

KIC 001870849

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})
001870849-01	OBS	No	0.531227	131.789187	77.8	1.345	19.2	12.6	1.89	6835	1.79	32167.89
001870849-02	OBS	No	0.531221	131.524867	101.5	3.817	21.1	26.6	1.89	6835	2.04	32168.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001870849-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
001870849-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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

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

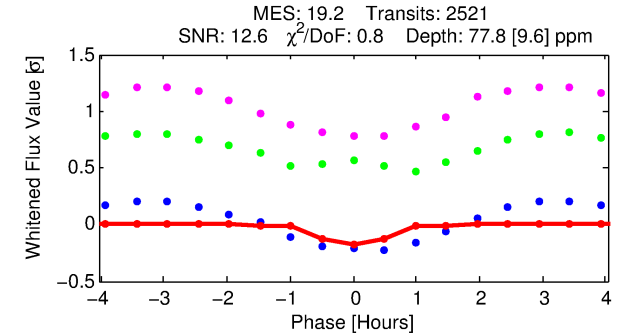
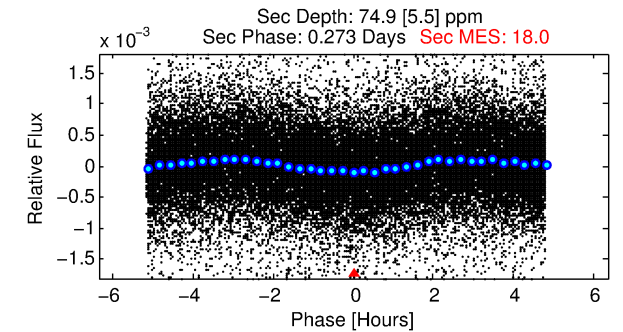
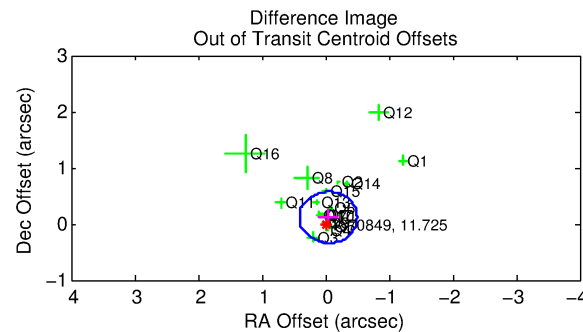
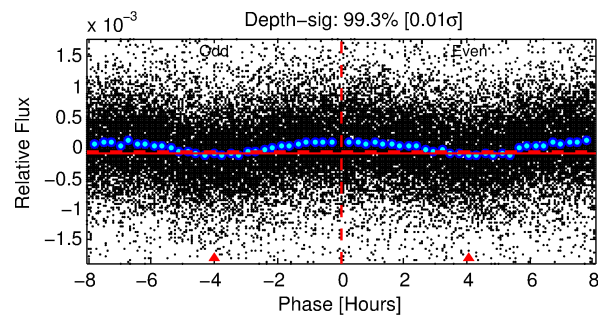
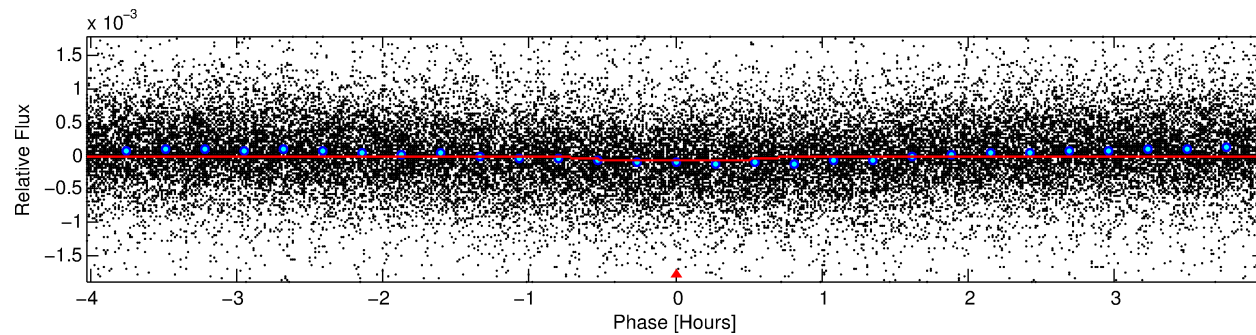
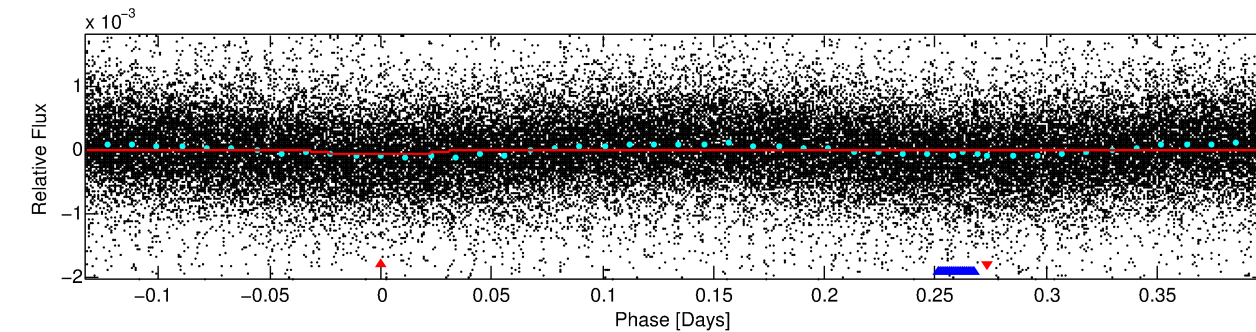
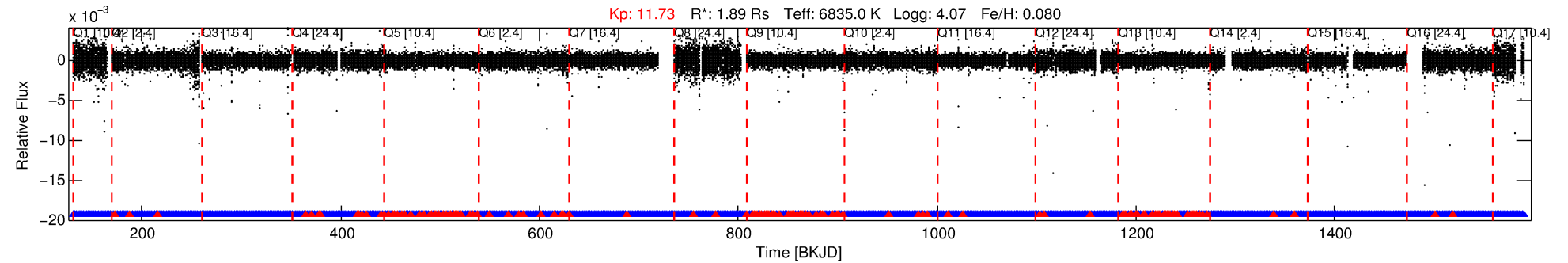
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001870849-01

No Significant Match Found

DV One-Page Summary

KIC: 1870849 Candidate: 1 of 2 Period: 0.531 d



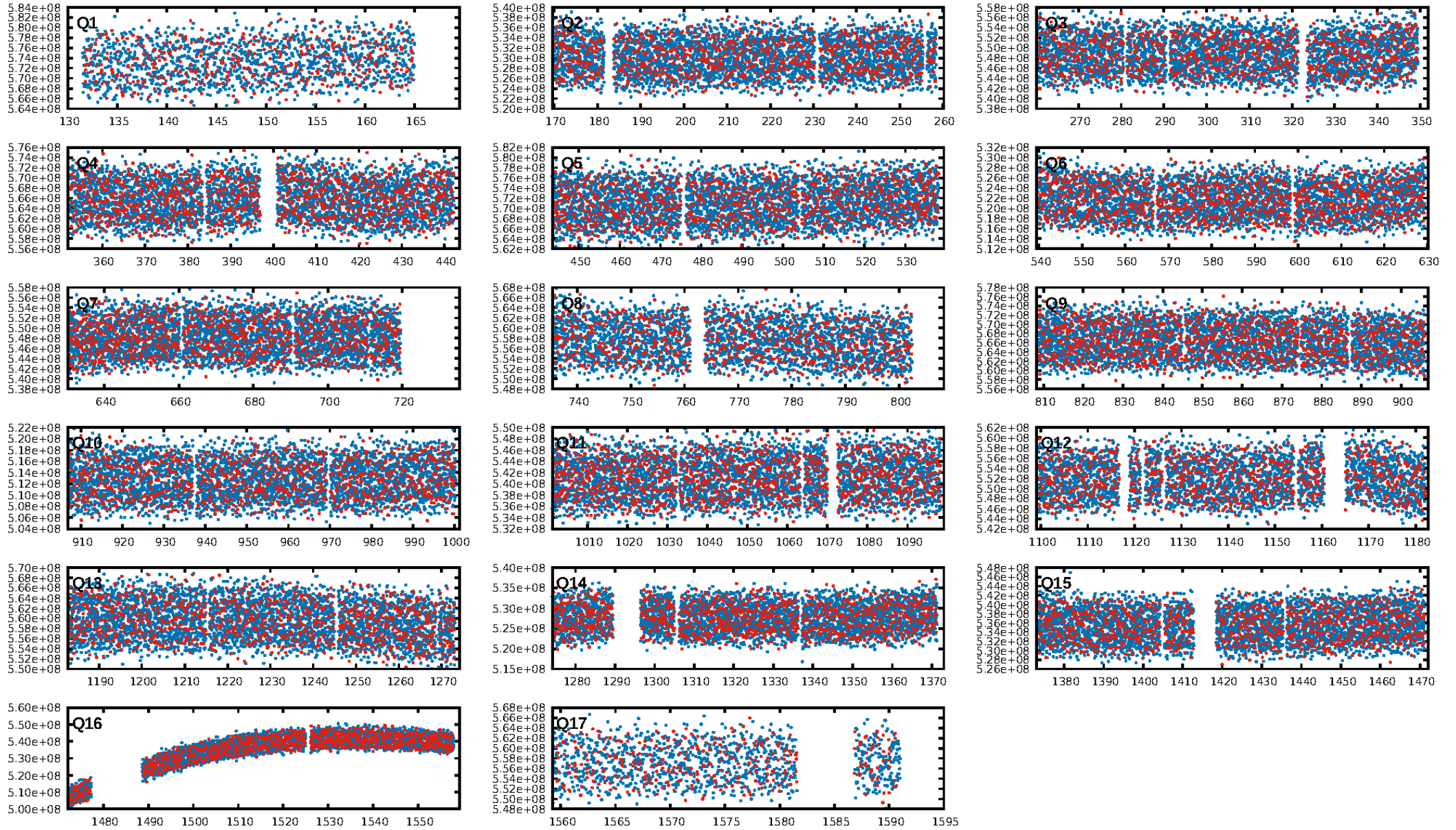
DV Fit Results:

Period = 0.53123 [0.00001] d
Epoch = 131.7892 [0.0019] BKJD
 R_p/R^* = 0.0087 [0.0026]
 a/R^* = 2.36 [3.31]
 b = 0.69 [1.30]
 S_{eff} = 32167.89 [12649.39]
 T_{eq} = 3415 [336] K
 R_p = 1.79 [0.75] R_e
 a = 0.0148 [0.0036] AU
 A_g = 2.80 [1.98] [0.91 σ]
 T_{eff} = 6829 [1093] K [2.99 σ]

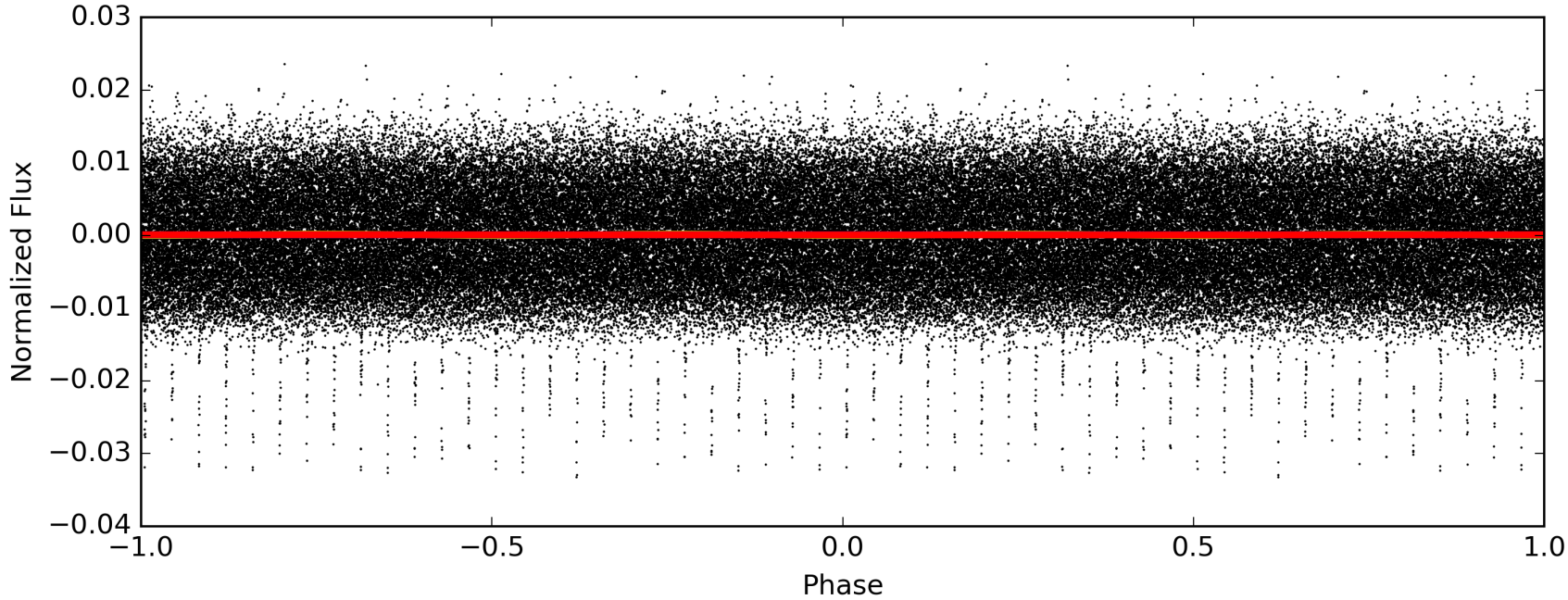
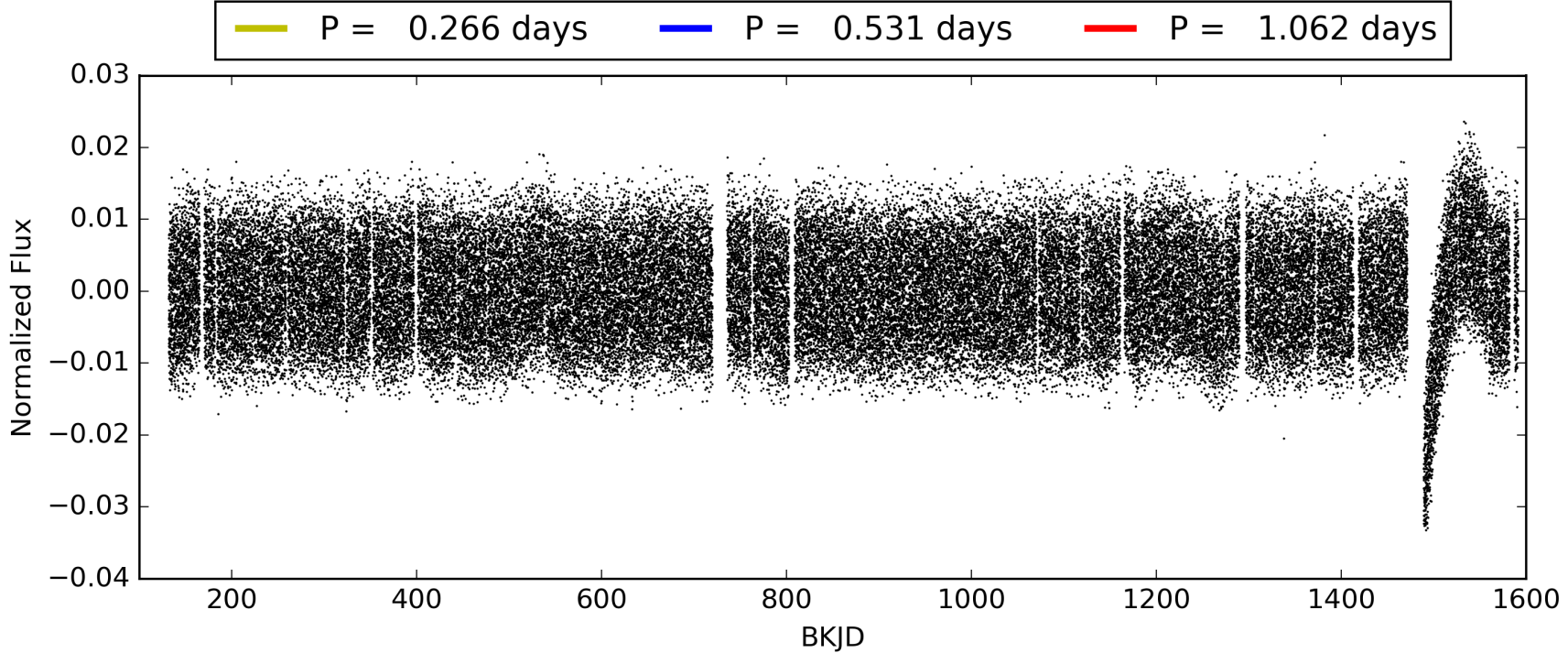
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.94 [2260/2408]
GhostDiagnostic-chr: 1.518
Centroid-sig: 0.9%
Centroid-so: 0.324 arcsec [1.52 σ]
OotOffset-rm: 0.123 arcsec [0.81 σ]
KicOffset-rm: 0.084 arcsec [0.54 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.71 [12/17]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 001870849-01, PDC Light Curves

