

KIC 007821010

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})
007821010-01	OBS	2938.01	24.238337	136.609953	470760.3	2.500	63391.2	-1.0	1.36	6457	66.48	93.85
007821010-02	OBS	No	24.238403	155.118567	376897.6	7.500	28904.6	-1.0	1.36	6457	34.26	93.85
007821010-03	OBS	No	218.148797	251.517944	10246.6	12.546	1993.9	342.9	1.36	6457	24.41	5.01
007821010-04	OBS	No	24.234305	154.730329	9168.5	7.500	1584.8	-1.0	1.36	6457	13.13	93.87

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007821010-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_SATURATED
007821010-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_SATURATED
007821010-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
007821010-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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 007821010-01

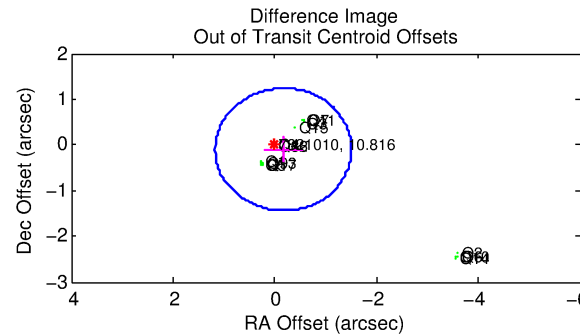
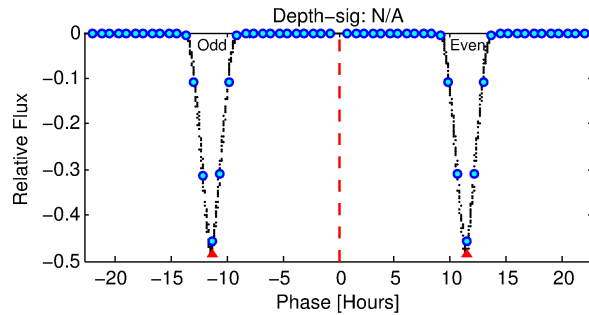
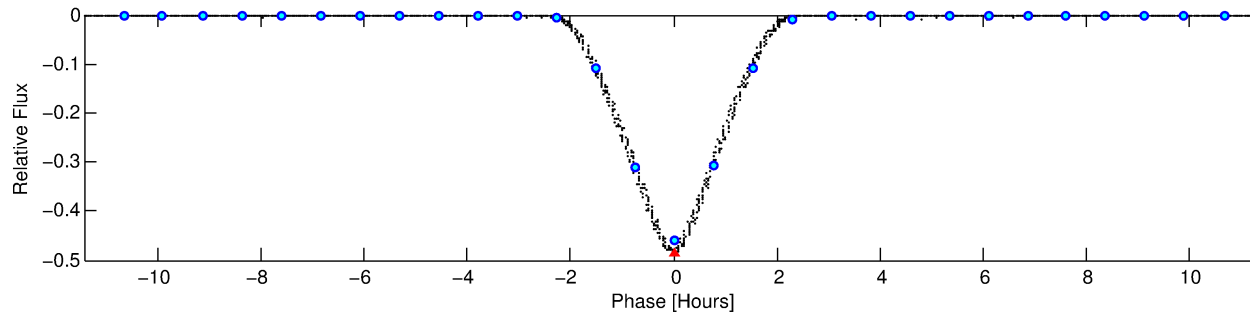
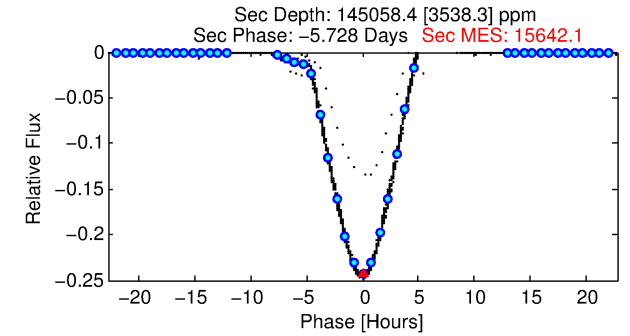
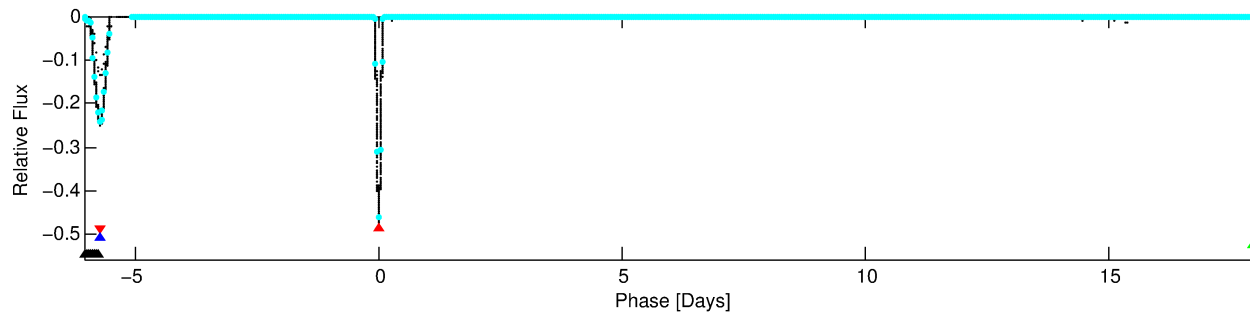
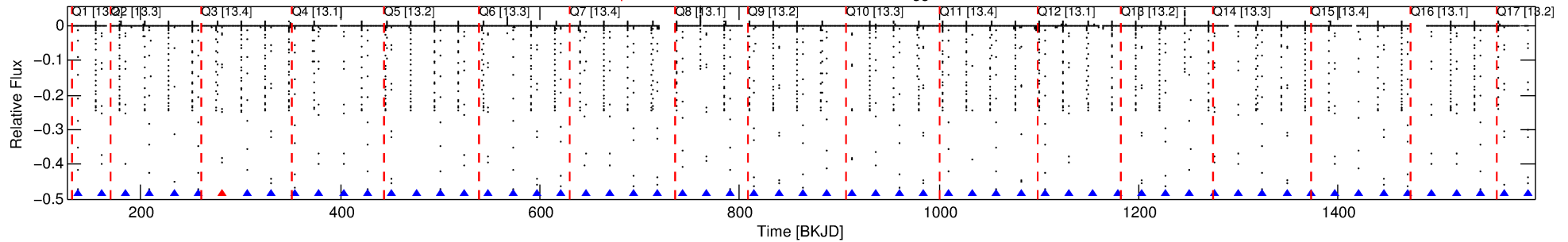
No Significant Match Found

DV One-Page Summary

KIC: 7821010 Candidate: 1 of 4 Period: 24.238 d

KOI: K02938.01 Corr: 0.777

Kp: 10.82 R*: 1.36 Rs Teff: 6457.0 K Logg: 4.26 Fe/H: 0.000



TPS TCE Results:

Period = 24.23834 d
Epoch = 136.6100 BKJD

DV fit results are unavailable

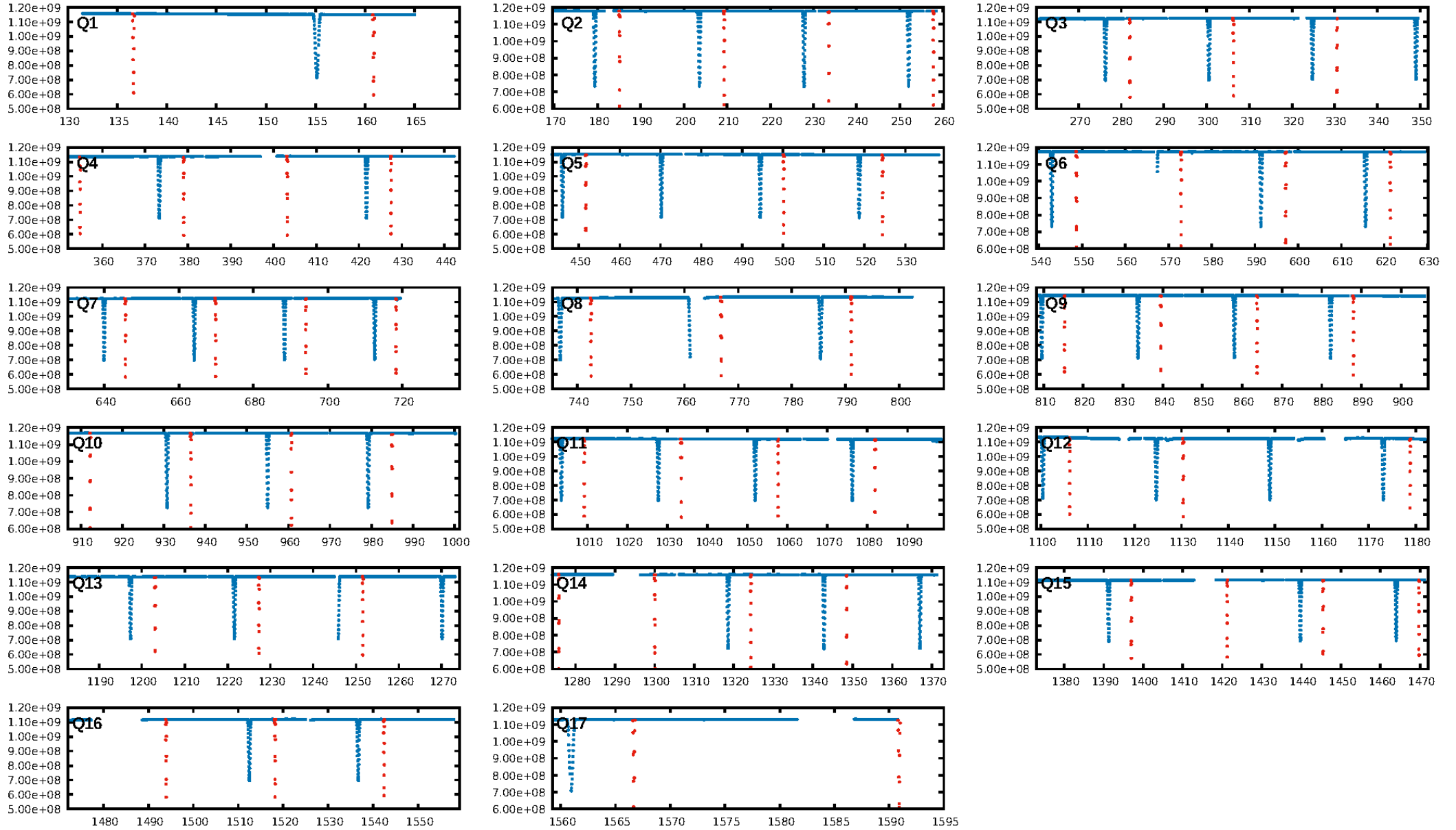
DV Diagnostic Results:

ShortPeriod-sig: 1.0% [0.01 σ]
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.98 [52/53]
GhostDiagnostic-chr: 17.03
Centroid-sig: N/A
Centroid-so: 0.234 arcsec [1613.46 σ]
OotOffset-rm: 0.195 arcsec [0.44 σ]
KicOffset-rm: 0.181 arcsec [0.48 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

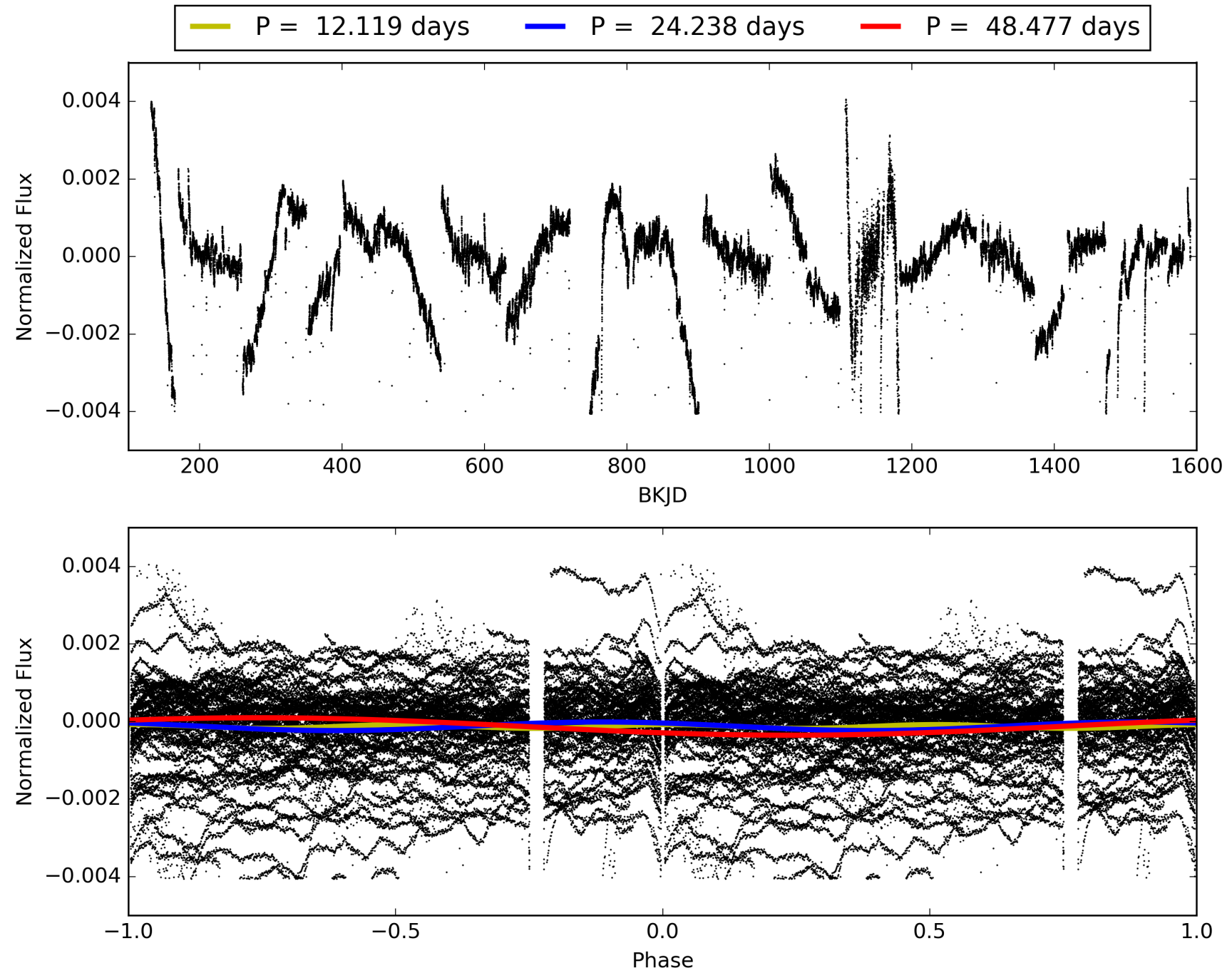
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:02:10 Z

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

TCE 007821010-01, PDC Light Curves

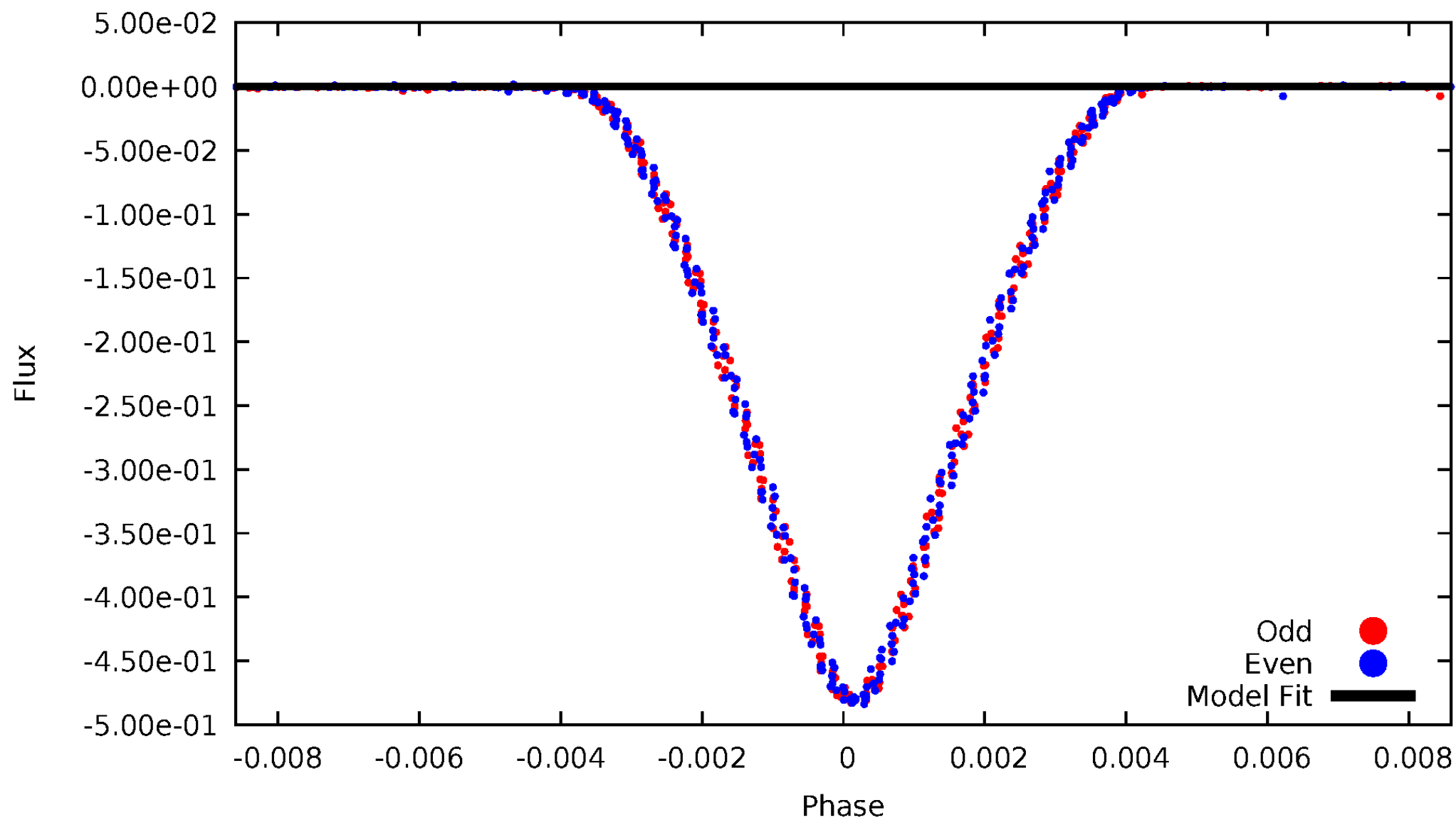


TCE 007821010-01



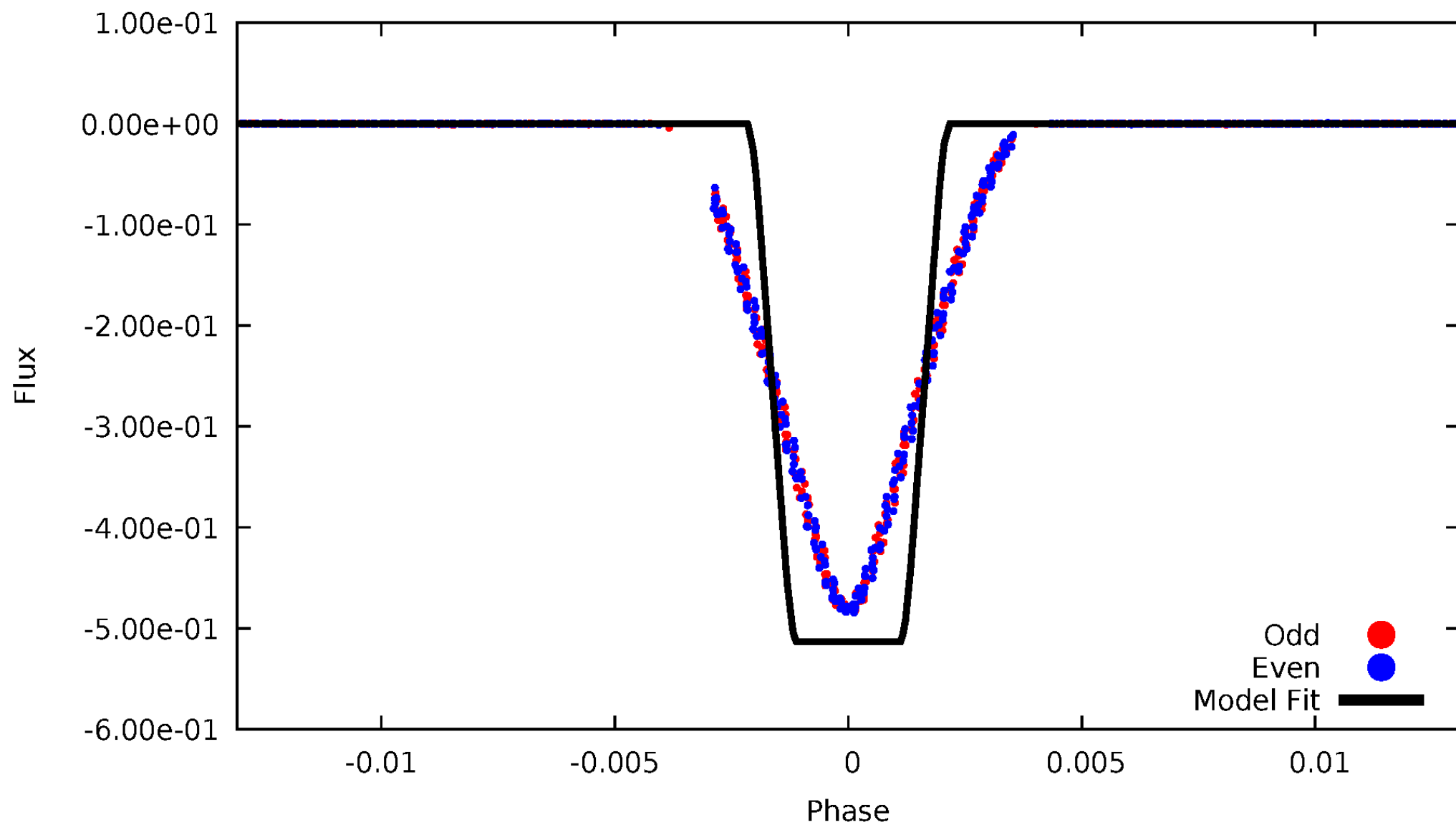
DV Odd/Even

TCE 007821010-01



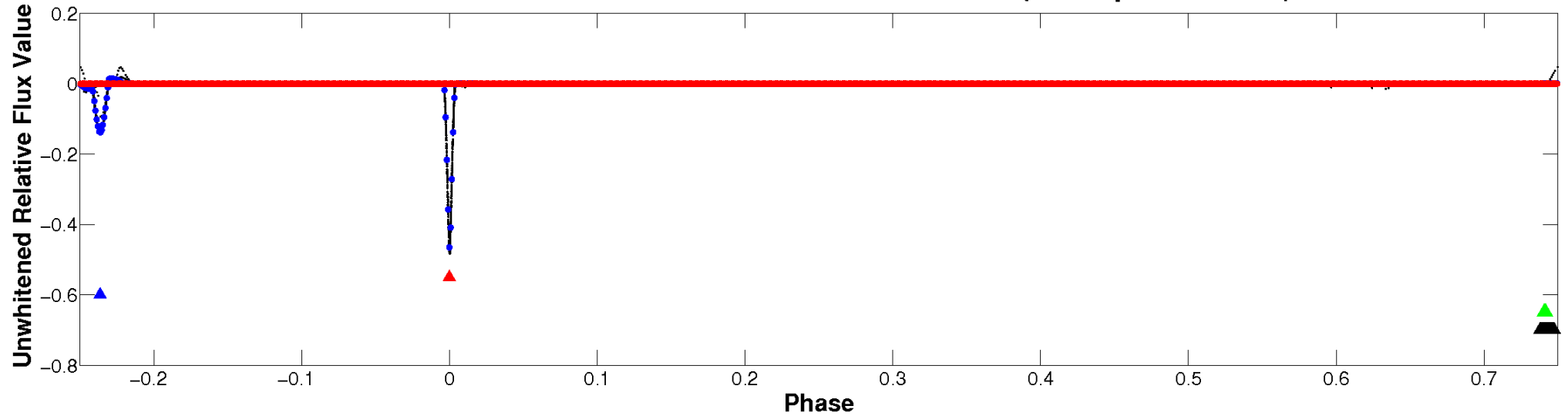
ALT Odd/Even

TCE 007821010-01



Non-Whitened Vs. Whitened Light Curve

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

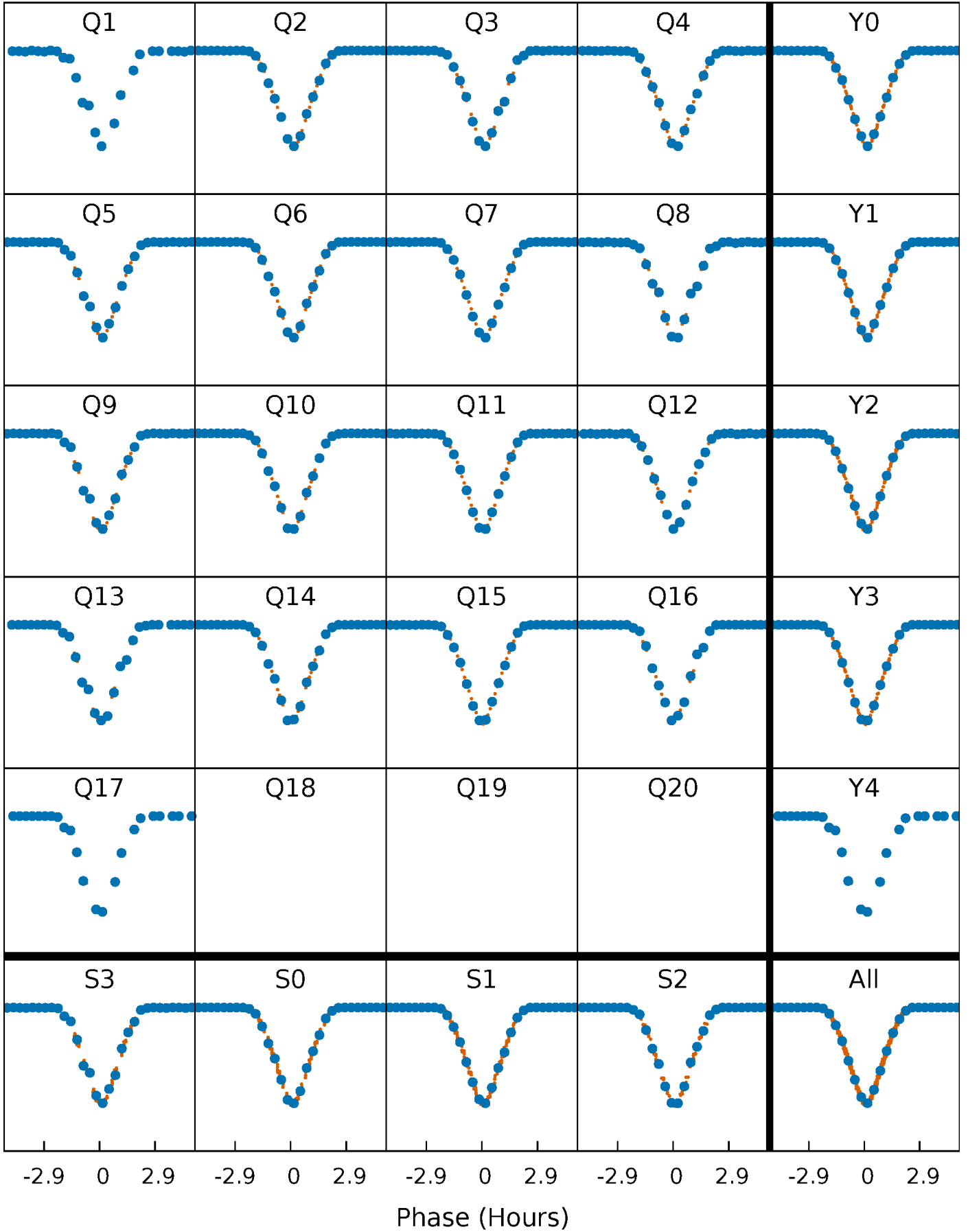


Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)



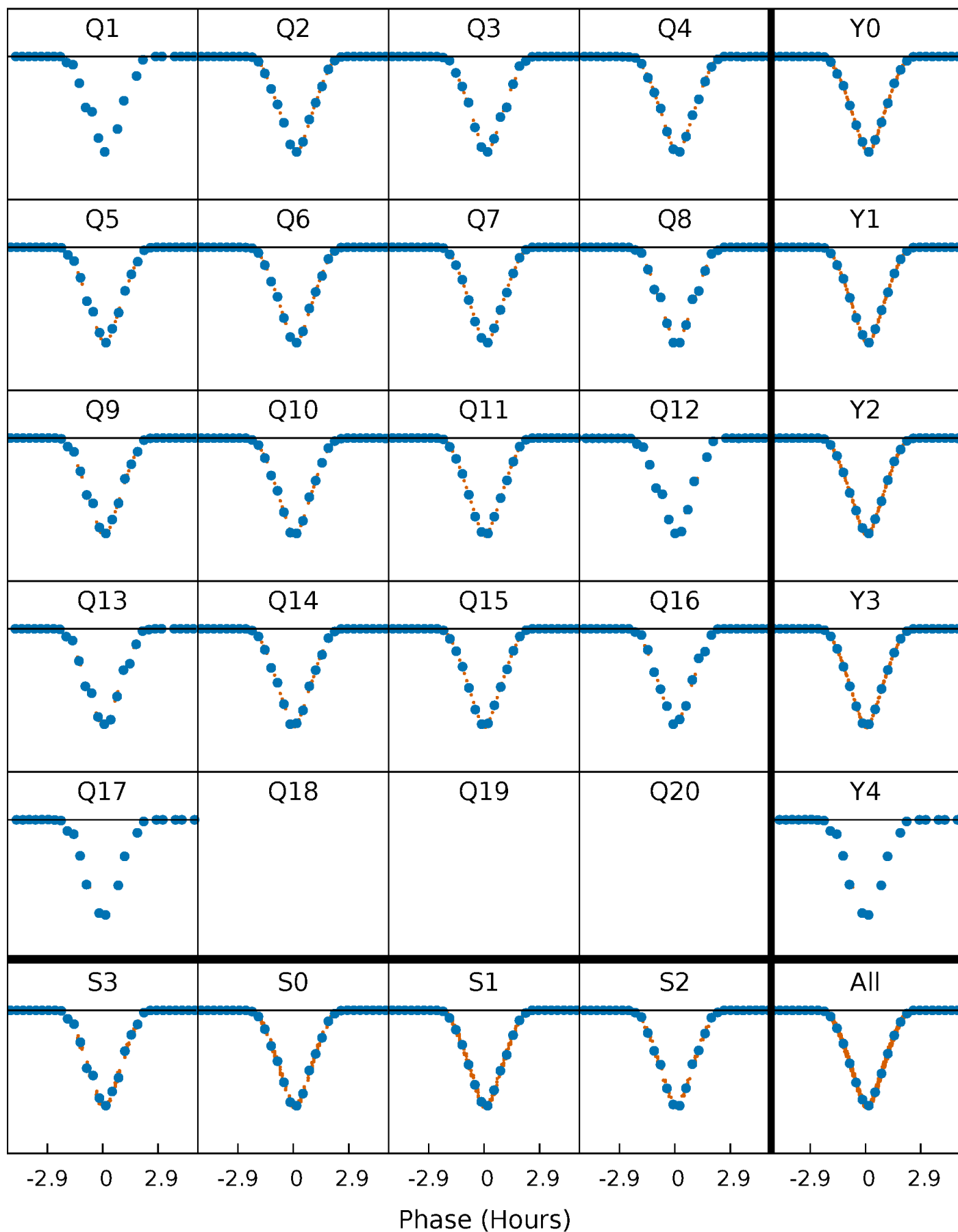
PDC Quarter-Phased Transit Curves

TCE 007821010-01 P= 24.238337 Days $T_0=136.609953$ (BKJD)



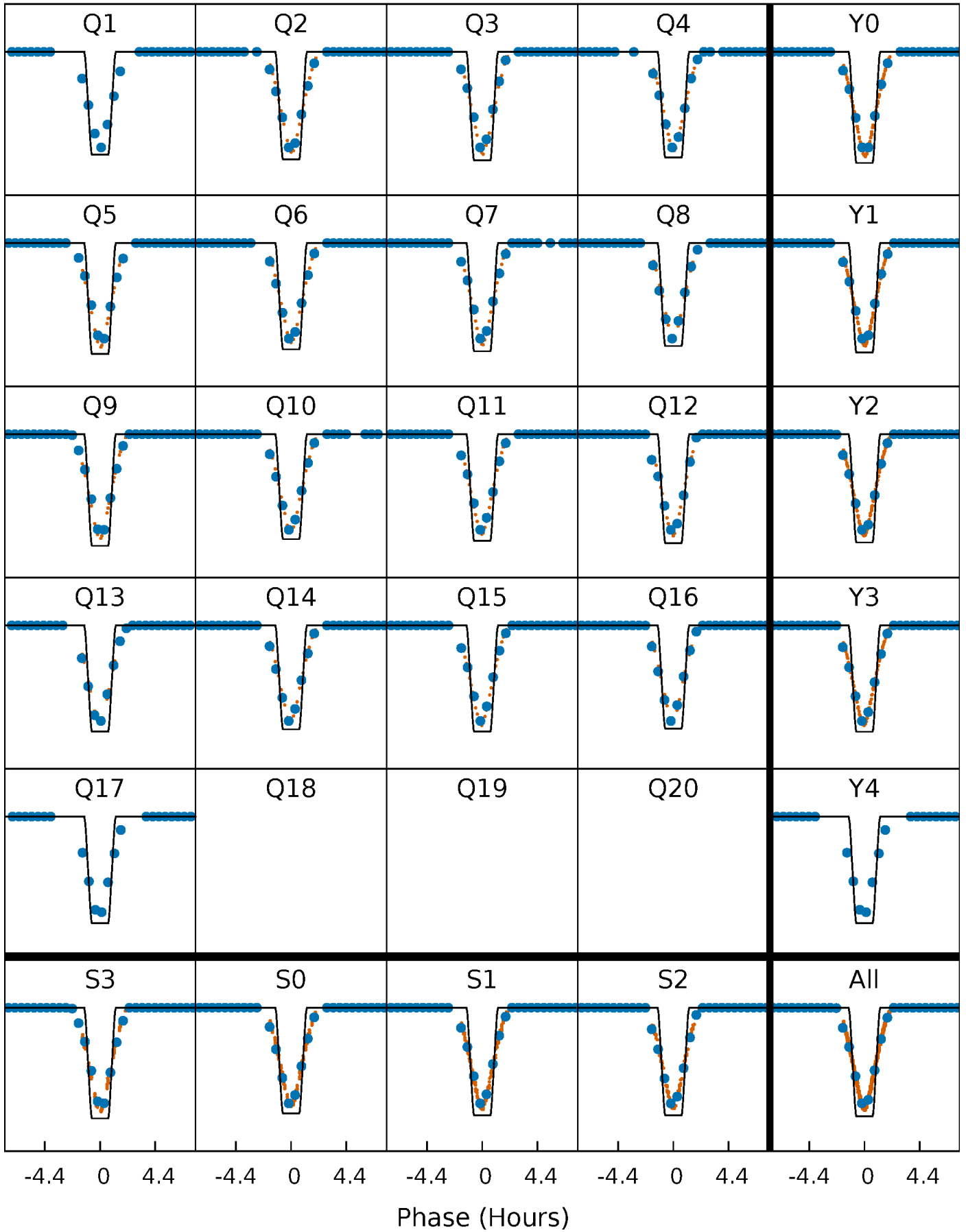
DV Quarter-Phased Transit Curves

TCE 007821010-01 P= 24.238337 Days $T_0=136.609953$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

