

KIC 002021440

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})
002021440-01	OBS	1987.01	7.811563	136.329653	782.5	5.597	30.7	32.2	0.71	5150	3.76	63.09
002021440-02	OBS	No	7.811575	131.528353	561.1	4.439	20.9	21.9	0.71	5150	3.23	63.09

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002021440-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST
002021440-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST

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

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

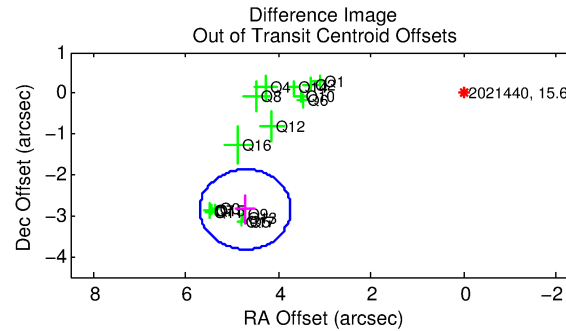
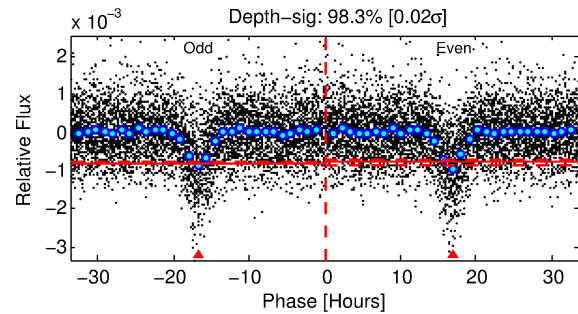
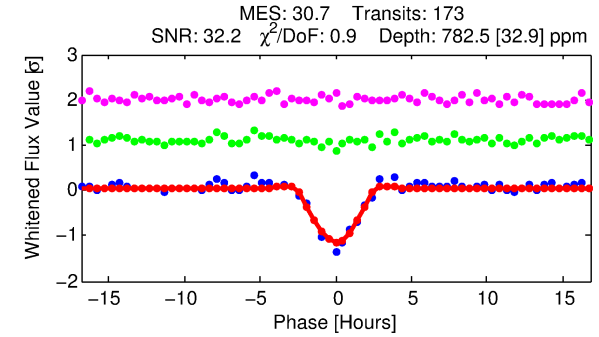
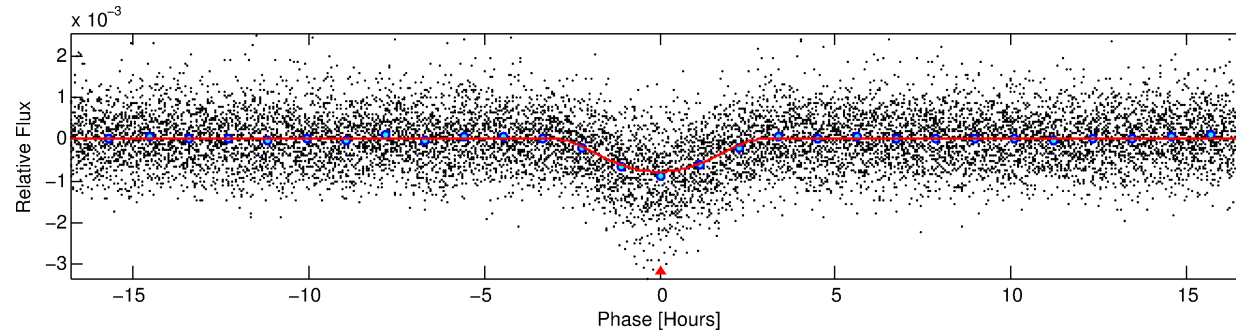
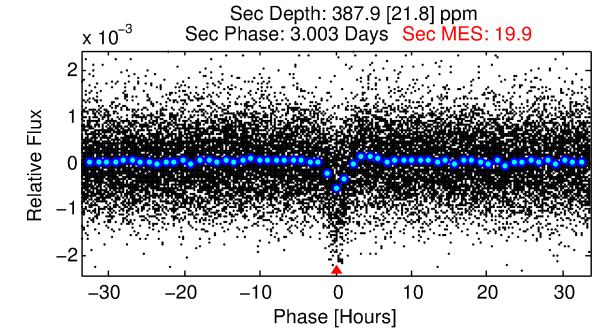
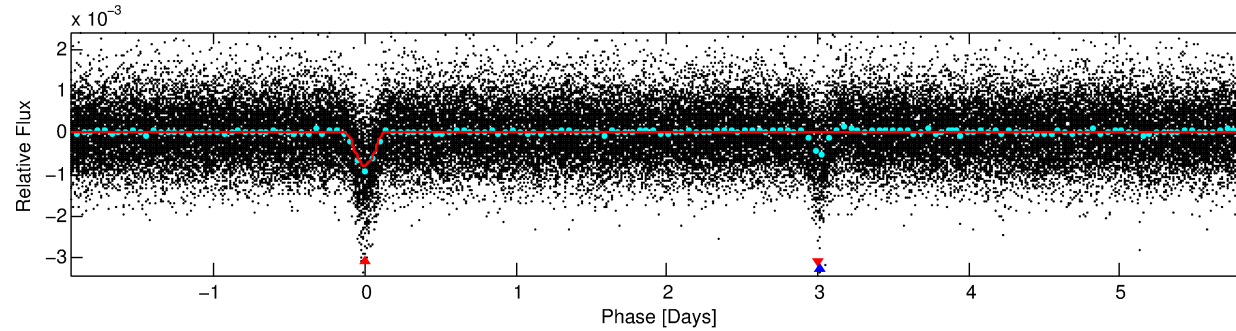
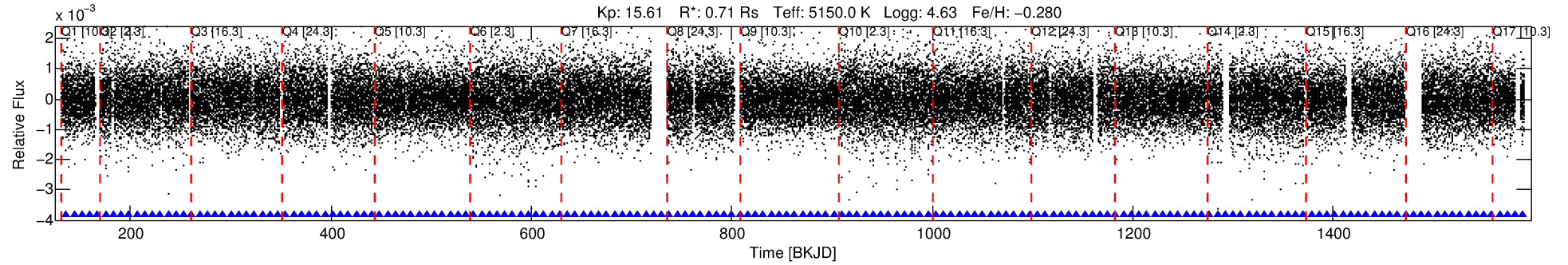
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002021440-01

No Significant Match Found

DV One-Page Summary

KIC: 2021440 Candidate: 1 of 2 Period: 7.812 d
KOI: K01987.01 Corr: 0.970



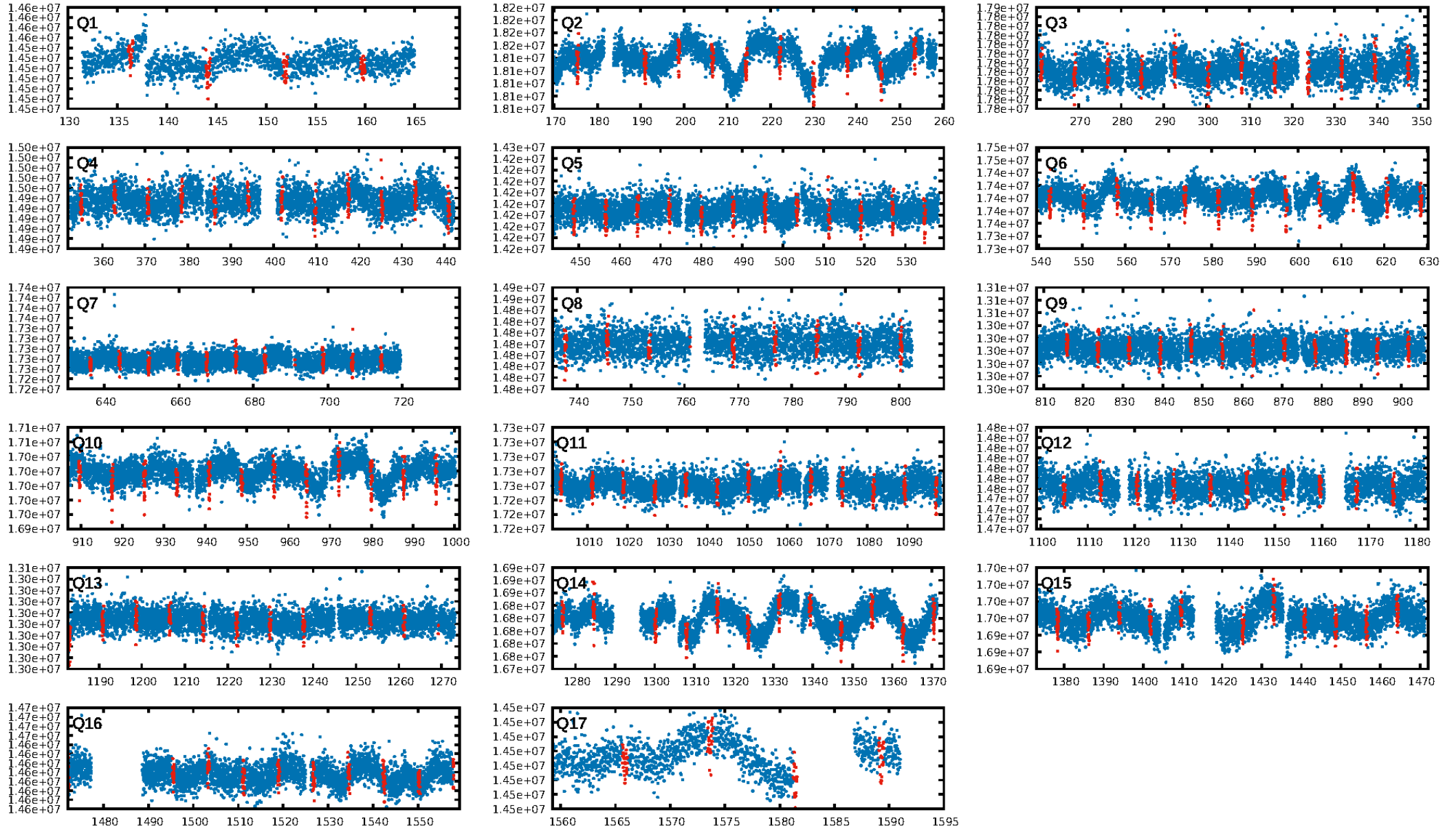
DV Fit Results:

Period = 7.81156 [0.00004] d
Epoch = 136.3297 [0.0040] BKJD
Rp/R* = 0.0485 [0.0478]
a/R* = 3.67 [0.87]
b = 0.99 [0.07]
Seff = 63.09 [12.04]
Teq = 719 [34] K
Rp = 3.76 [3.74] Re
a = 0.0710 [0.0077] AU
Ag = 76.20 [150.92] [0.50σ]
Teff = 3283 [1624] K [1.58σ]

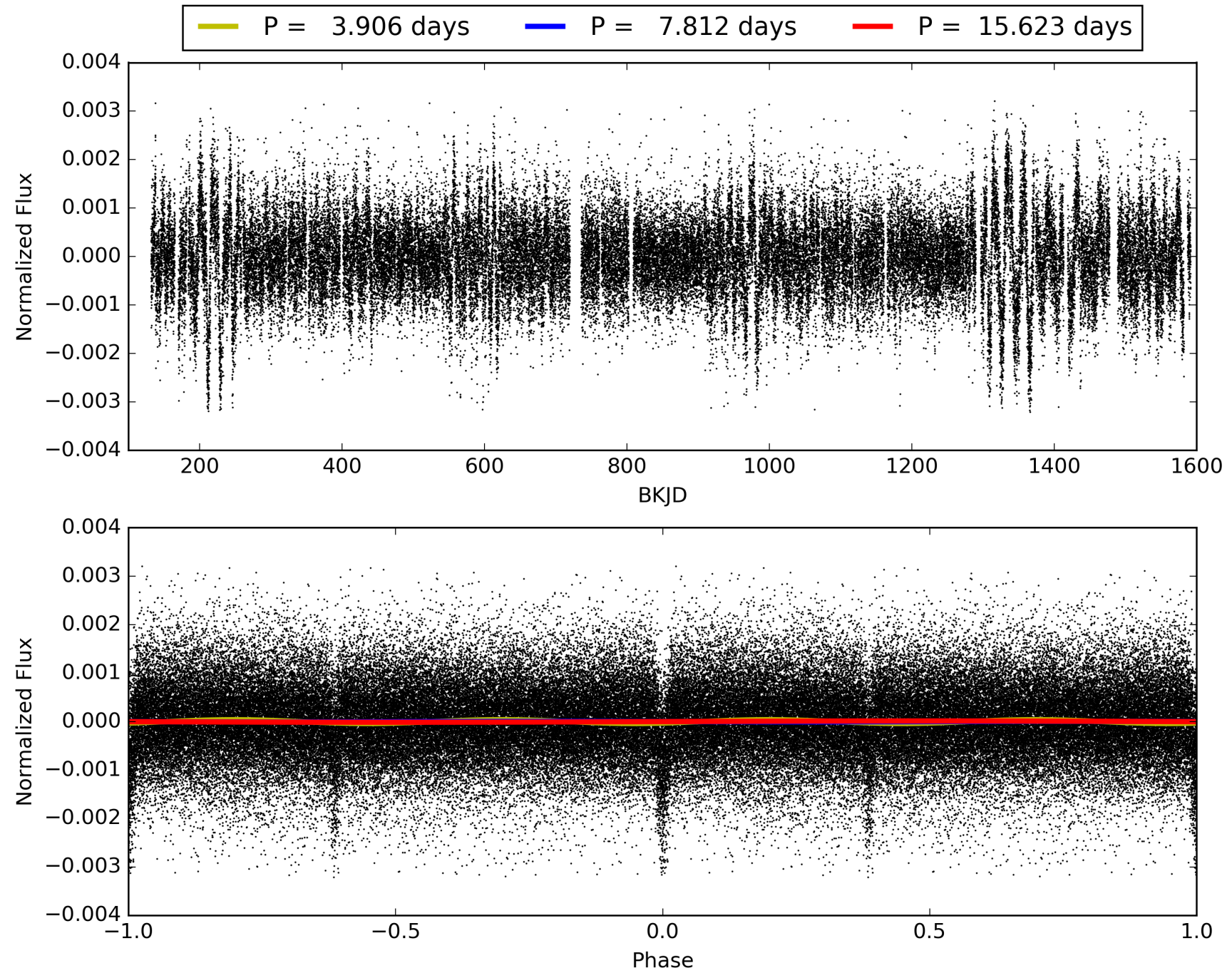
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 2.51e-199
RollingBand-fgt: 1.00 [165/165]
GhostDiagnostic-chr: 0.04596
Centroid-sig: 0.0%
Centroid-so: 7.831 arcsec [26.84σ]
OotOffset-rm: 5.510 arcsec [16.85σ]
KicOffset-rm: 5.624 arcsec [17.59σ]
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]

