

KIC 002438151

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})
002438151-01	OBS	No	410.674316	342.919392	2185.2	15.554	16.1	8.0	0.69	4596	3.99	0.21
002438151-02	OBS	No	559.284096	388.227037	1913.6	14.780	14.6	6.8	0.69	4596	3.36	0.14
002438151-03	OBS	No	188.804844	162.355500	869.7	2.366	15.1	1.9	0.69	4596	2.53	0.60
002438151-04	OBS	No	485.277028	135.261826	2441.4	4.001	10.8	9.2	0.69	4596	3.29	0.17
002438151-05	OBS	No	405.596824	175.811091	1949.5	4.523	11.2	6.7	0.69	4596	3.91	0.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438151-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
002438151-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—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.

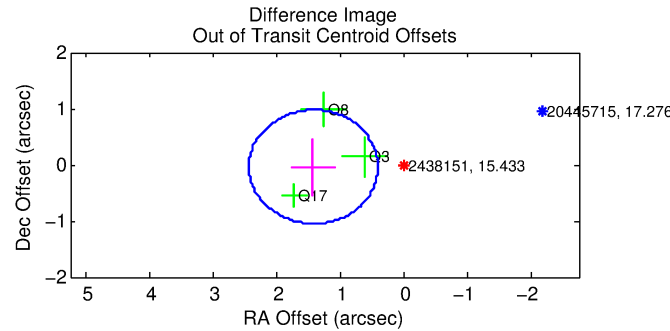
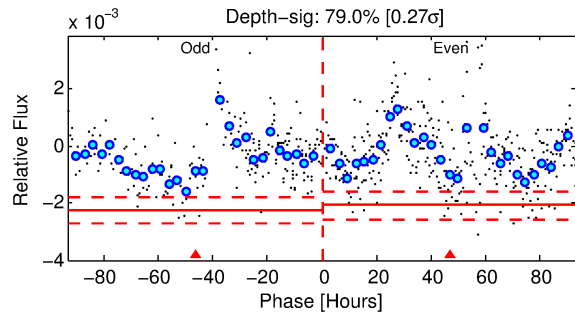
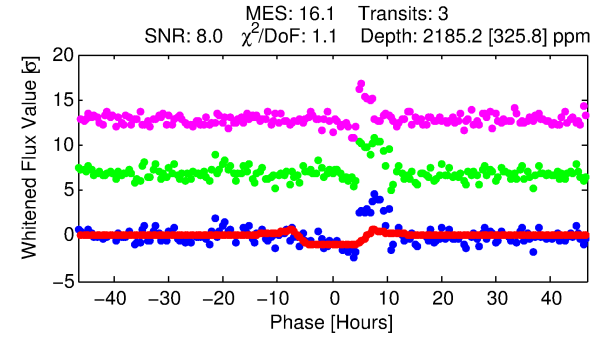
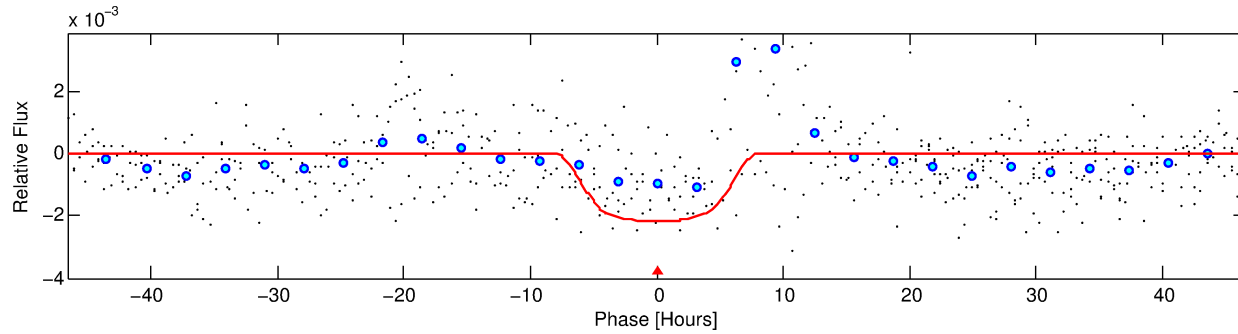
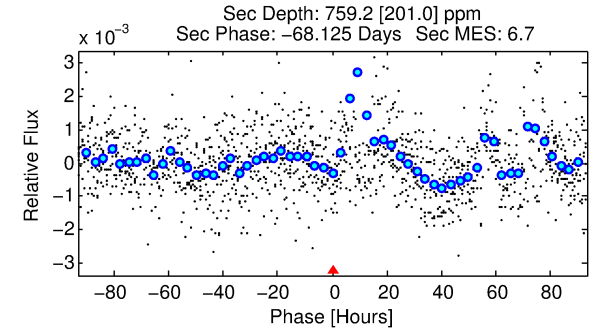
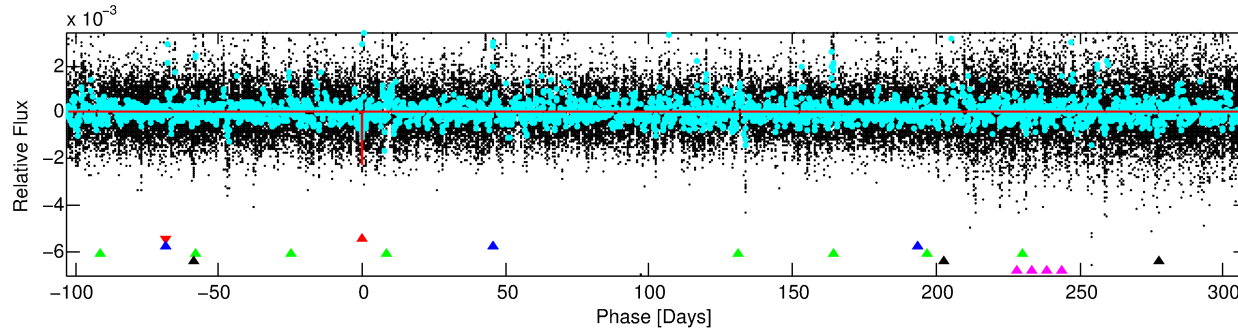
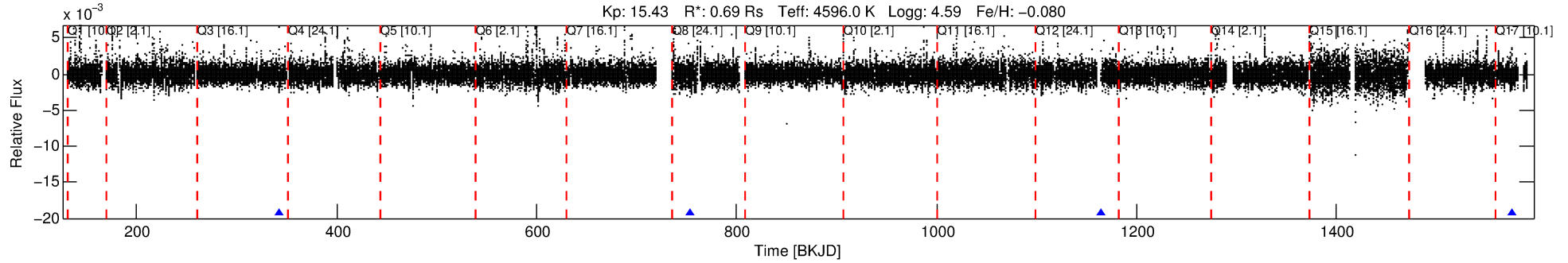
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002438151-01

No Significant Match Found

DV One-Page Summary

KIC: 2438151 Candidate: 1 of 5 Period: 410.674 d



DV Fit Results:

Period = 410.67432 [0.01131] d
Epoch = 342.9194 [0.0209] BKJD
Rp/R* = 0.0527 [0.0053]
a/R* = 110.67 [20.93]
b = 0.90 [0.04]
Seff = 0.21 [0.03]
Teff = 173 [7] K
Rp = 3.99 [0.53] Re
a = 0.9527 [0.0685] AU
Ag = 23761.82 [8266.95] [2.87σ]
Teffp = 3322 [293] K [10.73σ]

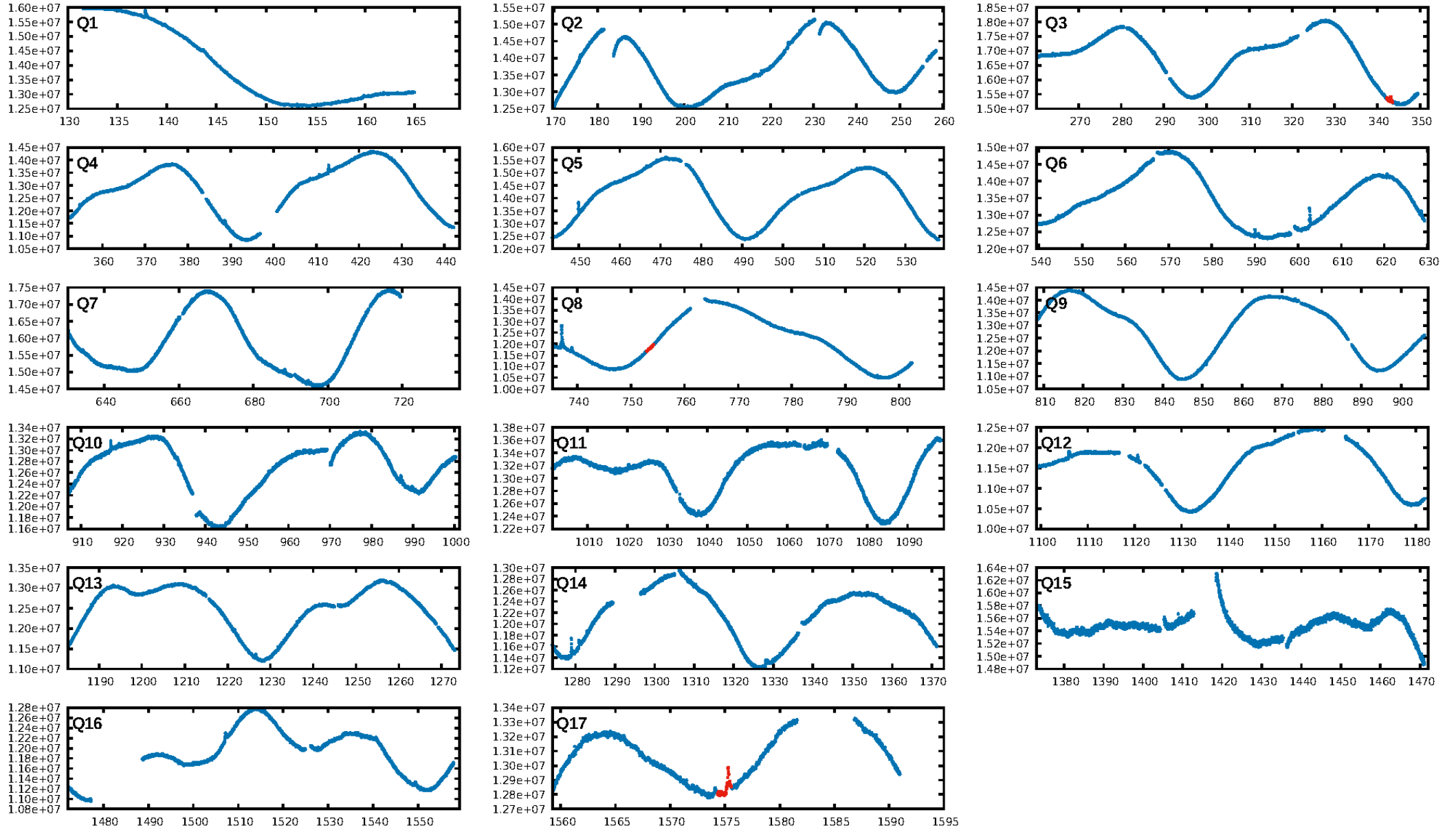
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.52σ]
LongPeriod-sig: 100.0% [111.48σ]
ModelChiSquare2-sig: 13.4%
ModelChiSquareGof-sig: 98.1%
Bootstrap-pfa: 1.94e-20
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 3.942
Centroid-sig: 51.8%
Centroid-so: 1.350 arcsec [2.70σ]
OotOffset-rm: 1.428 arcsec [4.22σ]
KicOffset-rm: 0.317 arcsec [1.25σ]
OotOffset-st: 0/1/1/1 [3]
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DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

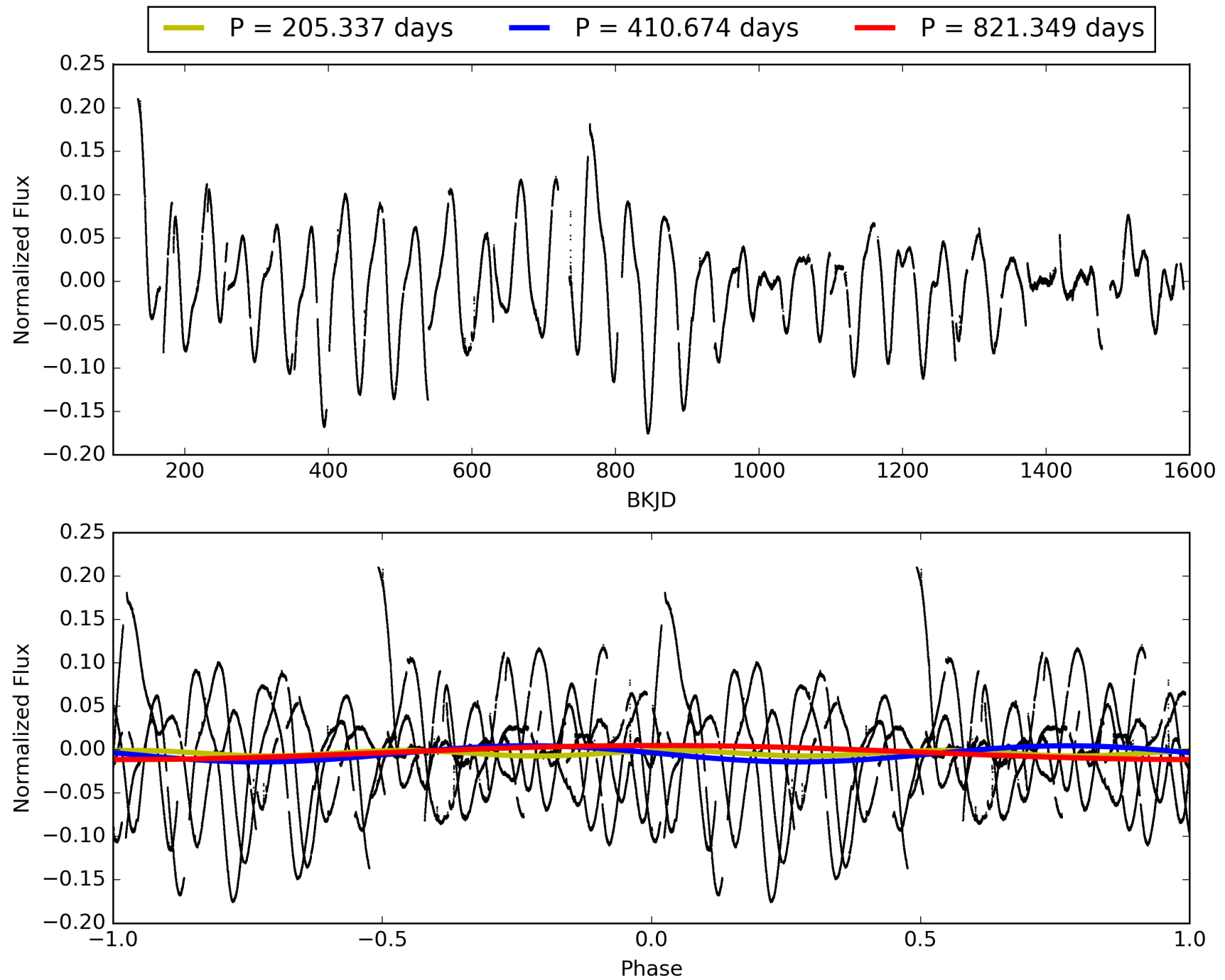
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:19:42 Z

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

TCE 002438151-01, PDC Light Curves

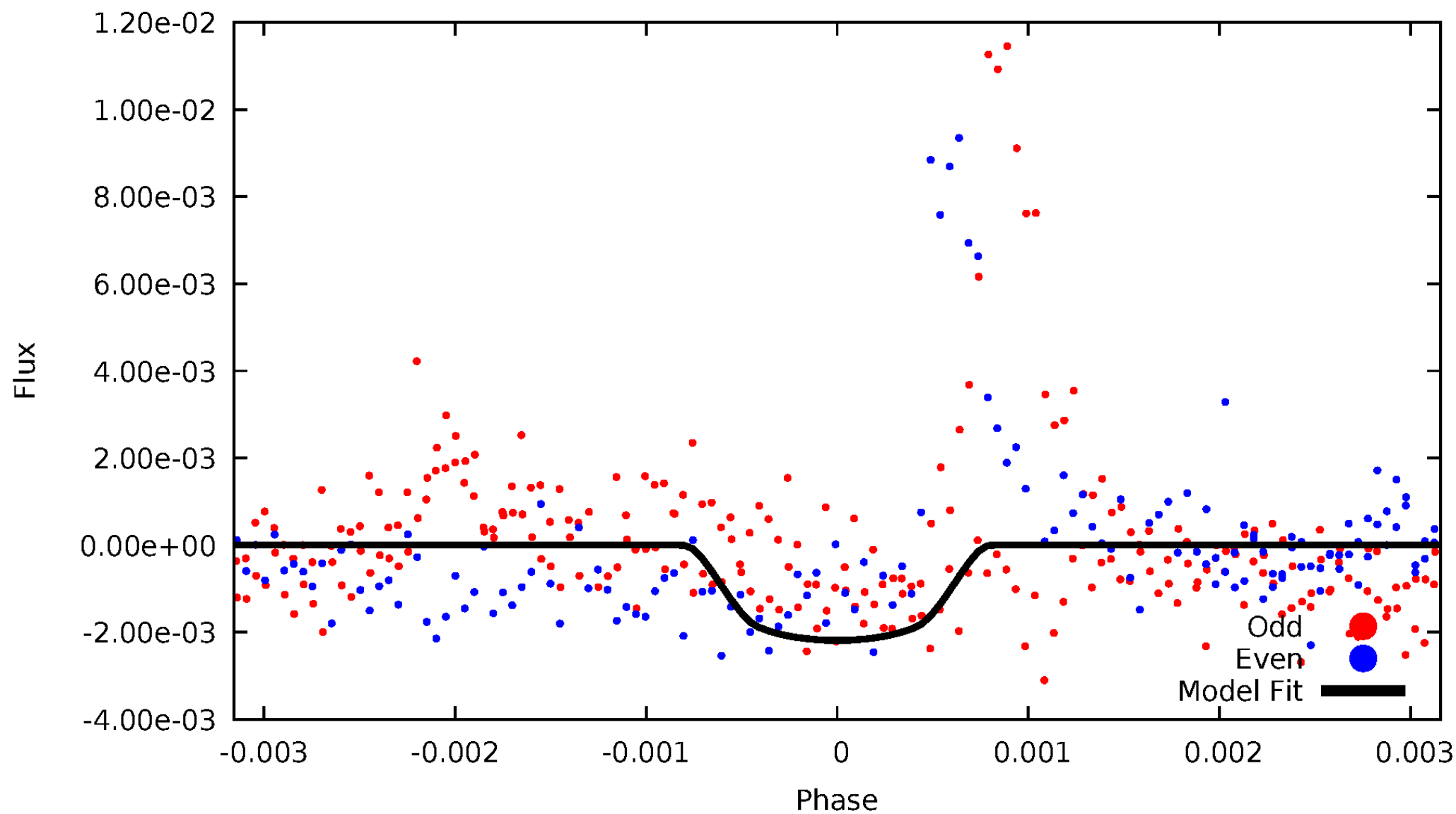


TCE 002438151-01



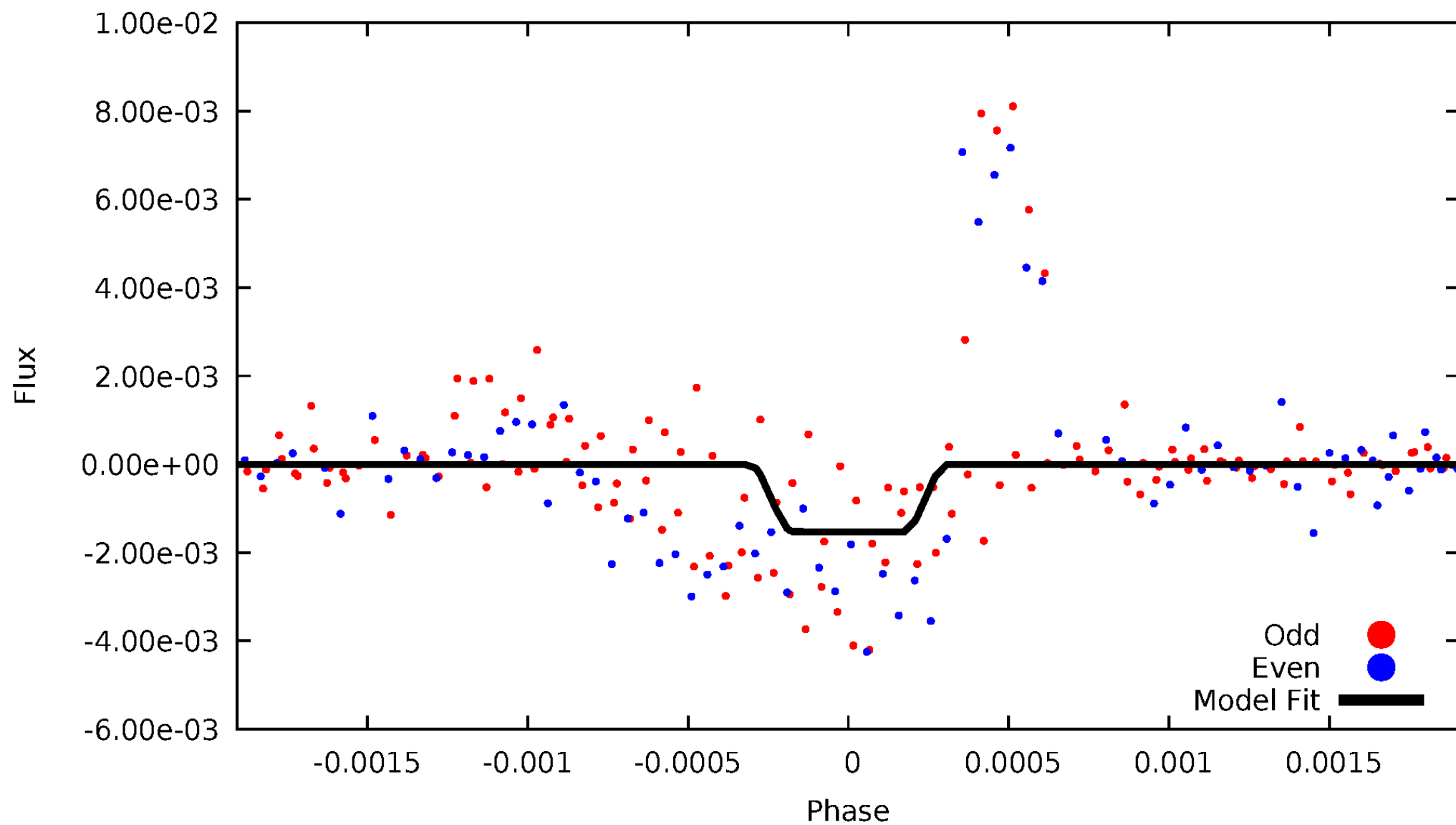
DV Odd/Even

TCE 002438151-01



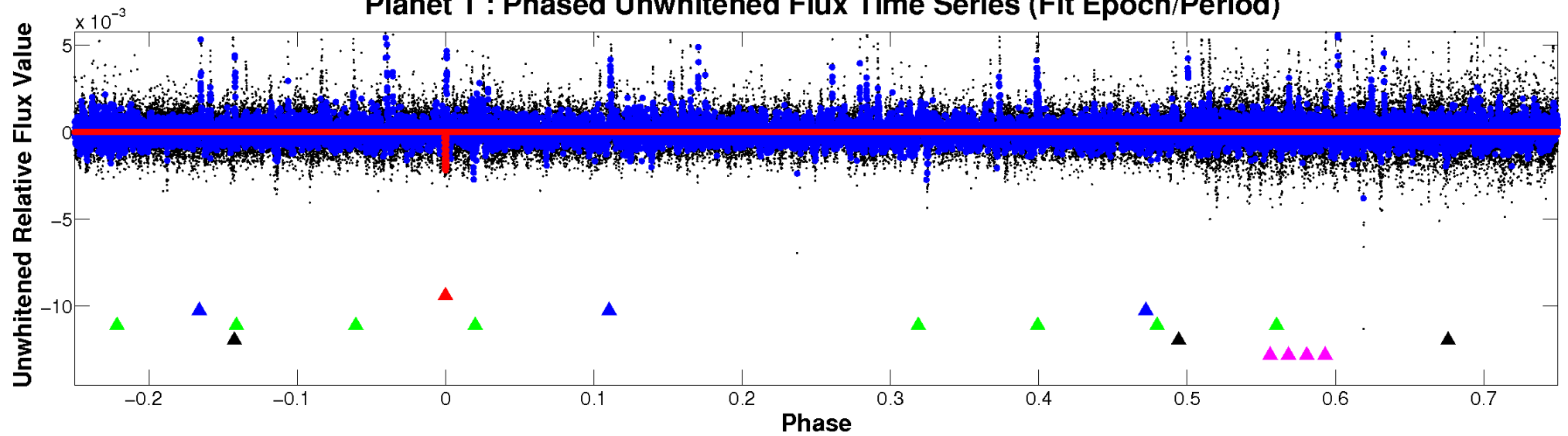
ALT Odd/Even

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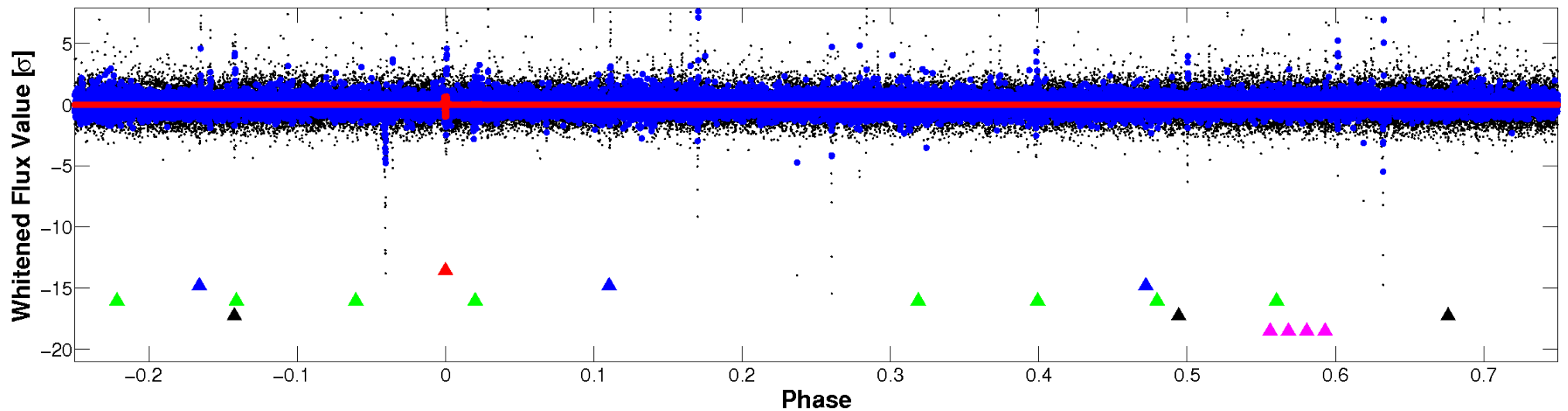


Non-Whitened Vs. Whitened Light Curve

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

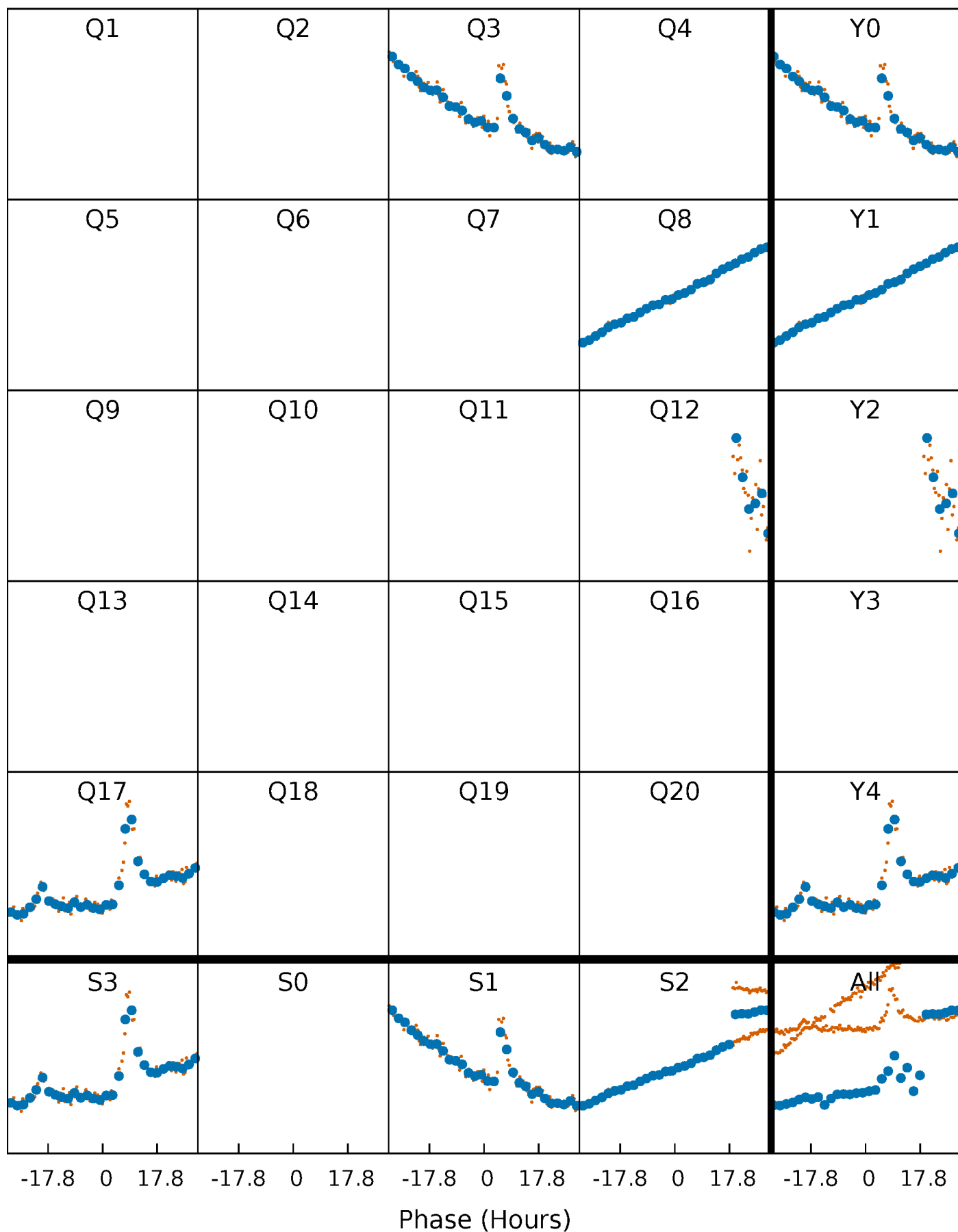


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



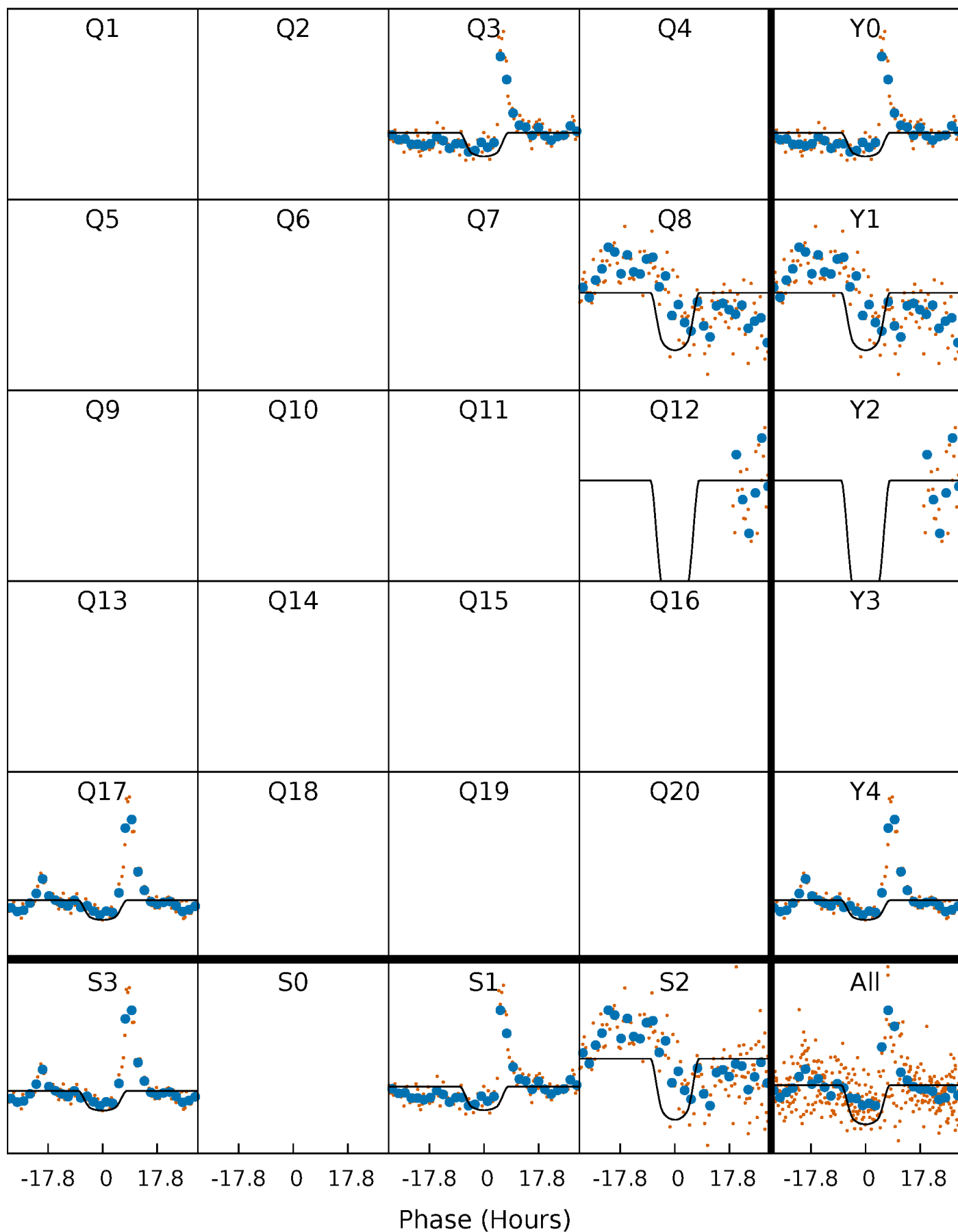
PDC Quarter-Phased Transit Curves

TCE 002438151-01 P=410.674315 Days $T_0=342.919392$ (BKJD)



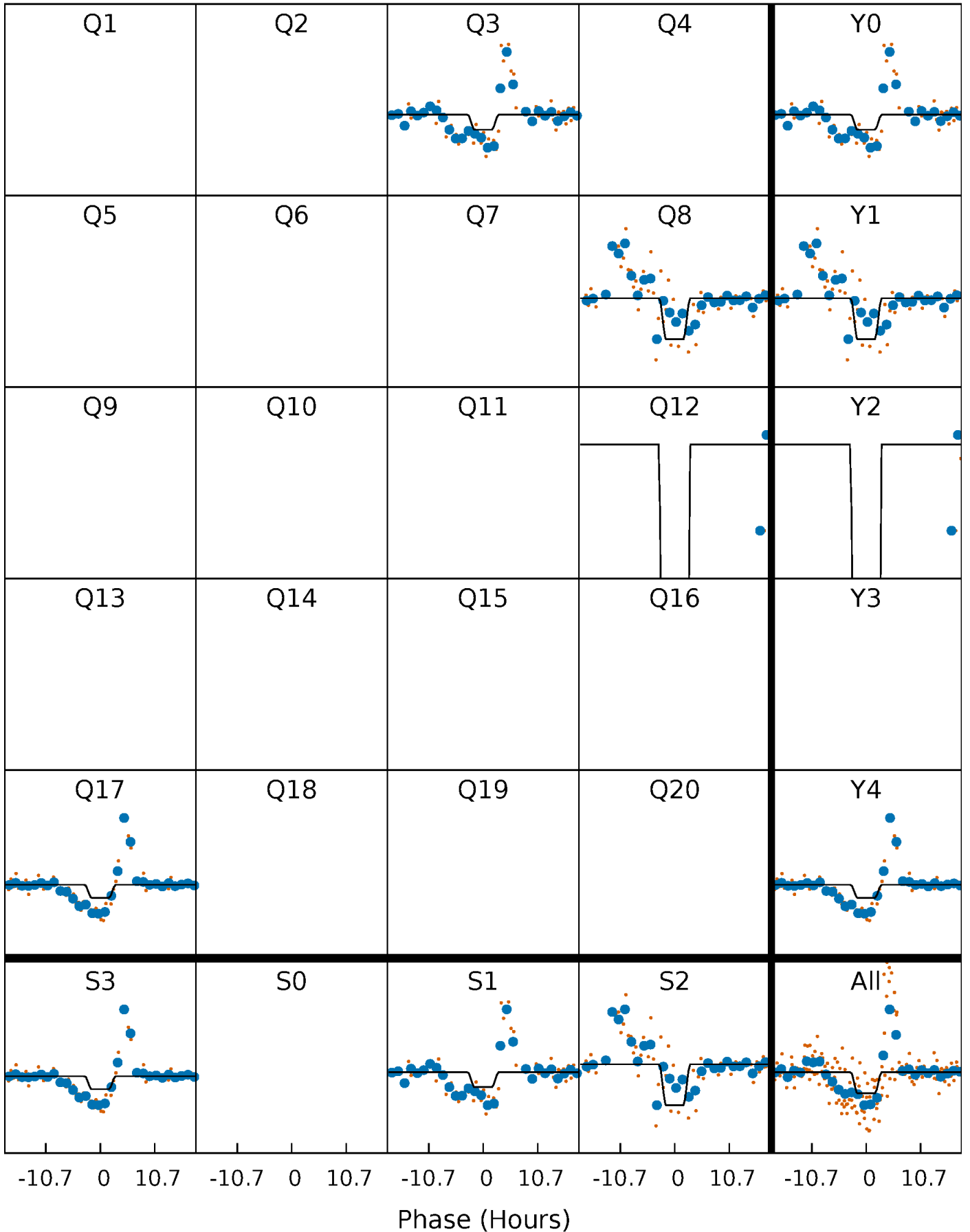
DV Quarter-Phased Transit Curves

TCE 002438151-01 P=410.674315 Days $T_0=342.919392$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

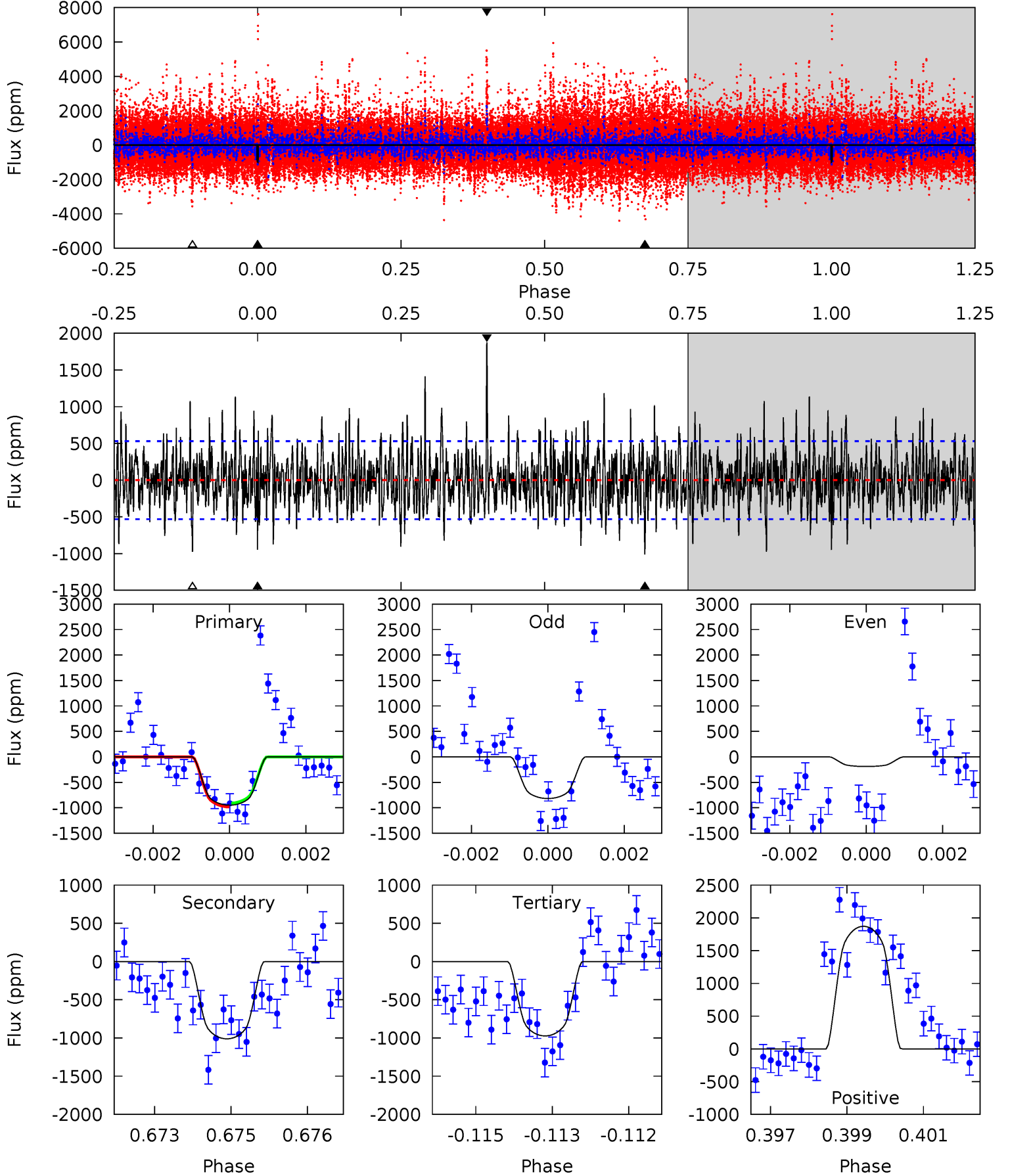
TCE 002438151-01 $P=410.707745$ Days $T_0=342.973724$ (BKJD)



DV Model-Shift Uniqueness Test

002438151-01, P = 410.674315 Days, E = 342.919392 Days

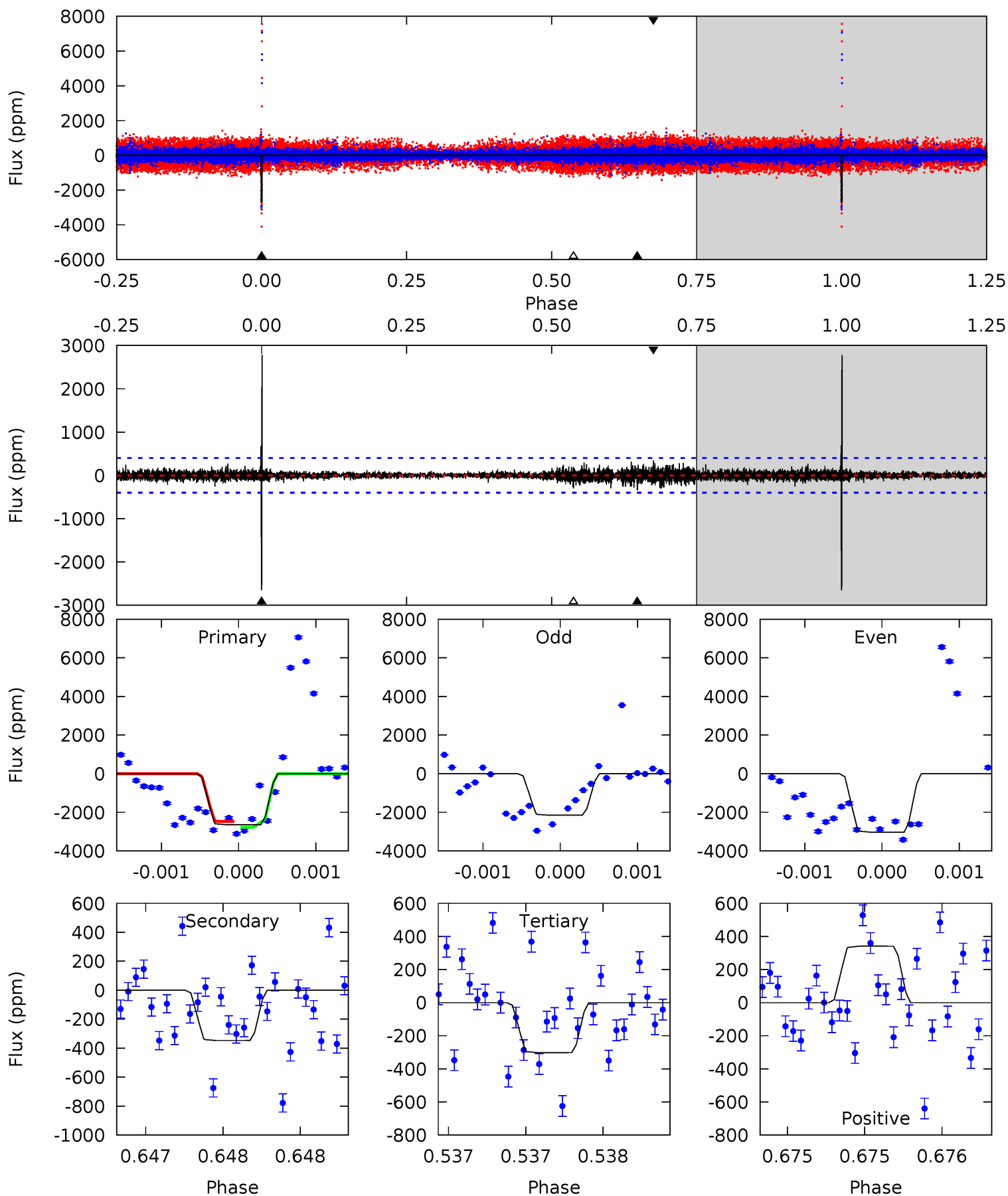
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.57	10.2	9.83	18.9	5.36	3.15	3.19	-0.25	-9.33	0.38	-8.69	2.37	1.17	0.65	0.39



