

KIC 002167890

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})
002167890-01	OBS	3670.01	2.648277	133.041404	12408.7	2.739	480.3	340.1	9.28	4839	133.20	0.00
002167890-02	OBS	No	2.648289	131.715560	847.4	2.614	30.3	35.6	9.28	4839	38.91	20273.68

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002167890-01	OBS	FP	0.00	0	1	1	0	PLANET_IN_STAR—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
002167890-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

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 002167890-01

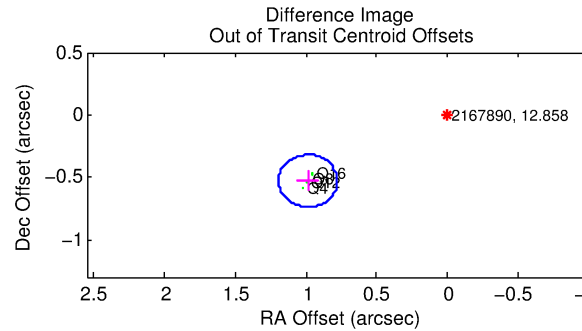
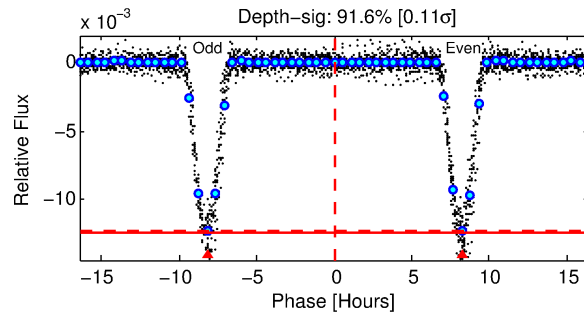
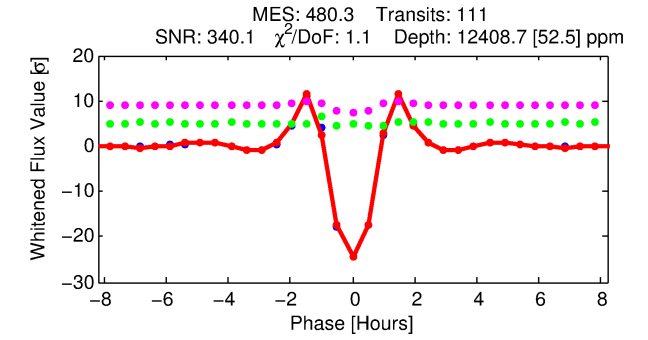
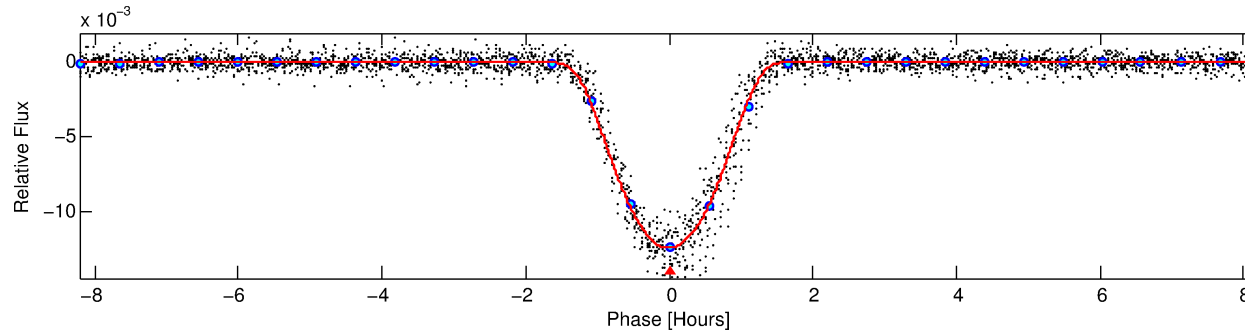
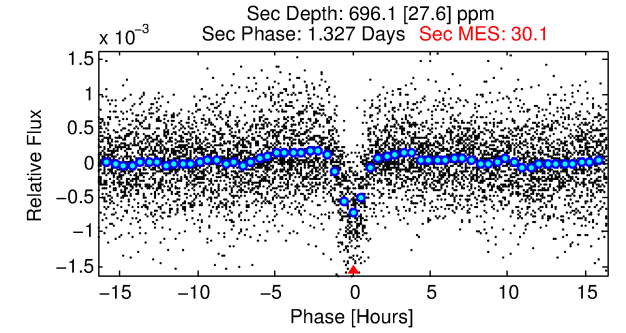
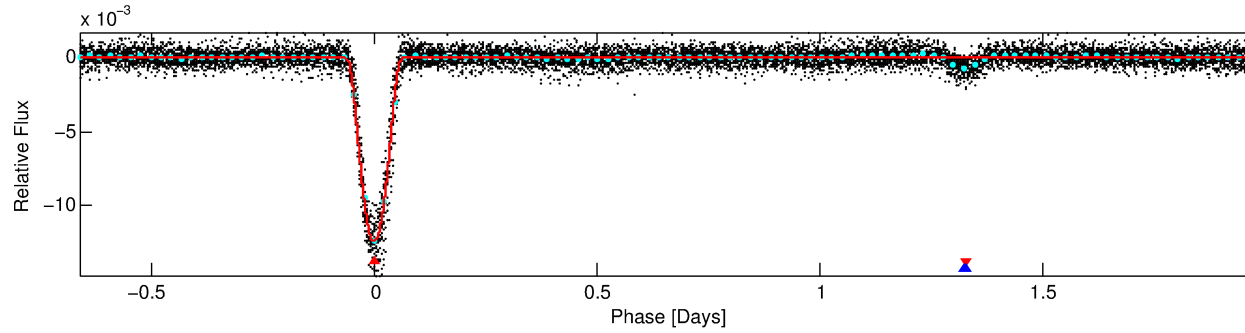
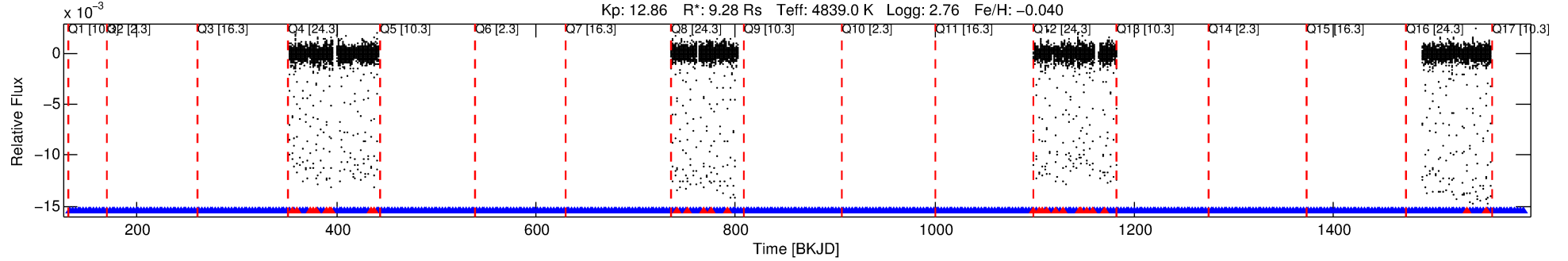
No Significant Match Found

DV One-Page Summary

KIC: 2167890 Candidate: 1 of 2 Period: 2.648 d

KOI: K03670.01 Corr: 0.972

Kp: 12.86 R*: 9.28 Rs Teff: 4839.0 K Logg: 2.76 Fe/H: -0.040



DV Fit Results:

Period = 2.64828 [0.00000] d
Epoch = 133.0414 [0.0001] BKJD
Rp/R* = 0.1316 [0.0015]
a/R* = 5.16 [0.03]
b = 0.90 [0.00]
Seff = N/A
Teq = N/A
Rp = 133.20 [40.67] Re
a = N/A
Ag = N/A
Teffp = N/A

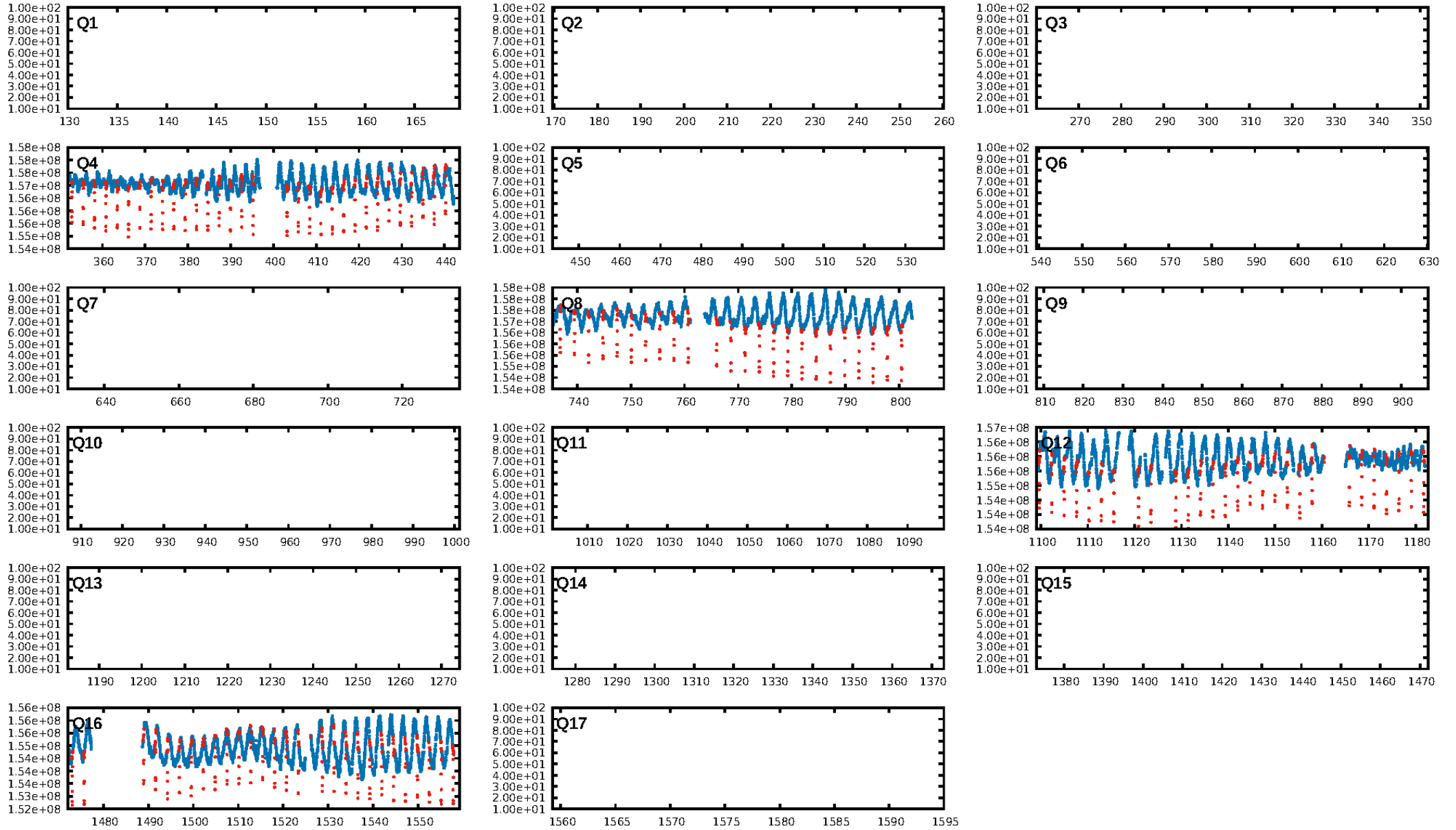
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 99.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.75 [83/111]
GhostDiagnostic-chr: 1.344
Centroid-sig: 0.0%
Centroid-so: 1.155 arcsec [107.46σ]
OotOffset-rm: 1.120 arcsec [16.10σ]
KicOffset-rm: 1.141 arcsec [14.84σ]
OotOffset-st: 0/0/4/0 [4]
KicOffset-st: 0/0/4/0 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [4/4]

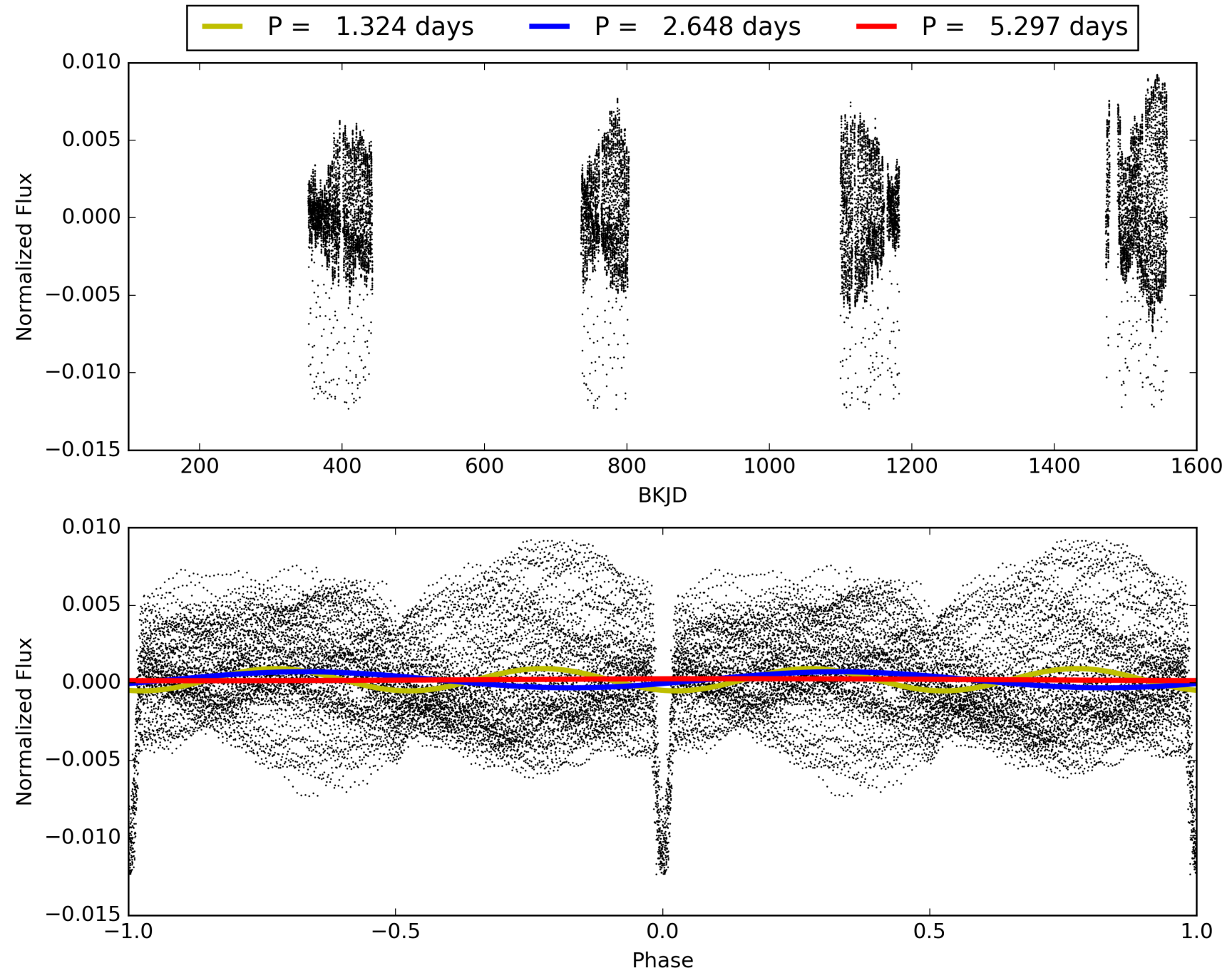
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:59:36 Z

