

KIC 002437060

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})
002437060-01	OBS	3712.01	3.187115	132.847877	107191.7	6.977	767.7	629.8	23.67	4599	822.84	0.00
002437060-02	OBS	No	1.593590	132.852137	9146.5	6.273	89.6	54.4	23.67	4599	306.18	0.00

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002437060-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—PLANET_IN_STAR—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—CENT_KIC_POS
002437060-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_KIC_POS—HALO_GHOST

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.

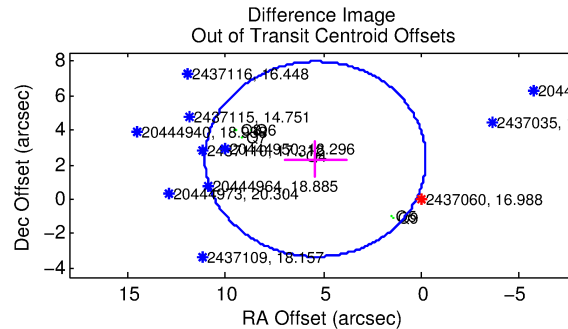
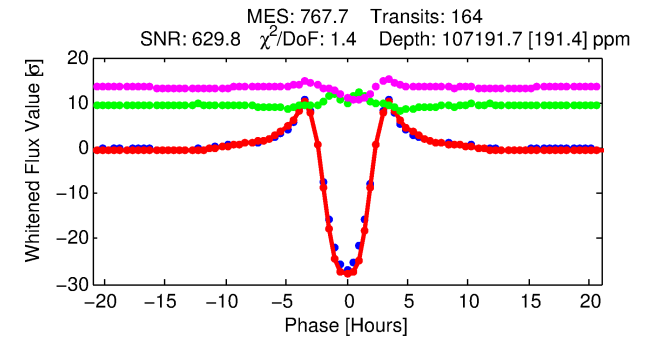
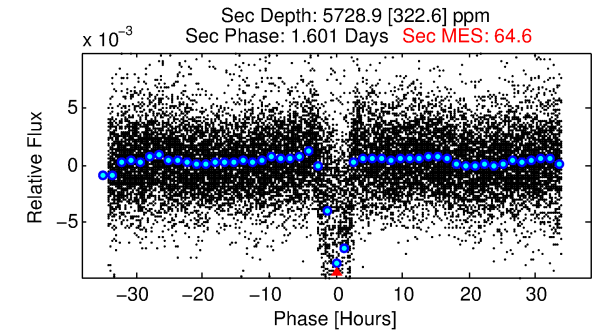
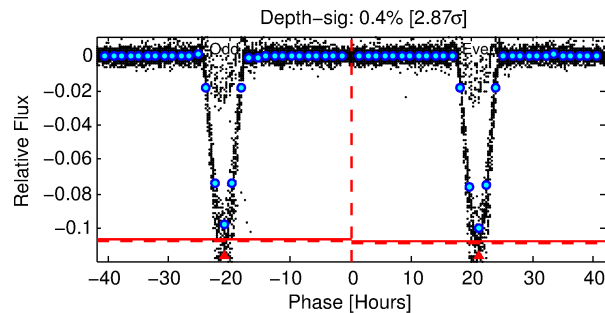
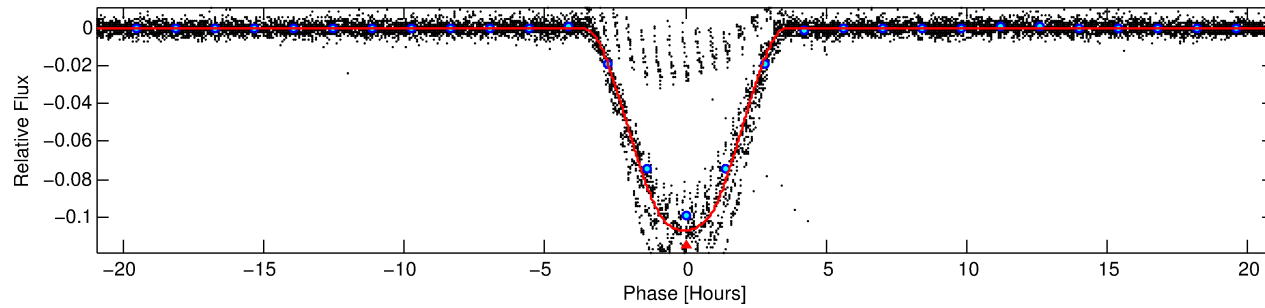
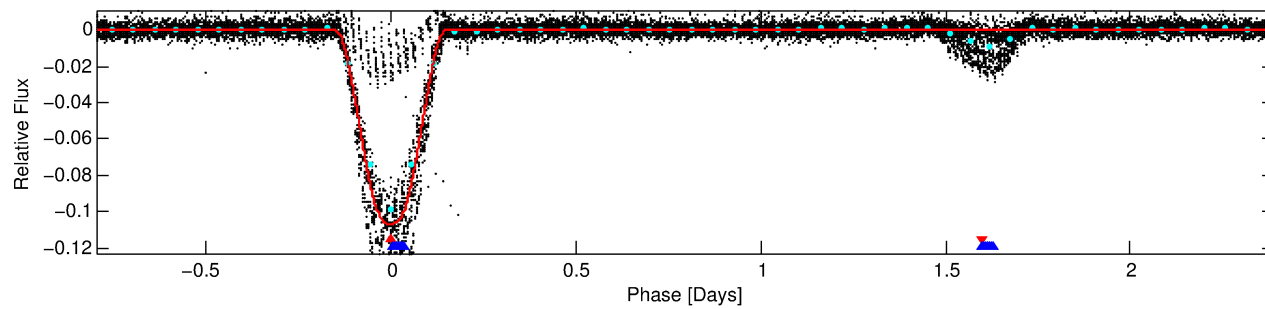
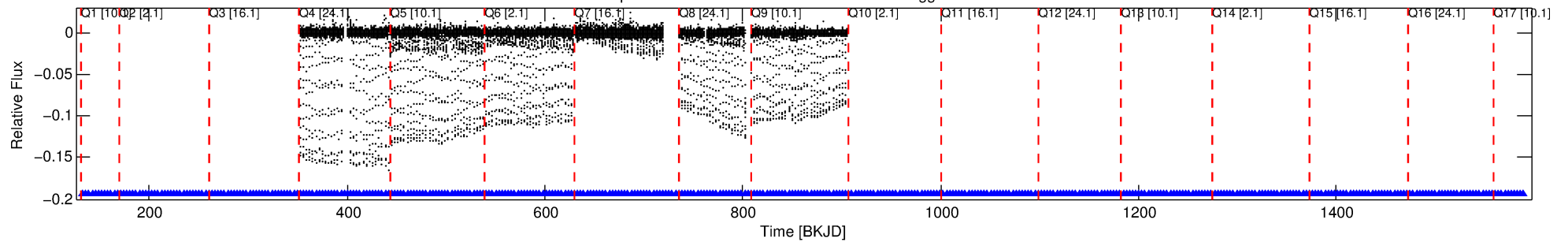
Ephemeris Match Information For 002437060-01

No Significant Match Found

DV One-Page Summary

KIC: 2437060 Candidate: 1 of 2 Period: 3.187 d
KOI: K03712.01 Corr: 0.989

Kp: 16.99 R*: 23.67 Rs Teff: 4599.0 K Logg: 2.14 Fe/H: 0.070



DV Fit Results:

Period = 3.18711 [0.00000] d
Epoch = 132.8479 [0.0003] BKJD
Rp/R* = 0.3185 [0.0005]
a/R* = 4.14 [0.01]
b = 0.63 [0.00]
Seff = N/A
Teq = N/A
Rp = 822.84 [470.84] Re
a = N/A
Ag = N/A
Teffp = N/A

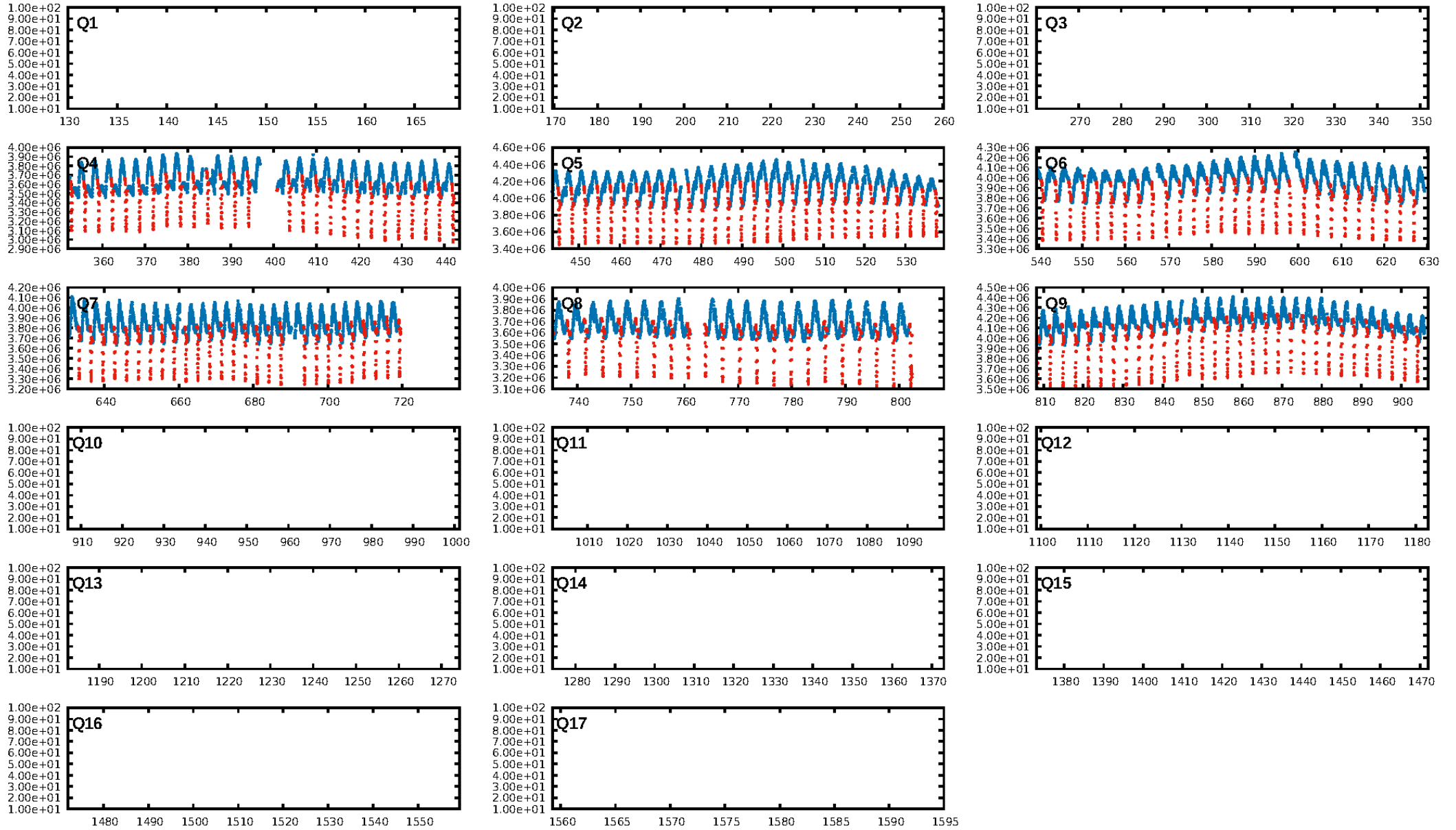
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.08σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 99.4%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [164/164]
GhostDiagnostic-chr: 1.279
Centroid-sig: N/A
Centroid-so: 1.303 arcsec [183.86σ]
OotOffset-rm: 5.872 arcsec [3.12σ]
KicOffset-rm: 0.194 arcsec [2.05σ]
OotOffset-st: 1/1/2/2 [6]
KicOffset-st: 1/1/2/2 [6]
DiffImageQuality-fgm: 1.00 [6/6]
DiffImageOverlap-fno: 0.00 [0/6]

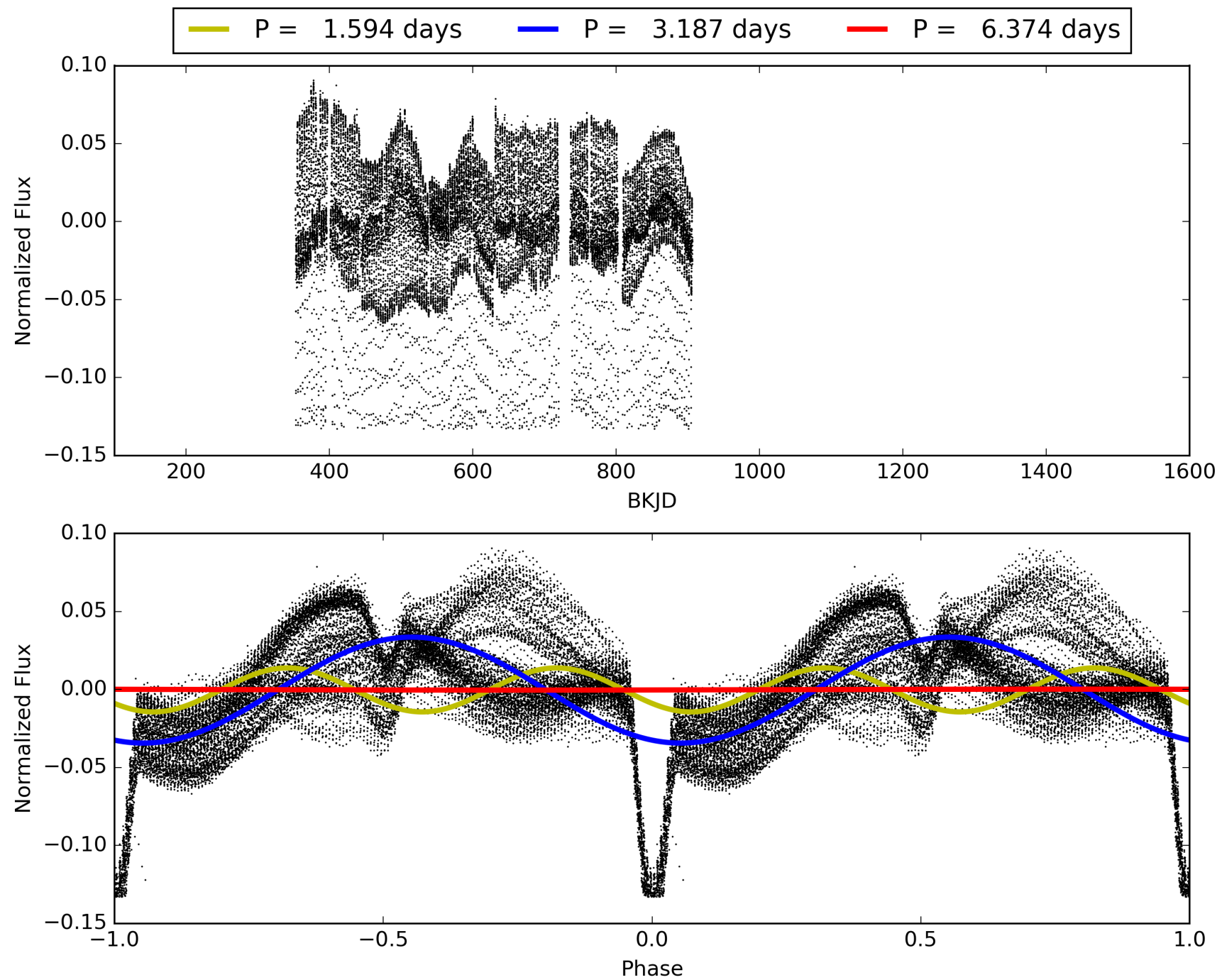
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:21:52 Z