Alt Model-Shift Uniqueness Test

002438151-01, P = 410.707745 Days, E = 342.973724 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.6	4.80	4.17	4.71	5.54	3.43	0.90	32.4	31.9	0.63	0.09	6.46	0.79	0.51	0



Stellar Parameters For KIC 002438151

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4596^{+138}_{-138}	$4.590^{+0.056}_{-0.024}$	$-0.080^{+0.300}_{-0.300}$	$0.694^{+0.045}_{-0.060}$	$0.683^{+0.068}_{-0.056}$	$2.880^{+0.677}_{-0.310}$
	+3%/-3%	+1%/-1%	+375%/-375%	+6%/-9%	+10%/-8%	+23%/-11%
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 002438151-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1011 ± 99	$3.96^{+0.44}_{-0.42}$	240^{+8}_{-8}	3823^{+178}_{-182}	32660^{+8908}_{-6820}
Alt.	-348 ± 72	$2.92^{+0.41}_{-0.44}$	240^{+9}_{-8}	3532^{+239}_{-203}	20110^{+9382}_{-5918}

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

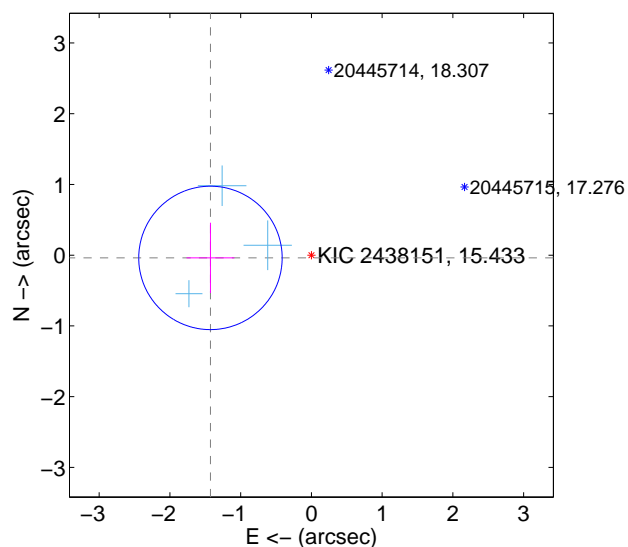
Supplemental centroid analysis for 002438151-01. Kepler magnitude: 15.43. Transit SNR 8.02

There are 3 quarters with good PRF difference image offsets

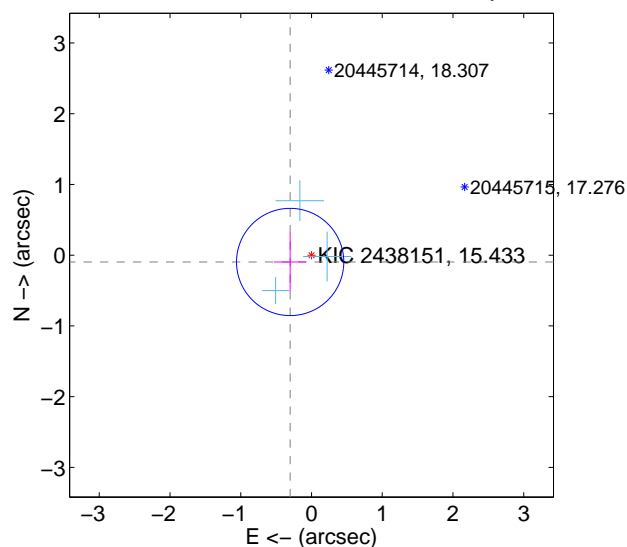
The direct PRF centroid is offset from the target star catalog position by about 1.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.428 ± 0.338	4.22	1.427 ± 0.338	-0.039 ± 0.497
PRF-fit source offset from KIC position	0.317 ± 0.253	1.25	0.302 ± 0.230	-0.096 ± 0.414
photometric centroid source offset	1.35 ± 0.50	2.70	-0.82 ± 0.59	-1.07 ± 0.44

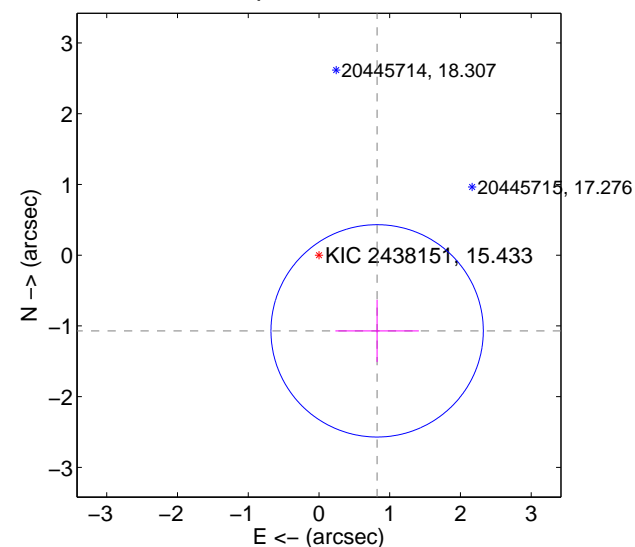
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

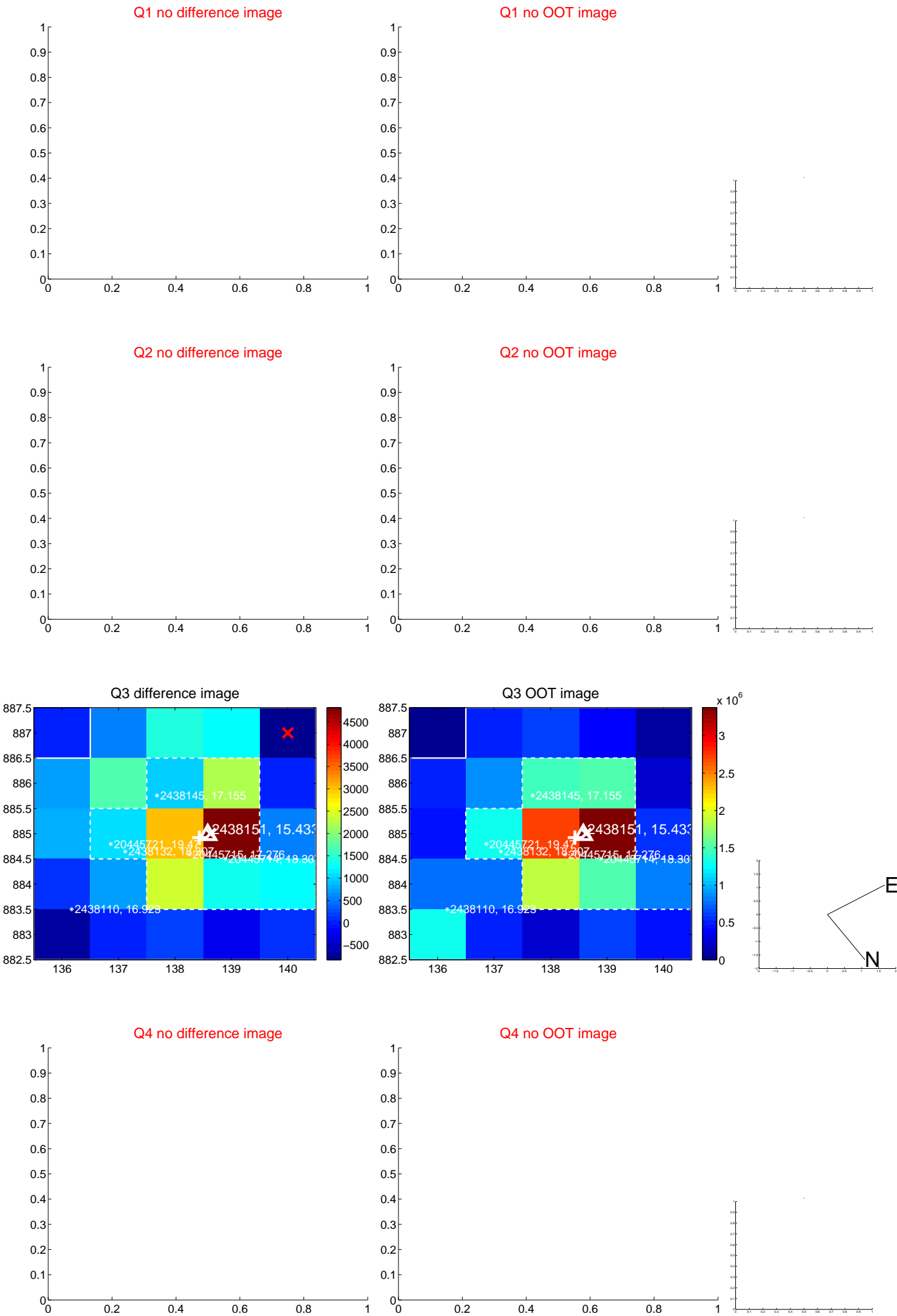


offset from photometric centroids

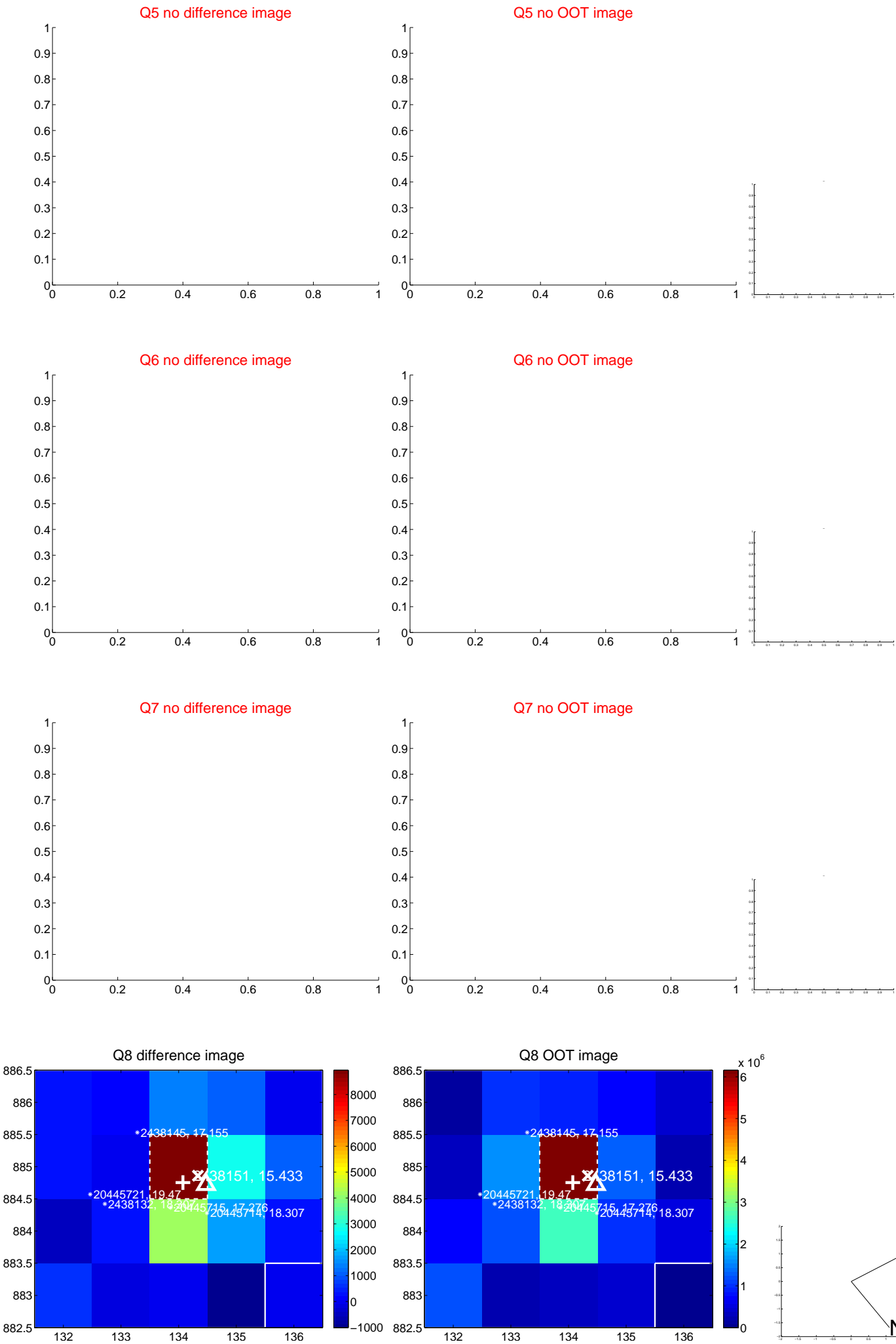


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

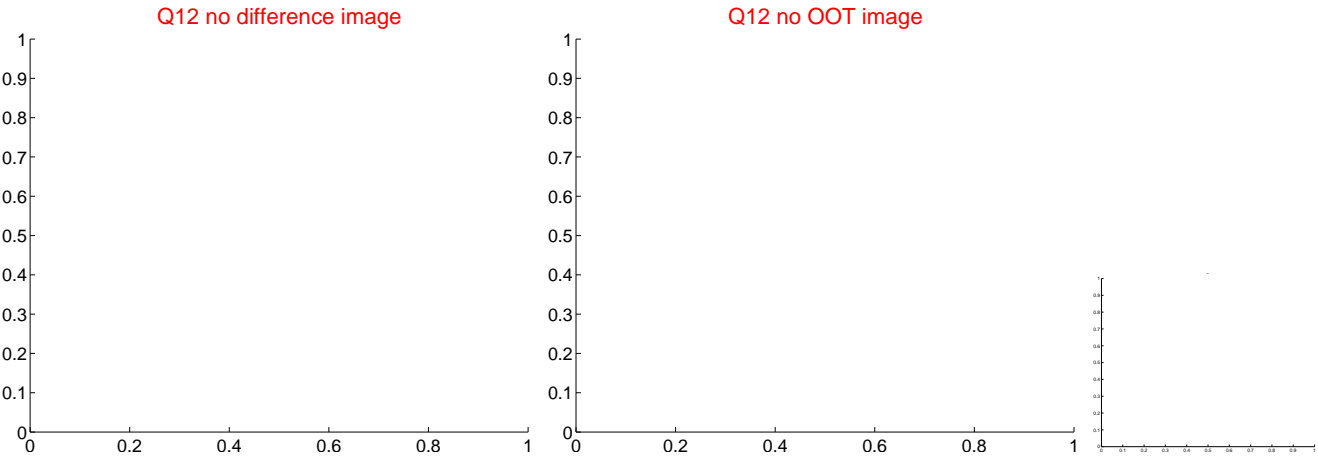
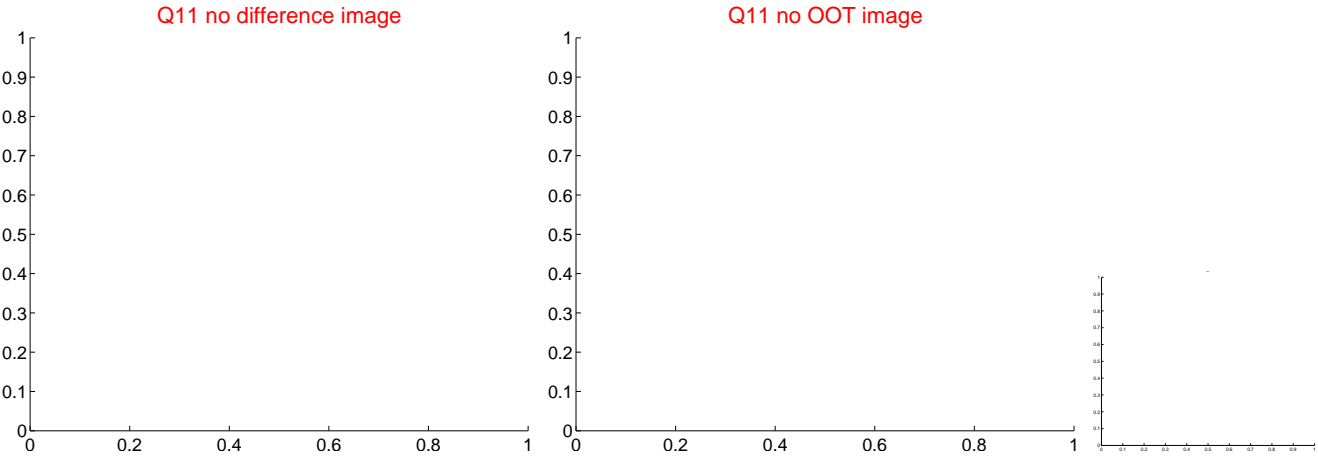
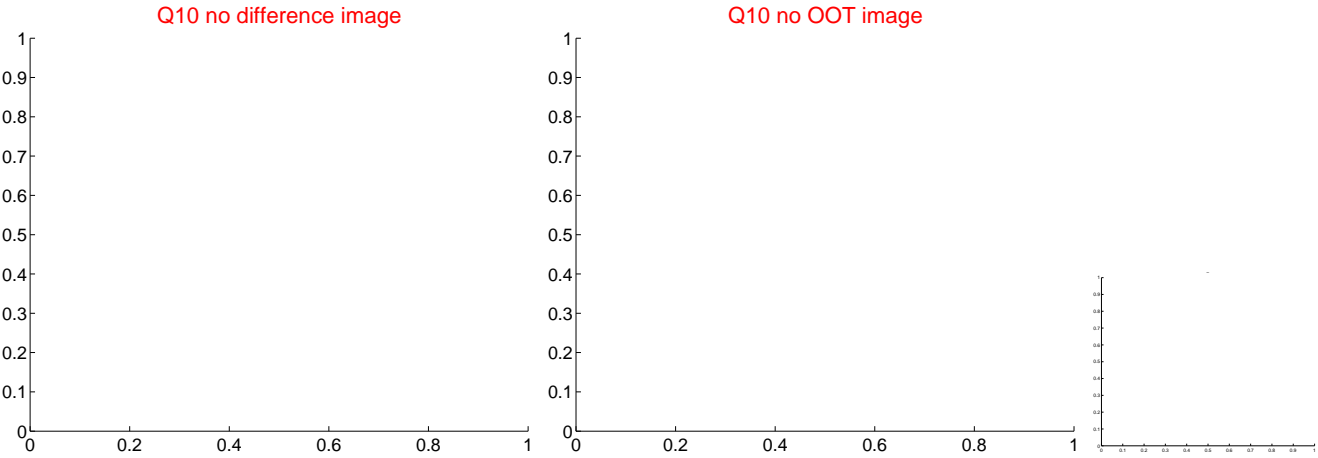
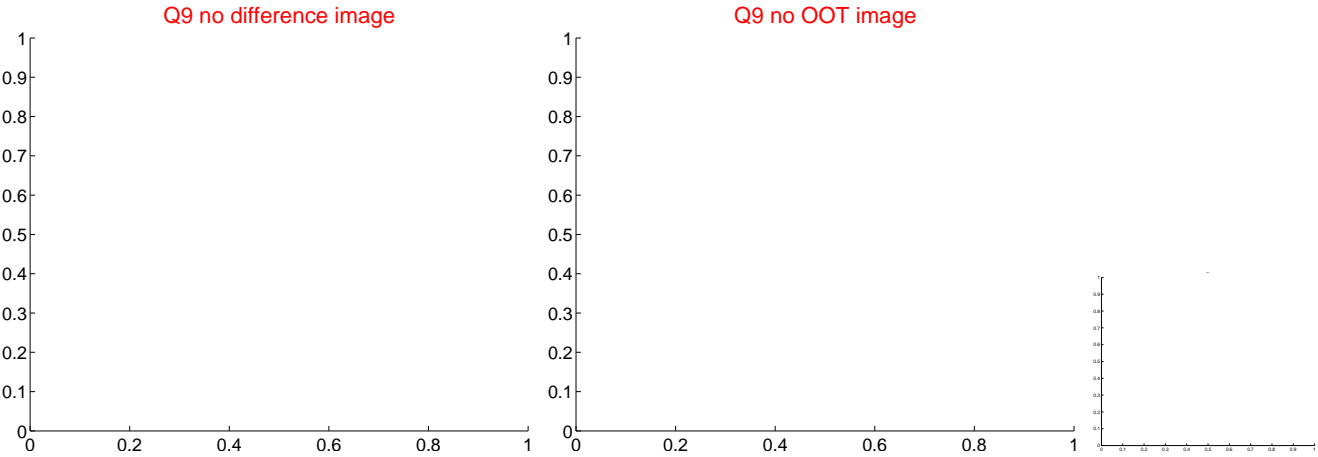
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



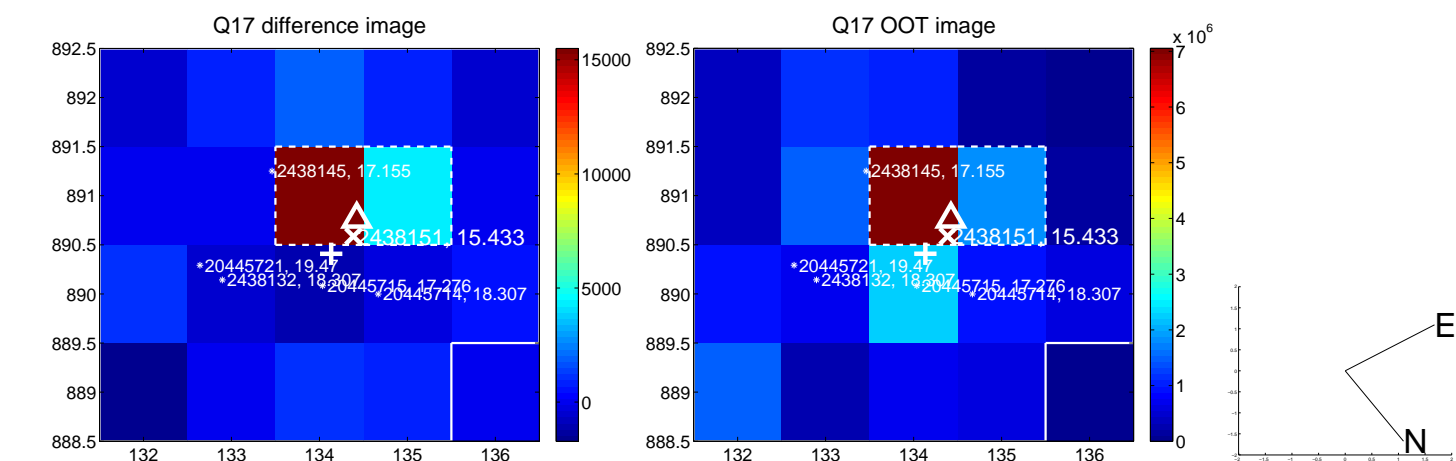
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



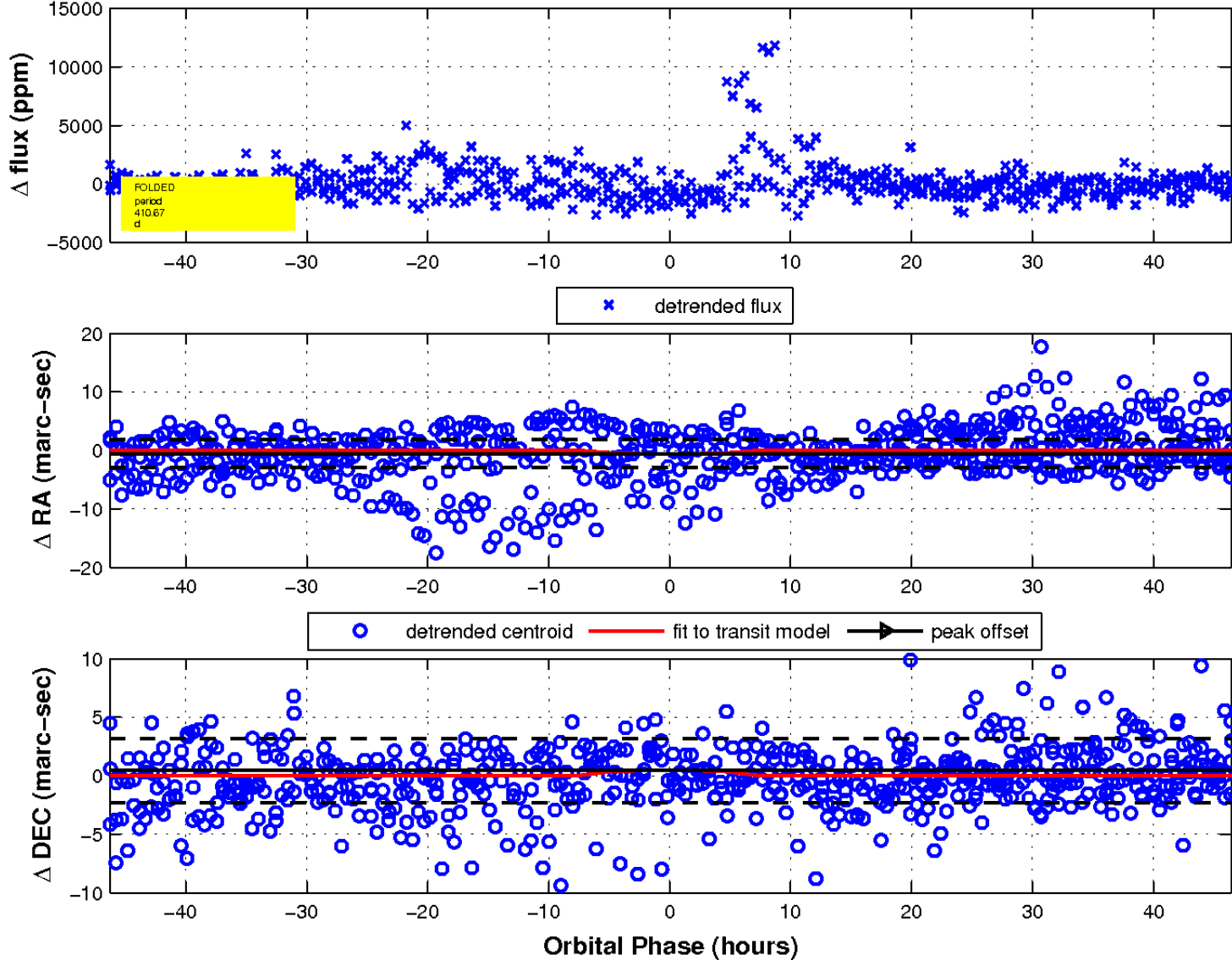
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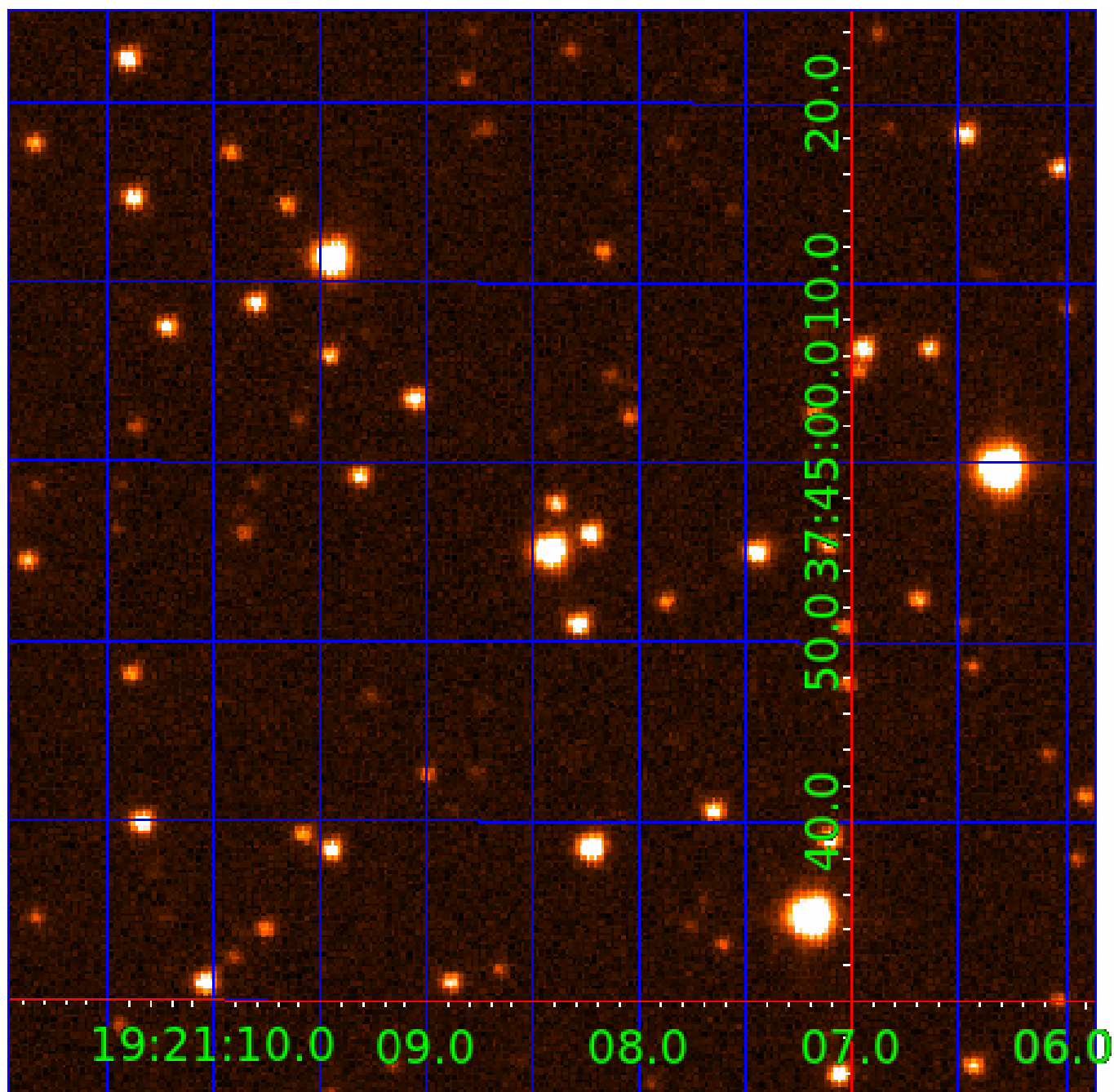


fluxWeightedCentroids, Planet 1 of 5



UKIRT Image

Declination



KIC 002438151

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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002438151-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—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.

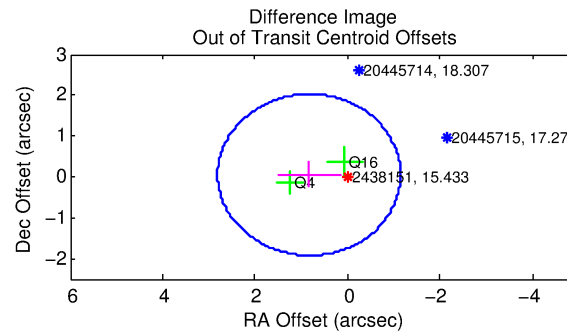
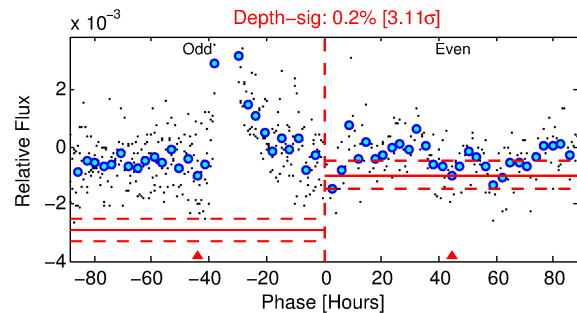
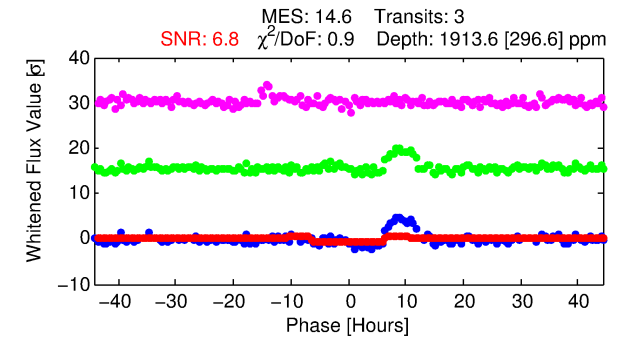
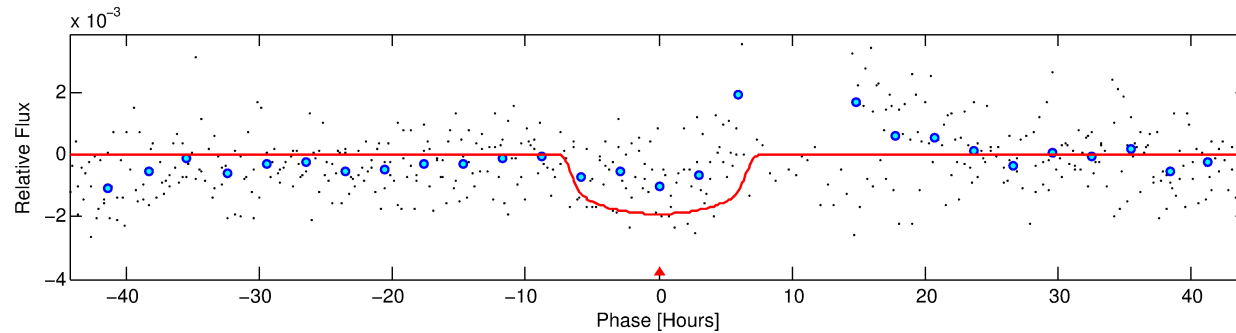
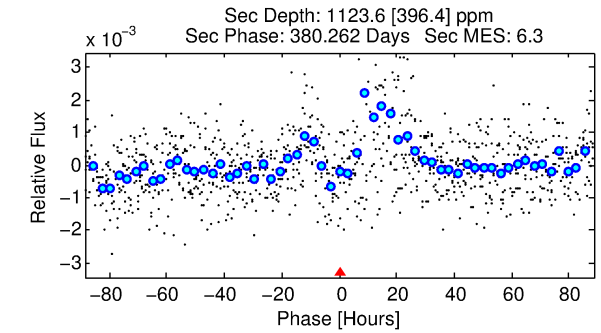
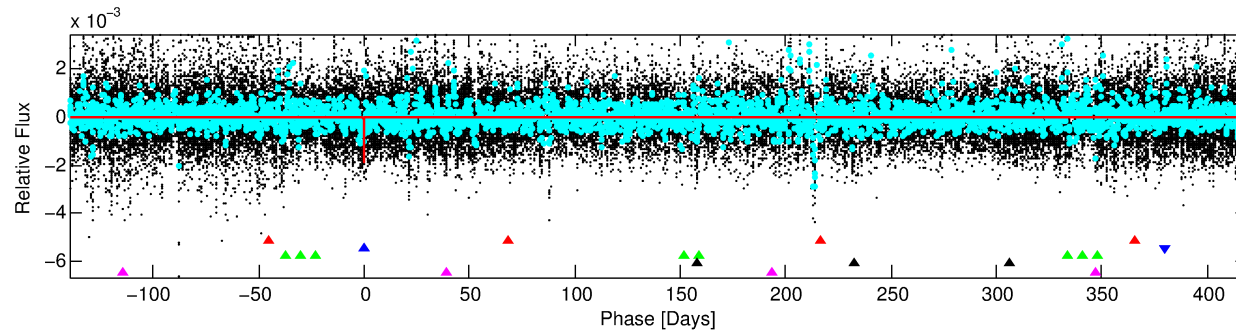
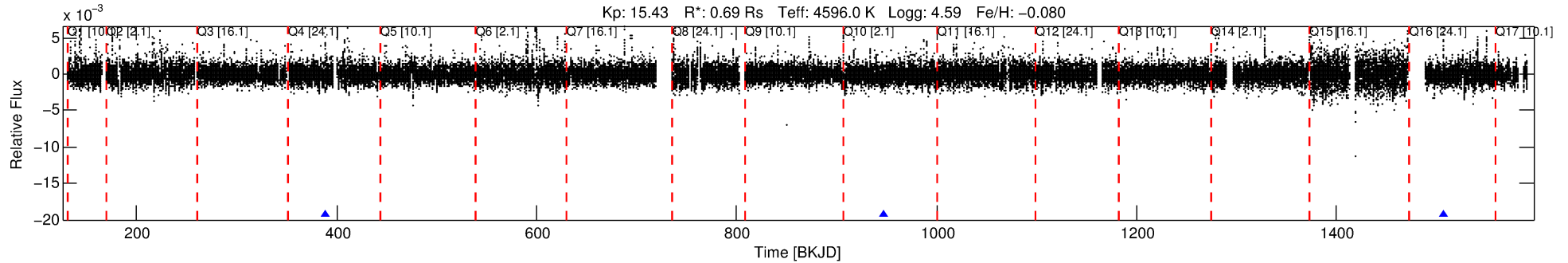
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002438151-02

No Significant Match Found

DV One-Page Summary

KIC: 2438151 Candidate: 2 of 5 Period: 559.284 d



DV Fit Results:

Period = 559.28410 [0.01399] d
Epoch = 388.2270 [0.0184] BKJD
Rp/R* = 0.0443 [0.0075]
a/R* = 203.30 [92.65]
b = 0.77 [0.24]
Seff = 0.14 [0.02]
Teq = 156 [6] K
Rp = 3.36 [0.64] Re
a = 1.1705 [0.0842] AU
Ag = 75129.31 [37523.56] [2.00 σ]
Teffp = 3996 [503] K [7.64 σ]

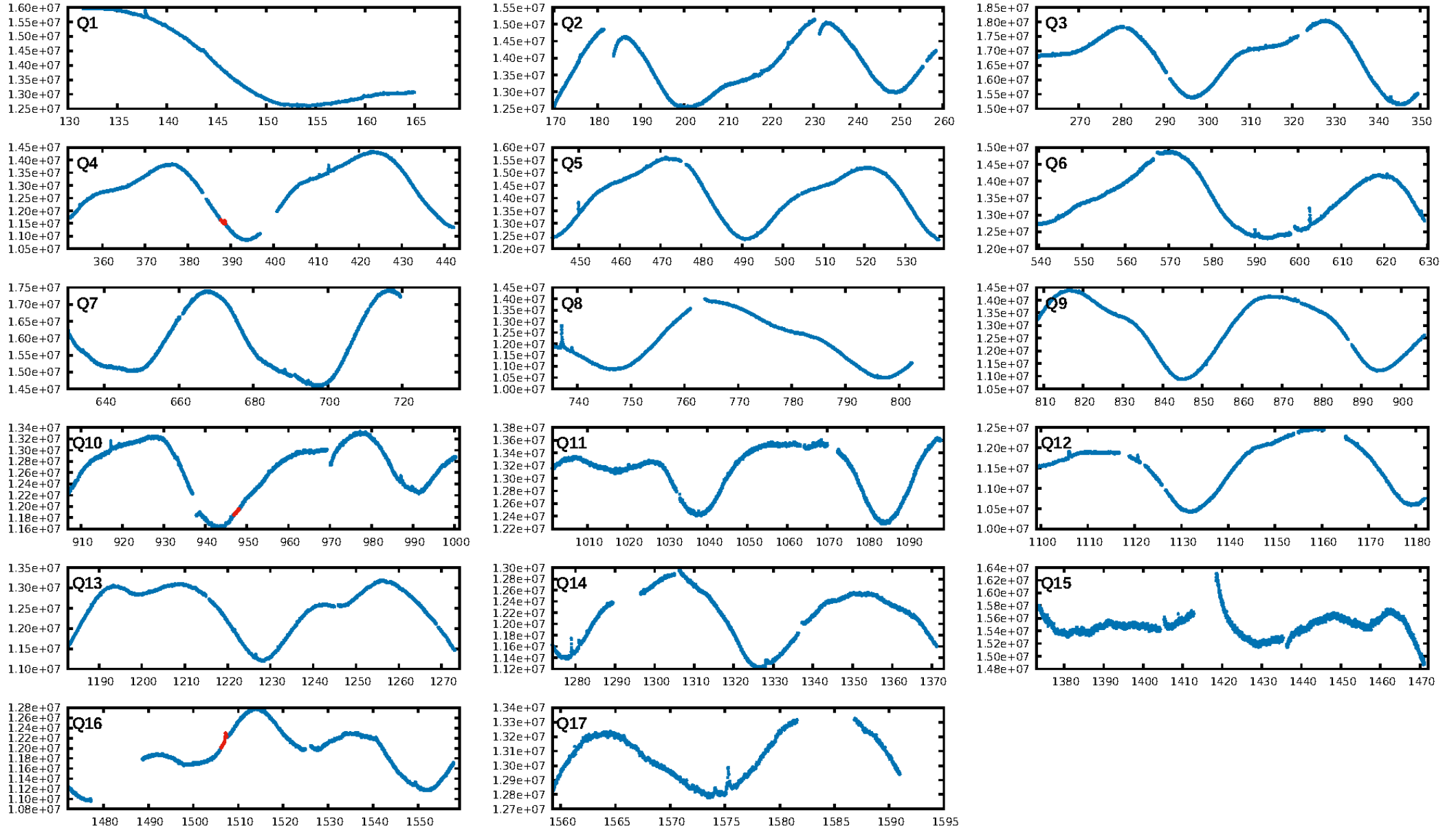
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [116.00 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.6%
ModelChiSquareGof-sig: 95.9%
Bootstrap-pfa: 3.52e-17
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 10.61
Centroid-sig: 45.7%
Centroid-so: 1.353 arcsec [1.50 σ]
OotOffset-rm: 0.837 arcsec [1.27 σ]
OotOffset-st: 0/0/2/0 [2]
KicOffset-rm: 0.364 arcsec [0.67 σ]
KicOffset-st: 0/0/2/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [3/3]

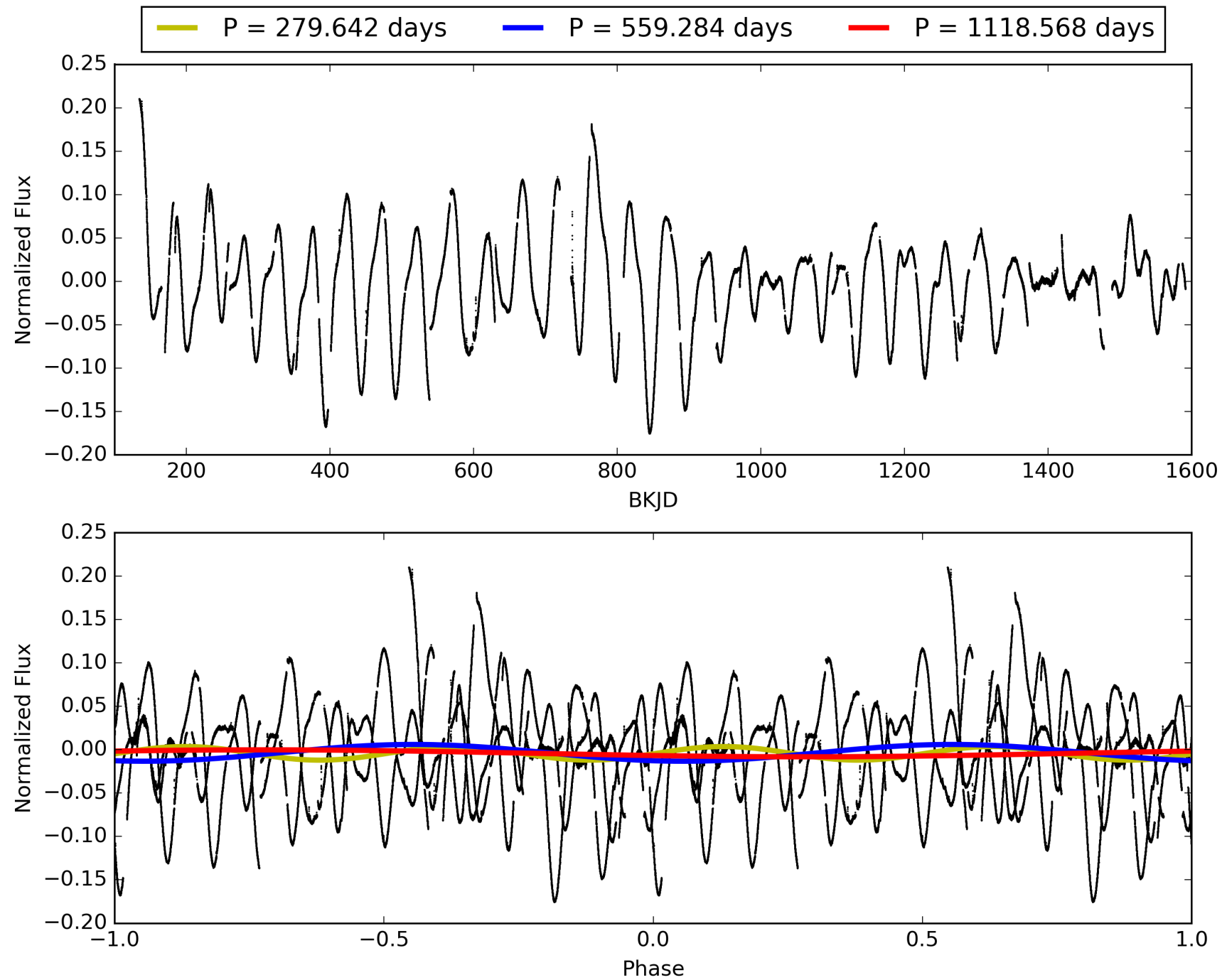
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:19:51 Z

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TCE 002438151-02, PDC Light Curves

