

KIC 010220756

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})
010220756-01	OBS	No	285.136931	186.884524	641.2	3.436	15.3	9.3	1.17	6015	3.39	2.46
010220756-02	OBS	No	310.981075	323.266450	705.9	10.887	19.0	4.4	1.17	6015	3.87	2.19
010220756-03	OBS	No	307.822148	271.056381	708.0	5.179	17.1	8.6	1.17	6015	3.14	2.22
010220756-04	OBS	No	198.461428	222.670194	420.6	2.294	17.8	5.6	1.17	6015	2.47	3.99
010220756-05	OBS	No	222.208933	277.030112	476.2	3.199	12.4	6.2	1.17	6015	2.59	3.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010220756-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
010220756-02	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
010220756-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

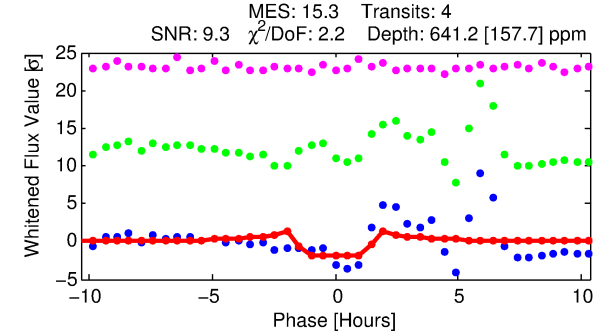
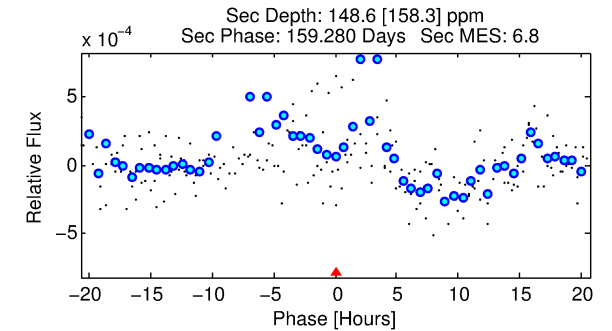
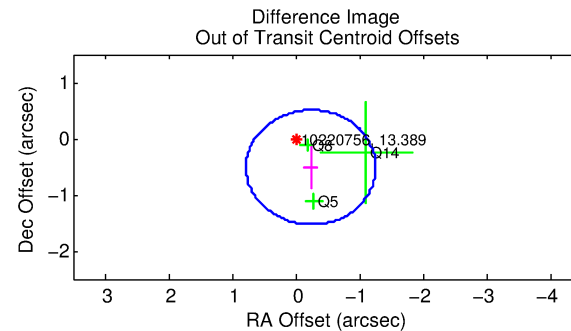
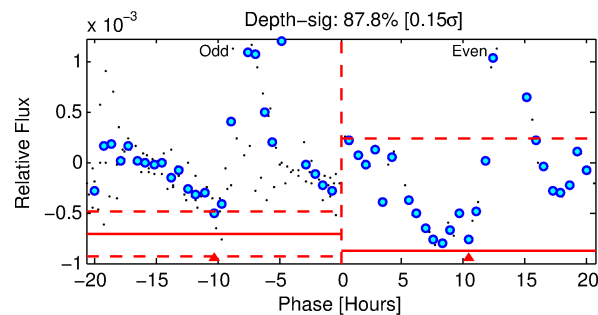
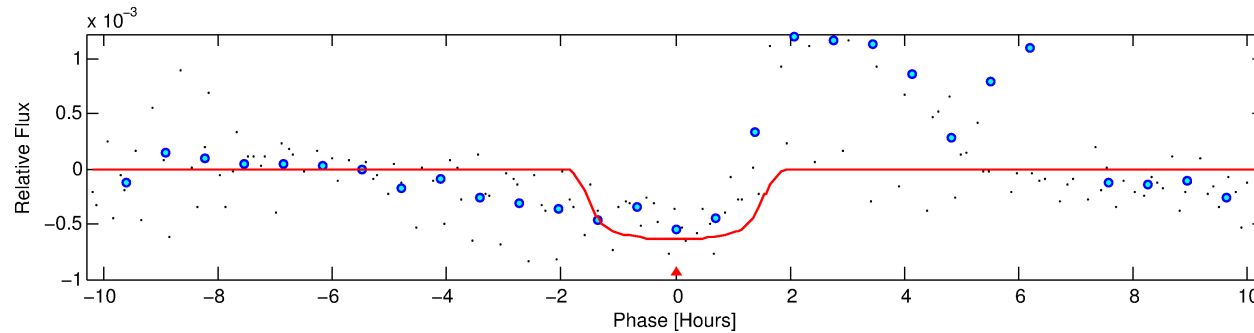
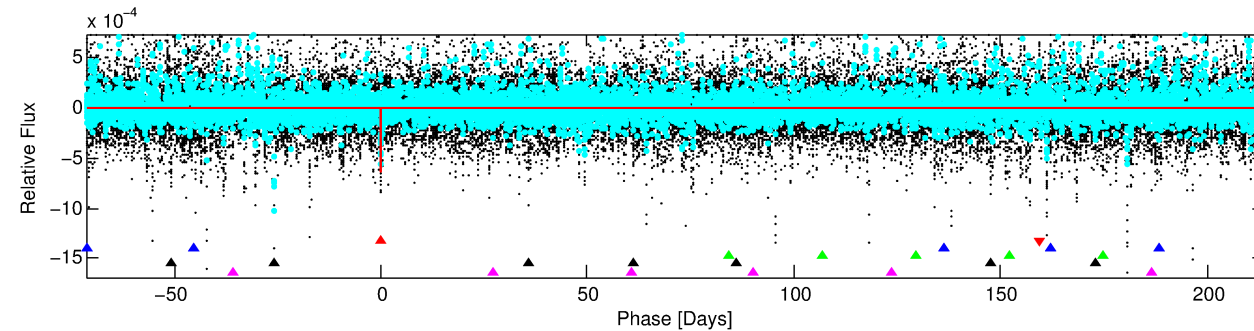
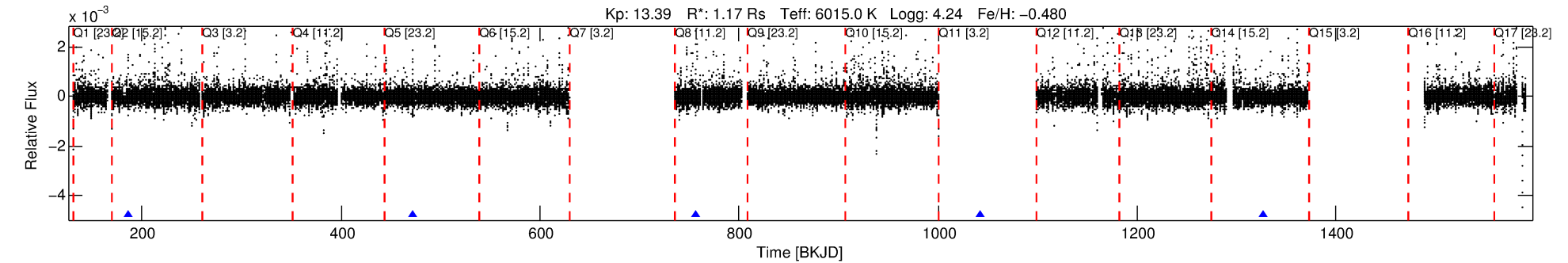
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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

Ephemeris Match Information For 010220756-01

No Significant Match Found

KIC: 10220756 Candidate: 1 of 5 Period: 285.137 d



DV Fit Results:

Period = 285.13693 [0.00354] d
Epoch = 186.8845 [0.0087] BKJD
Rp/R* = 0.0265 [0.0116]
a/R* = 355.88 [735.50]
b = 0.86 [0.63]

Seff = 2.46 [1.11]
Teq = 319 [36] K
Rp = 3.39 [1.75] Re
a = 0.8107 [0.2179] AU

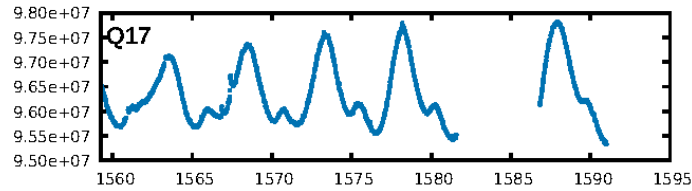
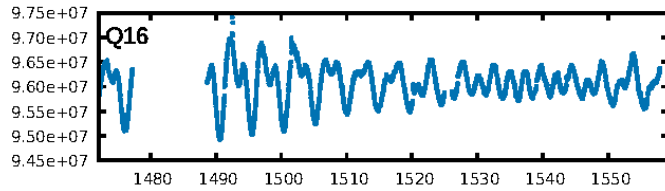
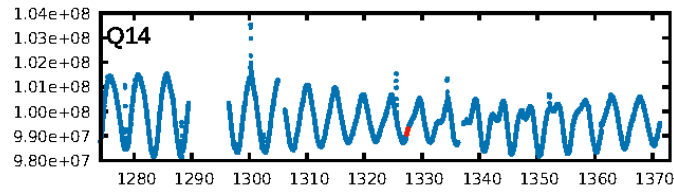
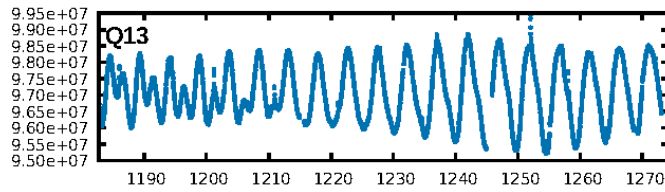
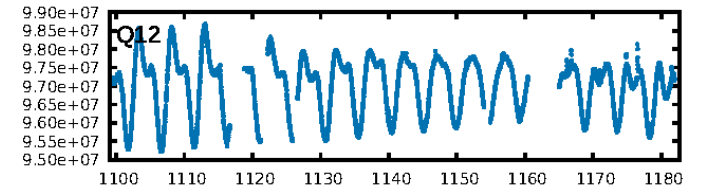
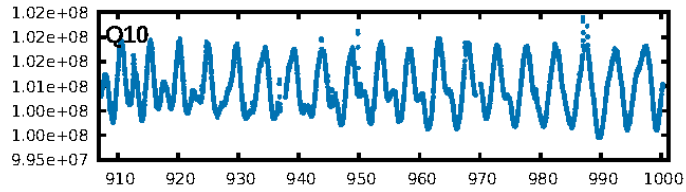
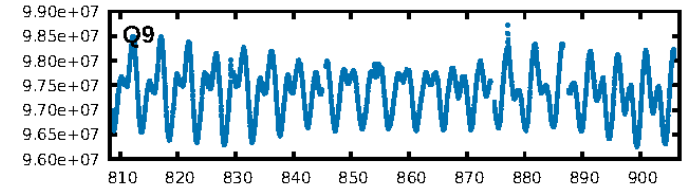
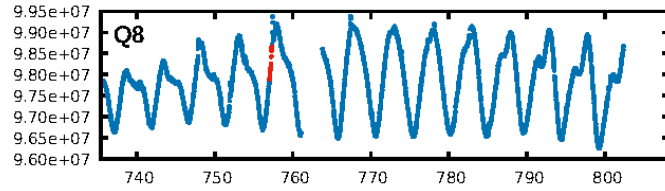
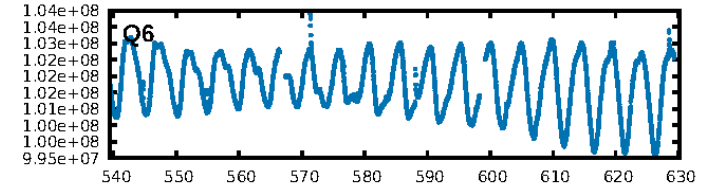
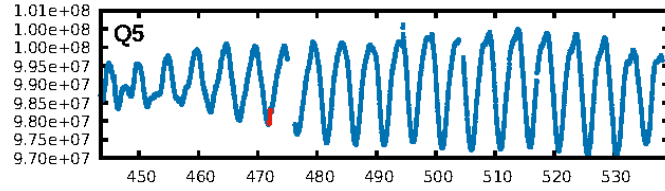
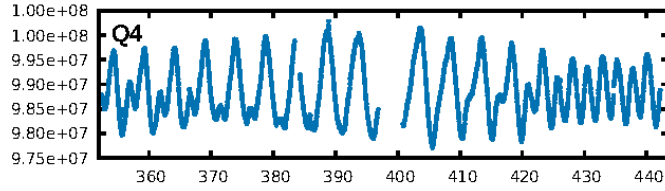
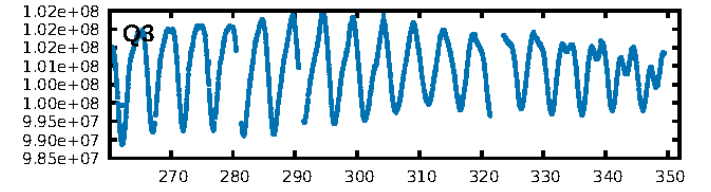
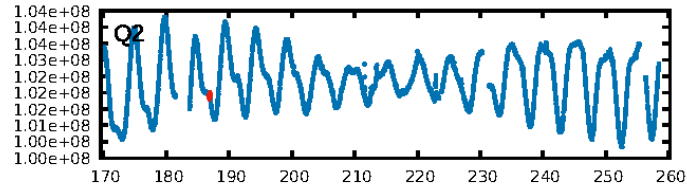
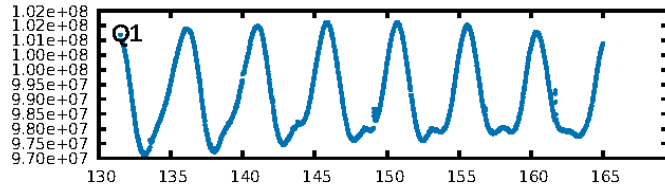
Ag = 4670.90 [6753.90] [0.69σ]
Teffp = 4082 [1412] K [2.66σ]

DV Diagnostic Results:

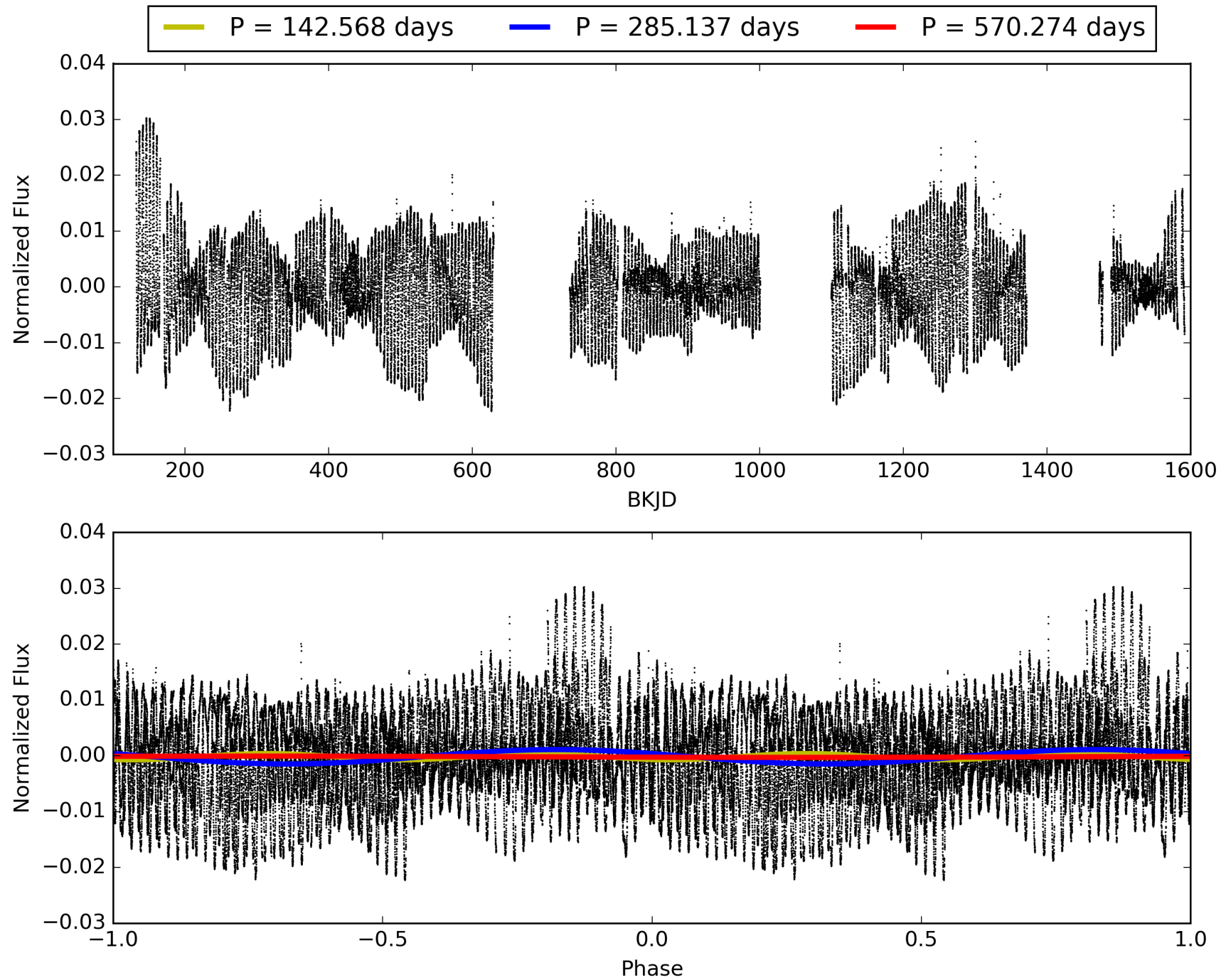
ShortPeriod-sig: 100.0% [321.73σ]
LongPeriod-sig: 100.0% [87.60σ]
ModelChiSquare2-sig: 3.3%
ModelChiSquareGof-sig: 11.5%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -2.421

Centroid-sig: 0.3%
Centroid-so: 1.288 arcsec [1.62σ]
OotOffset-rm: 0.566 arcsec [1.66σ]
KicOffset-rm: 0.552 arcsec [1.65σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [4/4]

TCE 010220756-01, PDC Light Curves

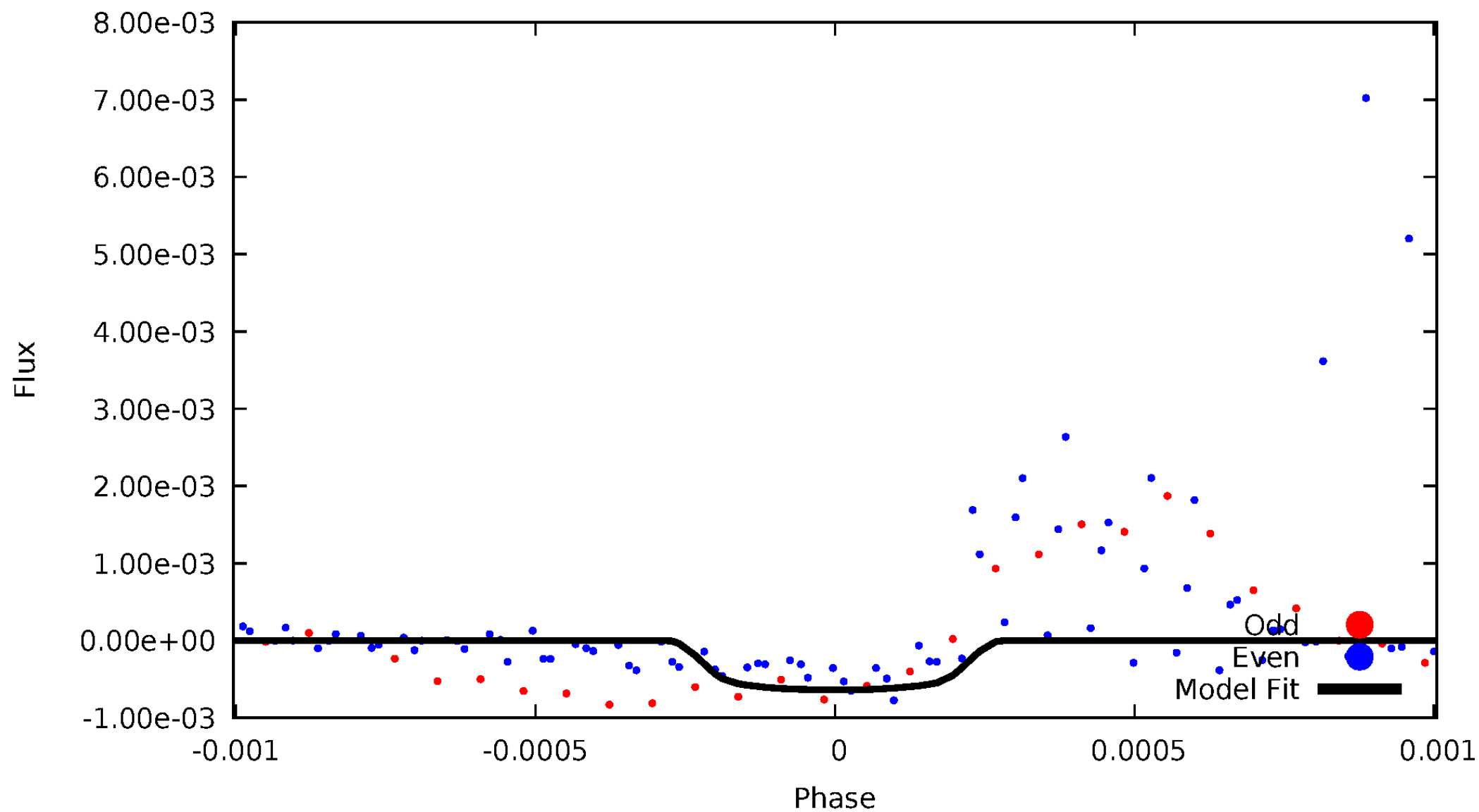


TCE 010220756-01



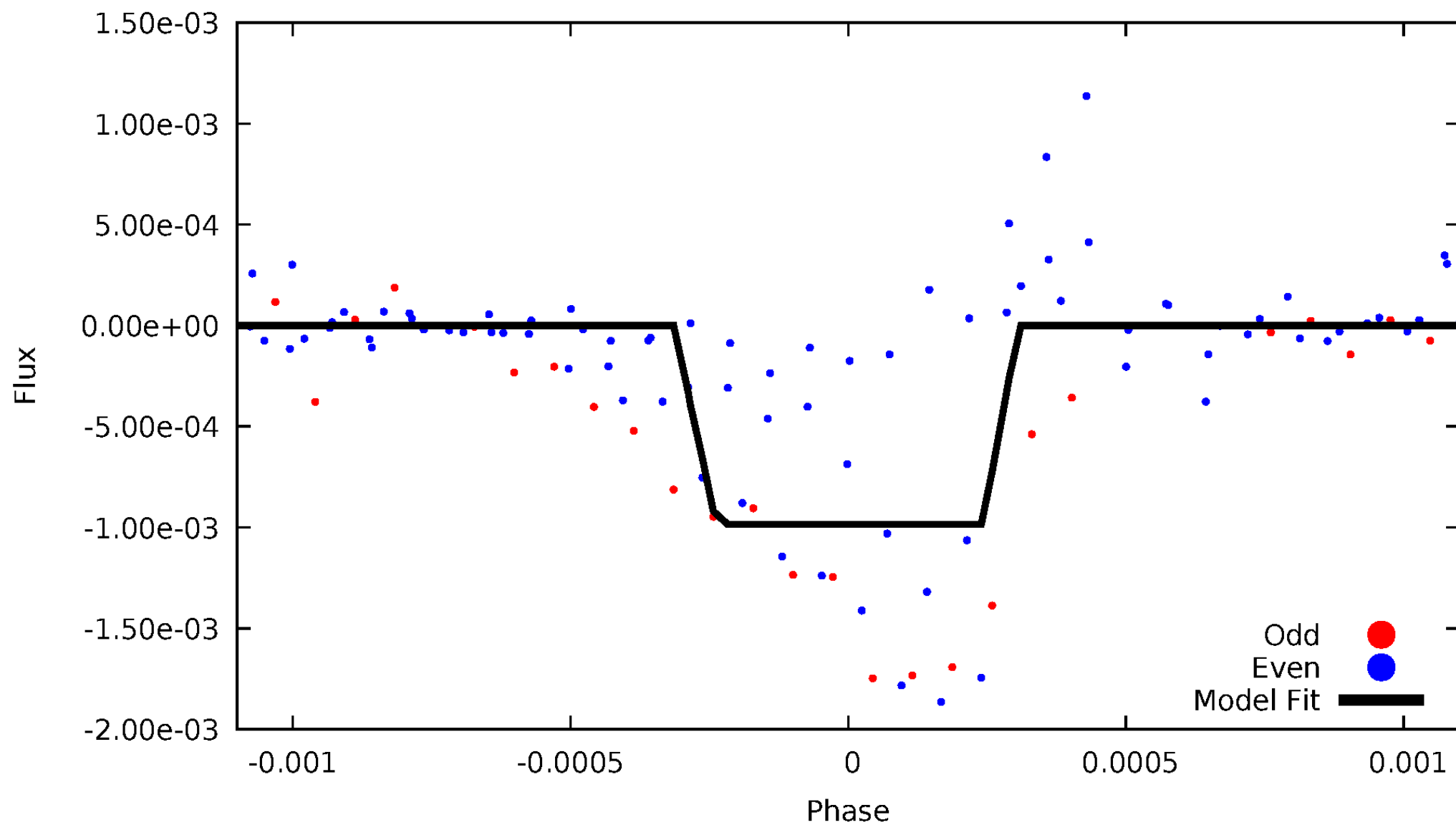
DV Odd/Even

TCE 010220756-01



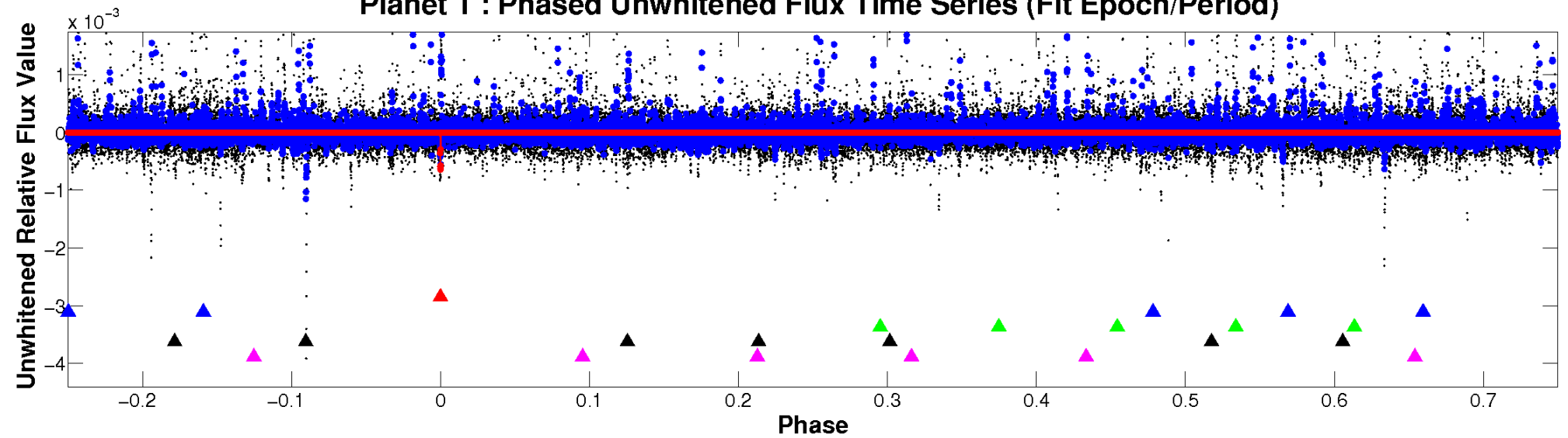
ALT Odd/Even

TCE 010220756-01

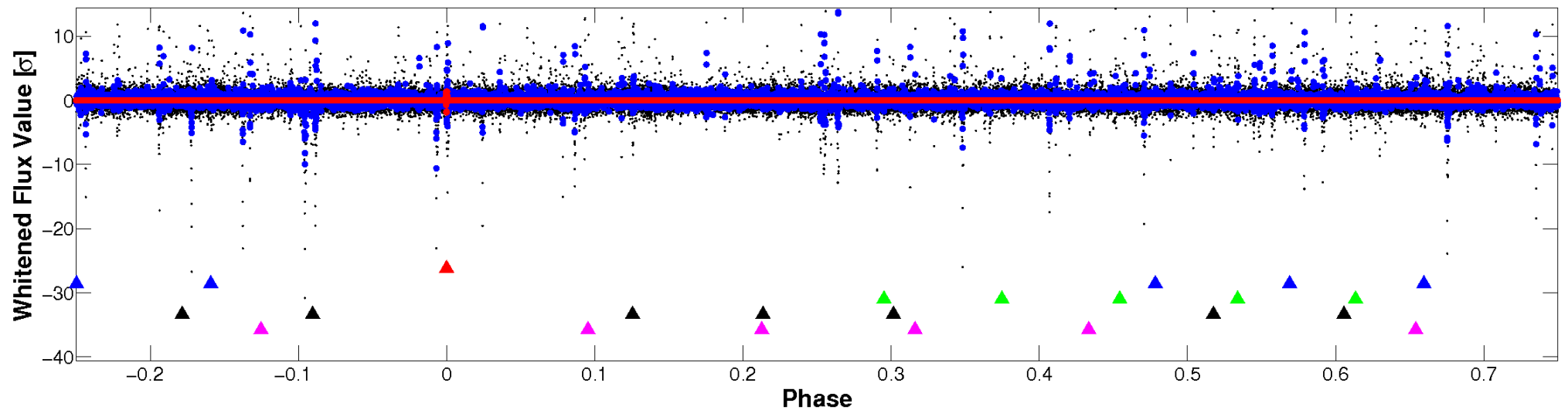


Non-Whitened Vs. Whitened Light Curve

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

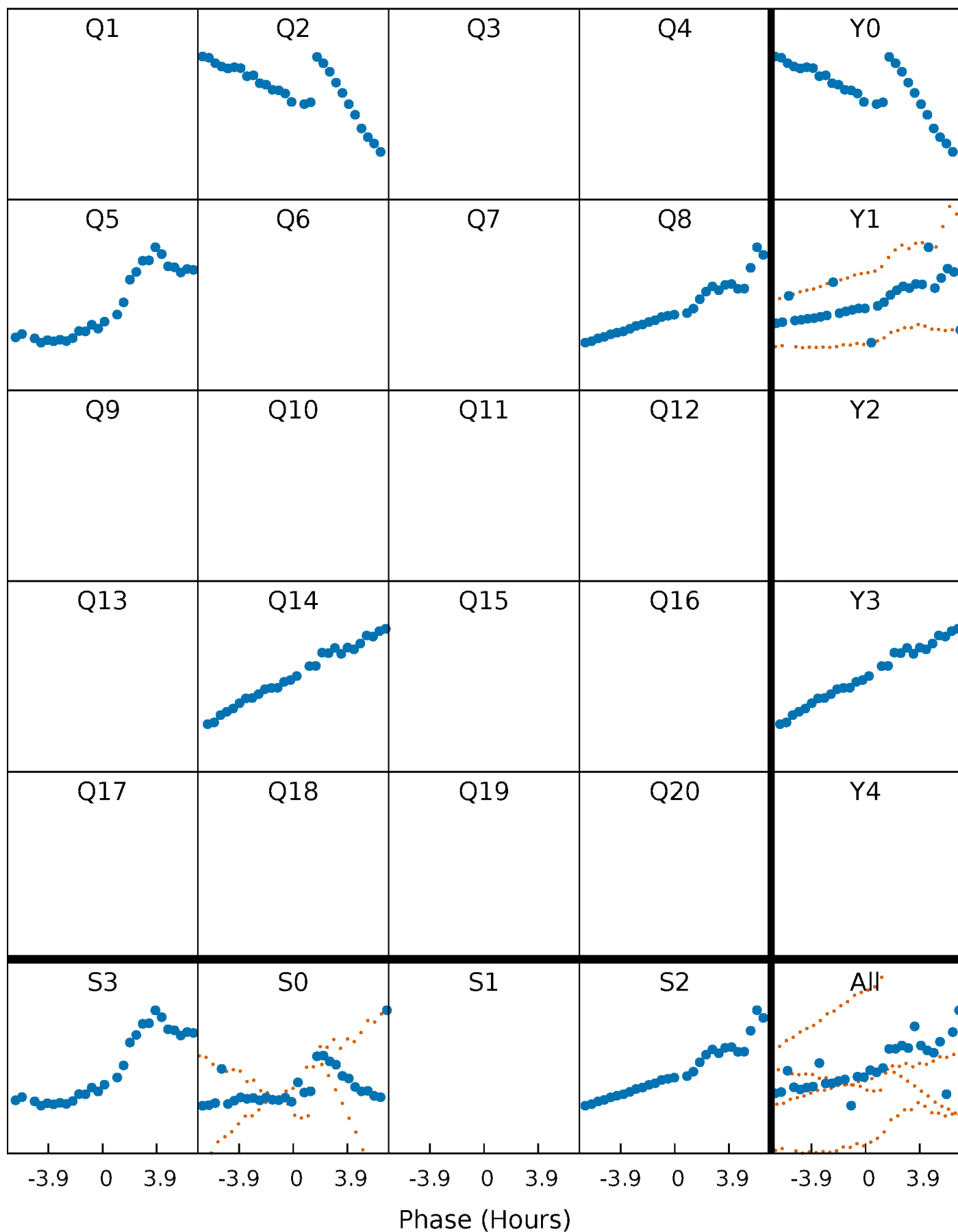


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



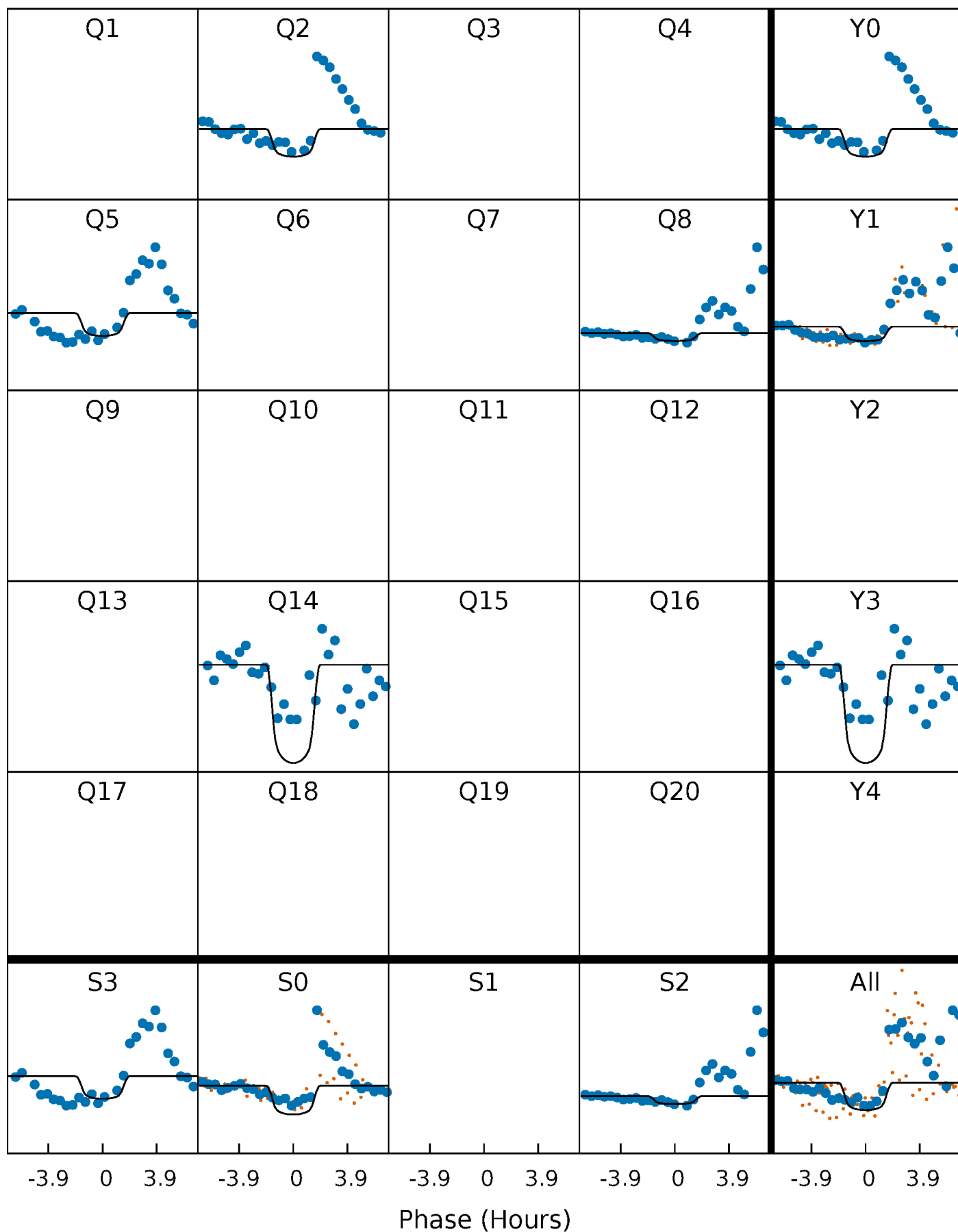
PDC Quarter-Phased Transit Curves

TCE 010220756-01 P=285.136931 Days $T_0=186.884524$ (BKJD)



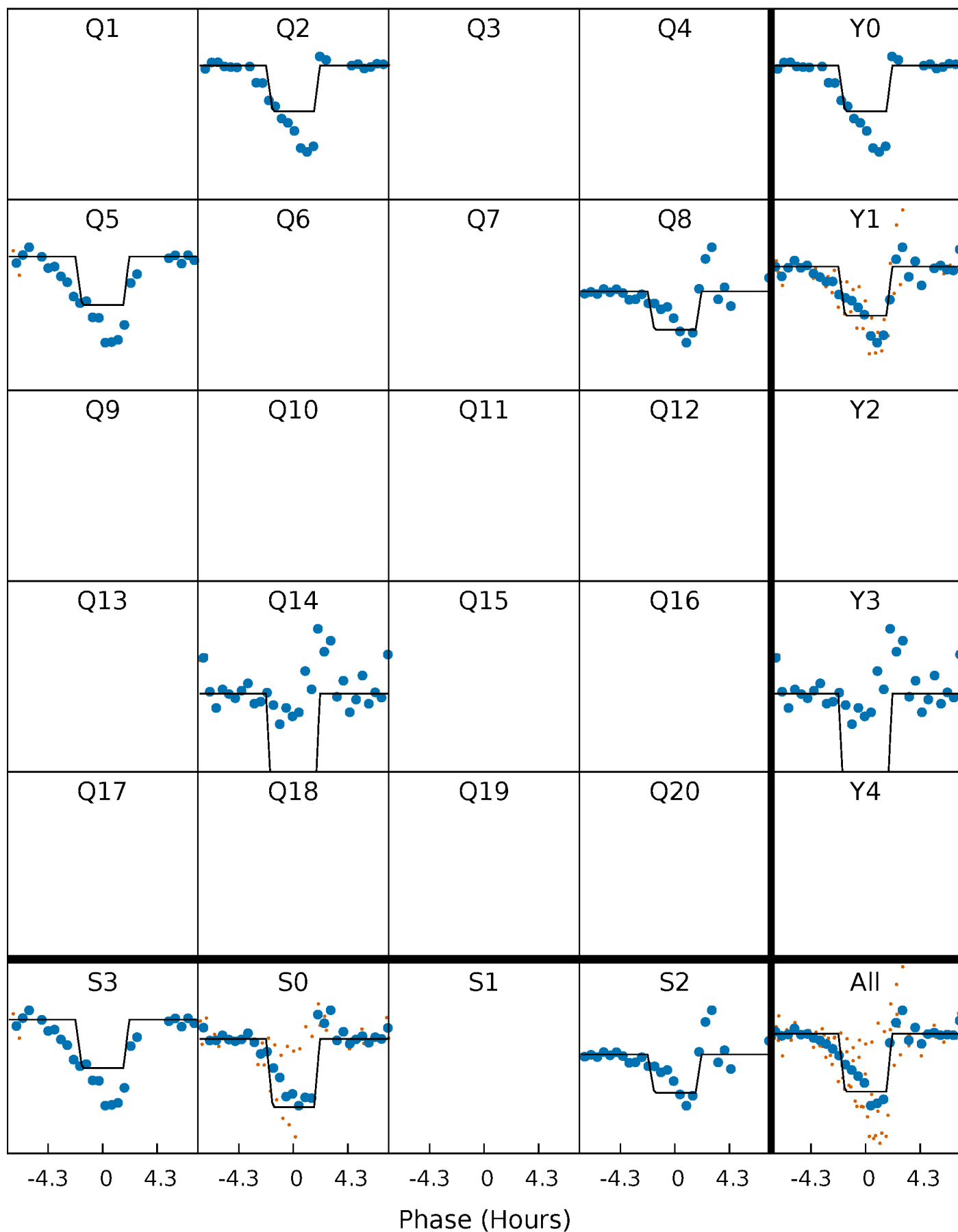
DV Quarter-Phased Transit Curves

TCE 010220756-01 P=285.136931 Days $T_0=186.884524$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

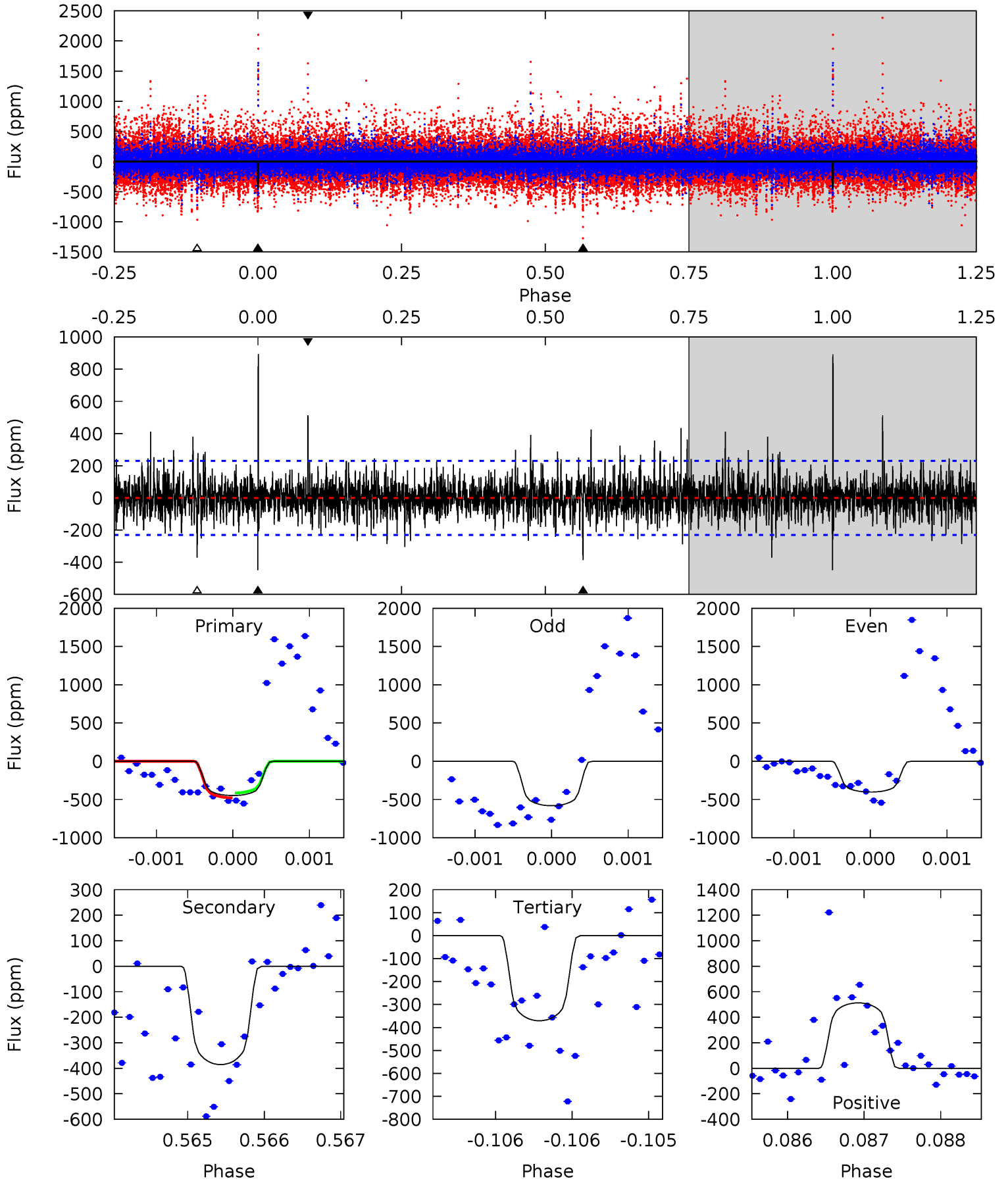
TCE 010220756-01 P=285.142304 Days $T_0=186.861393$ (BKJD)



