

# KIC 008784119

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008784119-01	OBS	No	526.400453	310.781690	906.5	3.477	15.0	6.9	0.53	4386	1.59	0.09
008784119-03	OBS	No	366.677020	192.945604	812.9	14.690	11.5	5.1	0.53	4386	1.57	0.14
008784119-04	OBS	No	397.031225	314.385327	1396.9	14.652	12.9	8.2	0.53	4386	1.95	0.13
008784119-05	OBS	No	532.372569	214.583321	1087.5	2.484	12.5	7.3	0.53	4386	1.94	0.09
008784119-06	OBS	No	407.438305	234.571861	556.4	6.094	8.6	5.5	0.53	4386	1.29	0.12
008784119-07	OBS	No	0.932797	131.671610	841.5	2.000	7.7	-1.0	0.53	4386	1.50	407.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008784119-01	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
008784119-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008784119-06	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—MOD_POS_ALT—CENT_FEW_DIFFS
008784119-07	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

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

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

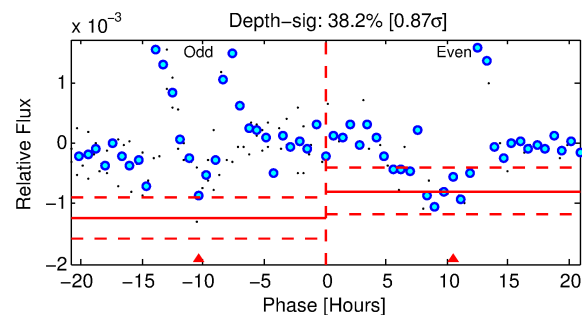
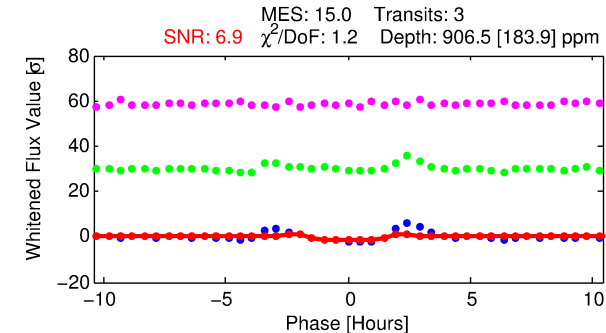
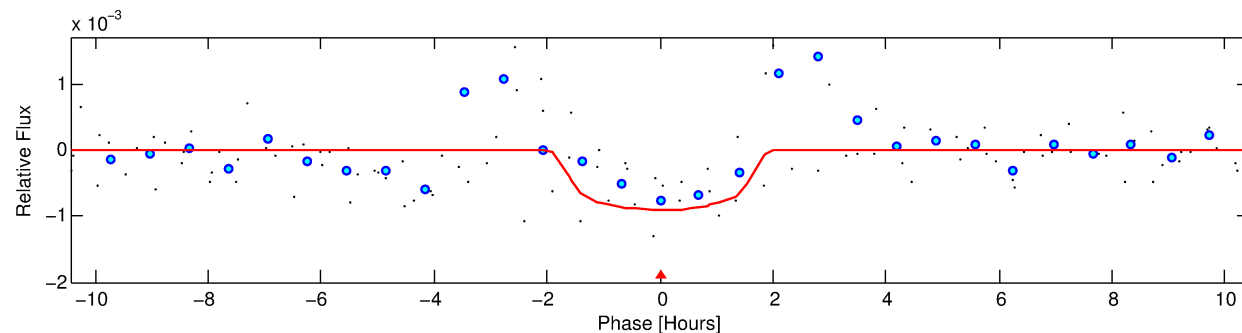
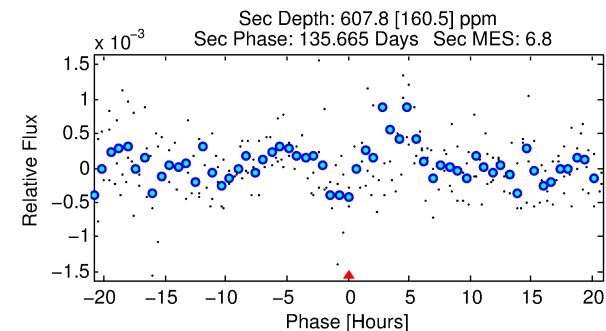
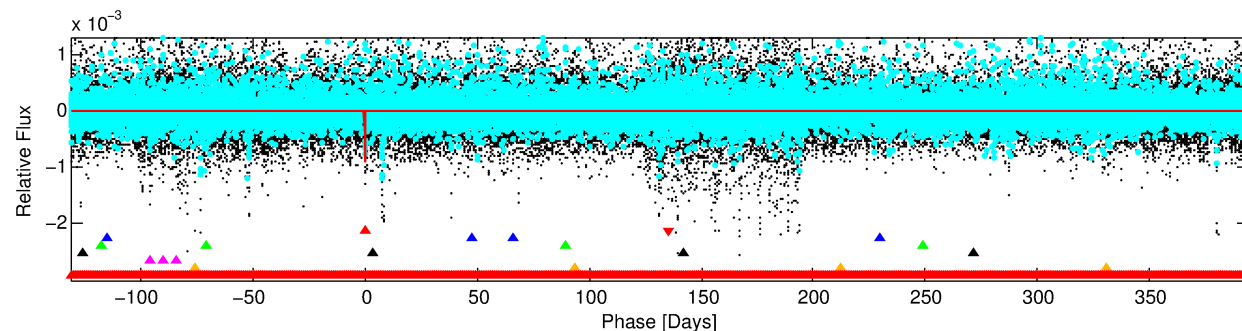
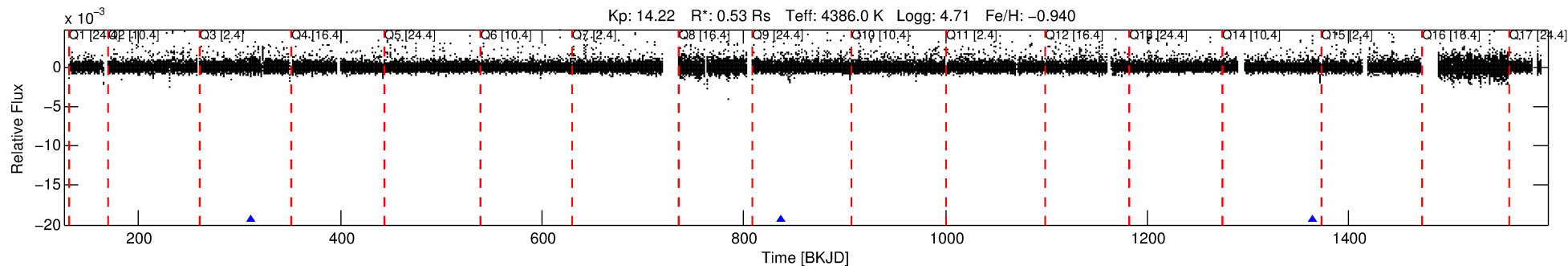
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008784119-01

No Significant Match Found

# DV One-Page Summary

KIC: 8784119 Candidate: 1 of 7 Period: 526.400 d



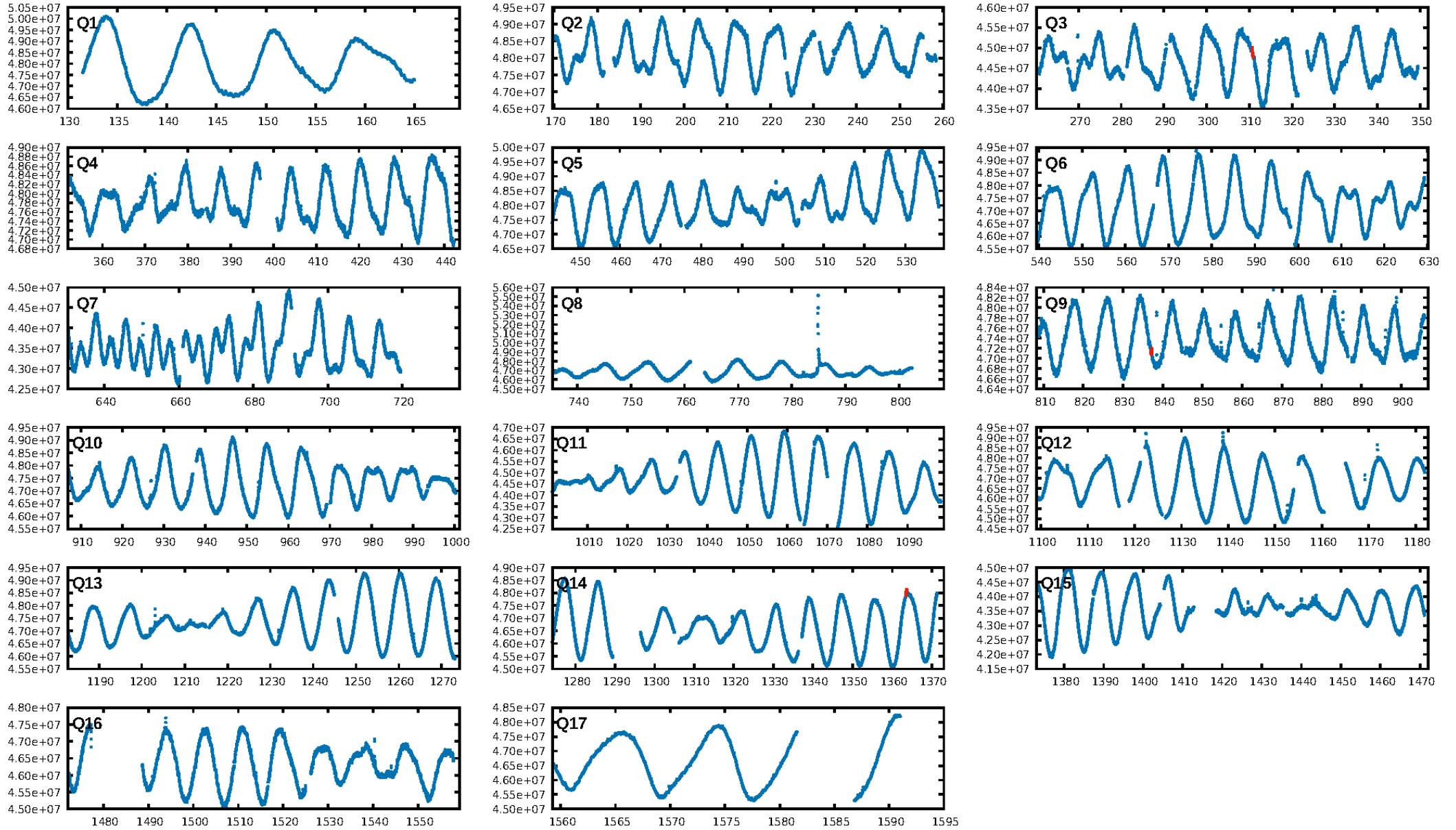
## DV Fit Results:

Period = 526.40045 [0.00758] d  
Epoch = 310.7817 [0.0094] BKJD  
Rp/R\* = 0.0276 [0.0628]  
a/R\* = 1104.05 [9372.84]  
b = 0.38 [19.42]  
Seff = 0.09 [0.01]  
Teq = 139 [6] K  
Rp = 1.59 [3.62] Re  
a = 1.0280 [0.0752] AU  
Ag = 140205.45 [639861.09] [0.22σ]  
Teffp = 4149 [4734] K [0.85σ]

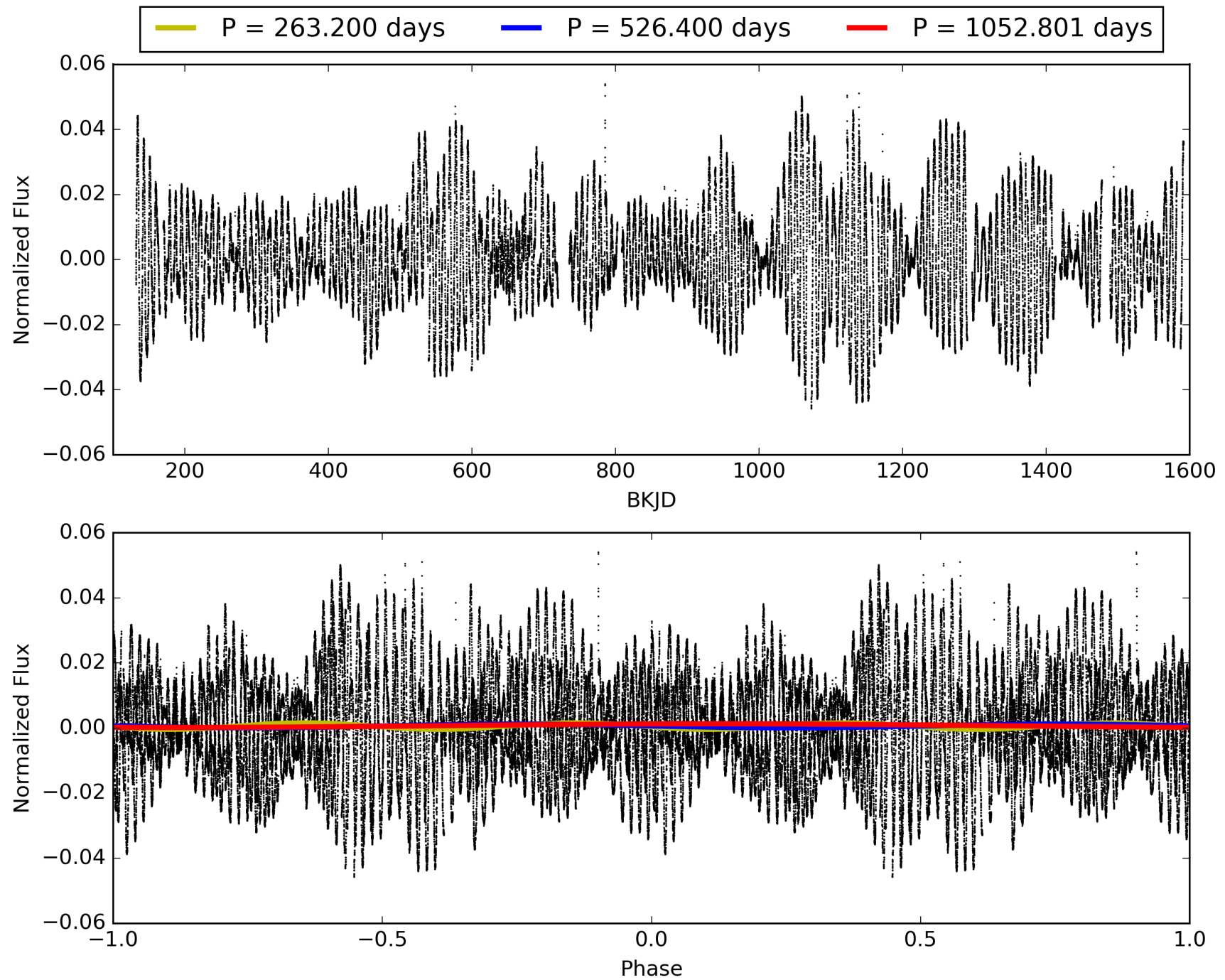
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [406.92σ]  
LongPeriod-sig: 100.0% [33.54σ]  
ModelChiSquare2-sig: 7.1%  
ModelChiSquareGof-sig: 68.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.549  
Centroid-sig: 7.5%  
Centroid-so: 2.344 arcsec [1.38σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.00 [0/3]

# TCE 008784119-01, PDC Light Curves



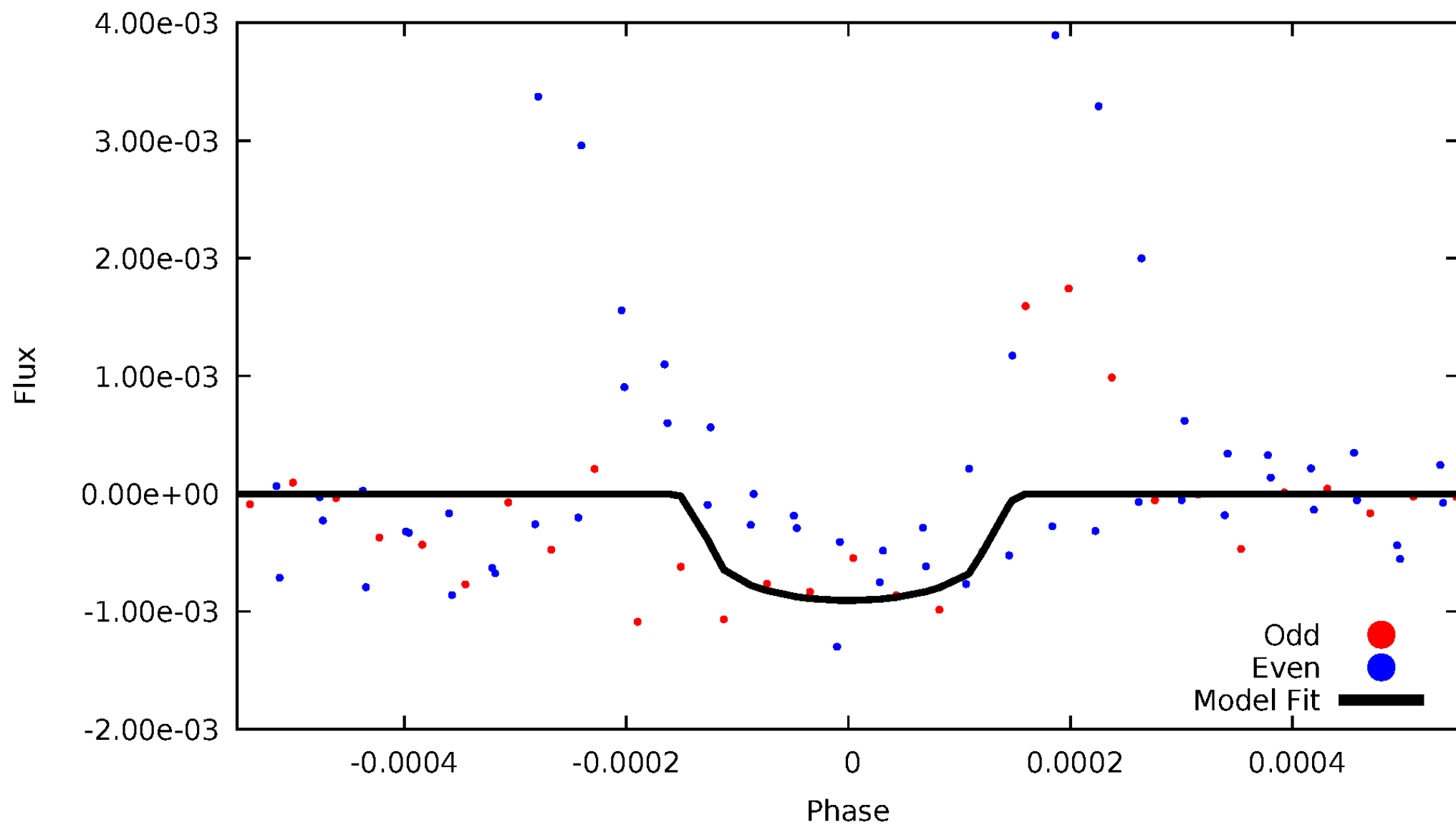
# TCE 008784119-01





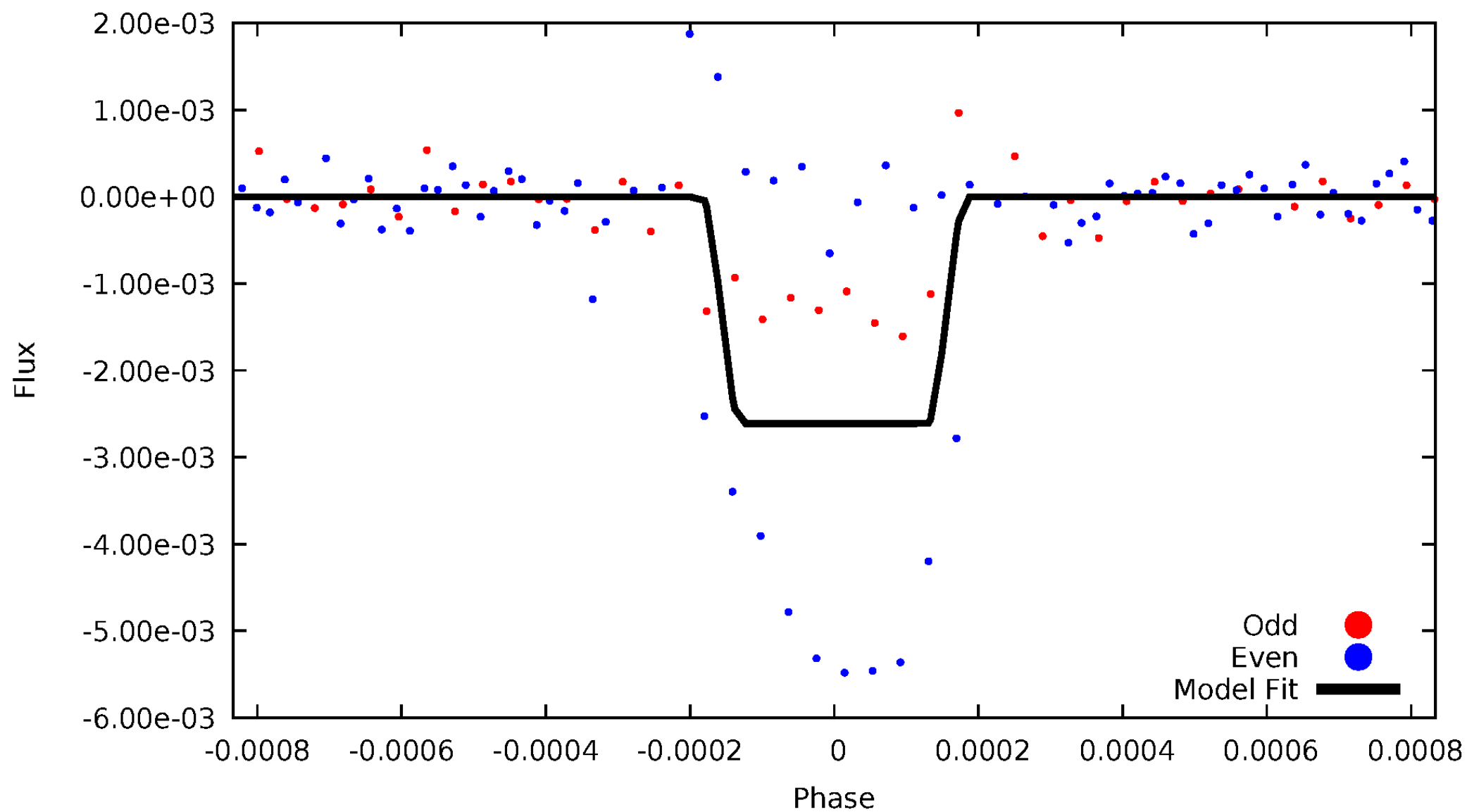
# DV Odd/Even

TCE 008784119-01



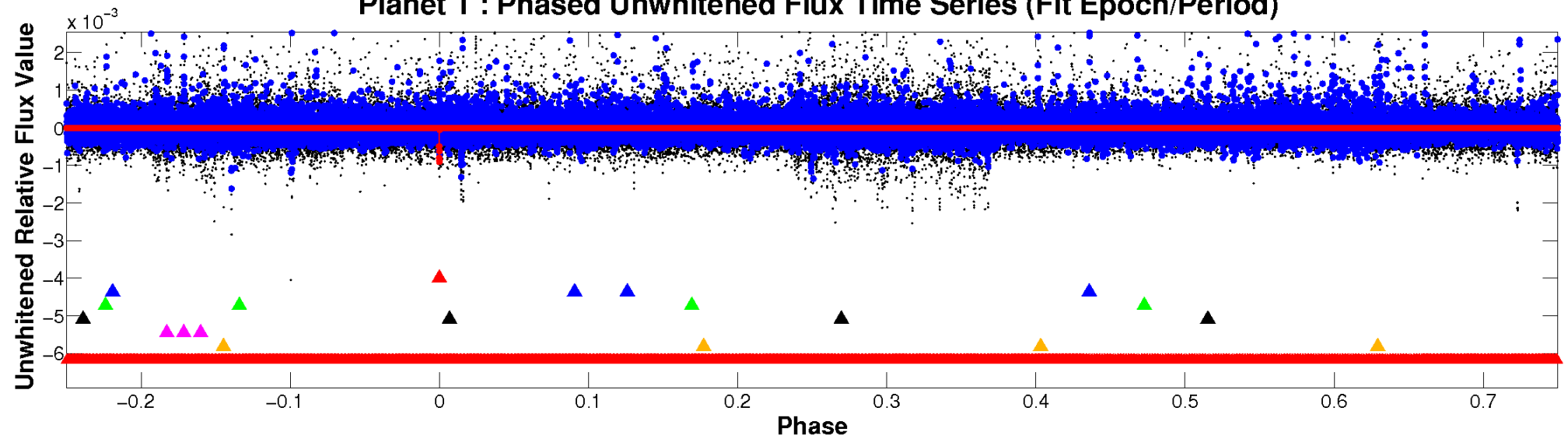
# ALT Odd/Even

TCE 008784119-01

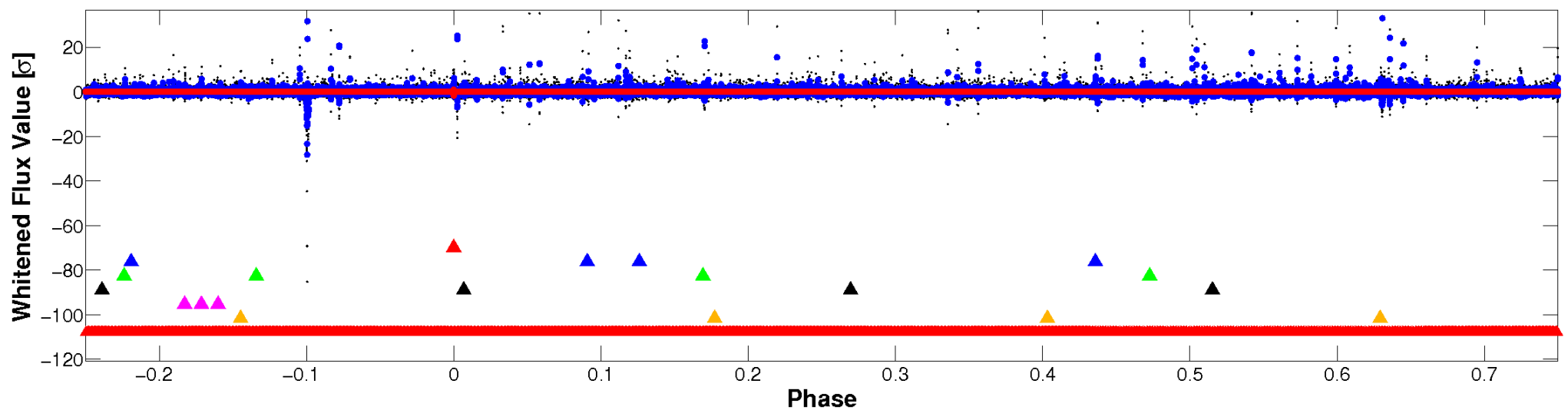


# Non-Whitened Vs. Whitened Light Curve

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

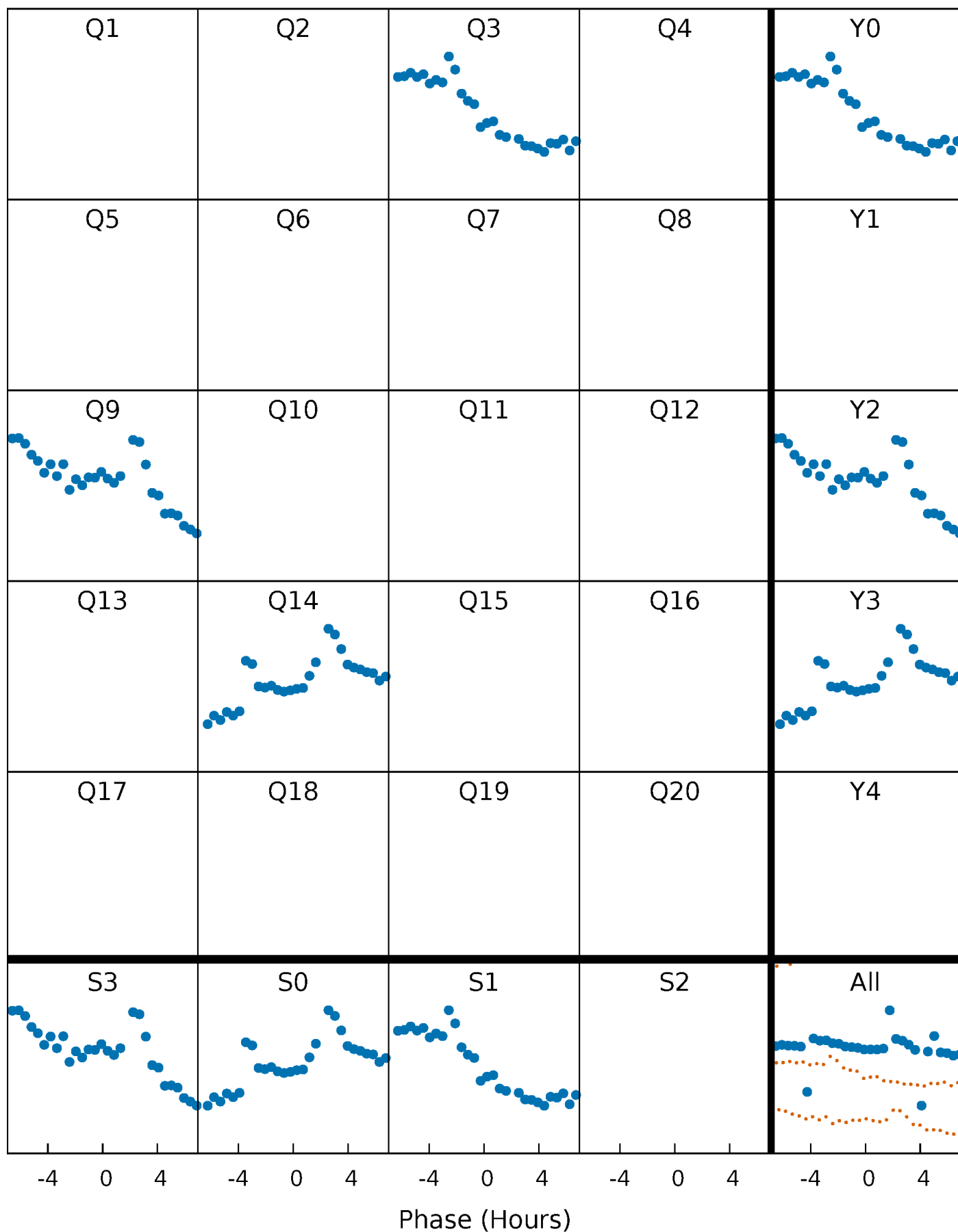


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



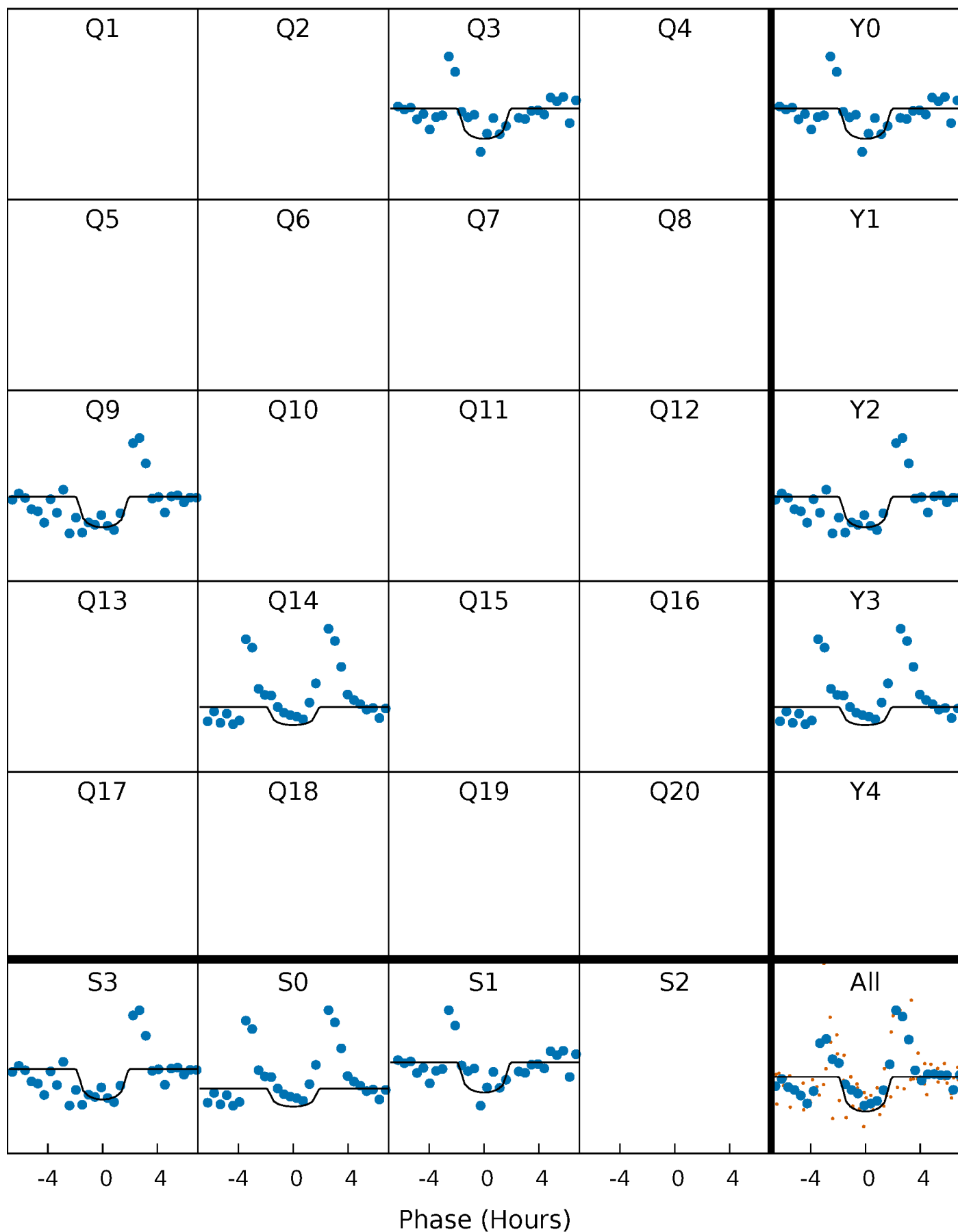
# PDC Quarter-Phased Transit Curves

TCE 008784119-01 P=526.400453 Days  $T_0=310.781690$  (BKJD)



# DV Quarter-Phased Transit Curves

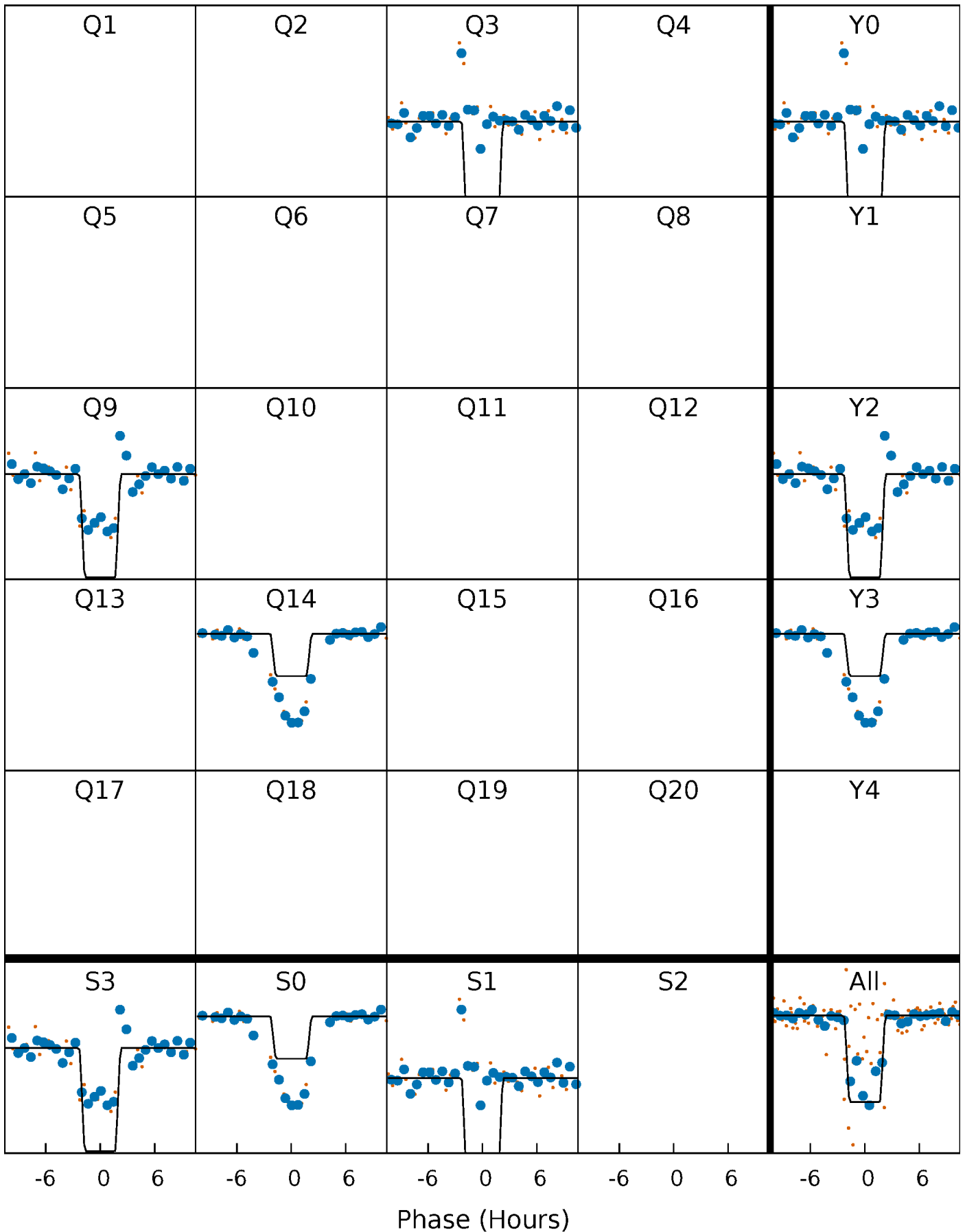
TCE 008784119-01 P=526.400453 Days  $T_0=310.781690$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

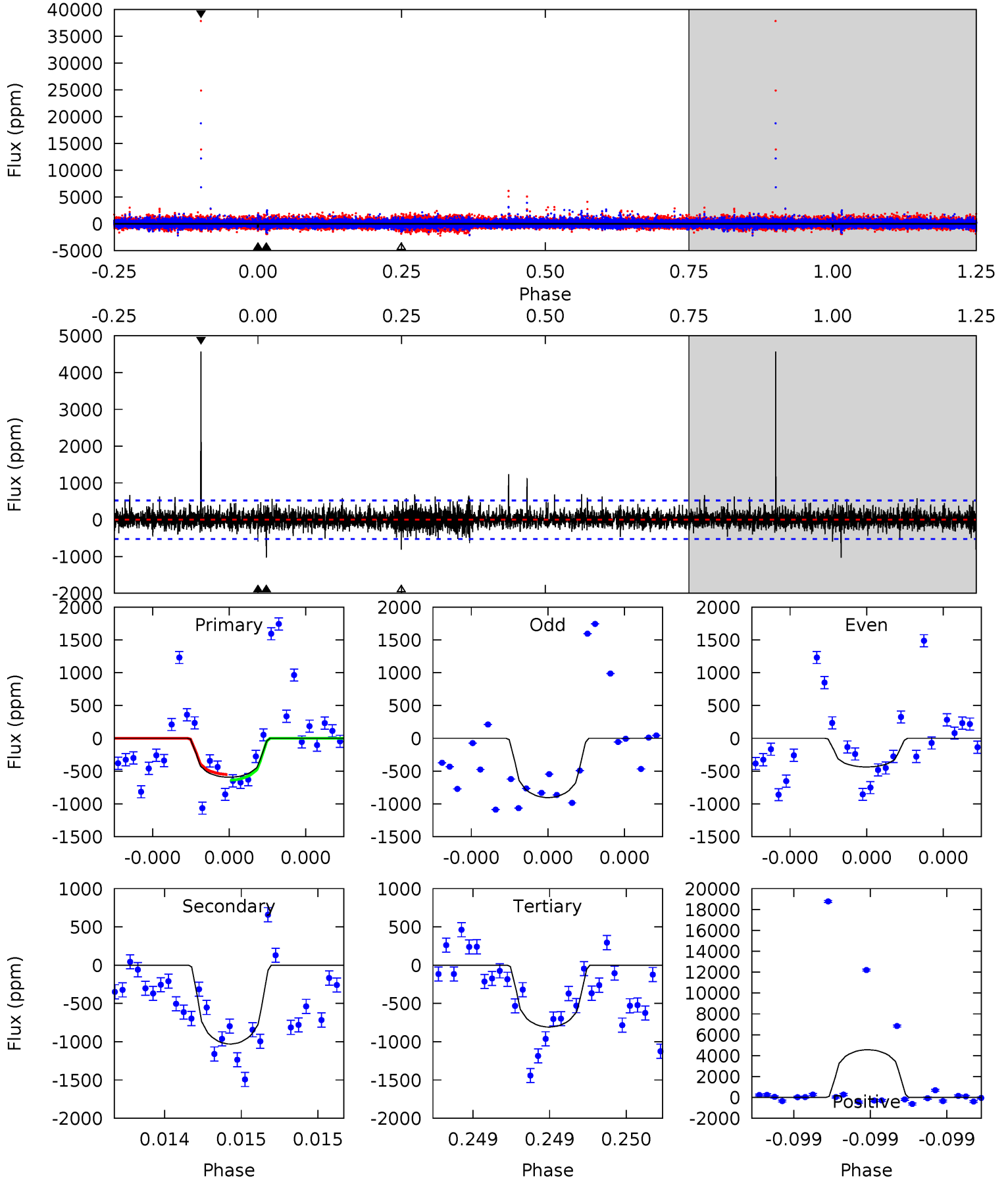
TCE 008784119-01 P=526.395750 Days  $T_0=310.779587$  (BKJD)



# DV Model-Shift Uniqueness Test

008784119-01, P = 526.400453 Days, E = 310.781690 Days

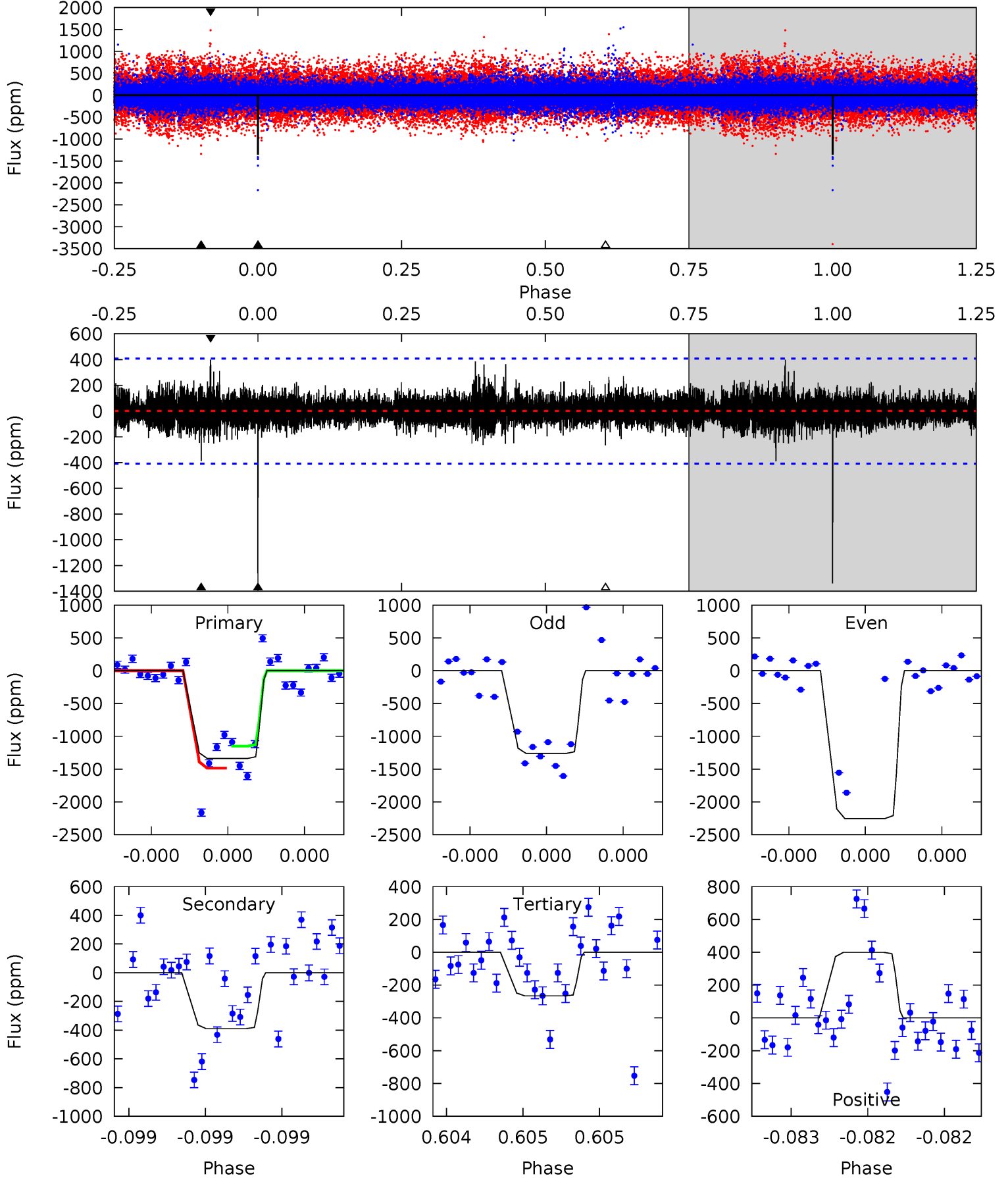
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.41	11.1	8.73	49.3	5.66	3.62	1.66	-2.31	-42.9	2.39	-38.2	0.85	0.92	0.82	0.46



# Alt Model-Shift Uniqueness Test

008784119-01, P = 526.395750 Days, E = 310.779587 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
18.4	5.36	3.67	5.50	5.63	3.56	0.85	14.8	12.9	1.69	-0.15	8.46	1.58	0.23	2.32



### Stellar Parameters For KIC 008784119

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4386^{+118}_{-144}$	$4.711^{+0.058}_{-0.031}$	$-0.940^{+0.300}_{-0.300}$	$0.528^{+0.042}_{-0.046}$	$0.523^{+0.044}_{-0.033}$	$5.001^{+1.241}_{-0.688}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
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 008784119-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1030 \pm 93$	$3.03^{+2.98}_{-2.08}$	$192^{+6}_{-7}$	$3648^{+2165}_{-663}$	$66716^{+587102}_{-49767}$
Alt.	$-389 \pm 73$	$3.91^{+3.05}_{-2.59}$	$192^{+6}_{-7}$	$2925^{+1165}_{-426}$	$14586^{+117320}_{-10170}$

$T_{max}$  = 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

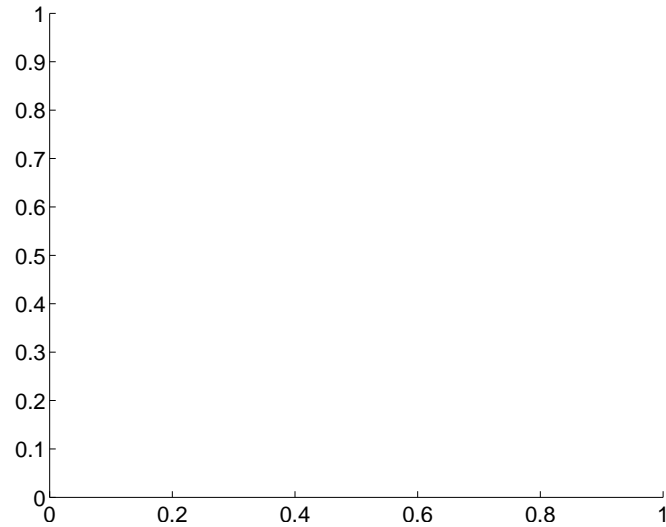
Supplemental centroid analysis for 008784119-01. Kepler magnitude: 14.22. Transit SNR 6.90

There are 0 quarters with good PRF difference image offsets

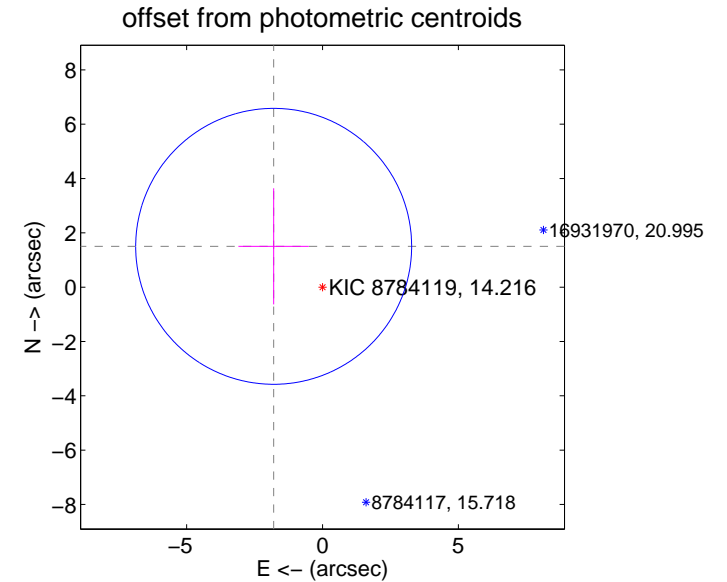
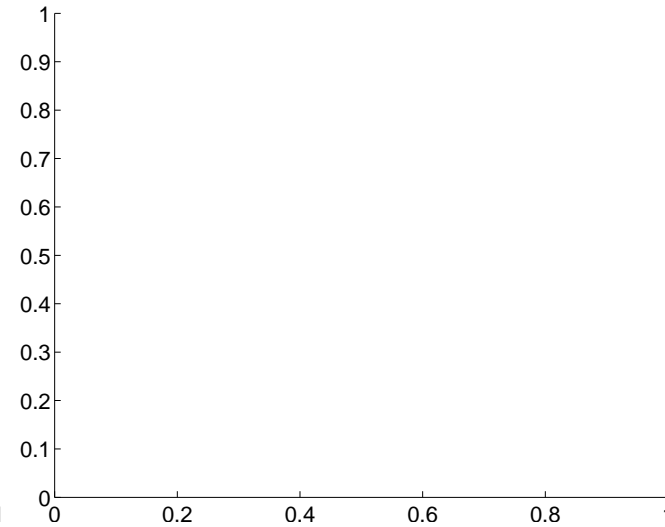
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$2.34 \pm 1.69$	1.38	$1.80 \pm 1.30$	$1.50 \pm 2.14$

There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC



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



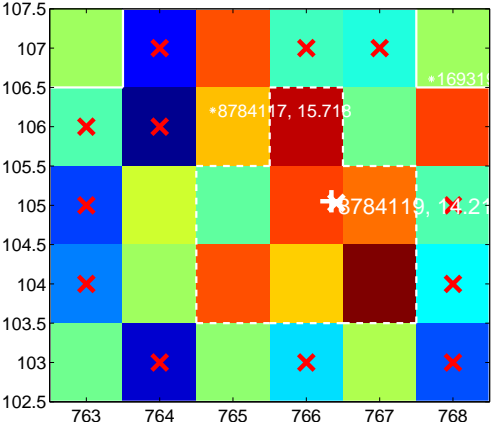
Q2 no difference image



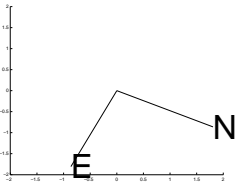
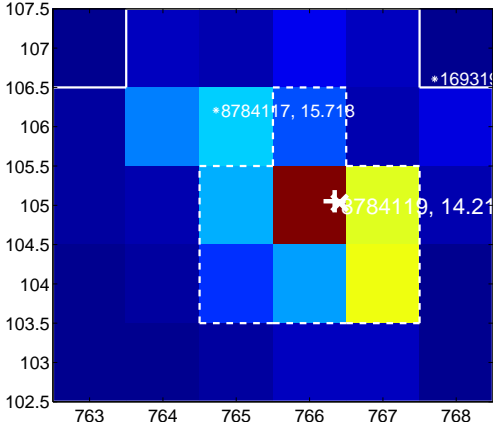
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