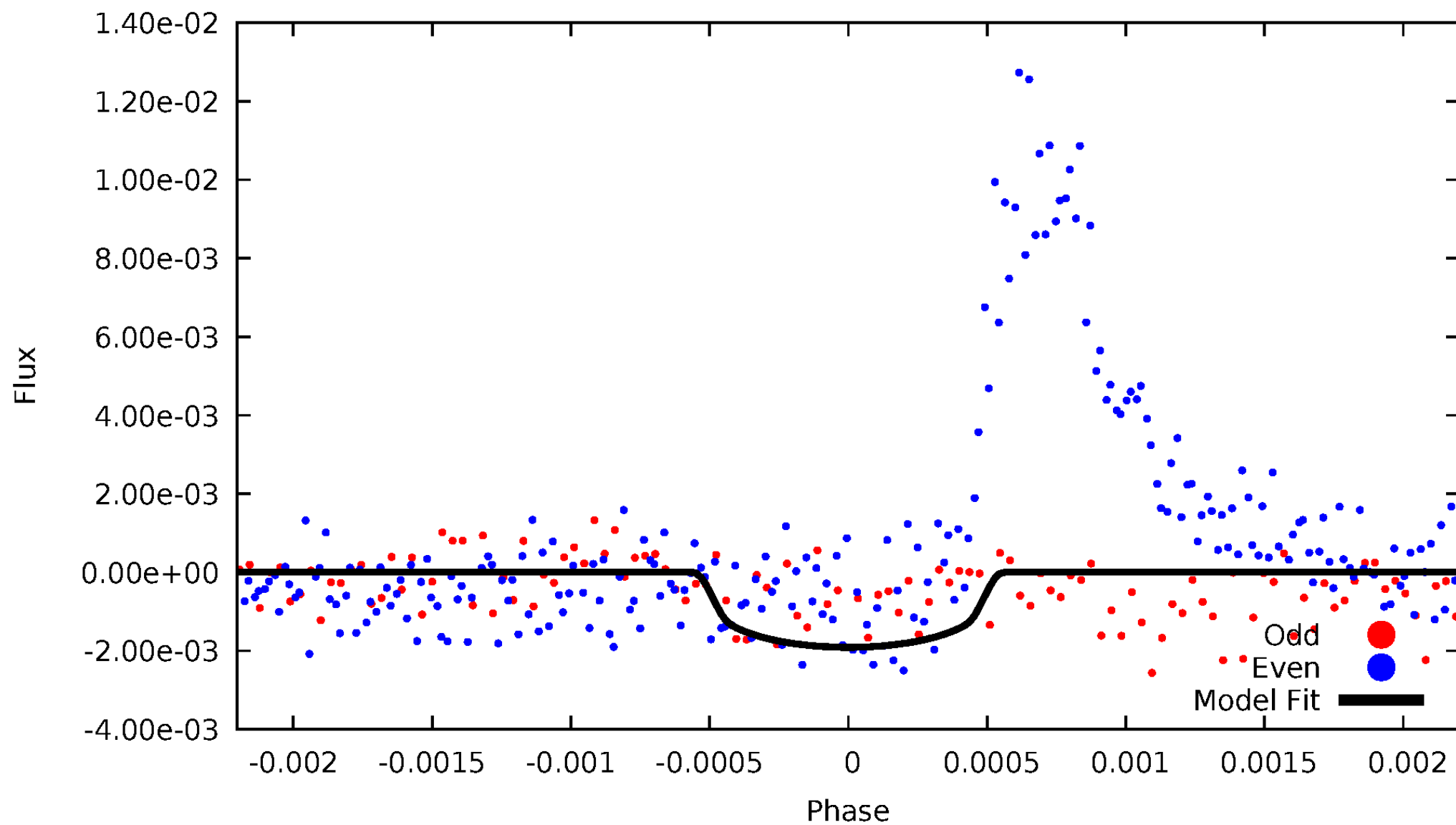


TCE 002438151-02



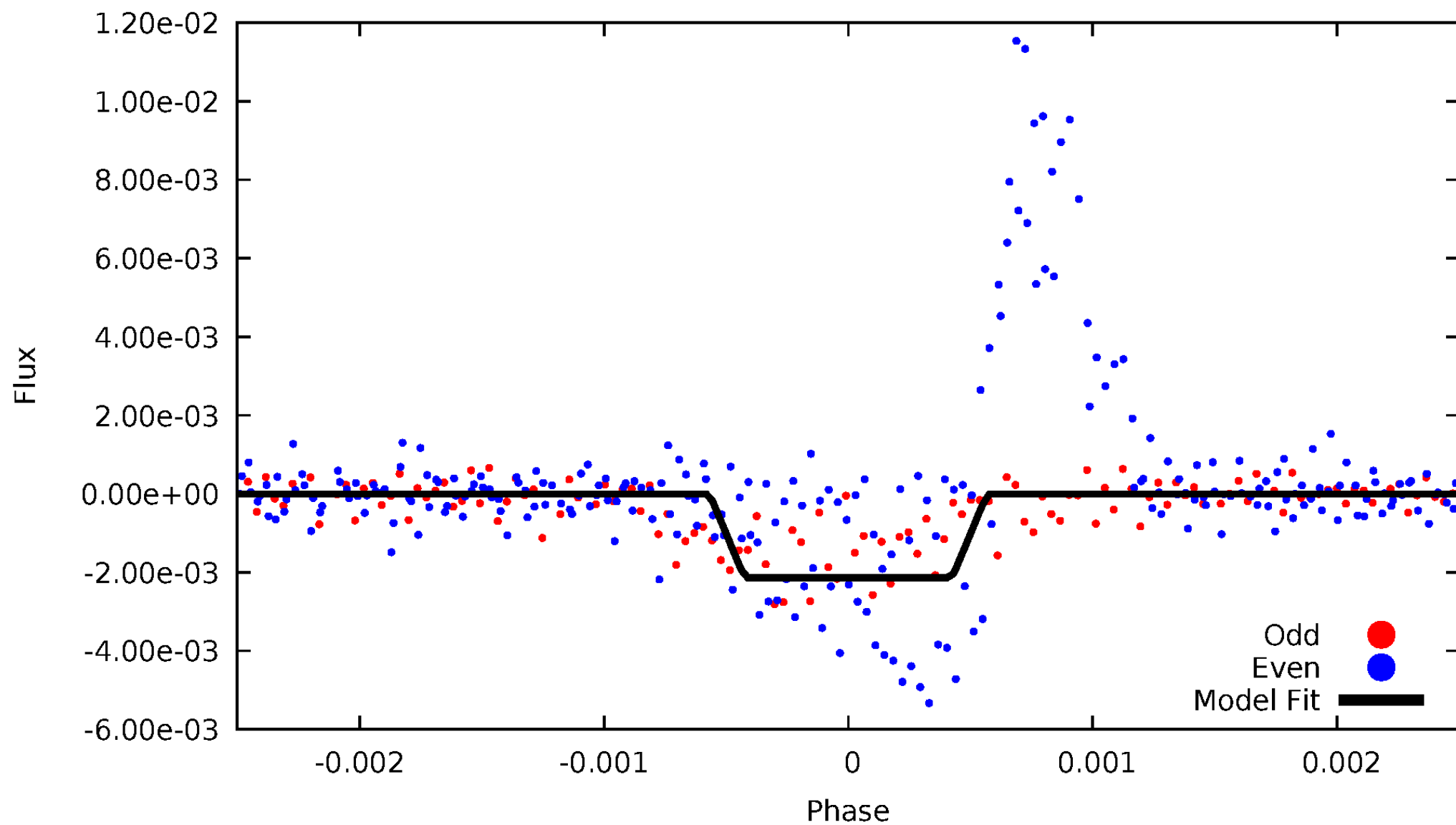
DV Odd/Even

TCE 002438151-02



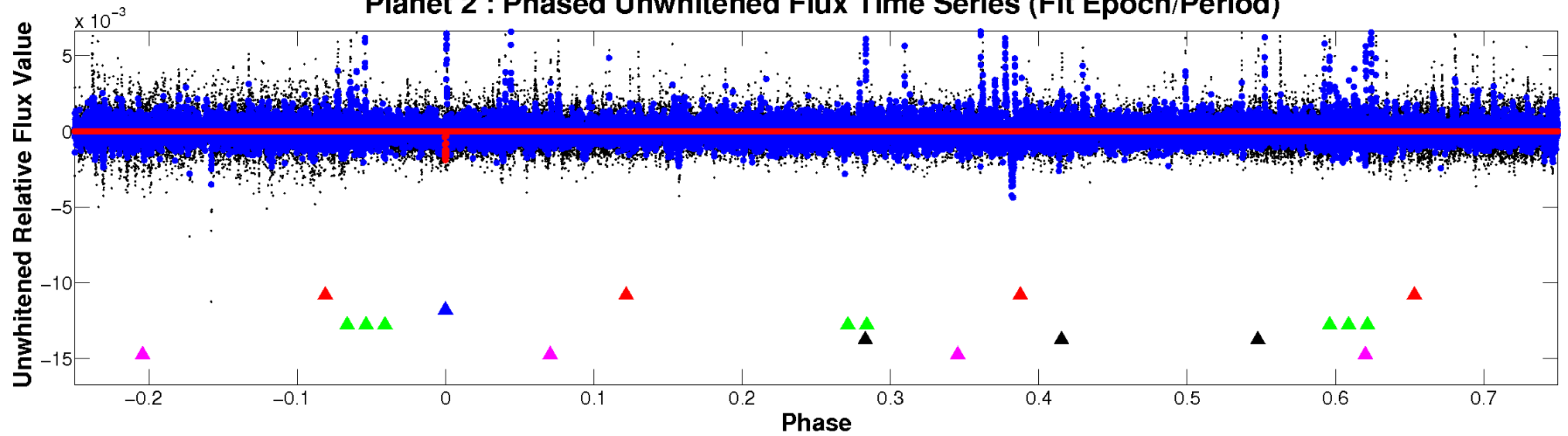
ALT Odd/Even

TCE 002438151-02

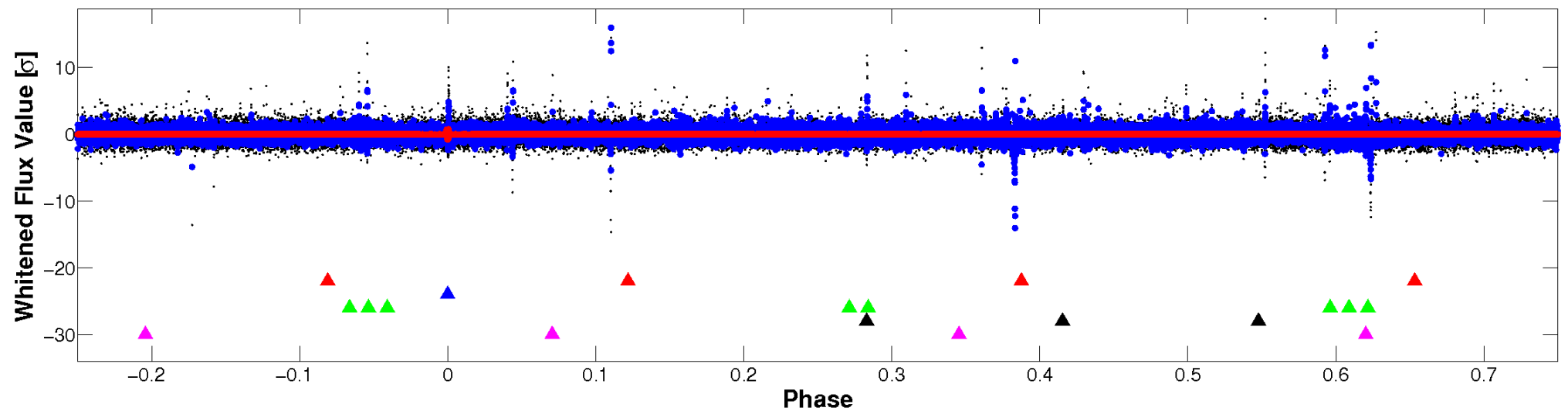


Non-Whitened Vs. Whitened Light Curve

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

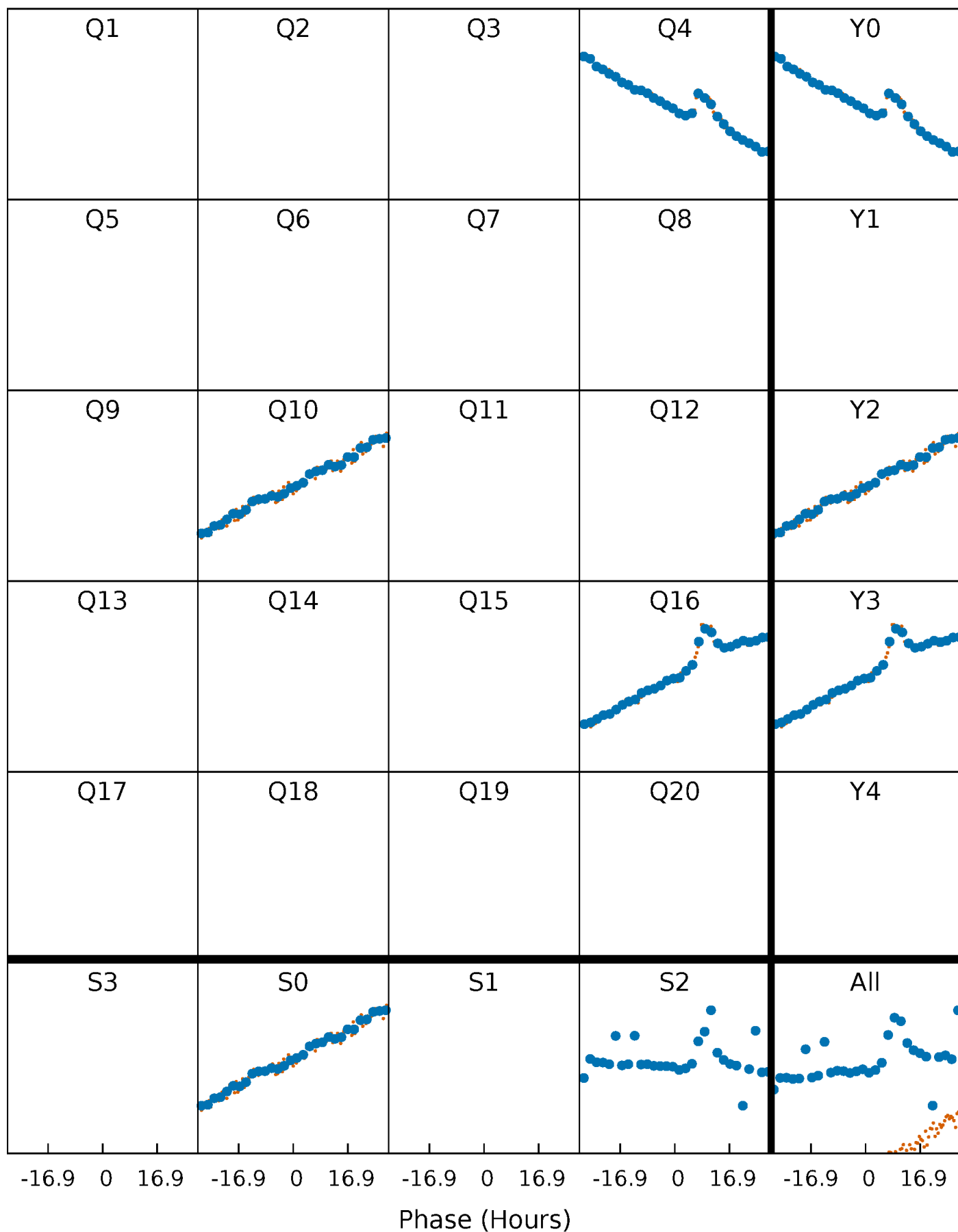


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



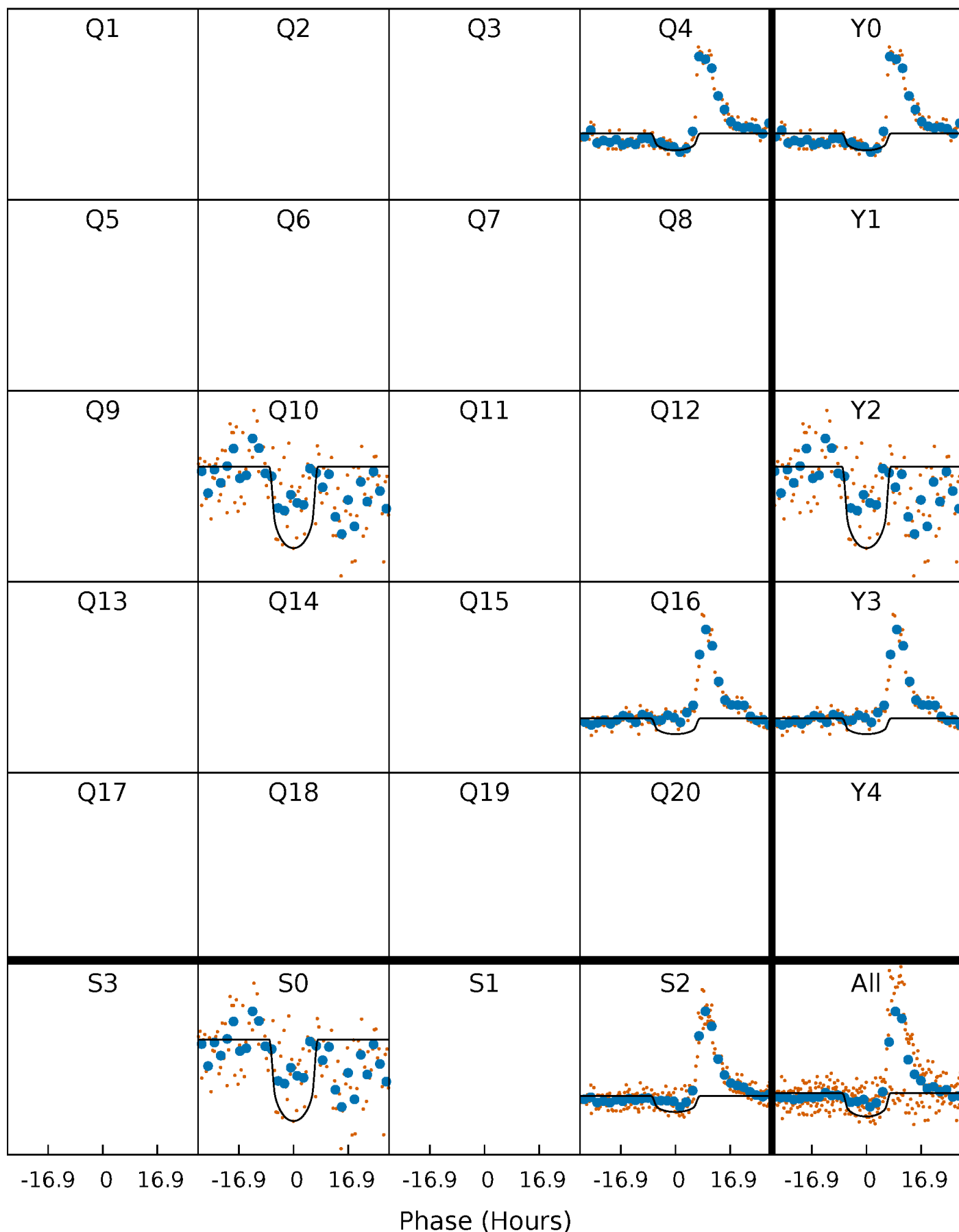
PDC Quarter-Phased Transit Curves

TCE 002438151-02 P=559.284096 Days $T_0=388.227037$ (BKJD)



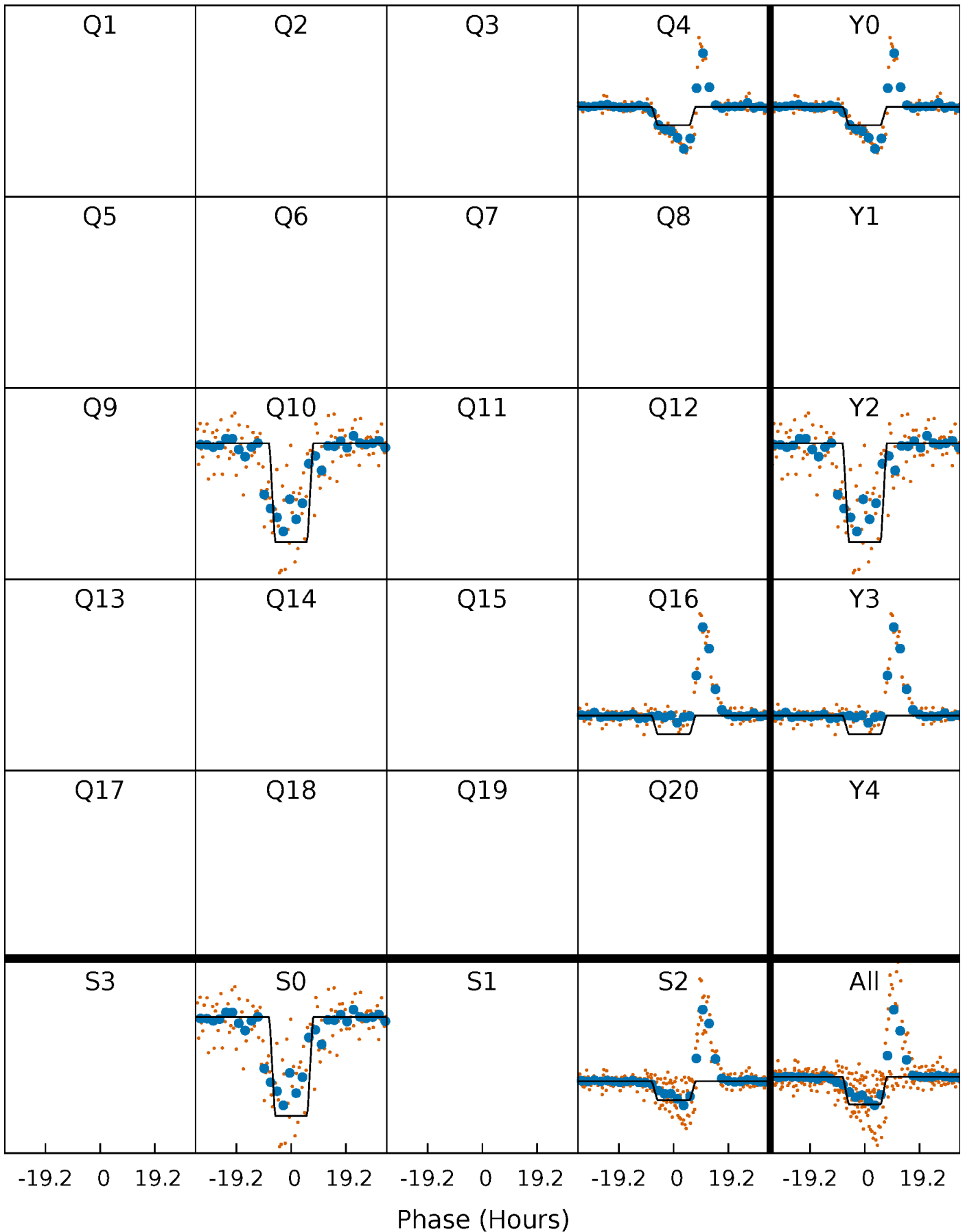
DV Quarter-Phased Transit Curves

TCE 002438151-02 P=559.284096 Days $T_0=388.227037$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

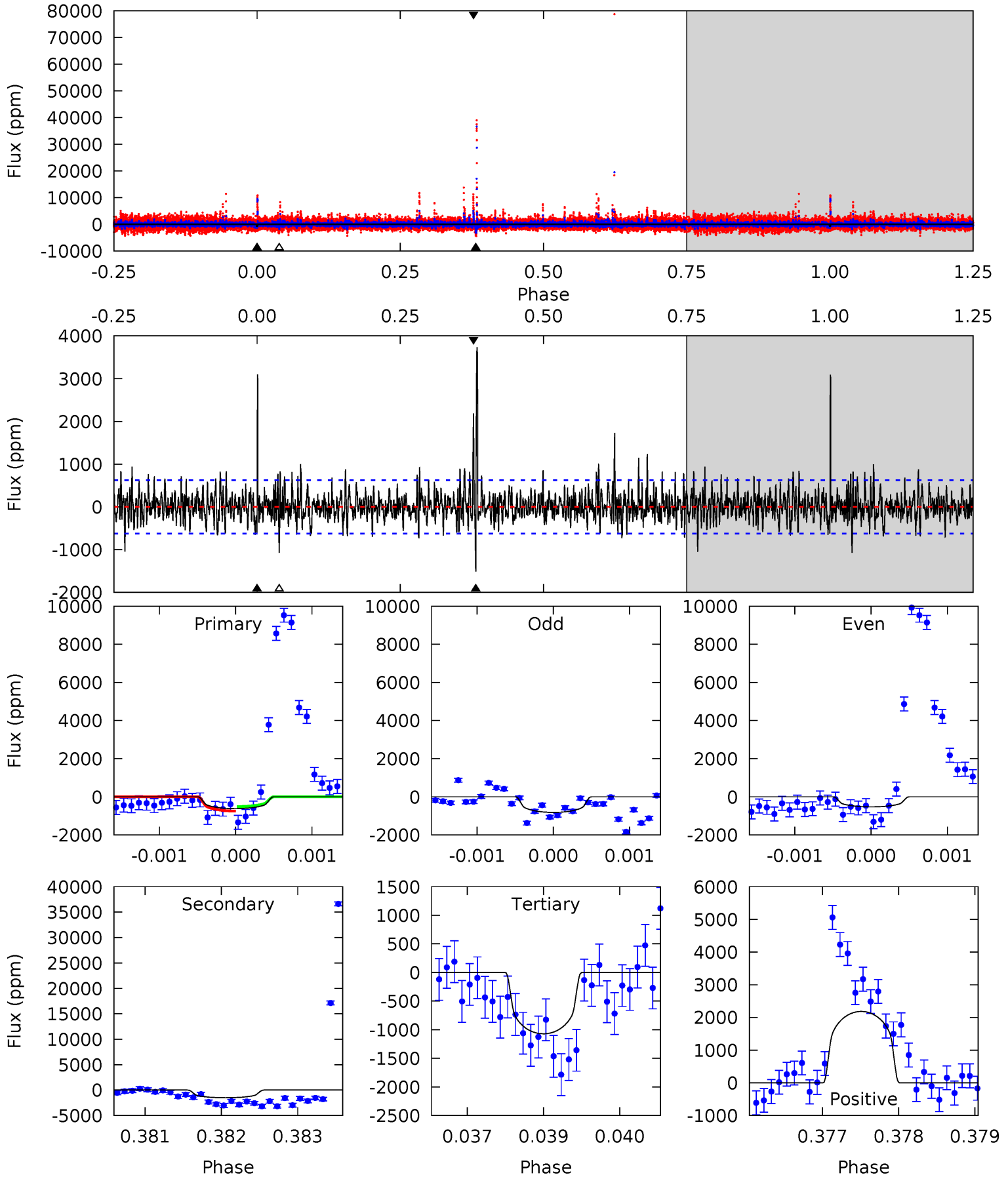
TCE 002438151-02 P=559.300593 Days $T_0=388.153773$ (BKJD)



DV Model-Shift Uniqueness Test

002438151-02, P = 559.284096 Days, E = 388.227037 Days

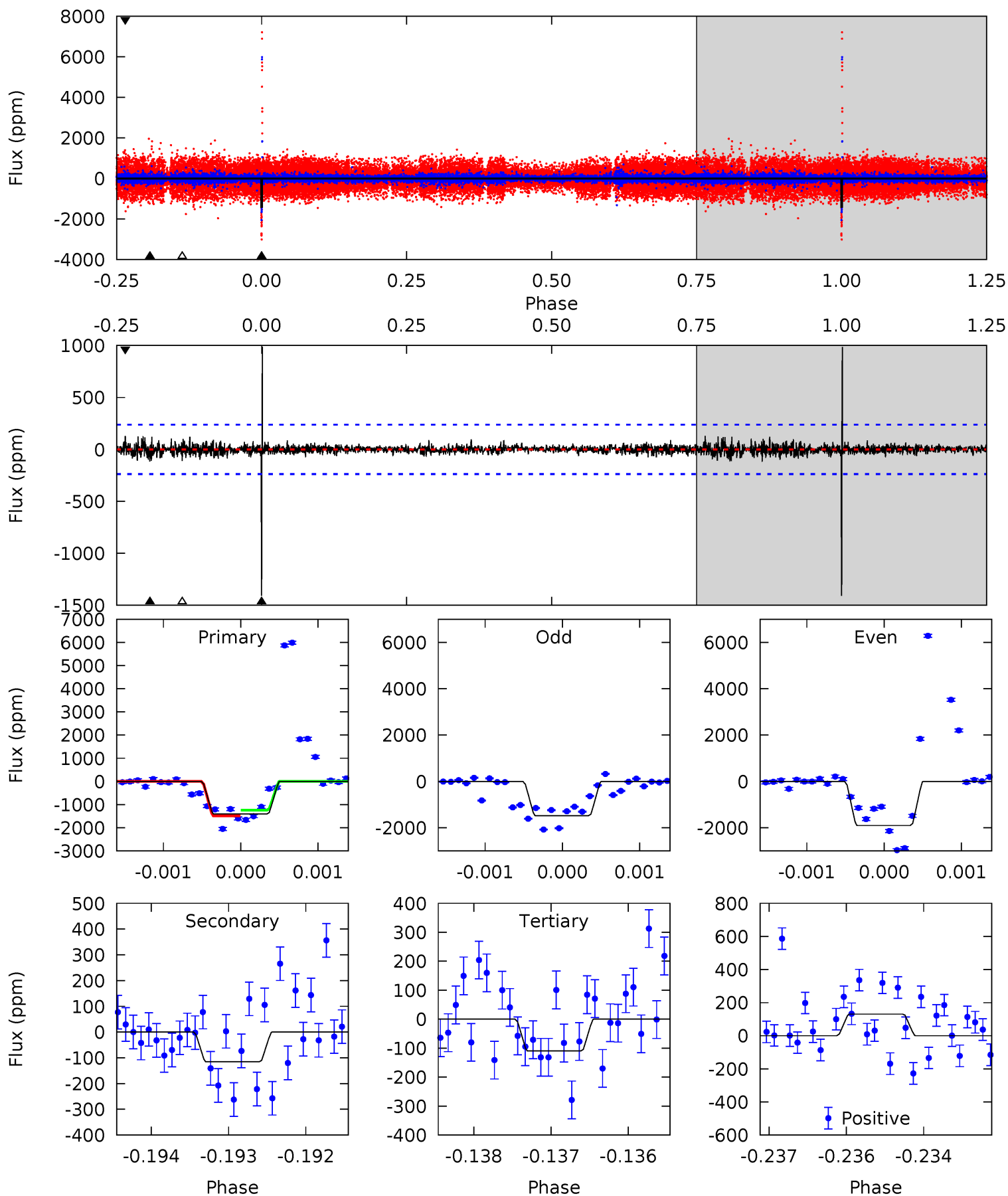
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.39	13.1	9.31	19.0	5.43	3.26	2.63	-3.92	-13.6	3.81	-5.86	0.94	0.76	0.71	1.01



Alt Model-Shift Uniqueness Test

002438151-02, P = 559.300593 Days, E = 388.153773 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.1	2.64	2.51	2.98	5.42	3.25	0.70	29.6	29.1	0.13	-0.34	5.33	1.14	0.41	2.89



Stellar Parameters For KIC 002438151

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4596^{+138}_{-138}	$4.590^{+0.056}_{-0.024}$	$-0.080^{+0.300}_{-0.300}$	$0.694^{+0.045}_{-0.060}$	$0.683^{+0.068}_{-0.056}$	$2.880^{+0.677}_{-0.310}$
	+3%/-3%	+1%/-1%	+375%/-375%	+6%/-9%	+10%/-8%	+23%/-11%
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 002438151-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1510 ± 115	$3.31^{+0.55}_{-0.56}$	217^{+7}_{-8}	4396^{+352}_{-298}	104939^{+49317}_{-29314}
Alt.	-116 ± 44	$3.50^{+0.51}_{-0.60}$	216^{+7}_{-8}	2840^{+229}_{-198}	7045^{+4595}_{-2937}

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

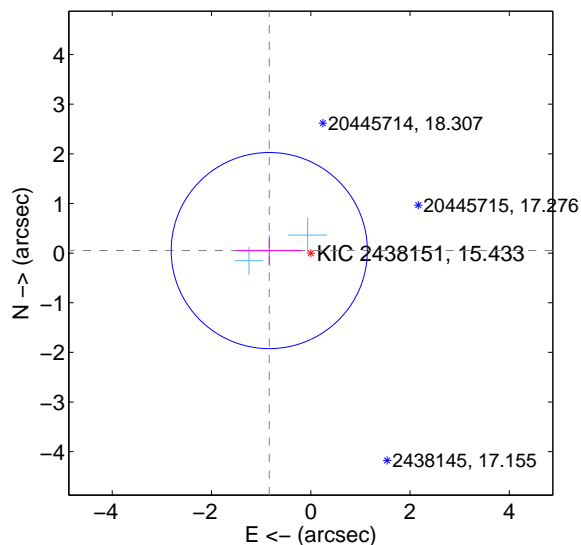
Supplemental centroid analysis for 002438151-02. Kepler magnitude: 15.43. Transit SNR 6.82

There are 2 quarters with good PRF difference image offsets

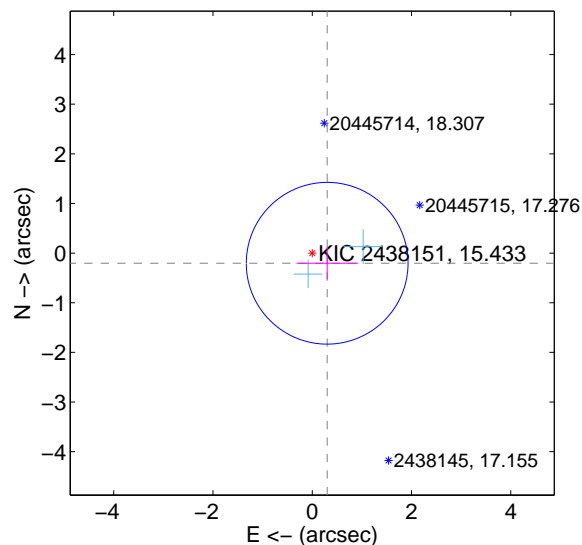
The direct PRF centroid is offset from the target star catalog position by about 1.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.837 ± 0.658	1.27	0.836 ± 0.659	0.051 ± 0.303
PRF-fit source offset from KIC position	0.364 ± 0.543	0.67	-0.301 ± 0.619	-0.205 ± 0.323
photometric centroid source offset	1.35 ± 0.90	1.50	-1.24 ± 0.96	-0.53 ± 0.53

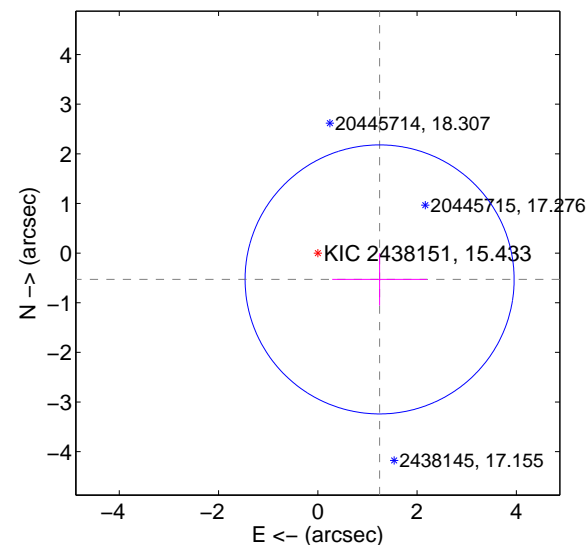
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

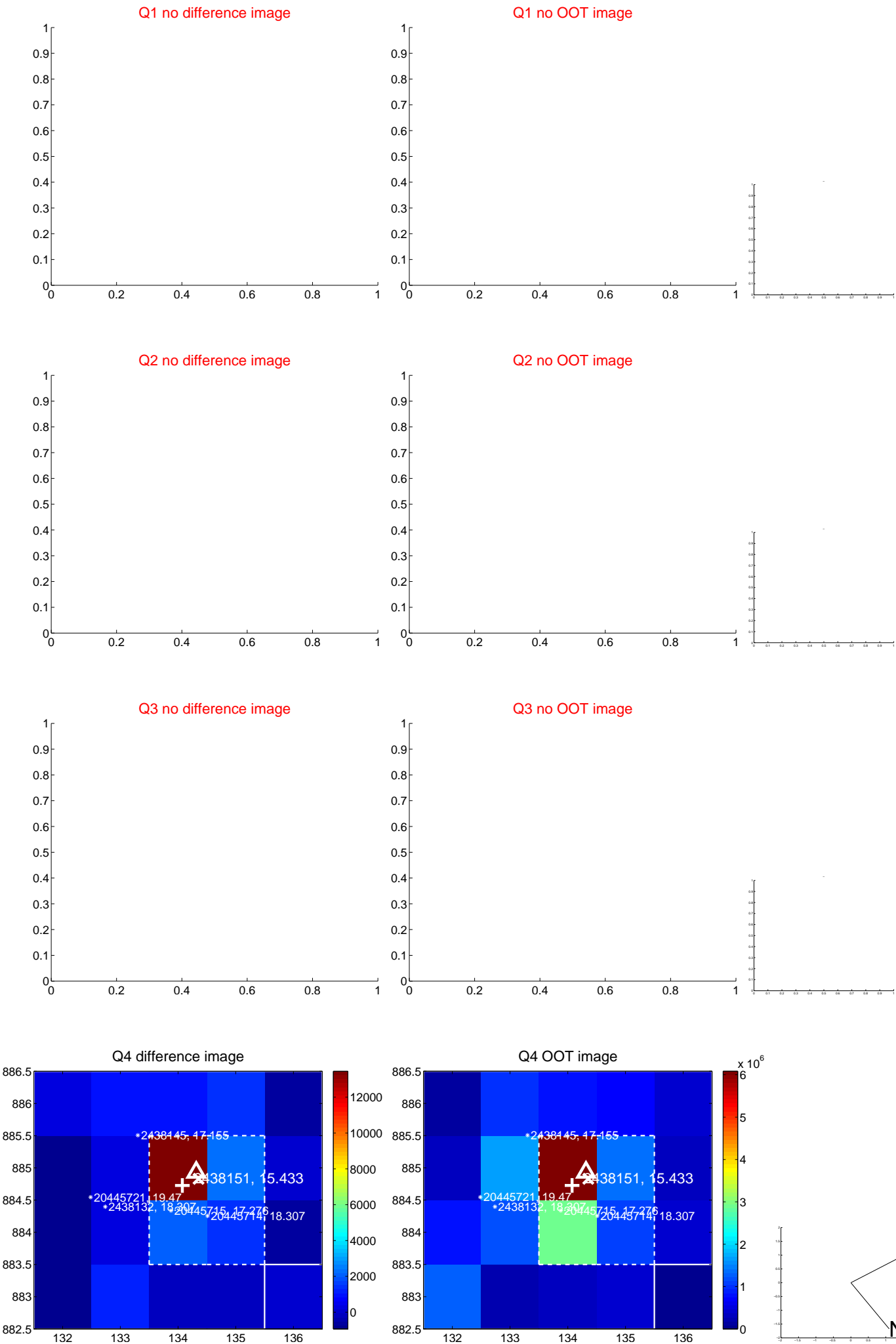


offset from photometric centroids



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.

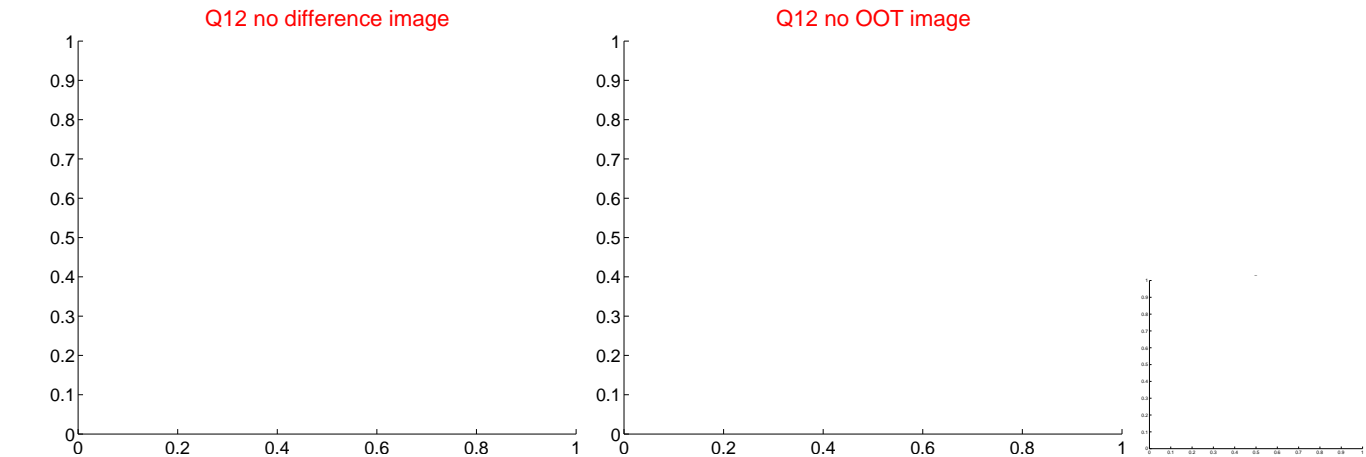
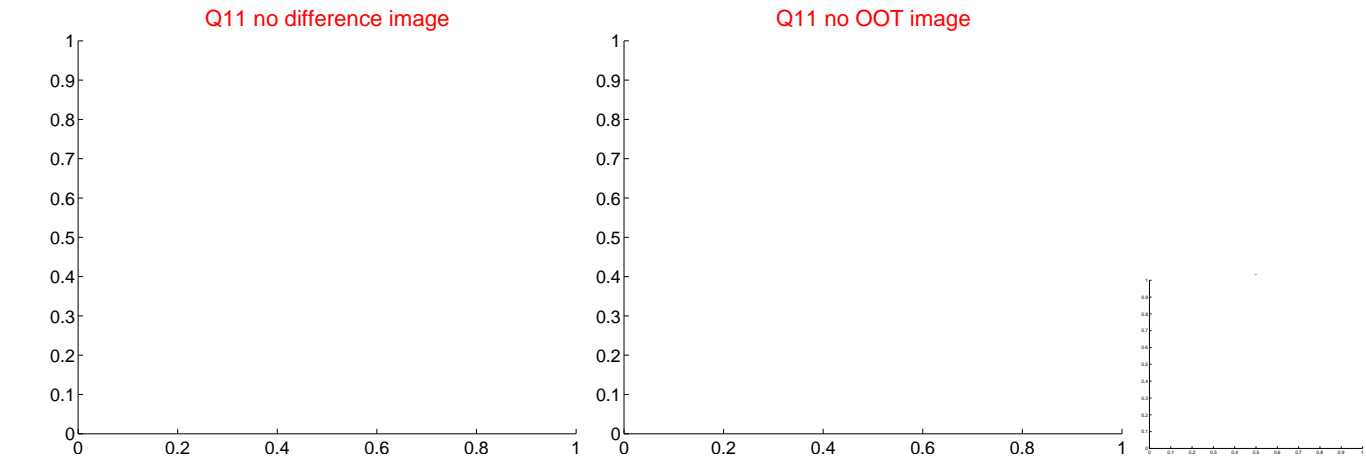
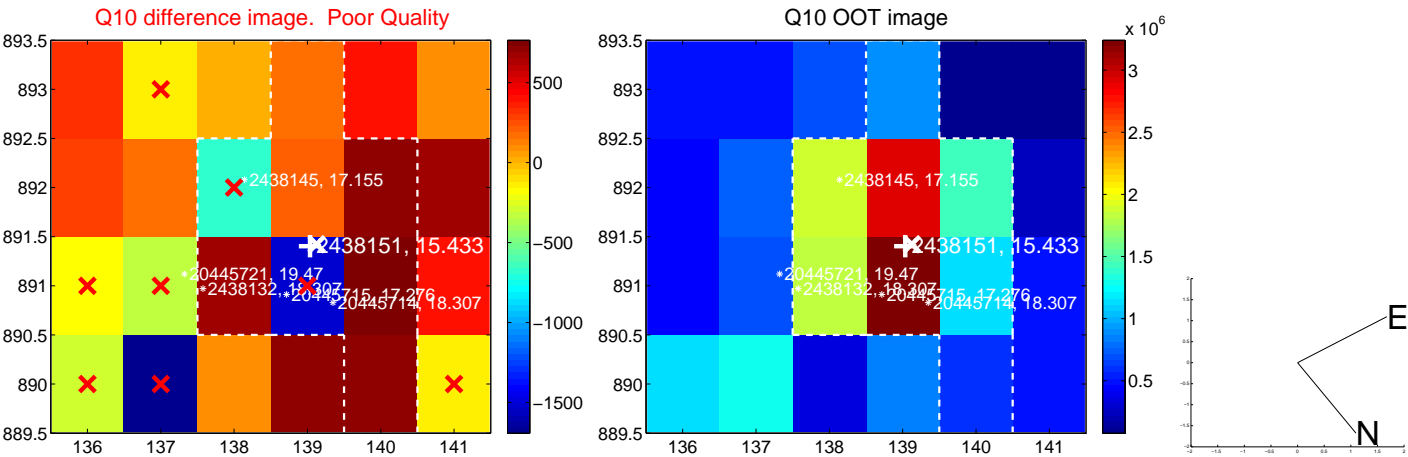
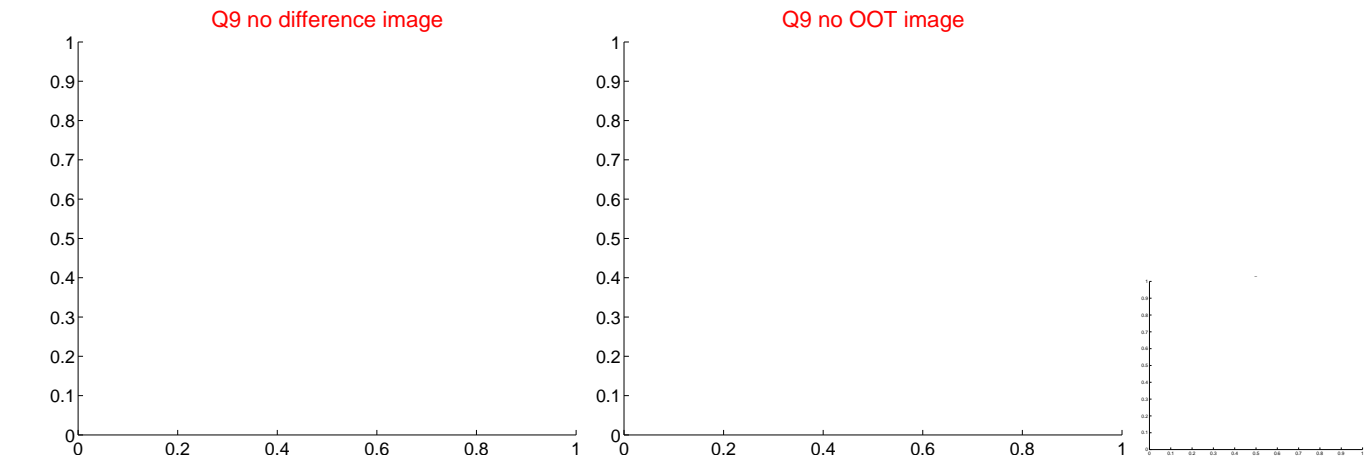
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



