

KIC 002164791

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})
002164791-02	OBS	No	631.128090	284.442023	1986.7	22.716	10.1	7.1	0.12	2661	0.62	0.00
002164791-03	OBS	No	478.848013	374.186556	2126.9	13.204	14.3	8.2	0.12	2661	0.53	0.00

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002164791-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—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—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002164791-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

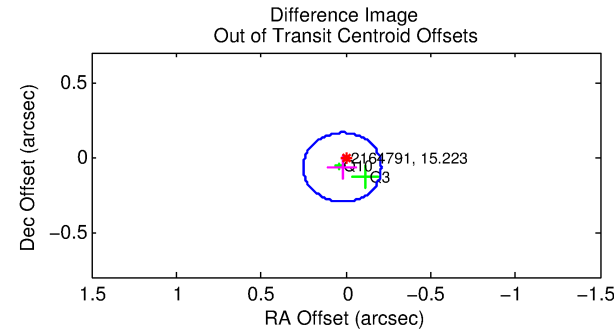
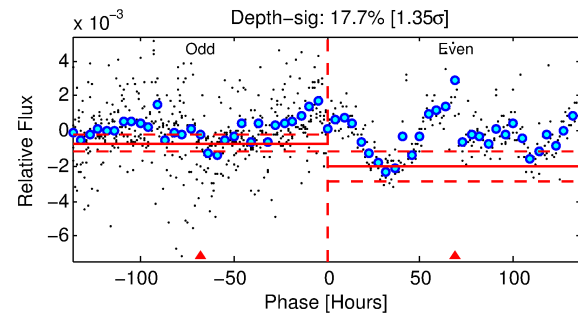
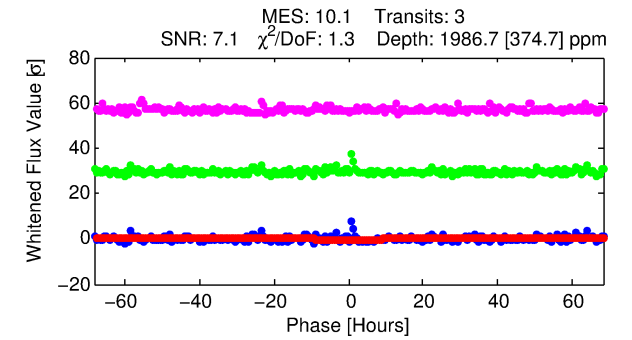
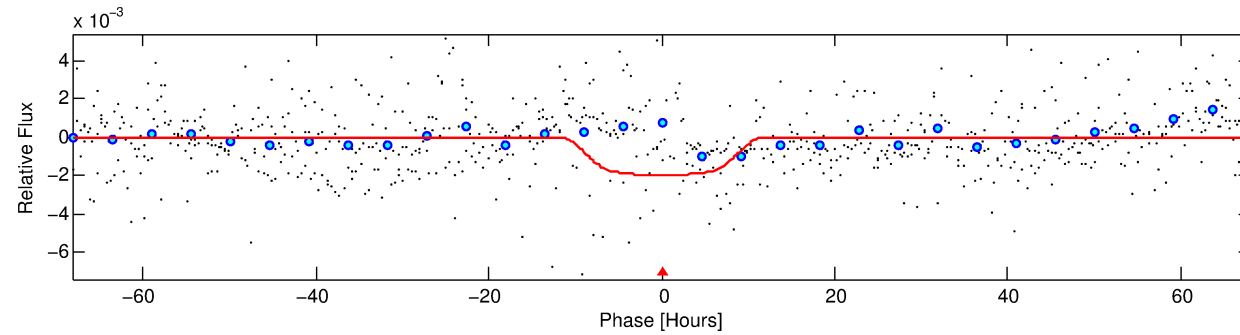
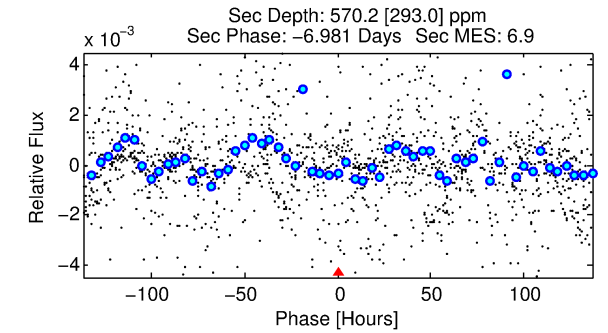
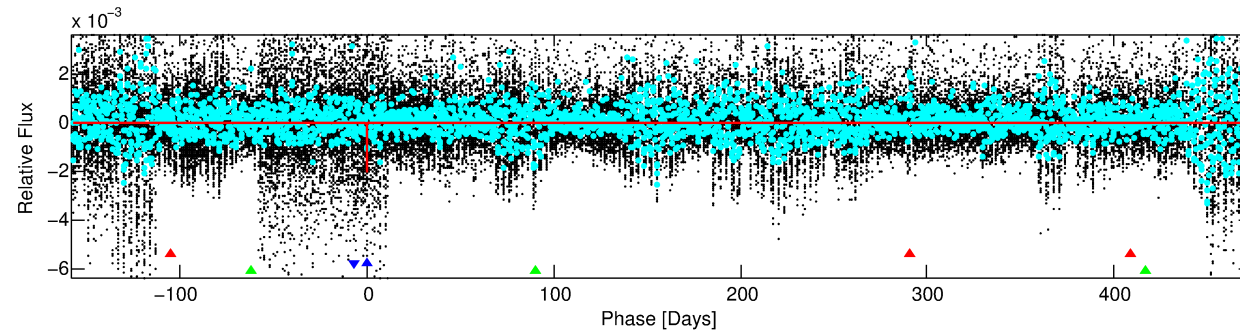
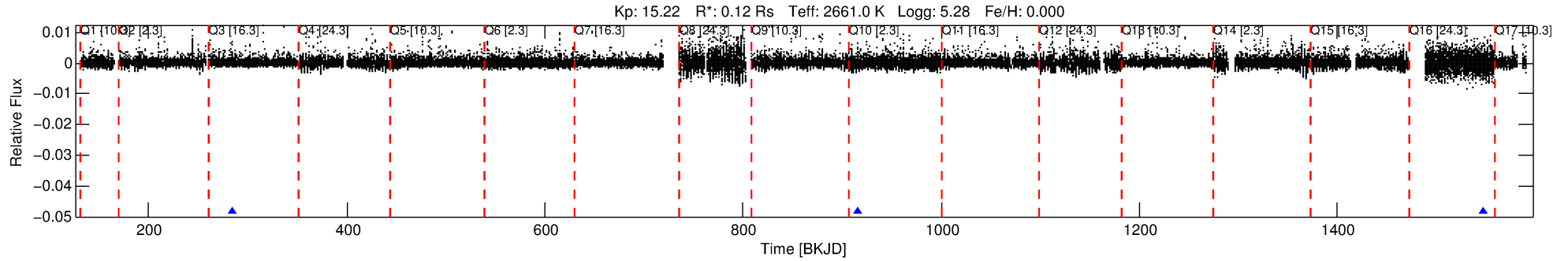
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002164791-02

No Significant Match Found

DV One-Page Summary

KIC: 2164791 Candidate: 2 of 3 Period: 631.128 d



DV Fit Results:

Period = 631.12809 [0.03804] d
Epoch = 284.4420 [0.0355] BKJD
Rp/R* = 0.0489 [0.0057]
a/R* = 113.42 [24.58]
b = 0.90 [0.05]
Seff = 0.00 [0.00]
Teq = 49 [0] K
Rp = 0.62 [0.07] Re
a = 0.6553 [0.0000] AU
Ag = 351127.29 [198381.39] [1.77σ]
Teffp = 1859 [263] K [6.89σ]

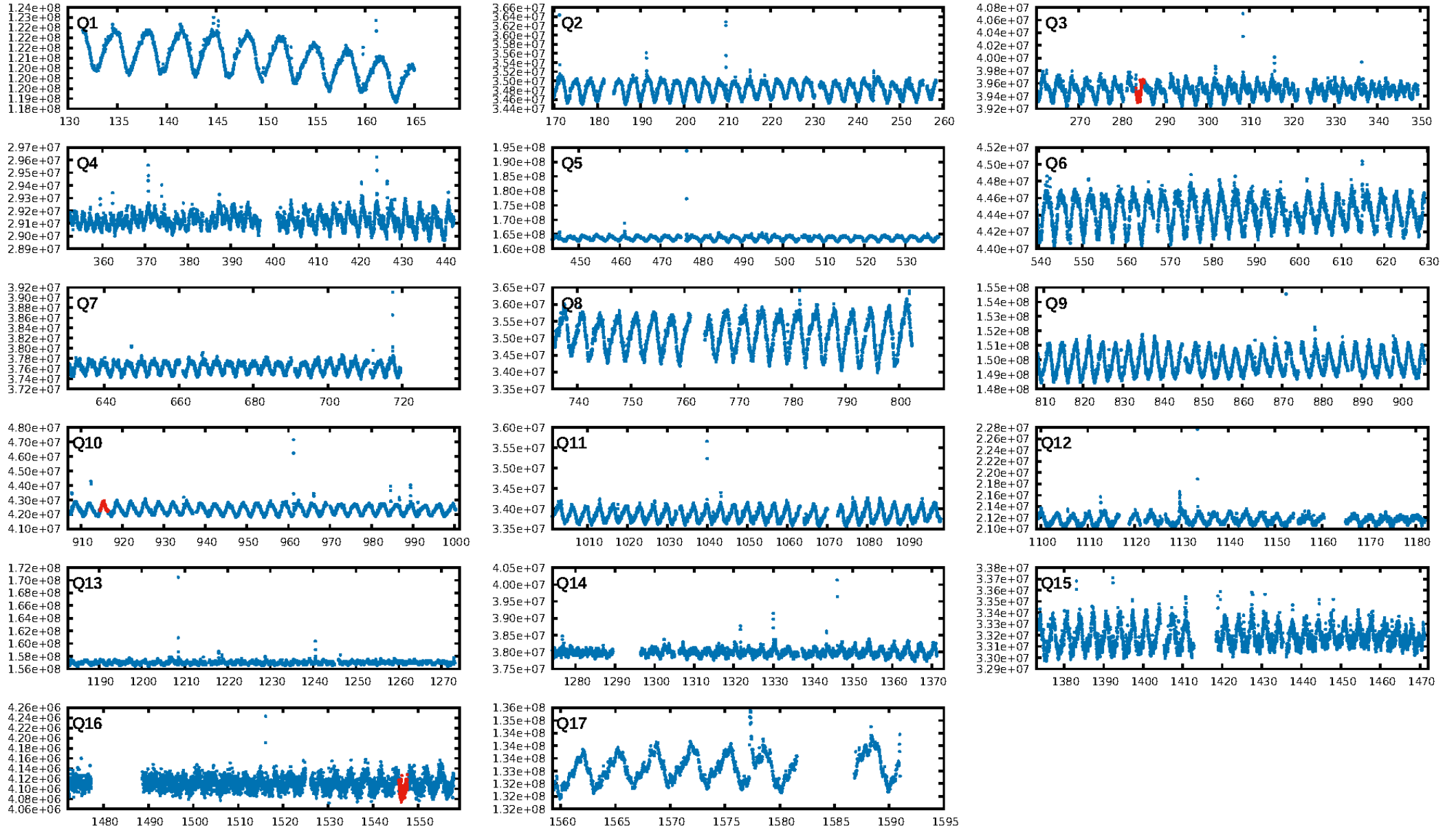
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [122.06σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 96.5%
ModelChiSquareGoF-sig: 94.6%
Bootstrap-pfa: 3.19e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 3.777
Centroid-sig: 2.3%
Centroid-so: 4.810 arcsec [7.13σ]
OotOffset-rm: 0.072 arcsec [0.93σ]
KicOffset-rm: 5.240 arcsec [20.62σ]
OotOffset-st: 1/1/0/0 [2]
KicOffset-st: 1/1/0/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [2/2]

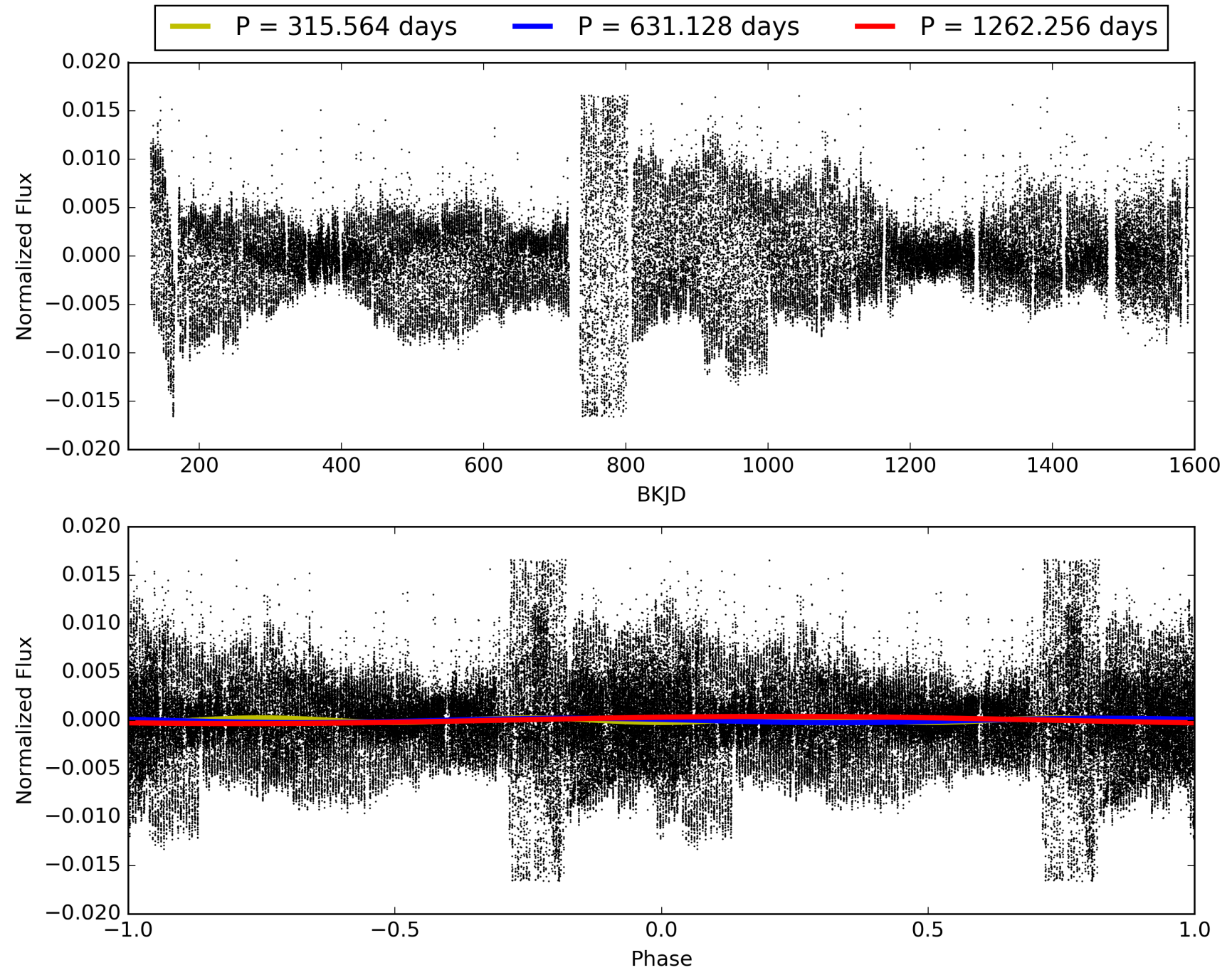
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 14:14:05 Z

