

KIC 007870746

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})
007870746-01	OBS	No	419.779213	187.447375	2454.6	3.107	12.5	6.1	2.19	4833	10.91	2.03
007870746-03	OBS	No	484.032397	179.214573	3340.0	5.008	12.7	6.4	2.19	4833	12.21	1.68

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007870746-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
007870746-03	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

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

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

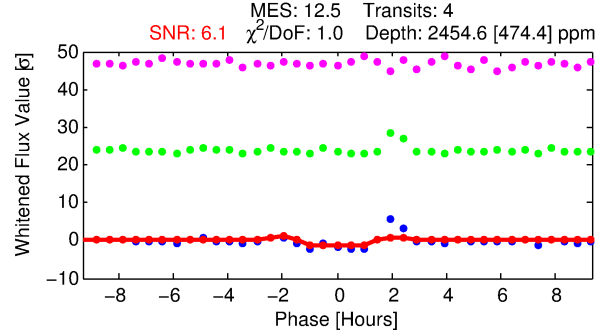
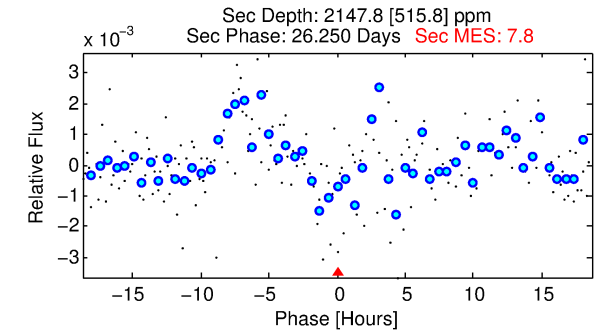
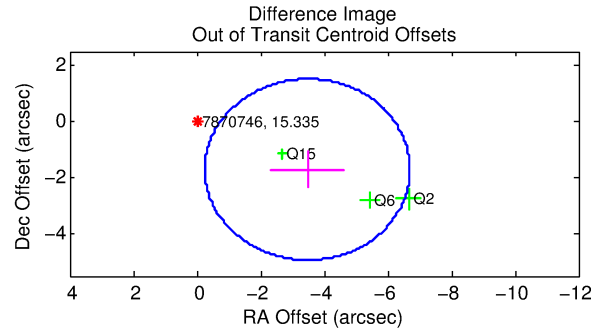
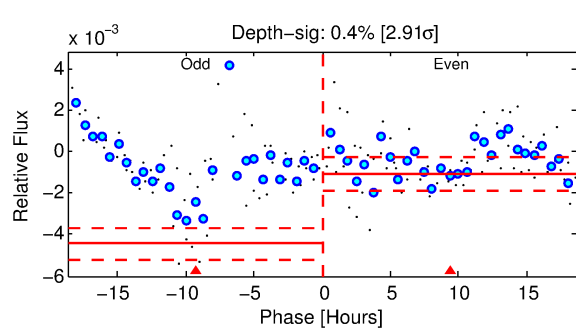
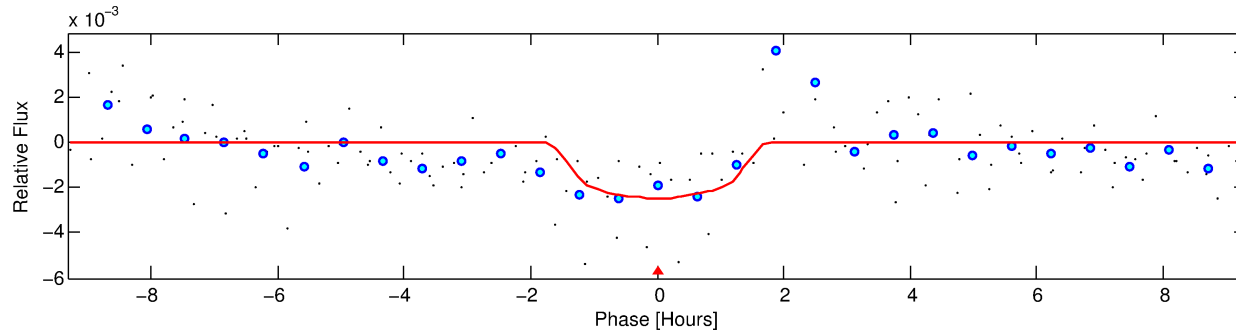
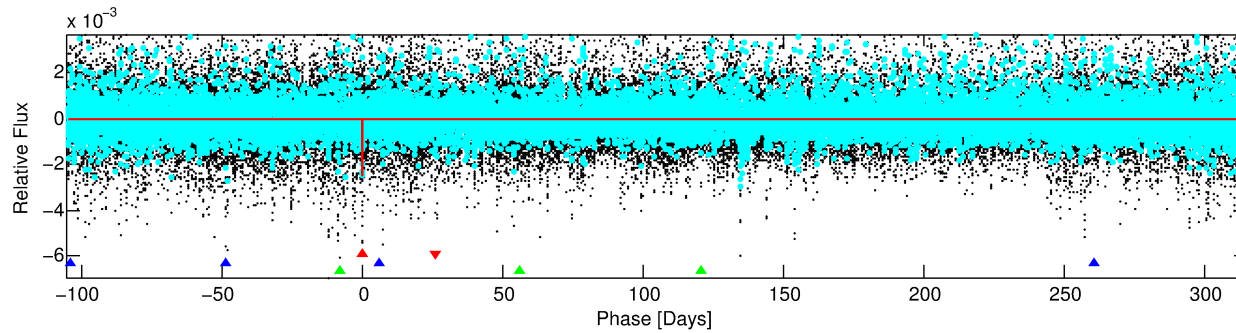
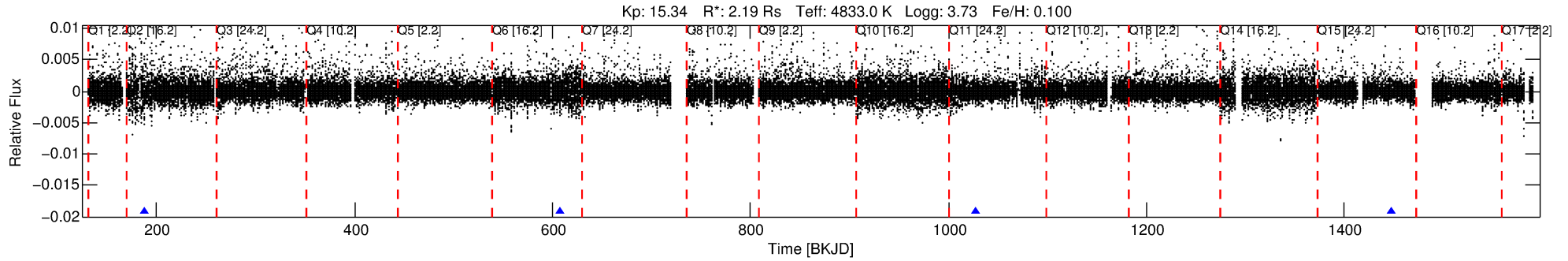
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007870746-01

No Significant Match Found

DV One-Page Summary

KIC: 7870746 Candidate: 1 of 3 Period: 419.779 d



DV Fit Results:

Period = 419.77921 [0.00430] d
Epoch = 187.4474 [0.0093] BKJD
Rp/R* = 0.0457 [0.0796]
a/R* = 948.43 [5149.37]
b = 0.50 [8.37]
Seff = 2.03 [2.96]
Teq = 304 [111] K
Rp = 10.91 [20.53] Re
a = 1.0737 [0.8939] AU
Ag = 11433.58 [43233.44] [0.26 σ]
Teff = 4867 [4253] K [1.07 σ]

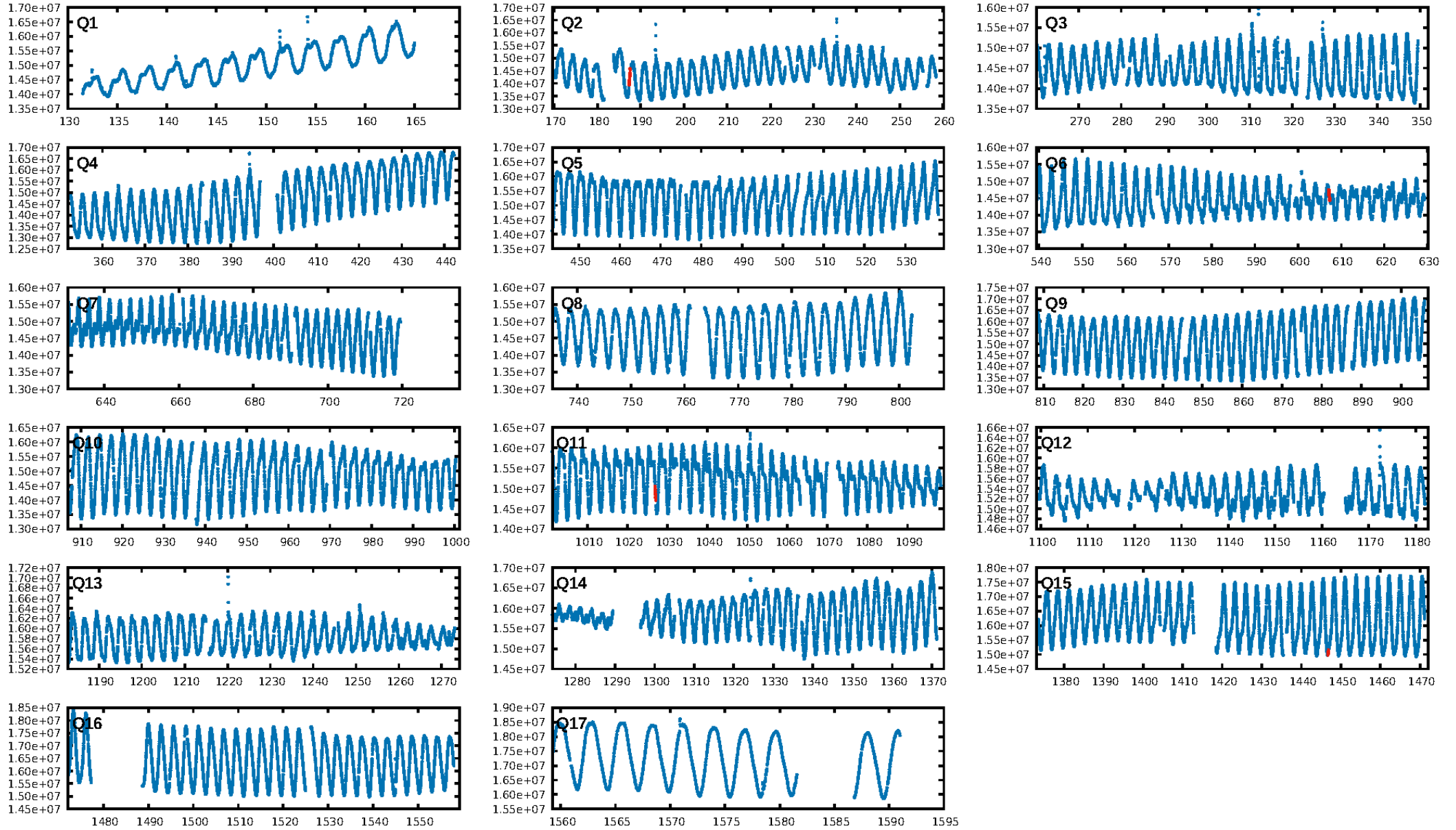
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [216.33 σ]
LongPeriod-sig: 100.0% [261.65 σ]
ModelChiSquare2-sig: 1.1%
ModelChiSquareGof-sig: 85.5%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.9744
Centroid-sig: 10.6%
Centroid-so: 0.797 arcsec [0.39 σ]
OotOffset-rm: 3.871 arcsec [3.60 σ]
KicOffset-rm: 0.535 arcsec [1.93 σ]
OotOffset-st: 2/1/0/0 [3]
KicOffset-st: 2/1/0/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

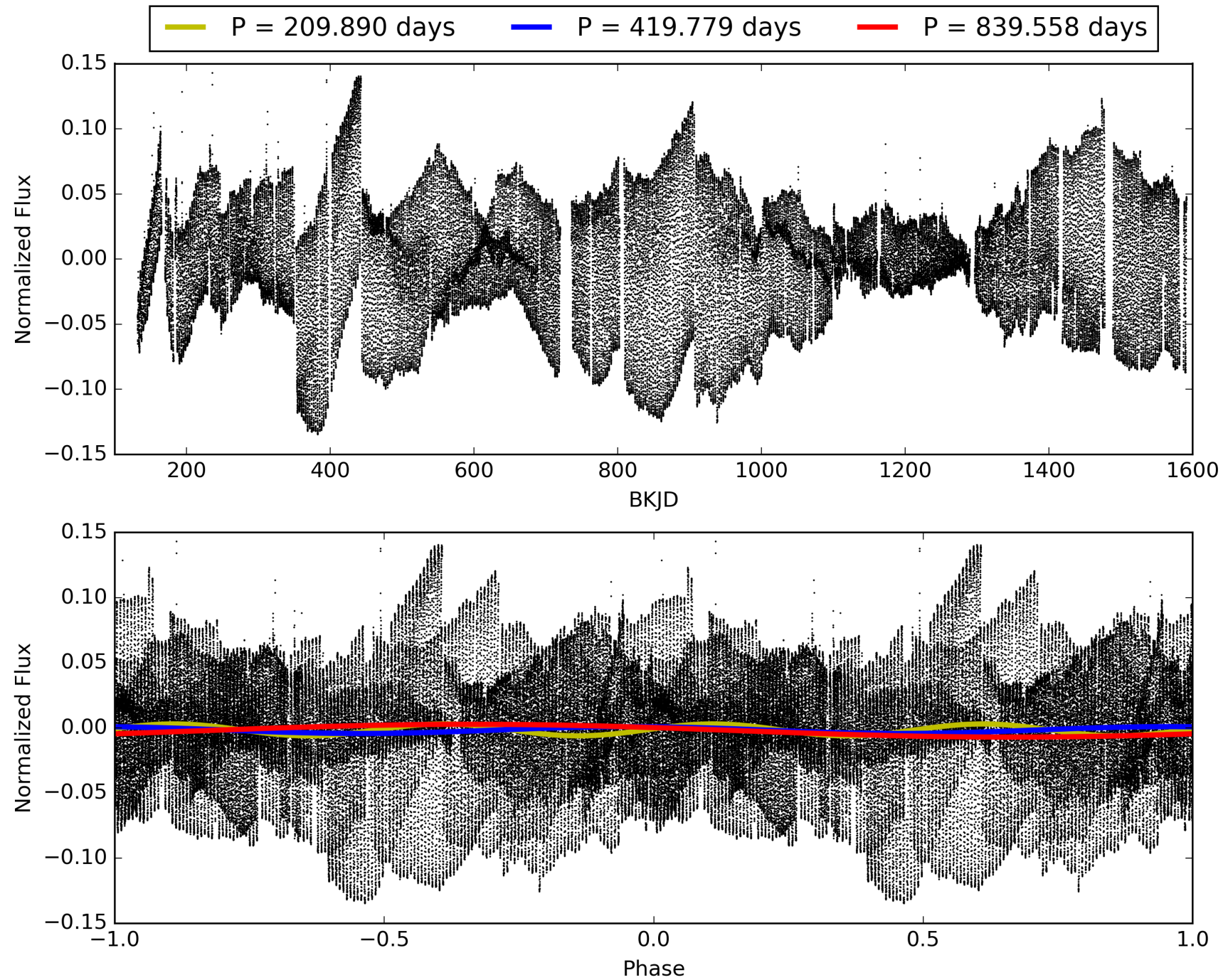
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 08:53:23 Z