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

TCE 002437060-01, PDC Light Curves

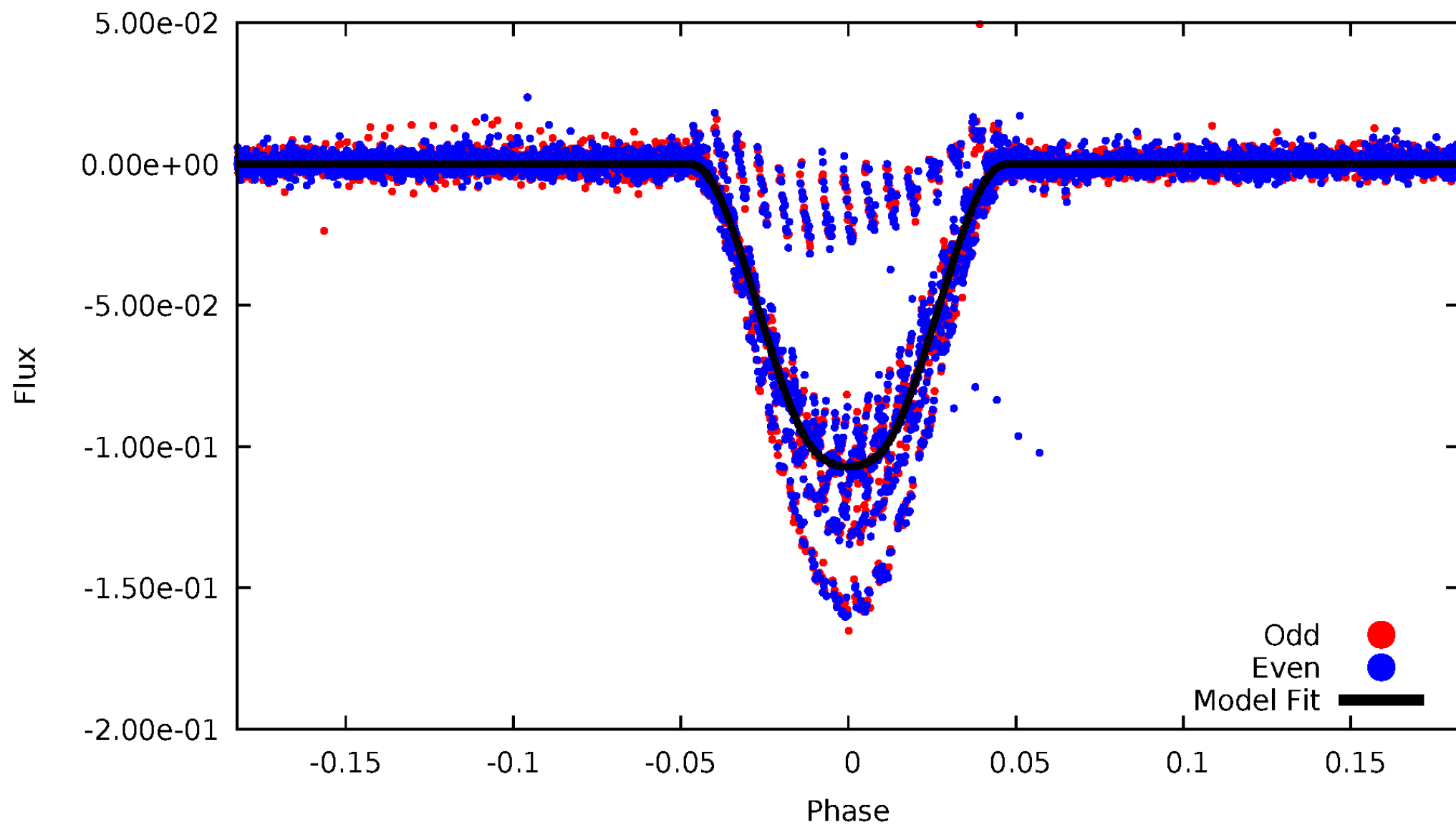


TCE 002437060-01



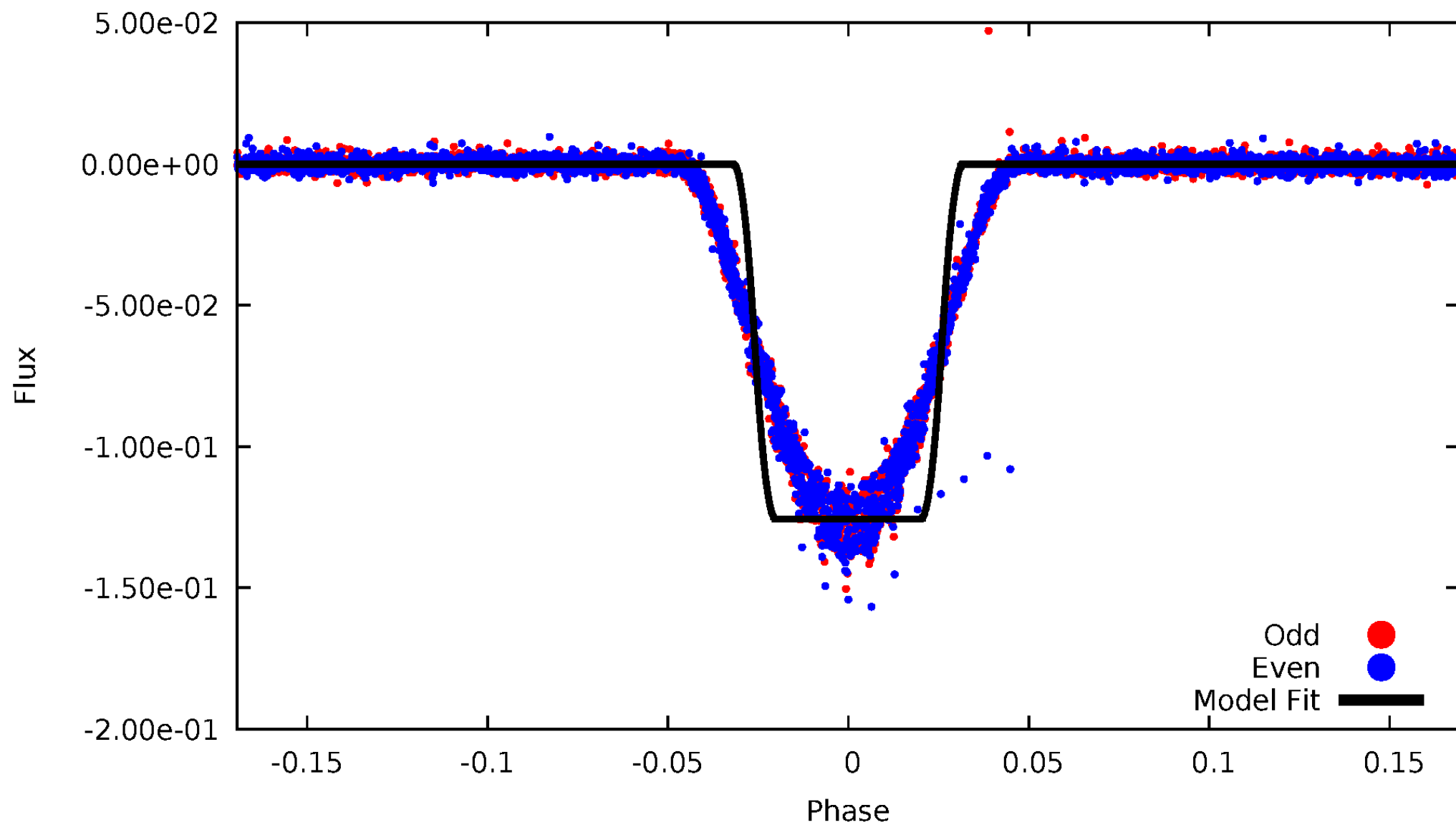
DV Odd/Even

TCE 002437060-01



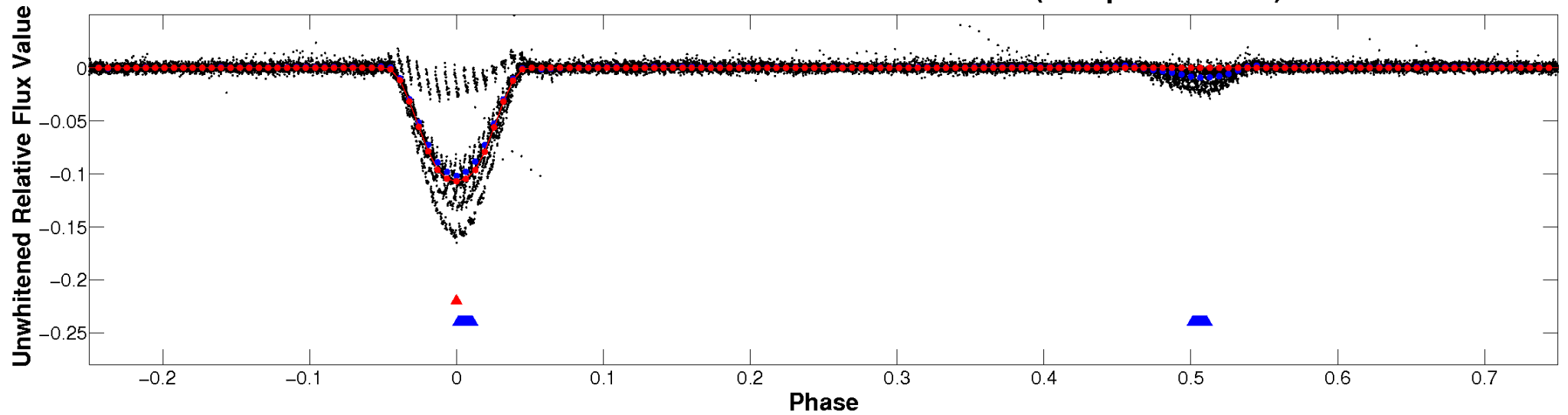
ALT Odd/Even

TCE 002437060-01

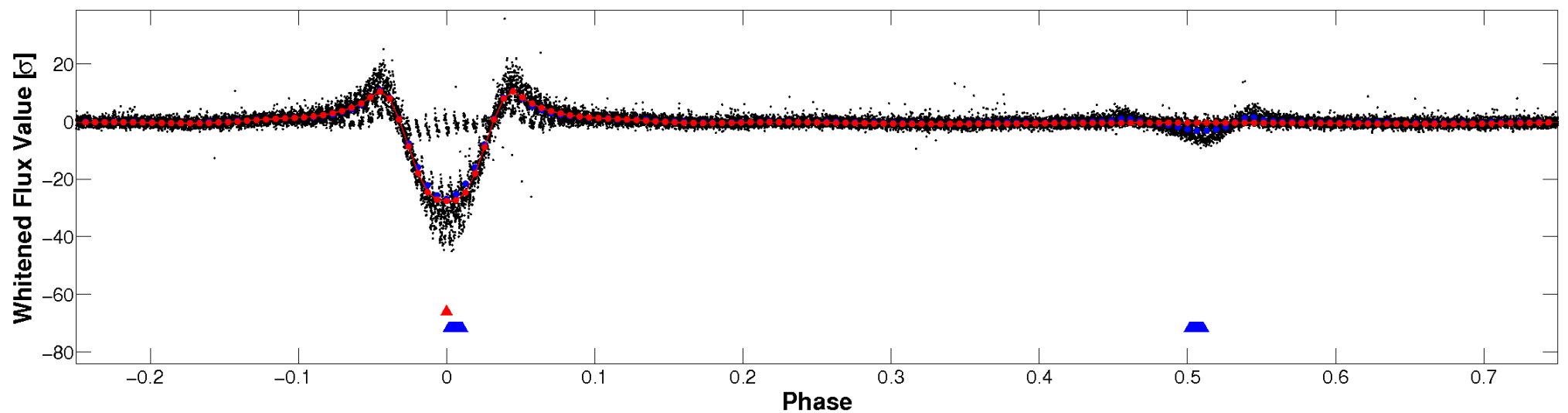


Non-Whitened Vs. Whitened Light Curve

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

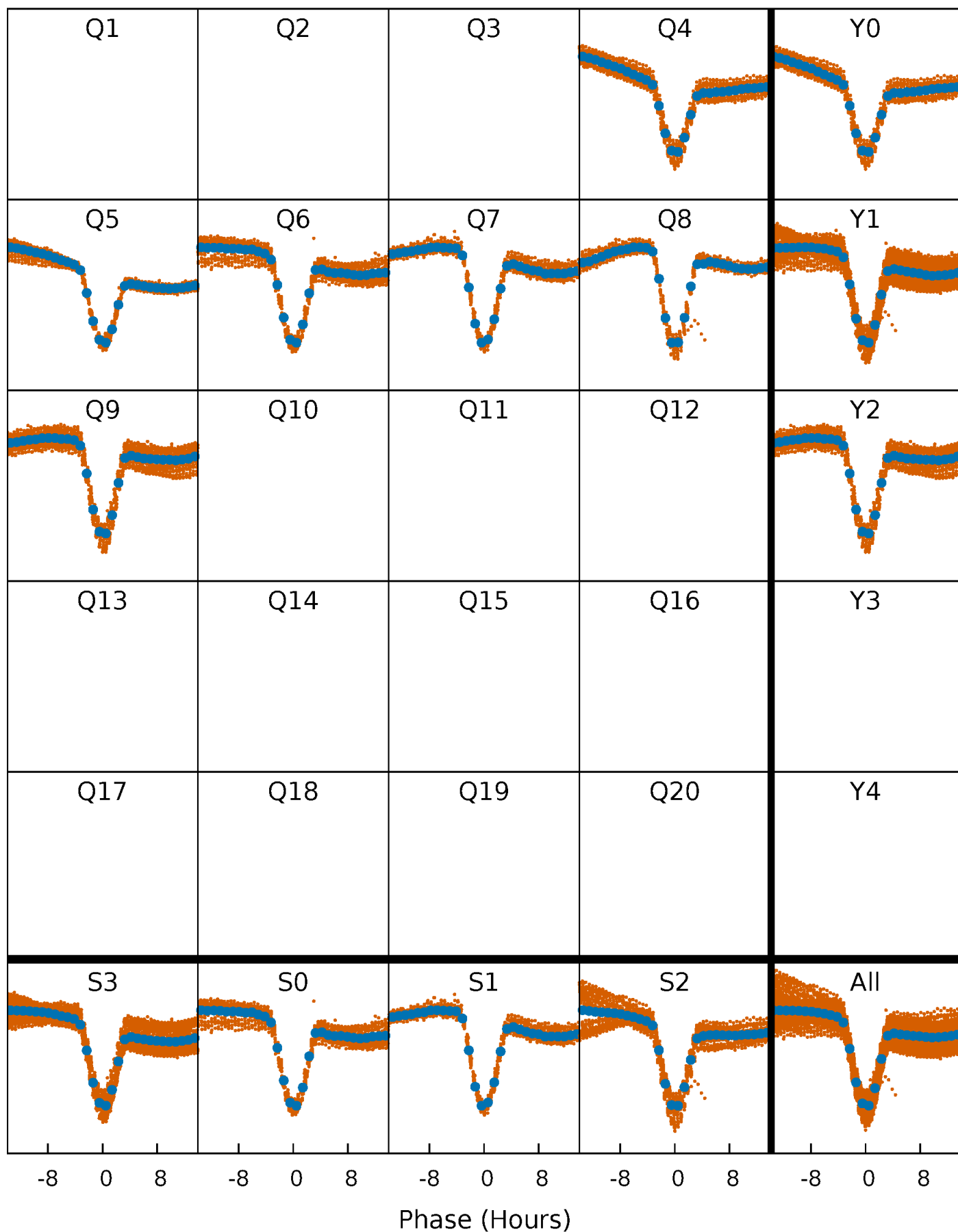


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



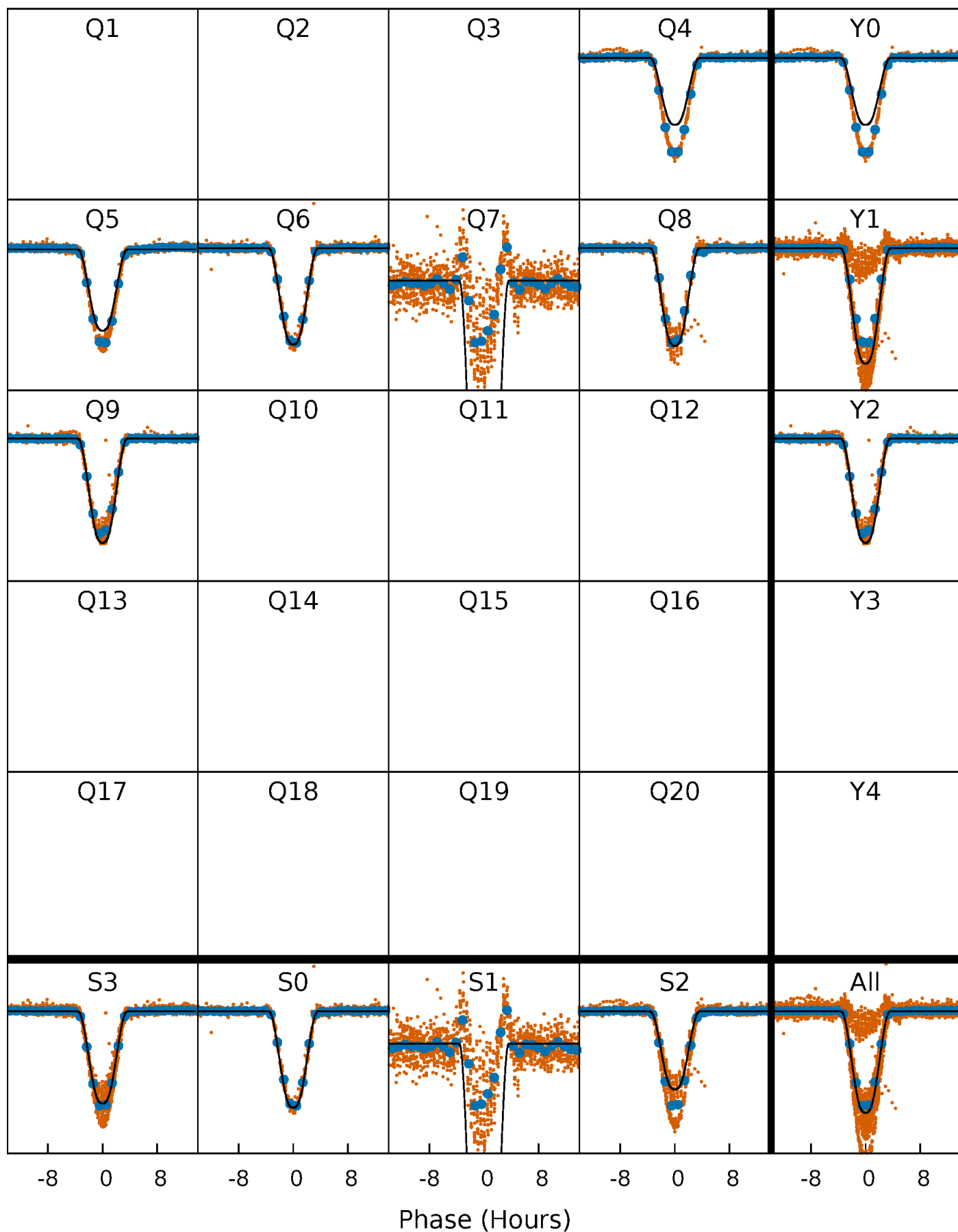
PDC Quarter-Phased Transit Curves

TCE 002437060-01 P= 3.187115 Days $T_0=132.847877$ (BKJD)