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

TCE 002164791-02, PDC Light Curves

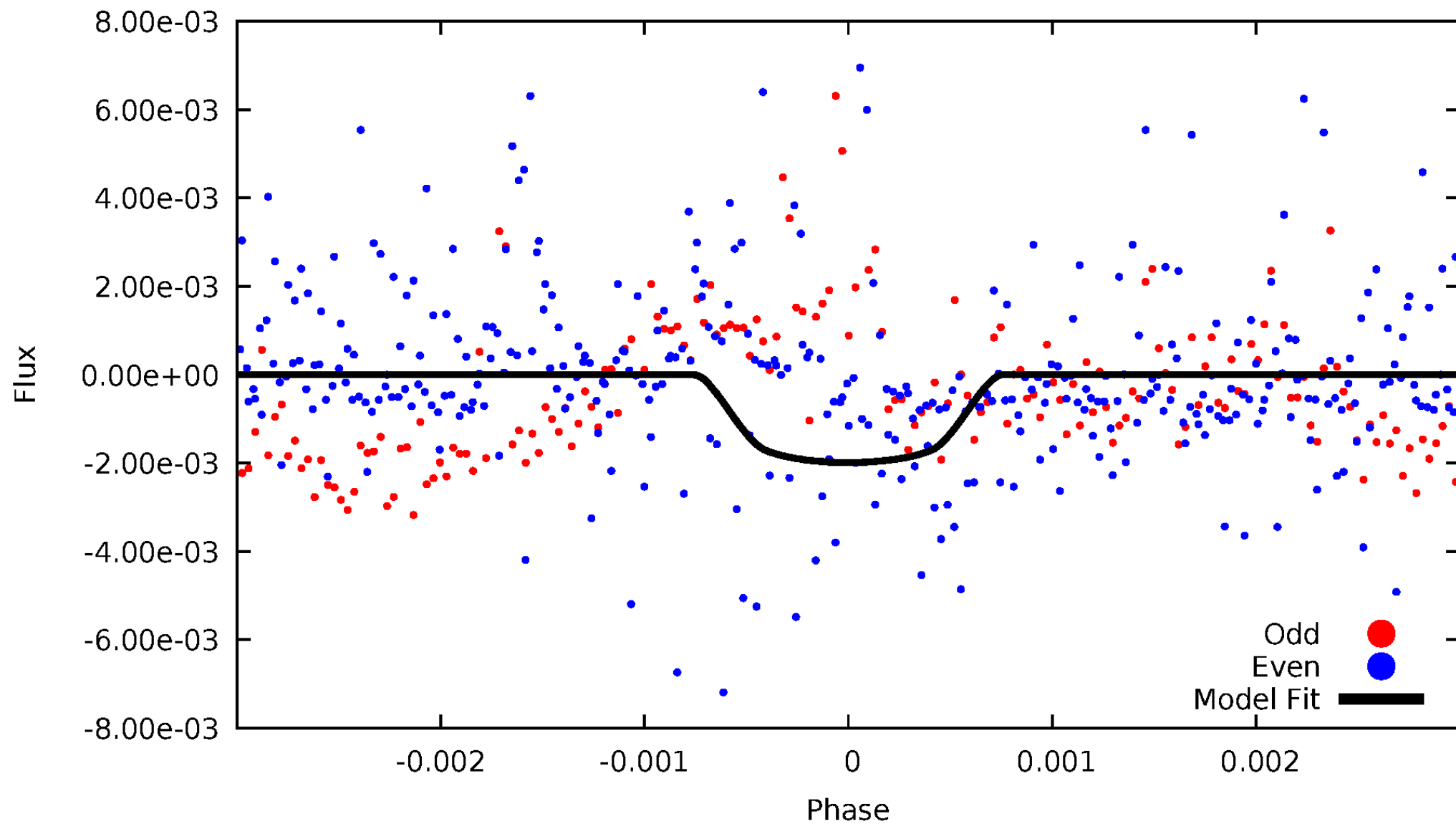


TCE 002164791-02



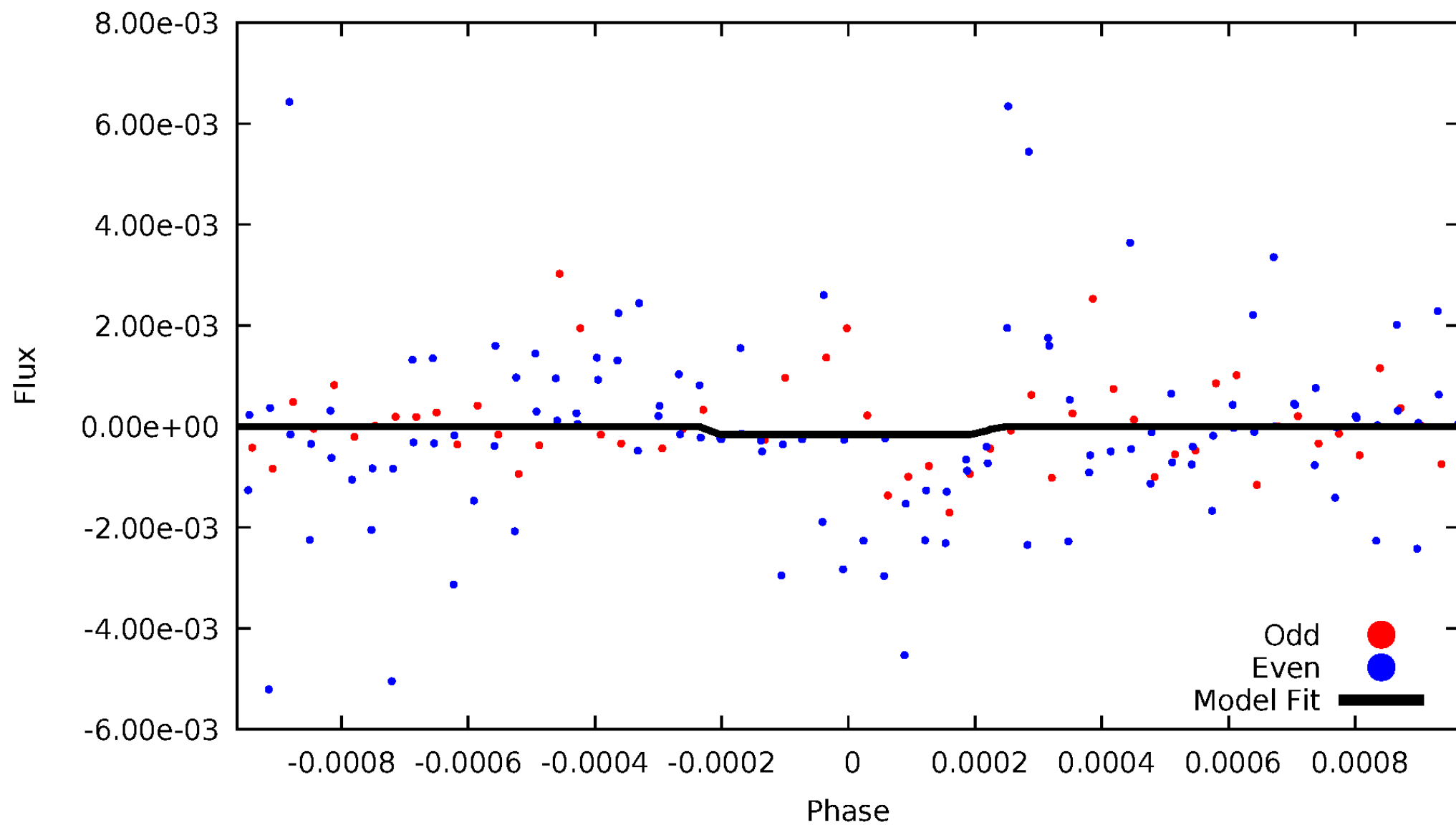
DV Odd/Even

TCE 002164791-02



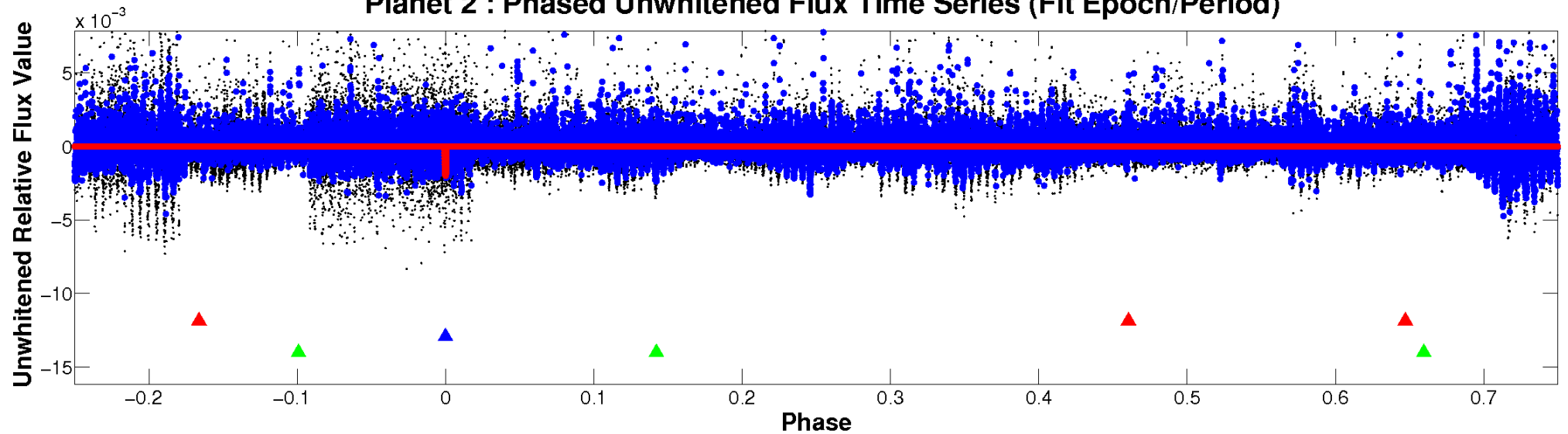
ALT Odd/Even

TCE 002164791-02

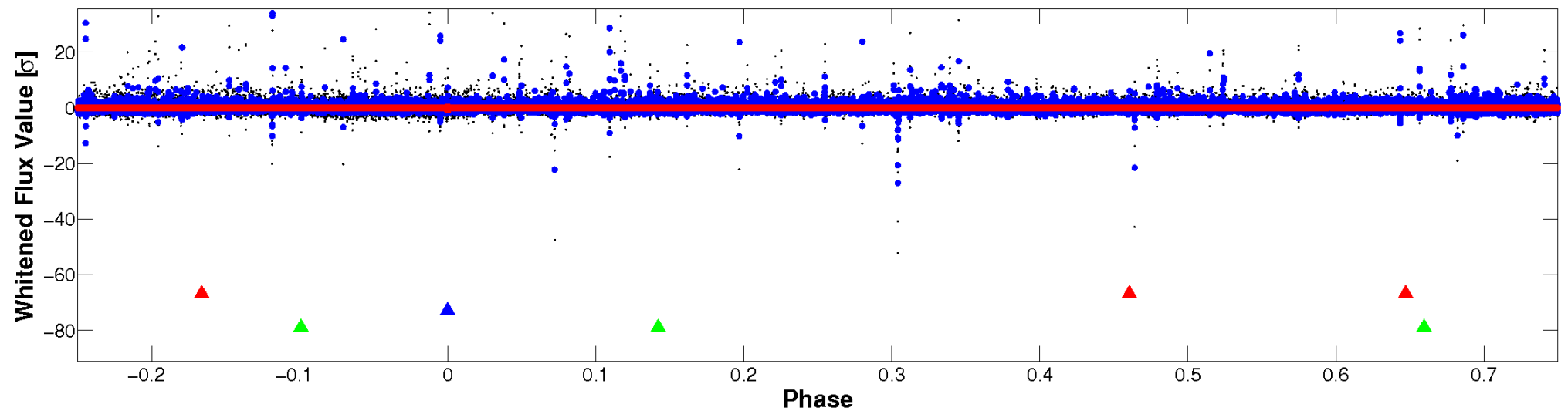


Non-Whitened Vs. Whitened Light Curve

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

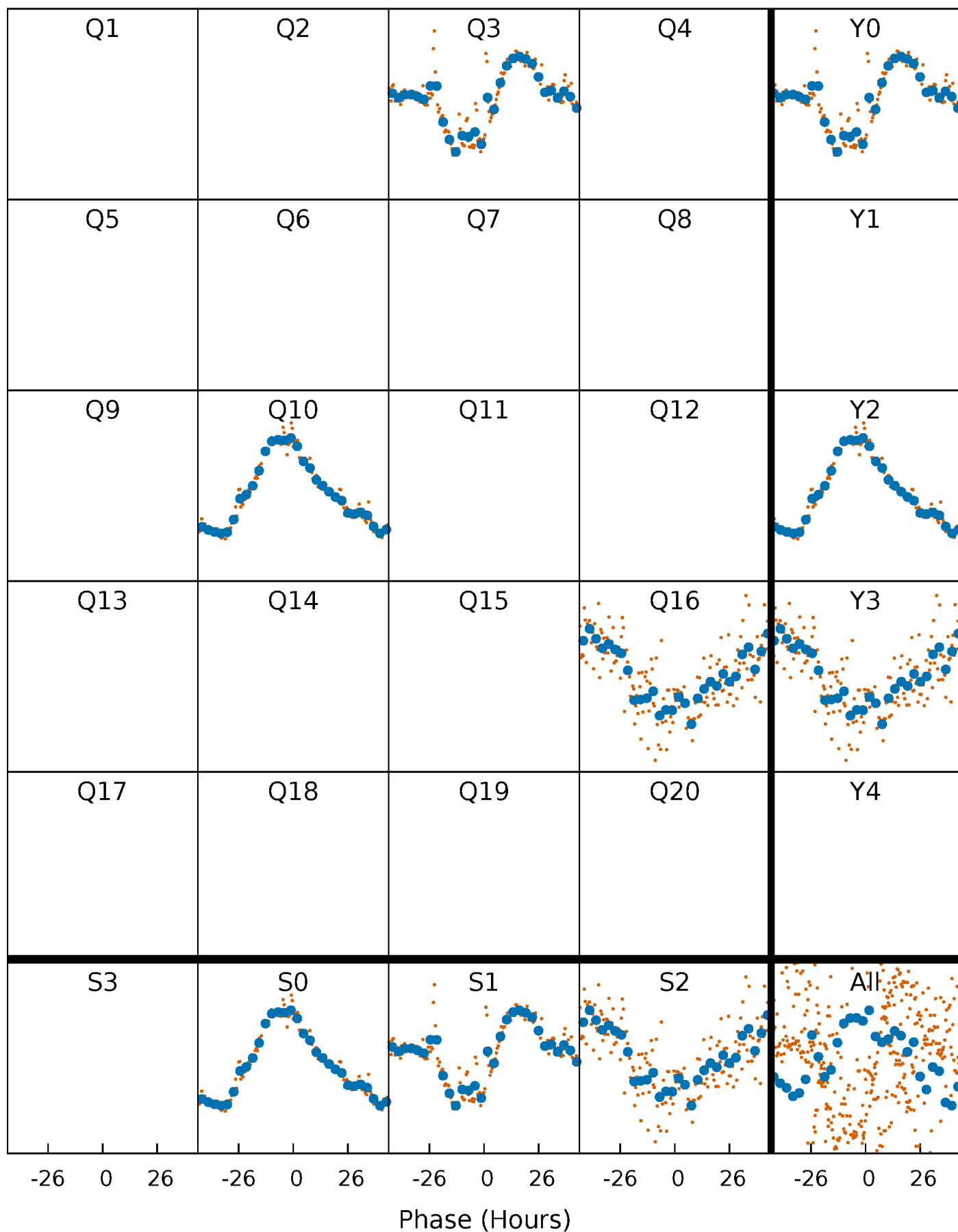


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



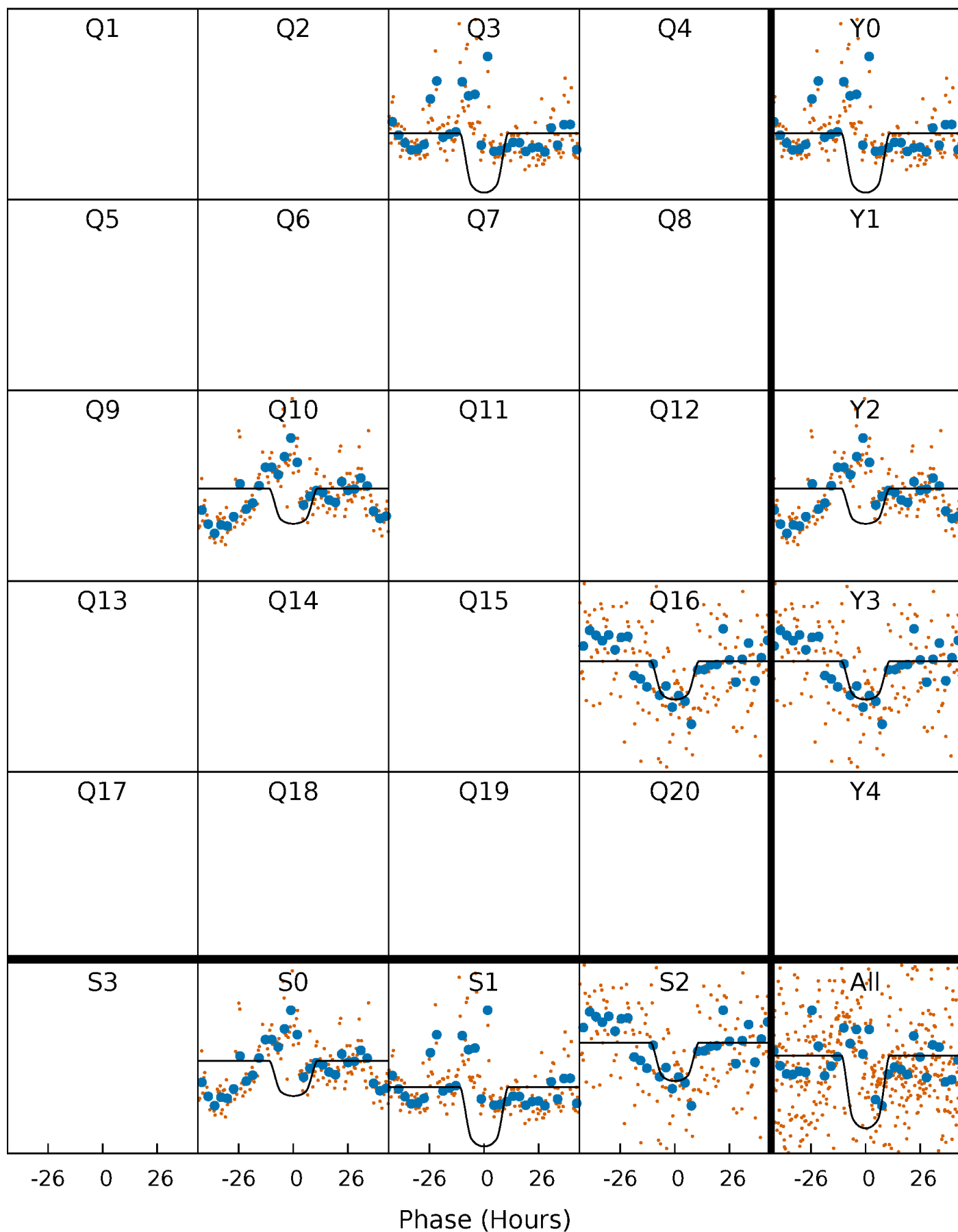
PDC Quarter-Phased Transit Curves

TCE 002164791-02 $P=631.128090$ Days $T_0=284.442023$ (BKJD)



