

KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

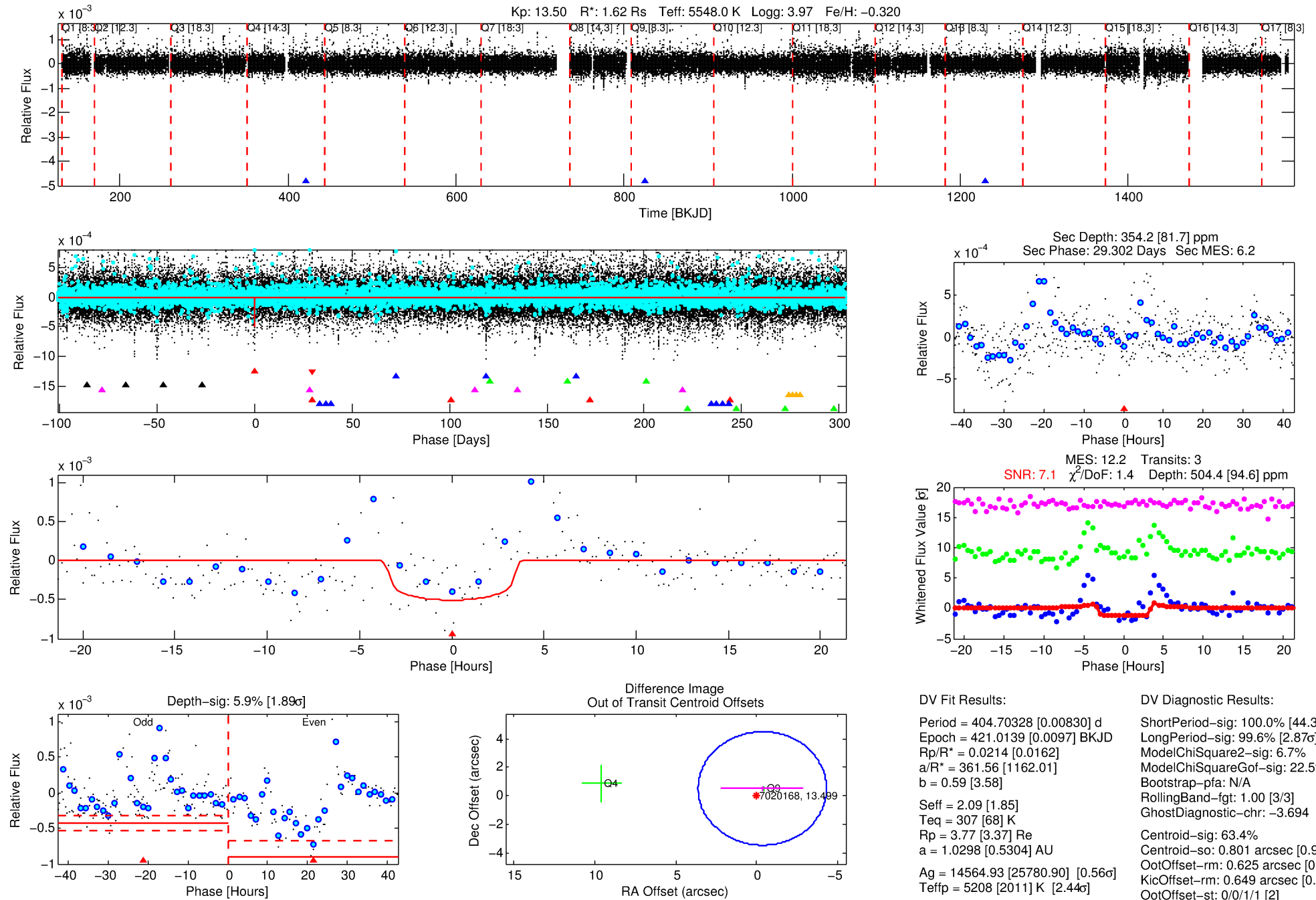
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-01

No Significant Match Found

DV One-Page Summary

KIC: 7020168 Candidate: 1 of 9 Period: 404.703 d



DV Fit Results:

Period = 404.70328 [0.00830] d
Epoch = 421.0139 [0.0097] BKJD
Rp/R* = 0.0214 [0.0162]
a/R* = 361.56 [1162.01]
b = 0.59 [3.58]
Seff = 2.09 [1.85]
Teff = 307 [68] K
Rp = 3.77 [3.37] Re
a = 1.0298 [0.5304] AU
Ag = 14564.93 [25780.90] [0.56σ]
Teffp = 5208 [2011] K [2.44σ]

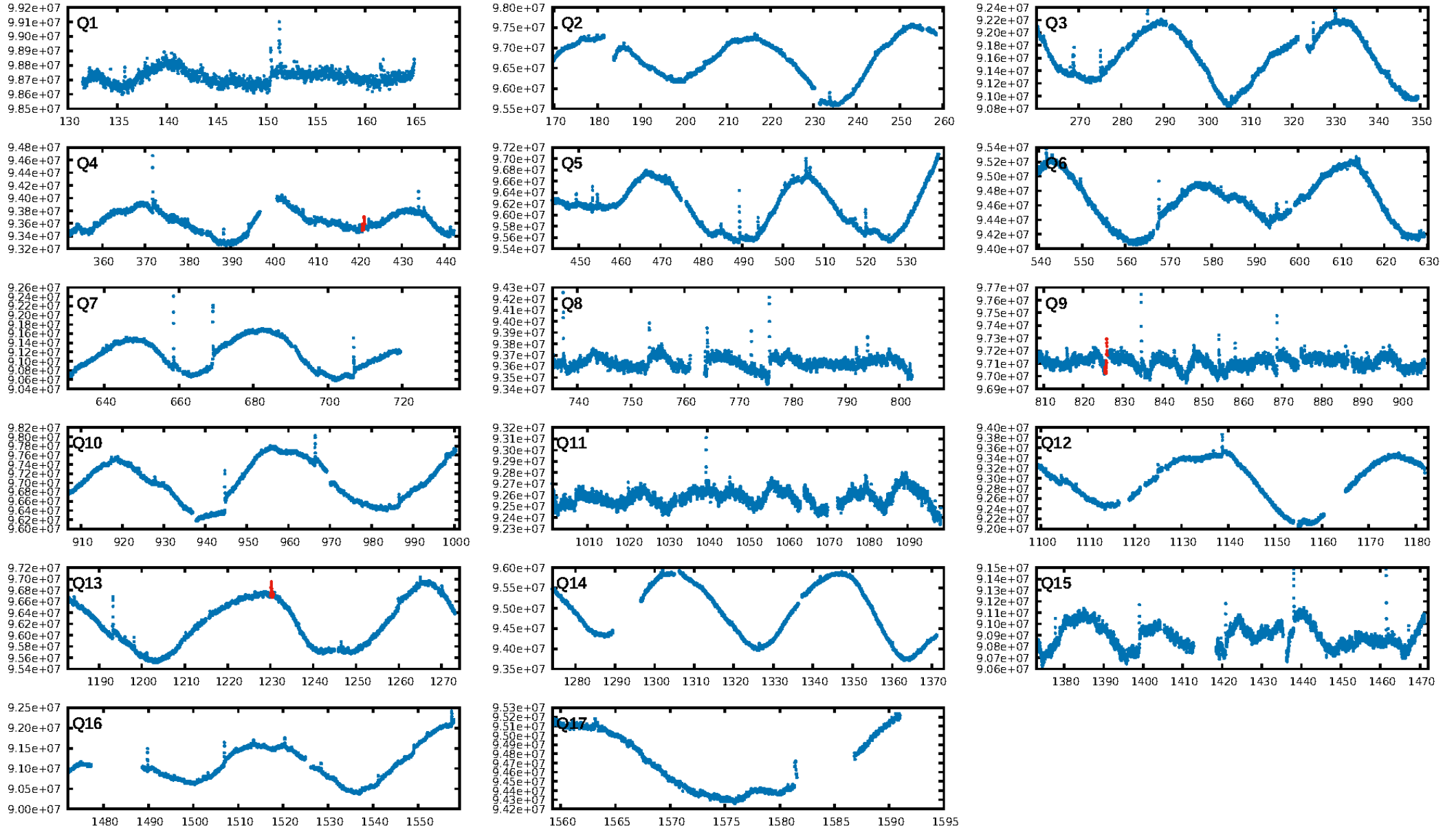
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [44.34σ]
LongPeriod-sig: 99.6% [2.87σ]
ModelChiSquare2-sig: 6.7%
ModelChiSquareGof-sig: 22.5%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -3.694
Centroid-sig: 63.4%
Centroid-so: 0.801 arcsec [0.96σ]
OotOffset-rm: 0.625 arcsec [0.47σ]
KicOffset-rm: 0.649 arcsec [0.35σ]
OotOffset-st: 0/0/1/1 [2]
KicOffset-st: 0/0/1/1 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

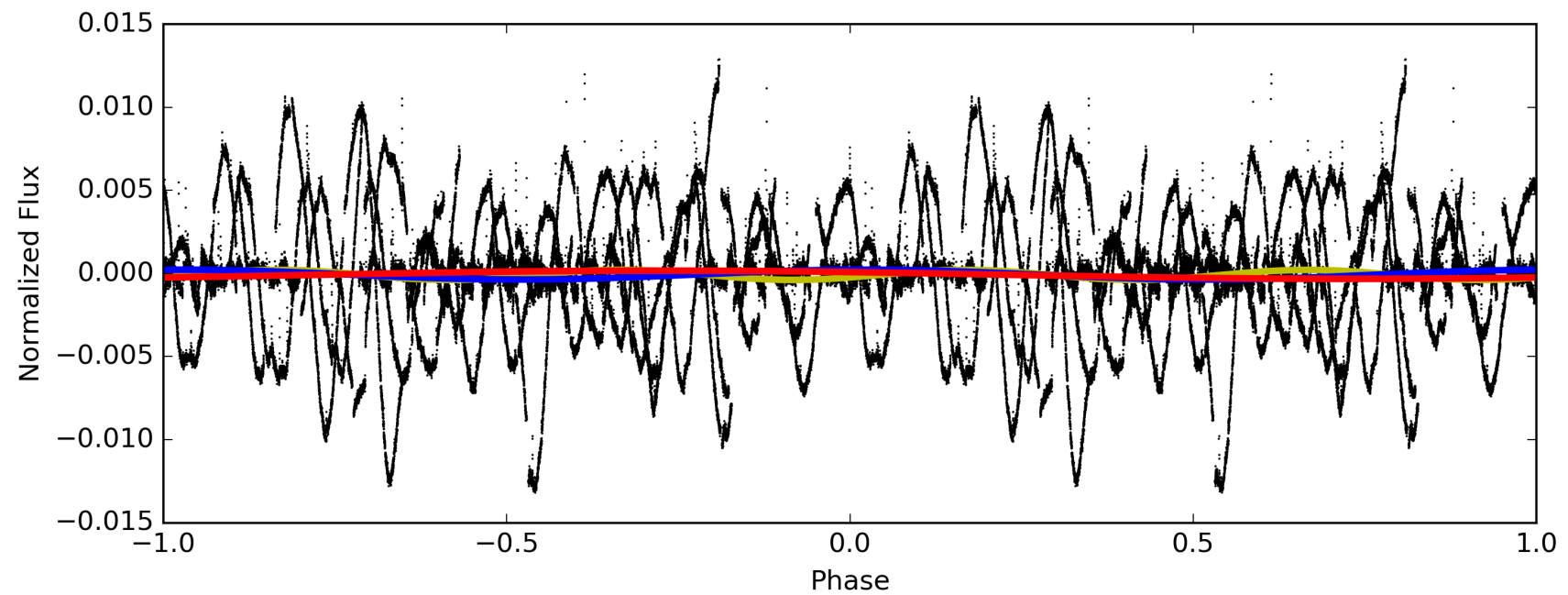
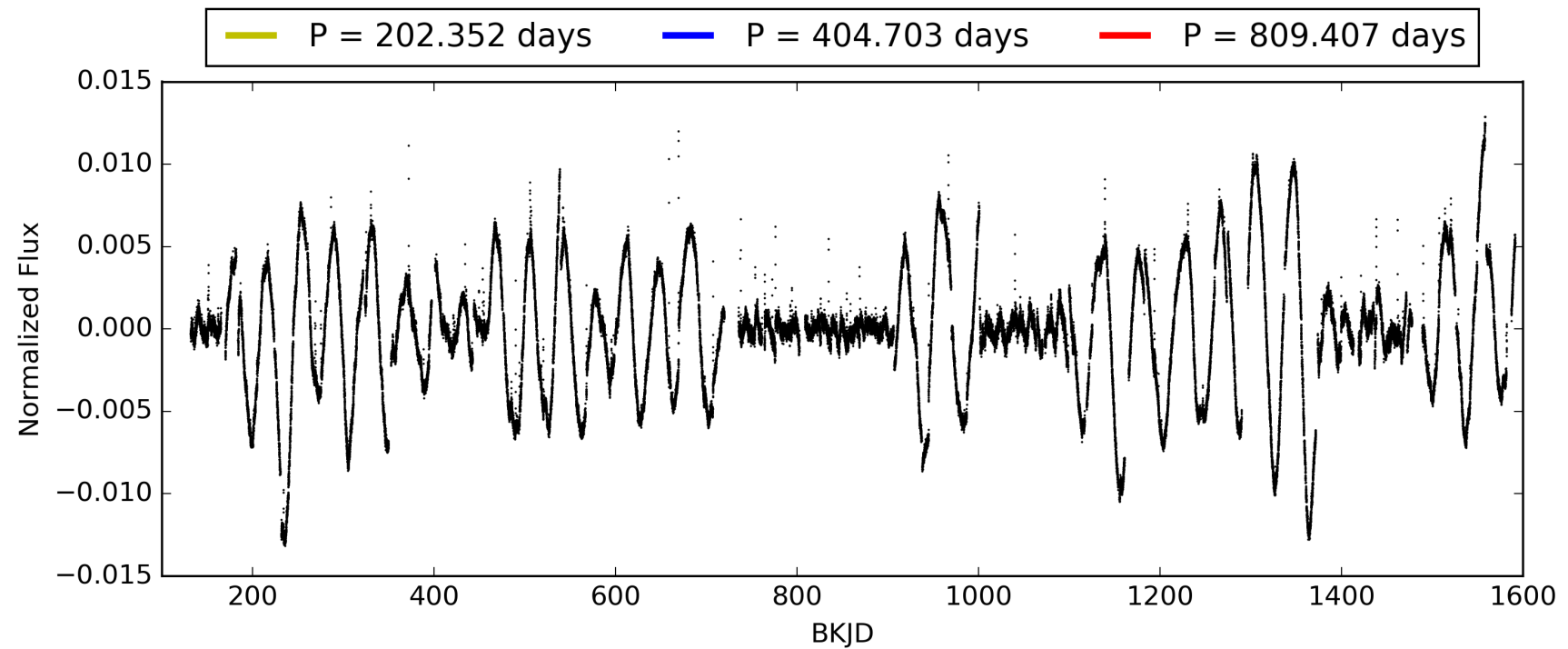
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 007020168-01, PDC Light Curves

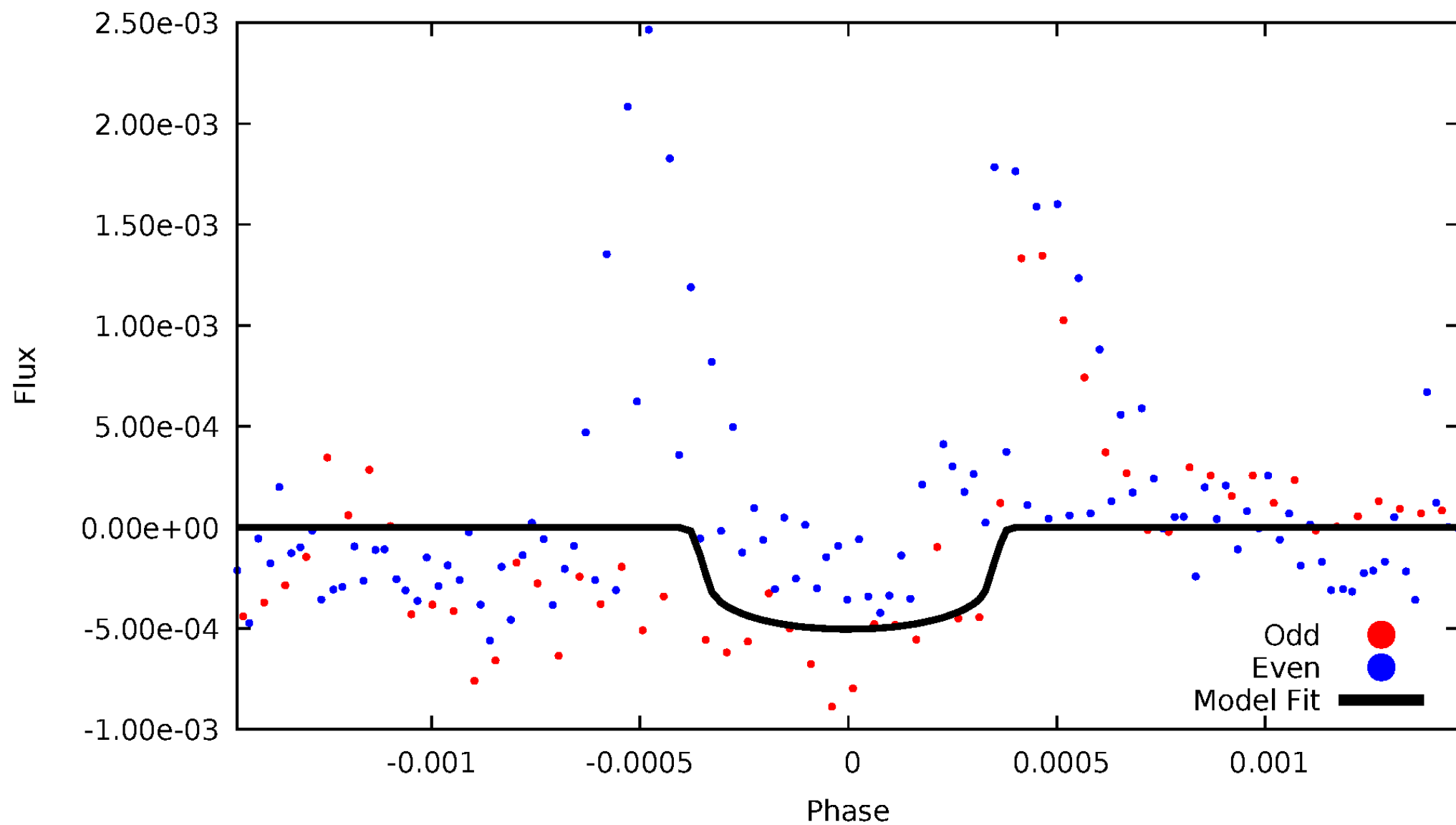


TCE 007020168-01



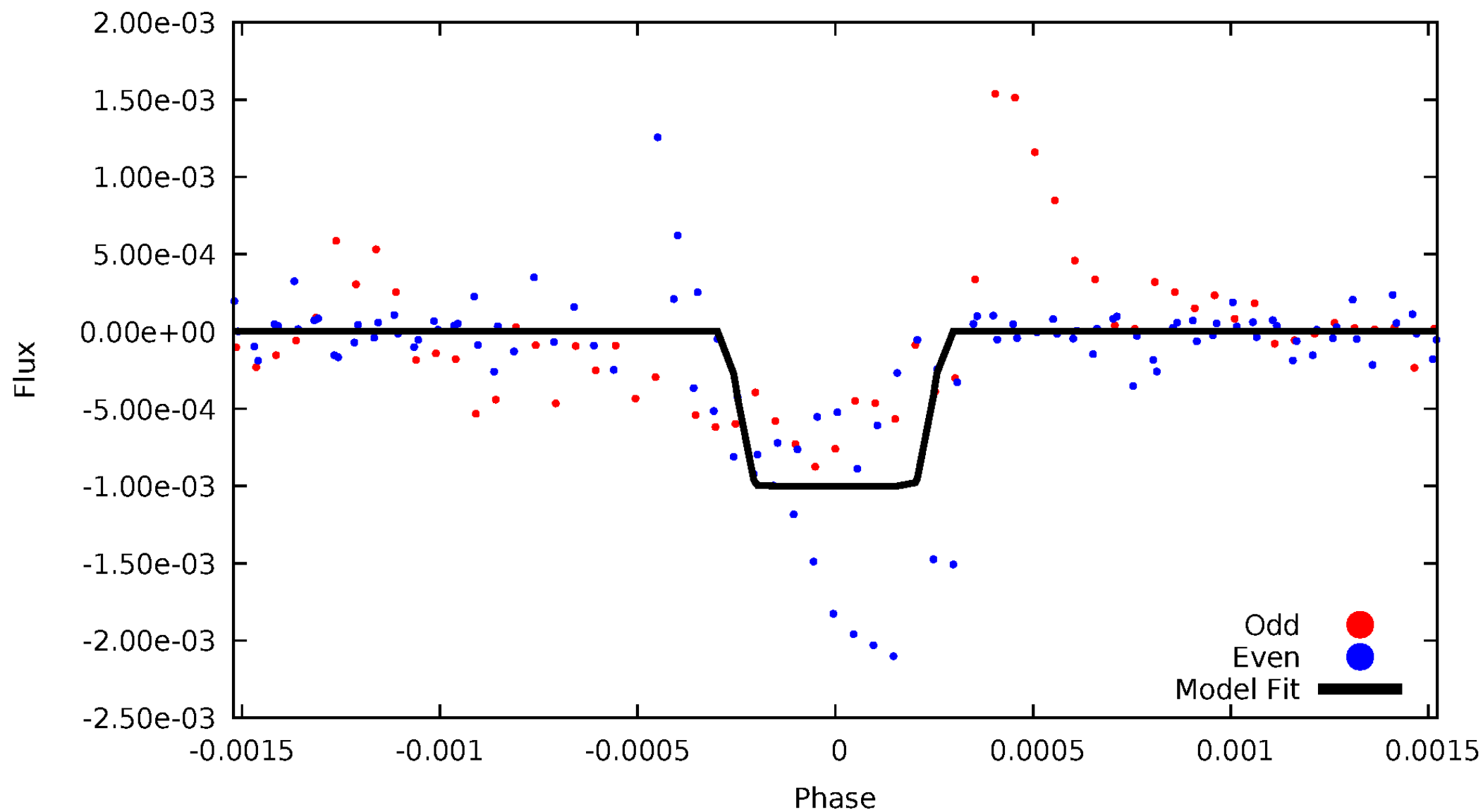
DV Odd/Even

TCE 007020168-01



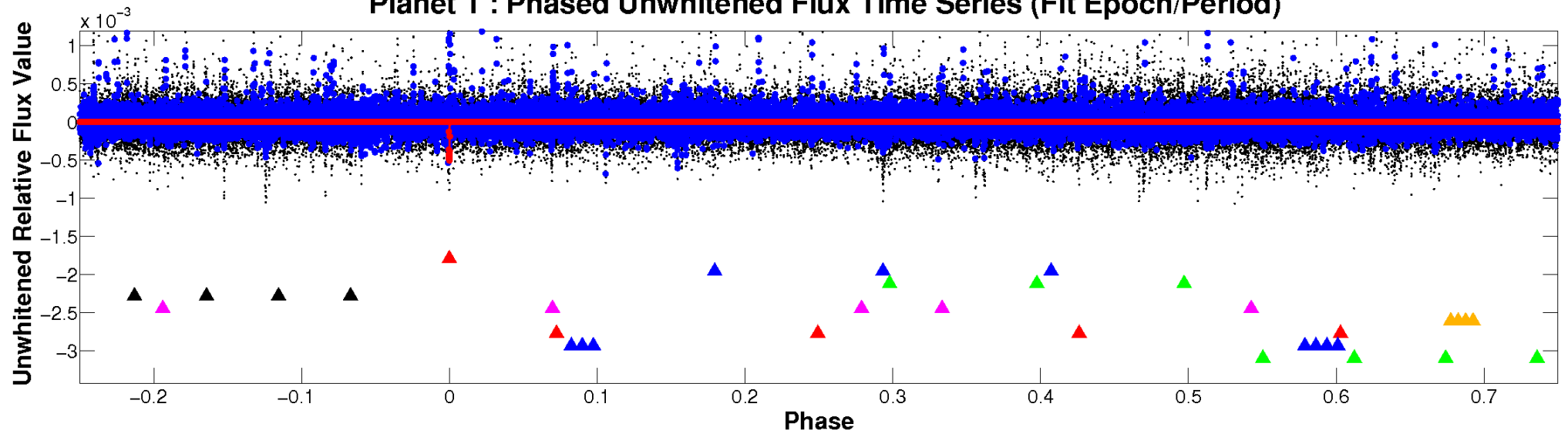
ALT Odd/Even

TCE 007020168-01

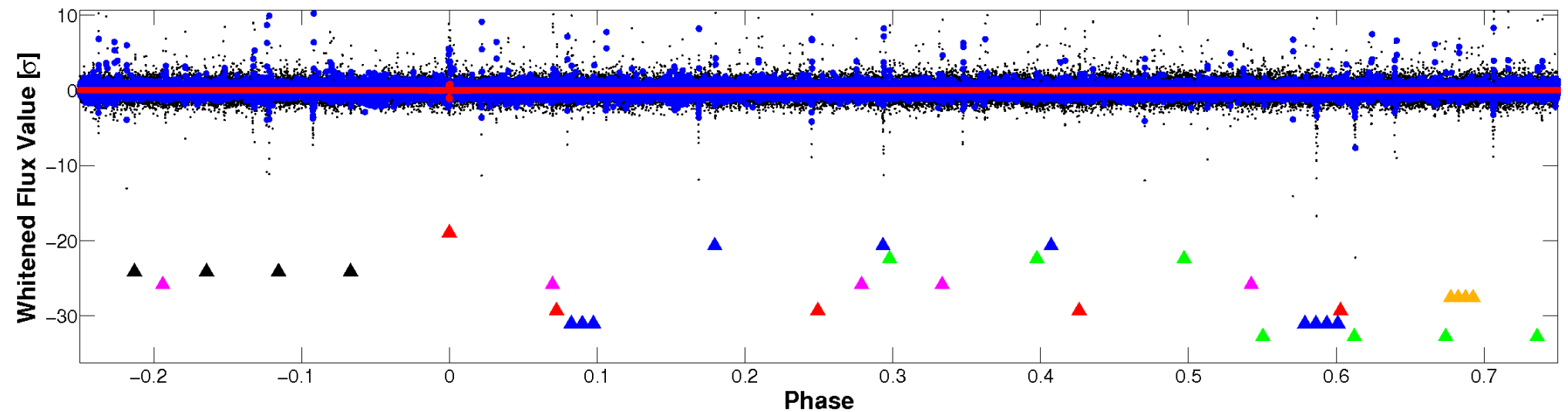


Non-Whitened Vs. Whitened Light Curve

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

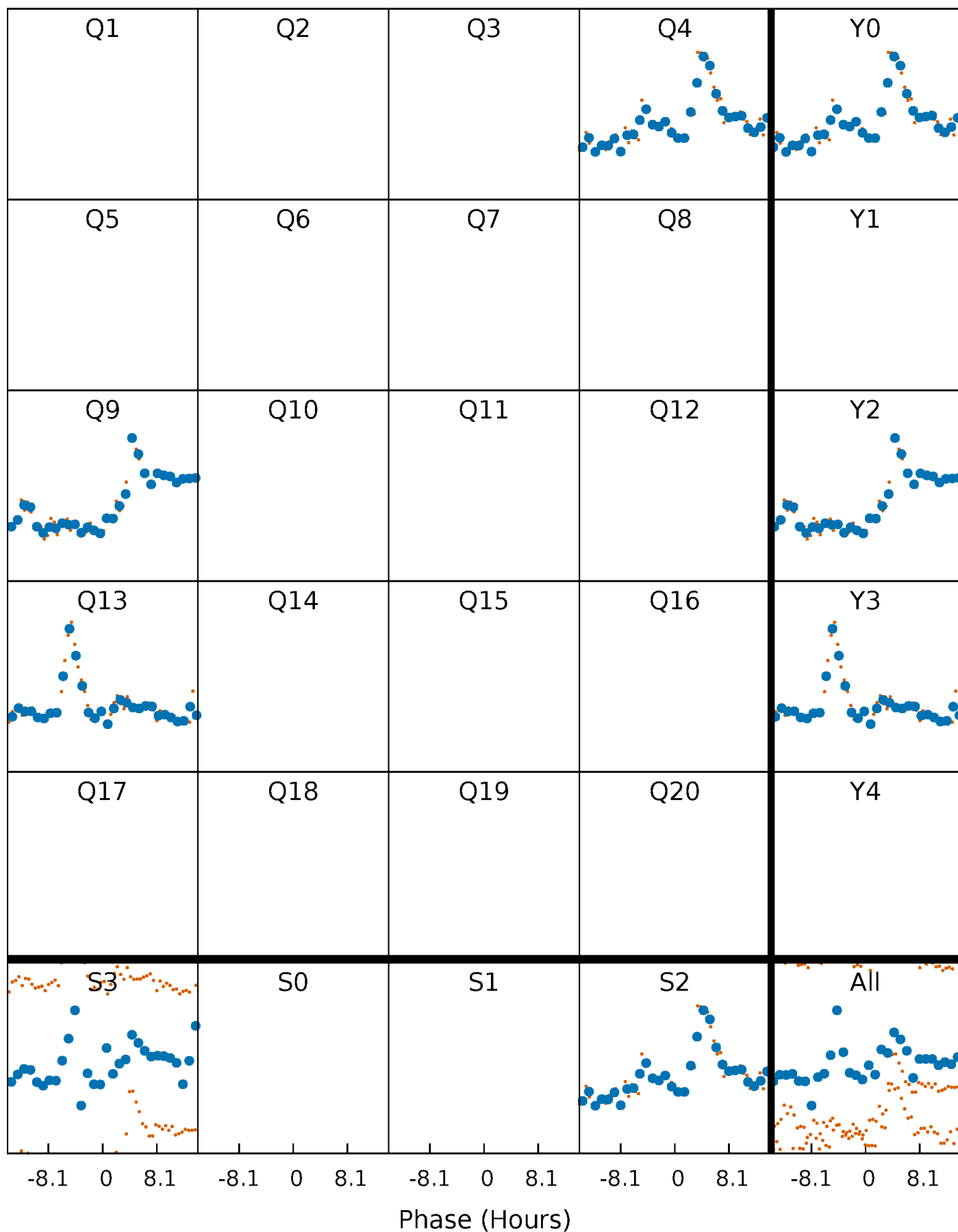


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



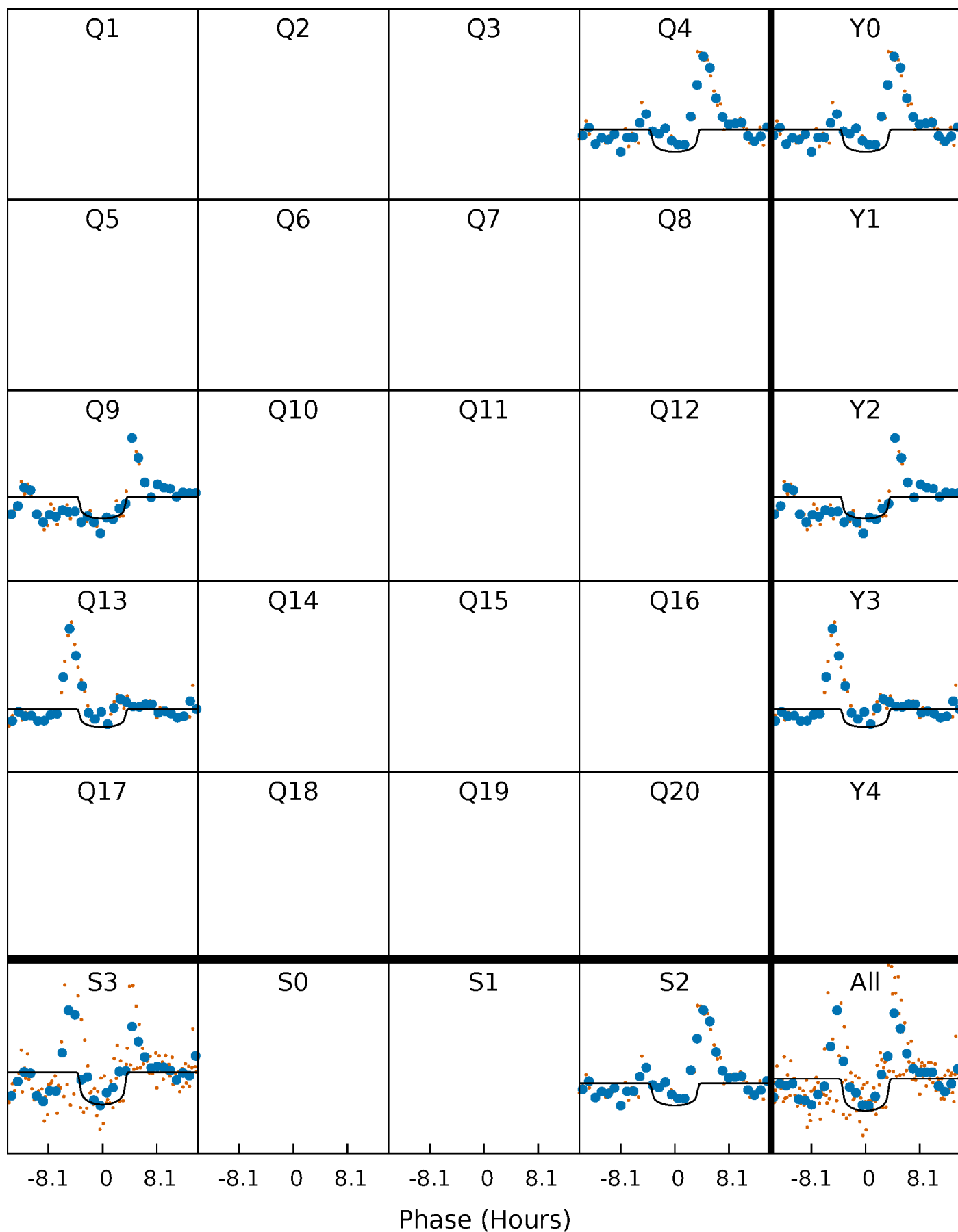
PDC Quarter-Phased Transit Curves

TCE 007020168-01 P=404.703285 Days $T_0=421.013869$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 007020168-01 P=404.703285 Days $T_0=421.013869$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

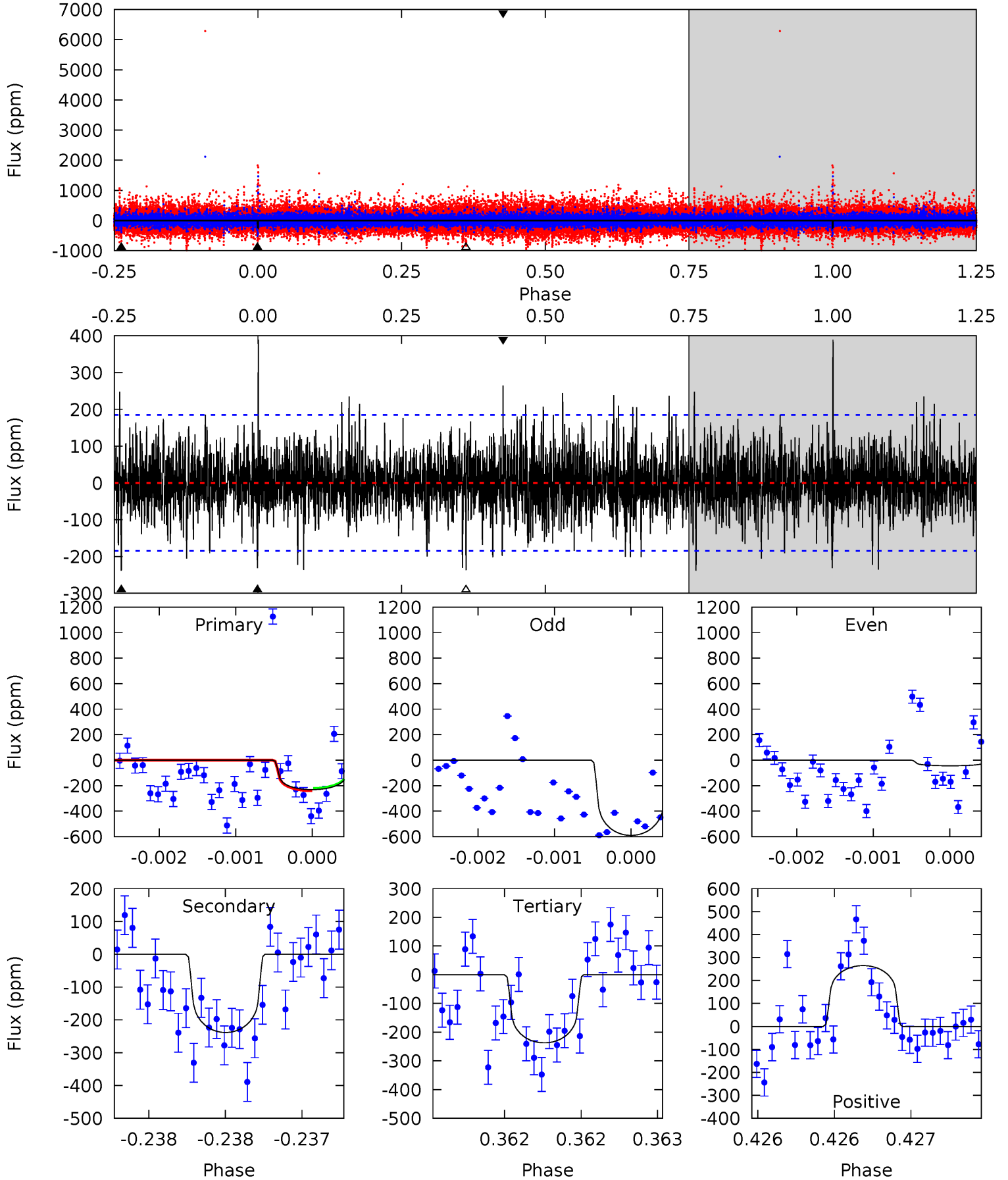
TCE 007020168-01 P=404.707089 Days $T_0=421.014674$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-01, P = 404.703285 Days, E = 16.310584 Days

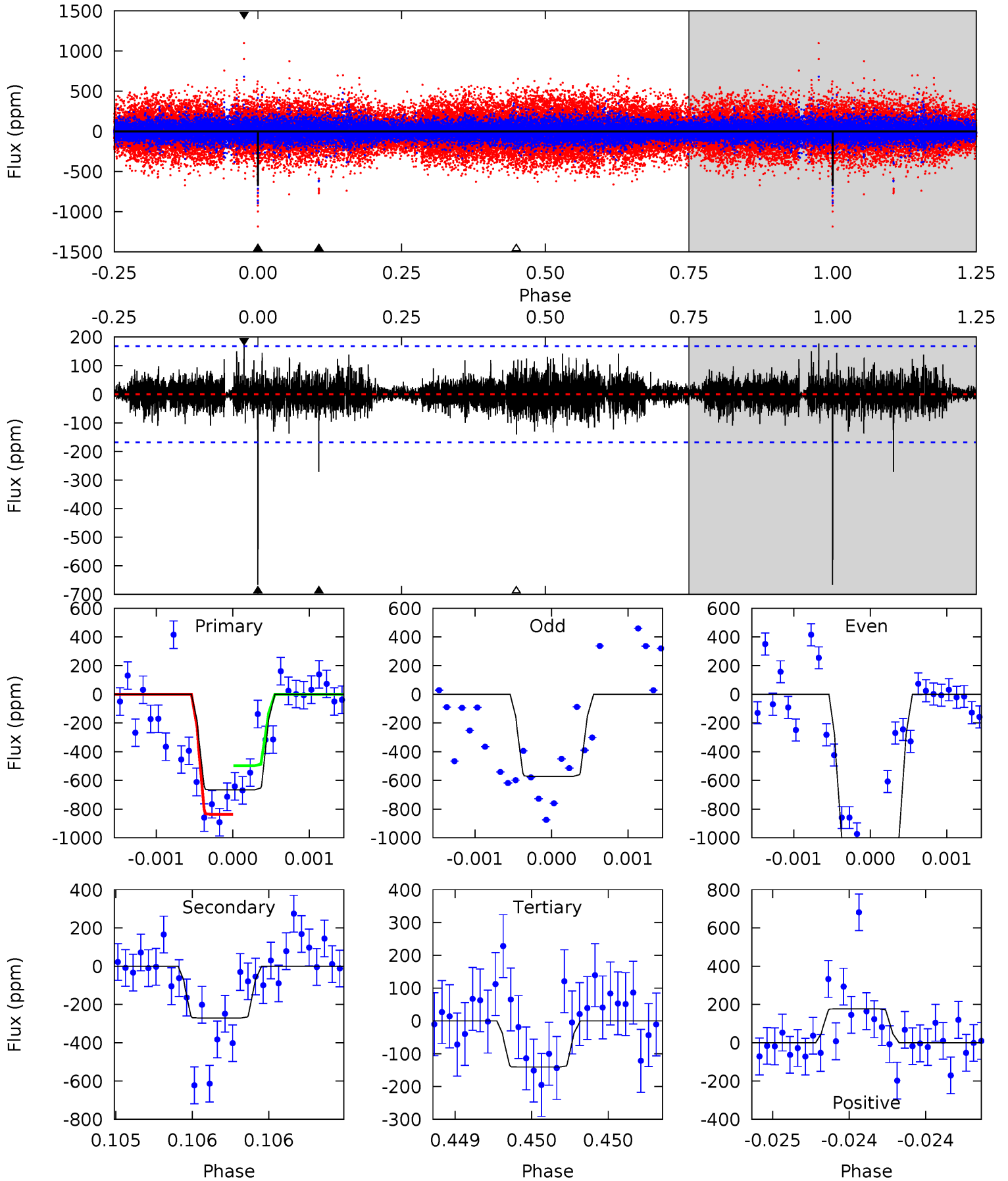
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.87	7.09	7.05	7.87	5.50	3.36	1.86	-0.18	-1.00	0.04	-0.78	6.39	3.68	0.62	0.27



Alt Model-Shift Uniqueness Test

007020168-01, P = 404.707089 Days, E = 16.307585 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.0	8.94	4.65	5.86	5.56	3.45	1.03	17.4	16.2	4.30	3.08	7.55	1.57	0.21	5.52



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-239 ± 34	$3.43^{+3.17}_{-1.98}$	418^{+44}_{-55}	4762^{+2421}_{-887}	11577^{+57181}_{-8343}
Alt.	-270 ± 30	$5.17^{+3.36}_{-2.80}$	424^{+47}_{-56}	4257^{+1392}_{-600}	5946^{+21374}_{-3783}

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 $A_{obs} \gg 1.0$

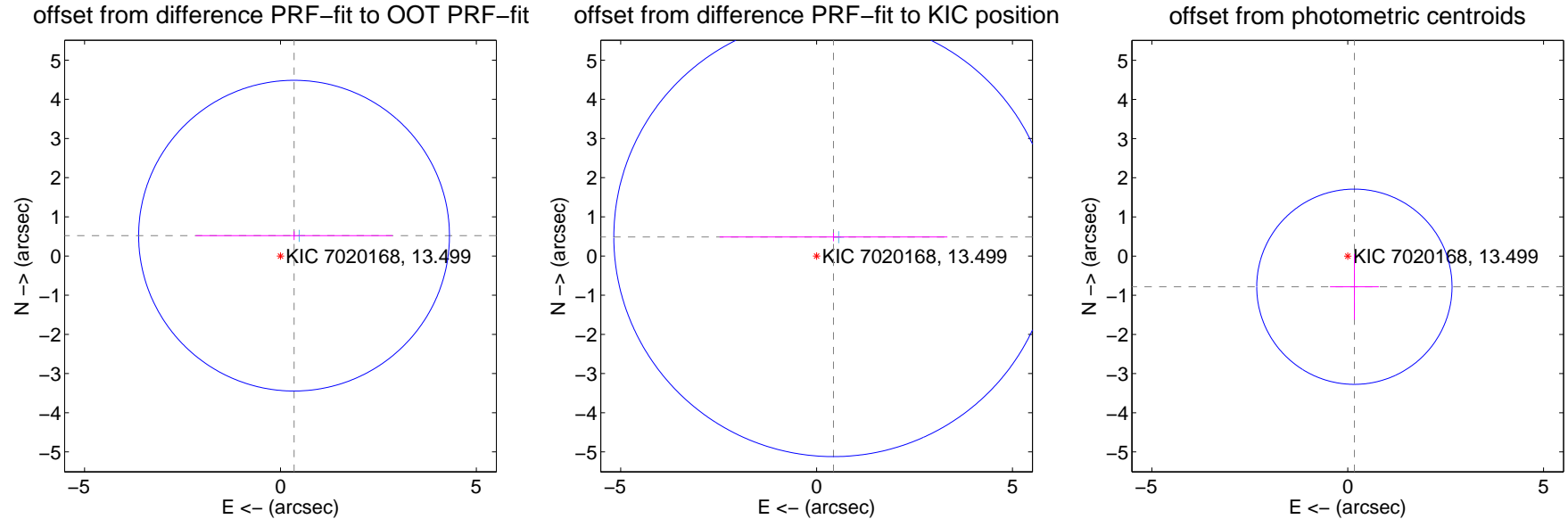
DV Centroid Data

Supplemental centroid analysis for 007020168-01. Kepler magnitude: 13.50. Transit SNR 7.09

There are 1 quarters with good PRF difference image offsets

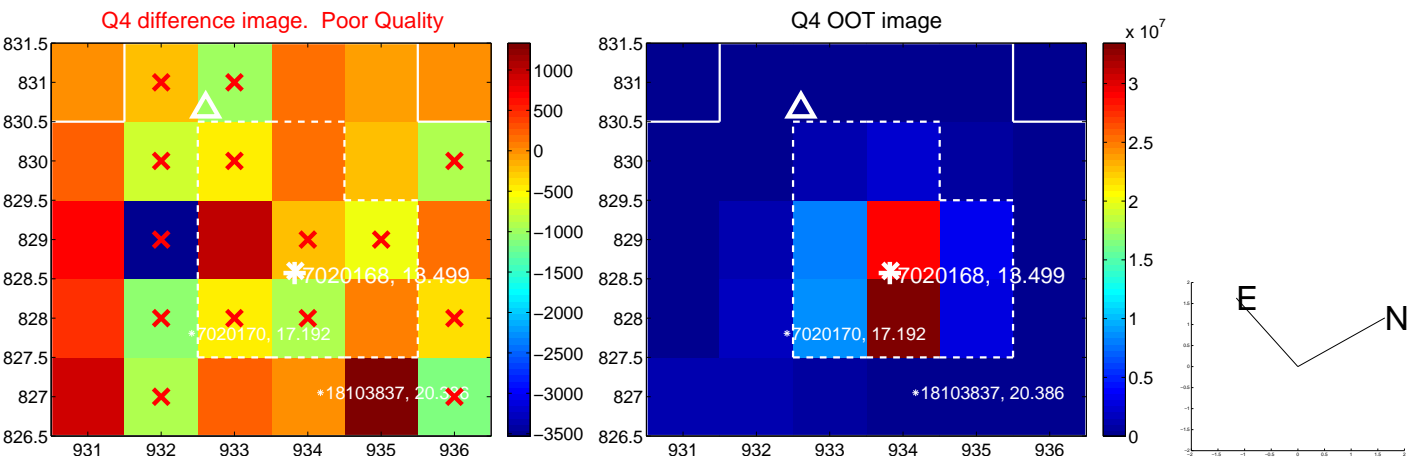
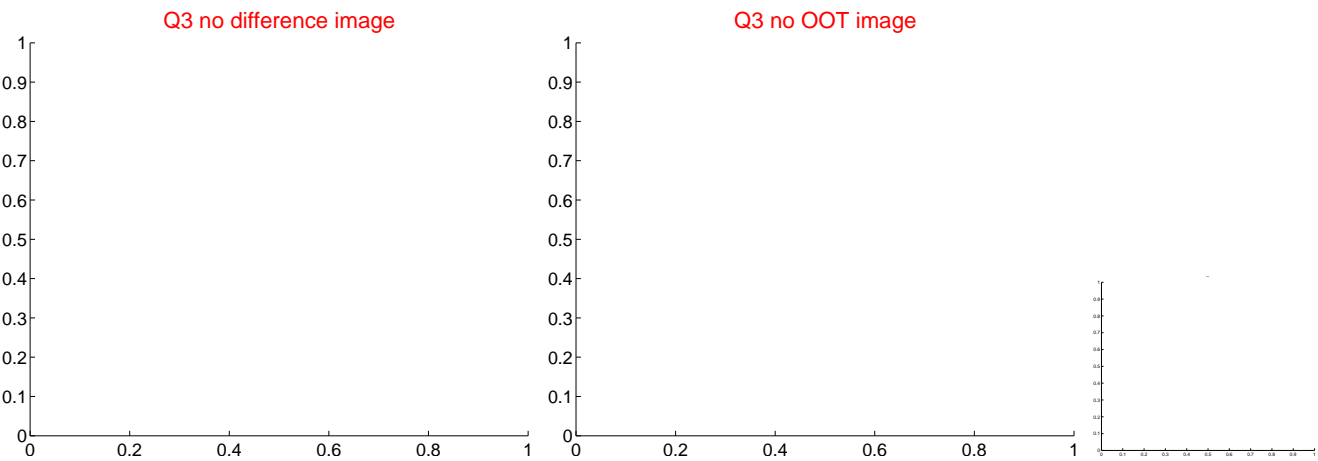
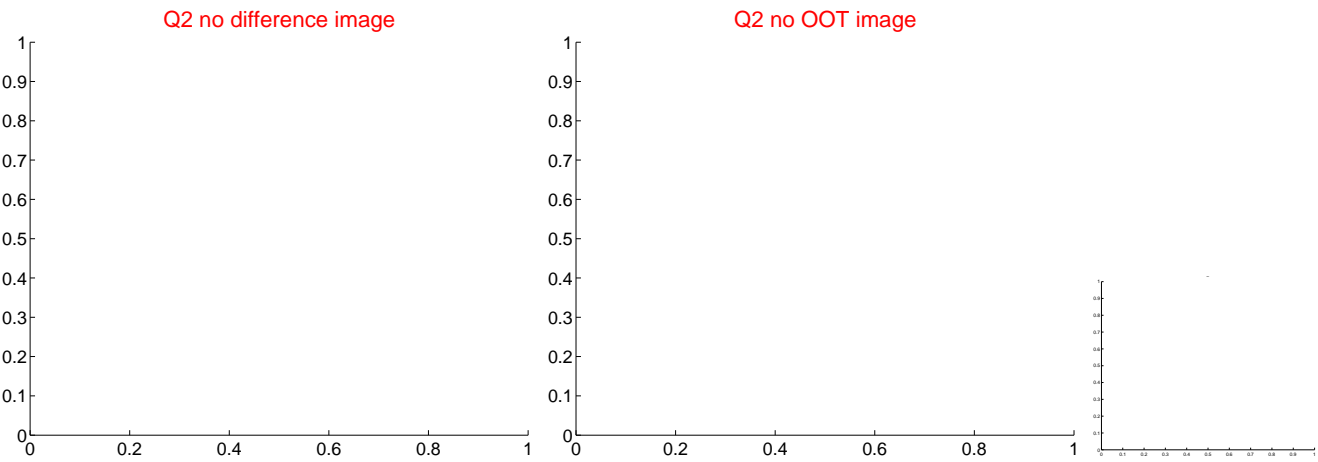
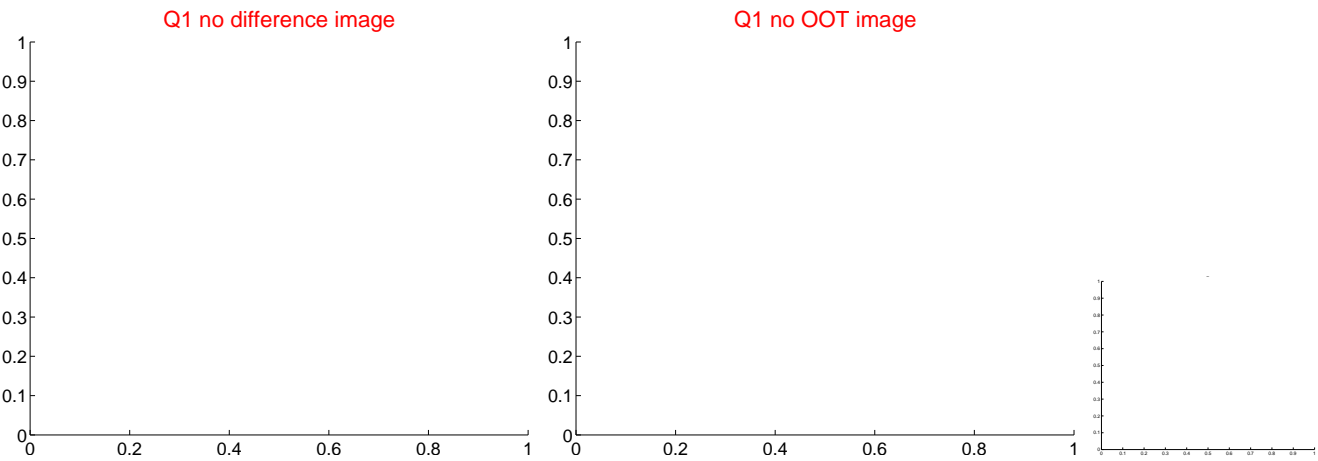
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.625 ± 1.322	0.47	-0.347 ± 2.513	0.520 ± 0.111
PRF-fit source offset from KIC position	0.649 ± 1.869	0.35	-0.431 ± 2.907	0.485 ± 0.108
photometric centroid source offset	0.80 ± 0.83	0.96	-0.17 ± 0.62	-0.78 ± 0.84

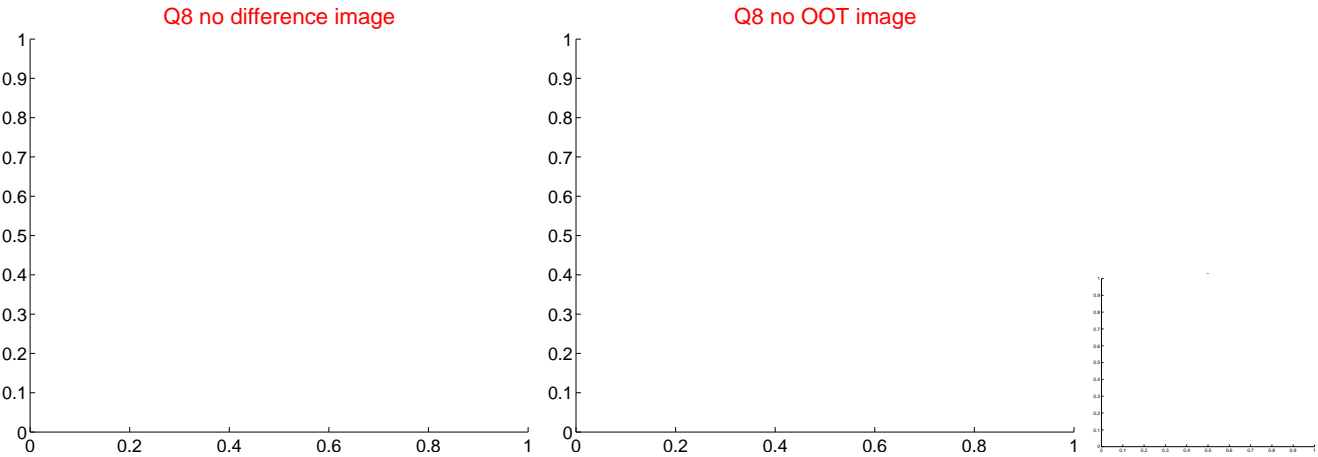
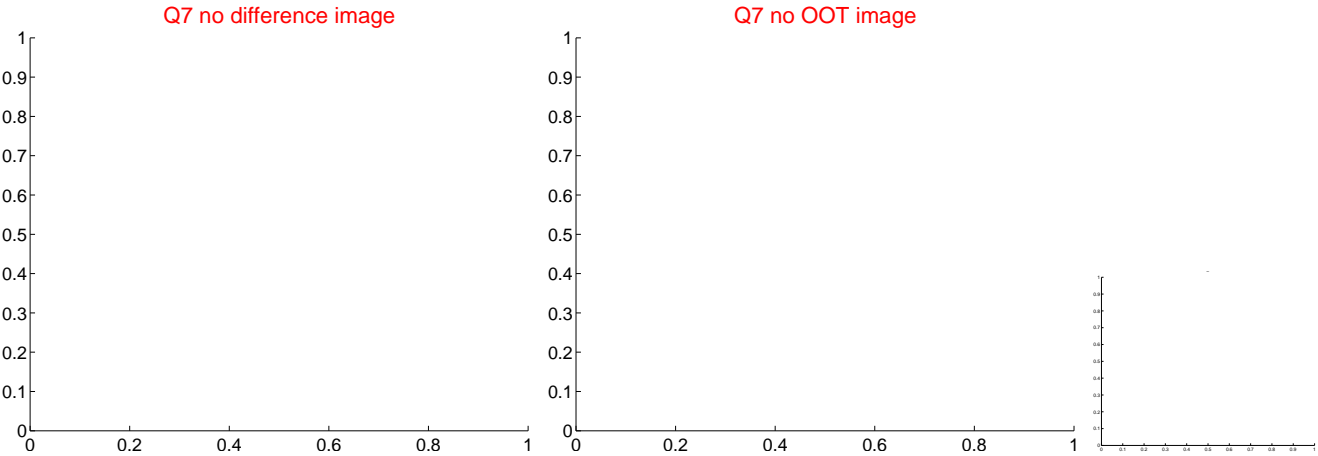
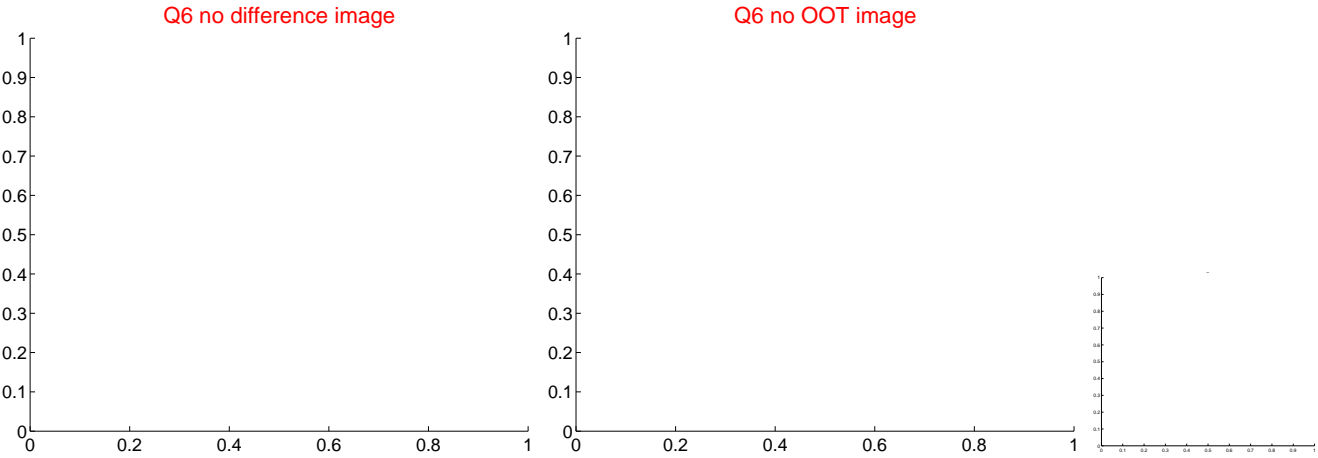
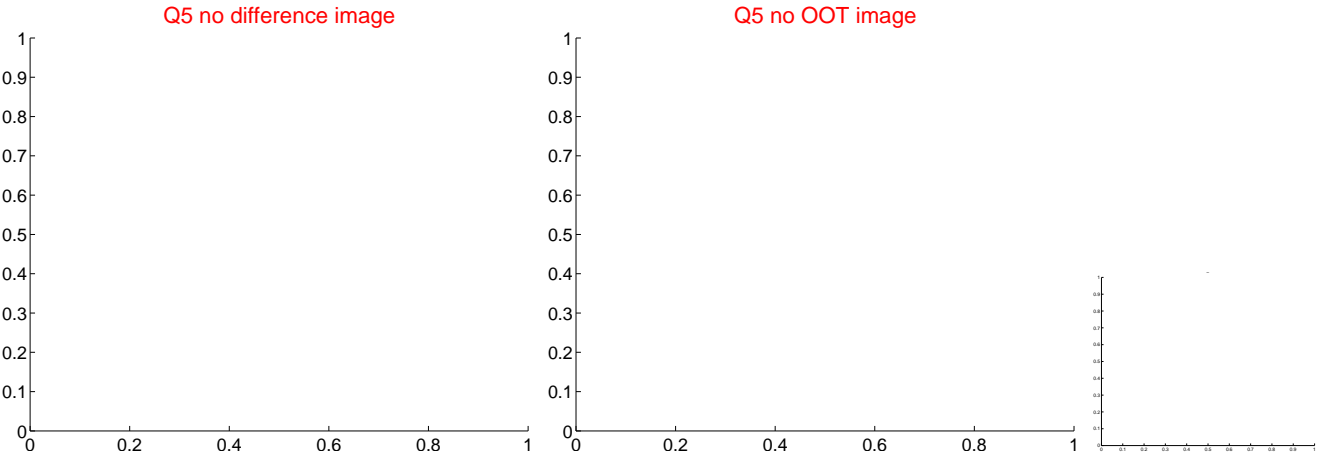


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

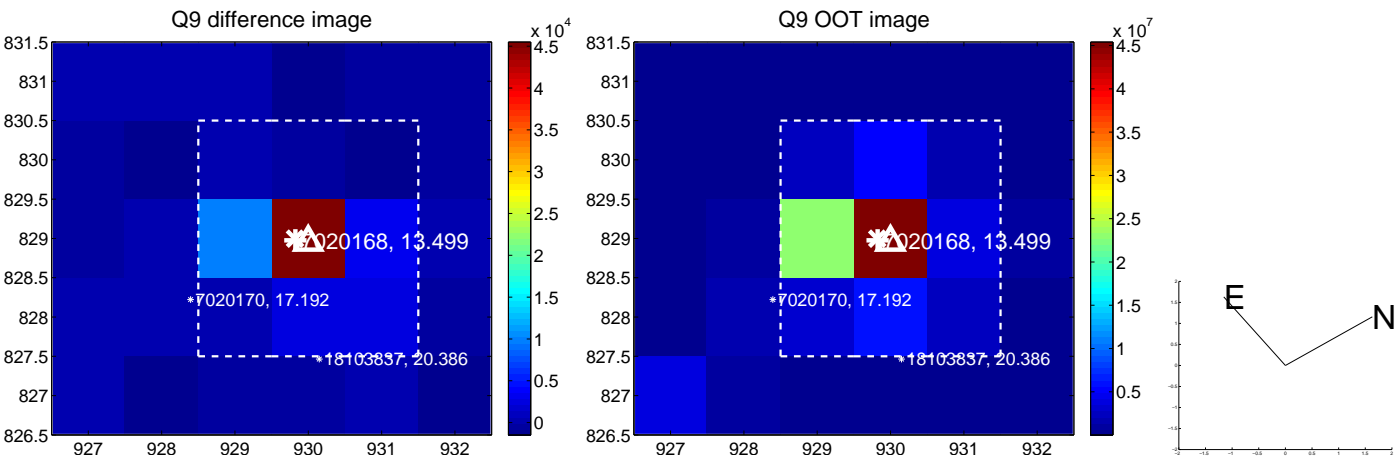
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



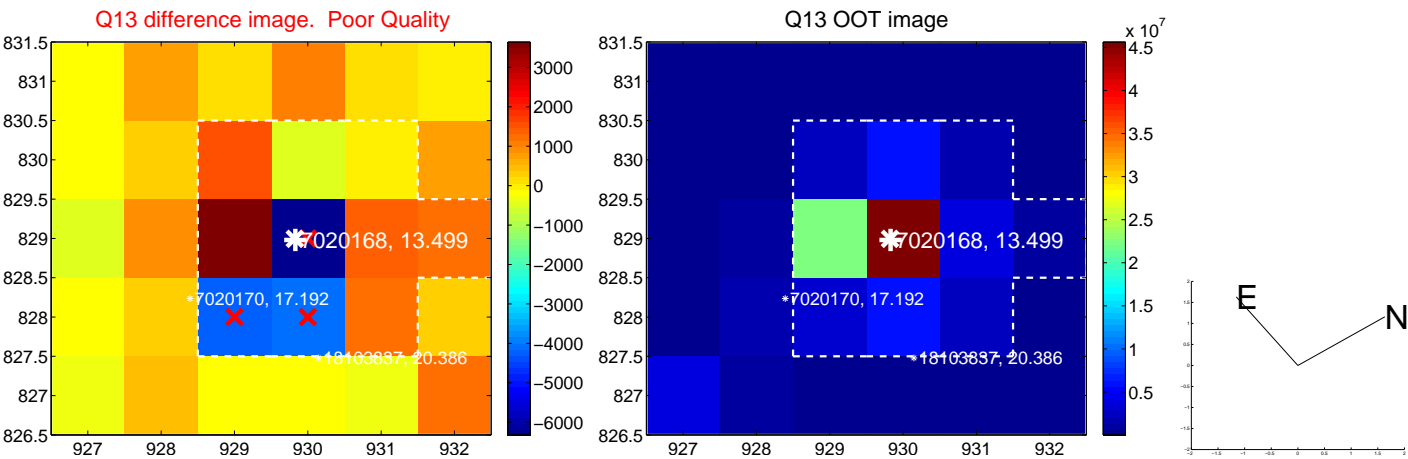
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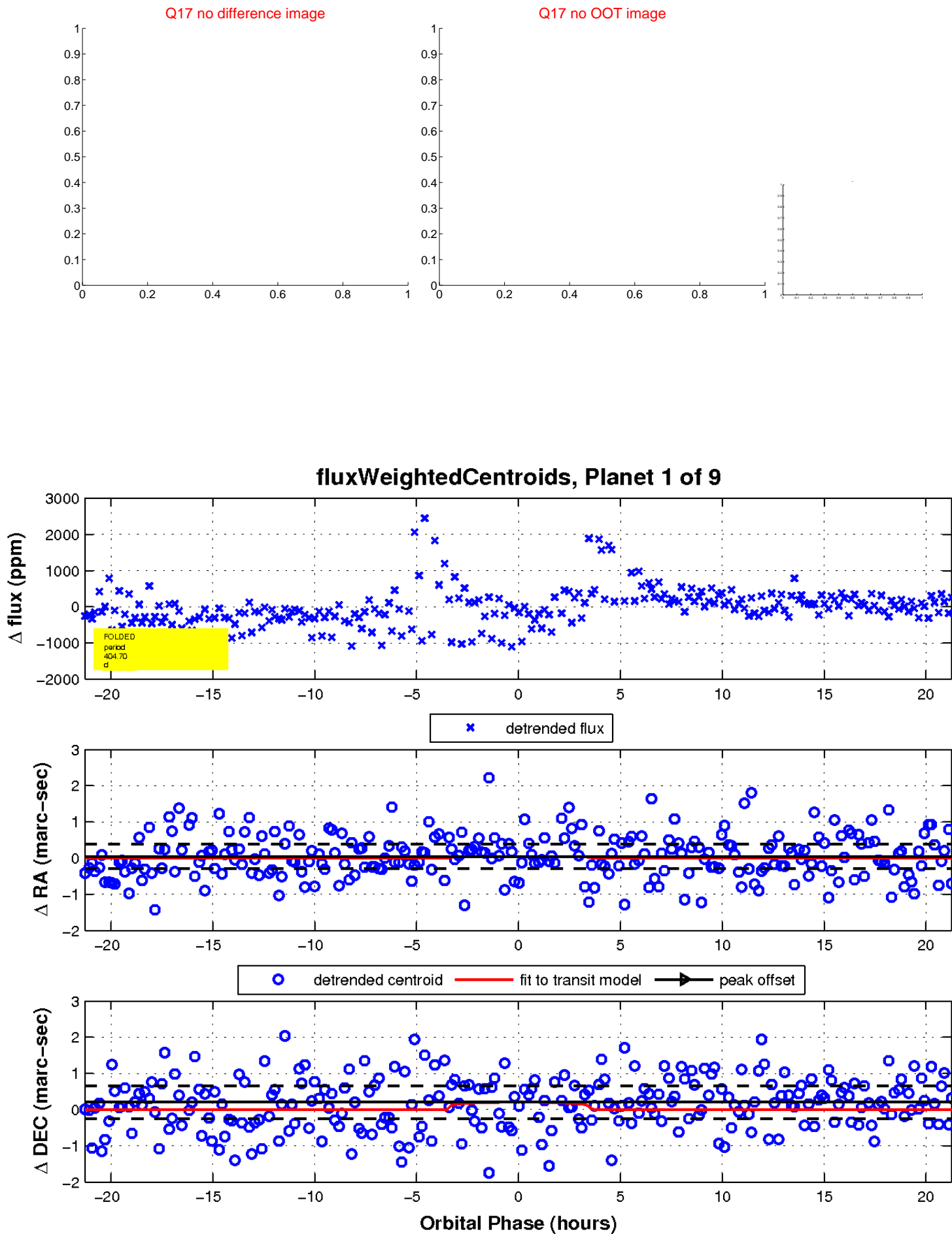
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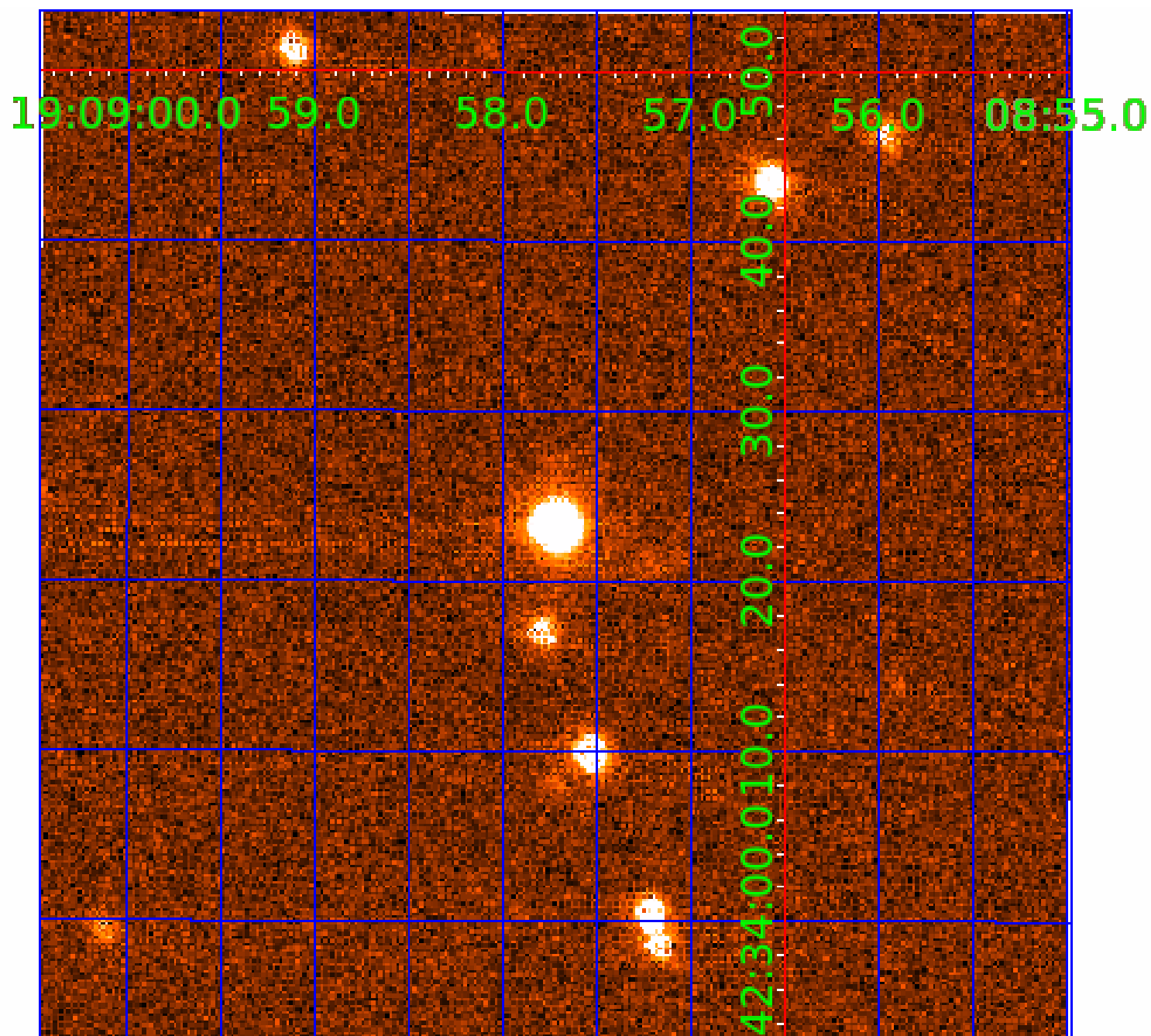


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UKIRT Image

Declination



KIC 007020168

Q1-17 DR25 TCE Parameters

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Robovetter Results

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007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

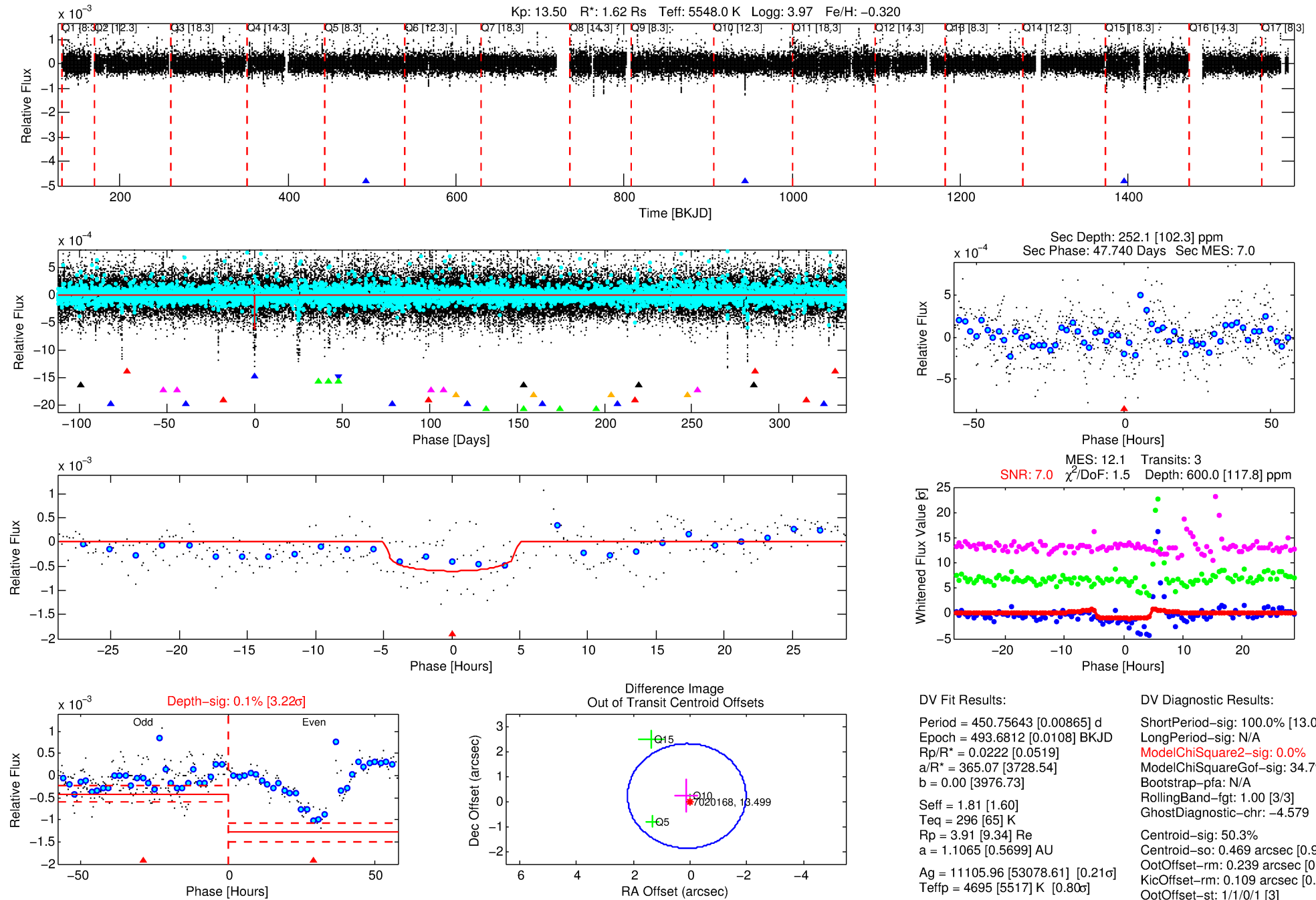
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-02

No Significant Match Found

DV One-Page Summary

KIC: 7020168 Candidate: 2 of 9 Period: 450.756 d



DV Fit Results:

Period = 450.75643 [0.00865] d
Epoch = 493.6812 [0.0108] BKJD
Rp/R* = 0.0222 [0.0519]
a/R* = 365.07 [3728.54]
b = 0.00 [3976.73]
Seff = 1.81 [1.60]
Teq = 296 [65] K
Rp = 3.91 [9.34] Re
a = 1.1065 [0.5699] AU
Ag = 11105.96 [53078.61] [0.21 σ]
Teff = 4695 [5517] K [0.80 σ]

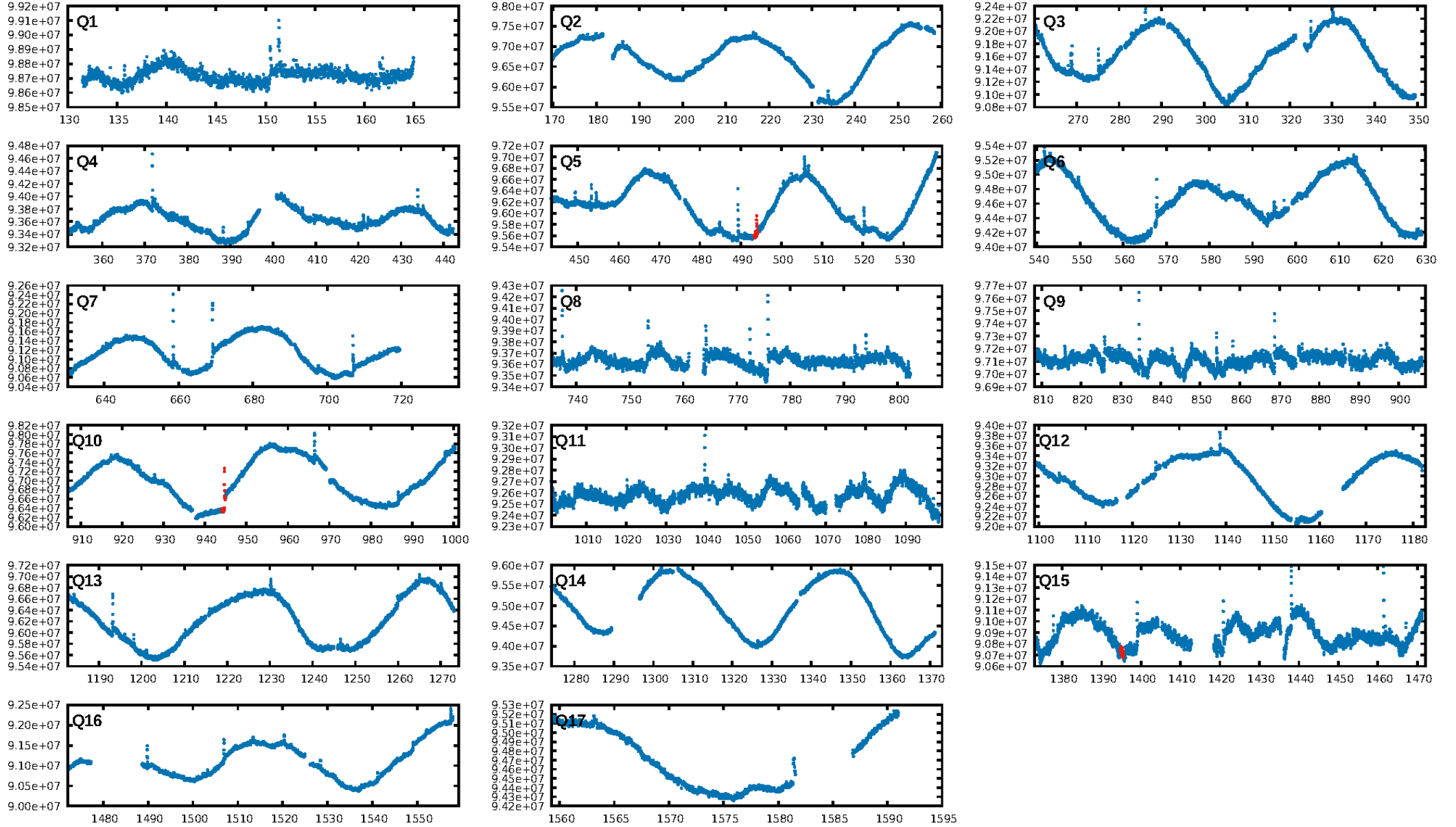
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [13.06 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 34.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -4.579
Centroid-sig: 50.3%
Centroid-so: 0.469 arcsec [0.92 σ]
OotOffset-rm: 0.239 arcsec [0.34 σ]
KicOffset-rm: 0.109 arcsec [0.25 σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

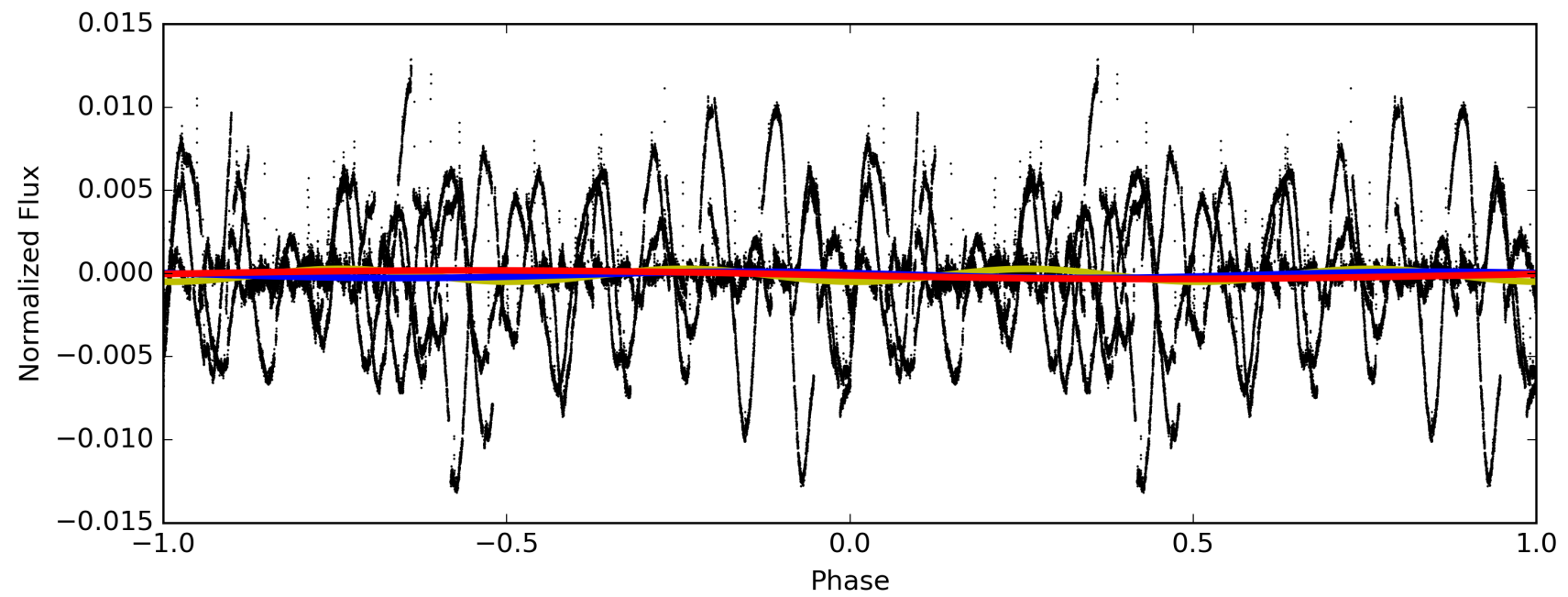
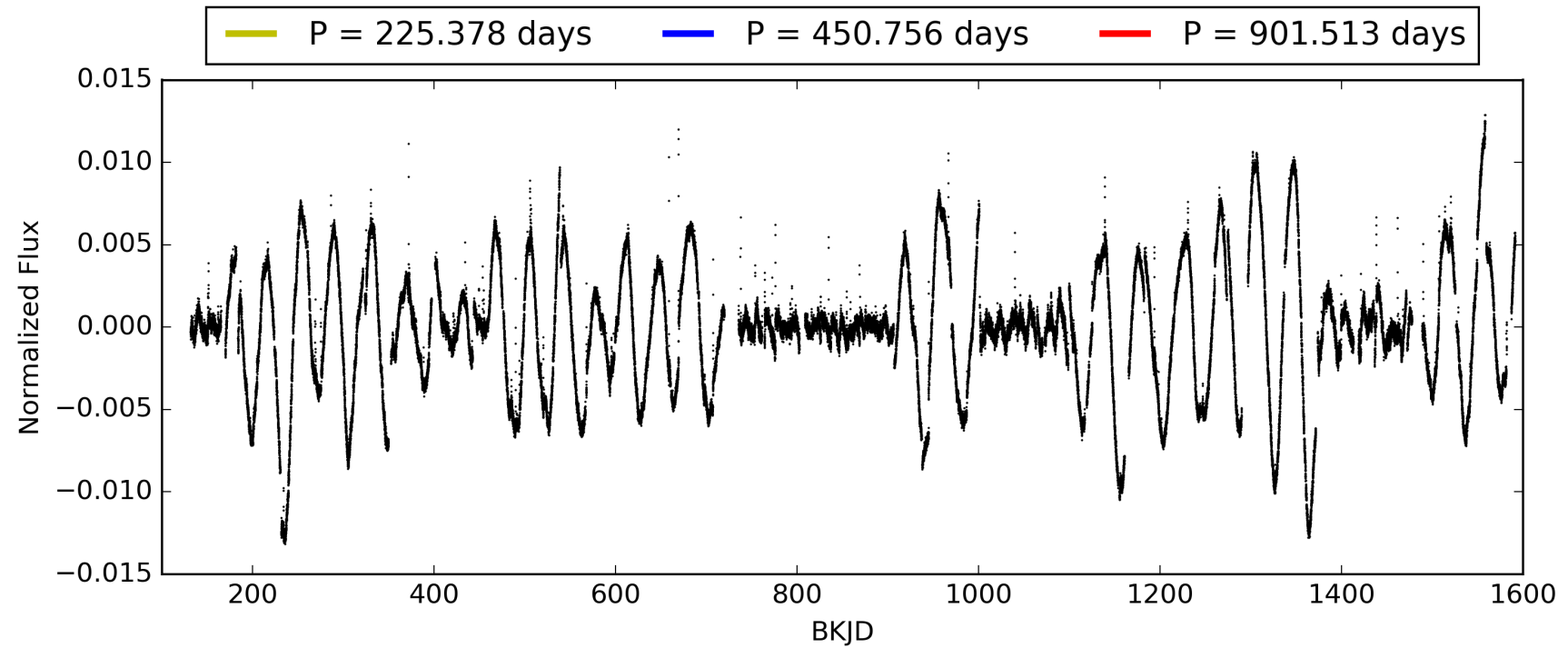
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TCE 007020168-02, PDC Light Curves

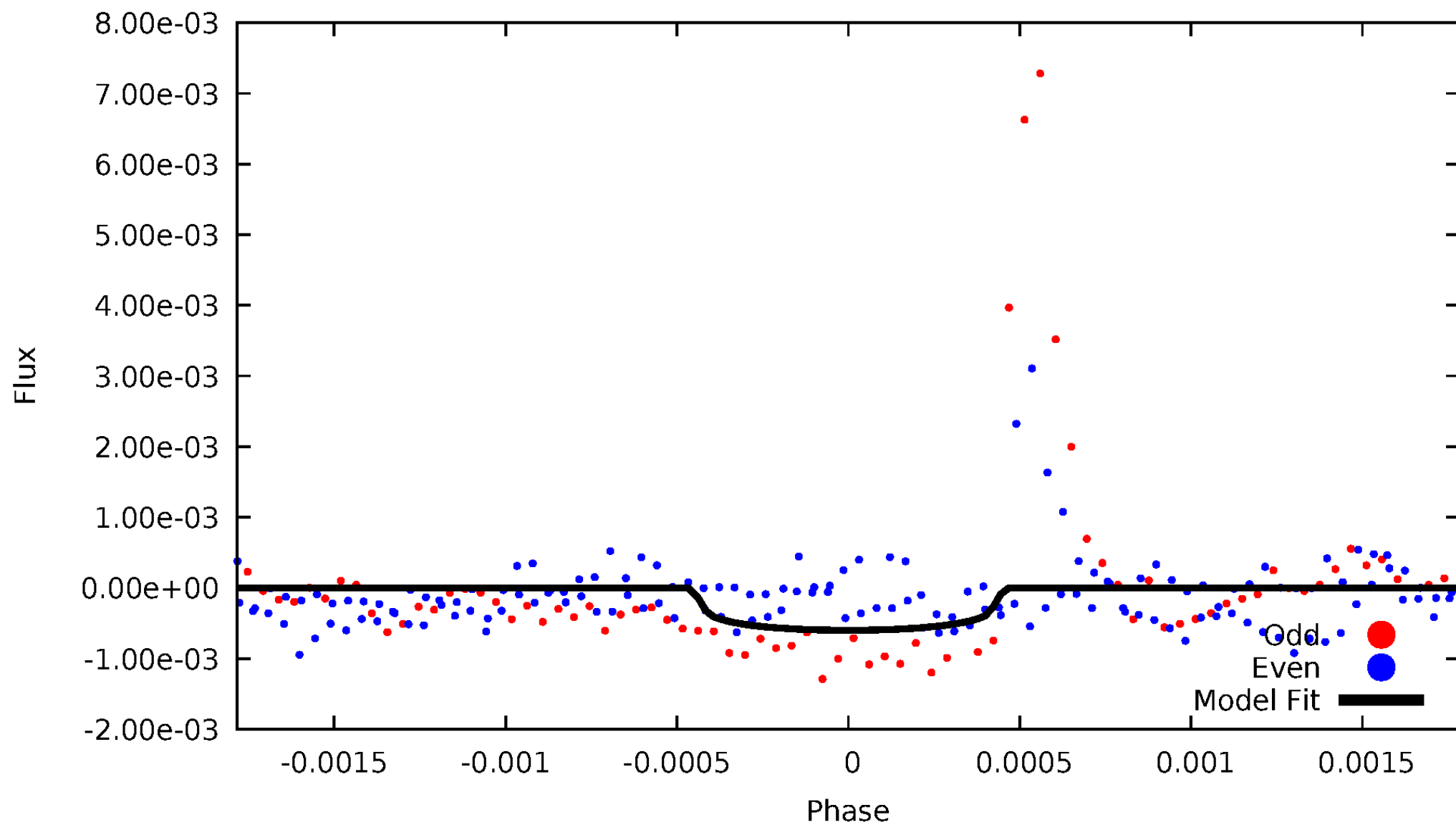


TCE 007020168-02



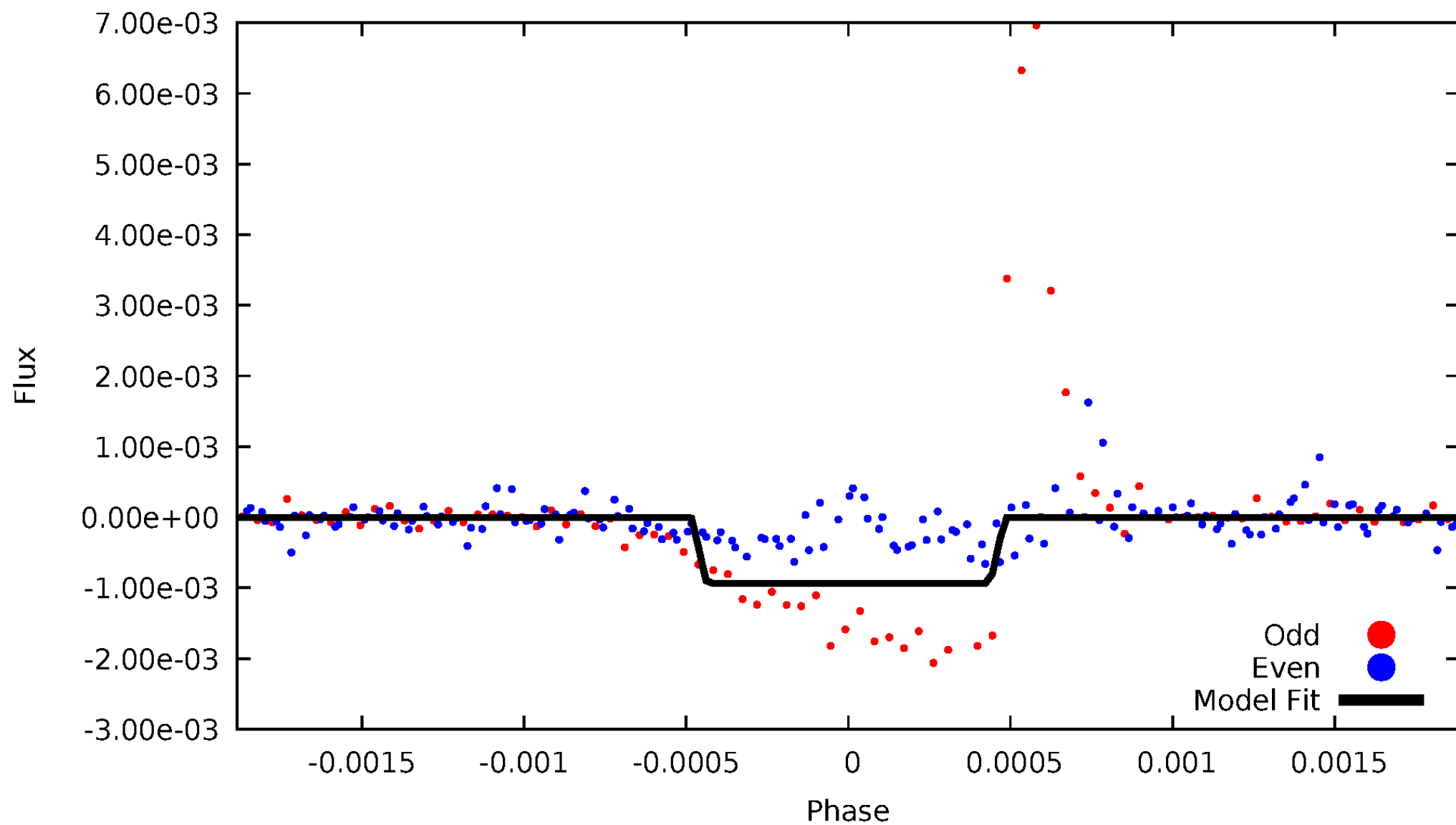
DV Odd/Even

TCE 007020168-02



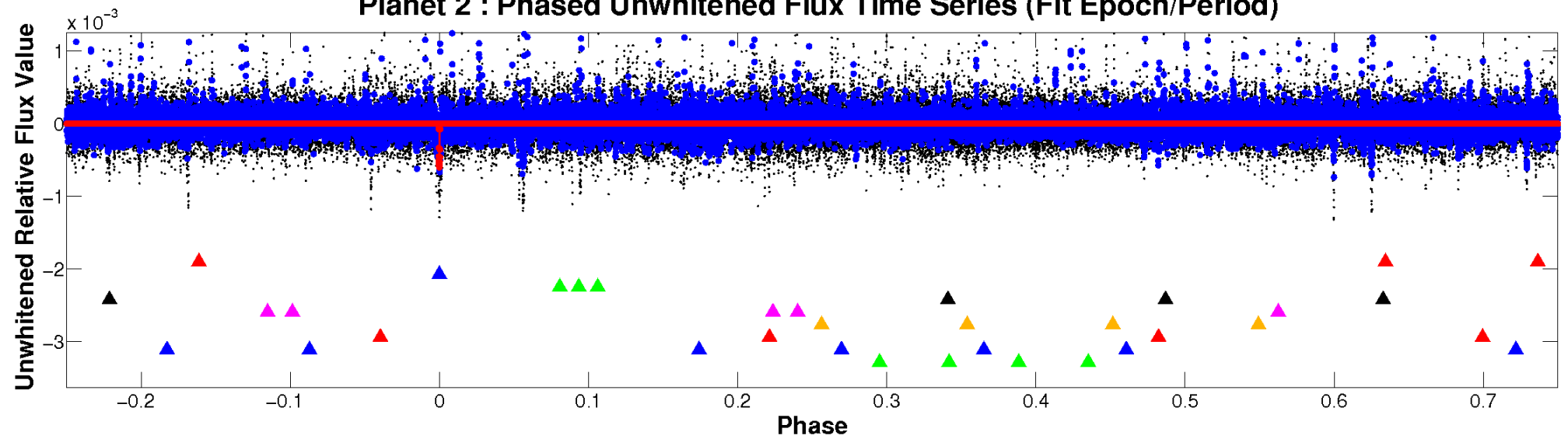
ALT Odd/Even

TCE 007020168-02

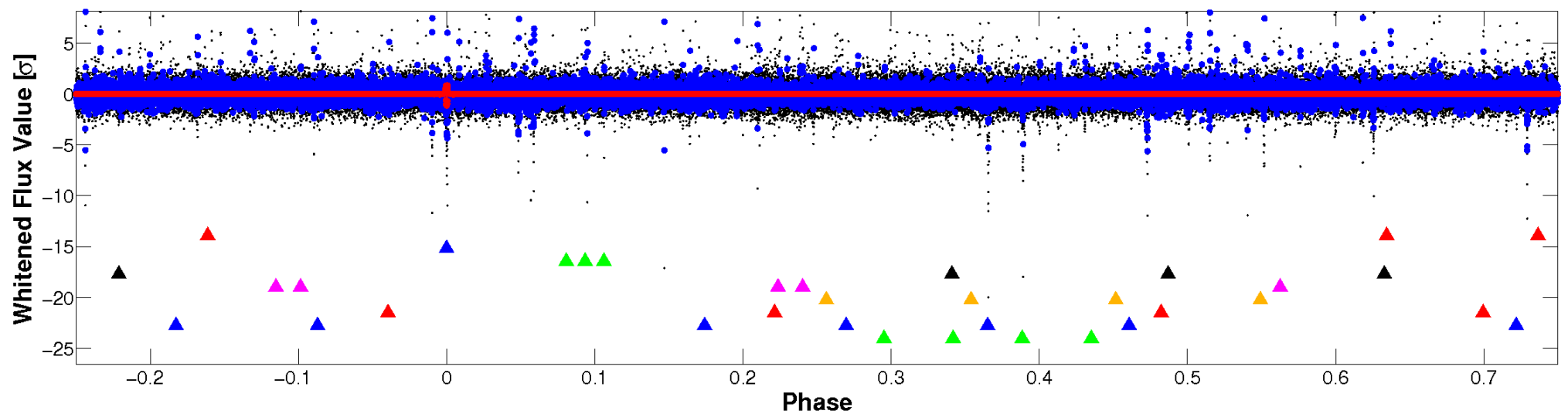


Non-Whitened Vs. Whitened Light Curve

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

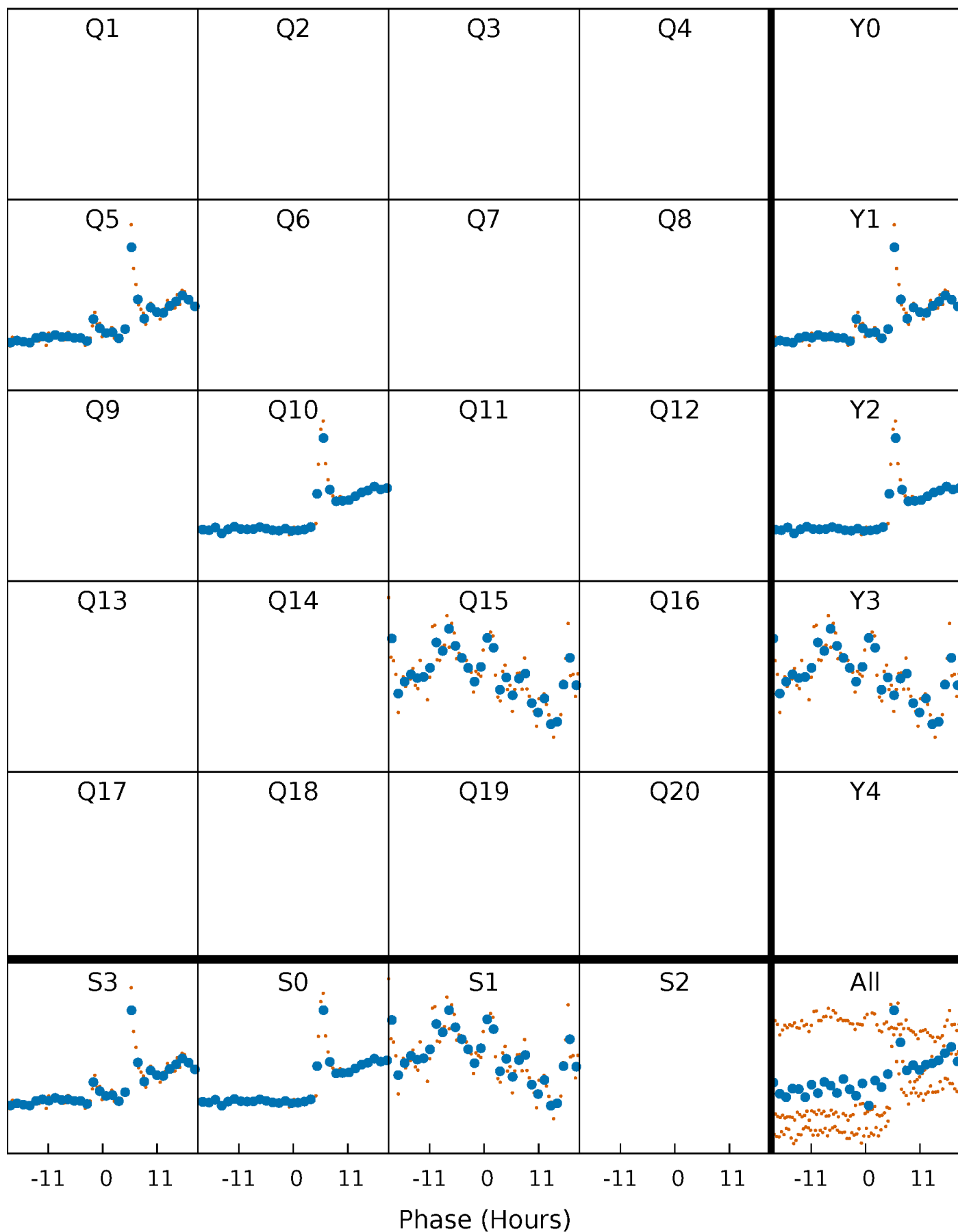


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



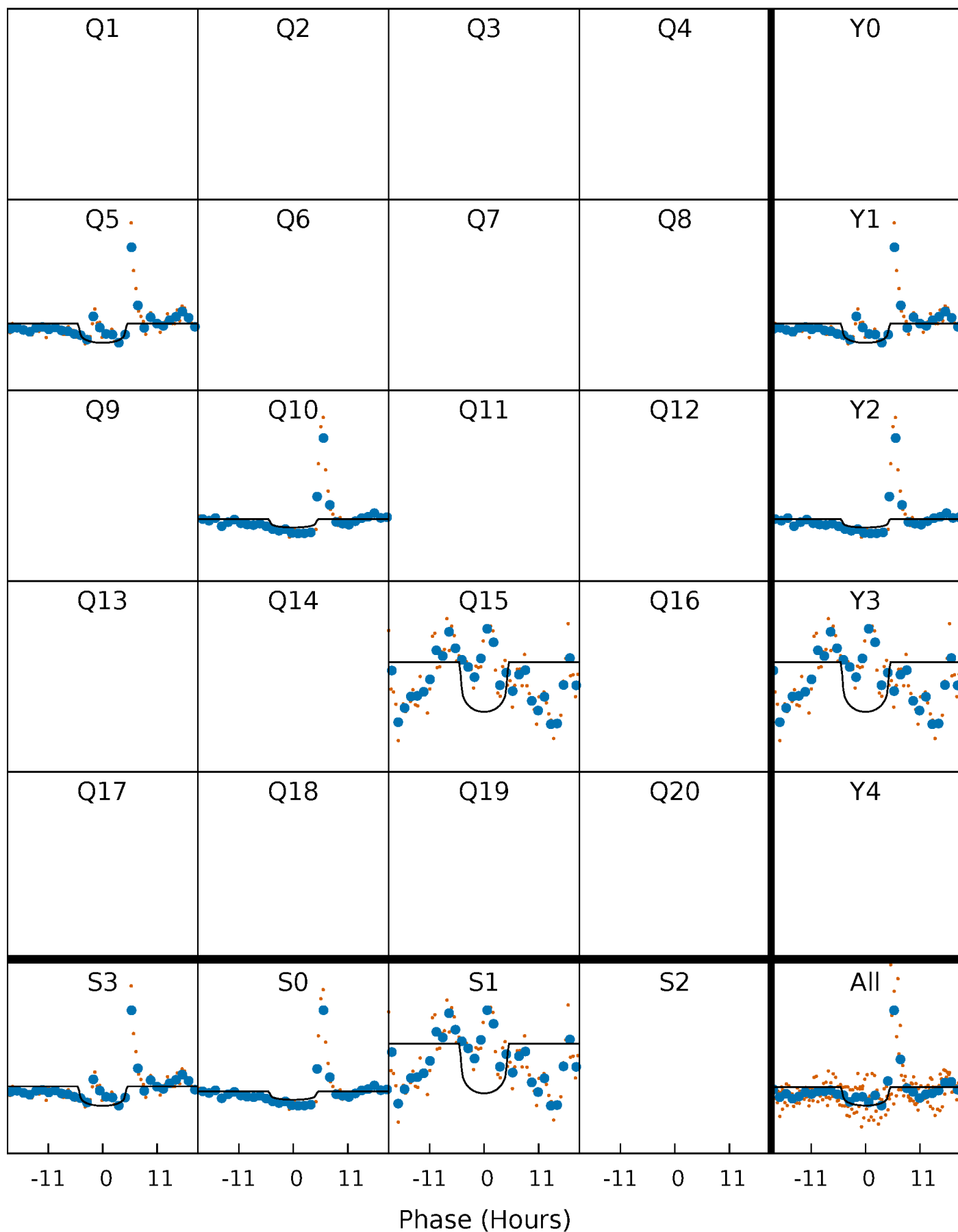
PDC Quarter-Phased Transit Curves

TCE 007020168-02 P=450.756428 Days $T_0=493.681250$ (BKJD)



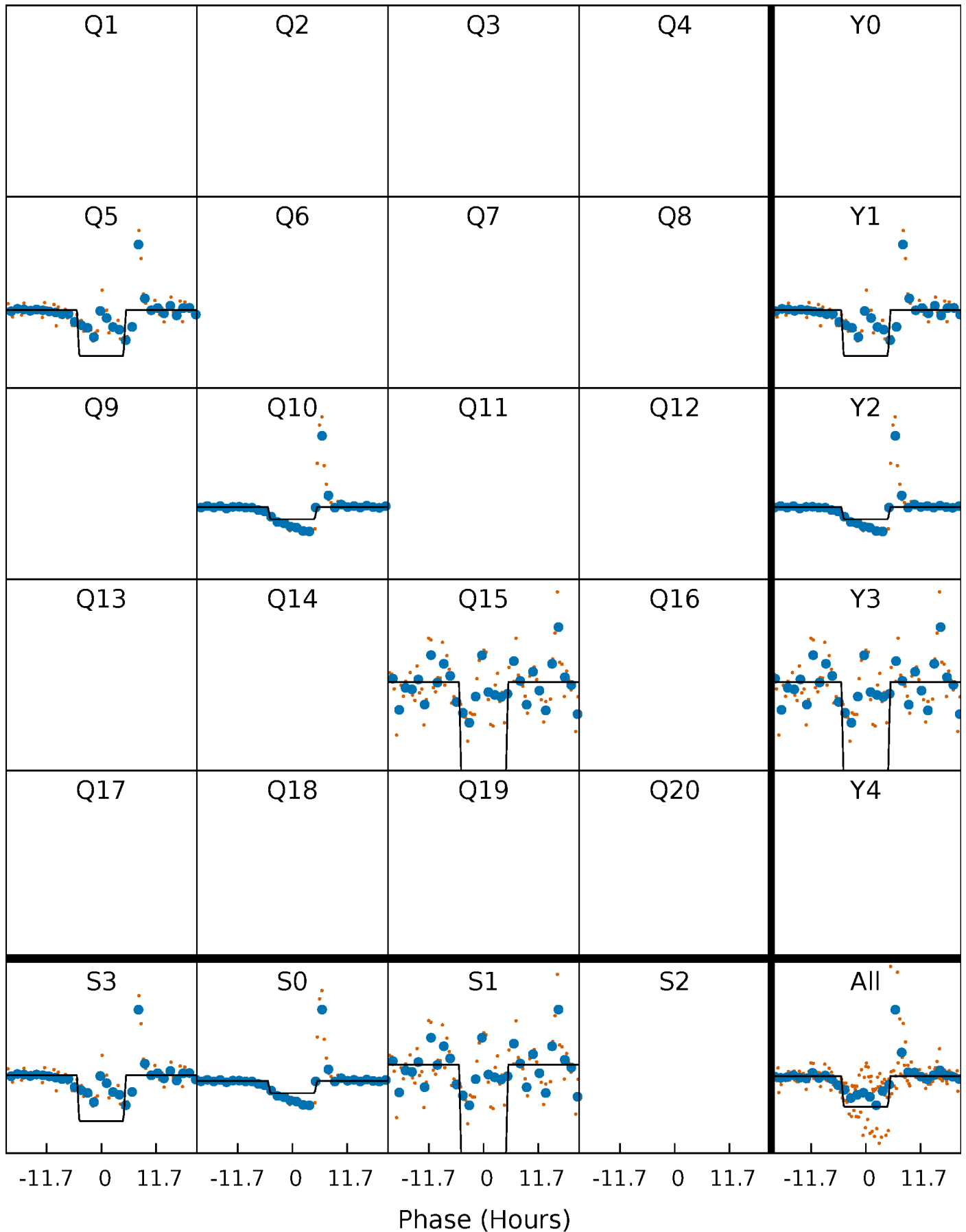
DV Quarter-Phased Transit Curves

TCE 007020168-02 $P=450.756428$ Days $T_0=493.681250$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

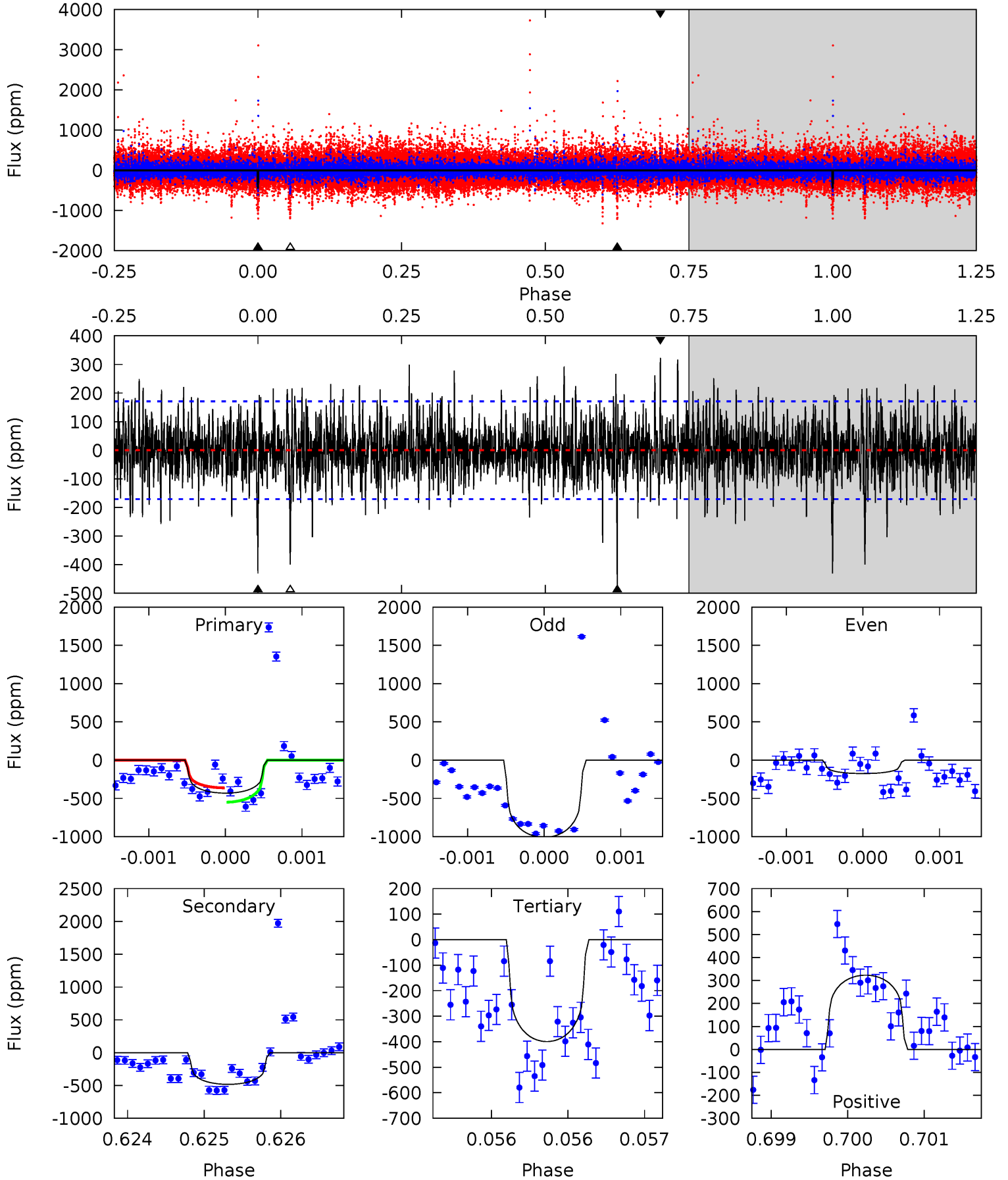
TCE 007020168-02 P=450.818823 Days $T_0=493.609557$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-02, P = 450.756428 Days, E = 42.924822 Days

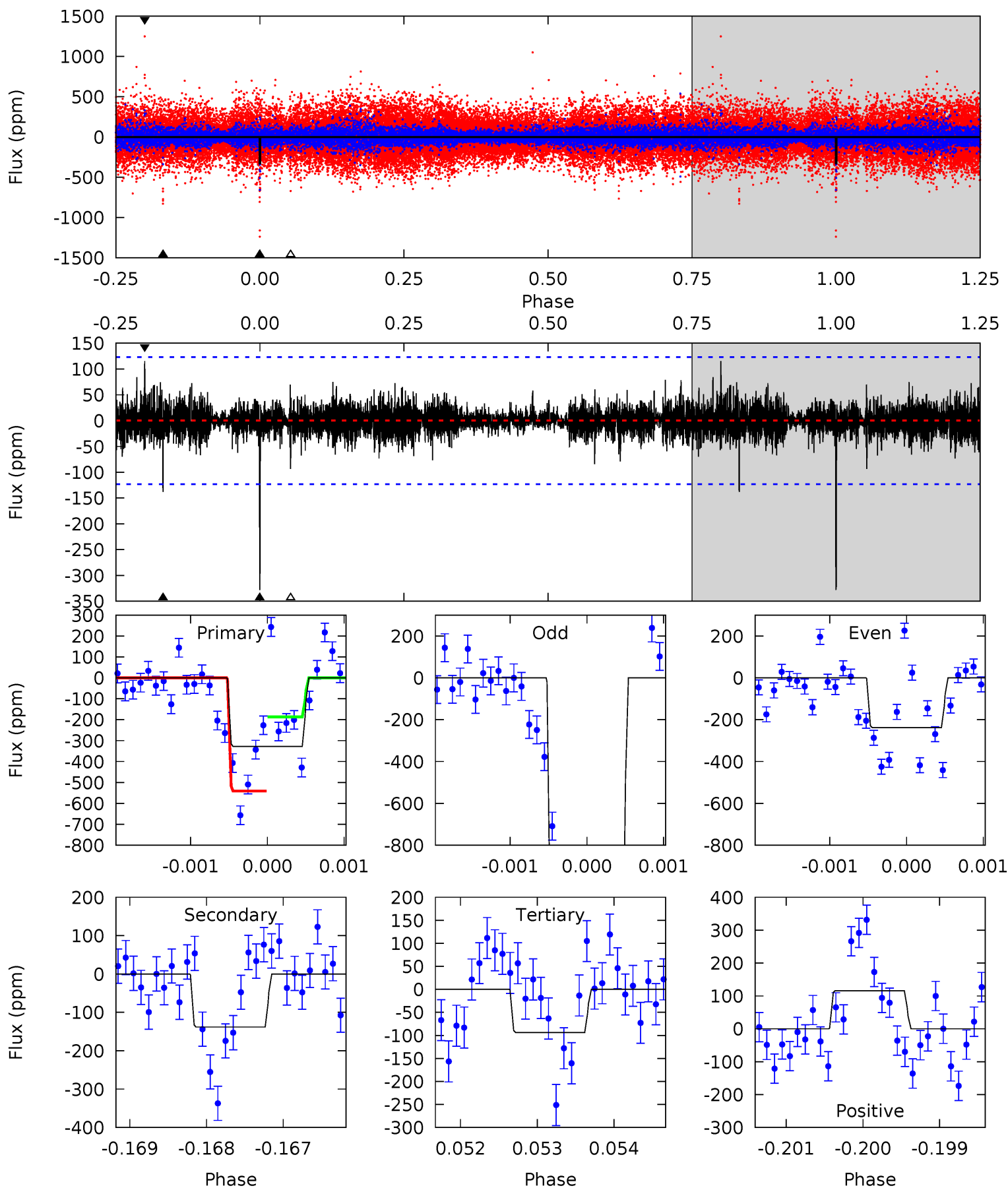
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.8	15.5	12.8	10.3	5.47	3.33	2.44	1.01	3.45	2.67	5.11	10.9	1.34	0.40	2.97



Alt Model-Shift Uniqueness Test

007020168-02, P = 450.818823 Days, E = 42.790734 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.6	6.13	4.15	5.13	5.46	3.31	0.81	10.4	9.44	1.98	1.01	27.0	2.08	0.26	7.71



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-483 ± 31	$7.02^{+8.31}_{-4.76}$	411^{+40}_{-60}	4209^{+2687}_{-907}	6569^{+56871}_{-5141}
Alt.	-138 ± 23	$7.59^{+8.64}_{-5.11}$	409^{+42}_{-56}	3301^{+1544}_{-573}	1662^{+12928}_{-1308}

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 $A_{obs} \gg 1.0$

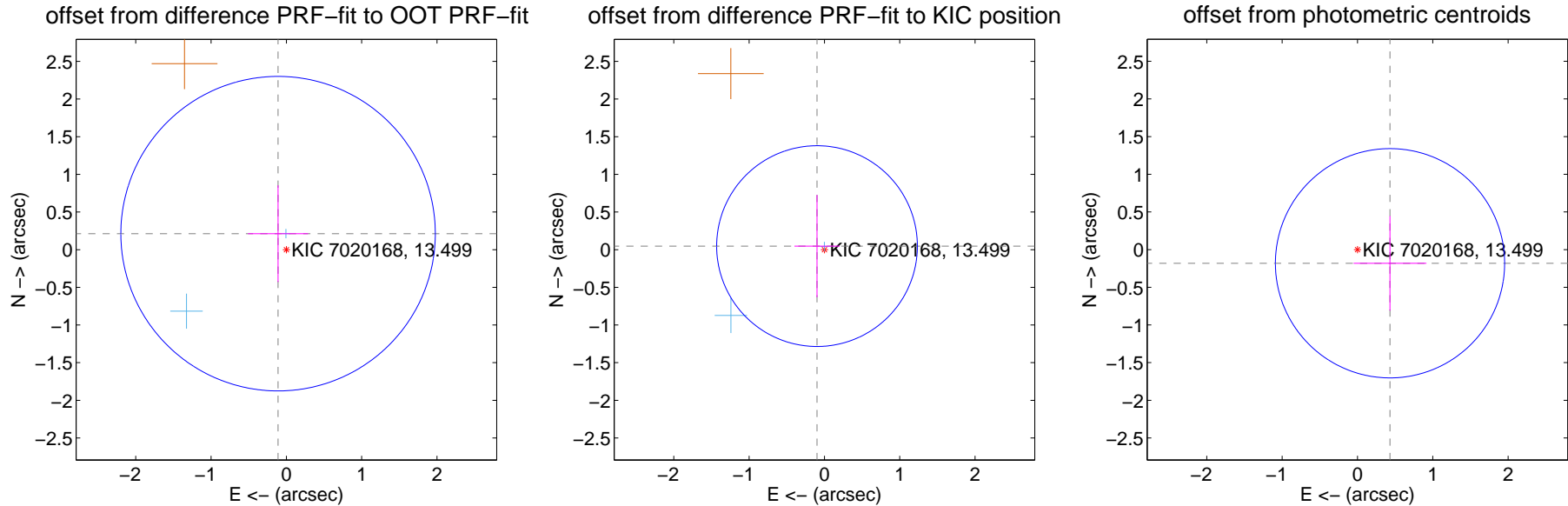
DV Centroid Data

Supplemental centroid analysis for 007020168-02. Kepler magnitude: 13.50. Transit SNR 7.04

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.239 ± 0.696	0.34	0.110 ± 0.399	0.213 ± 0.641
PRF-fit source offset from KIC position	0.109 ± 0.444	0.25	0.098 ± 0.300	0.047 ± 0.679
photometric centroid source offset	0.47 ± 0.51	0.92	-0.43 ± 0.48	-0.18 ± 0.63

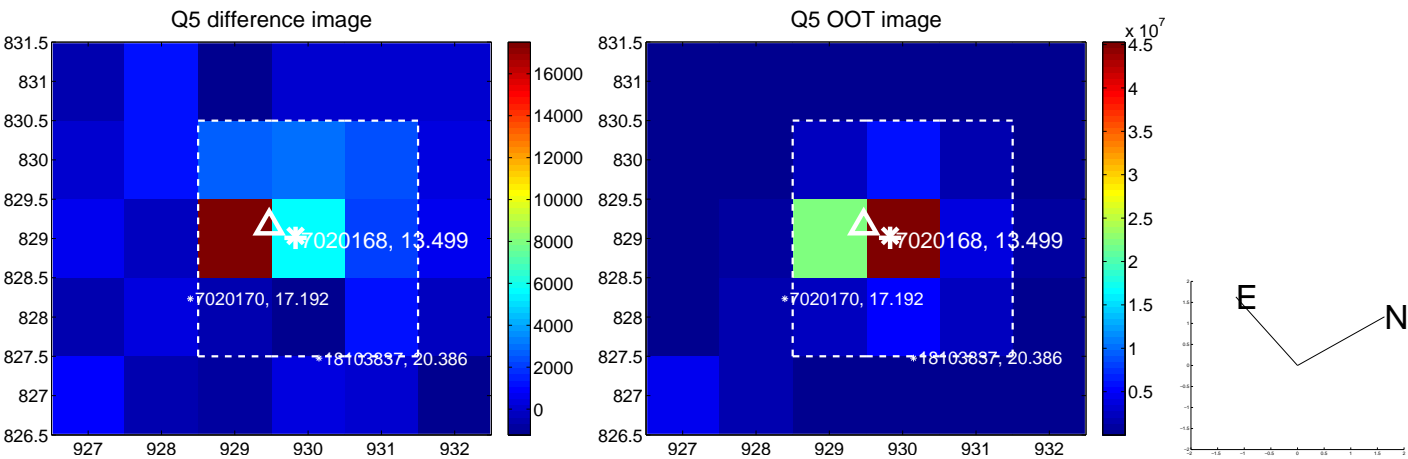


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

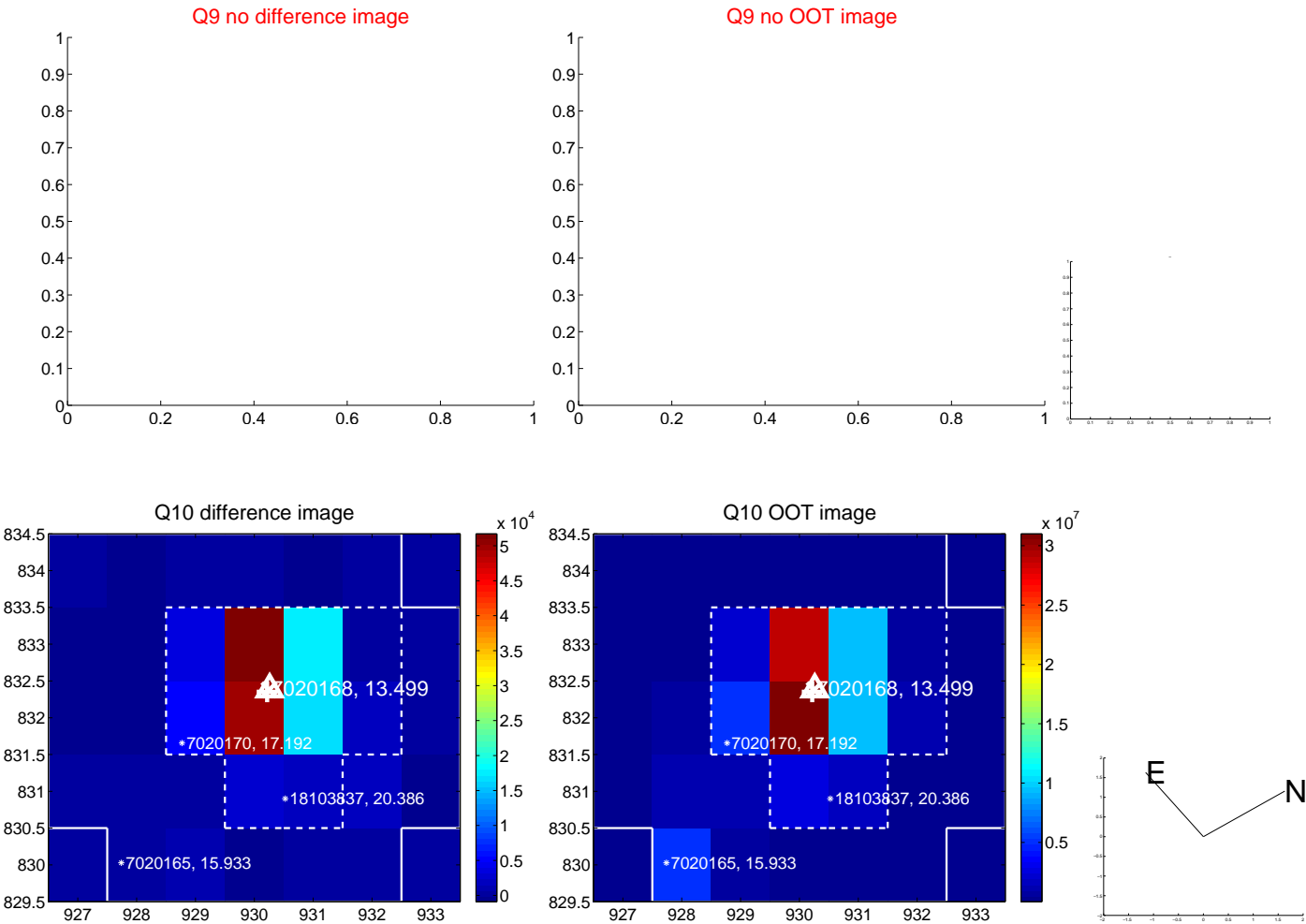
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



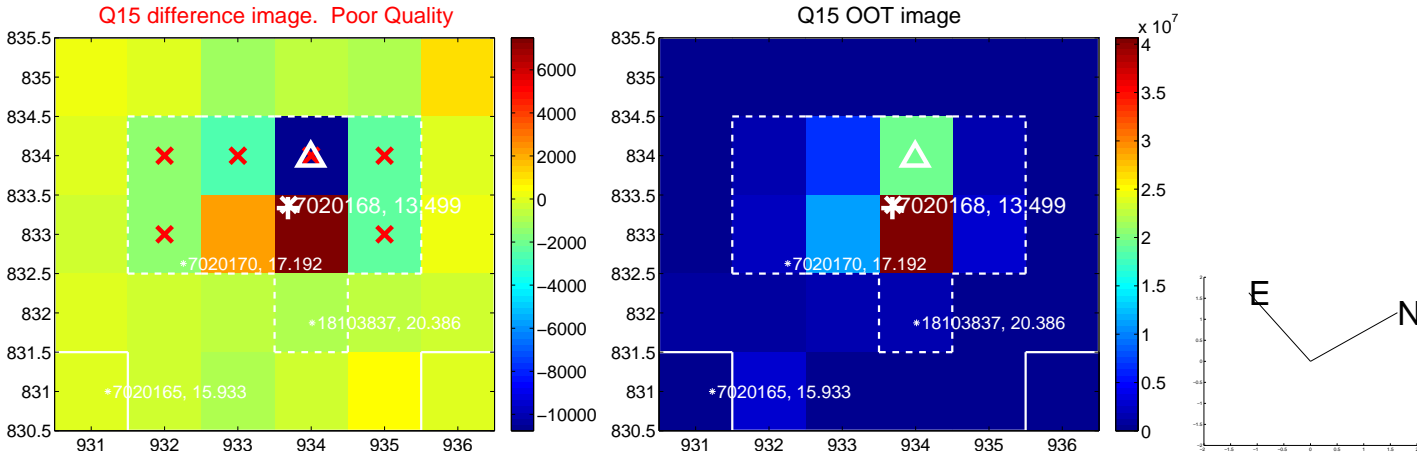
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



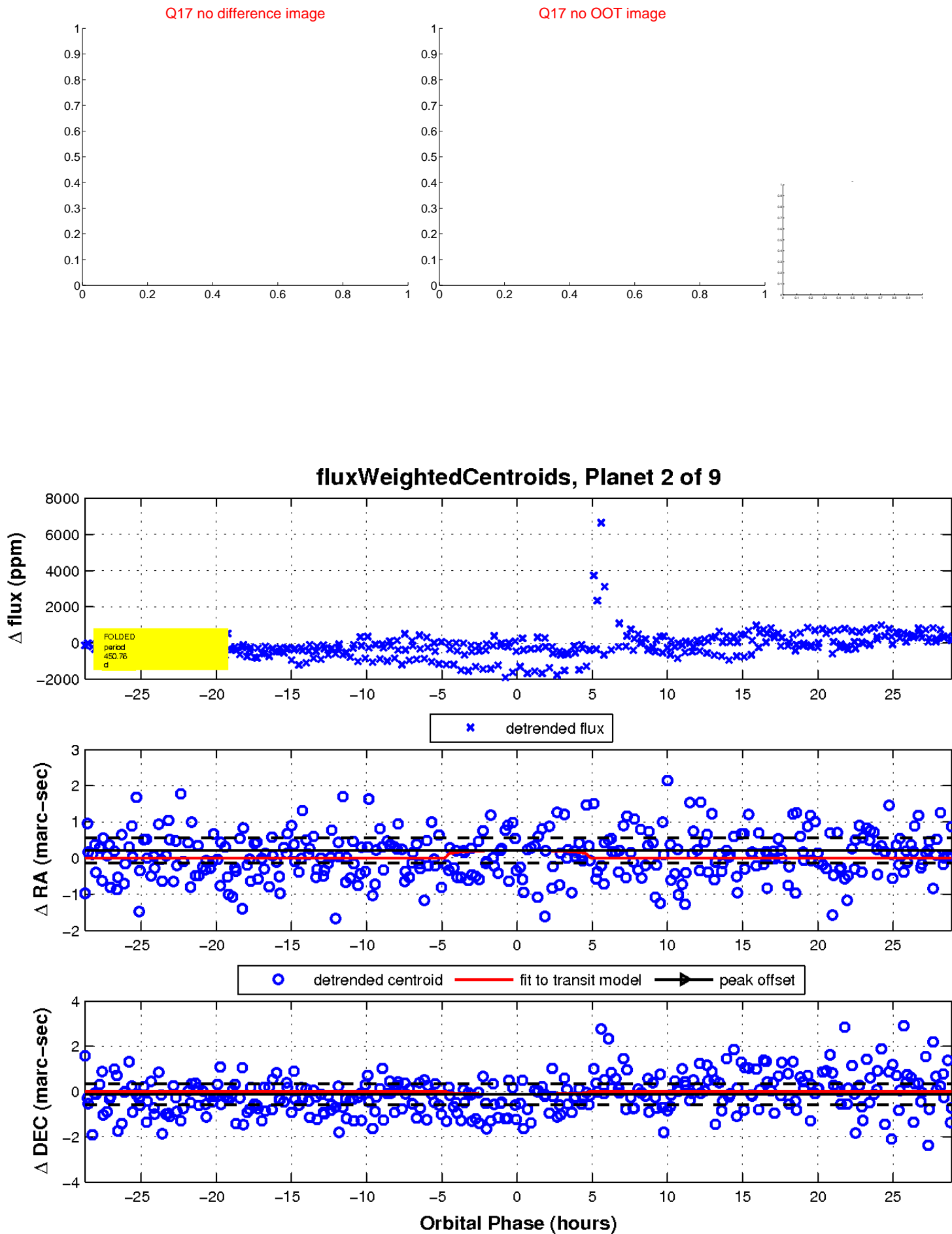
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

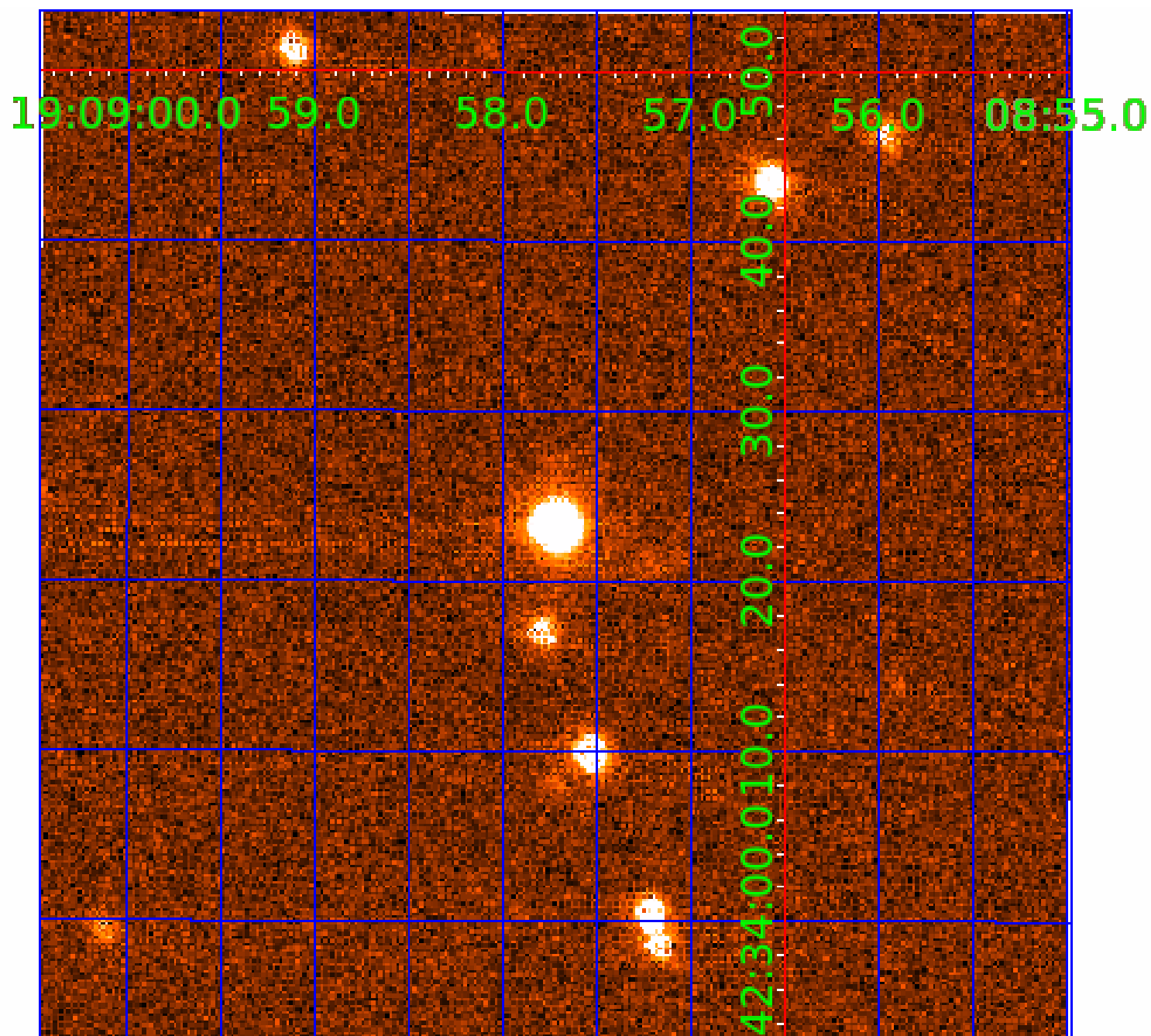


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

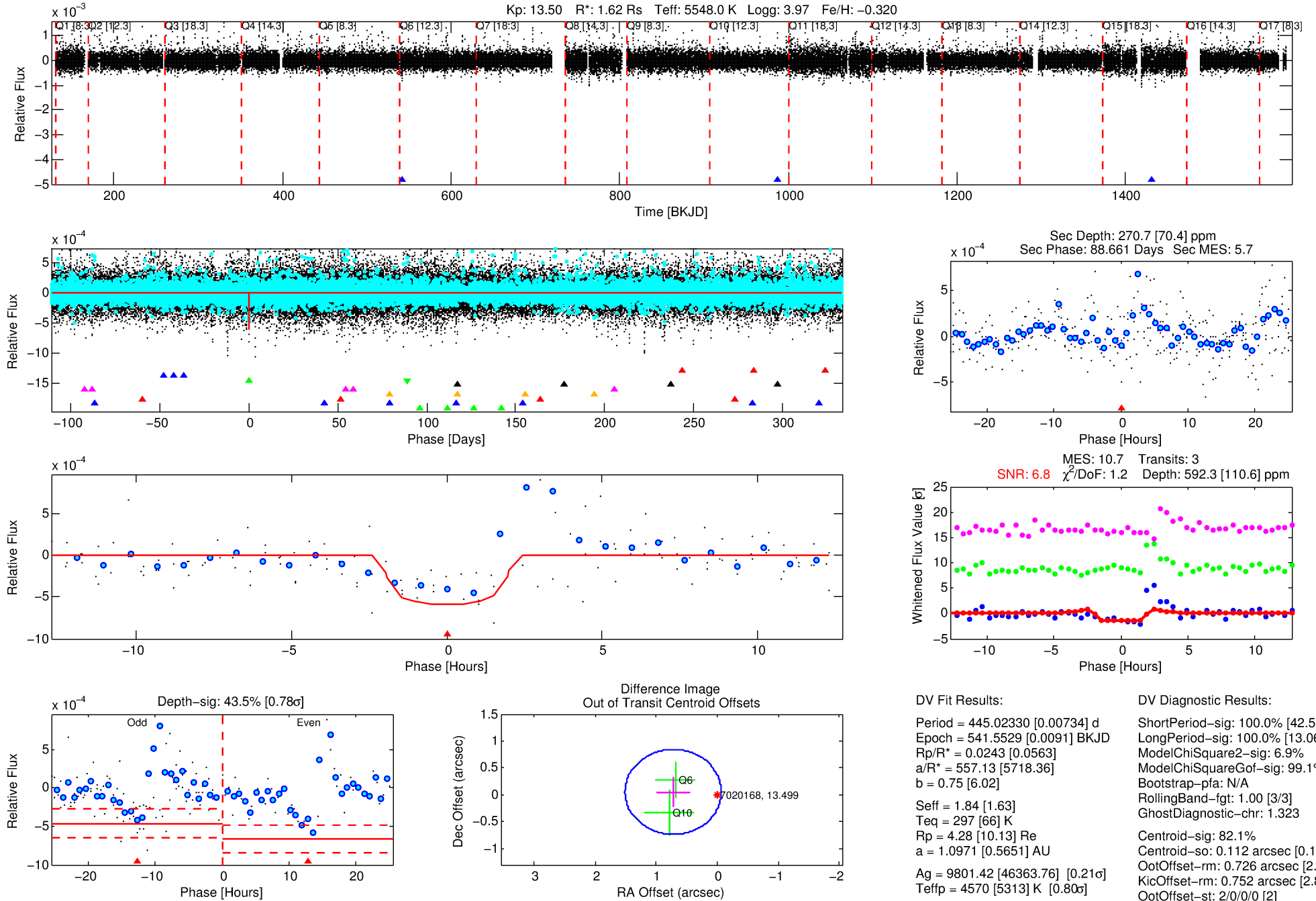
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-03

No Significant Match Found

DV One-Page Summary

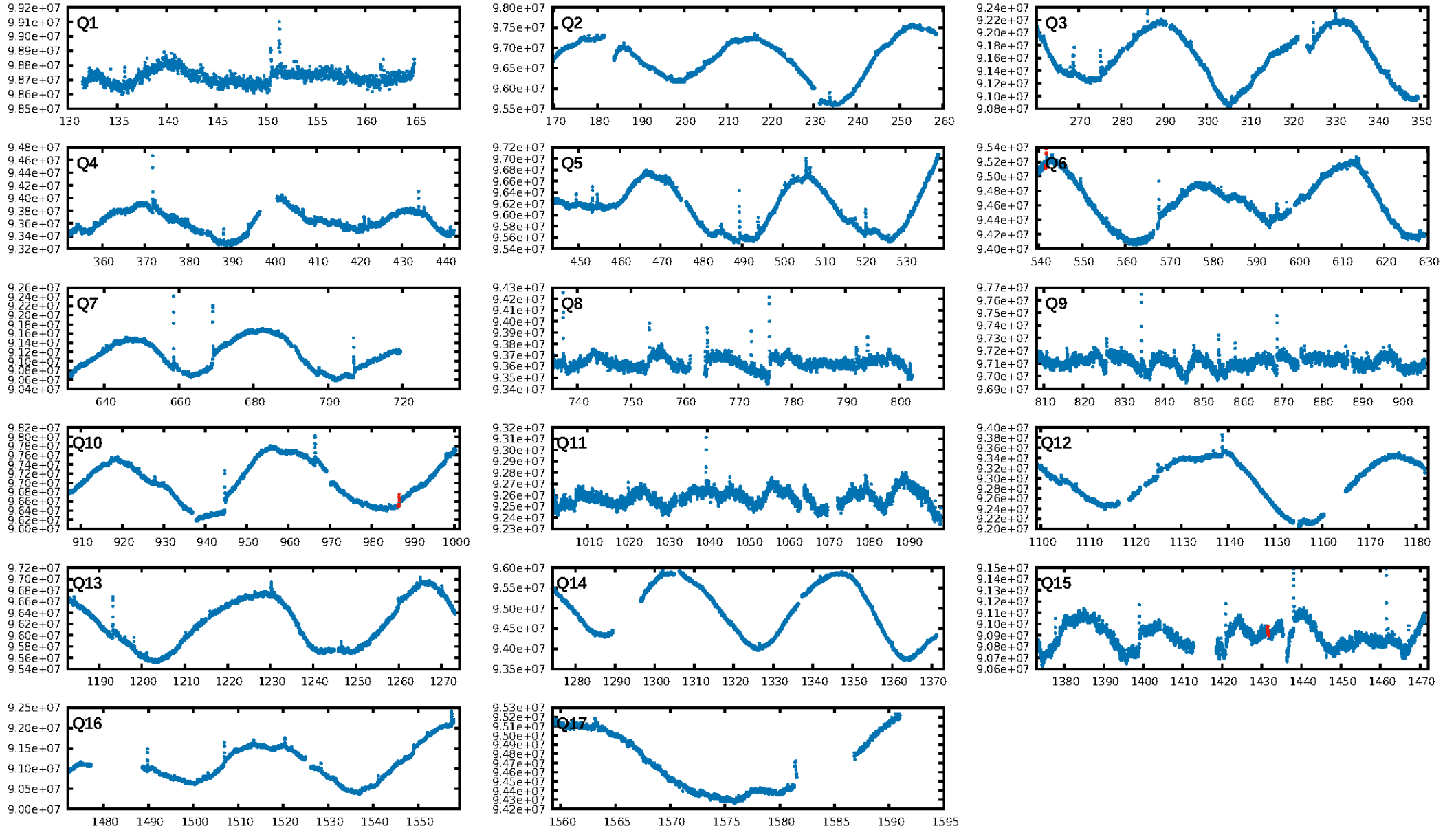
KIC: 7020168 Candidate: 3 of 9 Period: 445.023 d



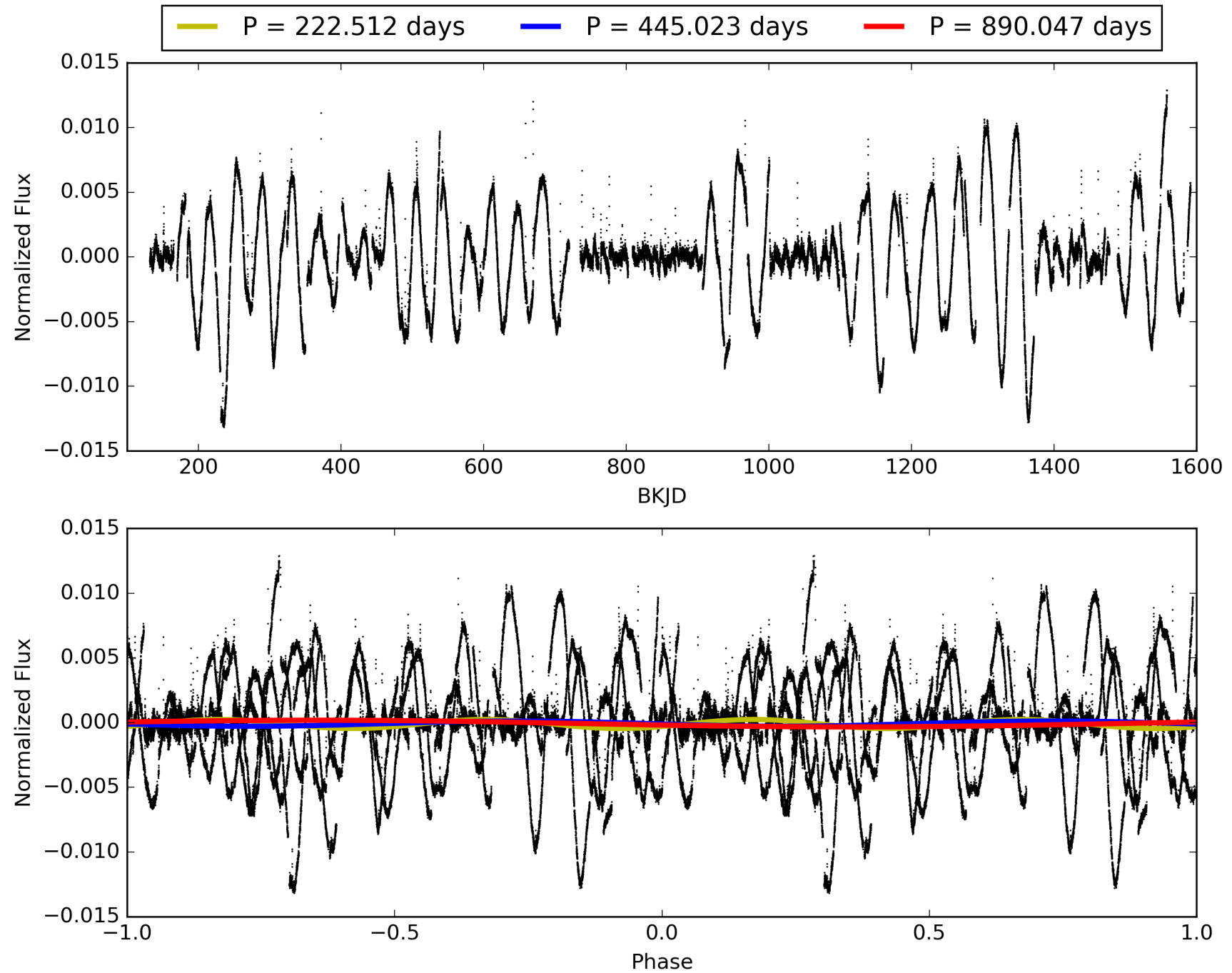
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:21:16 Z