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

TCE 002167890-01, PDC Light Curves

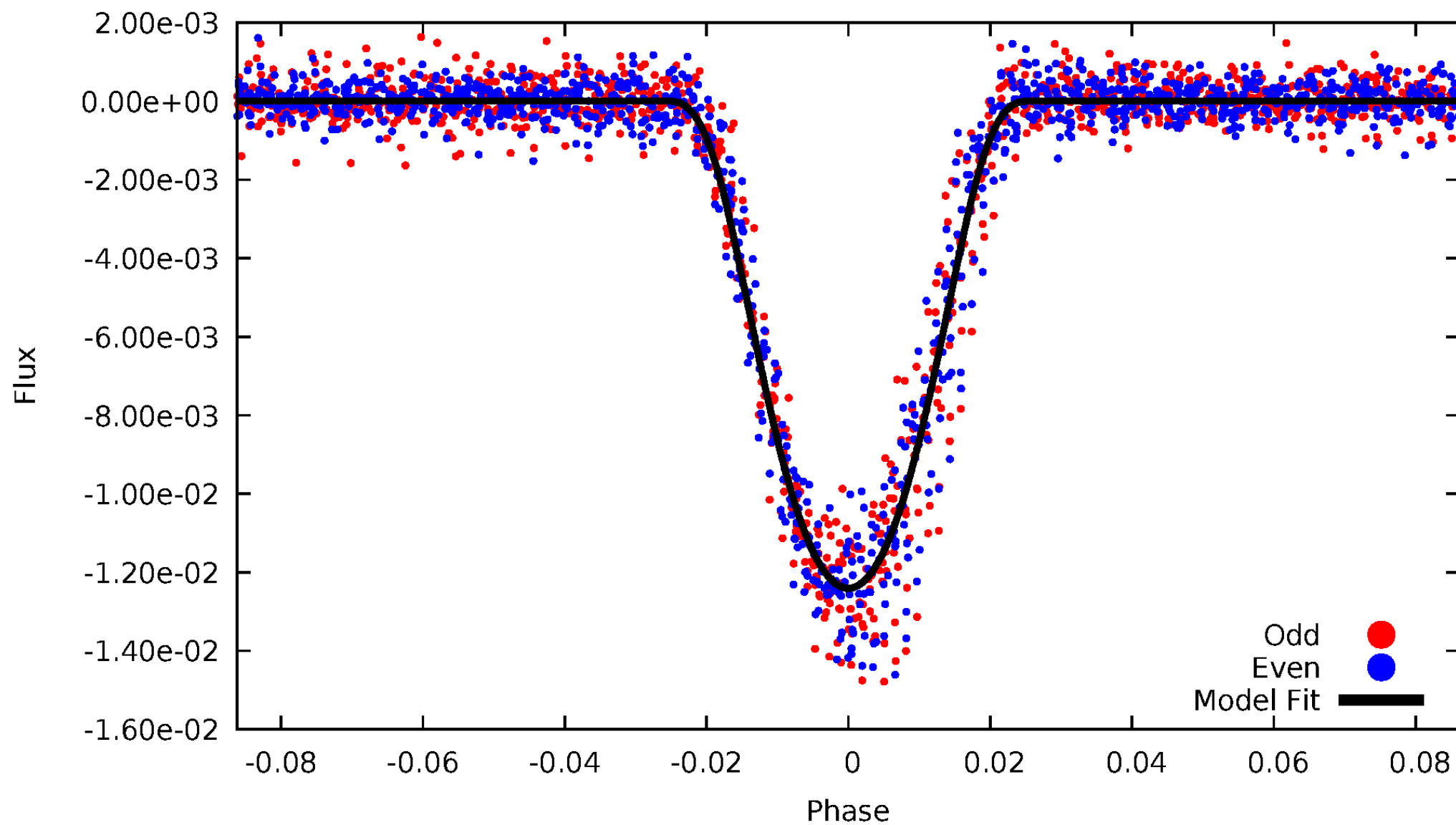


TCE 002167890-01



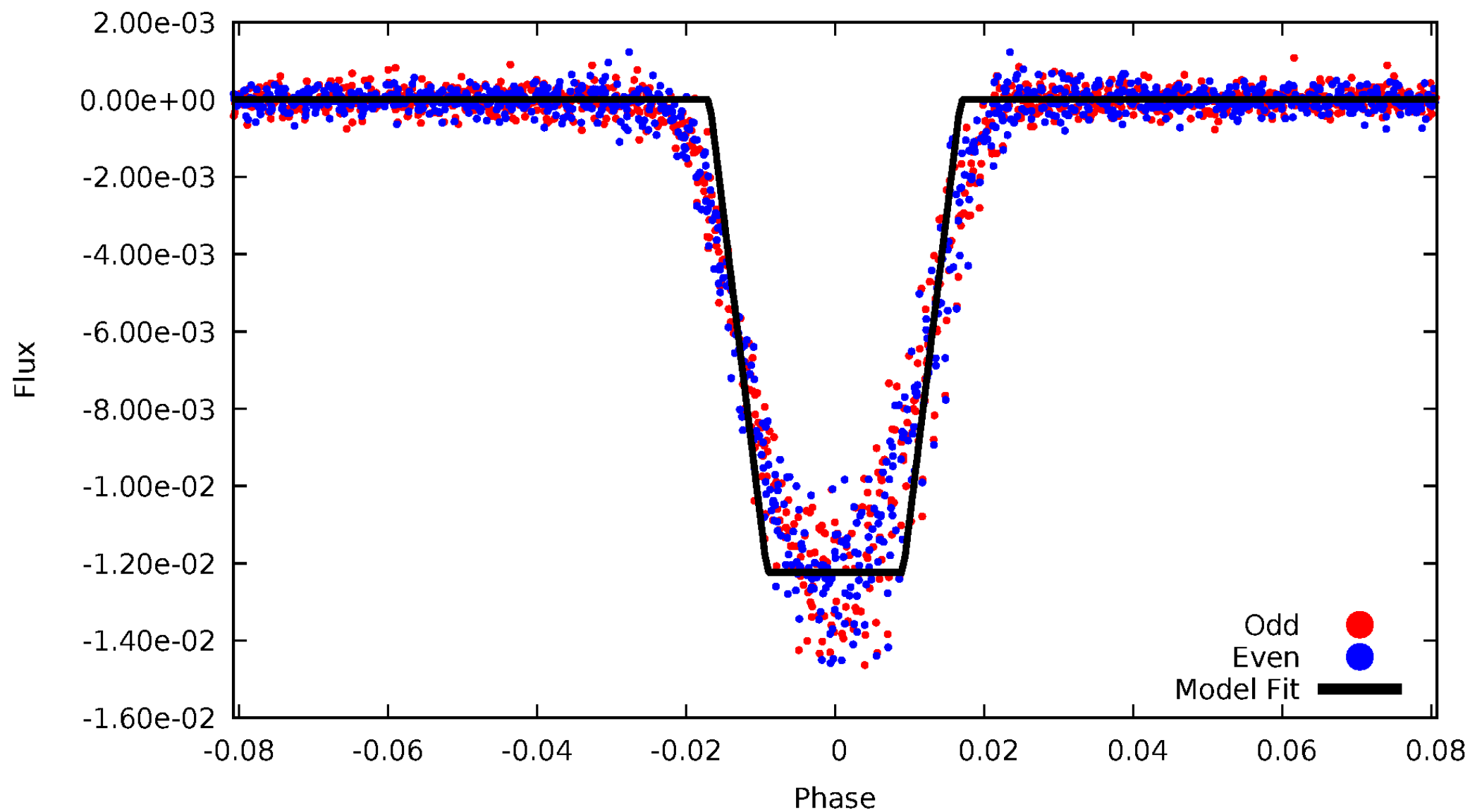
DV Odd/Even

TCE 002167890-01

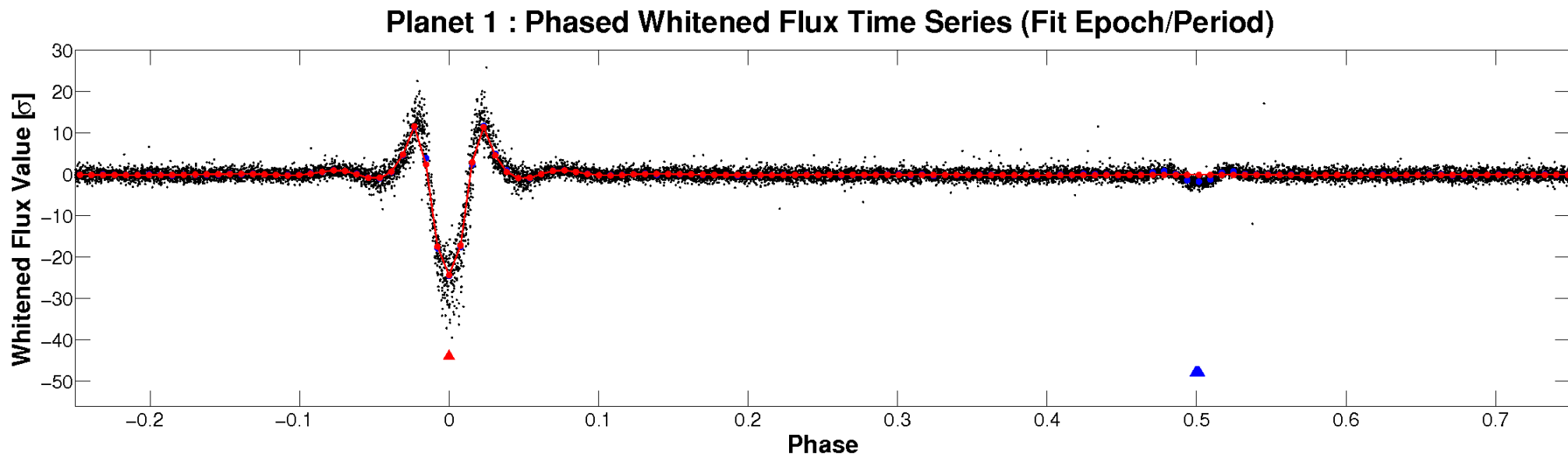
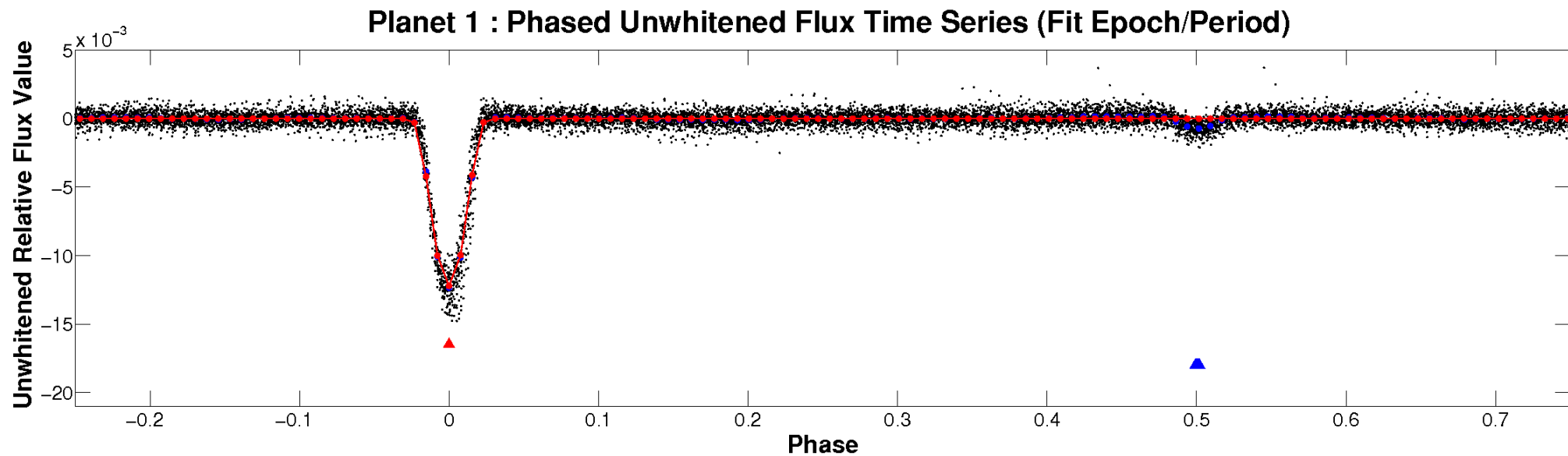


ALT Odd/Even

TCE 002167890-01

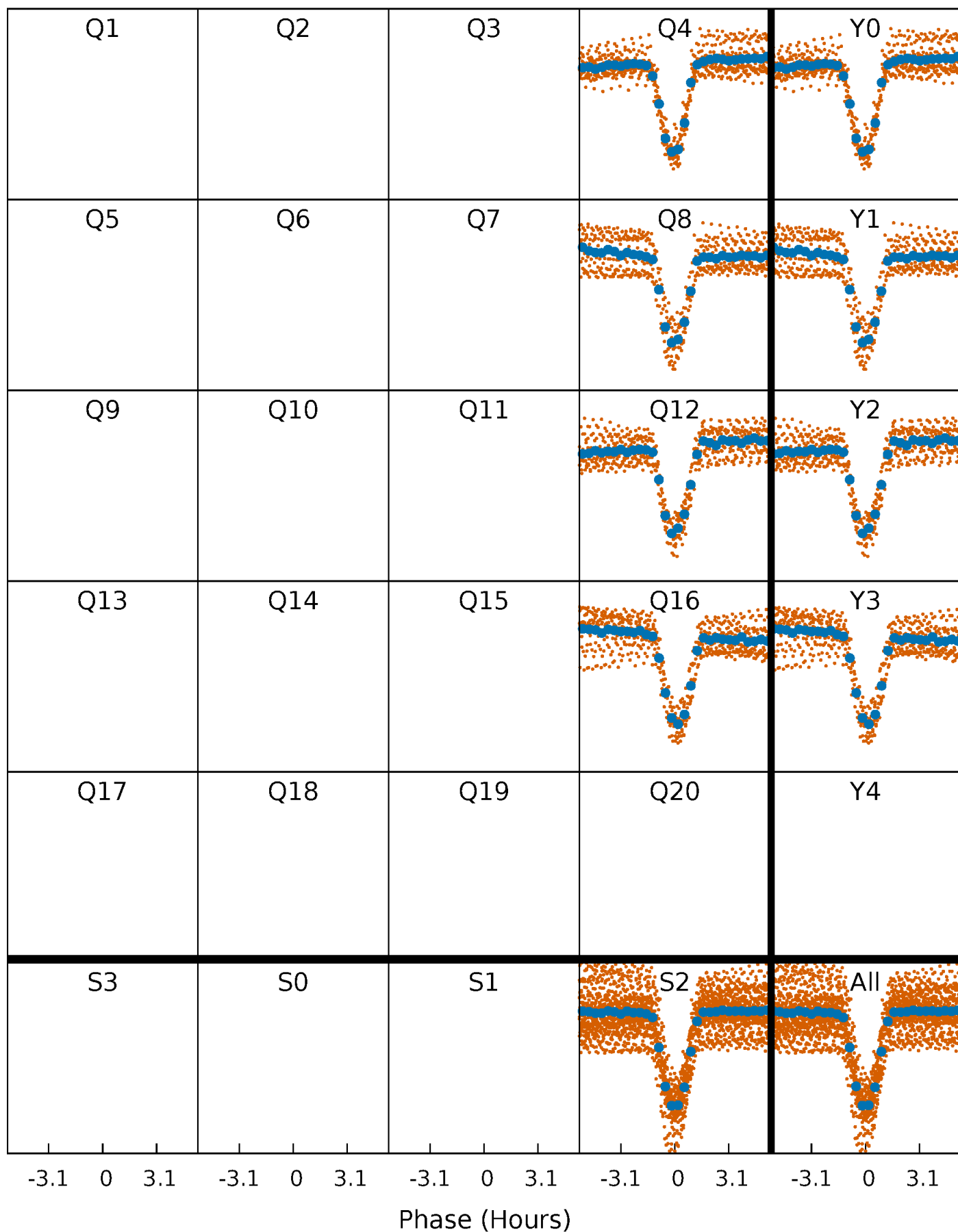


Non-Whitened Vs. Whitened Light Curve



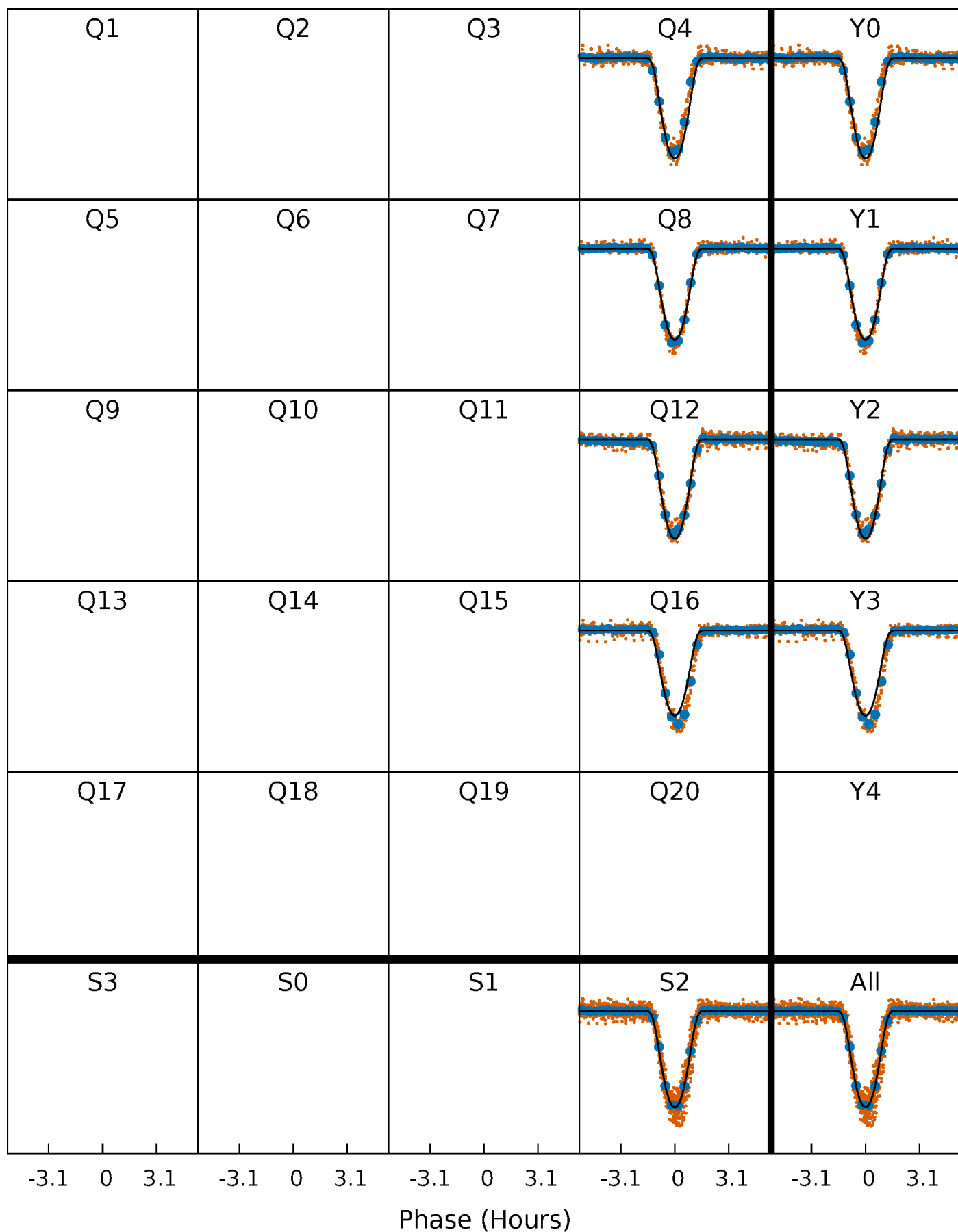
PDC Quarter-Phased Transit Curves

TCE 002167890-01 P= 2.648277 Days $T_0=133.041404$ (BKJD)



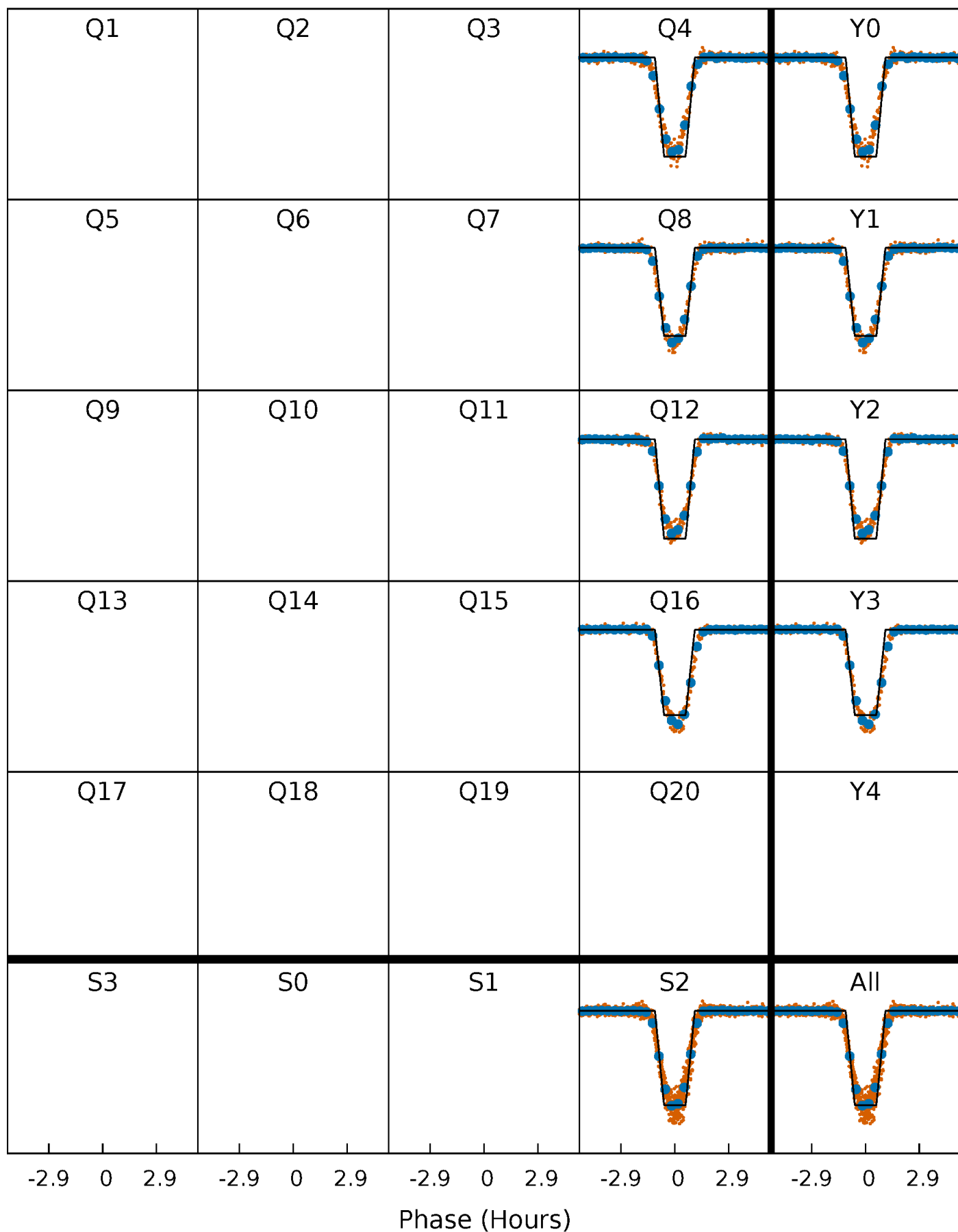
DV Quarter-Phased Transit Curves

TCE 002167890-01 P= 2.648277 Days $T_0=133.041404$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

