

KIC 009773094

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})
009773094-01	OBS	No	0.606436	131.697125	308.0	4.296	21.2	20.1	2.12	7363	4.24	45040.87
009773094-02	OBS	No	3.640305	133.133406	3059.2	1.662	19.0	20.8	2.12	7363	12.18	4128.61

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009773094-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT
009773094-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT

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

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

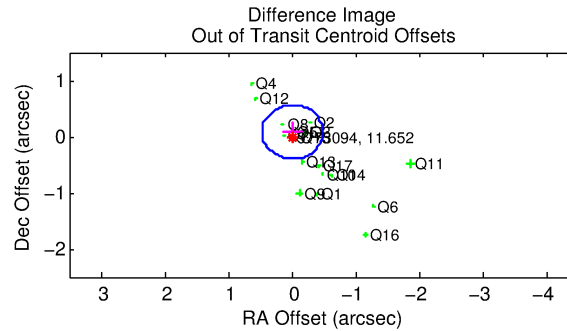
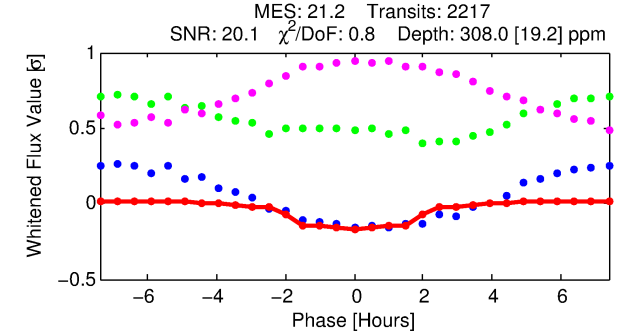
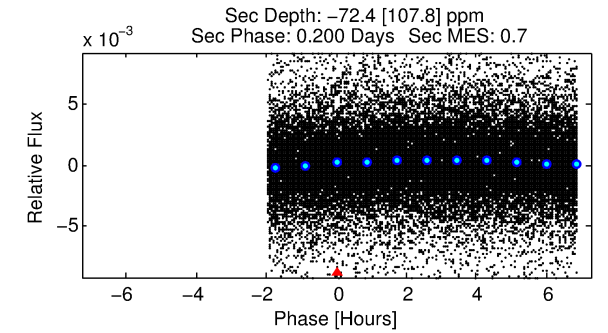
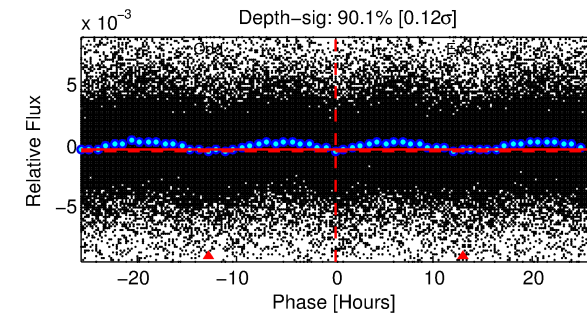
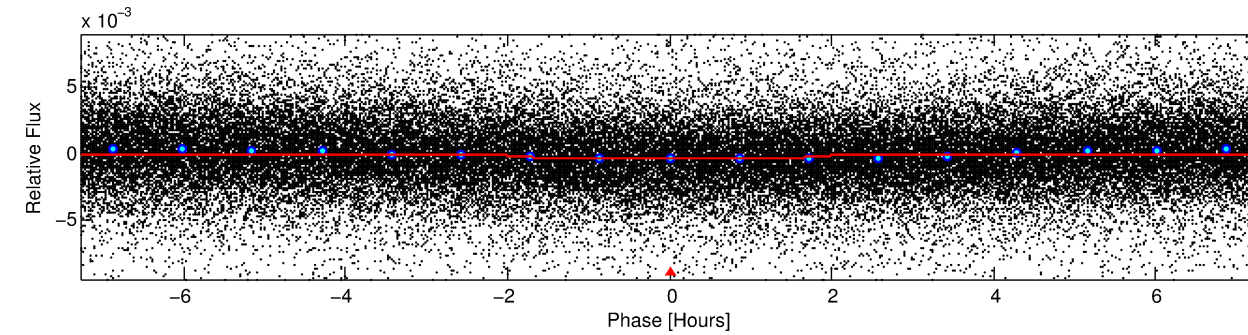
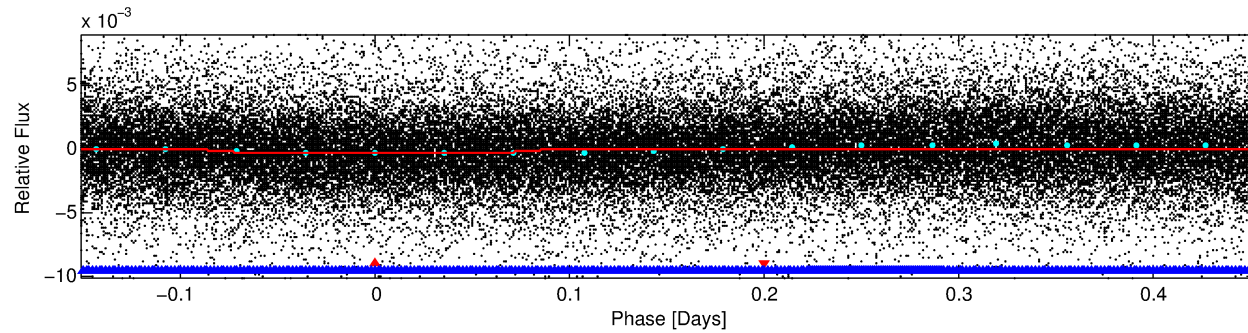
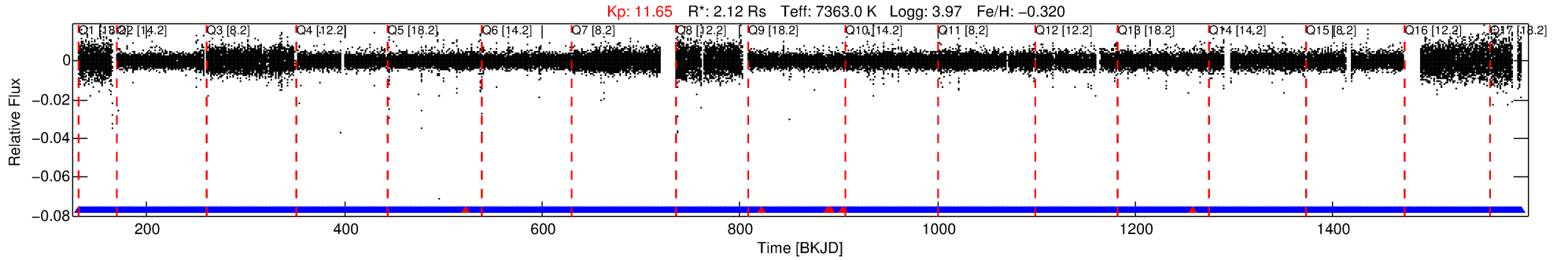
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009773094-01

No Significant Match Found

DV One-Page Summary

KIC: 9773094 Candidate: 1 of 2 Period: 0.606 d



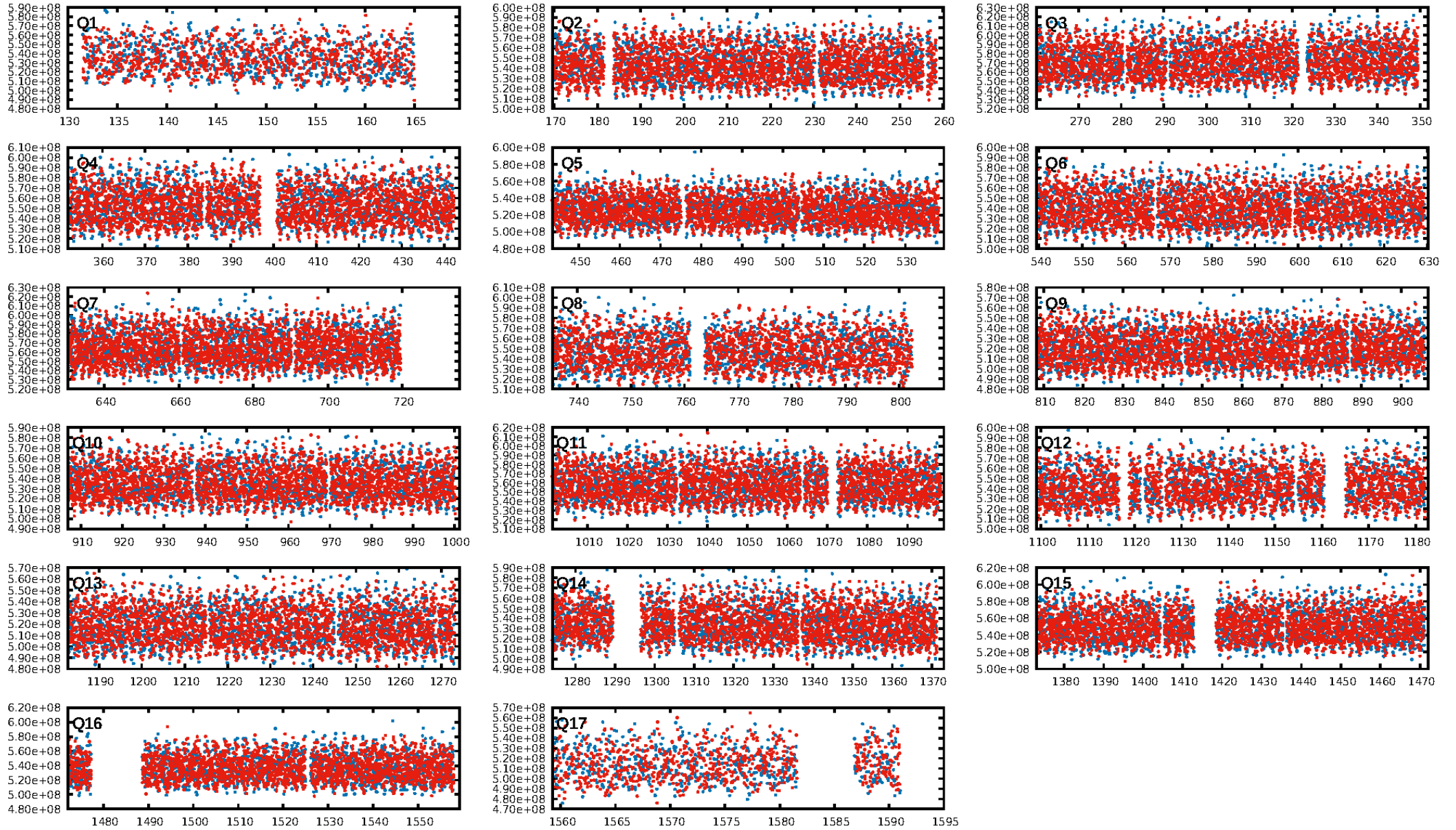
DV Fit Results:

Period = 0.60644 [0.00001] d
Epoch = 131.6971 [0.0028] BKJD
Rp/R* = 0.0184 [0.0022]
a/R* = 1.09 [0.12]
b = 0.88 [0.19]
Seff = 45040.87 [22640.75]
Teff = 3715 [467] K
Rp = 4.24 [1.50] Re
a = 0.0162 [0.0049] AU
Ag = N/A
Teffp = N/A

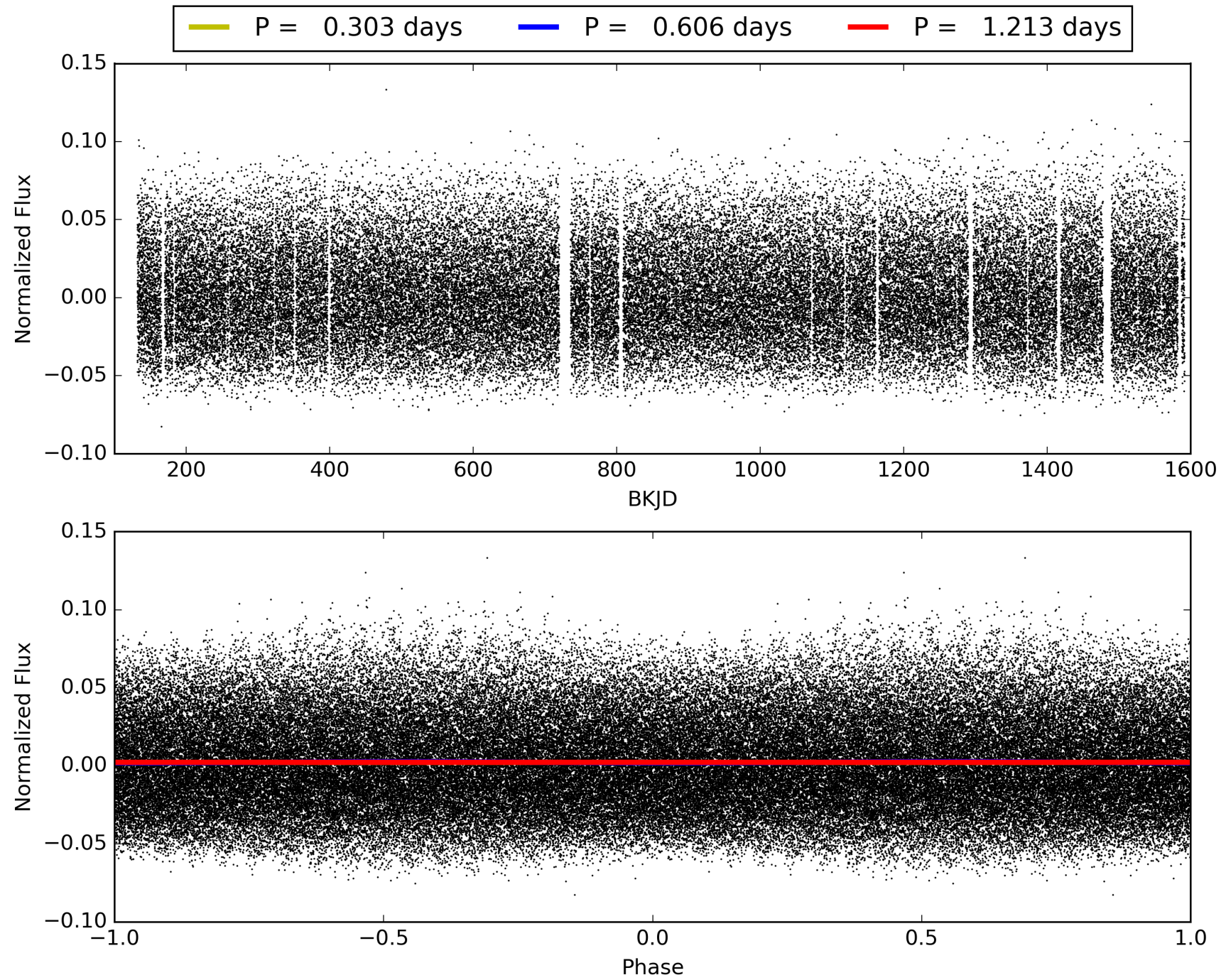
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [15.81 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2111/2117]
GhostDiagnostic-chr: 1.149
Centroid-sig: 0.0%
Centroid-so: 0.298 arcsec [7.22 σ]
OotOffset-rm: 0.082 arcsec [0.51 σ]
KicOffset-rm: 0.084 arcsec [0.39 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.71 [12/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009773094-01, PDC Light Curves

