig: 100.0% [29.21 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.812  
Centroid-sig: 7.3%  
Centroid-so: 1.016 arcsec [1.84 $\sigma$ ]  
OotOffset-rm: 0.508 arcsec [0.80 $\sigma$ ]  
KicOffset-rm: 0.630 arcsec [1.36 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
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DiffImageOverlap-fno: 1.00 [3/3]

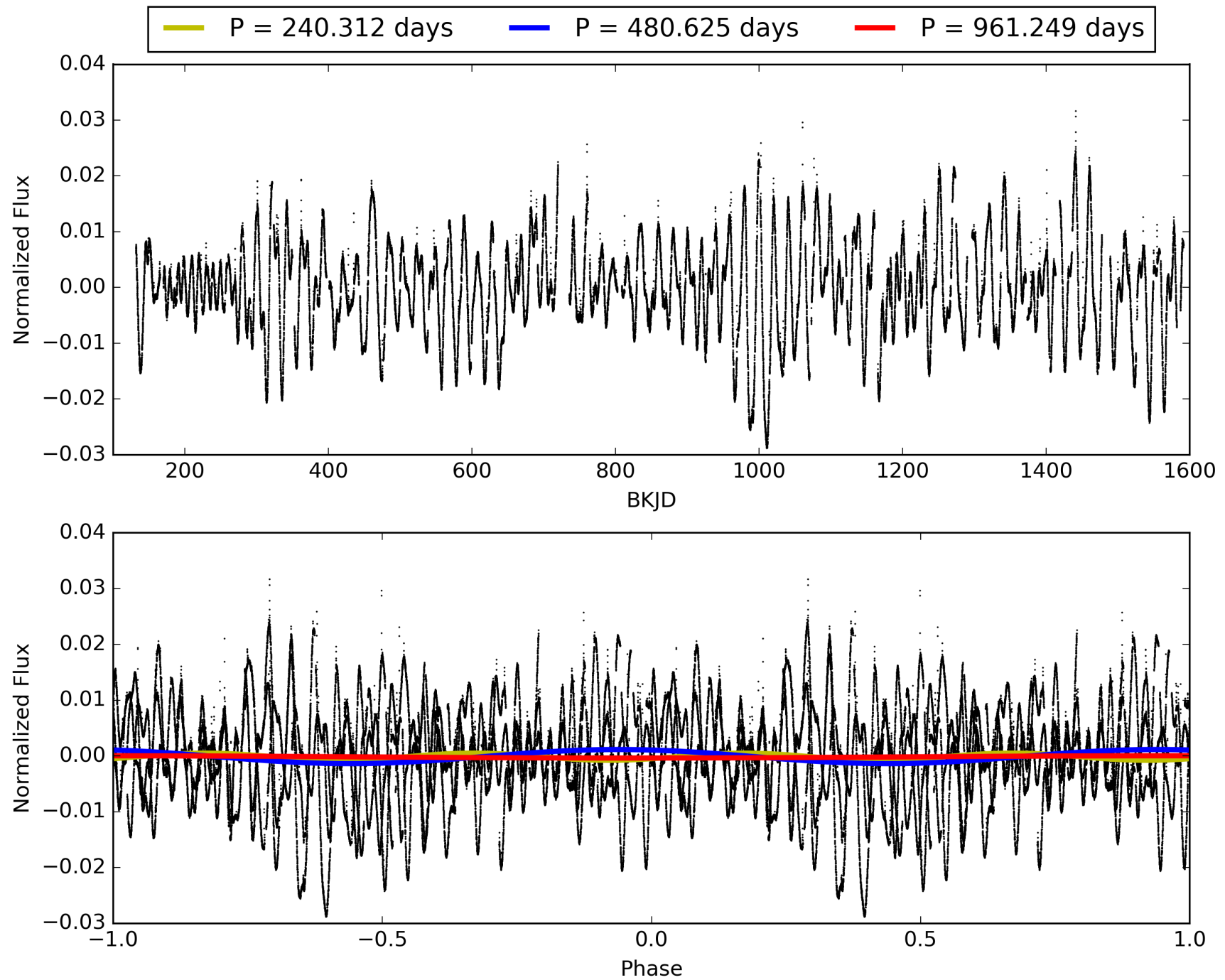
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:05:49 Z