Q4 no difference image



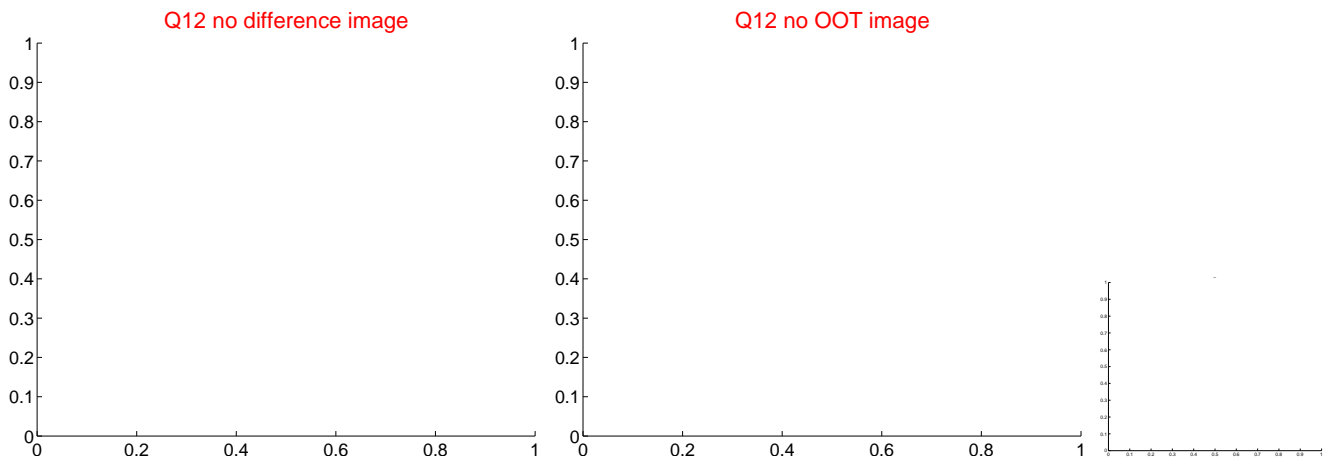
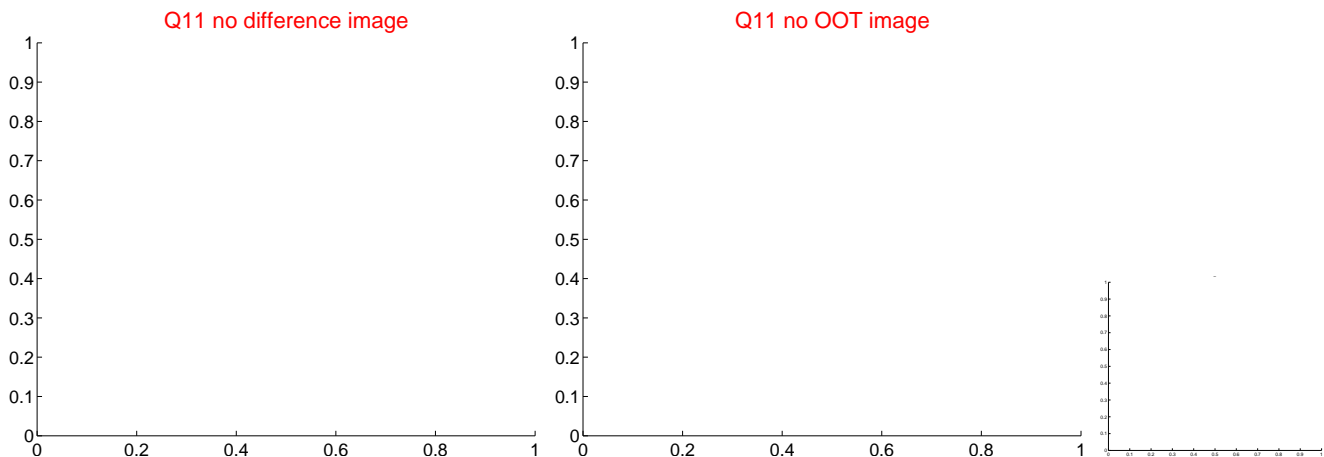
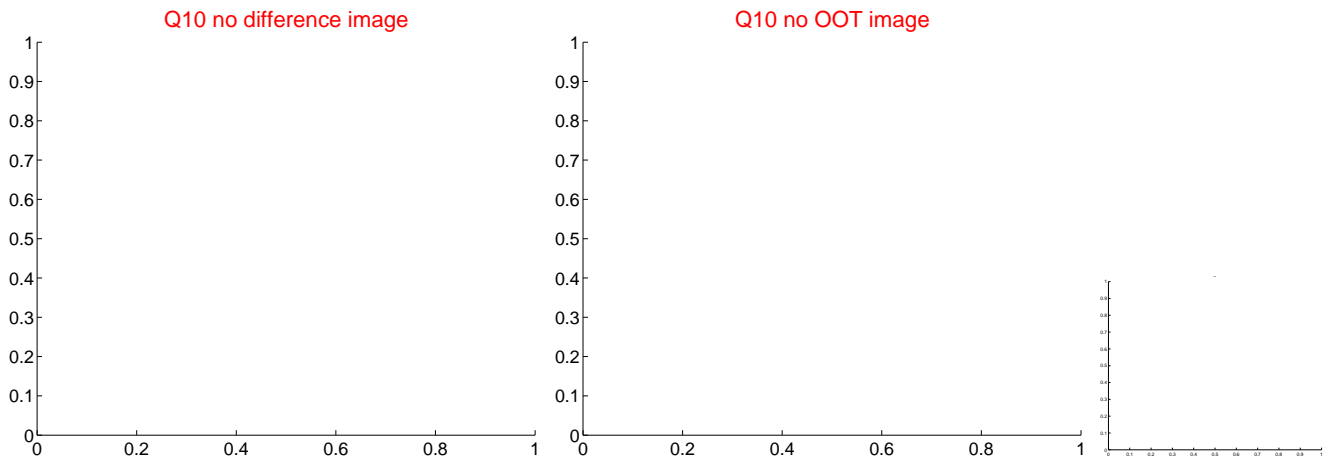
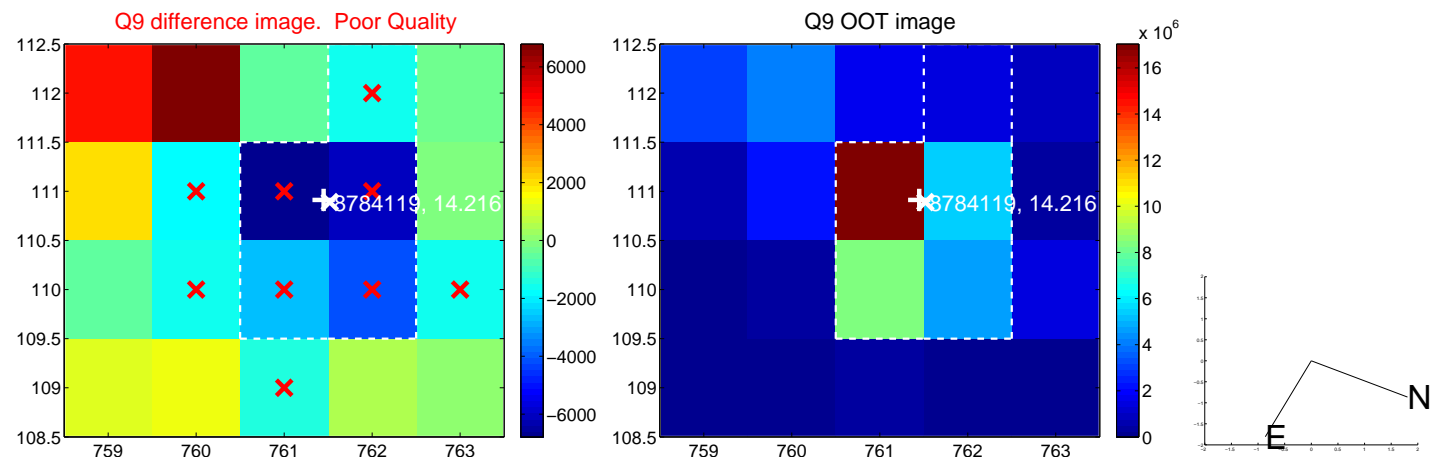
Q4 no OOT image



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

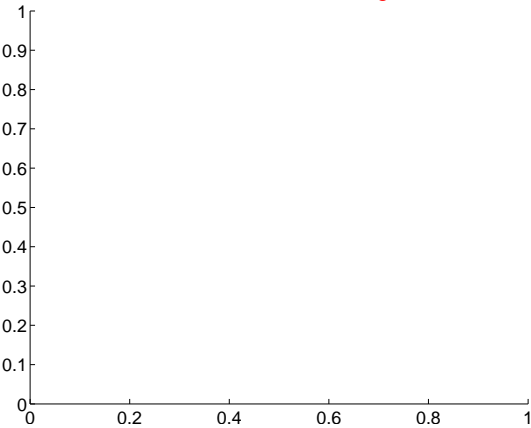


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

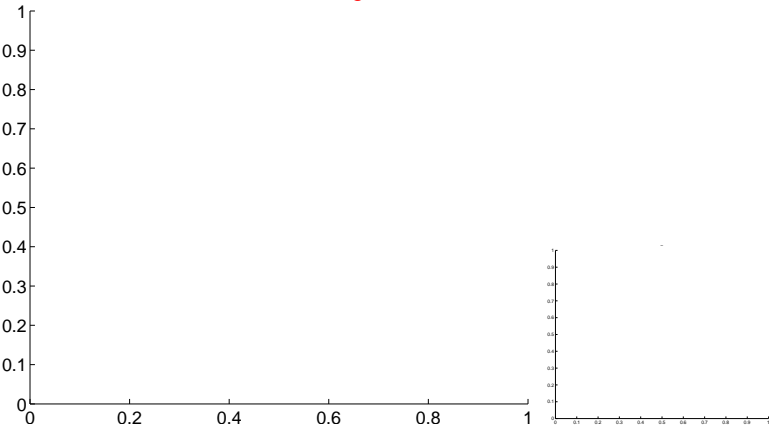


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

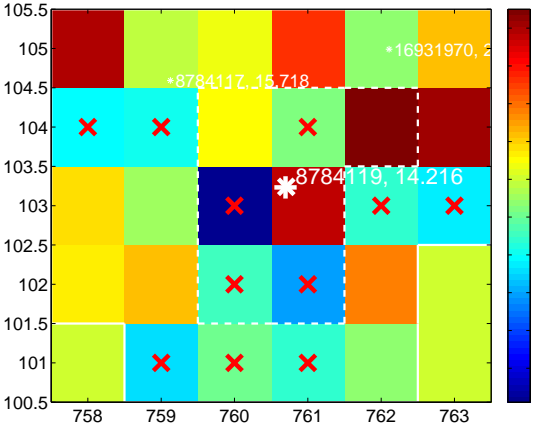
Q13 no difference image



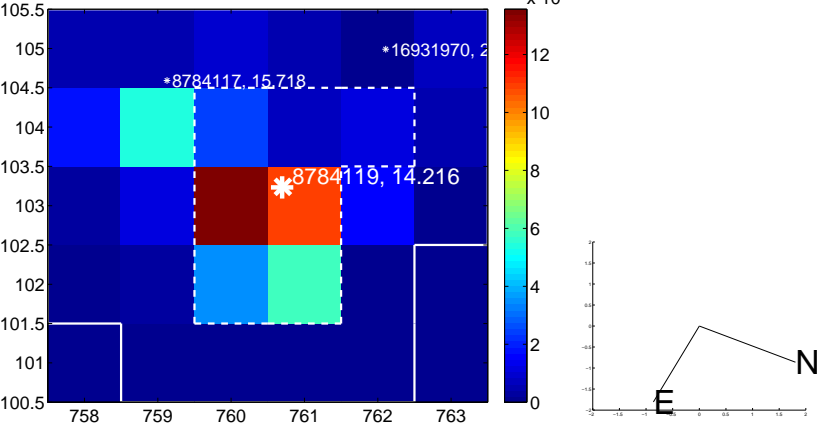
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



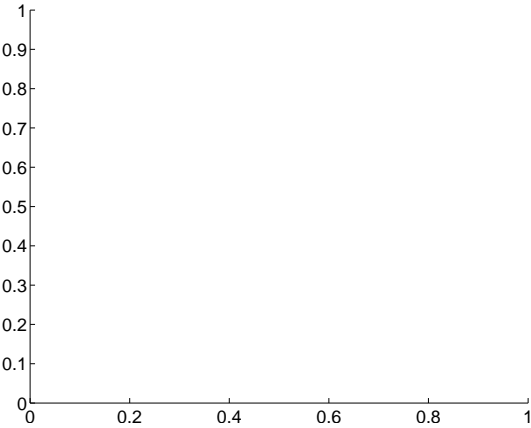
Q15 no difference image



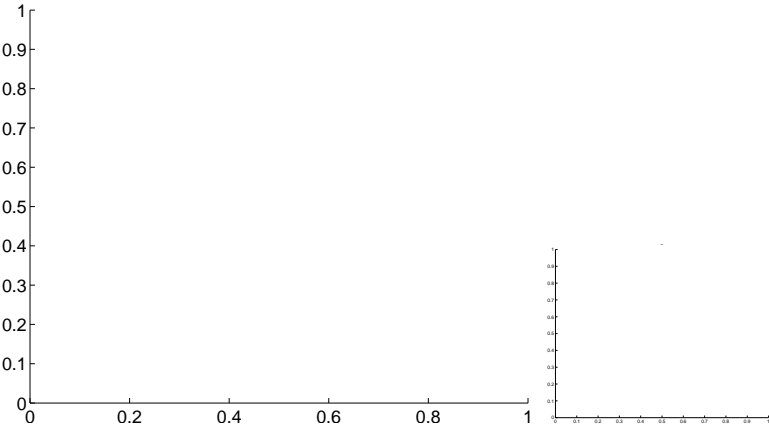
Q15 no OOT image



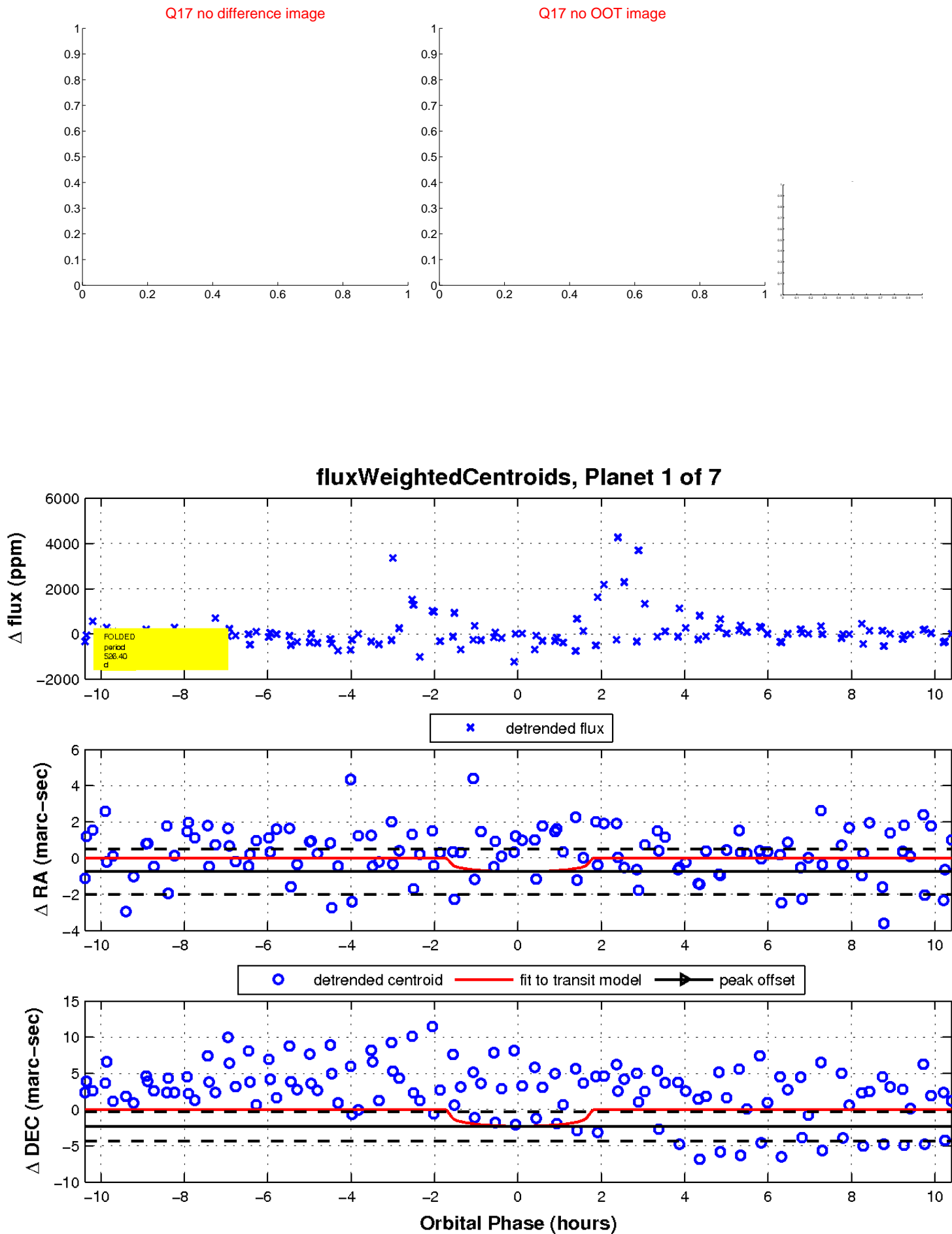
Q16 no difference image



Q16 no OOT image



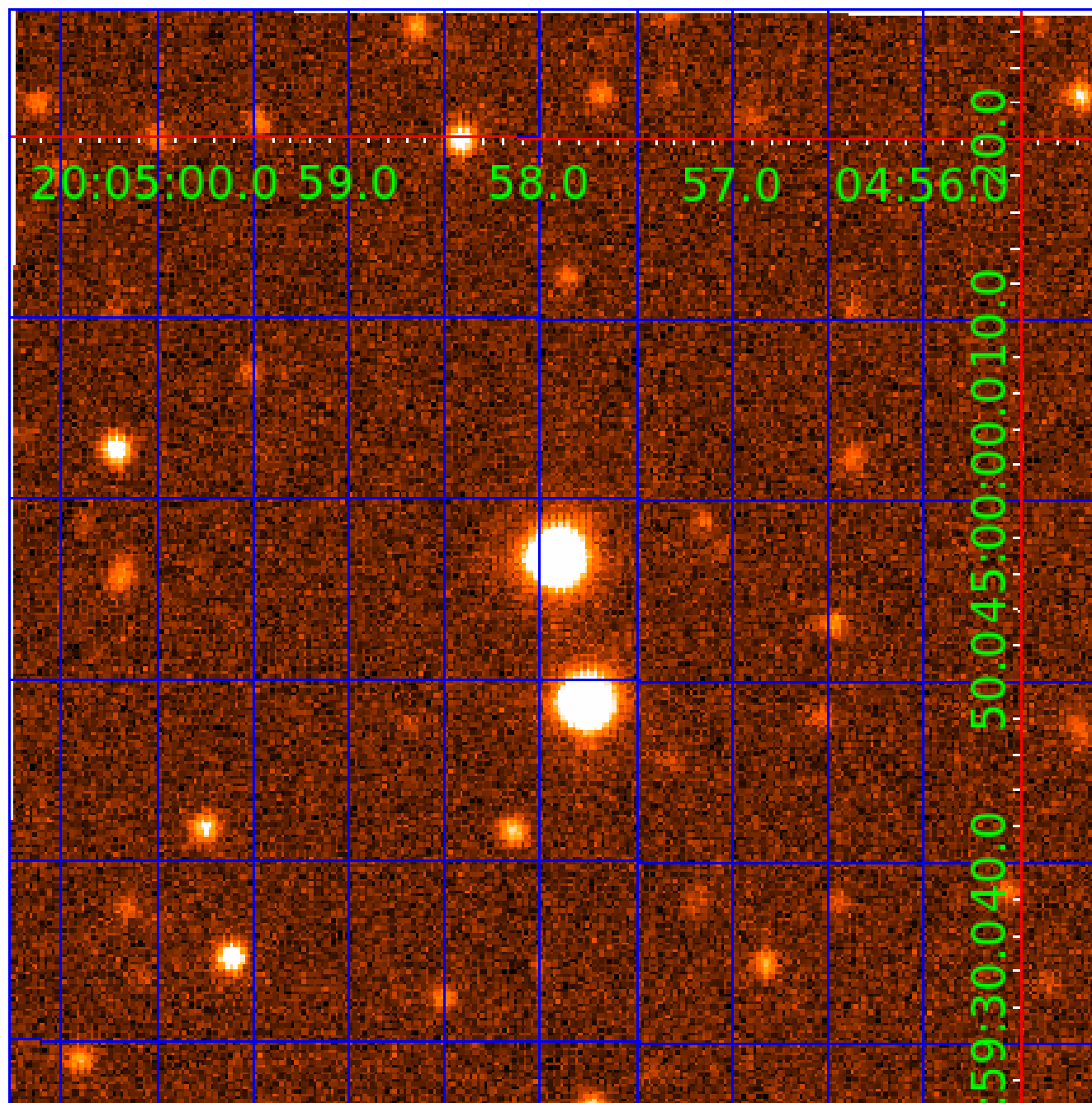
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 008784119

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008784119-01	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
008784119-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008784119-06	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—MOD_POS_ALT—CENT_FEW_DIFFS
008784119-07	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

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

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

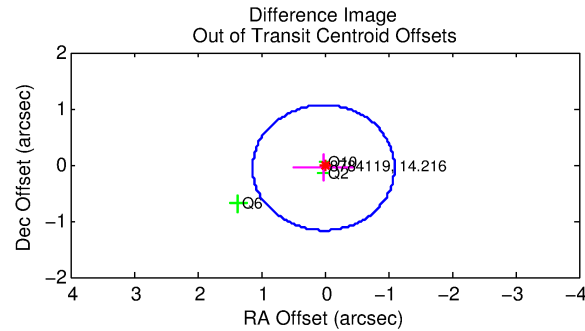
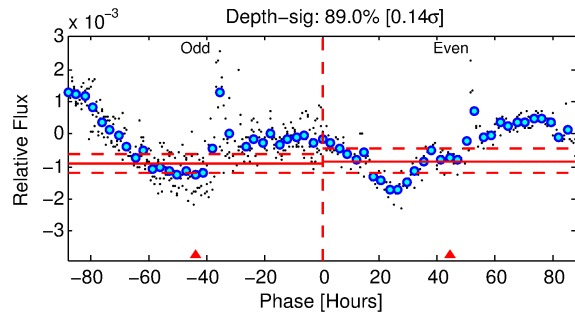
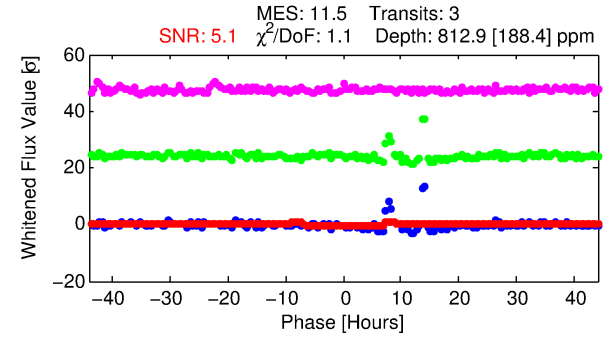
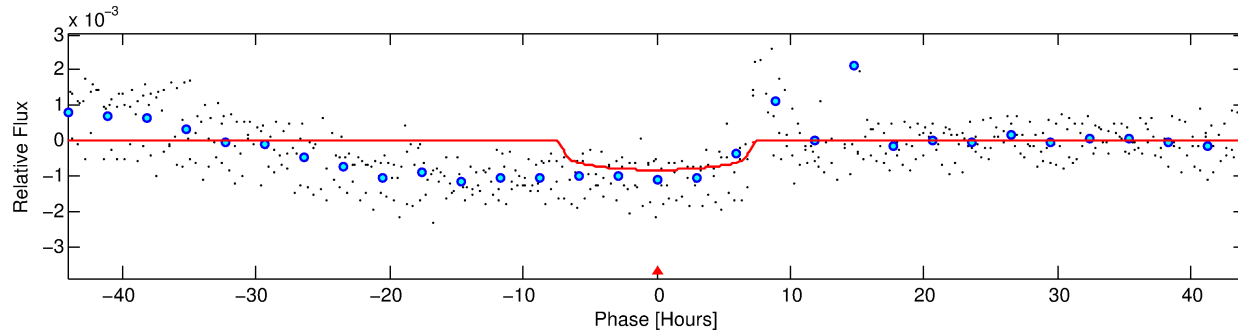
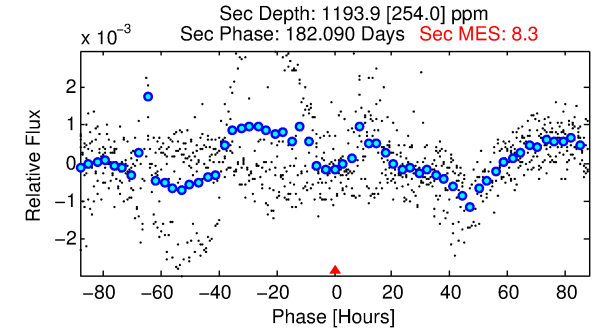
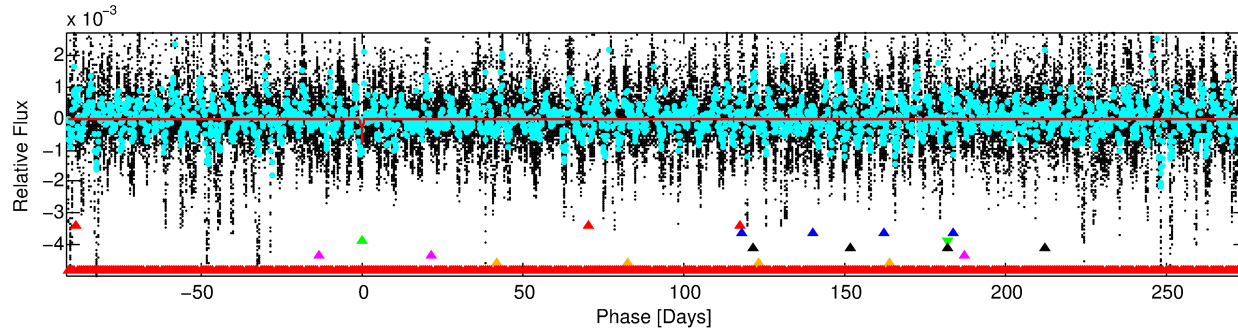
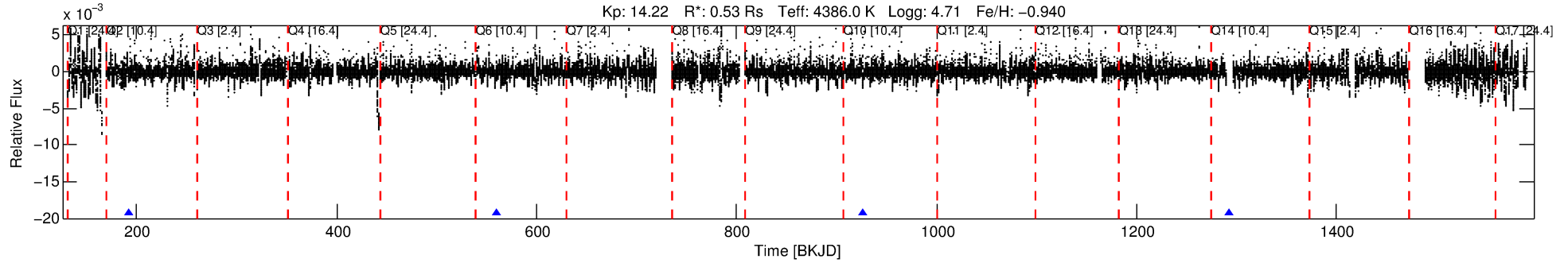
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008784119-03

No Significant Match Found

# DV One-Page Summary

KIC: 8784119 Candidate: 3 of 7 Period: 366.677 d



## DV Fit Results:

Period = 366.67702 [0.01226] d  
Epoch = 192.9456 [0.0160] BKJD  
Rp/R\* = 0.0273 [0.0080]  
a/R\* = 154.95 [155.48]  
b = 0.63 [0.97]  
Seff = 0.14 [0.02]  
Teq = 156 [7] K  
Rp = 1.57 [0.48] Re  
a = 0.8078 [0.0591] AU  
Ag = 173449.65 [110096.36] [1.58σ]  
**Teffp = 4936 [789] K [6.06σ]**

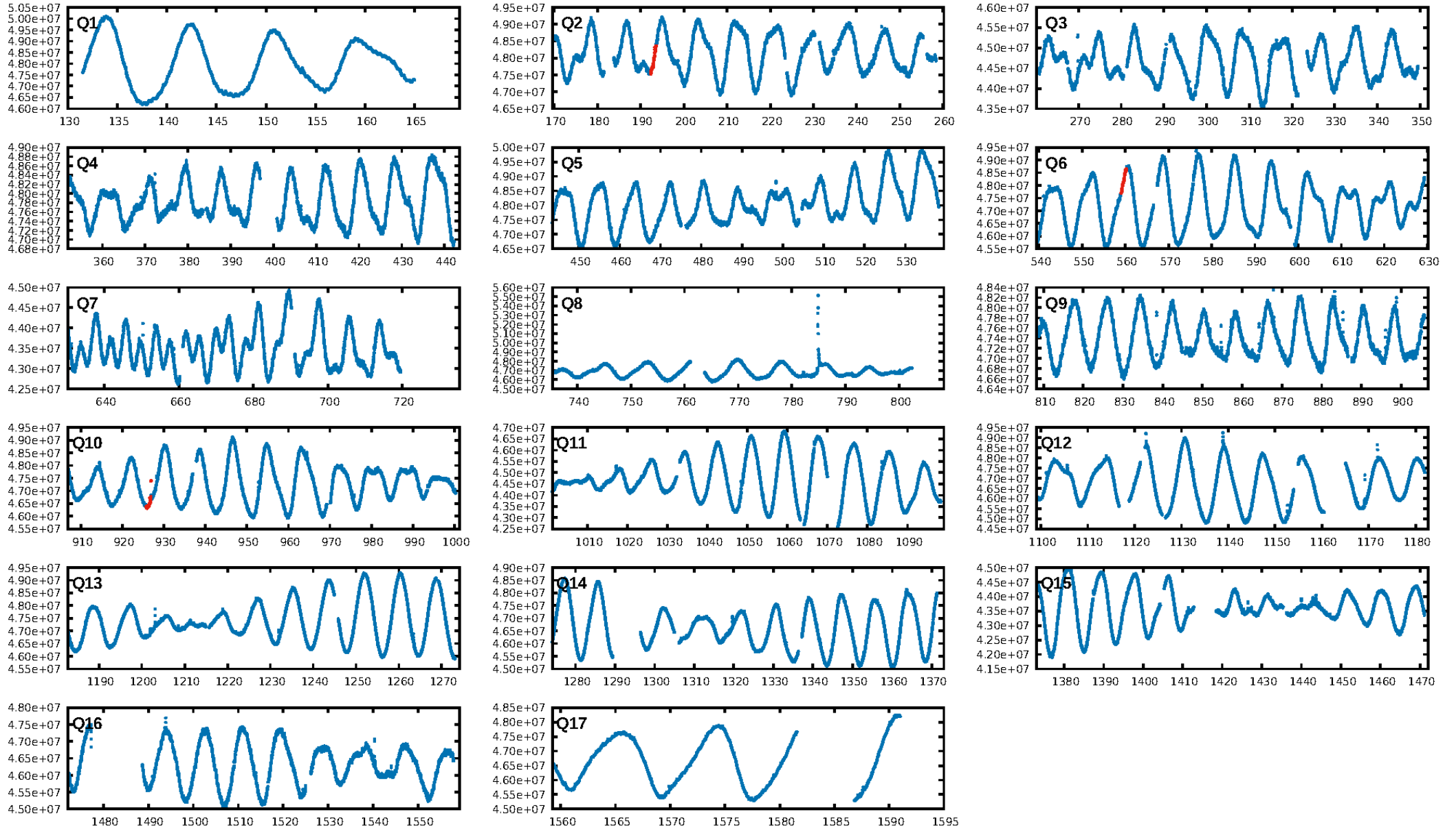
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [34.75σ]  
LongPeriod-sig: 100.0% [35.11σ]  
ModelChiSquare2-sig: 49.3%  
ModelChiSquareGof-sig: 93.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.831  
Centroid-sig: 48.0%  
Centroid-so: 1.223 arcsec [0.39σ]  
OotOffset-rm: 0.057 arcsec [0.15σ]  
OotOffset-st: 3/0/0/0 [3]  
KicOffset-rm: 0.251 arcsec [1.69σ]  
KicOffset-st: 3/0/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]

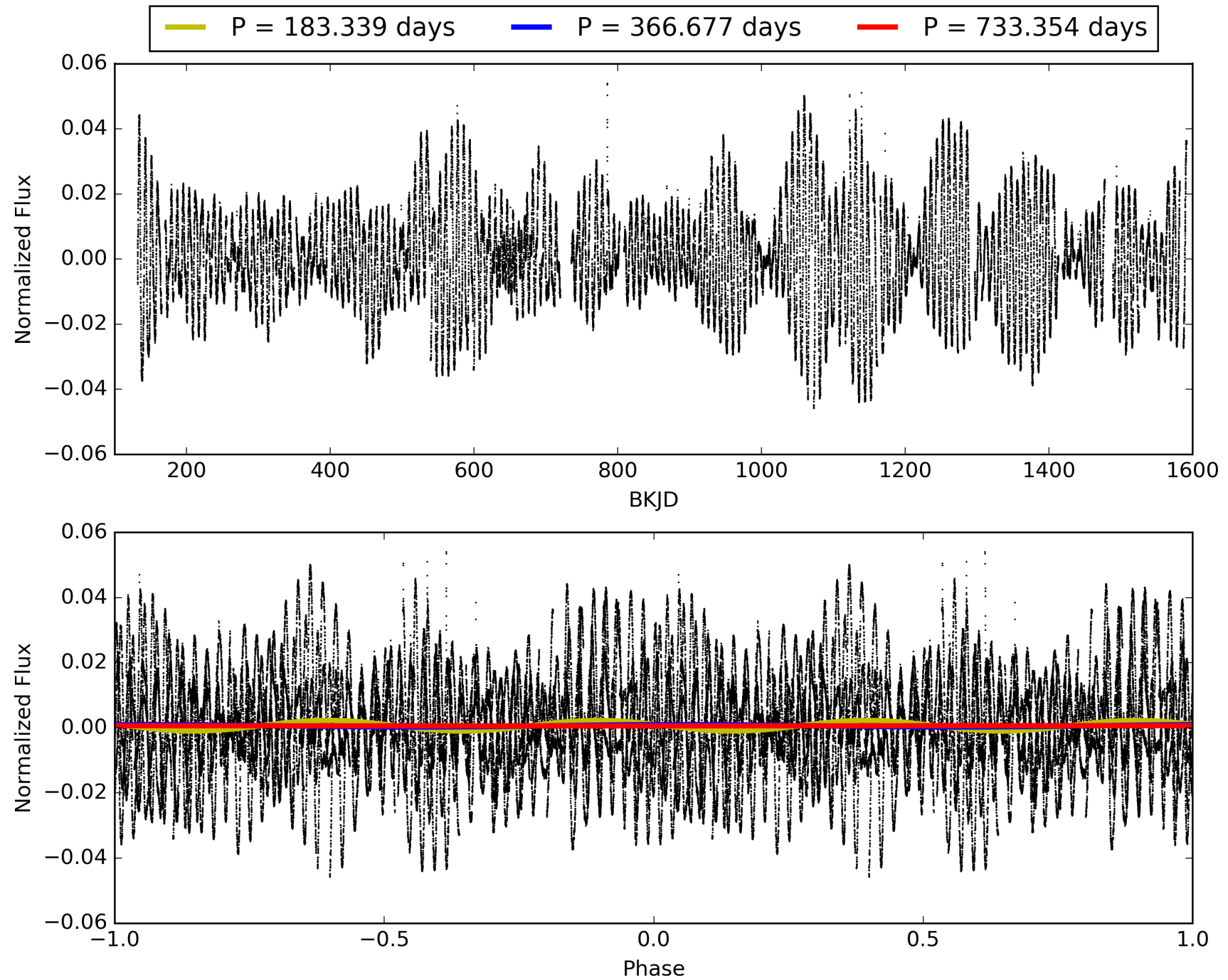
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:16:50 Z

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

# TCE 008784119-03, PDC Light Curves



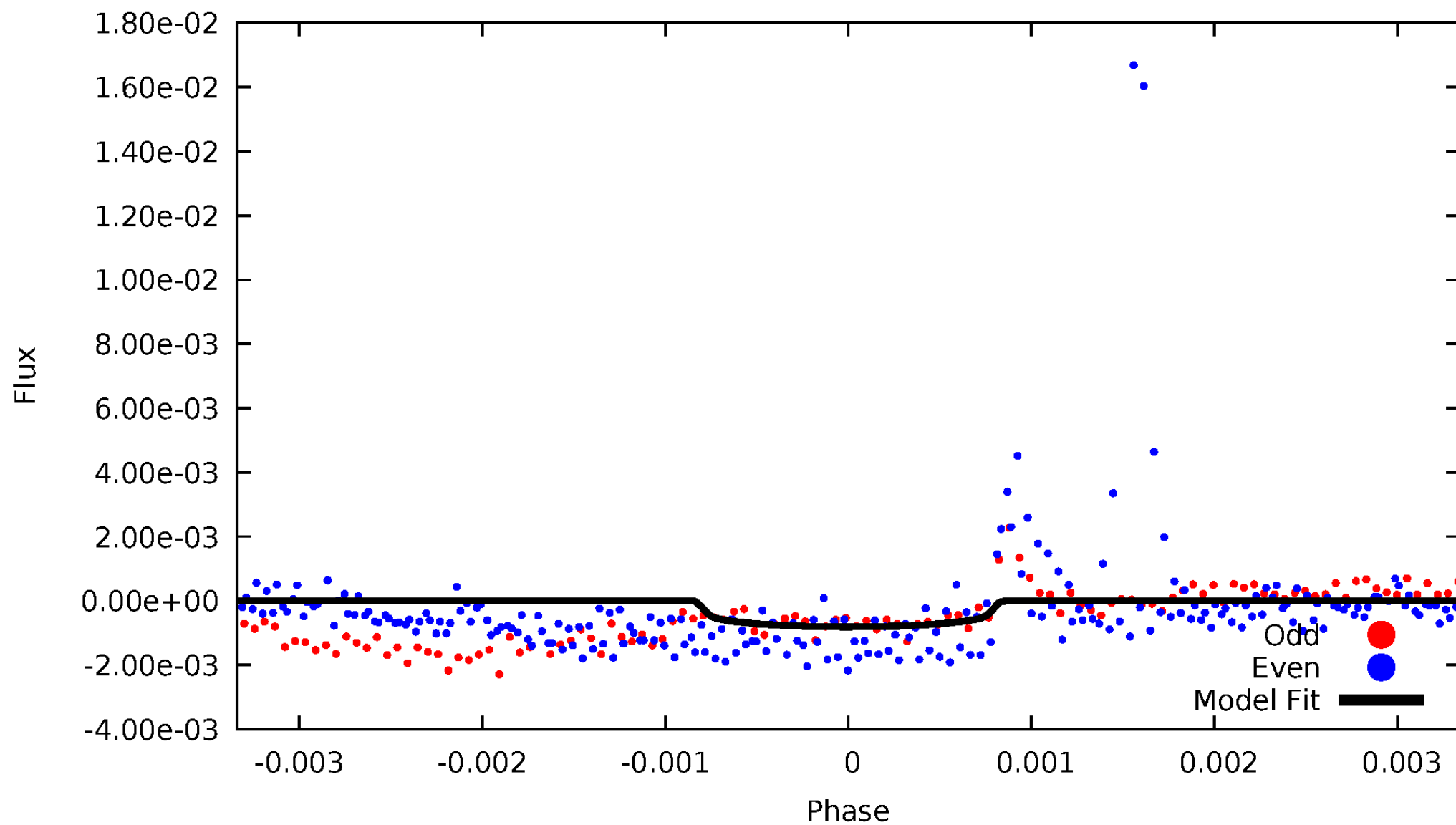
# TCE 008784119-03





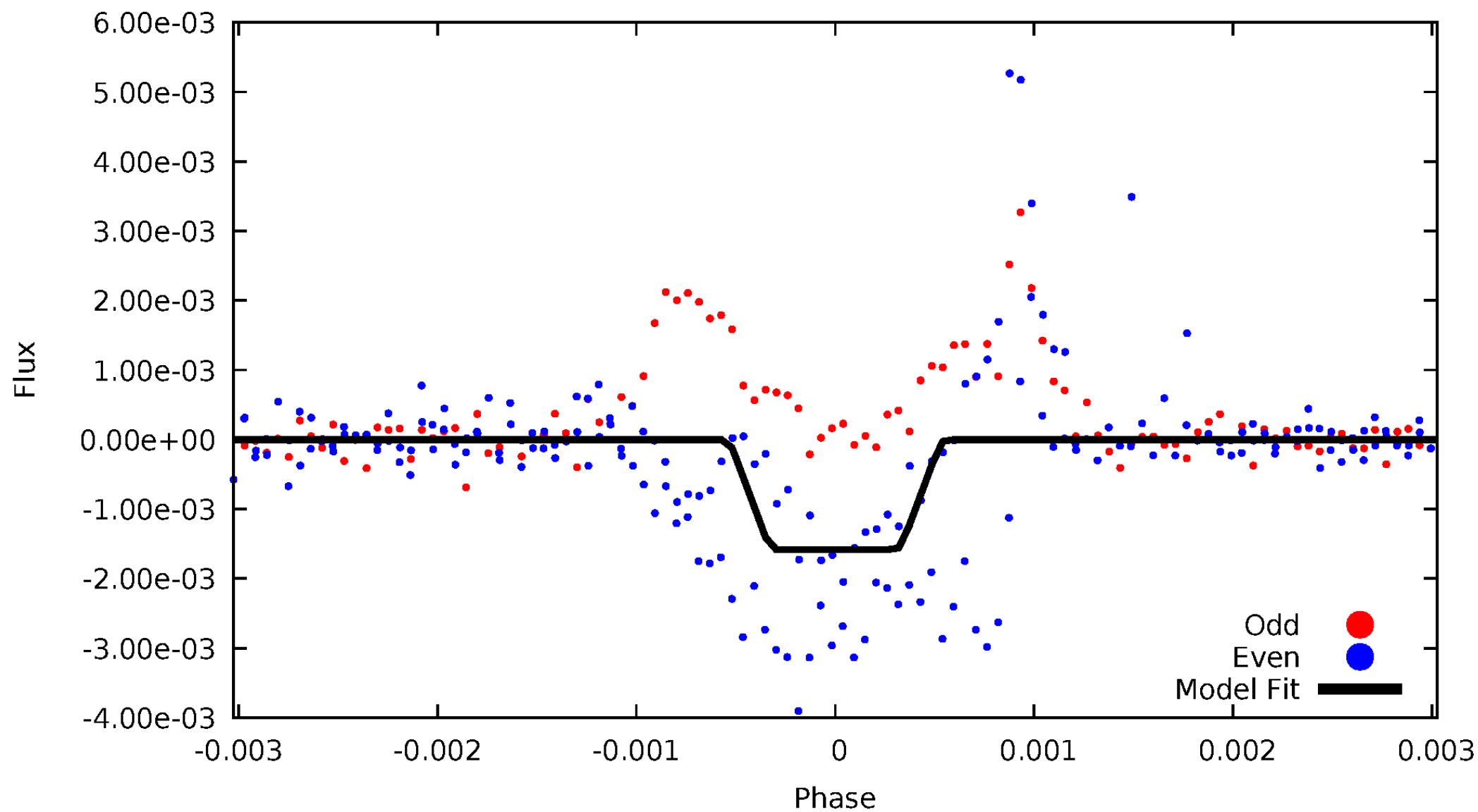
# DV Odd/Even

TCE 008784119-03



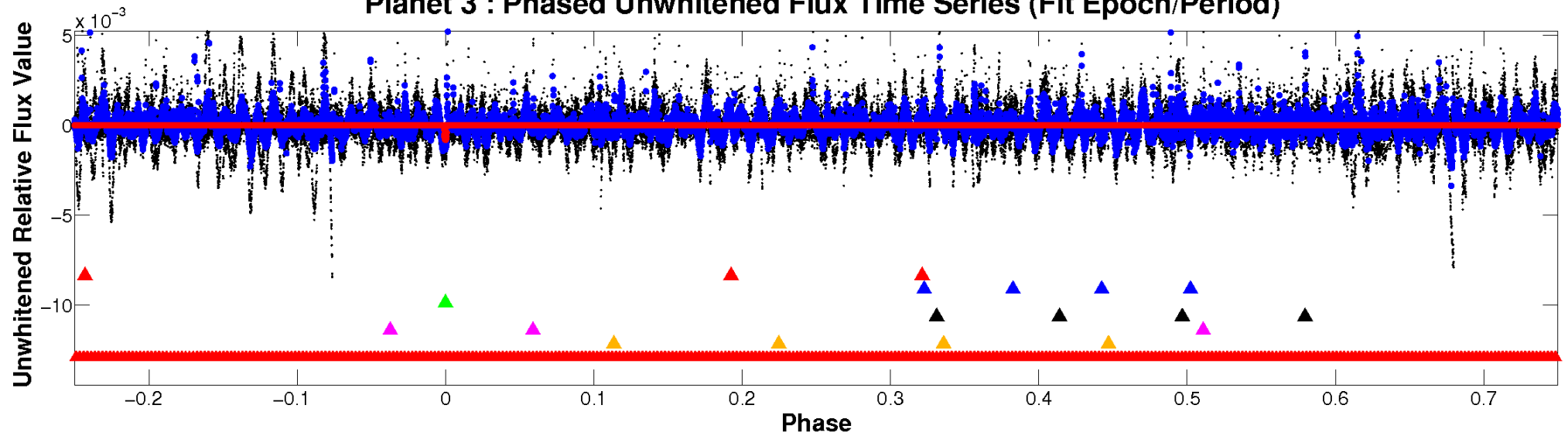
# ALT Odd/Even

TCE 008784119-03

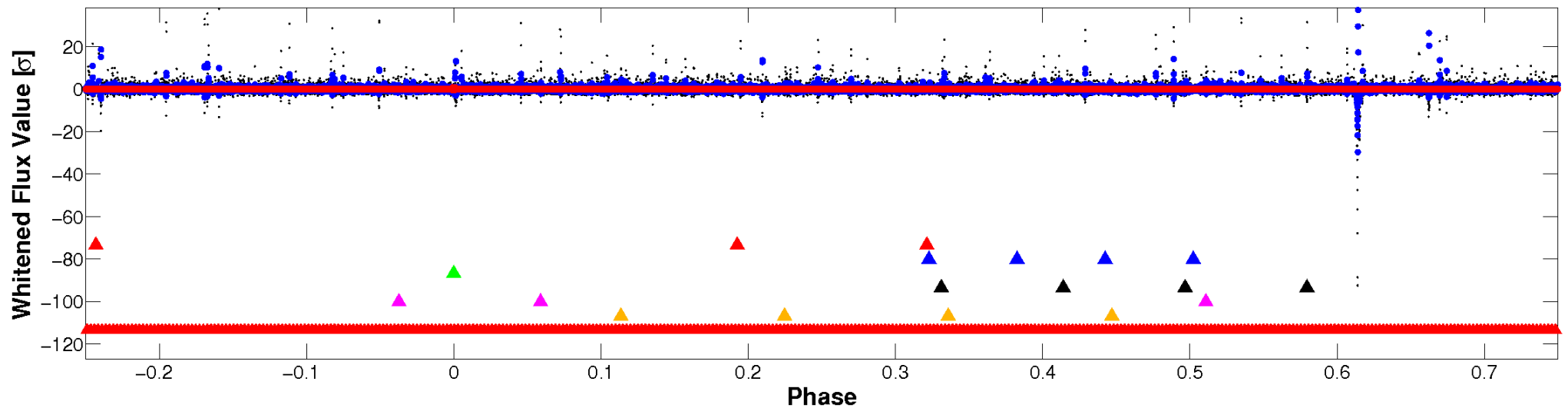


# Non-Whitened Vs. Whitened Light Curve

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

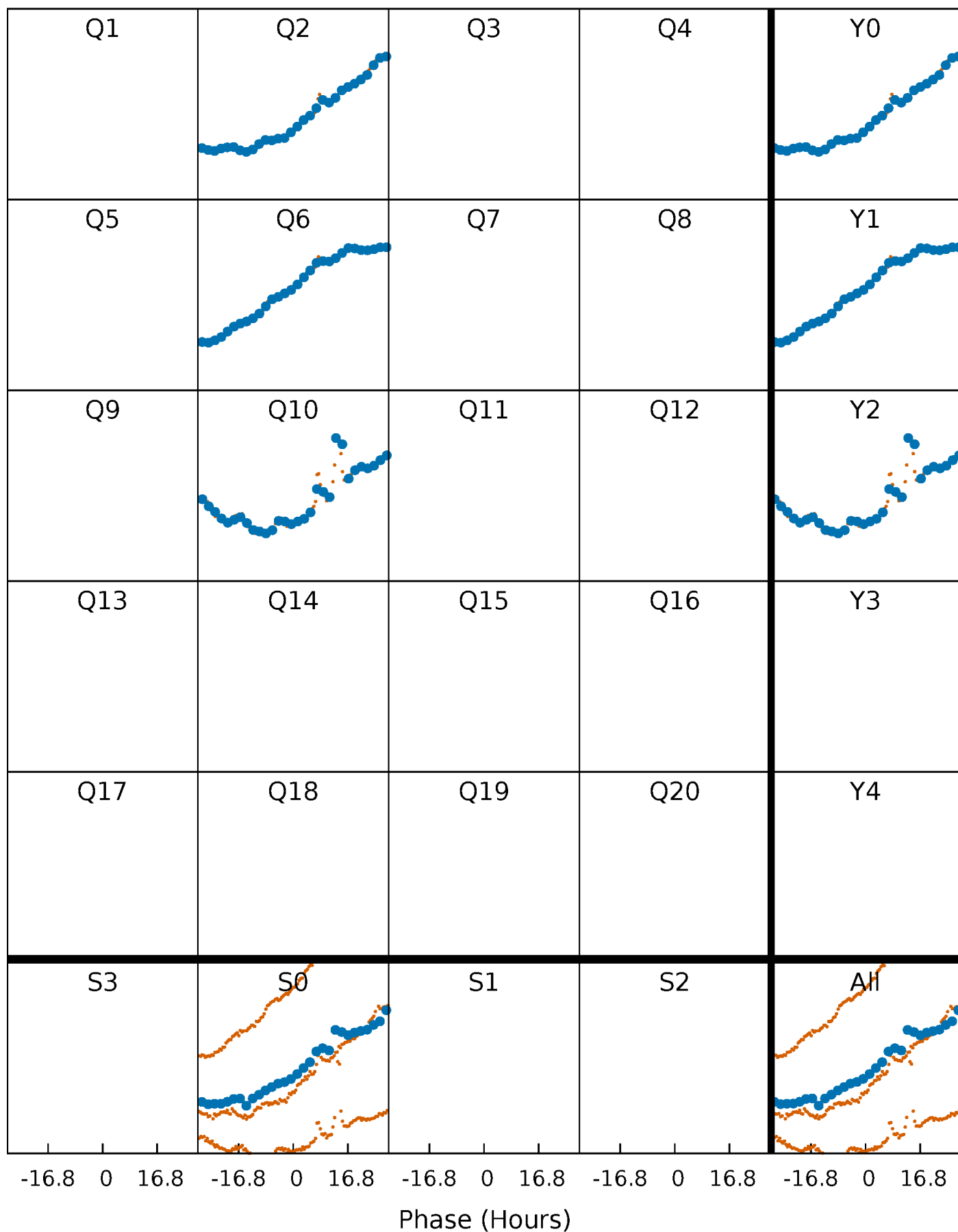


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



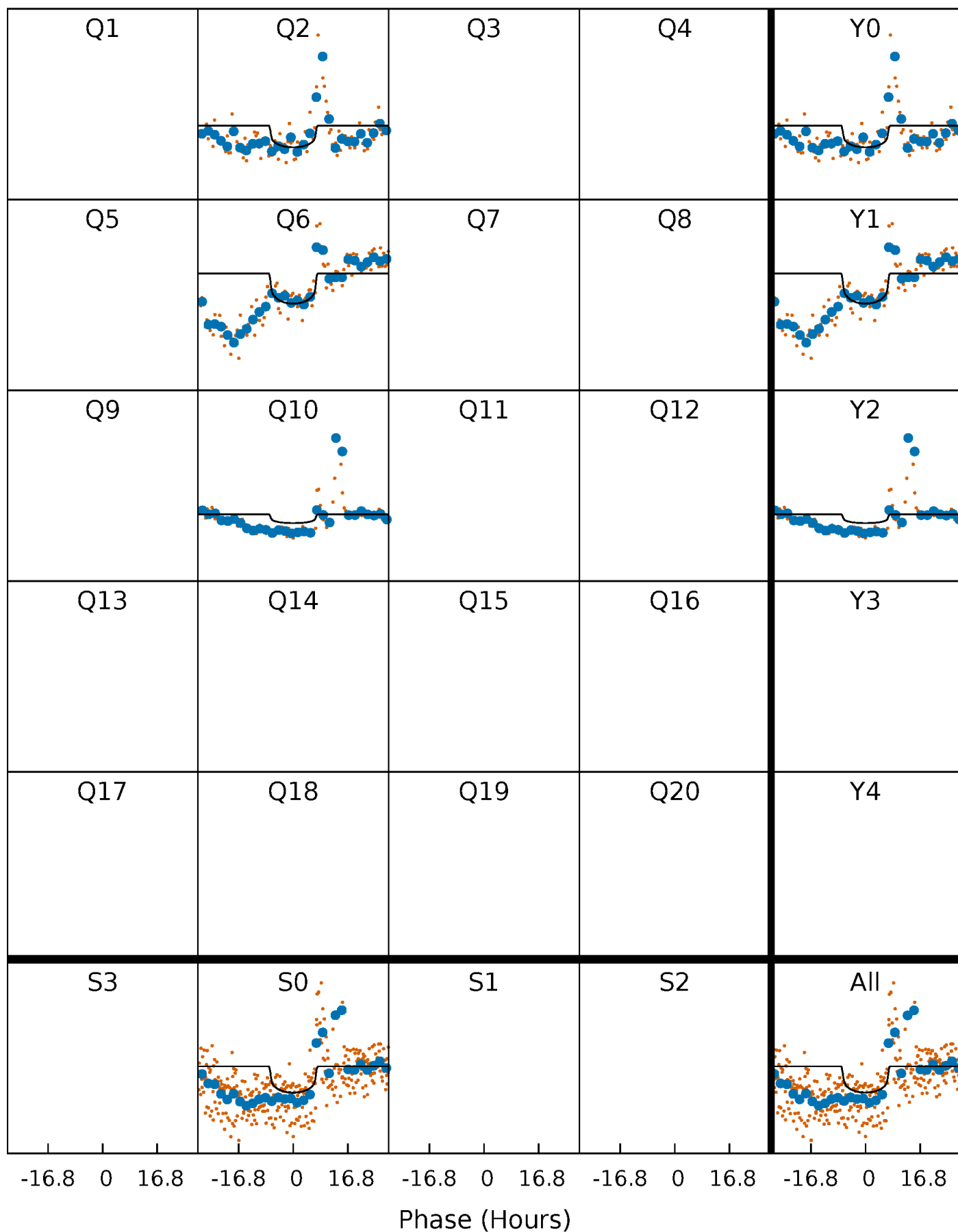
# PDC Quarter-Phased Transit Curves

TCE 008784119-03 P=366.677020 Days  $T_0=192.945605$  (BKJD)