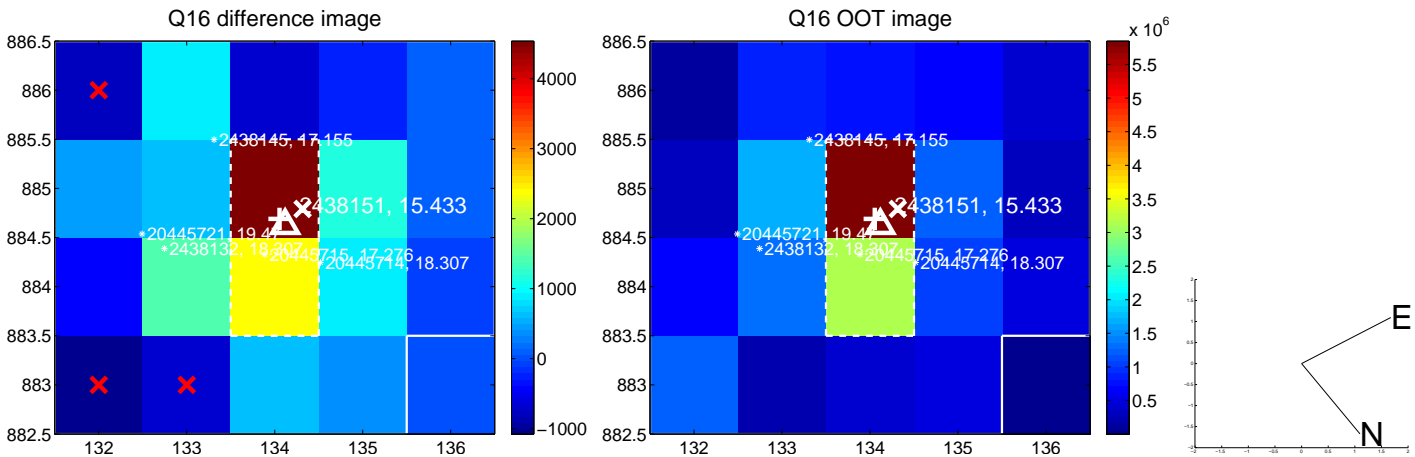
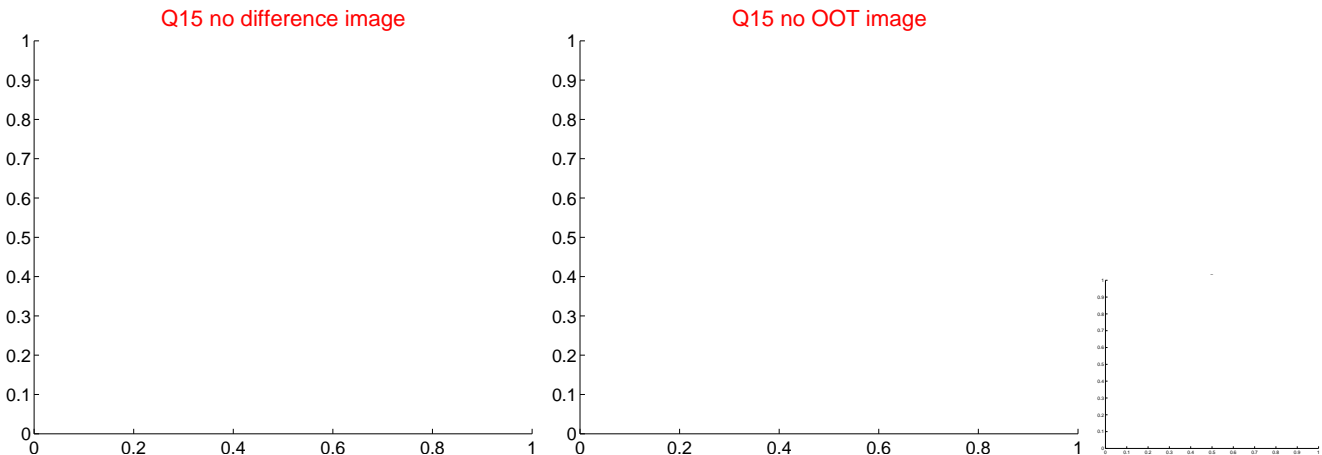
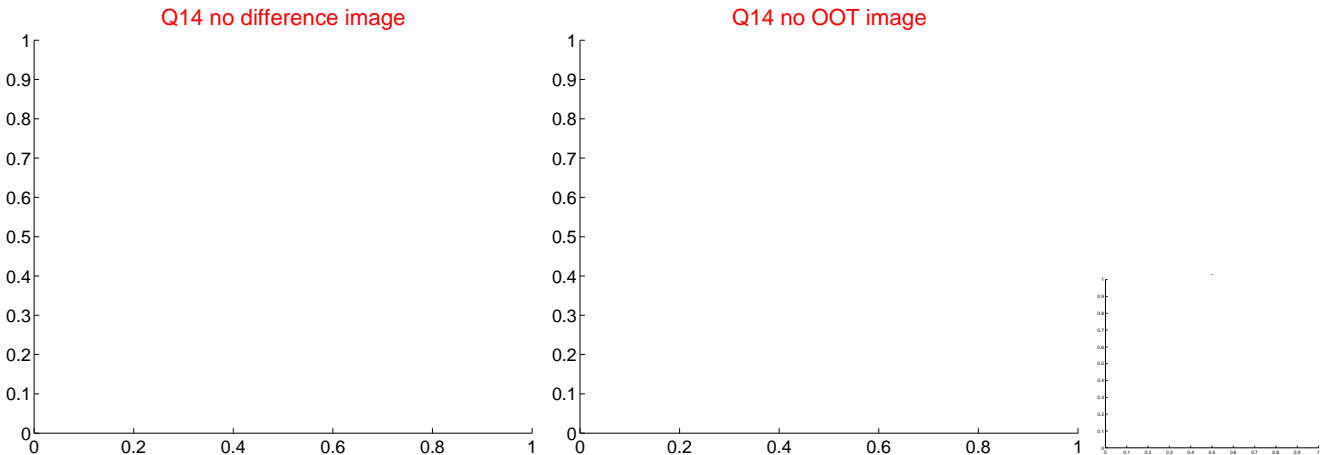
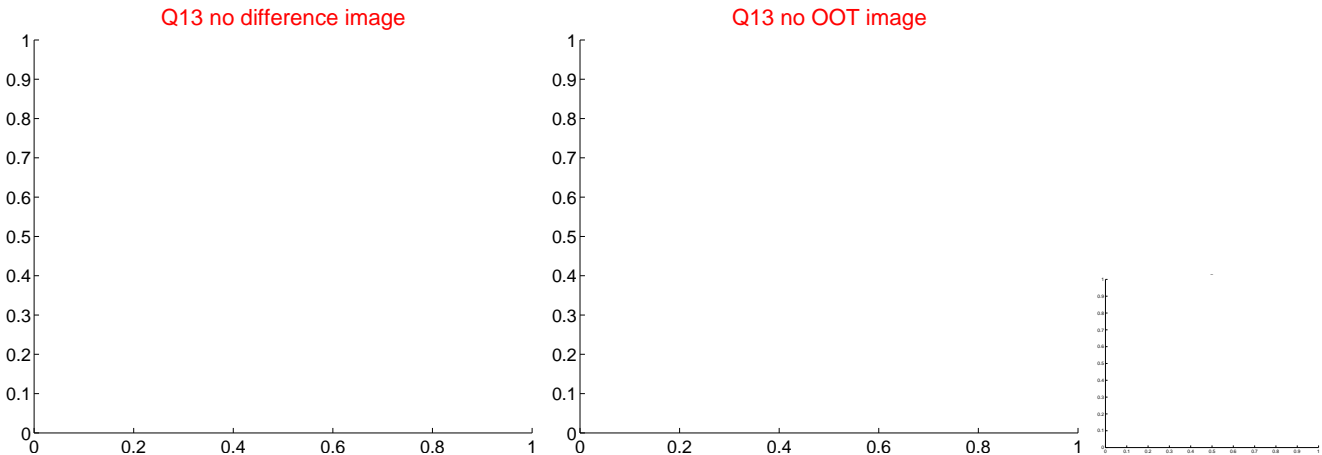
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



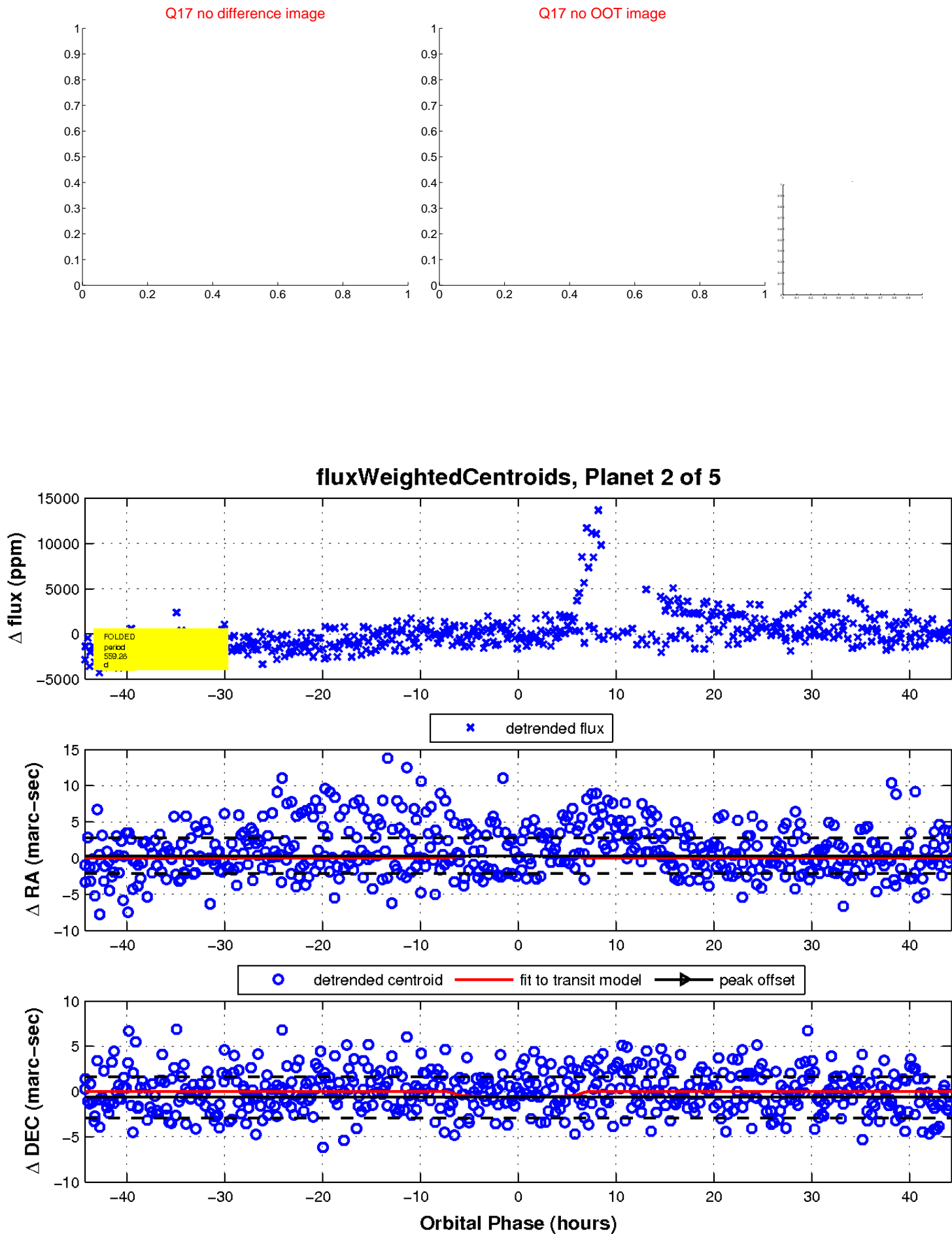
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

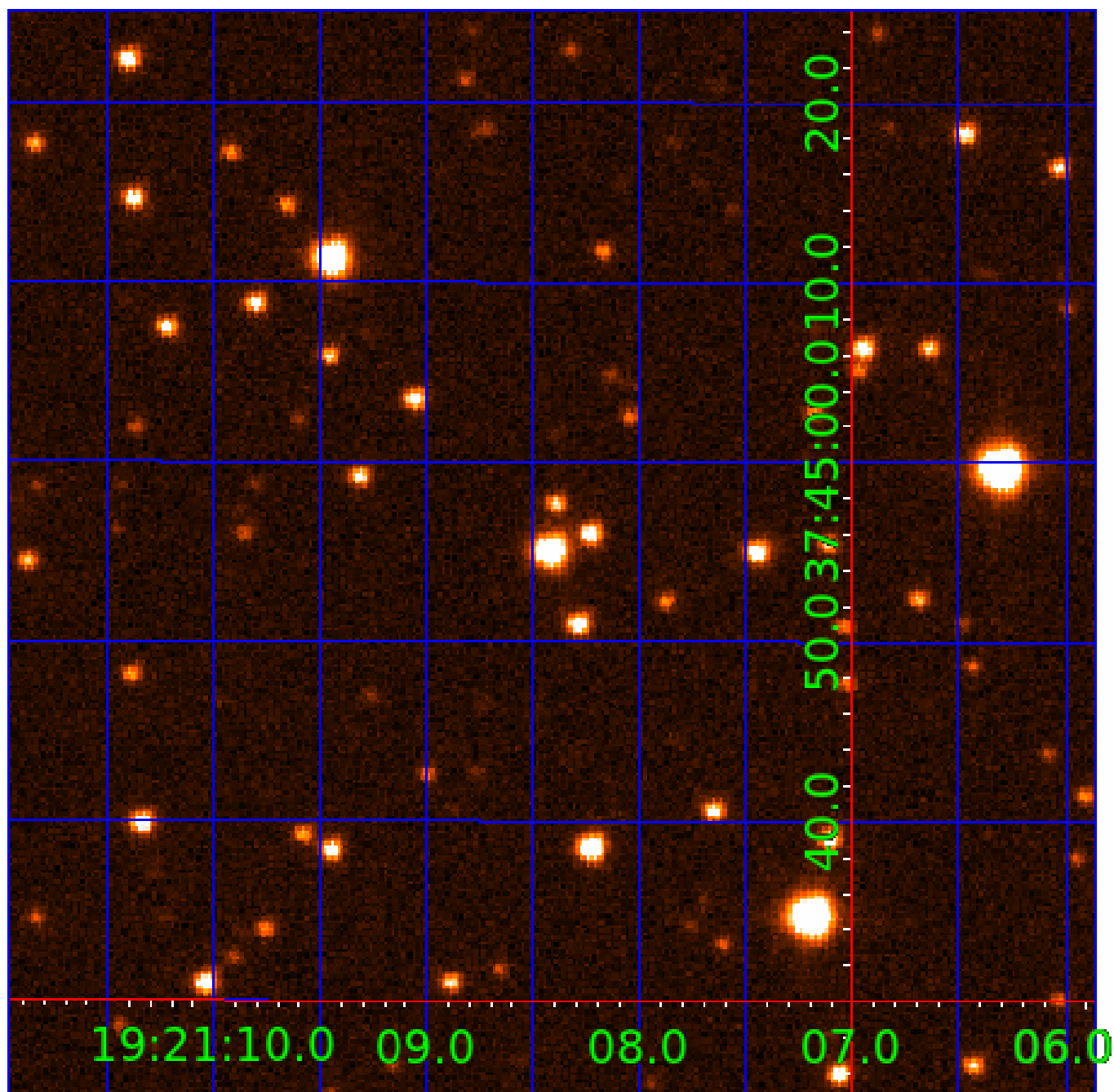


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002438151

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})
002438151-01	OBS	No	410.674316	342.919392	2185.2	15.554	16.1	8.0	0.69	4596	3.99	0.21
002438151-02	OBS	No	559.284096	388.227037	1913.6	14.780	14.6	6.8	0.69	4596	3.36	0.14
002438151-03	OBS	No	188.804844	162.355500	869.7	2.366	15.1	1.9	0.69	4596	2.53	0.60
002438151-04	OBS	No	485.277028	135.261826	2441.4	4.001	10.8	9.2	0.69	4596	3.29	0.17
002438151-05	OBS	No	405.596824	175.811091	1949.5	4.523	11.2	6.7	0.69	4596	3.91	0.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438151-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
002438151-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—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.

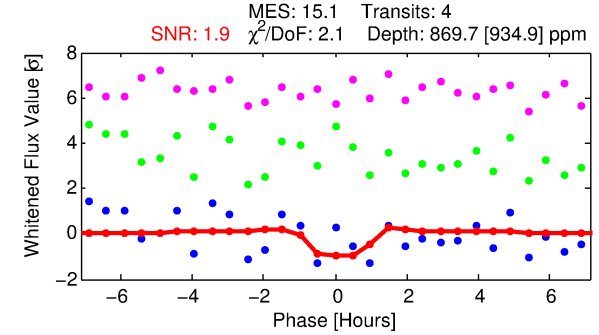
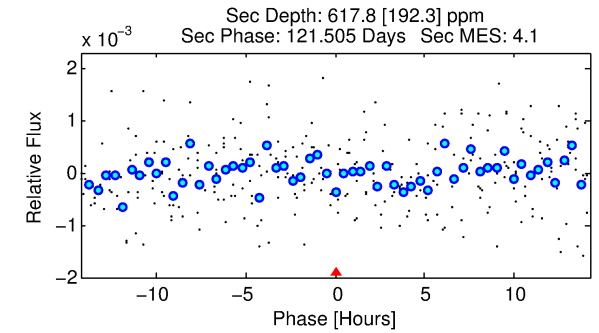
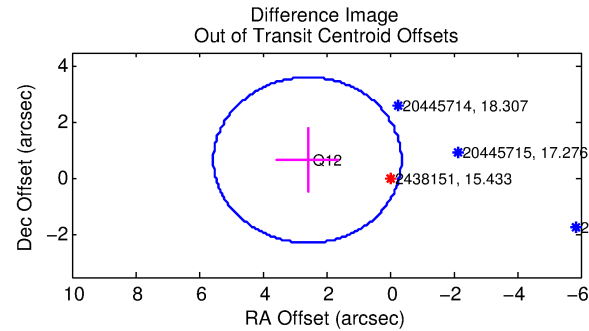
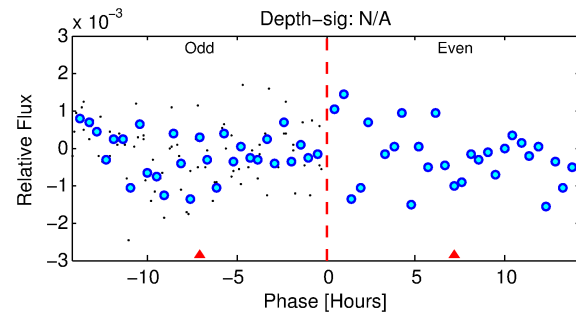
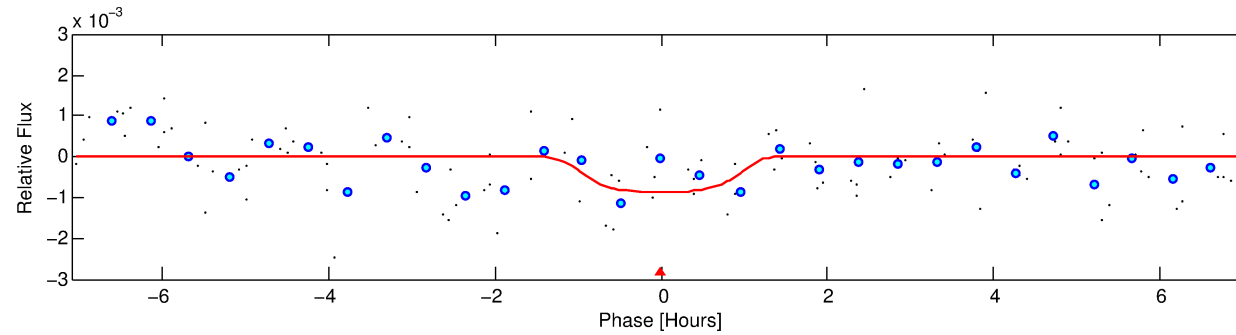
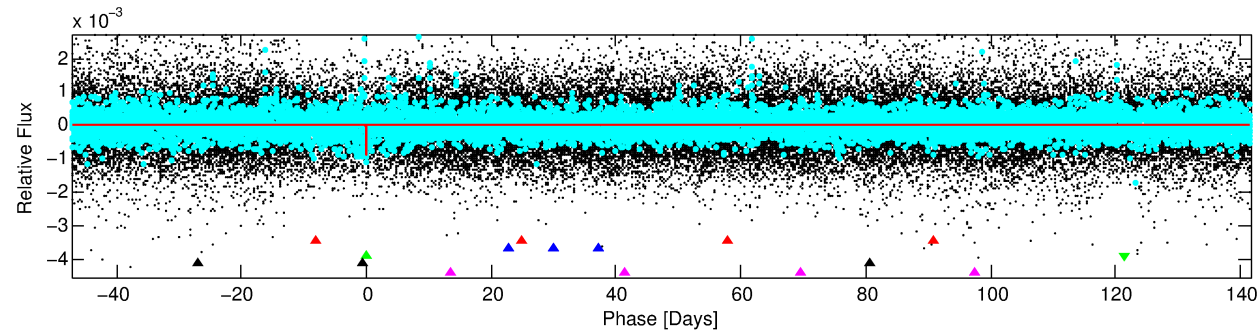
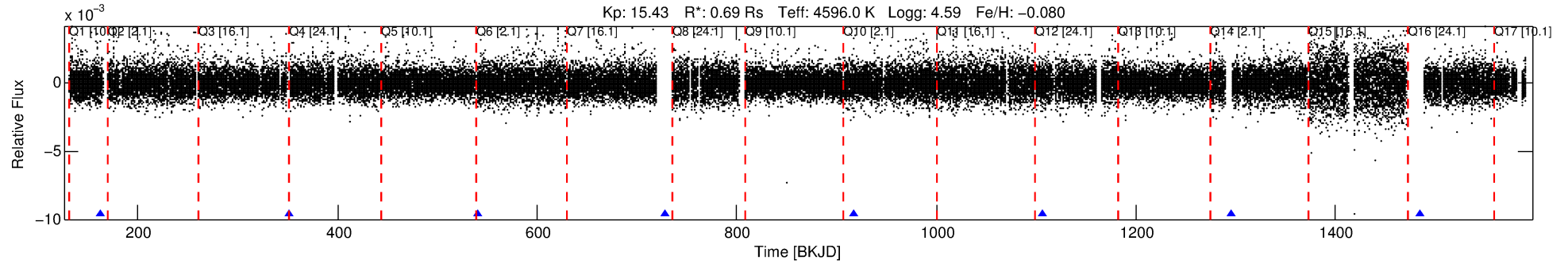
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002438151-03

No Significant Match Found

DV One-Page Summary

KIC: 2438151 Candidate: 3 of 5 Period: 188.805 d



DV Fit Results:

Period = 188.80484 [0.02964] d
Epoch = 162.3555 [0.0320] BKJD
Rp/R* = 0.0334 [0.1006]
a/R* = 309.39 [3106.82]
b = 0.90 [2.21]
Seff = 0.60 [0.09]
Teq = 224 [9] K
Rp = 2.53 [7.62] Re
a = 0.5675 [0.0408] AU
Ag = 17143.84 [103573.84] [0.17σ]
Teffp = 3967 [5992] K [0.62σ]

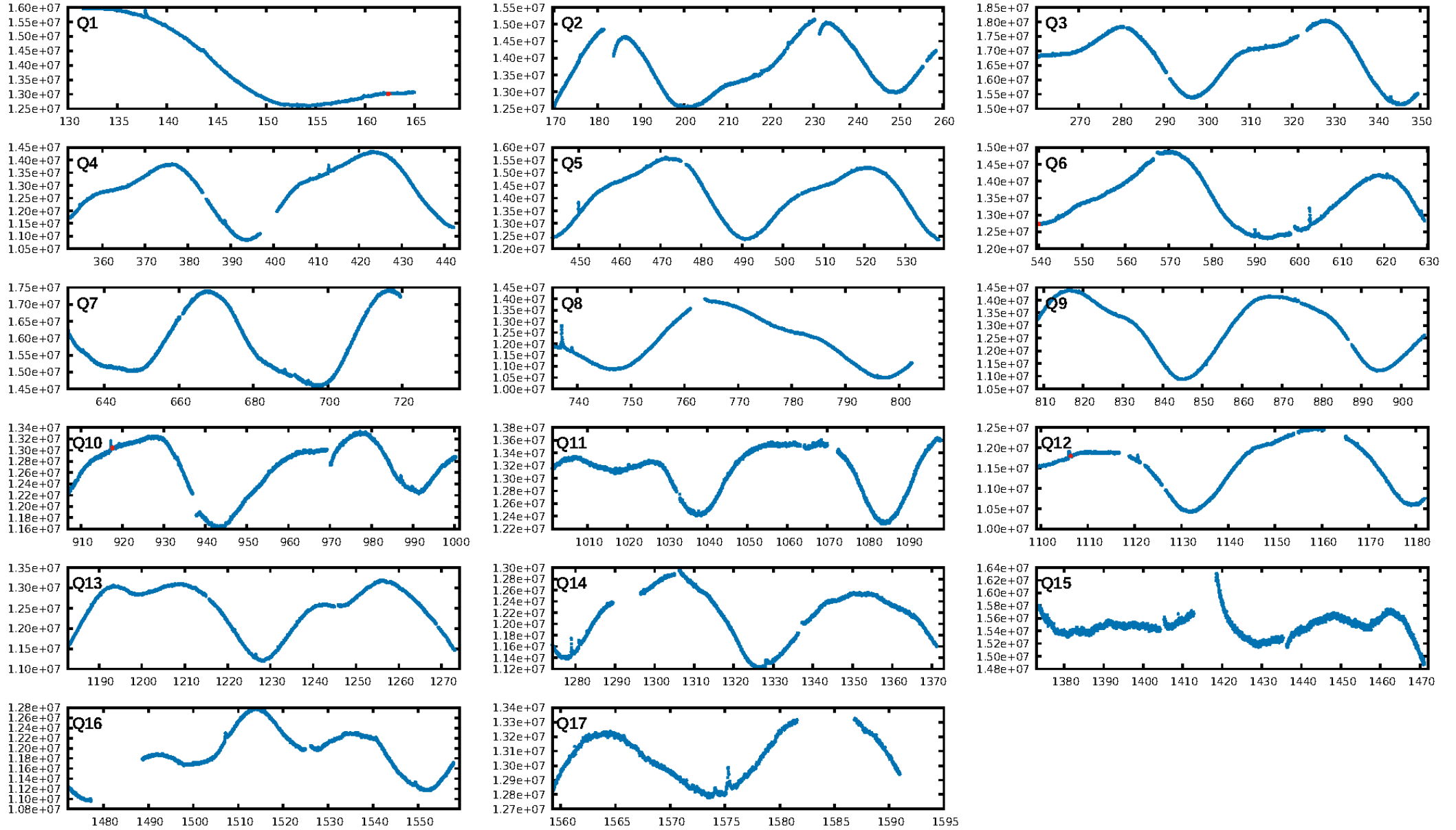
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1019.28σ]
ModelChiSquare2-sig: 23.7%
ModelChiSquareGof-sig: 72.8%
Bootstrap-pfa: 2.82e-24
RollingBand-ftg: 1.00 [3/3]
GhostDiagnostic-chr: 1.192
Centroid-sig: 36.3%
Centroid-so: 2.026 arcsec [0.80σ]
OotOffset-rm: 2.670 arcsec [2.71σ]
KicOffset-rm: 1.790 arcsec [1.81σ]
OotOffset-st: 0/0/1/0 [1]
KicOffset-st: 0/0/1/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 1.00 [3/3]

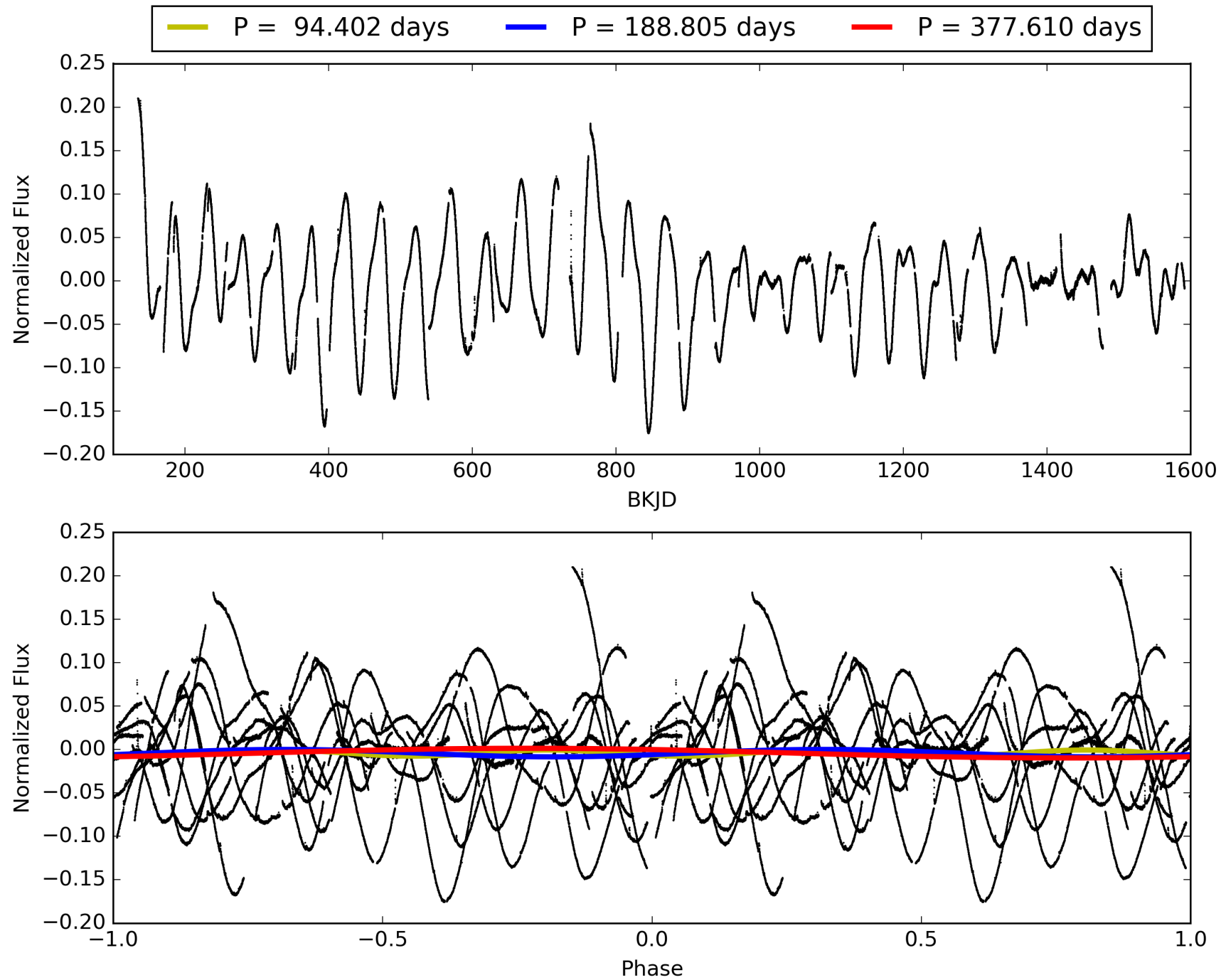
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:20:05 Z

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

TCE 002438151-03, PDC Light Curves

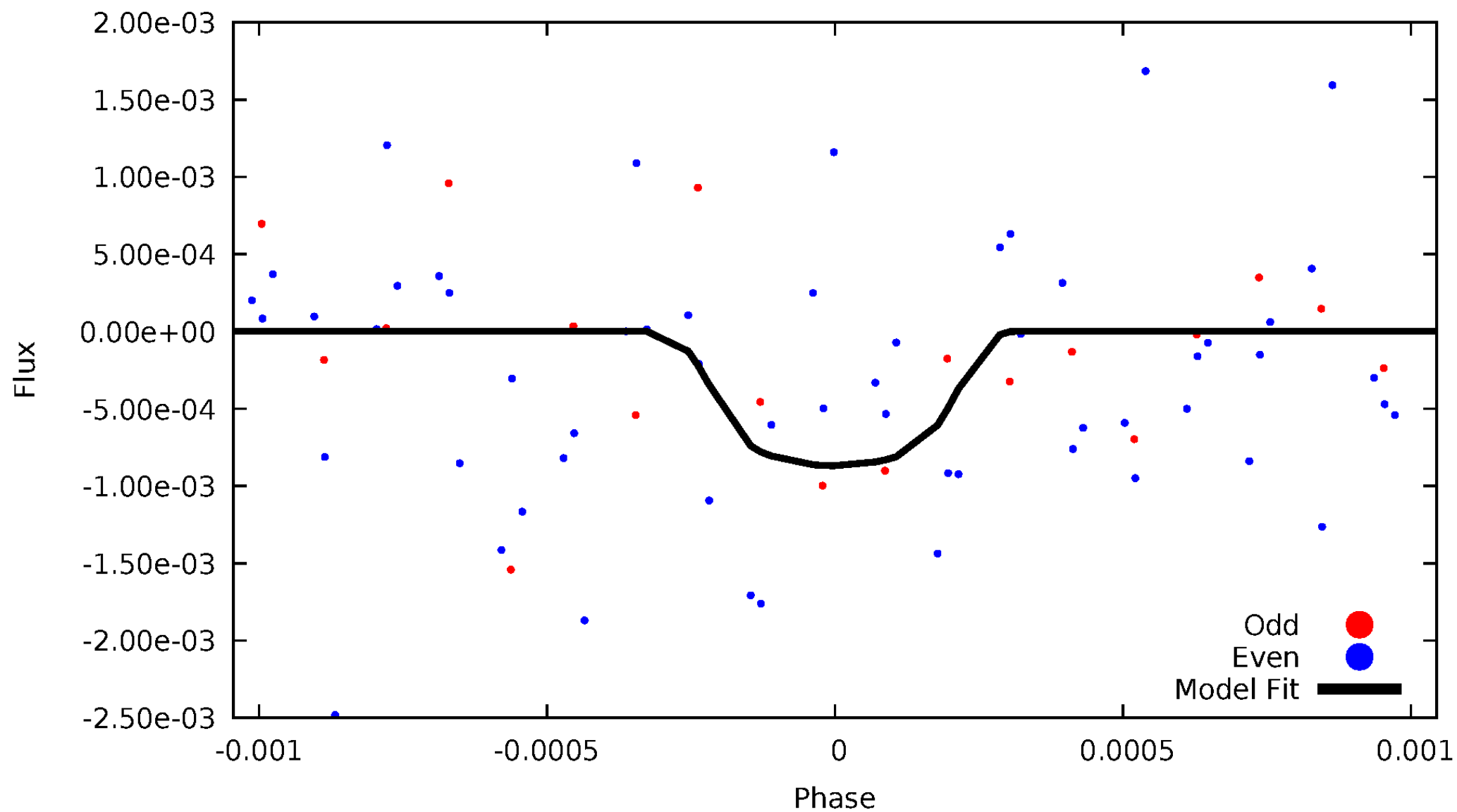


TCE 002438151-03



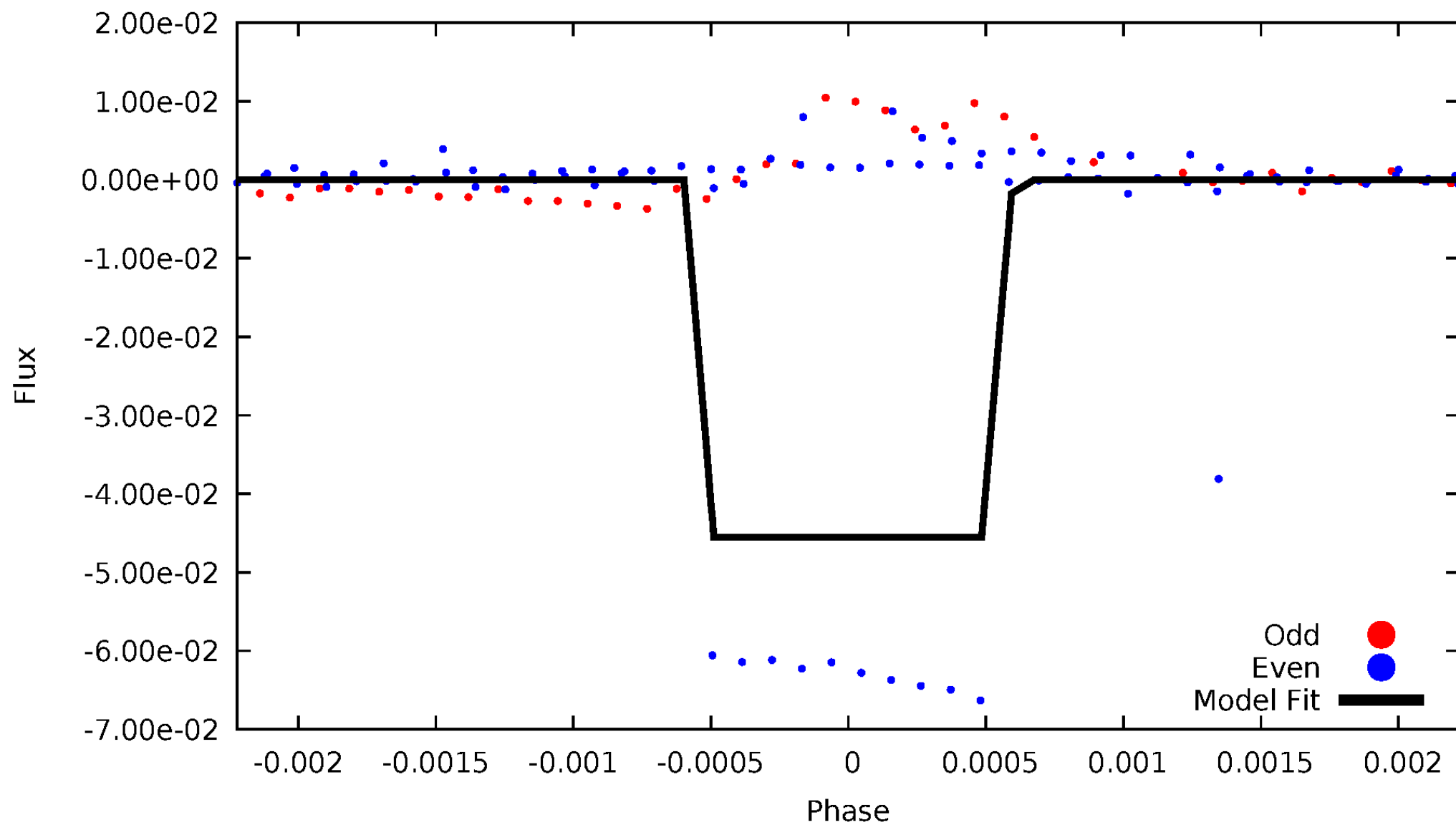
DV Odd/Even

TCE 002438151-03



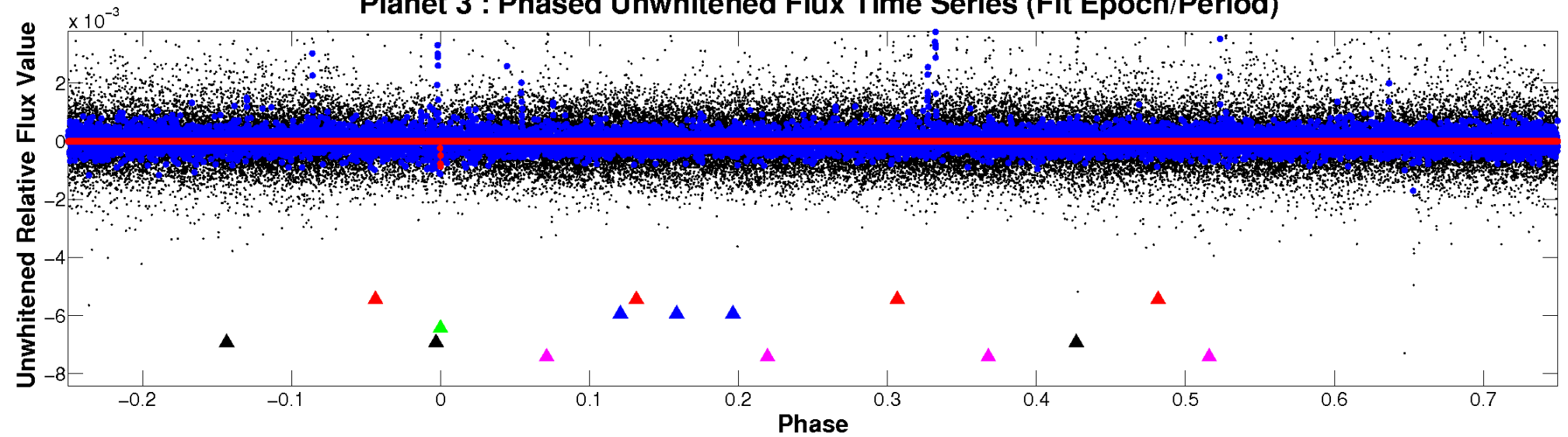
ALT Odd/Even

TCE 002438151-03

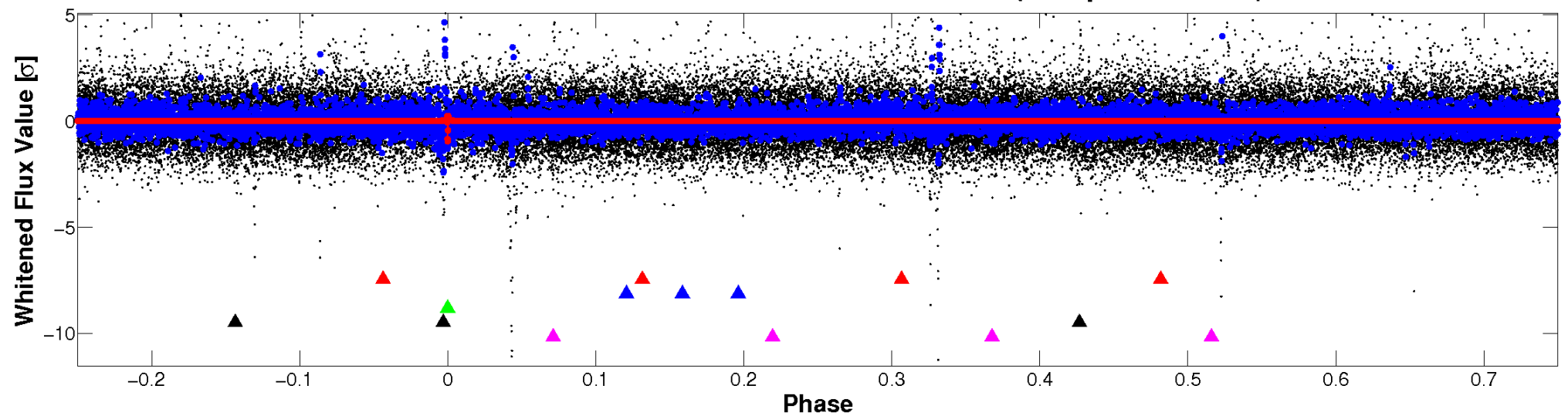


Non-Whitened Vs. Whitened Light Curve

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

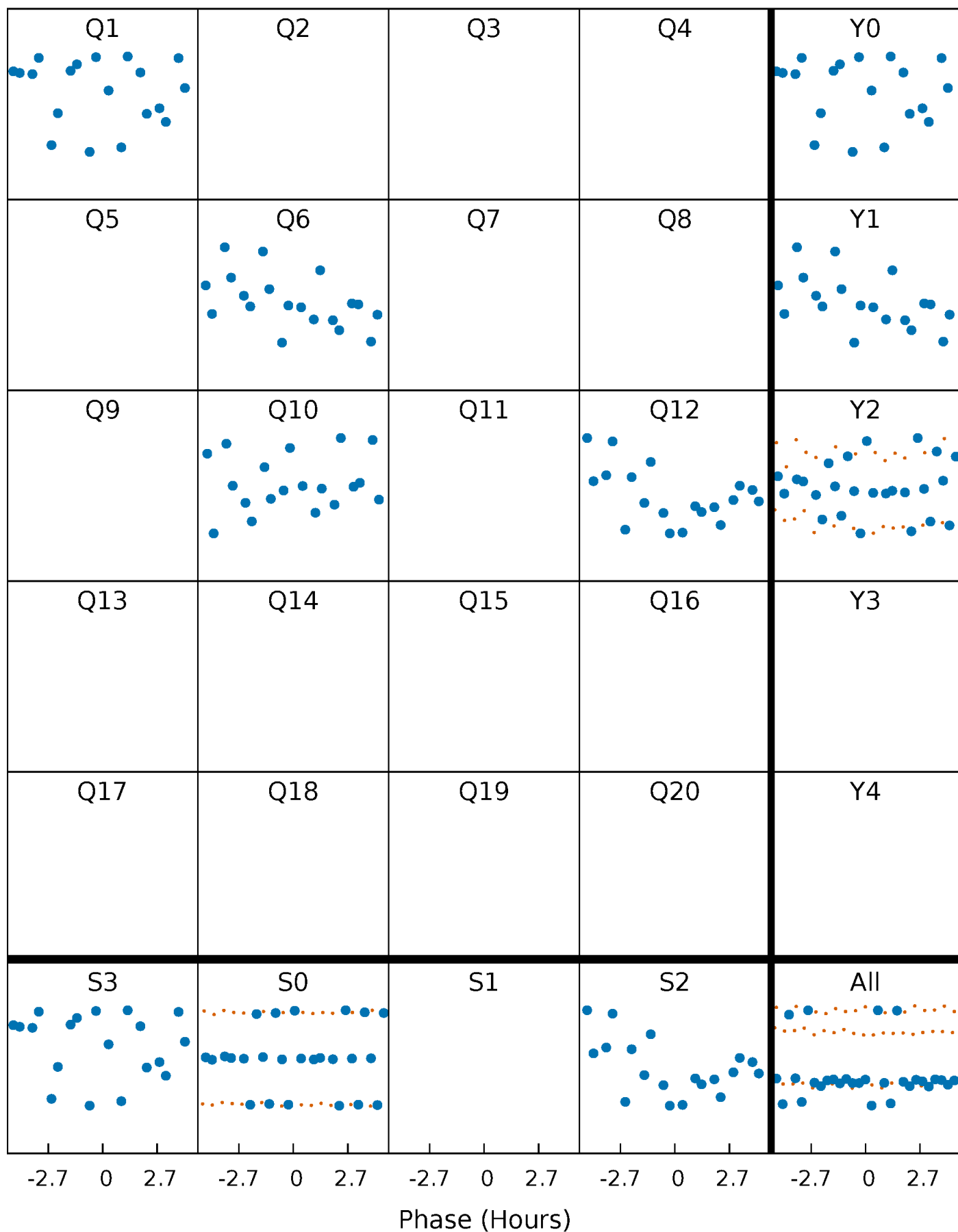


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



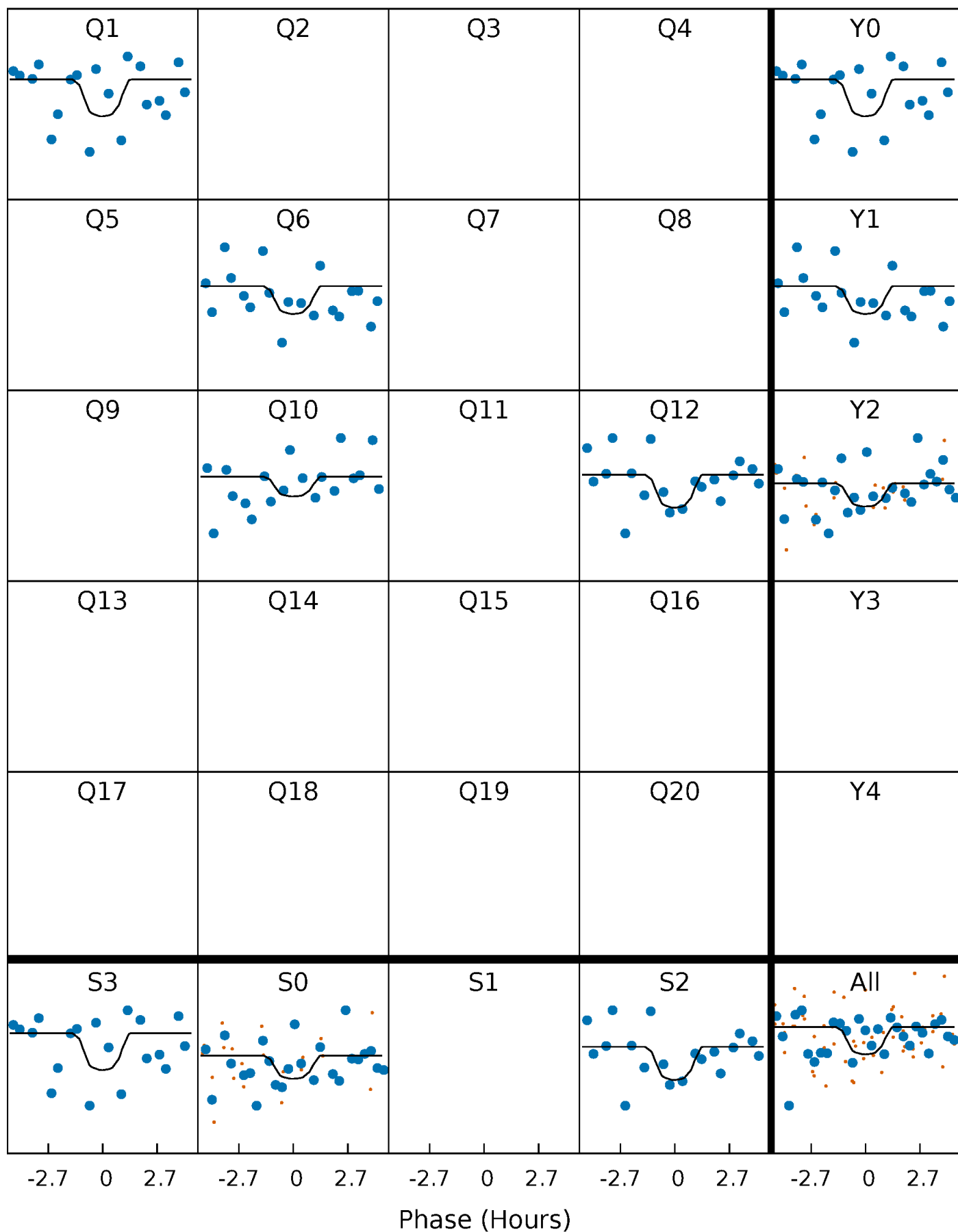
PDC Quarter-Phased Transit Curves

TCE 002438151-03 P=188.804844 Days $T_0=162.355500$ (BKJD)