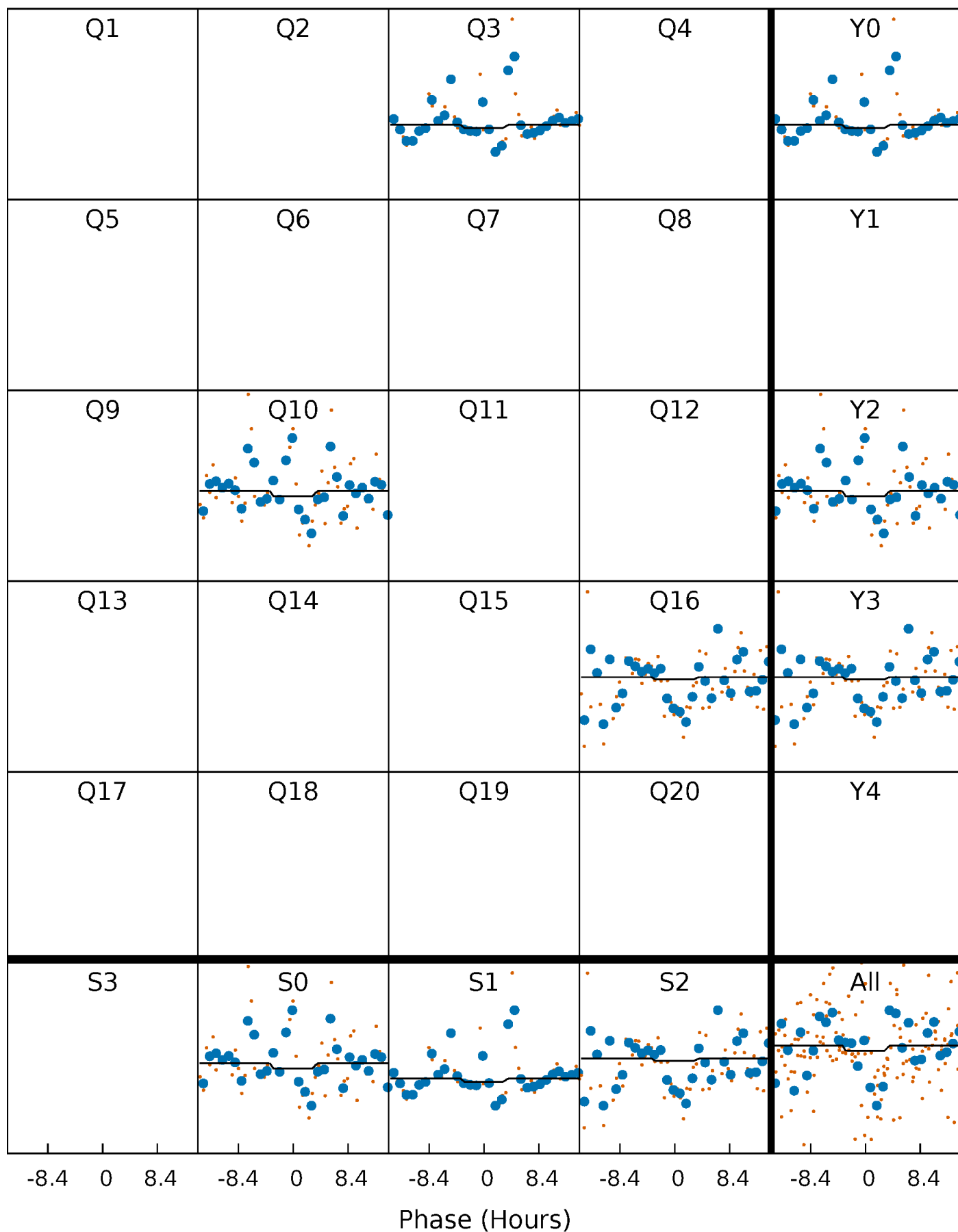
DV Quarter-Phased Transit Curves

TCE 002164791-02 $P=631.128090$ Days $T_0=284.442023$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

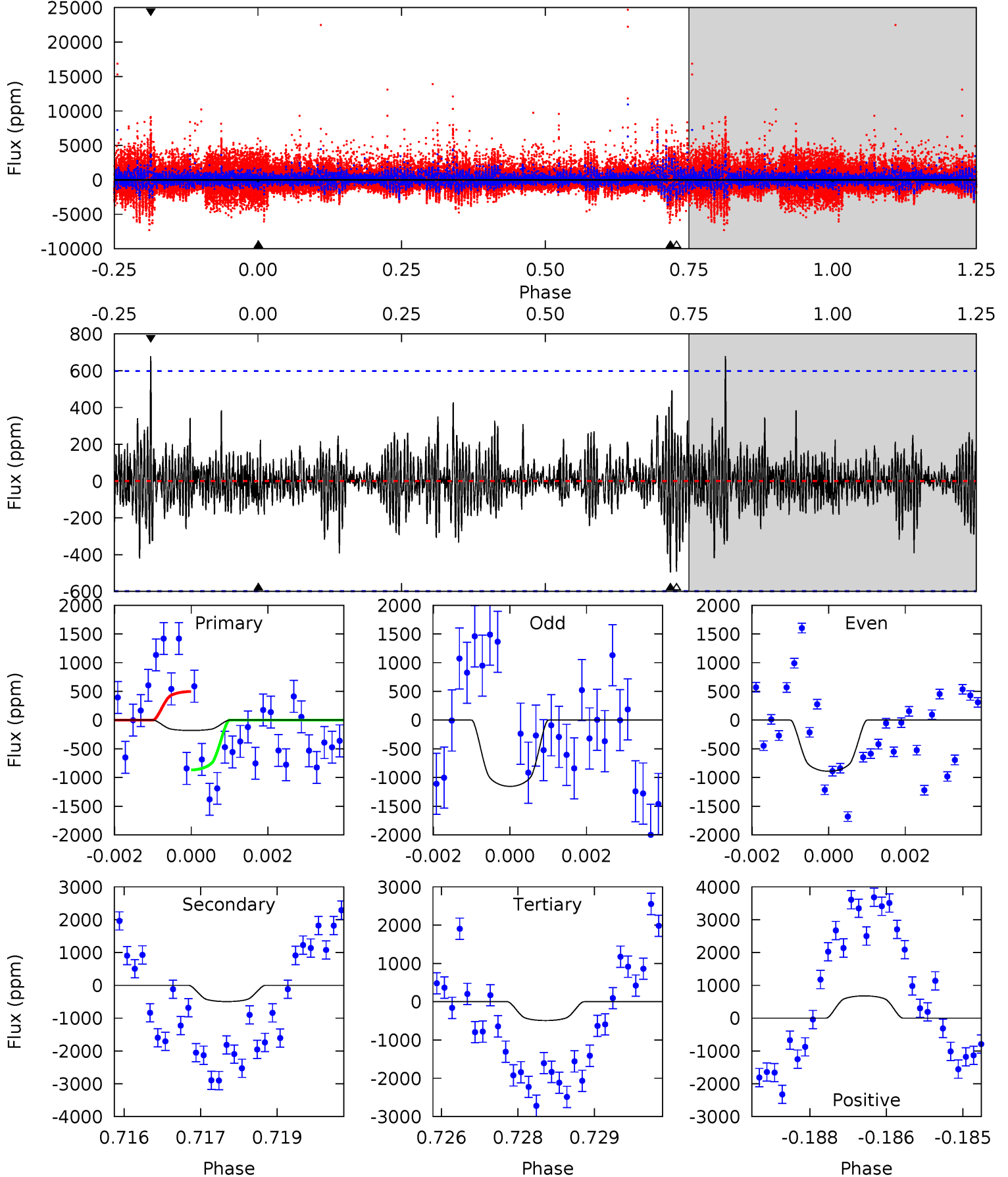
TCE 002164791-02 P=631.335703 Days $T_0=284.319464$ (BKJD)



DV Model-Shift Uniqueness Test

002164791-02, P = 631.128090 Days, E = 284.442023 Days

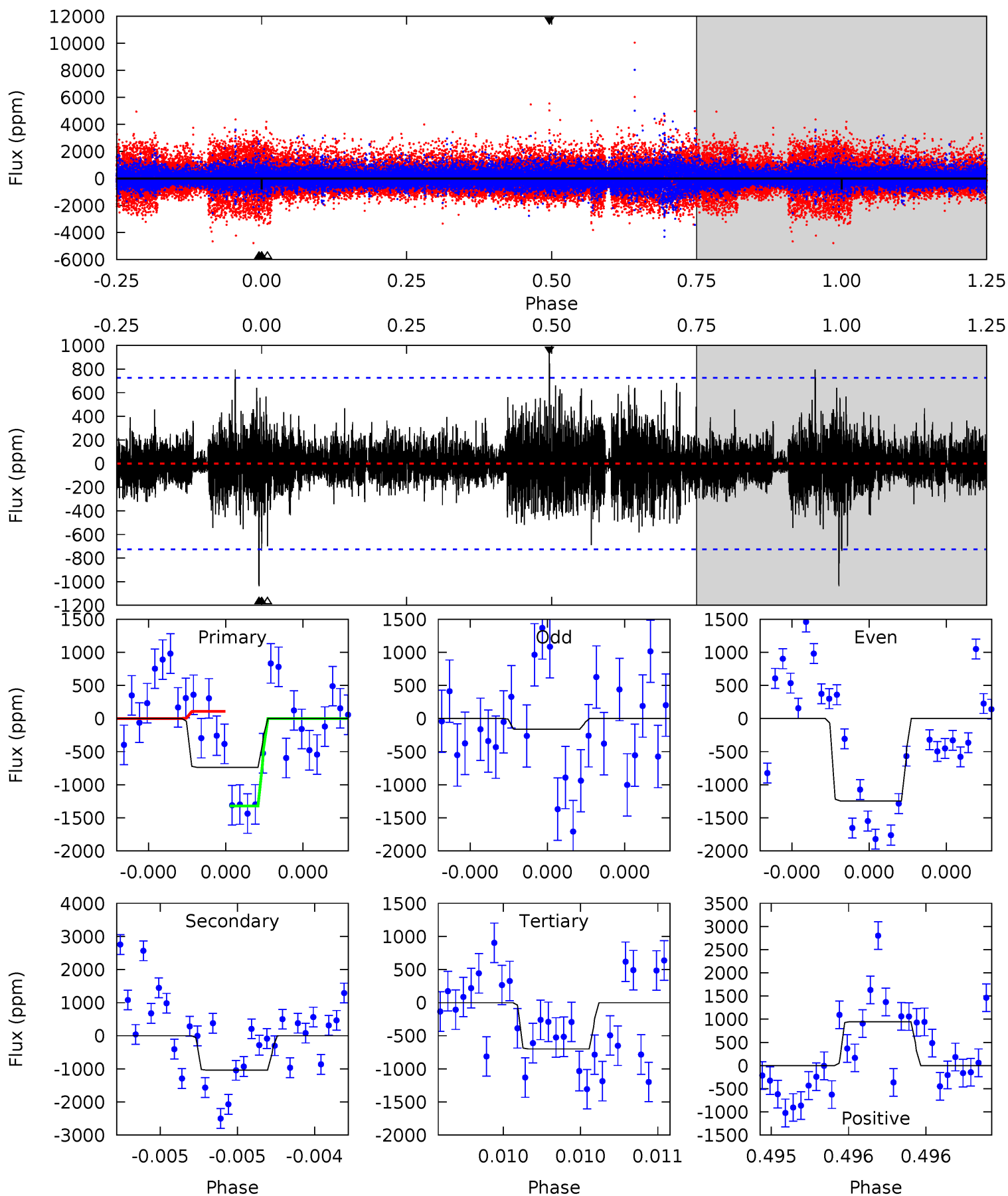
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.63	4.46	4.41	6.09	5.38	3.17	1.02	-2.79	-4.47	0.04	-1.64	0.87	-0.18	0.58	1.64



Alt Model-Shift Uniqueness Test

002164791-02, P = 631.335703 Days, E = 284.319464 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.68	7.99	5.38	7.27	5.59	3.50	1.20	0.30	-1.60	2.61	0.72	3.88	1.86	0.48	4.60



Stellar Parameters For KIC 002164791

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	2661^{+1}_{-1}	$5.283^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$0.116^{+1.000}_{-1.000}$	$0.094^{+1.000}_{-1.000}$	$85.200^{+1.000}_{-1.000}$
	+0%/-0%	+19%/-19%	+inf%/-inf%	+862%/-862%	+1064%/-1064%	+1%/-1%
Source	PHO54	PHO54	PHO54	BTSL		

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

Secondary Eclipse Parameters for KIC 002164791-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-496 ± 111	$0.72^{+0.24}_{-0.22}$	71^{+8}_{-7}	2209^{+181}_{-159}	$276591^{+159859}_{-94145}$
Alt.	-1039 ± 130	$0.18^{+0.12}_{-0.08}$	71^{+7}_{-7}	3477^{+747}_{-471}	$8654119^{+16443770}_{-4869923}$

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

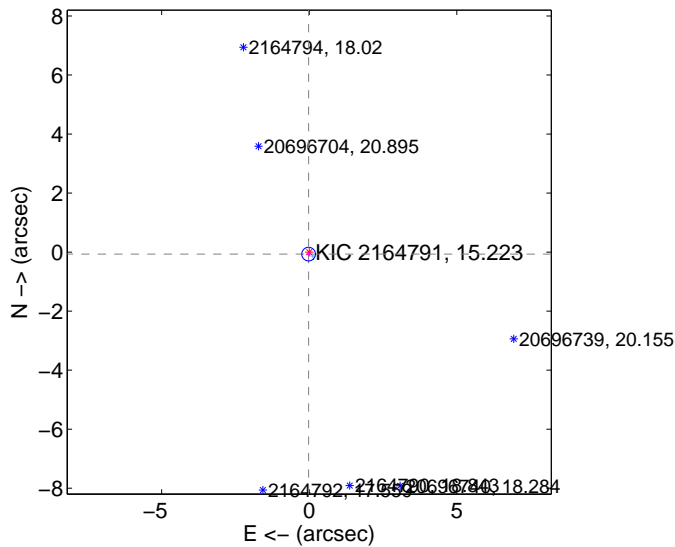
Supplemental centroid analysis for 002164791-02. Kepler magnitude: 15.22. Transit SNR 7.11