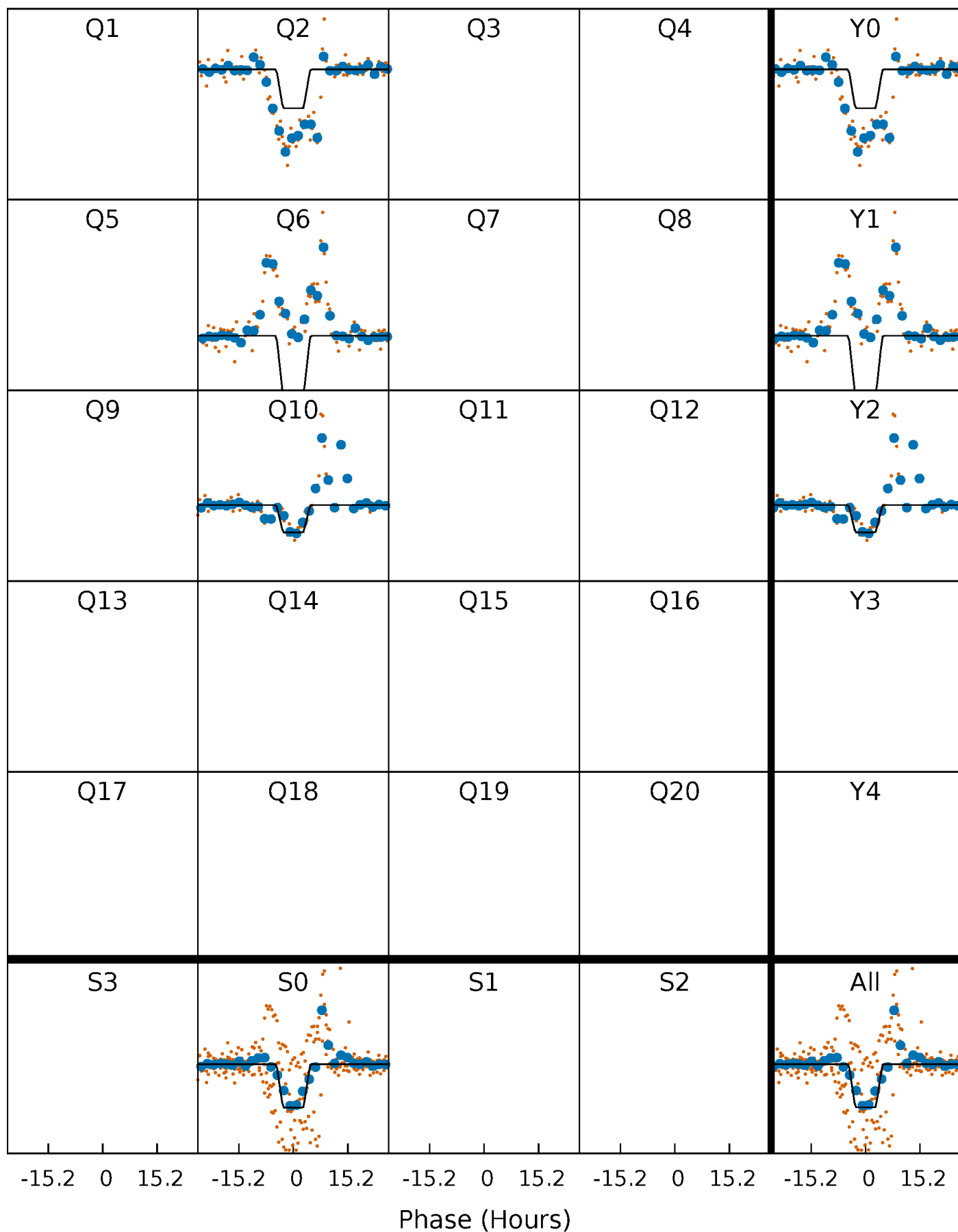
# DV Quarter-Phased Transit Curves

TCE 008784119-03 P=366.677020 Days  $T_0=192.945605$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

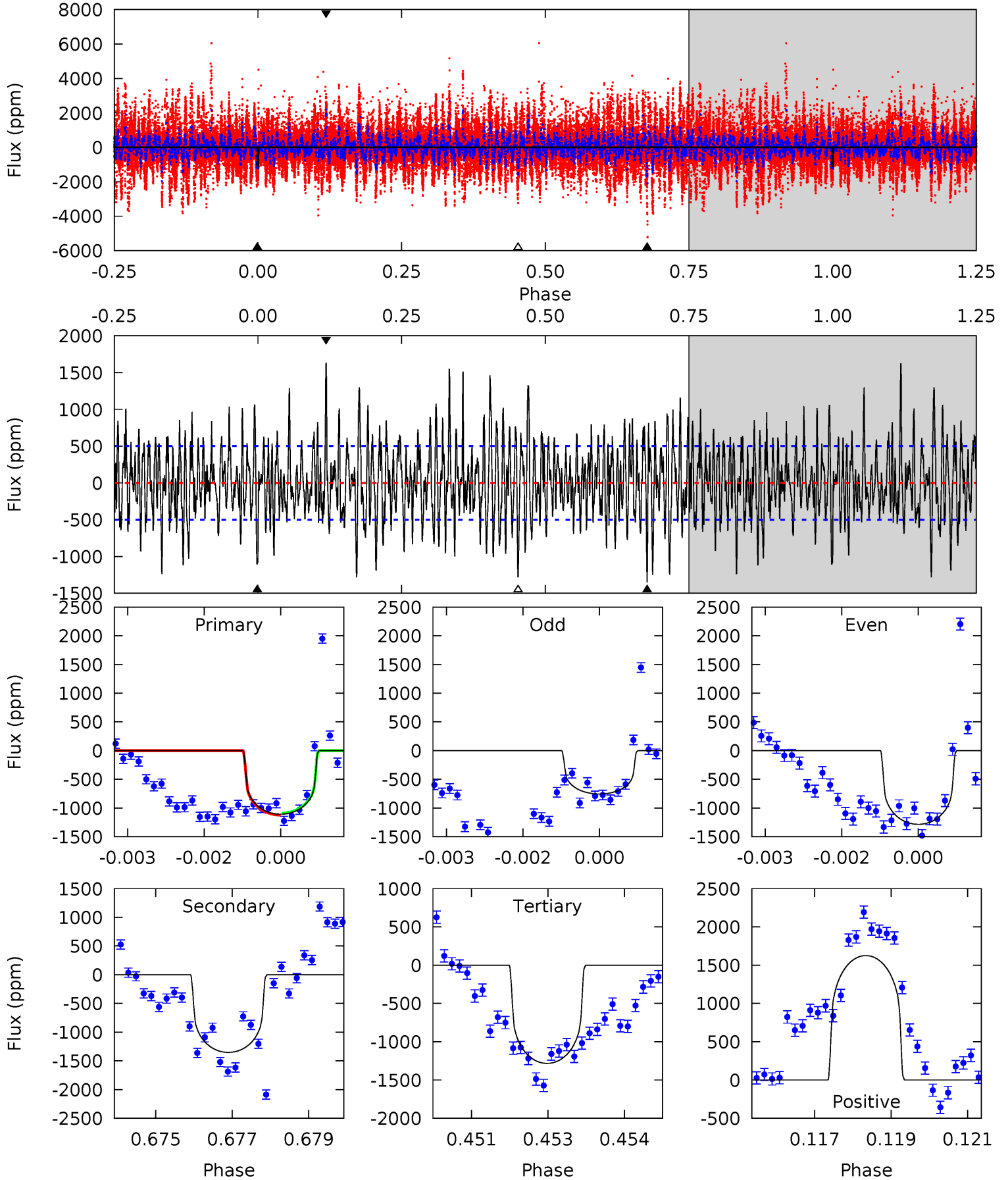
TCE 008784119-03 P=366.680234 Days  $T_0=192.923546$  (BKJD)



# DV Model-Shift Uniqueness Test

008784119-03, P = 366.677020 Days, E = 192.945605 Days

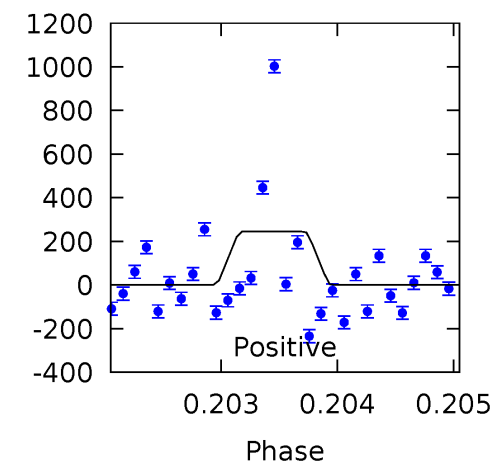
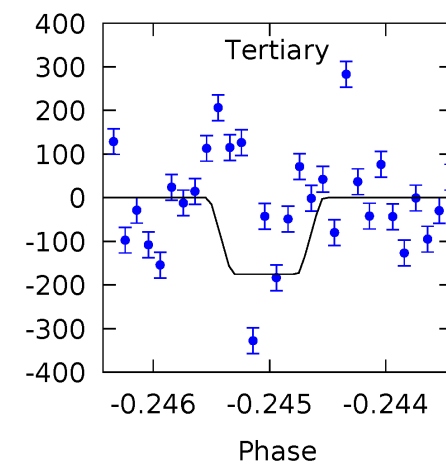
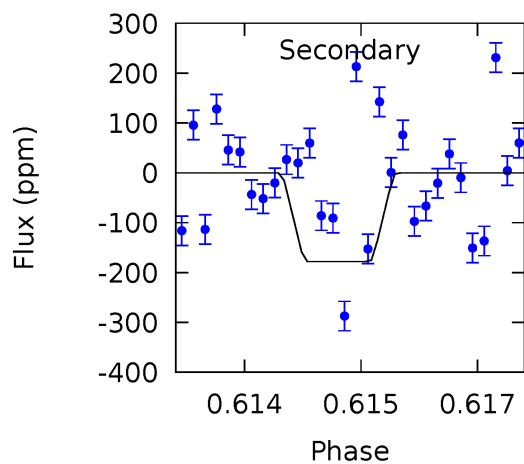
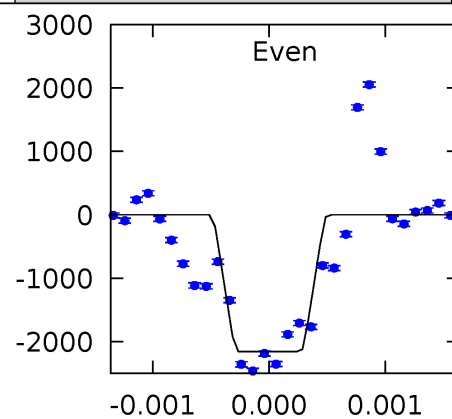
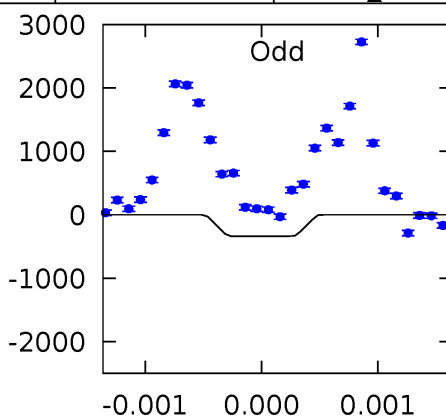
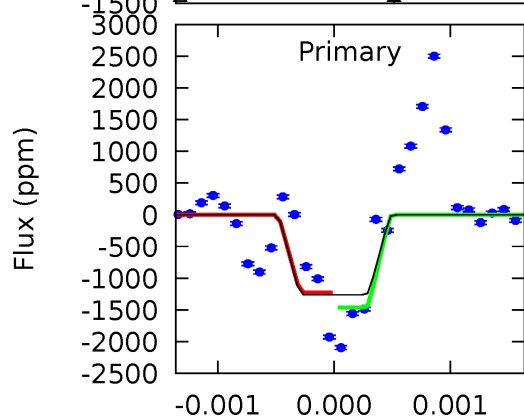
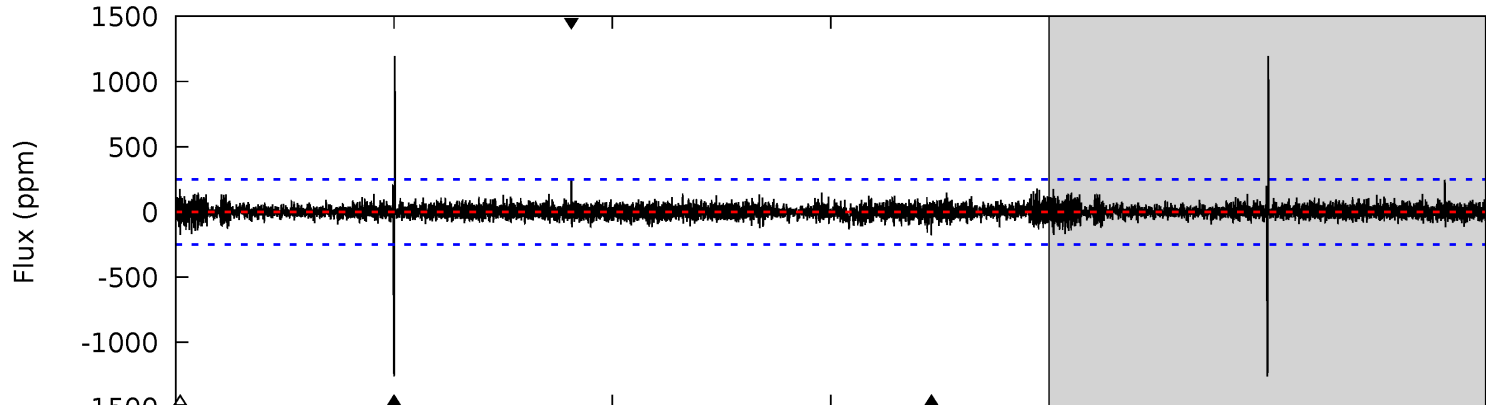
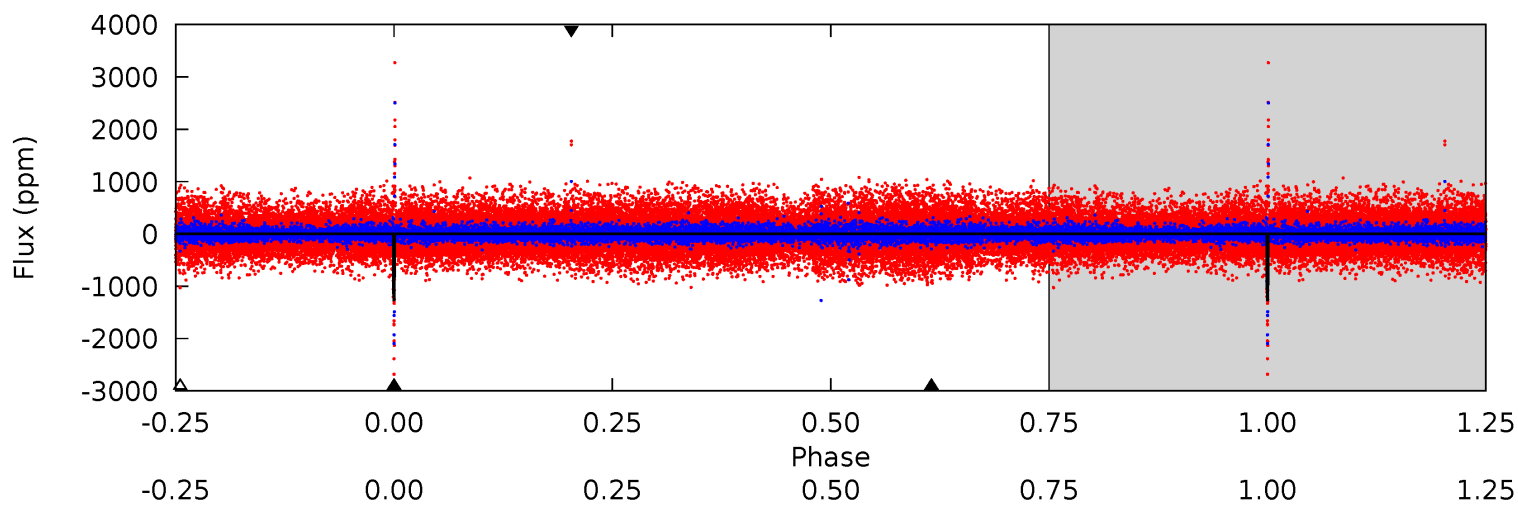
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.8	14.4	13.7	17.3	5.35	3.13	4.74	-1.86	-5.51	0.74	-2.91	2.32	1.47	0.55	0.17



# Alt Model-Shift Uniqueness Test

008784119-03, P = 366.680234 Days, E = 192.923546 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
27.5	3.88	3.82	5.35	5.43	3.26	0.78	23.7	22.1	0.06	-1.47	26.2	1.04	0.49	2.49





### Stellar Parameters For KIC 008784119

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$4386^{+118}_{-144}$	$4.711^{+0.058}_{-0.031}$	$-0.940^{+0.300}_{-0.300}$	$0.528^{+0.042}_{-0.046}$	$0.523^{+0.044}_{-0.033}$	$5.001^{+1.241}_{-0.688}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
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 008784119-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1353 \pm 94$	$1.57^{+0.43}_{-0.50}$	$217^{+7}_{-8}$	$4925^{+861}_{-472}$	$201391^{+227412}_{-80107}$
Alt.	$-178 \pm 46$	$2.26^{+0.49}_{-0.46}$	$217^{+7}_{-8}$	$3052^{+250}_{-215}$	$12379^{+7848}_{-4782}$

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

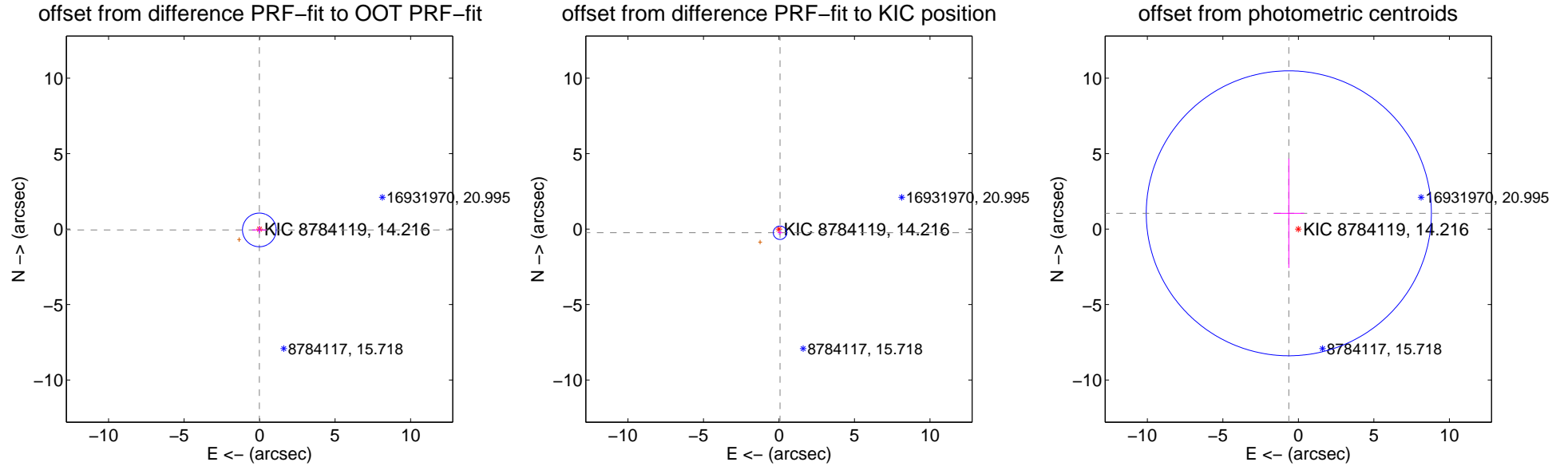
## DV Centroid Data

Supplemental centroid analysis for 008784119-03. Kepler magnitude: 14.22. Transit SNR 5.13

There are 2 quarters with good PRF difference image offsets

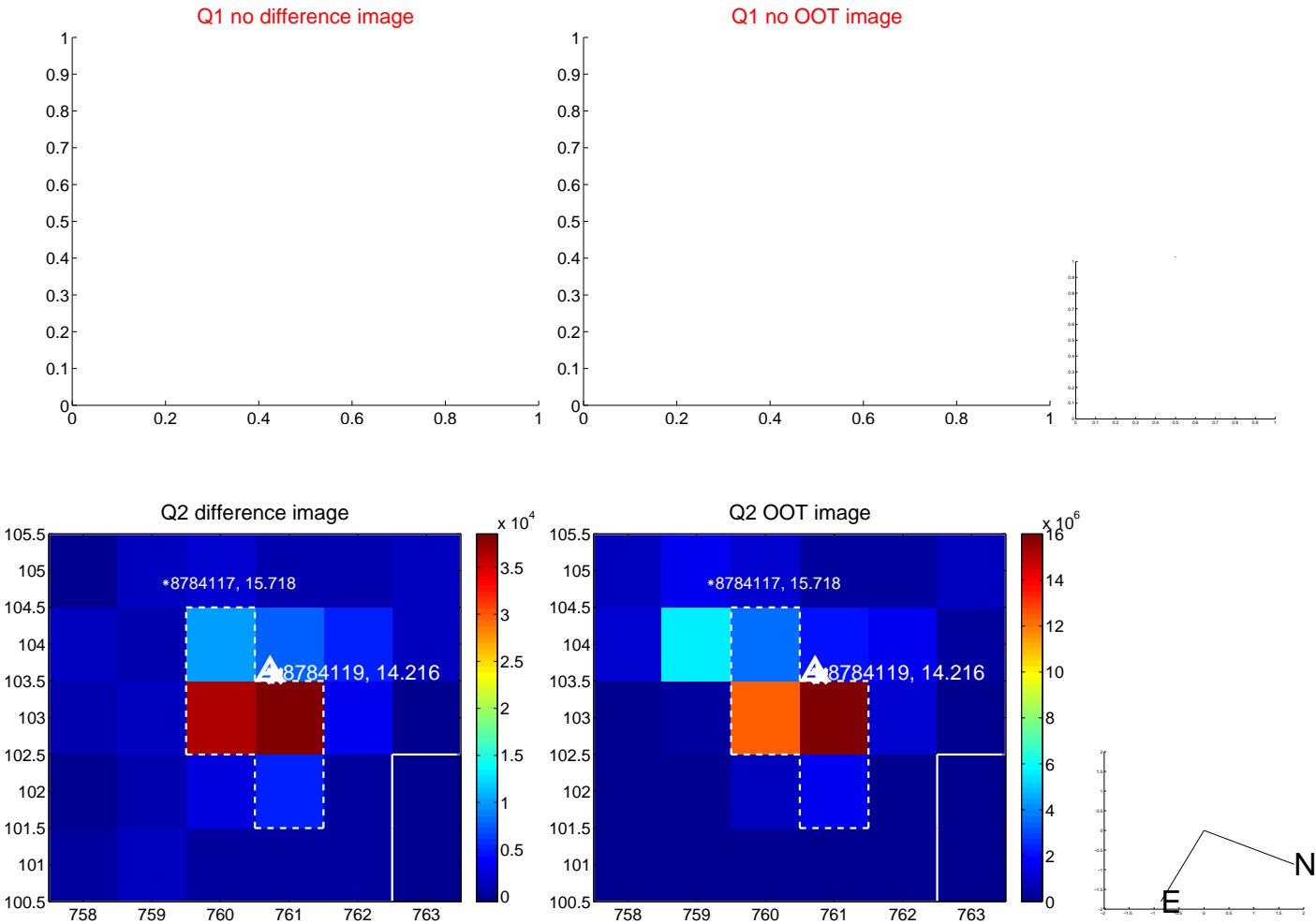
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.057 \pm 0.372$	0.15	$0.018 \pm 0.474$	$-0.055 \pm 0.245$
PRF-fit source offset from KIC position	$0.251 \pm 0.149$	1.69	$-0.069 \pm 0.166$	$-0.241 \pm 0.147$
photometric centroid source offset	$1.22 \pm 3.15$	0.39	$0.63 \pm 1.01$	$1.05 \pm 3.63$



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 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.

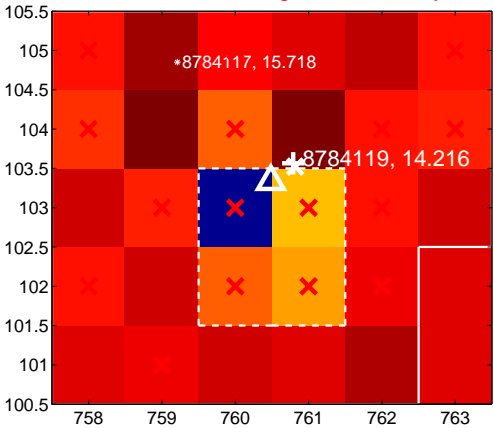
Q5 no difference image



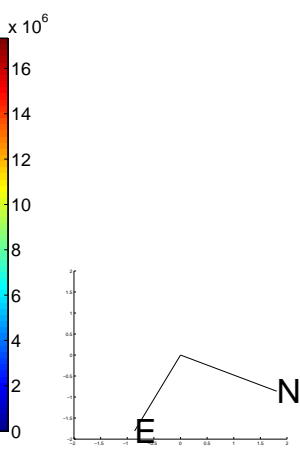
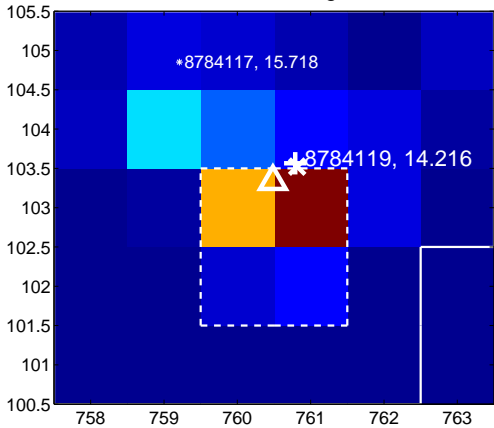
Q5 no OOT image



Q6 difference image. Poor Quality



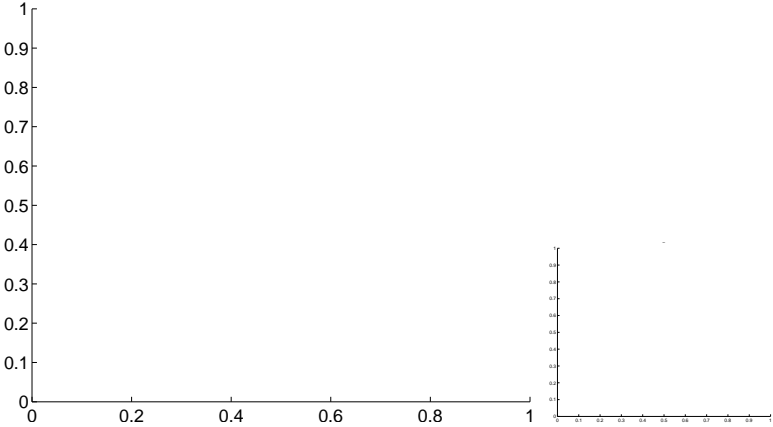
Q6 OOT image



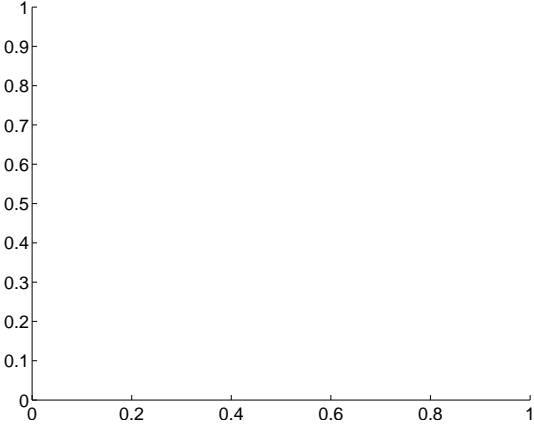
Q7 no difference image



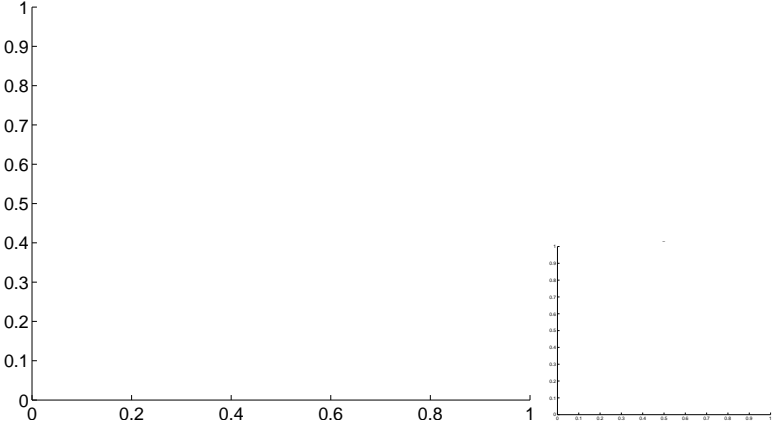
Q7 no OOT image



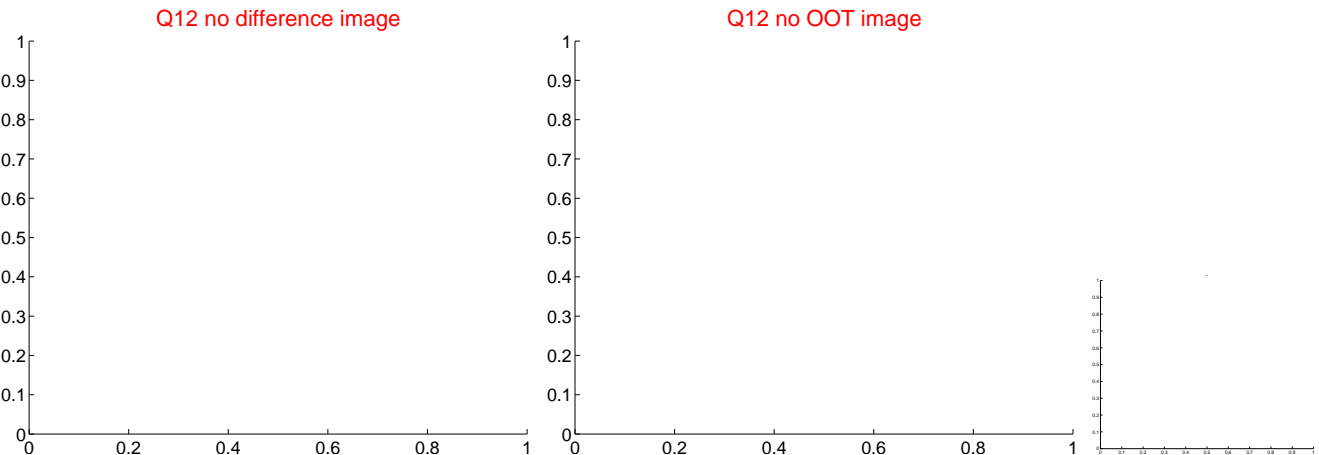
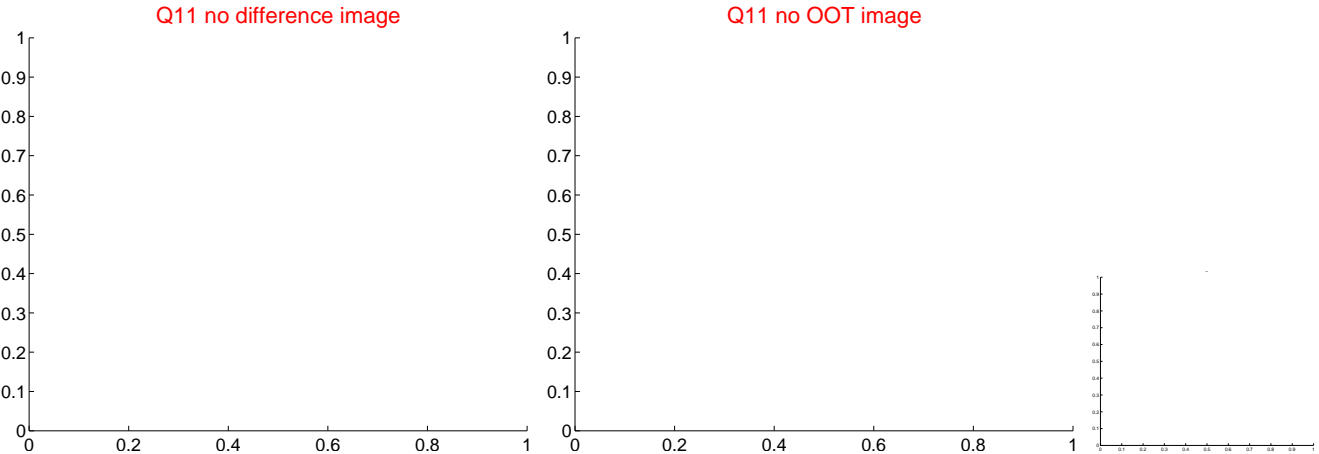
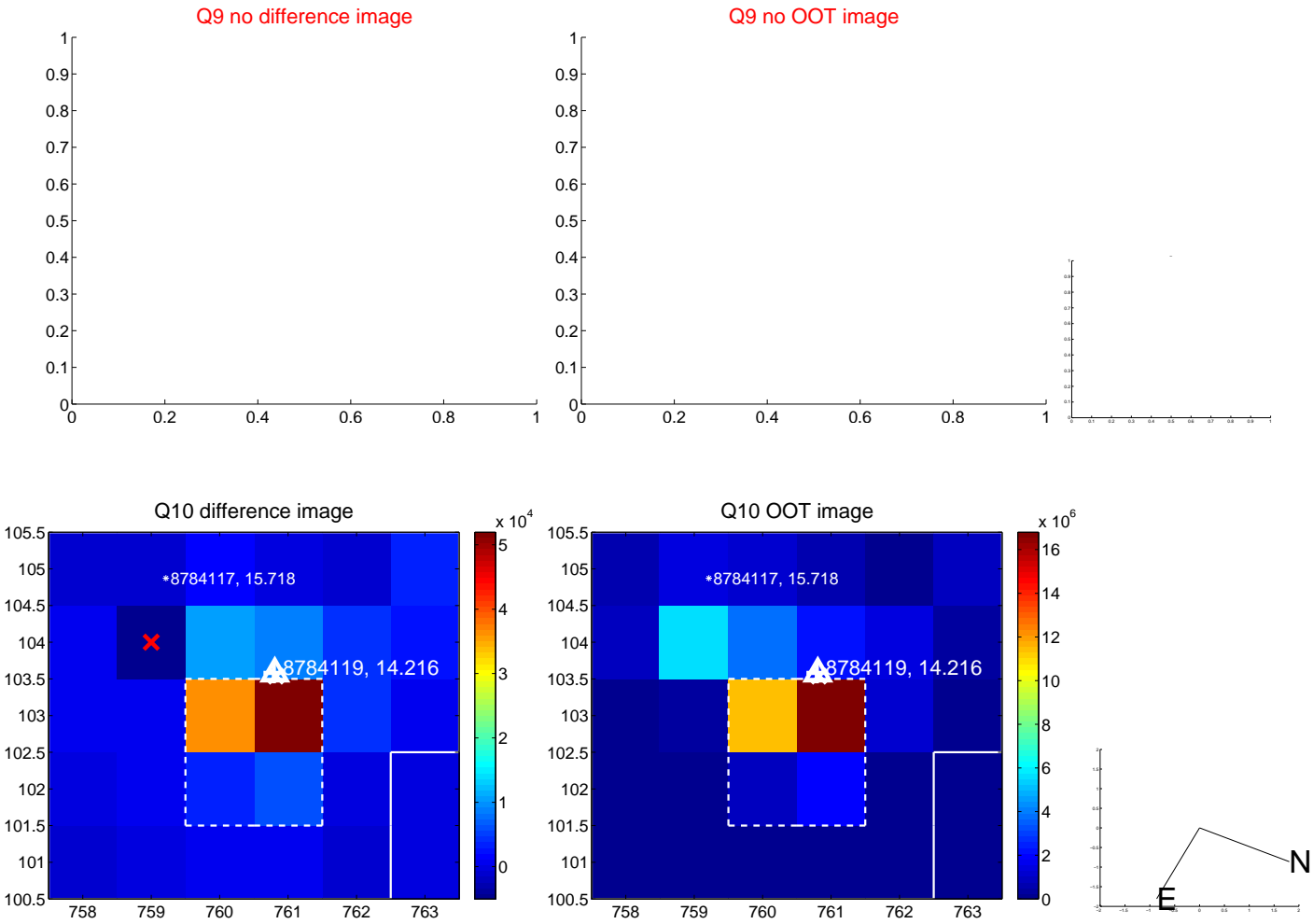
Q8 no difference image



Q8 no OOT image



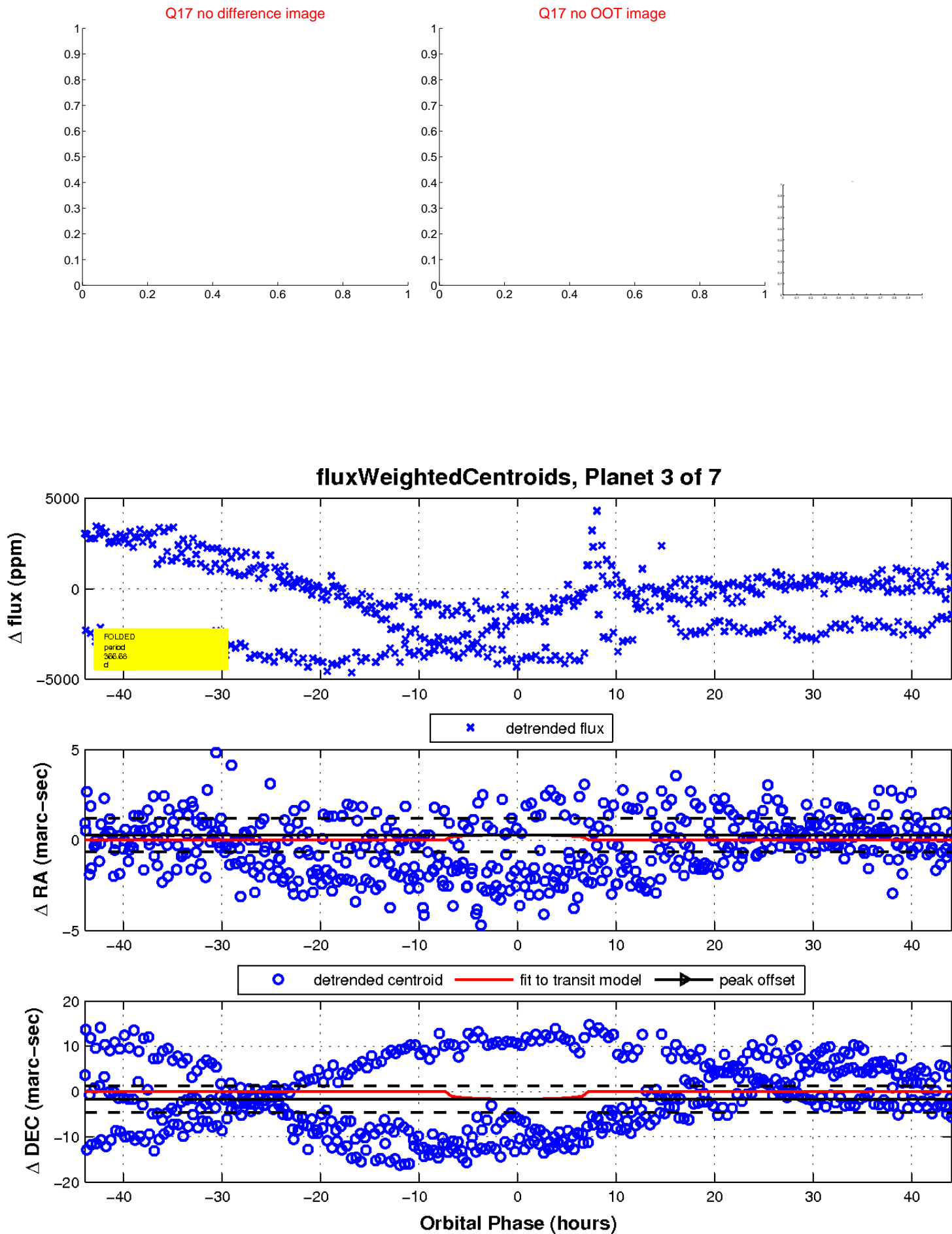
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

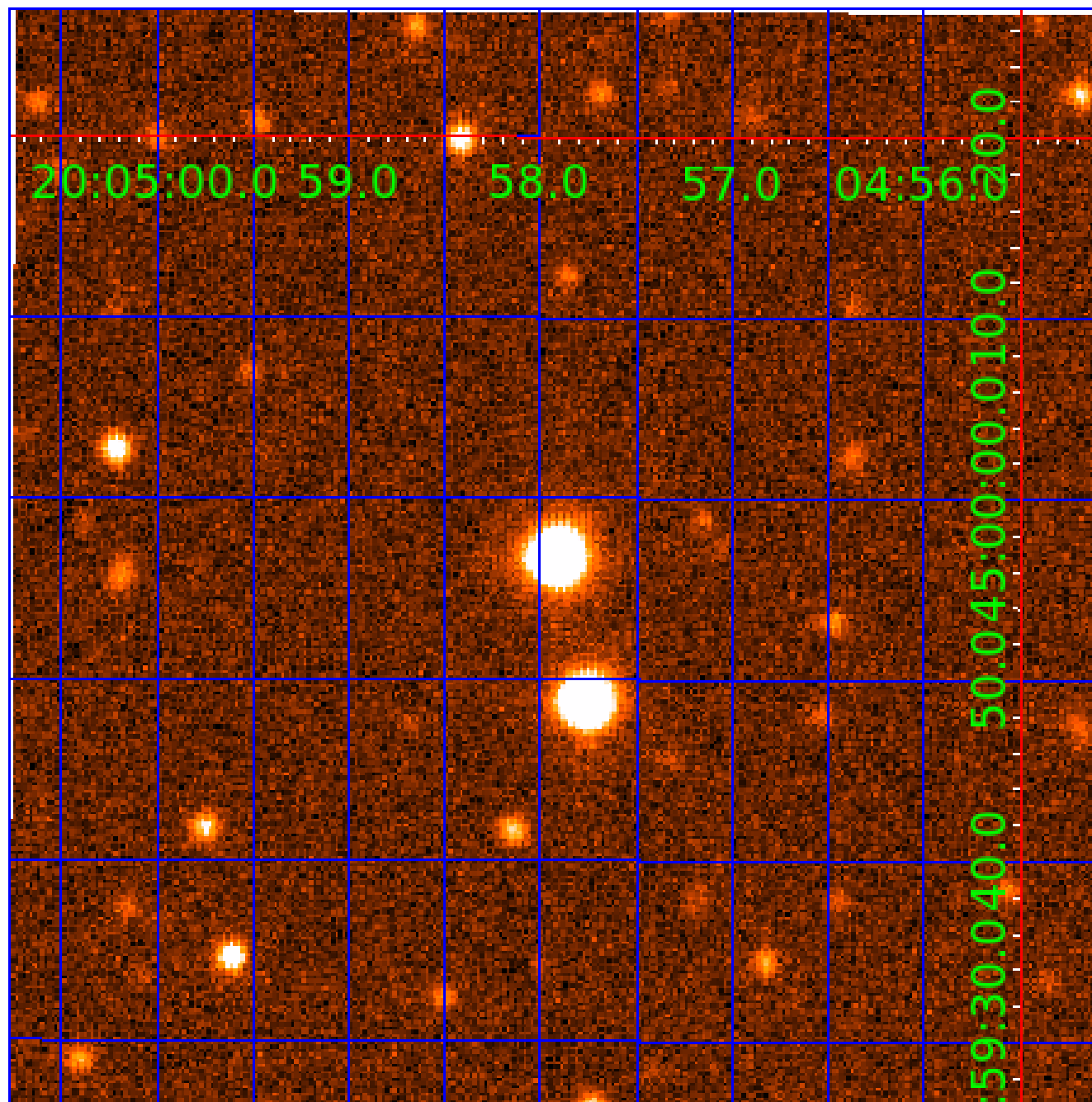


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 008784119

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008784119-01	OBS	No	526.400453	310.781690	906.5	3.477	15.0	6.9	0.53	4386	1.59	0.09
008784119-03	OBS	No	366.677020	192.945604	812.9	14.690	11.5	5.1	0.53	4386	1.57	0.14
008784119-04	OBS	No	397.031225	314.385327	1396.9	14.652	12.9	8.2	0.53	4386	1.95	0.13
008784119-05	OBS	No	532.372569	214.583321	1087.5	2.484	12.5	7.3	0.53	4386	1.94	0.09
008784119-06	OBS	No	407.438305	234.571861	556.4	6.094	8.6	5.5	0.53	4386	1.29	0.12
008784119-07	OBS	No	0.932797	131.671610	841.5	2.000	7.7	-1.0	0.53	4386	1.50	407.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008784119-01	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
008784119-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008784119-06	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—MOD_POS_ALT—CENT_FEW_DIFFS
008784119-07	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

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

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

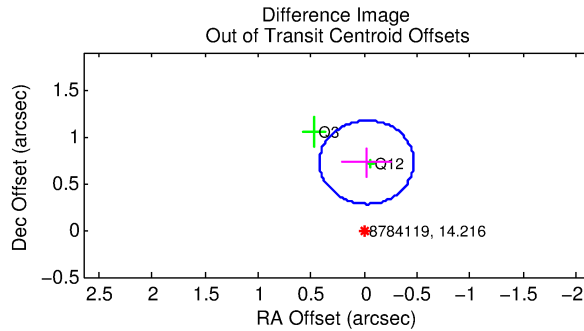
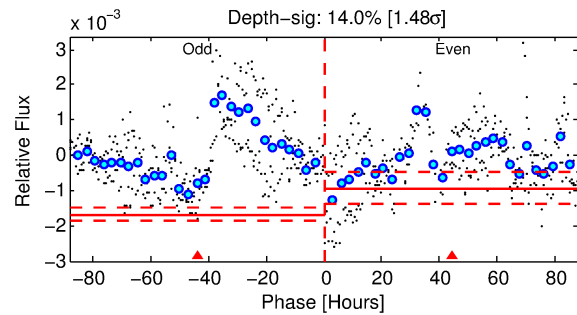
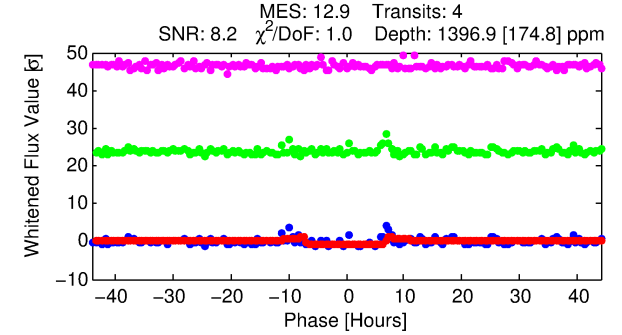
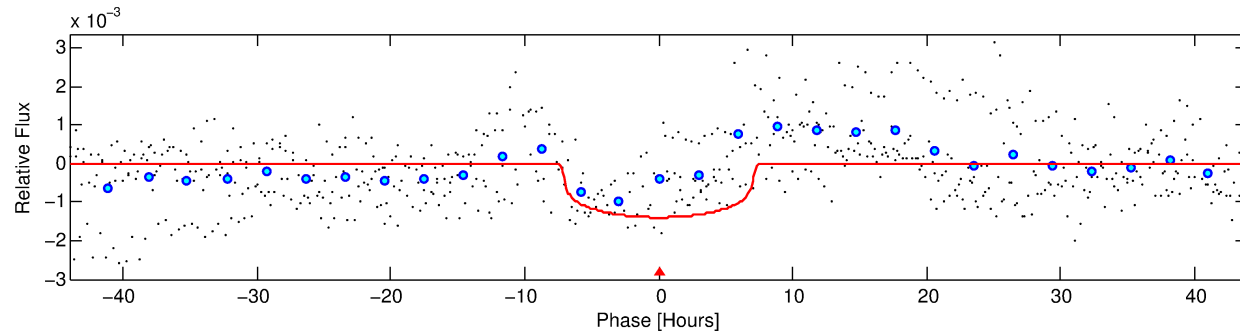
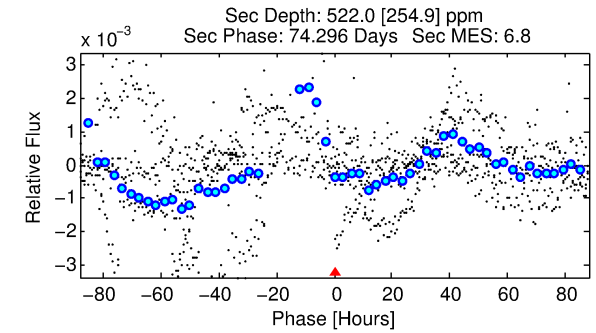
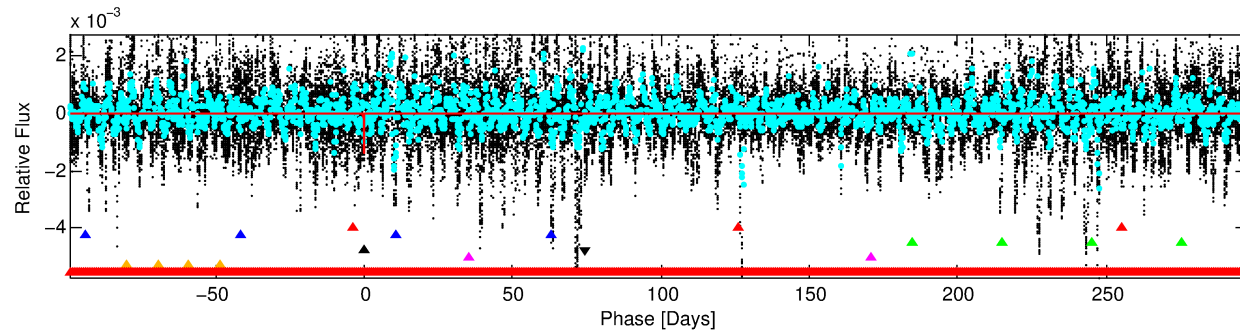
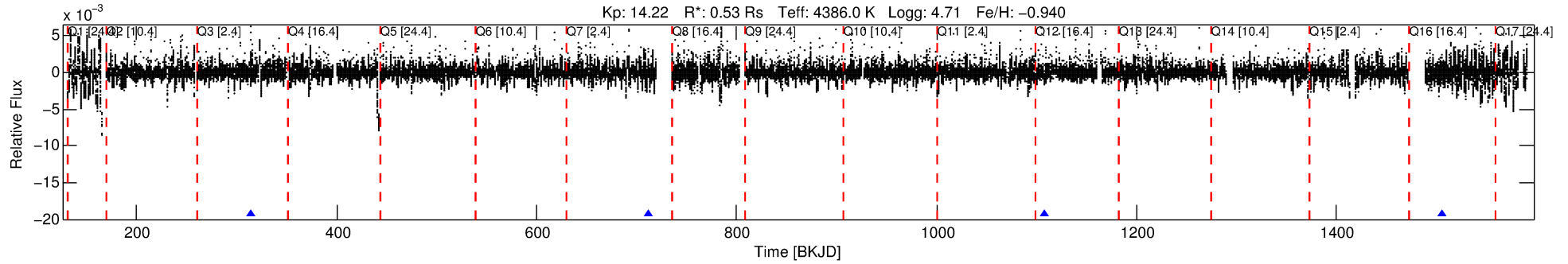
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008784119-04

No Significant Match Found

# DV One-Page Summary

KIC: 8784119 Candidate: 4 of 7 Period: 397.031 d



## DV Fit Results:

Period = 397.03122 [0.00475] d  
Epoch = 314.3853 [0.0089] BKJD  
Rp/R\* = 0.0338 [0.0094]  
a/R\* = 206.32 [206.56]  
b = 0.27 [3.40]  
Seff = 0.13 [0.02]  
Teq = 152 [6] K  
Rp = 1.95 [0.57] Re  
a = 0.8518 [0.0623] AU  
Ag = 54893.02 [41012.47] [1.34 $\sigma$ ]  
Teffp = 3605 [677] K [5.10 $\sigma$ ]