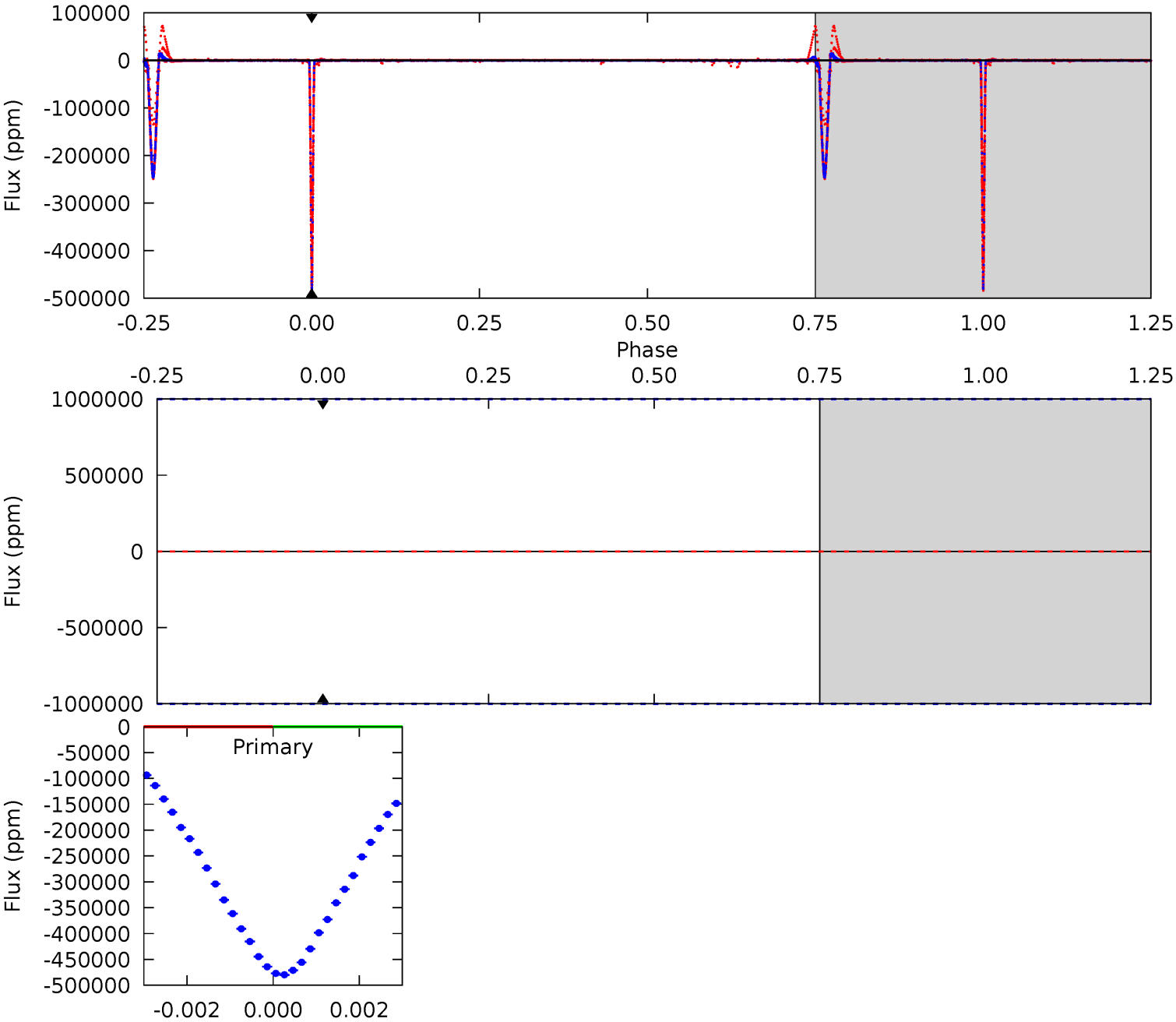
TCE 007821010-01 P= 24.238337 Days $T_0=136.614107$ (BKJD)



DV Model-Shift Uniqueness Test

007821010-01, P = 24.238337 Days, E = 112.371616 Days

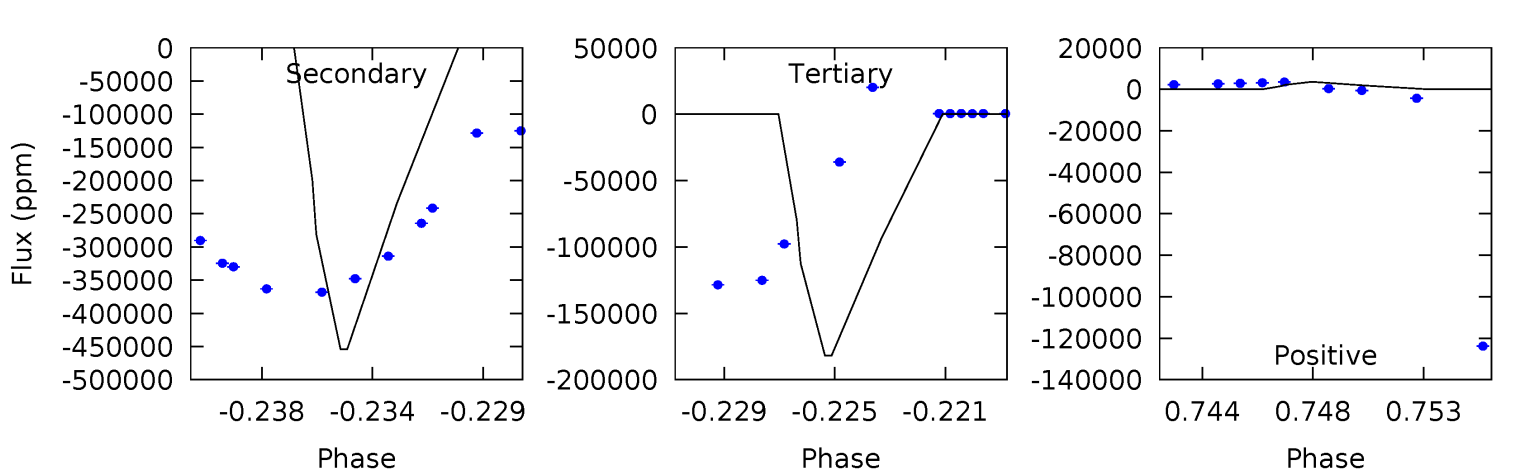
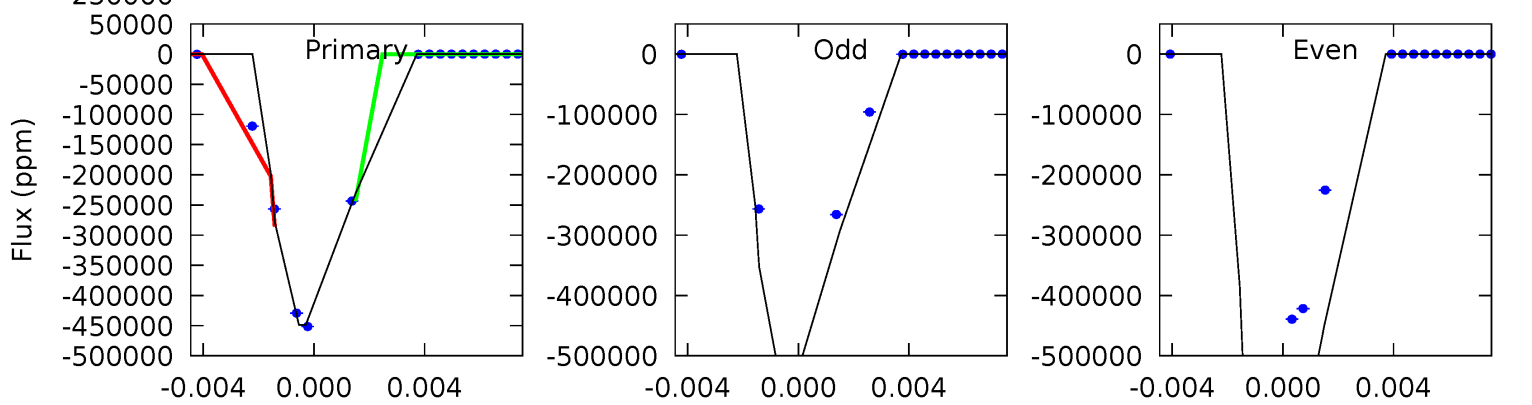
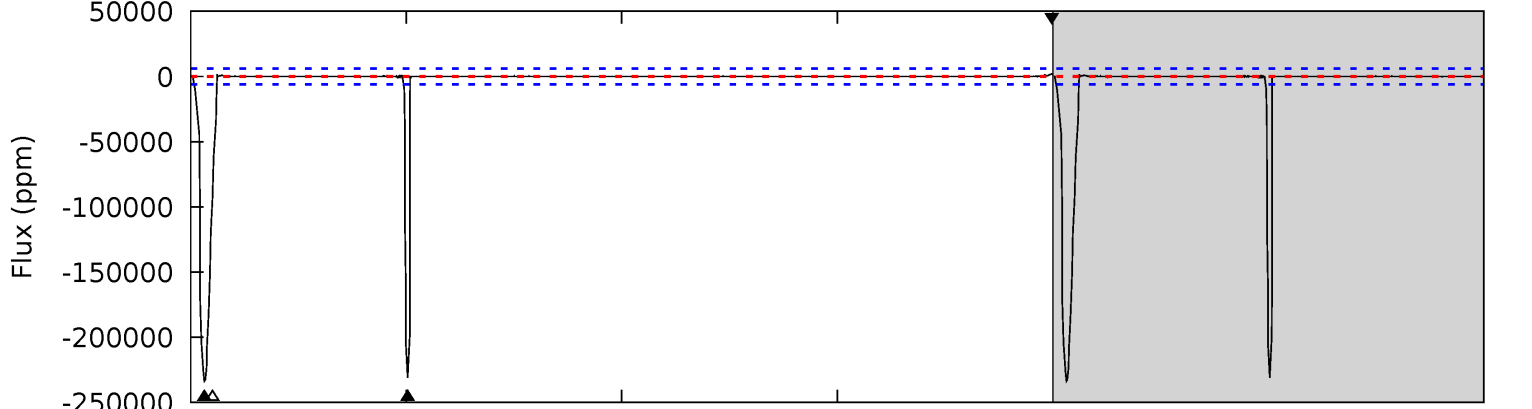
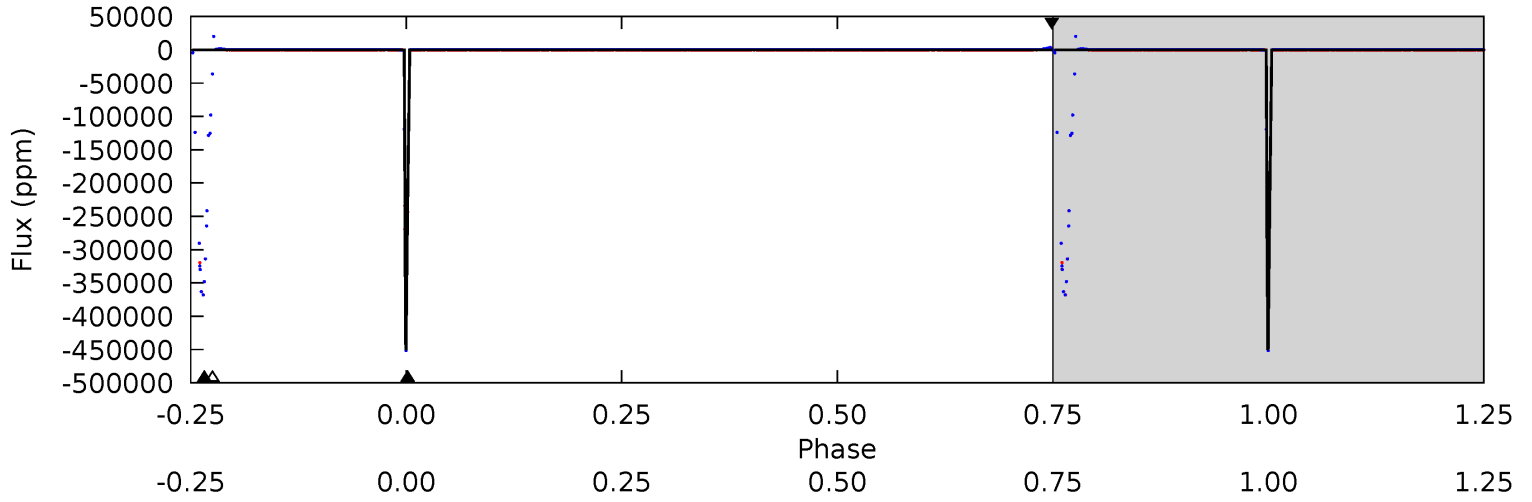
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

007821010-01, P = 24.238337 Days, E = 112.375770 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
196.7	199.0	79.7	1.52	5.18	2.85	1.37	117.1	195.2	119.4	197.5	84.9	1.00	0.01	0



Stellar Parameters For KIC 007821010

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6457^{+70}_{-83}	$4.259^{+0.080}_{-0.120}$	$0.000^{+0.150}_{-0.150}$	$1.365^{+0.253}_{-0.156}$	$1.233^{+0.096}_{-0.096}$	$0.683^{+0.274}_{-0.246}$
	+1%/-1%	+2%/-3%	+inf%/-inf%	+19%/-11%	+8%/-8%	+40%/-36%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 007821010-01 / KOI 2938.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$67.05^{+16.13}_{-15.37}$	1113^{+49}_{-38}	2968^{+2709}_{-8483}	14^{+431}_{-405}
Alt.	-233528 ± 1173	$107.52^{+18.31}_{-15.81}$	1113^{+53}_{-38}	5669^{+426}_{-314}	448^{+169}_{-119}

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 $A_{obs} \gg 1.0$

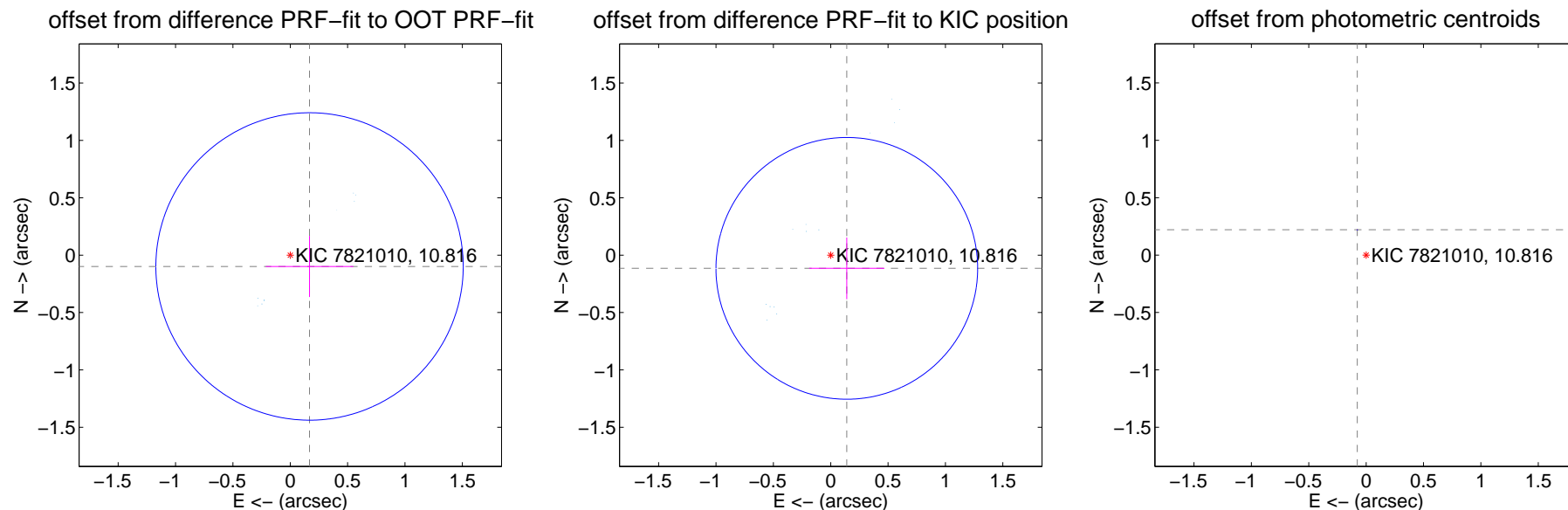
DV Centroid Data

Supplemental centroid analysis for 007821010-01. **Kepler magnitude: 10.82.** Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

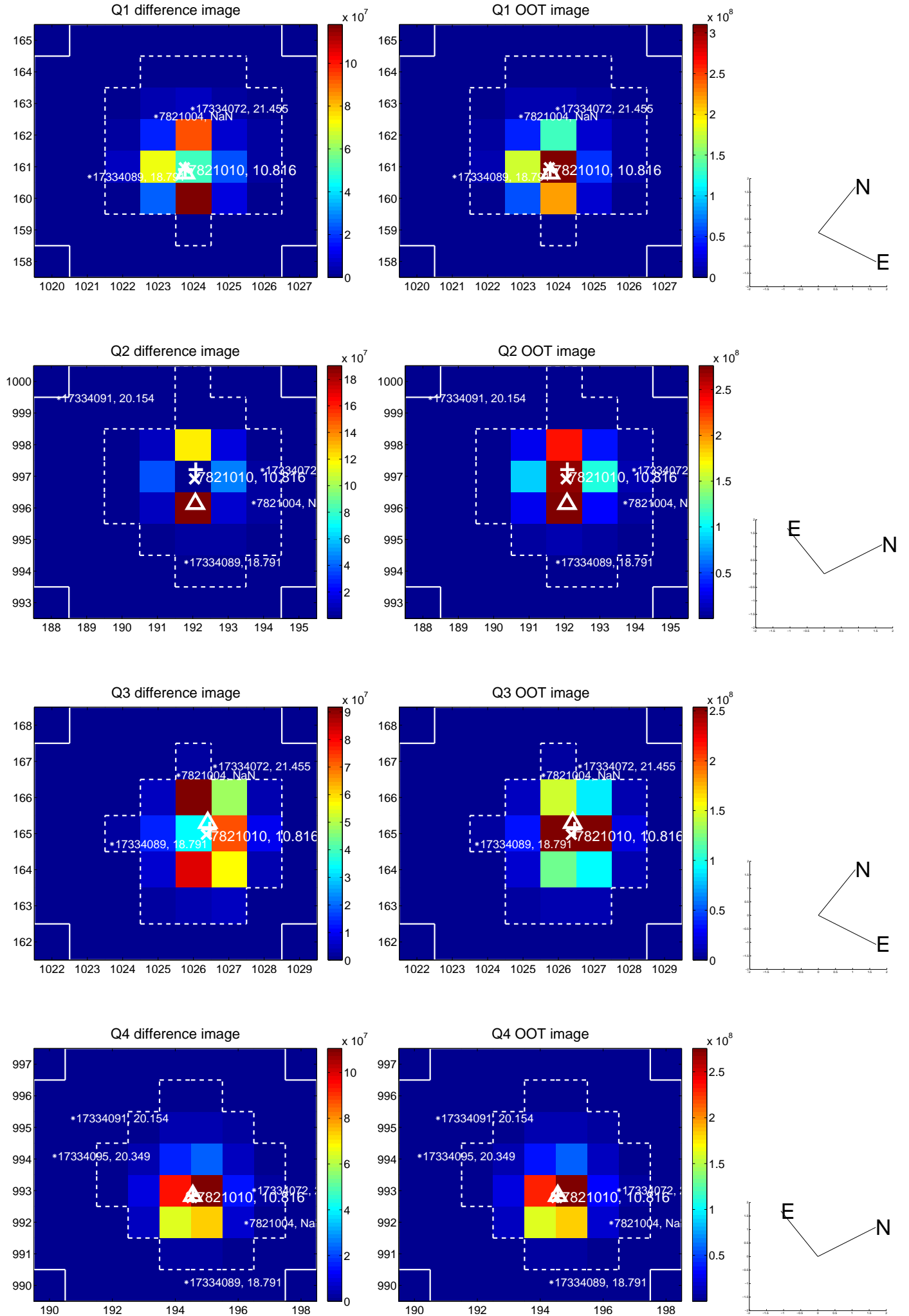
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.195 ± 0.447	0.44	-0.168 ± 0.381	-0.099 ± 0.266
PRF-fit source offset from KIC position	0.181 ± 0.380	0.48	-0.140 ± 0.328	-0.115 ± 0.269
photometric centroid source offset	0.23 ± 0.00	1613.46	0.08 ± 0.00	0.22 ± 0.00

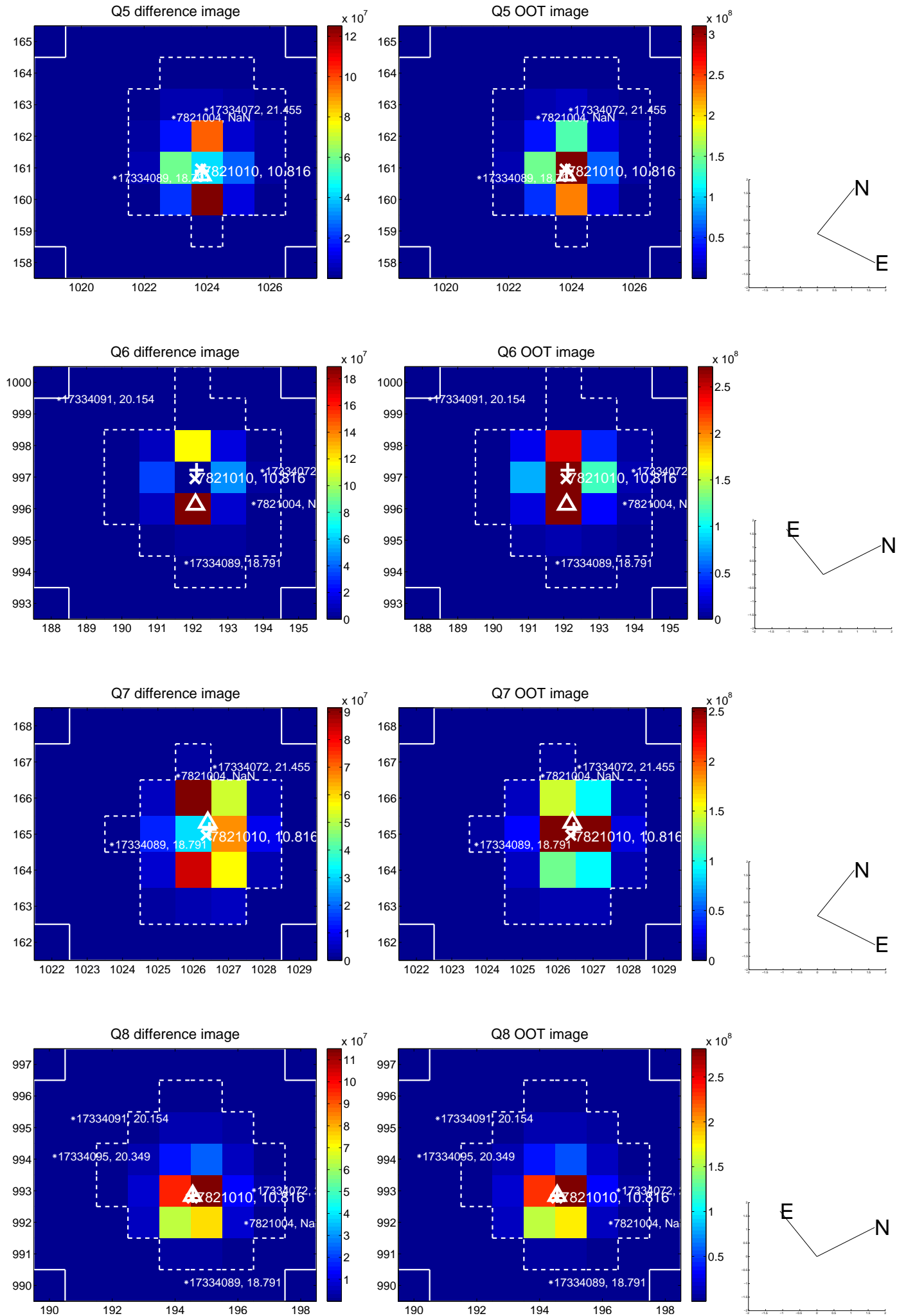


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

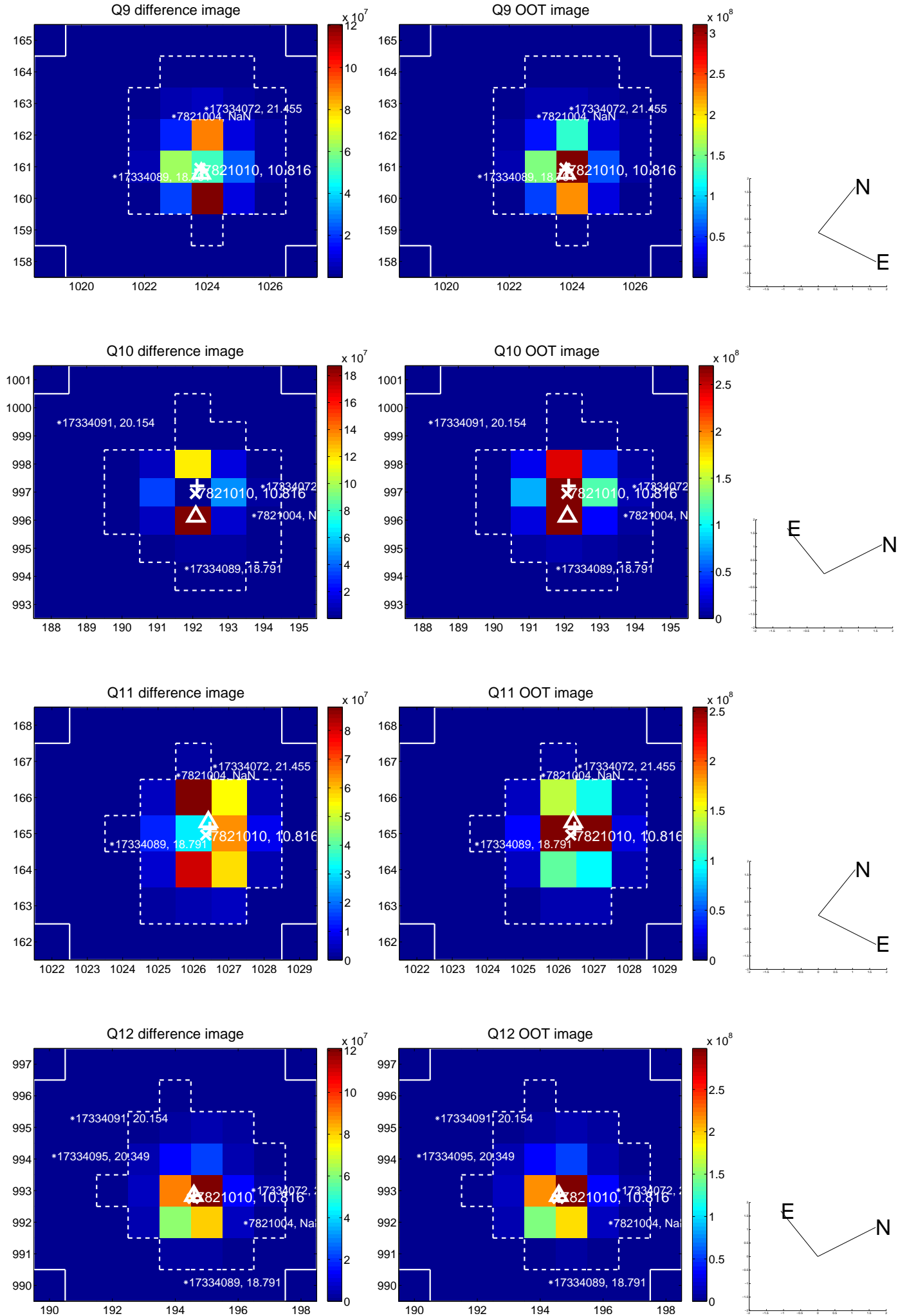
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



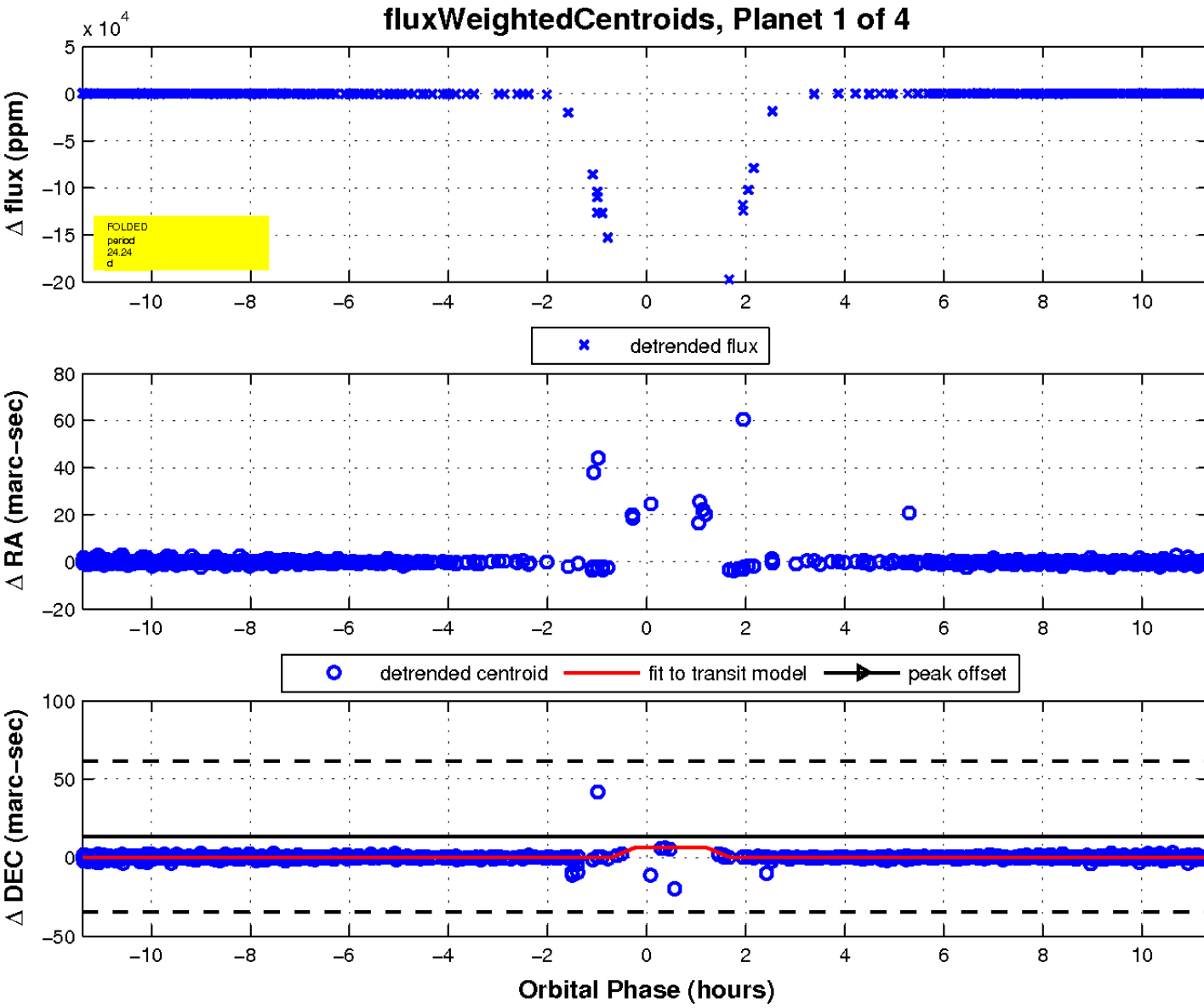
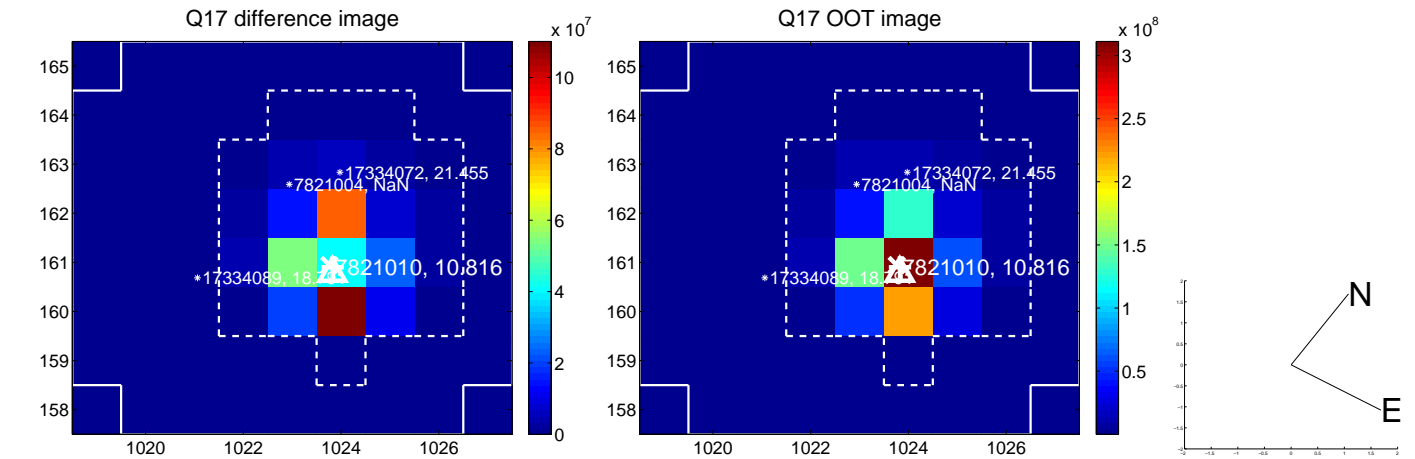
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

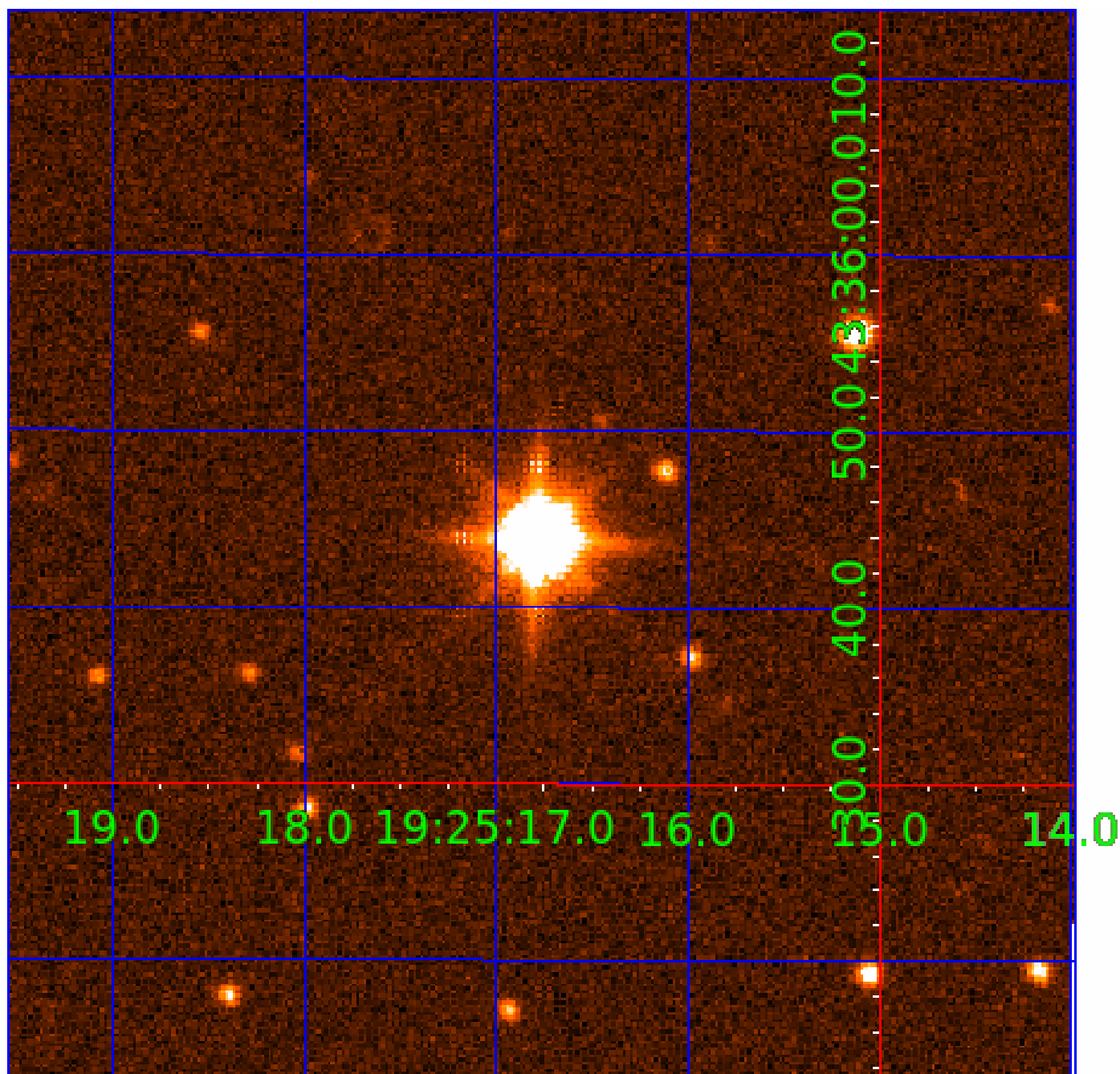


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007821010

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})
007821010-01	OBS	2938.01	24.238337	136.609953	470760.3	2.500	63391.2	-1.0	1.36	6457	66.48	93.85
007821010-02	OBS	No	24.238403	155.118567	376897.6	7.500	28904.6	-1.0	1.36	6457	34.26	93.85
007821010-03	OBS	No	218.148797	251.517944	10246.6	12.546	1993.9	342.9	1.36	6457	24.41	5.01
007821010-04	OBS	No	24.234305	154.730329	9168.5	7.500	1584.8	-1.0	1.36	6457	13.13	93.87

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007821010-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_SATURATED
007821010-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_SATURATED
007821010-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
007821010-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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.