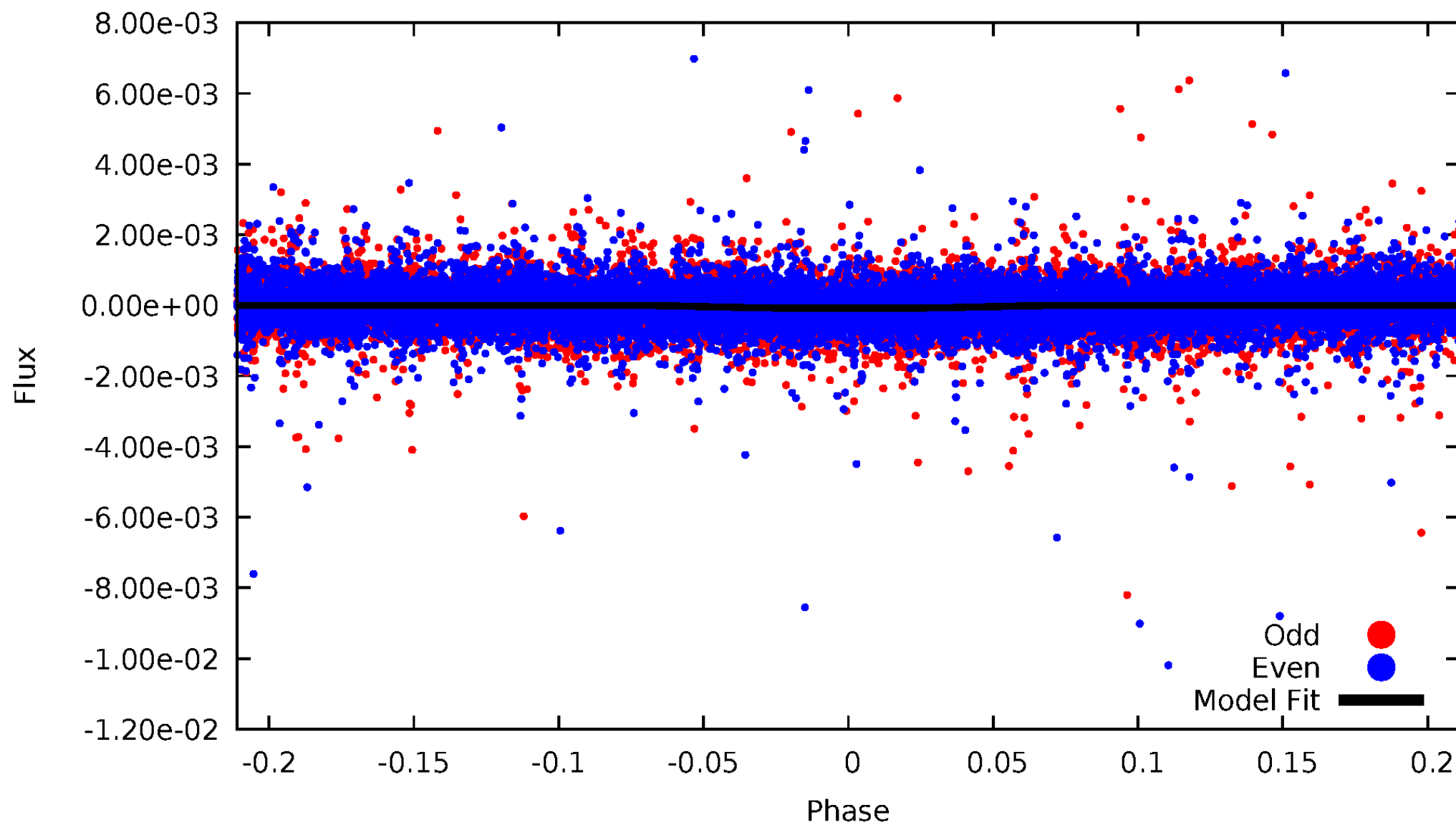


TCE 001870849-01



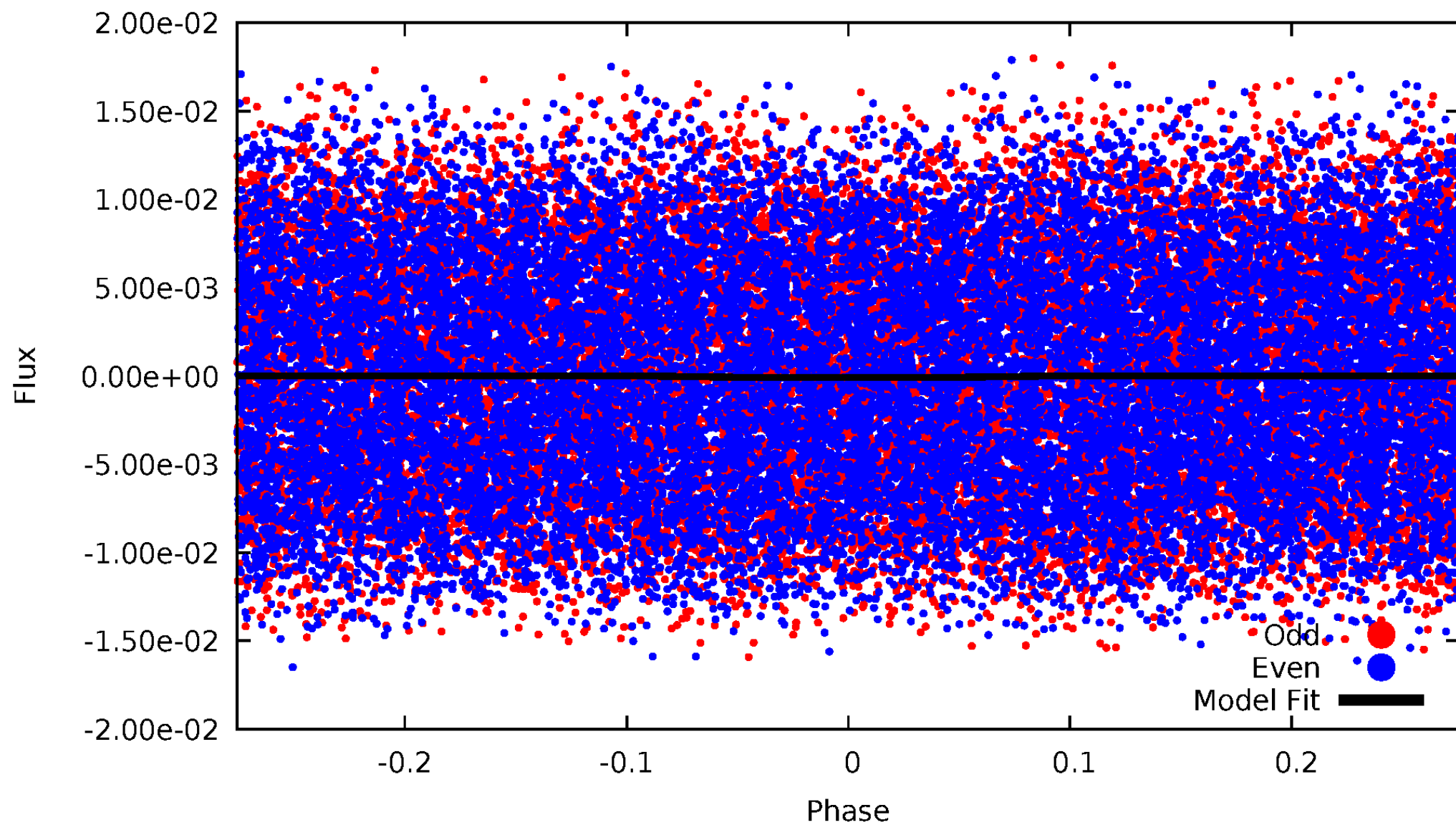
DV Odd/Even

TCE 001870849-01



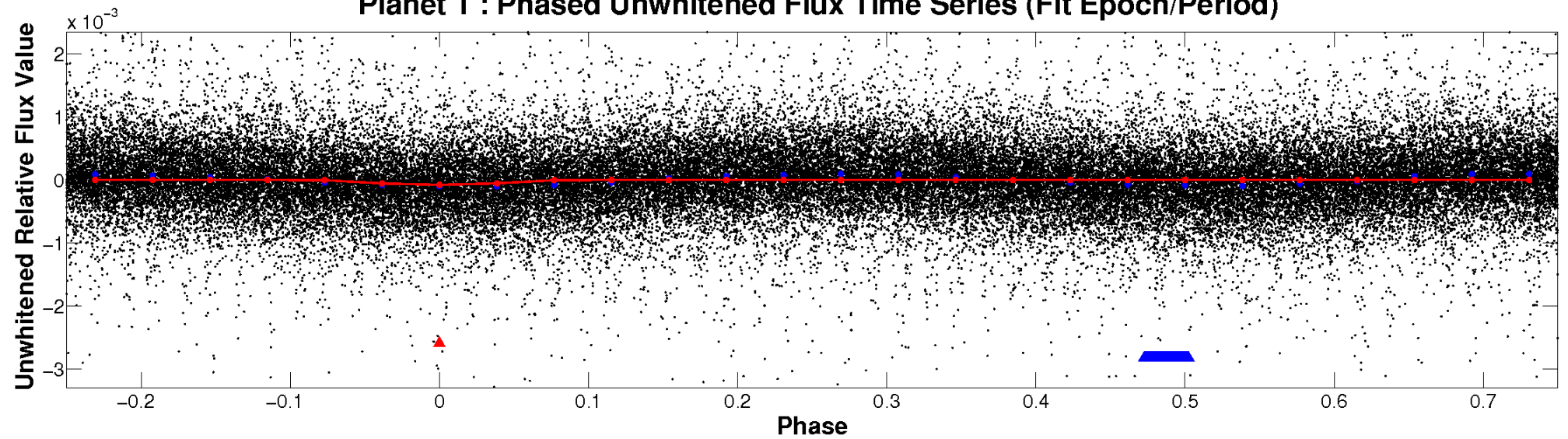
ALT Odd/Even

TCE 001870849-01

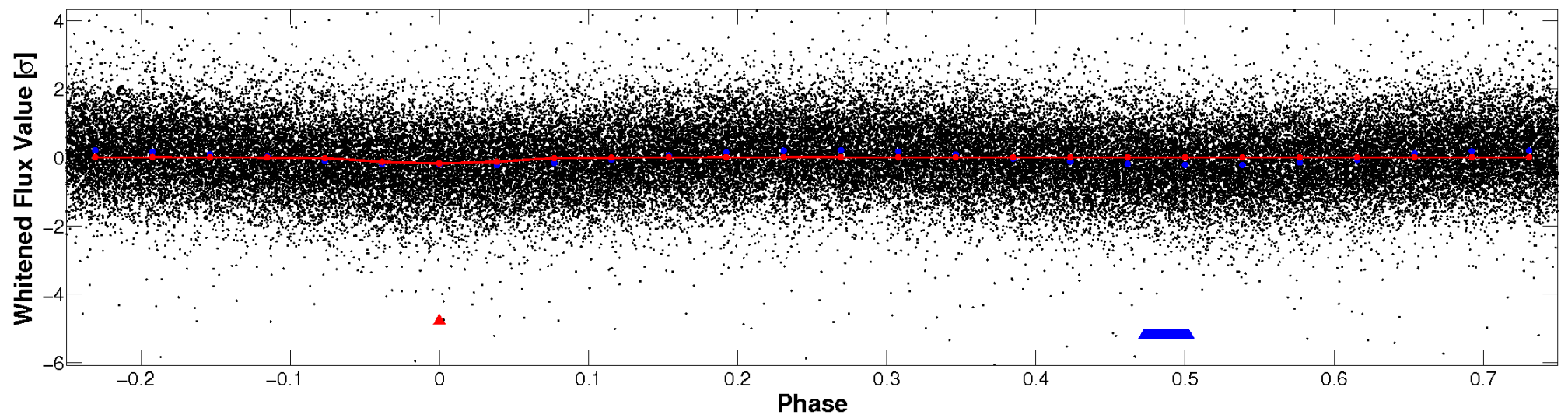


Non-Whitened Vs. Whitened Light Curve

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

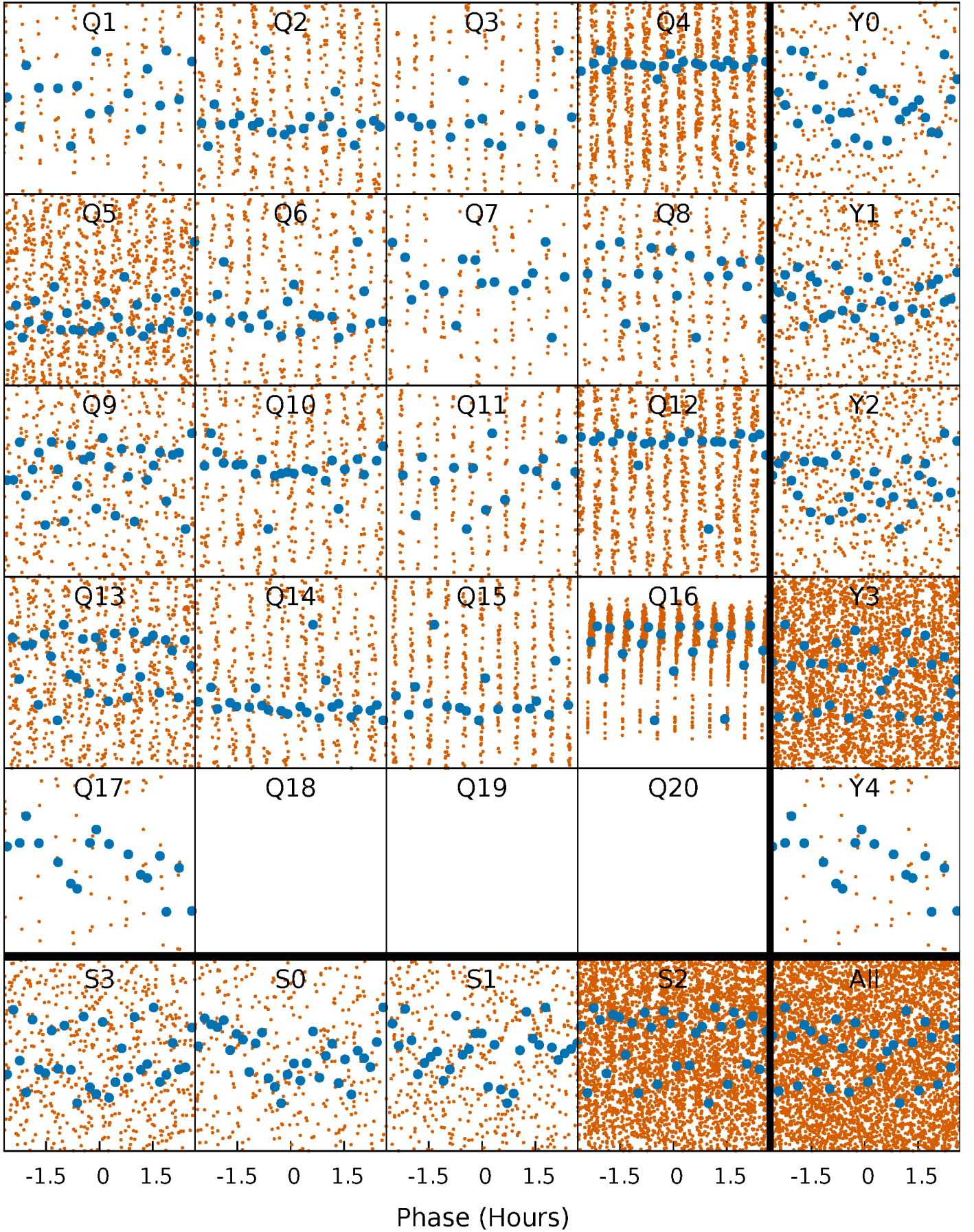