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

## TCE 011515713-09, PDC Light Curves

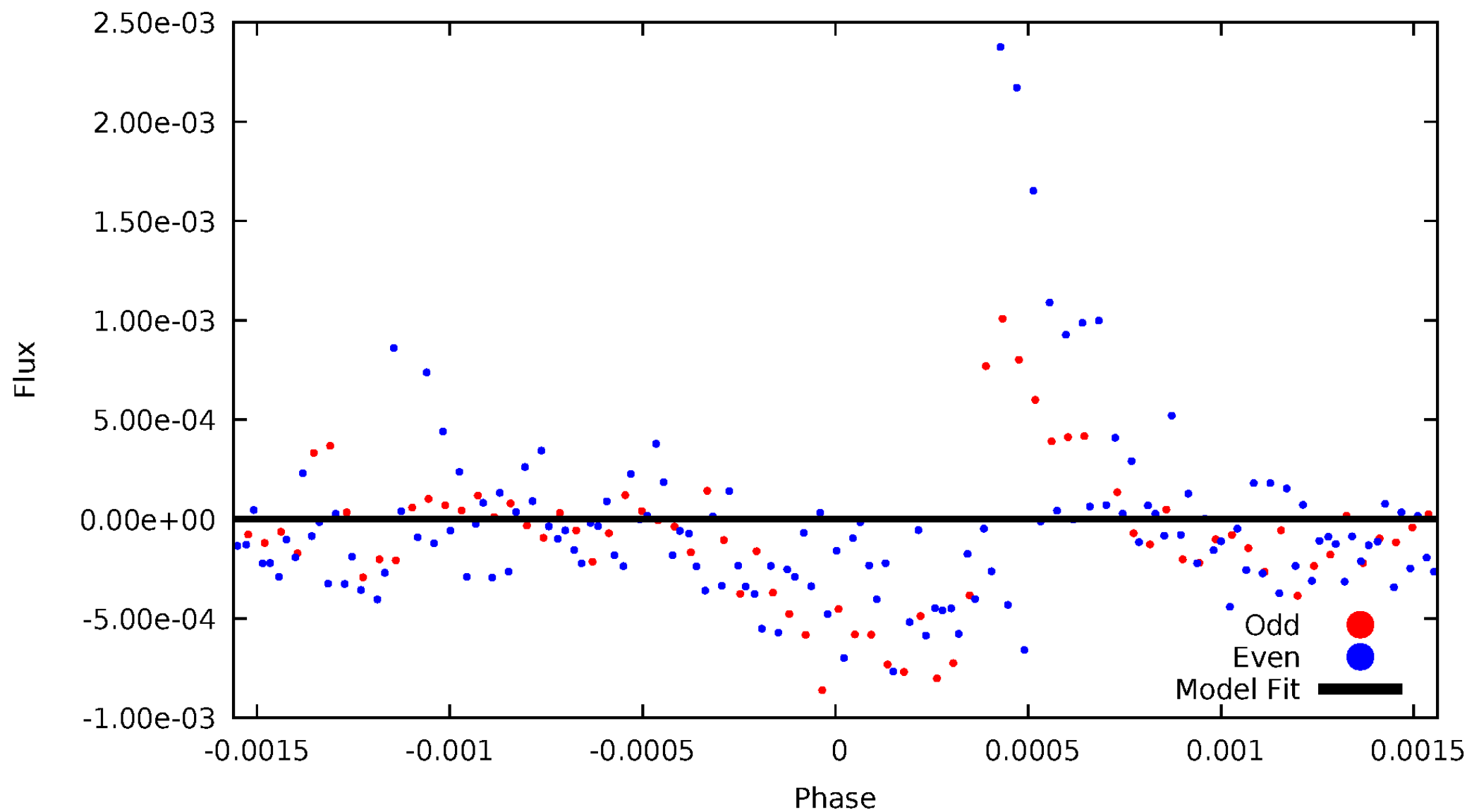


# TCE 011515713-09



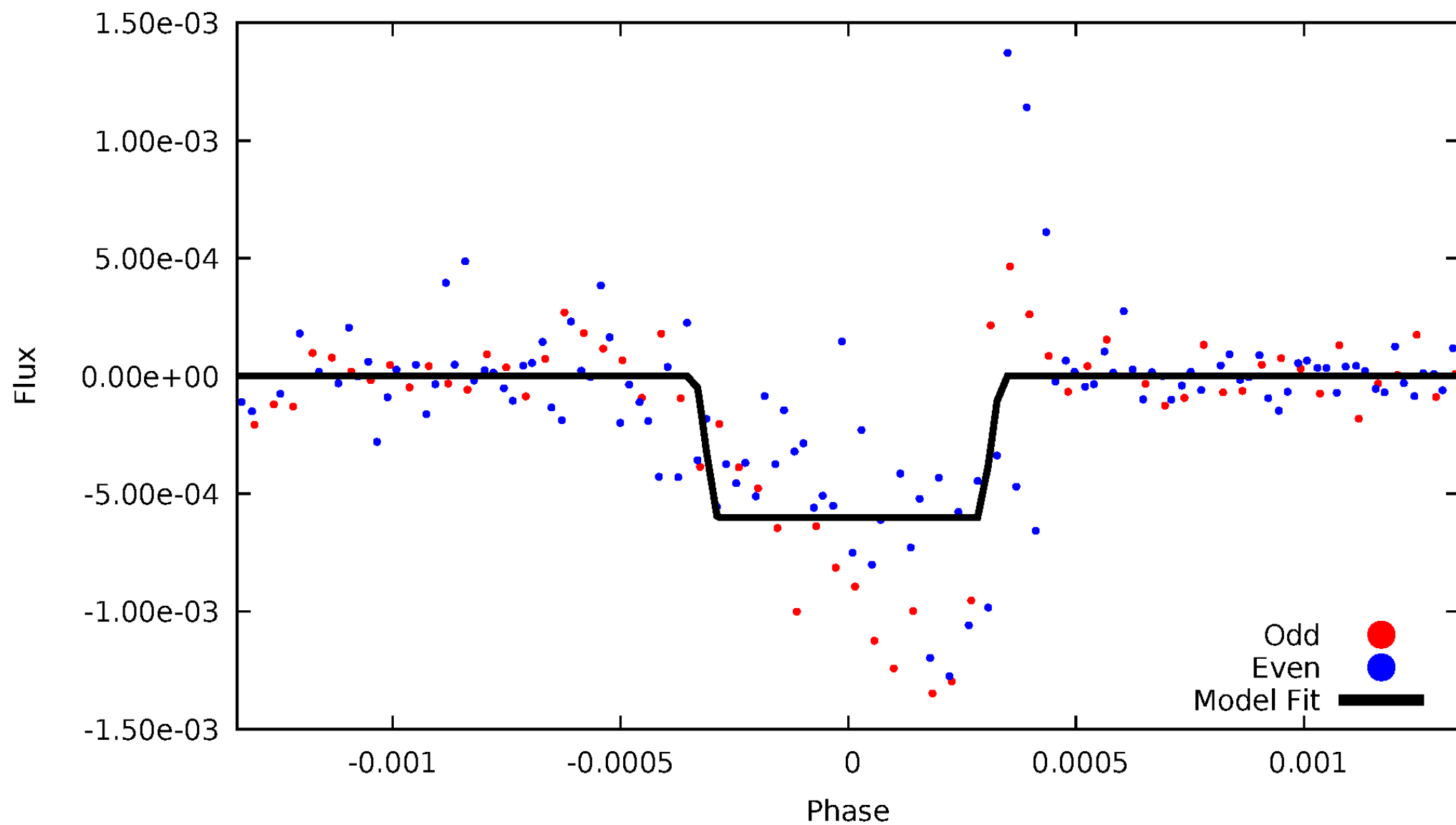
# DV Odd/Even

TCE 011515713-09

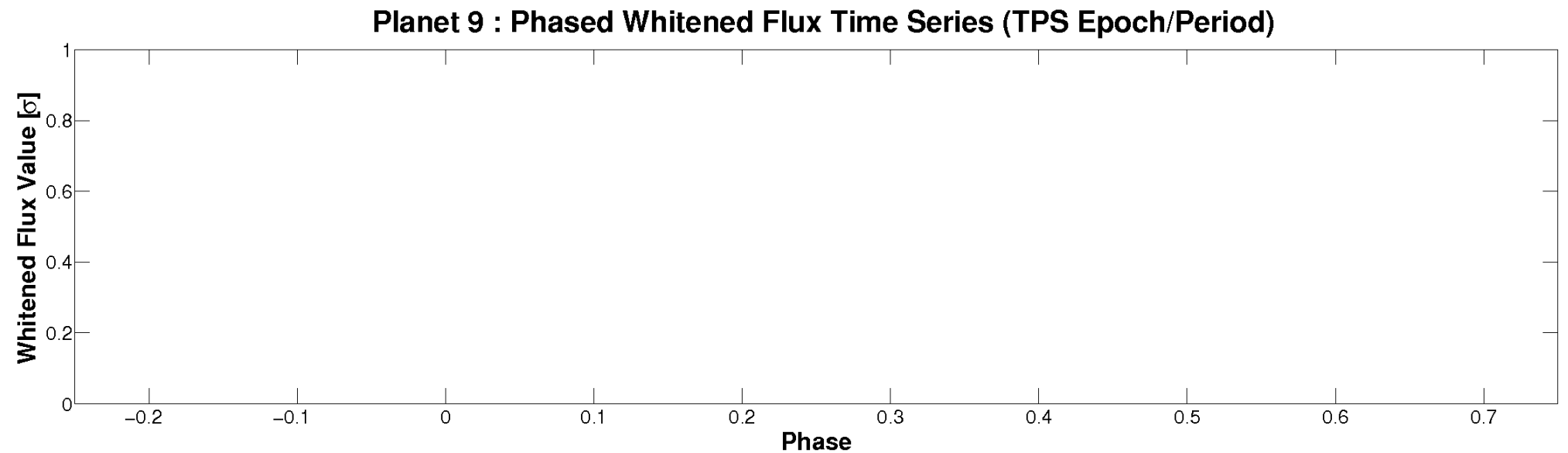
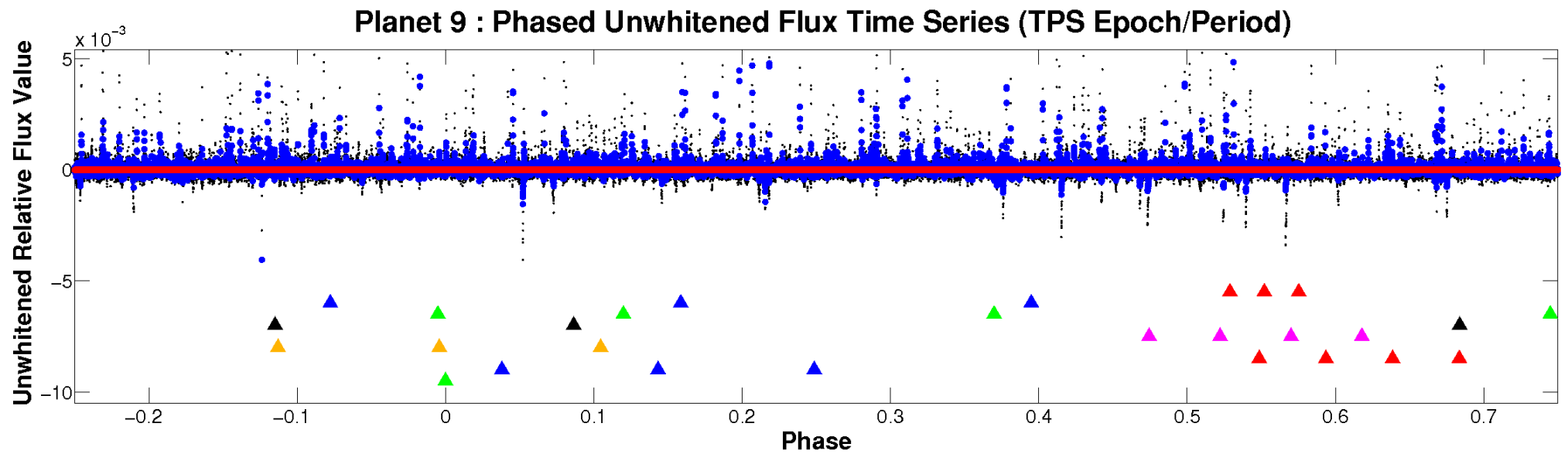


