

KIC 005221138

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})
005221138-01	OBS	No	574.368389	413.768104	462.8	8.327	12.7	6.9	1.95	5317	4.49	1.70
005221138-02	OBS	No	467.425923	240.497769	359.4	1.229	10.5	3.4	1.95	5317	4.66	2.24
005221138-03	OBS	No	523.651941	531.586742	370.9	5.159	9.1	5.0	1.95	5317	3.80	1.92
005221138-04	OBS	No	424.921738	237.524644	385.5	4.542	10.0	6.2	1.95	5317	3.92	2.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005221138-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005221138-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

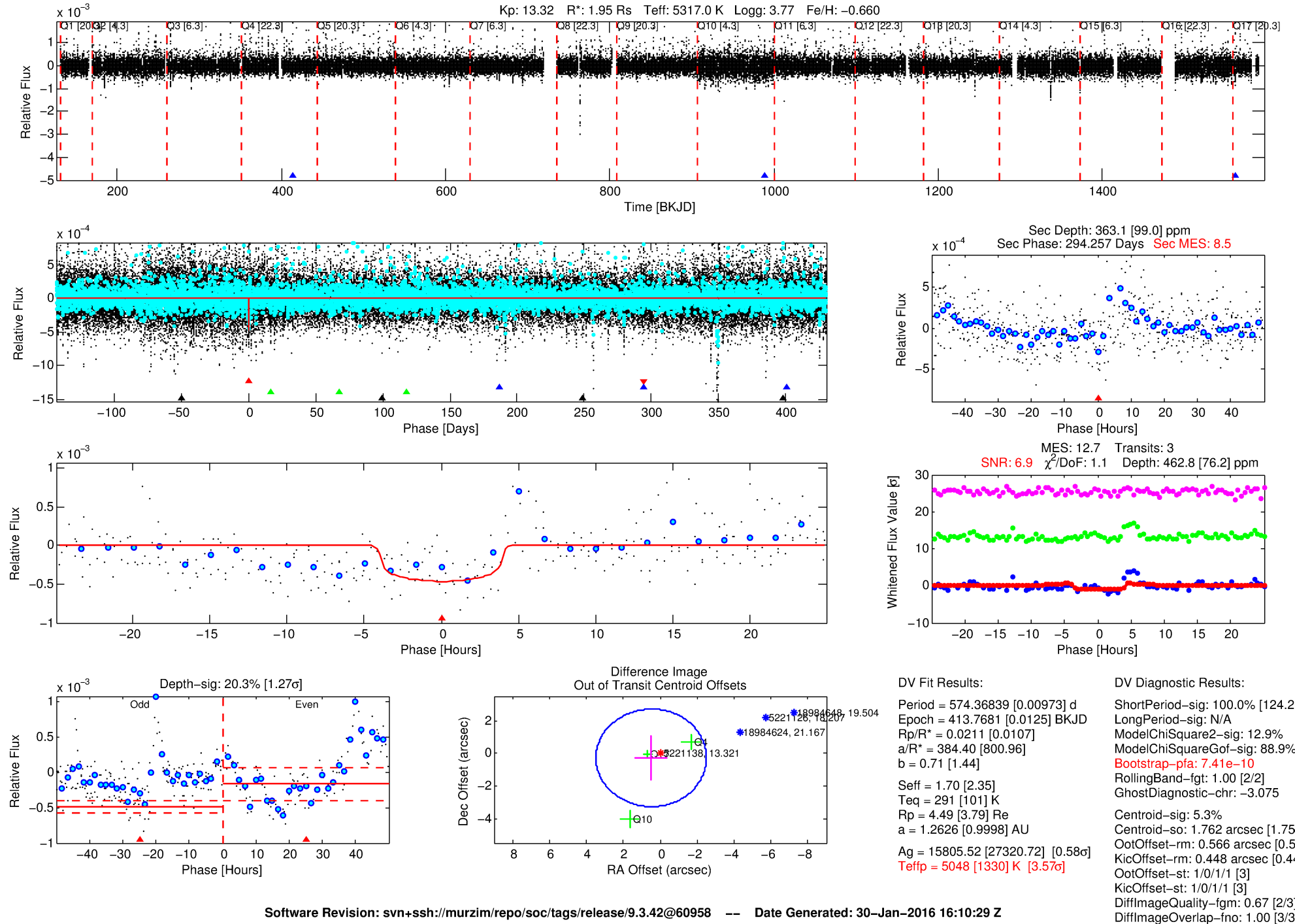
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005221138-01

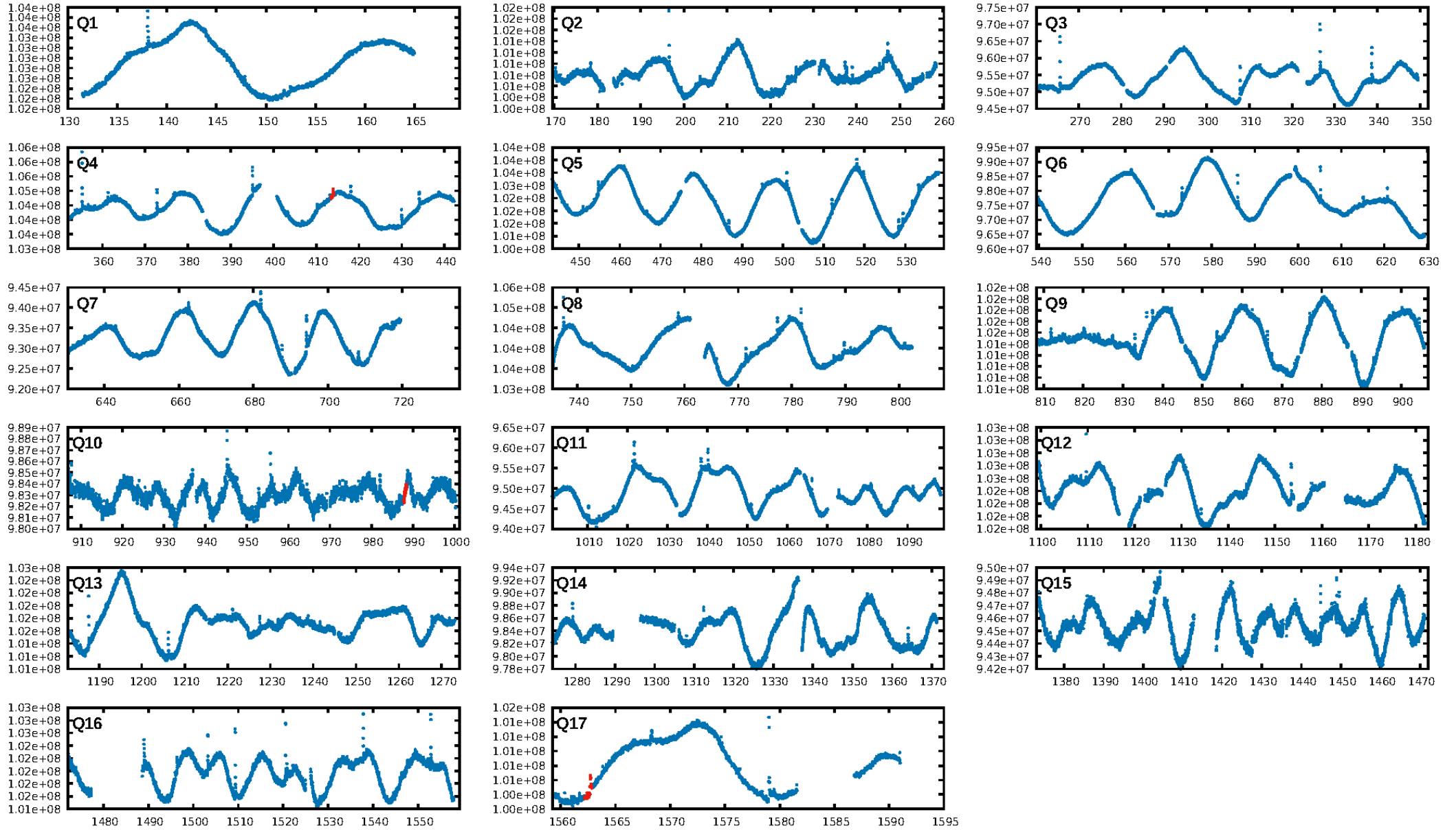
No Significant Match Found

DV One-Page Summary

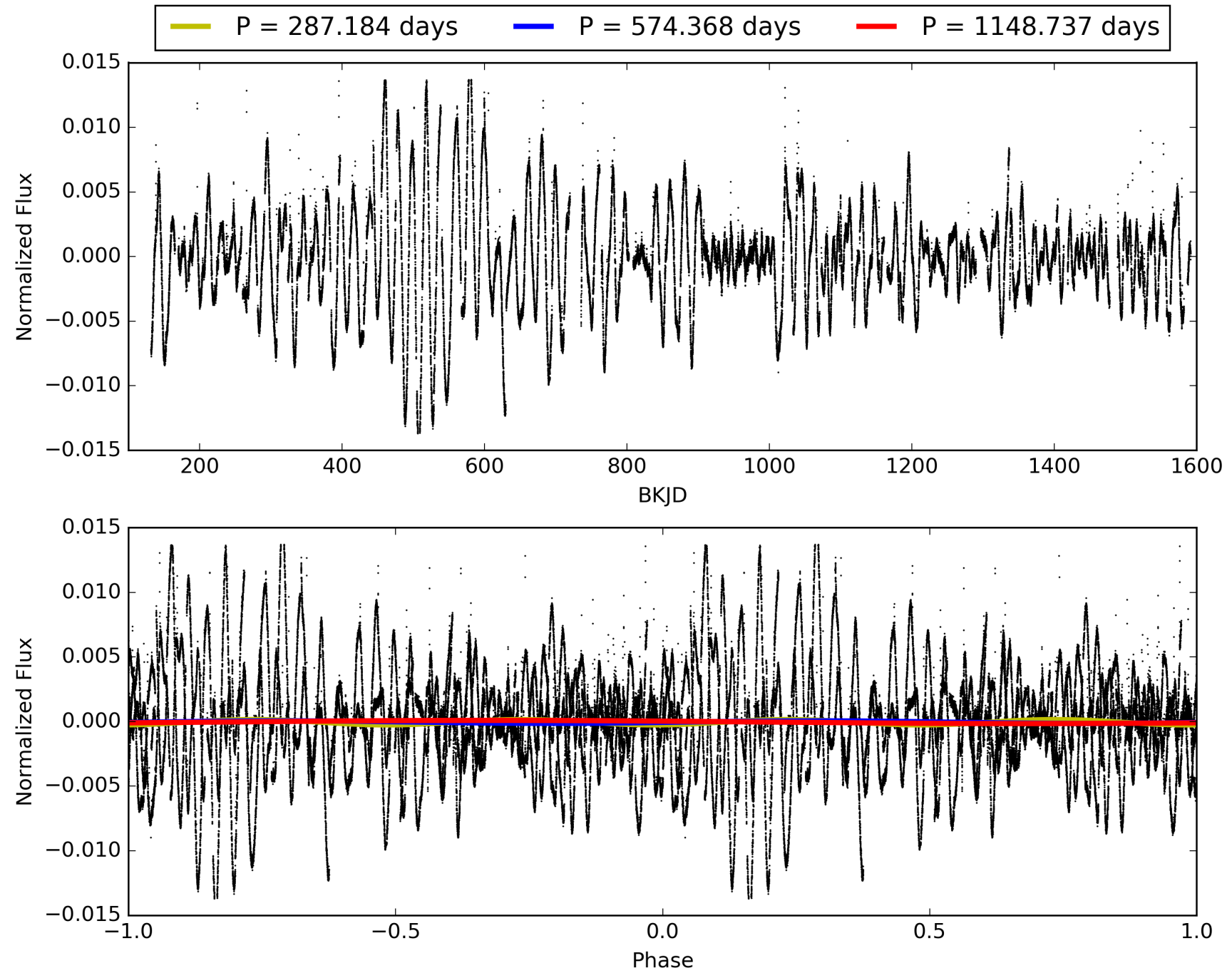
KIC: 5221138 Candidate: 1 of 4 Period: 574.368 d



TCE 005221138-01, PDC Light Curves

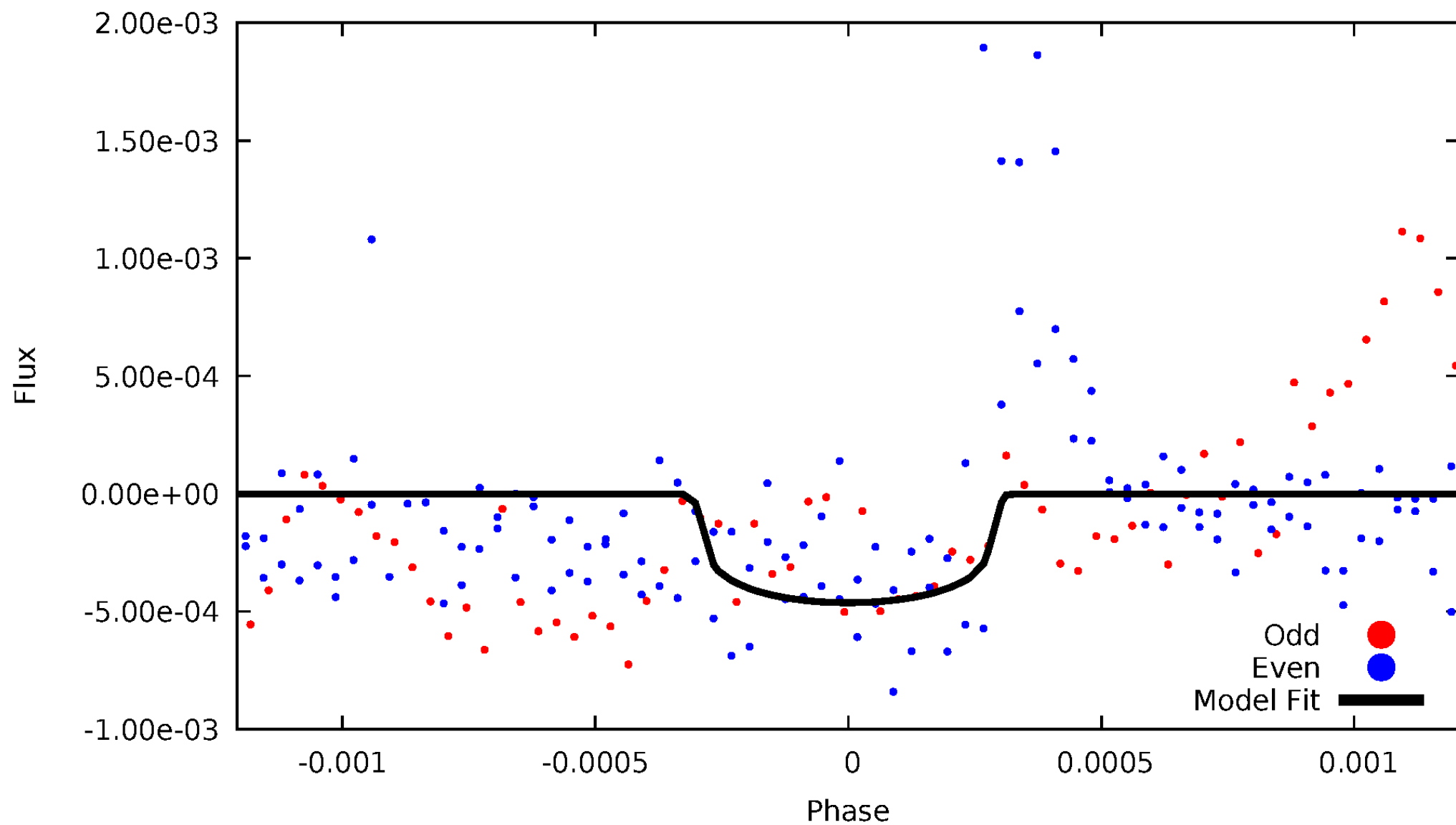


TCE 005221138-01



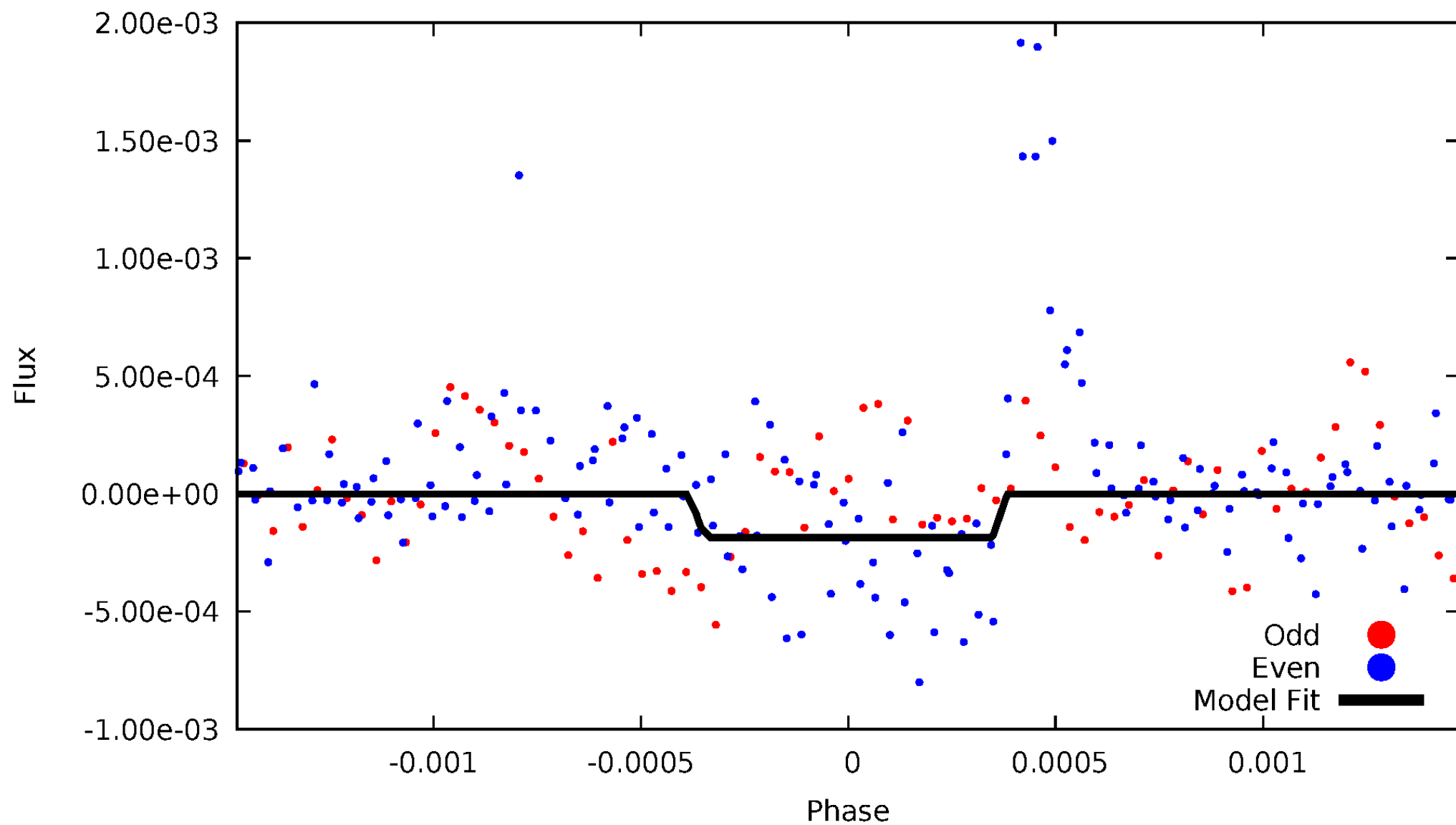
DV Odd/Even

TCE 005221138-01



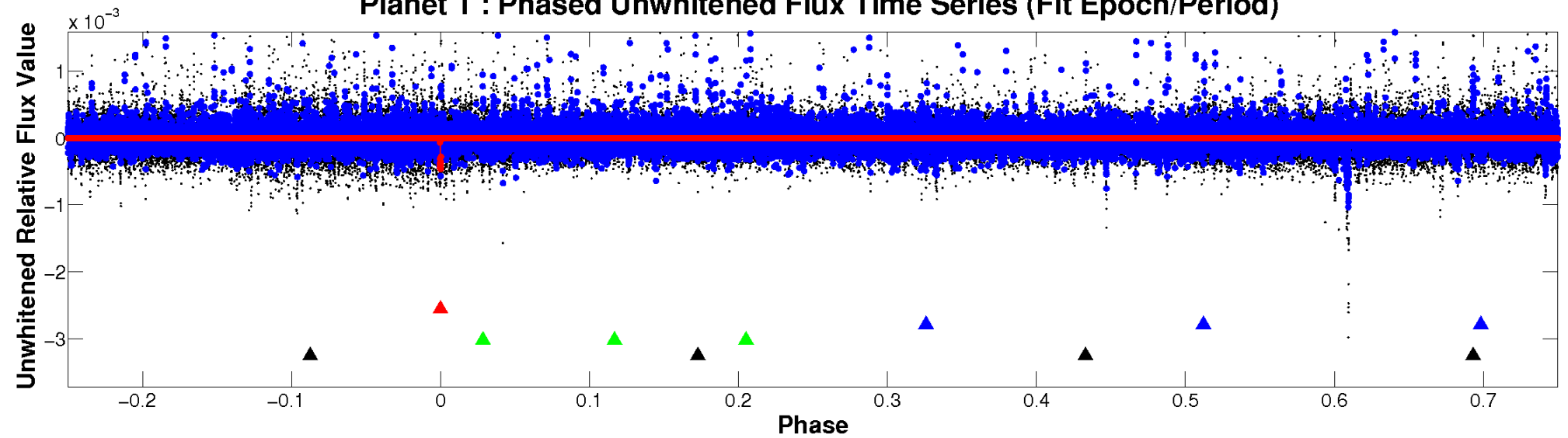
ALT Odd/Even

TCE 005221138-01

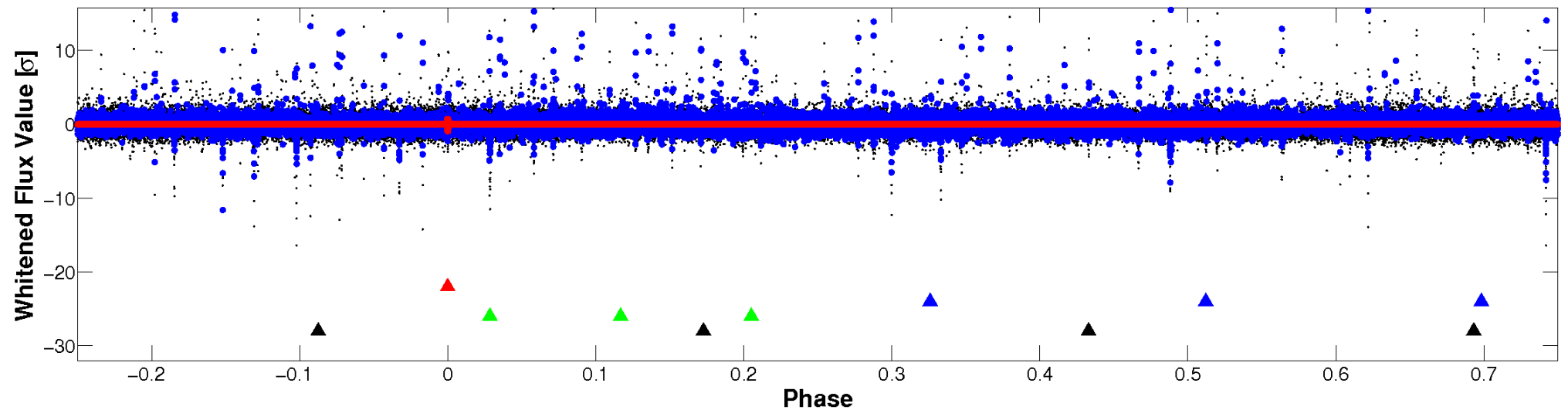


Non-Whitened Vs. Whitened Light Curve

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

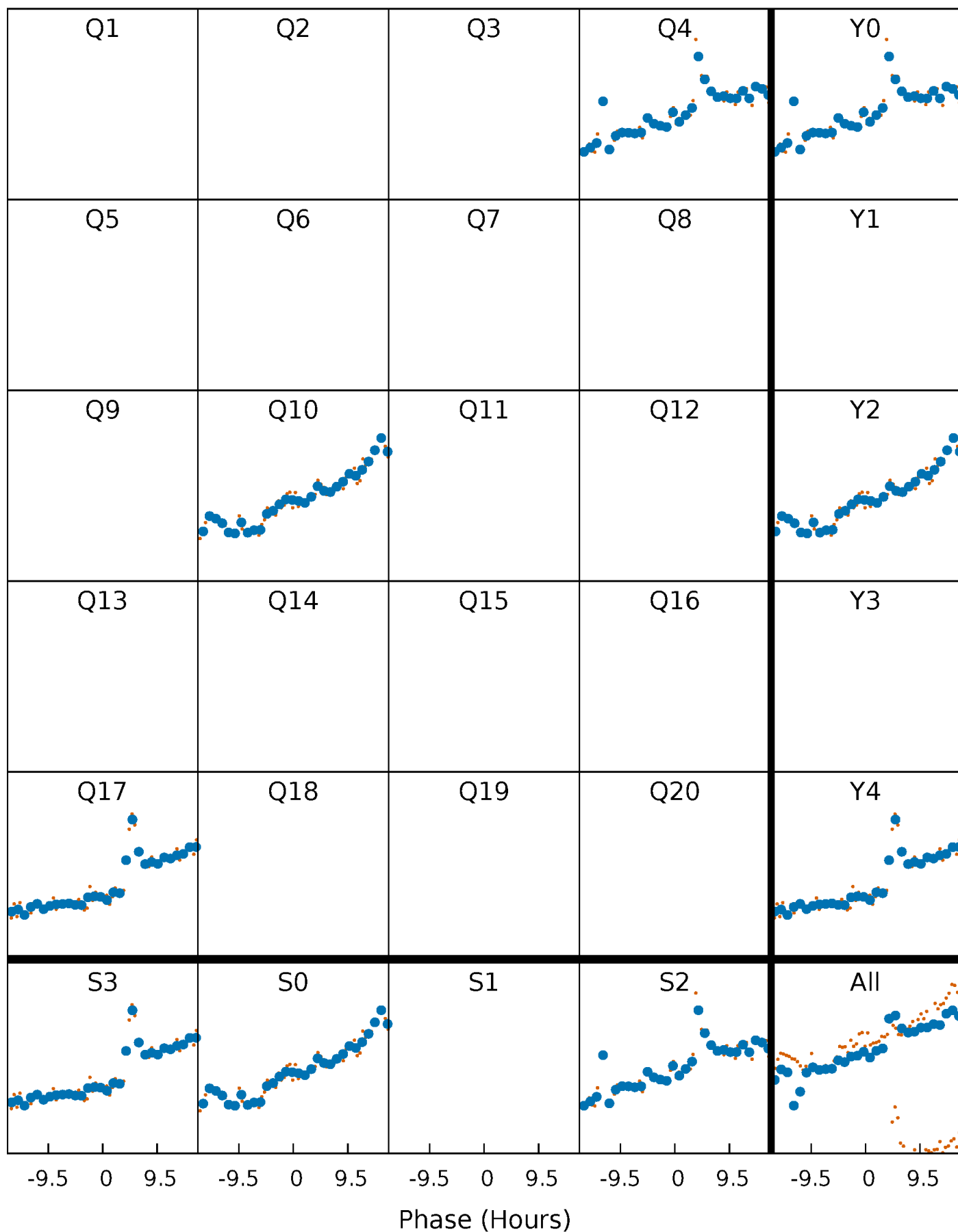


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



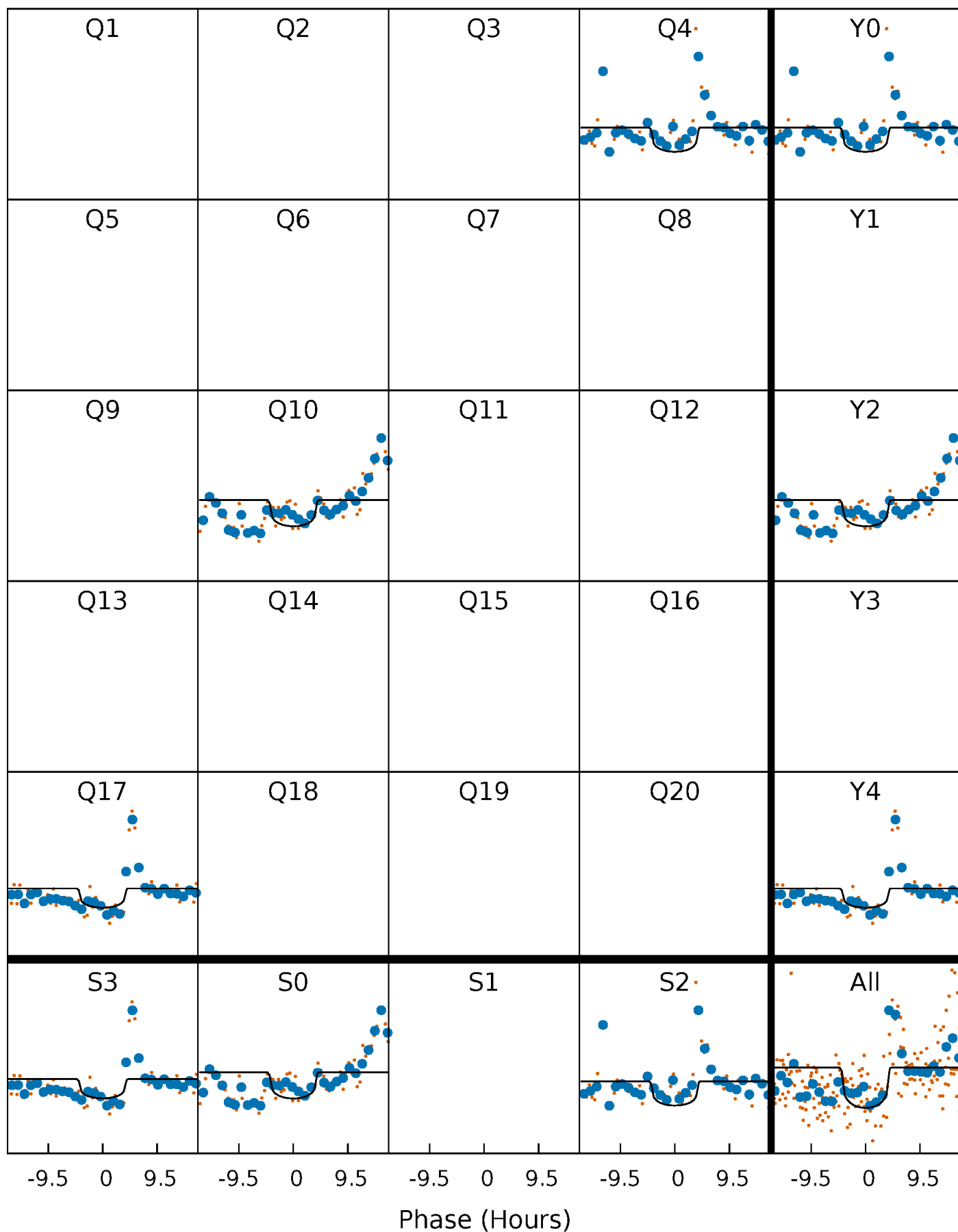
PDC Quarter-Phased Transit Curves

TCE 005221138-01 P=574.368390 Days $T_0=413.768104$ (BKJD)



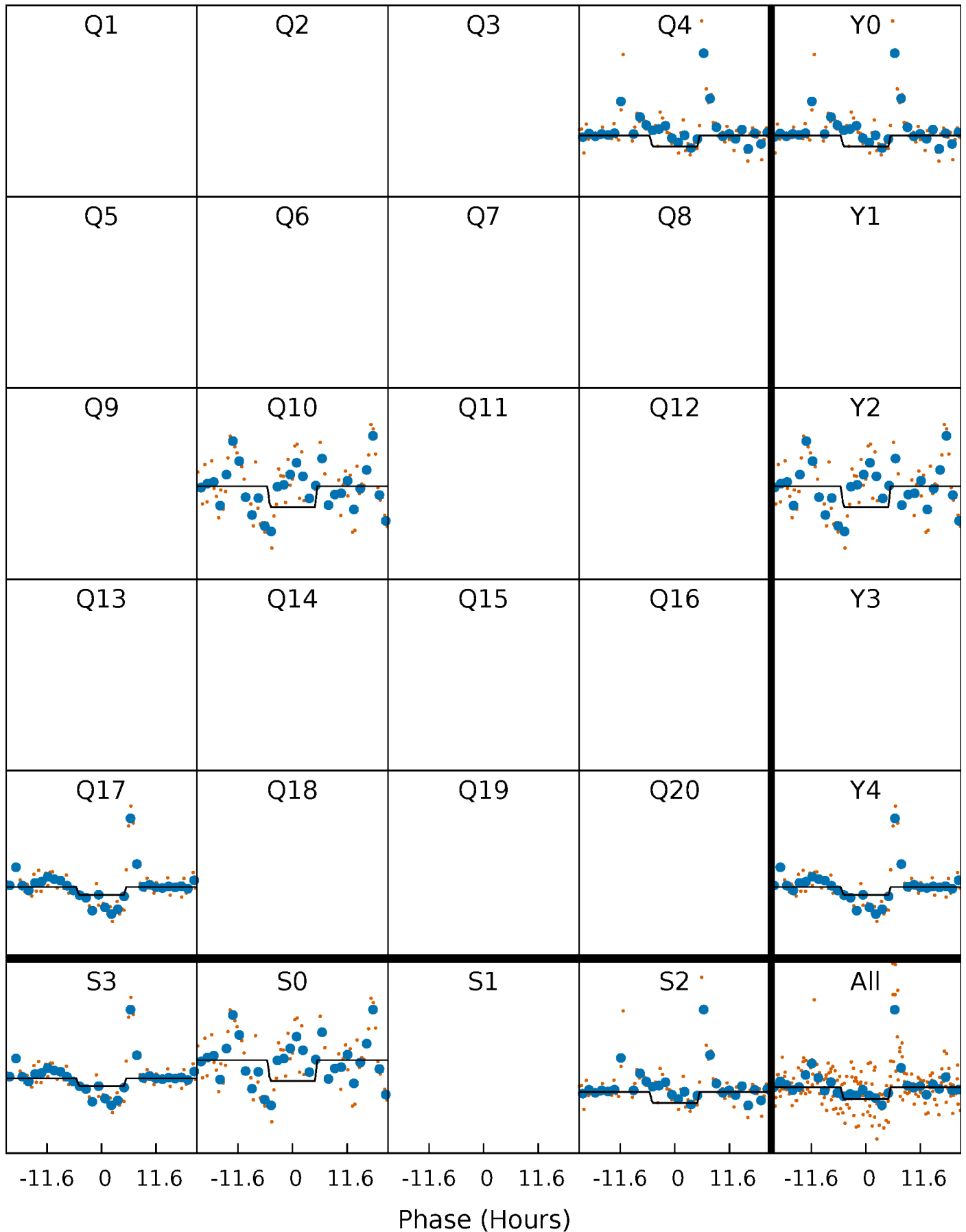
DV Quarter-Phased Transit Curves

TCE 005221138-01 P=574.368390 Days $T_0=413.768104$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