There are 1 quarters with good PRF difference image offsets

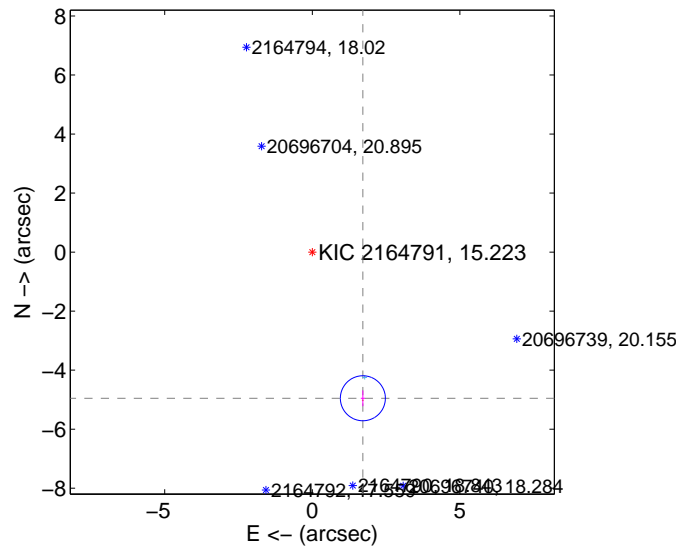
The OOT PRF centroid is offset from the target star catalog position by about 5.26 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.072 ± 0.077	0.93	0.021 ± 0.079	-0.068 ± 0.077
PRF-fit source offset from KIC position	5.240 ± 0.254	20.62	-1.714 ± 0.070	-4.952 ± 0.268
photometric centroid source offset	4.81 ± 0.67	7.13	-1.70 ± 0.53	-4.50 ± 0.69

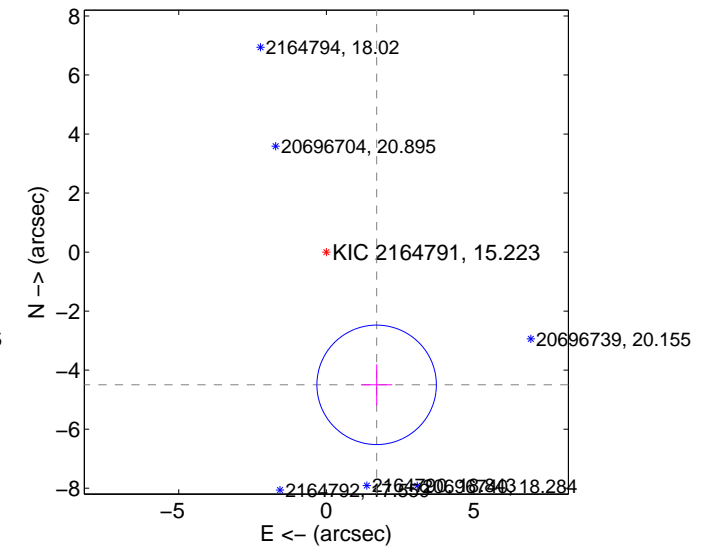
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

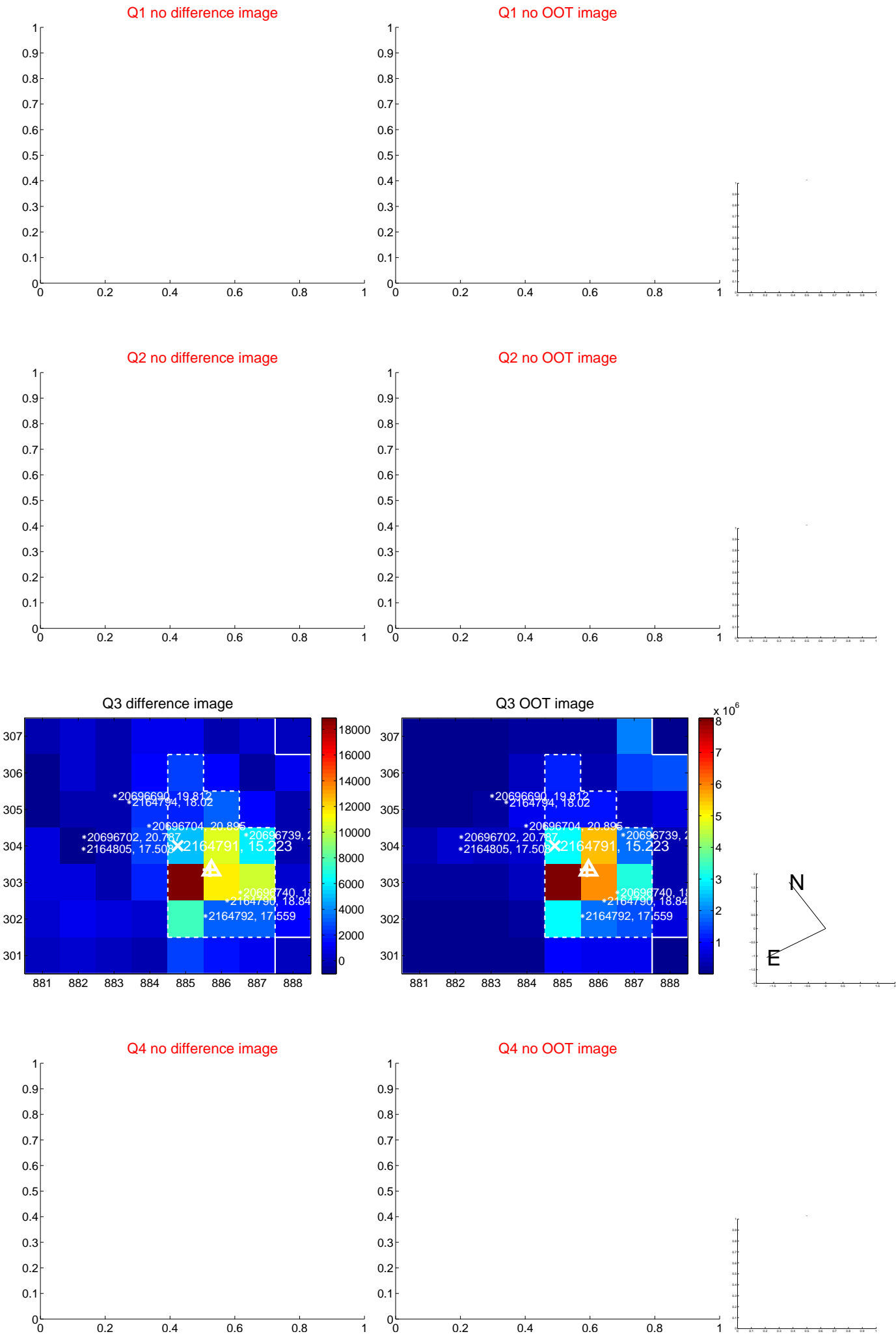


offset from photometric centroids



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

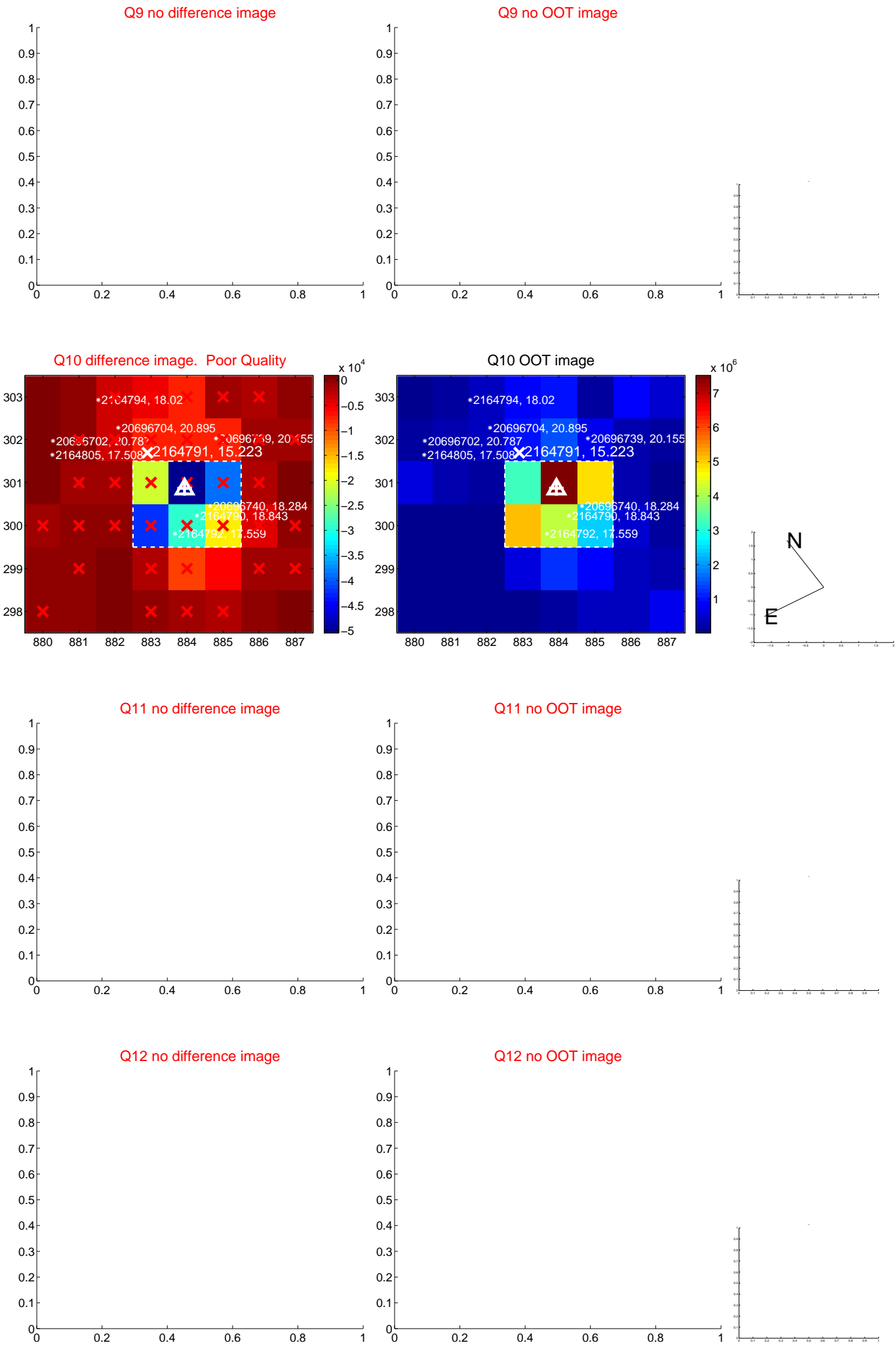
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



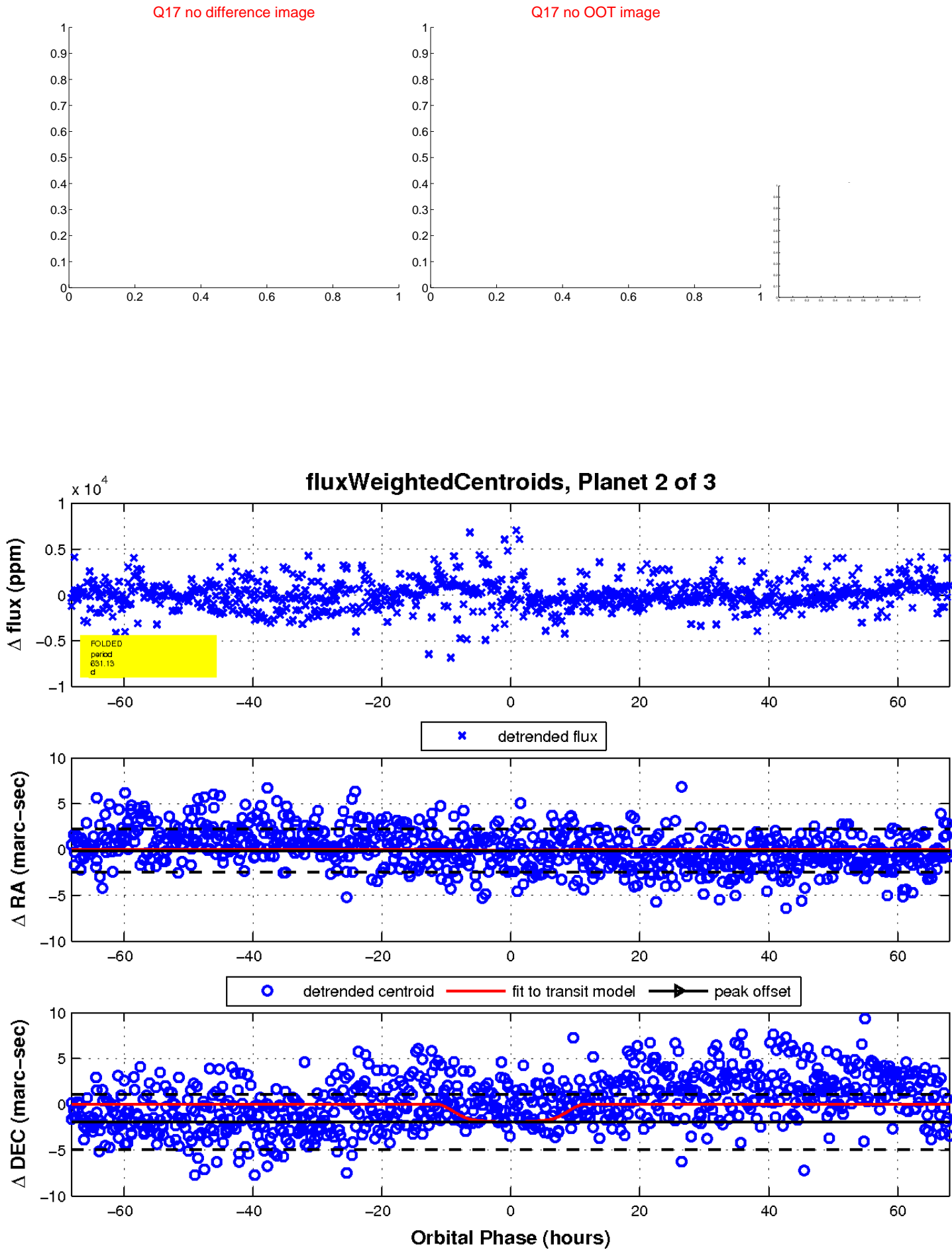
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

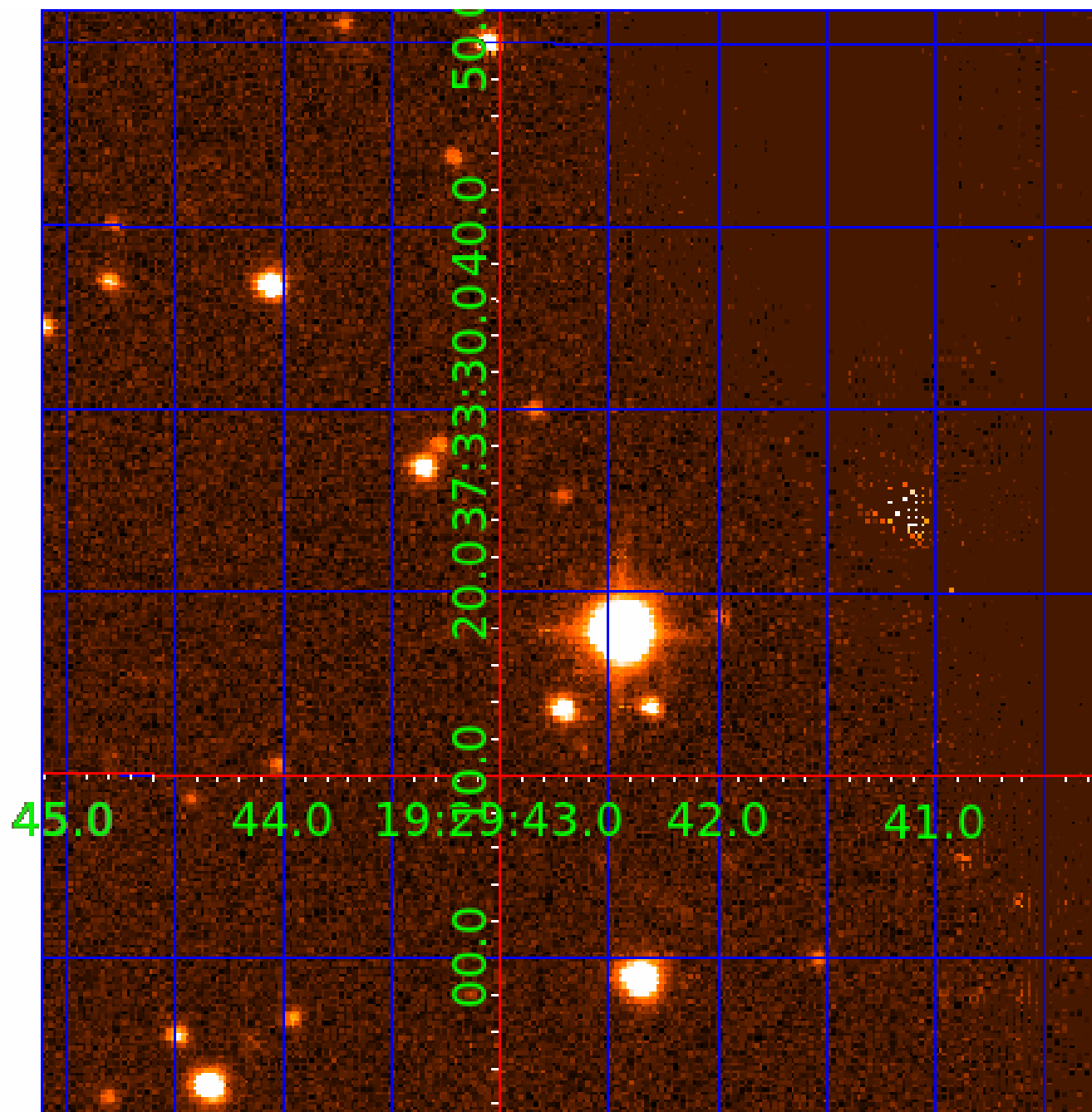


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002164791

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})
002164791-02	OBS	No	631.128090	284.442023	1986.7	22.716	10.1	7.1	0.12	2661	0.62	0.00
002164791-03	OBS	No	478.848013	374.186556	2126.9	13.204	14.3	8.2	0.12	2661	0.53	0.00

