

KIC 008028916

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})
008028916-01	OBS	No	161.399324	252.400210	821.3	6.619	26.9	1.7	1.50	7090	4.68	13.53
008028916-02	OBS	No	103.181808	163.240171	13112.4	11.294	12.4	3.7	1.50	7090	29.96	24.57
008028916-03	OBS	No	235.695941	315.481898	484.4	2.215	14.5	1.4	1.50	7090	3.73	8.17
008028916-04	OBS	No	138.721357	251.704459	1116.2	1.848	14.0	2.6	1.50	7090	5.38	16.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008028916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008028916-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
008028916-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008028916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

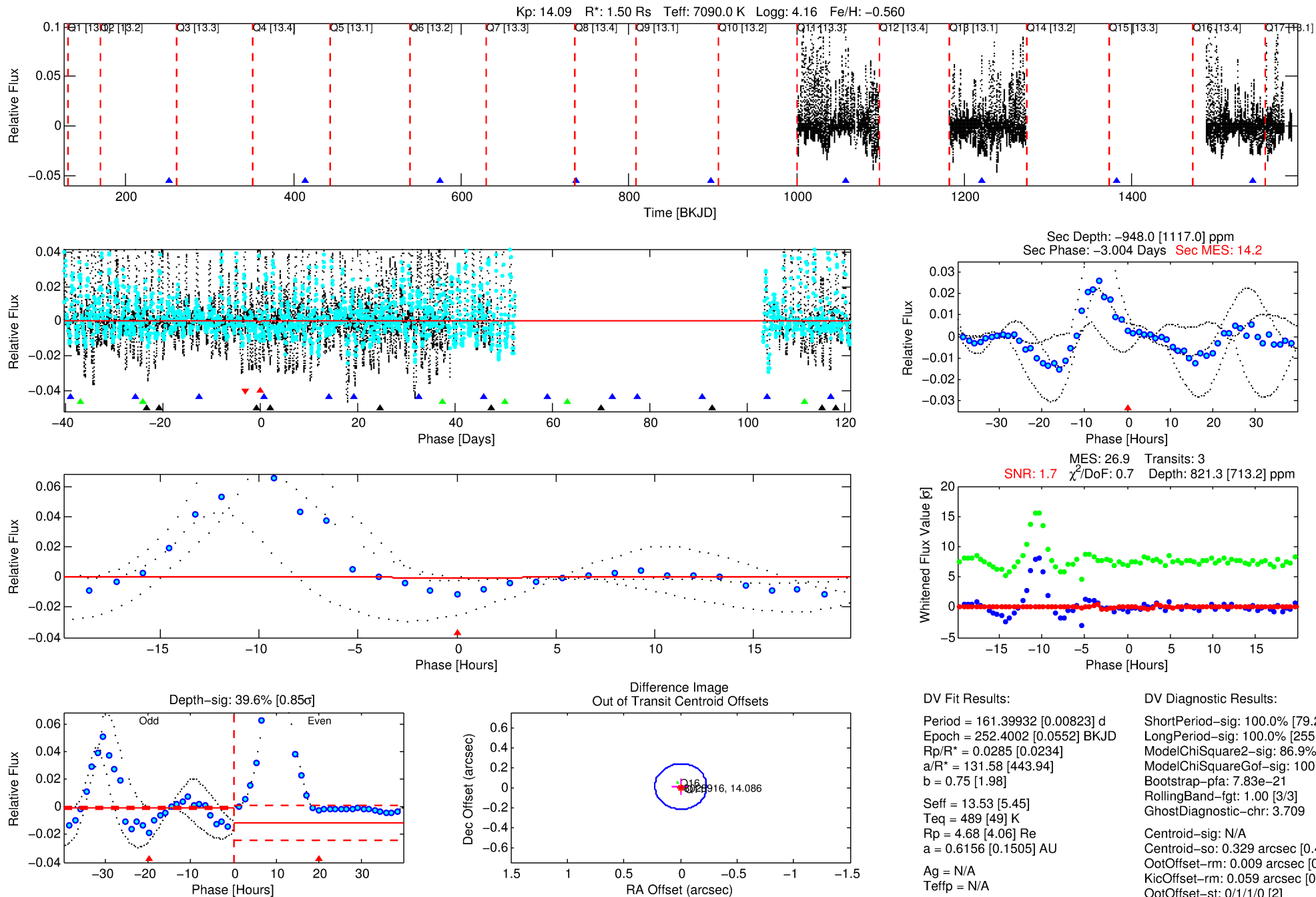
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008028916-01

No Significant Match Found

DV One-Page Summary

KIC: 8028916 Candidate: 1 of 4 Period: 161.399 d



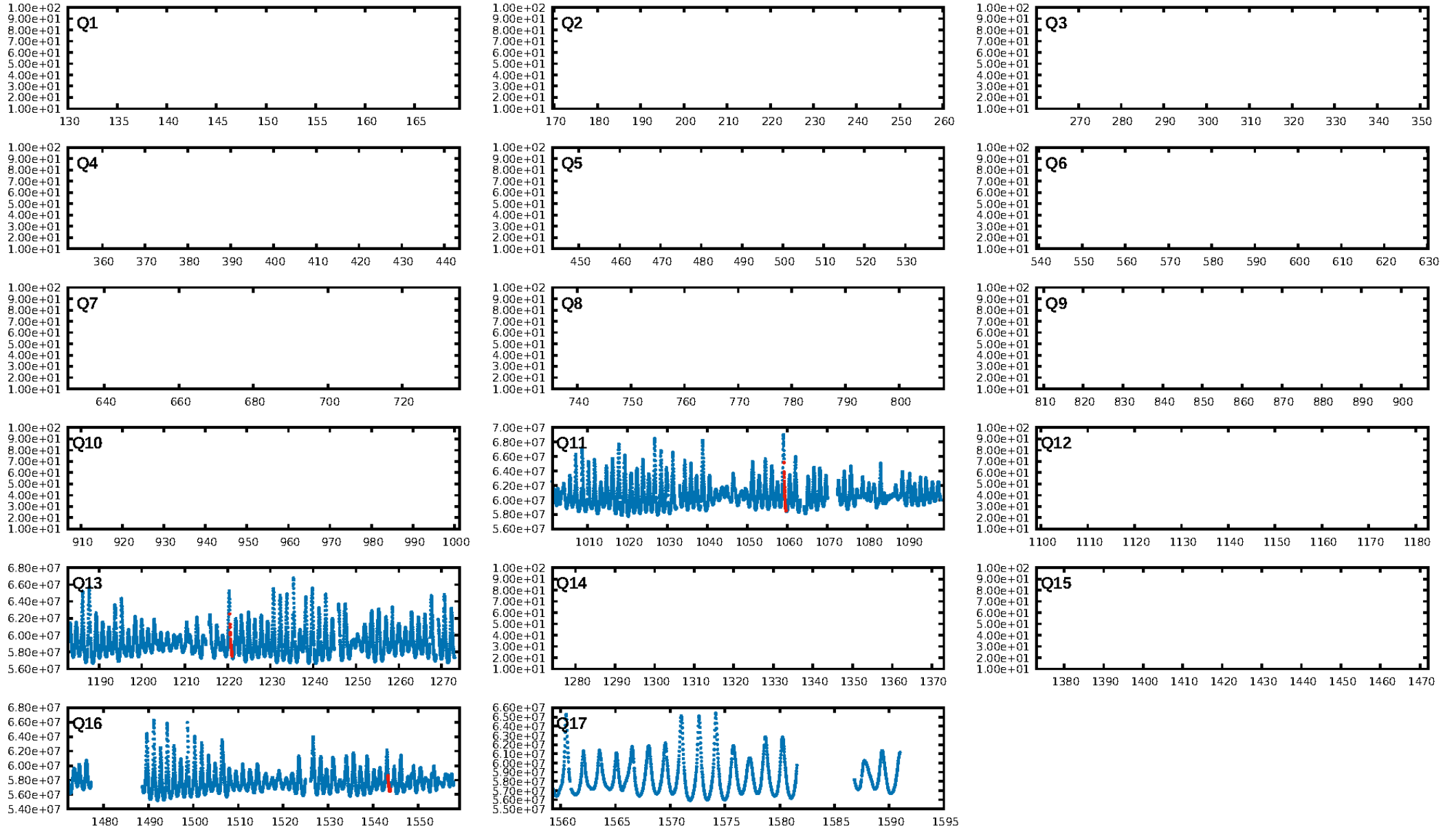
DV Fit Results:

Period = 161.39932 [0.00823] d
Epoch = 252.4002 [0.0552] BKJD
Rp/R* = 0.0285 [0.0234]
a/R* = 131.58 [443.94]
b = 0.75 [1.98]
Seff = 13.53 [5.45]
Teq = 489 [49] K
Rp = 4.68 [4.06] Re
a = 0.6156 [0.1505] AU
Ag = N/A
Teffp = N/A

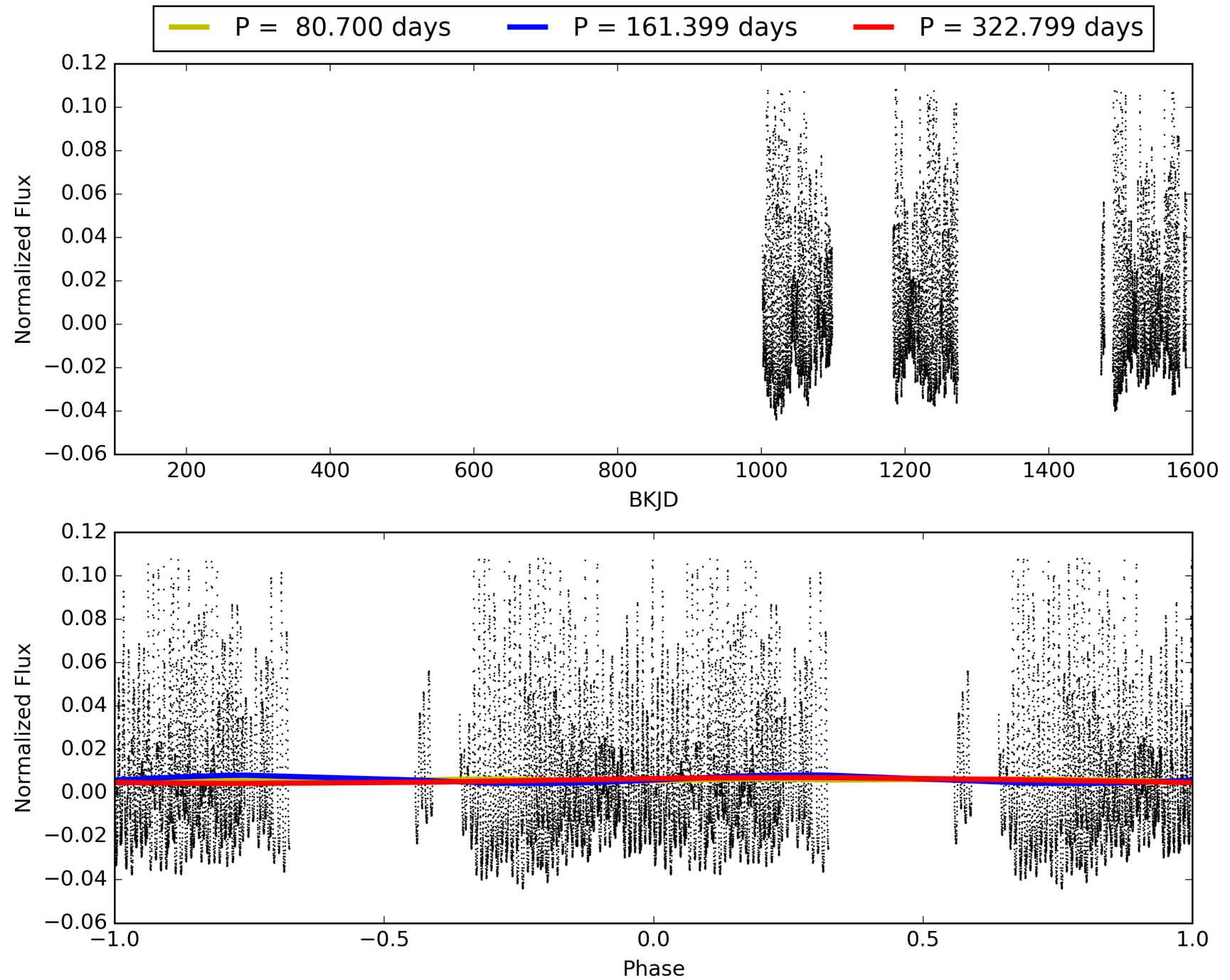
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [79.20σ]
LongPeriod-sig: 100.0% [255.46σ]
ModelChiSquare2-sig: 86.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.83e-21
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 3.709
Centroid-sig: N/A
Centroid-so: 0.329 arcsec [0.40σ]
OotOffset-rm: 0.009 arcsec [0.12σ]
KicOffset-rm: 0.059 arcsec [0.82σ]
OotOffset-st: 0/1/1/0 [2]
KicOffset-st: 0/1/1/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [2/2]

TCE 008028916-01, PDC Light Curves

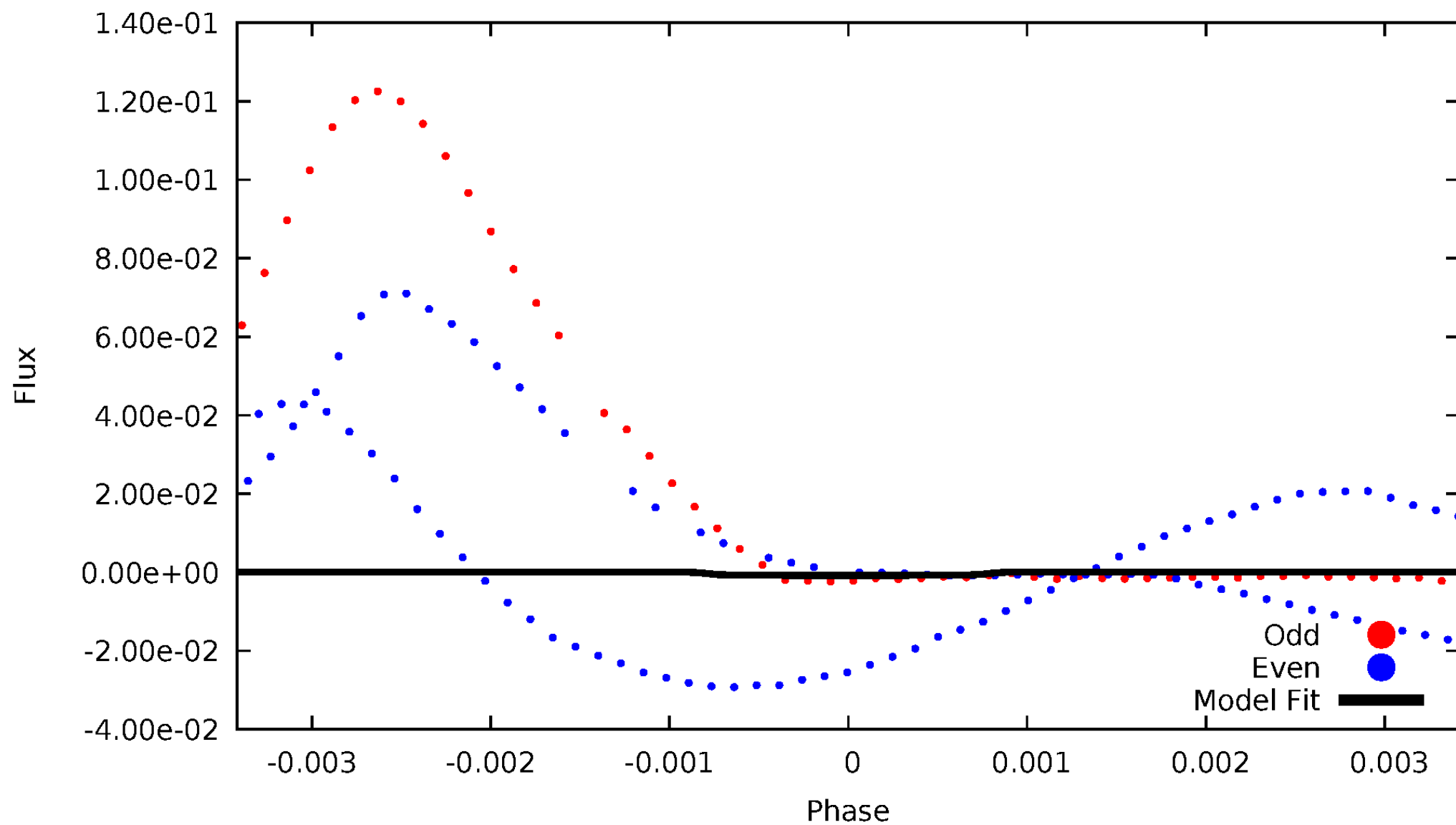


TCE 008028916-01



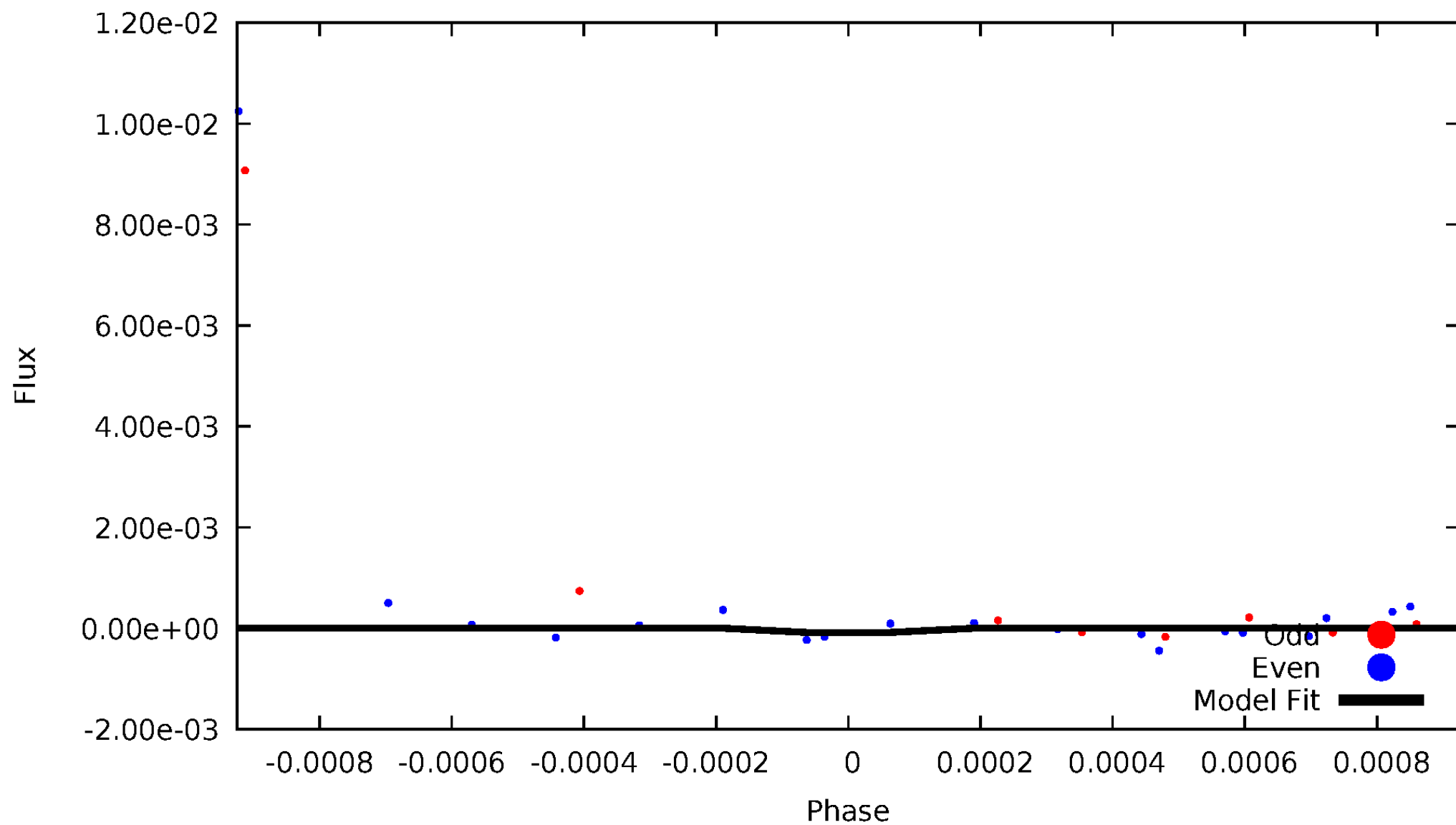
DV Odd/Even

TCE 008028916-01



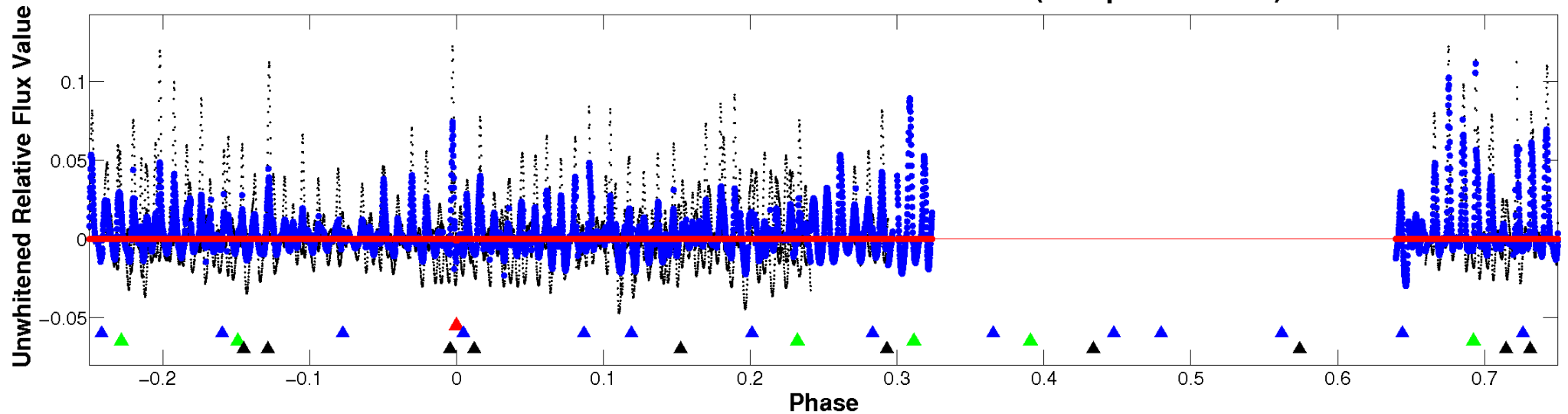
ALT Odd/Even

TCE 008028916-01

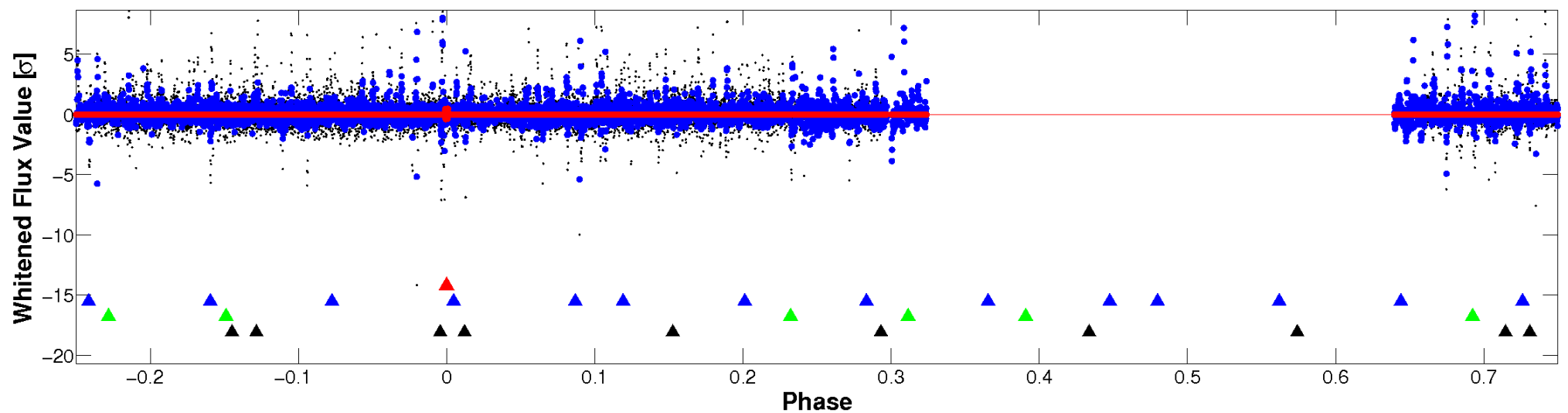


Non-Whitened Vs. Whitened Light Curve

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

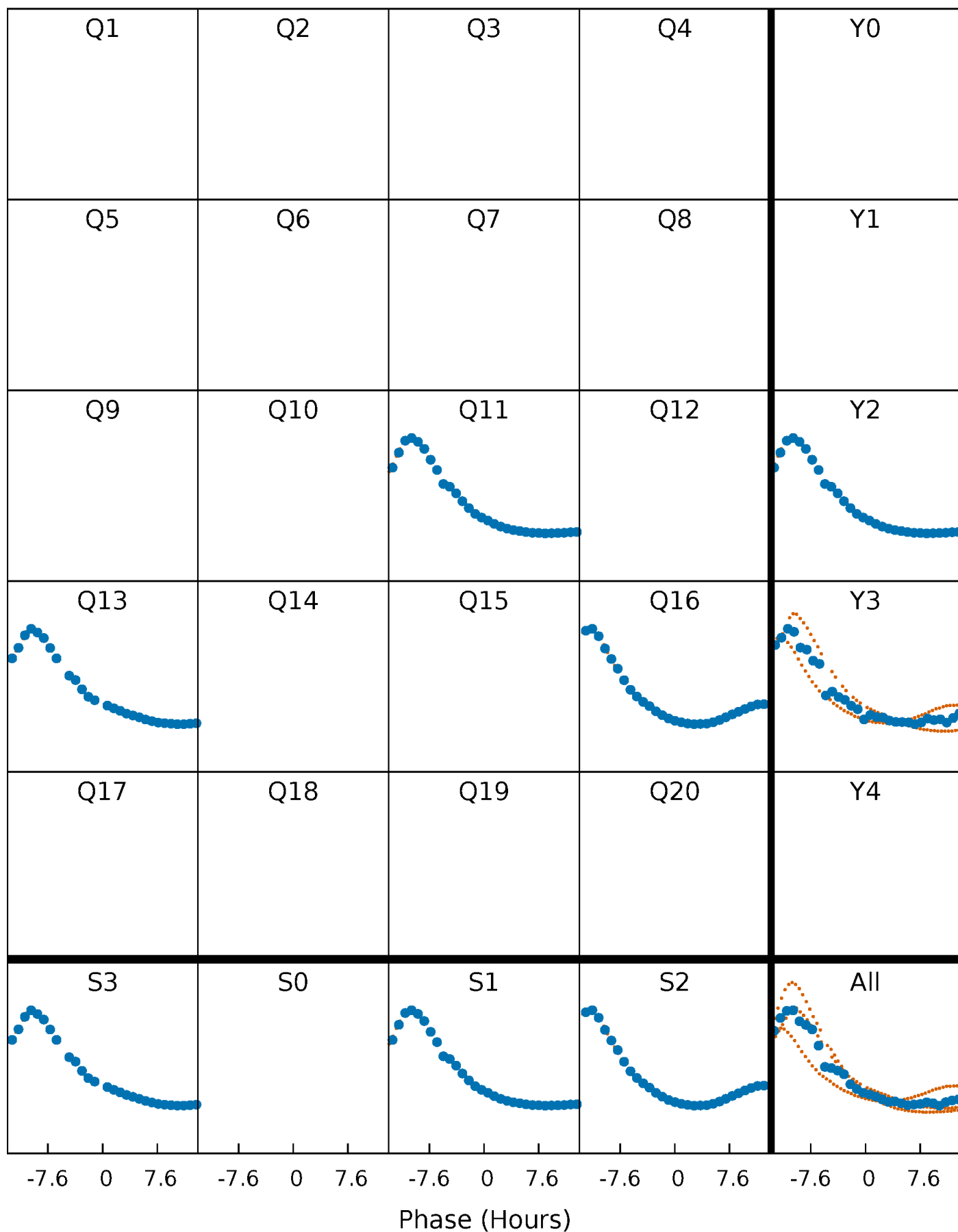


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



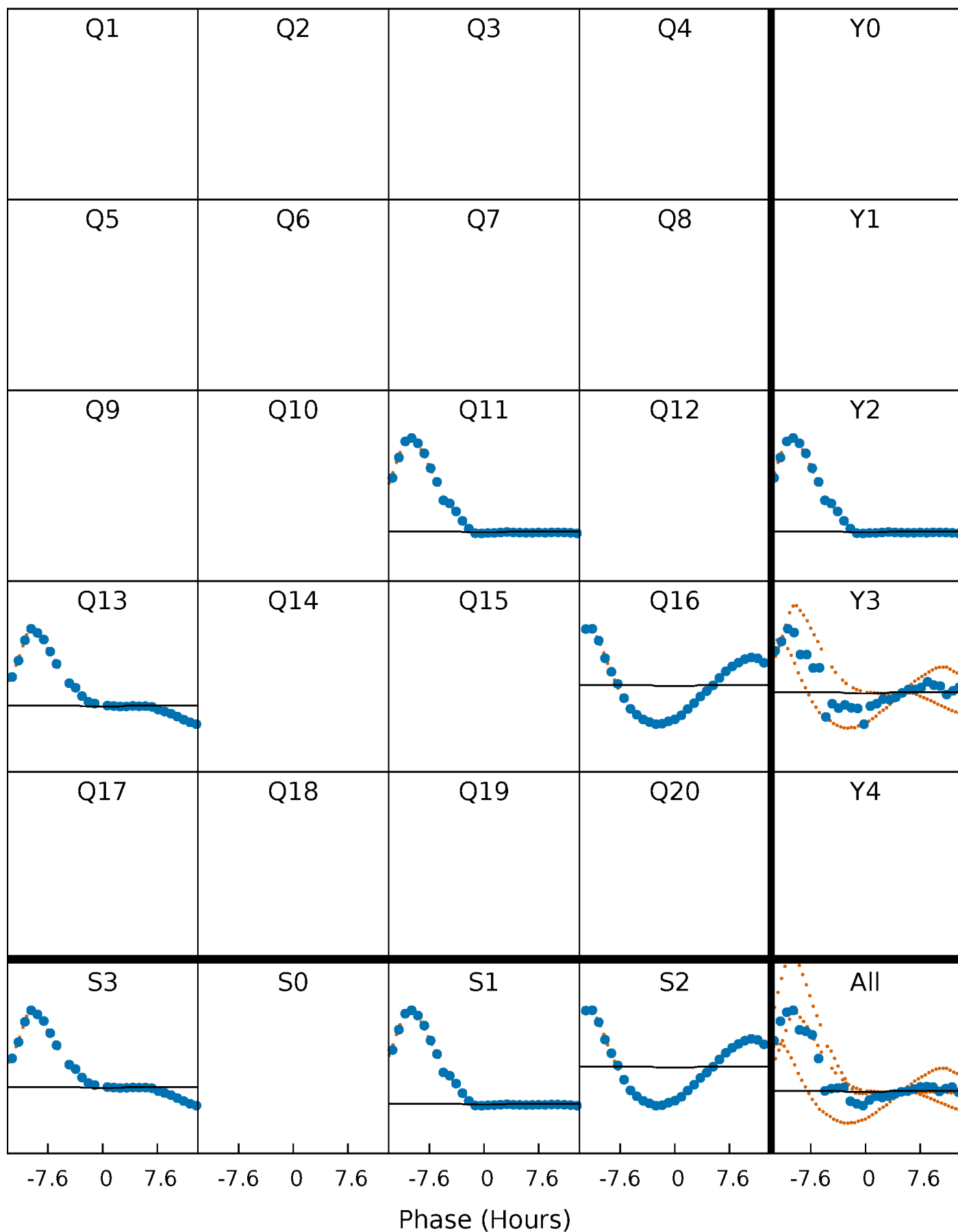
PDC Quarter-Phased Transit Curves

TCE 008028916-01 P=161.399324 Days $T_0=252.400210$ (BKJD)