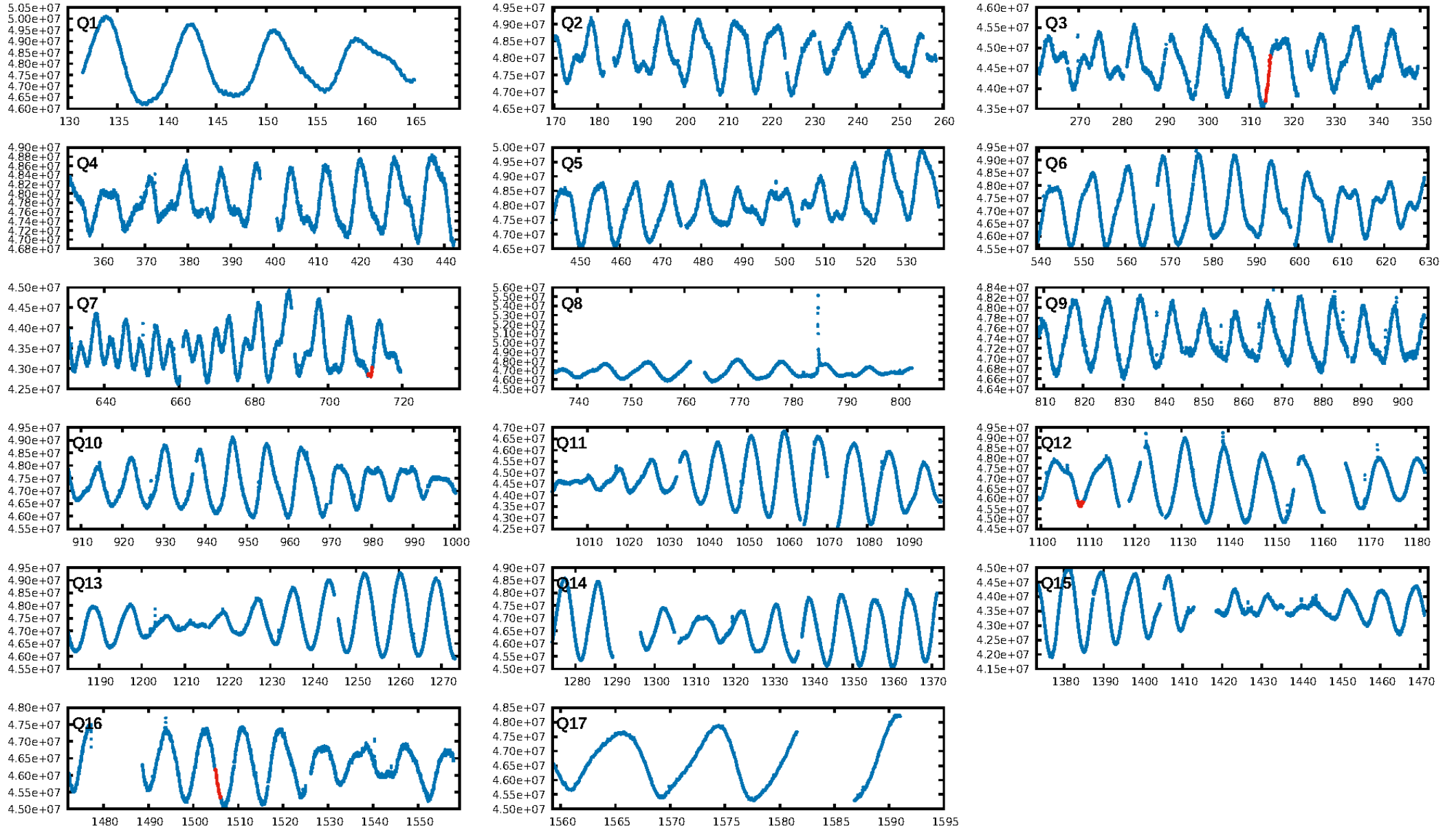
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [35.11 $\sigma$ ]  
LongPeriod-sig: 100.0% [15.74 $\sigma$ ]  
ModelChiSquare2-sig: 0.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -1.058  
Centroid-sig: 17.7%  
Centroid-so: 1.365 arcsec [1.15 $\sigma$ ]  
OotOffset-rm: 0.725 arcsec [4.88 $\sigma$ ]  
KicOffset-rm: 0.056 arcsec [0.24 $\sigma$ ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/2]

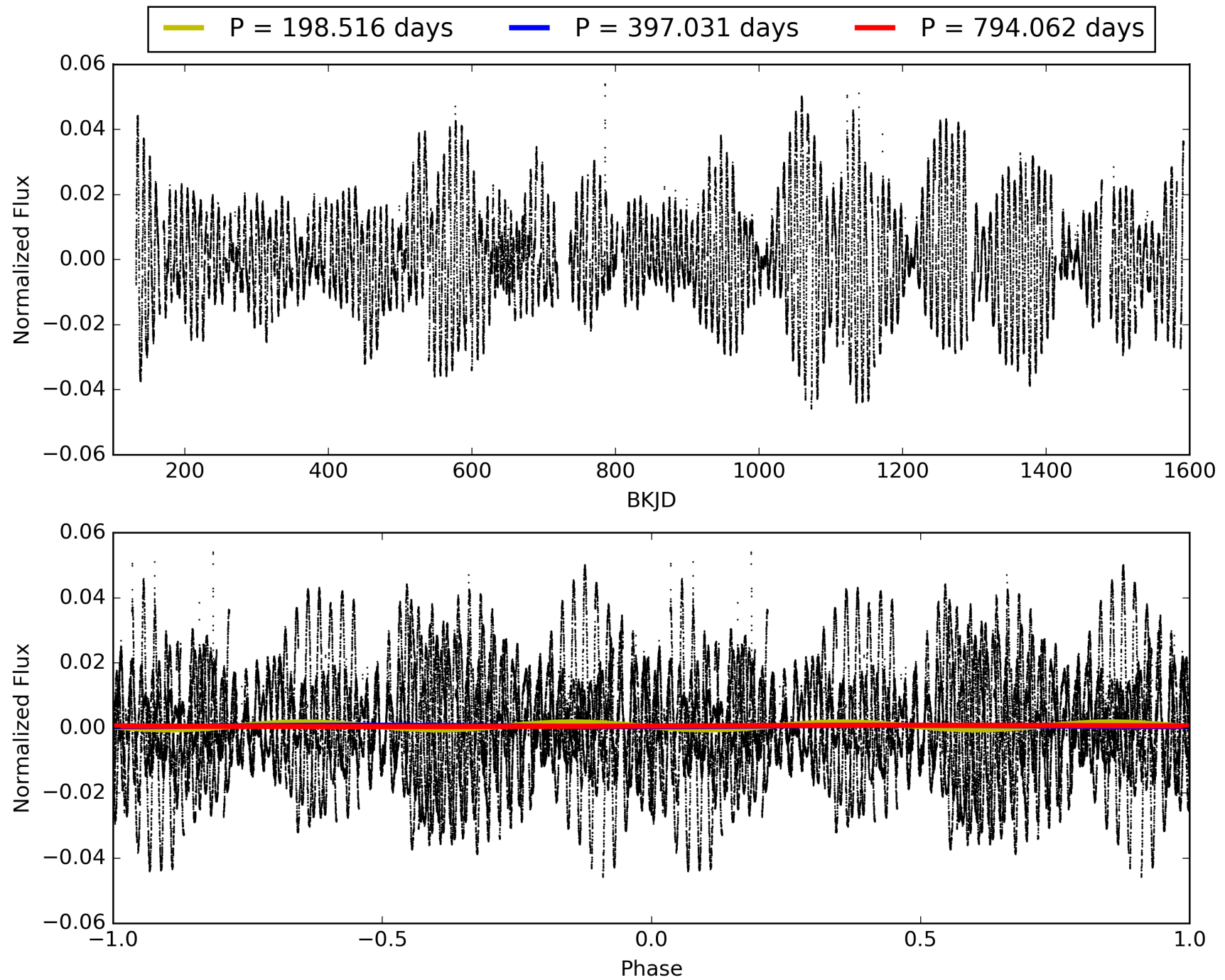
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:16:59 Z

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

# TCE 008784119-04, PDC Light Curves

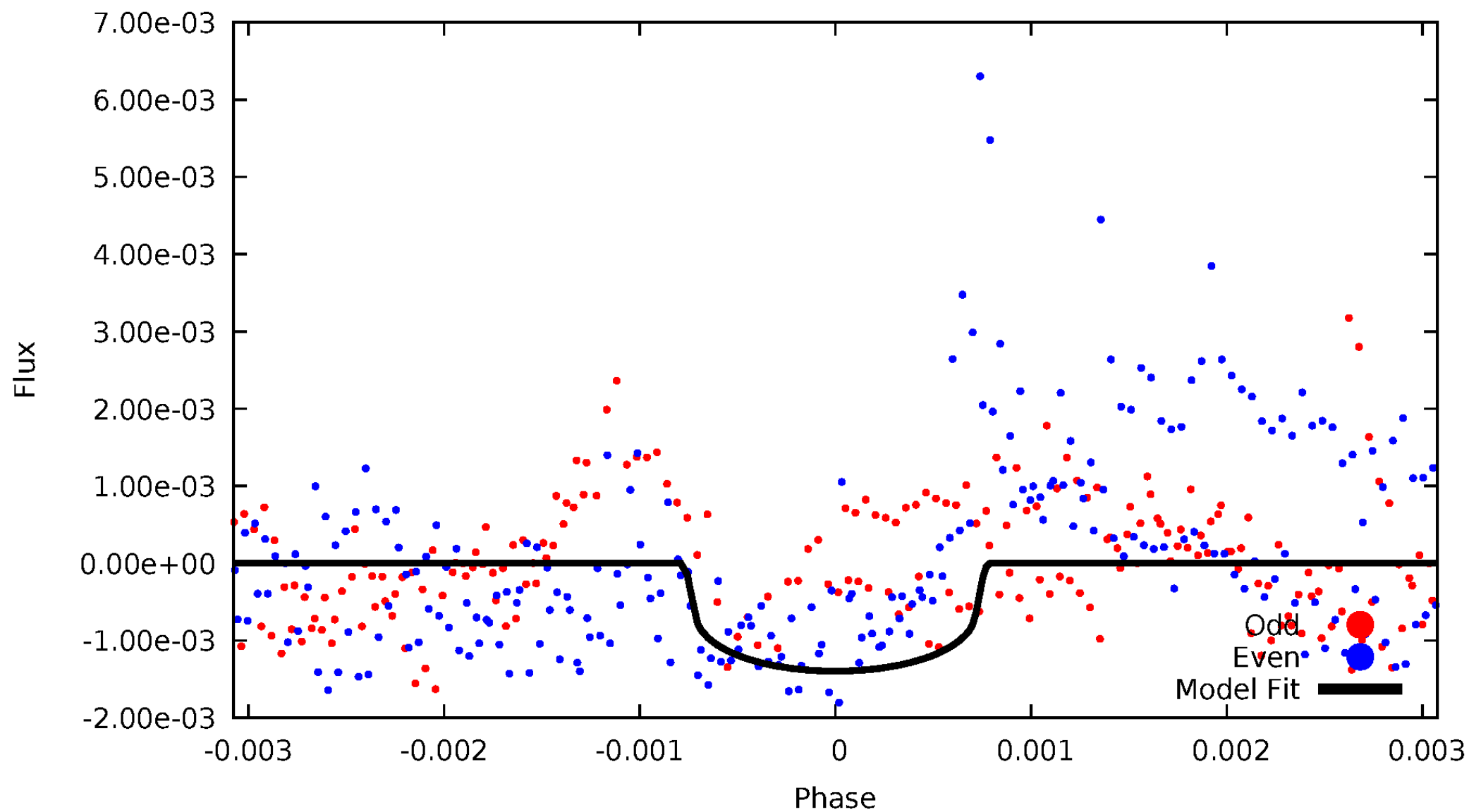


TCE 008784119-04



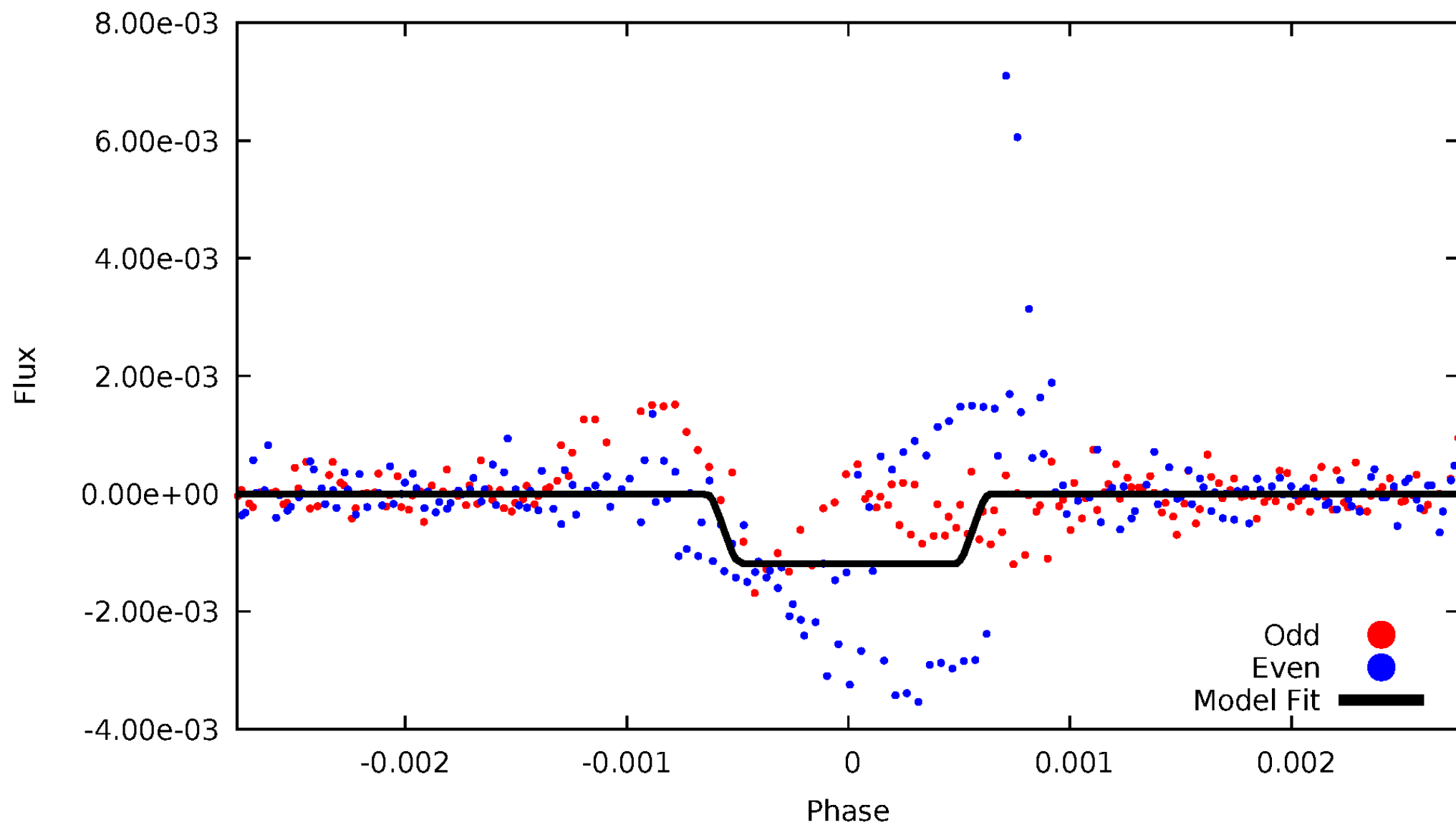
# DV Odd/Even

TCE 008784119-04



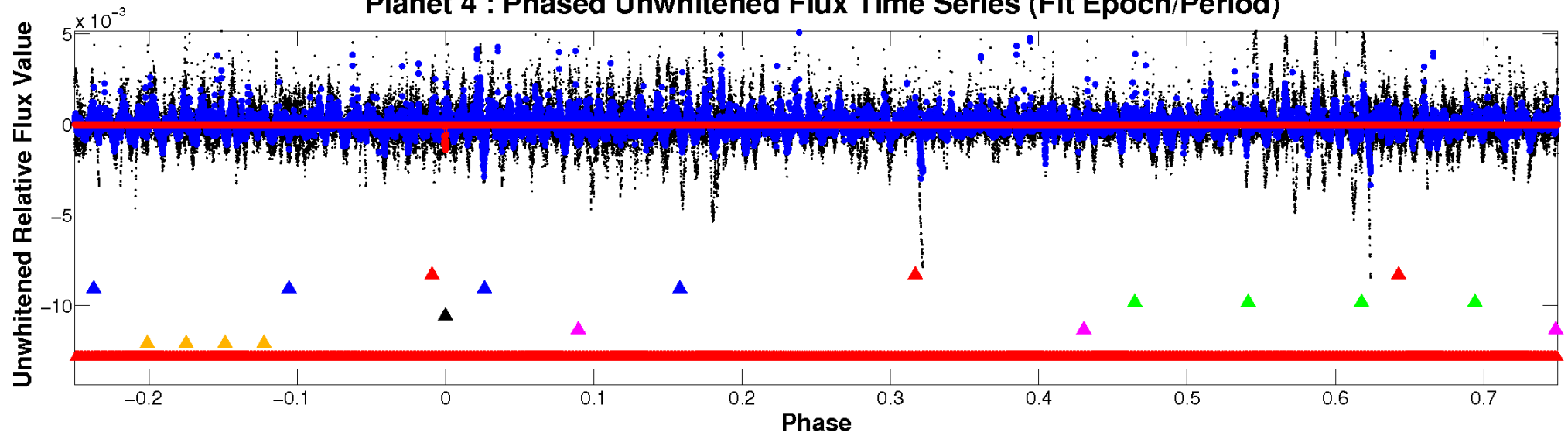
# ALT Odd/Even

TCE 008784119-04

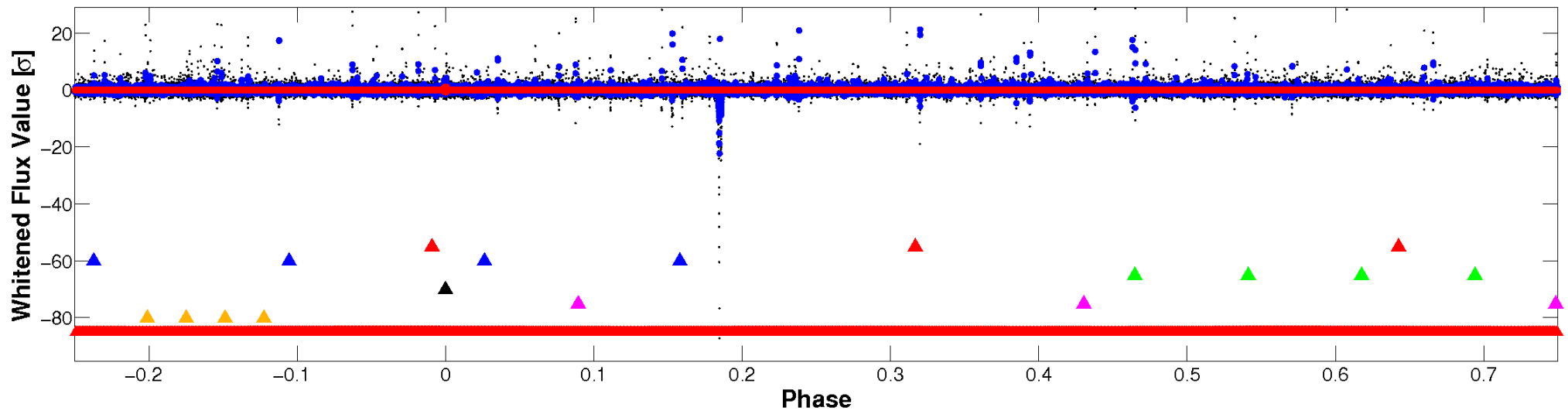


# Non-Whitened Vs. Whitened Light Curve

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

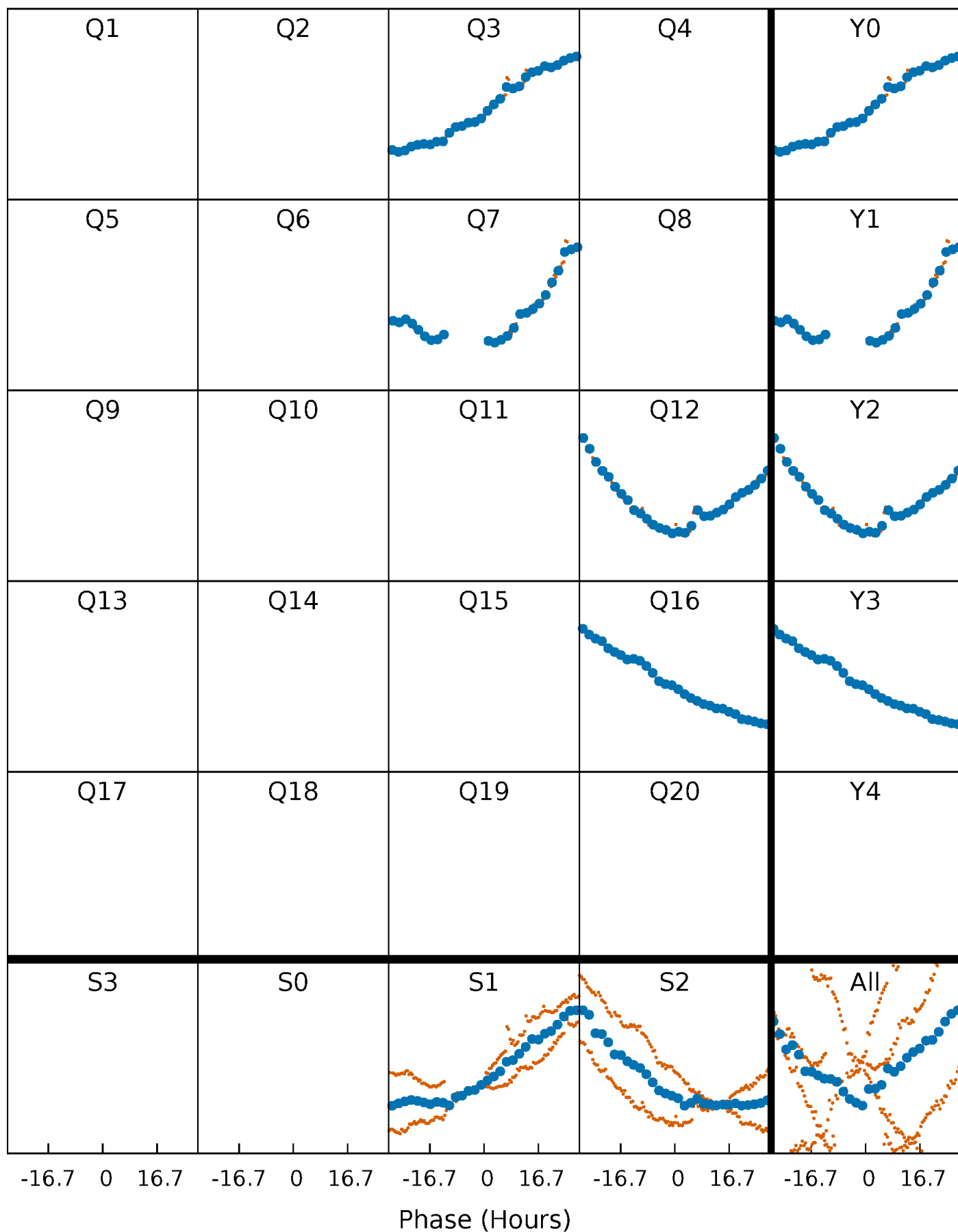


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

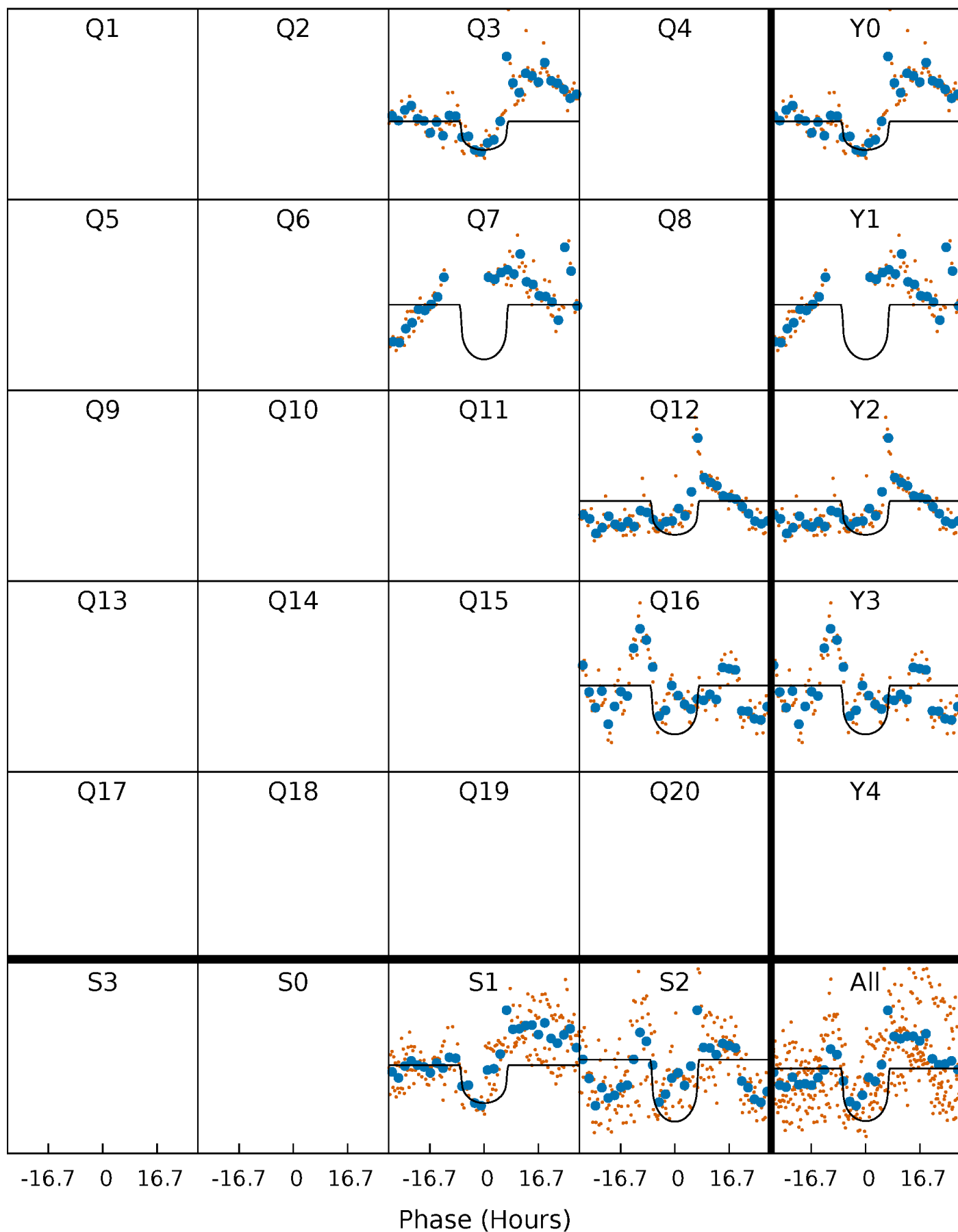
TCE 008784119-04     $P=397.031225$  Days     $T_0=314.385327$  (BKJD)





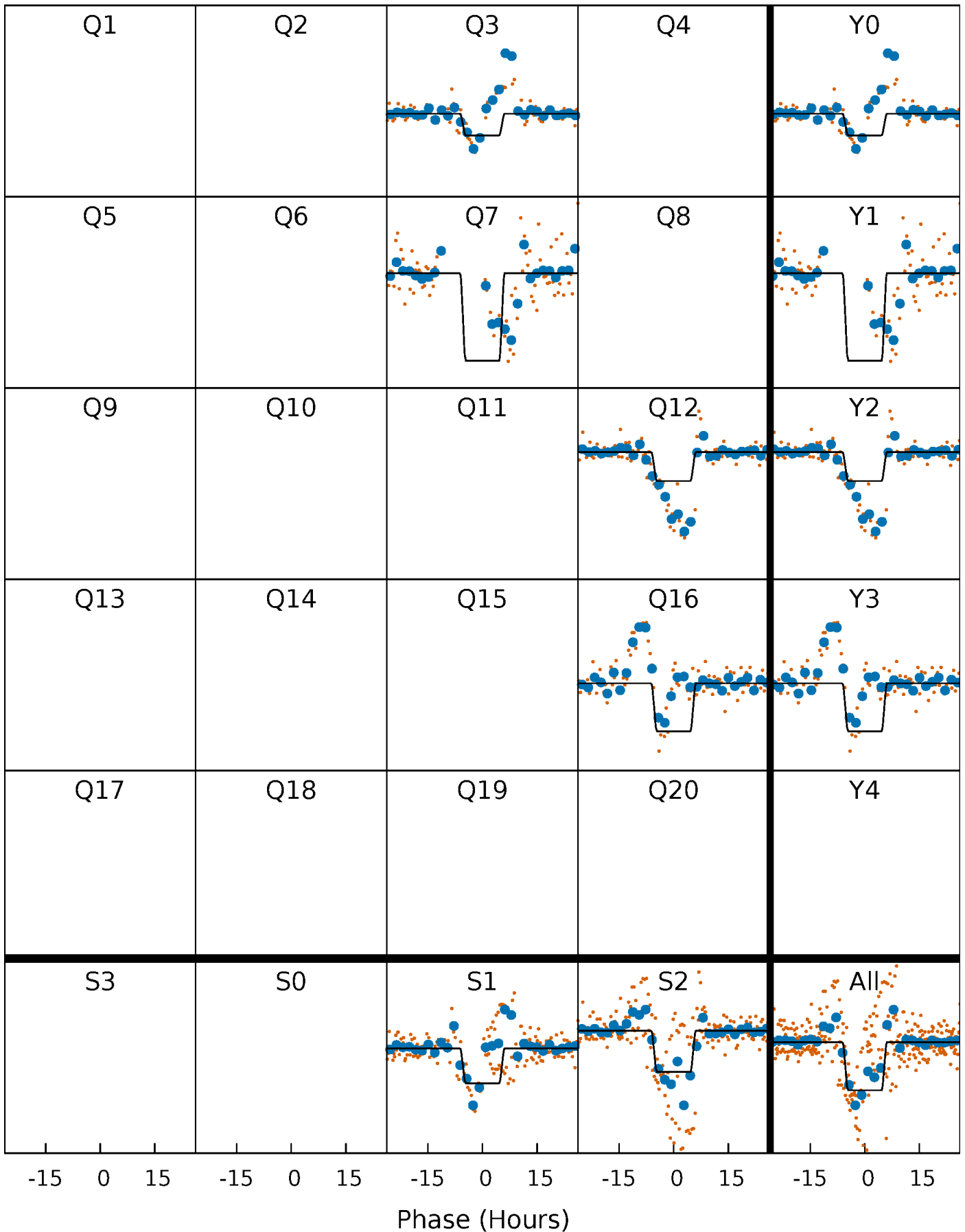
# DV Quarter-Phased Transit Curves

TCE 008784119-04     $P=397.031225$  Days     $T_0=314.385327$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

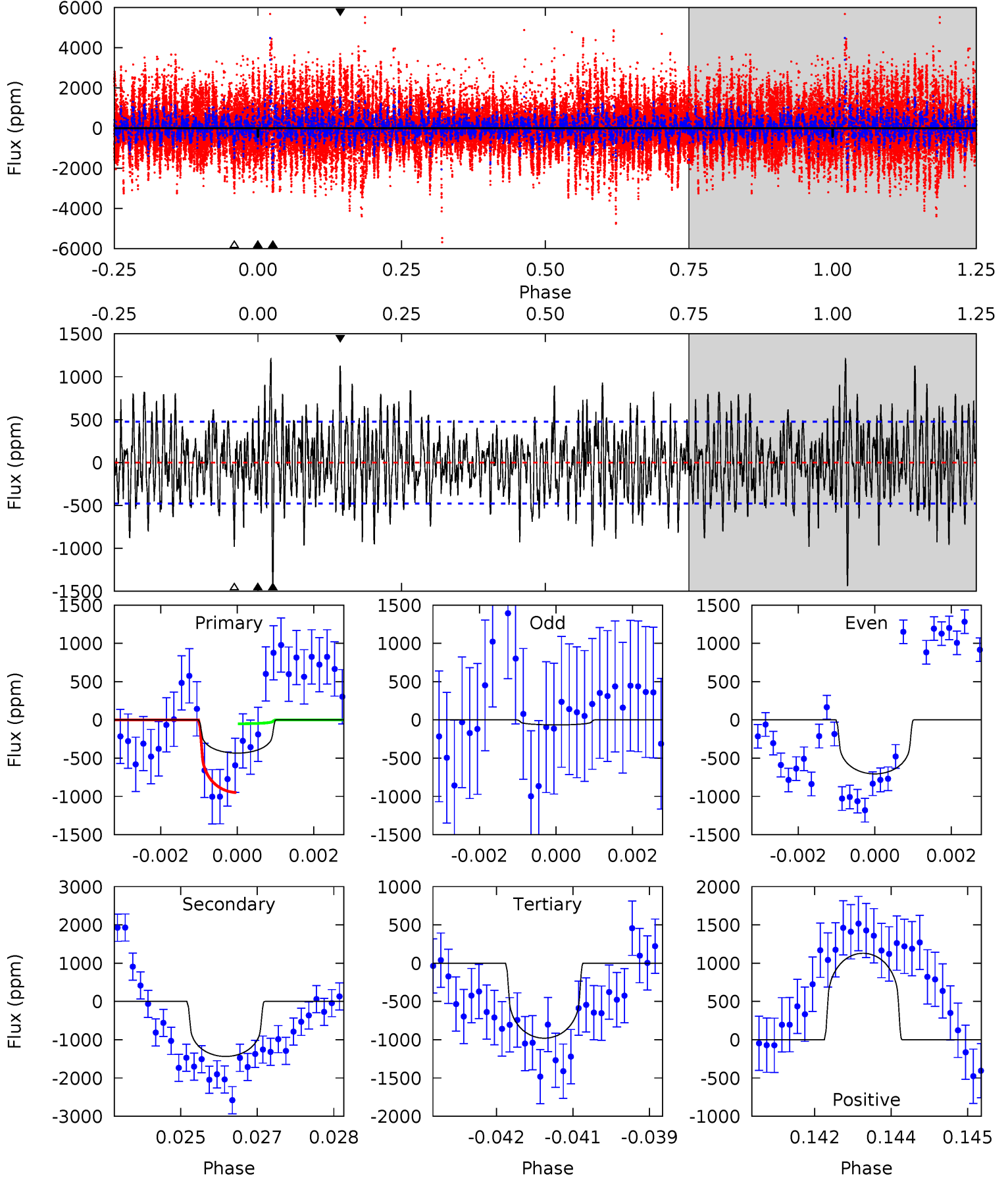
TCE 008784119-04     $P=397.010448$  Days     $T_0=314.396306$  (BKJD)



# DV Model-Shift Uniqueness Test

008784119-04, P = 397.031225 Days, E = 314.385327 Days

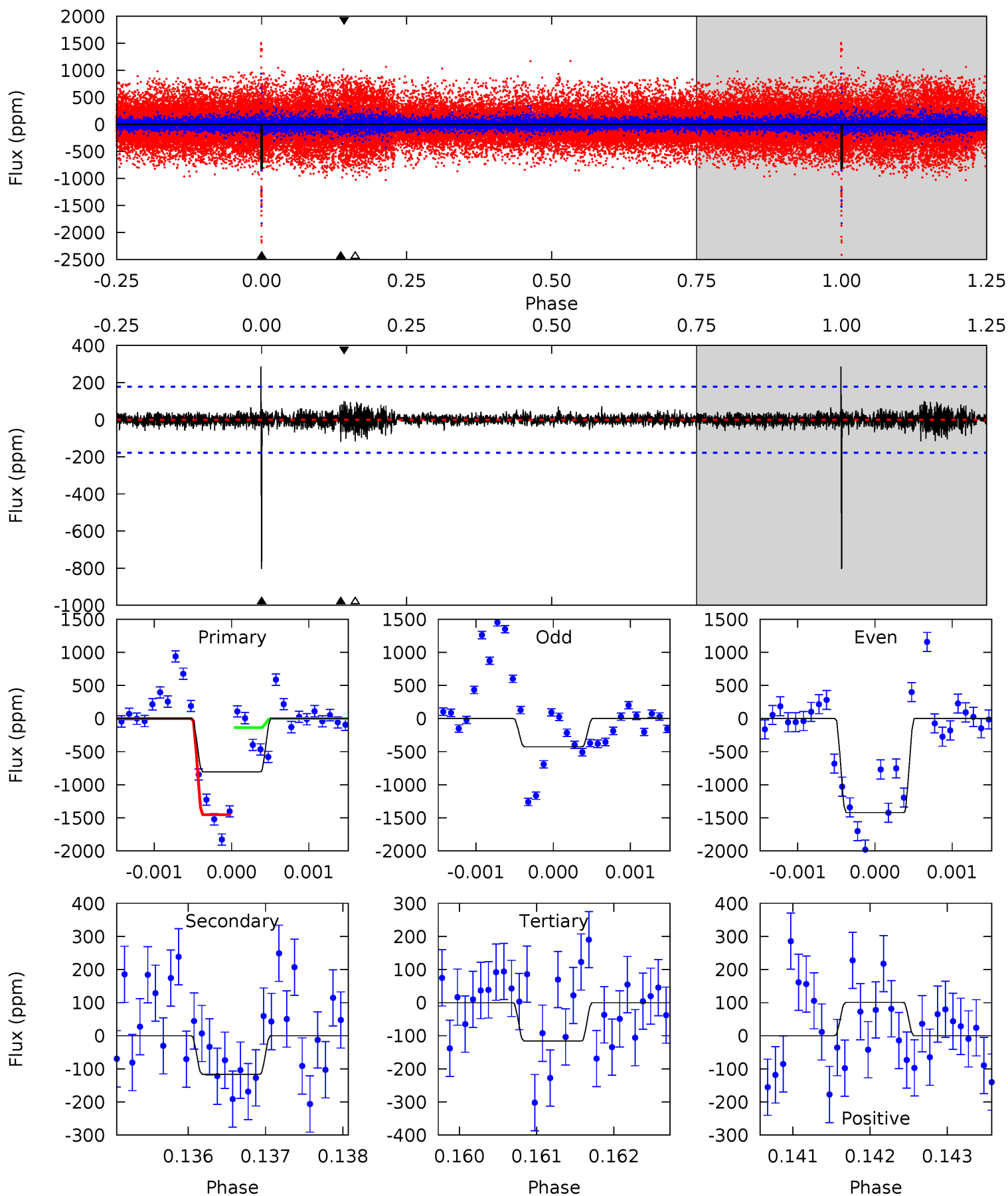
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.89	16.2	11.0	12.7	5.37	3.16	3.76	-6.15	-7.84	5.15	3.47	2.74	0.55	0.46	5.06



# Alt Model-Shift Uniqueness Test

008784119-04, P = 397.010448 Days, E = 314.396306 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
24.5	3.53	3.52	3.06	5.41	3.22	0.58	21.0	21.4	0.01	0.48	17.5	2.01	0.26	19.9



### Stellar Parameters For KIC 008784119

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$4386^{+118}_{-144}$	$4.711^{+0.058}_{-0.031}$	$-0.940^{+0.300}_{-0.300}$	$0.528^{+0.042}_{-0.046}$	$0.523^{+0.044}_{-0.033}$	$5.001^{+1.241}_{-0.688}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
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 008784119-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1437 \pm 89$	$1.96^{+0.53}_{-0.58}$	$212^{+7}_{-8}$	$4558^{+707}_{-415}$	$150628^{+145974}_{-58451}$
Alt.	$-116 \pm 33$	$1.95^{+0.56}_{-0.56}$	$211^{+8}_{-8}$	$2993^{+358}_{-227}$	$12059^{+13794}_{-5186}$

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

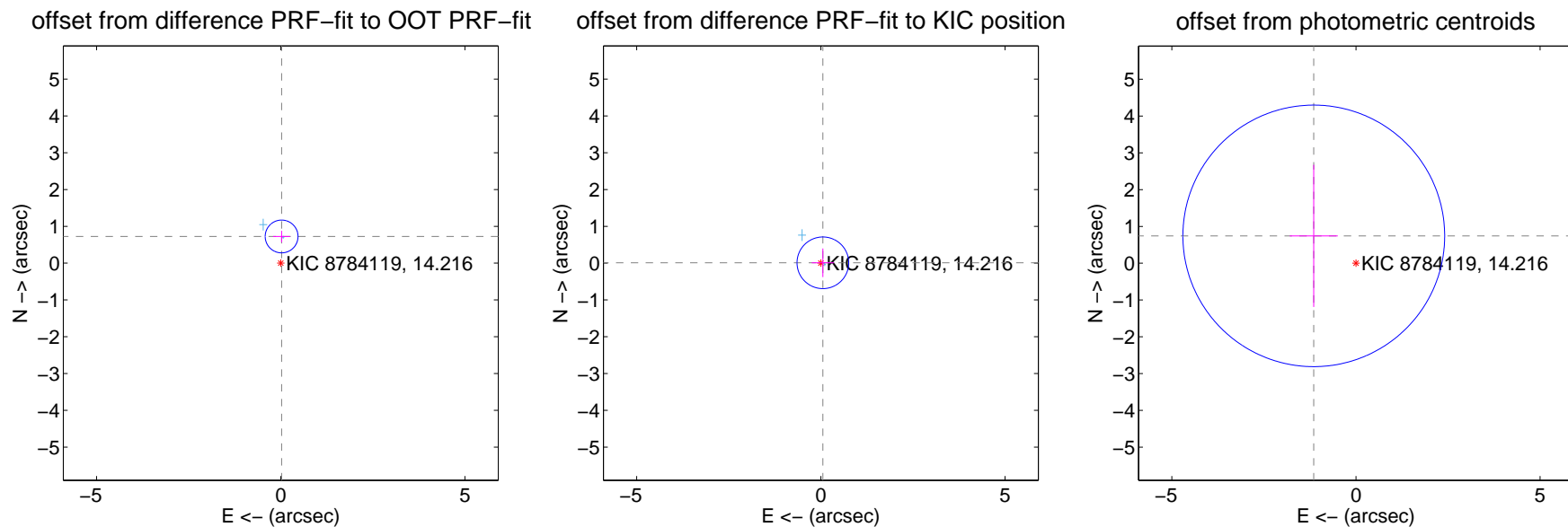
## DV Centroid Data

Supplemental centroid analysis for 008784119-04. Kepler magnitude: 14.22. Transit SNR 8.24

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.74 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>0.725 <math>\pm</math> 0.149</b>	<b>4.88</b>	-0.023 $\pm$ 0.231	0.725 $\pm$ 0.155
PRF-fit source offset from KIC position	0.056 $\pm$ 0.234	0.24	-0.055 $\pm$ 0.302	0.010 $\pm$ 0.388
photometric centroid source offset	1.37 $\pm$ 1.18	1.15	1.15 $\pm$ 0.65	0.74 $\pm$ 1.93



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



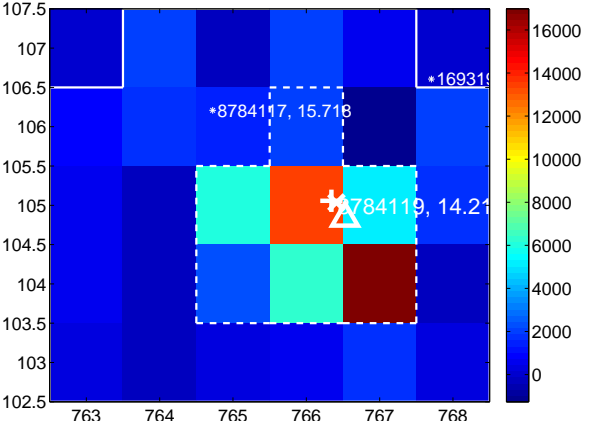
Q2 no difference image



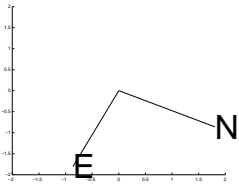
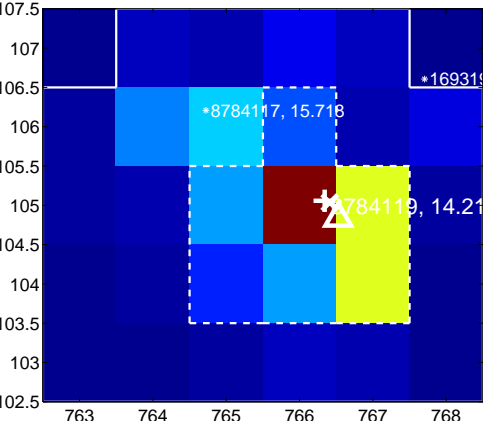
Q2 no OOT image



Q3 difference image



Q3 OOT image



Q4 no difference image



Q4 no OOT image

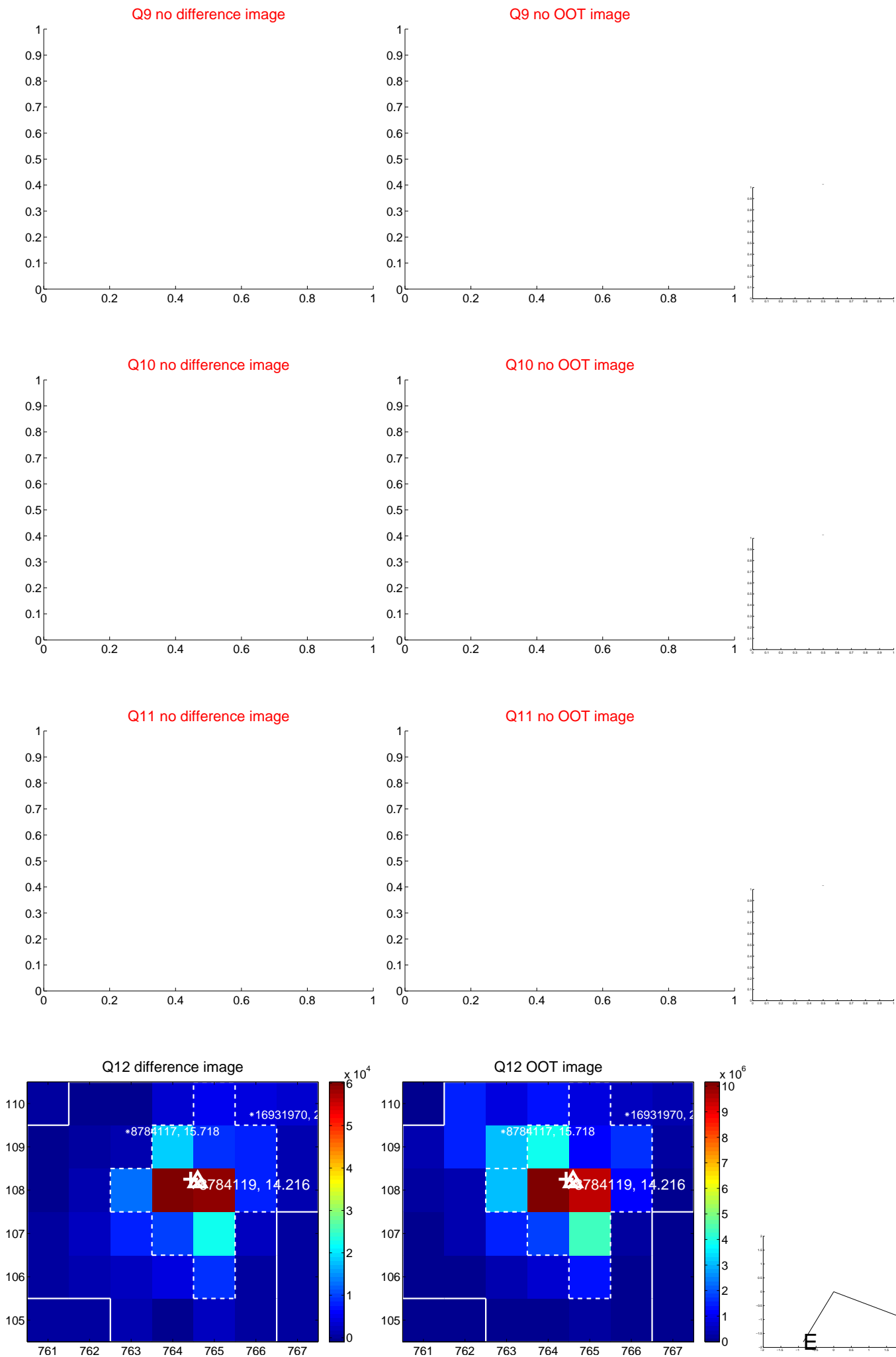


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





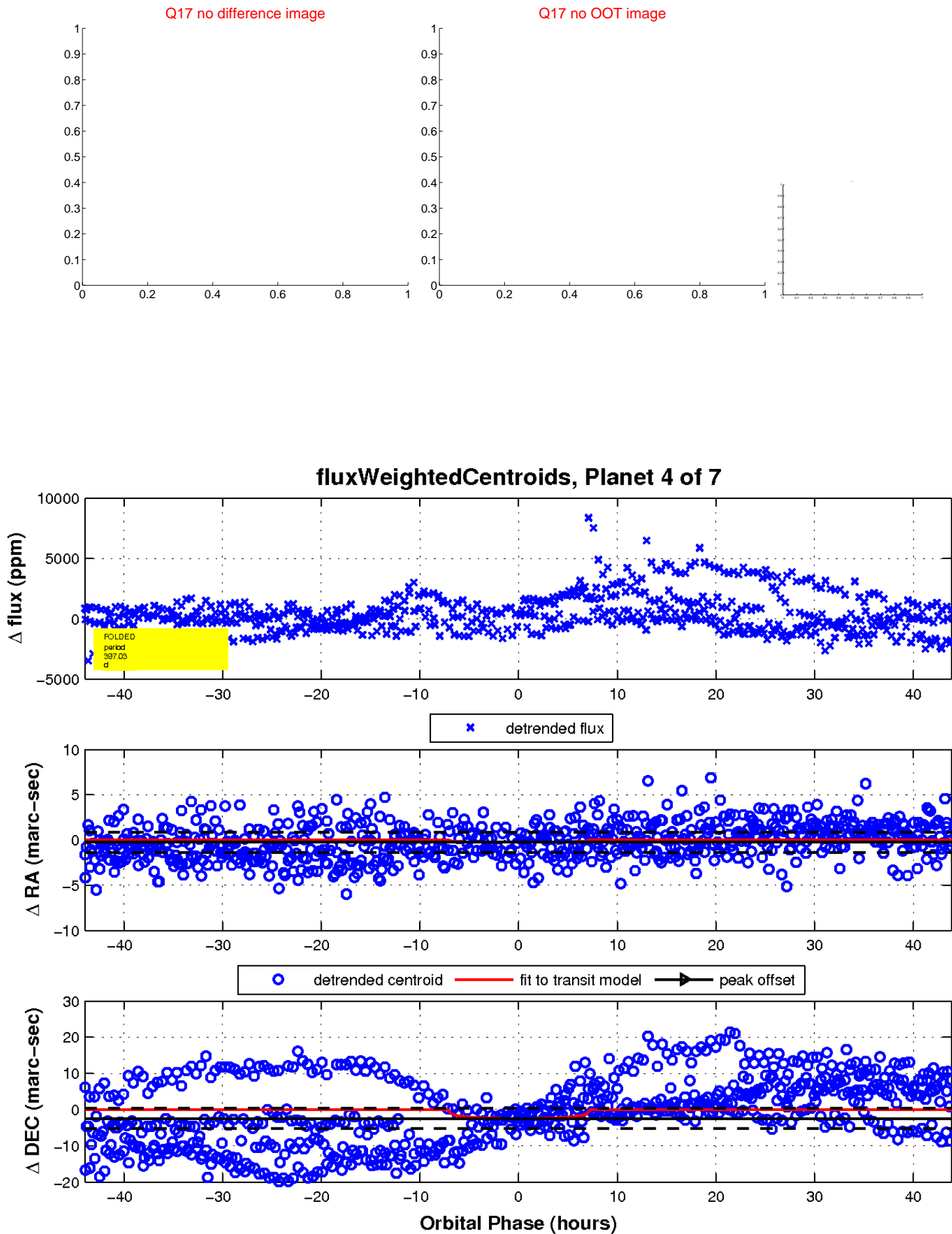
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