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

TCE 007870746-01, PDC Light Curves

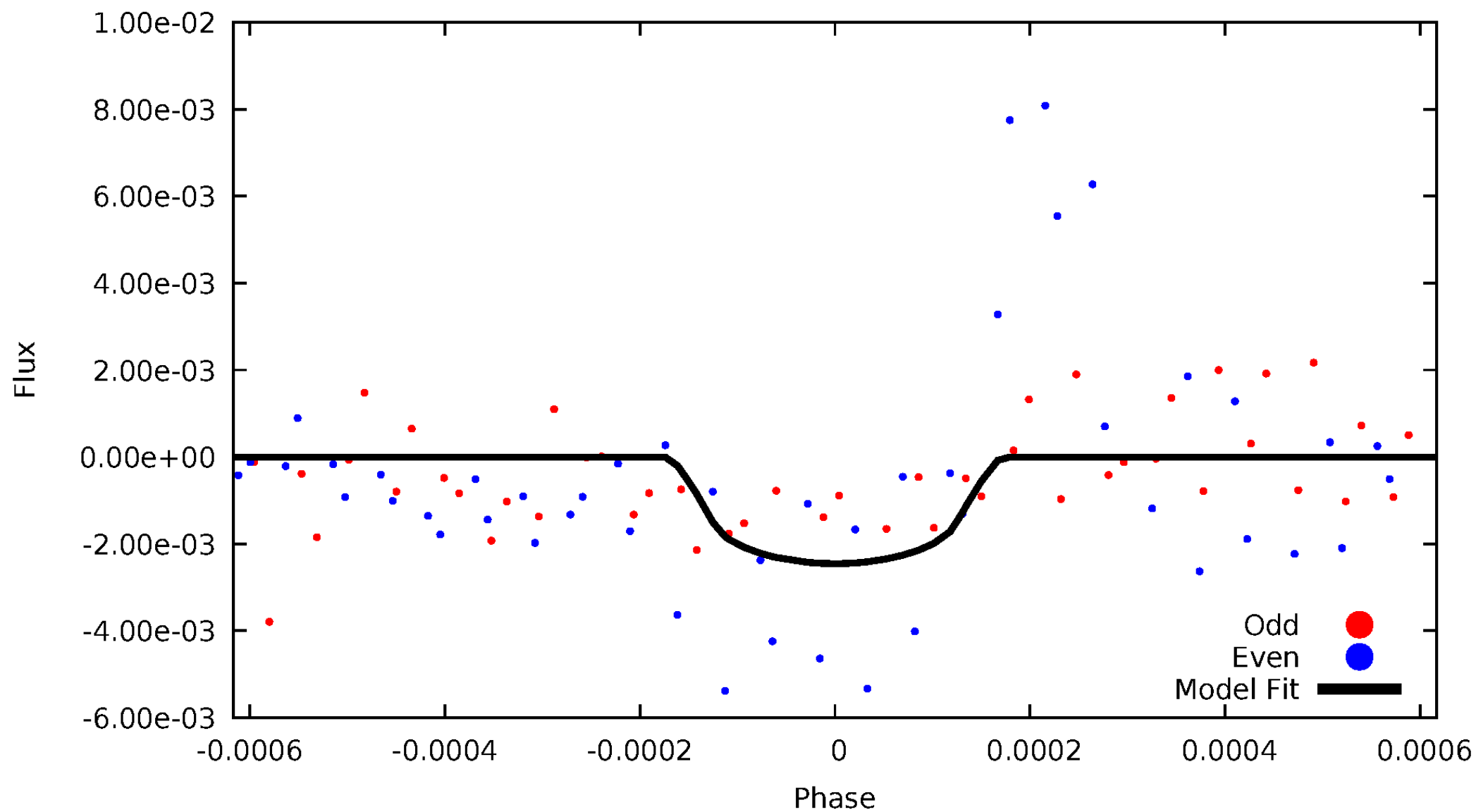


TCE 007870746-01



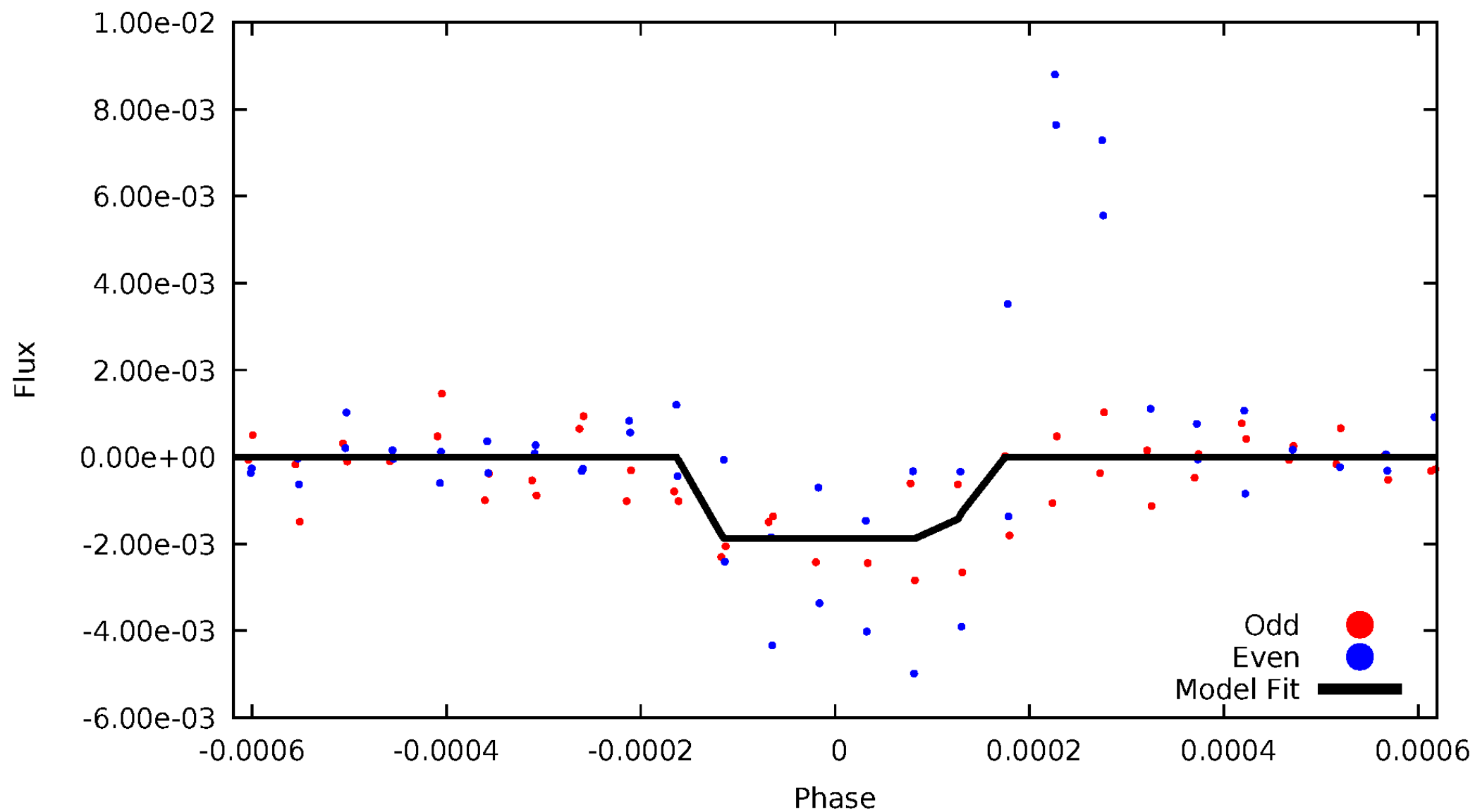
DV Odd/Even

TCE 007870746-01

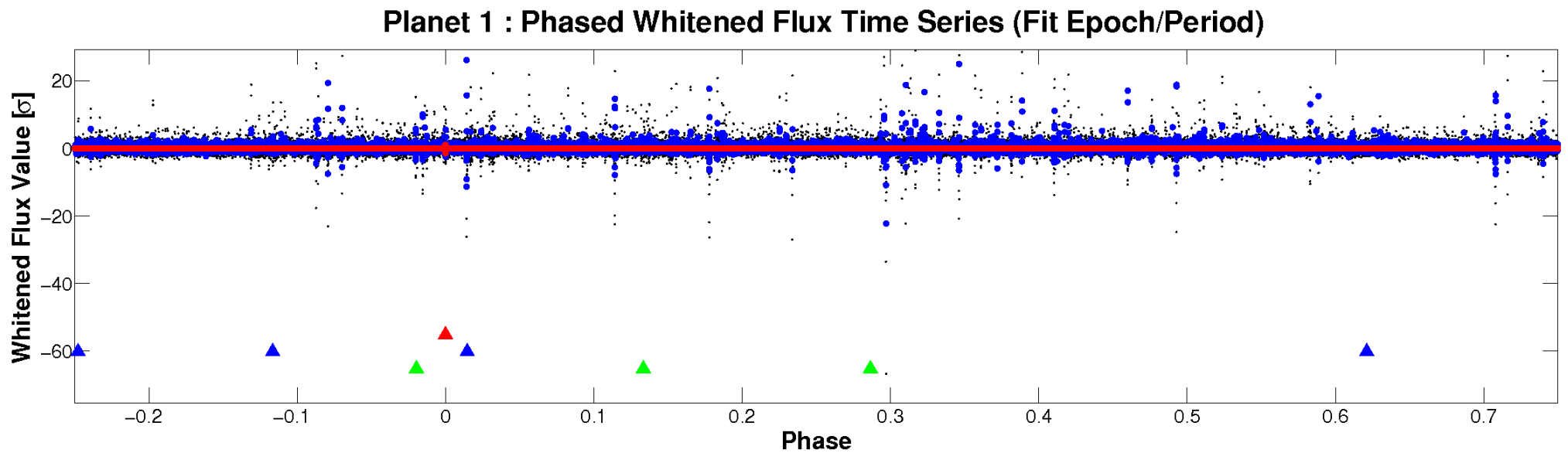
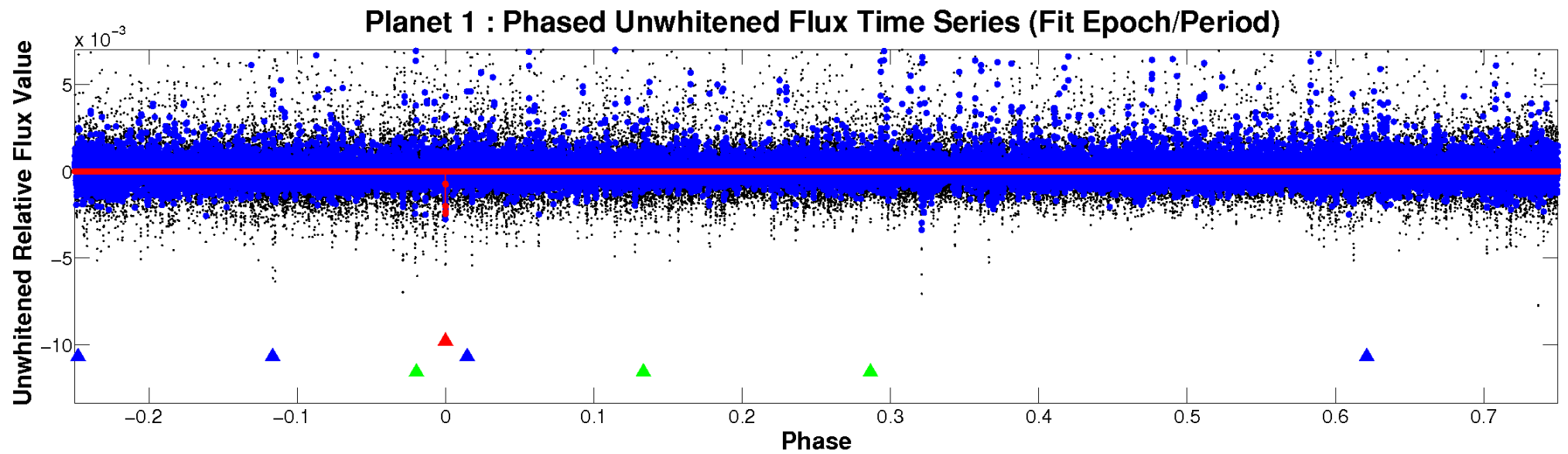


ALT Odd/Even

TCE 007870746-01

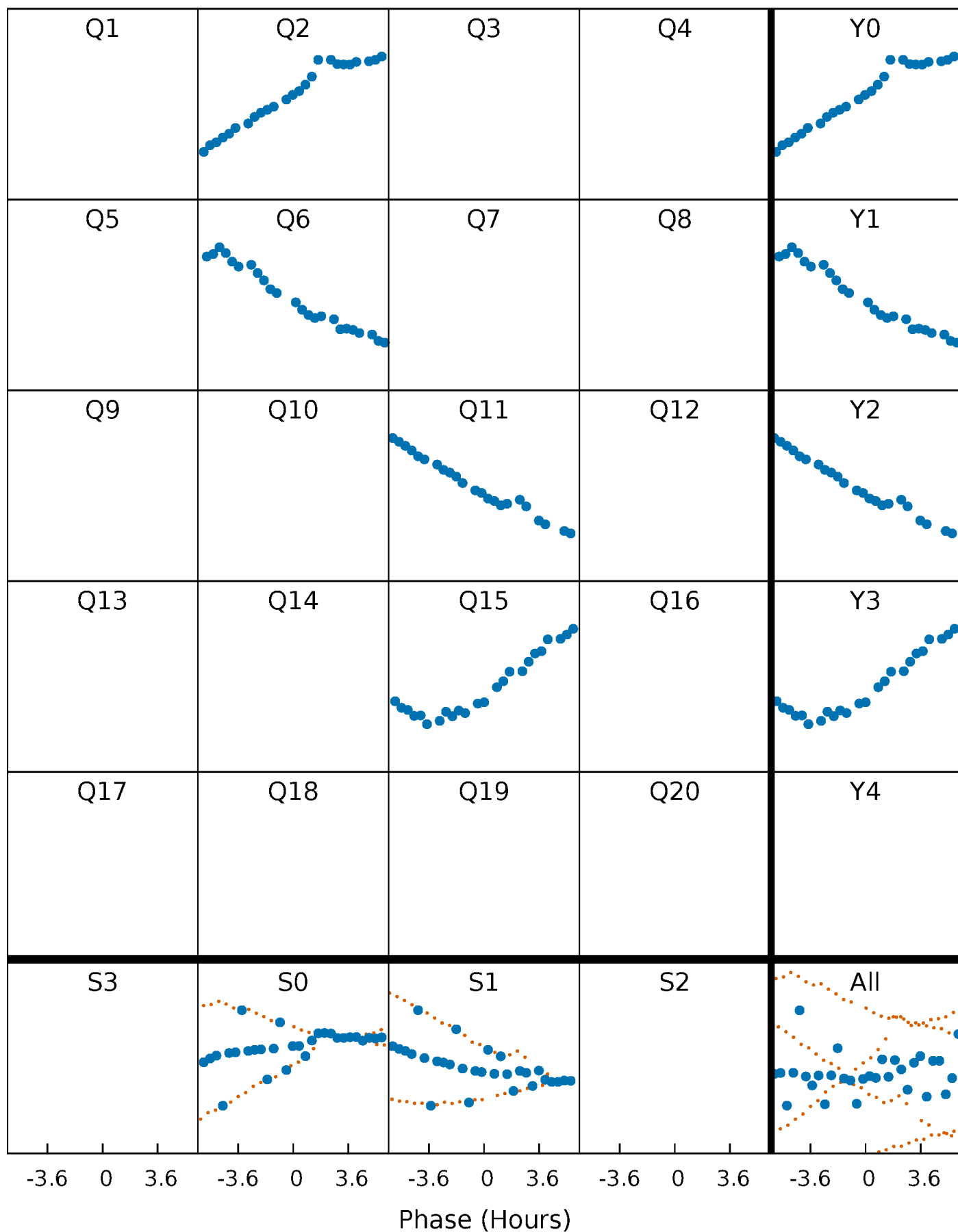


Non-Whitened Vs. Whitened Light Curve



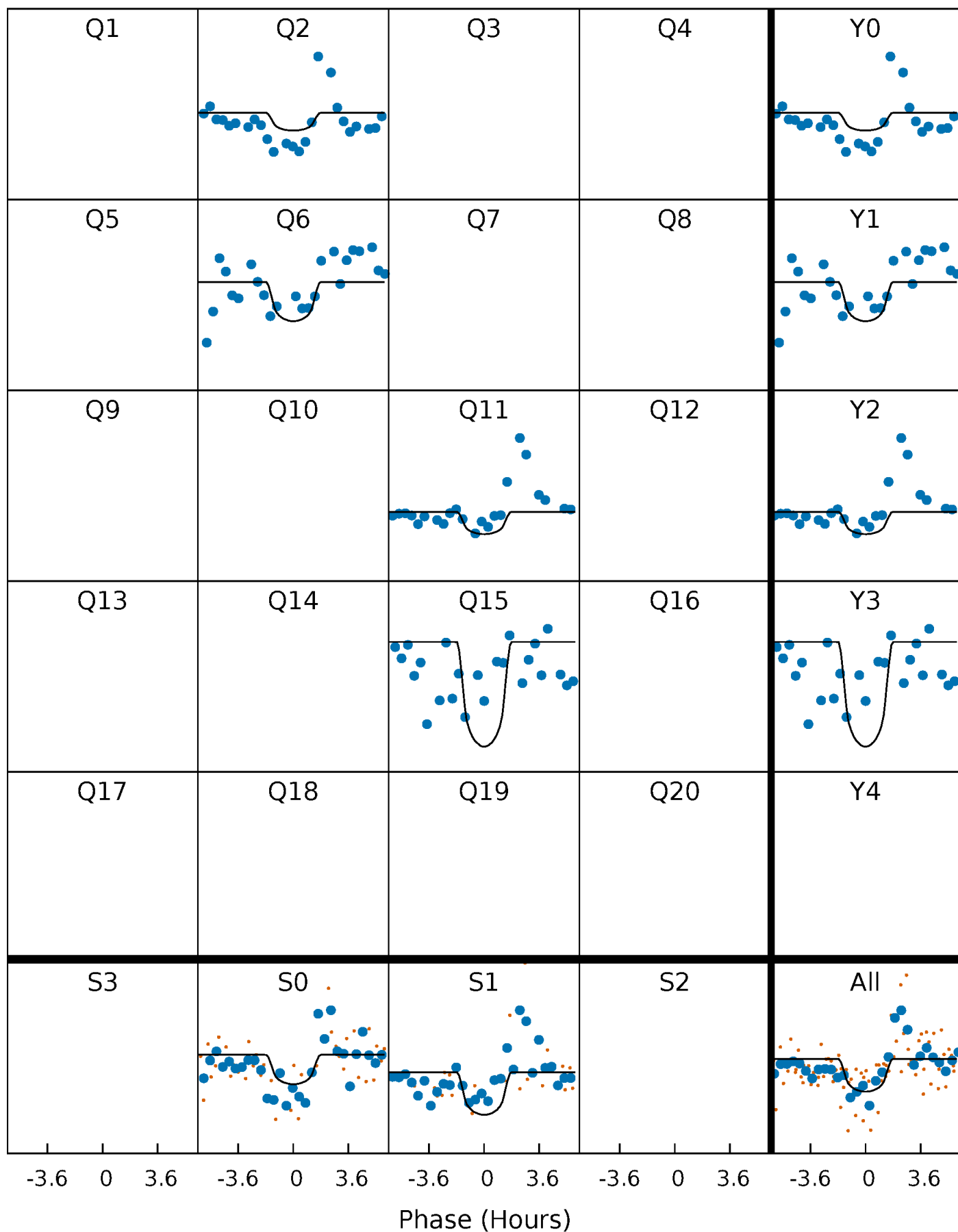
PDC Quarter-Phased Transit Curves

TCE 007870746-01 P=419.779213 Days $T_0=187.447375$ (BKJD)