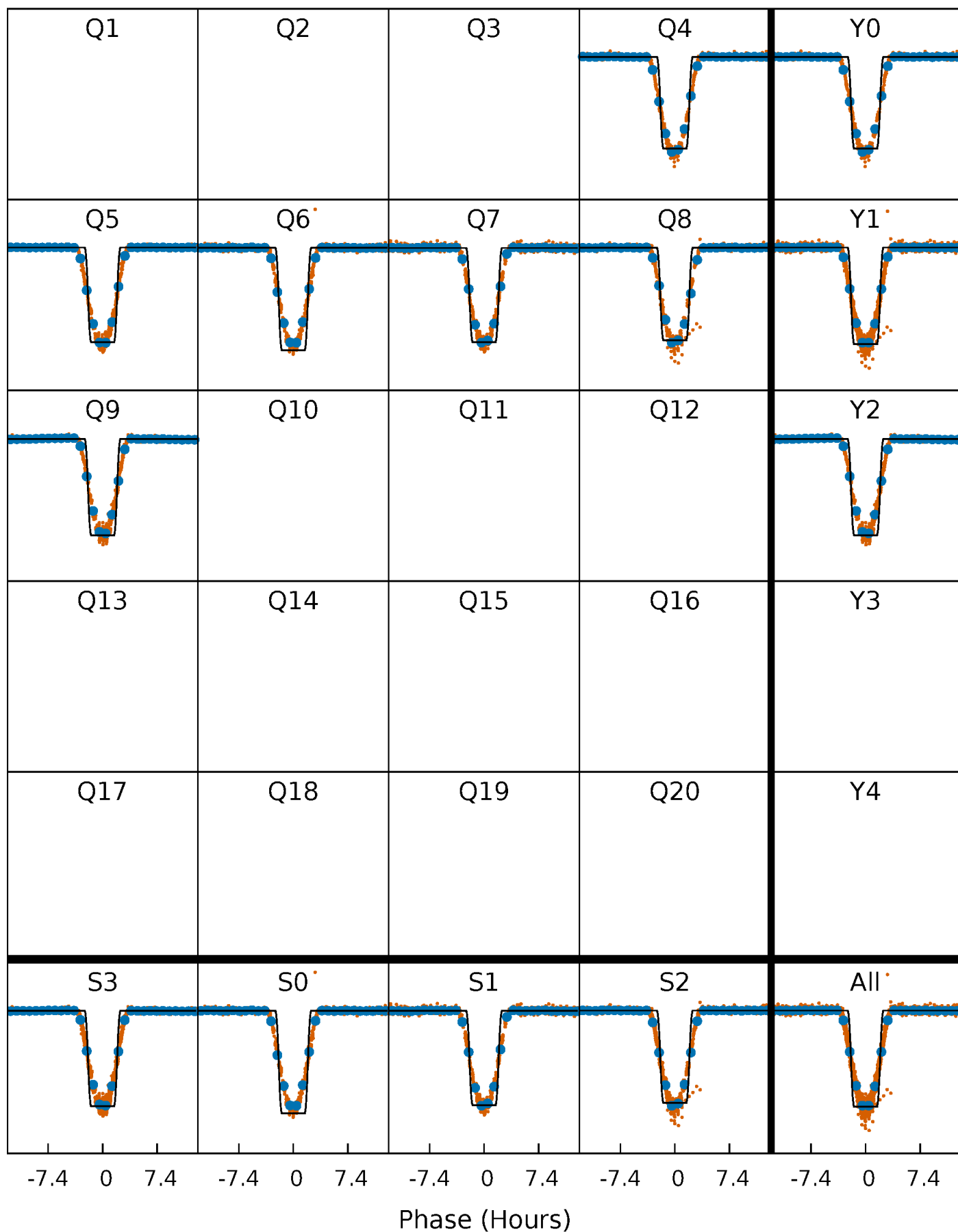
DV Quarter-Phased Transit Curves

TCE 002437060-01 P= 3.187115 Days $T_0=132.847877$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

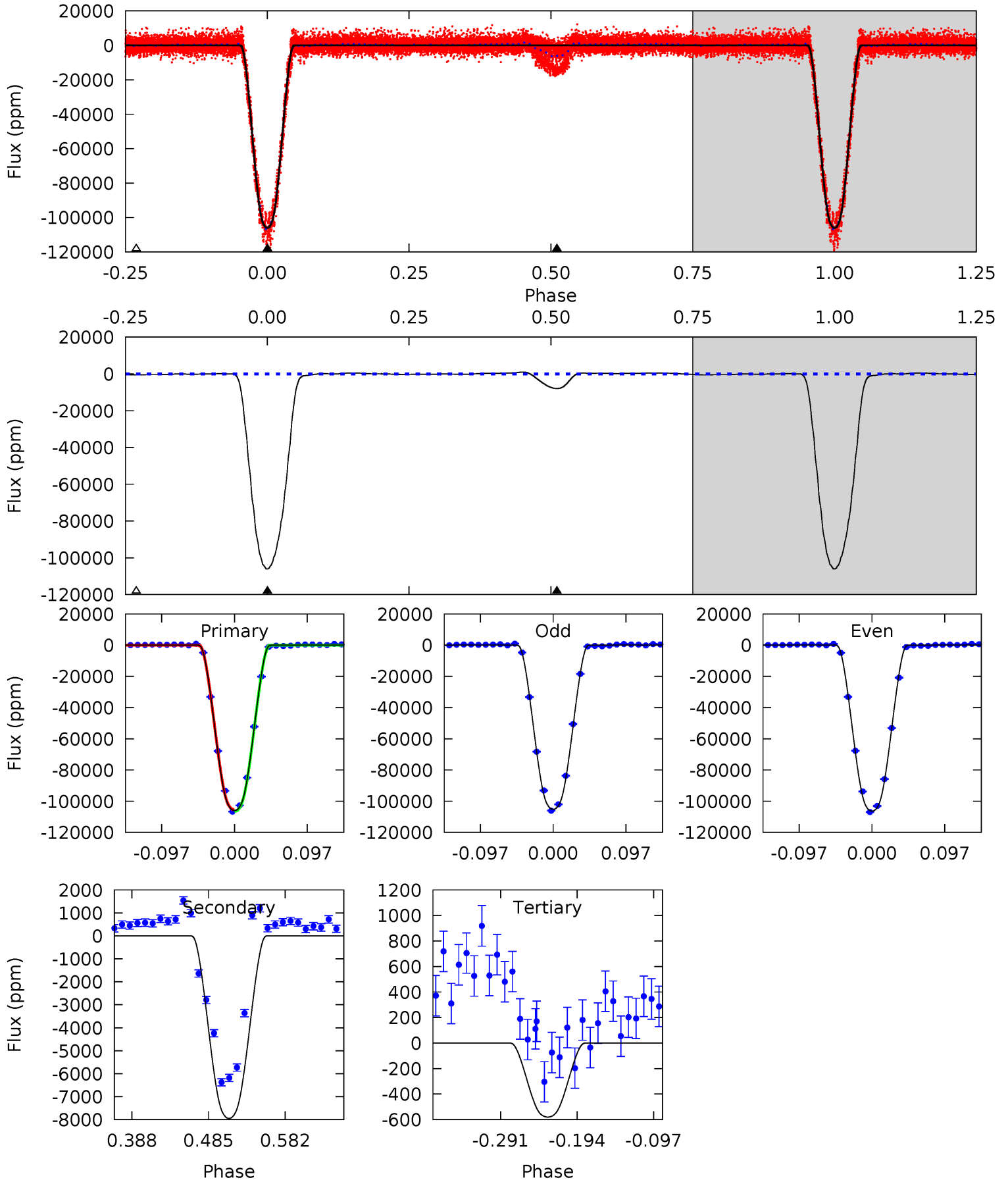
TCE 002437060-01 P= 3.187077 Days $T_0=132.853995$ (BKJD)



DV Model-Shift Uniqueness Test

002437060-01, P = 3.187115 Days, E = 132.847877 Days

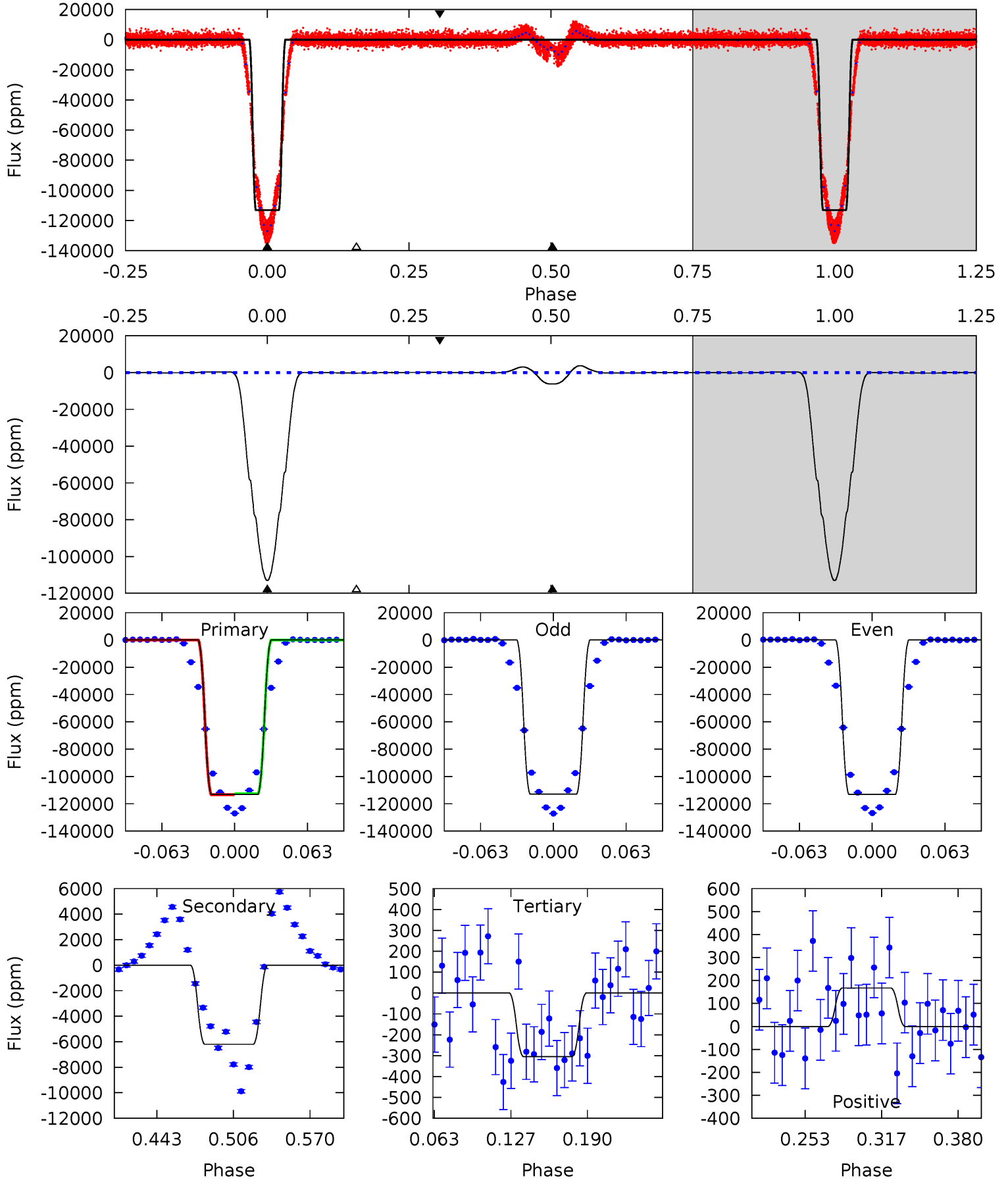
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1620	121.5	8.87	0	4.57	1.66	4.44	1611	1620	112.6	121.5	9.08	0.94	0.01	0



Alt Model-Shift Uniqueness Test

002437060-01, P = 3.187077 Days, E = 132.853995 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2146	117.6	5.78	3.18	4.66	1.86	5.73	2140	2143	111.8	114.5	2.95	1.00	0.03	0



Stellar Parameters For KIC 002437060

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4599^{+114}_{-126}	$2.137^{+0.450}_{-0.180}$	$0.070^{+0.200}_{-0.300}$	$23.673^{+3.612}_{-13.546}$	$2.799^{+0.542}_{-1.734}$	$0.000^{+0.002}_{-0.000}$
	+2%/-3%	+21%/-8%	+286%/-429%	+15%/-57%	+19%/-62%	+548%/-36%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 002437060-01 / KOI 3712.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-7949 ± 65	$841.78^{+92.95}_{-245.52}$	5621^{+378}_{-708}	-4525^{+486}_{-275}	$0.023^{+0.015}_{-0.005}$
Alt.	-6199 ± 53	$935.30^{+105.32}_{-260.26}$	5590^{+380}_{-602}	-4531^{+395}_{-270}	$0.015^{+0.009}_{-0.003}$

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 $A_{obs} \gg 1.0$

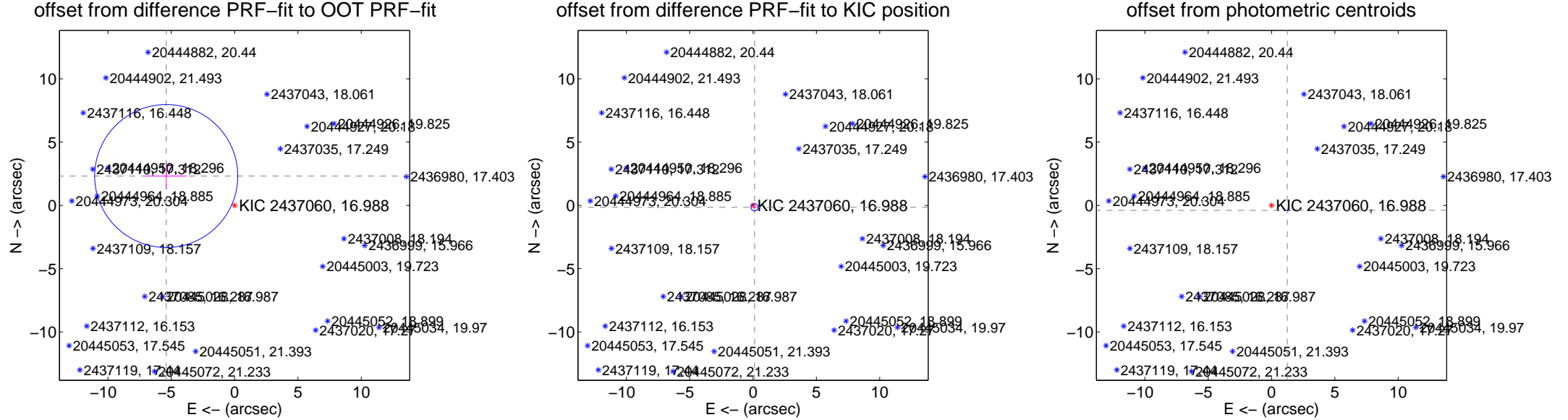
DV Centroid Data

Supplemental centroid analysis for 002437060-01. Kepler magnitude: 16.99. Transit SNR 629.76

There are 6 quarters with good PRF difference image offsets

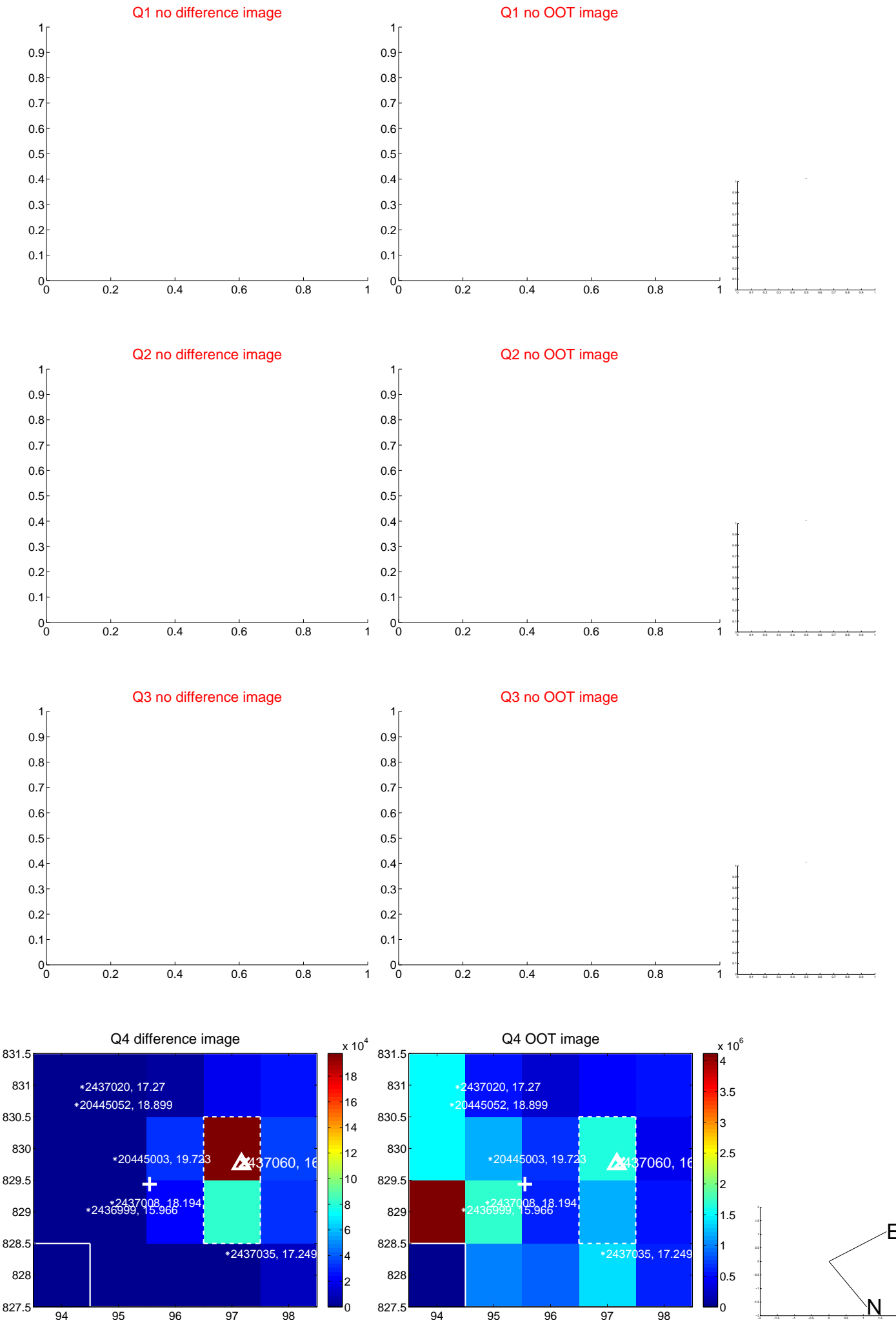
The direct PRF centroid is offset from the target star catalog position by about 1.59 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.872 ± 1.882	3.12	5.395 ± 1.606	2.320 ± 1.036
PRF-fit source offset from KIC position	0.194 ± 0.095	2.05	-0.119 ± 0.104	-0.153 ± 0.088
photometric centroid source offset	1.30 ± 0.01	183.86	-1.24 ± 0.01	-0.39 ± 0.01