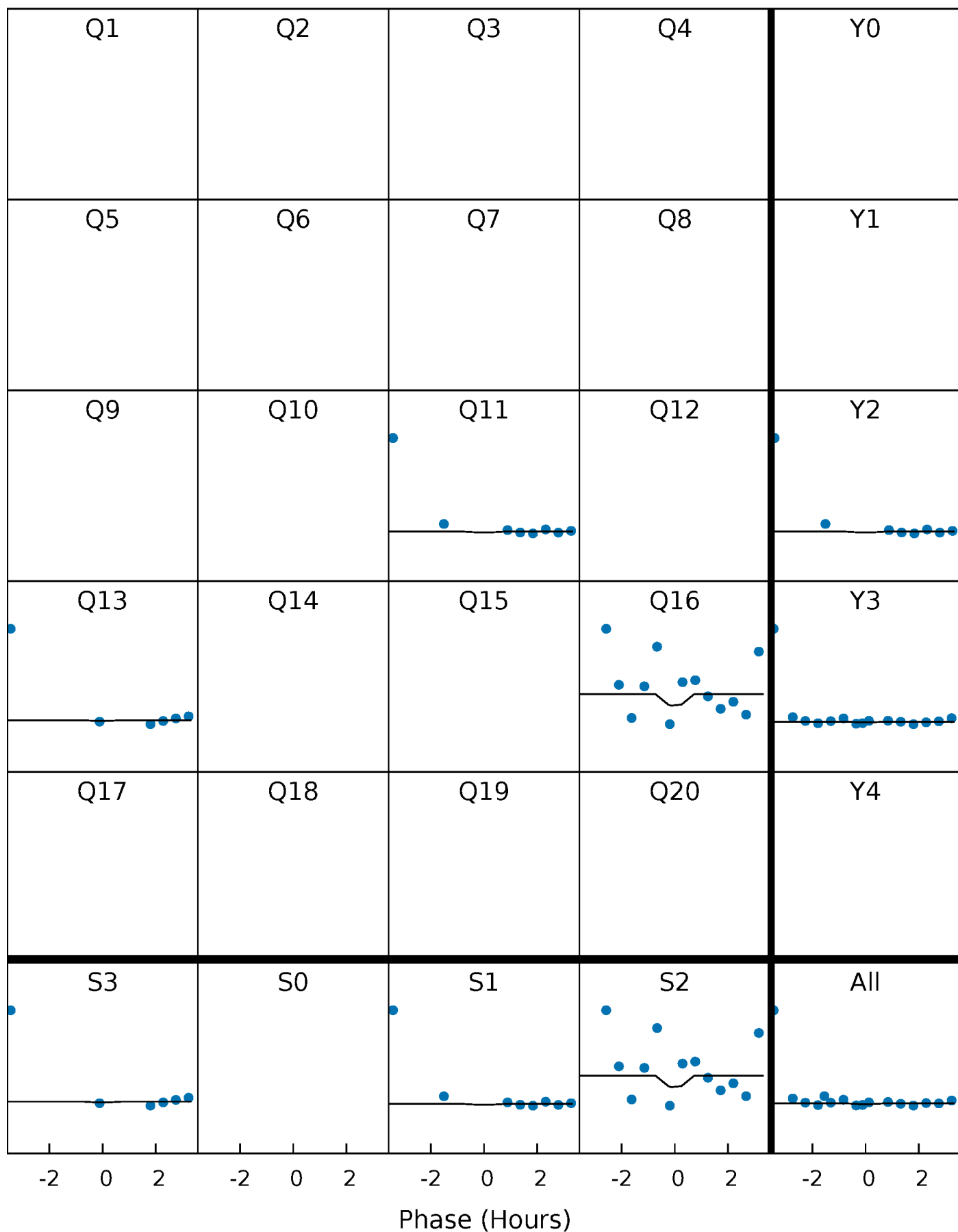
DV Quarter-Phased Transit Curves

TCE 008028916-01 P=161.399324 Days $T_0=252.400210$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

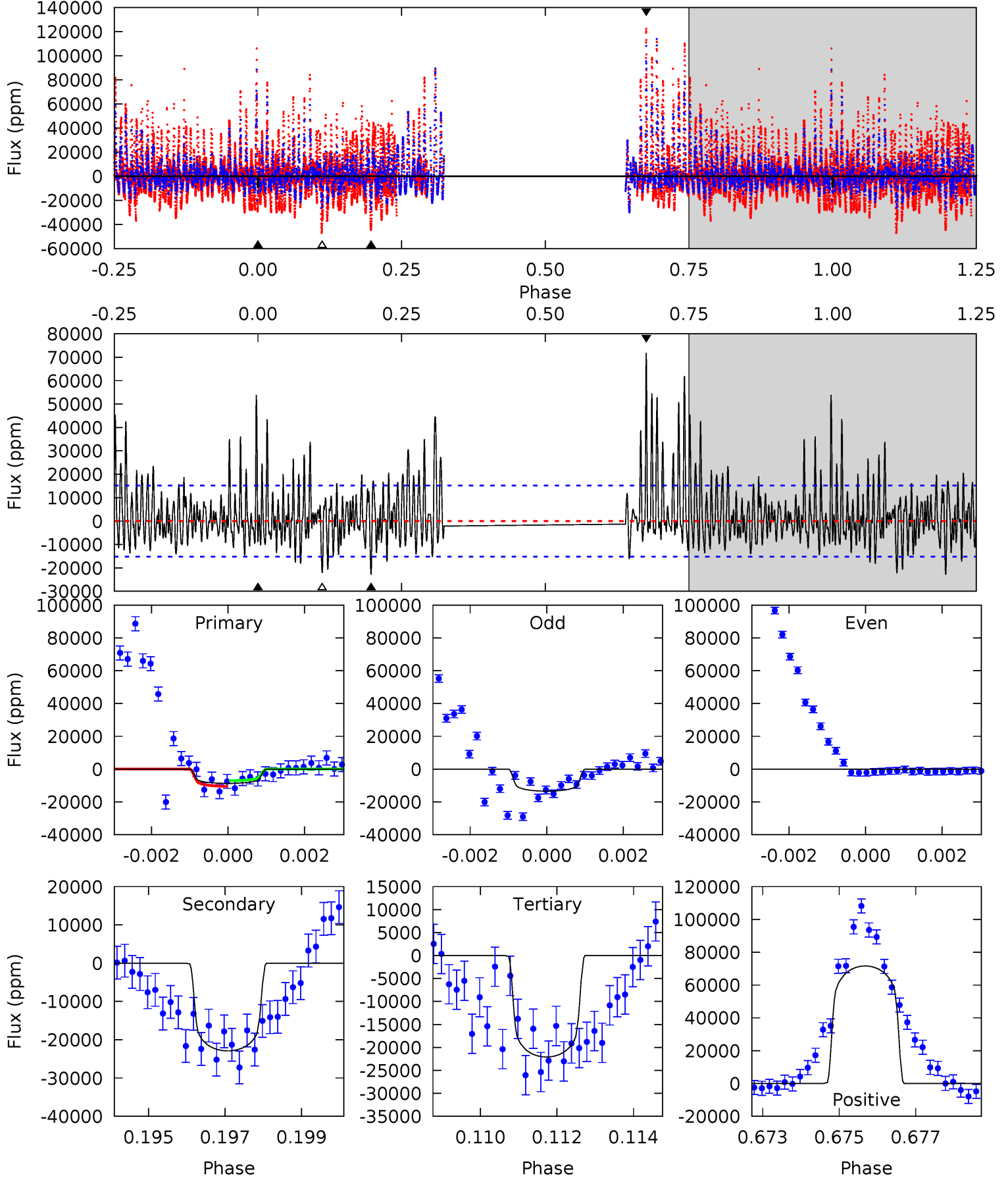
TCE 008028916-01 P=161.385905 Days $T_0=252.455483$ (BKJD)



DV Model-Shift Uniqueness Test

008028916-01, P = 161.399324 Days, E = 252.400210 Days

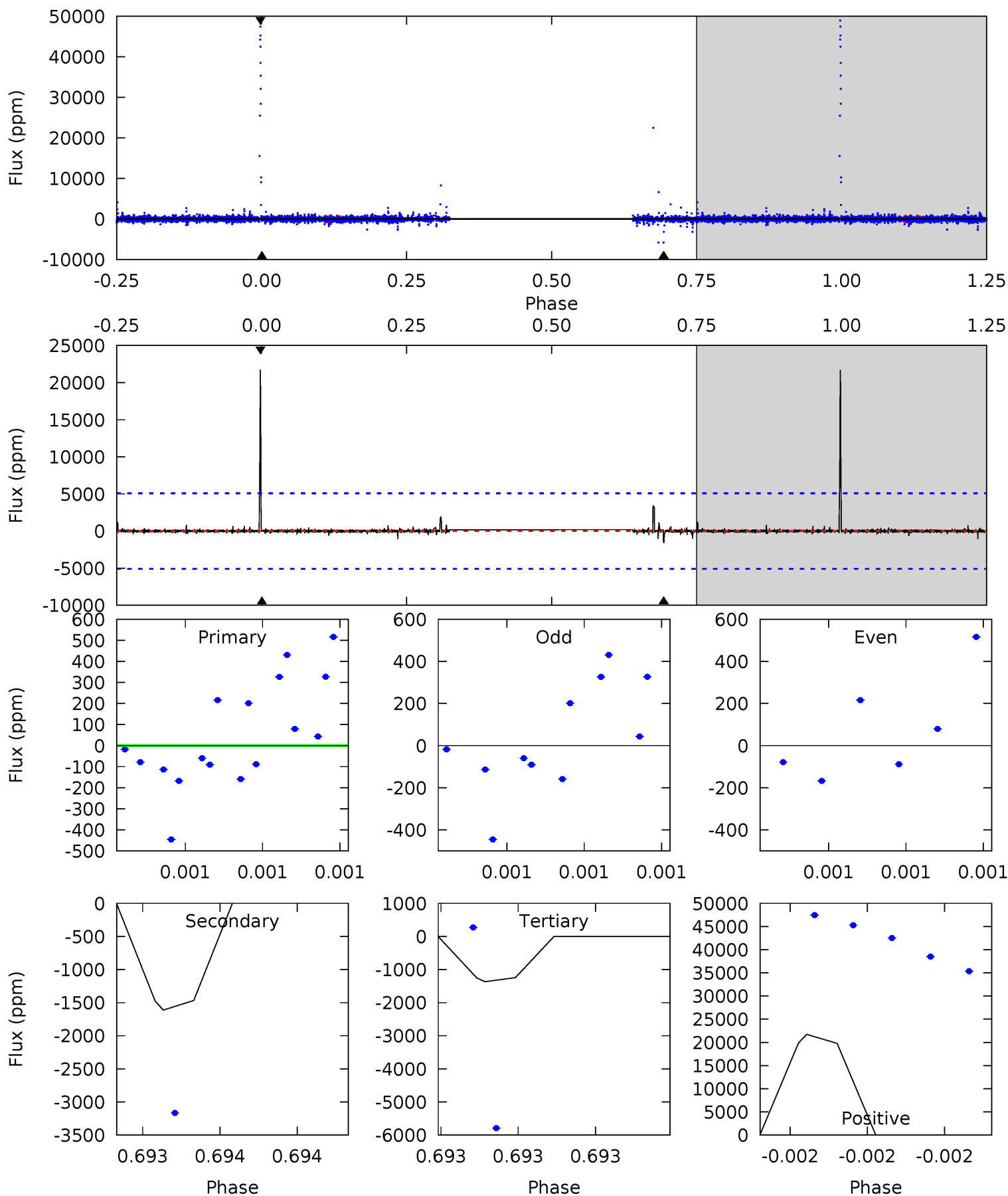
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.06	8.06	7.77	25.2	5.35	3.12	4.13	-4.71	-22.1	0.29	-17.1	1.91	-504.3	0.76	0.60



Alt Model-Shift Uniqueness Test

008028916-01, P = 161.385905 Days, E = 252.455483 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.13	1.80	1.53	24.3	5.69	3.66	0.62	-1.41	-24.2	0.27	-22.5	0	1.00	0.93	0.07



Stellar Parameters For KIC 008028916

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7090^{+200}_{-300}	$4.160^{+0.204}_{-0.167}$	$-0.560^{+0.250}_{-0.300}$	$1.505^{+0.424}_{-0.347}$	$1.192^{+0.174}_{-0.157}$	$0.493^{+0.486}_{-0.229}$
	+3%/-4%	+5%/-4%	+45%/-54%	+28%/-23%	+15%/-13%	+99%/-46%
Source	KIC0	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 008028916-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-22910 ± 2843	$4.98^{+3.78}_{-2.78}$	676^{+55}_{-54}	28202^{+72217}_{-12711}	$193019^{+857197}_{-130655}$
Alt.	-1613 ± 894	$3.14^{+3.31}_{-2.06}$	678^{+52}_{-50}	11055^{+26858}_{-4396}	$32269^{+265296}_{-26138}$

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

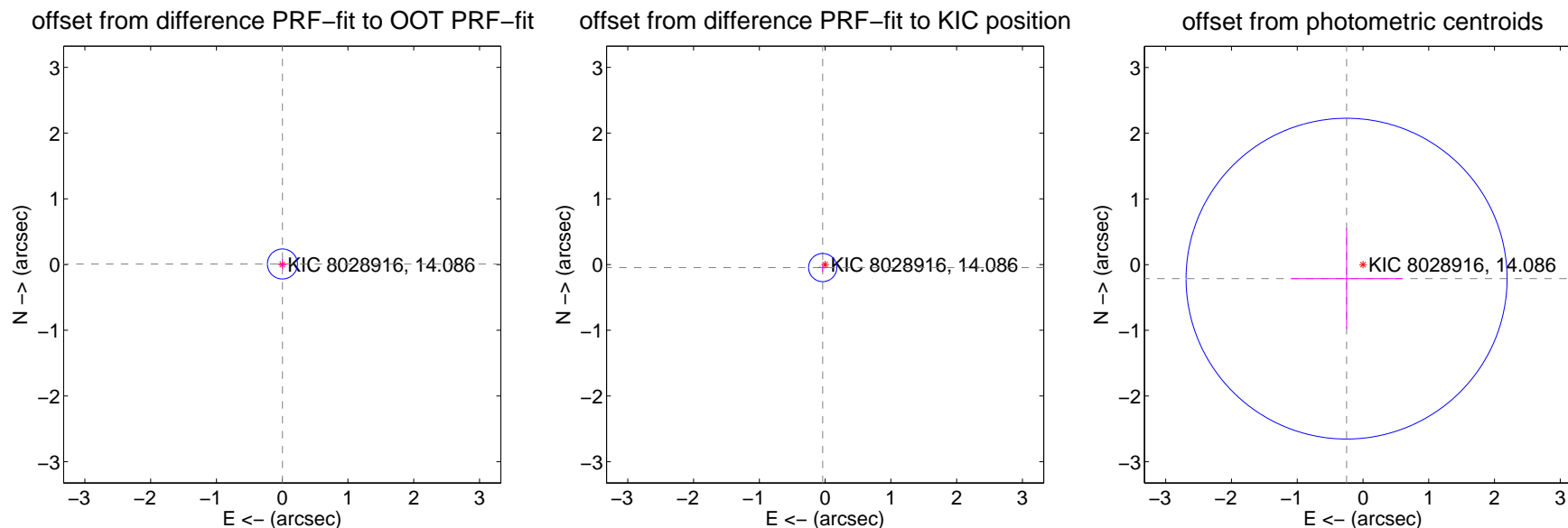
DV Centroid Data

Supplemental centroid analysis for 008028916-01. Kepler magnitude: 14.09. Transit SNR 1.70

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.009 ± 0.076	0.12	-0.003 ± 0.072	0.008 ± 0.077
PRF-fit source offset from KIC position	0.059 ± 0.071	0.82	0.037 ± 0.075	-0.046 ± 0.069
photometric centroid source offset	0.33 ± 0.81	0.40	0.25 ± 0.85	-0.21 ± 0.77



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- σ uncertainty. Blue circle: three- σ . 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



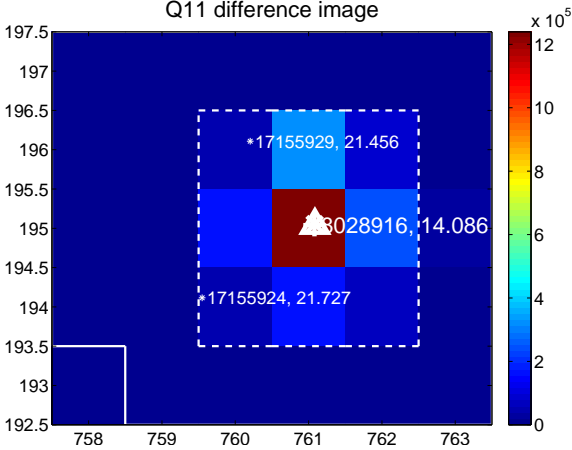
Q10 no difference image



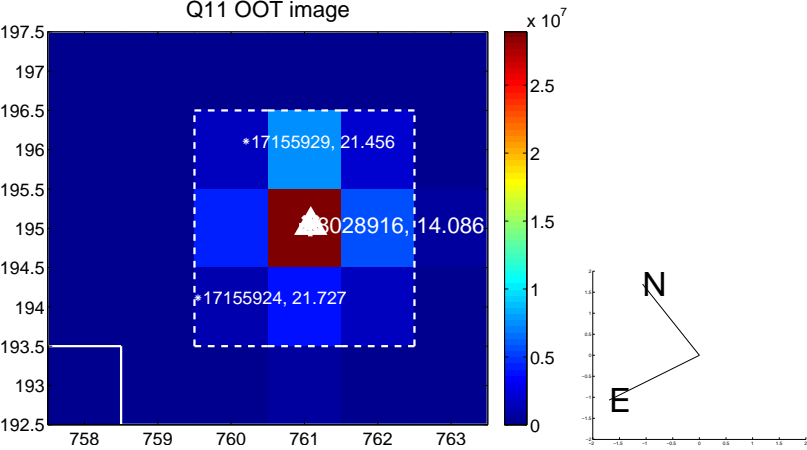
Q10 no OOT image



Q11 difference image



Q11 OOT image



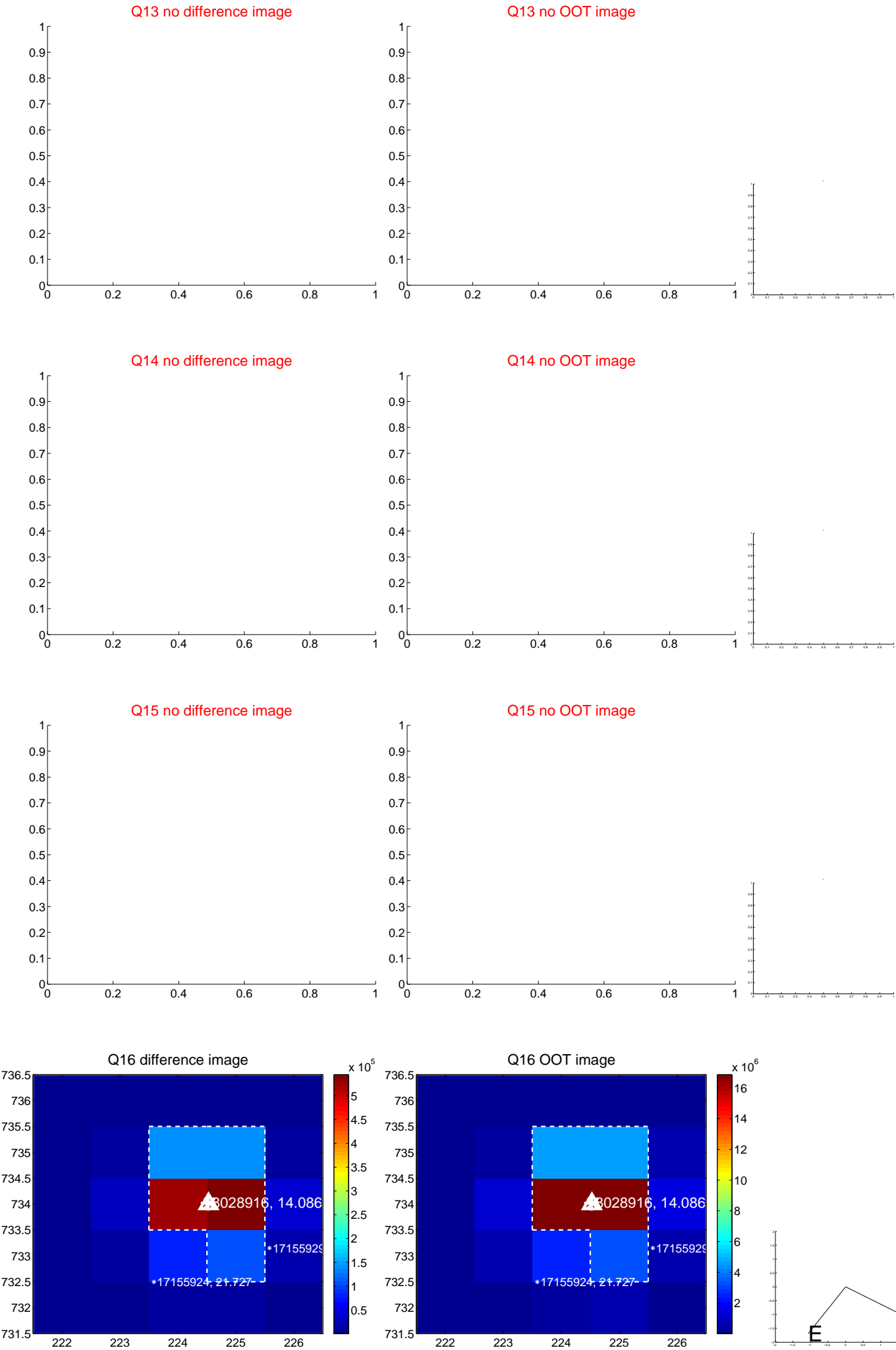
Q12 no difference image



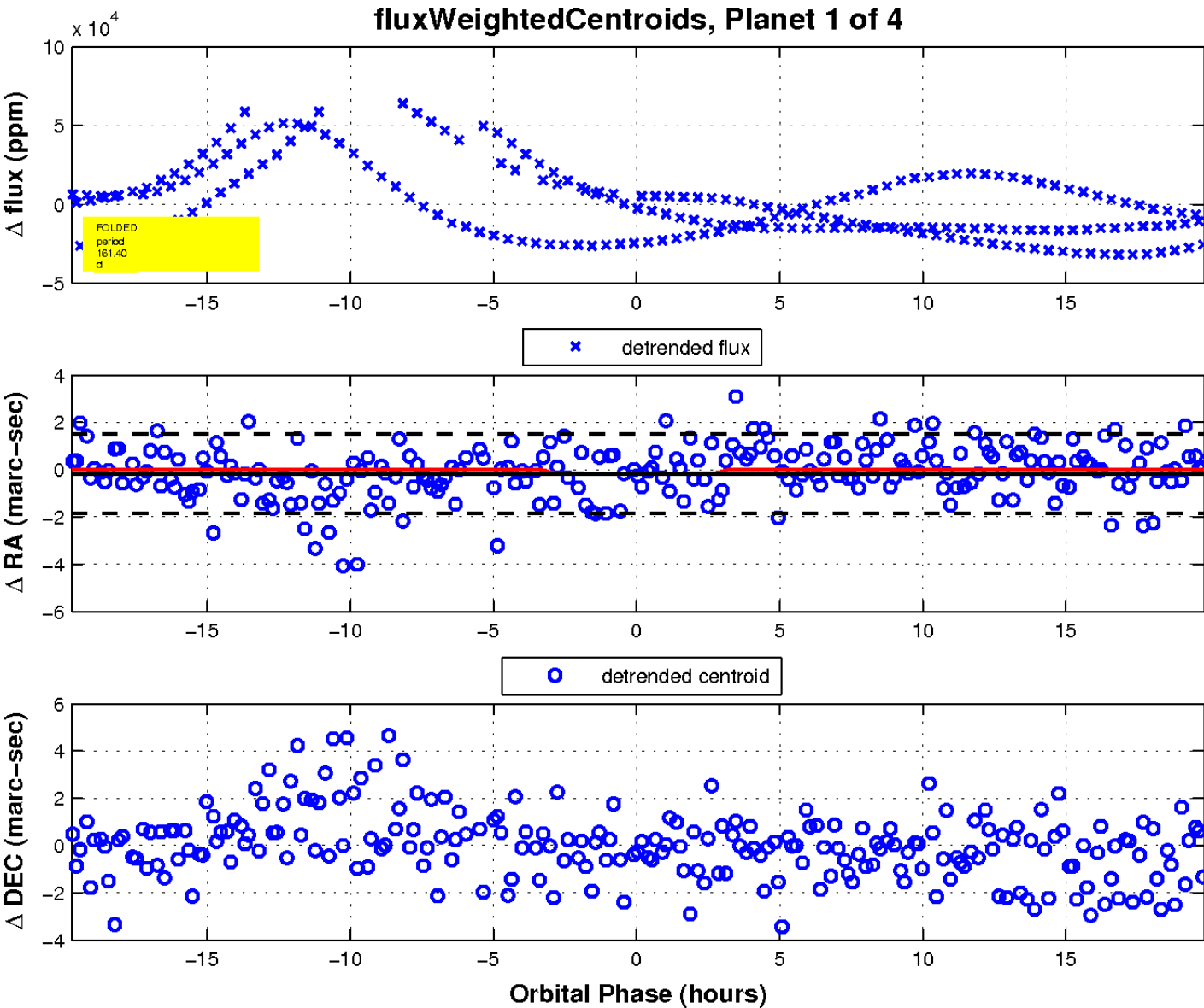
Q12 no OOT image



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

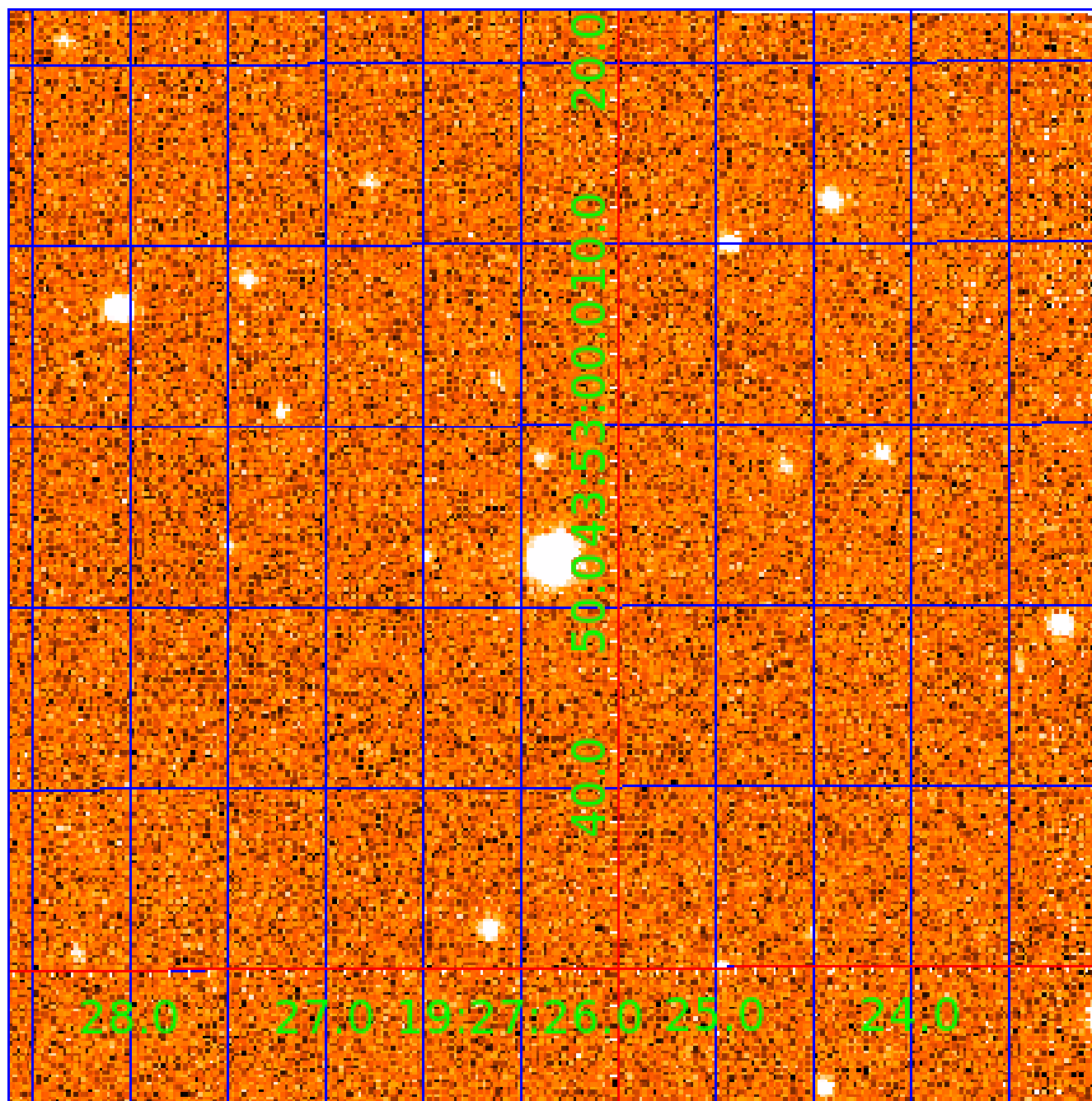


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008028916

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})
008028916-01	OBS	No	161.399324	252.400210	821.3	6.619	26.9	1.7	1.50	7090	4.68	13.53
008028916-02	OBS	No	103.181808	163.240171	13112.4	11.294	12.4	3.7	1.50	7090	29.96	24.57
008028916-03	OBS	No	235.695941	315.481898	484.4	2.215	14.5	1.4	1.50	7090	3.73	8.17
008028916-04	OBS	No	138.721357	251.704459	1116.2	1.848	14.0	2.6	1.50	7090	5.38	16.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008028916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008028916-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
008028916-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008028916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