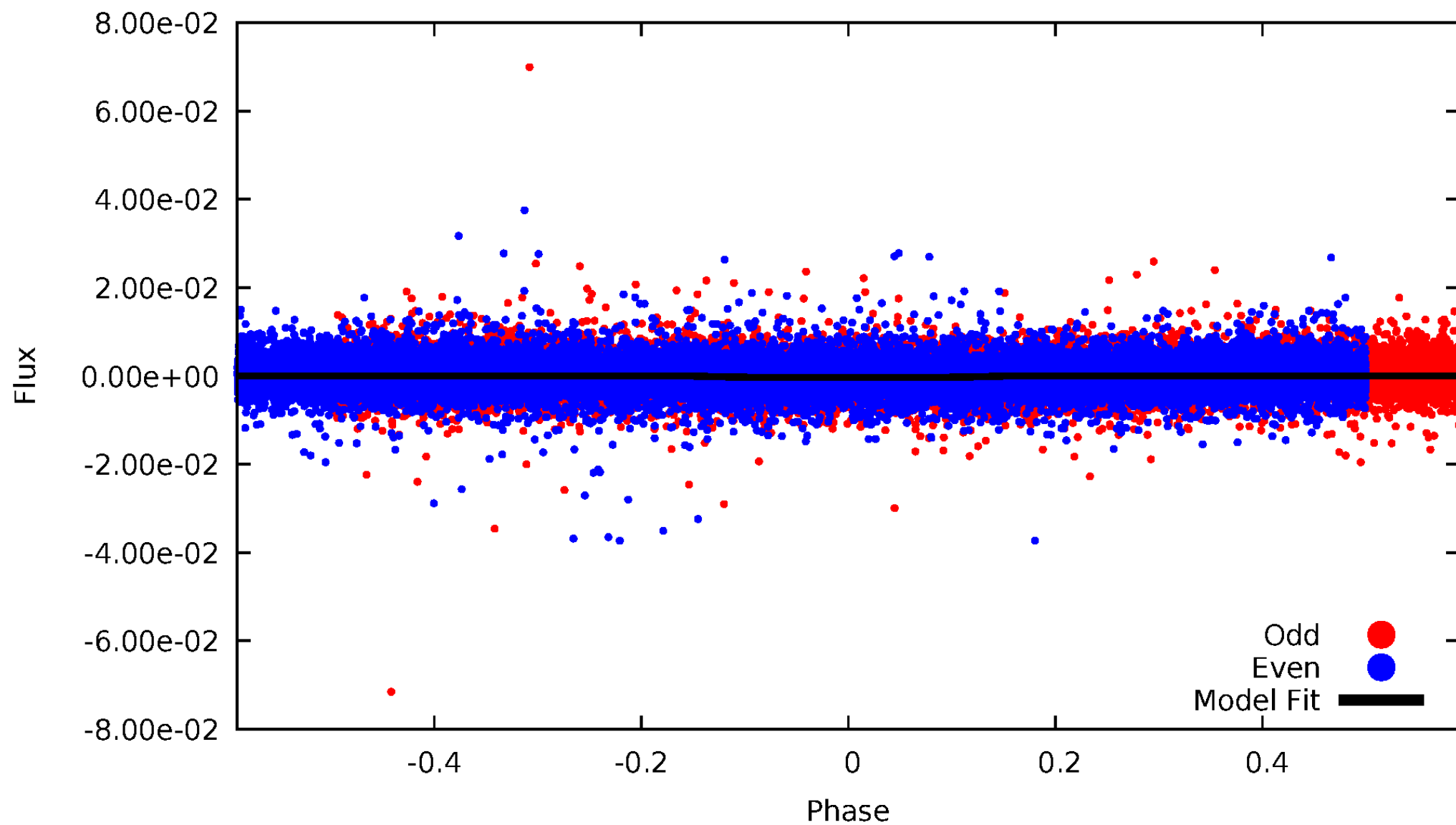


TCE 009773094-01



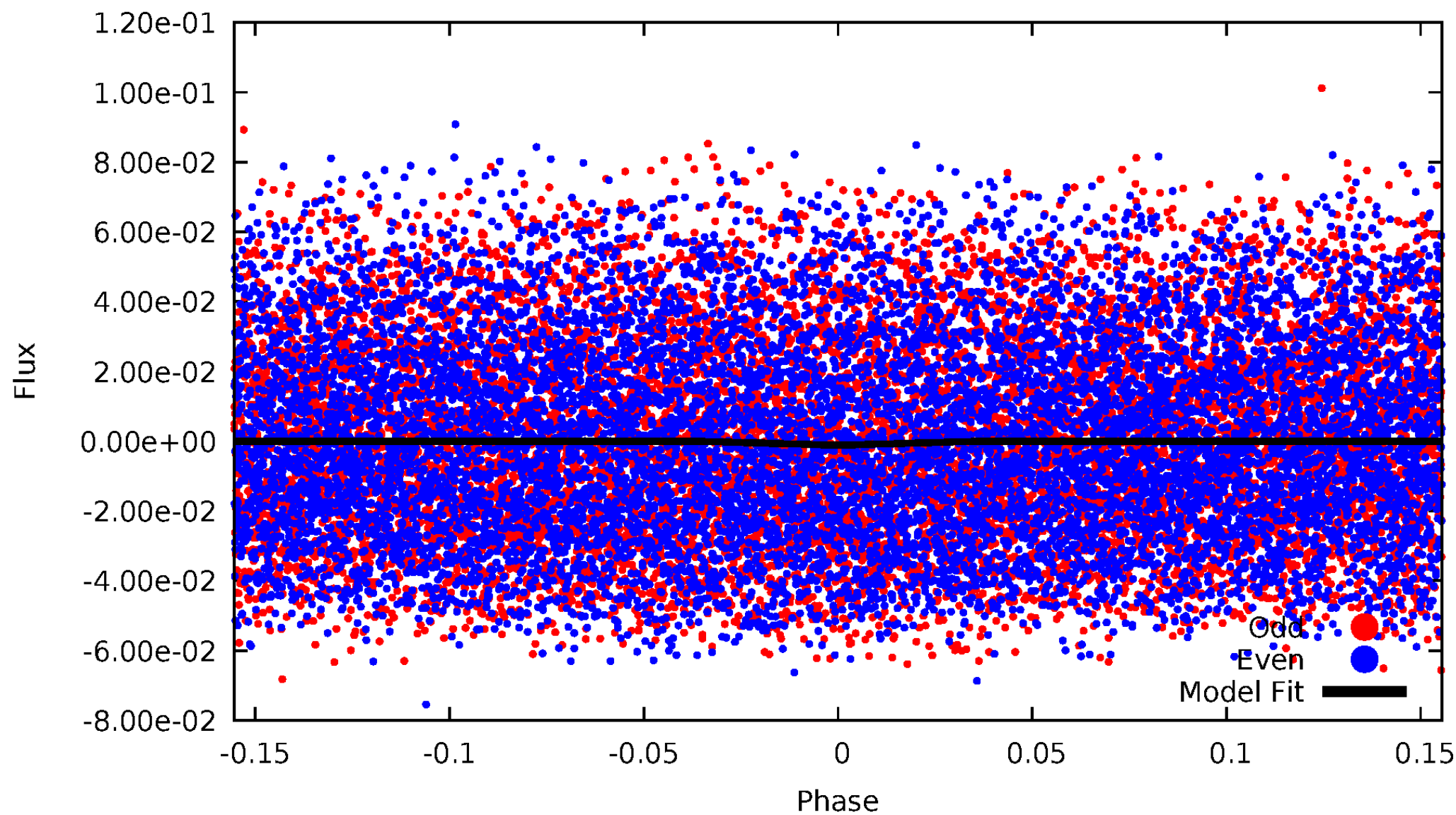
DV Odd/Even

TCE 009773094-01



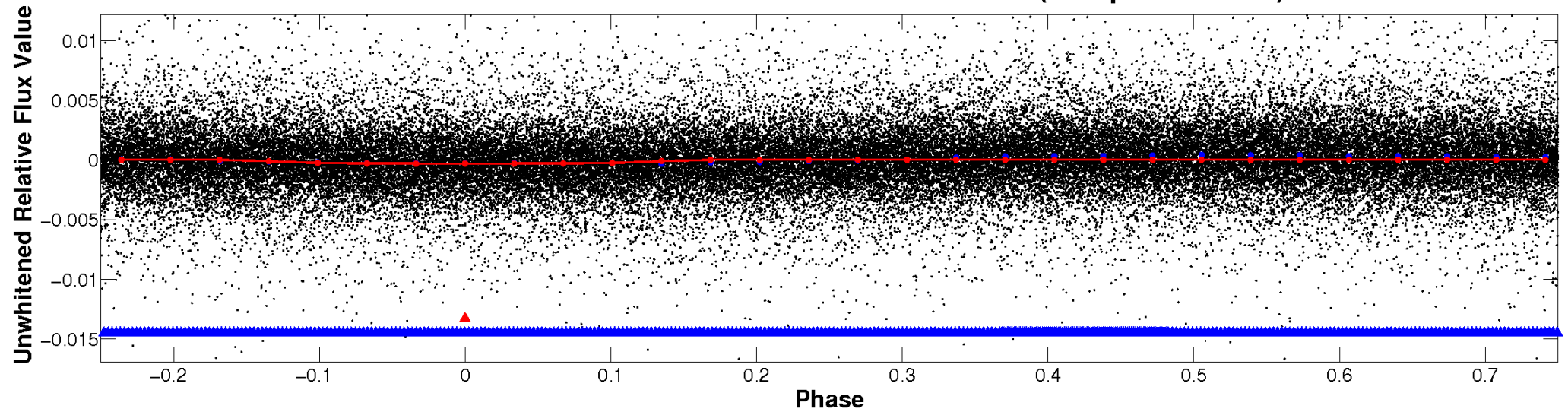
ALT Odd/Even

TCE 009773094-01

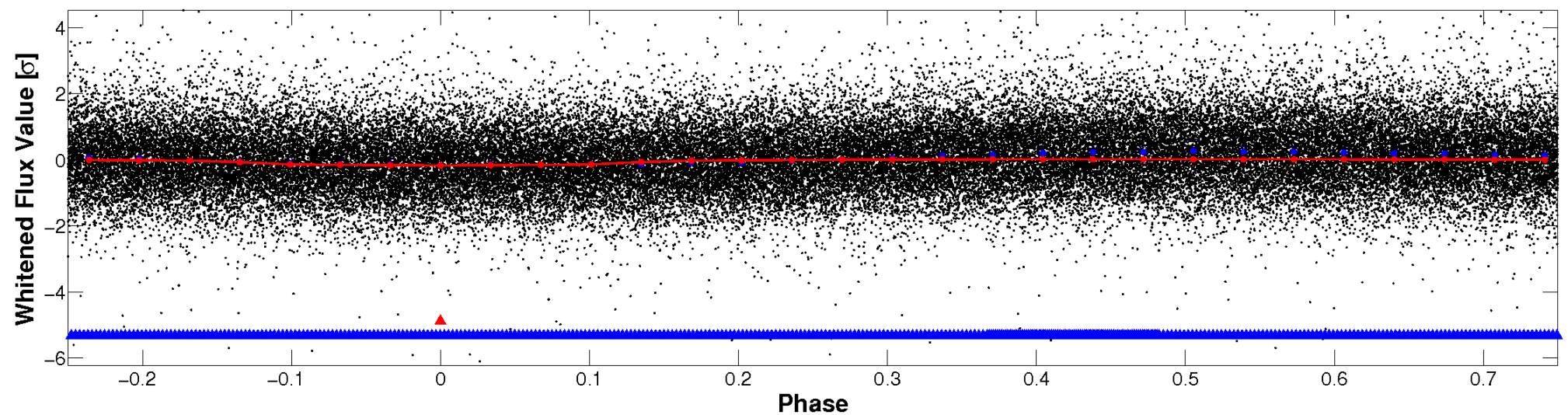


Non-Whitened Vs. Whitened Light Curve

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

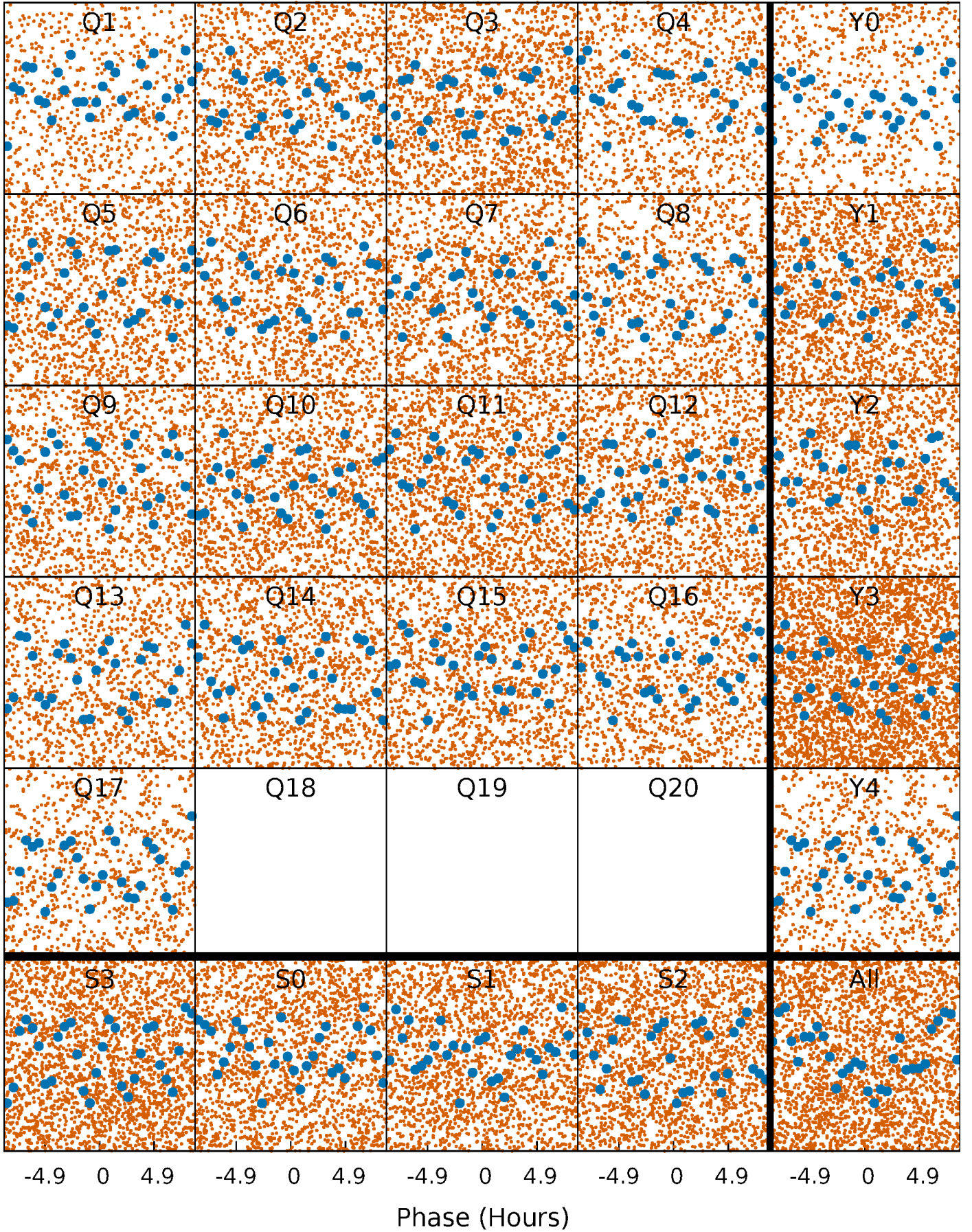


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



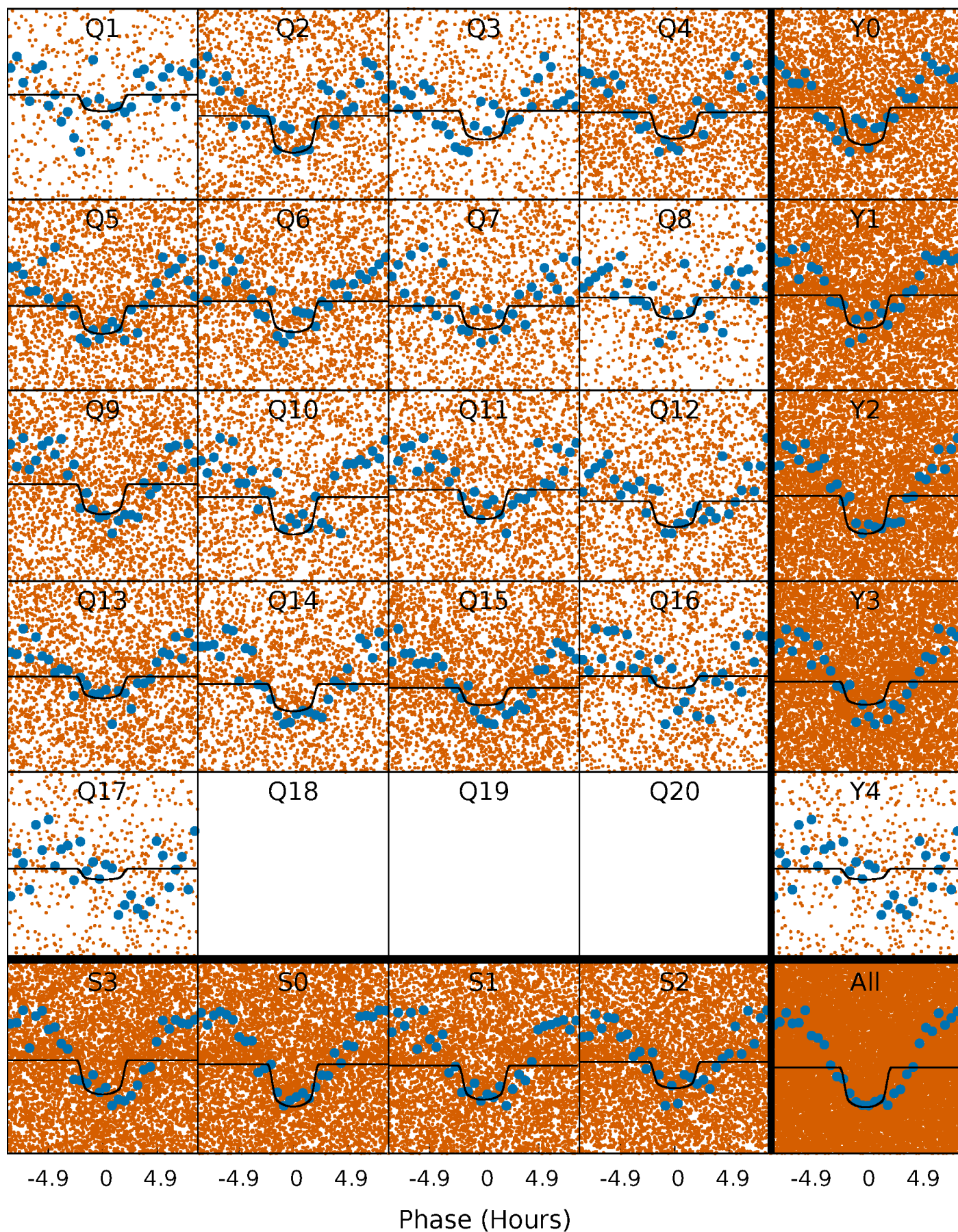
PDC Quarter-Phased Transit Curves

TCE 009773094-01 P= 0.606436 Days $T_0=131.697125$ (BKJD)