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

TCE 007020168-03, PDC Light Curves

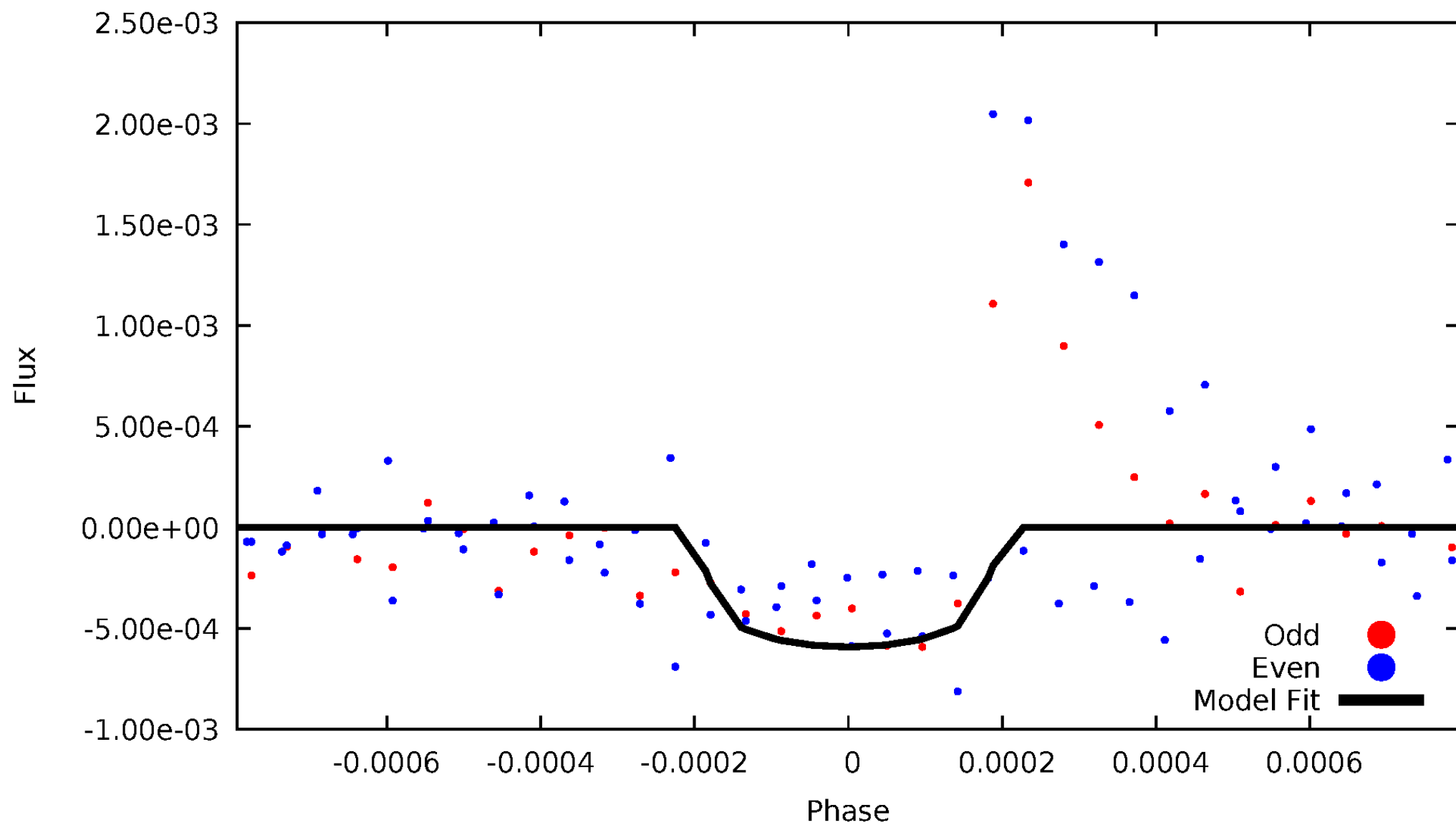


TCE 007020168-03



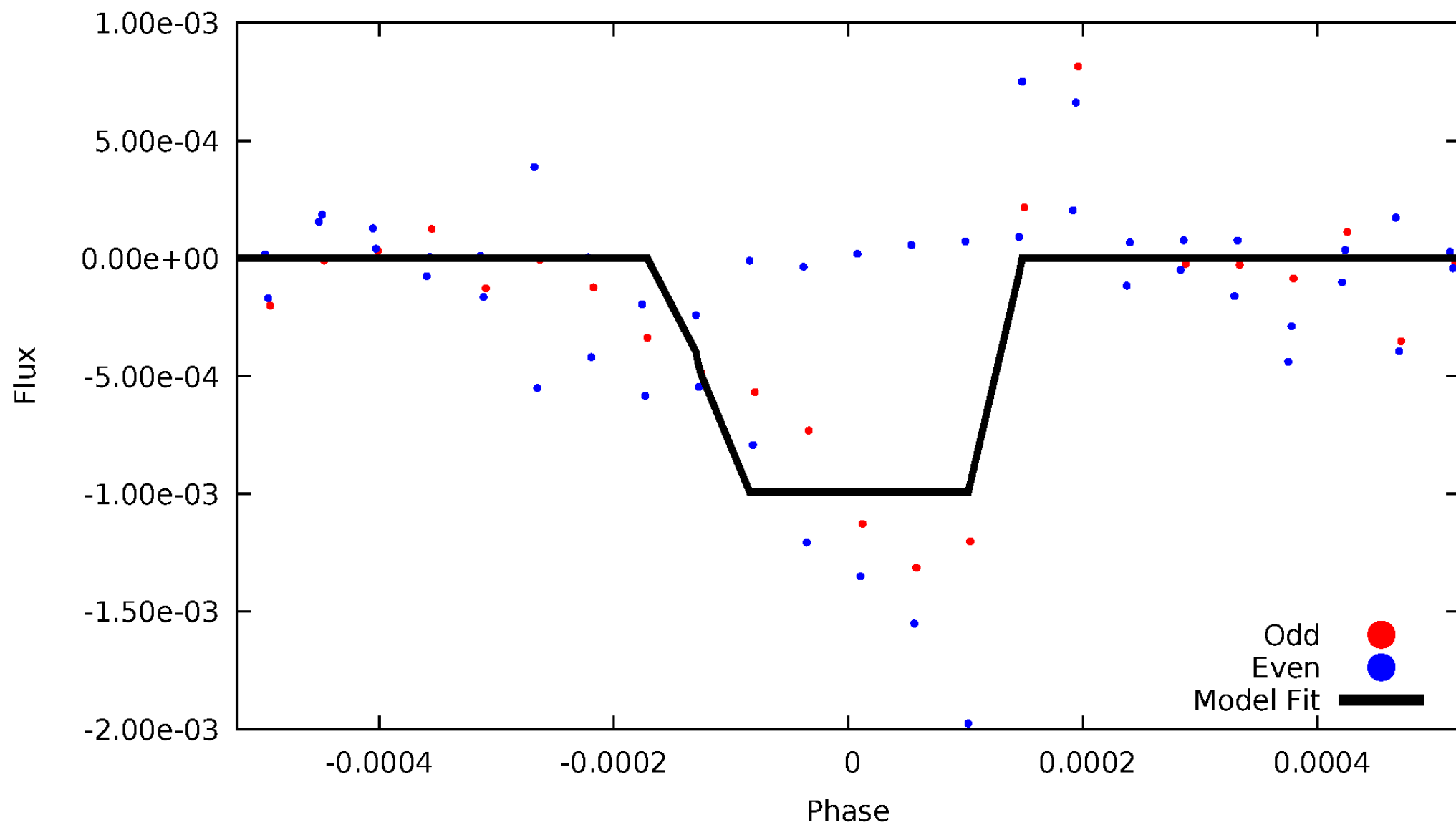
DV Odd/Even

TCE 007020168-03



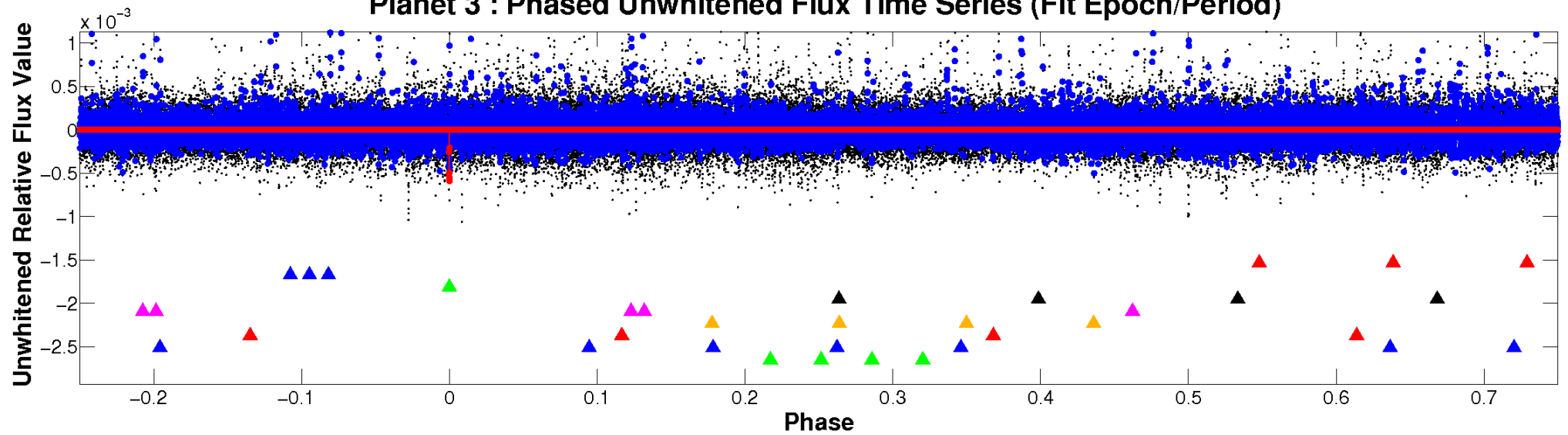
ALT Odd/Even

TCE 007020168-03

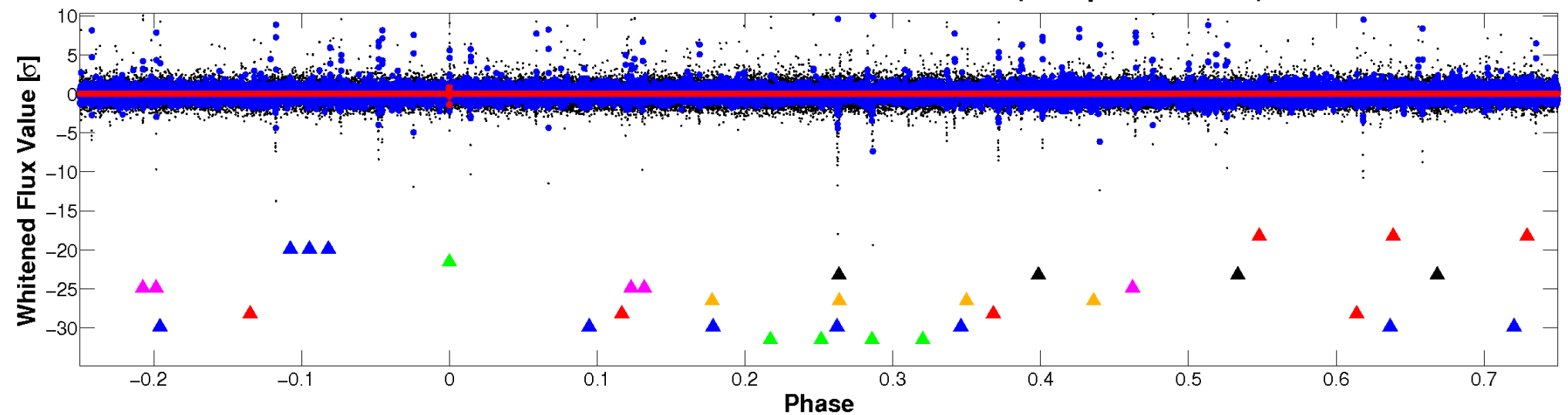


Non-Whitened Vs. Whitened Light Curve

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

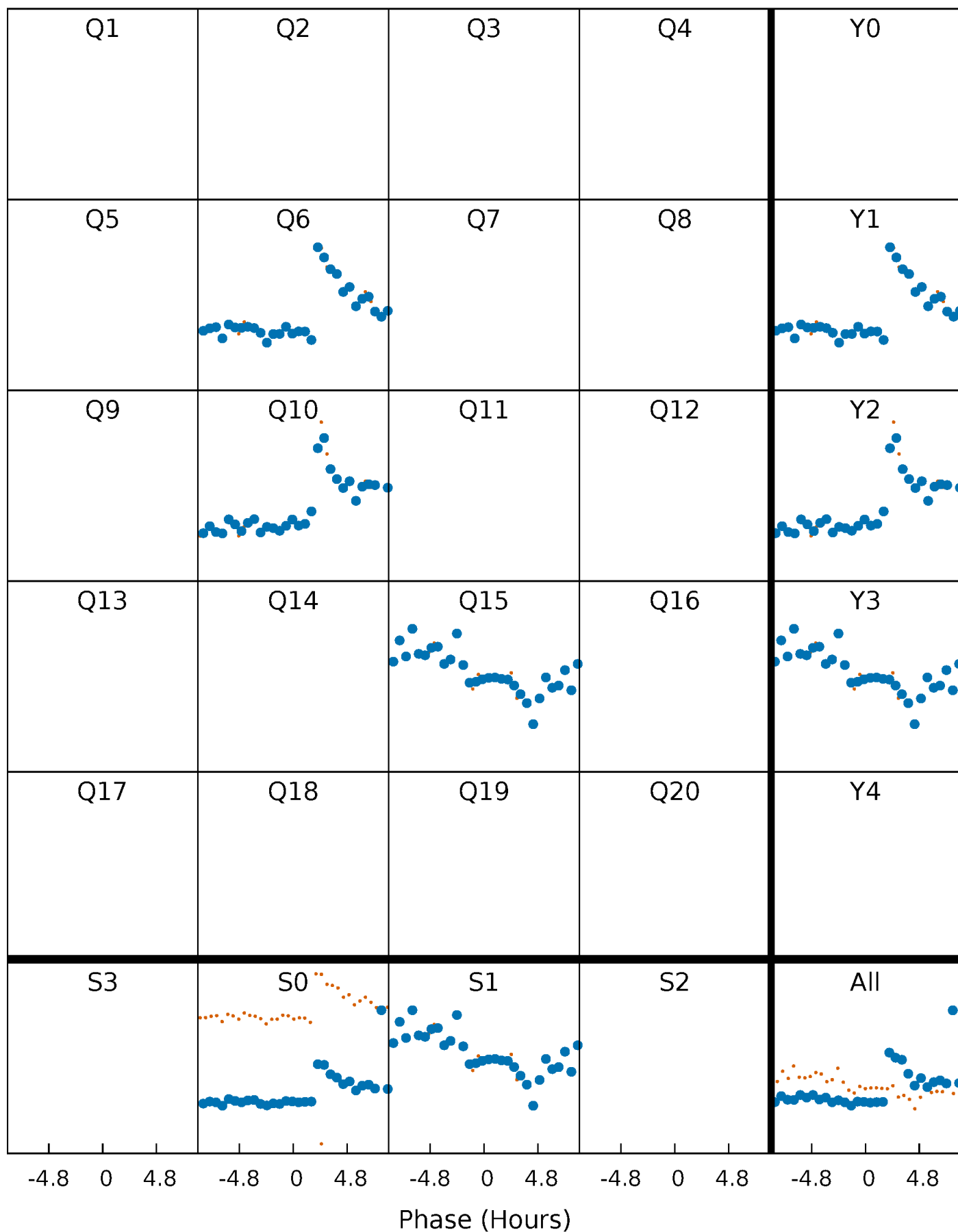


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



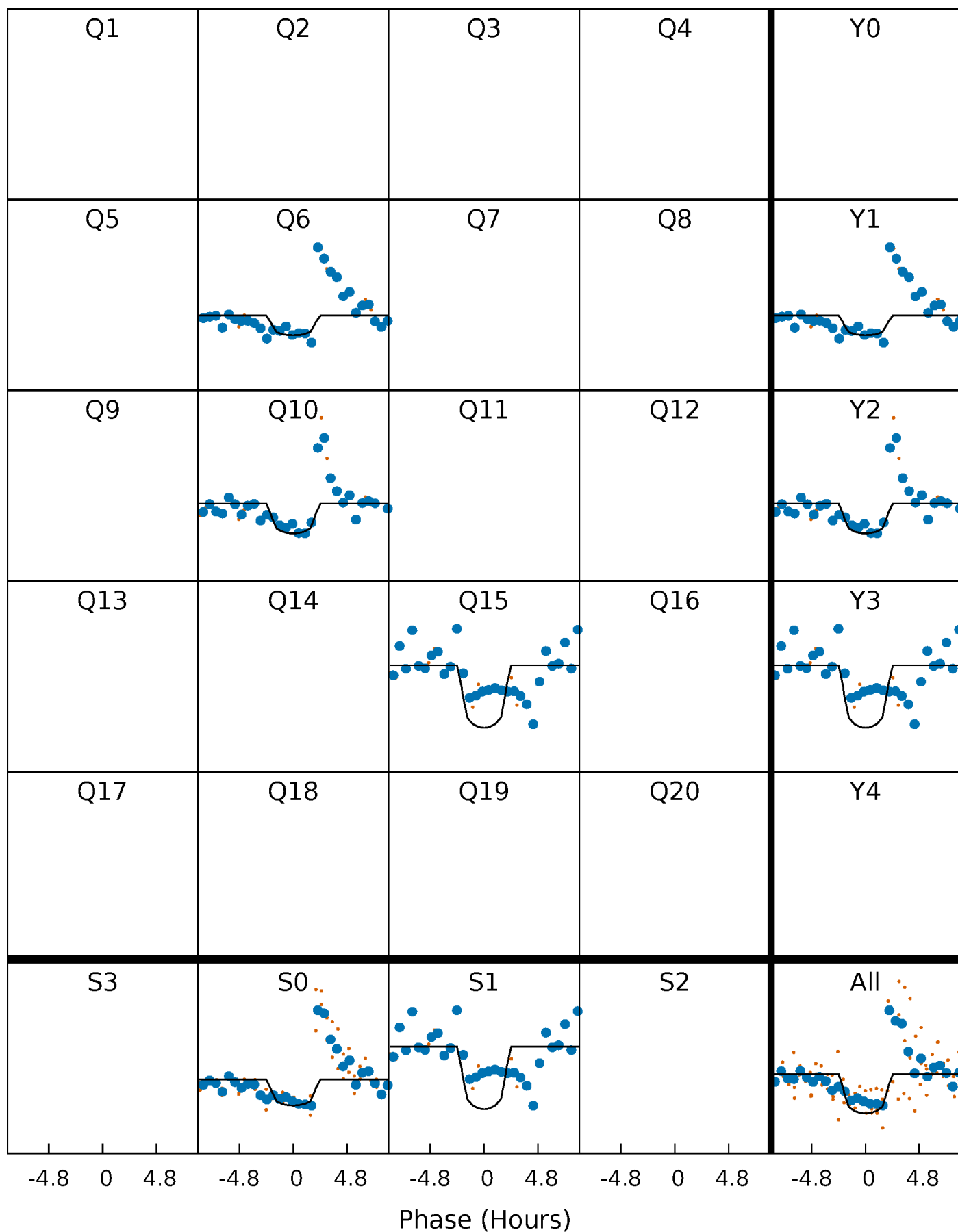
PDC Quarter-Phased Transit Curves

TCE 007020168-03 P=445.023299 Days $T_0=541.552939$ (BKJD)



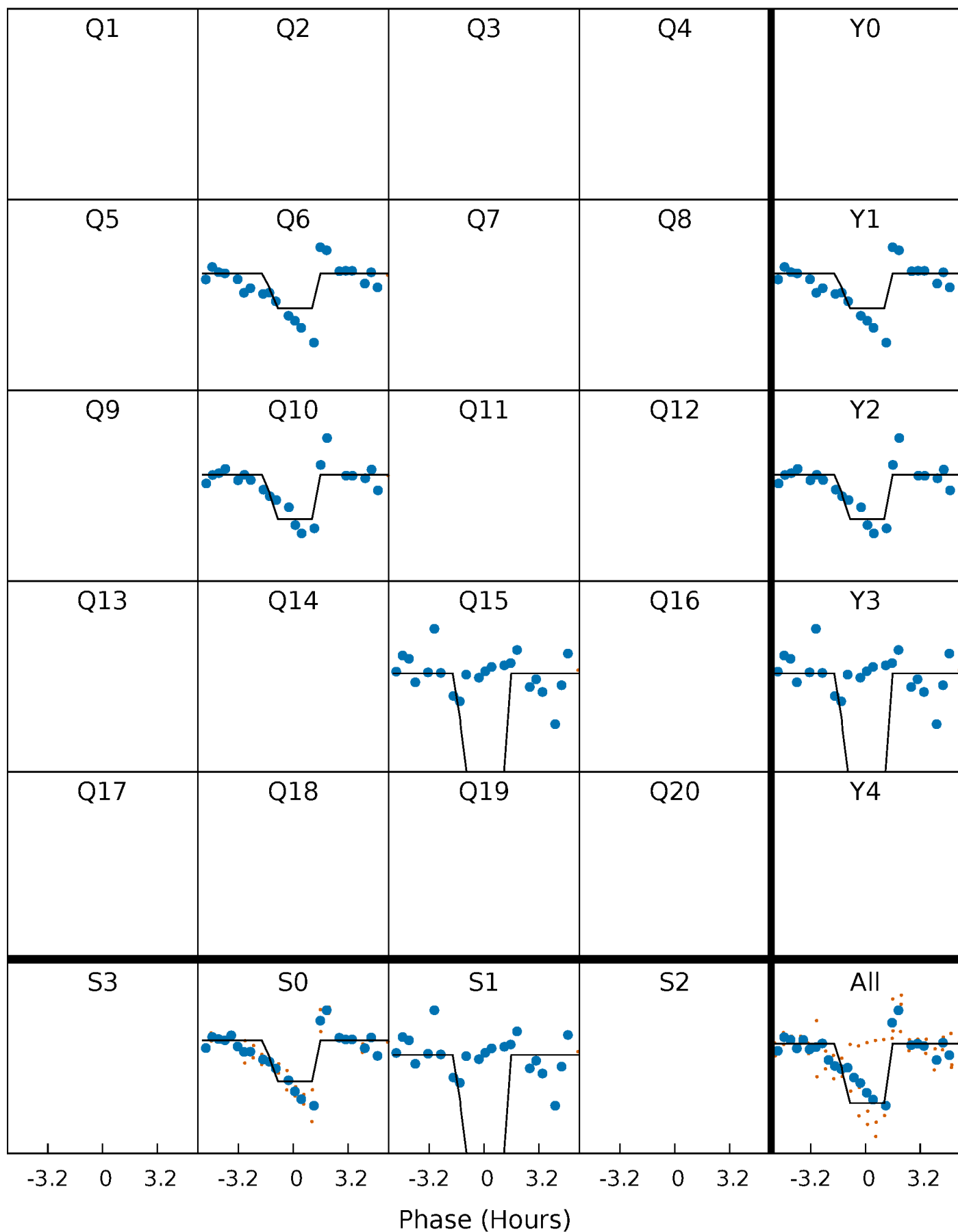
DV Quarter-Phased Transit Curves

TCE 007020168-03 P=445.023299 Days $T_0=541.552939$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

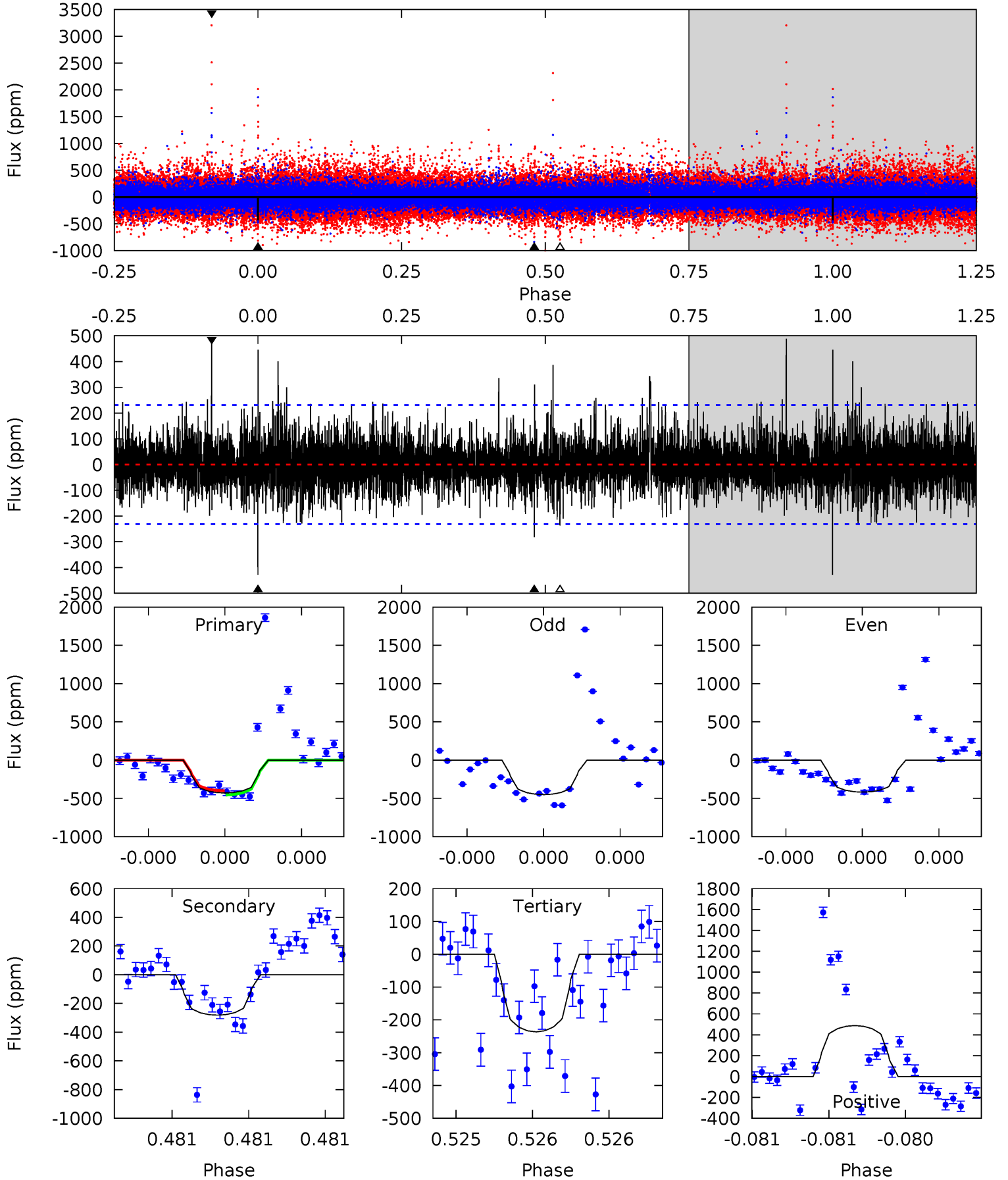
TCE 007020168-03 P=445.022503 Days $T_0=541.570734$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-03, P = 445.023299 Days, E = 96.529640 Days

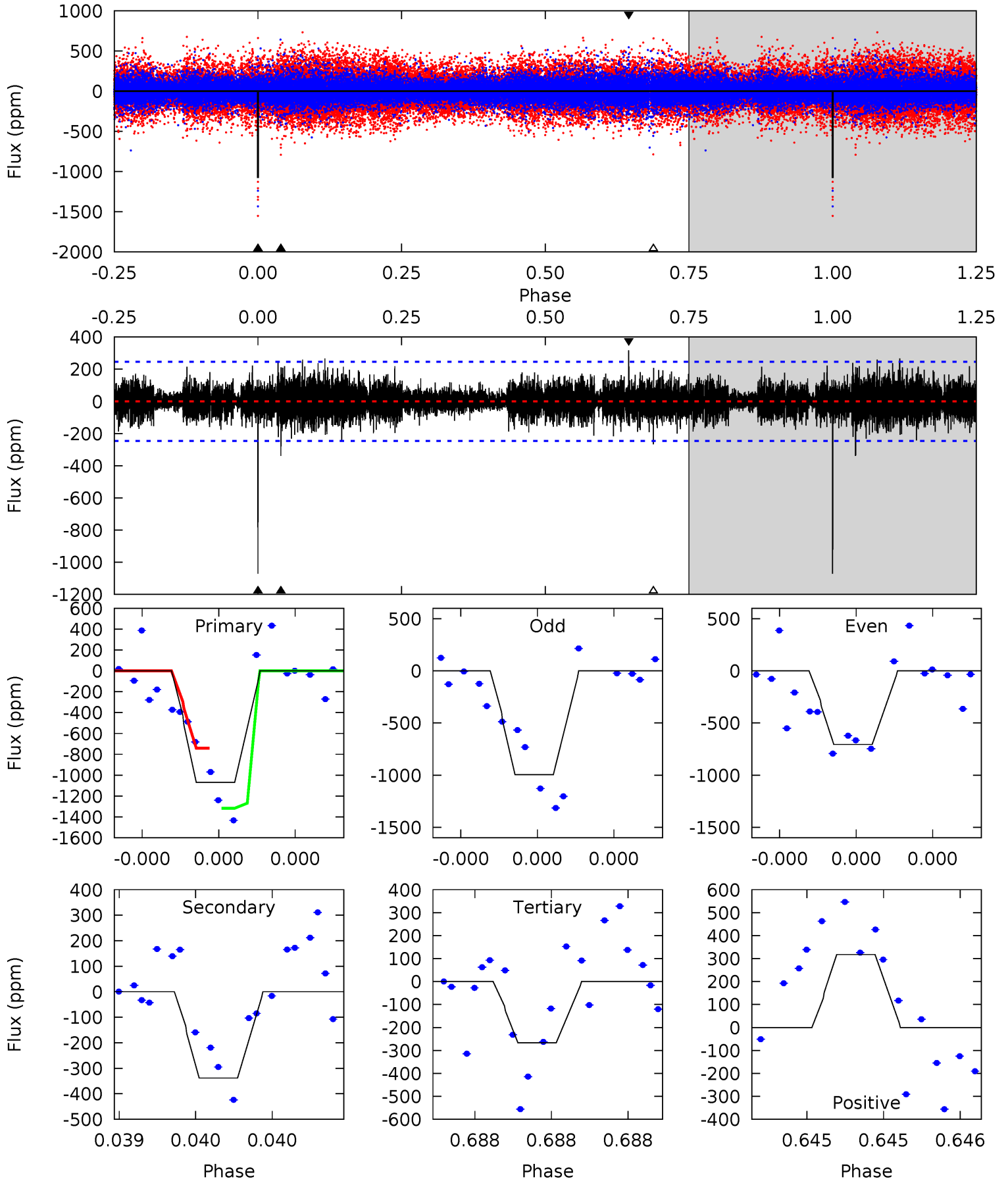
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	6.82	5.73	11.8	5.61	3.53	1.69	4.66	-1.44	1.09	-5.01	0.32	0.89	0.53	0.67



Alt Model-Shift Uniqueness Test

007020168-03, P = 445.022503 Days, E = 96.548231 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.7	7.80	6.14	7.32	5.67	3.63	1.21	18.5	17.4	1.66	0.48	3.58	0.79	0.23	6.68



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-281 ± 41	$7.68^{+8.27}_{-5.20}$	411^{+46}_{-60}	3690^{+2090}_{-686}	3171^{+26634}_{-2446}
Alt.	-338 ± 43	$8.45^{+9.25}_{-5.63}$	409^{+46}_{-56}	3719^{+2169}_{-689}	3249^{+23983}_{-2517}

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 $A_{obs} \gg 1.0$

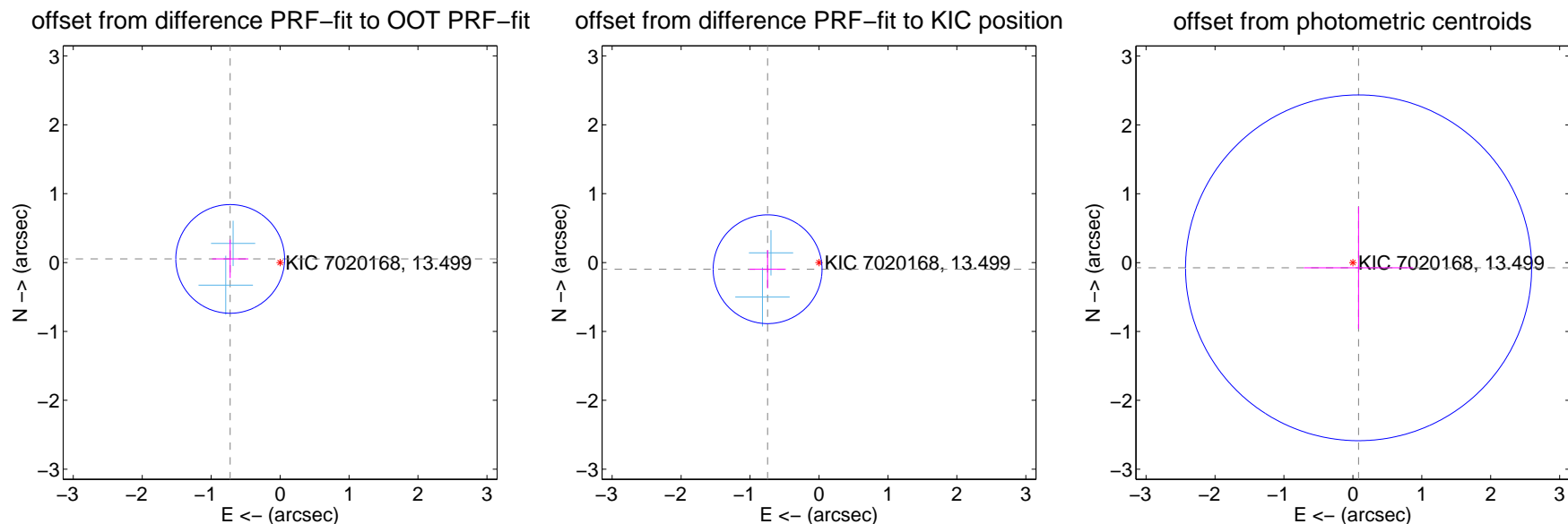
DV Centroid Data

Supplemental centroid analysis for 007020168-03. Kepler magnitude: 13.50. Transit SNR 6.82

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.726 ± 0.263	2.76	0.724 ± 0.263	0.053 ± 0.278
PRF-fit source offset from KIC position	0.752 ± 0.263	2.86	0.745 ± 0.263	-0.097 ± 0.278
photometric centroid source offset	0.11 ± 0.84	0.13	-0.08 ± 0.79	-0.08 ± 0.89

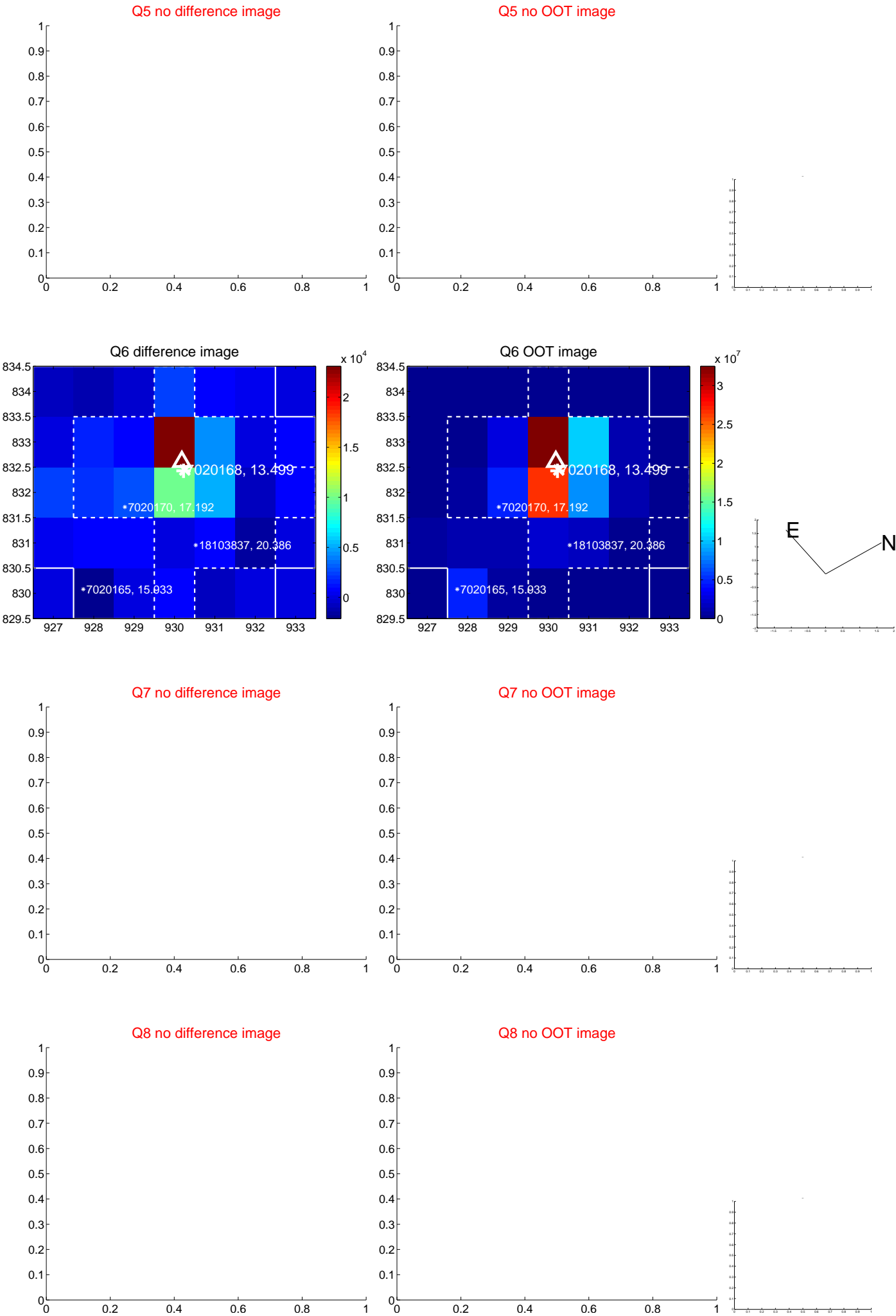


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

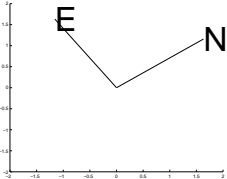
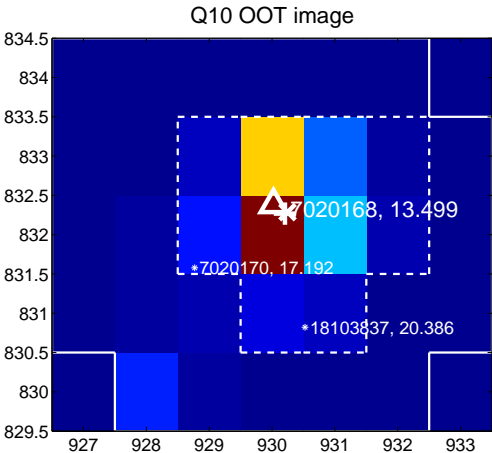
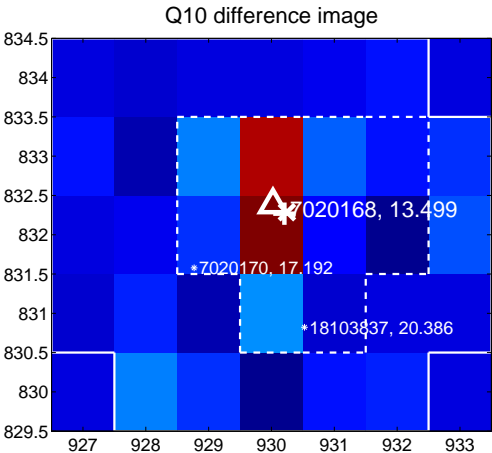


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

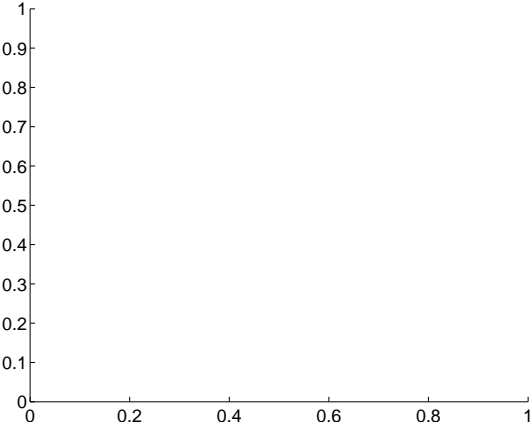
Q9 no difference image



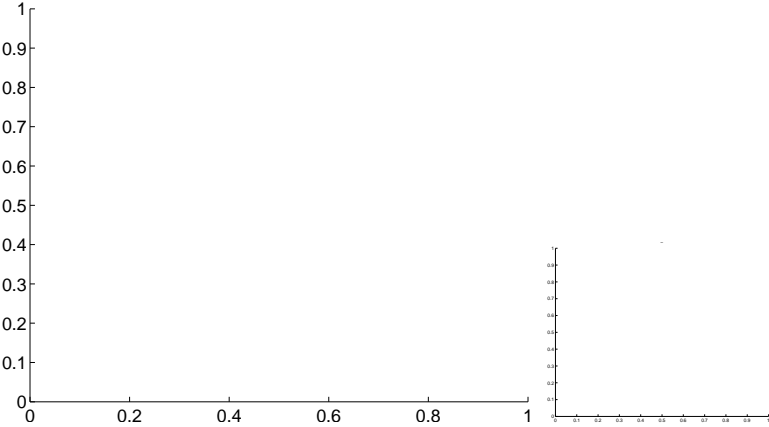
Q9 no OOT image



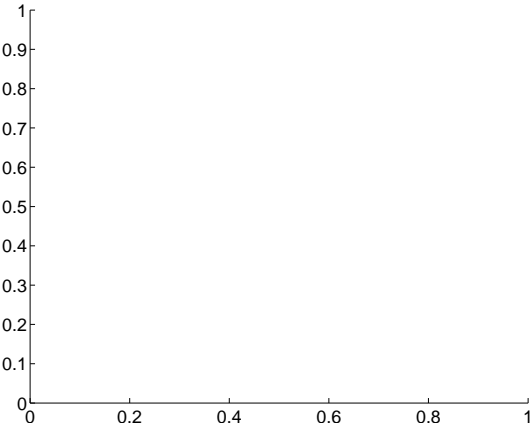
Q11 no difference image



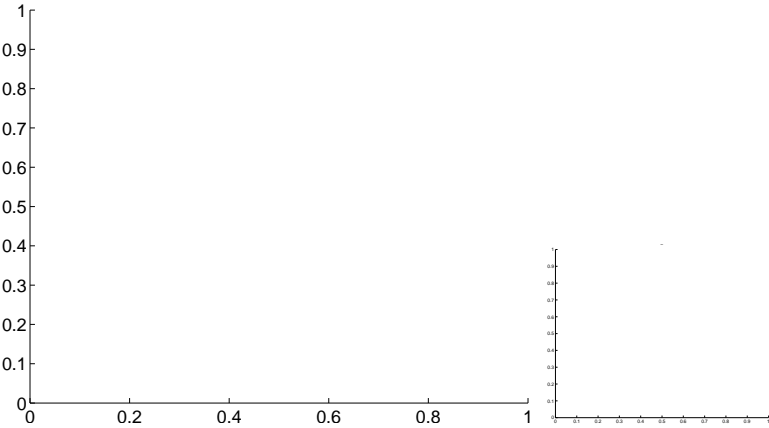
Q11 no OOT image



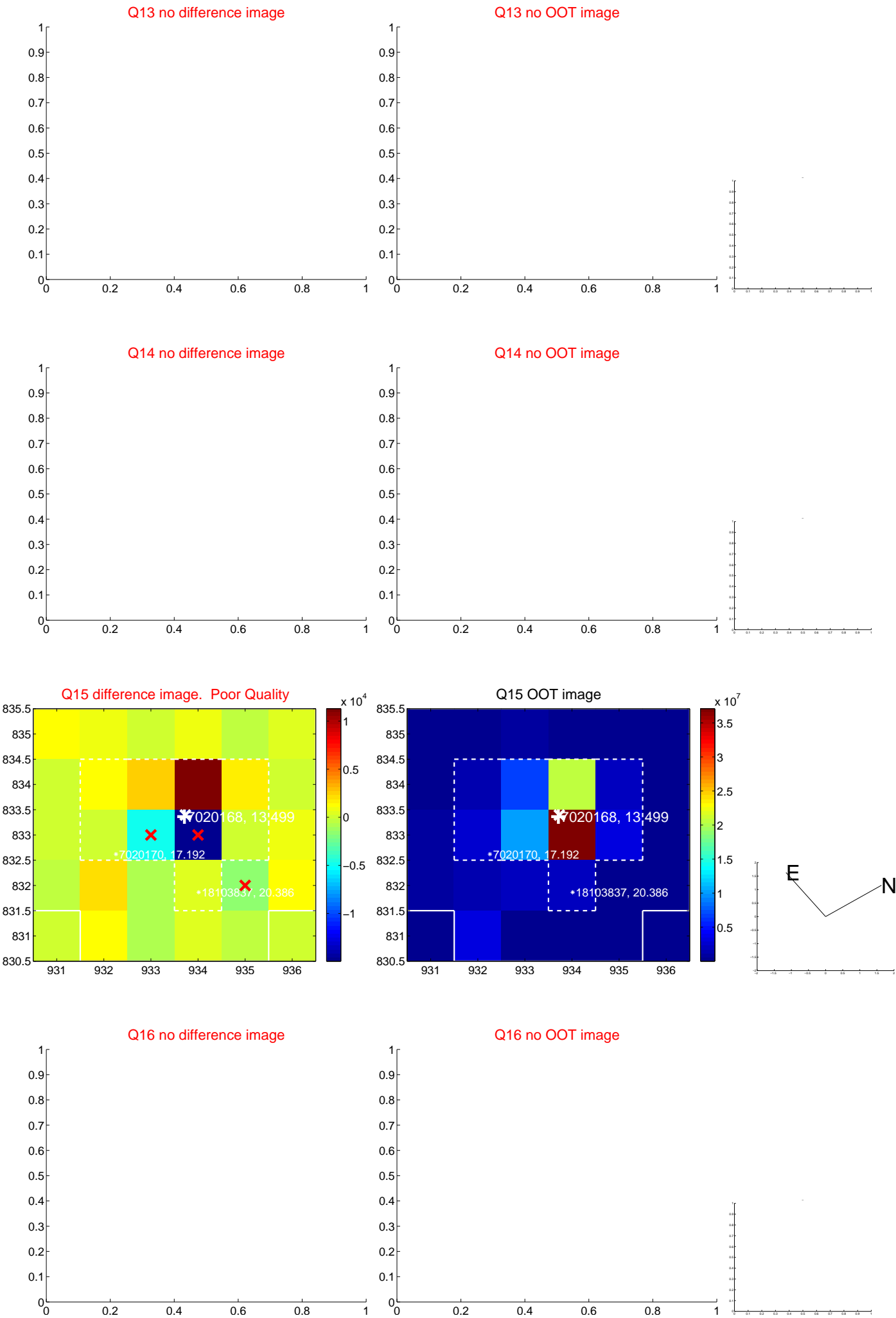
Q12 no difference image



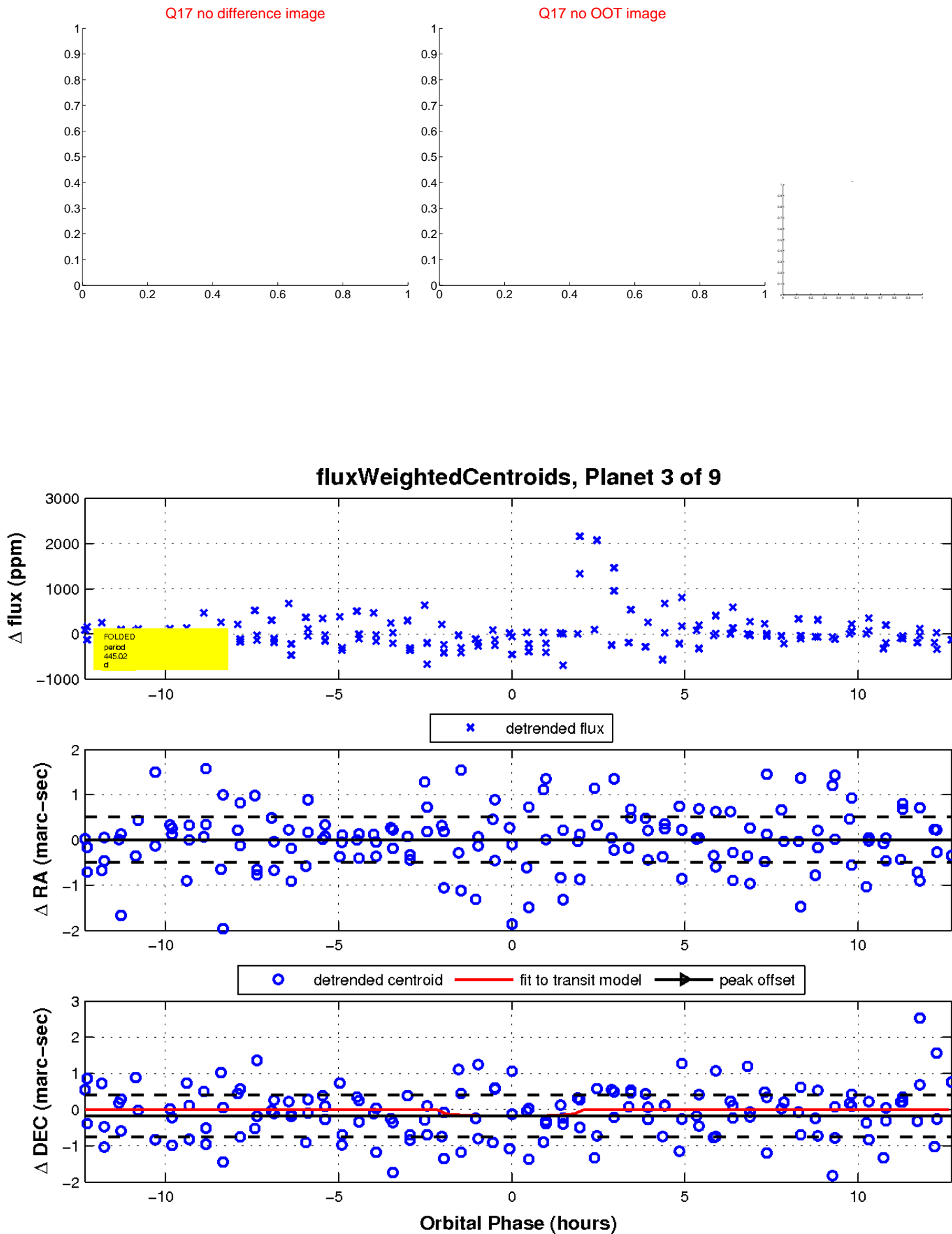
Q12 no OOT image



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

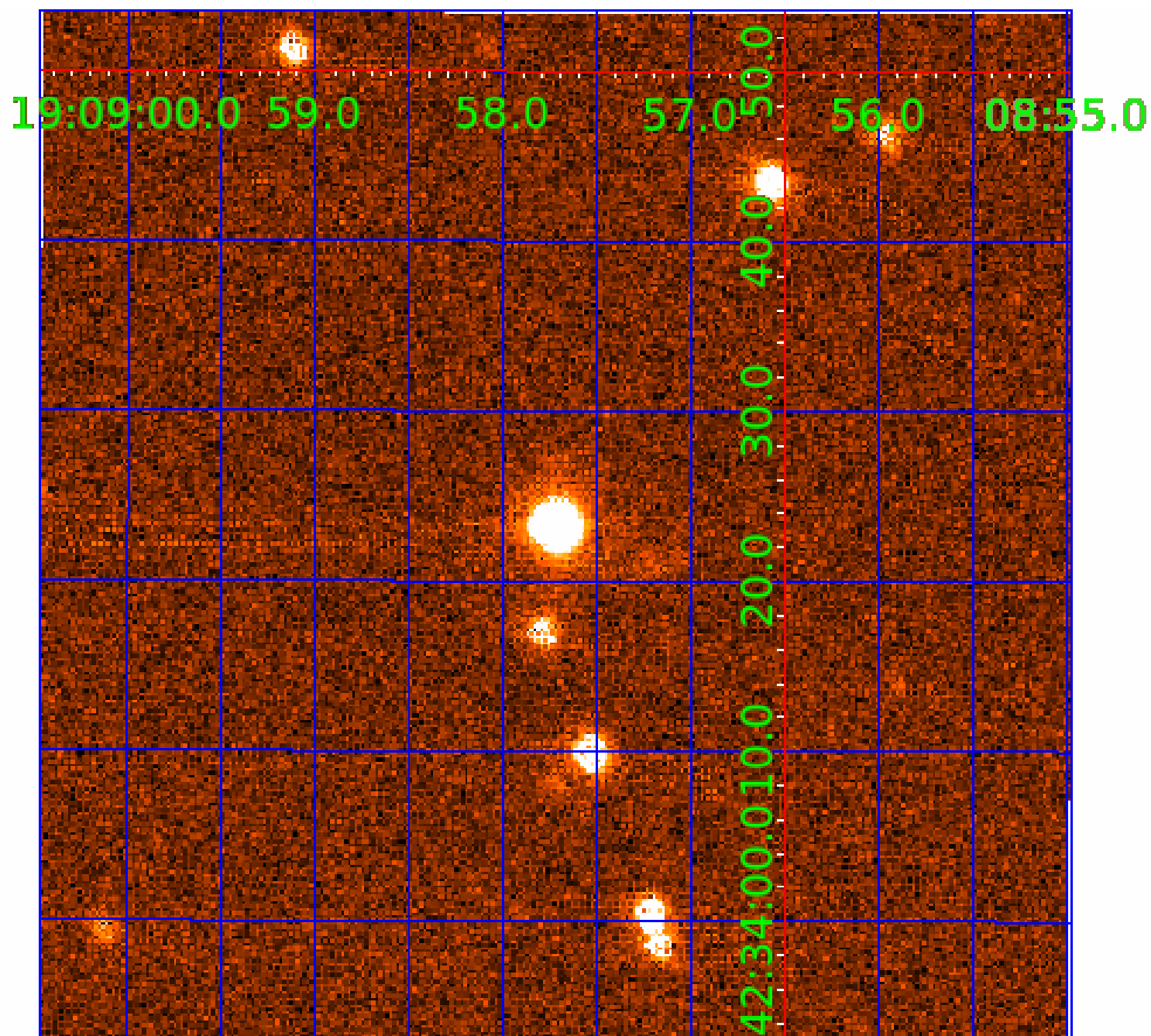


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

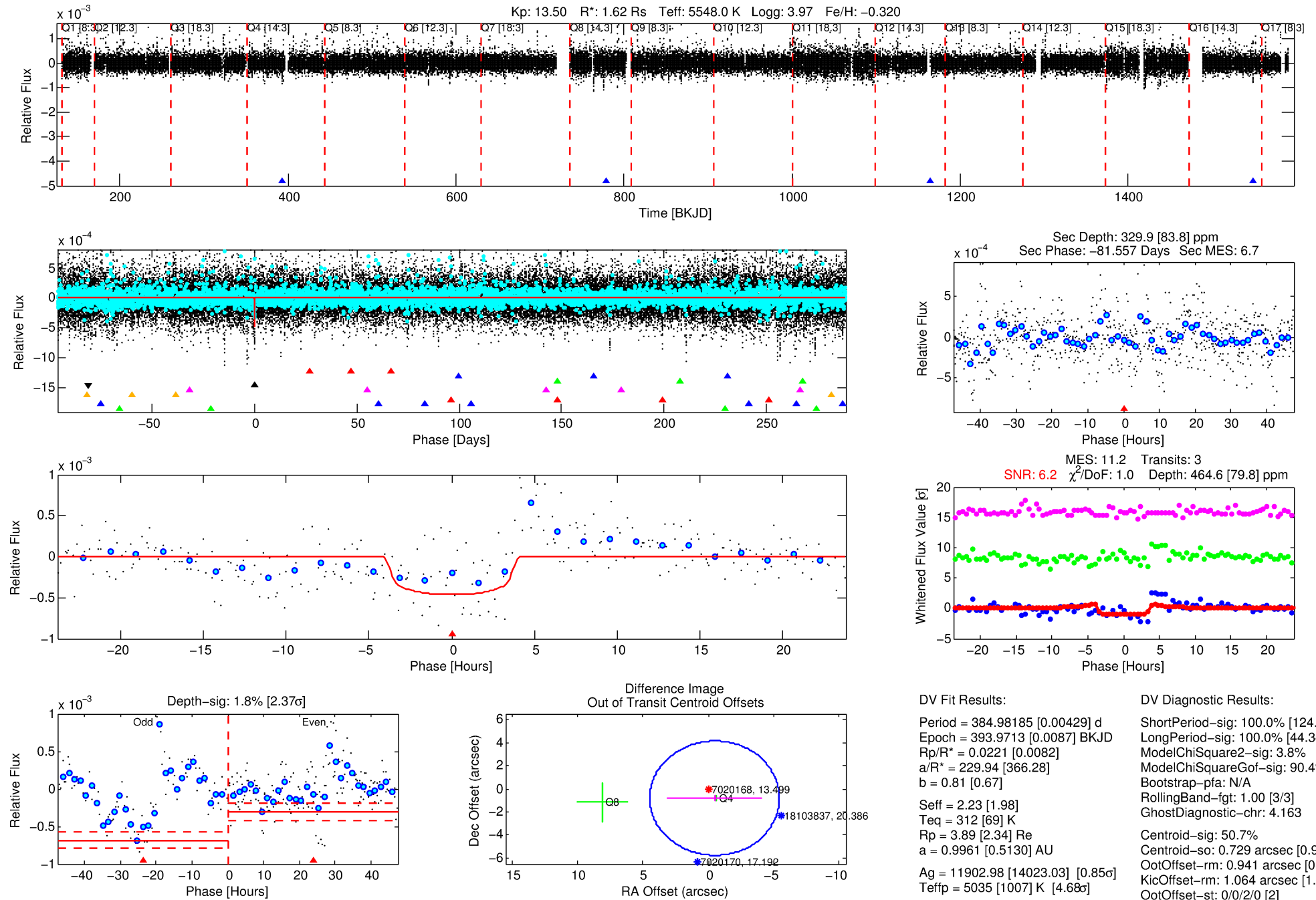
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-04

No Significant Match Found

DV One-Page Summary

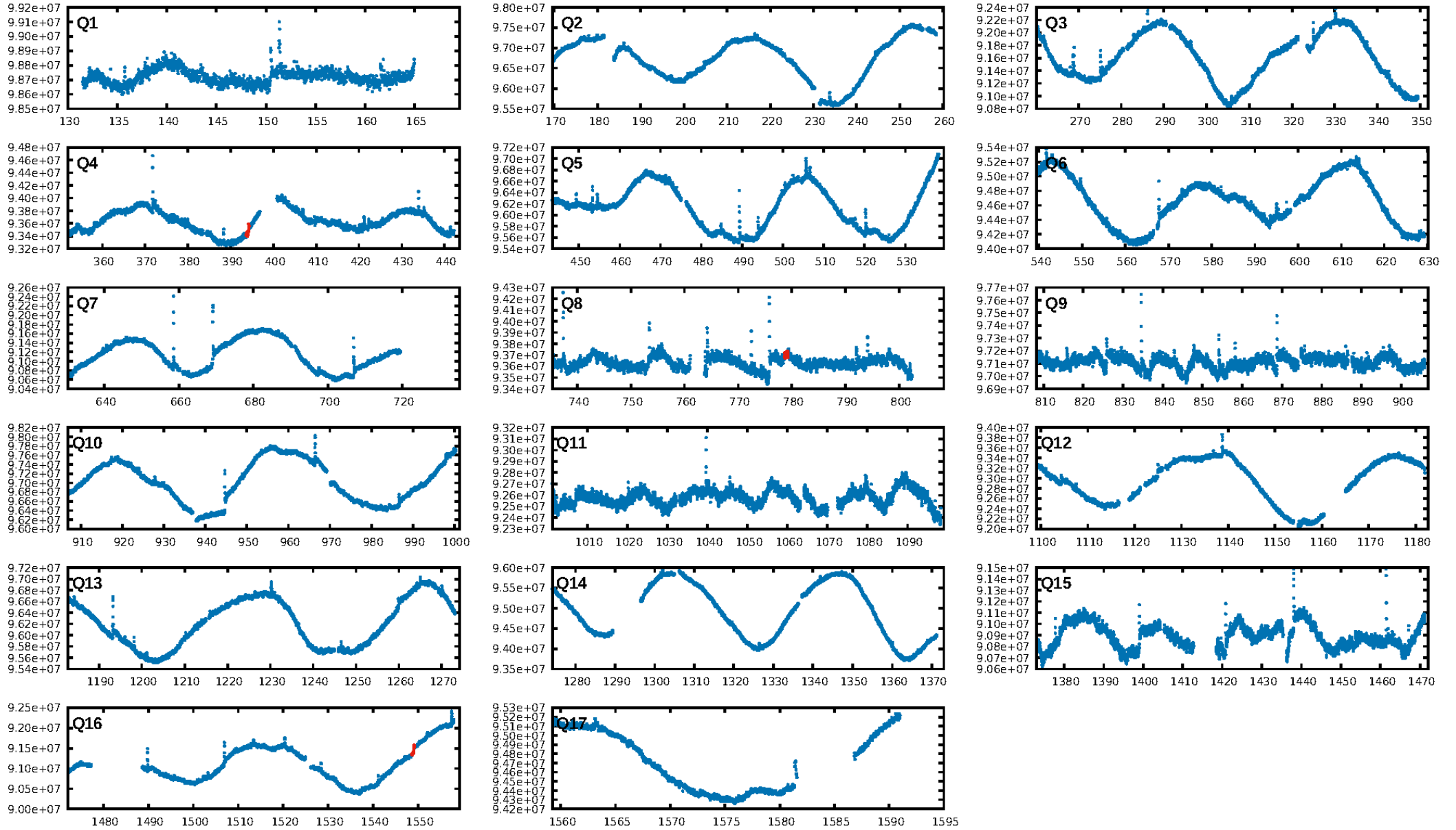
KIC: 7020168 Candidate: 4 of 9 Period: 384.982 d



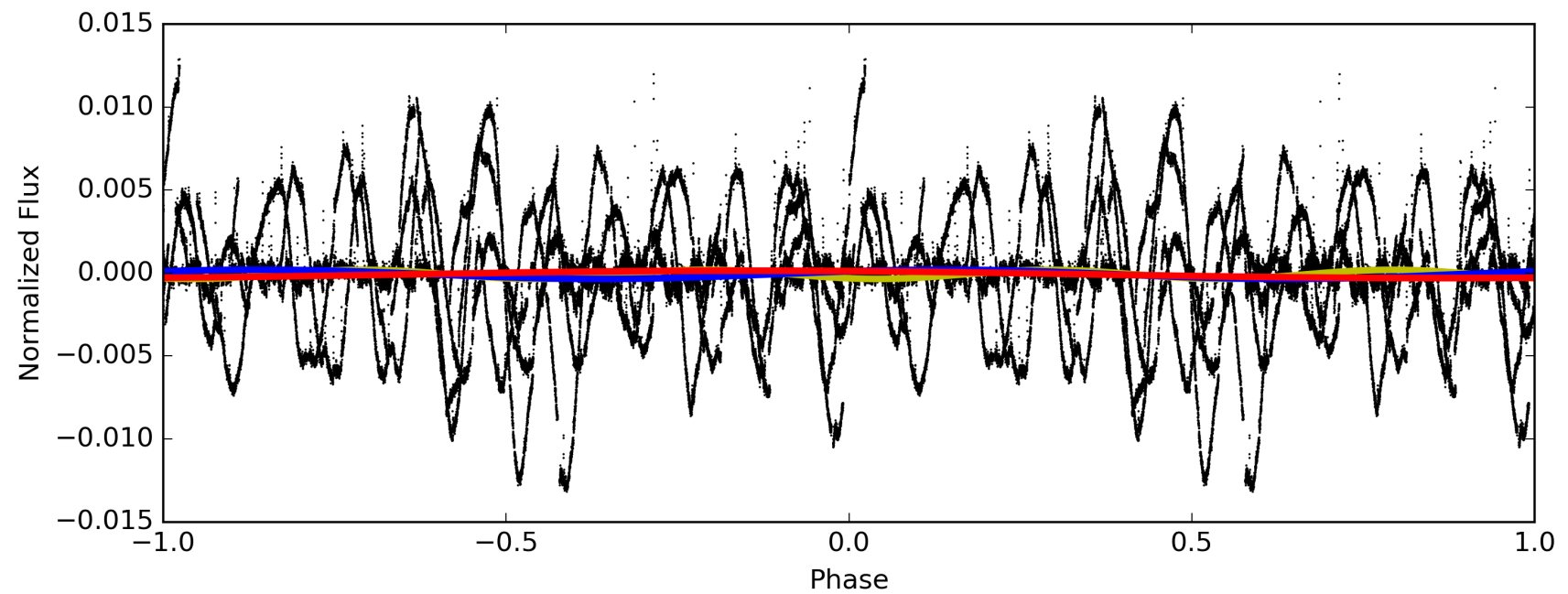
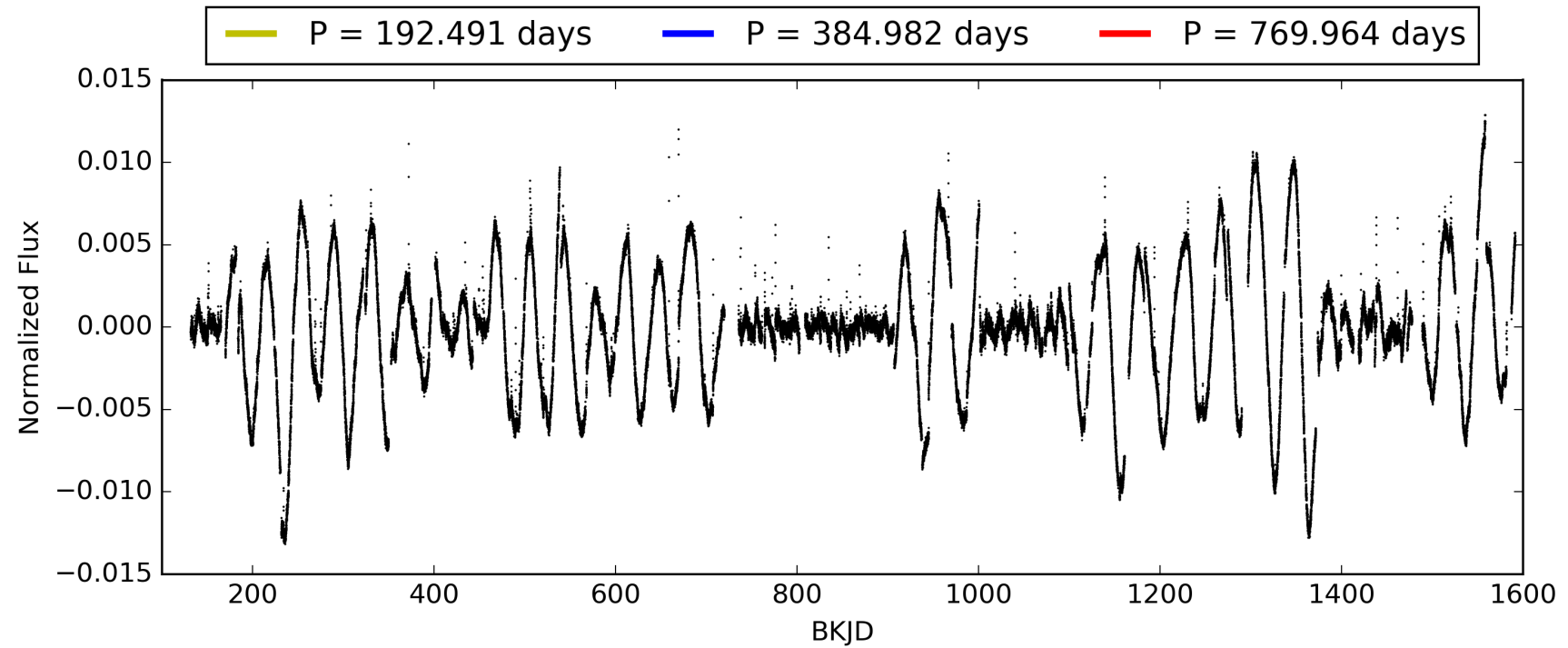
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 007020168-04, PDC Light Curves

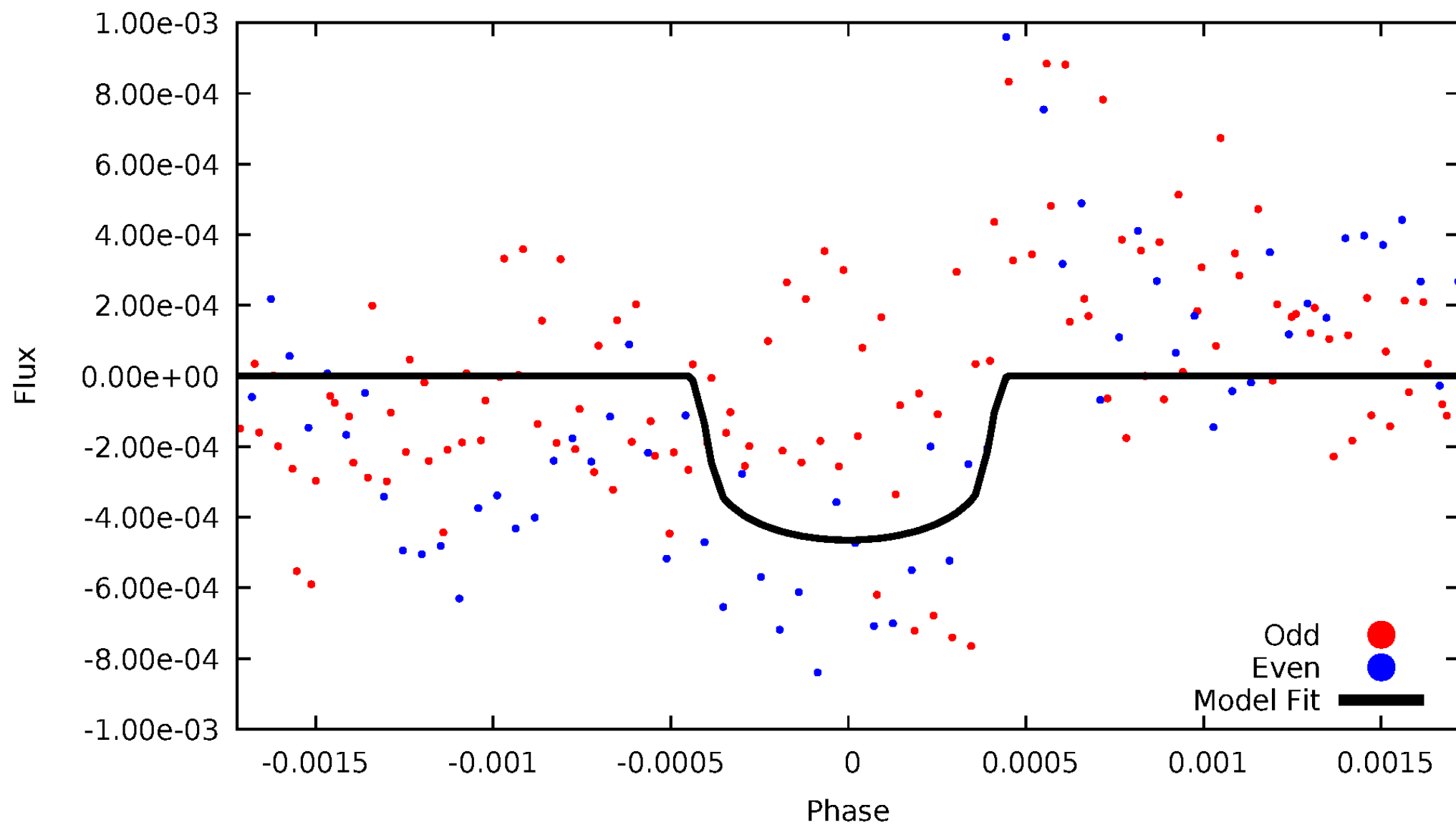


TCE 007020168-04



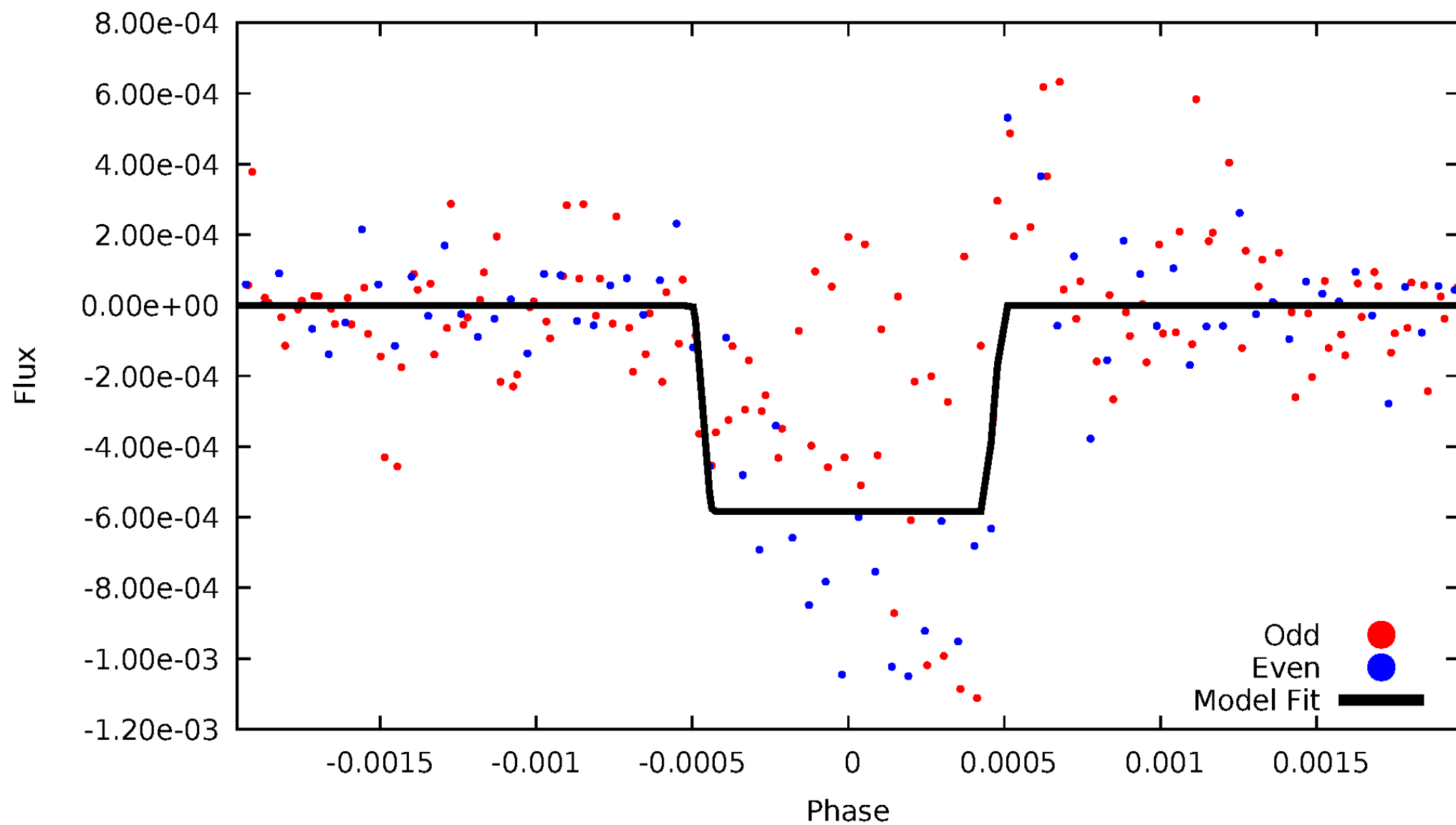
DV Odd/Even

TCE 007020168-04



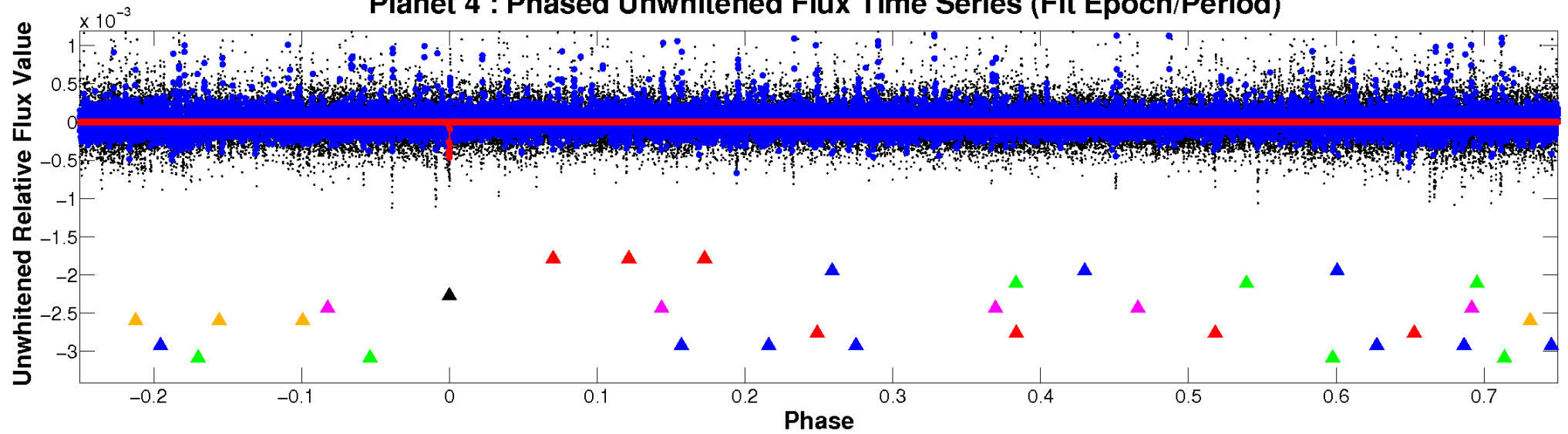
ALT Odd/Even

TCE 007020168-04

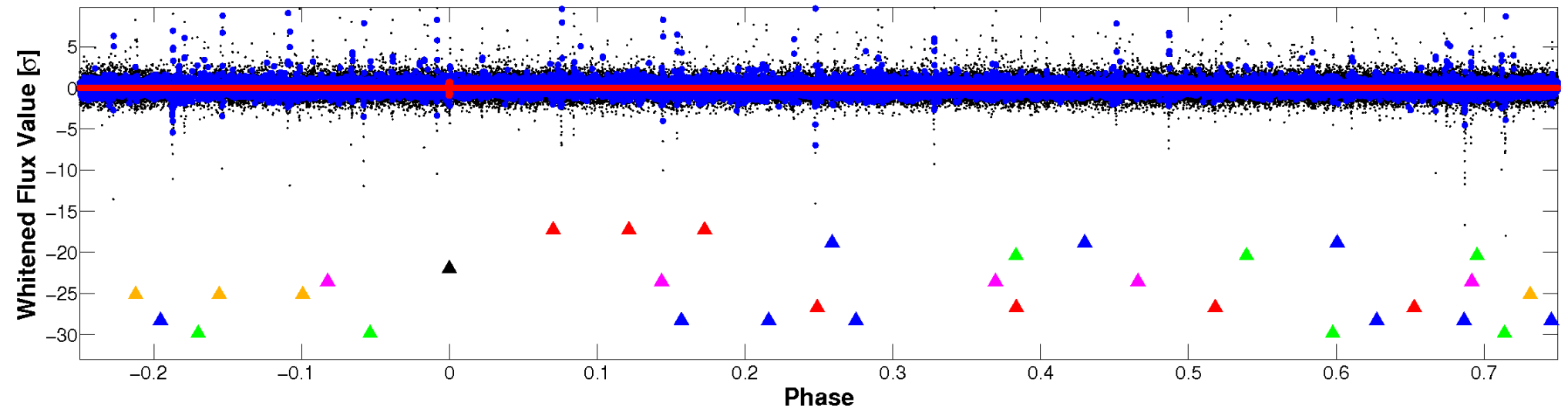


Non-Whitened Vs. Whitened Light Curve

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

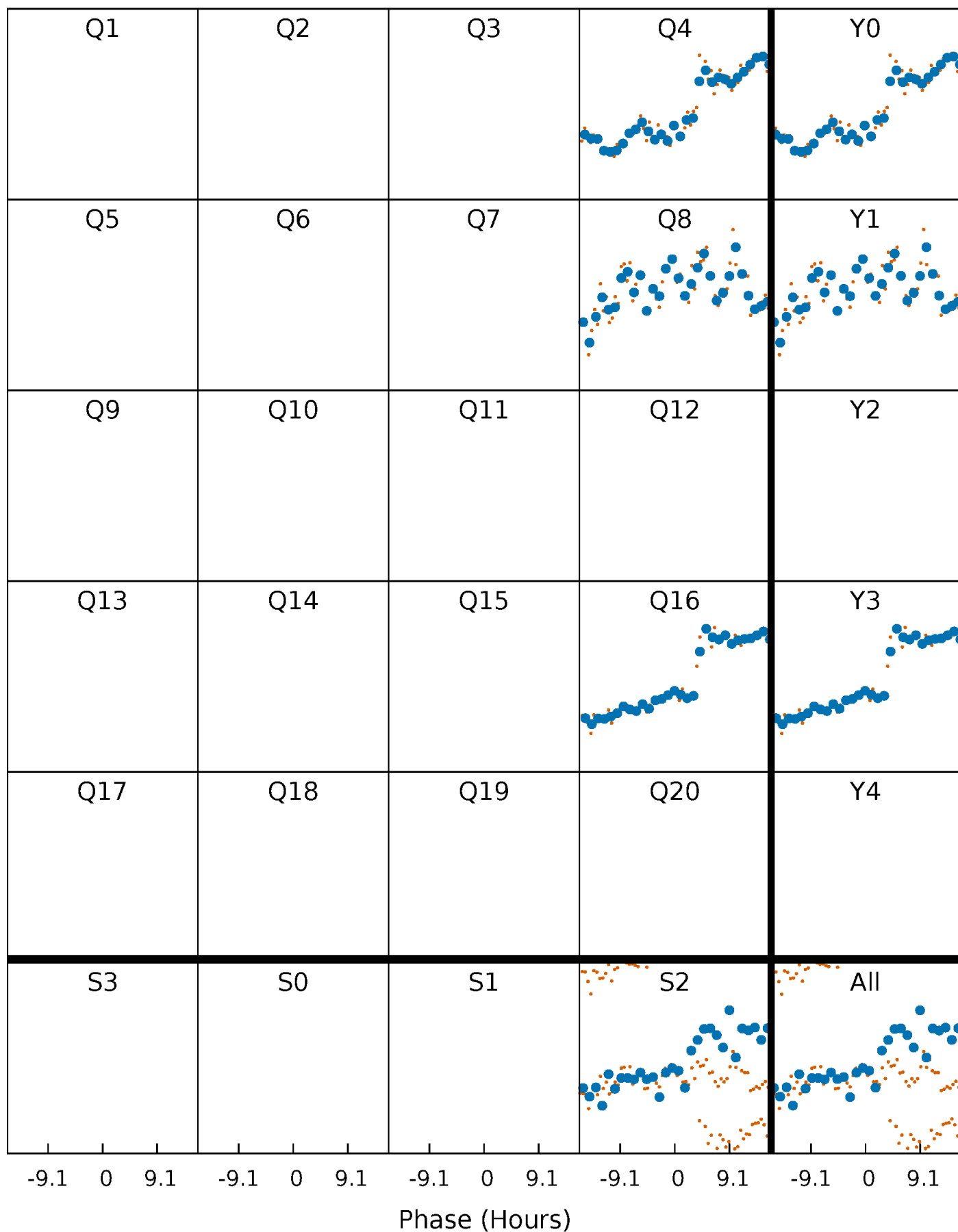


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 007020168-04 $P=384.981850$ Days $T_0=393.971339$ (BKJD)