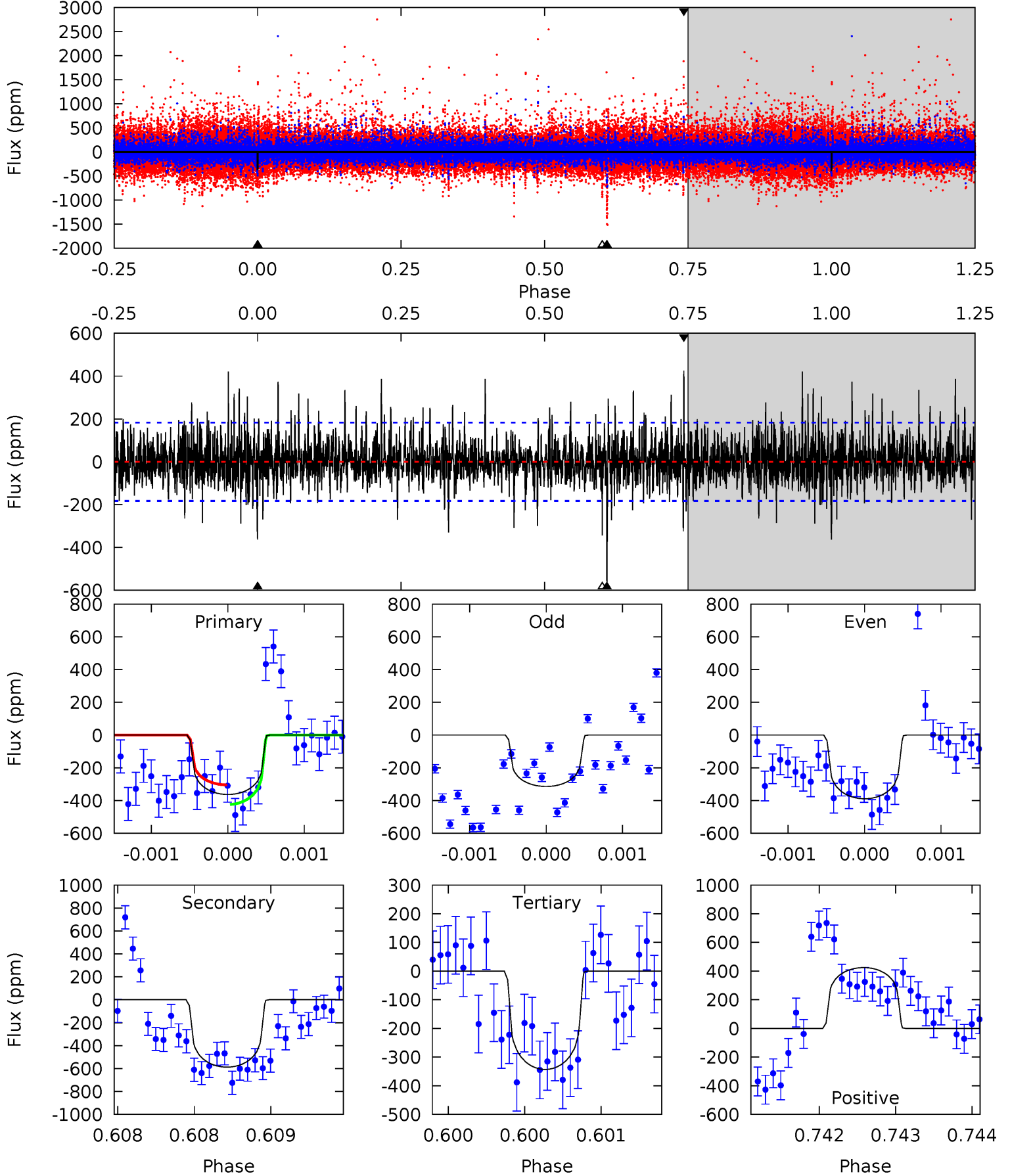
TCE 005221138-01 P=574.387372 Days $T_0=413.682881$ (BKJD)



DV Model-Shift Uniqueness Test

005221138-01, P = 574.368390 Days, E = 413.768104 Days

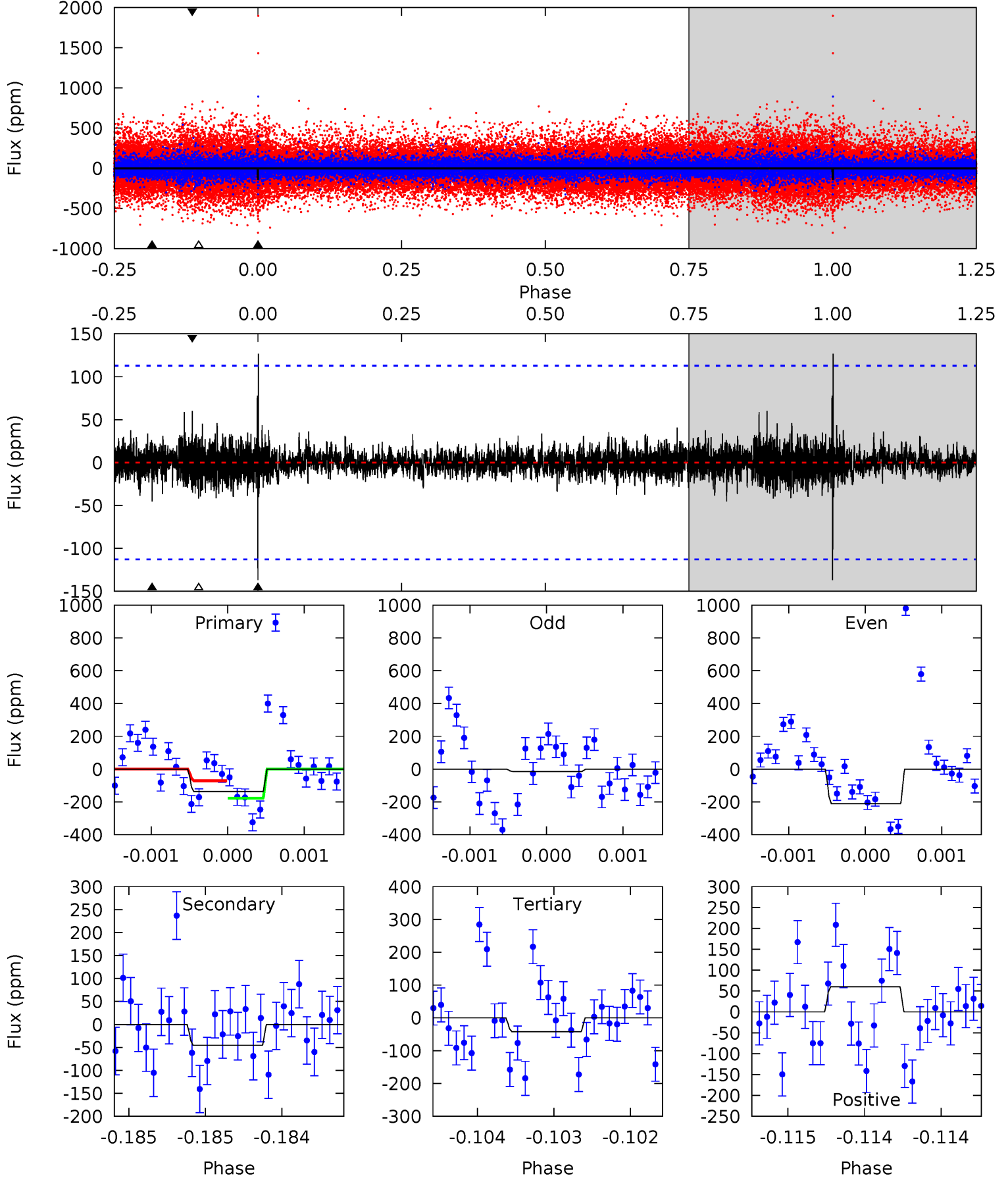
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	17.8	10.4	12.9	5.54	3.43	2.45	0.61	-1.86	7.42	4.95	0.85	1.04	0.42	1.83



Alt Model-Shift Uniqueness Test

005221138-01, P = 574.387372 Days, E = 413.682881 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.67	2.21	2.05	2.94	5.50	3.37	0.49	4.63	3.74	0.16	-0.73	4.48	6.35	0.48	2.59



Stellar Parameters For KIC 005221138

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5317^{+177}_{-144}	$3.770^{+0.847}_{-0.363}$	$-0.660^{+0.350}_{-0.250}$	$1.946^{+1.320}_{-1.188}$	$0.812^{+0.233}_{-0.125}$	$0.155^{+3.153}_{-0.113}$
	+3%/-3%	+22%/-10%	+53%/-38%	+68%/-61%	+29%/-15%	+2030%/-73%
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 005221138-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-588 ± 33	$4.07^{+3.03}_{-2.20}$	397^{+70}_{-74}	5633^{+2293}_{-895}	$31445^{+121953}_{-20865}$
Alt.	-45 ± 21	$2.85^{+2.57}_{-1.68}$	401^{+73}_{-70}	3852^{+1561}_{-688}	4573^{+24030}_{-3571}

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 $A_{obs} \gg 1.0$

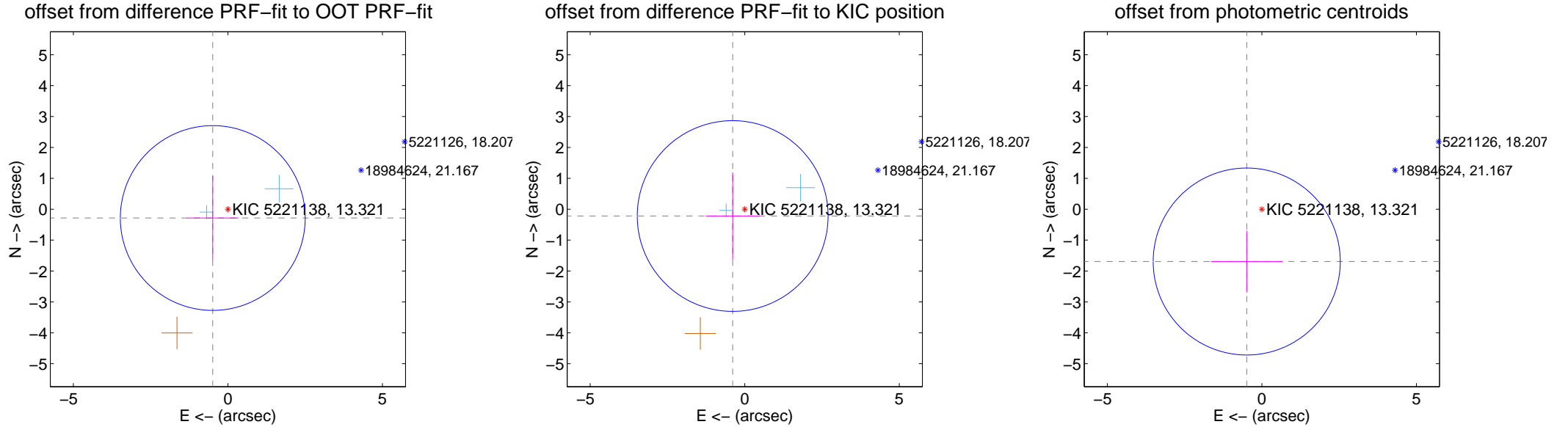
DV Centroid Data

Supplemental centroid analysis for 005221138-01. Kepler magnitude: 13.32. Transit SNR 6.93

There are 2 quarters with good PRF difference image offsets

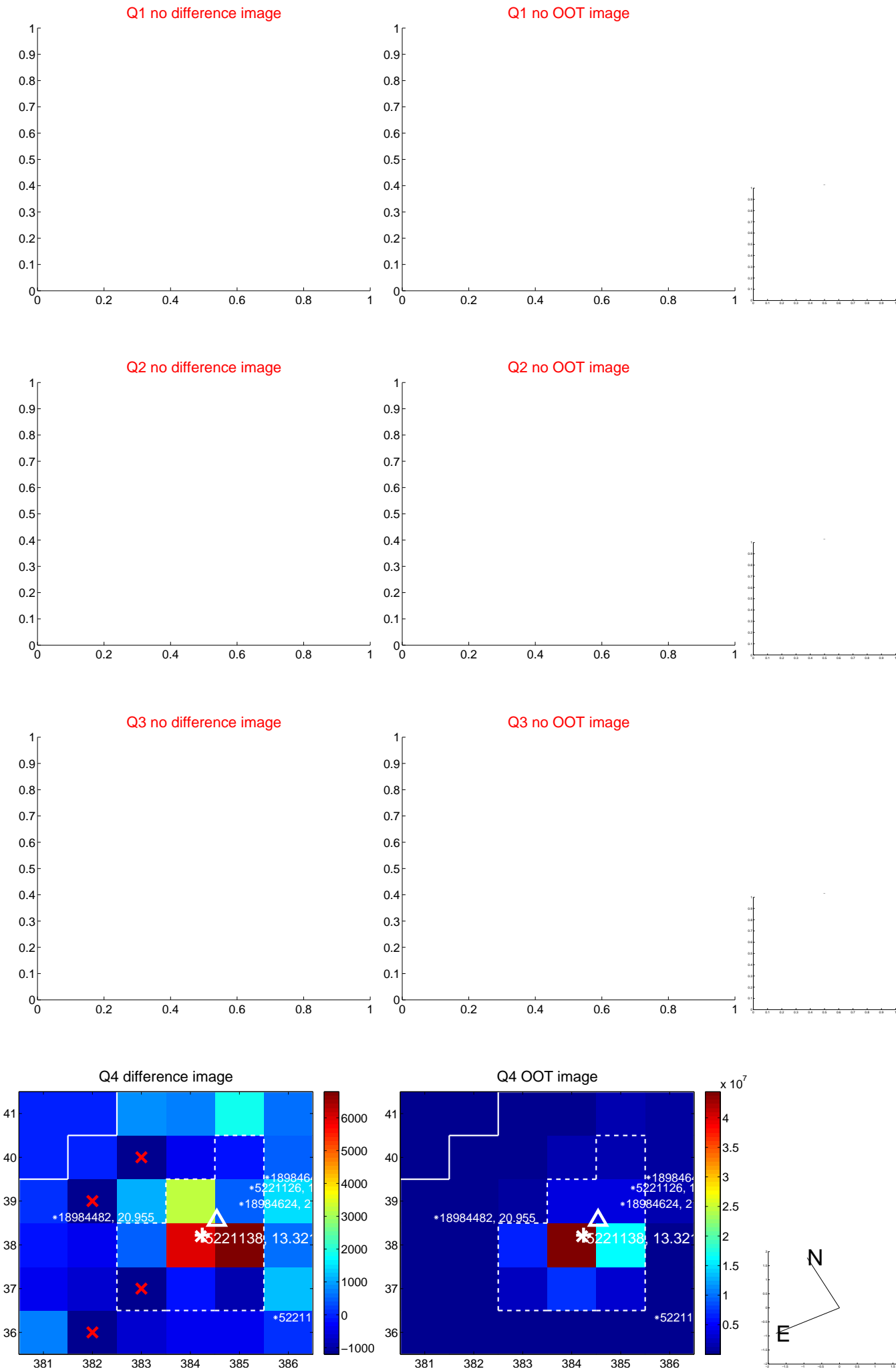
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.566 ± 0.997	0.57	0.490 ± 0.839	-0.285 ± 1.359
PRF-fit source offset from KIC position	0.448 ± 1.029	0.44	0.390 ± 0.874	-0.220 ± 1.409
photometric centroid source offset	1.76 ± 1.01	1.75	0.49 ± 1.16	-1.69 ± 1.00



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

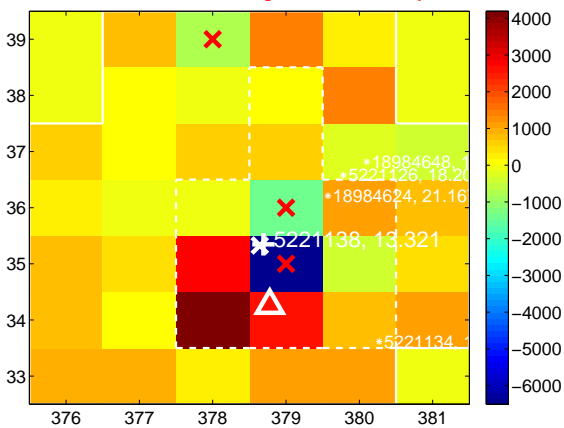
Q9 no difference image



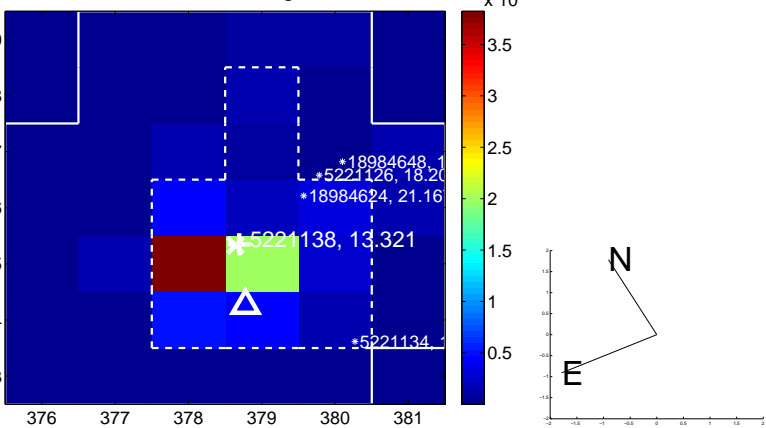
Q9 no OOT image



Q10 difference image. Poor Quality



Q10 OOT image



Q11 no difference image



Q11 no OOT image



Q12 no difference image



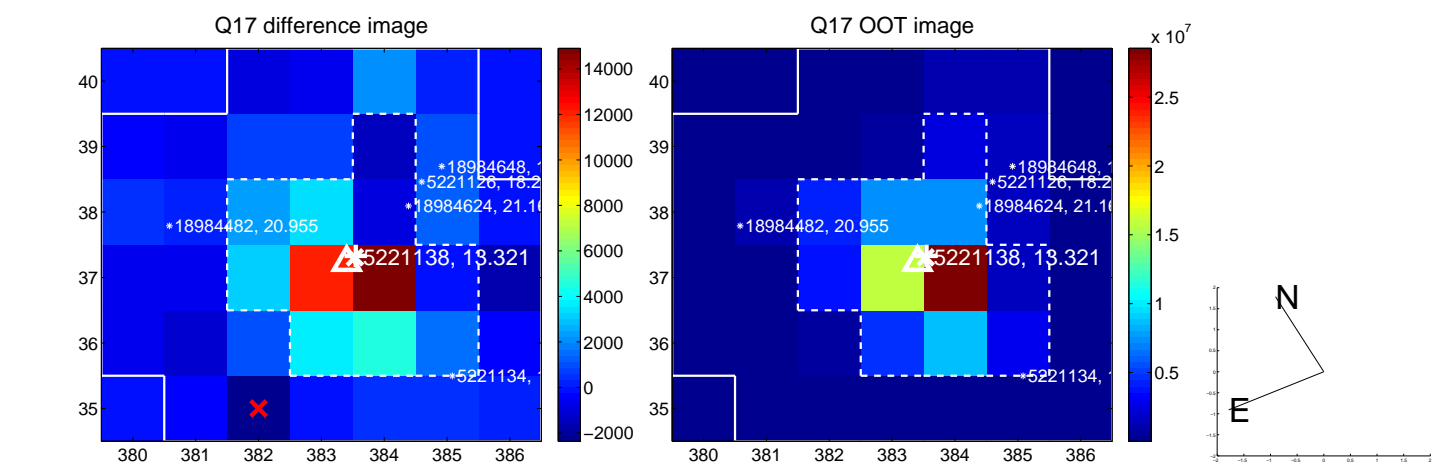
Q12 no OOT image



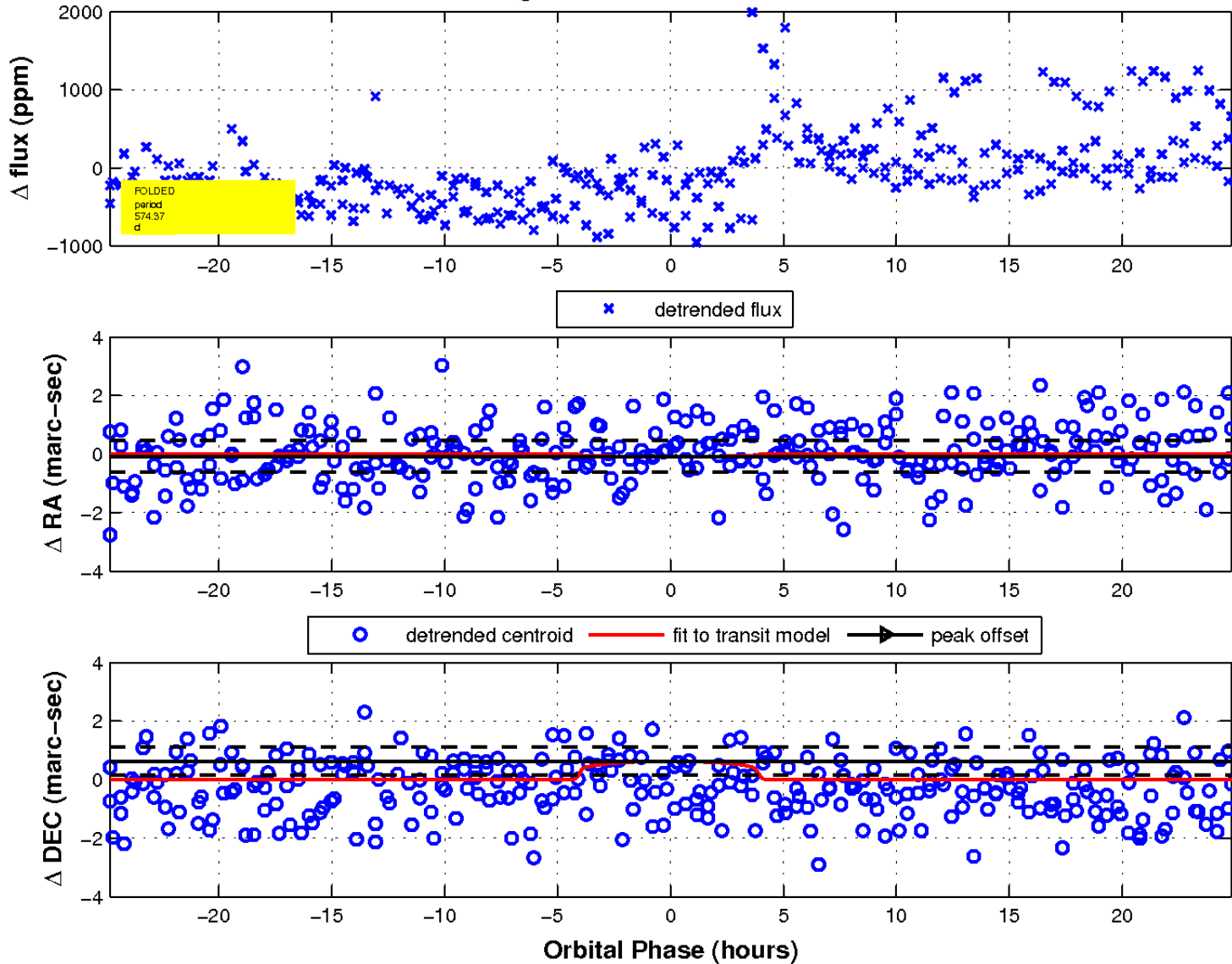
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

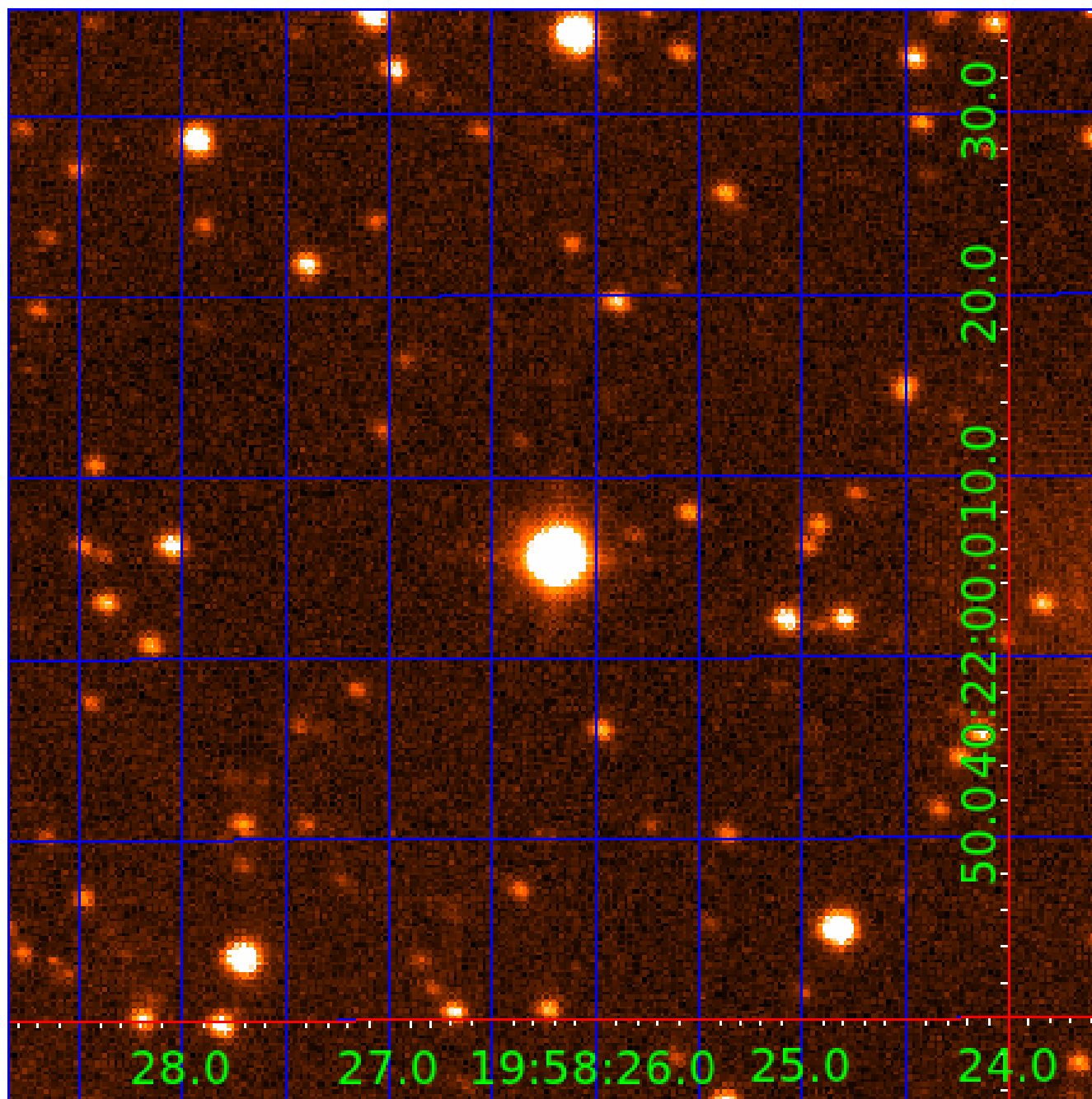


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 005221138

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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005221138-04	OBS	No	424.921738	237.524644	385.5	4.542	10.0	6.2	1.95	5317	3.92	2.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005221138-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005221138-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

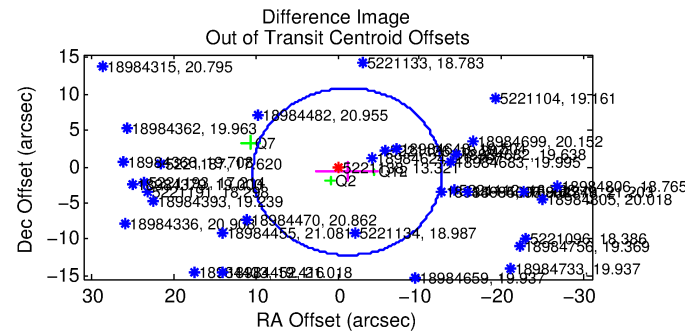
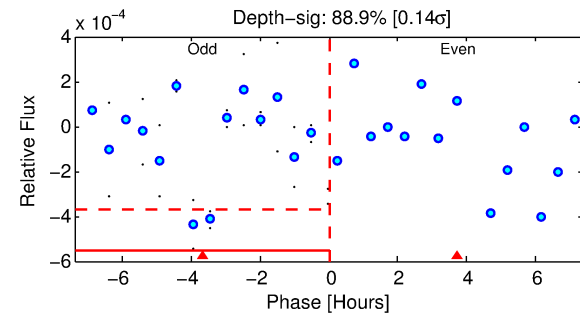
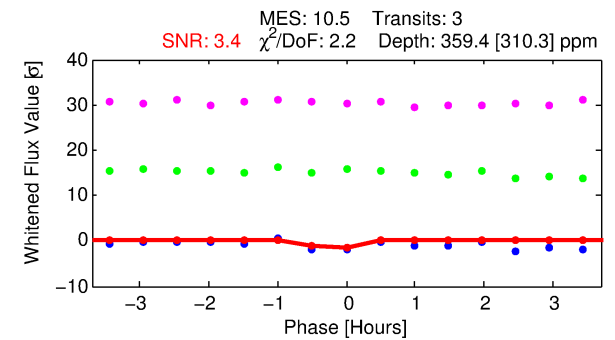
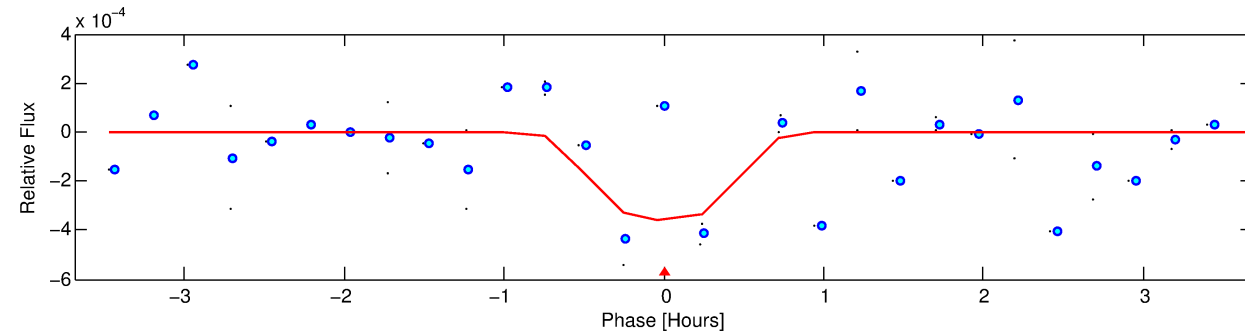
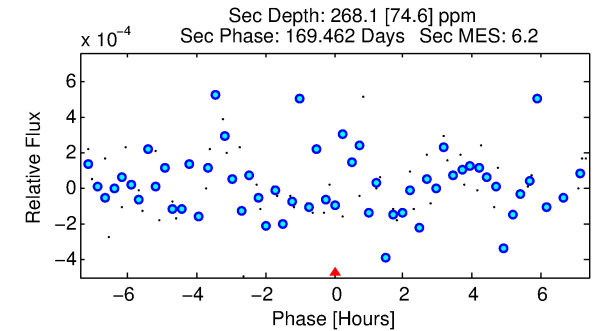
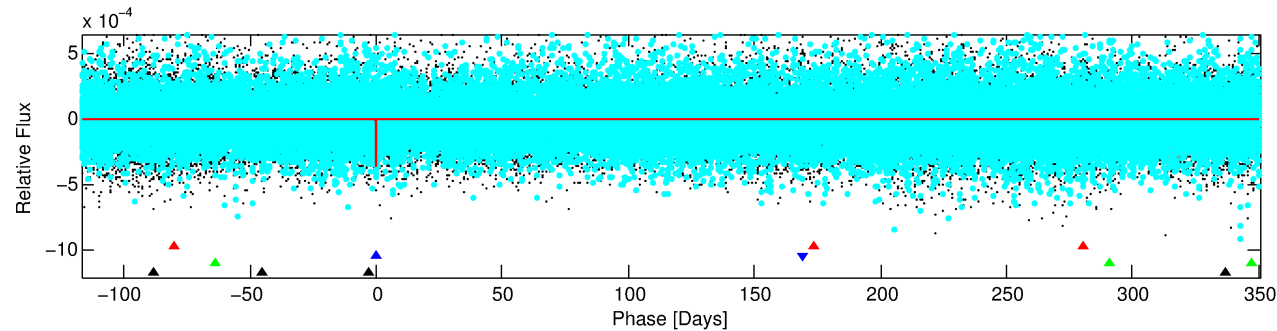
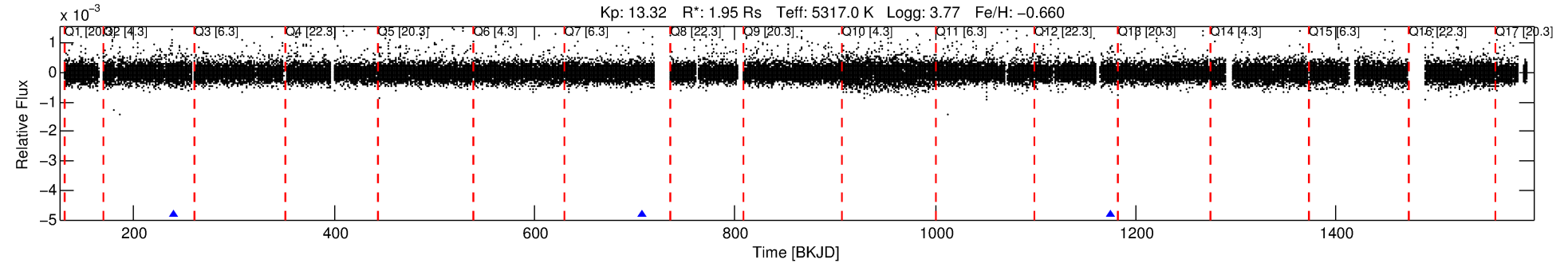
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005221138-02