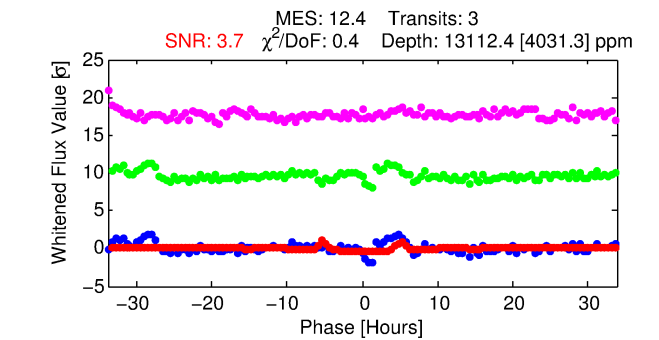
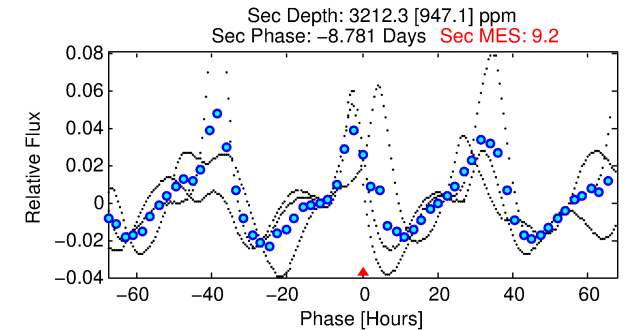
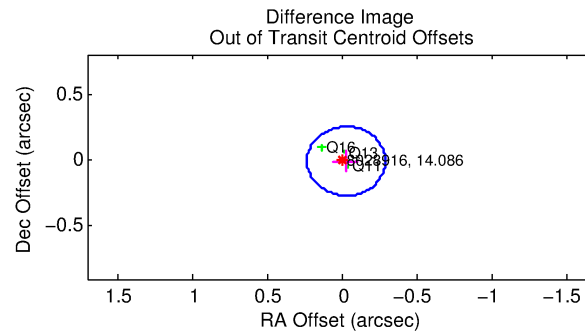
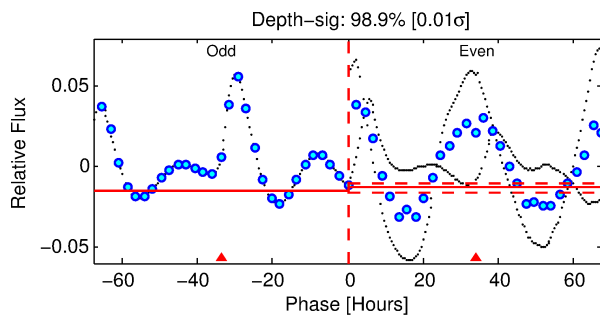
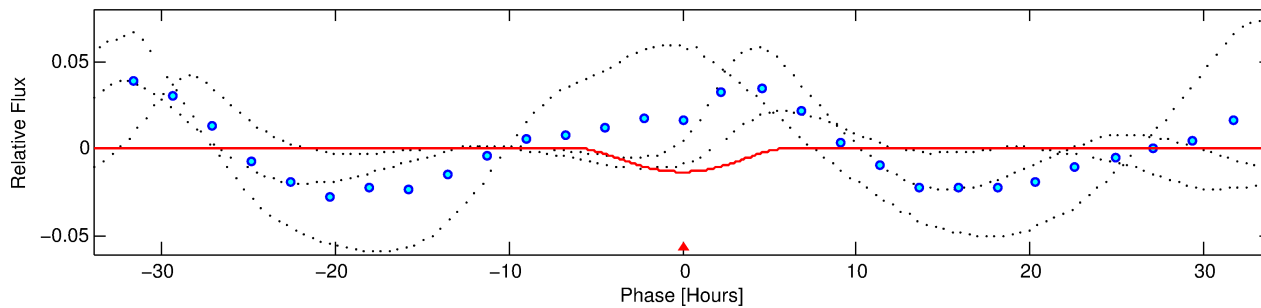
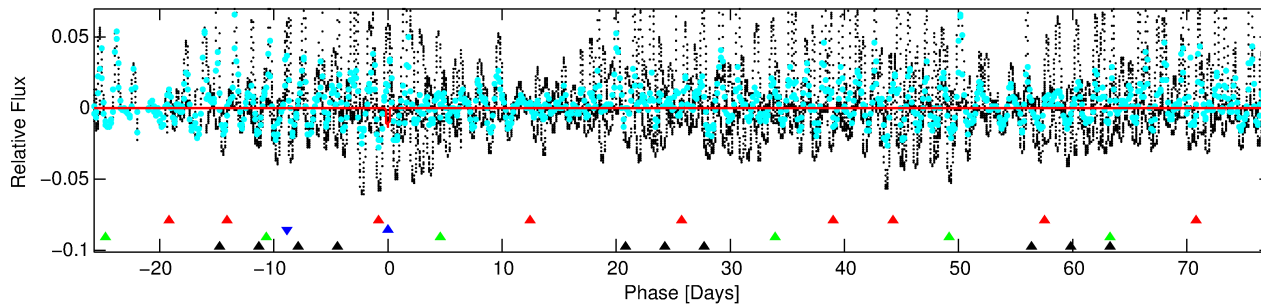
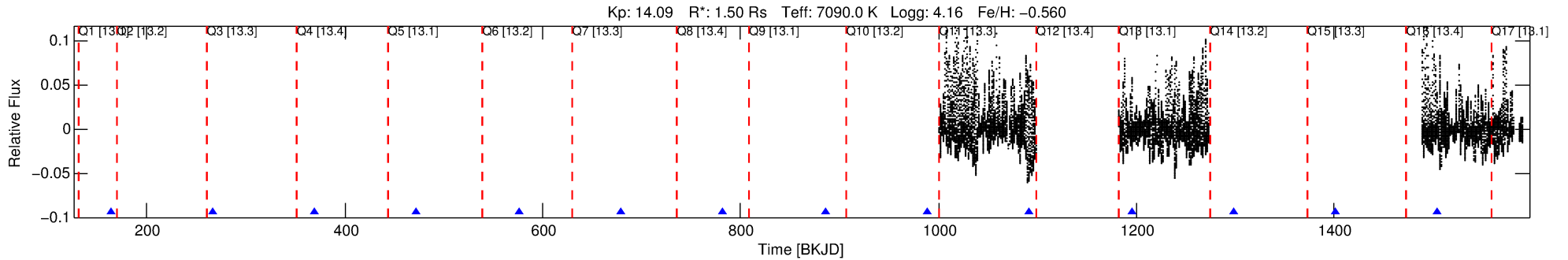
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008028916-02

No Significant Match Found

DV One-Page Summary

KIC: 8028916 Candidate: 2 of 4 Period: 103.182 d



DV Fit Results:

Period = 103.18181 [0.00269] d
Epoch = 163.2402 [0.0311] BKJD
Rp/R* = 0.1824 [0.1630]
a/R* = 44.05 [4.04]
b = 1.00 [0.20]
Seff = 24.57 [9.89]
Teq = 568 [57] K
Rp = 29.96 [28.07] Re
a = 0.4569 [0.1117] AU
Ag = 411.06 [759.68] [0.54σ]
Teffp = 3952 [1798] K [1.88σ]

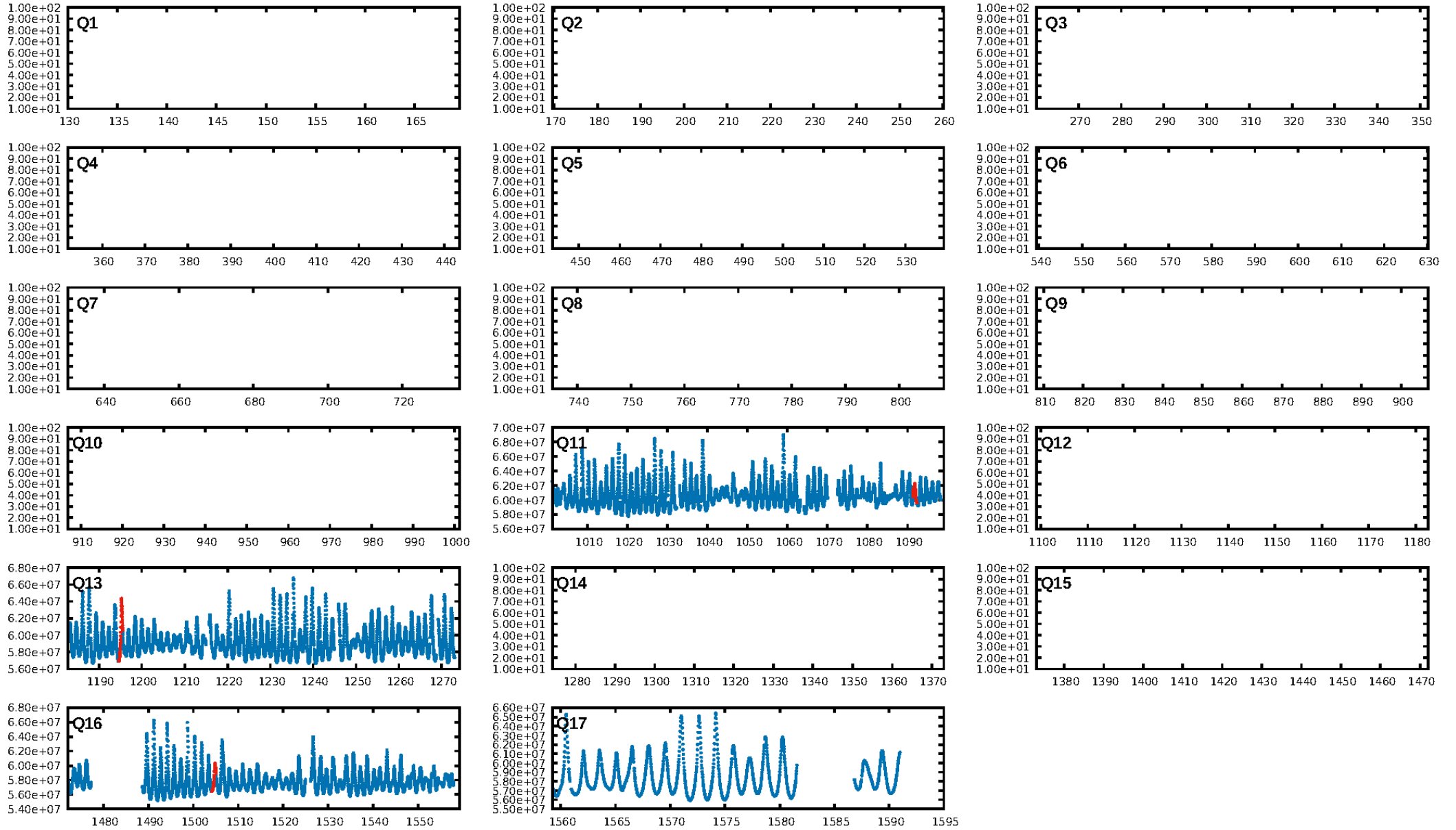
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [74.53σ]
ModelChiSquare2-sig: 4.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.87e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.912
Centroid-sig: N/A
Centroid-so: 0.191 arcsec [3.69σ]
OotOffset-rm: 0.032 arcsec [0.36σ]
KicOffset-rm: 0.055 arcsec [0.72σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.00 [0/3]
DiffImageOverlap-fno: 1.00 [3/3]

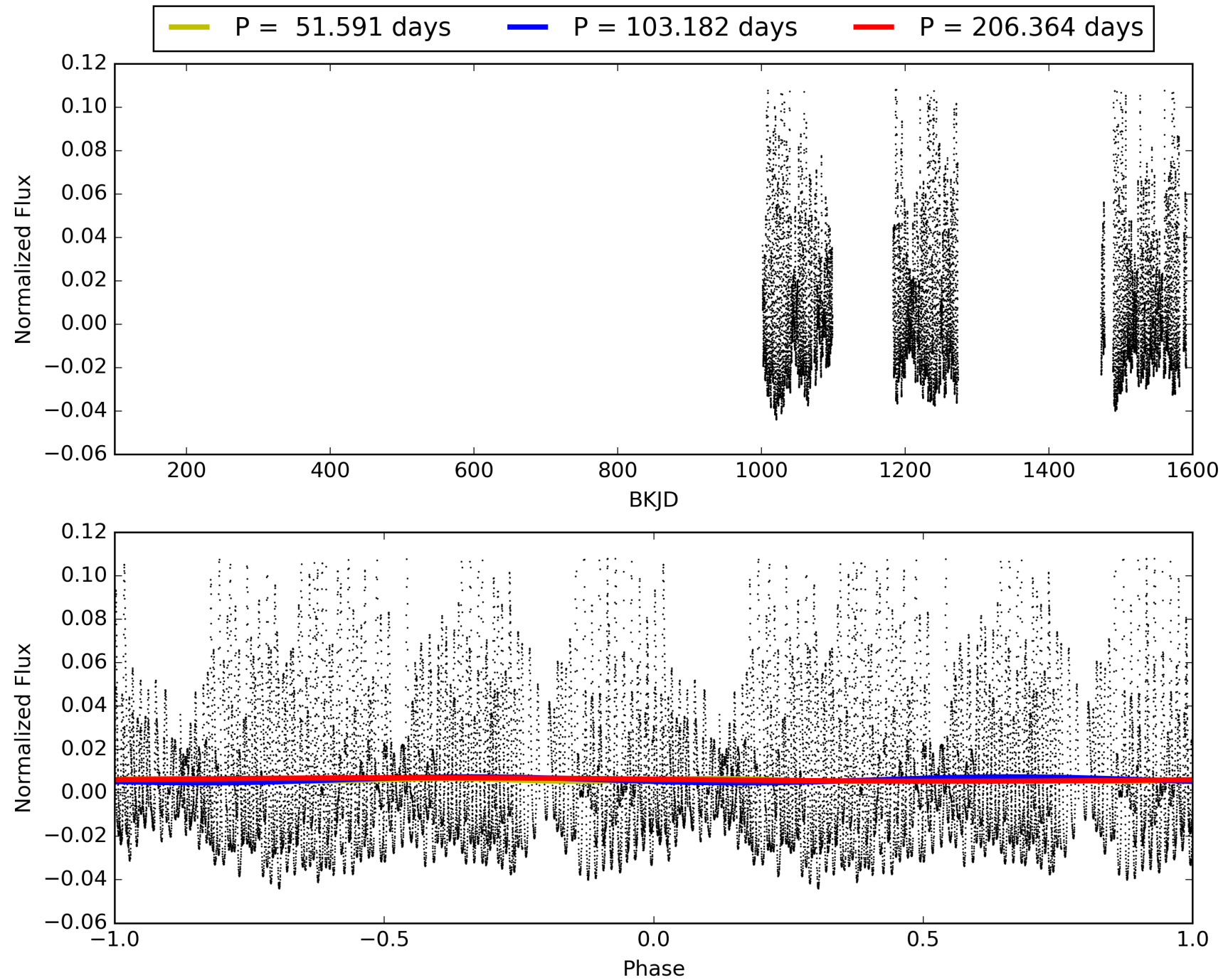
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 16:47:24 Z

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

TCE 008028916-02, PDC Light Curves

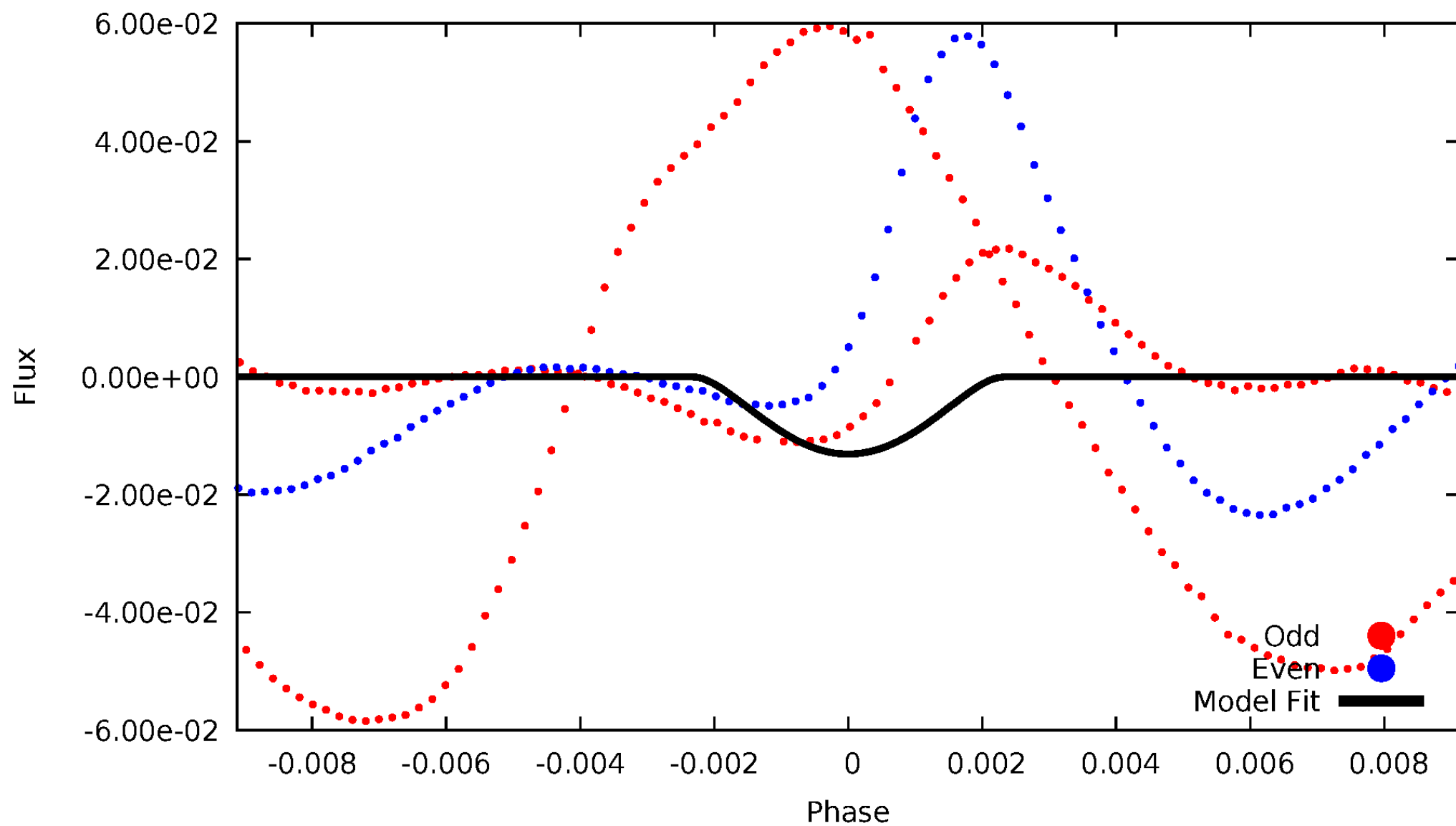


TCE 008028916-02



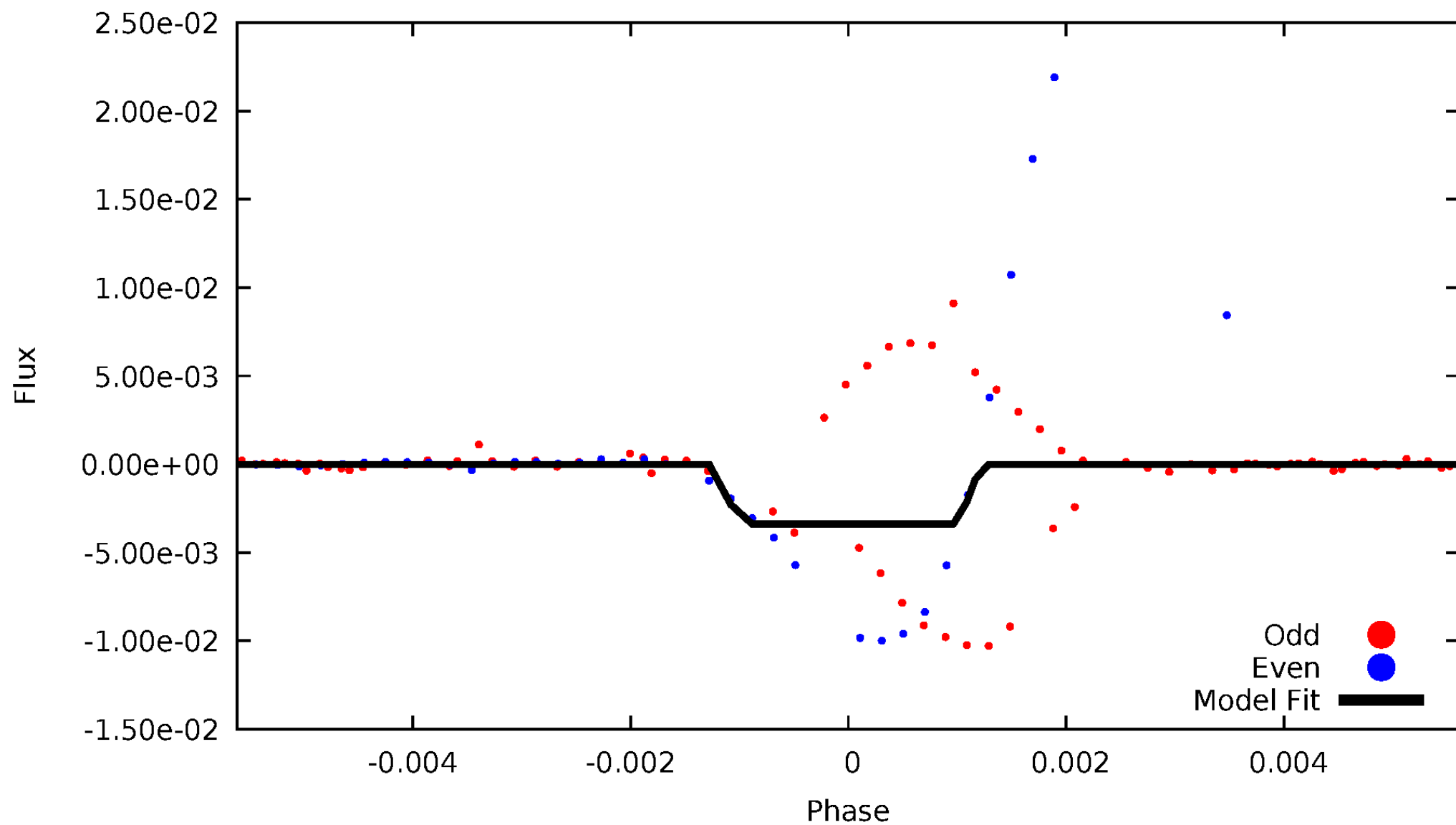
DV Odd/Even

TCE 008028916-02



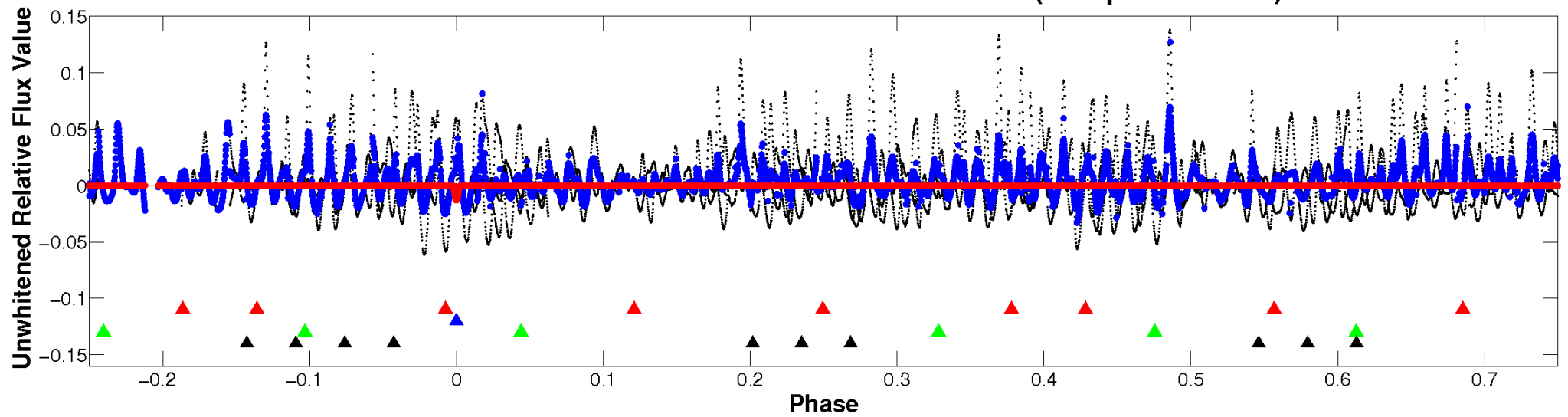
ALT Odd/Even

TCE 008028916-02

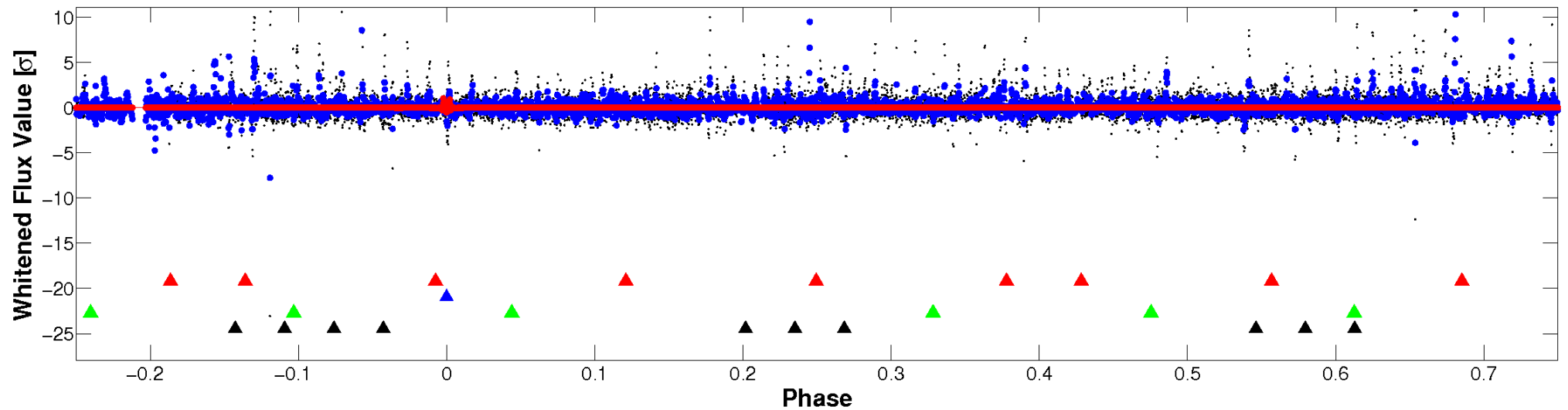


Non-Whitened Vs. Whitened Light Curve

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

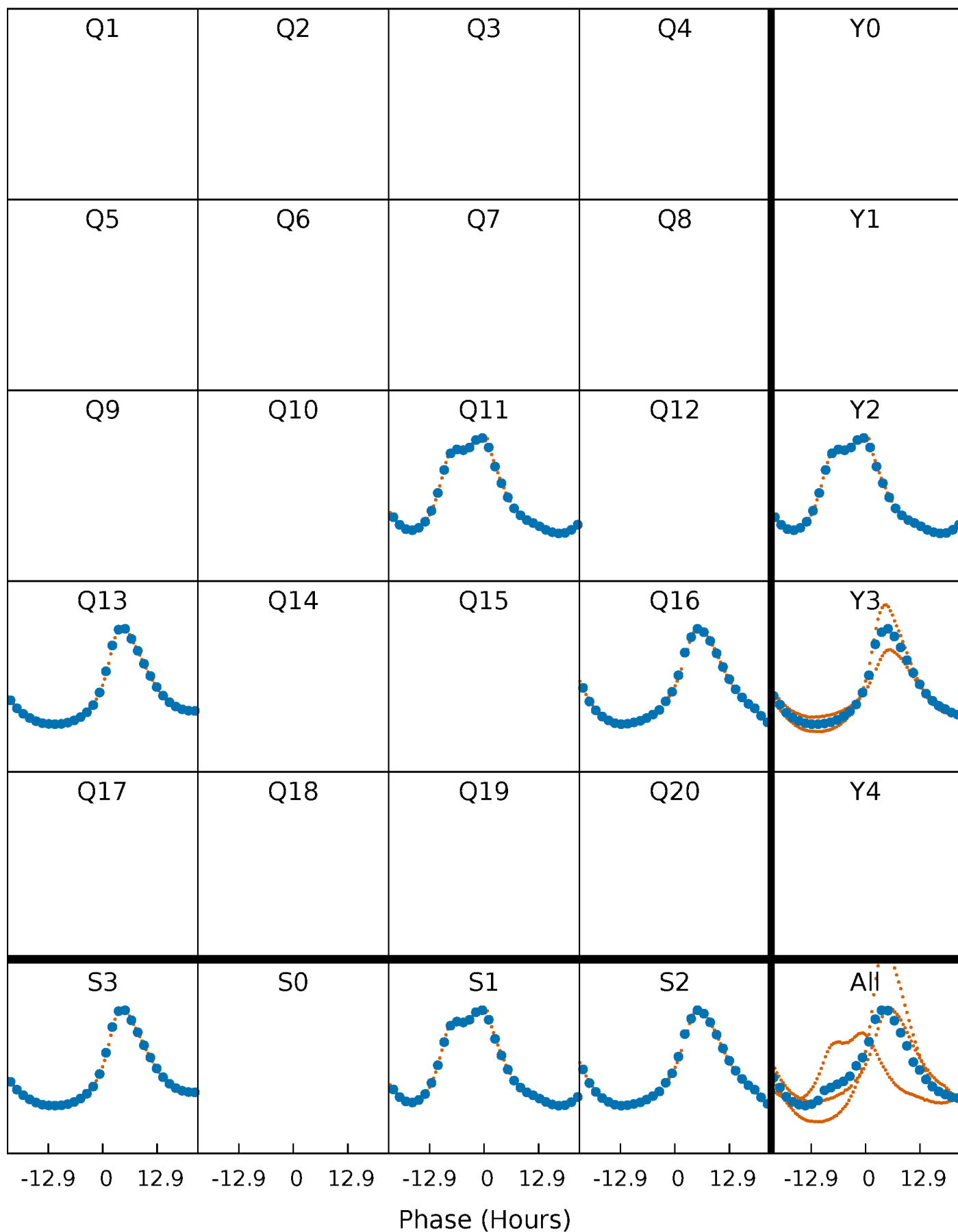


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



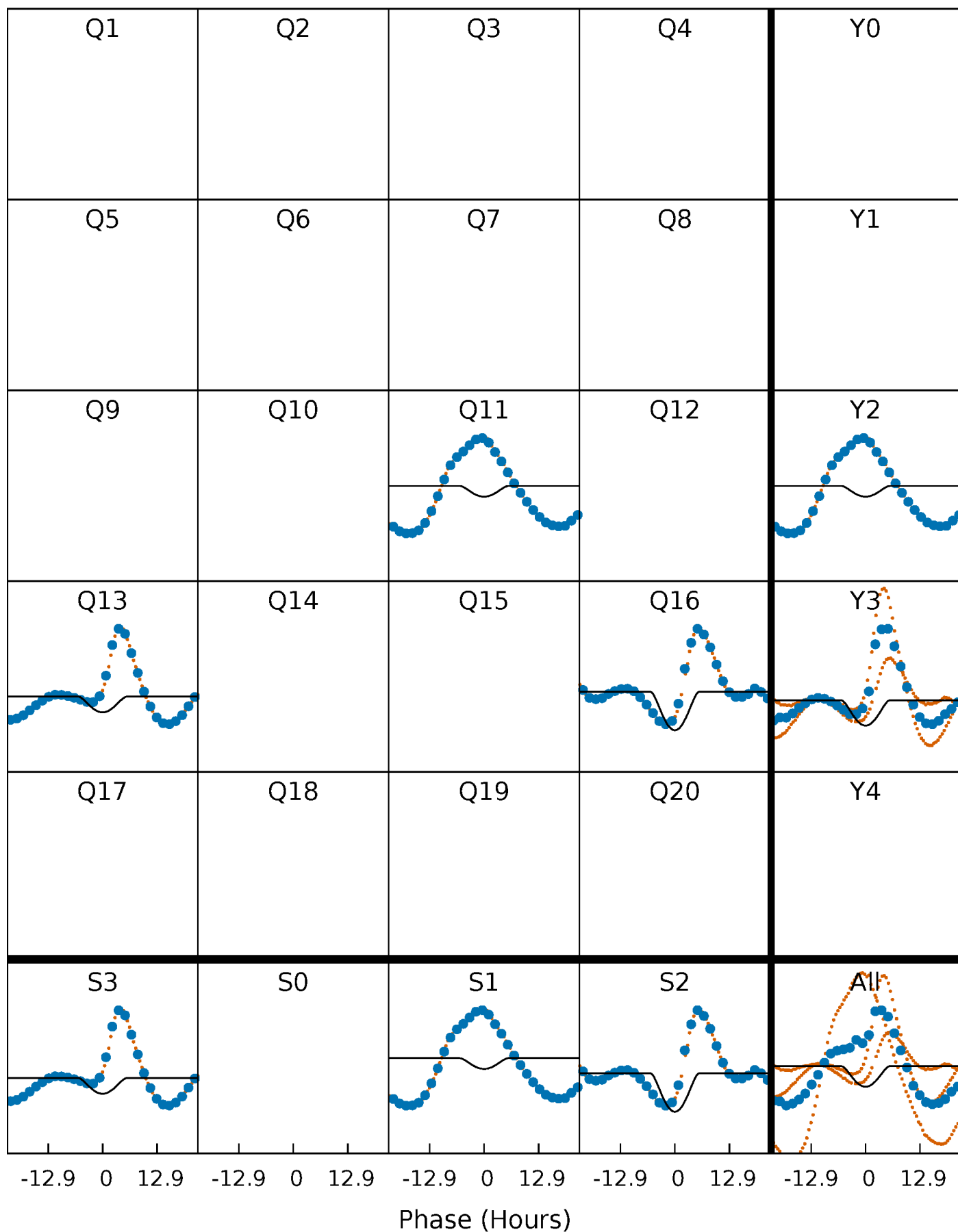
PDC Quarter-Phased Transit Curves

TCE 008028916-02 P=103.181808 Days $T_0=163.240171$ (BKJD)