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002164791-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—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—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002164791-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

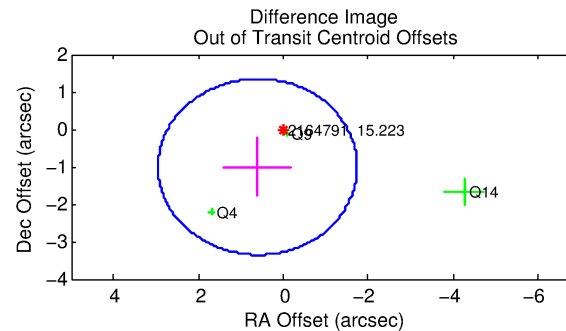
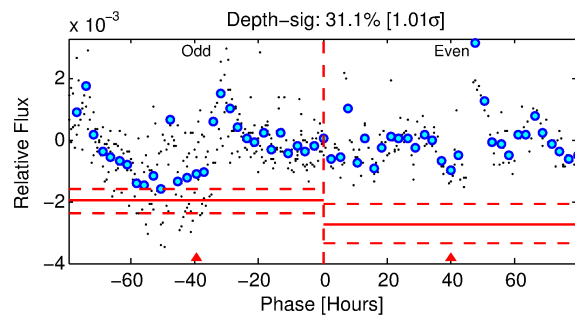
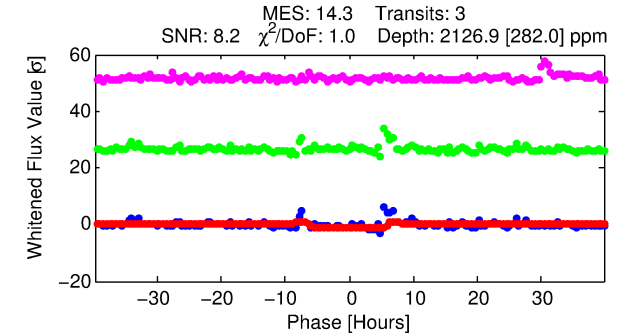
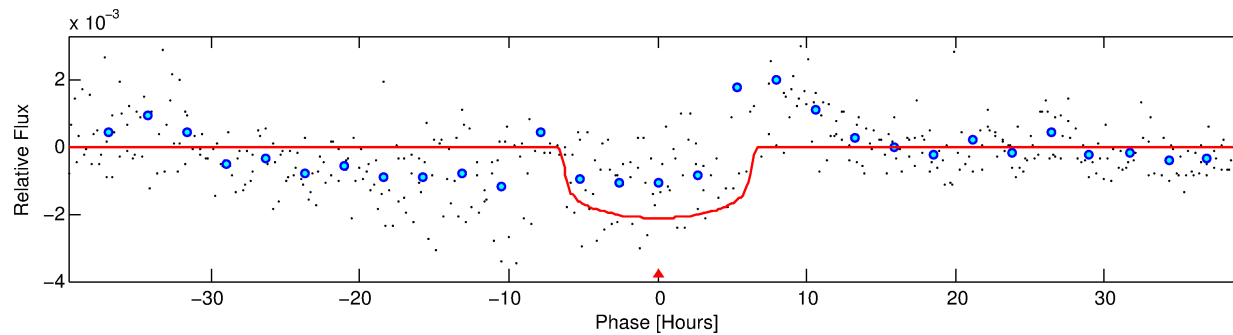
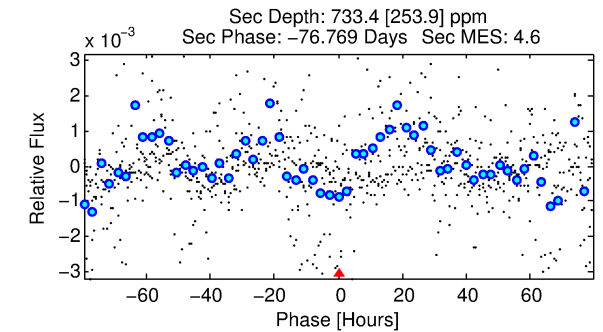
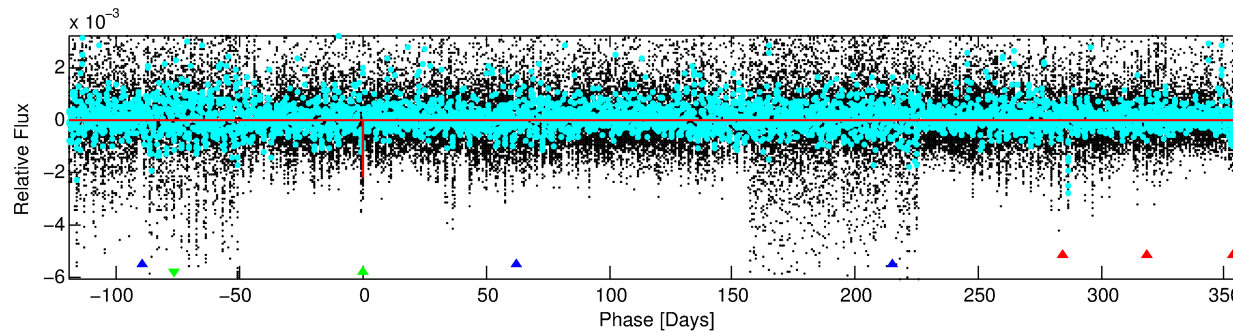
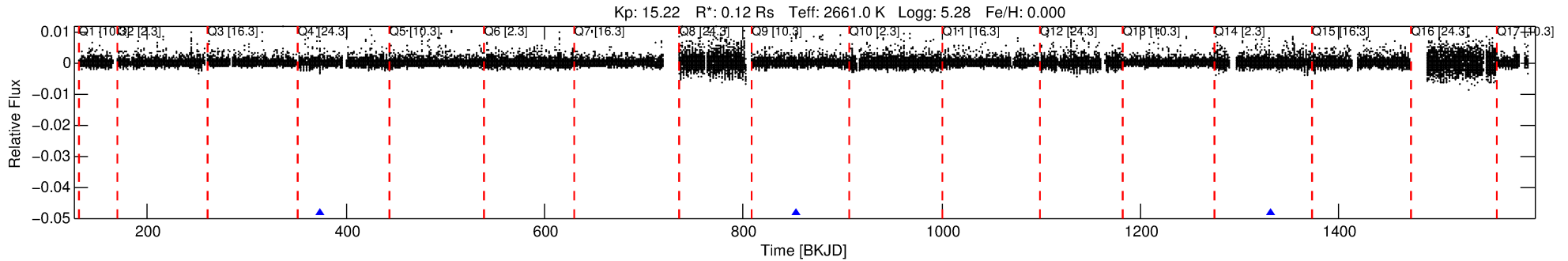
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002164791-03

No Significant Match Found

DV One-Page Summary

KIC: 2164791 Candidate: 3 of 3 Period: 478.848 d



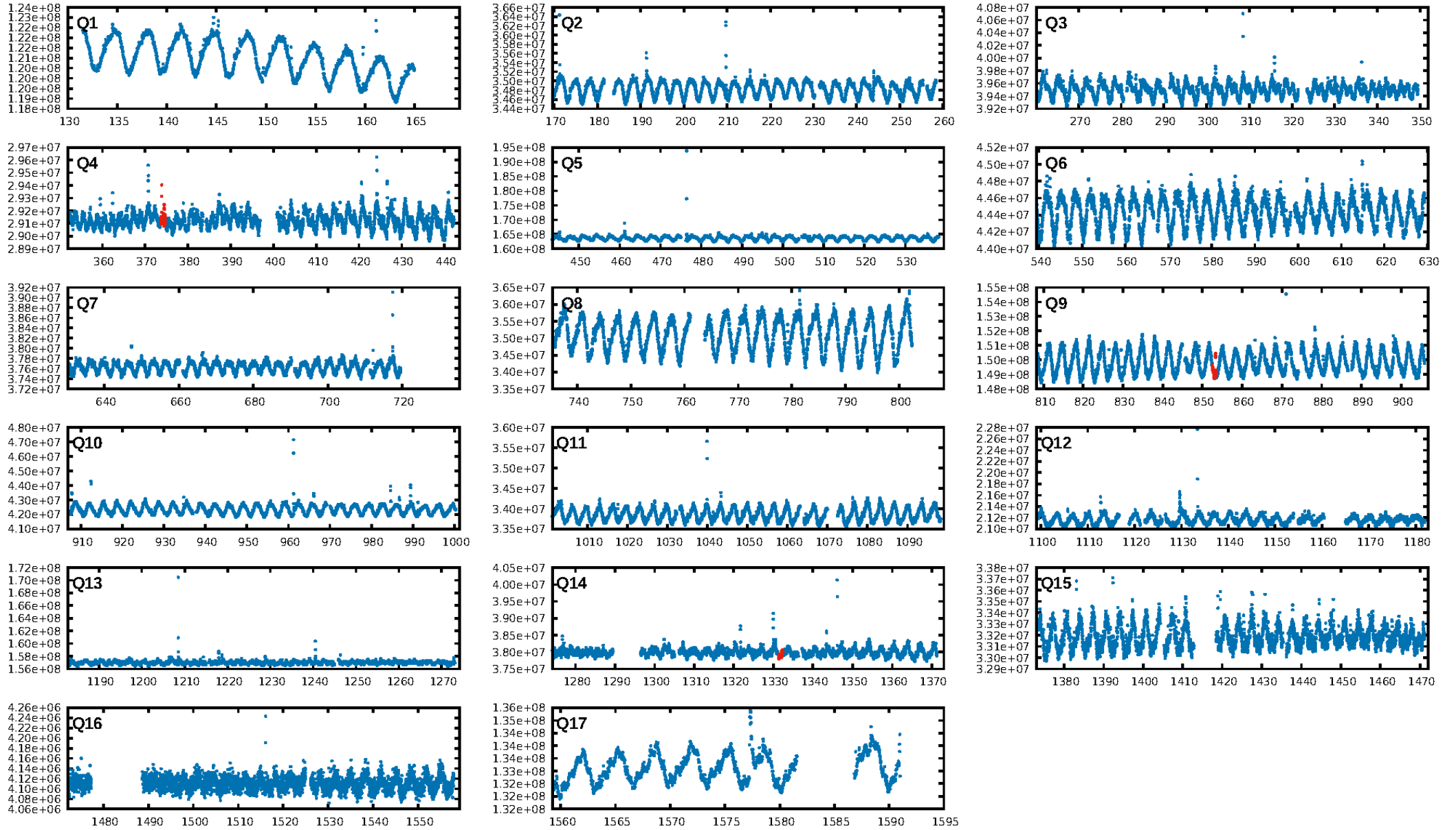
DV Fit Results:

Period = 478.84801 [0.00775] d
Epoch = 374.1866 [0.0091] BKJD
Rp/R* = 0.0418 [0.0089]
a/R* = 284.14 [236.37]
b = 0.18 [4.36]
Seff = 0.00 [0.00]
Teq = 54 [0] K
Rp = 0.53 [0.11] Re
a = 0.5451 [0.0000] AU
Ag = 427458.94 [234630.17] [1.82σ]
Teffp = 2141 [294] K [7.10σ]

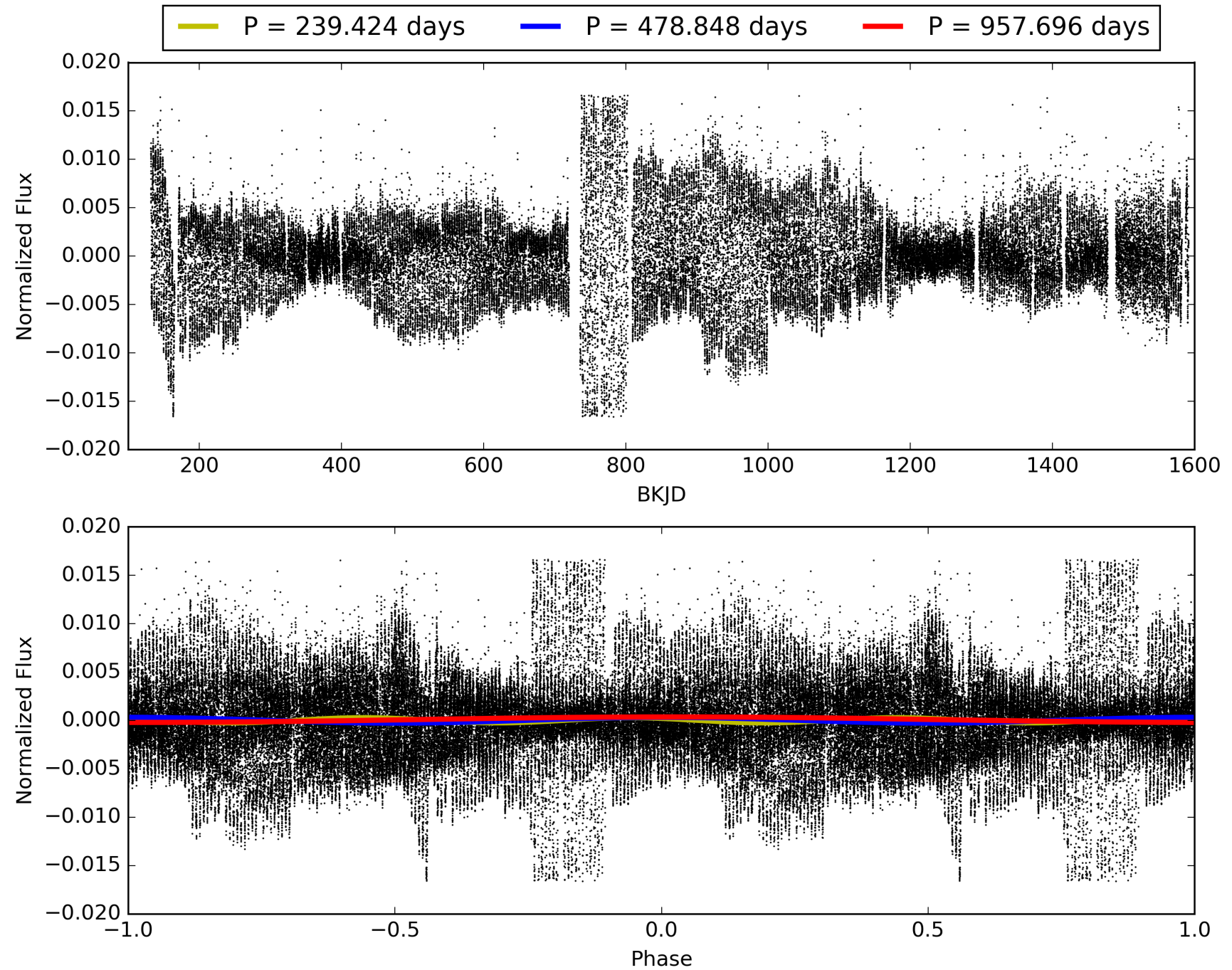
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [59.29σ]
ModelChiSquare2-sig: 0.2%
ModelChiSquareGof-sig: 98.2%
Bootstrap-pfa: 4.25e-19
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -2.286
Centroid-sig: 14.8%
Centroid-so: 5.620 arcsec [18.56σ]
OotOffset-rm: 1.172 arcsec [1.50σ]
KicOffset-rm: 5.615 arcsec [9.18σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 002164791-03, PDC Light Curves