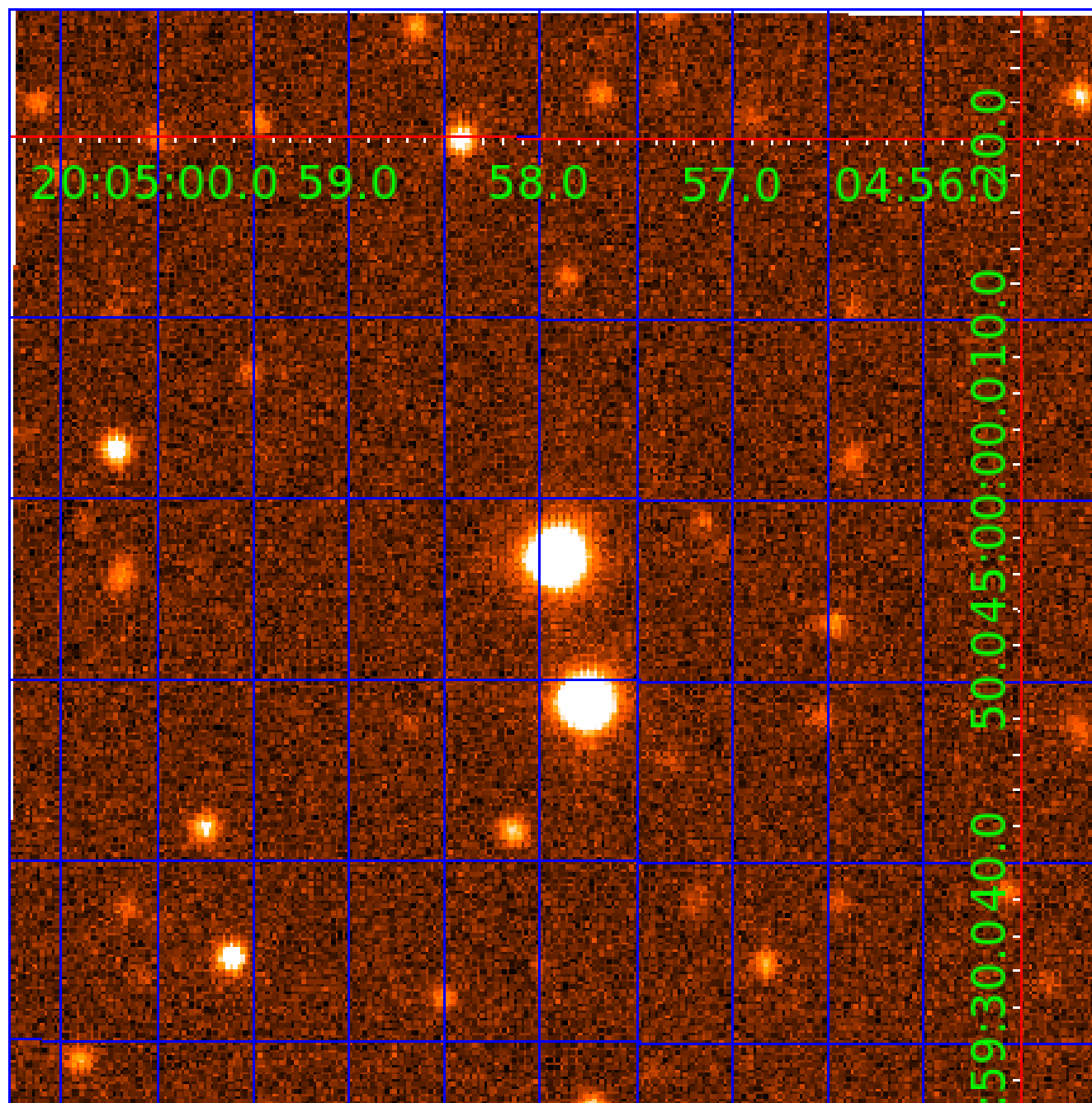
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 008784119

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008784119-01	OBS	No	526.400453	310.781690	906.5	3.477	15.0	6.9	0.53	4386	1.59	0.09
008784119-03	OBS	No	366.677020	192.945604	812.9	14.690	11.5	5.1	0.53	4386	1.57	0.14
008784119-04	OBS	No	397.031225	314.385327	1396.9	14.652	12.9	8.2	0.53	4386	1.95	0.13
008784119-05	OBS	No	532.372569	214.583321	1087.5	2.484	12.5	7.3	0.53	4386	1.94	0.09
008784119-06	OBS	No	407.438305	234.571861	556.4	6.094	8.6	5.5	0.53	4386	1.29	0.12
008784119-07	OBS	No	0.932797	131.671610	841.5	2.000	7.7	-1.0	0.53	4386	1.50	407.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008784119-01	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
008784119-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008784119-06	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—MOD_POS_ALT—CENT_FEW_DIFFS
008784119-07	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

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

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

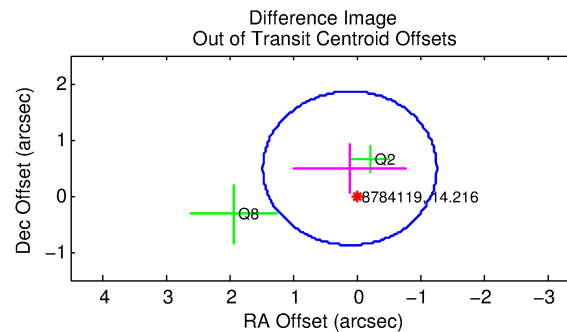
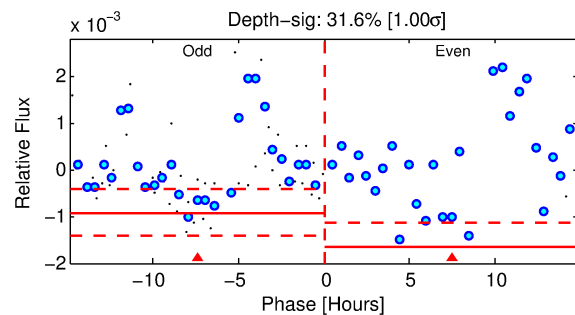
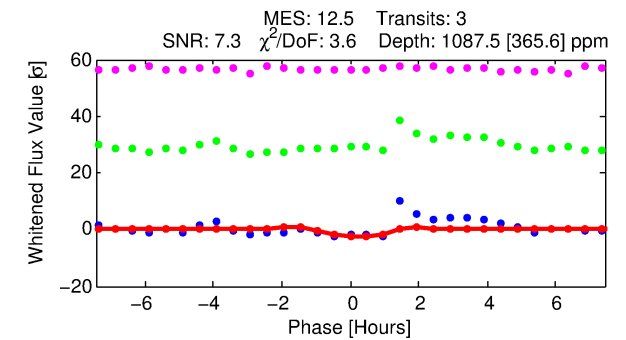
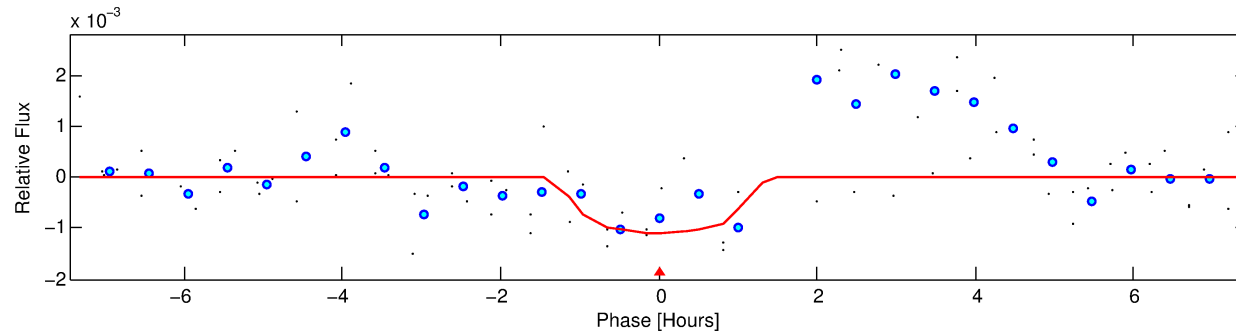
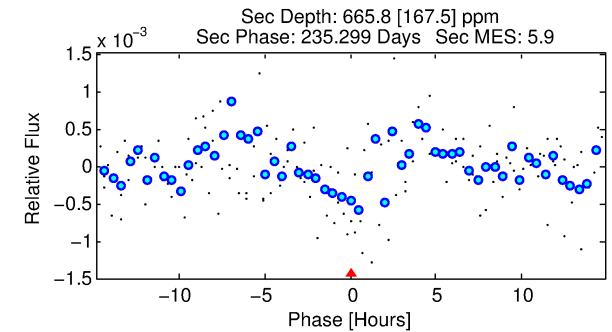
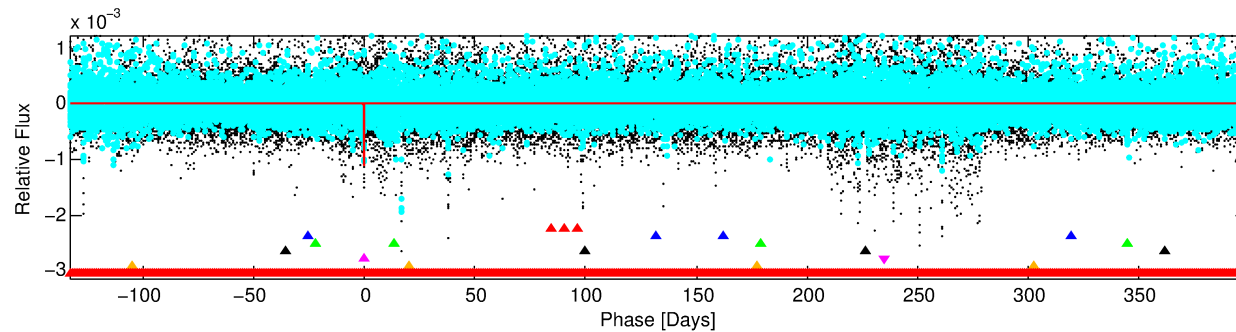
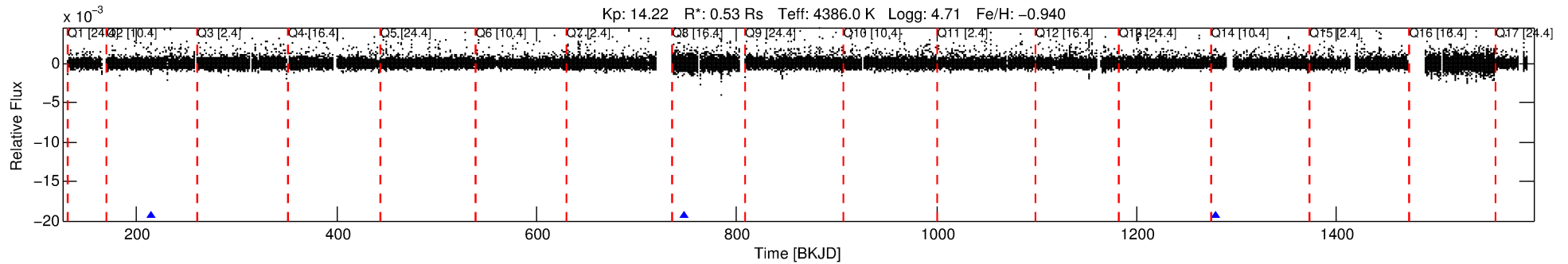
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008784119-05

No Significant Match Found

# DV One-Page Summary

KIC: 8784119 Candidate: 5 of 7 Period: 532.373 d



## DV Fit Results:

Period = 532.37257 [0.00888] d  
Epoch = 214.5833 [0.0138] BKJD  
Rp/R\* = 0.0337 [0.0926]  
a/R\* = 1083.46 [11827.15]  
b = 0.79 [5.19]  
Seff = 0.09 [0.01]  
Teq = 138 [6] K  
Rp = 1.94 [5.34] Re  
a = 1.0358 [0.0758] AU  
Ag = 104532.70 [576218.11] [0.18 $\sigma$ ]  
Teffp = 3841 [5293] K [0.70 $\sigma$ ]

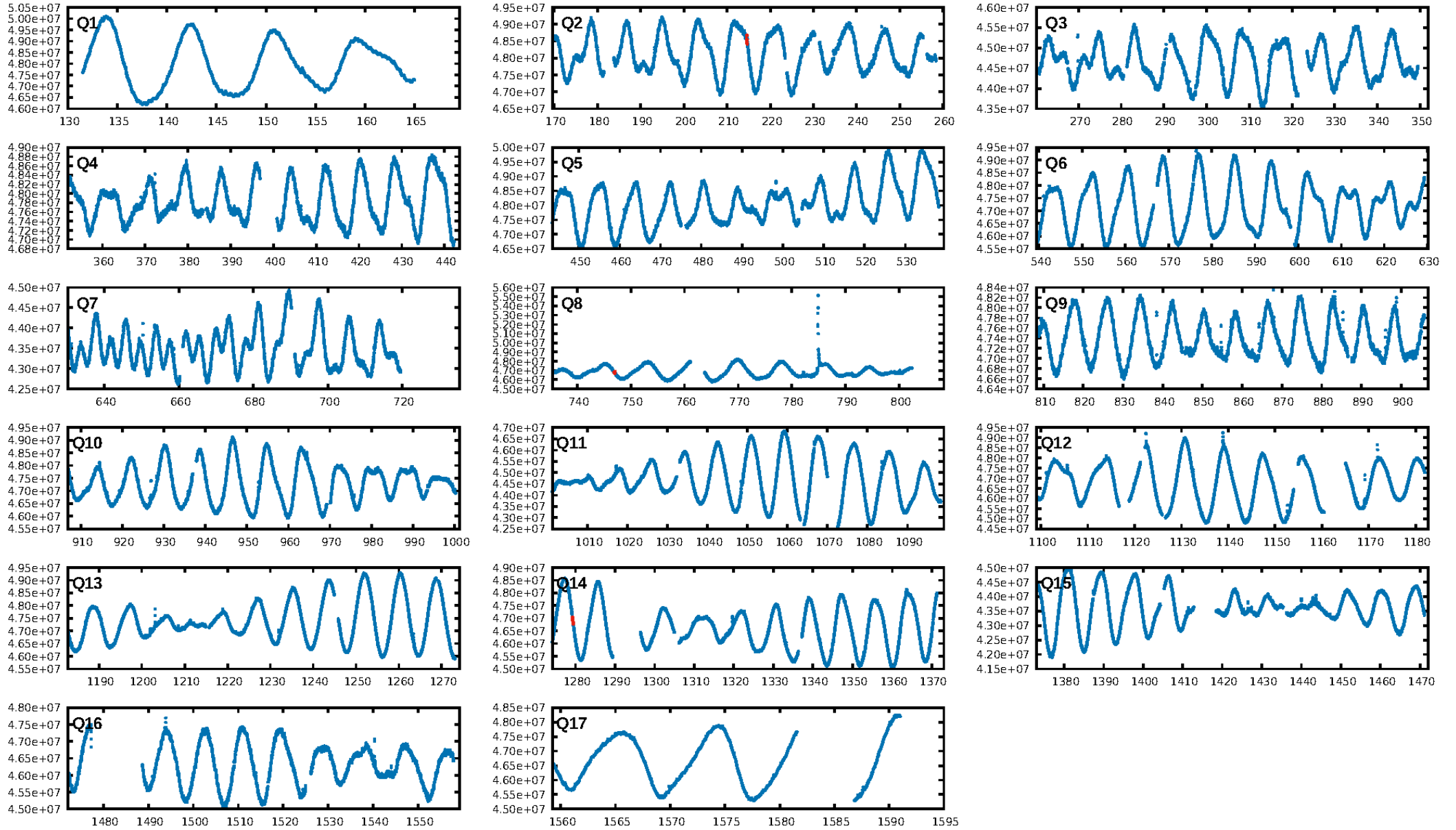
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.54 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.5%  
ModelChiSquareGof-sig: 6.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 3.489  
Centroid-sig: 29.9%  
Centroid-so: 1.966 arcsec [1.00 $\sigma$ ]  
OotOffset-rm: 0.500 arcsec [1.10 $\sigma$ ]  
OotOffset-st: 1/0/1/0 [2]  
KicOffset-rm: 0.266 arcsec [0.39 $\sigma$ ]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.50 [1/2]

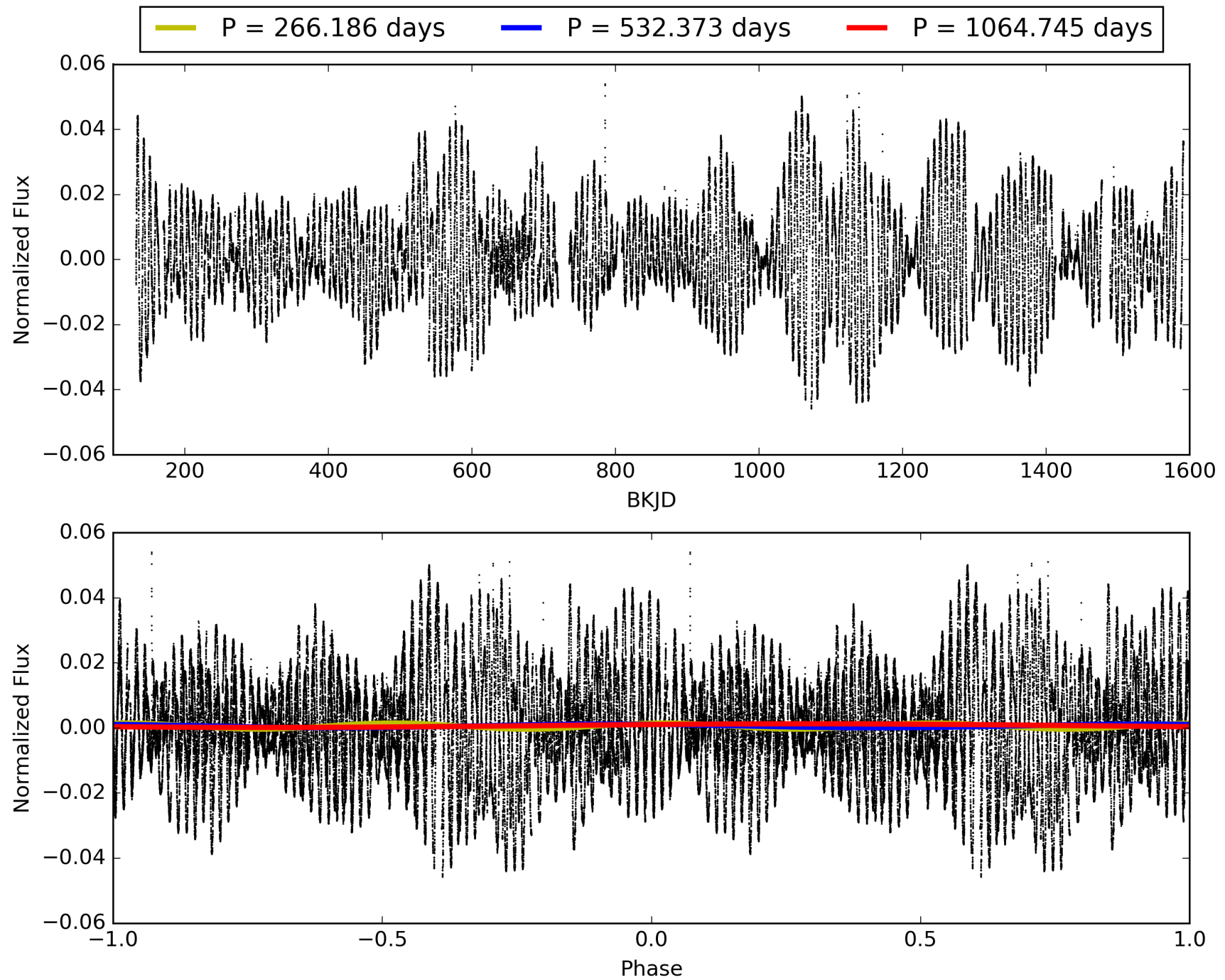
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:17:25 Z

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

# TCE 008784119-05, PDC Light Curves



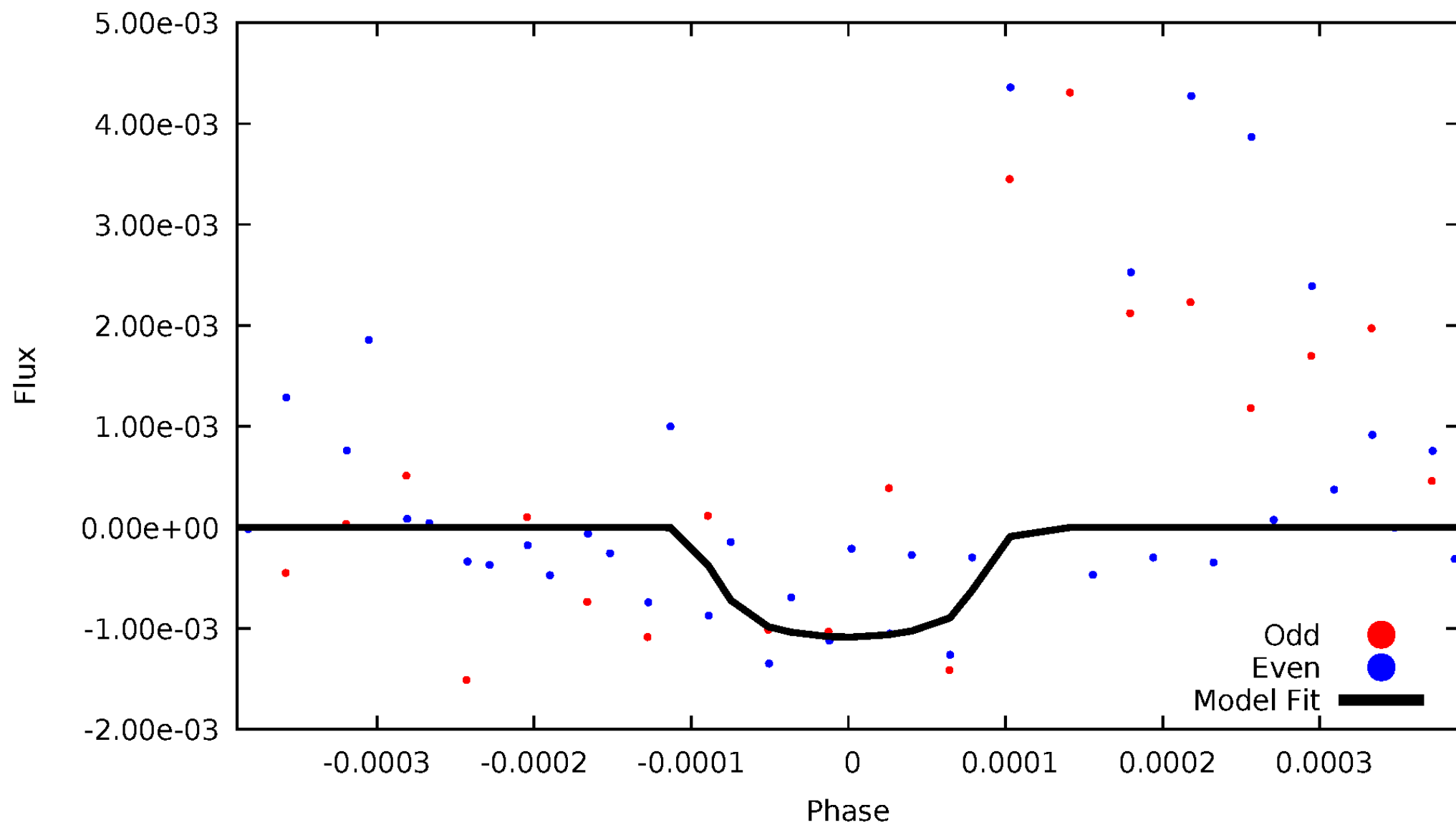
# TCE 008784119-05





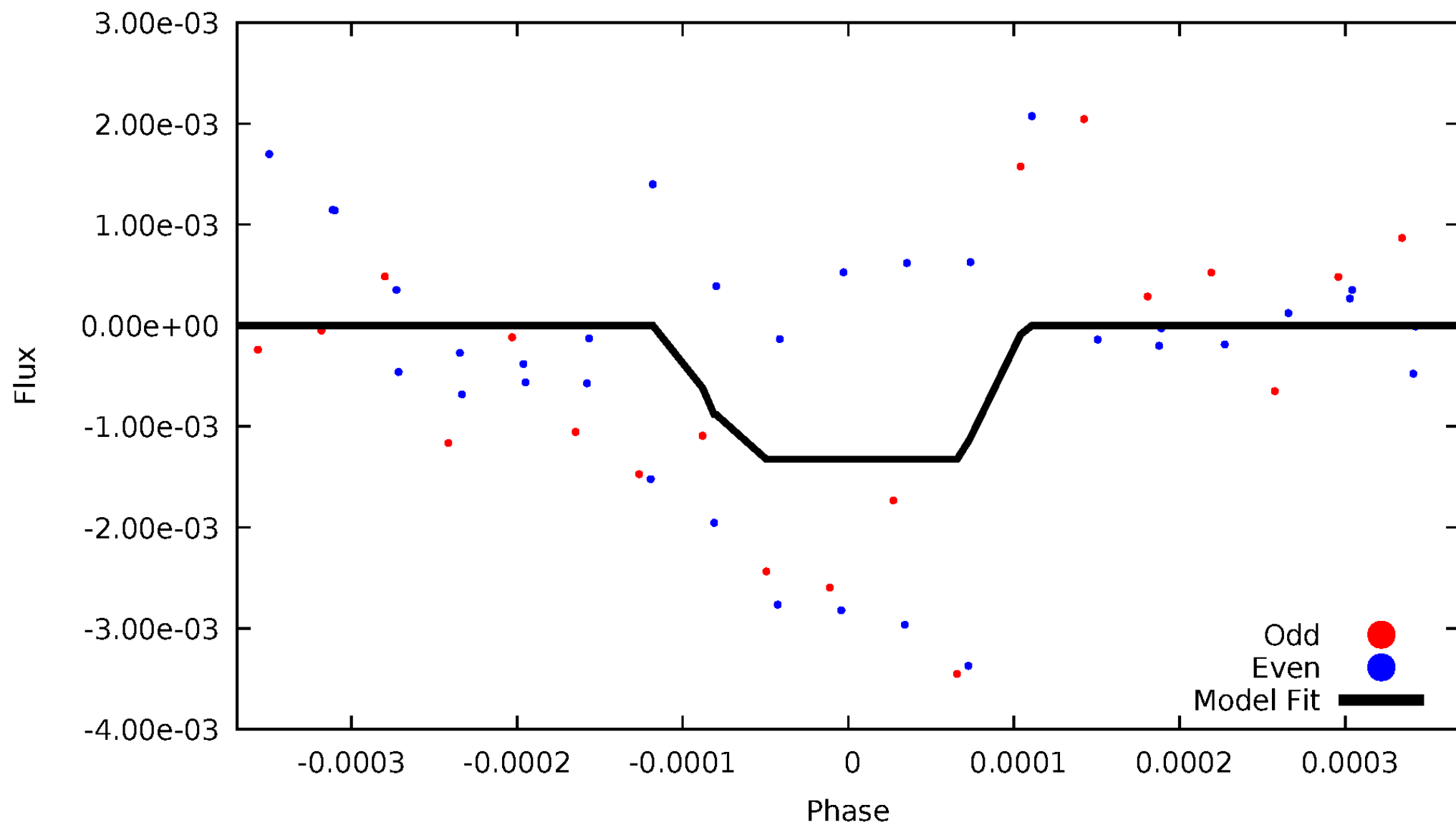
# DV Odd/Even

TCE 008784119-05



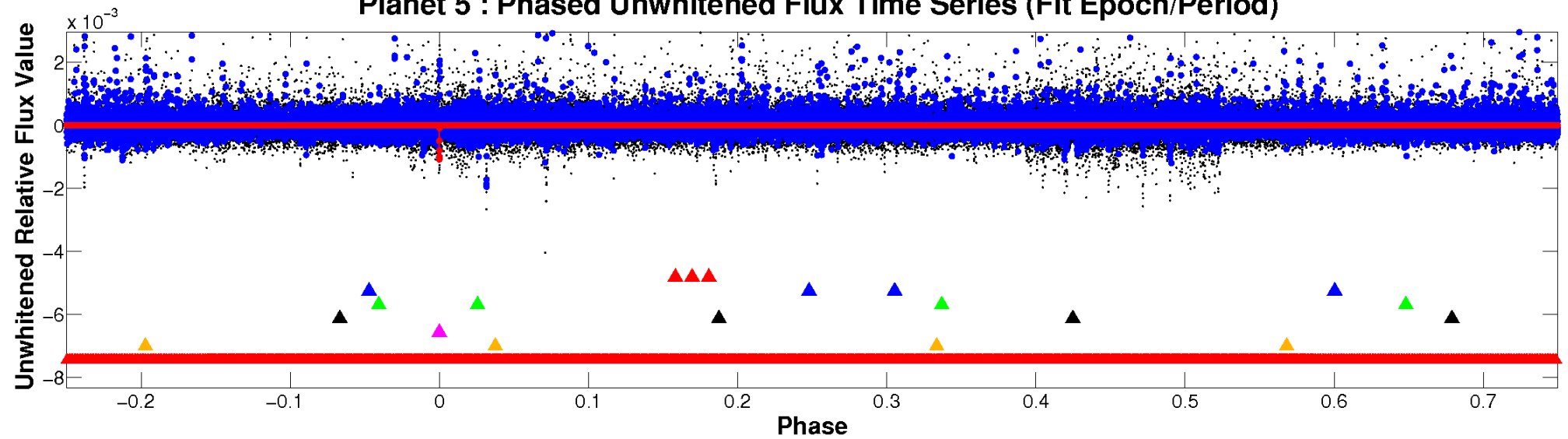
# ALT Odd/Even

TCE 008784119-05

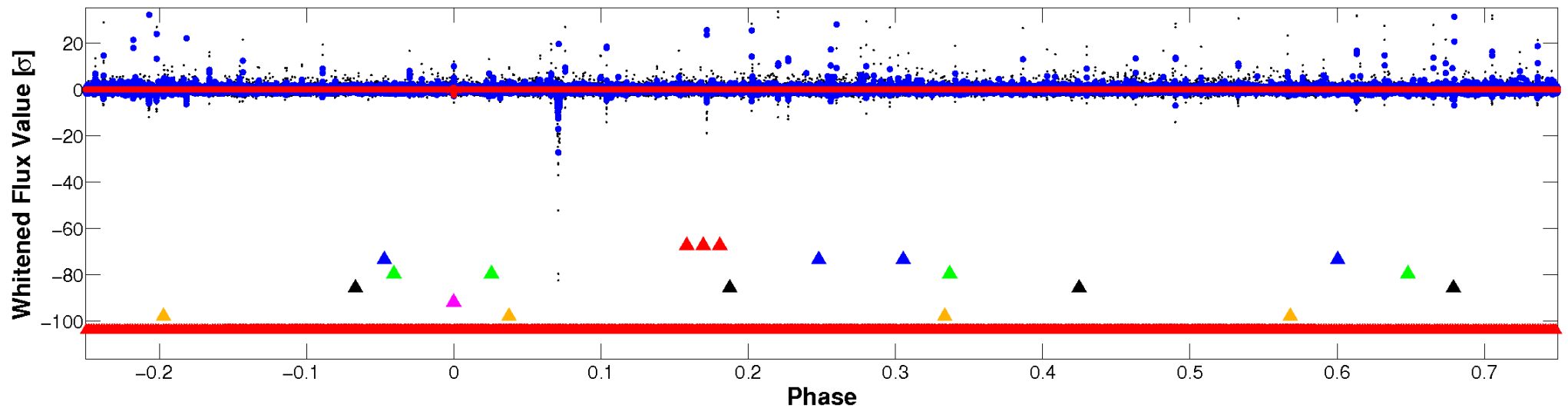


# Non-Whitened Vs. Whitened Light Curve

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

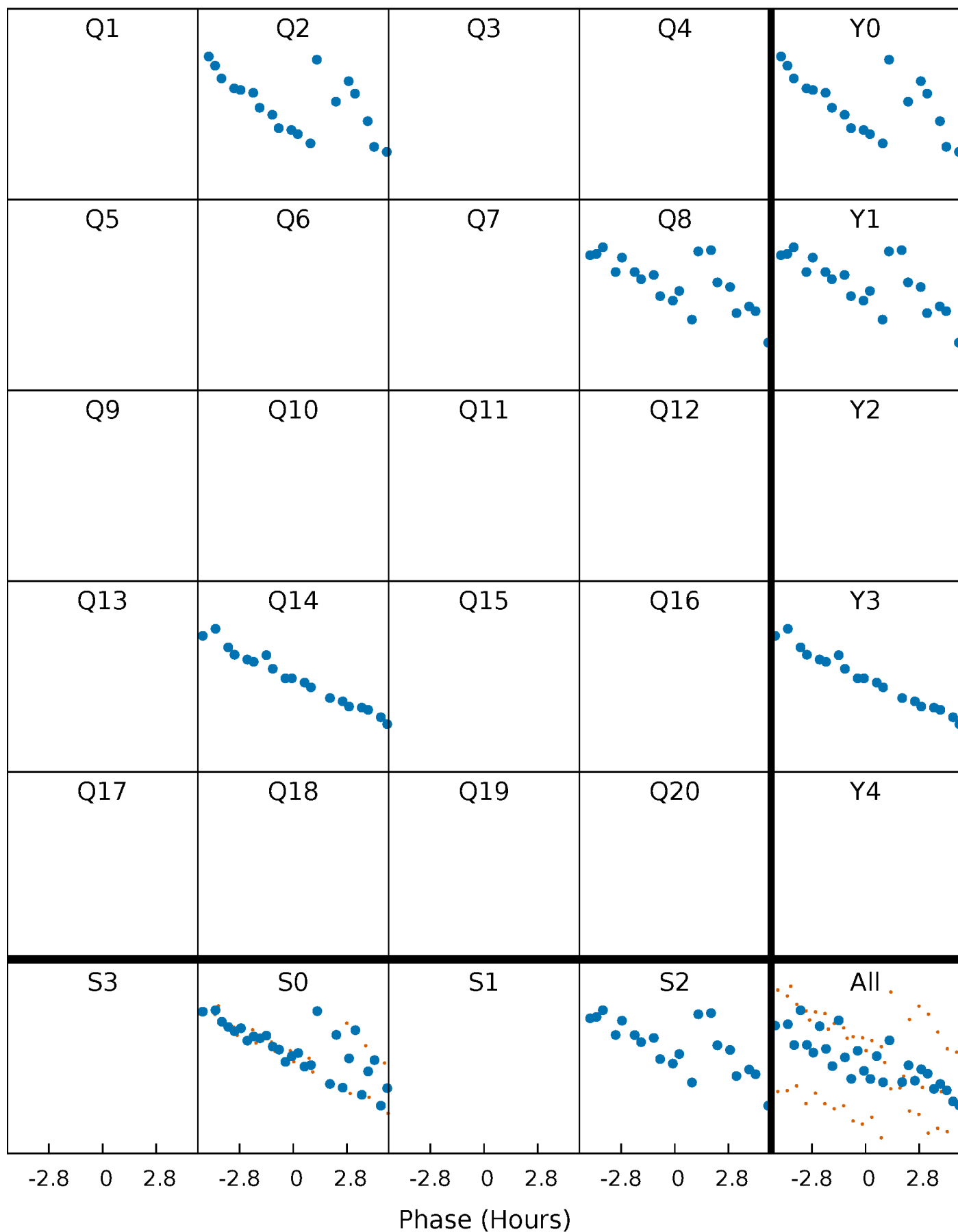


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



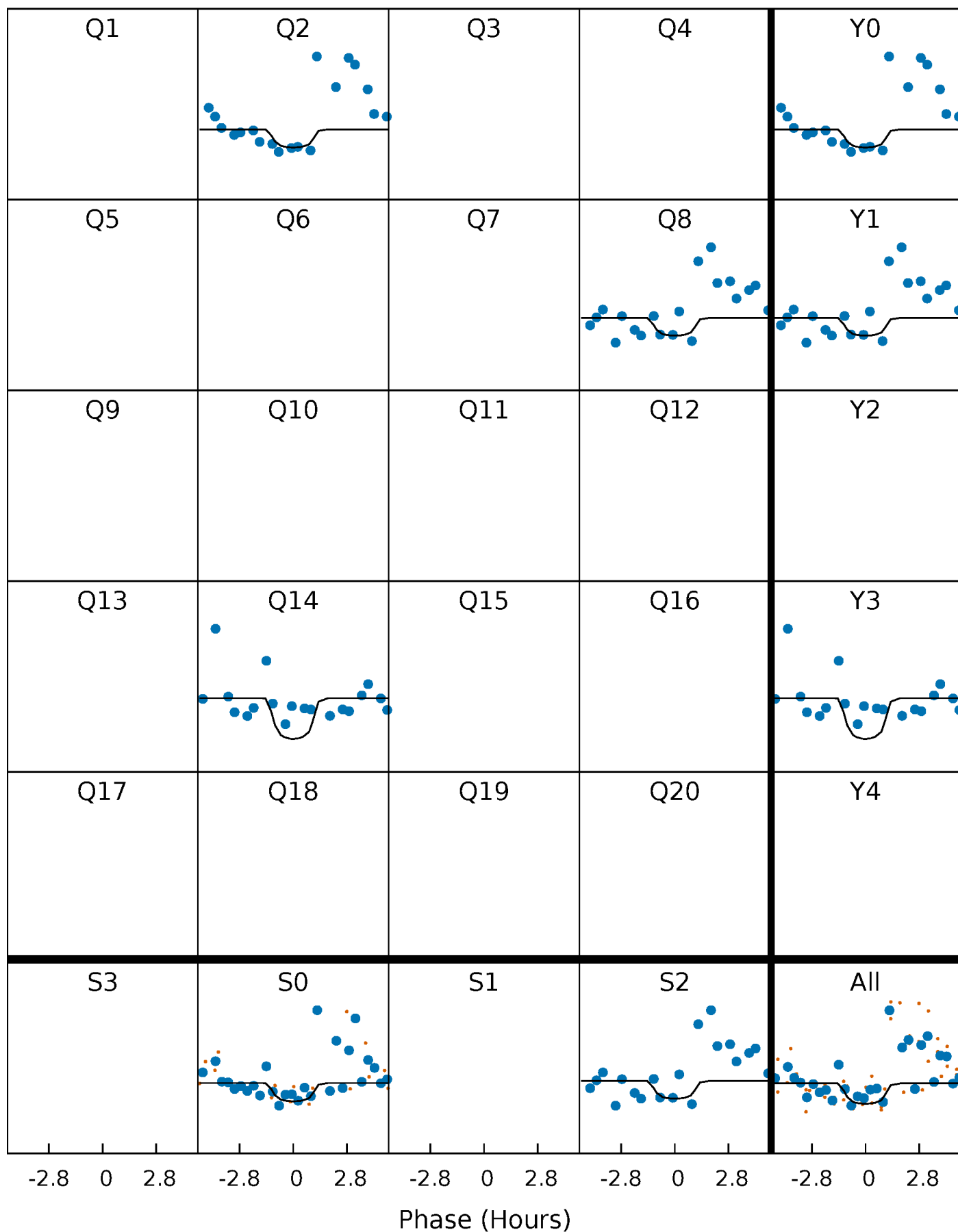
# PDC Quarter-Phased Transit Curves

TCE 008784119-05 P=532.372569 Days  $T_0=214.583321$  (BKJD)



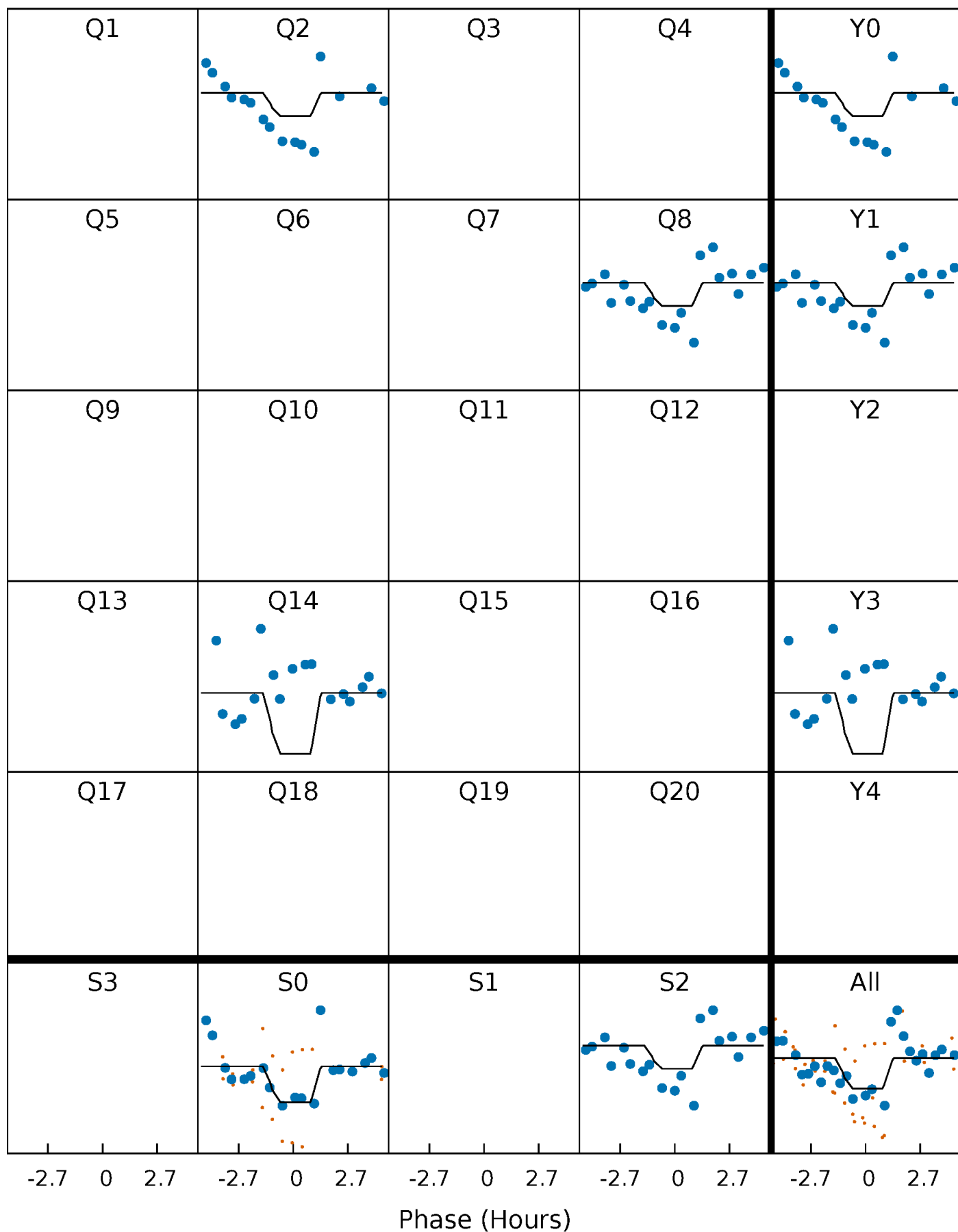
# DV Quarter-Phased Transit Curves

TCE 008784119-05     $P=532.372569$  Days     $T_0=214.583321$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

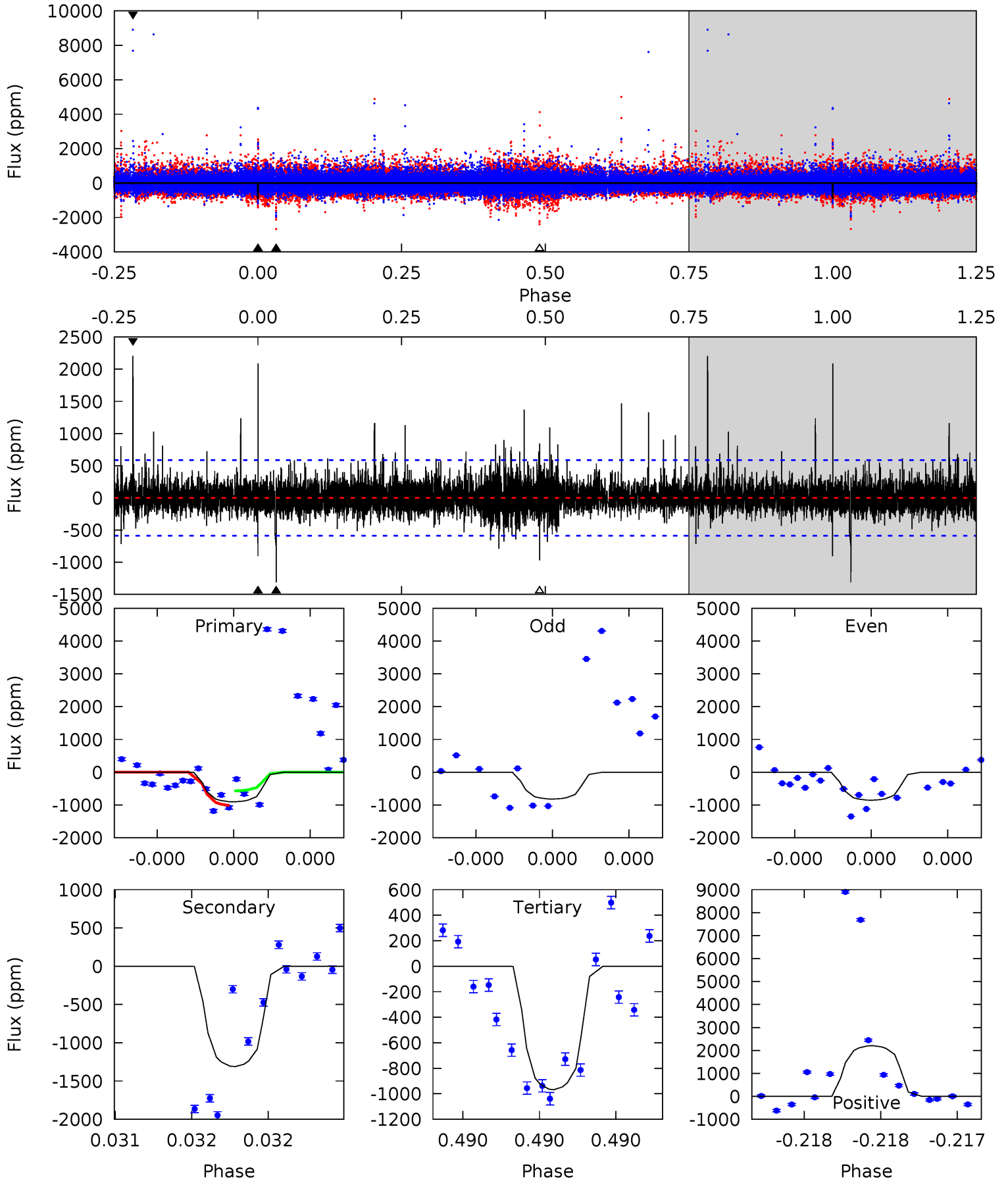
TCE 008784119-05 P=532.375972 Days  $T_0=214.579170$  (BKJD)



# DV Model-Shift Uniqueness Test

008784119-05, P = 532.372569 Days, E = 214.583321 Days

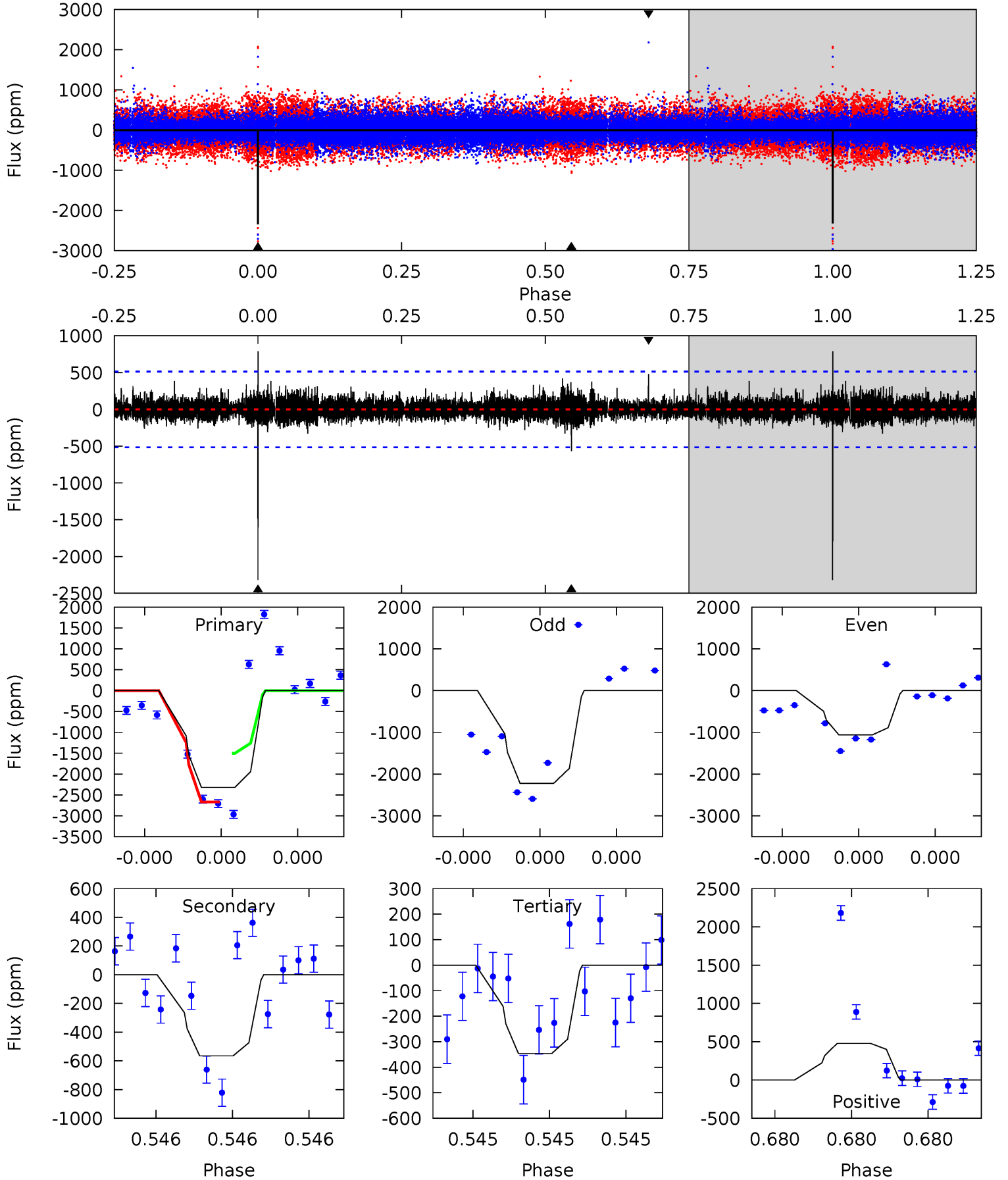
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.81	12.8	9.42	21.5	5.72	3.70	1.58	-0.62	-12.7	3.34	-8.72	0.06	1.14	0.63	2.25



# Alt Model-Shift Uniqueness Test

008784119-05, P = 532.375972 Days, E = 214.579170 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.8	6.30	3.86	5.33	5.74	3.73	0.78	22.0	20.5	2.44	0.97	6.65	0.68	0.25	0





### Stellar Parameters For KIC 008784119

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4386^{+118}_{-144}$	$4.711^{+0.058}_{-0.031}$	$-0.940^{+0.300}_{-0.300}$	$0.528^{+0.042}_{-0.046}$	$0.523^{+0.044}_{-0.033}$	$5.001^{+1.241}_{-0.688}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
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 008784119-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1311 \pm 103$	$4.44^{+4.30}_{-3.10}$	$192^{+6}_{-8}$	$3383^{+1714}_{-612}$	$39255^{+385192}_{-29057}$
Alt.	$-565 \pm 90$	$4.55^{+4.01}_{-3.18}$	$192^{+6}_{-7}$	$2951^{+1412}_{-450}$	$16153^{+160645}_{-11796}$

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

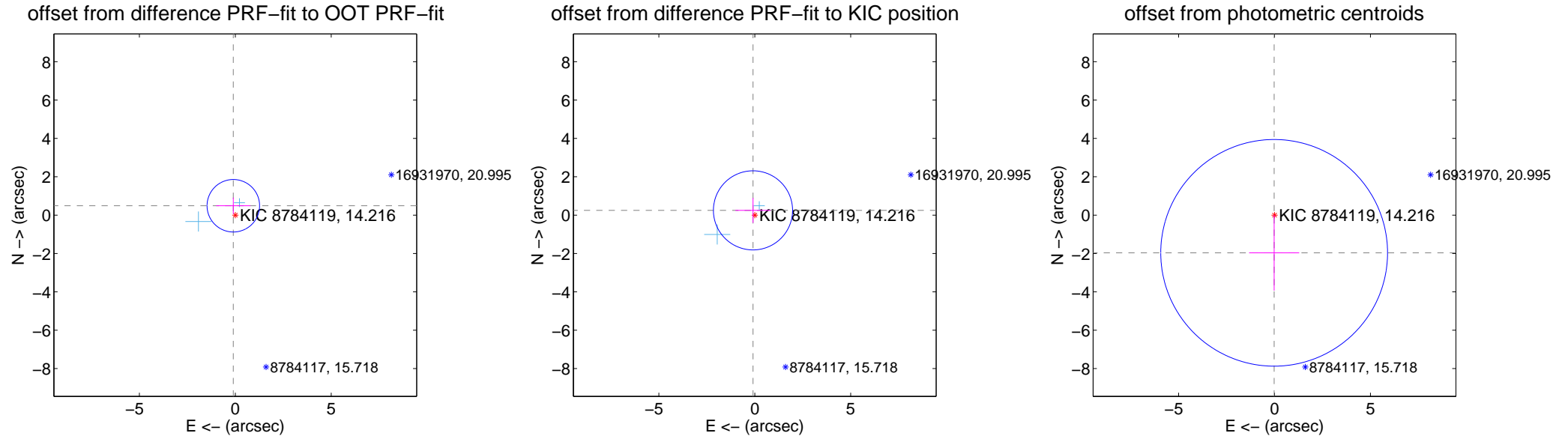
## DV Centroid Data

Supplemental centroid analysis for 008784119-05. Kepler magnitude: 14.22. Transit SNR 7.35