TCE 002021440-01, PDC Light Curves

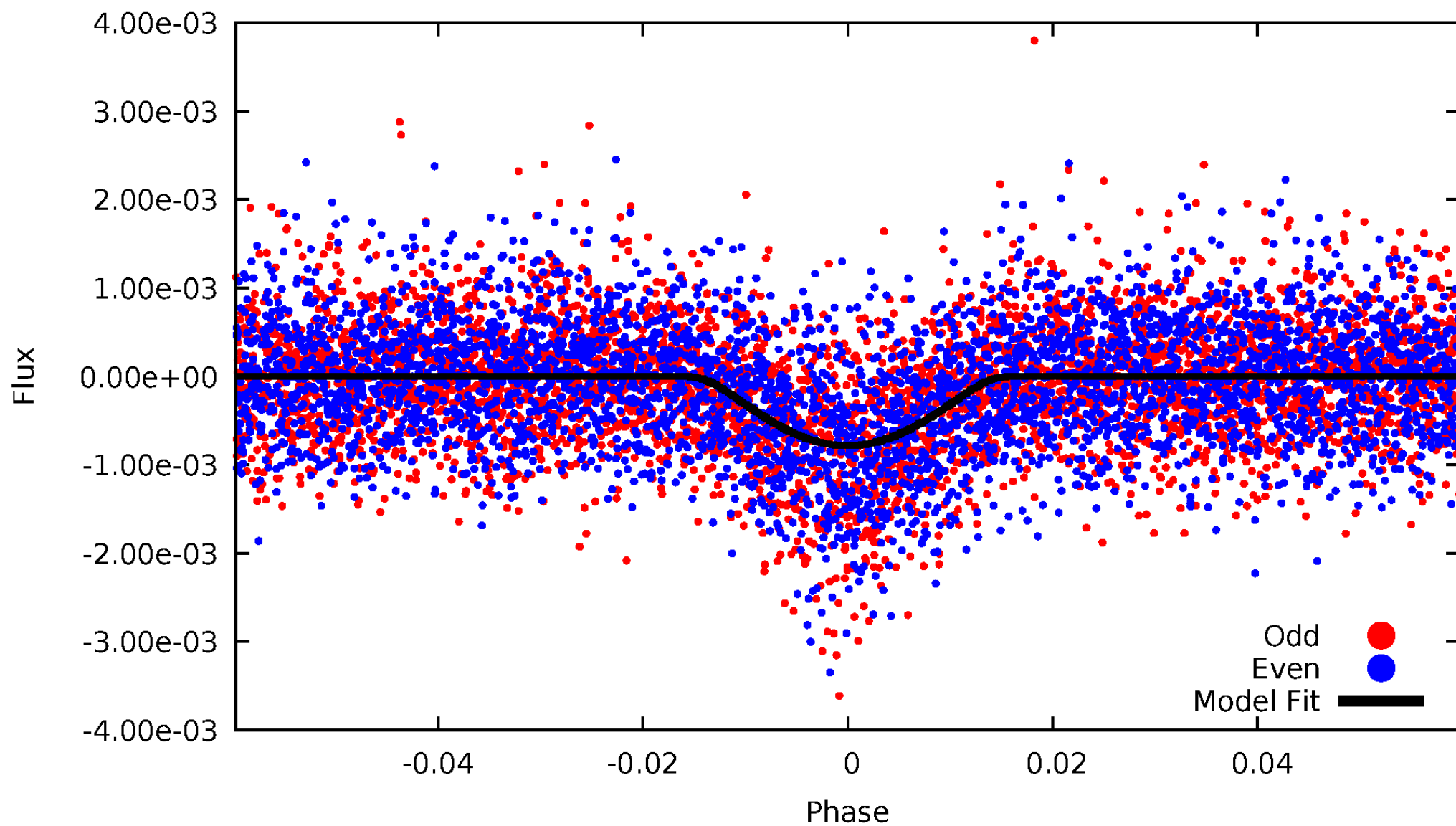


TCE 002021440-01



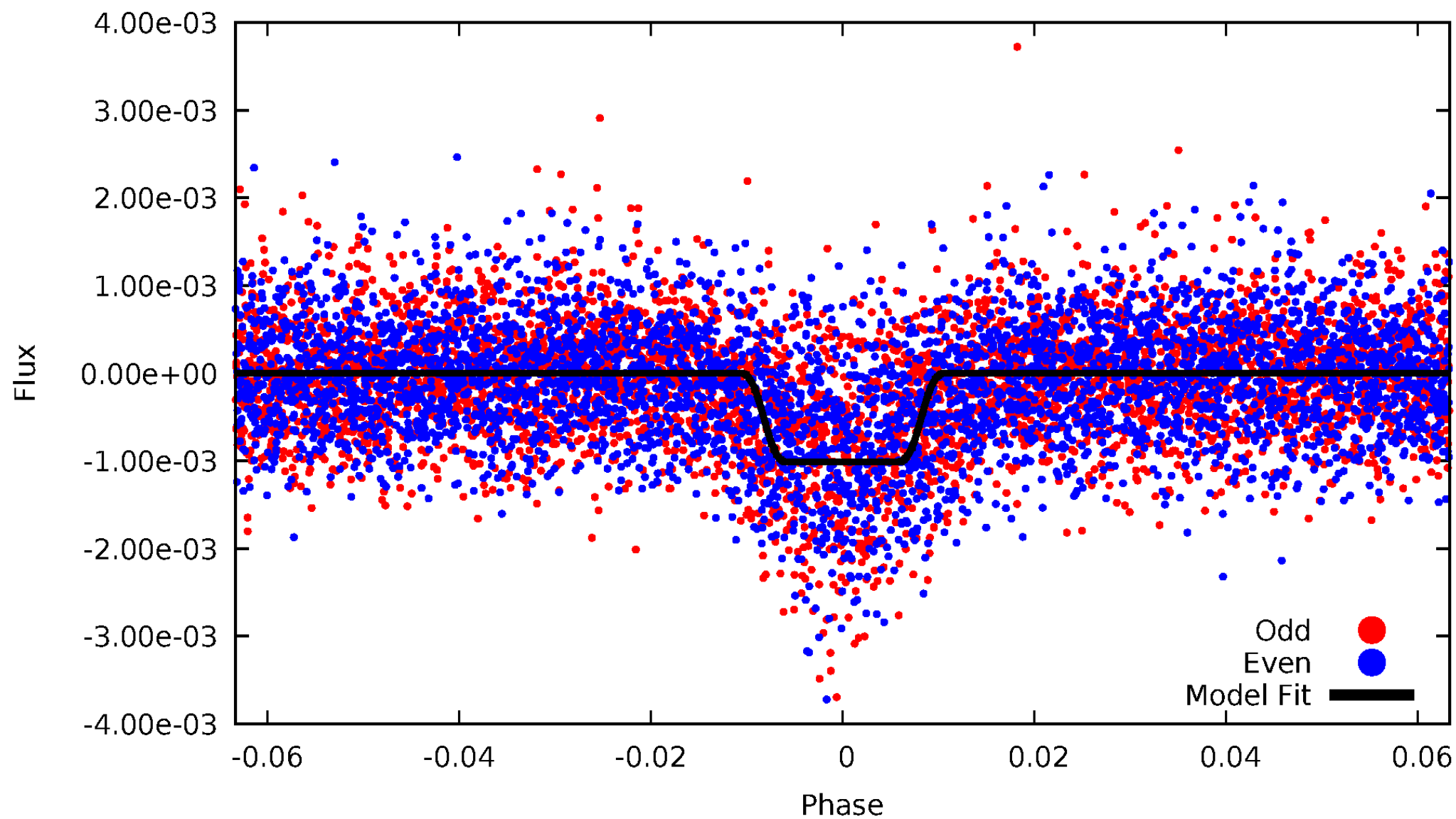
DV Odd/Even

TCE 002021440-01



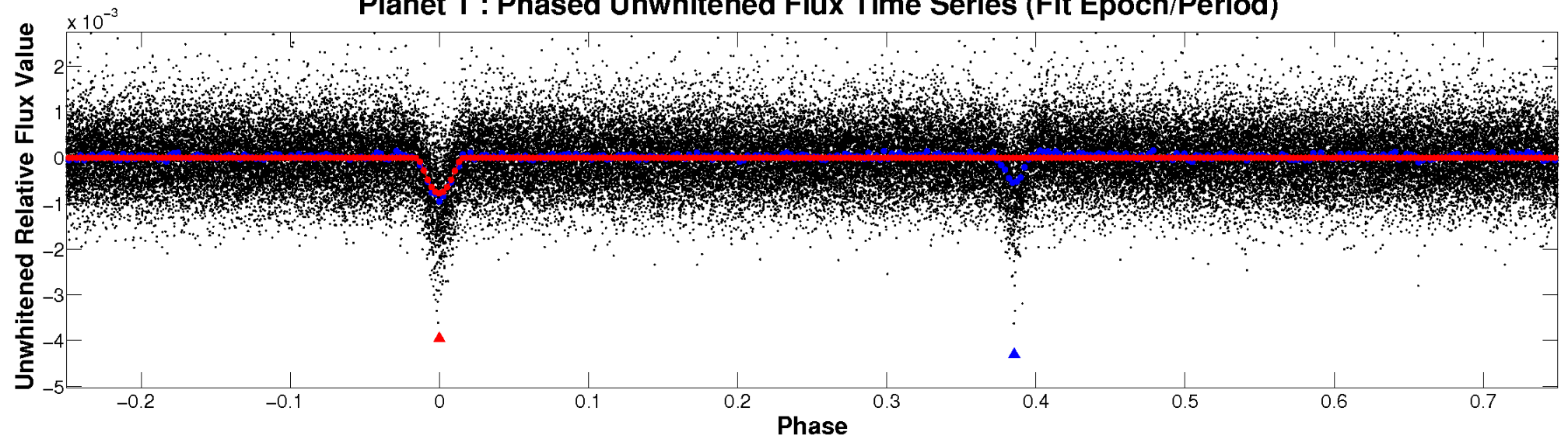
ALT Odd/Even

TCE 002021440-01

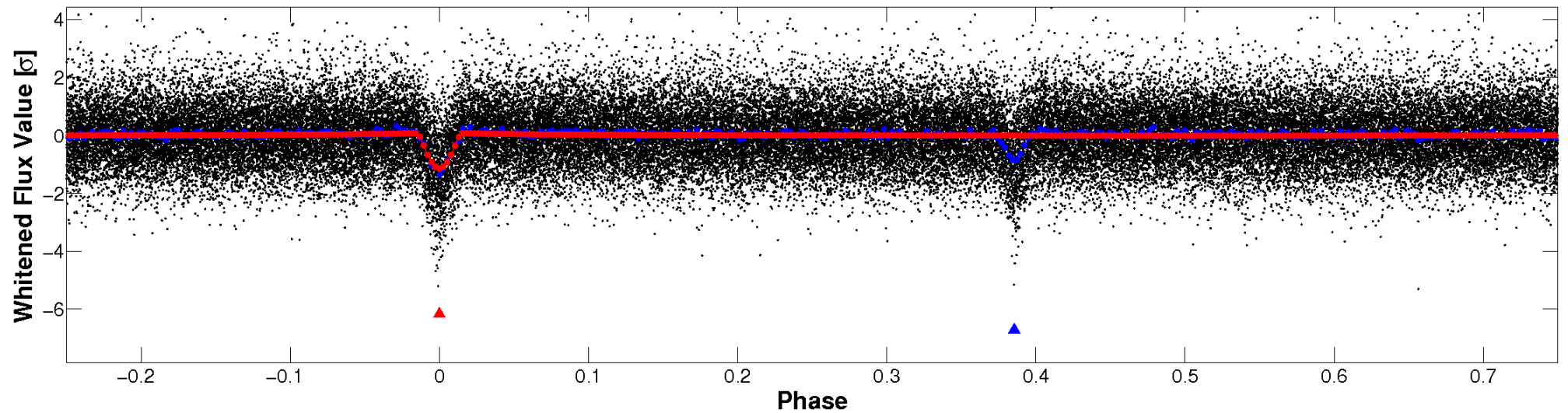


Non-Whitened Vs. Whitened Light Curve

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

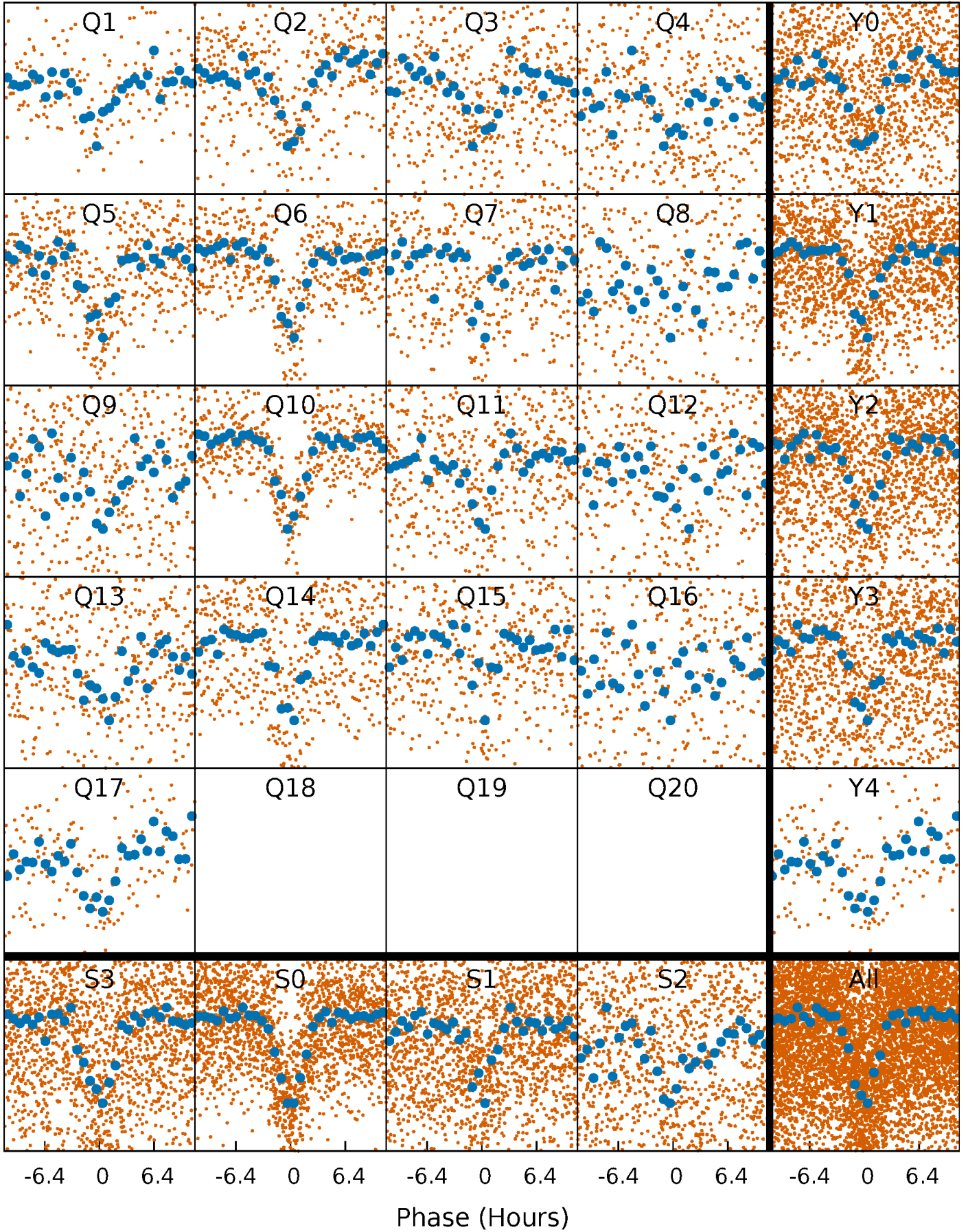


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



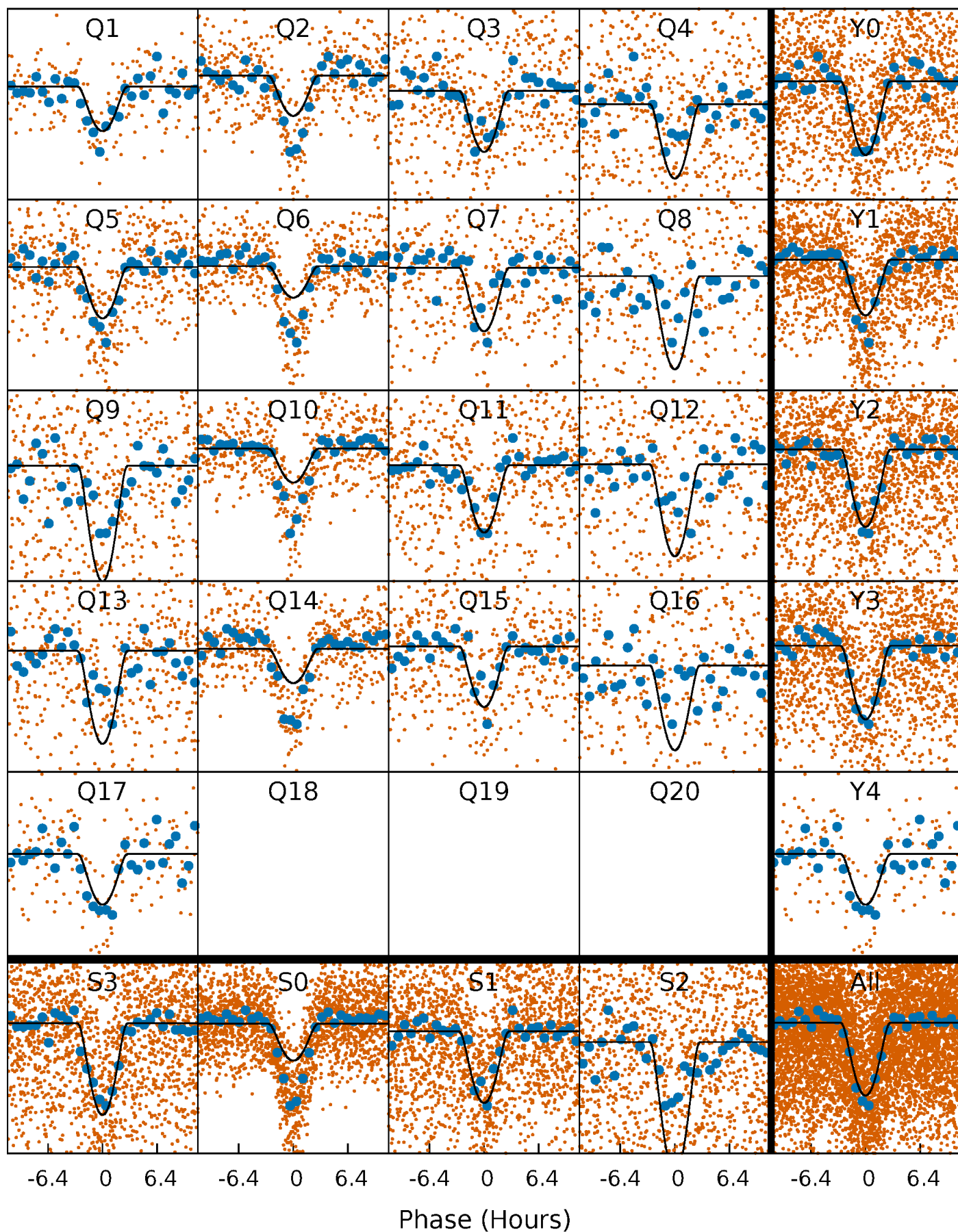
PDC Quarter-Phased Transit Curves

TCE 002021440-01 P= 7.811563 Days $T_0=136.329653$ (BKJD)



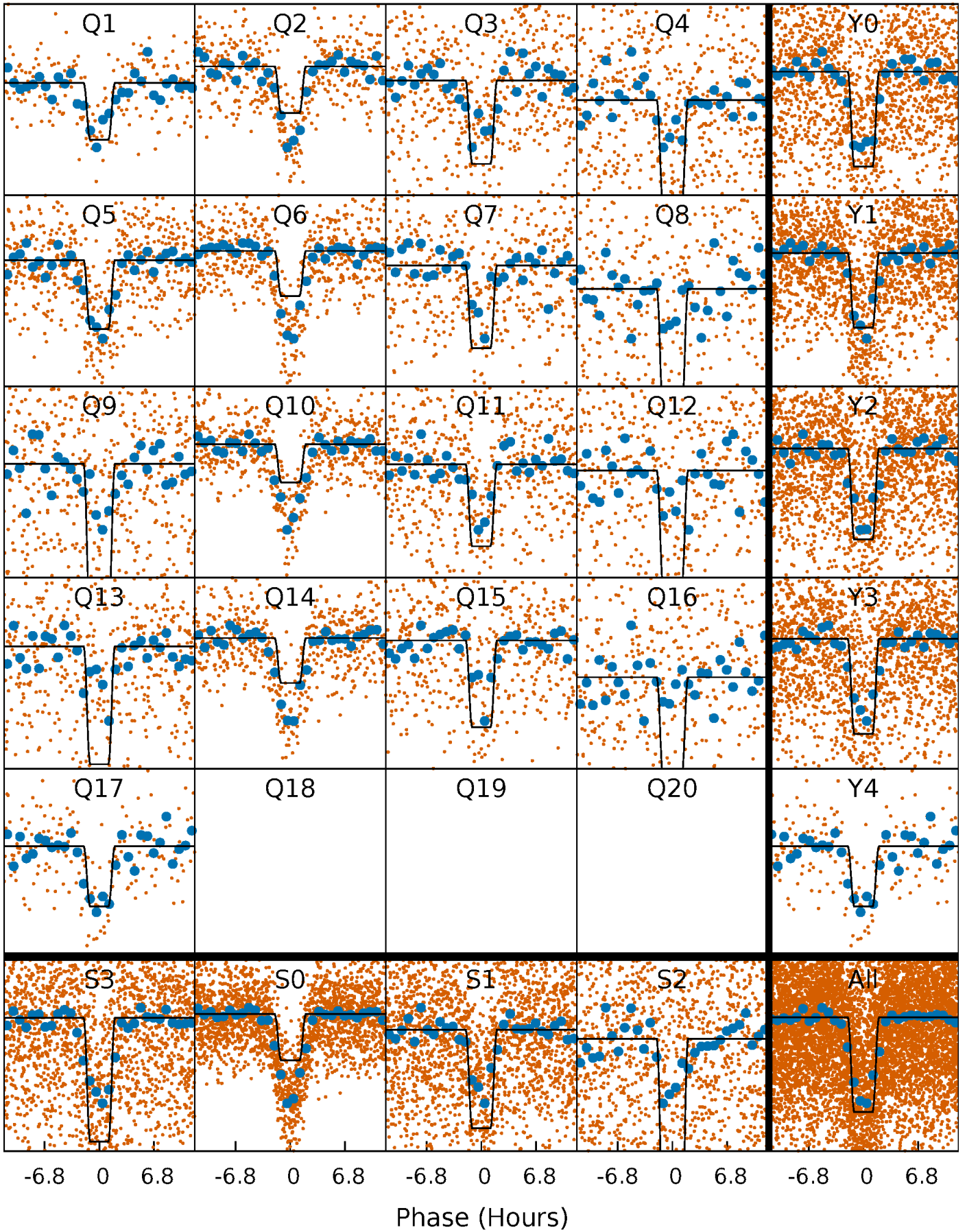
DV Quarter-Phased Transit Curves

TCE 002021440-01 P= 7.811563 Days $T_0=136.329653$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

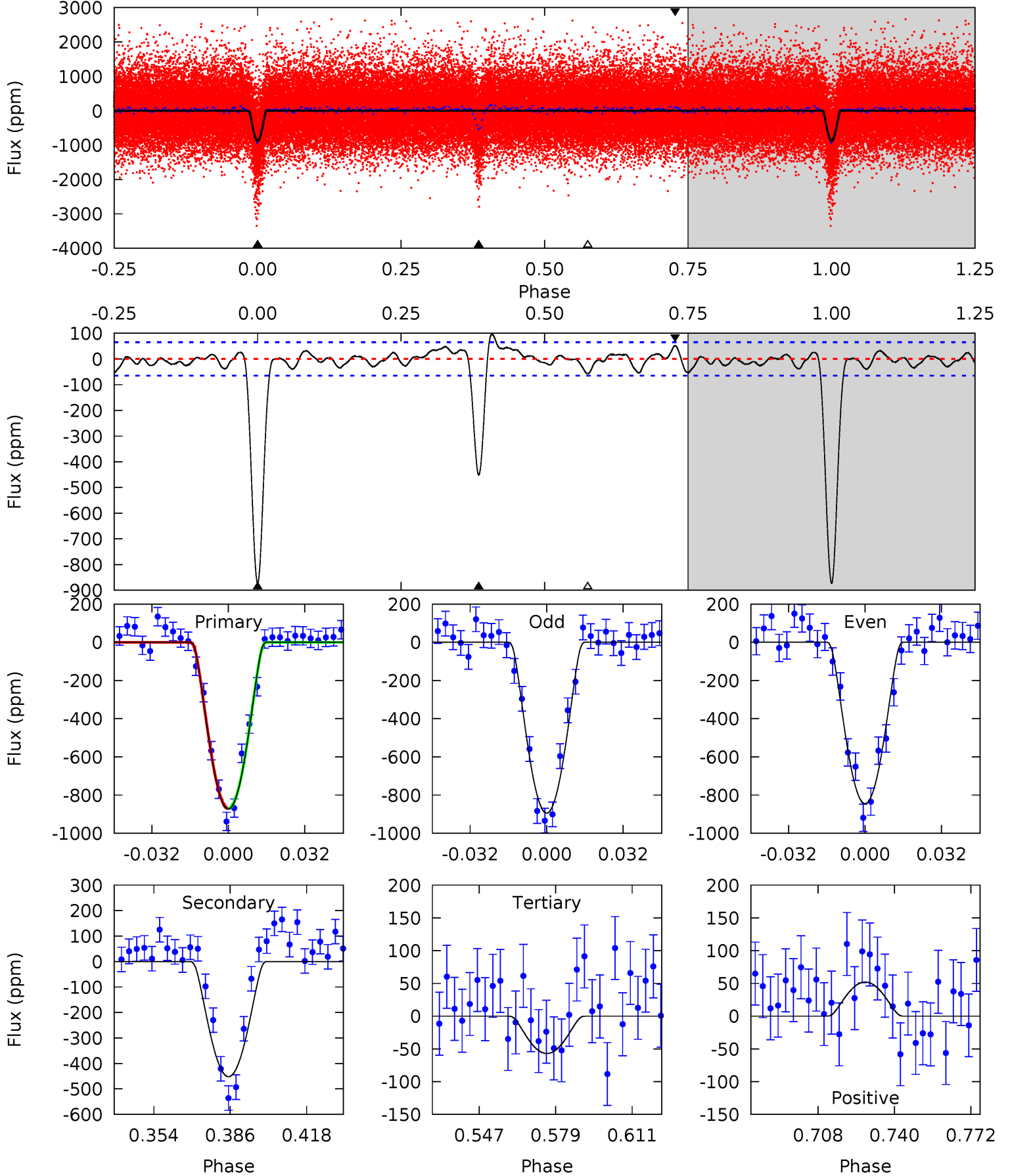
TCE 002021440-01 P= 7.811543 Days $T_0=136.330979$ (BKJD)