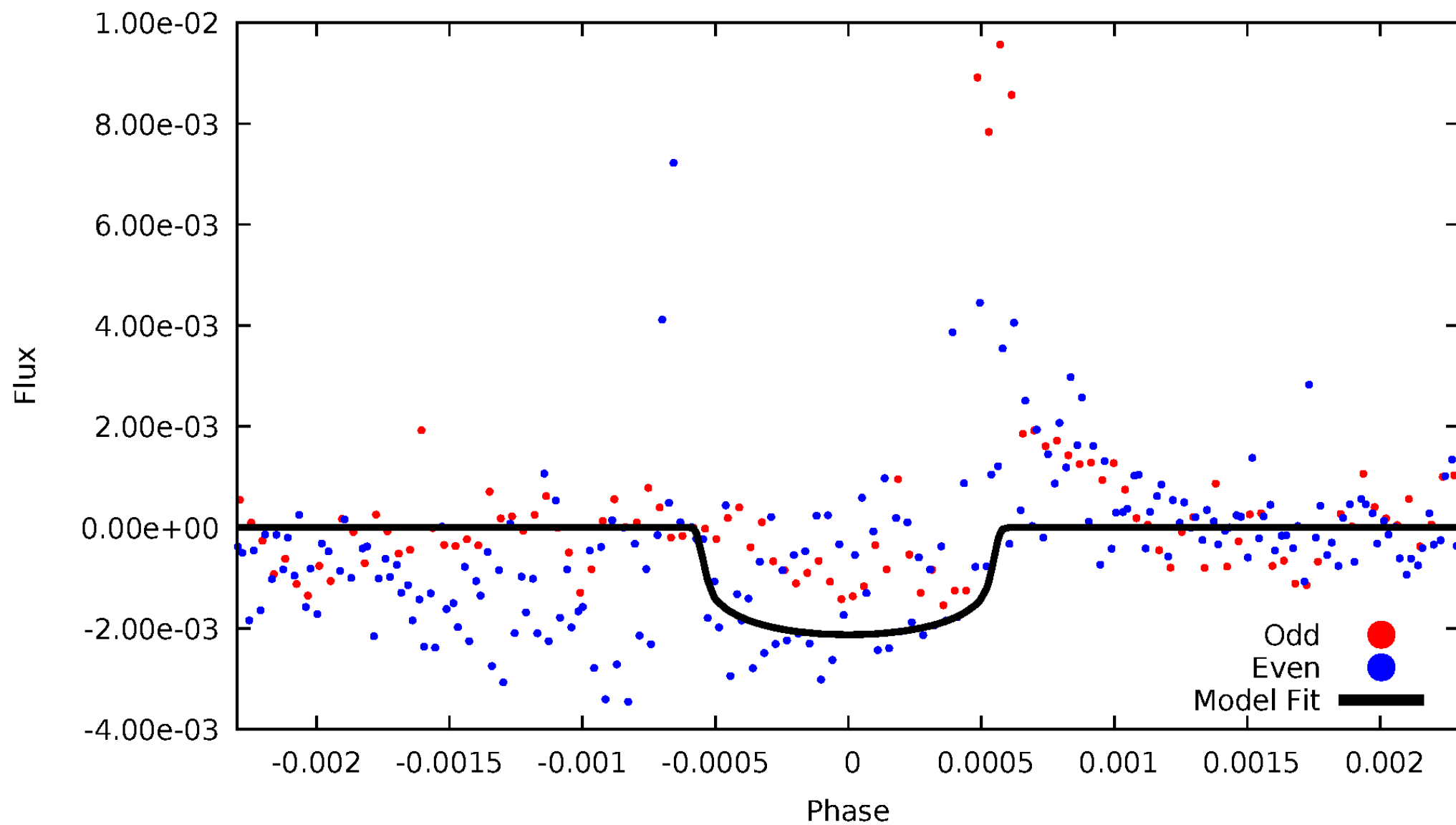


TCE 002164791-03



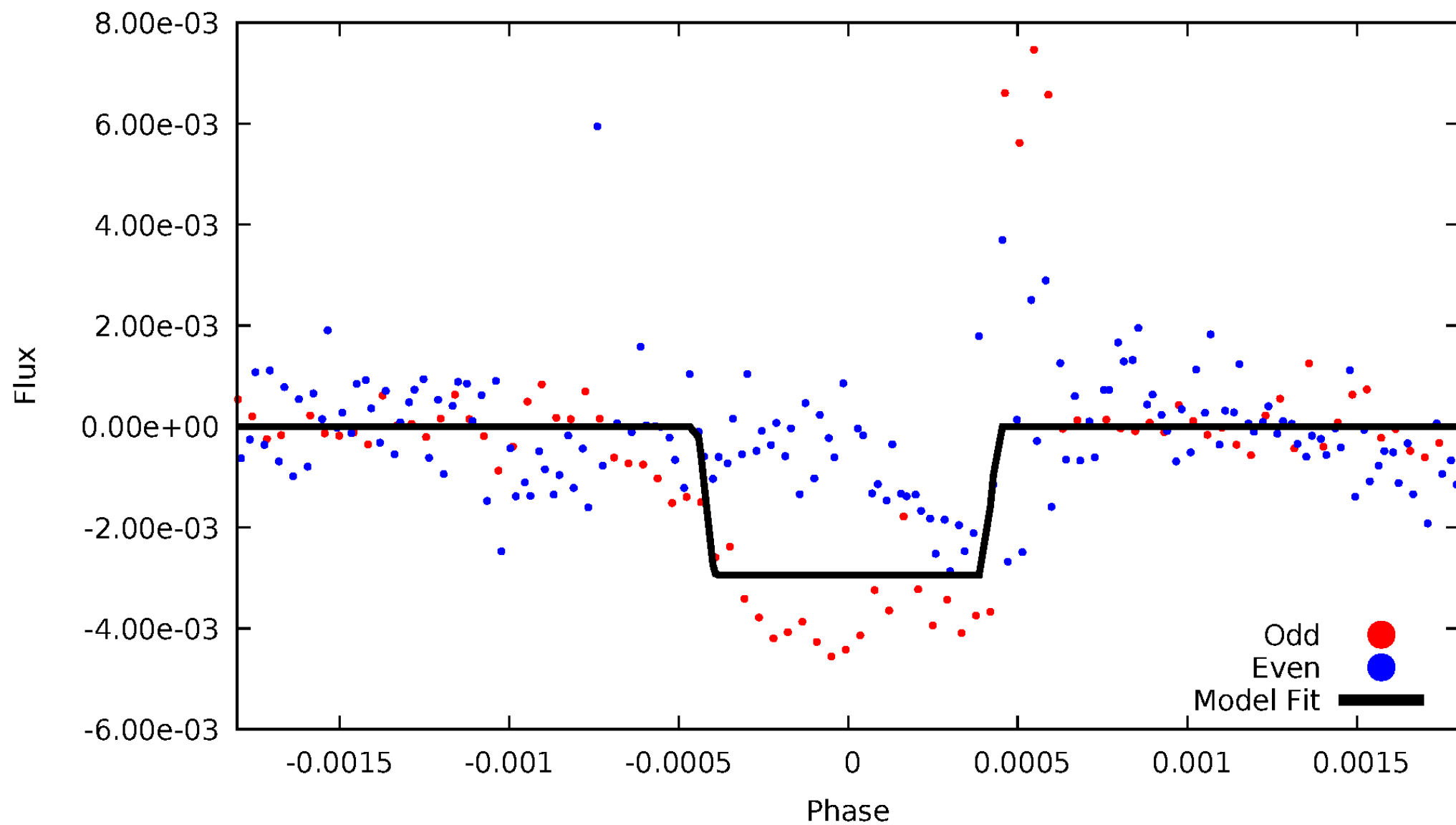
DV Odd/Even

TCE 002164791-03

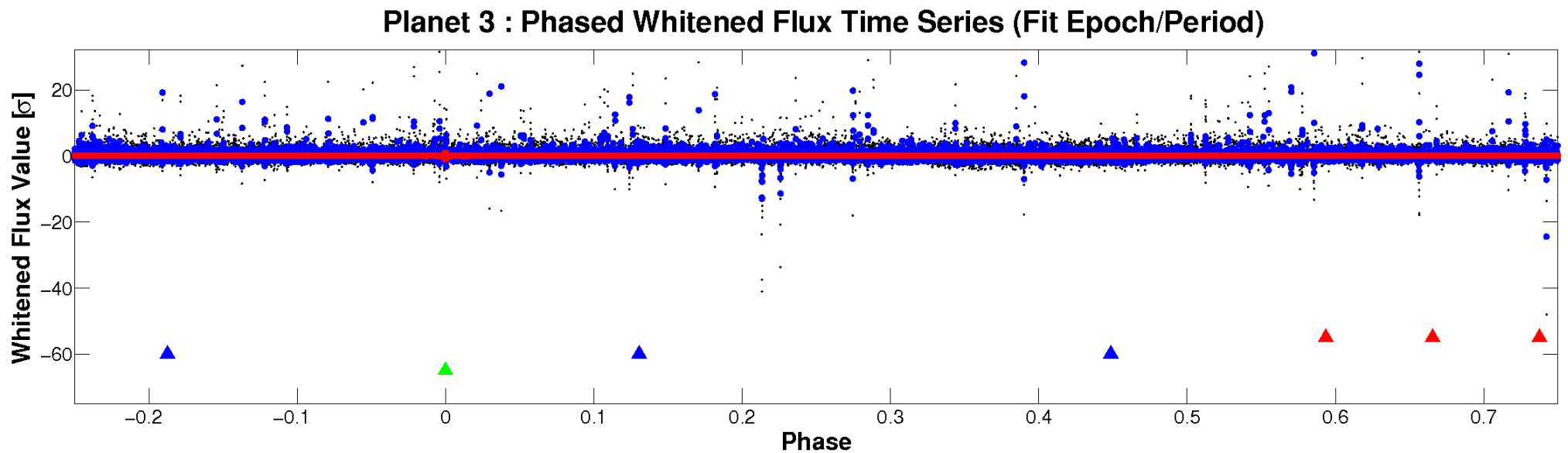
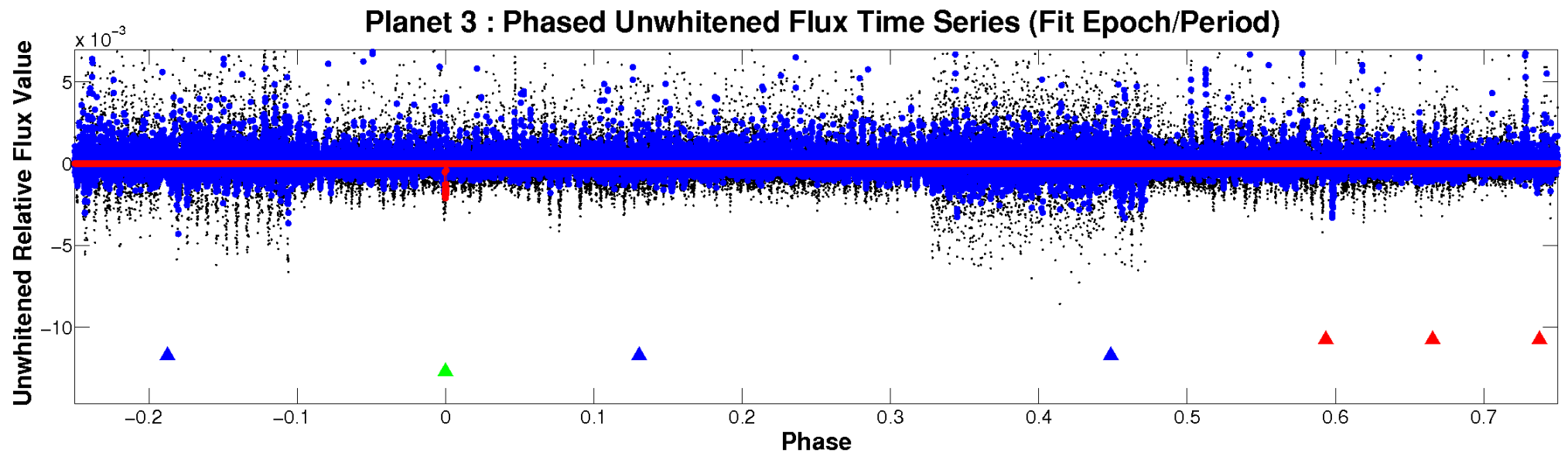