DV Model-Shift Uniqueness Test

010220756-01, P = 285.136931 Days, E = 186.884524 Days

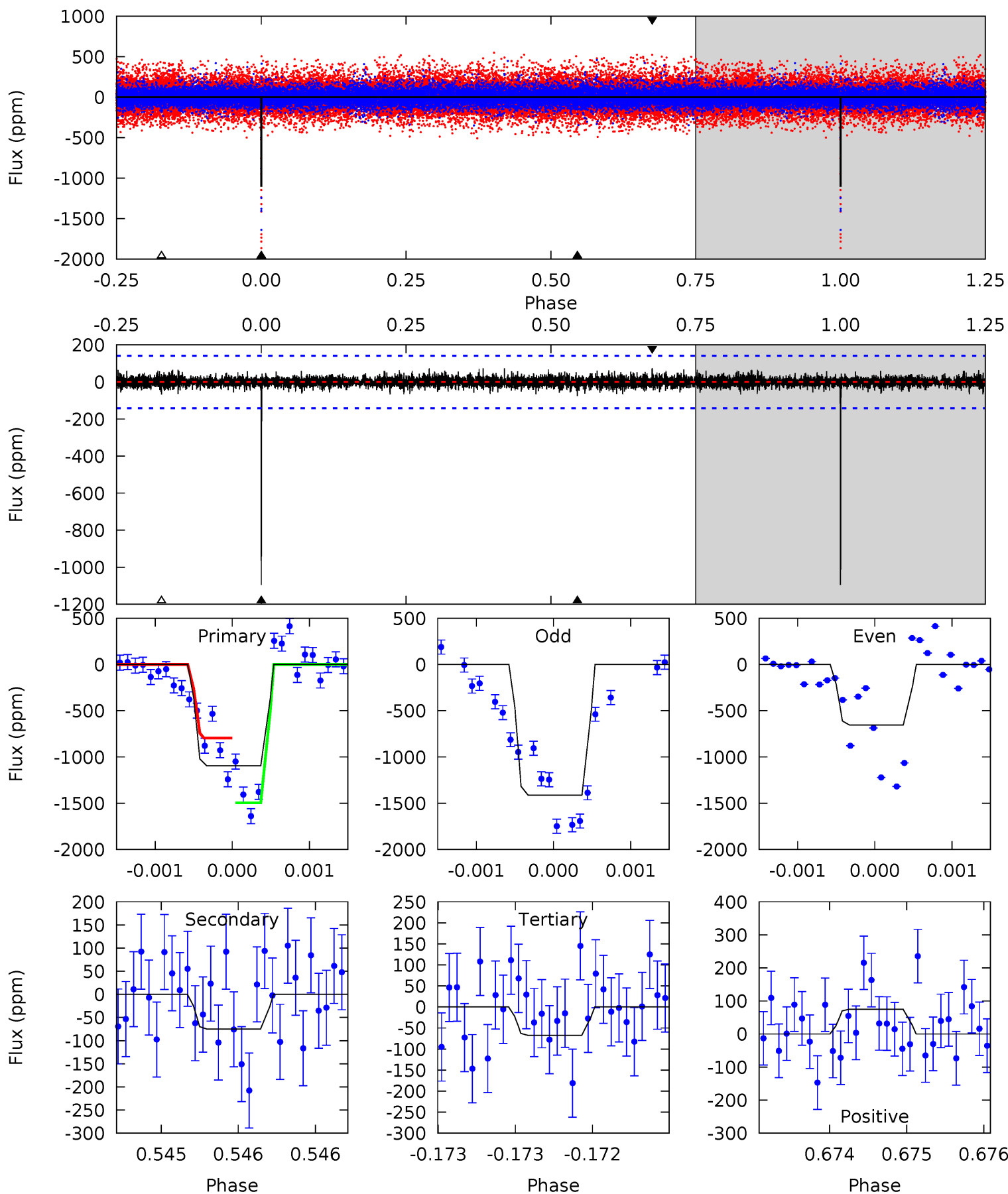
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.8	9.29	8.94	12.4	5.55	3.45	2.00	1.86	-1.57	0.35	-3.07	1.67	1.05	0.67	0.78



Alt Model-Shift Uniqueness Test

010220756-01, P = 285.142304 Days, E = 186.861393 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
43.0	2.93	2.64	2.93	5.55	3.44	0.66	40.3	40.0	0.29	-0.00	14.3	0.84	0.06	14.3



Stellar Parameters For KIC 010220756

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6015^{+161}_{-179}	$4.240^{+0.258}_{-0.172}$	$-0.480^{+0.300}_{-0.300}$	$1.174^{+0.320}_{-0.288}$	$0.874^{+0.128}_{-0.079}$	$0.760^{+1.121}_{-0.339}$
	+3%/-3%	+6%/-4%	+62%/-62%	+27%/-25%	+15%/-9%	+147%/-45%
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 010220756-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-386 ± 41	$3.42^{+1.59}_{-1.54}$	441^{+34}_{-34}	5177^{+1487}_{-711}	12248^{+27823}_{-6554}
Alt.	-75 ± 26	$3.98^{+1.72}_{-1.53}$	441^{+33}_{-32}	3585^{+595}_{-401}	1685^{+2814}_{-932}

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

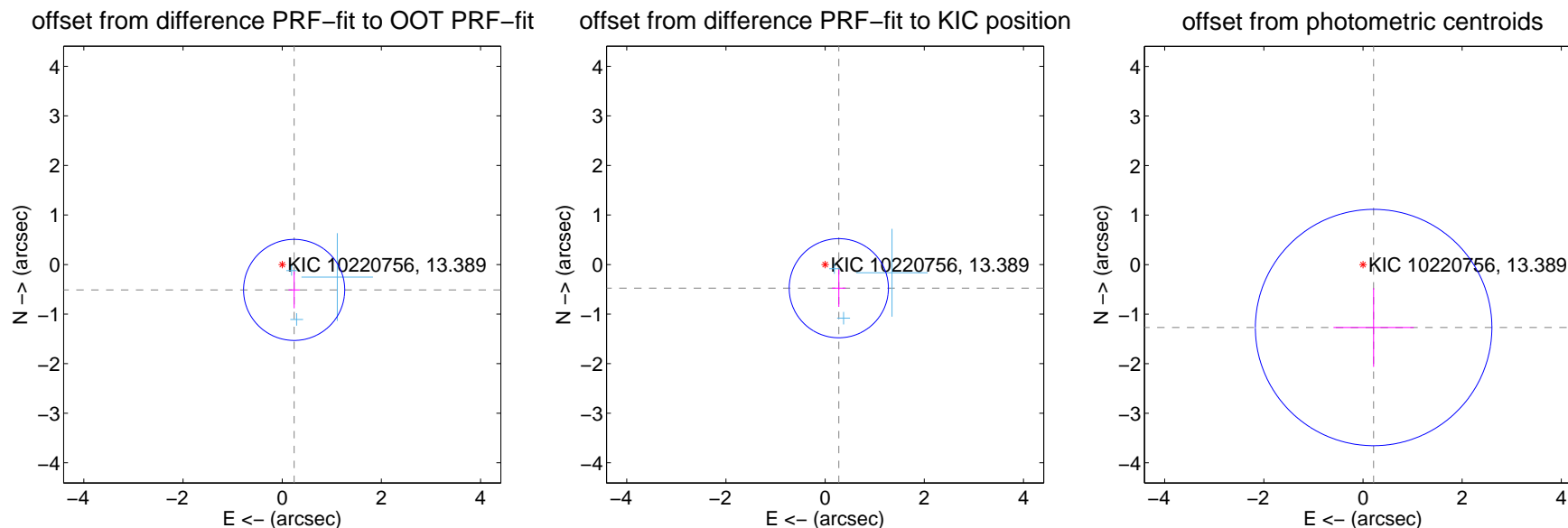
DV Centroid Data

Supplemental centroid analysis for 010220756-01. Kepler magnitude: 13.39. Transit SNR 9.30

There are 3 quarters with good PRF difference image offsets

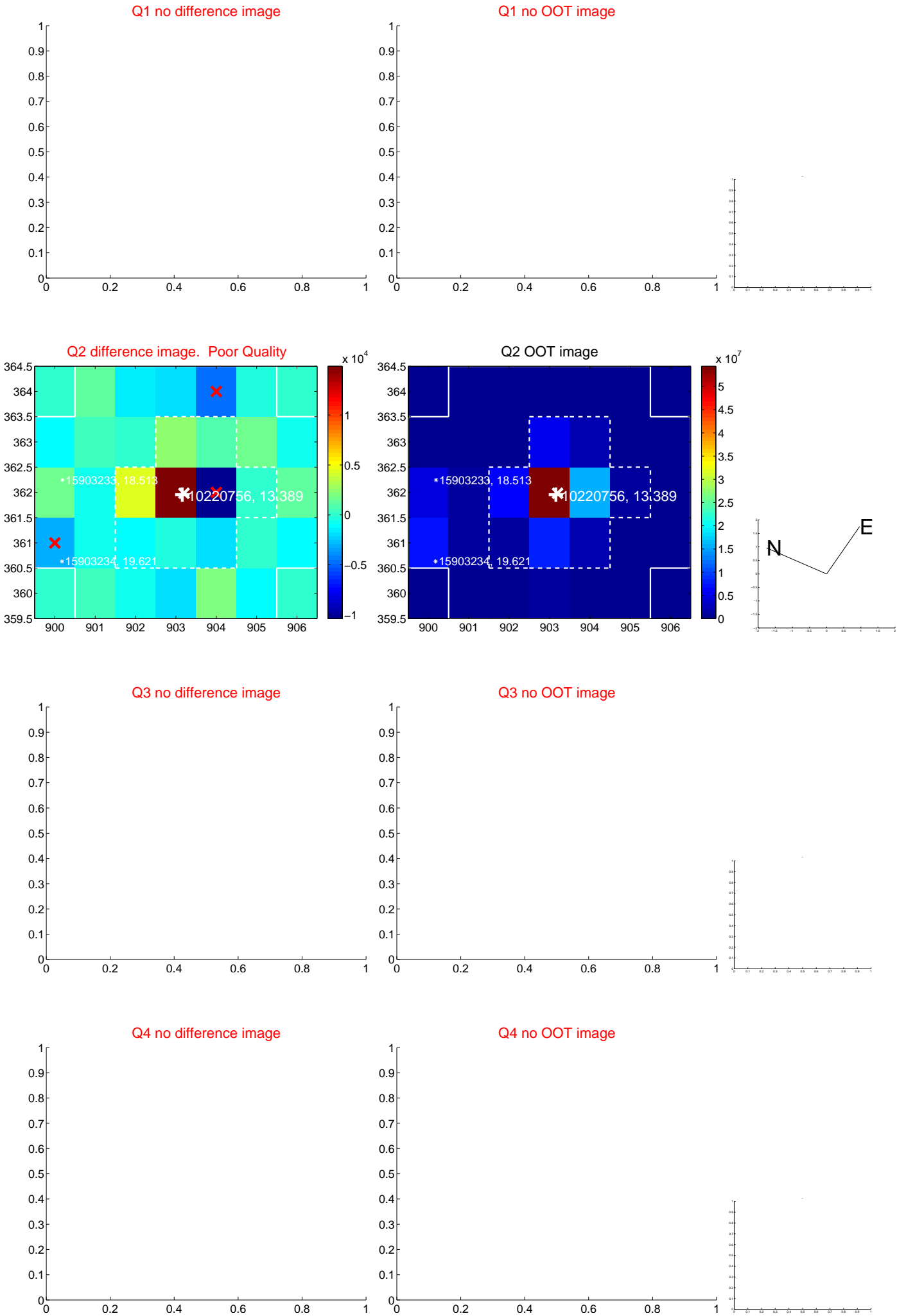
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.566 ± 0.340	1.66	-0.241 ± 0.112	-0.512 ± 0.372
PRF-fit source offset from KIC position	0.552 ± 0.333	1.65	-0.276 ± 0.138	-0.478 ± 0.377
photometric centroid source offset	1.29 ± 0.80	1.62	-0.21 ± 0.81	-1.27 ± 0.79

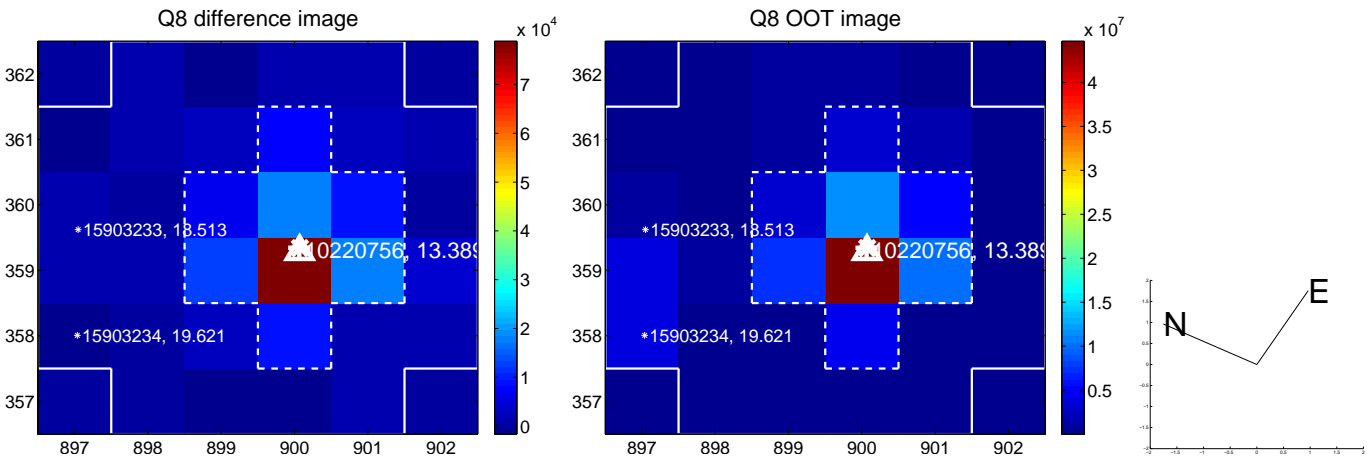
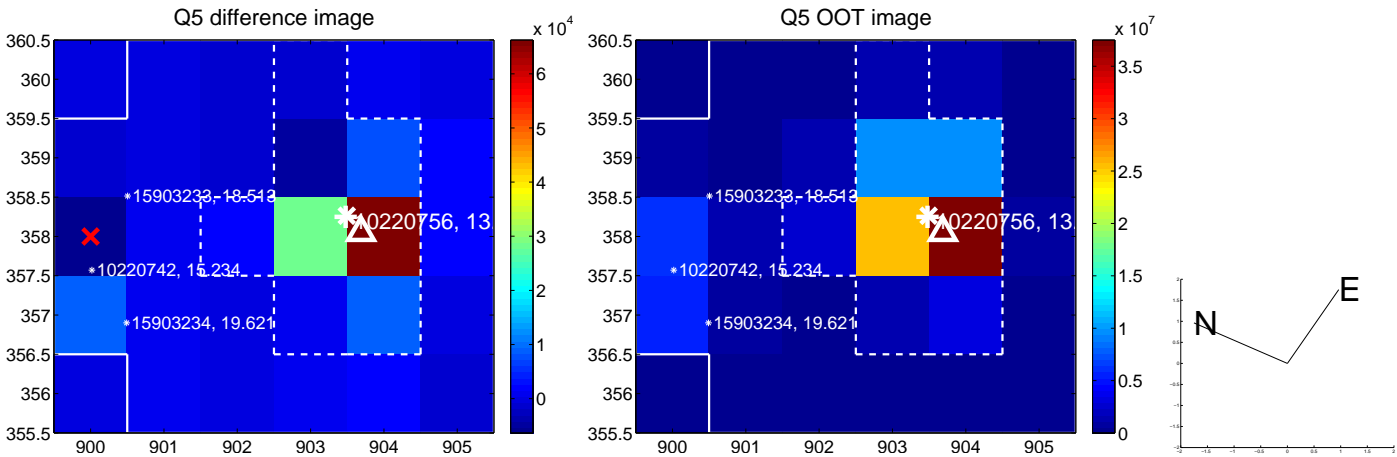


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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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white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

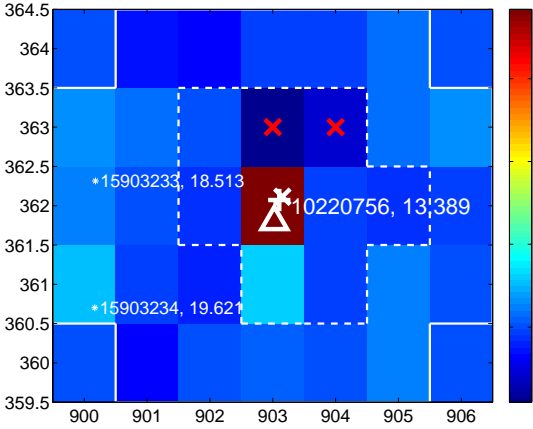
Q13 no difference image



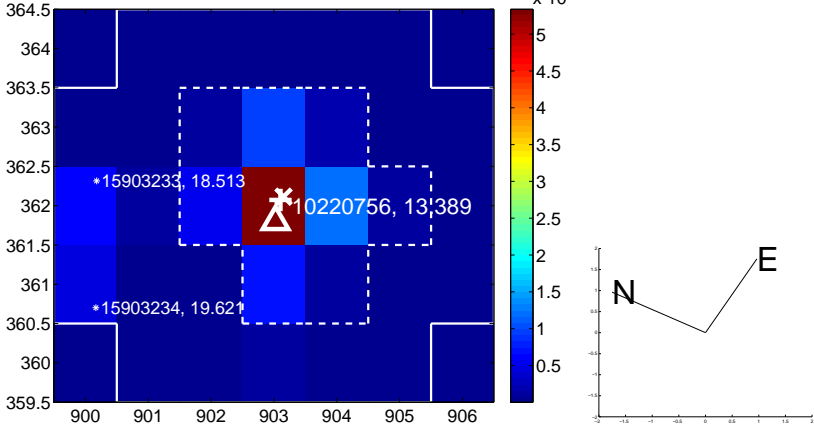
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



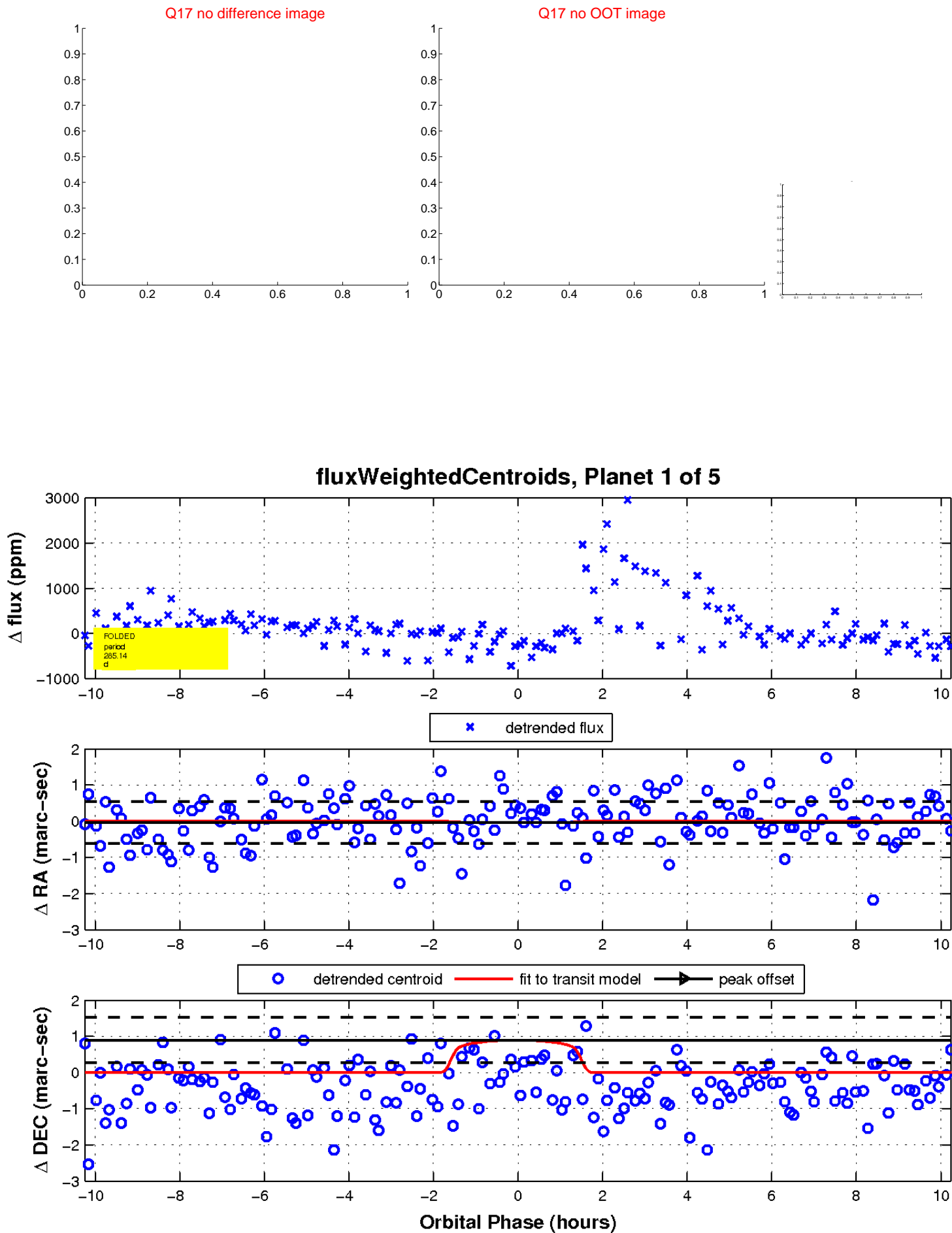
Q16 no difference image



Q16 no OOT image

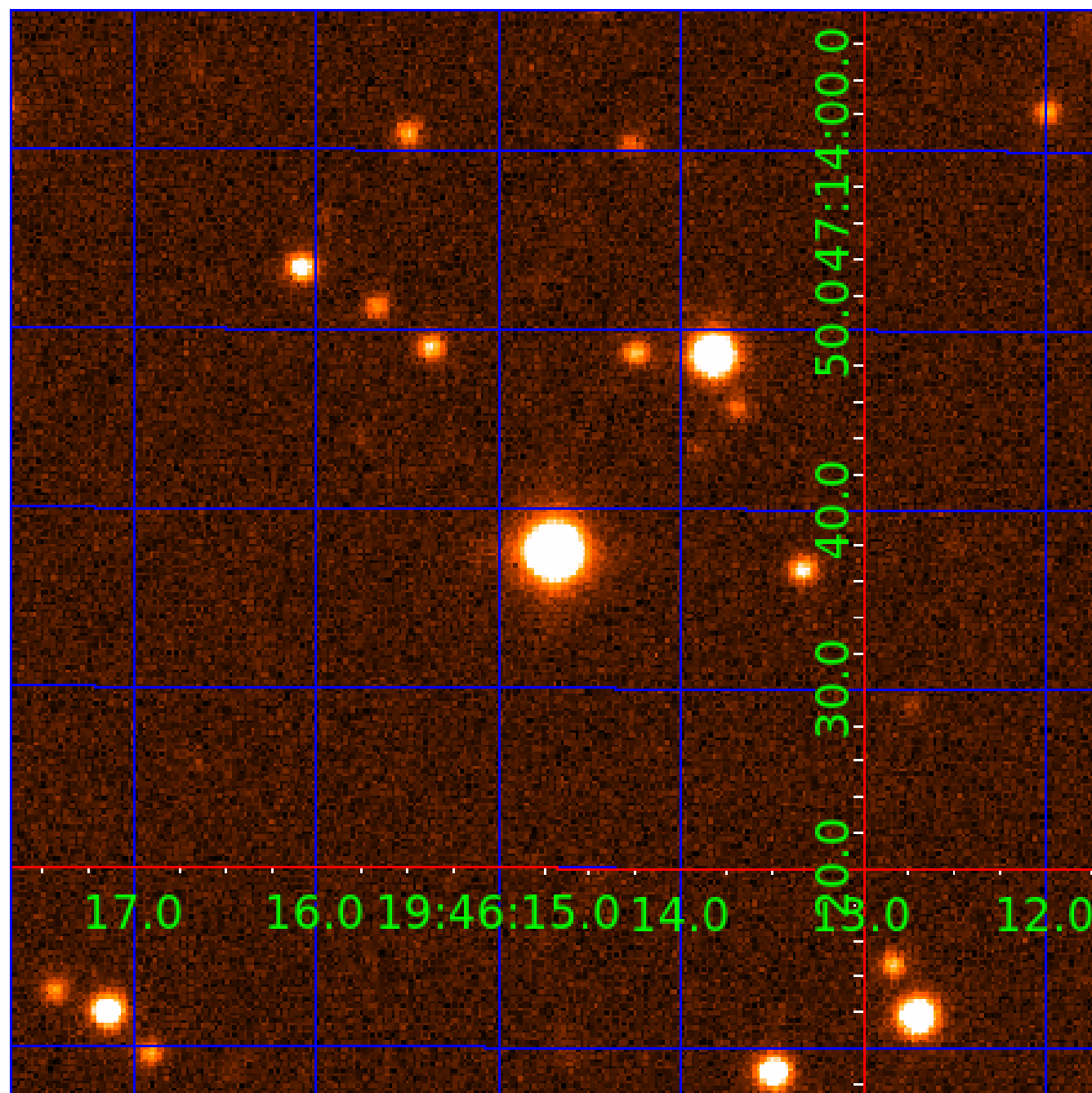


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010220756

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
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010220756-04	OBS	No	198.461428	222.670194	420.6	2.294	17.8	5.6	1.17	6015	2.47	3.99
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Robovetter Results

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010220756-02	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
010220756-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

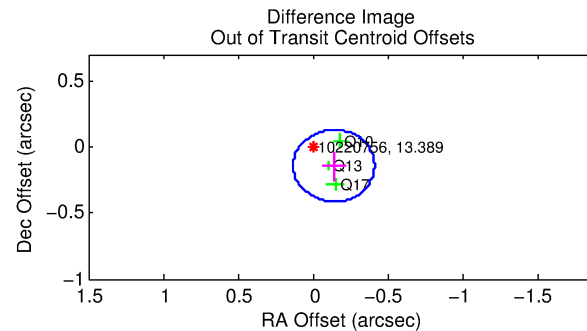
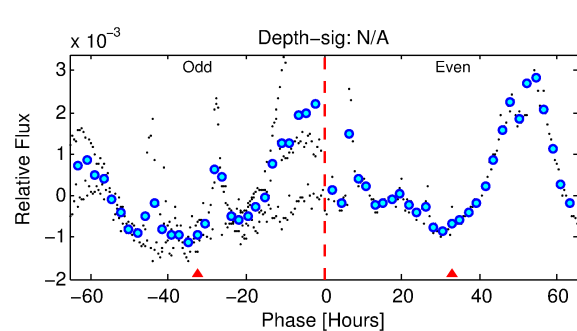
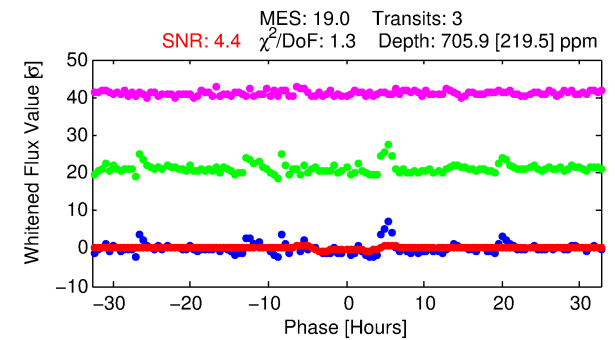
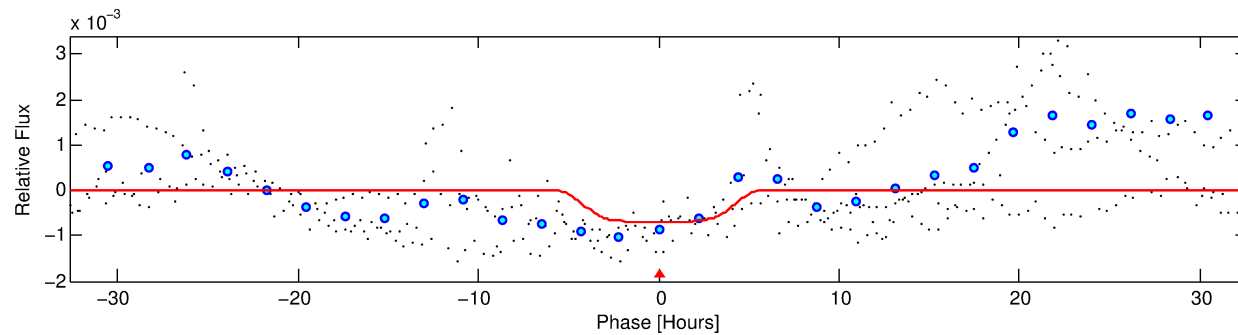
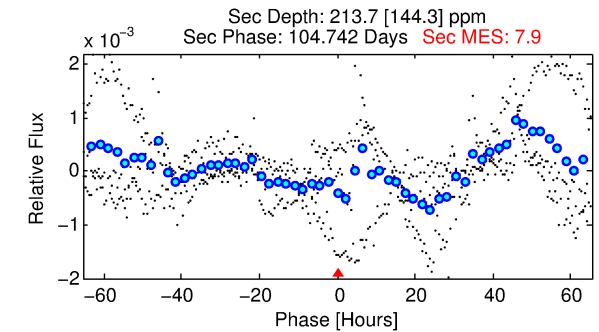
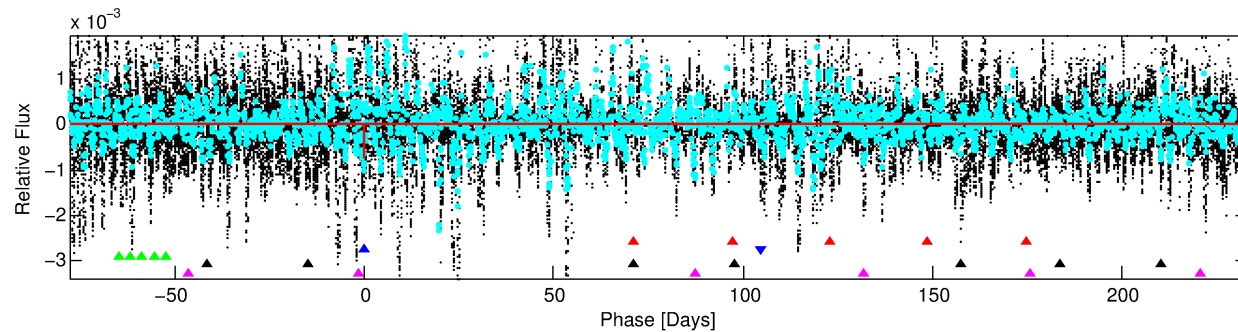
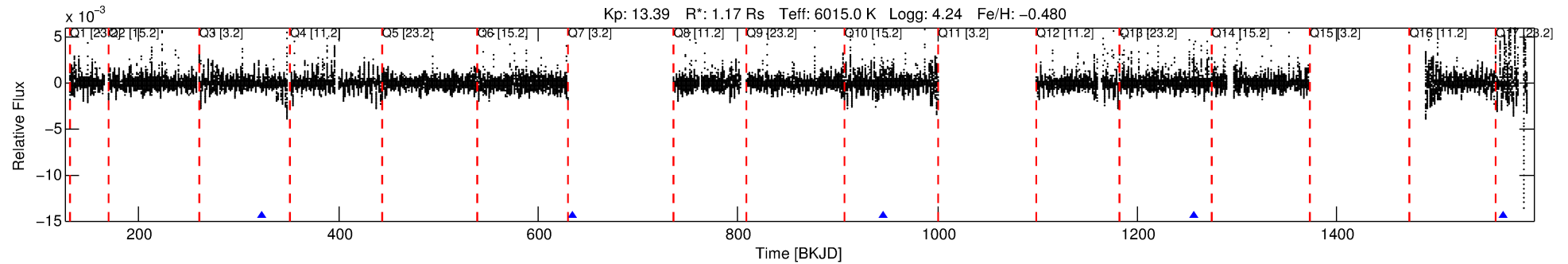
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010220756-02

No Significant Match Found

DV One-Page Summary

KIC: 10220756 Candidate: 2 of 5 Period: 310.981 d



DV Fit Results:

Period = 310.98108 [0.01405] d
Epoch = 323.2664 [0.0458] BKJD
Rp/R* = 0.0302 [0.0050]
a/R* = 89.14 [15.85]
b = 0.95 [0.02]
Seff = 2.19 [0.99]
Teq = 310 [35] K
Rp = 3.87 [1.23] Re
a = 0.8589 [0.2309] AU
Ag = 5805.54 [5040.04] [1.15] σ
Teffp = 4187 [796] K [4.87] σ

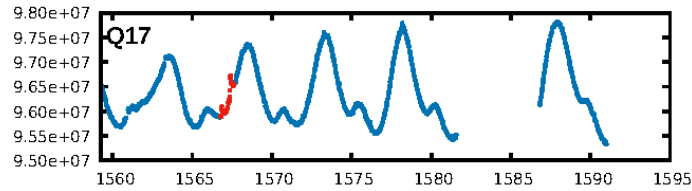
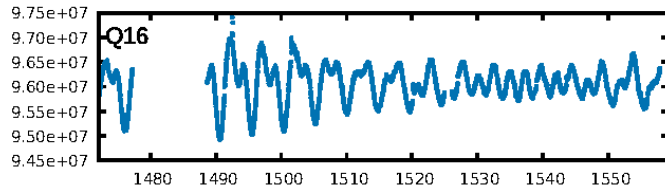
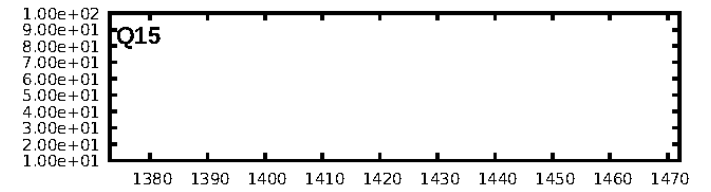
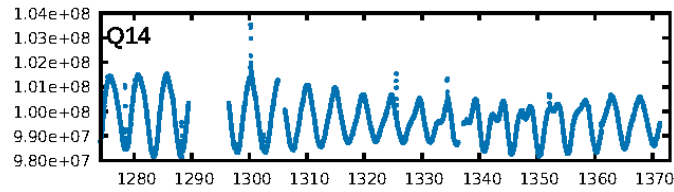
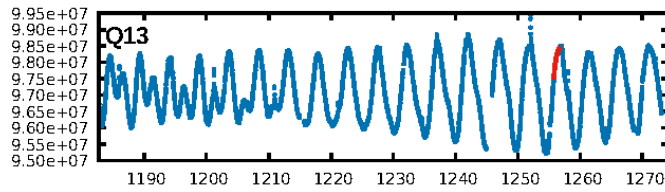
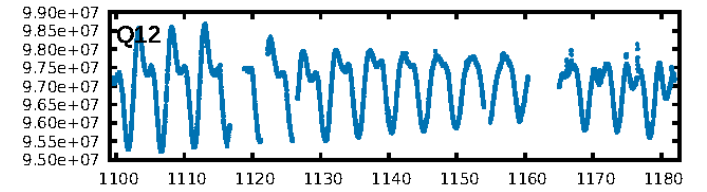
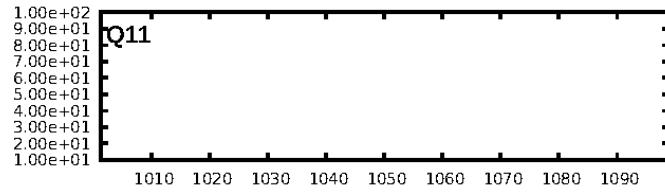
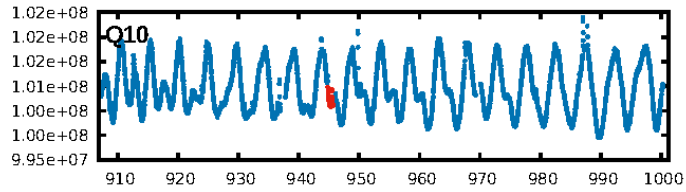
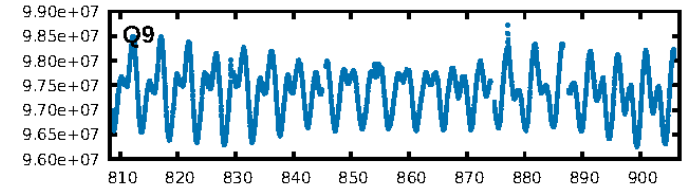
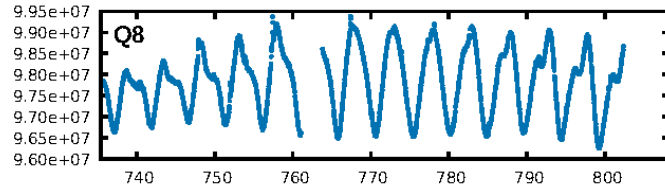
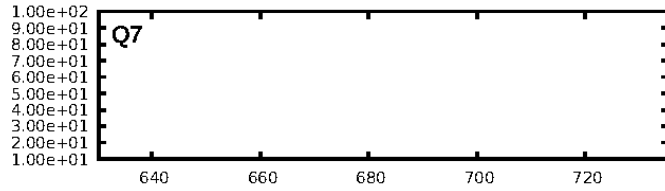
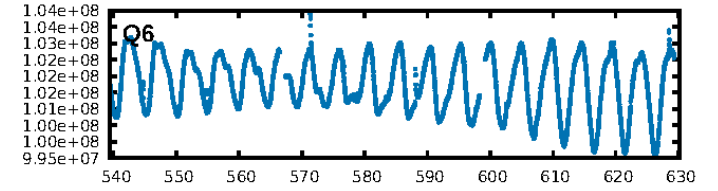
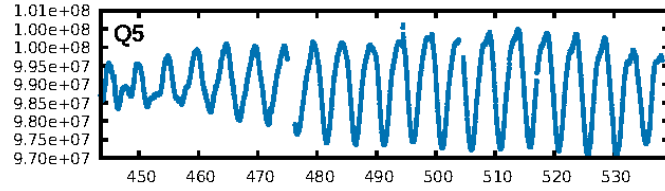
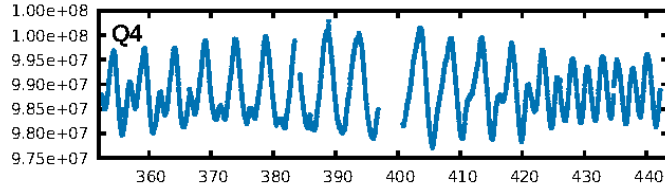
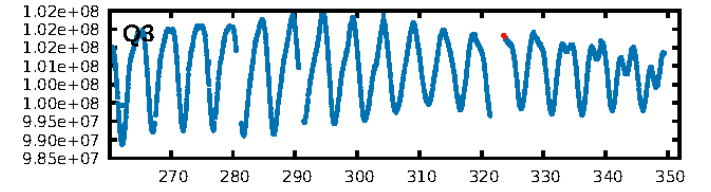
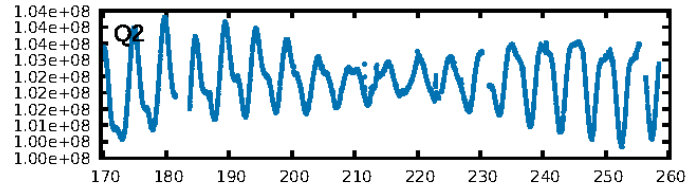
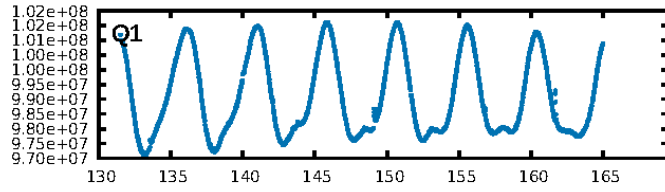
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.29] σ
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.9%
ModelChiSquareGof-sig: 92.4%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.004009
Centroid-sig: 49.1%
Centroid-so: 0.462 arcsec [0.73] σ
OotOffset-rm: 0.202 arcsec [2.23] σ
OotOffset-st: 1/0/0/2 [3]
KicOffset-rm: 0.271 arcsec [2.39] σ
KicOffset-st: 1/0/0/2 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