DV Model-Shift Uniqueness Test

002021440-01, P = 7.811563 Days, E = 128.518090 Days

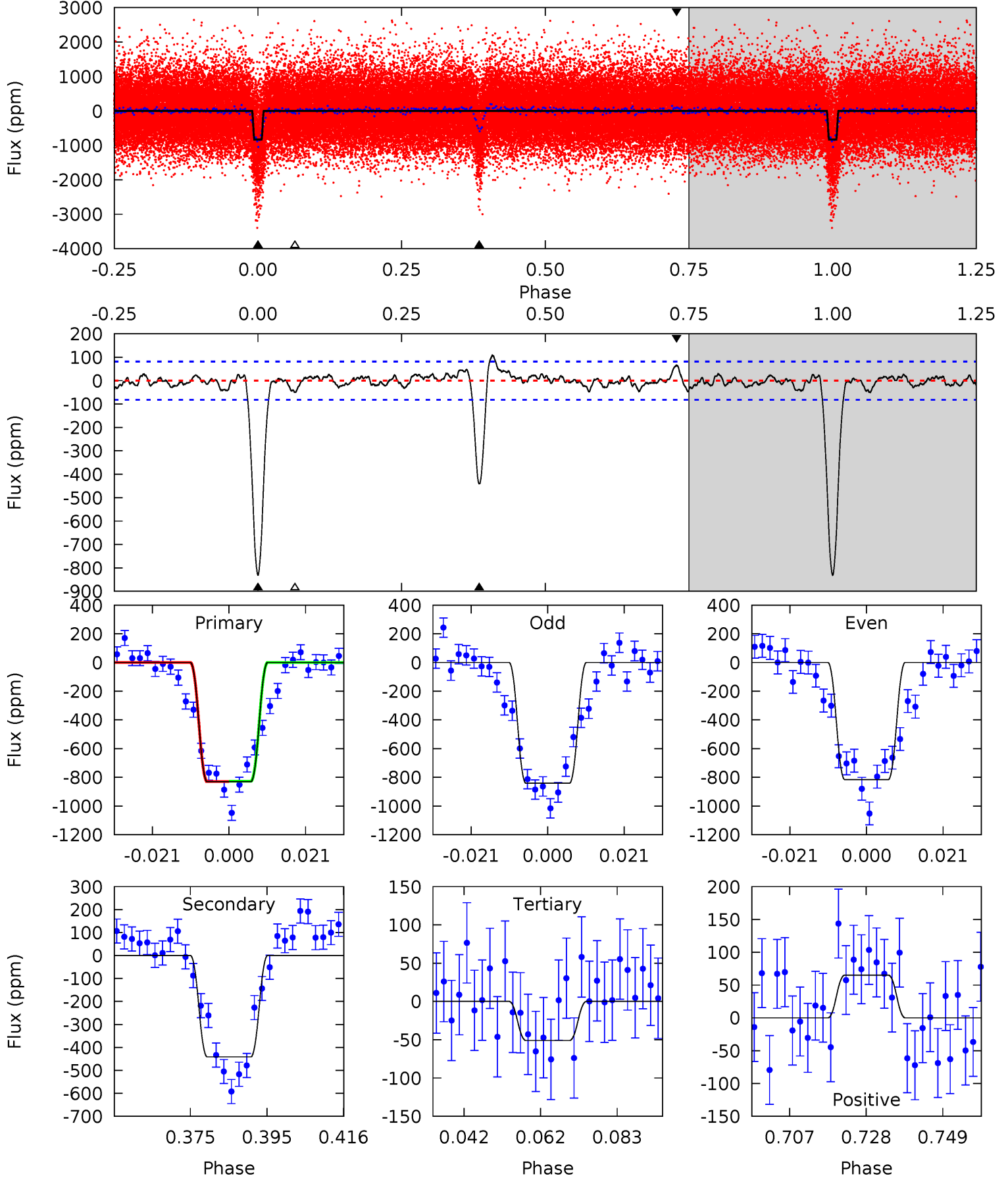
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
64.2	33.2	4.20	3.83	4.80	2.14	1.66	60.0	60.4	29.0	29.4	1.83	1.20	0.10	0.01



Alt Model-Shift Uniqueness Test

002021440-01, P = 7.811543 Days, E = 128.519436 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
49.6	26.4	3.04	3.89	4.88	2.31	1.34	46.6	45.7	23.3	22.5	0.75	1.25	0.12	0.08



Stellar Parameters For KIC 002021440

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5150^{+153}_{-153}	$4.628^{+0.033}_{-0.077}$	$-0.280^{+0.300}_{-0.300}$	$0.710^{+0.097}_{-0.057}$	$0.792^{+0.066}_{-0.088}$	$3.116^{+0.484}_{-0.836}$
	+3%/-3%	+1%/-2%	+107%/-107%	+14%/-8%	+8%/-11%	+16%/-27%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 002021440-01 / KOI 1987.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-452 ± 14	$4.65^{+3.32}_{-2.87}$	1014^{+38}_{-37}	3536^{+1464}_{-534}	59^{+325}_{-39}
Alt.	-441 ± 17	$3.91^{+3.14}_{-2.57}$	1015^{+39}_{-40}	3715^{+1905}_{-638}	80^{+590}_{-56}

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

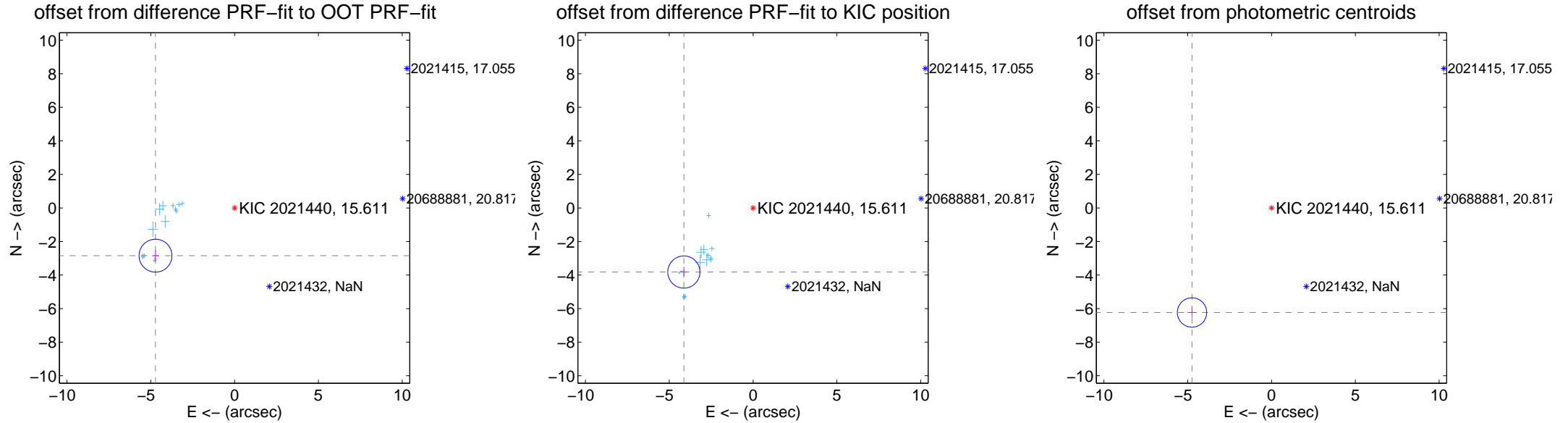
DV Centroid Data

Supplemental centroid analysis for 002021440-01. Kepler magnitude: 15.61. Transit SNR 32.16

There are 17 quarters with good PRF difference image offsets

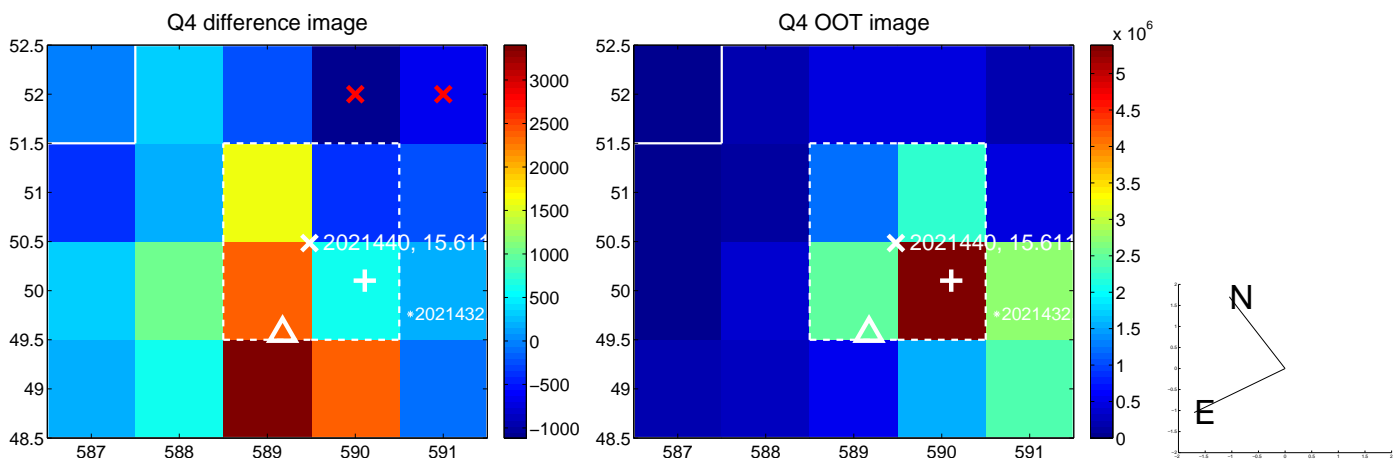
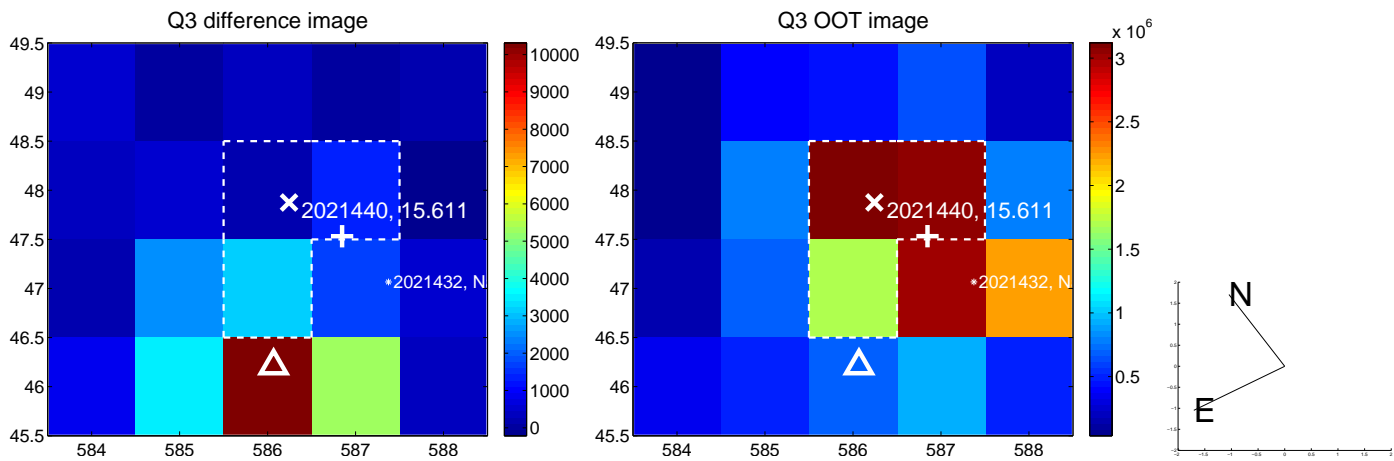
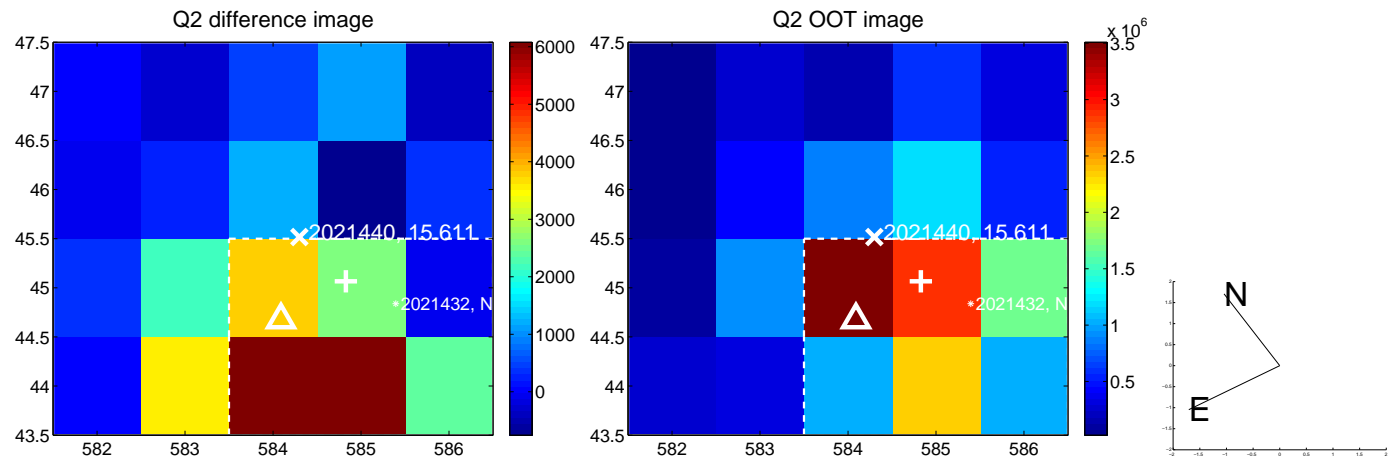
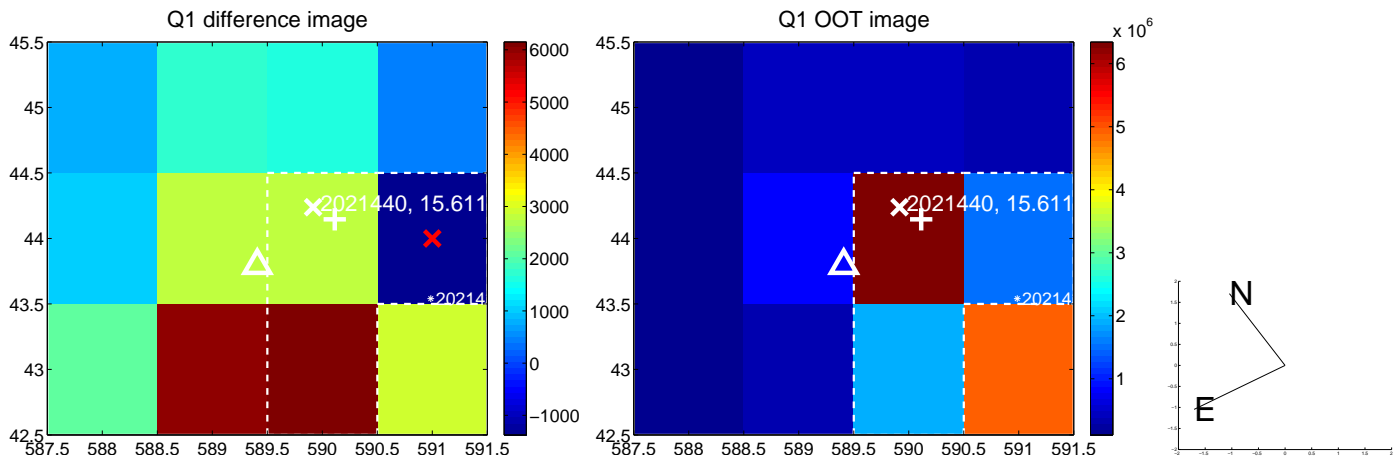
The direct PRF centroid is offset from the target star catalog position by about 0.83 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.510 ± 0.327	16.85	4.719 ± 0.201	-2.845 ± 0.337
PRF-fit source offset from KIC position	5.624 ± 0.320	17.59	4.128 ± 0.186	-3.820 ± 0.313
photometric centroid source offset	7.83 ± 0.29	26.84	4.74 ± 0.28	-6.23 ± 0.30

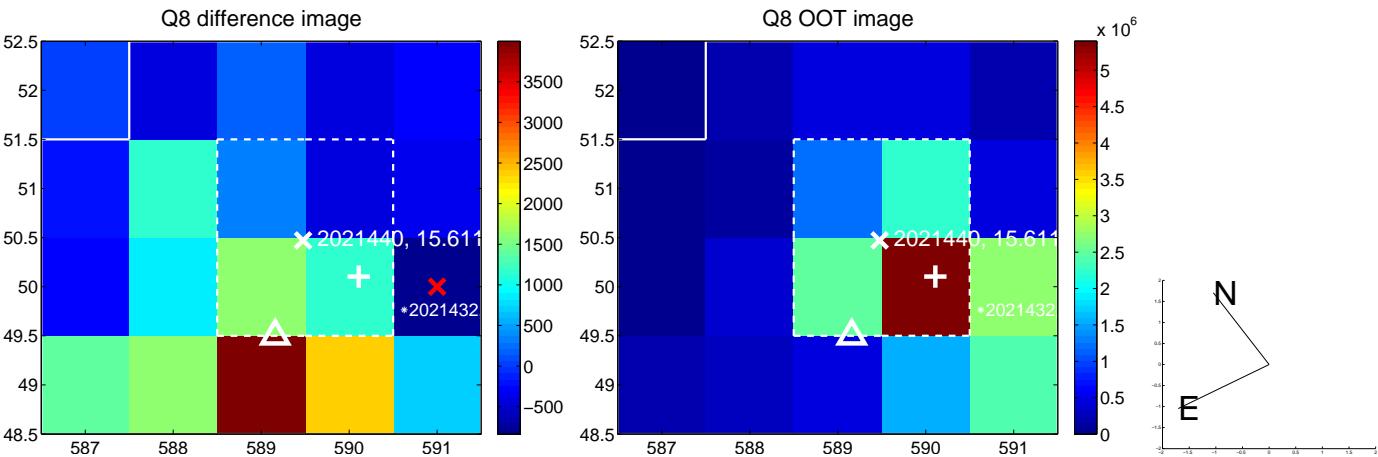
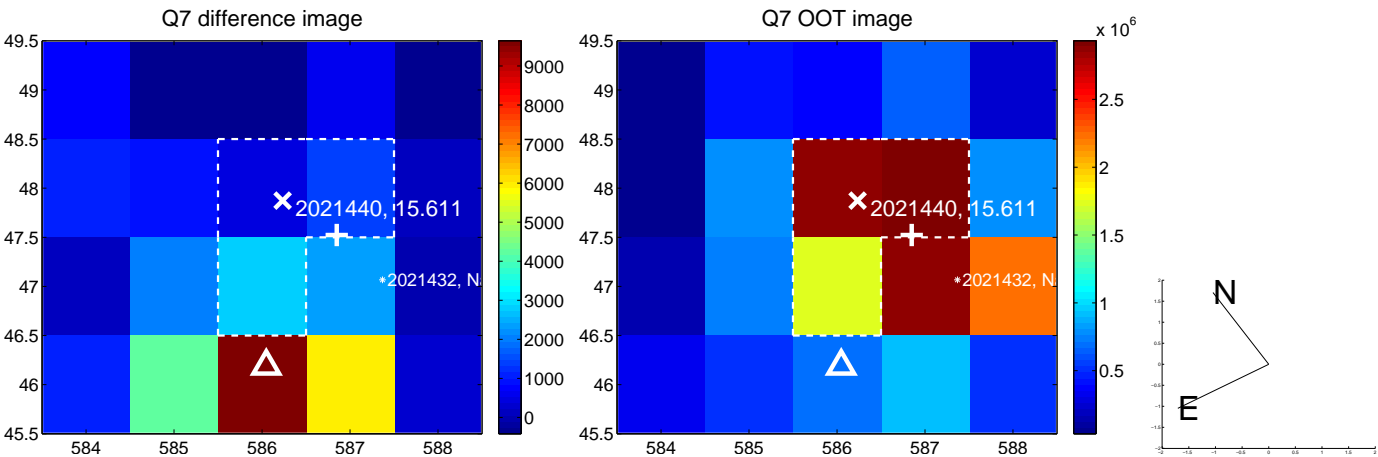
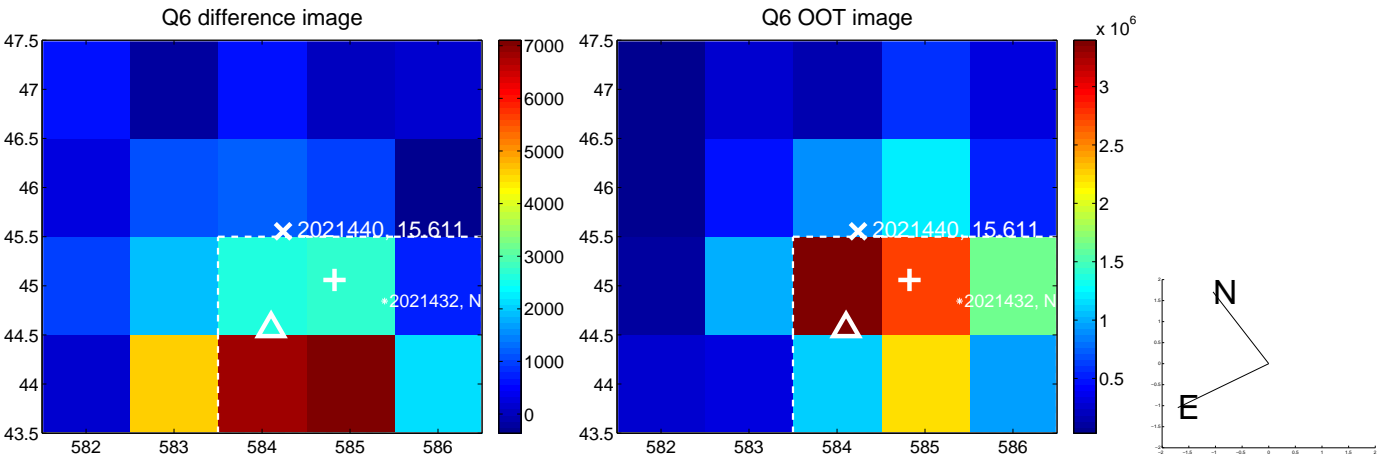
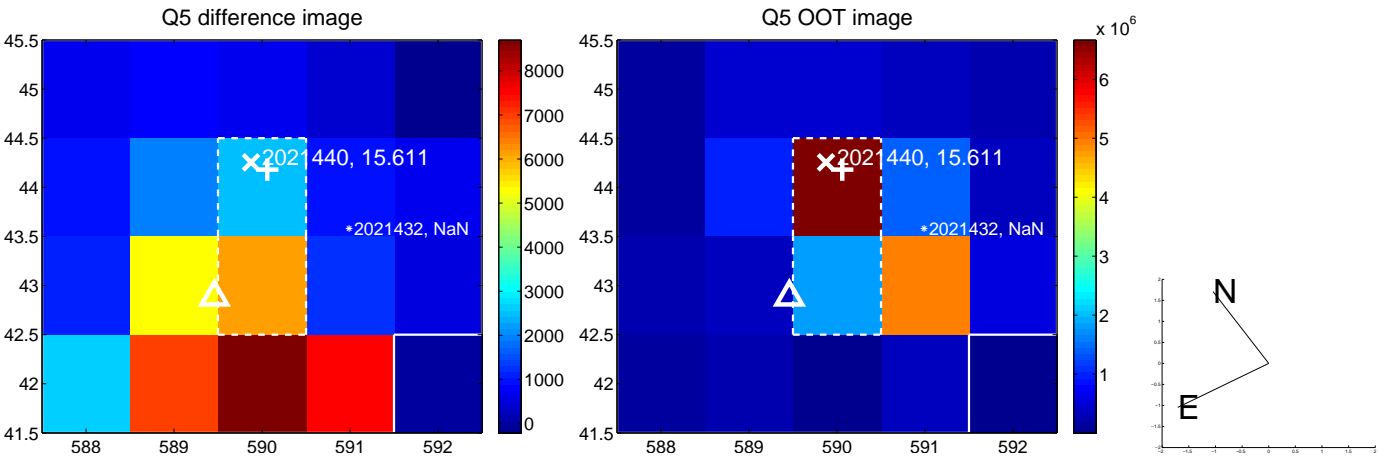