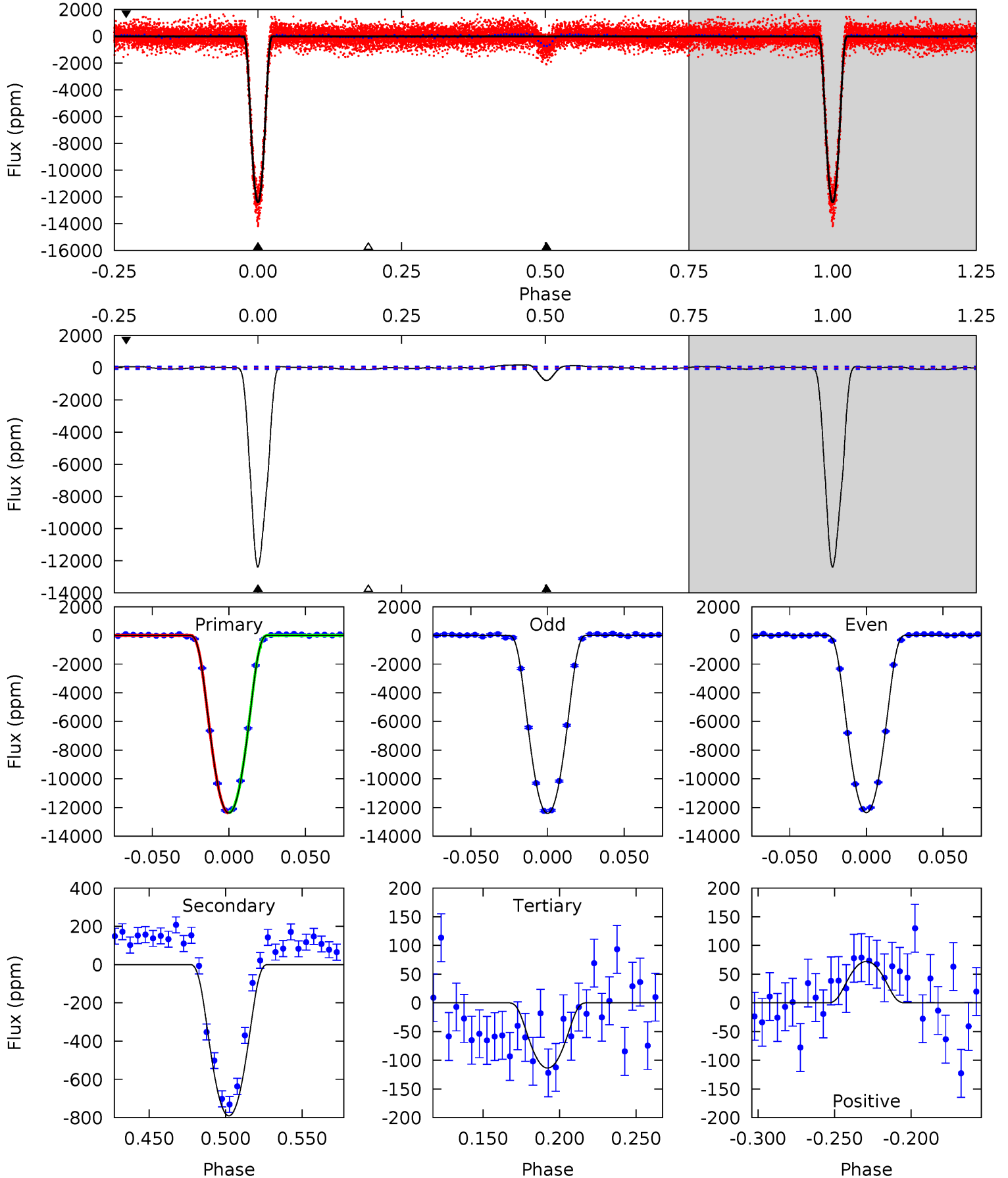
TCE 002167890-01 P= 2.648286 Days $T_0=133.039809$ (BKJD)



DV Model-Shift Uniqueness Test

002167890-01, P = 2.648277 Days, E = 133.041404 Days

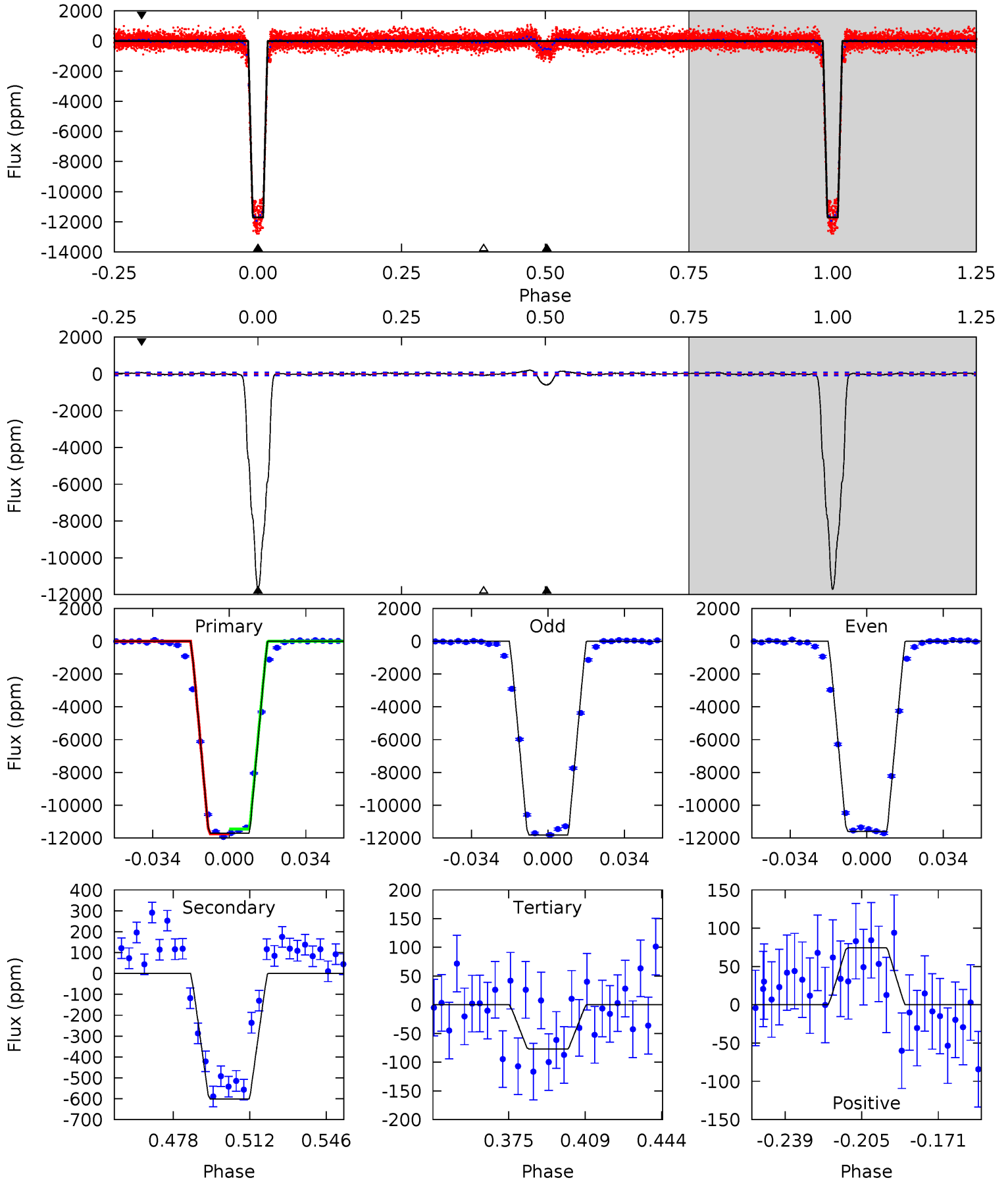
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
700.9	44.7	6.43	4.08	4.71	1.96	3.34	694.5	696.8	38.3	40.6	1.57	1.00	0.01	0



Alt Model-Shift Uniqueness Test

002167890-01, P = 2.648286 Days, E = 133.039809 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
683.4	35.1	4.51	4.34	4.79	2.12	2.00	678.9	679.1	30.6	30.8	6.35	1.00	0.02	8.48



Stellar Parameters For KIC 002167890

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4839^{+50}_{-86}	$2.761^{+0.188}_{-0.101}$	$-0.040^{+0.100}_{-0.150}$	$9.278^{+1.524}_{-2.831}$	$1.808^{+0.273}_{-0.682}$	$0.003^{+0.004}_{-0.001}$
	+1%/-2%	+7%/-4%	+250%/-375%	+16%/-31%	+15%/-38%	+120%/-33%
Source	SPE74	SPE74	SPE74	DSEP		

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

Secondary Eclipse Parameters for KIC 002167890-01 / KOI 3670.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-791 ± 18	$133.64^{+14.37}_{-21.03}$	4215^{+205}_{-253}	-3644^{+184}_{-140}	$0.052^{+0.015}_{-0.009}$
Alt.	-602 ± 17	$112.11^{+11.40}_{-17.31}$	4211^{+201}_{-270}	-3632^{+191}_{-141}	$0.057^{+0.017}_{-0.009}$

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

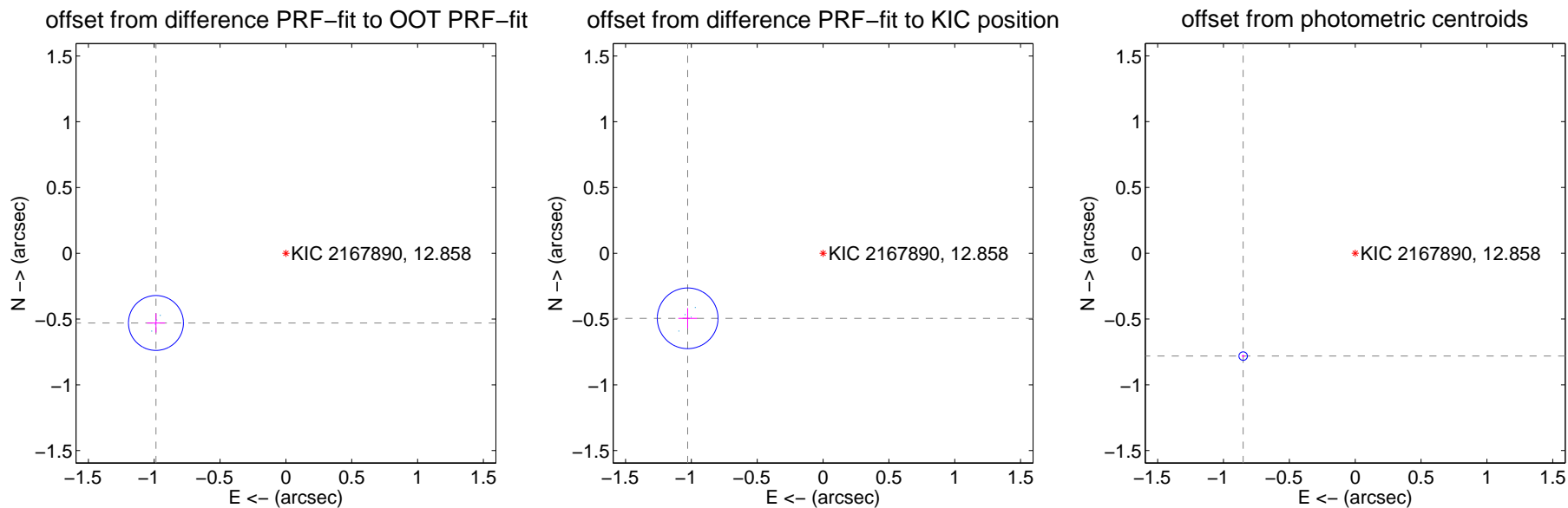
DV Centroid Data

Supplemental centroid analysis for 002167890-01. Kepler magnitude: 12.86. Transit SNR 340.09

There are 4 quarters with good PRF difference image offsets

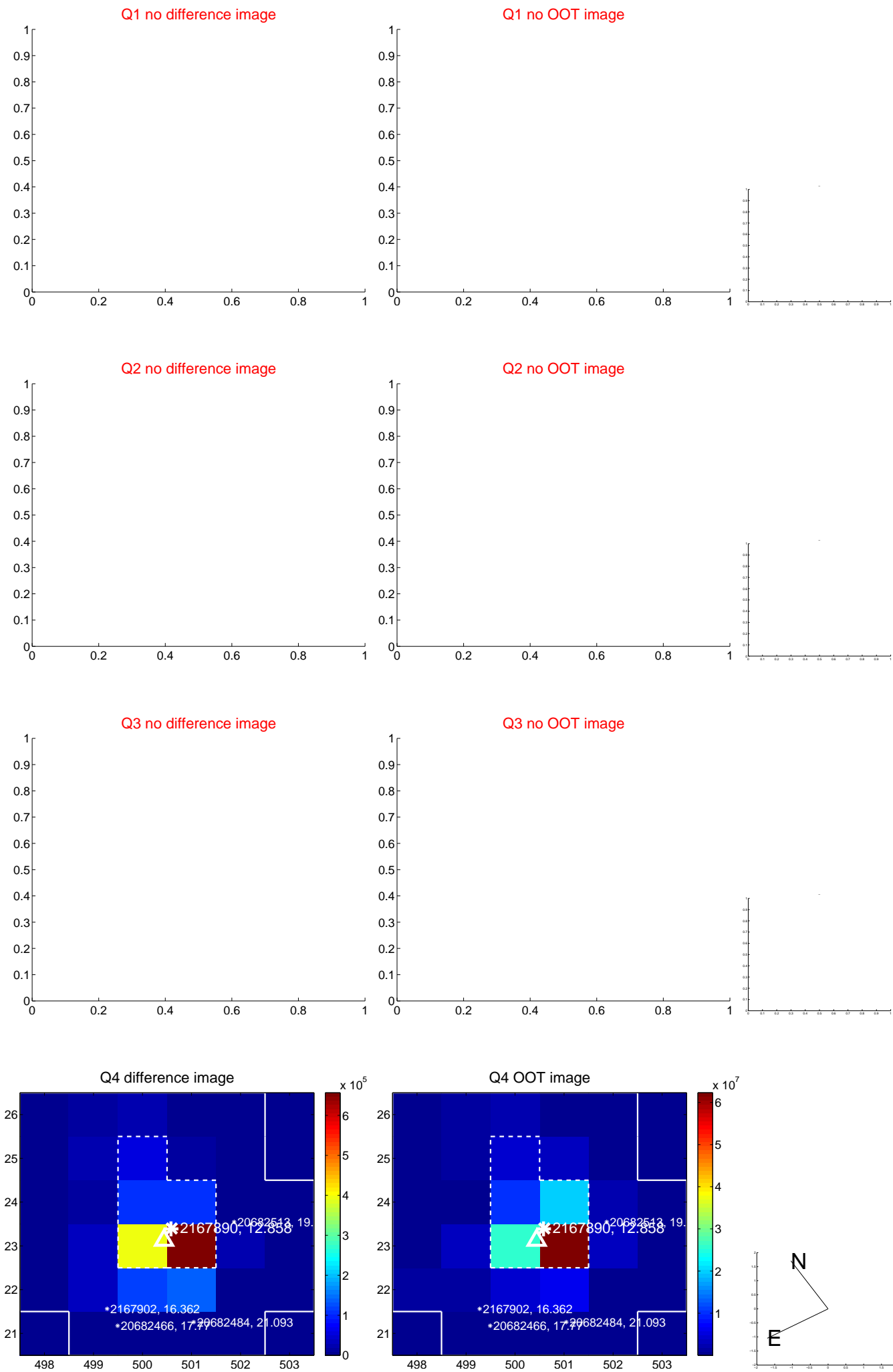
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.120 ± 0.070	16.10	0.987 ± 0.069	-0.530 ± 0.073
PRF-fit source offset from KIC position	1.141 ± 0.077	14.84	1.028 ± 0.071	-0.494 ± 0.077
photometric centroid source offset	1.16 ± 0.01	107.46	0.85 ± 0.01	-0.78 ± 0.01

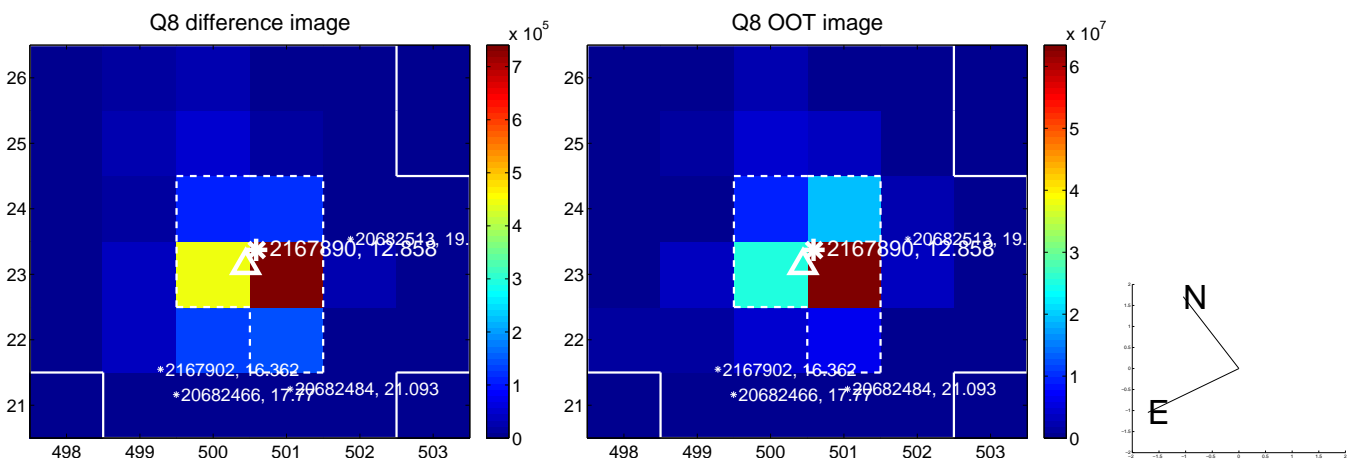
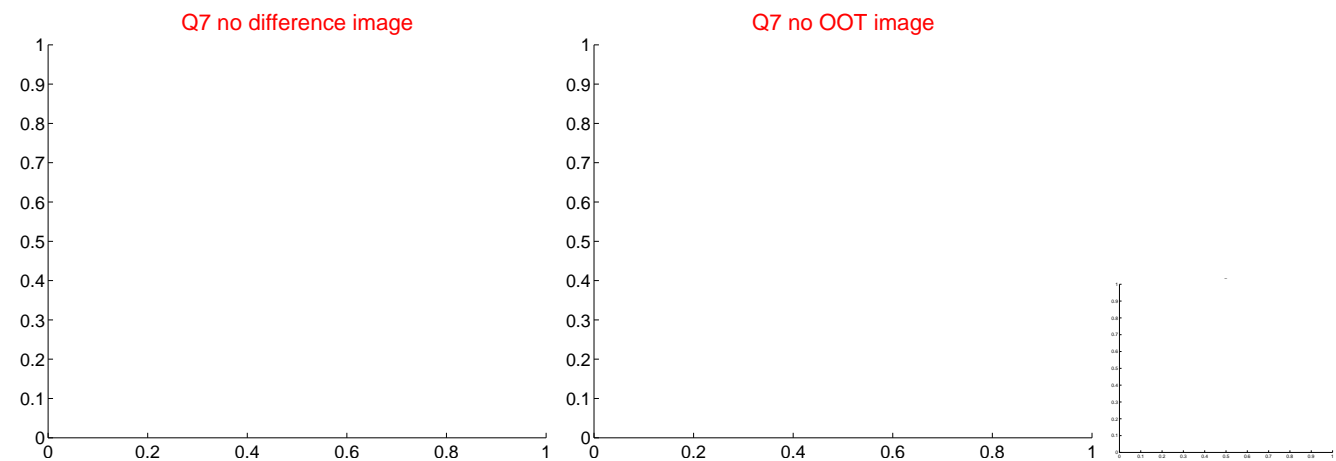
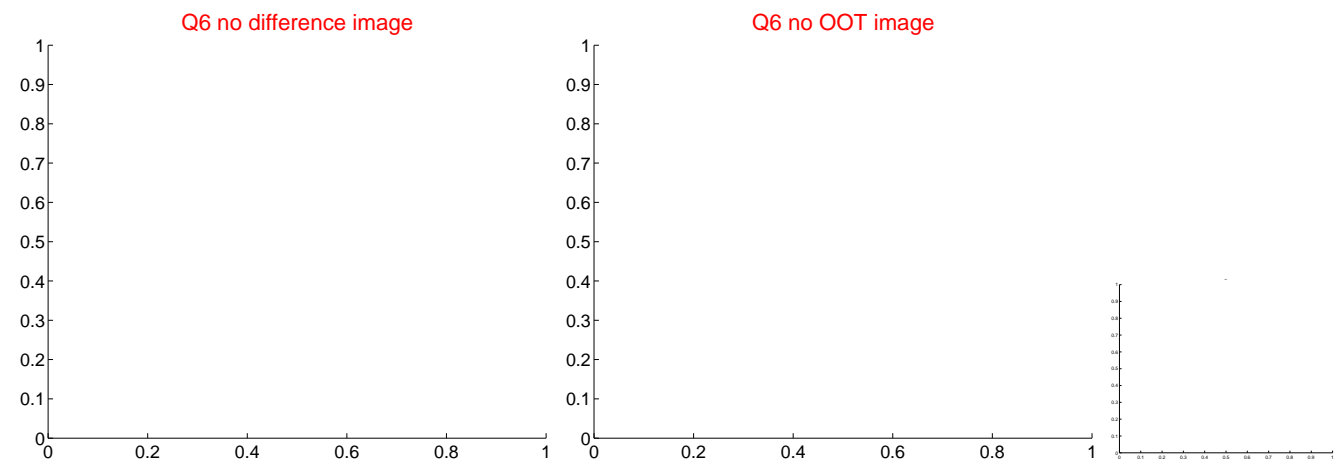
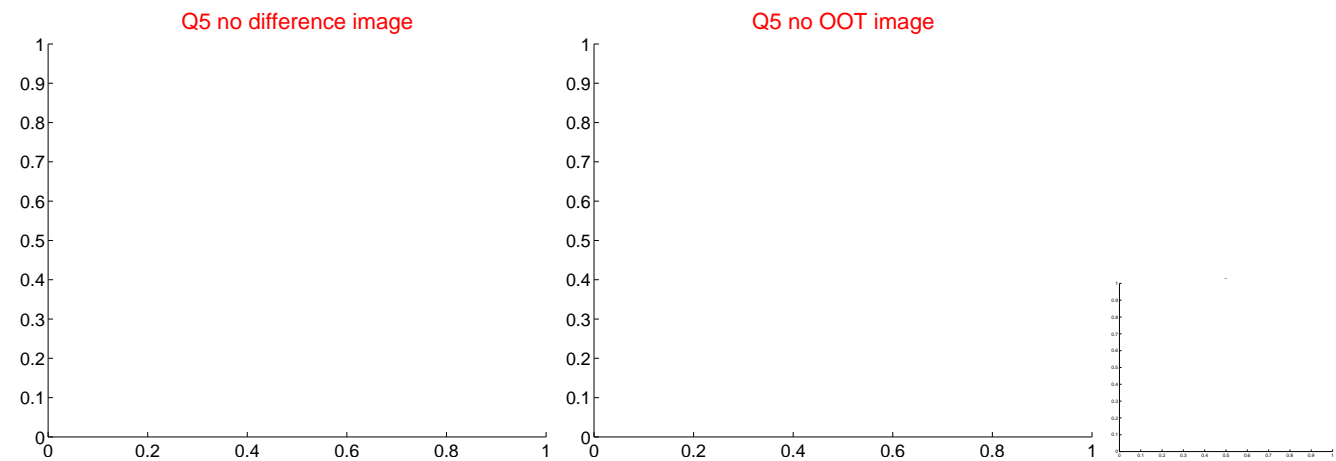