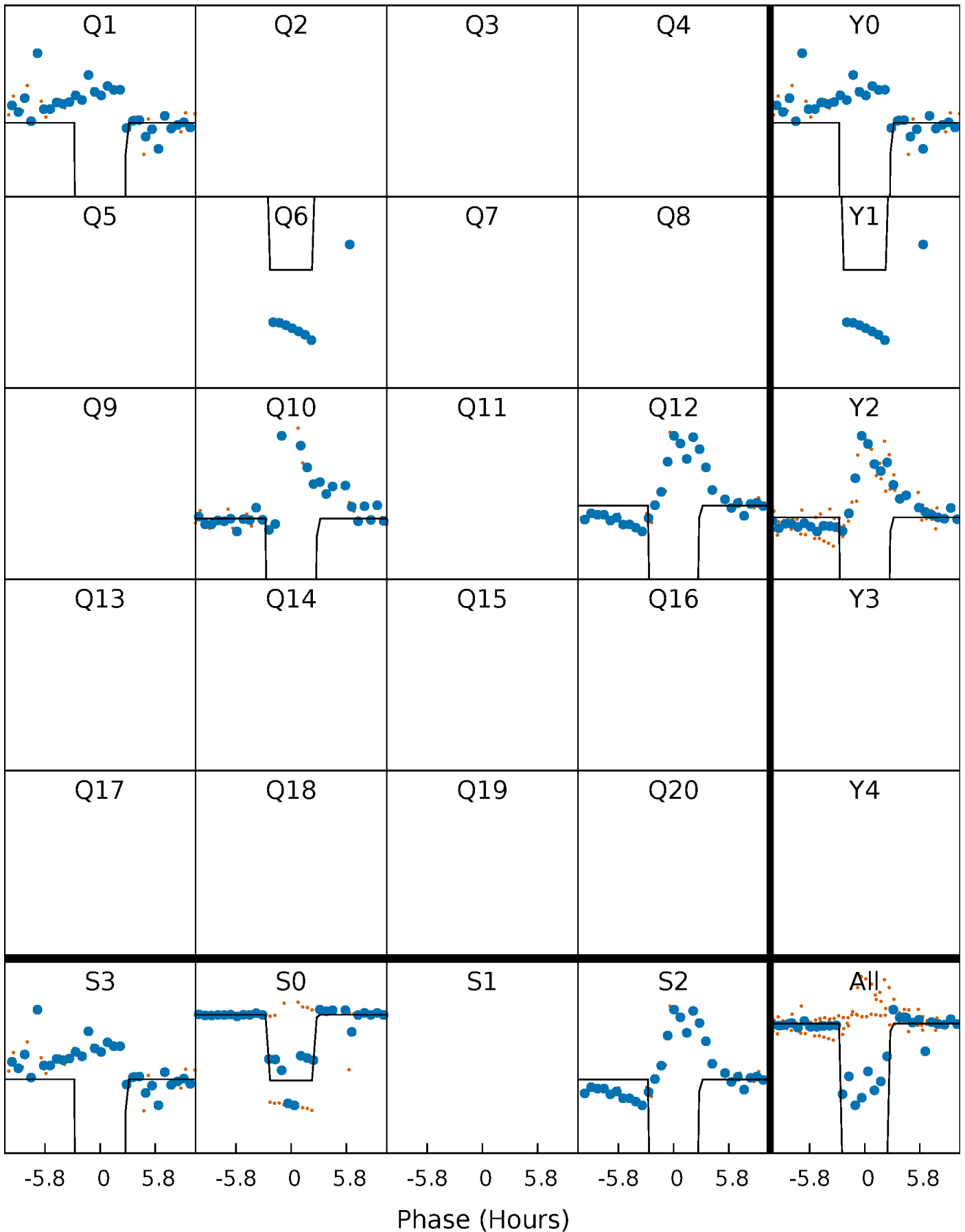
DV Quarter-Phased Transit Curves

TCE 002438151-03 P=188.804844 Days $T_0=162.355500$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

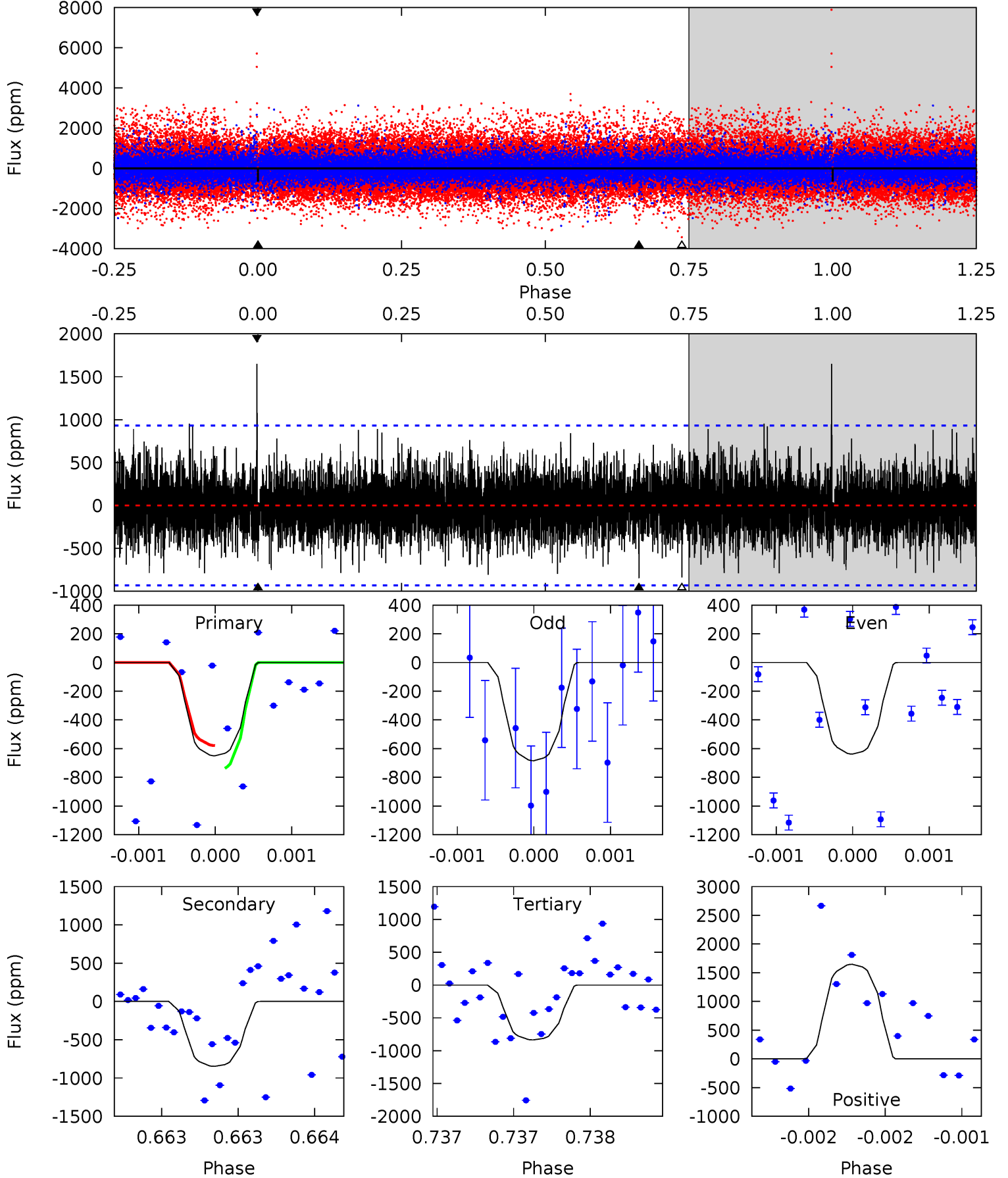
TCE 002438151-03 P=188.765227 Days $T_0=162.135977$ (BKJD)



DV Model-Shift Uniqueness Test

002438151-03, P = 188.804844 Days, E = 162.355500 Days

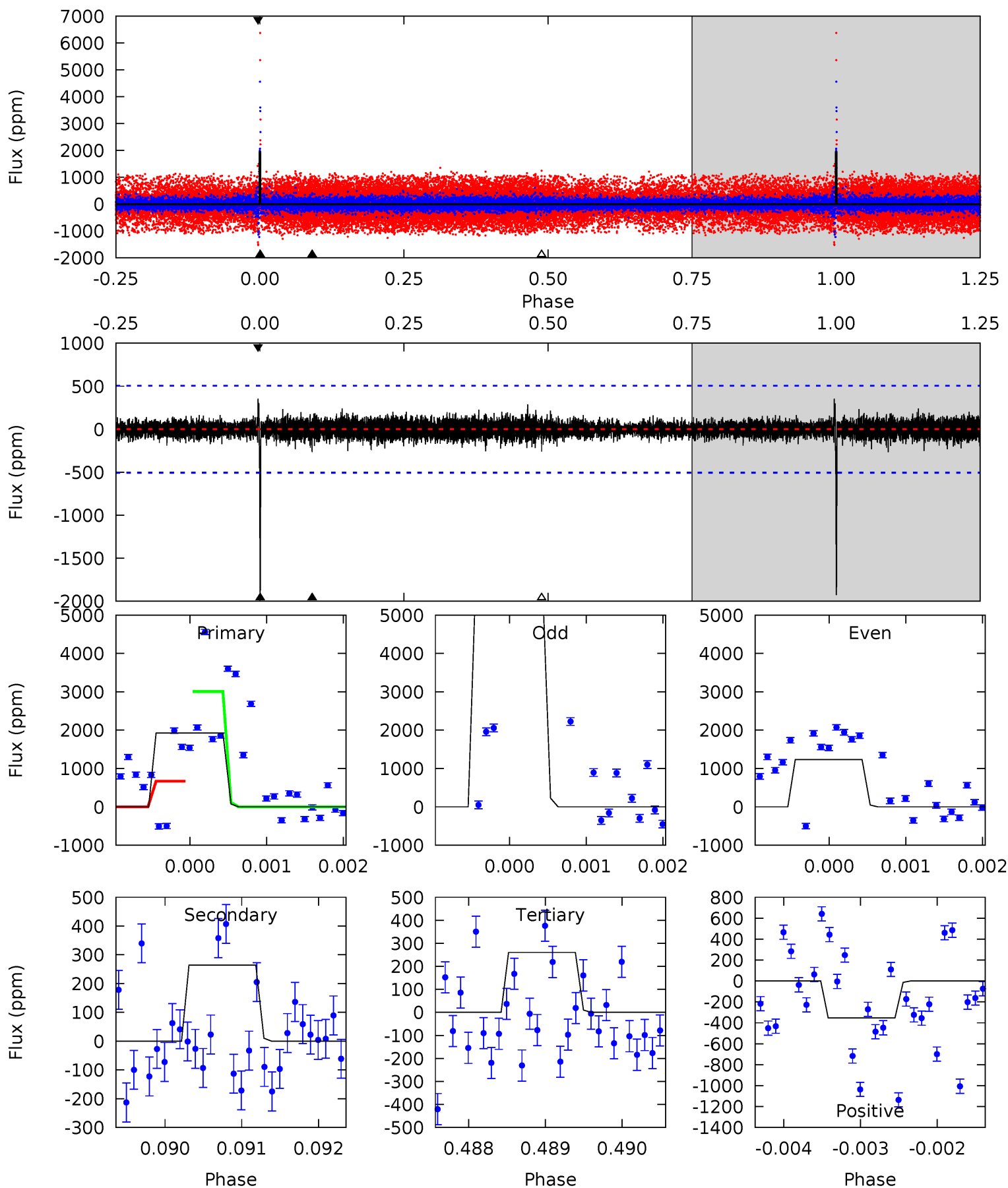
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.89	5.07	5.00	9.85	5.56	3.46	1.38	-1.11	-5.96	0.07	-4.78	0.12	0.88	0.66	0.48



Alt Model-Shift Uniqueness Test

002438151-03, P = 188.765227 Days, E = 162.135977 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.7	2.84	2.80	3.78	5.43	3.26	0.60	17.9	16.9	0.04	-0.94	29.3	-4.33	0.15	0



Stellar Parameters For KIC 002438151

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4596^{+138}_{-138}	$4.590^{+0.056}_{-0.024}$	$-0.080^{+0.300}_{-0.300}$	$0.694^{+0.045}_{-0.060}$	$0.683^{+0.068}_{-0.056}$	$2.880^{+0.677}_{-0.310}$
	+3%/-3%	+1%/-1%	+375%/-375%	+6%/-9%	+10%/-8%	+23%/-11%
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 002438151-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-848 ± 167	$5.96^{+6.39}_{-4.19}$	311^{+11}_{-10}	3227^{+1859}_{-578}	4079^{+48258}_{-3069}
Alt.	-265 ± 93	$16.14^{+7.58}_{-7.30}$	310^{+11}_{-10}	2171^{+323}_{-207}	173^{+426}_{-103}

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

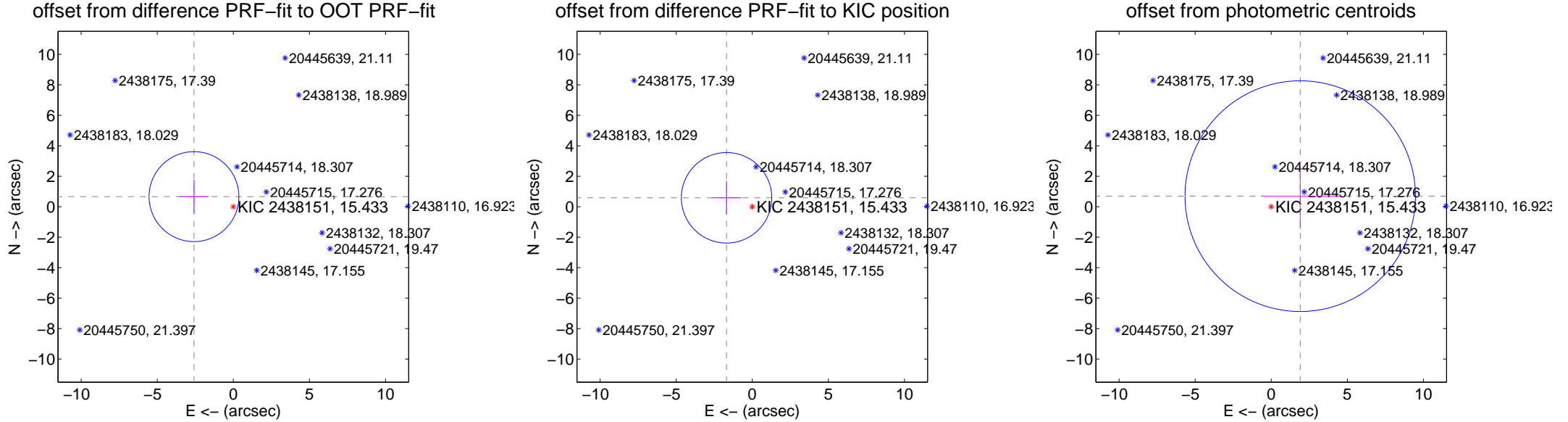
DV Centroid Data

Supplemental centroid analysis for 002438151-03. Kepler magnitude: 15.43. Transit SNR 1.93

There are 1 quarters with good PRF difference image offsets

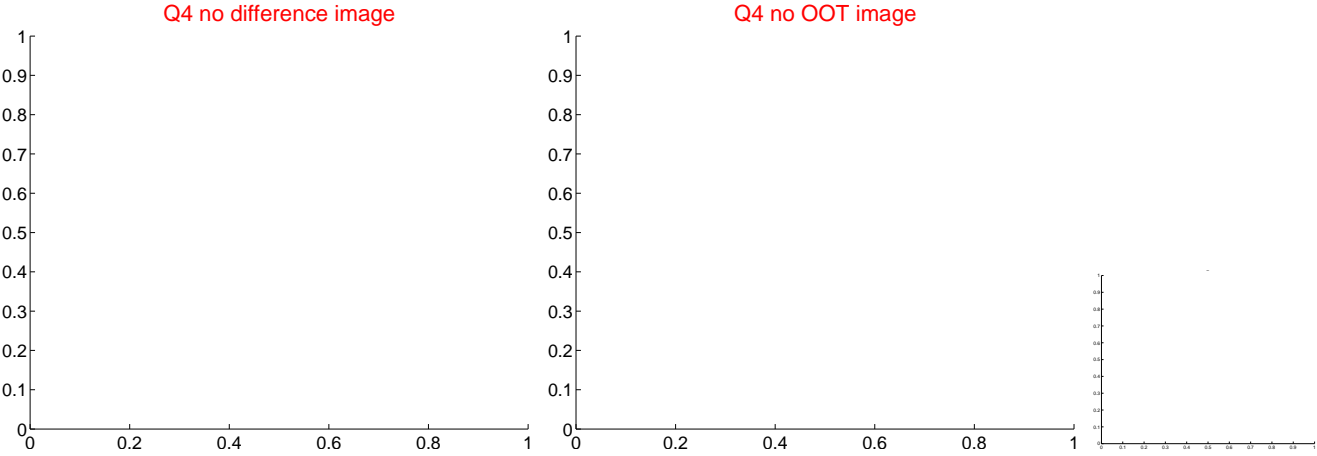
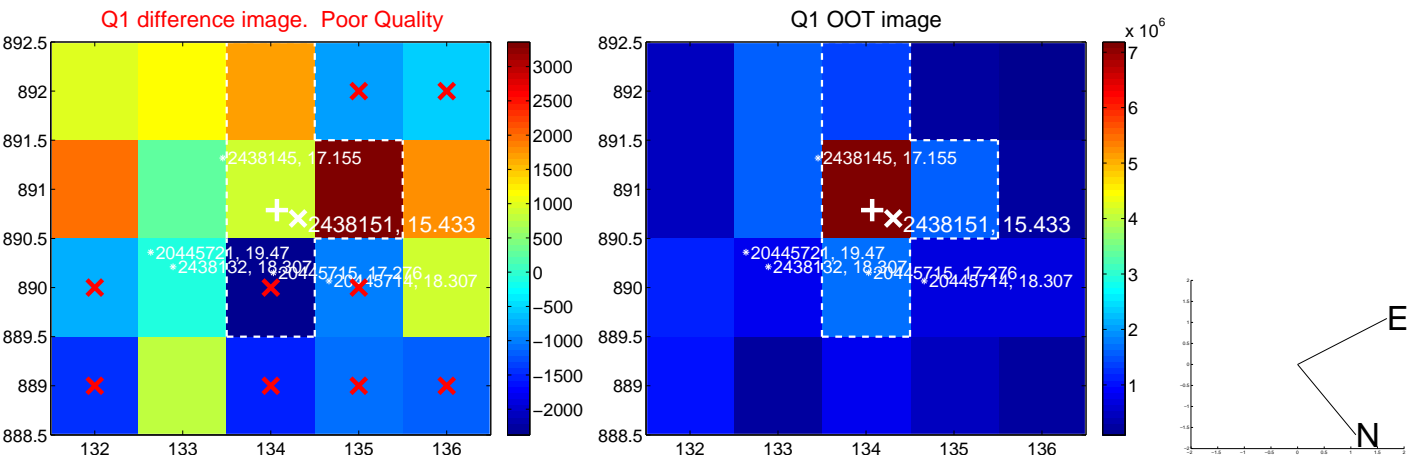
The direct PRF centroid is offset from the target star catalog position by about 0.90 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.670 ± 0.984	2.71	2.587 ± 0.975	0.662 ± 1.105
PRF-fit source offset from KIC position	1.790 ± 0.990	1.81	1.692 ± 0.975	0.586 ± 1.105
photometric centroid source offset	2.03 ± 2.52	0.80	-1.90 ± 2.57	0.69 ± 2.14



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.

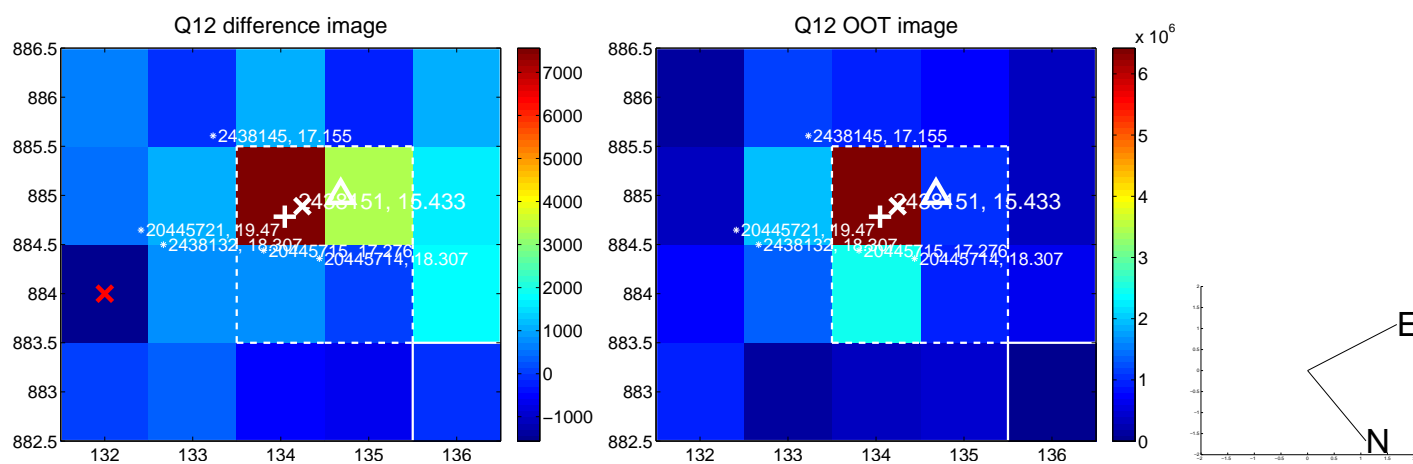
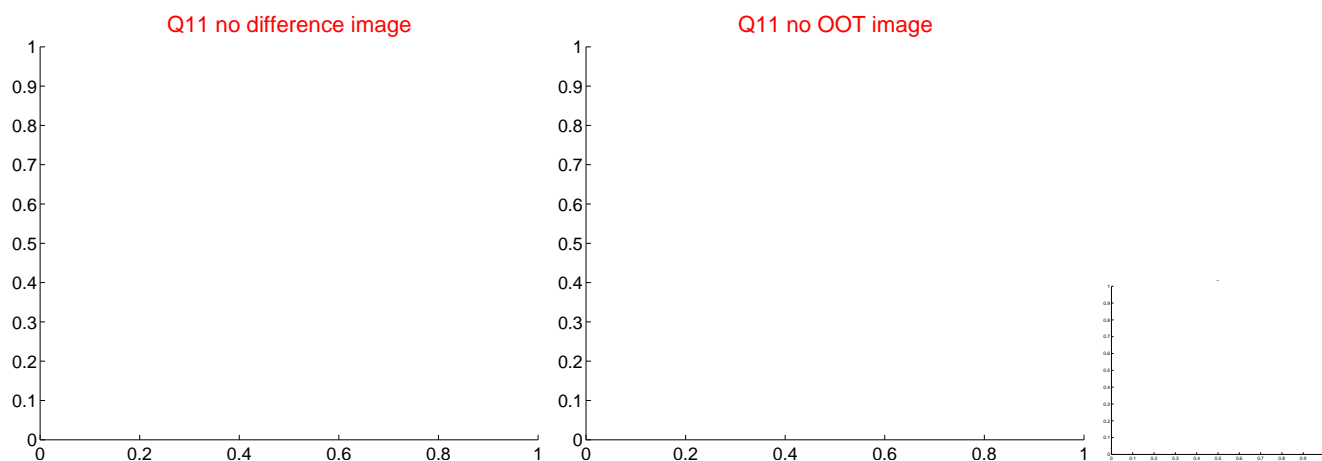
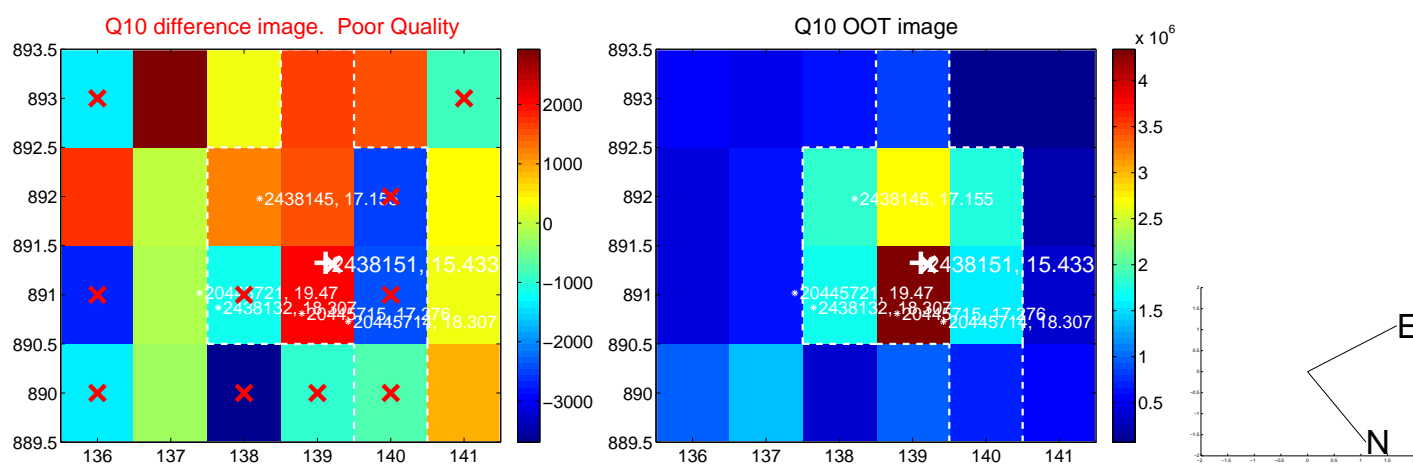
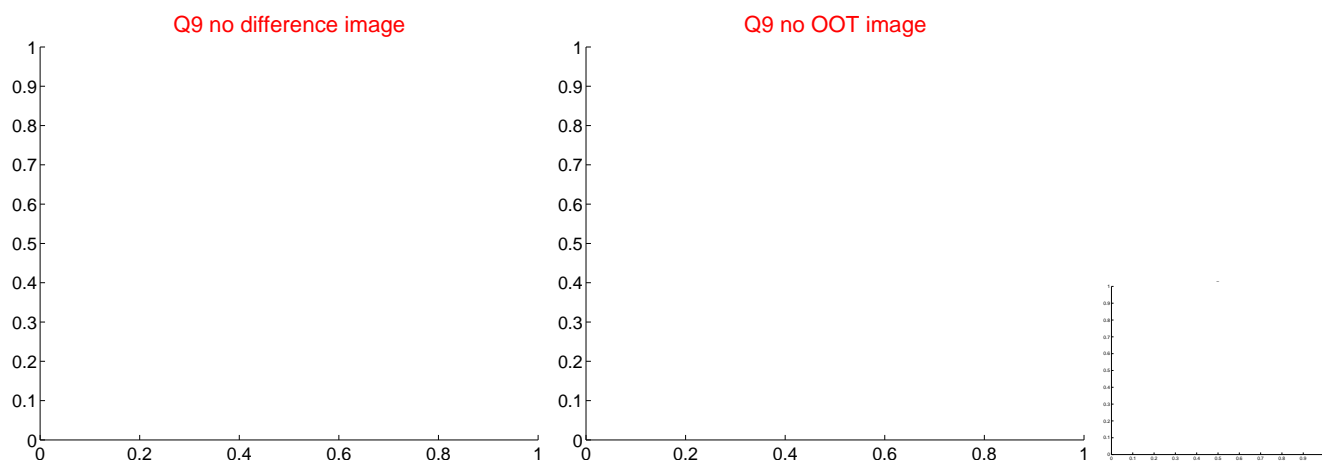
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



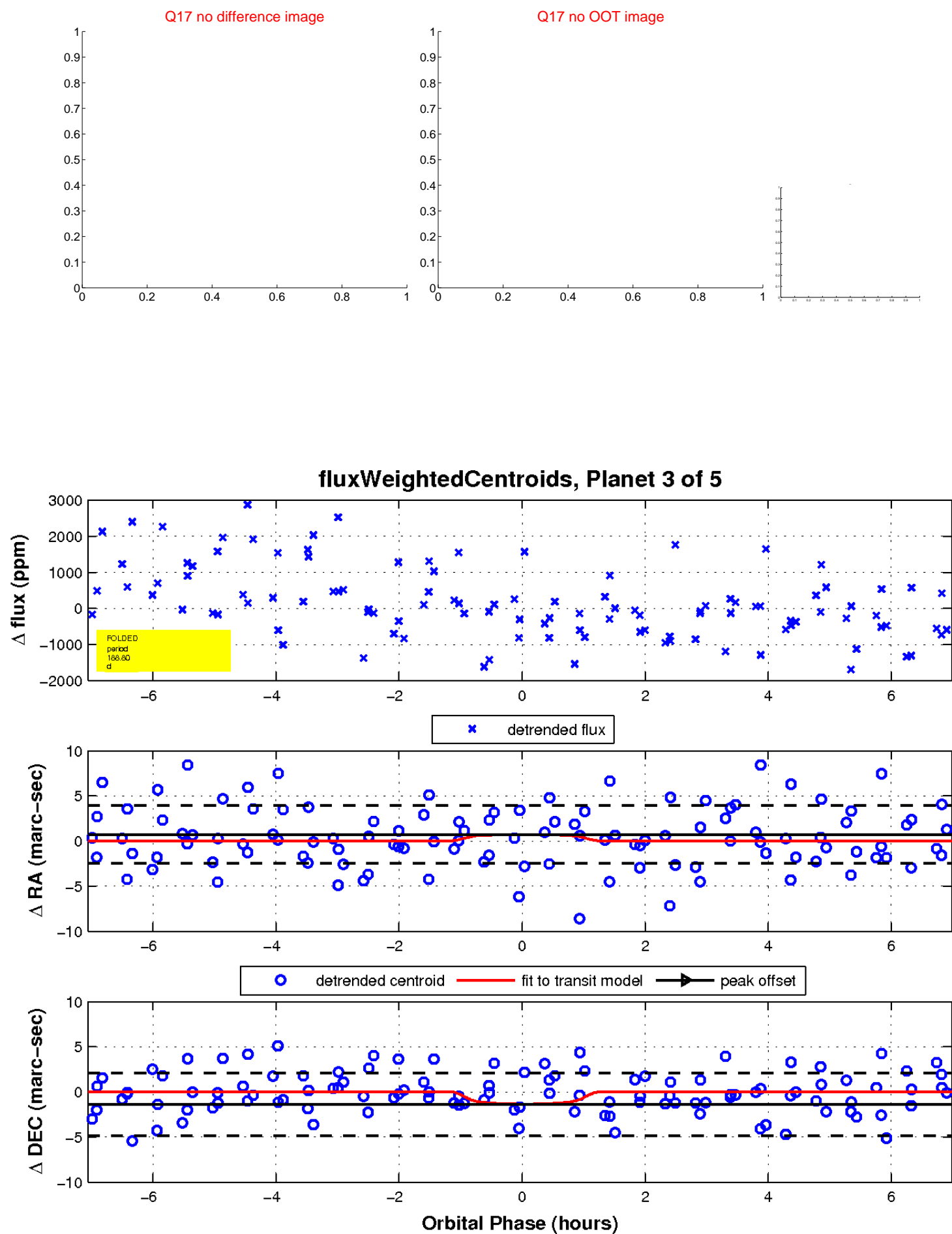
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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

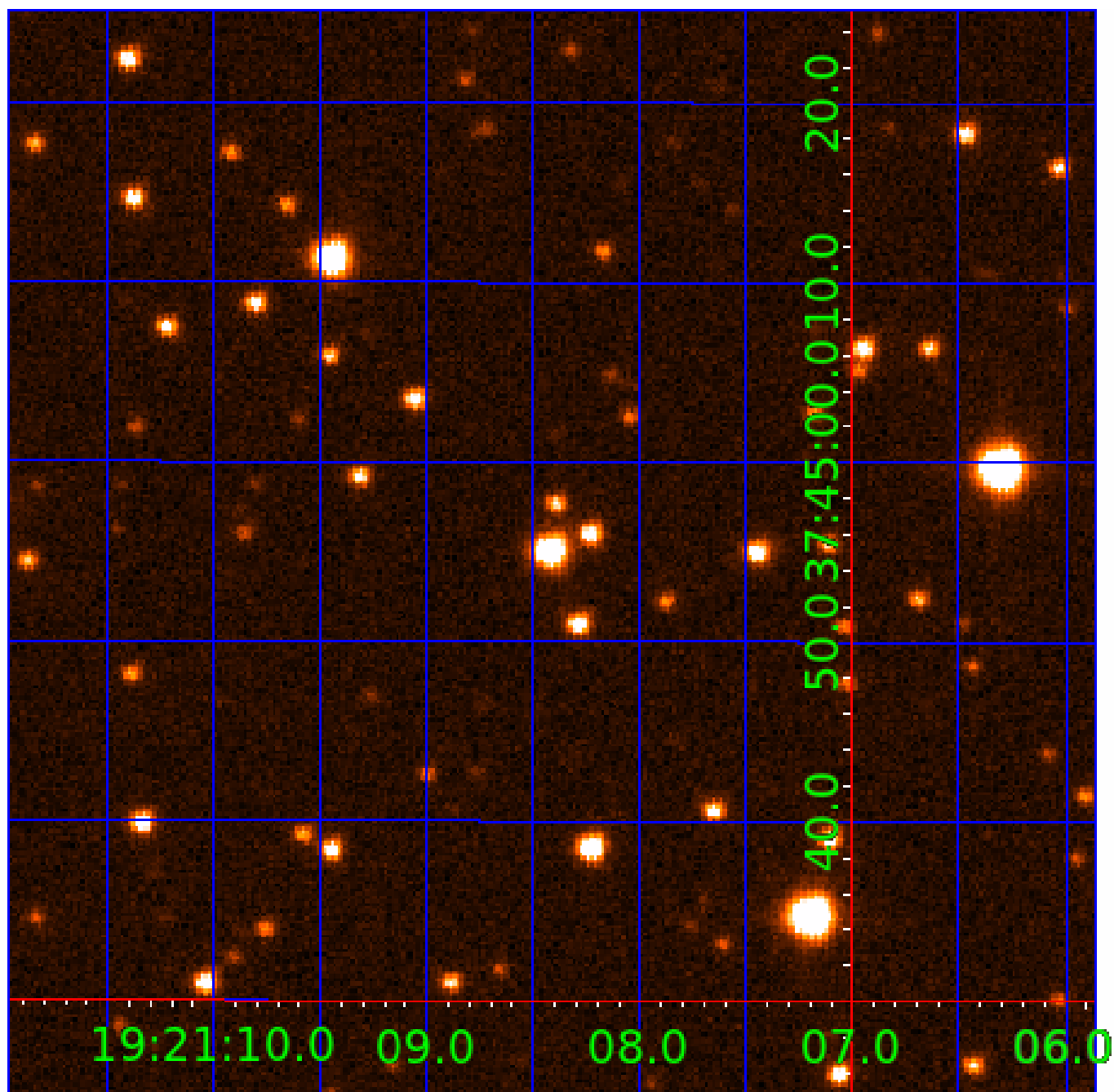


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002438151

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})
002438151-01	OBS	No	410.674316	342.919392	2185.2	15.554	16.1	8.0	0.69	4596	3.99	0.21
002438151-02	OBS	No	559.284096	388.227037	1913.6	14.780	14.6	6.8	0.69	4596	3.36	0.14
002438151-03	OBS	No	188.804844	162.355500	869.7	2.366	15.1	1.9	0.69	4596	2.53	0.60
002438151-04	OBS	No	485.277028	135.261826	2441.4	4.001	10.8	9.2	0.69	4596	3.29	0.17
002438151-05	OBS	No	405.596824	175.811091	1949.5	4.523	11.2	6.7	0.69	4596	3.91	0.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438151-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
002438151-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—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.