ALT Odd/Even

TCE 002164791-03

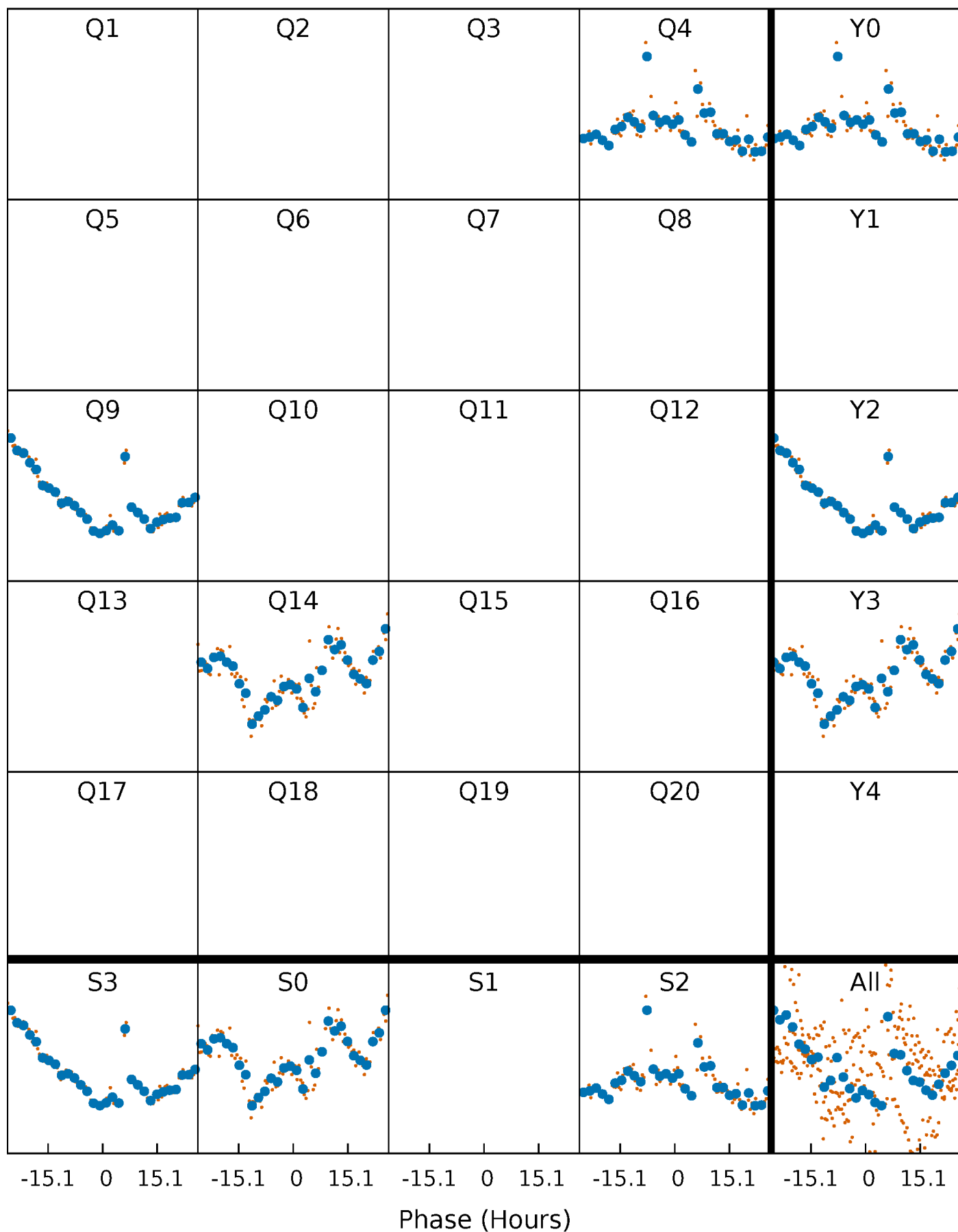


Non-Whitened Vs. Whitened Light Curve



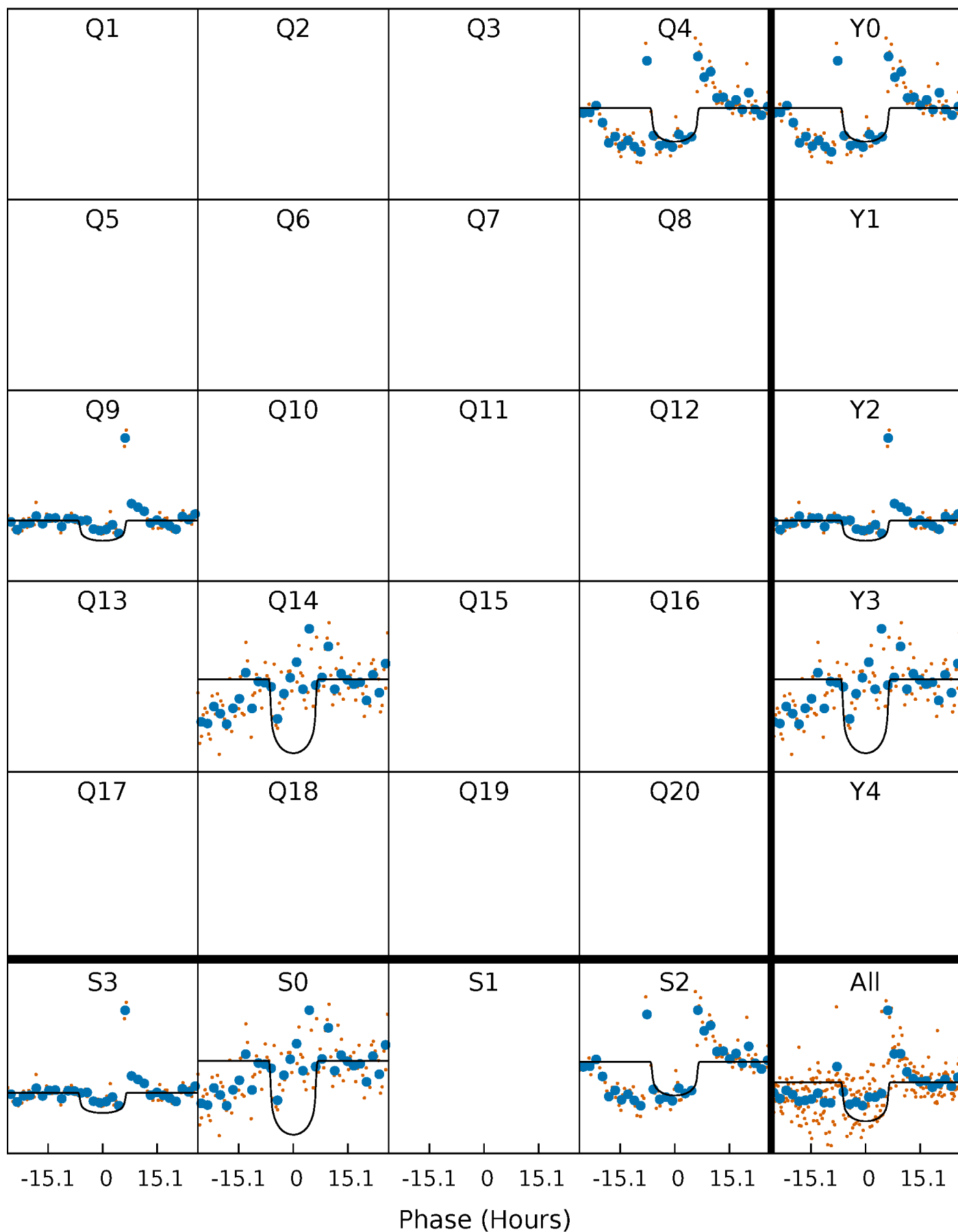
PDC Quarter-Phased Transit Curves

TCE 002164791-03 $P=478.848013$ Days $T_0=374.186556$ (BKJD)



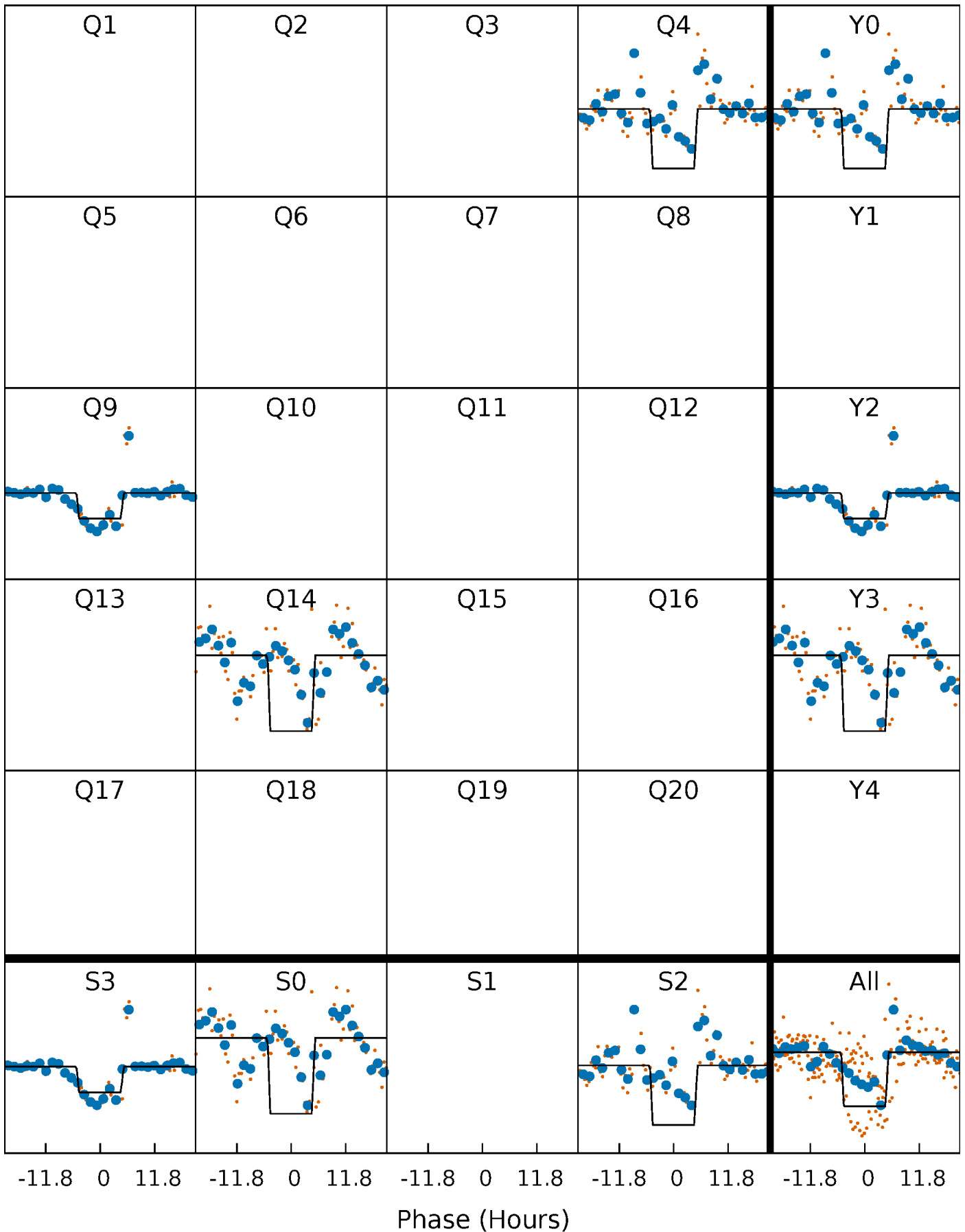
DV Quarter-Phased Transit Curves

TCE 002164791-03 $P=478.848013$ Days $T_0=374.186556$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

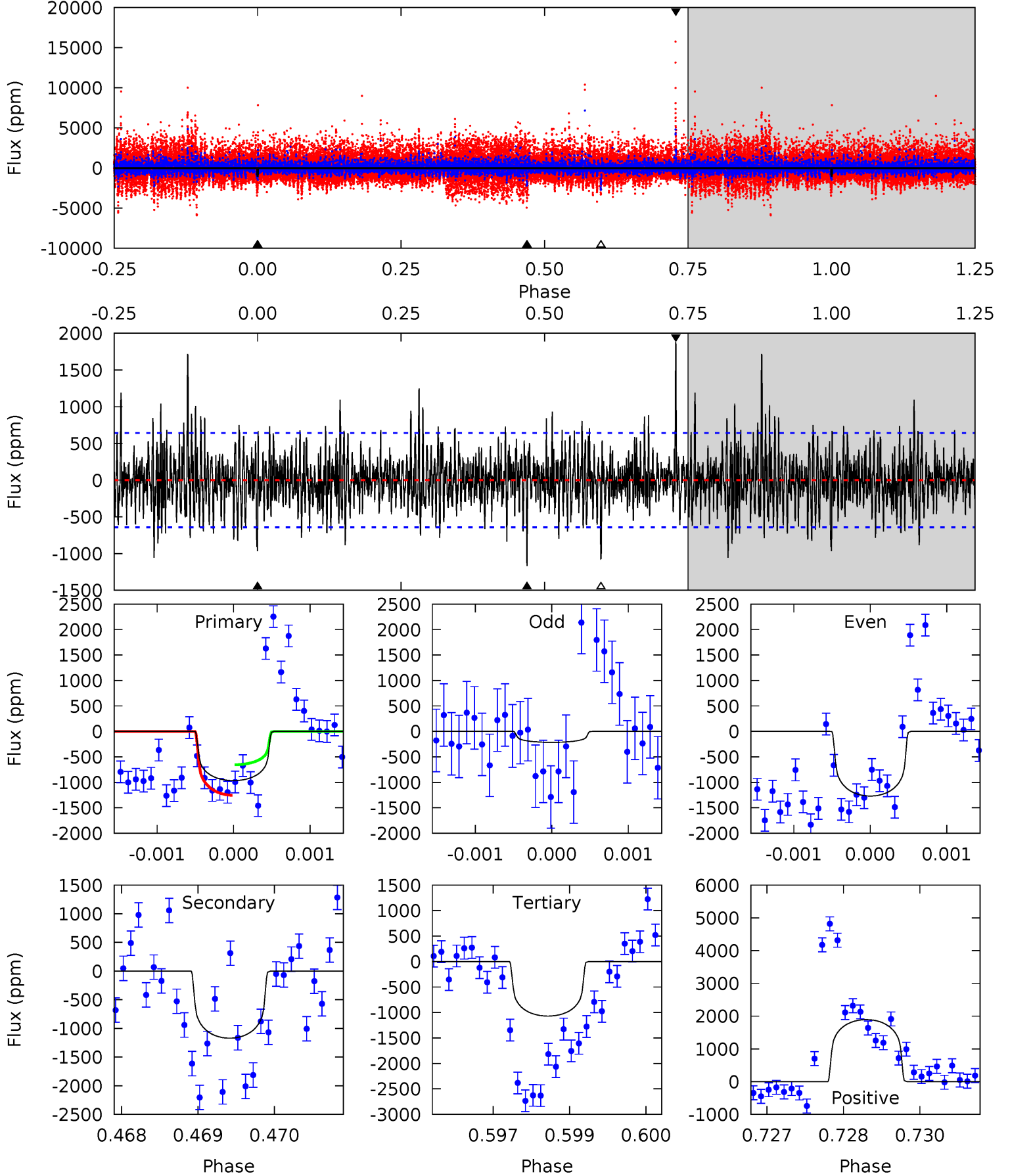
TCE 002164791-03 P=478.840045 Days $T_0=374.205928$ (BKJD)



DV Model-Shift Uniqueness Test

002164791-03, P = 478.848013 Days, E = 374.186556 Days

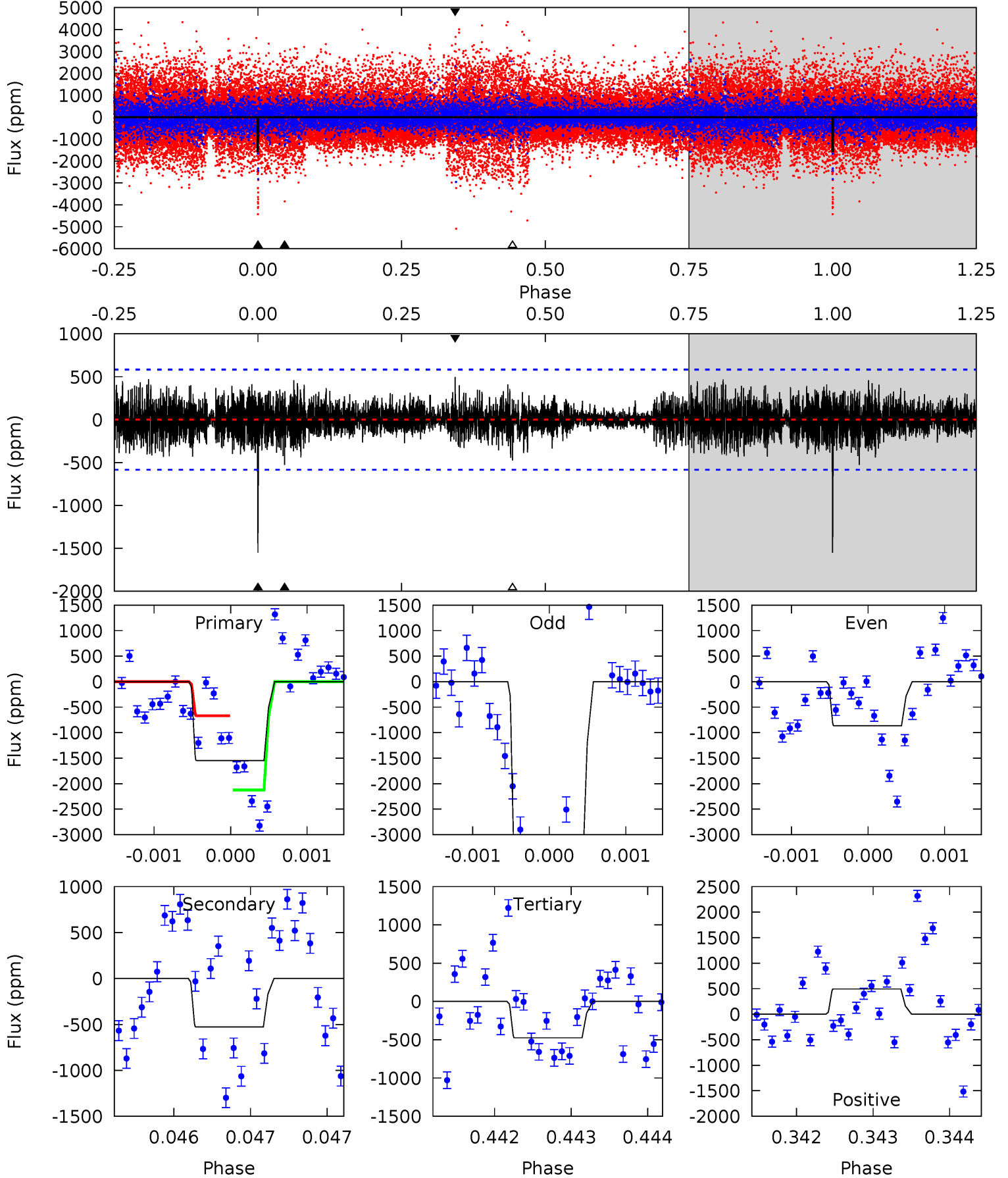
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.15	9.87	9.03	16.0	5.42	3.25	2.52	-0.88	-7.83	0.84	-6.10	3.05	3.63	0.62	2.55



Alt Model-Shift Uniqueness Test

002164791-03, P = 478.840045 Days, E = 374.205928 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.5	4.95	4.45	4.64	5.48	3.33	1.19	10.1	9.88	0.49	0.31	13.5	1.77	0.24	6.75



Stellar Parameters For KIC 002164791

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	2661^{+1}_{-1}	$5.283^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$0.116^{+1.000}_{-1.000}$	$0.094^{+1.000}_{-1.000}$	$85.200^{+1.000}_{-1.000}$
	+0%/-0%	+19%/-19%	+inf%/-inf%	+862%/-862%	+1064%/-1064%	+1%/-1%
Source	PHO54	PHO54	PHO54	BTSL		