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

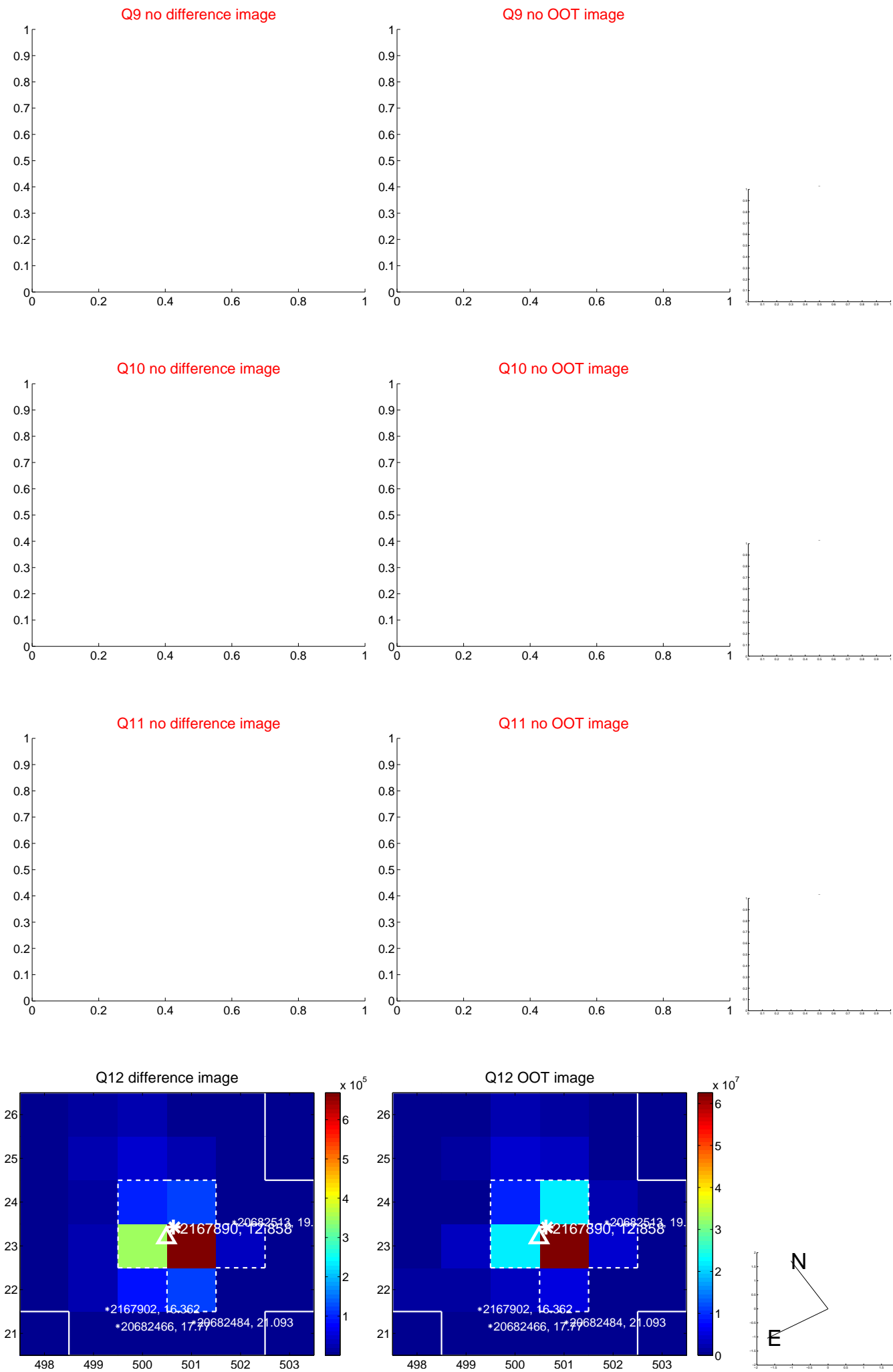
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



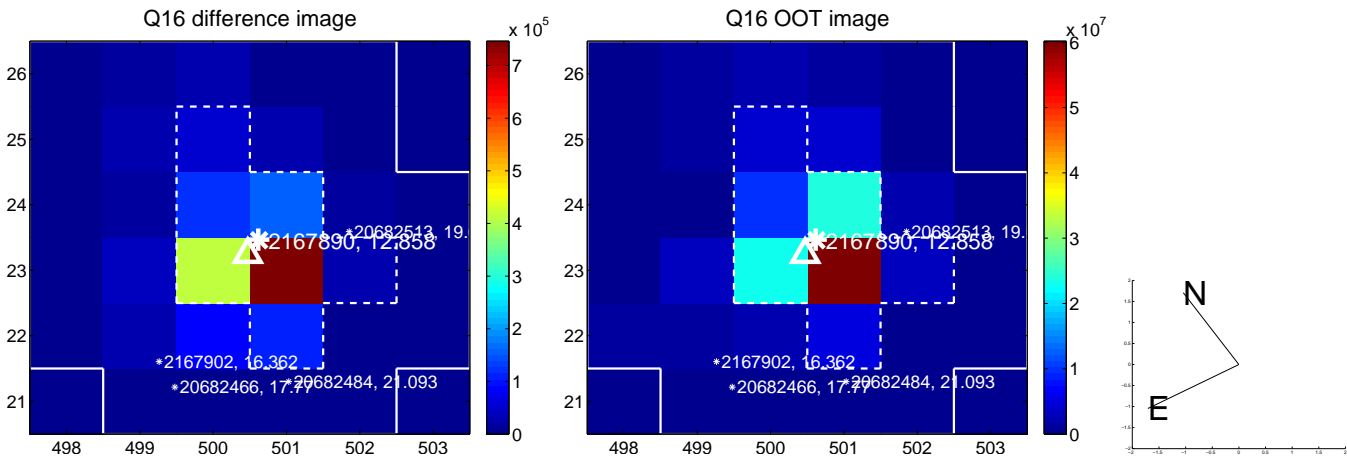
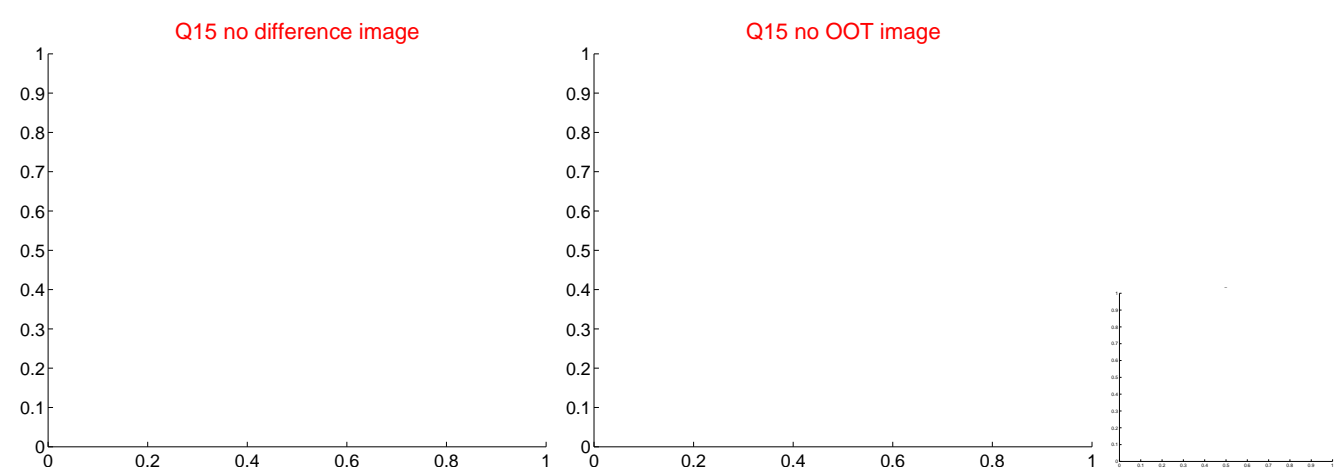
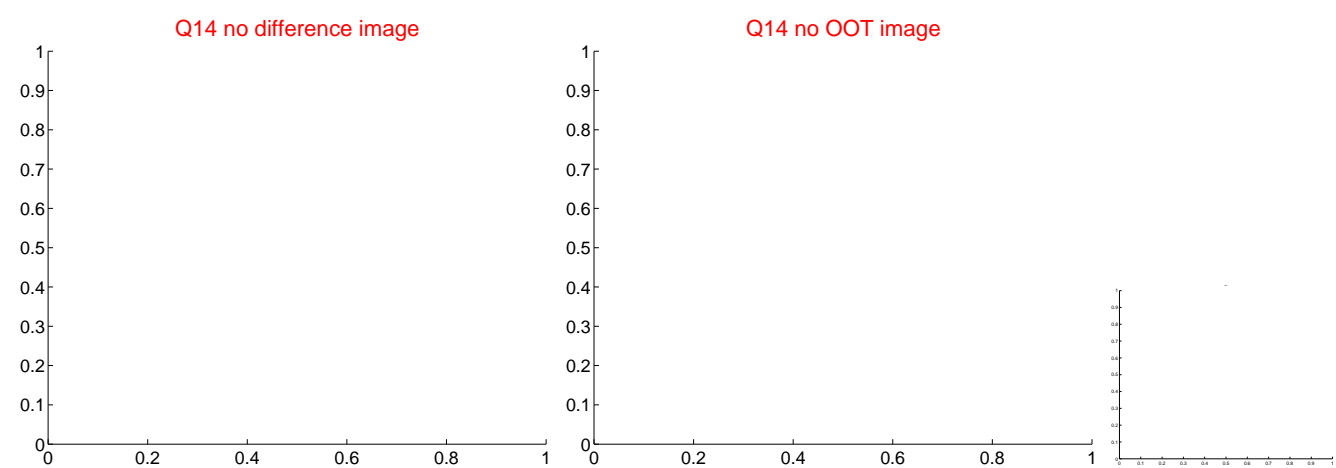
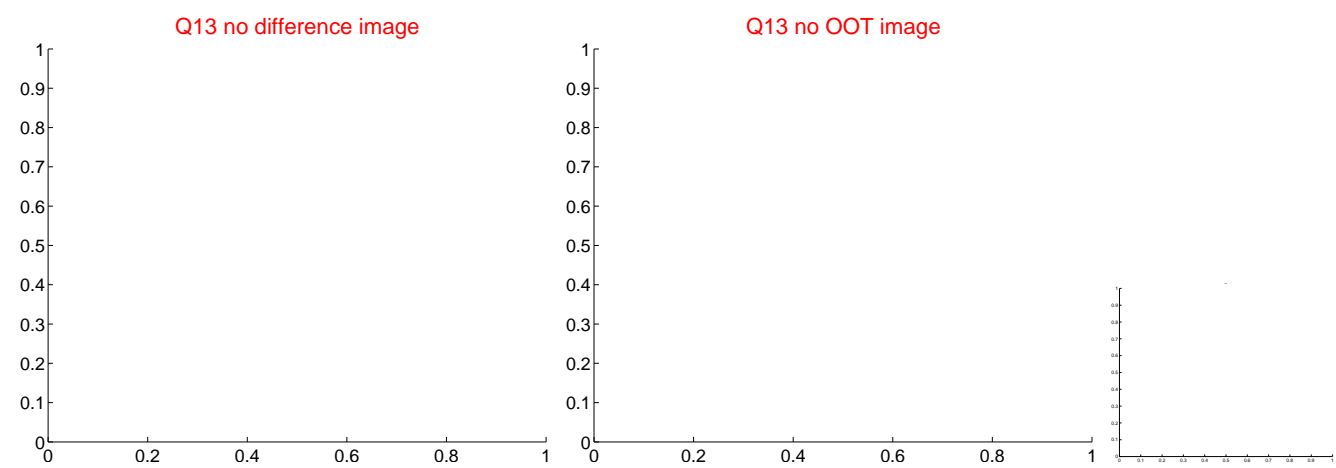
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



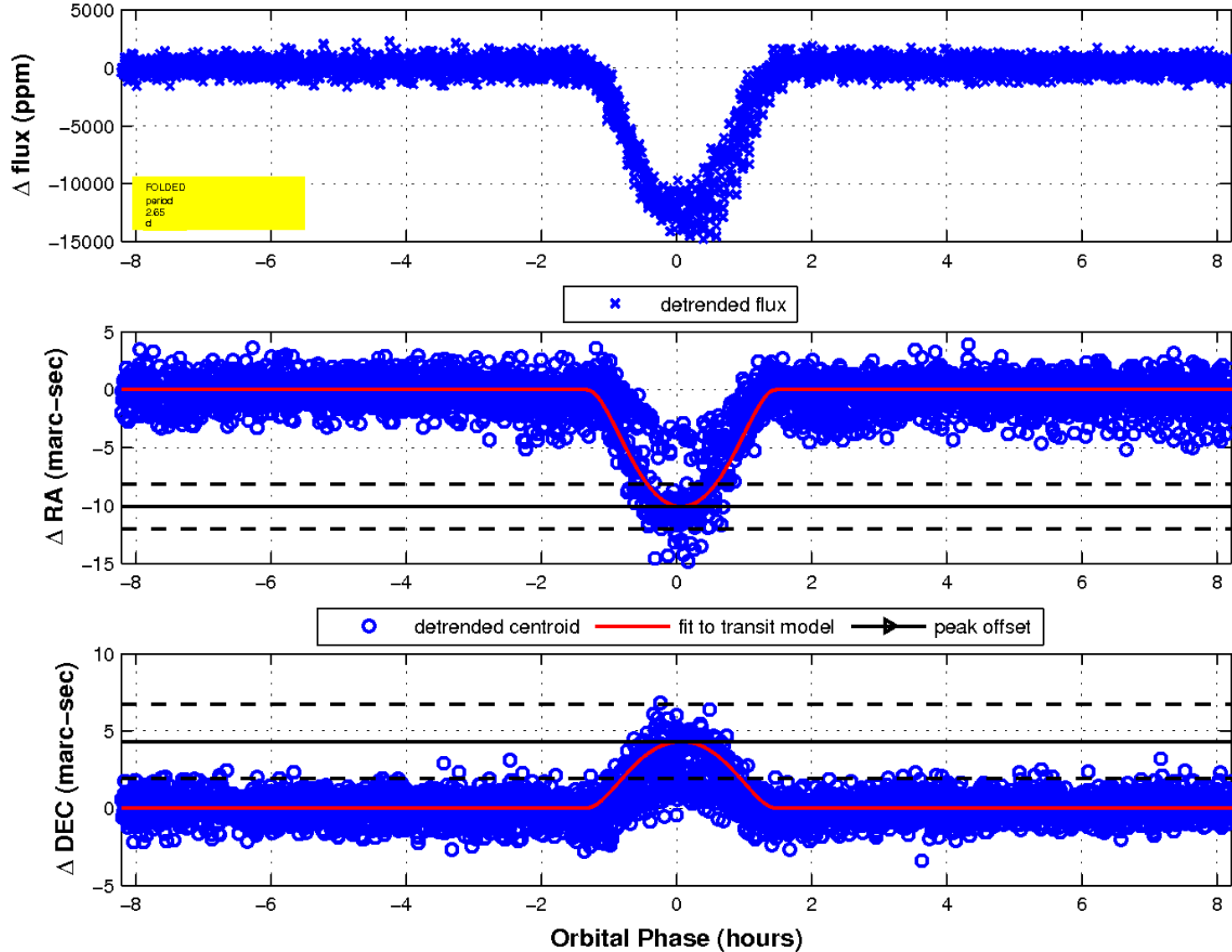
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q17 no difference image

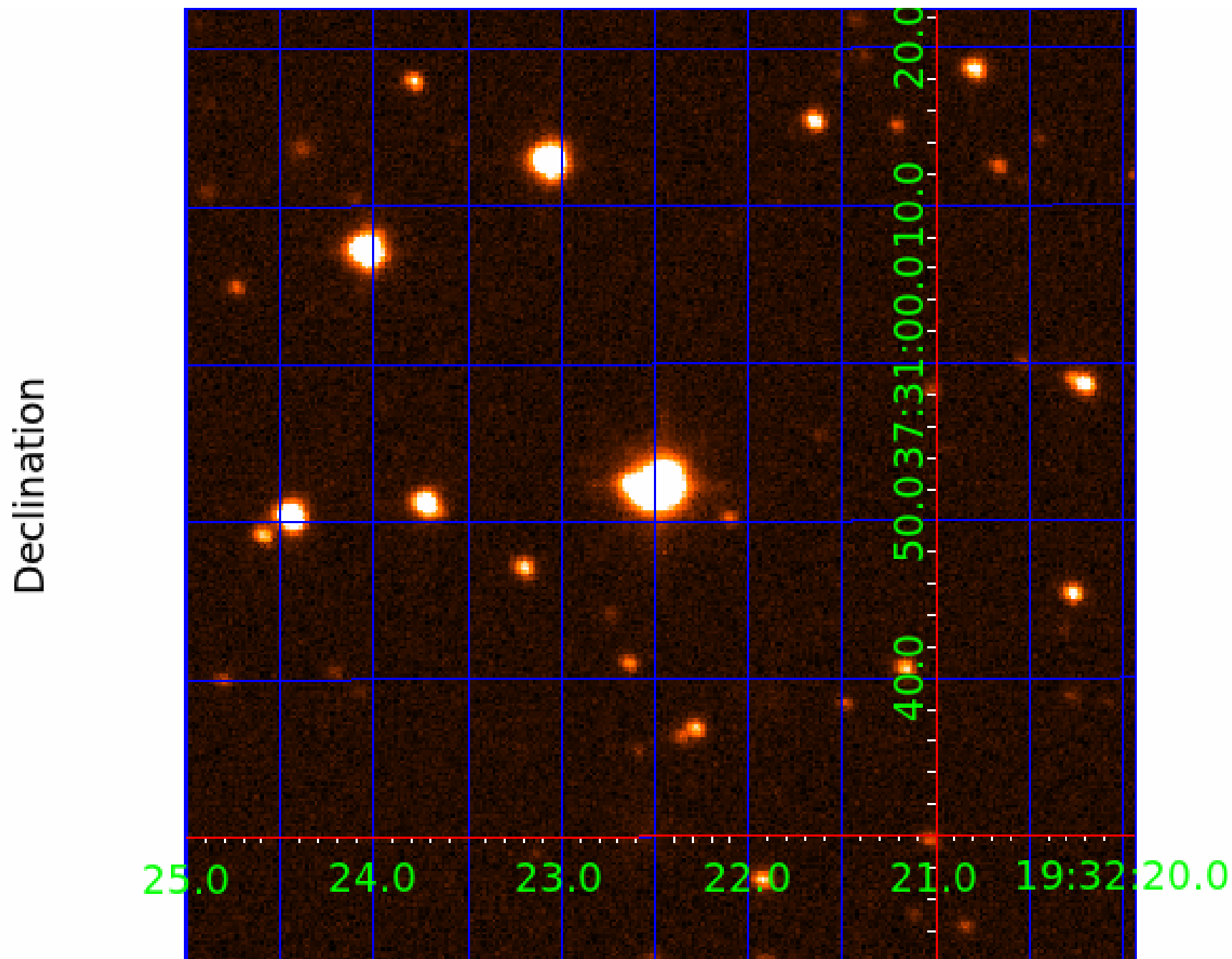
Q17 no OOT image



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 002167890

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})
002167890-01	OBS	3670.01	2.648277	133.041404	12408.7	2.739	480.3	340.1	9.28	4839	133.20	0.00
002167890-02	OBS	No	2.648289	131.715560	847.4	2.614	30.3	35.6	9.28	4839	38.91	20273.68

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002167890-01	OBS	FP	0.00	0	1	1	0	PLANET_IN_STAR—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
002167890-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

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.