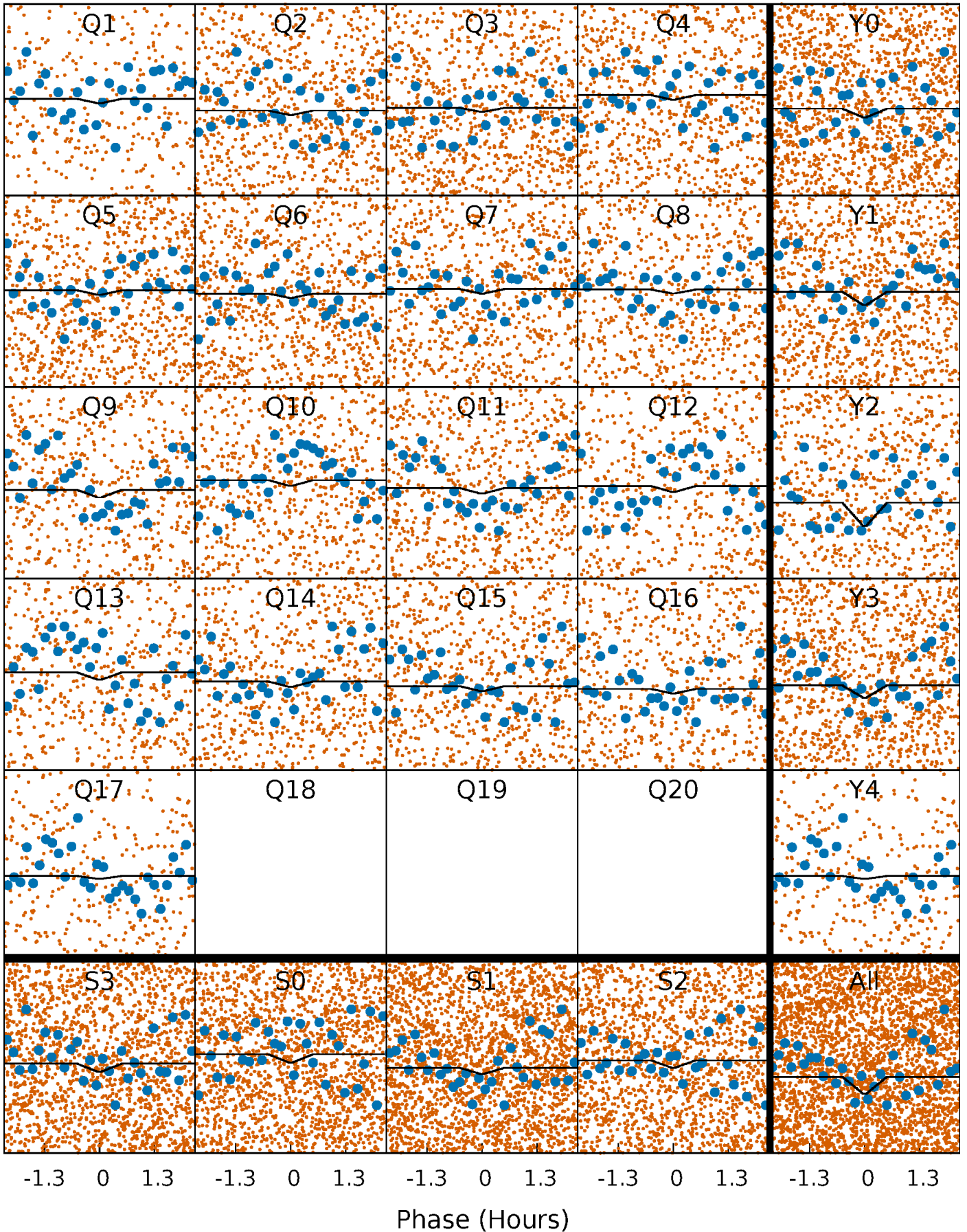
DV Quarter-Phased Transit Curves

TCE 009773094-01 P= 0.606436 Days $T_0=131.697125$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

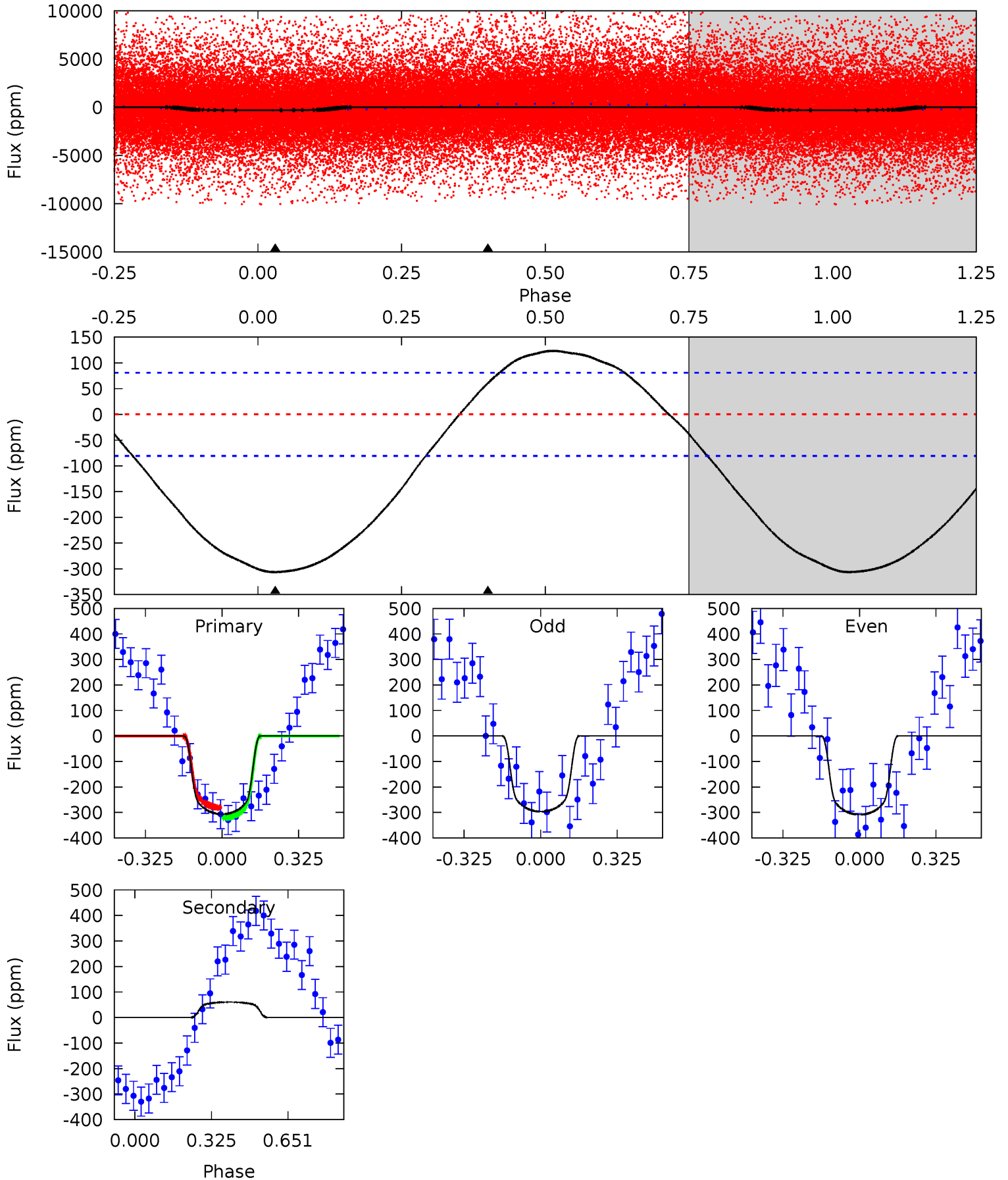
TCE 009773094-01 P= 0.606483 Days $T_0=131.670778$ (BKJD)



DV Model-Shift Uniqueness Test

009773094-01, P = 0.606436 Days, E = 131.090689 Days

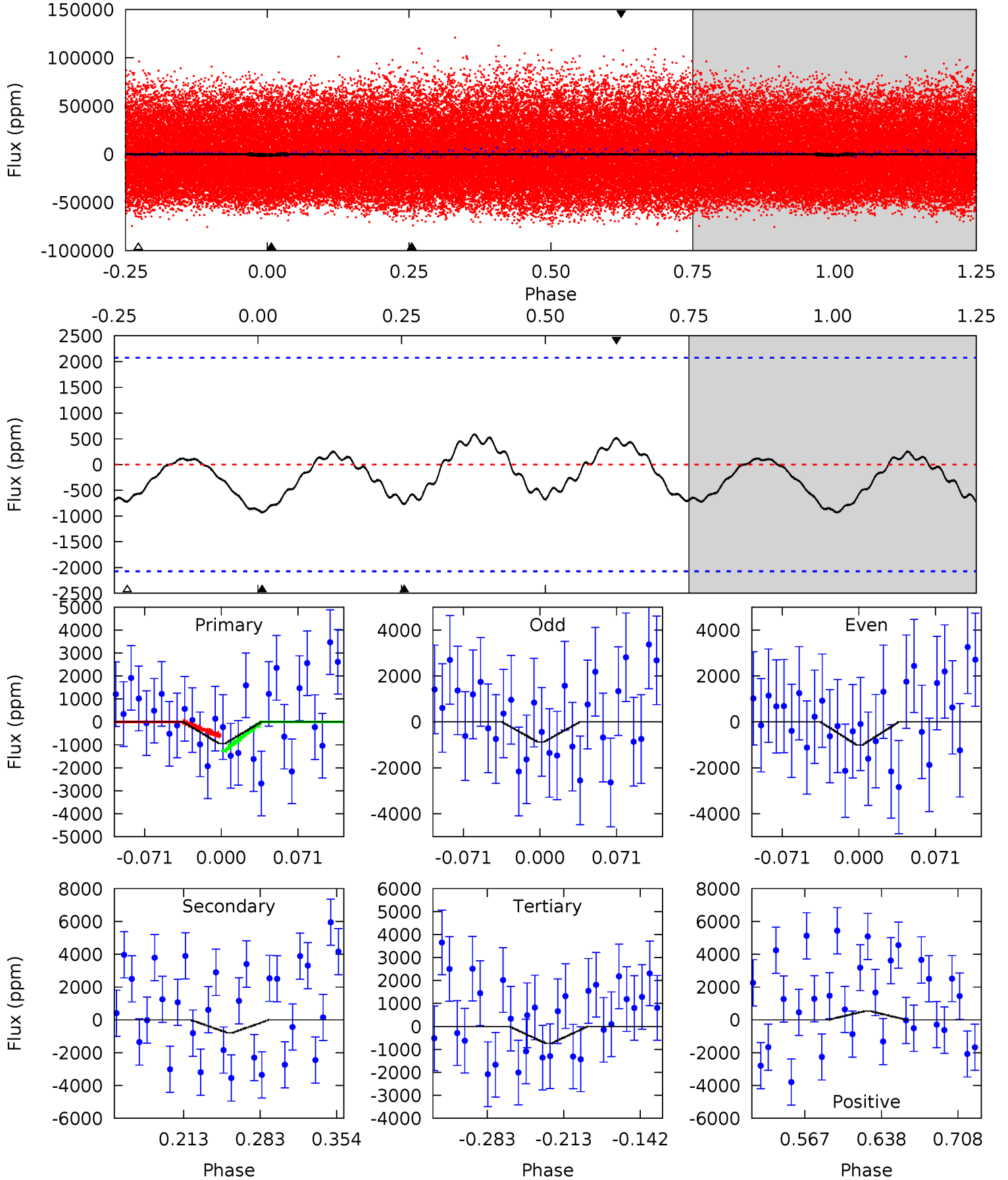
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.3	-3.23	0	0	4.31	0.98	1.78	16.3	16.3	-3.23	-3.23	0.32	0.98	0.29	1.10



Alt Model-Shift Uniqueness Test

009773094-01, P = 0.606483 Days, E = 131.064295 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.12	1.75	1.65	1.19	4.64	1.81	0.79	0.47	0.92	0.10	0.56	0.14	0.30	0.39	0.75



Stellar Parameters For KIC 009773094

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7363^{+230}_{-307}	$3.973^{+0.273}_{-0.147}$	$-0.320^{+0.250}_{-0.350}$	$2.115^{+0.512}_{-0.704}$	$1.533^{+0.204}_{-0.306}$	$0.228^{+0.430}_{-0.100}$
	+3%/-4%	+7%/-4%	+78%/-109%	+24%/-33%	+13%/-20%	+189%/-44%
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 009773094-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	61 ± 19	$4.09^{+0.90}_{-0.75}$	5136^{+401}_{-425}	-5364^{+352}_{-371}	$-0.505^{+0.204}_{-0.284}$
Alt.	-783 ± 447	$7.42^{+1.24}_{-1.23}$	5121^{+387}_{-459}	6332^{+1067}_{-1444}	$1.940^{+1.414}_{-1.154}$

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

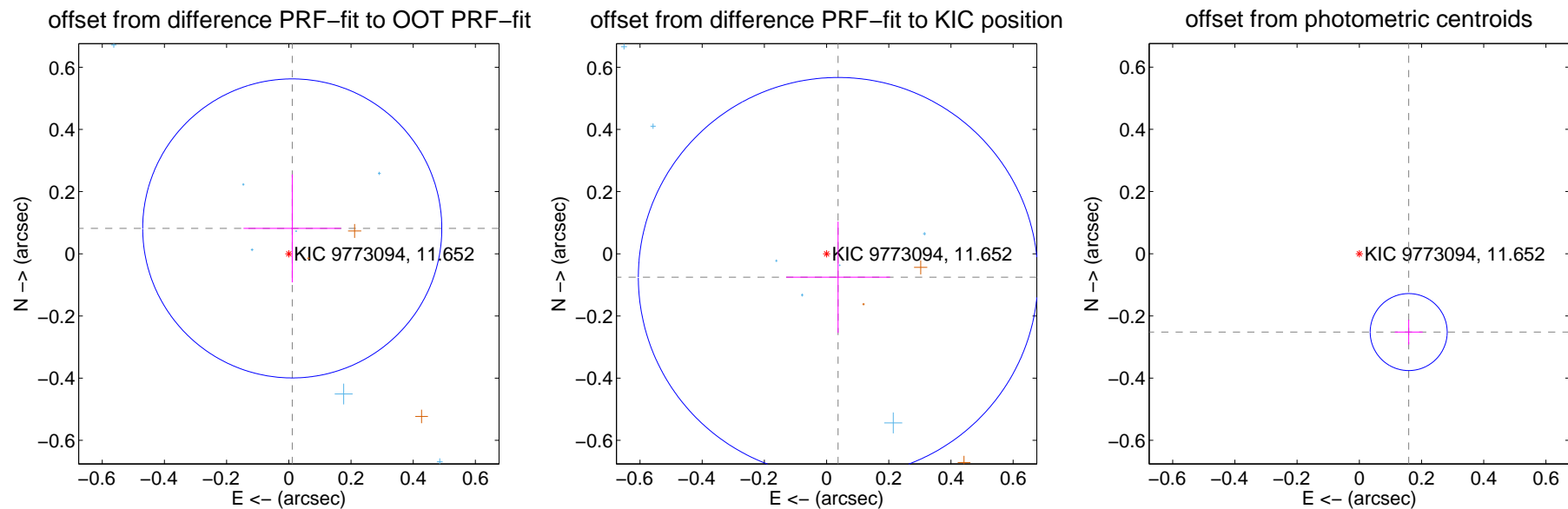
DV Centroid Data

Supplemental centroid analysis for 009773094-01. **Kepler magnitude: 11.65.** Transit SNR 20.13

There are 12 quarters with good PRF difference image offsets

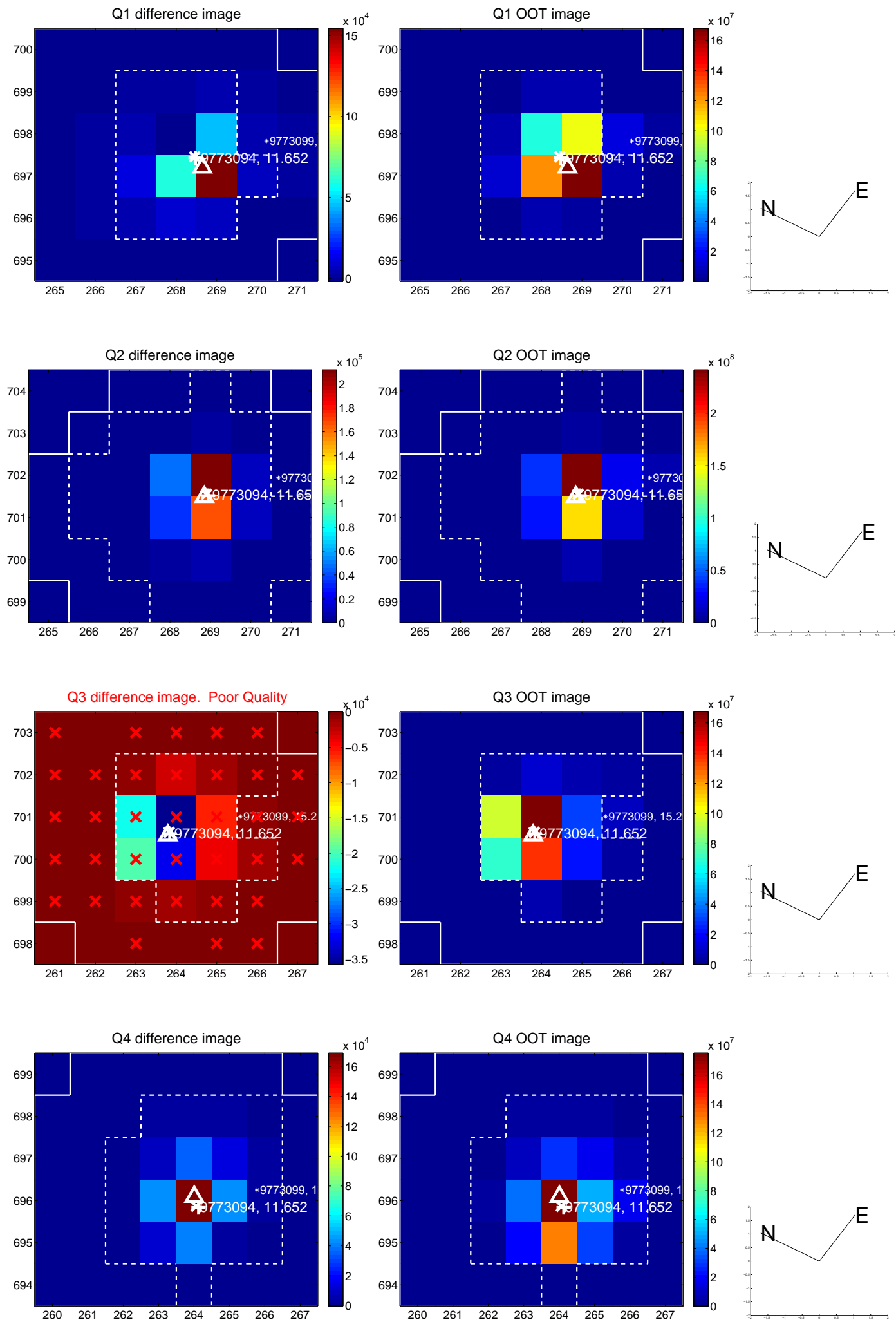
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.082 ± 0.160	0.51	-0.011 ± 0.157	0.082 ± 0.174
PRF-fit source offset from KIC position	0.084 ± 0.214	0.39	-0.037 ± 0.167	-0.075 ± 0.179
photometric centroid source offset	0.30 ± 0.04	7.22	-0.16 ± 0.04	-0.25 ± 0.04