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



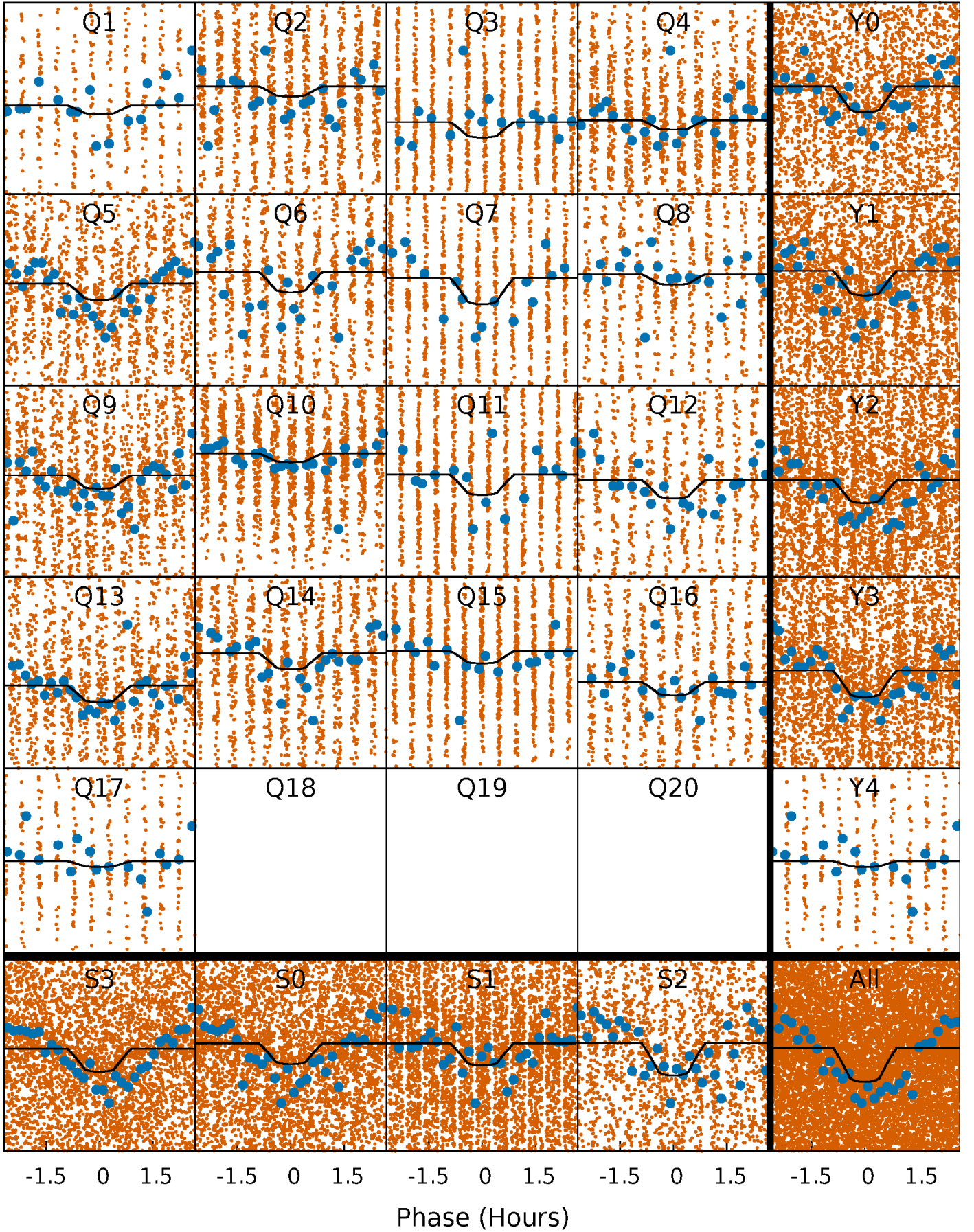
PDC Quarter-Phased Transit Curves

TCE 001870849-01 P= 0.531227 Days $T_0=131.789186$ (BKJD)



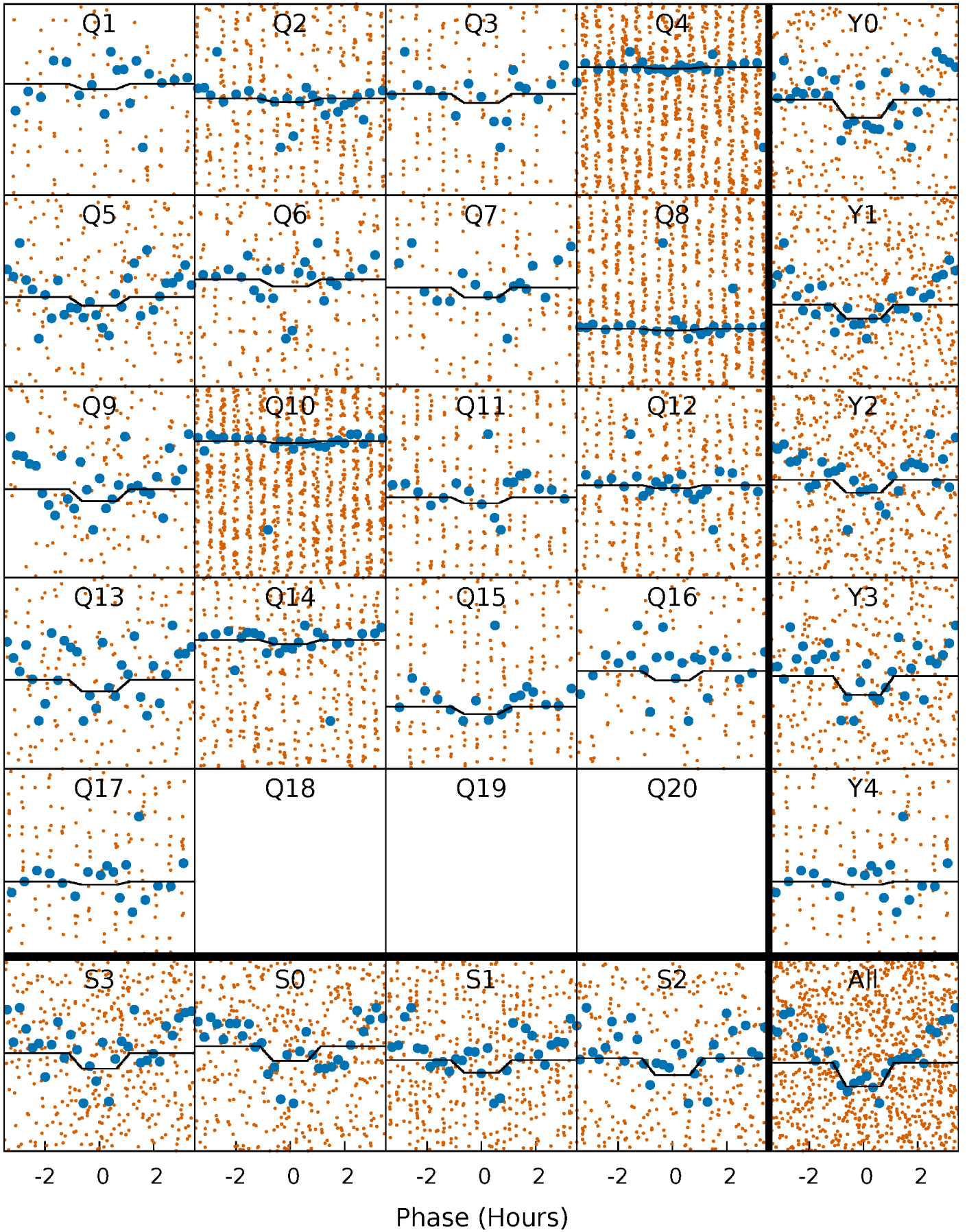
DV Quarter-Phased Transit Curves

TCE 001870849-01 P= 0.531227 Days $T_0=131.789186$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