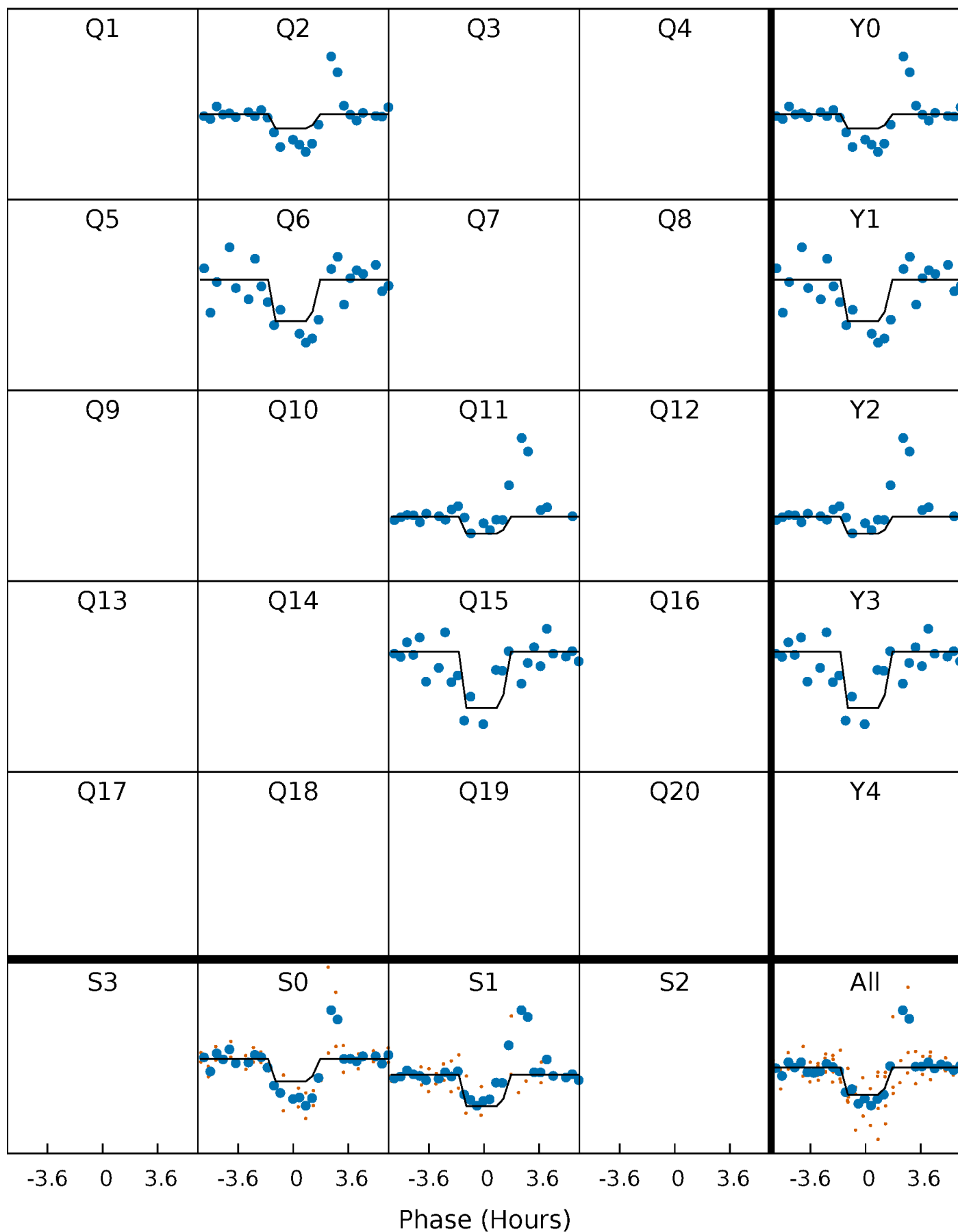
DV Quarter-Phased Transit Curves

TCE 007870746-01 P=419.779213 Days $T_0=187.447375$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

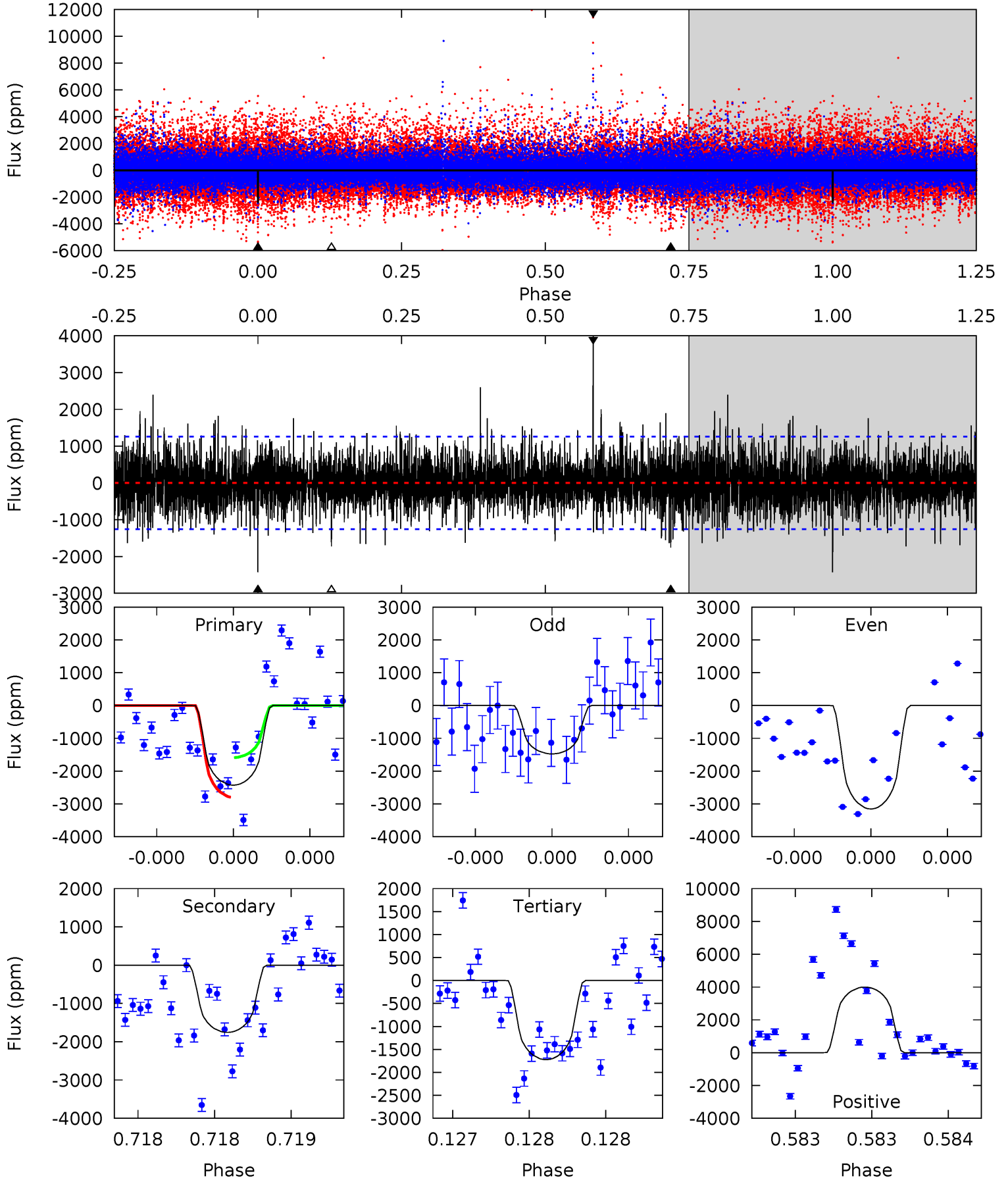
TCE 007870746-01 P=419.787057 Days $T_0=187.427269$ (BKJD)



DV Model-Shift Uniqueness Test

007870746-01, P = 419.779213 Days, E = 187.447375 Days

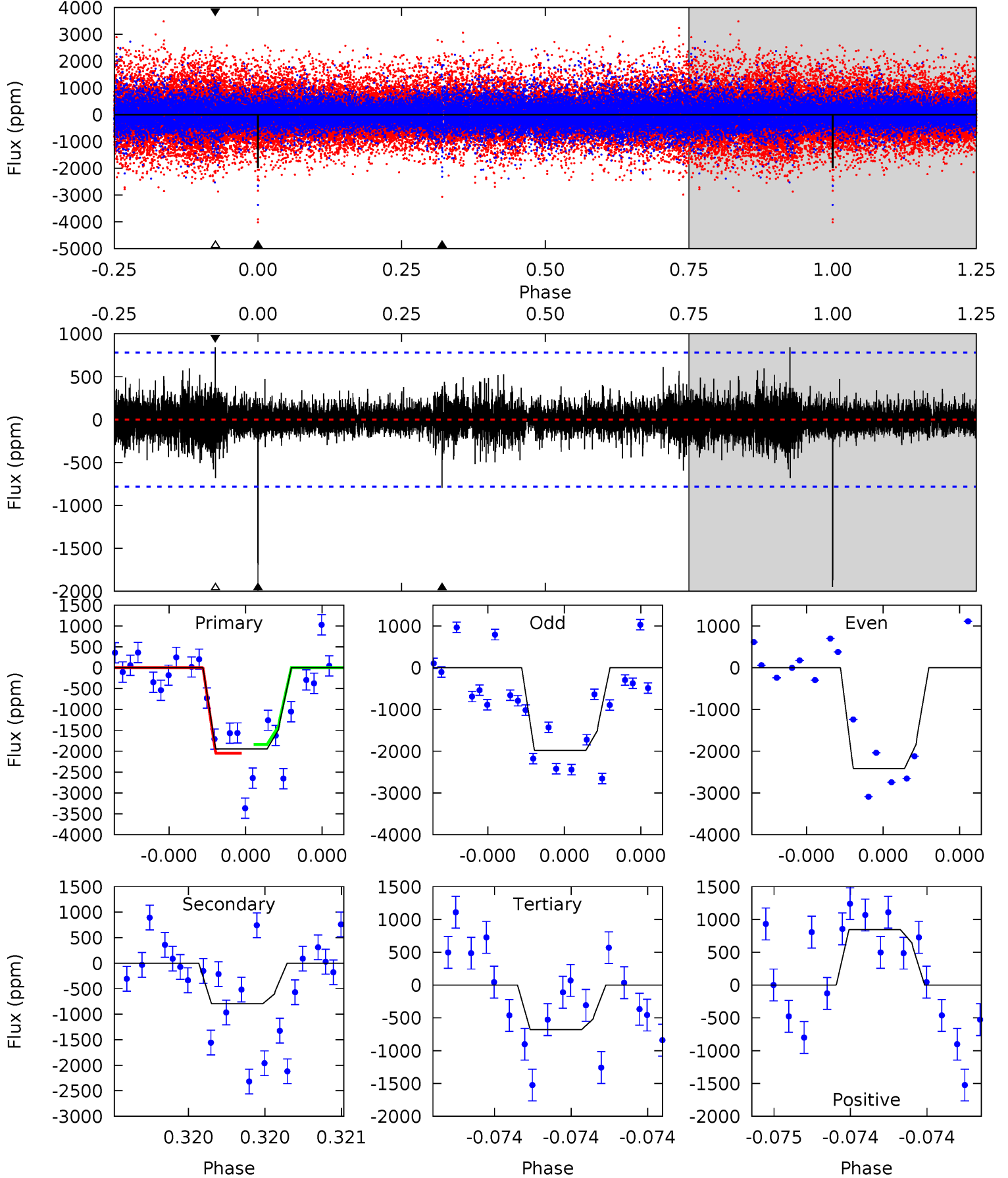
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.9	7.87	7.73	17.9	5.63	3.57	2.13	3.16	-7.04	0.15	-10.1	3.16	1.52	0.62	2.67



Alt Model-Shift Uniqueness Test

007870746-01, $P = 419.787057$ Days, $E = 187.427269$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.1	5.77	4.93	6.13	5.67	3.62	0.83	9.20	8.00	0.83	-0.37	1.56	1.11	0.30	0.75



Stellar Parameters For KIC 007870746

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4833^{+99}_{-170}	$3.729^{+0.893}_{-0.298}$	$0.100^{+0.200}_{-0.350}$	$2.189^{+1.035}_{-1.552}$	$0.935^{+0.173}_{-0.237}$	$0.126^{+3.253}_{-0.088}$
	+2%/-4%	+24%/-8%	+200%/-350%	+47%/-71%	+19%/-25%	+2592%/-70%
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 007870746-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1756 ± 223	$15.47^{+16.86}_{-10.89}$	416^{+54}_{-79}	3924^{+2519}_{-784}	4733^{+44059}_{-3709}
Alt.	-795 ± 138	$15.24^{+17.52}_{-10.17}$	420^{+53}_{-81}	3438^{+1592}_{-612}	2170^{+18352}_{-1722}

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

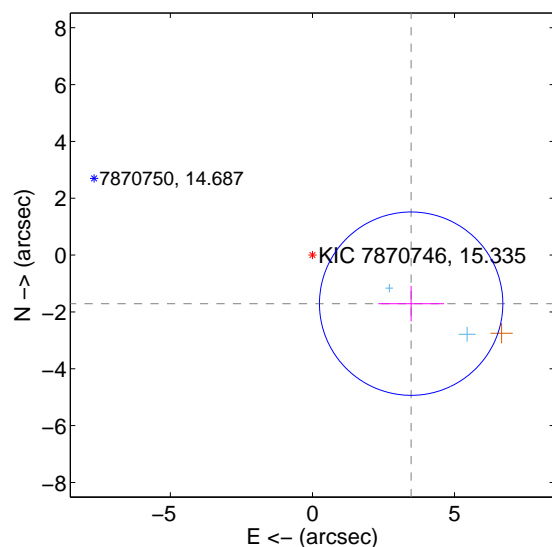
Supplemental centroid analysis for 007870746-01. Kepler magnitude: 15.34. Transit SNR 6.14

There are 2 quarters with good PRF difference image offsets

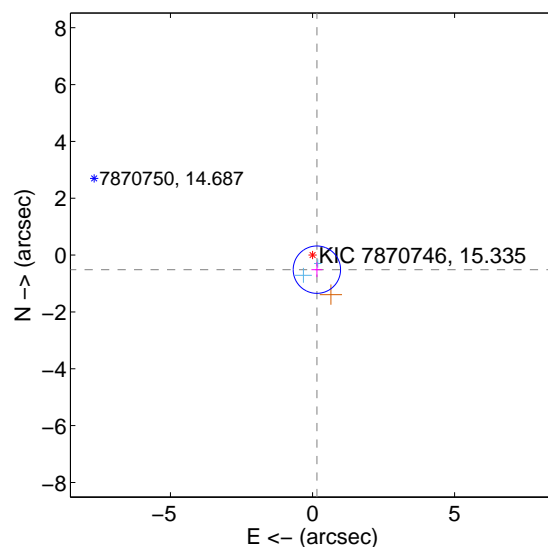
The OOT PRF centroid is offset from the target star catalog position by about 2.66 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.871 ± 1.075	3.60	-3.473 ± 1.158	-1.709 ± 0.625
PRF-fit source offset from KIC position	0.535 ± 0.278	1.93	-0.153 ± 0.192	-0.513 ± 0.261
photometric centroid source offset	0.80 ± 2.05	0.39	-0.78 ± 2.09	-0.16 ± 0.80

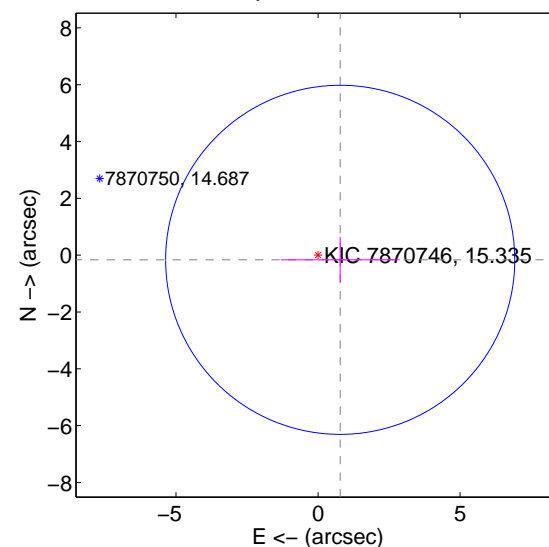
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