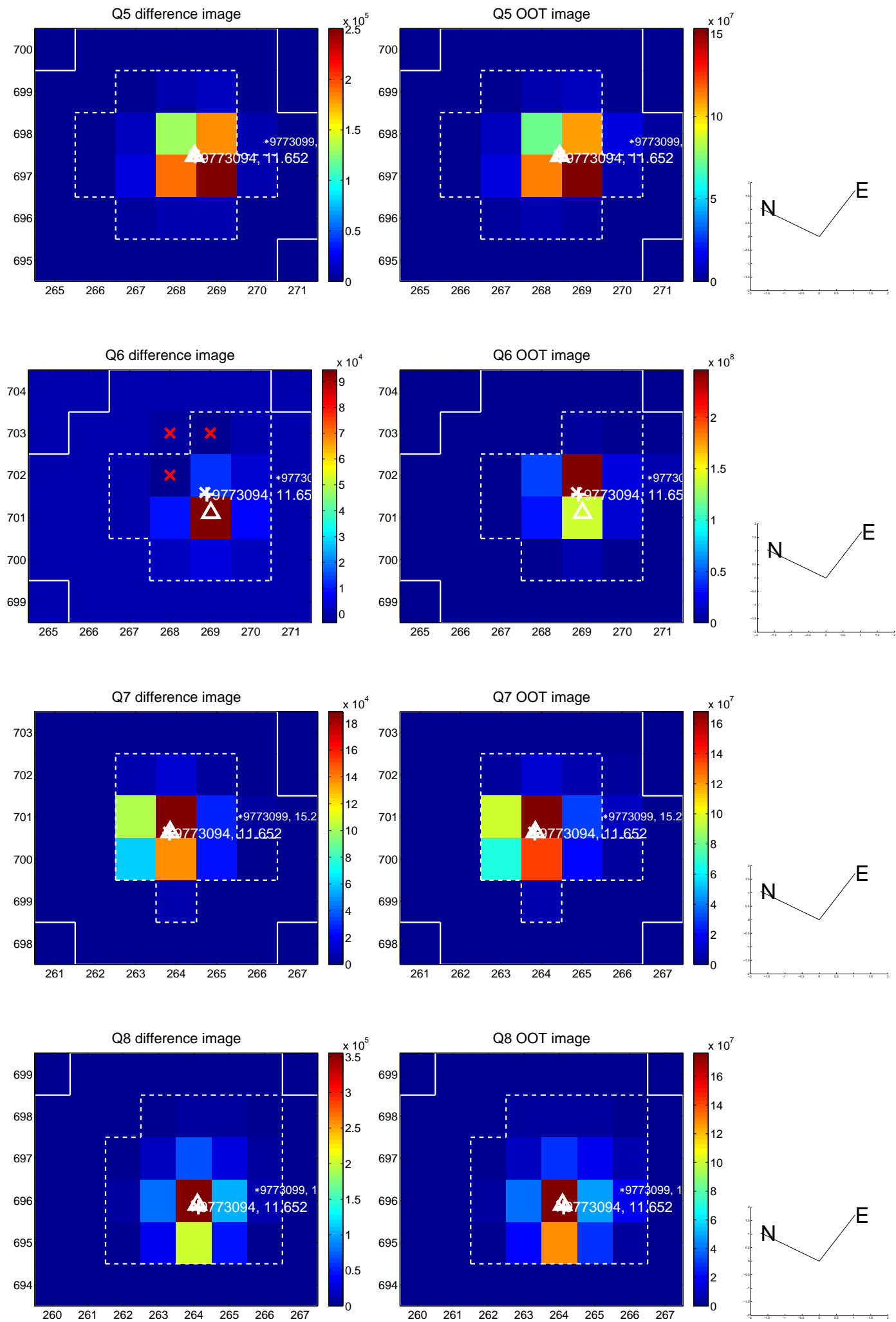


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

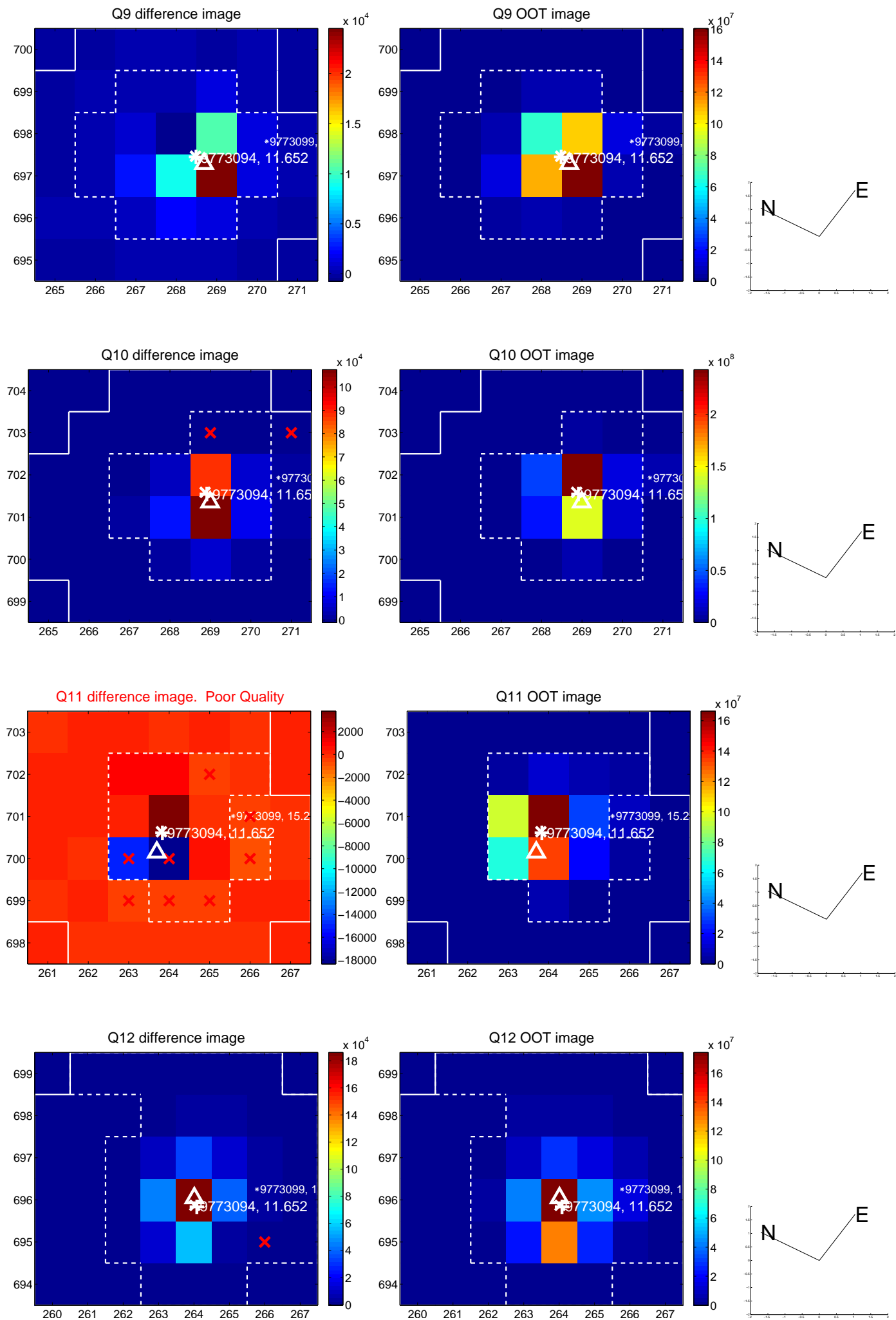
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



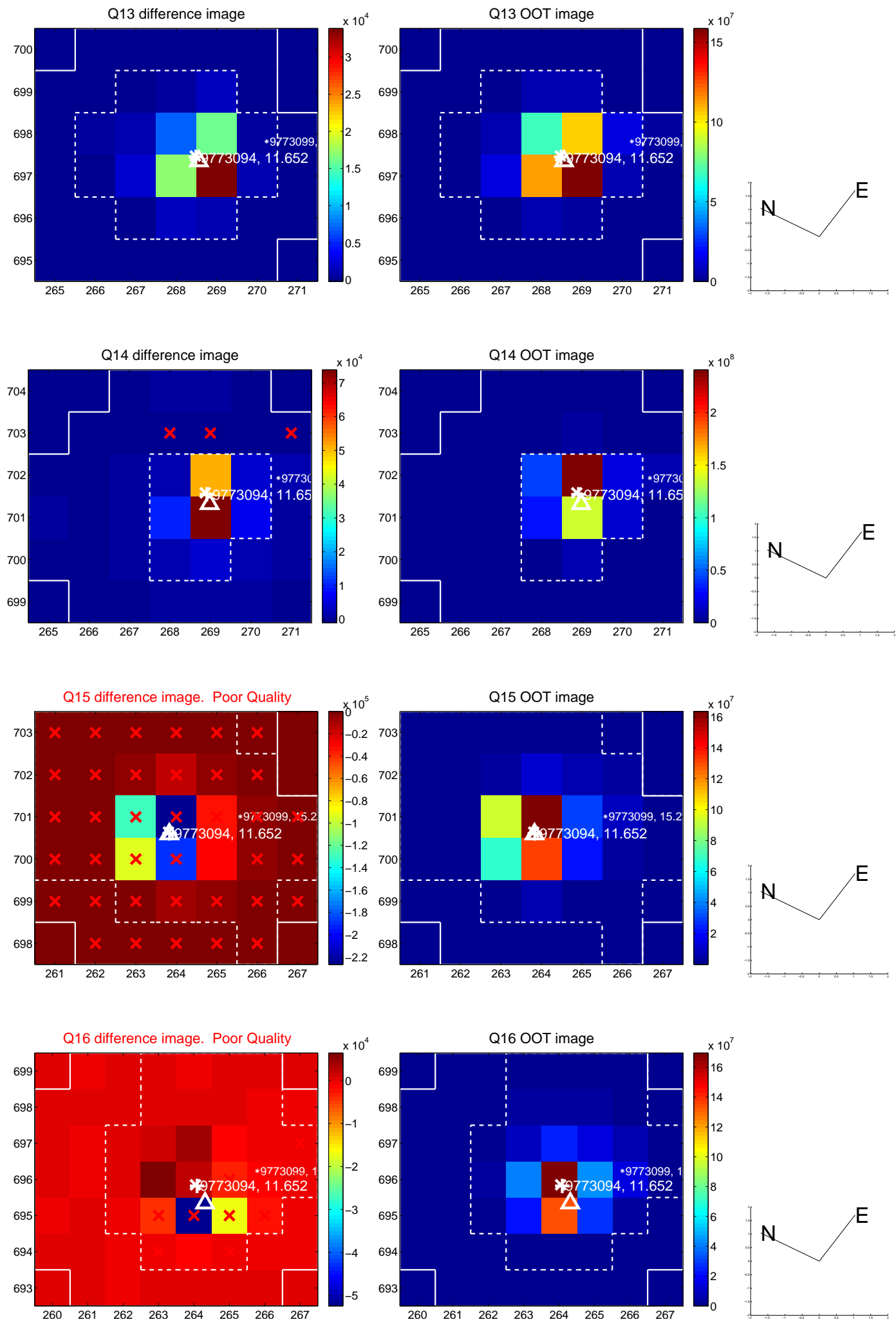
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



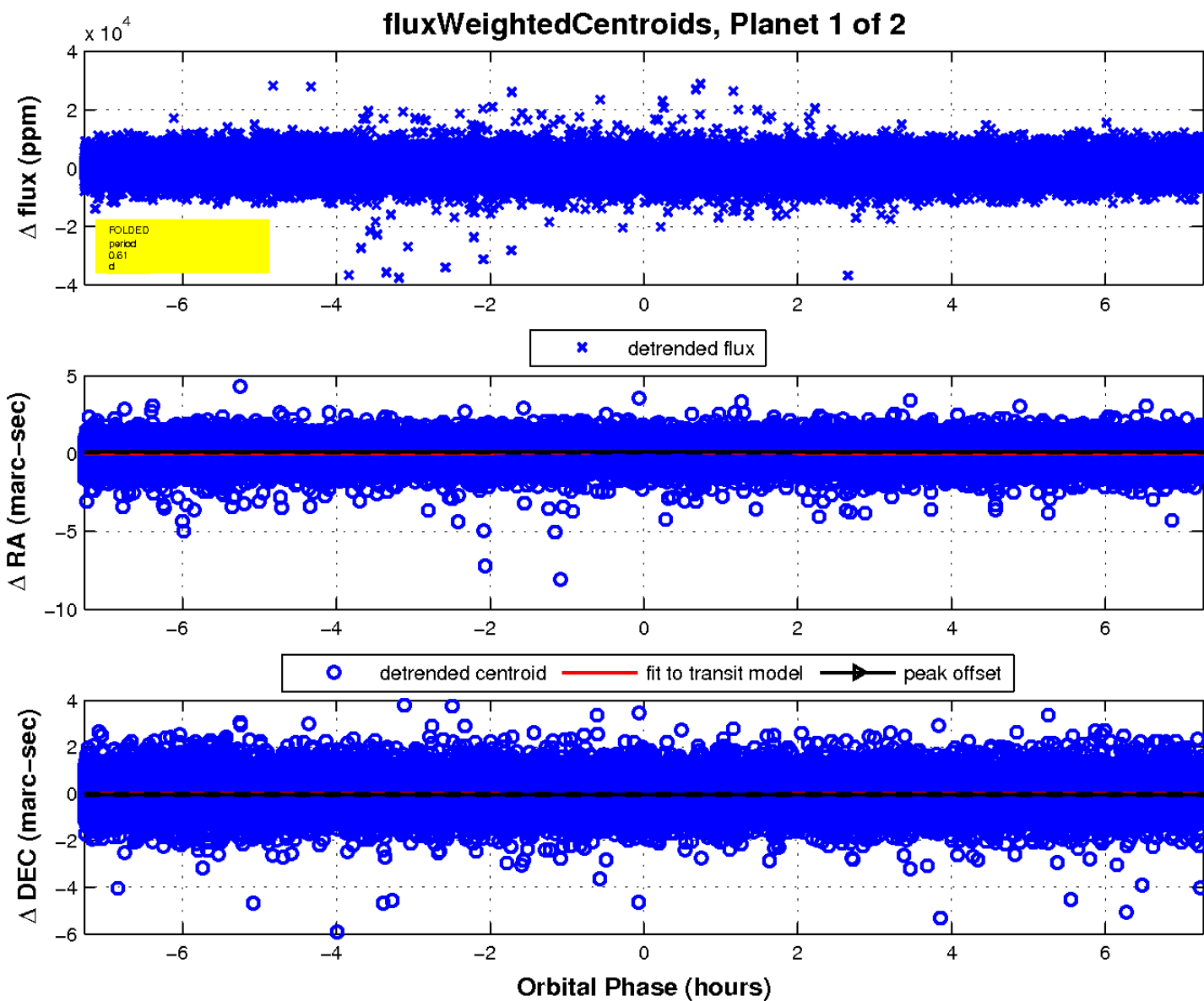
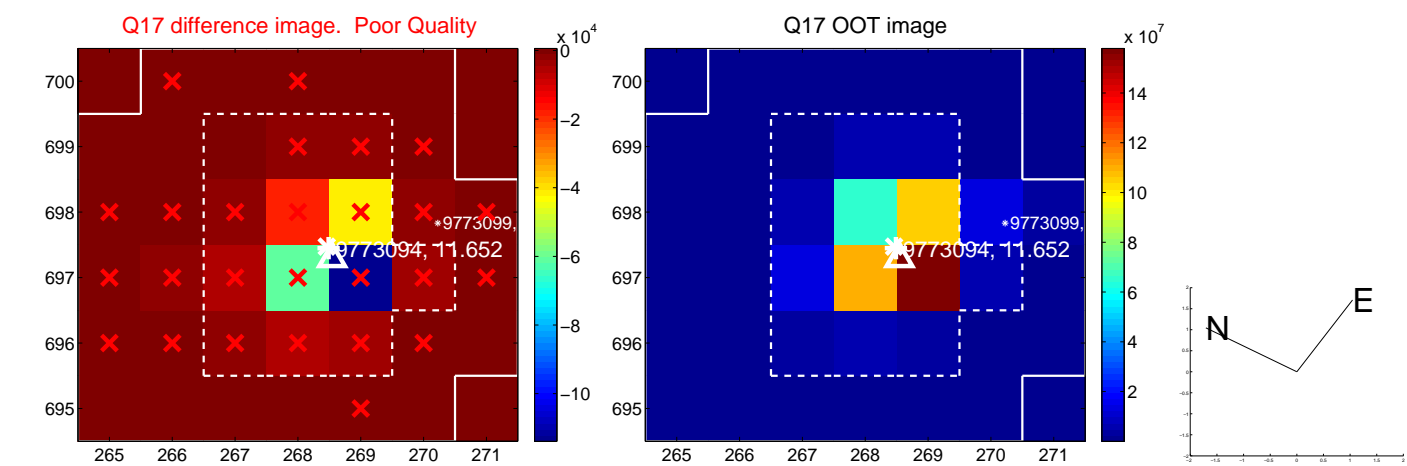
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