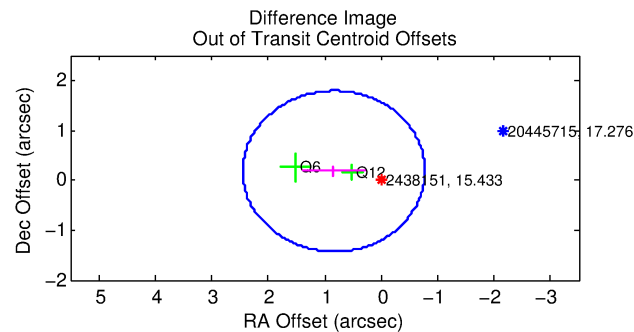
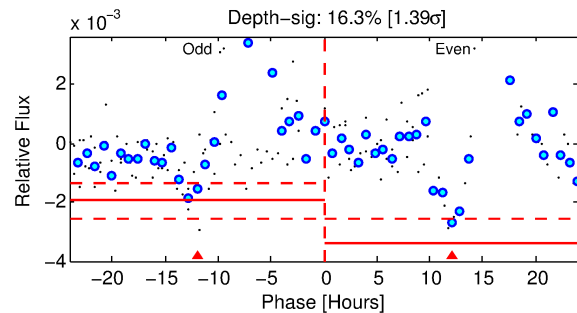
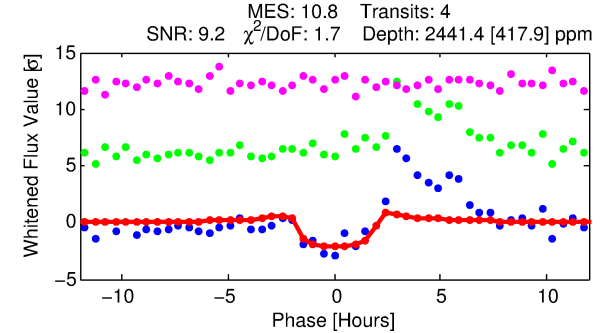
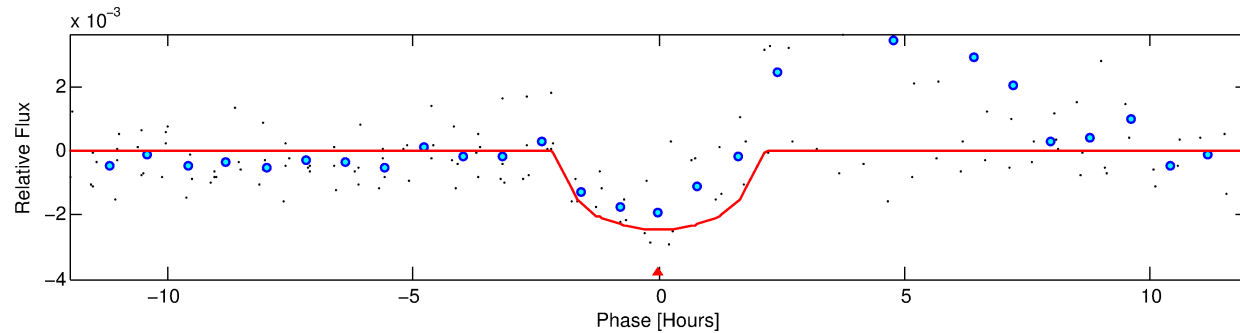
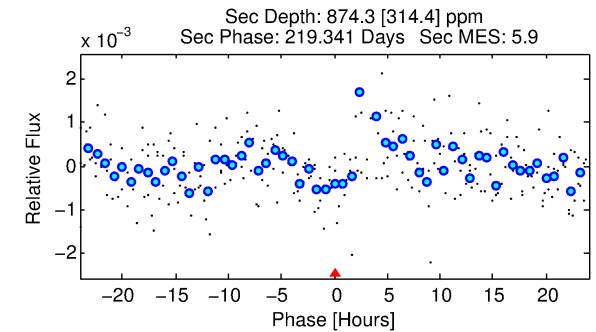
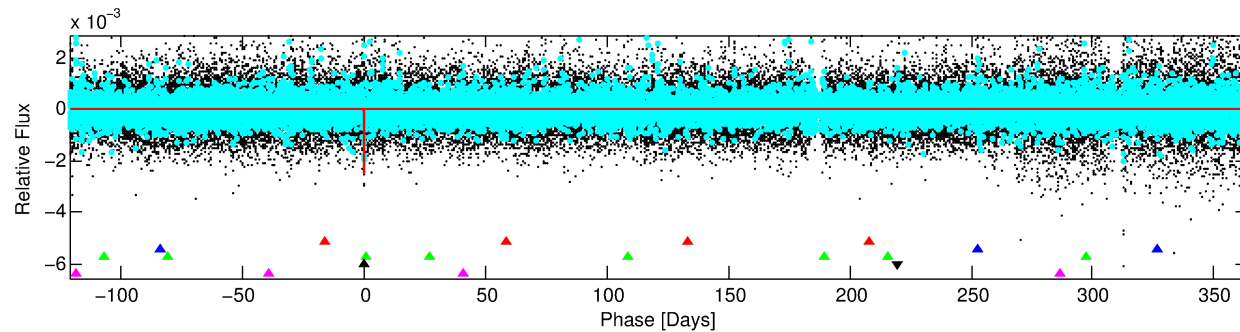
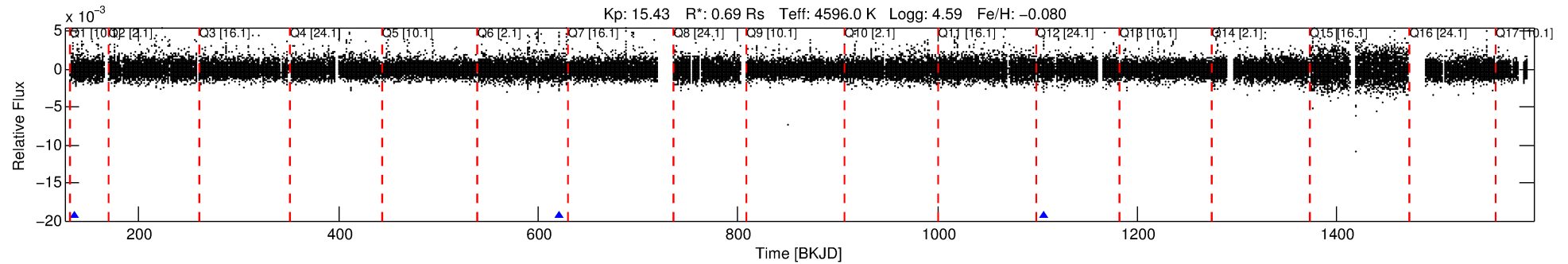
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002438151-04

No Significant Match Found

DV One-Page Summary

KIC: 2438151 Candidate: 4 of 5 Period: 485.277 d



DV Fit Results:

Period = 485.27703 [0.00704] d
Epoch = 135.2618 [0.0089] BKJD
Rp/R* = 0.0434 [0.1333]
a/R* = 966.73 [8767.12]
b = 0.00 [2807.92]
Seff = 0.17 [0.03]
Teq = 164 [6] K
Rp = 3.29 [10.10] Re
a = 1.0648 [0.0766] AU
Ag = 50461.29 [310410.34] [0.16σ]
Teffp = 3793 [5834] K [0.62σ]

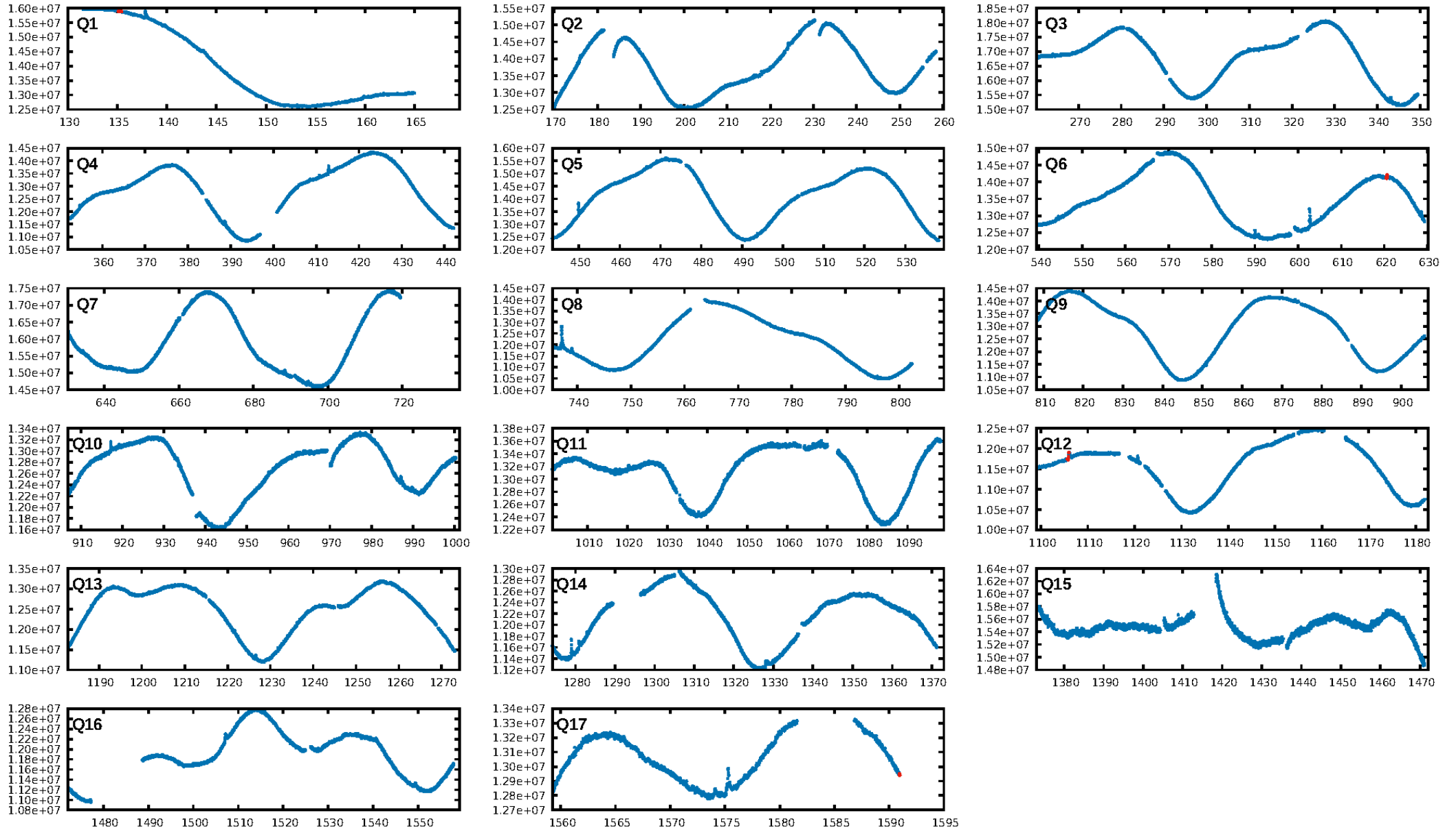
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [111.48σ]
LongPeriod-sig: 100.0% [116.00σ]
ModelChiSquare2-sig: 0.1%
ModelChiSquareGof-sig: 32.9%
Bootstrap-pfa: 4.12e-11
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 2.568
Centroid-sig: 1.0%
Centroid-so: 0.807 arcsec [1.22σ]
OotOffset-rm: 0.855 arcsec [1.59σ]
OotOffset-st: 1/0/1/0 [2]
KicOffset-rm: 0.134 arcsec [0.33σ]
KicOffset-st: 1/0/1/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [3/3]

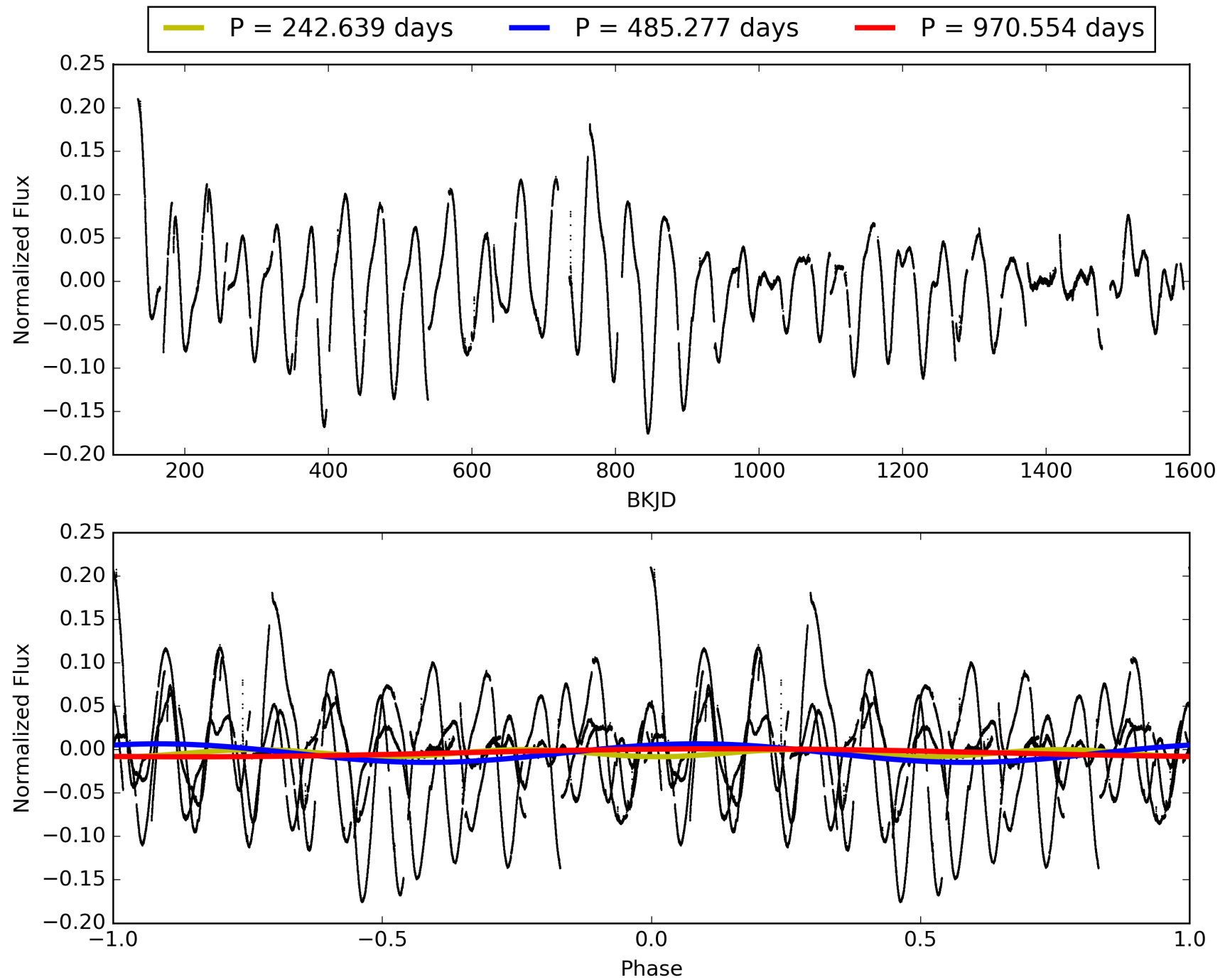
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:20:23 Z

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

TCE 002438151-04, PDC Light Curves

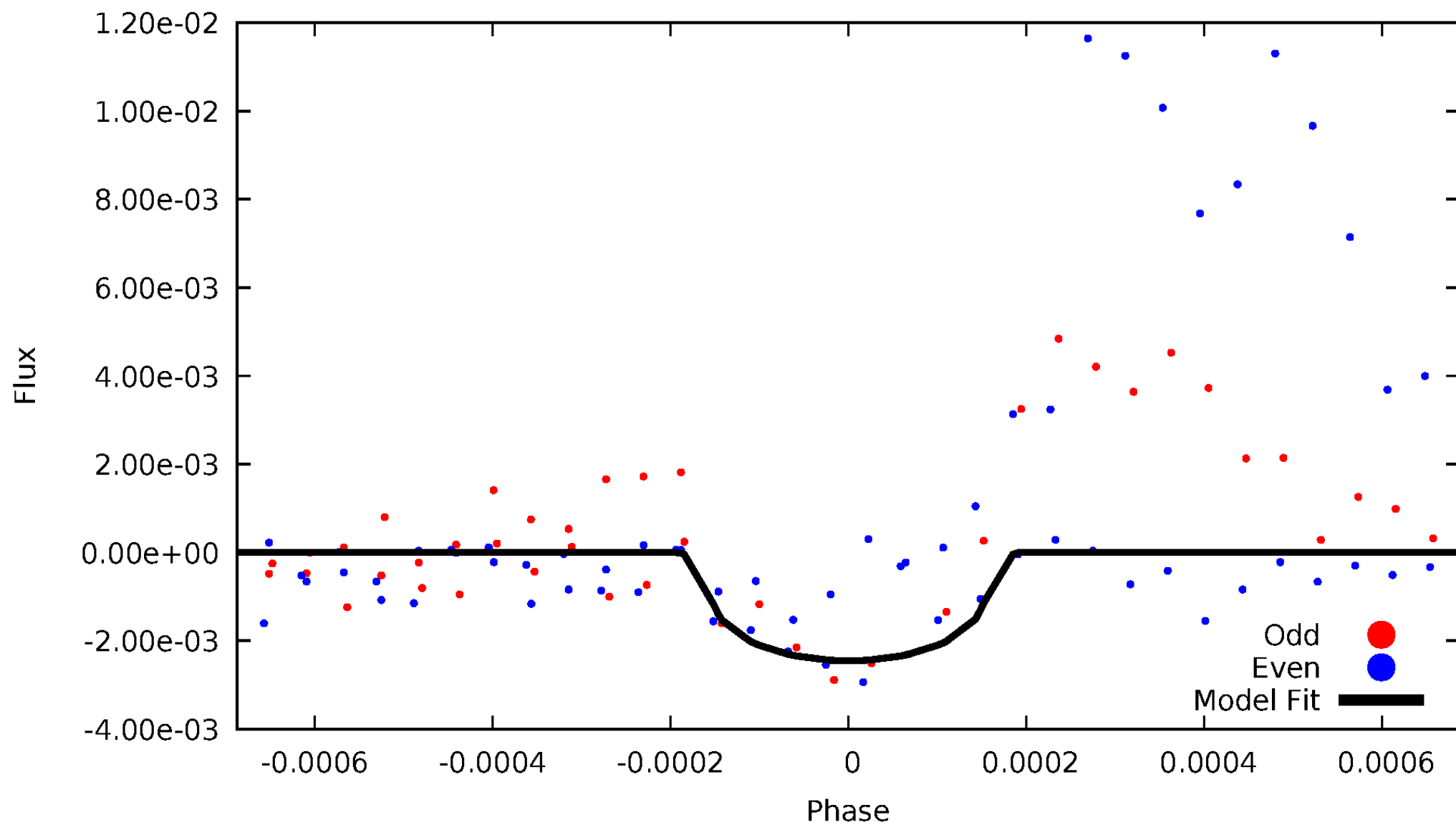


TCE 002438151-04



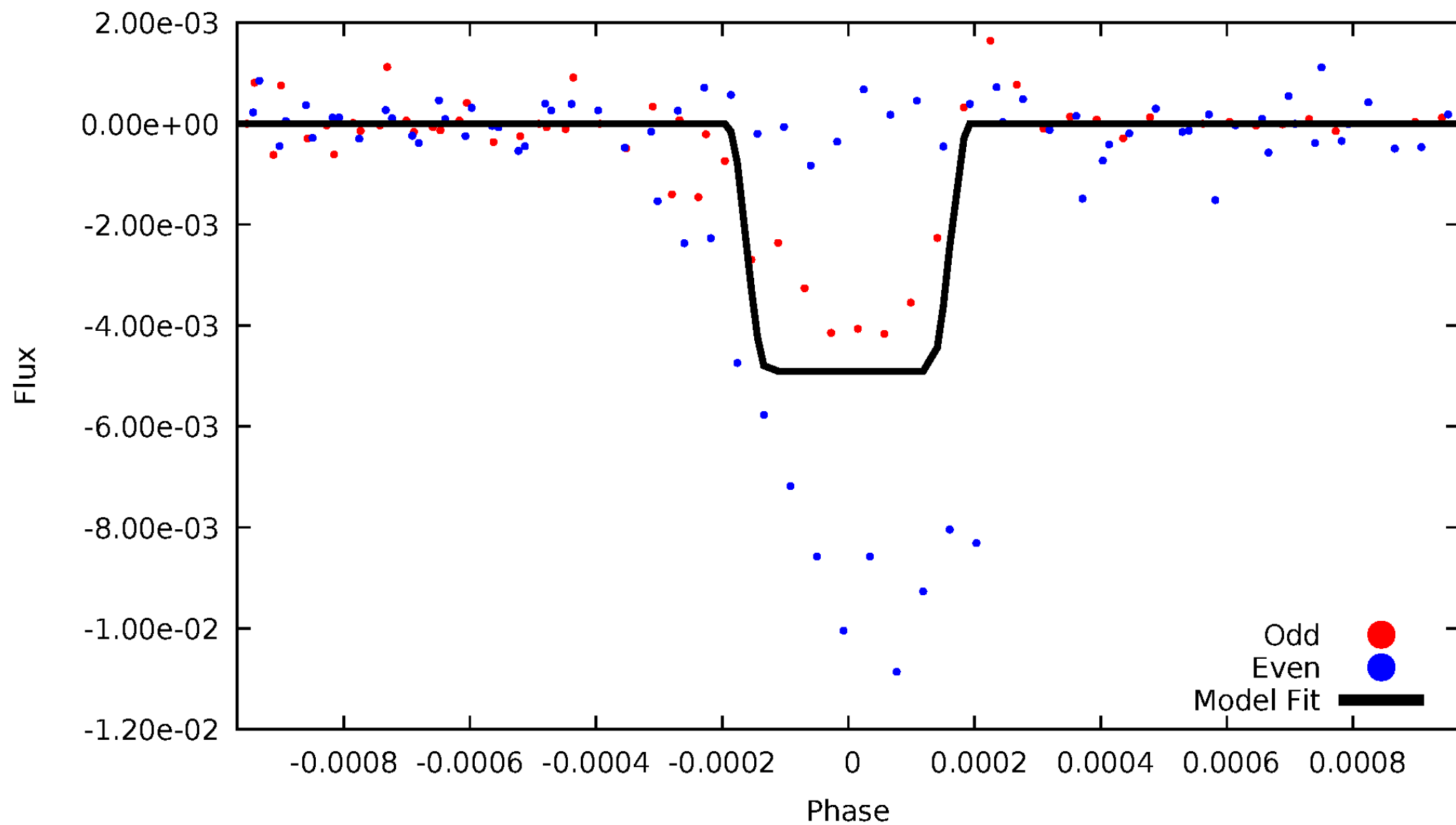
DV Odd/Even

TCE 002438151-04



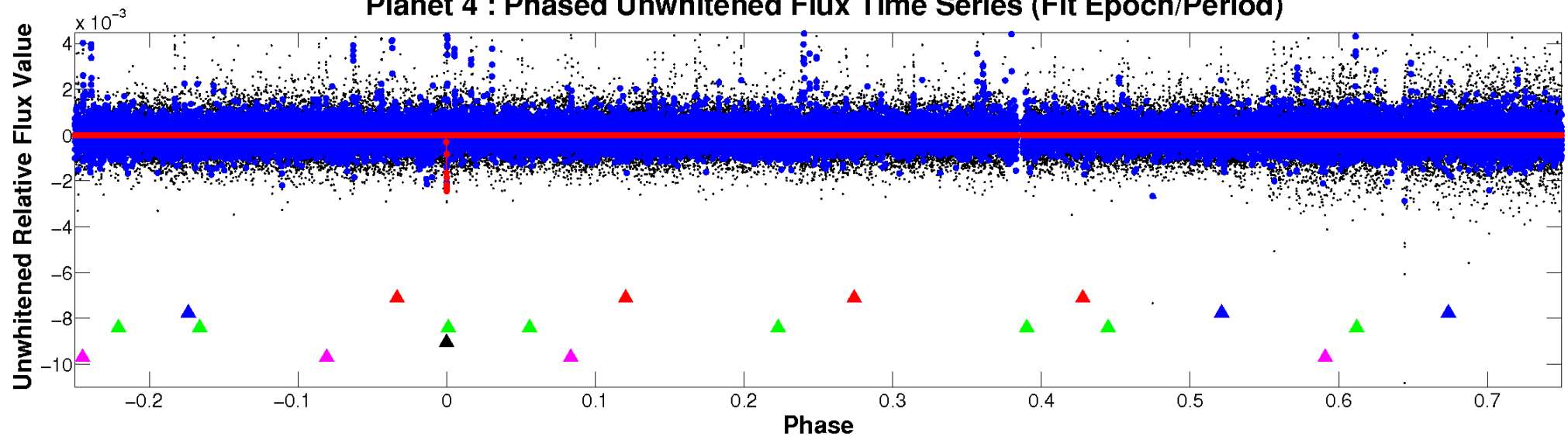
ALT Odd/Even

TCE 002438151-04

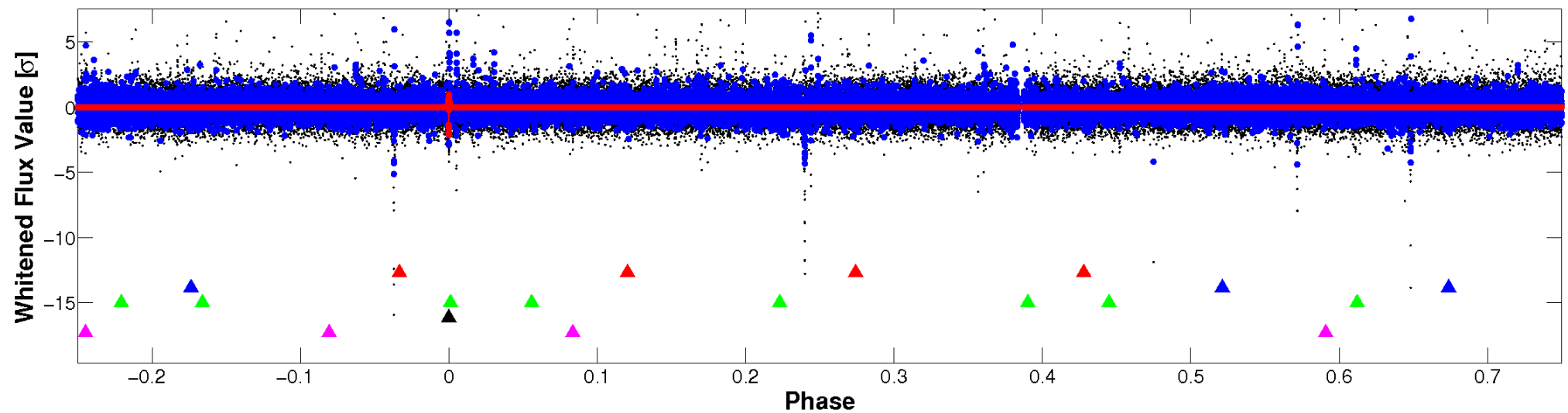


Non-Whitened Vs. Whitened Light Curve

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

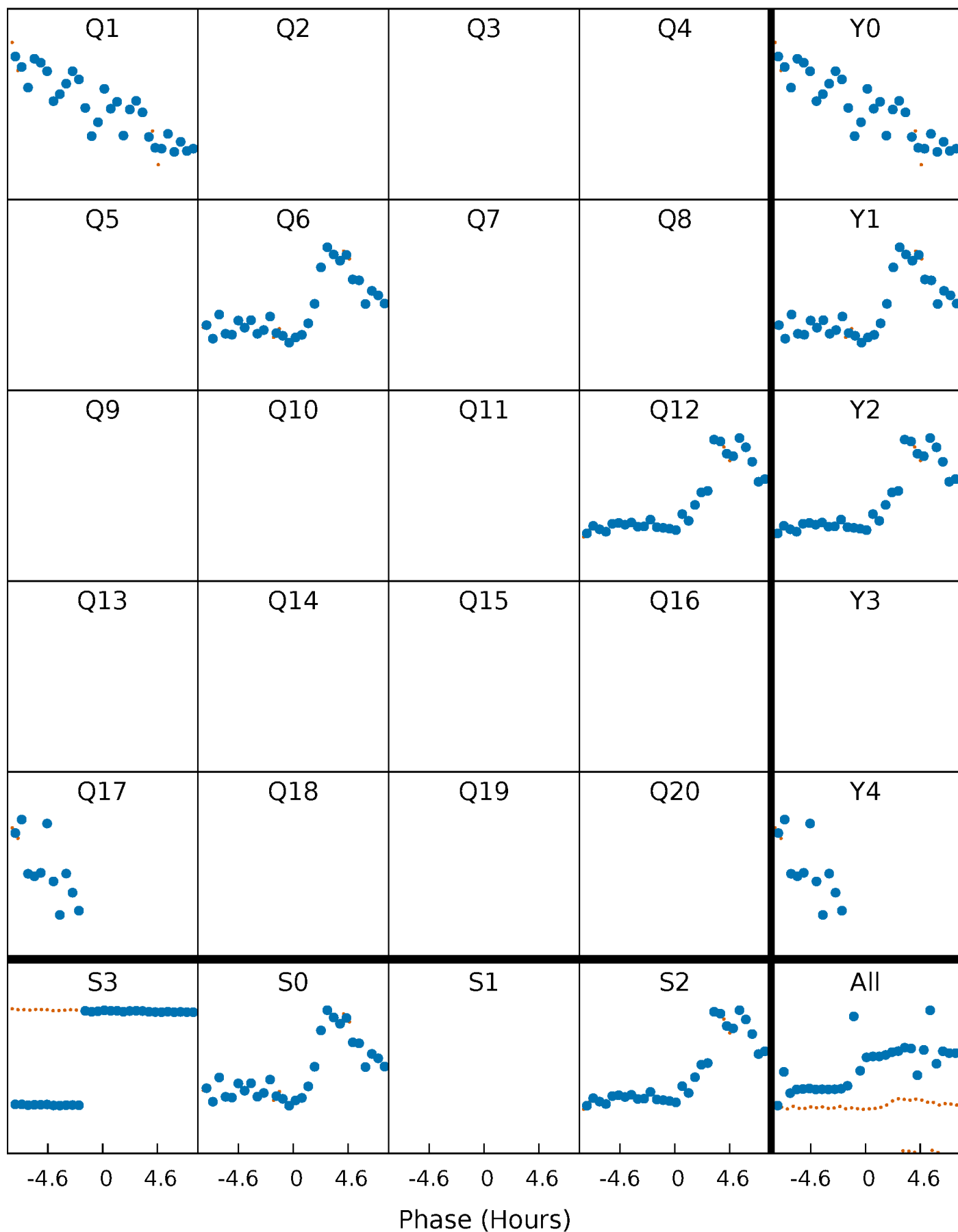


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



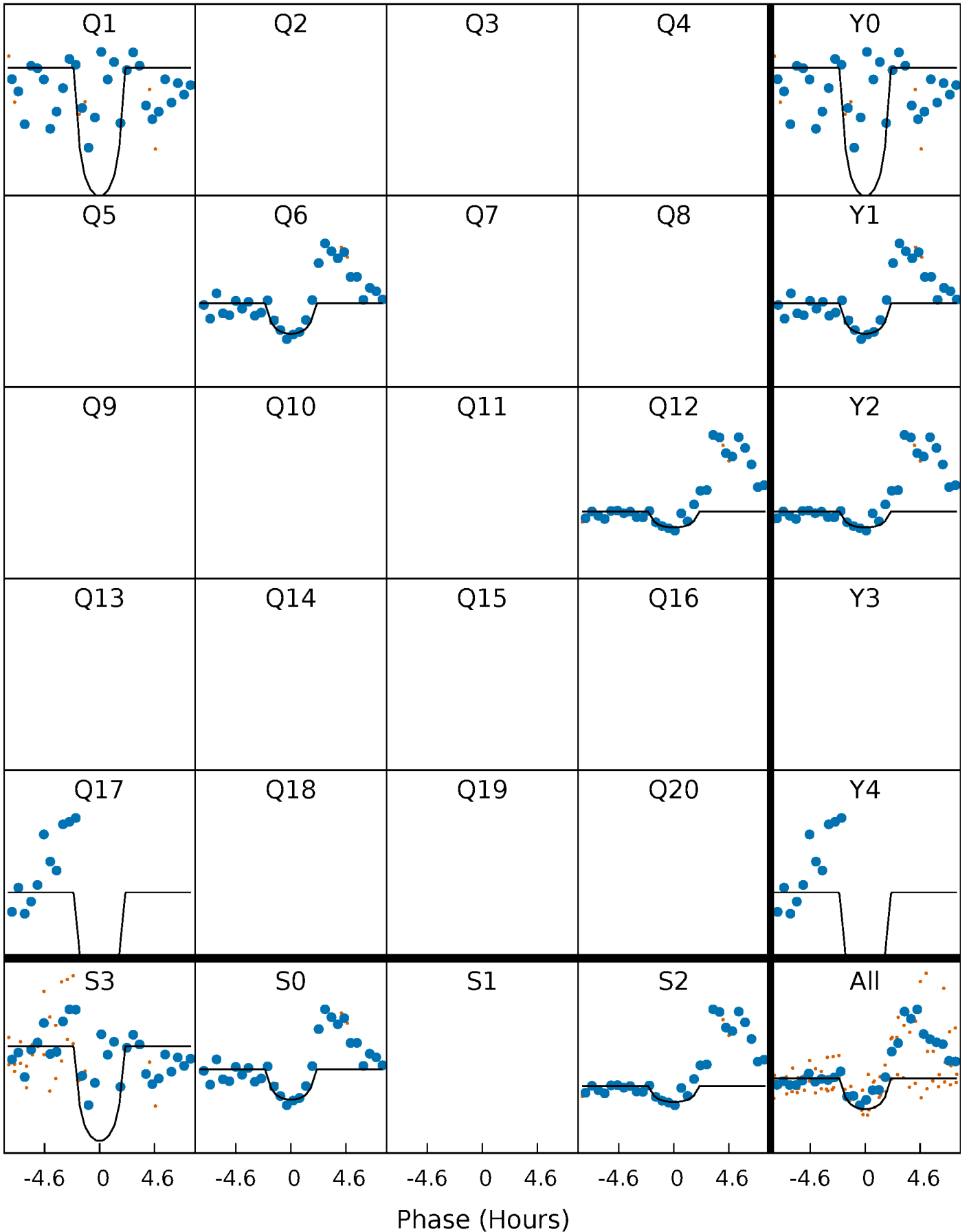
PDC Quarter-Phased Transit Curves

TCE 002438151-04 $P=485.277028$ Days $T_0=135.261826$ (BKJD)



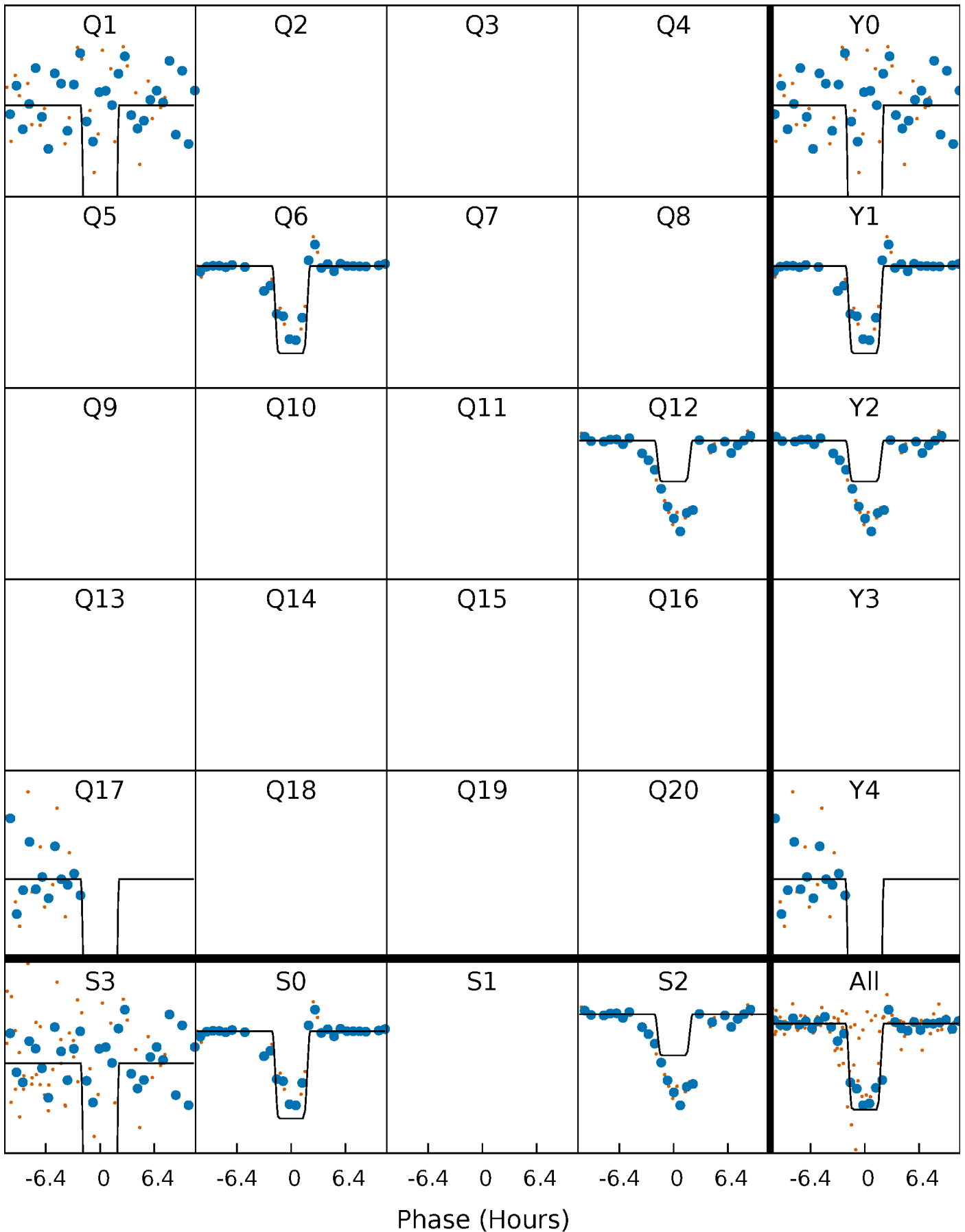
DV Quarter-Phased Transit Curves

TCE 002438151-04 $P=485.277028$ Days $T_0=135.261826$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

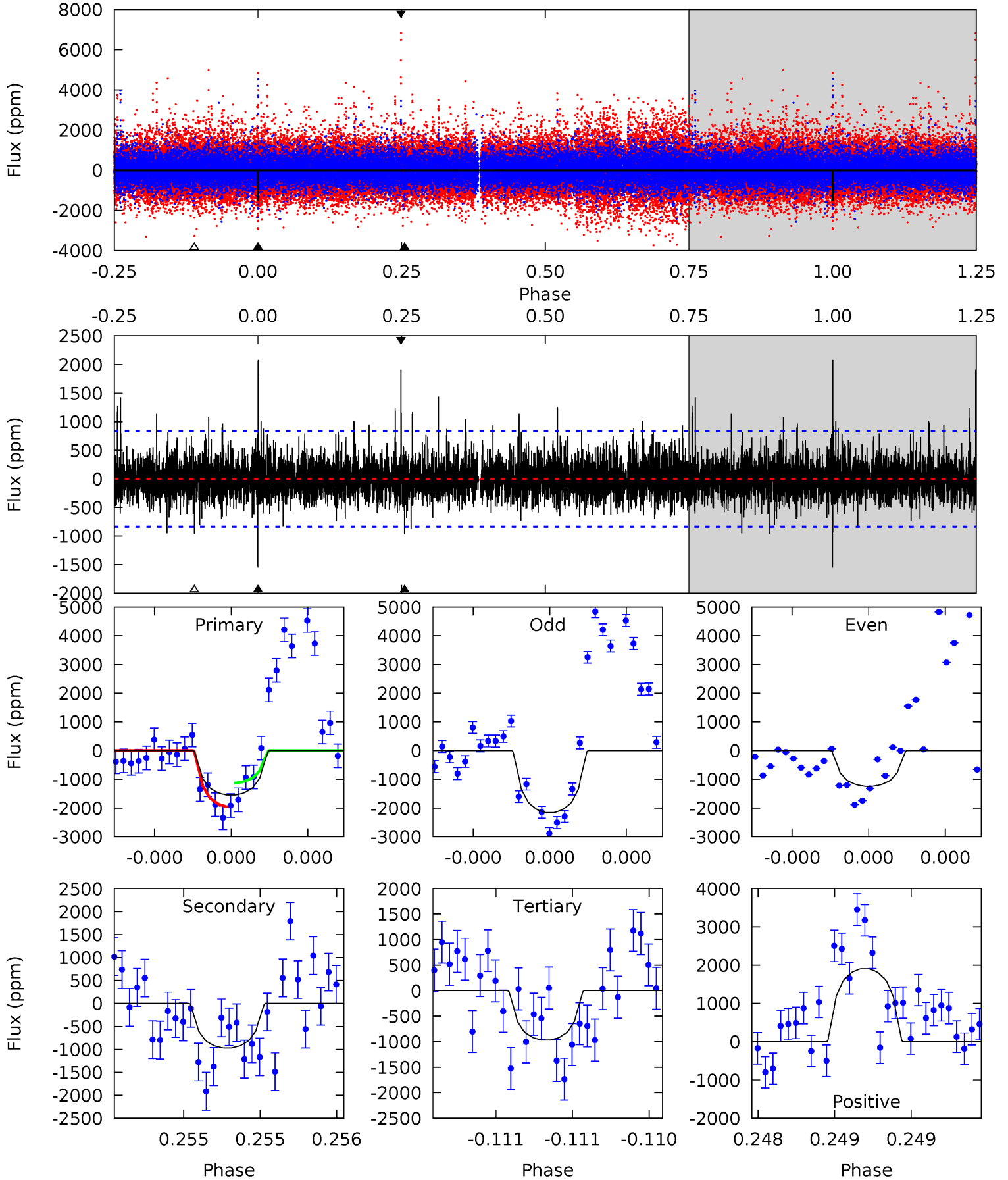
TCE 002438151-04 P=485.283428 Days $T_0=135.260823$ (BKJD)



DV Model-Shift Uniqueness Test

002438151-04, P = 485.277028 Days, E = 135.261826 Days

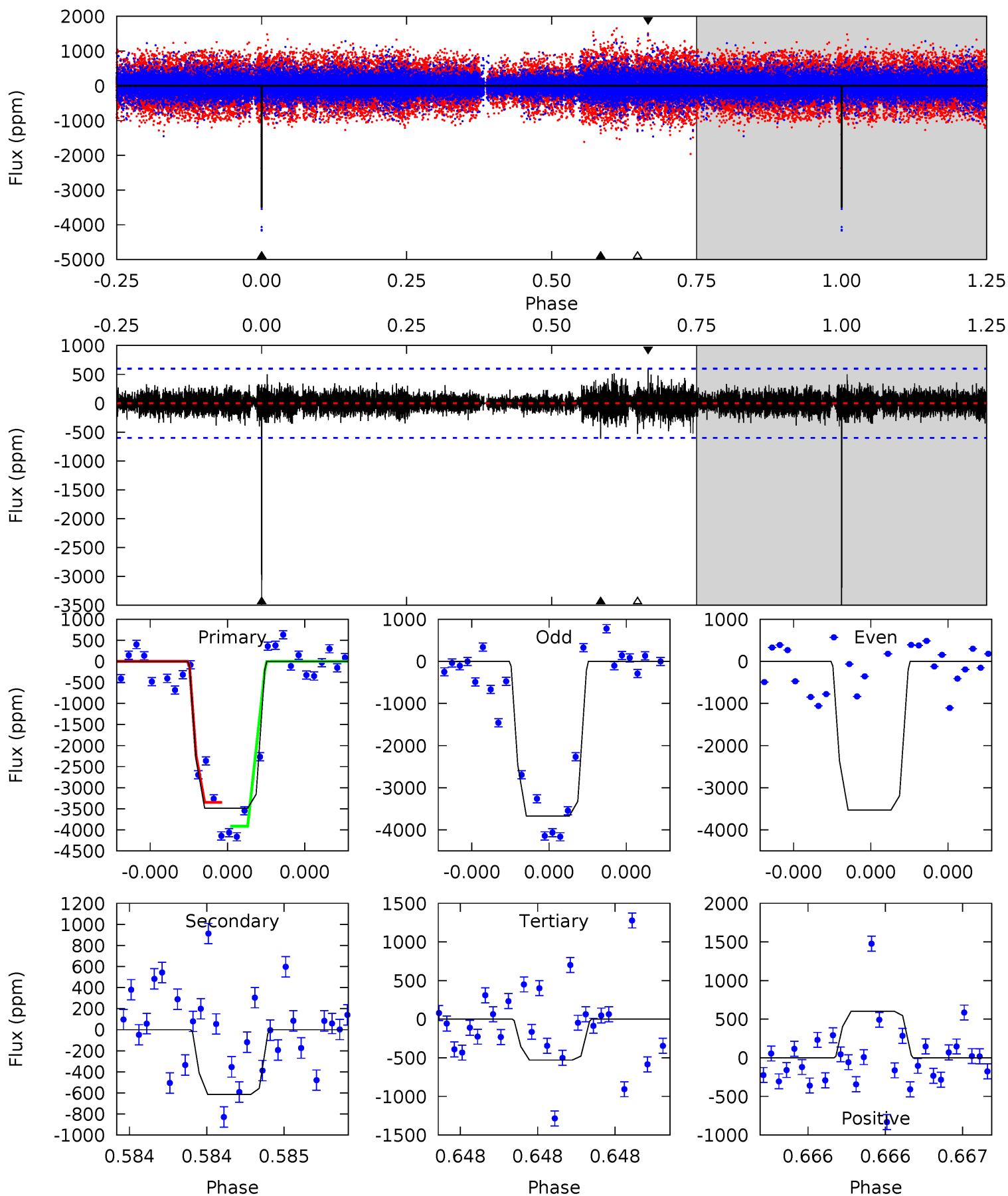
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	6.52	6.50	12.8	5.62	3.55	1.71	3.92	-2.41	0.01	-6.32	1.98	0.85	0.57	2.79



Alt Model-Shift Uniqueness Test

002438151-04, P = 485.283428 Days, E = 135.260823 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.7	5.76	4.95	5.66	5.62	3.55	0.88	27.7	27.0	0.81	0.10	0.90	1.20	0.15	0



Stellar Parameters For KIC 002438151

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4596^{+138}_{-138}	$4.590^{+0.056}_{-0.024}$	$-0.080^{+0.300}_{-0.300}$	$0.694^{+0.045}_{-0.060}$	$0.683^{+0.068}_{-0.056}$	$2.880^{+0.677}_{-0.310}$
	+3%/-3%	+1%/-1%	+375%/-375%	+6%/-9%	+10%/-8%	+23%/-11%
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 002438151-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-969 ± 149	$8.04^{+8.58}_{-5.51}$	227^{+8}_{-8}	3041^{+1416}_{-533}	9673^{+88103}_{-7529}
Alt.	-615 ± 107	$9.04^{+8.37}_{-5.96}$	227^{+8}_{-8}	2748^{+1029}_{-401}	4517^{+34097}_{-3279}

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

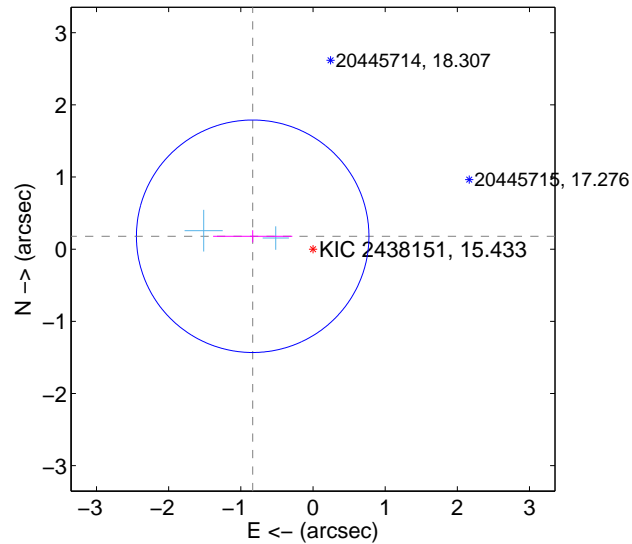
Supplemental centroid analysis for 002438151-04. Kepler magnitude: 15.43. Transit SNR 9.25

There are 2 quarters with good PRF difference image offsets

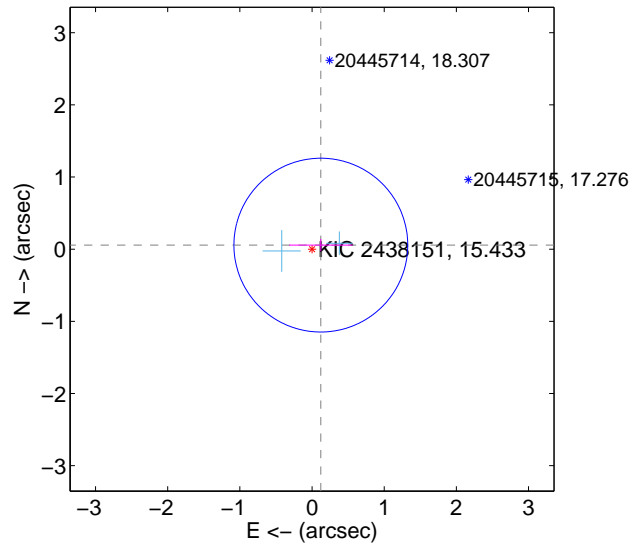
The direct PRF centroid is offset from the target star catalog position by about 0.90 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.855 ± 0.537	1.59	0.836 ± 0.549	0.179 ± 0.084
PRF-fit source offset from KIC position	0.134 ± 0.401	0.33	-0.122 ± 0.440	0.056 ± 0.085
photometric centroid source offset	0.81 ± 0.66	1.22	0.25 ± 0.76	-0.77 ± 0.65

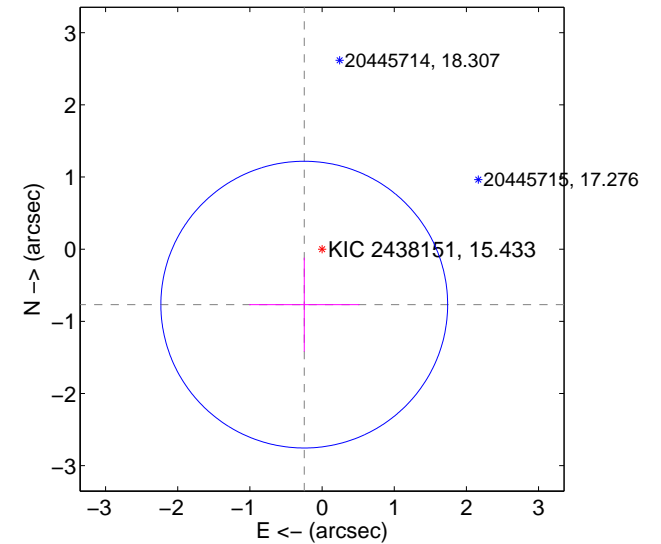
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