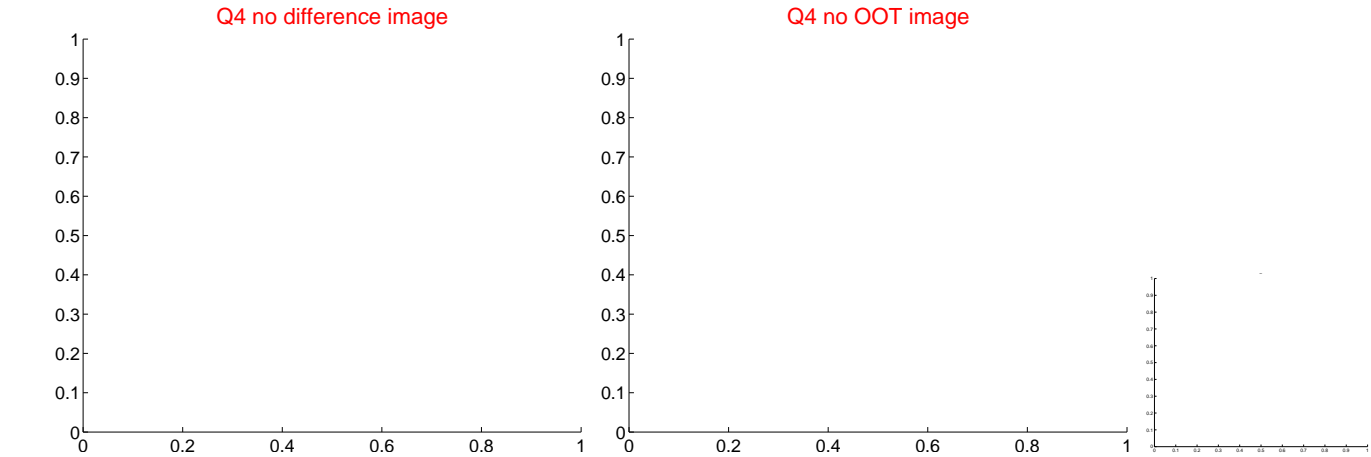
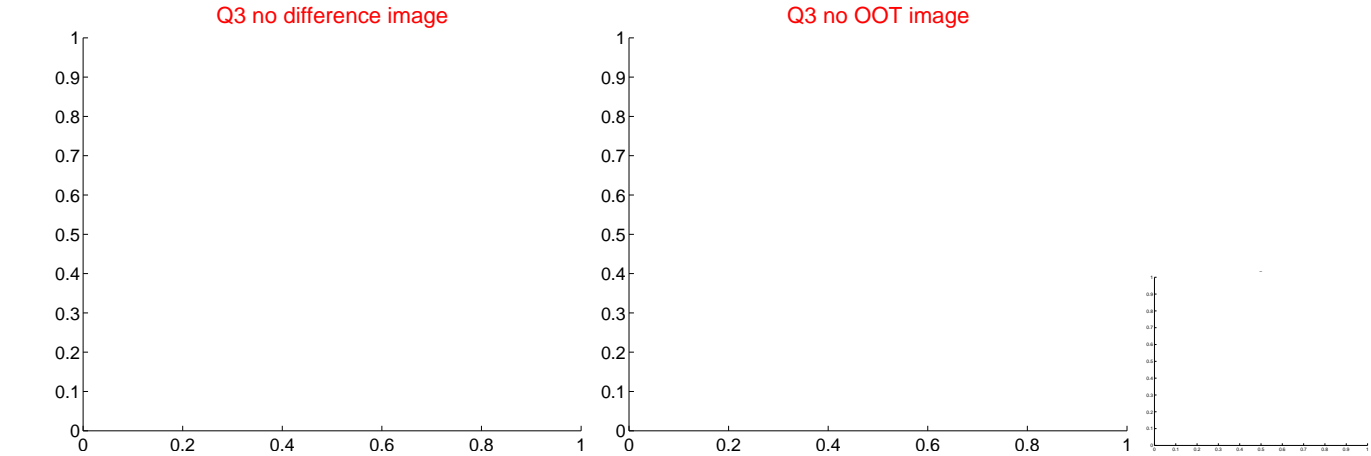
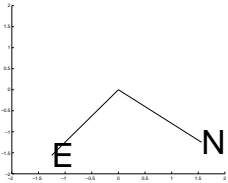
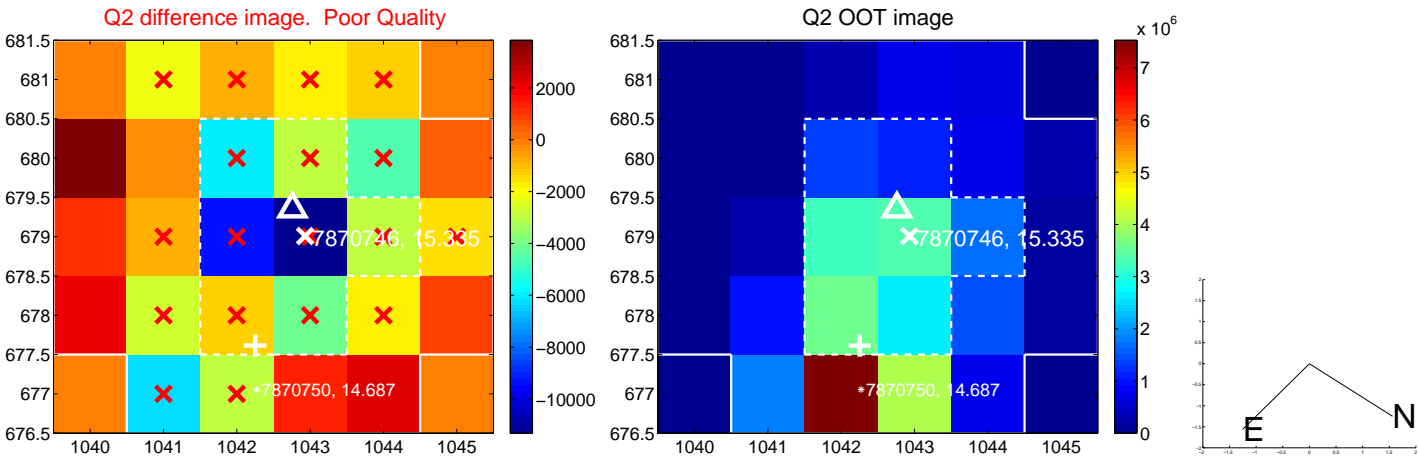
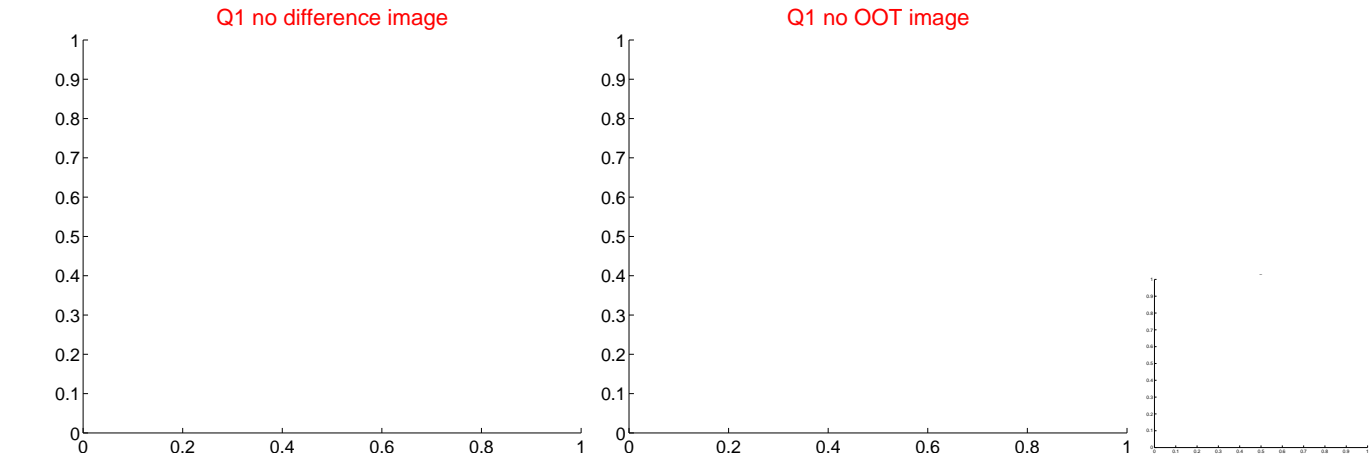


offset from photometric centroids

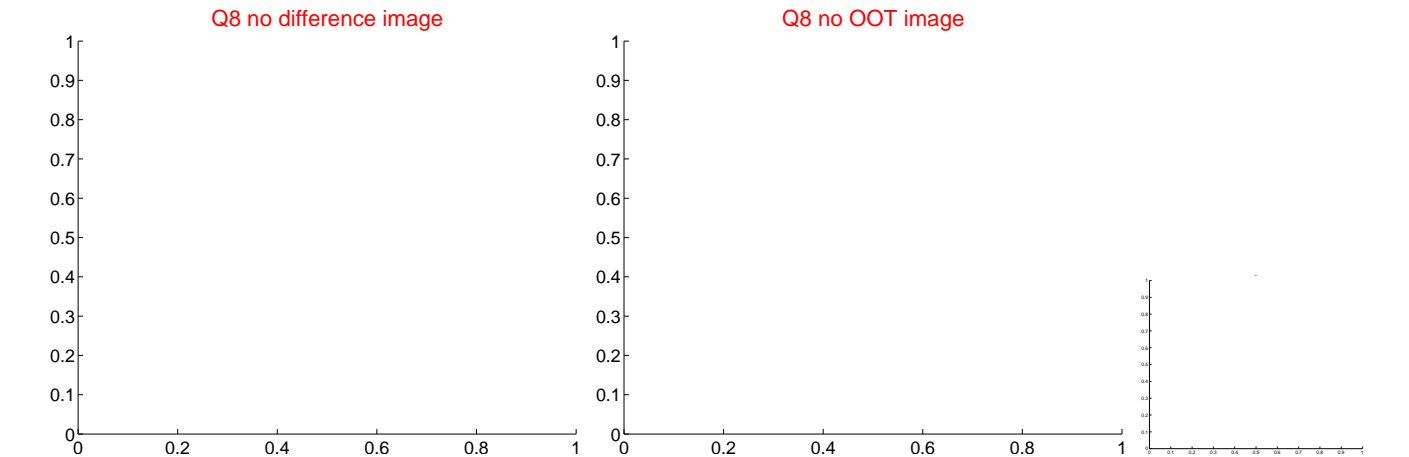
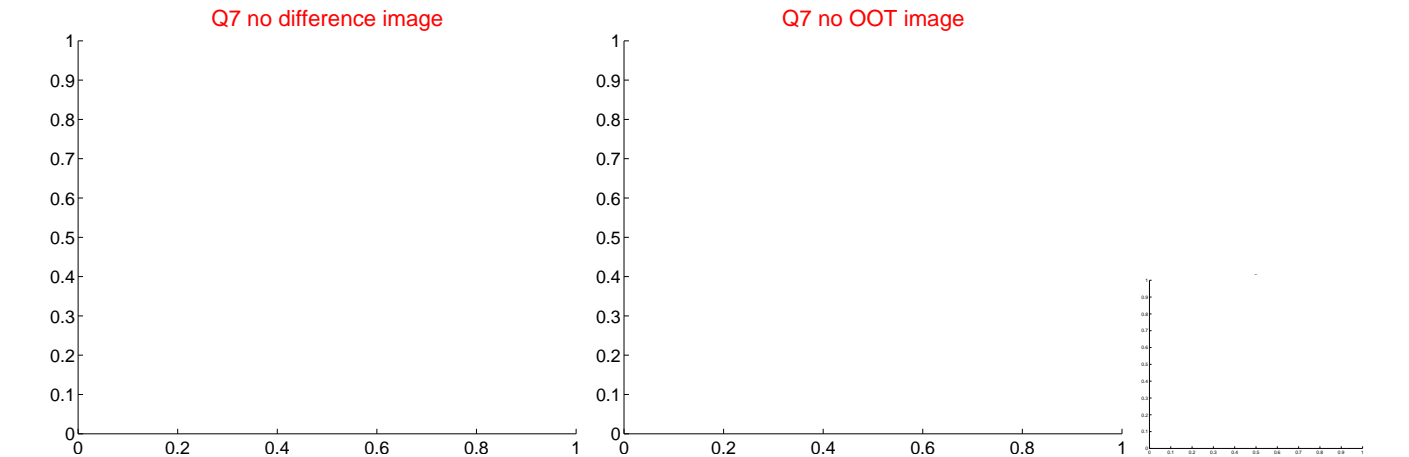
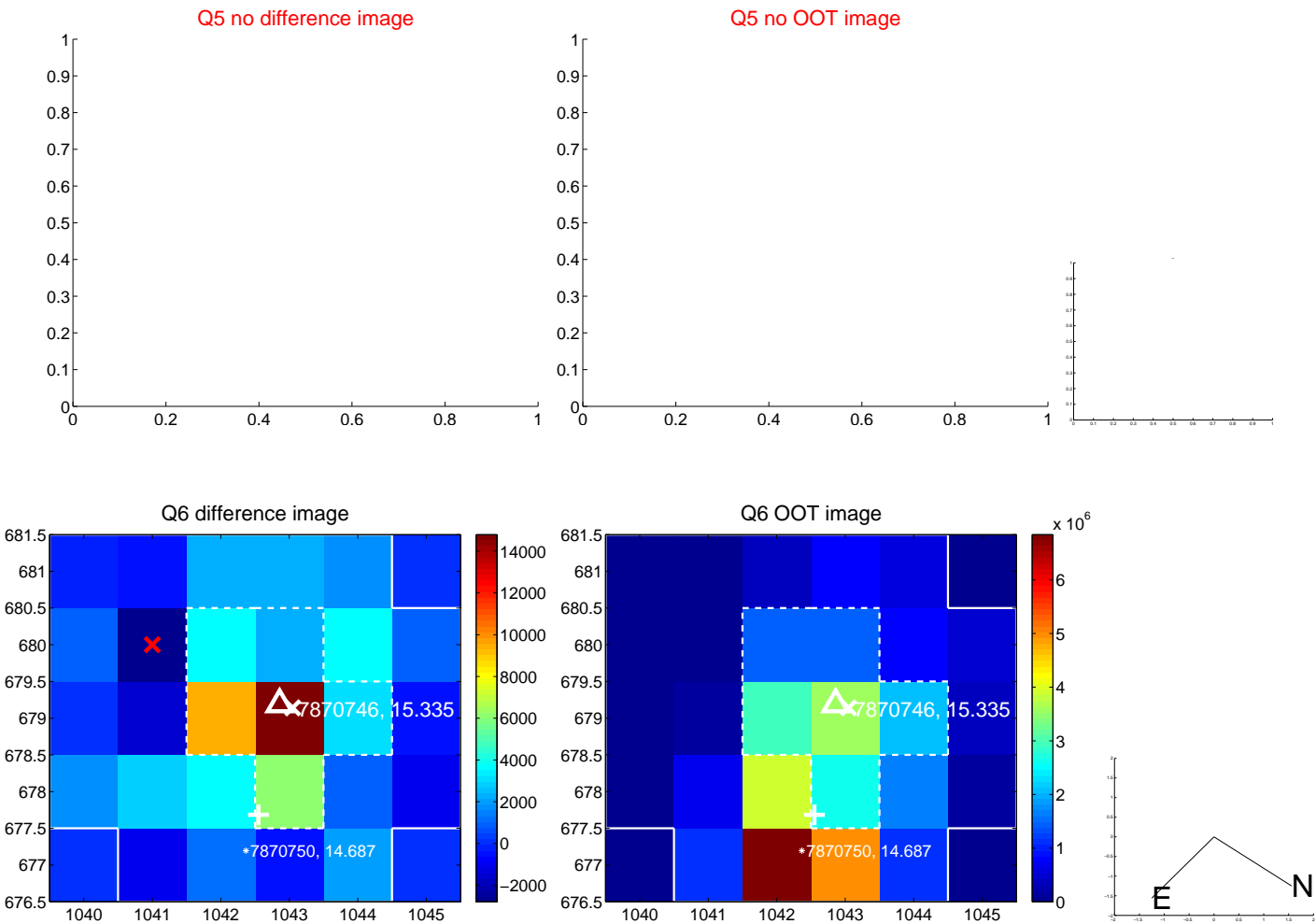


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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



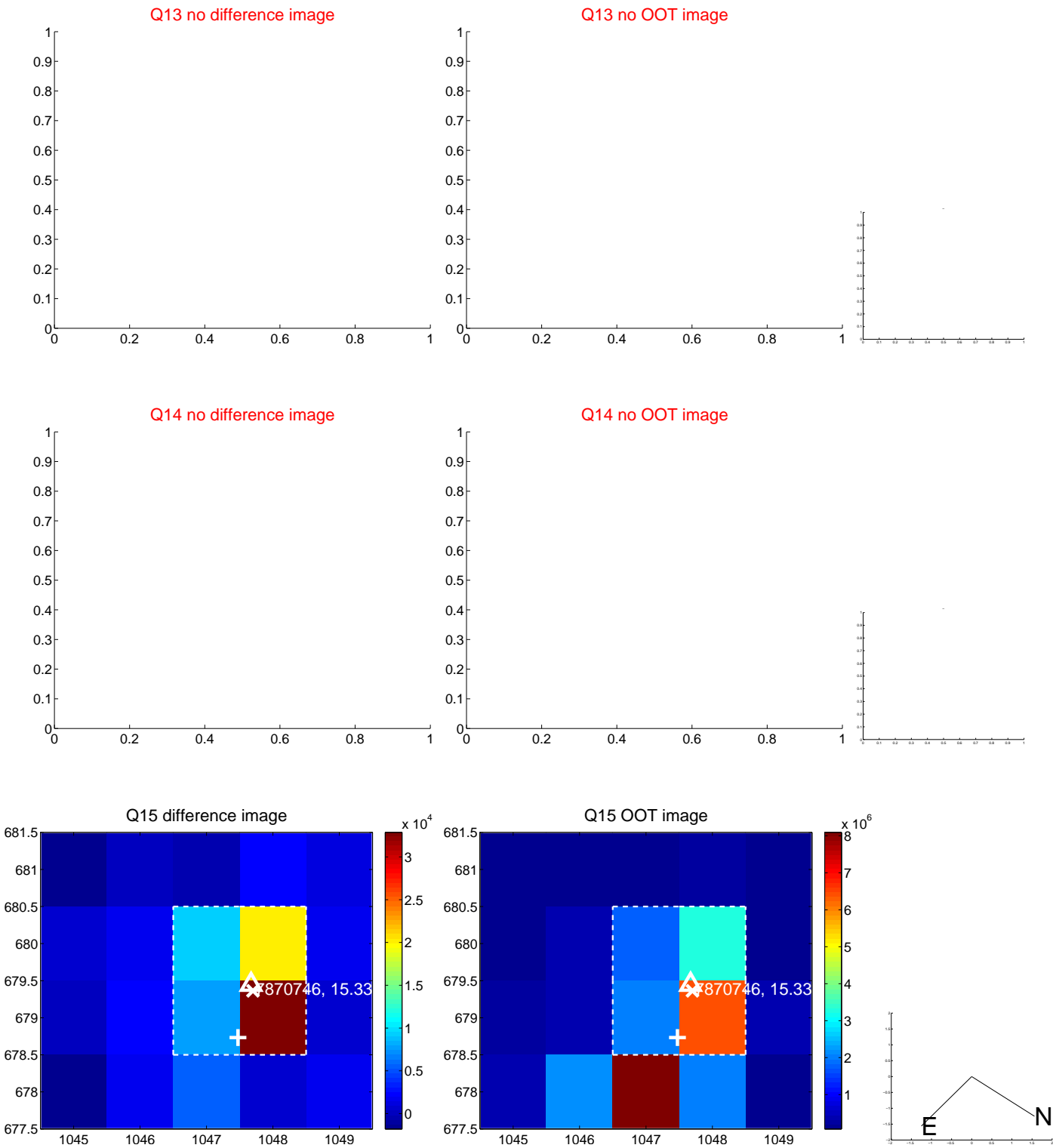
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