# ALT Odd/Even

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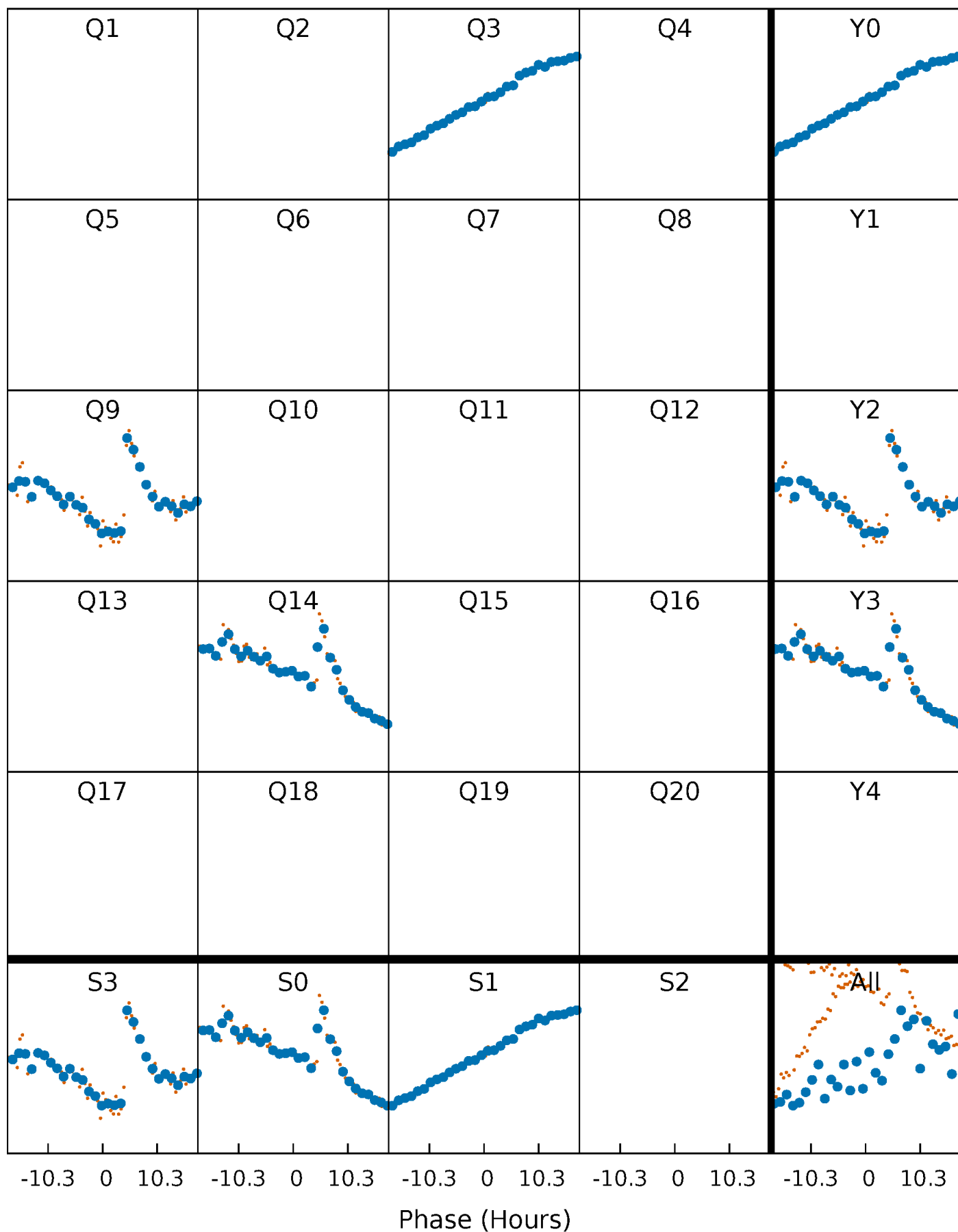


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

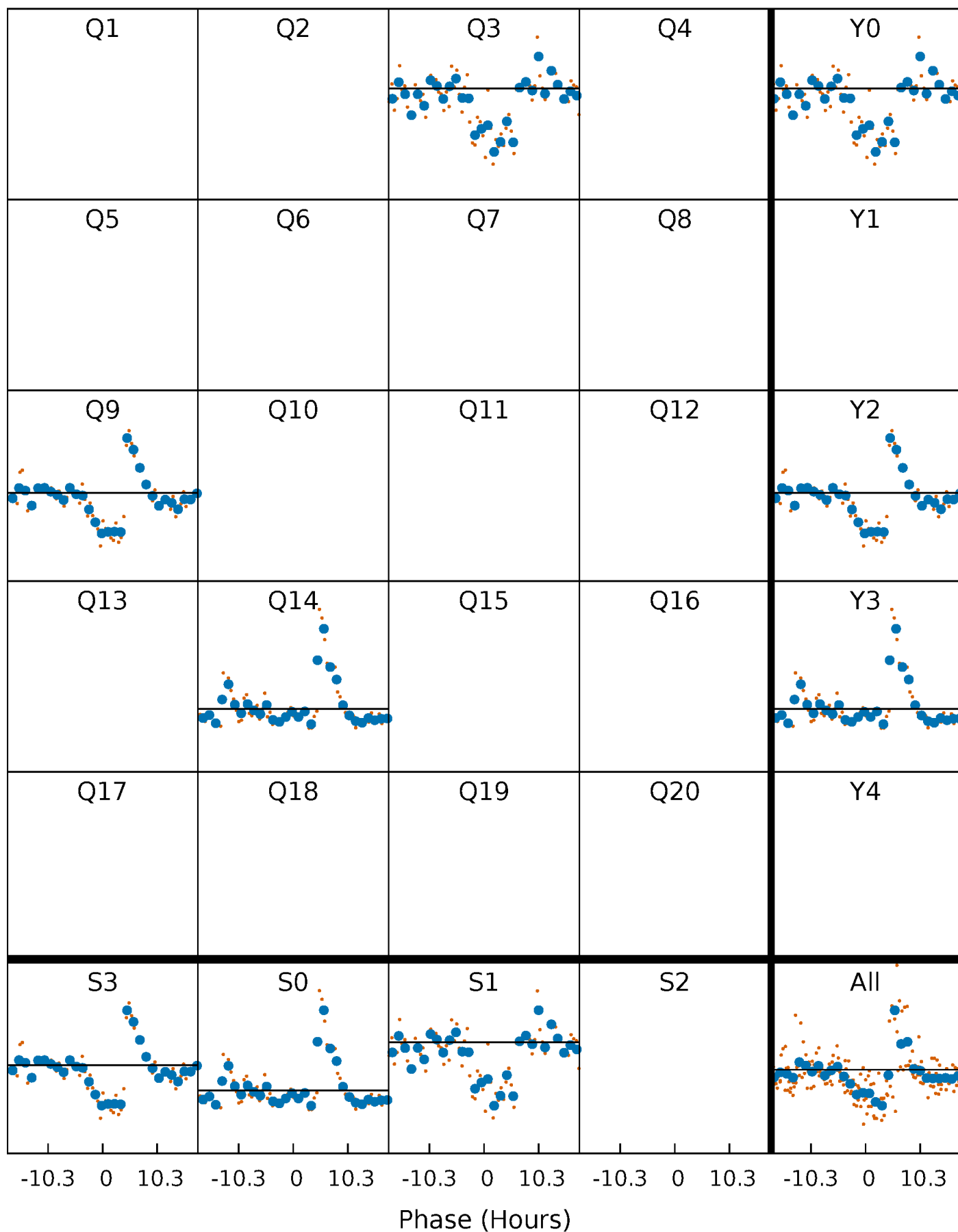
TCE 011515713-09 P=480.624576 Days  $T_0=339.923089$  (BKJD)