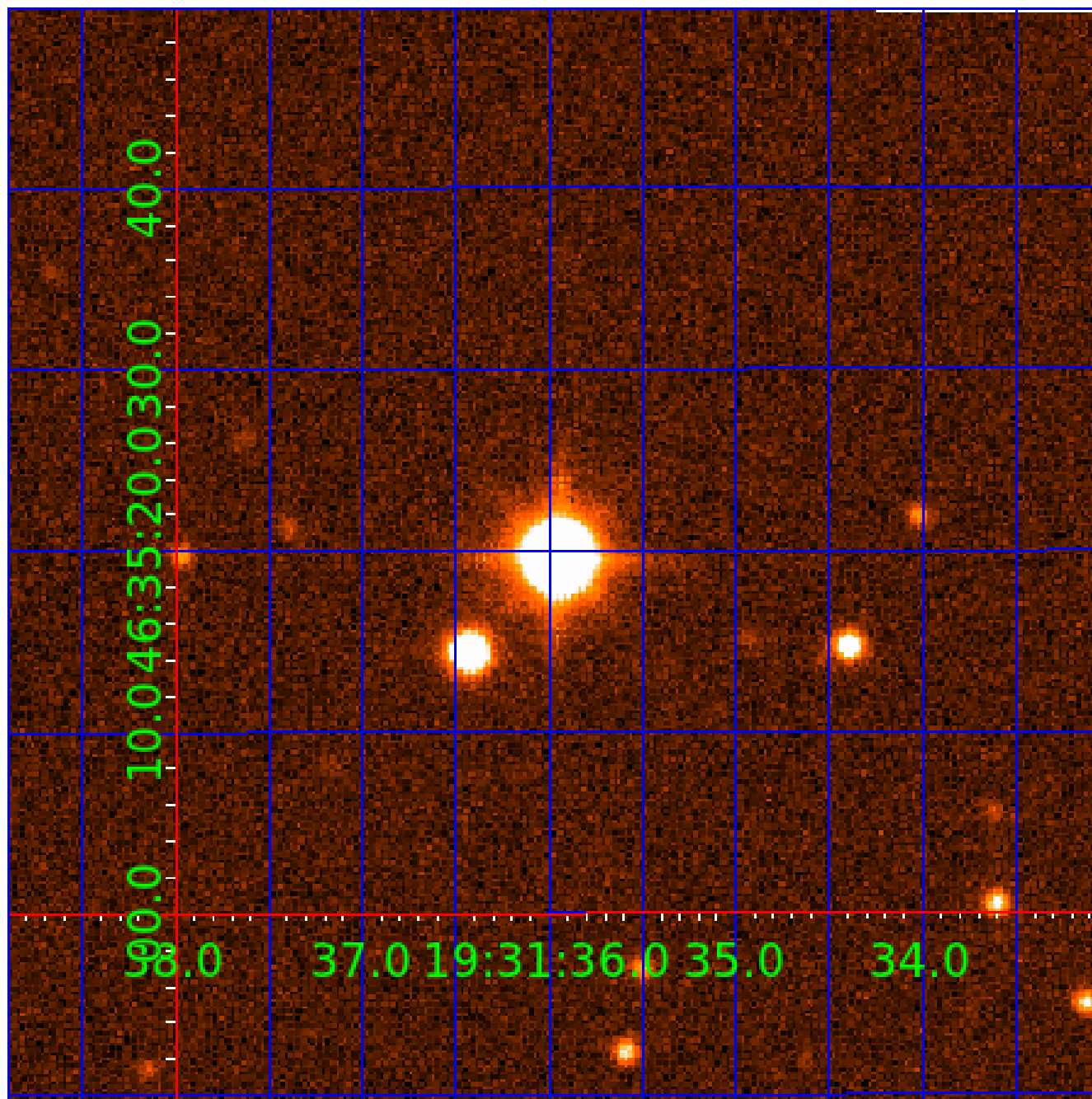


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009773094

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})
009773094-01	OBS	No	0.606436	131.697125	308.0	4.296	21.2	20.1	2.12	7363	4.24	45040.87
009773094-02	OBS	No	3.640305	133.133406	3059.2	1.662	19.0	20.8	2.12	7363	12.18	4128.61

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009773094-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT
009773094-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT

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

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

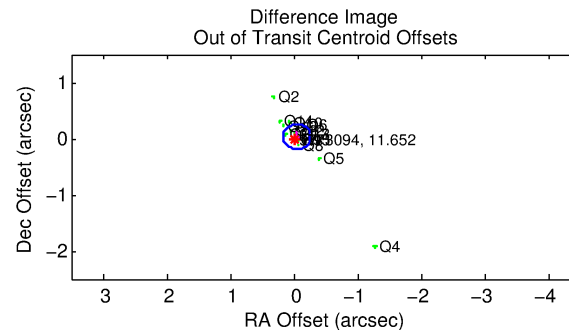
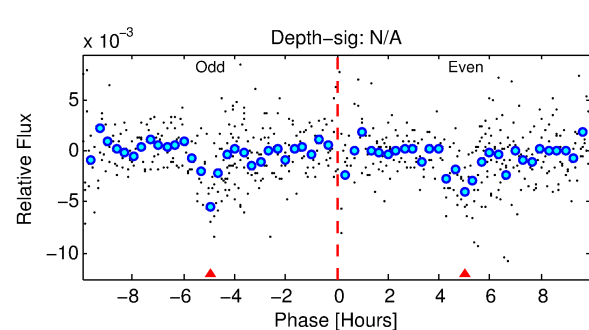
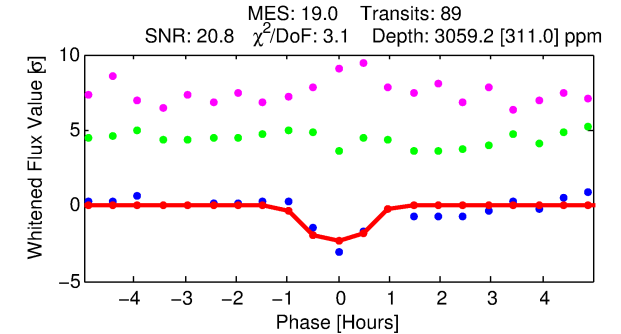
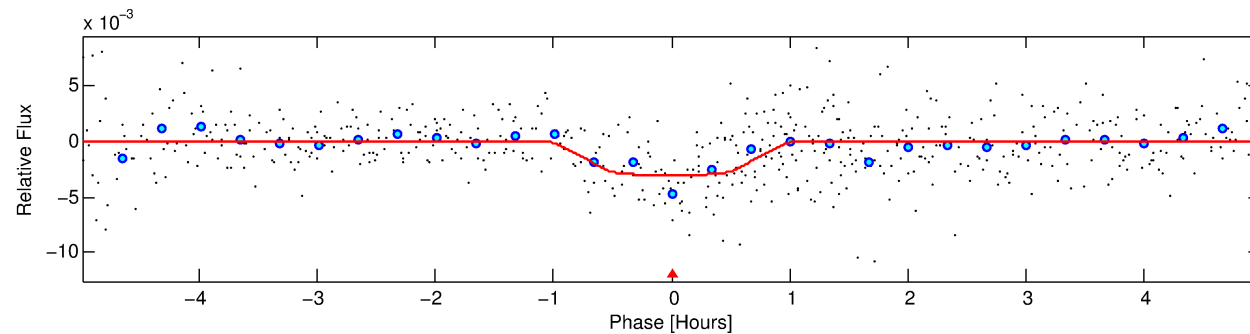
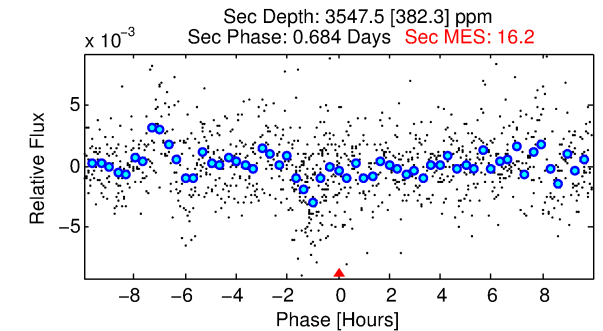
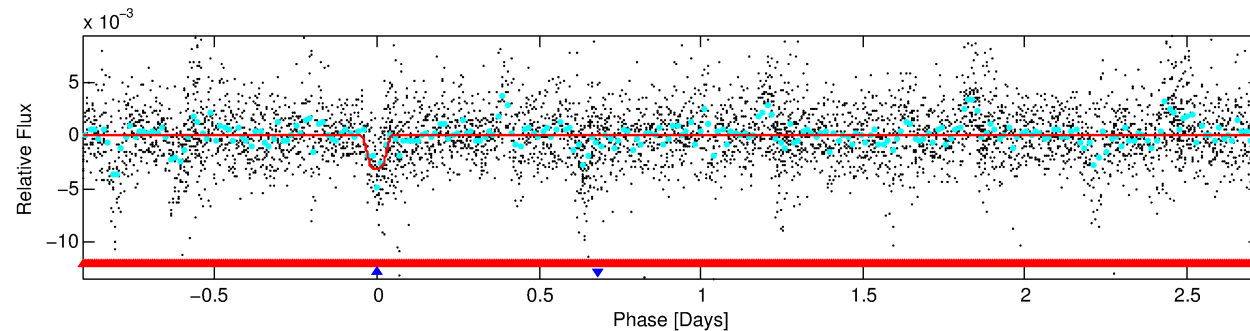
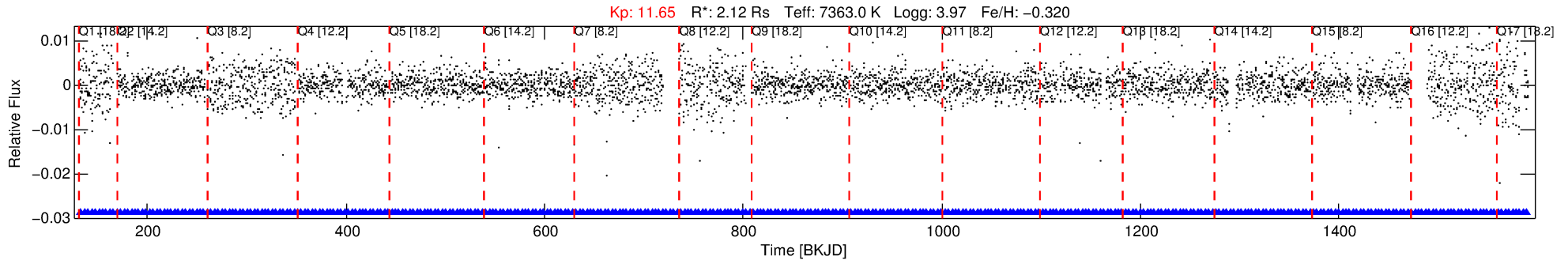
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009773094-02

No Significant Match Found

DV One-Page Summary

KIC: 9773094 Candidate: 2 of 2 Period: 3.640 d



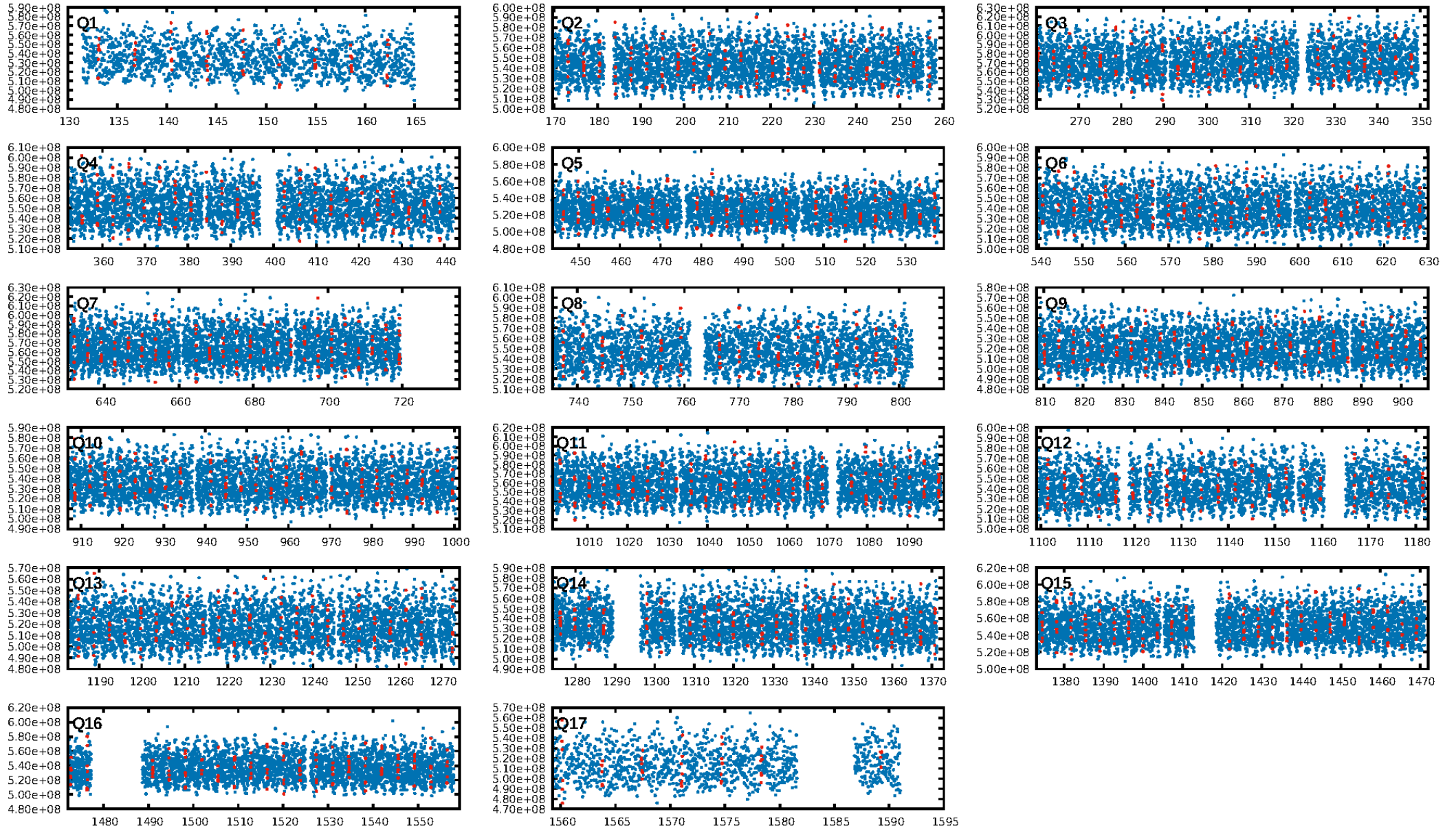
DV Fit Results:

Period = 3.64031 [0.00002] d
Epoch = 133.1334 [0.0025] BKJD
Rp/R* = 0.0528 [0.0420]
a/R* = 15.47 [72.19]
b = 0.51 [6.96]
Seff = 4128.61 [2075.33]
Teq = 2044 [257] K
Rp = 12.18 [10.52] Re
a = 0.0534 [0.0163] AU
Ag = 37.52 [62.49] [0.58σ]
Teffp = 7821 [3139] K [1.83σ]

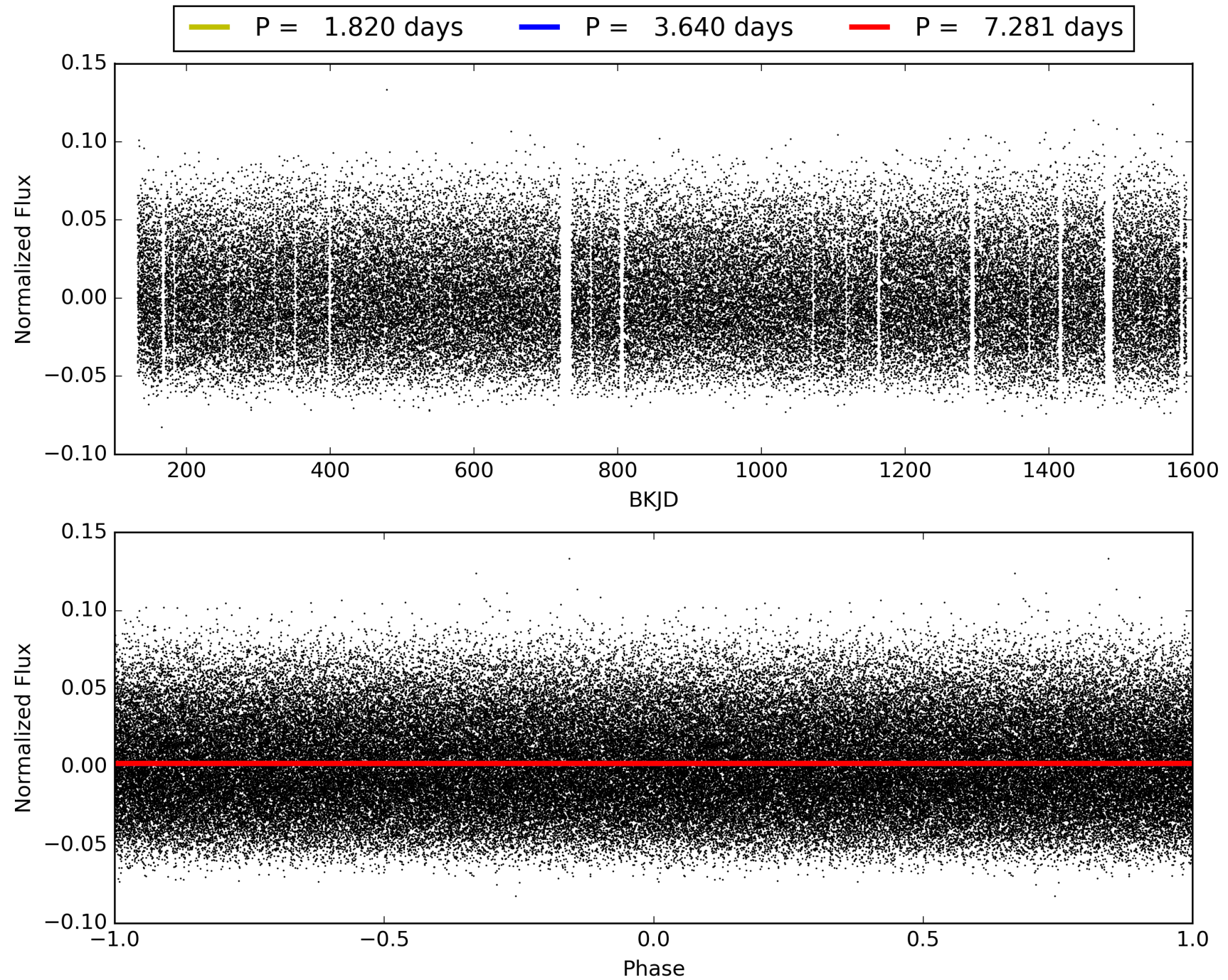
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.81σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 91.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [82/82]
GhostDiagnostic-chr: -1.69
Centroid-sig: 23.3%
Centroid-so: 0.405 arcsec [24.86σ]
OotOffset-rm: 0.055 arcsec [0.75σ]
KicOffset-rm: 0.141 arcsec [0.82σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.41 [7/17]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 009773094-02, PDC Light Curves