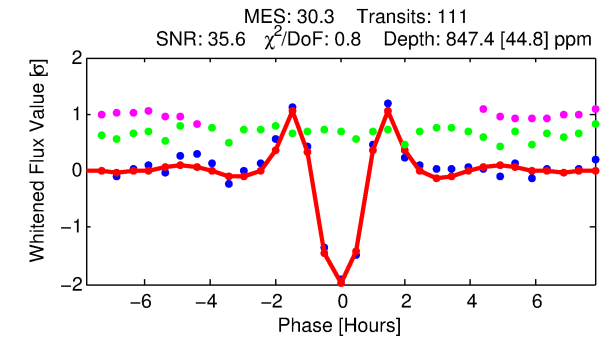
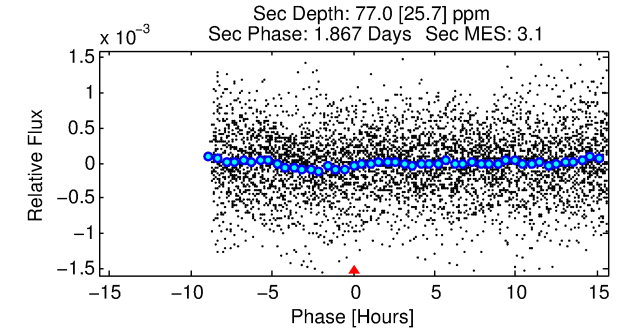
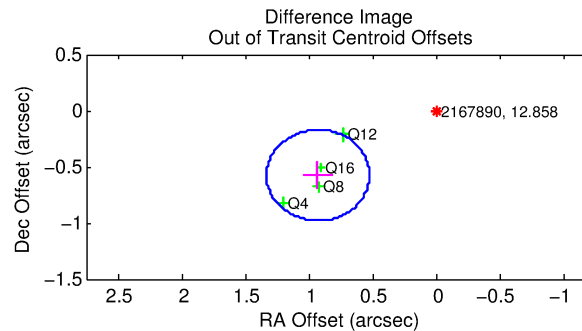
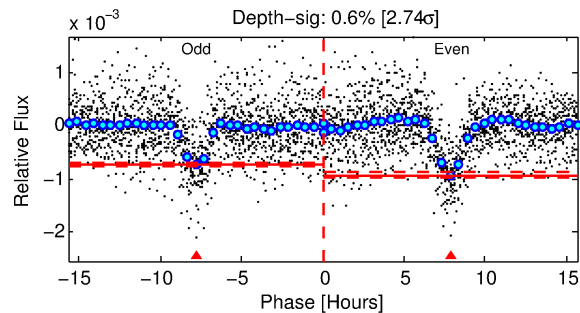
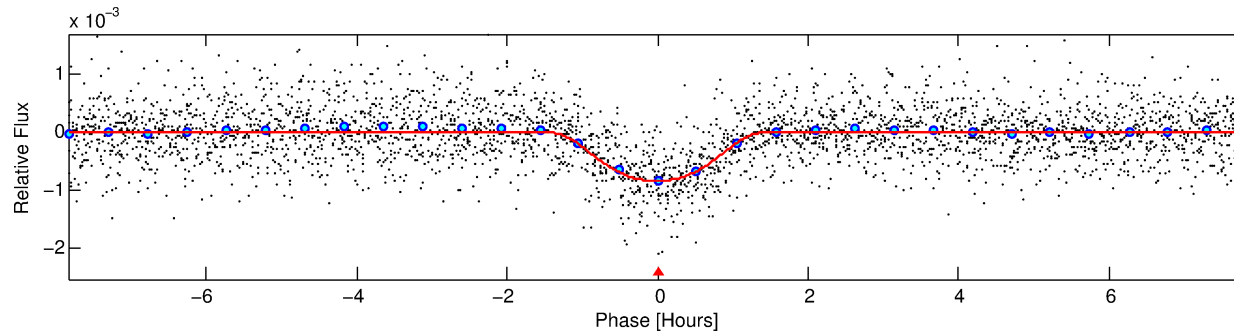
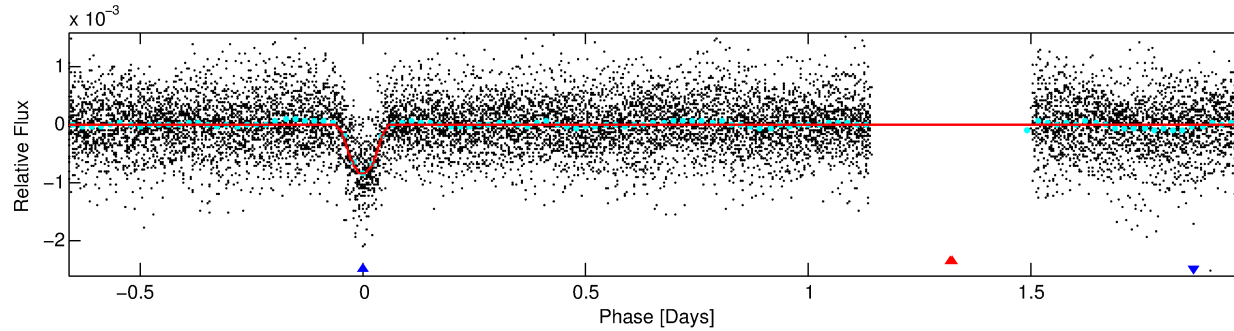
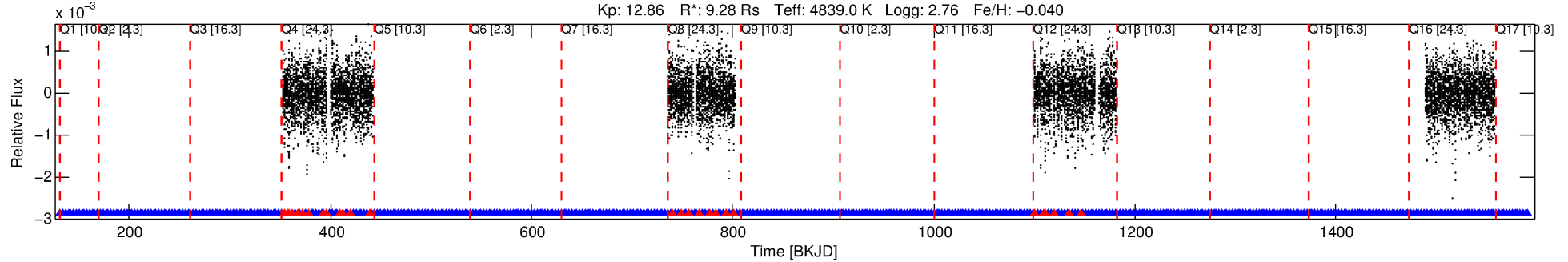
Ephemeris Match Information For 002167890-02

No Significant Match Found

DV One-Page Summary

KIC: 2167890 Candidate: 2 of 2 Period: 2.648 d
KOI: K03670 Corr: No Ephemeris Match

Kp: 12.86 R*: 9.28 Rs Teff: 4839.0 K Logg: 2.76 Fe/H: -0.040



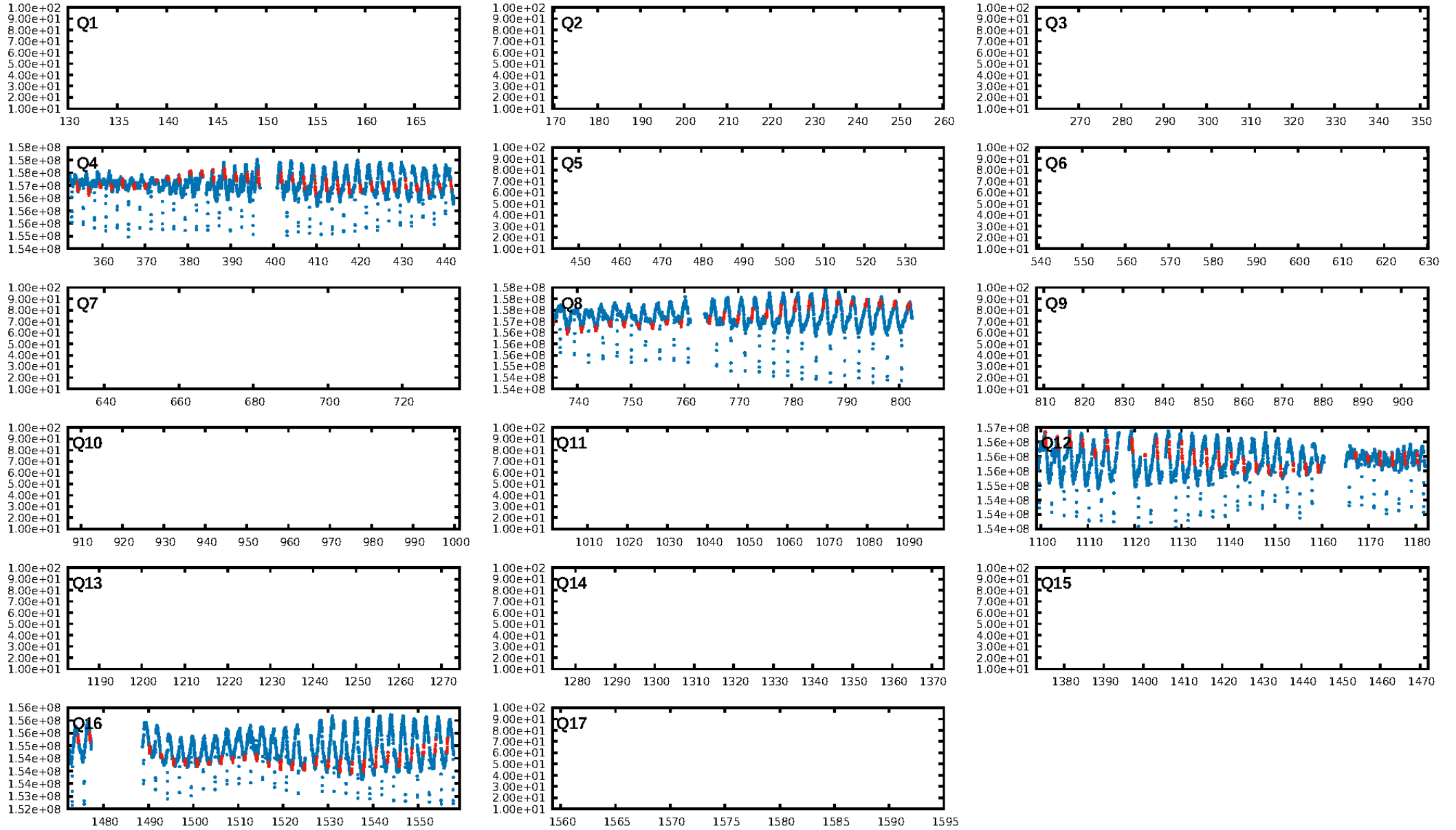
DV Fit Results:

Period = 2.64829 [0.00000] d
Epoch = 131.7156 [0.0007] BKJD
Rp/R* = 0.0384 [0.0028]
a/R* = 3.06 [0.14]
b = 0.97 [0.01]
Seff = 20273.68 [7301.85]
Teq = 3043 [274] K
Rp = 38.91 [12.22] Re
a = 0.0457 [0.0114] AU
Ag = 0.06 [0.03] [-31.80σ]
Teffp = 2312 [215] K [-2.10σ]

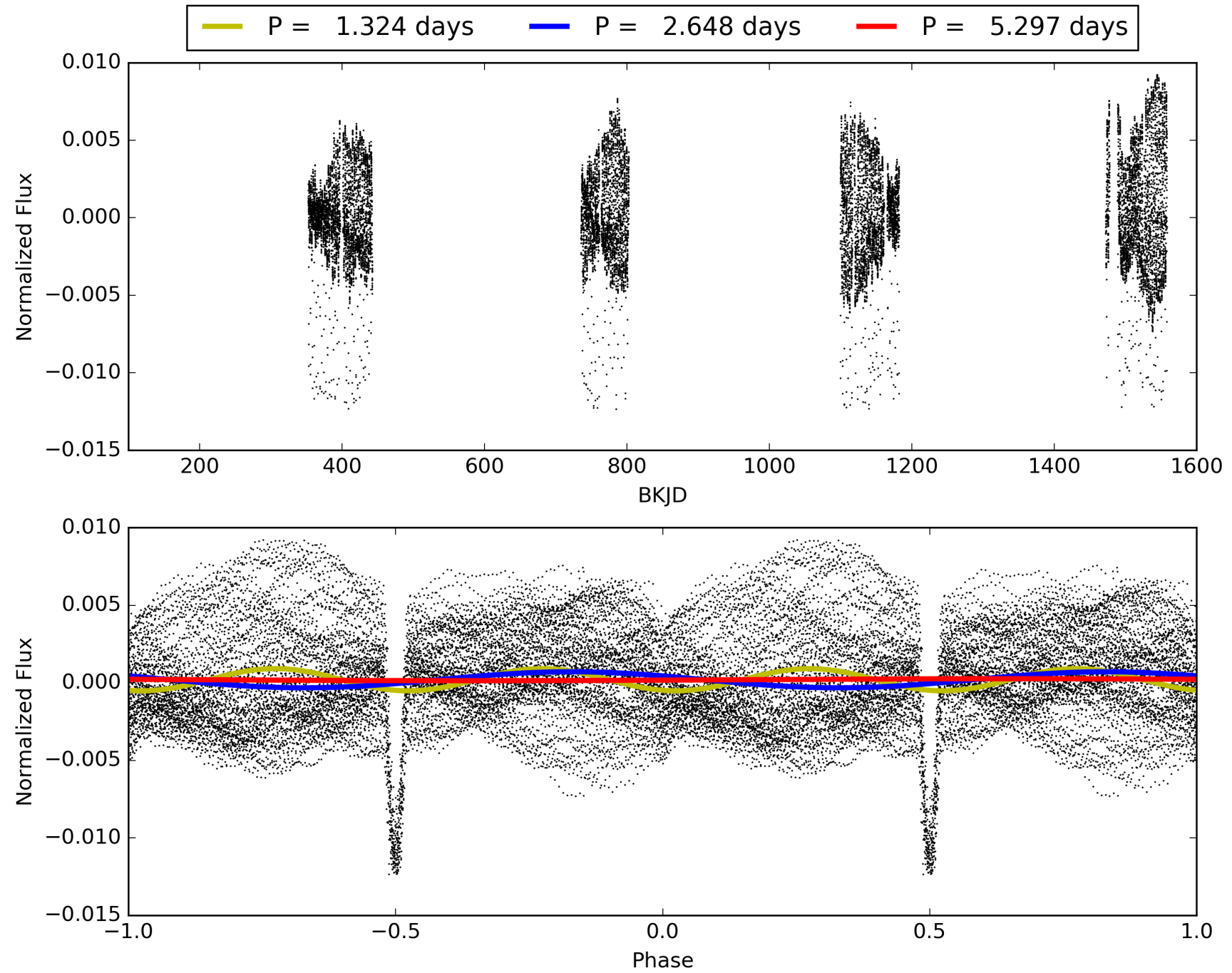
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.00e-183
RollingBand-fgt: 0.76 [84/111]
GhostDiagnostic-chr: 1.787
Centroid-sig: 0.0%
Centroid-so: 0.796 arcsec [5.19σ]
OotOffset-rm: 1.093 arcsec [8.10σ]
KicOffset-rm: 1.090 arcsec [7.48σ]
OotOffset-st: 0/0/4/0 [4]
KicOffset-st: 0/0/4/0 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [4/4]