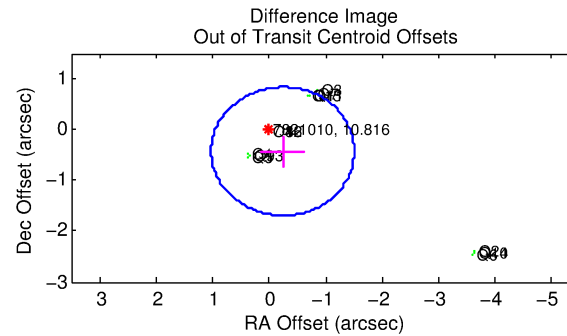
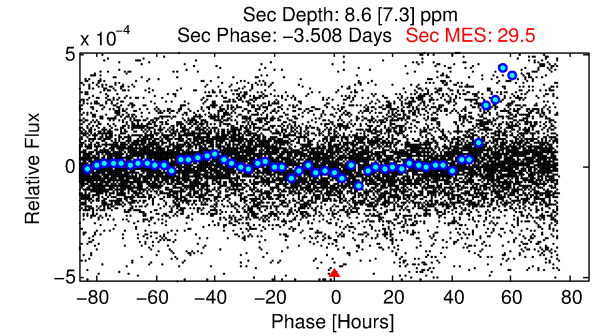
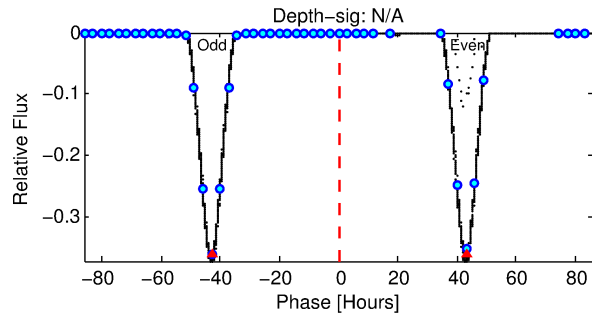
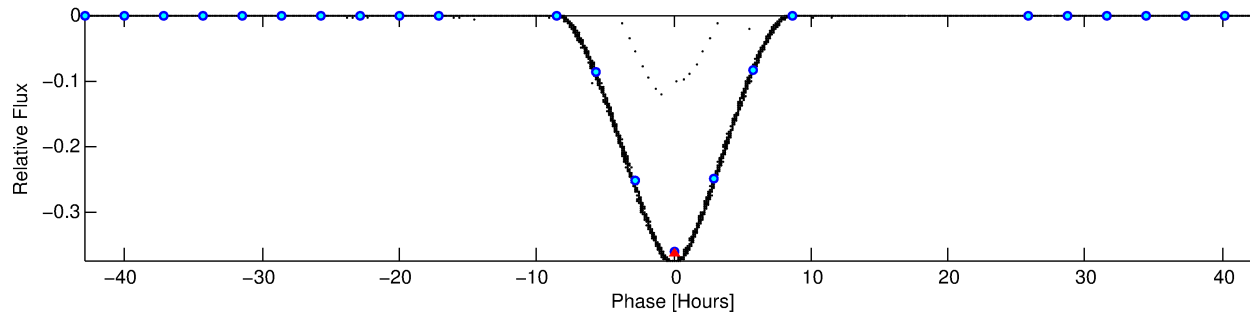
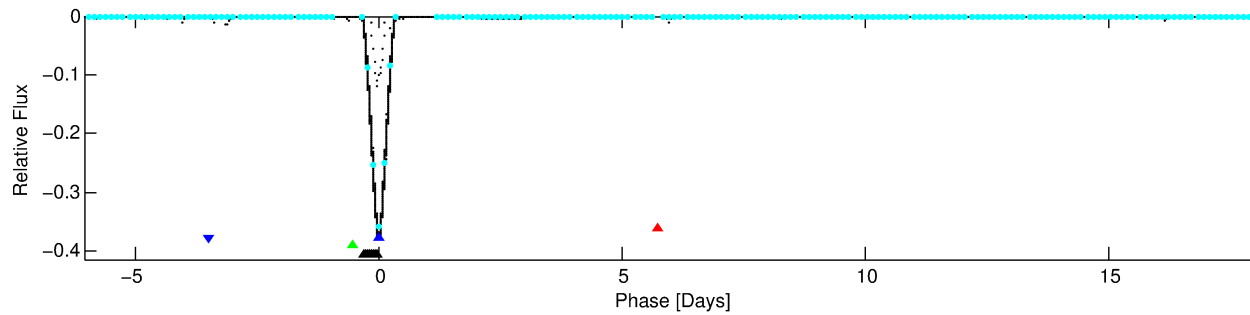
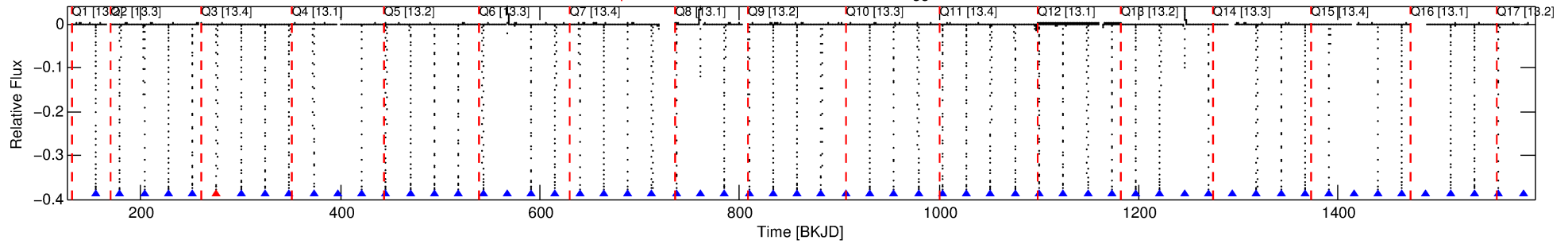
Ephemeris Match Information For 007821010-02

No Significant Match Found

DV One-Page Summary

KIC: 7821010 Candidate: 2 of 4 Period: 24.238 d
KOI: K02938 Corr: No Ephemeris Match

Kp: 10.82 R*: 1.36 Rs Teff: 6457.0 K Logg: 4.26 Fe/H: 0.000



TPS TCE Results:

Period = 24.23840 d
Epoch = 155.1186 BKJD

DV fit results are unavailable

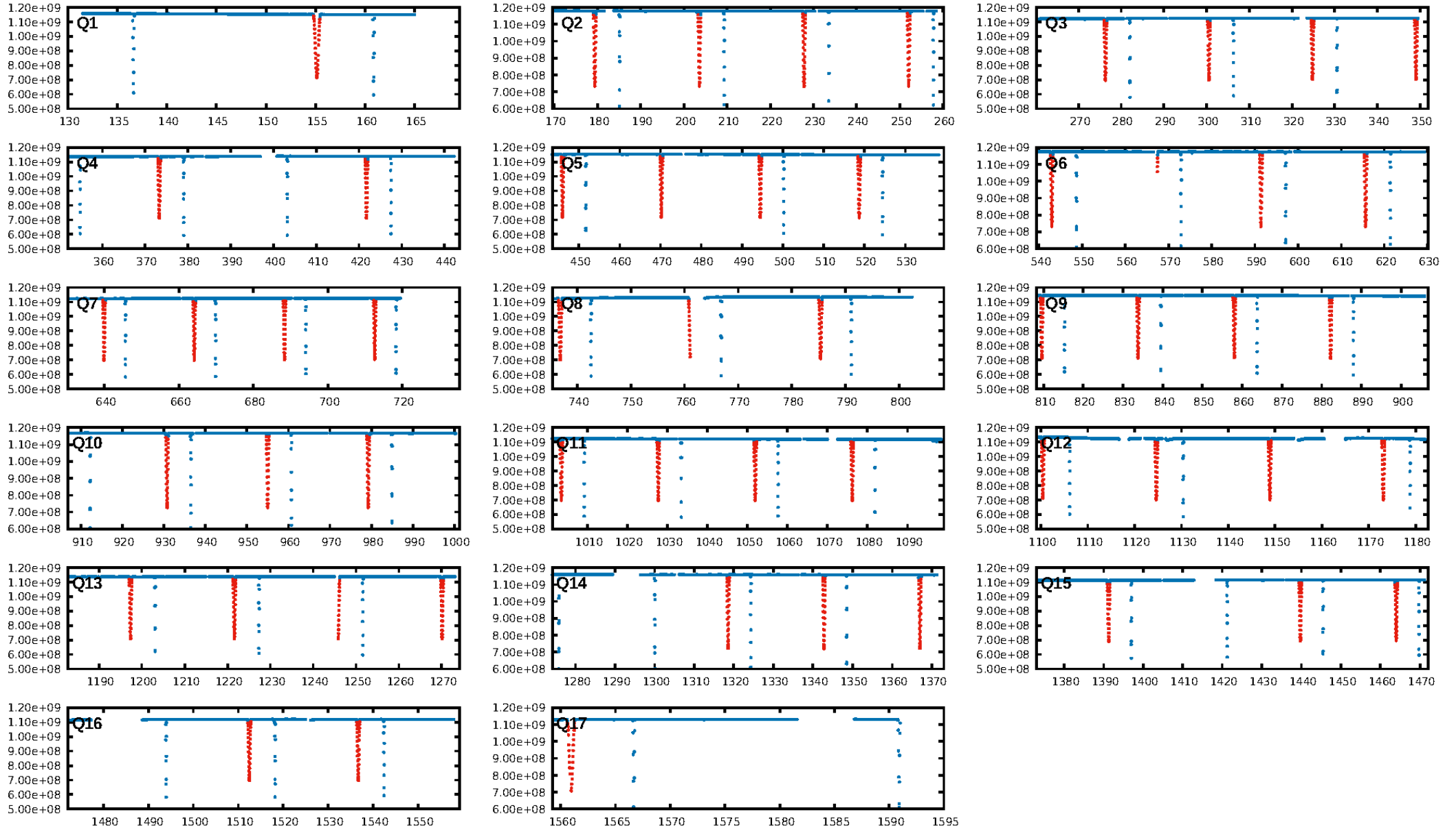
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 σ]
LongPeriod-sig: 100.0% [318.39 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.98 [51/52]
GhostDiagnostic-chr: 2.188
Centroid-sig: N/A
Centroid-so: 0.198 arcsec [1246.90 σ]
OotOffset-rm: 0.490 arcsec [1.16 σ]
KicOffset-rm: 0.516 arcsec [1.40 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.94 [15/16]
DiffImageOverlap-fno: 0.00 [0/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:02:13 Z

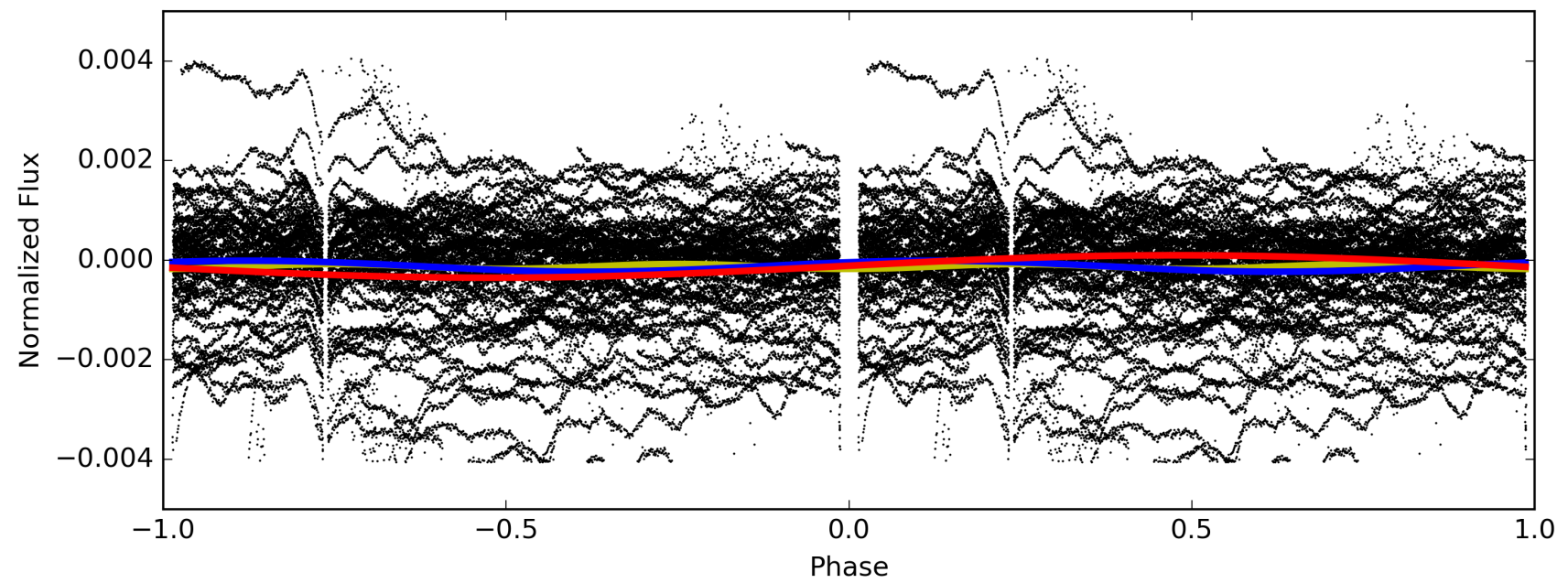
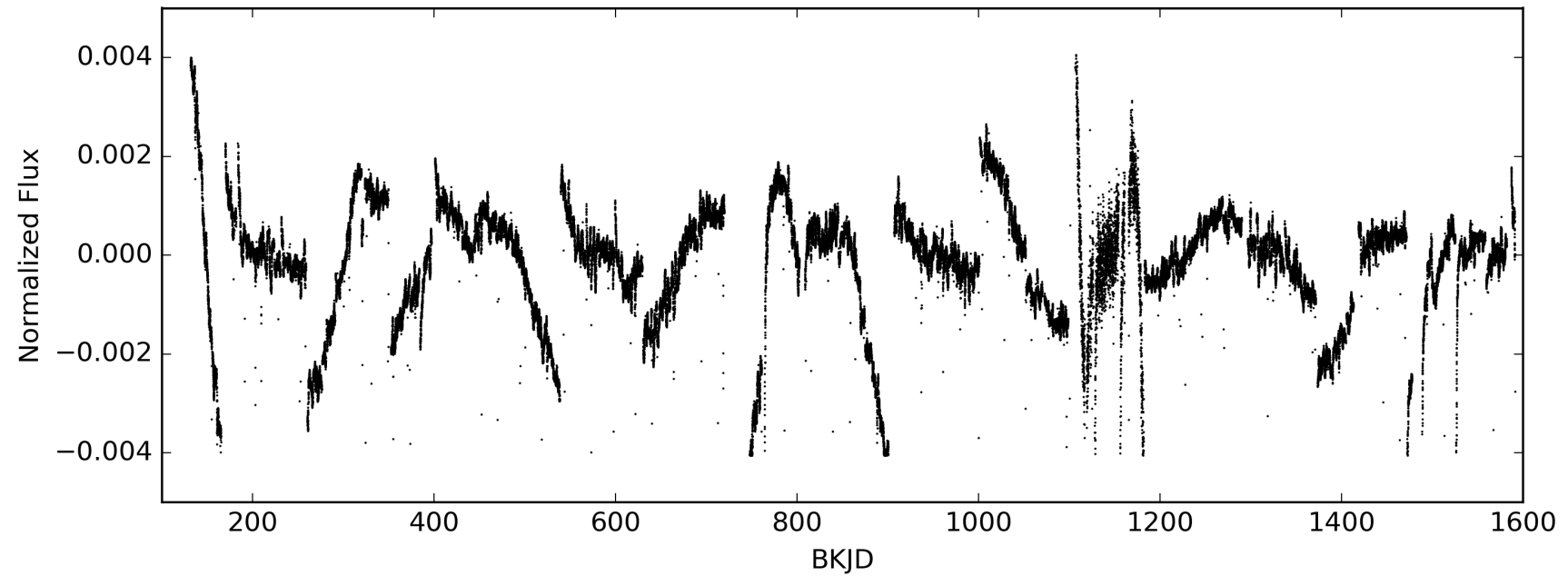
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 007821010-02, PDC Light Curves



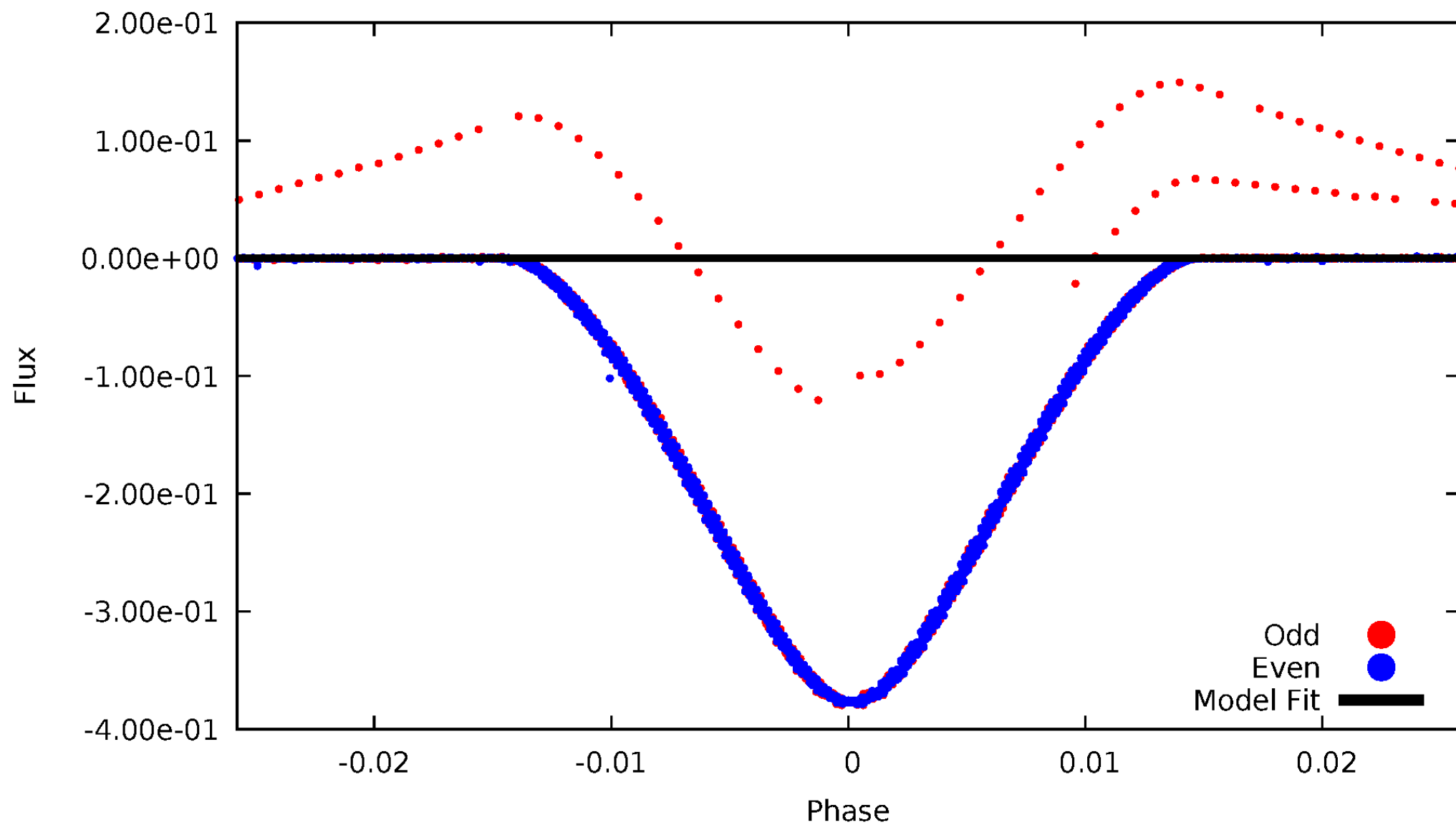
TCE 007821010-02

— P = 12.119 days — P = 24.238 days — P = 48.477 days



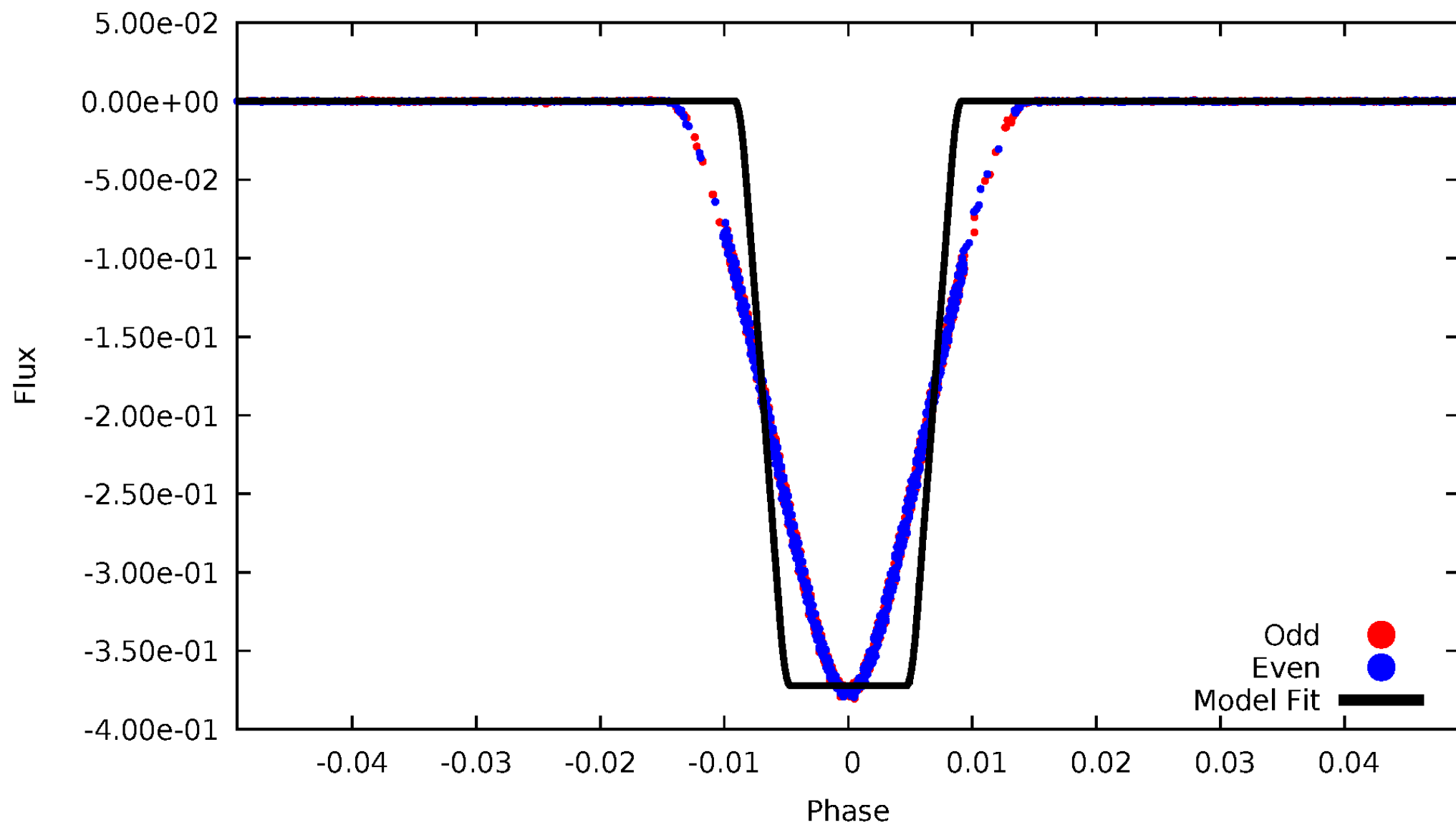
DV Odd/Even

TCE 007821010-02



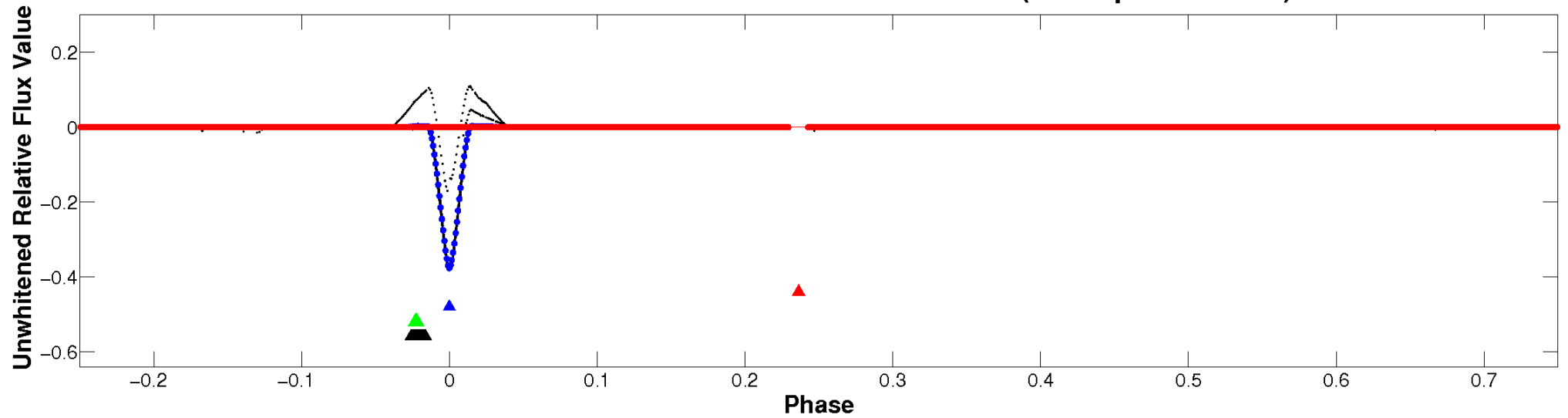
ALT Odd/Even

TCE 007821010-02

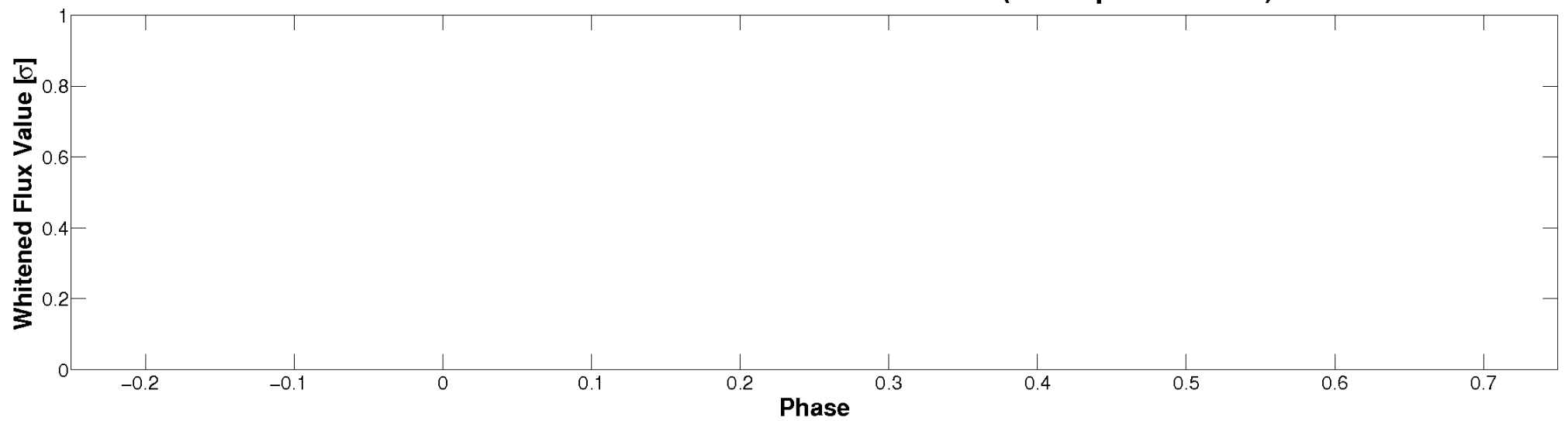


Non-Whitened Vs. Whitened Light Curve

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

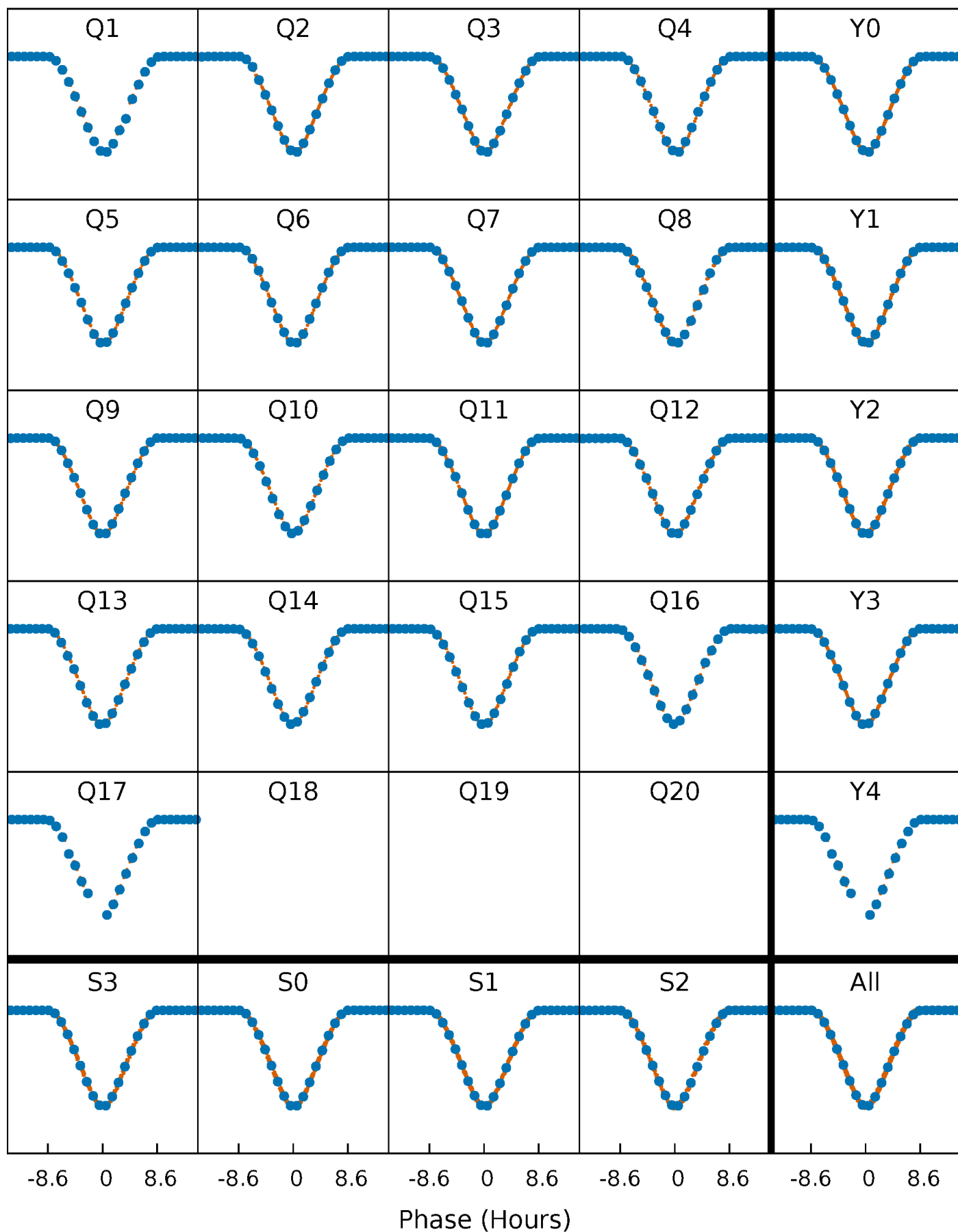


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



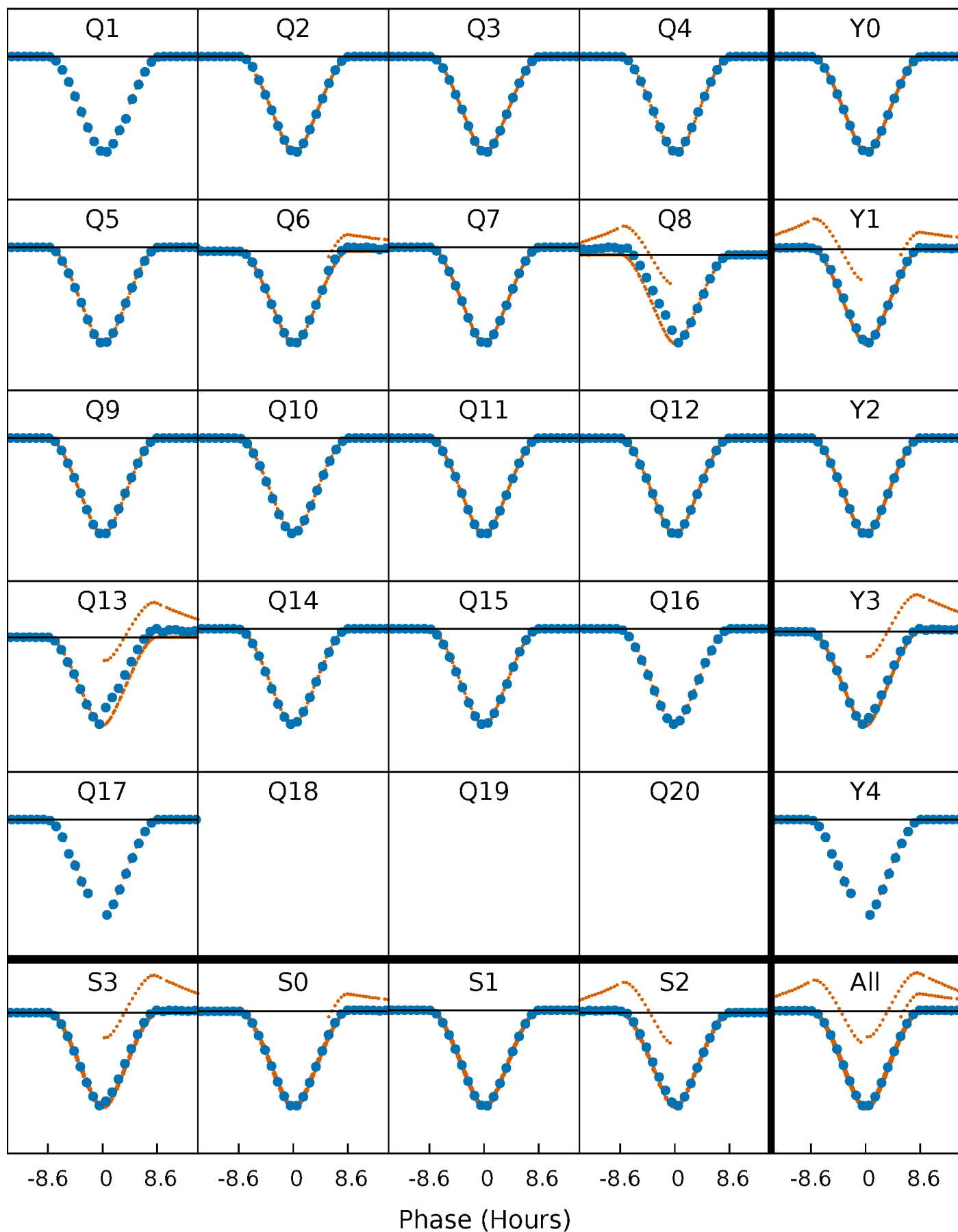
PDC Quarter-Phased Transit Curves

TCE 007821010-02 P= 24.238403 Days $T_0=155.118567$ (BKJD)