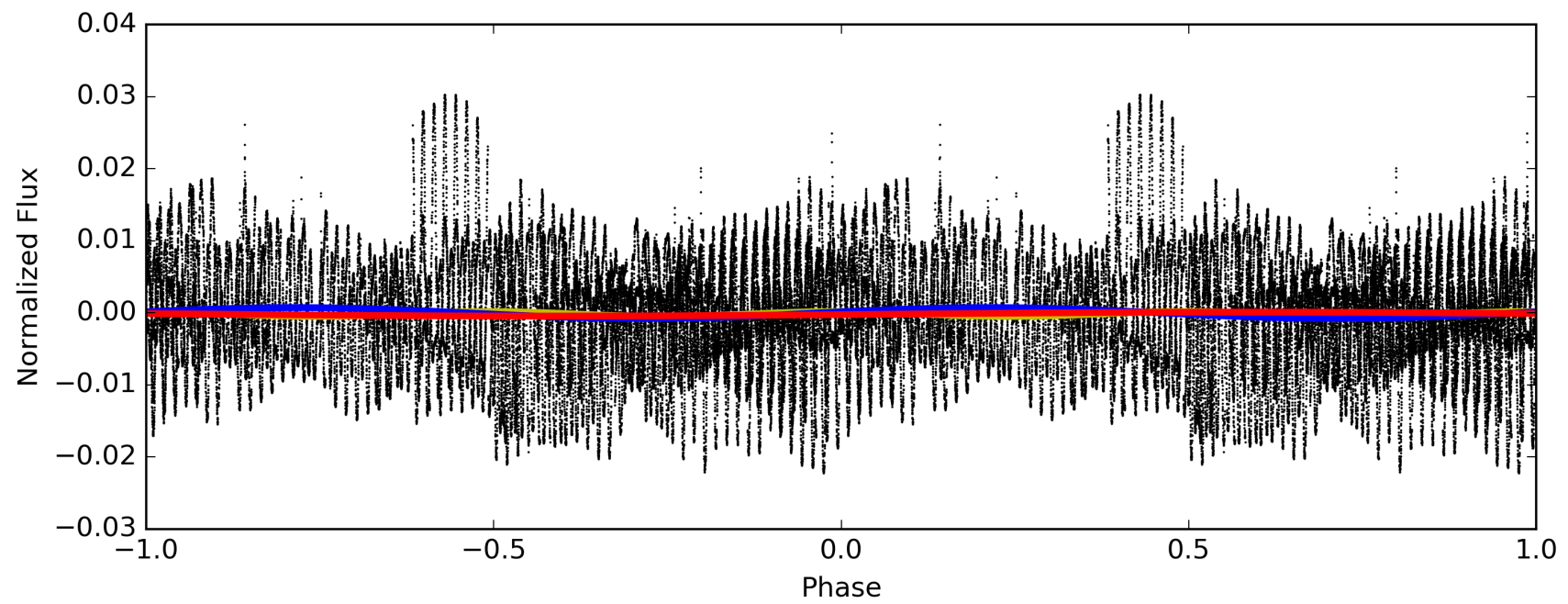
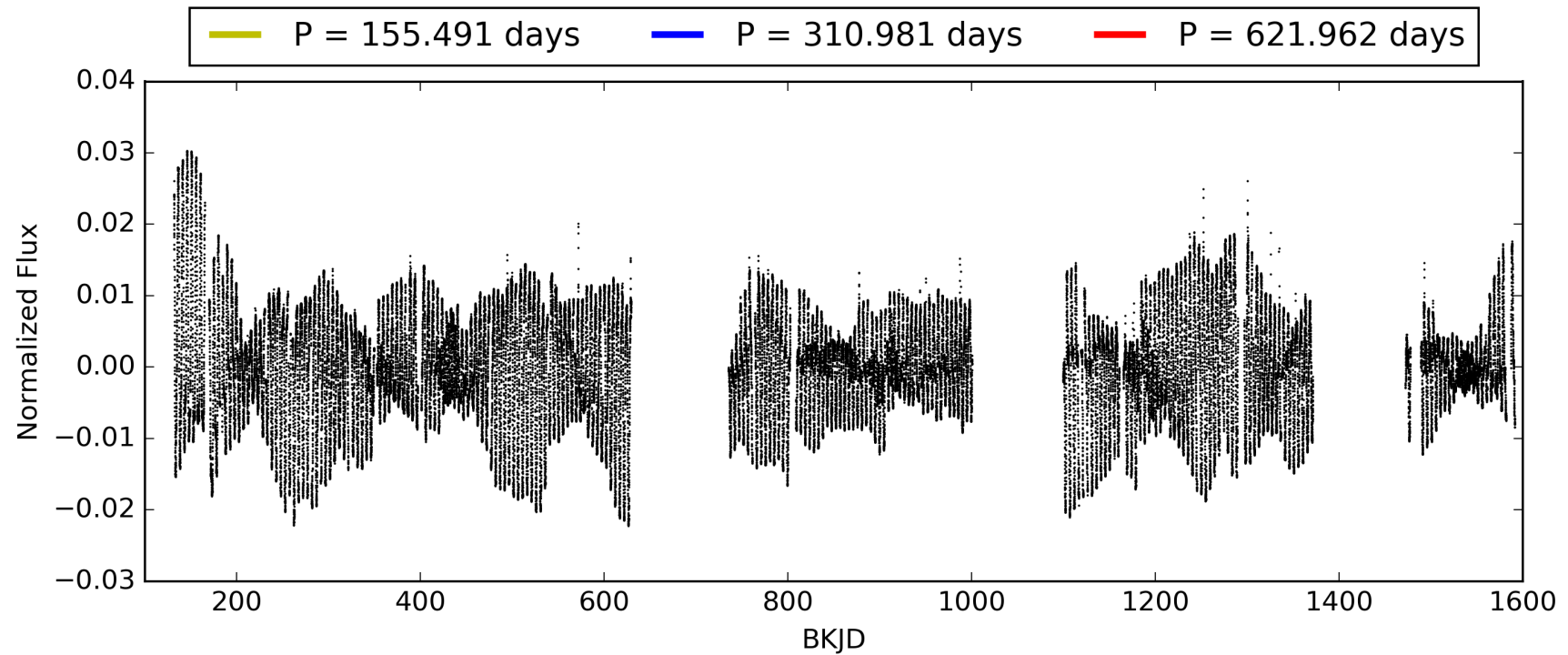
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:02:11 Z

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

TCE 010220756-02, PDC Light Curves

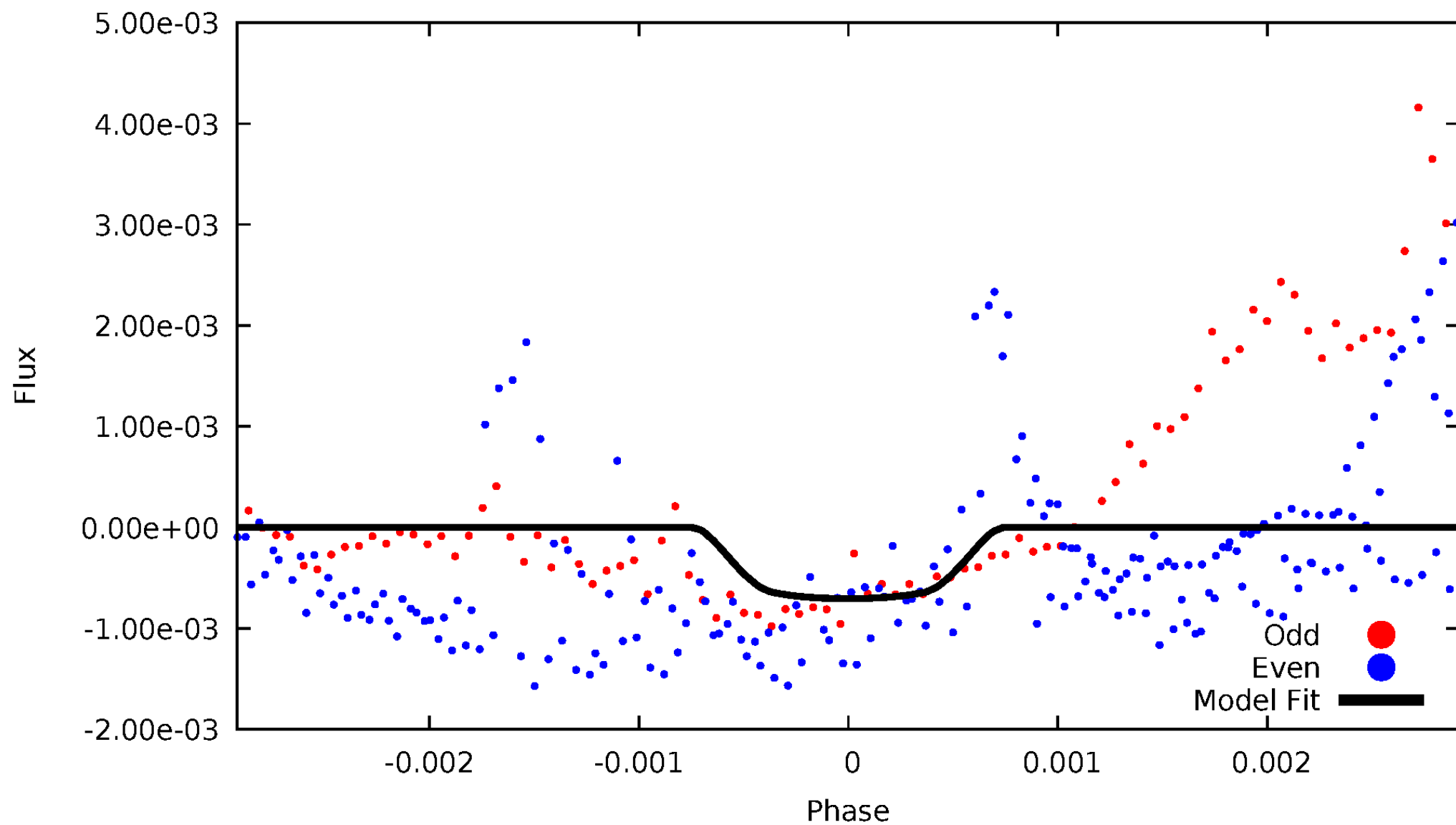


TCE 010220756-02



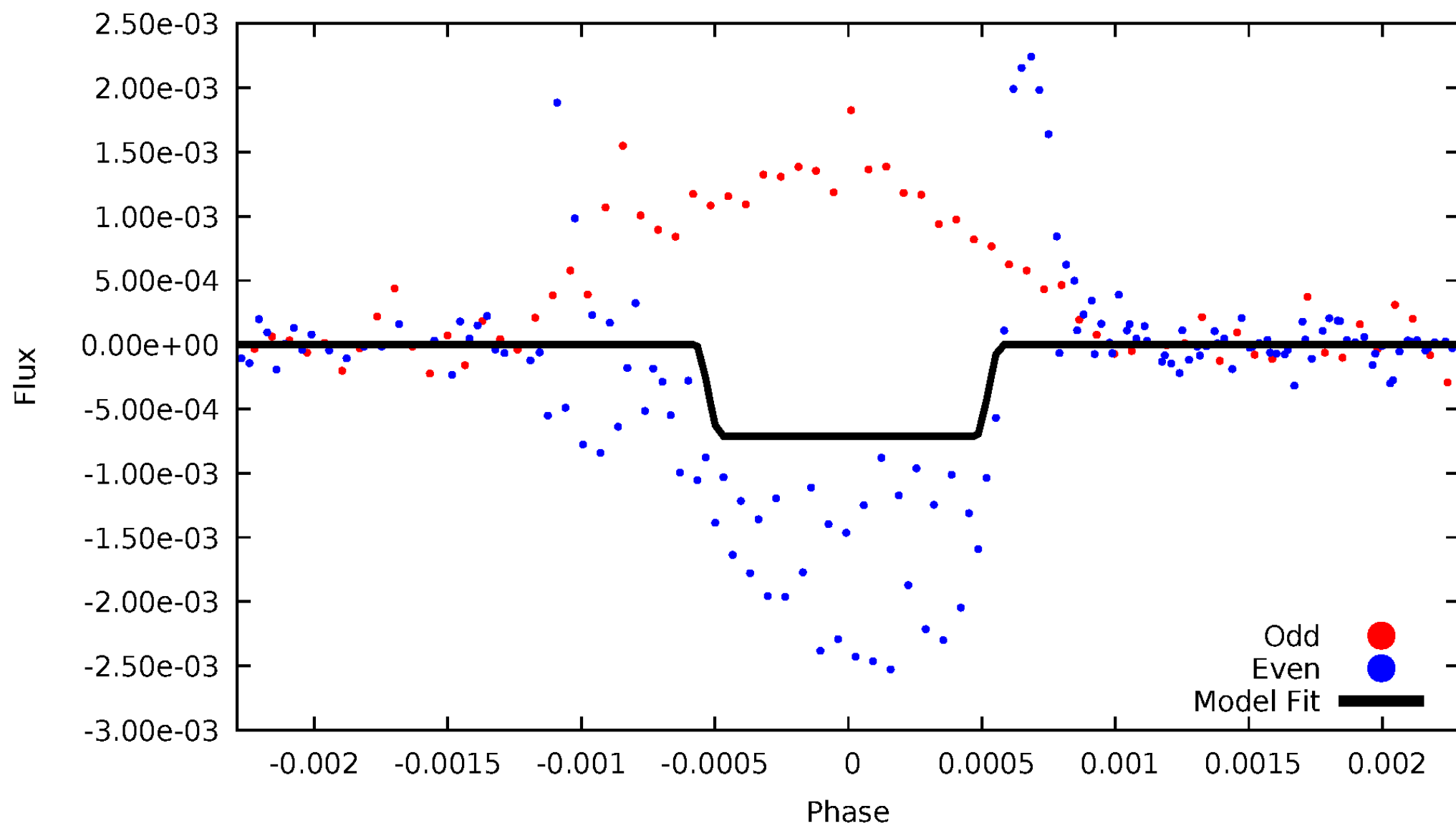
DV Odd/Even

TCE 010220756-02



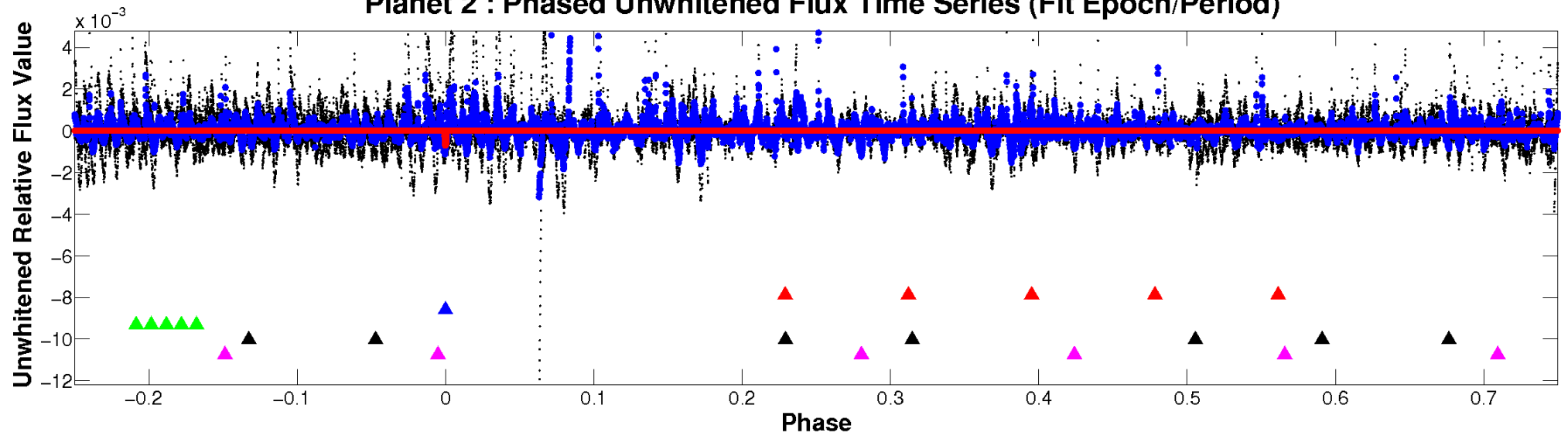
ALT Odd/Even

TCE 010220756-02

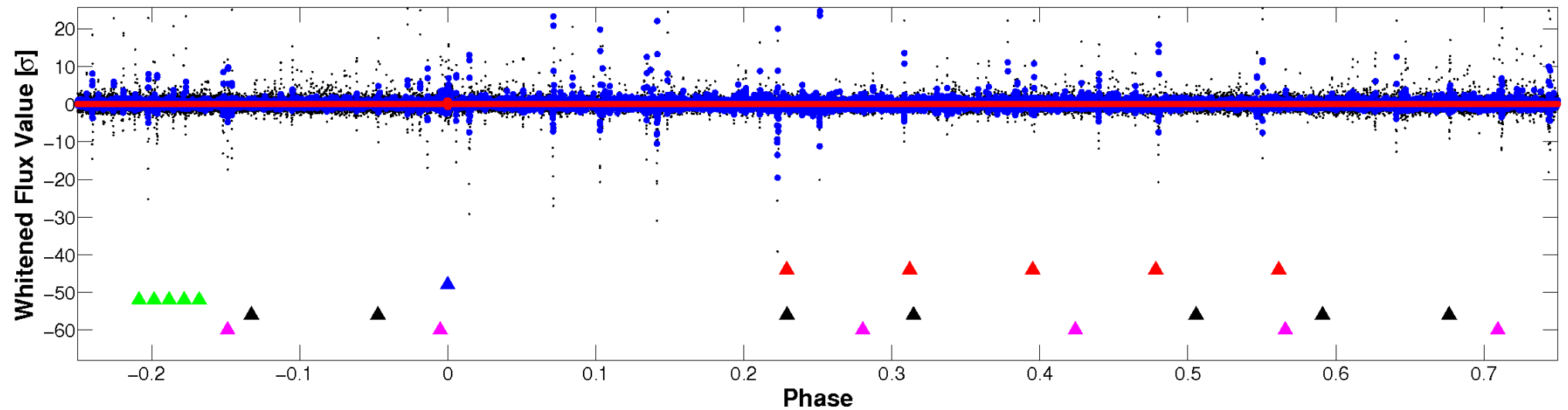


Non-Whitened Vs. Whitened Light Curve

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

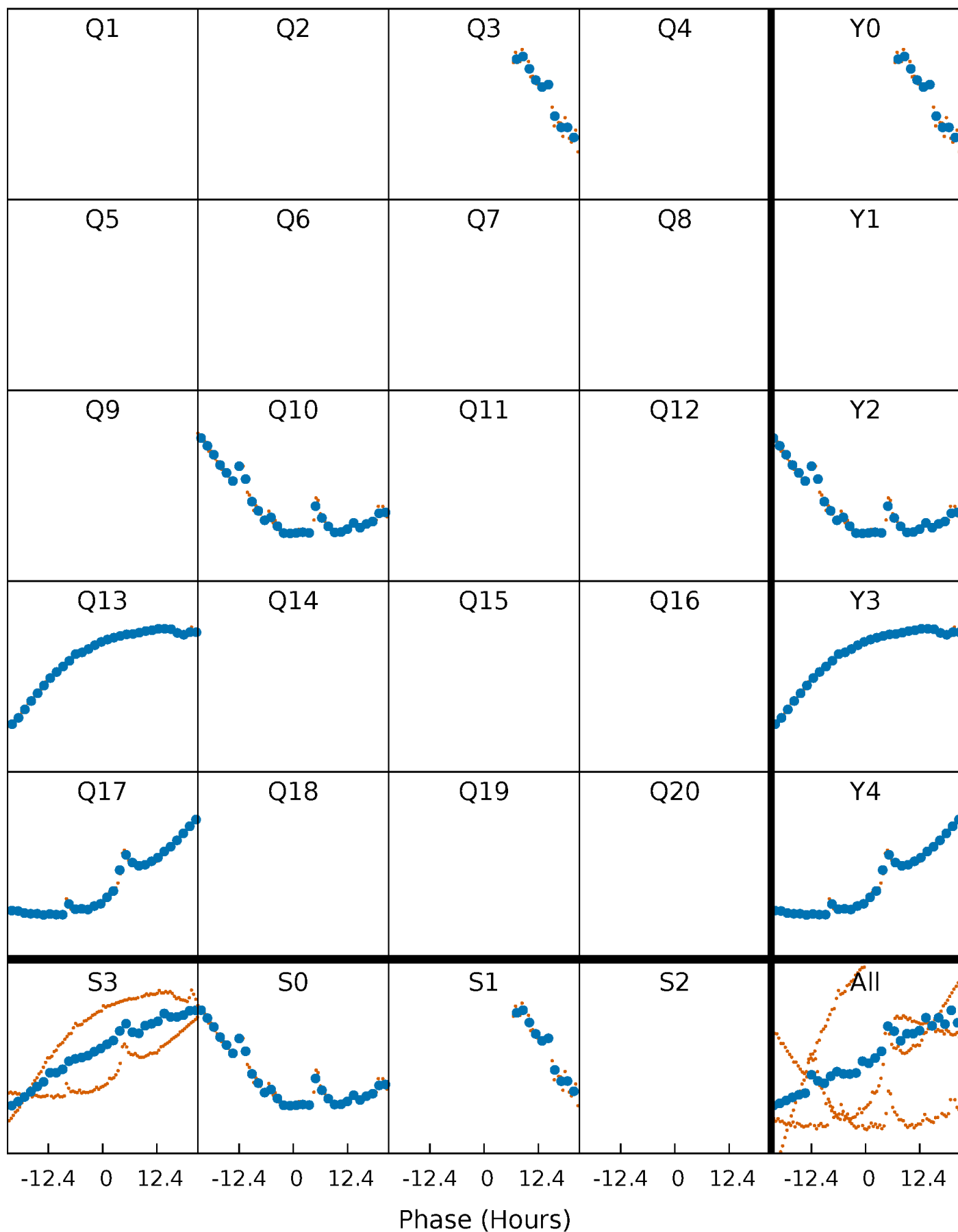


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



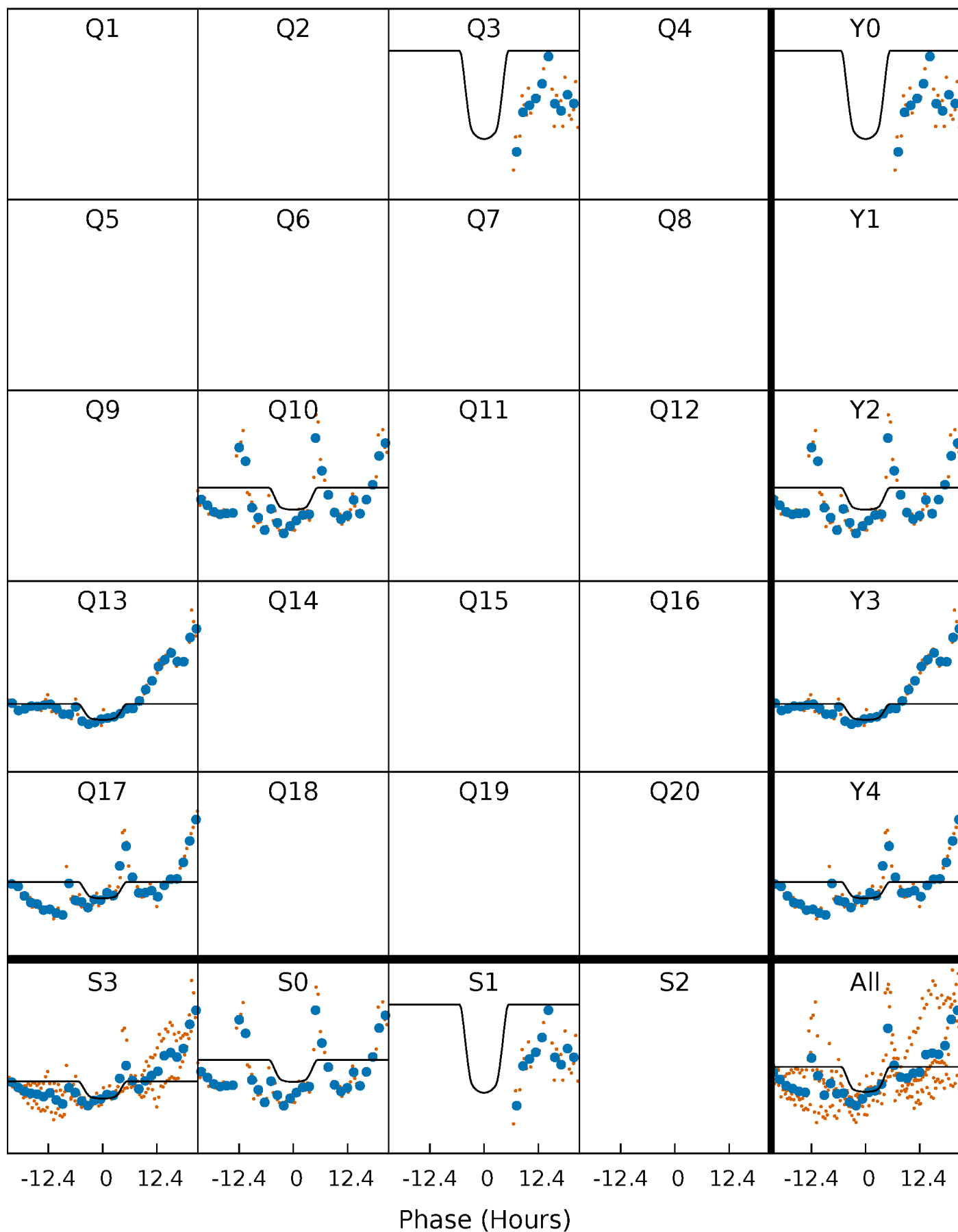
PDC Quarter-Phased Transit Curves

TCE 010220756-02 $P=310.981075$ Days $T_0=323.266450$ (BKJD)



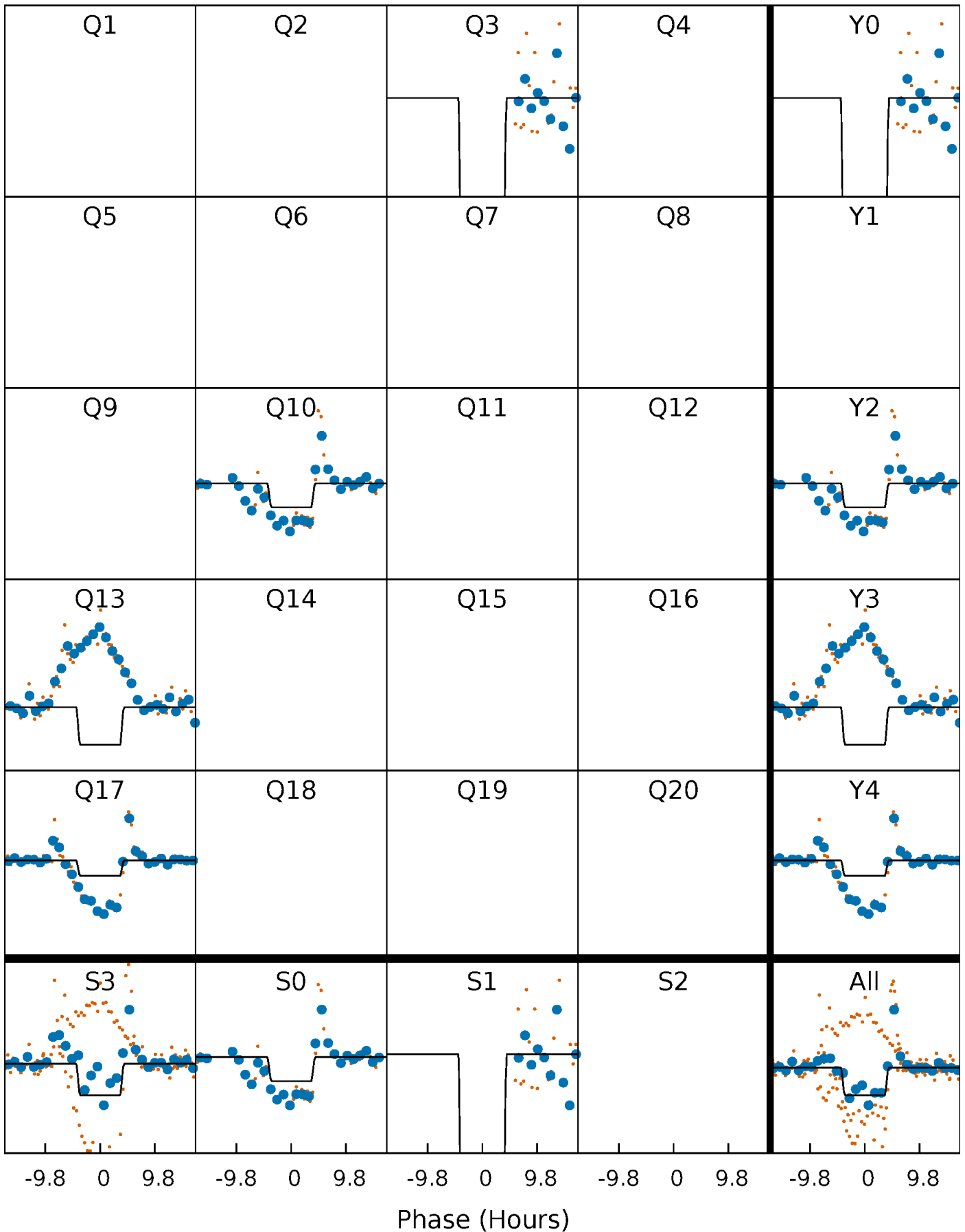
DV Quarter-Phased Transit Curves

TCE 010220756-02 P=310.981075 Days $T_0=323.266450$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

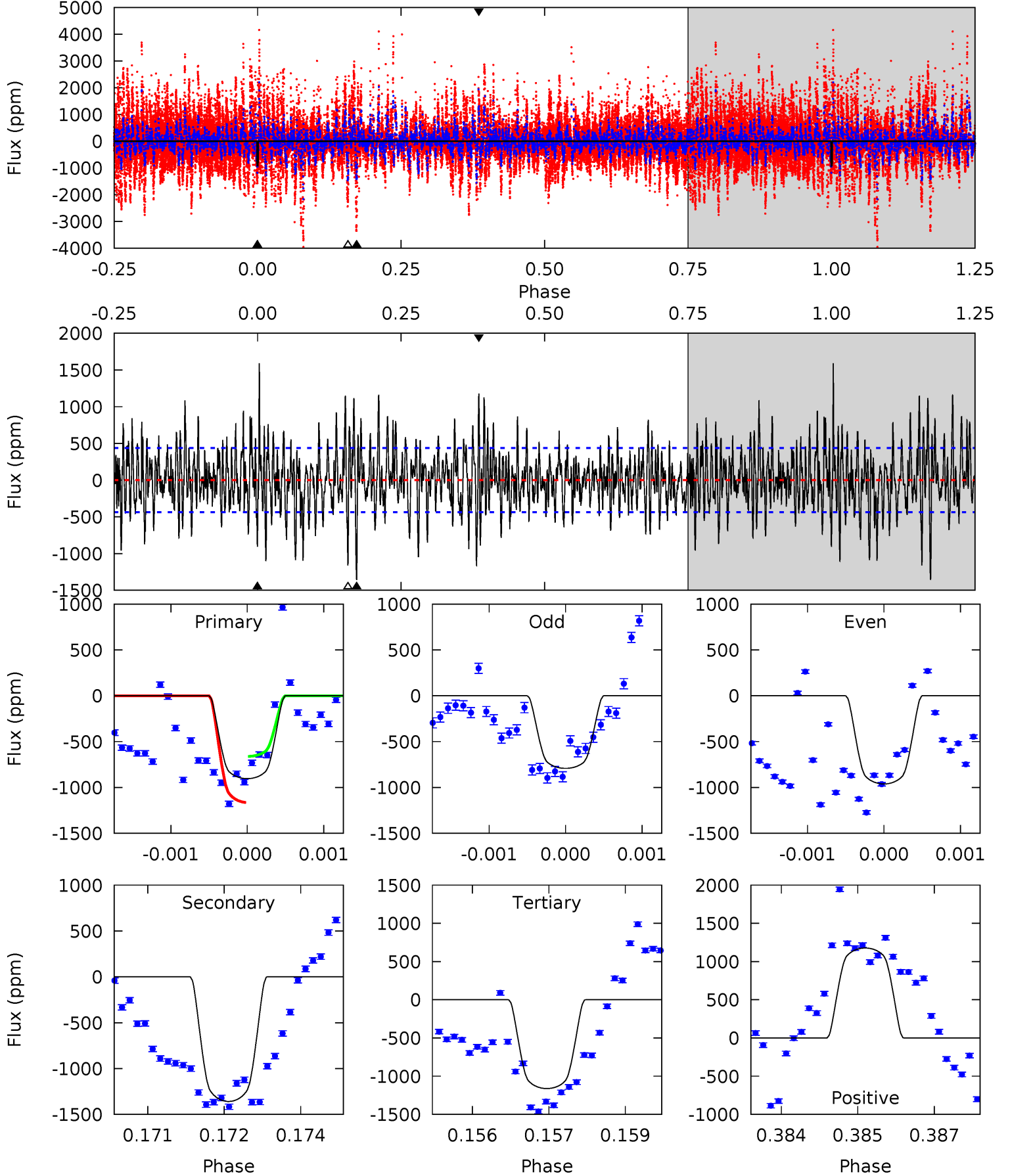
TCE 010220756-02 P=310.971538 Days $T_0=323.300580$ (BKJD)



DV Model-Shift Uniqueness Test

010220756-02, $P = 310.981075$ Days, $E = 12.285375$ Days

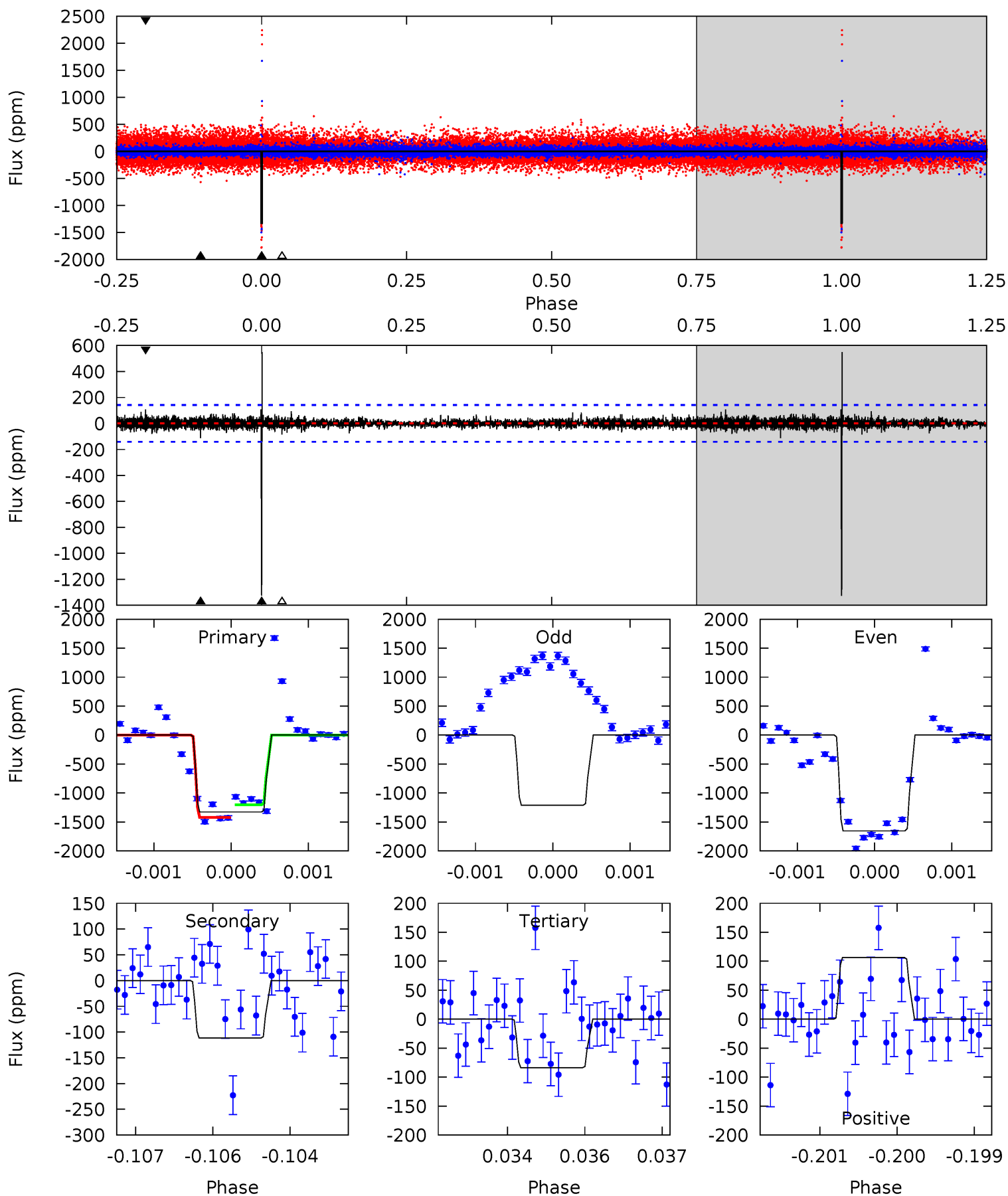
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	16.7	14.3	14.5	5.38	3.17	4.15	-3.17	-3.36	2.42	2.24	0.84	1.15	0.54	3.11



Alt Model-Shift Uniqueness Test

010220756-02, P = 310.971538 Days, E = 12.329042 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
50.9	4.28	3.21	4.08	5.43	3.25	0.70	47.7	46.8	1.07	0.20	11.4	0.56	0.29	4.19



Stellar Parameters For KIC 010220756

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6015^{+161}_{-179}	$4.240^{+0.258}_{-0.172}$	$-0.480^{+0.300}_{-0.300}$	$1.174^{+0.320}_{-0.288}$	$0.874^{+0.128}_{-0.079}$	$0.760^{+1.121}_{-0.339}$
	+3%/-3%	+6%/-4%	+62%/-62%	+27%/-25%	+15%/-9%	+147%/-45%
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 010220756-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1359 ± 81	$3.80^{+0.83}_{-0.81}$	430^{+34}_{-35}	6676^{+720}_{-530}	38880^{+23871}_{-12942}
Alt.	-112 ± 26	$3.38^{+0.85}_{-0.78}$	429^{+32}_{-35}	4065^{+365}_{-306}	3992^{+2992}_{-1585}

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

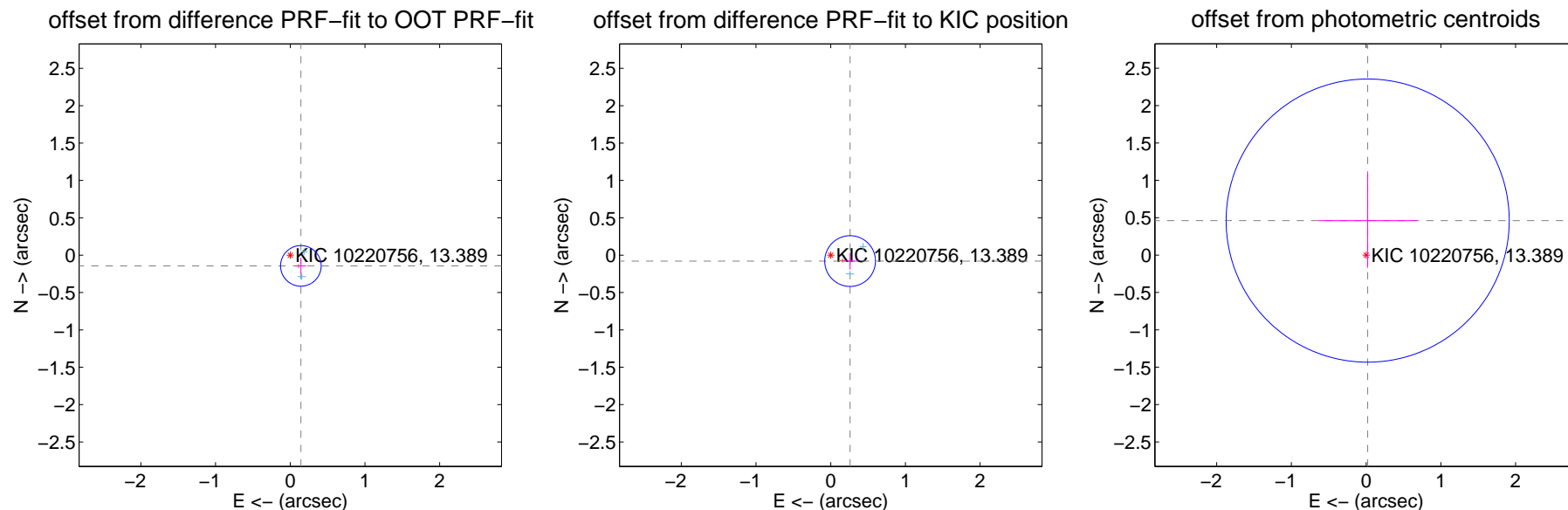
DV Centroid Data

Supplemental centroid analysis for 010220756-02. Kepler magnitude: 13.39. Transit SNR 4.39

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.202 ± 0.091	2.23	-0.142 ± 0.071	-0.144 ± 0.106
PRF-fit source offset from KIC position	0.271 ± 0.113	2.39	-0.259 ± 0.113	-0.079 ± 0.112
photometric centroid source offset	0.46 ± 0.63	0.73	-0.02 ± 0.66	0.46 ± 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.