TCE 002167890-02, PDC Light Curves

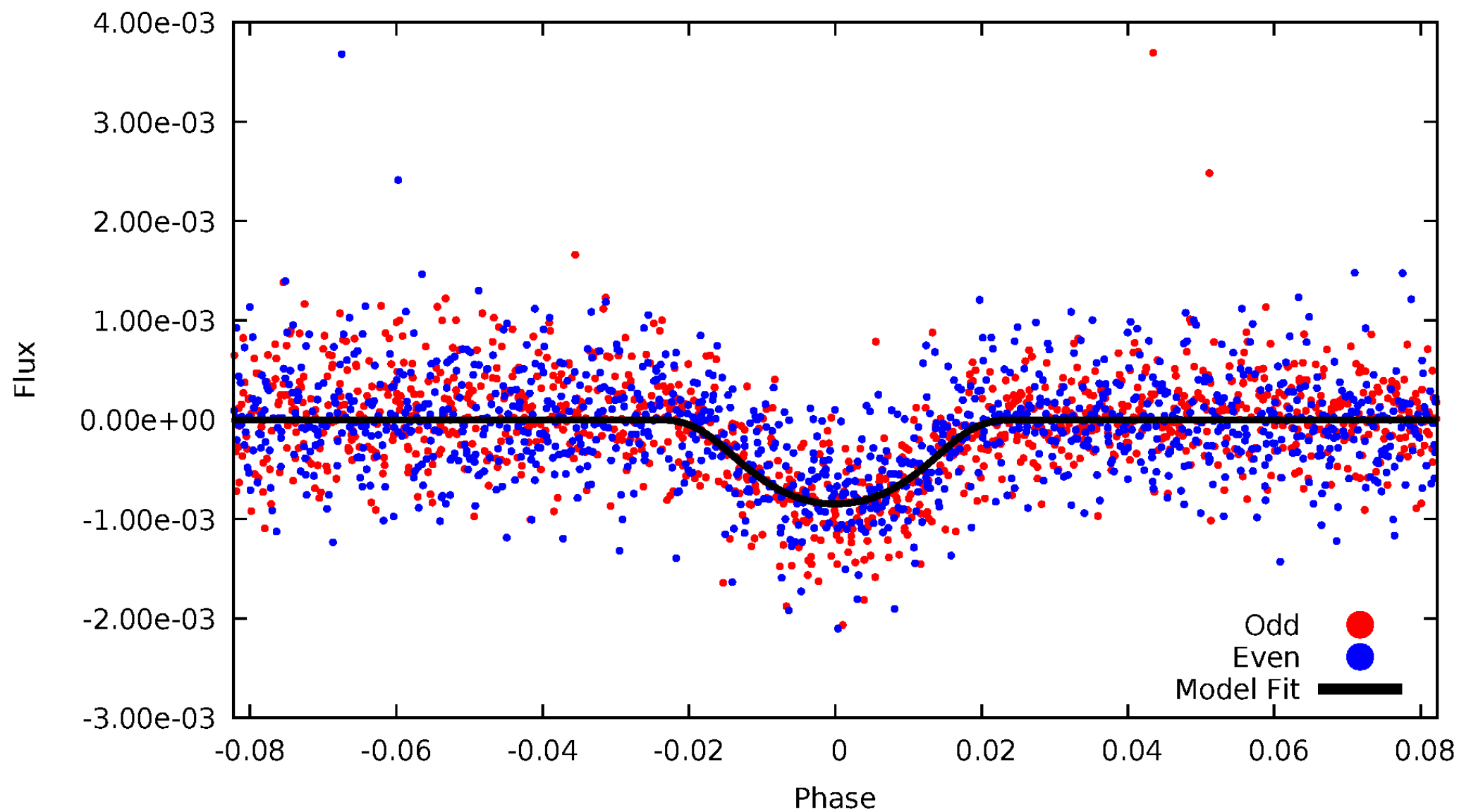


TCE 002167890-02



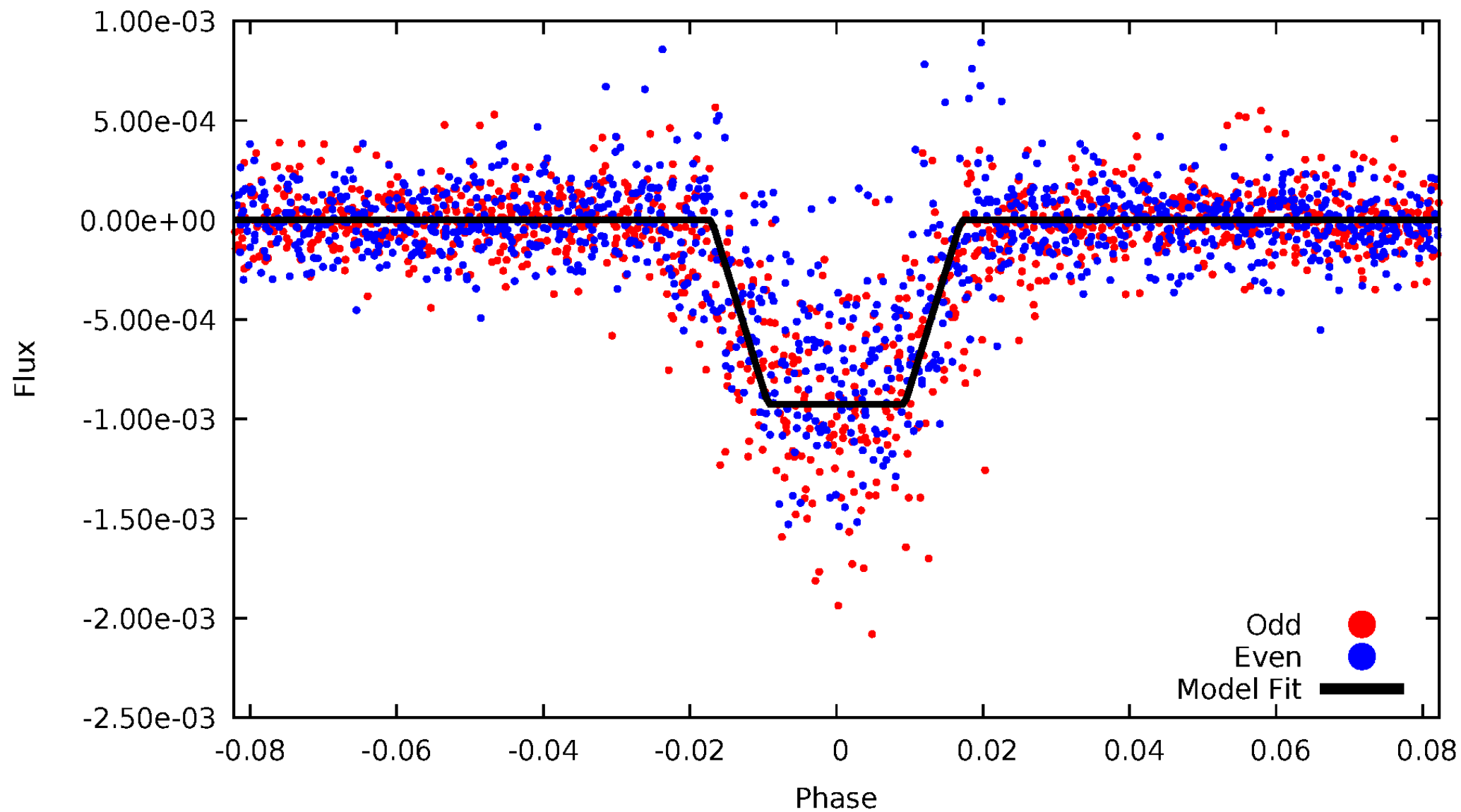
DV Odd/Even

TCE 002167890-02



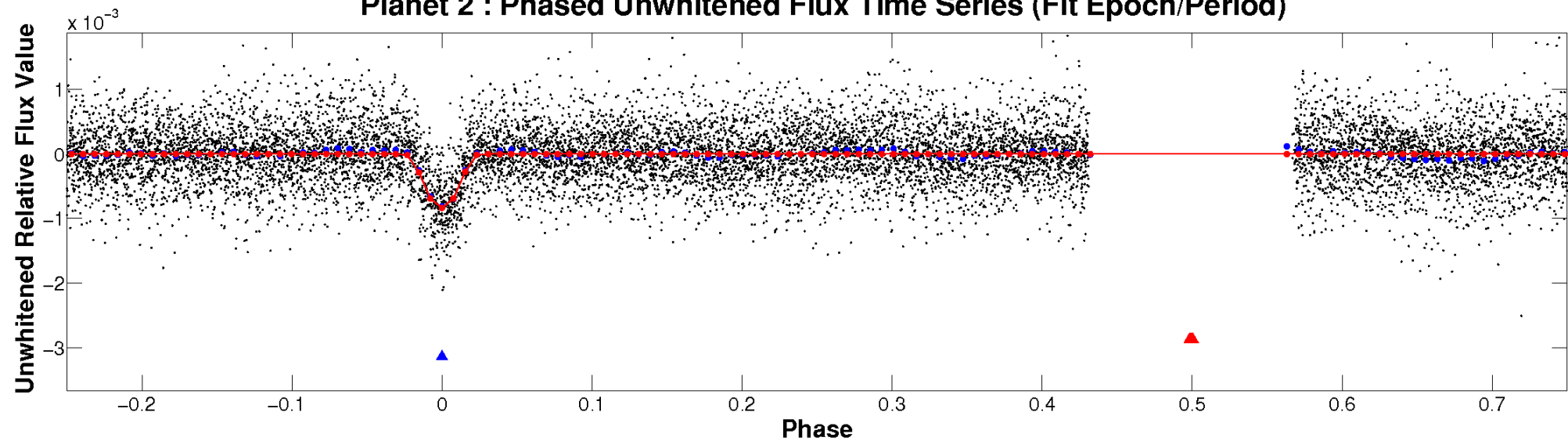
ALT Odd/Even

TCE 002167890-02

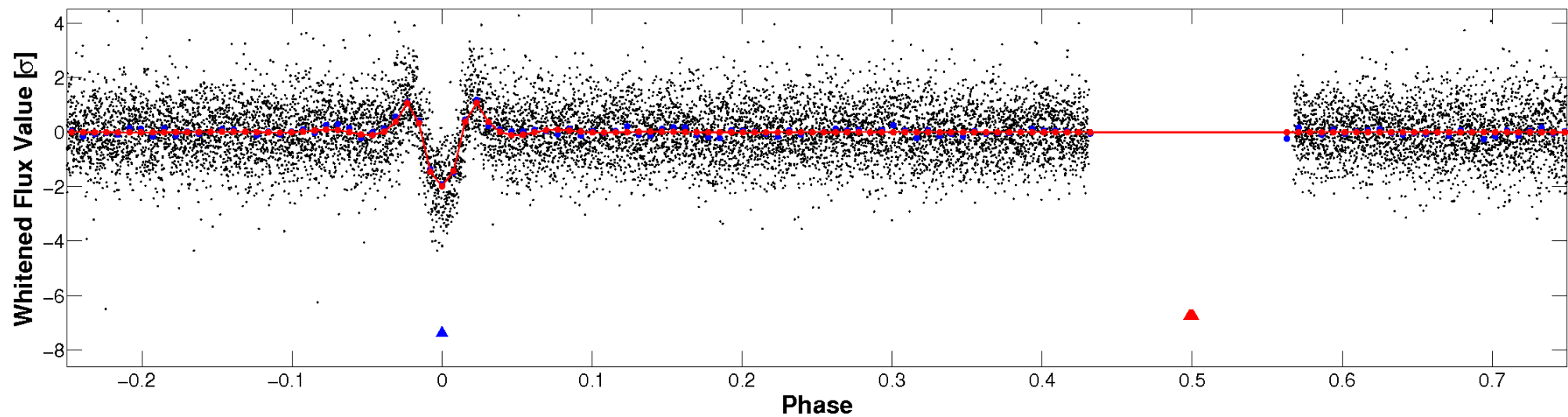


Non-Whitened Vs. Whitened Light Curve

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

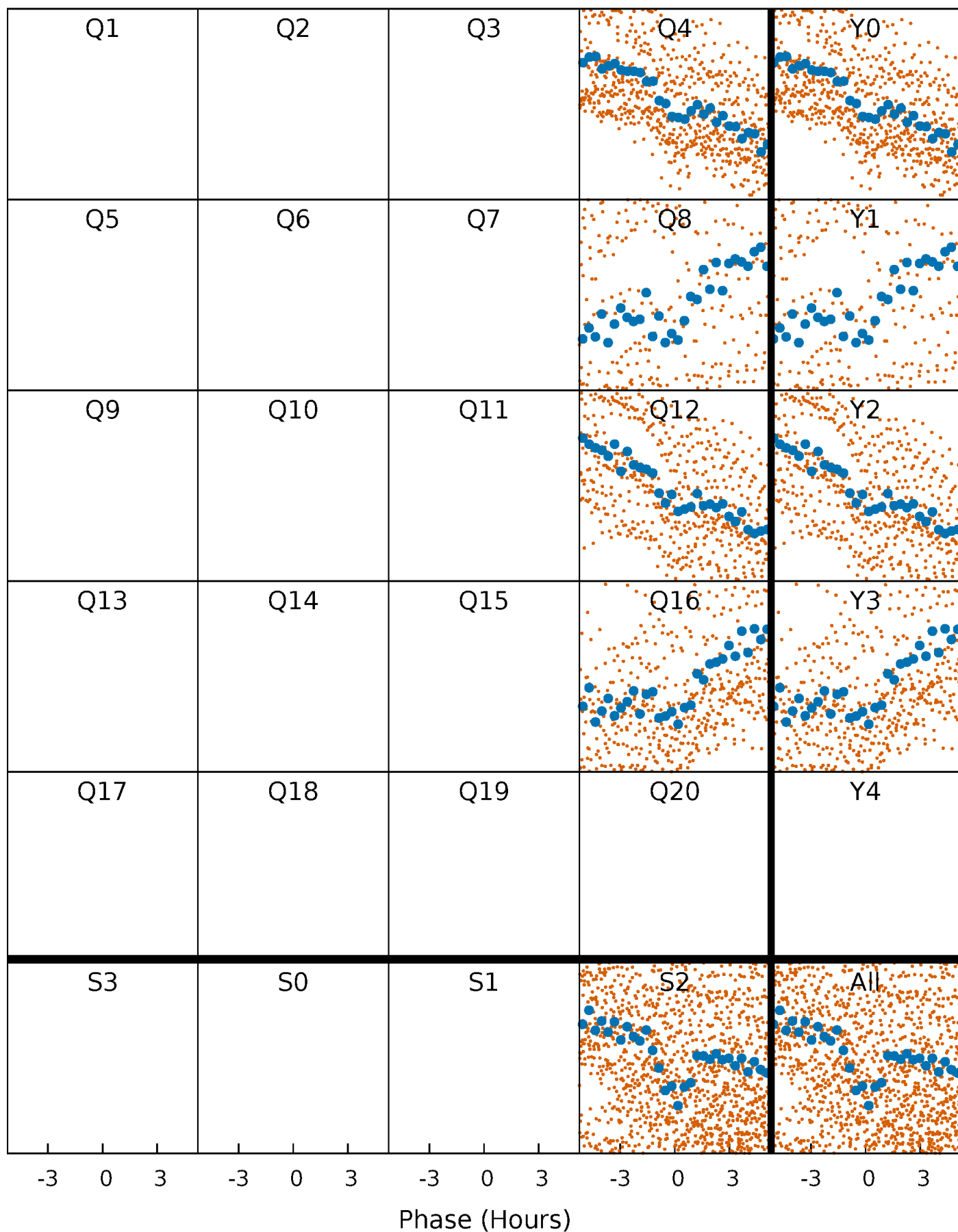


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



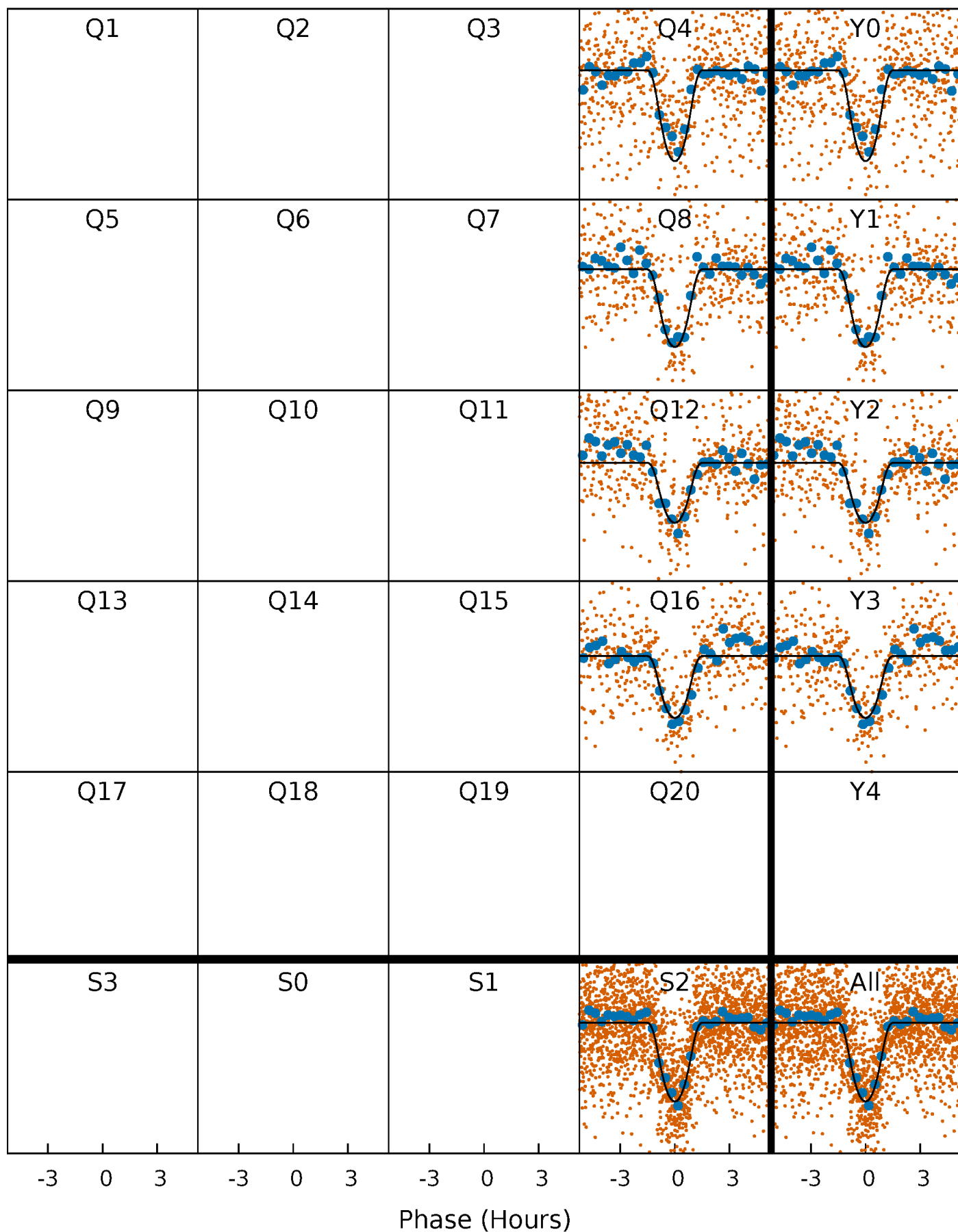
PDC Quarter-Phased Transit Curves

TCE 002167890-02 P= 2.648289 Days $T_0=131.715560$ (BKJD)



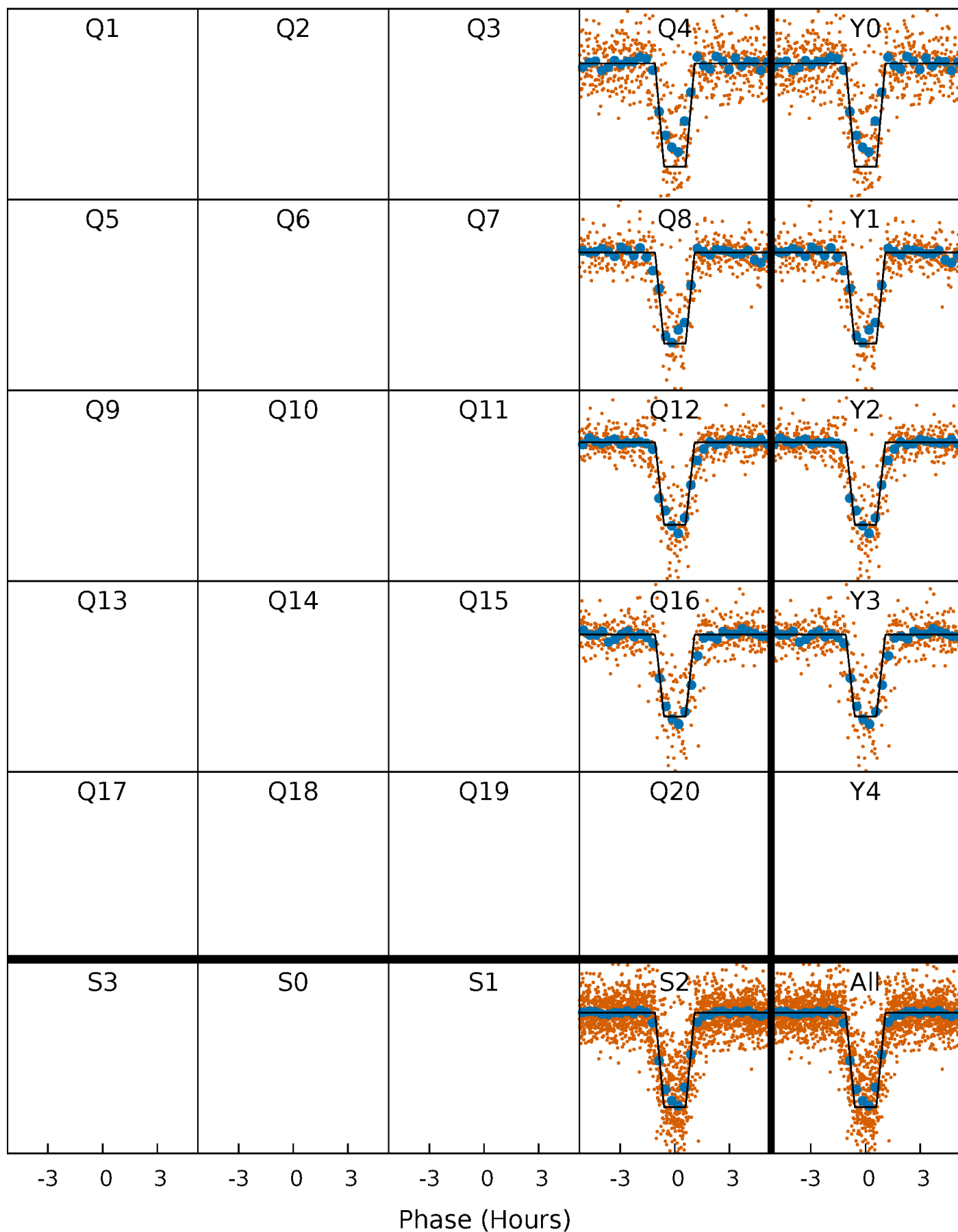
DV Quarter-Phased Transit Curves

TCE 002167890-02 P= 2.648289 Days $T_0=131.715560$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