There are 2 quarters with good PRF difference image offsets

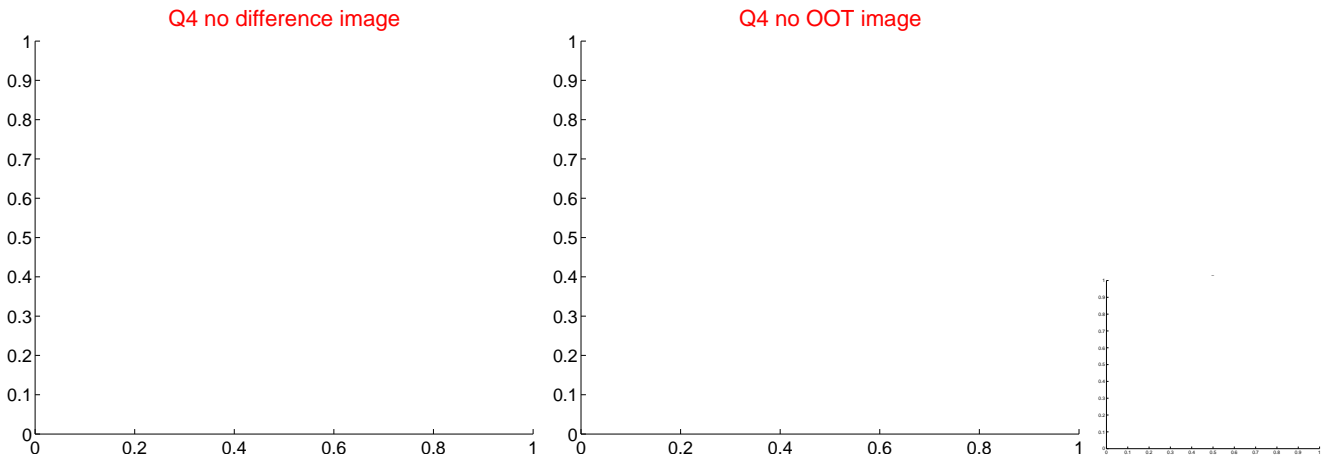
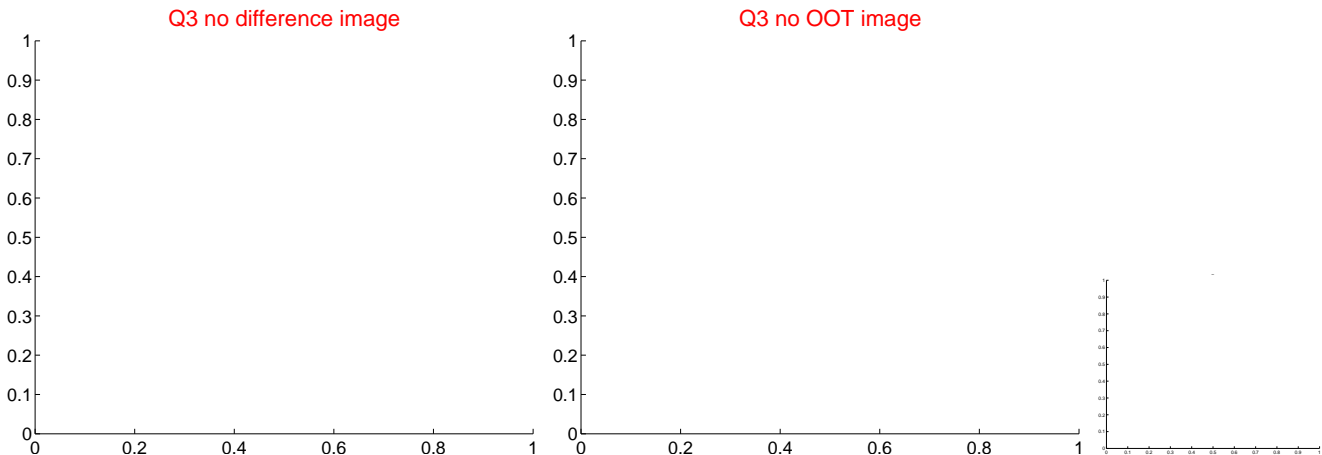
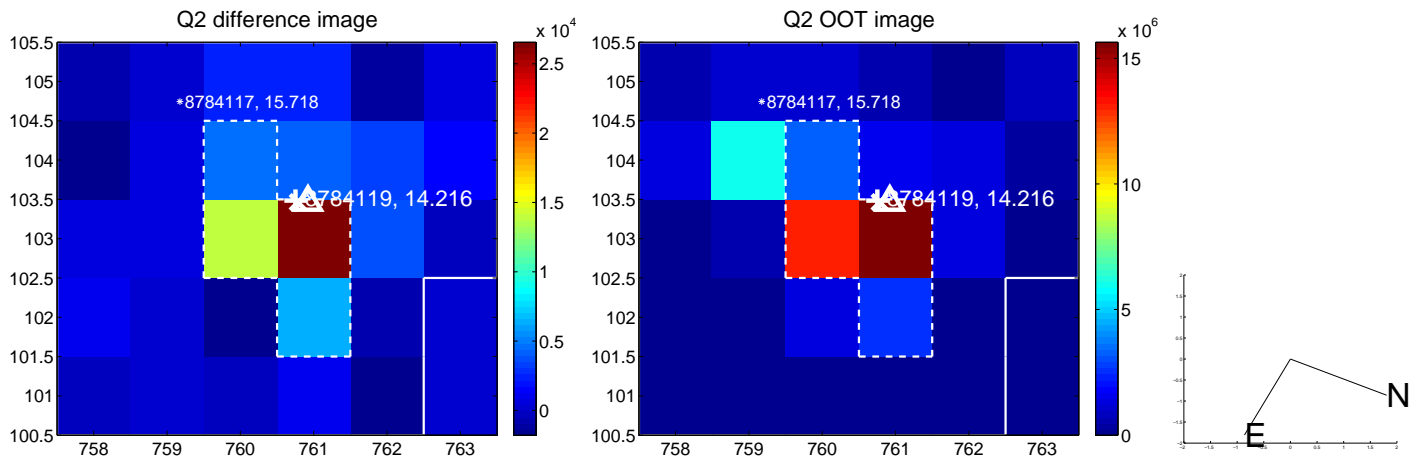
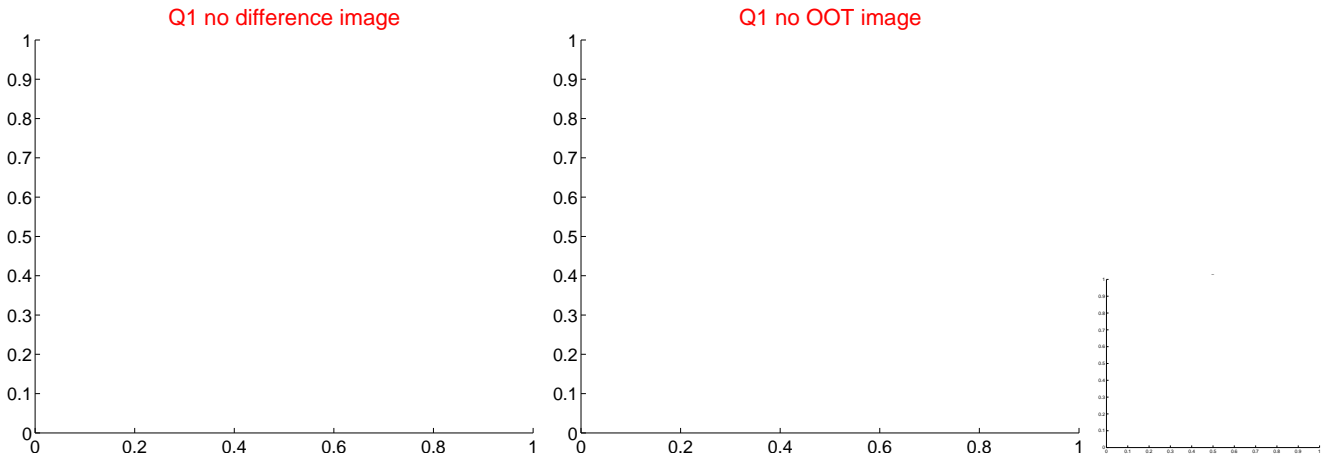
The direct PRF centroid is offset from the target star catalog position by about 0.68 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.500 \pm 0.456$	1.10	$0.103 \pm 0.895$	$0.489 \pm 0.426$
PRF-fit source offset from KIC position	$0.266 \pm 0.688$	0.39	$0.093 \pm 0.916$	$0.249 \pm 0.649$
photometric centroid source offset	$1.97 \pm 1.97$	1.00	$0.02 \pm 1.31$	$-1.97 \pm 1.97$



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

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



white  $\times$ : 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



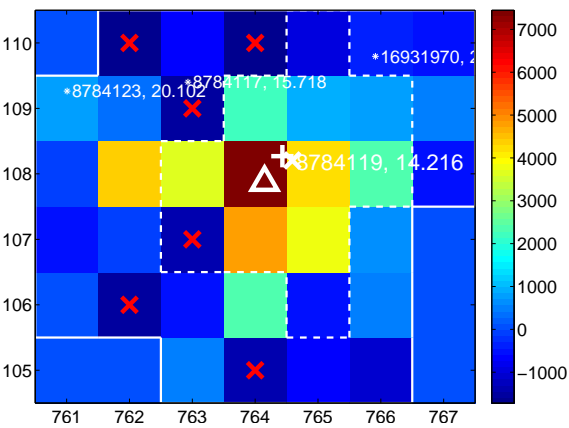
Q7 no difference image



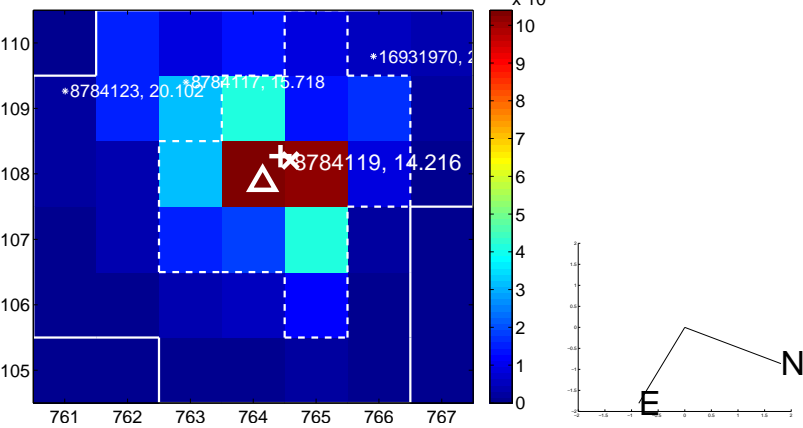
Q7 no OOT image



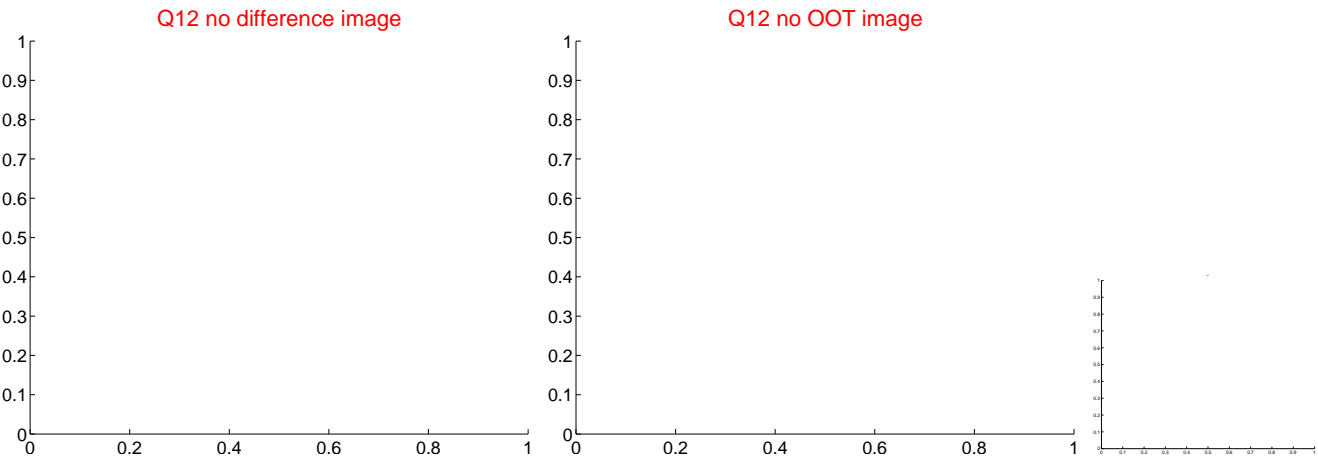
Q8 difference image



Q8 OOT image



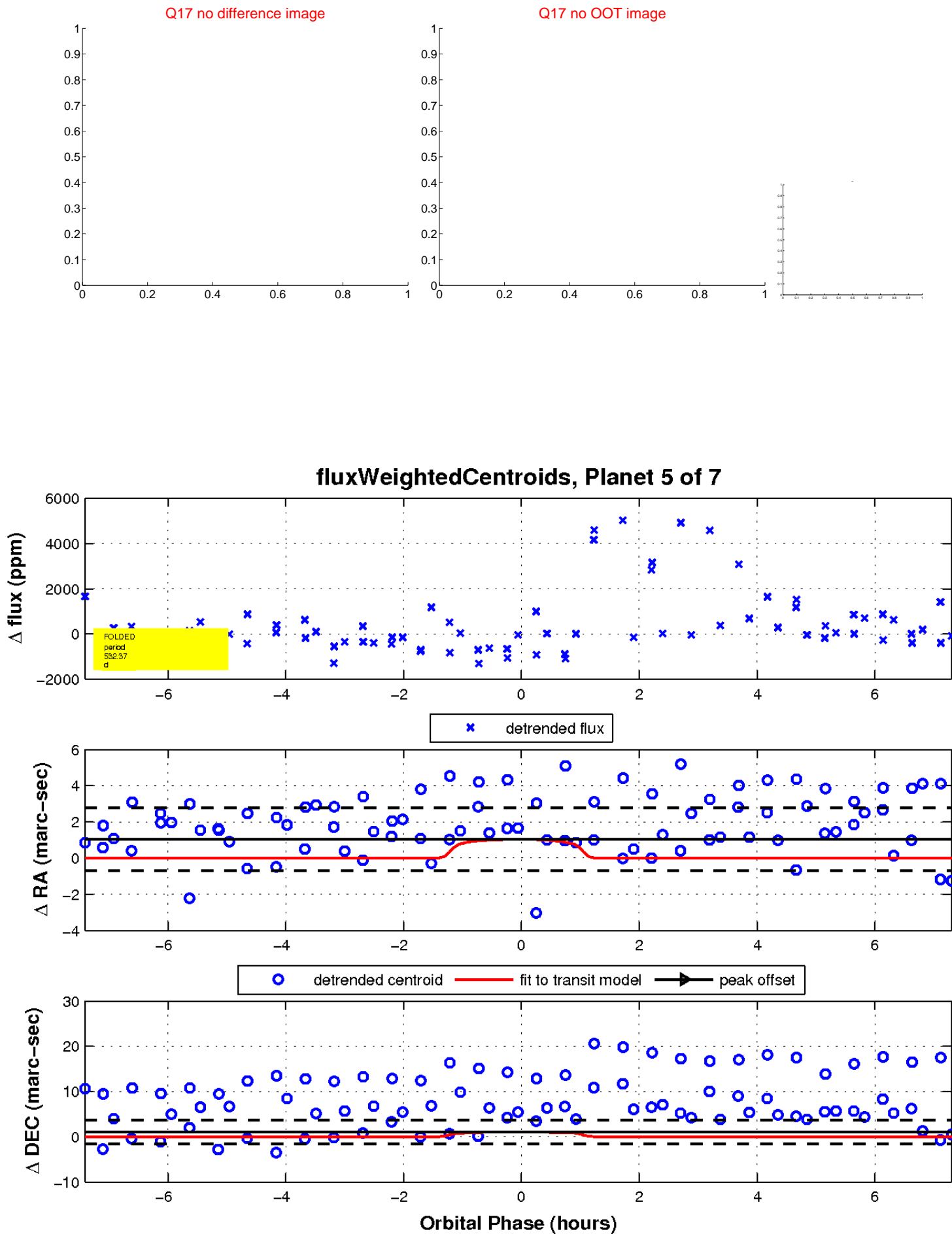
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

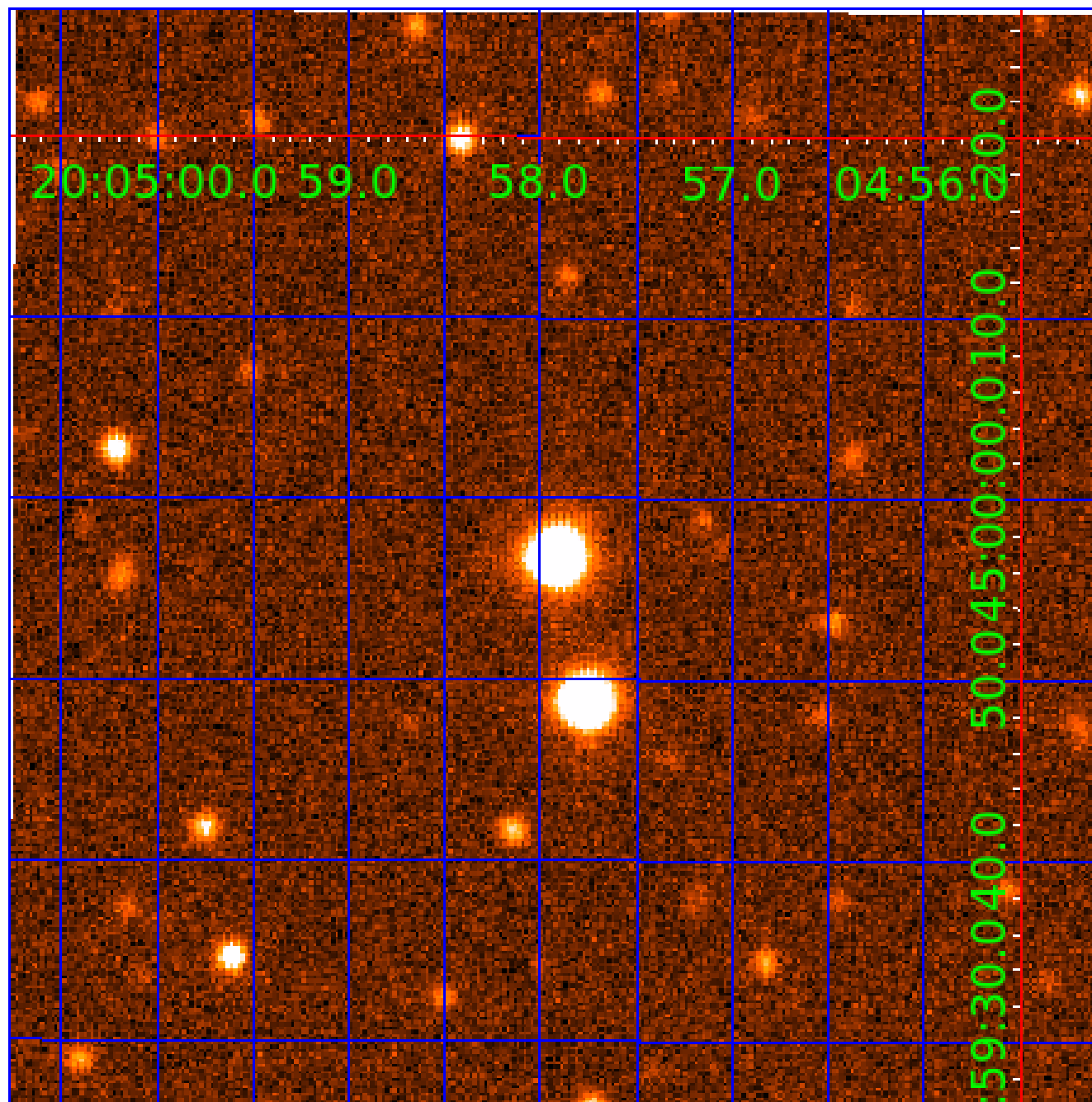


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 008784119

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008784119-01	OBS	No	526.400453	310.781690	906.5	3.477	15.0	6.9	0.53	4386	1.59	0.09
008784119-03	OBS	No	366.677020	192.945604	812.9	14.690	11.5	5.1	0.53	4386	1.57	0.14
008784119-04	OBS	No	397.031225	314.385327	1396.9	14.652	12.9	8.2	0.53	4386	1.95	0.13
008784119-05	OBS	No	532.372569	214.583321	1087.5	2.484	12.5	7.3	0.53	4386	1.94	0.09
008784119-06	OBS	No	407.438305	234.571861	556.4	6.094	8.6	5.5	0.53	4386	1.29	0.12
008784119-07	OBS	No	0.932797	131.671610	841.5	2.000	7.7	-1.0	0.53	4386	1.50	407.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008784119-01	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
008784119-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008784119-06	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—MOD_POS_ALT—CENT_FEW_DIFFS
008784119-07	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

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

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

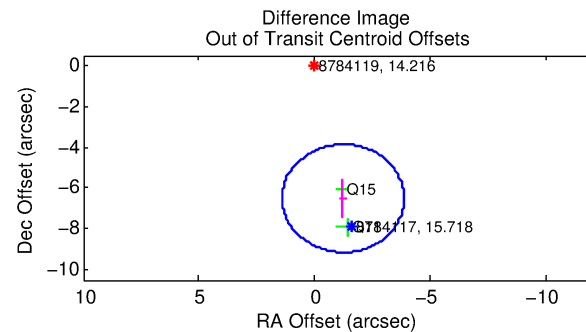
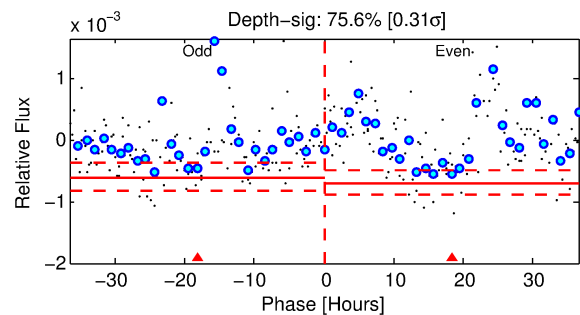
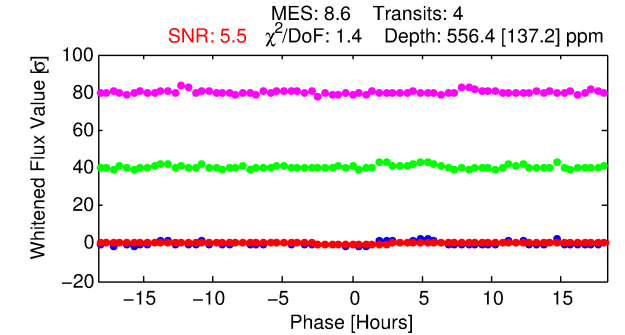
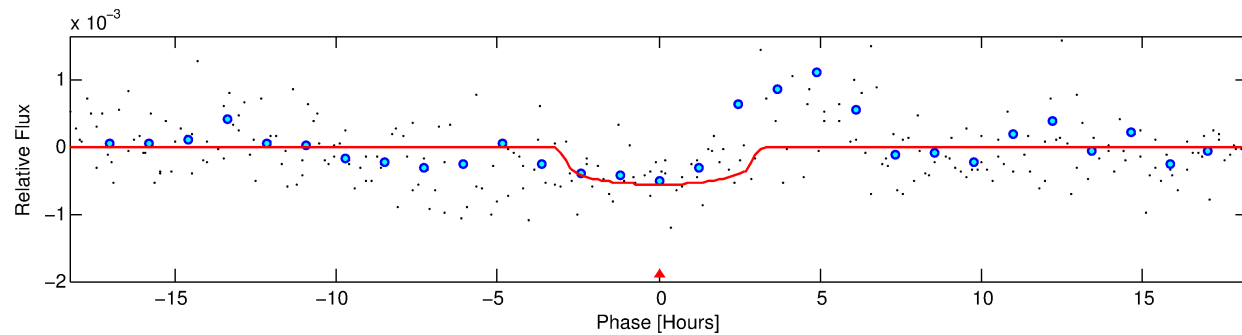
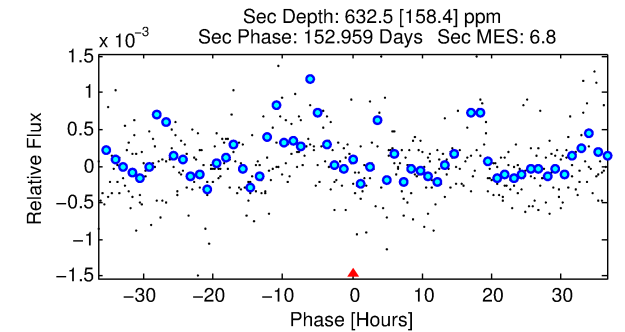
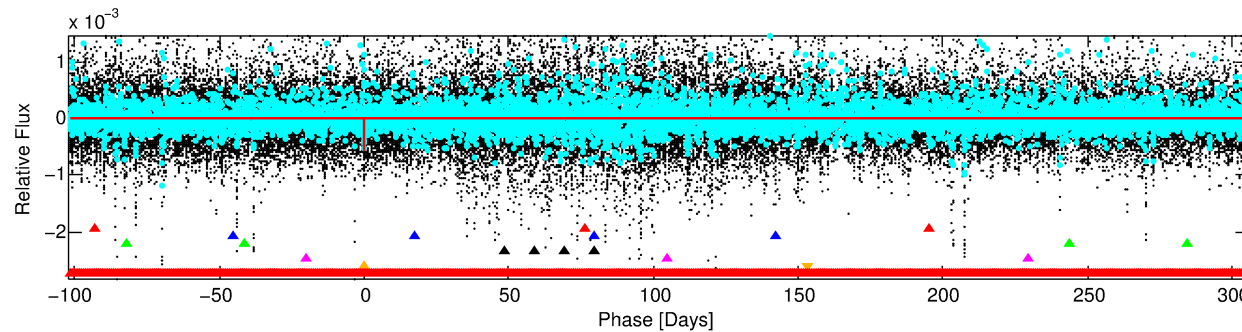
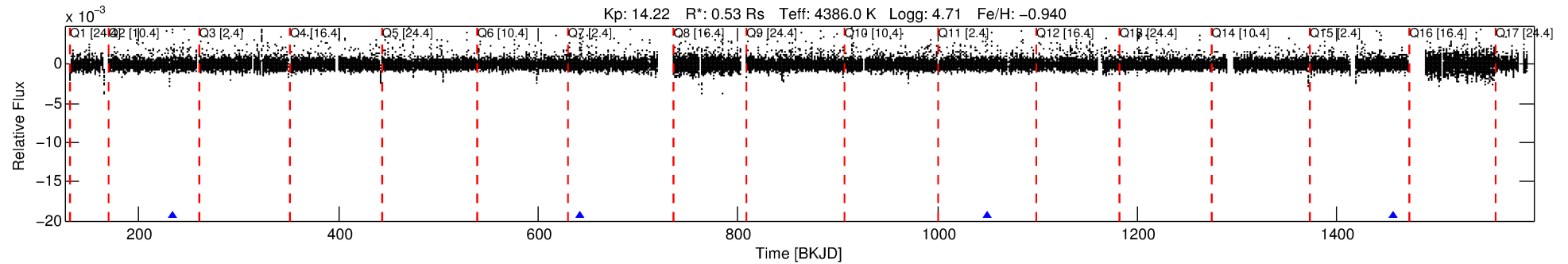
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008784119-06

No Significant Match Found

# DV One-Page Summary

KIC: 8784119 Candidate: 6 of 7 Period: 407.438 d



## DV Fit Results:

Period = 407.43831 [0.01054] d  
Epoch = 234.5719 [0.0200] BKJD  
Rp/R\* = 0.0224 [0.0336]  
a/R\* = 424.71 [2450.34]  
b = 0.59 [6.34]  
Seff = 0.12 [0.02]  
Teq = 151 [6] K  
Rp = 1.29 [1.94] Re  
a = 0.8666 [0.0634] AU  
Ag = 157072.39 [473276.37] [0.33 $\sigma$ ]  
Teffp = 4649 [3503] K [1.28 $\sigma$ ]

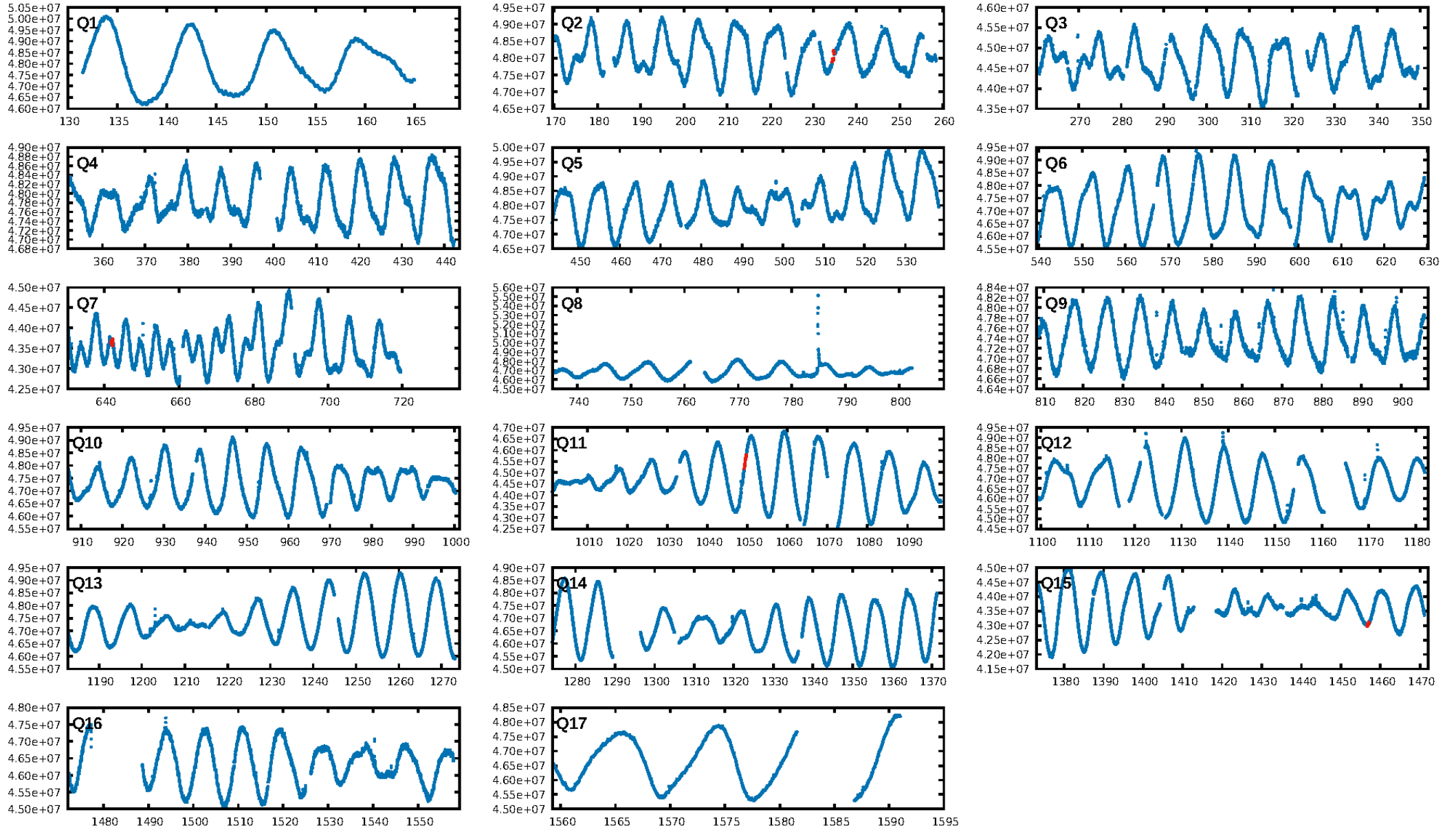
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.74 $\sigma$ ]  
LongPeriod-sig: 100.0% [406.92 $\sigma$ ]  
ModelChiSquare2-sig: 7.5%  
ModelChiSquareGof-sig: 97.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 3.246  
Centroid-sig: 85.8%  
Centroid-so: 2.145 arcsec [0.79 $\sigma$ ]  
OotOffset-rm: 6.622 arcsec [7.52 $\sigma$ ]  
KicOffset-rm: 6.875 arcsec [8.00 $\sigma$ ]  
OotOffset-st: 0/2/0/0 [2]  
KicOffset-st: 0/2/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/4]

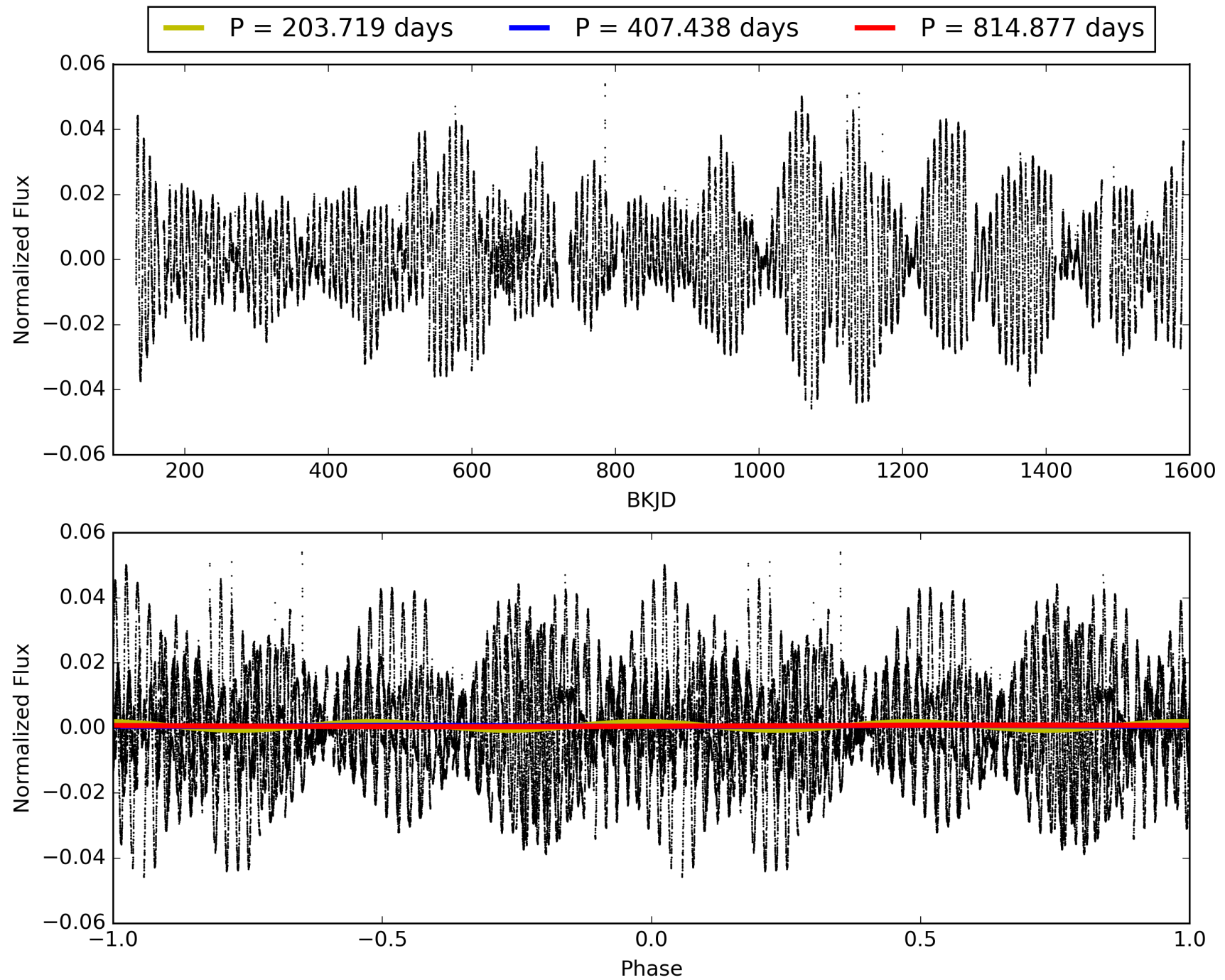
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:17:38 Z

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

# TCE 008784119-06, PDC Light Curves

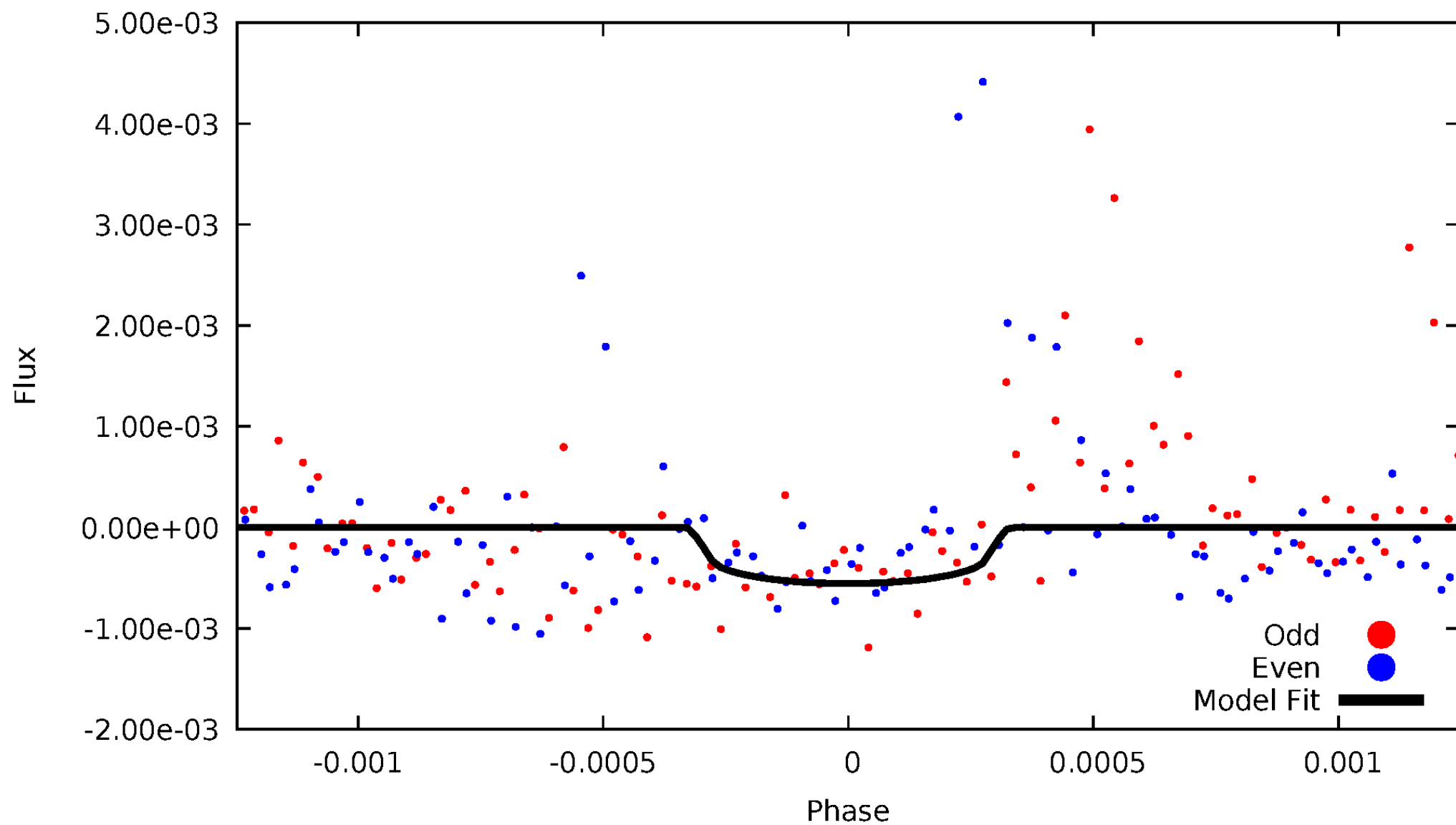


# TCE 008784119-06



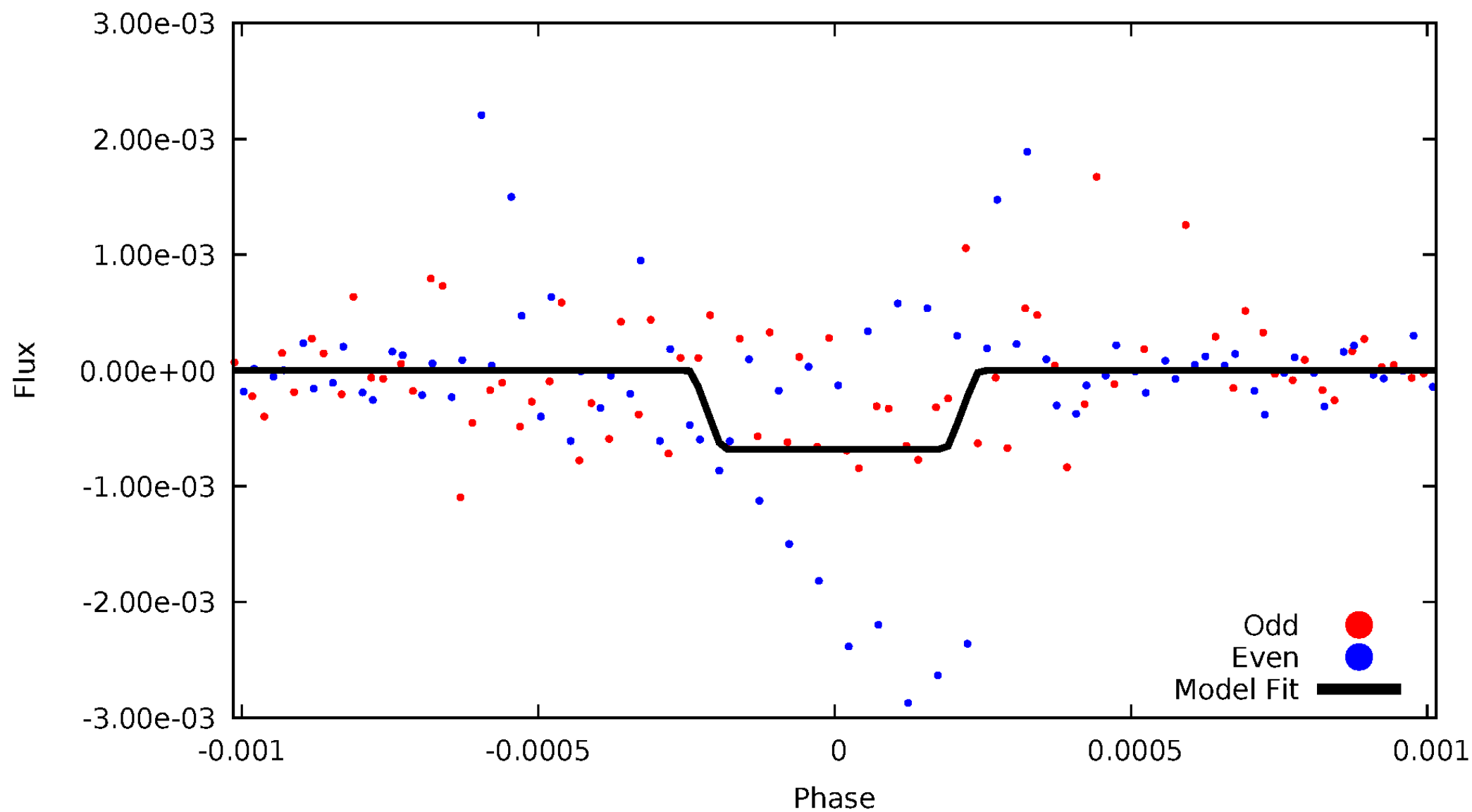
# DV Odd/Even

TCE 008784119-06



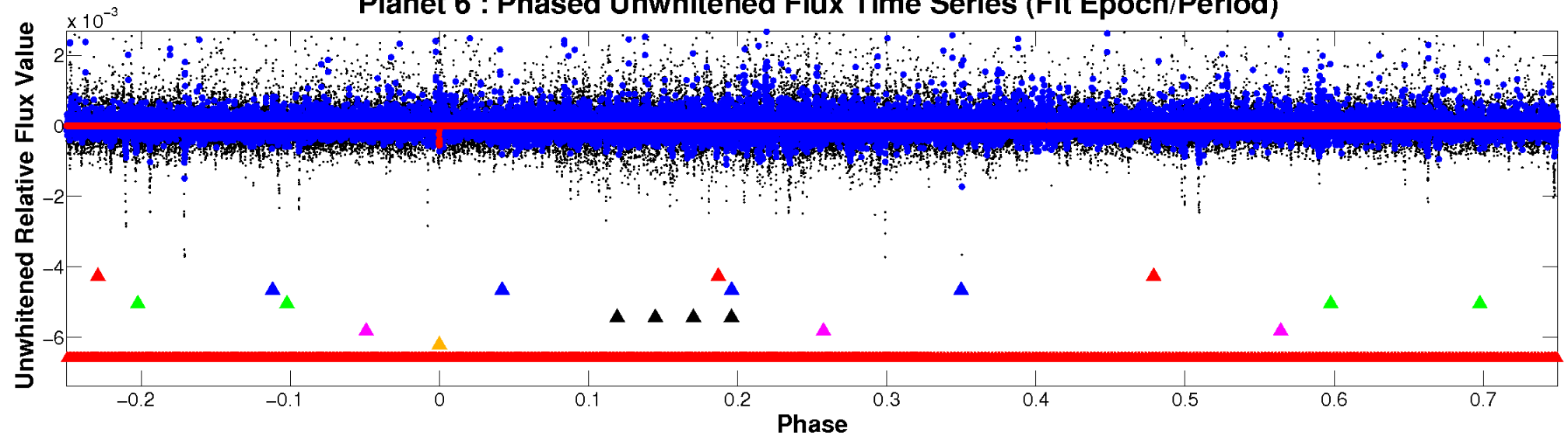
# ALT Odd/Even

TCE 008784119-06

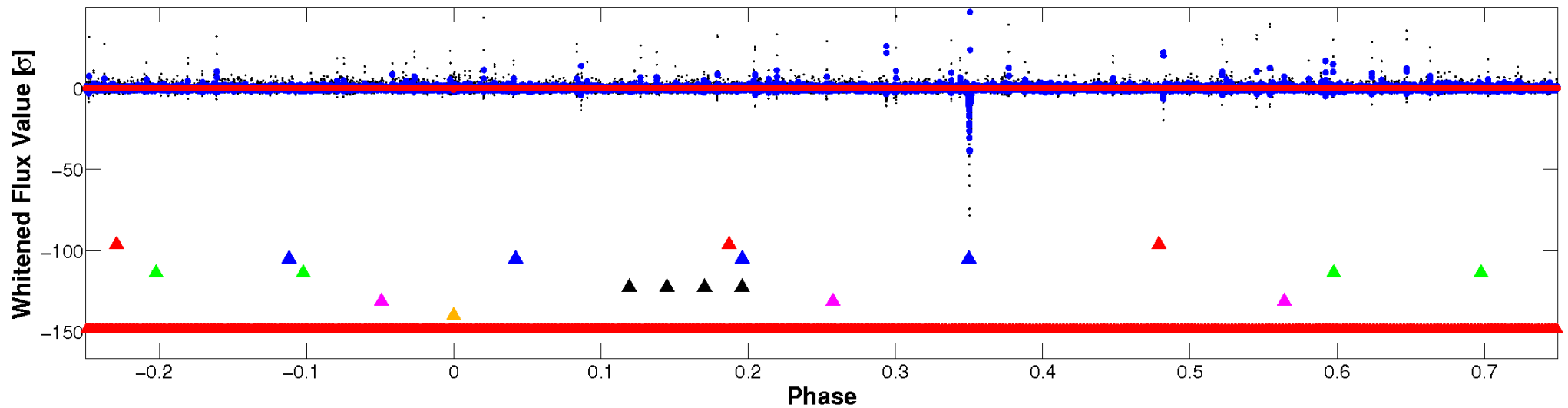


# Non-Whitened Vs. Whitened Light Curve

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

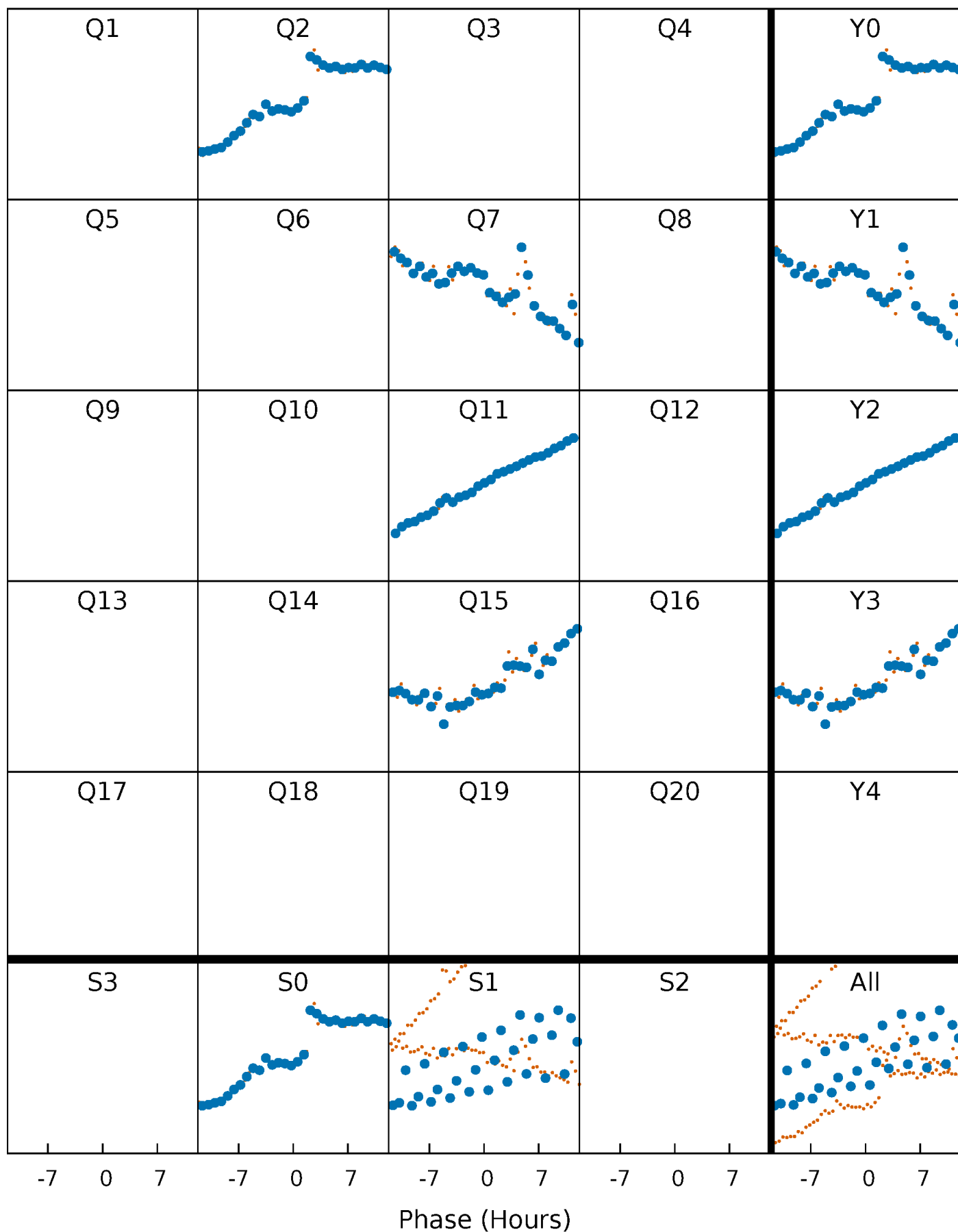


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

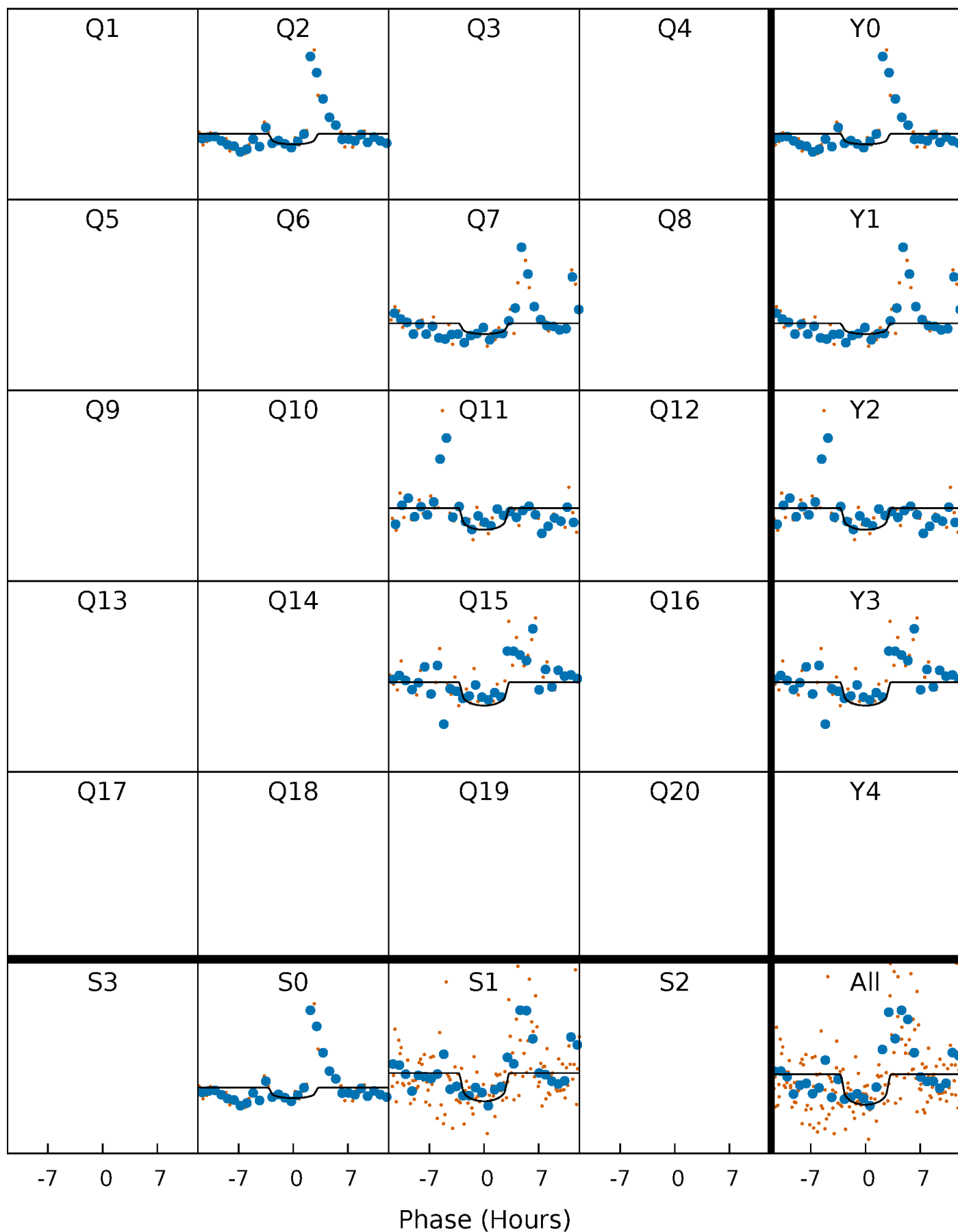
TCE 008784119-06 P=407.438305 Days  $T_0=234.571861$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 008784119-06 P=407.438305 Days  $T_0=234.571861$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