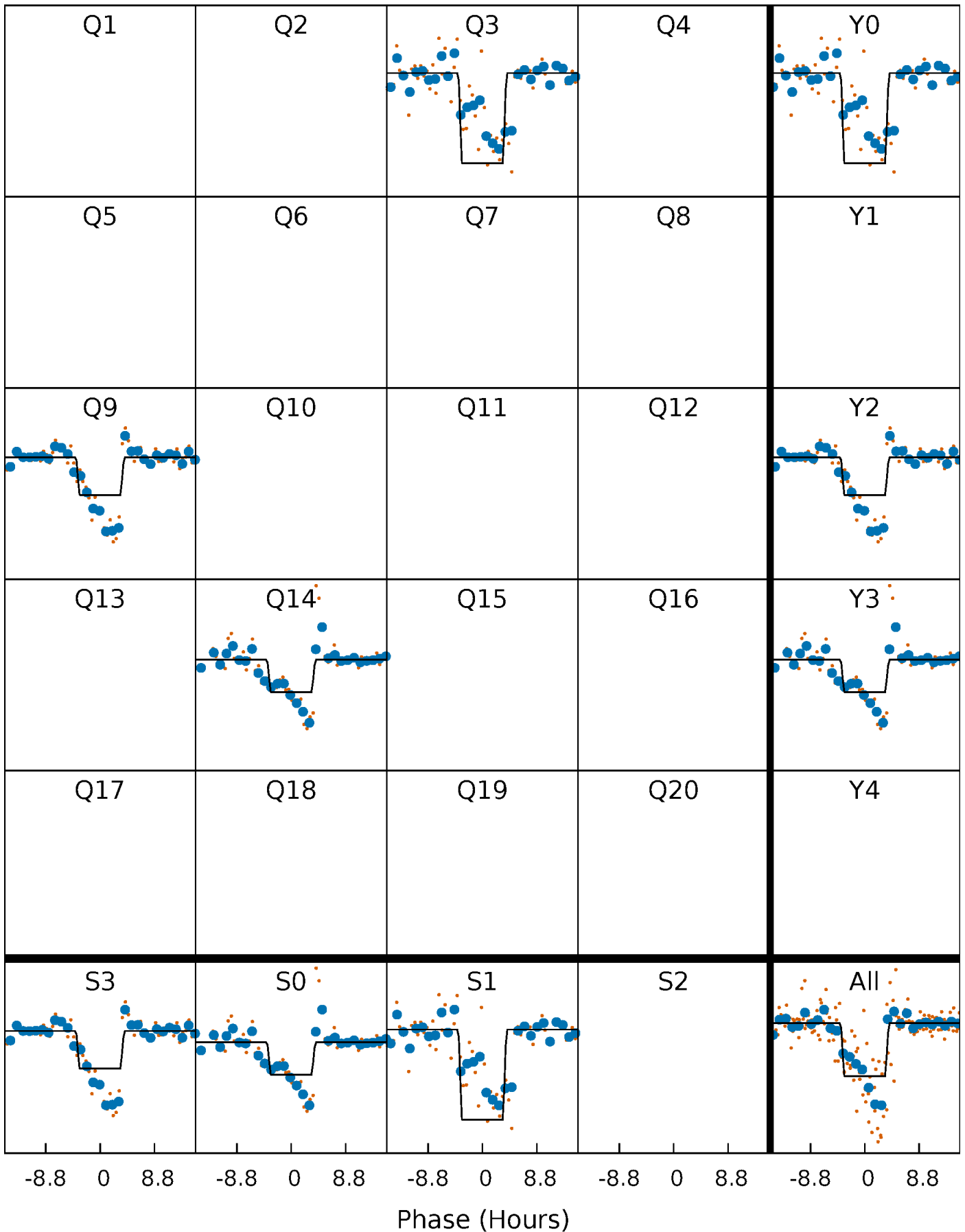
# DV Quarter-Phased Transit Curves

TCE 011515713-09     $P=480.624576$  Days     $T_0=339.923089$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

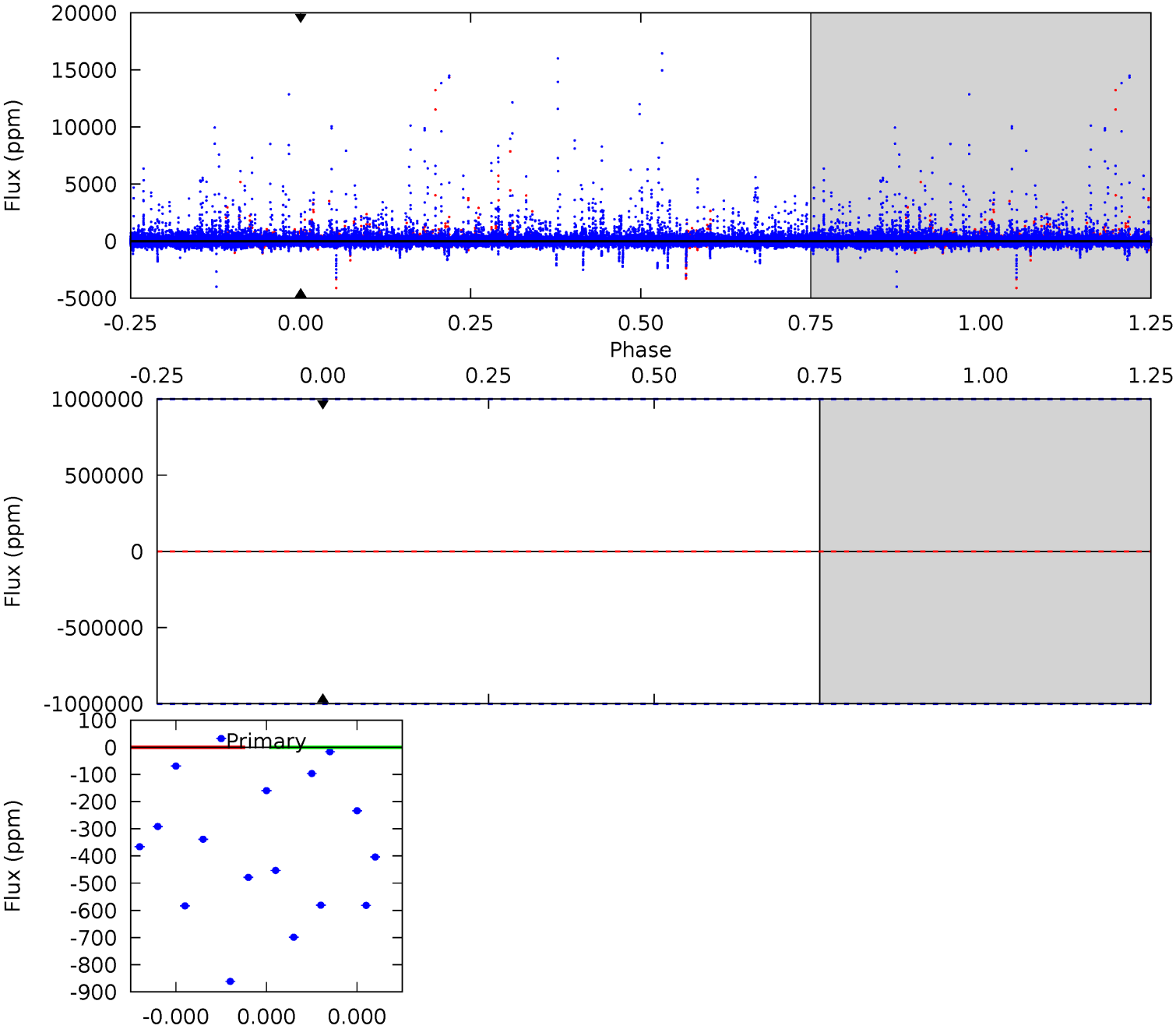
TCE 011515713-09 P=480.624576 Days  $T_0=339.960732$  (BKJD)