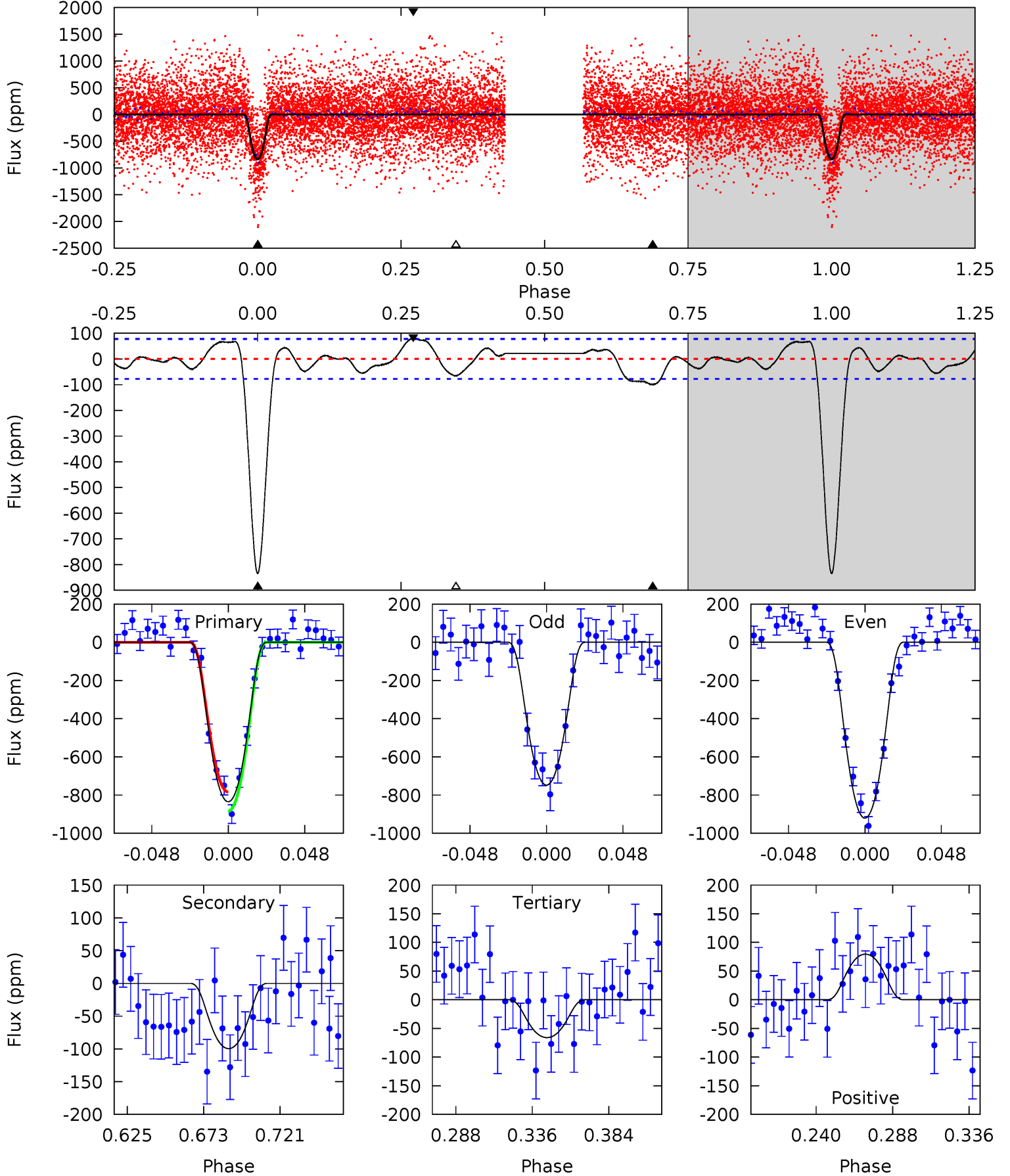
TCE 002167890-02 $P = 2.648286$ Days $T_0 = 131.717436$ (BKJD)



DV Model-Shift Uniqueness Test

002167890-02, P = 2.648289 Days, E = 131.715560 Days

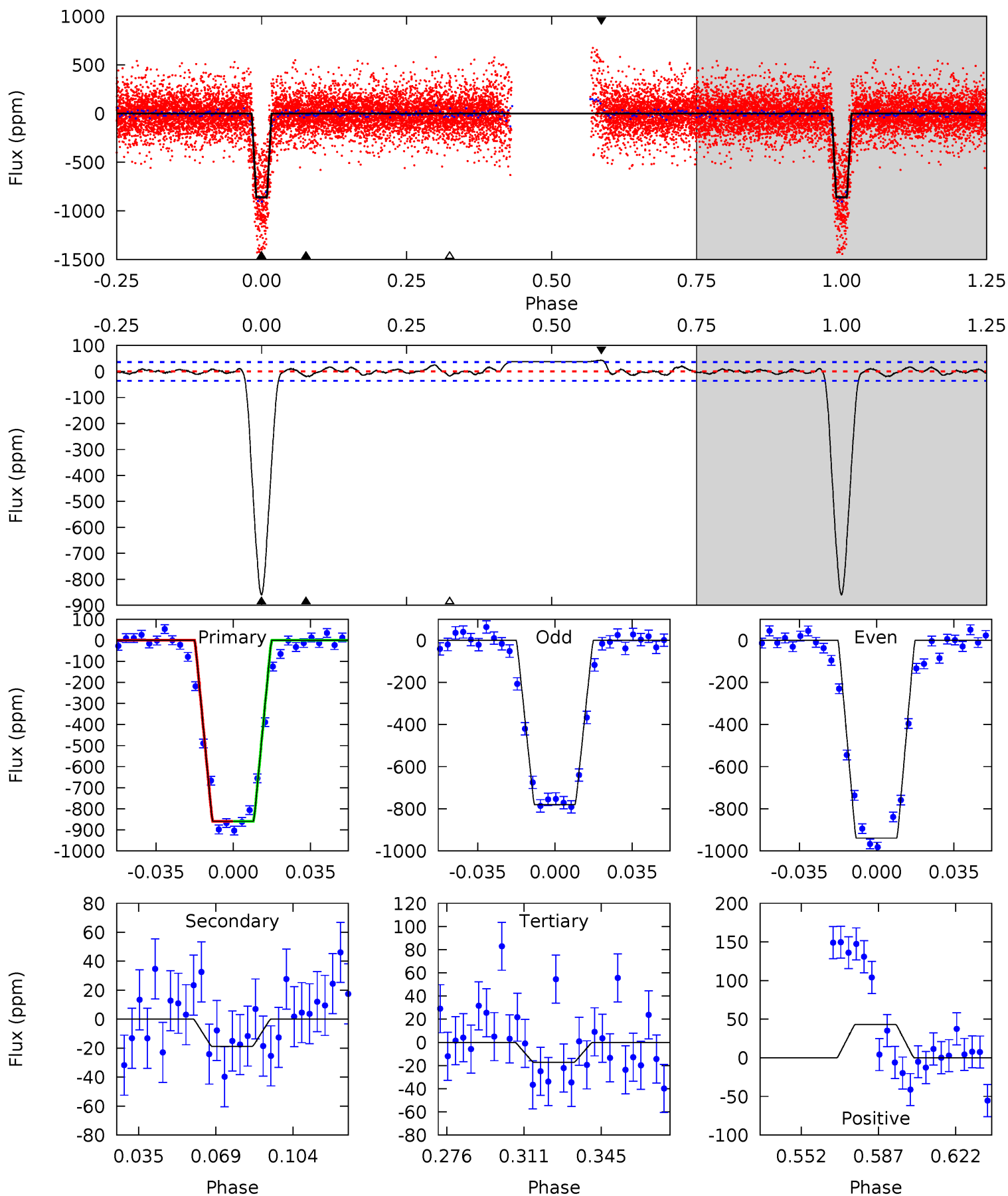
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
50.5	6.03	4.00	4.81	4.72	1.98	2.15	46.5	45.7	2.04	1.22	5.29	1.01	0.09	3.08



Alt Model-Shift Uniqueness Test

002167890-02, P = 2.648286 Days, E = 131.717436 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
114.3	2.49	2.29	5.73	4.78	2.11	1.36	112.0	108.6	0.21	-3.24	10.6	0.97	0.05	0.03



Stellar Parameters For KIC 002167890

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4839^{+50}_{-86}	$2.761^{+0.188}_{-0.101}$	$-0.040^{+0.100}_{-0.150}$	$9.278^{+1.524}_{-2.831}$	$1.808^{+0.273}_{-0.682}$	$0.003^{+0.004}_{-0.001}$
	+1%/-2%	+7%/-4%	+250%/-375%	+16%/-31%	+15%/-38%	+120%/-33%
Source	SPE74	SPE74	SPE74	DSEP		

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

Secondary Eclipse Parameters for KIC 002167890-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-100 ± 17	$38.50^{+5.46}_{-6.51}$	4204^{+203}_{-260}	-3570^{+205}_{-154}	$0.079^{+0.028}_{-0.021}$
Alt.	-19 ± 8	$30.17^{+4.82}_{-5.44}$	4209^{+202}_{-260}	-3703^{+171}_{-134}	$0.023^{+0.015}_{-0.010}$

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

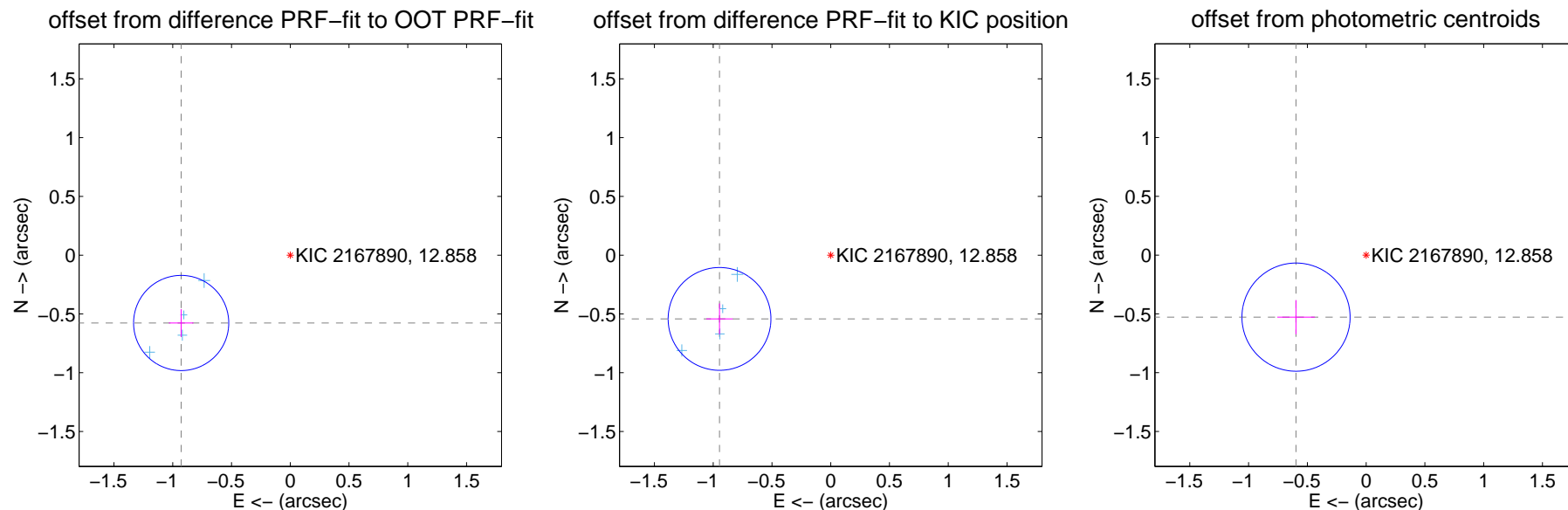
DV Centroid Data

Supplemental centroid analysis for 002167890-02. Kepler magnitude: 12.86. Transit SNR 35.61

There are 4 quarters with good PRF difference image offsets

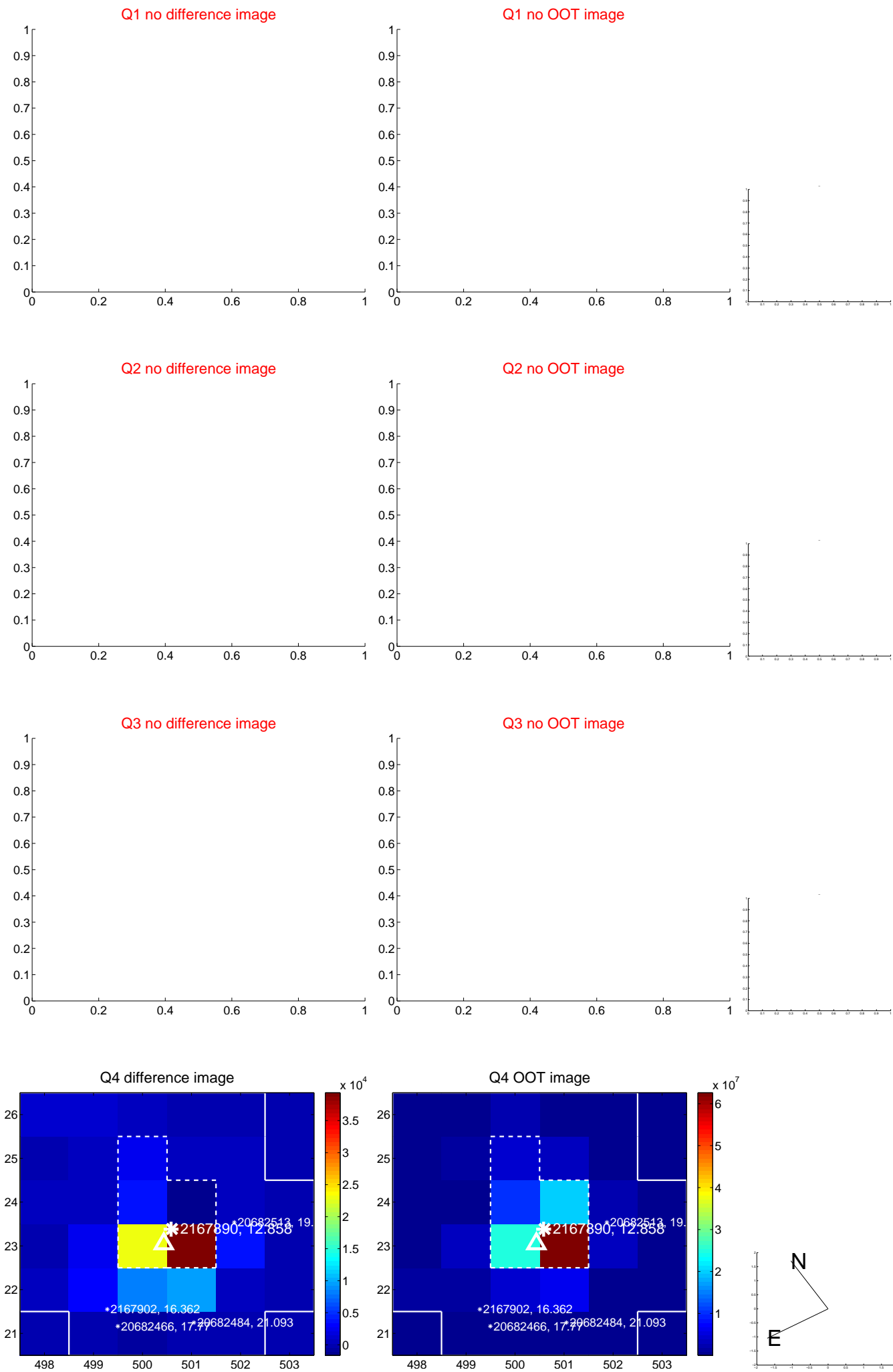
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.093 ± 0.135	8.10	0.928 ± 0.105	-0.577 ± 0.117
PRF-fit source offset from KIC position	1.090 ± 0.146	7.48	0.946 ± 0.112	-0.542 ± 0.131
photometric centroid source offset	0.80 ± 0.15	5.19	0.60 ± 0.16	-0.53 ± 0.15