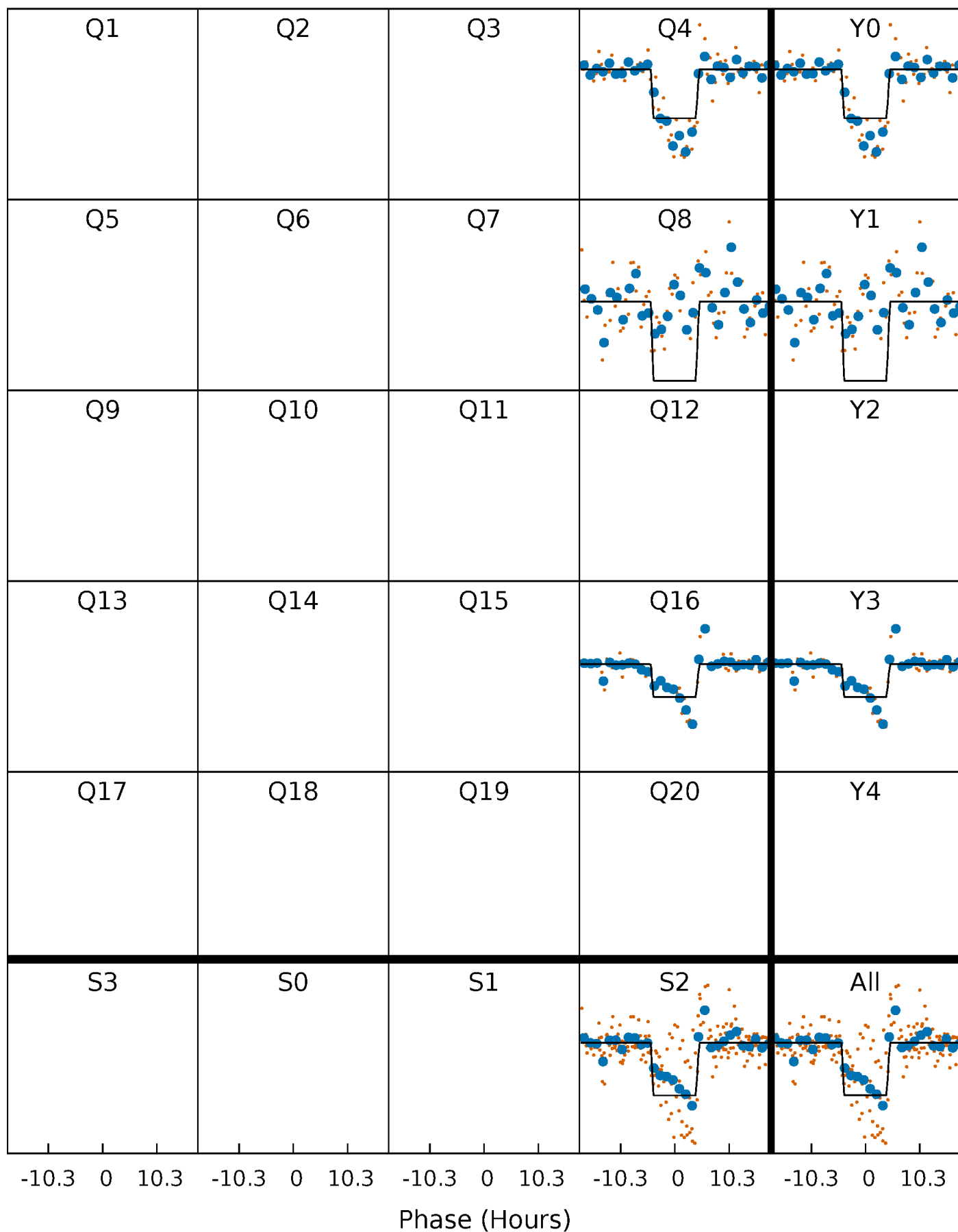
DV Quarter-Phased Transit Curves

TCE 007020168-04 P=384.981850 Days $T_0=393.971339$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

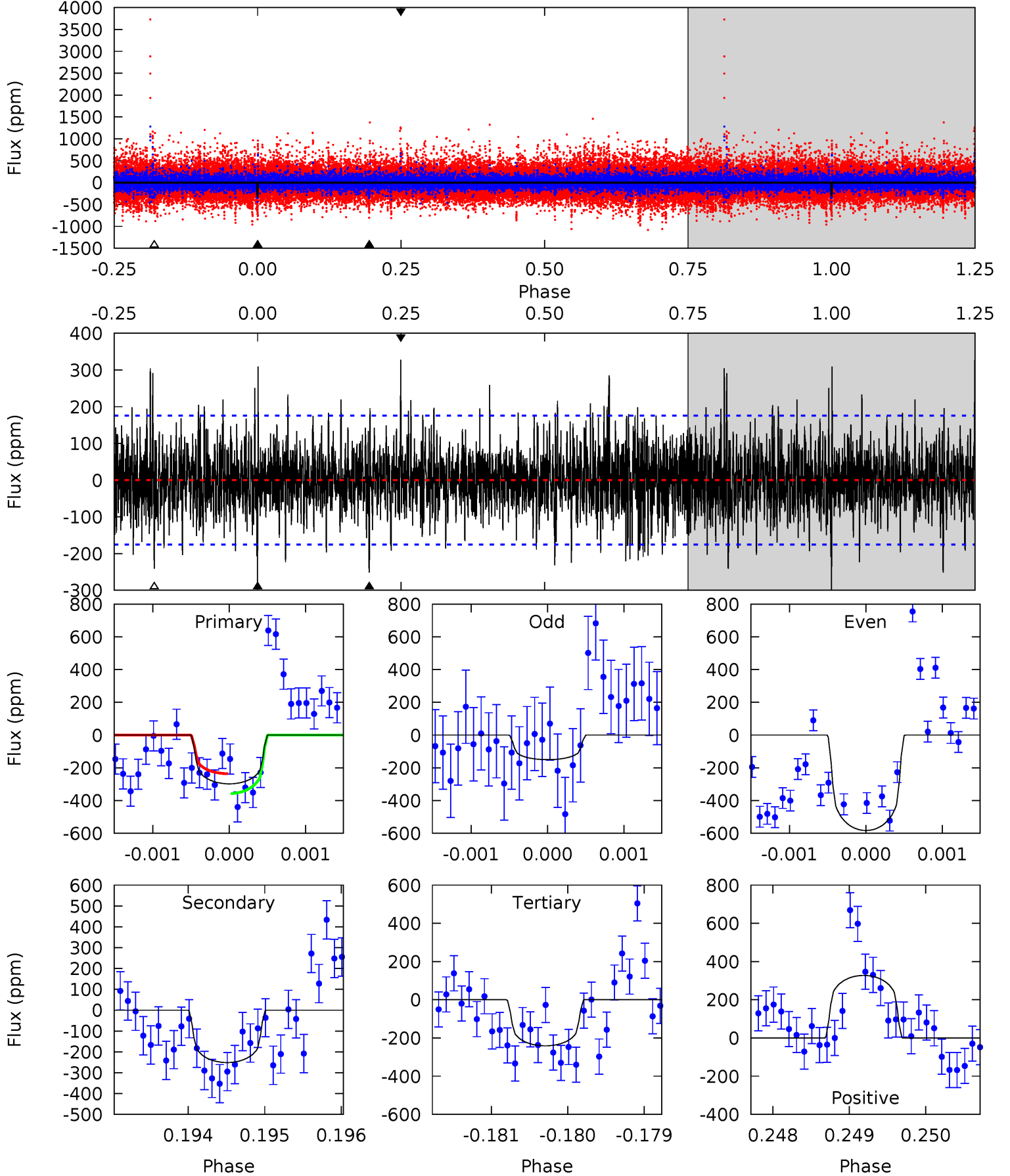
TCE 007020168-04 $P=384.981893$ Days $T_0=393.945625$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-04, P = 384.981850 Days, E = 8.989489 Days

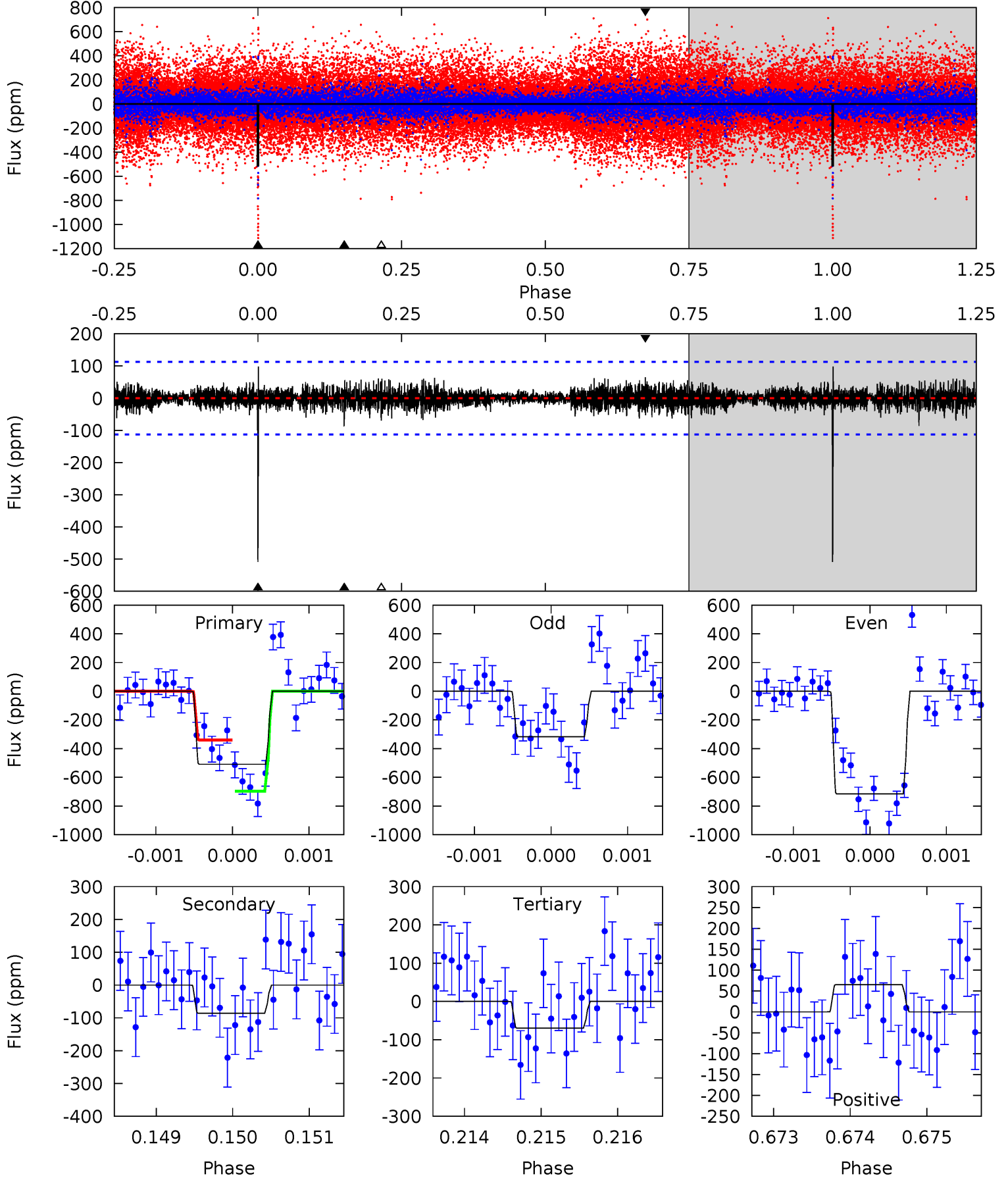
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.28	7.82	7.51	10.2	5.47	3.32	2.15	1.77	-0.91	0.32	-2.37	5.89	0.70	0.52	1.89



Alt Model-Shift Uniqueness Test

007020168-04, P = 384.981893 Days, E = 8.963732 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.7	4.15	3.37	3.15	5.46	3.30	0.80	21.3	21.5	0.78	1.01	9.57	0.77	0.16	8.62



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-251 ± 32	$3.58^{+2.04}_{-1.58}$	430^{+48}_{-59}	4815^{+1153}_{-599}	10645^{+24144}_{-6312}
Alt.	-86 ± 21	$4.00^{+1.75}_{-1.57}$	432^{+49}_{-56}	3814^{+649}_{-391}	2907^{+5253}_{-1565}

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

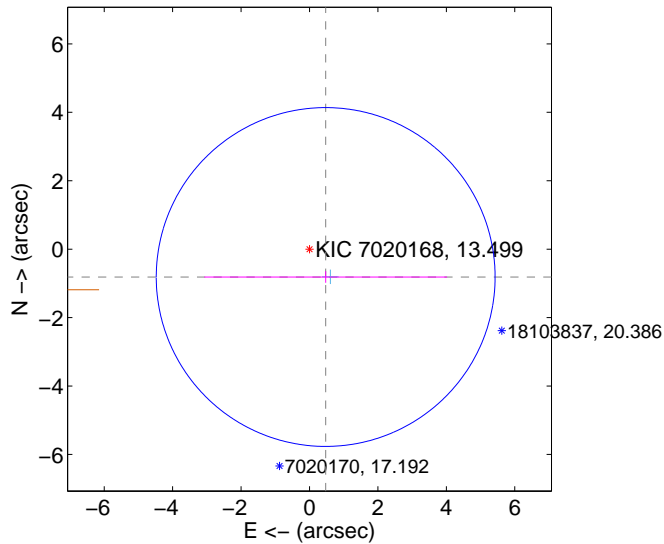
Supplemental centroid analysis for 007020168-04. Kepler magnitude: 13.50. Transit SNR 6.19

There are 1 quarters with good PRF difference image offsets

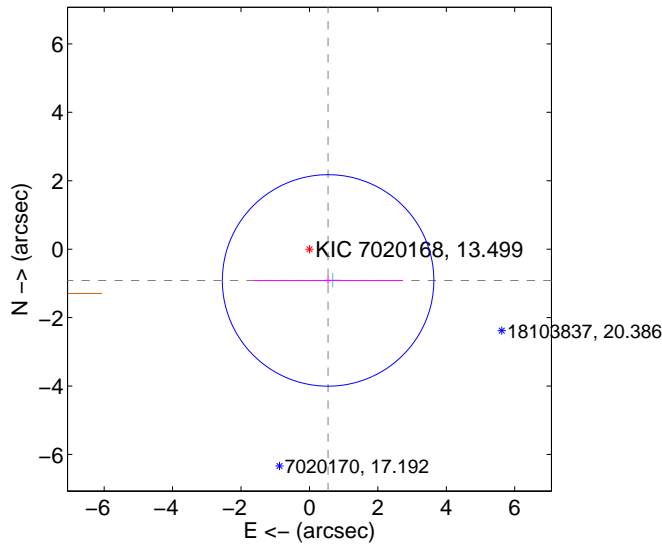
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.941 ± 1.650	0.57	-0.473 ± 3.548	-0.814 ± 0.169
PRF-fit source offset from KIC position	1.064 ± 1.030	1.03	-0.545 ± 2.170	-0.914 ± 0.118
photometric centroid source offset	0.73 ± 0.77	0.95	0.31 ± 0.64	-0.66 ± 0.79

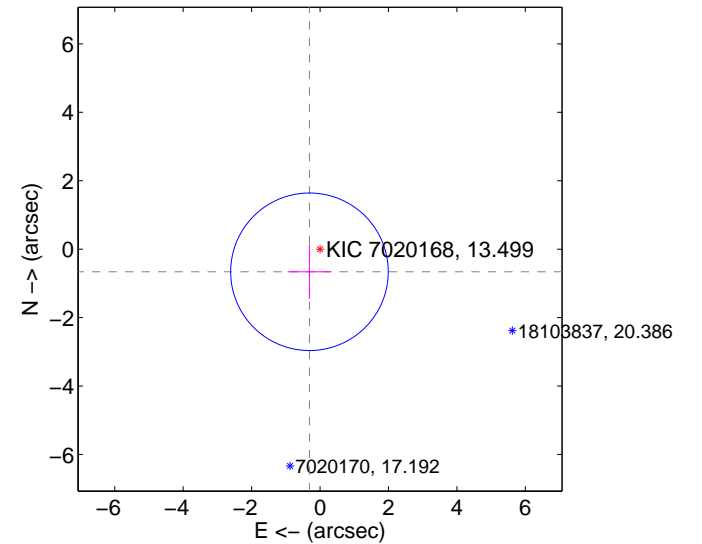
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

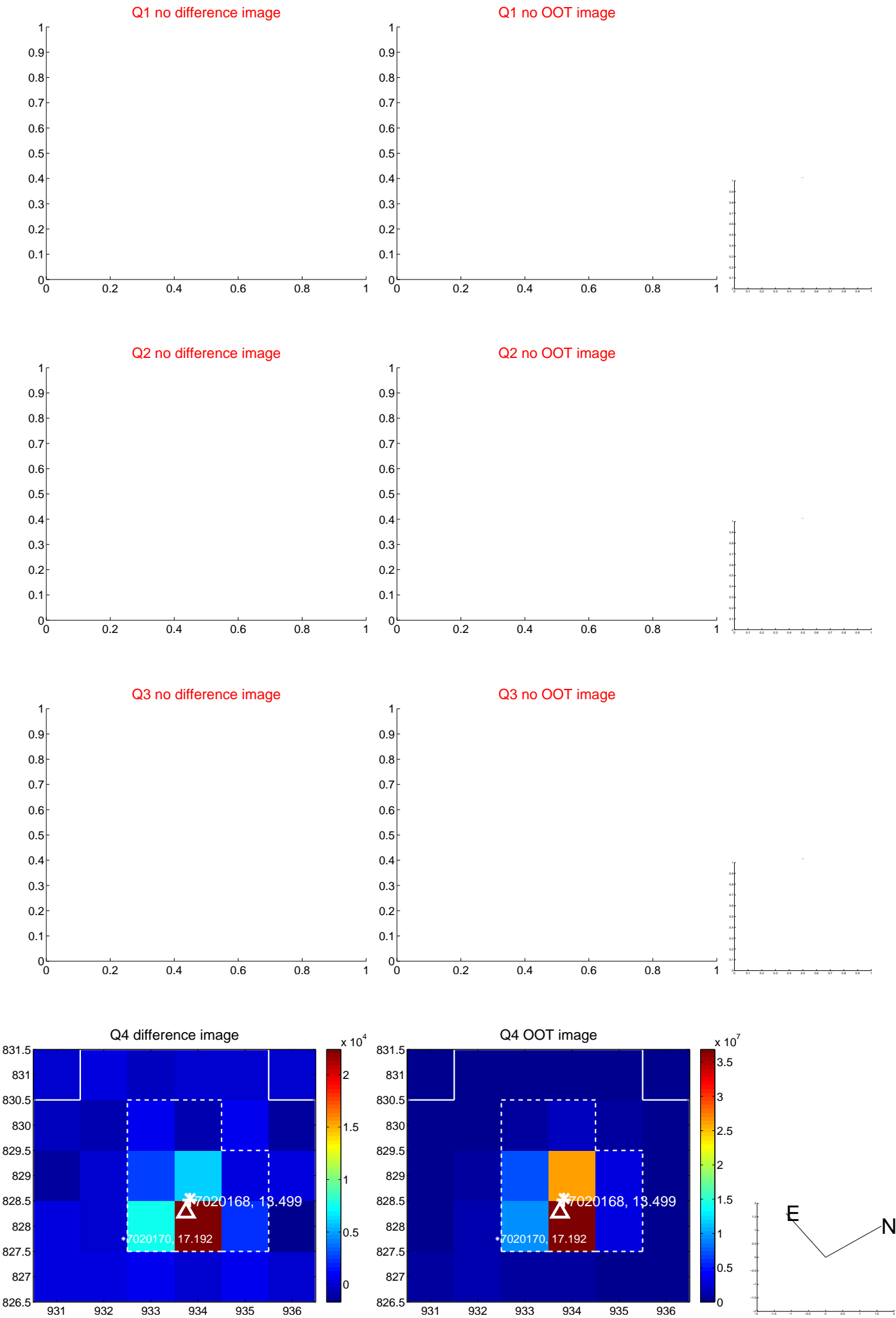


offset from photometric centroids

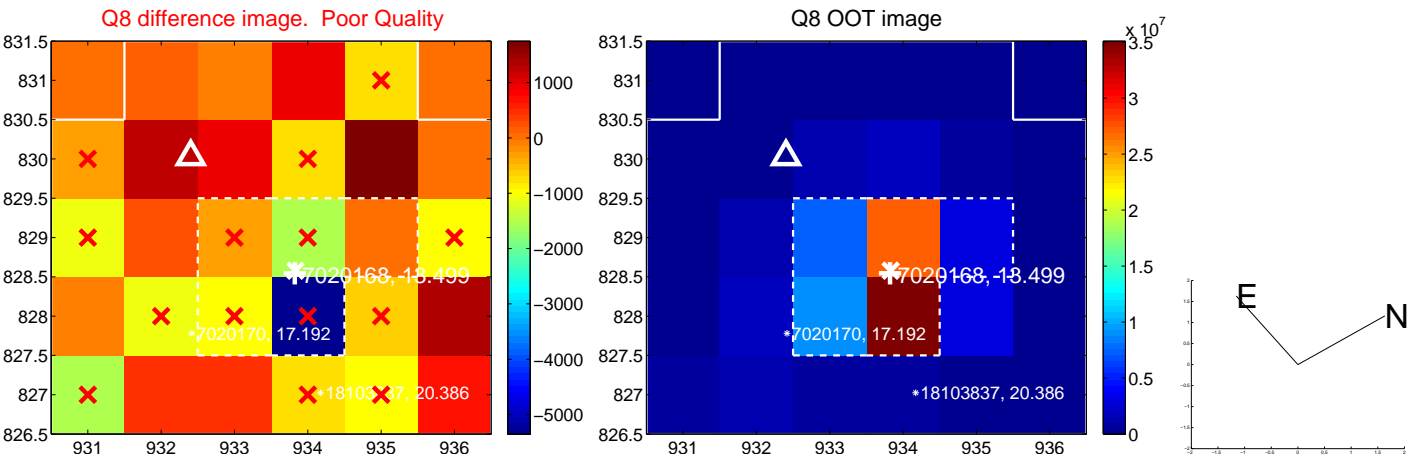


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



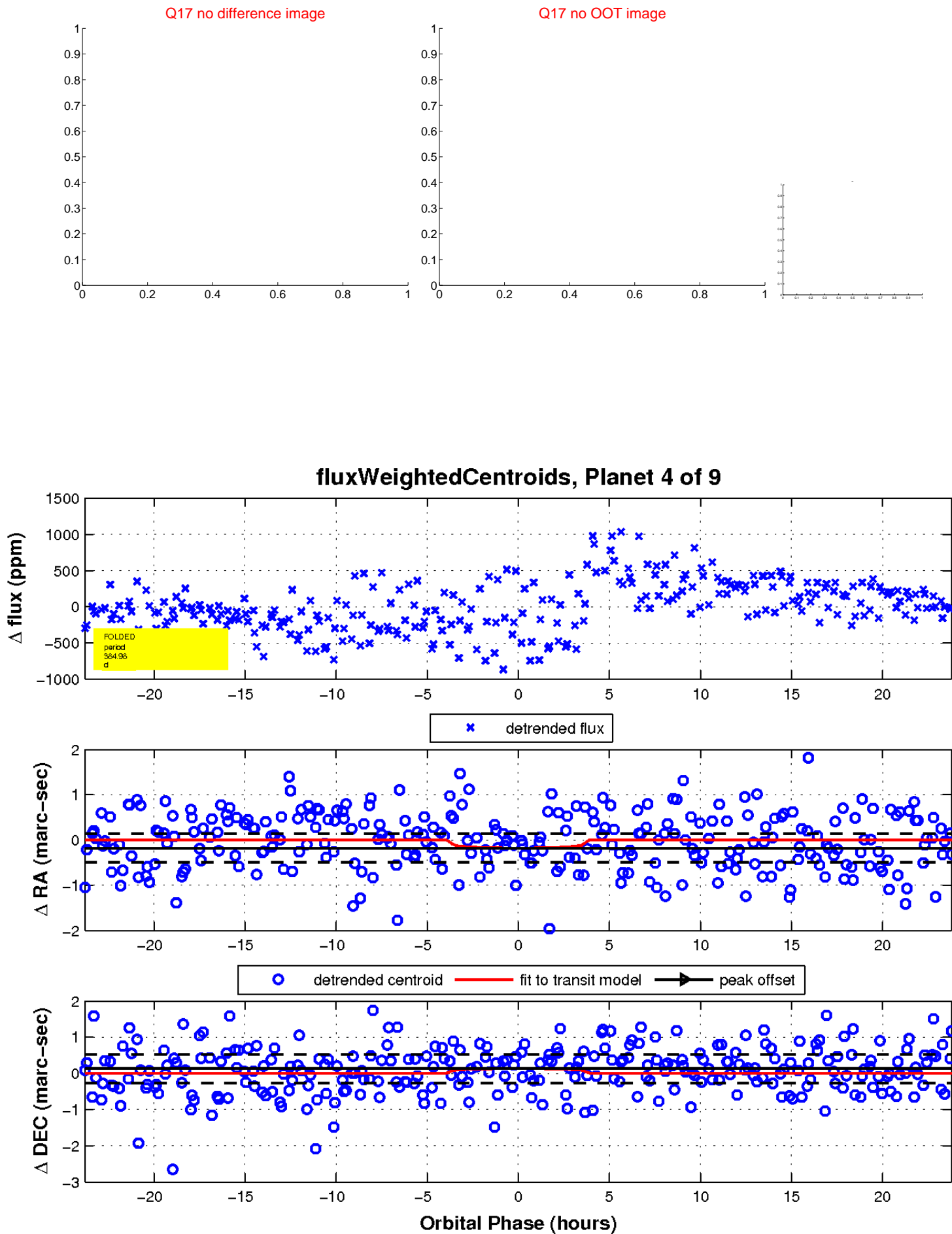
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

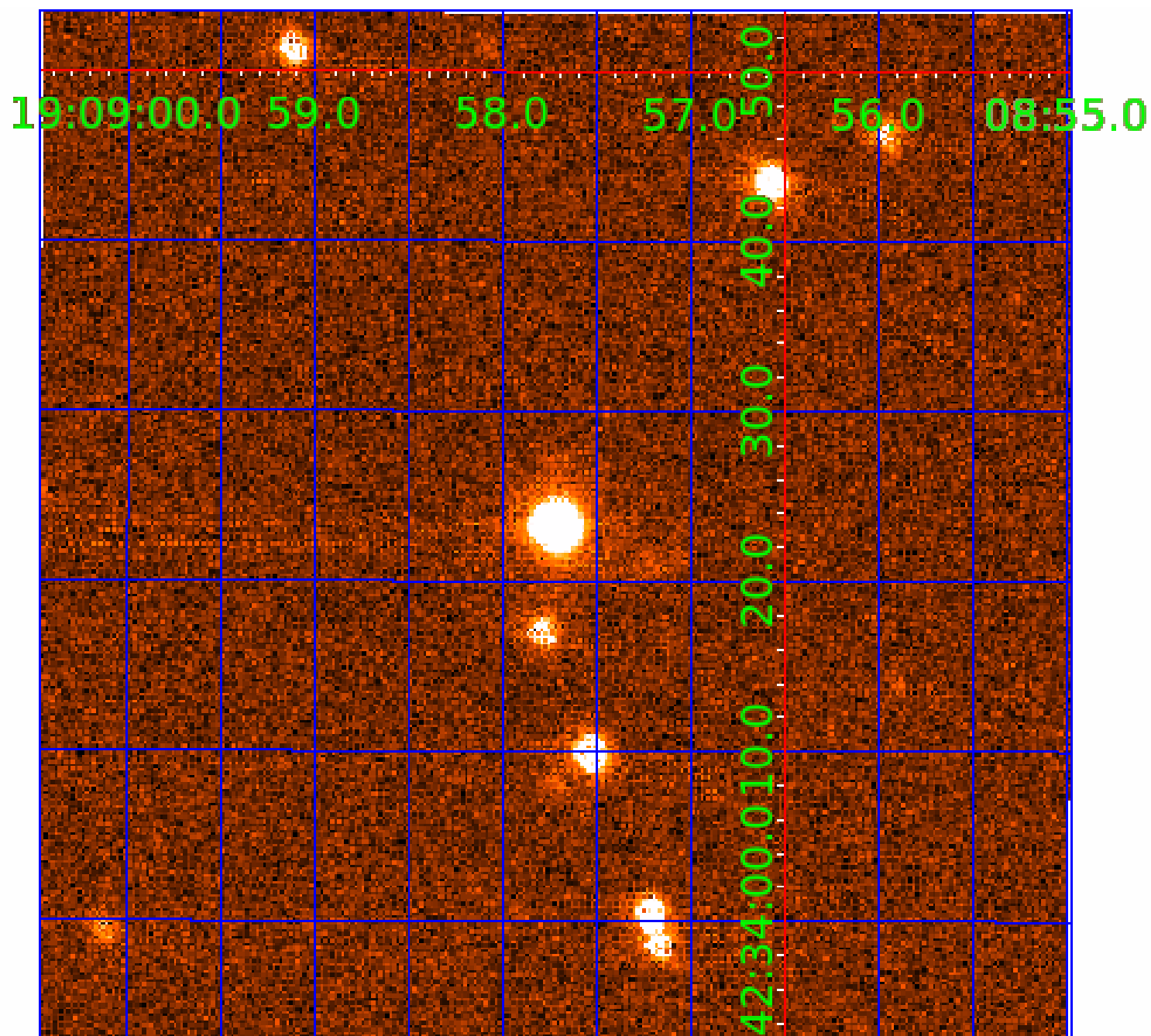


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

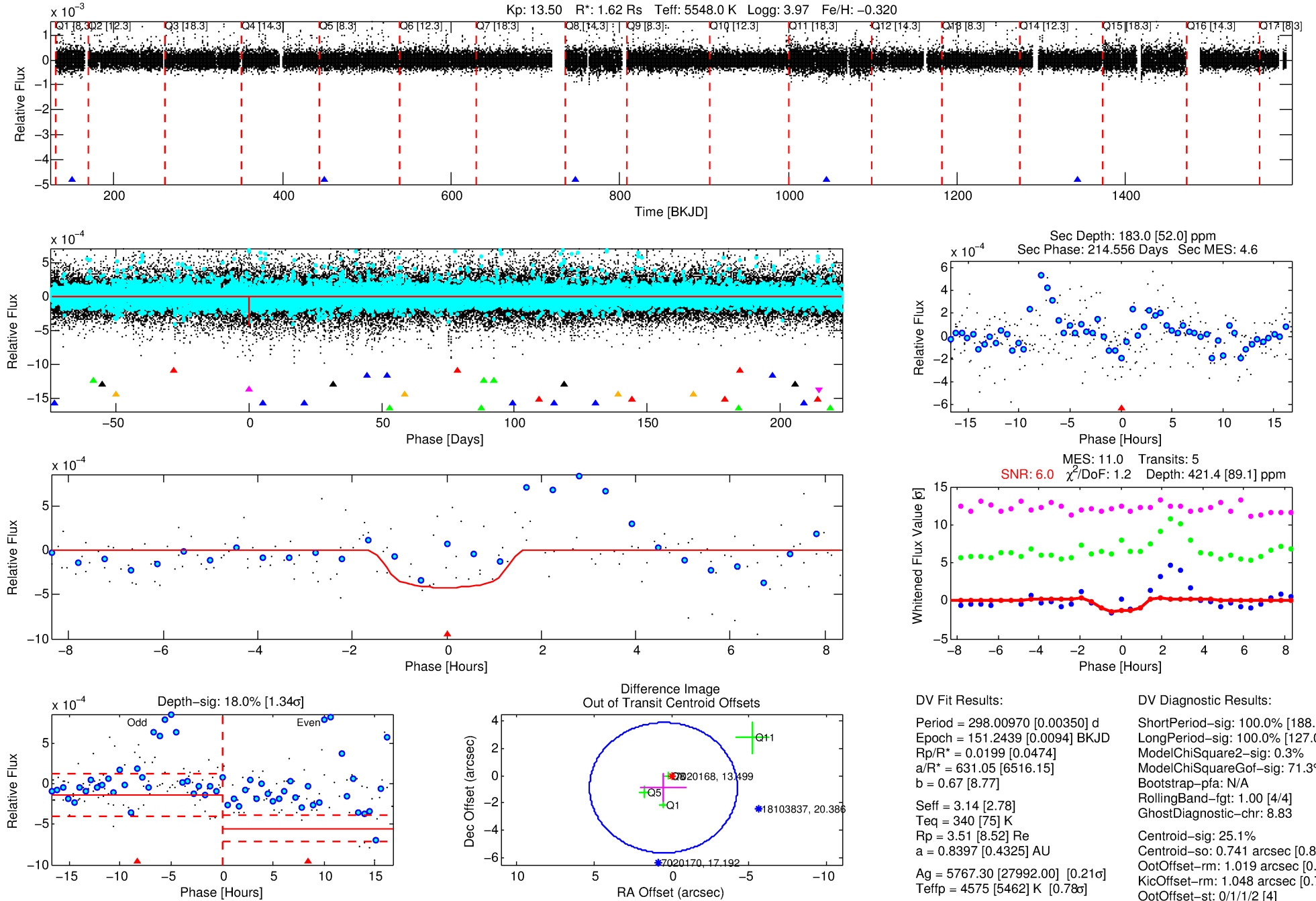
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-05

No Significant Match Found

DV One-Page Summary

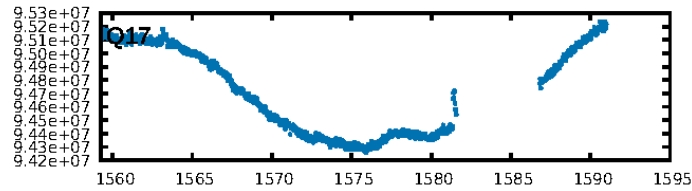
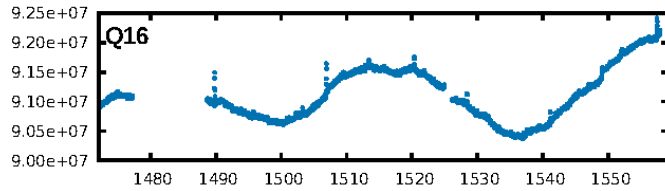
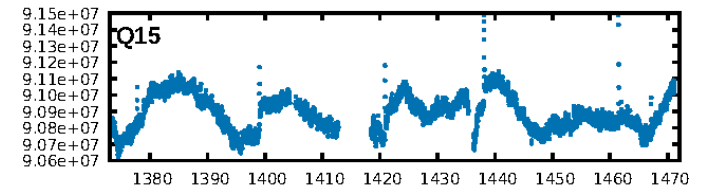
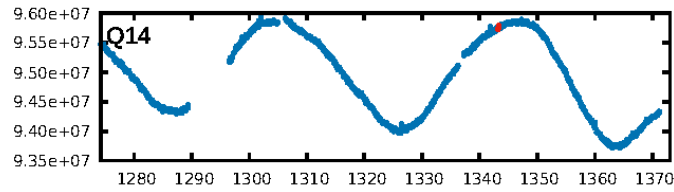
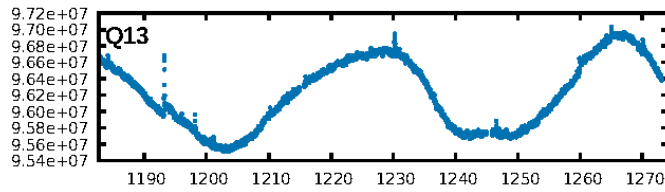
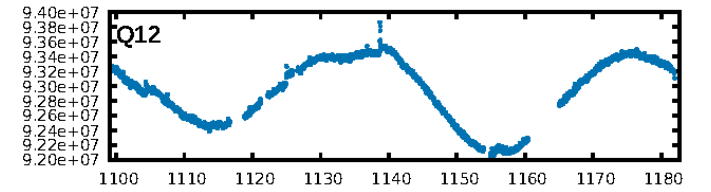
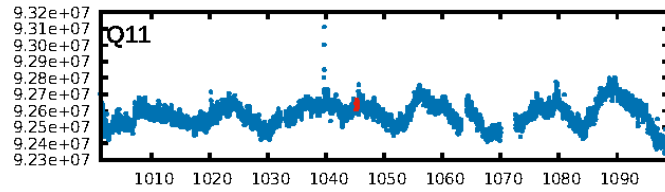
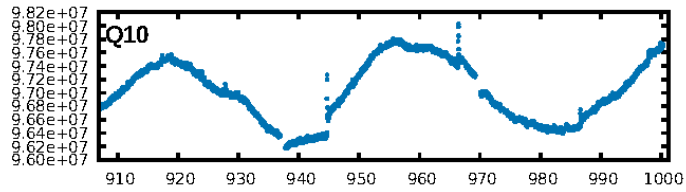
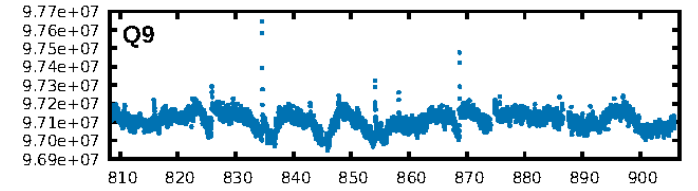
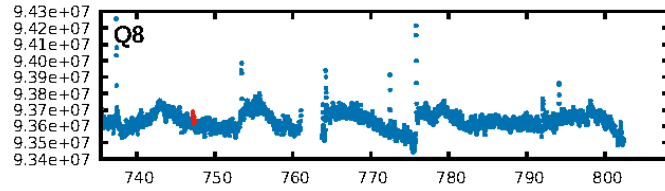
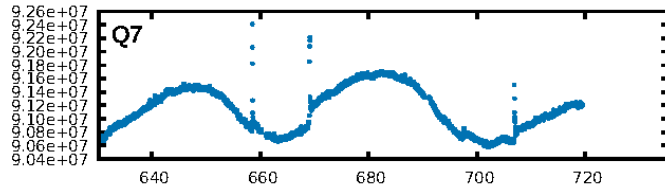
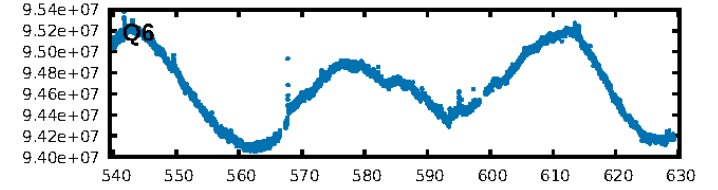
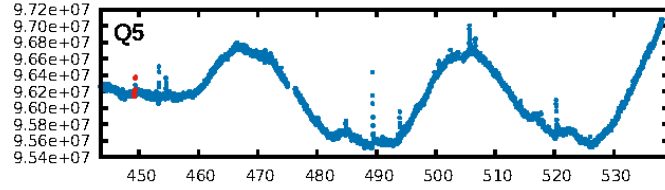
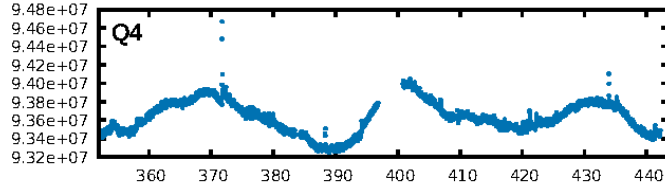
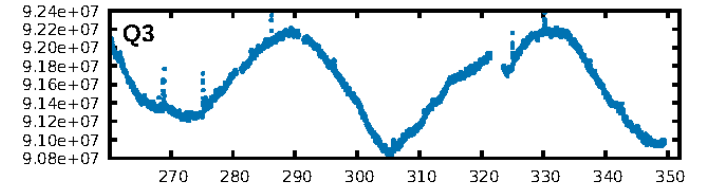
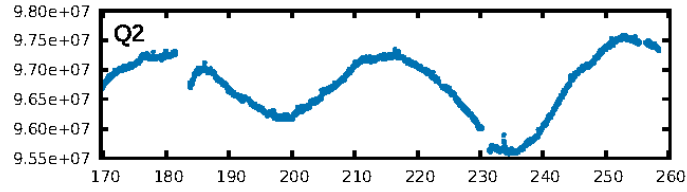
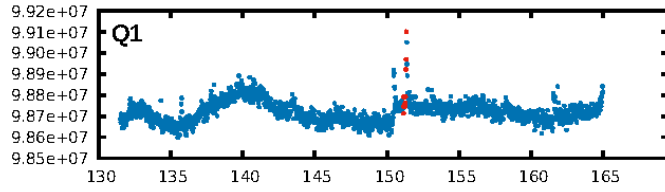
KIC: 7020168 Candidate: 5 of 9 Period: 298.010 d



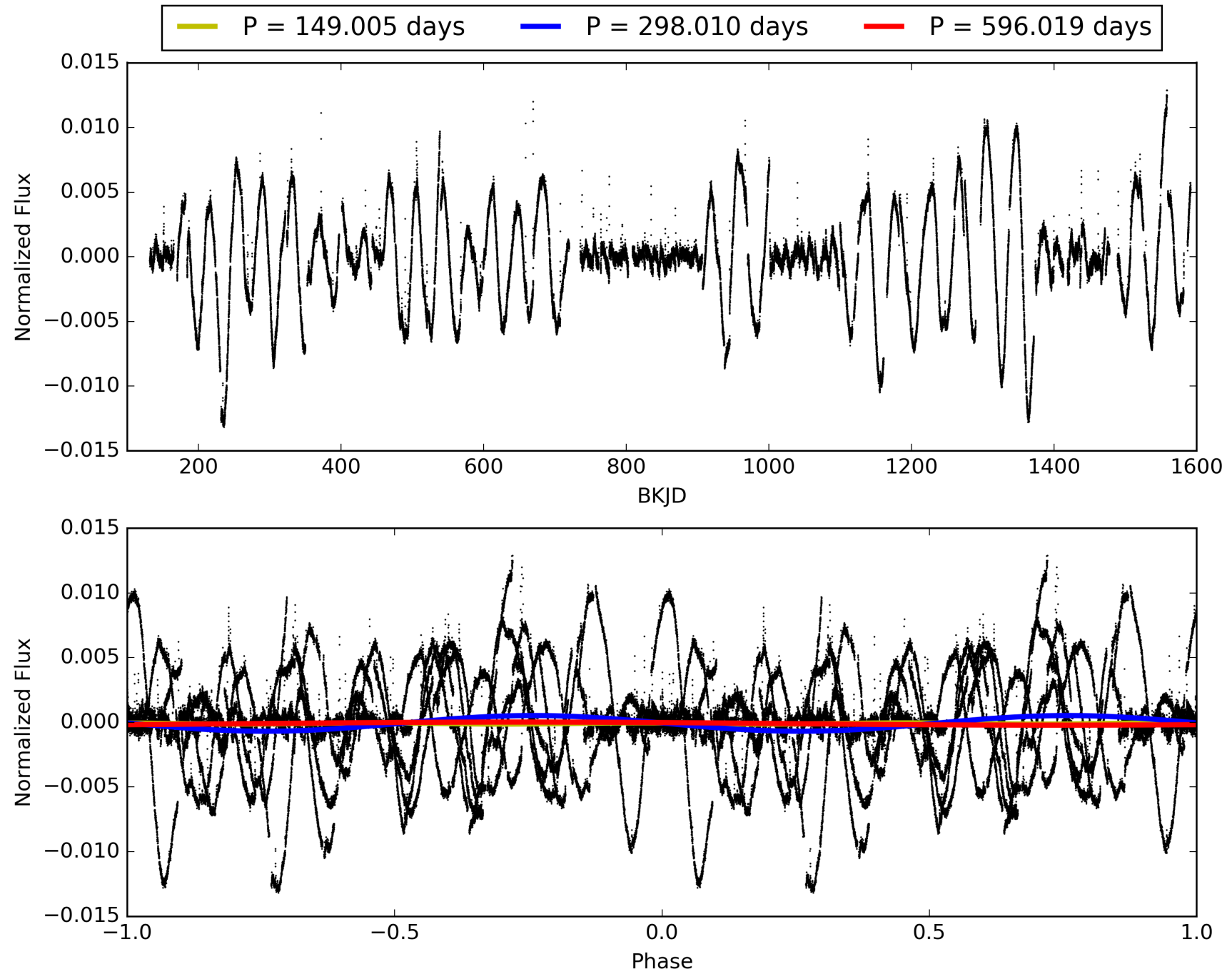
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:21:43 Z

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

TCE 007020168-05, PDC Light Curves

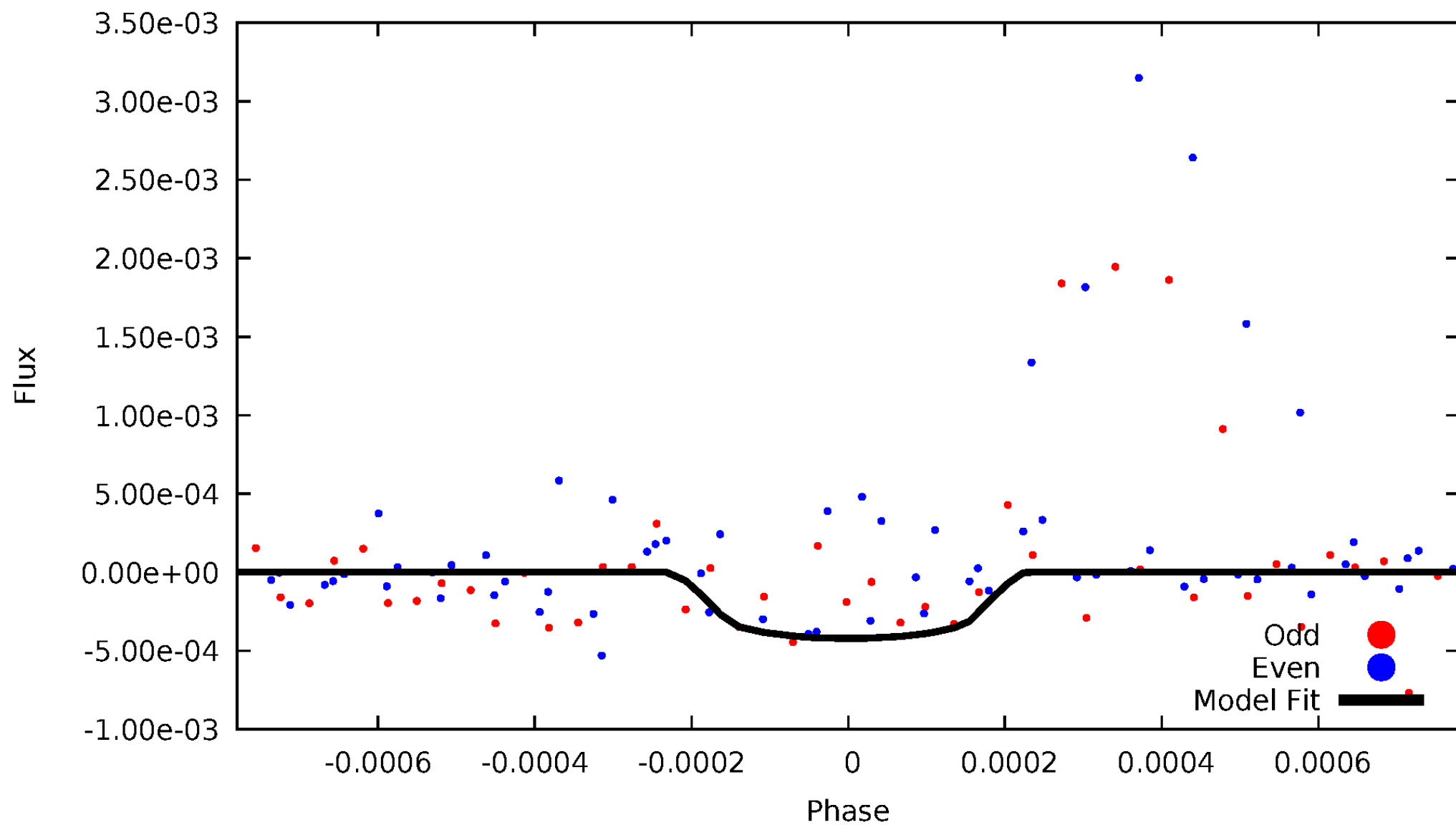


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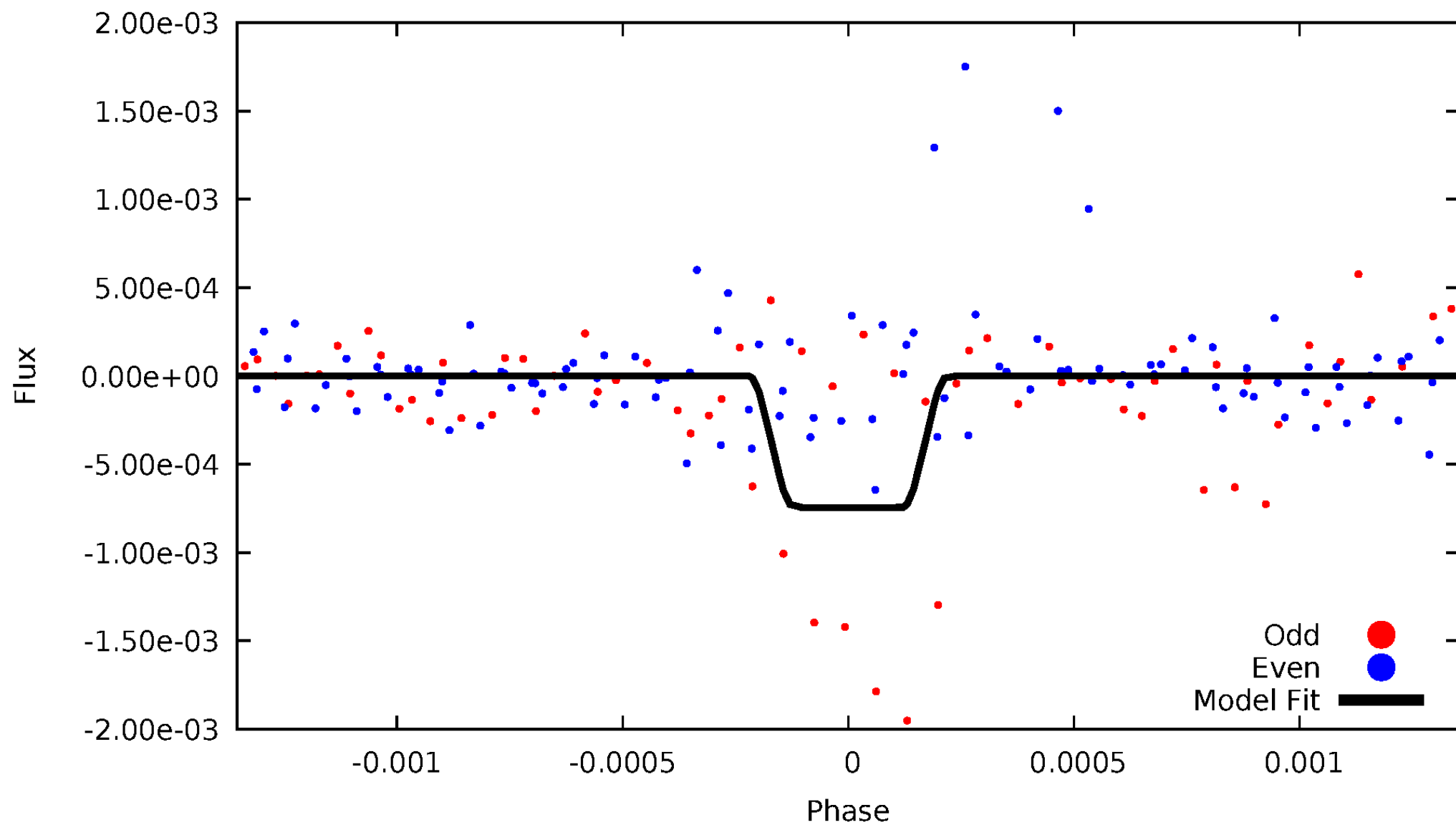
DV Odd/Even

TCE 007020168-05



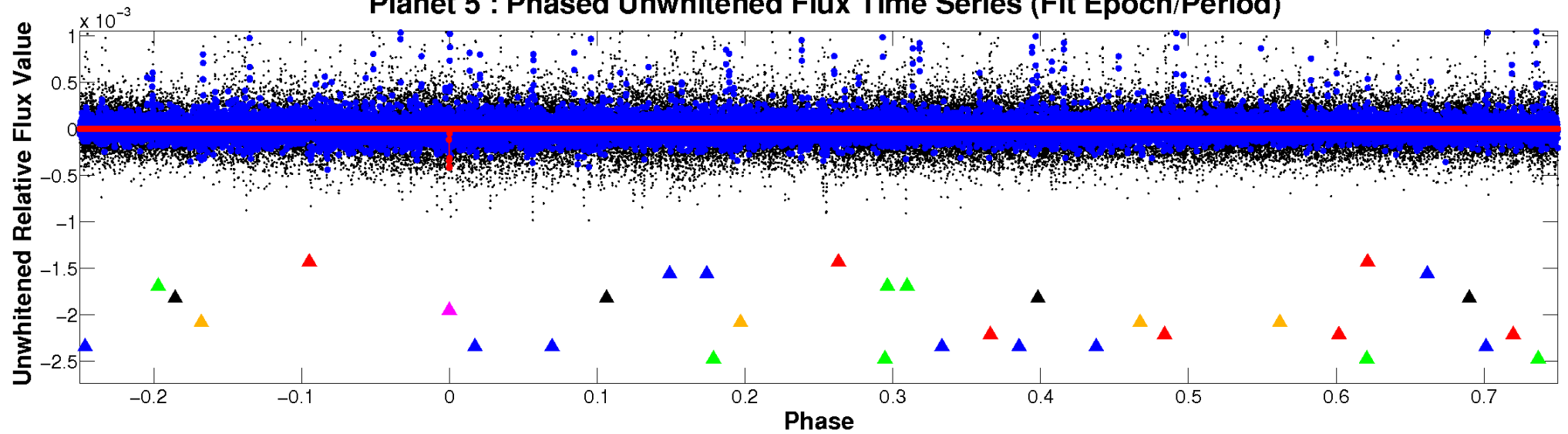
ALT Odd/Even

TCE 007020168-05

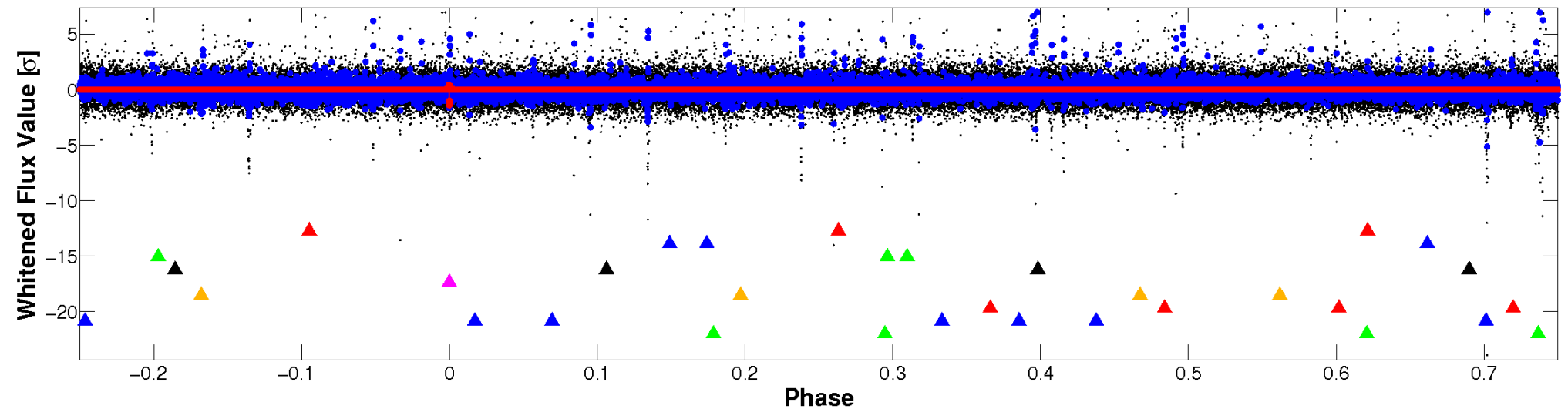


Non-Whitened Vs. Whitened Light Curve

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

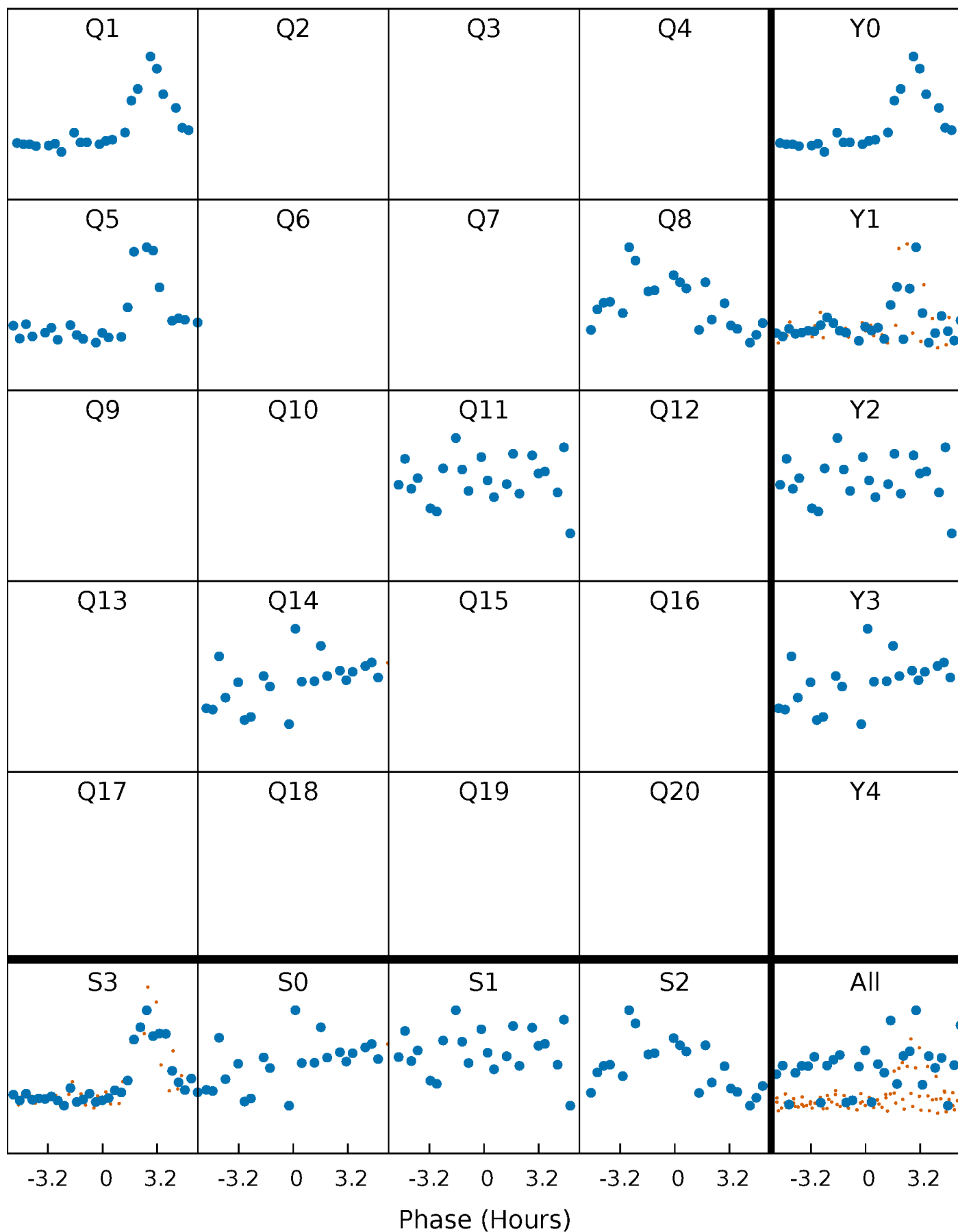


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



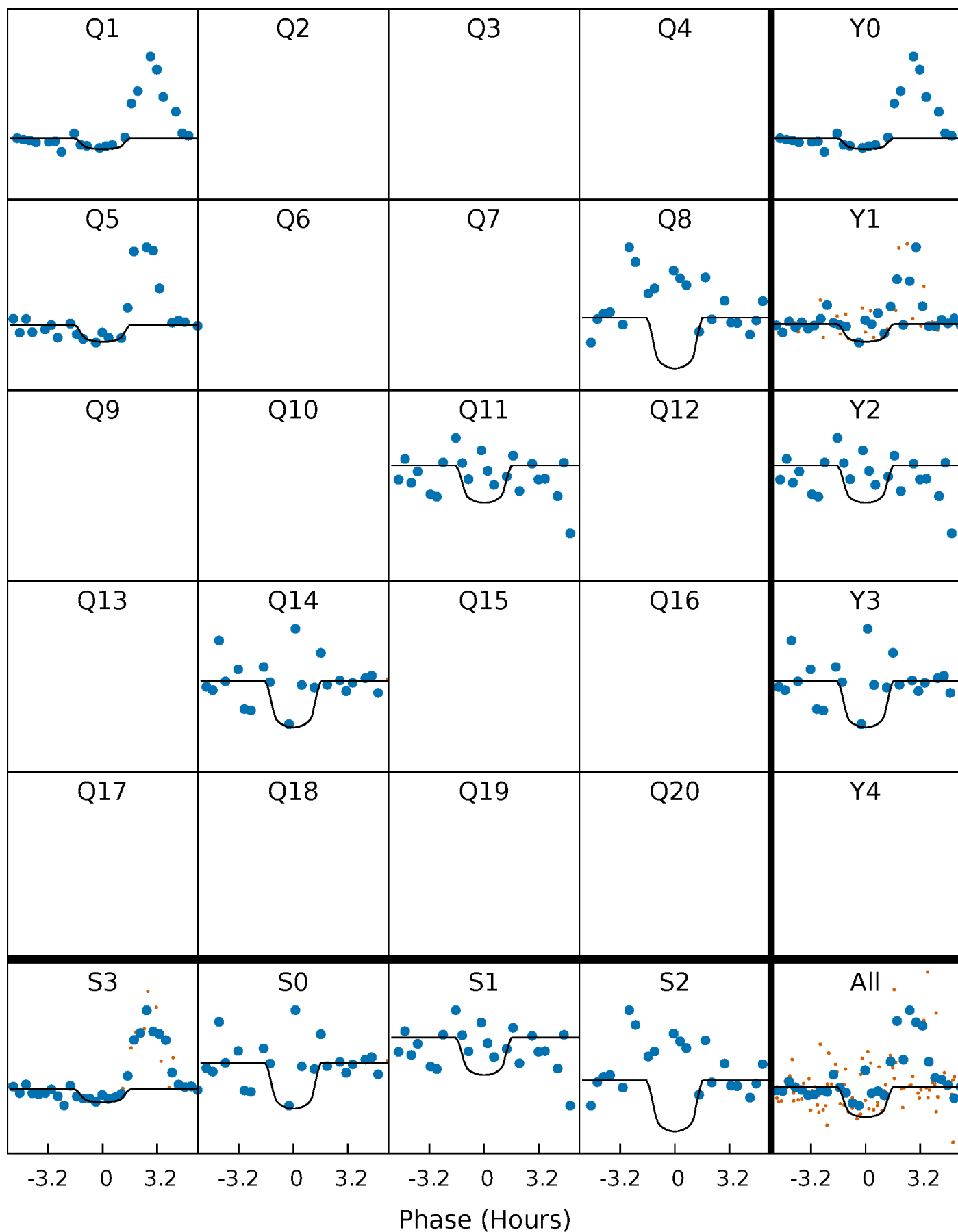
PDC Quarter-Phased Transit Curves

TCE 007020168-05 P=298.009703 Days $T_0=151.243857$ (BKJD)



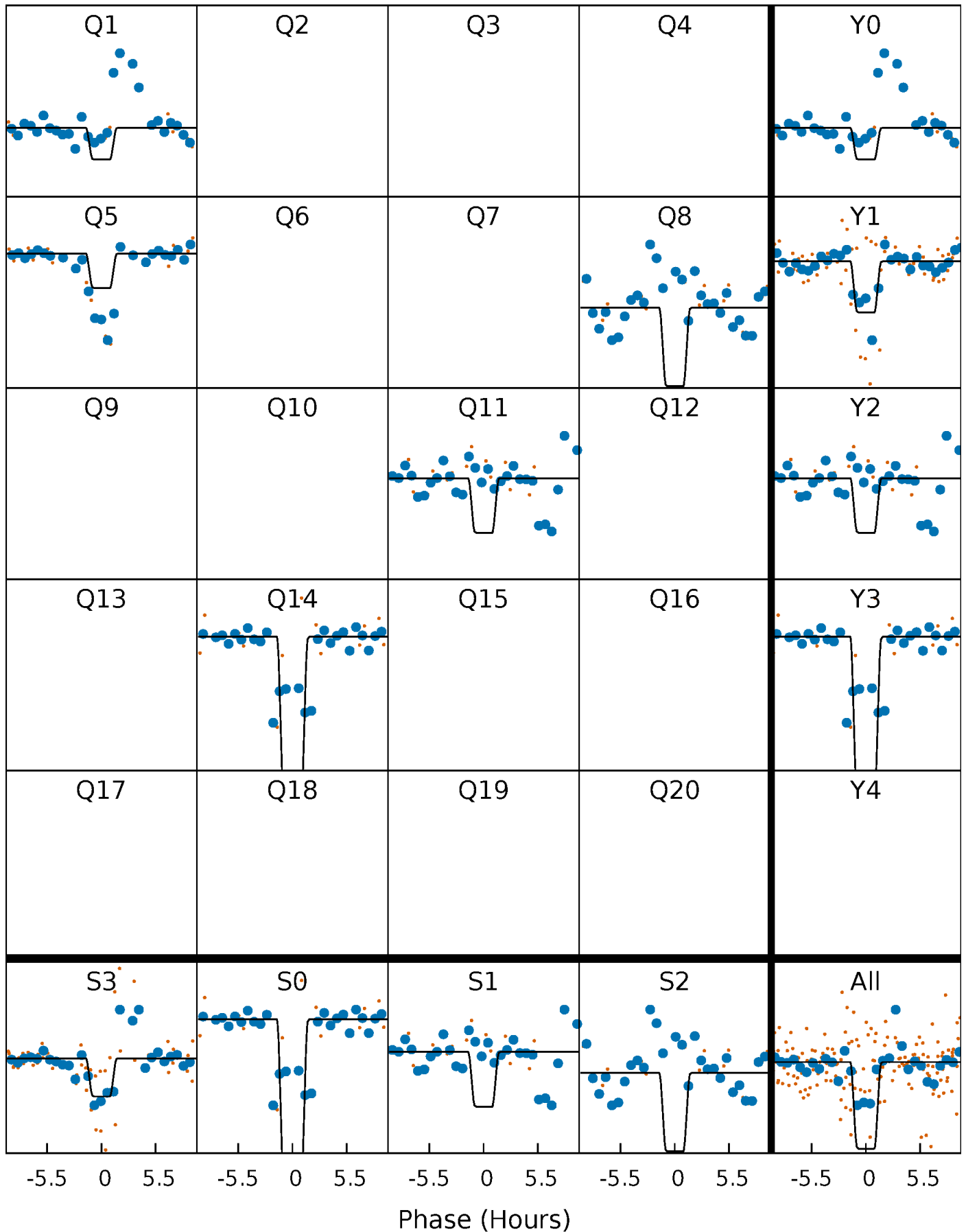
DV Quarter-Phased Transit Curves

TCE 007020168-05 $P=298.009703$ Days $T_0=151.243857$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

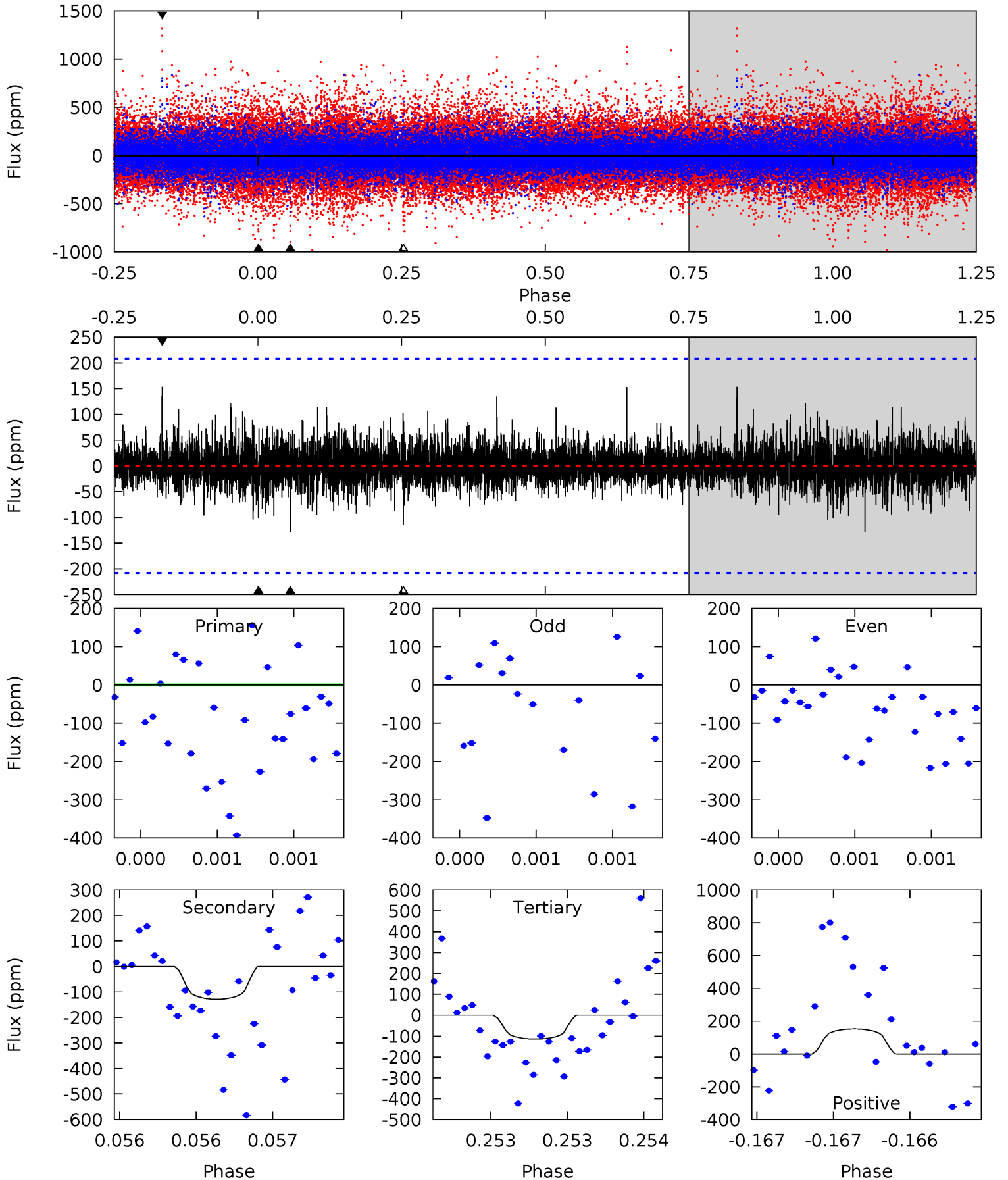
TCE 007020168-05 $P=297.998171$ Days $T_0=151.256807$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-05, P = 298.009703 Days, E = 151.243857 Days

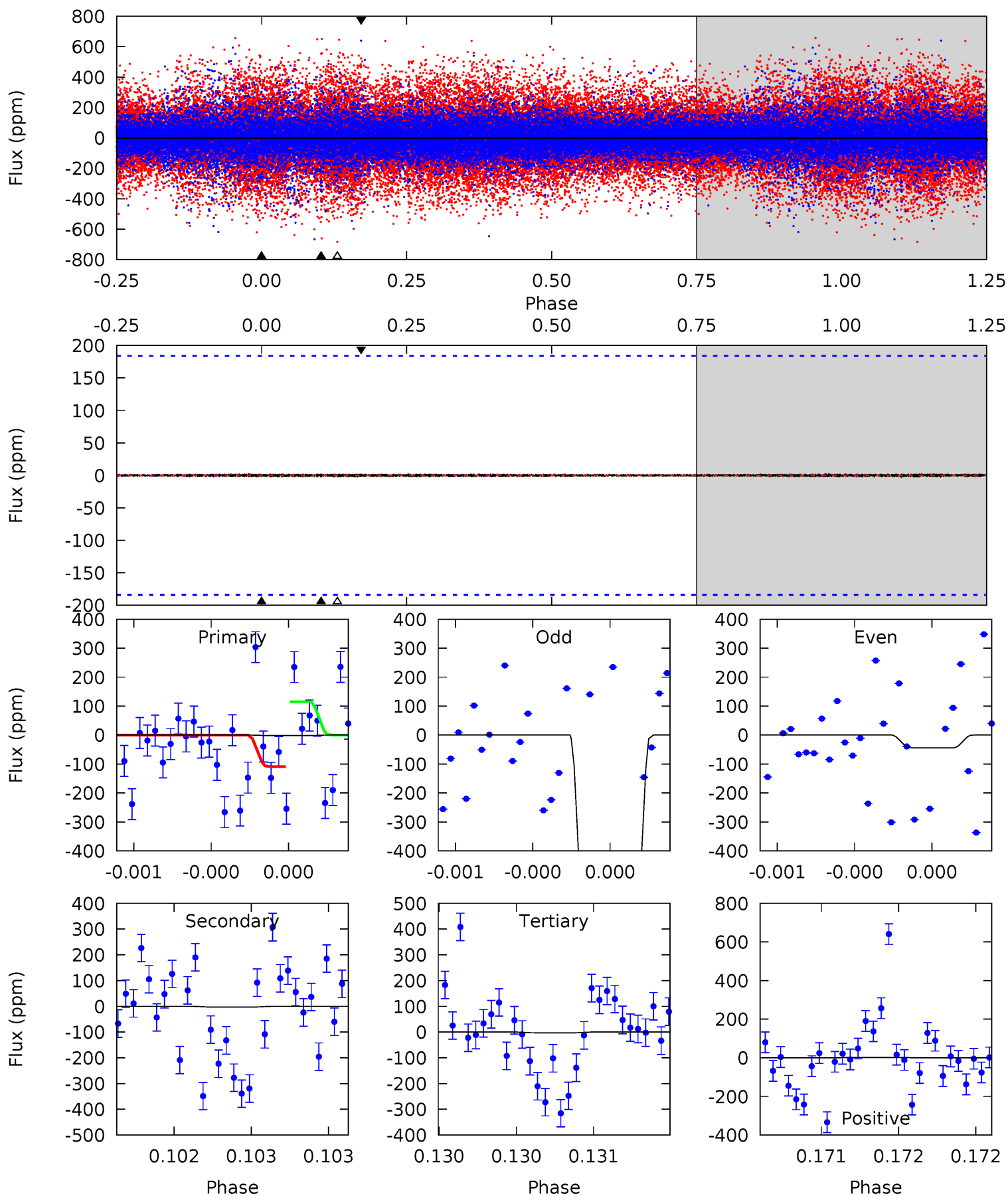
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.72	3.47	3.07	4.13	5.60	3.53	0.75	-0.35	-1.41	0.40	-0.66	2.37	1.12	0.54	1.62



Alt Model-Shift Uniqueness Test

007020168-05, P = 297.998171 Days, E = 151.256807 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.04	0.09	0.08	0.07	5.60	3.52	0.01	-0.04	-0.03	0.01	0.02	13.5	2.01	0.45	0



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-129 ± 37	$7.30^{+6.86}_{-5.12}$	472^{+50}_{-67}	3367^{+1815}_{-573}	959^{+9937}_{-727}
Alt.	-3 ± 33	$7.00^{+7.61}_{-4.76}$	470^{+52}_{-66}	2003^{+1071}_{-4883}	12^{+486}_{-366}