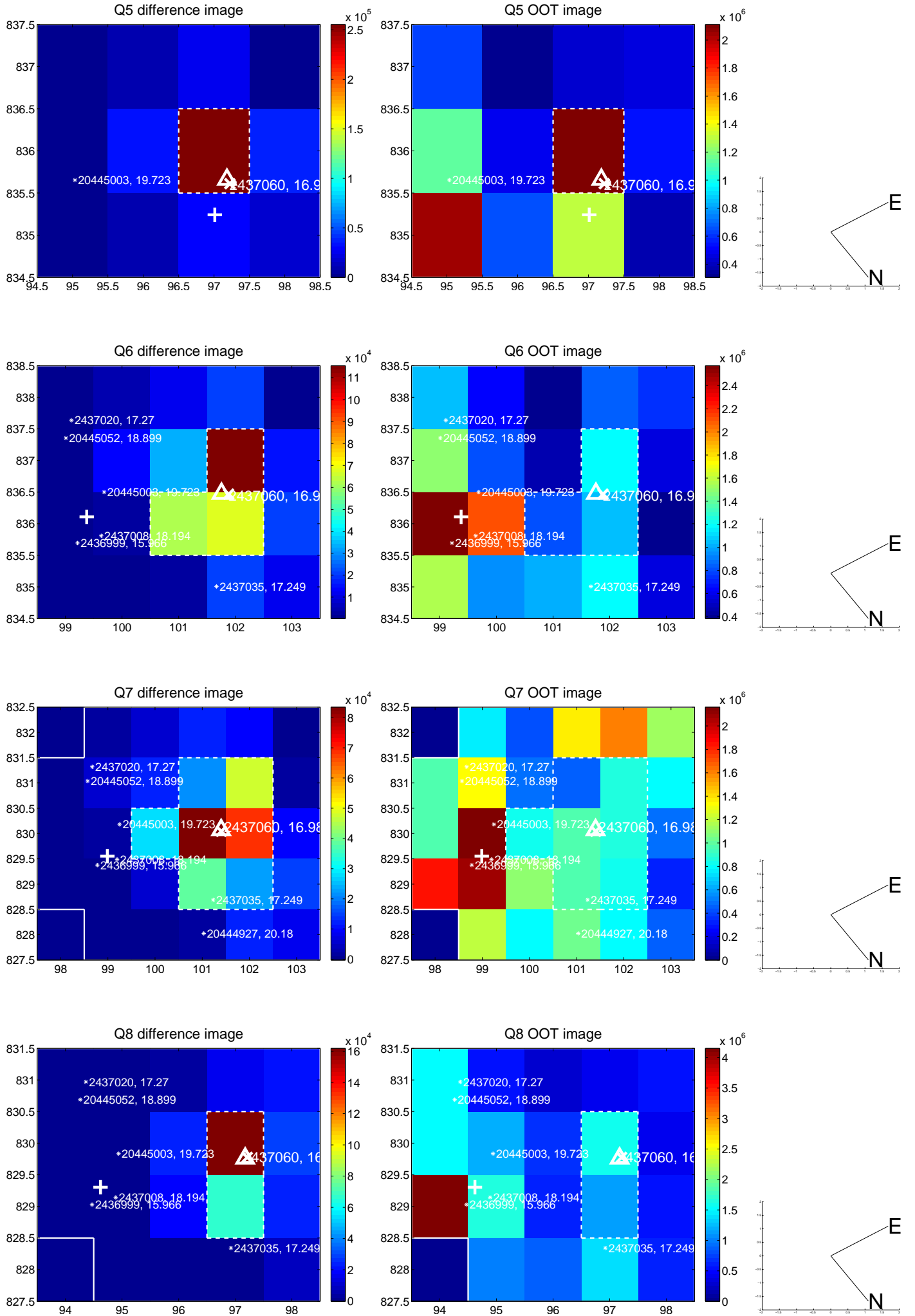


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

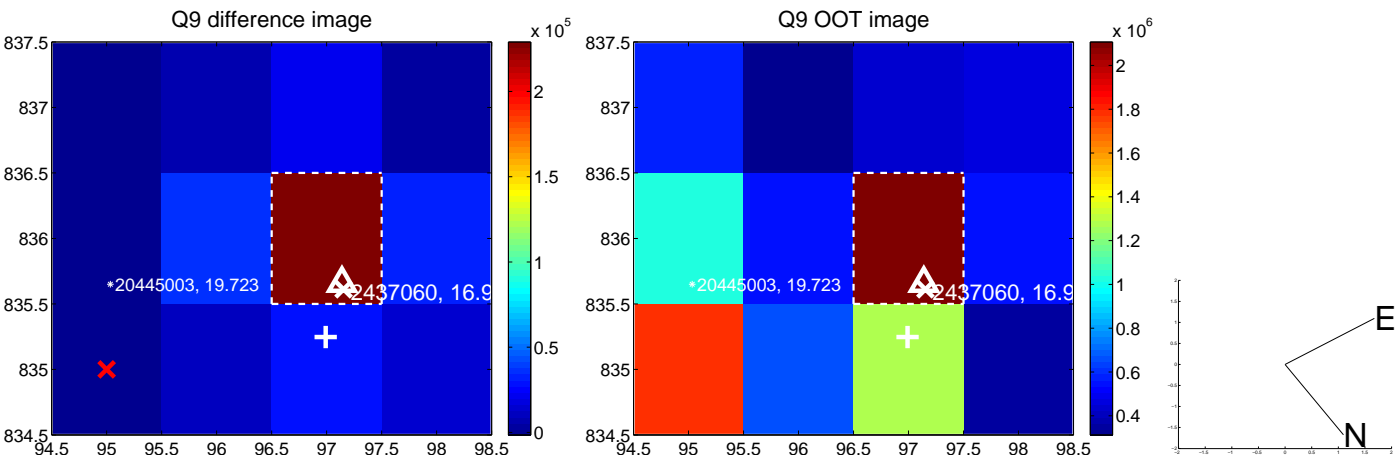
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



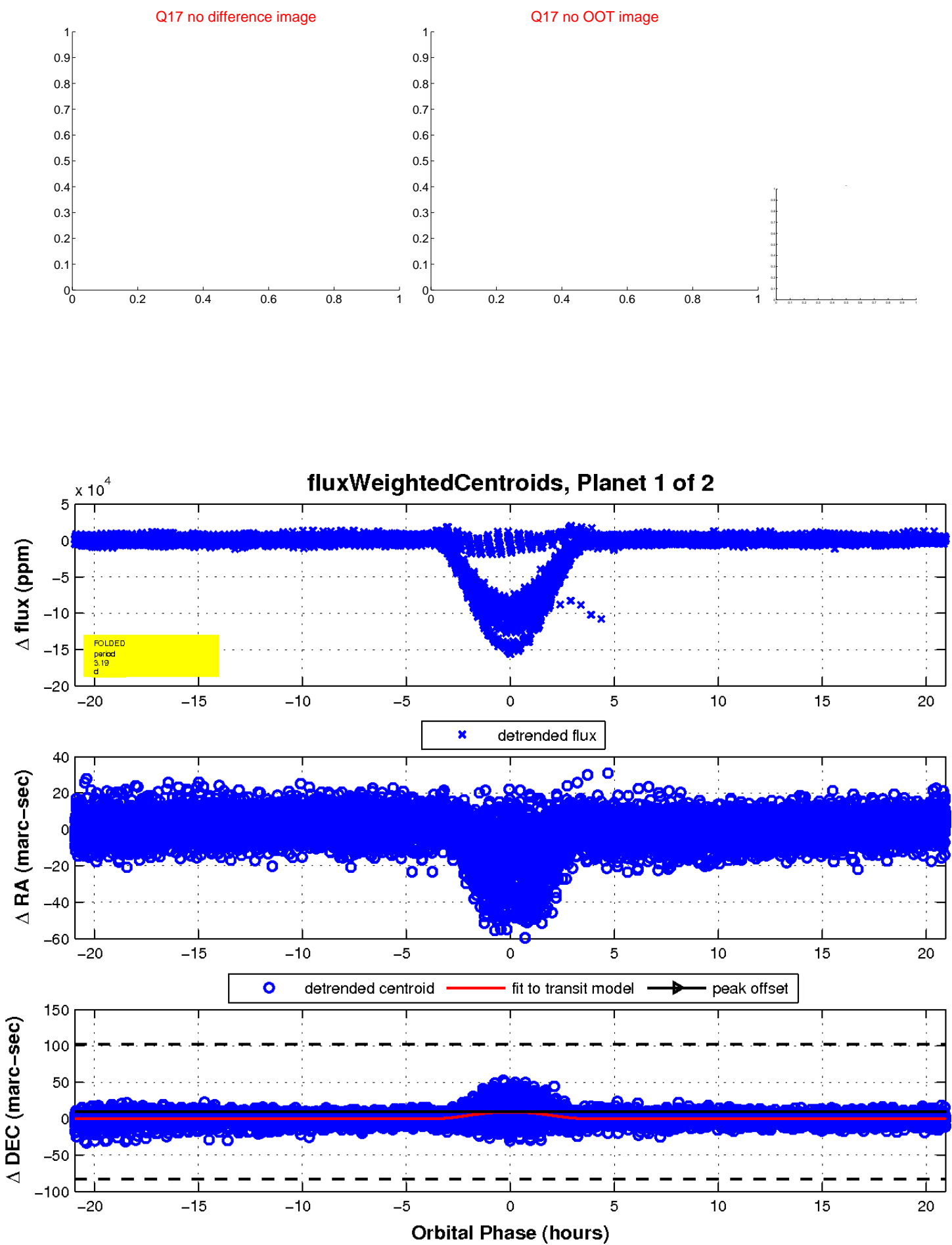
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

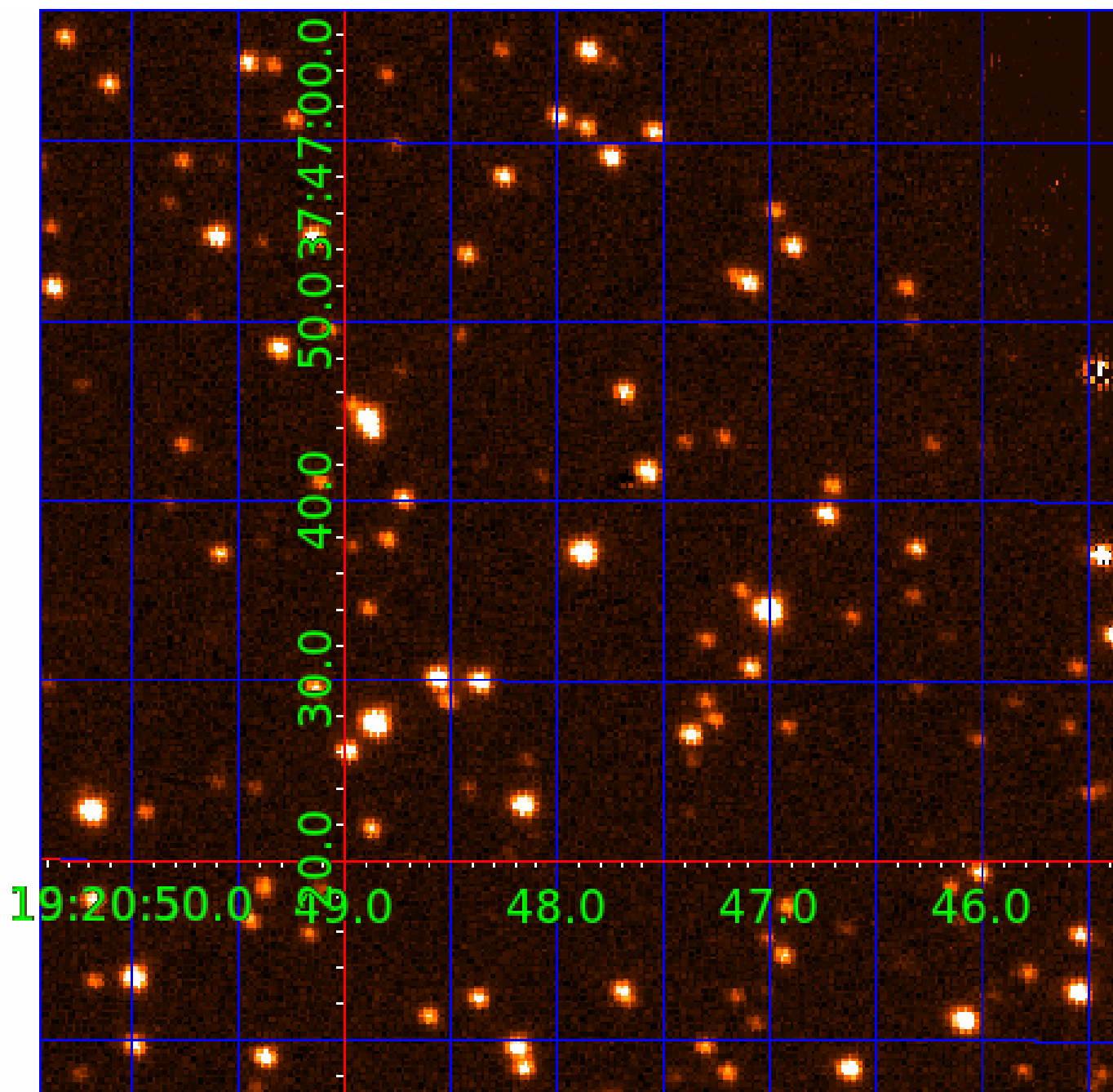


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002437060

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})
002437060-01	OBS	3712.01	3.187115	132.847877	107191.7	6.977	767.7	629.8	23.67	4599	822.84	0.00
002437060-02	OBS	No	1.593590	132.852137	9146.5	6.273	89.6	54.4	23.67	4599	306.18	0.00

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002437060-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—PLANET_IN_STAR—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—CENT_KIC_POS
002437060-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_KIC_POS—HALO_GHOST

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.