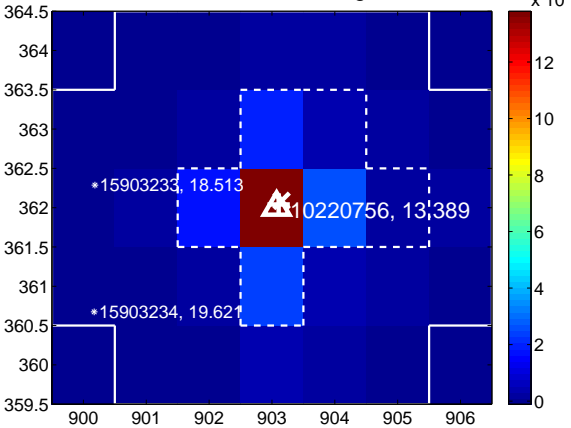
Q9 no difference image



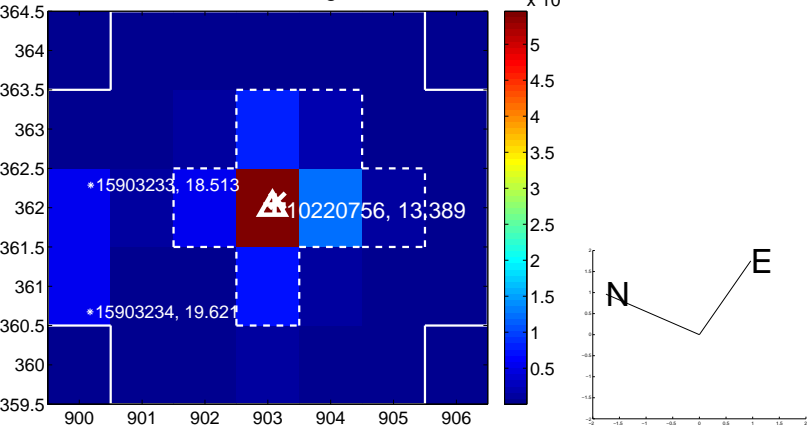
Q9 no OOT image



Q10 difference image



Q10 OOT image



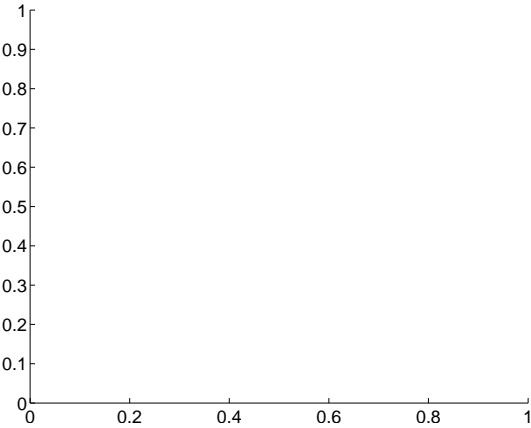
Q11 no difference image



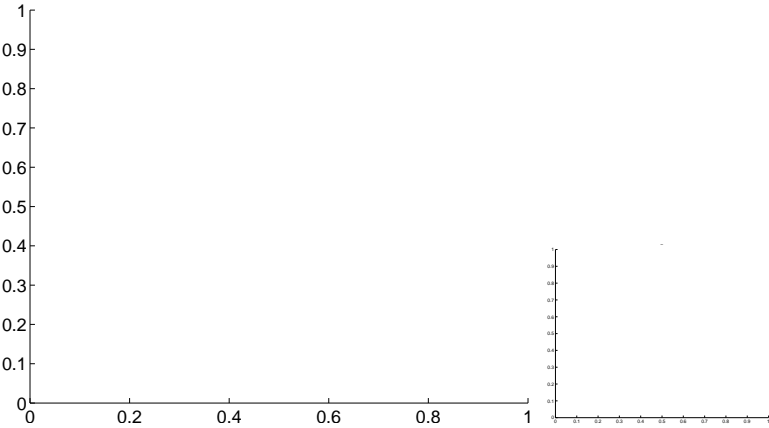
Q11 no OOT image



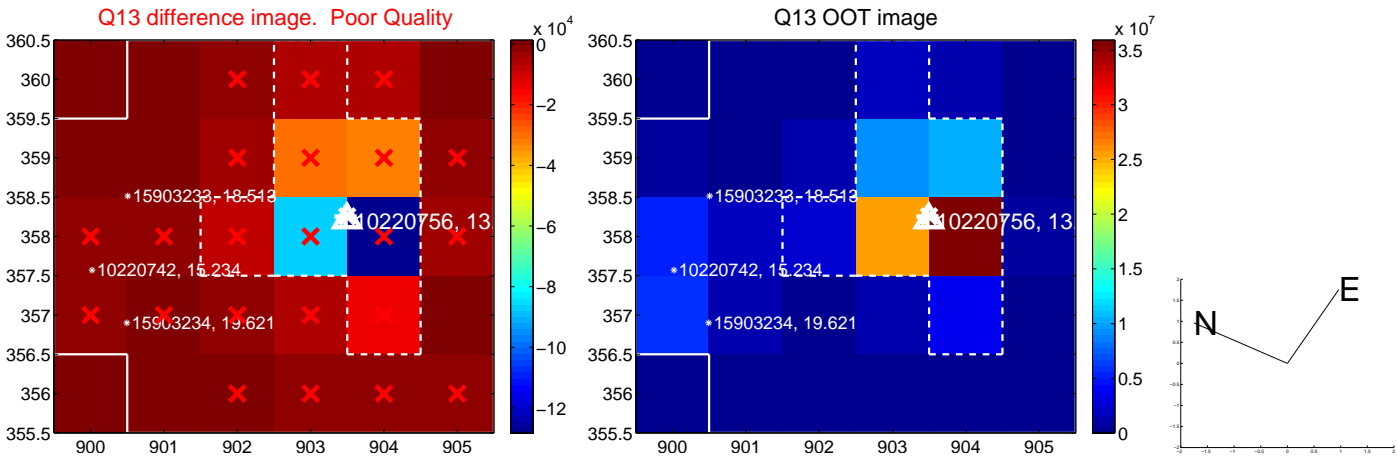
Q12 no difference image



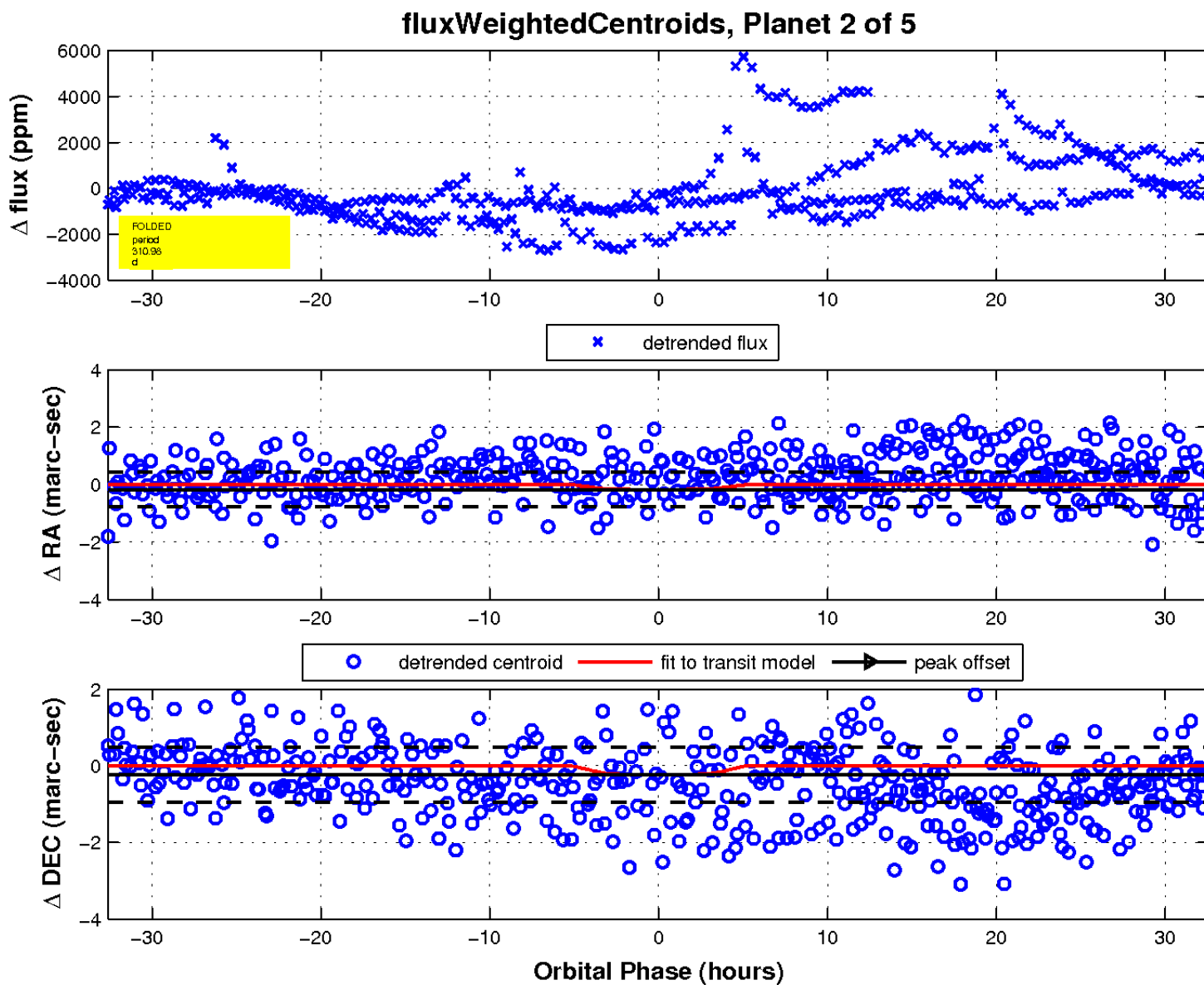
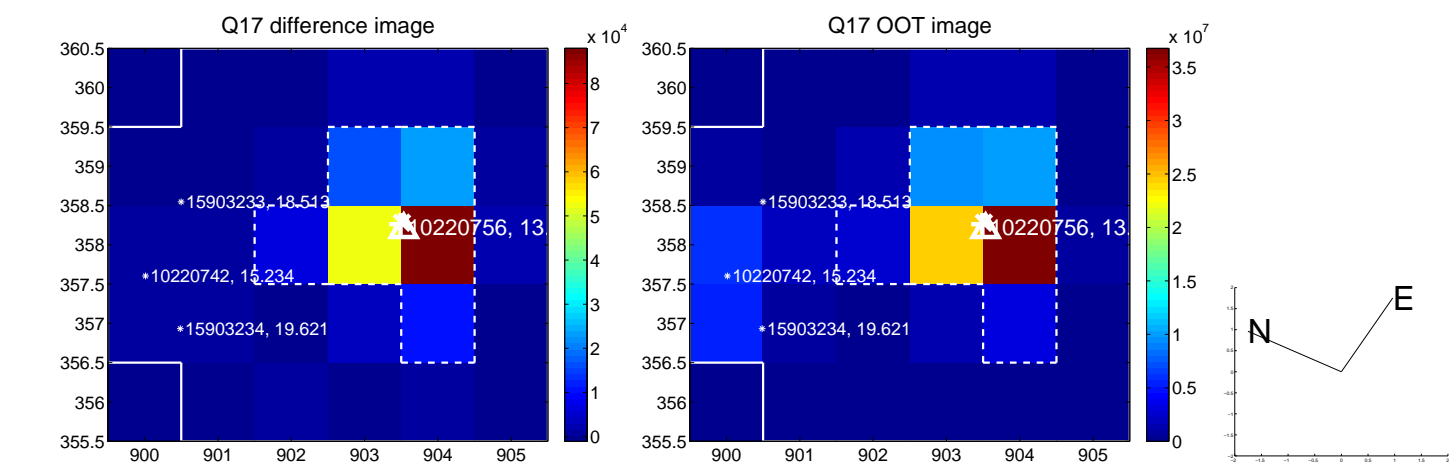
Q12 no OOT image



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

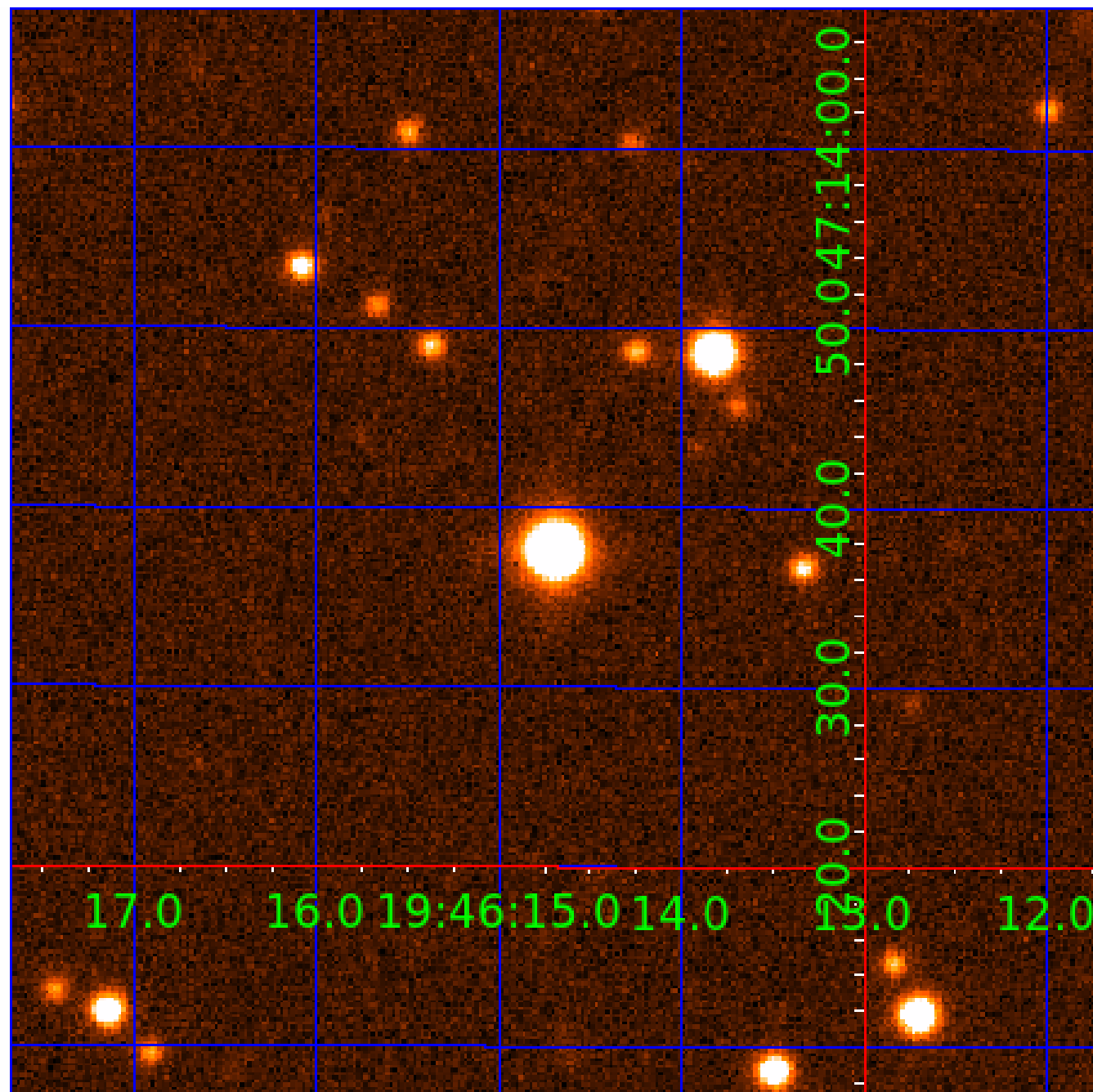


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010220756

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})
010220756-01	OBS	No	285.136931	186.884524	641.2	3.436	15.3	9.3	1.17	6015	3.39	2.46
010220756-02	OBS	No	310.981075	323.266450	705.9	10.887	19.0	4.4	1.17	6015	3.87	2.19
010220756-03	OBS	No	307.822148	271.056381	708.0	5.179	17.1	8.6	1.17	6015	3.14	2.22
010220756-04	OBS	No	198.461428	222.670194	420.6	2.294	17.8	5.6	1.17	6015	2.47	3.99
010220756-05	OBS	No	222.208933	277.030112	476.2	3.199	12.4	6.2	1.17	6015	2.59	3.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010220756-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
010220756-02	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
010220756-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

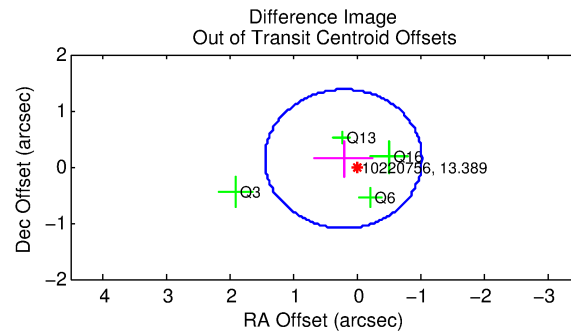
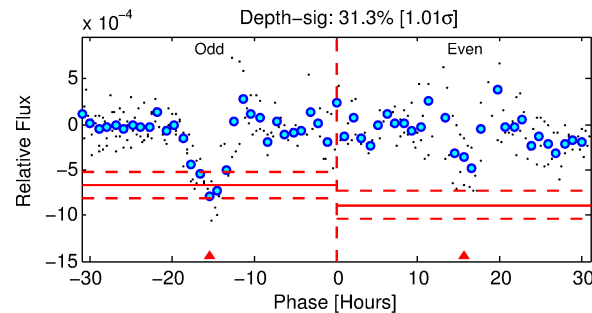
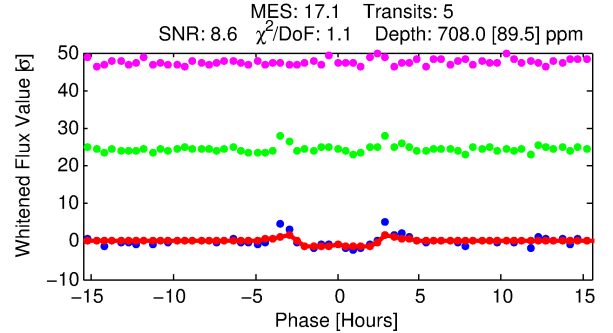
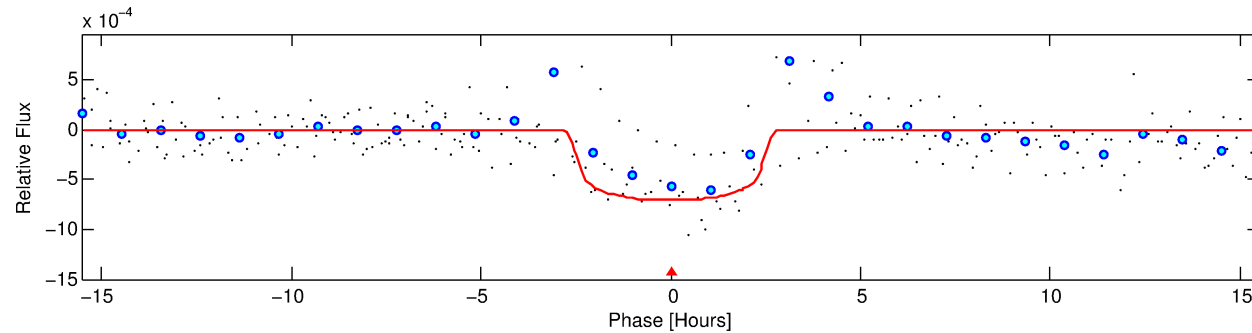
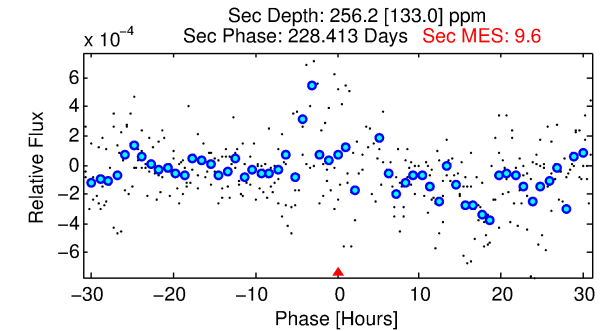
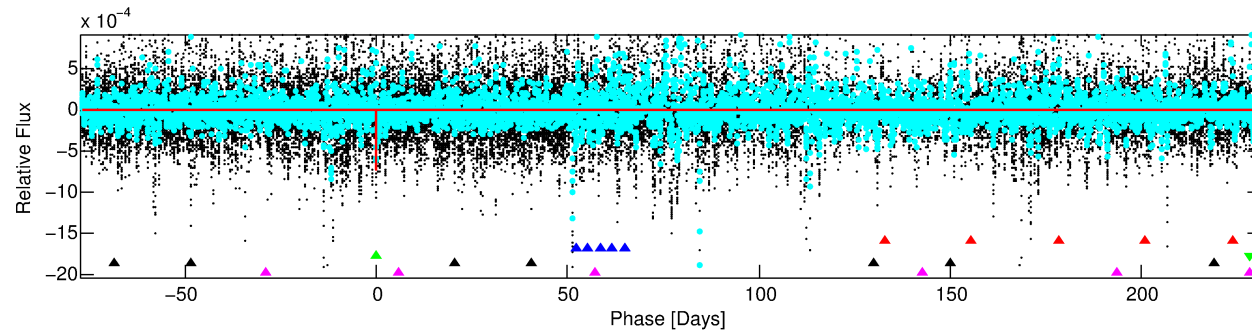
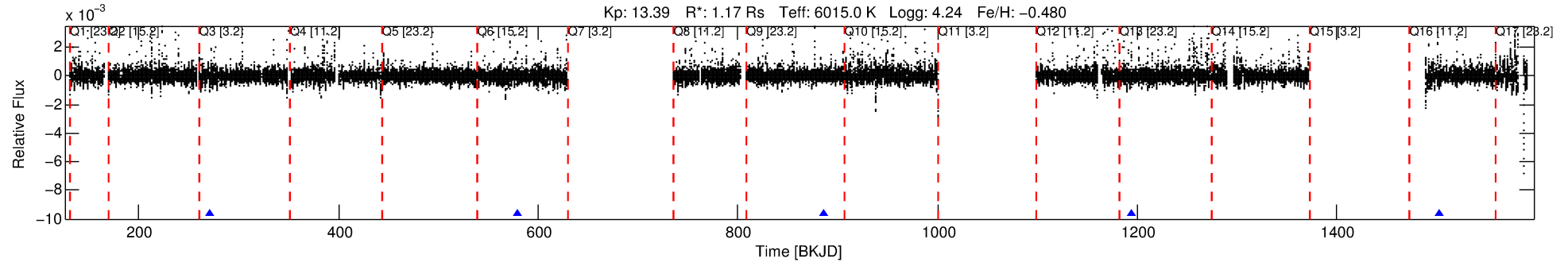
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010220756-03

No Significant Match Found

DV One-Page Summary

KIC: 10220756 Candidate: 3 of 5 Period: 307.822 d



DV Fit Results:

Period = 307.82215 [0.00195] d
Epoch = 271.0564 [0.0046] BKJD
Rp/R* = 0.0245 [0.0241]
a/R* = 451.45 [2207.33]
b = 0.25 [18.70]
Seff = 2.22 [1.00]
Teq = 311 [35] K
Rp = 3.14 [3.20] Re
a = 0.8531 [0.2293] AU
Ag = 10377.09 [21552.62] [0.48 σ]
Teffp = 4858 [2470] K [1.84 σ]

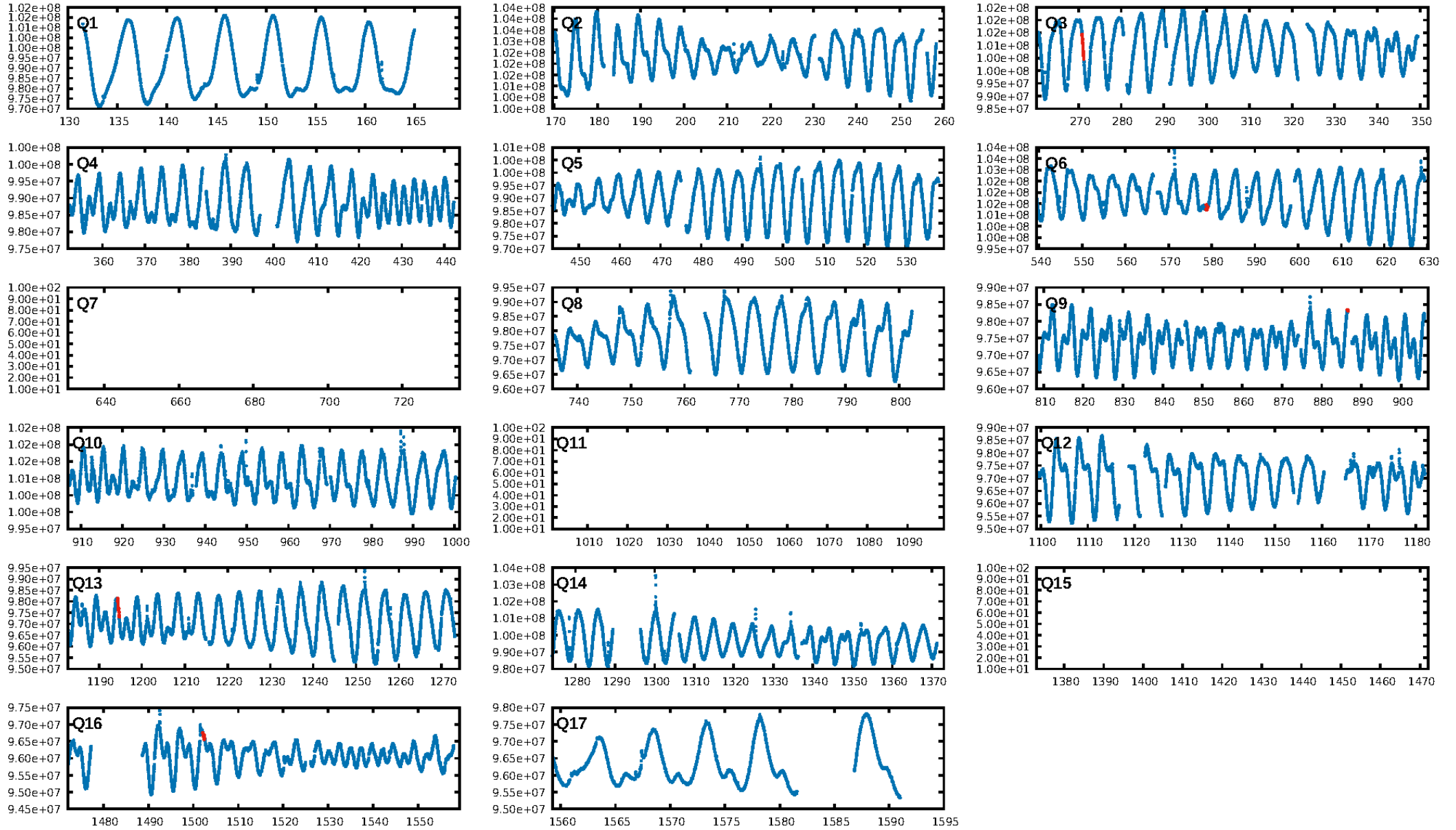
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [87.60 σ]
LongPeriod-sig: 100.0% [6.29 σ]
ModelChiSquare2-sig: 13.3%
ModelChiSquareGof-sig: 99.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: 0.4542
Centroid-sig: 94.9%
Centroid-so: 0.379 arcsec [0.62 σ]
OotOffset-rm: 0.246 arcsec [0.60 σ]
OotOffset-st: 1/1/1/1 [4]
KicOffset-rm: 0.212 arcsec [0.61 σ]
KicOffset-st: 1/1/1/1 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 1.00 [4/4]

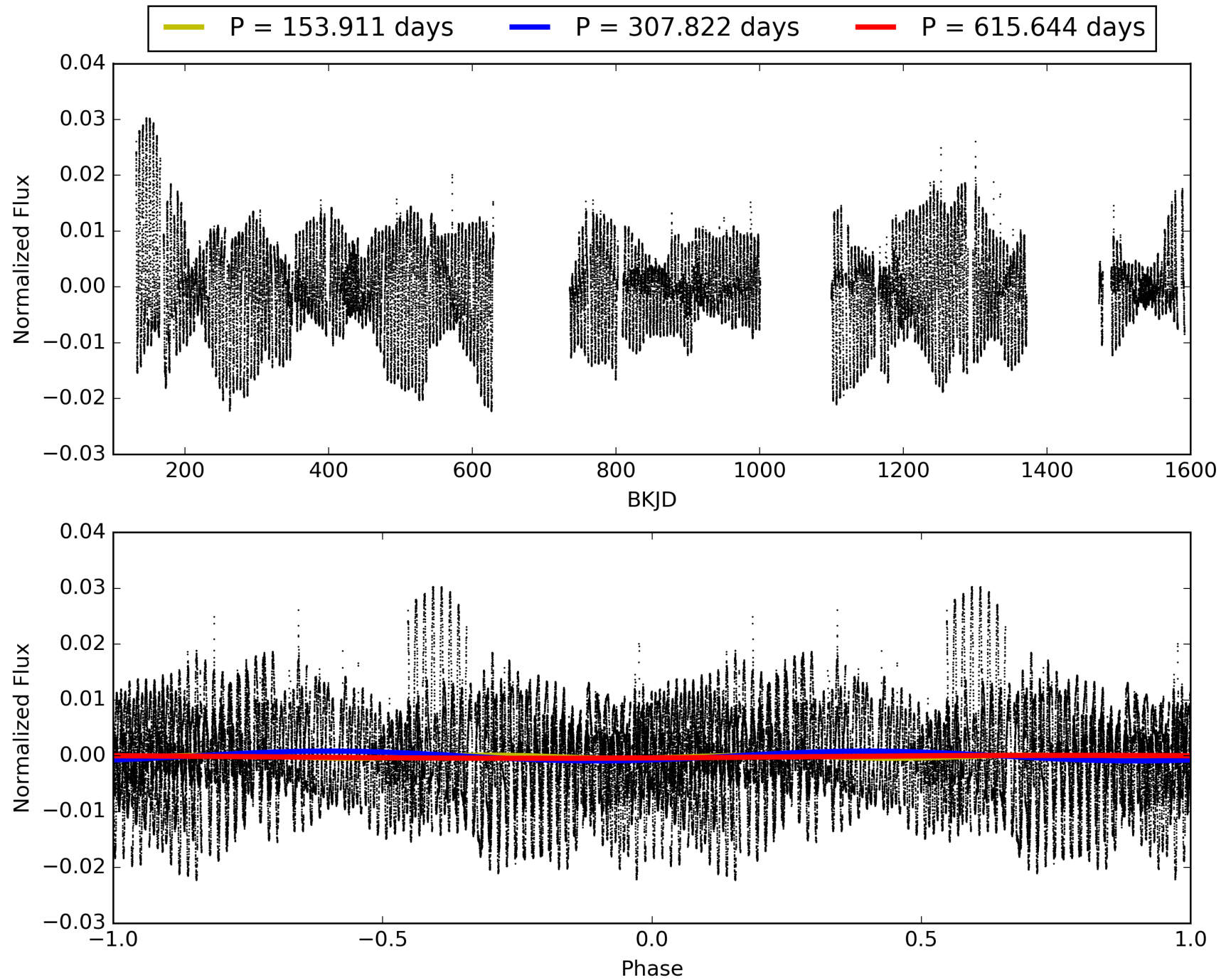
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:02:21 Z

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

TCE 010220756-03, PDC Light Curves

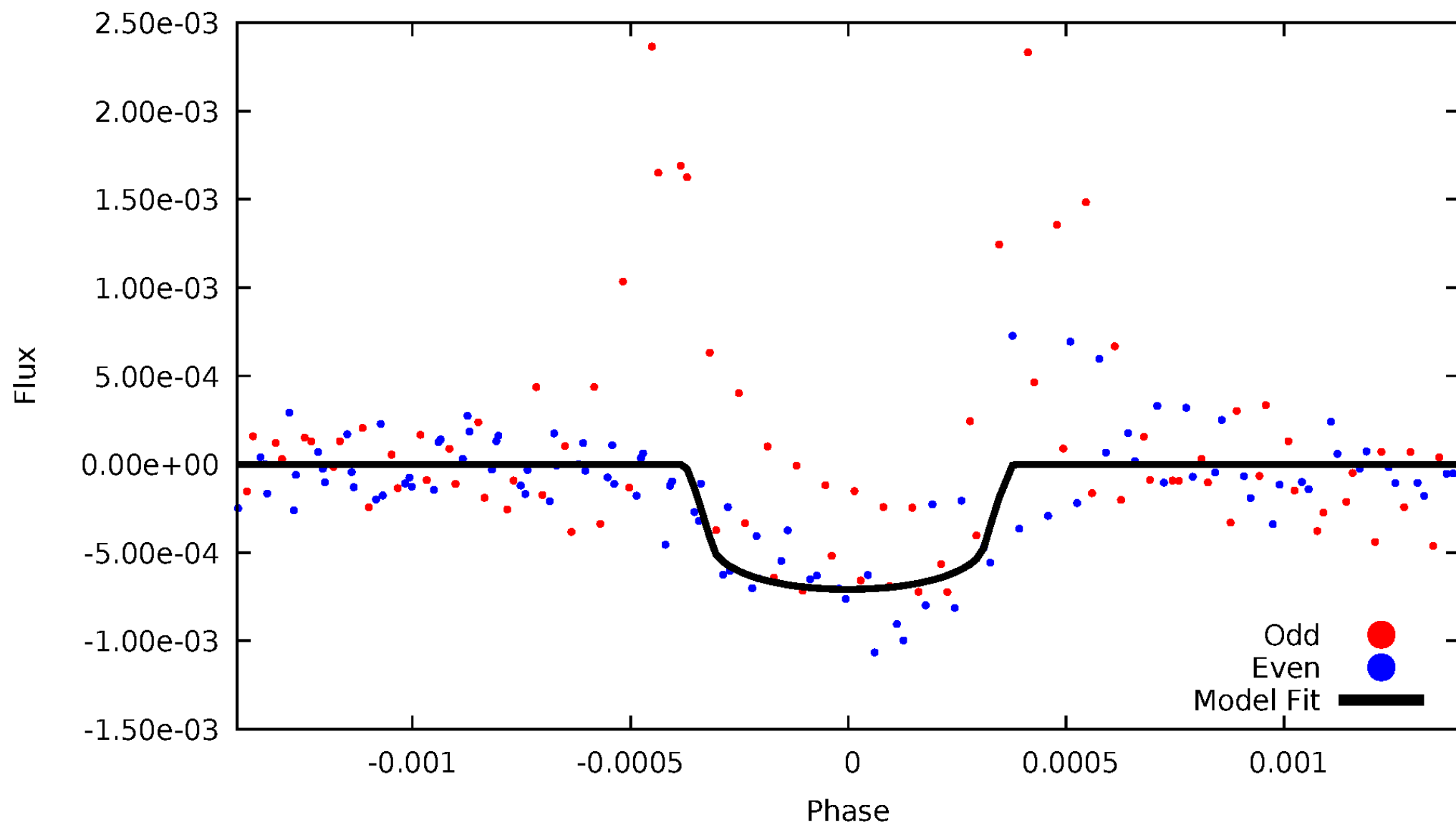


TCE 010220756-03



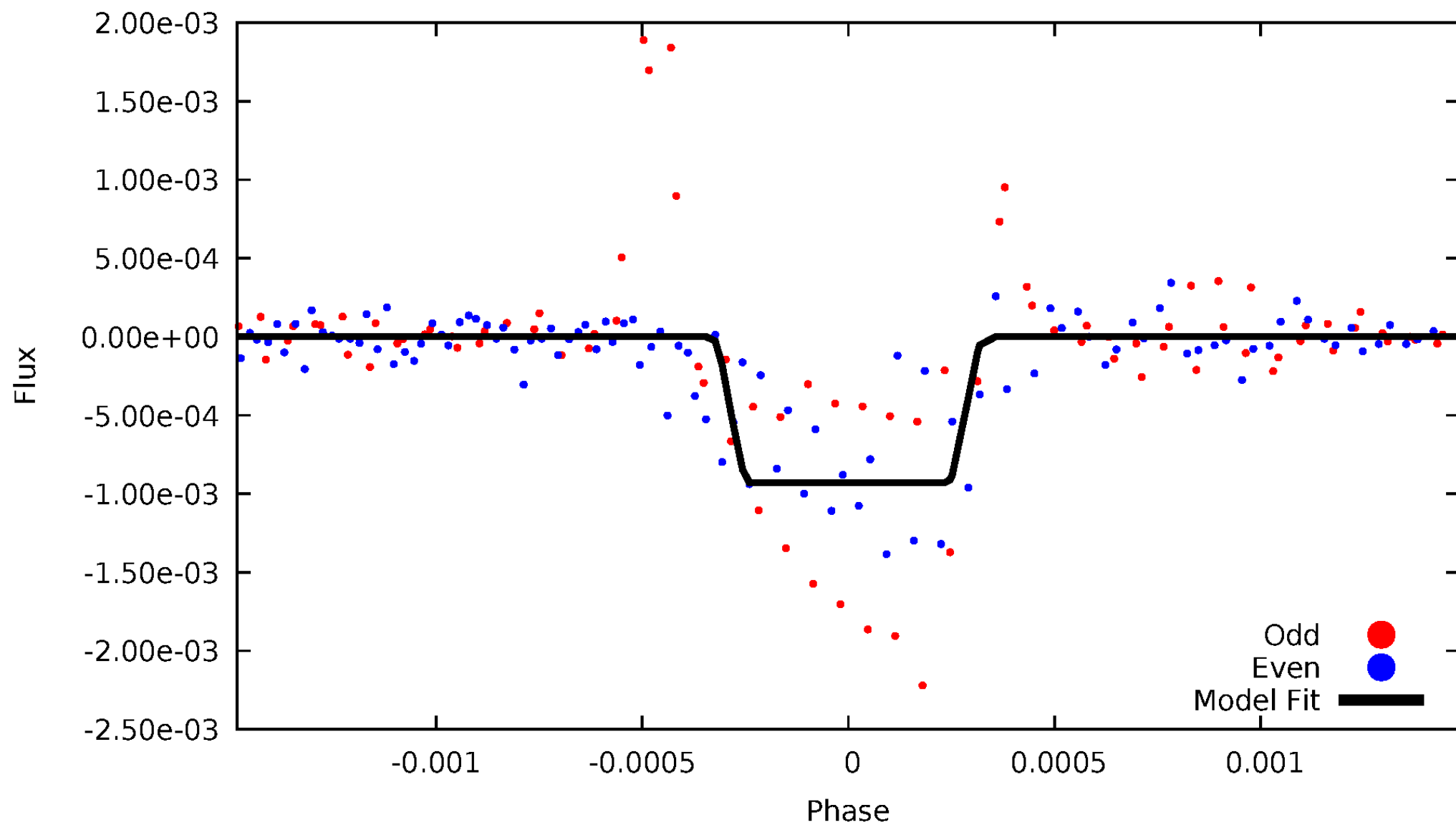
DV Odd/Even

TCE 010220756-03



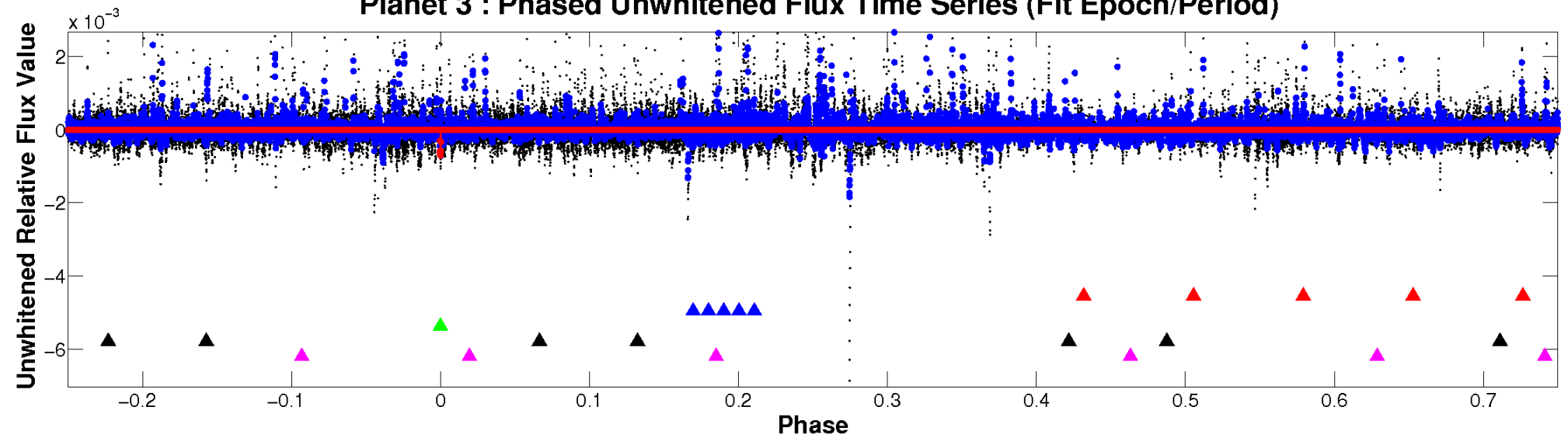
ALT Odd/Even

TCE 010220756-03

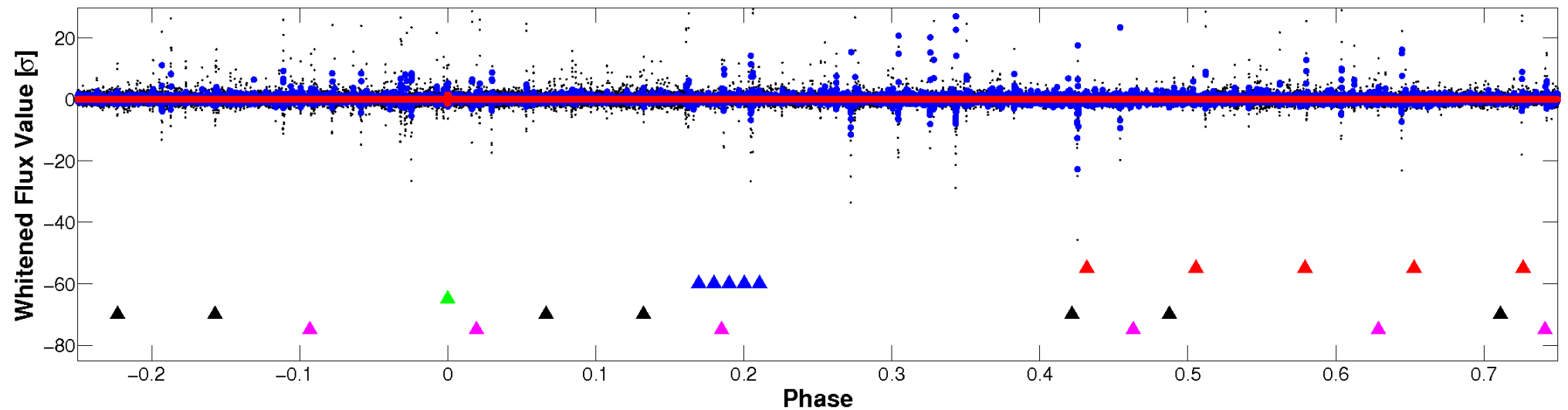


Non-Whitened Vs. Whitened Light Curve

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

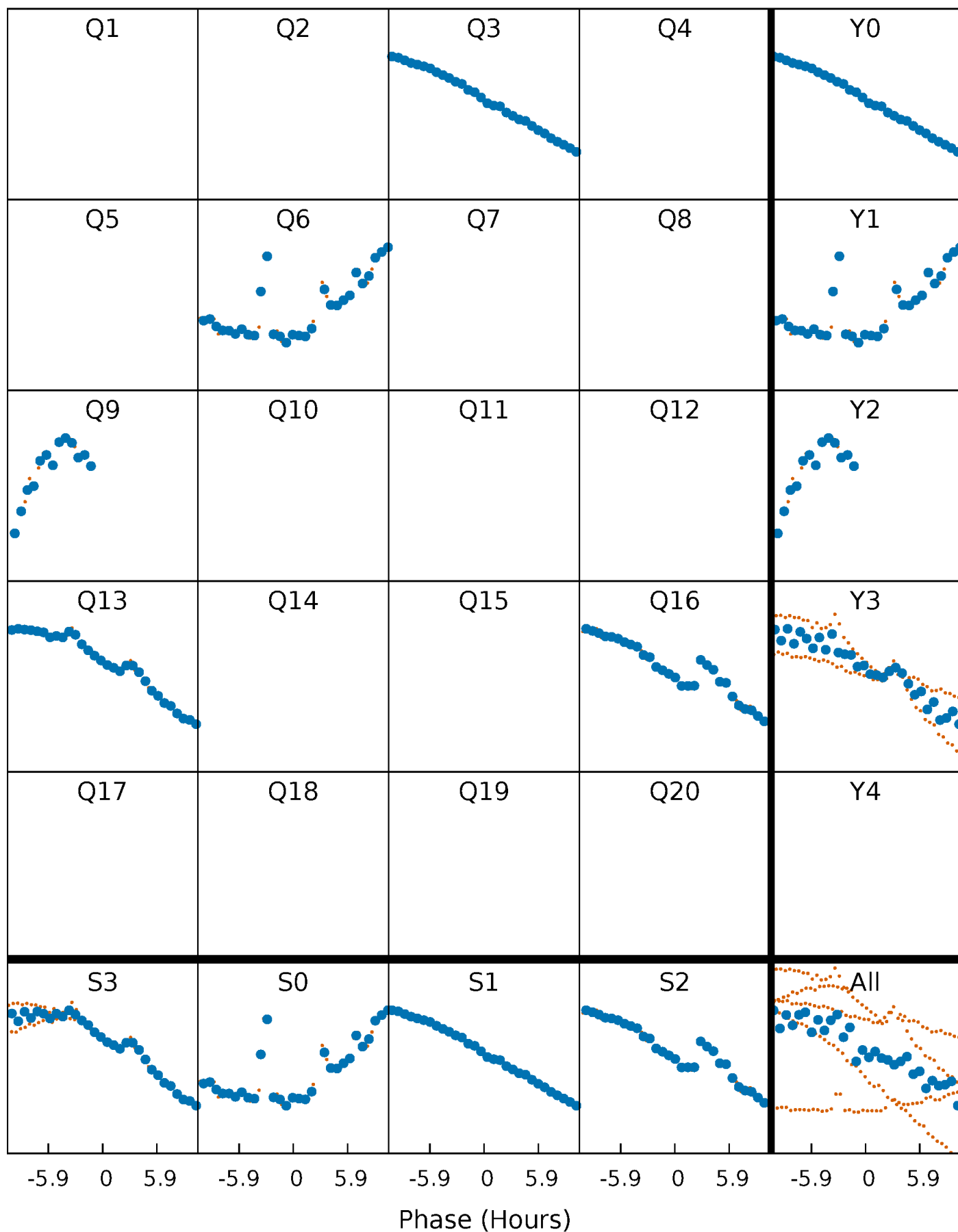


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



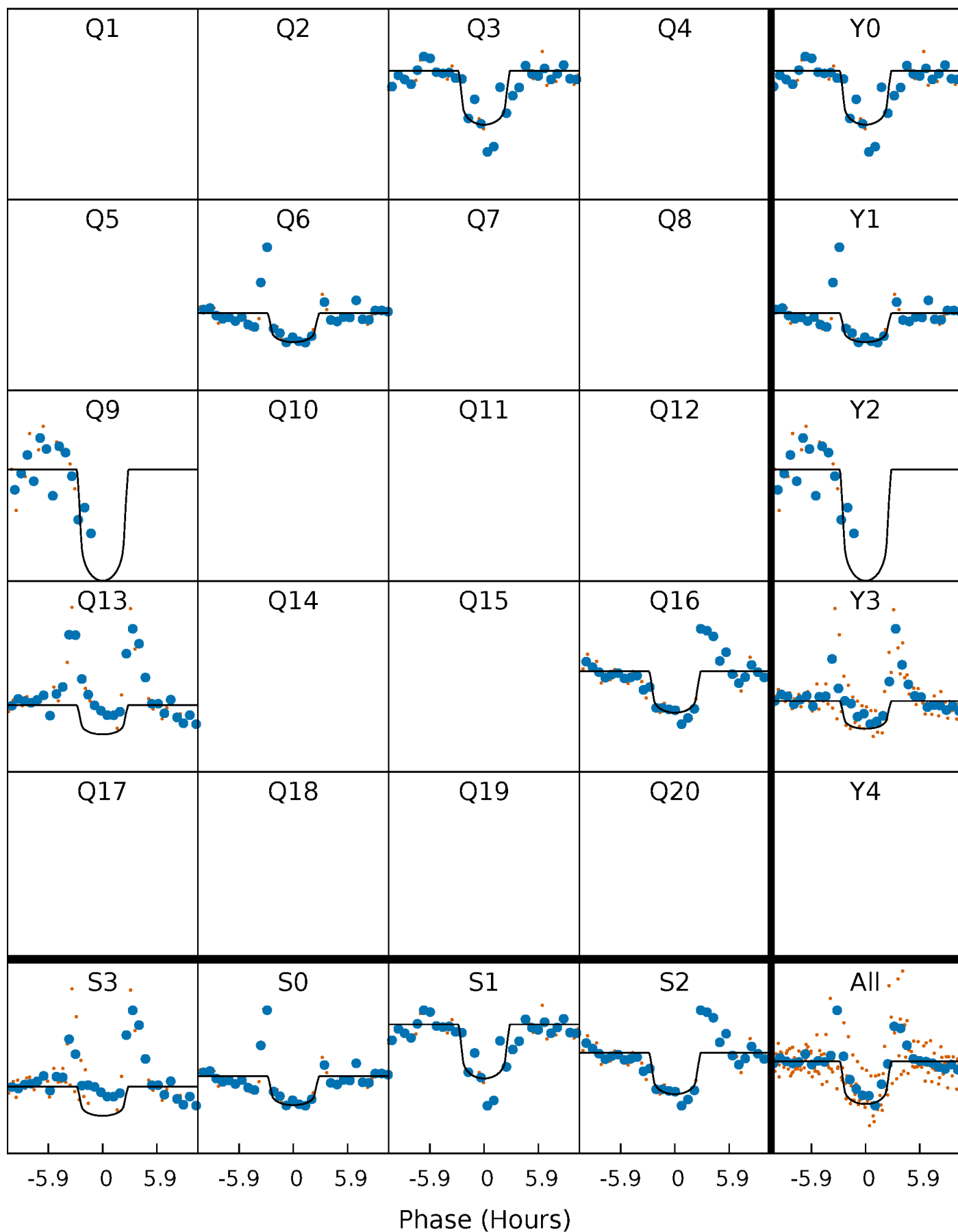
PDC Quarter-Phased Transit Curves

TCE 010220756-03 P=307.822148 Days $T_0=271.056381$ (BKJD)