No Significant Match Found

DV One-Page Summary

KIC: 5221138 Candidate: 2 of 4 Period: 467.426 d



DV Fit Results:

Period = 467.42592 [0.01253] d
Epoch = 240.4978 [0.0176] BKJD
Rp/R* = 0.0220 [0.0429]
a/R* = 1166.62 [8930.78]
b = 0.94 [1.03]
Seff = 2.24 [3.10]
Teq = 312 [108] K
Rp = 4.66 [9.65] Re
a = 1.1005 [0.8715] AU
Ag = 8213.91 [34128.60] [0.24 σ]
Teffp = 4591 [4502] K [0.95 σ]

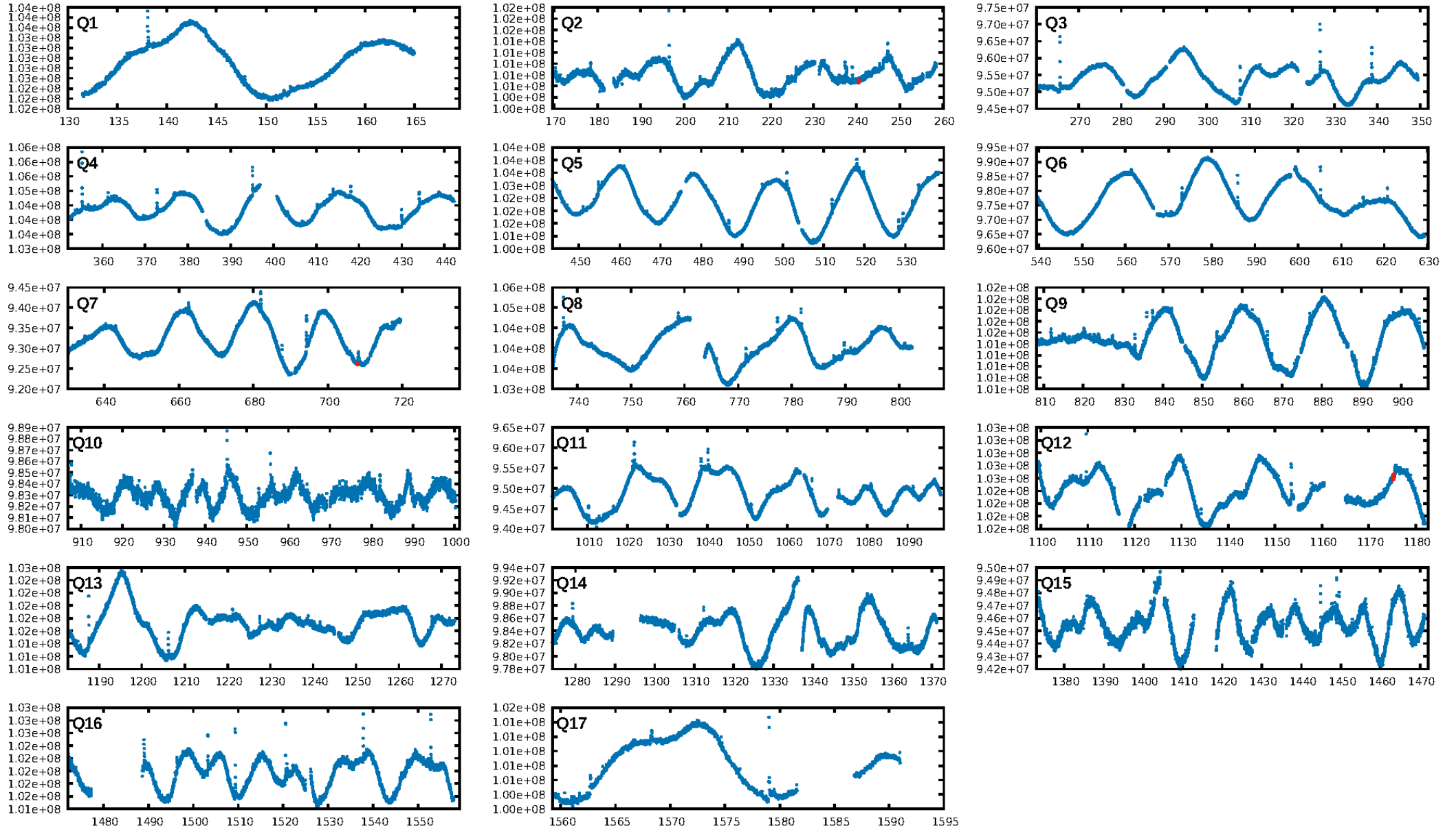
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [216.79 σ]
LongPeriod-sig: 100.0% [254.46 σ]
ModelChiSquare2-sig: 13.1%
ModelChiSquareGof-sig: 75.6%
Bootstrap-pfa: 7.57e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.5185
Centroid-sig: 20.2%
Centroid-so: 4.097 arcsec [1.06 σ]
OotOffset-rm: 1.380 arcsec [0.36 σ]
KicOffset-rm: 1.564 arcsec [0.37 σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

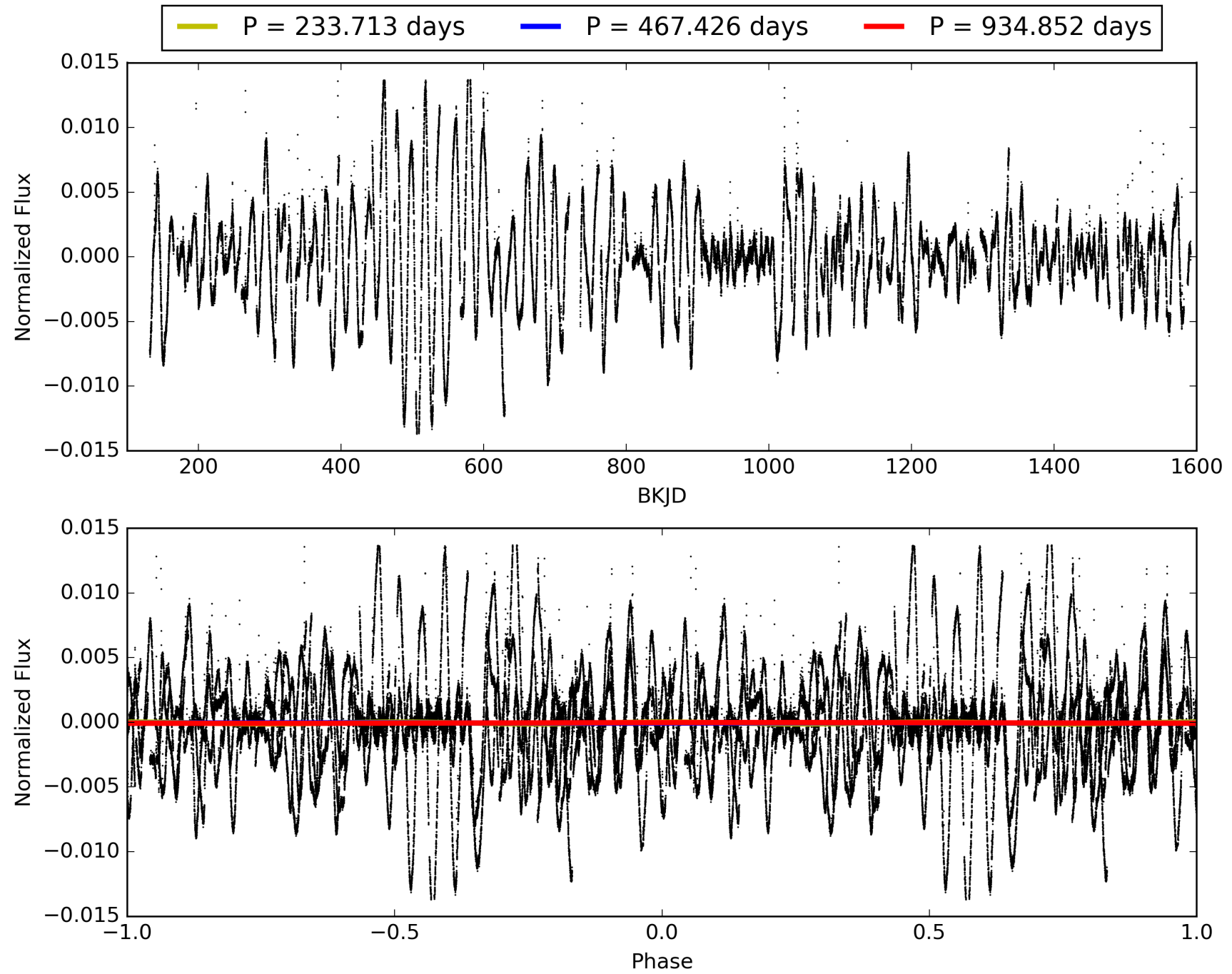
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:11:12 Z

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

TCE 005221138-02, PDC Light Curves

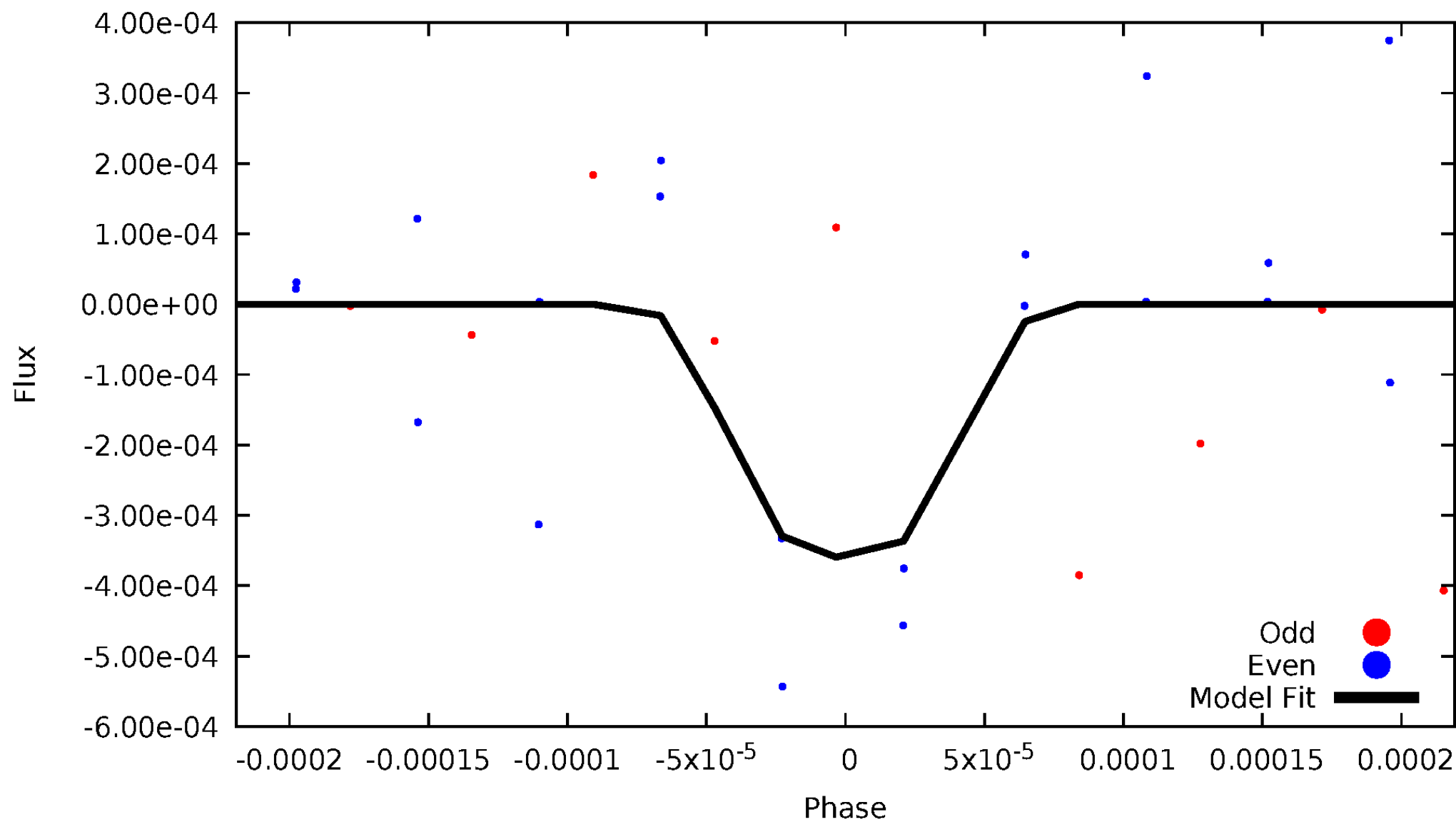


TCE 005221138-02



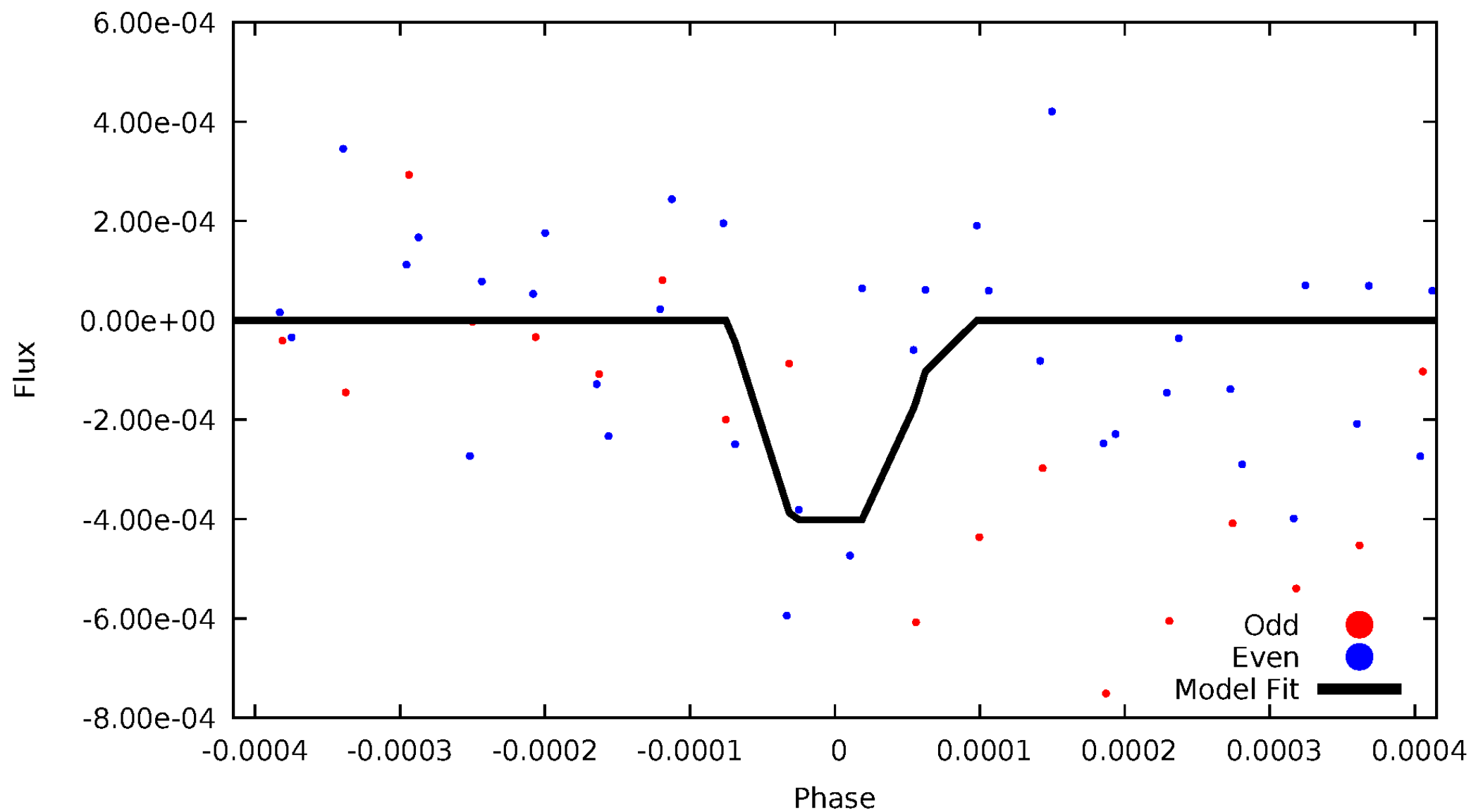
DV Odd/Even

TCE 005221138-02



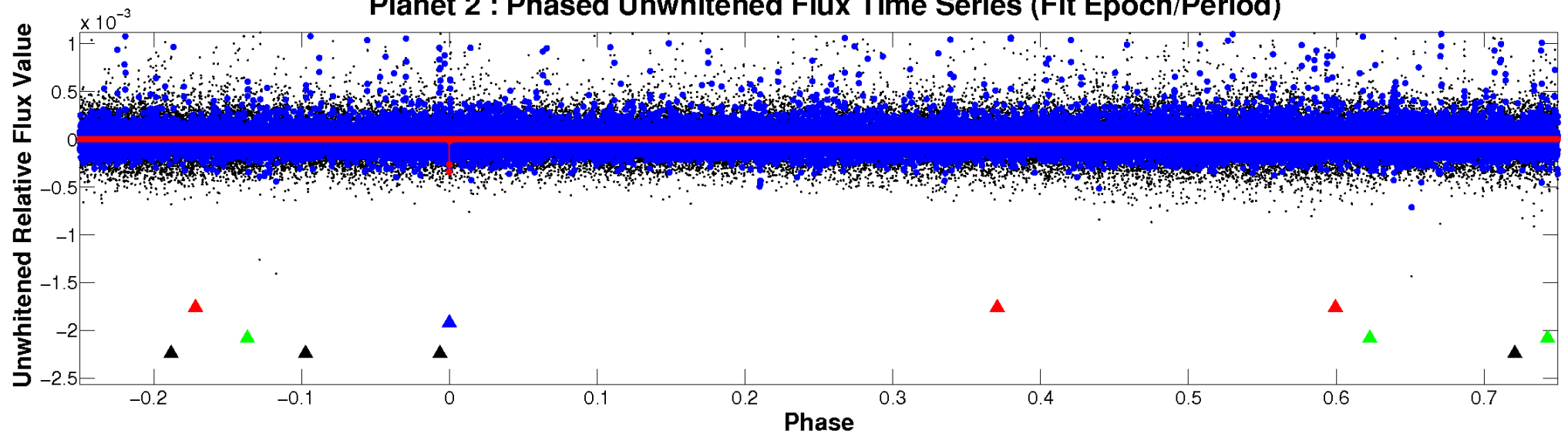
ALT Odd/Even

TCE 005221138-02

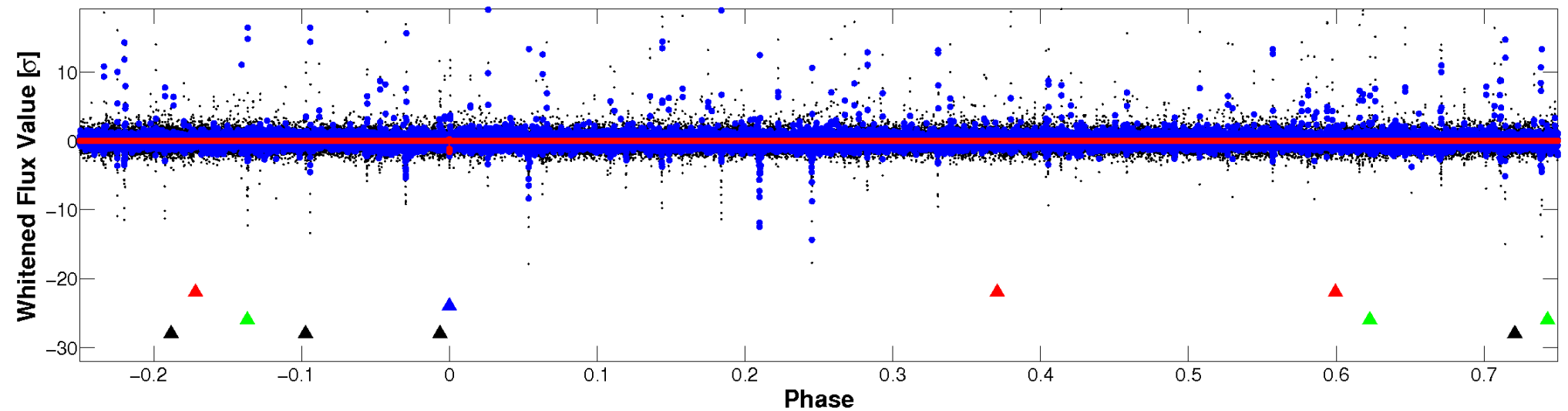


Non-Whitened Vs. Whitened Light Curve

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

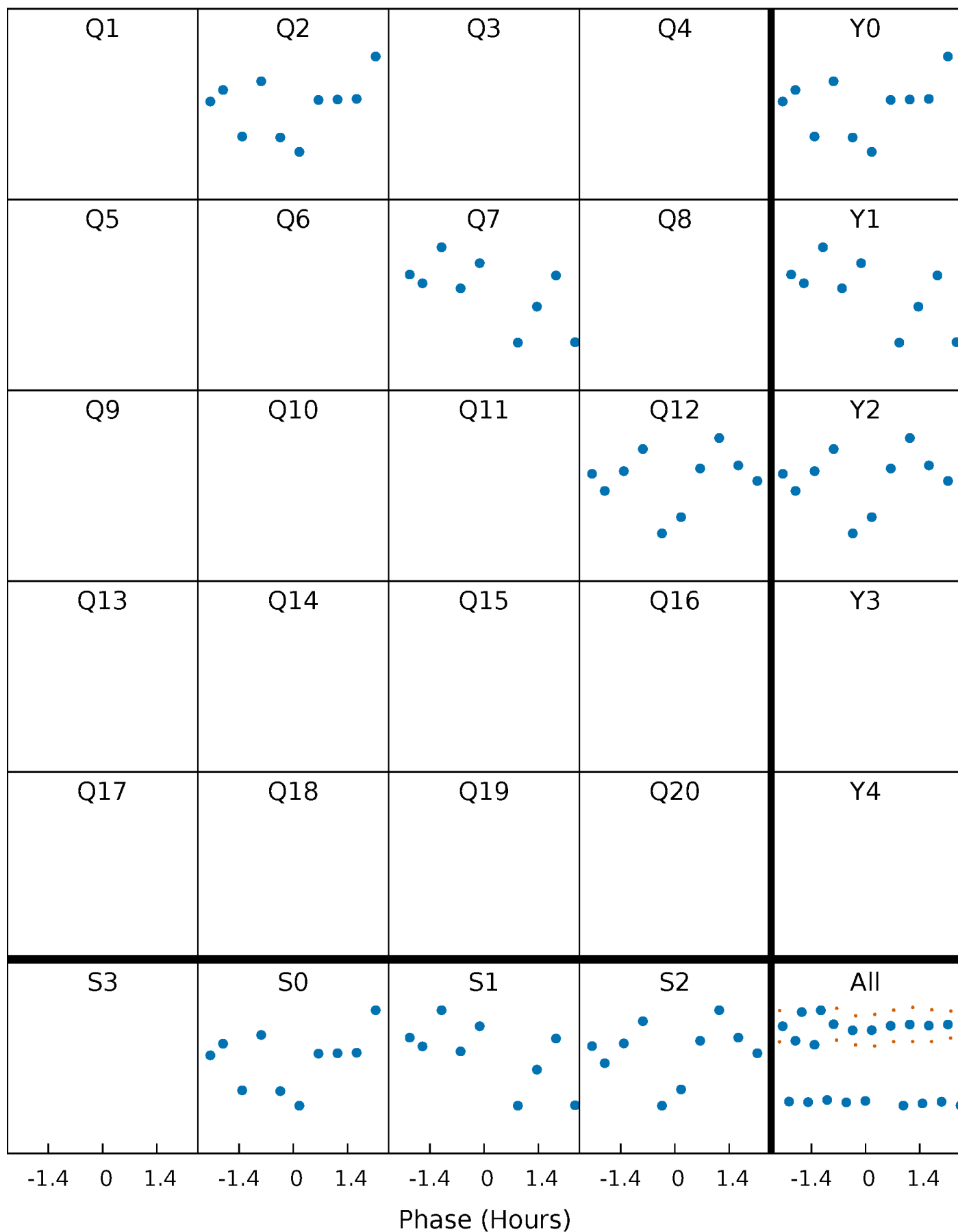


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



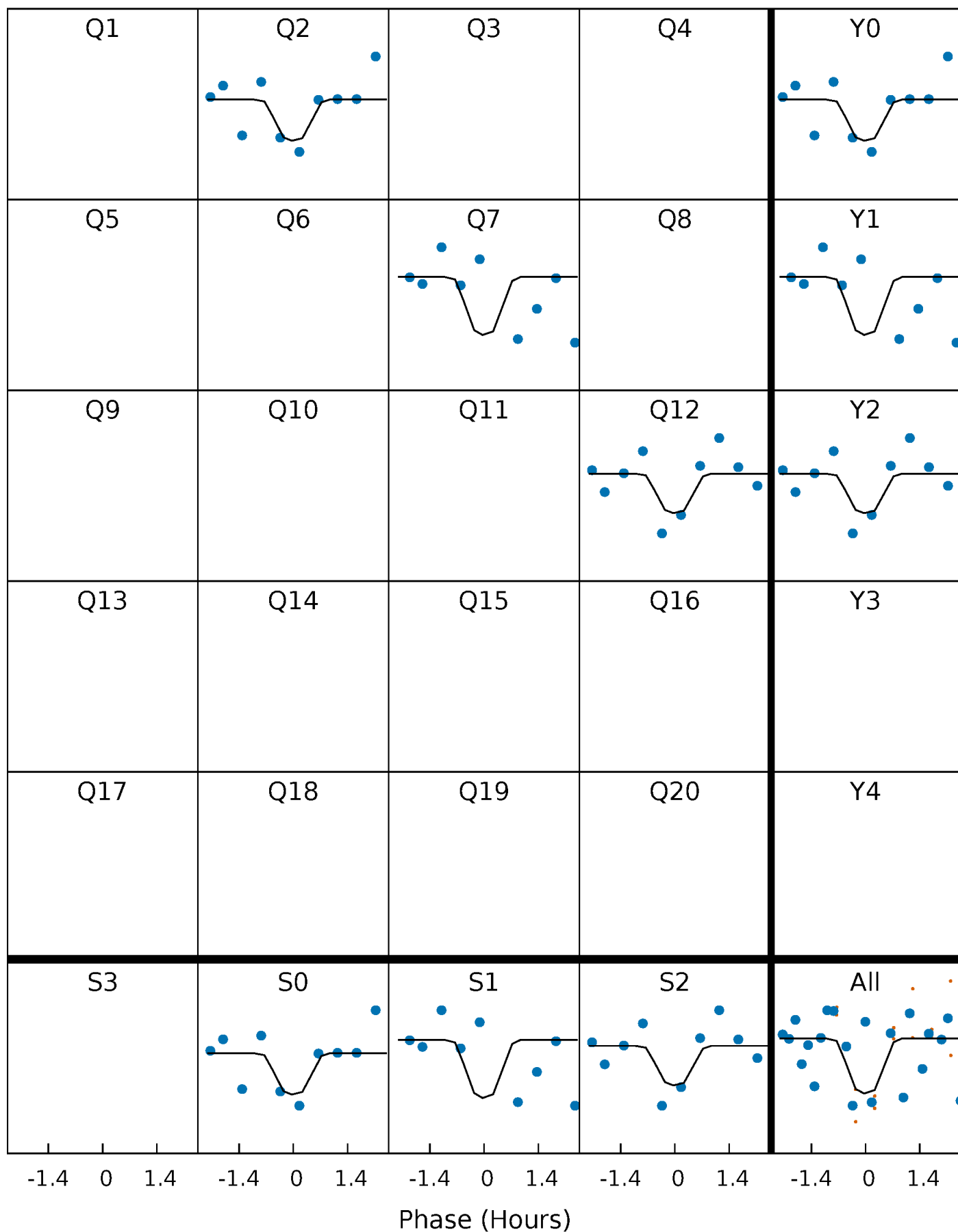
PDC Quarter-Phased Transit Curves

TCE 005221138-02 P=467.425923 Days $T_0=240.497769$ (BKJD)



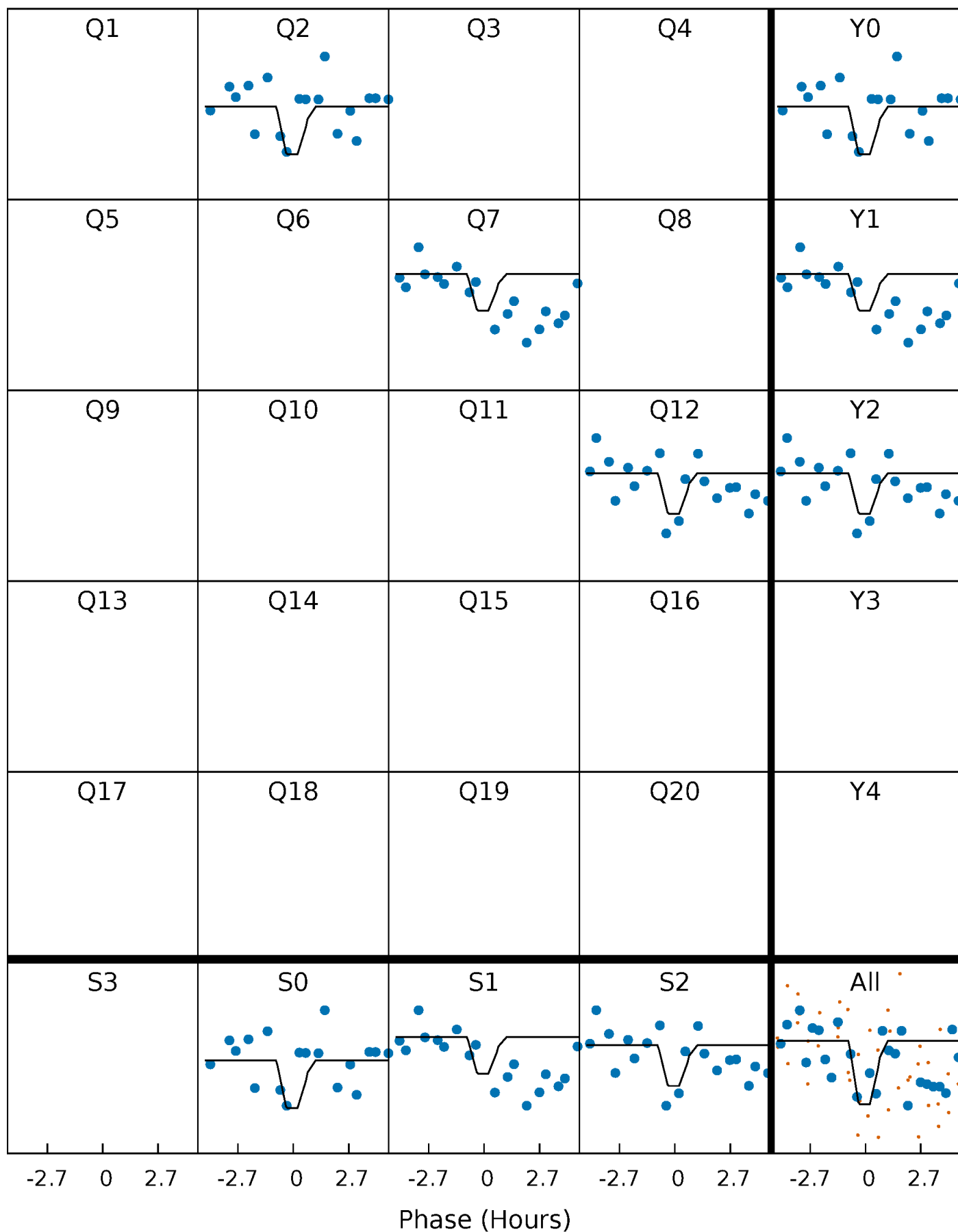
DV Quarter-Phased Transit Curves

TCE 005221138-02 P=467.425923 Days $T_0=240.497769$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