# DV Model-Shift Uniqueness Test

011515713-09, P = 480.624576 Days, E = 339.923089 Days

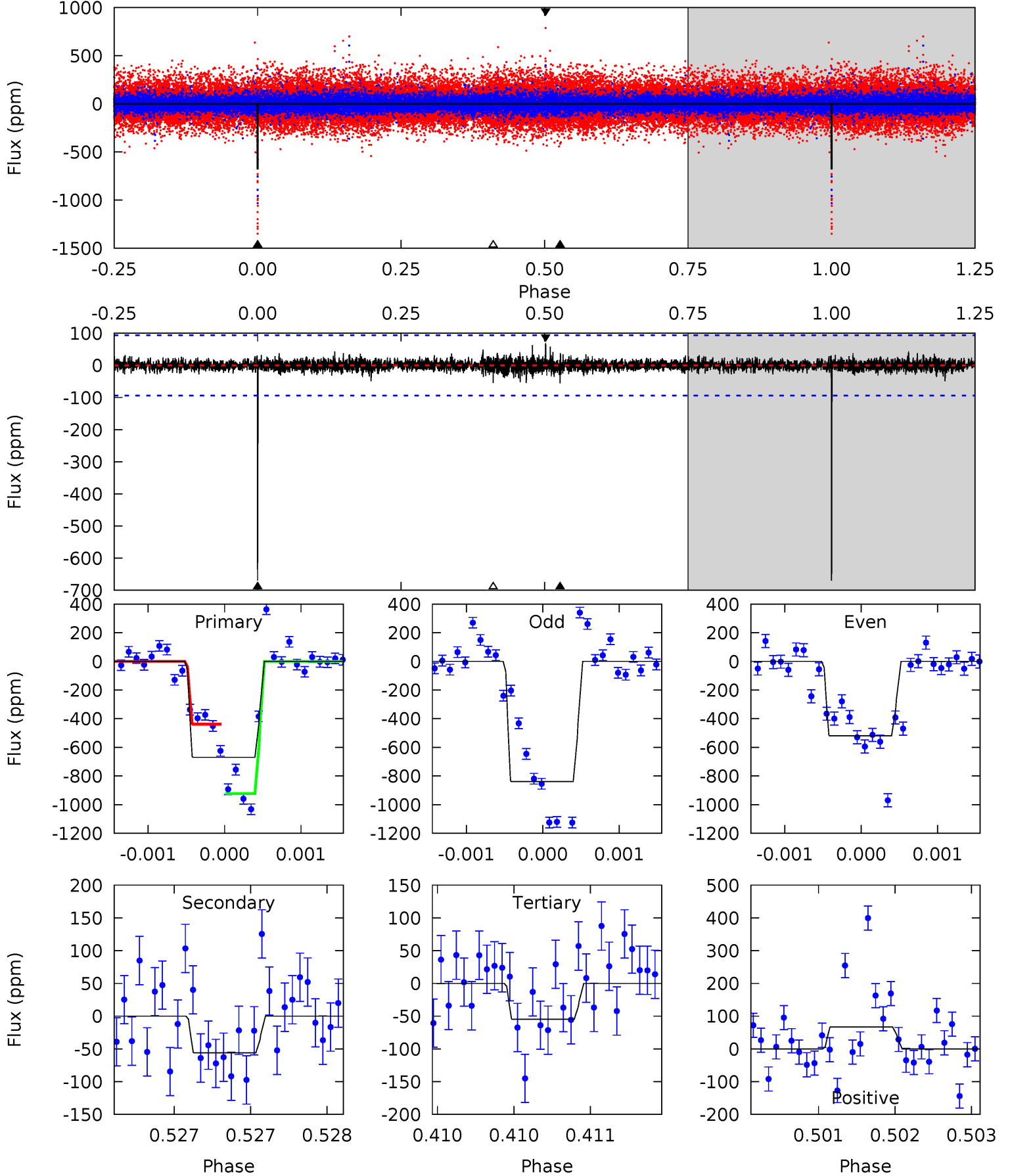
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

011515713-09, P = 480.624576 Days, E = 339.960732 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
39.4	3.28	3.23	3.94	5.52	3.40	0.57	36.2	35.4	0.05	-0.66	9.18	0.88	0.09	0



### Stellar Parameters For KIC 011515713

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5657^{+168}_{-168}$	$3.498^{+0.799}_{-0.141}$	$0.280^{+0.150}_{-0.250}$	$3.947^{+0.935}_{-2.806}$	$1.792^{+0.197}_{-0.789}$	$0.041^{+0.828}_{-0.017}$
	+3%/-3%	+23%/-4%	+54%/-89%	+24%/-71%	+11%/-44%	+2019%/-42%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011515713-09 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$25.82^{+32.27}_{-18.60}$	$552^{+52}_{-105}$	$5211^{+16311}_{-21326}$	$6937^{+372534}_{-197946}$
Alt.	$-56 \pm 17$	$27.84^{+36.43}_{-19.67}$	$558^{+47}_{-101}$	$2556^{+1064}_{-401}$	$78^{+821}_{-63}$

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

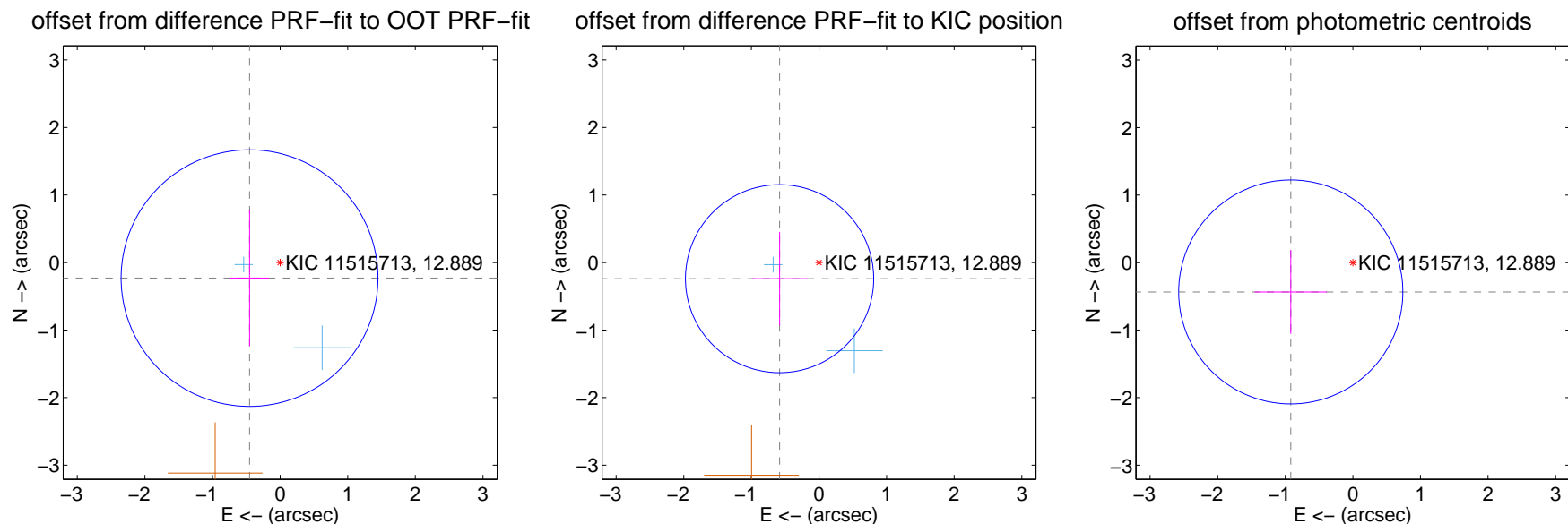
## DV Centroid Data

Supplemental centroid analysis for 011515713-09. Kepler magnitude: 12.89. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