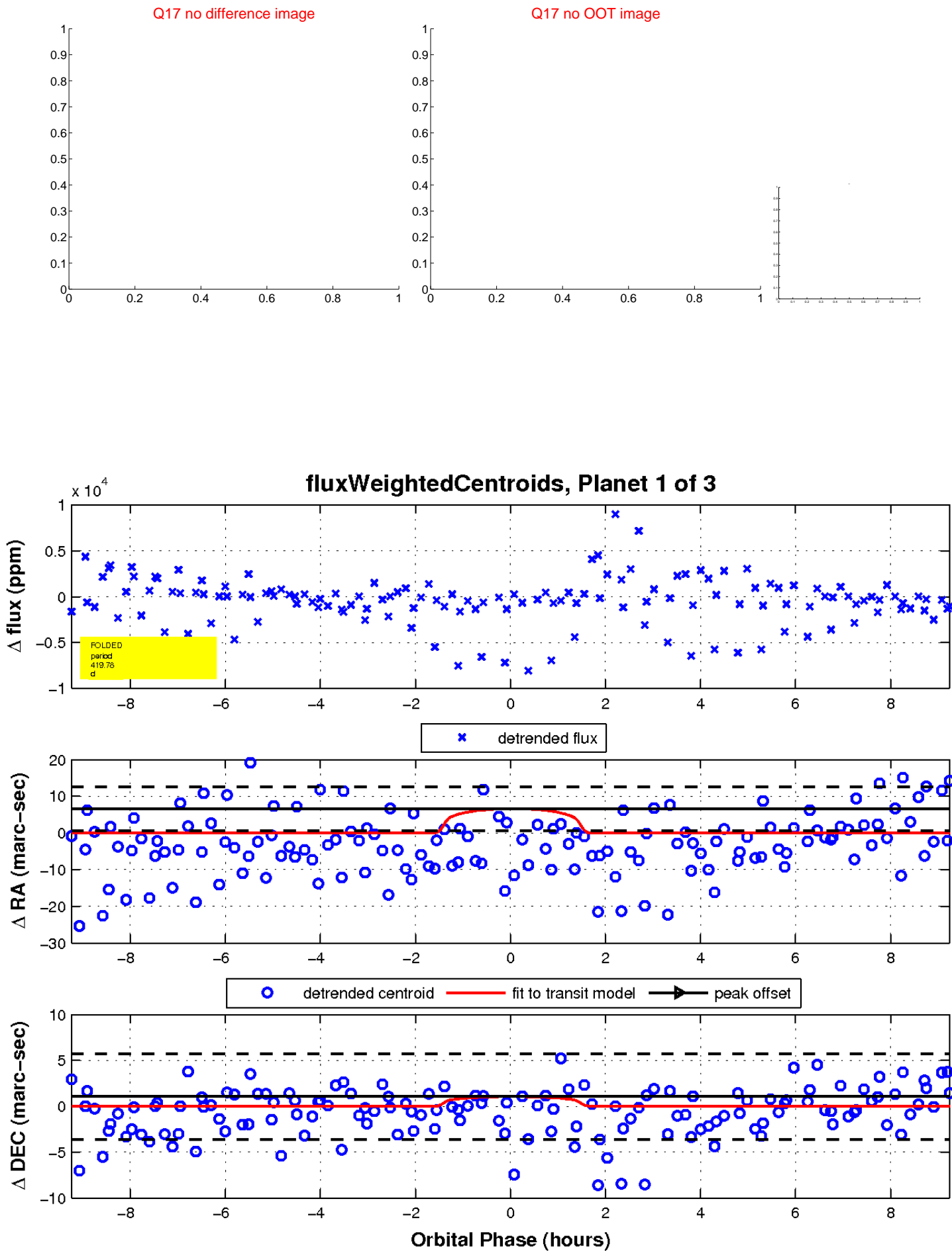
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



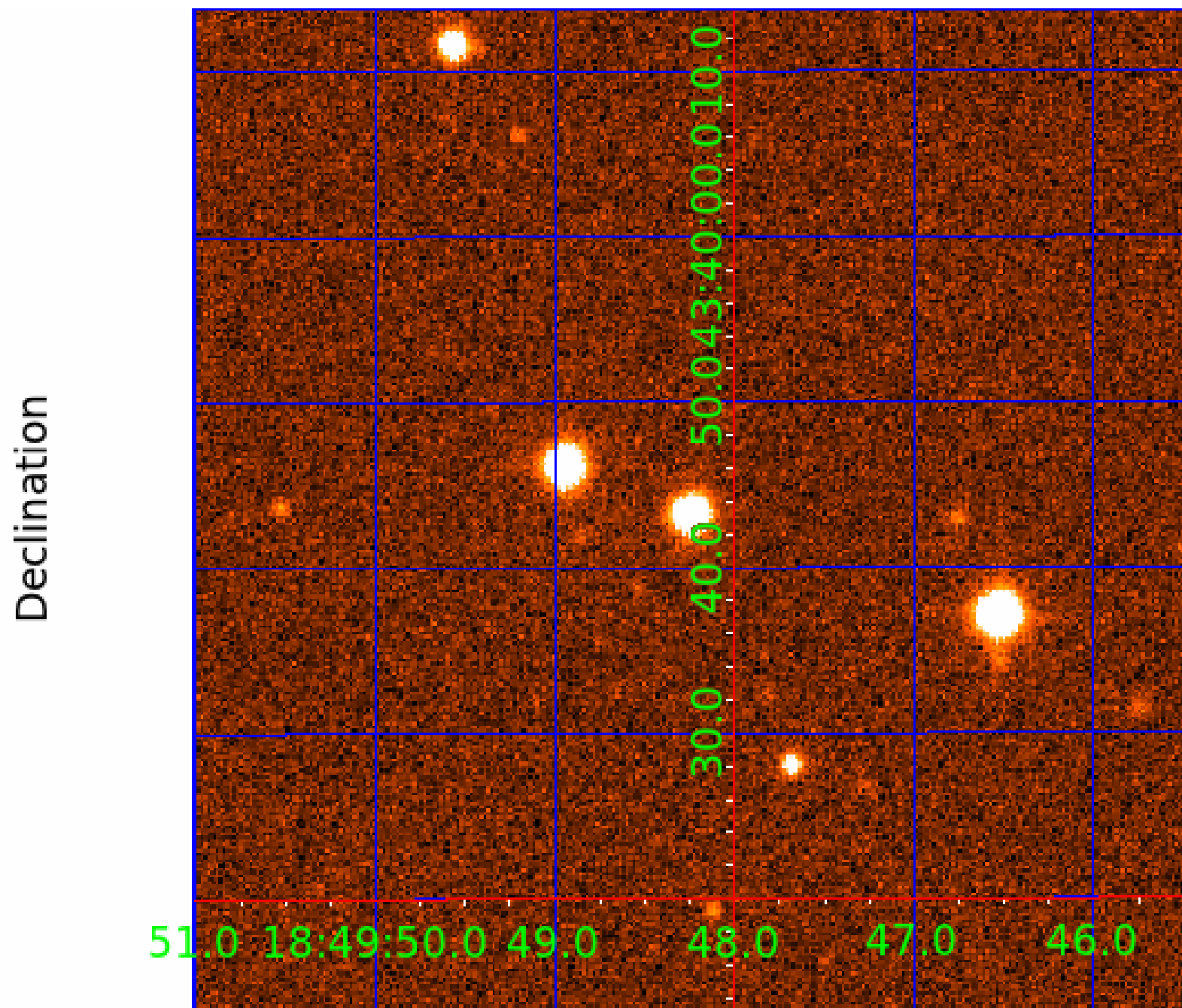
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 007870746

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})
007870746-01	OBS	No	419.779213	187.447375	2454.6	3.107	12.5	6.1	2.19	4833	10.91	2.03
007870746-03	OBS	No	484.032397	179.214573	3340.0	5.008	12.7	6.4	2.19	4833	12.21	1.68

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007870746-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
007870746-03	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

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

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

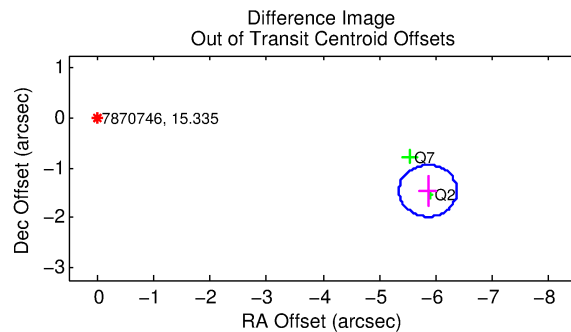
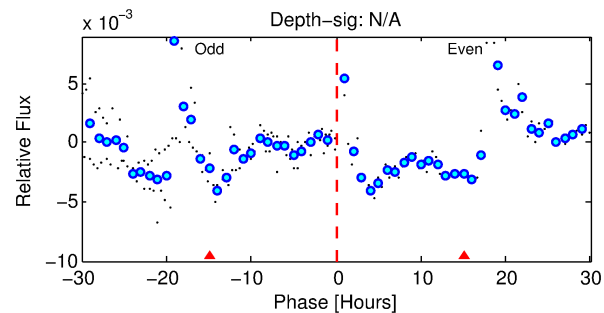
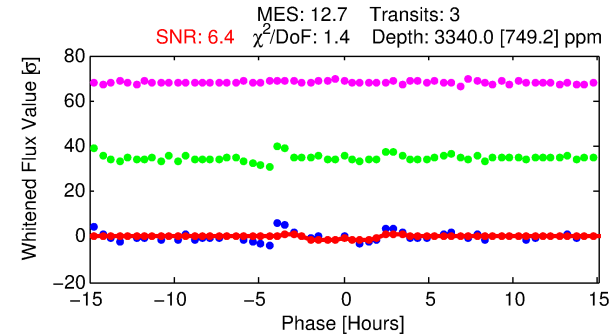
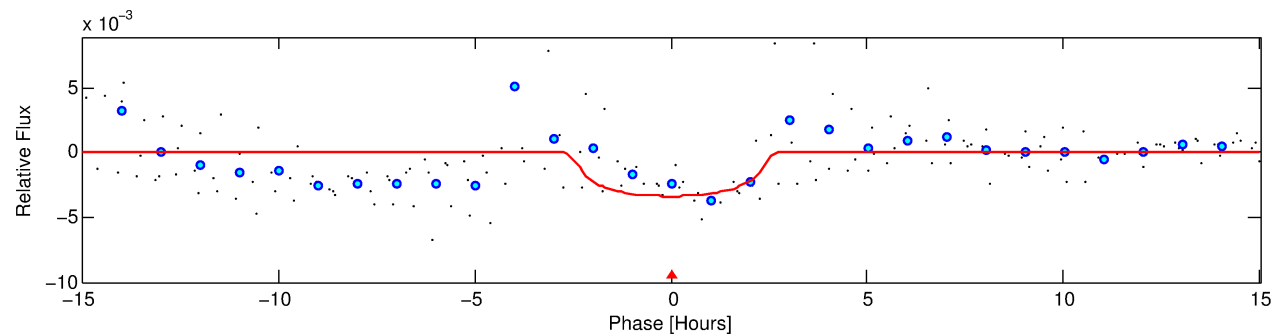
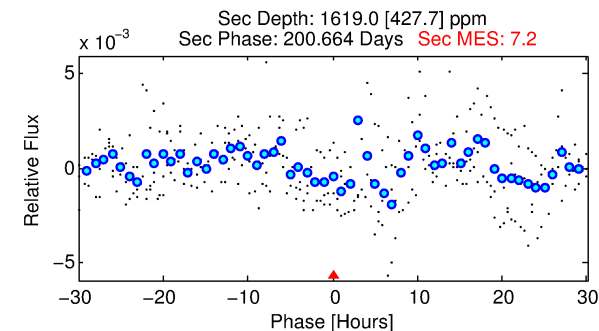
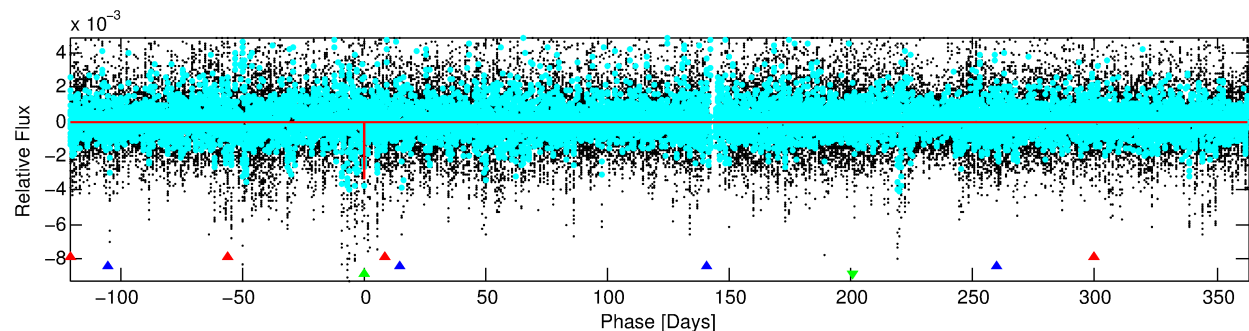
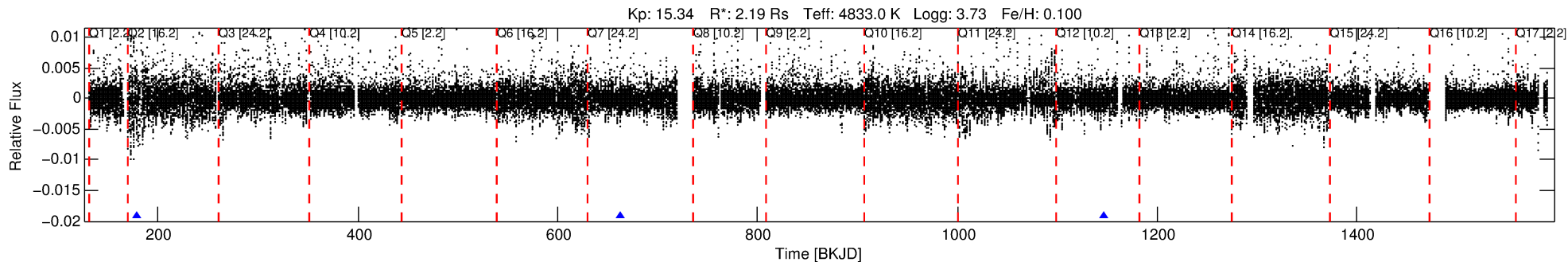
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007870746-03

No Significant Match Found

DV One-Page Summary

KIC: 7870746 Candidate: 3 of 3 Period: 484.032 d



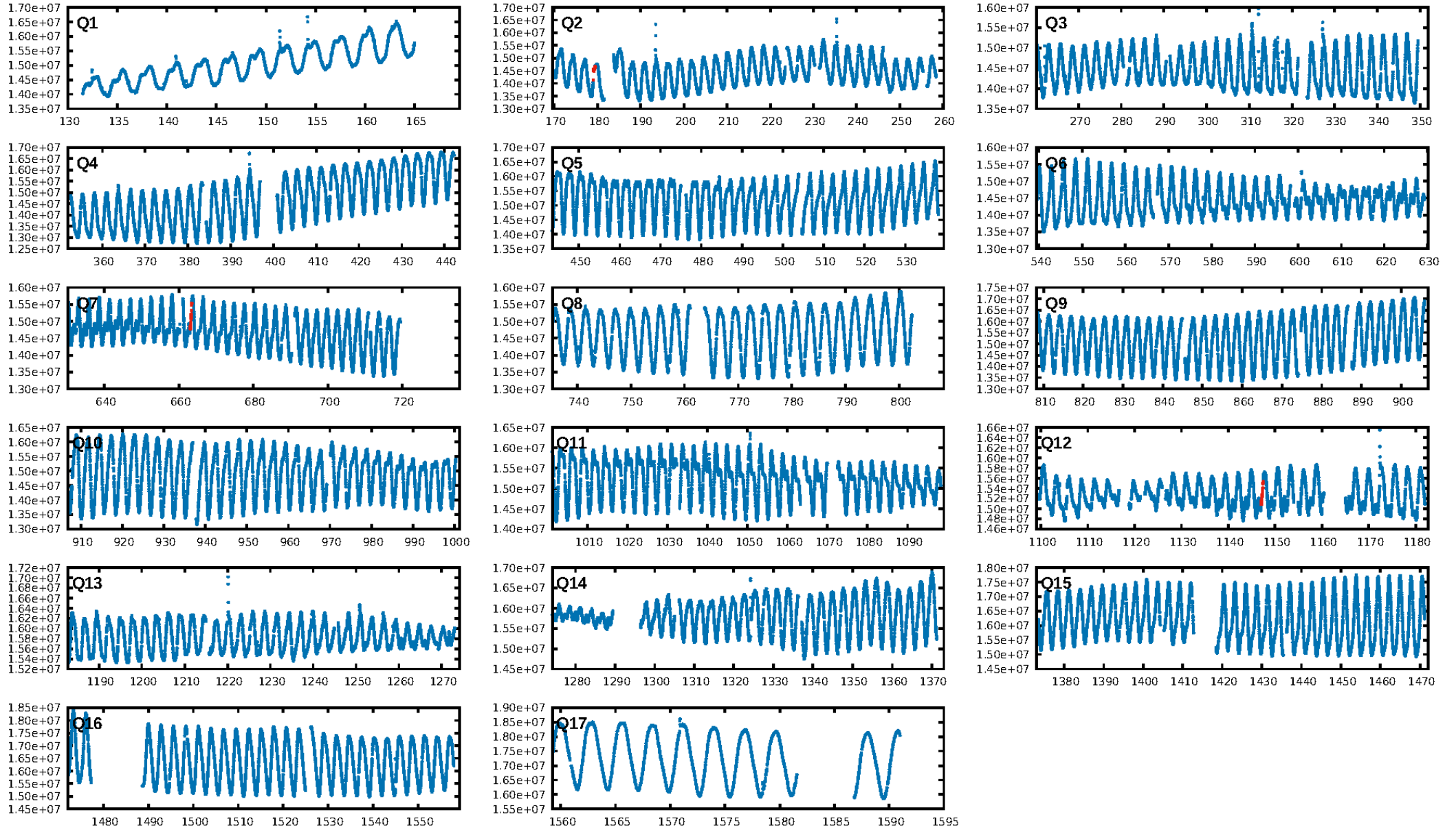
DV Fit Results:

Period = 484.03240 [0.00686] d
Epoch = 179.2146 [0.0091] BKJD
Rp/R* = 0.0511 [0.0752]
a/R* = 767.87 [3493.15]
b = 0.15 [29.71]
Seff = 1.68 [2.45]
Teq = 290 [106] K
Rp = 12.21 [19.94] Re
a = 1.1806 [0.9830] AU
Ag = 8325.83 [27390.41] [0.30σ]
Teffp = 4288 [3169] K [1.26σ]