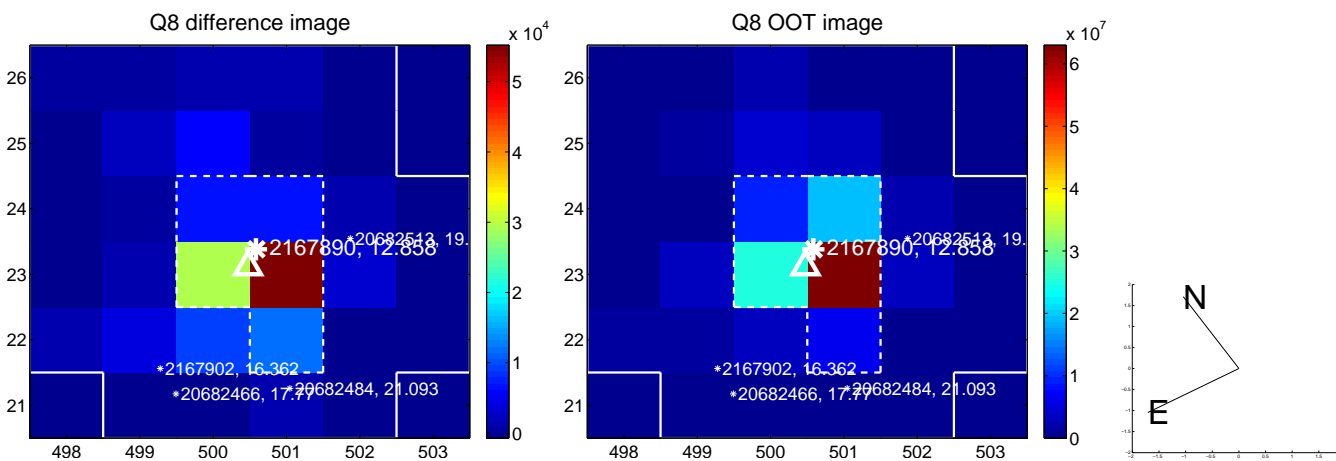
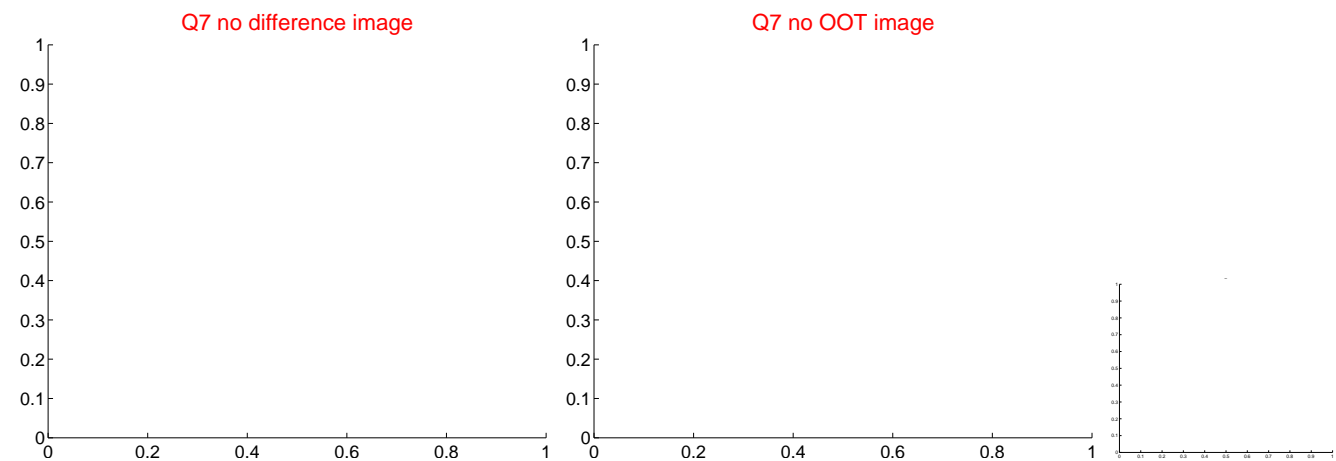
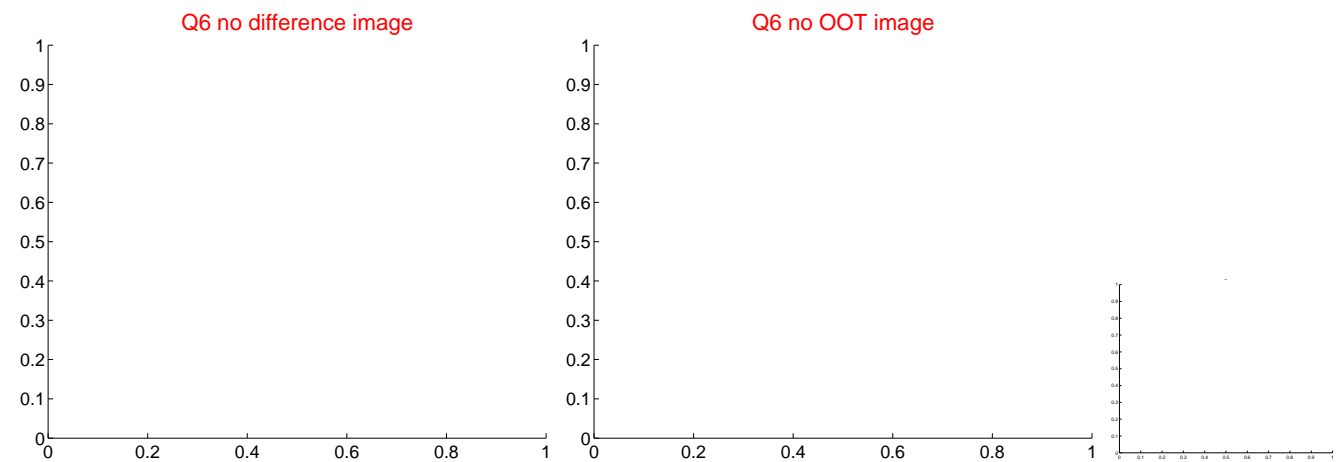
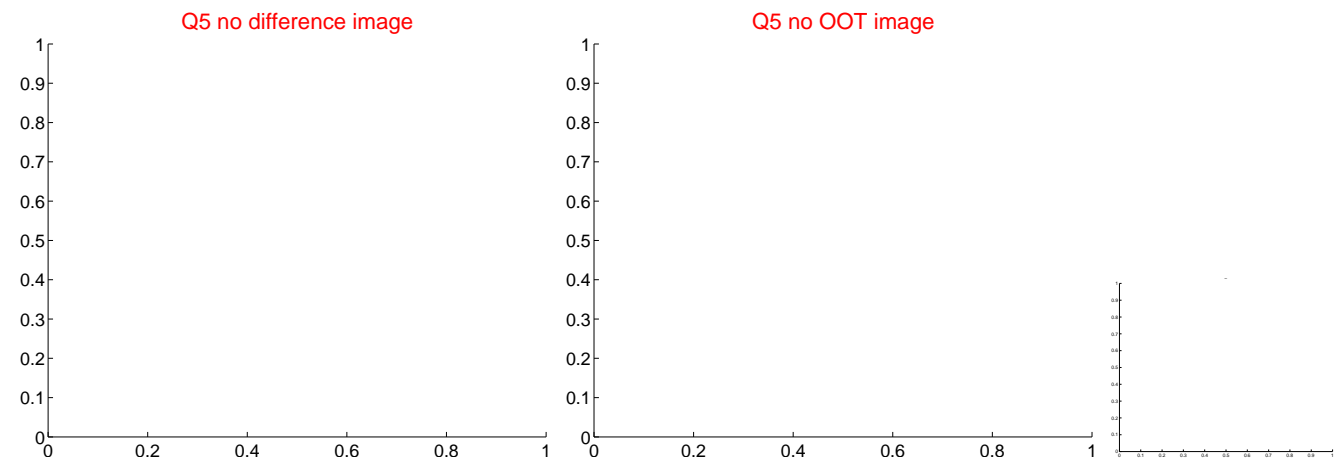


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

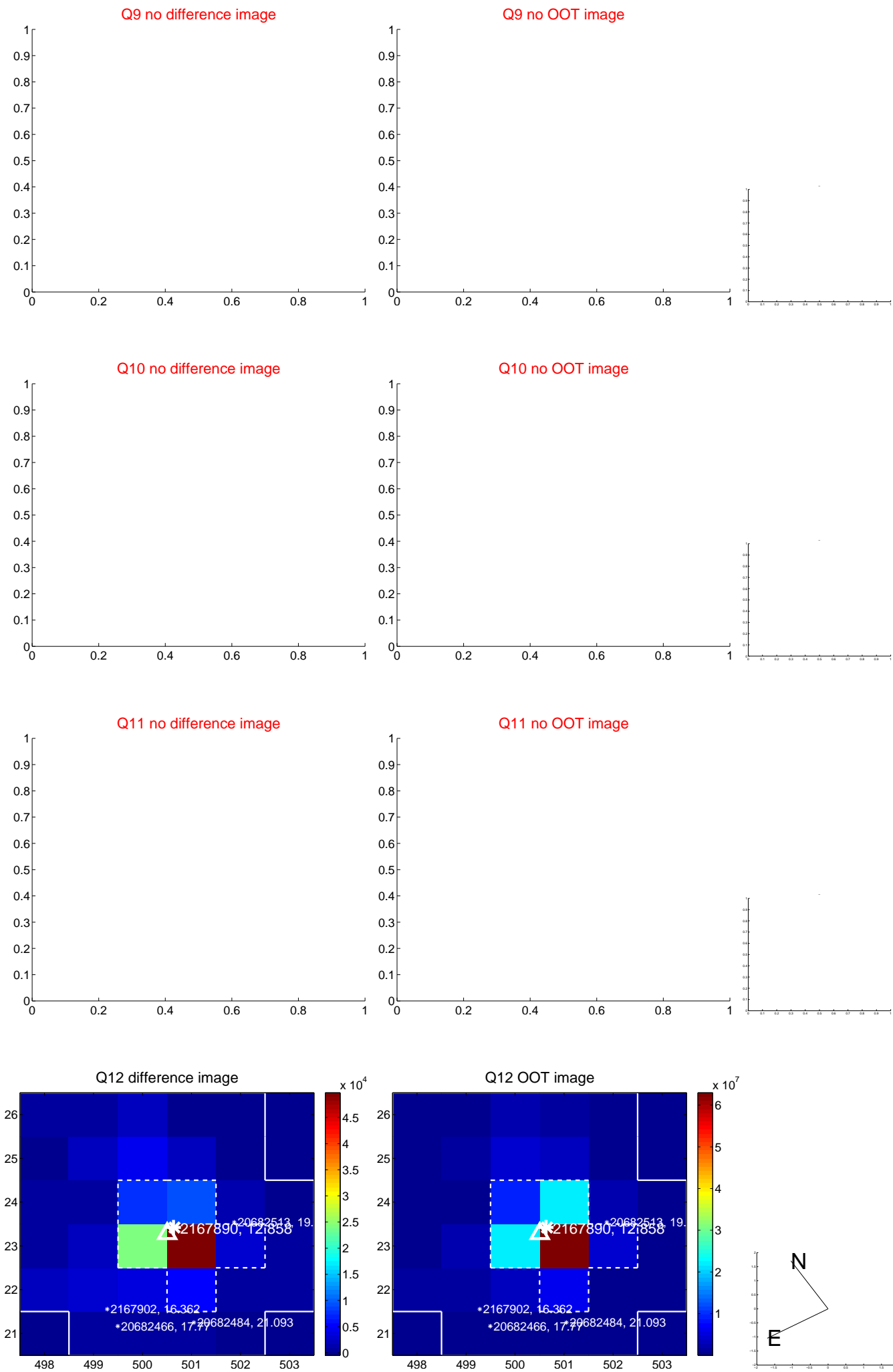
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



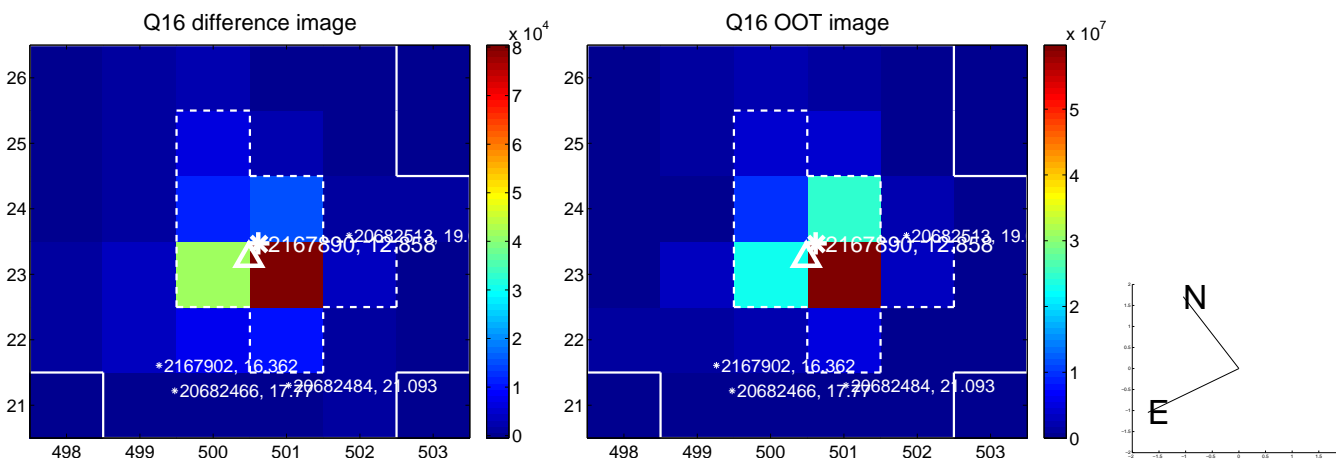
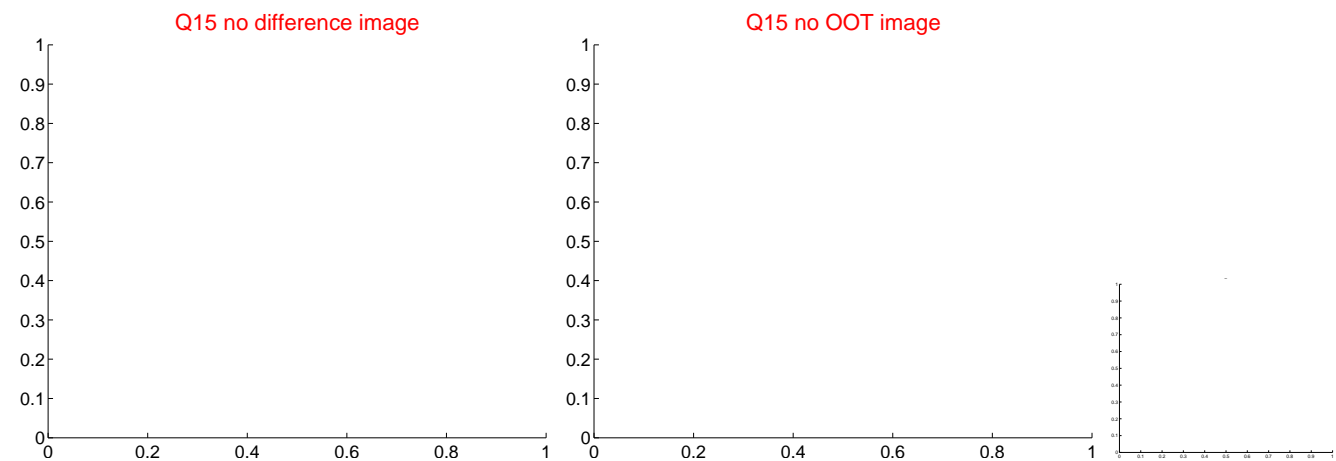
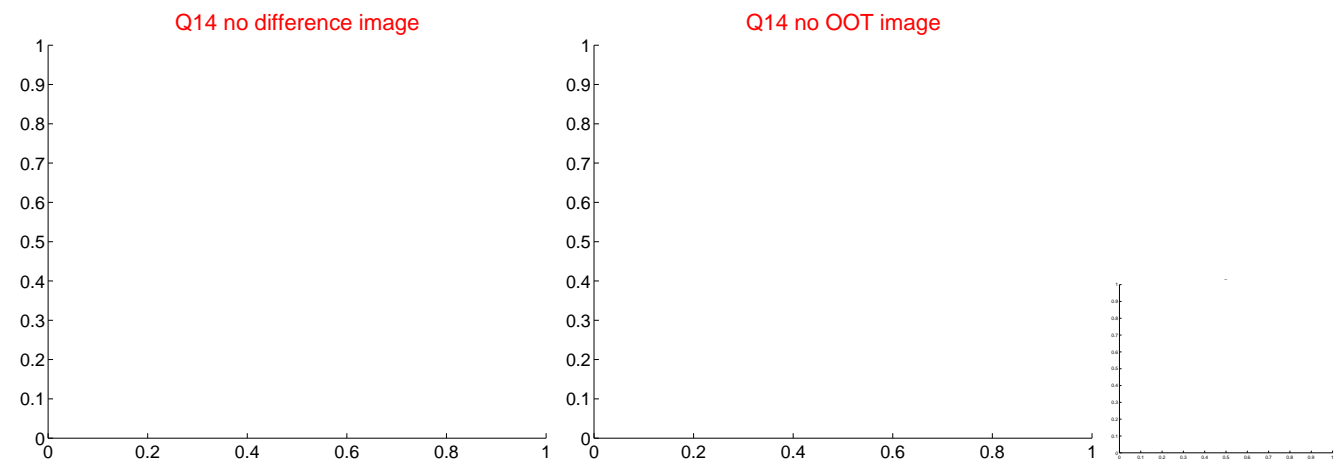
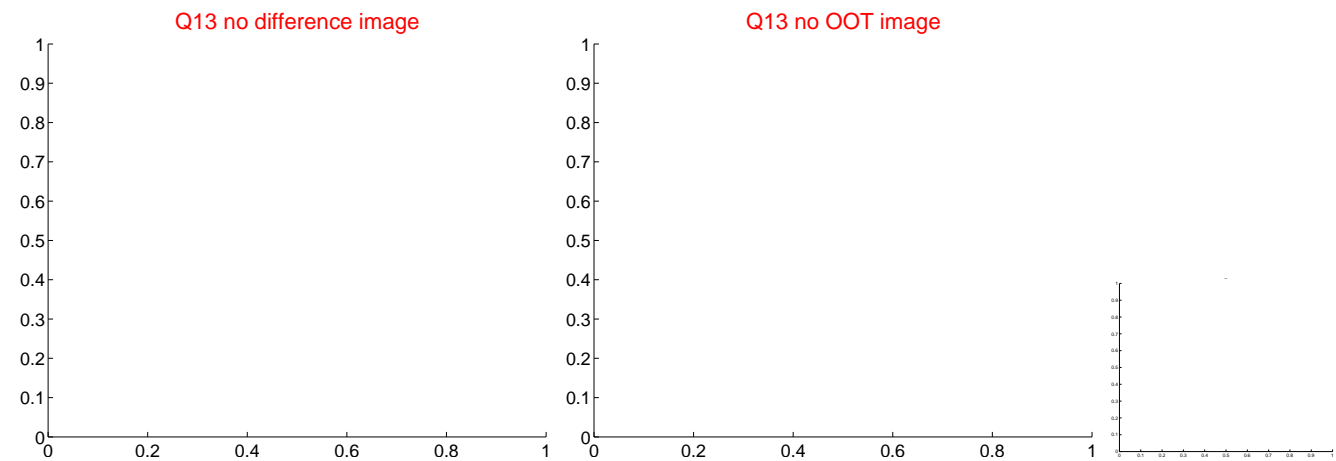
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



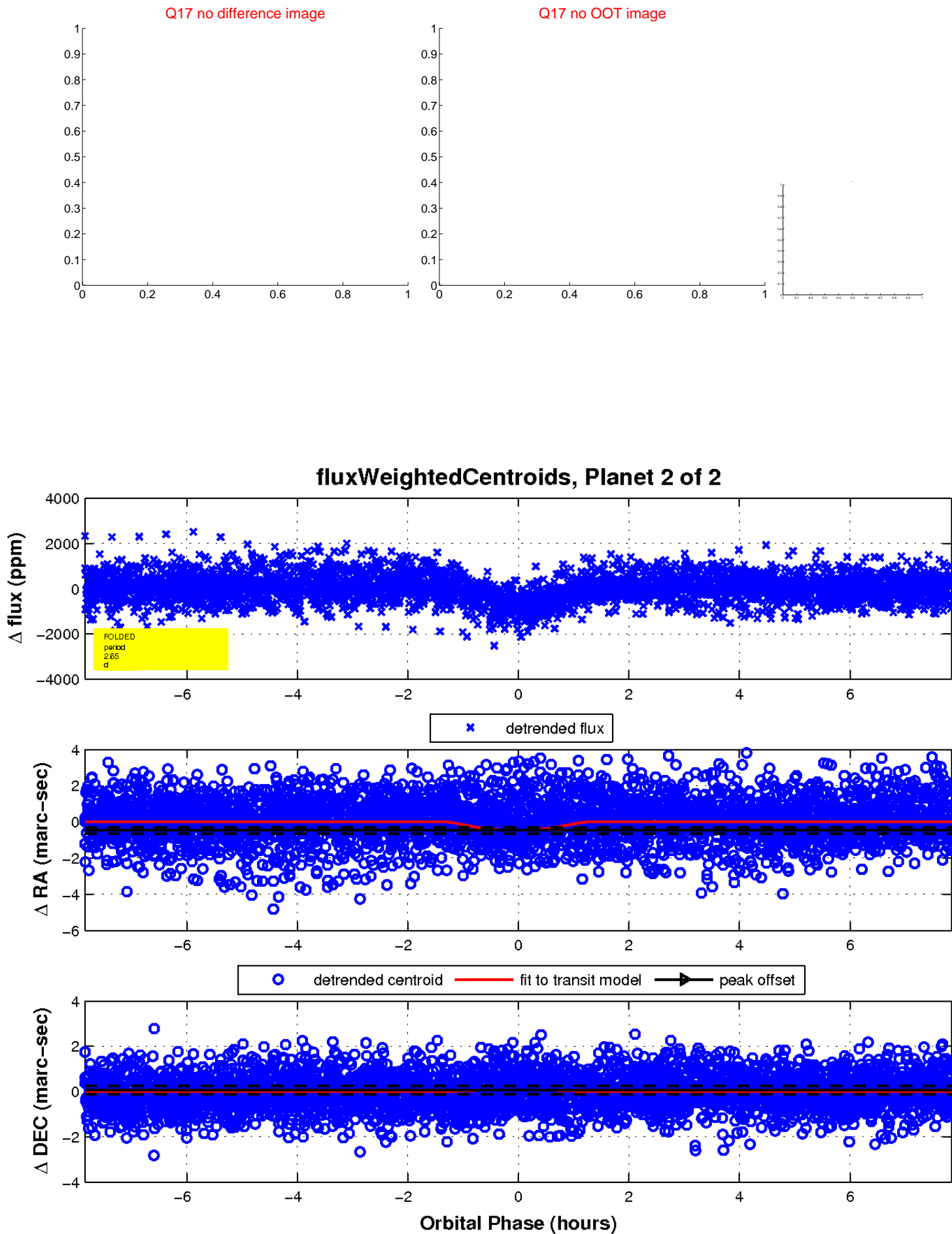
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UKIRT Image