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

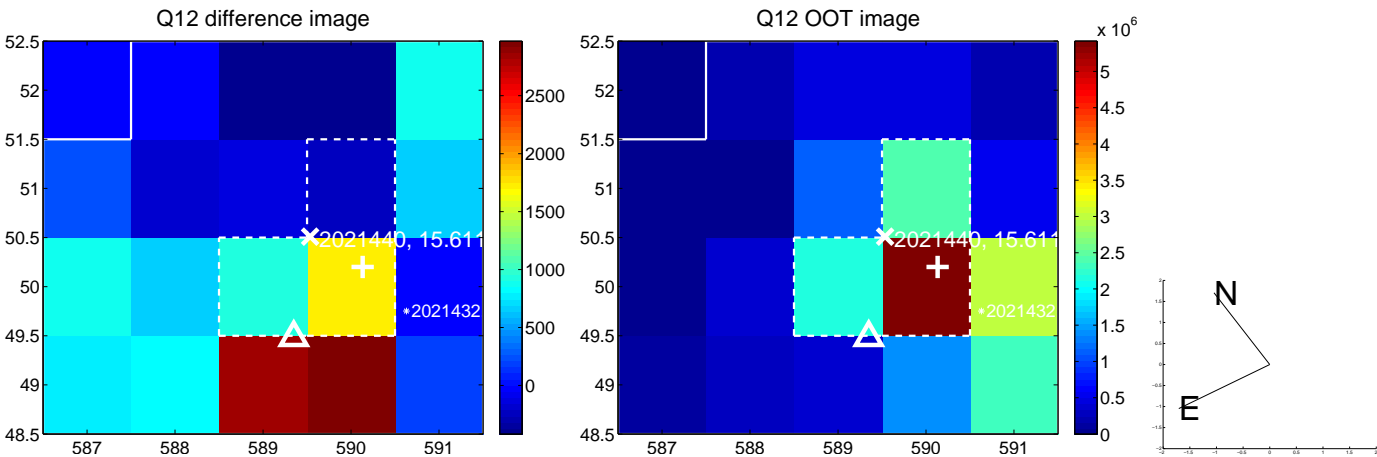
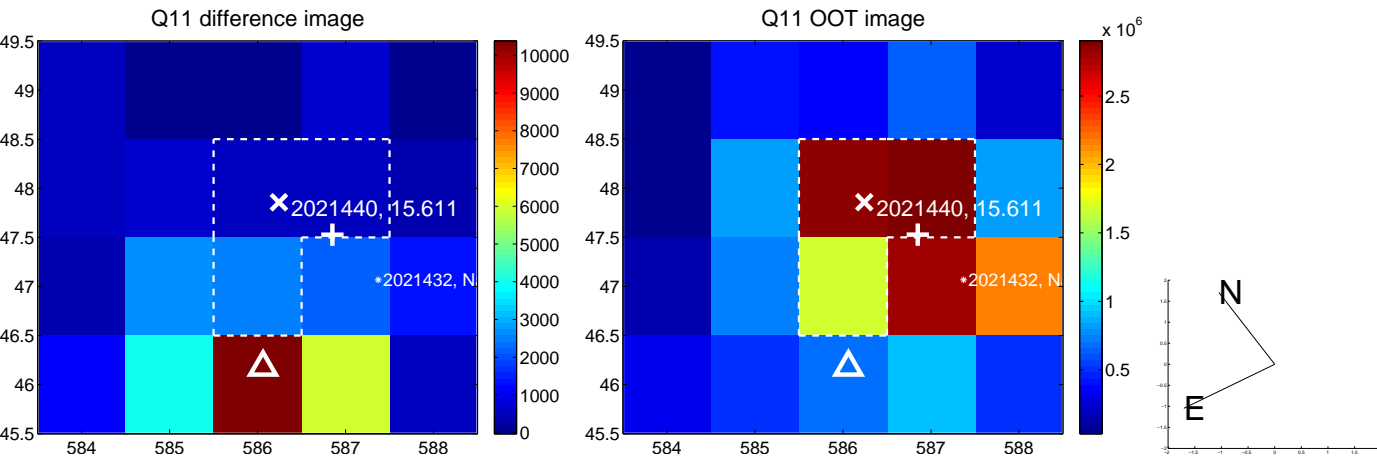
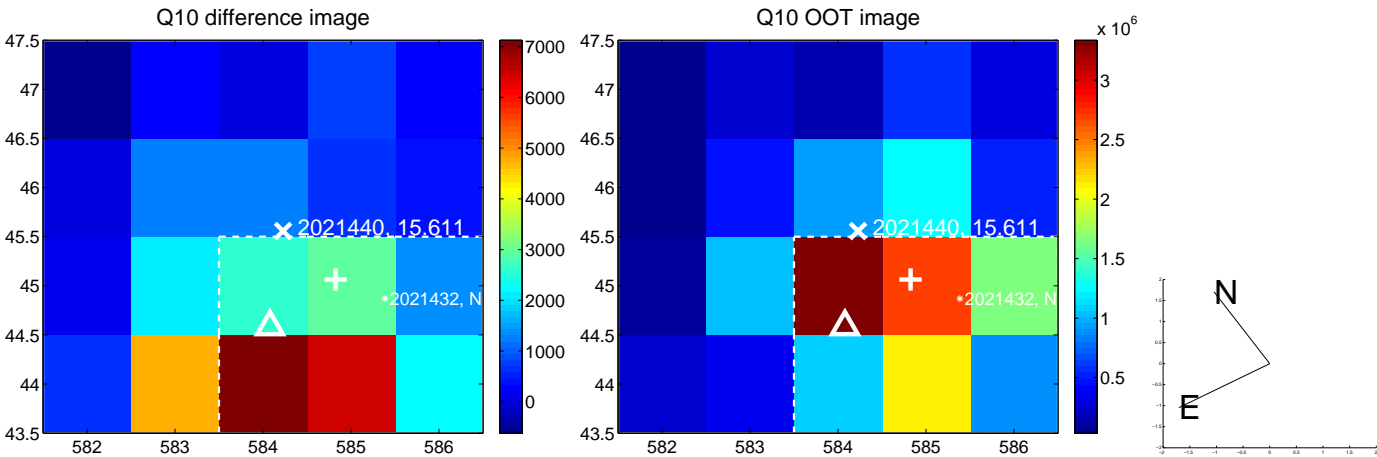
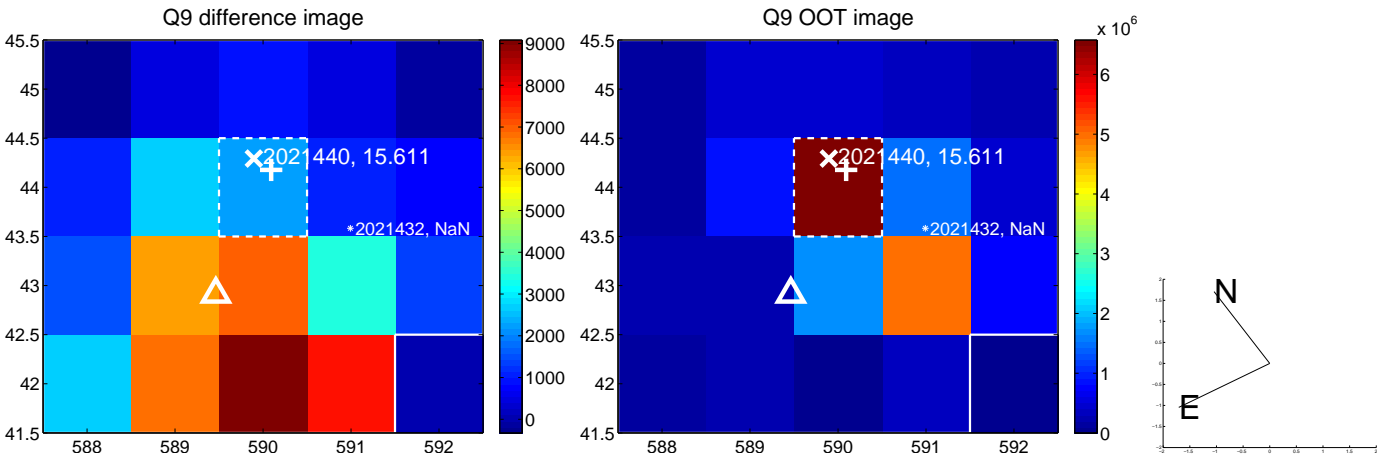
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



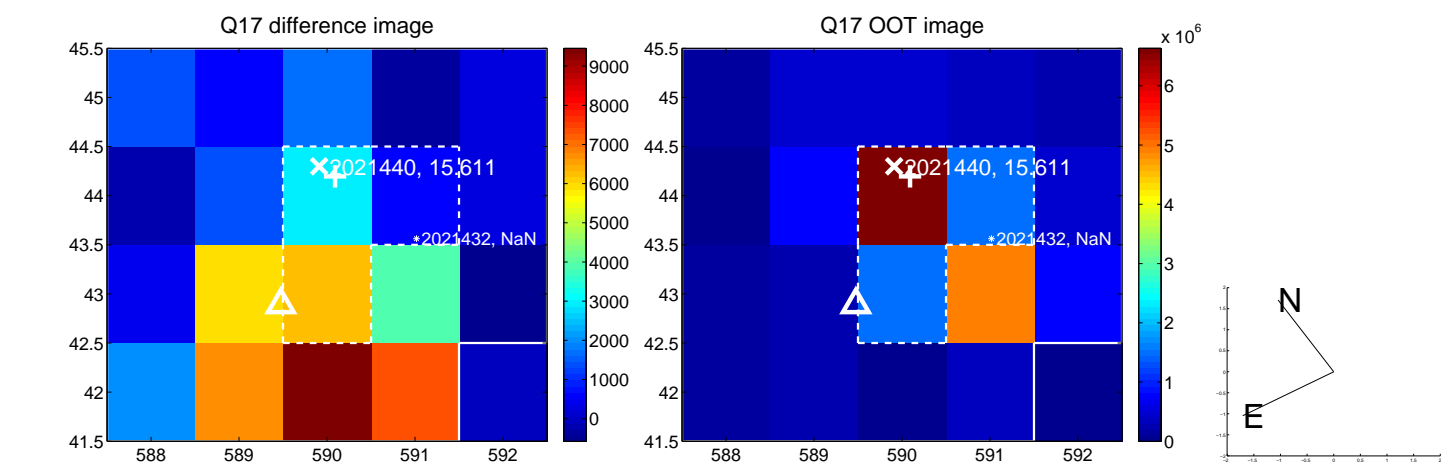
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



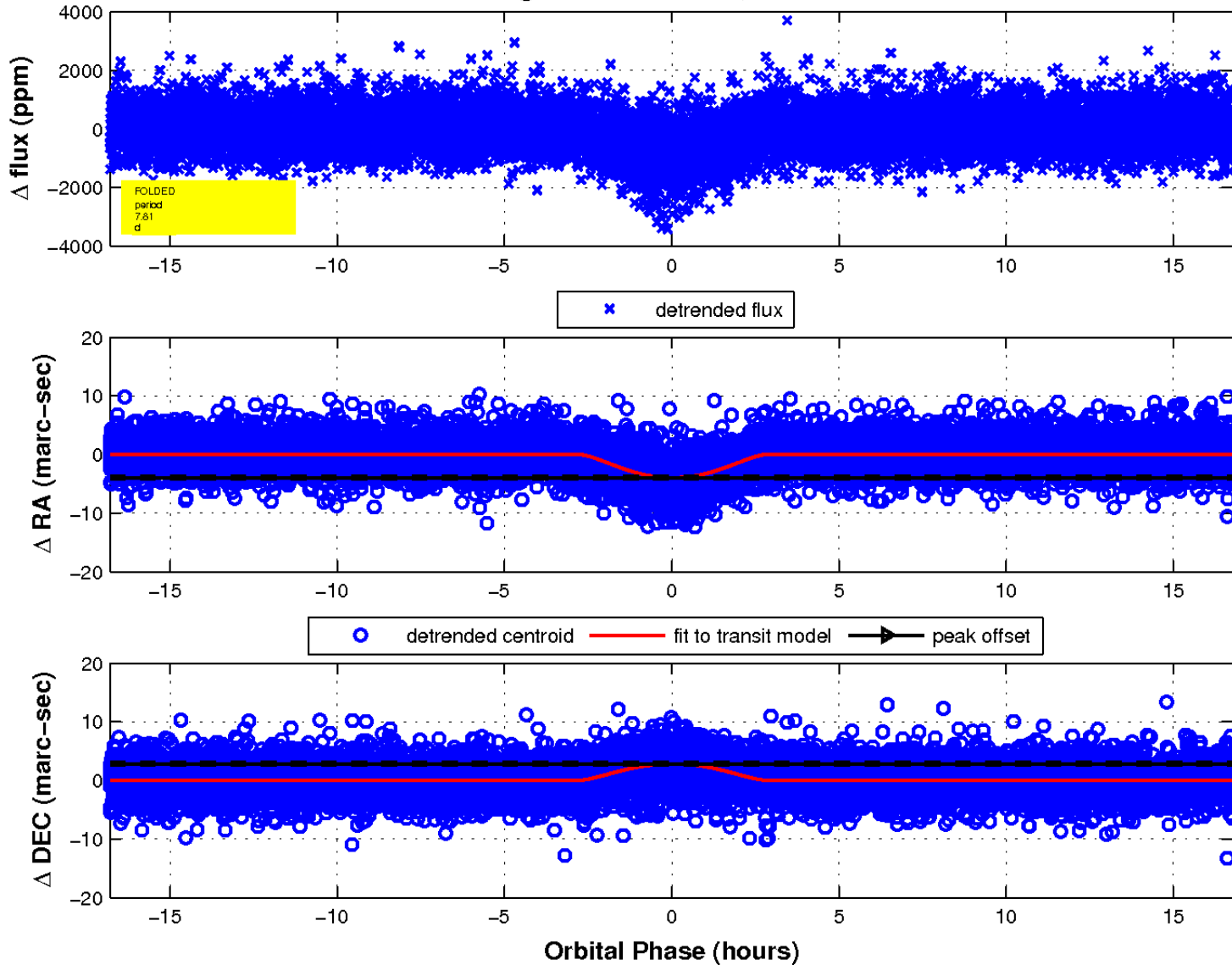
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



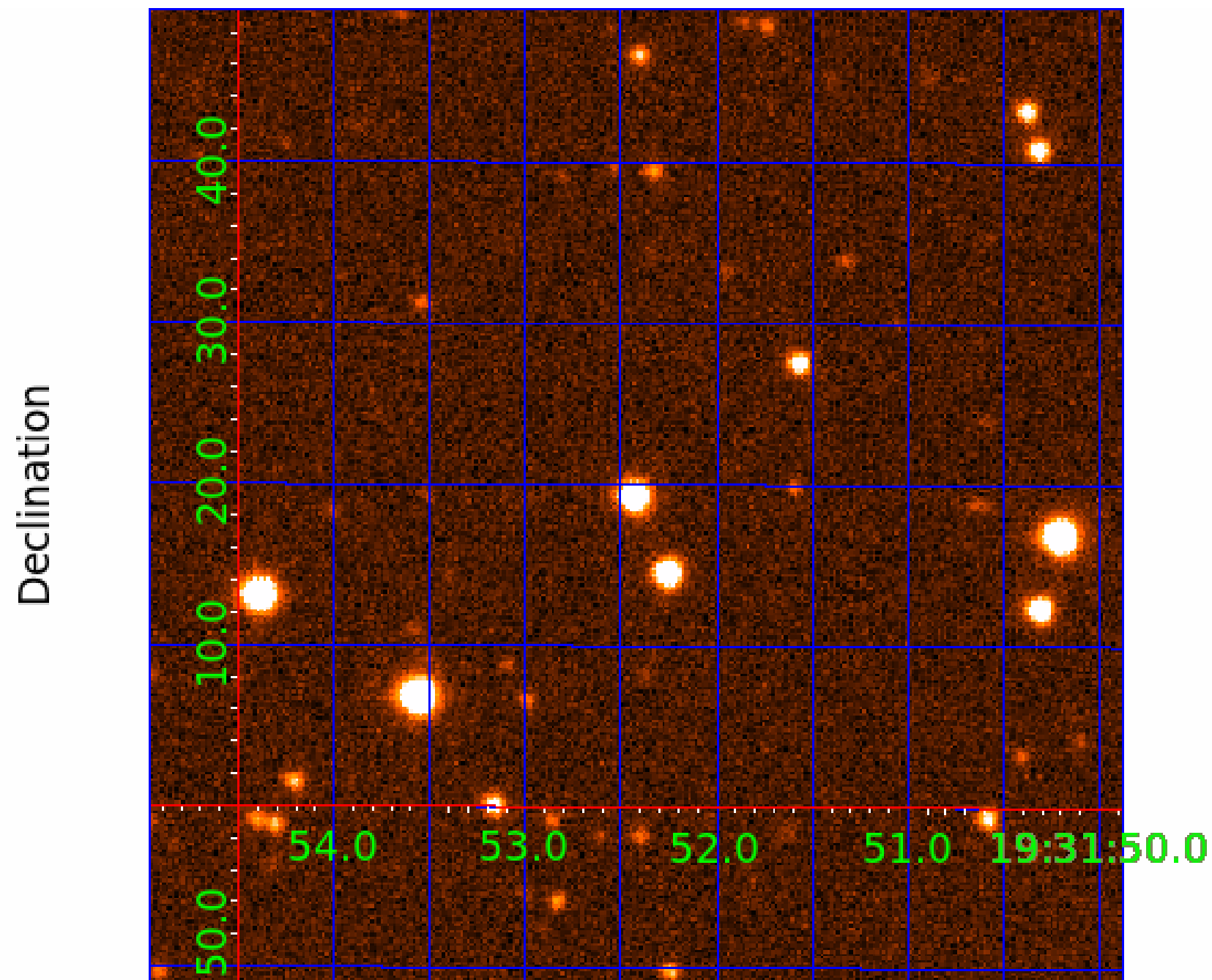
white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 002021440

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})
002021440-01	OBS	1987.01	7.811563	136.329653	782.5	5.597	30.7	32.2	0.71	5150	3.76	63.09
002021440-02	OBS	No	7.811575	131.528353	561.1	4.439	20.9	21.9	0.71	5150	3.23	63.09

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002021440-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST
002021440-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—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.