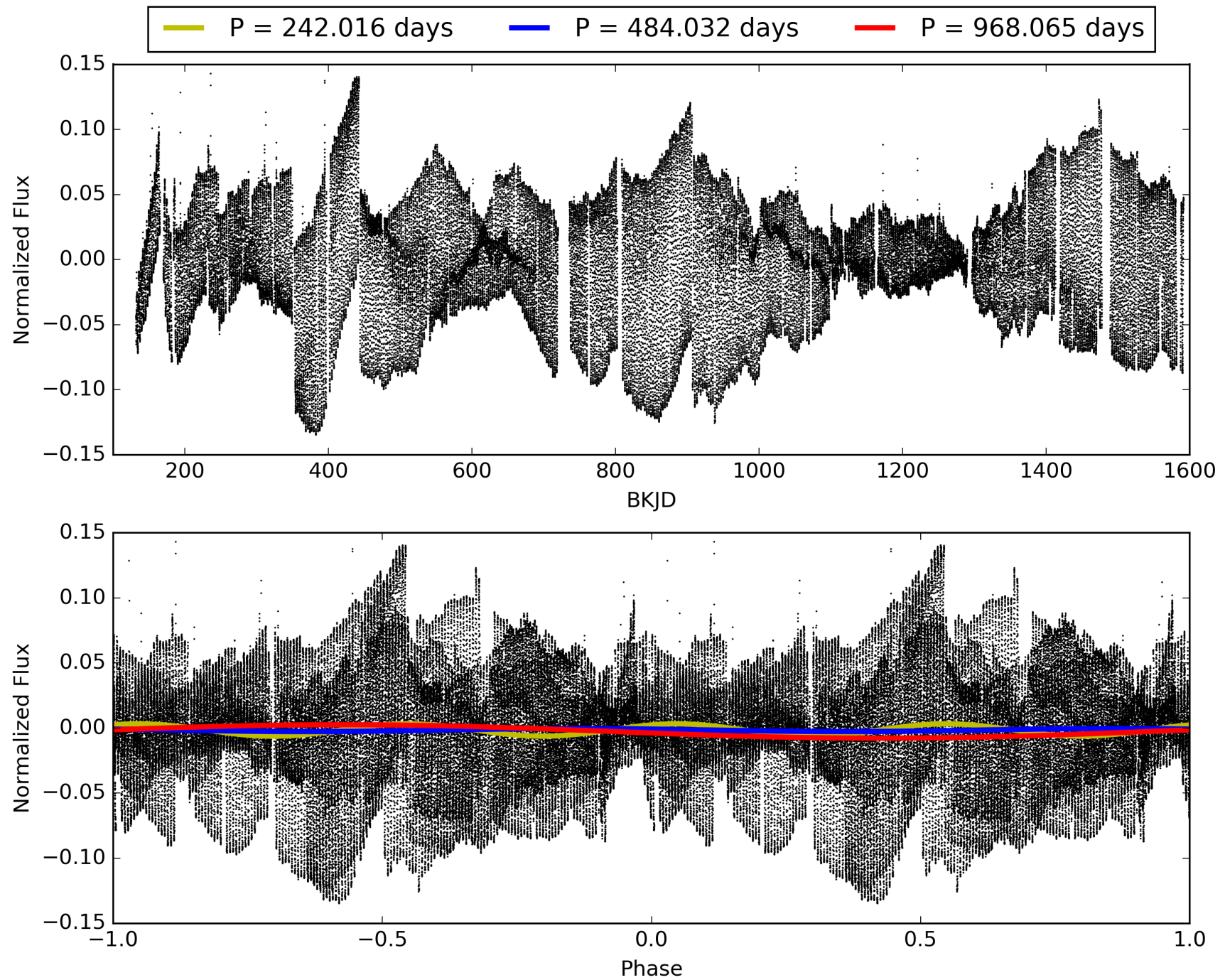
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [261.65σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 60.1%
ModelChiSquareGof-sig: 35.6%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.7281
Centroid-sig: 67.0%
Centroid-so: 1.585 arcsec [1.17σ]
OotOffset-rm: 6.036 arcsec [35.22σ]
OotOffset-st: 1/1/0/0 [2]
KicOffset-st: 1/1/0/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 007870746-03, PDC Light Curves