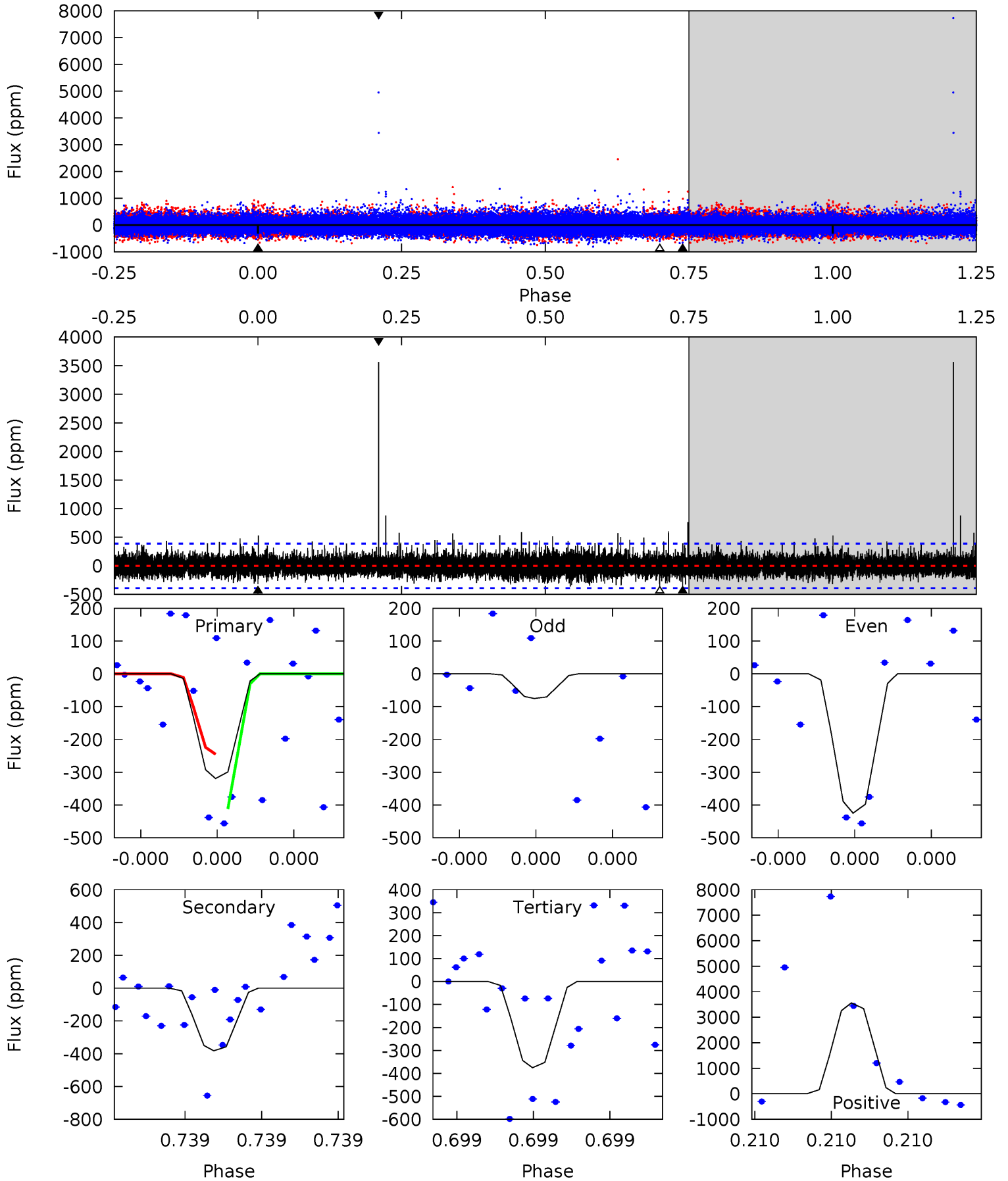
TCE 005221138-02 P=467.417685 Days $T_0=240.519187$ (BKJD)



DV Model-Shift Uniqueness Test

005221138-02, P = 467.425923 Days, E = 240.497769 Days

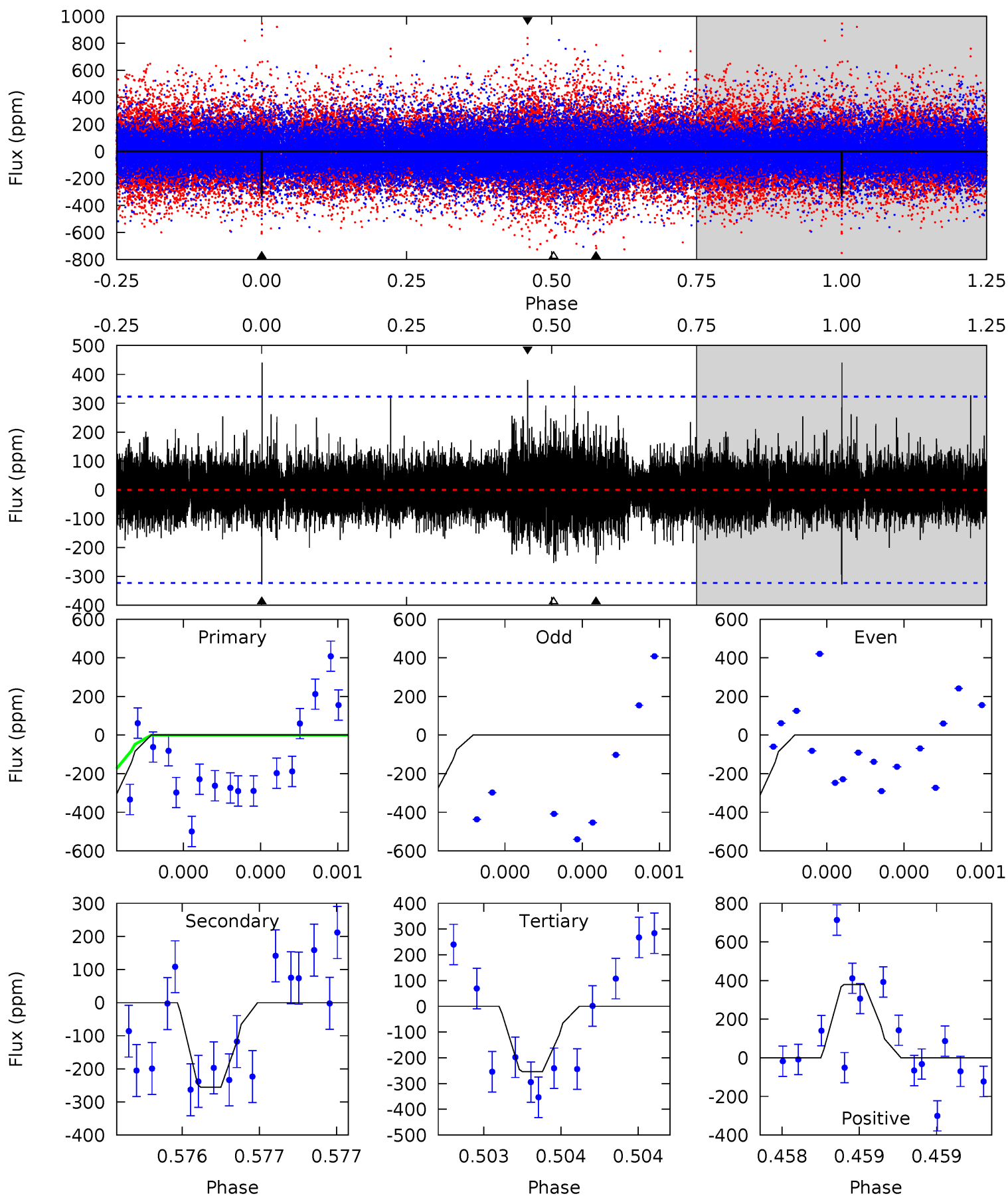
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.74	5.68	5.58	52.9	5.78	3.79	1.47	-0.83	-48.2	0.10	-47.2	1.94	0.66	0.90	1.24



Alt Model-Shift Uniqueness Test

005221138-02, P = 467.417685 Days, E = 240.519187 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.83	4.56	4.53	6.78	5.76	3.76	0.96	1.31	-0.94	0.04	-2.22	0.33	1.07	0.57	1.55



Stellar Parameters For KIC 005221138

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5317^{+177}_{-144}	$3.770^{+0.847}_{-0.363}$	$-0.660^{+0.350}_{-0.250}$	$1.946^{+1.320}_{-1.188}$	$0.812^{+0.233}_{-0.125}$	$0.155^{+3.153}_{-0.113}$
	+3%/-3%	+22%/-10%	+53%/-38%	+68%/-61%	+29%/-15%	+2030%/-73%
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 005221138-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-382 ± 67	$7.80^{+8.28}_{-5.27}$	428^{+76}_{-84}	4010^{+2327}_{-726}	4535^{+36700}_{-3504}
Alt.	-256 ± 56	$7.34^{+8.41}_{-5.23}$	422^{+77}_{-76}	3767^{+2355}_{-666}	3270^{+33444}_{-2616}

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

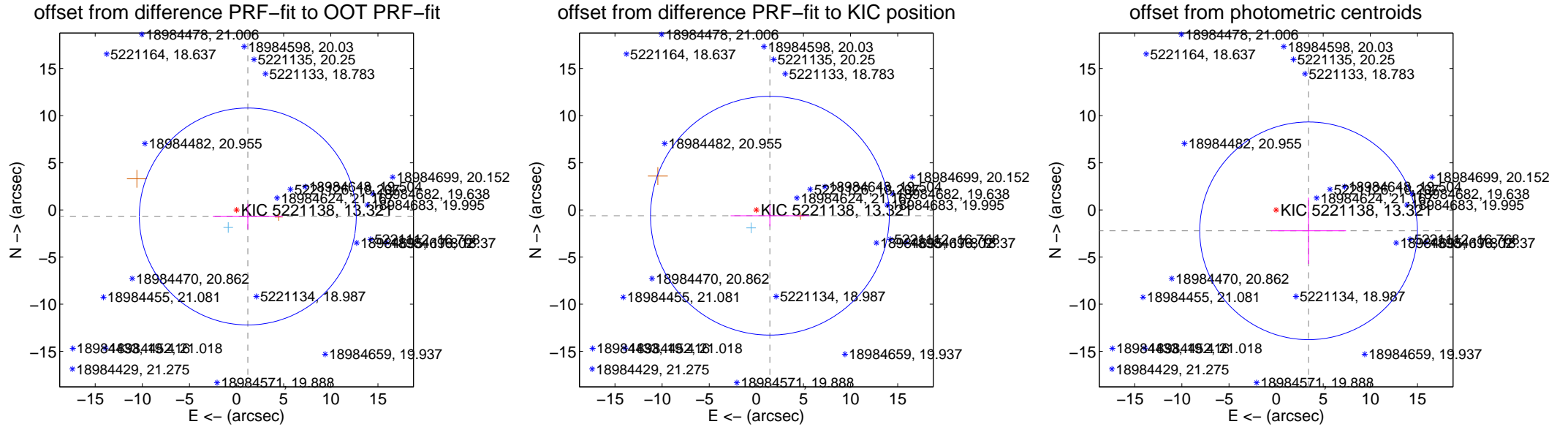
DV Centroid Data

Supplemental centroid analysis for 005221138-02. Kepler magnitude: 13.32. Transit SNR 3.45

There are 1 quarters with good PRF difference image offsets

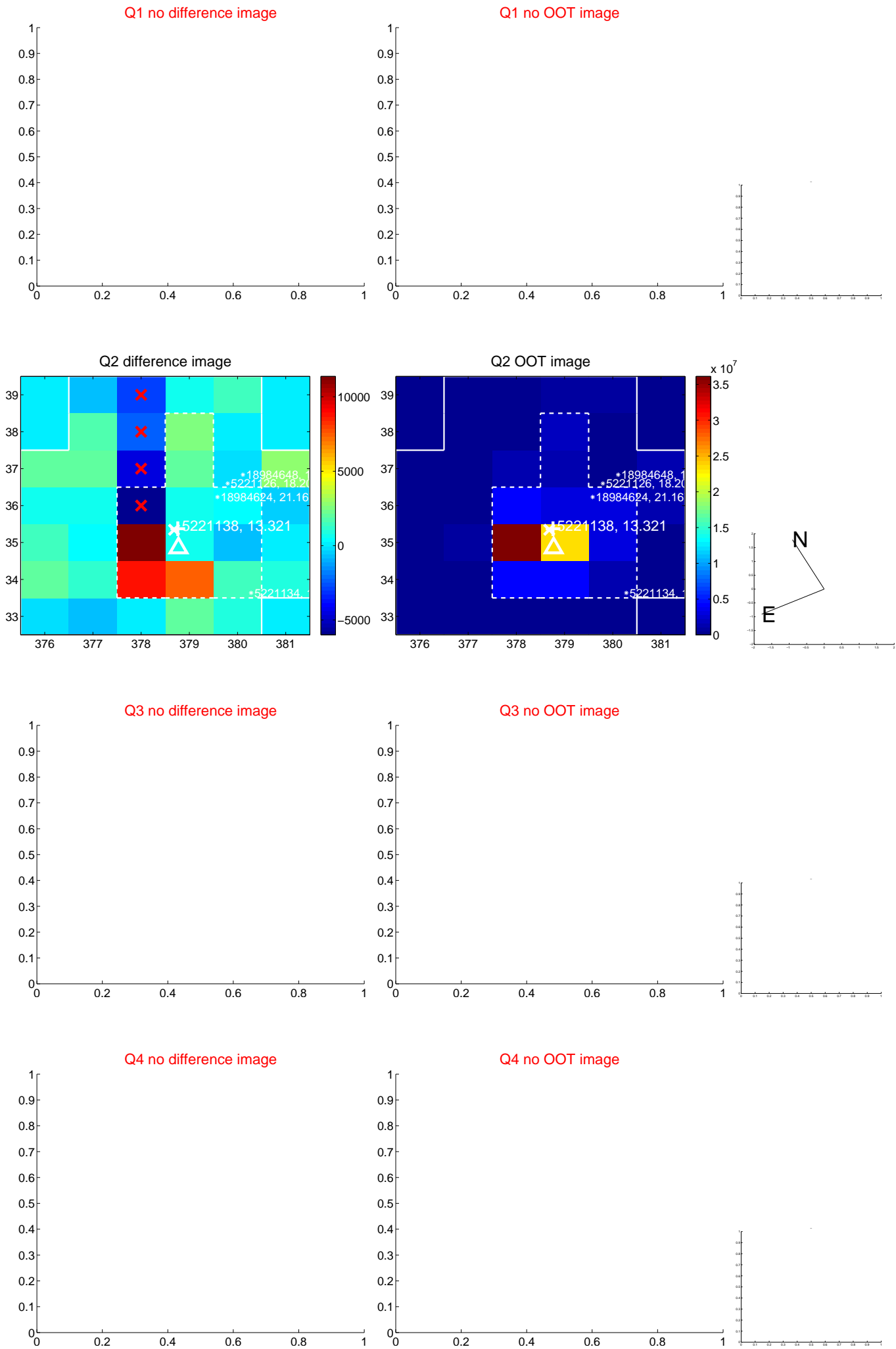
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.380 ± 3.836	0.36	-1.191 ± 3.721	-0.698 ± 1.349
PRF-fit source offset from KIC position	1.564 ± 4.223	0.37	-1.438 ± 4.171	-0.614 ± 1.127
photometric centroid source offset	4.10 ± 3.85	1.06	-3.44 ± 3.98	-2.22 ± 3.52



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



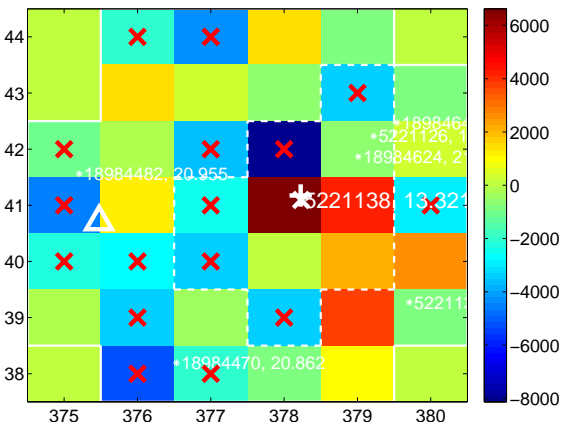
Q6 no difference image



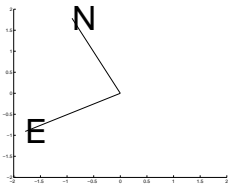
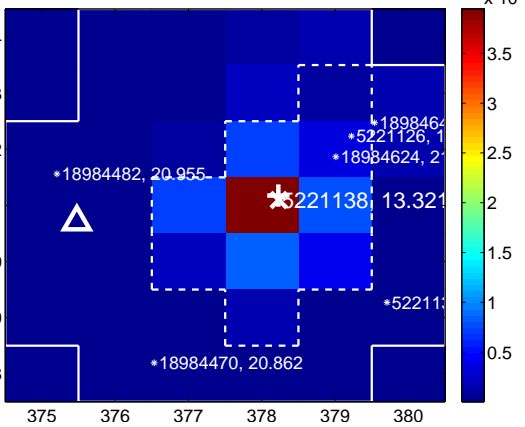
Q6 no OOT image



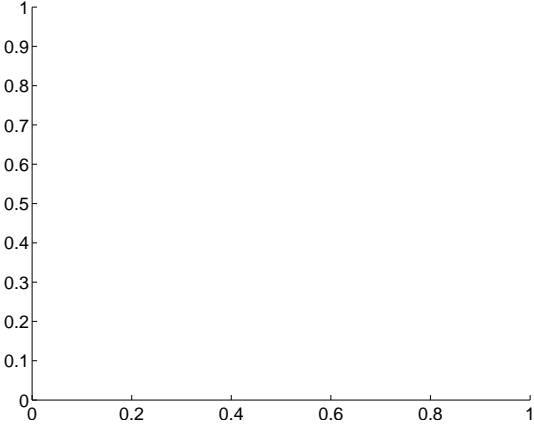
Q7 difference image. Poor Quality



Q7 OOT image



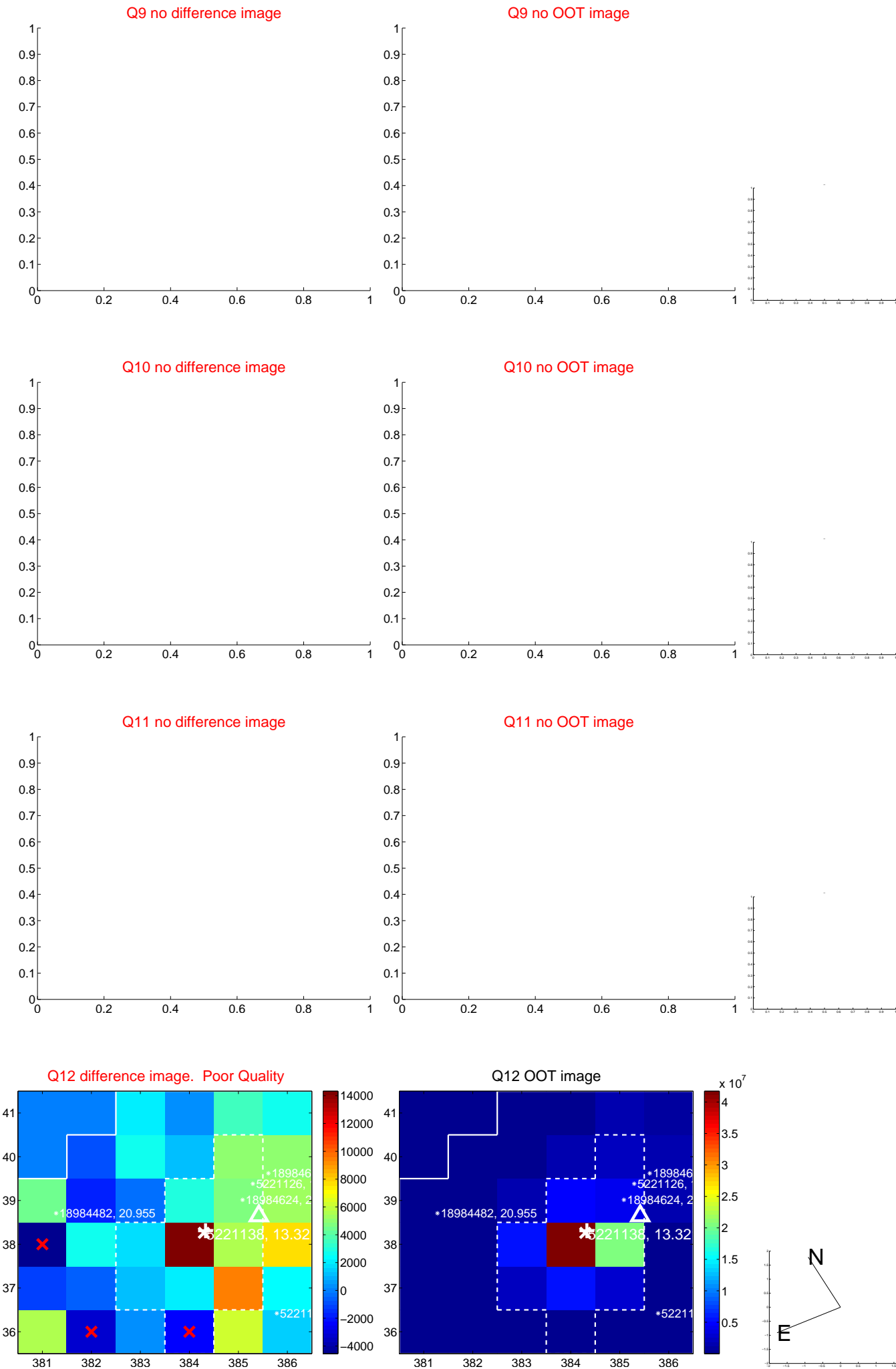
Q8 no difference image



Q8 no OOT image



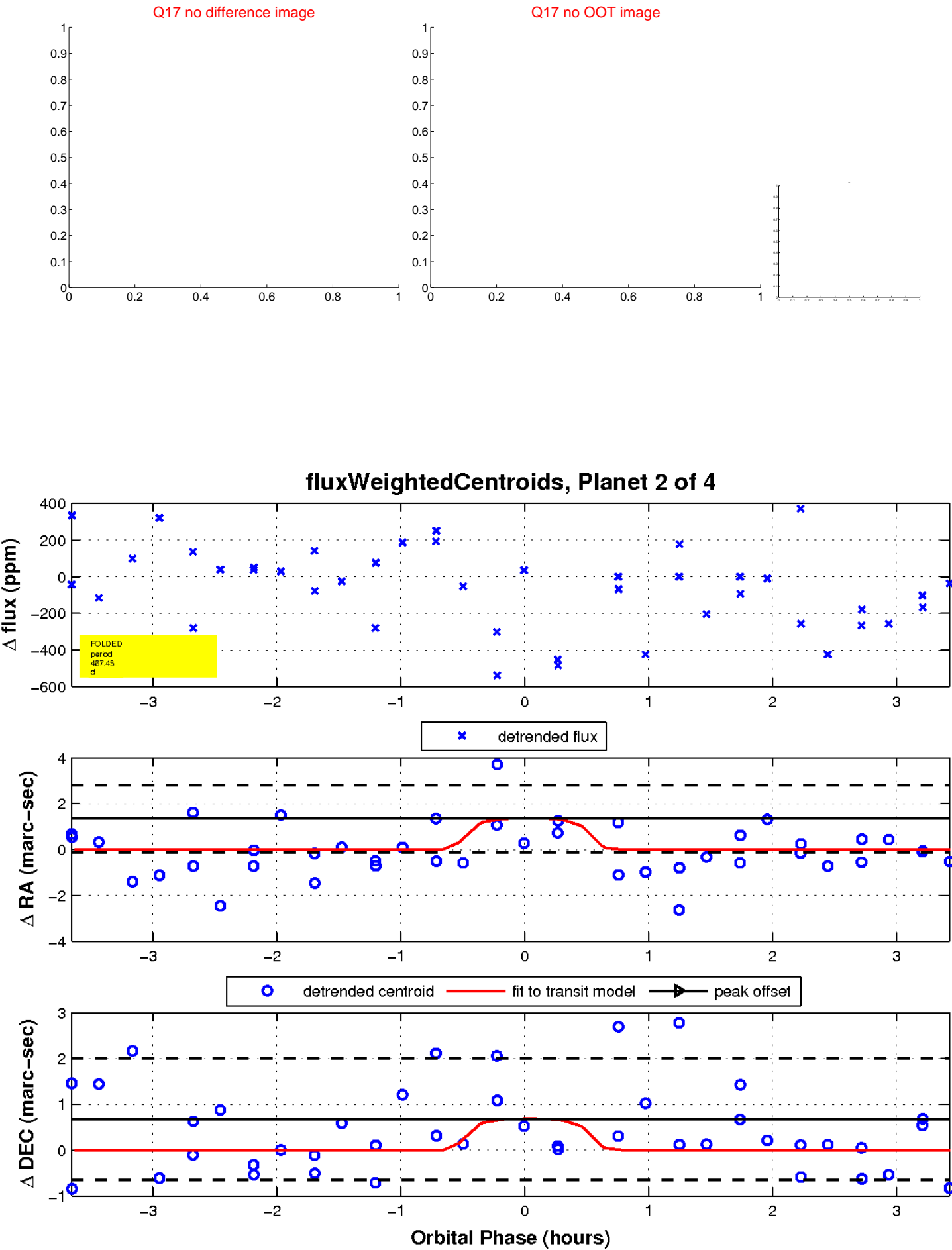
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

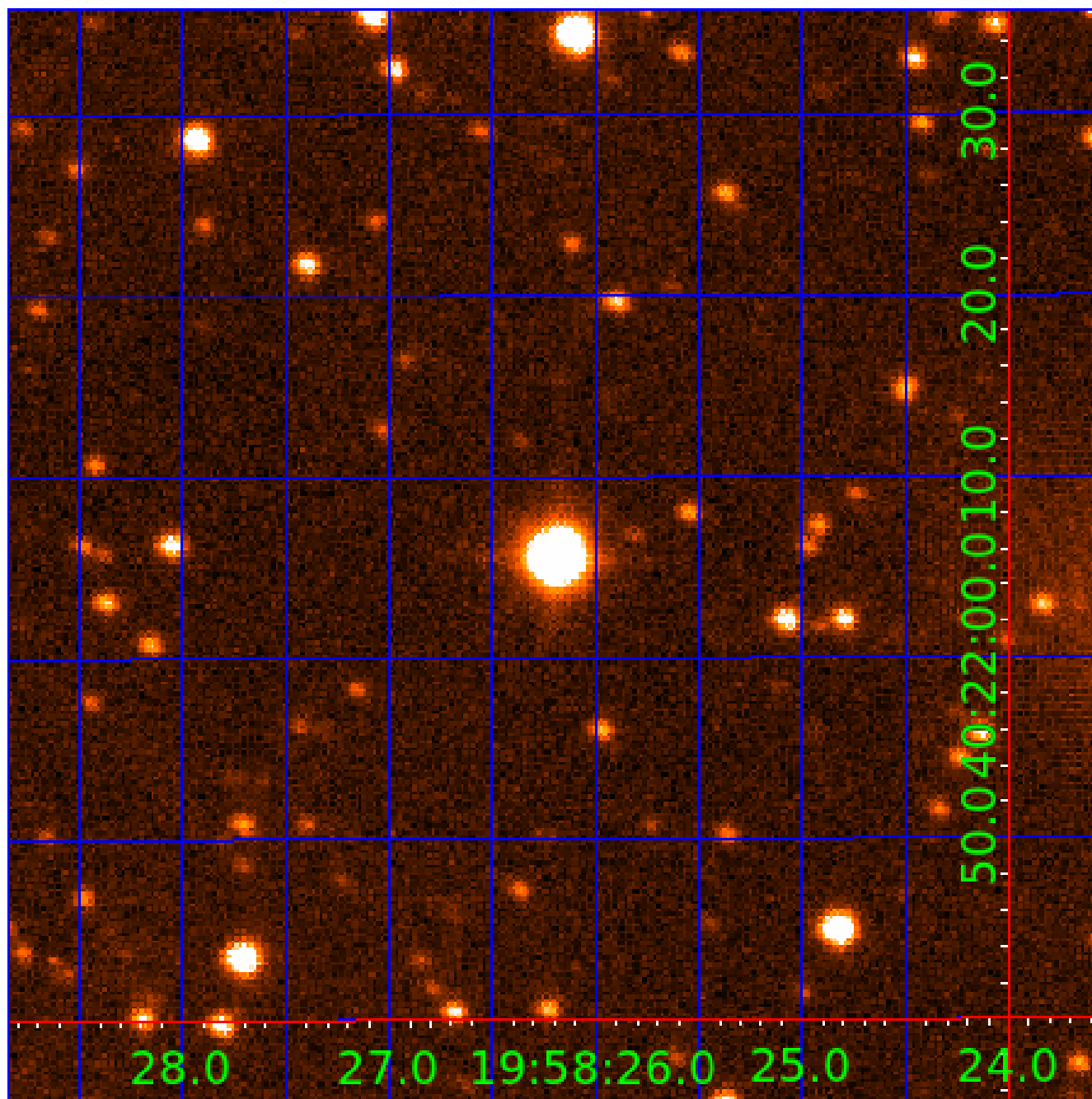


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005221138

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})
005221138-01	OBS	No	574.368389	413.768104	462.8	8.327	12.7	6.9	1.95	5317	4.49	1.70
005221138-02	OBS	No	467.425923	240.497769	359.4	1.229	10.5	3.4	1.95	5317	4.66	2.24
005221138-03	OBS	No	523.651941	531.586742	370.9	5.159	9.1	5.0	1.95	5317	3.80	1.92
005221138-04	OBS	No	424.921738	237.524644	385.5	4.542	10.0	6.2	1.95	5317	3.92	2.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005221138-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005221138-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

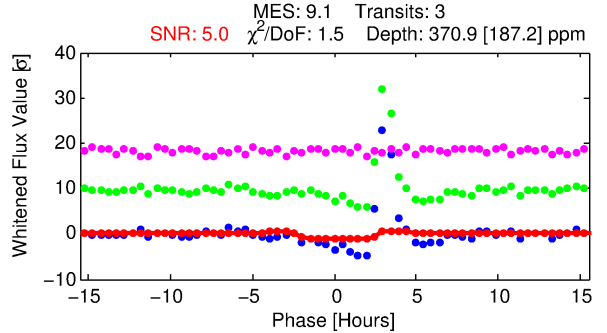
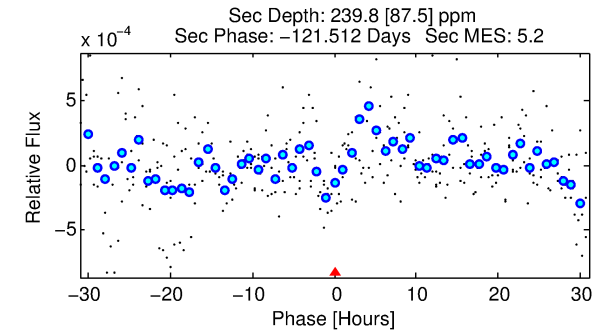
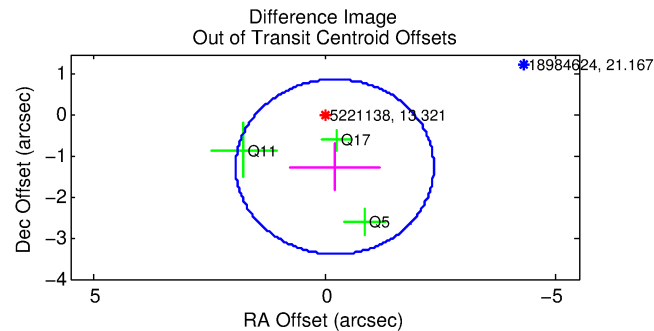
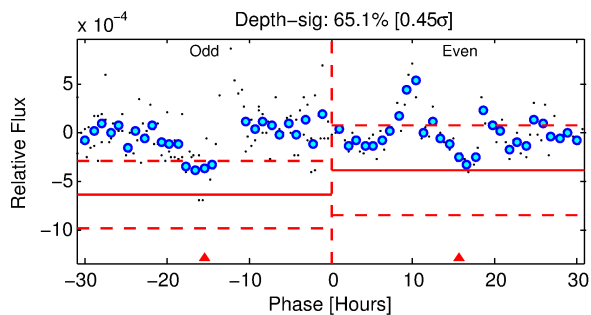
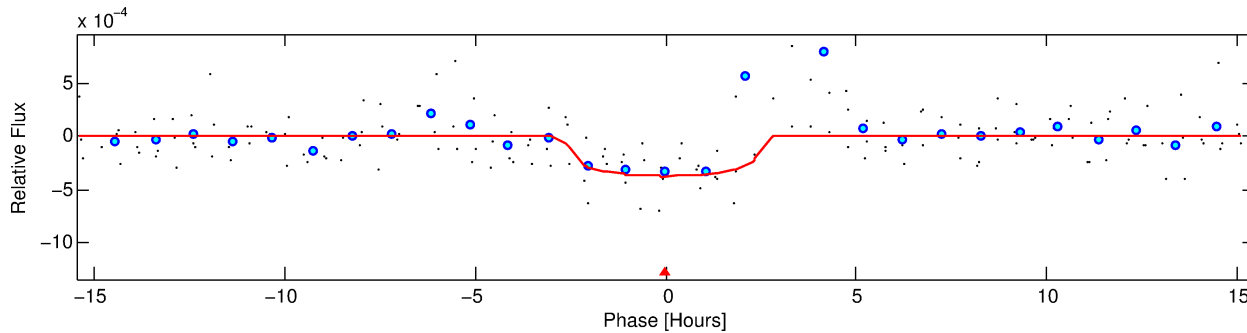
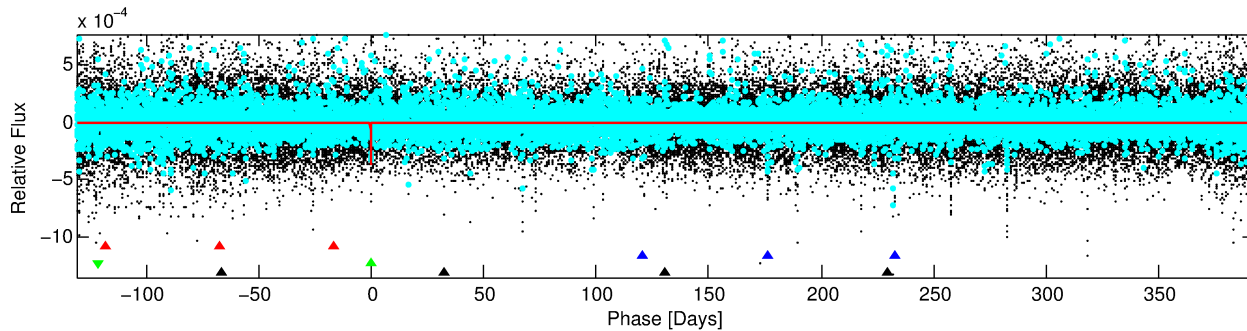
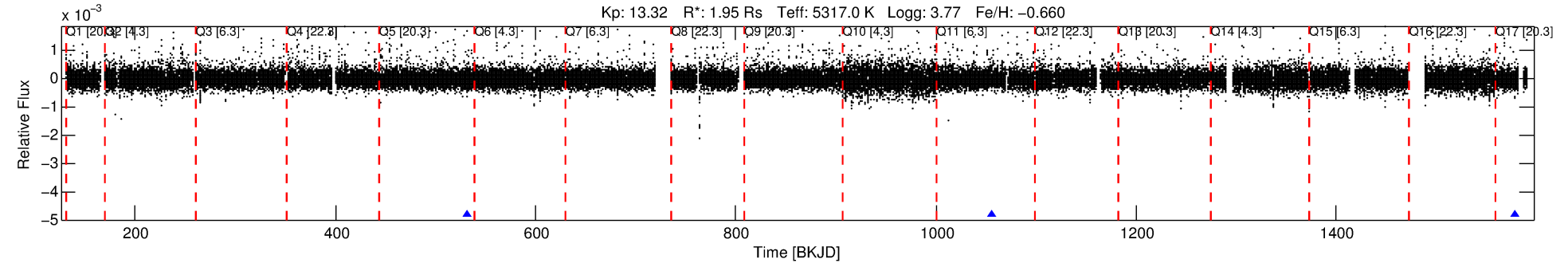
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005221138-03