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

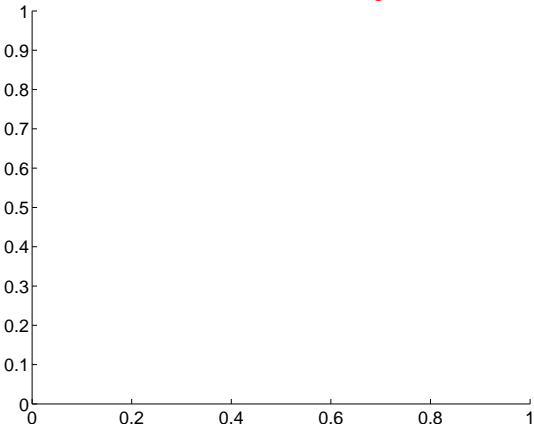
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.508 \pm 0.633$	0.80	$0.452 \pm 0.288$	$-0.230 \pm 1.006$
PRF-fit source offset from KIC position	$0.630 \pm 0.464$	1.36	$0.583 \pm 0.412$	$-0.239 \pm 0.692$
photometric centroid source offset	$1.02 \pm 0.55$	1.84	$0.92 \pm 0.54$	$-0.43 \pm 0.62$



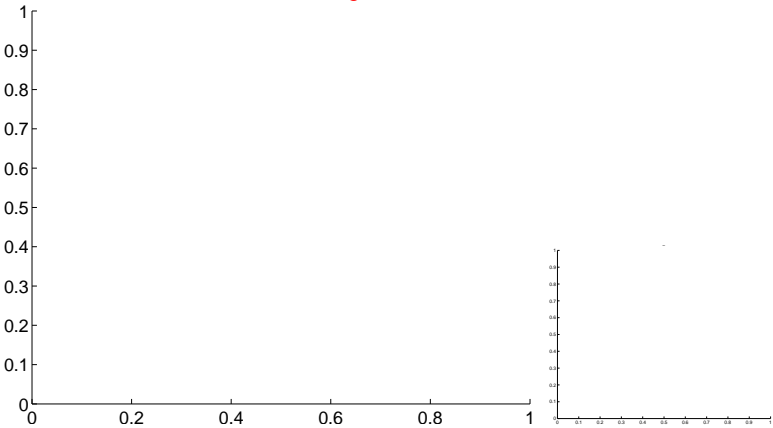
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

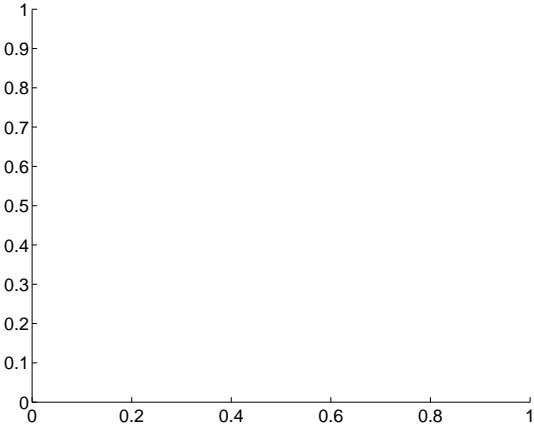
Q1 no difference image



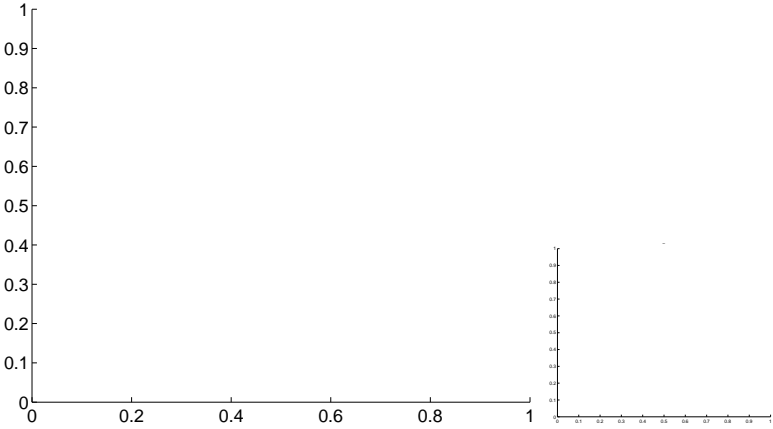
Q1 no OOT image



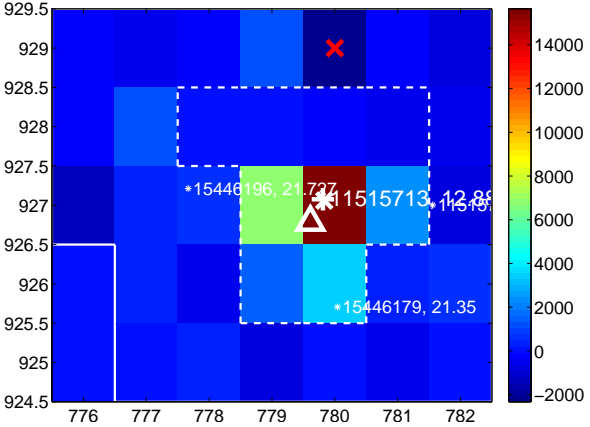
Q2 no difference image



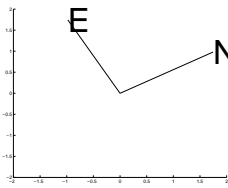
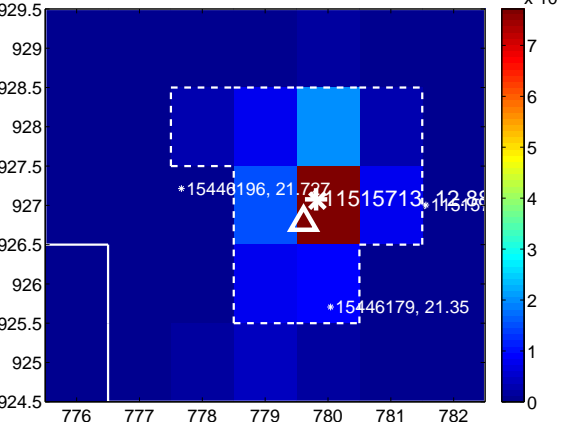
Q2 no OOT image