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 $A_{obs} \gg 1.0$

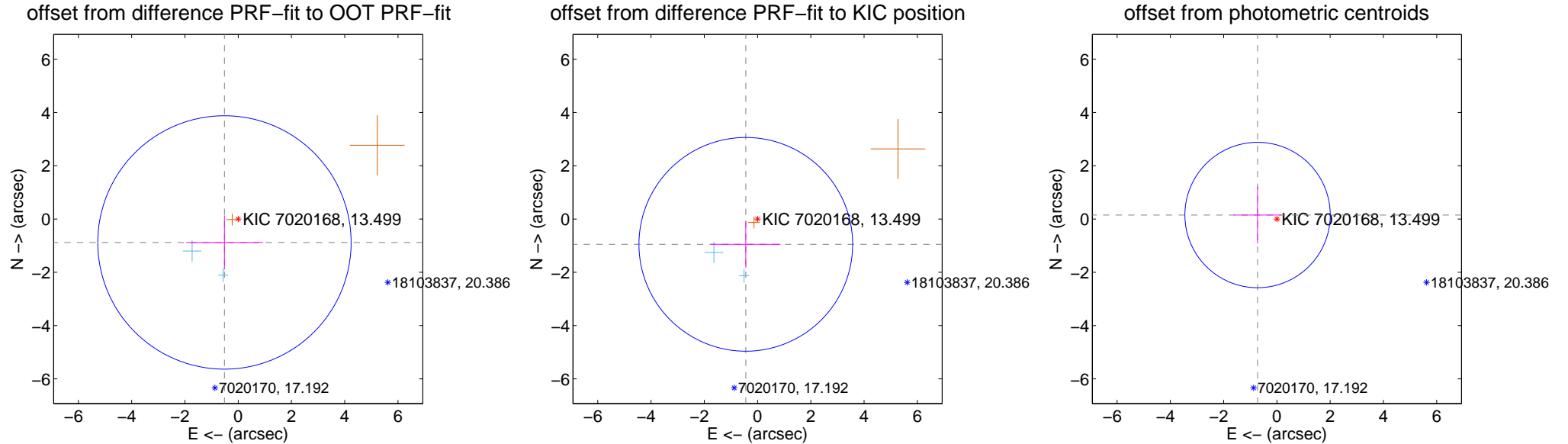
DV Centroid Data

Supplemental centroid analysis for 007020168-05. Kepler magnitude: 13.50. Transit SNR 6.04

There are 2 quarters with good PRF difference image offsets

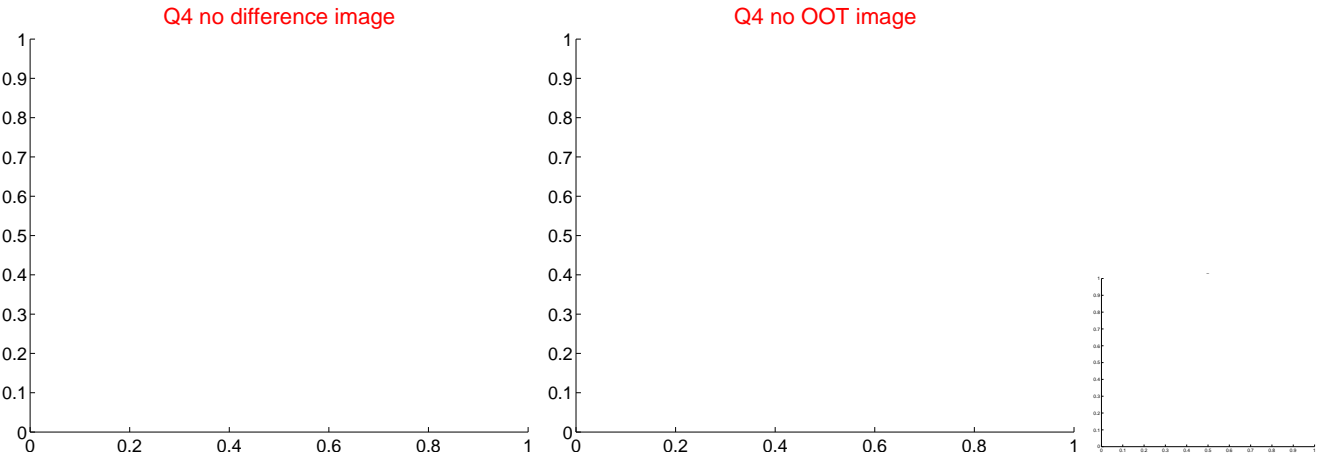
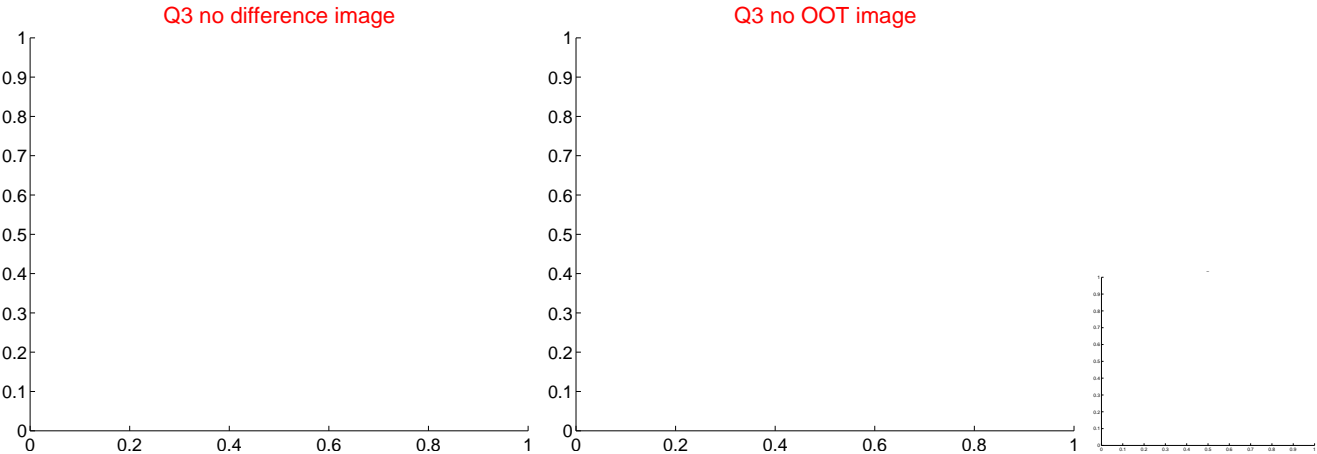
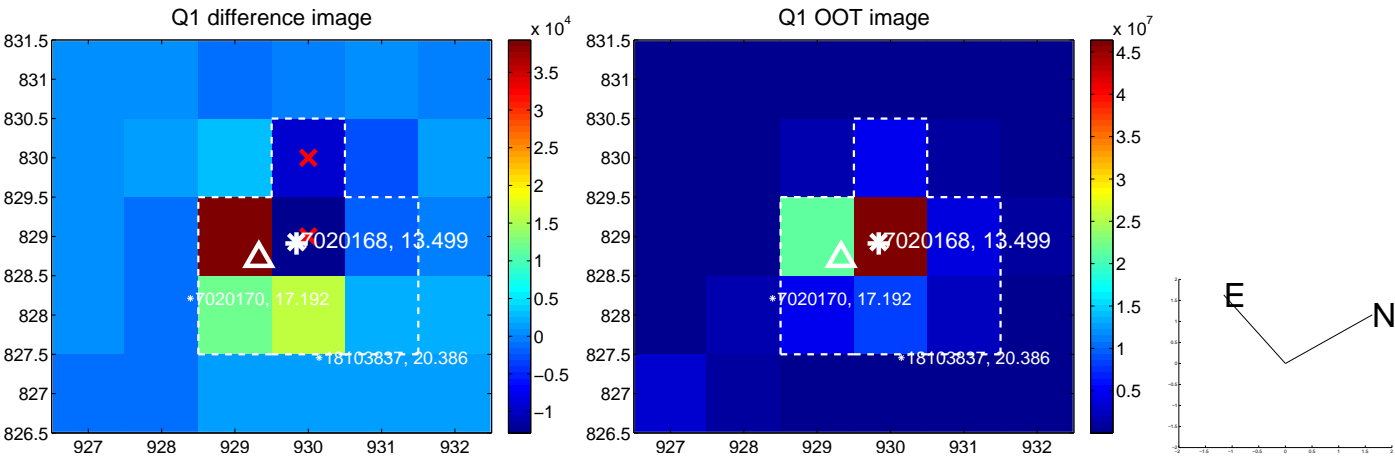
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.019 ± 1.585	0.64	0.516 ± 1.443	-0.879 ± 1.011
PRF-fit source offset from KIC position	1.048 ± 1.337	0.78	0.442 ± 1.307	-0.950 ± 0.884
photometric centroid source offset	0.74 ± 0.91	0.81	0.73 ± 0.90	0.15 ± 1.07

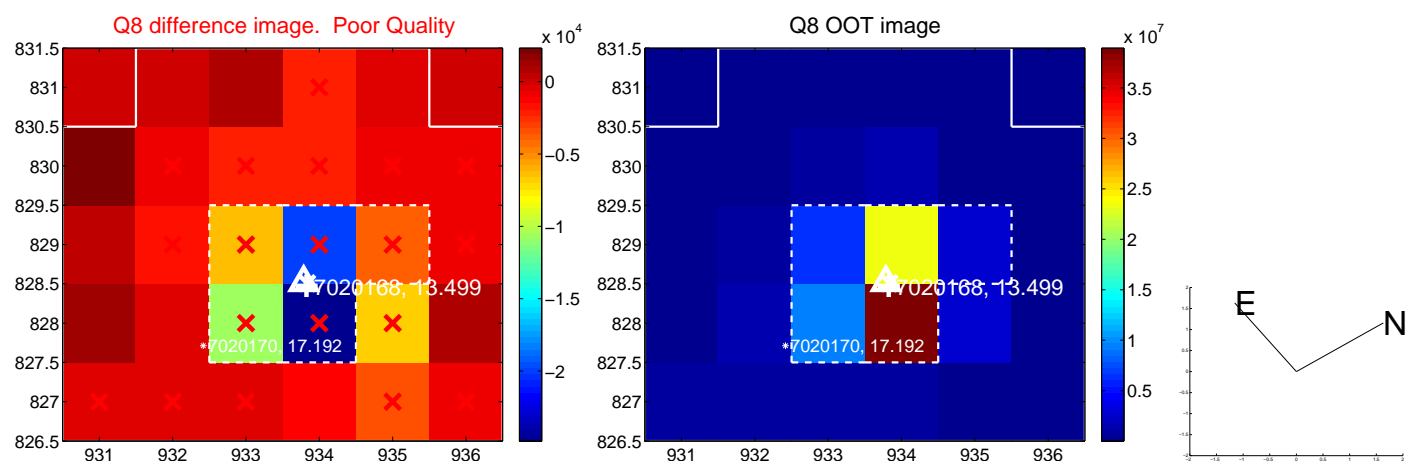
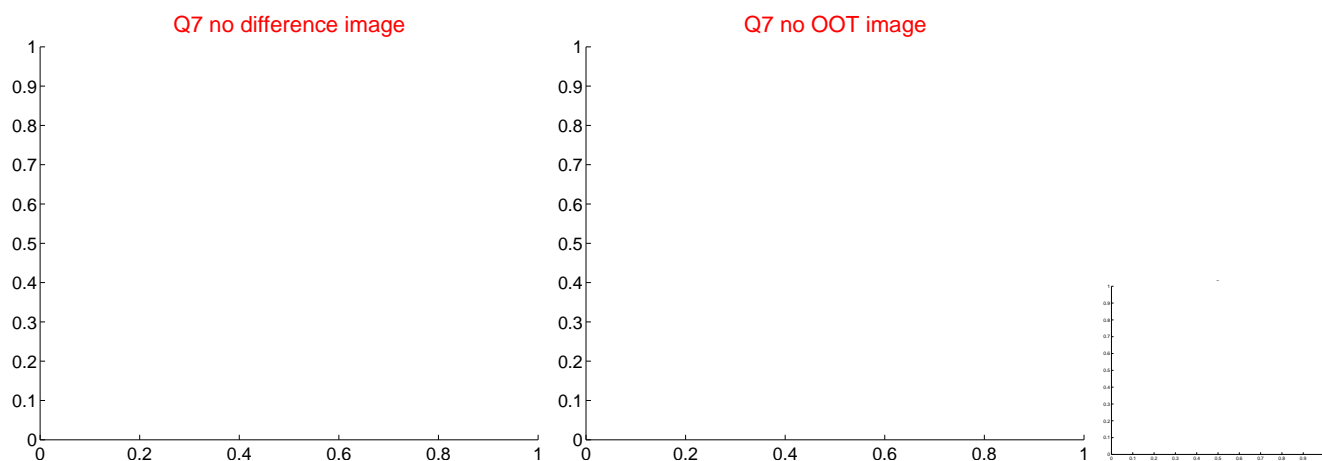
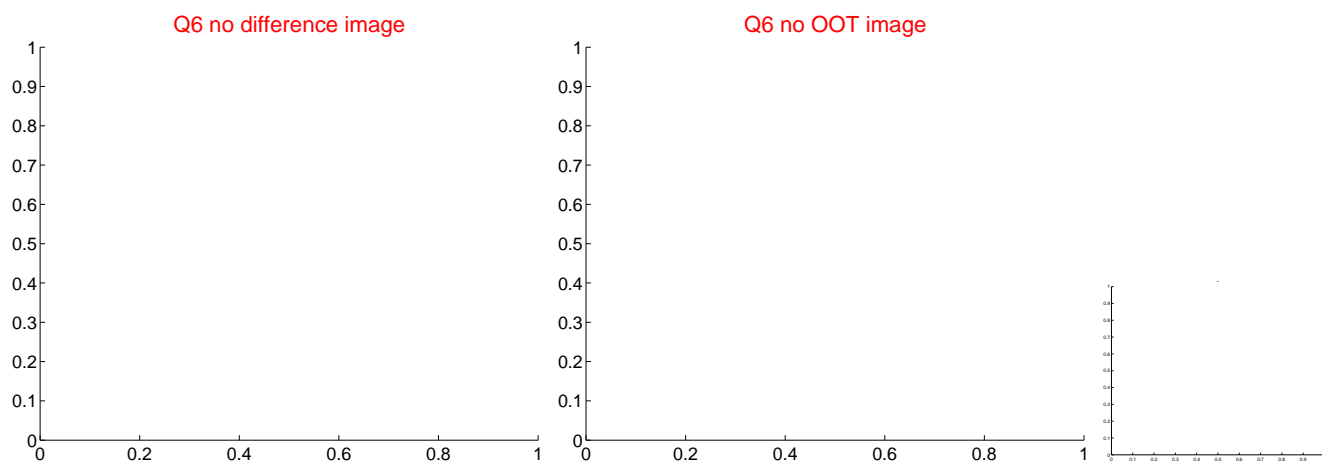
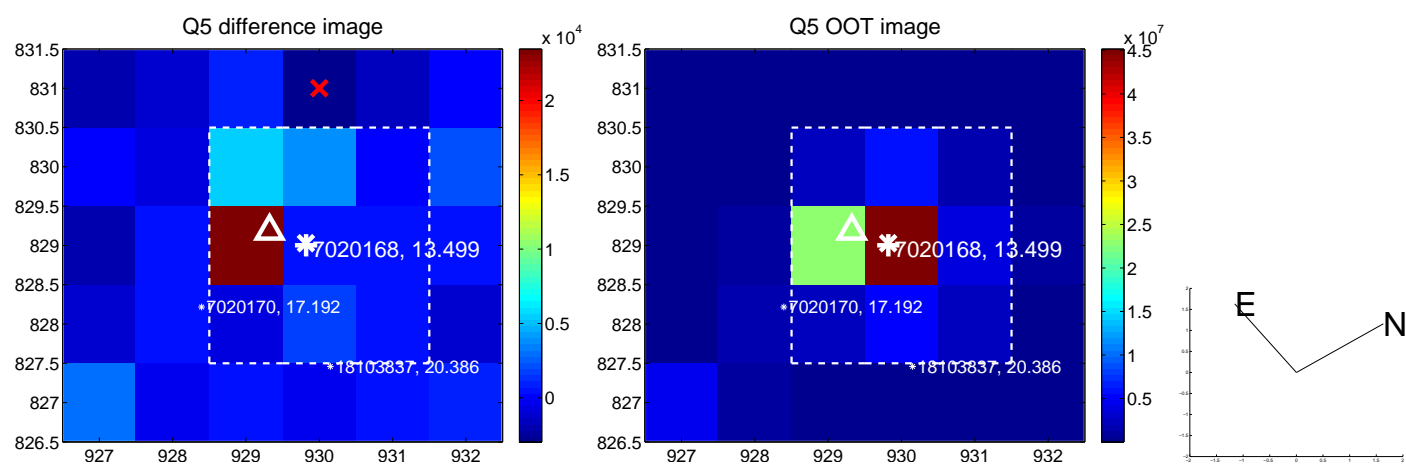


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

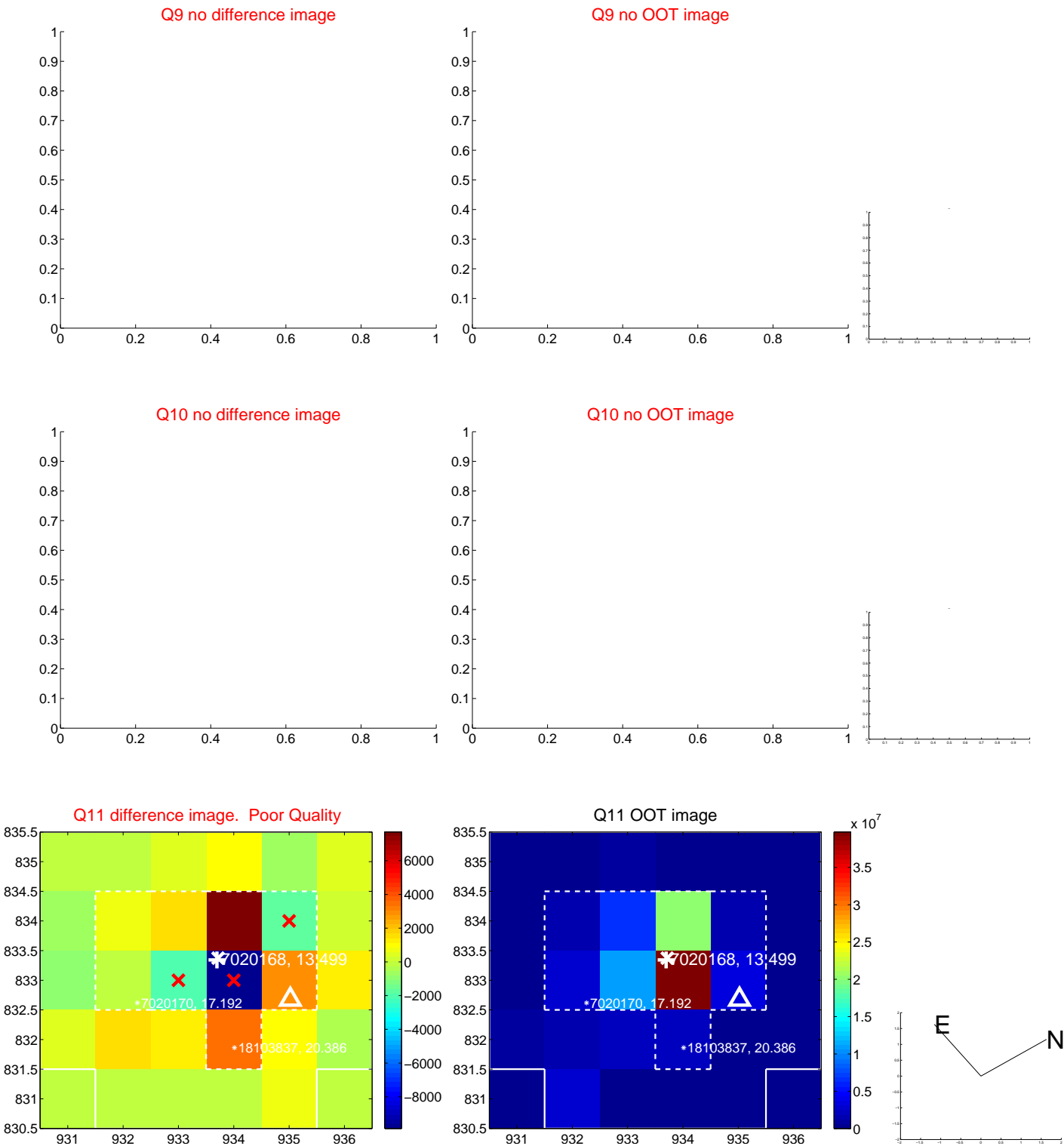
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



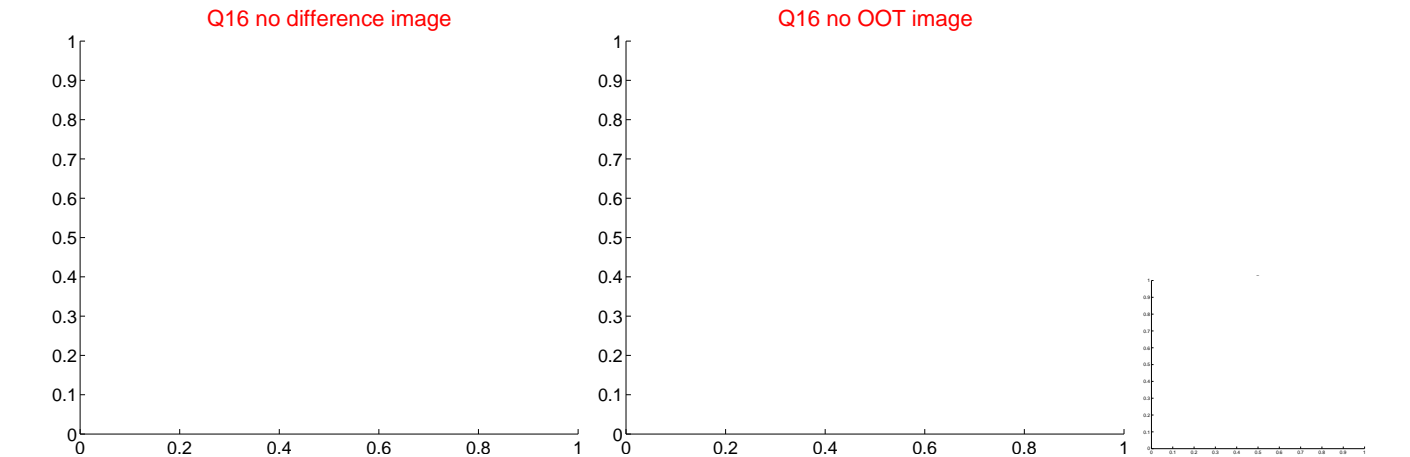
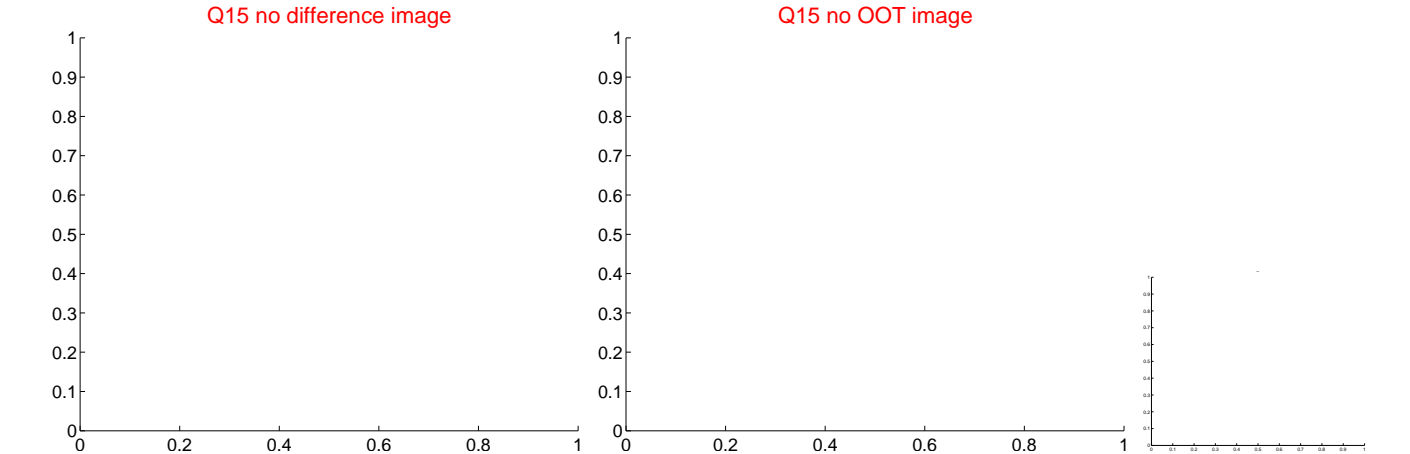
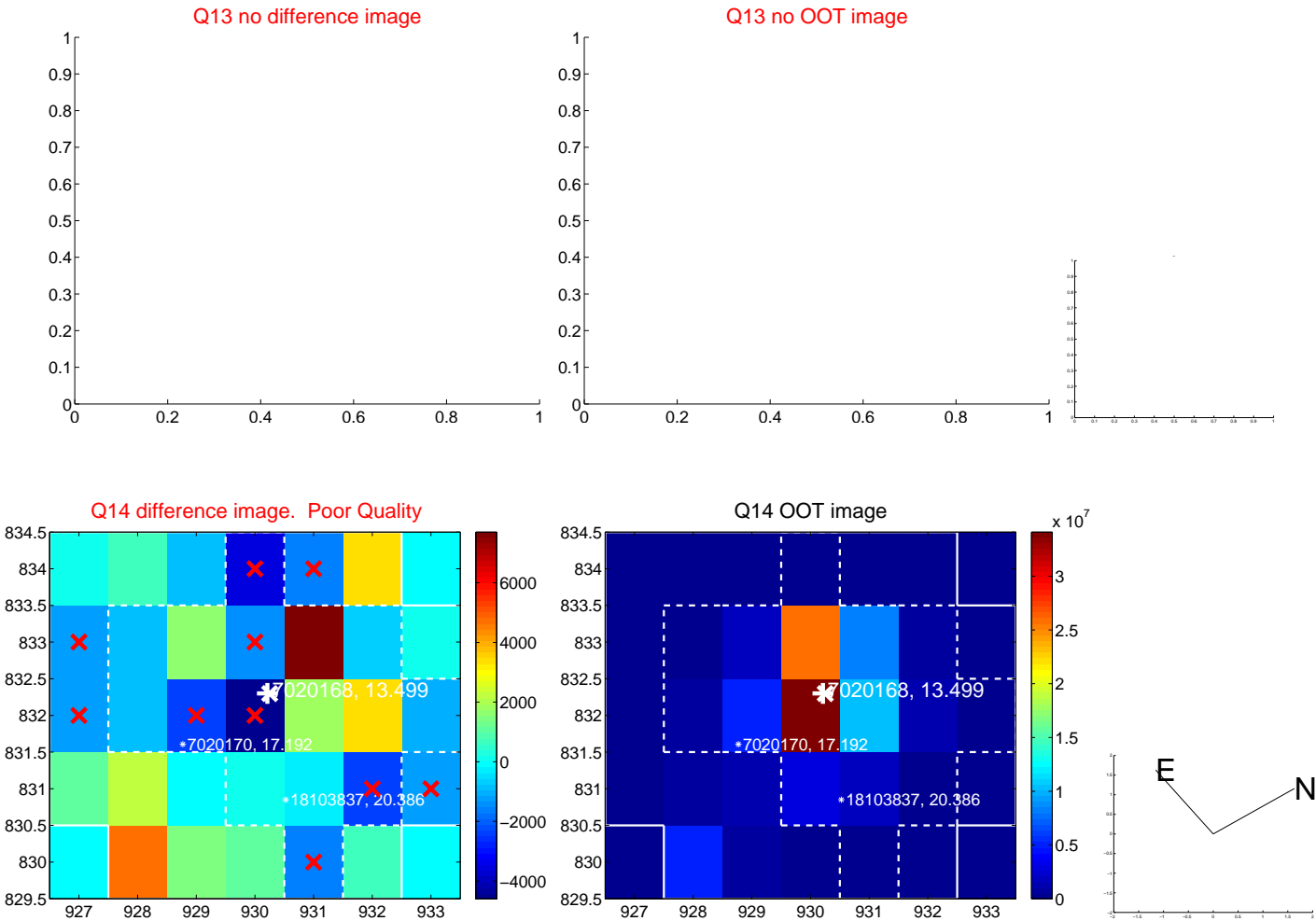
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



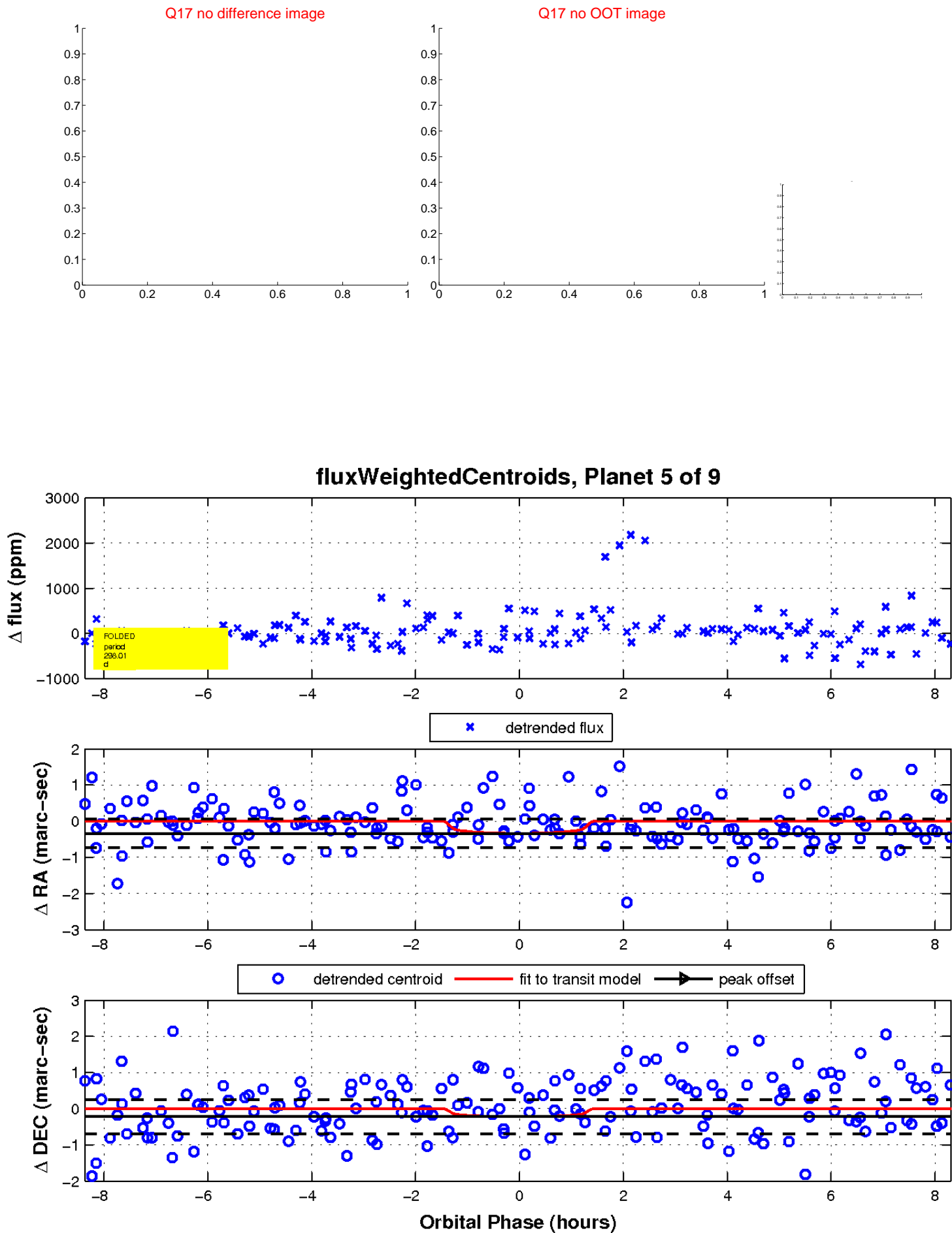
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

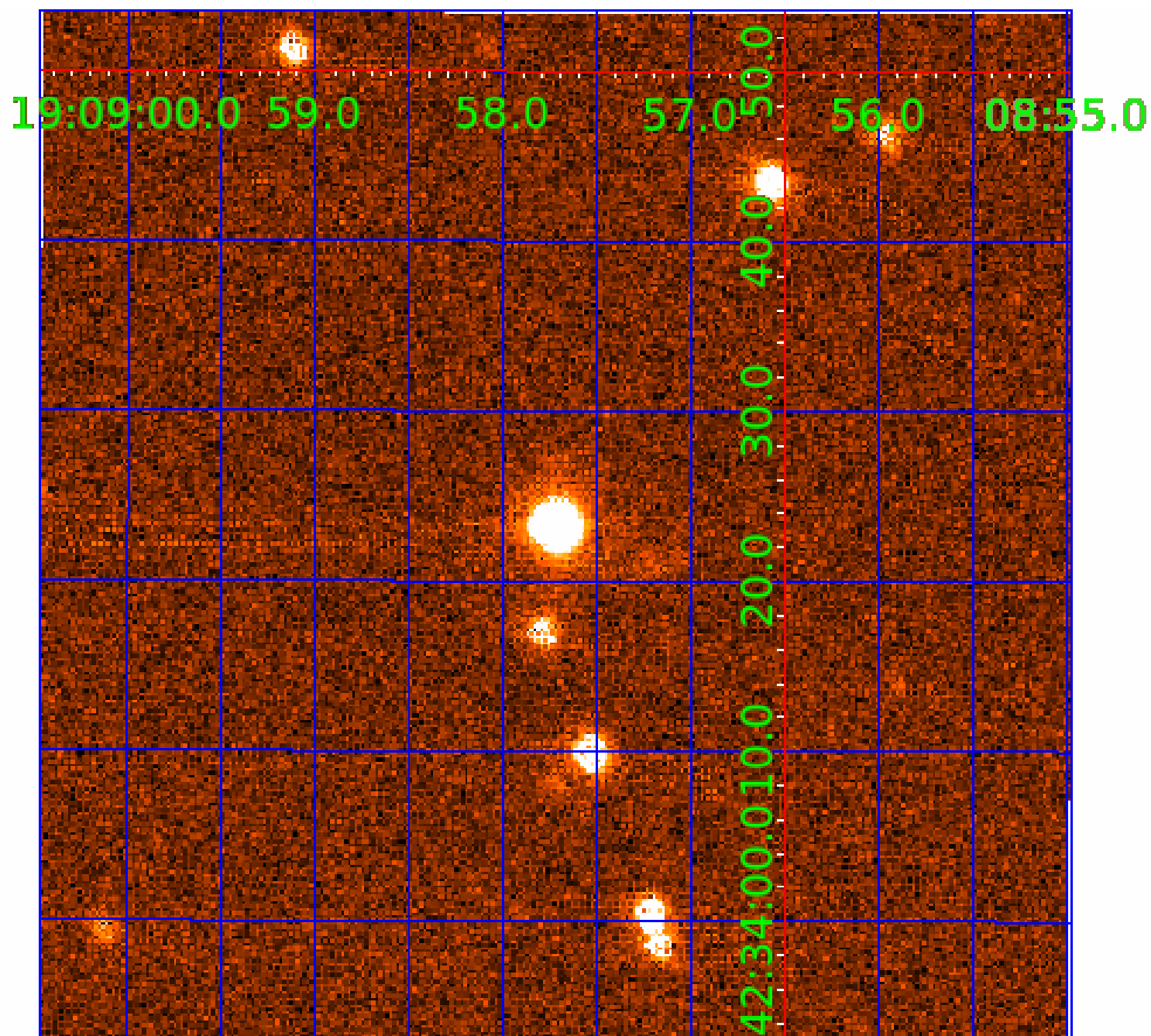


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

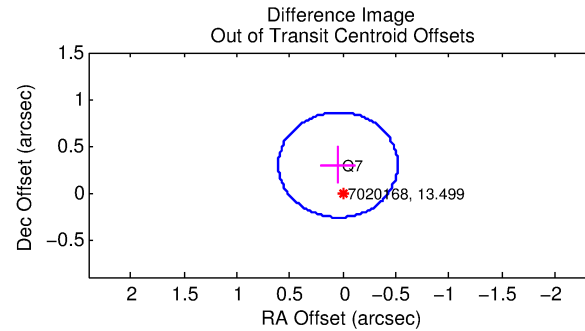
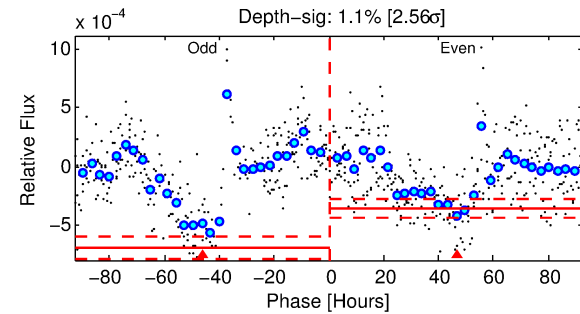
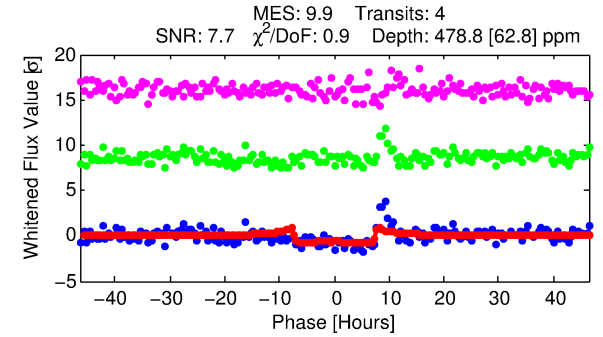
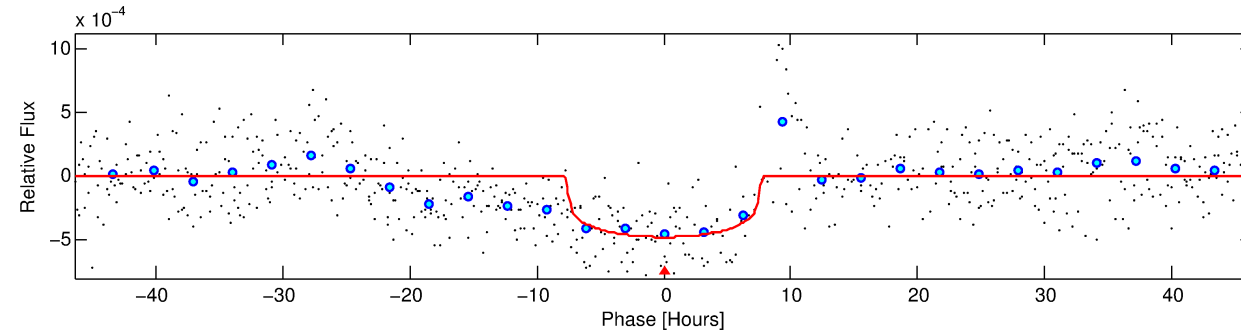
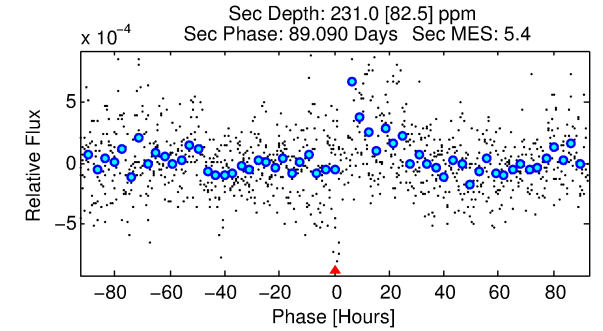
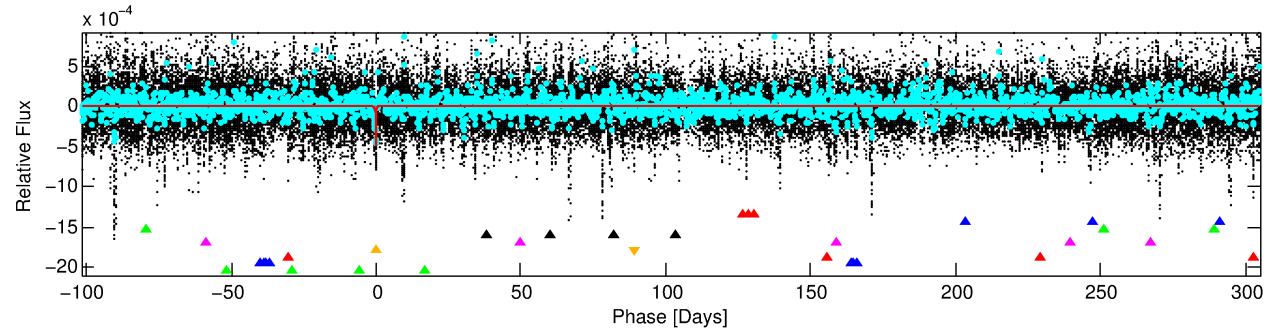
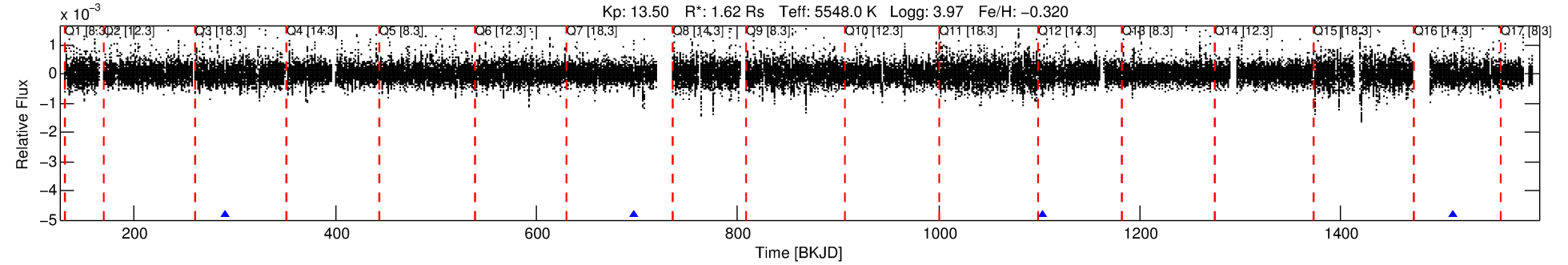
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-06

No Significant Match Found

DV One-Page Summary

KIC: 7020168 Candidate: 6 of 9 Period: 406.739 d



DV Fit Results:

Period = 406.73899 [0.00605] d
Epoch = 290.5055 [0.0125] BKJD
Rp/R* = 0.0206 [0.0067]
a/R* = 175.82 [239.28]
b = 0.52 [1.89]
Seff = 2.08 [1.84]
Teq = 306 [68] K
Rp = 3.62 [2.08] Re
a = 1.0332 [0.5322] AU
Ag = 10327.88 [11864.75] [0.87σ]
Teffp = 4771 [902] K [4.94σ]

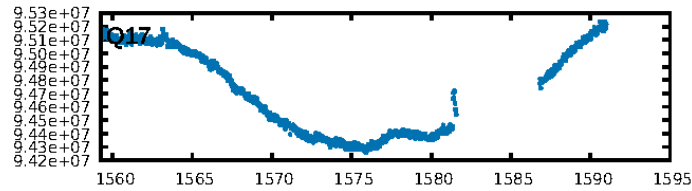
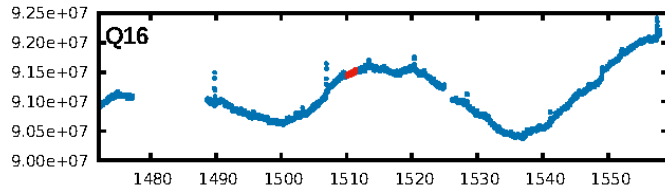
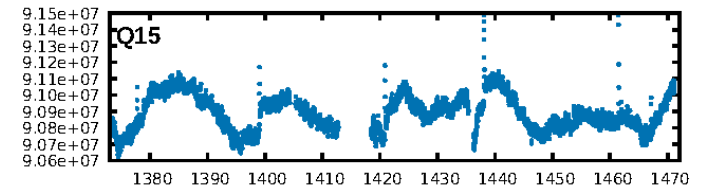
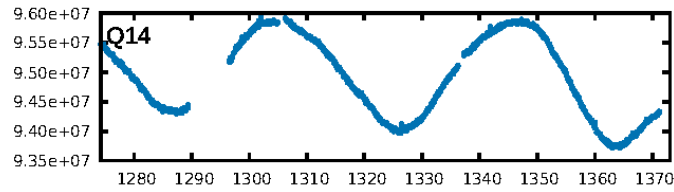
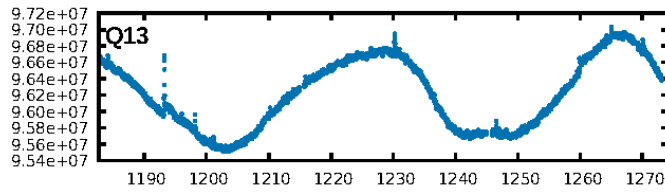
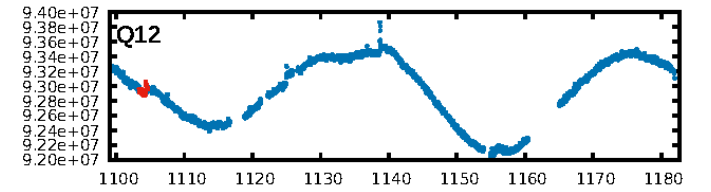
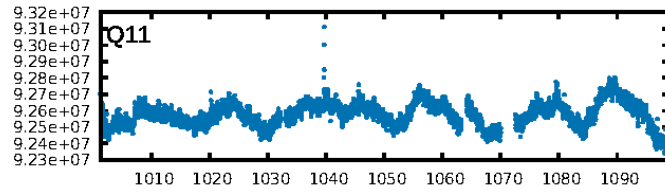
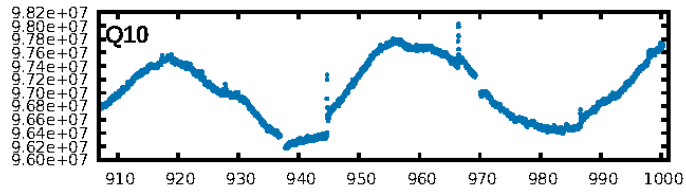
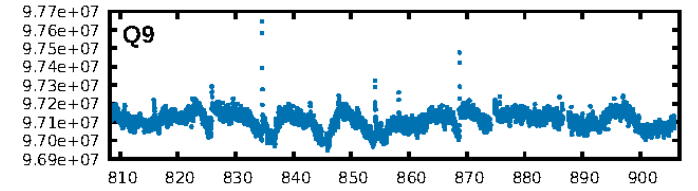
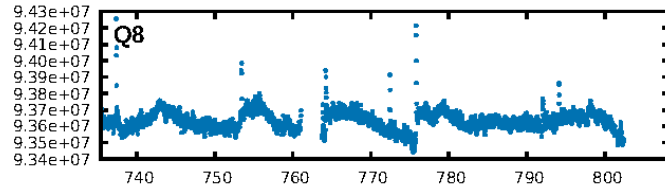
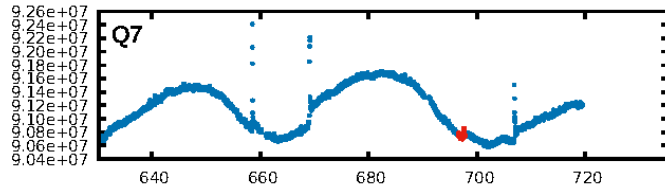
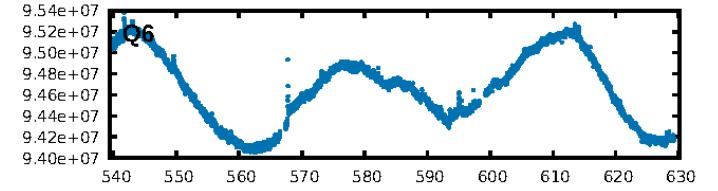
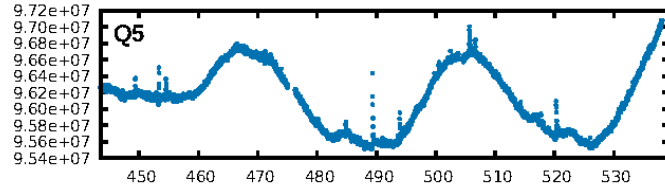
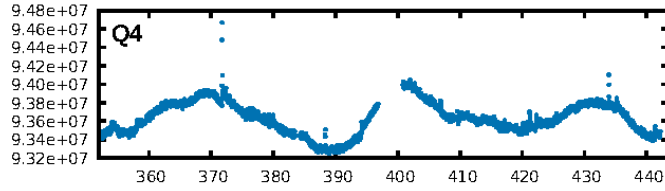
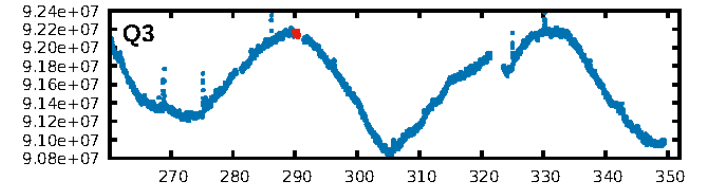
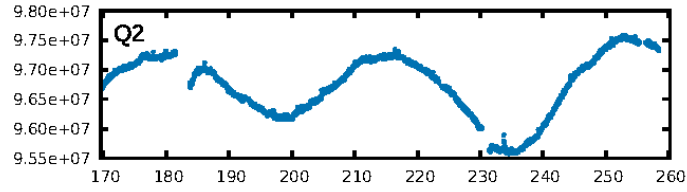
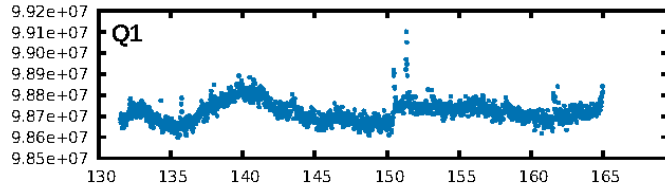
DV Diagnostic Results:

ShortPeriod-sig: 99.6% [2.87σ]
LongPeriod-sig: 100.0% [32.10σ]
ModelChiSquare2-sig: 4.2%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 7.388
Centroid-sig: 29.5%
Centroid-so: 0.500 arcsec [1.01σ]
OotOffset-rm: 0.300 arcsec [1.60σ]
OotOffset-st: 0/1/0/0 [1]
KicOffset-rm: 0.118 arcsec [0.63σ]
KicOffset-st: 0/1/0/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 1.00 [1/1]

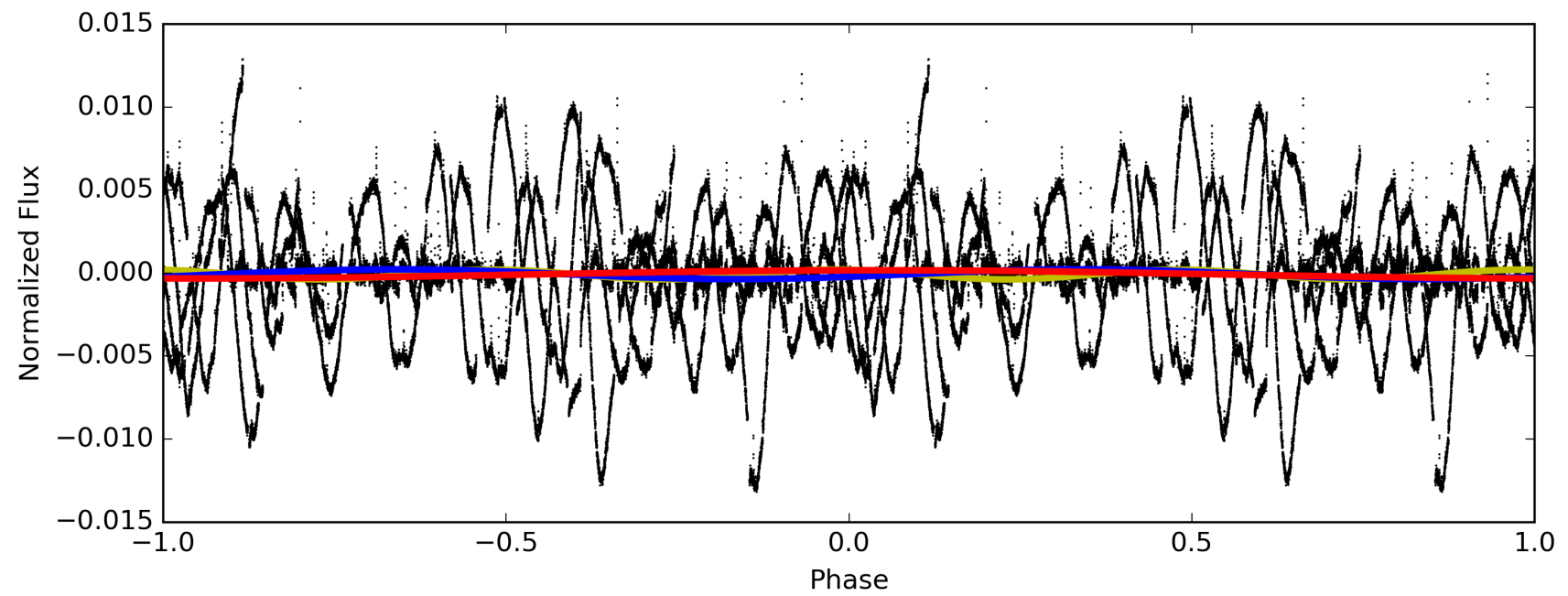
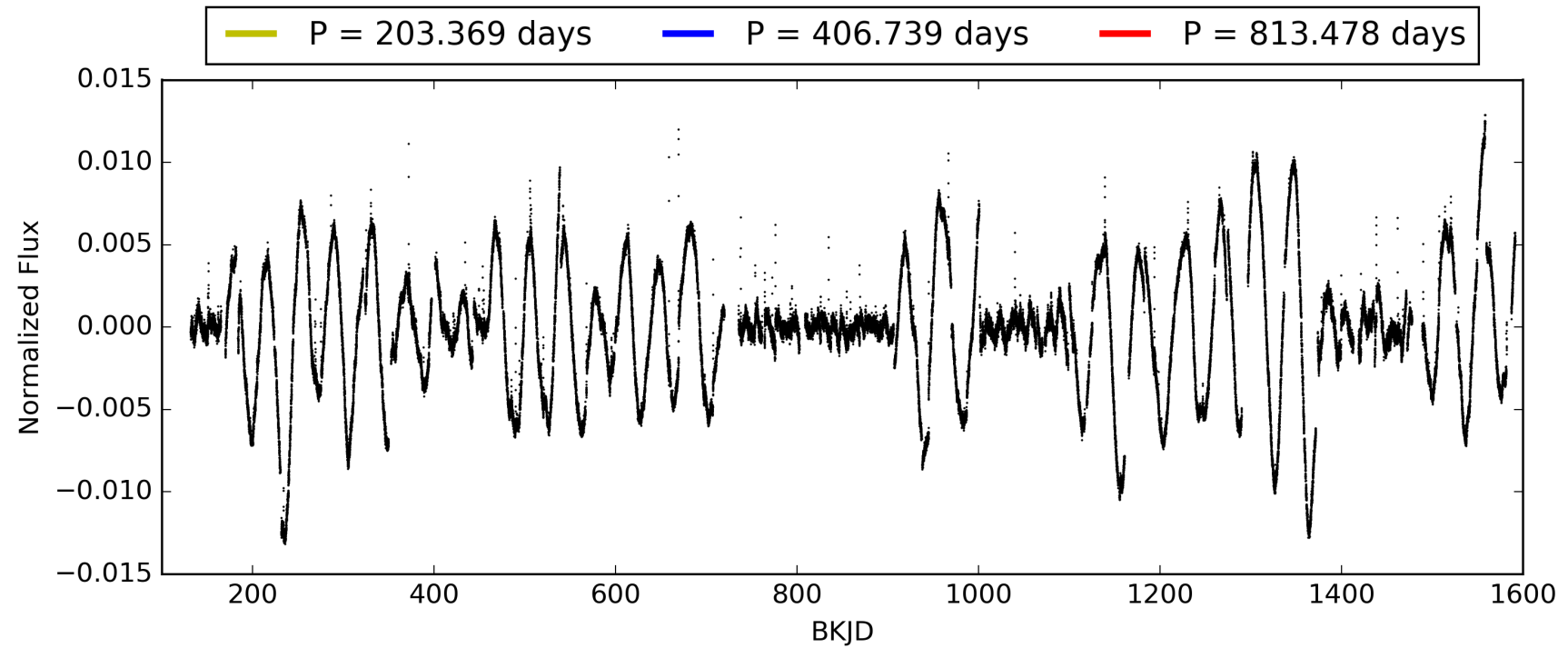
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:21:52 Z

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

TCE 007020168-06, PDC Light Curves

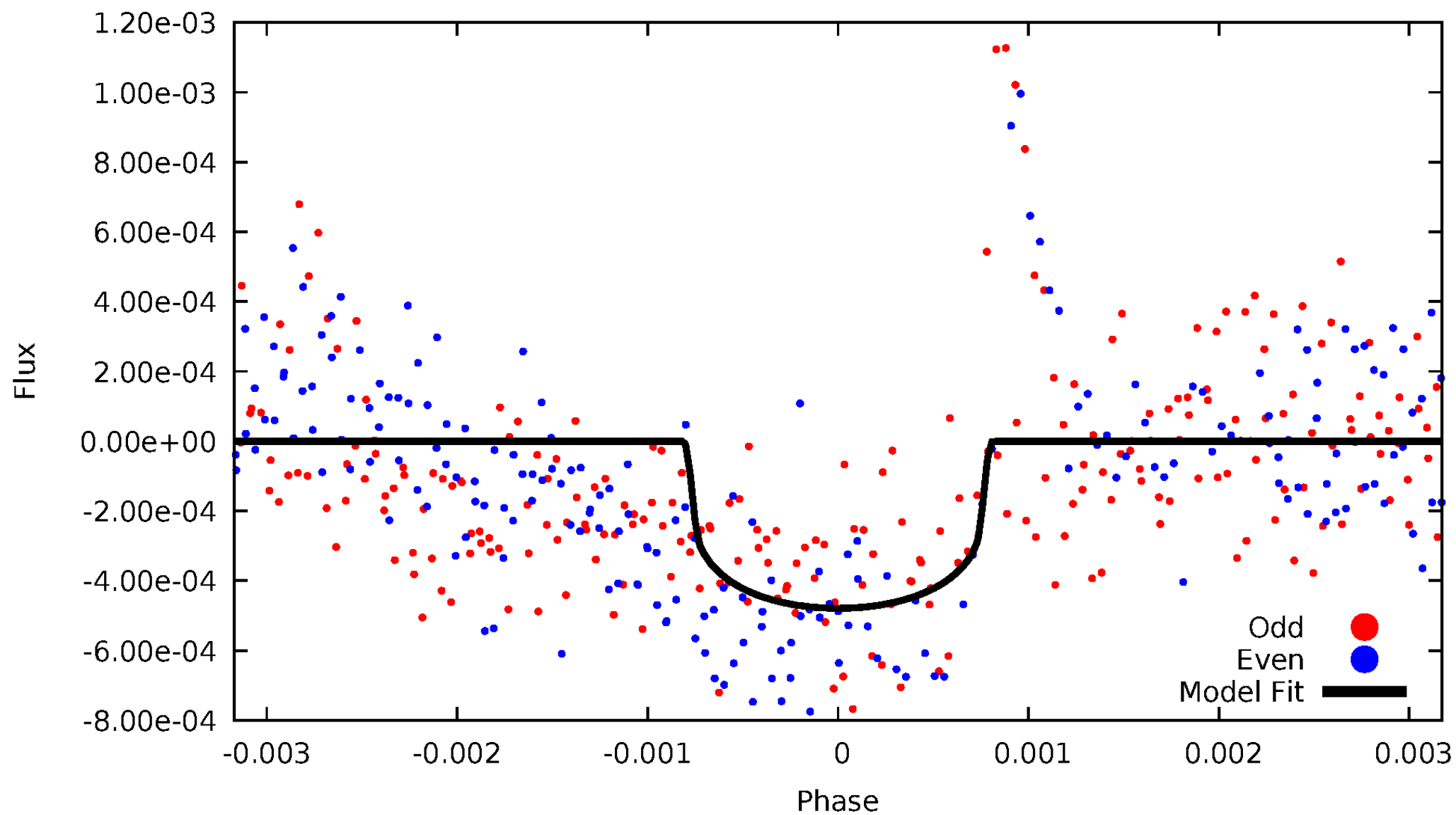


TCE 007020168-06



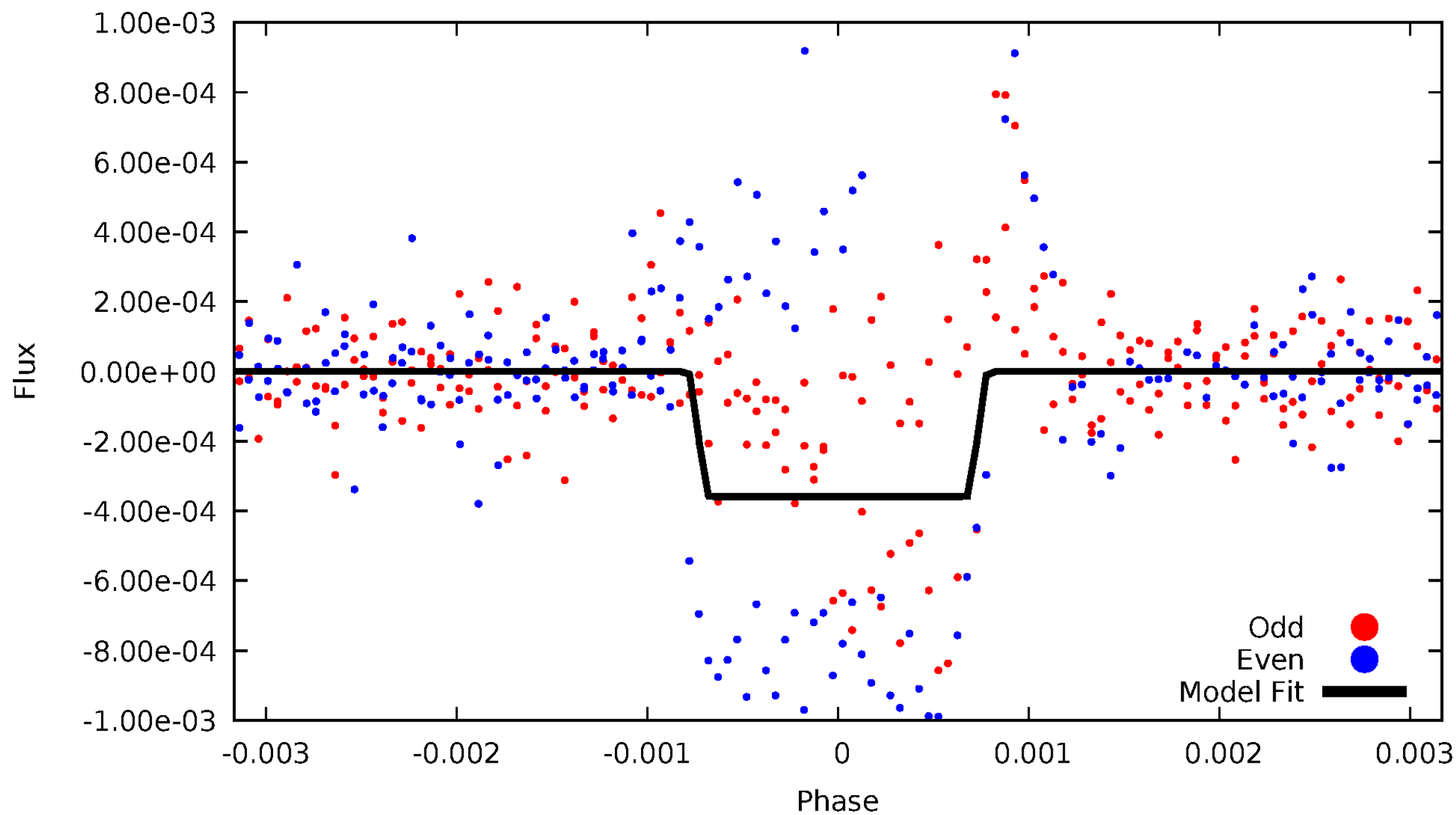
DV Odd/Even

TCE 007020168-06



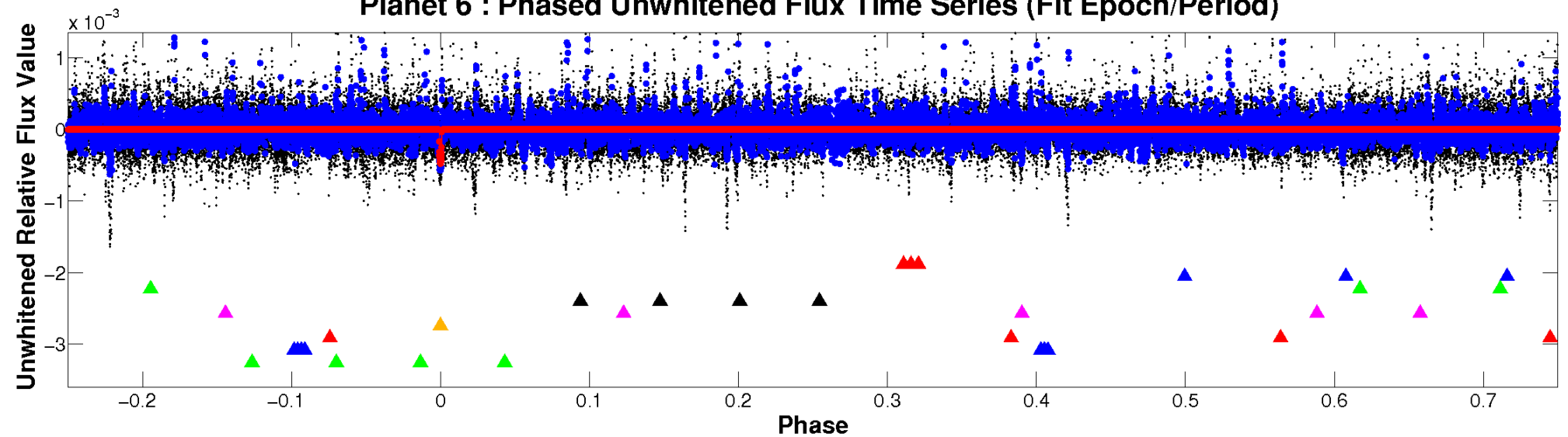
ALT Odd/Even

TCE 007020168-06

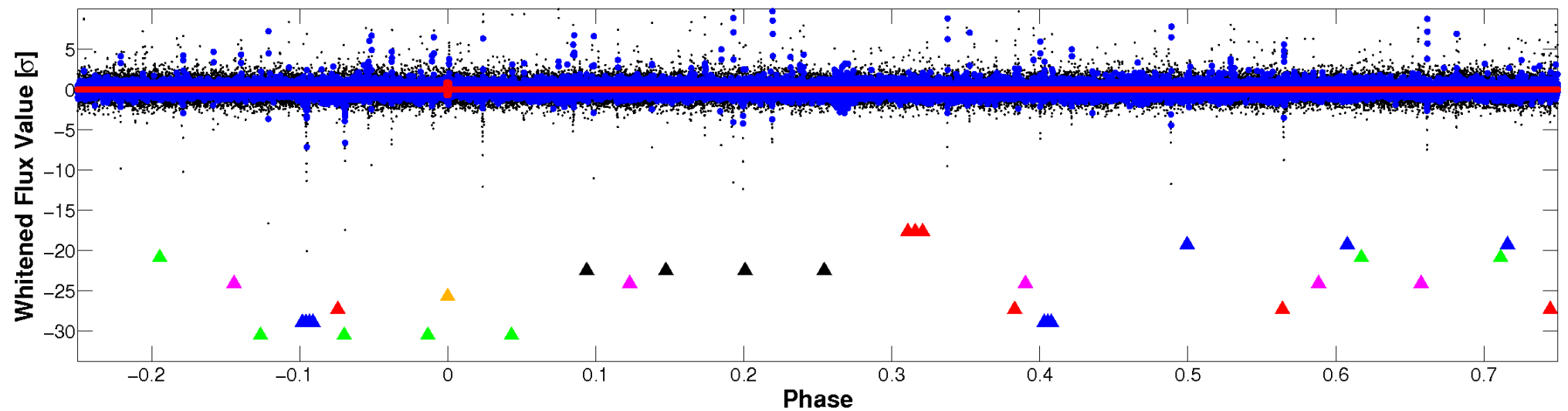


Non-Whitened Vs. Whitened Light Curve

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

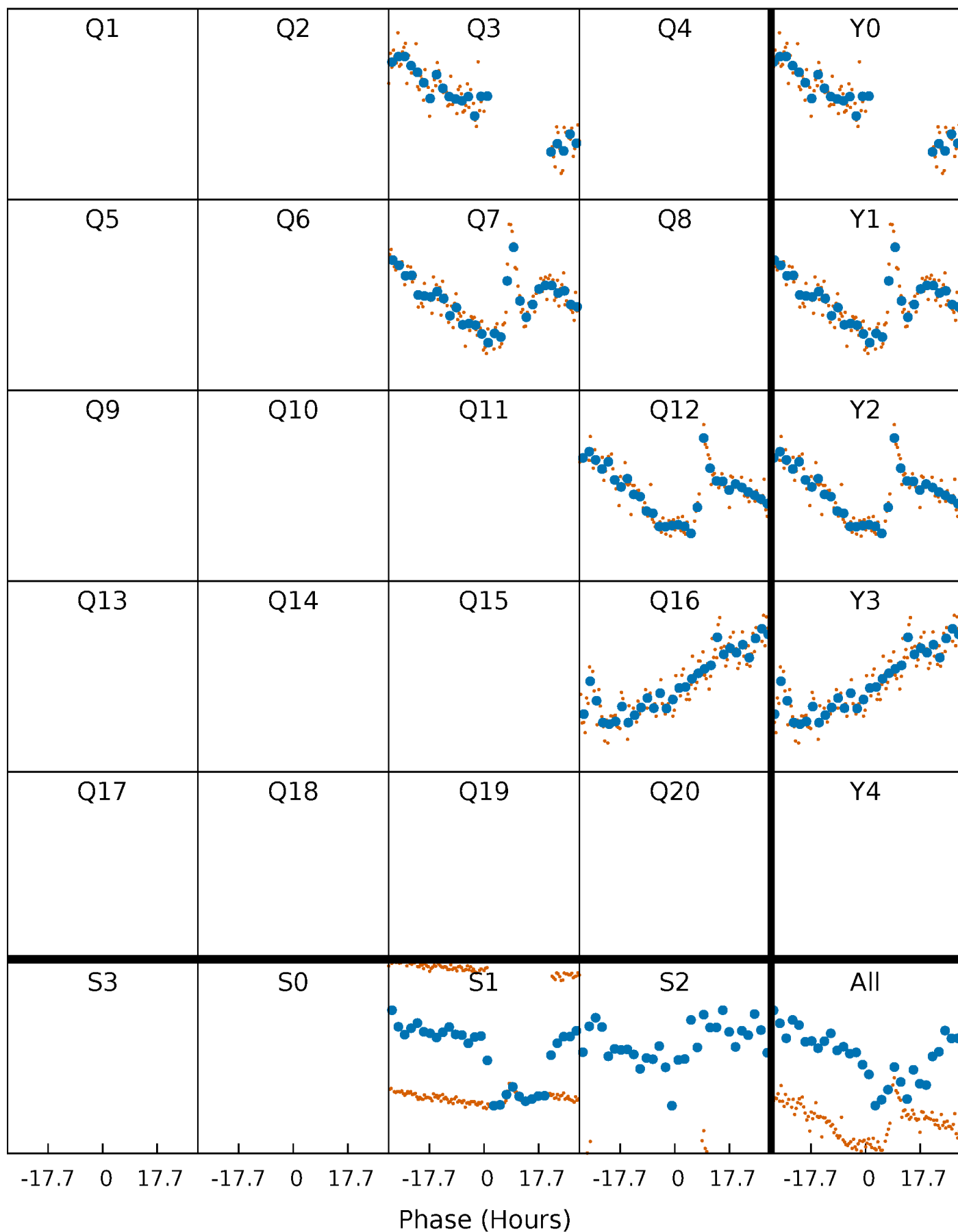


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



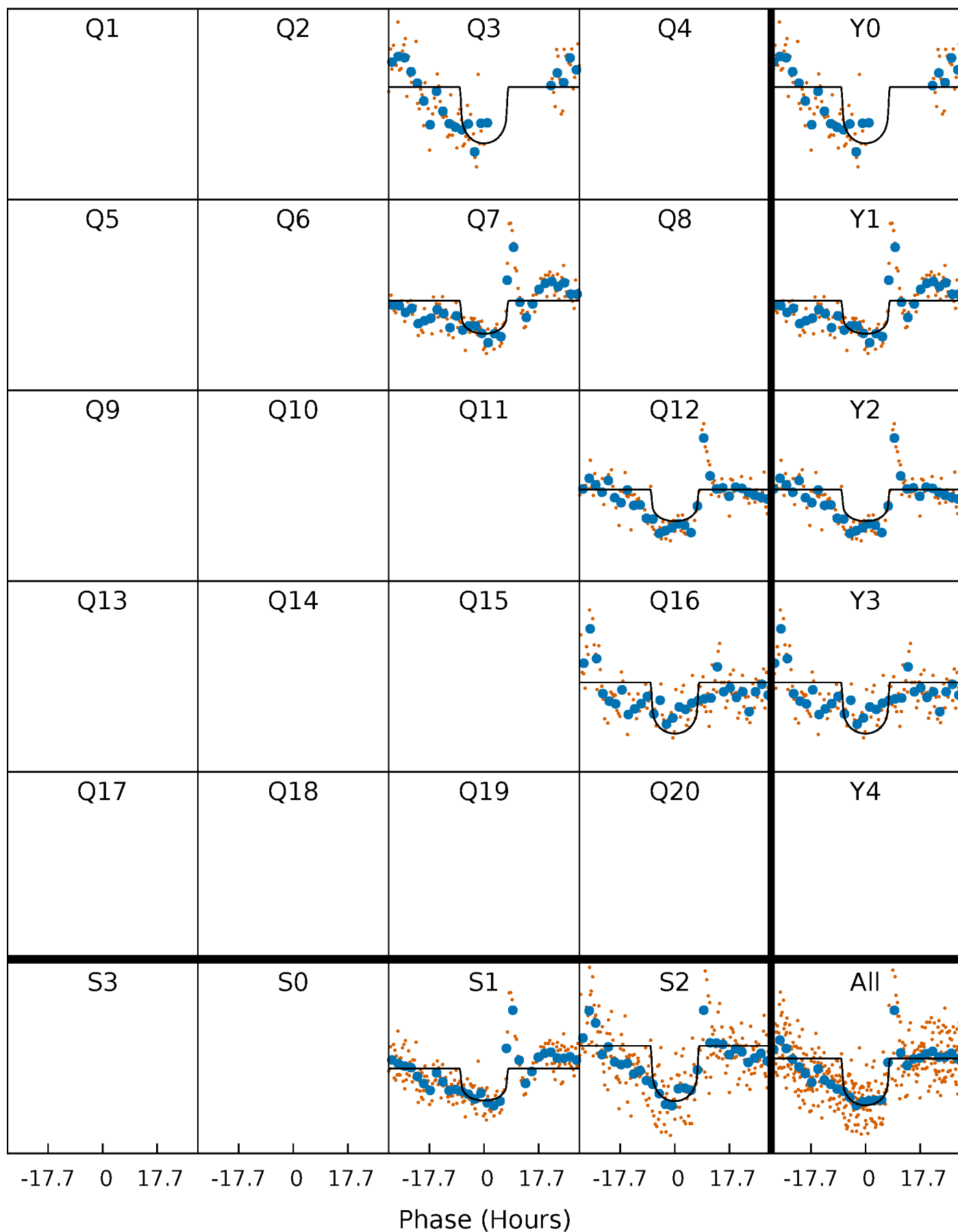
PDC Quarter-Phased Transit Curves

TCE 007020168-06 P=406.738989 Days $T_0=290.505478$ (BKJD)