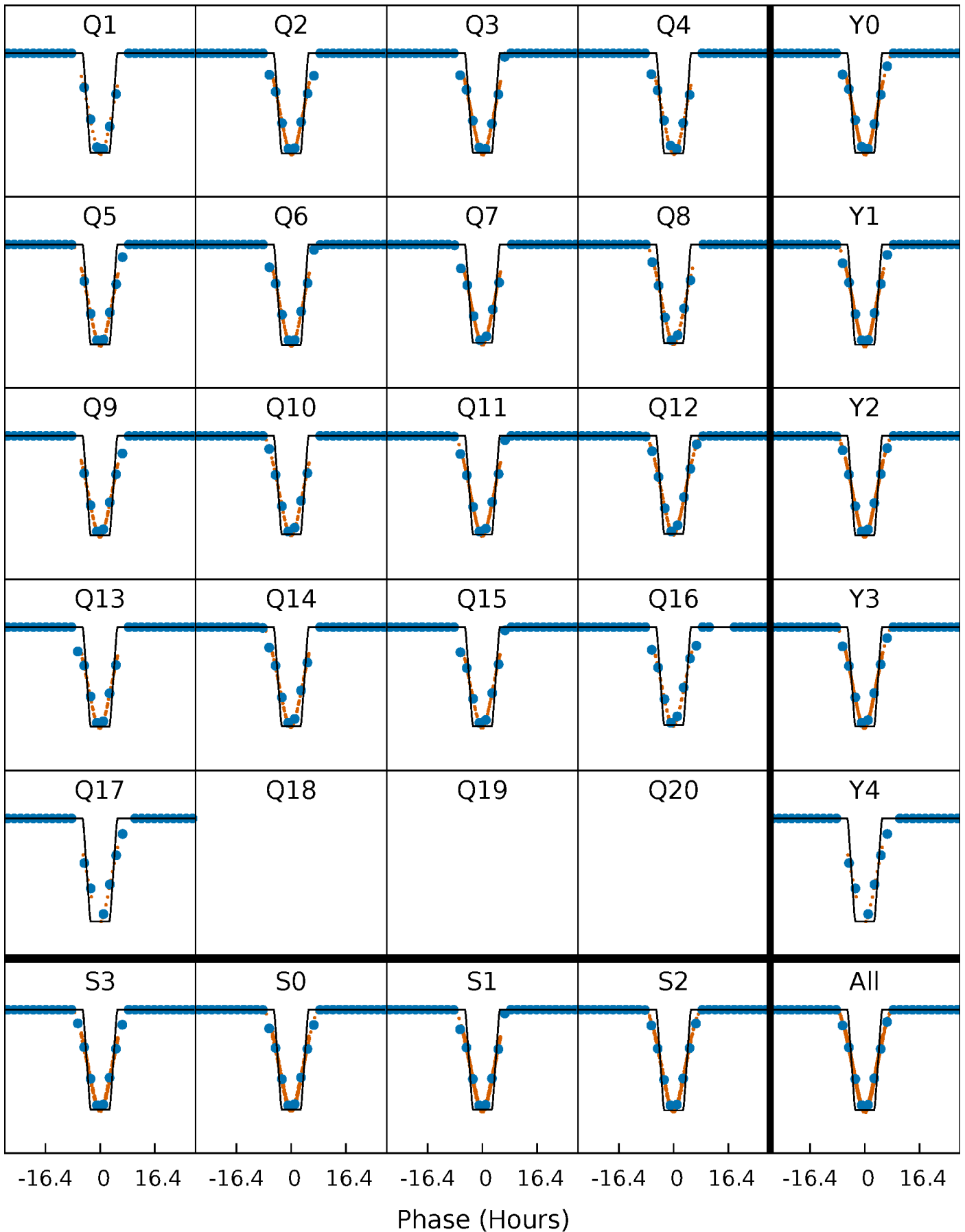
DV Quarter-Phased Transit Curves

TCE 007821010-02 P= 24.238403 Days $T_0=155.118567$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

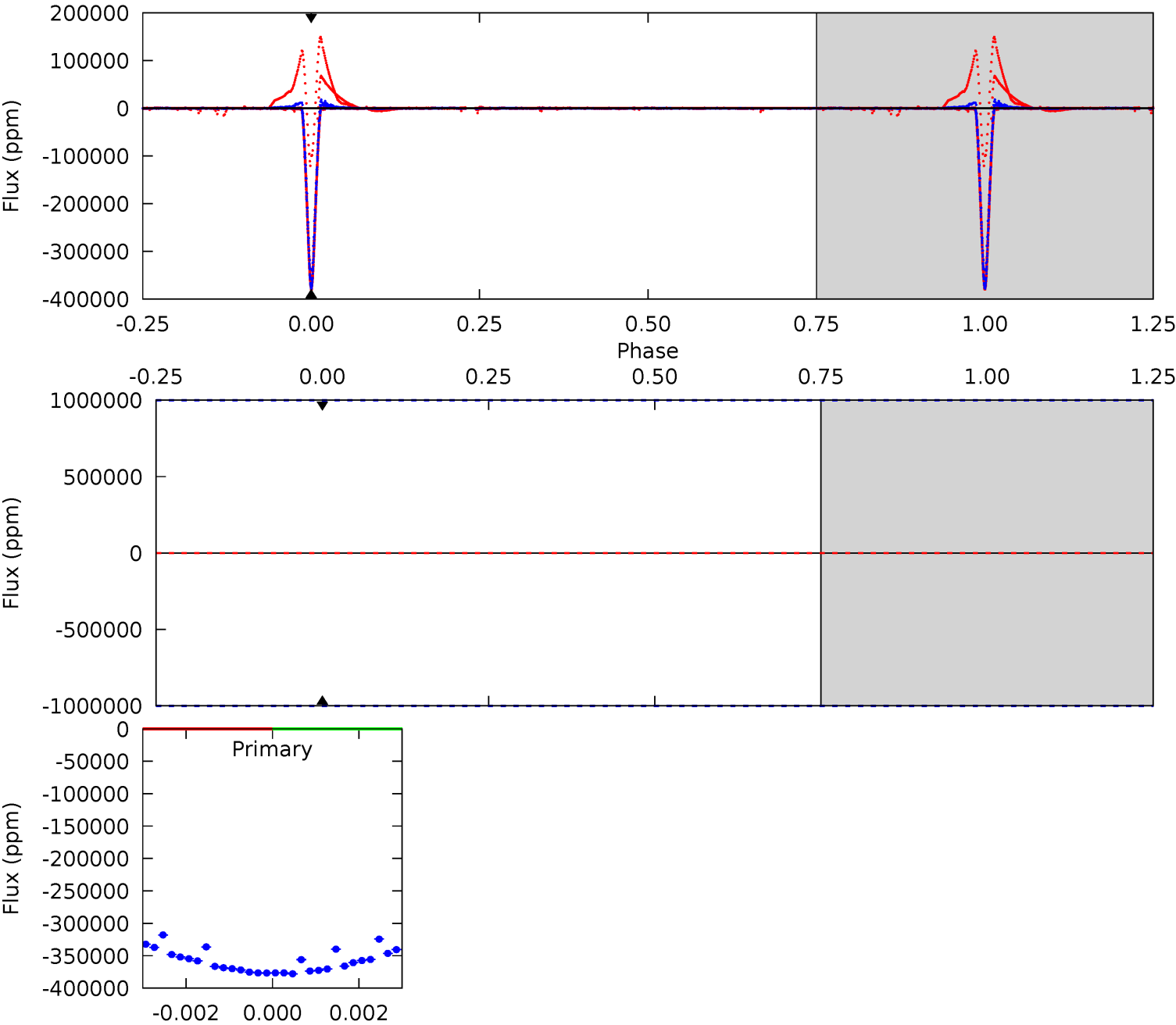
TCE 007821010-02 P= 24.238403 Days $T_0=155.122095$ (BKJD)



DV Model-Shift Uniqueness Test

007821010-02, P = 24.238403 Days, E = 130.880164 Days

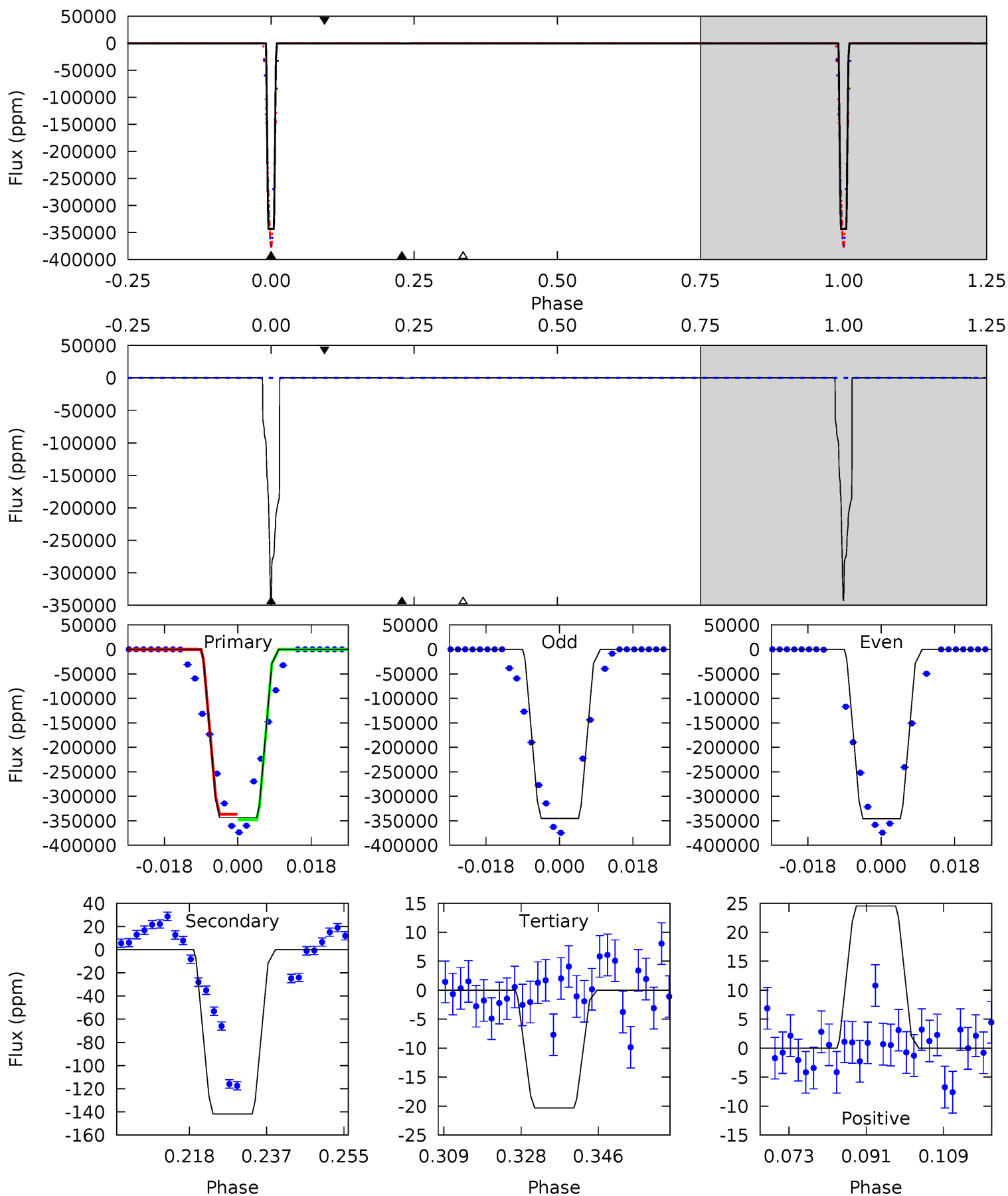
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

007821010-02, P = 24.238403 Days, E = 130.883692 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
63467	26.2	3.76	4.54	4.91	2.36	1.16	63463	63463	22.5	21.7	54.3	1.00	0.00	0



Stellar Parameters For KIC 007821010

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6457^{+70}_{-83}	$4.259^{+0.080}_{-0.120}$	$0.000^{+0.150}_{-0.150}$	$1.365^{+0.253}_{-0.156}$	$1.233^{+0.096}_{-0.096}$	$0.683^{+0.274}_{-0.246}$
	+1%/-1%	+2%/-3%	+inf%/-inf%	+19%/-11%	+8%/-8%	+40%/-36%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 007821010-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$34.68^{+15.31}_{-14.47}$	1110^{+48}_{-35}	2569^{+5910}_{-10317}	$4.649^{+1921.761}_{-1495.750}$
Alt.	-142 ± 5	$91.38^{+16.99}_{-15.89}$	1113^{+48}_{-37}	-1481^{+3245}_{-264}	$0.286^{+0.138}_{-0.084}$

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 $A_{obs} \gg 1.0$

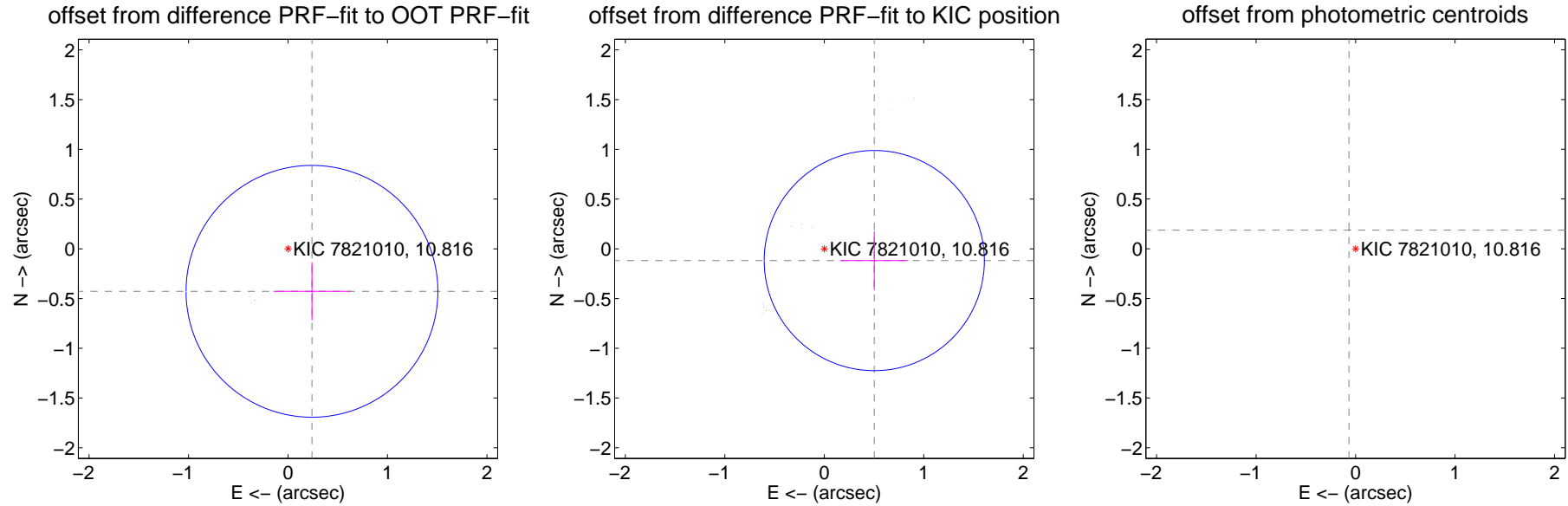
DV Centroid Data

Supplemental centroid analysis for 007821010-02. **Kepler magnitude: 10.82.** Transit SNR -1.00

There are 15 quarters with good PRF difference image offsets

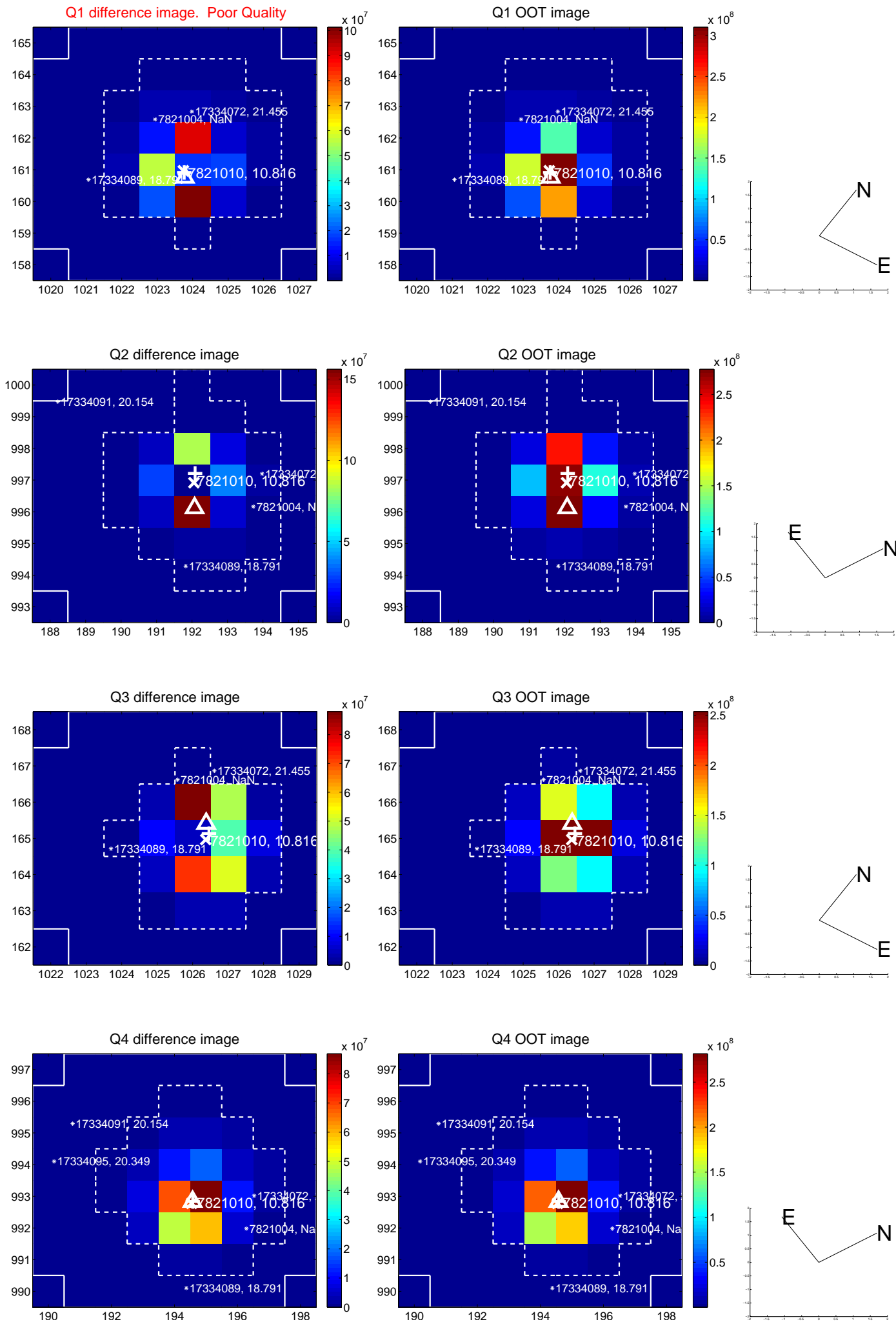
The direct PRF centroid is offset from the target star catalog position by about 0.41 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.490 ± 0.422	1.16	-0.241 ± 0.386	-0.427 ± 0.292
PRF-fit source offset from KIC position	0.516 ± 0.369	1.40	-0.503 ± 0.342	-0.118 ± 0.296
photometric centroid source offset	0.20 ± 0.00	1246.90	0.07 ± 0.00	0.19 ± 0.00

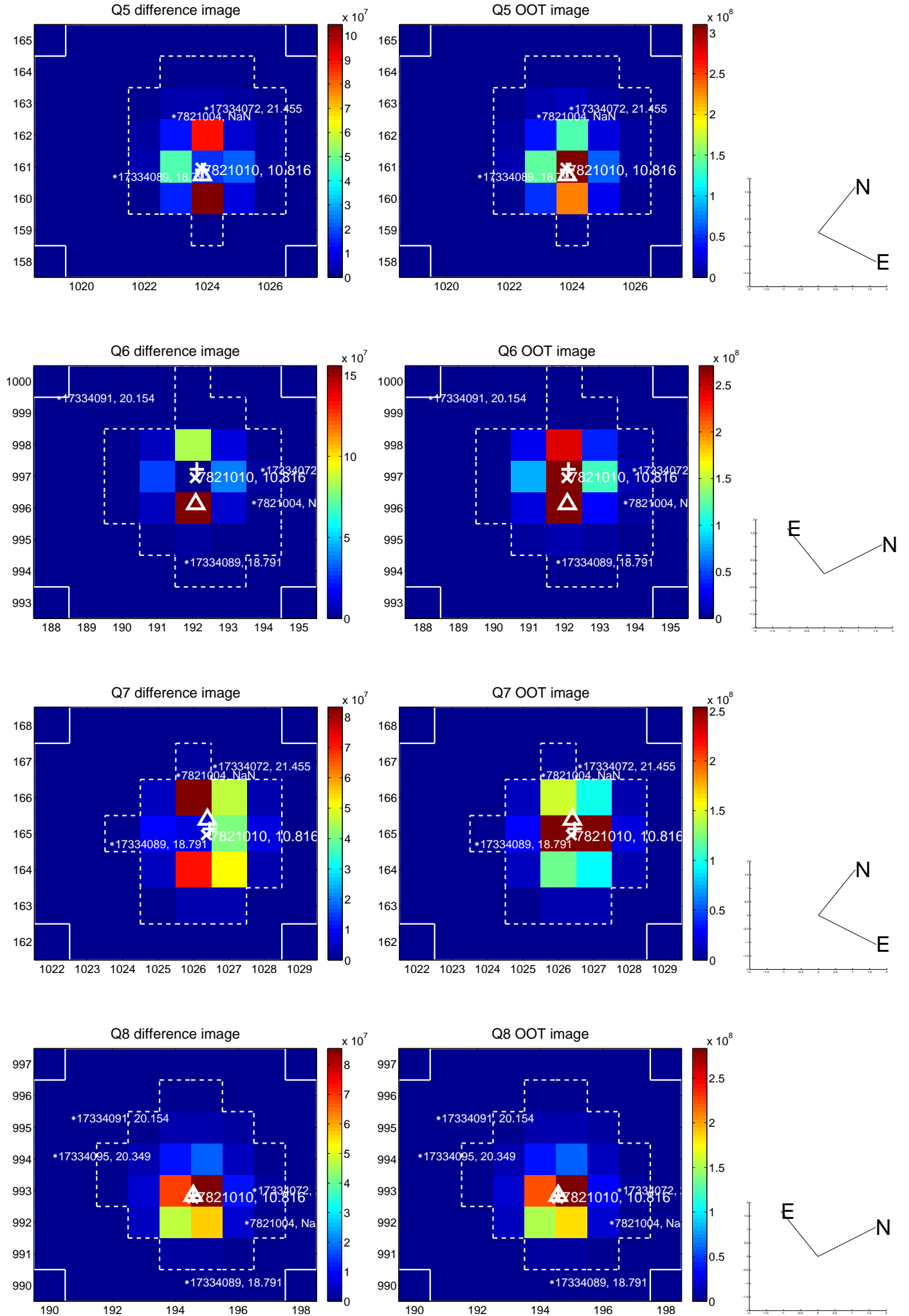


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

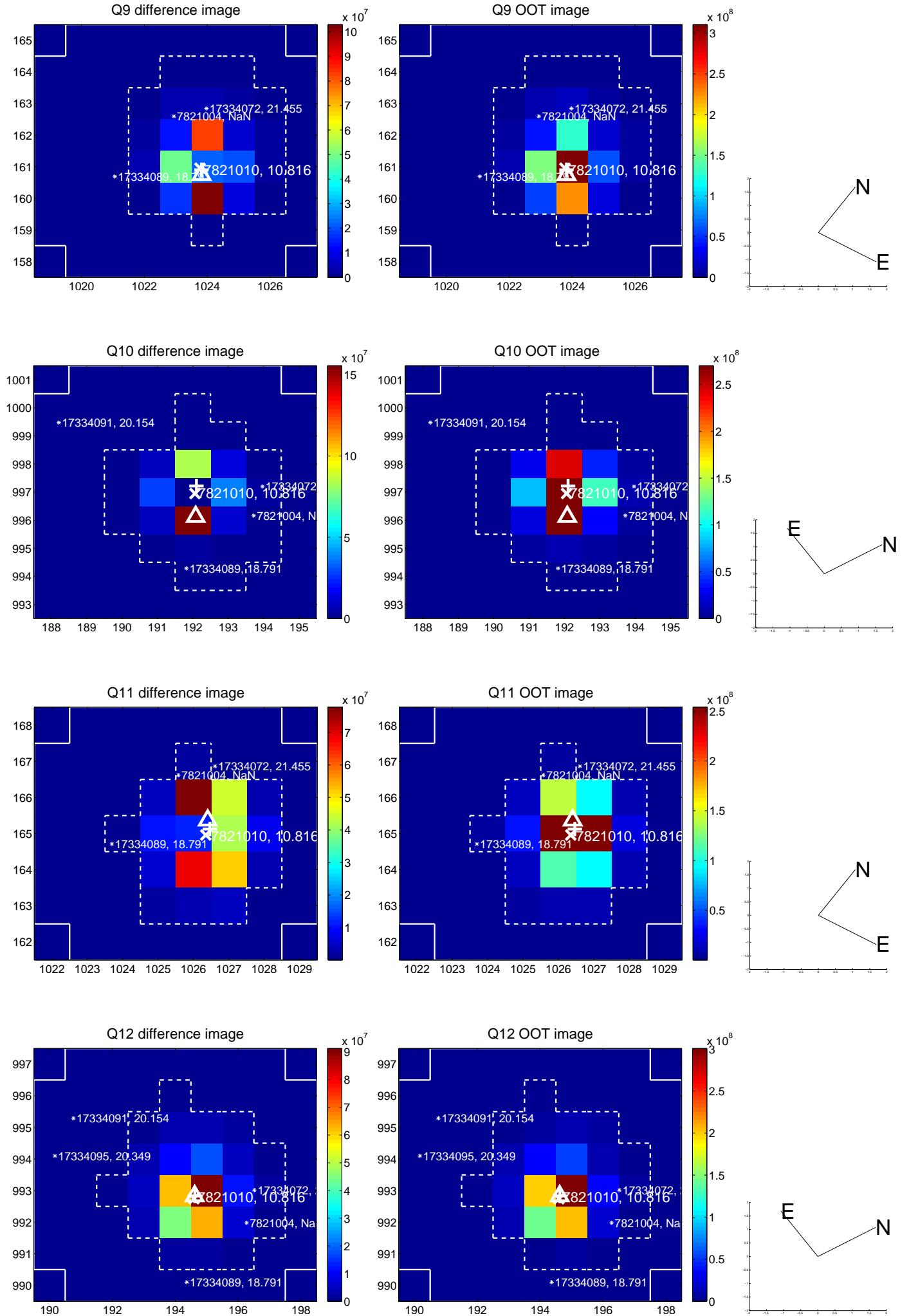
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



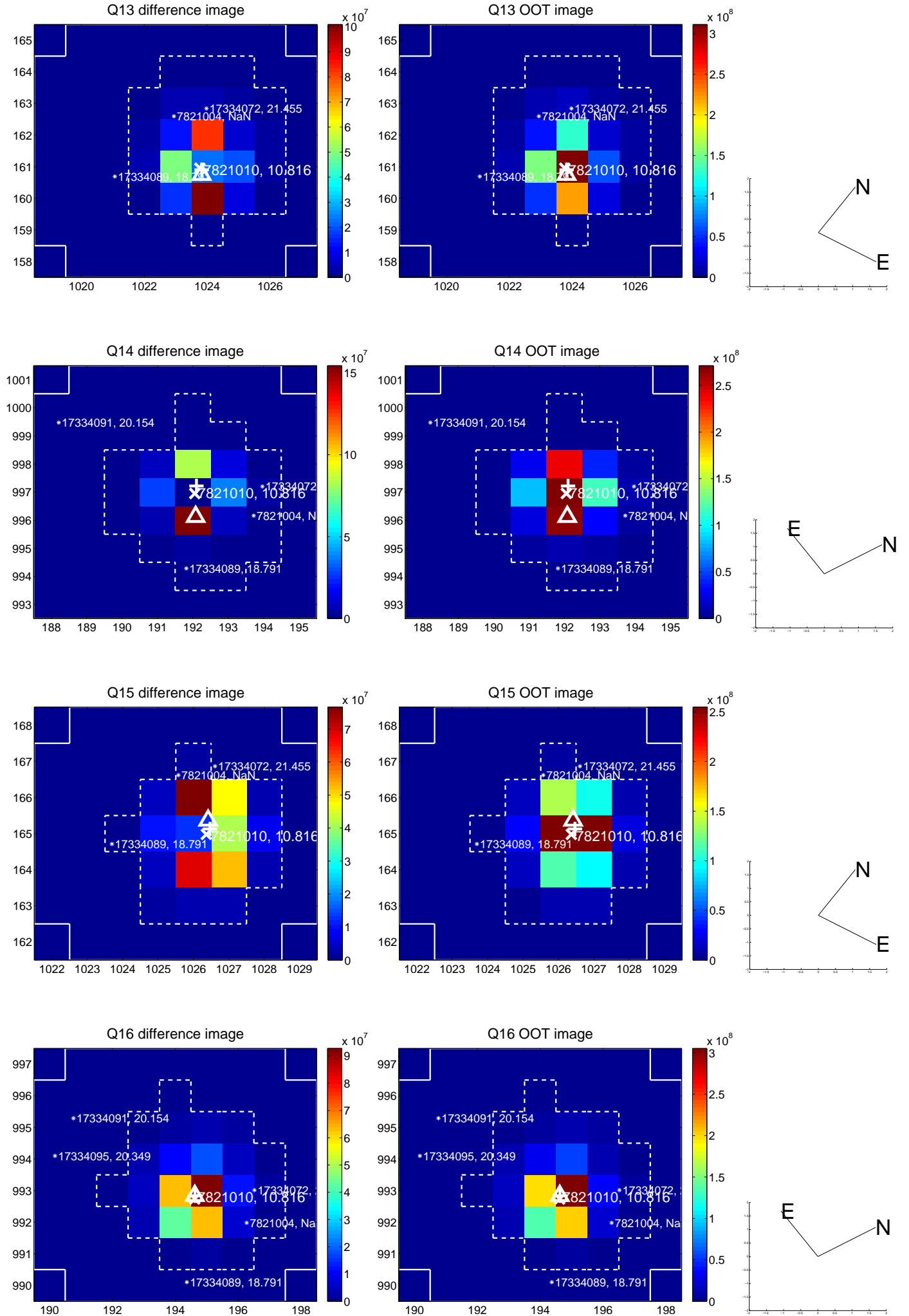
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



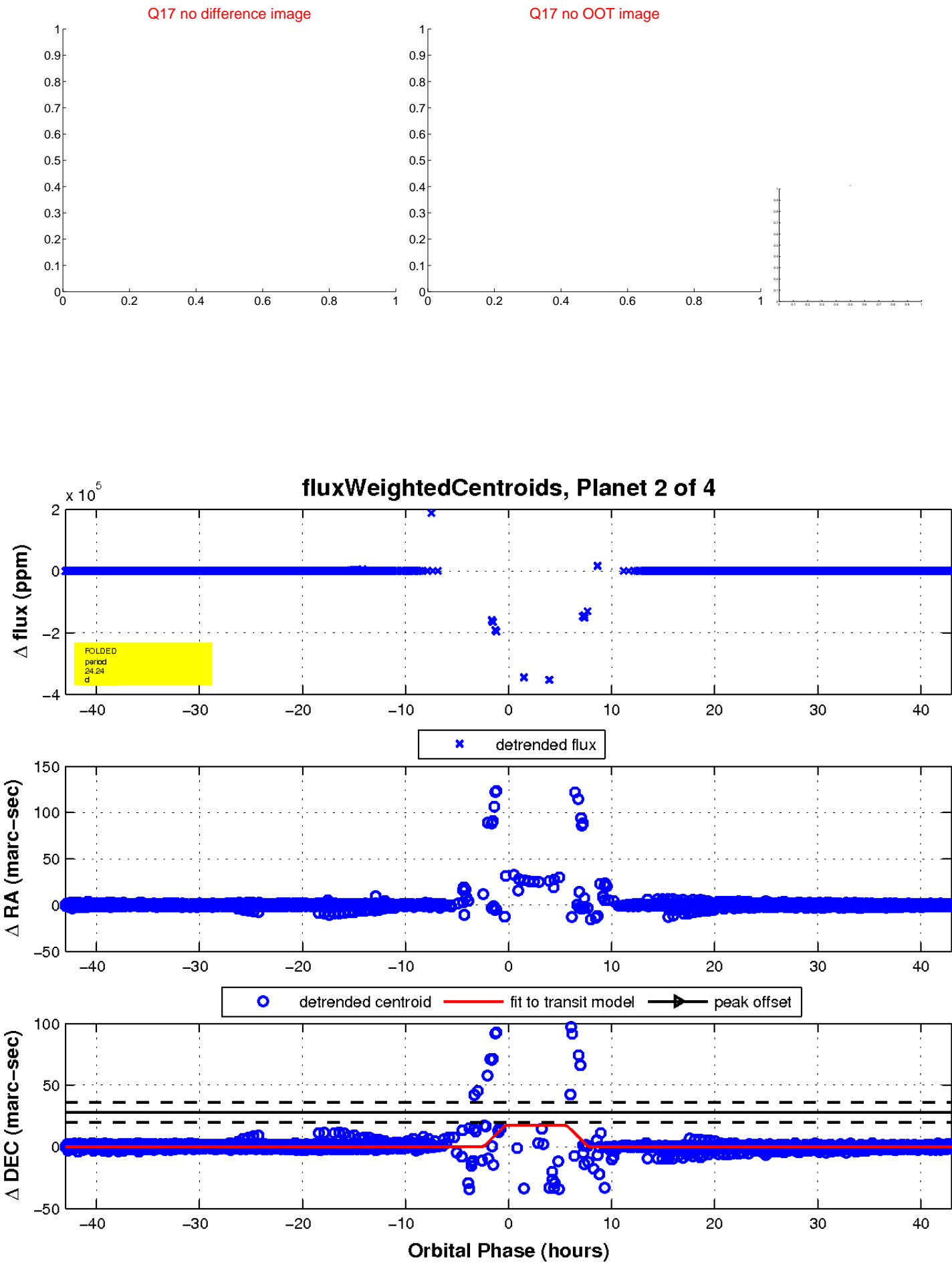
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

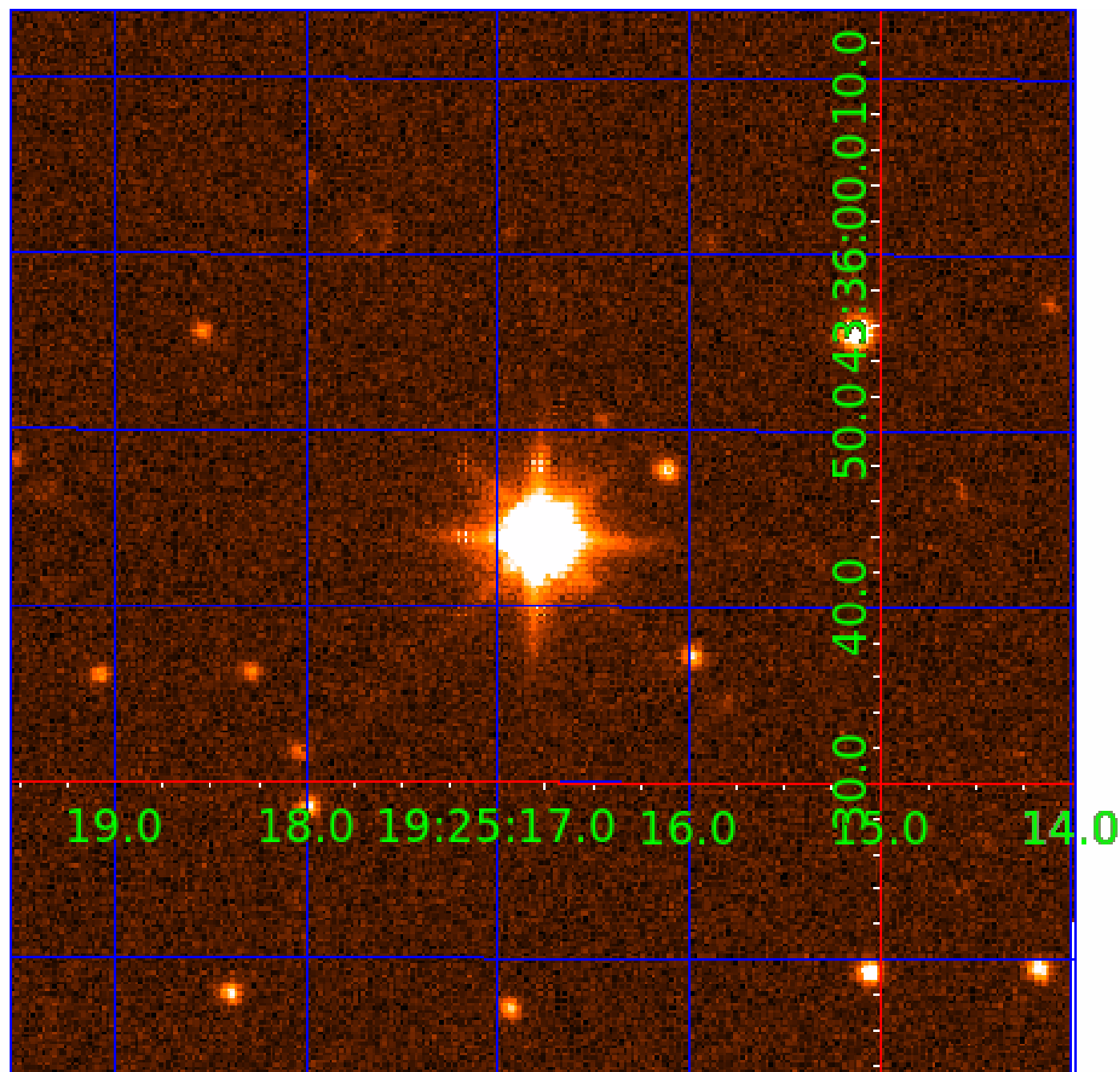


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007821010

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})
007821010-01	OBS	2938.01	24.238337	136.609953	470760.3	2.500	63391.2	-1.0	1.36	6457	66.48	93.85
007821010-02	OBS	No	24.238403	155.118567	376897.6	7.500	28904.6	-1.0	1.36	6457	34.26	93.85
007821010-03	OBS	No	218.148797	251.517944	10246.6	12.546	1993.9	342.9	1.36	6457	24.41	5.01
007821010-04	OBS	No	24.234305	154.730329	9168.5	7.500	1584.8	-1.0	1.36	6457	13.13	93.87

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007821010-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_SATURATED
007821010-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_SATURATED
007821010-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
007821010-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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.