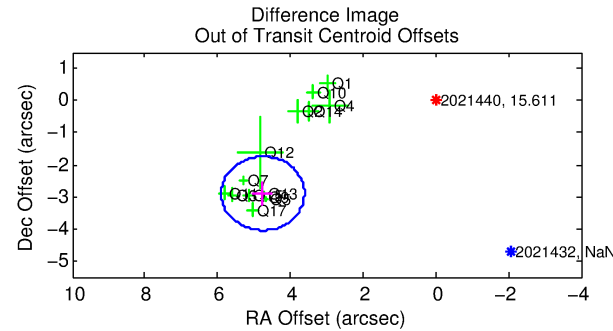
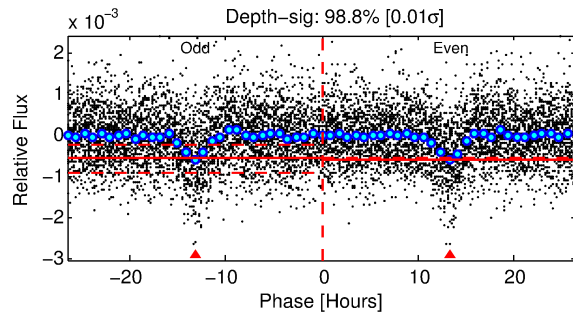
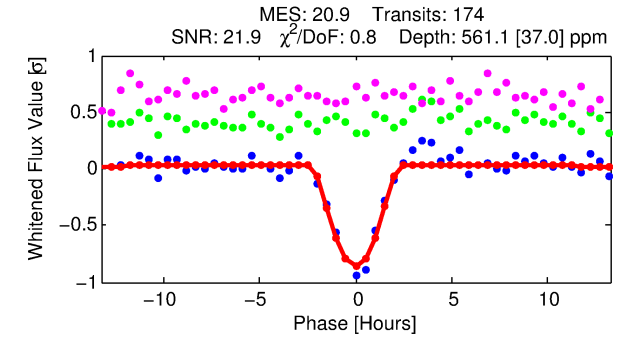
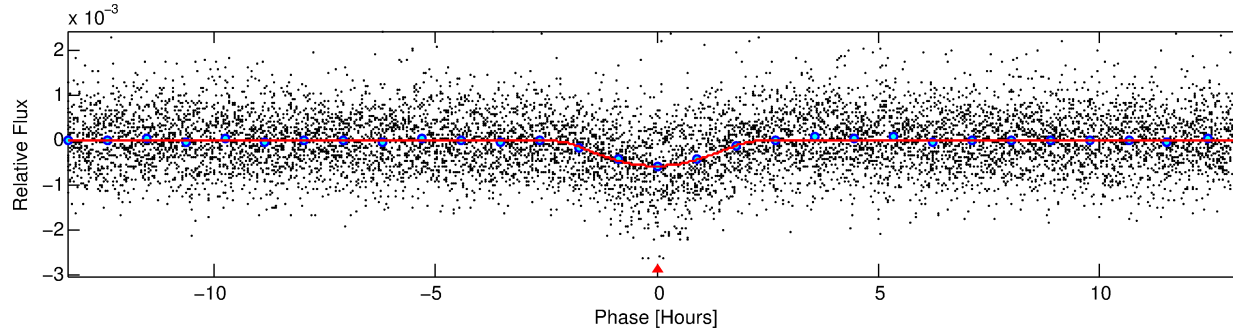
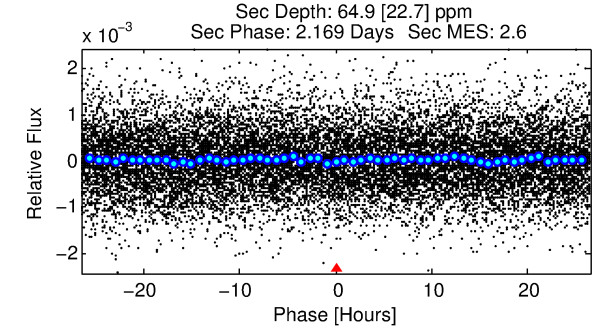
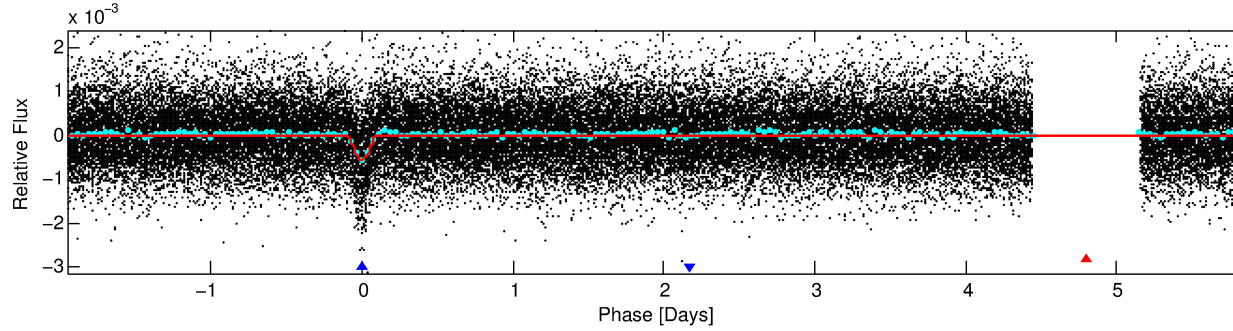
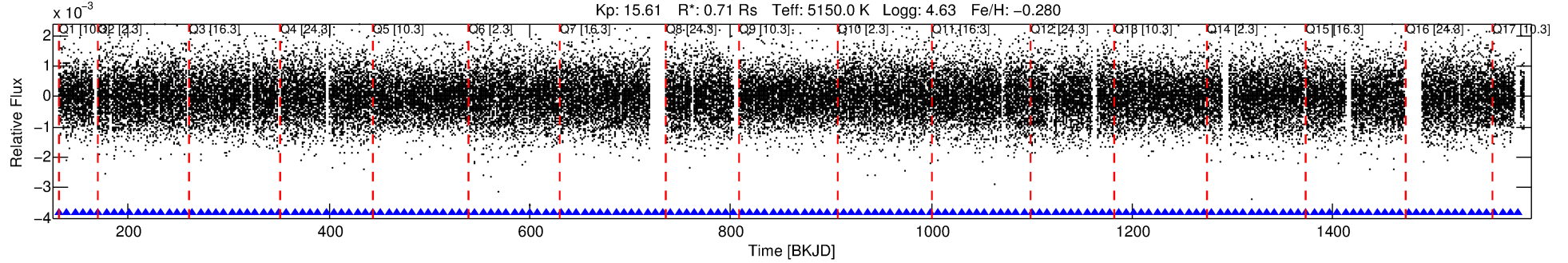
Ephemeris Match Information For 002021440-02

No Significant Match Found

DV One-Page Summary

KIC: 2021440 Candidate: 2 of 2 Period: 7.812 d
KOI: K01987 Corr: No Ephemeris Match

Kp: 15.61 R*: 0.71 Rs Teff: 5150.0 K Logg: 4.63 Fe/H: -0.280



DV Fit Results:

Period = 7.81157 [0.00005] d
Epoch = 131.5284 [0.0047] BKJD
Rp/R* = 0.0417 [0.0643]
a/R* = 4.24 [1.65]
b = 1.00 [0.10]
Seff = 63.09 [12.04]
Teq = 719 [34] K
Rp = 3.23 [5.00] Re
a = 0.0710 [0.0077] AU
Ag = 17.27 [53.72] [0.30σ]
Teff = 2265 [1761] K [0.88σ]

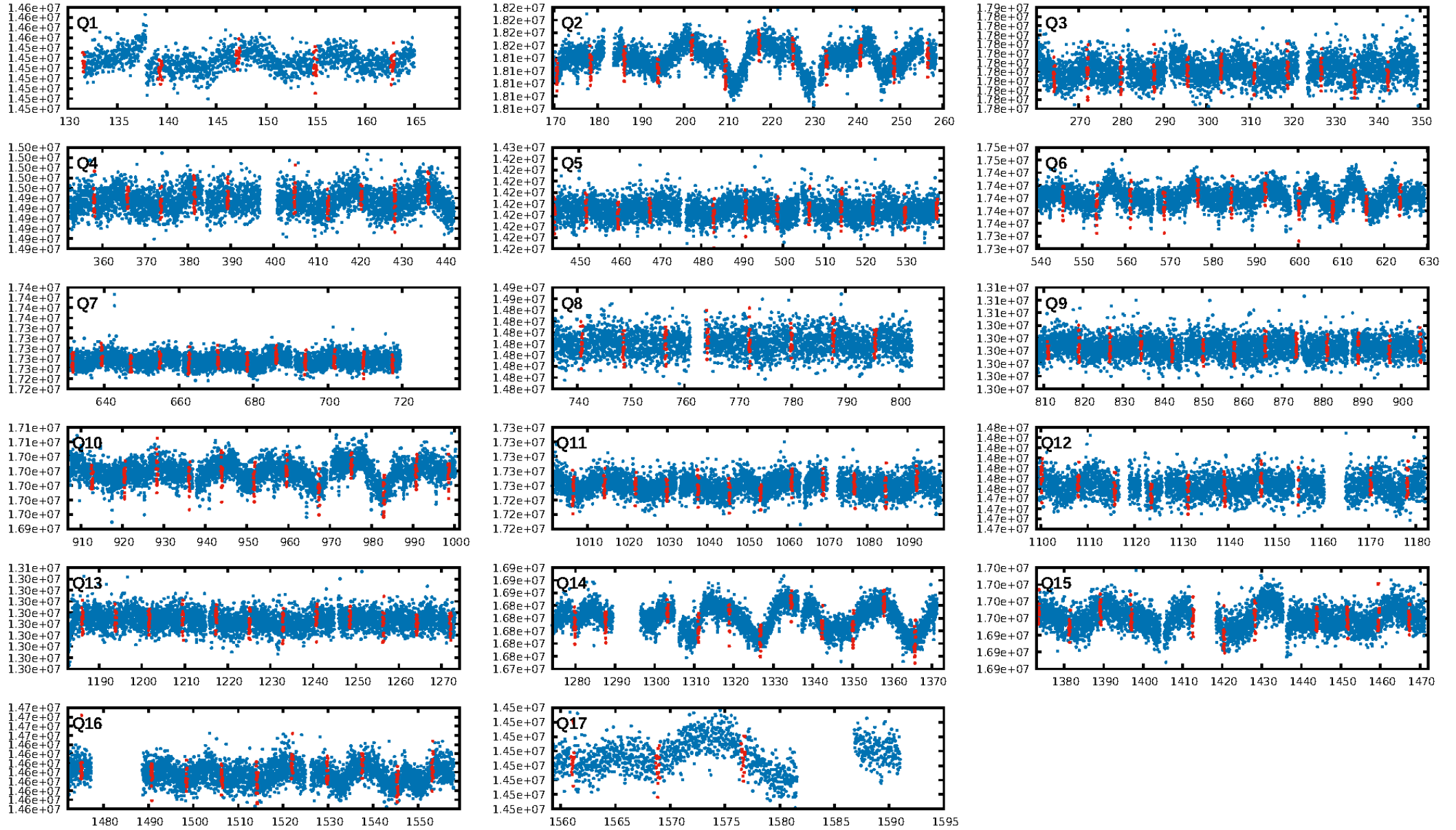
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 1.39e-94
RollingBand-fgt: 1.00 [166/166]
GhostDiagnostic-chr: 0.1707
Centroid-sig: 0.0%
Centroid-so: 8.130 arcsec [18.67σ]
OotOffset-rm: 5.574 arcsec [14.55σ]
KicOffset-rm: 5.659 arcsec [15.19σ]
OotOffset-st: 3/4/2/5 [14]
KicOffset-st: 3/4/2/5 [14]
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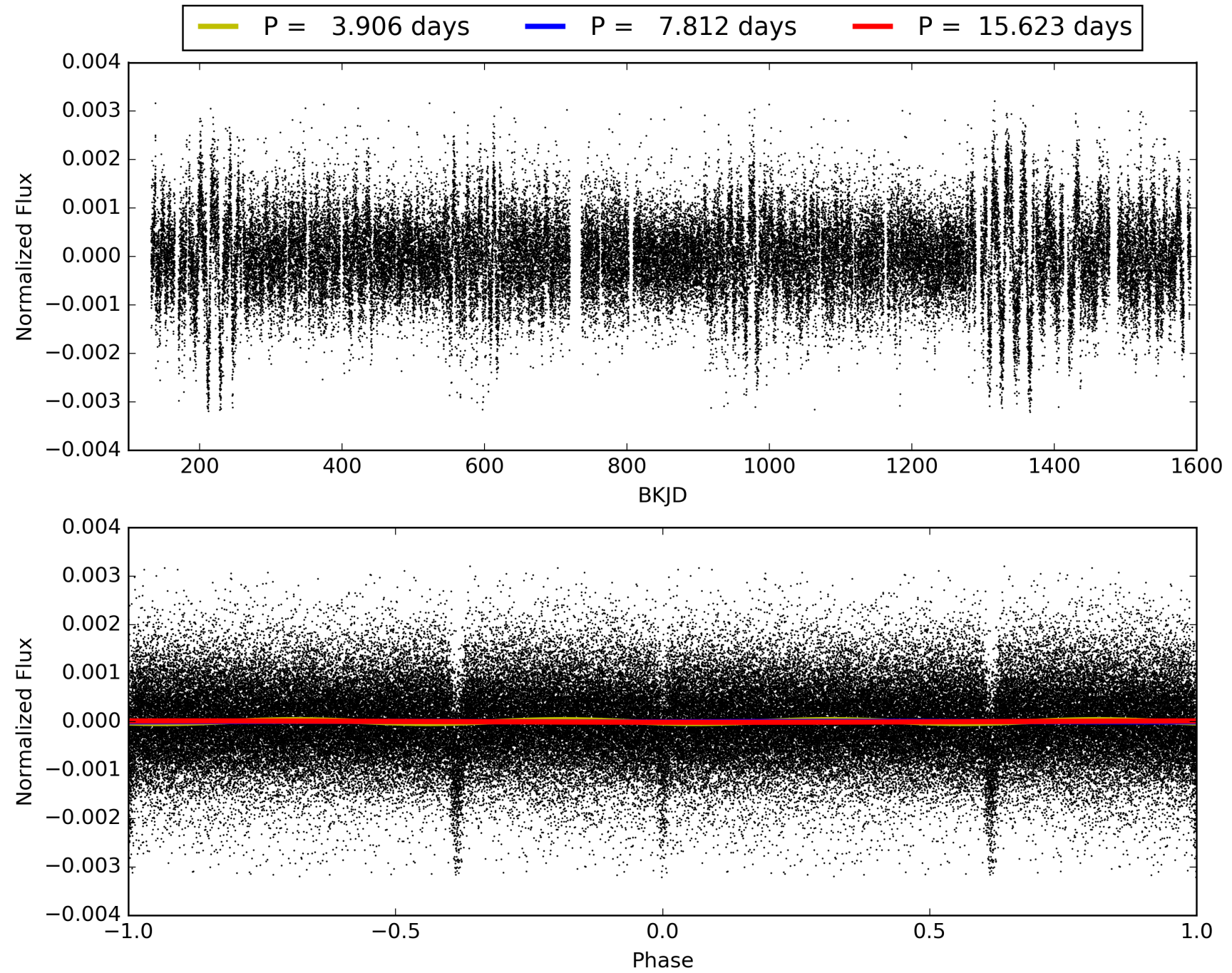
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:51:33 Z