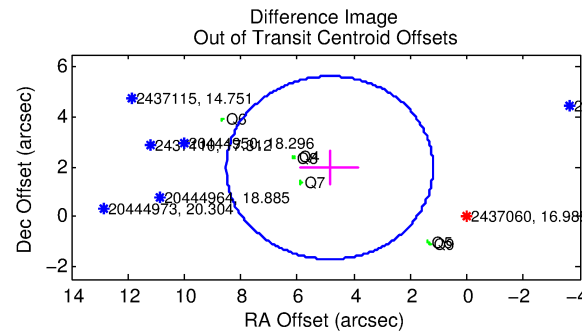
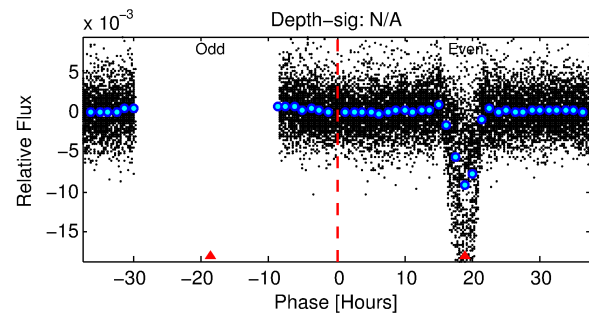
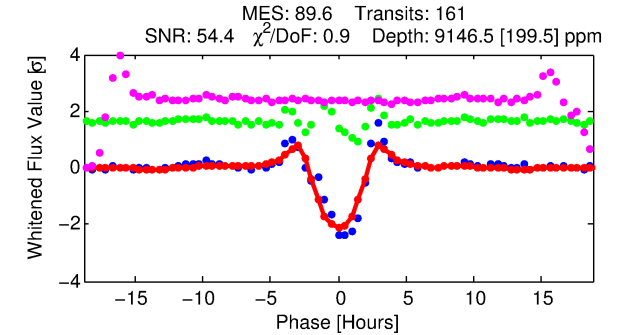
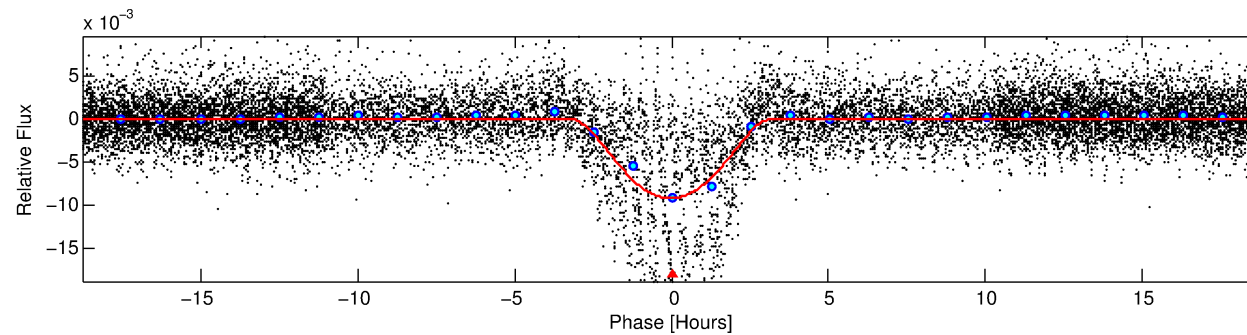
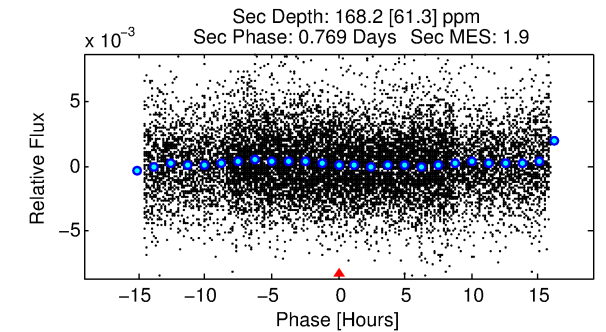
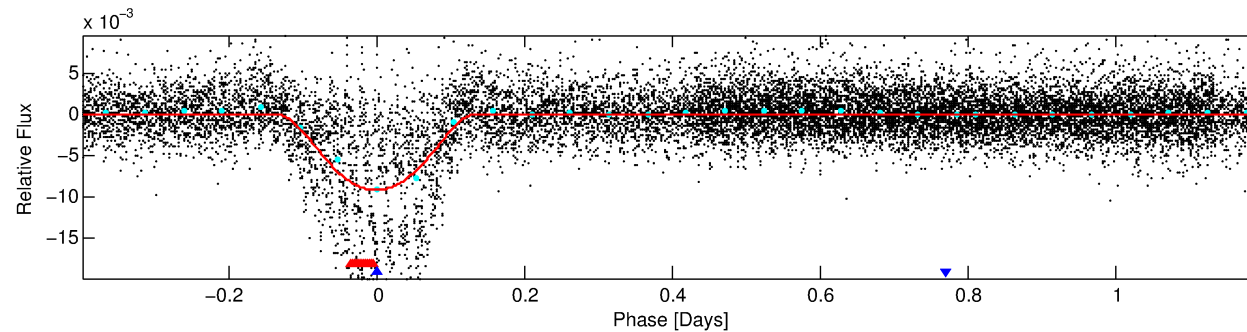
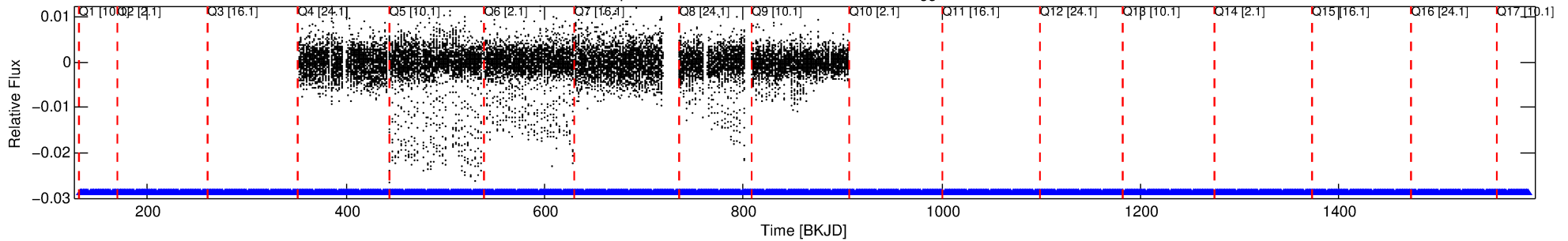
Ephemeris Match Information For 002437060-02

No Significant Match Found

DV One-Page Summary

KIC: 2437060 Candidate: 2 of 2 Period: 1.594 d
KOI: K03712 Corr: No Ephemeris Match

Kp: 16.99 R*: 23.67 Rs Teff: 4599.0 K Logg: 2.14 Fe/H: 0.070



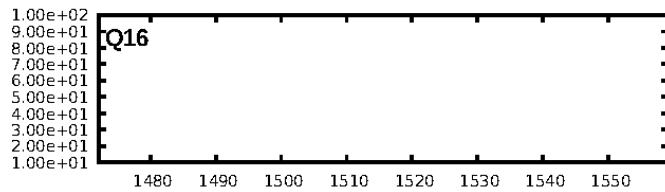
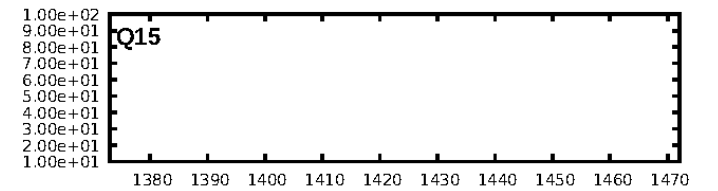
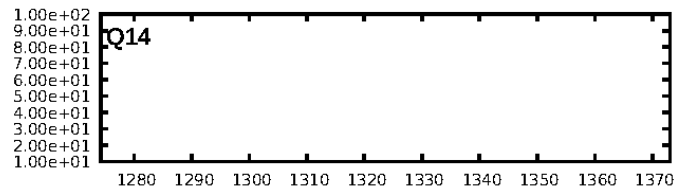
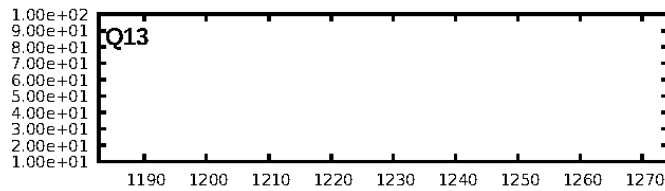
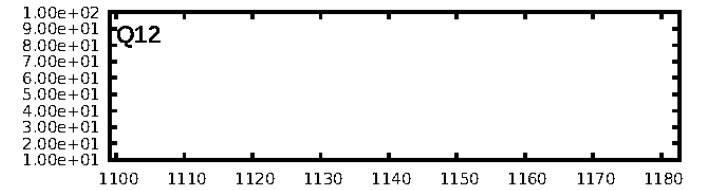
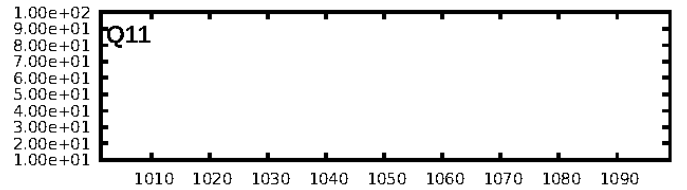
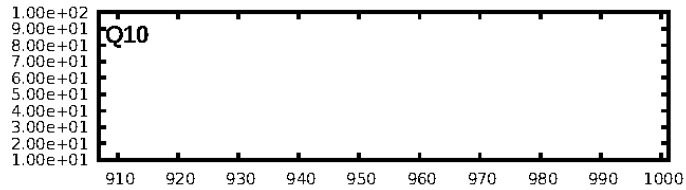
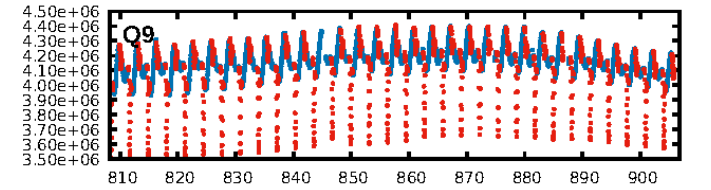
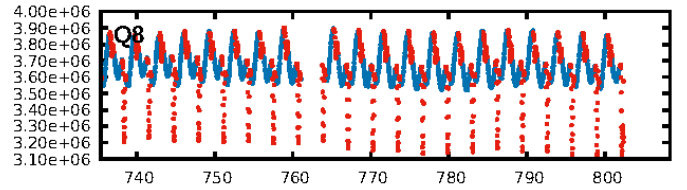
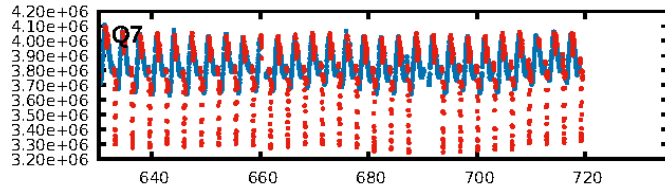
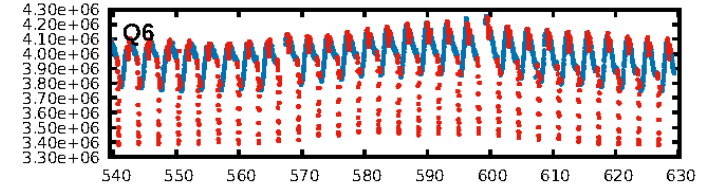
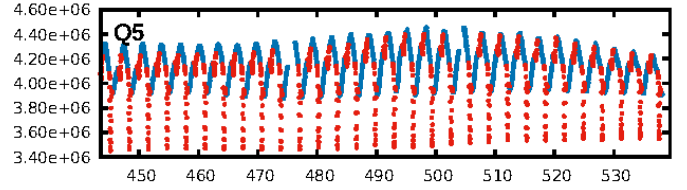
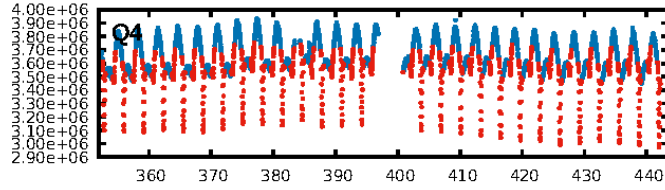
DV Fit Results:

Period = 1.59359 [0.00001] d
Epoch = 132.8521 [0.0020] BKJD
Rp/R* = 0.1185 [0.0100]
a/R* = 1.58 [0.03]
b = 0.92 [0.02]
Seff = N/A
Teq = N/A
Rp = 306.18 [177.08] Re
a = N/A
Ag = N/A
Teffp = N/A

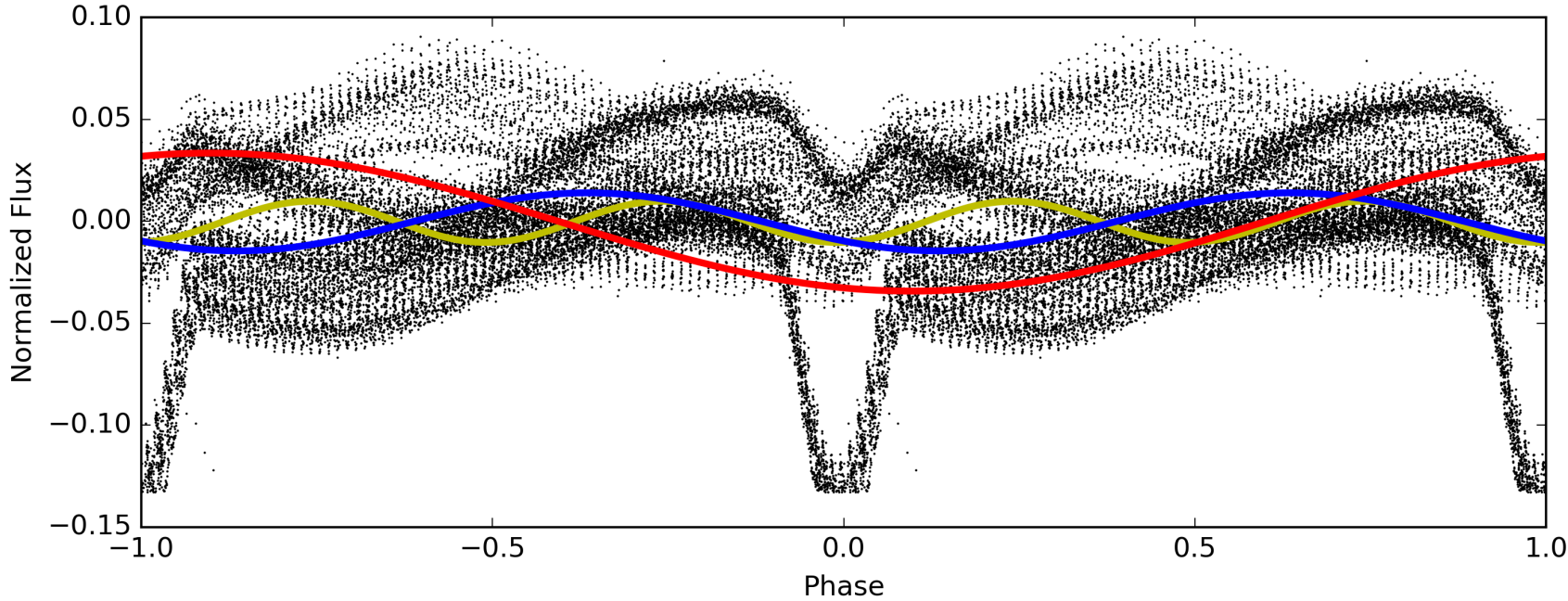
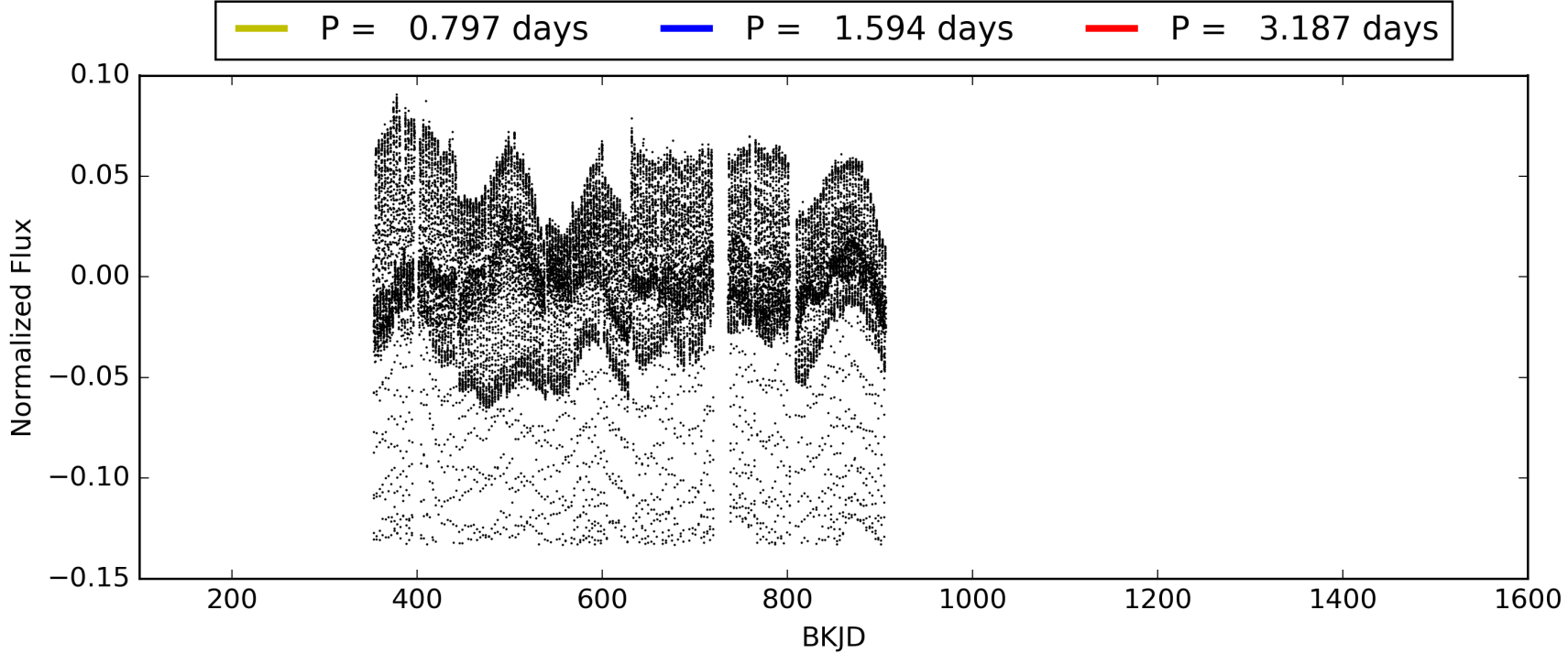
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [4.08σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [161/161]
GhostDiagnostic-chr: -0.1196
Centroid-sig: N/A
Centroid-so: 1.424 arcsec [23.58σ]
OotOffset-rm: 5.234 arcsec [4.29σ]
KicOffset-rm: 0.237 arcsec [2.19σ]
OotOffset-st: 1/1/2/2 [6]
KicOffset-st: 1/1/2/2 [6]
DiffImageQuality-fgm: 1.00 [6/6]
DiffImageOverlap-fno: 1.00 [6/6]