No Significant Match Found

DV One-Page Summary

KIC: 5221138 Candidate: 3 of 4 Period: 523.652 d



DV Fit Results:

Period = 523.65194 [0.02340] d
Epoch = 531.5867 [0.0333] BKJD
Rp/R* = 0.0179 [0.1606]
a/R* = 706.94 [26975.68]
b = 0.45 [67.71]
Seff = 1.92 [2.66]
Teq = 300 [104] K
Rp = 3.80 [34.21] Re
a = 1.1871 [0.9401] AU
Ag = 12884.70 [232181.48] [0.06 σ]
Teffp = 4947 [22222] K [0.21 σ]

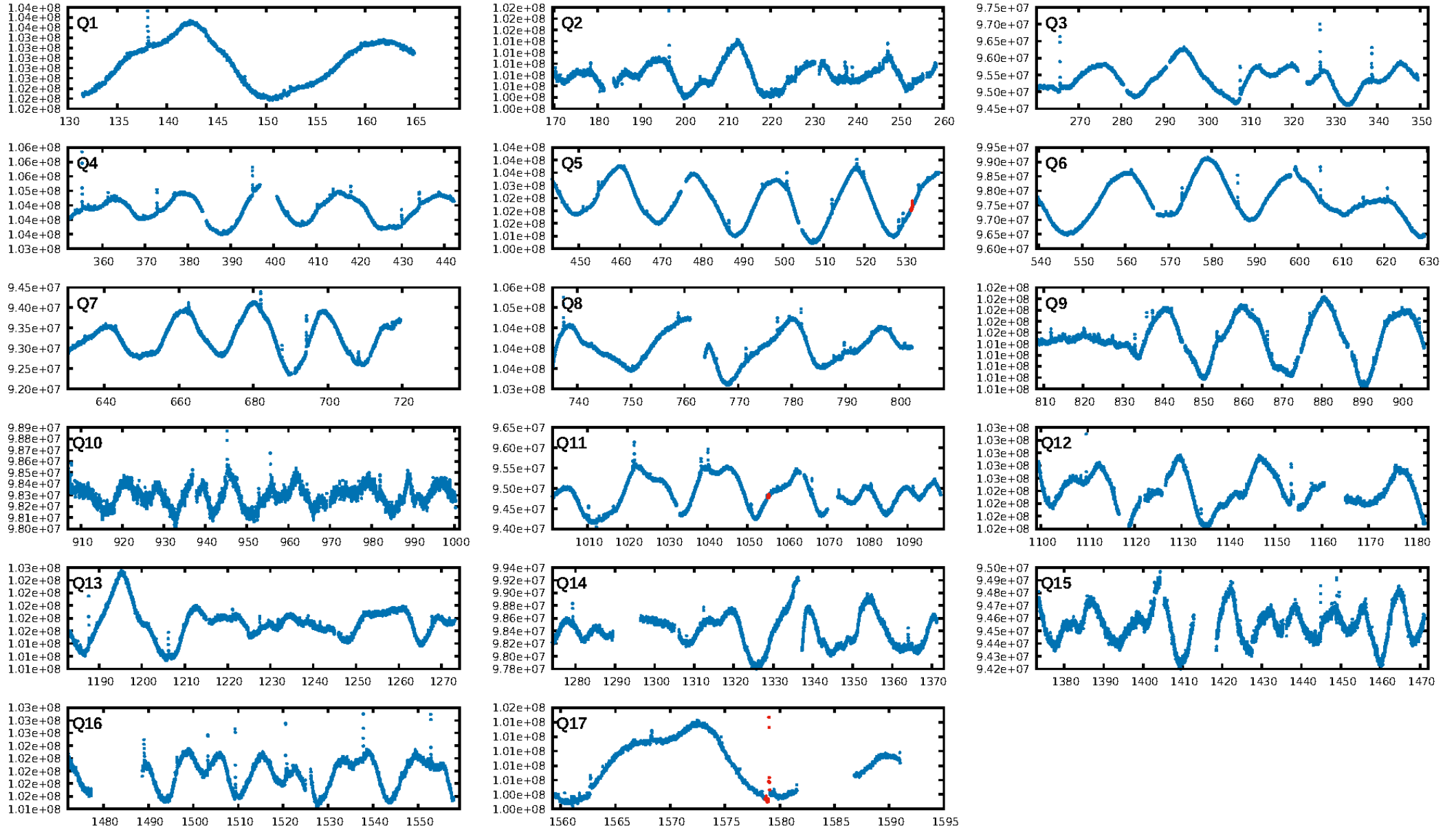
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [254.46 σ]
LongPeriod-sig: 100.0% [124.26 σ]
ModelChiSquare2-sig: 1.2%
ModelChiSquareGof-sig: 96.7%
Bootstrap-pfa: 6.15e-08
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: -3.842
Centroid-sig: 31.8%
Centroid-so: 1.527 arcsec [0.88 σ]
OotOffset-rm: 1.273 arcsec [1.78 σ]
KicOffset-rm: 1.245 arcsec [1.74 σ]
OotOffset-st: 0/1/0/2 [3]
KicOffset-st: 0/1/0/2 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

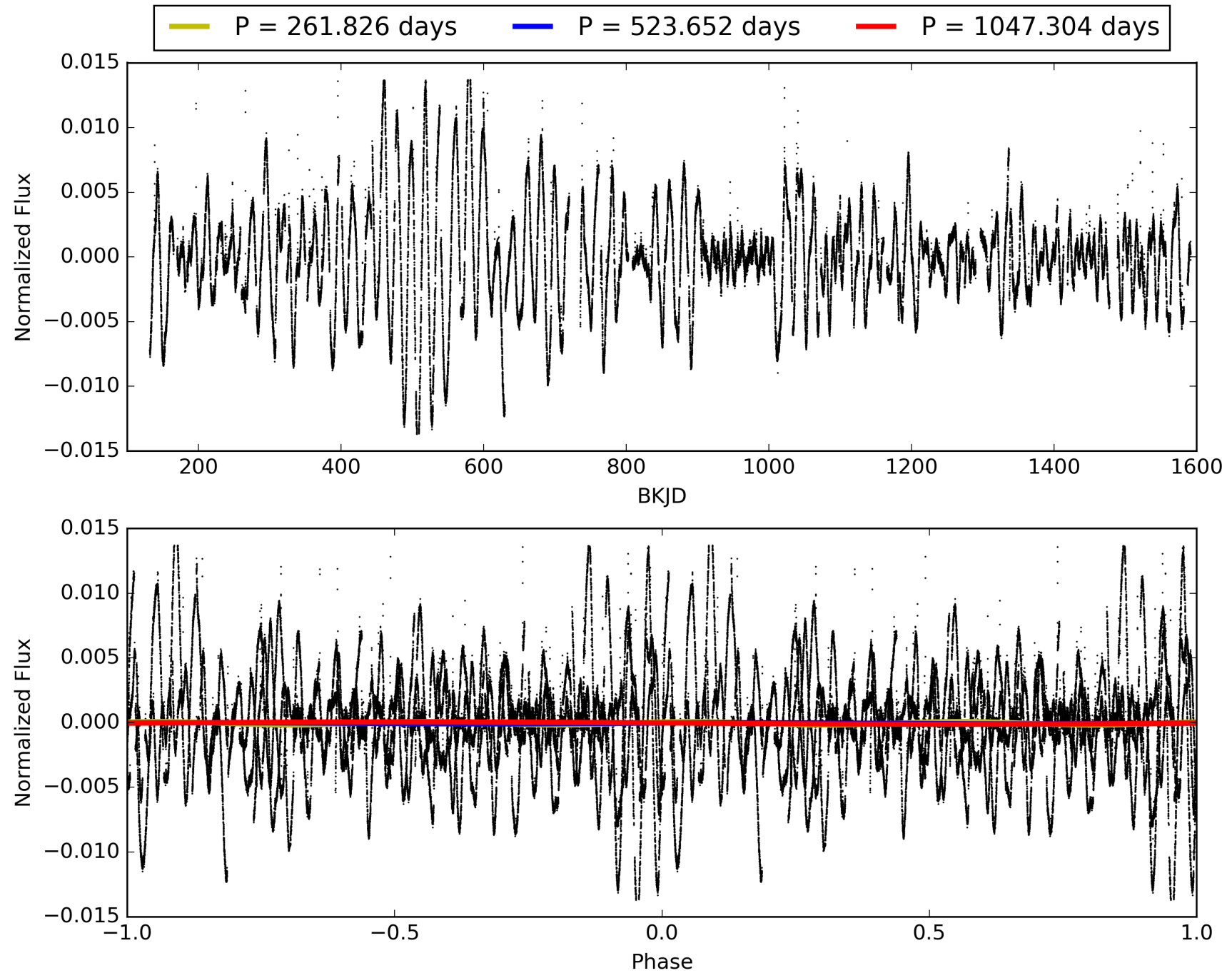
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:11:30 Z

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

TCE 005221138-03, PDC Light Curves

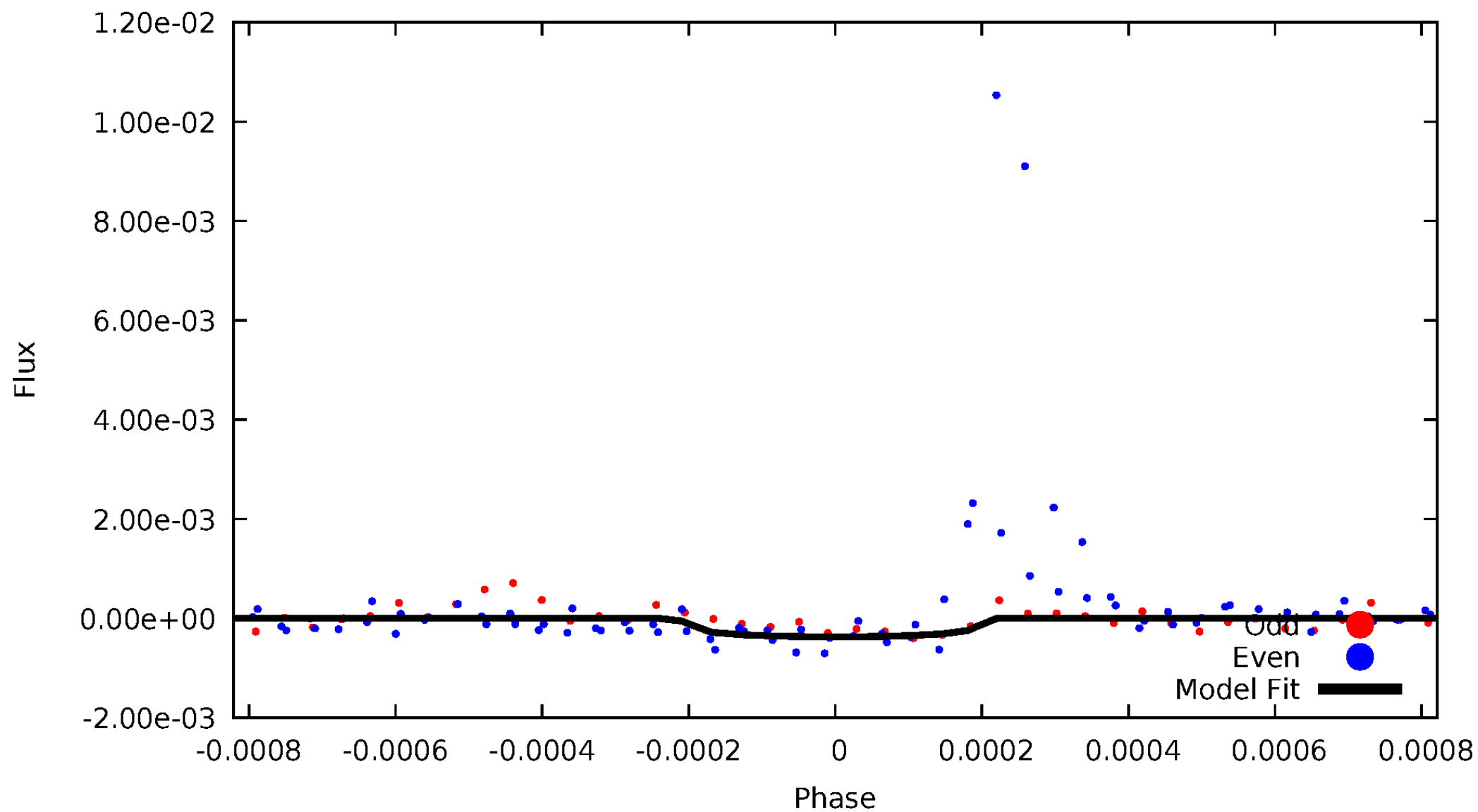


TCE 005221138-03



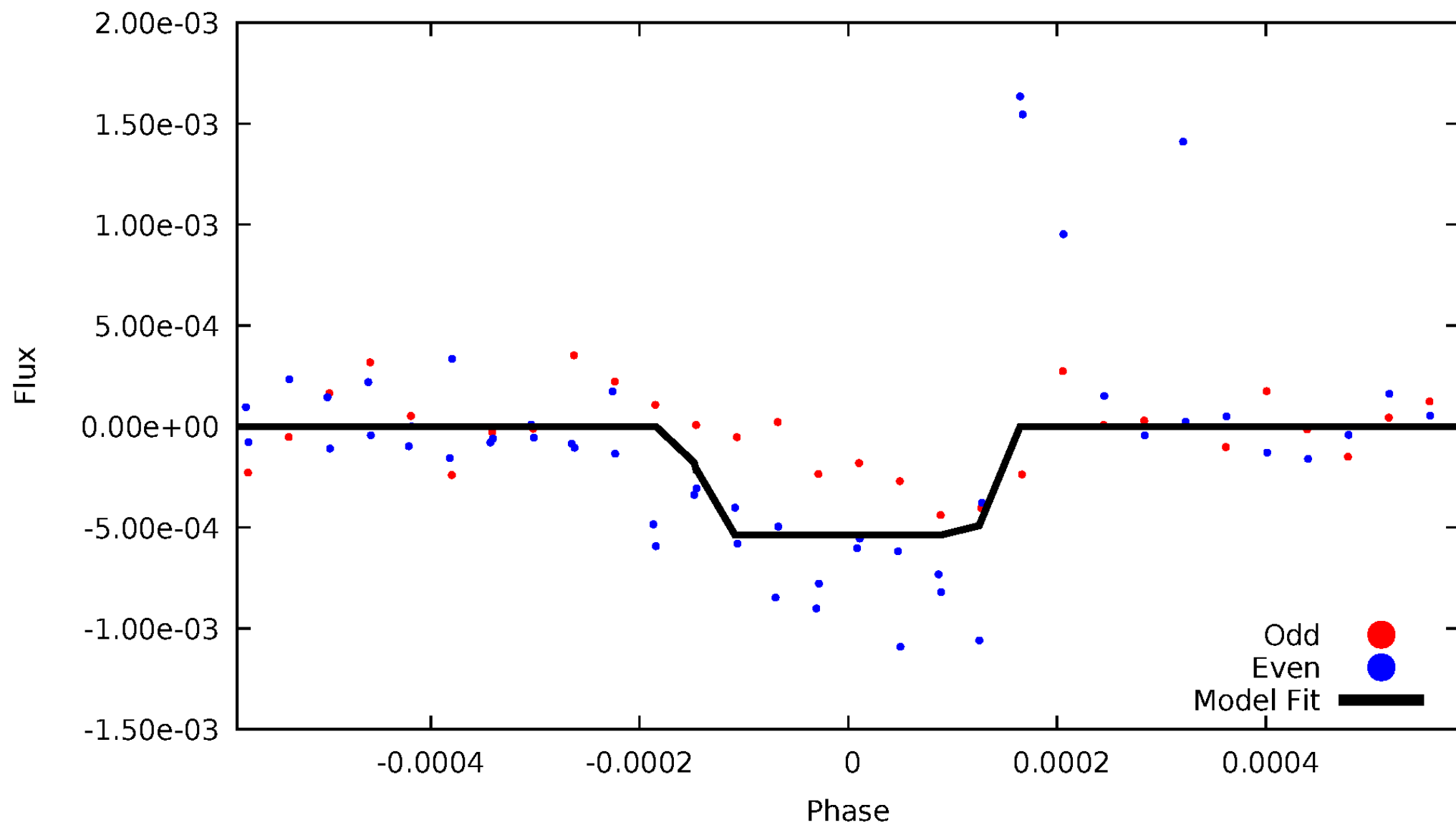
DV Odd/Even

TCE 005221138-03



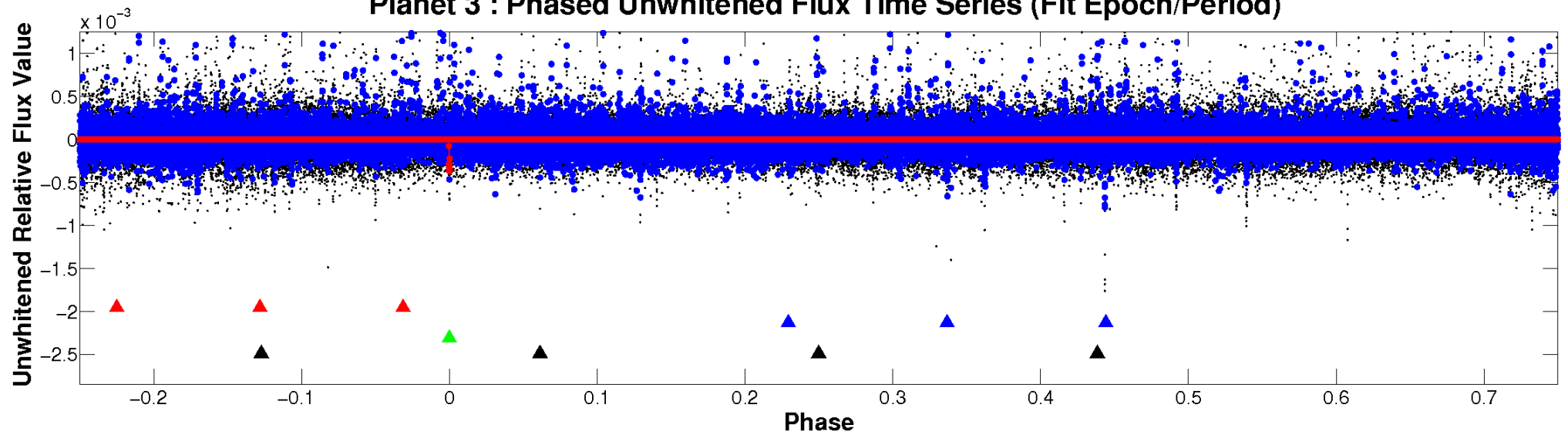
ALT Odd/Even

TCE 005221138-03

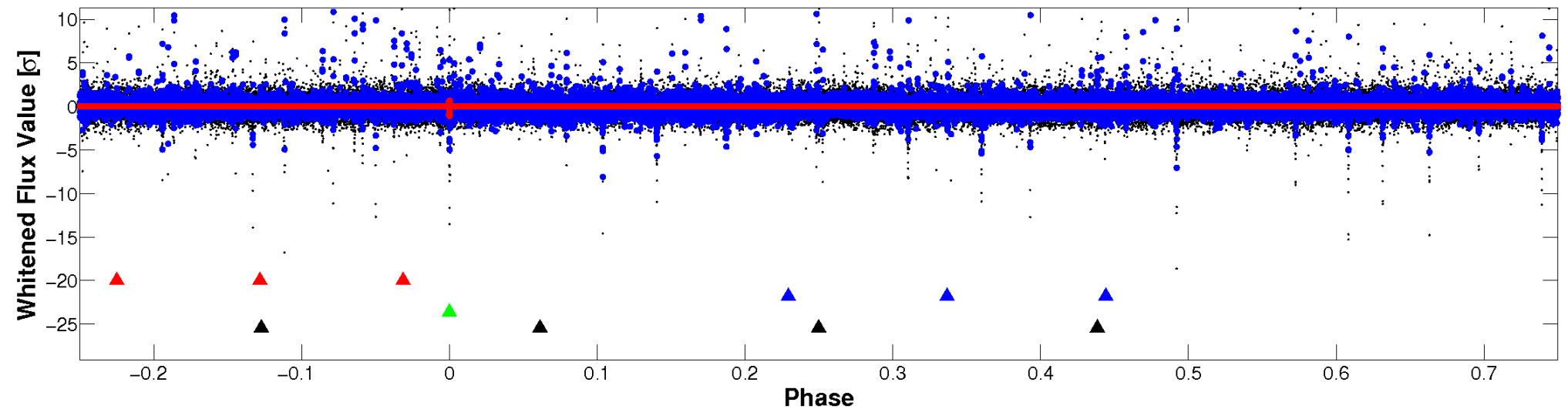


Non-Whitened Vs. Whitened Light Curve

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

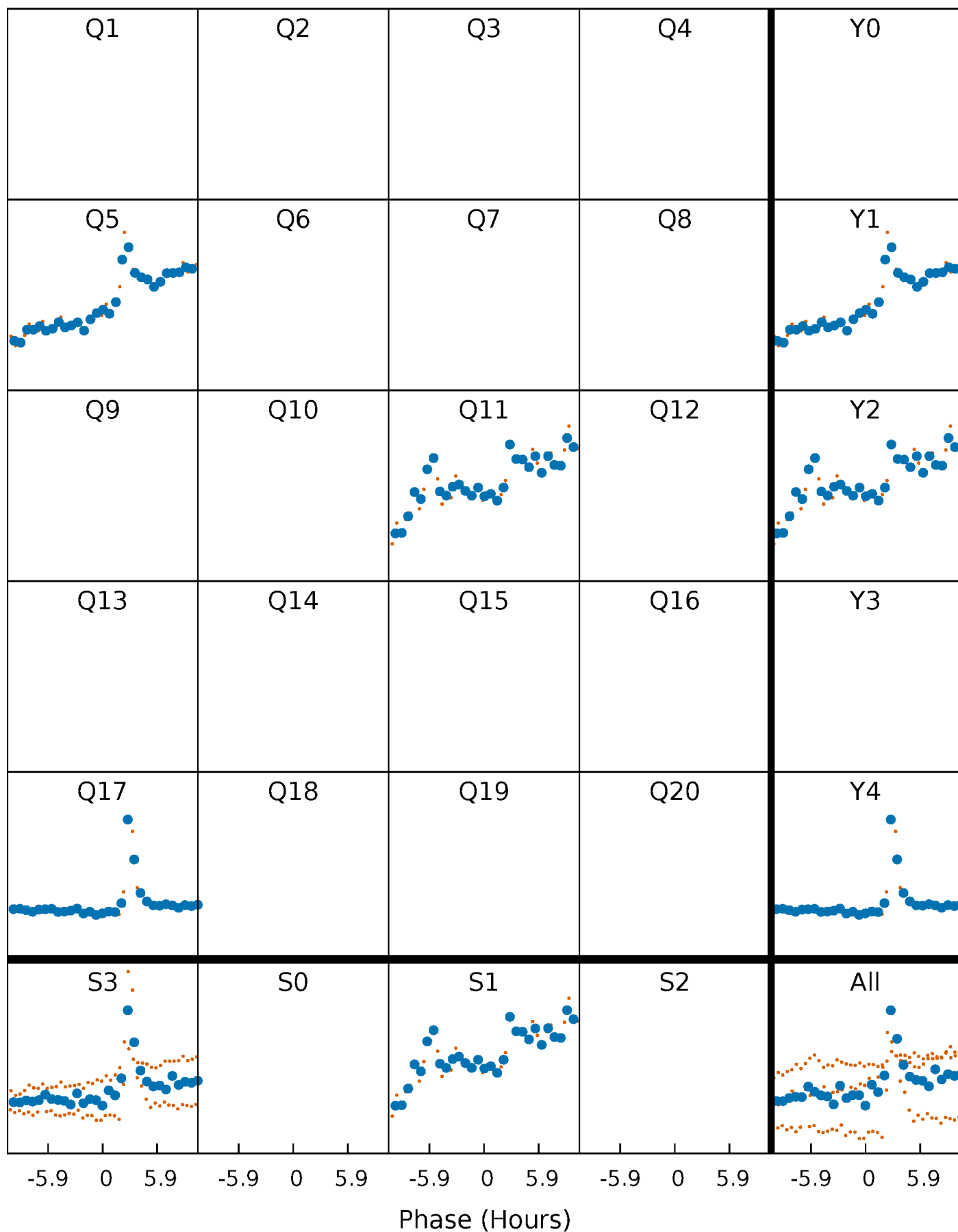


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



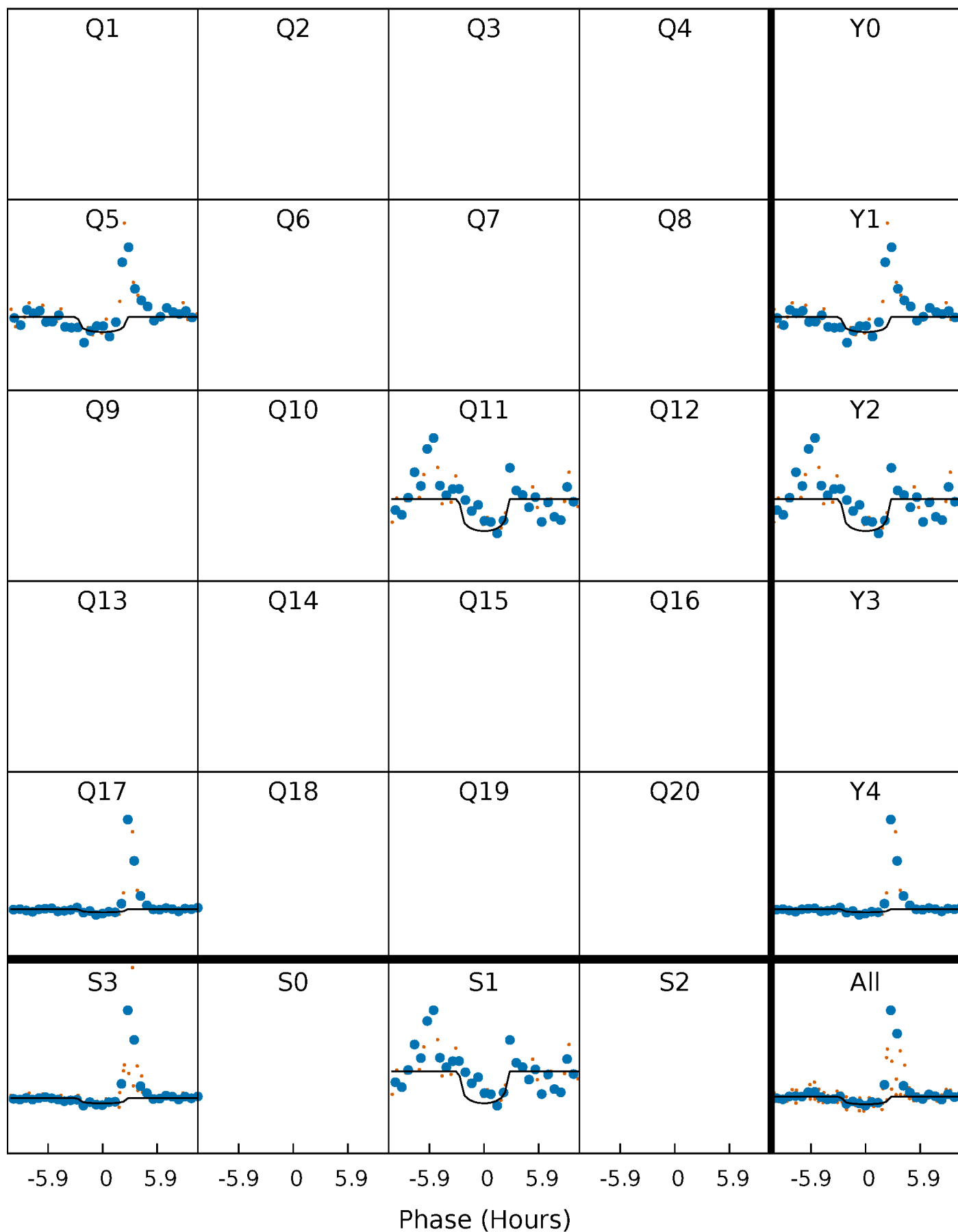
PDC Quarter-Phased Transit Curves

TCE 005221138-03 P=523.651941 Days $T_0=531.586742$ (BKJD)



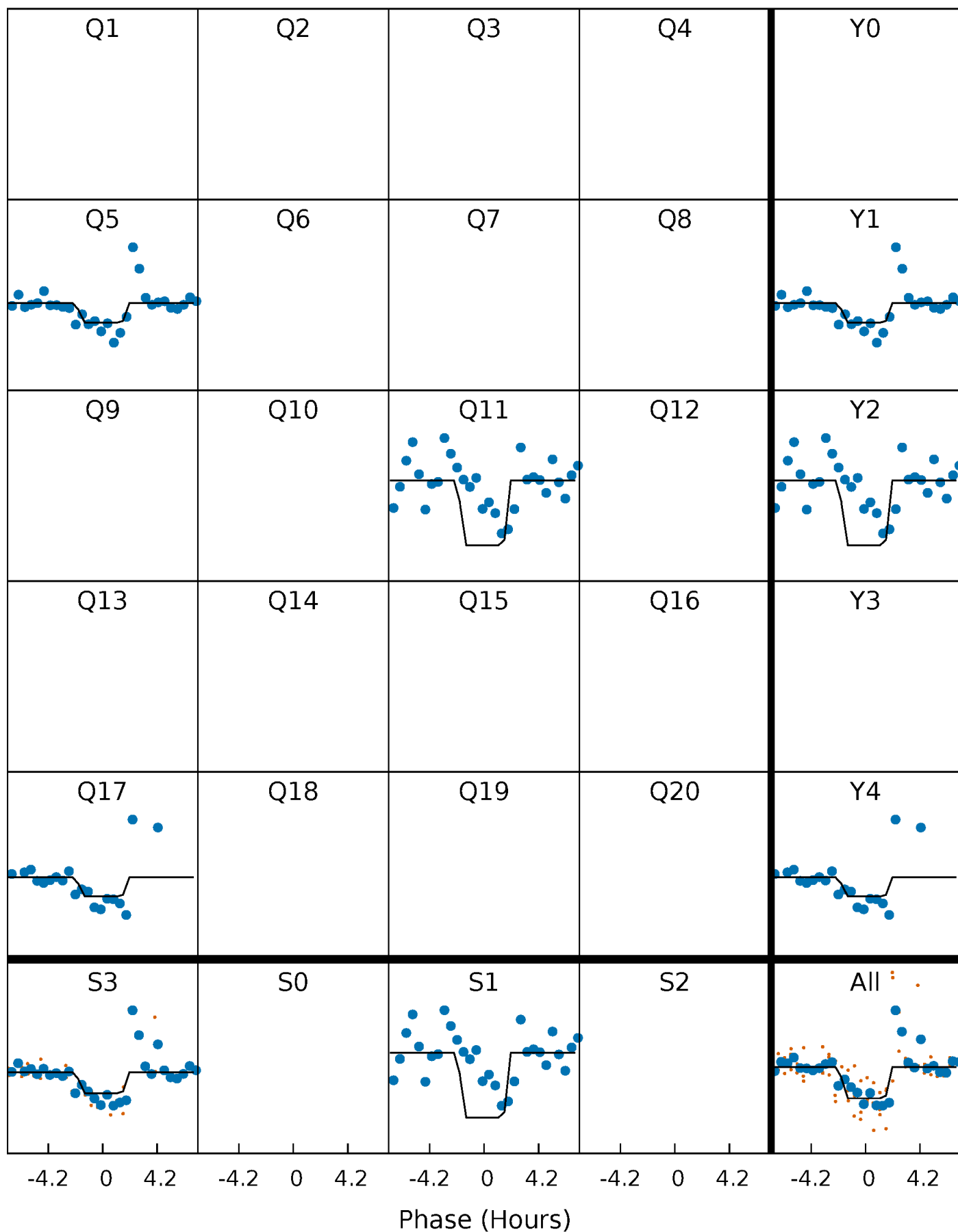
DV Quarter-Phased Transit Curves

TCE 005221138-03 $P=523.651941$ Days $T_0=531.586742$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