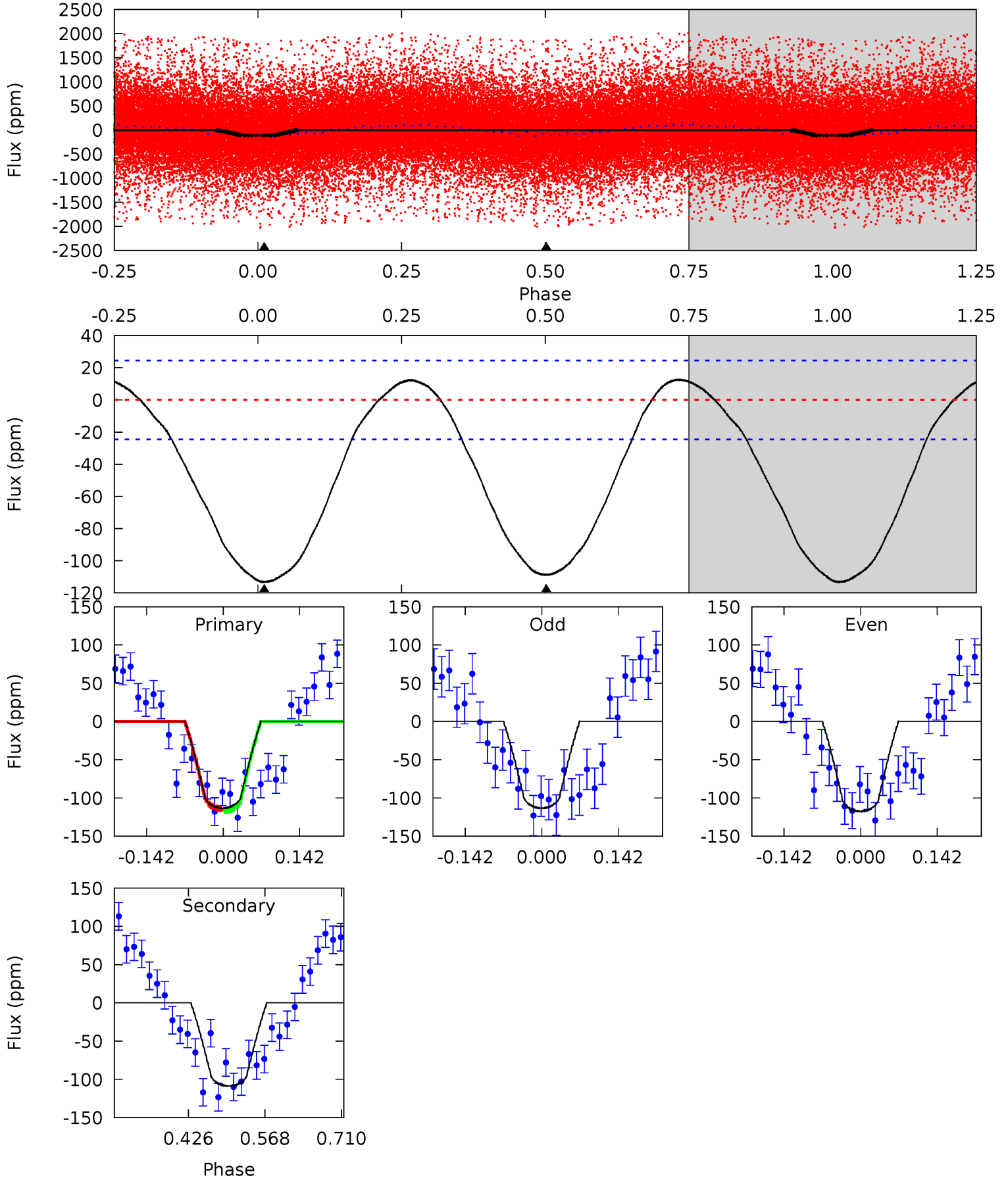
TCE 001870849-01 P= 0.531229 Days $T_0=131.789058$ (BKJD)



DV Model-Shift Uniqueness Test

001870849-01, P = 0.531227 Days, E = 131.257959 Days

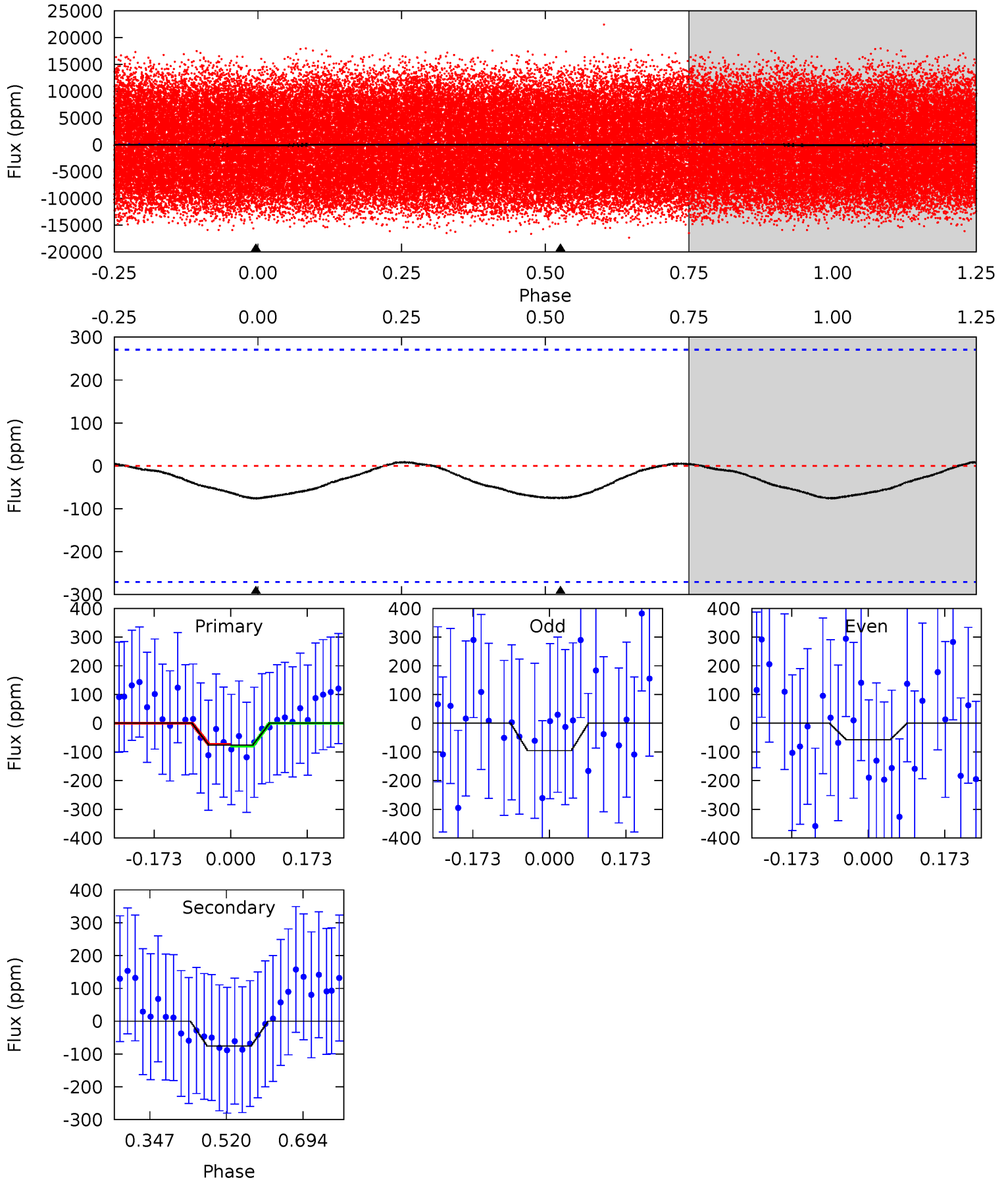
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.7	19.9	0	0	4.49	1.47	2.49	20.7	20.7	19.9	19.9	0.39	0.98	0.10	0.26



Alt Model-Shift Uniqueness Test

001870849-01, P = 0.531229 Days, E = 131.257829 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.26	1.24	0	0	4.45	1.36	0.14	1.26	1.26	1.24	1.24	0.31	7.66	0.11	0.05



Stellar Parameters For KIC 001870849

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6835^{+189}_{-307}	$4.065^{+0.190}_{-0.190}$	$0.080^{+0.250}_{-0.350}$	$1.892^{+0.548}_{-0.493}$	$1.515^{+0.208}_{-0.277}$	$0.315^{+0.380}_{-0.149}$
	+3%/-4%	+5%/-5%	+312%/-438%	+29%/-26%	+14%/-18%	+121%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 001870849-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-109 ± 5	$1.74^{+0.62}_{-0.56}$	4740^{+417}_{-351}	7483^{+2078}_{-1168}	$4.197^{+5.038}_{-1.862}$
Alt.	-76 ± 61	$1.74^{+0.67}_{-0.57}$	4759^{+388}_{-395}	6714^{+2404}_{-2595}	$2.911^{+5.225}_{-2.309}$

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

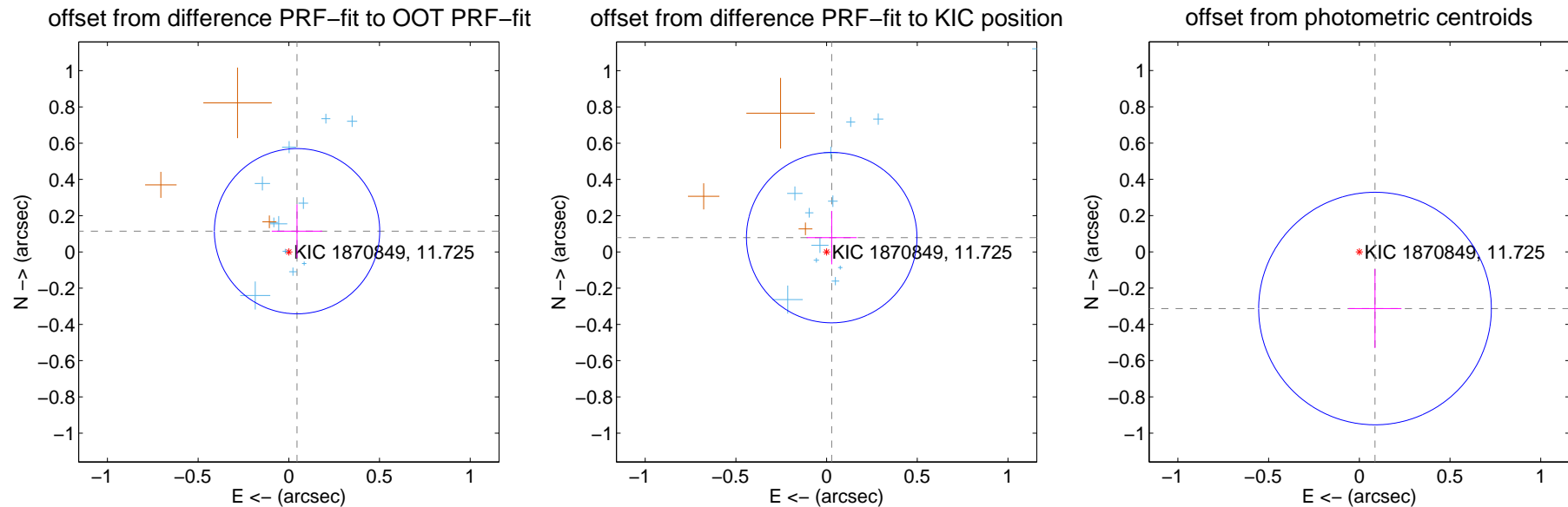
DV Centroid Data

Supplemental centroid analysis for 001870849-01. **Kepler magnitude: 11.72.** Transit SNR 12.61