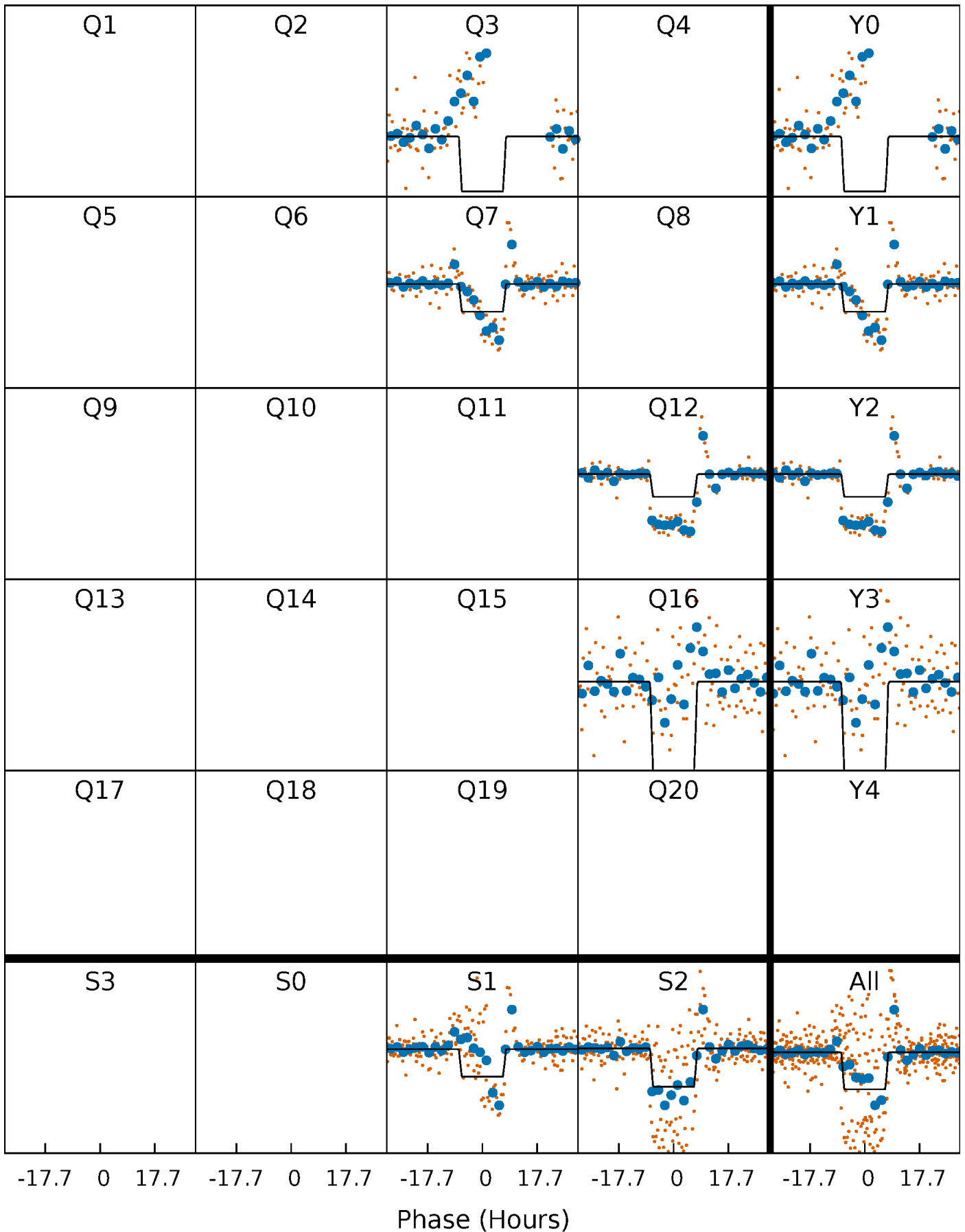
DV Quarter-Phased Transit Curves

TCE 007020168-06 P=406.738989 Days $T_0=290.505478$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

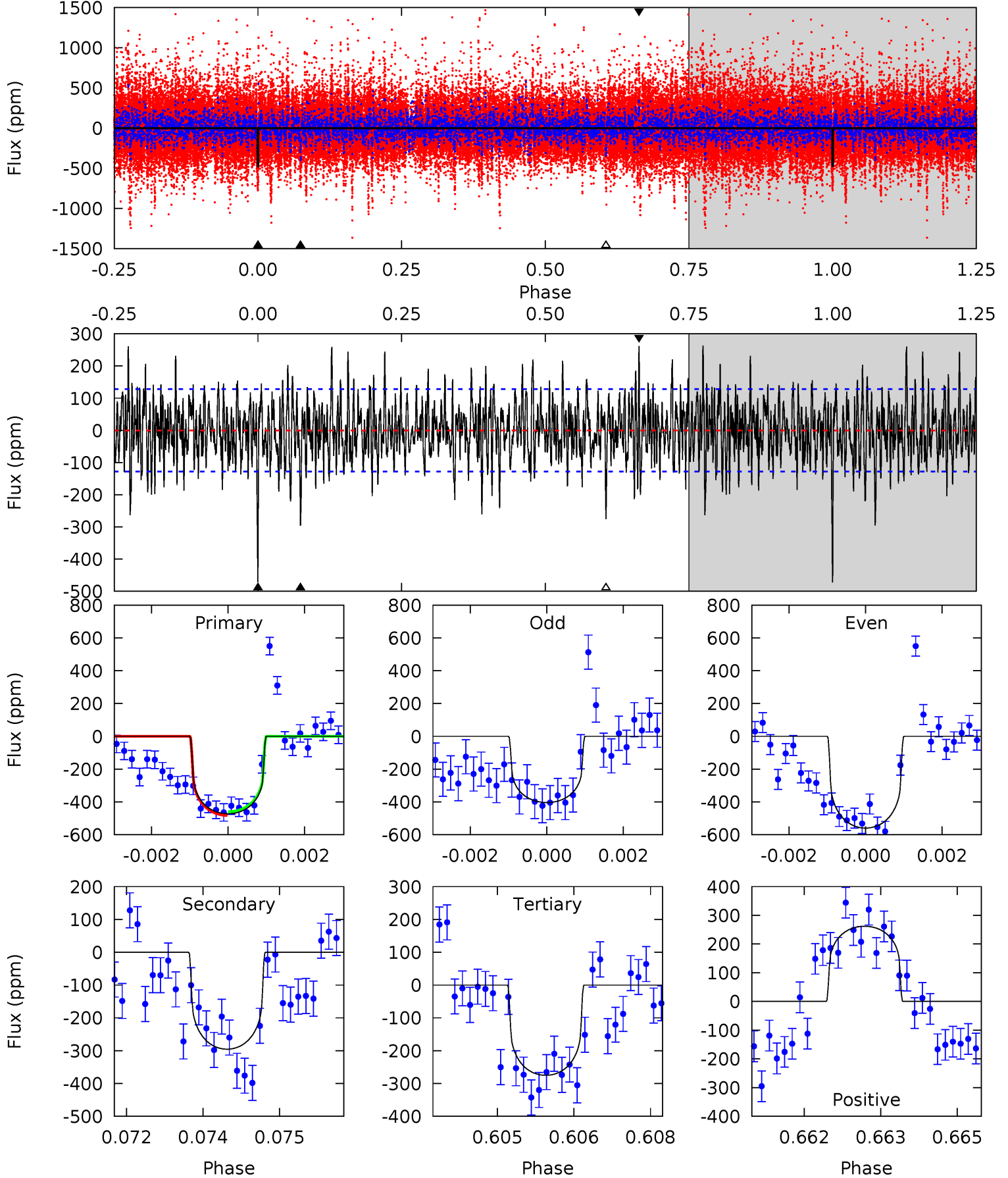
TCE 007020168-06 P=406.750445 Days $T_0=290.495385$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-06, P = 406.738989 Days, E = 290.505478 Days

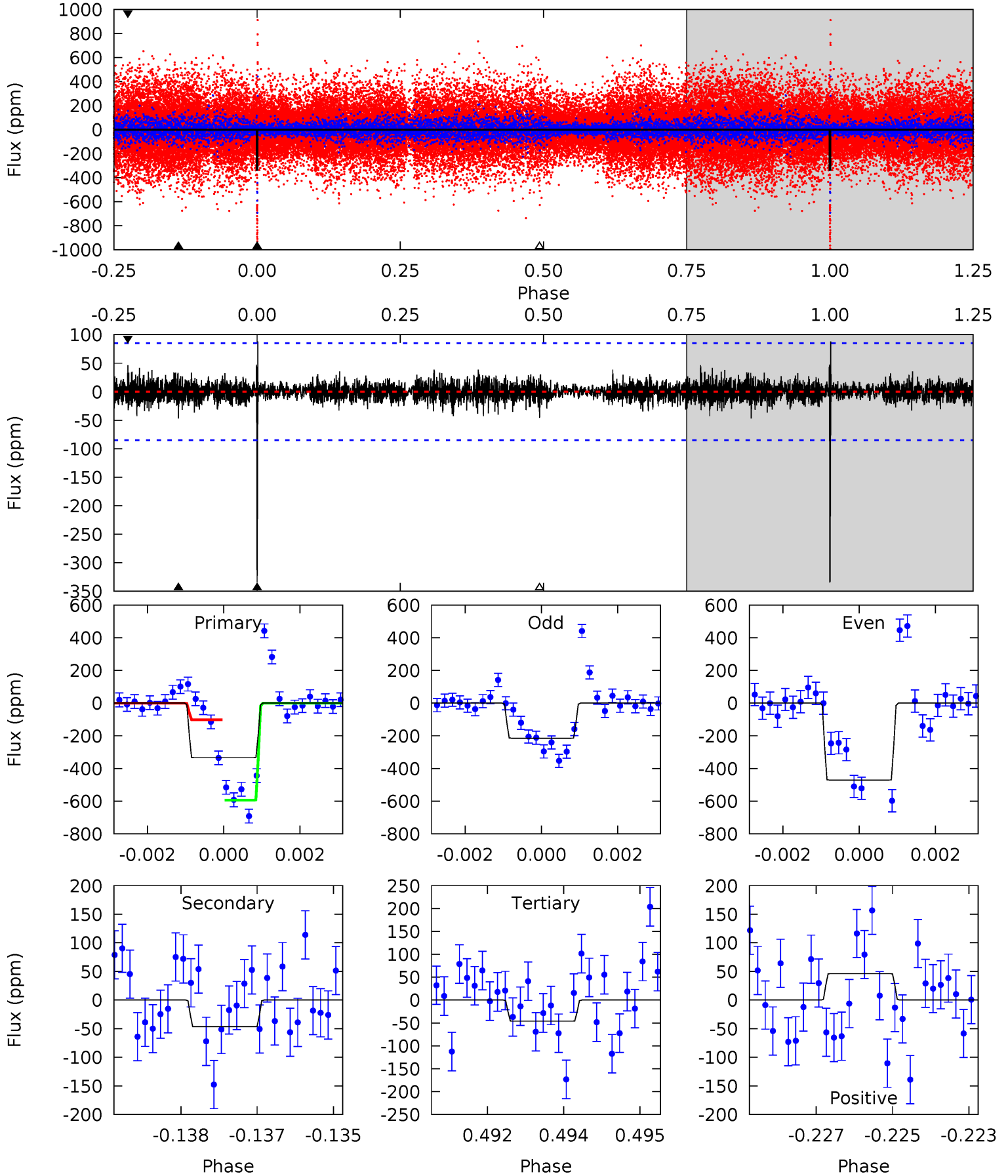
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.8	12.4	11.5	11.0	5.36	3.15	3.30	8.27	8.81	0.85	1.40	2.83	1.00	0.36	0.48



Alt Model-Shift Uniqueness Test

007020168-06, P = 406.750445 Days, E = 290.495385 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.1	2.95	2.91	2.91	5.37	3.15	0.64	18.2	18.2	0.04	0.04	8.78	1.02	0.21	15.5



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-295 ± 24	$3.28^{+1.52}_{-1.20}$	421^{+48}_{-55}	5197^{+980}_{-604}	15940^{+22829}_{-8479}
Alt.	-47 ± 16	$3.18^{+1.43}_{-1.29}$	423^{+42}_{-56}	3720^{+616}_{-421}	2734^{+5147}_{-1587}

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 $A_{\text{obs}} \gg 1.0$

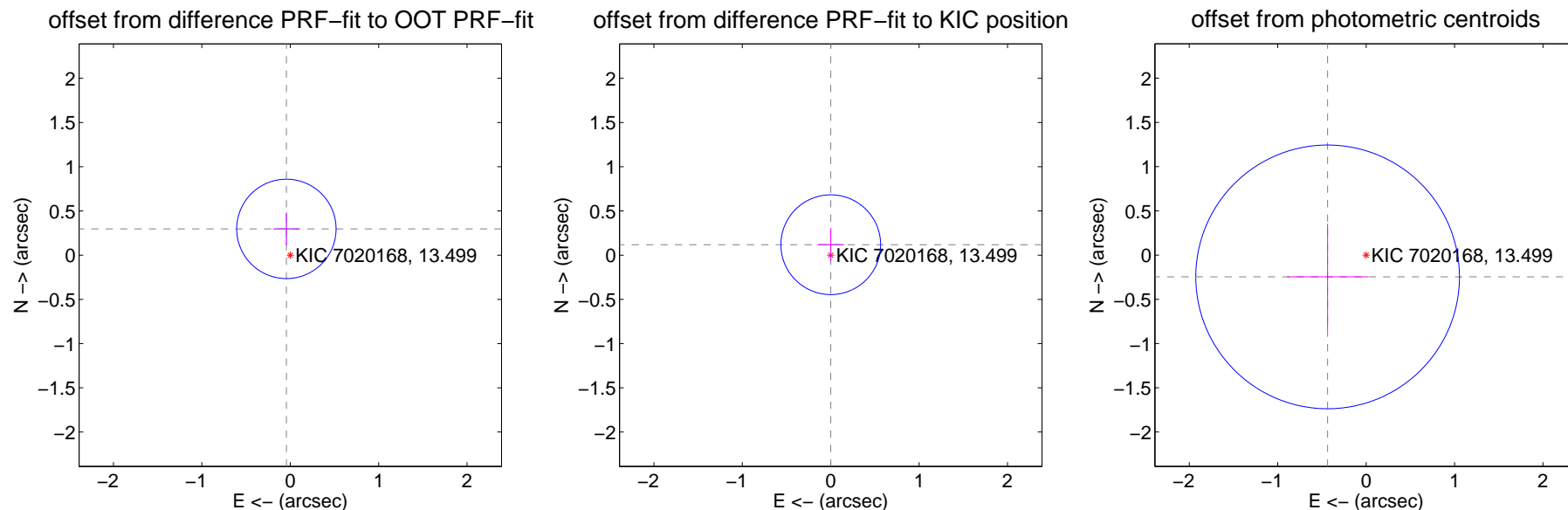
DV Centroid Data

Supplemental centroid analysis for 007020168-06. Kepler magnitude: 13.50. Transit SNR 7.69

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.300 ± 0.187	1.60	0.044 ± 0.151	0.297 ± 0.188
PRF-fit source offset from KIC position	0.118 ± 0.188	0.63	-0.001 ± 0.151	0.118 ± 0.188
photometric centroid source offset	0.50 ± 0.50	1.01	0.44 ± 0.46	-0.25 ± 0.60

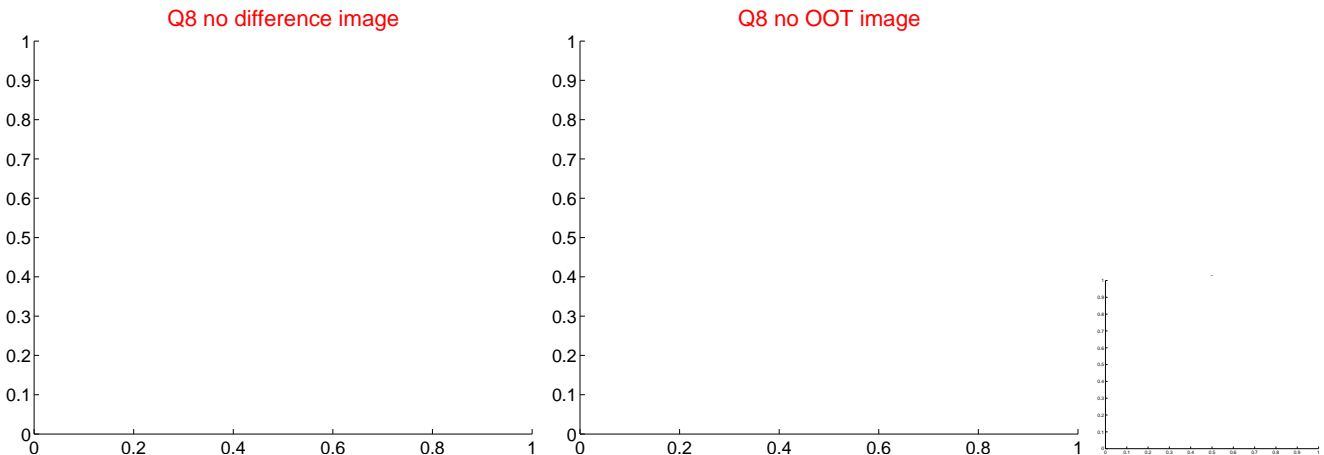
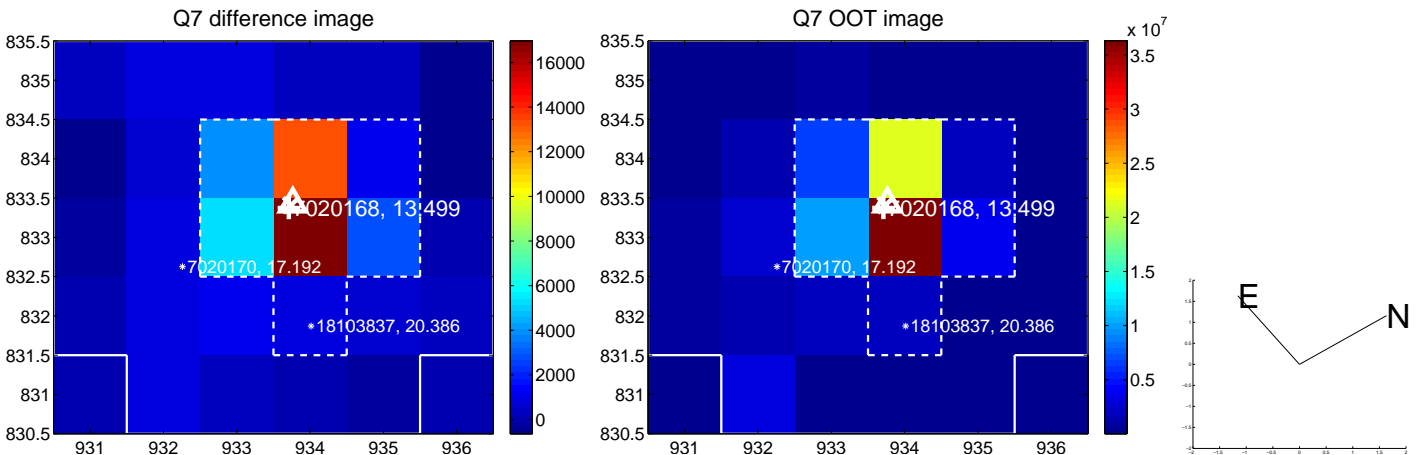
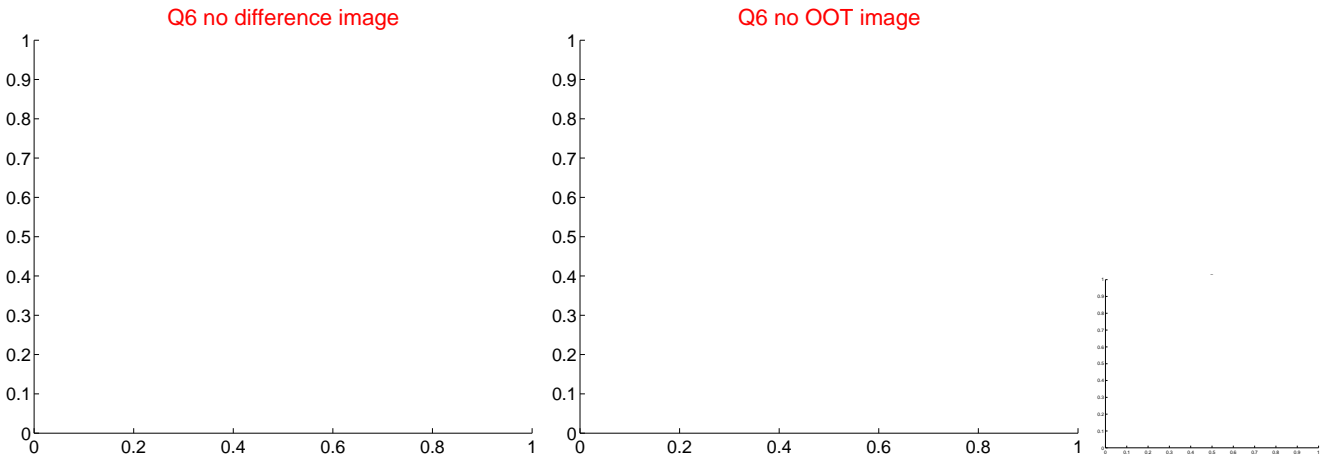
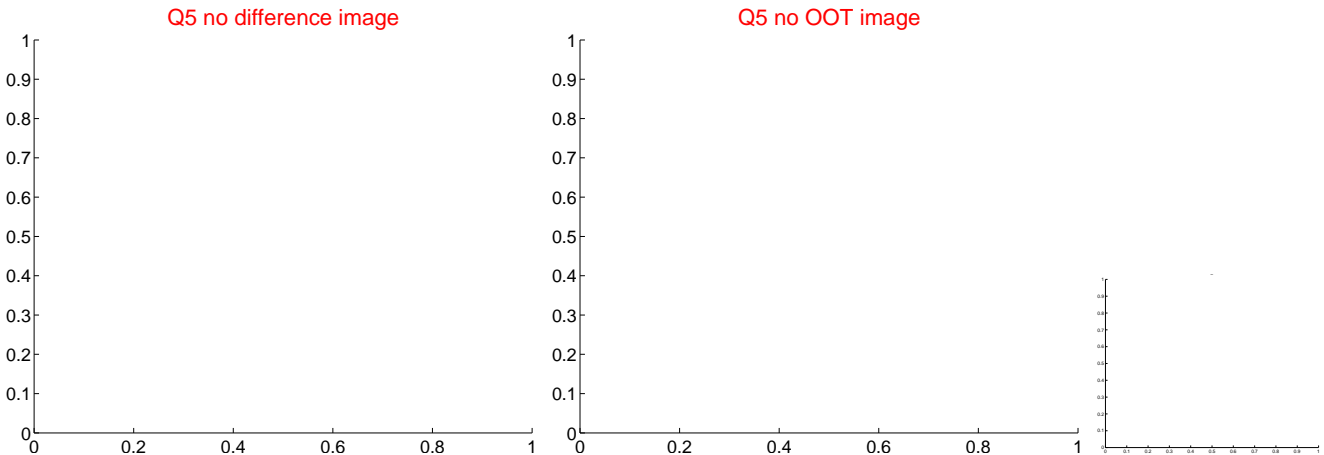


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



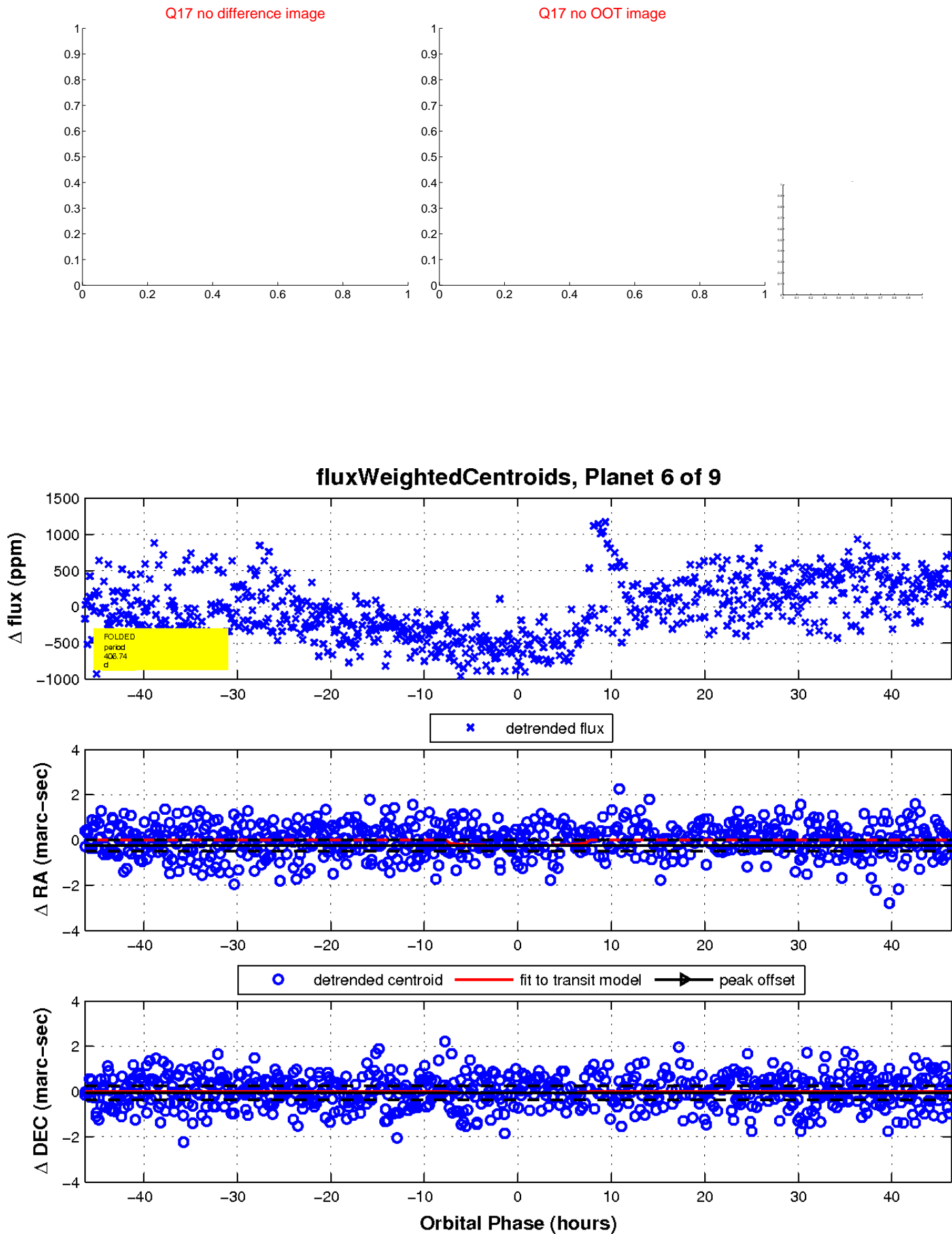
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

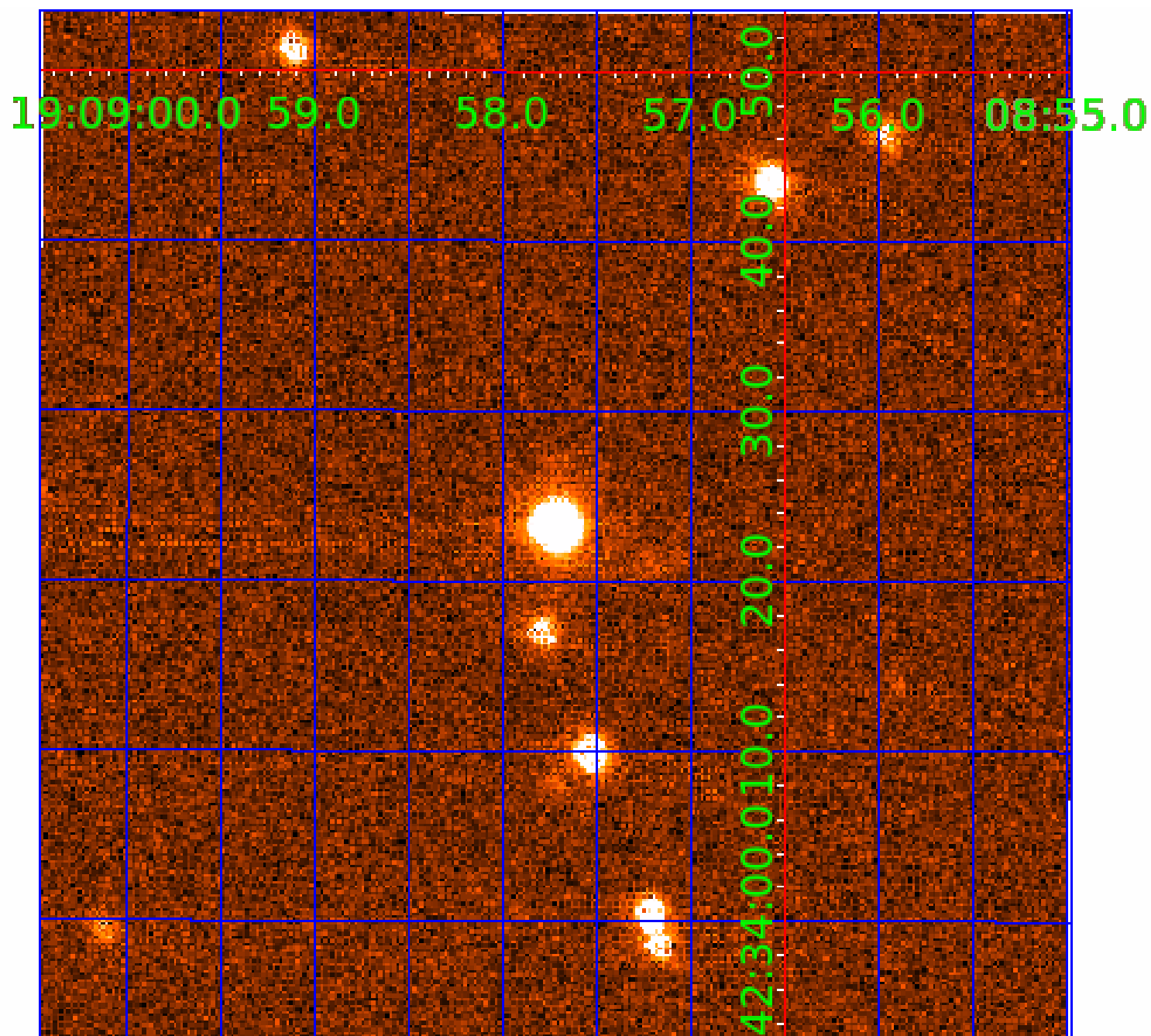


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

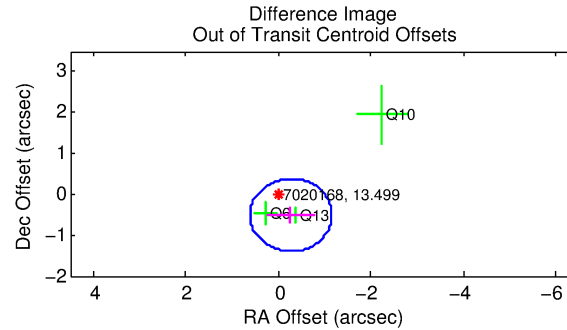
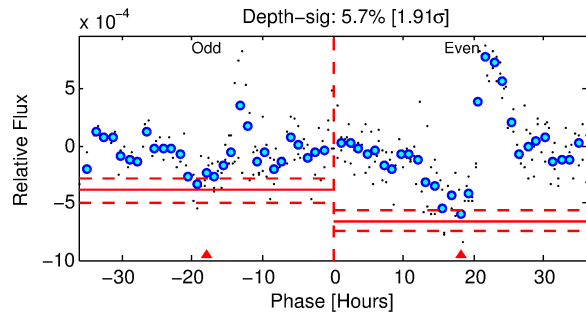
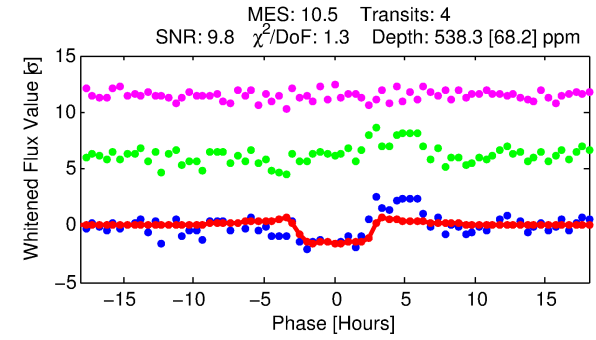
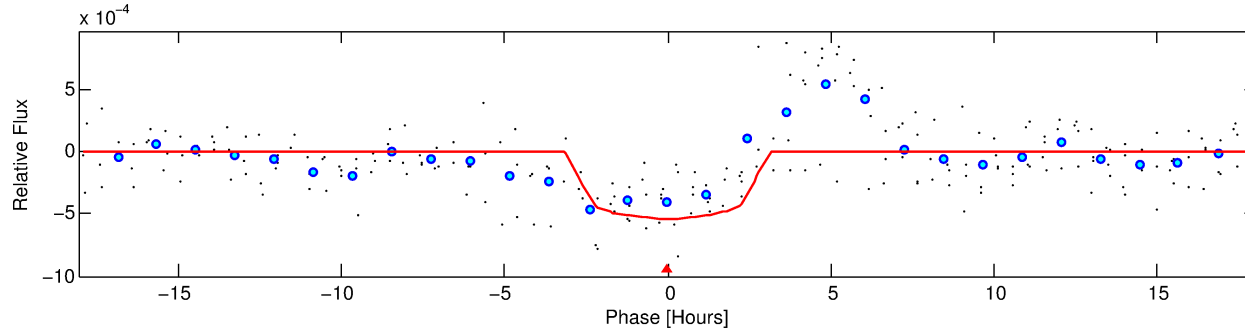
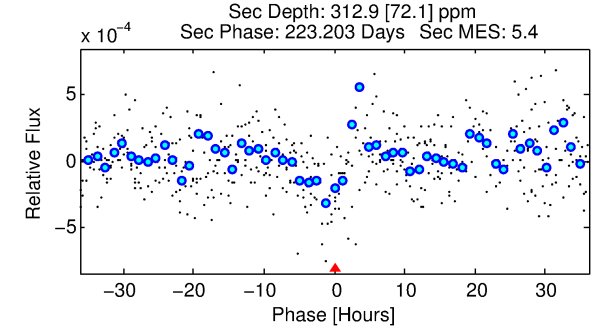
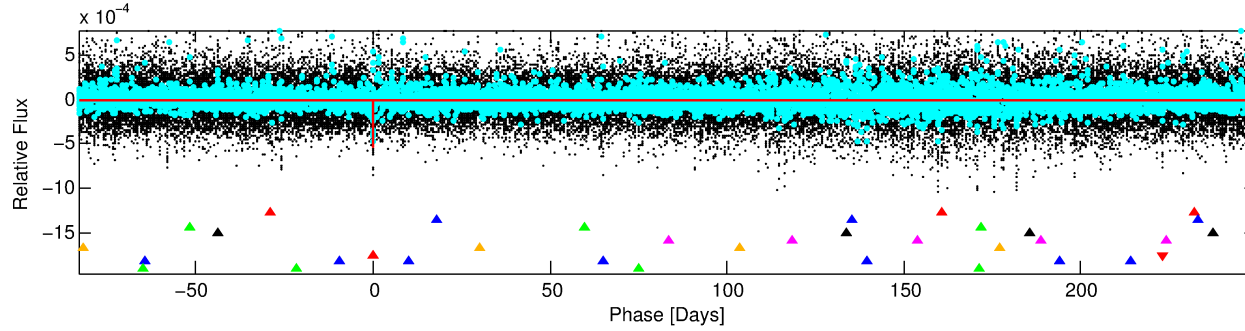
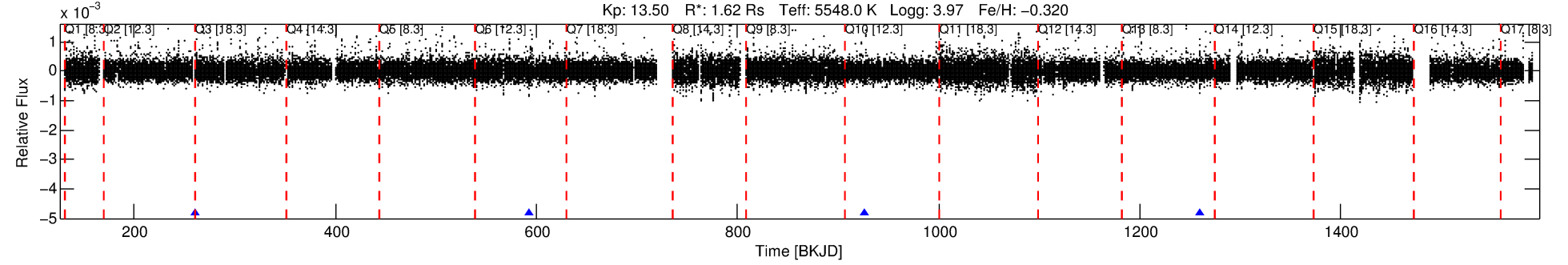
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-07

No Significant Match Found

DV One-Page Summary

KIC: 7020168 Candidate: 7 of 9 Period: 333.151 d



DV Fit Results:

Period = 333.15067 [0.00607] d
Epoch = 260.3134 [0.0144] BKJD
Rp/R* = 0.0245 [0.0174]
a/R* = 234.50 [763.95]
b = 0.86 [0.98]
Seff = 2.71 [2.40]
Teq = 327 [72] K
Rp = 4.32 [3.68] Re
a = 0.9045 [0.4659] AU
Ag = 7548.31 [12695.85] [0.59σ]
Teffp = 4715 [1700] K [2.58σ]

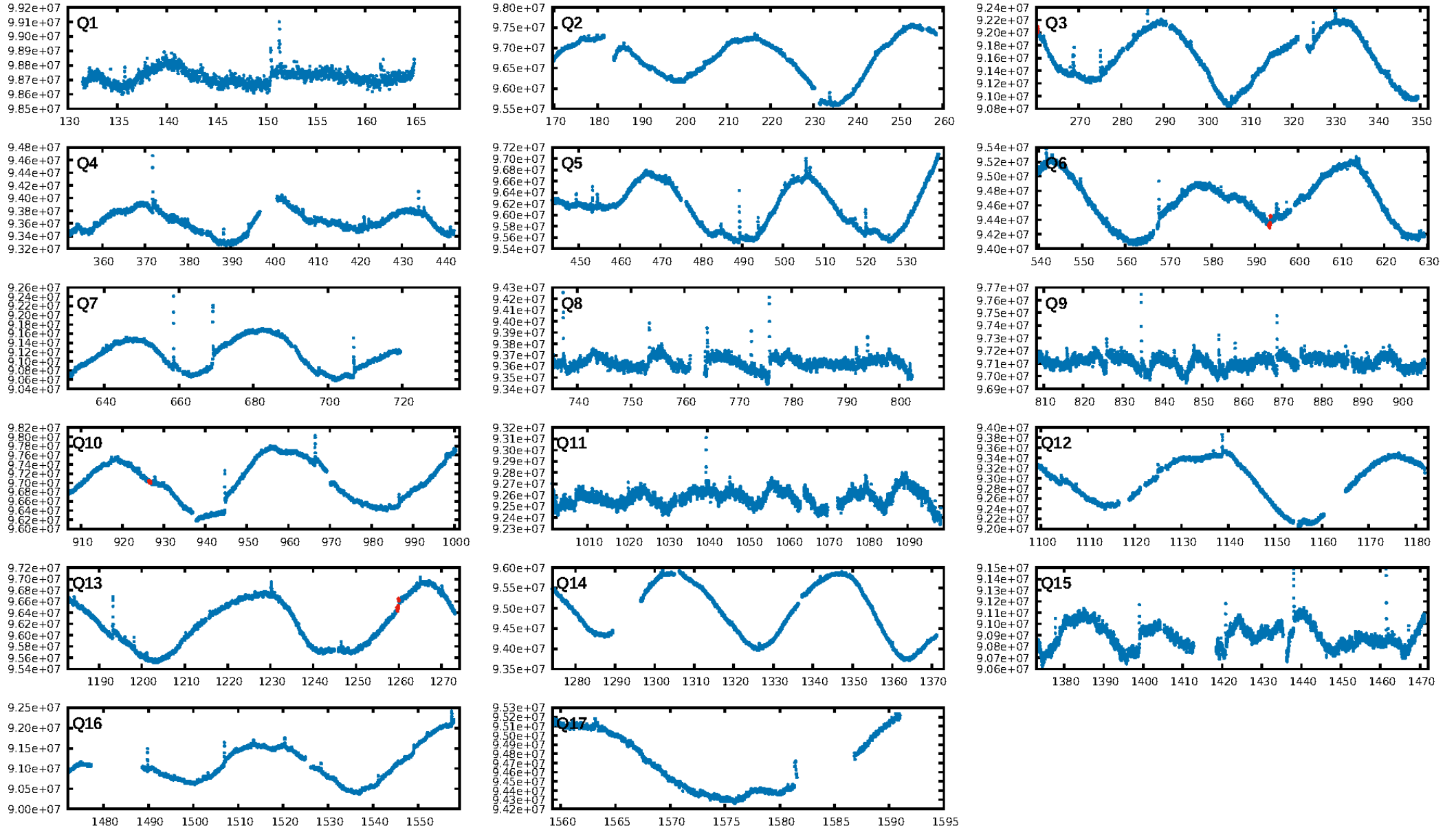
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [127.00σ]
LongPeriod-sig: 100.0% [124.70σ]
ModelChiSquare2-sig: 9.8%
ModelChiSquareGof-sig: 99.4%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -5.016
Centroid-sig: 76.8%
Centroid-so: 0.679 arcsec [0.92σ]
OotOffset-rm: 0.574 arcsec [1.94σ]
OotOffset-st: 2/0/0/1 [3]
KicOffset-rm: 0.635 arcsec [1.90σ]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

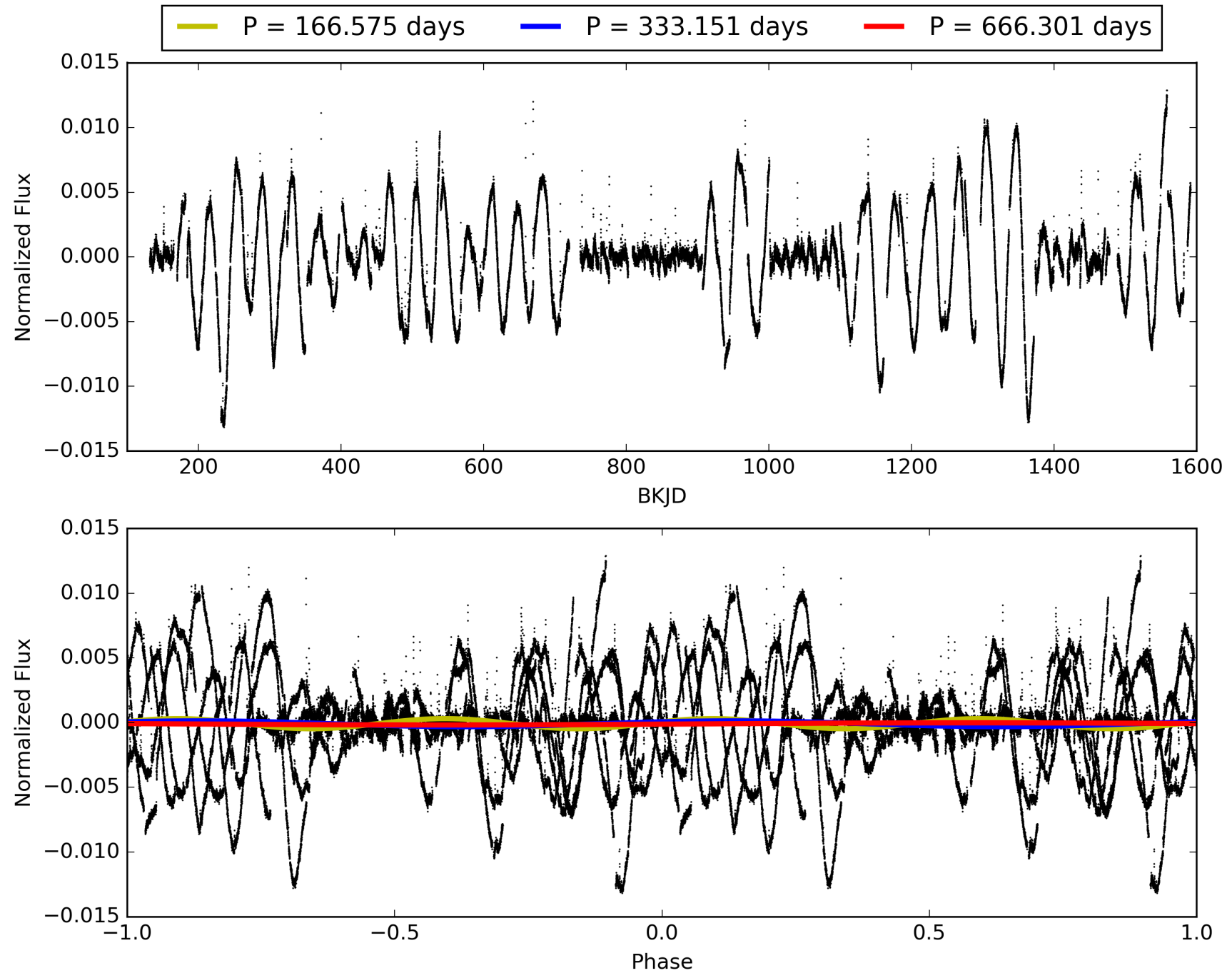
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:22:03 Z

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

TCE 007020168-07, PDC Light Curves

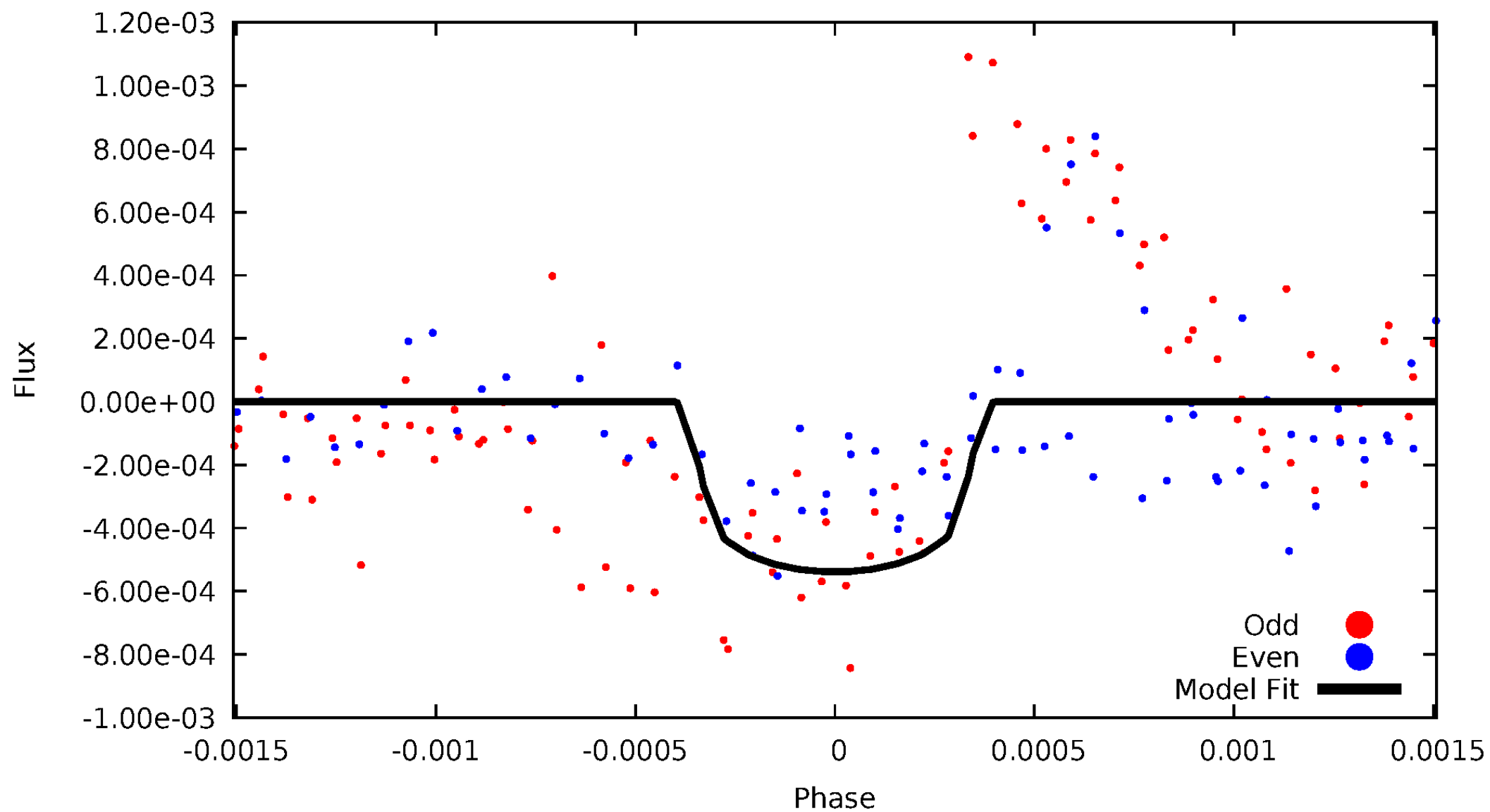


TCE 007020168-07



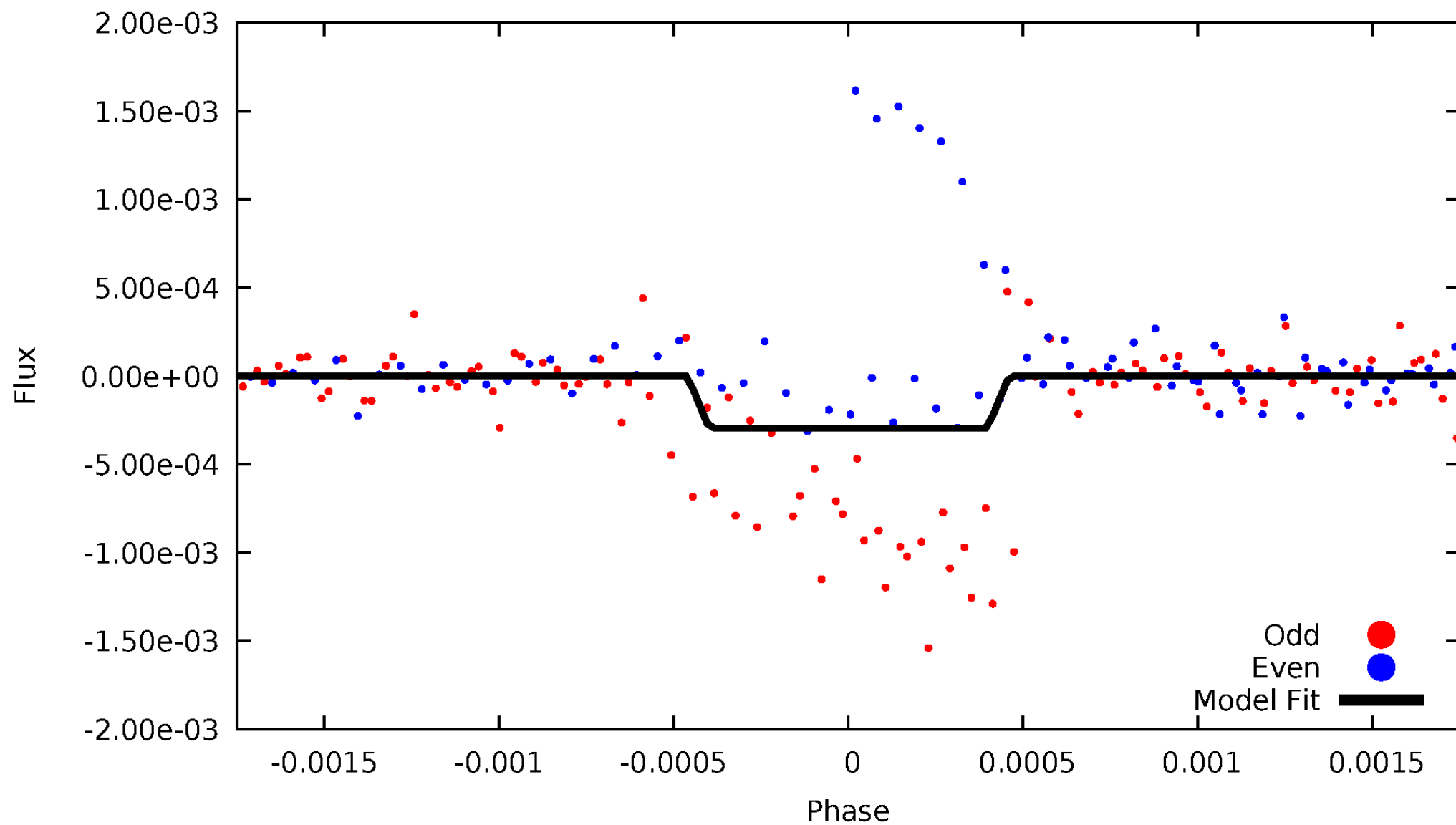
DV Odd/Even

TCE 007020168-07



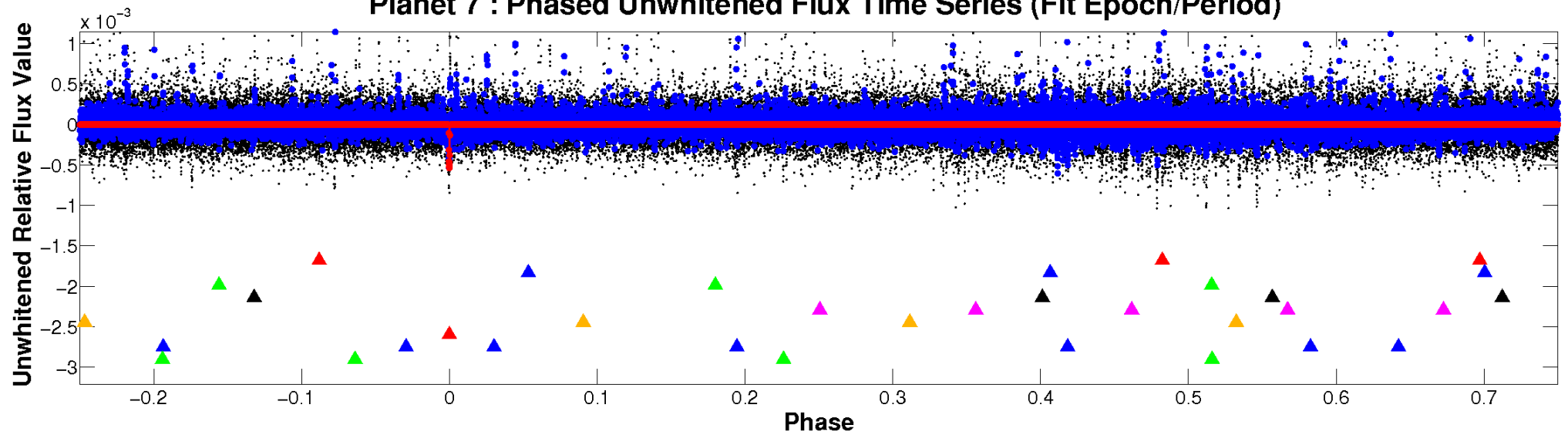
ALT Odd/Even

TCE 007020168-07

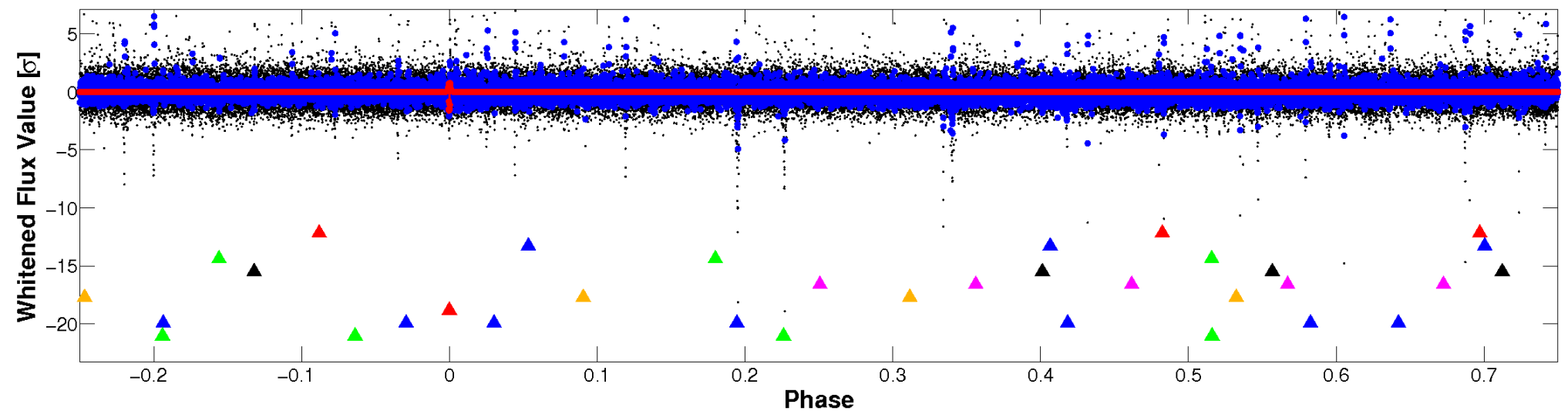


Non-Whitened Vs. Whitened Light Curve

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

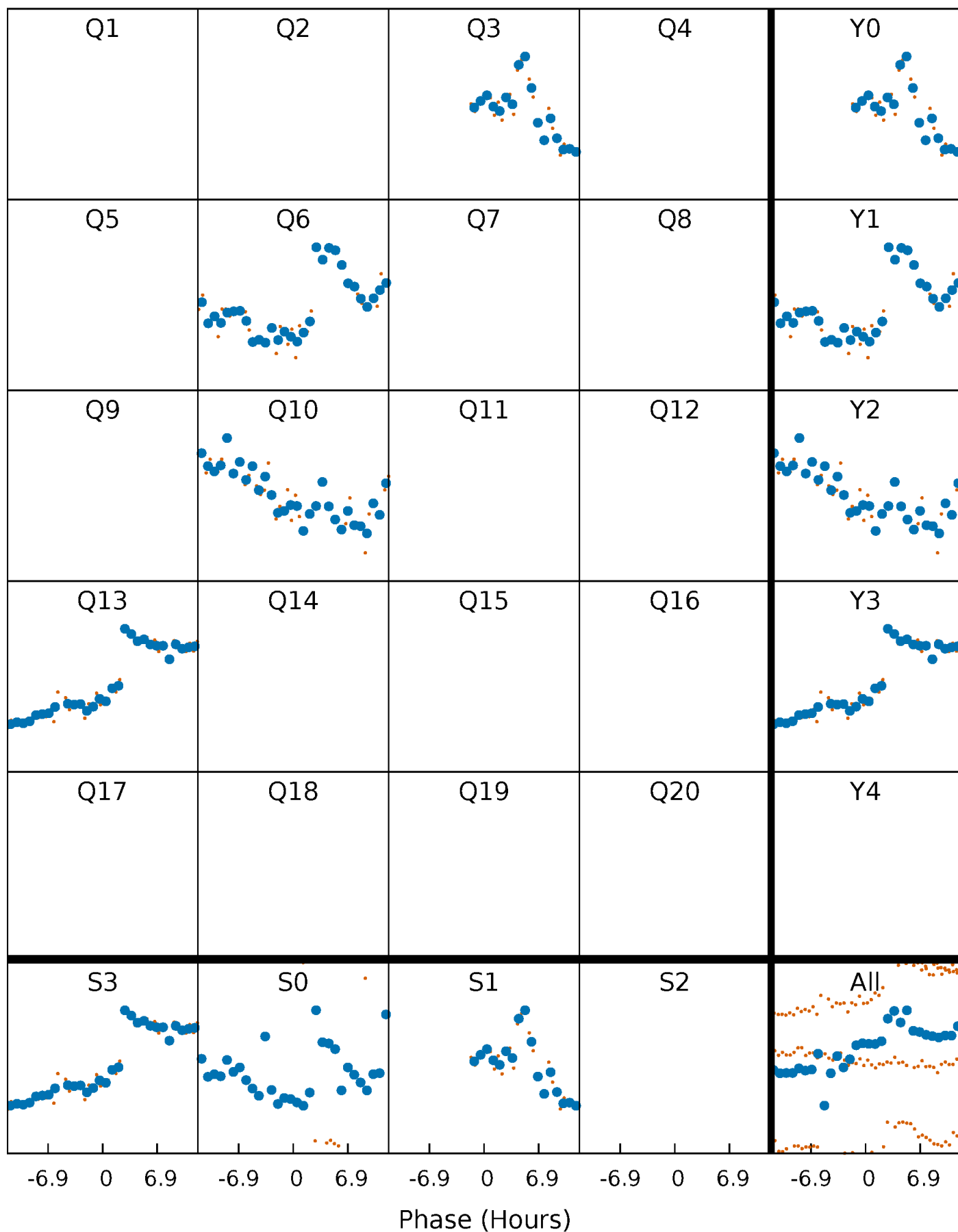


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



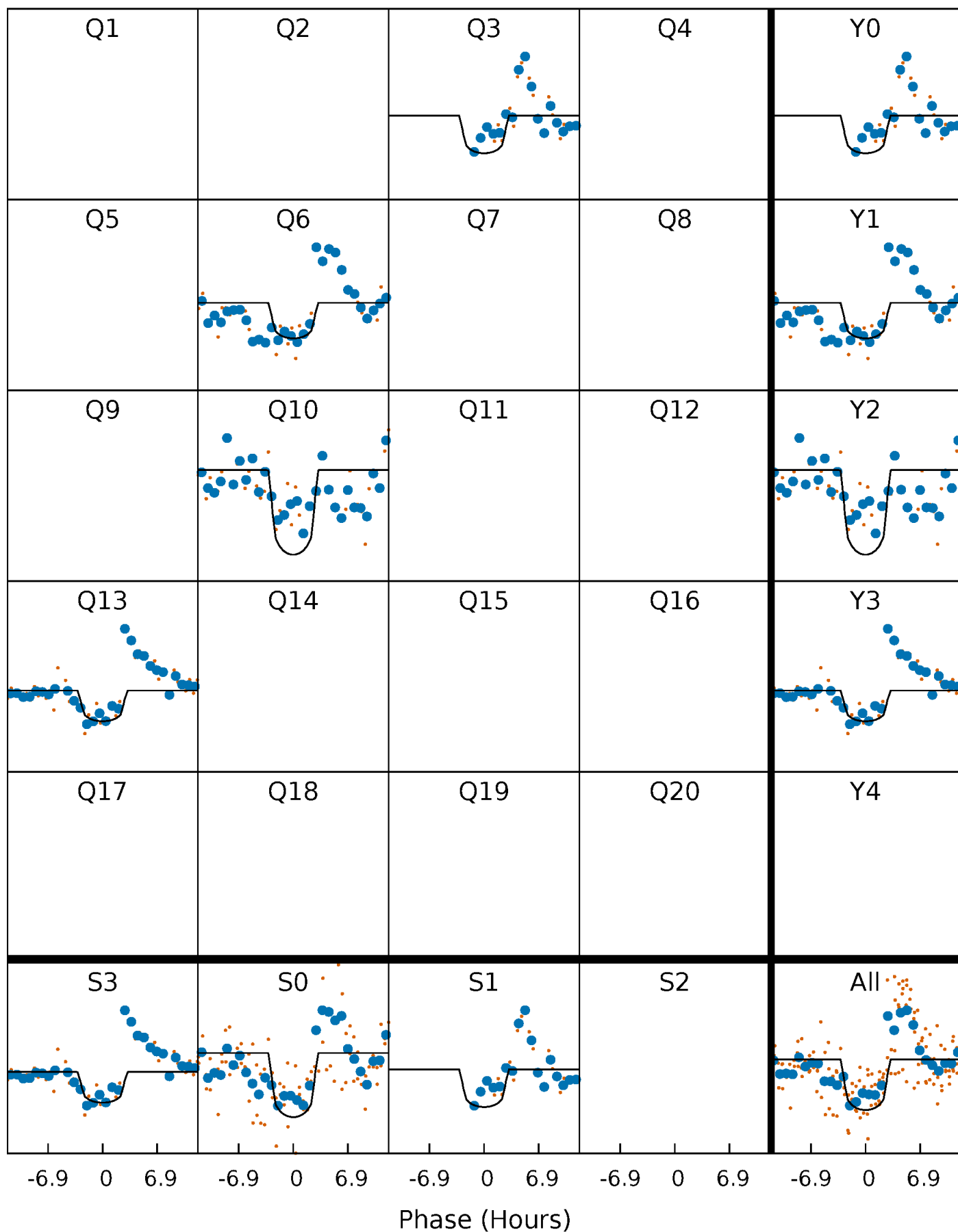
PDC Quarter-Phased Transit Curves

TCE 007020168-07 P=333.150670 Days $T_0=260.313437$ (BKJD)



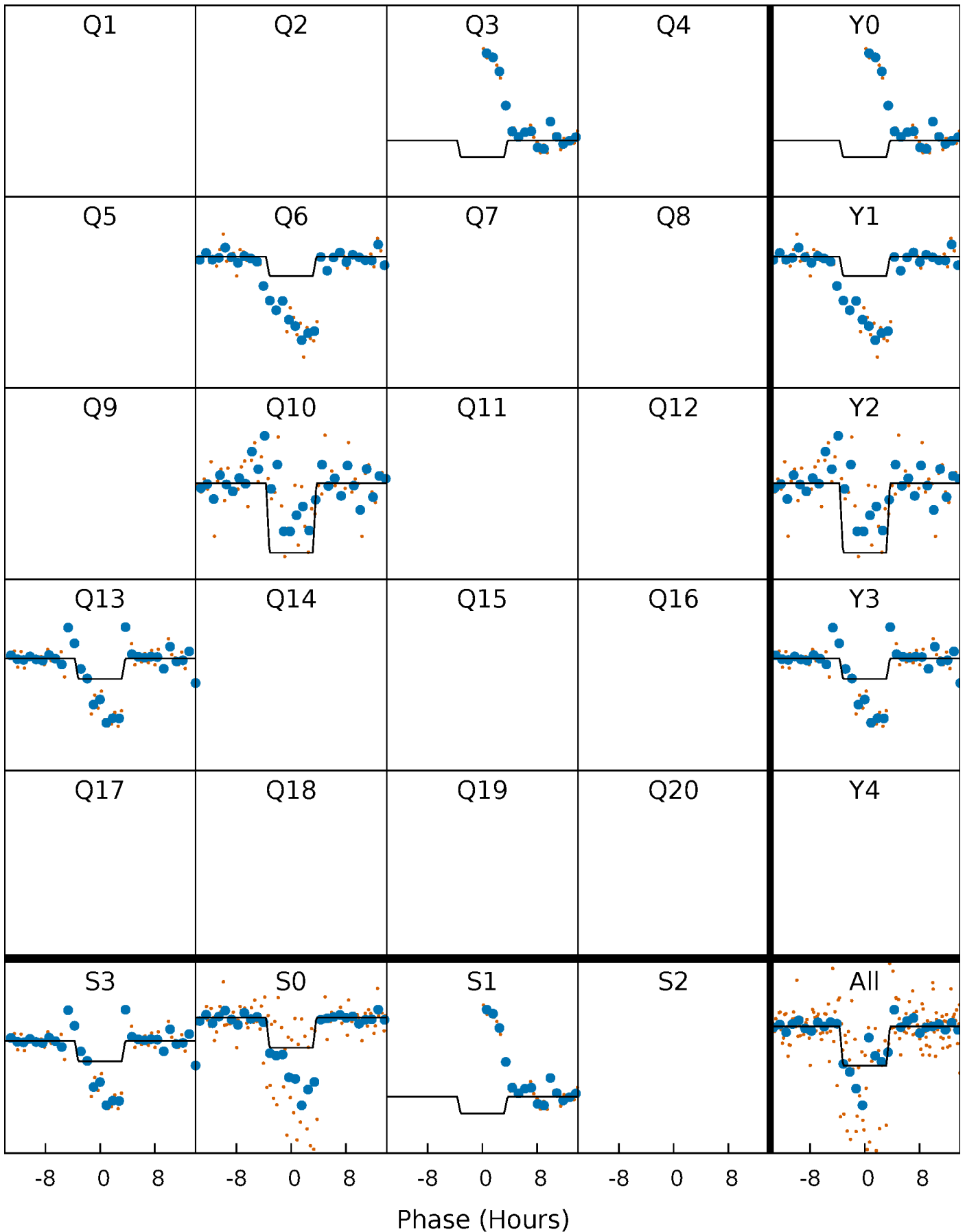
DV Quarter-Phased Transit Curves

TCE 007020168-07 P=333.150670 Days $T_0=260.313437$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

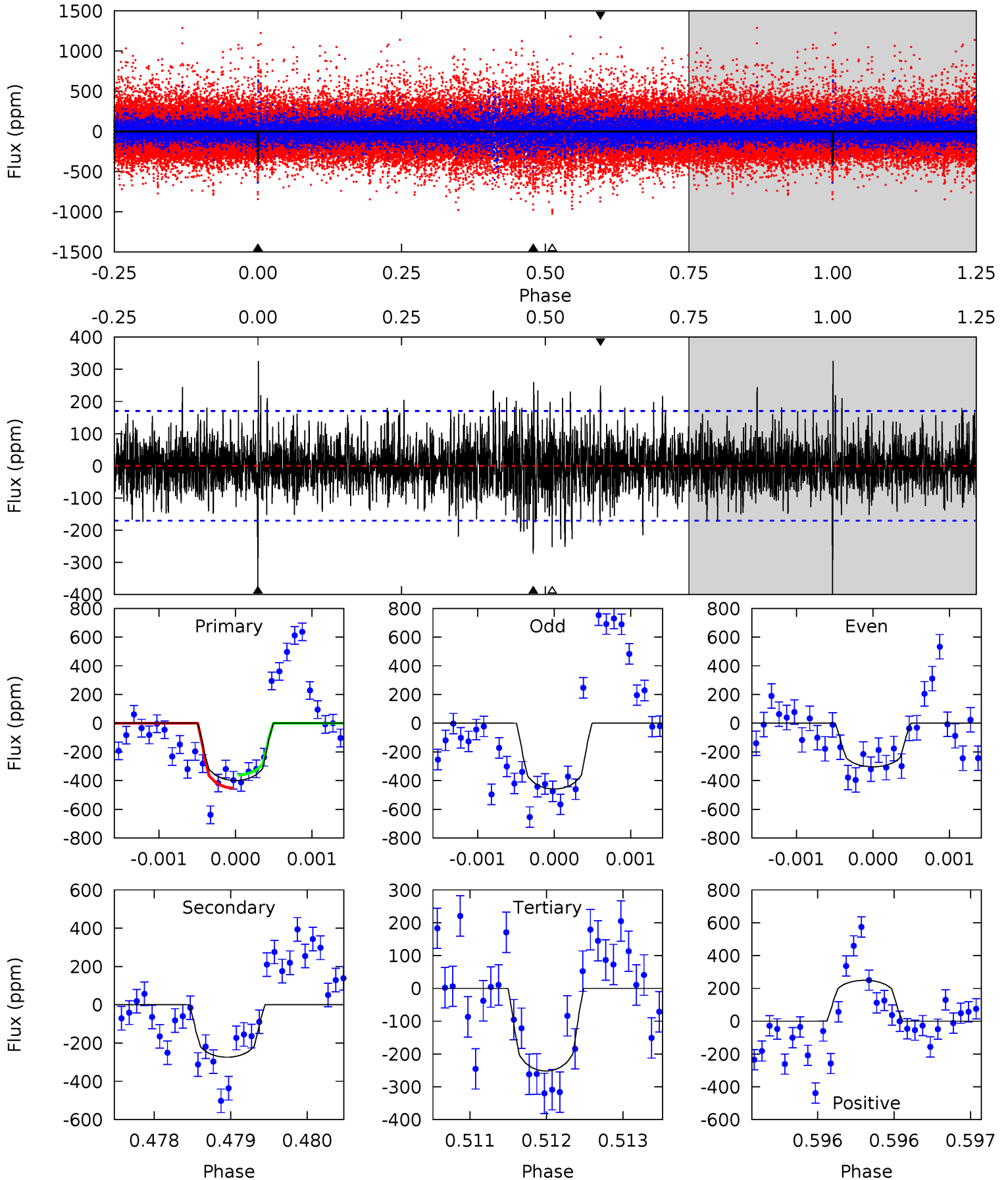
TCE 007020168-07 $P=333.162385$ Days $T_0=260.238265$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-07, P = 333.150670 Days, E = 260.313437 Days

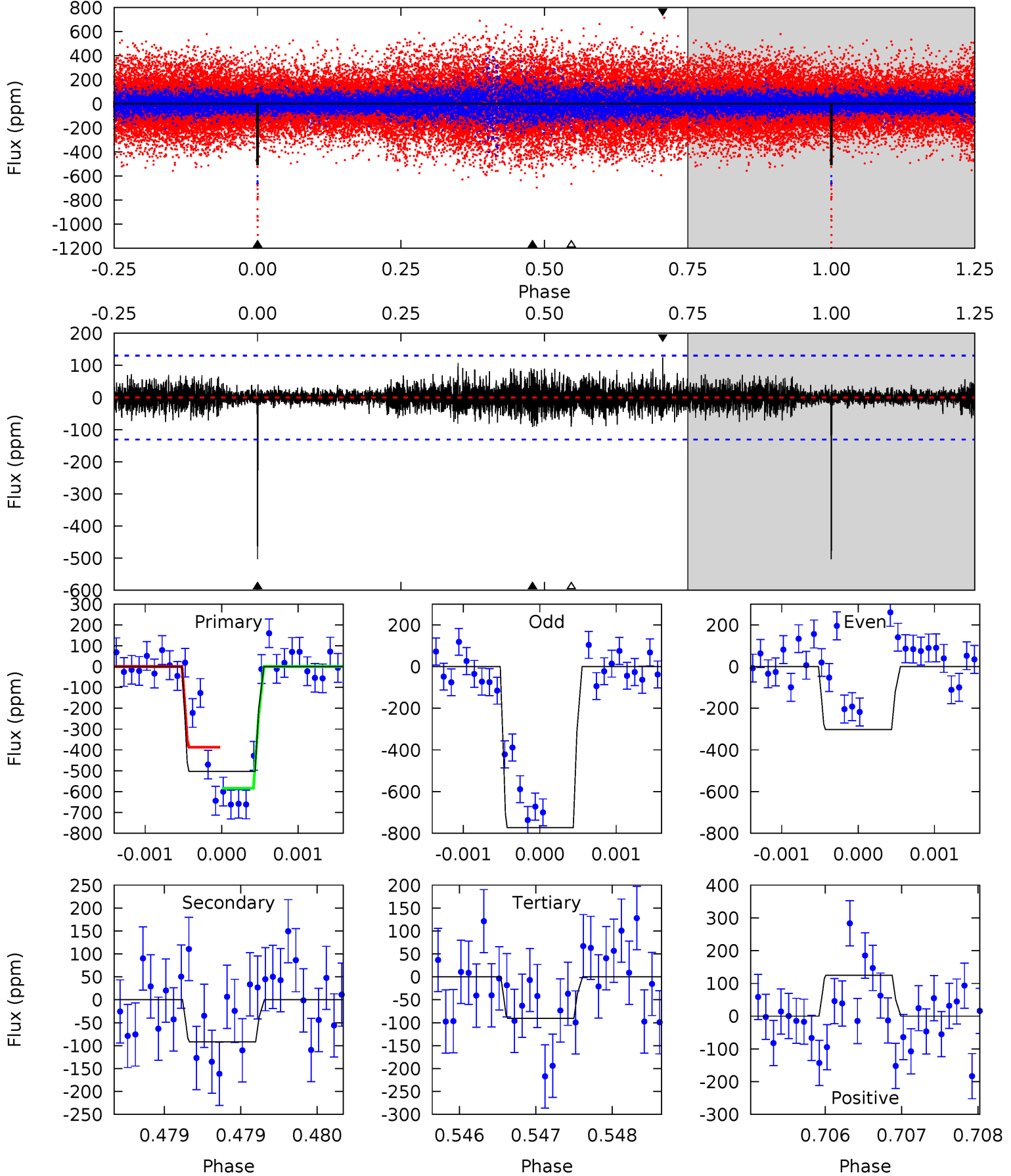
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	8.83	8.12	8.03	5.49	3.35	1.95	4.75	4.84	0.71	0.80	2.32	1.02	0.45	1.45



Alt Model-Shift Uniqueness Test

007020168-07, P = 333.162385 Days, E = 260.238265 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.0	3.84	3.80	5.22	5.47	3.32	0.93	17.2	15.8	0.04	-1.38	11.0	0.32	0.20	4.02



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-274 ± 31	$4.18^{+3.36}_{-2.37}$	451^{+50}_{-61}	4559^{+2100}_{-725}	6999^{+31521}_{-4835}
Alt.	-92 ± 24	$3.45^{+2.81}_{-2.24}$	451^{+51}_{-61}	4023^{+2101}_{-664}	3551^{+23946}_{-2589}