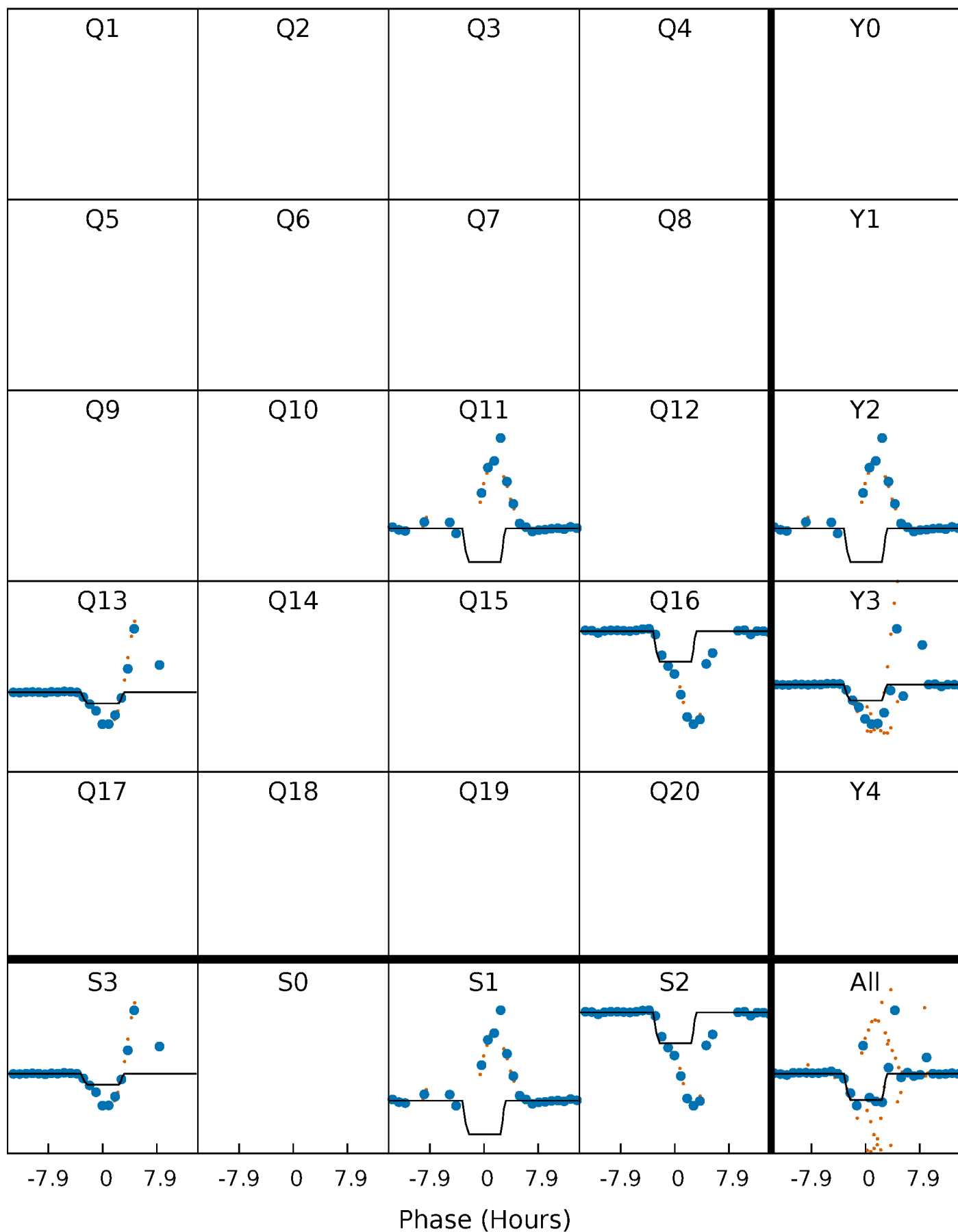
DV Quarter-Phased Transit Curves

TCE 008028916-02 P=103.181808 Days $T_0=163.240171$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

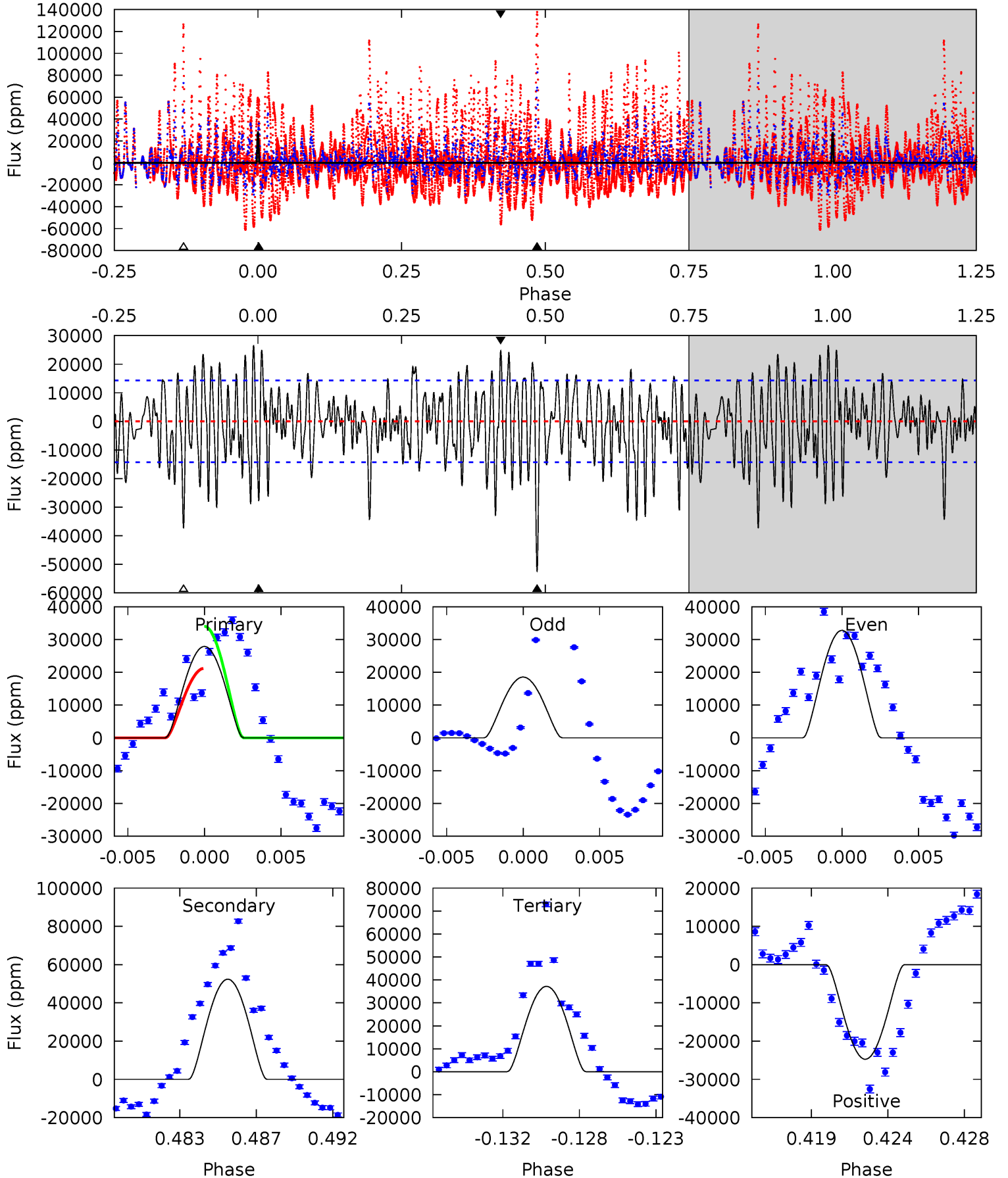
TCE 008028916-02 P=103.176058 Days $T_0=163.225538$ (BKJD)



DV Model-Shift Uniqueness Test

008028916-02, P = 103.181808 Days, E = 163.240171 Days

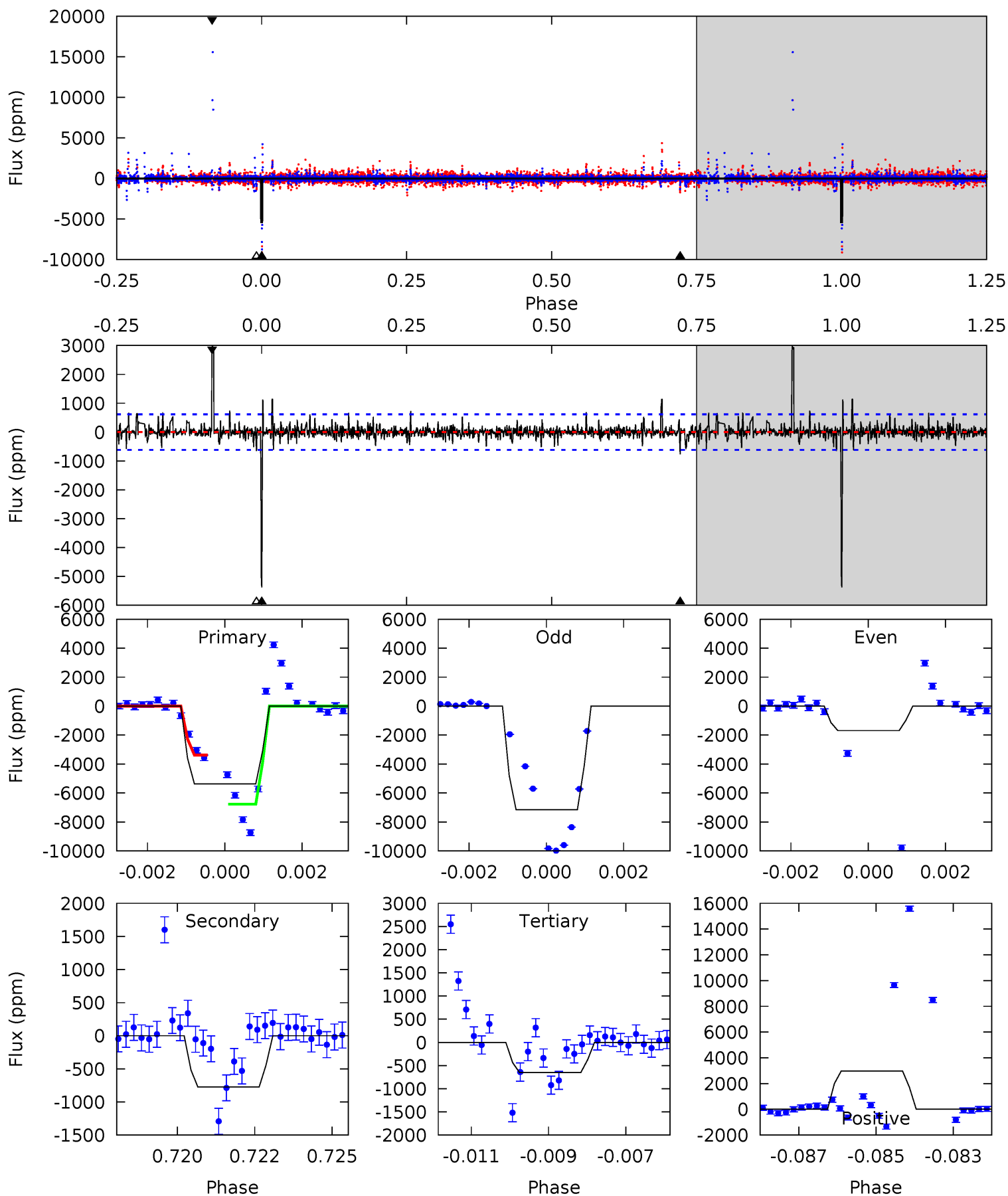
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	19.0	13.5	8.95	5.18	2.84	4.01	-3.37	1.14	5.50	10.0	2.26	1.44	0.34	2.36



Alt Model-Shift Uniqueness Test

008028916-02, P = 103.176058 Days, E = 163.225538 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.4	6.67	5.62	25.7	5.31	3.06	1.47	40.8	20.7	1.05	-19.0	11.5	0.37	0.36	0



Stellar Parameters For KIC 008028916

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7090^{+200}_{-300}	$4.160^{+0.204}_{-0.167}$	$-0.560^{+0.250}_{-0.300}$	$1.505^{+0.424}_{-0.347}$	$1.192^{+0.174}_{-0.157}$	$0.493^{+0.486}_{-0.229}$
	+3%/-4%	+5%/-4%	+45%/-54%	+28%/-23%	+15%/-13%	+99%/-46%
Source	KIC0	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 008028916-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-52391 ± 2764	$33.84^{+25.61}_{-20.21}$	789^{+60}_{-62}	7528^{+7002}_{-1843}	5537^{+27225}_{-3784}
Alt.	-773 ± 116	$23.11^{+21.69}_{-16.25}$	785^{+64}_{-57}	3598^{+1986}_{-661}	173^{+1696}_{-129}

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

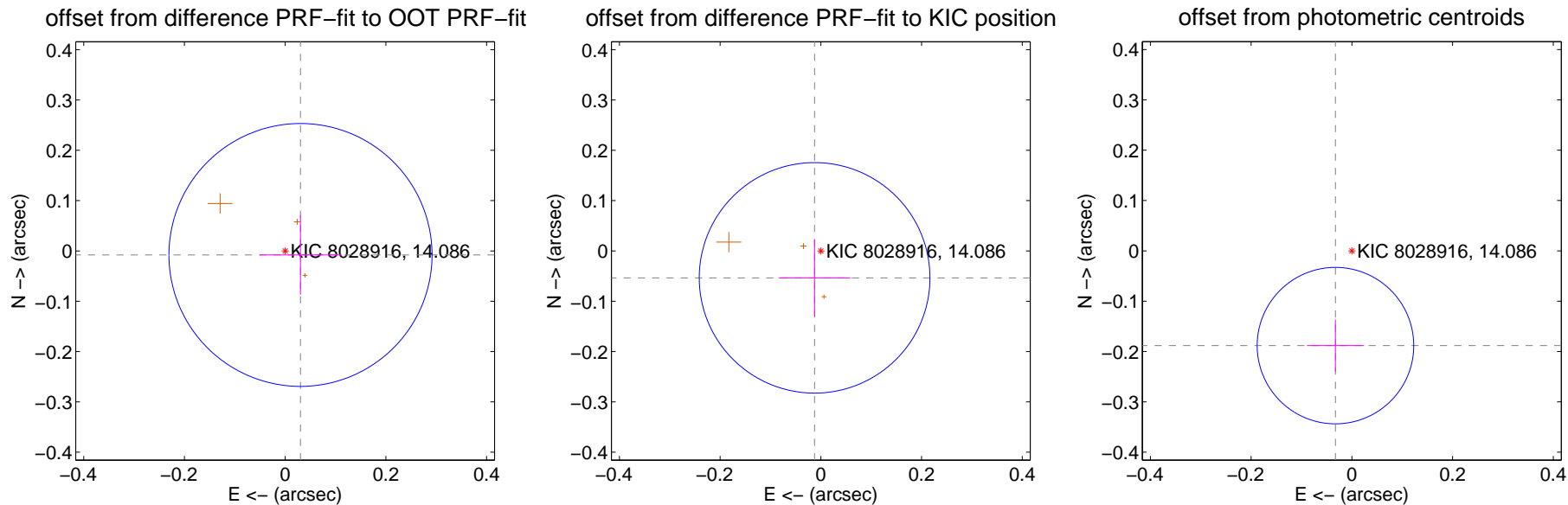
DV Centroid Data

Supplemental centroid analysis for 008028916-02. Kepler magnitude: 14.09. Transit SNR 3.74

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.032 ± 0.087	0.36	-0.030 ± 0.082	-0.008 ± 0.079
PRF-fit source offset from KIC position	0.055 ± 0.076	0.72	0.012 ± 0.071	-0.054 ± 0.077
photometric centroid source offset	0.19 ± 0.05	3.69	0.03 ± 0.06	-0.19 ± 0.05



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- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

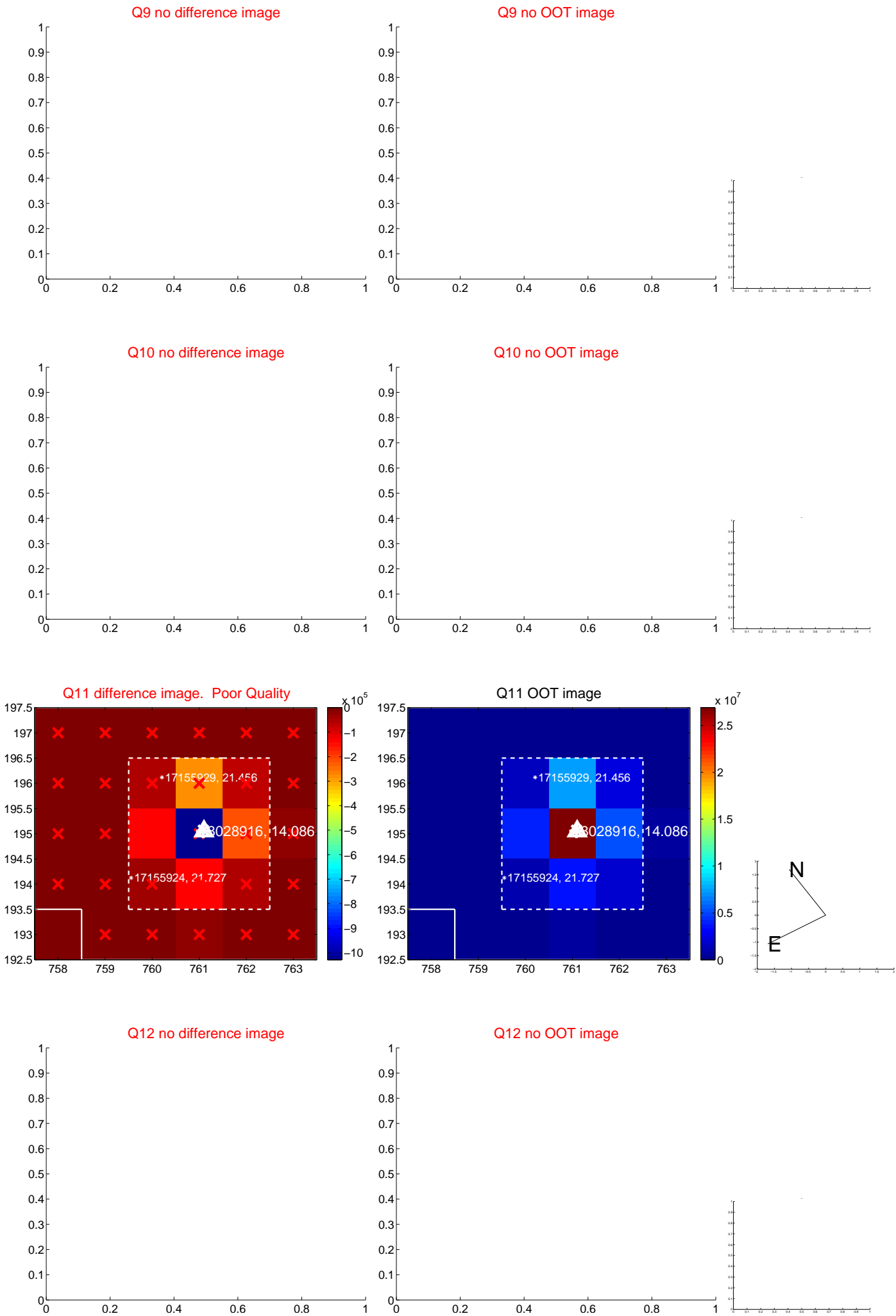
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



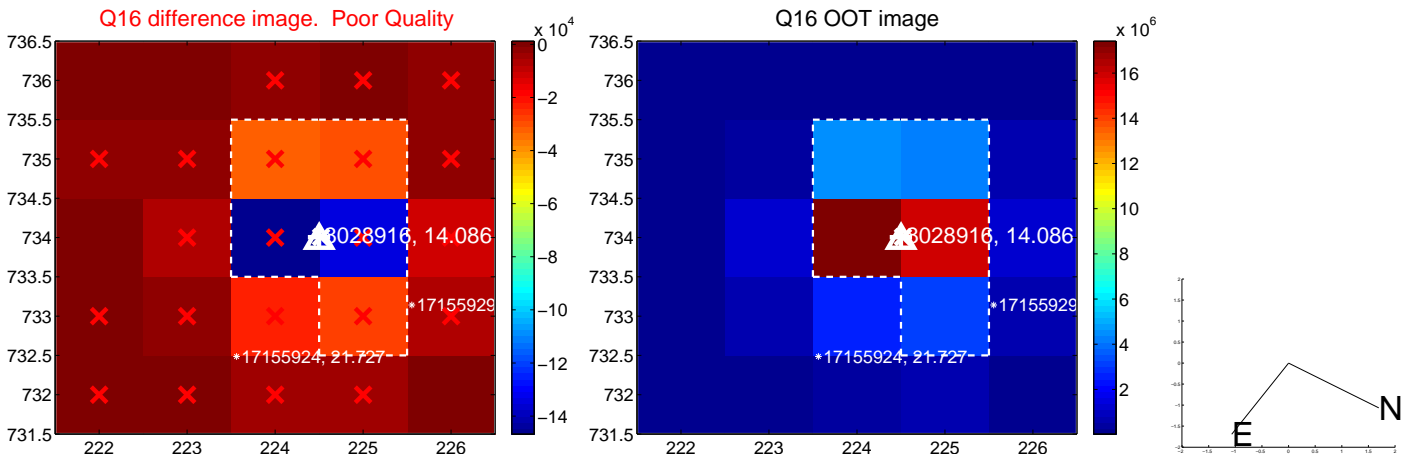
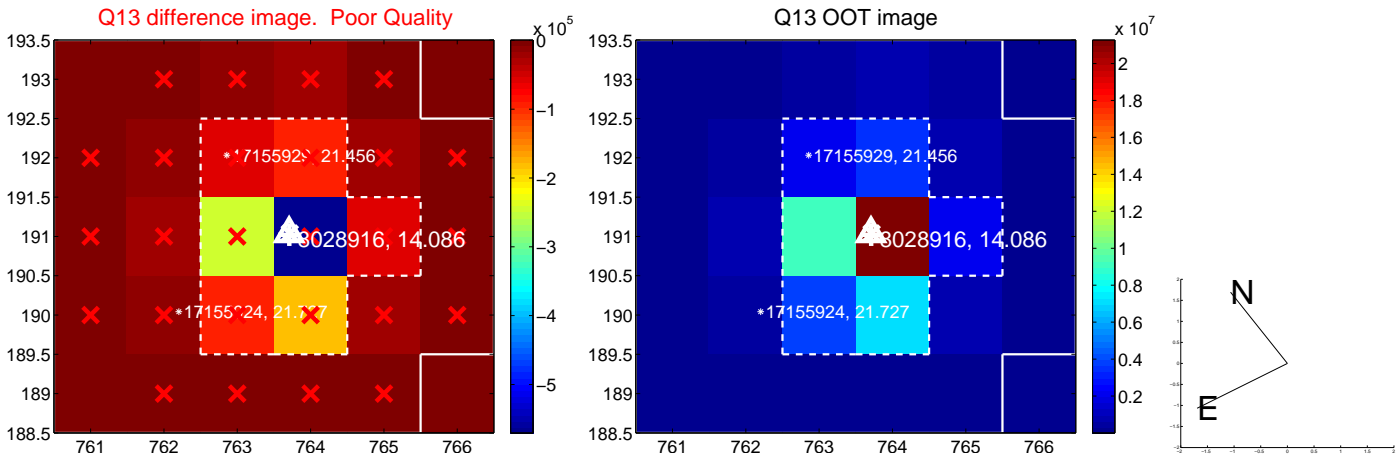
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



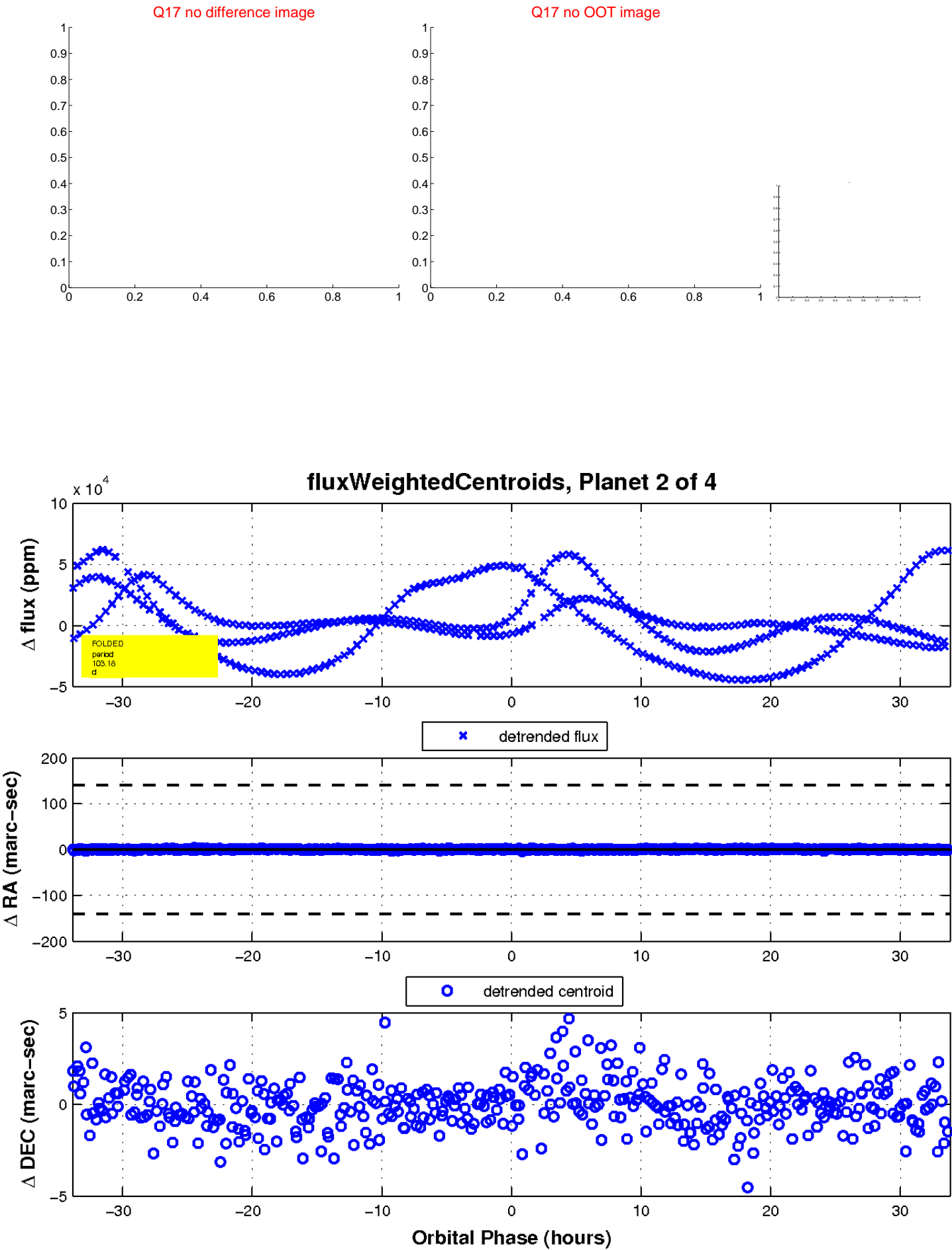
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

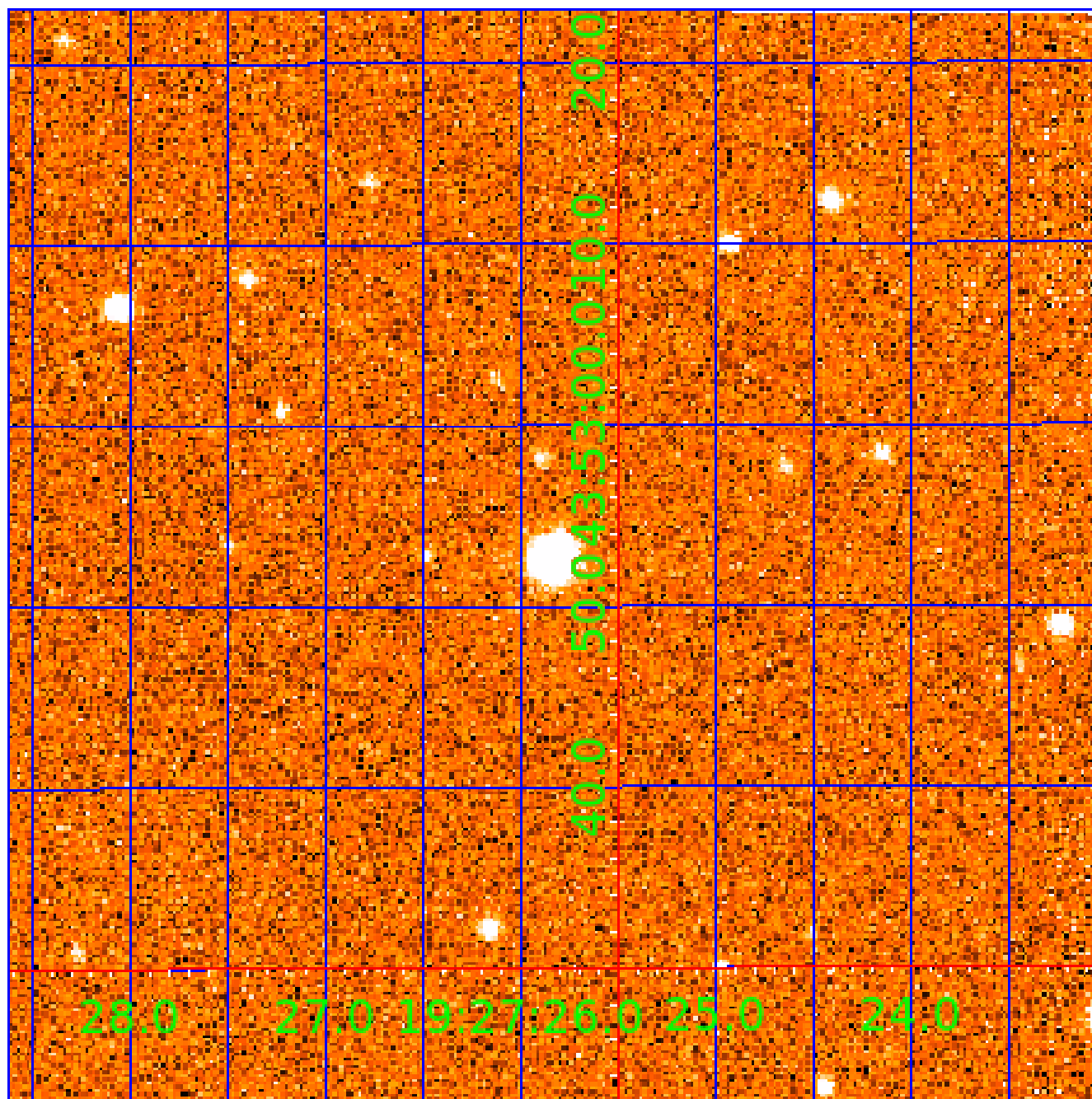


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008028916

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})
008028916-01	OBS	No	161.399324	252.400210	821.3	6.619	26.9	1.7	1.50	7090	4.68	13.53
008028916-02	OBS	No	103.181808	163.240171	13112.4	11.294	12.4	3.7	1.50	7090	29.96	24.57
008028916-03	OBS	No	235.695941	315.481898	484.4	2.215	14.5	1.4	1.50	7090	3.73	8.17
008028916-04	OBS	No	138.721357	251.704459	1116.2	1.848	14.0	2.6	1.50	7090	5.38	16.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008028916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008028916-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
008028916-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008028916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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 for comment definitions.