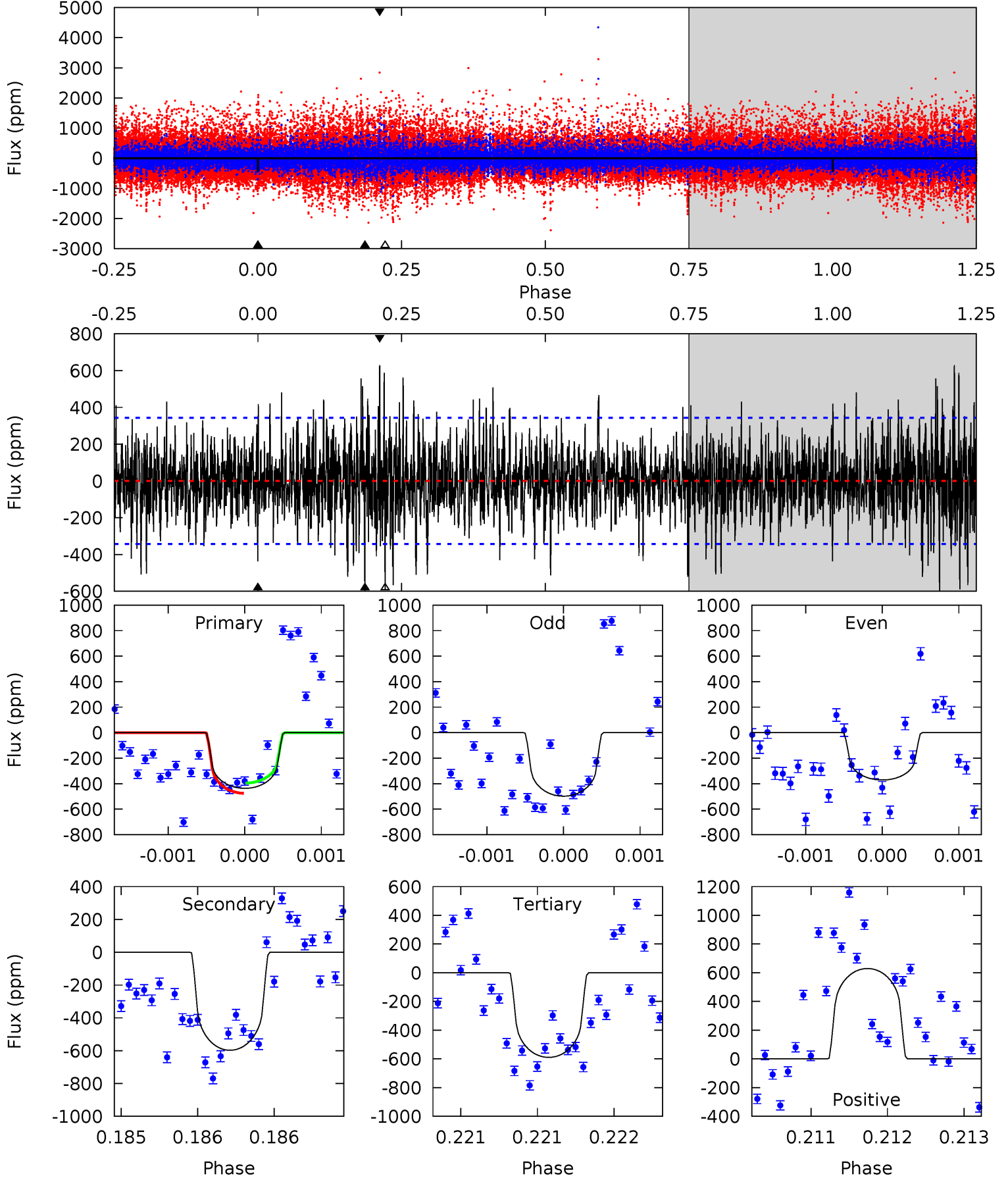
TCE 008784119-06 P=407.458809 Days  $T_0=234.551451$  (BKJD)



# DV Model-Shift Uniqueness Test

008784119-06, P = 407.438305 Days, E = 234.571861 Days

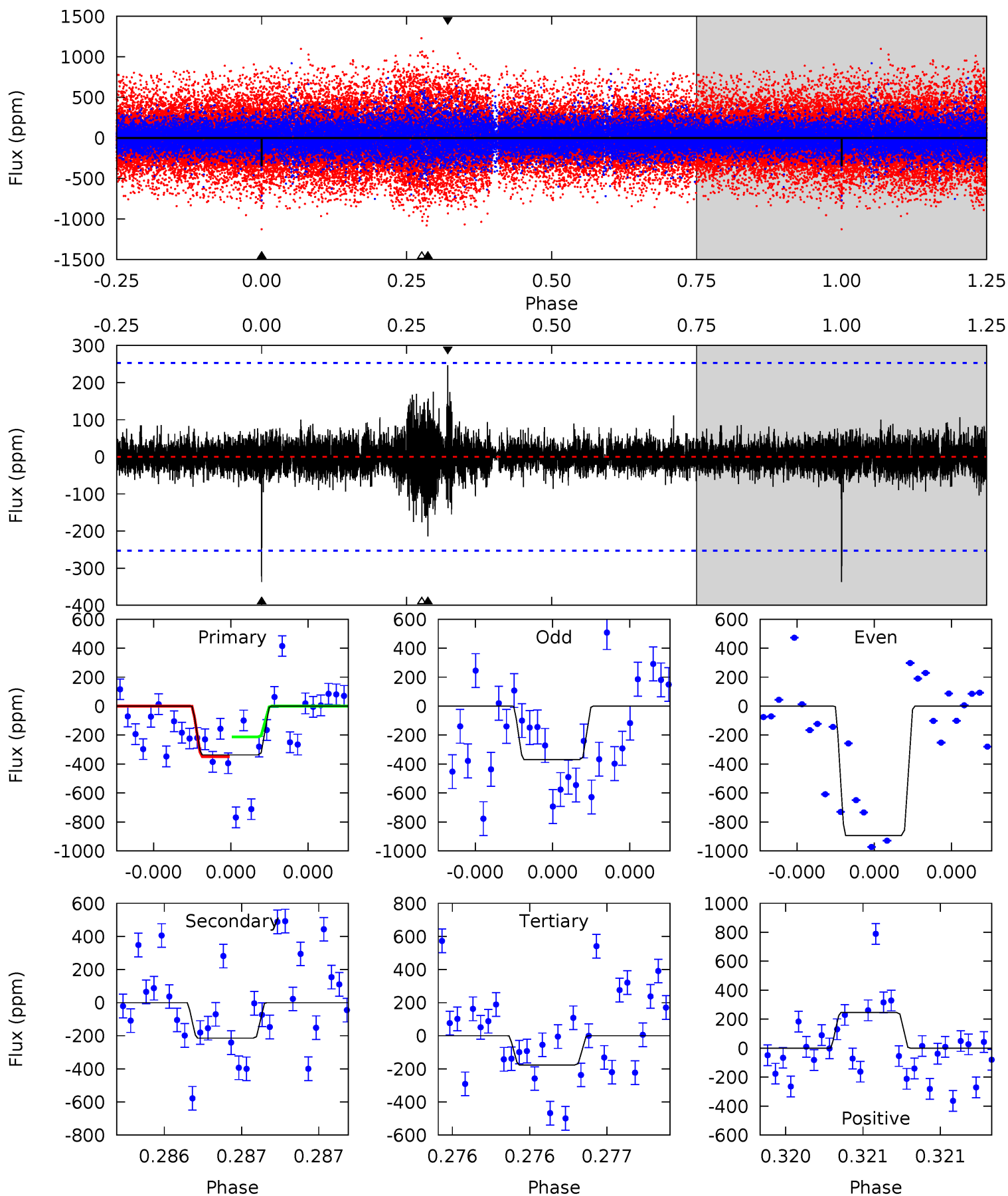
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.03	9.62	9.50	10.1	5.53	3.41	2.27	-2.46	-3.11	0.13	-0.52	0.46	0.83	0.51	0.64



# Alt Model-Shift Uniqueness Test

008784119-06, P = 407.458809 Days, E = 234.551451 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
7.43	4.73	3.88	5.44	5.58	3.49	0.65	3.55	2.00	0.84	-0.71	6.51	2.05	0.42	1.51



### Stellar Parameters For KIC 008784119

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4386^{+118}_{-144}$	$4.711^{+0.058}_{-0.031}$	$-0.940^{+0.300}_{-0.300}$	$0.528^{+0.042}_{-0.046}$	$0.523^{+0.044}_{-0.033}$	$5.001^{+1.241}_{-0.688}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
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 008784119-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-597 \pm 62$	$1.88^{+1.73}_{-1.18}$	$210^{+7}_{-8}$	$3928^{+2051}_{-757}$	$68672^{+452693}_{-49792}$
Alt.	$-214 \pm 45$	$2.04^{+1.69}_{-1.35}$	$209^{+8}_{-7}$	$3233^{+1498}_{-503}$	$21146^{+161734}_{-14956}$

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

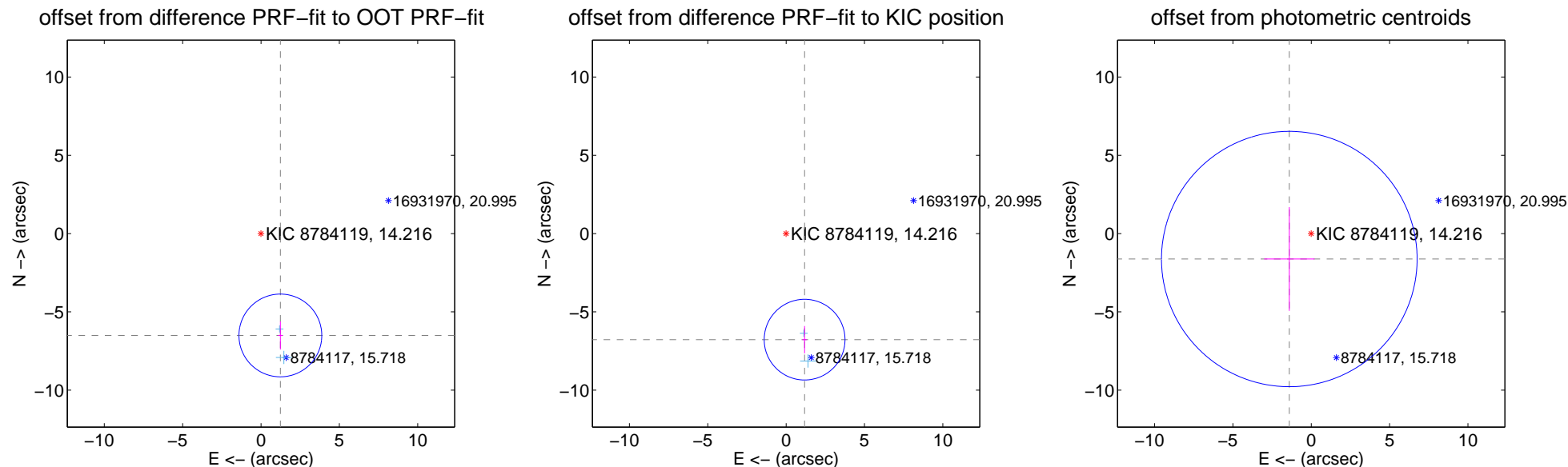
## DV Centroid Data

Supplemental centroid analysis for 008784119-06. Kepler magnitude: 14.22. Transit SNR 5.49

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.622 \pm 0.881$	7.52	$-1.236 \pm 0.143$	$-6.505 \pm 0.896$
PRF-fit source offset from KIC position	$6.875 \pm 0.859$	8.00	$-1.179 \pm 0.142$	$-6.773 \pm 0.872$
photometric centroid source offset	$2.14 \pm 2.72$	0.79	$1.40 \pm 1.61$	$-1.62 \pm 3.31$



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 are from the UKIRT catalog.

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

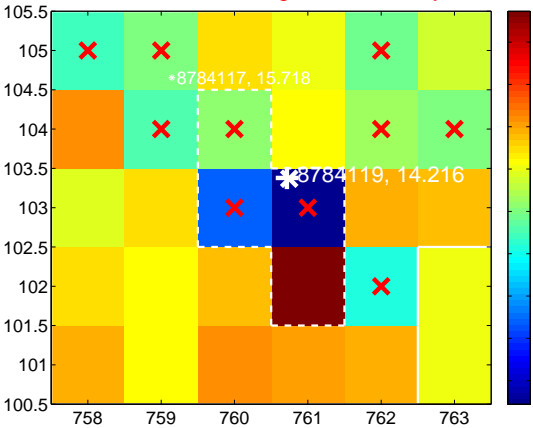
Q1 no difference image



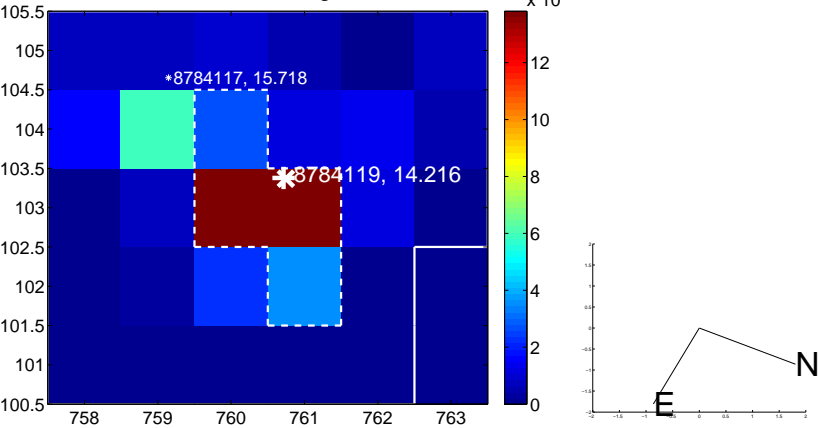
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



Q3 no OOT image



Q4 no difference image



Q4 no OOT image



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

Q5 no difference image



Q5 no OOT image



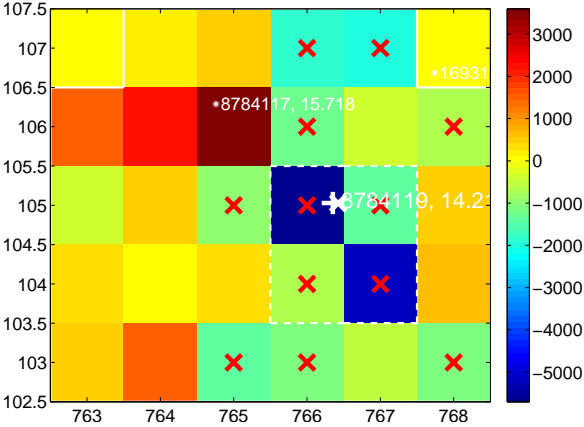
Q6 no difference image



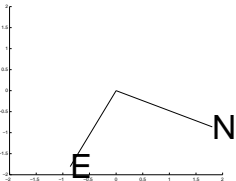
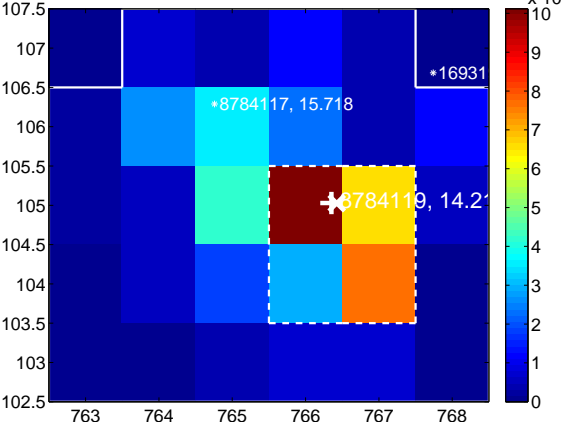
Q6 no OOT image



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.

Q9 no difference image



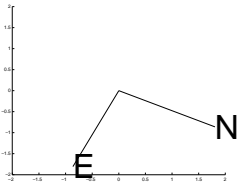
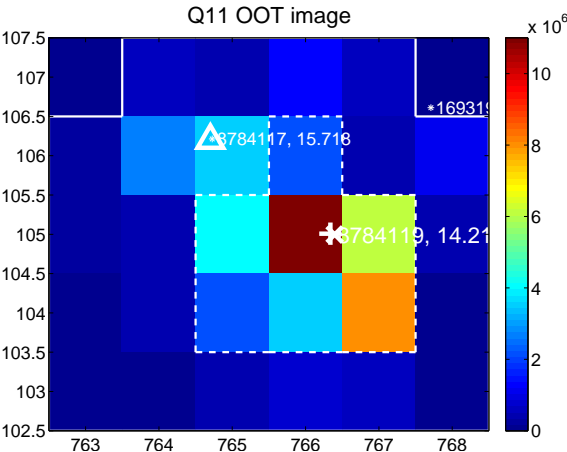
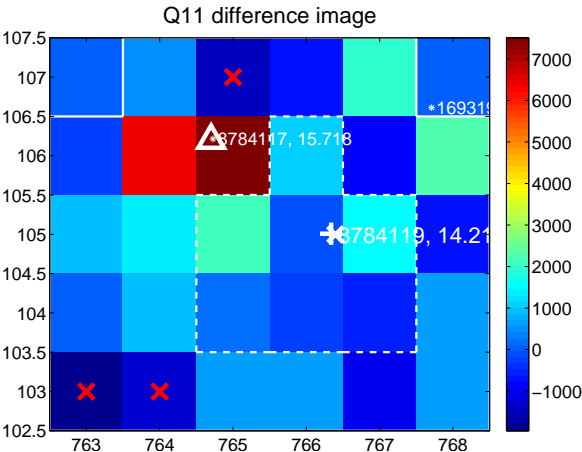
Q9 no OOT image



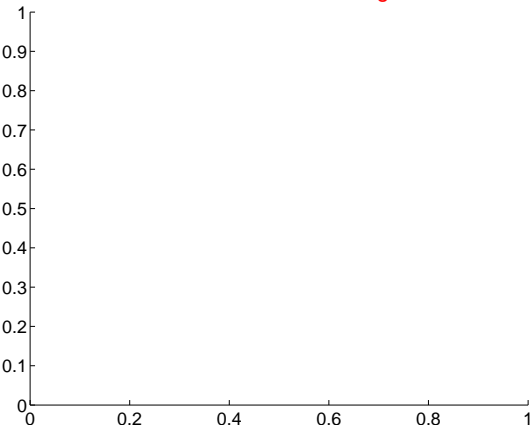
Q10 no difference image



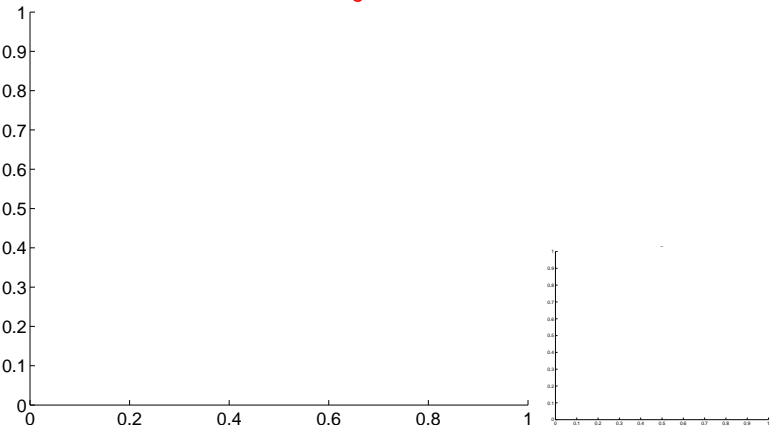
Q10 no OOT image



Q12 no difference image



Q12 no OOT image

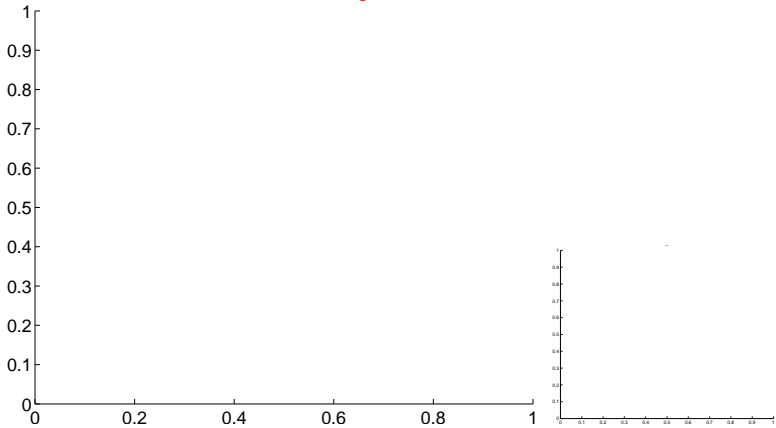


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q13 no difference image



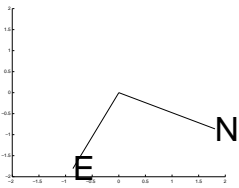
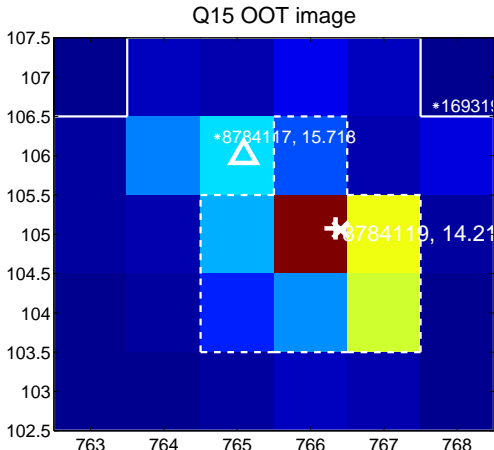
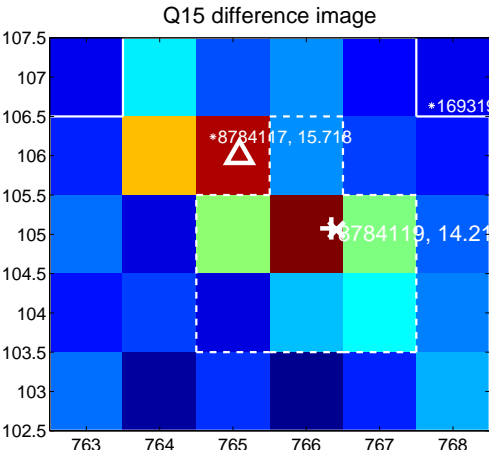
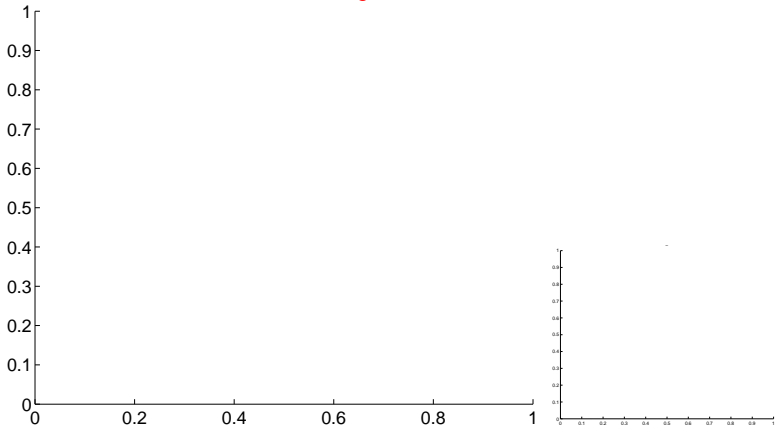
Q13 no OOT image



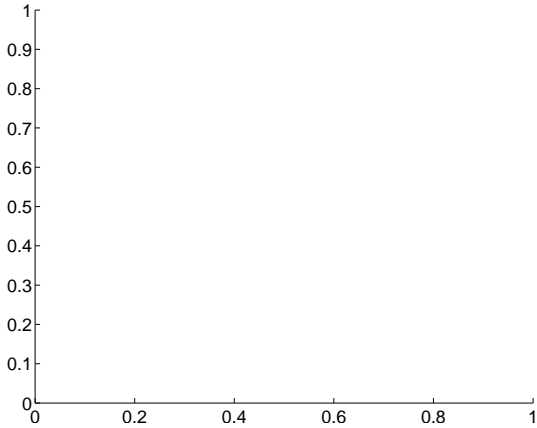
Q14 no difference image



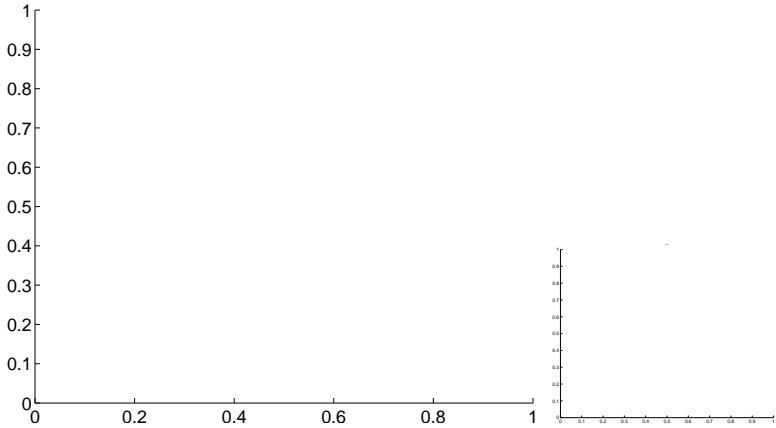
Q14 no OOT image



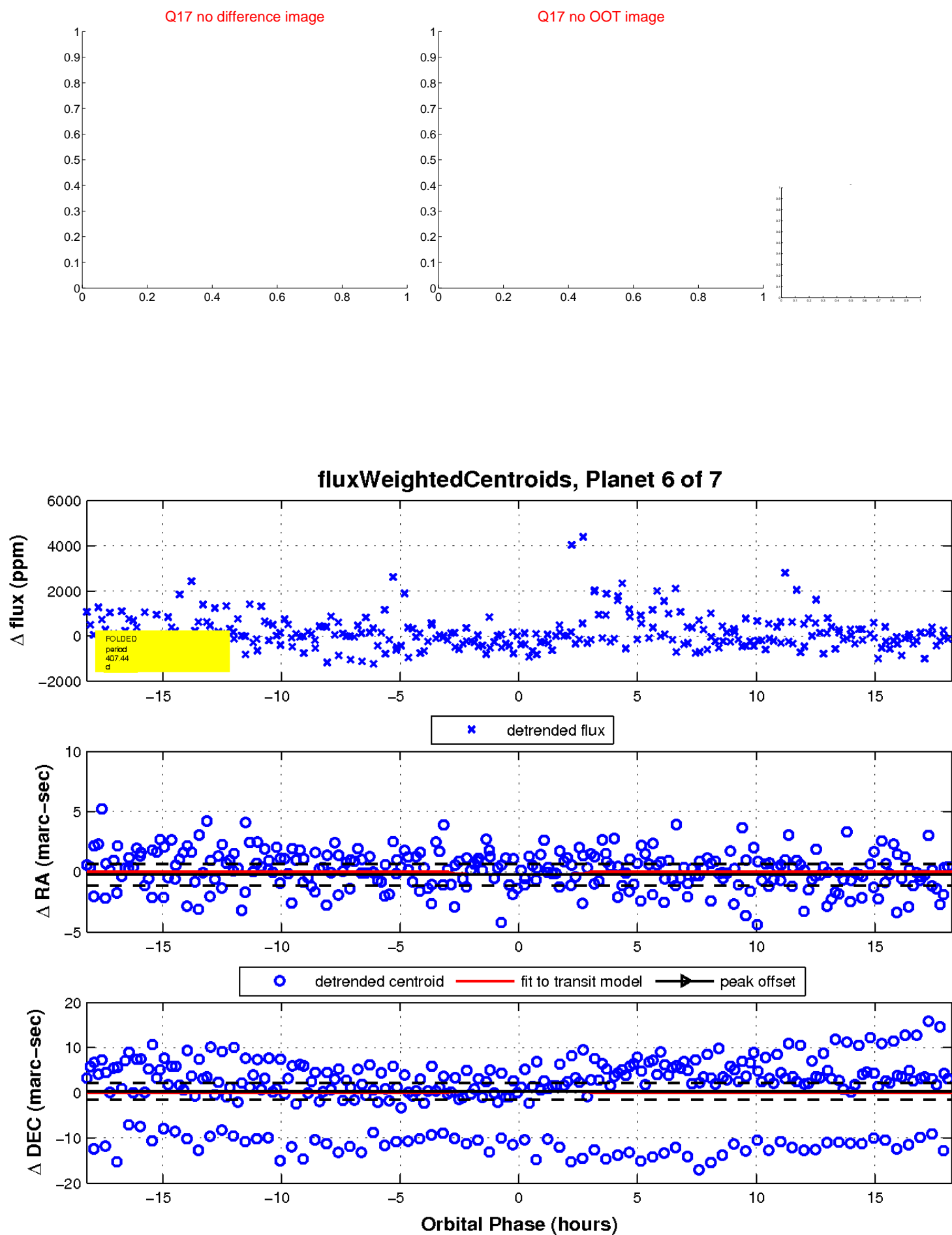
Q16 no difference image



Q16 no OOT image

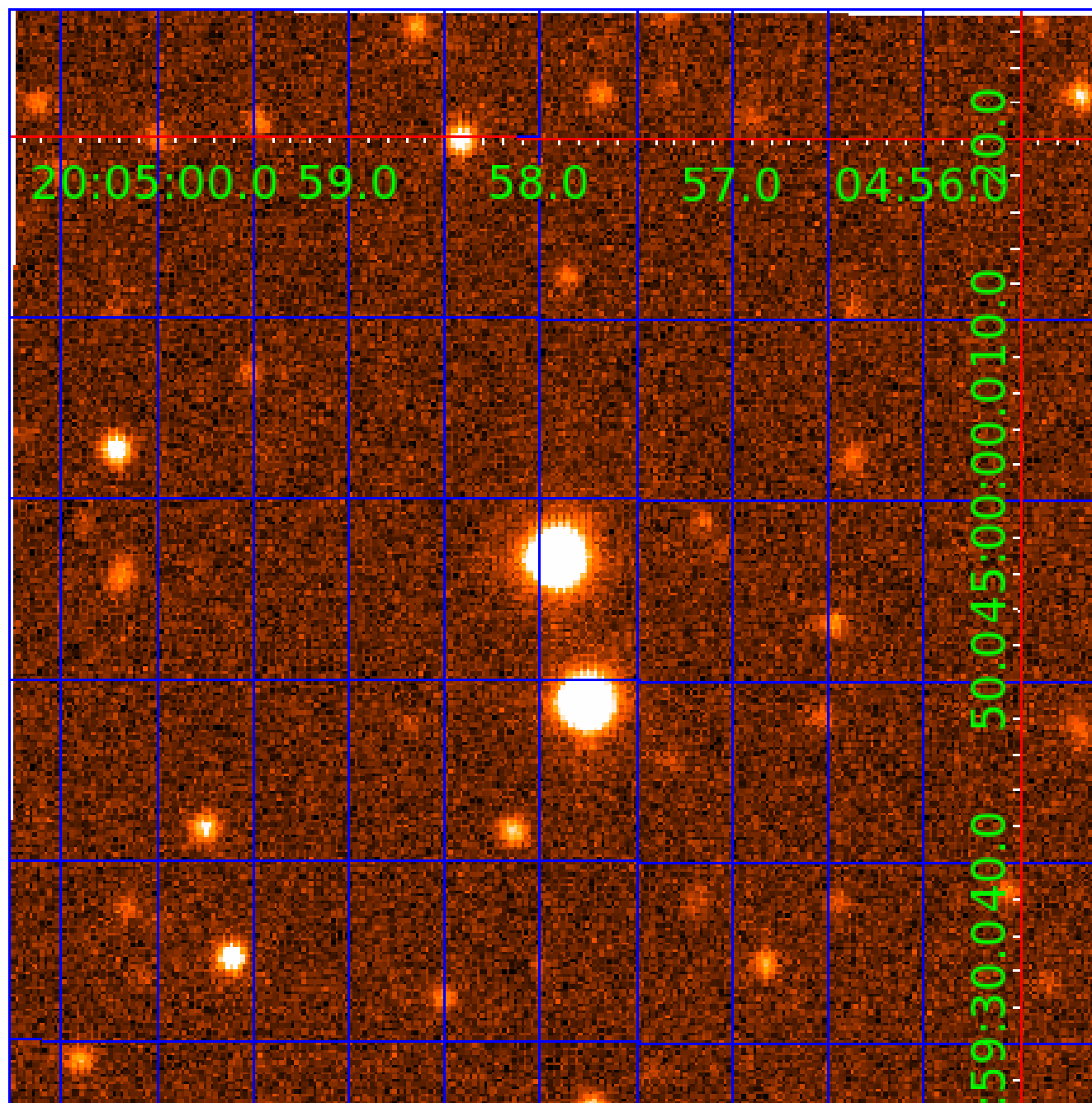


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008784119

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008784119-01	OBS	No	526.400453	310.781690	906.5	3.477	15.0	6.9	0.53	4386	1.59	0.09
008784119-03	OBS	No	366.677020	192.945604	812.9	14.690	11.5	5.1	0.53	4386	1.57	0.14
008784119-04	OBS	No	397.031225	314.385327	1396.9	14.652	12.9	8.2	0.53	4386	1.95	0.13
008784119-05	OBS	No	532.372569	214.583321	1087.5	2.484	12.5	7.3	0.53	4386	1.94	0.09
008784119-06	OBS	No	407.438305	234.571861	556.4	6.094	8.6	5.5	0.53	4386	1.29	0.12
008784119-07	OBS	No	0.932797	131.671610	841.5	2.000	7.7	-1.0	0.53	4386	1.50	407.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008784119-01	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
008784119-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008784119-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008784119-06	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—MOD_POS_ALT—CENT_FEW_DIFFS
008784119-07	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

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

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

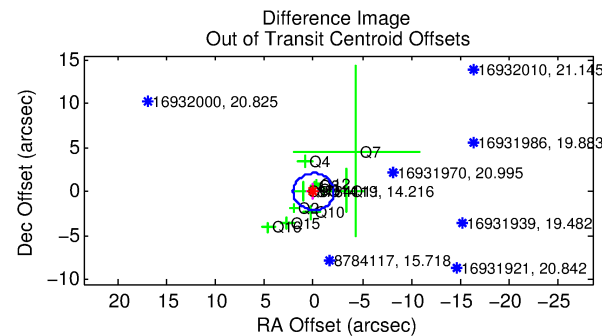
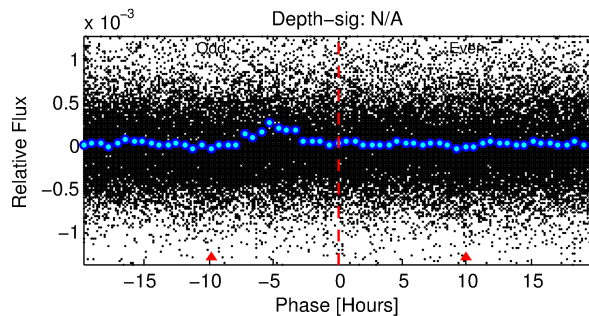
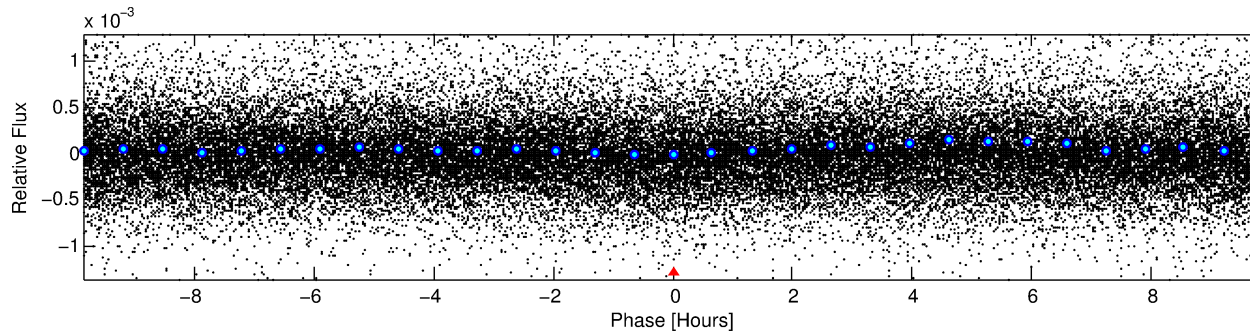
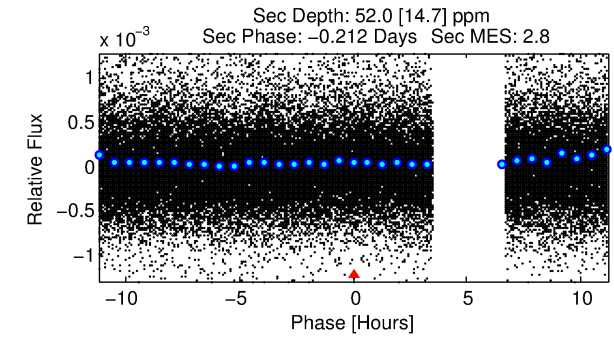
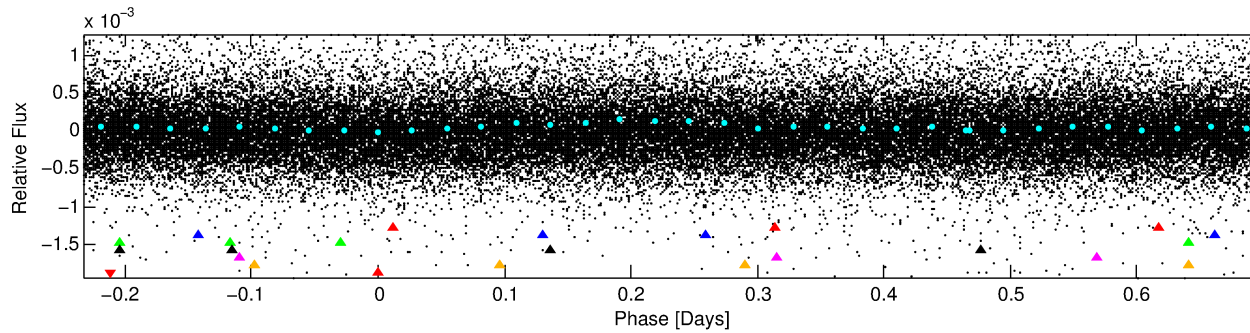
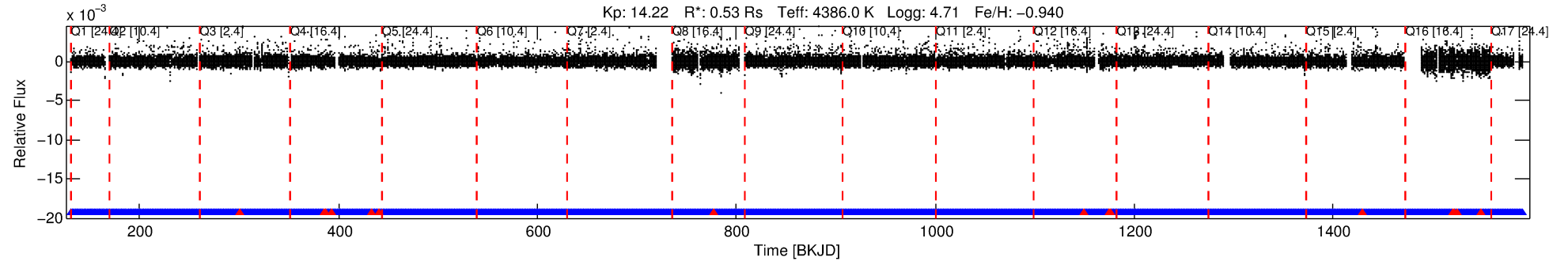
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008784119-07

No Significant Match Found

# DV One-Page Summary

KIC: 8784119 Candidate: 7 of 7 Period: 0.933 d



## TPS TCE Results:

Period = 0.93280 d  
Epoch = 131.6716 BKJD

DV fit results are unavailable

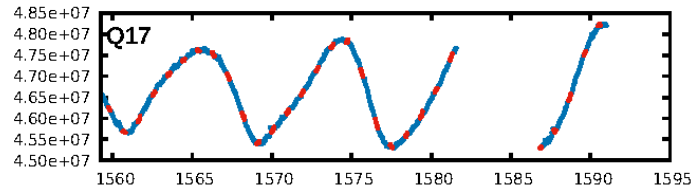
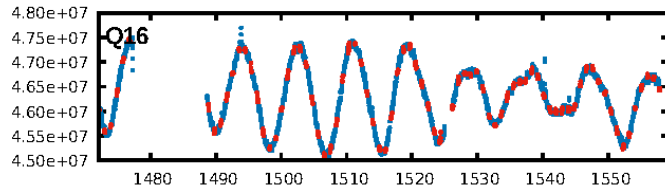
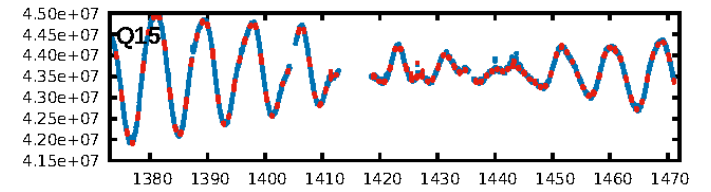
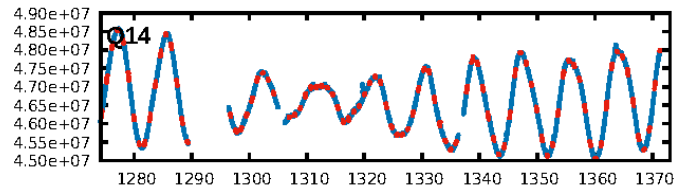
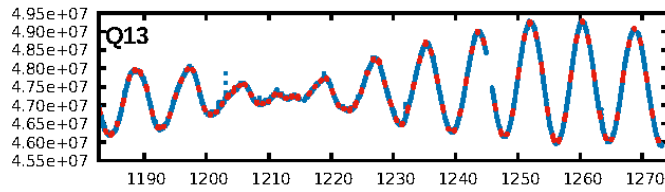
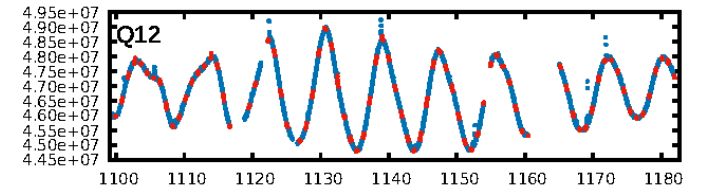
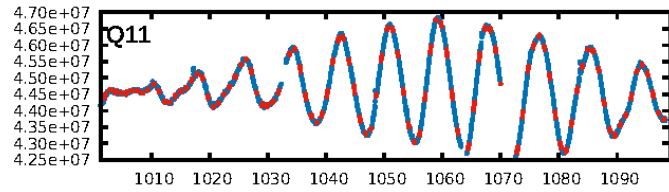
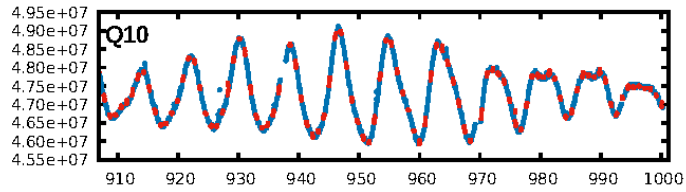
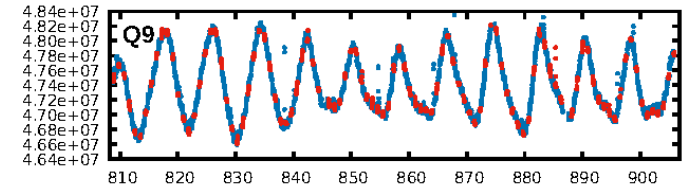
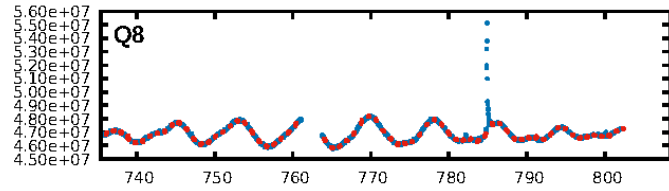
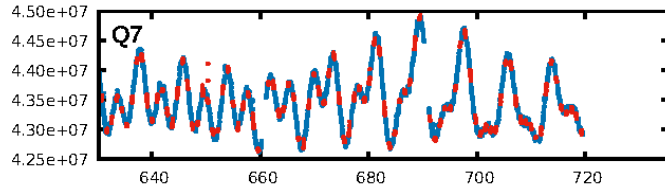
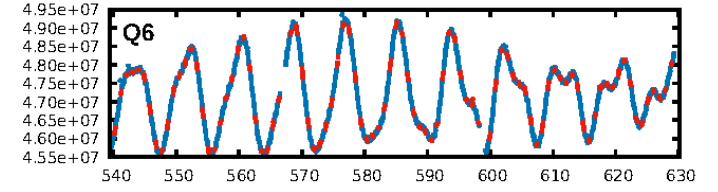
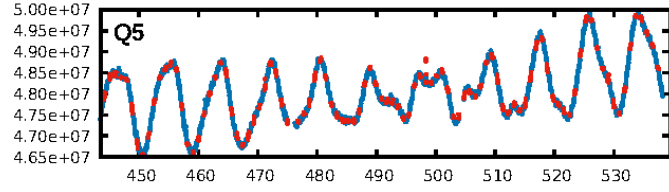
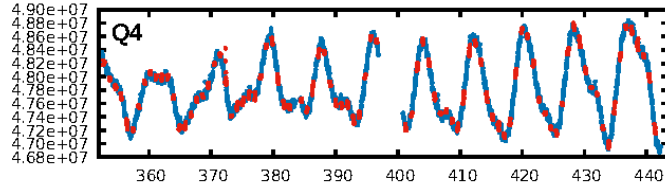
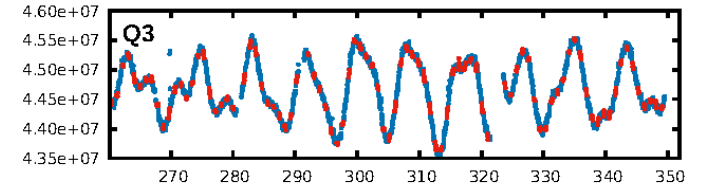
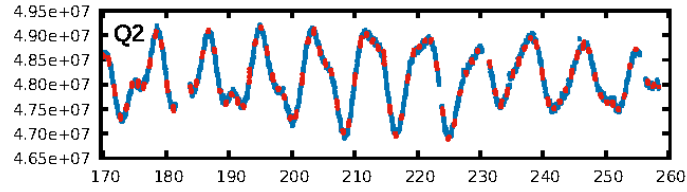
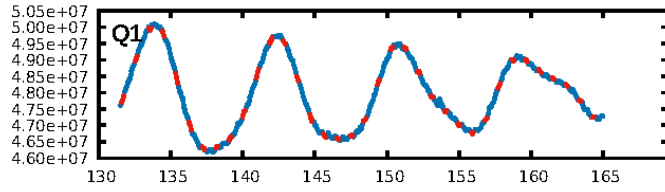
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1952.30 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [1339/1354]  
GhostDiagnostic-chr: 0.5598  
Centroid-sig: 0.3%  
Centroid-so: 2.827 arcsec [2.34 $\sigma$ ]  
OotOffset-rm: 0.010 arcsec [0.01 $\sigma$ ]  
KicOffset-rm: 0.581 arcsec [0.69 $\sigma$ ]  
OotOffset-st: 3/4/4/1 [12]  
KicOffset-st: 3/4/4/1 [12]  
DiffImageQuality-fgm: 0.50 [6/12]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:17:45 Z

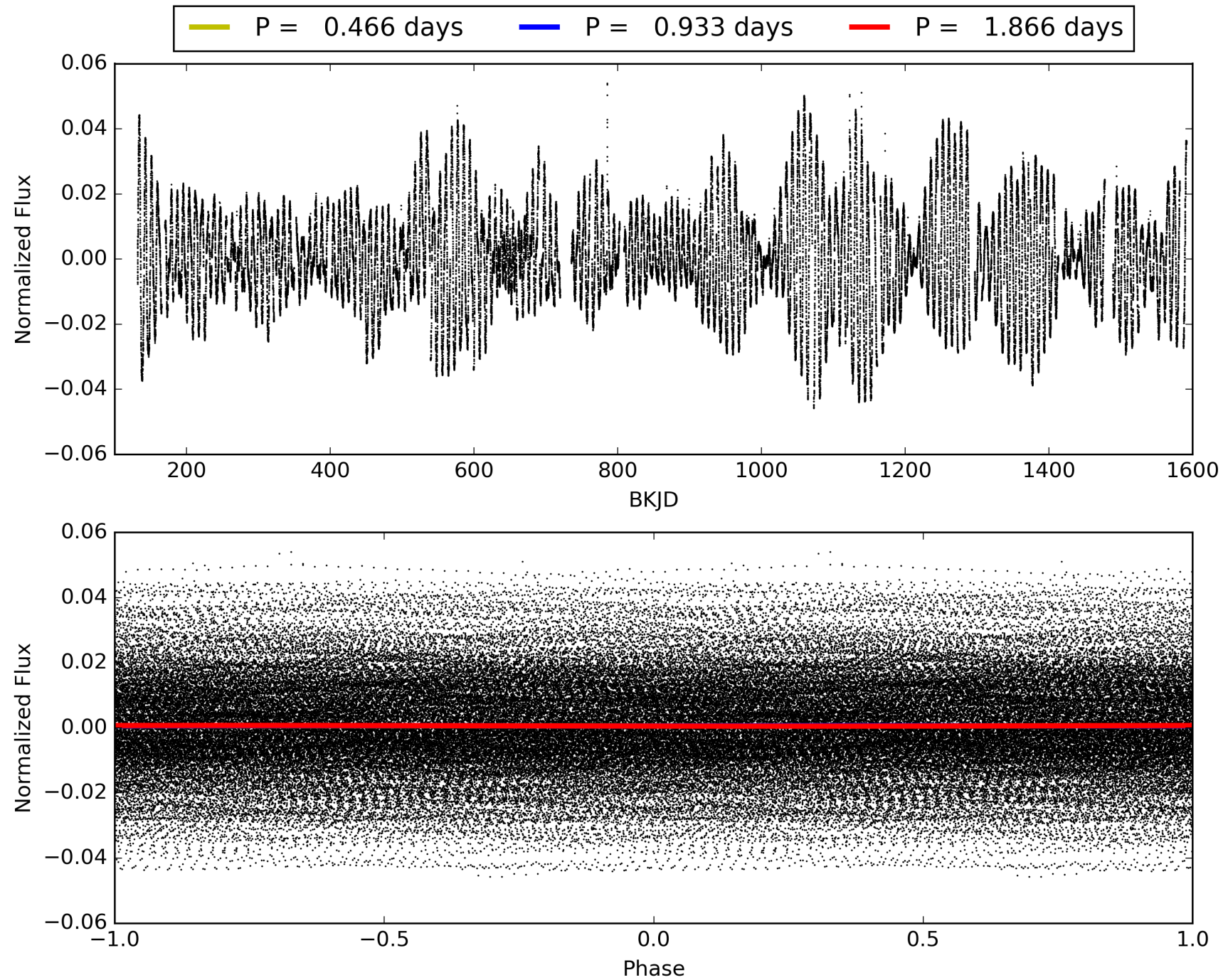
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008784119-07, PDC Light Curves