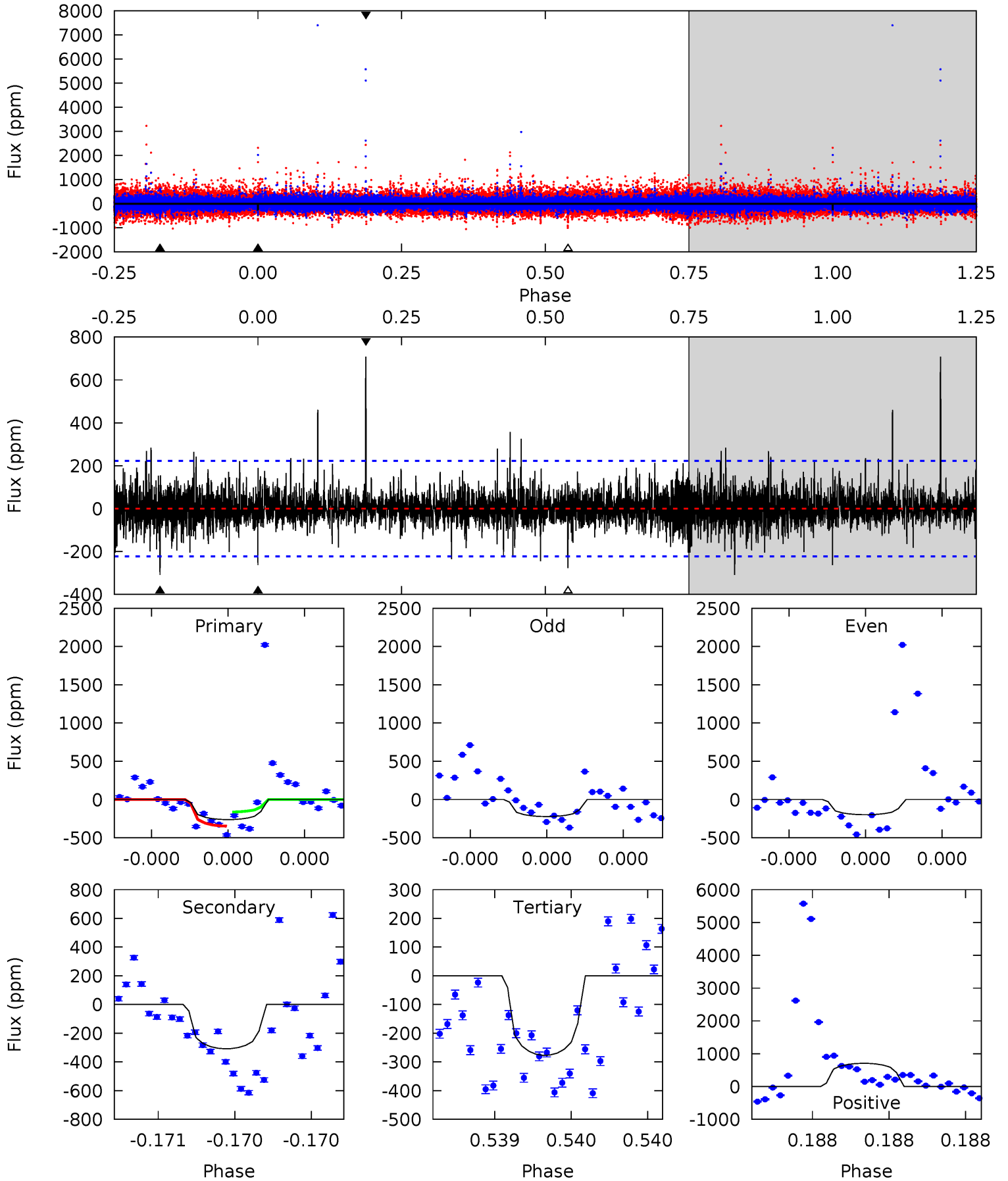
TCE 005221138-03 P=523.650842 Days $T_0=531.597488$ (BKJD)



DV Model-Shift Uniqueness Test

005221138-03, P = 523.651941 Days, E = 7.934801 Days

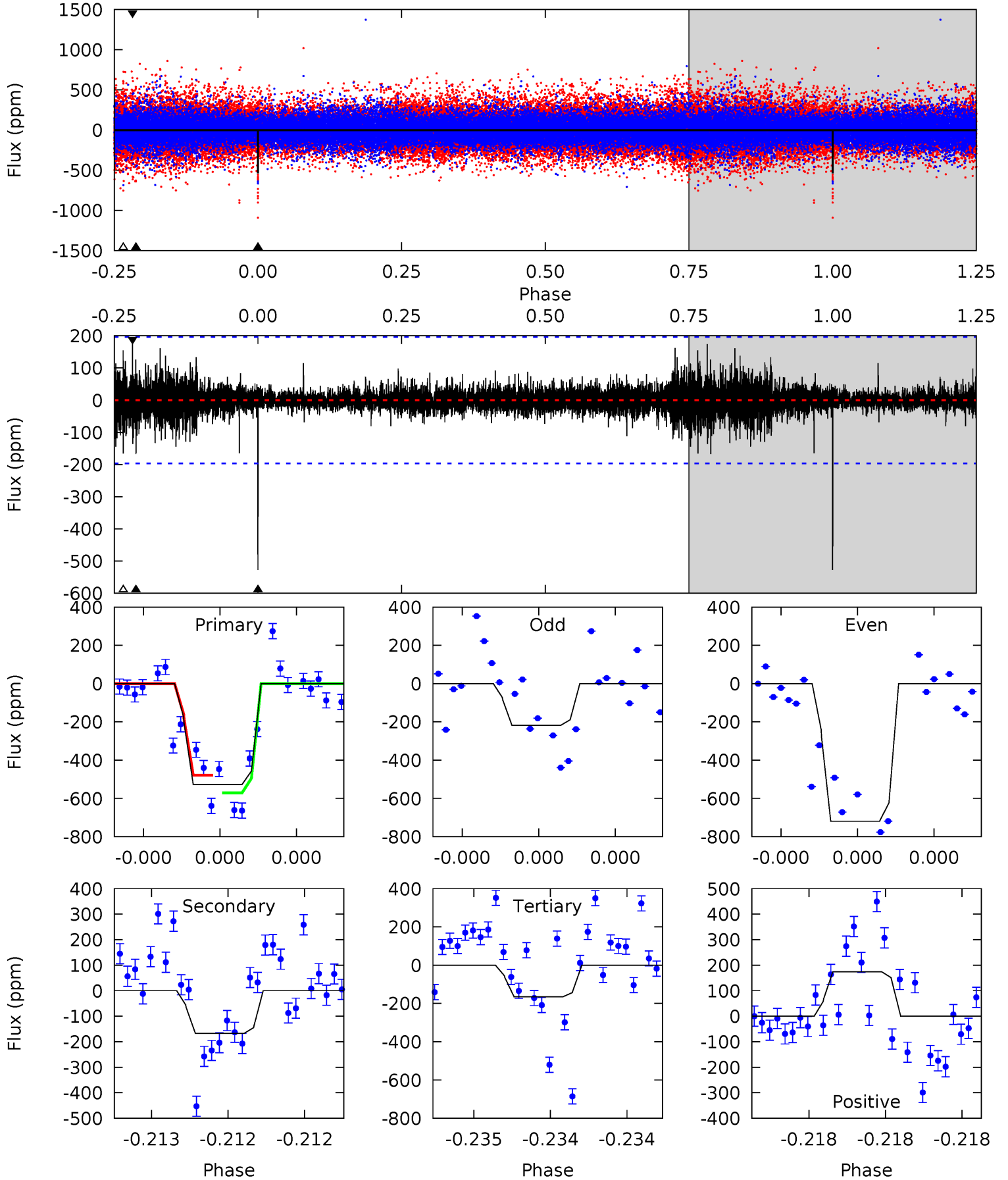
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.60	7.76	6.97	17.8	5.60	3.52	1.48	-0.37	-11.2	0.79	-10.0	0.25	0.90	0.70	2.34



Alt Model-Shift Uniqueness Test

005221138-03, P = 523.650842 Days, E = 7.946646 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.2	4.81	4.75	5.02	5.66	3.61	0.76	10.4	10.1	0.06	-0.20	6.69	0.80	0.25	1.34



Stellar Parameters For KIC 005221138

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5317^{+177}_{-144}	$3.770^{+0.847}_{-0.363}$	$-0.660^{+0.350}_{-0.250}$	$1.946^{+1.320}_{-1.188}$	$0.812^{+0.233}_{-0.125}$	$0.155^{+3.153}_{-0.113}$
	+3%/-3%	+22%/-10%	+53%/-38%	+68%/-61%	+29%/-15%	+2030%/-73%
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 005221138-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-308 ± 40	$23.53^{+30.08}_{-17.34}$	411^{+71}_{-76}	2779^{+1191}_{-451}	437^{+5605}_{-351}
Alt.	-167 ± 35	$21.32^{+28.02}_{-16.26}$	411^{+76}_{-82}	2636^{+1146}_{-442}	288^{+4603}_{-234}

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

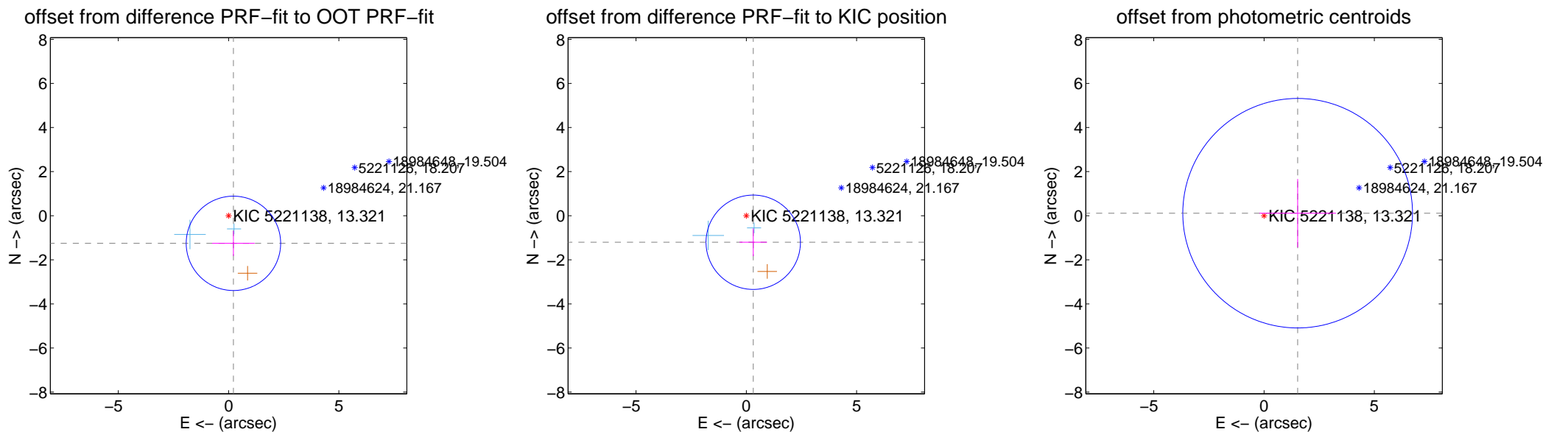
DV Centroid Data

Supplemental centroid analysis for 005221138-03. Kepler magnitude: 13.32. Transit SNR 5.04

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.273 ± 0.714	1.78	-0.220 ± 0.962	-1.254 ± 0.568
PRF-fit source offset from KIC position	1.245 ± 0.713	1.74	-0.314 ± 0.624	-1.204 ± 0.628
photometric centroid source offset	1.53 ± 1.74	0.88	-1.52 ± 1.74	0.11 ± 1.55

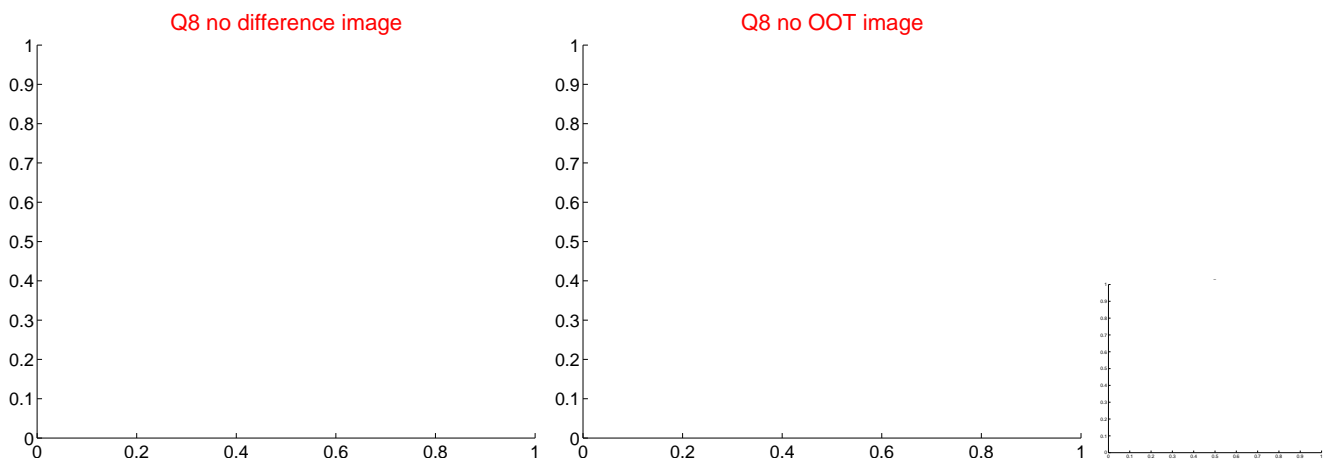
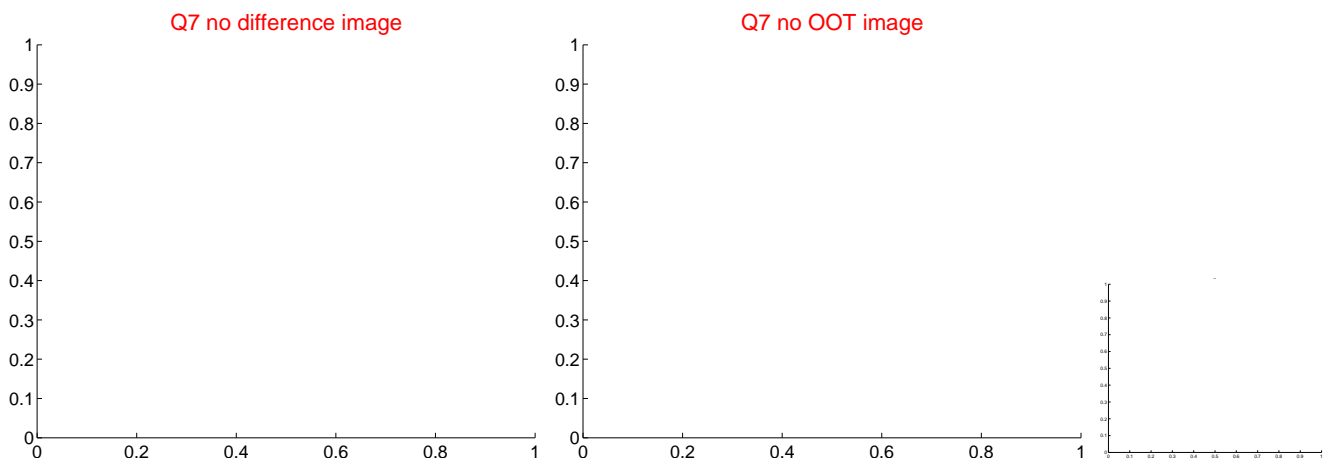
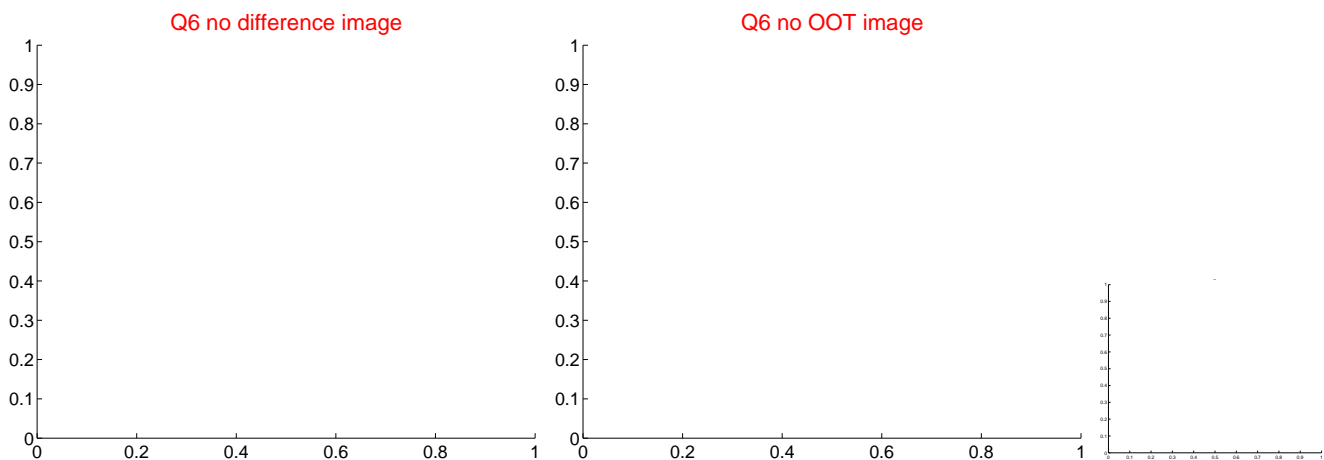
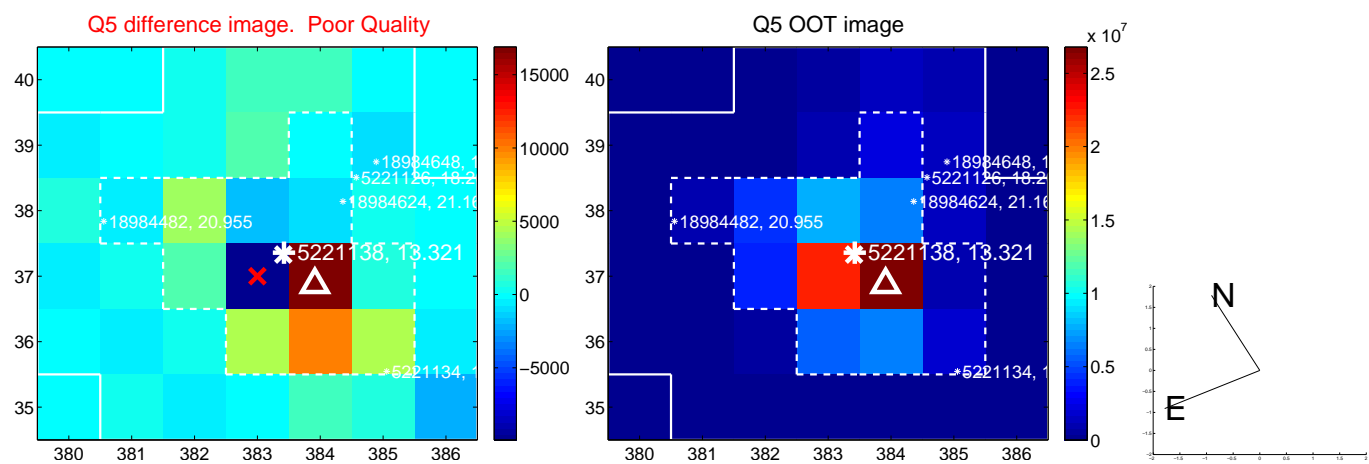


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

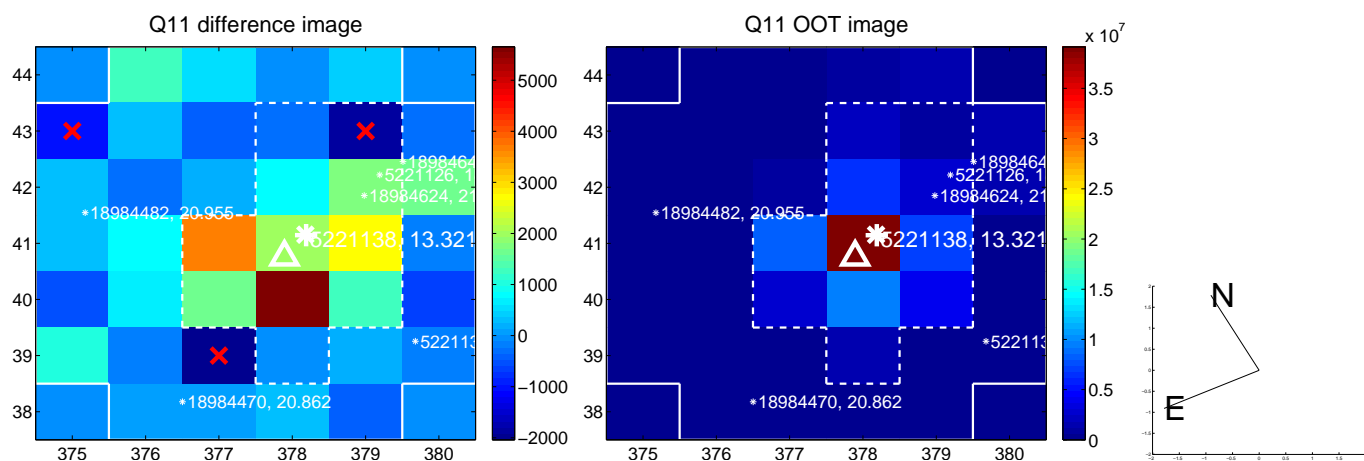
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



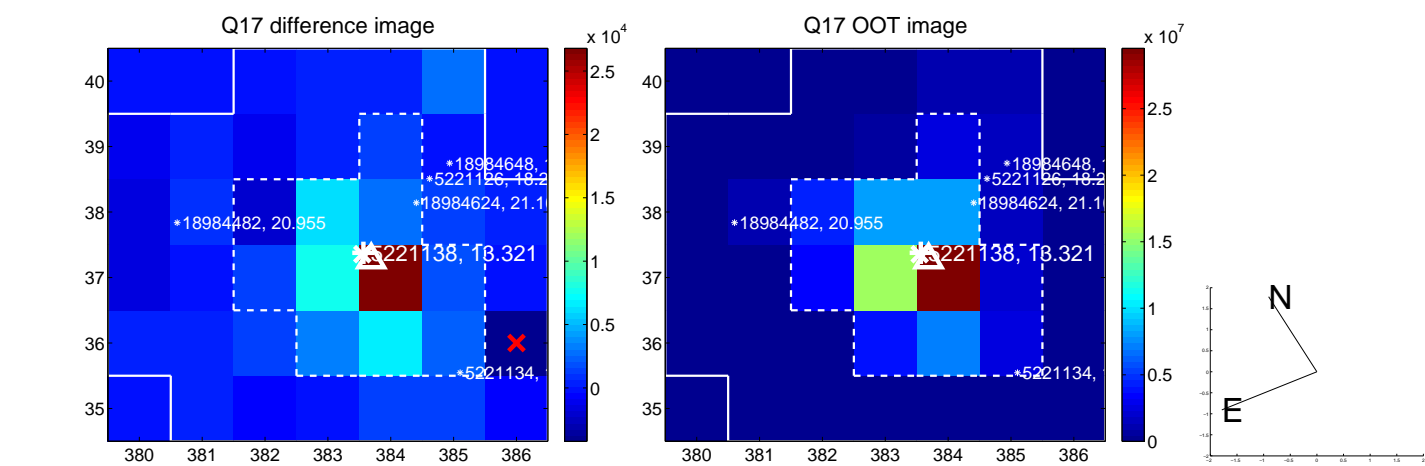
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



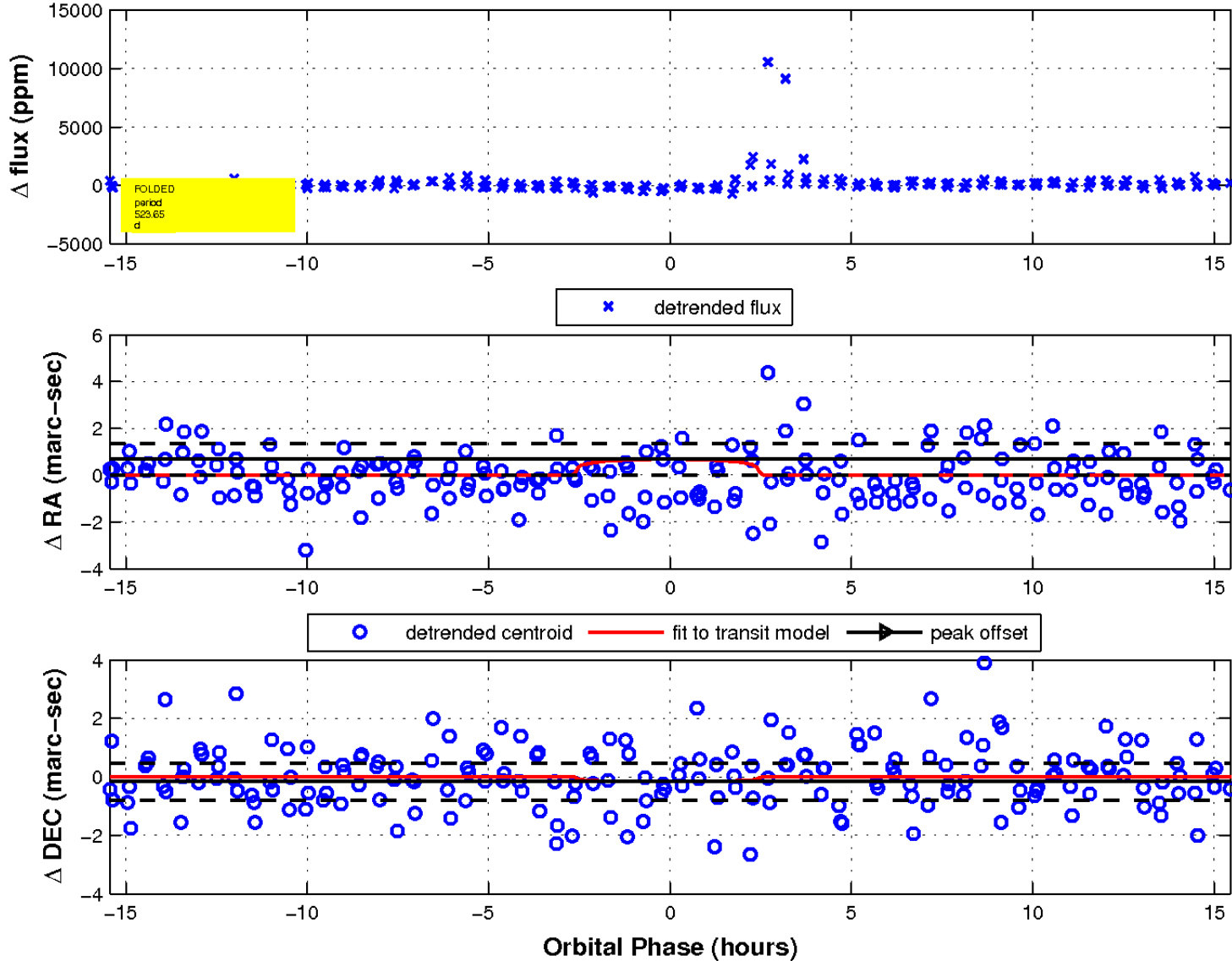
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

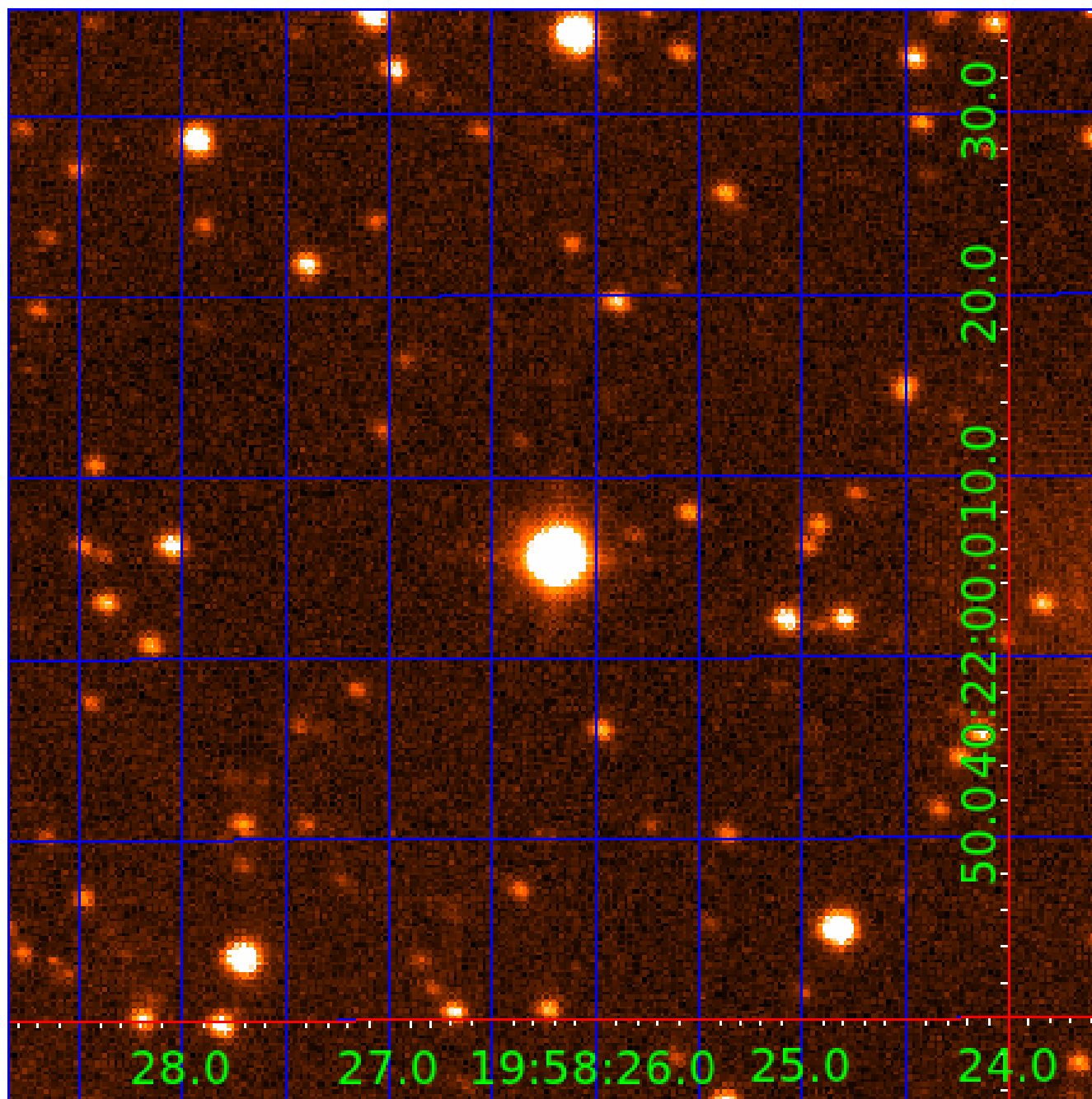


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



KIC 005221138

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})
005221138-01	OBS	No	574.368389	413.768104	462.8	8.327	12.7	6.9	1.95	5317	4.49	1.70
005221138-02	OBS	No	467.425923	240.497769	359.4	1.229	10.5	3.4	1.95	5317	4.66	2.24
005221138-03	OBS	No	523.651941	531.586742	370.9	5.159	9.1	5.0	1.95	5317	3.80	1.92
005221138-04	OBS	No	424.921738	237.524644	385.5	4.542	10.0	6.2	1.95	5317	3.92	2.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005221138-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005221138-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005221138-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

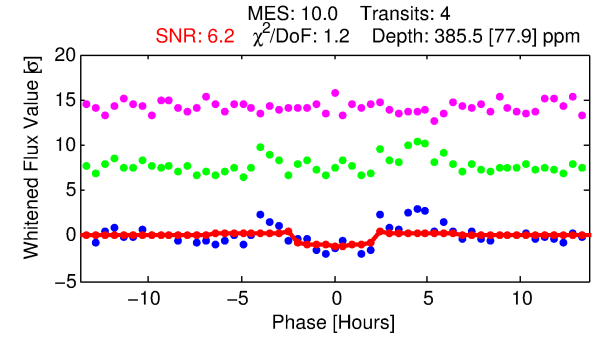
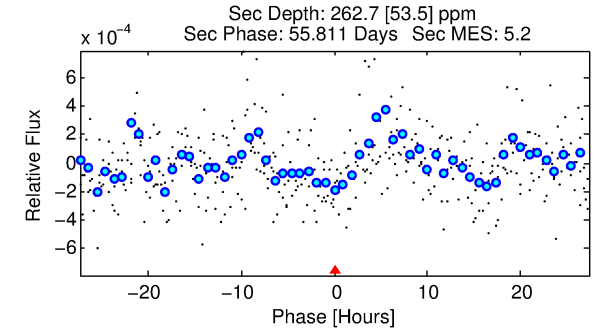
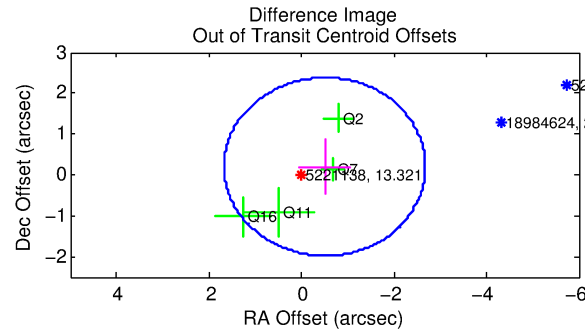
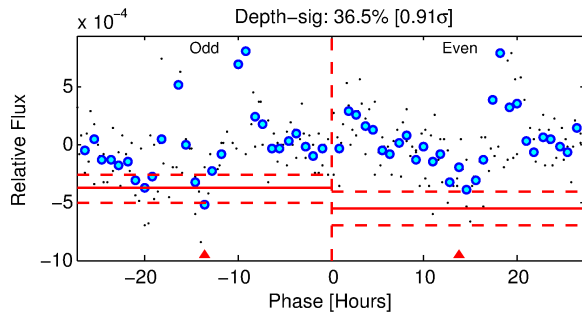
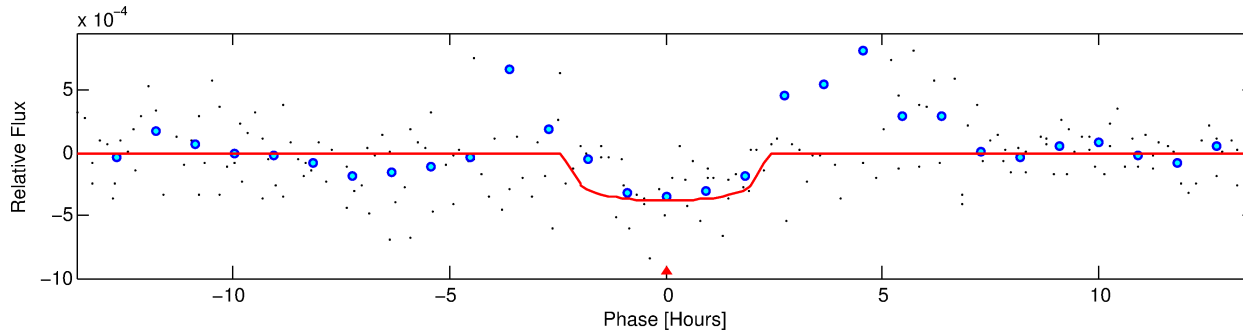
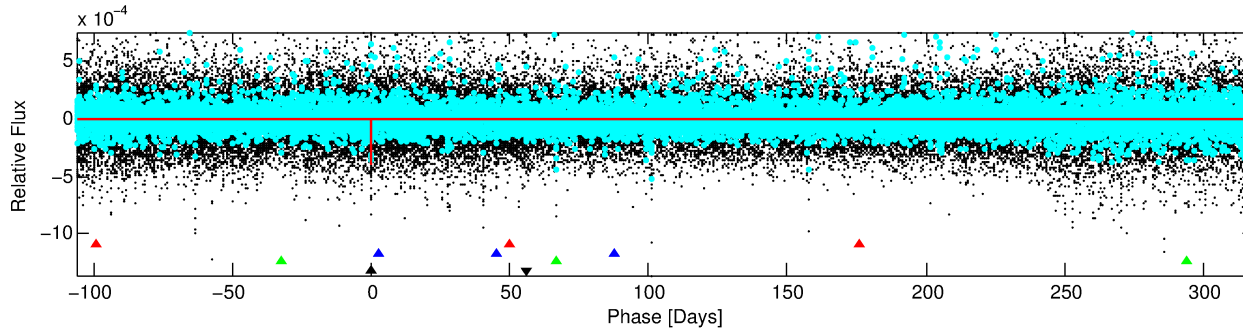
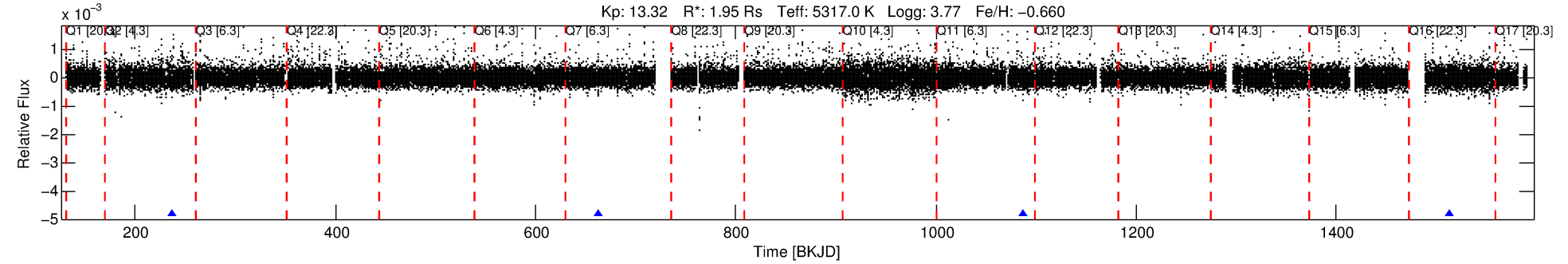
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005221138-04