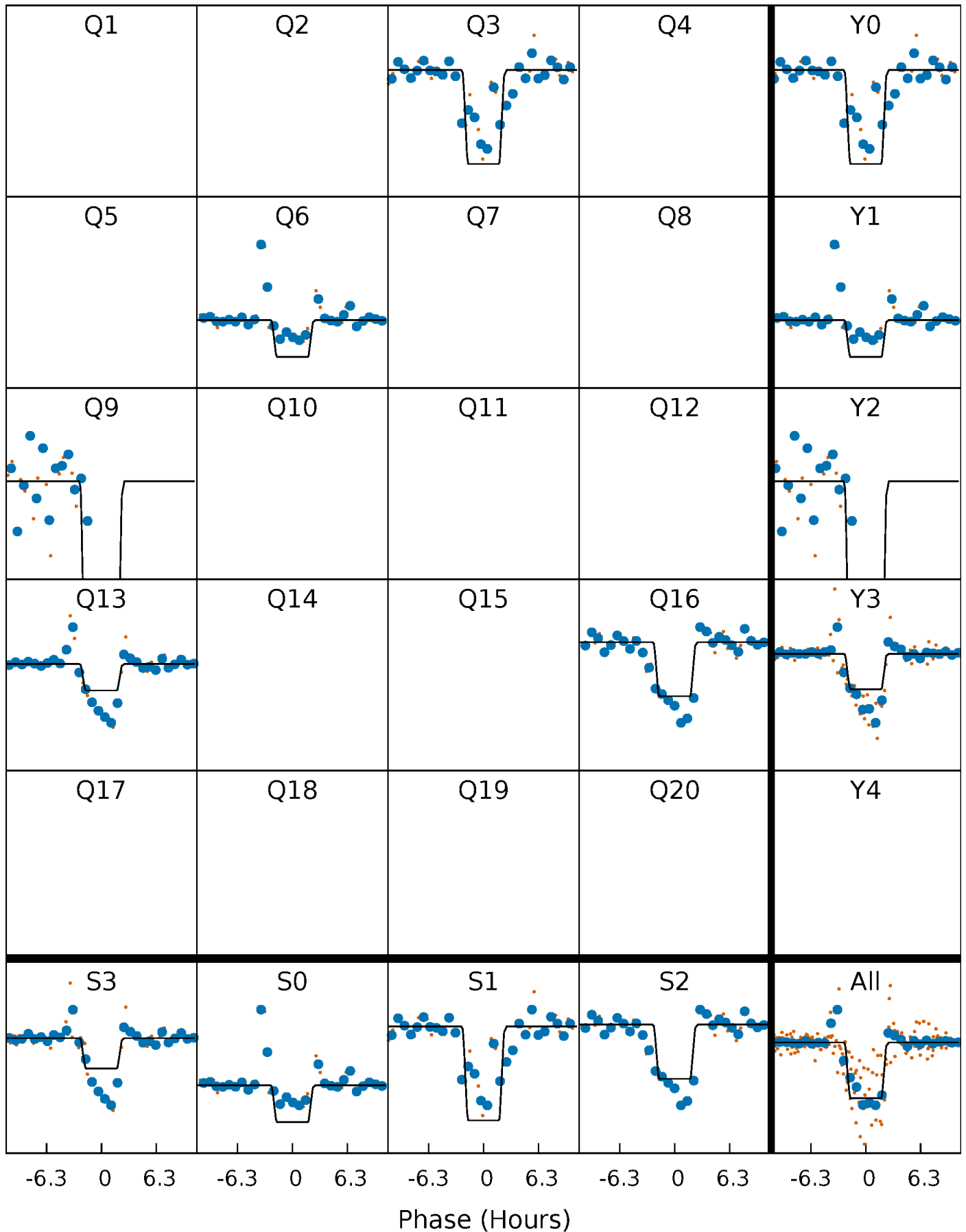
DV Quarter-Phased Transit Curves

TCE 010220756-03 P=307.822148 Days $T_0=271.056381$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

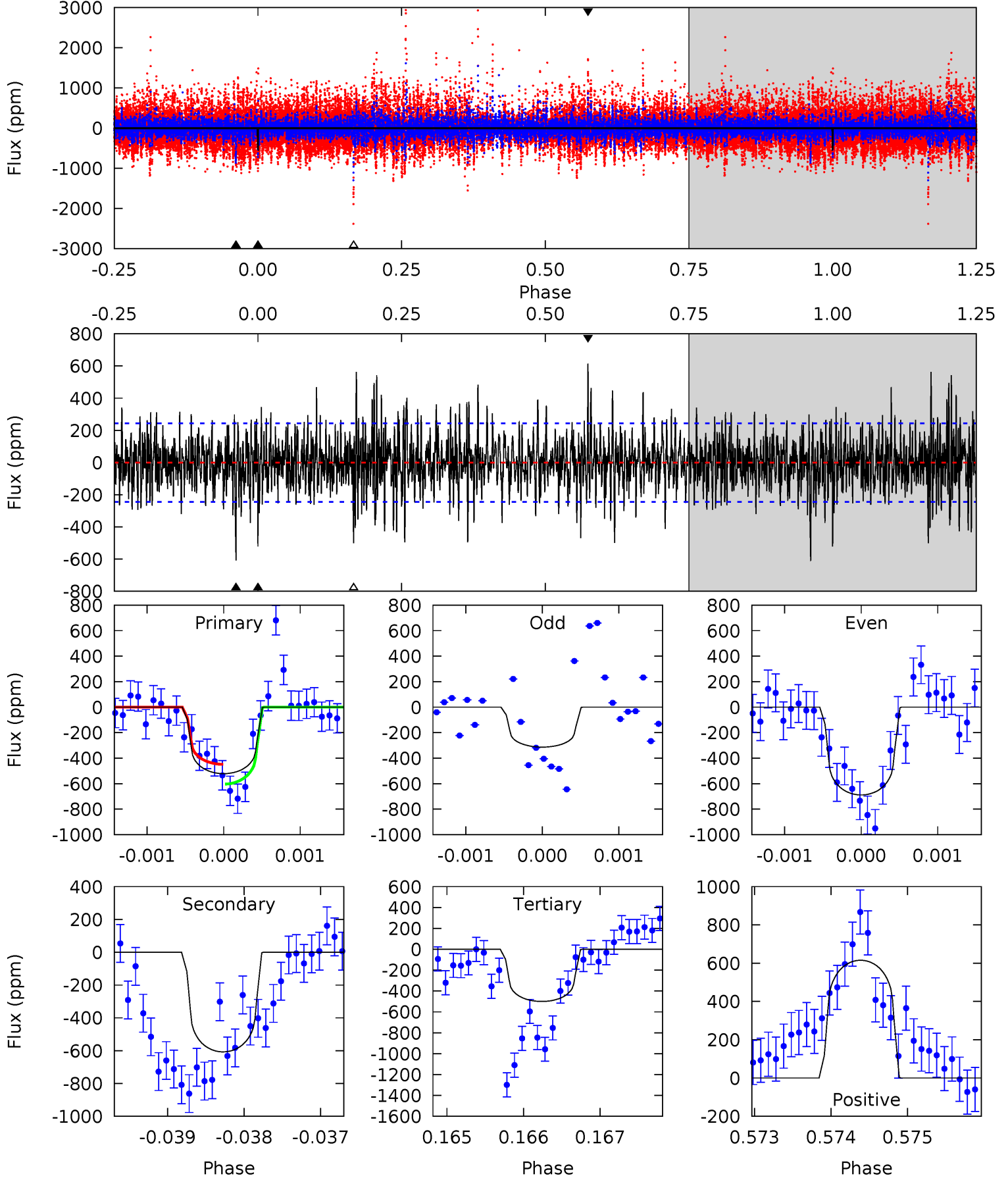
TCE 010220756-03 $P=307.817959$ Days $T_0=271.079058$ (BKJD)



DV Model-Shift Uniqueness Test

010220756-03, P = 307.822148 Days, E = 271.056381 Days

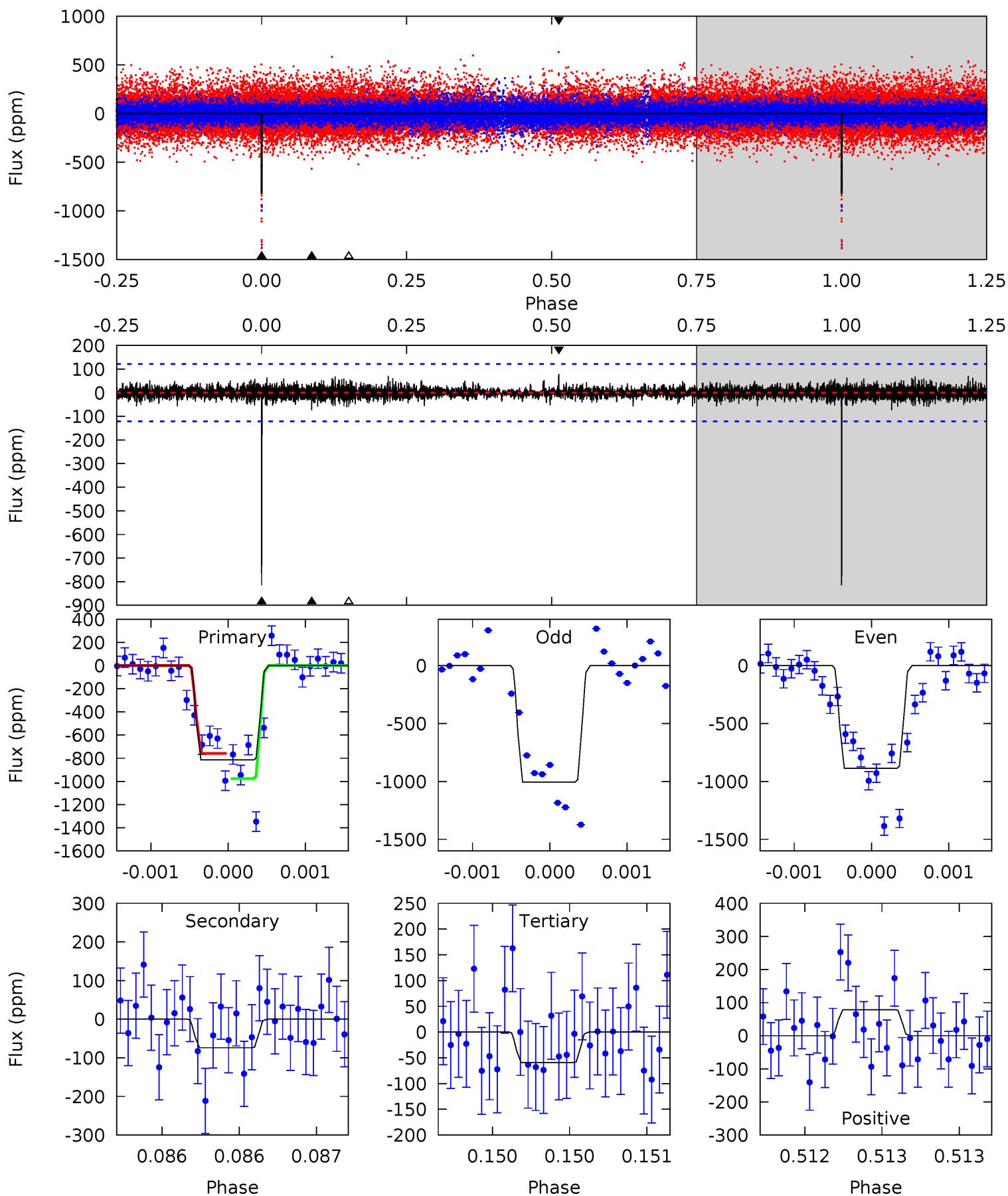
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.8	13.7	11.3	13.9	5.50	3.37	2.98	0.48	-2.12	2.42	-0.18	2.81	0.78	0.50	1.75



Alt Model-Shift Uniqueness Test

010220756-03, P = 307.817959 Days, E = 271.079058 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
37.0	3.35	2.69	3.56	5.52	3.40	0.67	34.3	33.4	0.66	-0.21	2.74	1.55	0.09	4.66



Stellar Parameters For KIC 010220756

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6015^{+161}_{-179}	$4.240^{+0.258}_{-0.172}$	$-0.480^{+0.300}_{-0.300}$	$1.174^{+0.320}_{-0.288}$	$0.874^{+0.128}_{-0.079}$	$0.760^{+1.121}_{-0.339}$
	+3%/-3%	+6%/-4%	+62%/-62%	+27%/-25%	+15%/-9%	+147%/-45%
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 010220756-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-607 ± 44	$3.61^{+3.08}_{-2.23}$	432^{+30}_{-35}	5505^{+4268}_{-1127}	$18639^{+110099}_{-13044}$
Alt.	-74 ± 22	$4.37^{+2.85}_{-2.62}$	431^{+34}_{-34}	3438^{+1360}_{-489}	1512^{+8217}_{-1005}

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

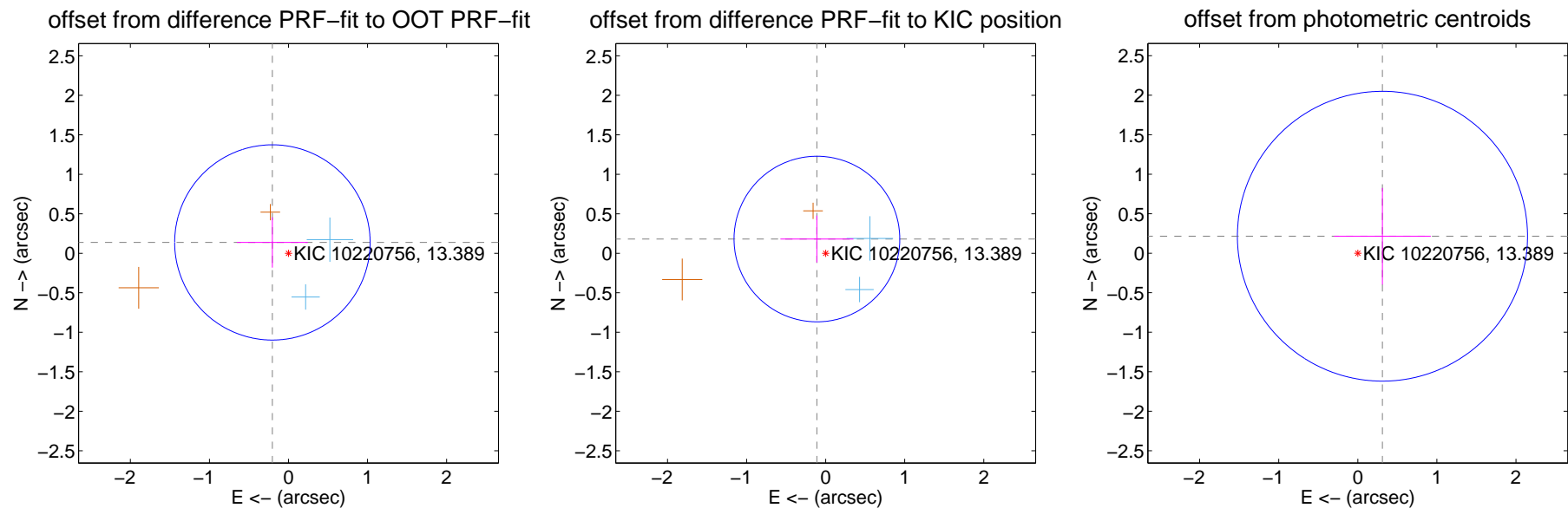
DV Centroid Data

Supplemental centroid analysis for 010220756-03. Kepler magnitude: 13.39. Transit SNR 8.63

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.246 ± 0.412	0.60	0.204 ± 0.448	0.137 ± 0.320
PRF-fit source offset from KIC position	0.212 ± 0.349	0.61	0.111 ± 0.462	0.180 ± 0.296
photometric centroid source offset	0.38 ± 0.61	0.62	-0.31 ± 0.61	0.22 ± 0.61



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.

Q1 no difference image



Q1 no OOT image



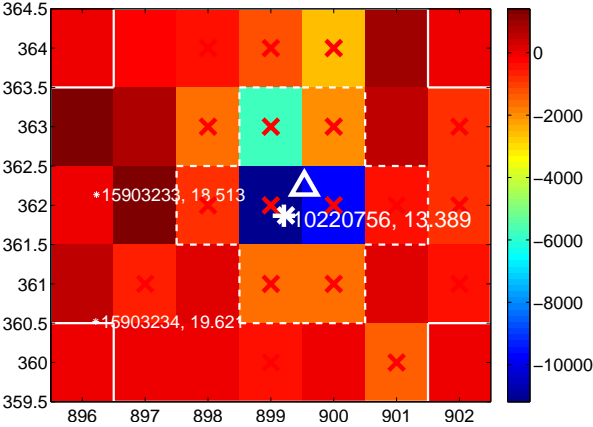
Q2 no difference image



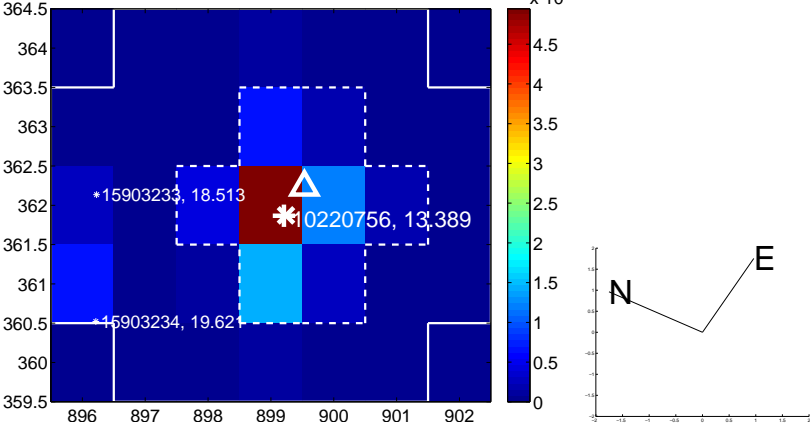
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



Q4 no difference image

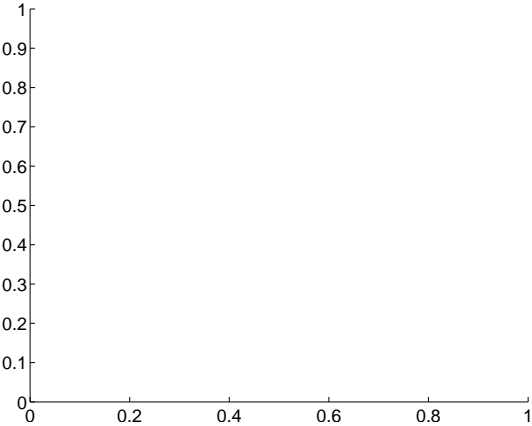


Q4 no OOT image

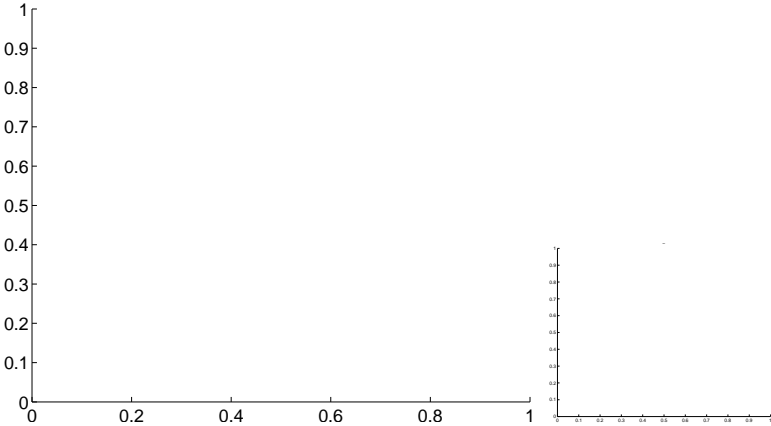


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

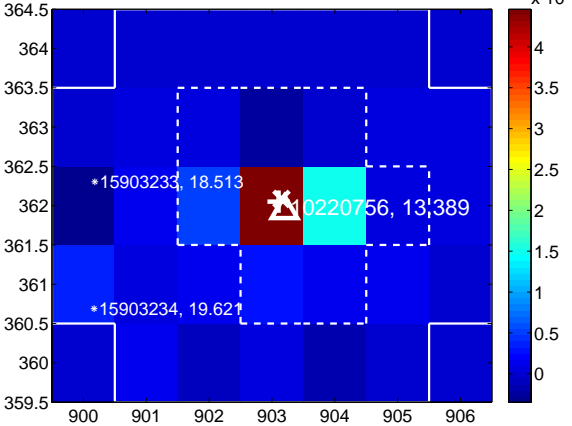
Q5 no difference image



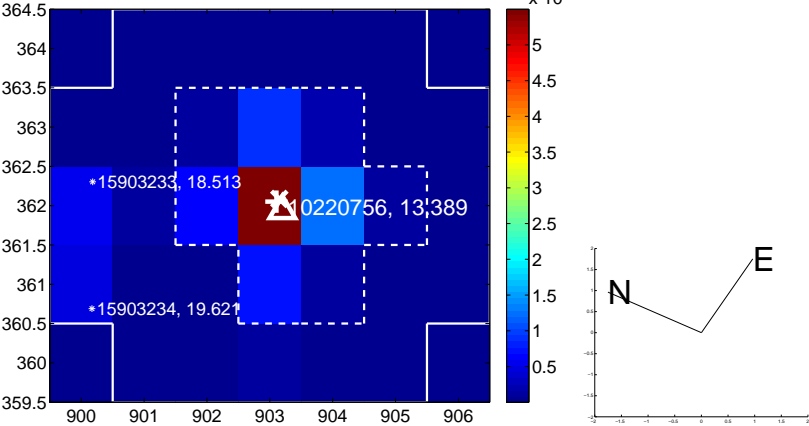
Q5 no OOT image



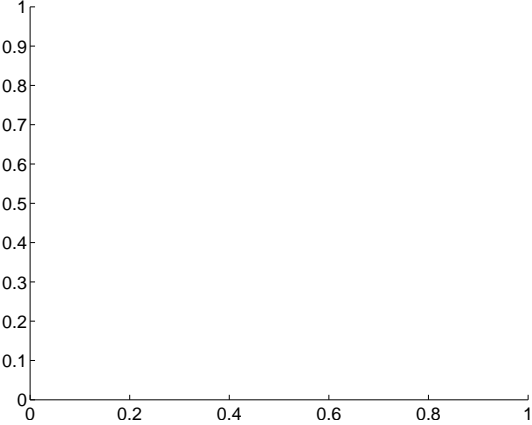
Q6 difference image



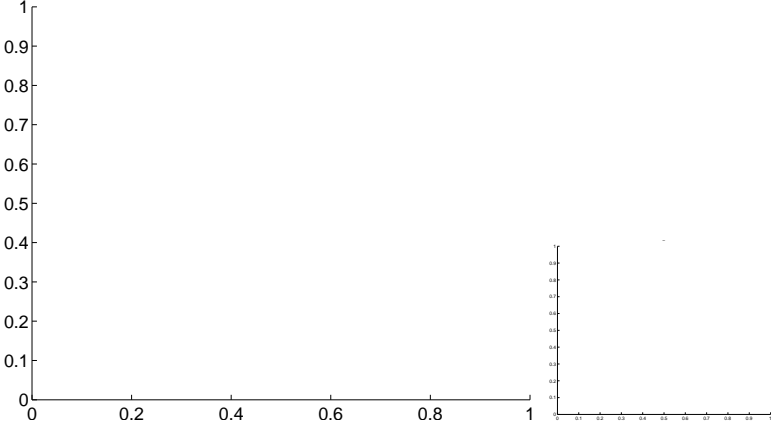
Q6 OOT image



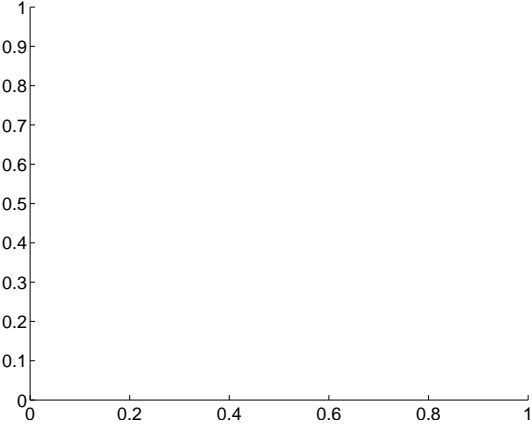
Q7 no difference image



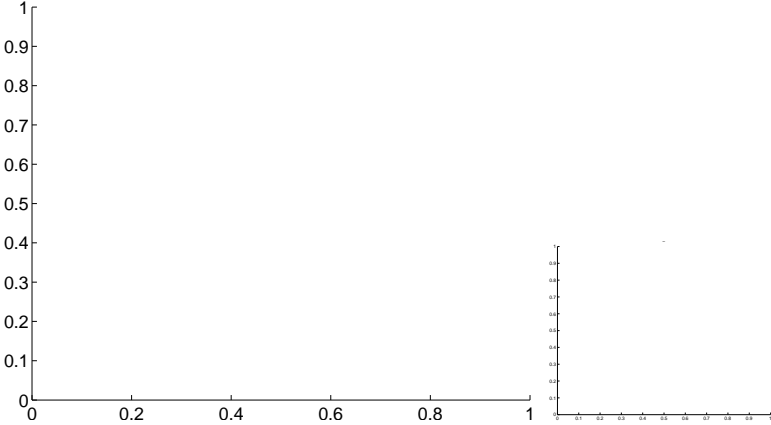
Q7 no OOT image



Q8 no difference image



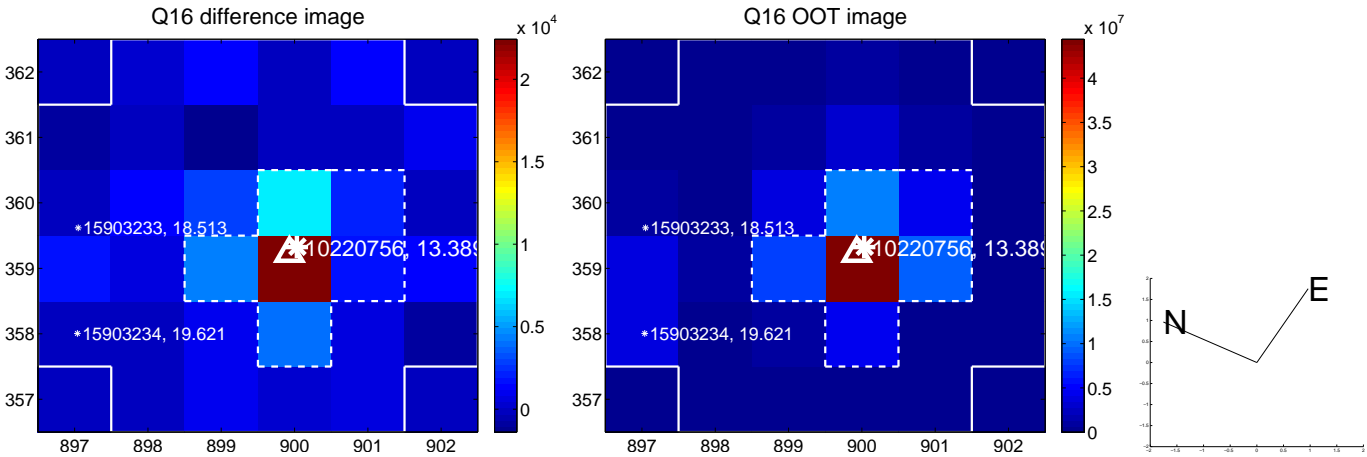
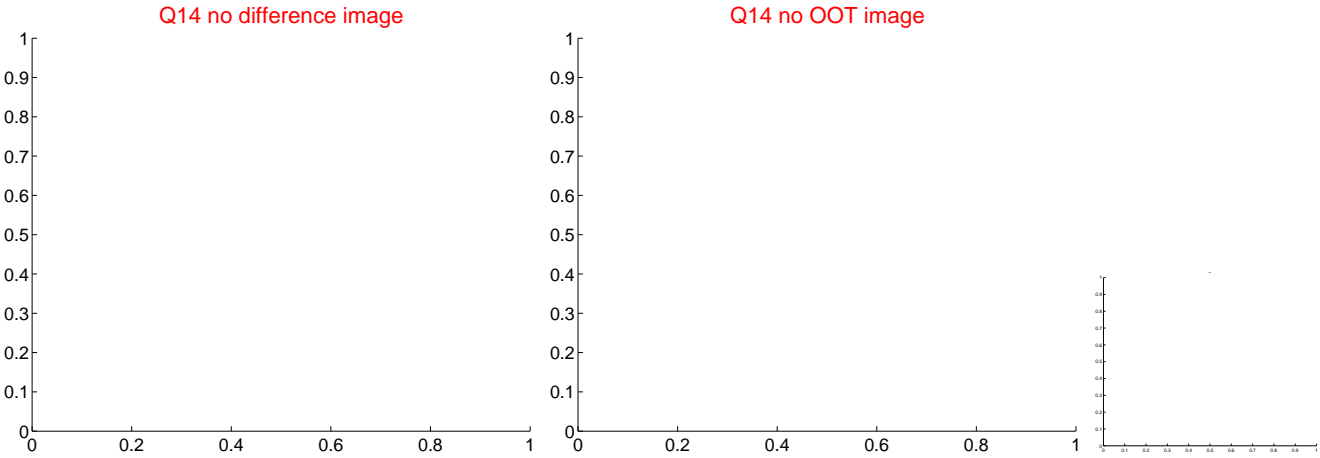
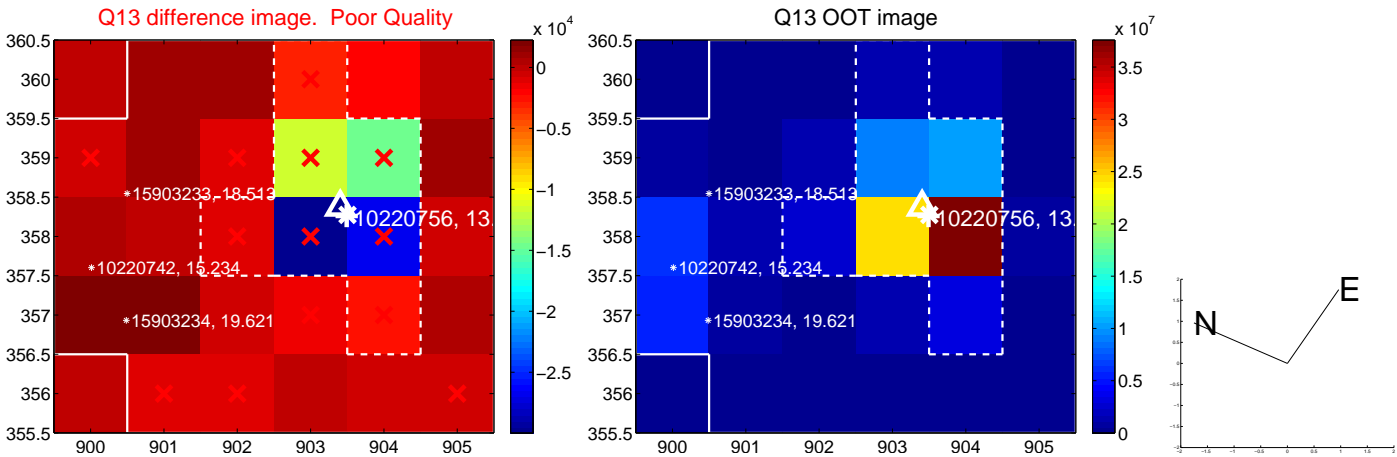
Q8 no OOT image



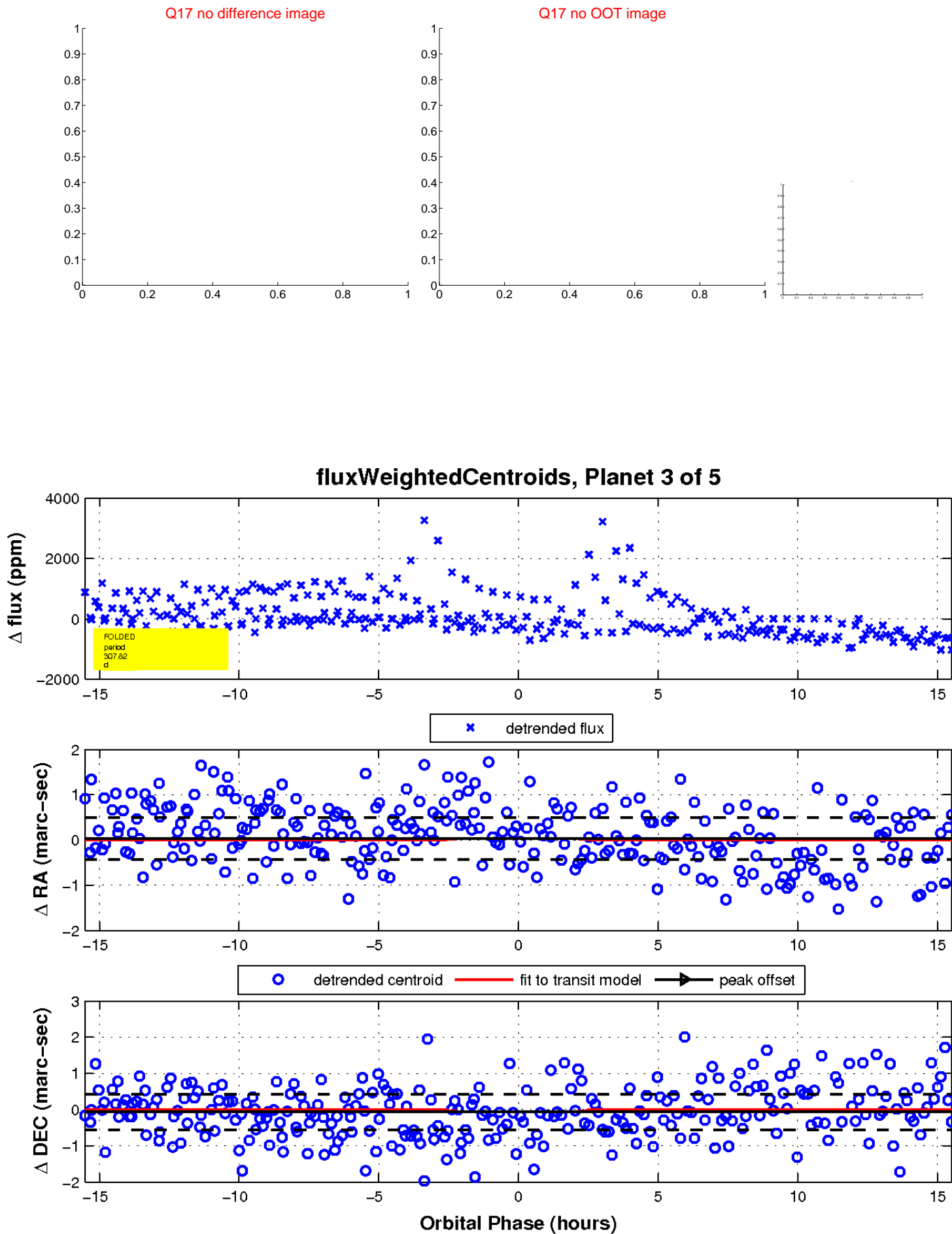
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

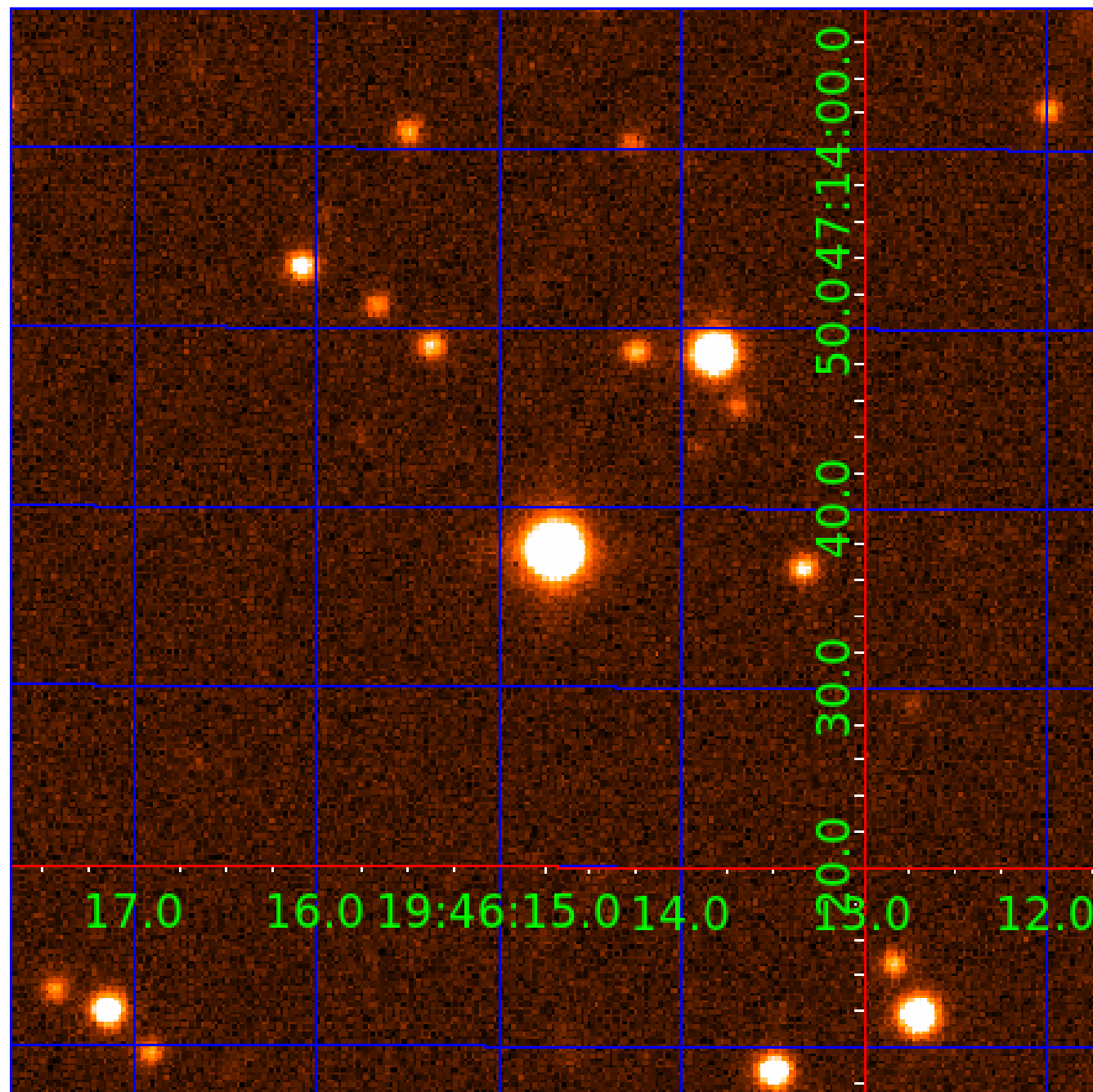


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010220756

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})
010220756-01	OBS	No	285.136931	186.884524	641.2	3.436	15.3	9.3	1.17	6015	3.39	2.46
010220756-02	OBS	No	310.981075	323.266450	705.9	10.887	19.0	4.4	1.17	6015	3.87	2.19
010220756-03	OBS	No	307.822148	271.056381	708.0	5.179	17.1	8.6	1.17	6015	3.14	2.22
010220756-04	OBS	No	198.461428	222.670194	420.6	2.294	17.8	5.6	1.17	6015	2.47	3.99
010220756-05	OBS	No	222.208933	277.030112	476.2	3.199	12.4	6.2	1.17	6015	2.59	3.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010220756-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
010220756-02	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
010220756-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

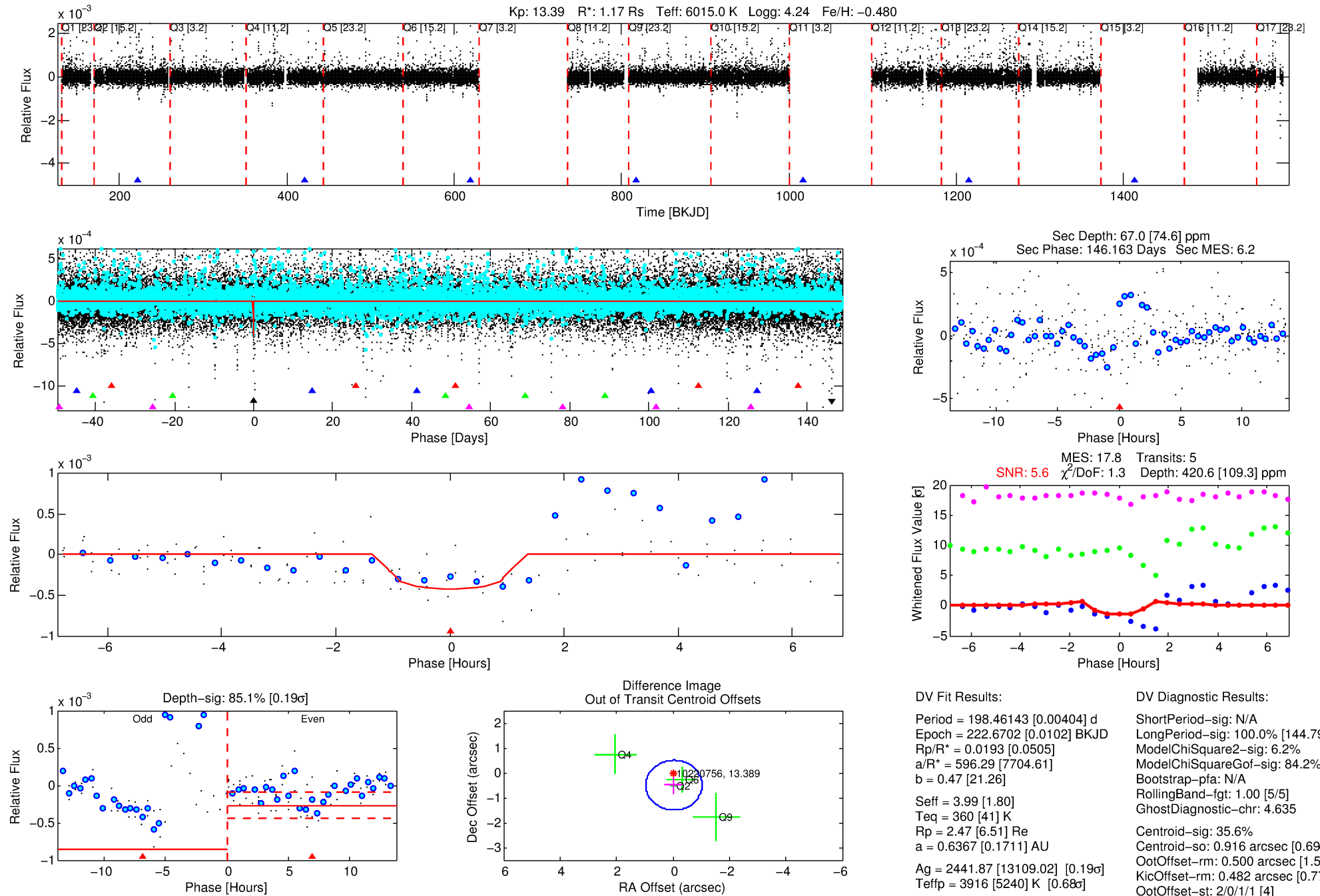
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010220756-04