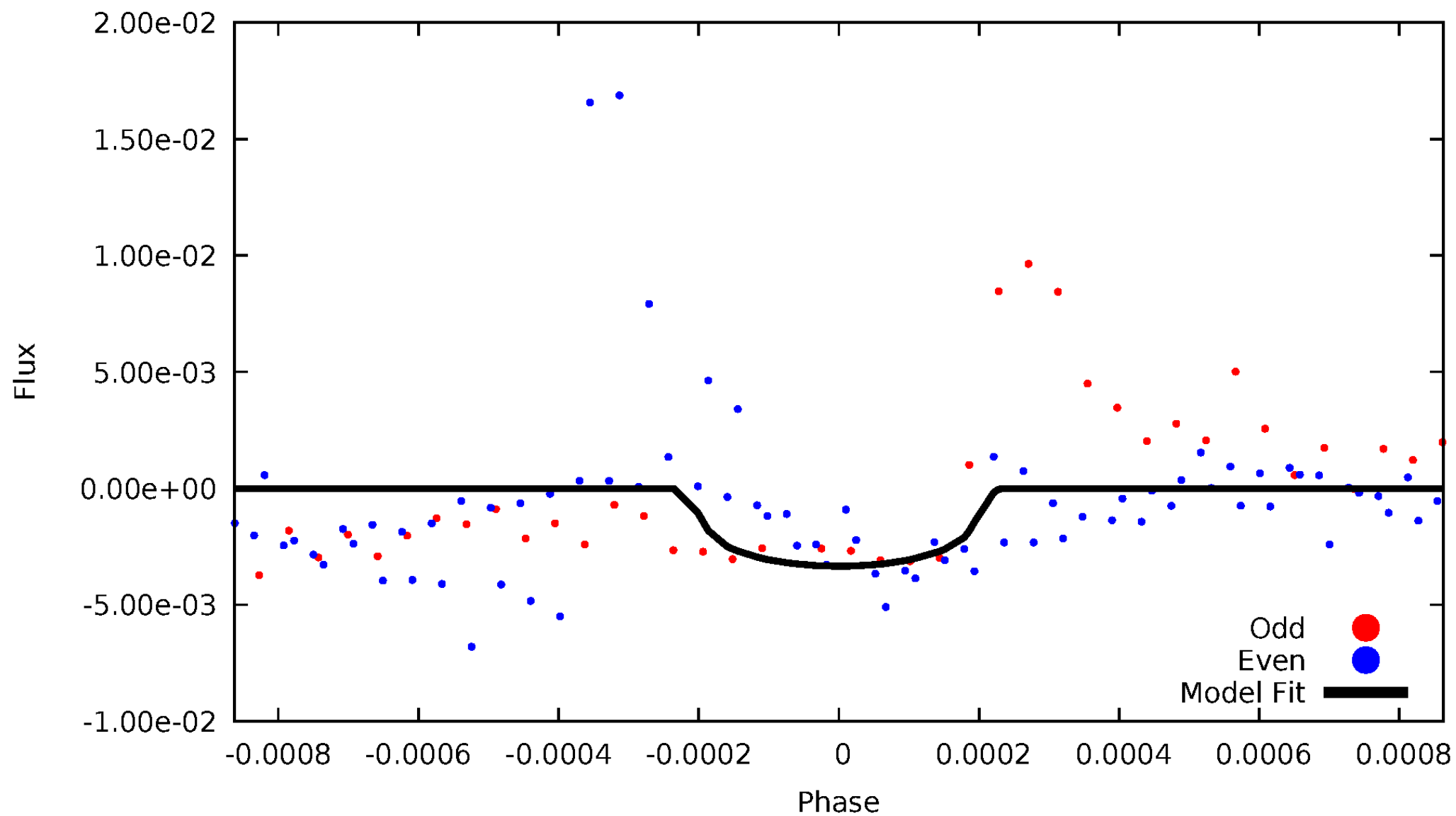


TCE 007870746-03



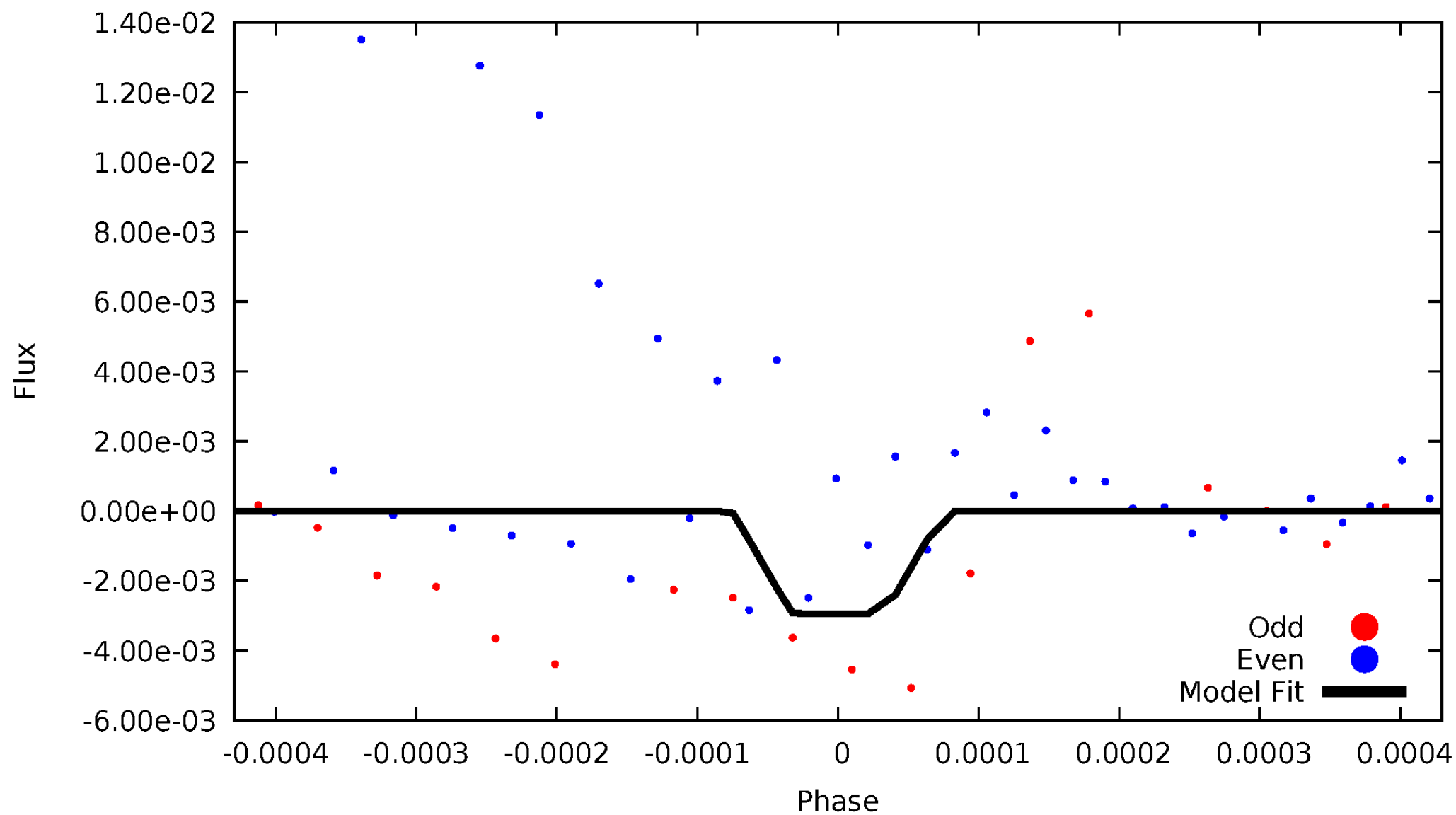
DV Odd/Even

TCE 007870746-03



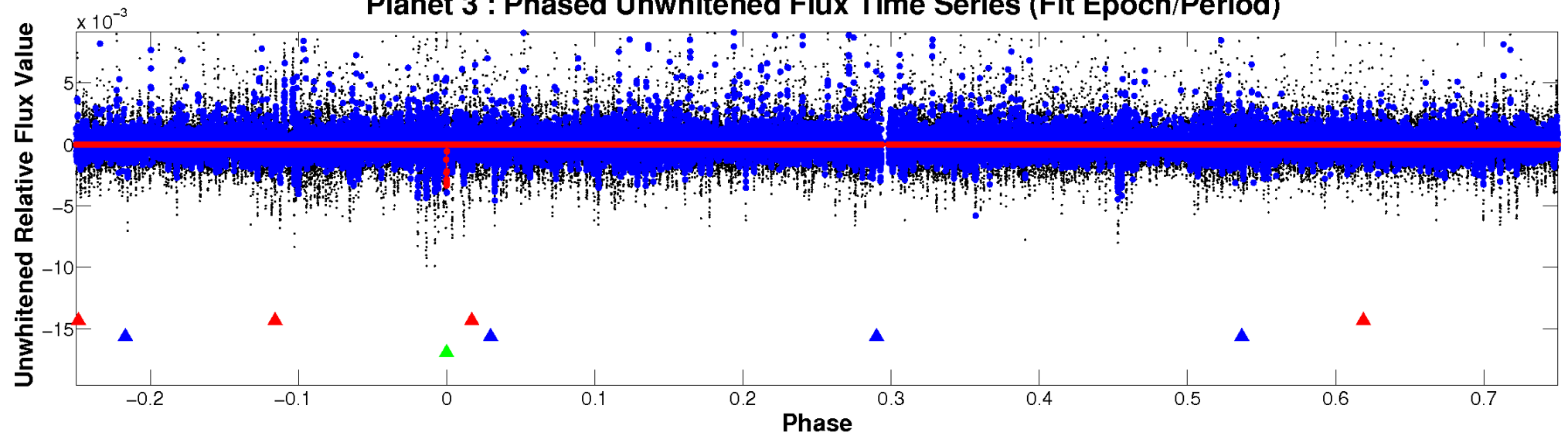
ALT Odd/Even

TCE 007870746-03

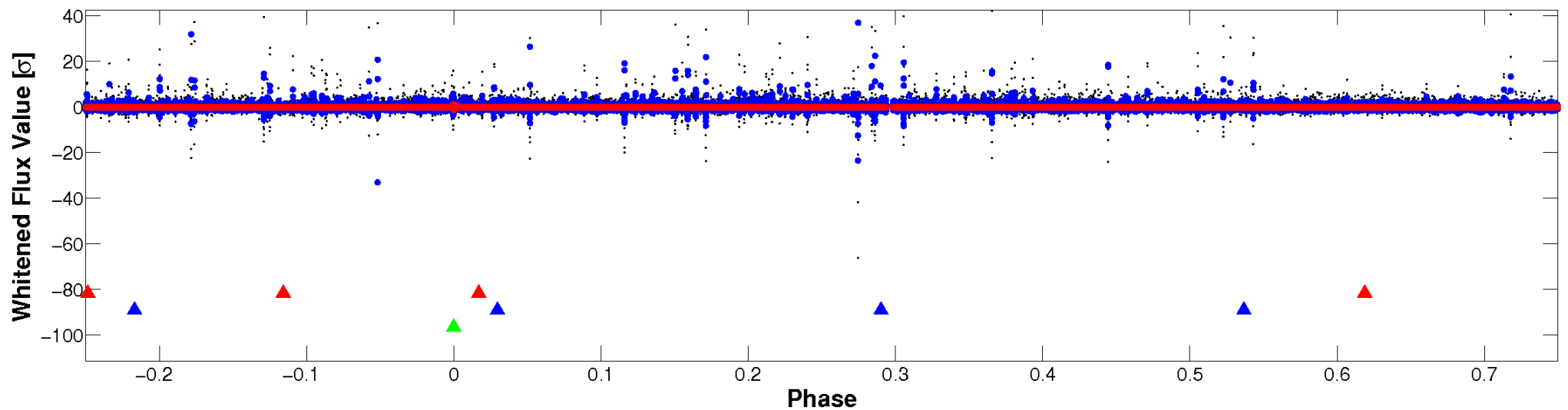


Non-Whitened Vs. Whitened Light Curve

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

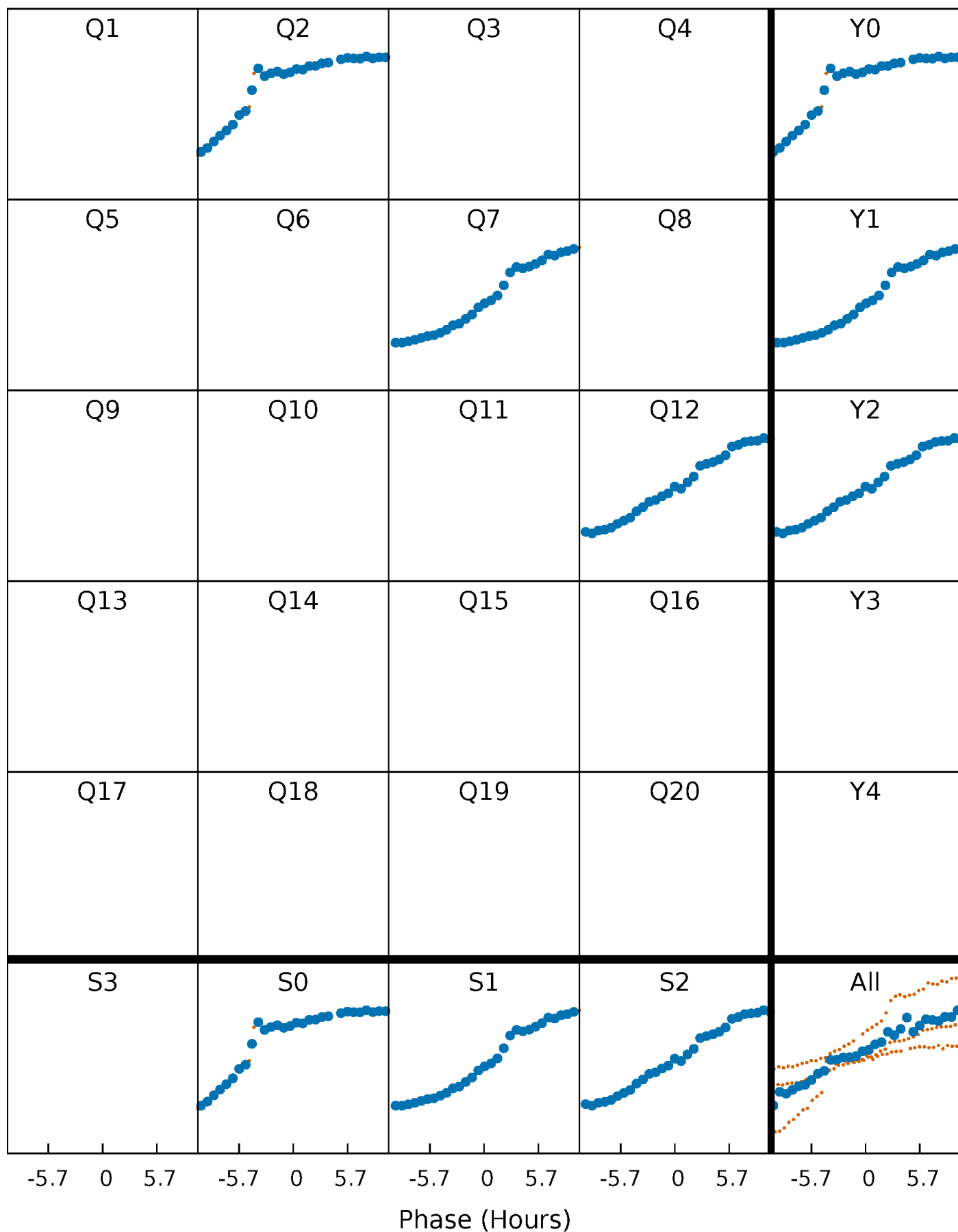


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



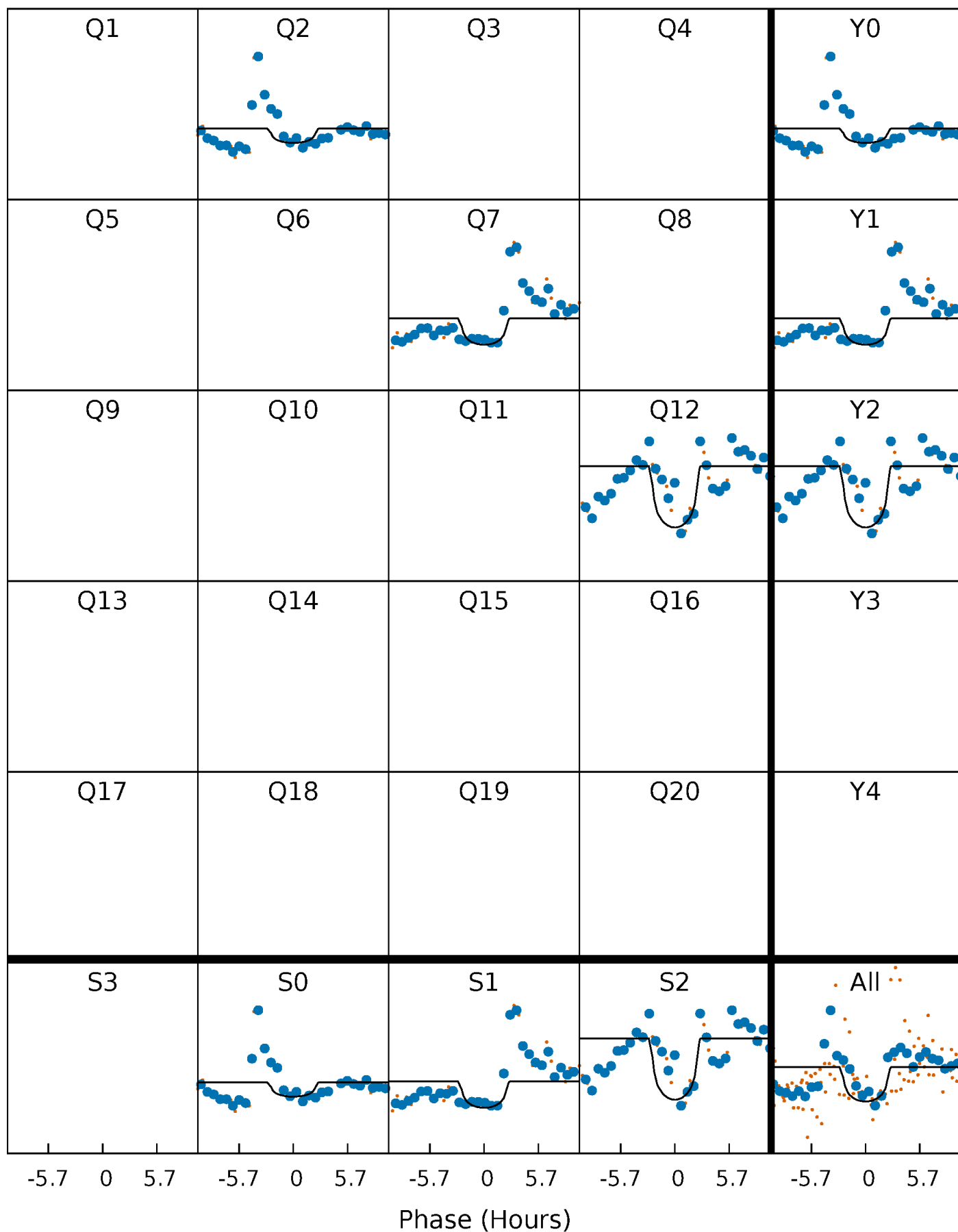
PDC Quarter-Phased Transit Curves

TCE 007870746-03 P=484.032397 Days $T_0=179.214573$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 007870746-03 $P=484.032397$ Days $T_0=179.214573$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

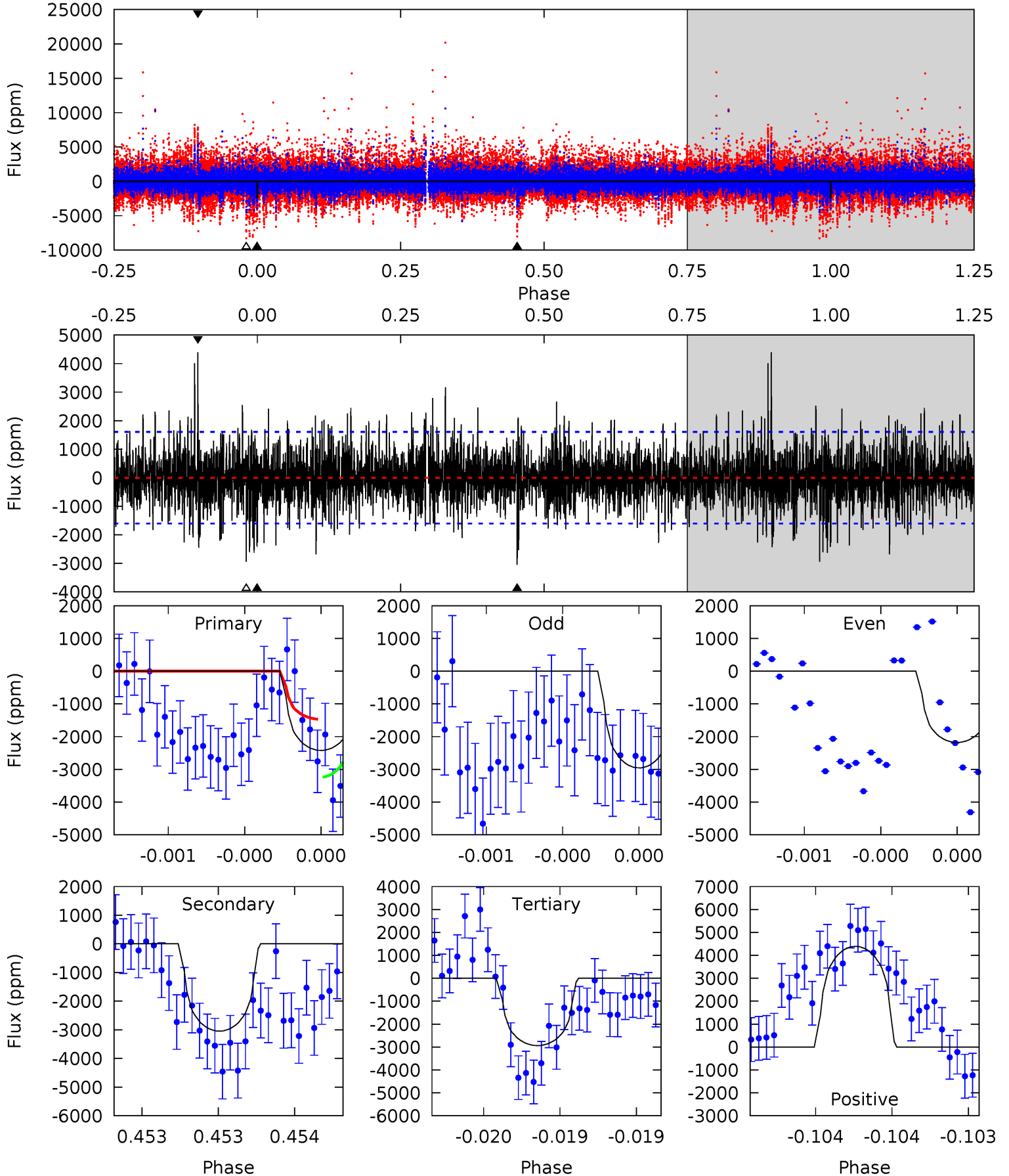
TCE 007870746-03 P=484.043792 Days $T_0=179.247643$ (BKJD)



DV Model-Shift Uniqueness Test

007870746-03, P = 484.032397 Days, E = 179.214573 Days

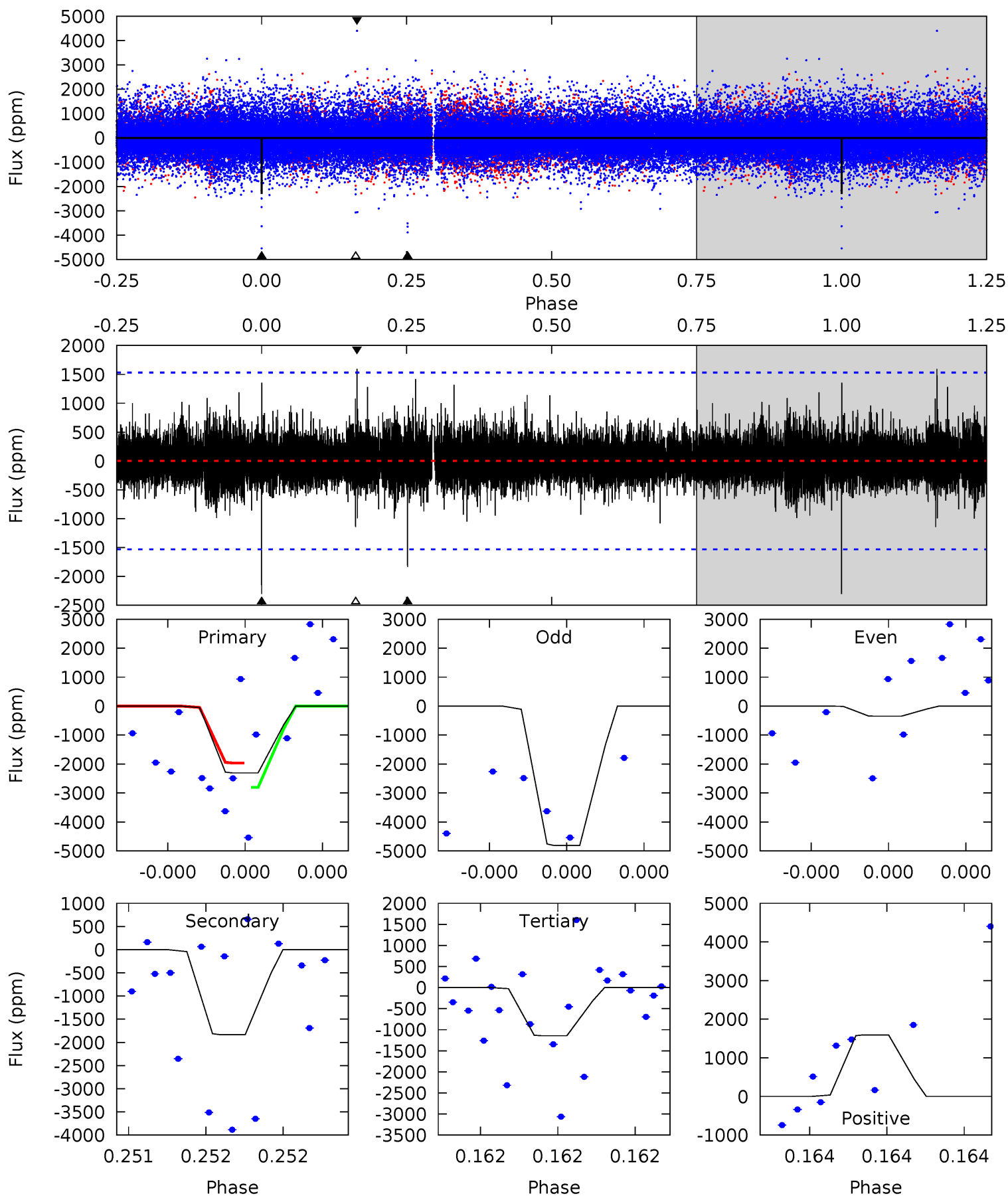
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.44	10.6	10.2	15.3	5.60	3.52	2.43	-1.80	-6.87	0.38	-4.69	1.21	1.10	0.59	3.09



Alt Model-Shift Uniqueness Test

007870746-03, P = 484.043792 Days, E = 179.247643 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.75	6.96	4.34	6.04	5.81	3.83	0.83	4.41	2.71	2.62	0.92	9.56	0.70	0.41	1.56



Stellar Parameters For KIC 007870746

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4833^{+99}_{-170}	$3.729^{+0.893}_{-0.298}$	$0.100^{+0.200}_{-0.350}$	$2.189^{+1.035}_{-1.552}$	$0.935^{+0.173}_{-0.237}$	$0.126^{+3.253}_{-0.088}$
	+2%/-4%	+24%/-8%	+200%/-350%	+47%/-71%	+19%/-25%	+2592%/-70%
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 007870746-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-3045 ± 287	$15.95^{+17.44}_{-10.93}$	397^{+53}_{-76}	4214^{+2437}_{-788}	8991^{+76894}_{-6905}
Alt.	-1833 ± 263	$16.65^{+17.40}_{-10.88}$	396^{+57}_{-73}	3774^{+1788}_{-649}	4897^{+38192}_{-3726}

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 $A_{obs} \gg 1.0$

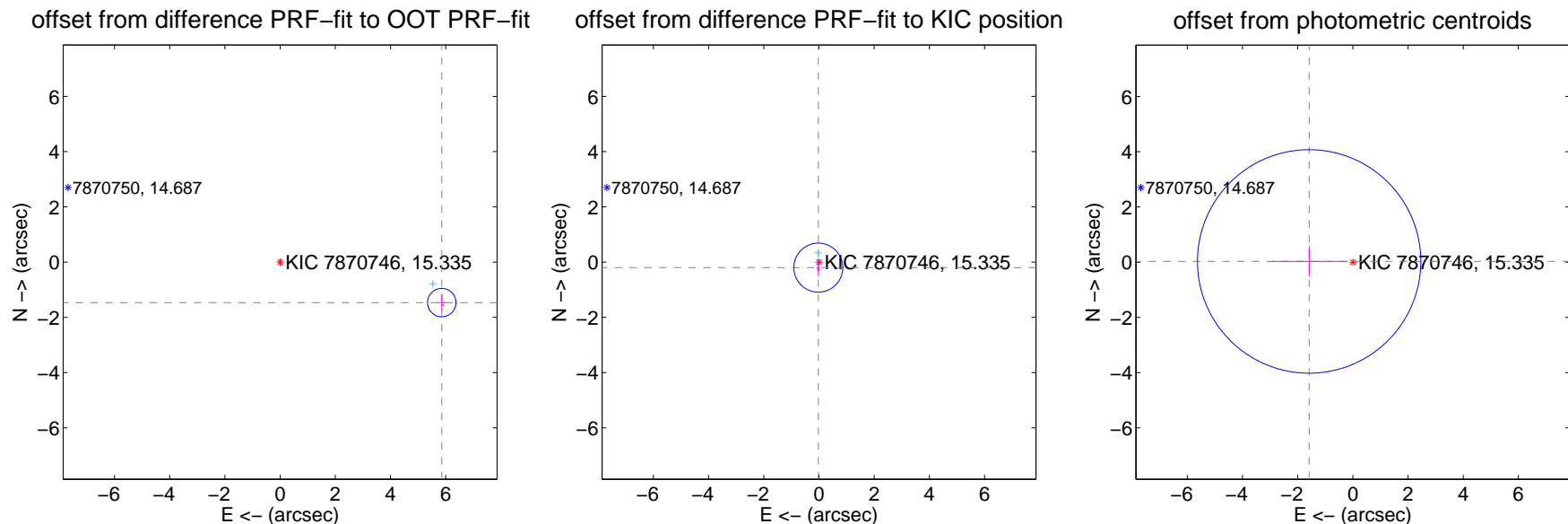
DV Centroid Data

Supplemental centroid analysis for 007870746-03. Kepler magnitude: 15.34. Transit SNR 6.37