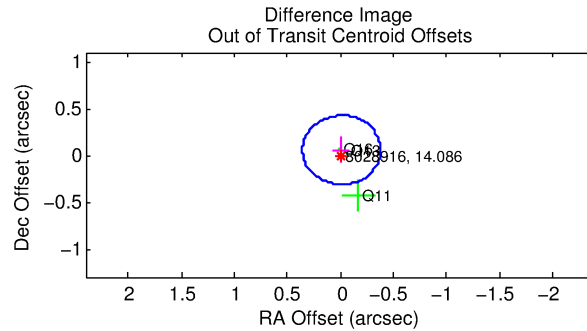
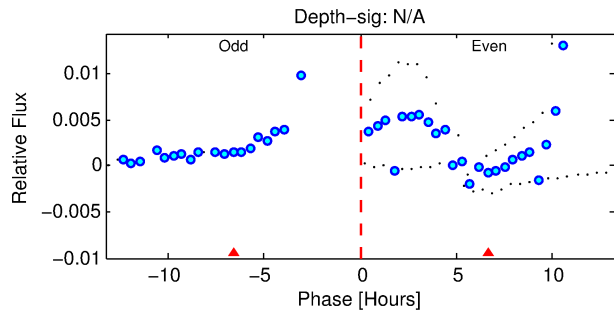
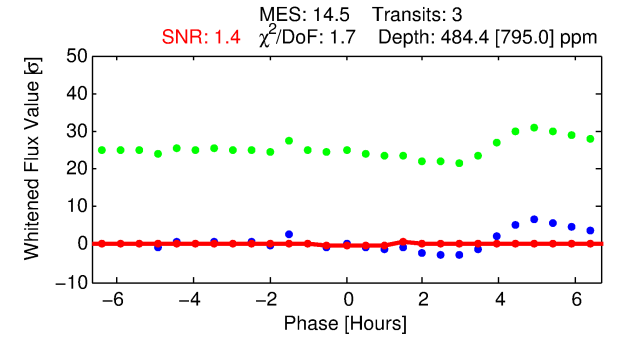
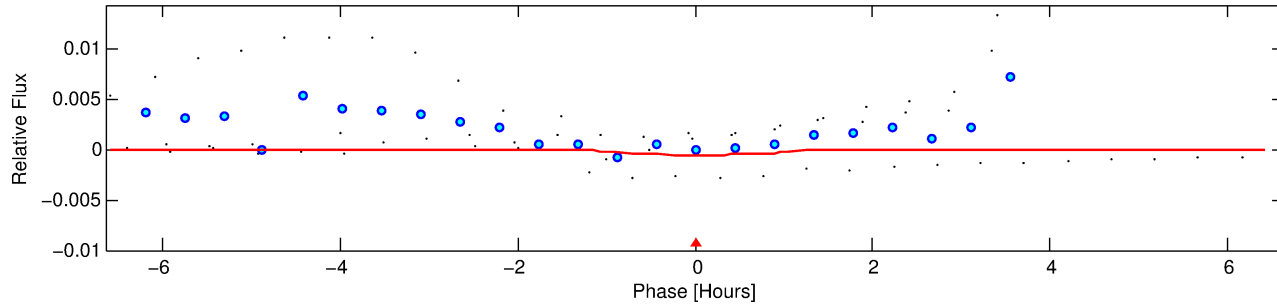
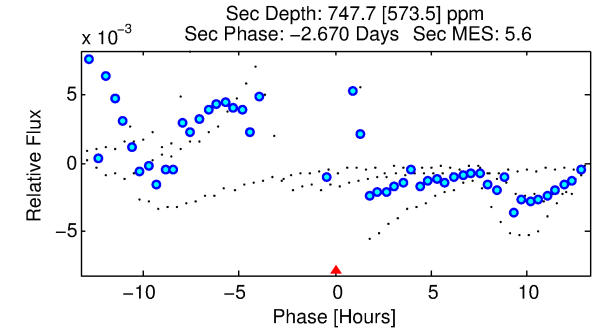
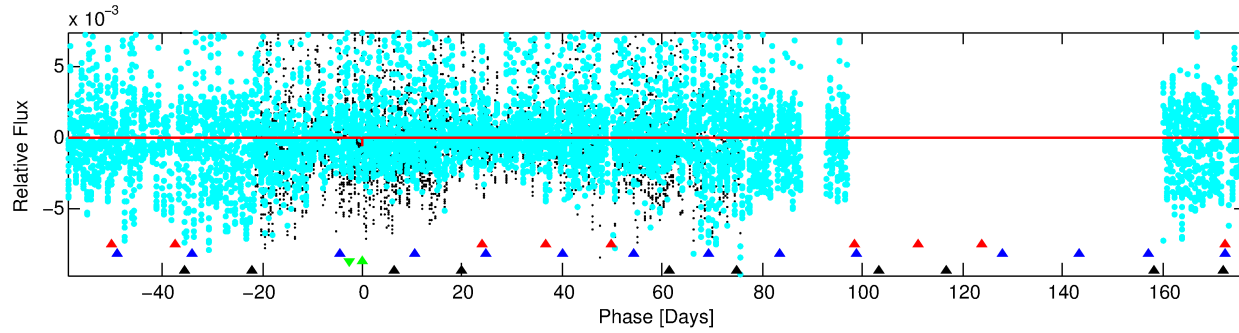
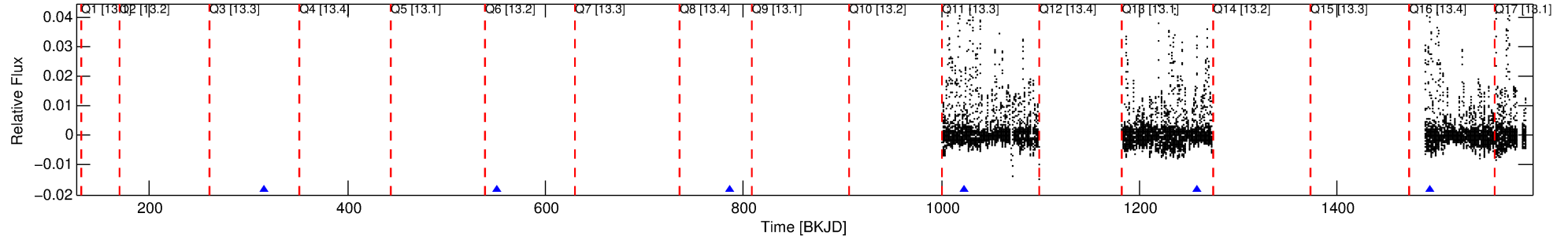
Ephemeris Match Information For 008028916-03

No Significant Match Found

DV One-Page Summary

KIC: 8028916 Candidate: 3 of 4 Period: 235.696 d

Kp: 14.09 R*: 1.50 Rs Teff: 7090.0 K Logg: 4.16 Fe/H: -0.560



DV Fit Results:

Period = 235.69594 [0.02323] d
Epoch = 315.4819 [0.0964] BKJD
Rp/R* = 0.0227 [0.0778]
a/R* = 466.34 [9294.18]
b = 0.85 [6.71]
Seff = 8.17 [3.29]
Teq = 431 [43] K
Rp = 3.73 [12.82] Re
a = 0.7924 [0.1938] AU
Ag = 18569.89 [128190.08] [0.14σ]
Teff = 7780 [13412] K [0.55σ]

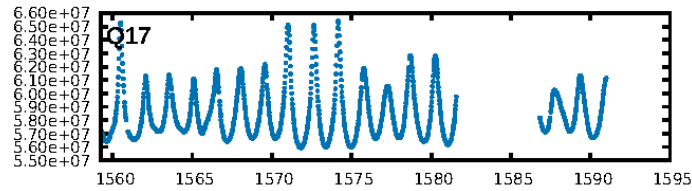
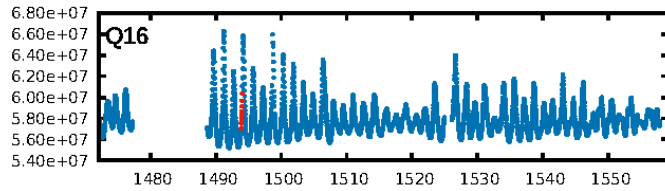
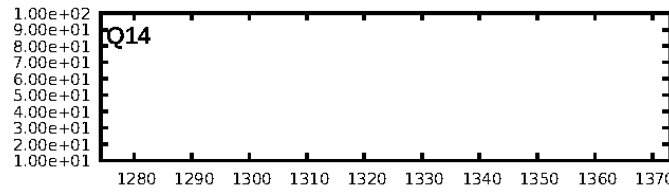
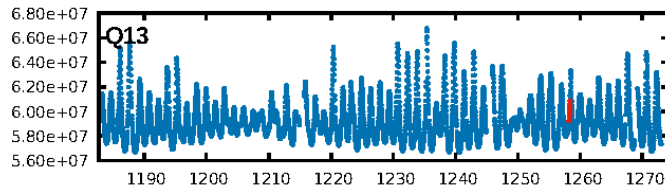
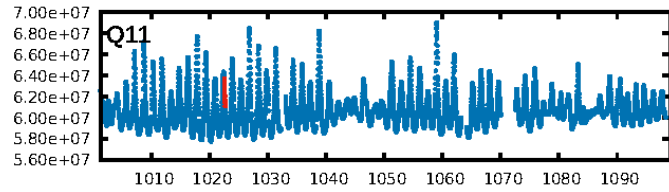
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [255.46σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 91.1%
ModelChiSquareGof-sig: 93.5%
Bootstrap-pfa: 1.93e-08
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.06468
Centroid-sig: N/A
Centroid-so: 1.154 arcsec [0.62σ]
OotOffset-rm: 0.058 arcsec [0.47σ]
KicOffset-rm: 0.044 arcsec [0.52σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

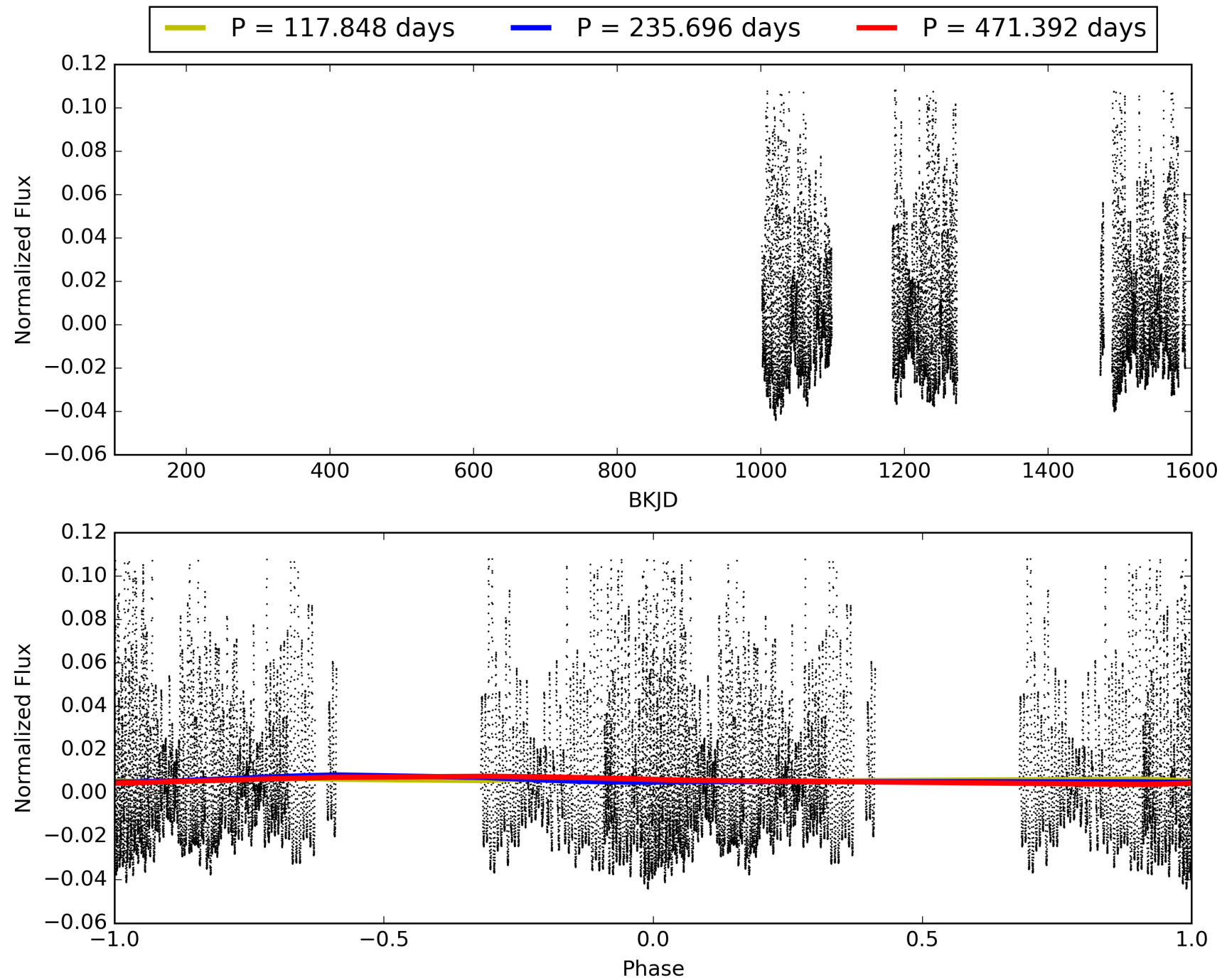
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 16:47:29 Z

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

TCE 008028916-03, PDC Light Curves

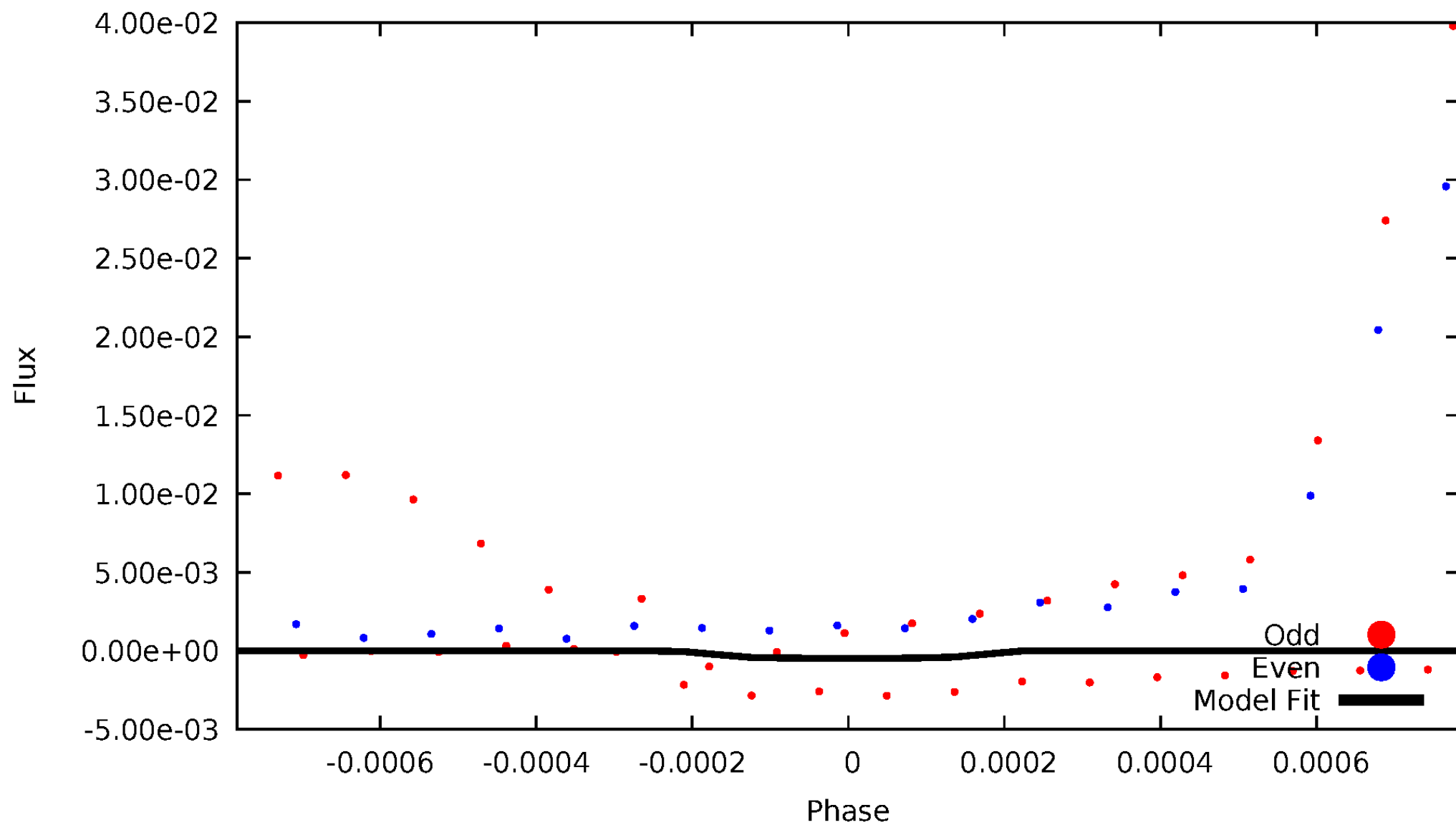


TCE 008028916-03



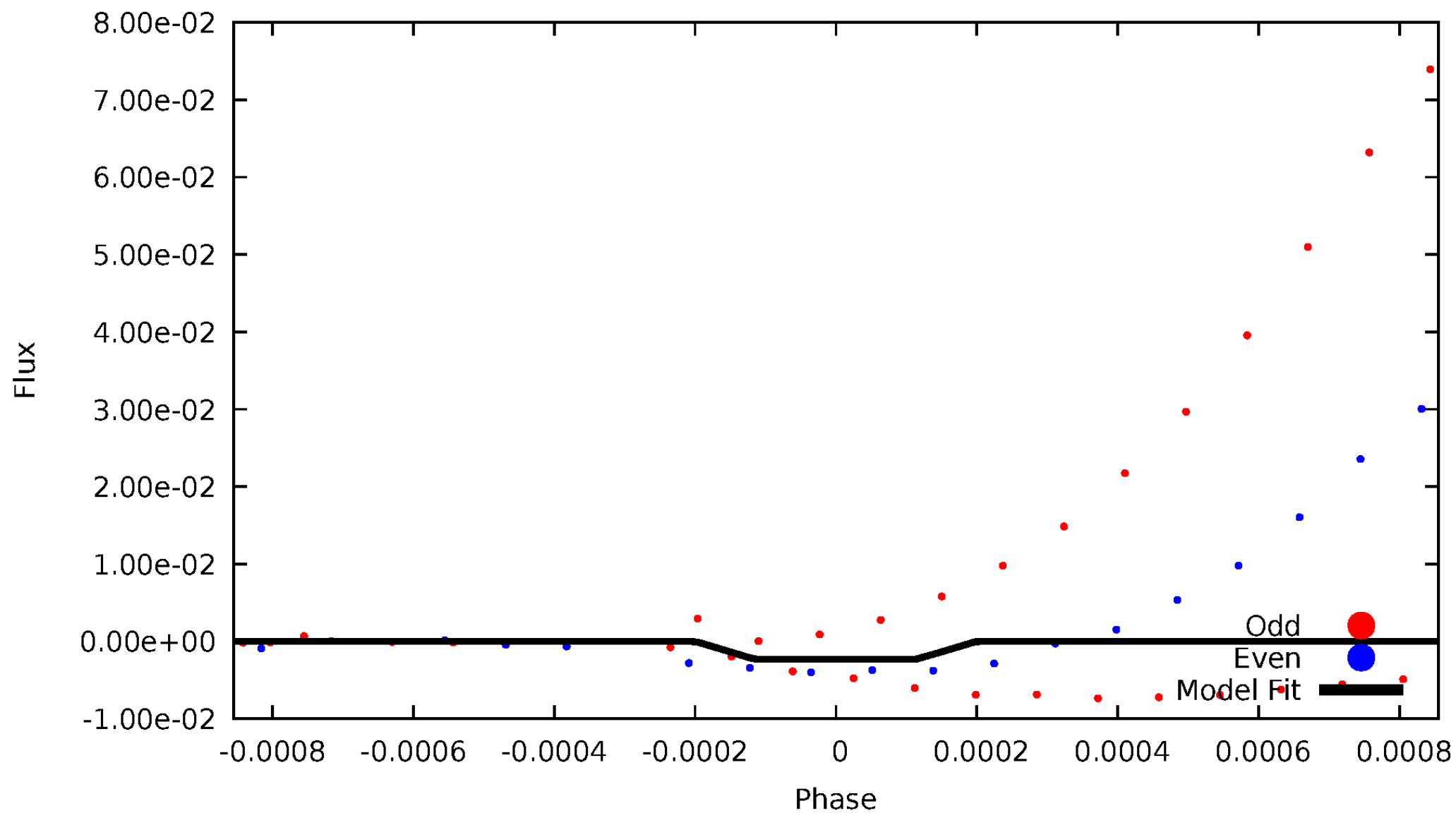
DV Odd/Even

TCE 008028916-03



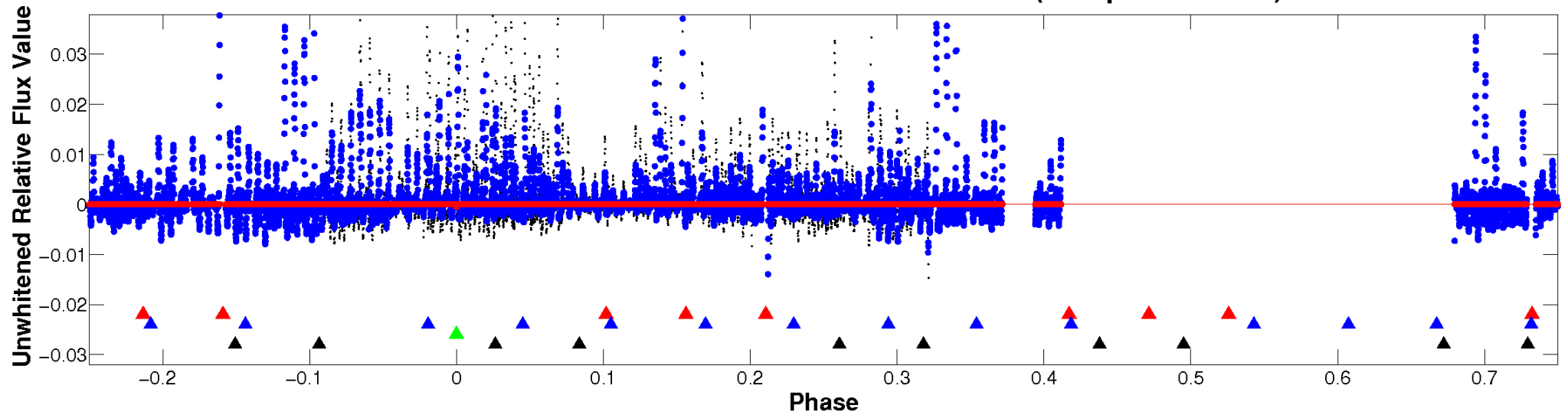
ALT Odd/Even

TCE 008028916-03

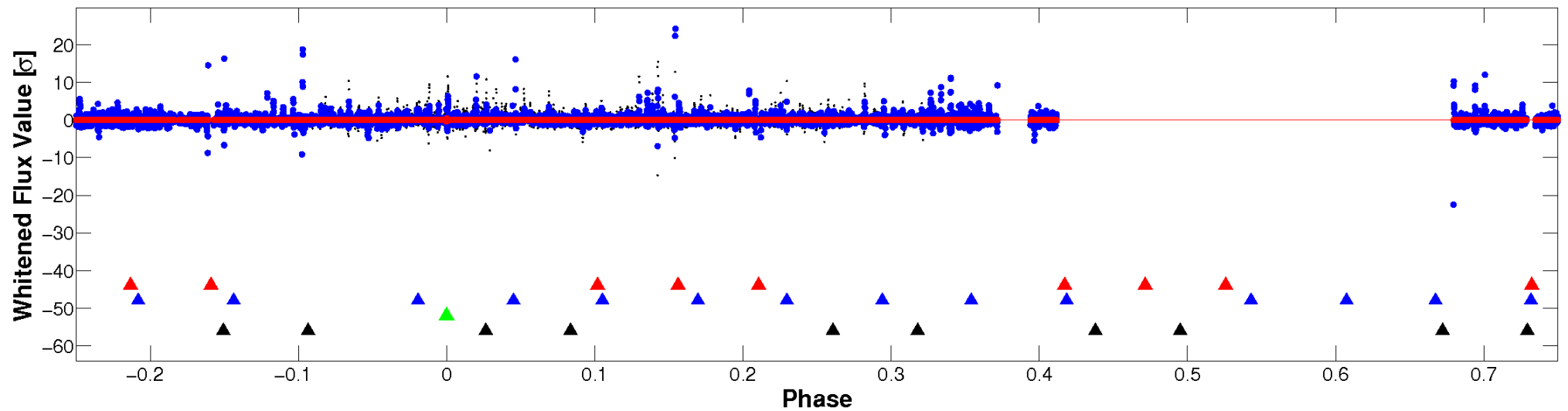


Non-Whitened Vs. Whitened Light Curve

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

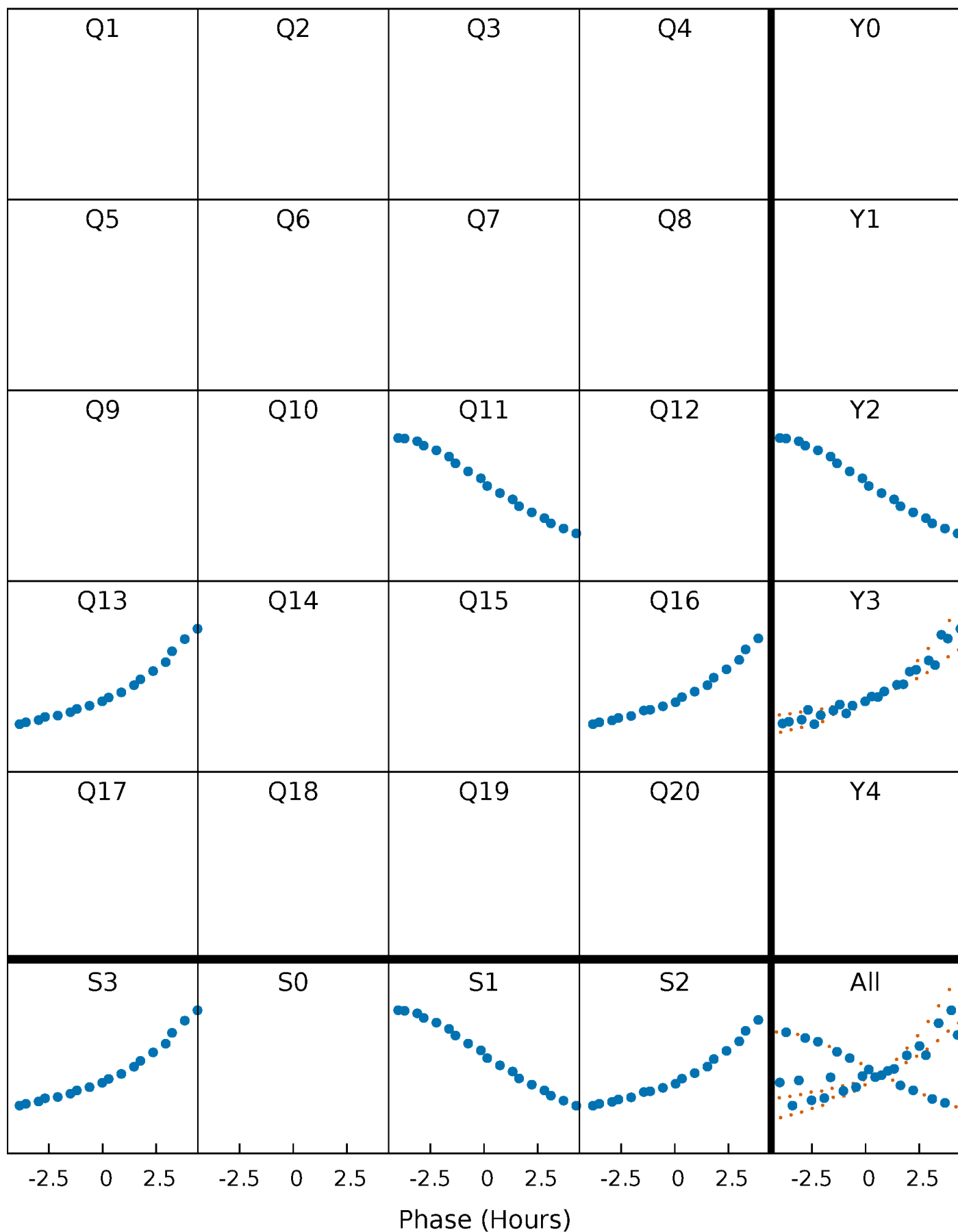


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



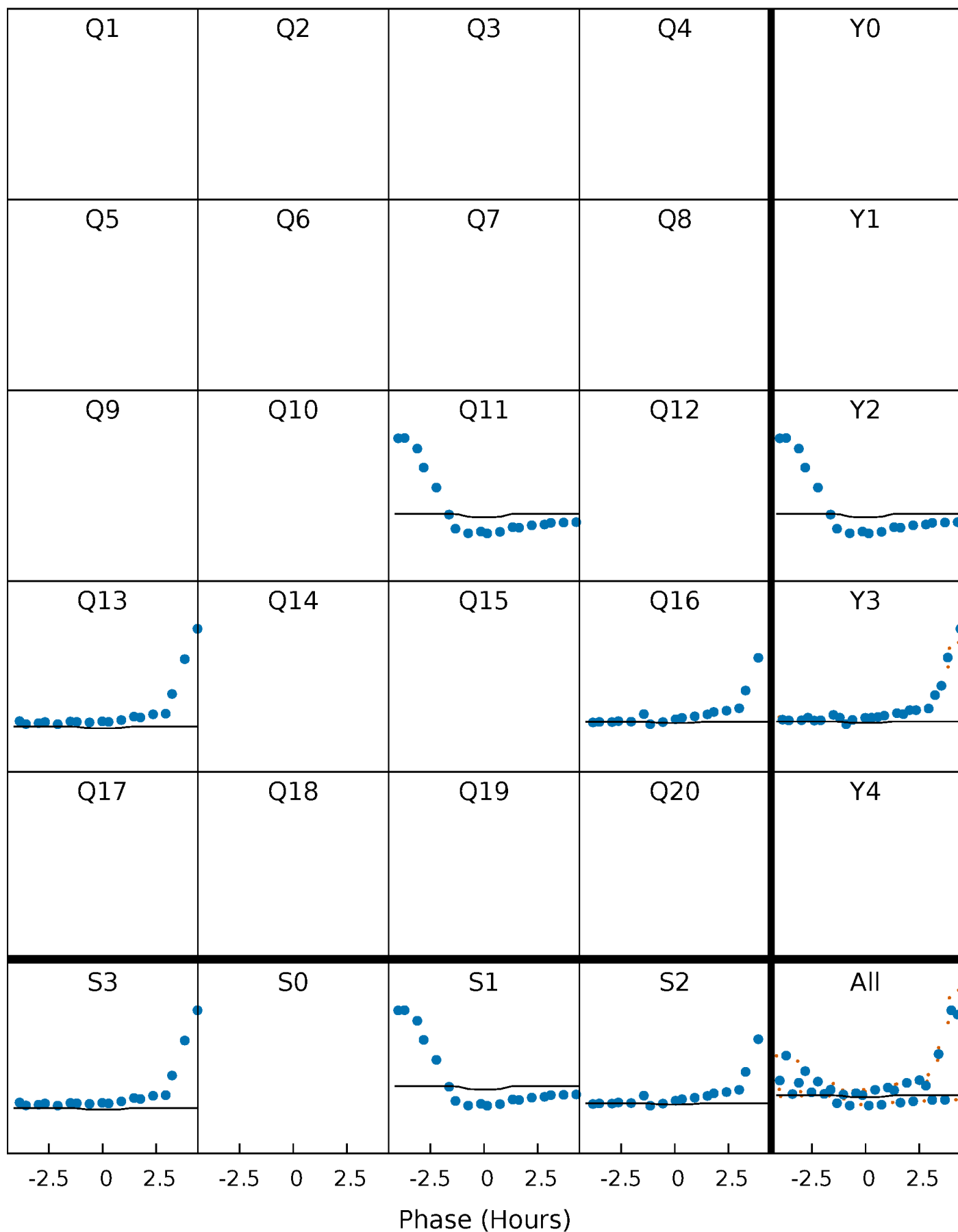
PDC Quarter-Phased Transit Curves

TCE 008028916-03 $P=235.695941$ Days $T_0=315.481898$ (BKJD)