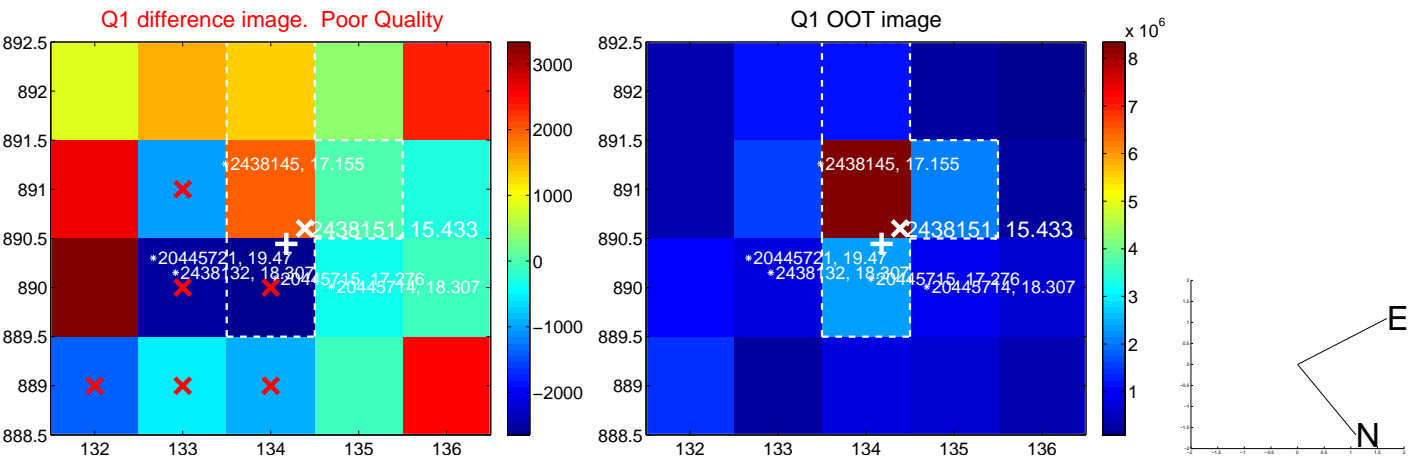


offset from photometric centroids

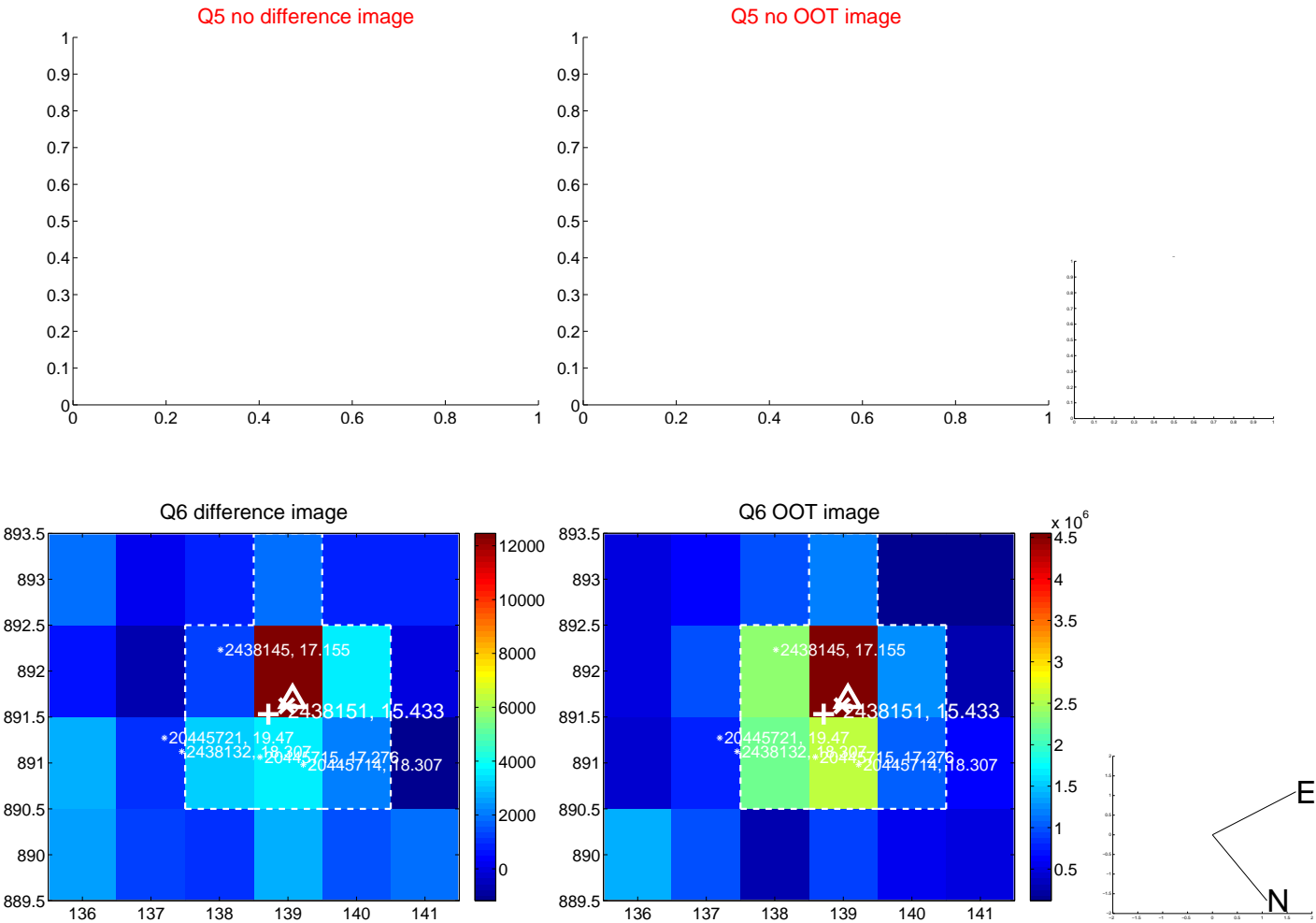


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

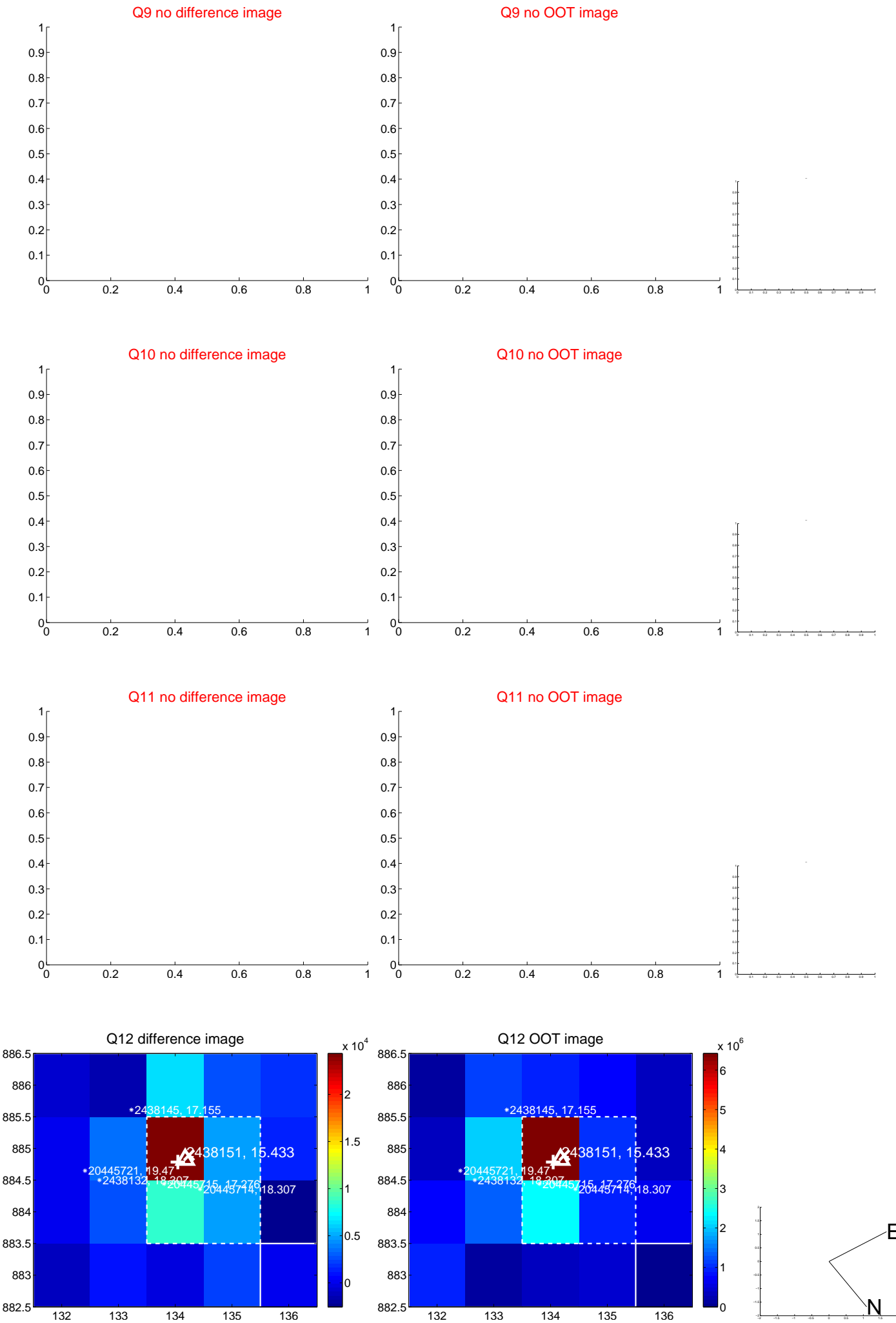
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



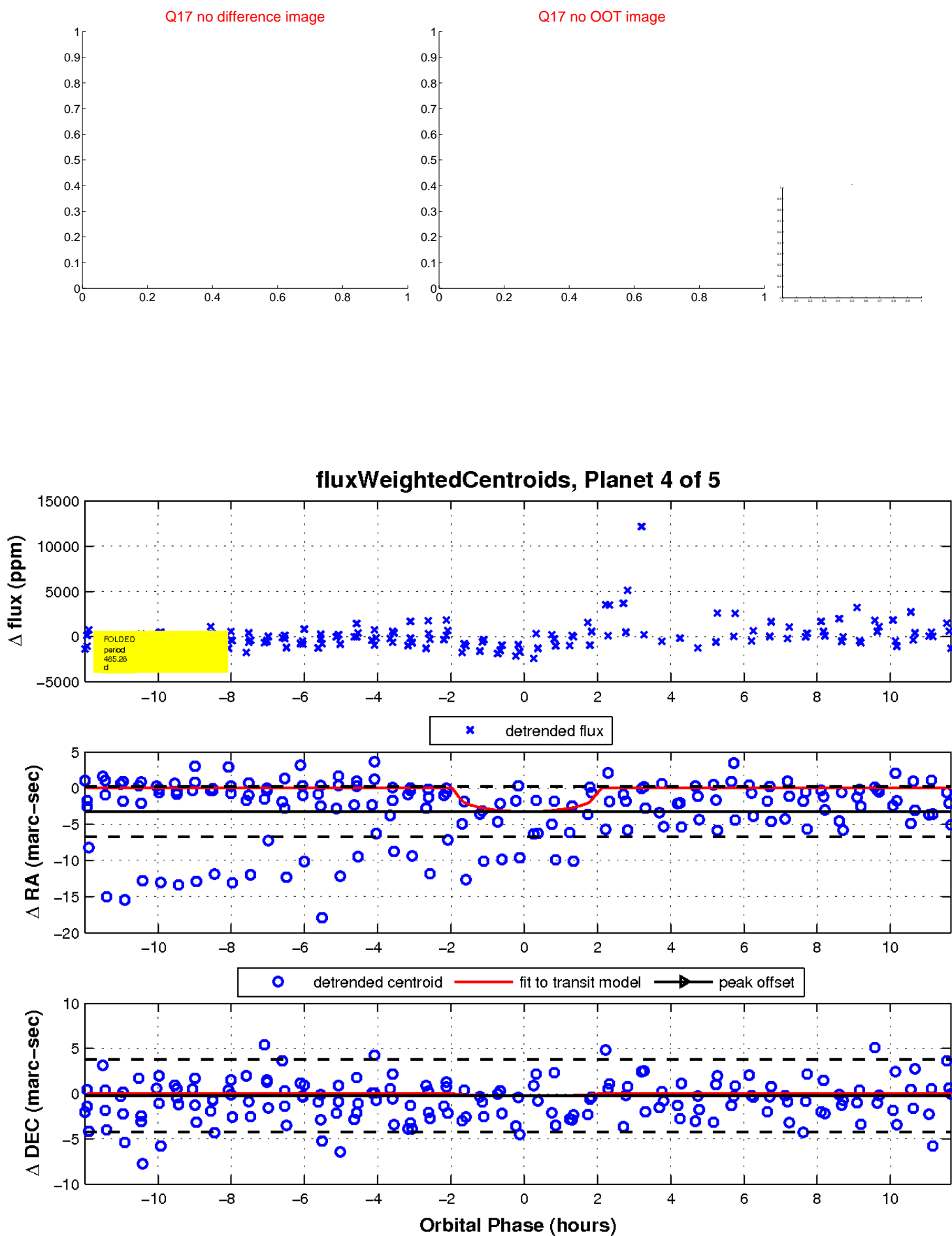
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

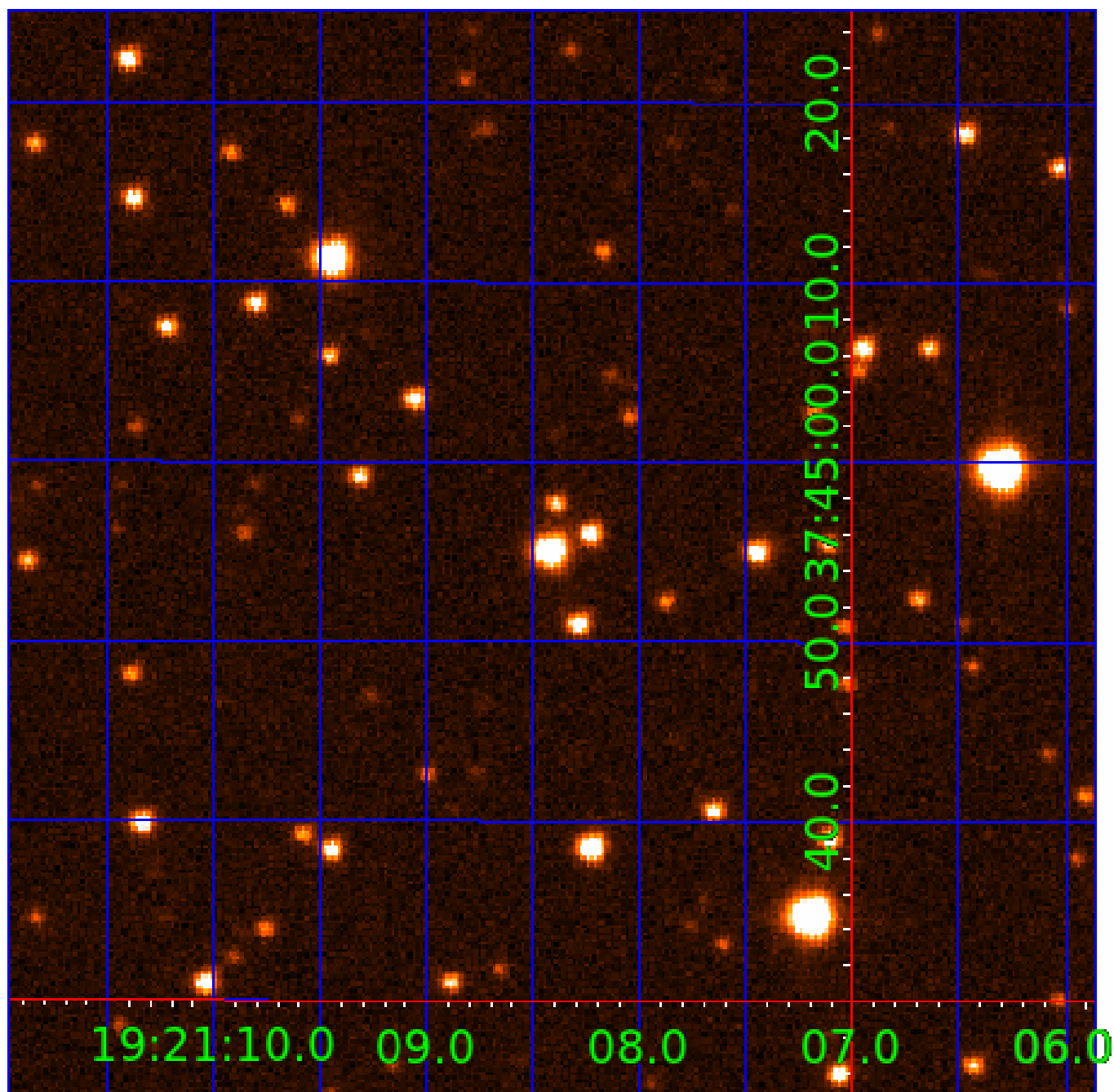


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002438151

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})
002438151-01	OBS	No	410.674316	342.919392	2185.2	15.554	16.1	8.0	0.69	4596	3.99	0.21
002438151-02	OBS	No	559.284096	388.227037	1913.6	14.780	14.6	6.8	0.69	4596	3.36	0.14
002438151-03	OBS	No	188.804844	162.355500	869.7	2.366	15.1	1.9	0.69	4596	2.53	0.60
002438151-04	OBS	No	485.277028	135.261826	2441.4	4.001	10.8	9.2	0.69	4596	3.29	0.17
002438151-05	OBS	No	405.596824	175.811091	1949.5	4.523	11.2	6.7	0.69	4596	3.91	0.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438151-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS
002438151-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002438151-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—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.

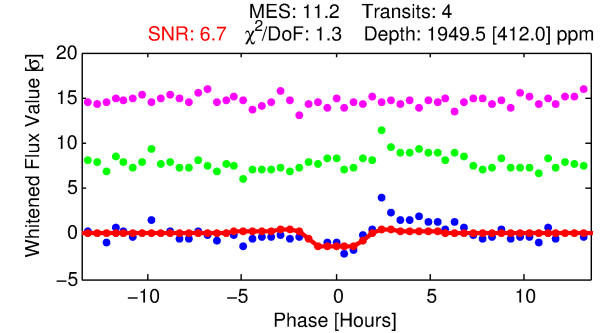
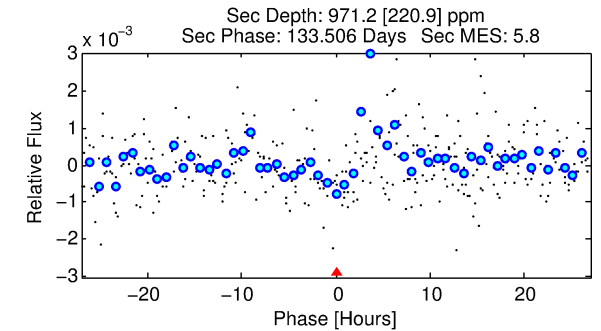
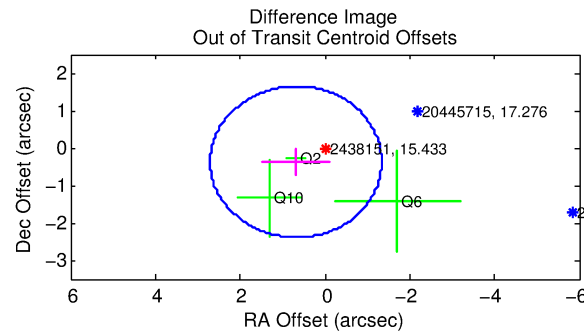
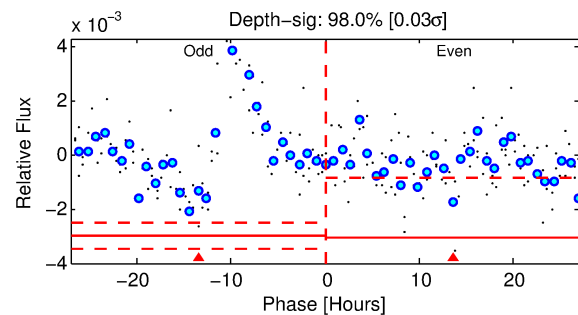
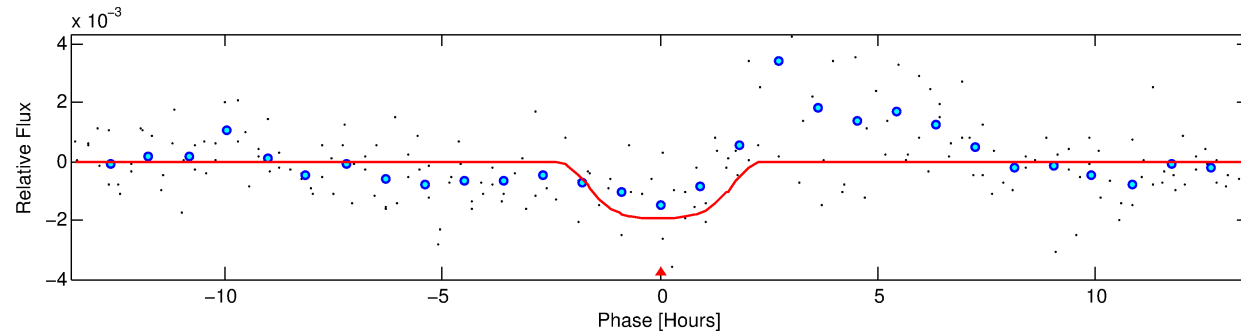
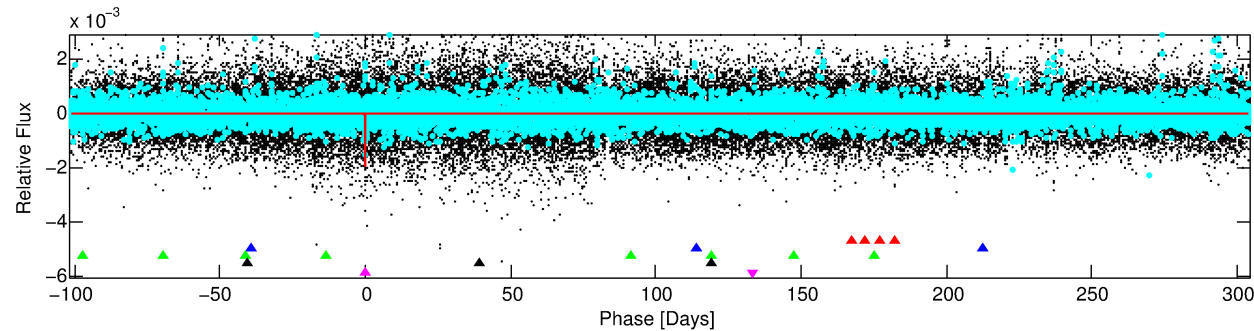
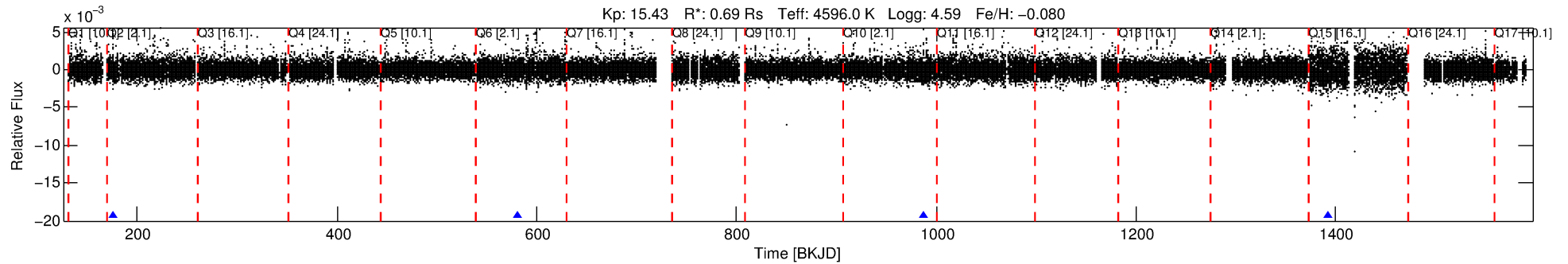
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002438151-05

No Significant Match Found

DV One-Page Summary

KIC: 2438151 Candidate: 5 of 5 Period: 405.597 d



DV Fit Results:

Period = 405.59682 [0.00779] d
Epoch = 175.8111 [0.0124] BKJD
Rp/R* = 0.0516 [0.0099]
a/R* = 345.43 [147.03]
b = 0.92 [0.08]
Seff = 0.22 [0.03]
Teq = 174 [7] K
Rp = 3.91 [0.82] Re
a = 0.9448 [0.0679] AU
Ag = 31173.68 [14229.08] [2.19 σ]
Teffp = 3570 [411] K [8.26 σ]

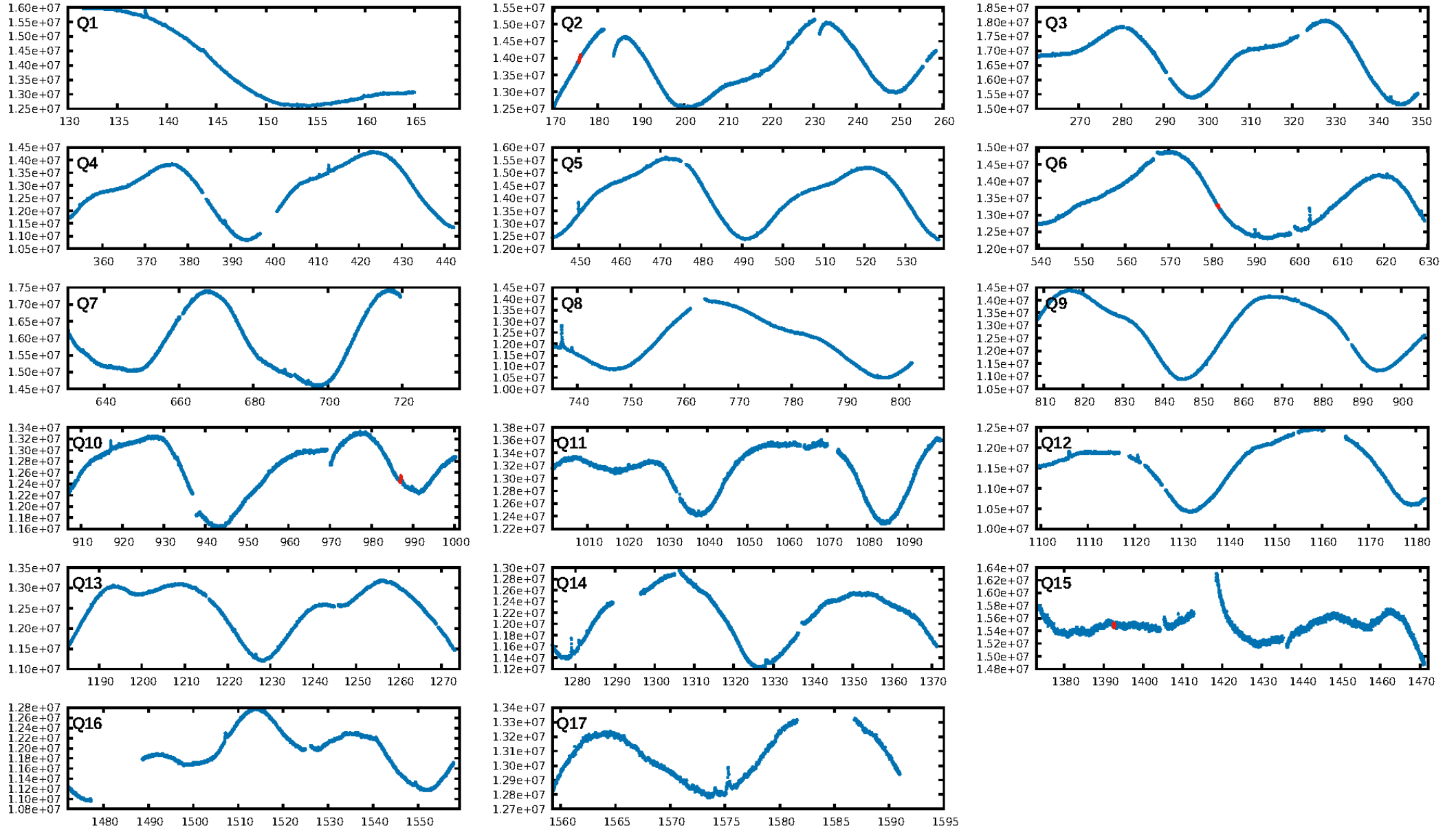
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1019.28 σ]
LongPeriod-sig: 100.0% [7.52 σ]
ModelChiSquare2-sig: 6.0%
ModelChiSquareGof-sig: 66.4%
Bootstrap-pfa: 8.58e-14
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.8501
Centroid-sig: 21.2%
Centroid-so: 0.859 arcsec [0.97 σ]
OotOffset-rm: 0.778 arcsec [1.15 σ]
OotOffset-st: 3/0/0/0 [3]
KicOffset-rm: 0.617 arcsec [1.07 σ]
KicOffset-st: 3/0/0/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [4/4]

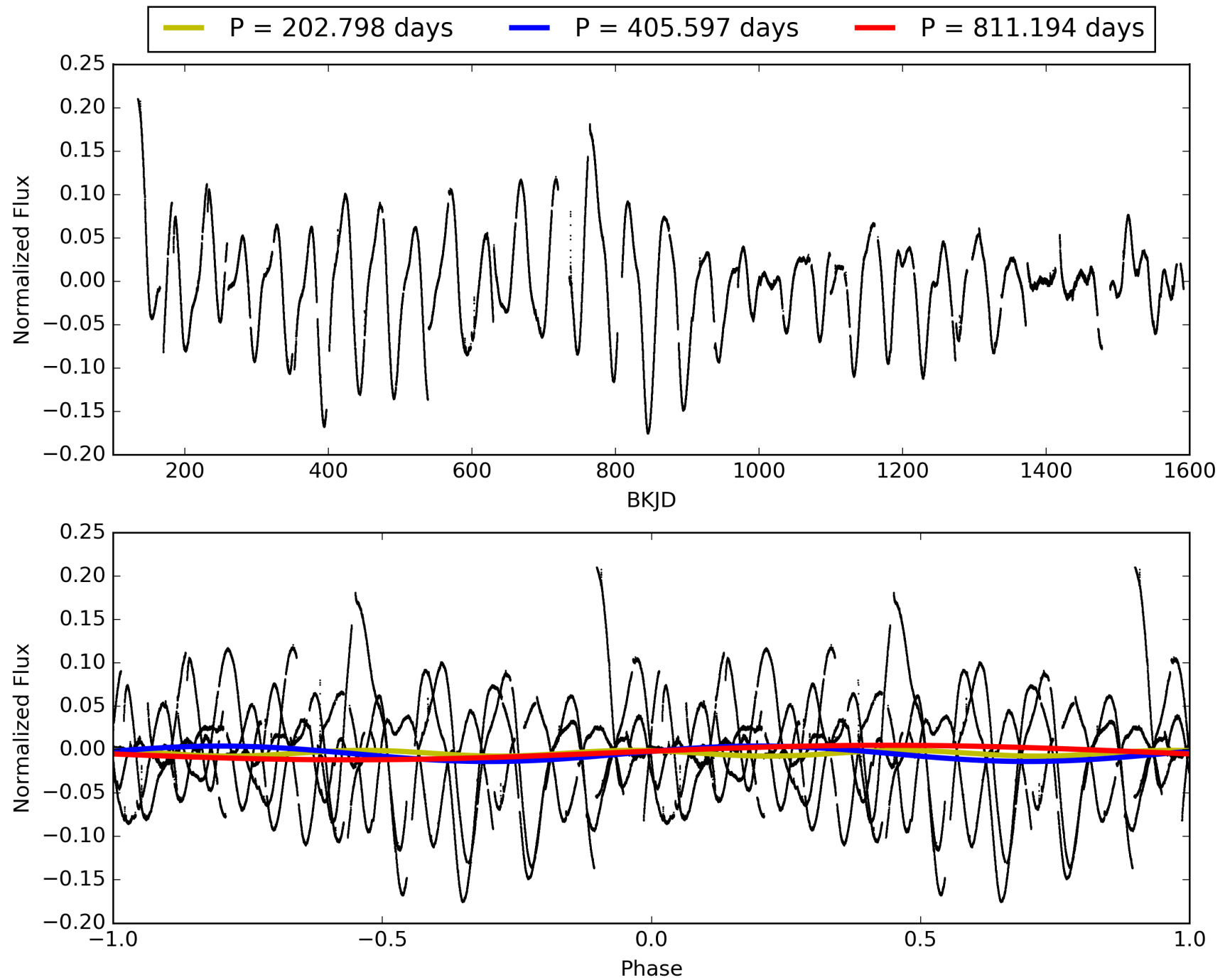
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:20:38 Z

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

TCE 002438151-05, PDC Light Curves

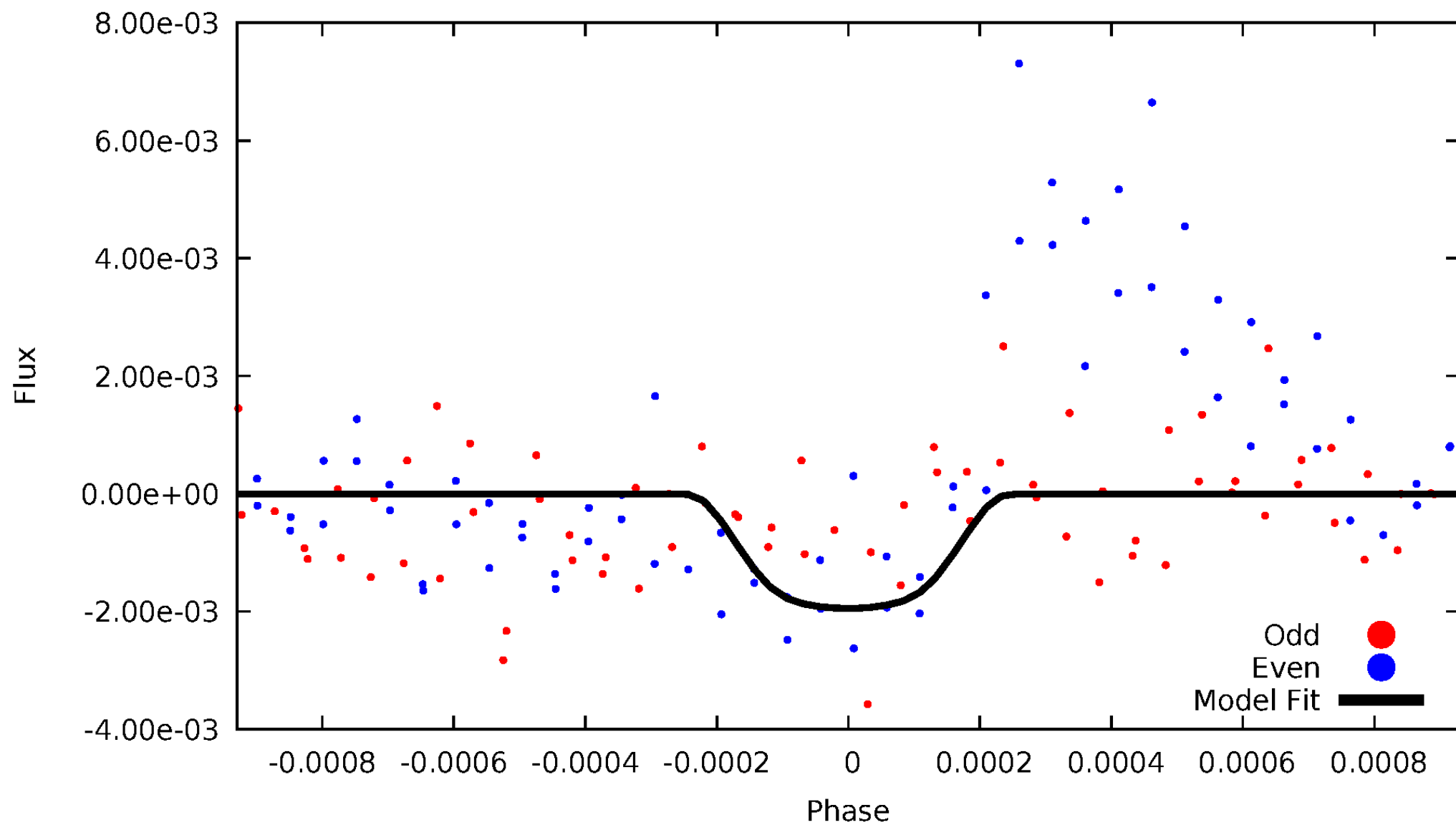


TCE 002438151-05



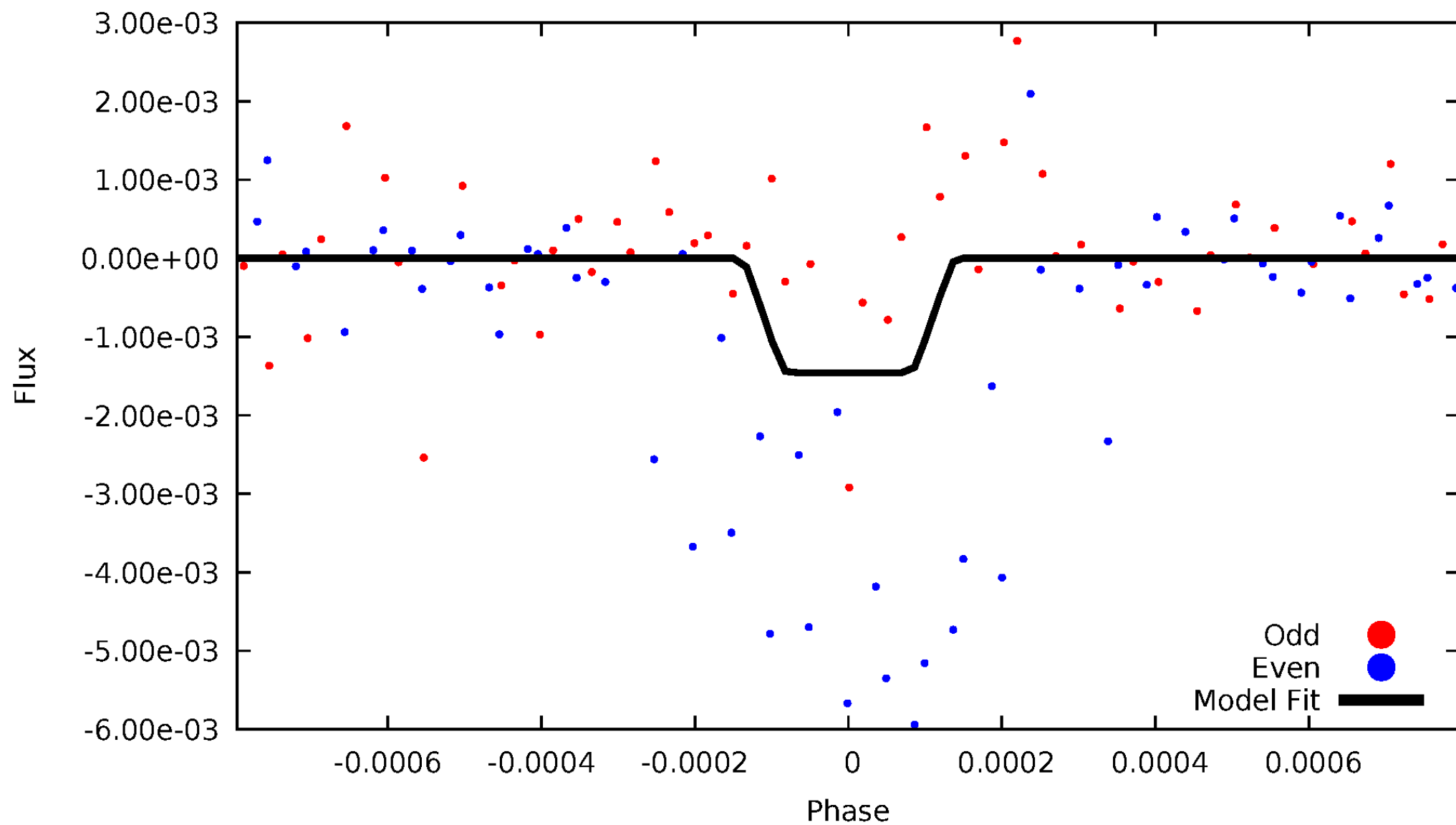
DV Odd/Even

TCE 002438151-05



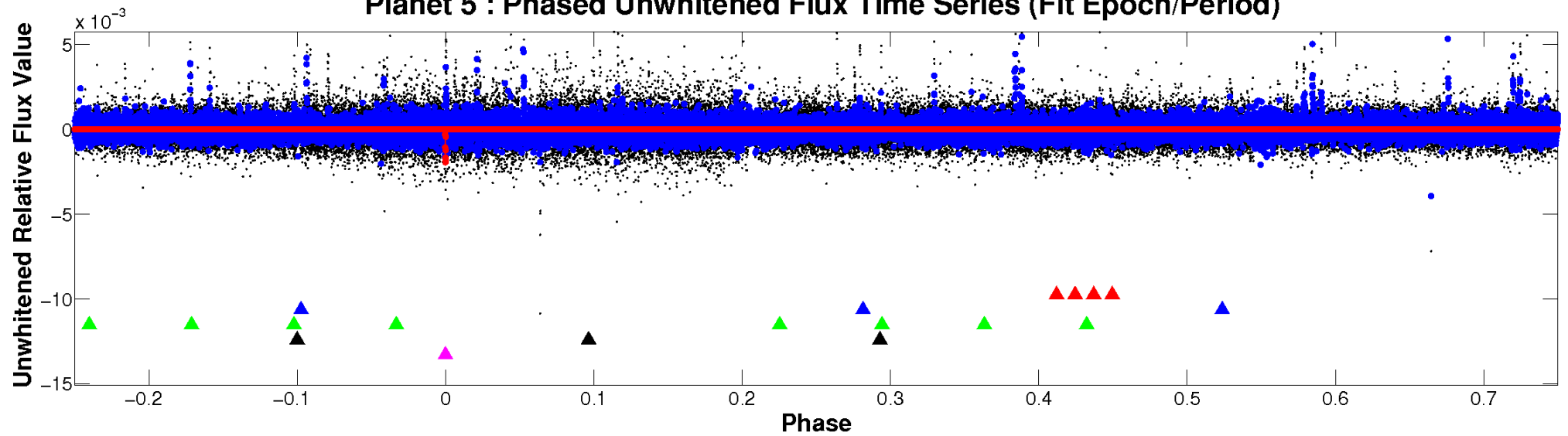
ALT Odd/Even

TCE 002438151-05

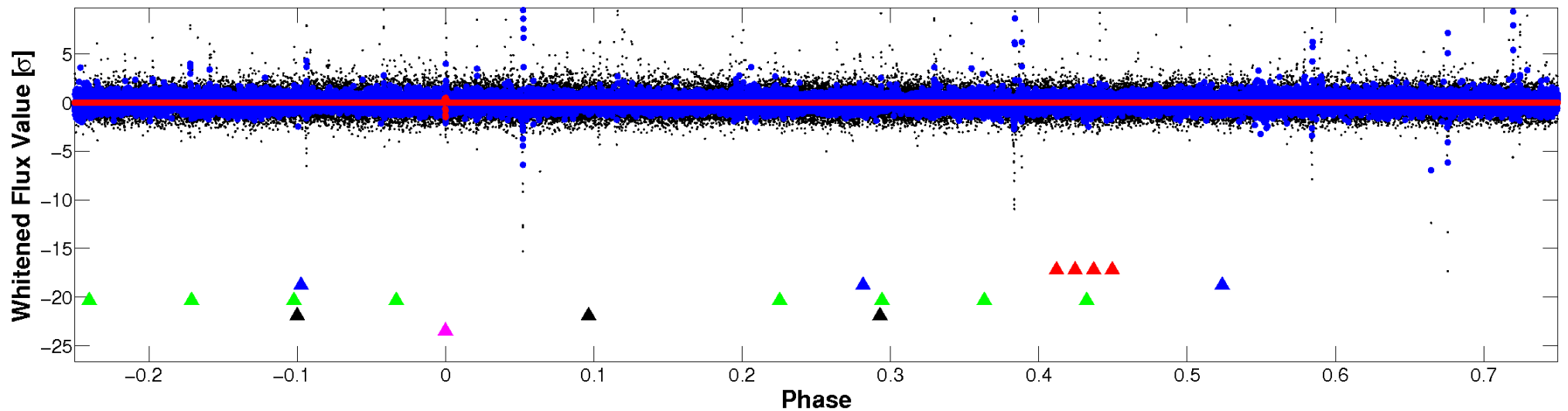


Non-Whitened Vs. Whitened Light Curve

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

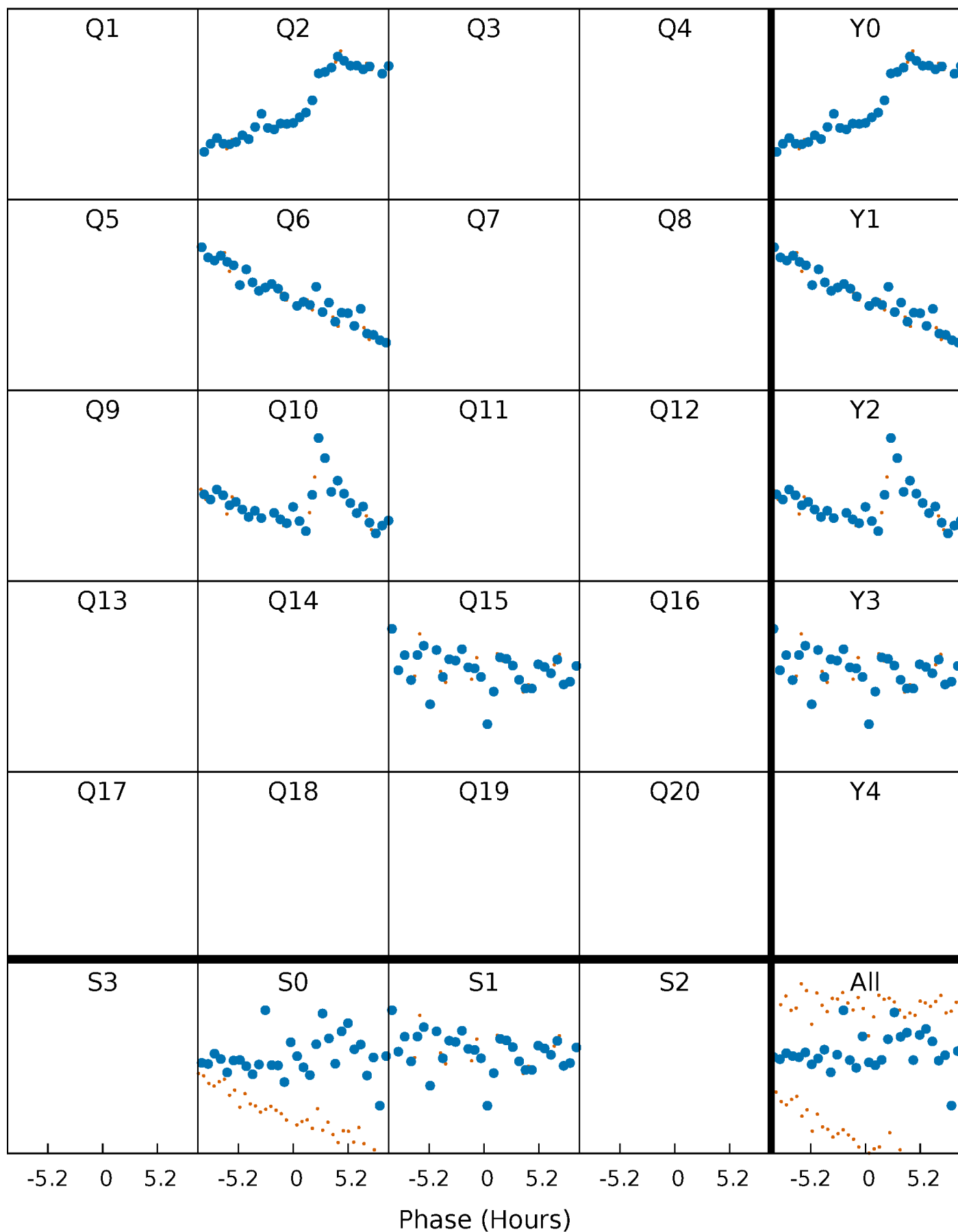


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



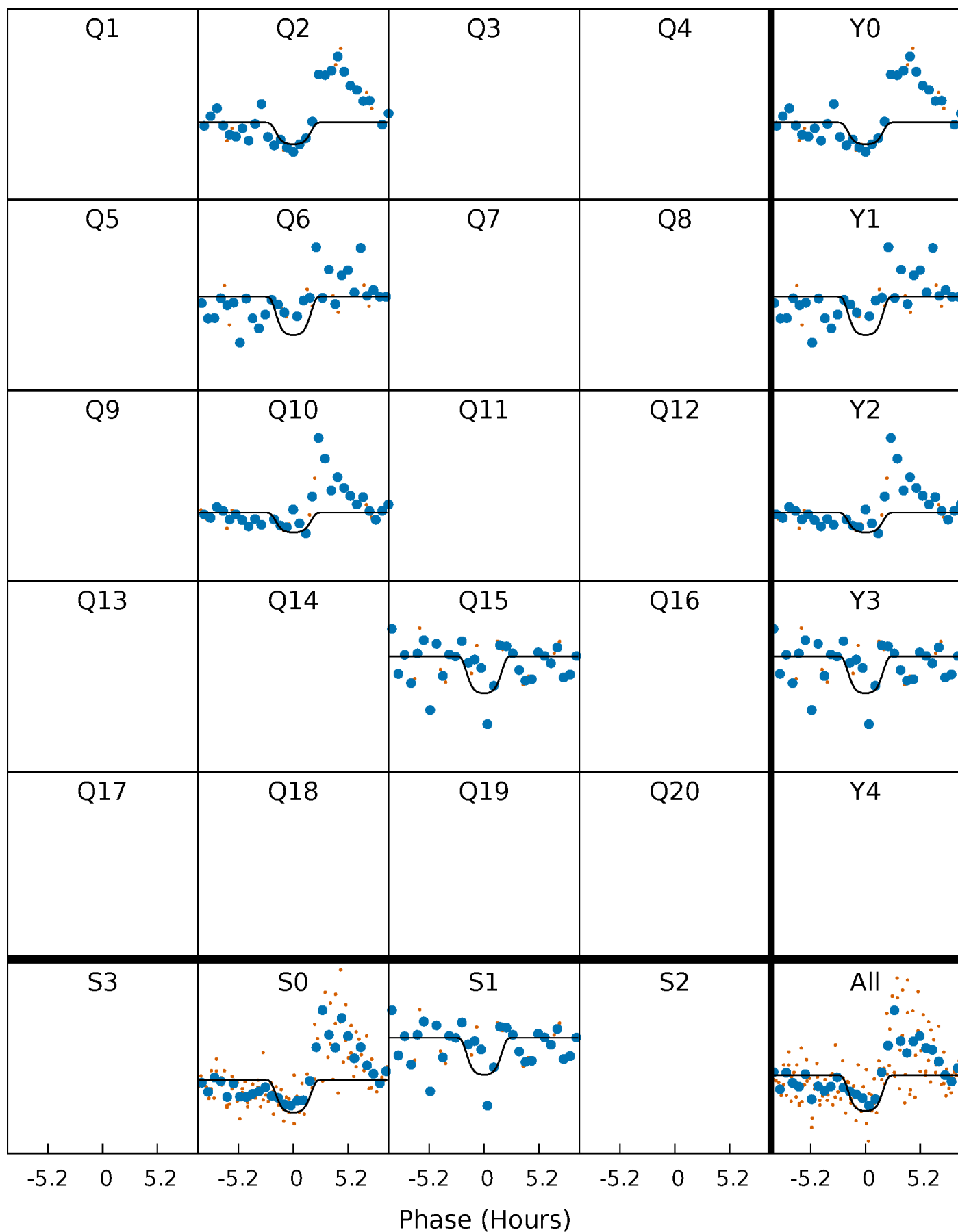
PDC Quarter-Phased Transit Curves

TCE 002438151-05 $P=405.596824$ Days $T_0=175.811091$ (BKJD)