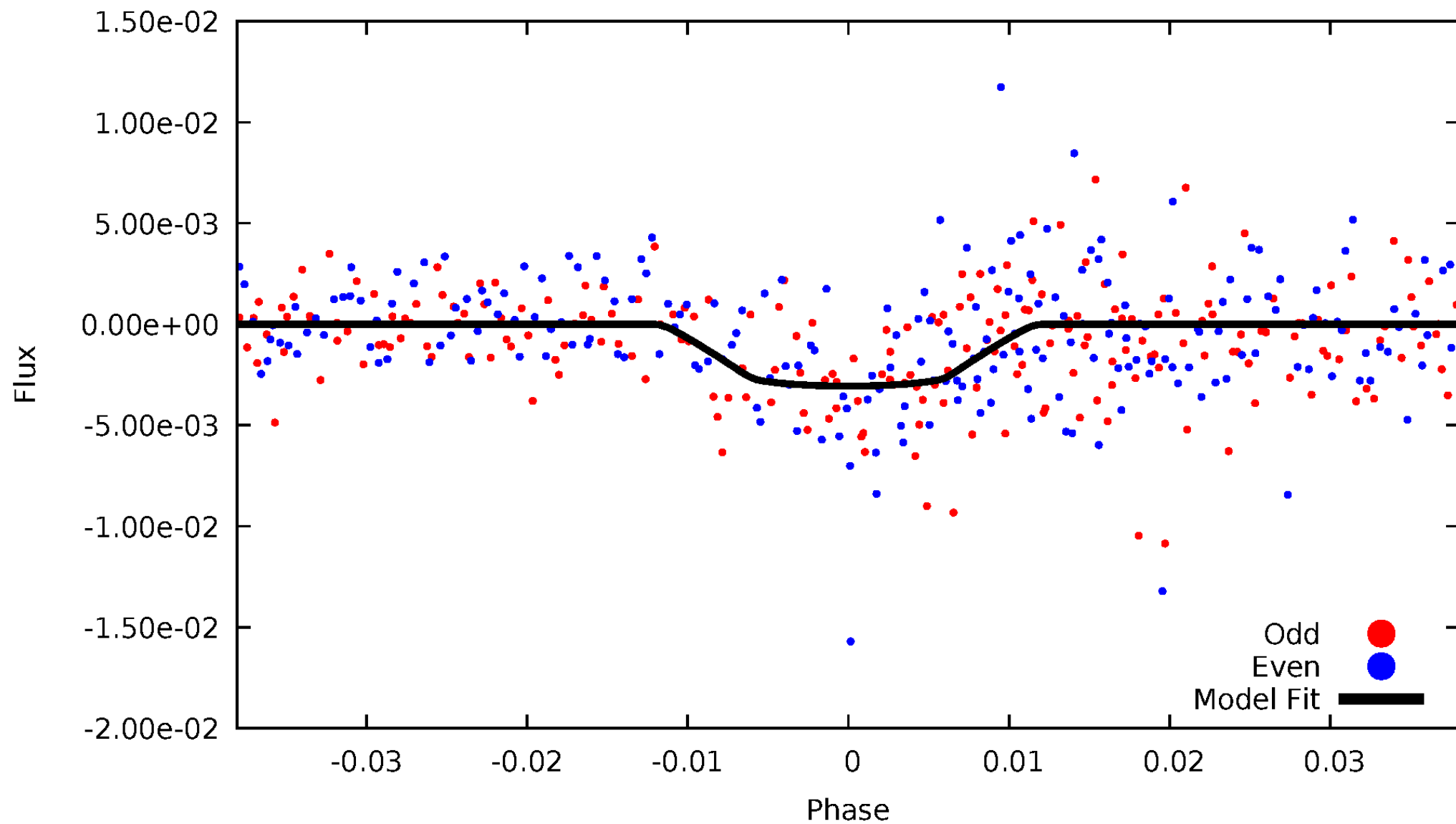


TCE 009773094-02



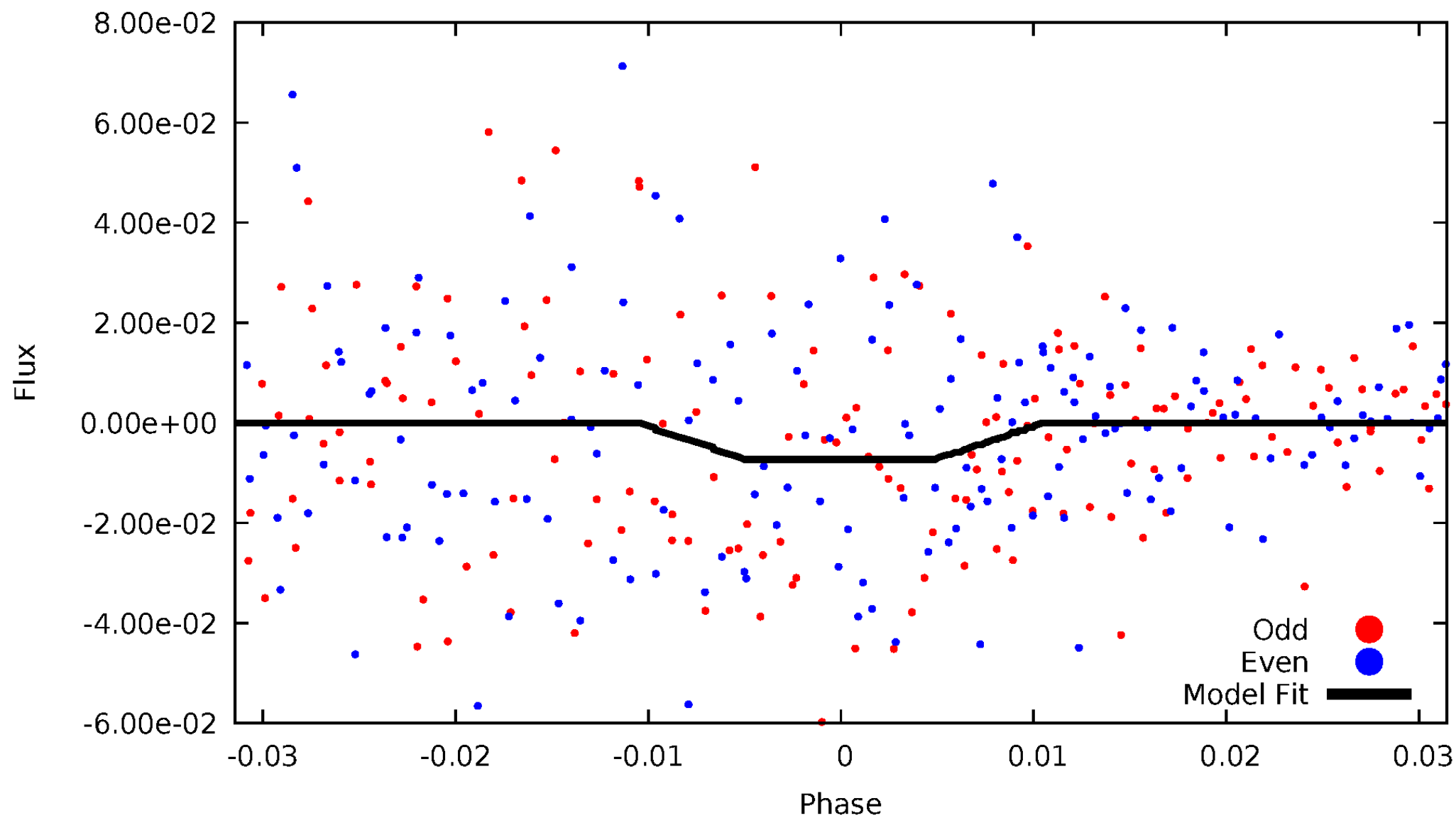
DV Odd/Even

TCE 009773094-02



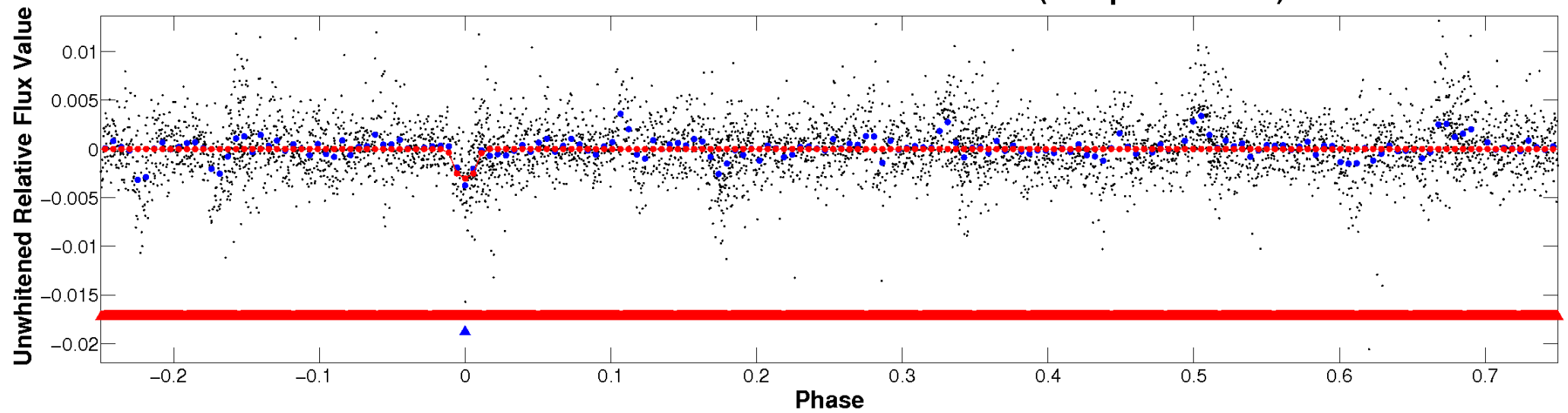
ALT Odd/Even

TCE 009773094-02

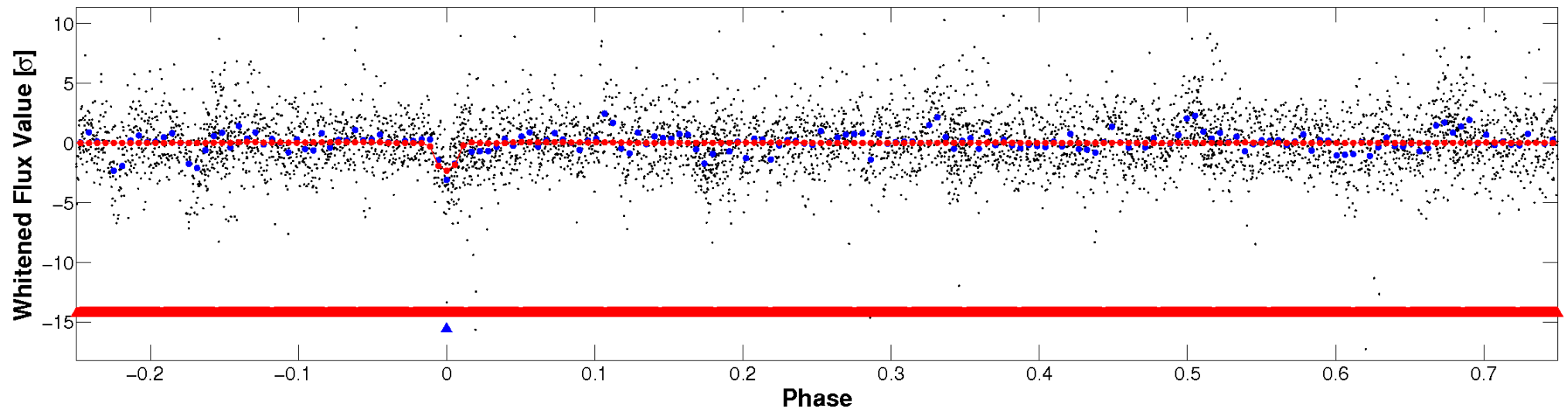


Non-Whitened Vs. Whitened Light Curve

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

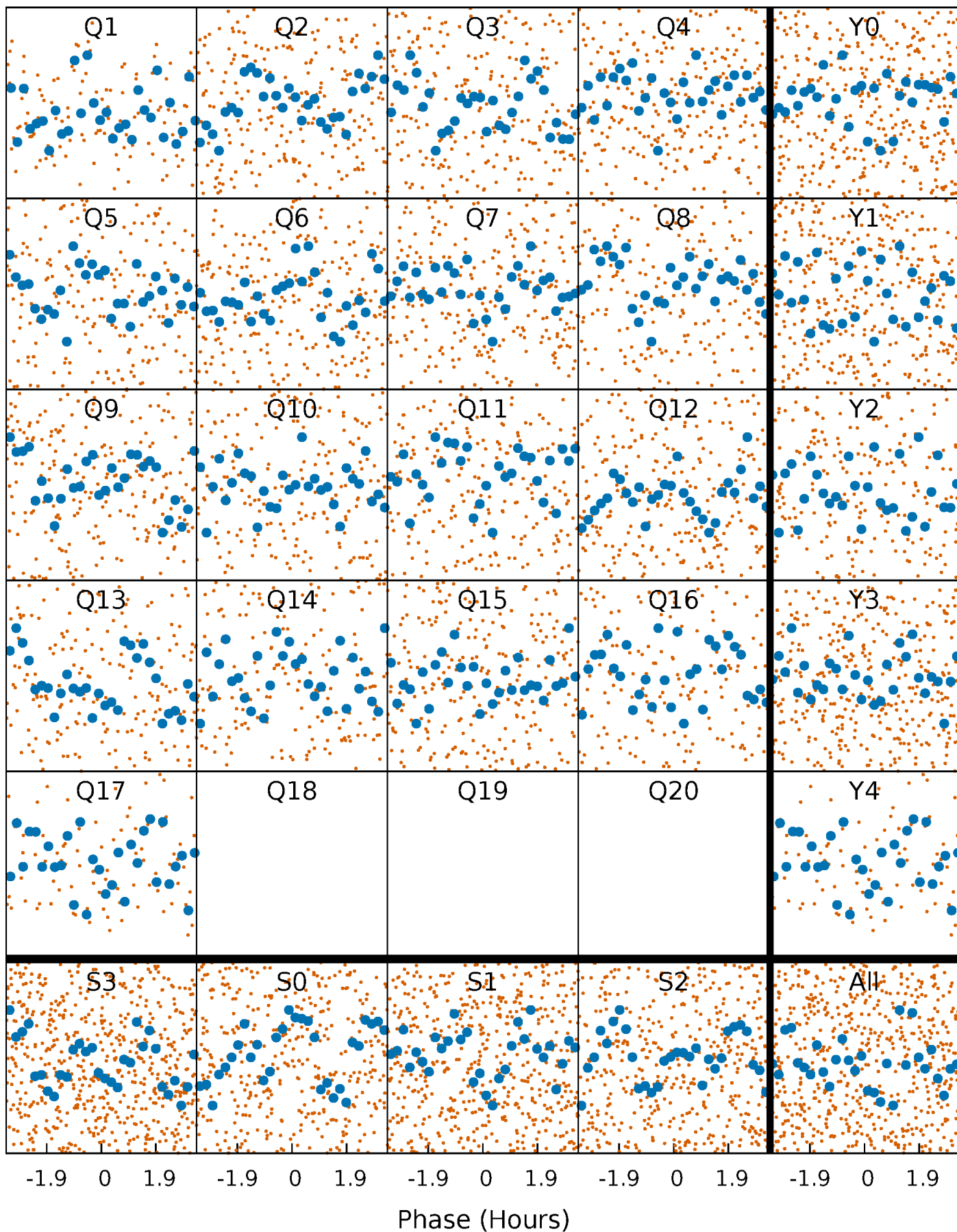


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



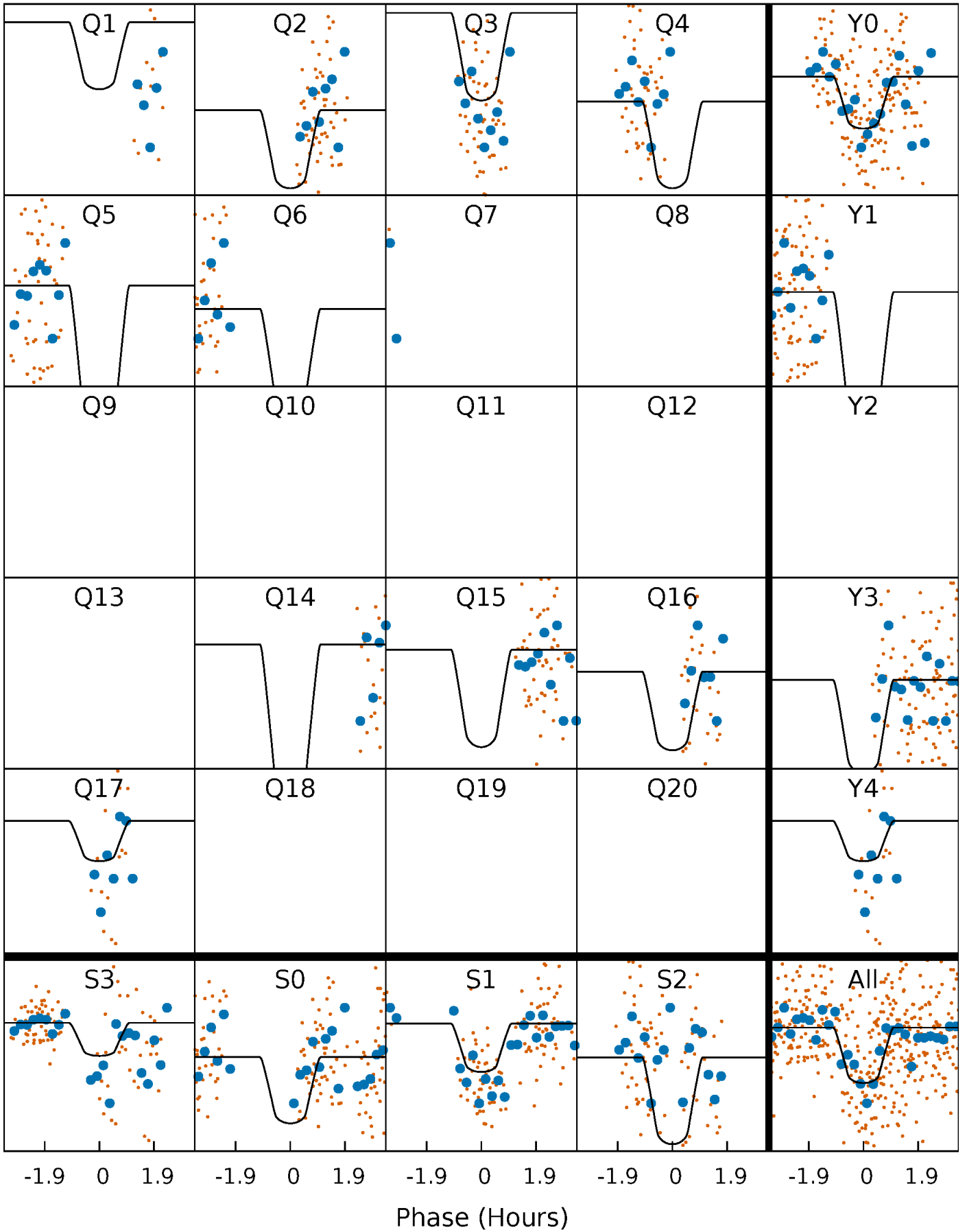
PDC Quarter-Phased Transit Curves

TCE 009773094-02 P= 3.640305 Days $T_0=133.133407$ (BKJD)