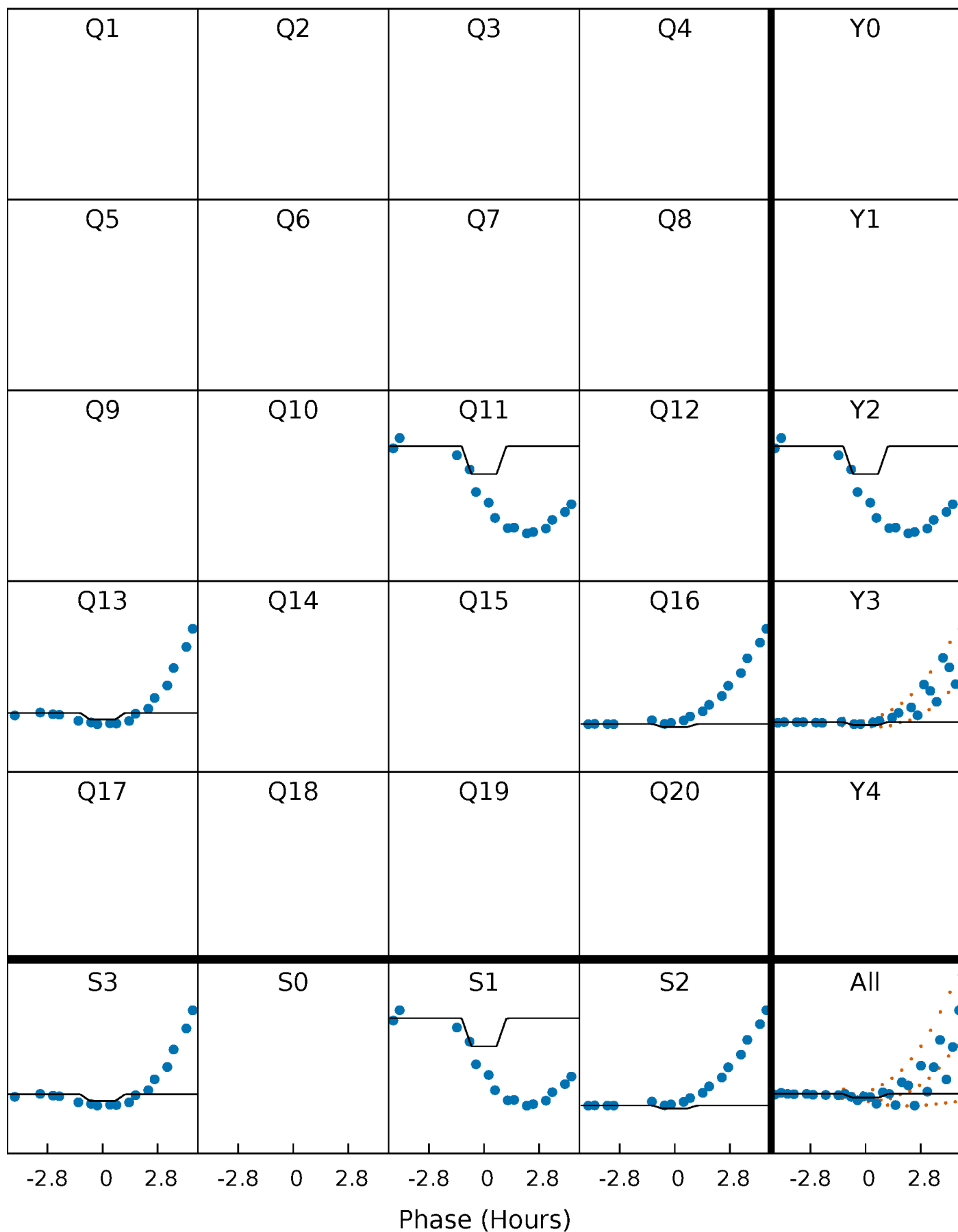
DV Quarter-Phased Transit Curves

TCE 008028916-03 $P=235.695941$ Days $T_0=315.481898$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

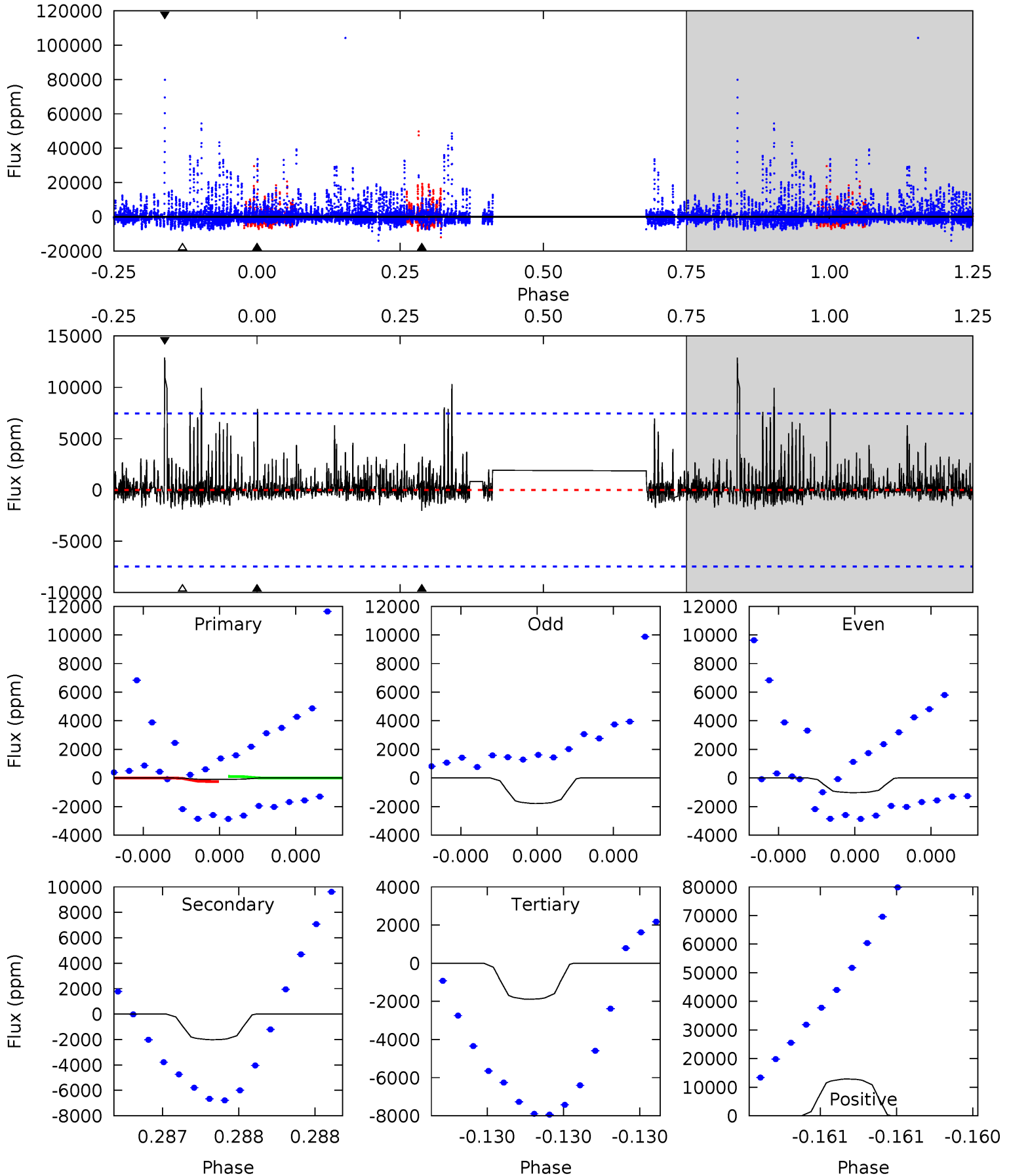
TCE 008028916-03 P=235.695234 Days $T_0=315.469299$ (BKJD)



DV Model-Shift Uniqueness Test

008028916-03, P = 235.695941 Days, E = 315.481898 Days

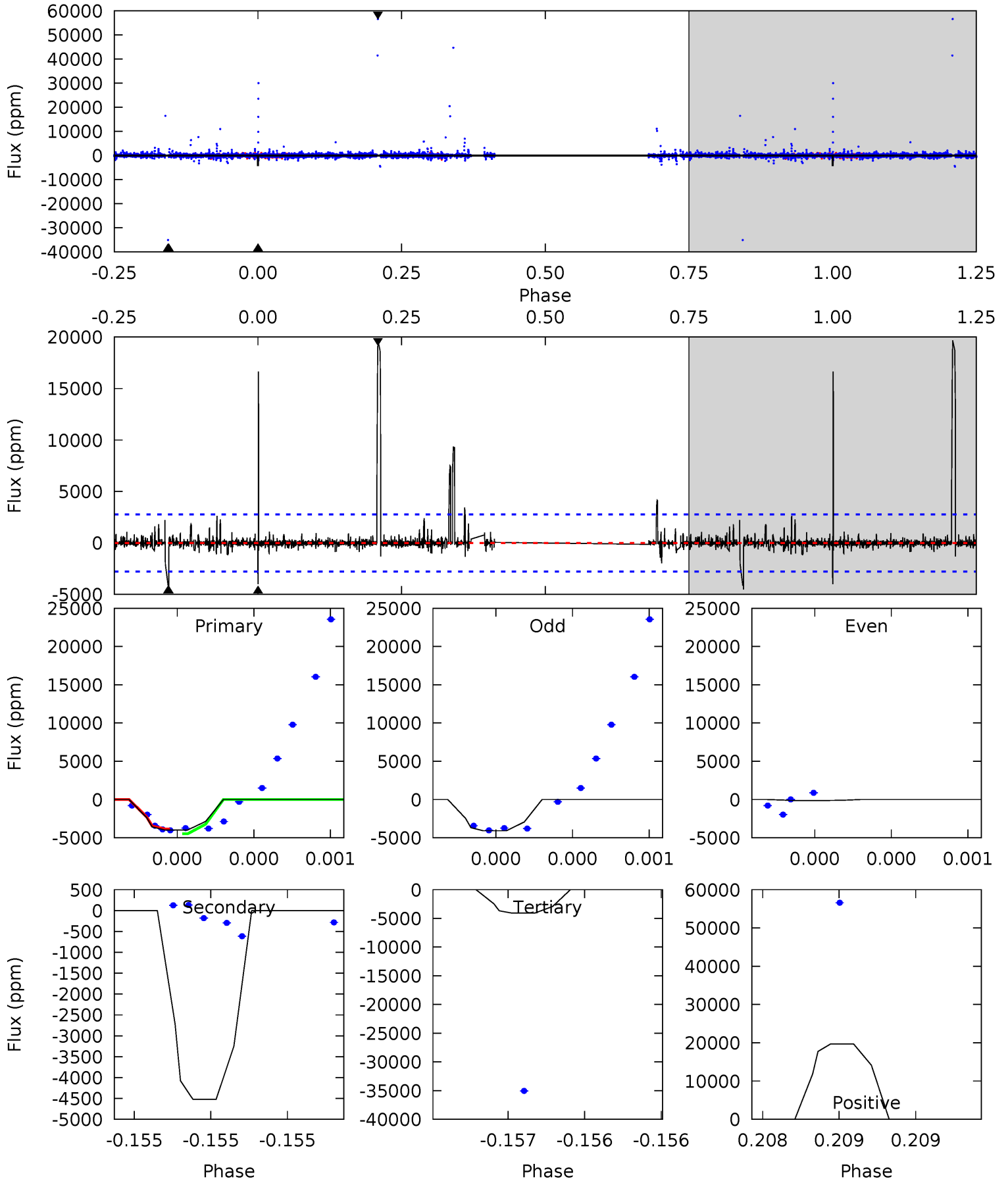
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.08	1.51	1.42	9.67	5.60	3.52	0.90	-1.34	-9.60	0.09	-8.16	0.25	-0.04	0.86	0.05



Alt Model-Shift Uniqueness Test

008028916-03, P = 235.695234 Days, E = 315.469299 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.07	9.17	8.25	39.9	5.62	3.56	1.24	-0.19	-31.8	0.91	-30.7	4.57	0.55	0.81	0



Stellar Parameters For KIC 008028916

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7090^{+200}_{-300}	$4.160^{+0.204}_{-0.167}$	$-0.560^{+0.250}_{-0.300}$	$1.505^{+0.424}_{-0.347}$	$1.192^{+0.174}_{-0.157}$	$0.493^{+0.486}_{-0.229}$
	+3%/-4%	+5%/-4%	+45%/-54%	+28%/-23%	+15%/-13%	+99%/-46%
Source	KIC0	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 008028916-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2017 ± 1332	$10.14^{+10.09}_{-6.66}$	597^{+44}_{-45}	5817^{+5273}_{-1925}	6023^{+47651}_{-5157}
Alt.	-4522 ± 493	$11.55^{+11.82}_{-7.63}$	596^{+47}_{-46}	6664^{+7843}_{-1760}	11651^{+91505}_{-8763}

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

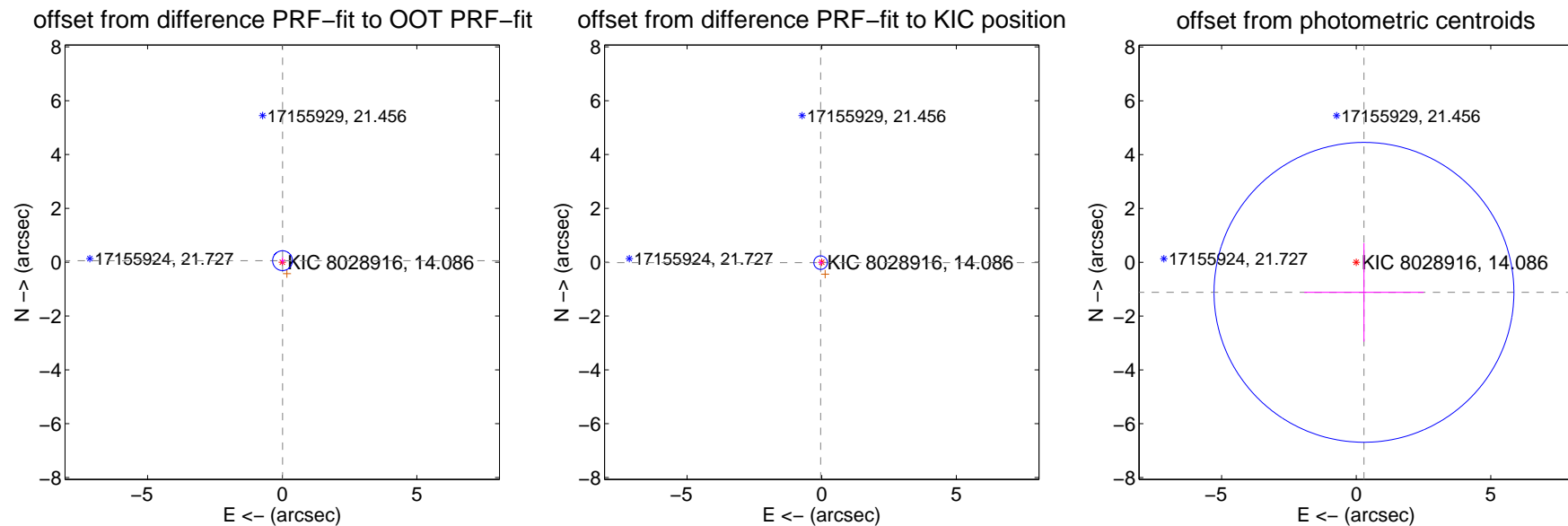
DV Centroid Data

Supplemental centroid analysis for 008028916-03. Kepler magnitude: 14.09. Transit SNR 1.43

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.058 ± 0.123	0.47	-0.012 ± 0.076	0.057 ± 0.131
PRF-fit source offset from KIC position	0.044 ± 0.084	0.52	0.041 ± 0.084	-0.016 ± 0.085
photometric centroid source offset	1.15 ± 1.86	0.62	-0.29 ± 2.22	-1.12 ± 1.83



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- σ uncertainty. Blue circle: three- σ . 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



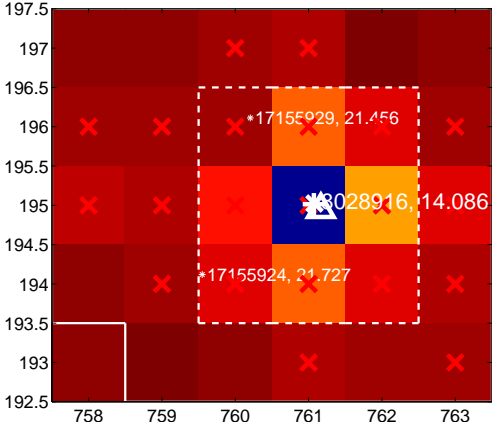
Q10 no difference image



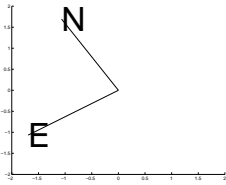
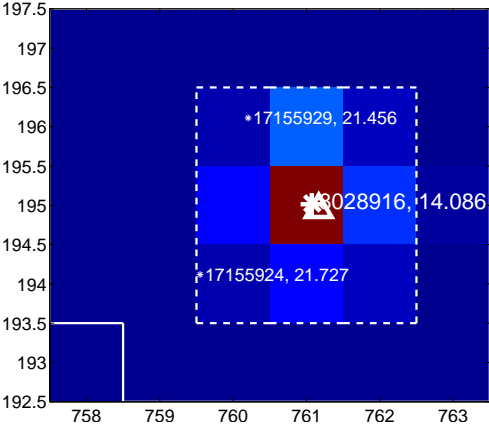
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



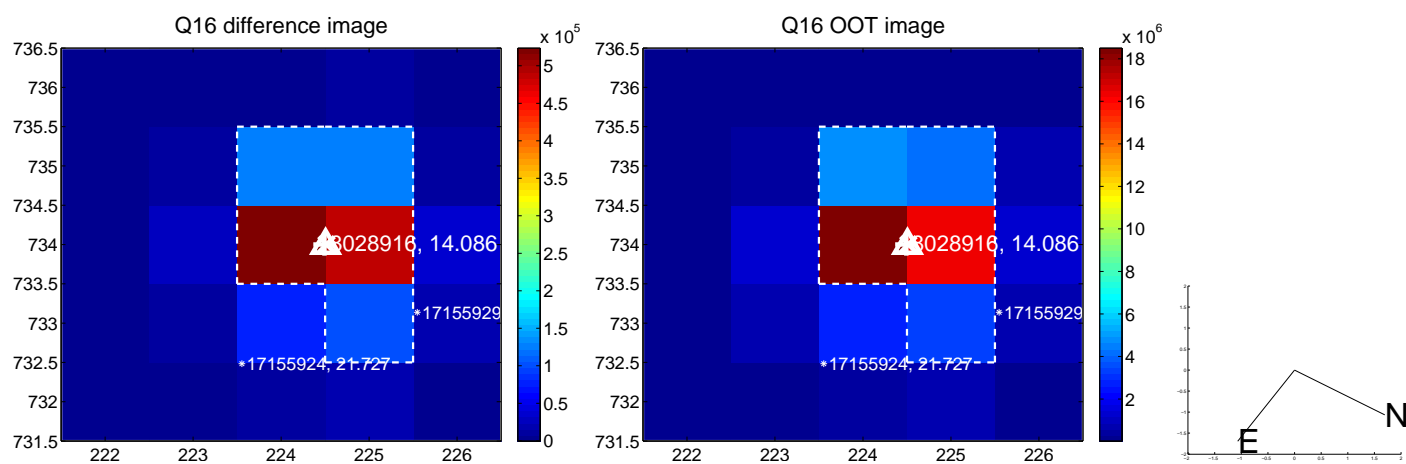
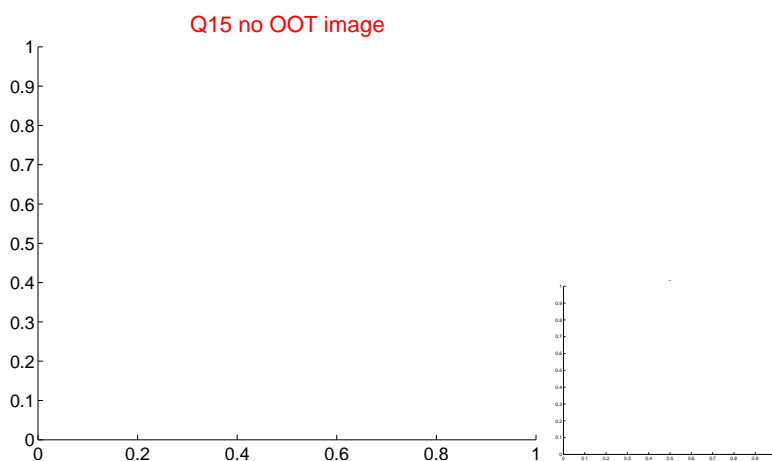
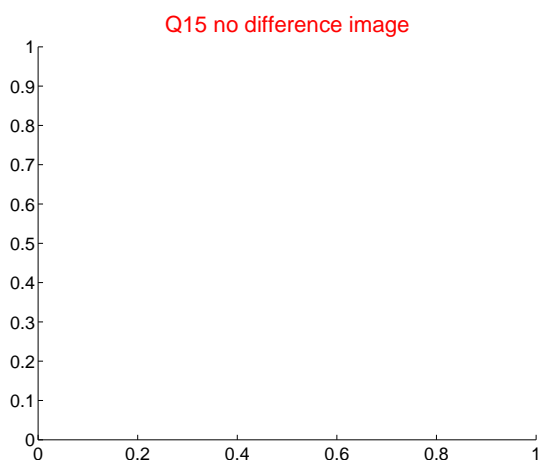
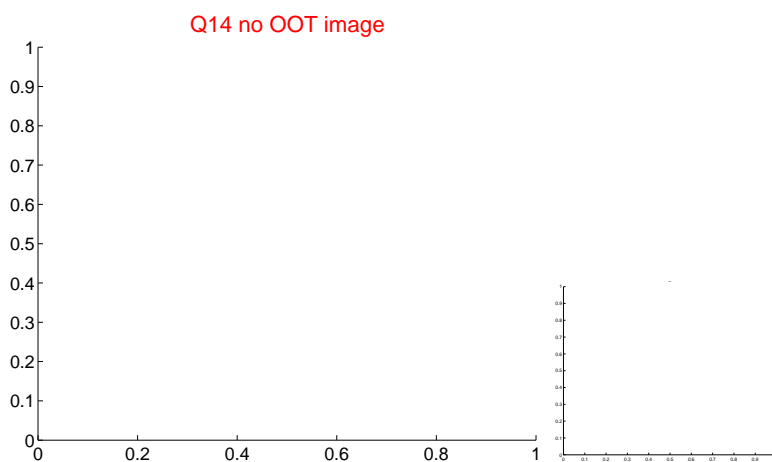
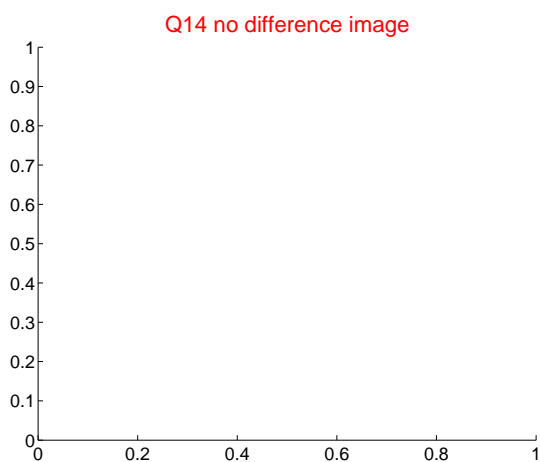
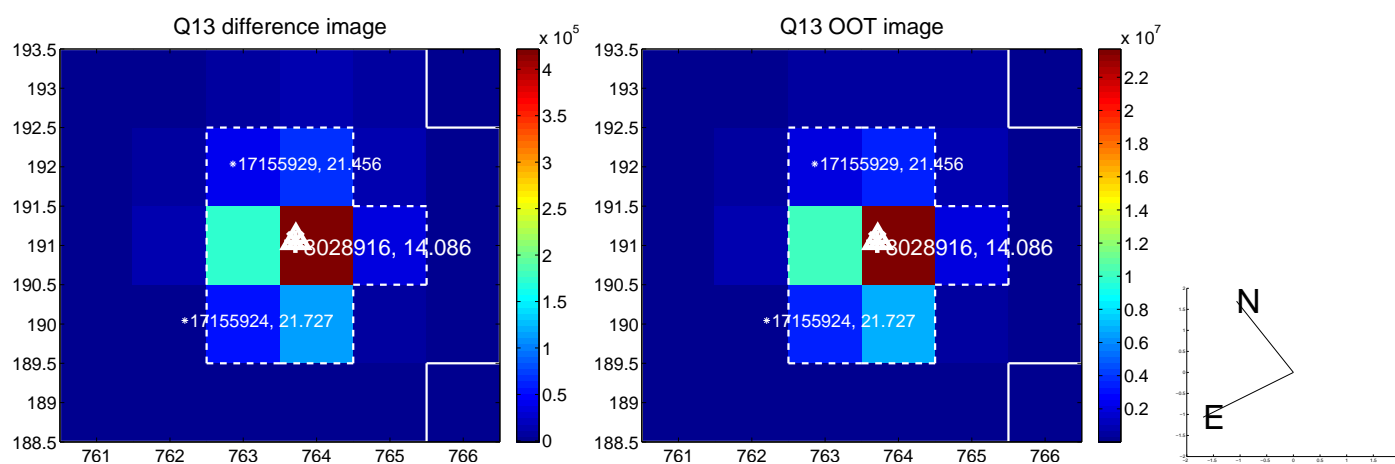
Q12 no difference image



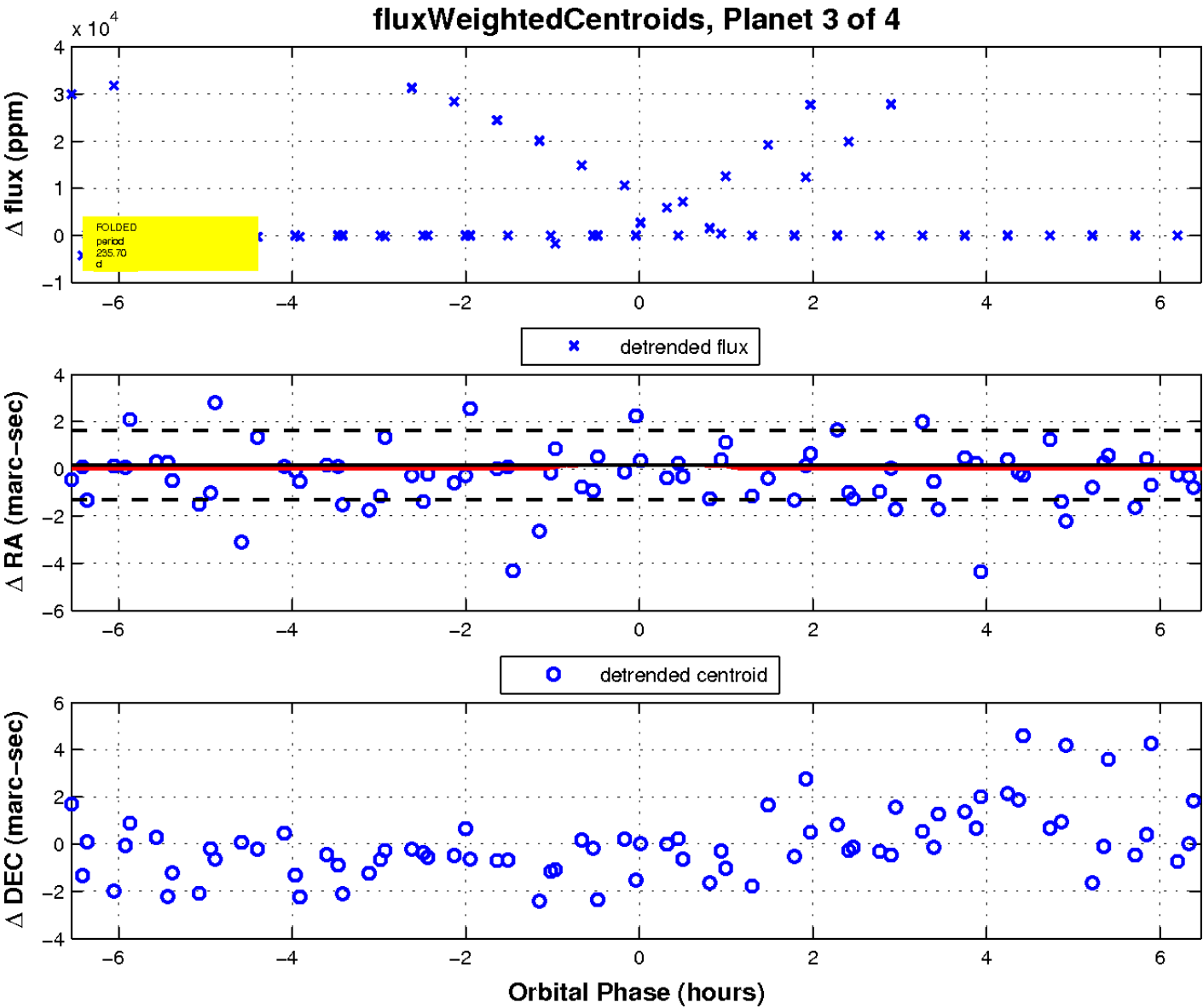
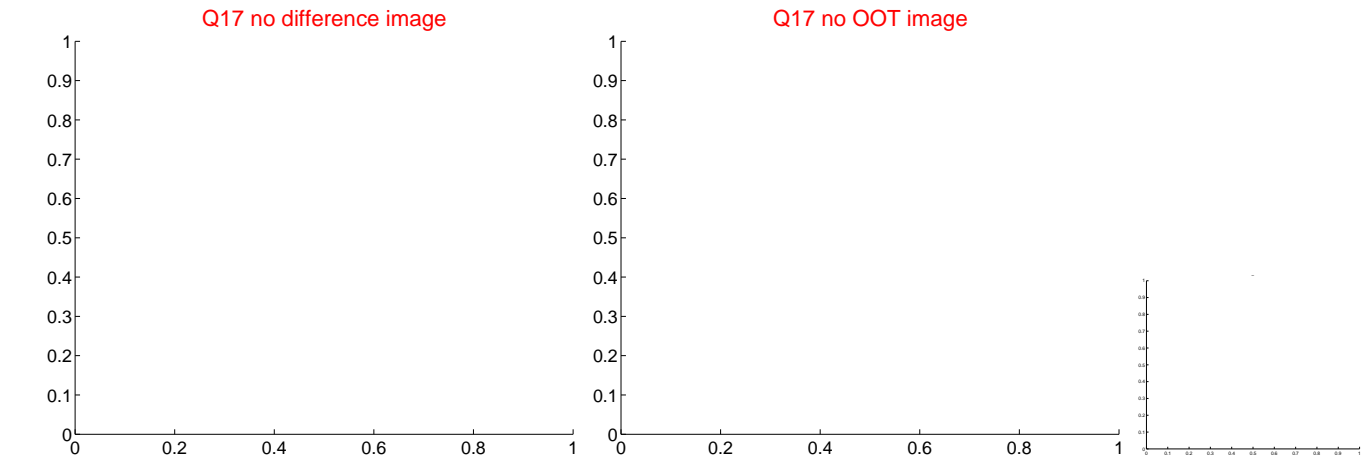
Q12 no OOT image