TCE 002437060-02, PDC Light Curves

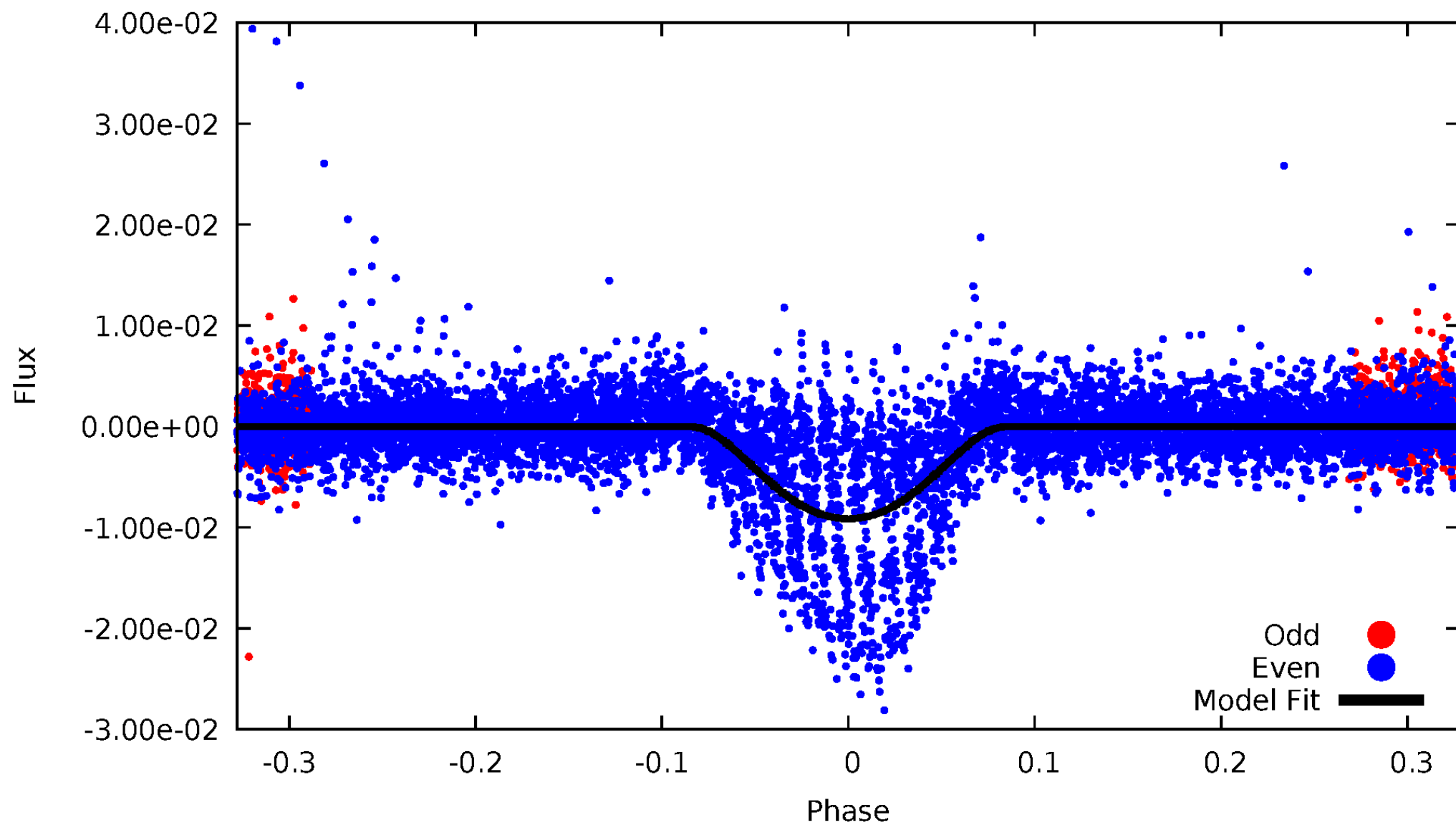


TCE 002437060-02



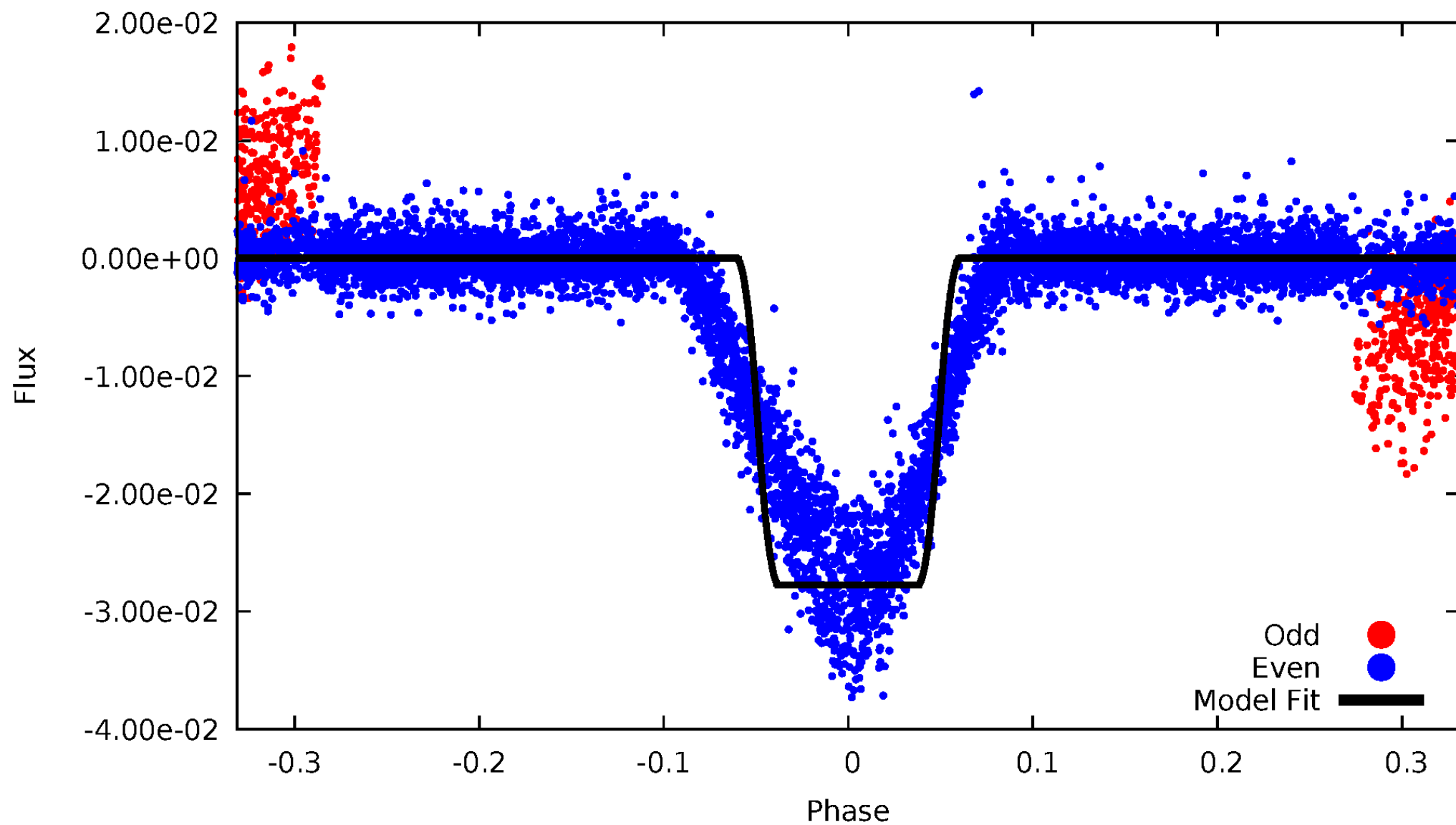
DV Odd/Even

TCE 002437060-02



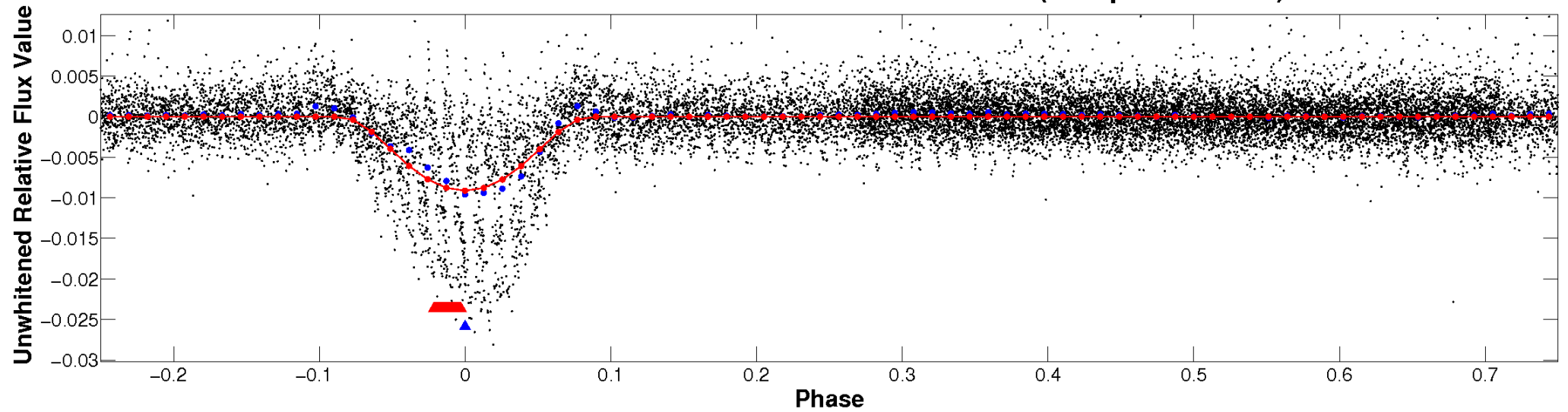
ALT Odd/Even

TCE 002437060-02

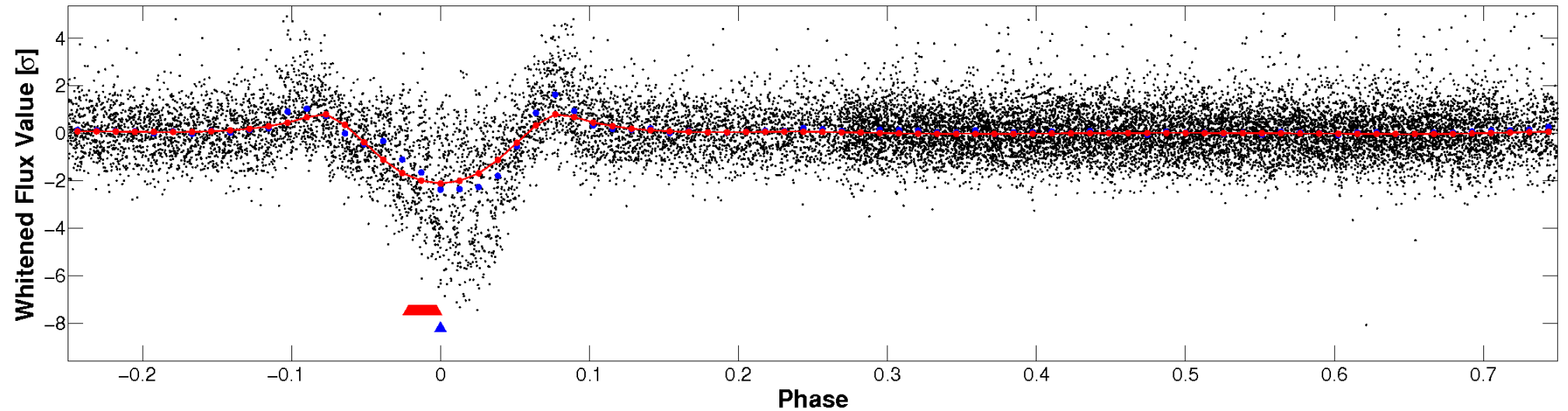


Non-Whitened Vs. Whitened Light Curve

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

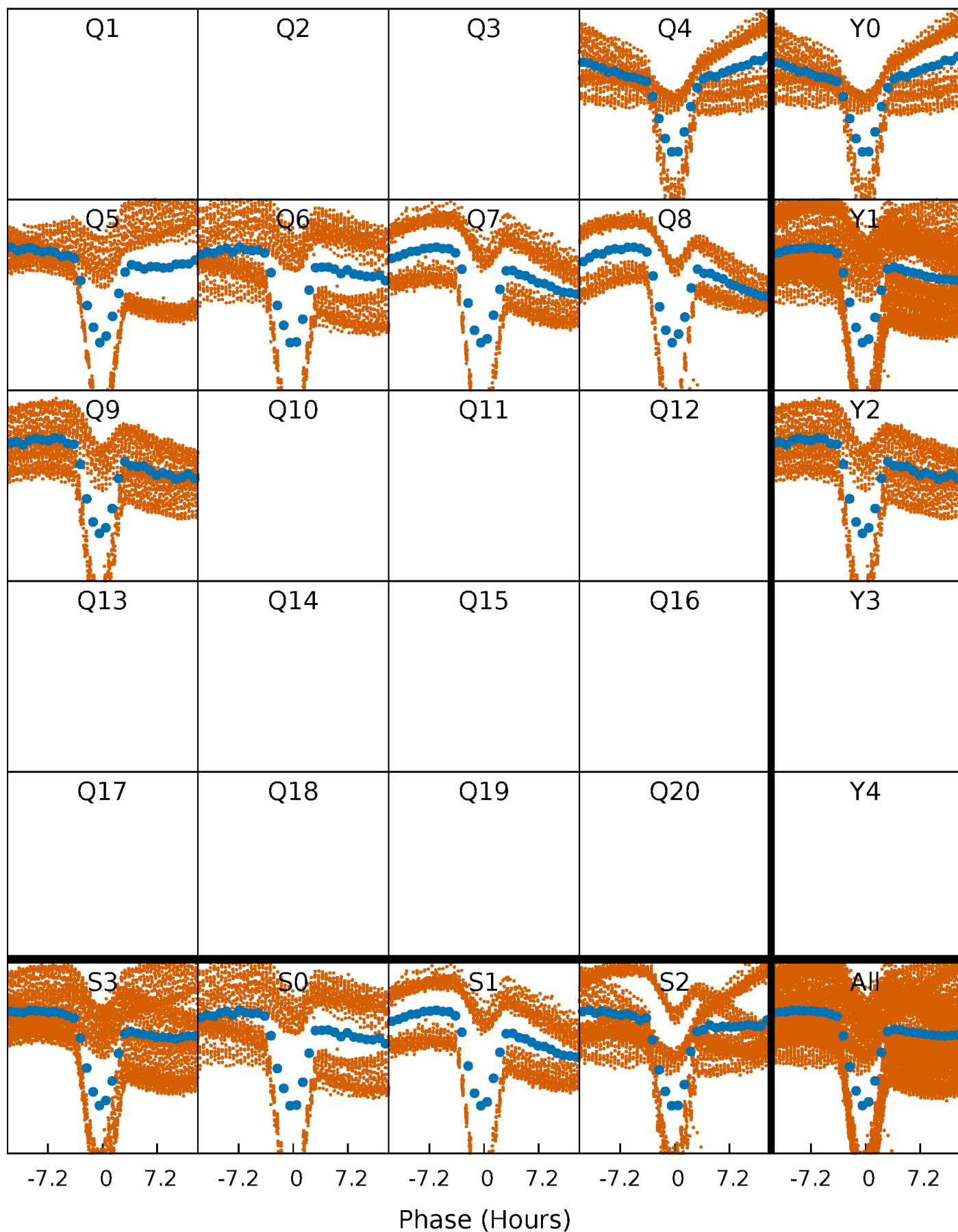


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



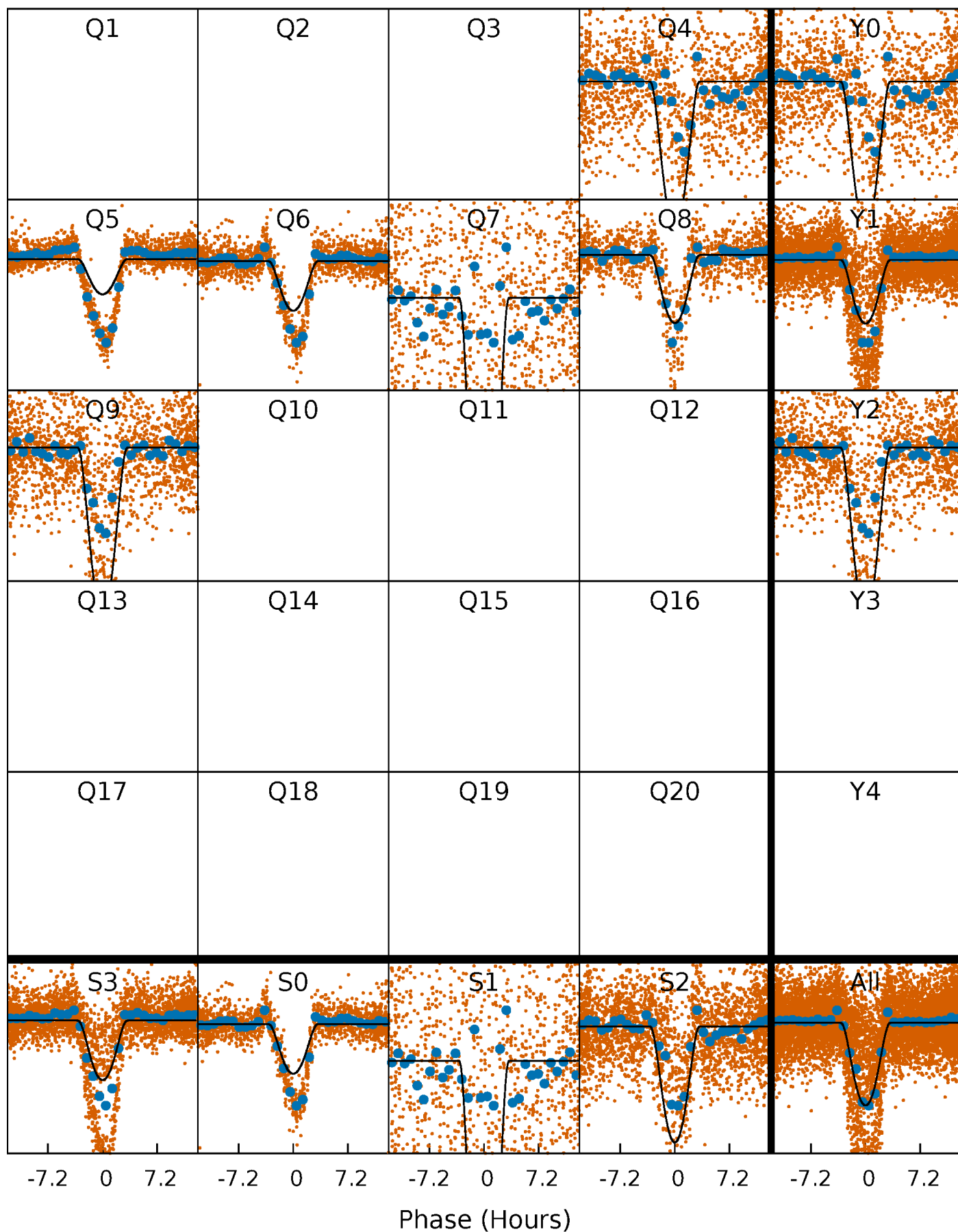
PDC Quarter-Phased Transit Curves

TCE 002437060-02 $P = 1.593590$ Days $T_0 = 132.852137$ (BKJD)