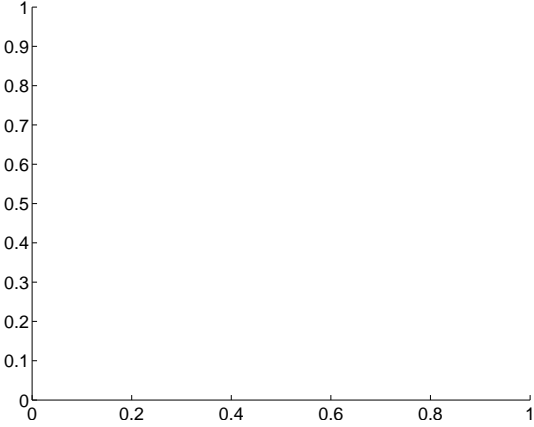
Q3 difference image



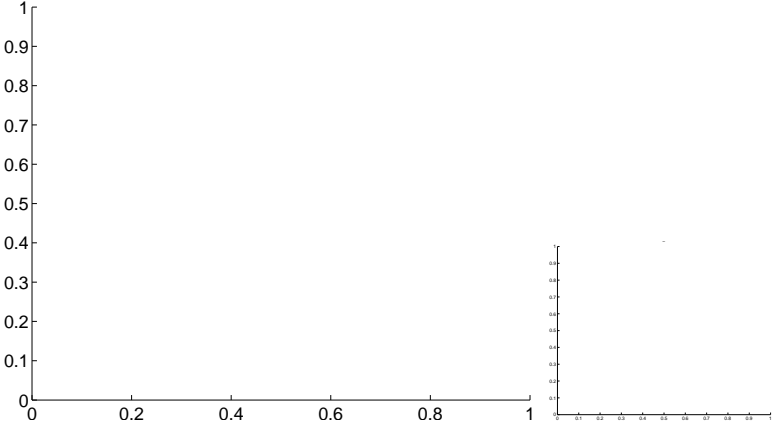
Q3 OOT image



Q4 no difference image



Q4 no OOT image

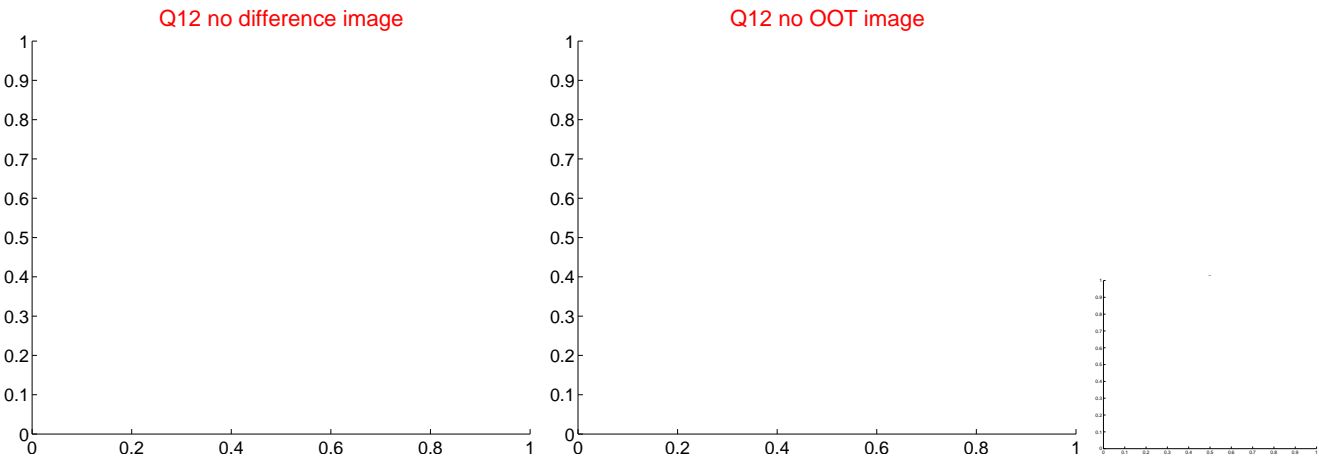
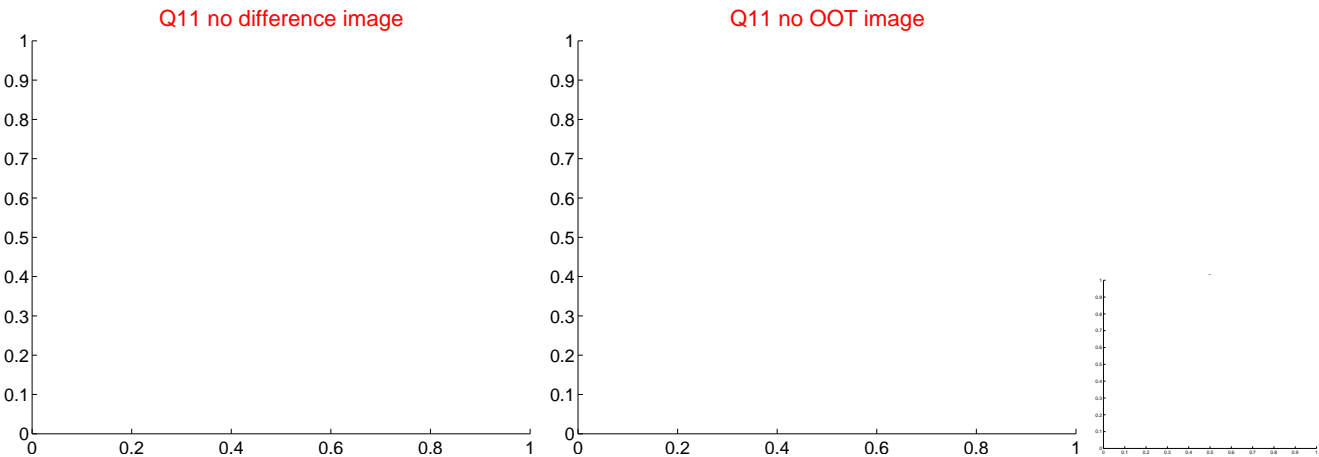
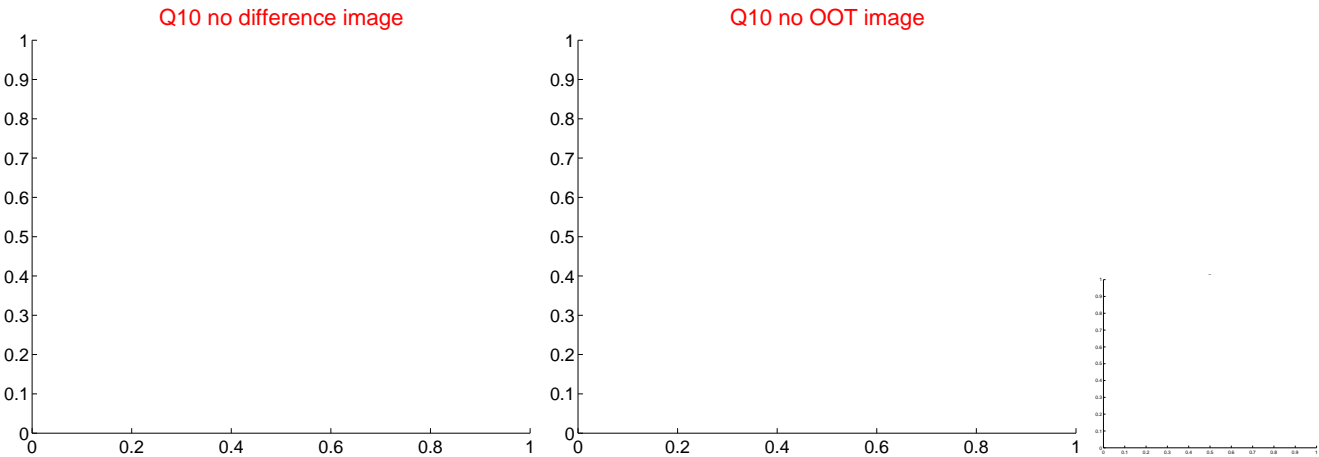
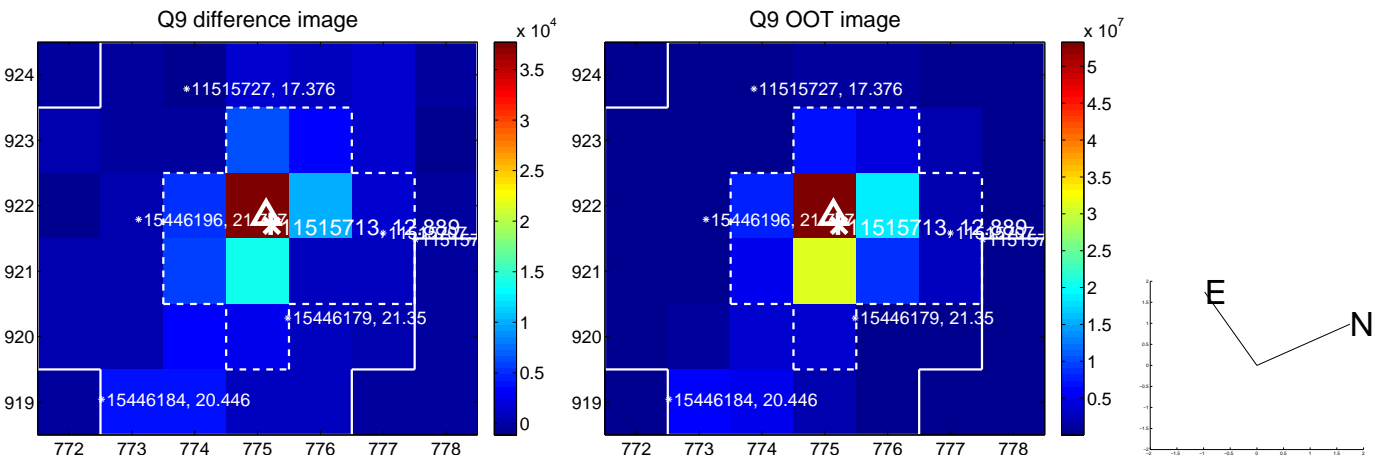