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

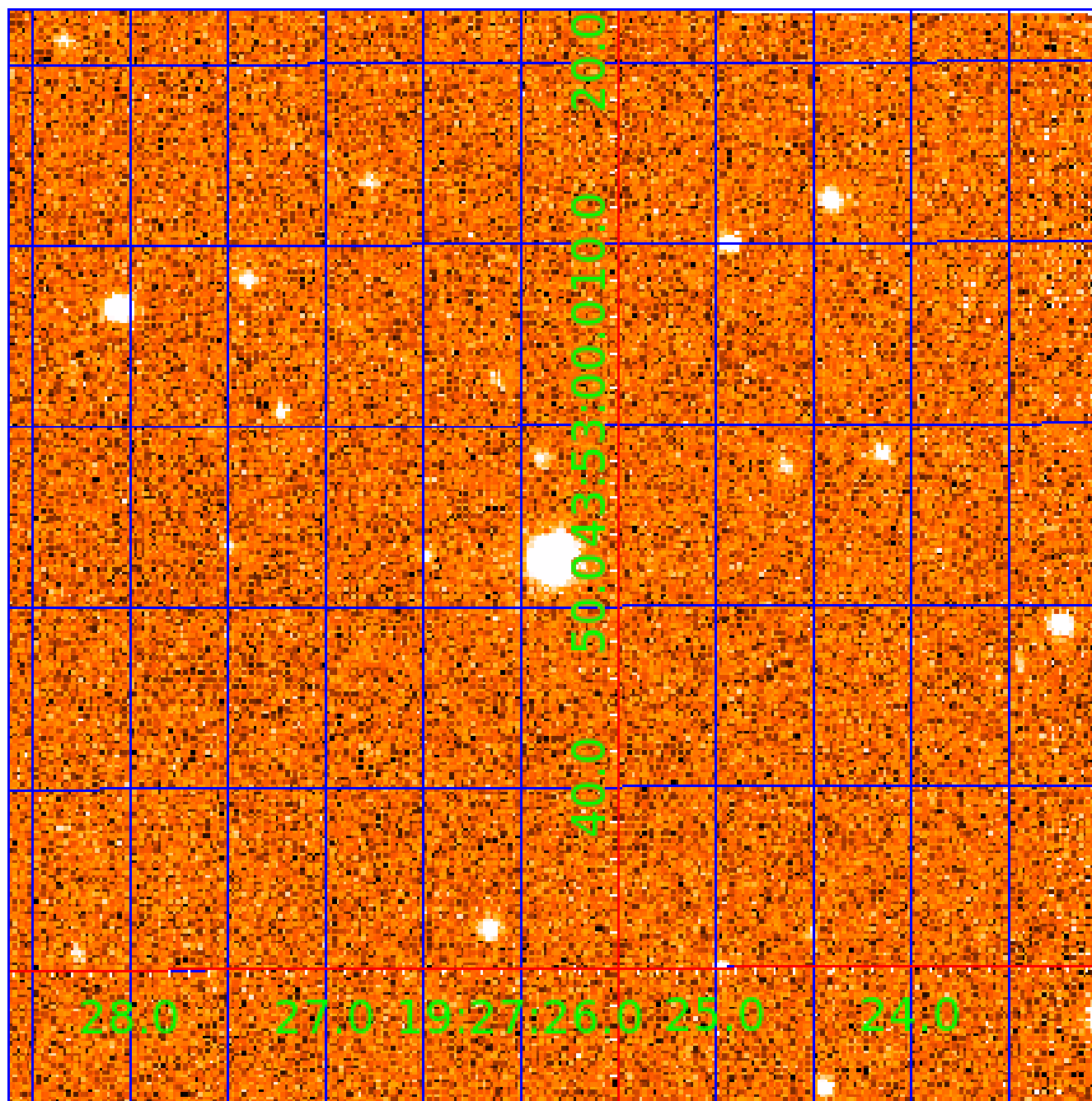


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008028916

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})
008028916-01	OBS	No	161.399324	252.400210	821.3	6.619	26.9	1.7	1.50	7090	4.68	13.53
008028916-02	OBS	No	103.181808	163.240171	13112.4	11.294	12.4	3.7	1.50	7090	29.96	24.57
008028916-03	OBS	No	235.695941	315.481898	484.4	2.215	14.5	1.4	1.50	7090	3.73	8.17
008028916-04	OBS	No	138.721357	251.704459	1116.2	1.848	14.0	2.6	1.50	7090	5.38	16.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008028916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008028916-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
008028916-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008028916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

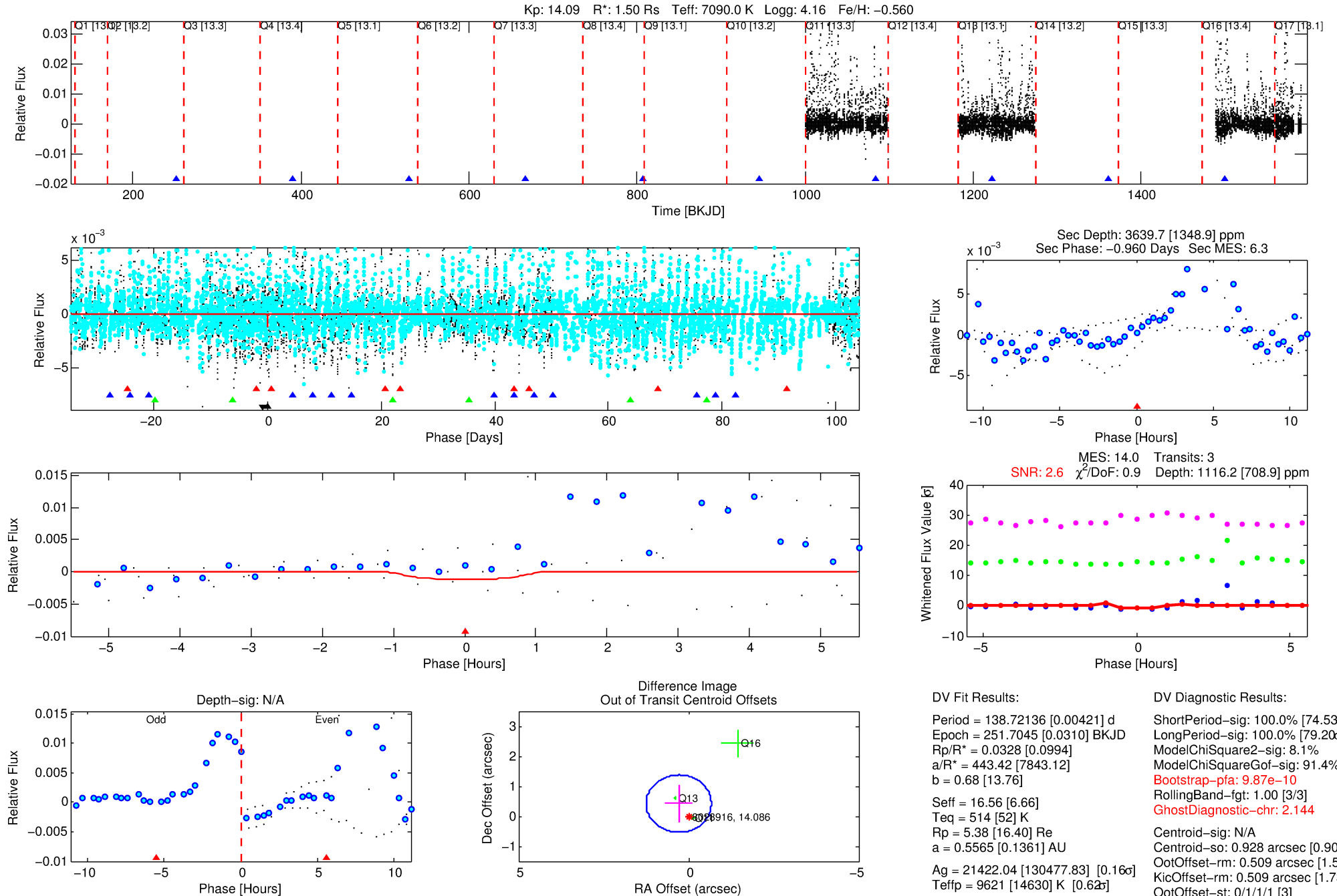
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008028916-04

No Significant Match Found

DV One-Page Summary

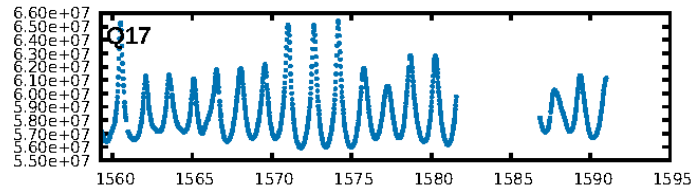
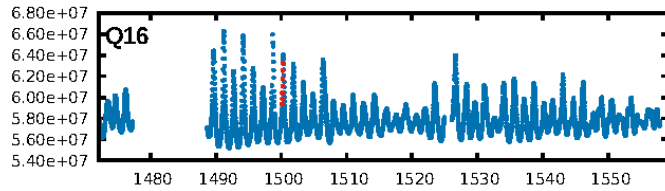
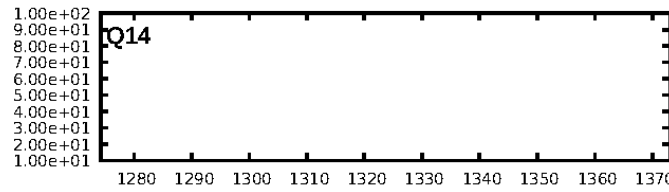
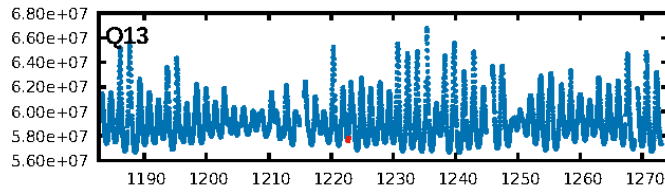
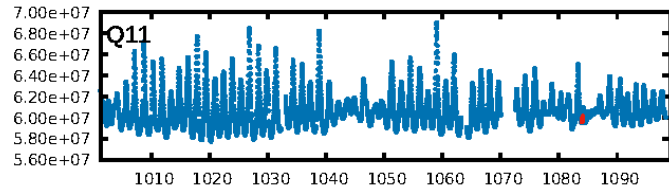
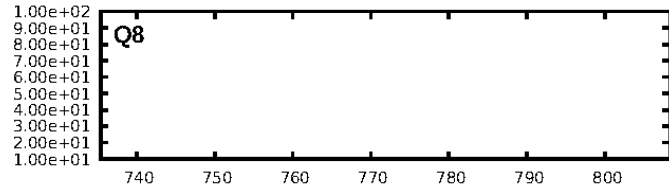
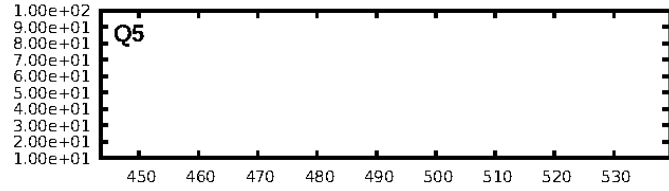
KIC: 8028916 Candidate: 4 of 4 Period: 138.721 d



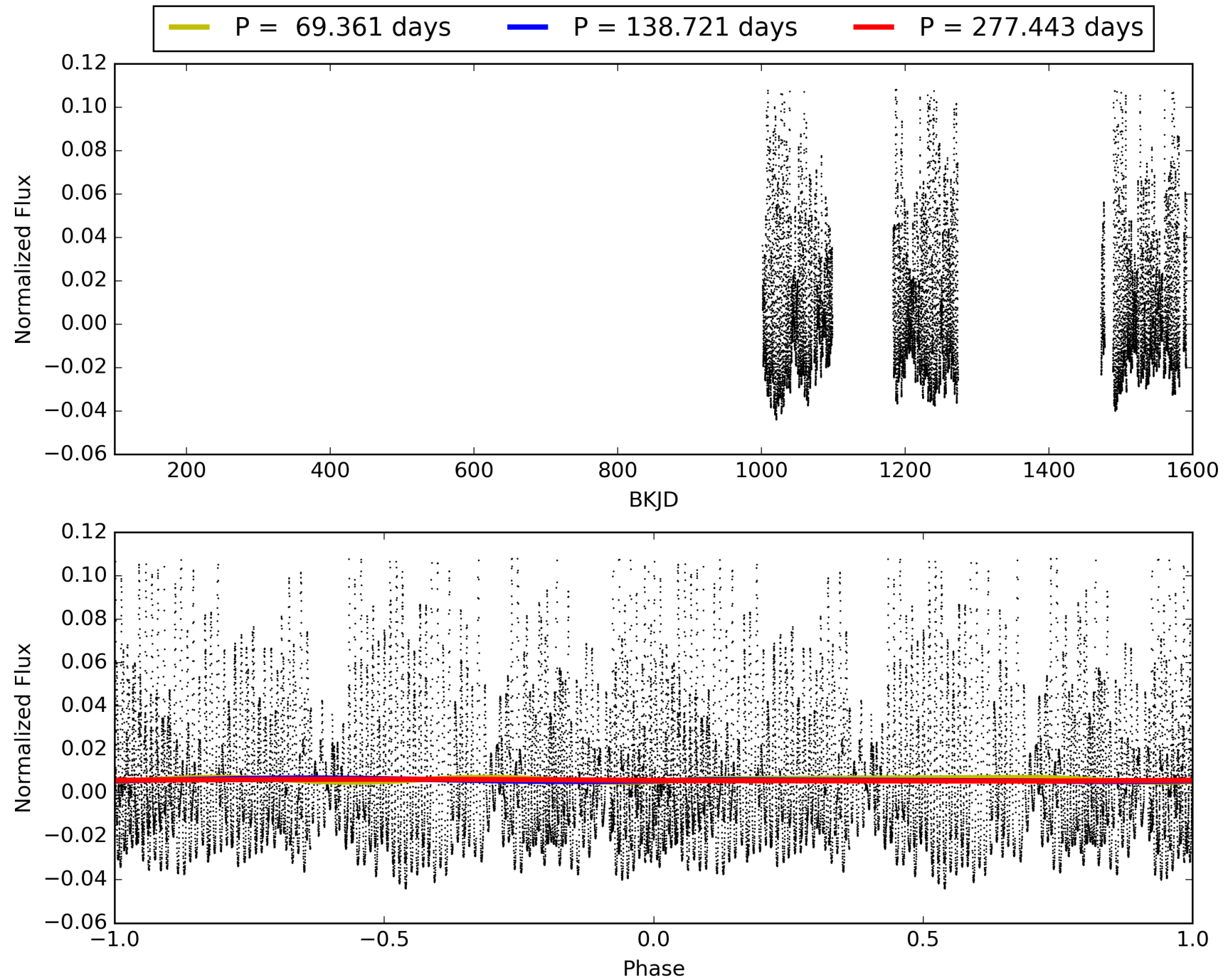
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 16:47:34 Z