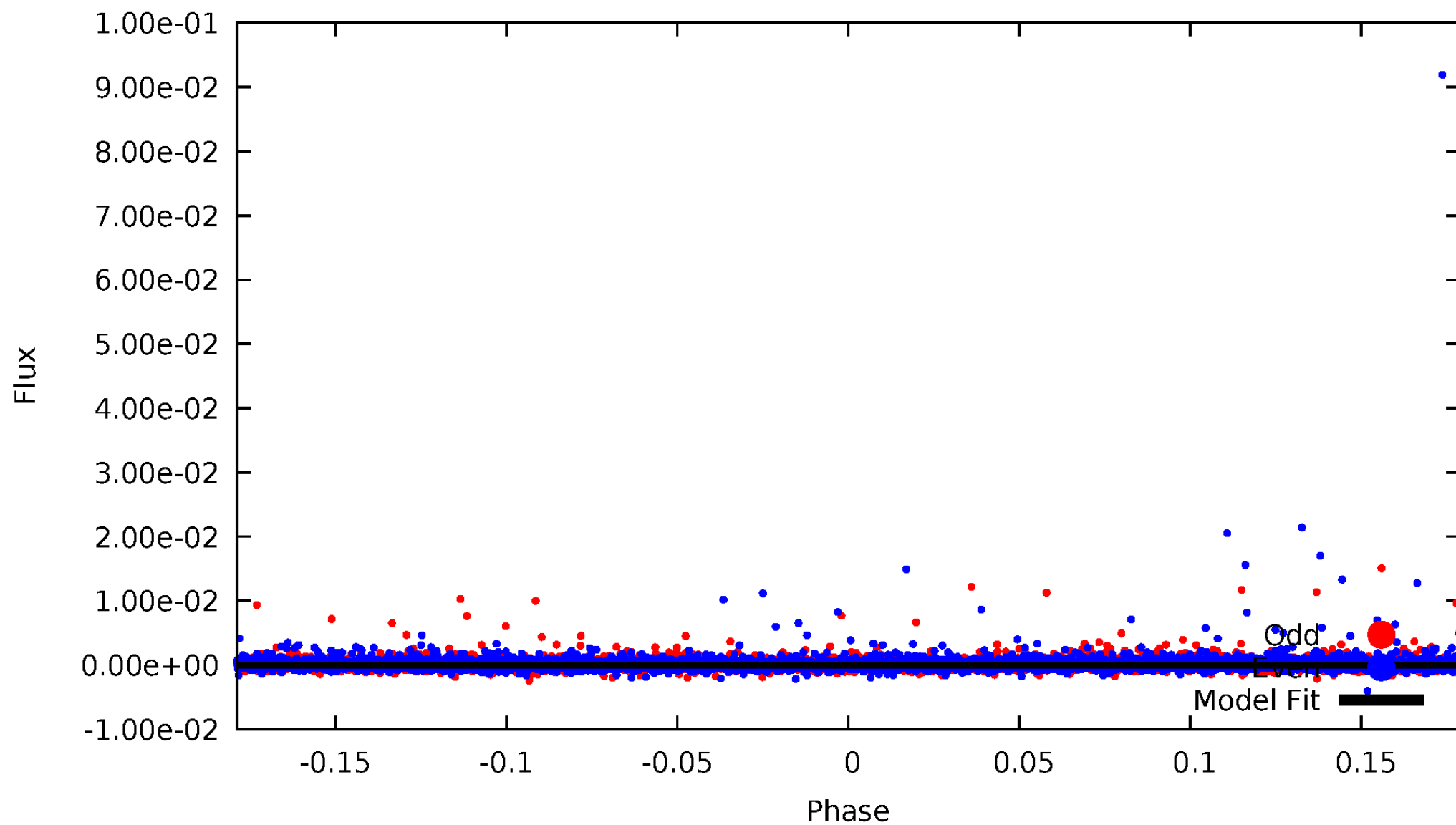
# TCE 008784119-07





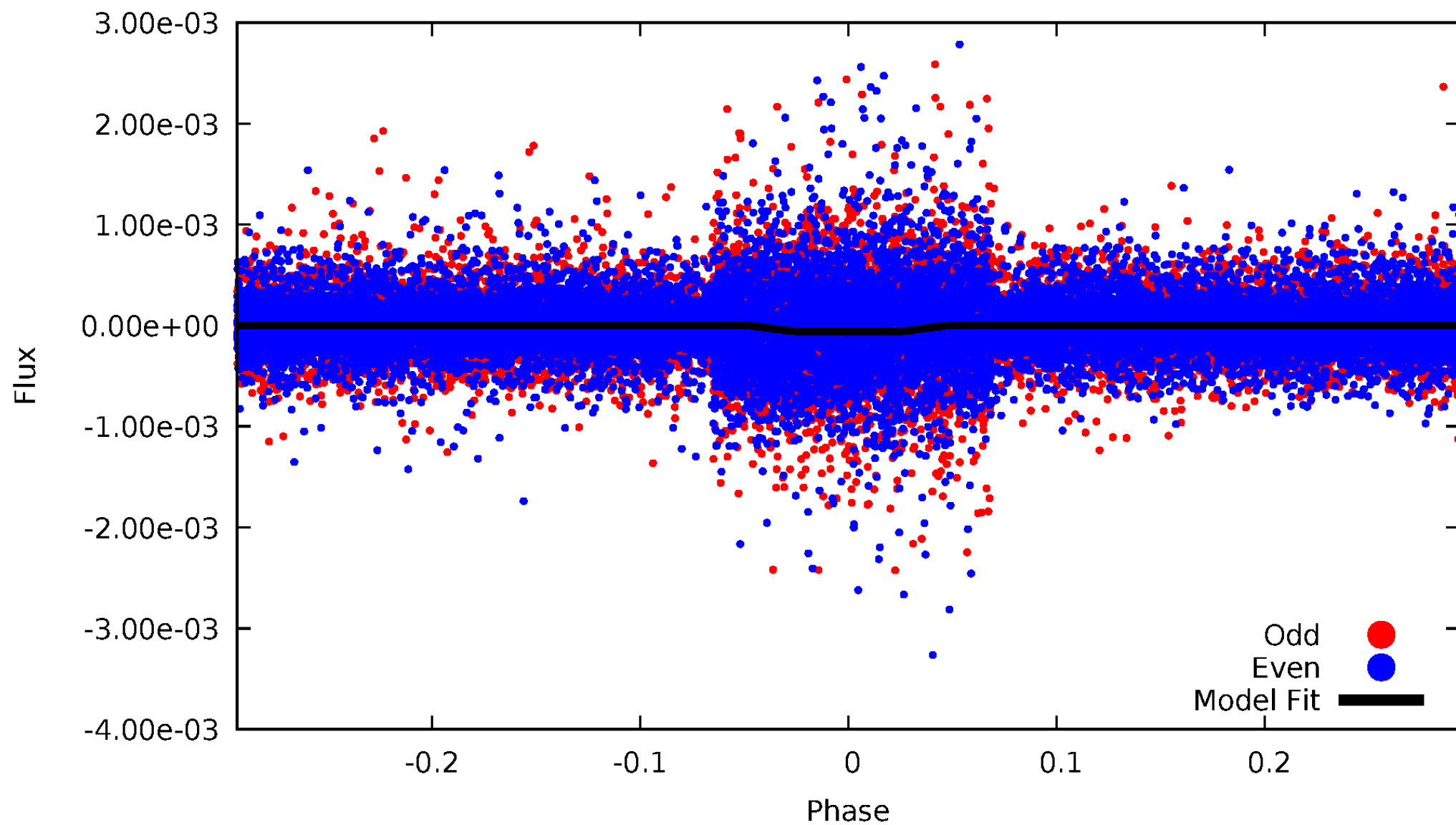
# DV Odd/Even

TCE 008784119-07

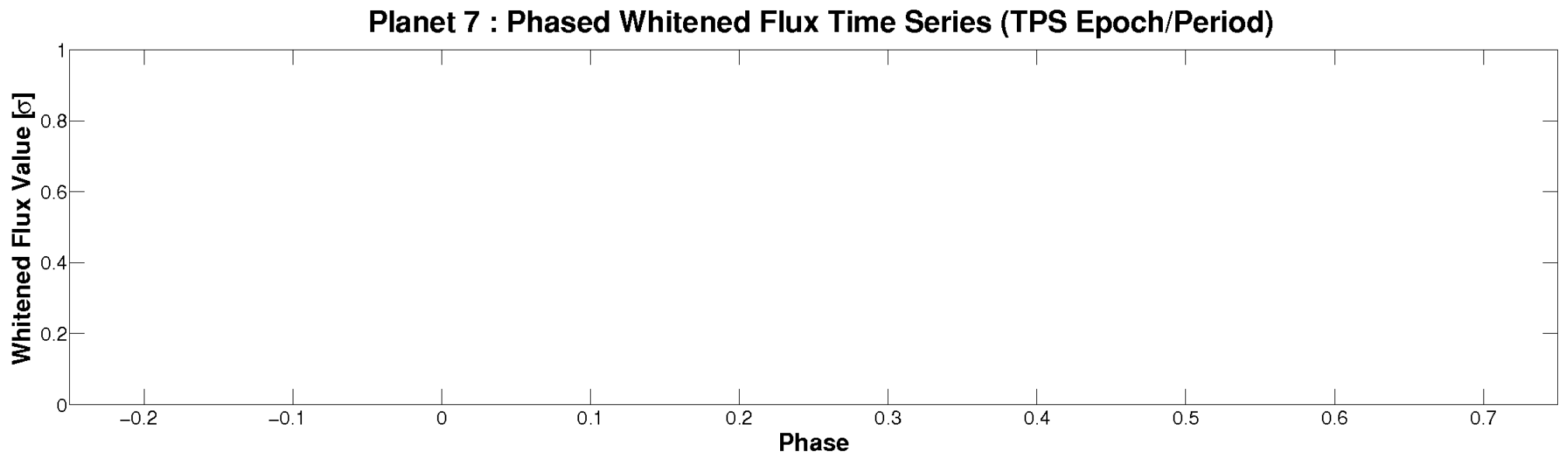
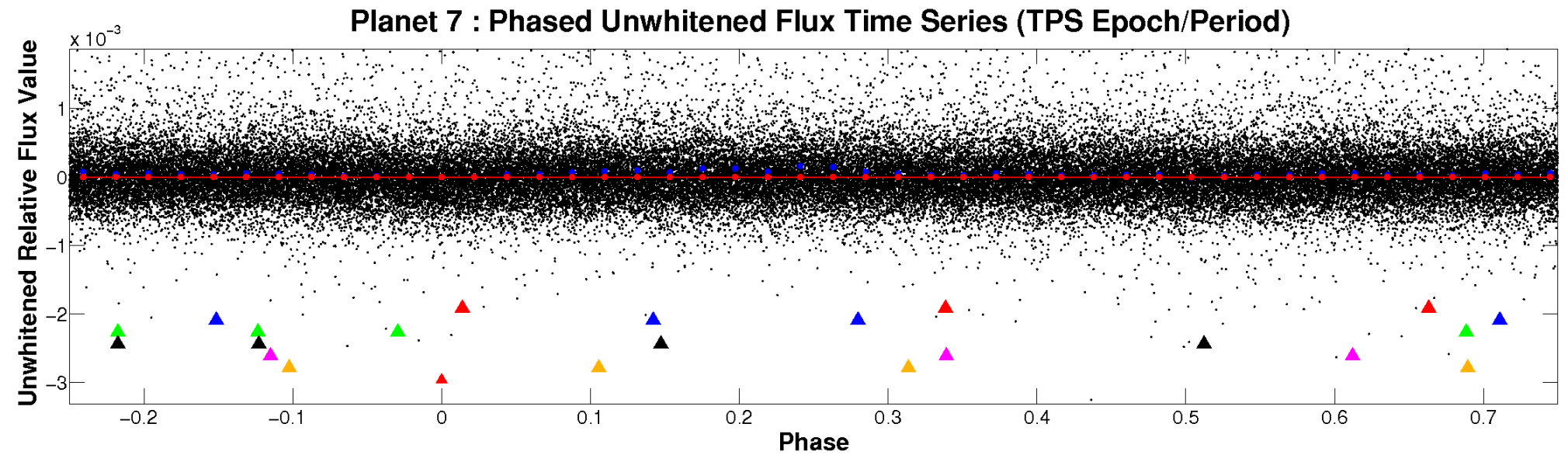


# ALT Odd/Even

TCE 008784119-07

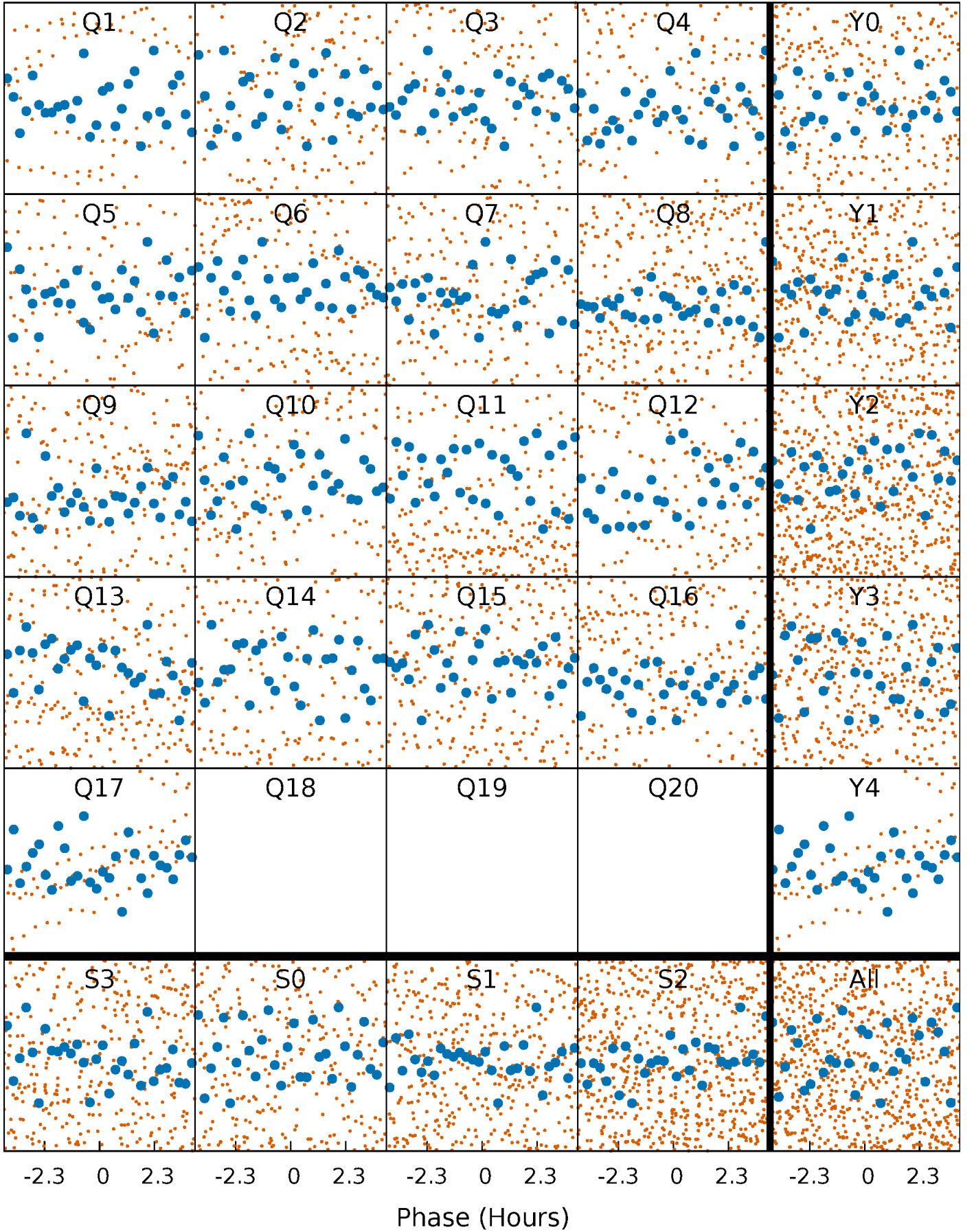


# Non-Whitened Vs. Whitened Light Curve



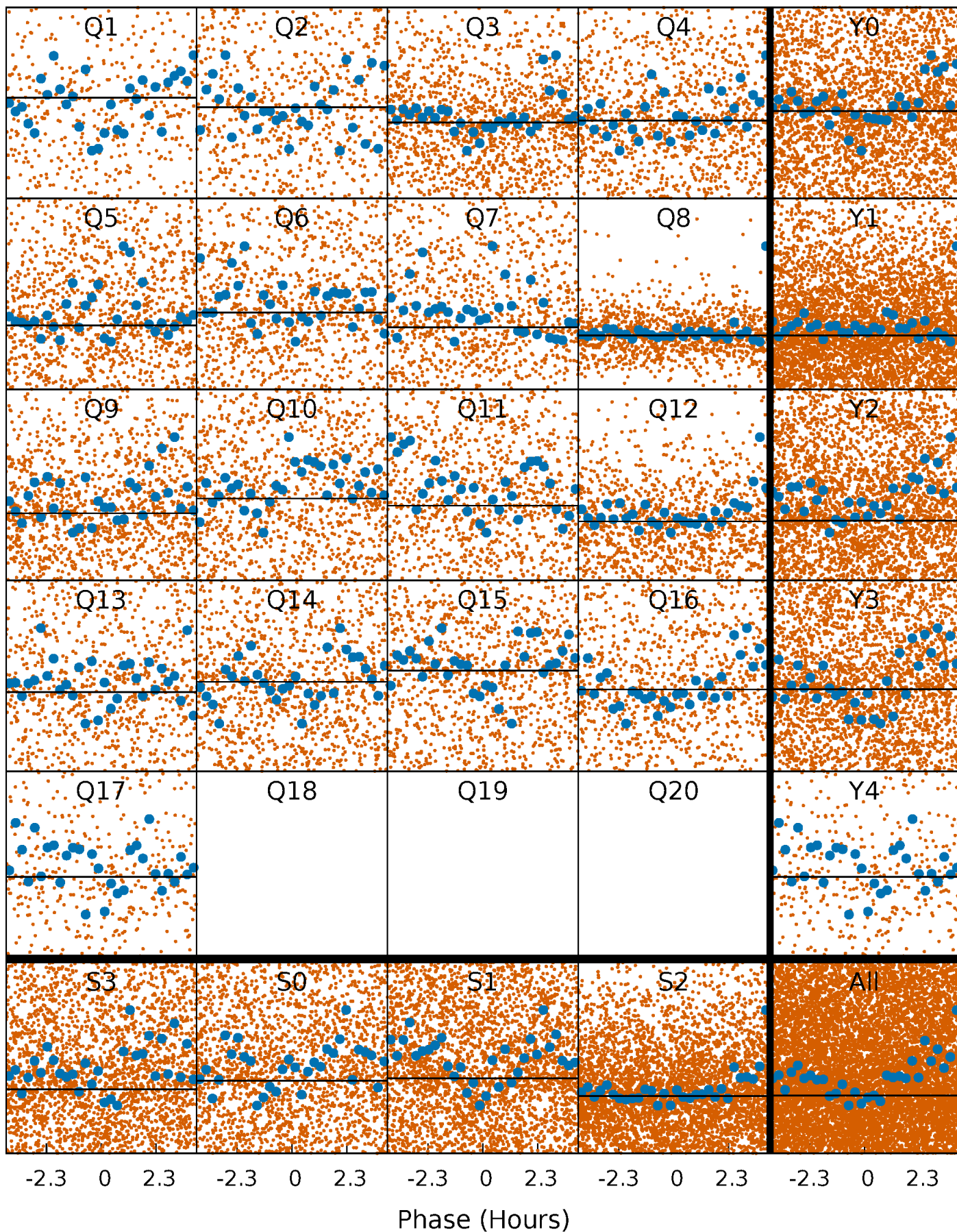
# PDC Quarter-Phased Transit Curves

TCE 008784119-07   P= 0.932797 Days    $T_0=131.671610$  (BKJD)



# DV Quarter-Phased Transit Curves

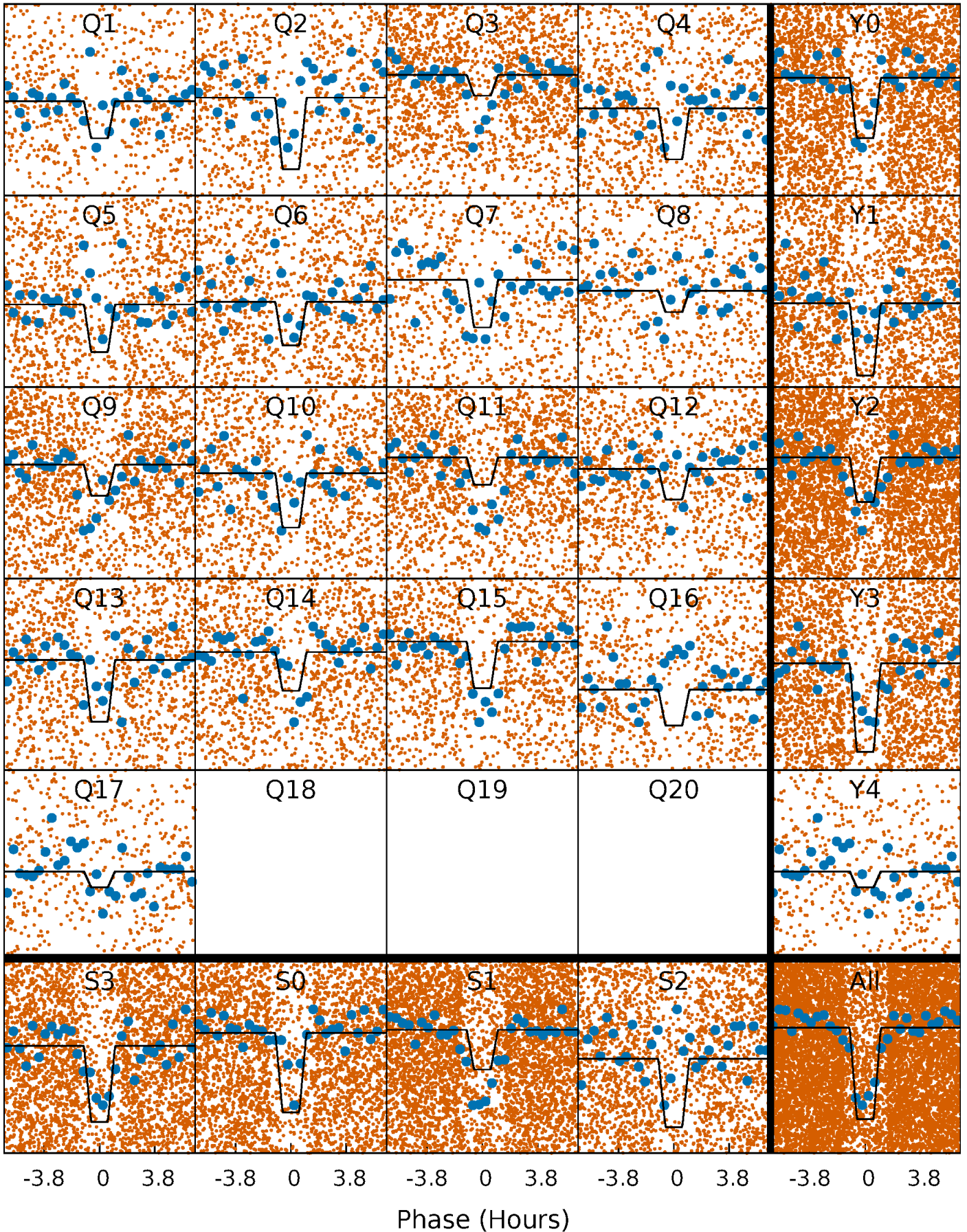
TCE 008784119-07   P= 0.932797 Days    $T_0=131.671610$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

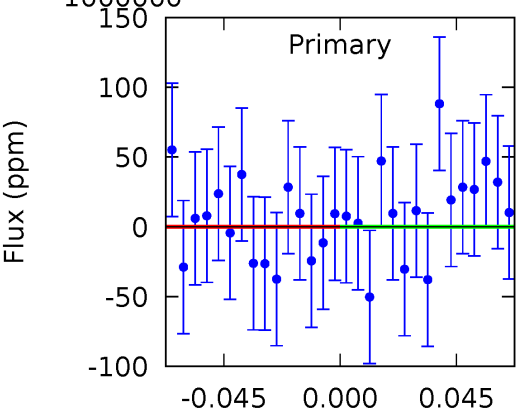
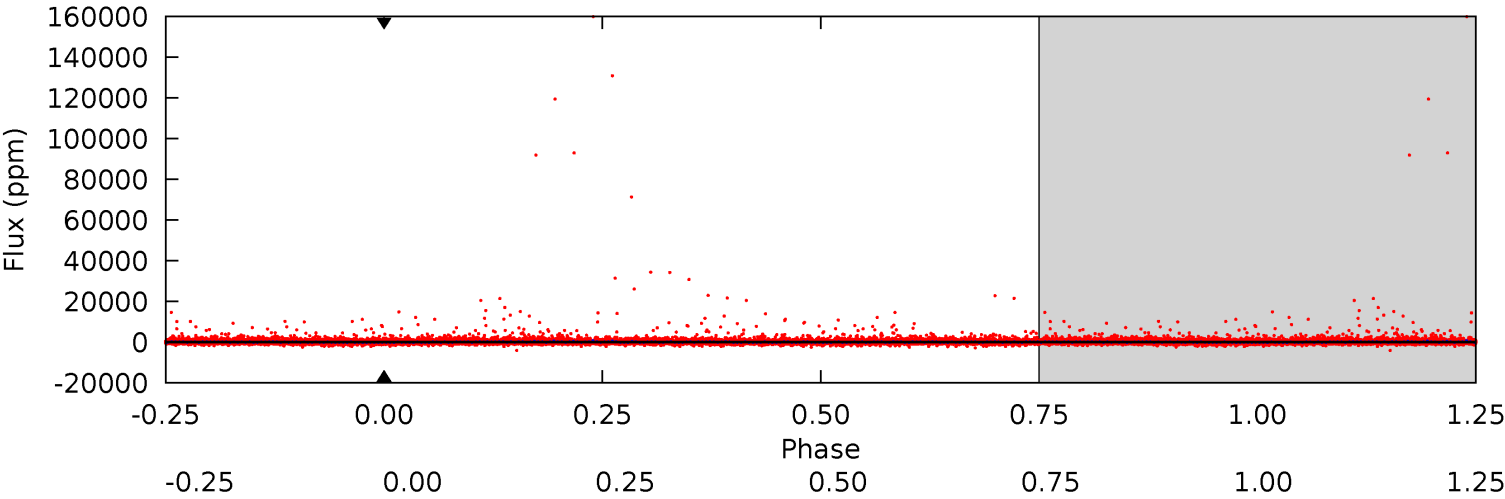
TCE 008784119-07     $P = 0.932797$  Days     $T_0 = 131.673271$  (BKJD)



# DV Model-Shift Uniqueness Test

008784119-07, P = 0.932797 Days, E = 130.738813 Days

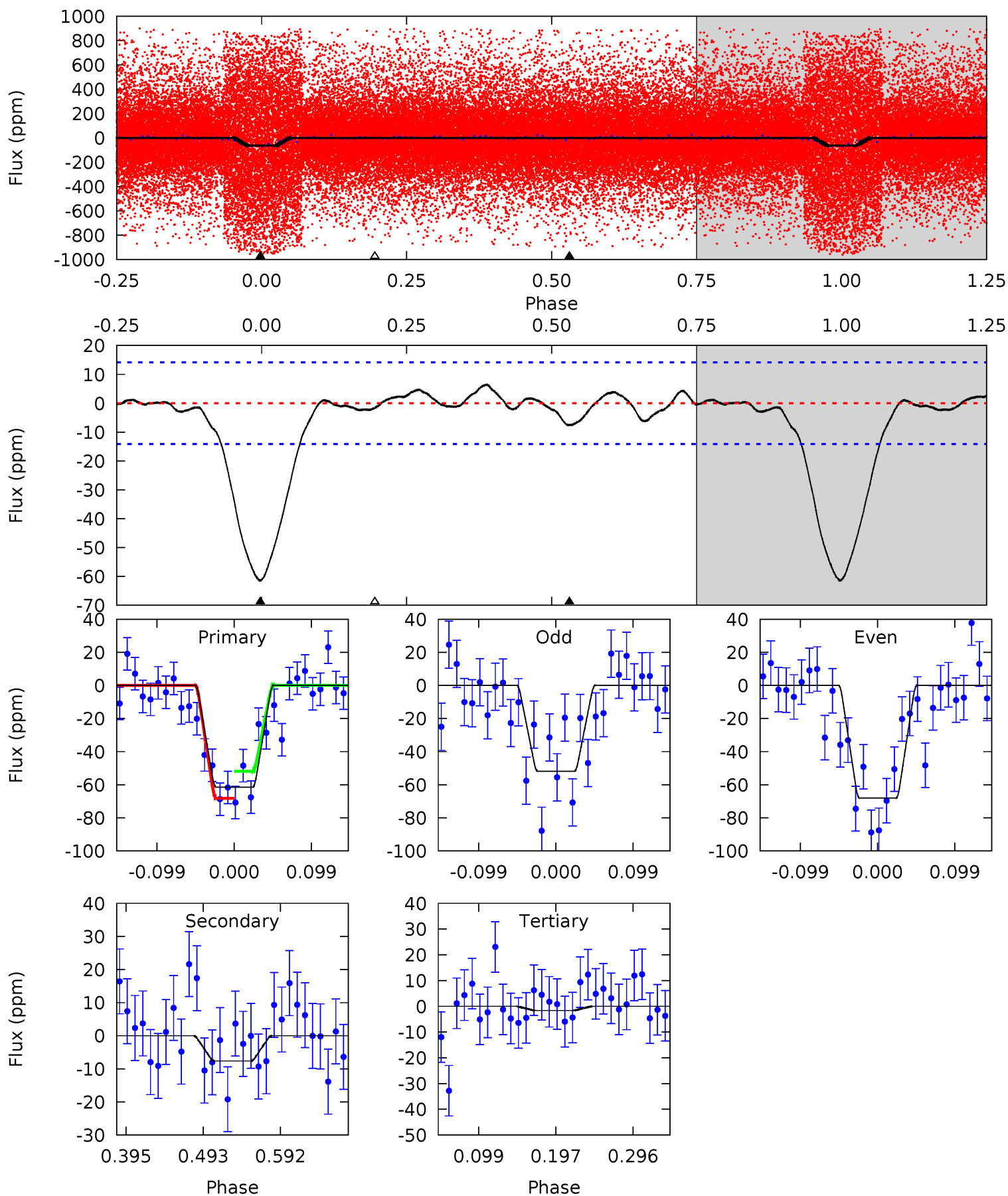
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

008784119-07, P = 0.932797 Days, E = 130.740474 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.9	2.46	0.52	0	4.57	1.65	0.82	19.3	19.9	1.94	2.46	2.63	1.22	0.09	2.64





### Stellar Parameters For KIC 008784119

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4386^{+118}_{-144}$	$4.711^{+0.058}_{-0.031}$	$-0.940^{+0.300}_{-0.300}$	$0.528^{+0.042}_{-0.046}$	$0.523^{+0.044}_{-0.033}$	$5.001^{+1.241}_{-0.688}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
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 008784119-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$4.39^{+4.55}_{-2.99}$	$1590^{+50}_{-57}$	$-3787^{+14397}_{-7249}$	$-16.656^{+1084.872}_{-1153.683}$
Alt.	$-8 \pm 3$	$4.14^{+4.24}_{-2.90}$	$1592^{+53}_{-56}$	$-2132^{+4304}_{-65}$	$0.051^{+0.545}_{-0.040}$

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

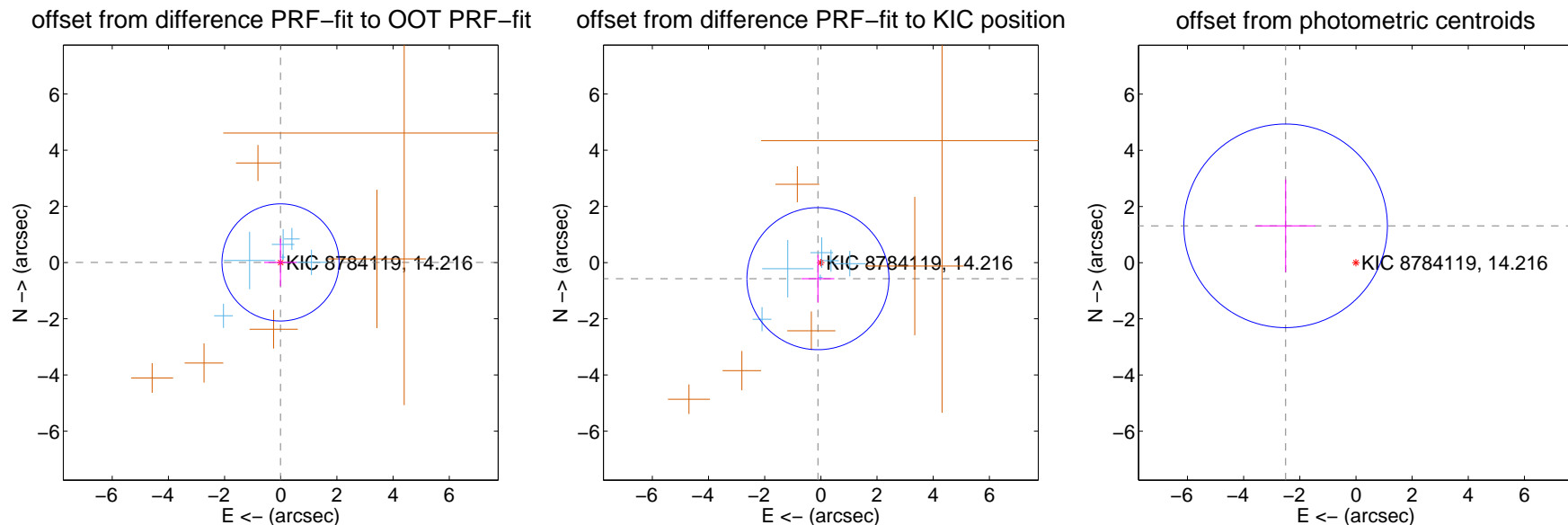
## DV Centroid Data

Supplemental centroid analysis for 008784119-07. Kepler magnitude: 14.22. Transit SNR -1.00

There are 6 quarters with good PRF difference image offsets

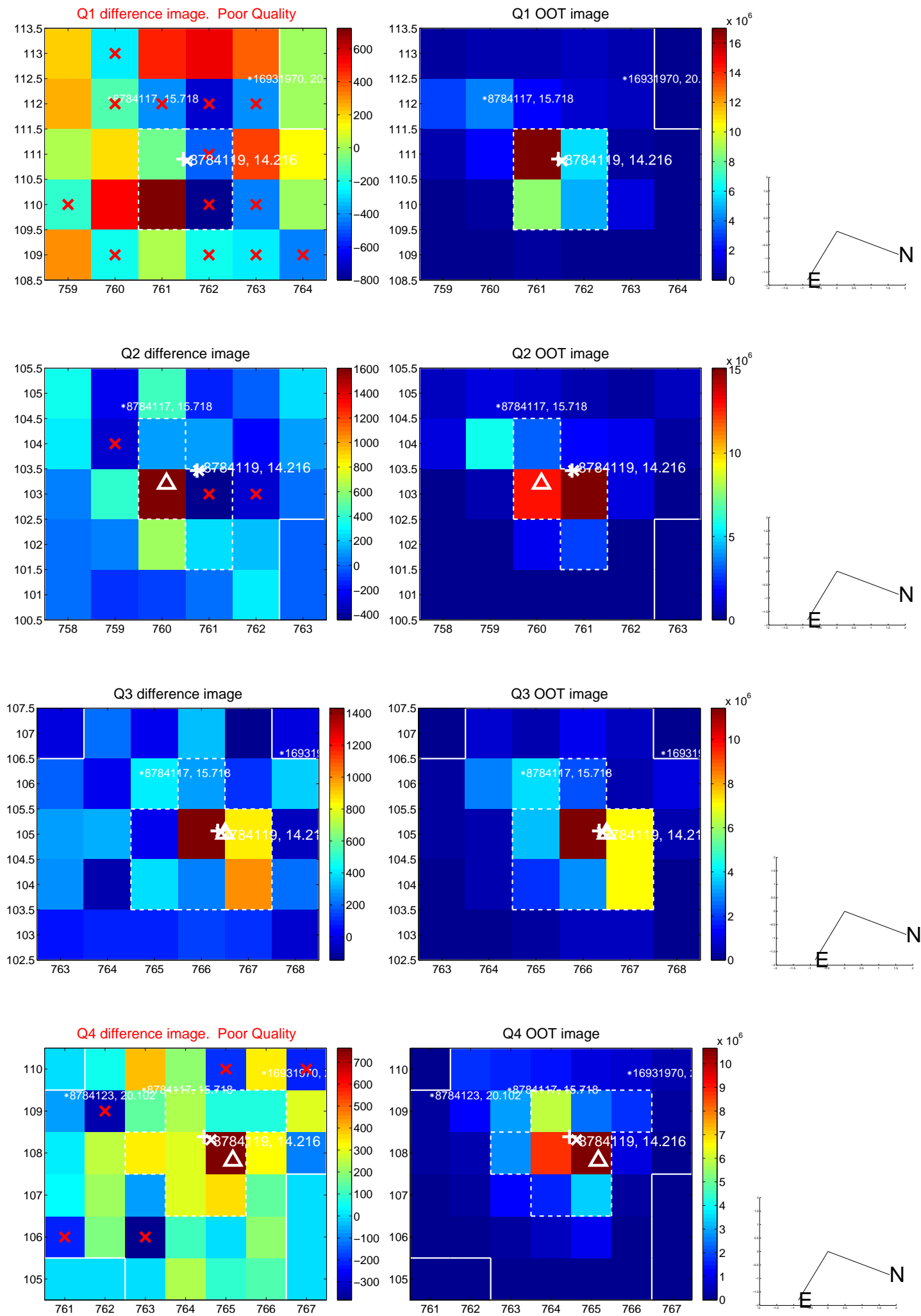
The direct PRF centroid is offset from the target star catalog position by about 0.77 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.010 \pm 0.695$	0.01	$0.008 \pm 0.583$	$0.006 \pm 0.850$
PRF-fit source offset from KIC position	$0.581 \pm 0.843$	0.69	$0.104 \pm 0.583$	$-0.572 \pm 0.850$
photometric centroid source offset	$2.83 \pm 1.21$	2.34	$2.50 \pm 1.06$	$1.31 \pm 1.65$

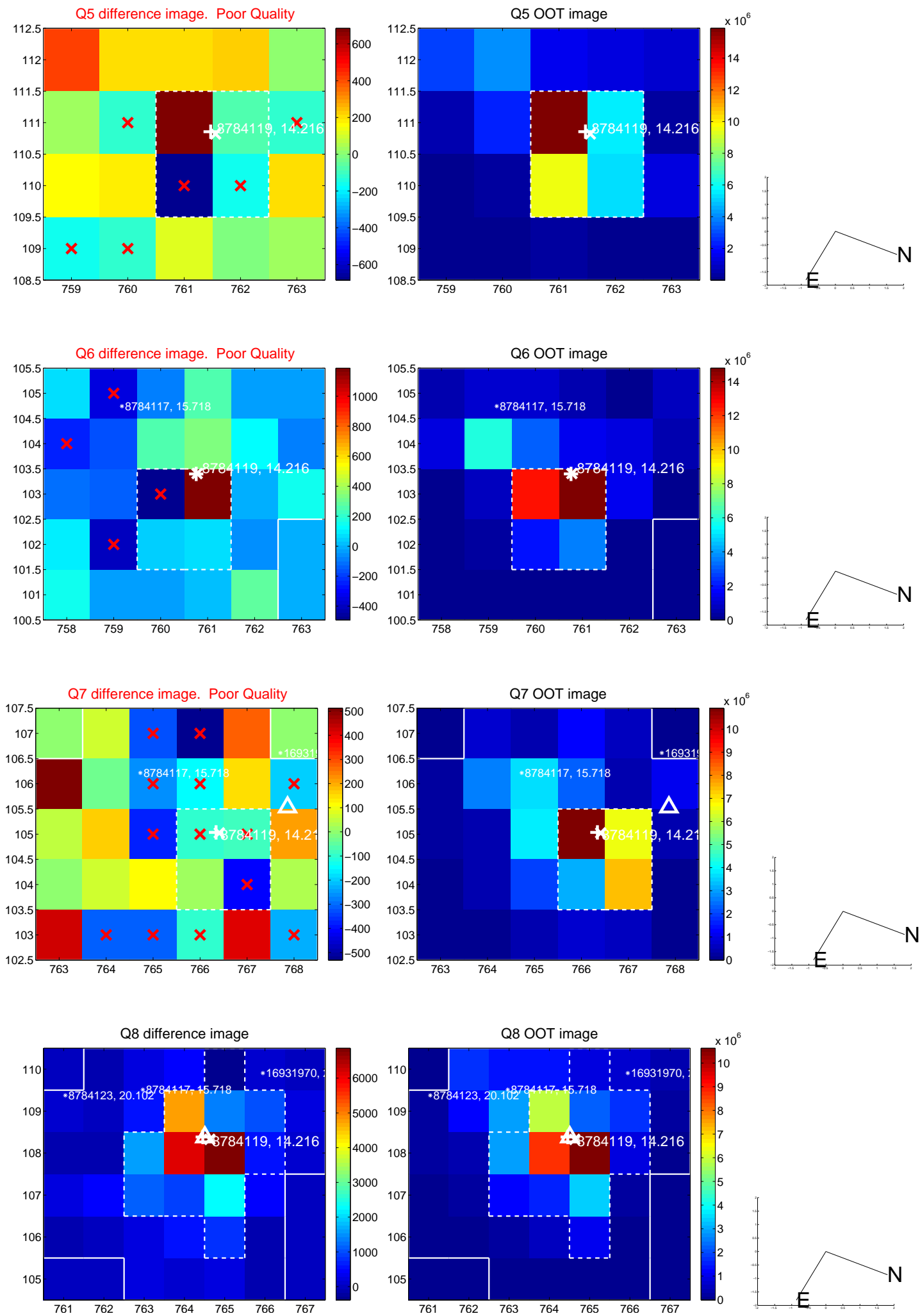


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

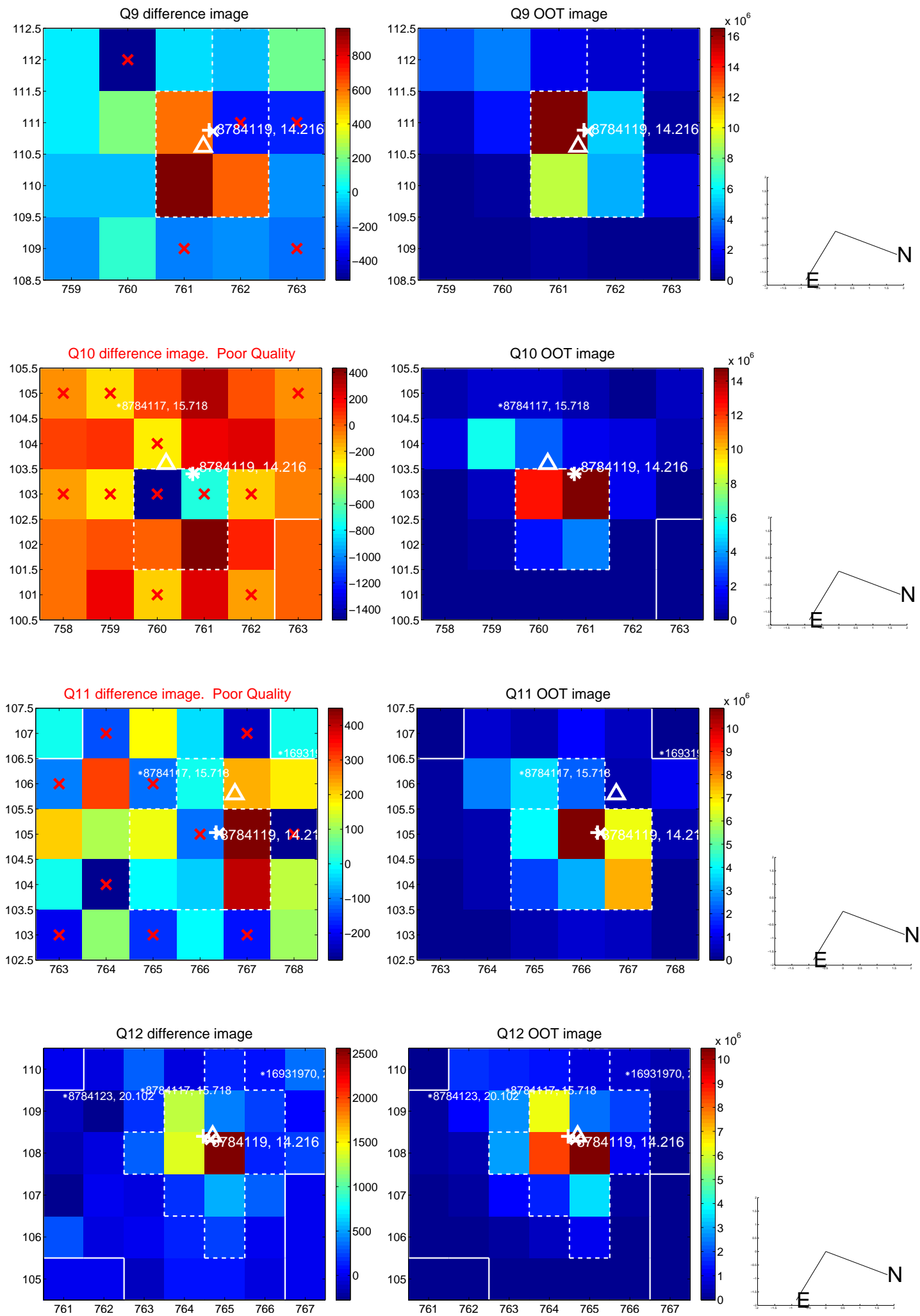
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



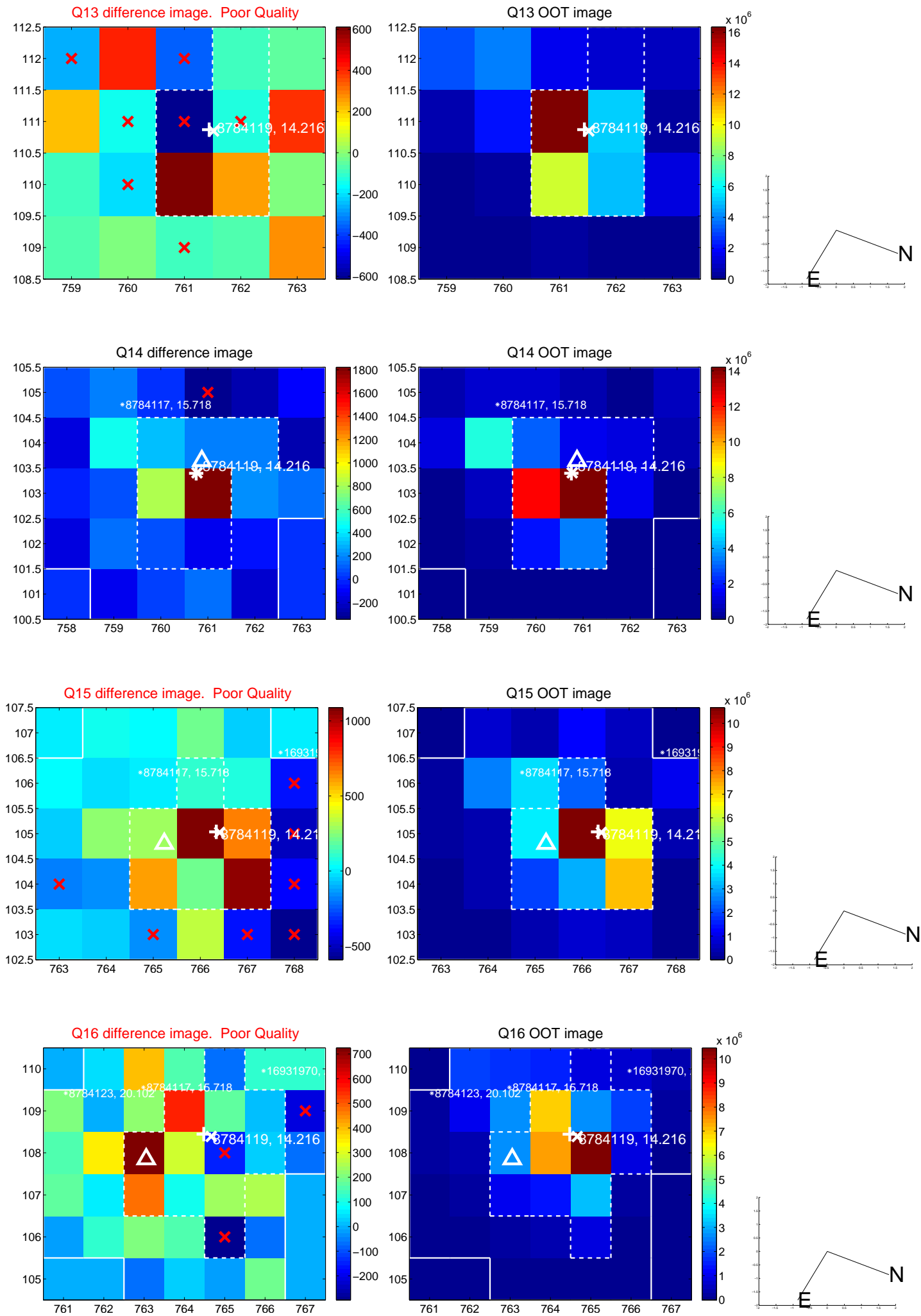
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



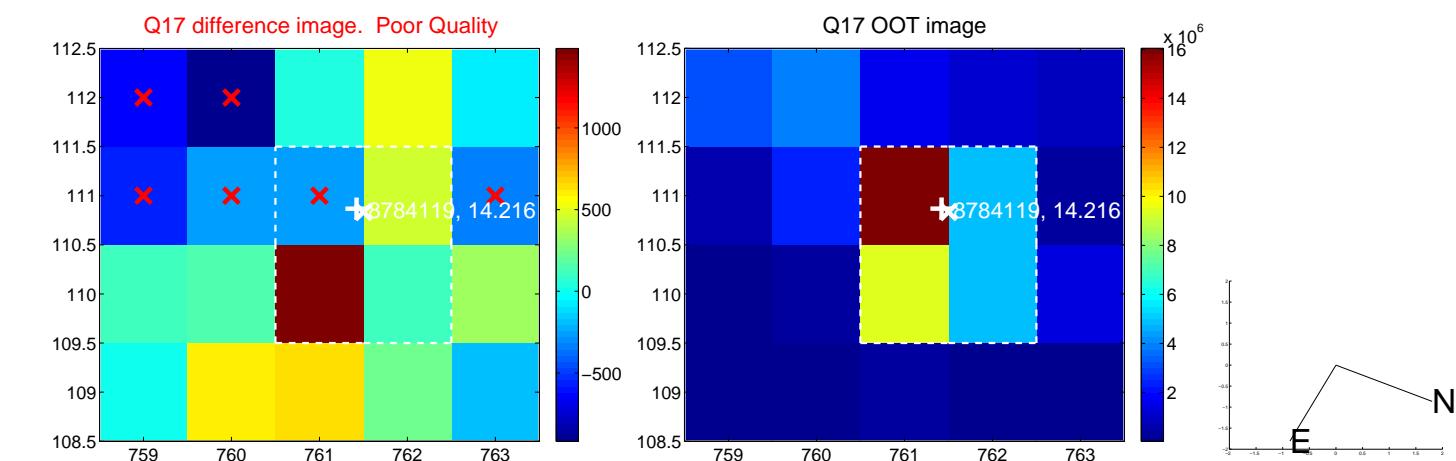
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



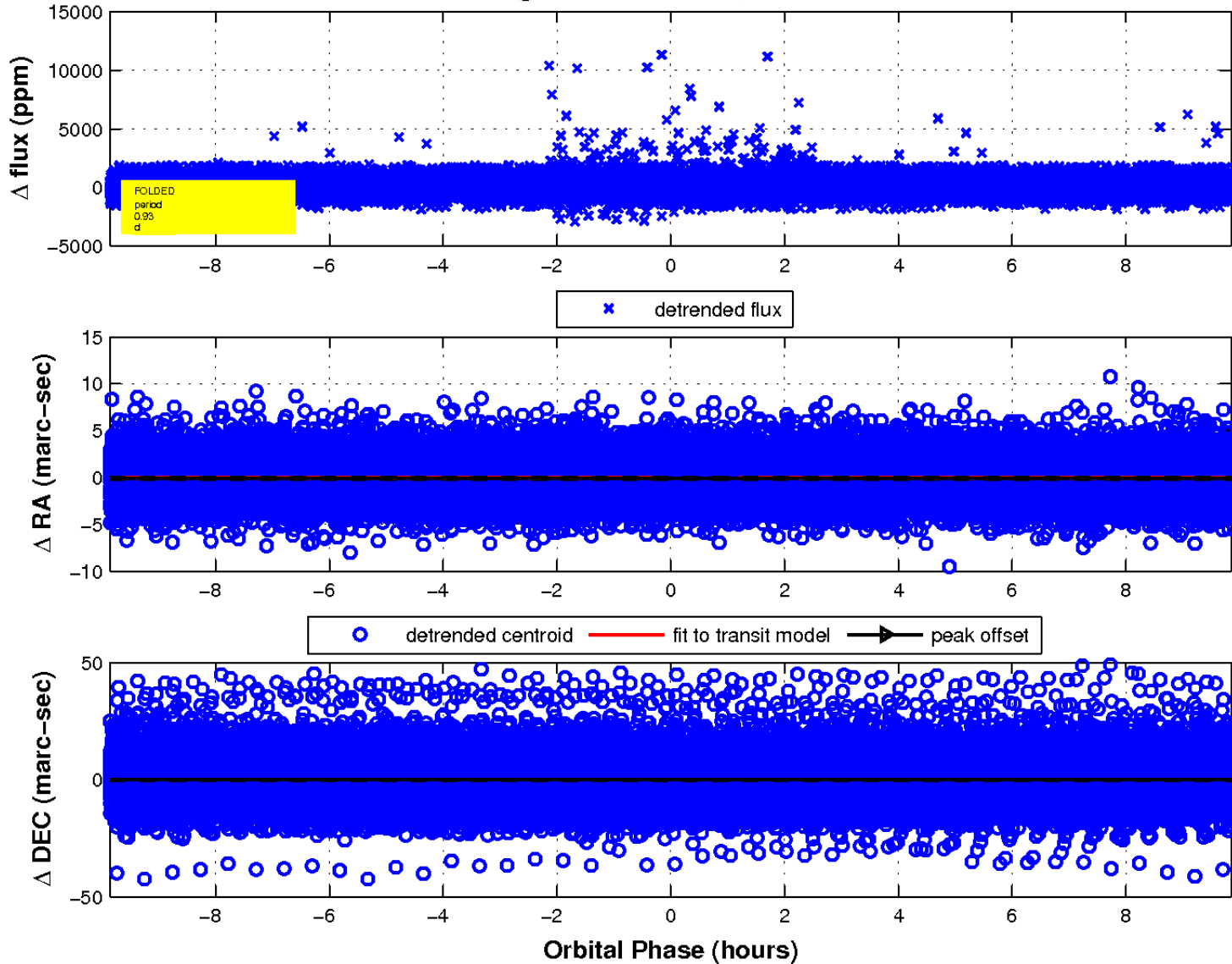
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 7 of 7



UKIRT Image