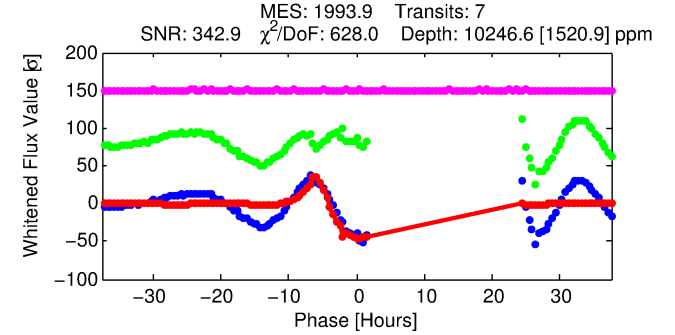
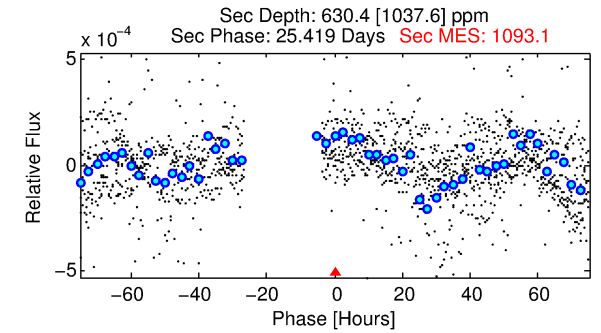
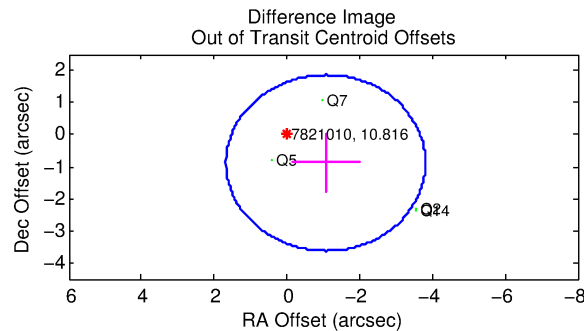
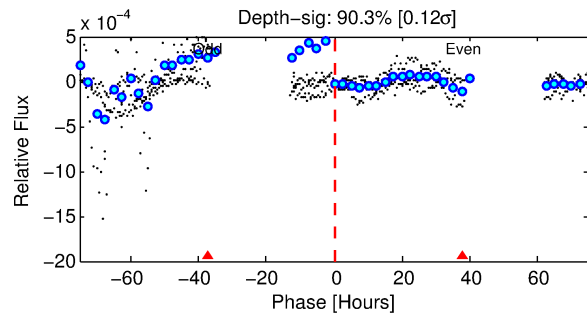
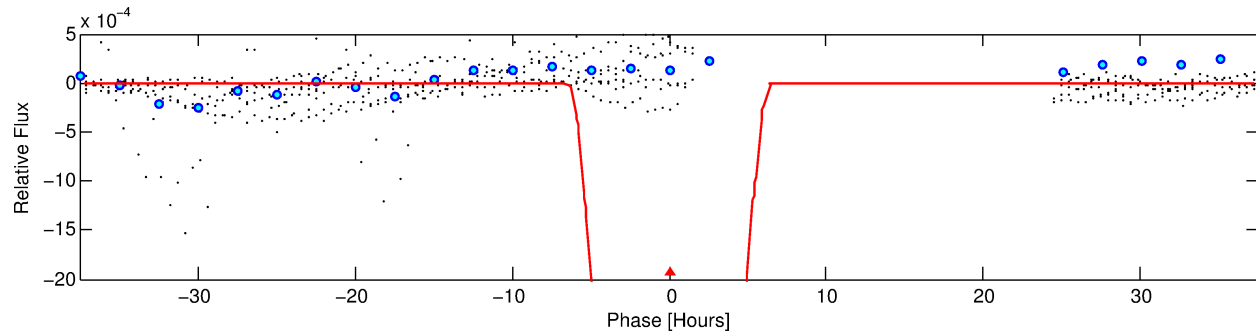
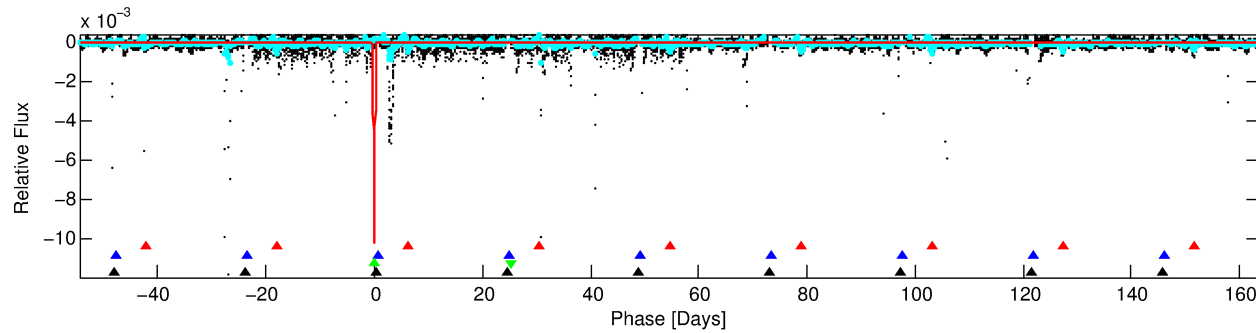
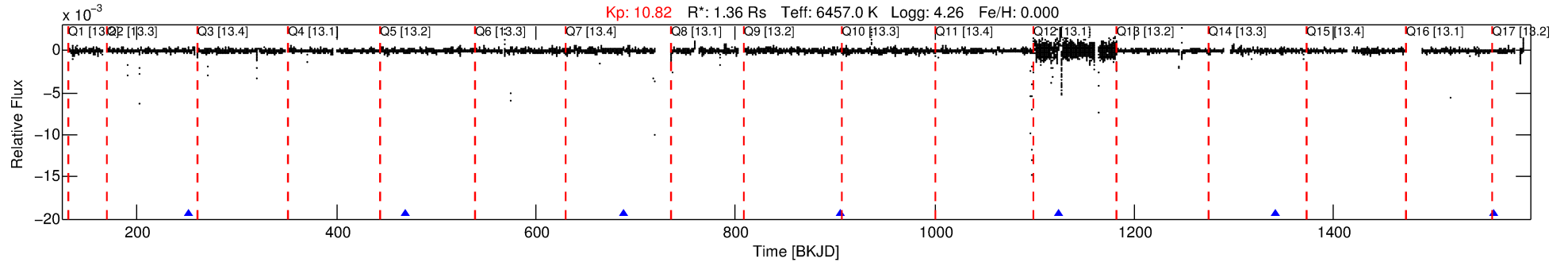
Ephemeris Match Information For 007821010-03

No Significant Match Found

DV One-Page Summary

KIC: 7821010 Candidate: 3 of 4 Period: 218.149 d

KOI: K02938 Corr: No Ephemeris Match



DV Fit Results:

Period = 218.14880 [0.00343] d
Epoch = 251.5179 [0.0213] BKJD
 R_p/R^* = 0.1639 [0.1941]
 a/R^* = 79.16 [13.73]
 b = 1.00 [0.27]
 S_{eff} = 5.01 [1.14]
 T_{eq} = 382 [22] K
 R_p = 24.41 [29.26] R_e
 a = 0.7608 [0.1173] AU
 A_g = 336.95 [974.73] [0.34 σ]
 T_{eff} = 2527 [1823] K [1.18 σ]

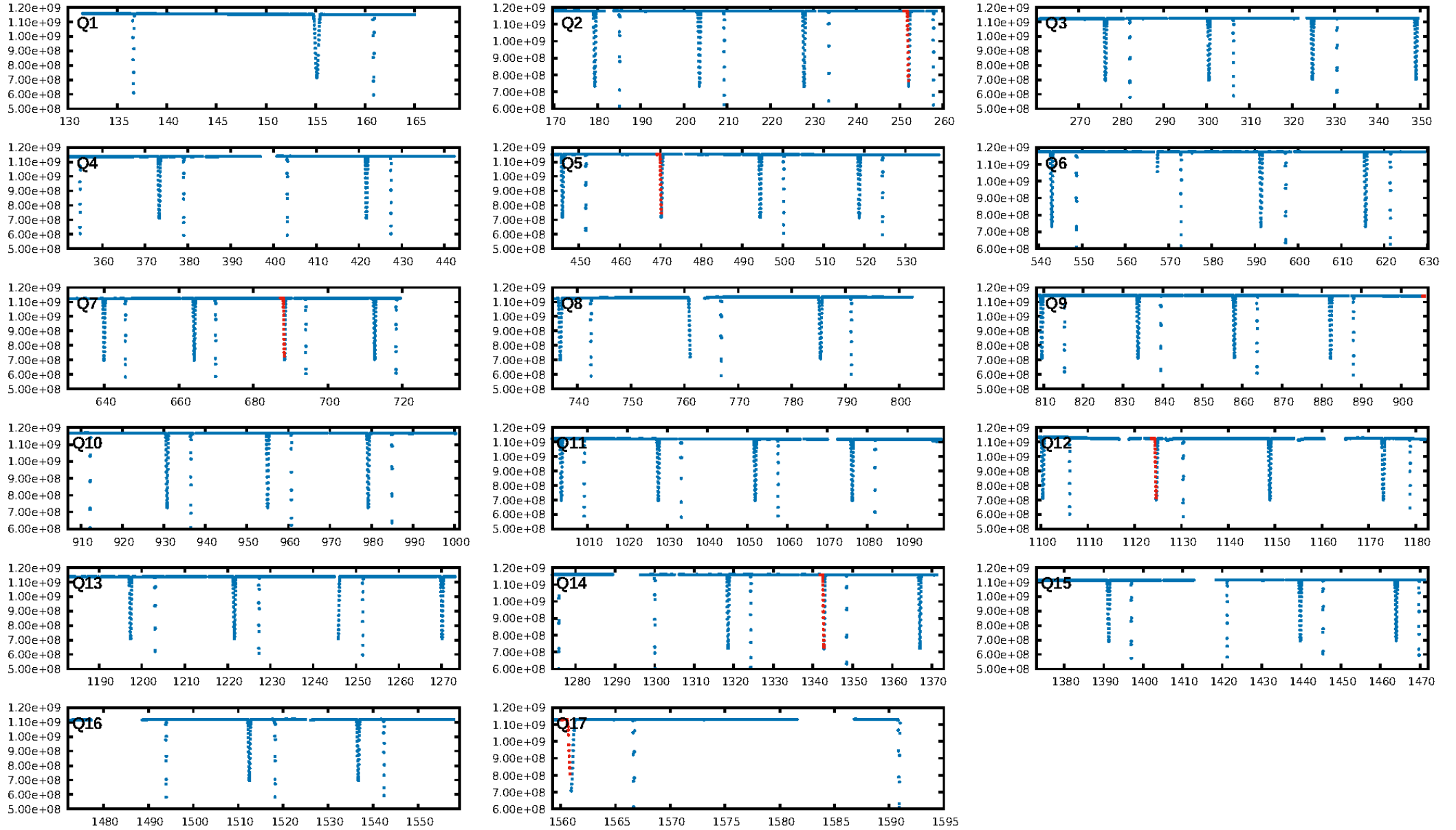
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [318.39 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: -123.3
Centroid-sig: N/A
Centroid-so: 1.461 arcsec [107.19 σ]
OotOffset-rm: 1.382 arcsec [1.51 σ]
KicOffset-rm: 1.149 arcsec [1.30 σ]
OotOffset-st: 2/1/0/1 [4]
KicOffset-st: 2/1/0/1 [4]
DiffImageQuality-fgm: 0.00 [0/4]
DiffImageOverlap-fno: 0.00 [0/4]

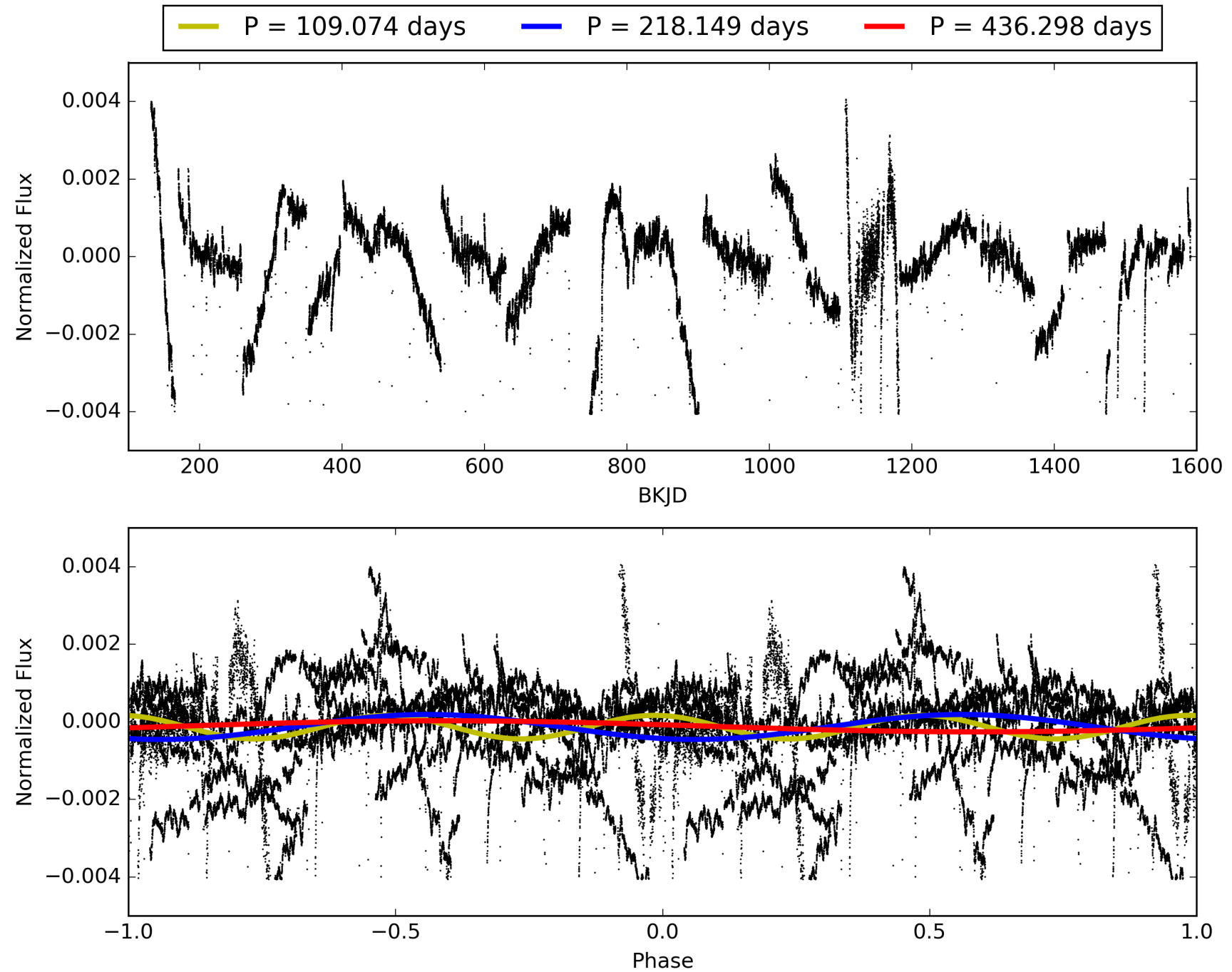
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:02:18 Z

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

TCE 007821010-03, PDC Light Curves

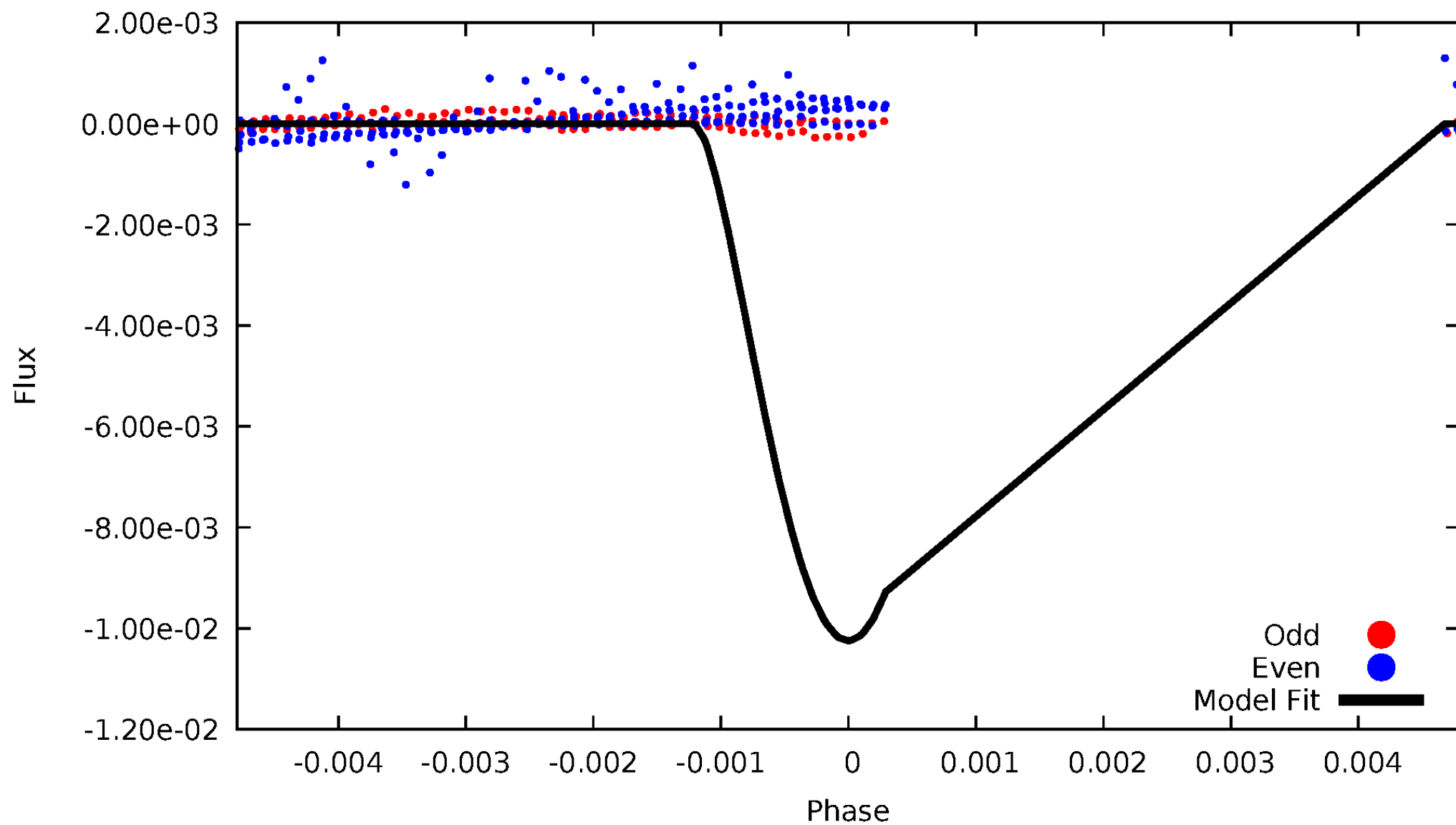


TCE 007821010-03



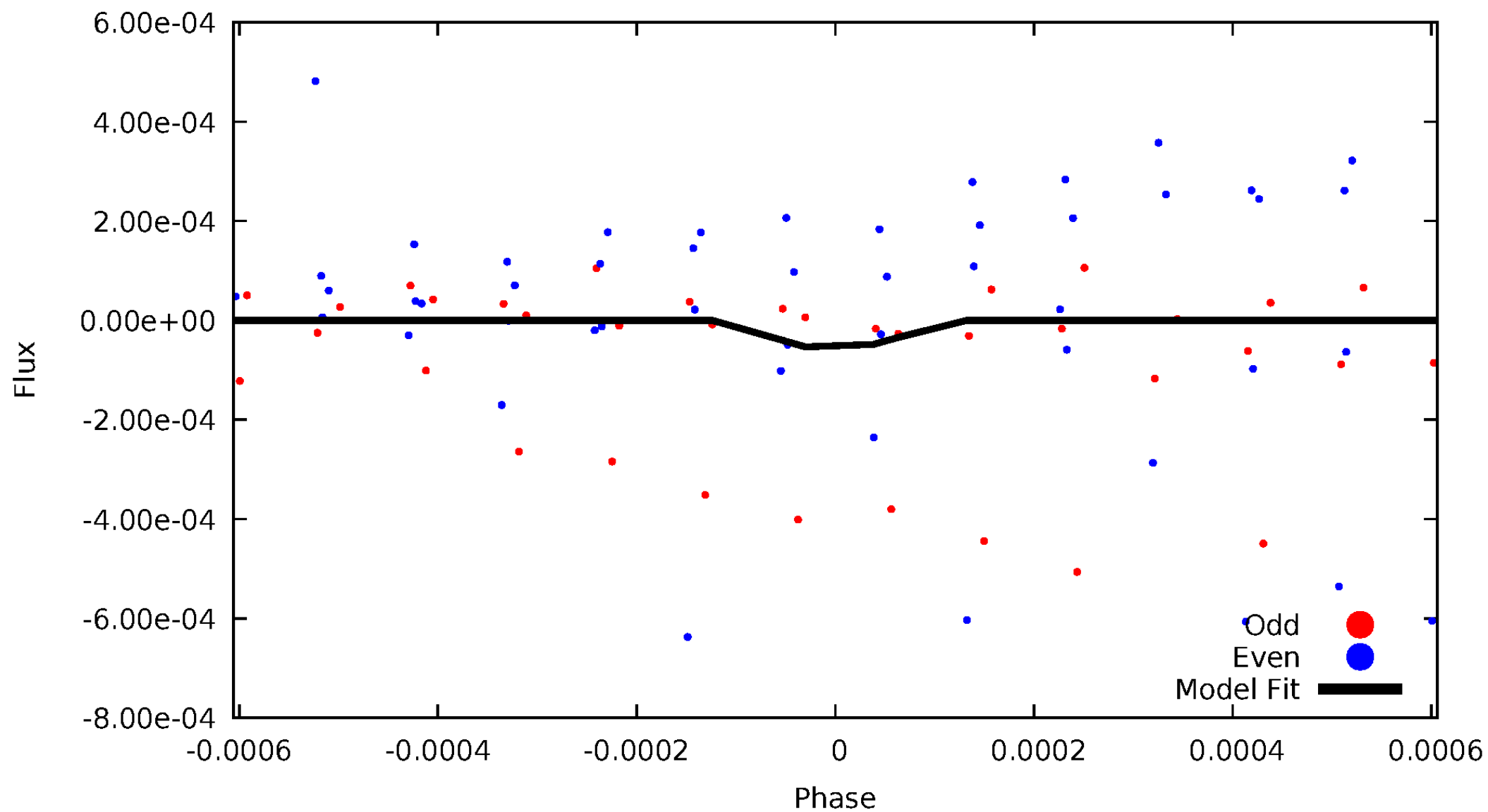
DV Odd/Even

TCE 007821010-03



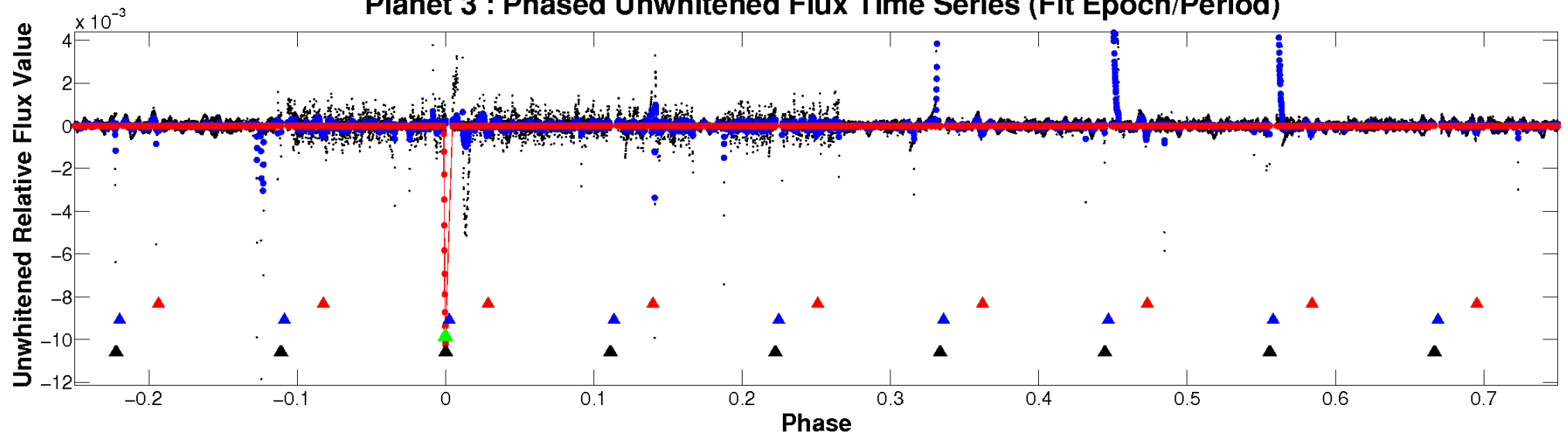
ALT Odd/Even

TCE 007821010-03

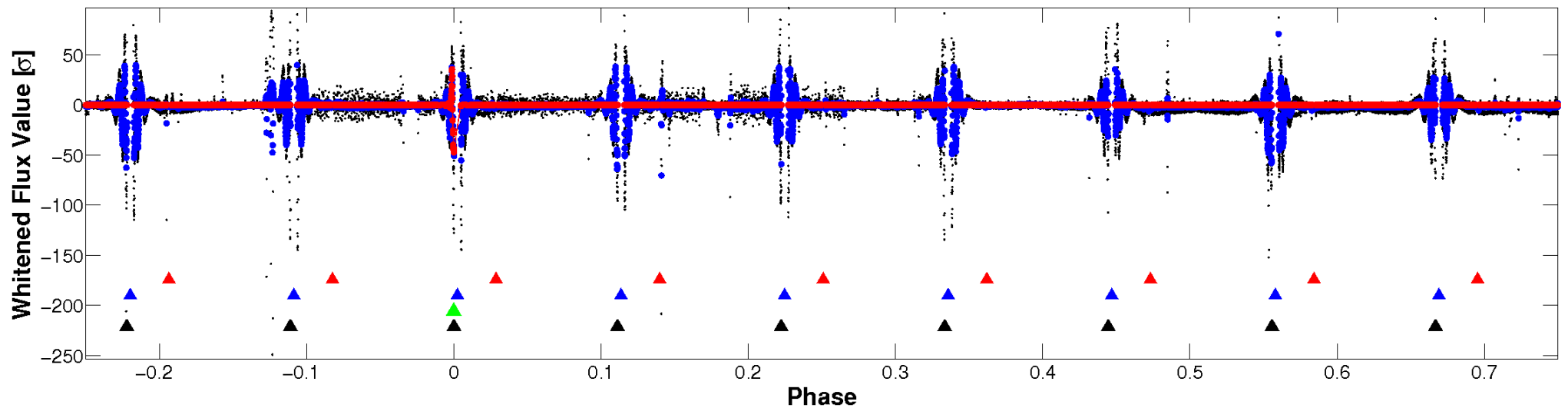


Non-Whitened Vs. Whitened Light Curve

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

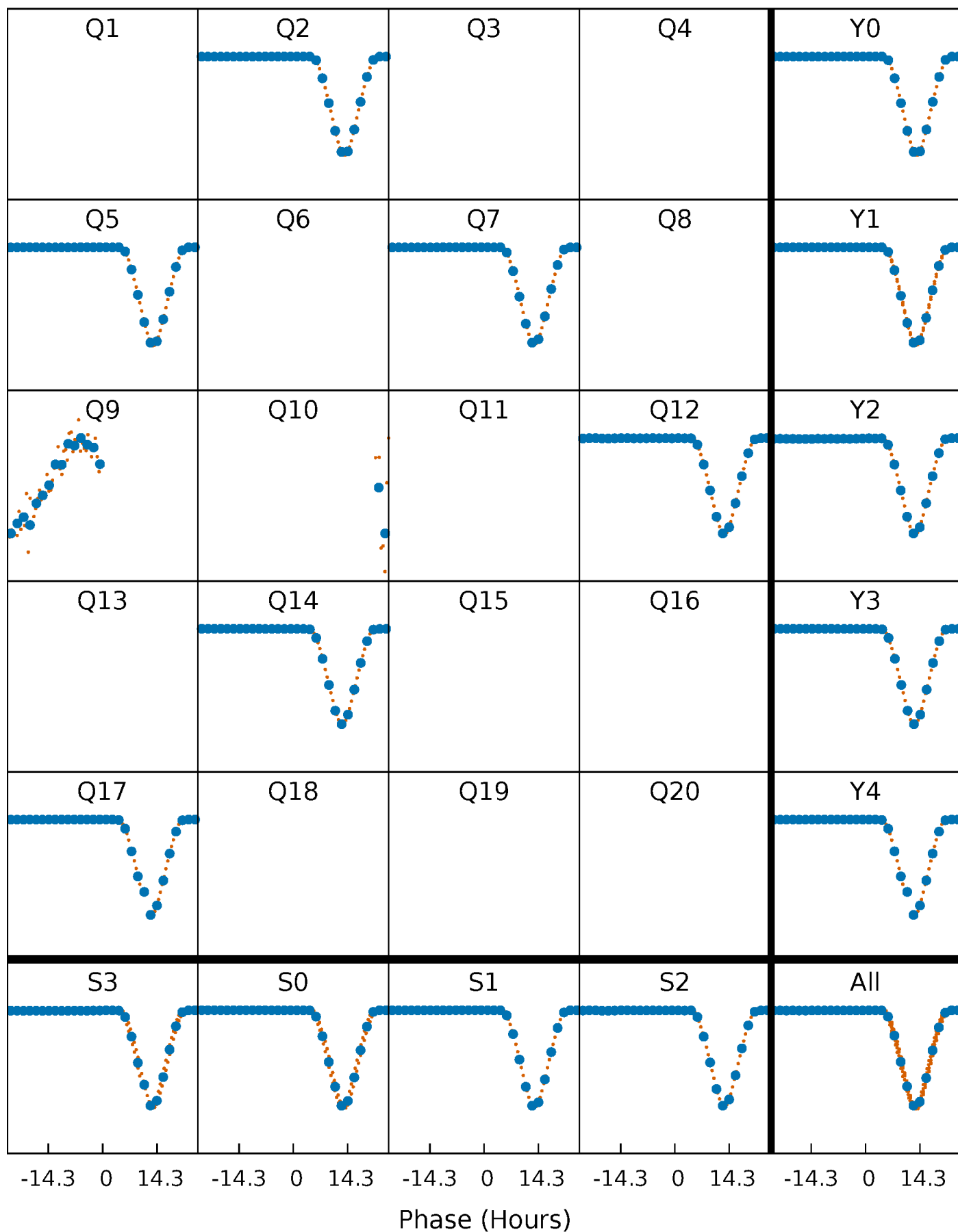


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



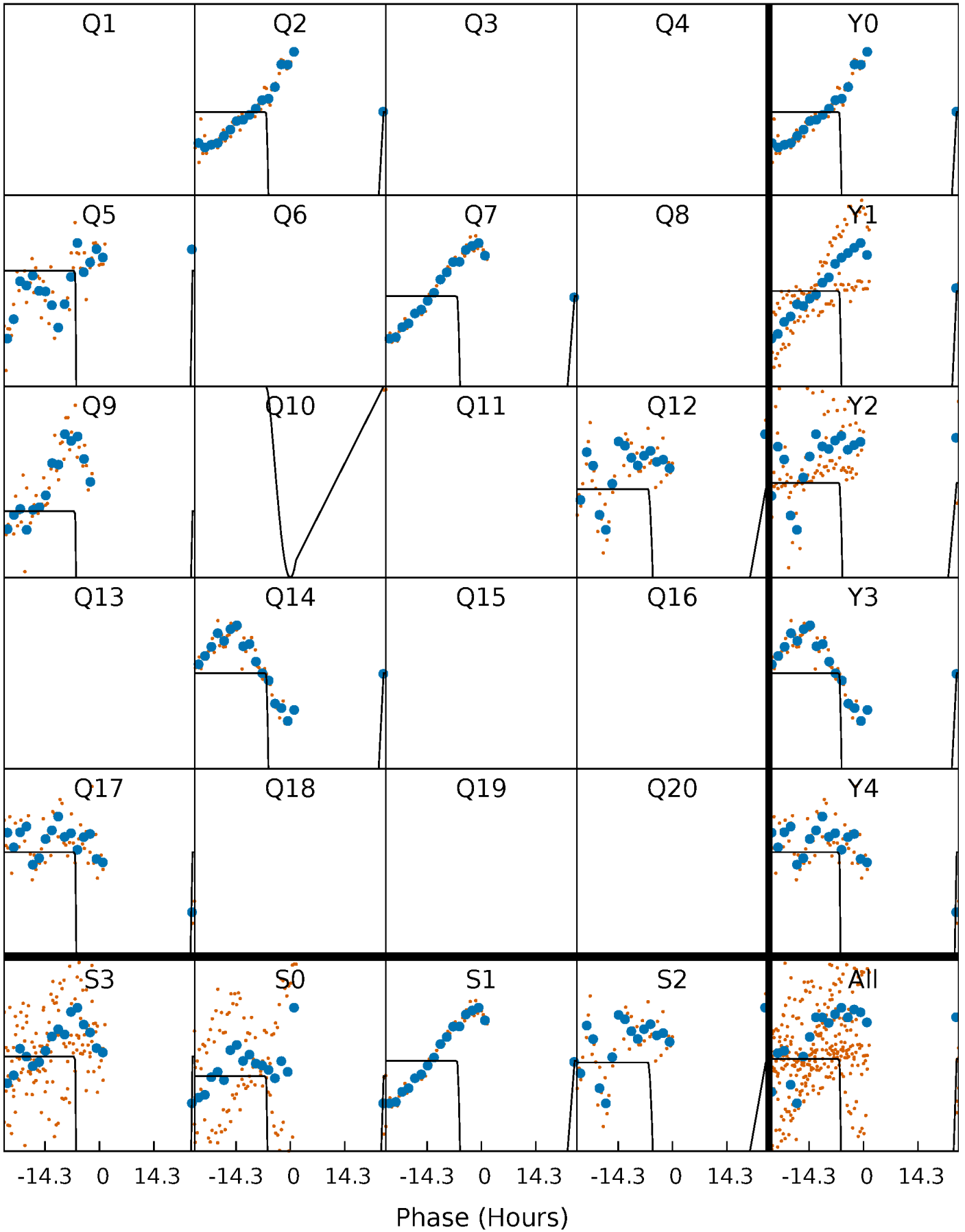
PDC Quarter-Phased Transit Curves

TCE 007821010-03 P=218.148797 Days $T_0=251.517944$ (BKJD)