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 $A_{obs} \gg 1.0$

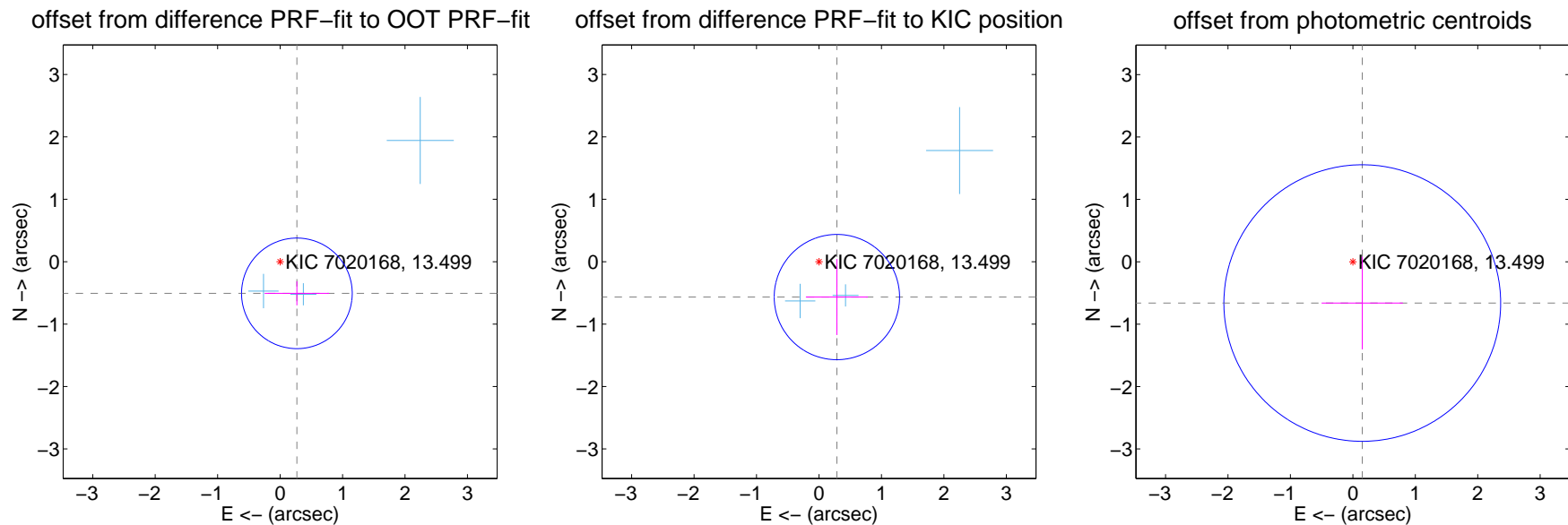
DV Centroid Data

Supplemental centroid analysis for 007020168-07. Kepler magnitude: 13.50. Transit SNR 9.79

There are 3 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.574 ± 0.295	1.94	-0.269 ± 0.517	-0.507 ± 0.192
PRF-fit source offset from KIC position	0.635 ± 0.335	1.90	-0.287 ± 0.495	-0.567 ± 0.609
photometric centroid source offset	0.68 ± 0.74	0.92	-0.15 ± 0.65	-0.66 ± 0.74

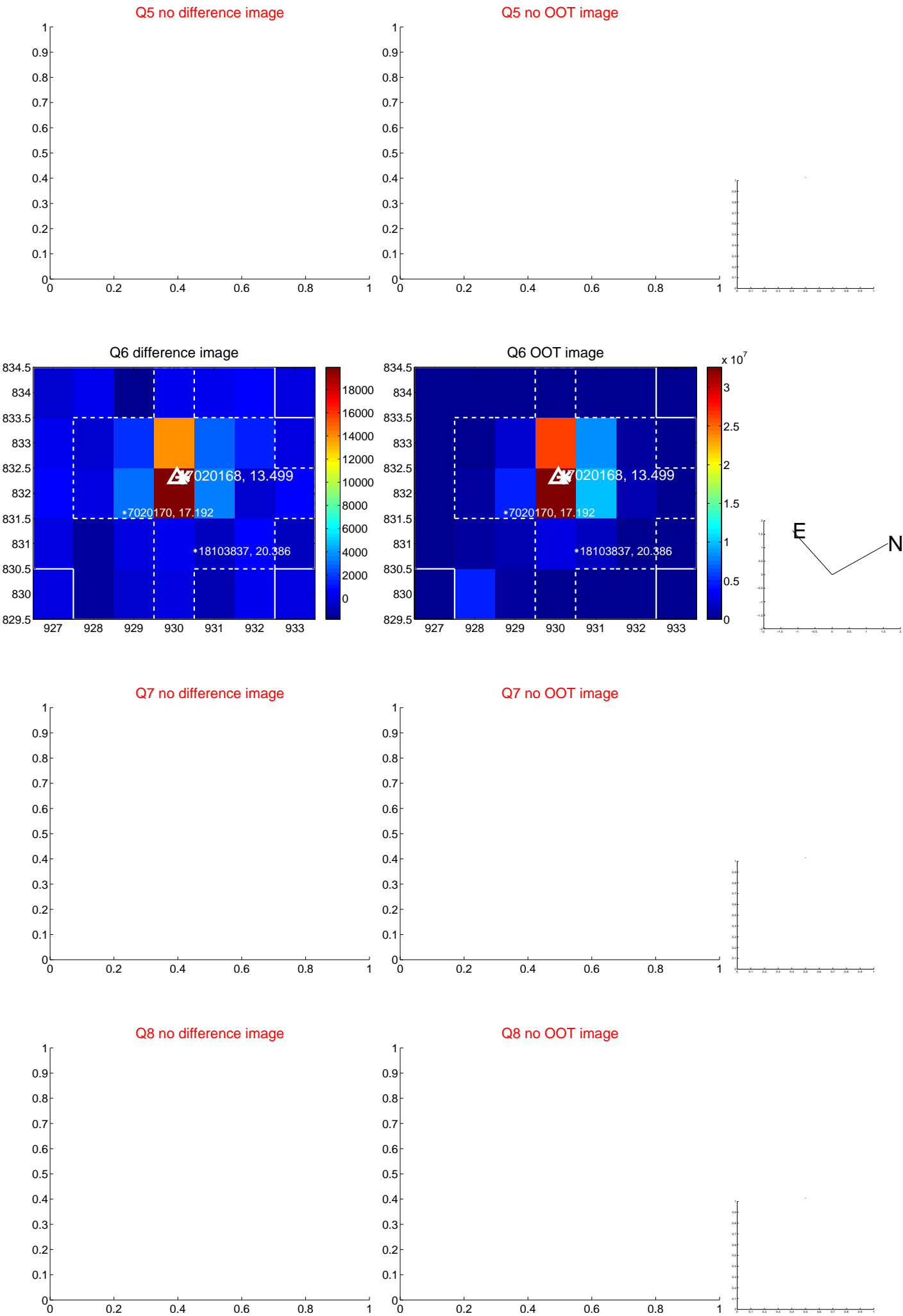


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

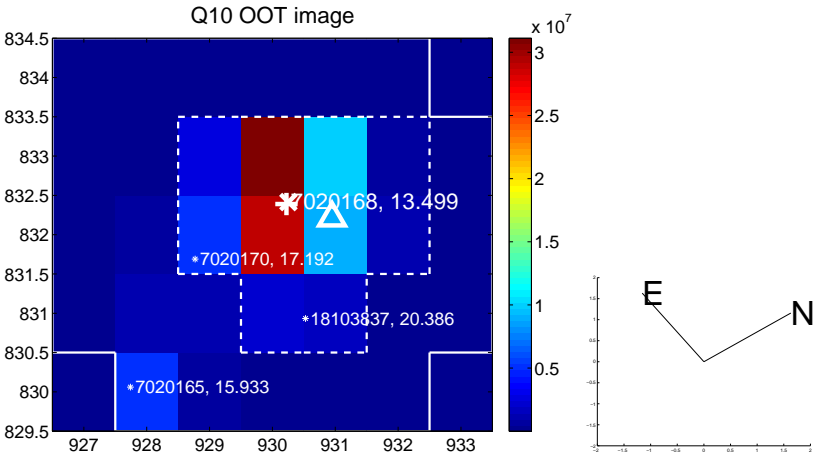
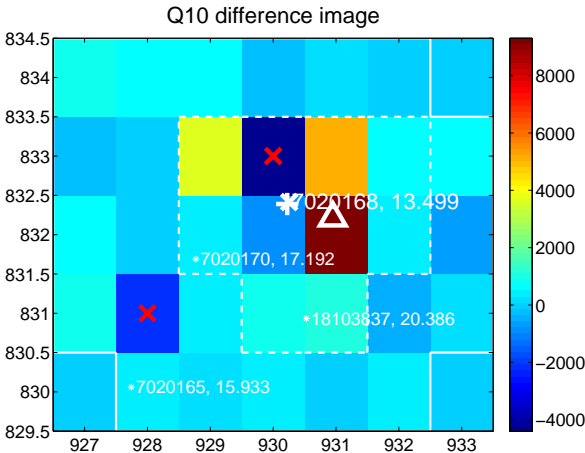


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

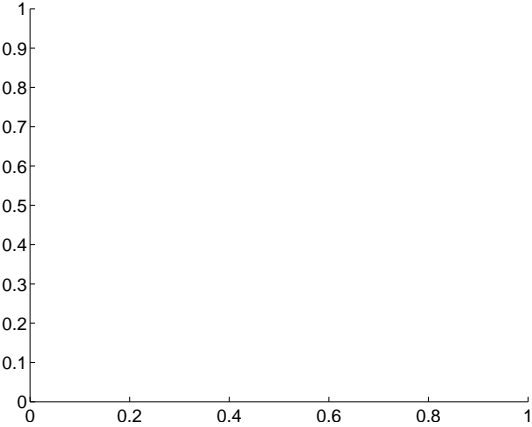
Q9 no difference image



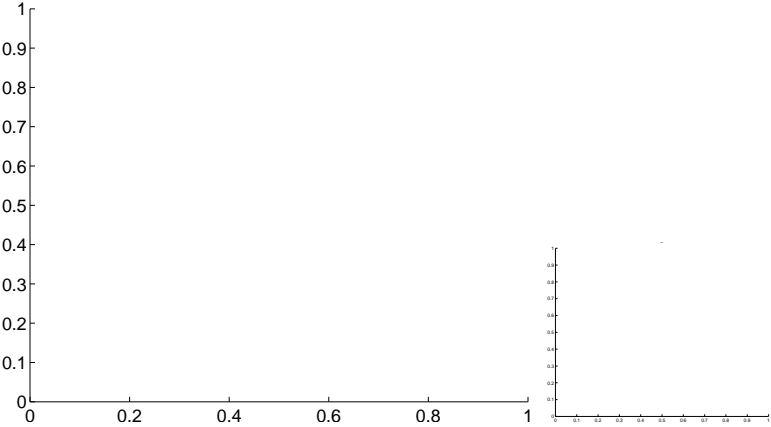
Q9 no OOT image



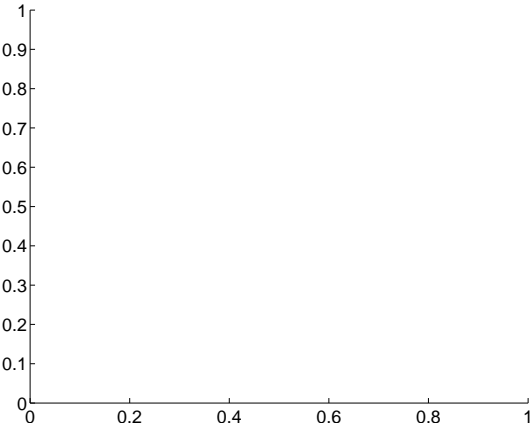
Q11 no difference image



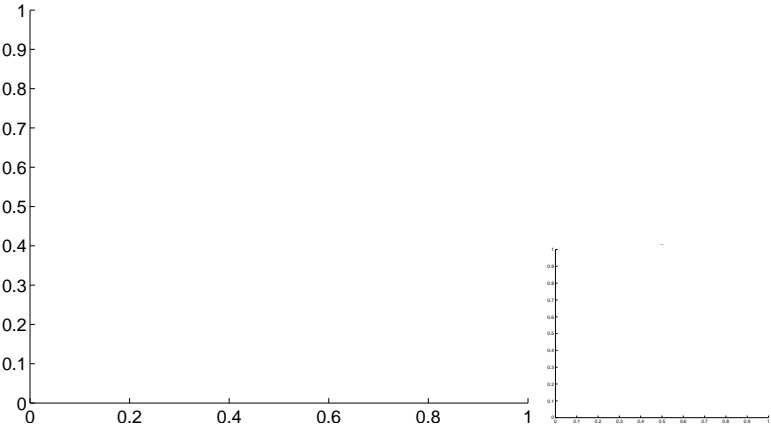
Q11 no OOT image



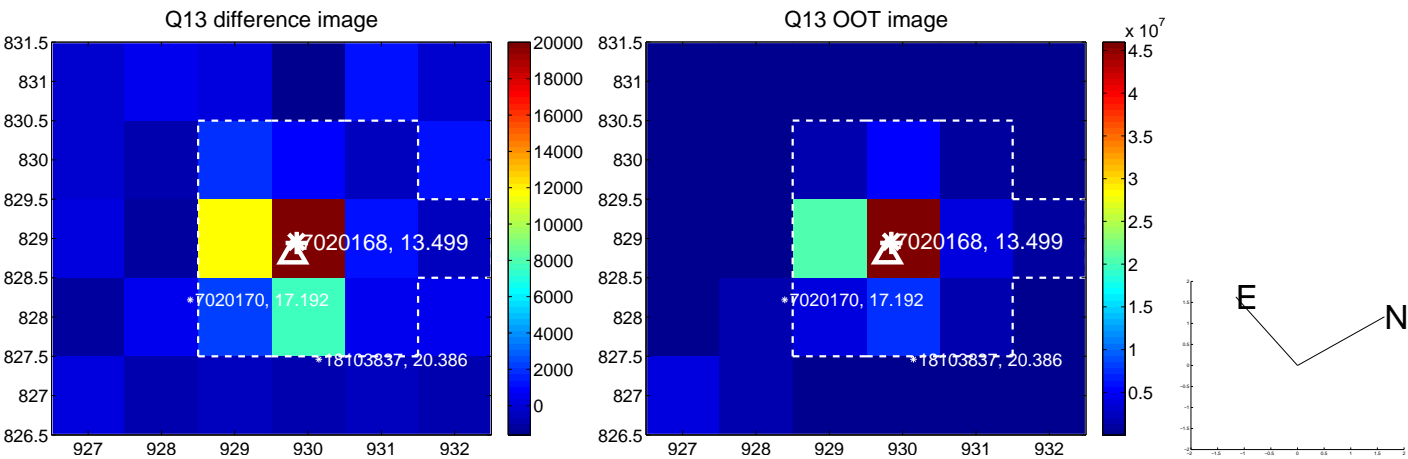
Q12 no difference image



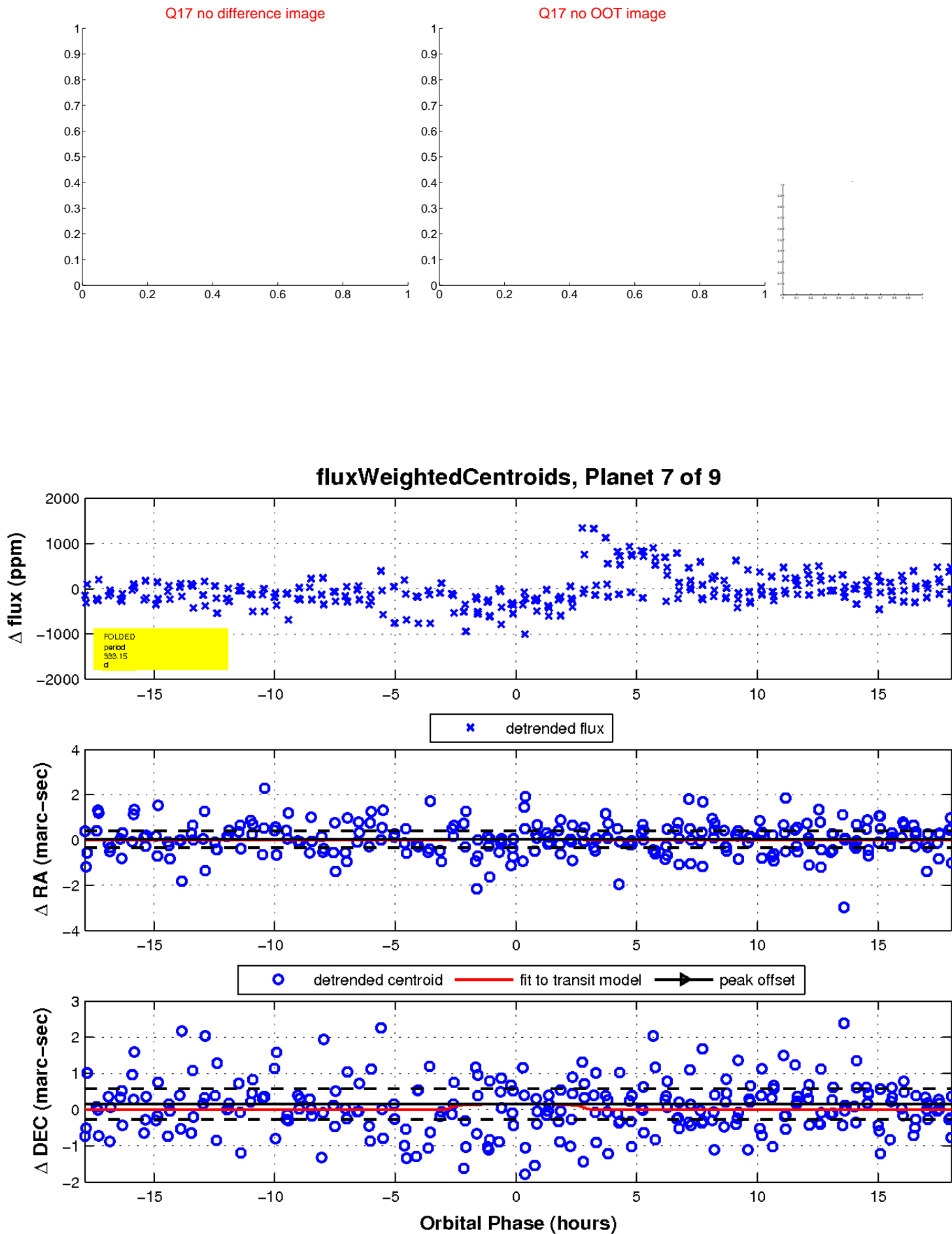
Q12 no OOT image



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

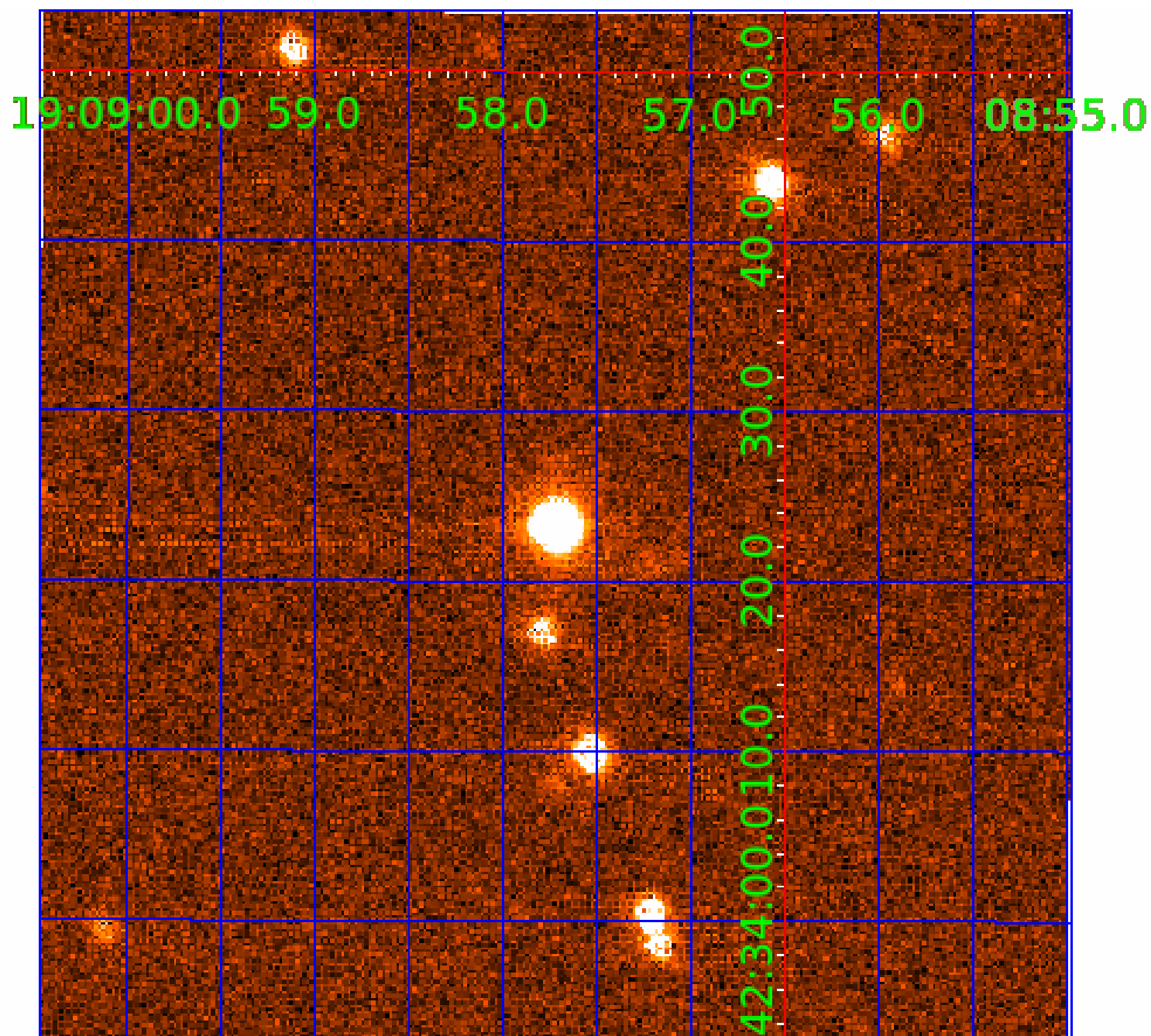


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

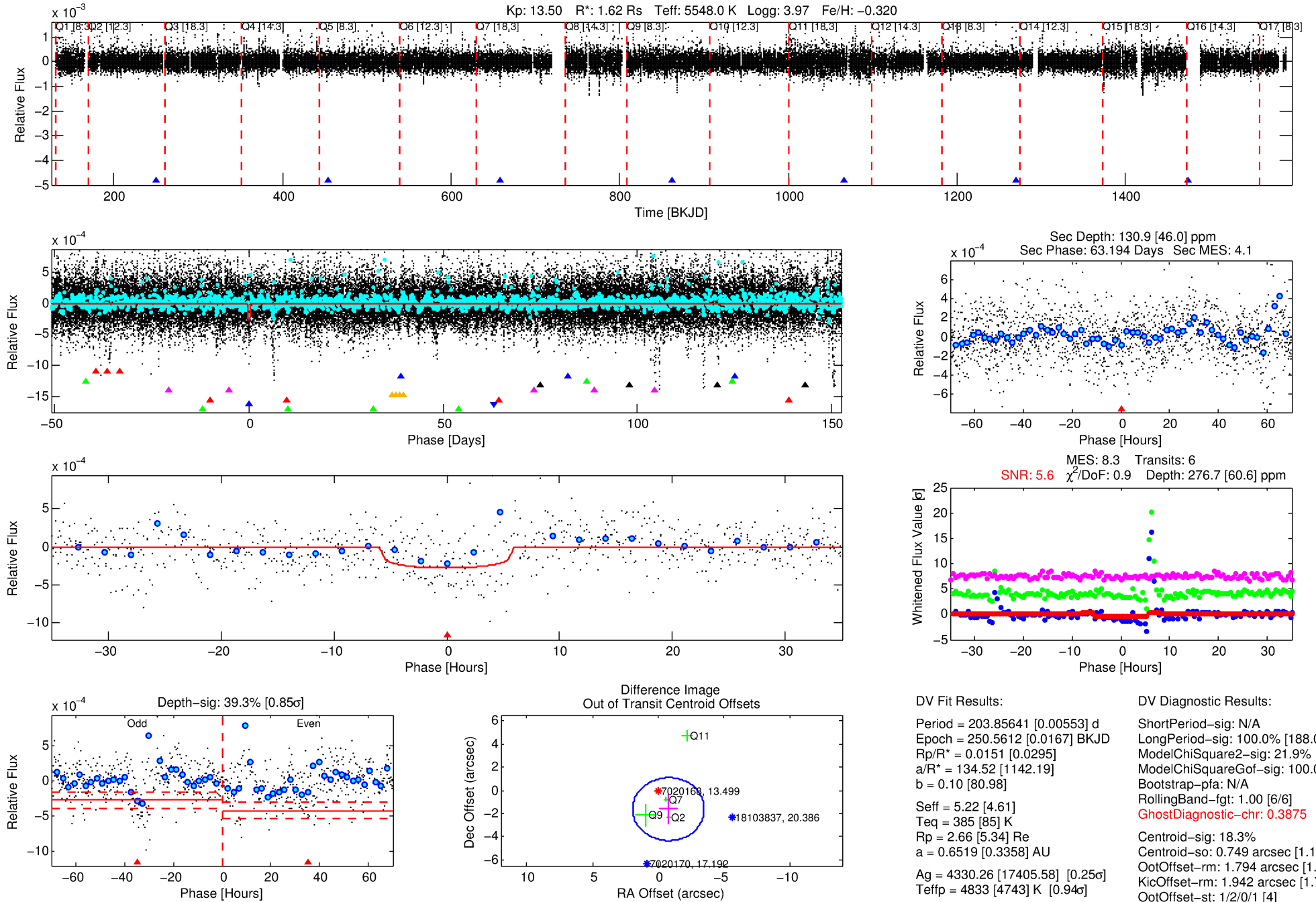
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-08

No Significant Match Found

DV One-Page Summary

KIC: 7020168 Candidate: 8 of 9 Period: 203.856 d



DV Fit Results:

Period = 203.85641 [0.00553] d
Epoch = 250.5612 [0.0167] BKJD
Rp/R* = 0.0151 [0.0295]
a/R* = 134.52 [1142.19]
b = 0.10 [80.98]
Seff = 5.22 [4.61]
Teq = 385 [85] K
Rp = 2.66 [5.34] Re
a = 0.6519 [0.3358] AU
Ag = 4330.26 [17405.58] [0.25σ]
Teffp = 4833 [4743] K [0.94σ]

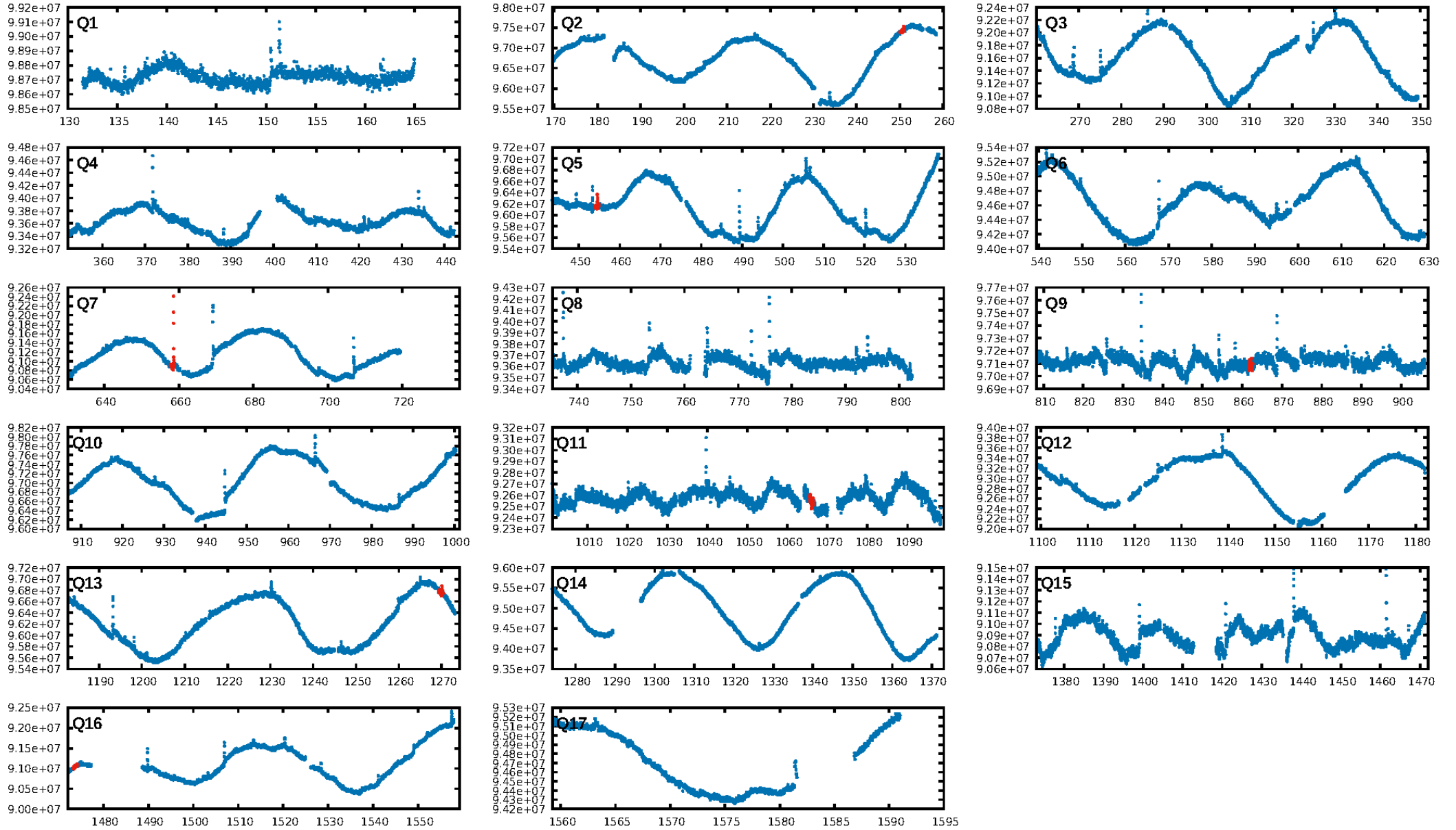
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [188.02σ]
ModelChiSquare2-sig: 21.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 0.3875
Centroid-sig: 18.3%
Centroid-so: 0.749 arcsec [1.13σ]
OotOffset-rm: 1.794 arcsec [1.98σ]
OotOffset-st: 1/2/0/1 [4]
KicOffset-rm: 1.942 arcsec [1.75σ]
KicOffset-st: 1/2/0/1 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 1.00 [5/5]

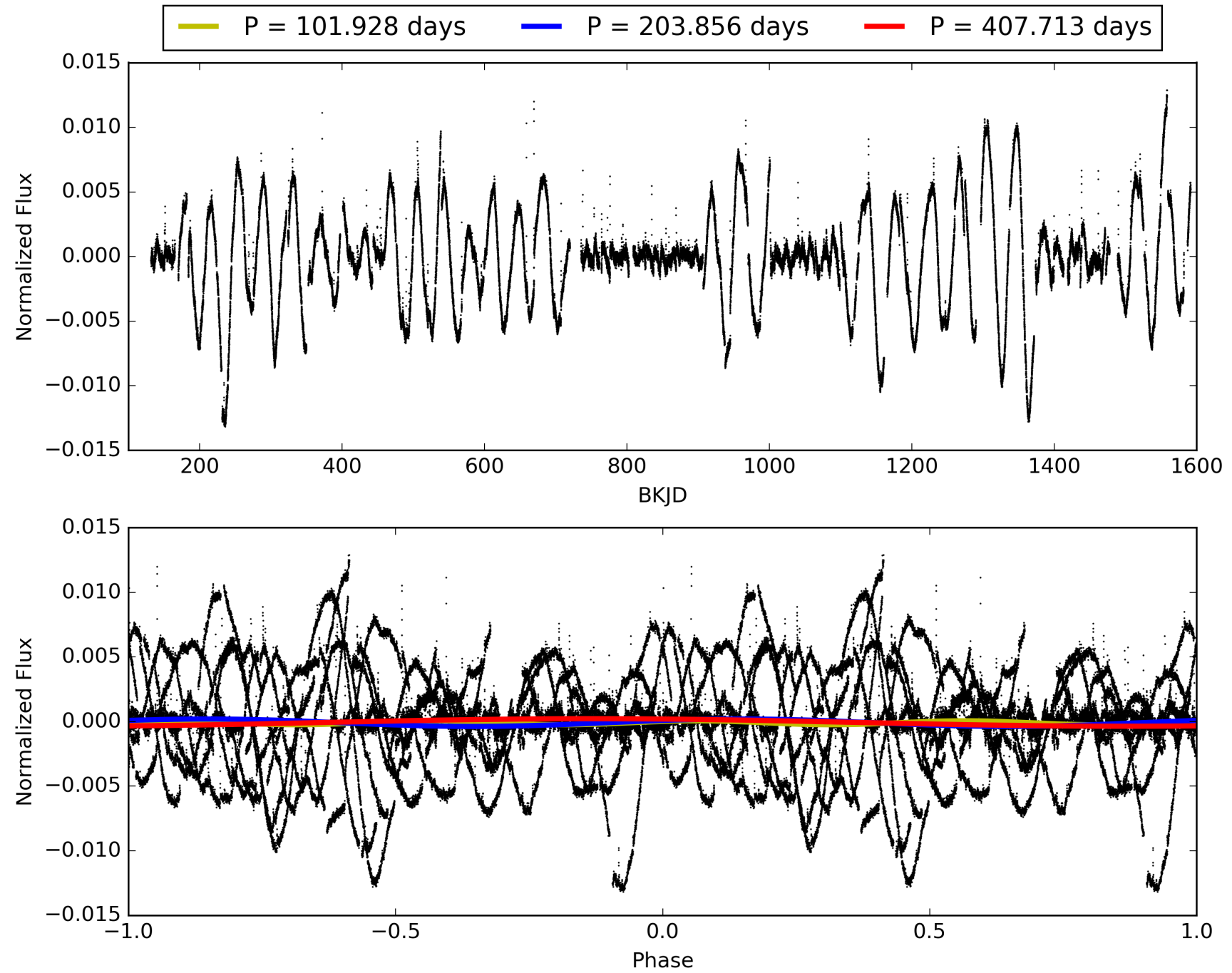
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:22:11 Z

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

TCE 007020168-08, PDC Light Curves

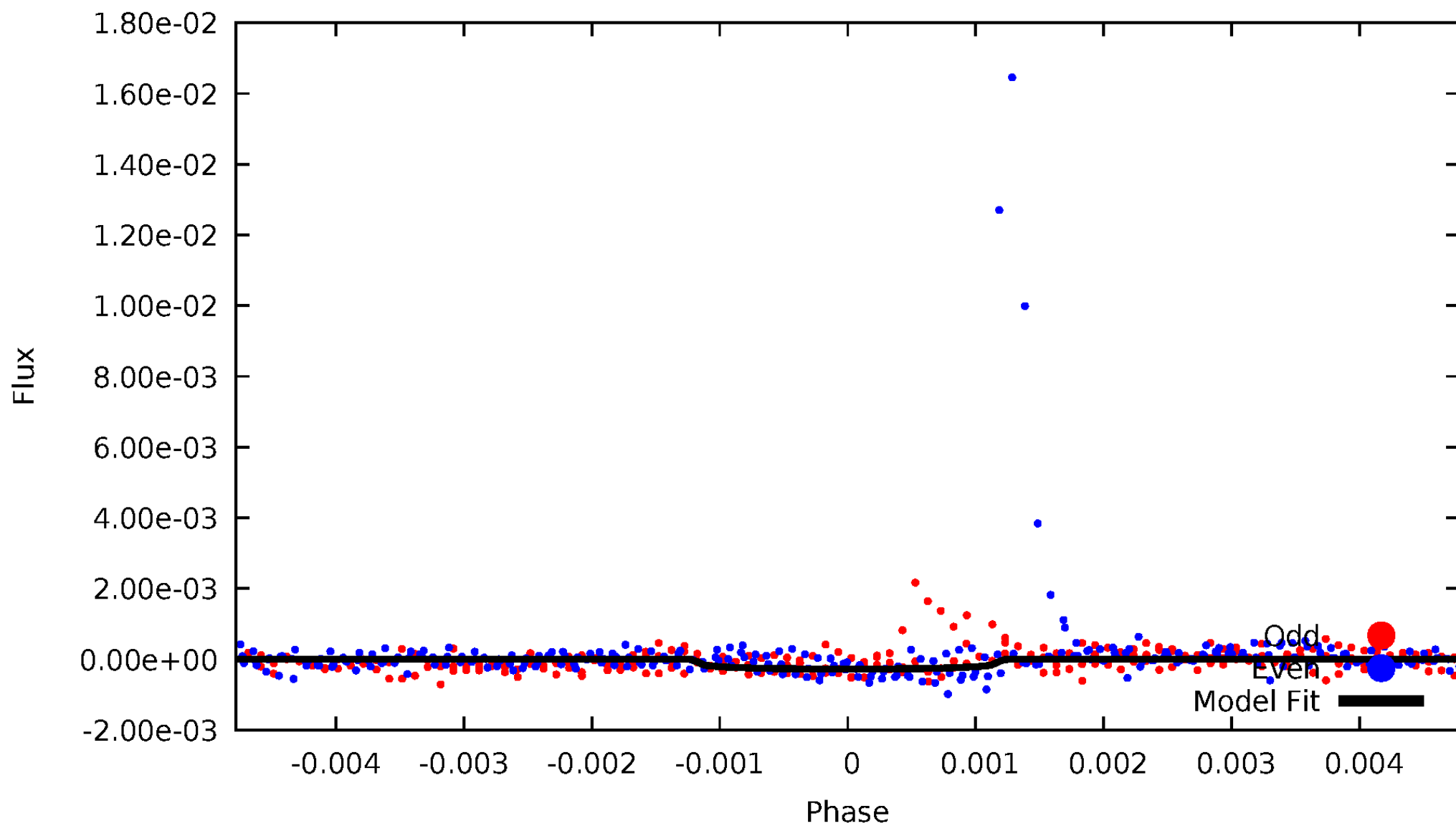


TCE 007020168-08



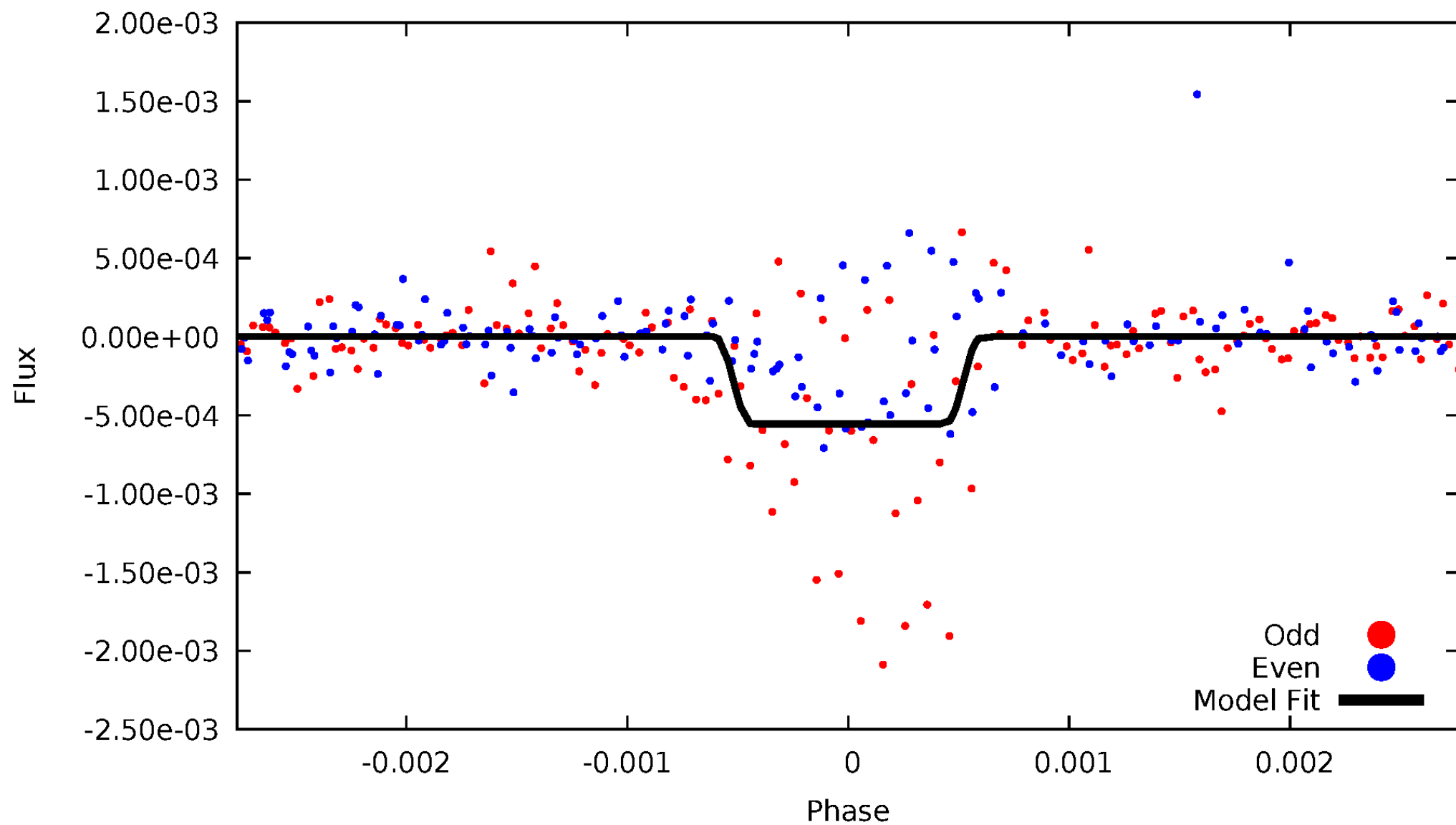
DV Odd/Even

TCE 007020168-08



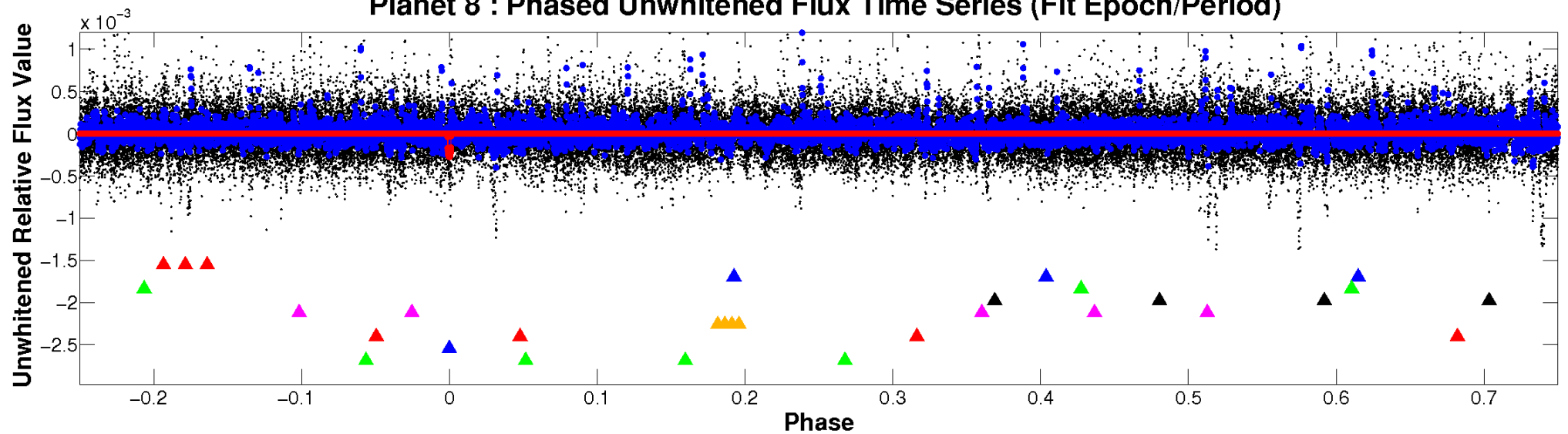
ALT Odd/Even

TCE 007020168-08

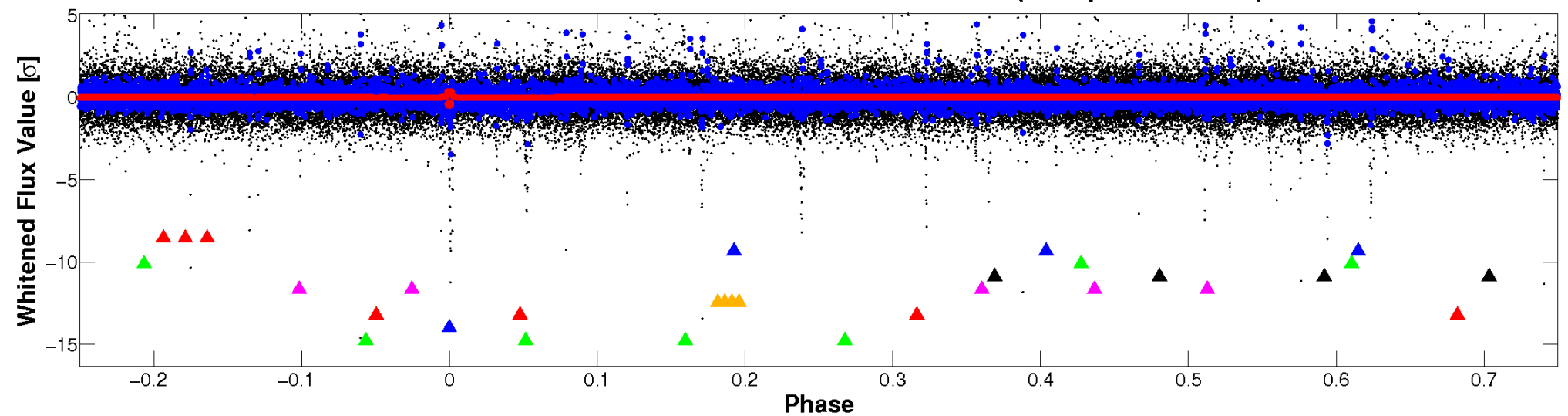


Non-Whitened Vs. Whitened Light Curve

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

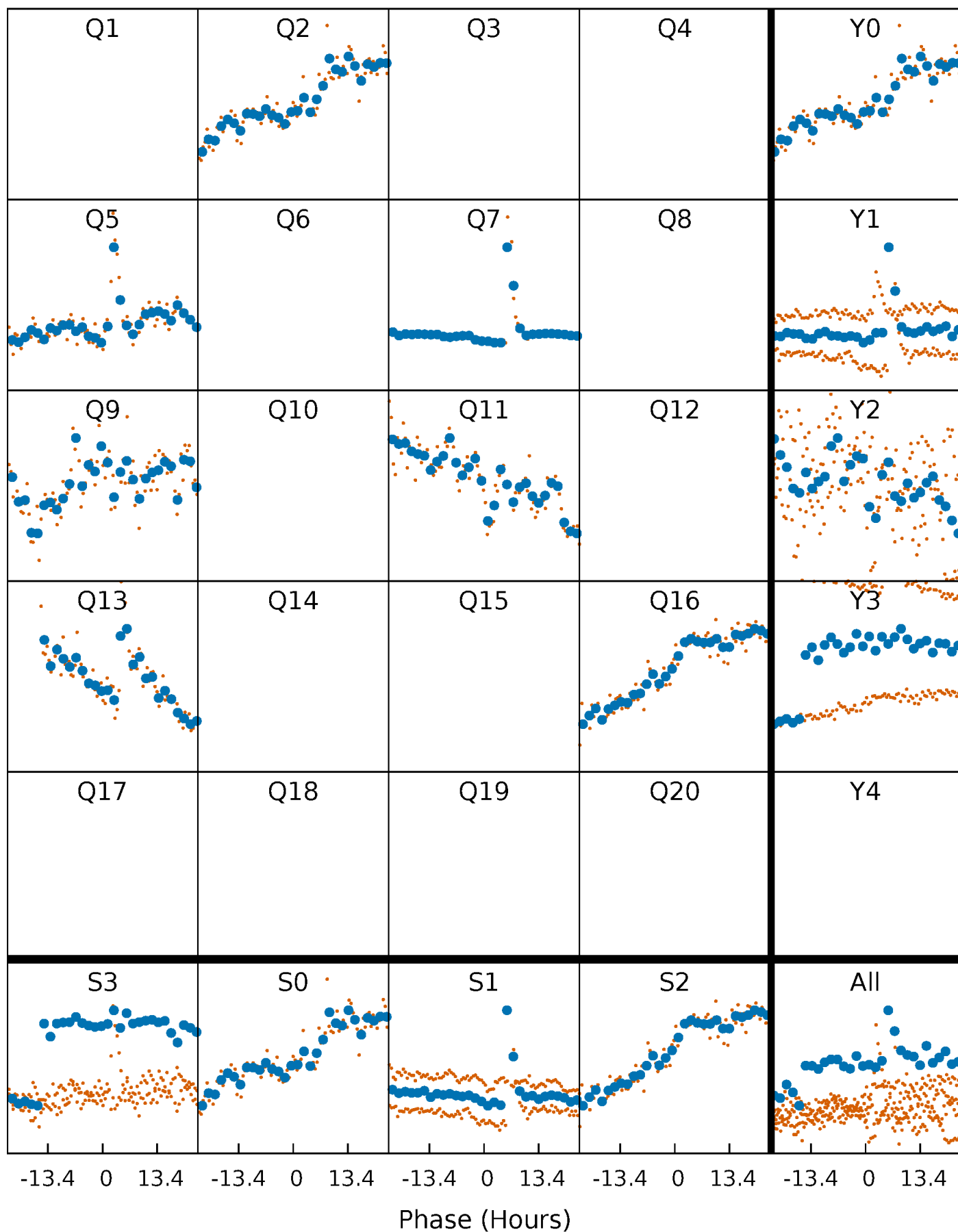


Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



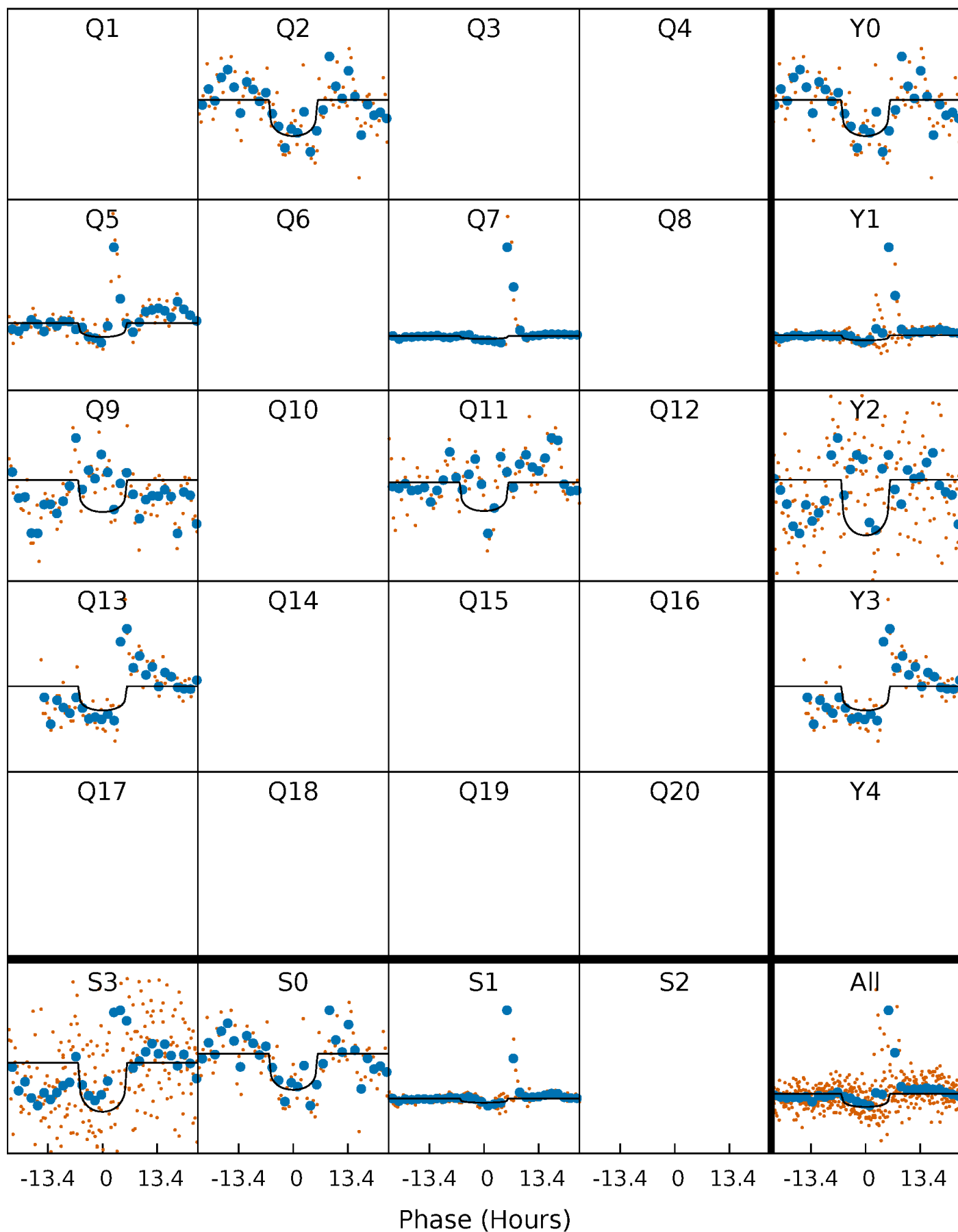
PDC Quarter-Phased Transit Curves

TCE 007020168-08 $P=203.856408$ Days $T_0=250.561153$ (BKJD)



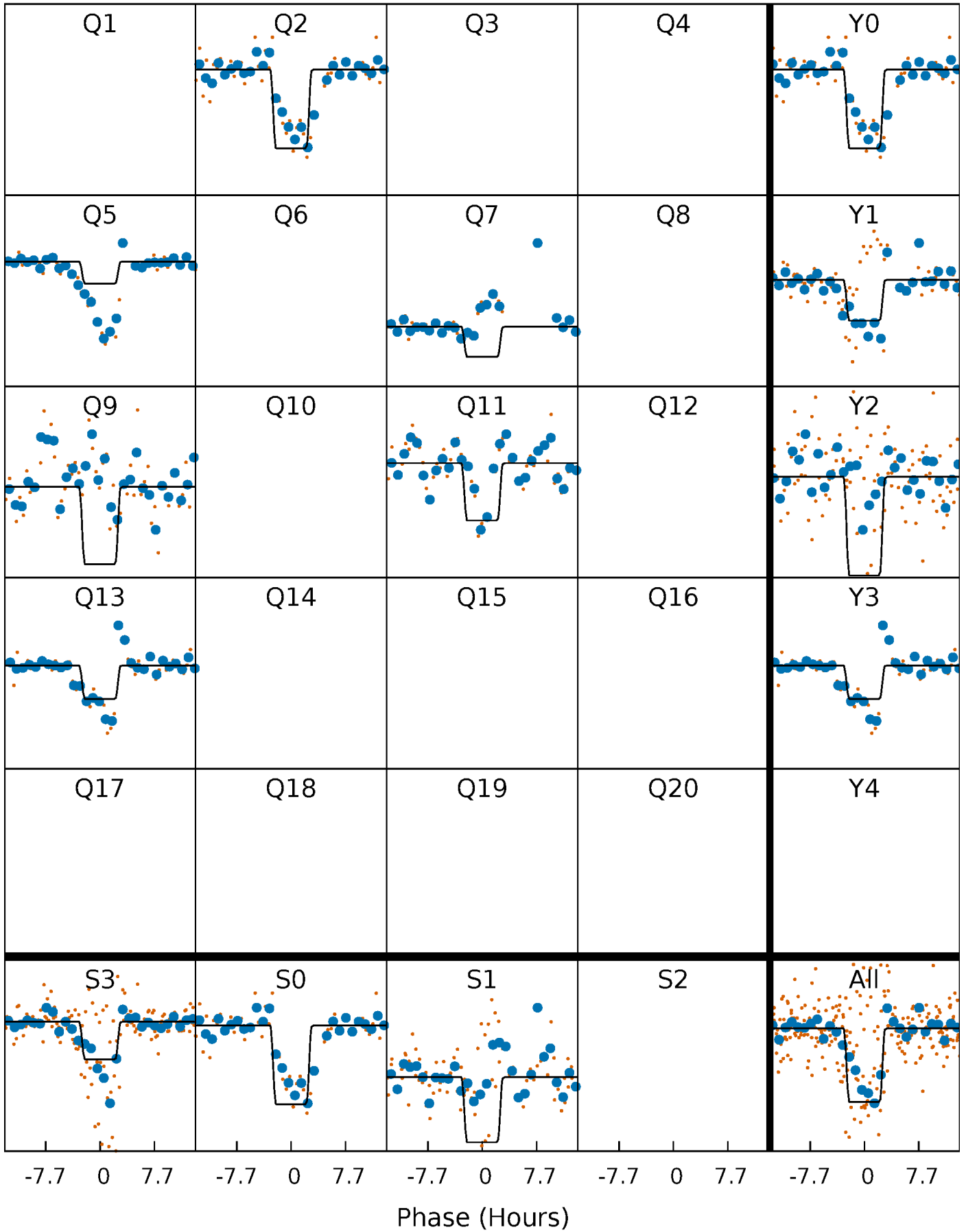
DV Quarter-Phased Transit Curves

TCE 007020168-08 $P=203.856408$ Days $T_0=250.561153$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

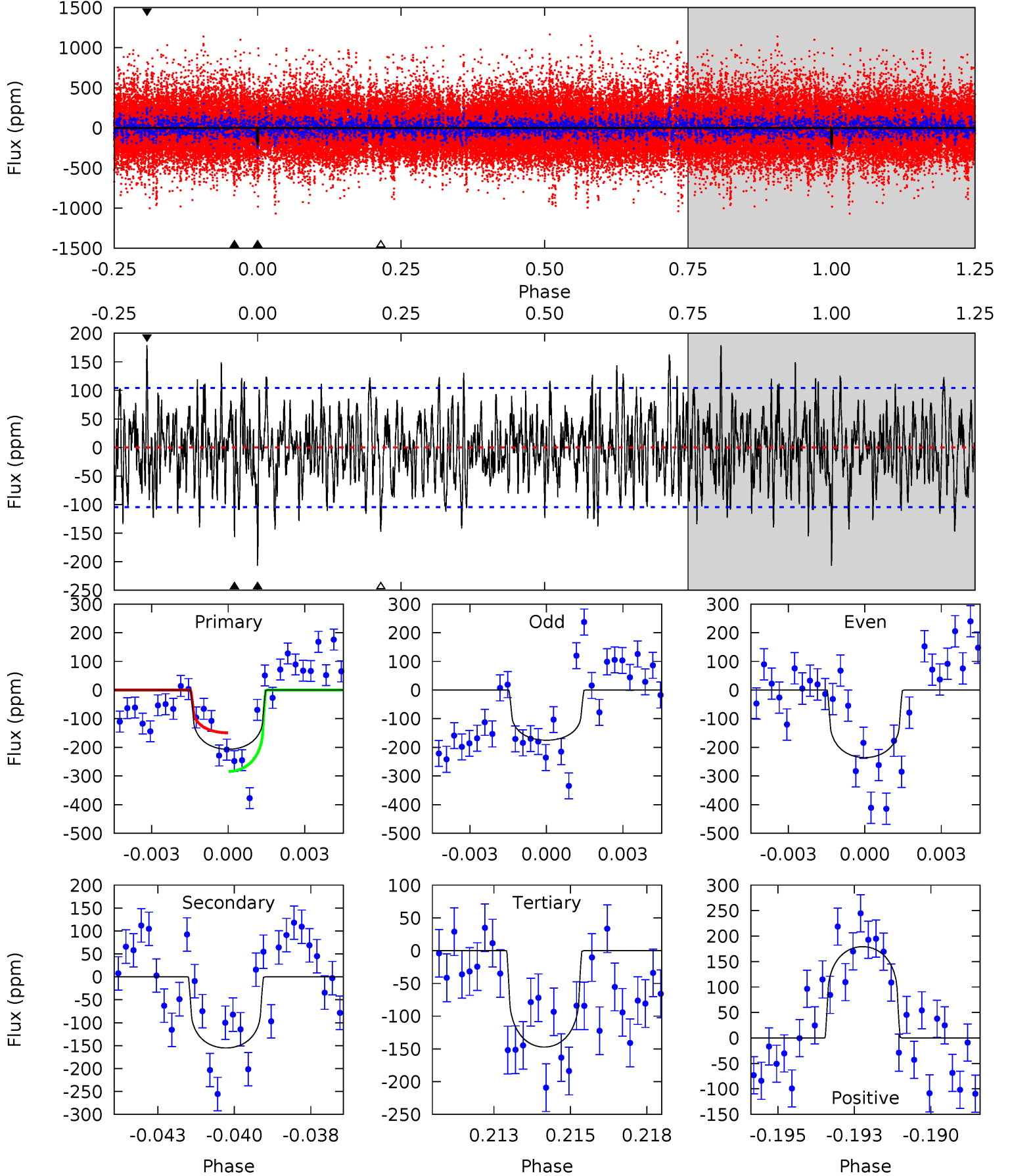
TCE 007020168-08 P=203.884279 Days $T_0=250.506596$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-08, P = 203.856408 Days, E = 46.704745 Days

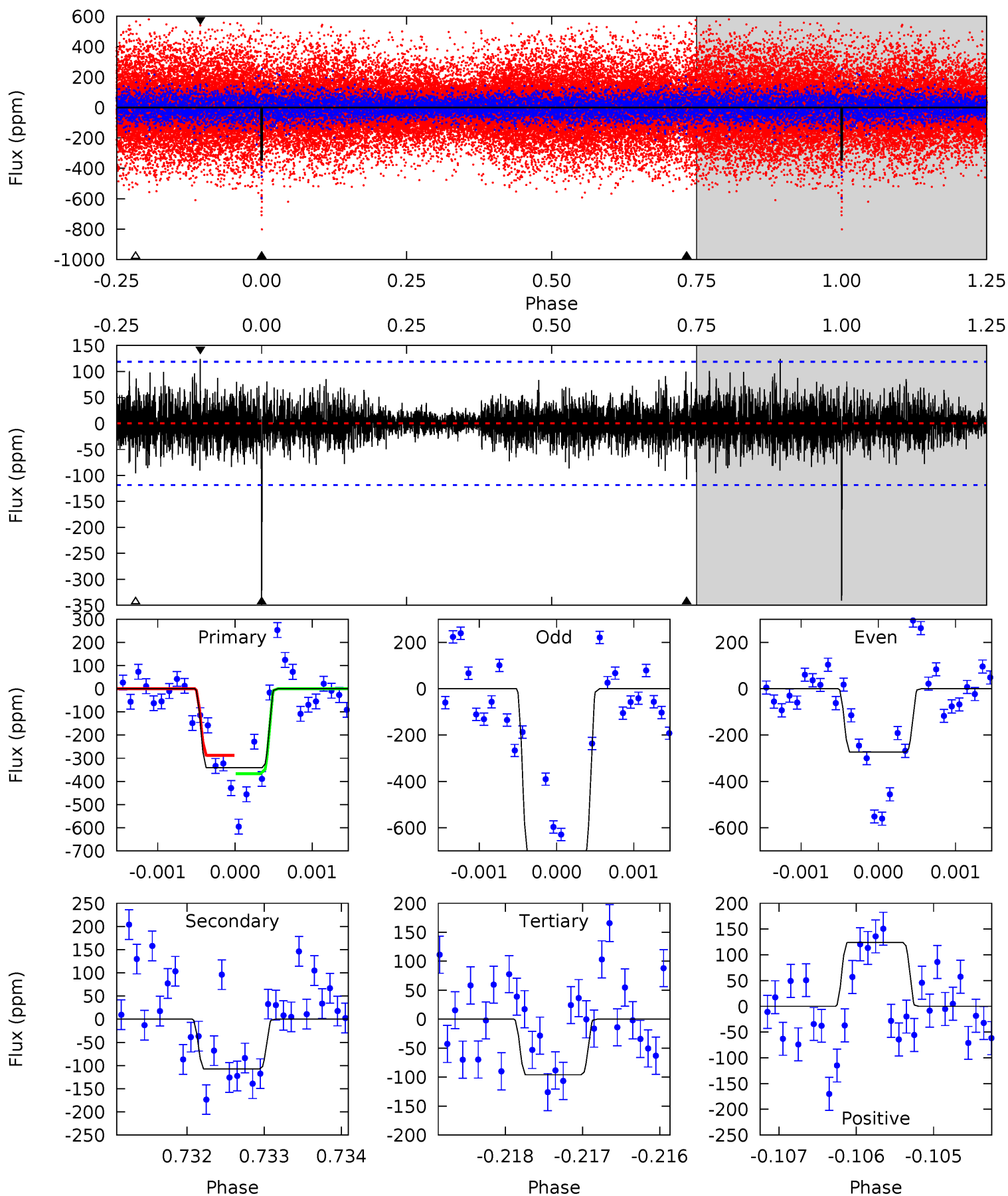
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	7.86	7.46	9.08	5.29	3.02	2.54	3.02	1.40	0.40	-1.22	1.53	0.75	0.46	3.42



Alt Model-Shift Uniqueness Test

007020168-08, P = 203.884279 Days, E = 46.622317 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.6	4.91	4.38	5.66	5.42	3.24	1.12	11.2	9.92	0.52	-0.75	10.2	1.23	0.27	1.82



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-08 / KOI 8131.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-155 ± 20	$4.33^{+4.83}_{-2.94}$	532^{+62}_{-72}	4080^{+2340}_{-834}	1943^{+15174}_{-1525}
Alt.	-107 ± 22	$4.66^{+4.93}_{-2.99}$	533^{+56}_{-69}	3720^{+1867}_{-699}	1144^{+7247}_{-882}

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

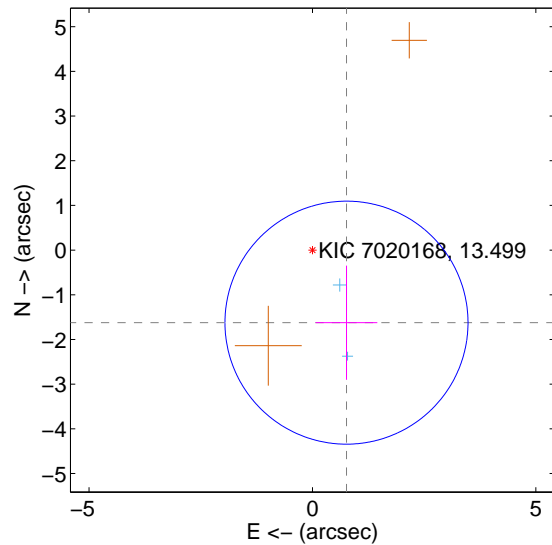
Supplemental centroid analysis for 007020168-08. Kepler magnitude: 13.50. Transit SNR 5.58

There are 2 quarters with good PRF difference image offsets

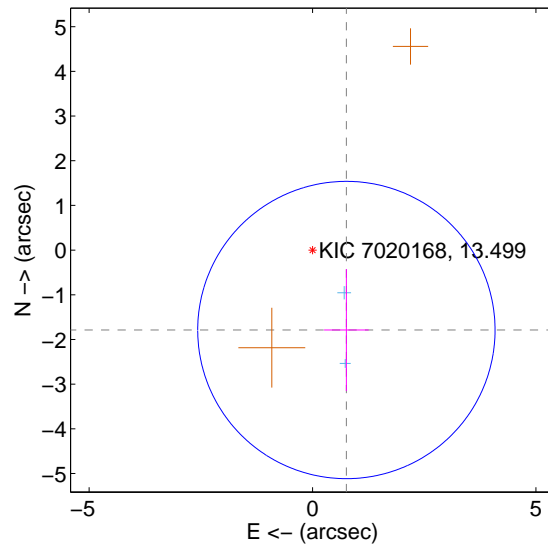
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.794 ± 0.906	1.98	-0.762 ± 0.690	-1.624 ± 1.278
PRF-fit source offset from KIC position	1.942 ± 1.109	1.75	-0.758 ± 0.499	-1.788 ± 1.365
photometric centroid source offset	0.75 ± 0.66	1.13	-0.72 ± 0.64	0.21 ± 0.90

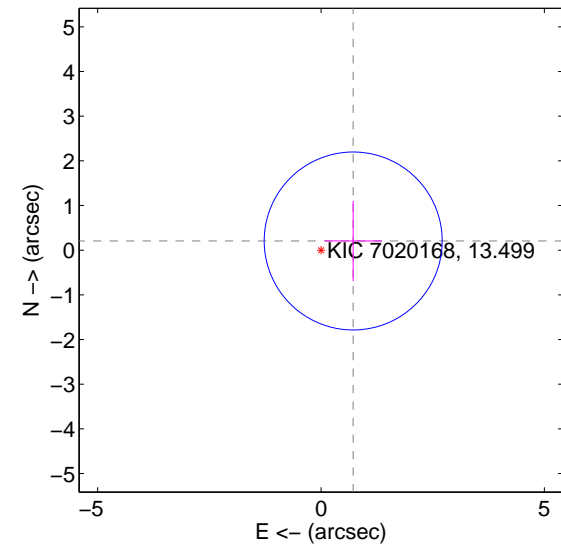
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

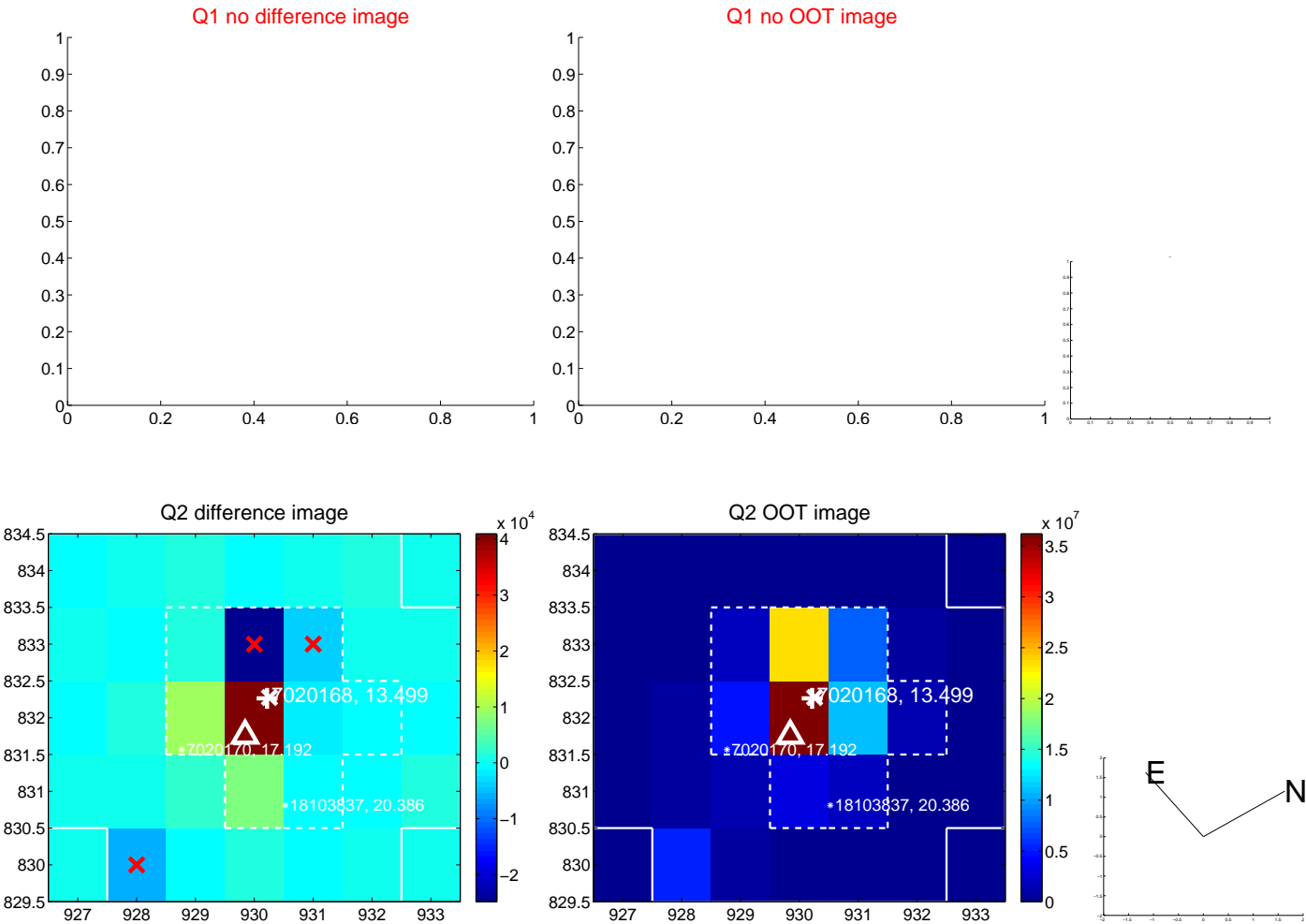


offset from photometric centroids

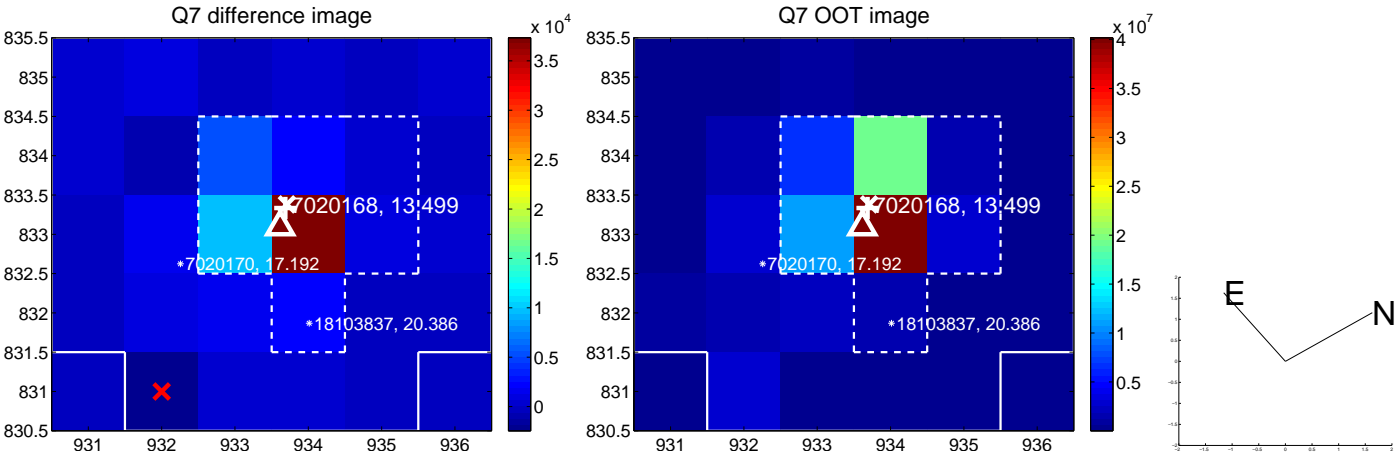
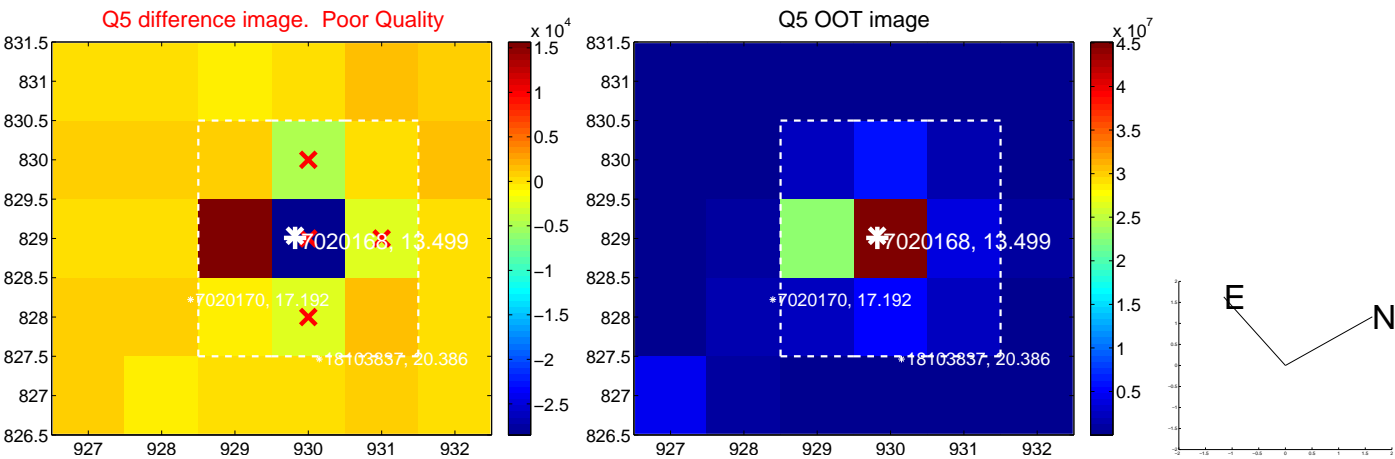