There are 12 quarters with good PRF difference image offsets

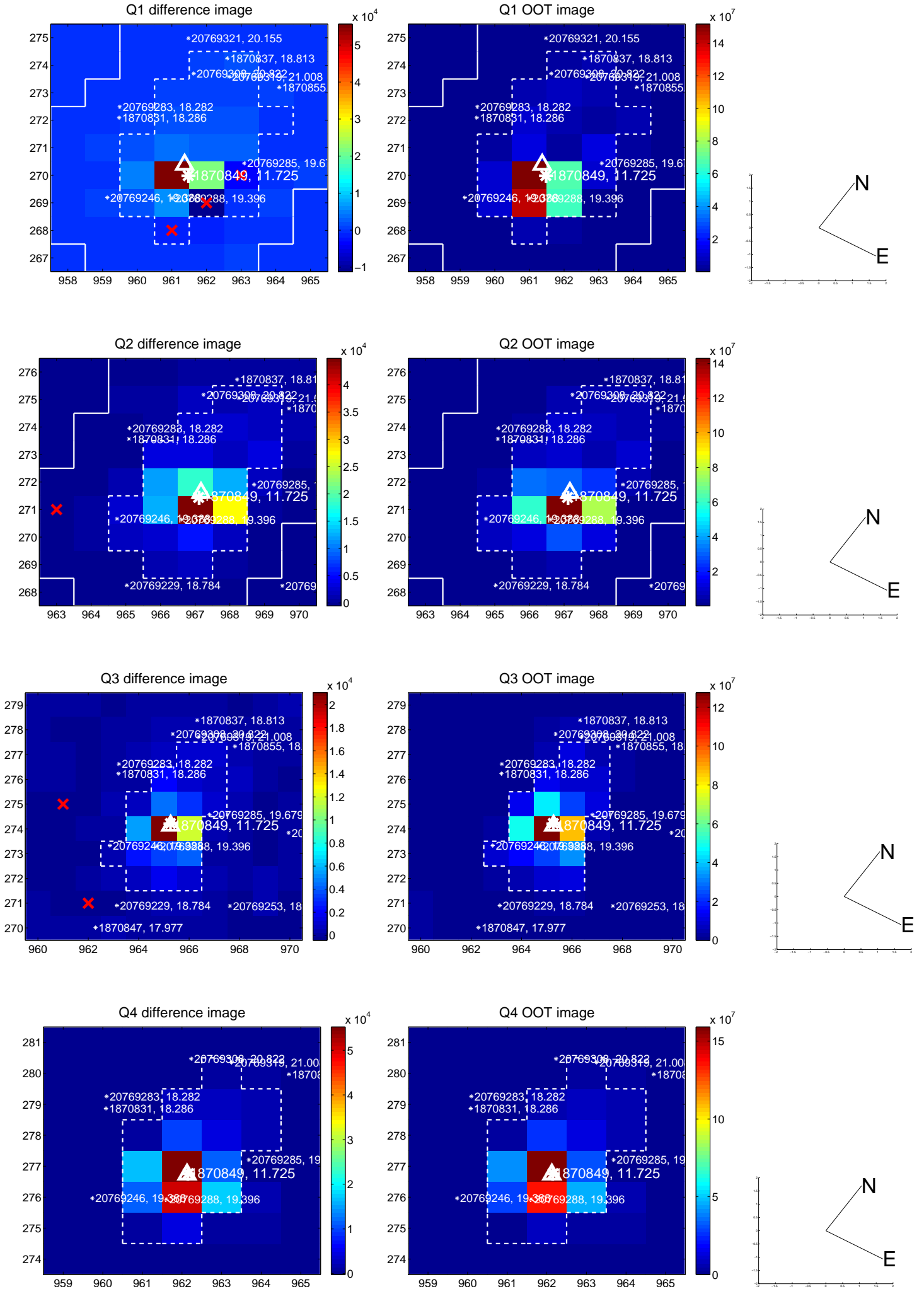
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.123 ± 0.152	0.81	-0.045 ± 0.139	0.114 ± 0.148
PRF-fit source offset from KIC position	0.084 ± 0.157	0.54	-0.028 ± 0.138	0.079 ± 0.147
photometric centroid source offset	0.32 ± 0.21	1.52	-0.09 ± 0.15	-0.31 ± 0.22

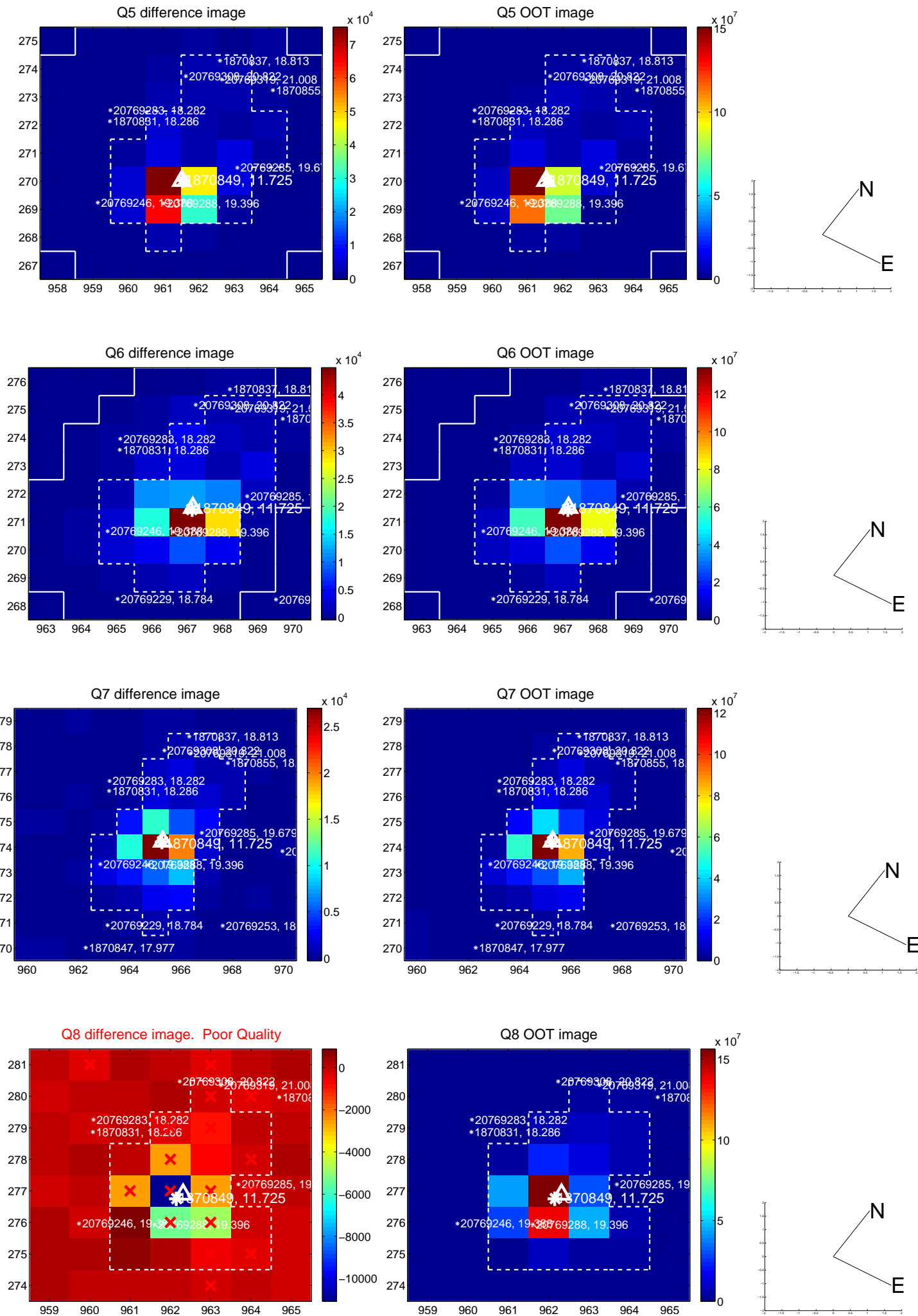


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

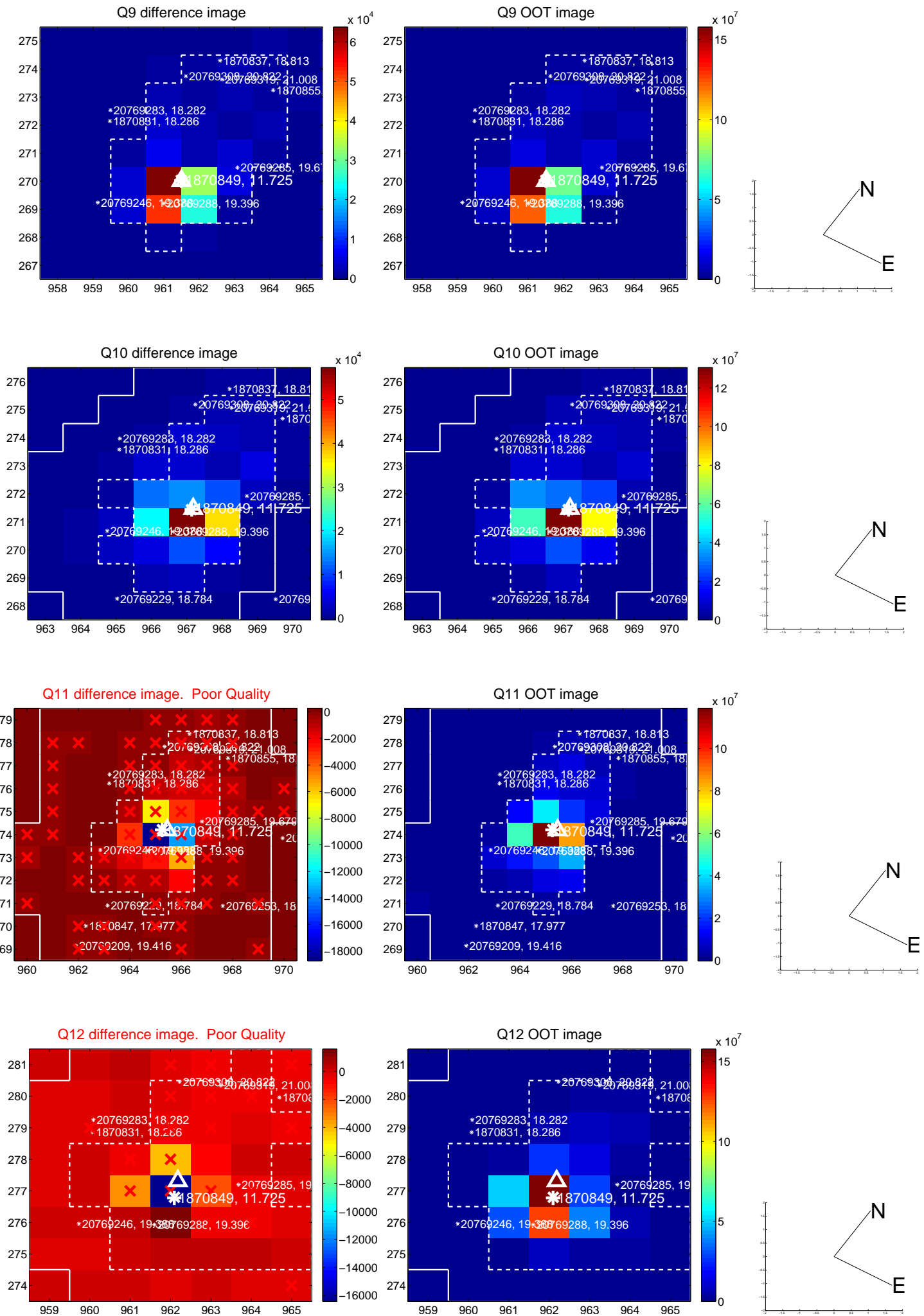
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