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

TCE 002021440-02, PDC Light Curves

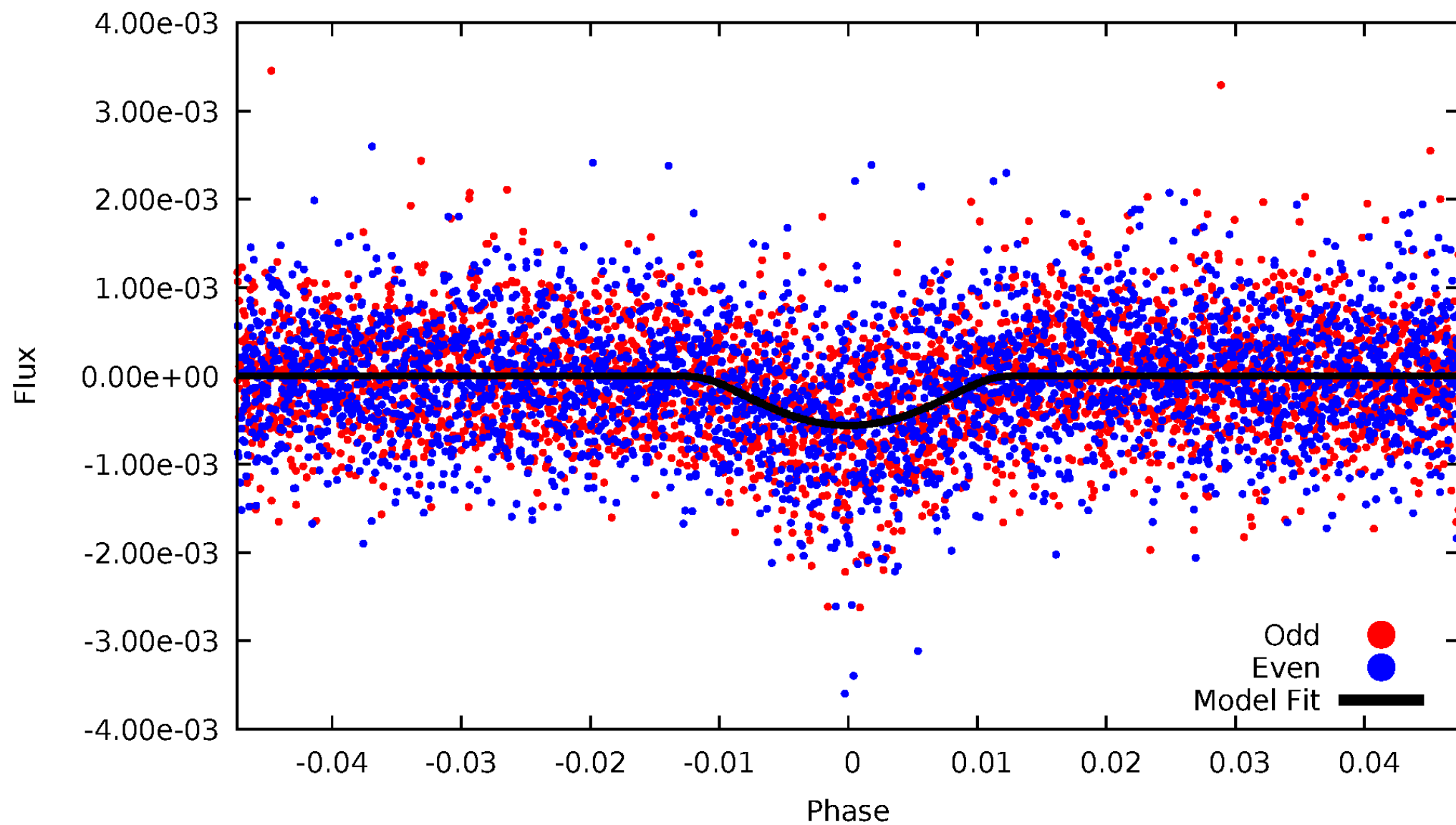


TCE 002021440-02



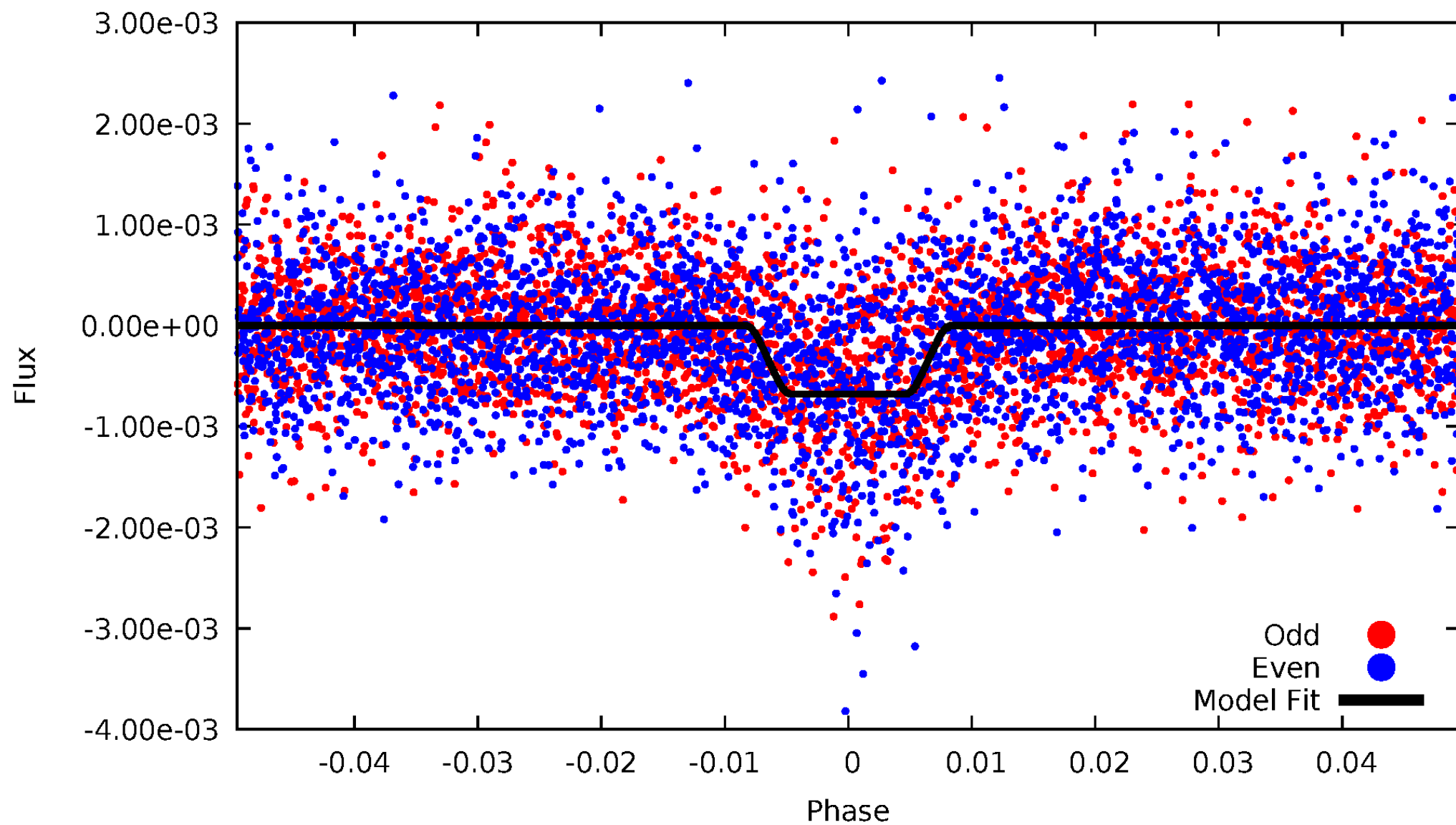
DV Odd/Even

TCE 002021440-02



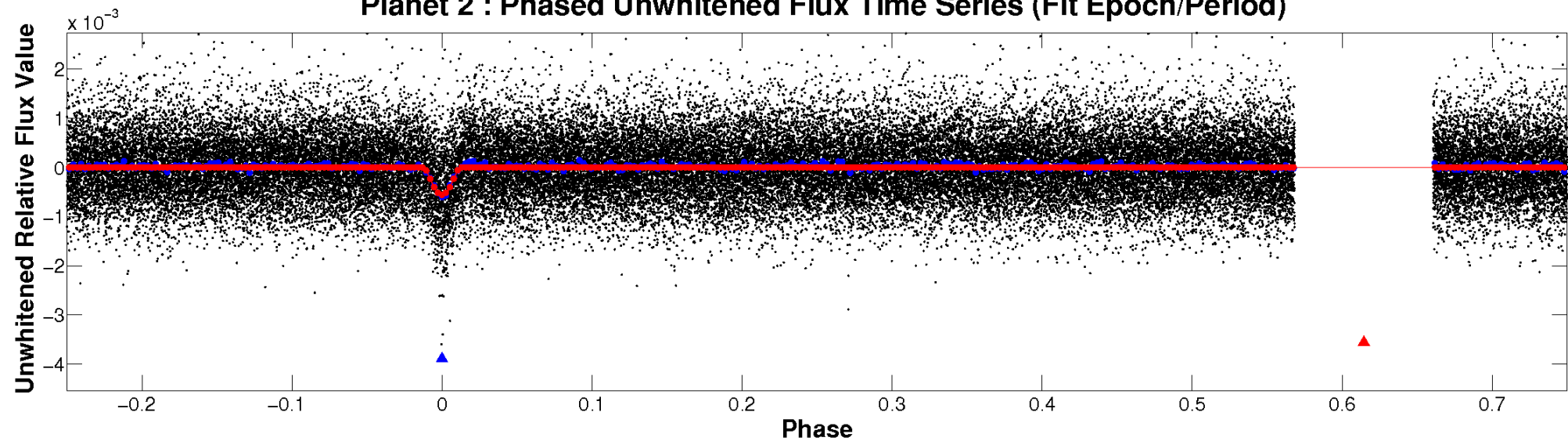
ALT Odd/Even

TCE 002021440-02

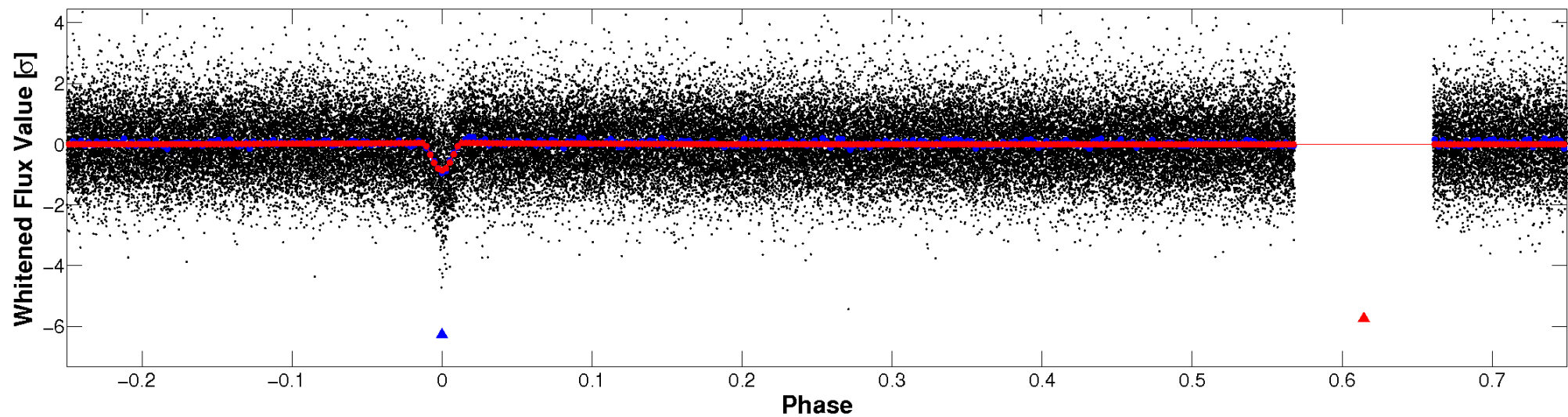


Non-Whitened Vs. Whitened Light Curve

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

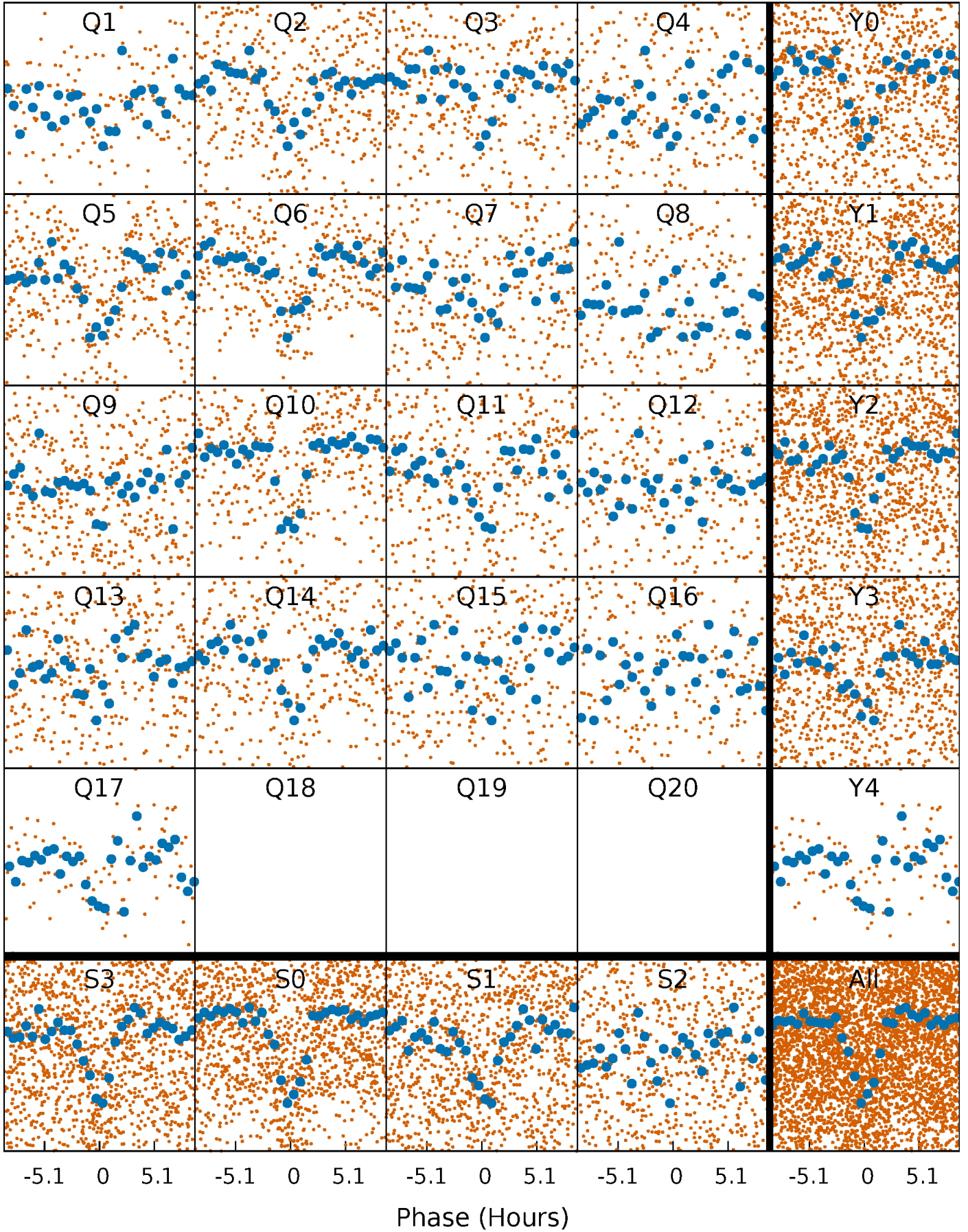


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



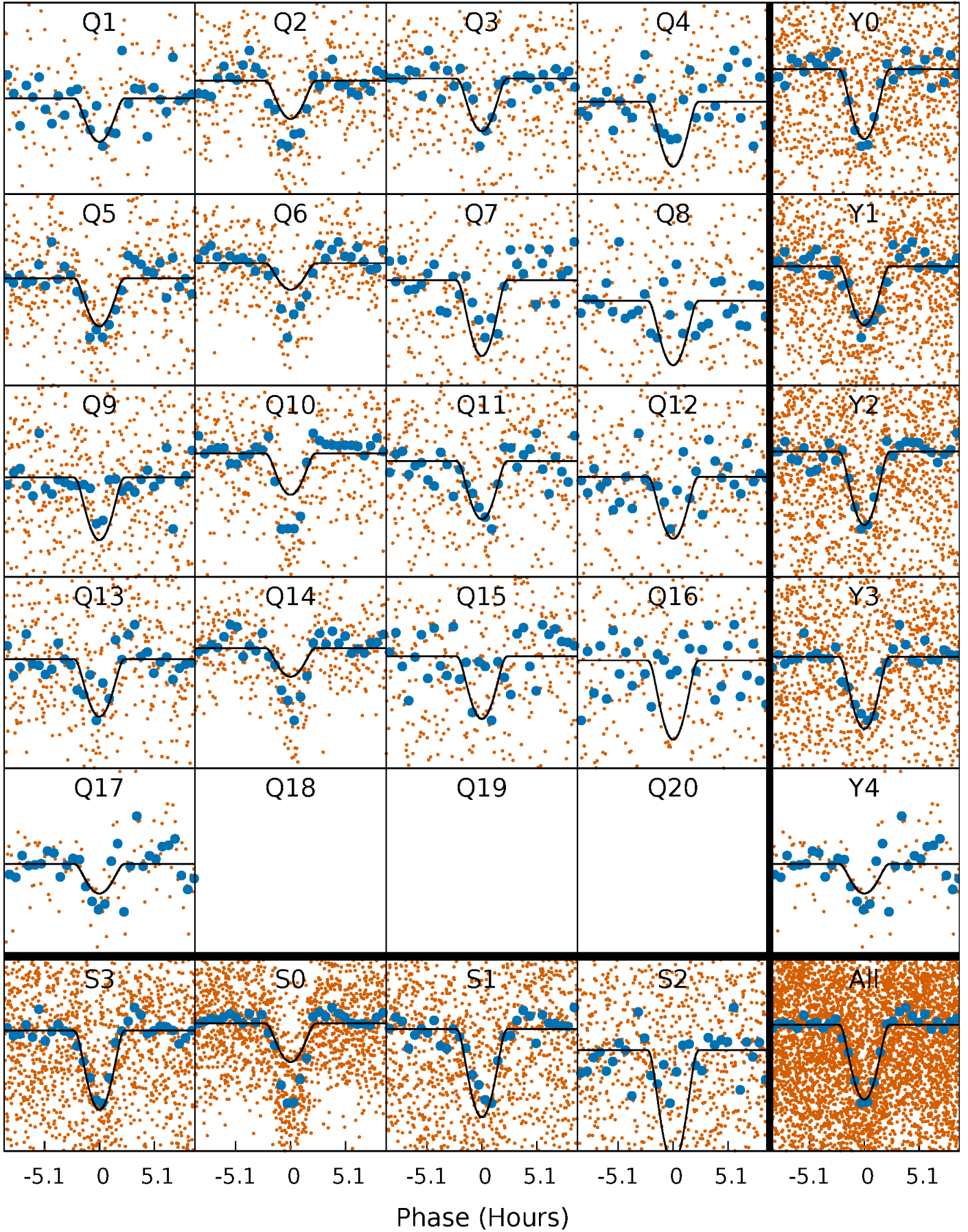
PDC Quarter-Phased Transit Curves

TCE 002021440-02 P= 7.811575 Days $T_0=131.528353$ (BKJD)



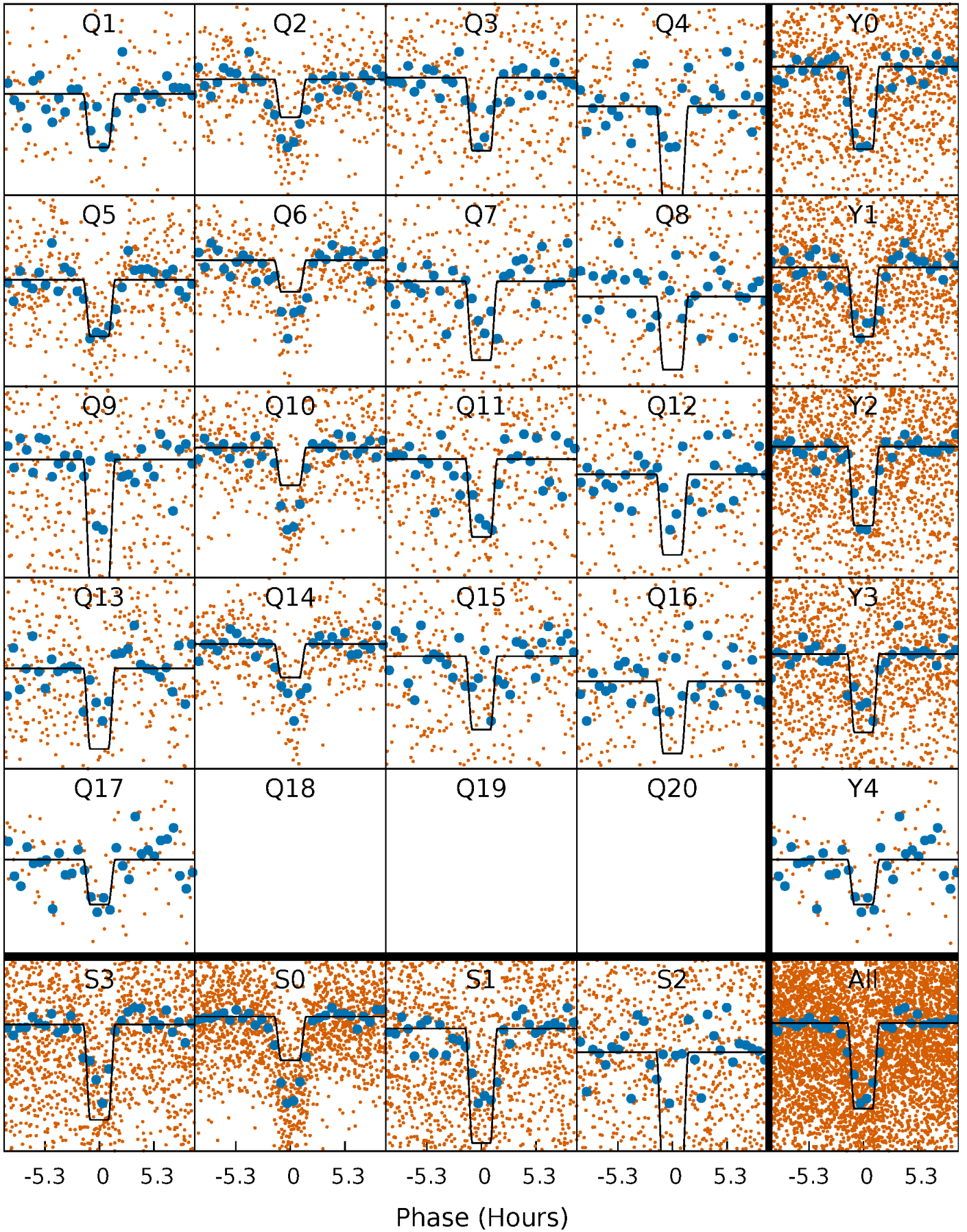
DV Quarter-Phased Transit Curves

TCE 002021440-02 P= 7.811575 Days $T_0=131.528353$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

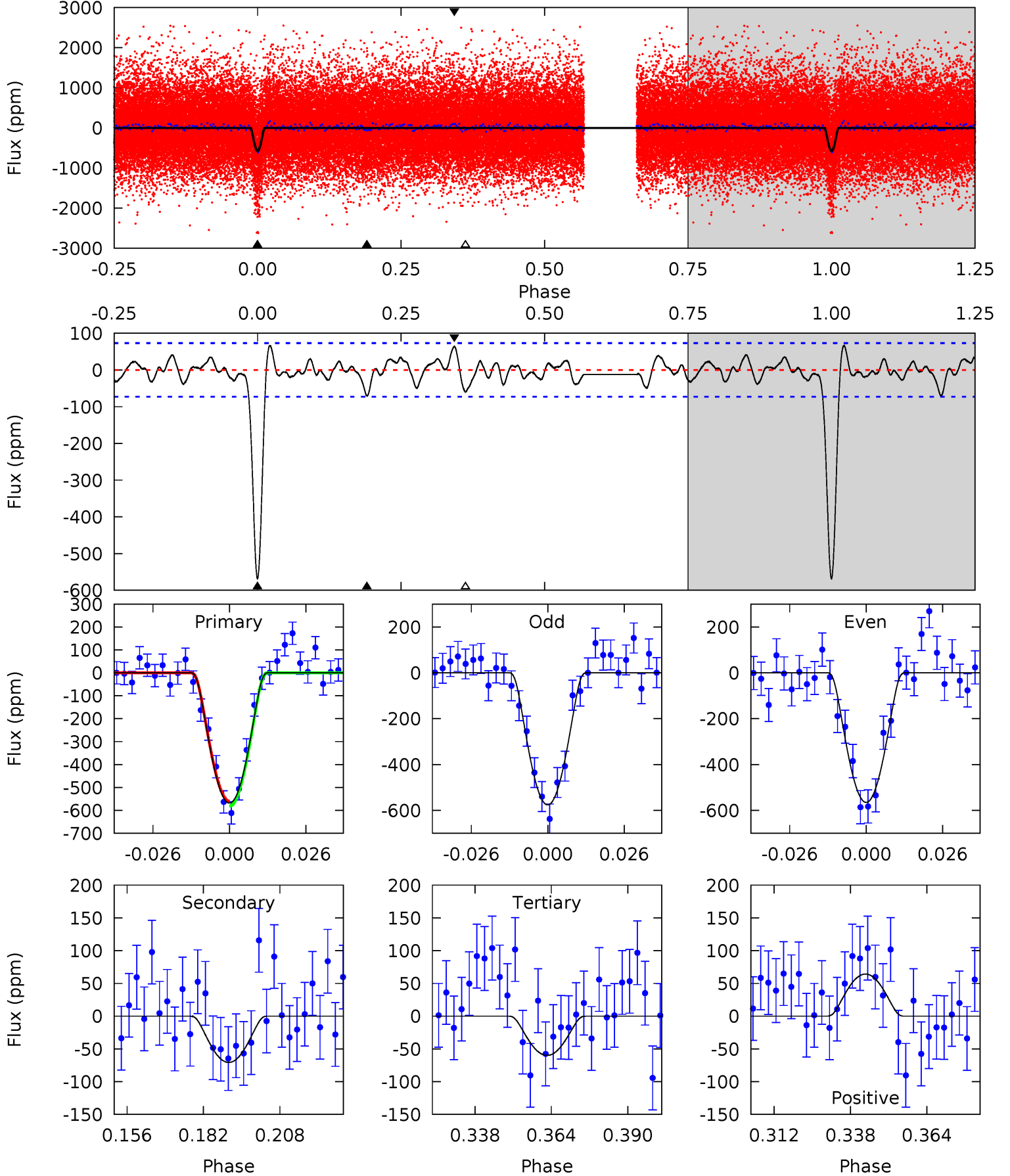
TCE 002021440-02 P= 7.811511 Days $T_0=131.531838$ (BKJD)