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

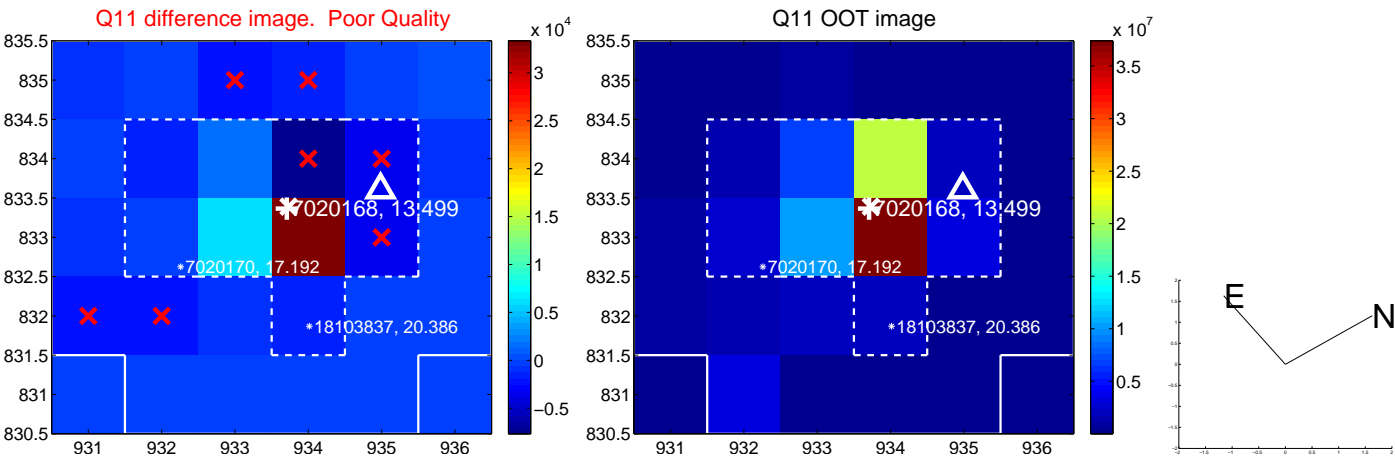
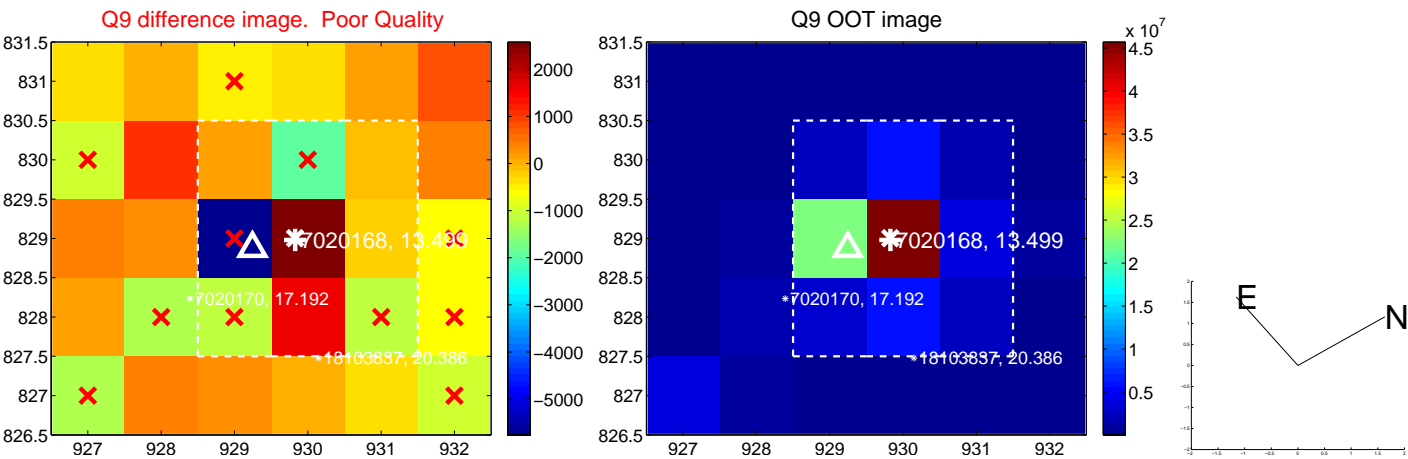
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



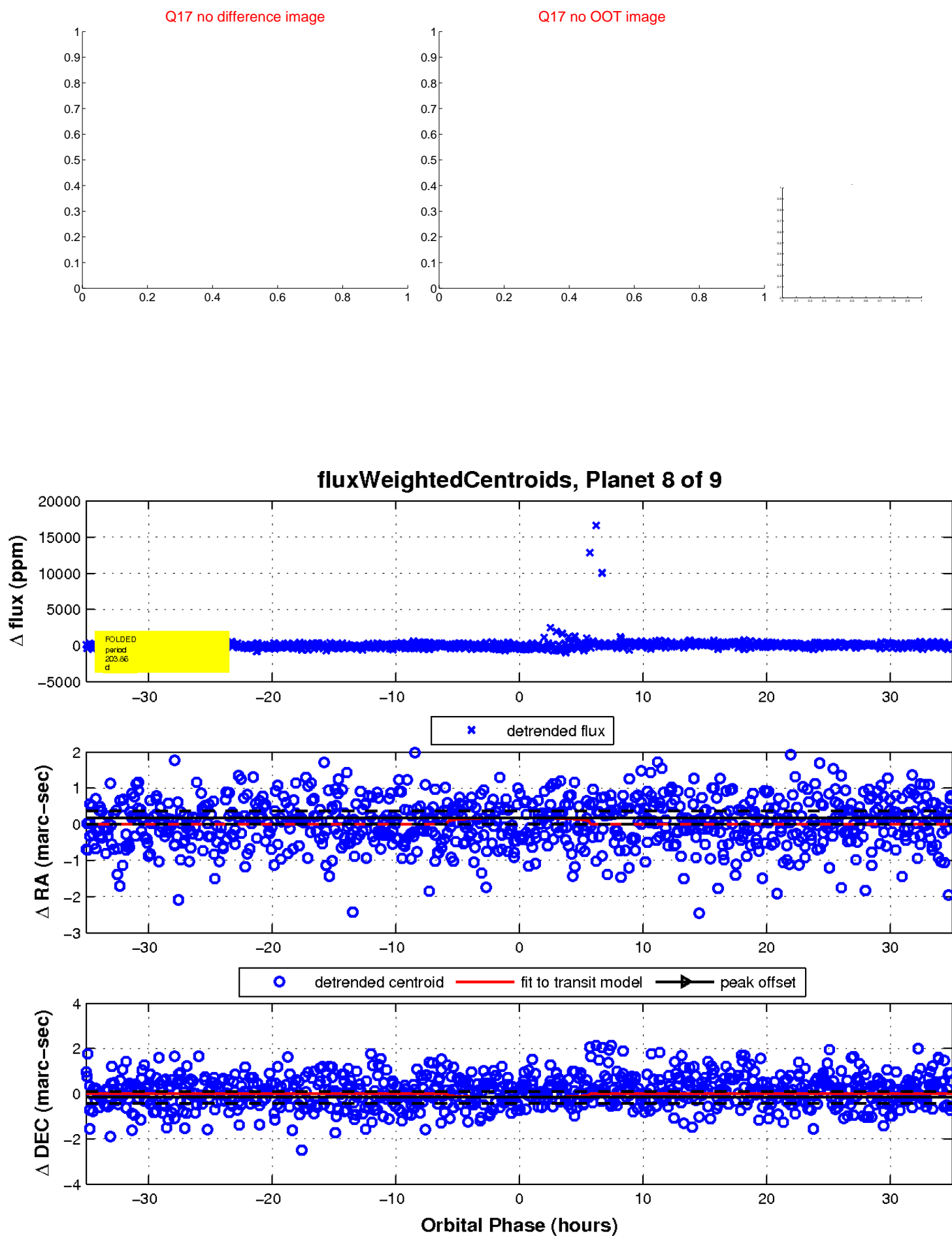
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

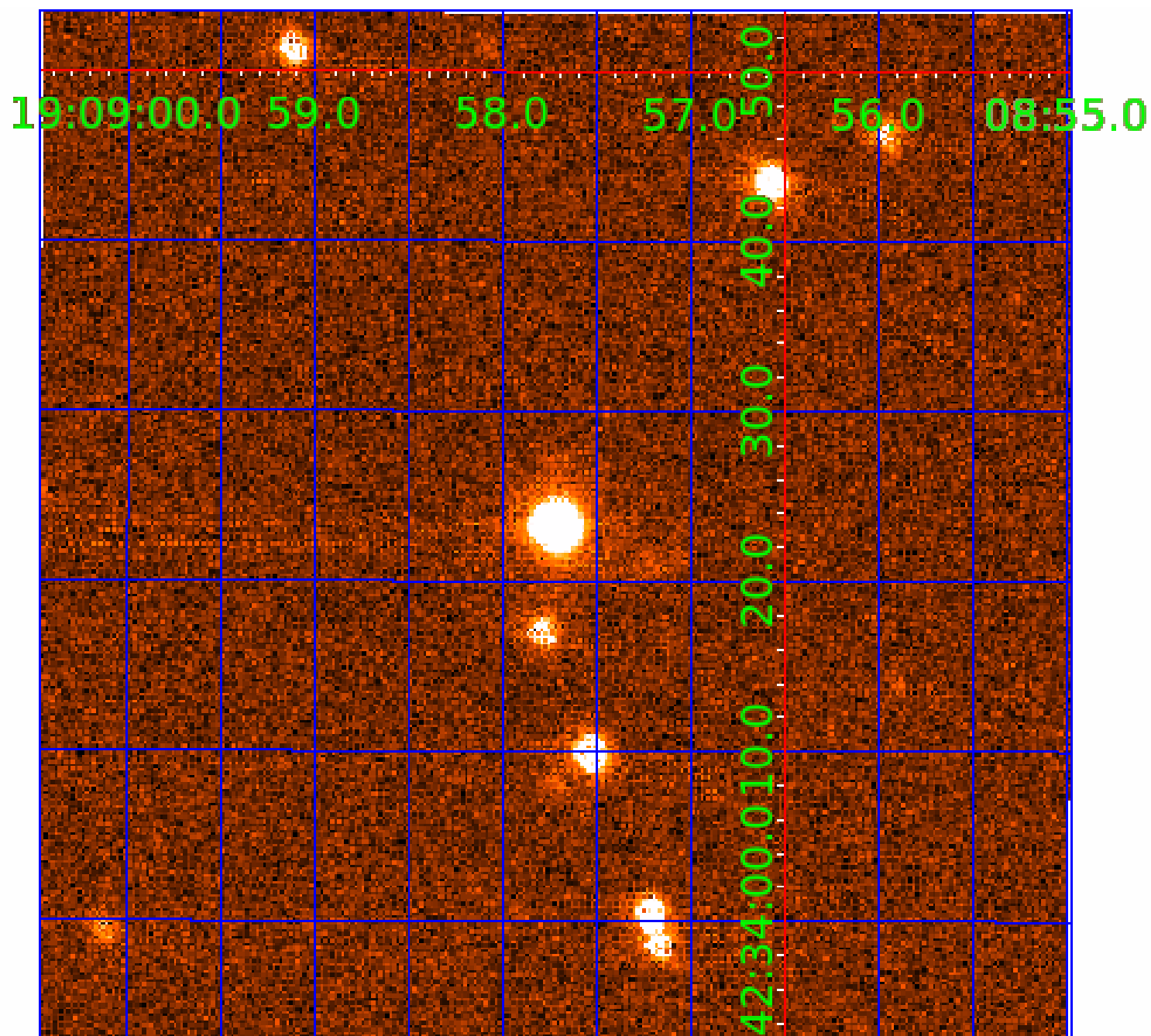


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007020168

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})
007020168-01	OBS	No	404.703285	421.013869	504.4	7.124	12.2	7.1	1.62	5548	3.77	2.09
007020168-02	OBS	No	450.756428	493.681250	600.0	9.642	12.1	7.0	1.62	5548	3.91	1.81
007020168-03	OBS	No	445.023299	541.552939	592.3	4.243	10.7	6.8	1.62	5548	4.28	1.84
007020168-04	OBS	No	384.981850	393.971339	464.6	7.949	11.2	6.2	1.62	5548	3.89	2.23
007020168-05	OBS	No	298.009703	151.243857	421.4	2.789	11.0	6.0	1.62	5548	3.51	3.14
007020168-06	OBS	No	406.738989	290.505478	478.8	15.471	9.9	7.7	1.62	5548	3.62	2.08
007020168-07	OBS	No	333.150670	260.313437	538.3	6.027	10.5	9.8	1.62	5548	4.32	2.71
007020168-08	OBS	8131.01	203.856408	250.561153	276.7	11.690	8.3	5.6	1.62	5548	2.66	5.22
007020168-09	OBS	No	429.731389	239.066442	210.4	7.500	9.2	-1.0	1.62	5548	2.32	1.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007020168-01	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—CENT_FEW_DIFFS
007020168-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
007020168-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007020168-08	OBS	FP	0.26	1	0	0	0	MOD_NONUNIQ_DV—CENT_FEW_DIFFS
007020168-09	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST

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

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

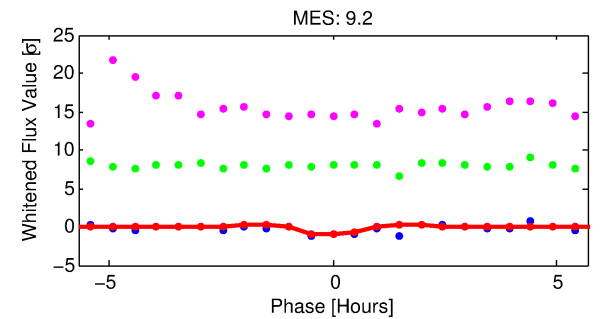
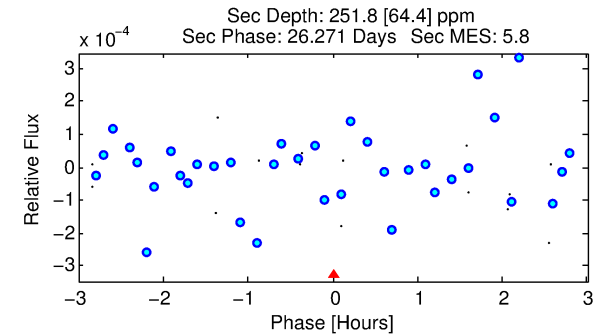
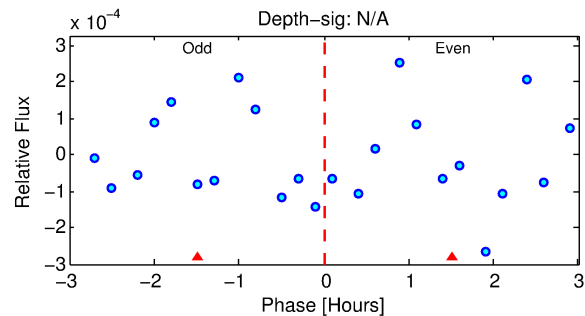
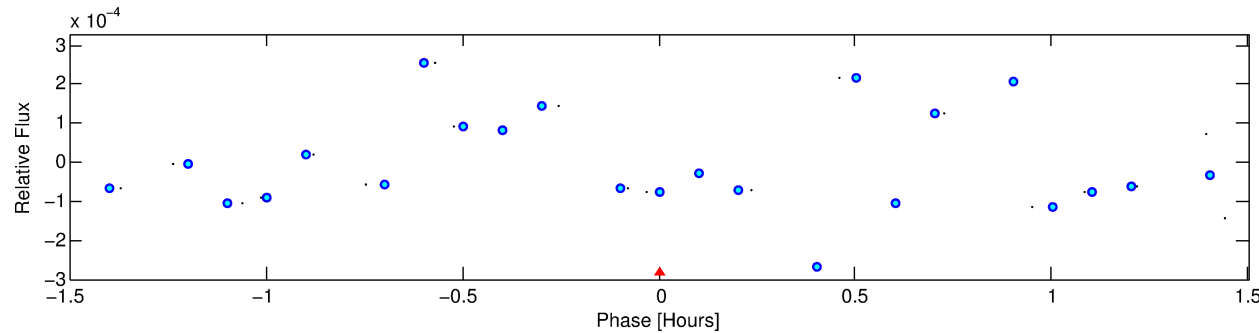
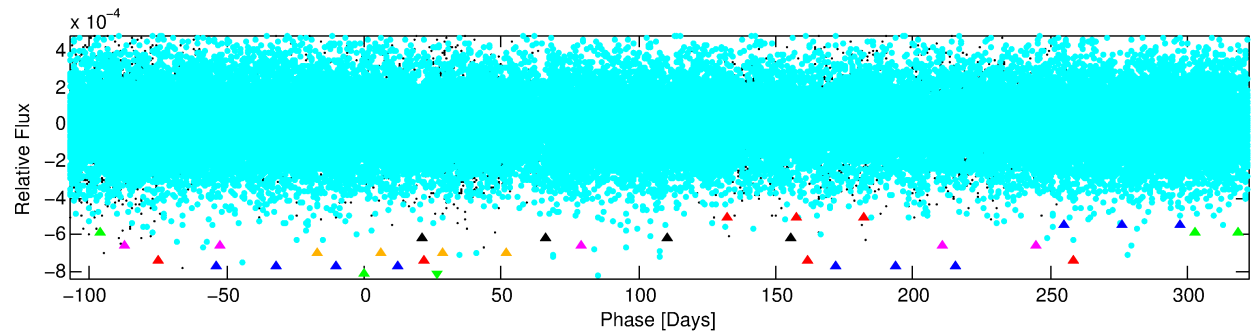
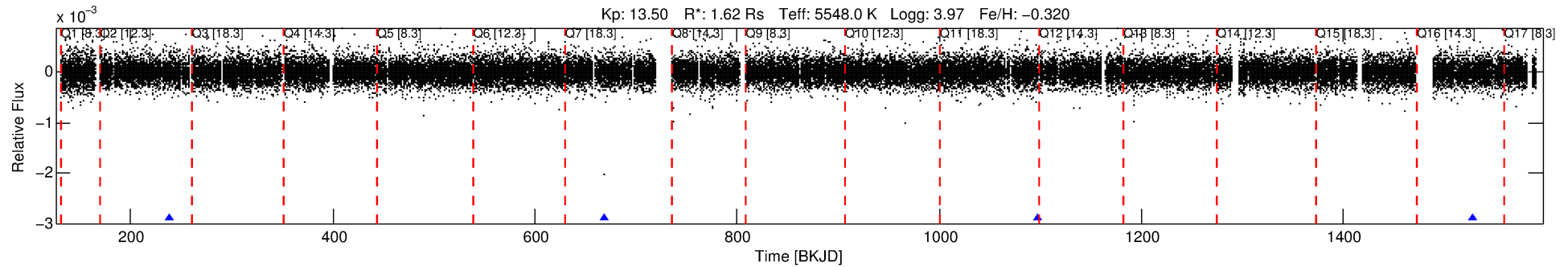
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007020168-09

No Significant Match Found

DV One-Page Summary

KIC: 7020168 Candidate: 9 of 9 Period: 429.731 d



TPS TCE Results:

Period = 429.73139 d
Epoch = 239.0664 BKJD

DV fit results are unavailable

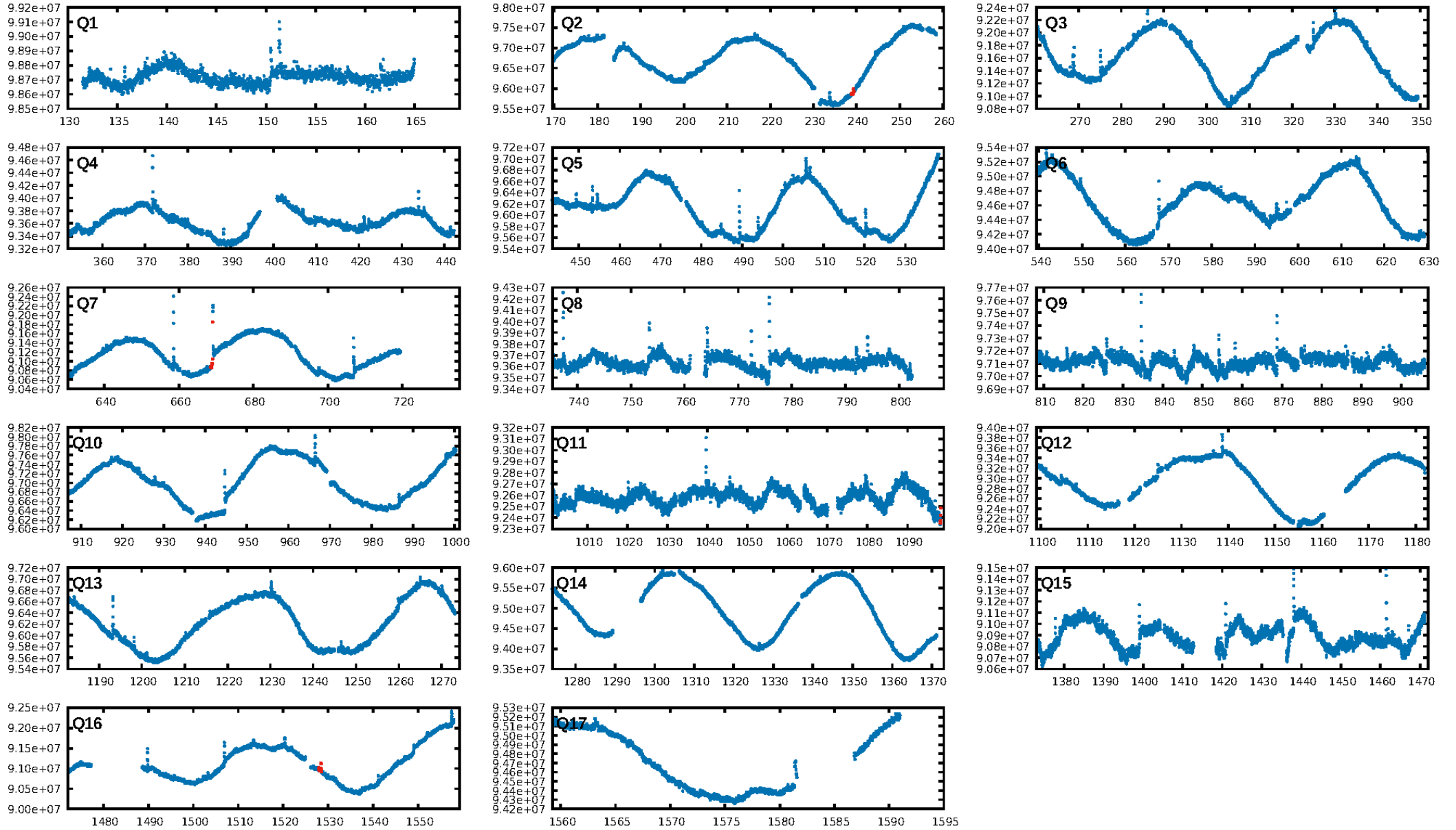
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [32.10σ]
LongPeriod-sig: 100.0% [42.59σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -0.1925
Centroid-sig: 68.3%
Centroid-so: 14.806 arcsec [0.57σ]
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: 1.00 [3/3]

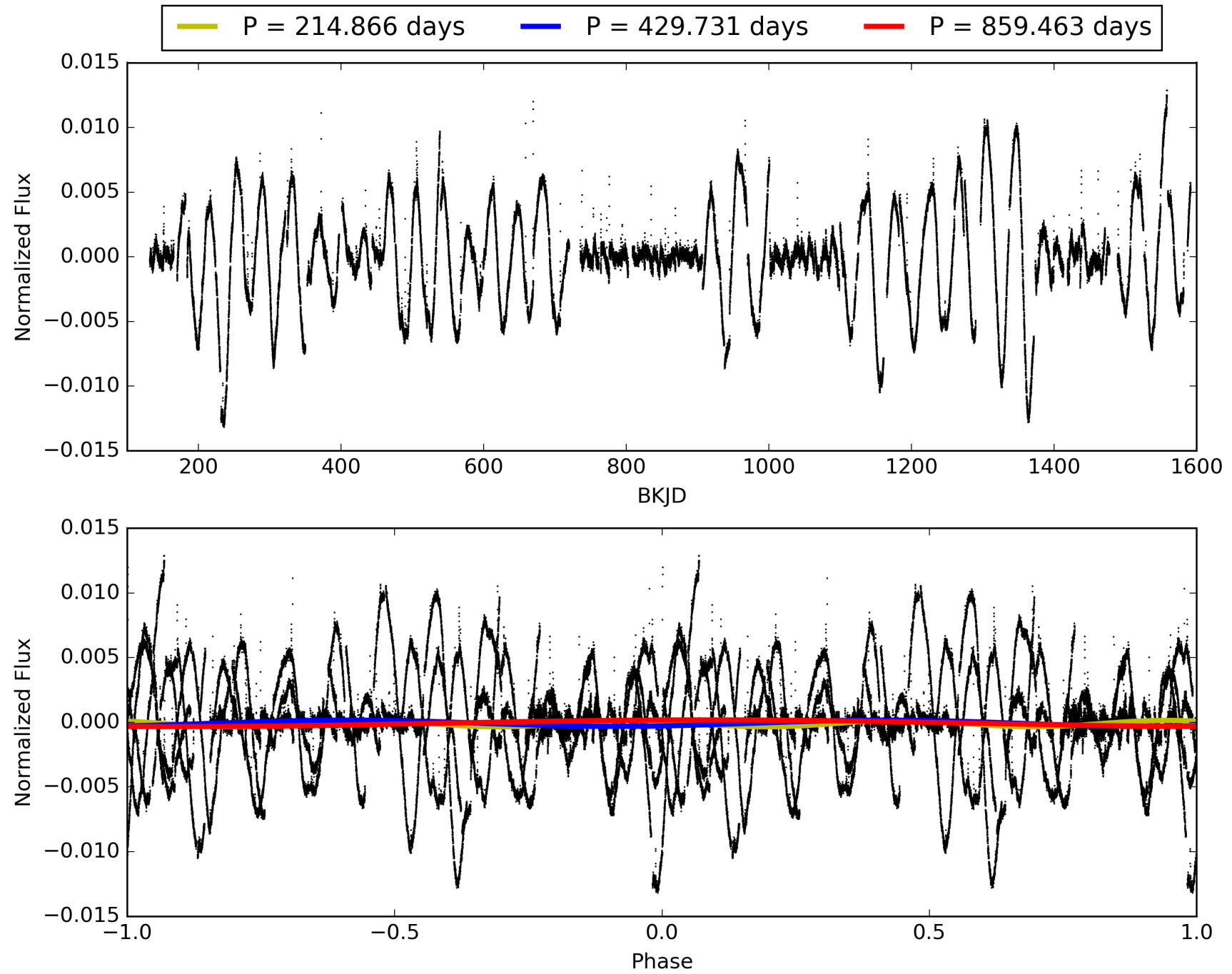
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:23:41 Z

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

TCE 007020168-09, PDC Light Curves

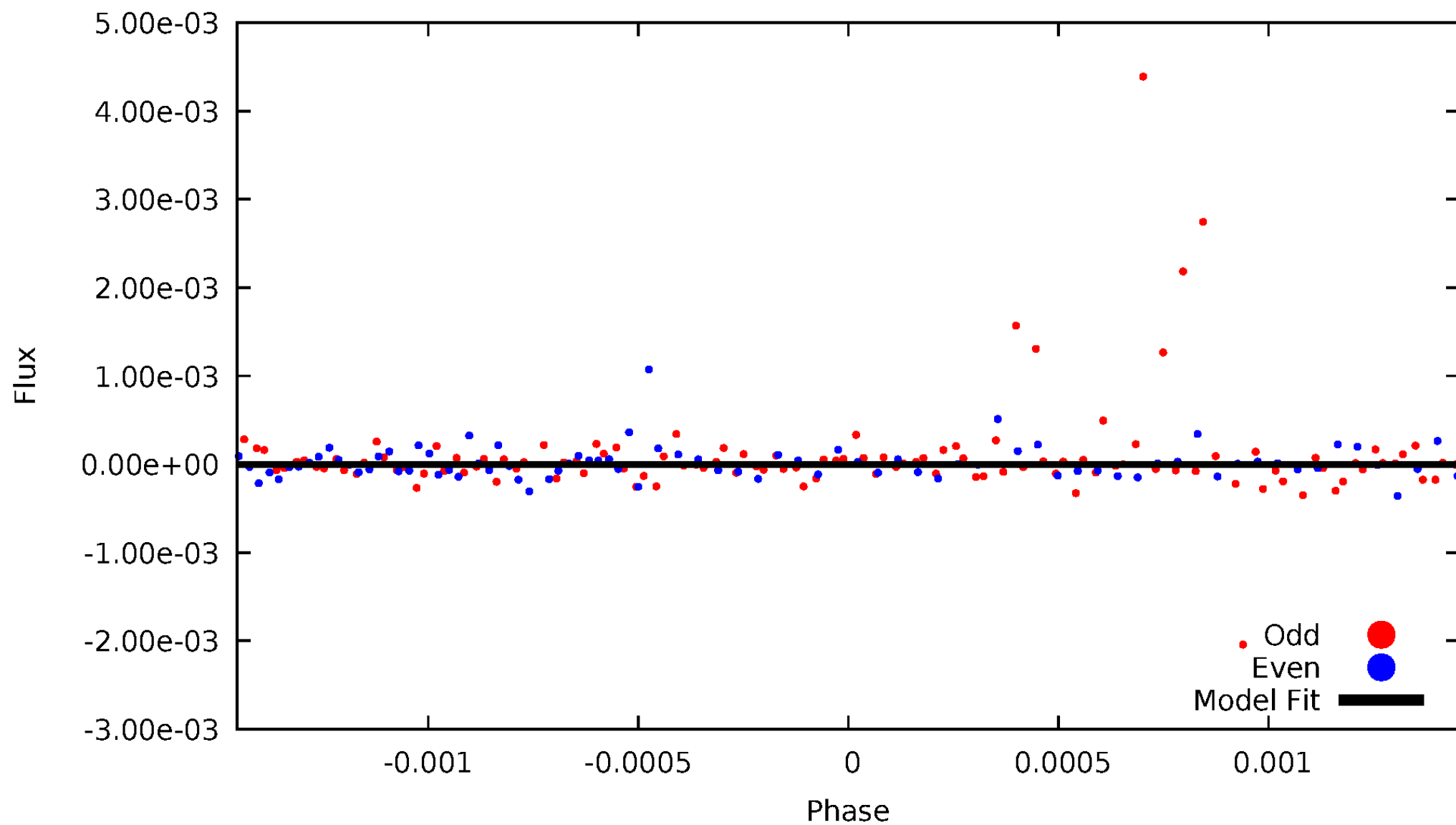


TCE 007020168-09



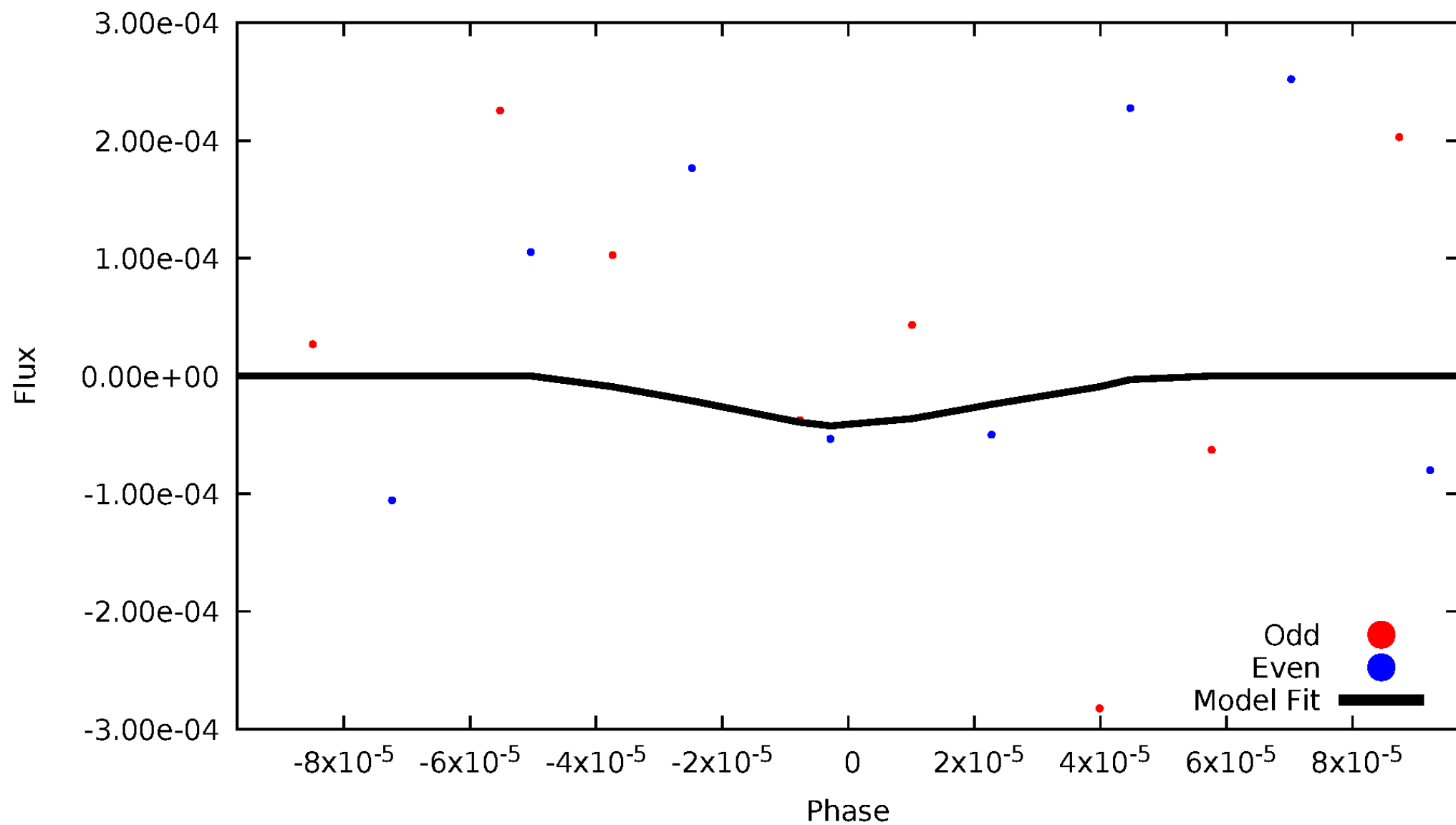
DV Odd/Even

TCE 007020168-09



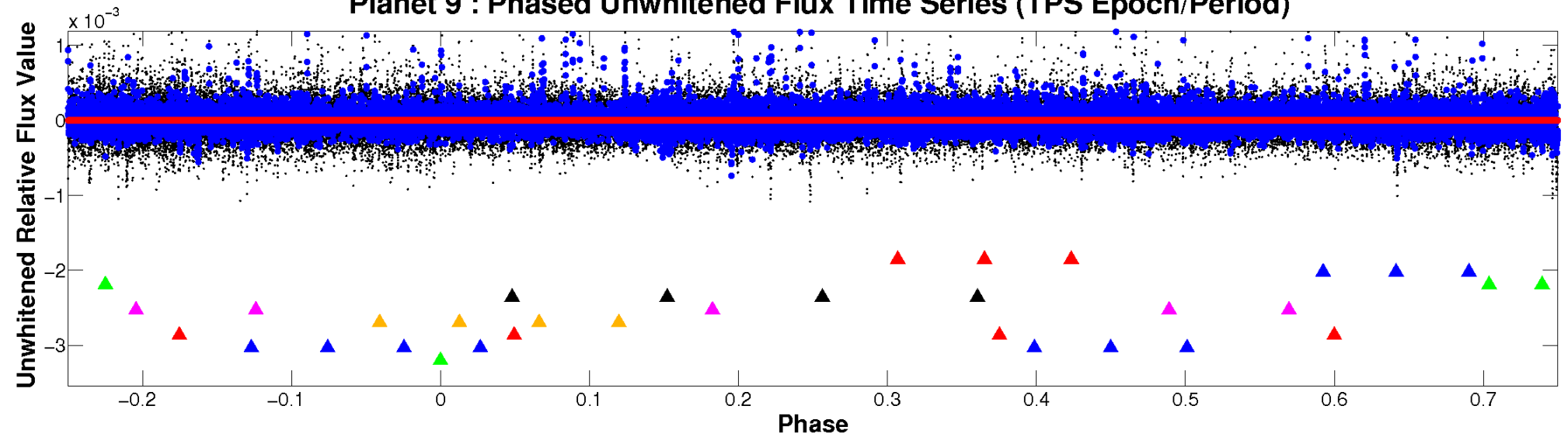
ALT Odd/Even

TCE 007020168-09



Non-Whitened Vs. Whitened Light Curve

Planet 9 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

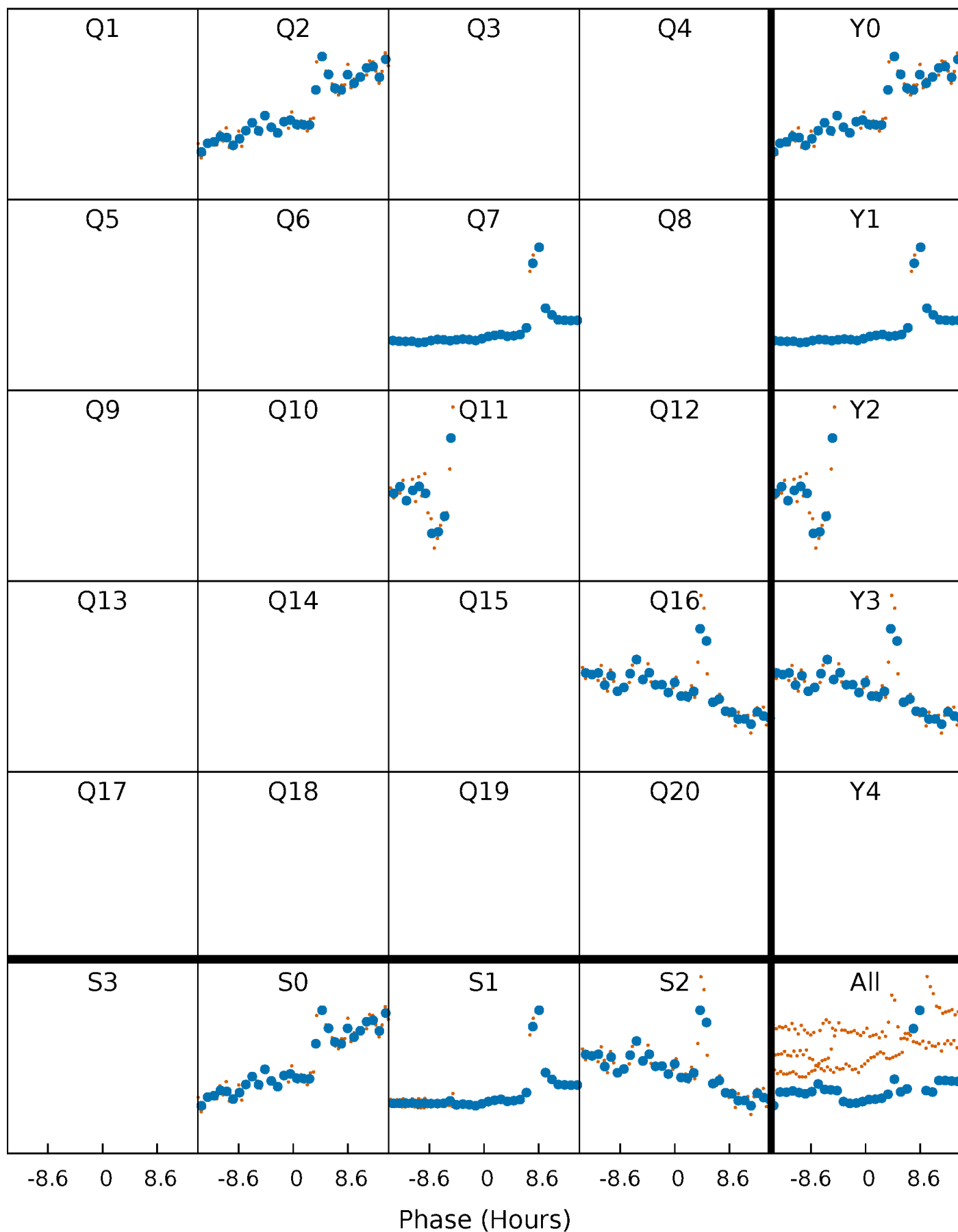


Planet 9 : Phased Whitened Flux Time Series (TPS Epoch/Period)



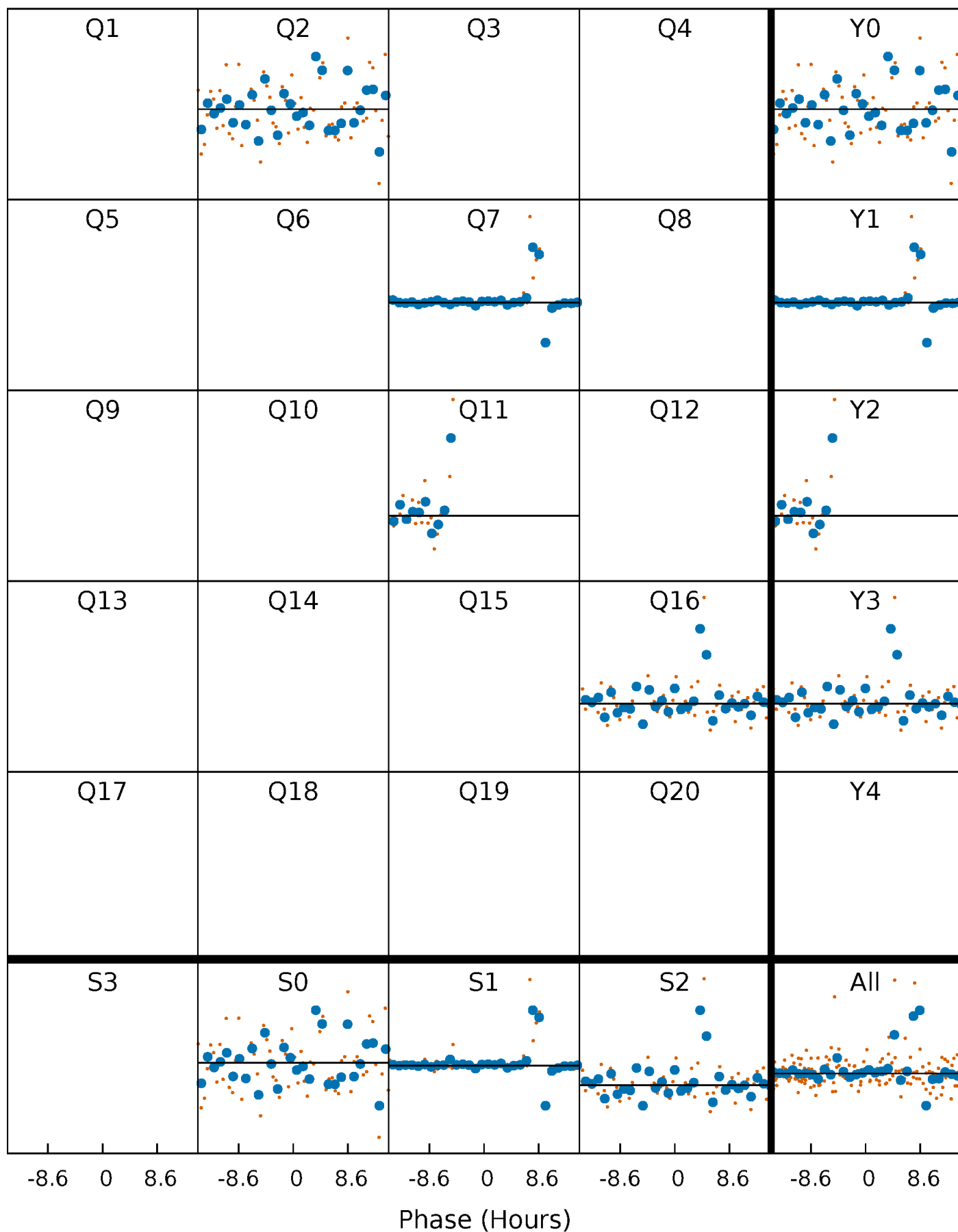
PDC Quarter-Phased Transit Curves

TCE 007020168-09 P=429.731389 Days $T_0=239.066442$ (BKJD)



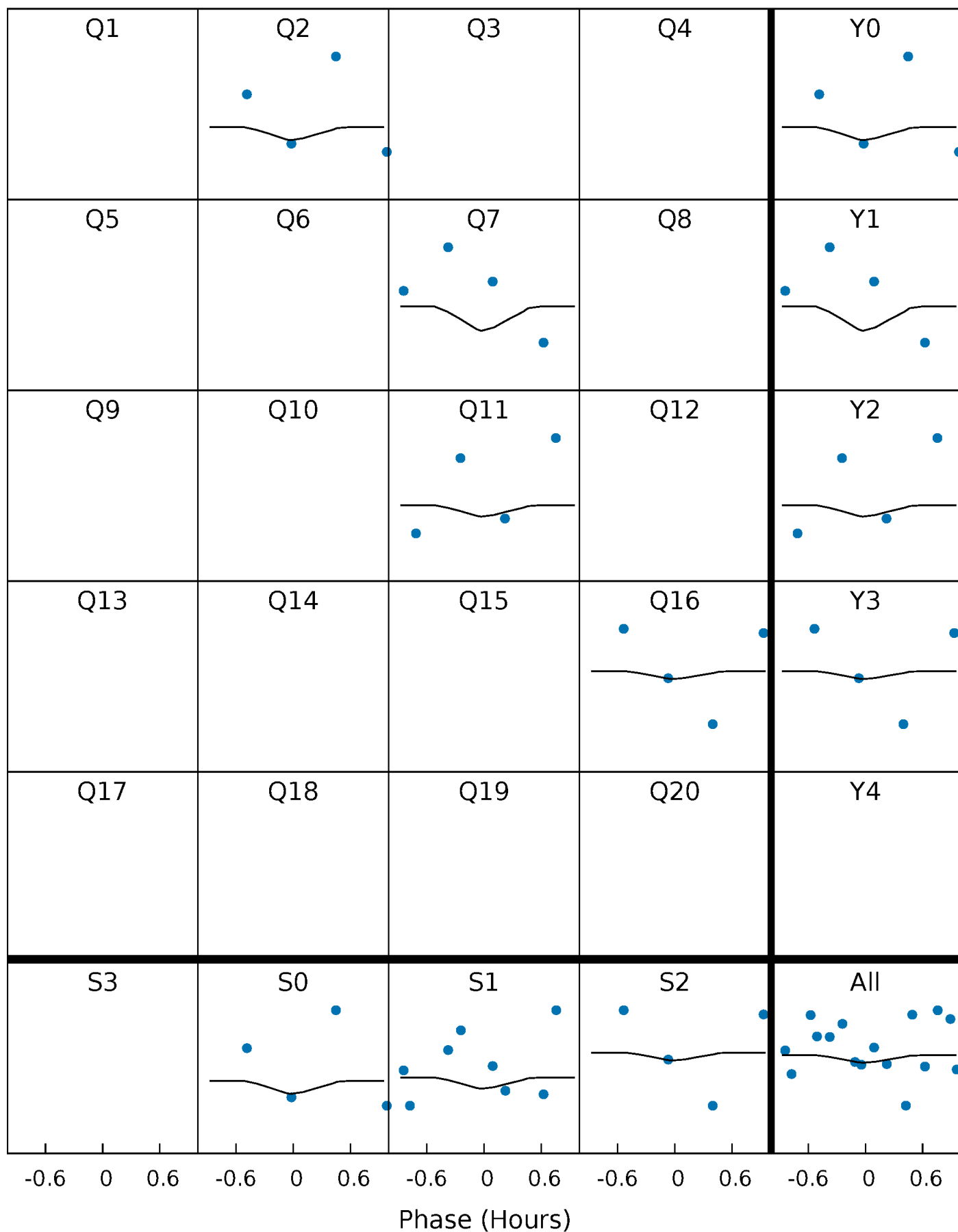
DV Quarter-Phased Transit Curves

TCE 007020168-09 $P=429.731389$ Days $T_0=239.066442$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

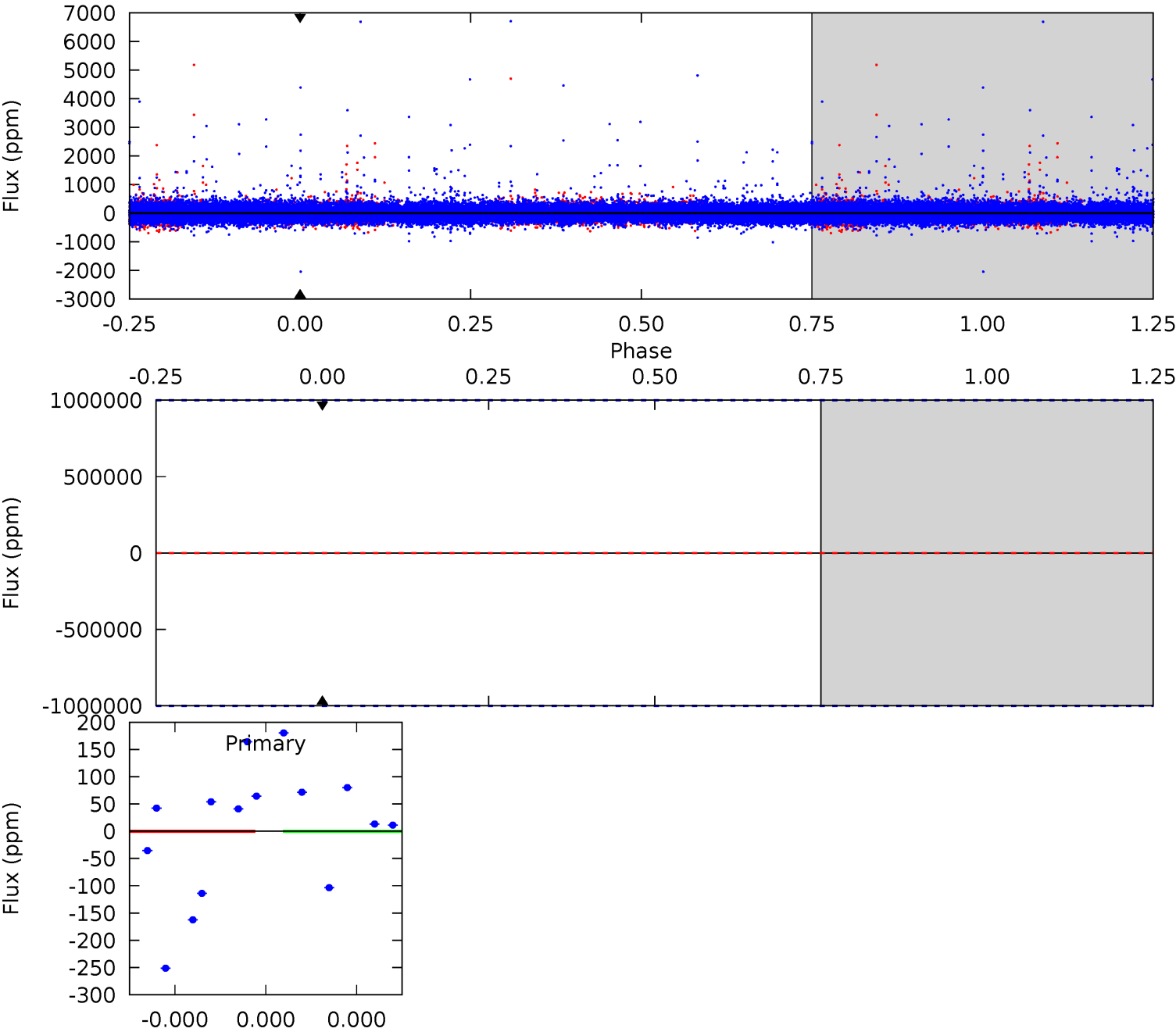
TCE 007020168-09 P=429.731389 Days $T_0=238.607669$ (BKJD)



DV Model-Shift Uniqueness Test

007020168-09, P = 429.731389 Days, E = 239.066442 Days

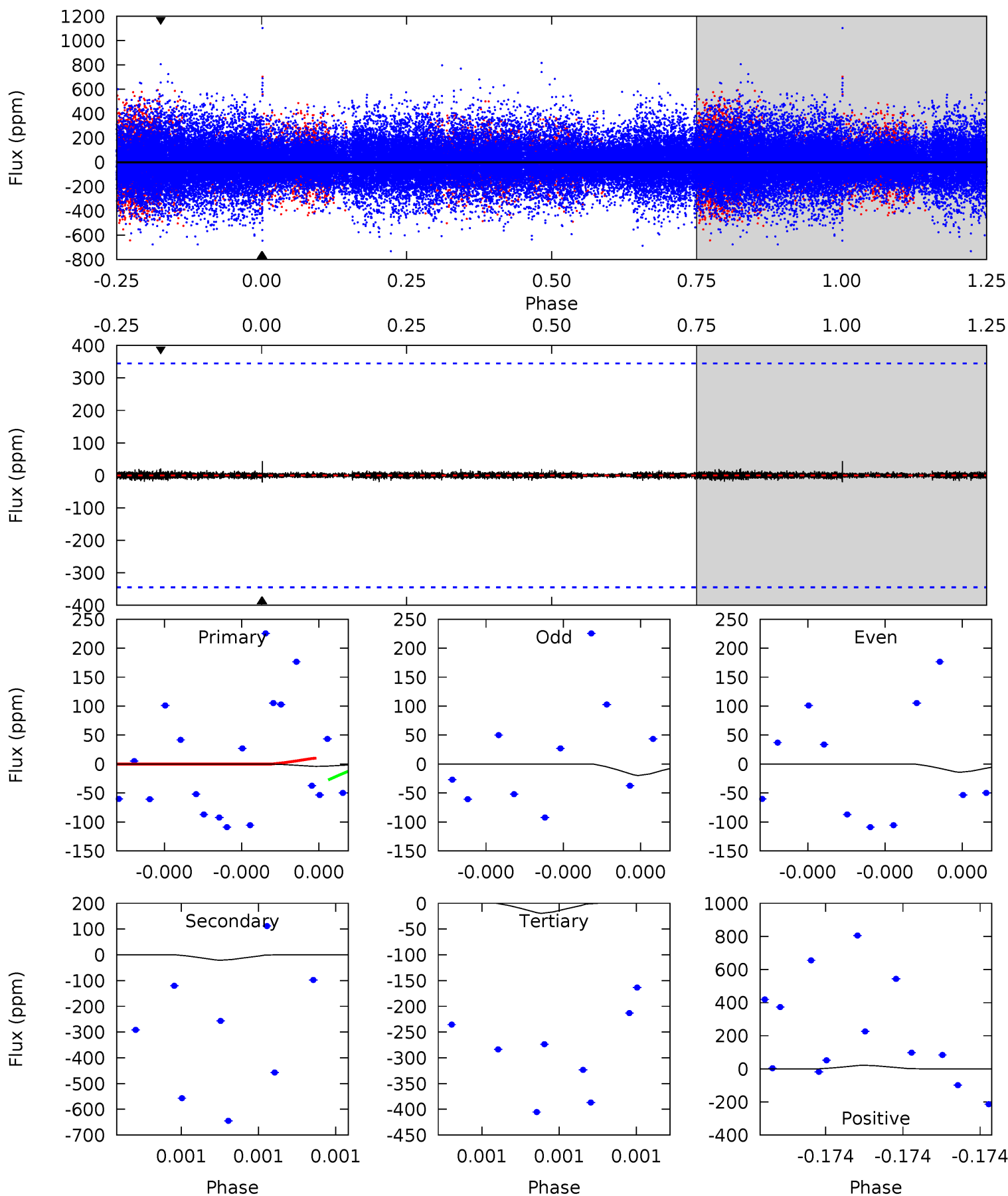
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

007020168-09, P = 429.731389 Days, E = 238.607669 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.07	0.36	0.33	0.37	5.88	3.94	0.07	-0.26	-0.30	0.03	-0.01	0.05	0.48	0.67	0.15



Stellar Parameters For KIC 007020168

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5548^{+183}_{-133}	$3.970^{+0.532}_{-0.228}$	$-0.320^{+0.350}_{-0.250}$	$1.616^{+0.623}_{-0.761}$	$0.889^{+0.109}_{-0.109}$	$0.297^{+1.663}_{-0.160}$
	+3%/-2%	+13%/-6%	+109%/-78%	+39%/-47%	+12%/-12%	+561%/-54%
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 007020168-09 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$12.29^{+13.67}_{-8.89}$	412^{+46}_{-54}	4501^{+16549}_{-22010}	$8522^{+934133}_{-645086}$
Alt.	-21 ± 59	$11.48^{+13.78}_{-8.03}$	414^{+46}_{-54}	2161^{+1001}_{-4739}	52^{+940}_{-285}

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

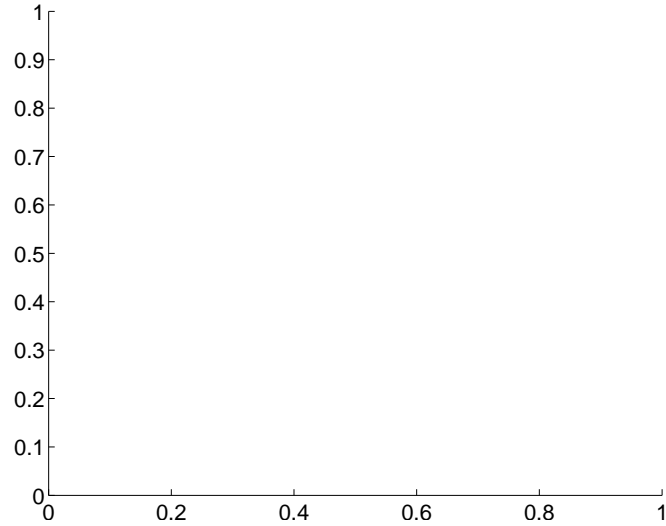
Supplemental centroid analysis for 007020168-09. Kepler magnitude: 13.50. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

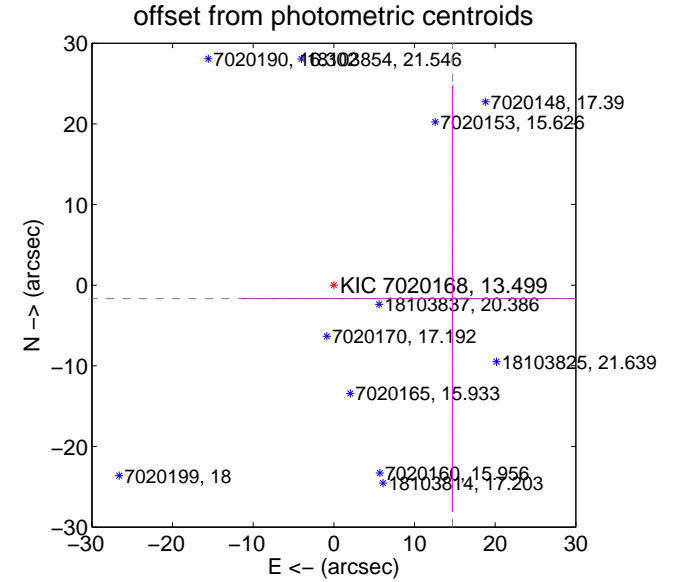
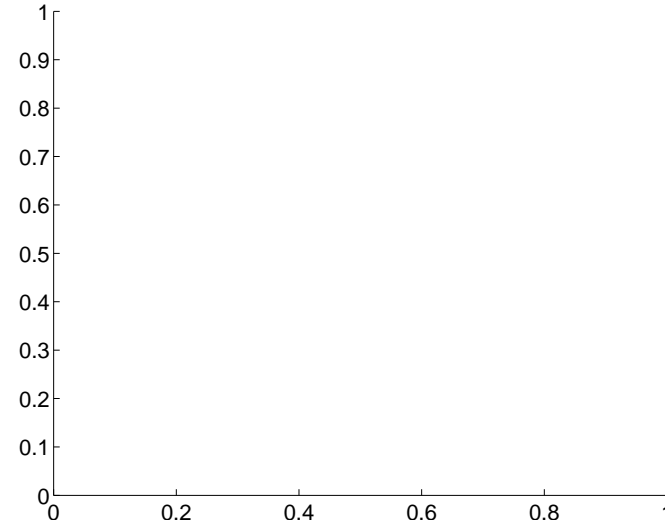
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	14.81 ± 26.14	0.57	-14.71 ± 26.13	-1.67 ± 26.44

There is no PRF-fit offset from OOT-fit

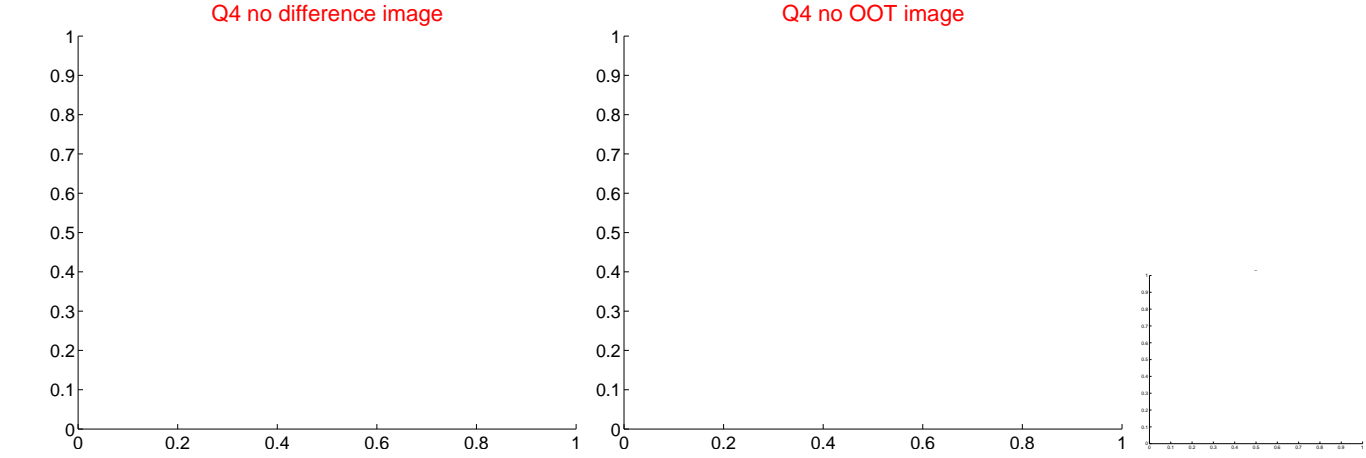
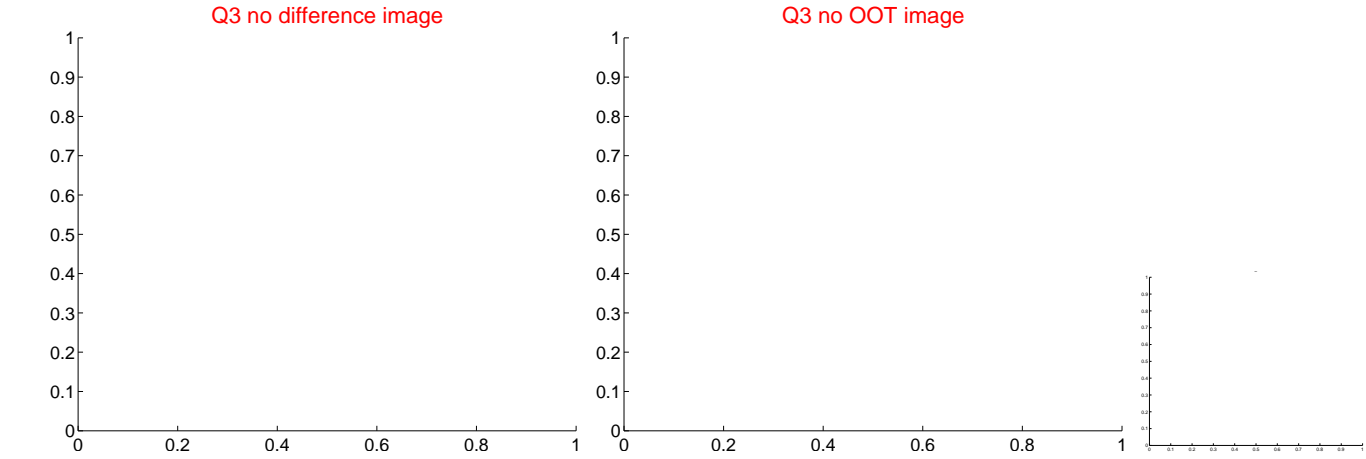
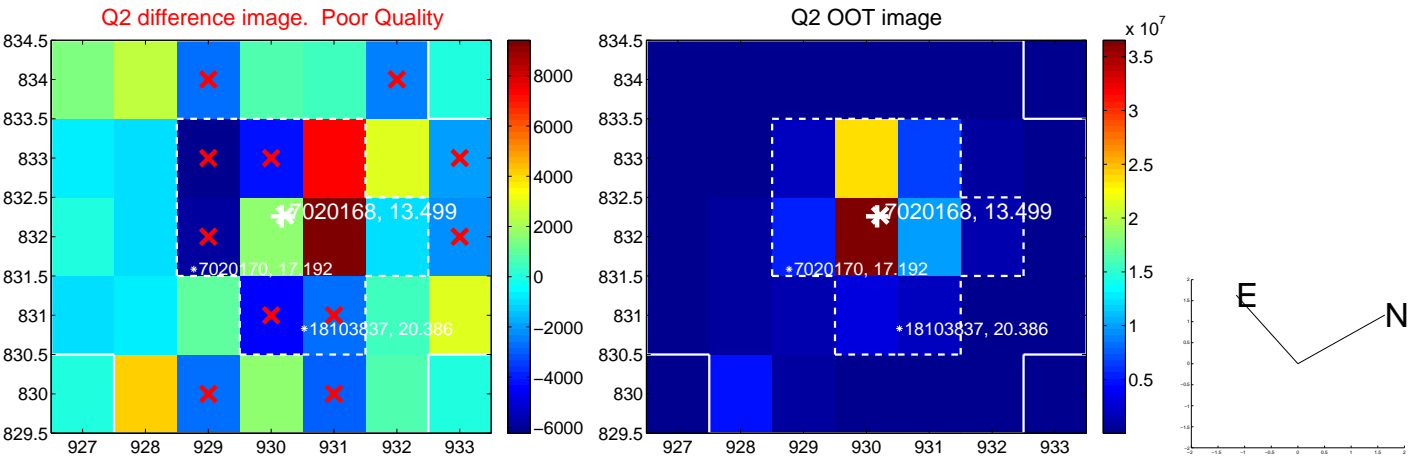
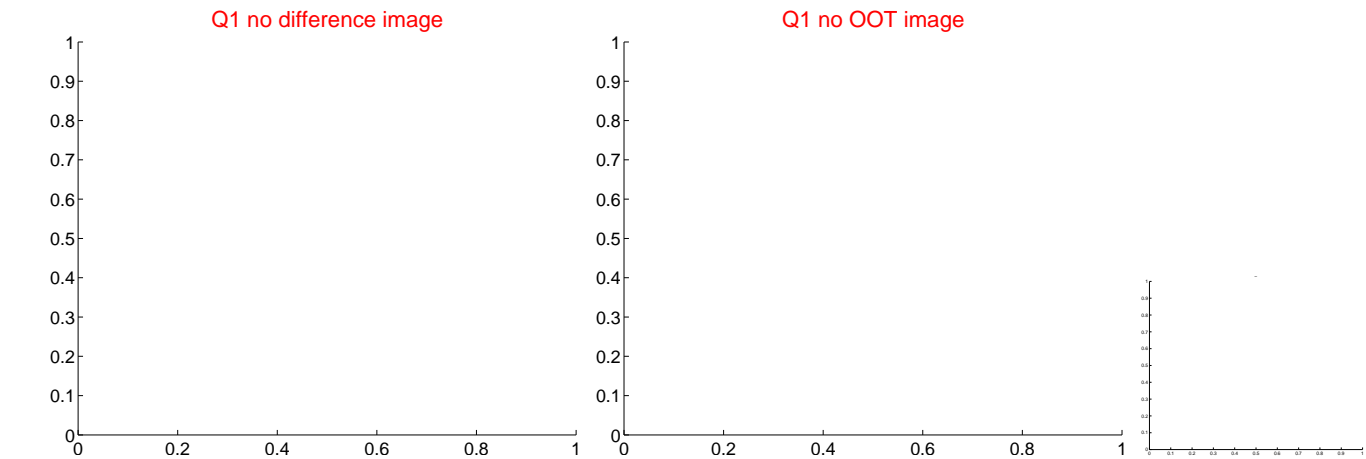


There is no PRF-fit offset from KIC

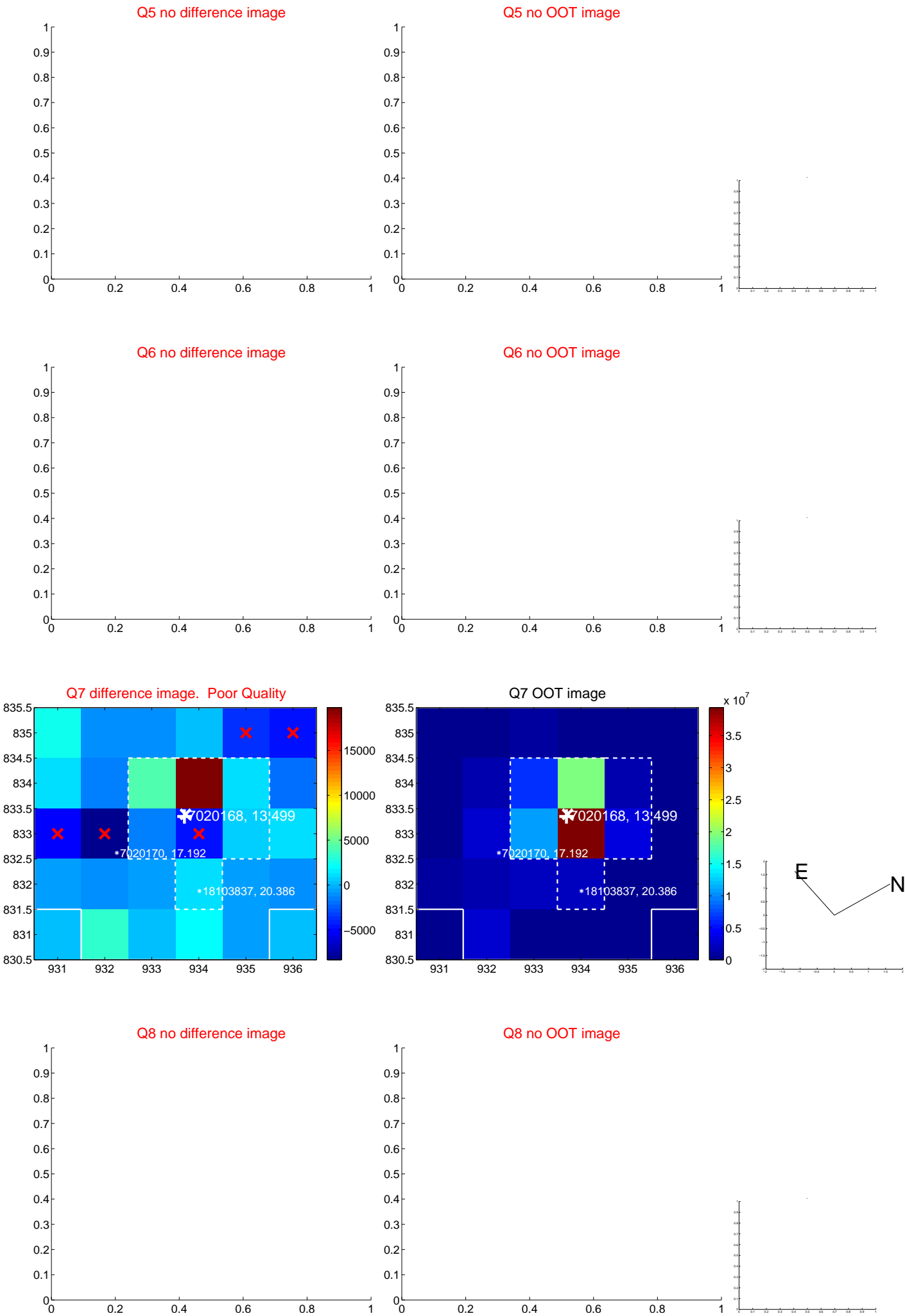


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



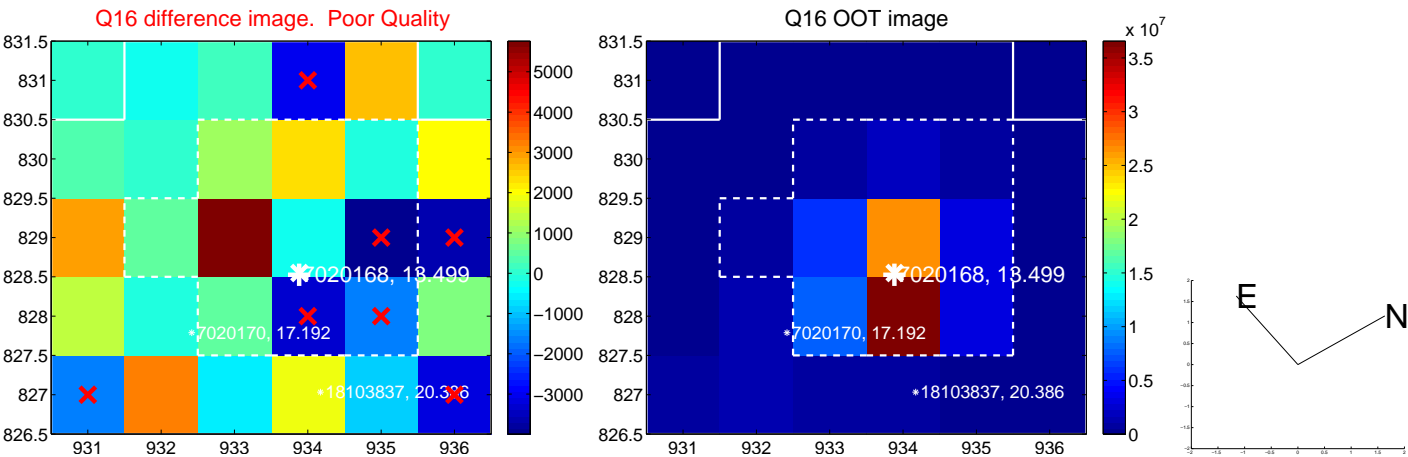
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



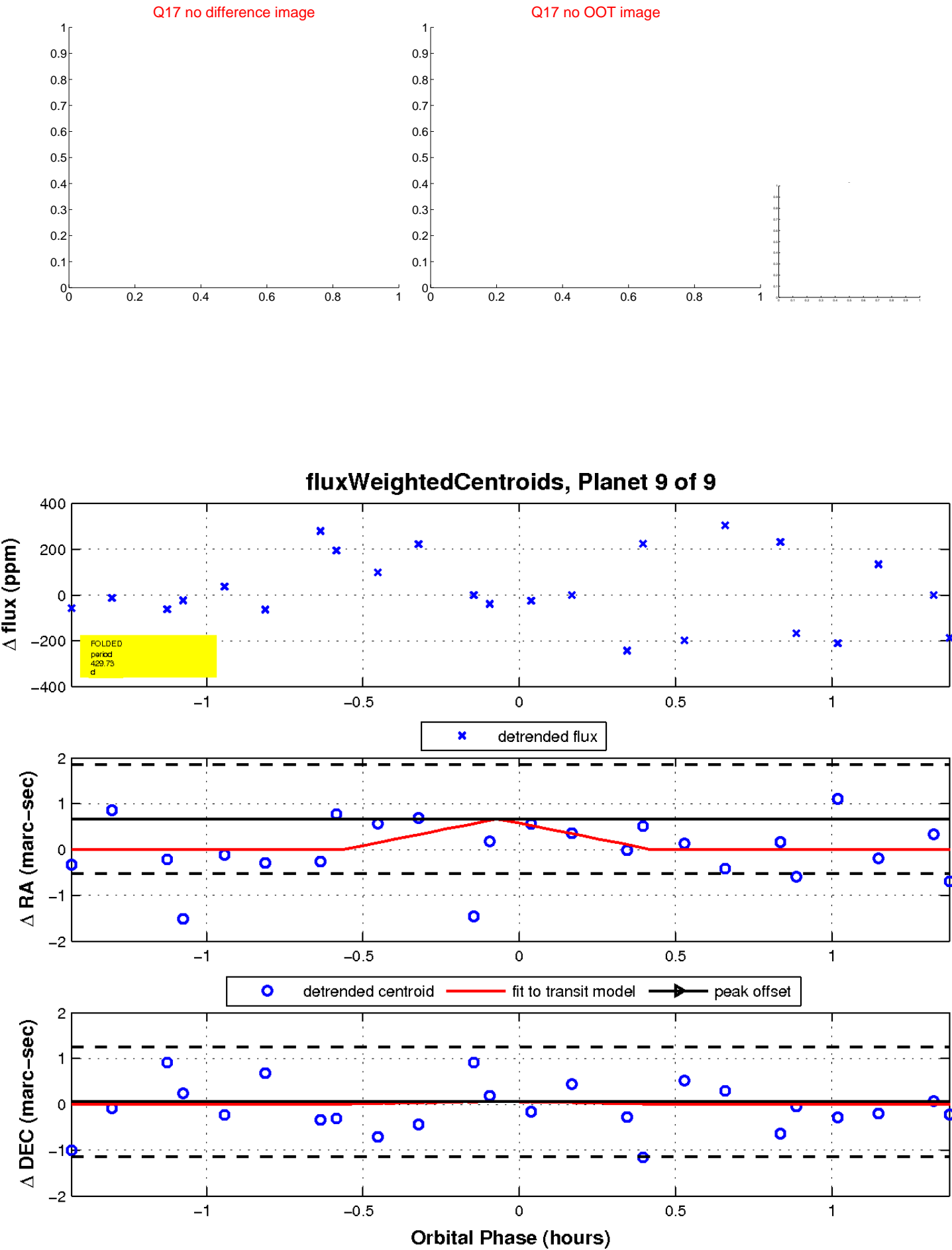
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UKIRT Image

Declination