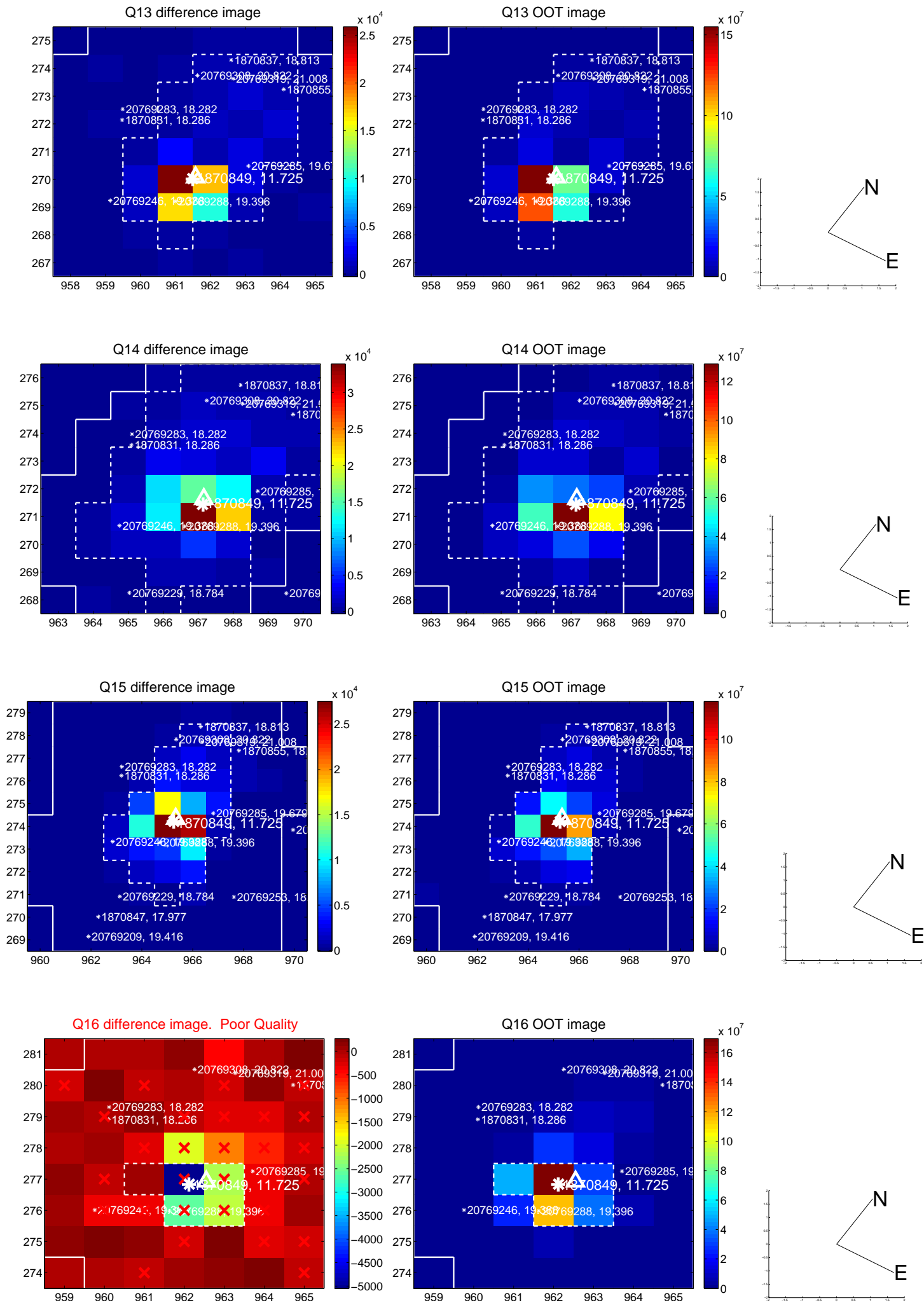
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



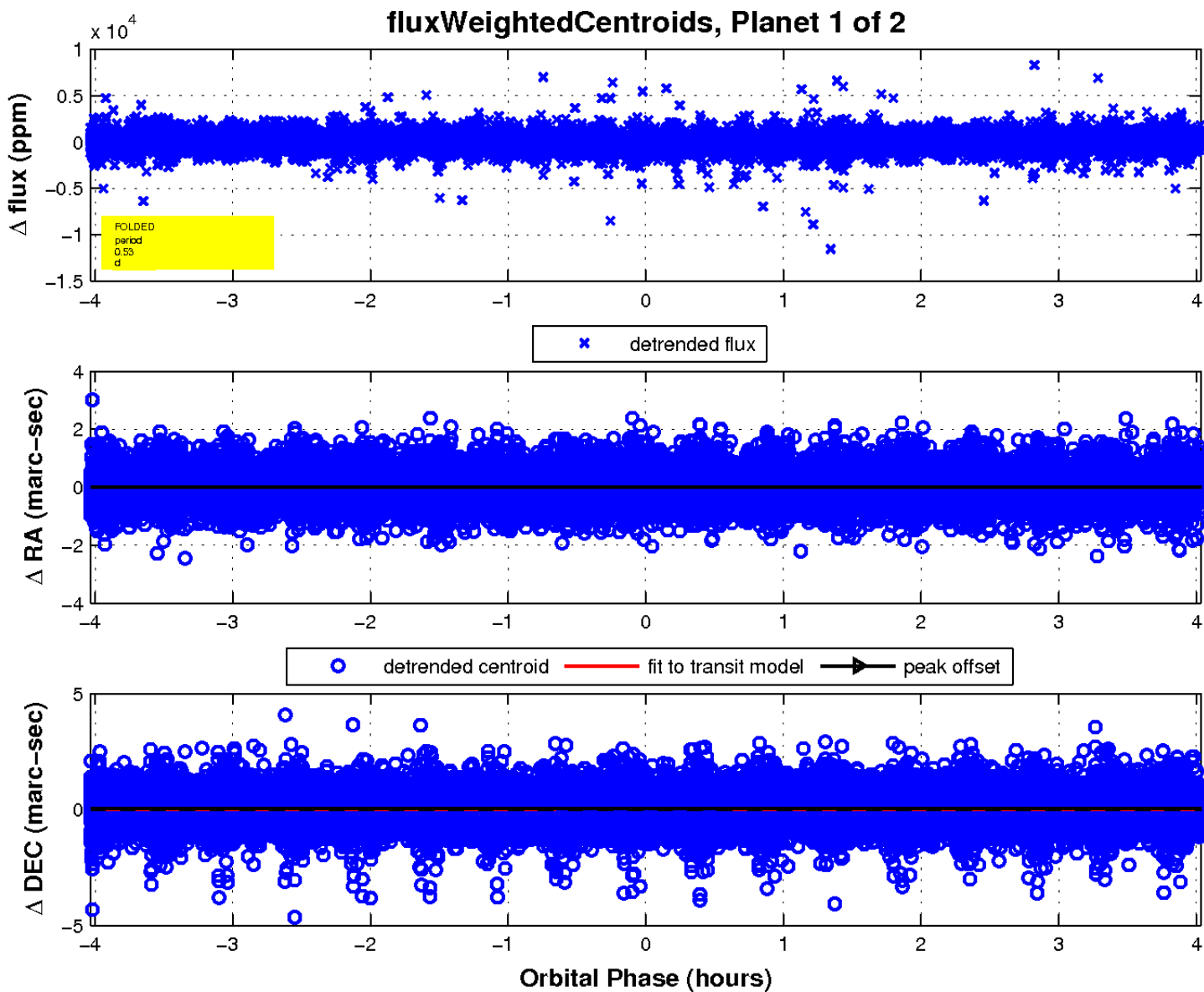
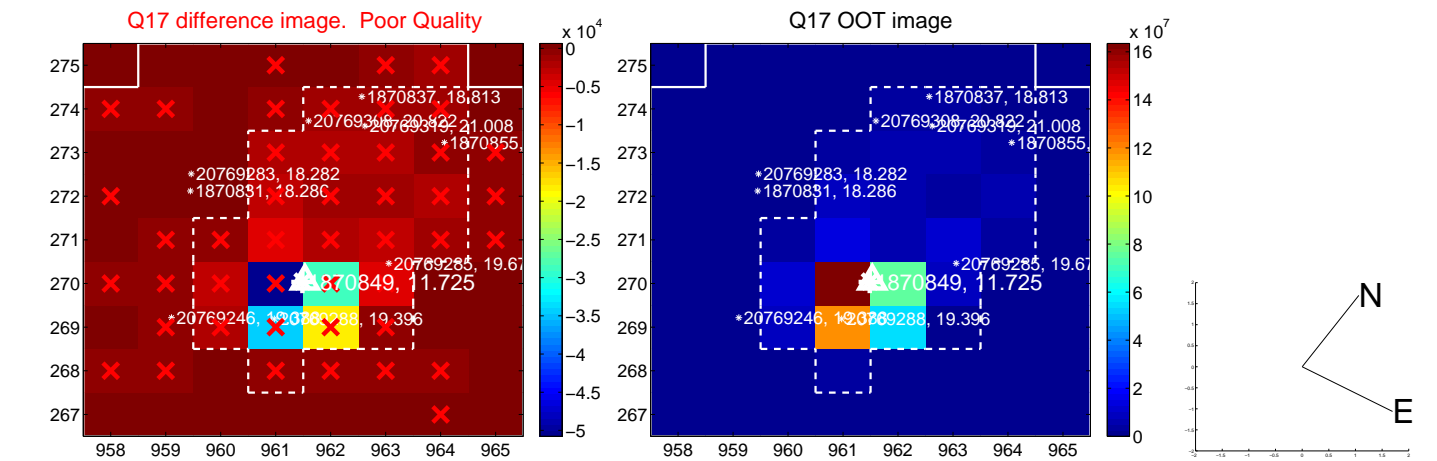
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