No Significant Match Found

DV One-Page Summary

KIC: 10220756 Candidate: 4 of 5 Period: 198.461 d



DV Fit Results:

Period = 198.46143 [0.00404] d
Epoch = 222.6702 [0.0102] BKJD
Rp/R* = 0.0193 [0.0505]
a/R* = 596.29 [7704.61]
b = 0.47 [21.26]
Seff = 3.99 [1.80]
Teq = 360 [41] K
Rp = 2.47 [6.51] Re
a = 0.6367 [0.1711] AU
Ag = 2441.87 [13109.02] [0.19 σ]
Teffp = 3916 [5240] K [0.68 σ]

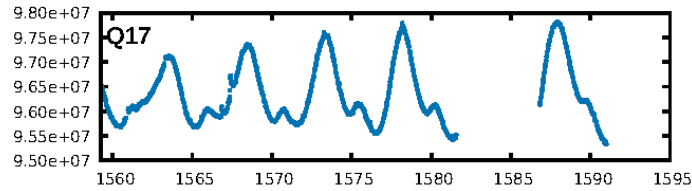
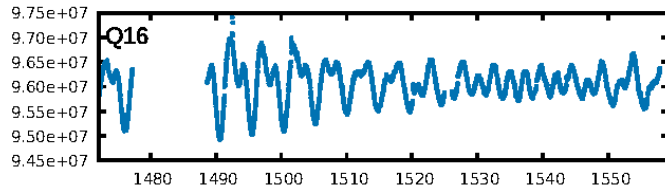
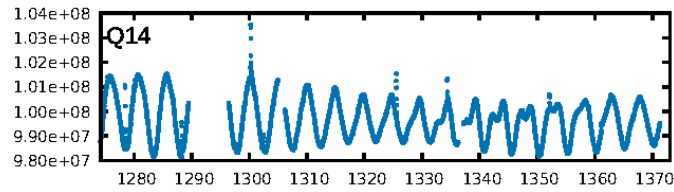
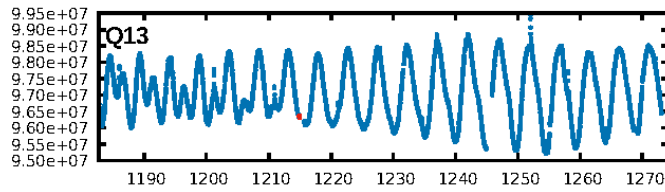
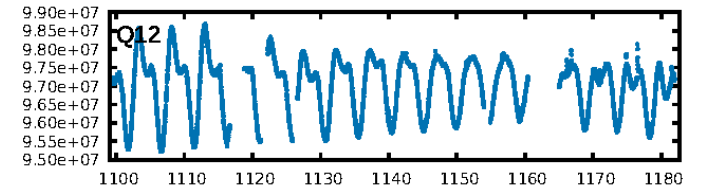
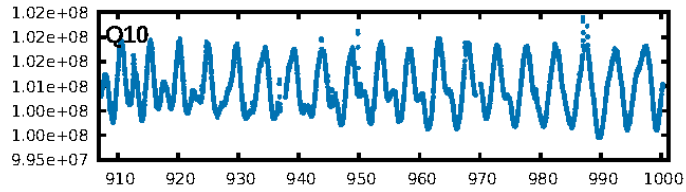
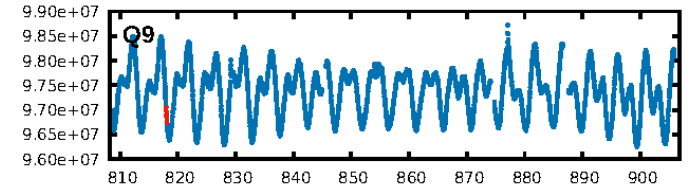
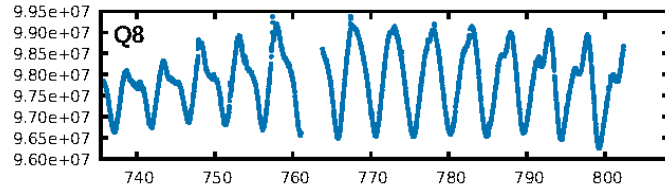
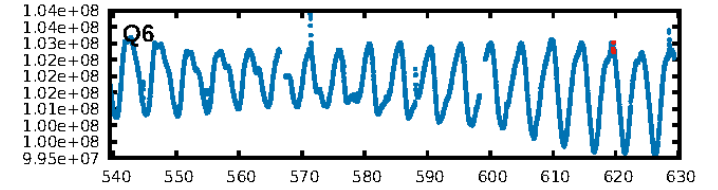
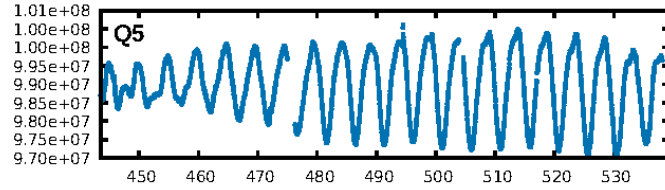
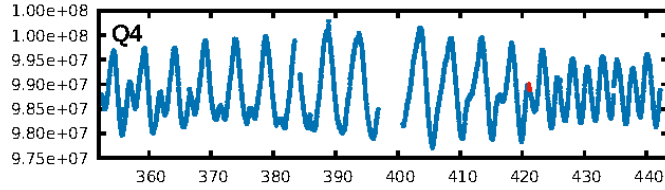
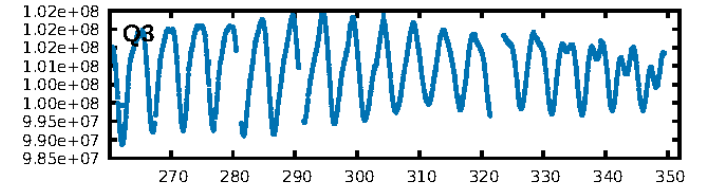
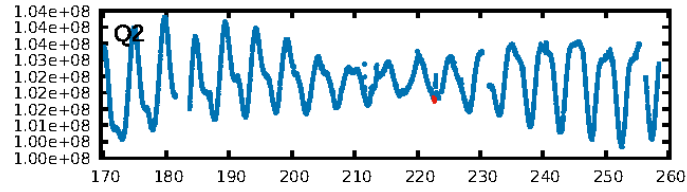
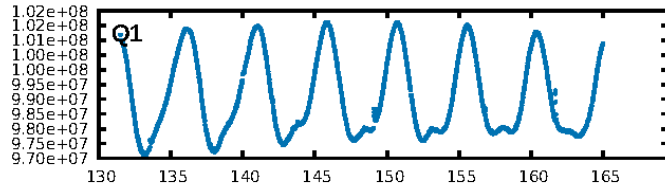
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [144.79 σ]
ModelChiSquare2-sig: 6.2%
ModelChiSquareGof-sig: 84.2%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: 4.635
Centroid-sig: 35.6%
Centroid-so: 0.916 arcsec [0.69 σ]
OotOffset-rm: 0.500 arcsec [1.50 σ]
KicOffset-rm: 0.482 arcsec [0.77 σ]
OotOffset-st: 2/0/1/1 [4]
KicOffset-st: 2/0/1/1 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 1.00 [4/4]

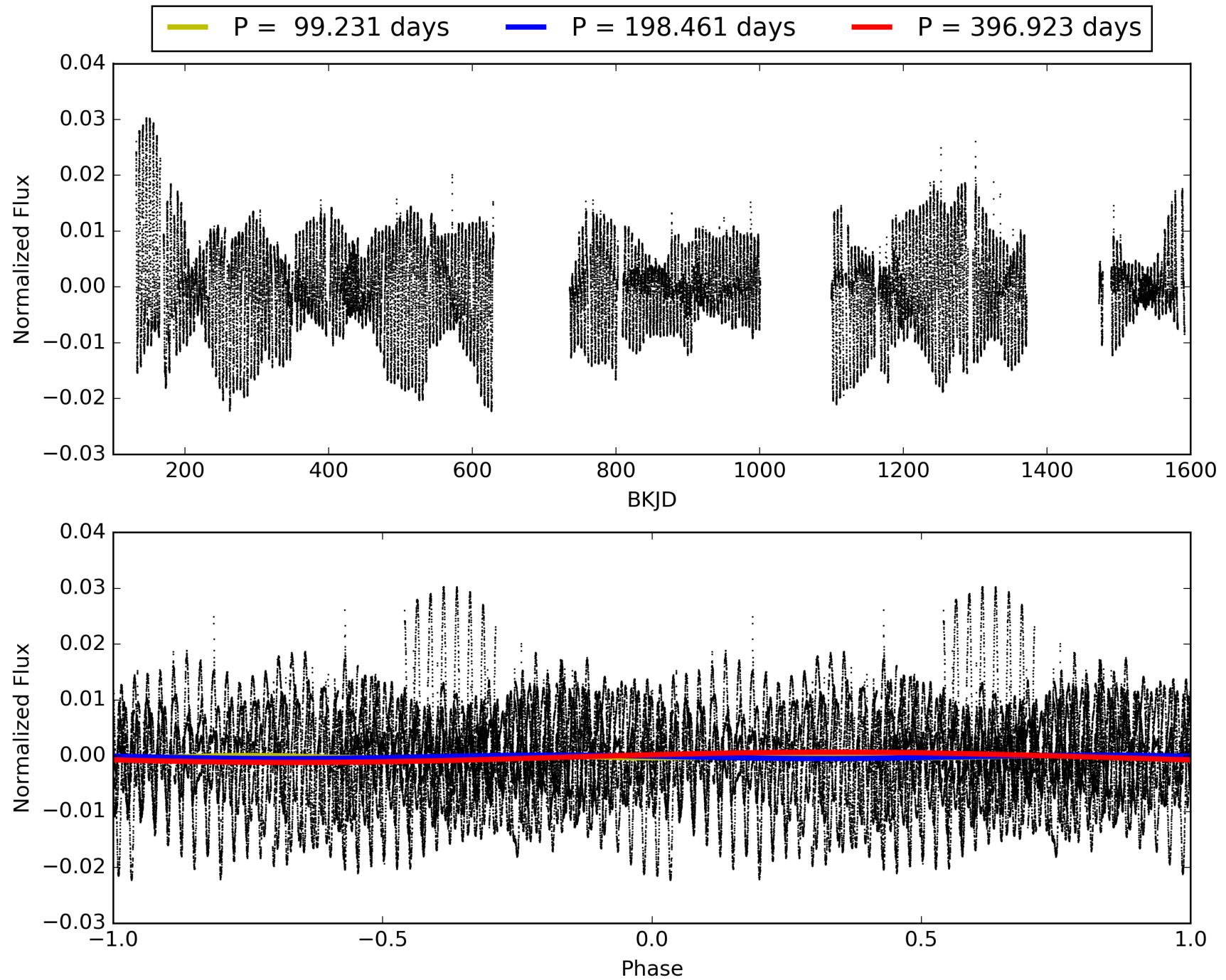
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:02:32 Z

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

TCE 010220756-04, PDC Light Curves

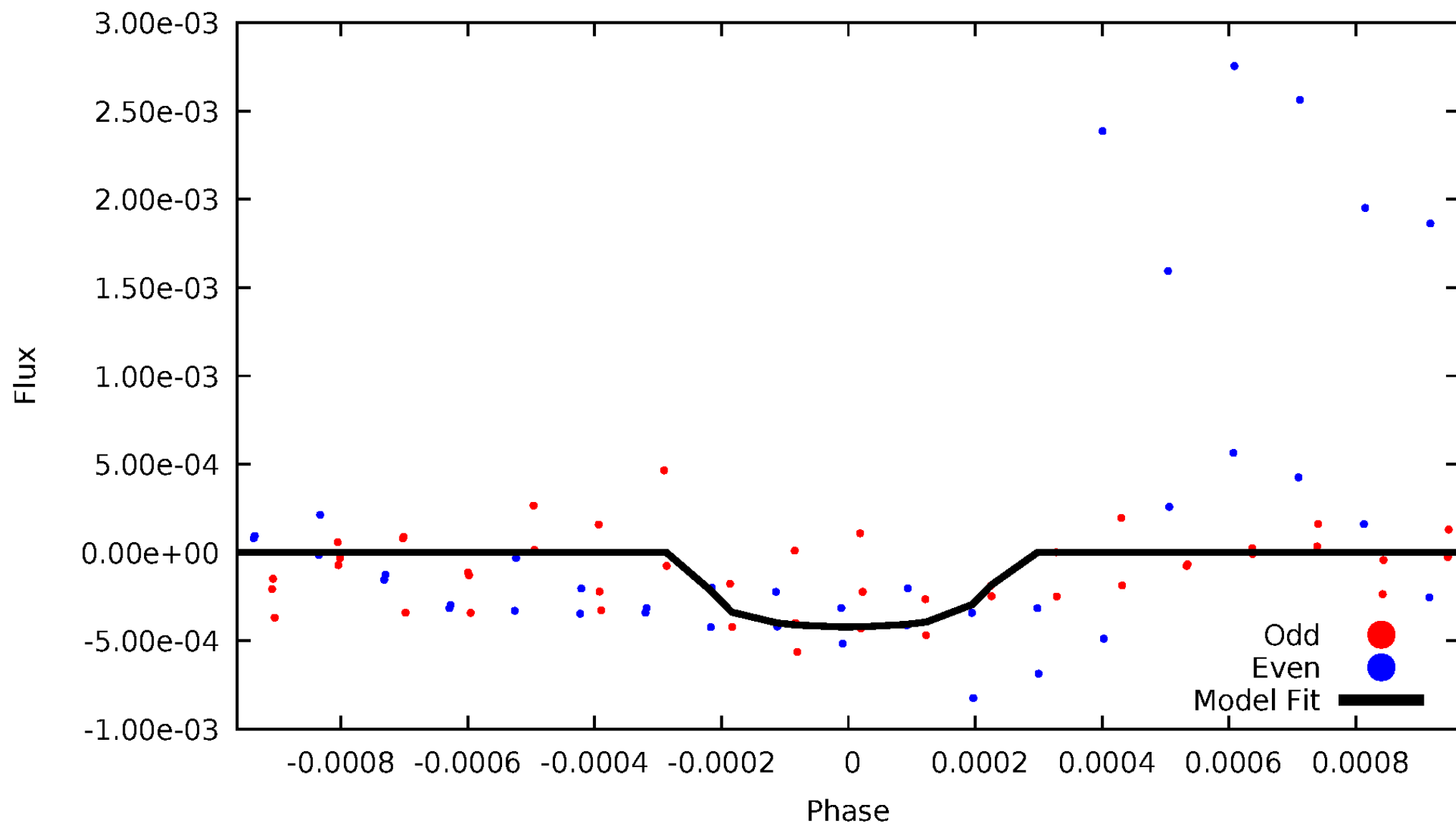


TCE 010220756-04



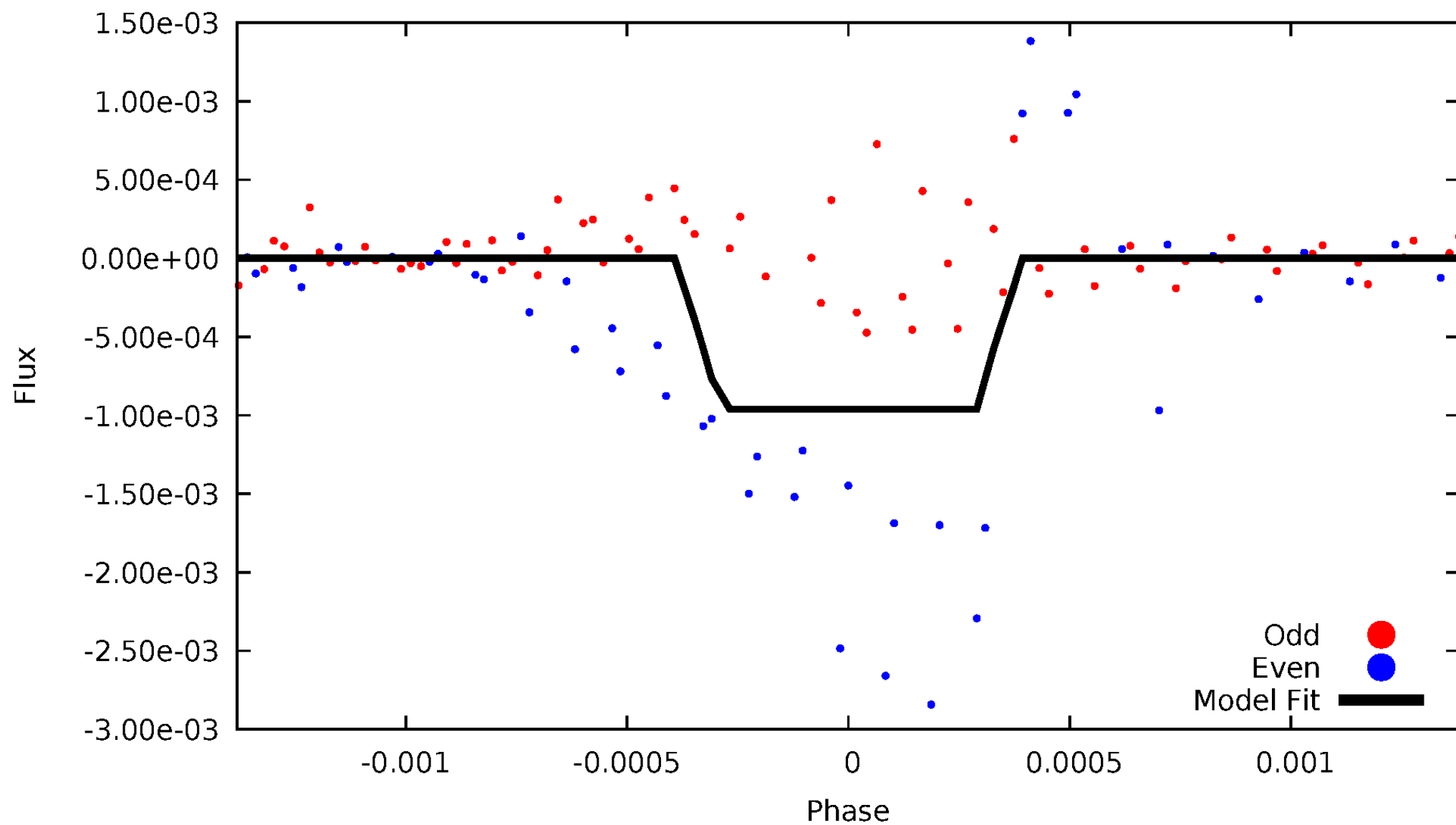
DV Odd/Even

TCE 010220756-04



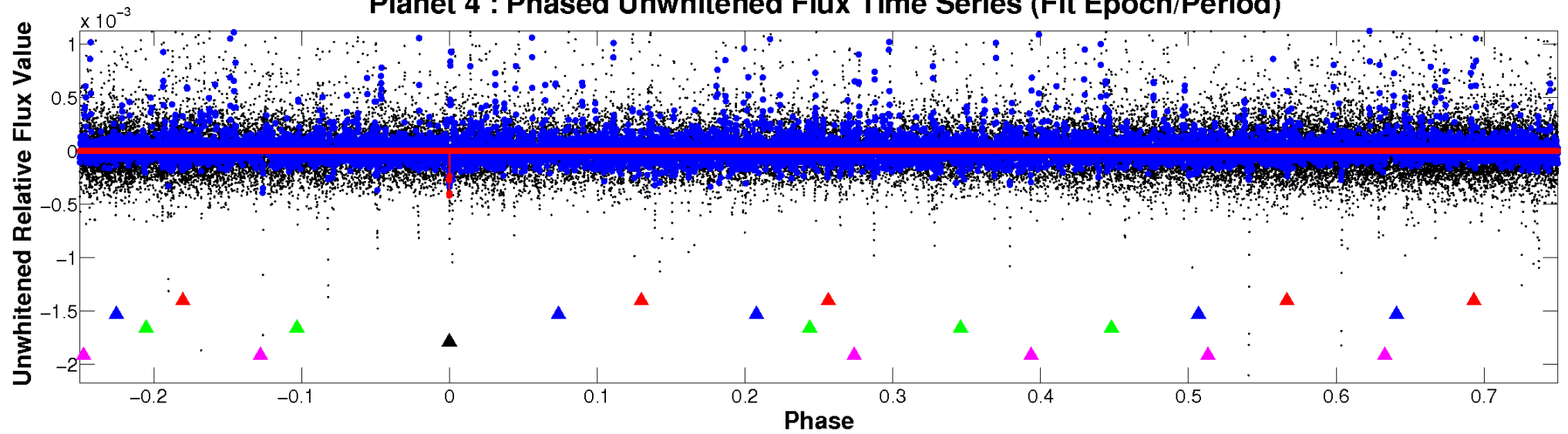
ALT Odd/Even

TCE 010220756-04

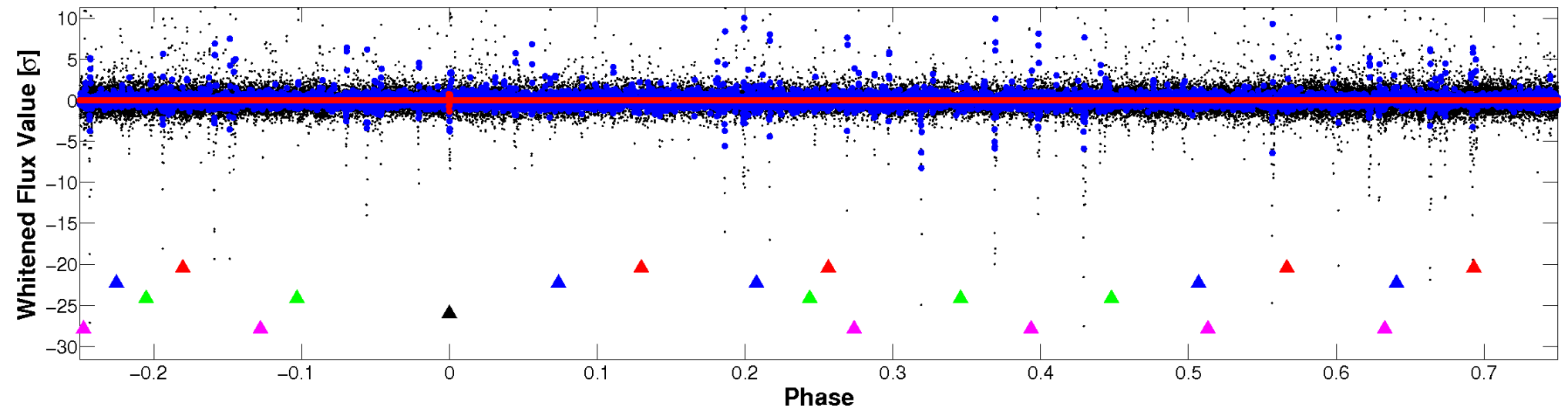


Non-Whitened Vs. Whitened Light Curve

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

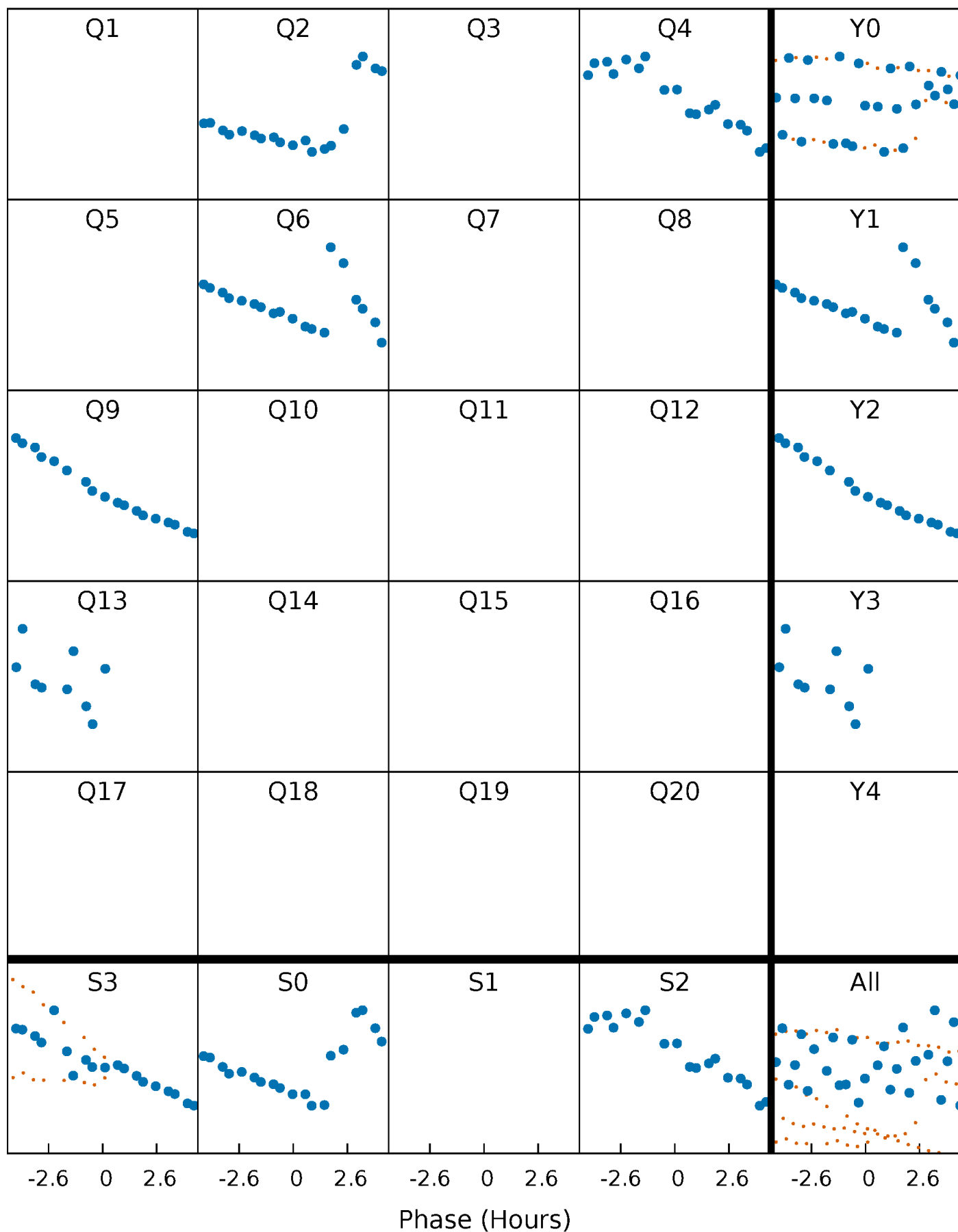


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



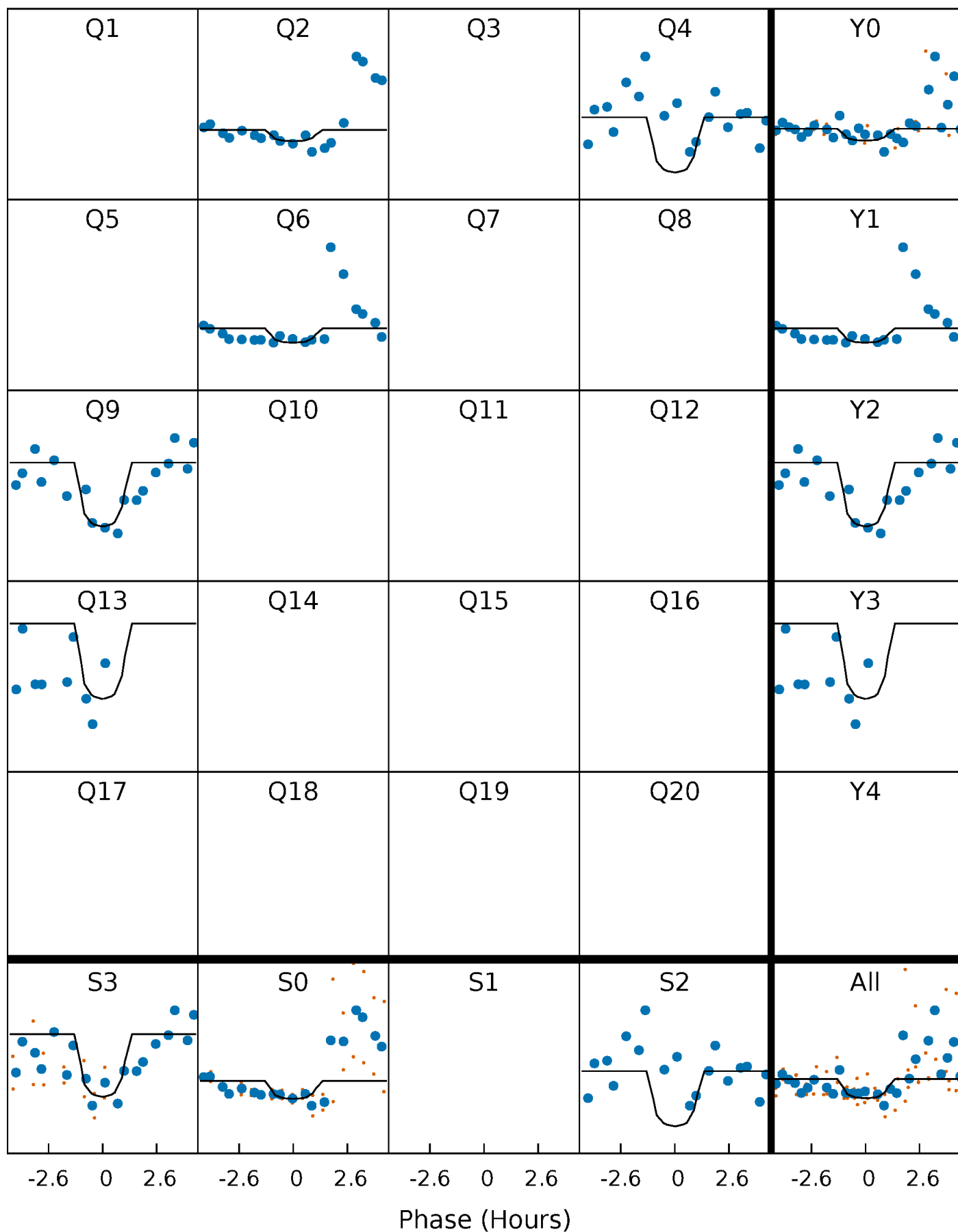
PDC Quarter-Phased Transit Curves

TCE 010220756-04 $P=198.461428$ Days $T_0=222.670194$ (BKJD)



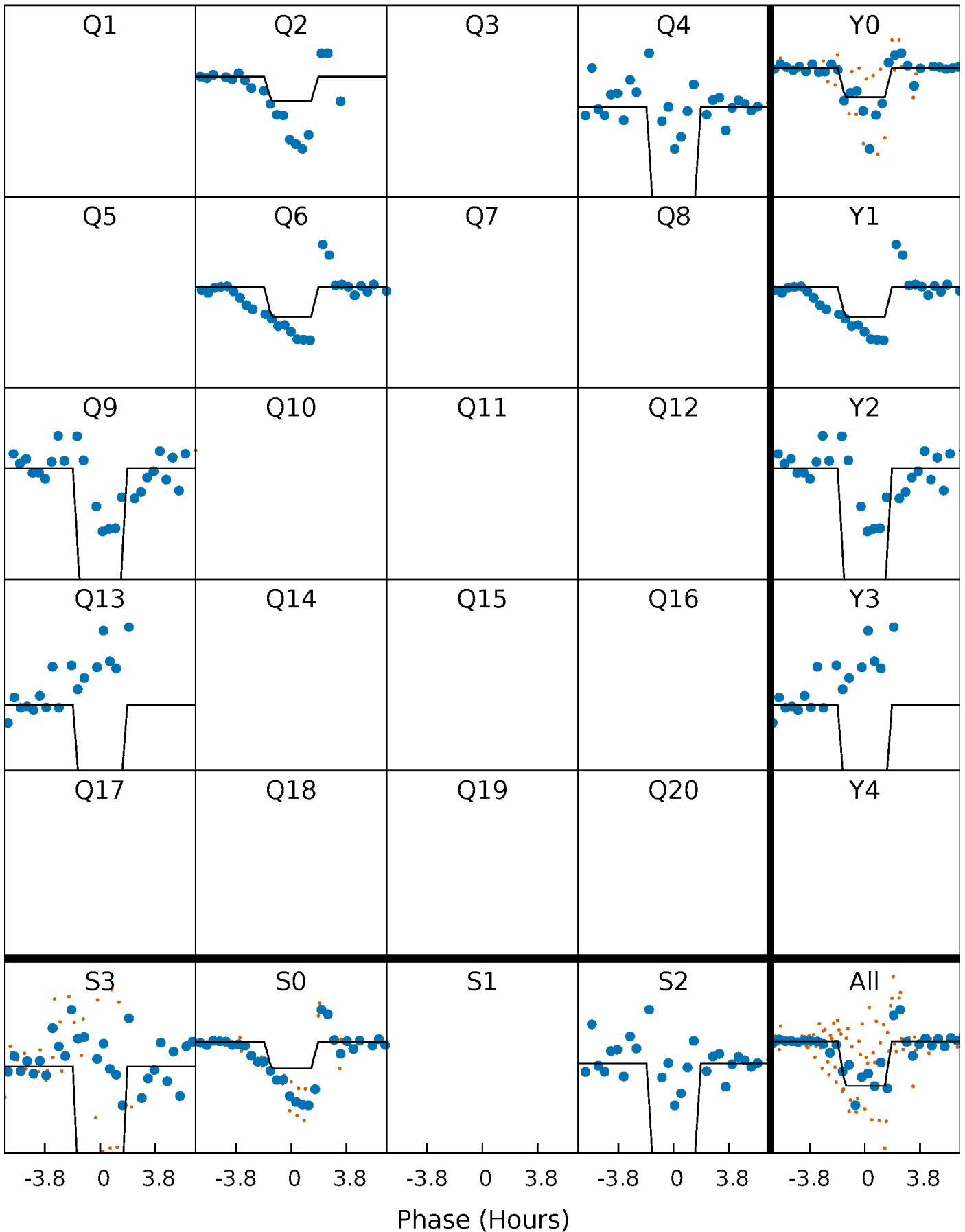
DV Quarter-Phased Transit Curves

TCE 010220756-04 P=198.461428 Days $T_0=222.670194$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

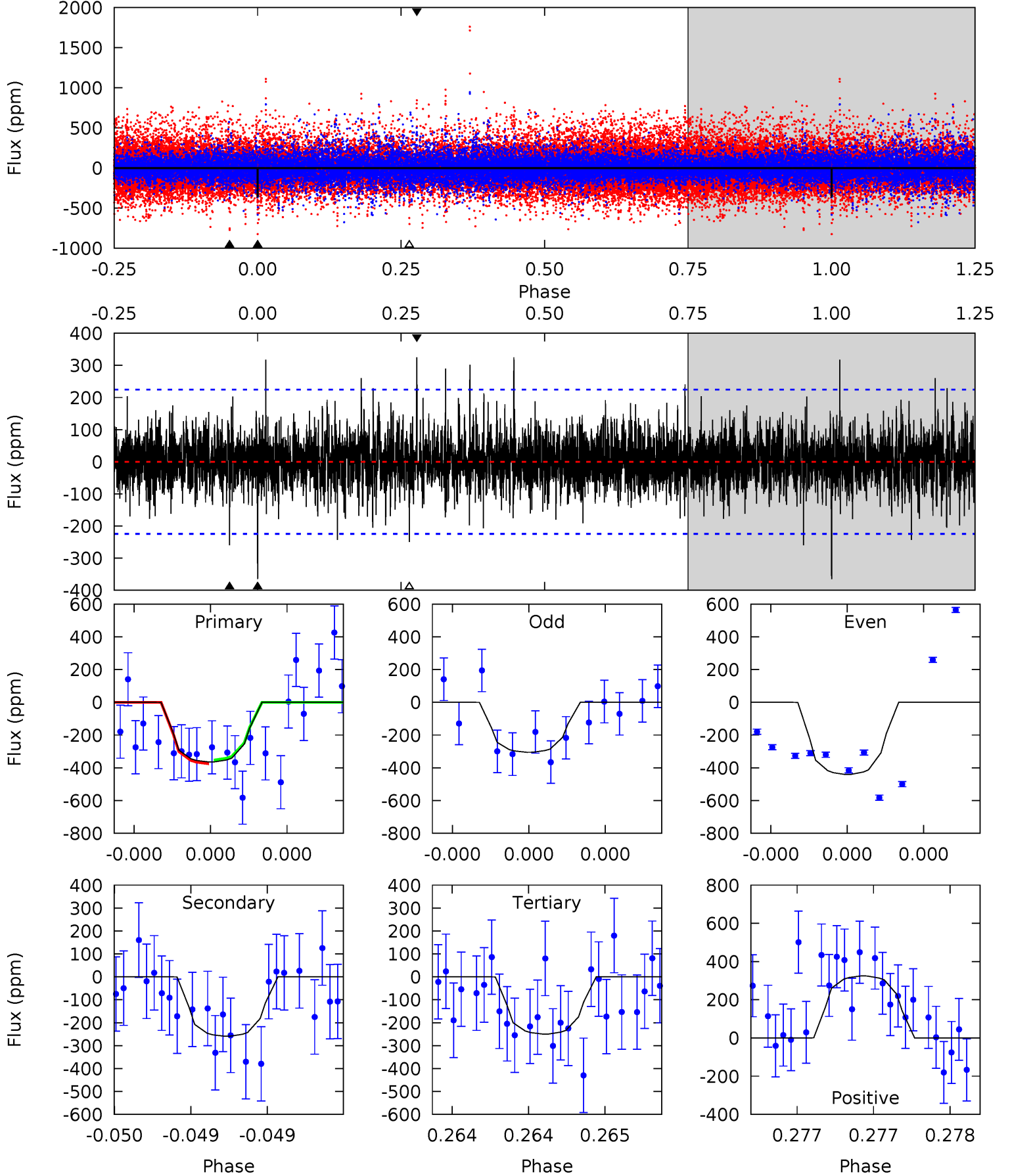
TCE 010220756-04 P=198.438935 Days $T_0=222.712986$ (BKJD)



DV Model-Shift Uniqueness Test

010220756-04, P = 198.461428 Days, E = 24.208766 Days

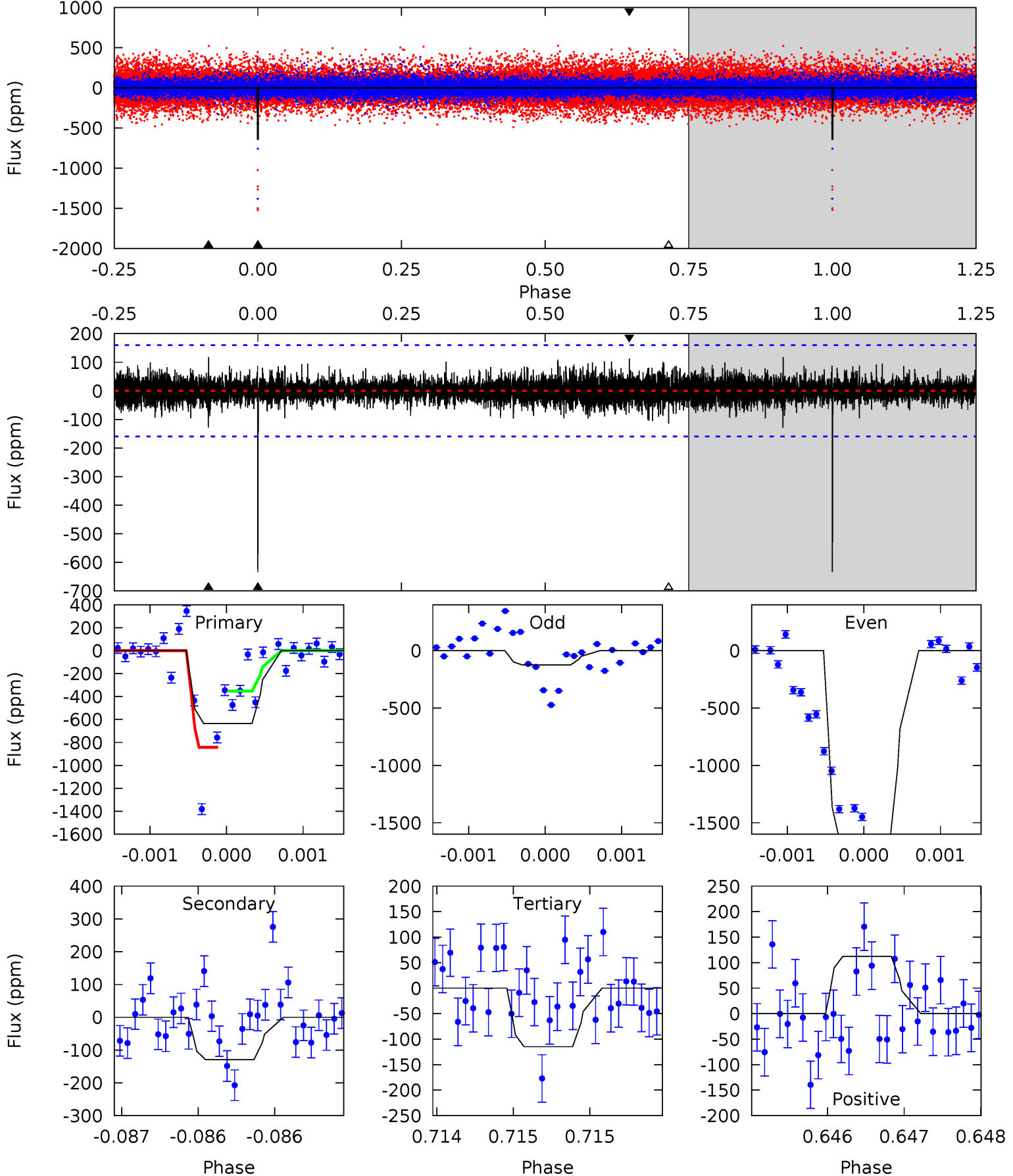
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.09	6.46	6.22	8.09	5.59	3.51	1.44	2.87	1.00	0.24	-1.63	1.42	0.87	0.47	0.27



Alt Model-Shift Uniqueness Test

010220756-04, P = 198.438935 Days, E = 24.274051 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.9	4.46	3.96	3.87	5.50	3.37	0.90	17.9	18.0	0.50	0.59	35.3	2.34	0.16	0



Stellar Parameters For KIC 010220756

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6015^{+161}_{-179}	$4.240^{+0.258}_{-0.172}$	$-0.480^{+0.300}_{-0.300}$	$1.174^{+0.320}_{-0.288}$	$0.874^{+0.128}_{-0.079}$	$0.760^{+1.121}_{-0.339}$
	+3%/-3%	+6%/-4%	+62%/-62%	+27%/-25%	+15%/-9%	+147%/-45%
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 010220756-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-259 ± 40	$5.41^{+5.32}_{-3.59}$	500^{+37}_{-40}	3973^{+2422}_{-767}	1940^{+16744}_{-1443}
Alt.	-129 ± 29	$6.33^{+5.77}_{-4.11}$	501^{+39}_{-38}	3362^{+1549}_{-538}	695^{+4824}_{-500}