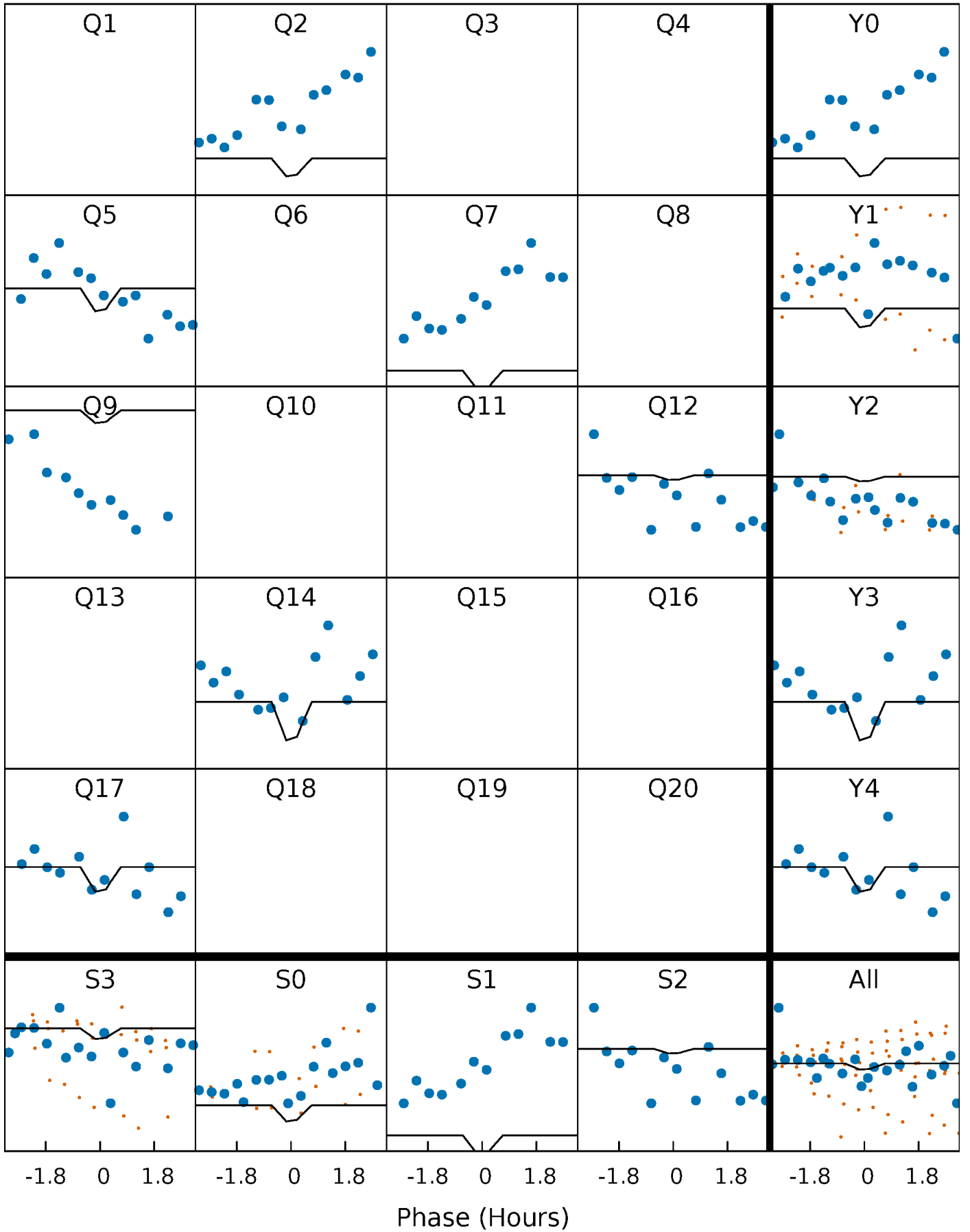
DV Quarter-Phased Transit Curves

TCE 007821010-03 P=218.148797 Days $T_0=251.517944$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

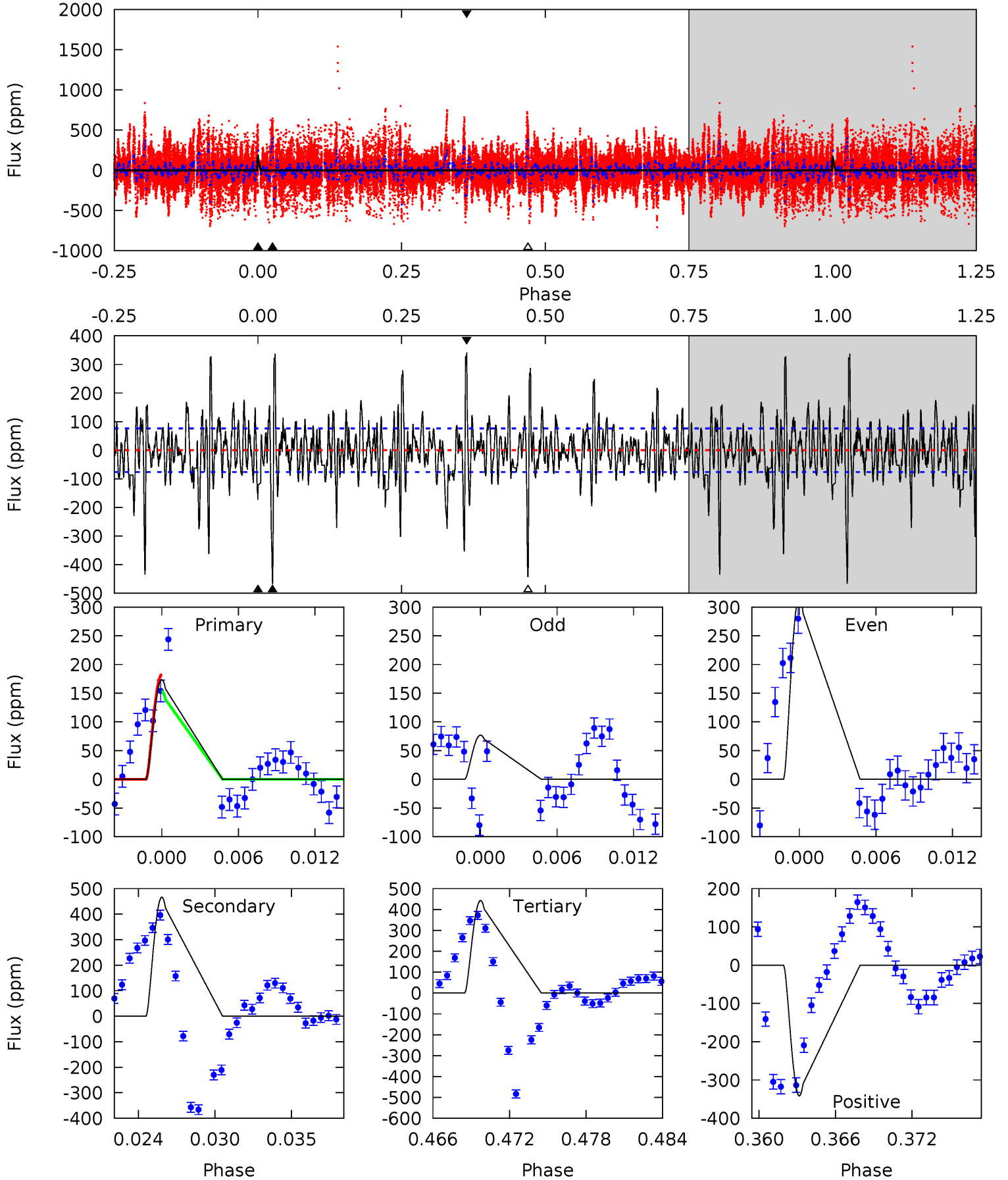
TCE 007821010-03 P=218.169120 Days $T_0=251.284275$ (BKJD)



DV Model-Shift Uniqueness Test

007821010-03, $P = 218.148797$ Days, $E = 33.369147$ Days

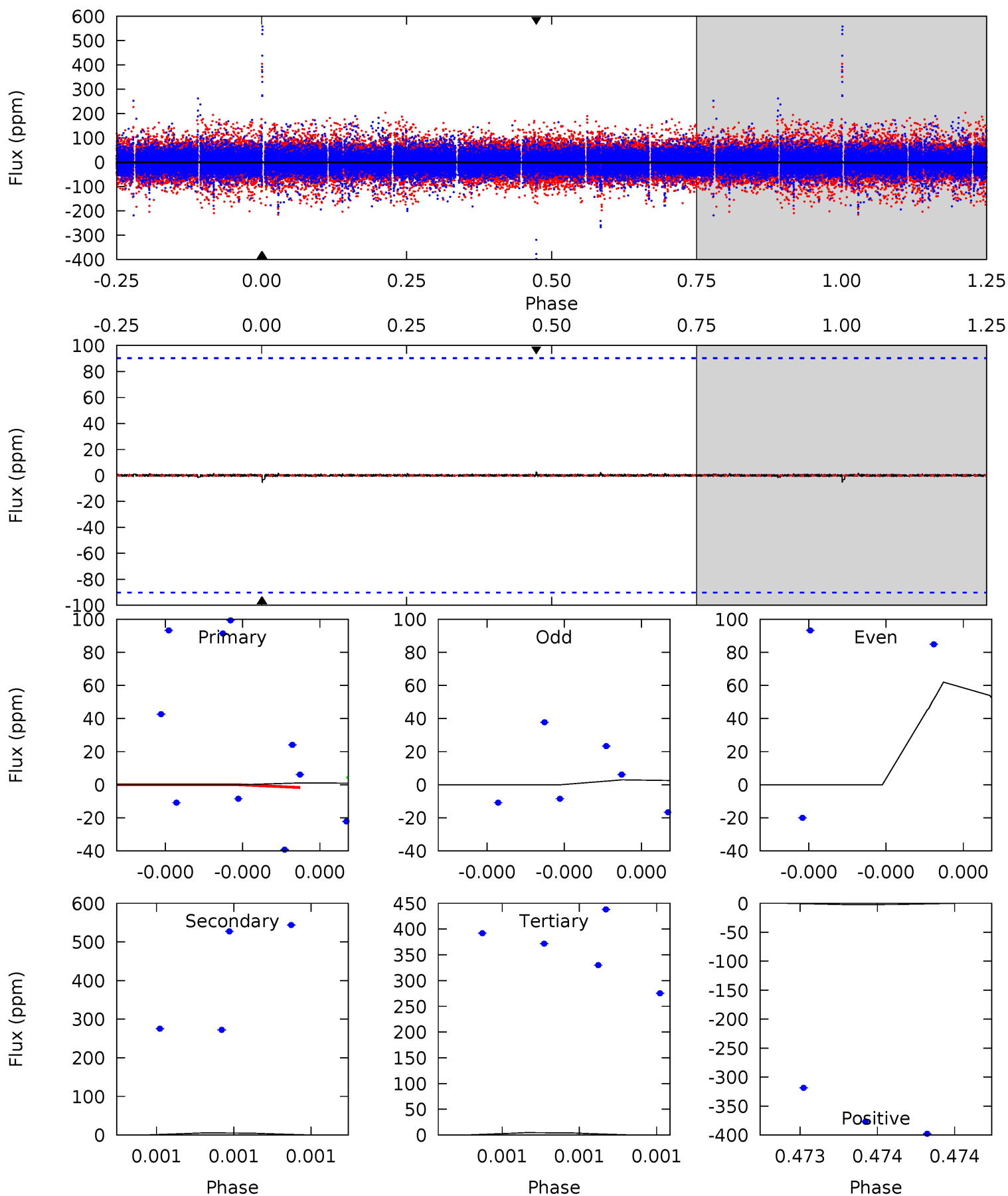
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.6	31.3	29.8	22.9	5.13	2.75	5.44	-18.1	-11.3	1.59	8.41	7.84	1.19	0.42	0.70



Alt Model-Shift Uniqueness Test

007821010-03, P = 218.169120 Days, E = 33.115155 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.07	0.36	0.30	0.15	5.82	3.85	0.01	-0.23	-0.08	0.06	0.21	2.04	7.18	0.30	0.09



Stellar Parameters For KIC 007821010

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6457^{+70}_{-83}	$4.259^{+0.080}_{-0.120}$	$0.000^{+0.150}_{-0.150}$	$1.365^{+0.253}_{-0.156}$	$1.233^{+0.096}_{-0.096}$	$0.683^{+0.274}_{-0.246}$
	+1%/-1%	+2%/-3%	+inf%/-inf%	+19%/-11%	+8%/-8%	+40%/-36%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 007821010-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-467 ± 15	$31.70^{+26.22}_{-21.00}$	535^{+23}_{-18}	2814^{+1074}_{-404}	148^{+1148}_{-103}
Alt.	-6 ± 16	$20.46^{+21.13}_{-14.44}$	536^{+22}_{-19}	1773^{+657}_{-3732}	$2.521^{+43.611}_{-8.808}$

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

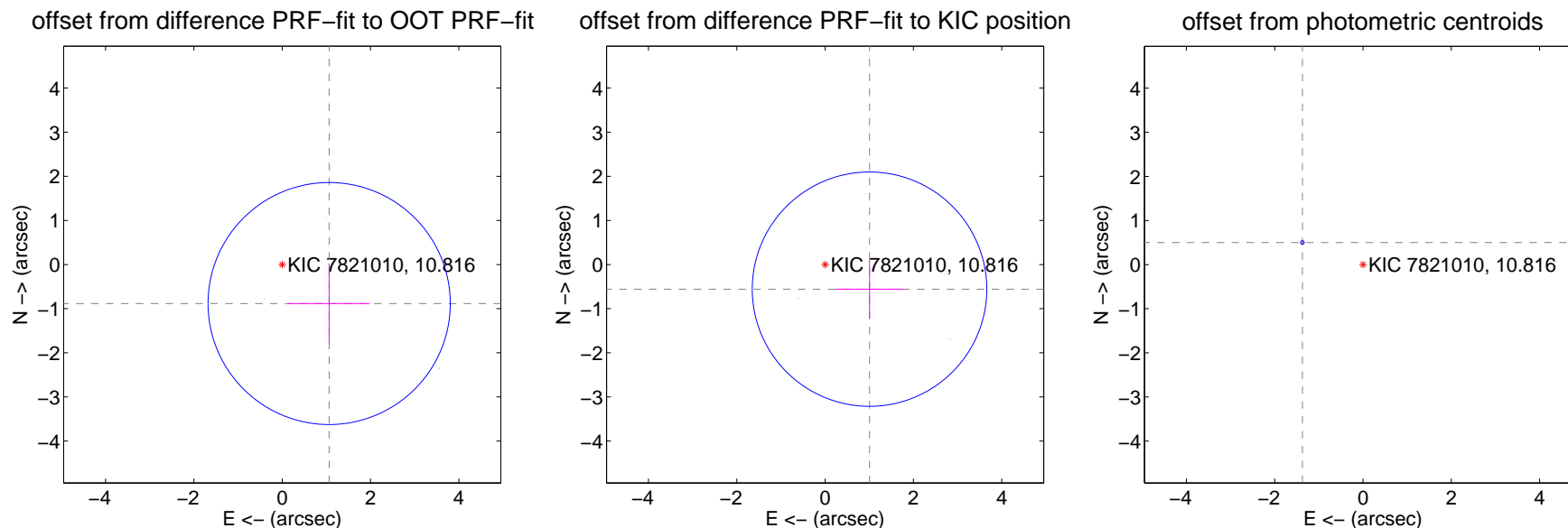
DV Centroid Data

Supplemental centroid analysis for 007821010-03. **Kepler magnitude: 10.82.** Transit SNR 342.92

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.97 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.382 ± 0.914	1.51	-1.063 ± 0.918	-0.883 ± 0.908
PRF-fit source offset from KIC position	1.149 ± 0.885	1.30	-1.005 ± 0.766	-0.558 ± 0.666
photometric centroid source offset	1.46 ± 0.01	107.19	1.37 ± 0.01	0.50 ± 0.01



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.

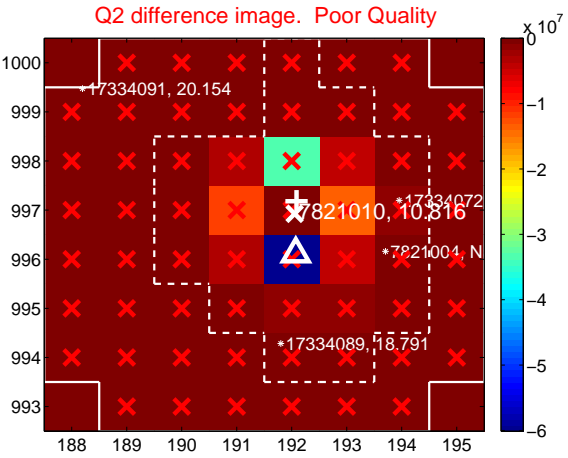
Q1 no difference image



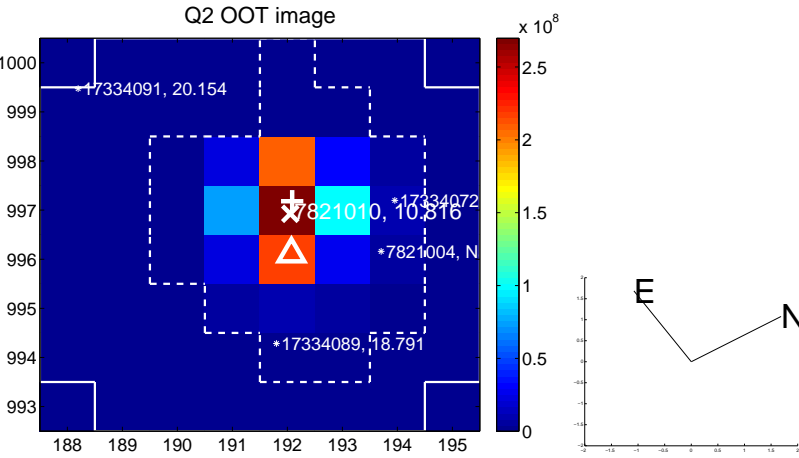
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



Q3 no OOT image



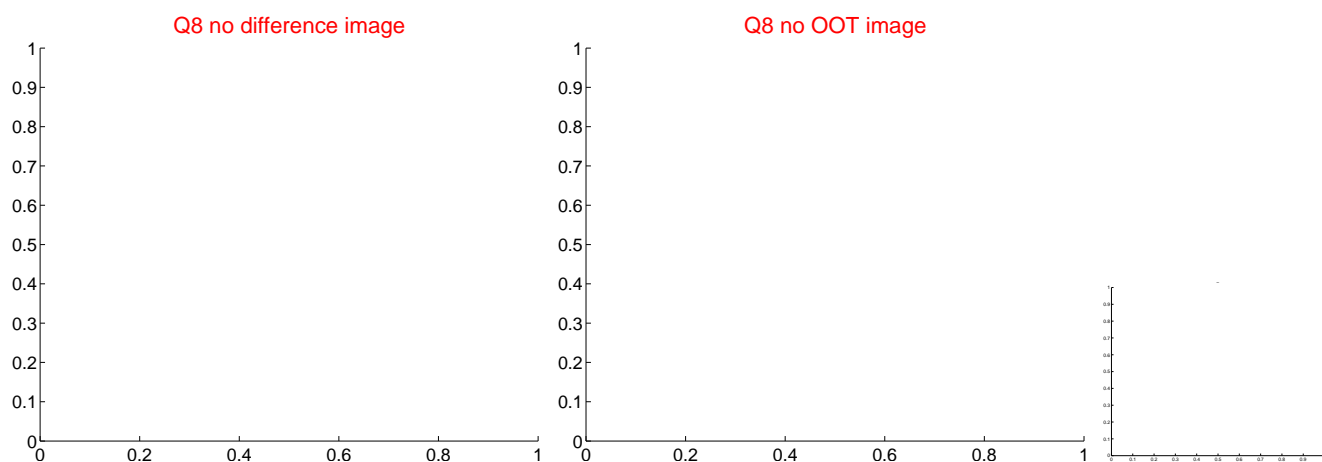
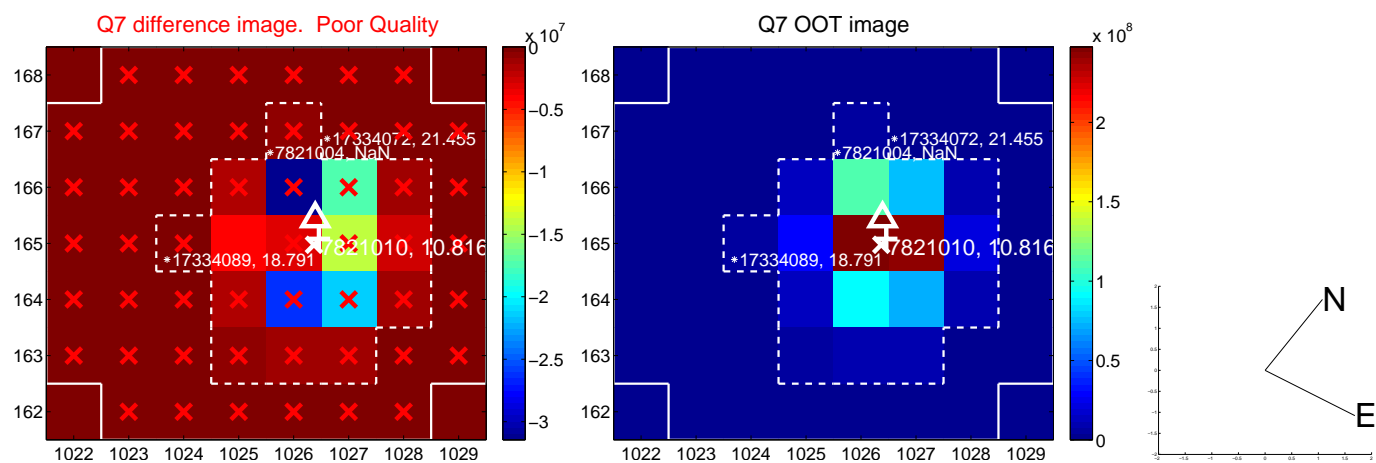
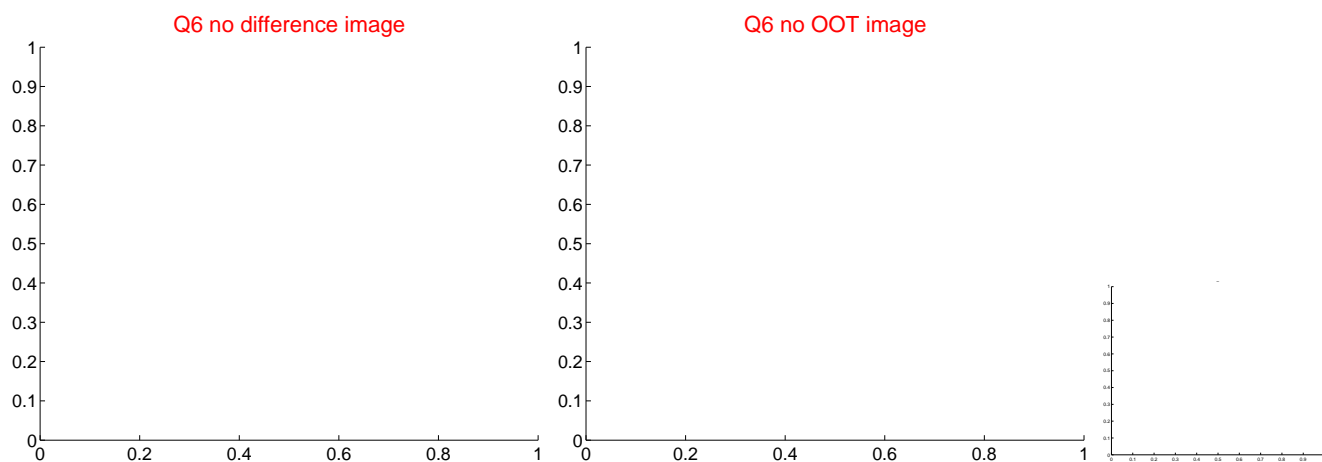
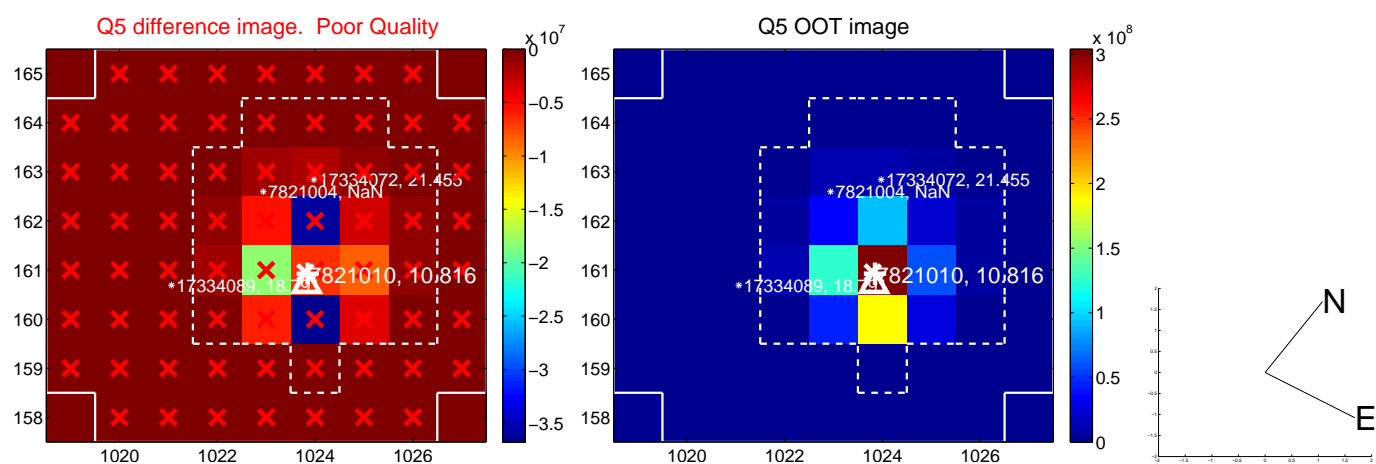
Q4 no difference image



Q4 no OOT image



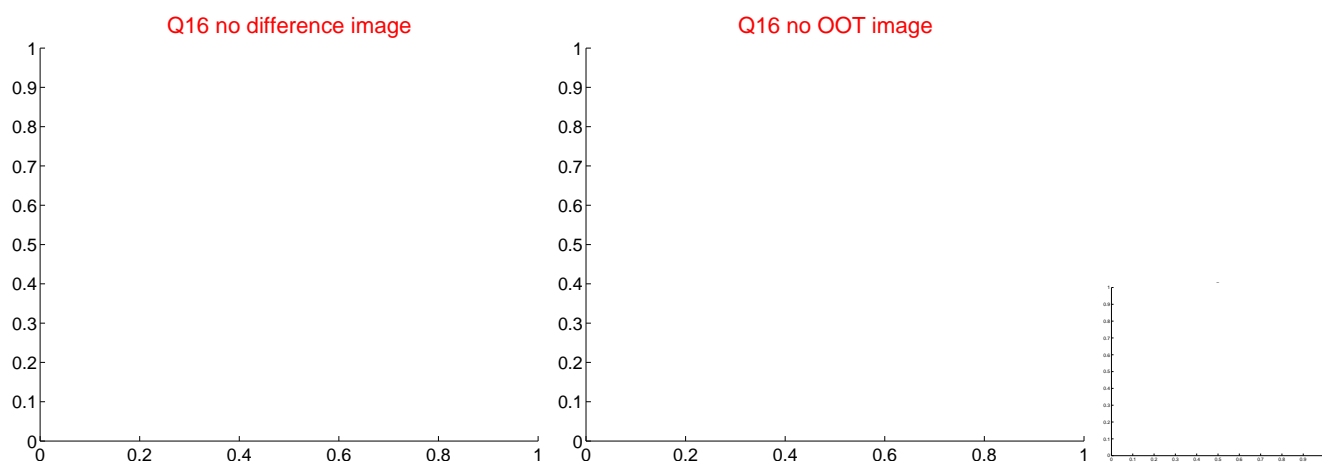
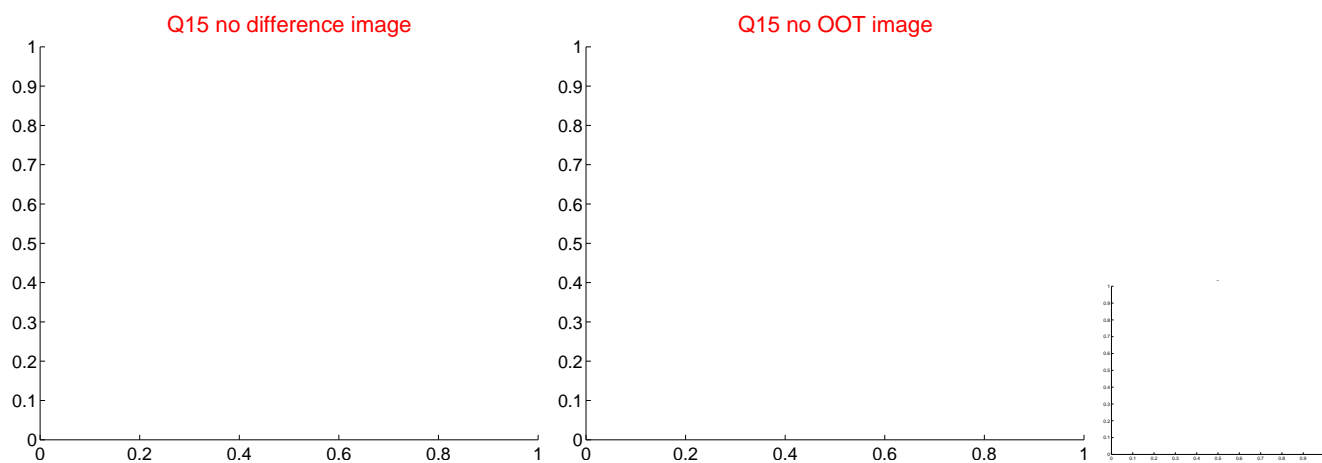
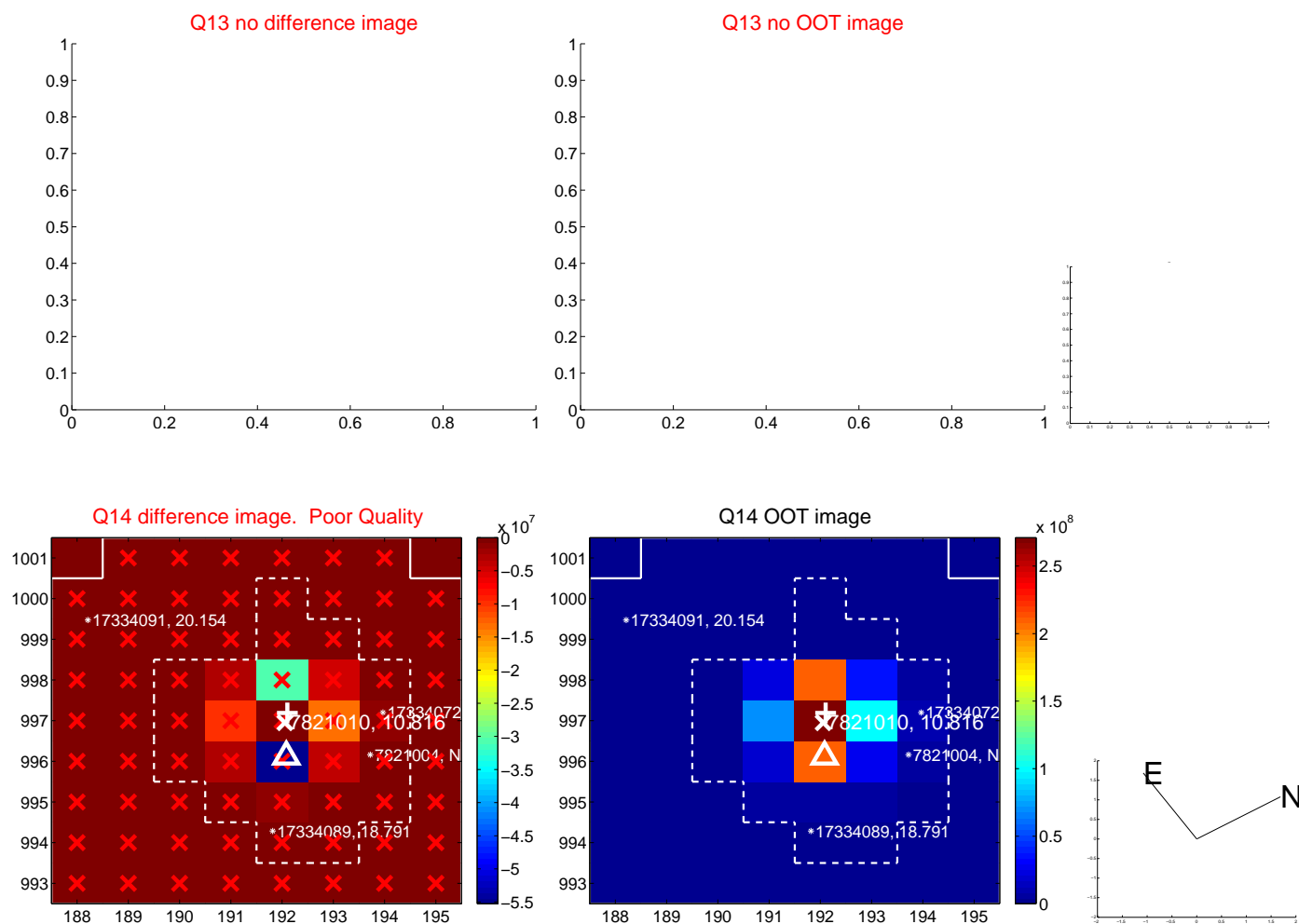
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