There are 1 quarters with good PRF difference image offsets

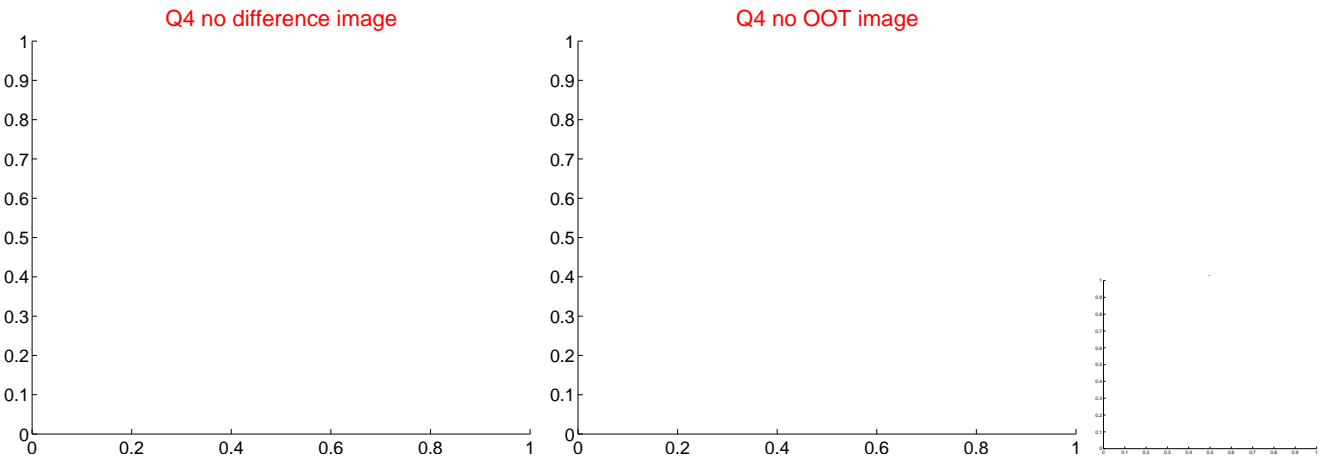
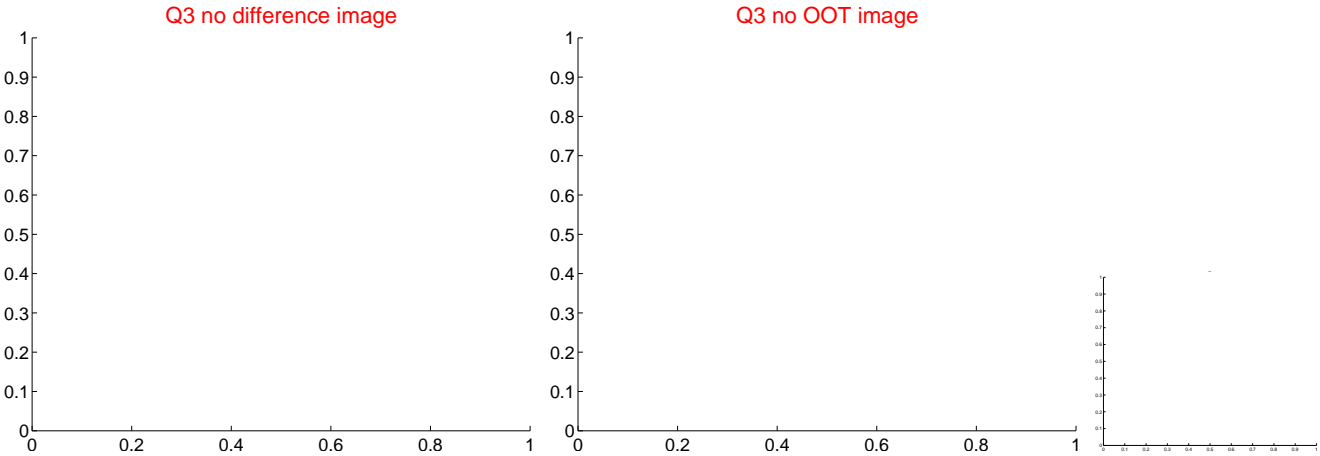
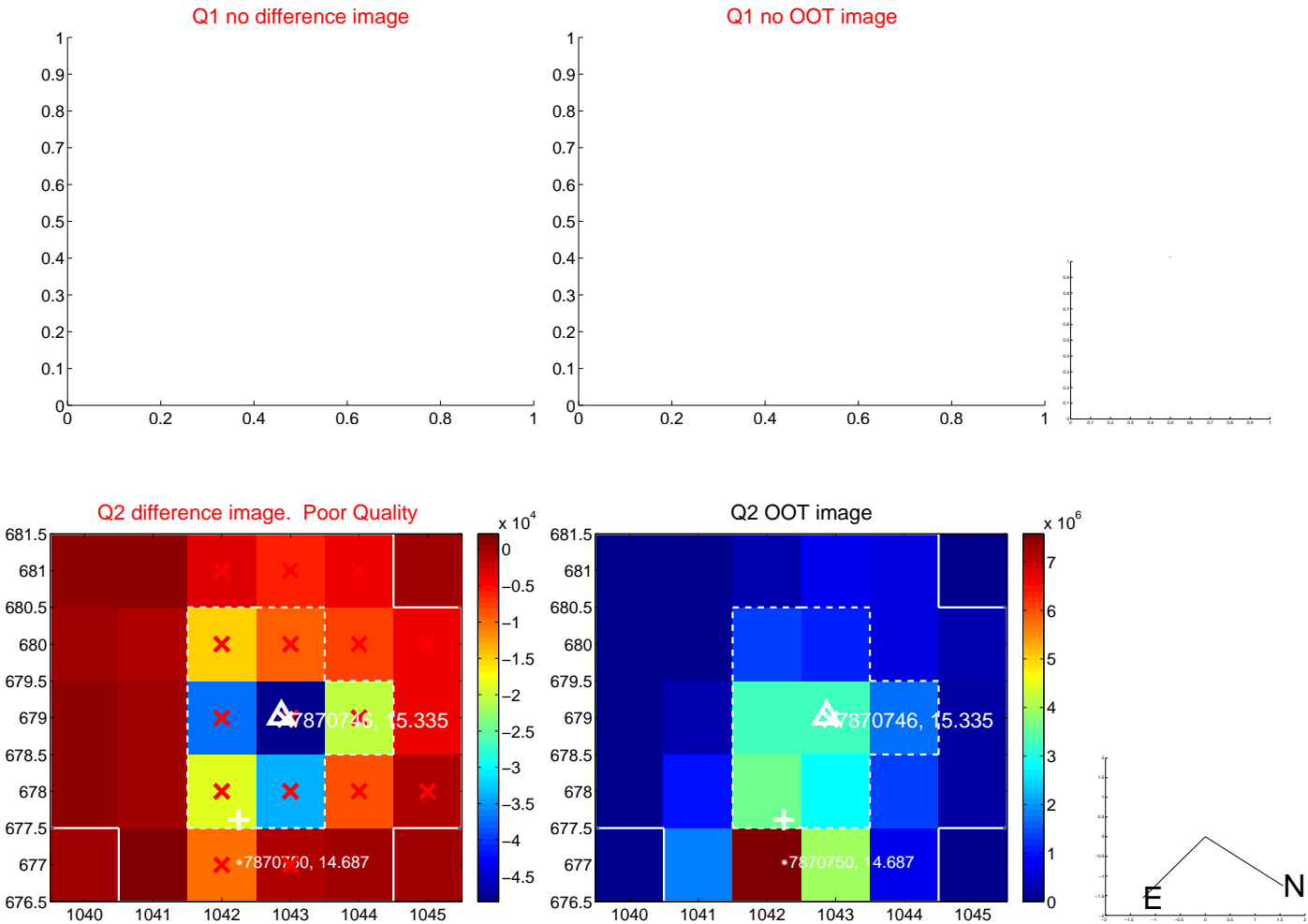
The OOT PRF centroid is offset from the target star catalog position by about 5.67 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	6.036 ± 0.171	35.22	-5.855 ± 0.160	-1.466 ± 0.296
PRF-fit source offset from KIC position	0.202 ± 0.296	0.68	0.024 ± 0.067	-0.201 ± 0.298
photometric centroid source offset	1.58 ± 1.35	1.17	1.58 ± 1.35	0.03 ± 0.54

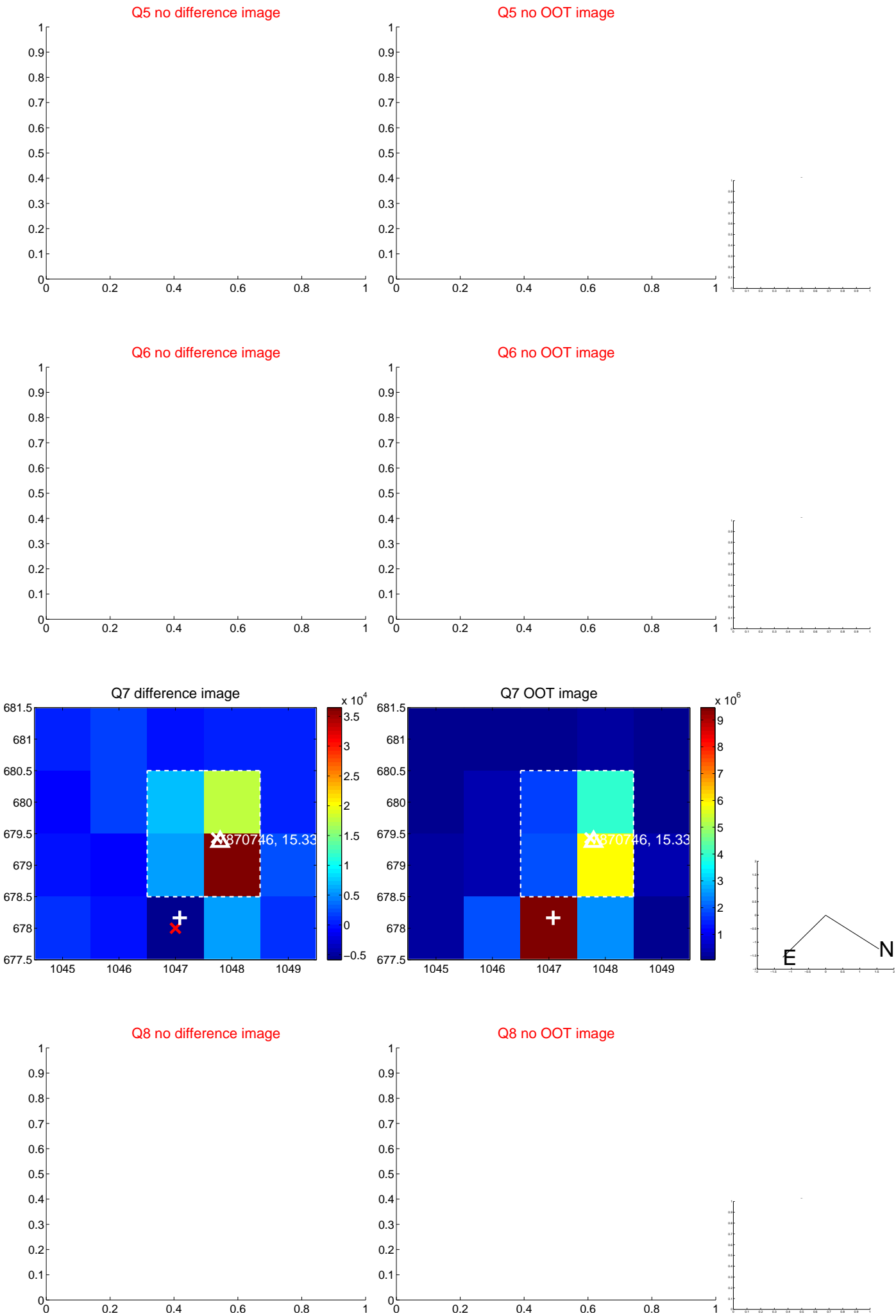


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

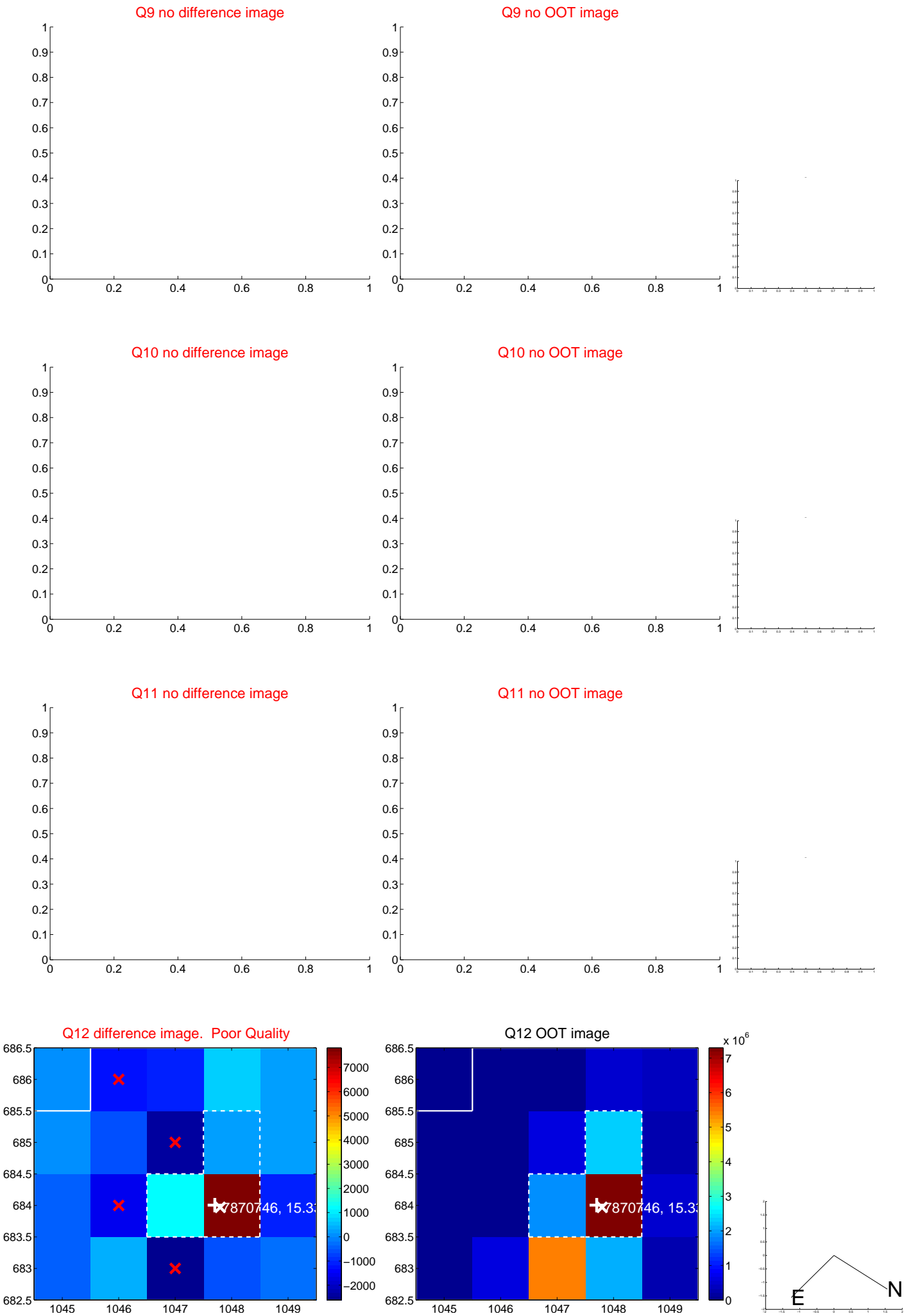
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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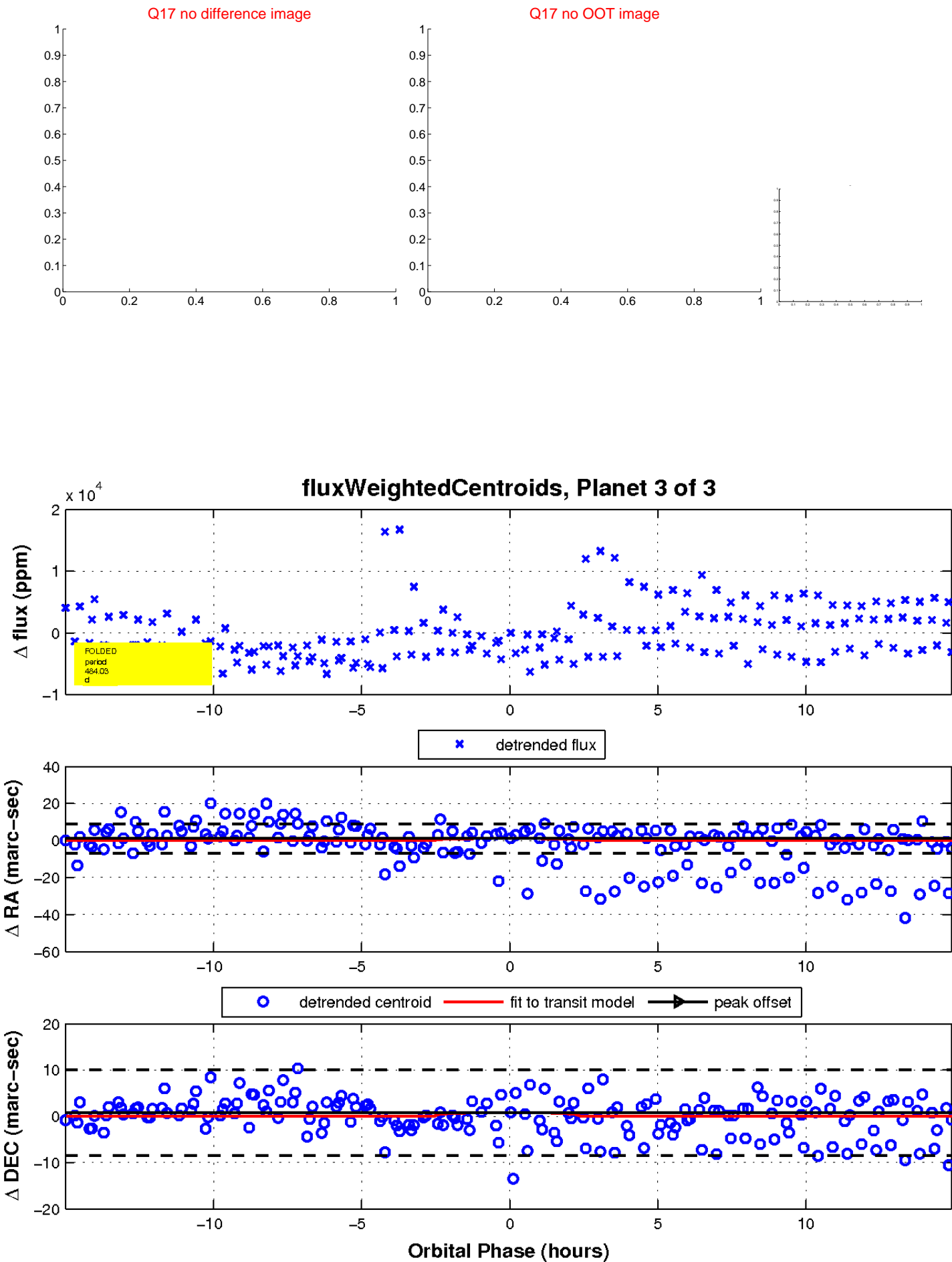
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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