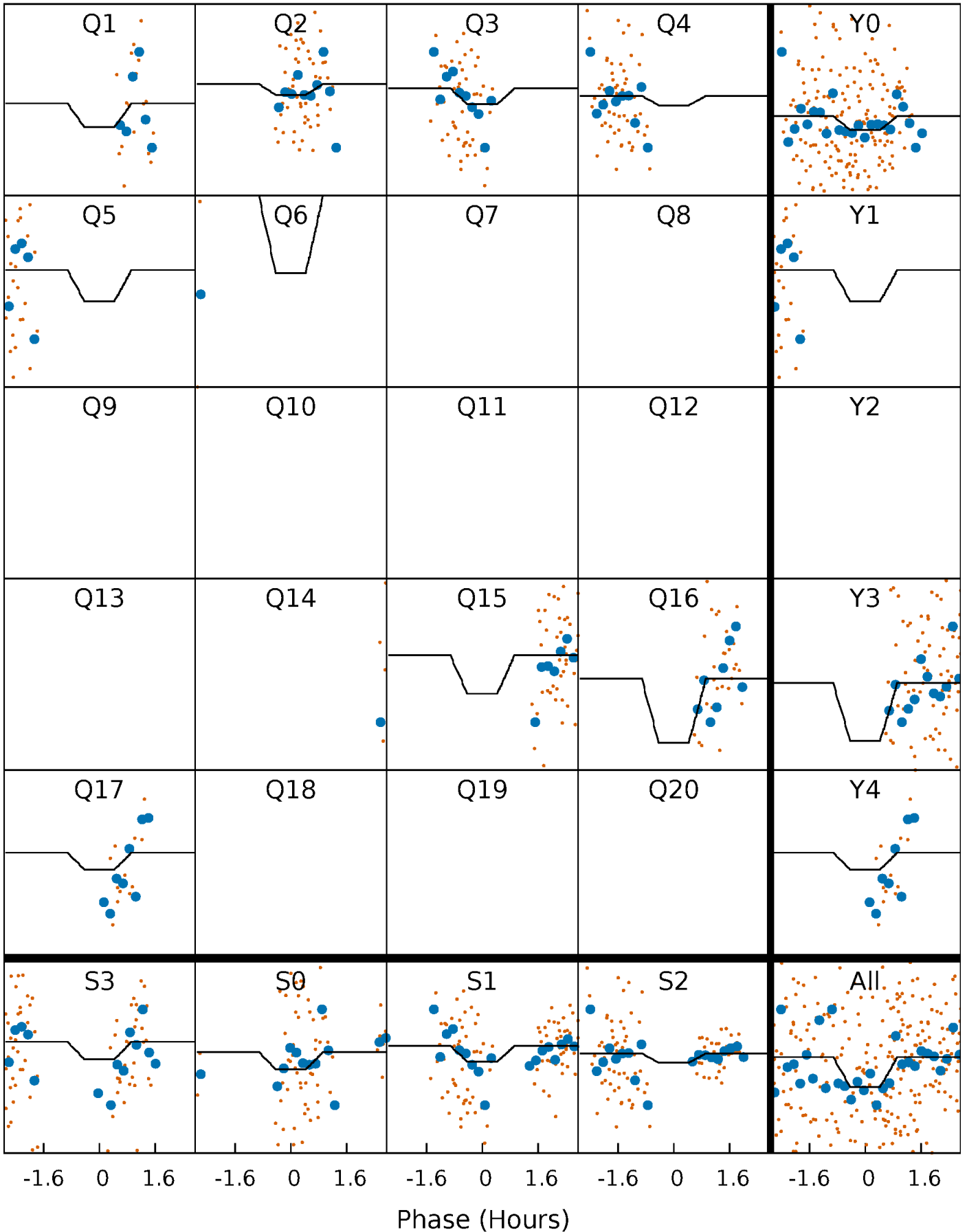
DV Quarter-Phased Transit Curves

TCE 009773094-02 $P = 3.640305$ Days $T_0 = 133.133407$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

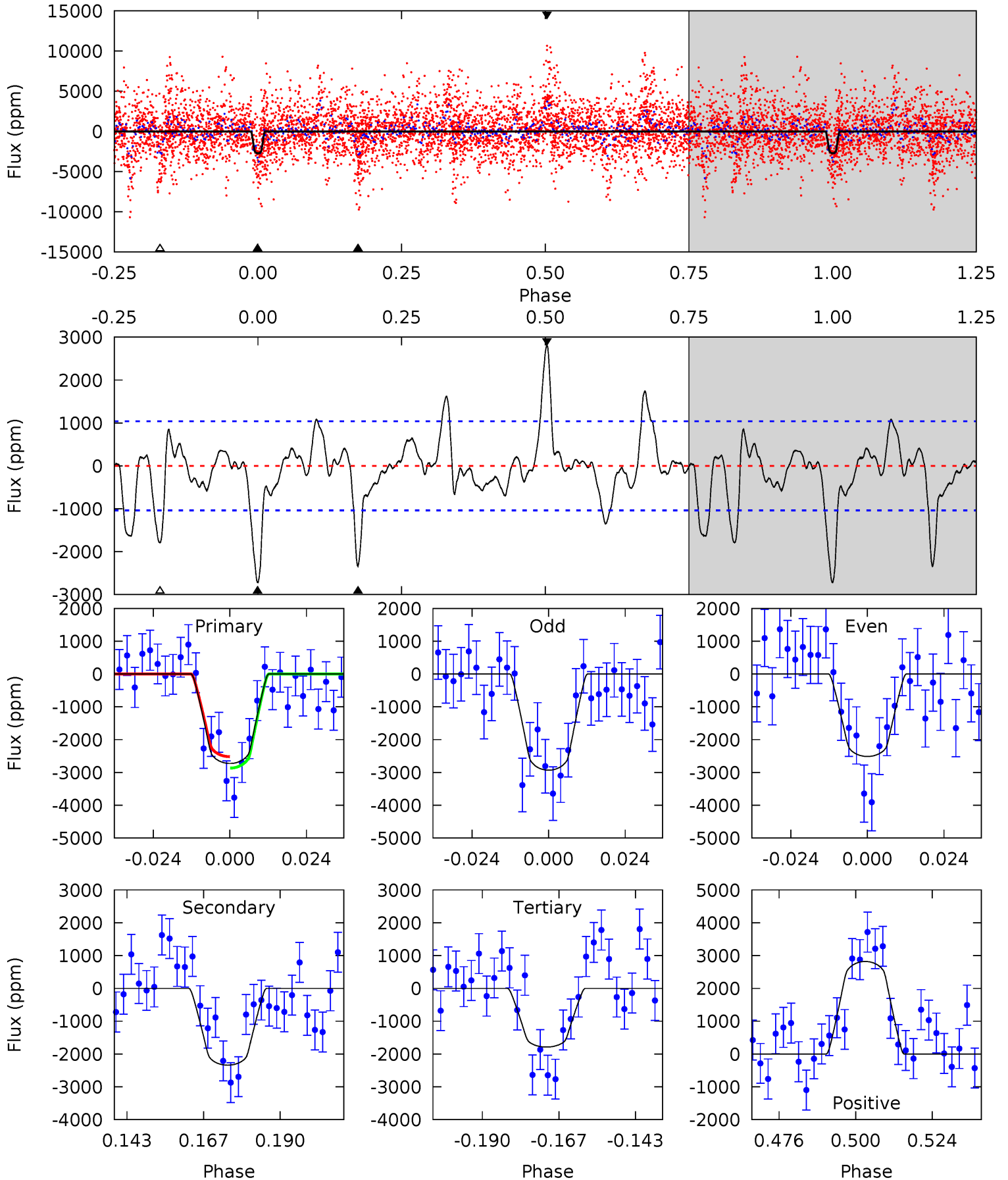
TCE 009773094-02 $P = 3.640196$ Days $T_0 = 133.164257$ (BKJD)



DV Model-Shift Uniqueness Test

009773094-02, P = 3.640305 Days, E = 129.493102 Days

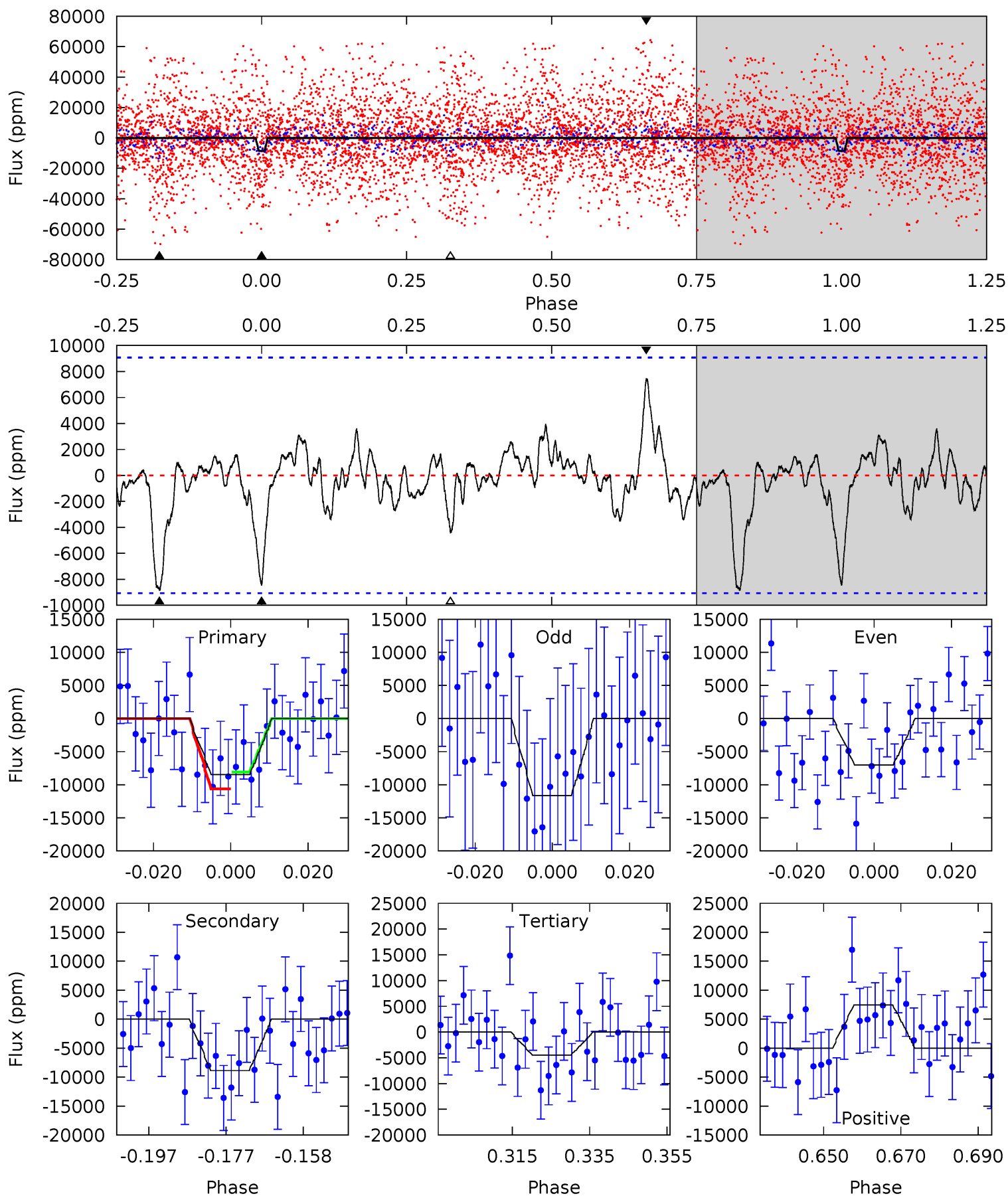
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	10.9	8.36	13.2	4.86	2.26	3.16	4.39	-0.43	2.58	-2.24	0.99	0.91	0.51	0.79



Alt Model-Shift Uniqueness Test

009773094-02, P = 3.640196 Days, E = 129.524061 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.57	4.79	2.41	4.04	4.89	2.33	0.92	2.17	0.53	2.38	0.75	1.26	0.59	0.46	0.69



Stellar Parameters For KIC 009773094

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7363^{+230}_{-307}	$3.973^{+0.273}_{-0.147}$	$-0.320^{+0.250}_{-0.350}$	$2.115^{+0.512}_{-0.704}$	$1.533^{+0.204}_{-0.306}$	$0.228^{+0.430}_{-0.100}$
	+3%/-4%	+7%/-4%	+78%/-109%	+24%/-33%	+13%/-20%	+189%/-44%
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 009773094-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2341 ± 214	$11.88^{+10.17}_{-7.24}$	2812^{+223}_{-259}	6806^{+6013}_{-1682}	26^{+150}_{-18}
Alt.	-8869 ± 1852	$18.92^{+9.93}_{-8.75}$	2826^{+227}_{-240}	7752^{+4110}_{-1542}	39^{+93}_{-23}

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

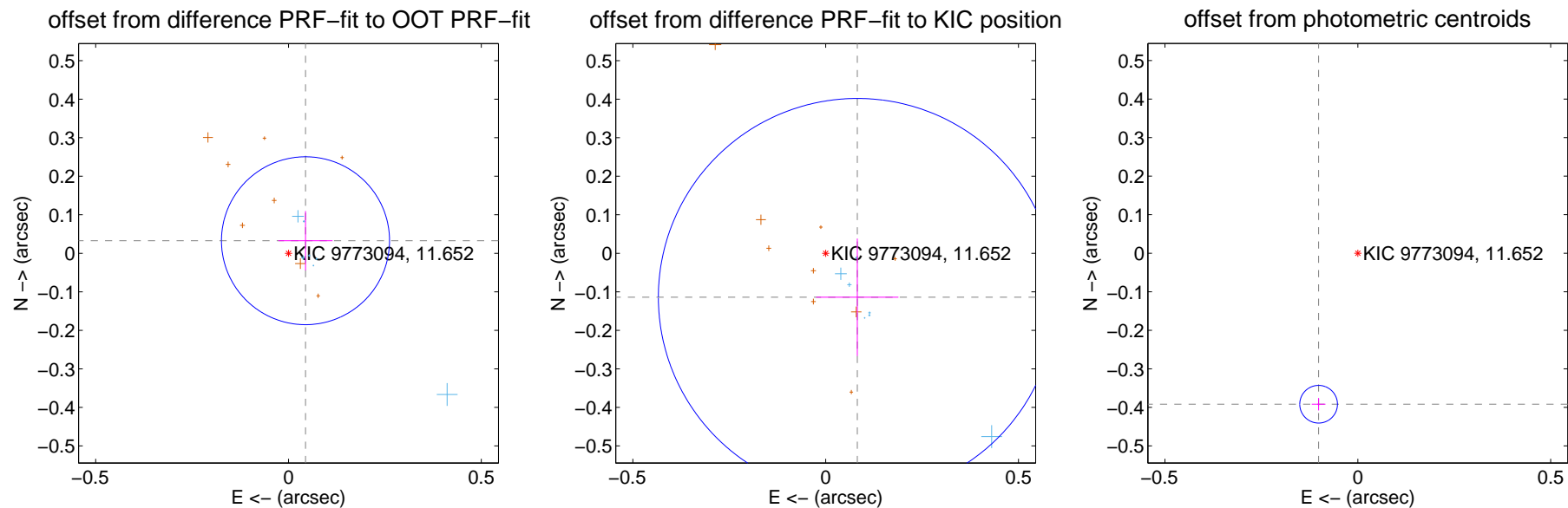
DV Centroid Data

Supplemental centroid analysis for 009773094-02. **Kepler magnitude: 11.65.** Transit SNR 20.78

There are 7 quarters with good PRF difference image offsets

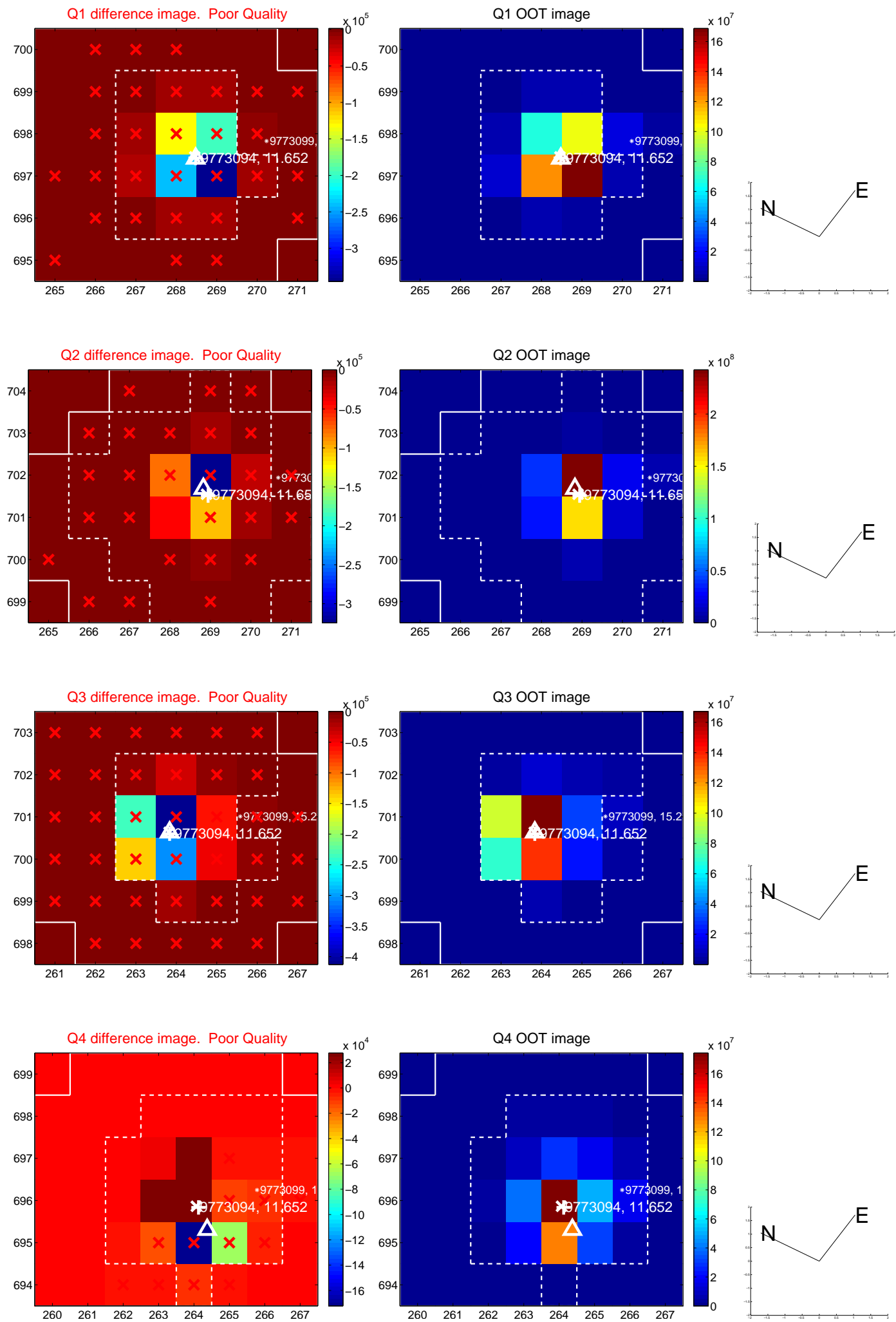
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.055 ± 0.073	0.75	-0.044 ± 0.070	0.033 ± 0.077
PRF-fit source offset from KIC position	0.141 ± 0.172	0.82	-0.082 ± 0.107	-0.114 ± 0.152
photometric centroid source offset	0.40 ± 0.02	24.86	0.10 ± 0.02	-0.39 ± 0.02