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

TCE 008028916-04, PDC Light Curves

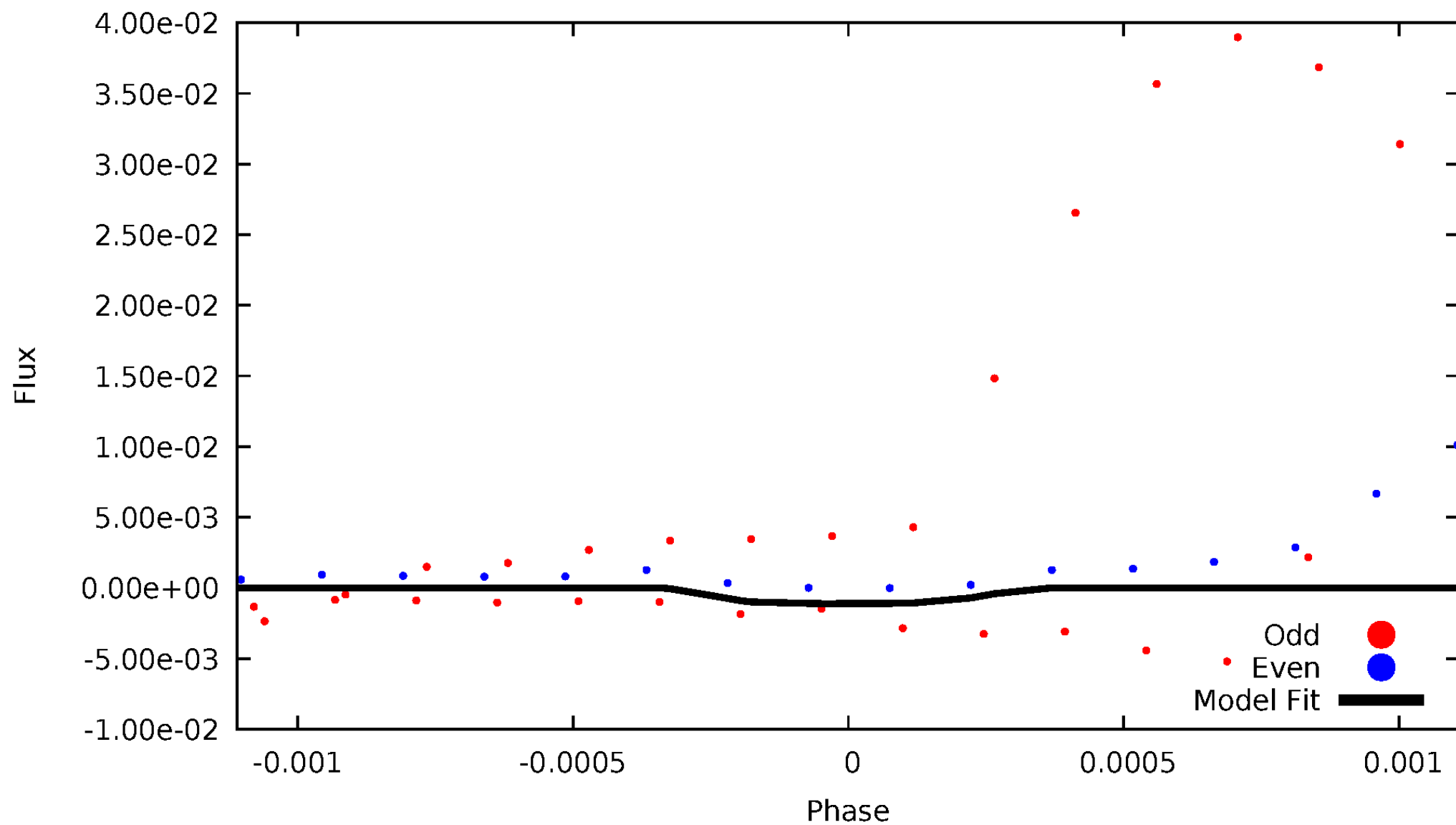


TCE 008028916-04



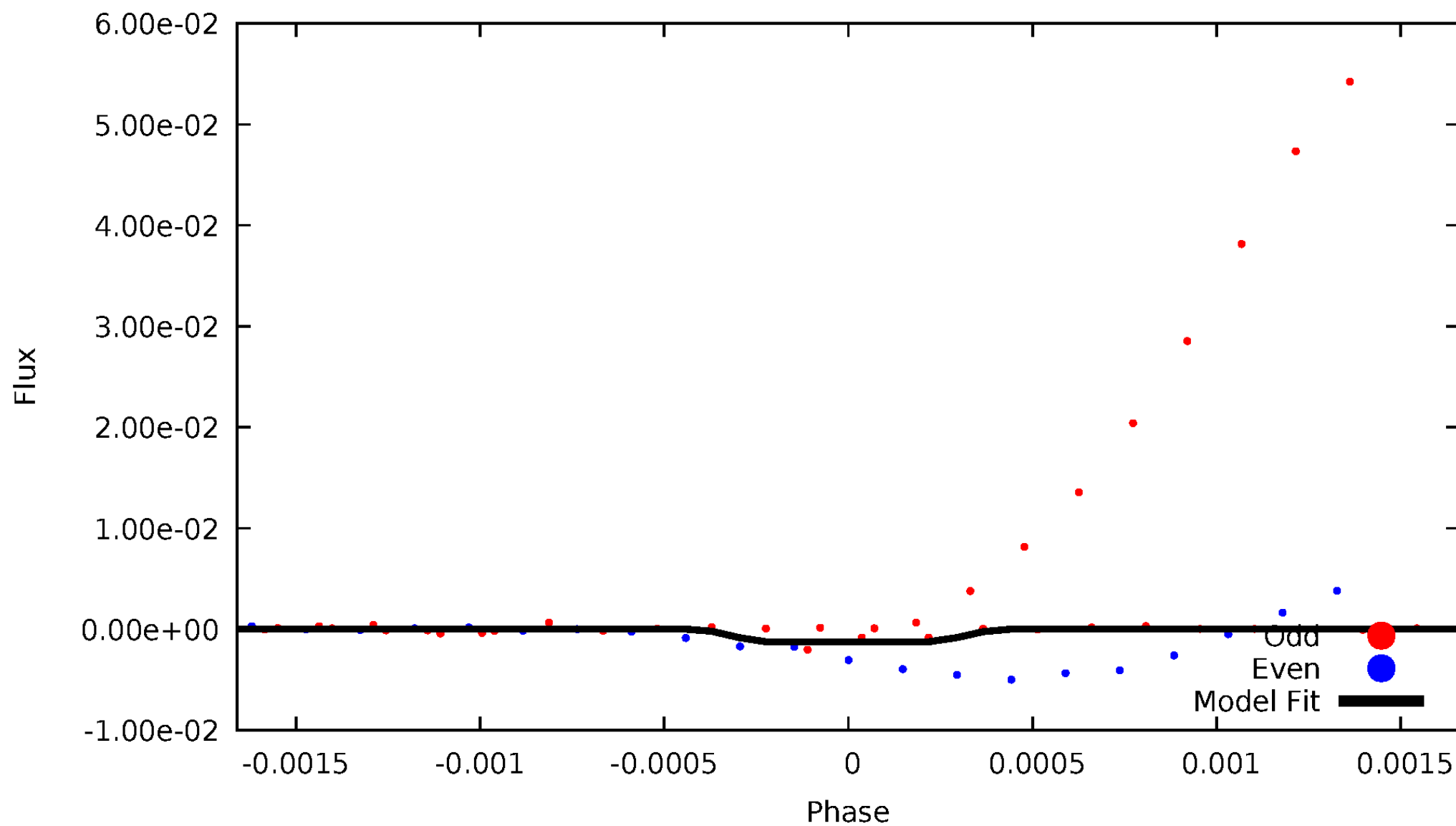
DV Odd/Even

TCE 008028916-04



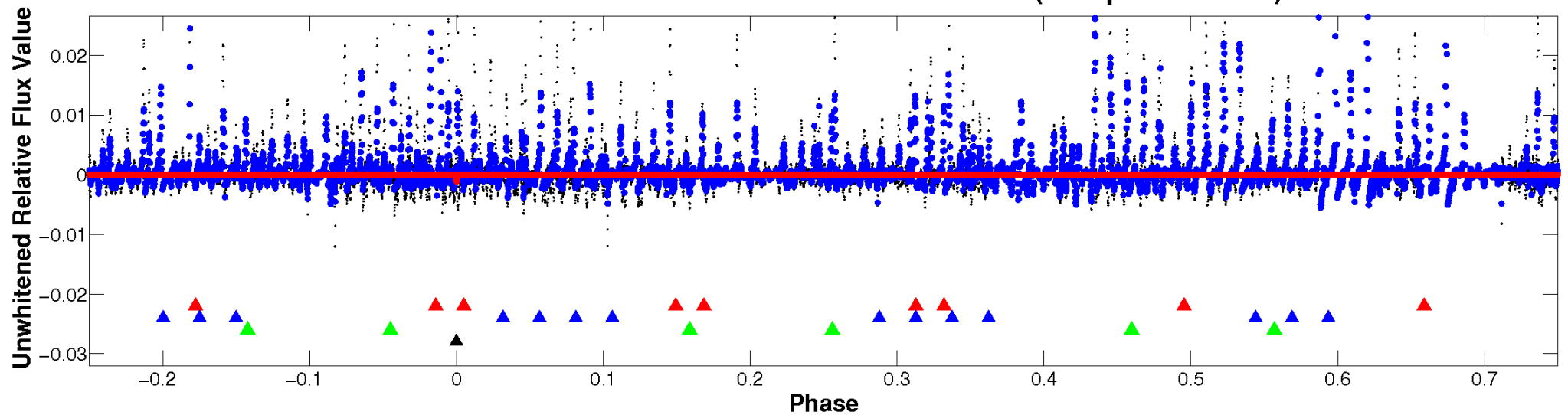
ALT Odd/Even

TCE 008028916-04

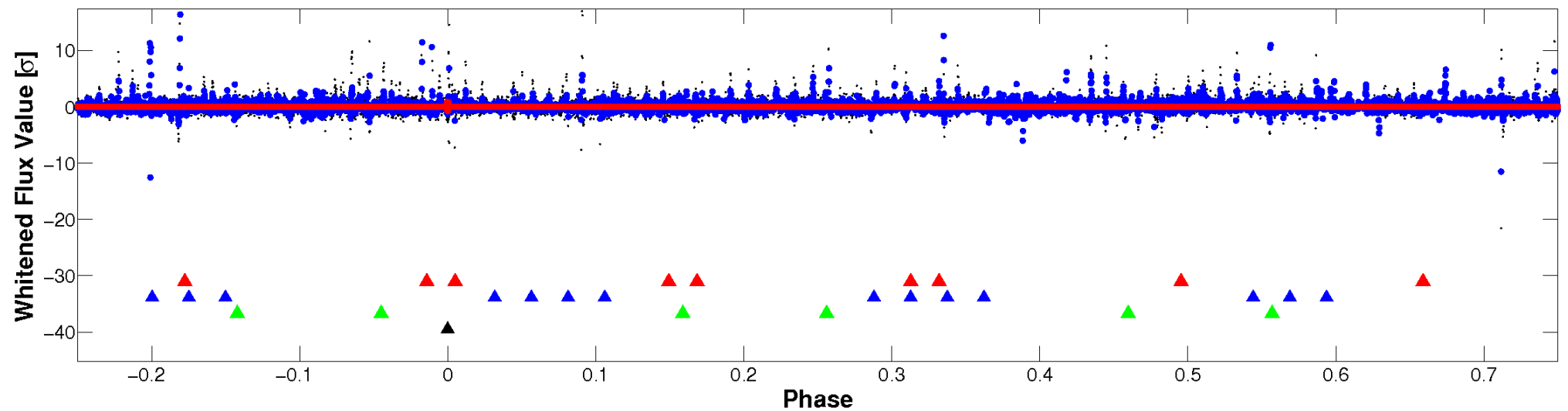


Non-Whitened Vs. Whitened Light Curve

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

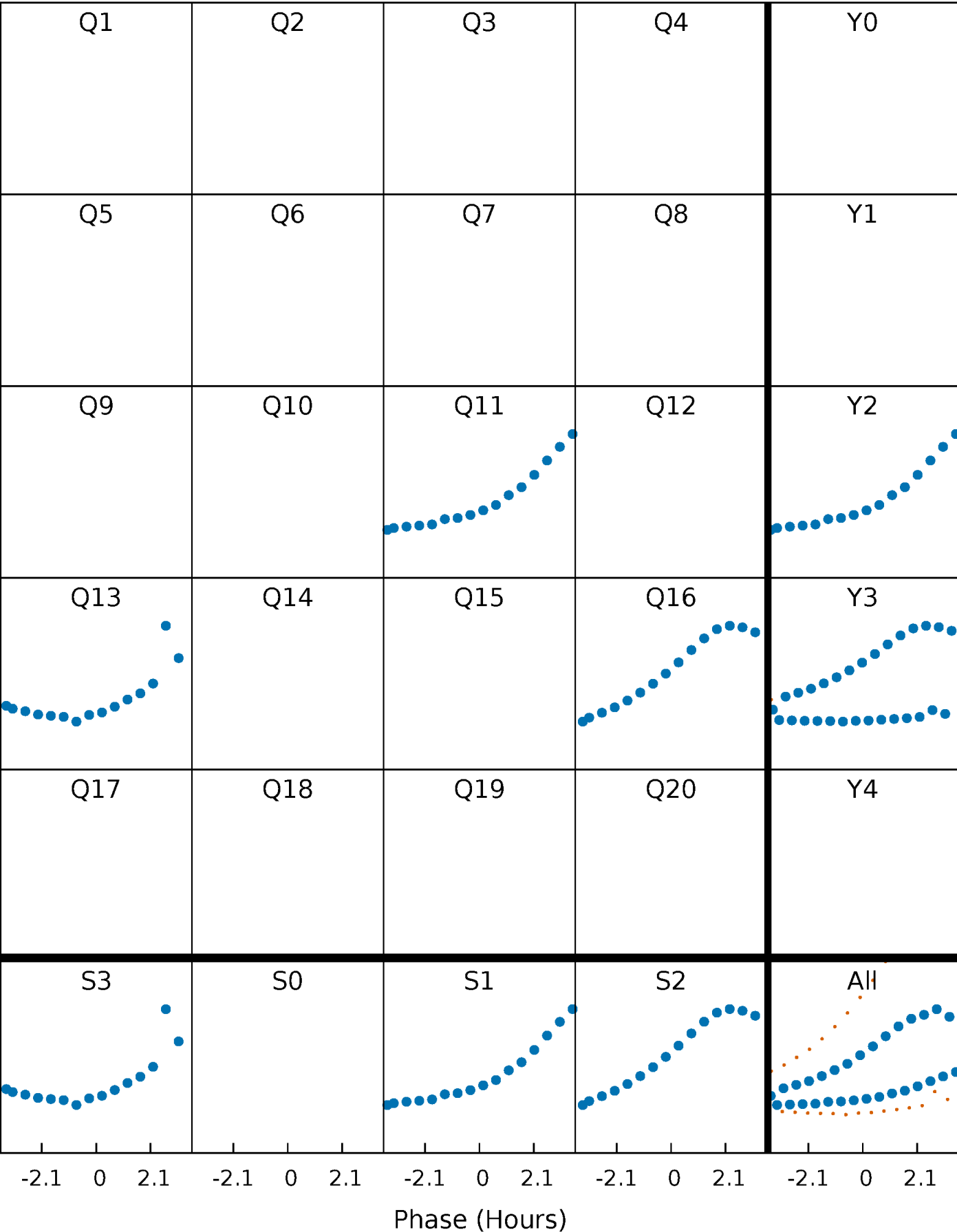


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



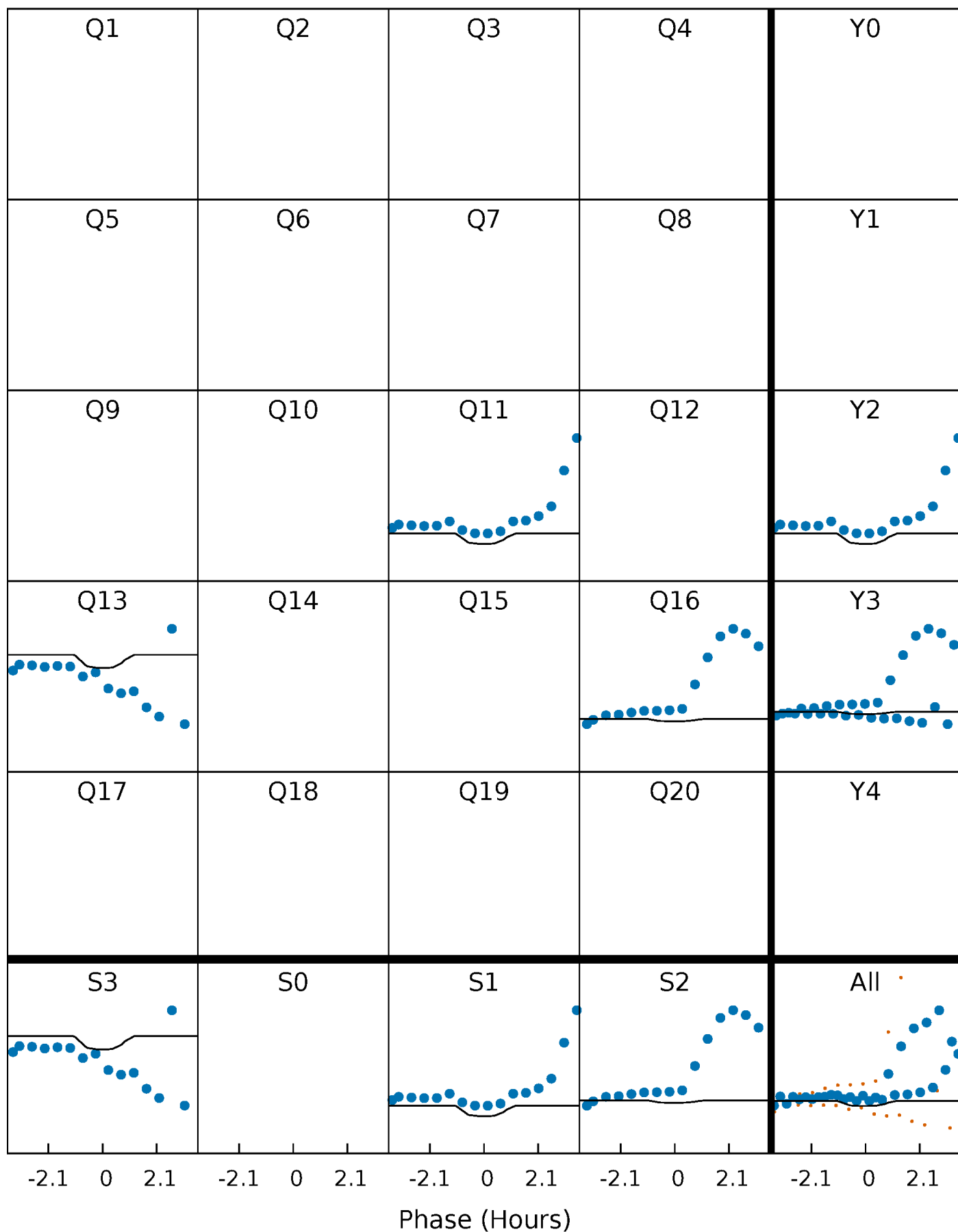
PDC Quarter-Phased Transit Curves

TCE 008028916-04 P=138.721357 Days T₀=251.704459 (BKJD)



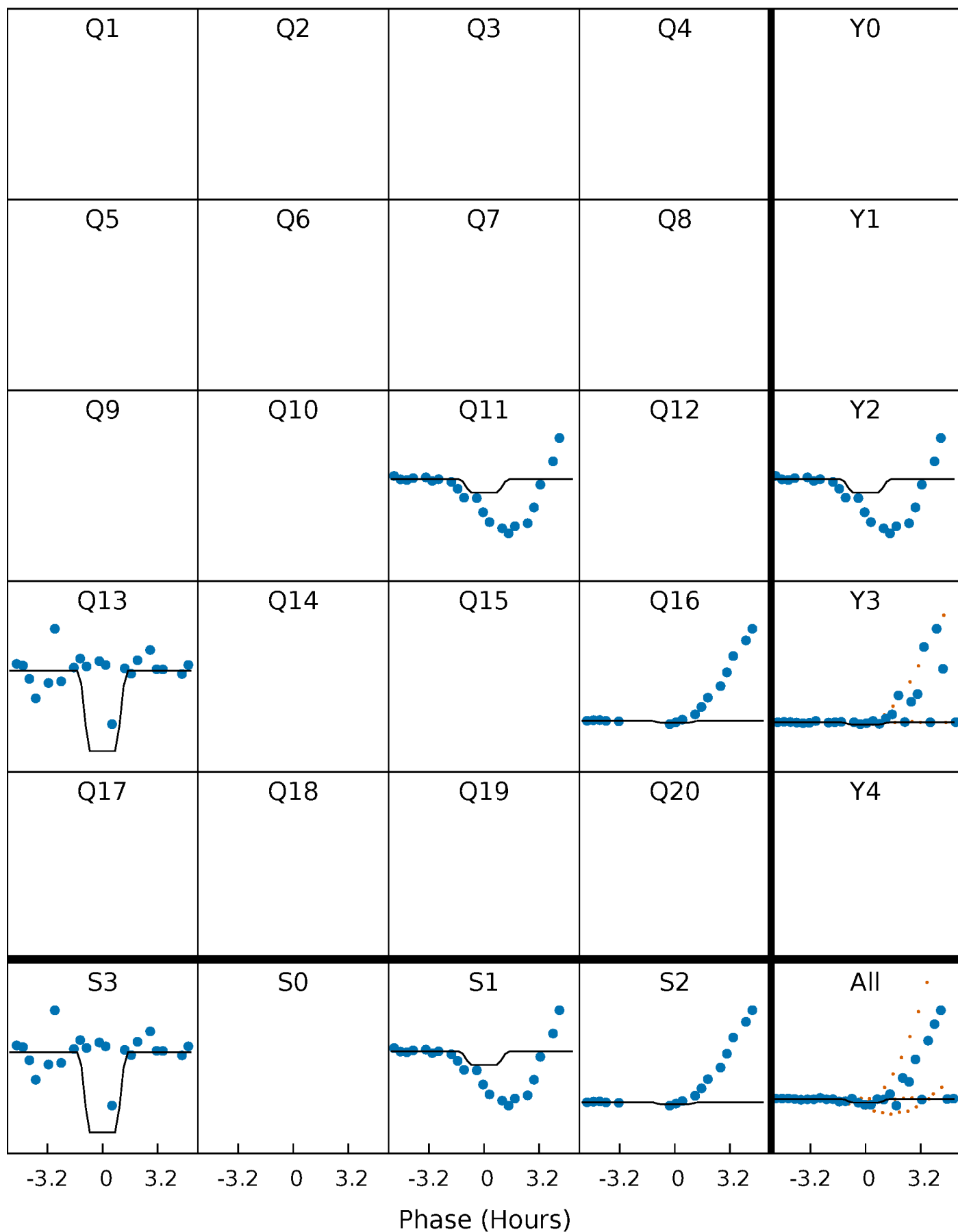
DV Quarter-Phased Transit Curves

TCE 008028916-04 P=138.721357 Days $T_0=251.704459$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

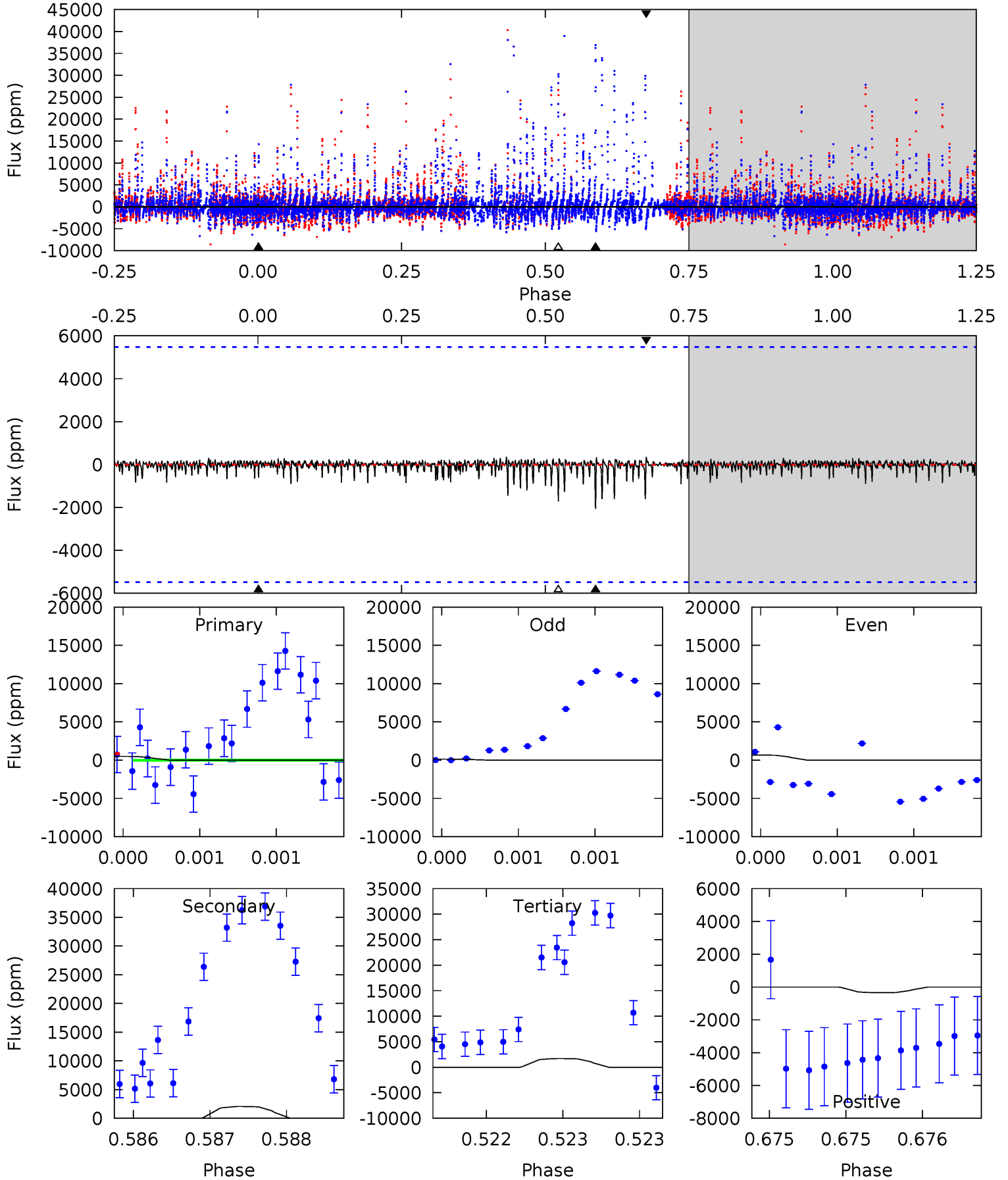
TCE 008028916-04 P=138.694433 Days $T_0=251.835474$ (BKJD)



DV Model-Shift Uniqueness Test

008028916-04, P = 138.721357 Days, E = 251.704459 Days

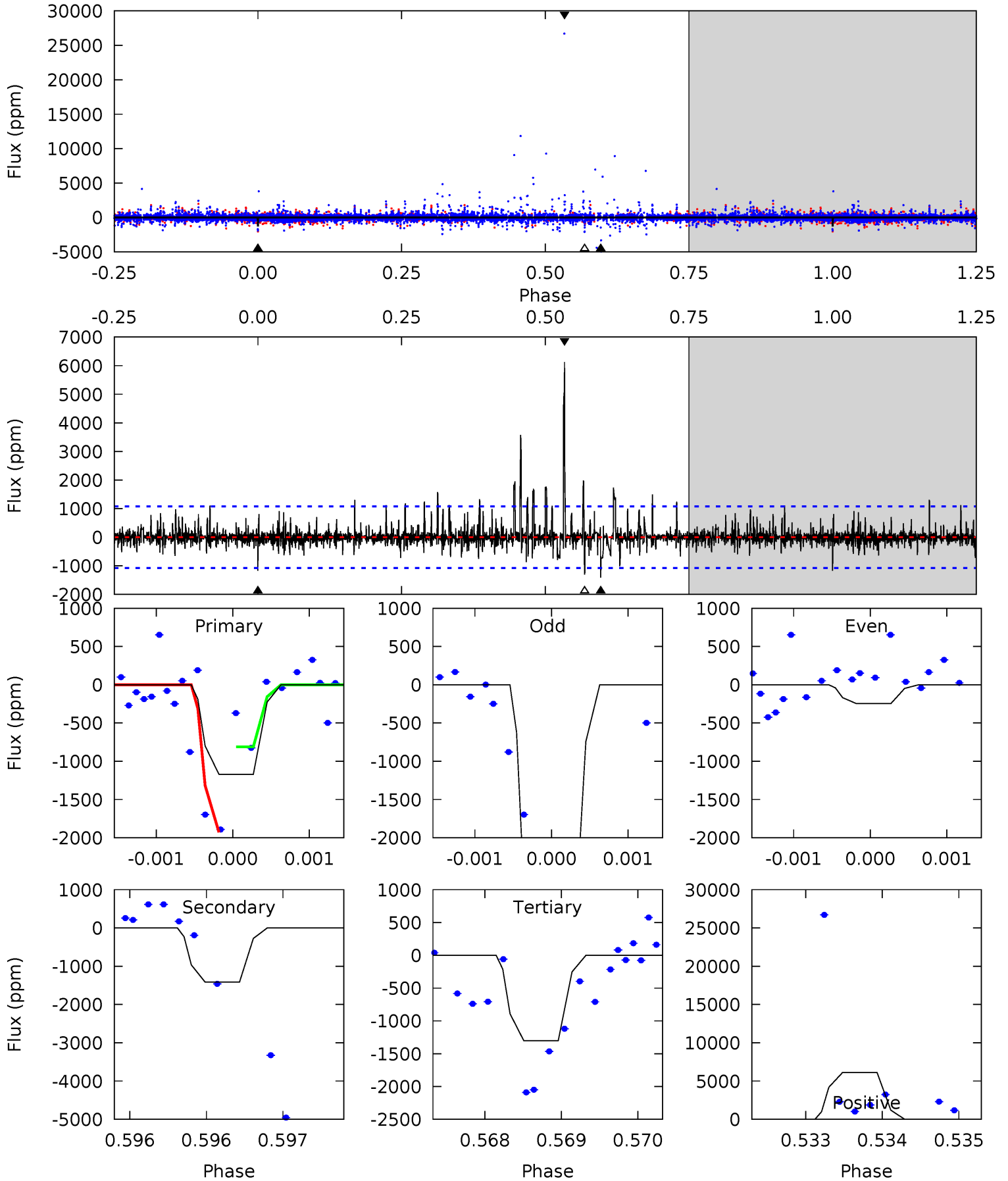
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.49	2.08	1.73	0.35	5.54	3.43	0.20	-1.24	0.14	0.35	1.74	0.22	8.40	0.14	0.42



Alt Model-Shift Uniqueness Test

008028916-04, P = 138.694433 Days, E = 251.835474 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.96	7.20	6.64	31.2	5.49	3.35	1.36	-0.68	-25.2	0.56	-24.0	7.92	6.49	0.81	0



Stellar Parameters For KIC 008028916

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7090^{+200}_{-300}	$4.160^{+0.204}_{-0.167}$	$-0.560^{+0.250}_{-0.300}$	$1.505^{+0.424}_{-0.347}$	$1.192^{+0.174}_{-0.157}$	$0.493^{+0.486}_{-0.229}$
	+3%/-4%	+5%/-4%	+45%/-54%	+28%/-23%	+15%/-13%	+99%/-46%
Source	KIC0	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 008028916-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2060 ± 989	$13.43^{+12.56}_{-9.07}$	712^{+60}_{-50}	5138^{+4408}_{-1373}	1752^{+15246}_{-1389}
Alt.	-1414 ± 196	$13.50^{+14.25}_{-9.18}$	709^{+52}_{-51}	4797^{+3651}_{-1059}	1314^{+12064}_{-983}

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

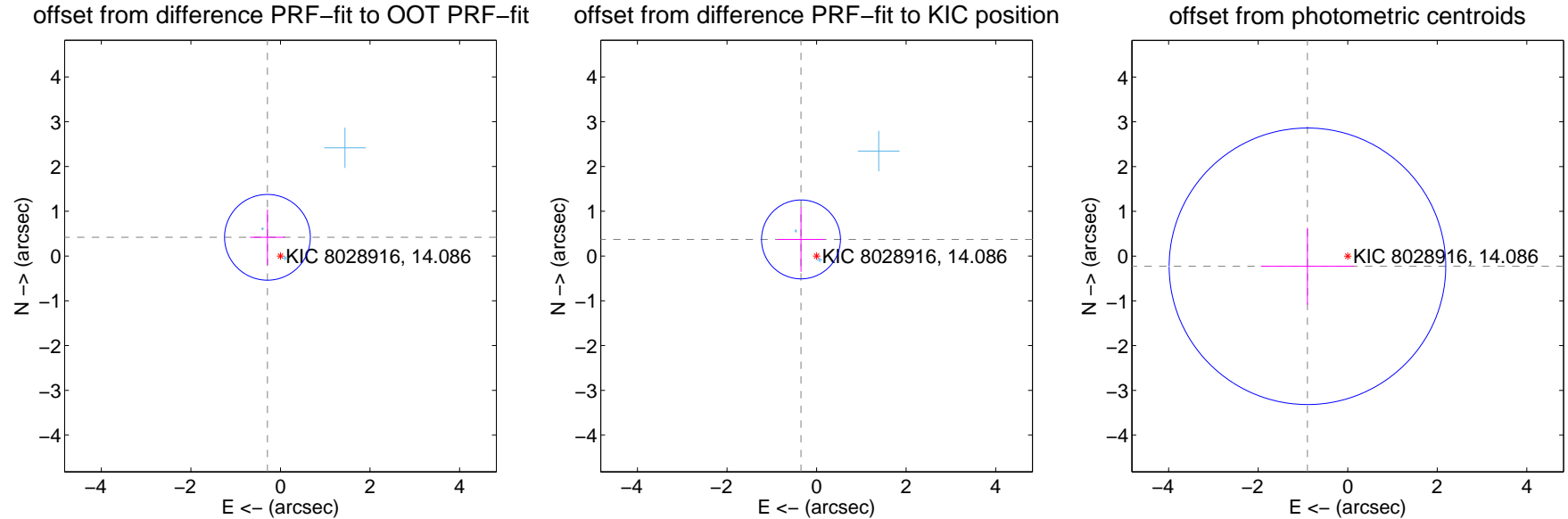
DV Centroid Data

Supplemental centroid analysis for 008028916-04. Kepler magnitude: 14.09. Transit SNR 2.57

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.509 ± 0.319	1.59	0.291 ± 0.390	0.418 ± 0.619
PRF-fit source offset from KIC position	0.509 ± 0.294	1.73	0.348 ± 0.526	0.371 ± 0.724
photometric centroid source offset	0.93 ± 1.03	0.90	0.90 ± 1.04	-0.23 ± 0.86



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- σ uncertainty. Blue circle: three- σ . 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



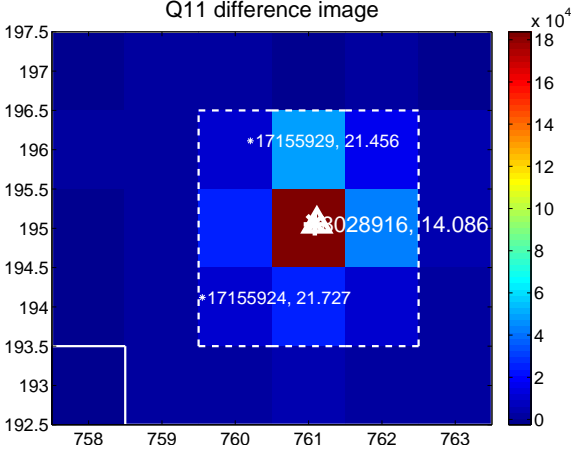
Q10 no difference image



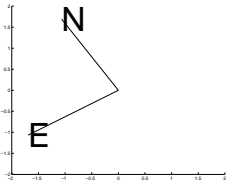
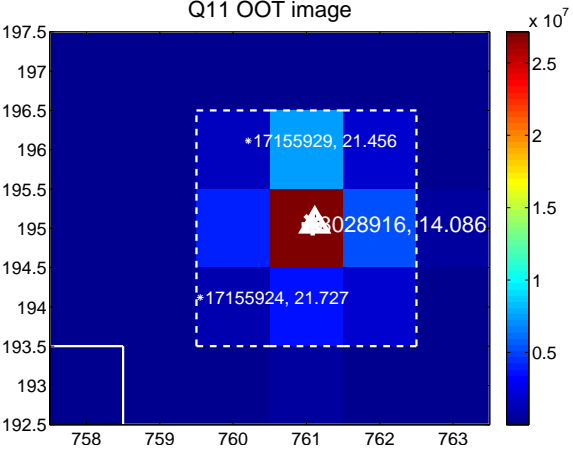
Q10 no OOT image



Q11 difference image



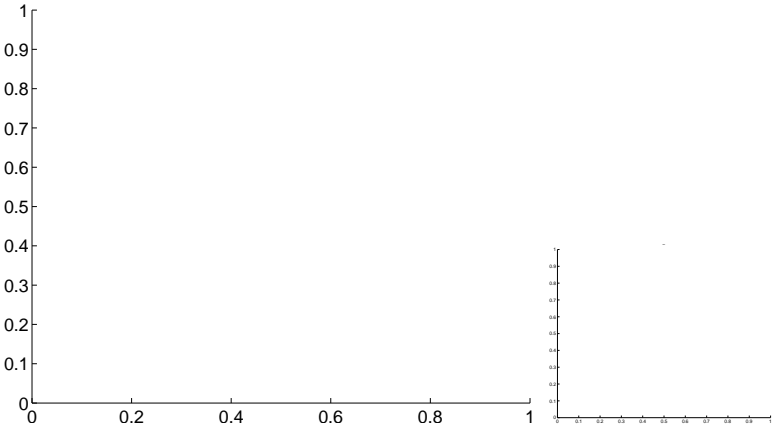
Q11 OOT image



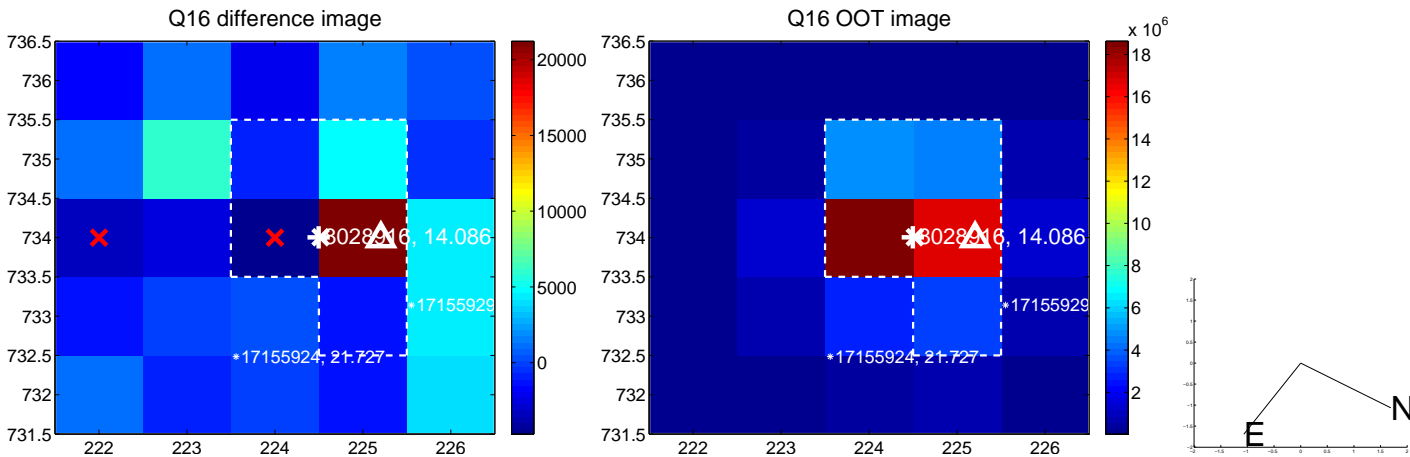
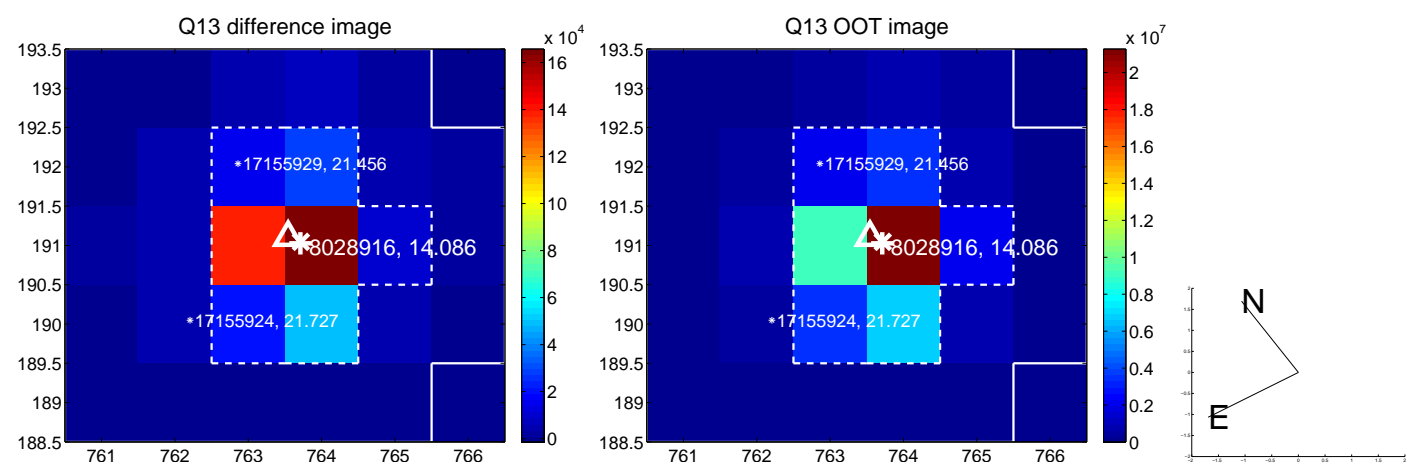
Q12 no difference image



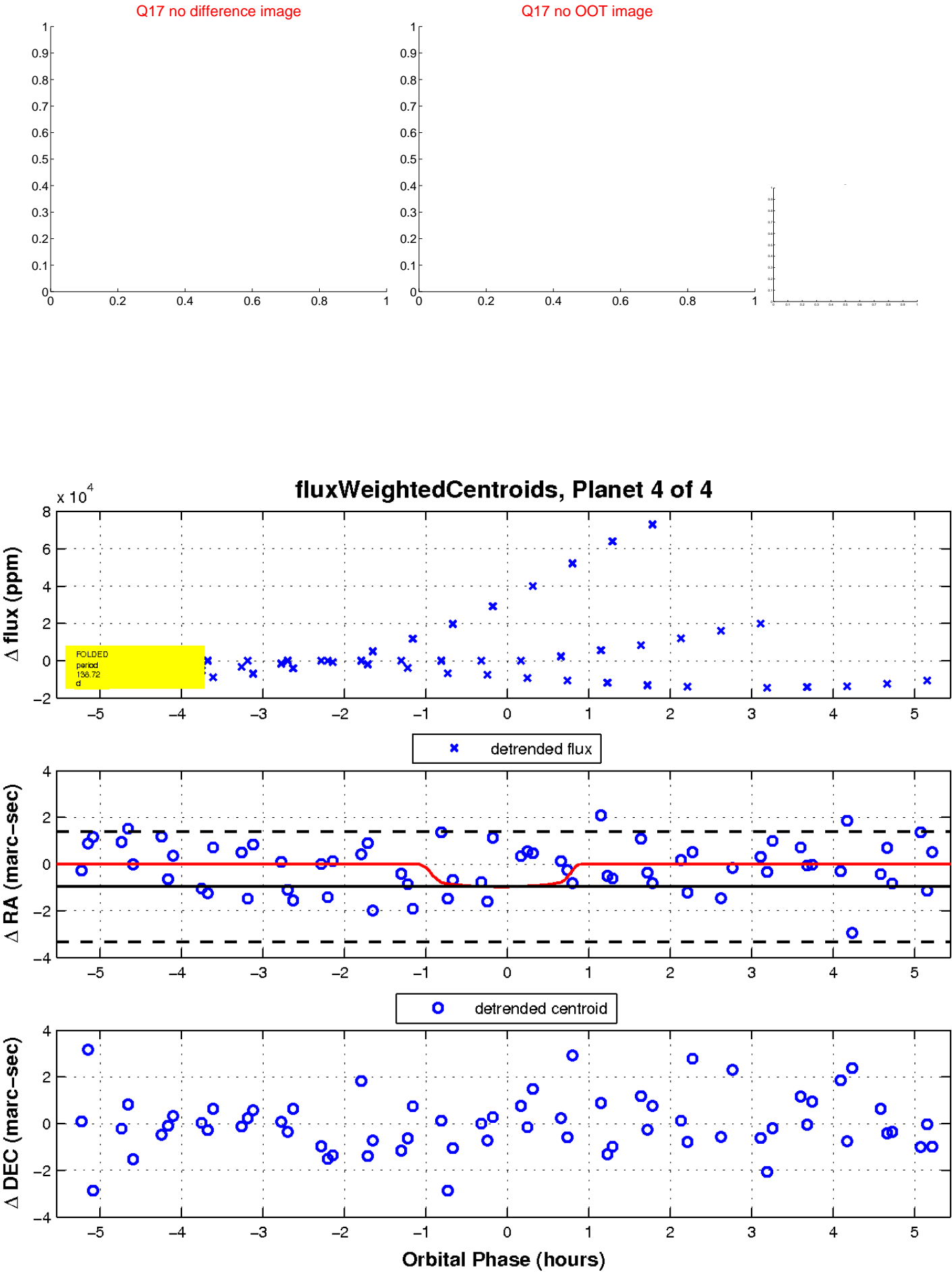
Q12 no OOT image



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