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

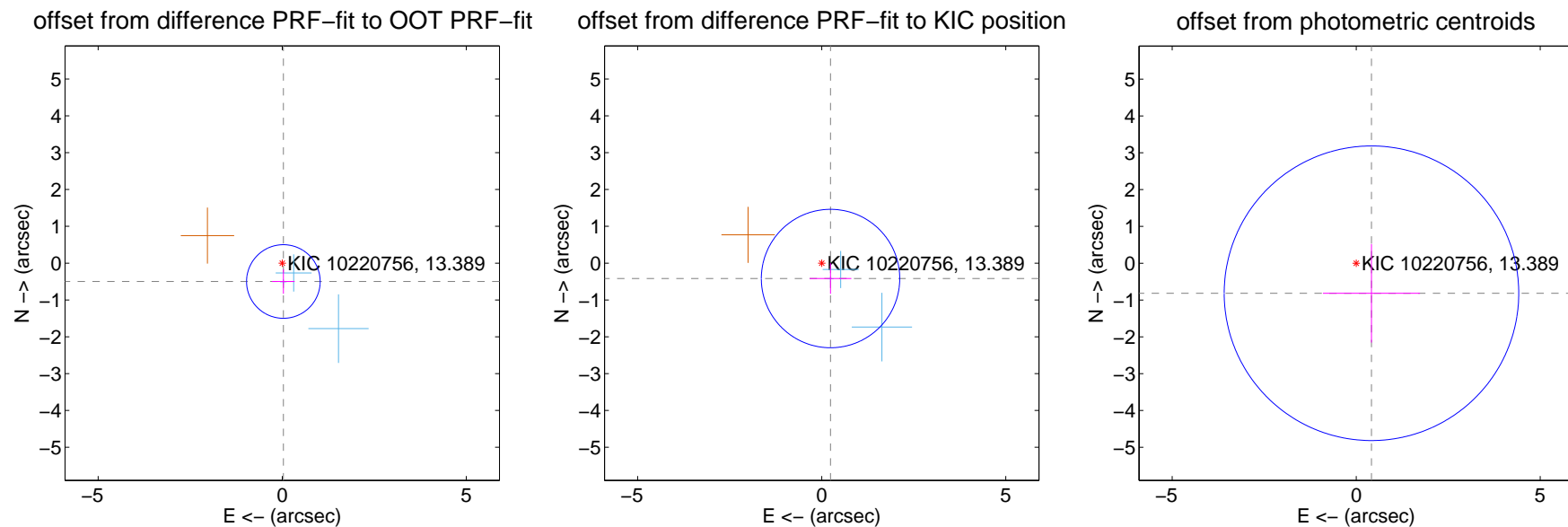
DV Centroid Data

Supplemental centroid analysis for 010220756-04. Kepler magnitude: 13.39. Transit SNR 5.60

There are 3 quarters with good PRF difference image offsets

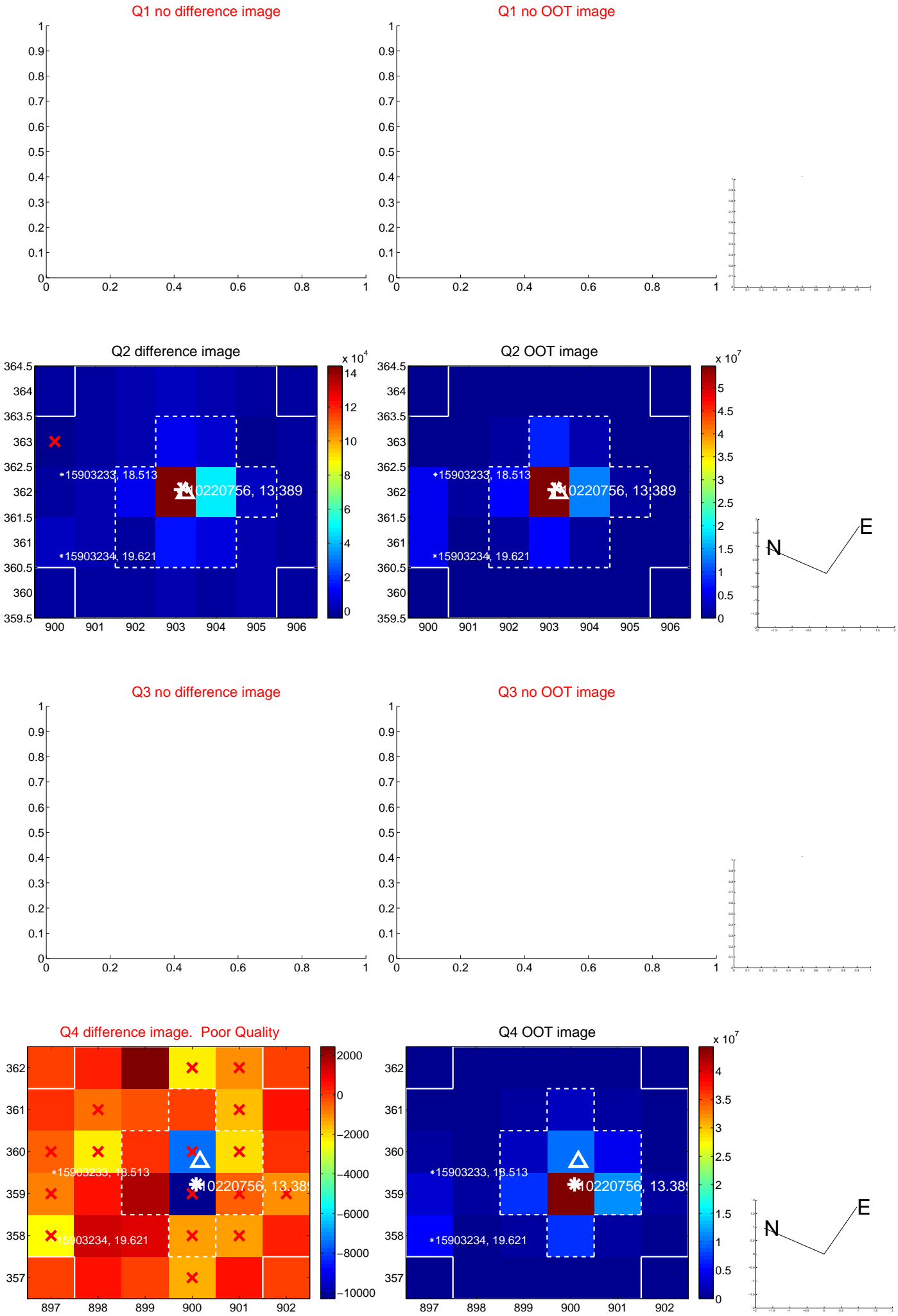
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.500 ± 0.333	1.50	-0.031 ± 0.307	-0.499 ± 0.333
PRF-fit source offset from KIC position	0.482 ± 0.627	0.77	-0.240 ± 0.567	-0.418 ± 0.416
photometric centroid source offset	0.92 ± 1.33	0.69	-0.41 ± 1.32	-0.82 ± 1.34



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.

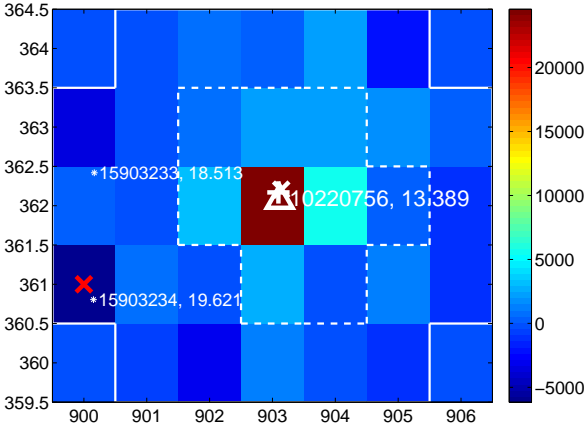
Q5 no difference image



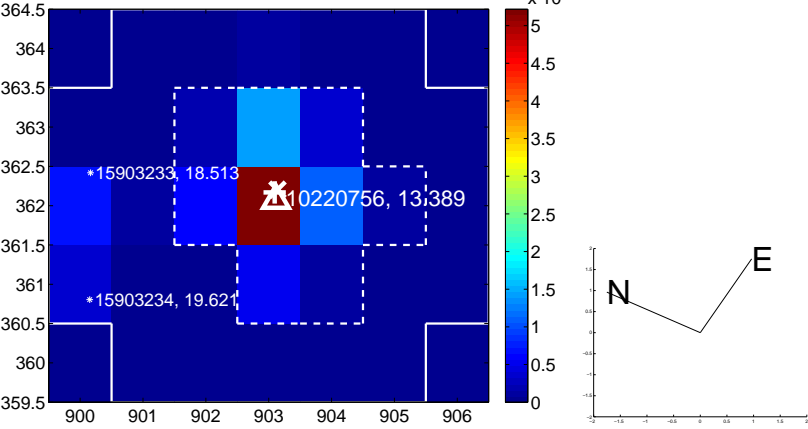
Q5 no OOT image



Q6 difference image



Q6 OOT image



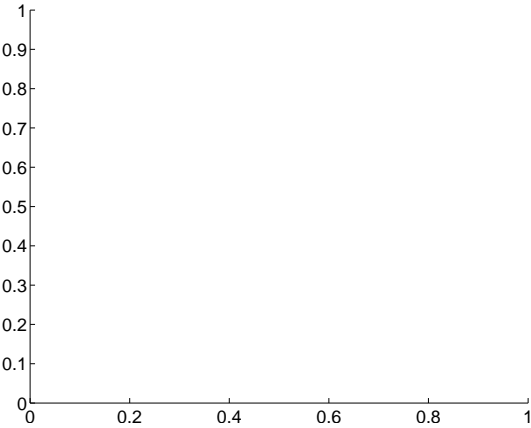
Q7 no difference image



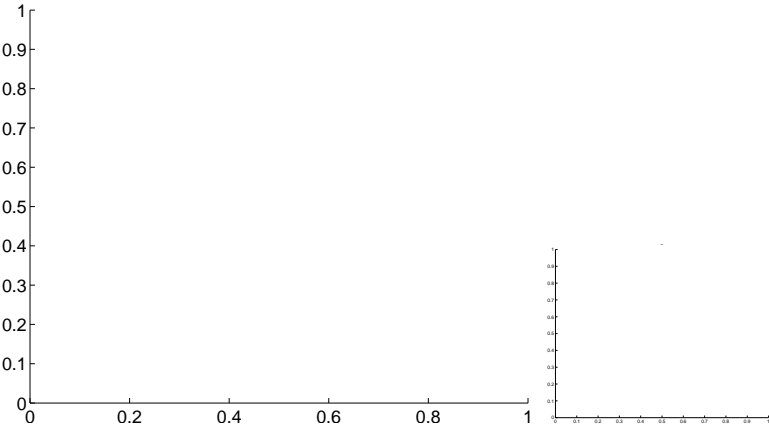
Q7 no OOT image



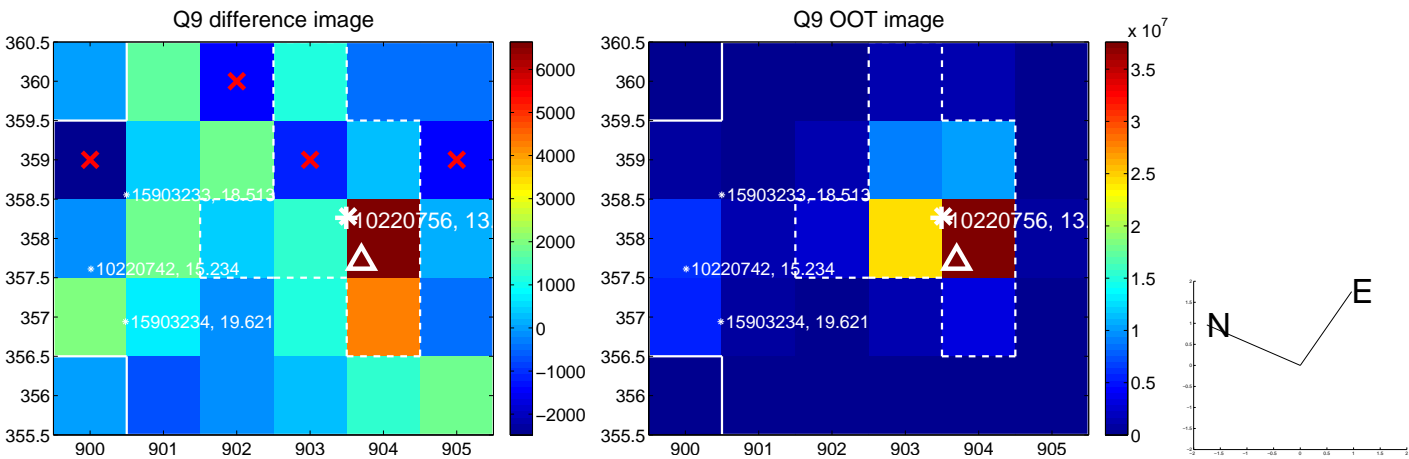
Q8 no difference image



Q8 no OOT image



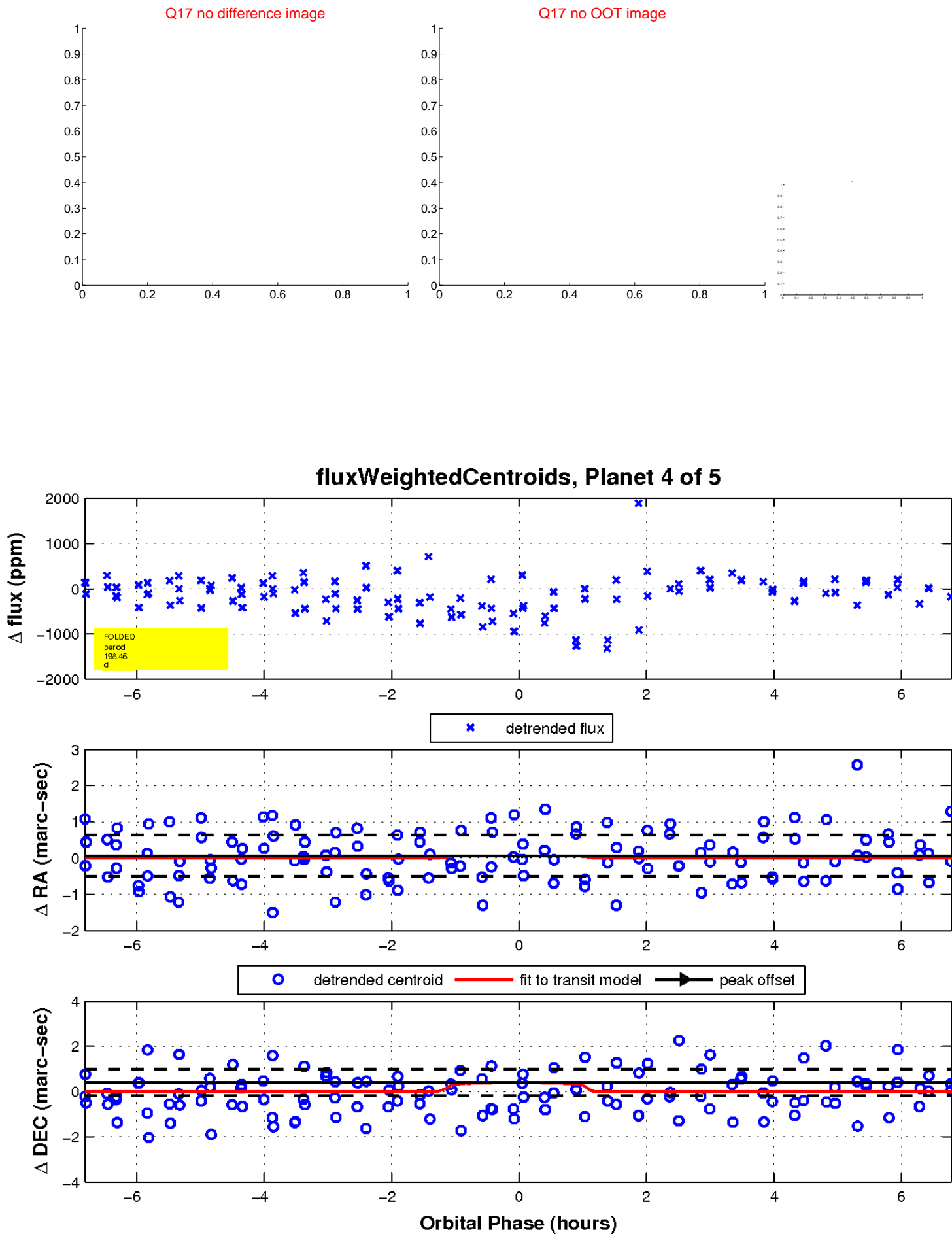
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

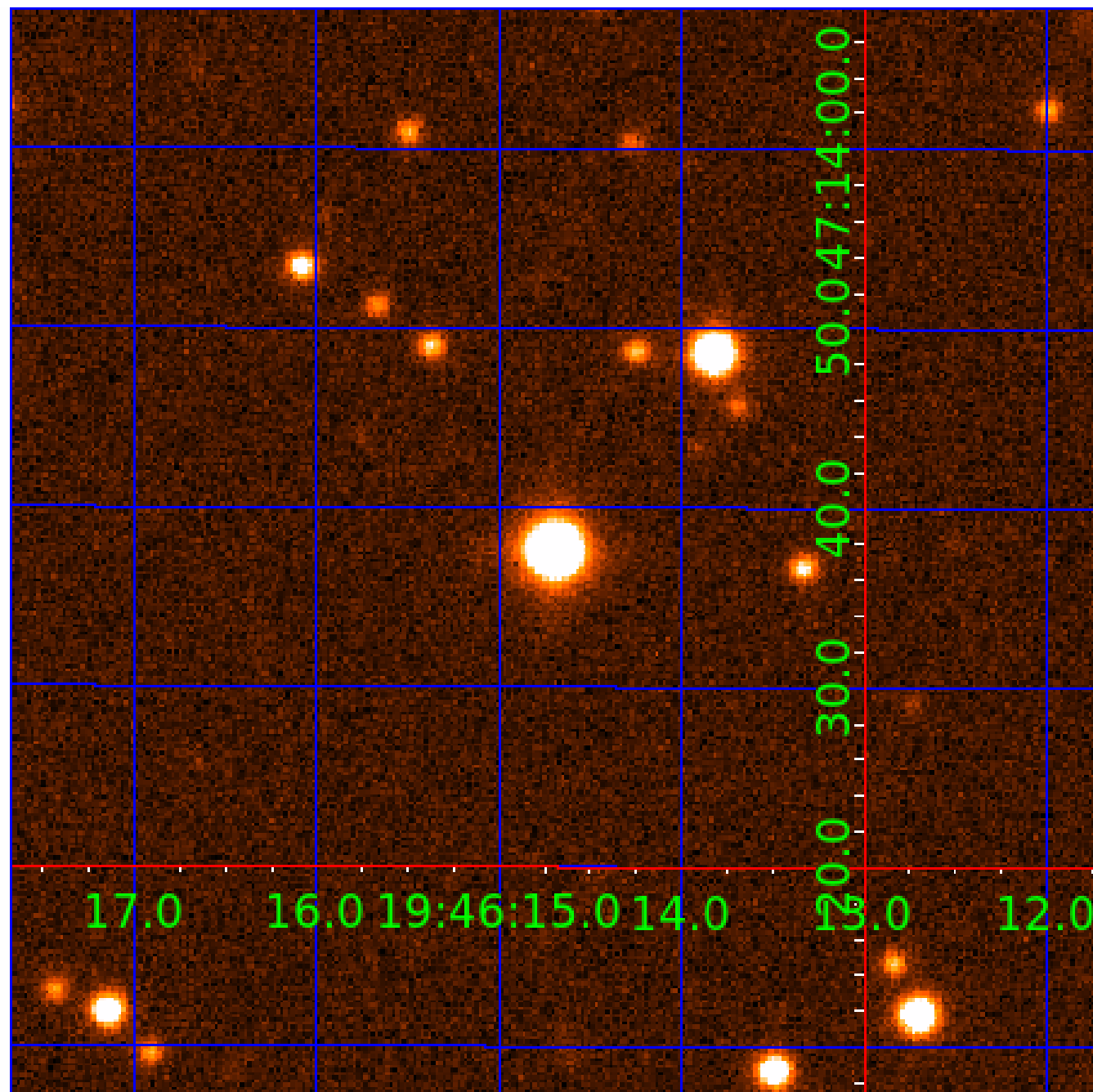


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010220756

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})
010220756-01	OBS	No	285.136931	186.884524	641.2	3.436	15.3	9.3	1.17	6015	3.39	2.46
010220756-02	OBS	No	310.981075	323.266450	705.9	10.887	19.0	4.4	1.17	6015	3.87	2.19
010220756-03	OBS	No	307.822148	271.056381	708.0	5.179	17.1	8.6	1.17	6015	3.14	2.22
010220756-04	OBS	No	198.461428	222.670194	420.6	2.294	17.8	5.6	1.17	6015	2.47	3.99
010220756-05	OBS	No	222.208933	277.030112	476.2	3.199	12.4	6.2	1.17	6015	2.59	3.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010220756-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
010220756-02	OBS	FP	0.00	1	0	1	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
010220756-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010220756-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

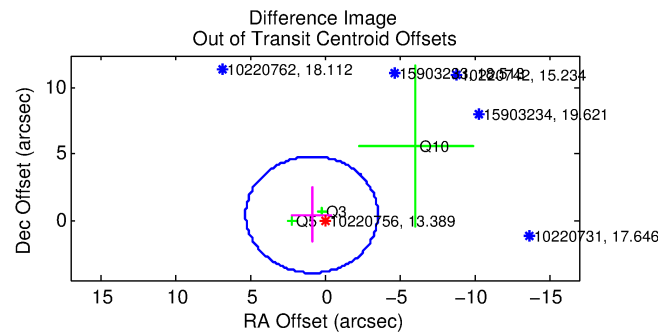
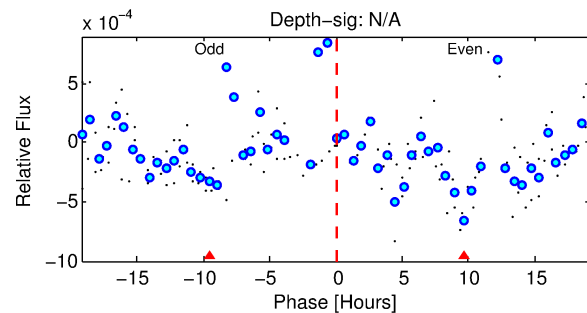
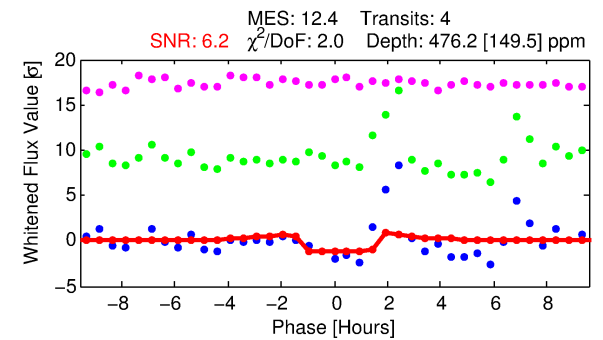
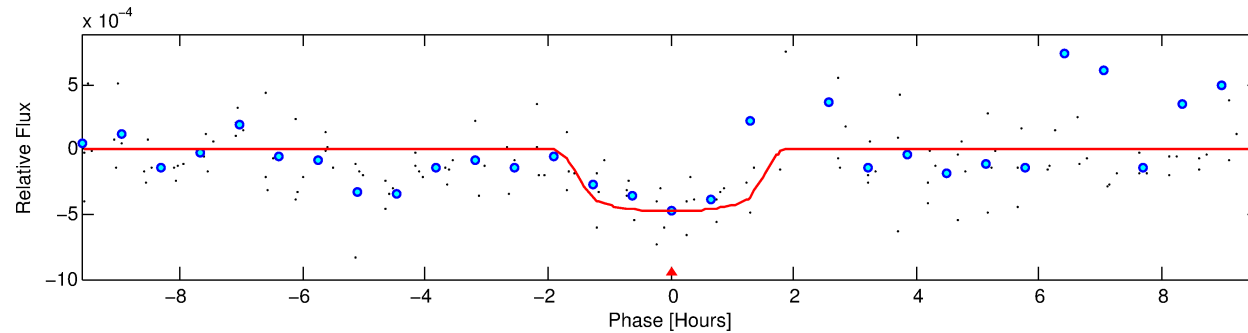
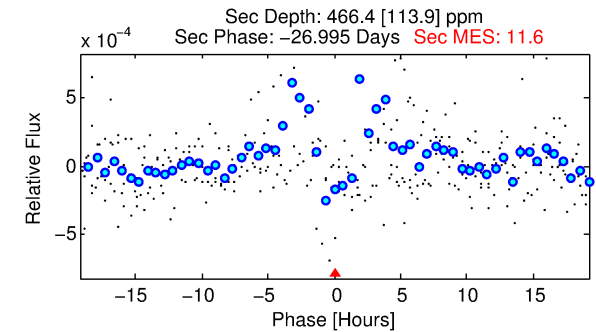
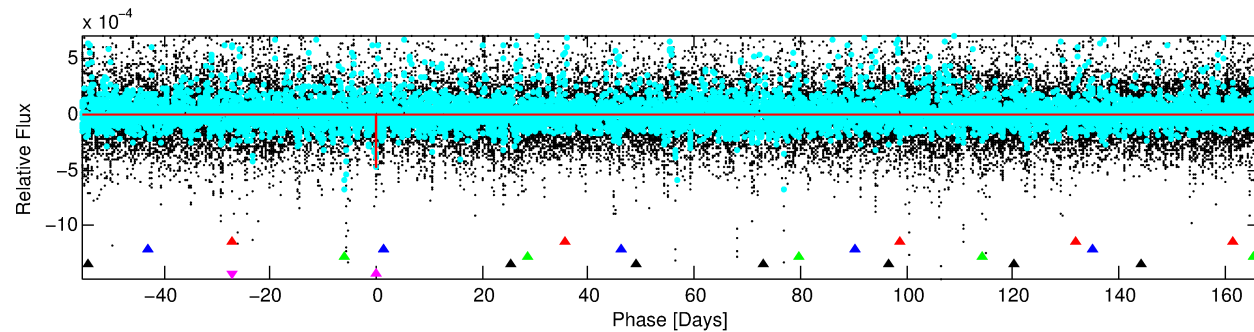
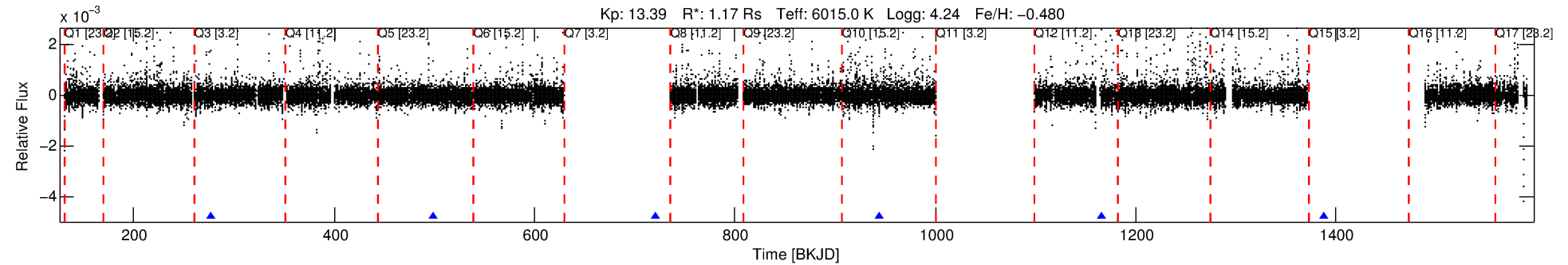
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010220756-05

No Significant Match Found

DV One-Page Summary

KIC: 10220756 Candidate: 5 of 5 Period: 222.209 d



DV Fit Results:

Period = 222.20893 [0.00596] d
Epoch = 277.0301 [0.0142] BKJD
Rp/R* = 0.0202 [0.0713]
a/R* = 517.10 [9138.90]
b = 0.30 [53.61]
Seff = 3.43 [1.55]
Teq = 347 [39] K
Rp = 2.59 [9.16] Re
a = 0.6865 [0.1845] AU
Ag = 18047.05 [127641.42] [0.14σ]
Teffp = 6218 [10976] K [0.53σ]

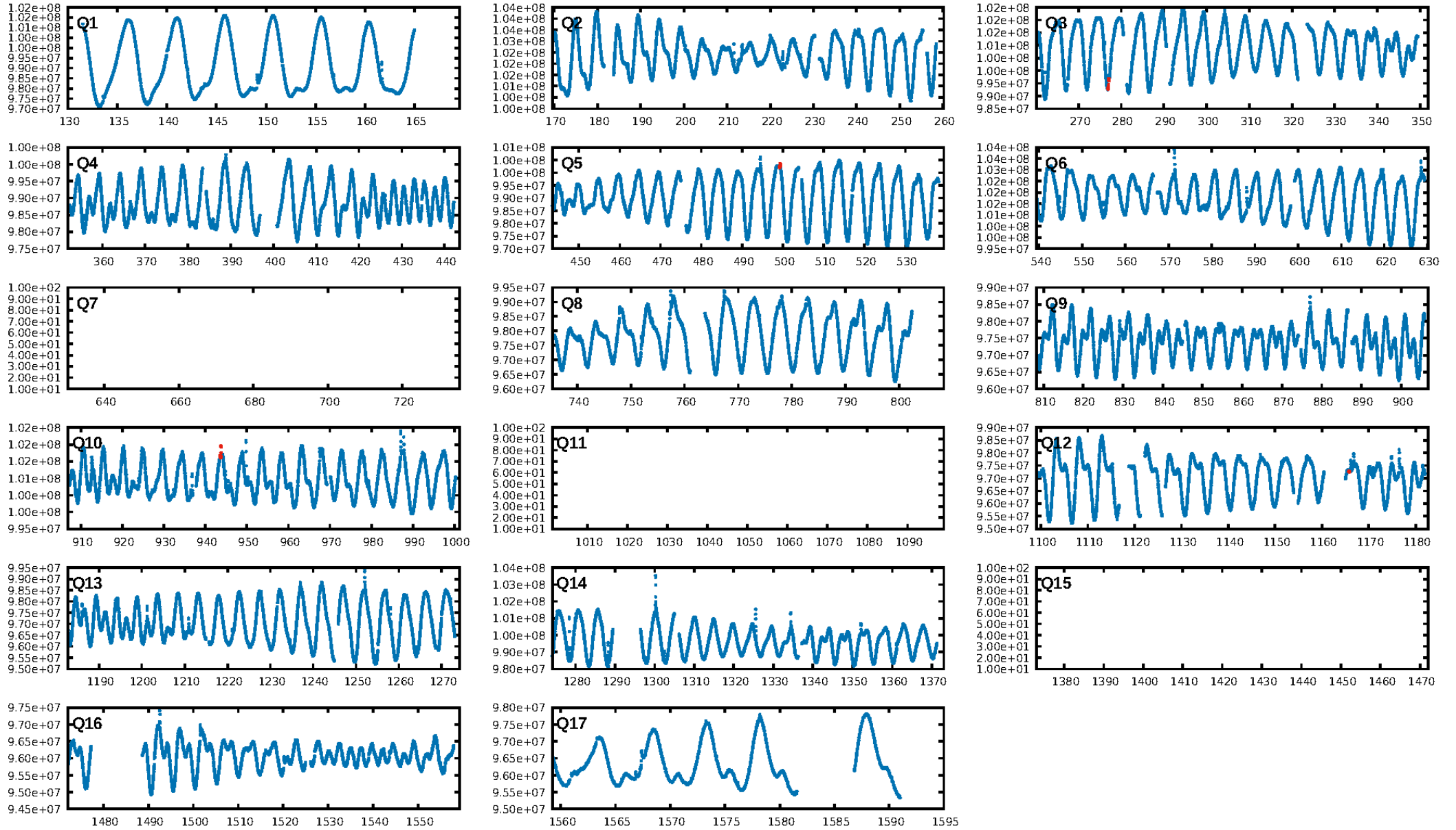
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [144.79σ]
LongPeriod-sig: 100.0% [321.73σ]
ModelChiSquare2-sig: 3.5%
ModelChiSquareGof-sig: 47.5%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.5347
Centroid-sig: 34.1%
Centroid-so: 1.035 arcsec [0.94σ]
OotOffset-rm: 0.962 arcsec [0.65σ]
KicOffset-rm: 0.945 arcsec [0.61σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:02:43 Z

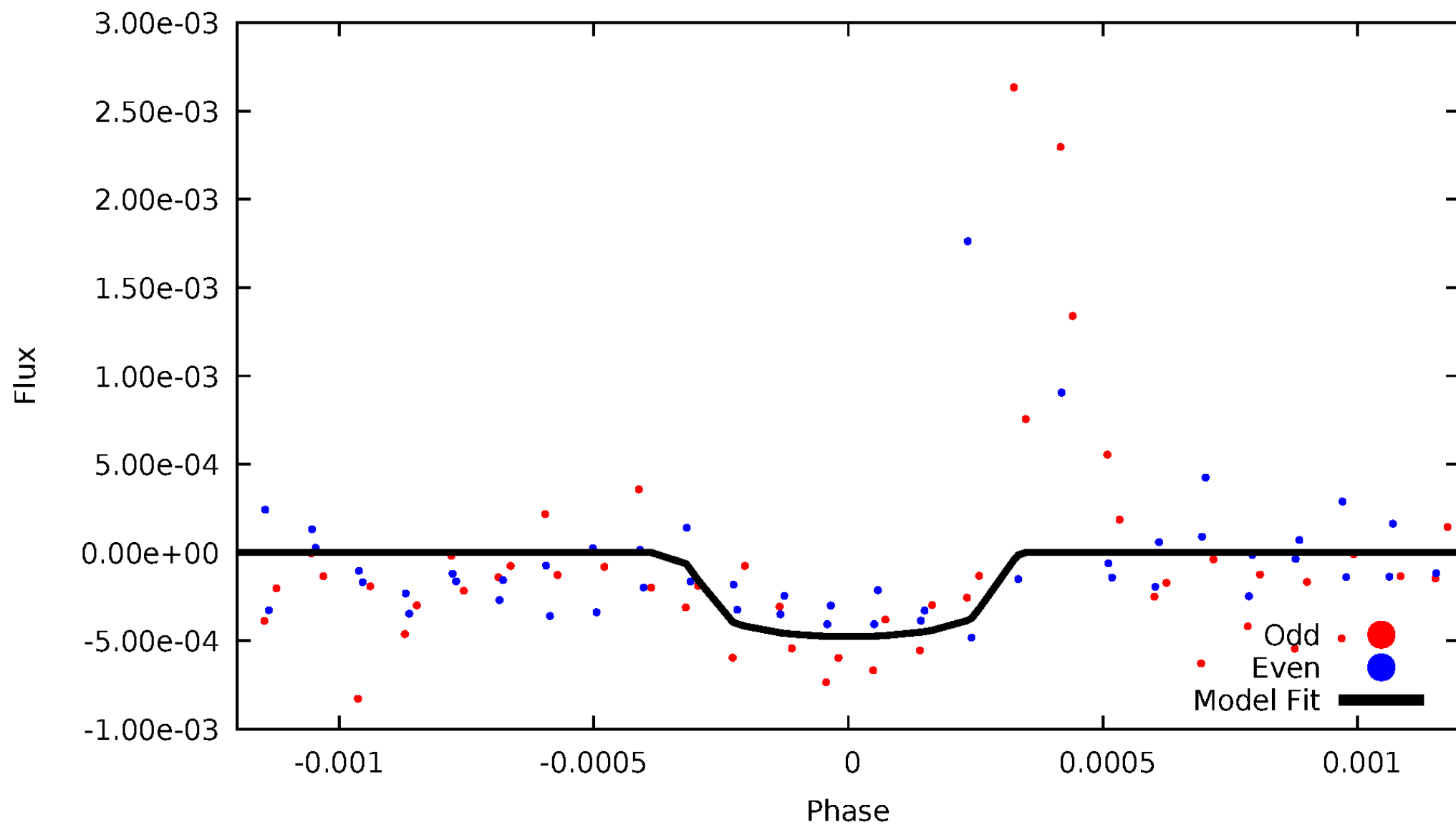
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 010220756-05, PDC Light Curves