DV Model-Shift Uniqueness Test

002021440-02, P = 7.811575 Days, E = 123.716778 Days

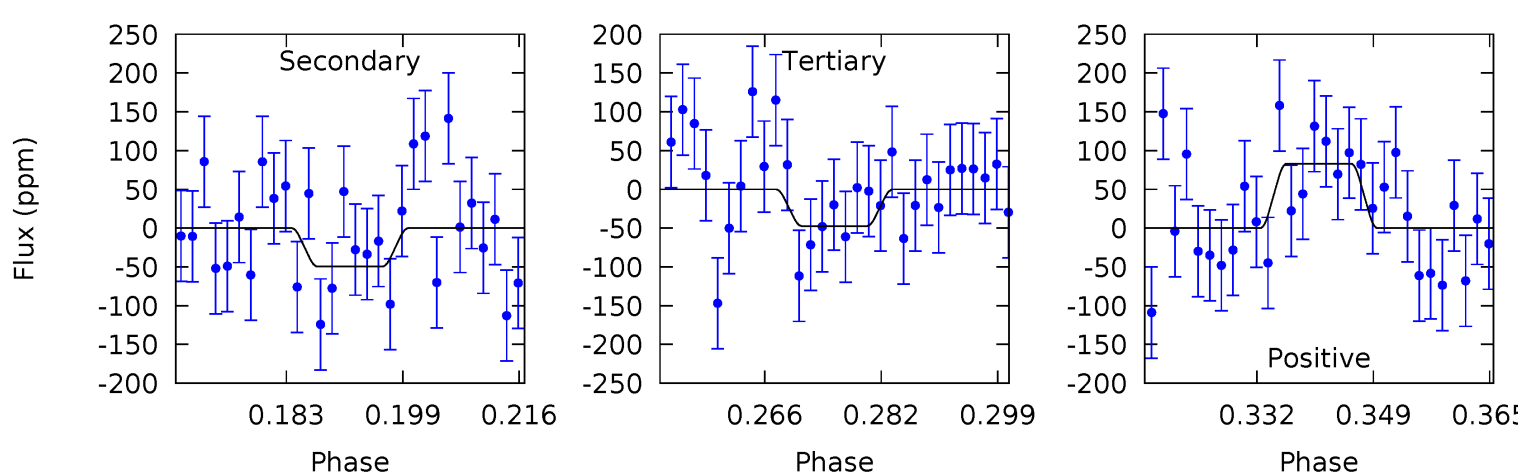
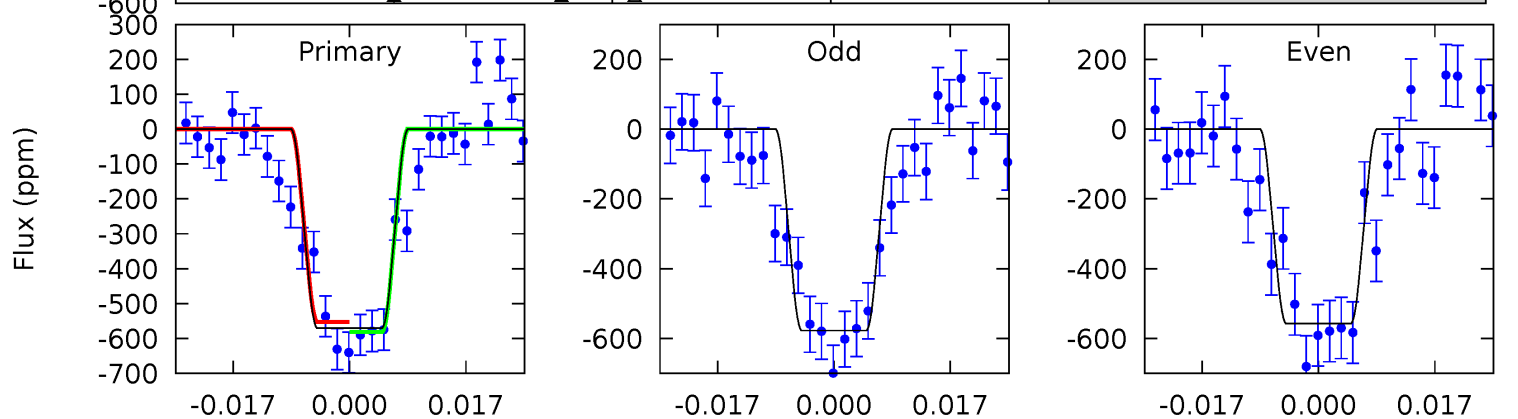
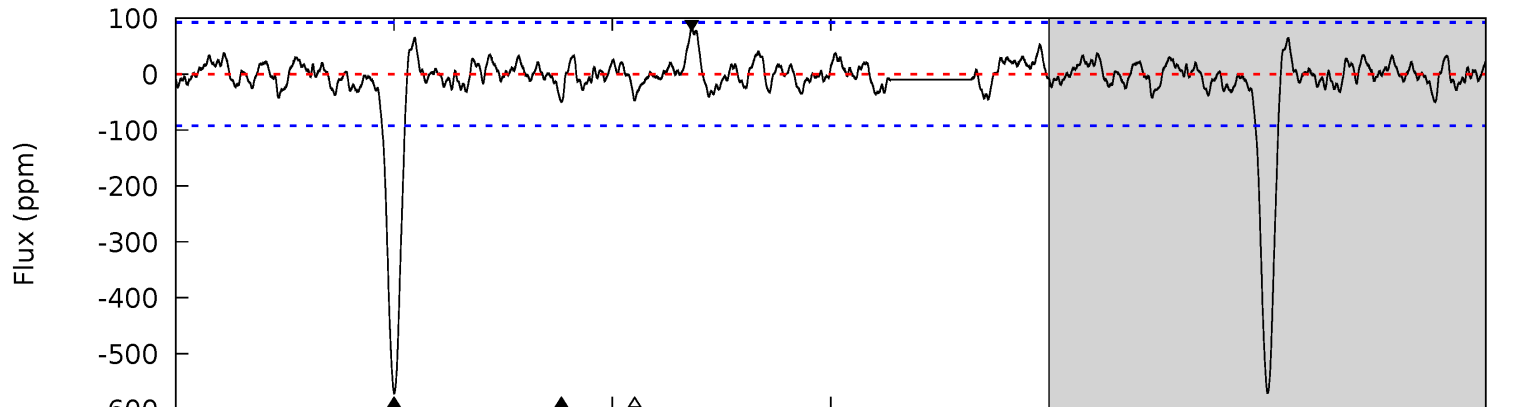
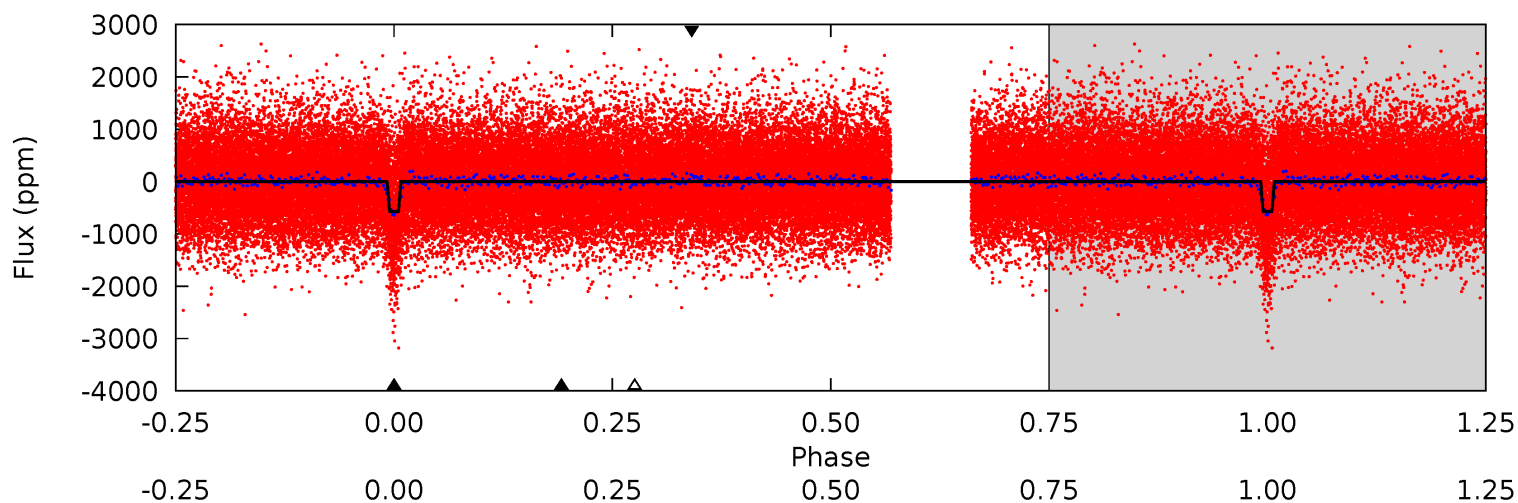
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
37.6	4.68	3.97	4.25	4.84	2.23	1.43	33.7	33.4	0.71	0.43	0.36	1.08	0.10	0.72



Alt Model-Shift Uniqueness Test

002021440-02, P = 7.811511 Days, E = 123.720327 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.4	2.64	2.53	4.42	4.93	2.40	1.11	27.9	26.0	0.11	-1.78	0.53	1.18	0.13	0.75



Stellar Parameters For KIC 002021440

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5150^{+153}_{-153}	$4.628^{+0.033}_{-0.077}$	$-0.280^{+0.300}_{-0.300}$	$0.710^{+0.097}_{-0.057}$	$0.792^{+0.066}_{-0.088}$	$3.116^{+0.484}_{-0.836}$
	+3%/-3%	+1%/-2%	+107%/-107%	+14%/-8%	+8%/-11%	+16%/-27%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 002021440-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-71 ± 15	$5.17^{+4.66}_{-3.28}$	1013^{+38}_{-34}	2610^{+836}_{-410}	$6.948^{+47.983}_{-4.978}$
Alt.	-50 ± 19	$4.25^{+4.40}_{-2.94}$	1014^{+37}_{-40}	2623^{+1083}_{-469}	$7.407^{+72.030}_{-5.709}$

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

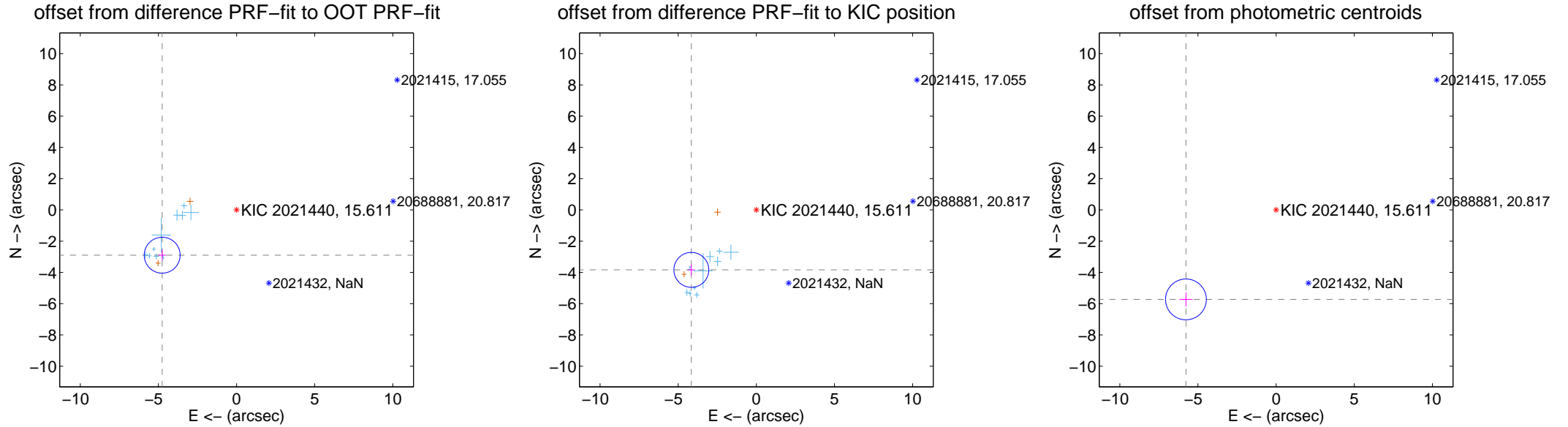
DV Centroid Data

Supplemental centroid analysis for 002021440-02. Kepler magnitude: 15.61. Transit SNR 21.89

There are 12 quarters with good PRF difference image offsets

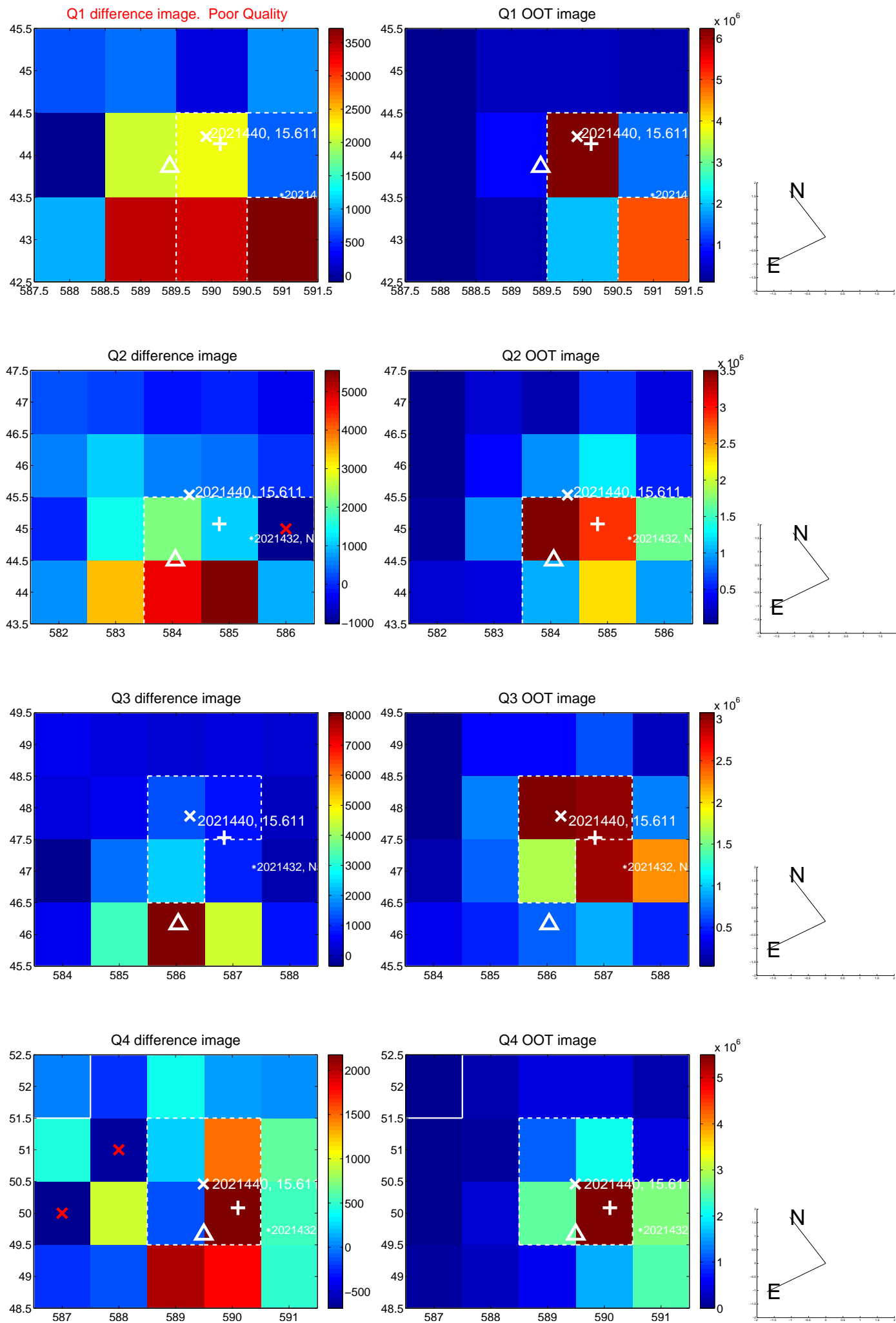
The direct PRF centroid is offset from the target star catalog position by about 0.82 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.574 ± 0.383	14.55	4.761 ± 0.249	-2.898 ± 0.354
PRF-fit source offset from KIC position	5.659 ± 0.372	15.19	4.161 ± 0.234	-3.836 ± 0.358
photometric centroid source offset	8.13 ± 0.44	18.67	5.77 ± 0.42	-5.73 ± 0.45

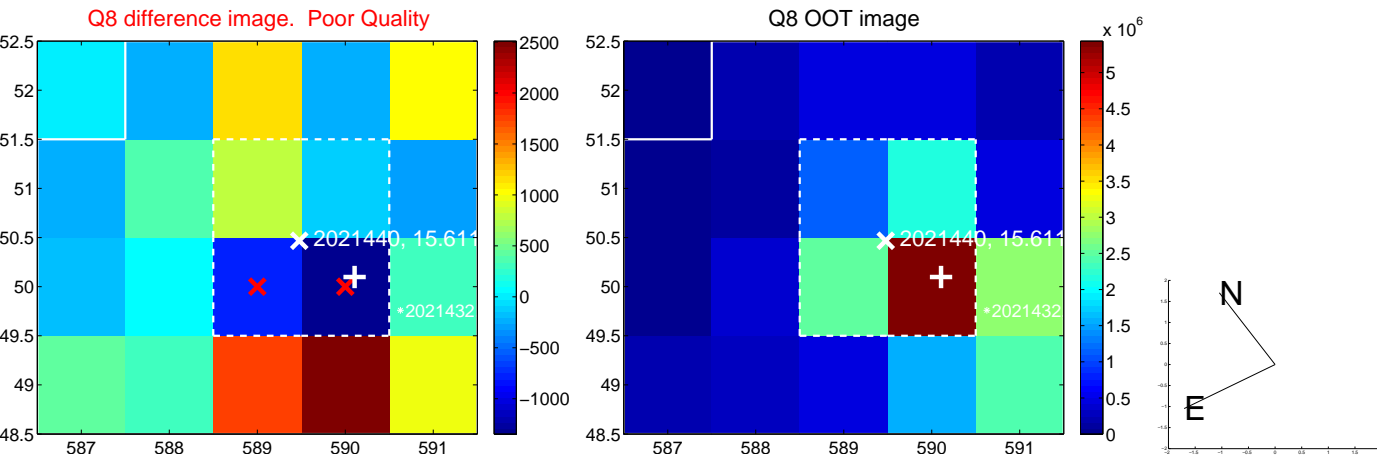
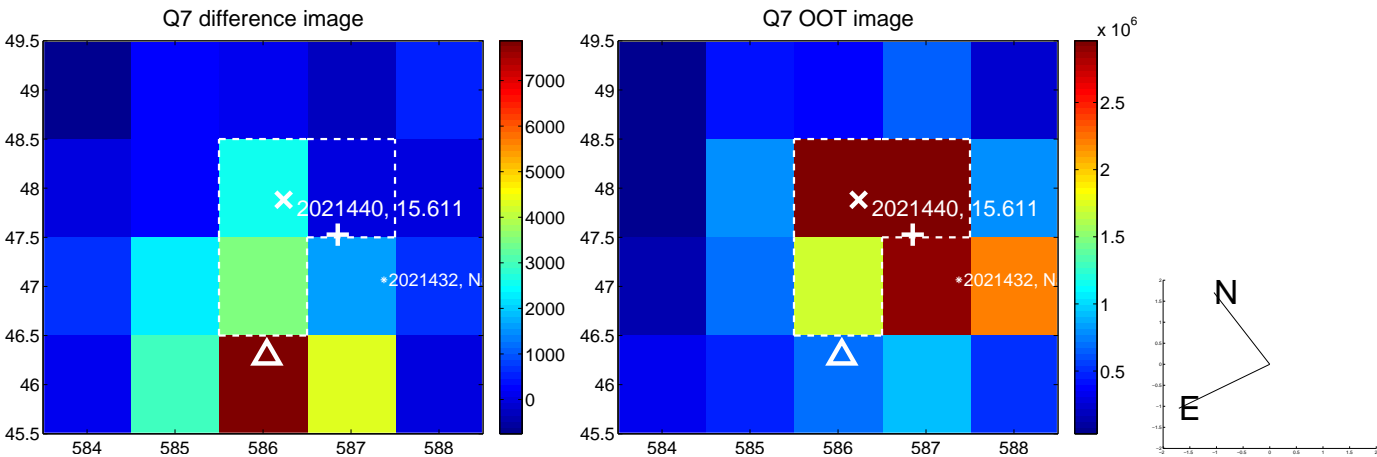
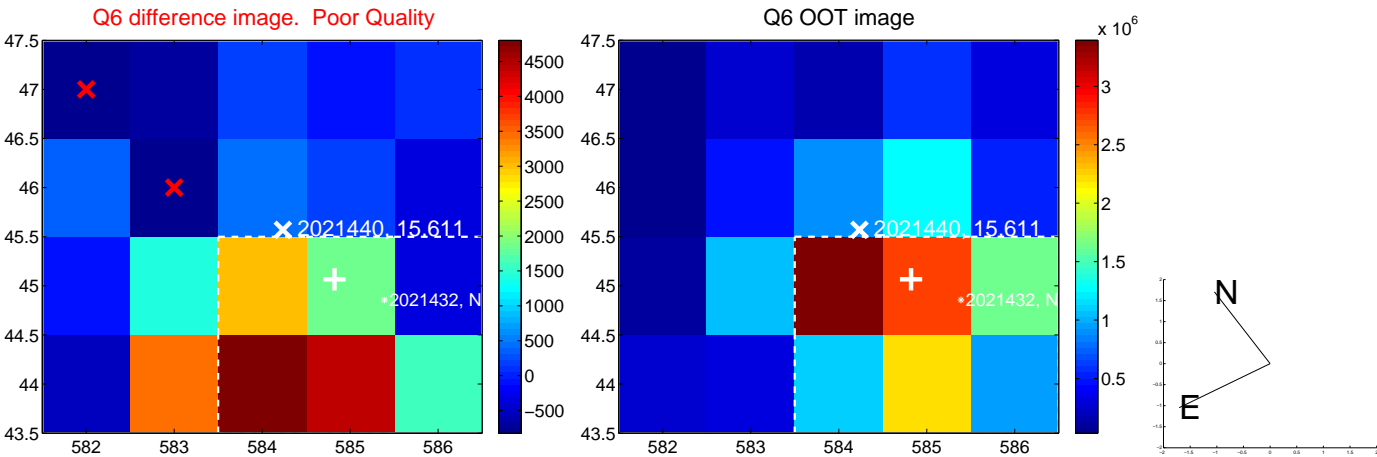
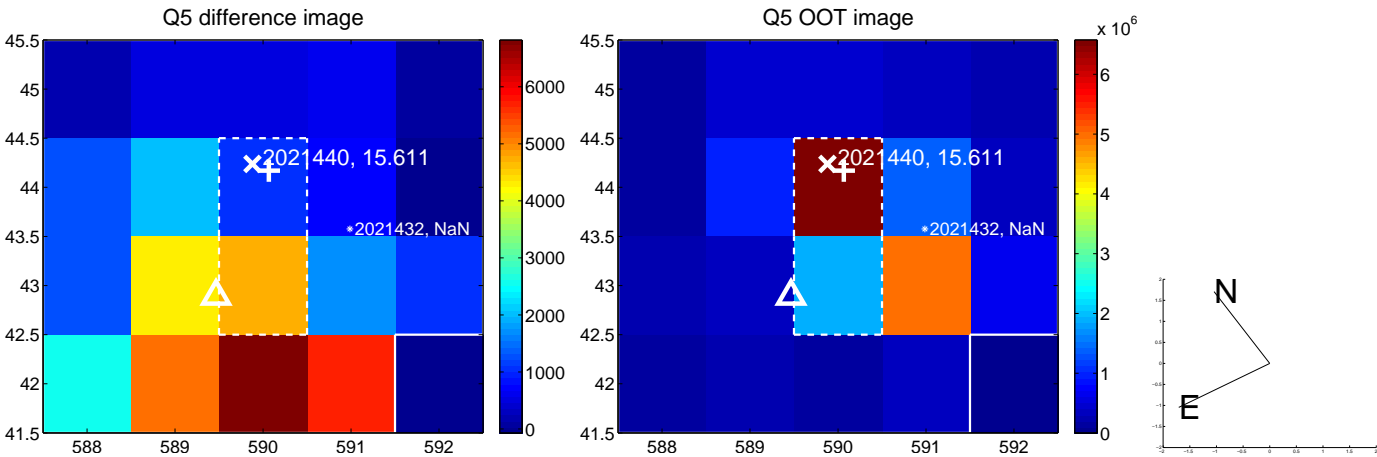