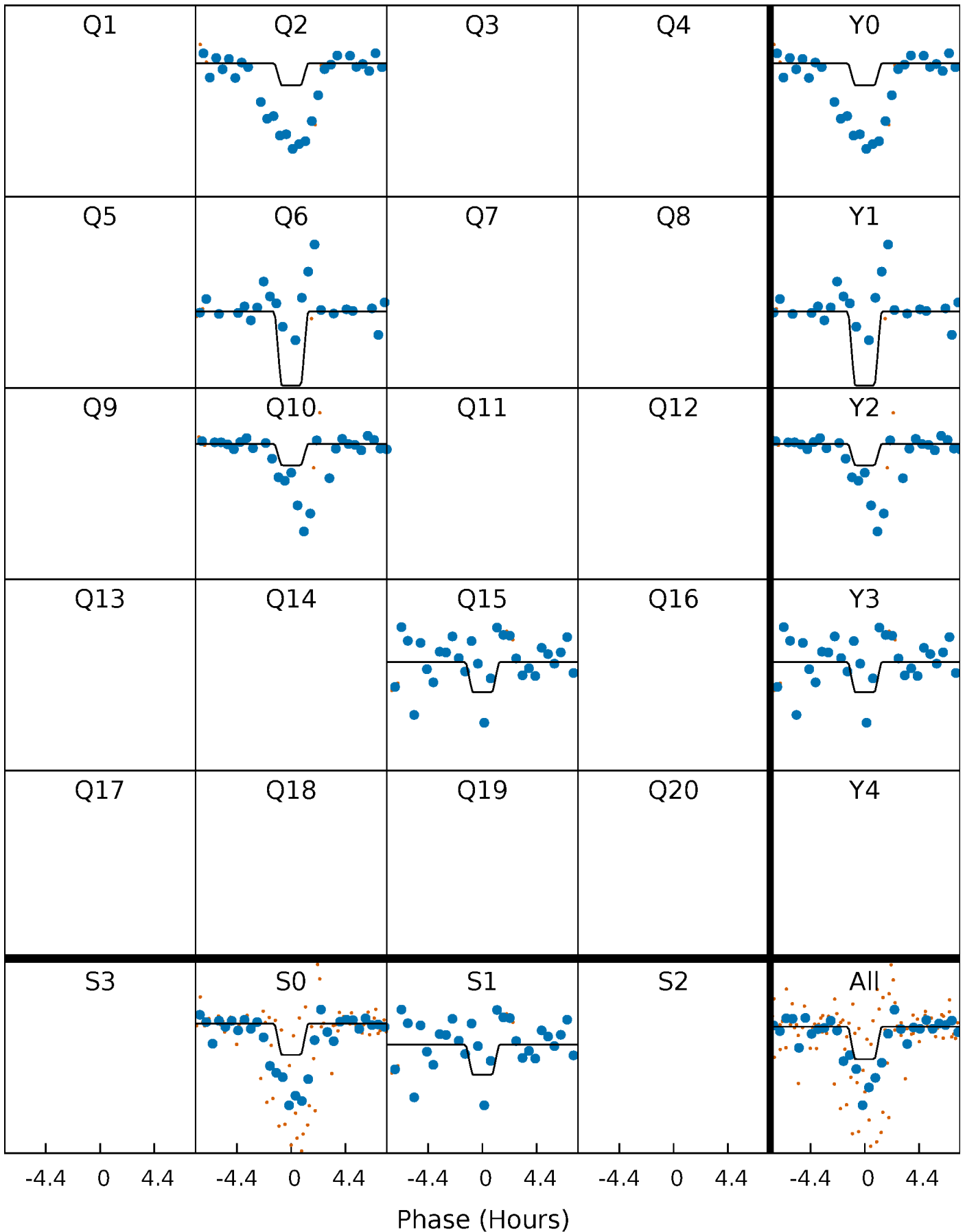
DV Quarter-Phased Transit Curves

TCE 002438151-05 $P=405.596824$ Days $T_0=175.811091$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

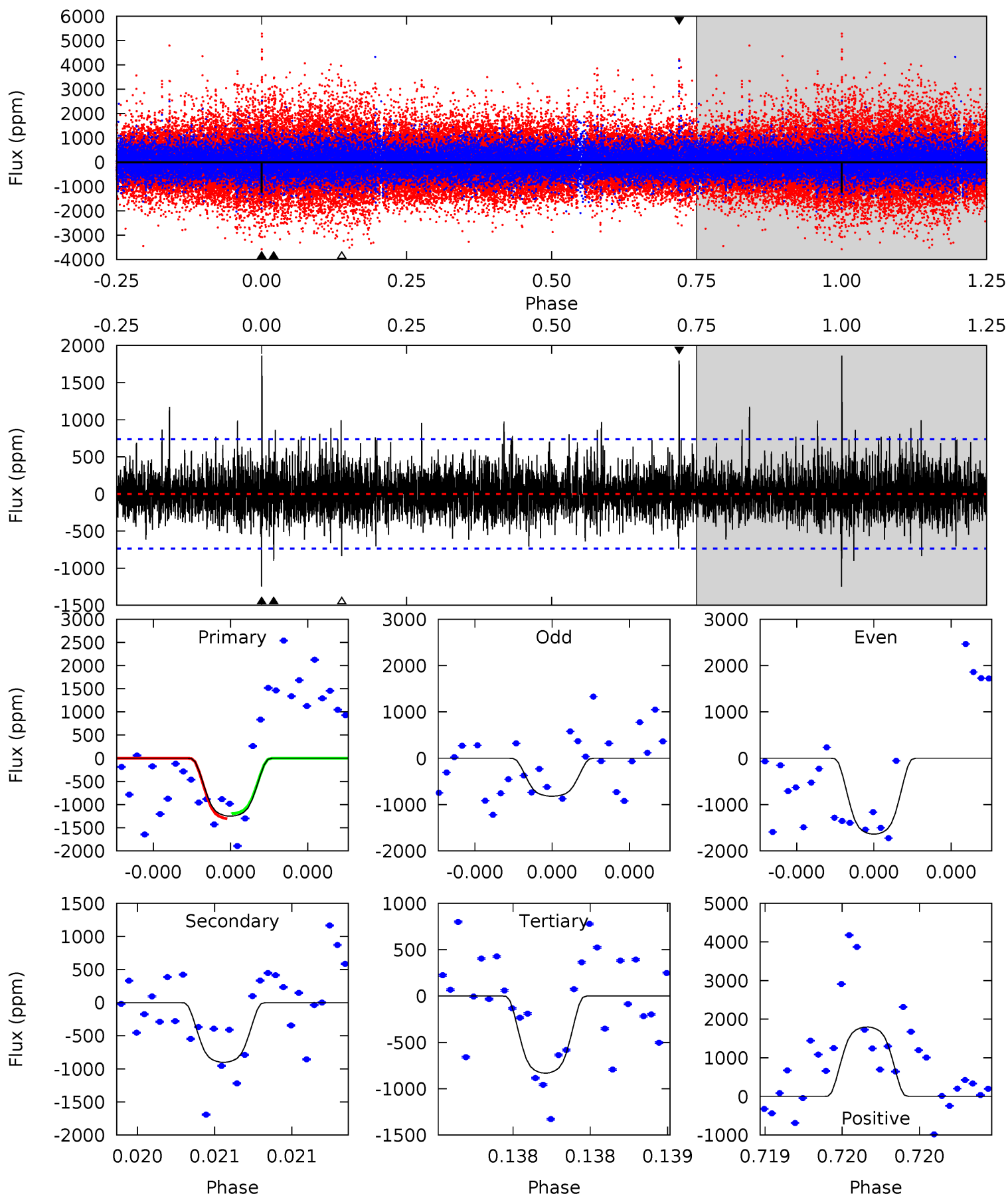
TCE 002438151-05 $P=405.599355$ Days $T_0=175.814941$ (BKJD)



DV Model-Shift Uniqueness Test

002438151-05, P = 405.596824 Days, E = 175.811091 Days

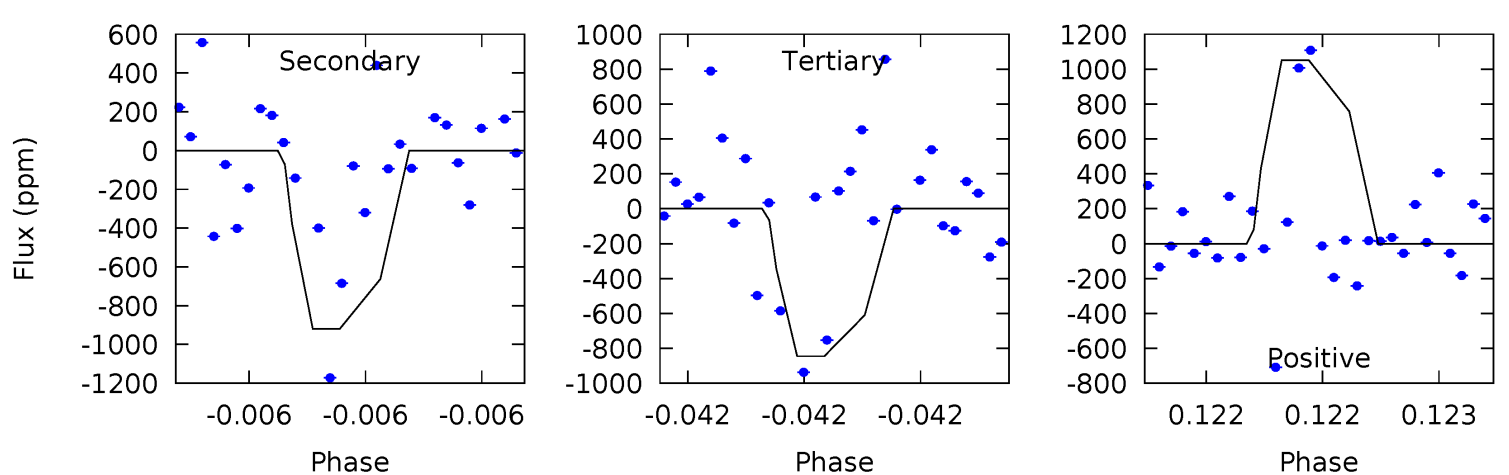
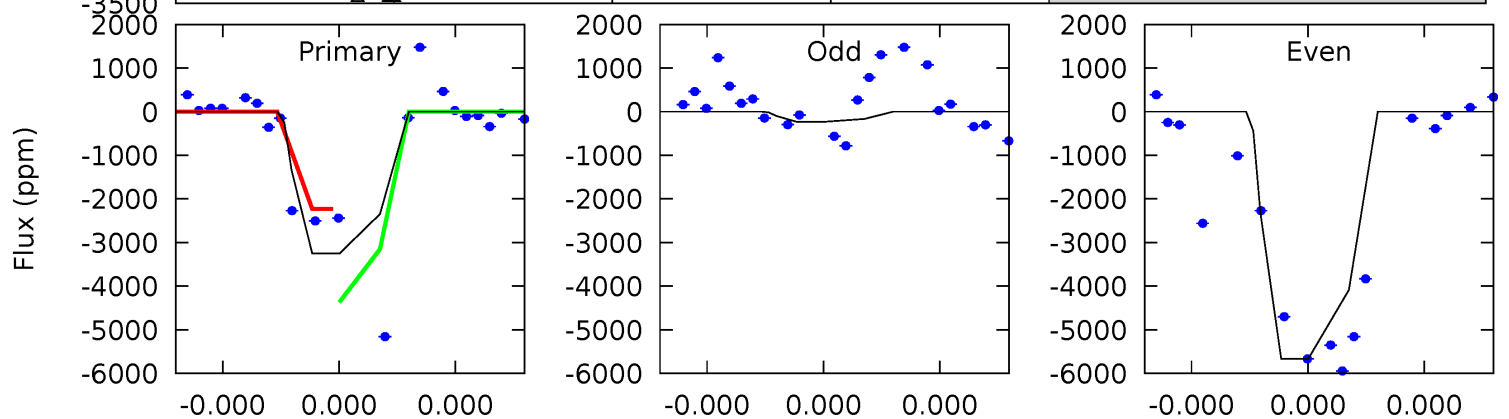
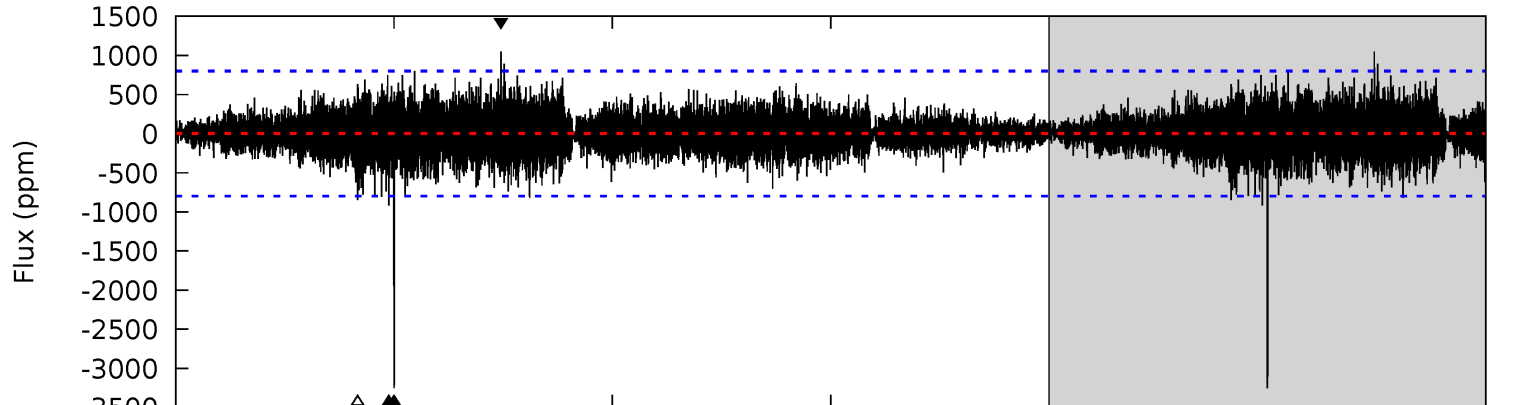
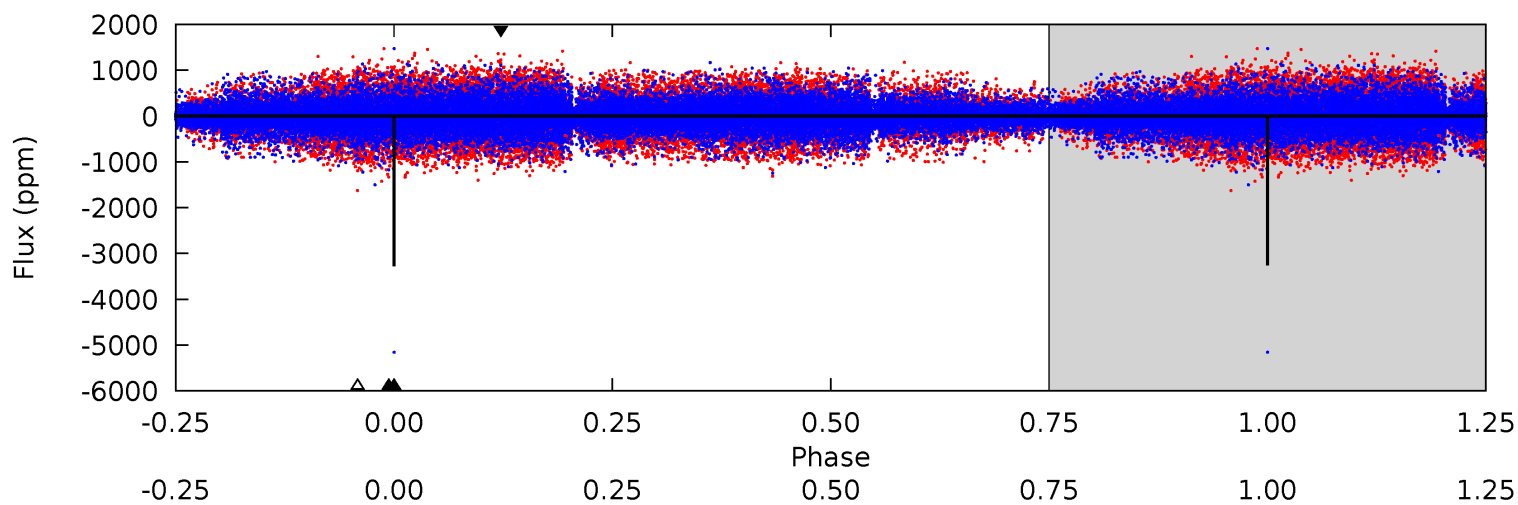
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.47	6.83	6.31	13.6	5.58	3.49	1.74	3.16	-4.16	0.52	-6.79	2.57	1.16	0.60	0.42



Alt Model-Shift Uniqueness Test

002438151-05, P = 405.599355 Days, E = 175.814941 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.1	6.52	6.00	7.46	5.67	3.63	1.11	17.1	15.7	0.52	-0.94	26.3	1.18	0.24	0



Stellar Parameters For KIC 002438151

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4596^{+138}_{-138}	$4.590^{+0.056}_{-0.024}$	$-0.080^{+0.300}_{-0.300}$	$0.694^{+0.045}_{-0.060}$	$0.683^{+0.068}_{-0.056}$	$2.880^{+0.677}_{-0.310}$
	+3%/-3%	+1%/-1%	+375%/-375%	+6%/-9%	+10%/-8%	+23%/-11%
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 002438151-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-901 ± 132	$3.89^{+0.83}_{-0.78}$	242^{+7}_{-9}	3773^{+326}_{-270}	29647^{+18309}_{-9932}
Alt.	-919 ± 141	$2.89^{+0.79}_{-0.80}$	241^{+8}_{-9}	4189^{+602}_{-373}	54267^{+49296}_{-21315}

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 $A_{obs} \gg 1.0$

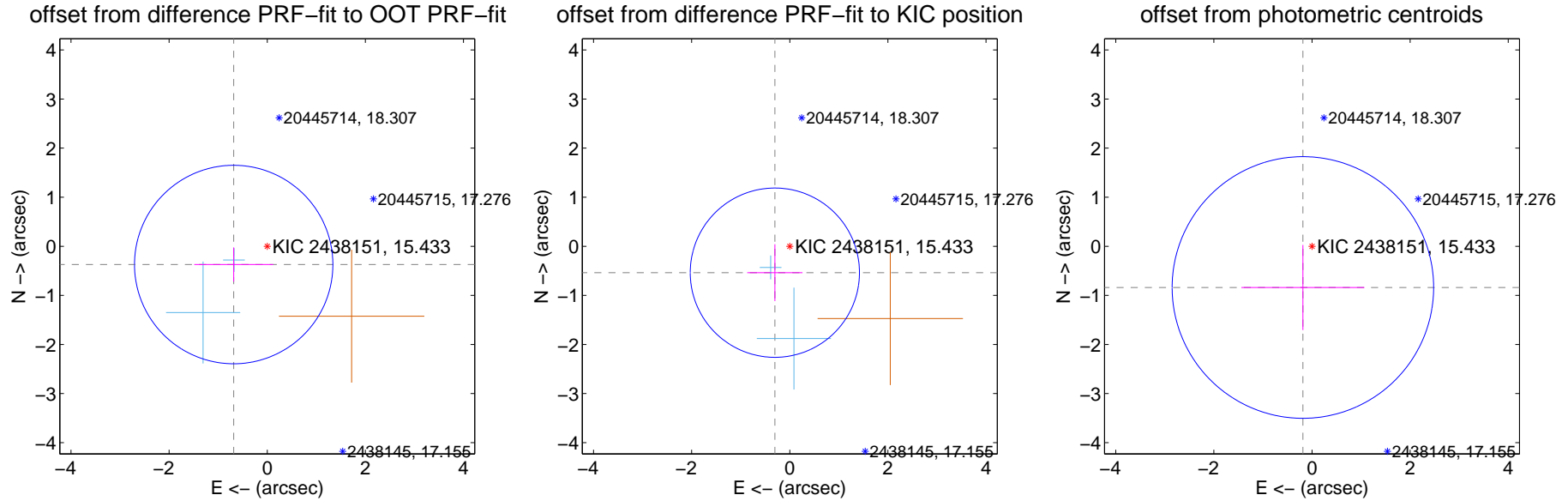
DV Centroid Data

Supplemental centroid analysis for 002438151-05. Kepler magnitude: 15.43. Transit SNR 6.74

There are 2 quarters with good PRF difference image offsets

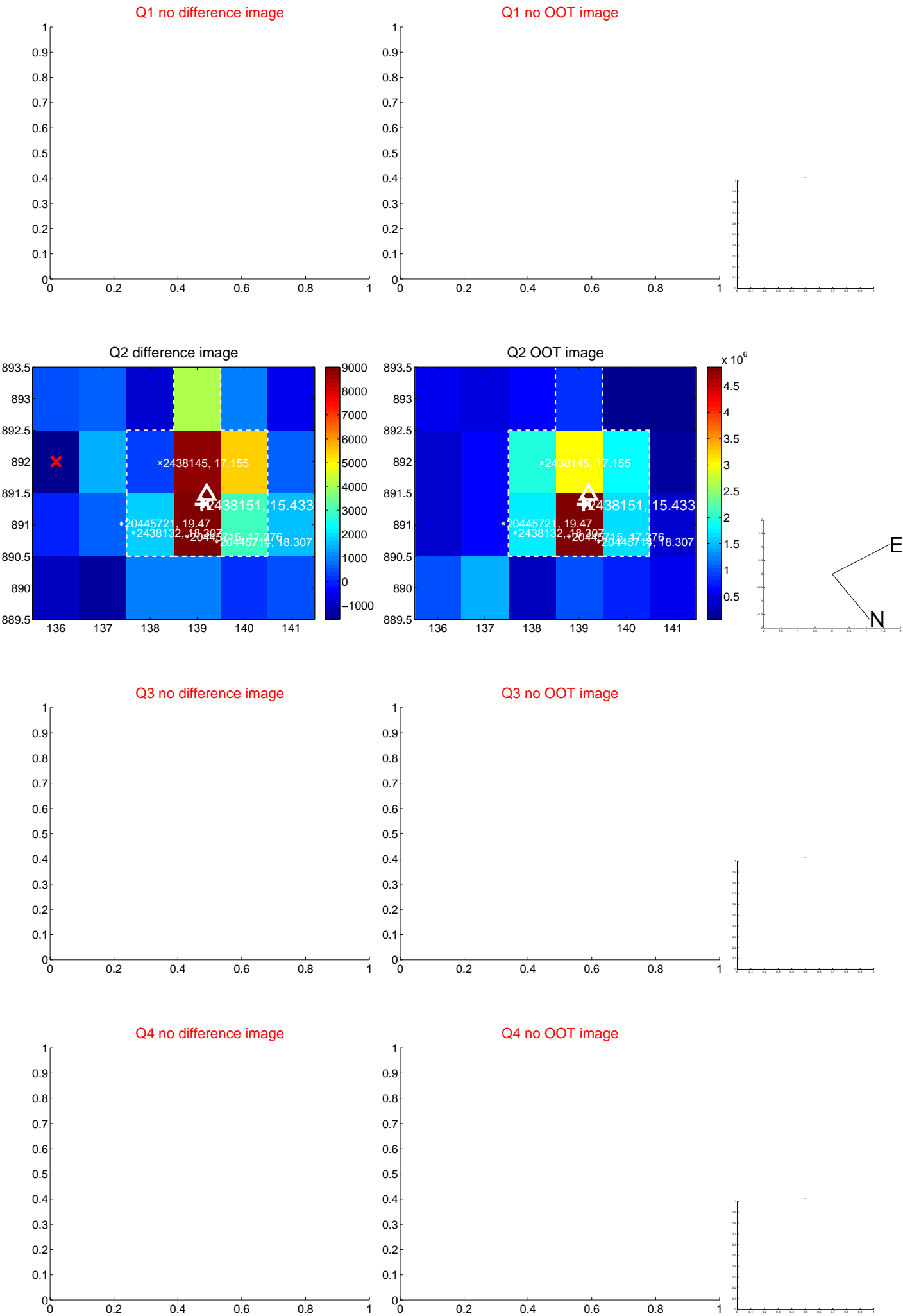
The direct PRF centroid is offset from the target star catalog position by about 1.49 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.778 ± 0.674	1.15	0.684 ± 0.805	-0.372 ± 0.348
PRF-fit source offset from KIC position	0.617 ± 0.575	1.07	0.304 ± 0.563	-0.537 ± 0.578
photometric centroid source offset	0.86 ± 0.89	0.97	0.19 ± 1.25	-0.84 ± 0.87

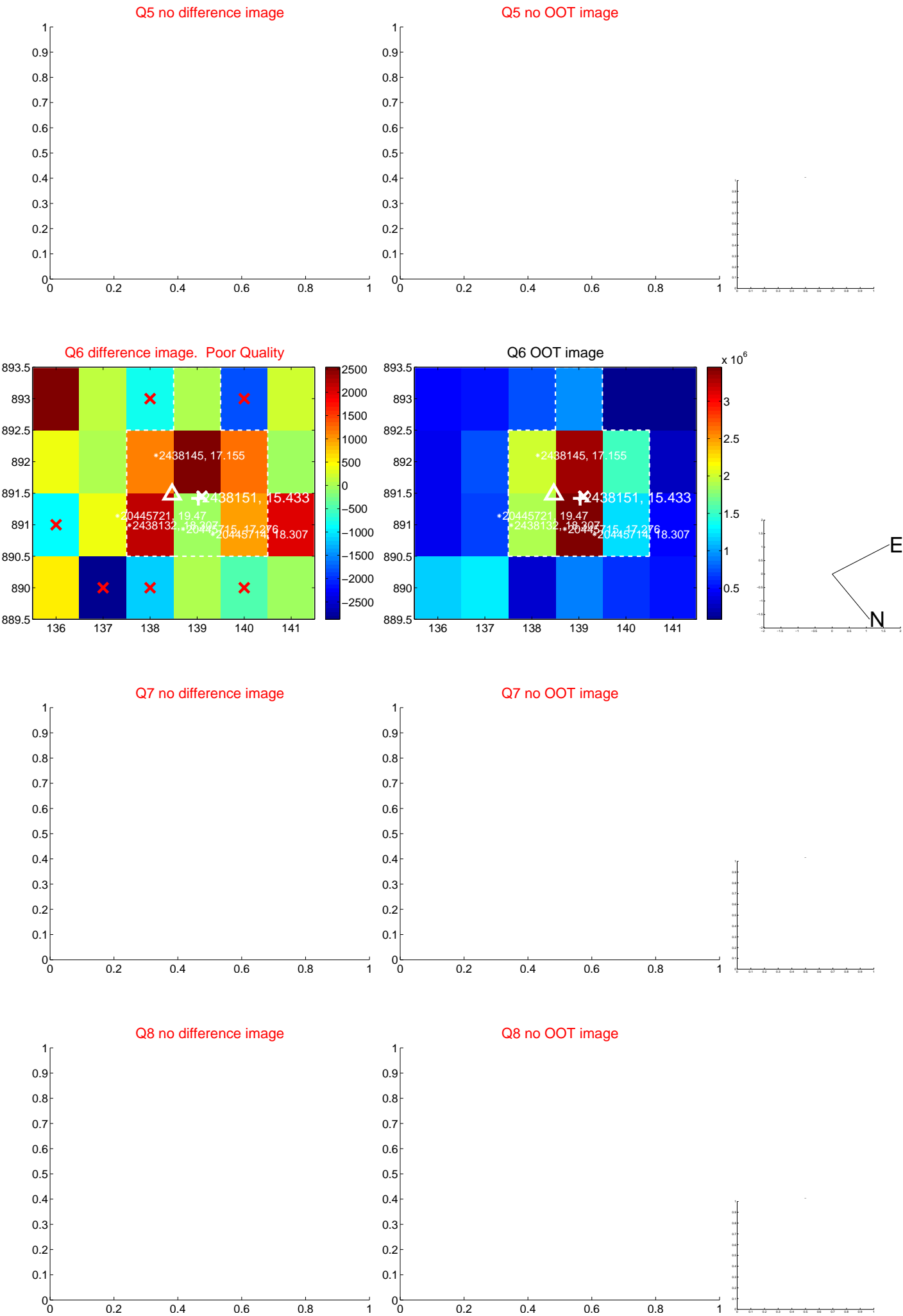


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

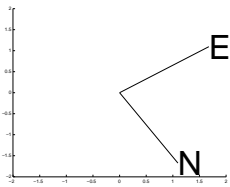
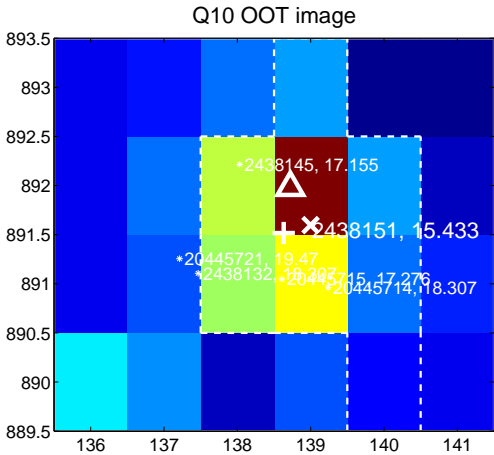
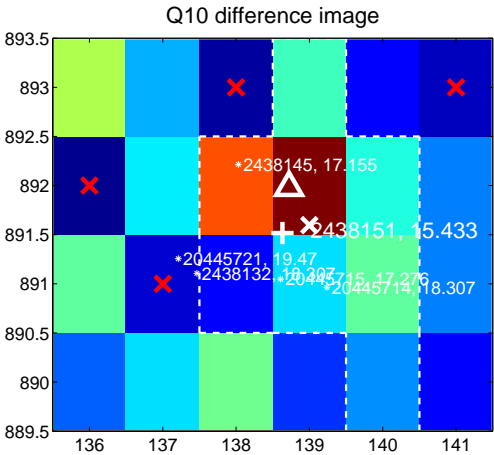


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

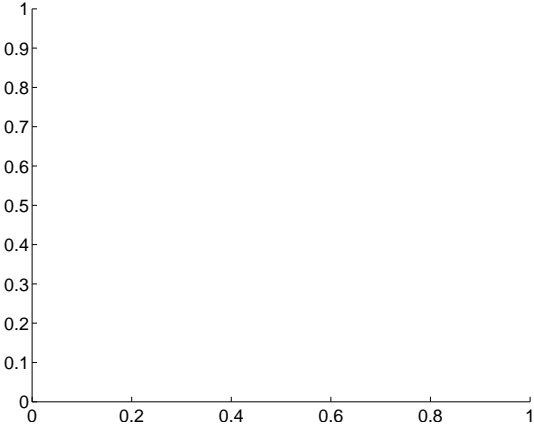
Q9 no difference image



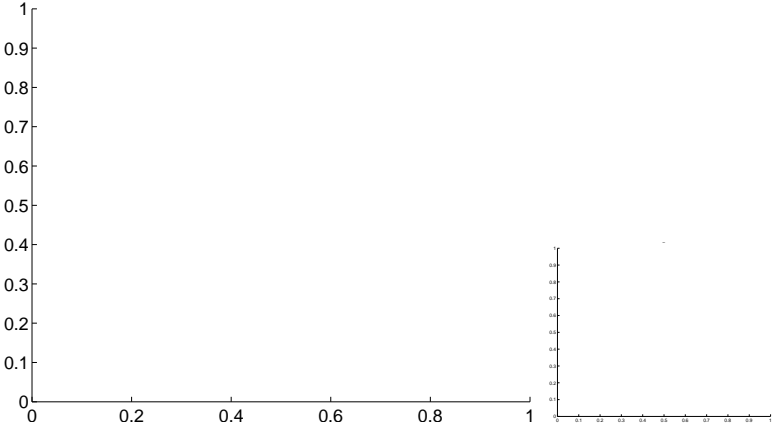
Q9 no OOT image



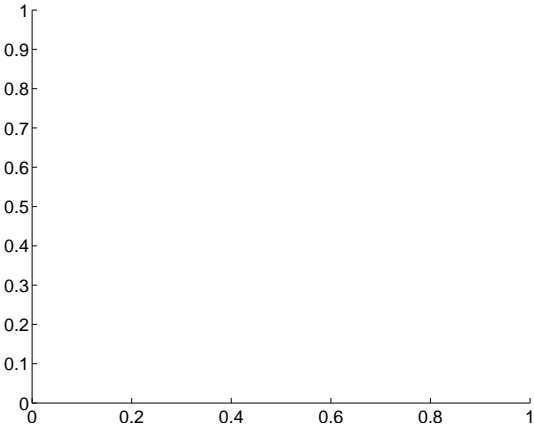
Q11 no difference image



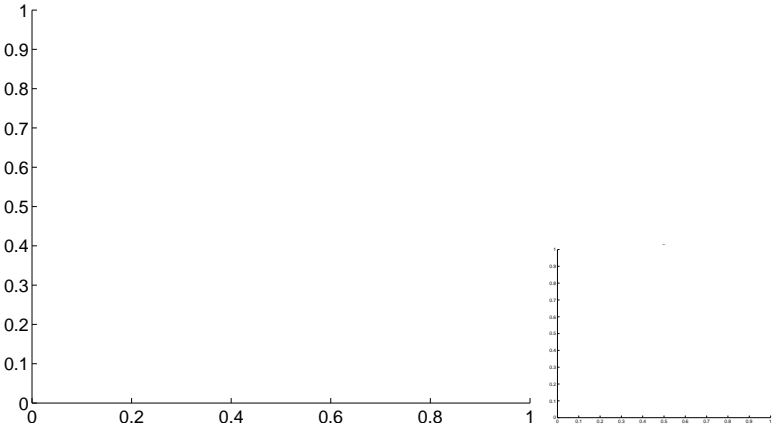
Q11 no OOT image



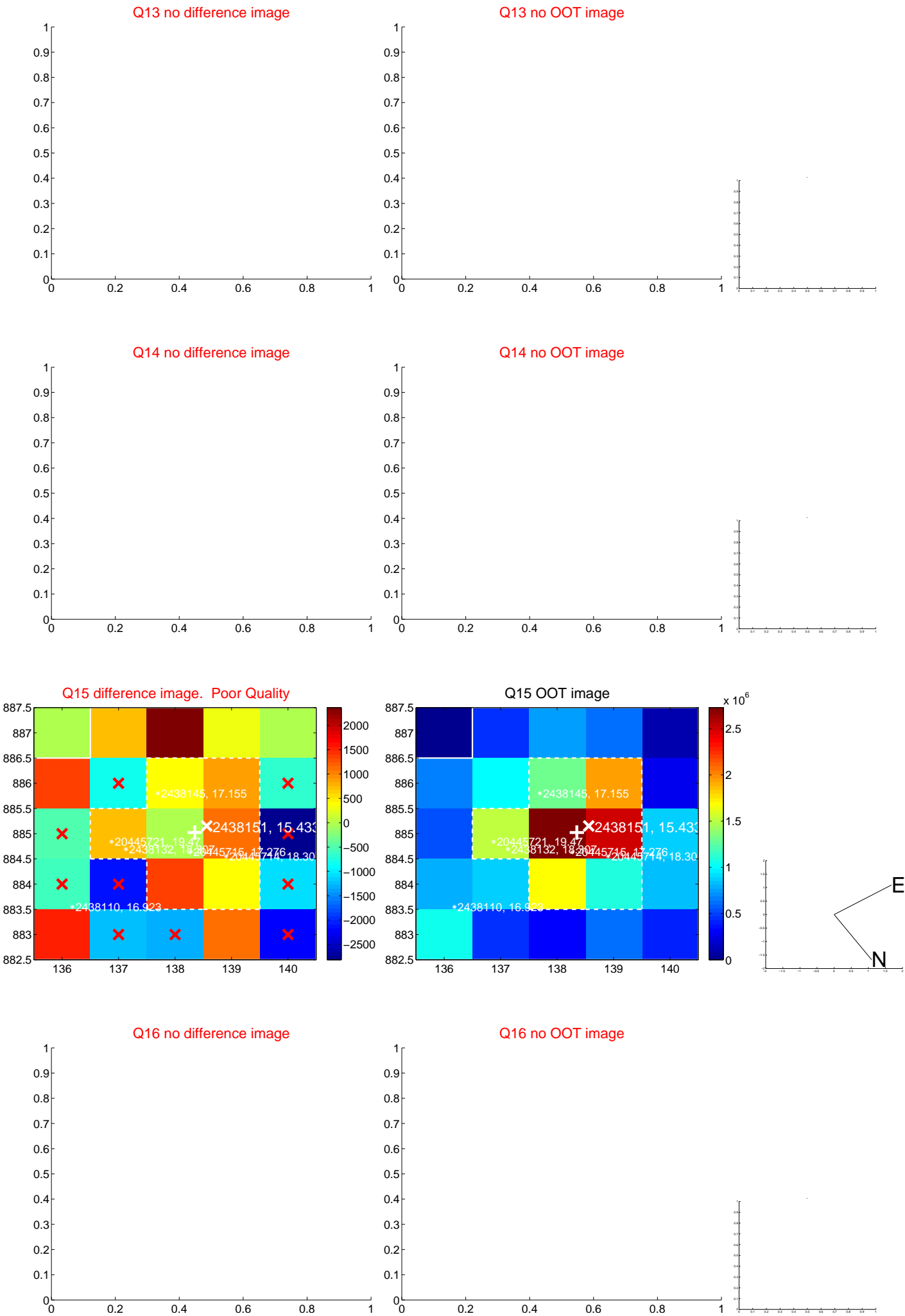
Q12 no difference image



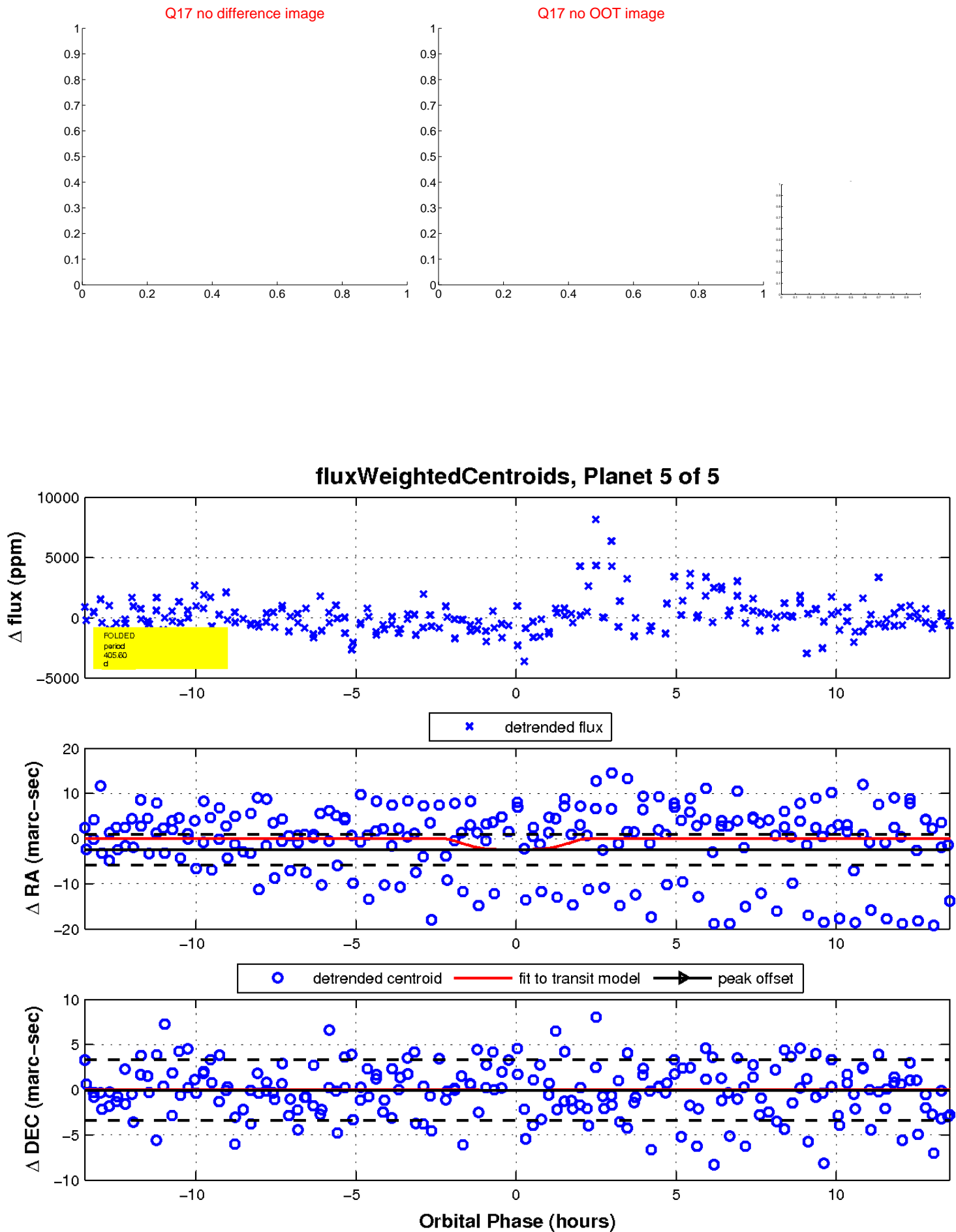
Q12 no OOT image



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