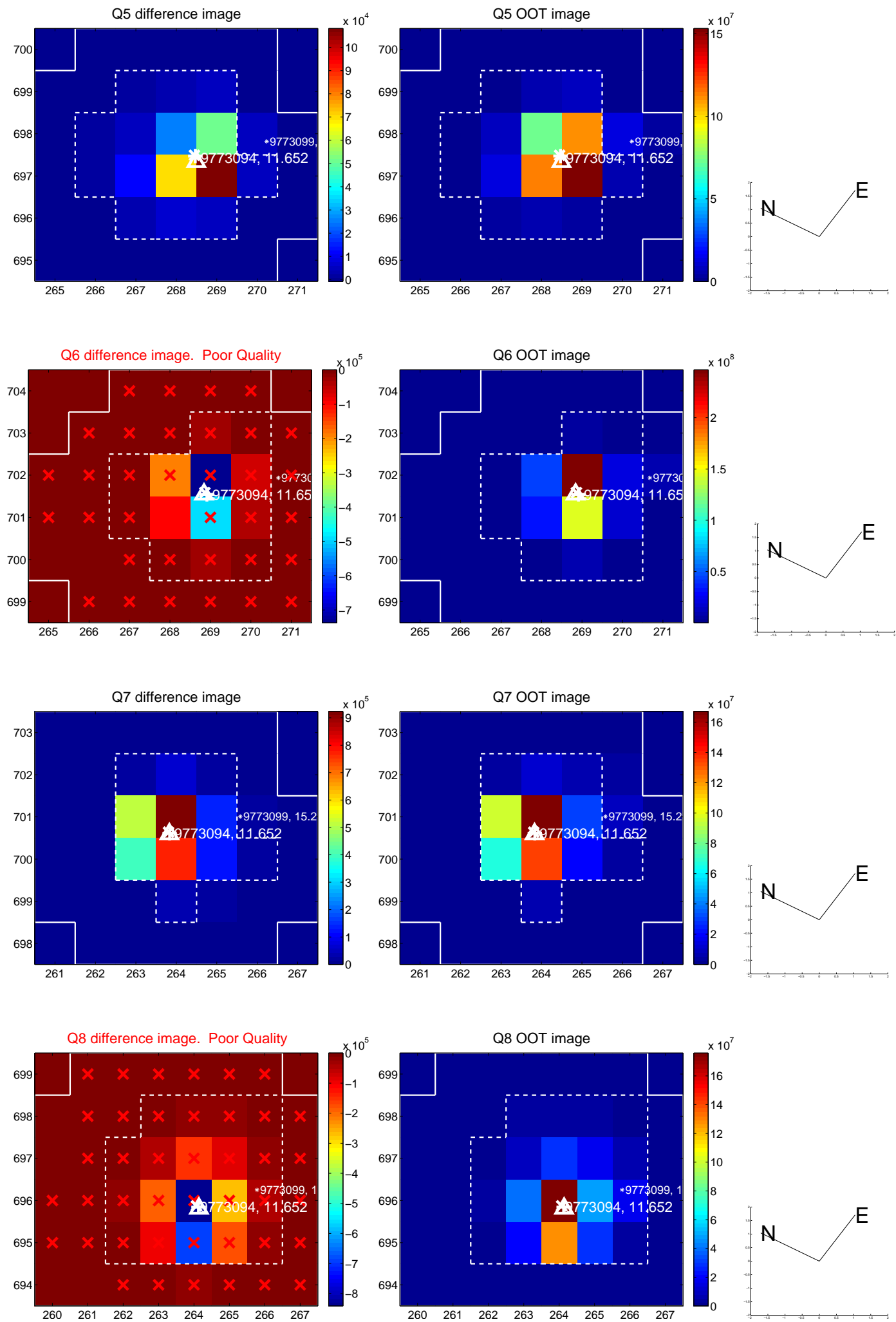


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

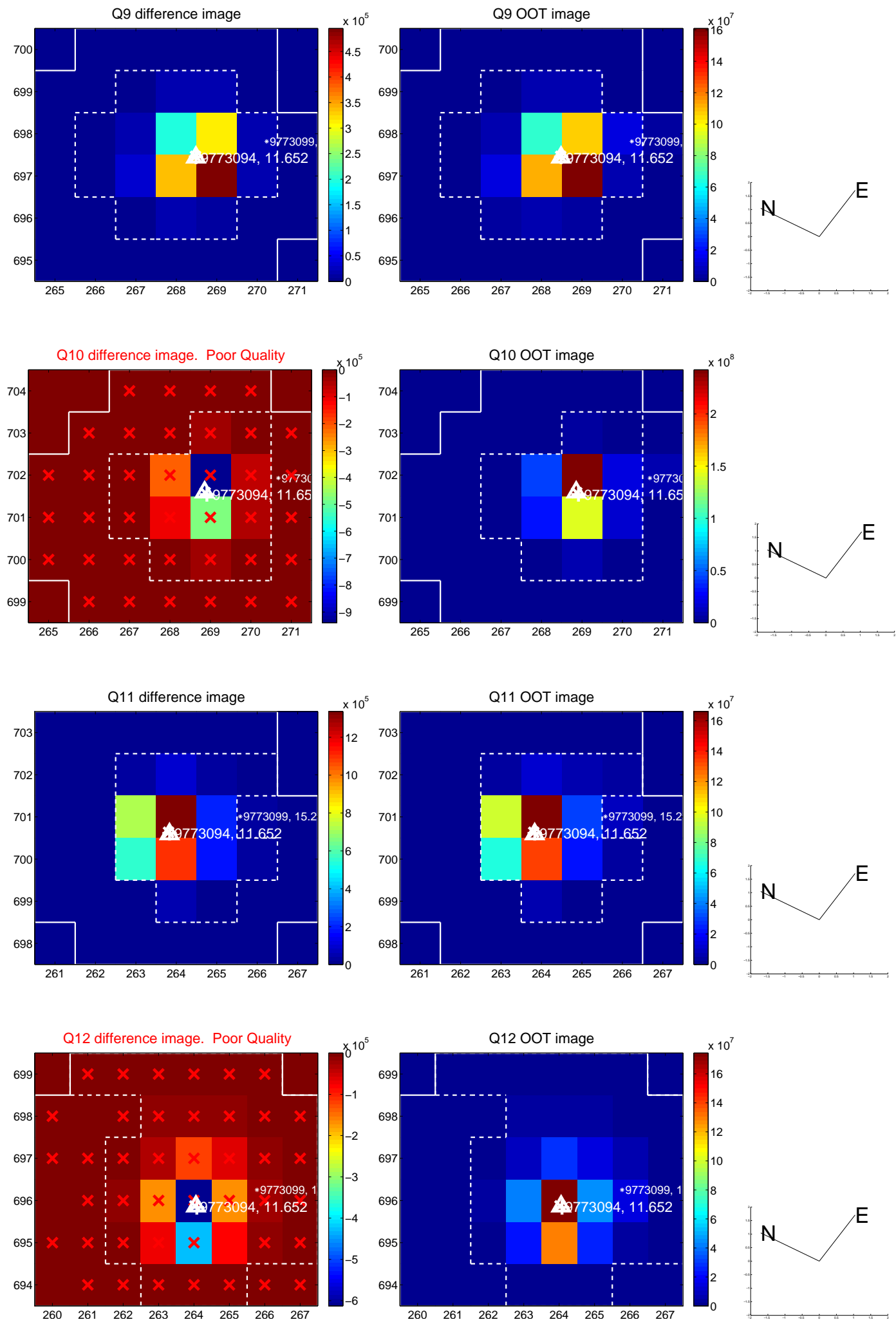
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



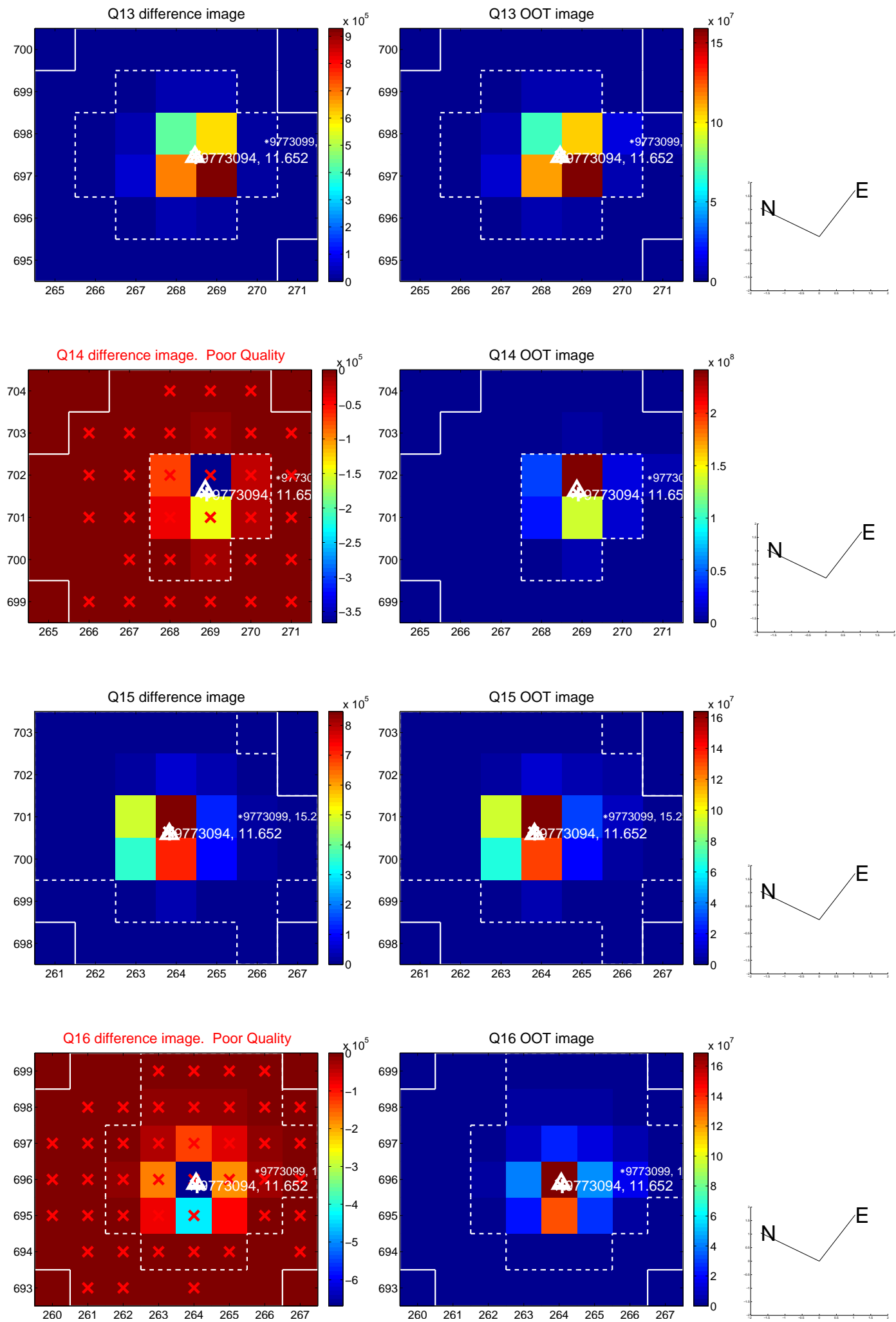
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



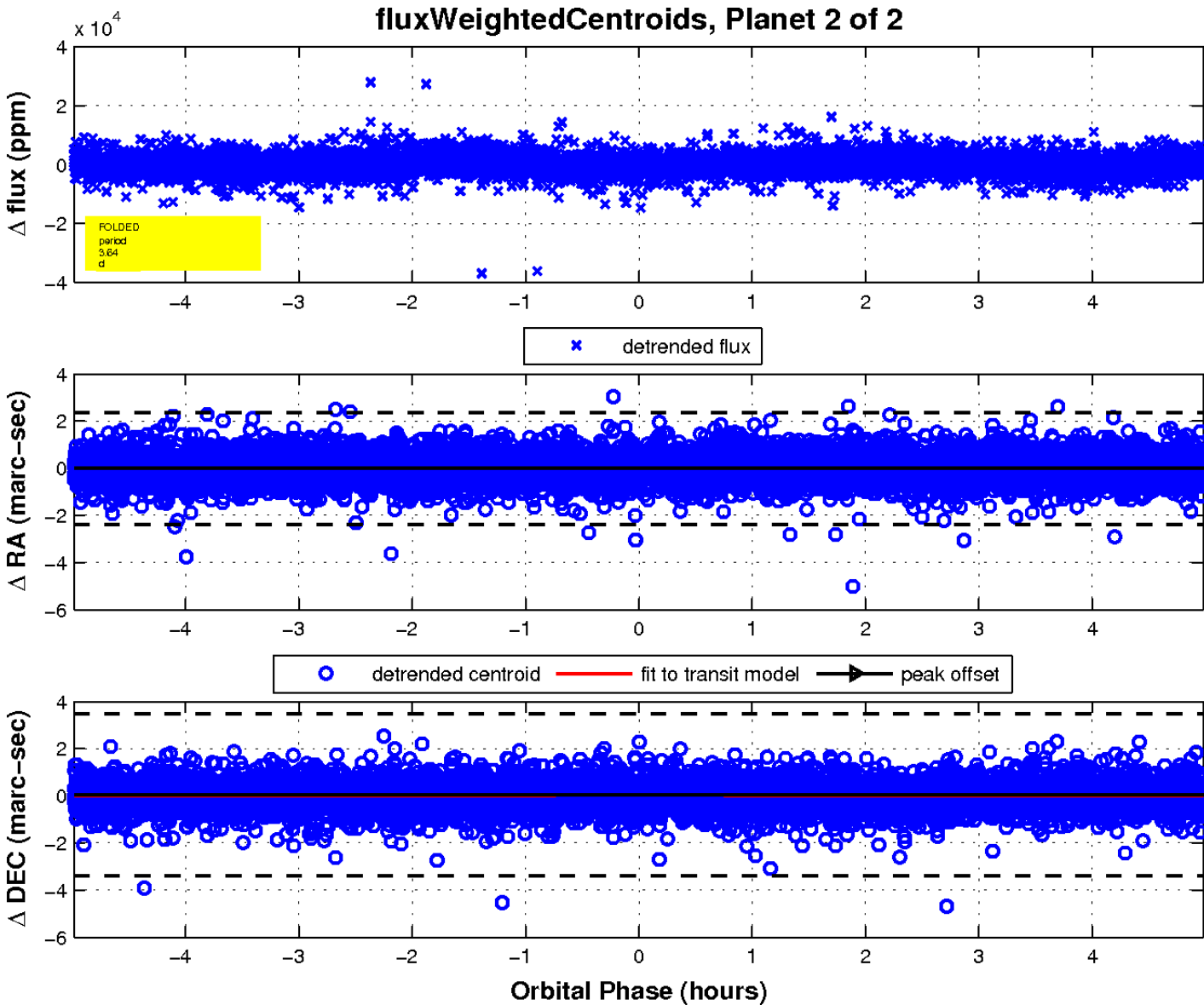
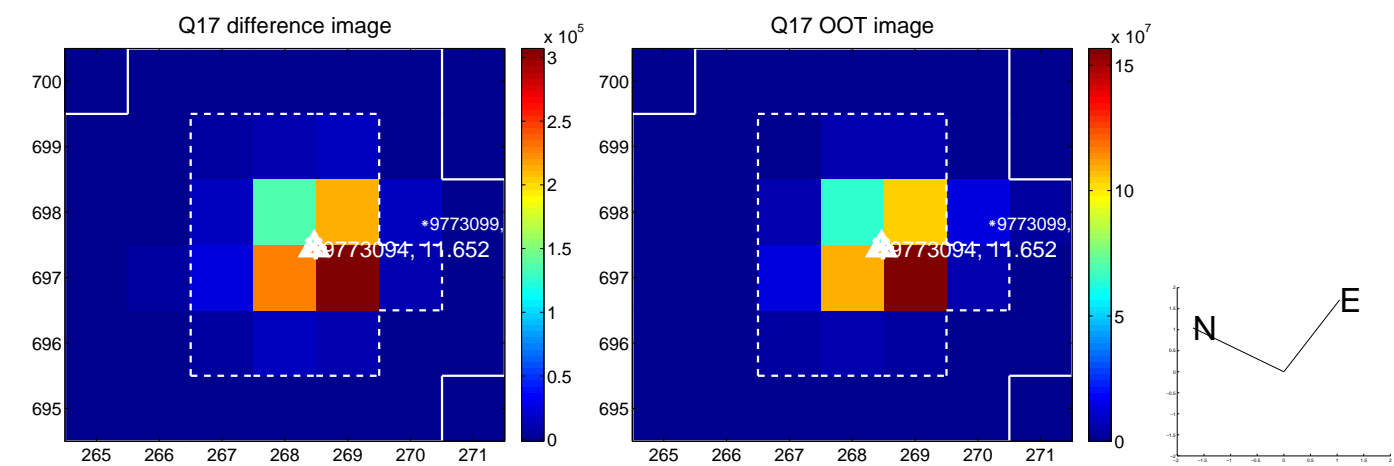
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