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

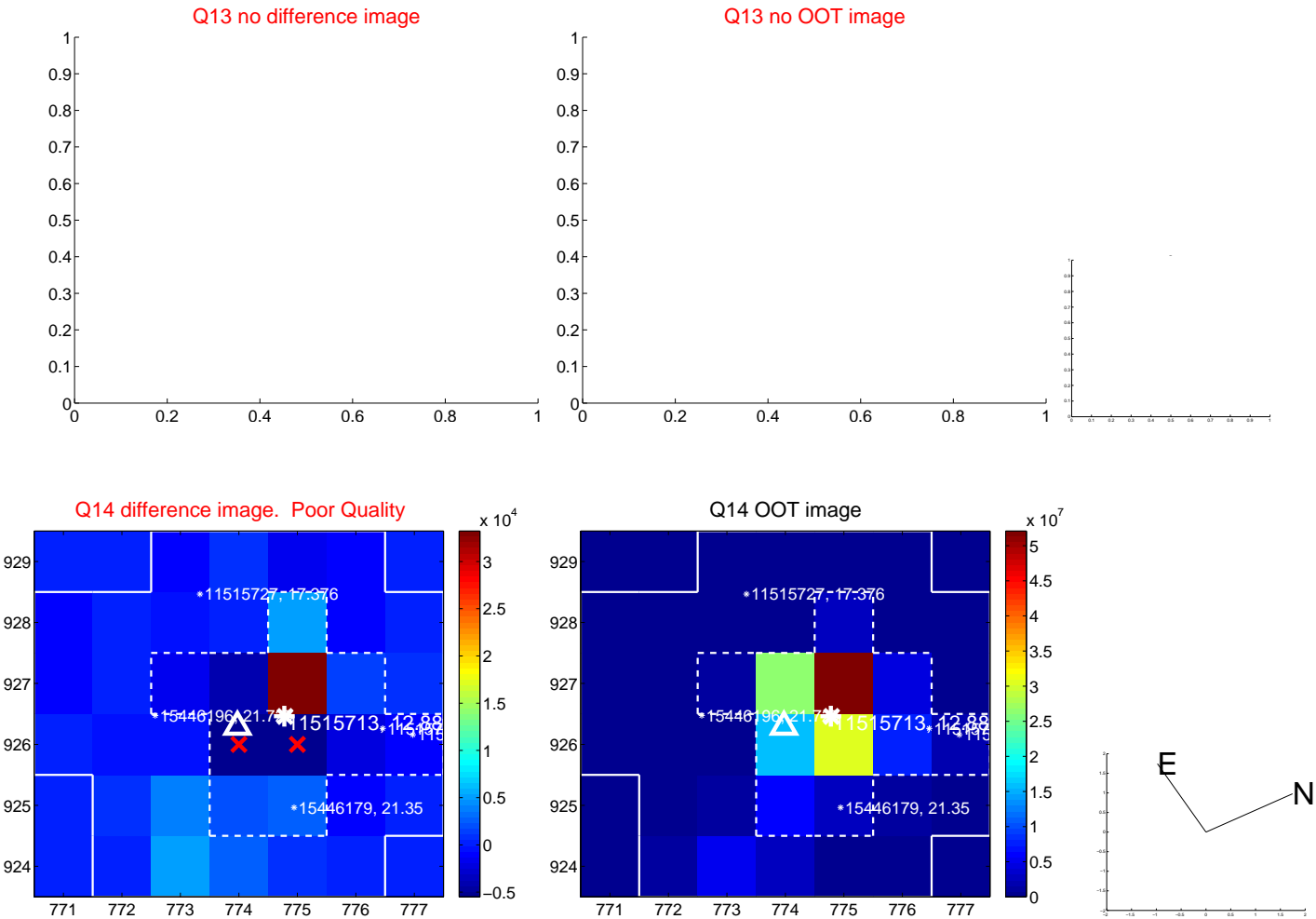




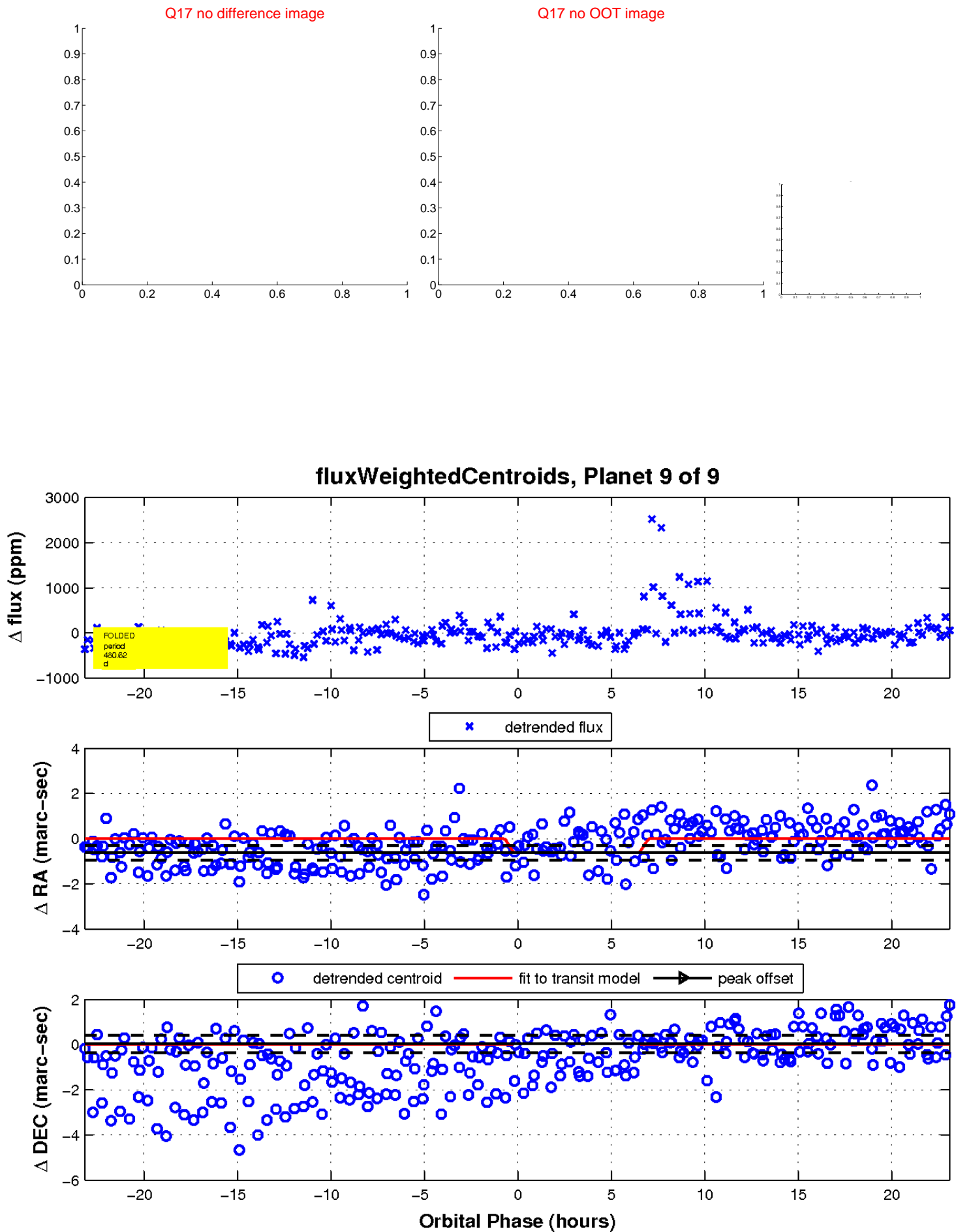
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