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

Secondary Eclipse Parameters for KIC 002164791-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1170 ± 119	$0.63^{+0.25}_{-0.23}$	78^{+8}_{-8}	2539^{+256}_{-224}	$616696^{+499917}_{-233840}$
Alt.	-528 ± 107	$0.80^{+0.27}_{-0.25}$	77^{+9}_{-8}	2184^{+173}_{-162}	$168771^{+103772}_{-59484}$

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

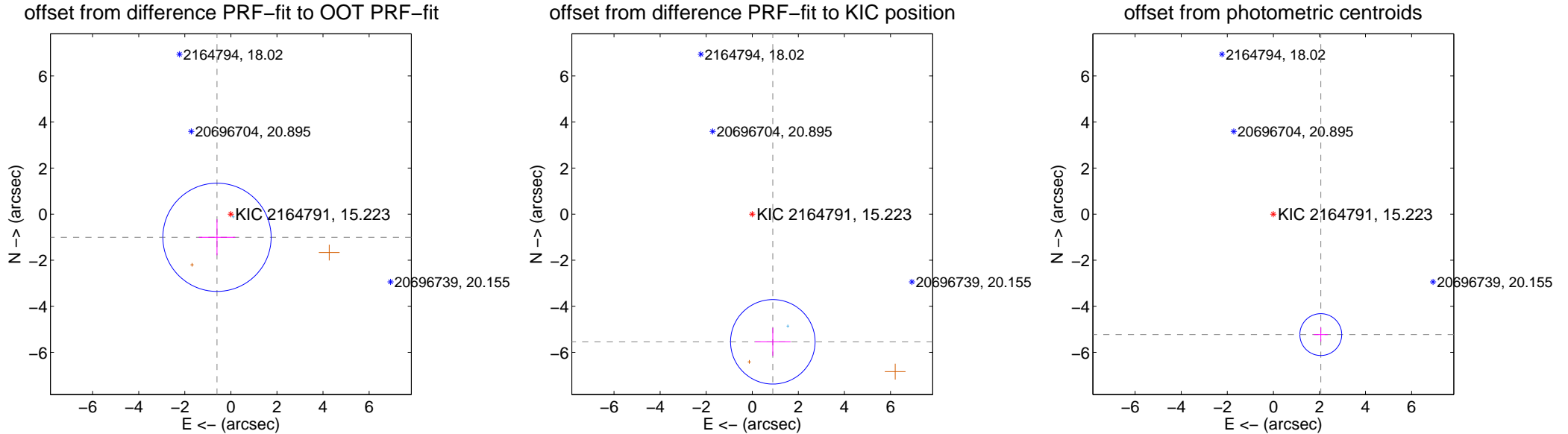
DV Centroid Data

Supplemental centroid analysis for 002164791-03. Kepler magnitude: 15.22. Transit SNR 8.22

There are 1 quarters with good PRF difference image offsets

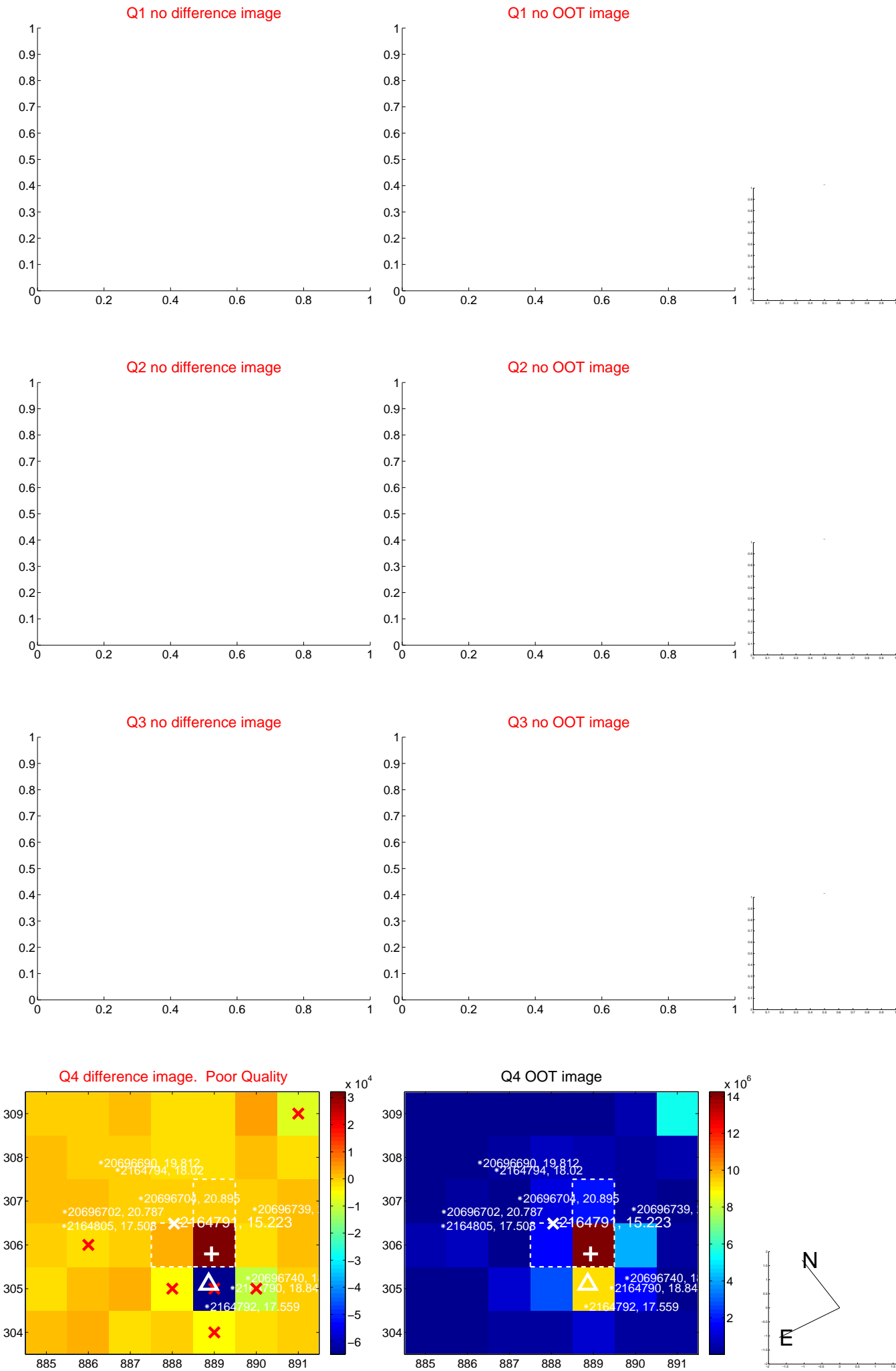
The OOT PRF centroid is offset from the target star catalog position by about 5.52 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.172 ± 0.783	1.50	0.602 ± 0.789	-1.006 ± 0.781
PRF-fit source offset from KIC position	5.615 ± 0.611	9.18	-0.892 ± 0.775	-5.544 ± 0.607
photometric centroid source offset	5.62 ± 0.30	18.56	-2.06 ± 0.30	-5.23 ± 0.30



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

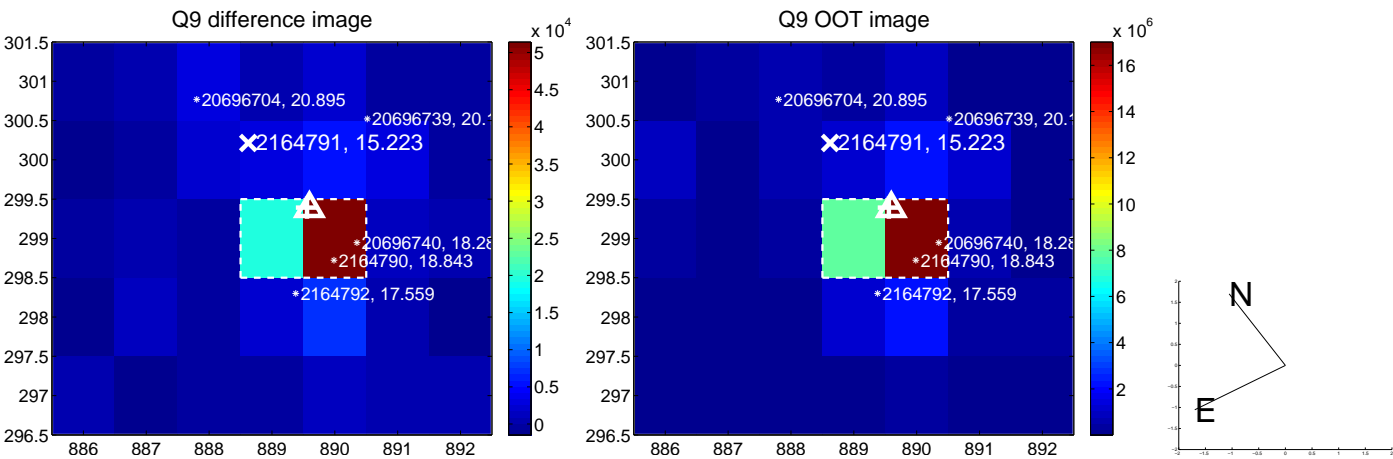
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



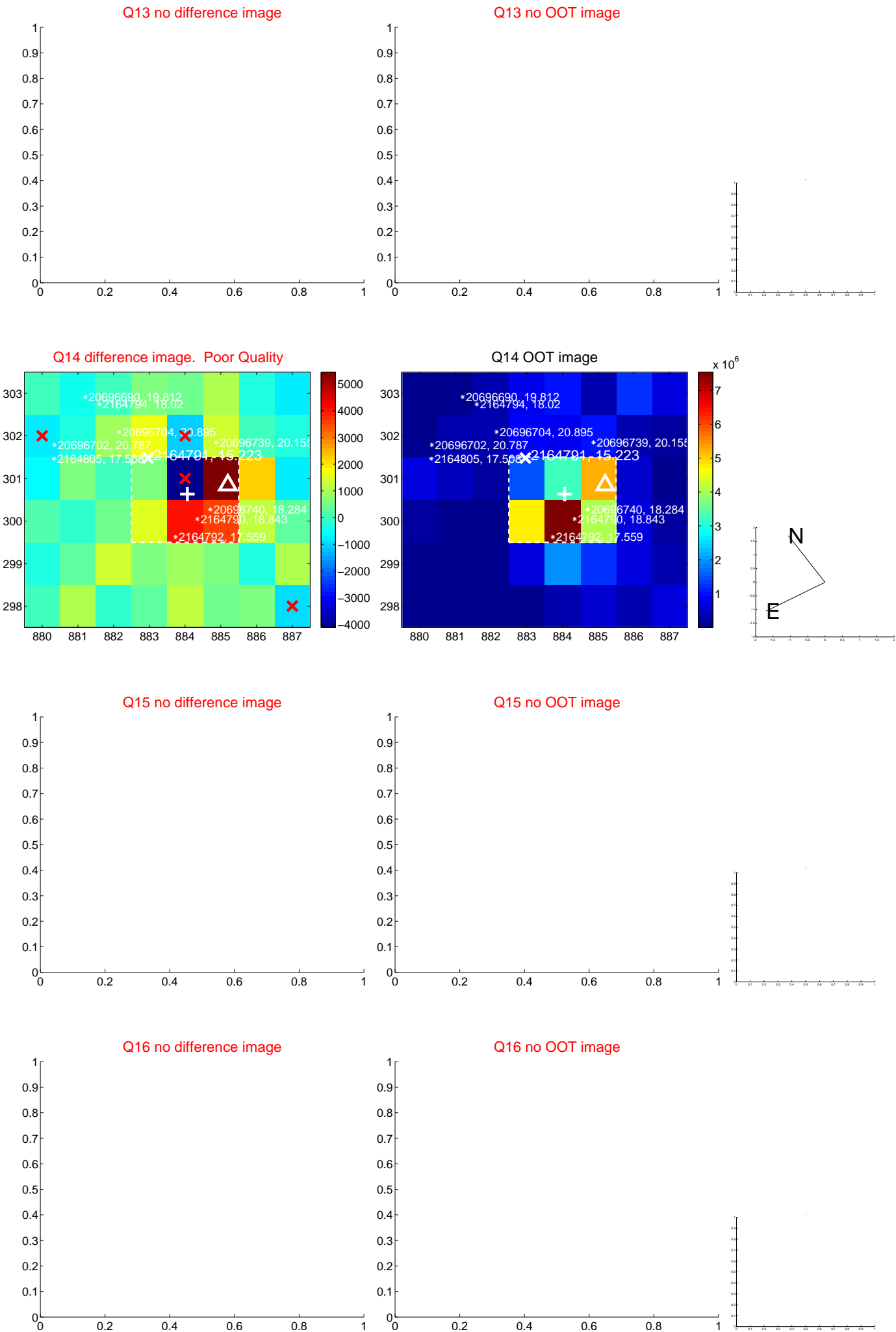
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



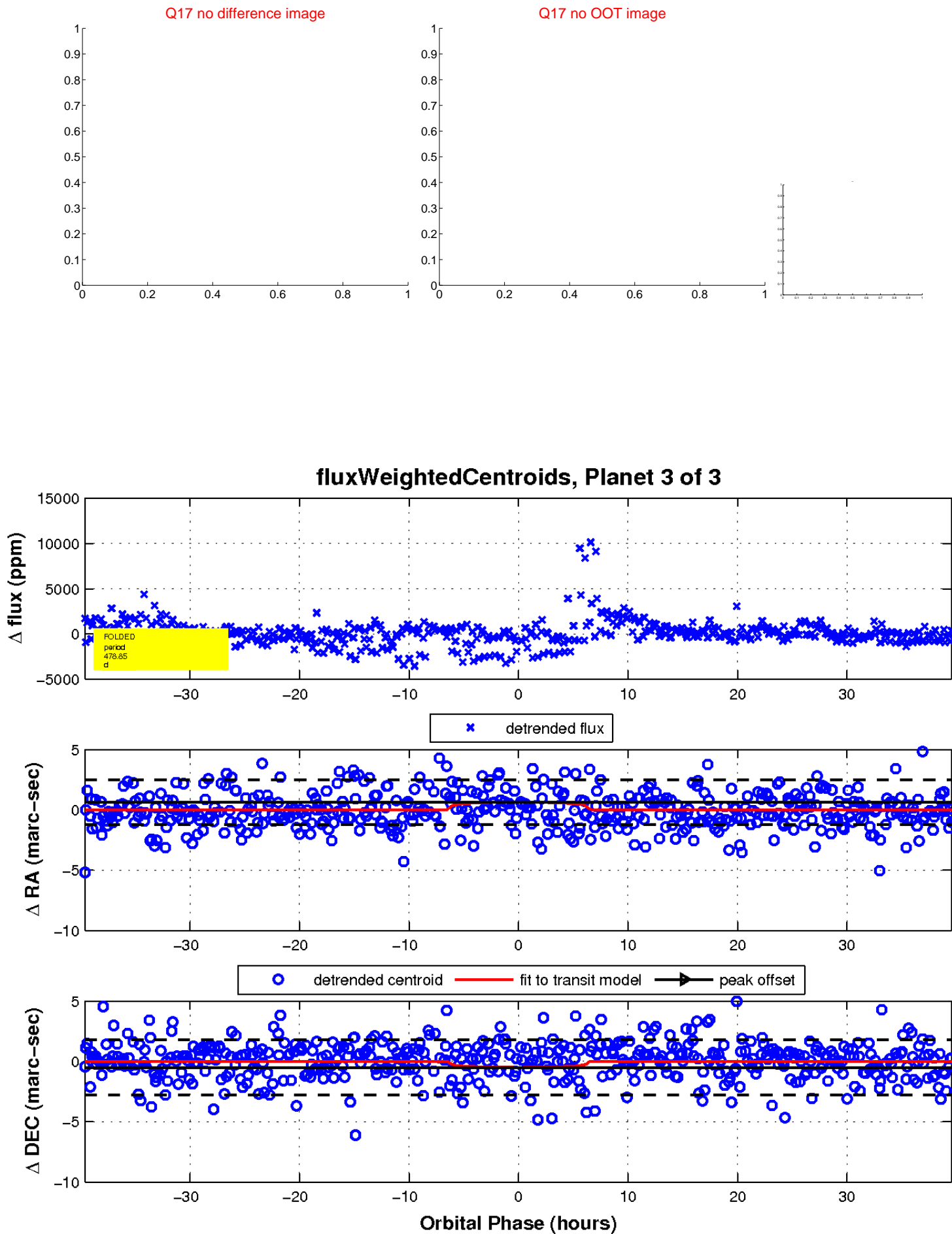
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