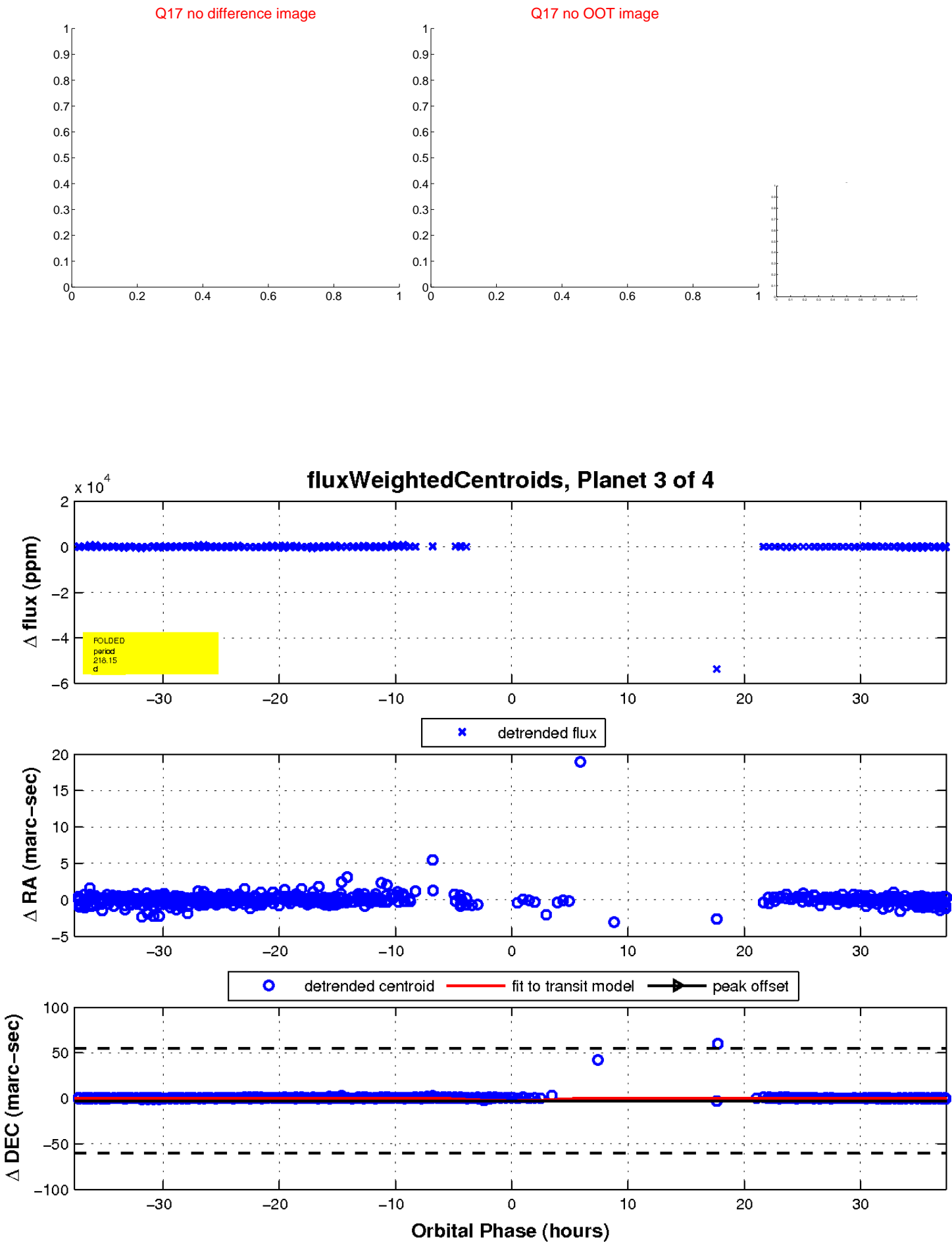
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

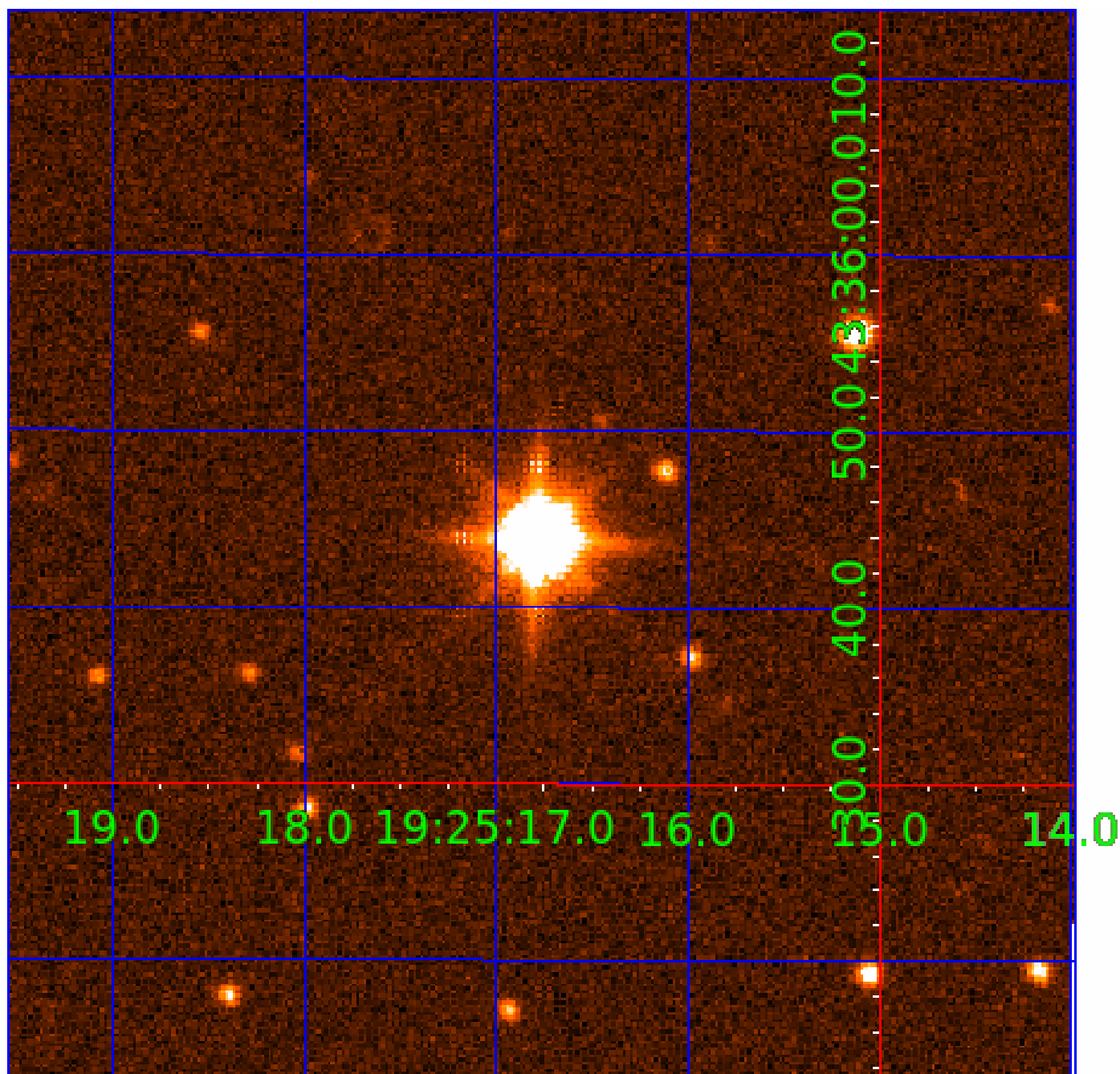


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007821010

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})
007821010-01	OBS	2938.01	24.238337	136.609953	470760.3	2.500	63391.2	-1.0	1.36	6457	66.48	93.85
007821010-02	OBS	No	24.238403	155.118567	376897.6	7.500	28904.6	-1.0	1.36	6457	34.26	93.85
007821010-03	OBS	No	218.148797	251.517944	10246.6	12.546	1993.9	342.9	1.36	6457	24.41	5.01
007821010-04	OBS	No	24.234305	154.730329	9168.5	7.500	1584.8	-1.0	1.36	6457	13.13	93.87

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007821010-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_SATURATED
007821010-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_SATURATED
007821010-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
007821010-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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.

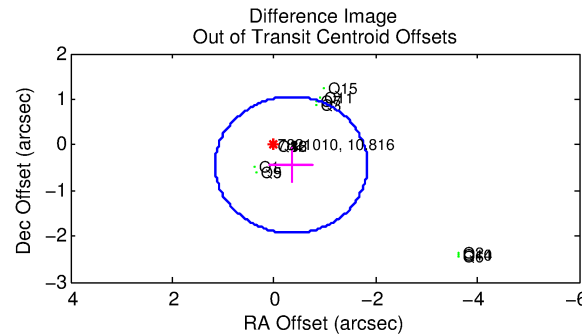
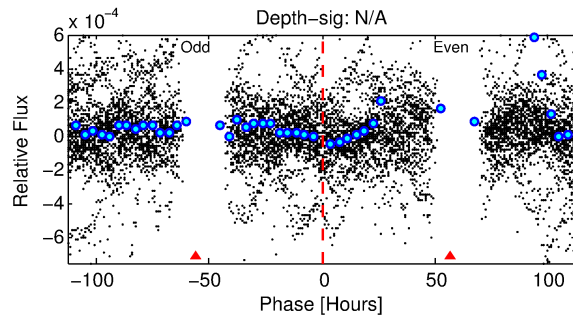
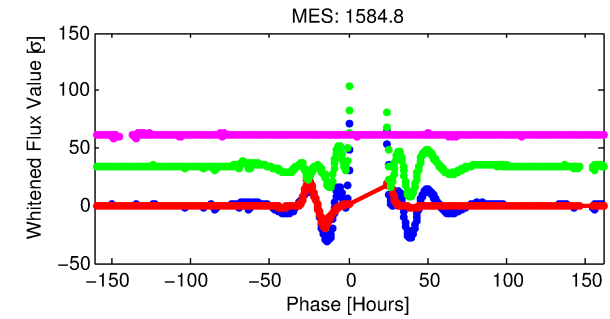
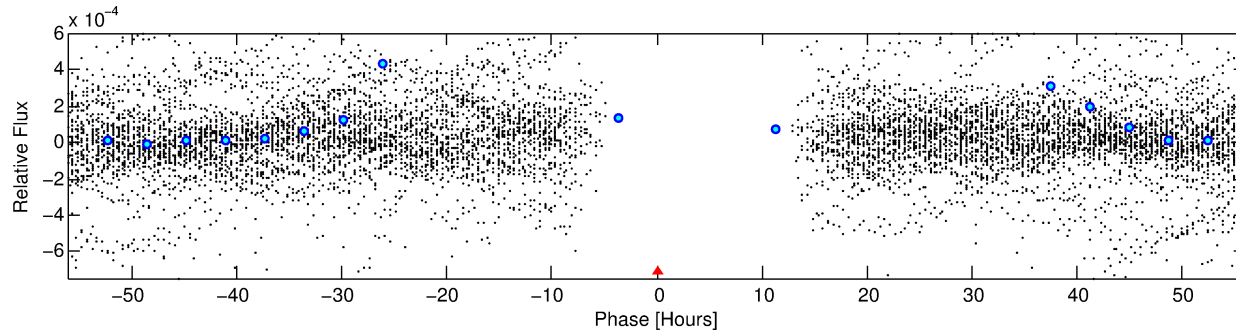
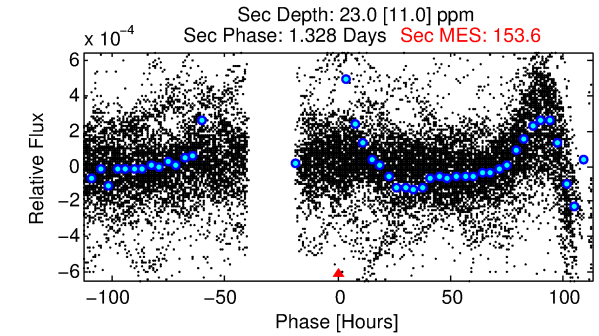
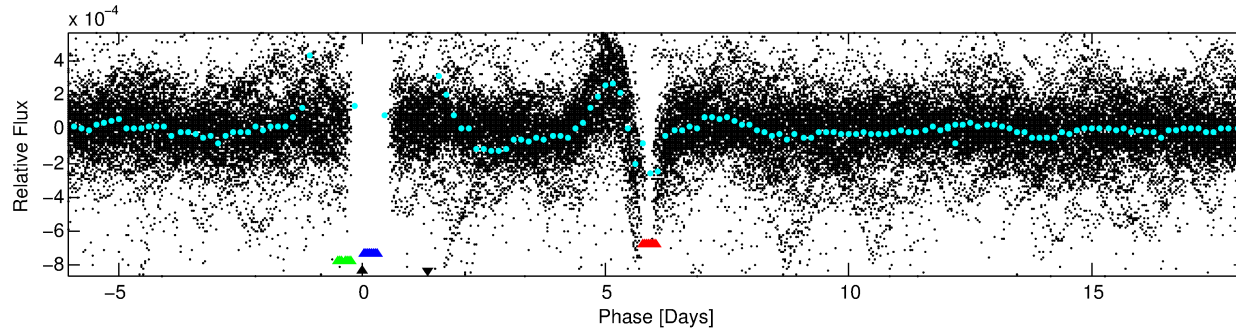
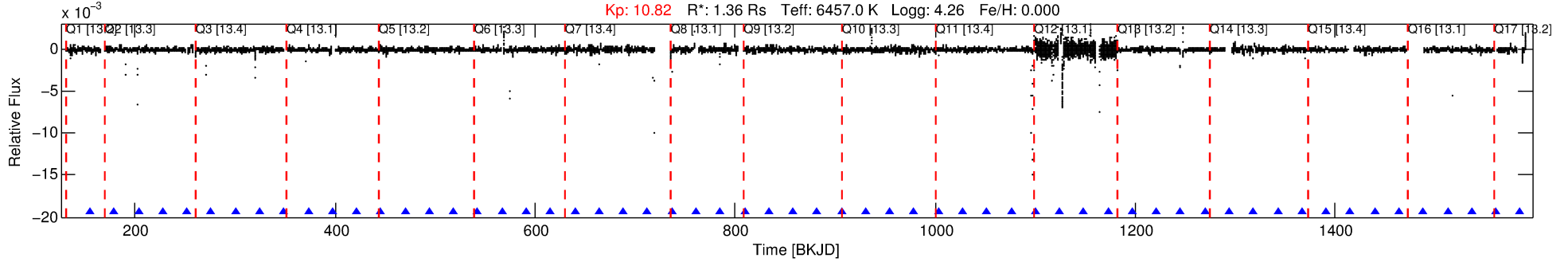
Ephemeris Match Information For 007821010-04

No Significant Match Found

DV One-Page Summary

KIC: 7821010 Candidate: 4 of 4 Period: 24.234 d
KOI: K02938 Corr: No Ephemeris Match

Kp: 10.82 R*: 1.36 Rs Teff: 6457.0 K Logg: 4.26 Fe/H: 0.000



TPS TCE Results:

Period = 24.23431 d
Epoch = 154.7303 BKJD

DV fit results are unavailable

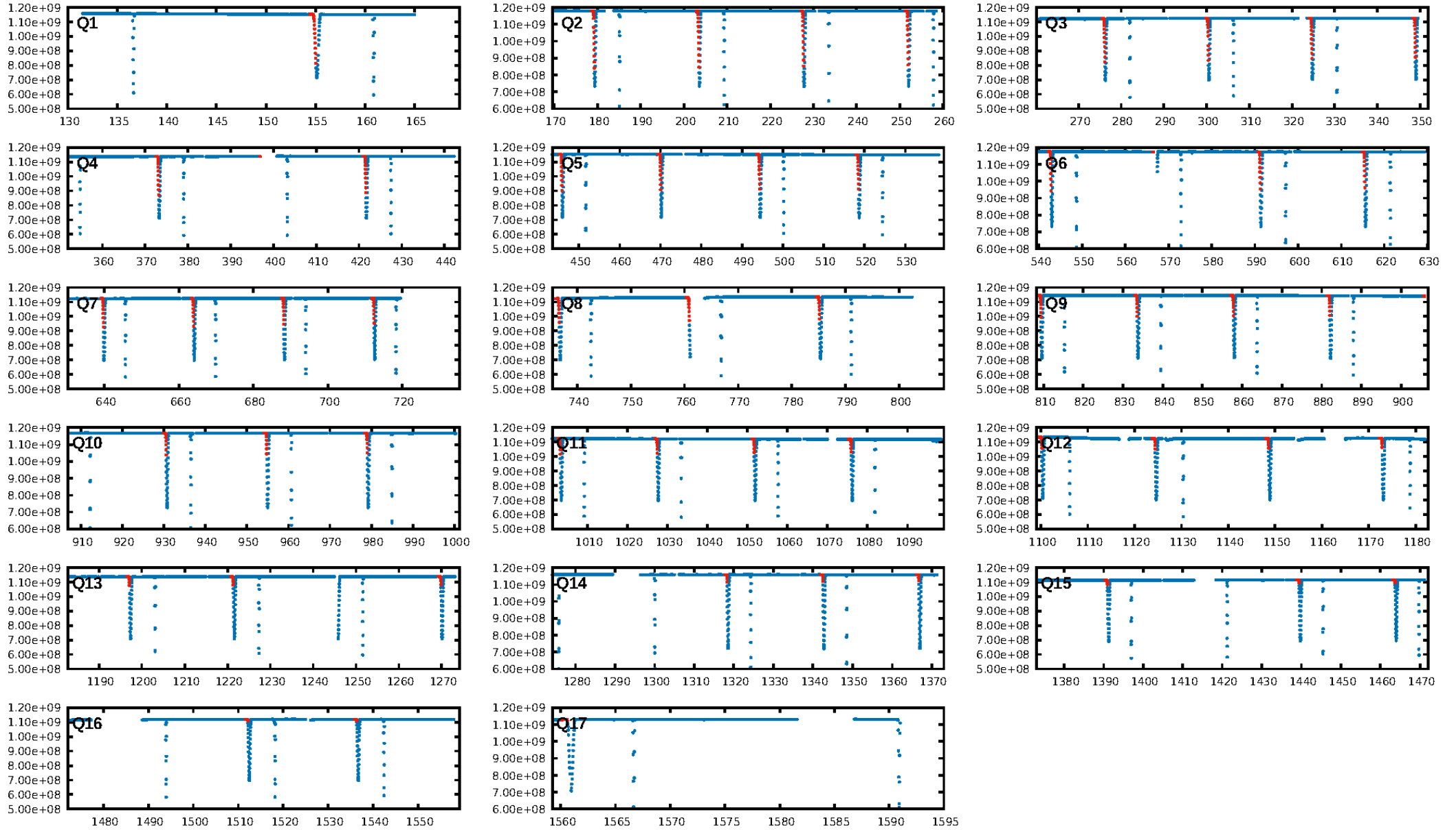
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 1.0% [0.01σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [36/36]
GhostDiagnostic-chr: 4.173
Centroid-sig: N/A
Centroid-so: 93.972 arcsec [290.15σ]
OotOffset-rm: 0.555 arcsec [1.11σ]
KicOffset-rm: 0.506 arcsec [1.29σ]
OotOffset-st: 4/4/4/3 [15]
KicOffset-st: 4/4/4/3 [15]
DiffImageQuality-fgm: 0.80 [12/15]
DiffImageOverlap-fno: 0.00 [0/15]

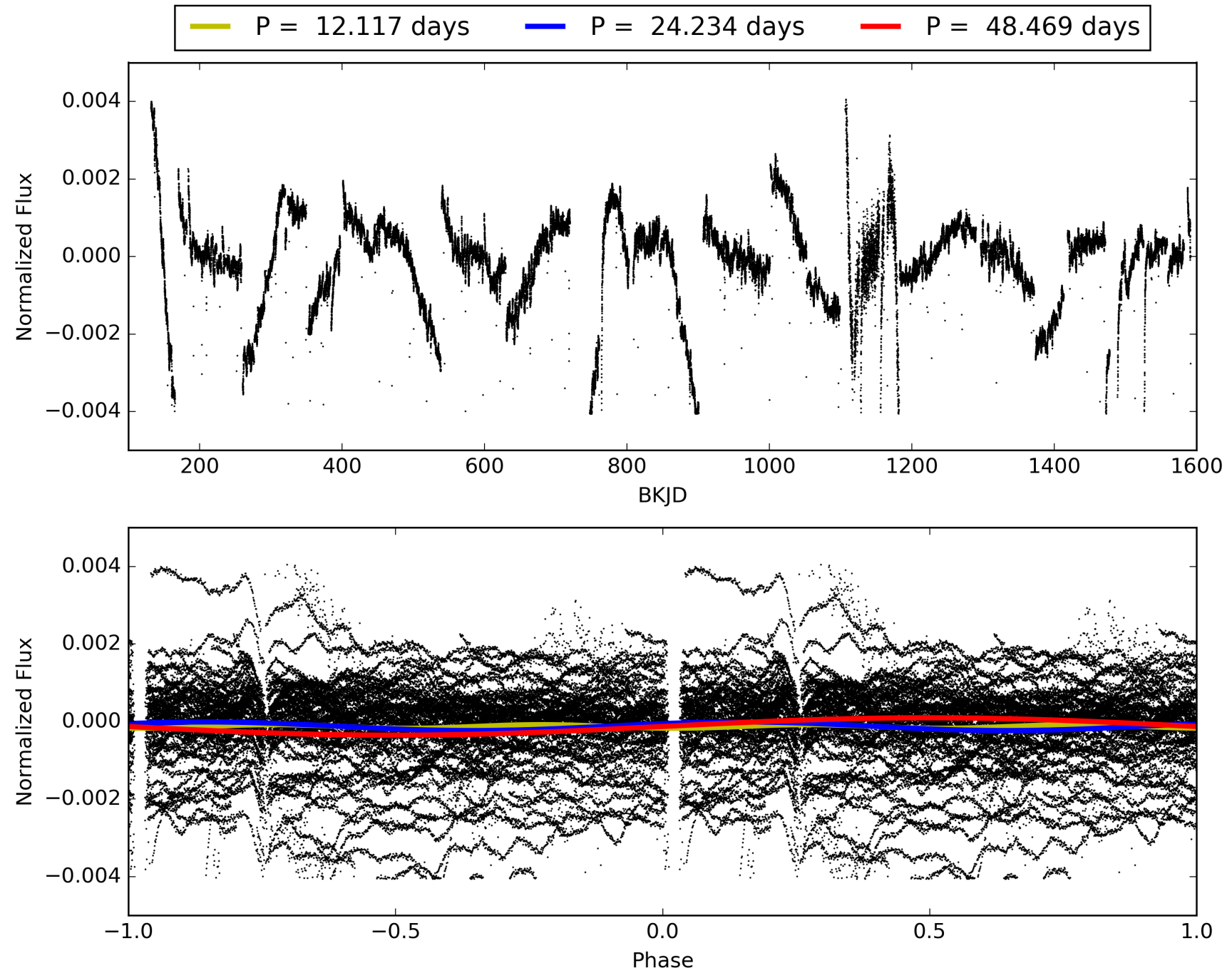
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:02:23 Z

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

TCE 007821010-04, PDC Light Curves

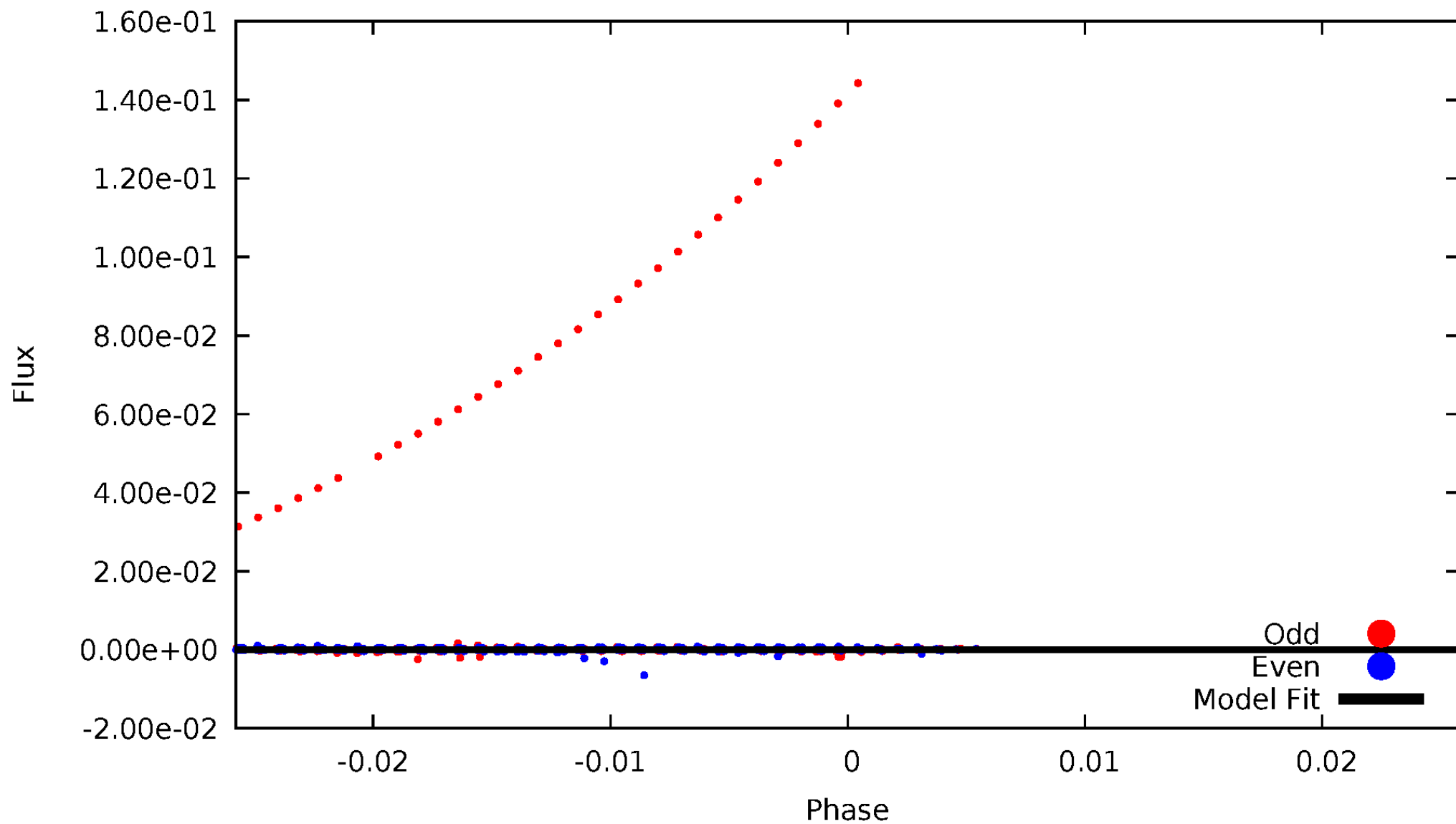


TCE 007821010-04



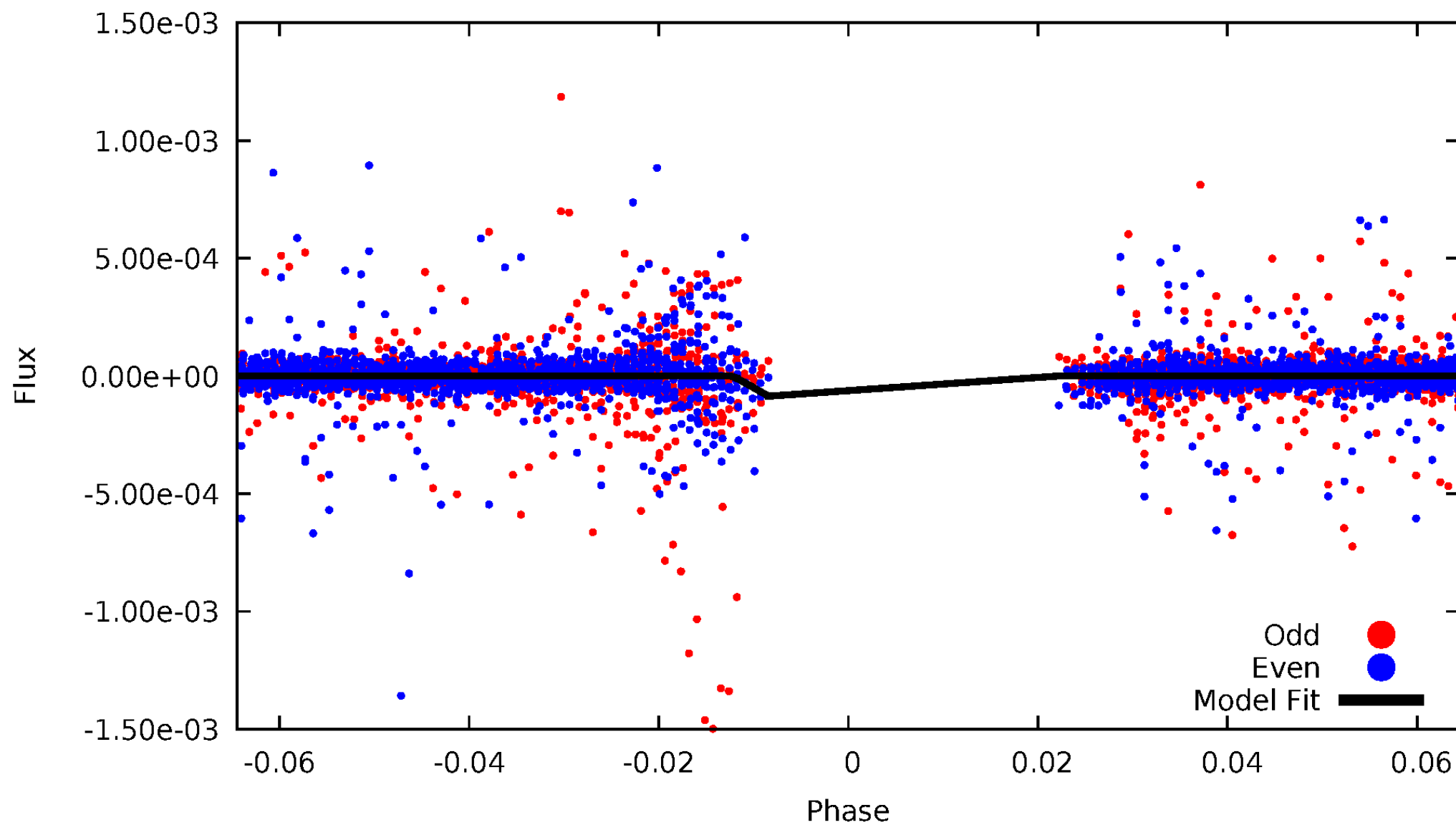
DV Odd/Even

TCE 007821010-04



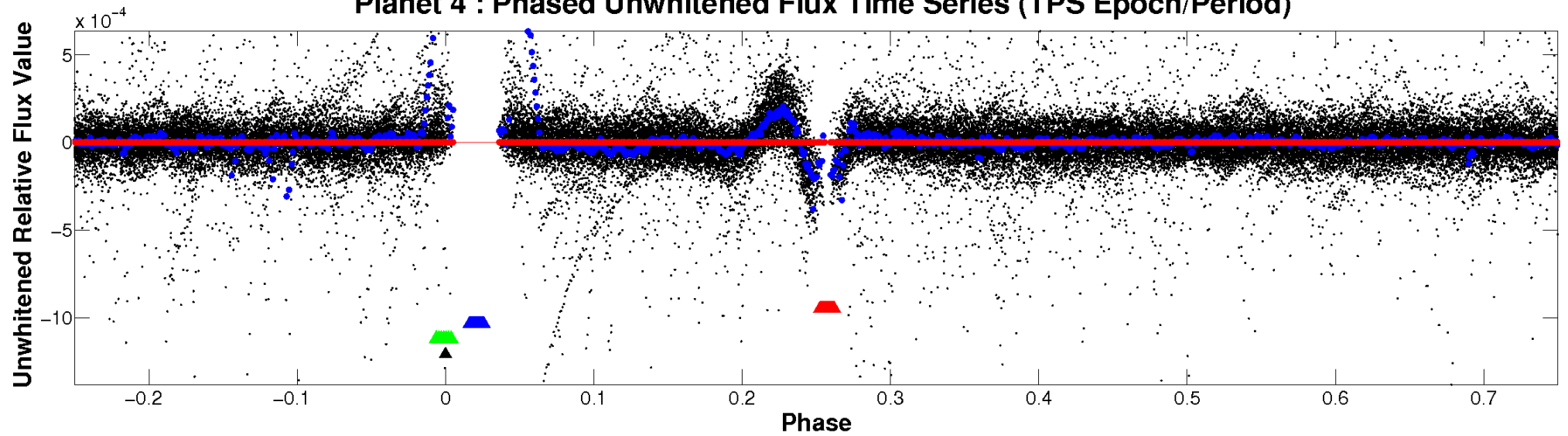
ALT Odd/Even

TCE 007821010-04



Non-Whitened Vs. Whitened Light Curve

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

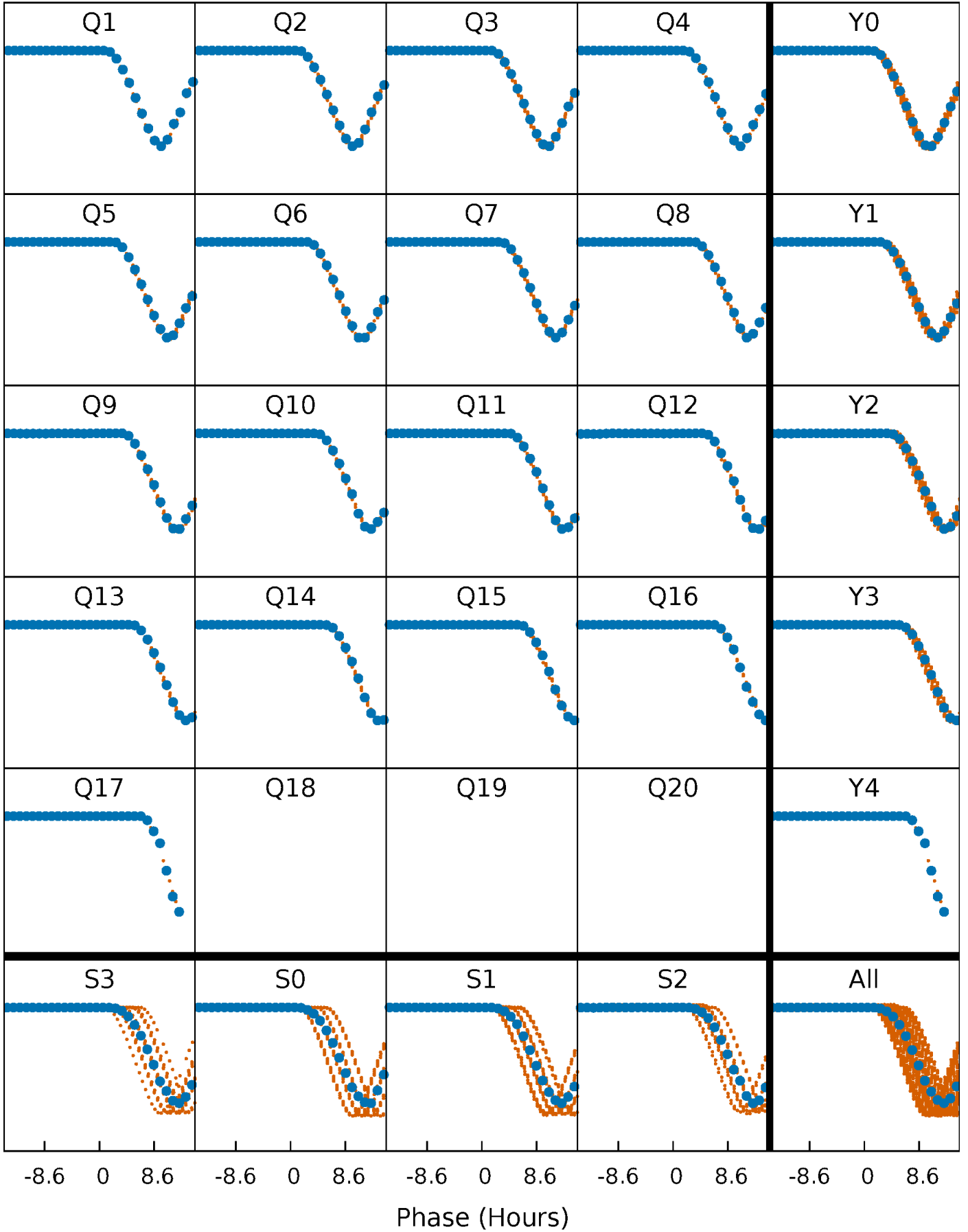


Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)