No Significant Match Found

DV One-Page Summary

KIC: 5221138 Candidate: 4 of 4 Period: 424.922 d



DV Fit Results:

Period = 424.92174 [0.00674] d
Epoch = 237.5246 [0.0121] BKJD
Rp/R* = 0.0185 [0.0308]
a/R* = 620.78 [4364.68]
b = 0.53 [9.57]
Seff = 2.54 [3.52]
Teq = 322 [111] K
Rp = 3.92 [7.06] Re
a = 1.0328 [0.8178] AU
Ag = 10035.27 [36293.29] [0.28 σ]
Teffp = 4983 [4169] K [1.12 σ]

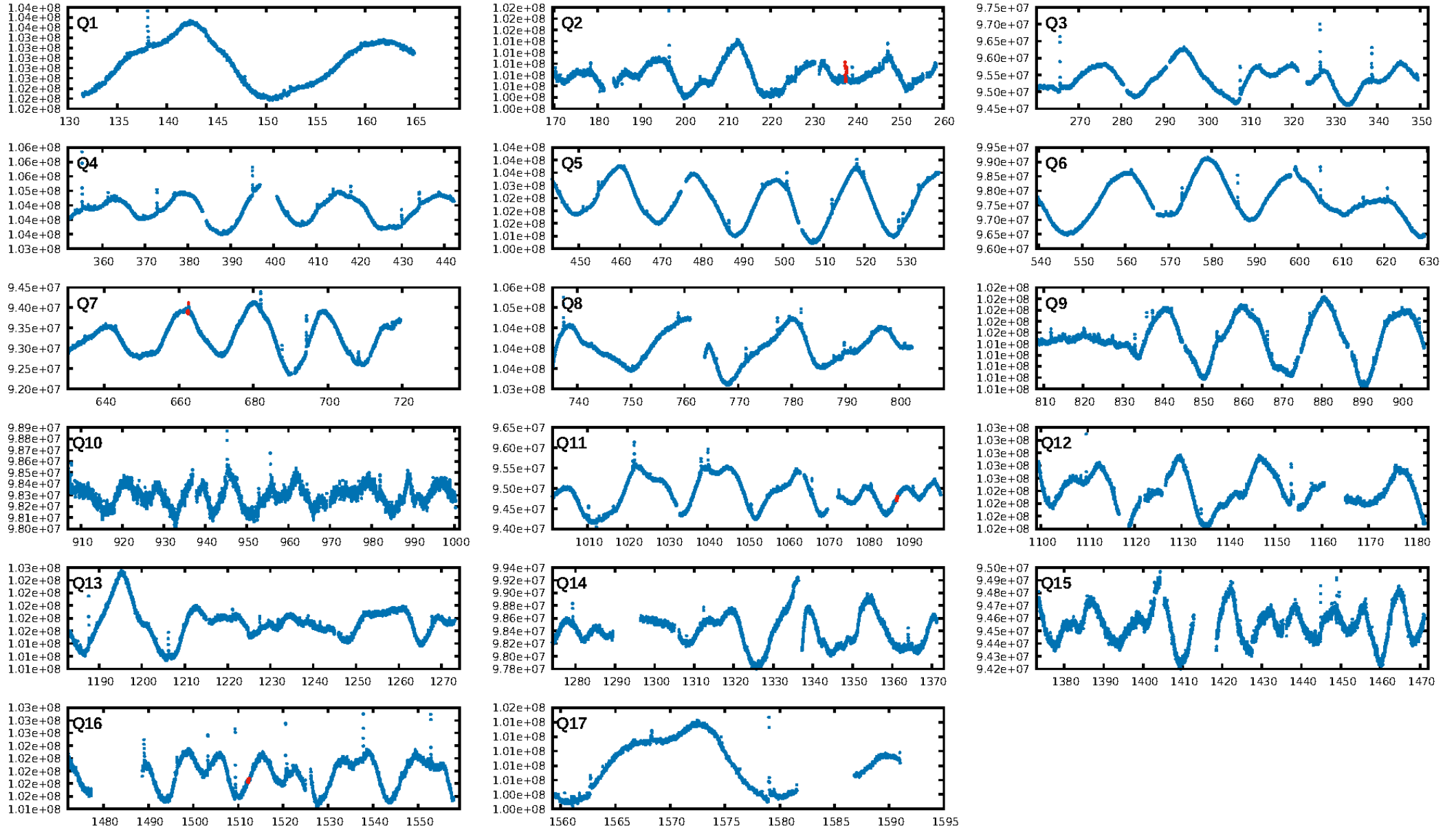
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [216.79 σ]
ModelChiSquare2-sig: 2.5%
ModelChiSquareGoF-sig: 75.3%
Bootstrap-pfa: 3.27e-10
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -4.709
Centroid-sig: 73.8%
Centroid-so: 0.984 arcsec [0.68 σ]
OotOffset-rm: 0.541 arcsec [0.74 σ]
OotOffset-st: 1/2/1/0 [4]
KicOffset-rm: 0.774 arcsec [1.09 σ]
KicOffset-st: 1/2/1/0 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [4/4]

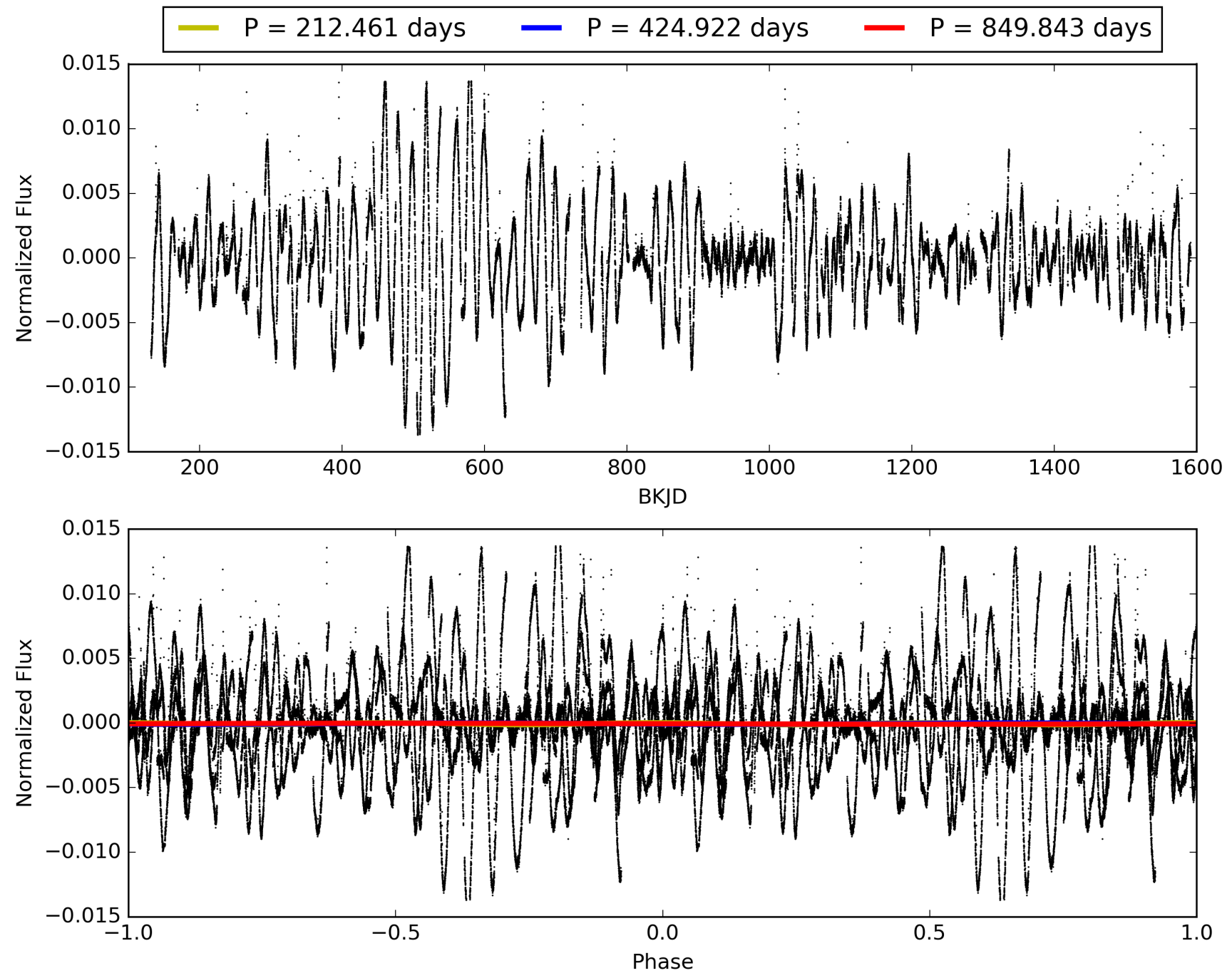
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:11:45 Z

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

TCE 005221138-04, PDC Light Curves

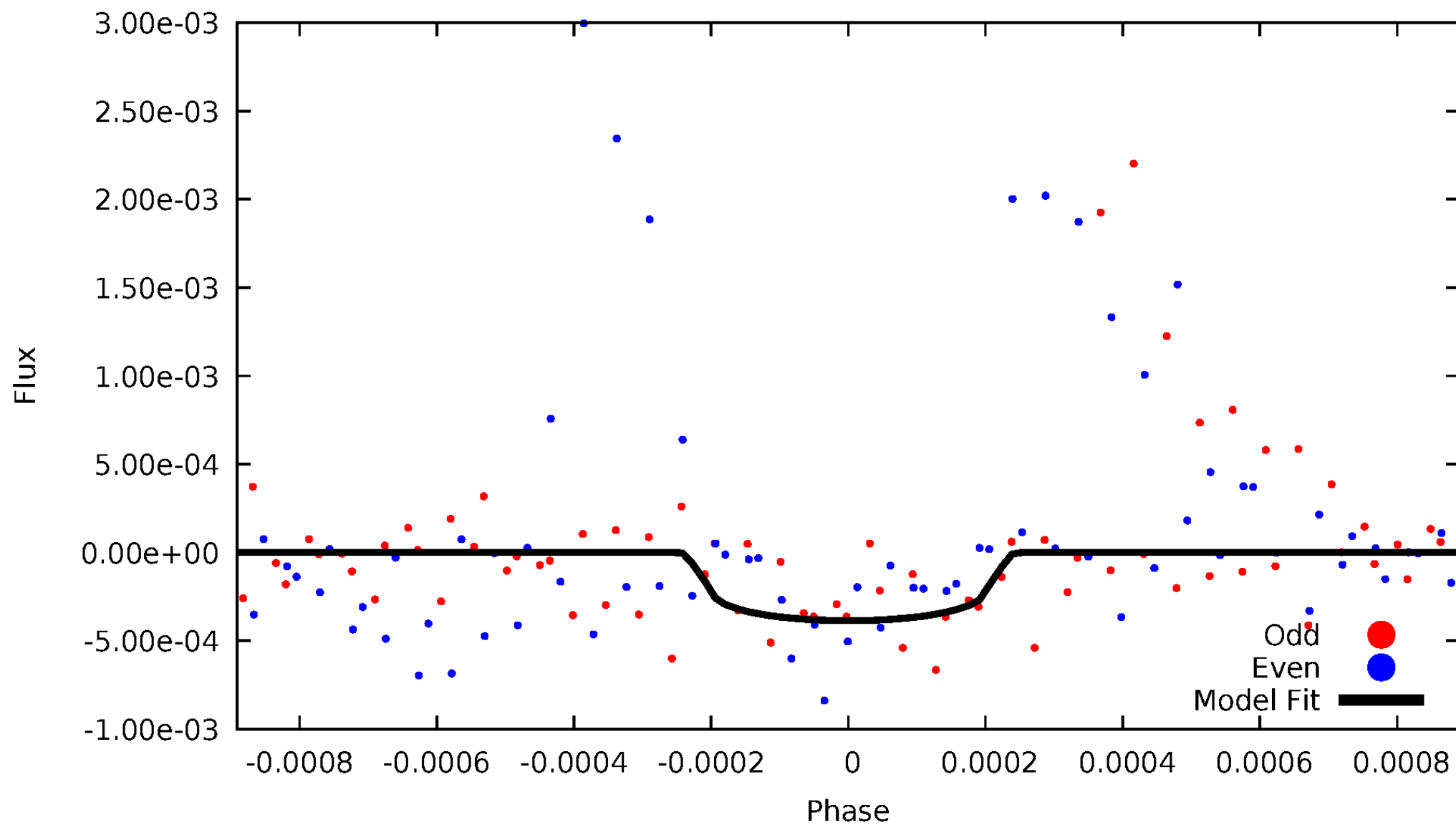


TCE 005221138-04



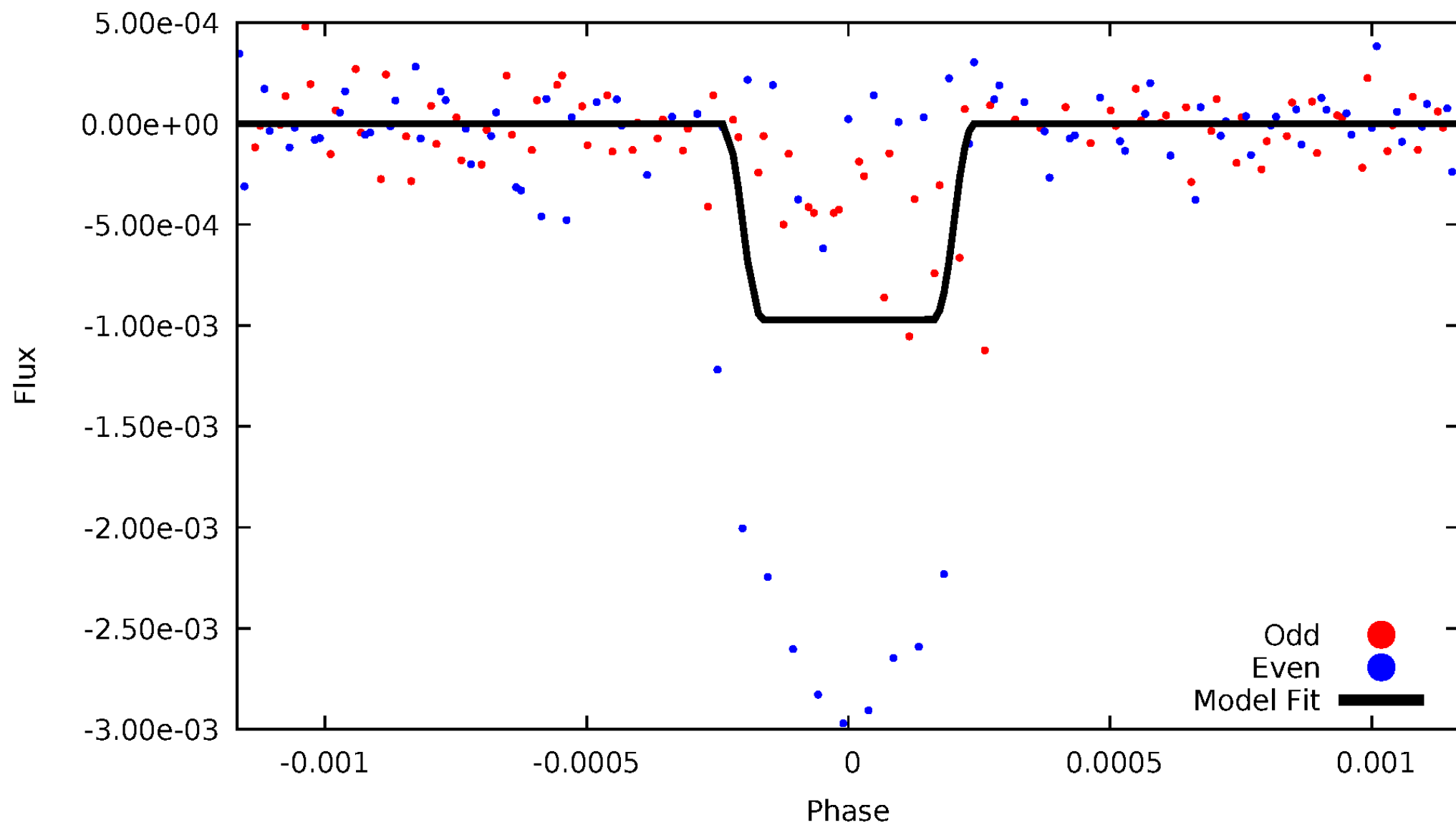
DV Odd/Even

TCE 005221138-04



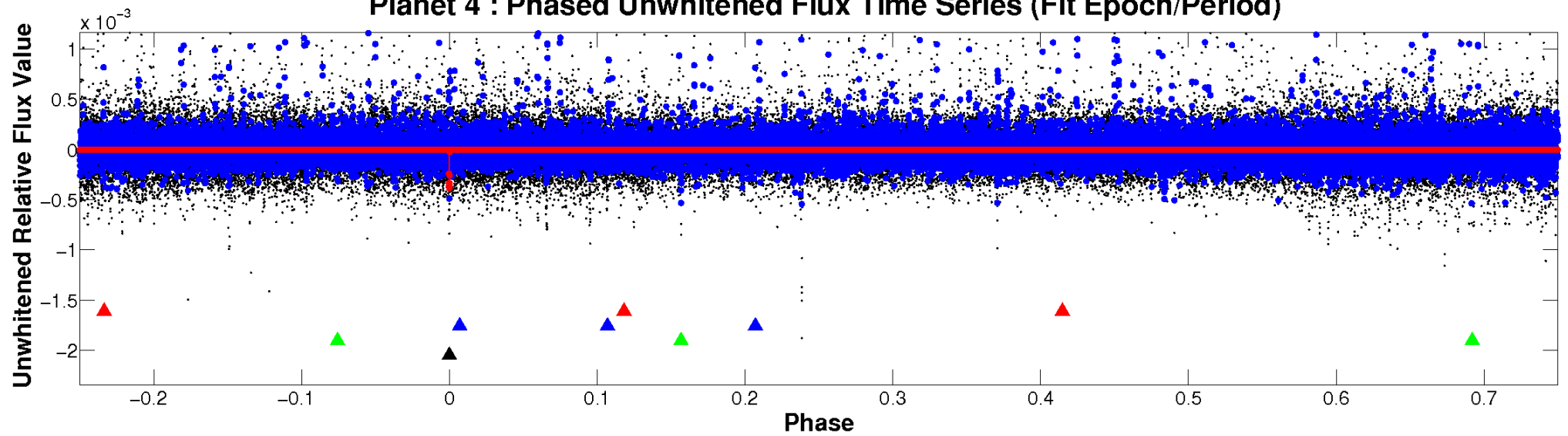
ALT Odd/Even

TCE 005221138-04

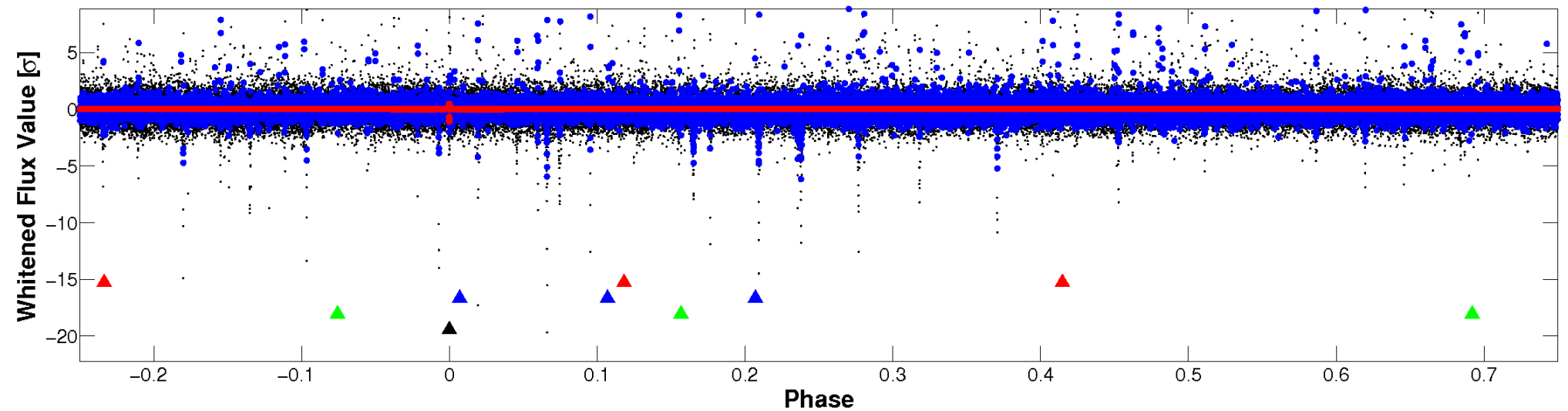


Non-Whitened Vs. Whitened Light Curve

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

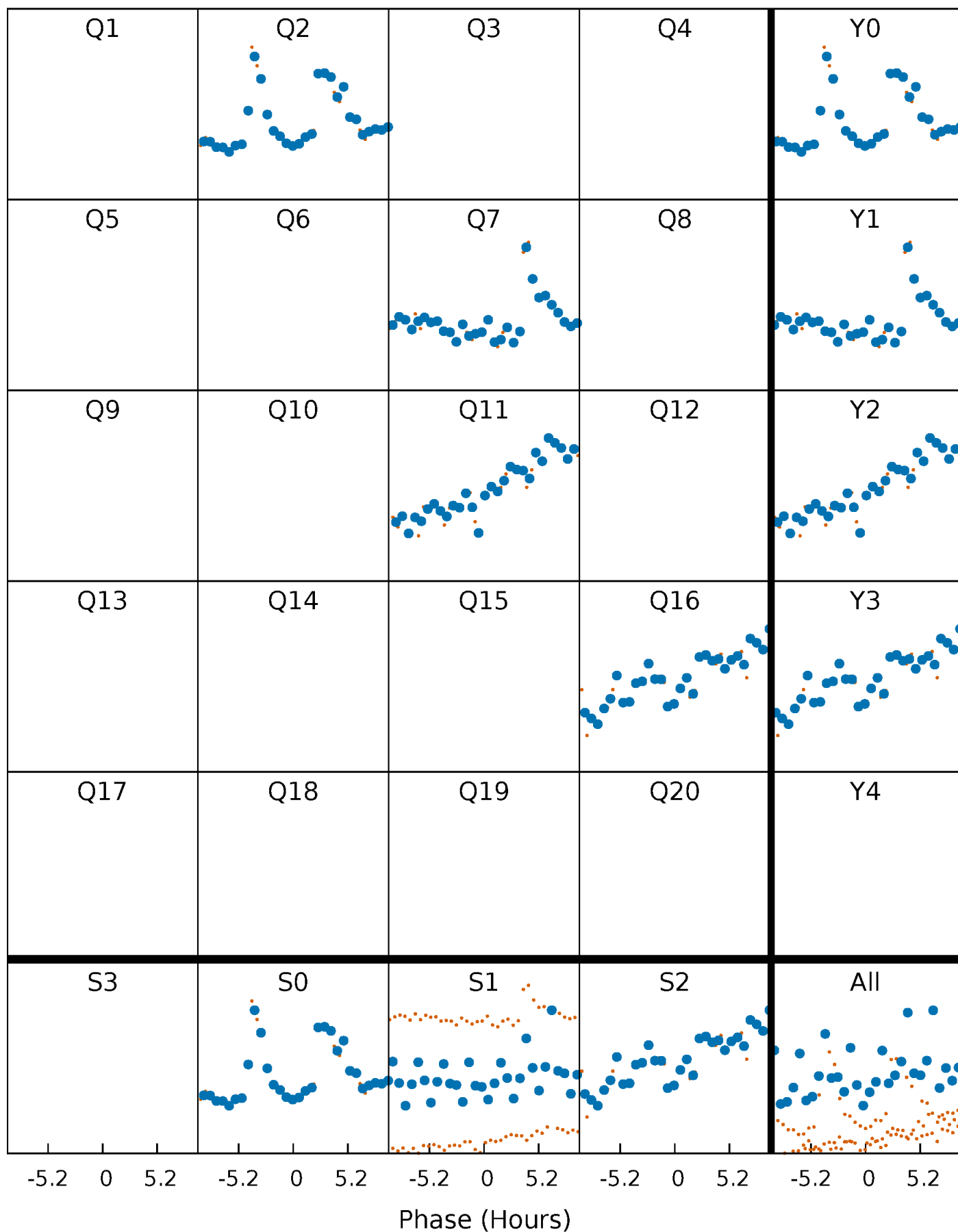


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



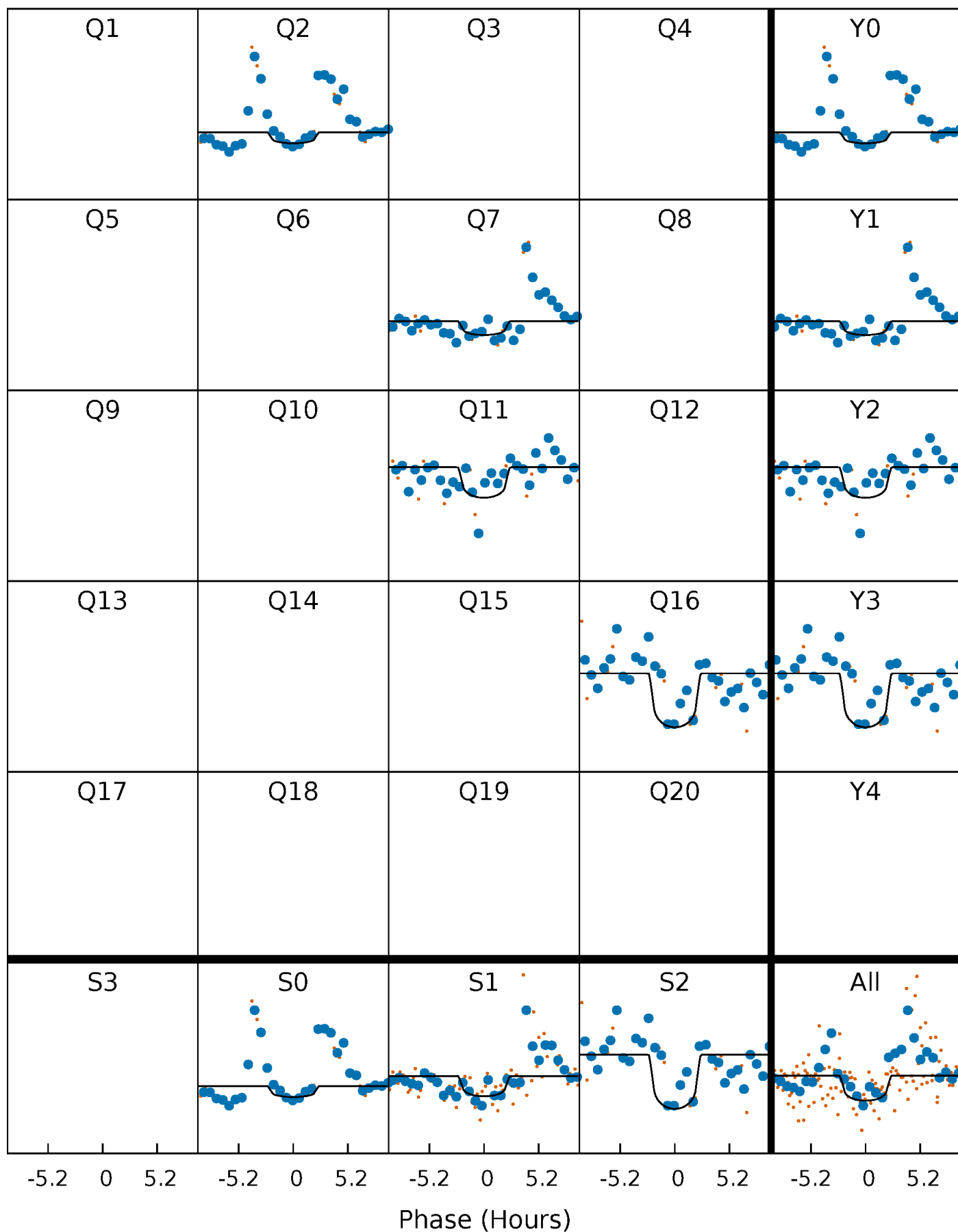
PDC Quarter-Phased Transit Curves

TCE 005221138-04 P=424.921738 Days $T_0=237.524644$ (BKJD)



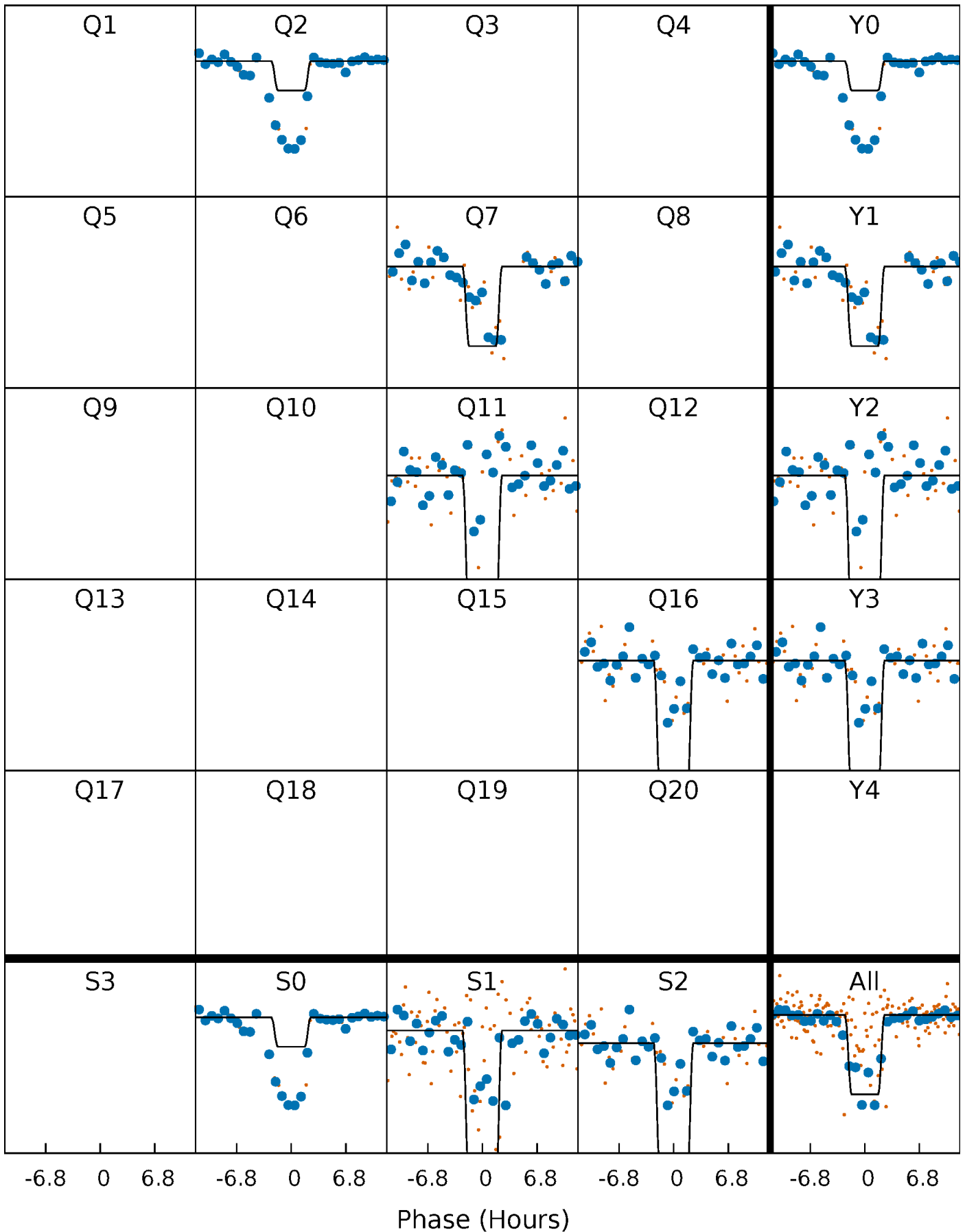
DV Quarter-Phased Transit Curves

TCE 005221138-04 P=424.921738 Days $T_0=237.524644$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