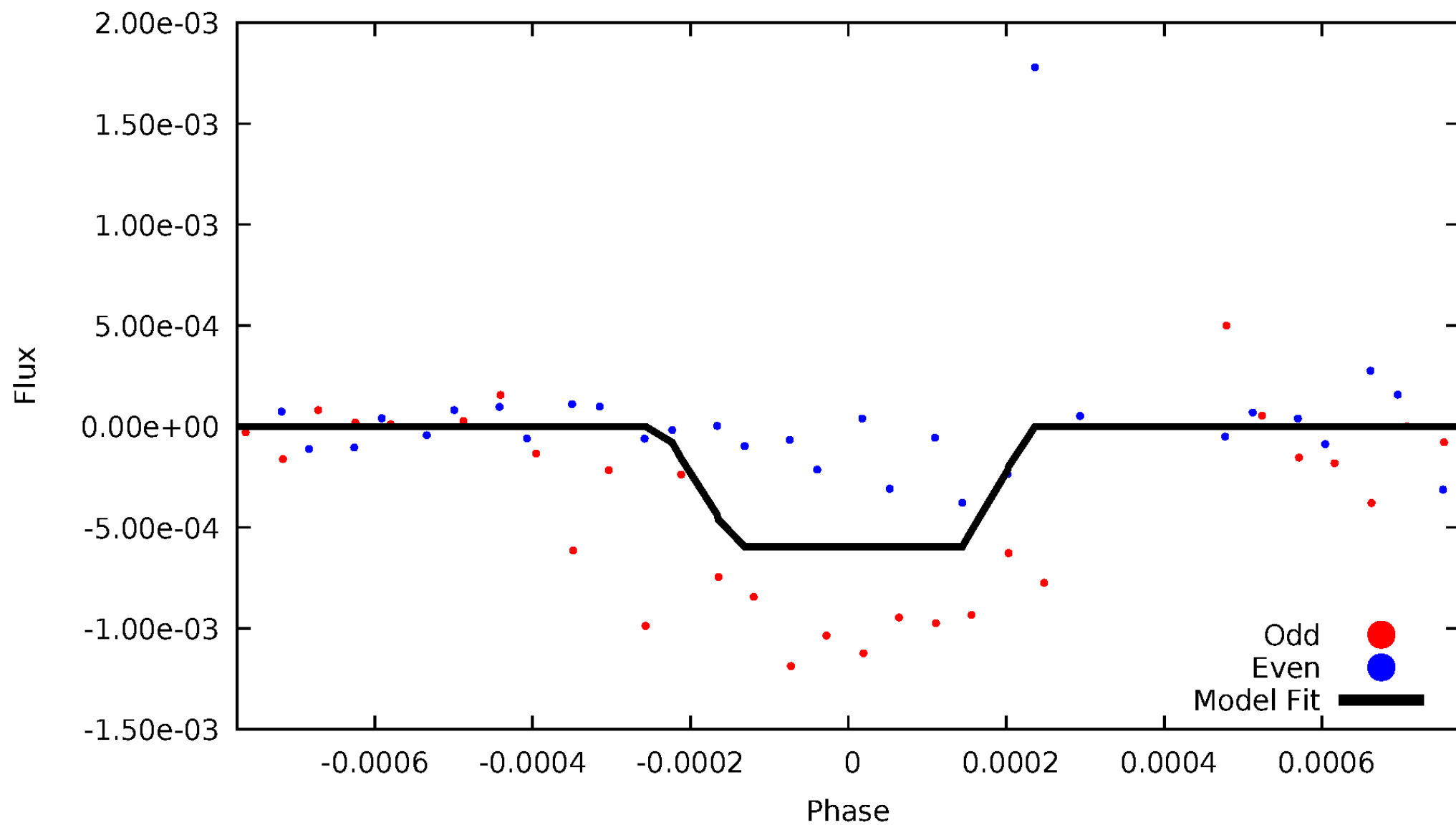
DV Odd/Even

TCE 010220756-05



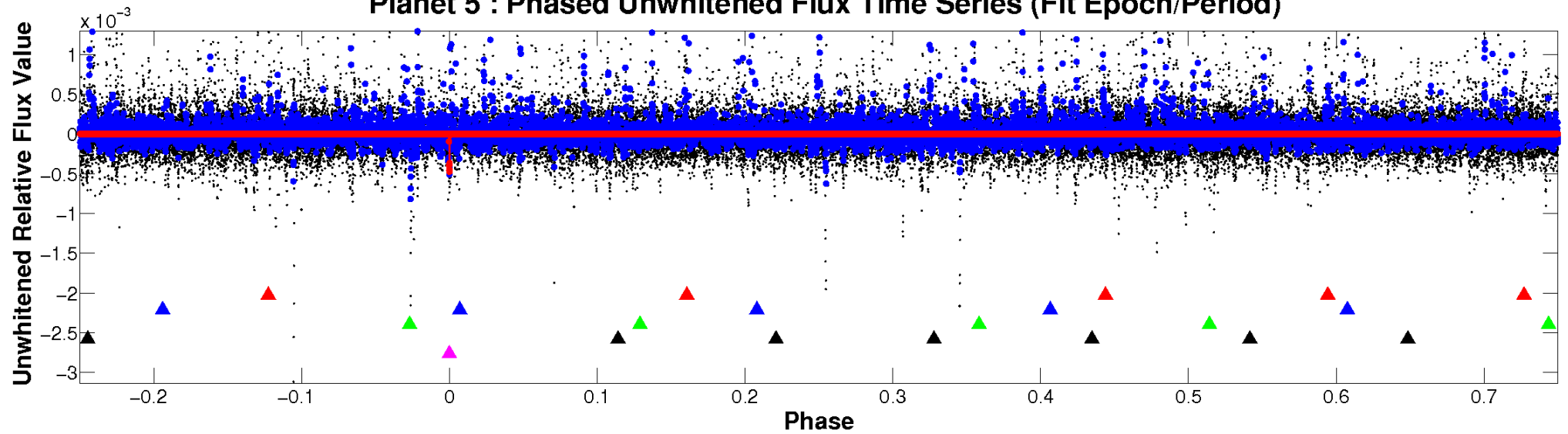
ALT Odd/Even

TCE 010220756-05

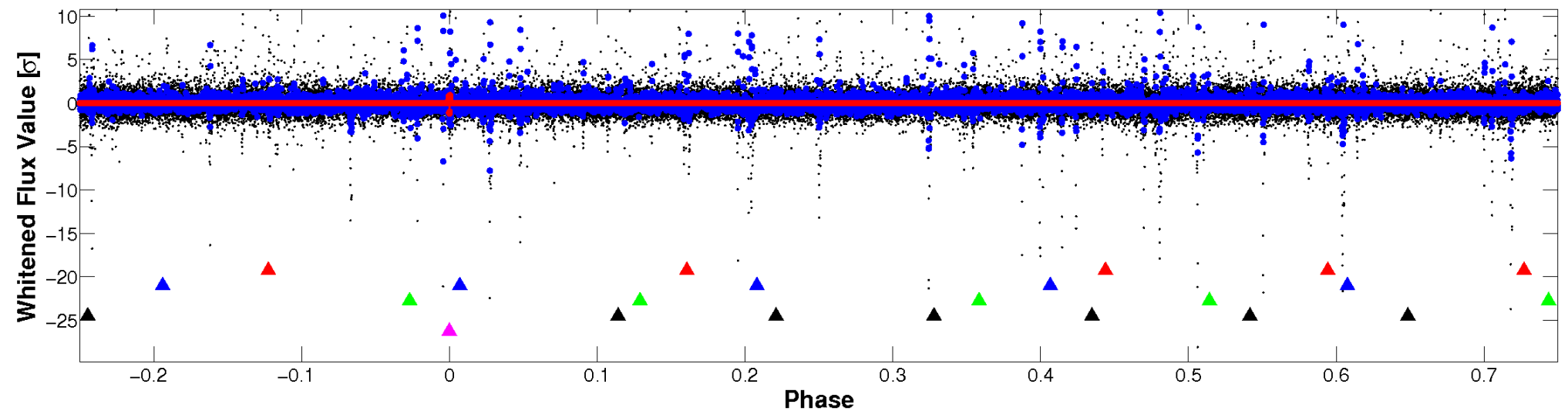


Non-Whitened Vs. Whitened Light Curve

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

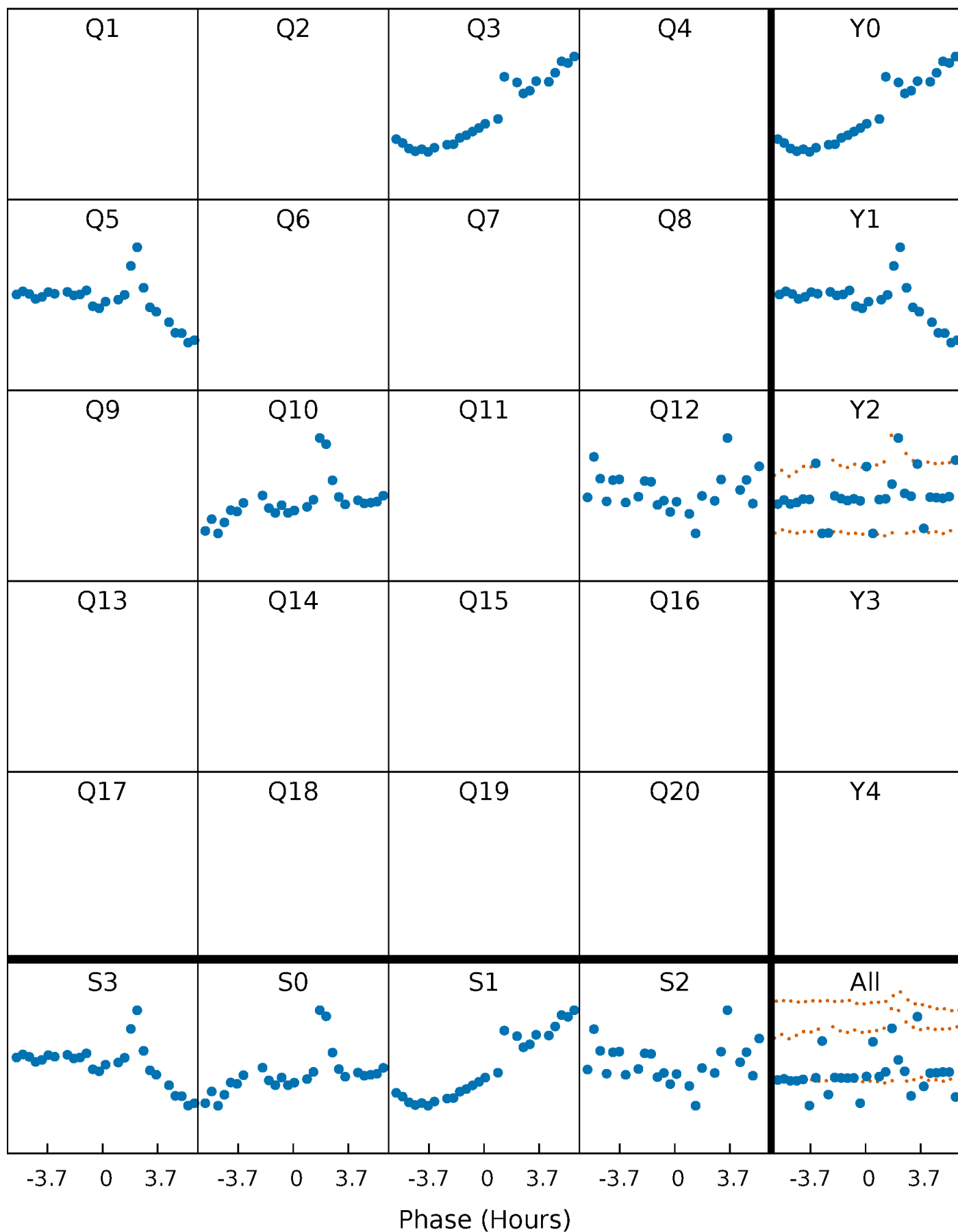


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



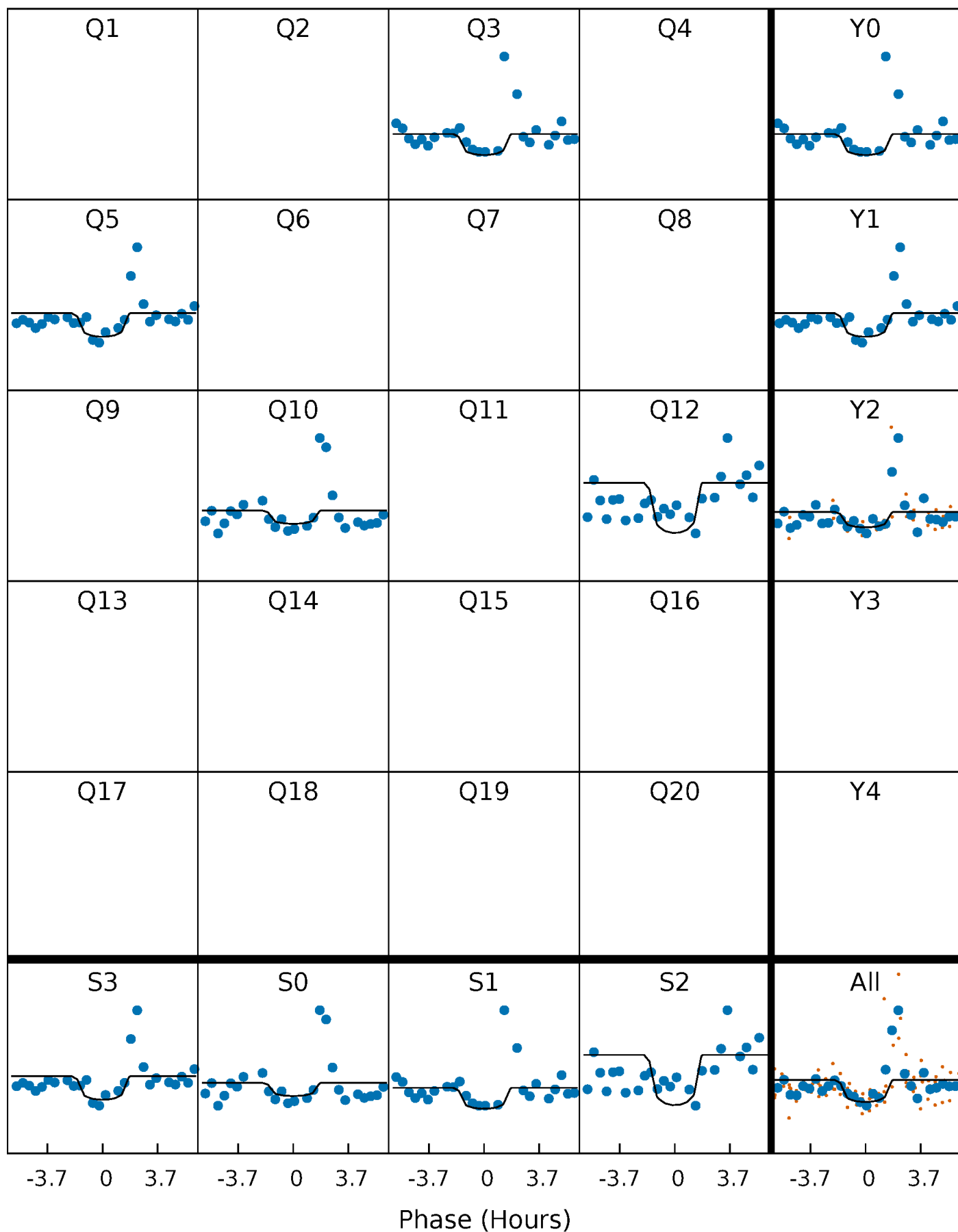
PDC Quarter-Phased Transit Curves

TCE 010220756-05 $P=222.208933$ Days $T_0=277.030112$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 010220756-05 $P=222.208933$ Days $T_0=277.030112$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

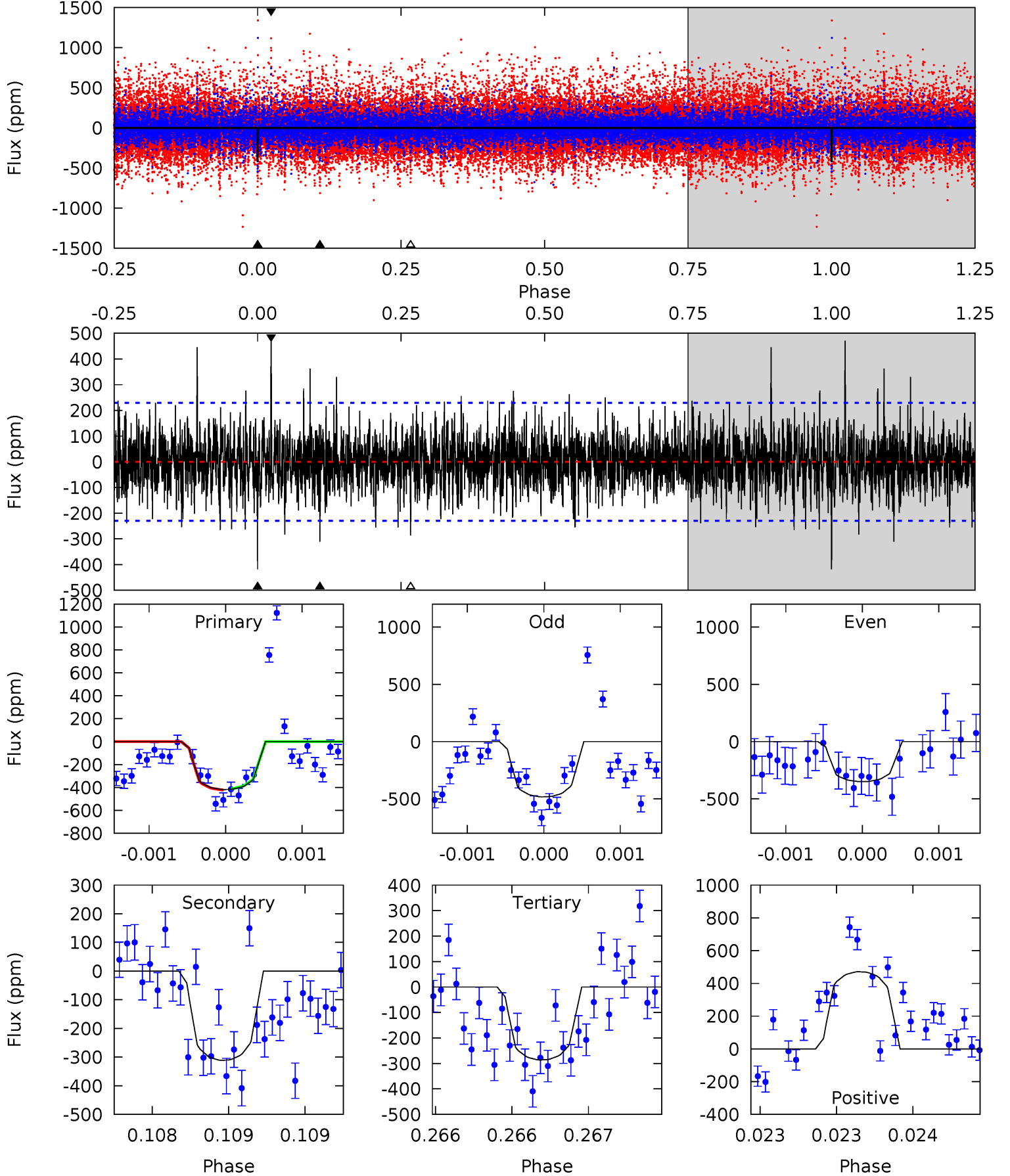
TCE 010220756-05 $P=222.211268$ Days $T_0=277.029687$ (BKJD)



DV Model-Shift Uniqueness Test

010220756-05, P = 222.208933 Days, E = 54.821179 Days

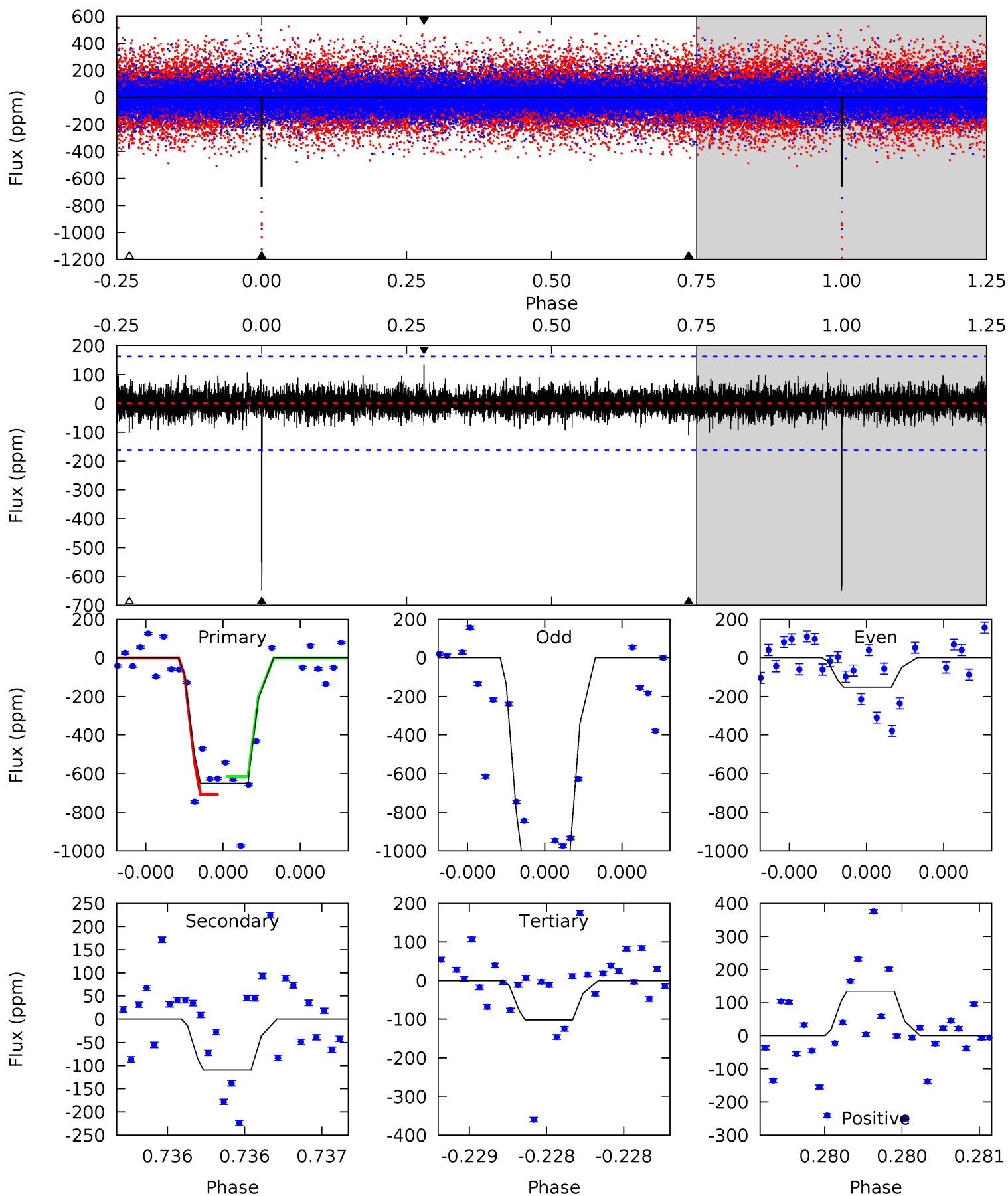
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	7.49	6.89	11.3	5.52	3.40	1.86	3.17	-1.28	0.60	-3.85	1.43	0.89	0.53	0.13



Alt Model-Shift Uniqueness Test

010220756-05, P = 222.211268 Days, E = 54.818419 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.4	3.80	3.53	4.64	5.59	3.51	0.84	18.9	17.8	0.27	-0.84	16.0	0.97	0.17	1.51



Stellar Parameters For KIC 010220756

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6015^{+161}_{-179}	$4.240^{+0.258}_{-0.172}$	$-0.480^{+0.300}_{-0.300}$	$1.174^{+0.320}_{-0.288}$	$0.874^{+0.128}_{-0.079}$	$0.760^{+1.121}_{-0.339}$
	+3%/-3%	+6%/-4%	+62%/-62%	+27%/-25%	+15%/-9%	+147%/-45%
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 010220756-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-311 ± 42	$7.40^{+7.09}_{-5.32}$	482^{+35}_{-37}	3757^{+2503}_{-754}	1575^{+17274}_{-1195}
Alt.	-110 ± 29	$7.27^{+7.03}_{-4.88}$	479^{+35}_{-35}	3142^{+1388}_{-531}	527^{+4254}_{-397}

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 $A_{obs} \gg 1.0$

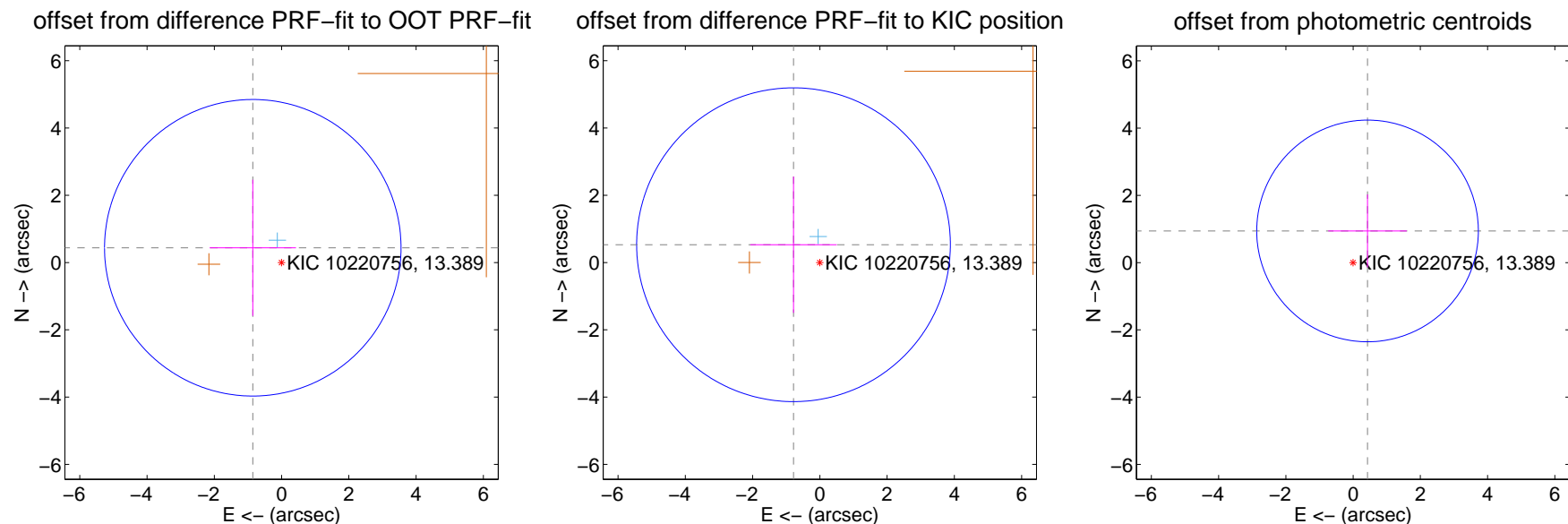
DV Centroid Data

Supplemental centroid analysis for 010220756-05. Kepler magnitude: 13.39. Transit SNR 6.23

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.962 ± 1.469	0.65	0.856 ± 1.284	0.439 ± 2.023
PRF-fit source offset from KIC position	0.945 ± 1.554	0.61	0.783 ± 1.284	0.529 ± 2.023
photometric centroid source offset	1.03 ± 1.10	0.94	-0.43 ± 1.17	0.94 ± 1.08



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.

Q1 no difference image



Q1 no OOT image



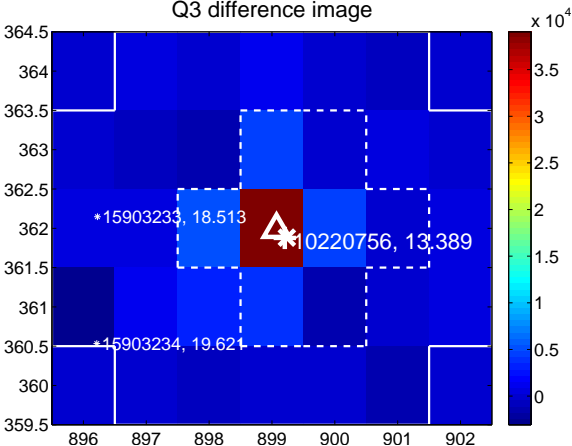
Q2 no difference image



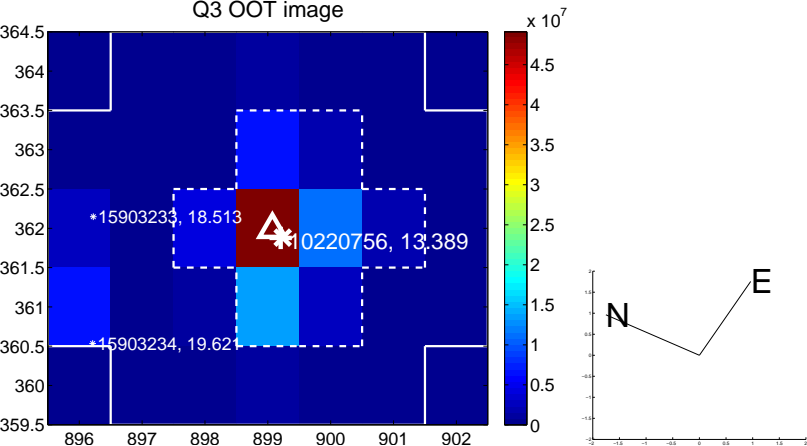
Q2 no OOT image



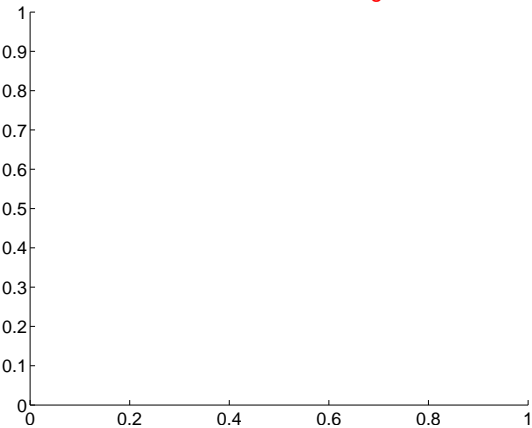
Q3 difference image



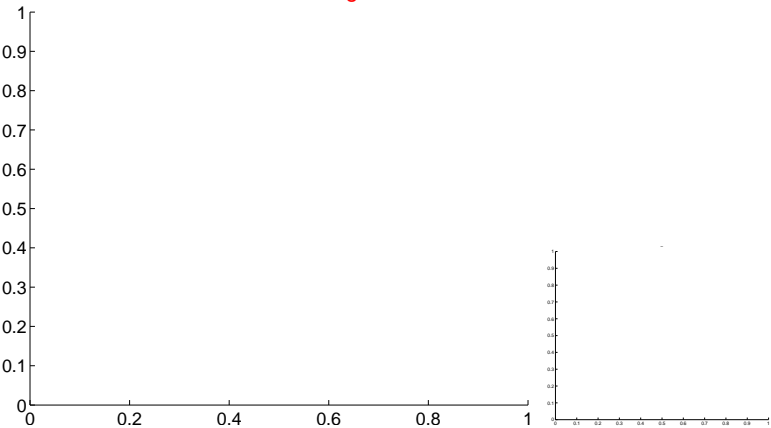
Q3 OOT image



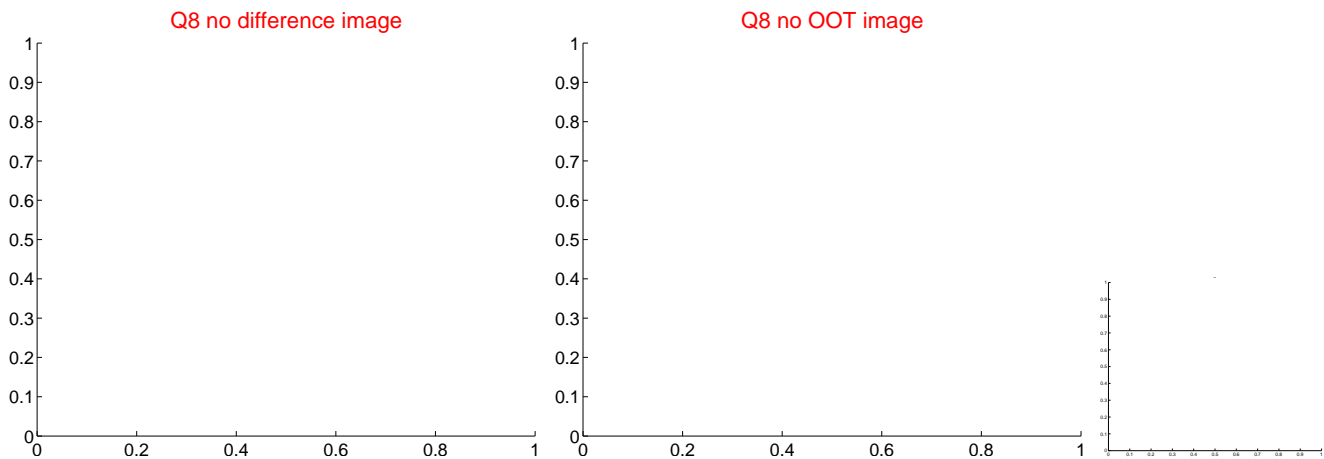
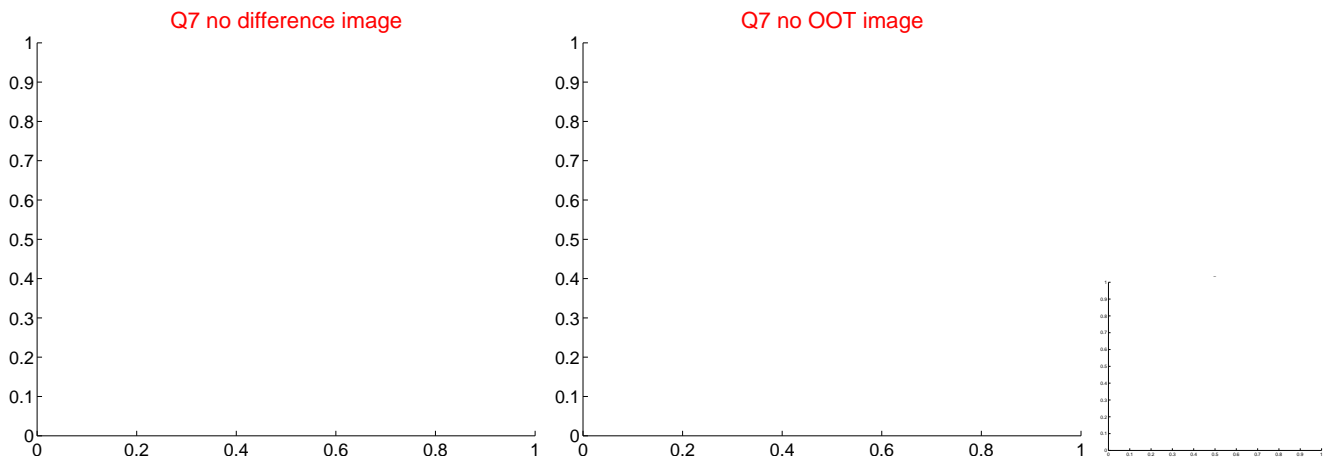
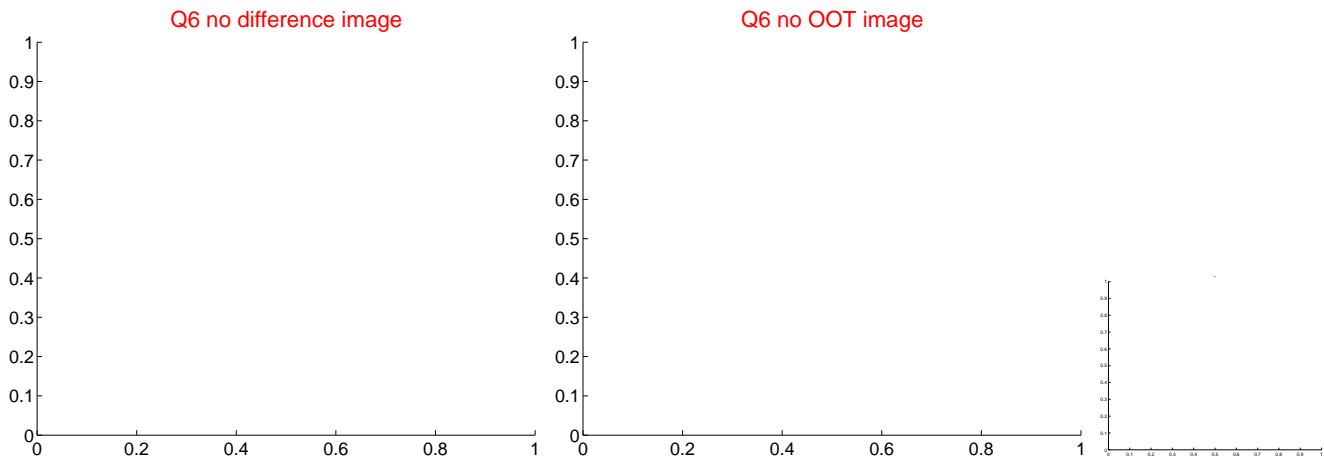
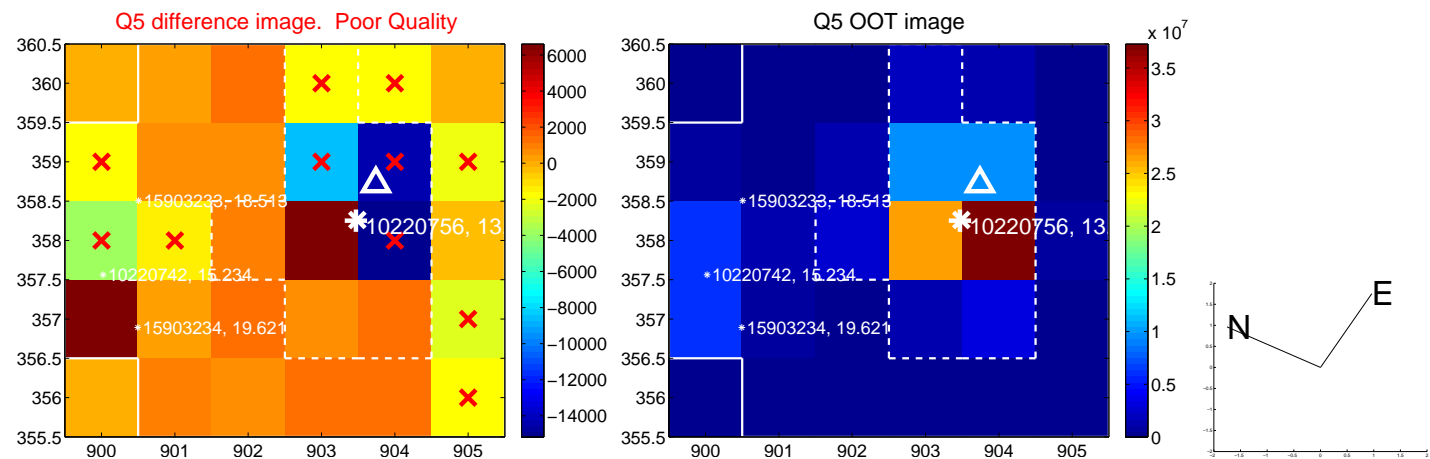
Q4 no difference image



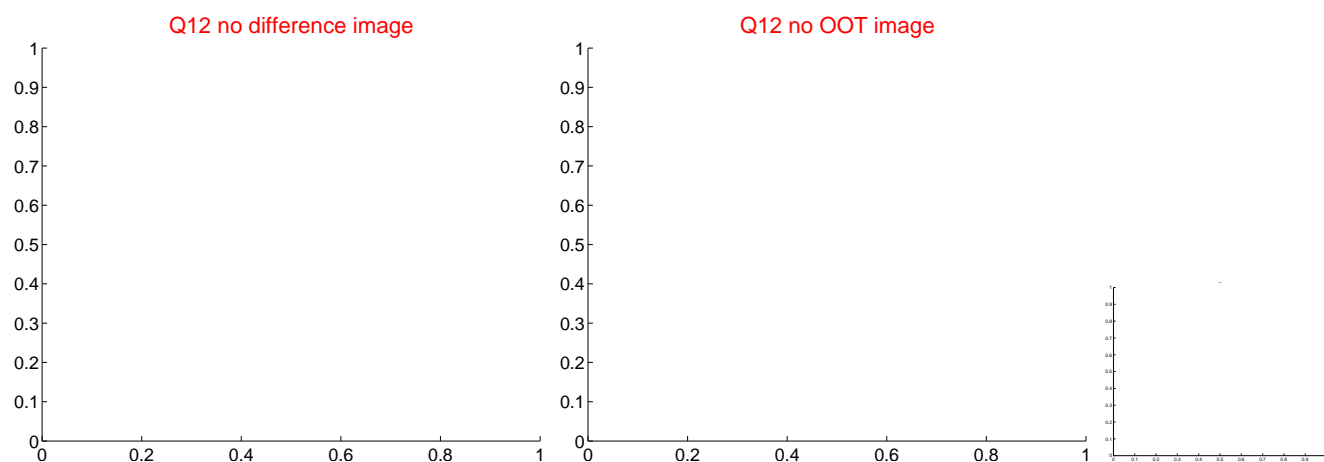
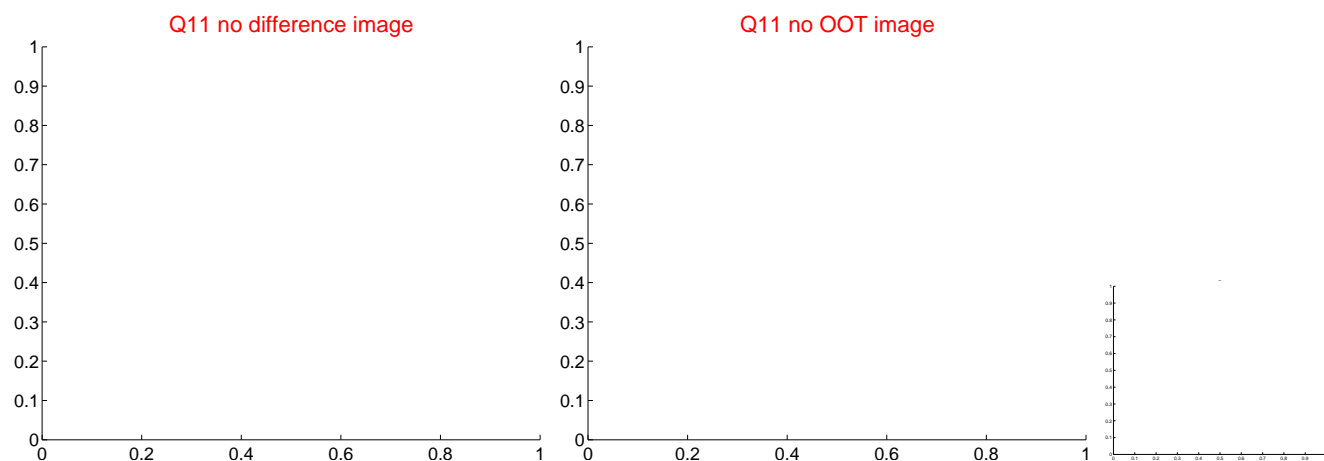
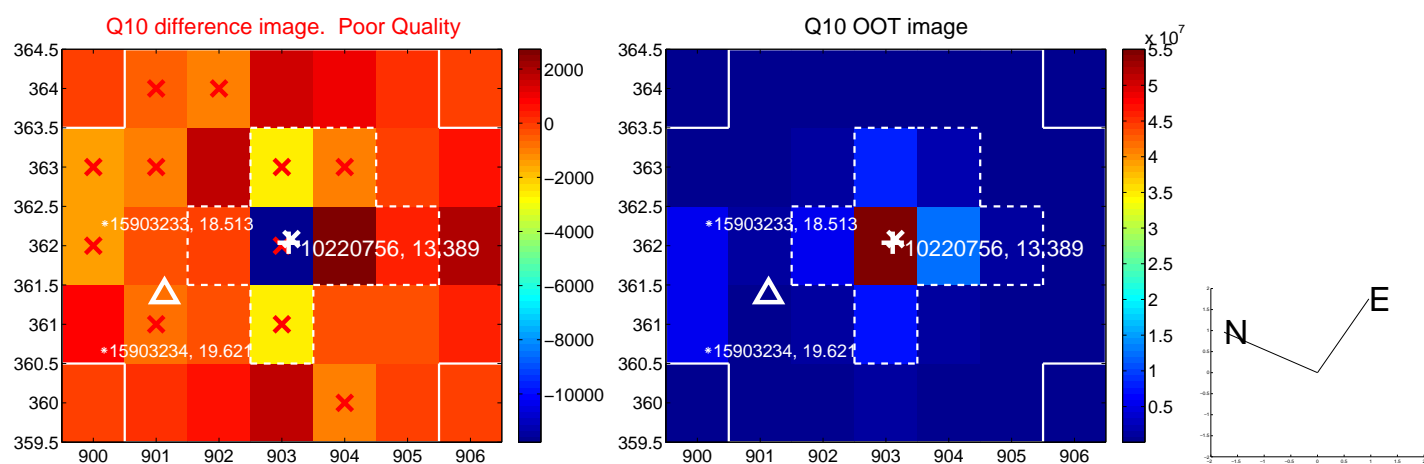
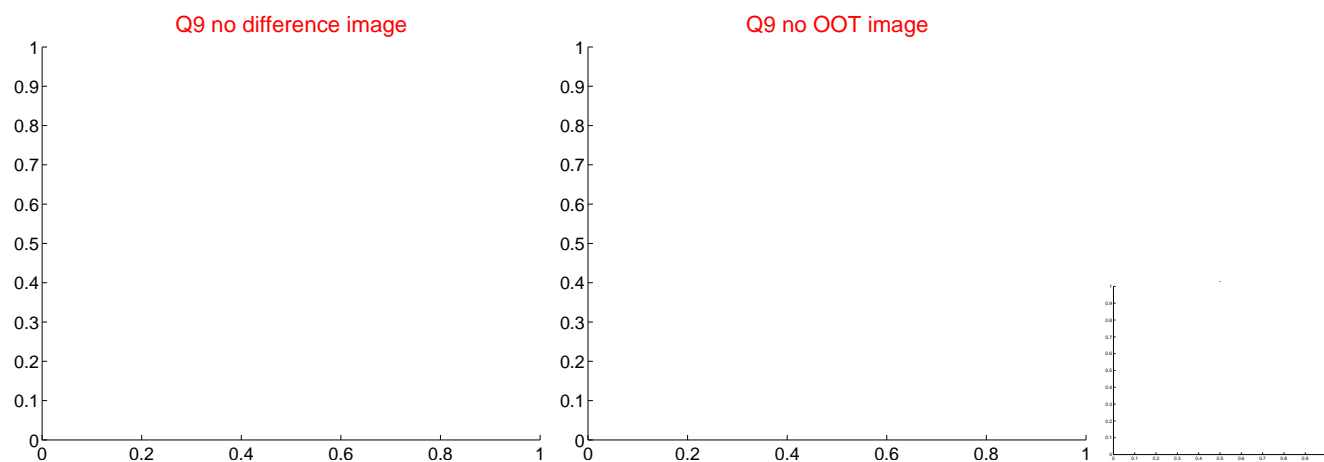
Q4 no OOT image



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



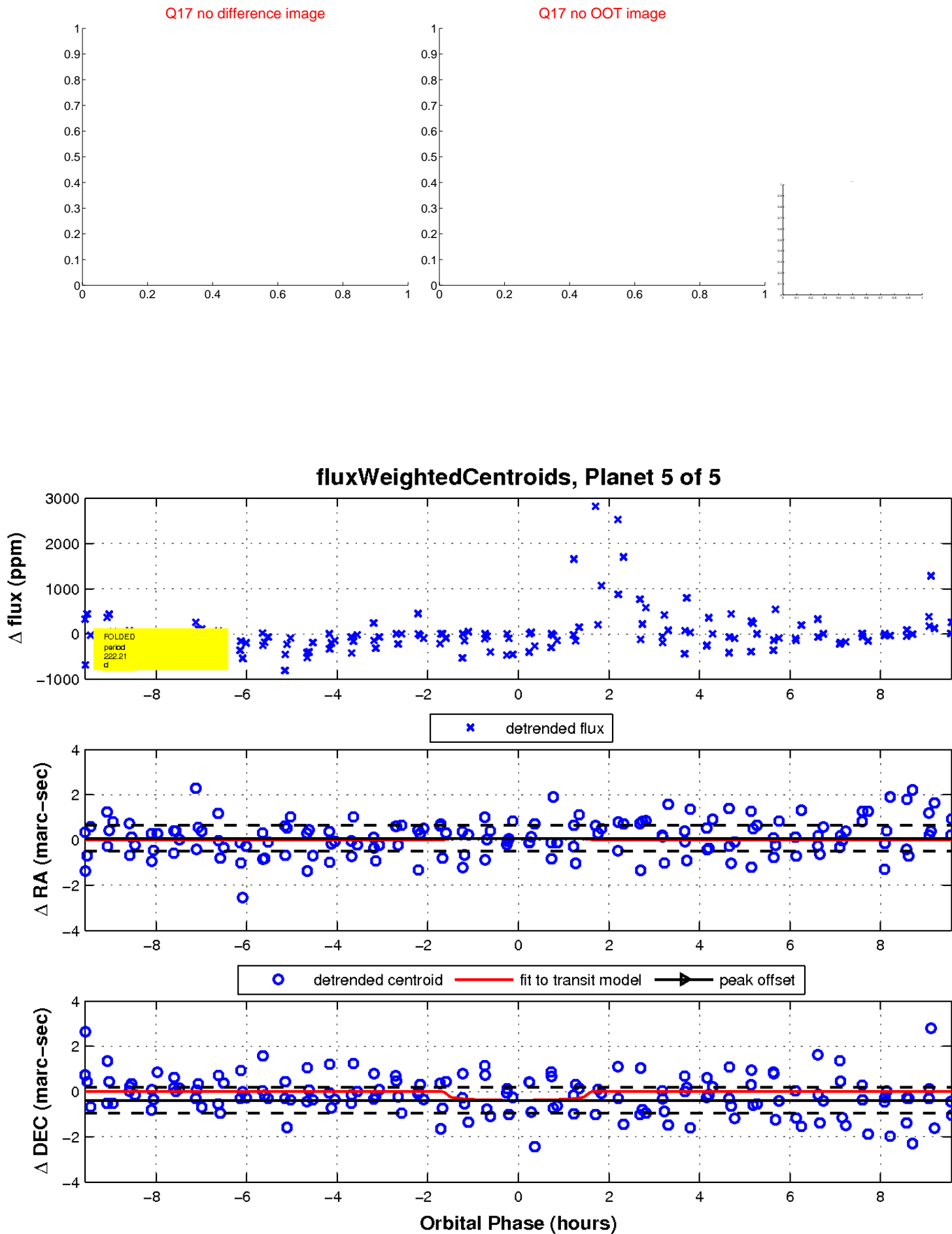
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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



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



UKIRT Image

Declination