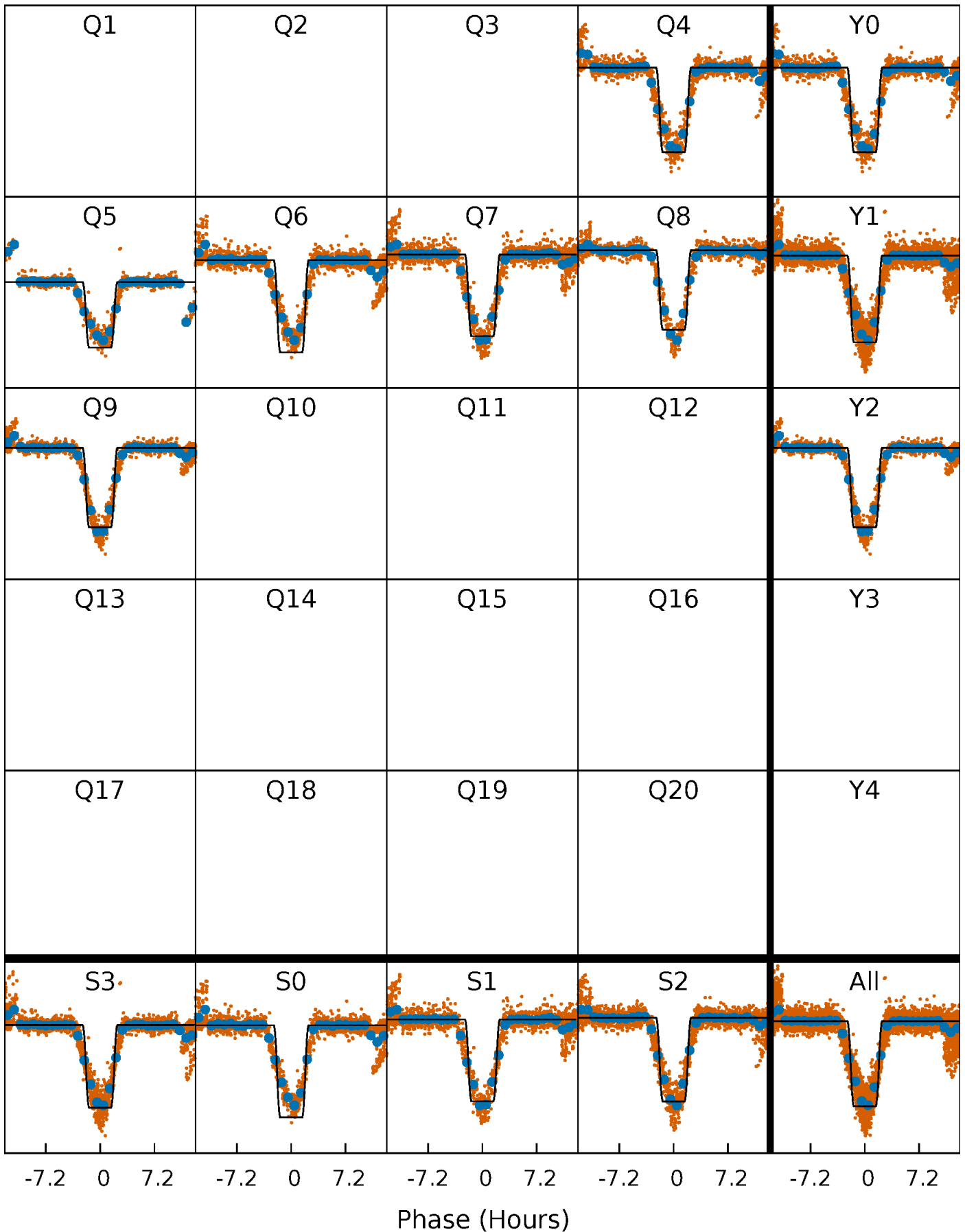
DV Quarter-Phased Transit Curves

TCE 002437060-02 $P = 1.593590$ Days $T_0 = 132.852137$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

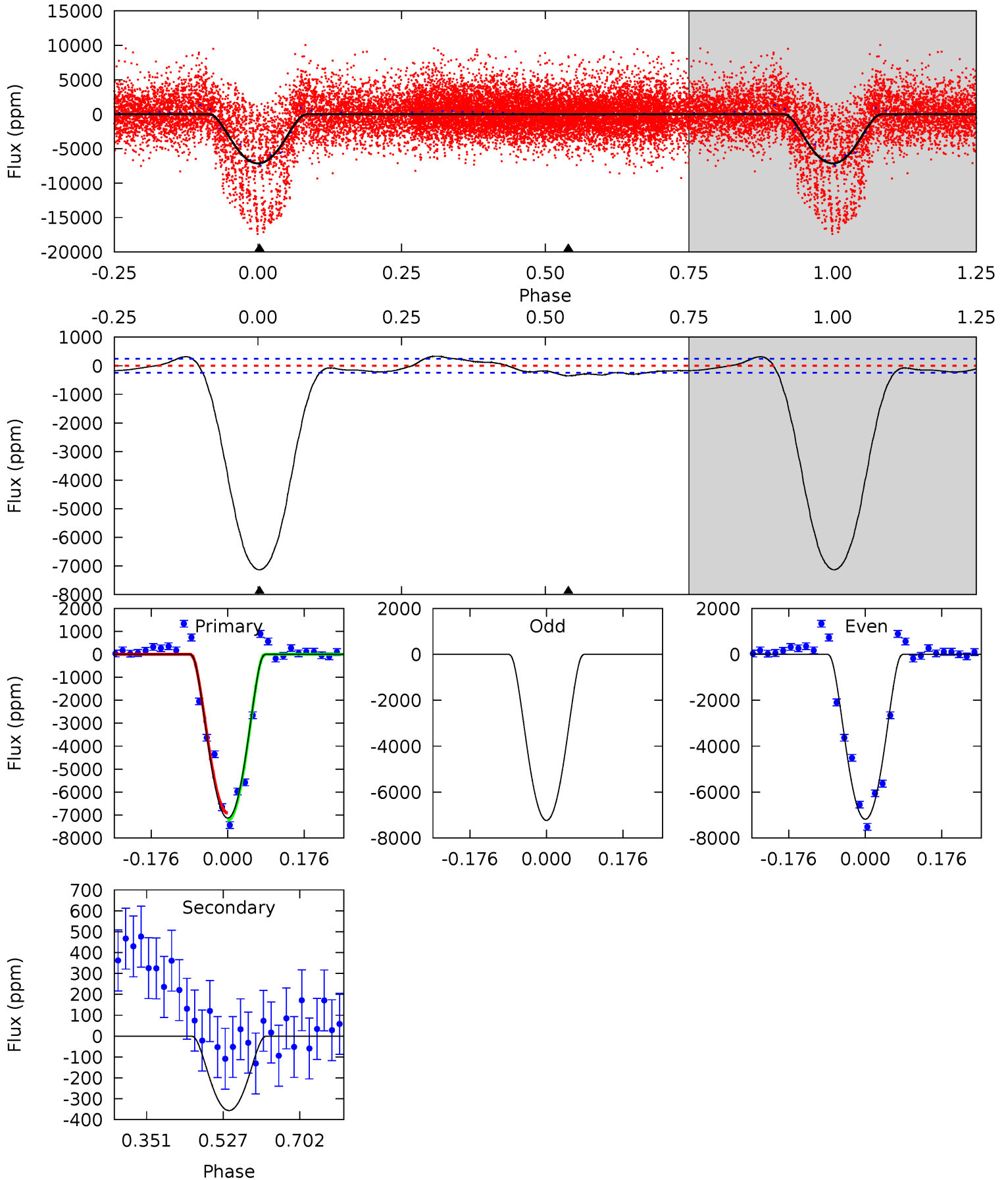
TCE 002437060-02 P= 1.593540 Days $T_0=132.862717$ (BKJD)



DV Model-Shift Uniqueness Test

002437060-02, P = 1.593590 Days, E = 132.852137 Days

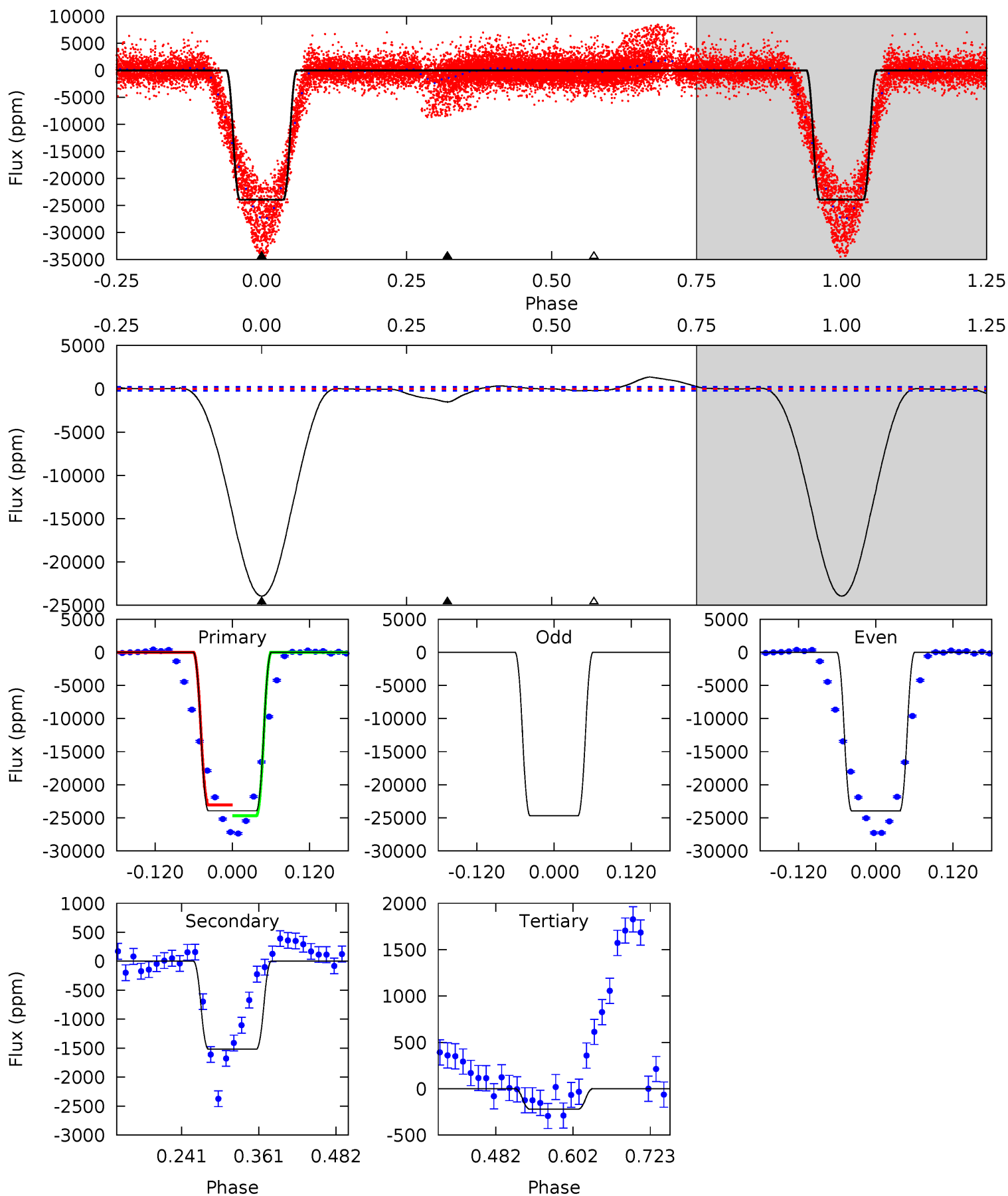
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
129.2	6.46	0	0	4.45	1.35	3.66	129.2	129.2	6.46	6.46	0.54	1.27	0.04	0



Alt Model-Shift Uniqueness Test

002437060-02, P = 1.593540 Days, E = 132.862717 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
485.7	30.8	4.49	0	4.53	1.55	8.63	481.3	485.7	26.3	30.8	8.12	1.00	0.05	14.4



Stellar Parameters For KIC 002437060

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4599^{+114}_{-126}	$2.137^{+0.450}_{-0.180}$	$0.070^{+0.200}_{-0.300}$	$23.673^{+3.612}_{-13.546}$	$2.799^{+0.542}_{-1.734}$	$0.000^{+0.002}_{-0.000}$
	+2%/-3%	+21%/-8%	+286%/-429%	+15%/-57%	+19%/-62%	+548%/-36%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 002437060-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-357 ± 55	$308.79^{+50.61}_{-85.04}$	7073^{+448}_{-818}	-5573^{+583}_{-363}	$0.003^{+0.002}_{-0.001}$
Alt.	-1518 ± 49	$431.80^{+61.77}_{-113.51}$	7035^{+486}_{-718}	-5538^{+529}_{-393}	$0.007^{+0.004}_{-0.002}$

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 $A_{obs} \gg 1.0$

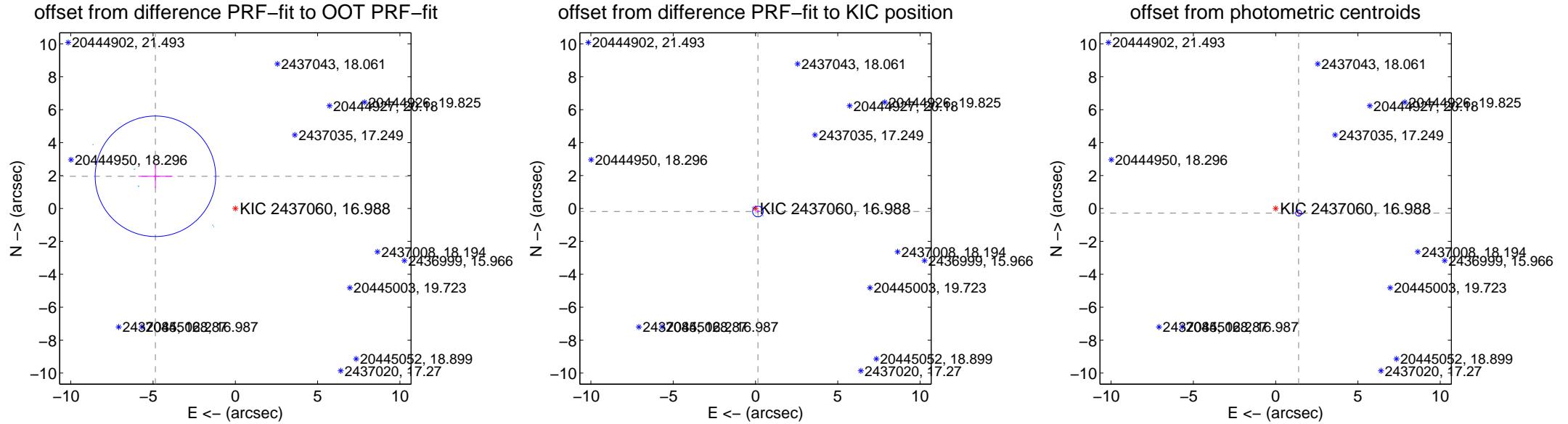
DV Centroid Data

Supplemental centroid analysis for 002437060-02. Kepler magnitude: 16.99. Transit SNR 54.41