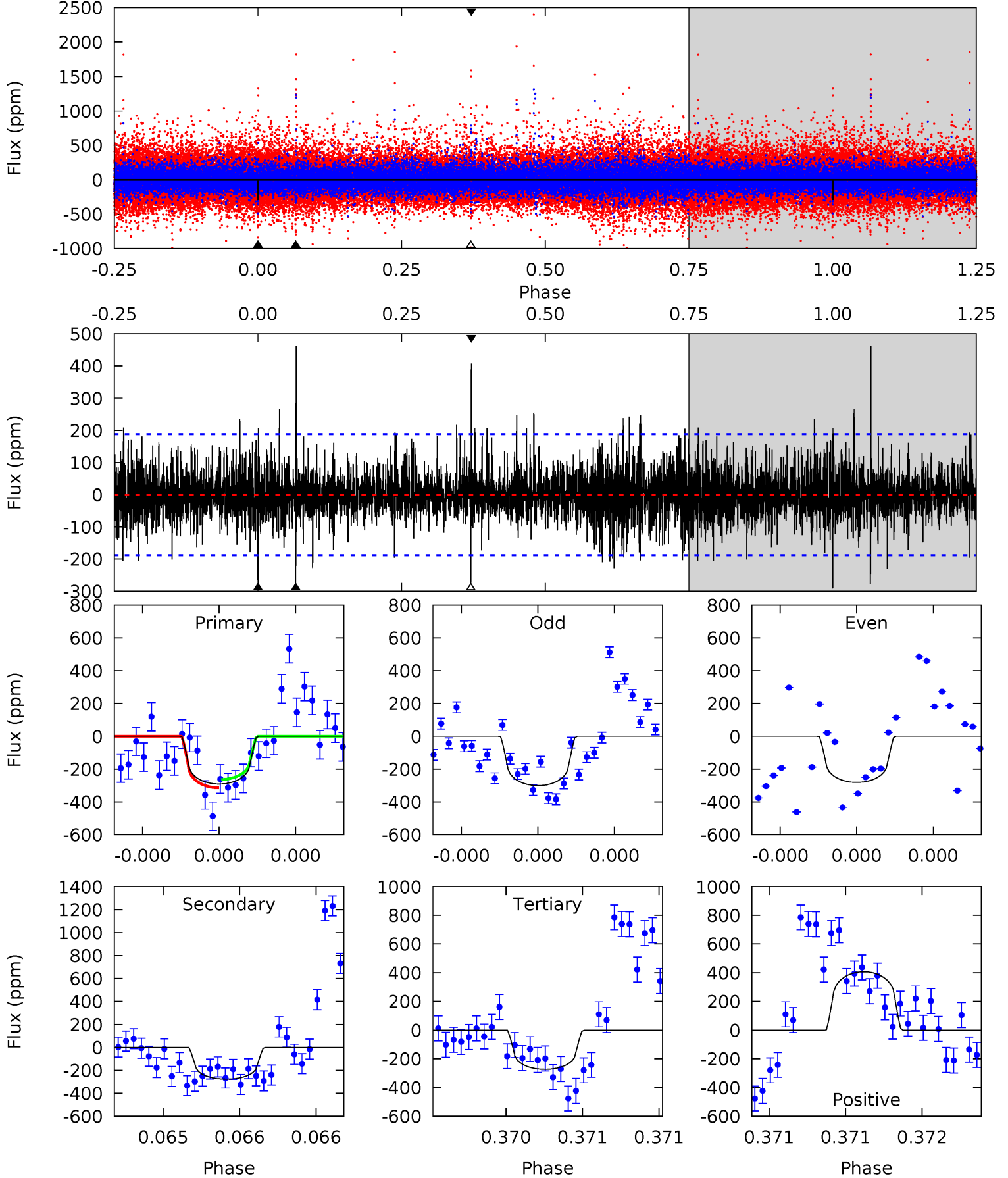
TCE 005221138-04 P=424.922691 Days $T_0=237.528319$ (BKJD)



DV Model-Shift Uniqueness Test

005221138-04, P = 424.921738 Days, E = 237.524644 Days

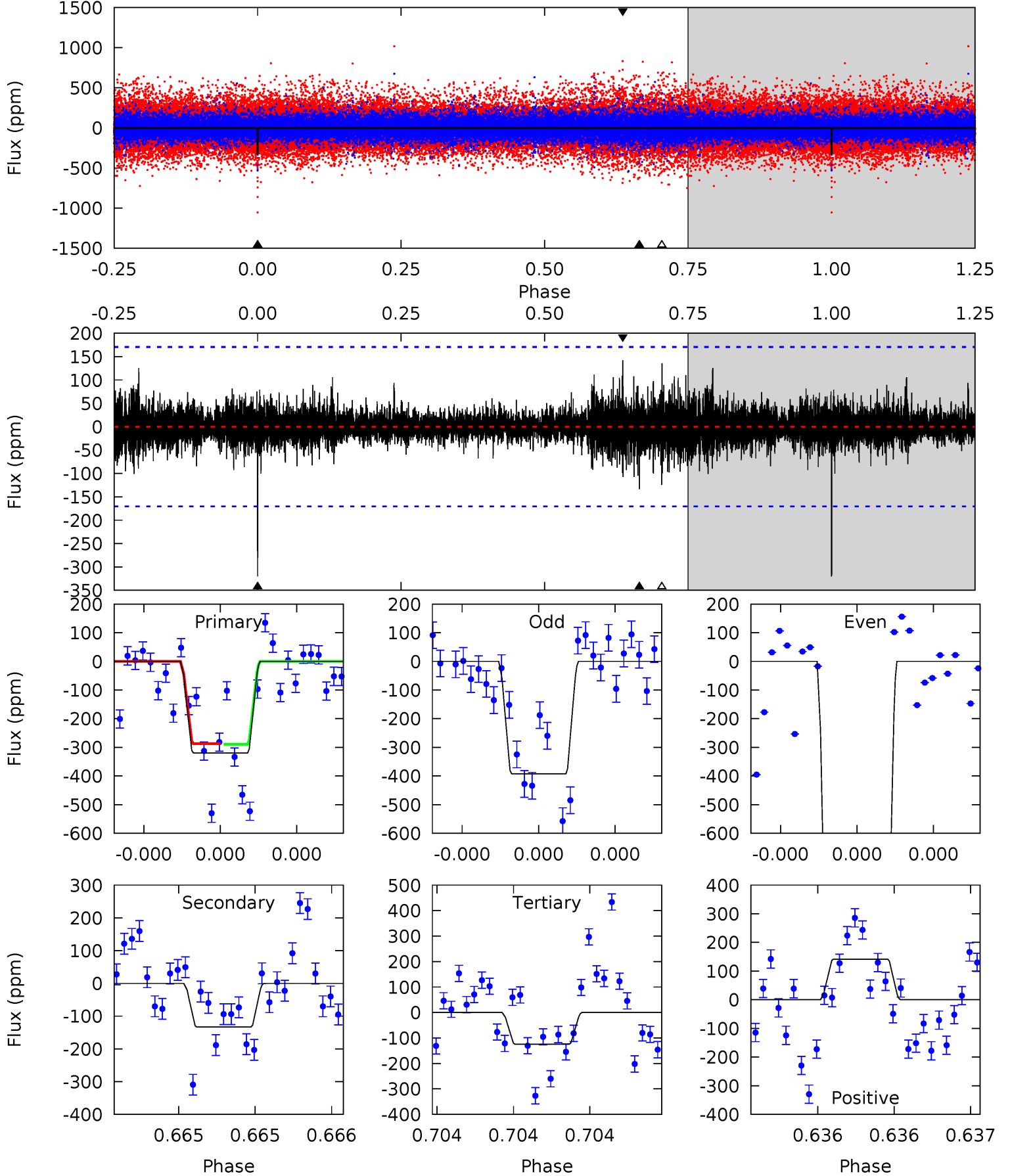
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.62	8.21	8.09	12.1	5.58	3.48	1.78	0.53	-3.45	0.11	-3.86	0.27	1.04	0.61	0.75



Alt Model-Shift Uniqueness Test

005221138-04, P = 424.922691 Days, E = 237.528319 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	4.37	4.08	4.64	5.59	3.50	0.77	6.41	5.84	0.29	-0.28	20.5	2.13	0.31	0.03



Stellar Parameters For KIC 005221138

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5317^{+177}_{-144}	$3.770^{+0.847}_{-0.363}$	$-0.660^{+0.350}_{-0.250}$	$1.946^{+1.320}_{-1.188}$	$0.812^{+0.233}_{-0.125}$	$0.155^{+3.153}_{-0.113}$
	+3%/-3%	+22%/-10%	+53%/-38%	+68%/-61%	+29%/-15%	+2030%/-73%
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 005221138-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-277 ± 34	$5.34^{+6.12}_{-3.67}$	440^{+77}_{-84}	4328^{+2362}_{-872}	5818^{+51231}_{-4607}
Alt.	-133 ± 31	$7.13^{+7.12}_{-4.44}$	446^{+67}_{-84}	3432^{+1192}_{-527}	1538^{+9131}_{-1155}

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 $A_{obs} \gg 1.0$

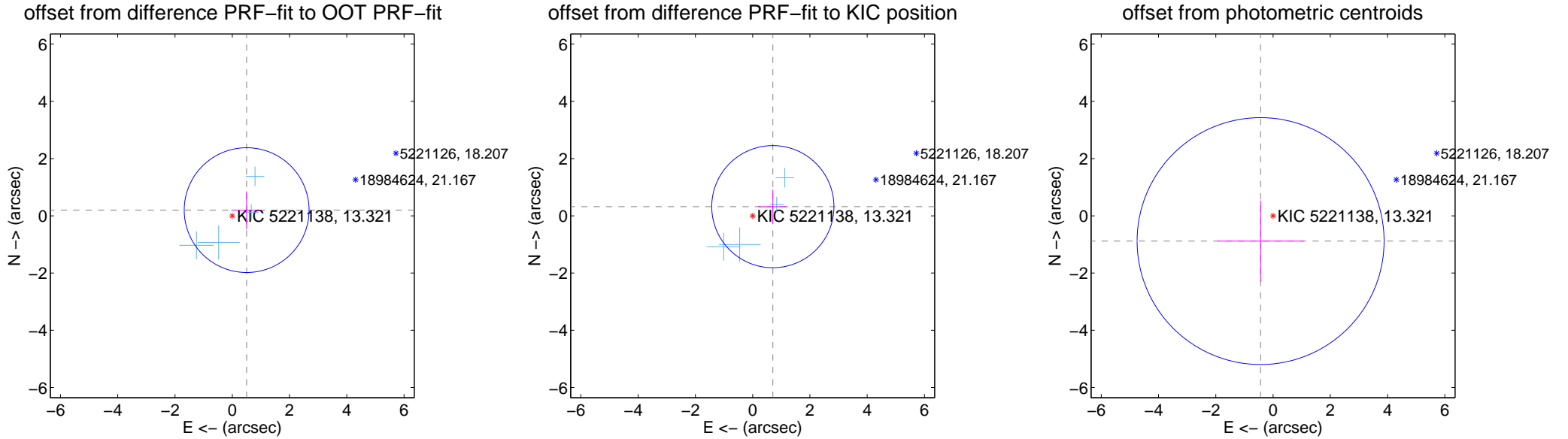
DV Centroid Data

Supplemental centroid analysis for 005221138-04. Kepler magnitude: 13.32. Transit SNR 6.17

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.541 ± 0.727	0.74	-0.502 ± 0.535	0.199 ± 0.658
PRF-fit source offset from KIC position	0.774 ± 0.711	1.09	-0.705 ± 0.517	0.320 ± 0.594
photometric centroid source offset	0.98 ± 1.44	0.68	0.43 ± 1.52	-0.88 ± 1.42



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.

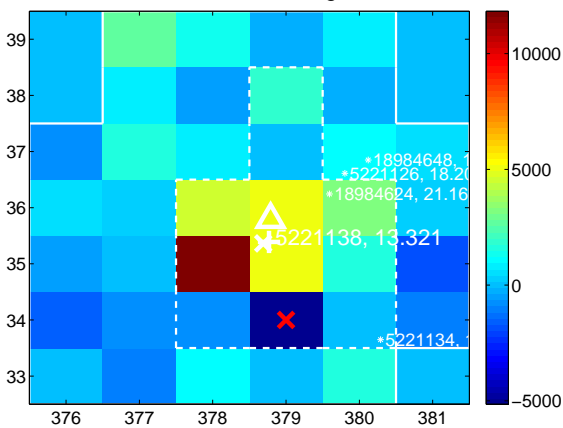
Q1 no difference image



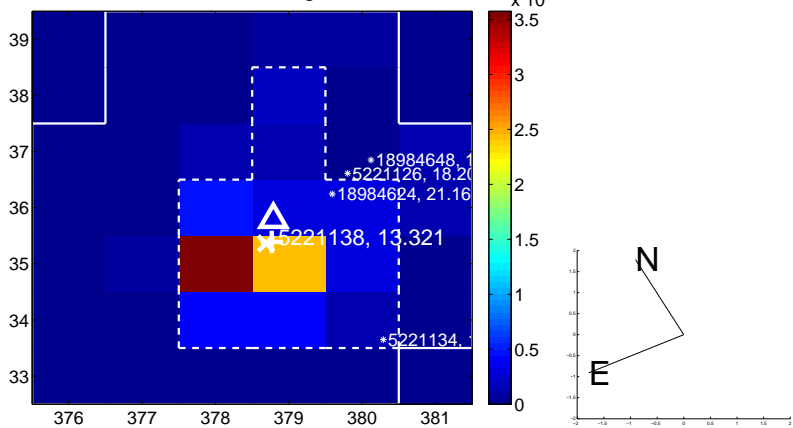
Q1 no OOT image



Q2 difference image



Q2 OOT image



Q3 no difference image



Q3 no OOT image



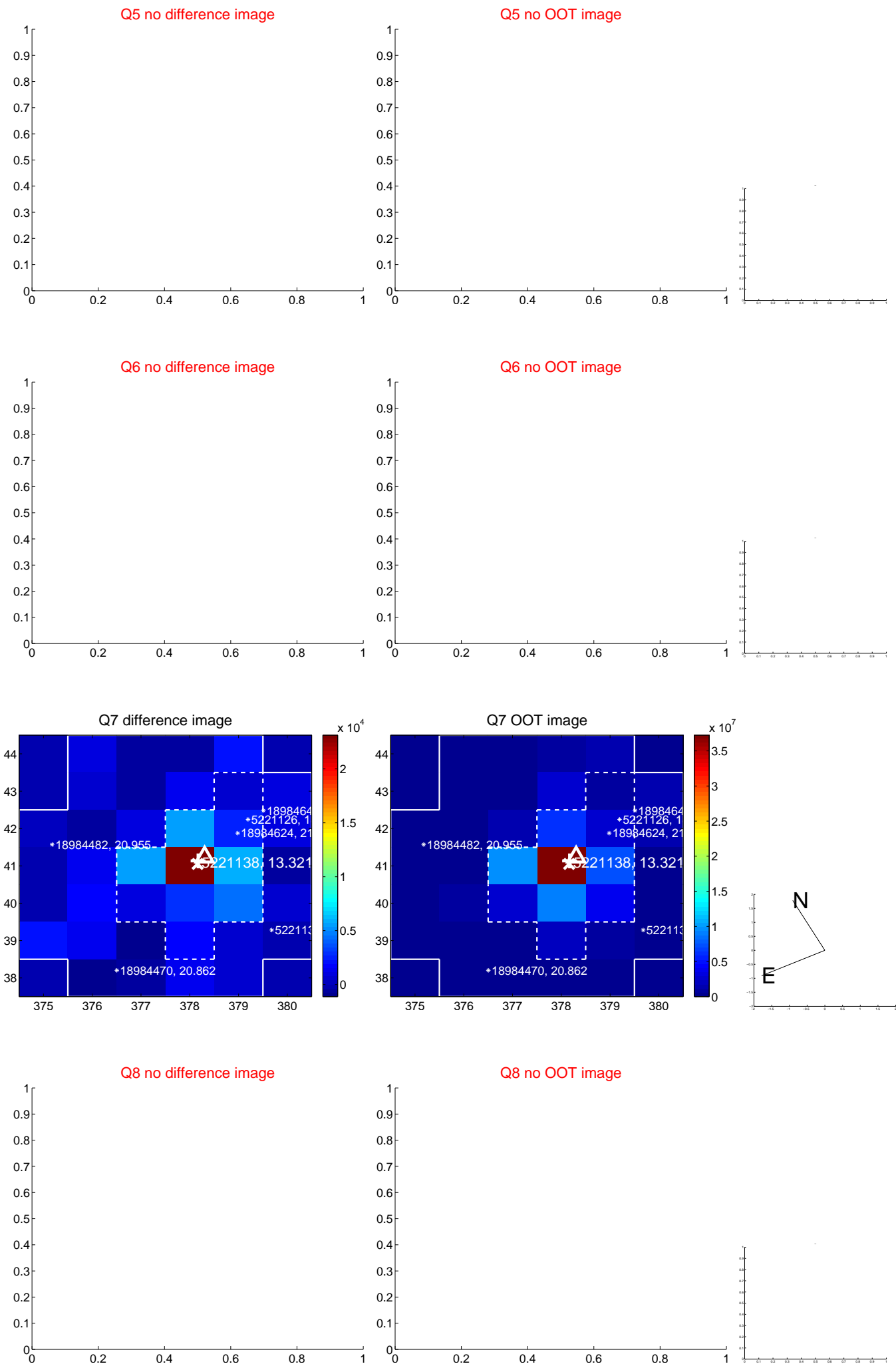
Q4 no difference image



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.

Q9 no difference image



Q9 no OOT image



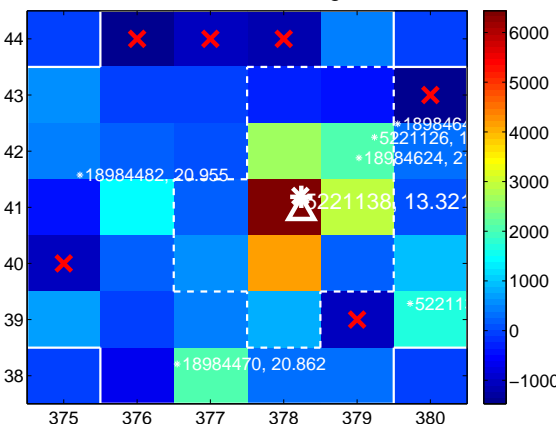
Q10 no difference image



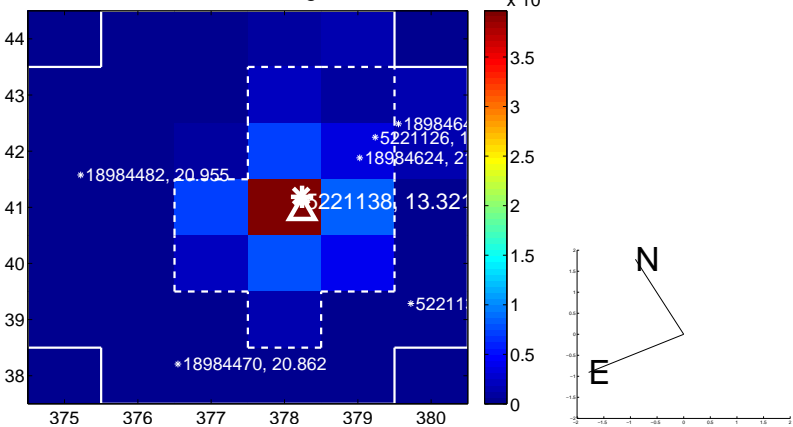
Q10 no OOT image



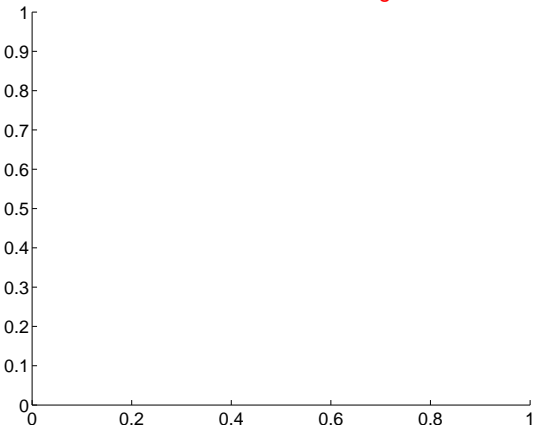
Q11 difference image



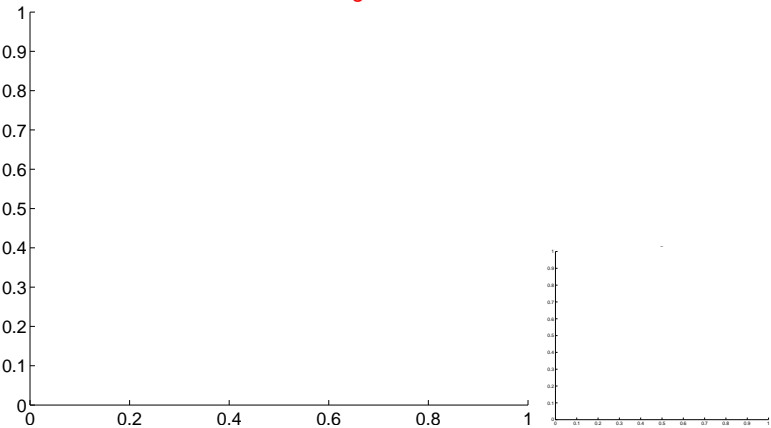
Q11 OOT image



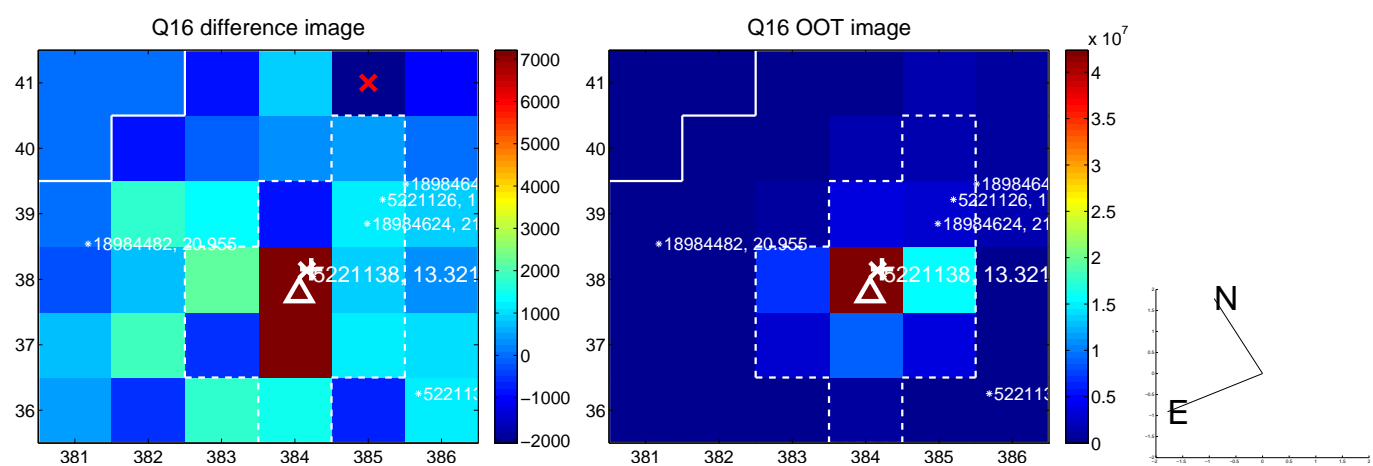
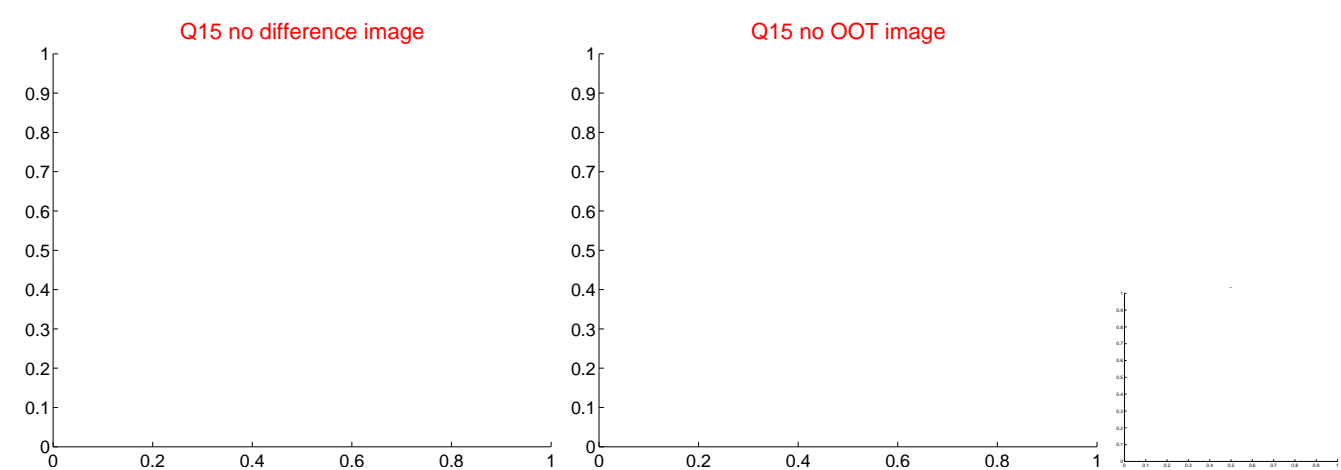
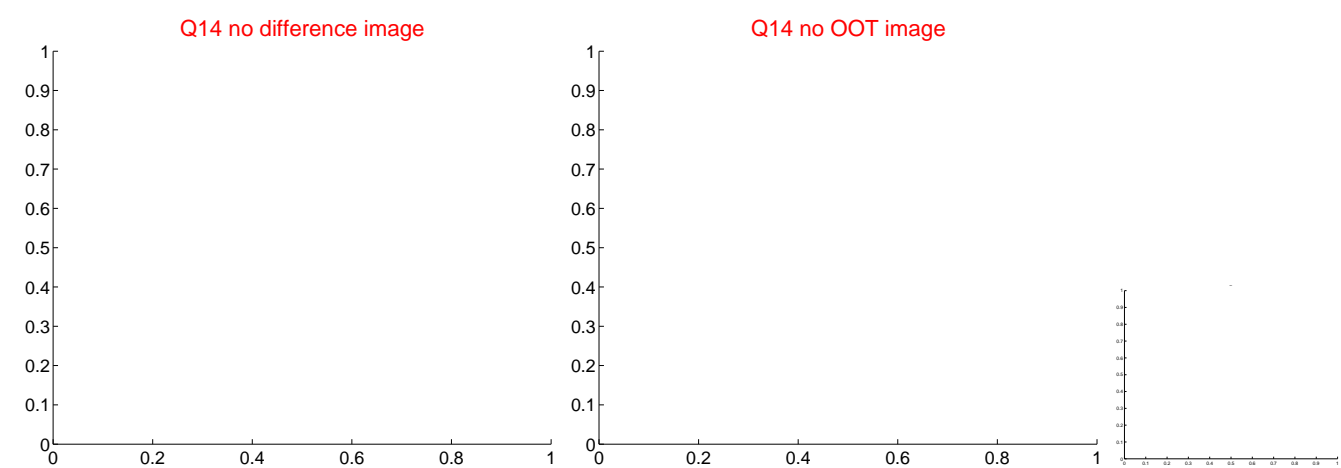
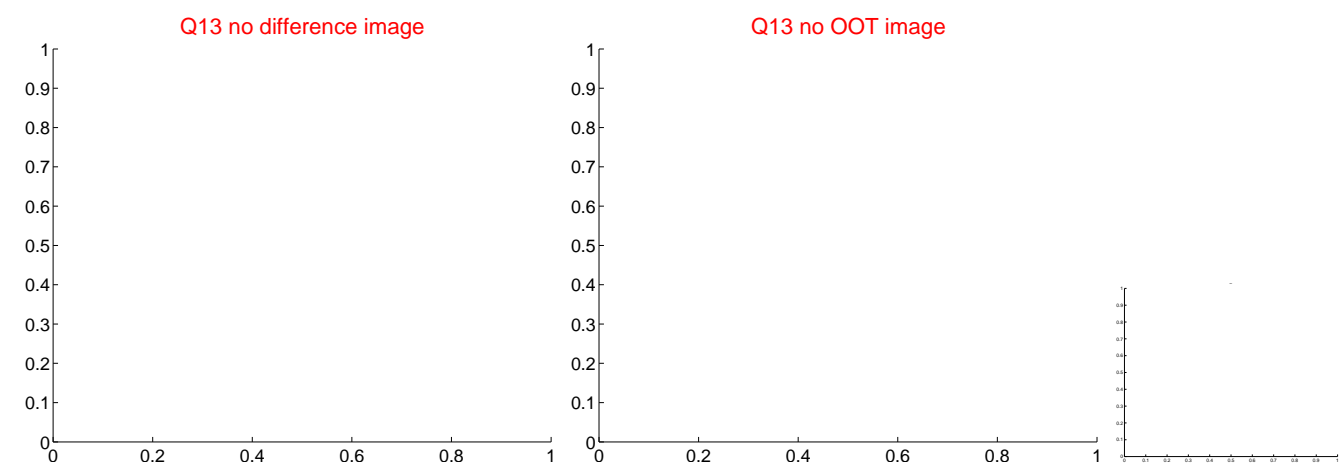
Q12 no difference image



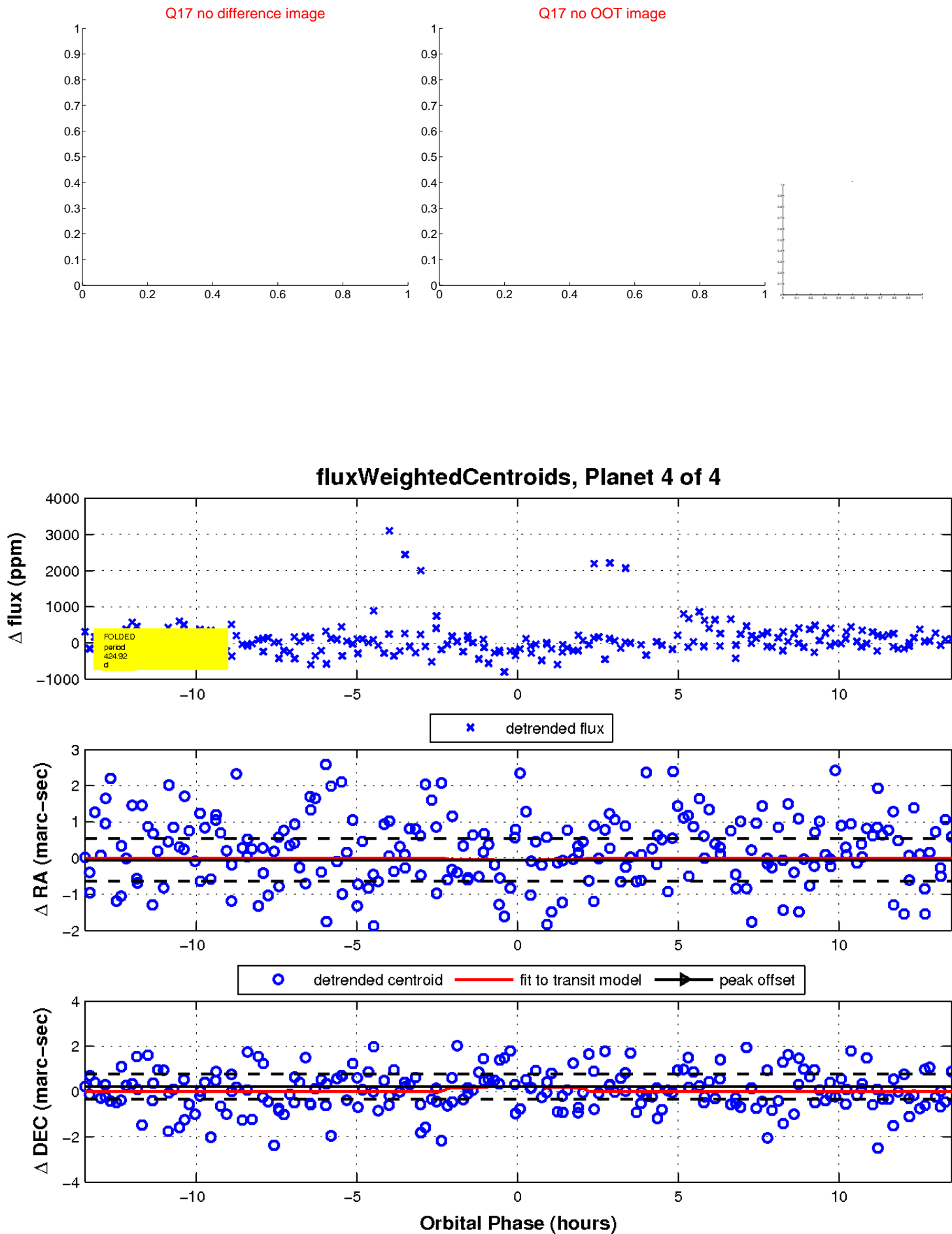
Q12 no OOT image



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



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



UKIRT Image

Declination