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

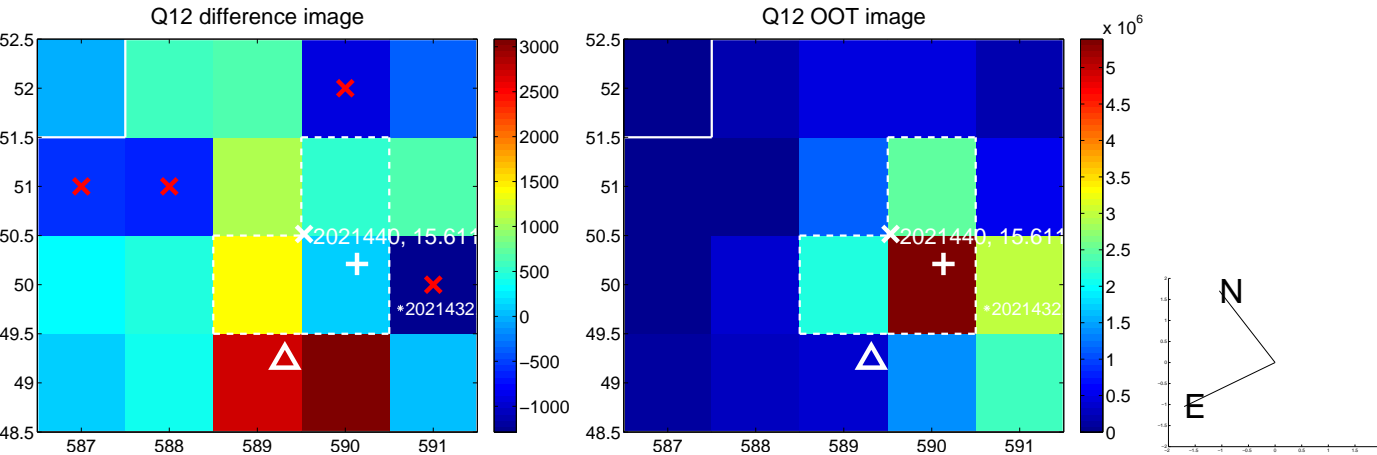
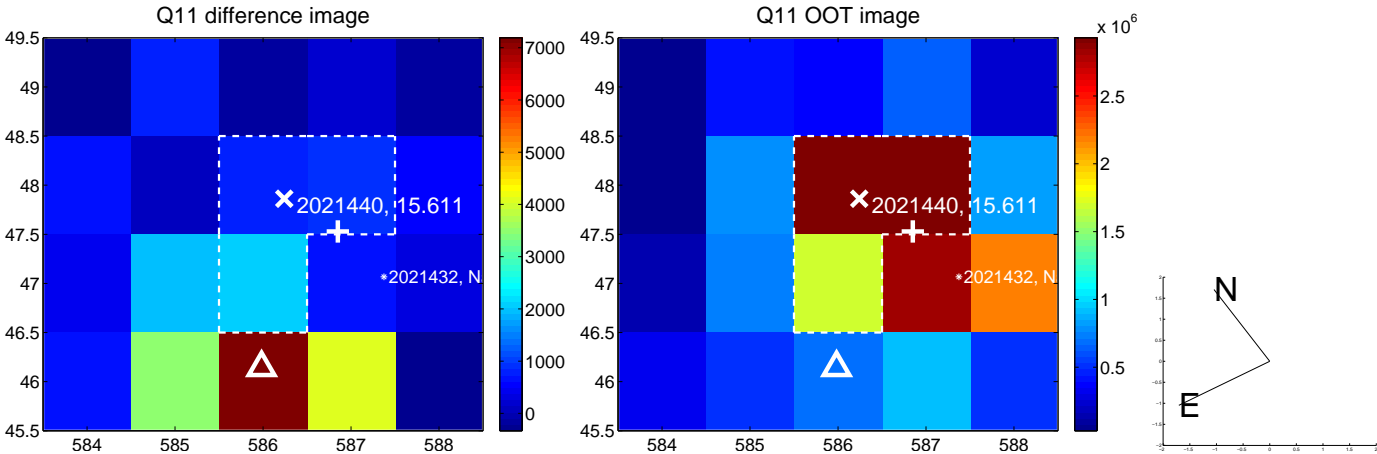
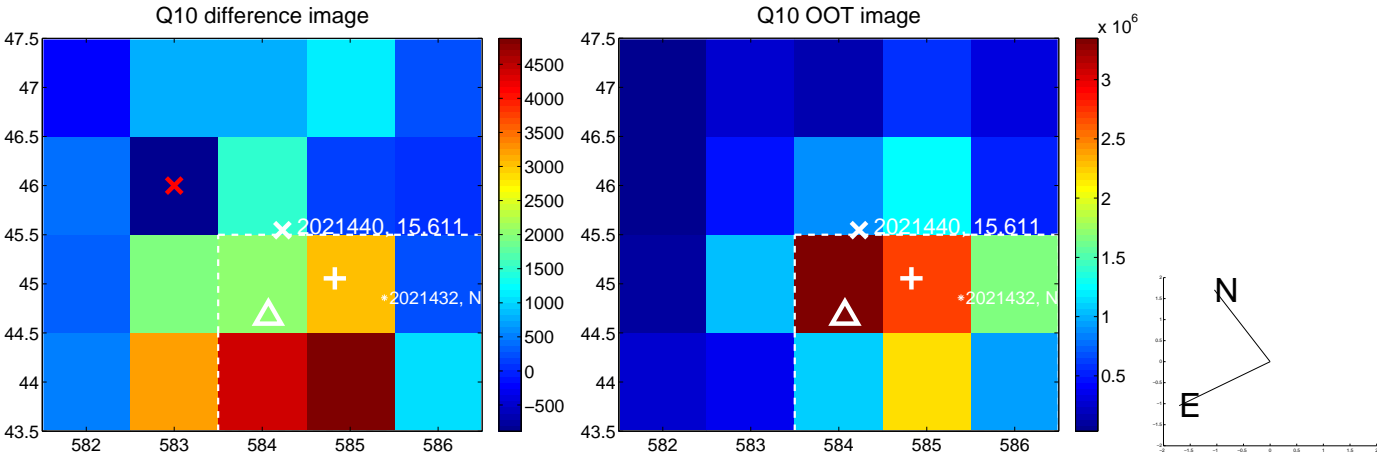
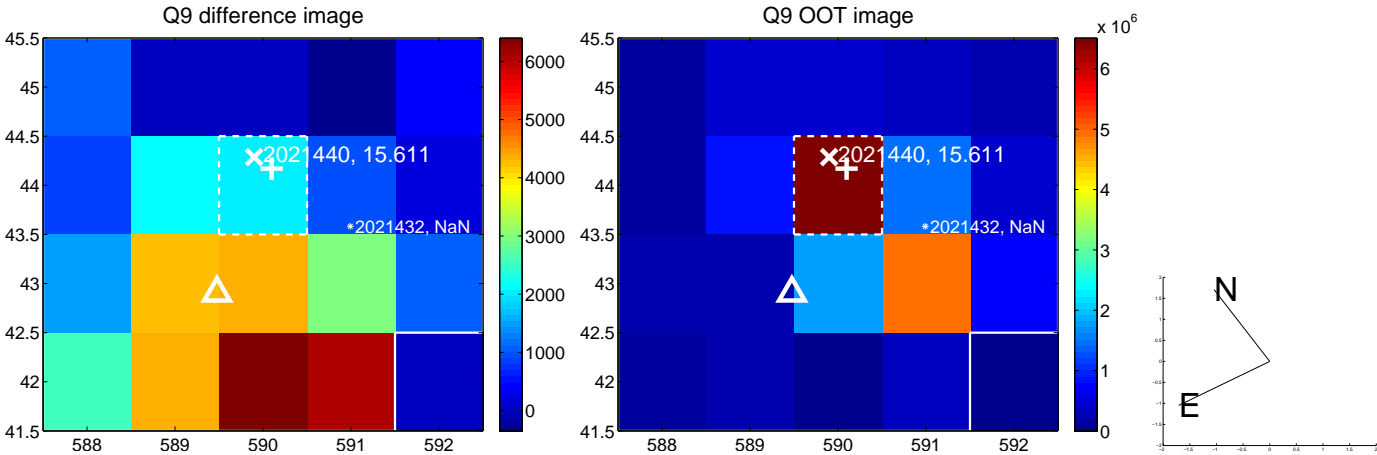
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



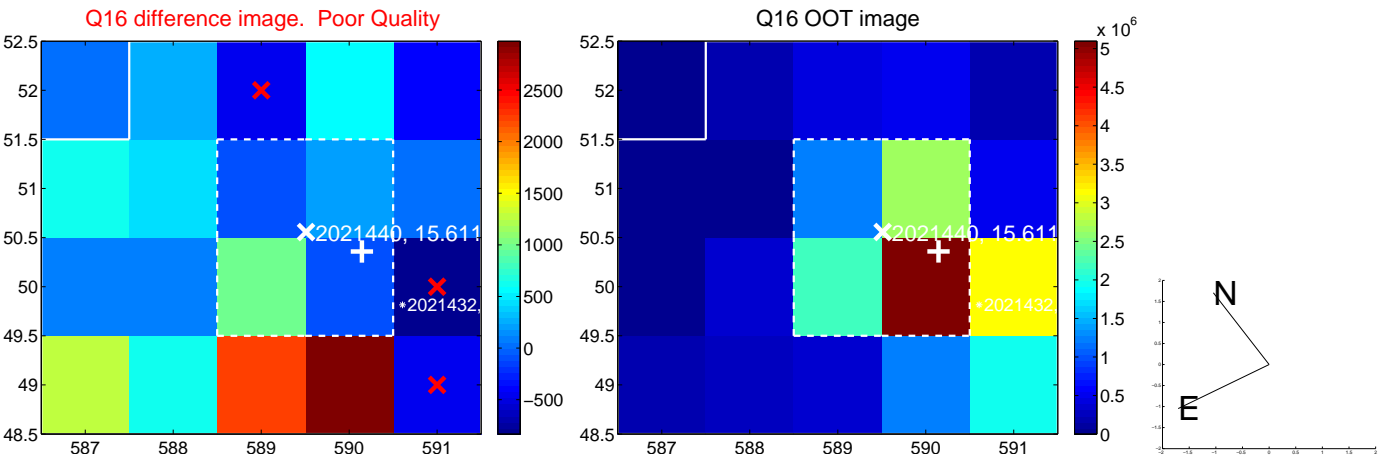
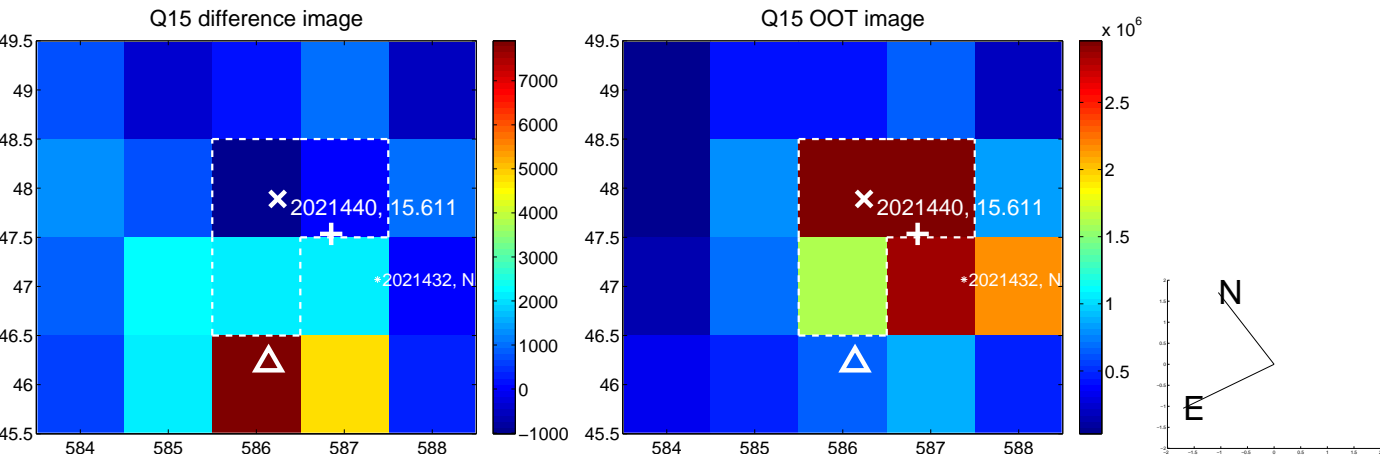
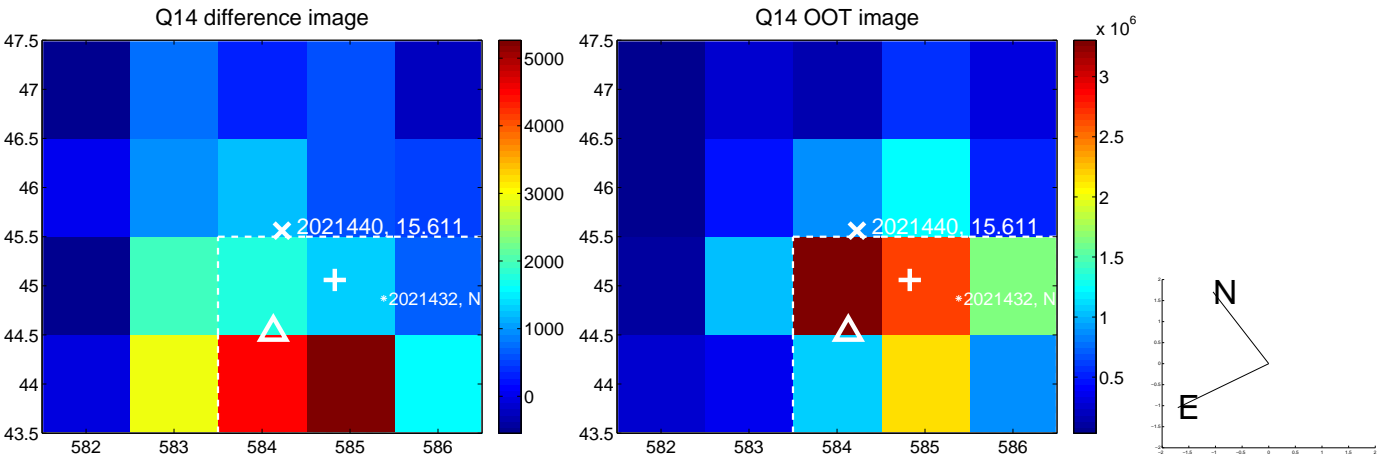
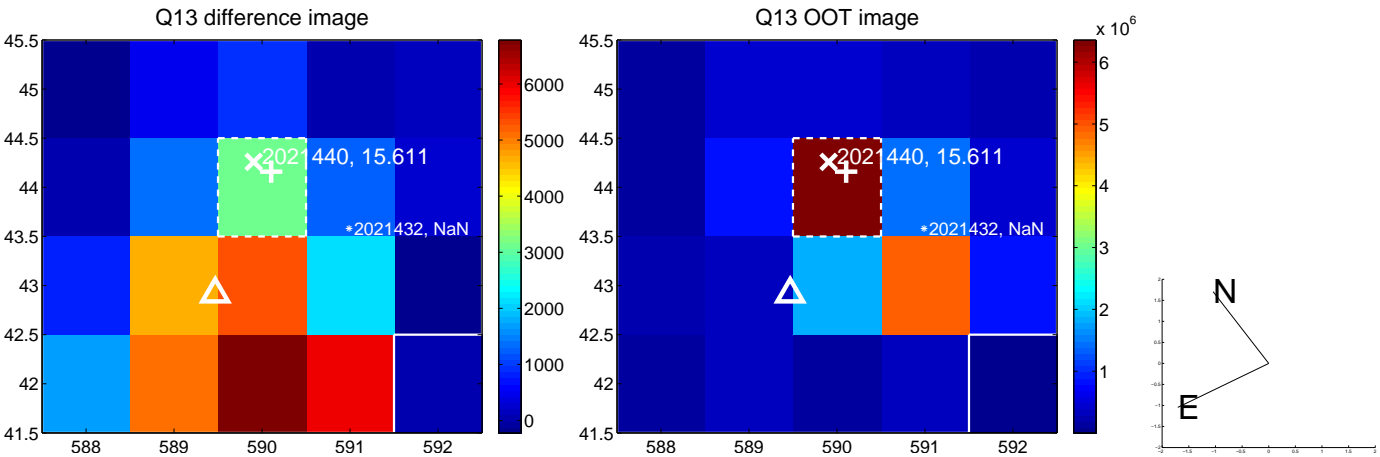
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



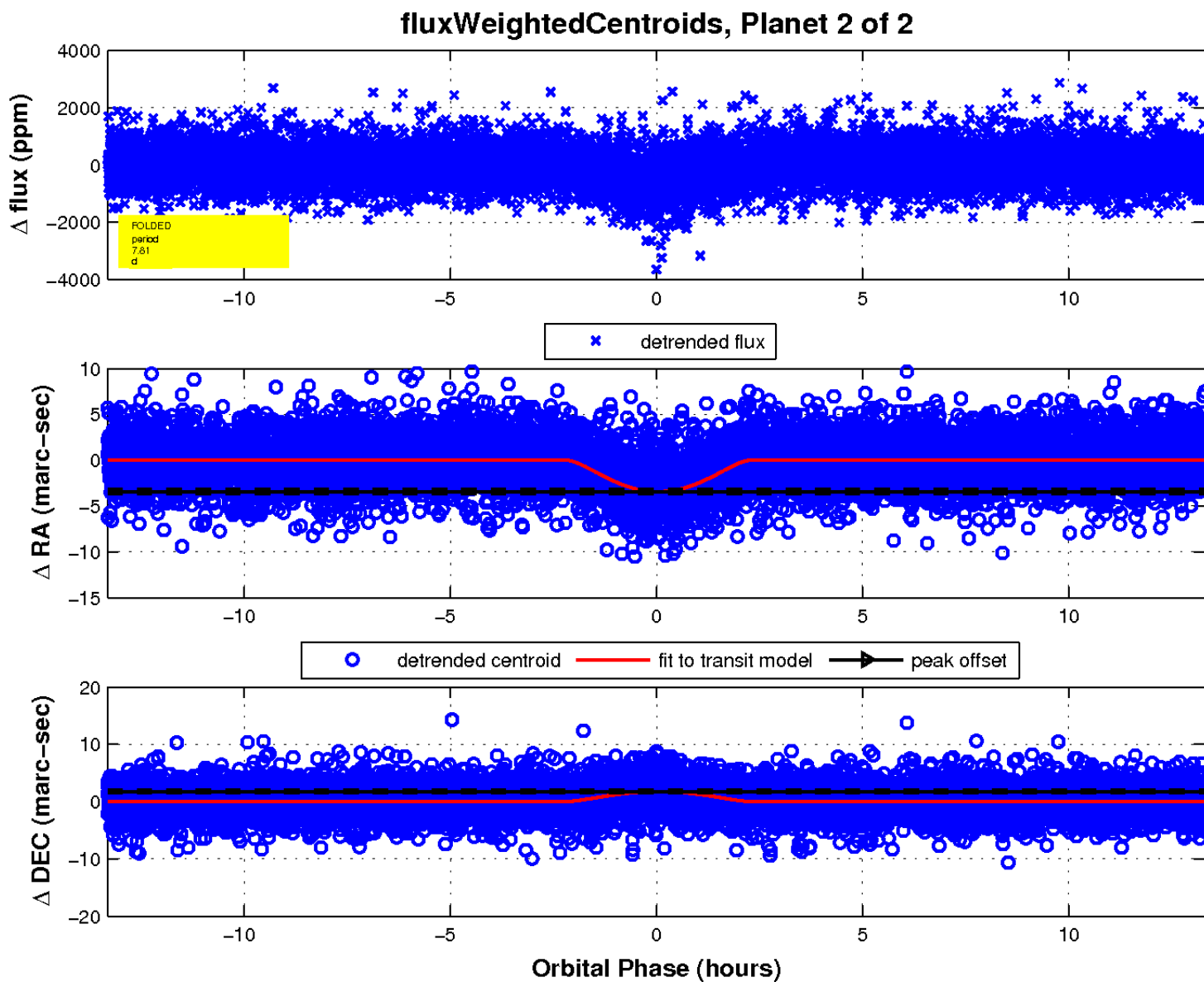
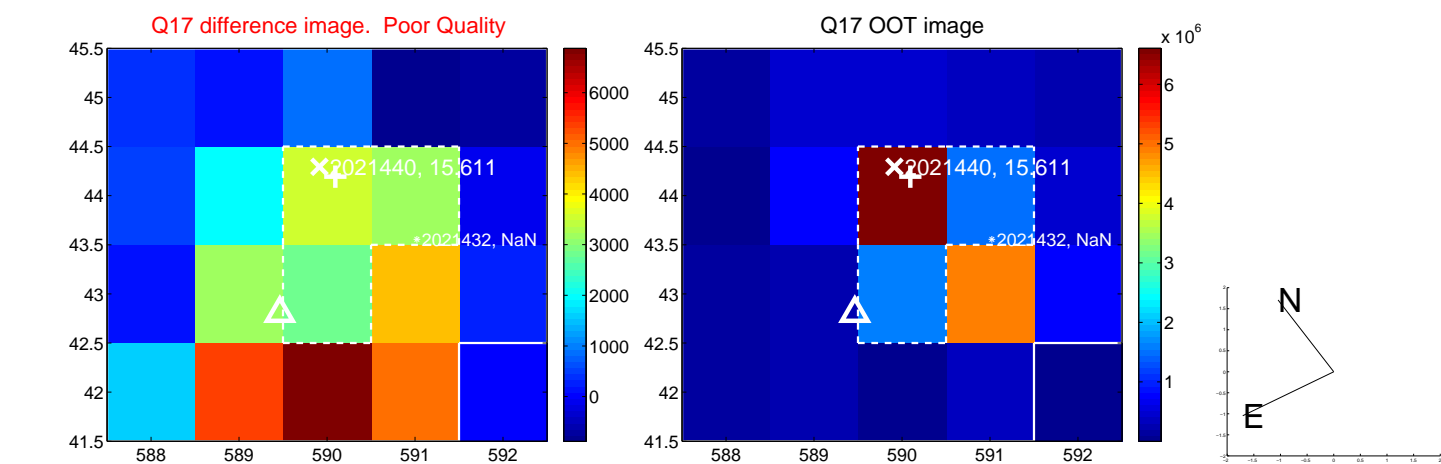
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