There are 6 quarters with good PRF difference image offsets

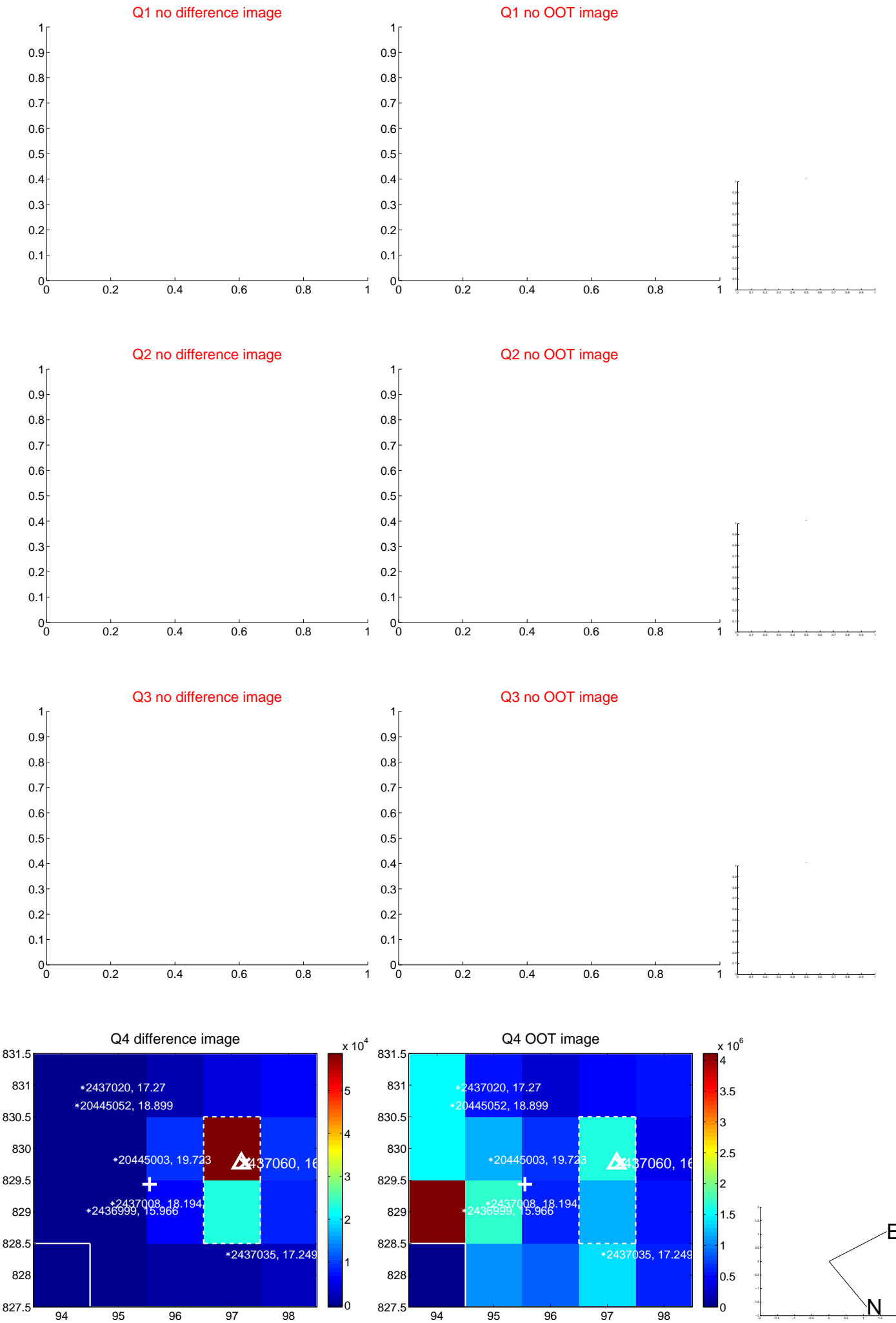
The direct PRF centroid is offset from the target star catalog position by about 1.54 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.234 ± 1.220	4.29	4.856 ± 1.037	1.954 ± 0.701
PRF-fit source offset from KIC position	0.237 ± 0.108	2.19	-0.148 ± 0.105	-0.185 ± 0.088
photometric centroid source offset	1.42 ± 0.06	23.58	-1.40 ± 0.06	-0.28 ± 0.05

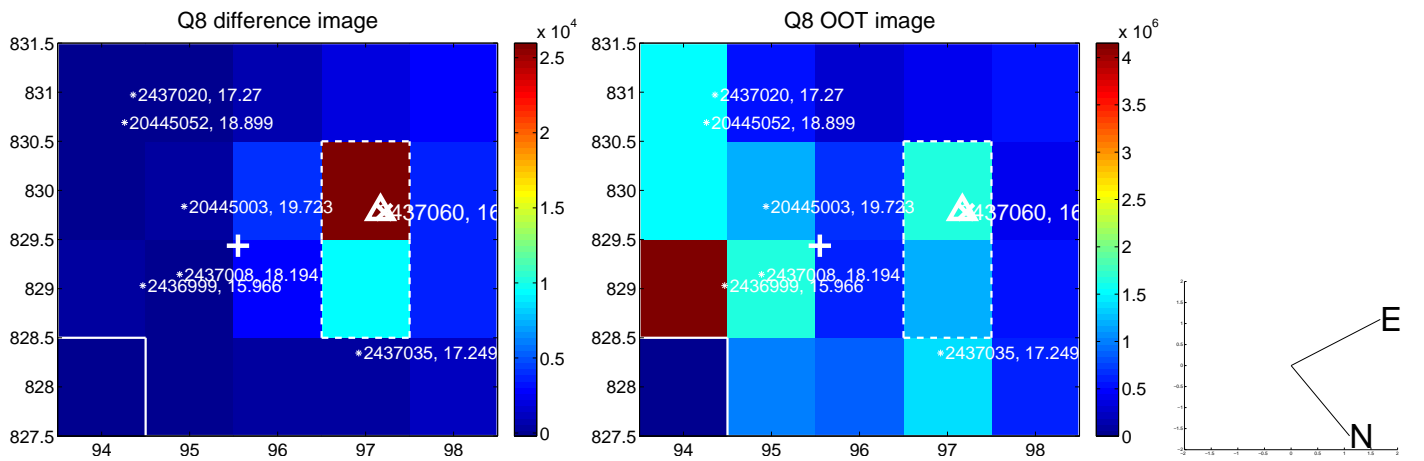
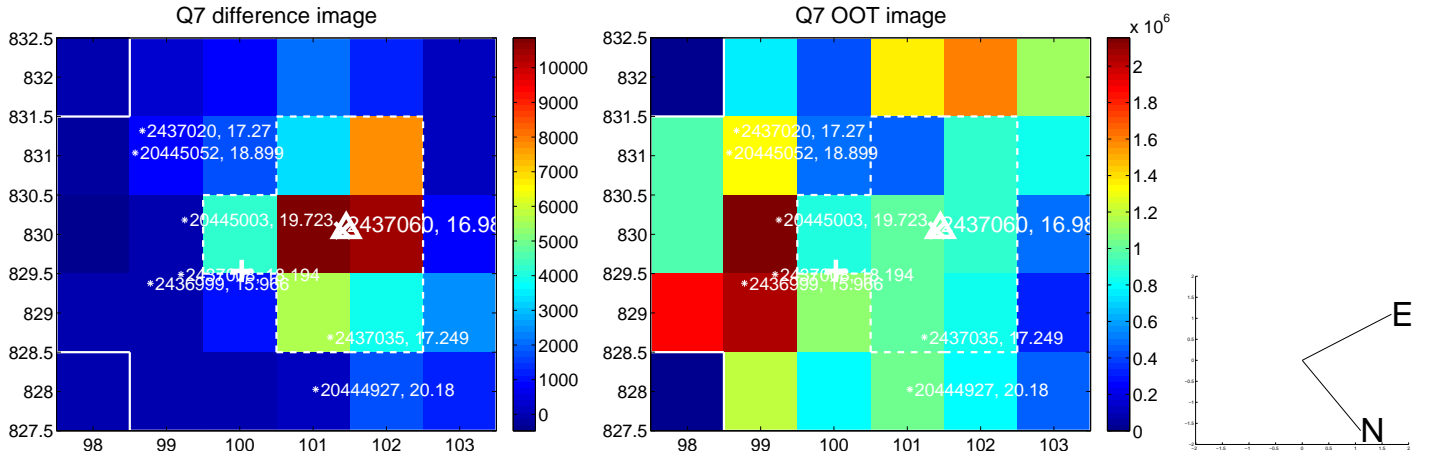
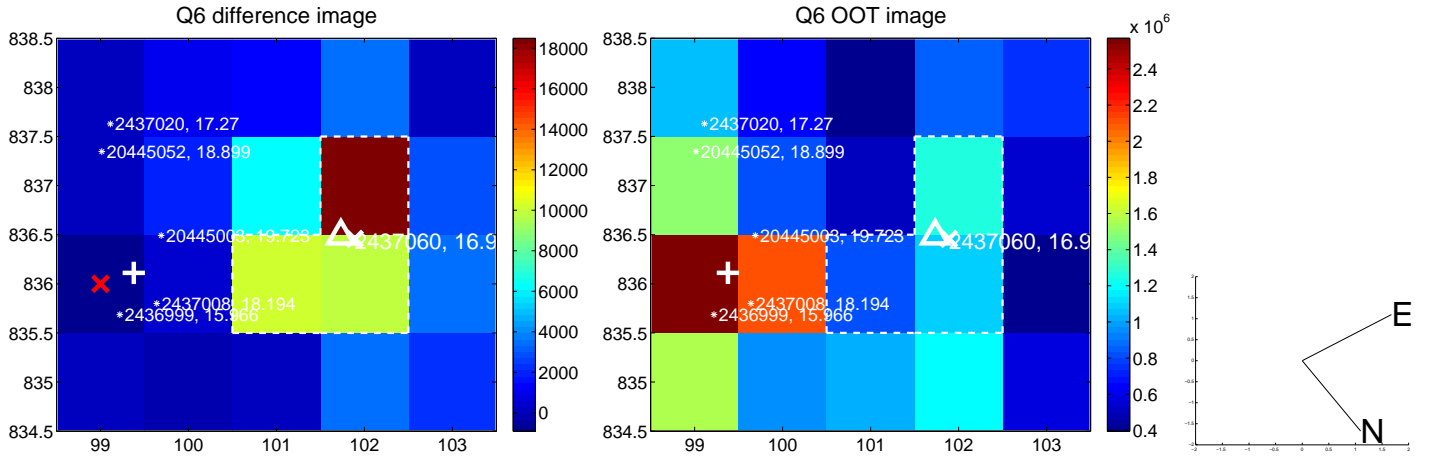
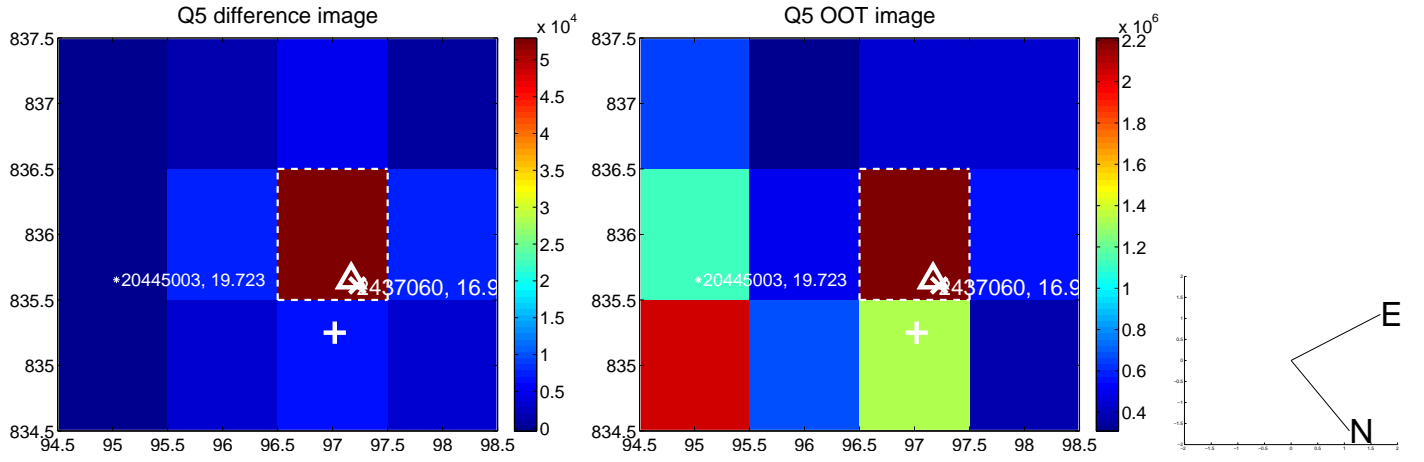


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

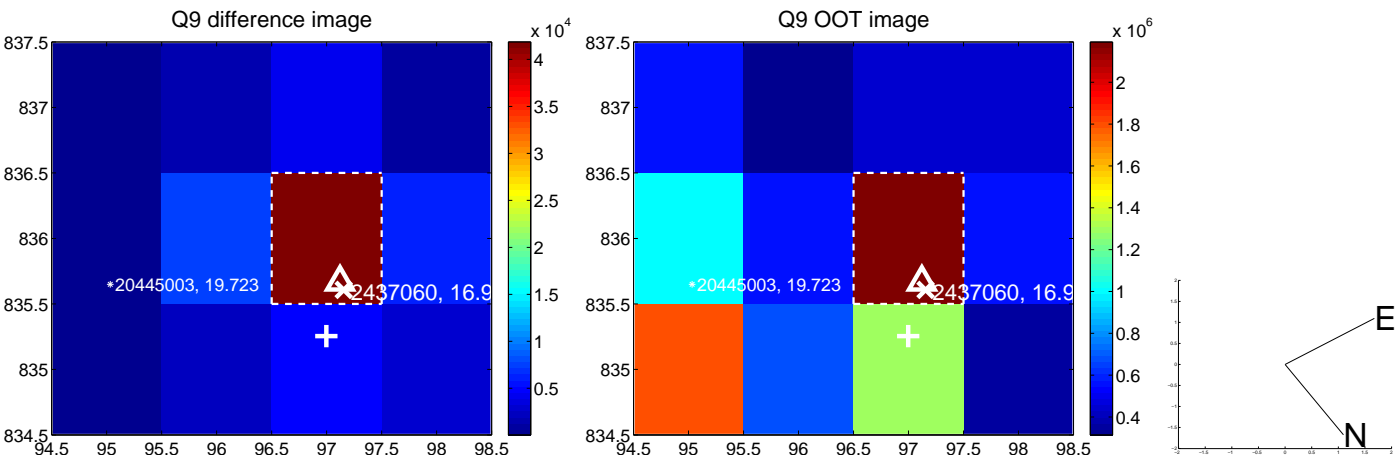
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



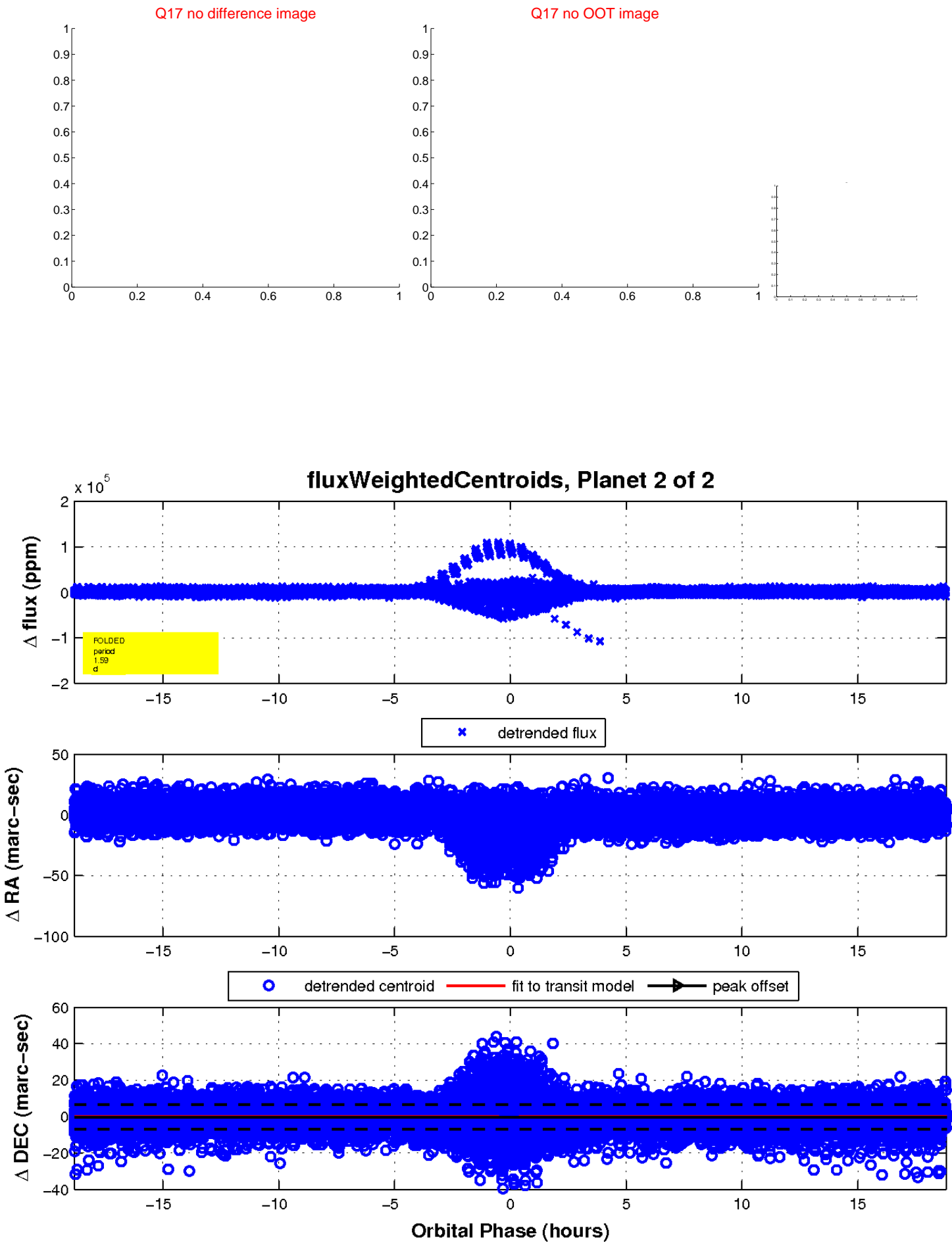
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