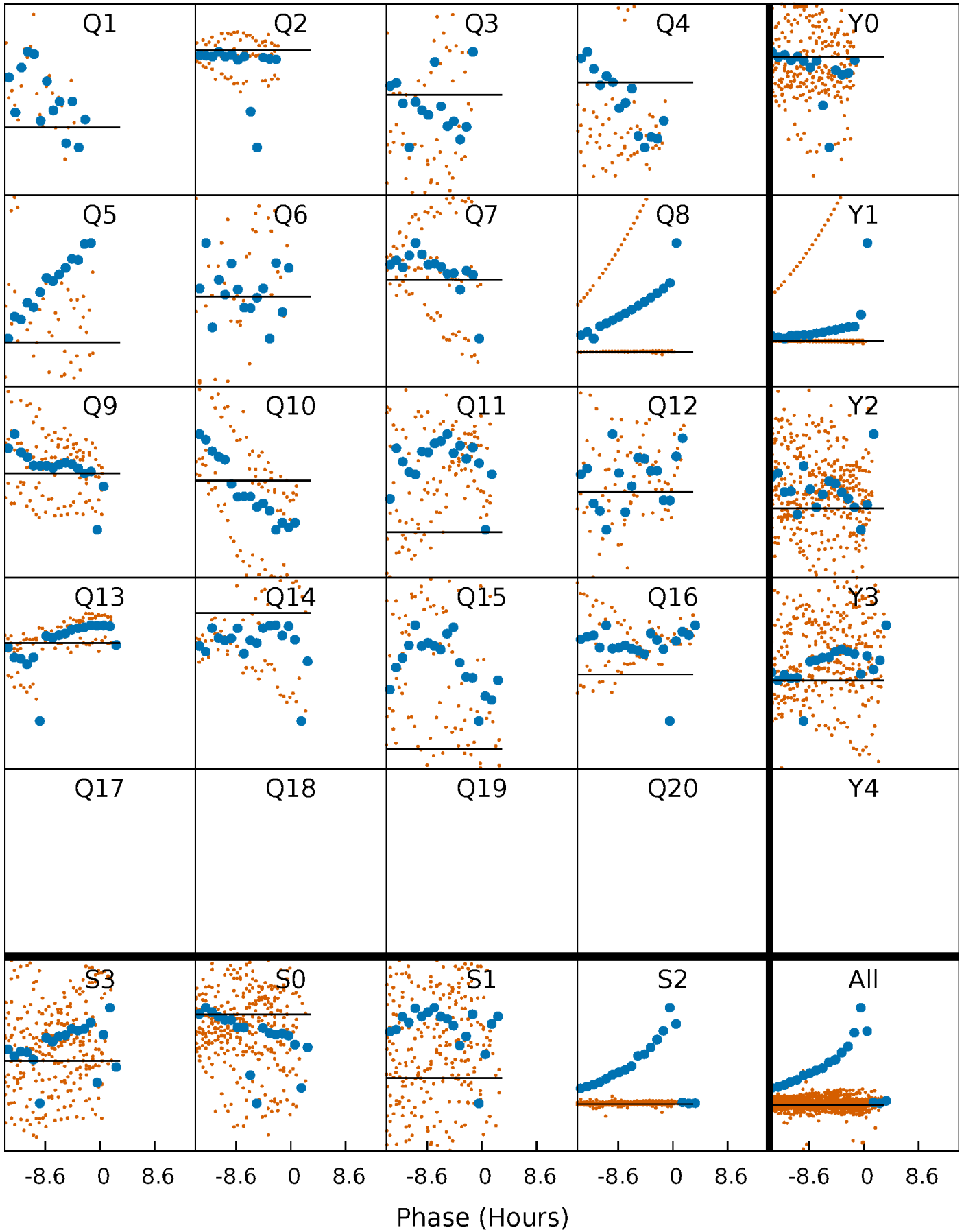
PDC Quarter-Phased Transit Curves

TCE 007821010-04 P= 24.234305 Days $T_0=154.730329$ (BKJD)



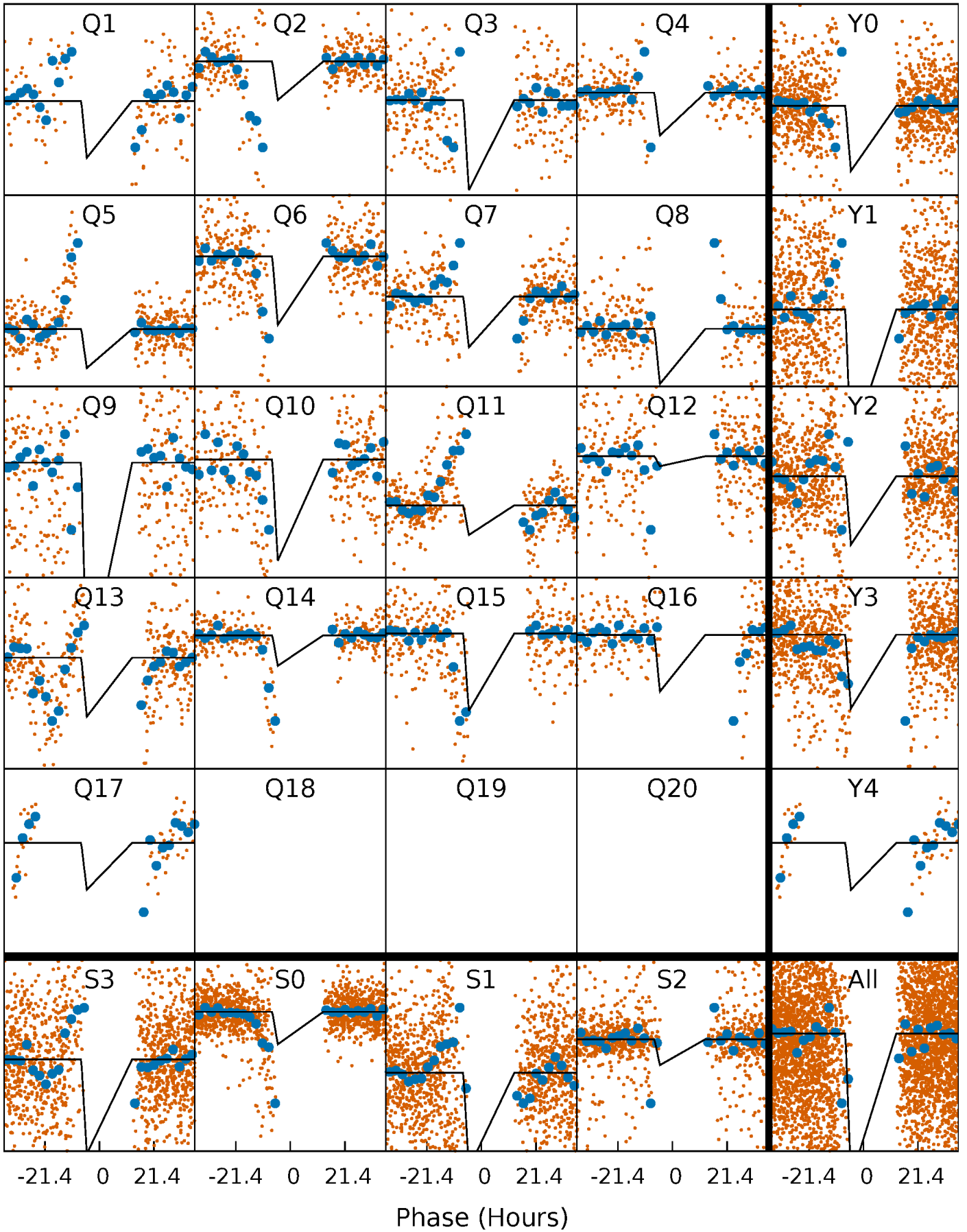
DV Quarter-Phased Transit Curves

TCE 007821010-04 P= 24.234305 Days $T_0=154.730329$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

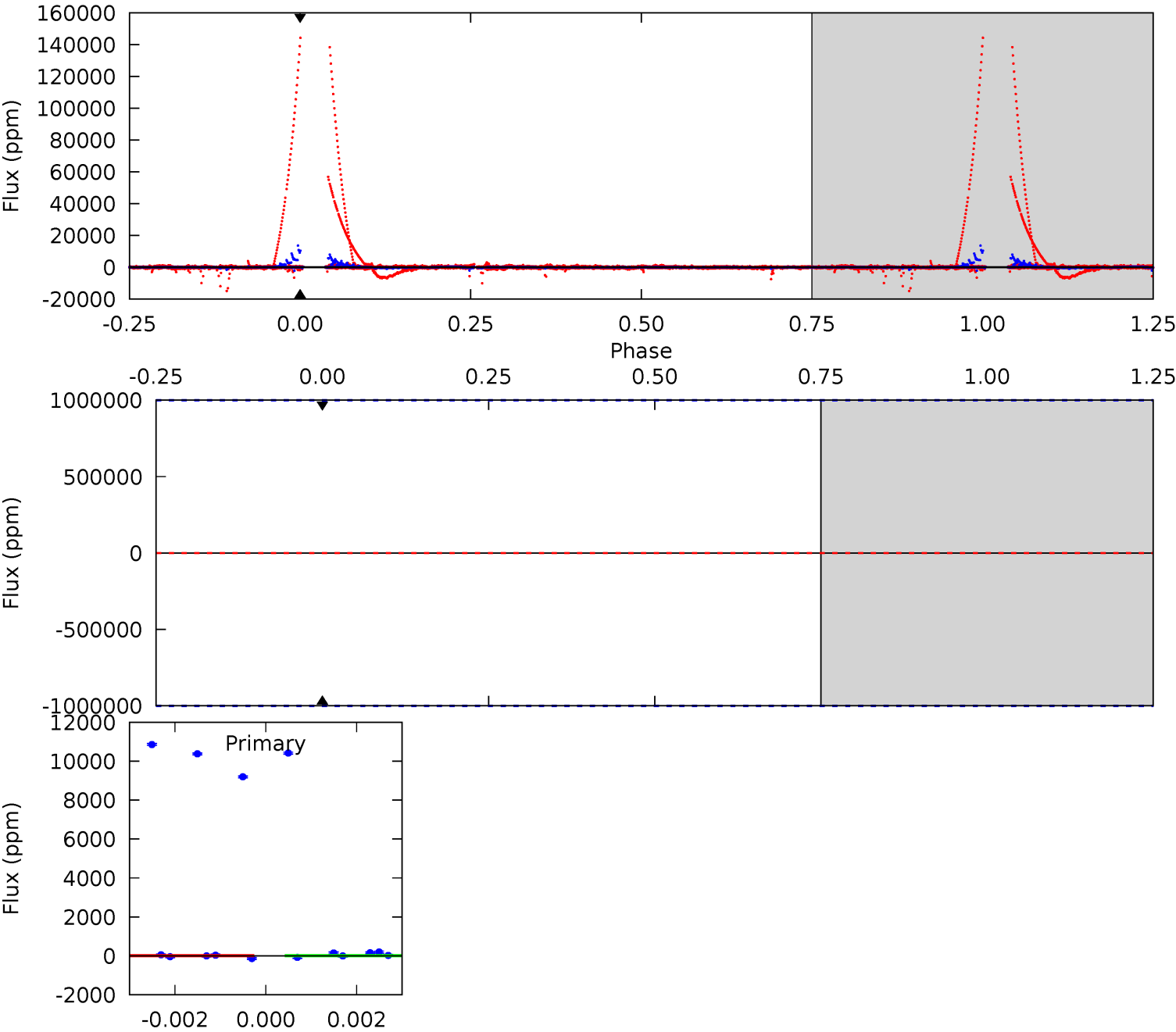
TCE 007821010-04 P= 24.234305 Days $T_0=155.066136$ (BKJD)



DV Model-Shift Uniqueness Test

007821010-04, P = 24.234305 Days, E = 130.496024 Days

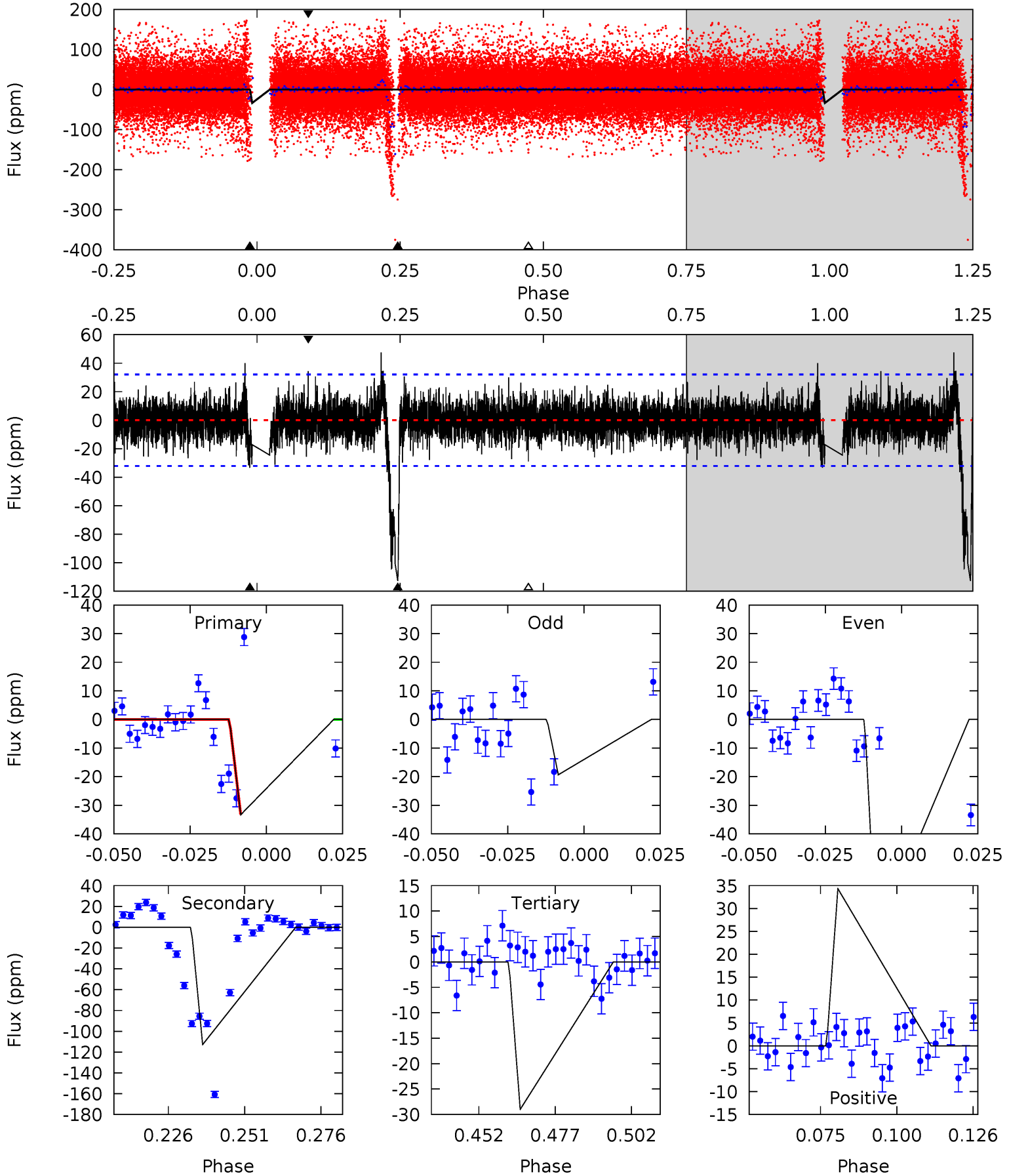
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

007821010-04, P = 24.234305 Days, E = 130.831831 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.03	17.0	4.37	5.18	4.85	2.24	1.14	0.66	-0.15	12.6	11.8	4.33	0	0.30	0



Stellar Parameters For KIC 007821010

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6457^{+70}_{-83}	$4.259^{+0.080}_{-0.120}$	$0.000^{+0.150}_{-0.150}$	$1.365^{+0.253}_{-0.156}$	$1.233^{+0.096}_{-0.096}$	$0.683^{+0.274}_{-0.246}$
	+1%/-1%	+2%/-3%	+inf%/-inf%	+19%/-11%	+8%/-8%	+40%/-36%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 007821010-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$16.06^{+13.59}_{-10.14}$	1110^{+52}_{-36}	4363^{+15549}_{-20137}	133^{+14973}_{-9303}
Alt.	-113 ± 7	$10.25^{+11.46}_{-7.10}$	1110^{+50}_{-38}	3135^{+1608}_{-574}	18^{+176}_{-14}

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 $A_{obs} \gg 1.0$

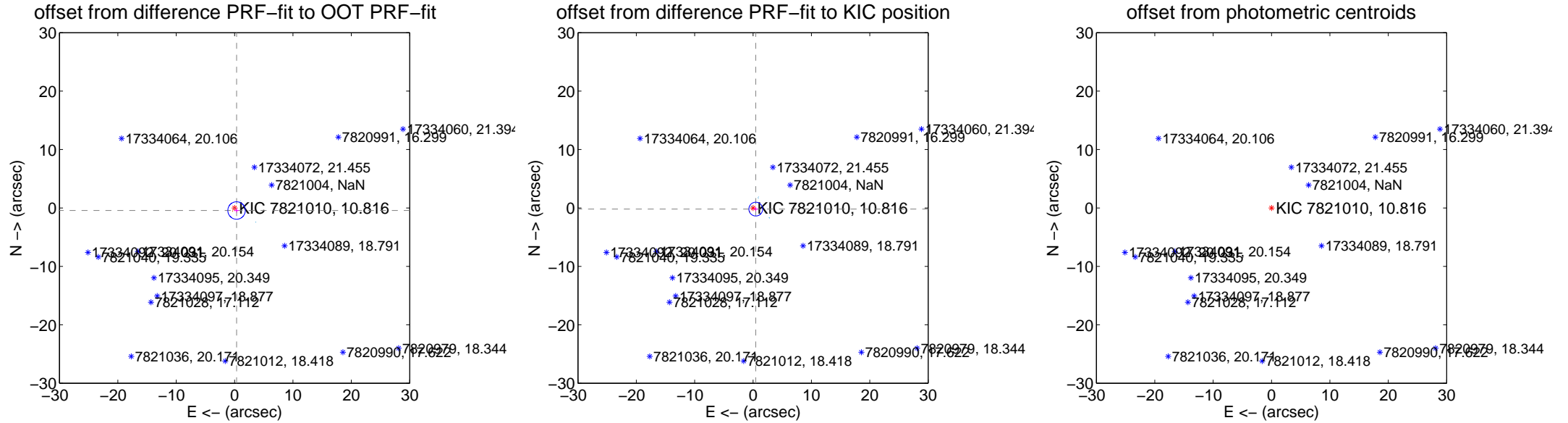
DV Centroid Data

Supplemental centroid analysis for 007821010-04. **Kepler magnitude: 10.82.** Transit SNR -1.00

There are 12 quarters with good PRF difference image offsets

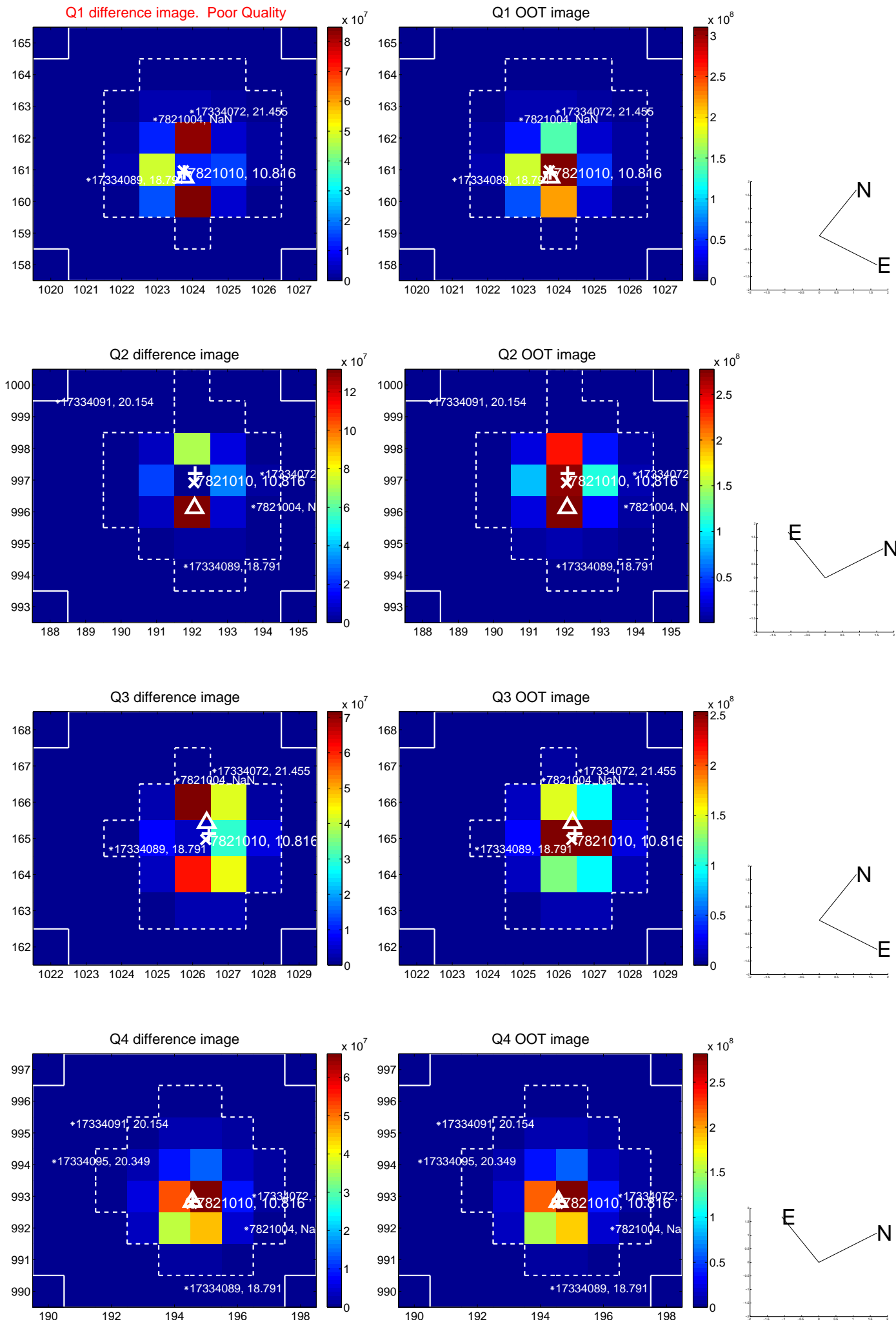
The direct PRF centroid is offset from the target star catalog position by about 0.41 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.555 ± 0.498	1.11	-0.341 ± 0.416	-0.438 ± 0.352
PRF-fit source offset from KIC position	0.506 ± 0.393	1.29	-0.466 ± 0.398	-0.197 ± 0.366
photometric centroid source offset	93.97 ± 0.32	290.15	31.02 ± 0.36	88.70 ± 0.32

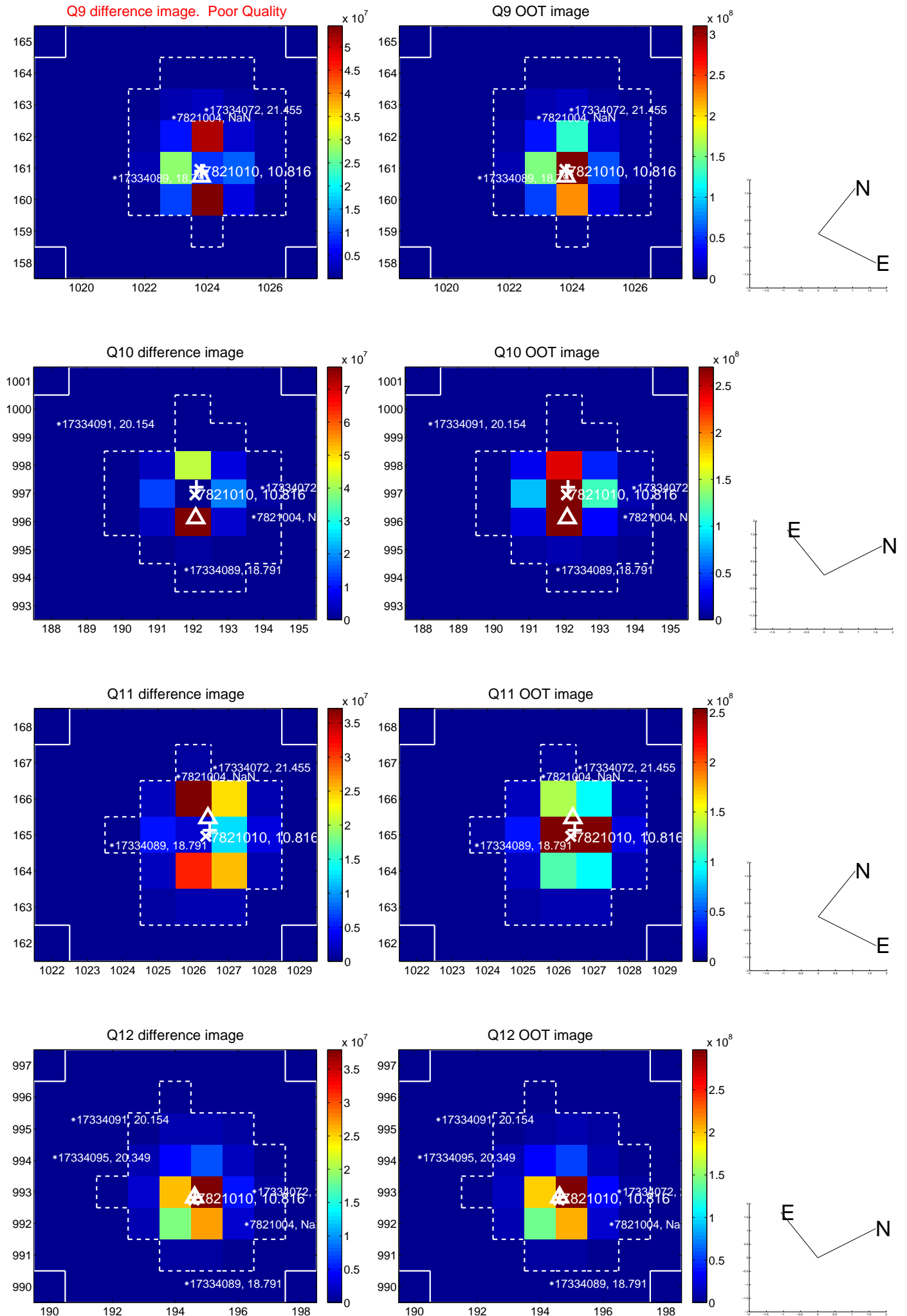


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

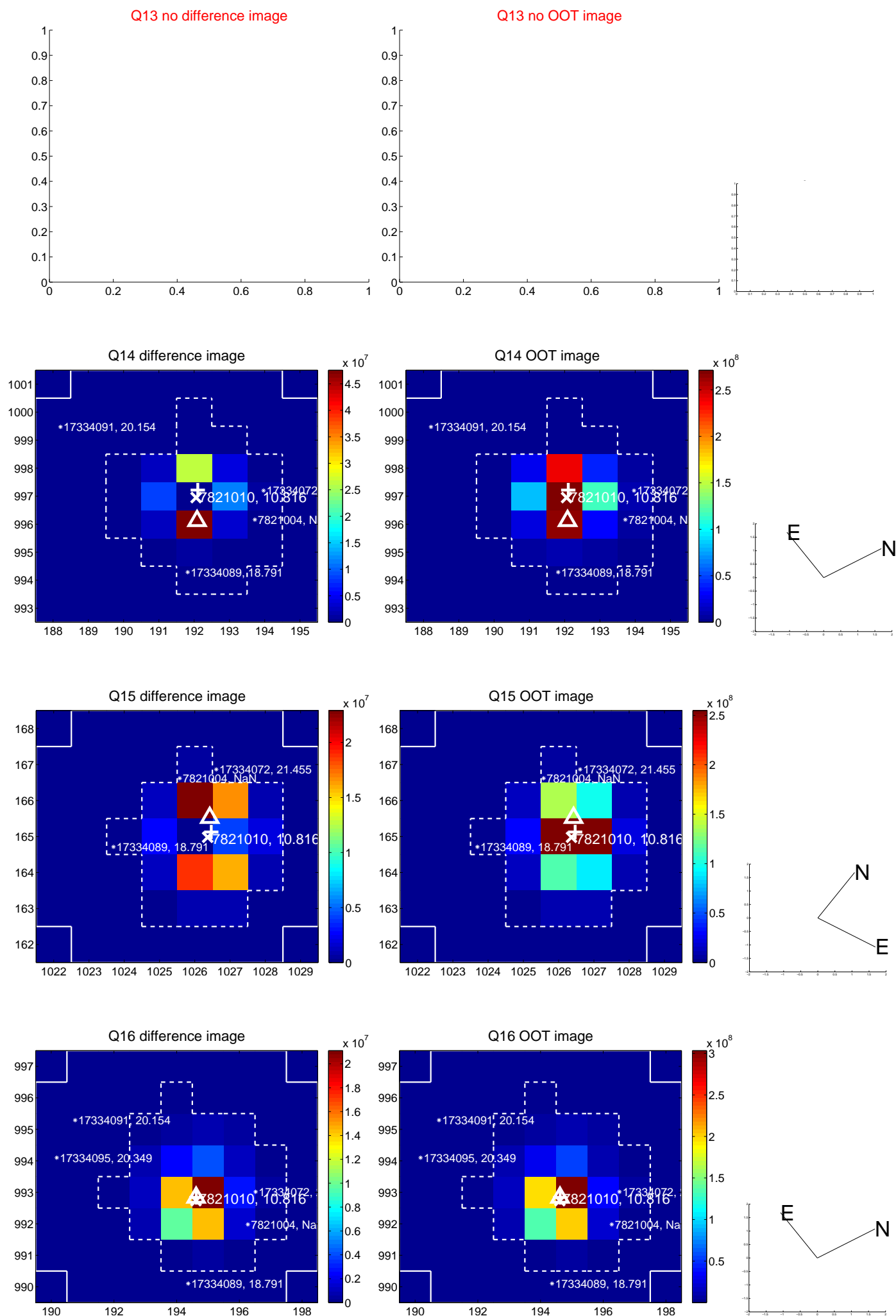
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



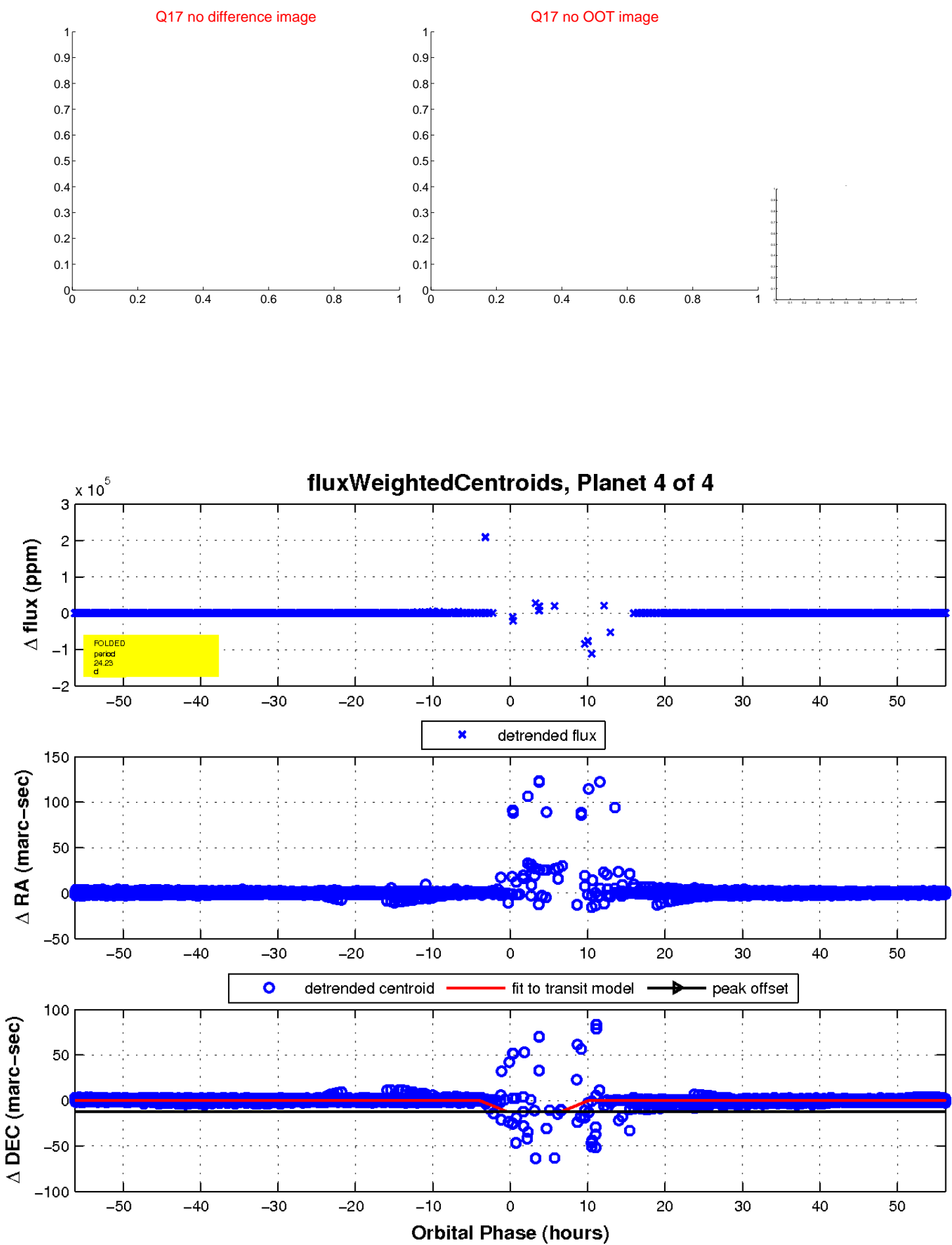
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



UKIRT Image

Declination