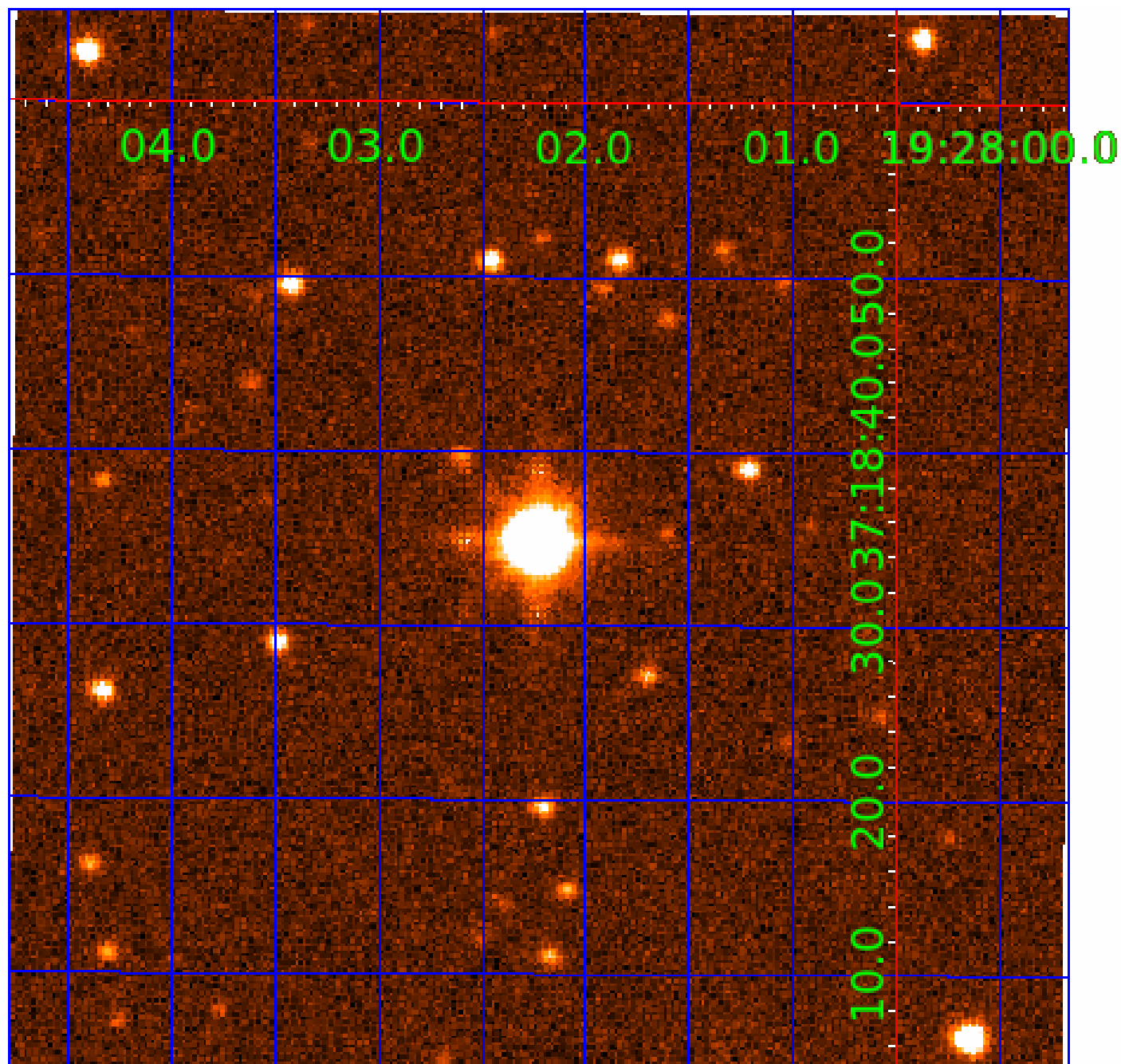


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 001870849

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})
001870849-01	OBS	No	0.531227	131.789187	77.8	1.345	19.2	12.6	1.89	6835	1.79	32167.89
001870849-02	OBS	No	0.531221	131.524867	101.5	3.817	21.1	26.6	1.89	6835	2.04	32168.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001870849-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
001870849-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFS

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

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

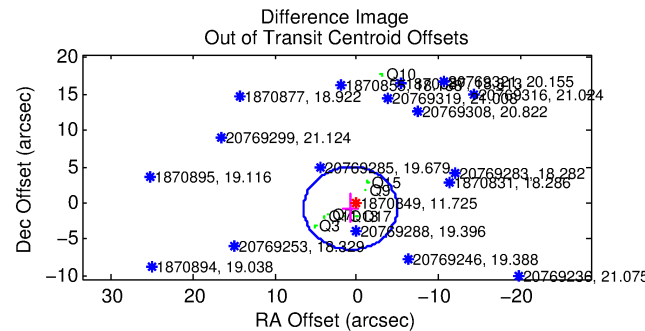
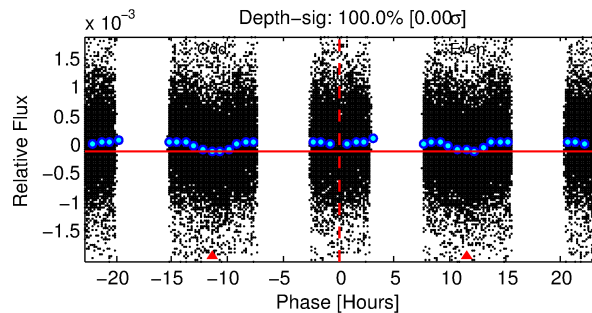
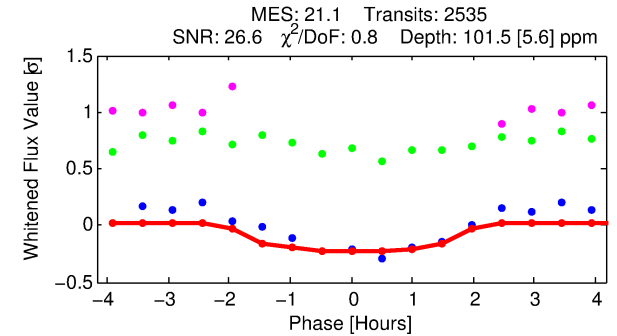
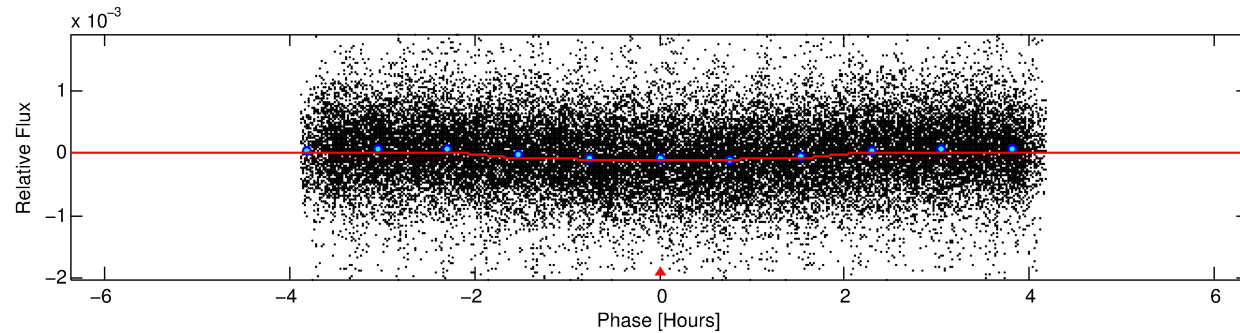
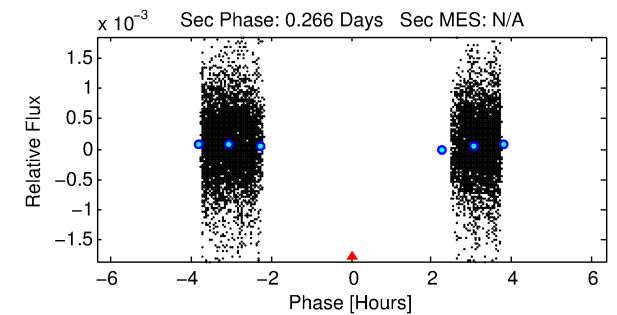
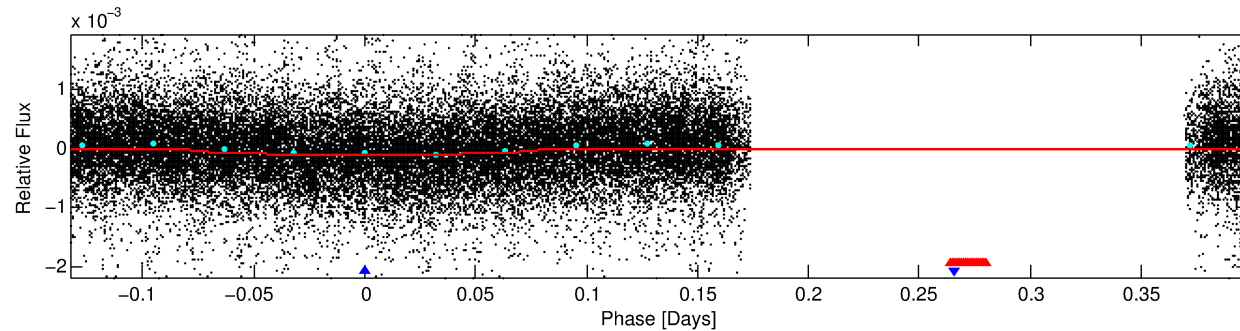
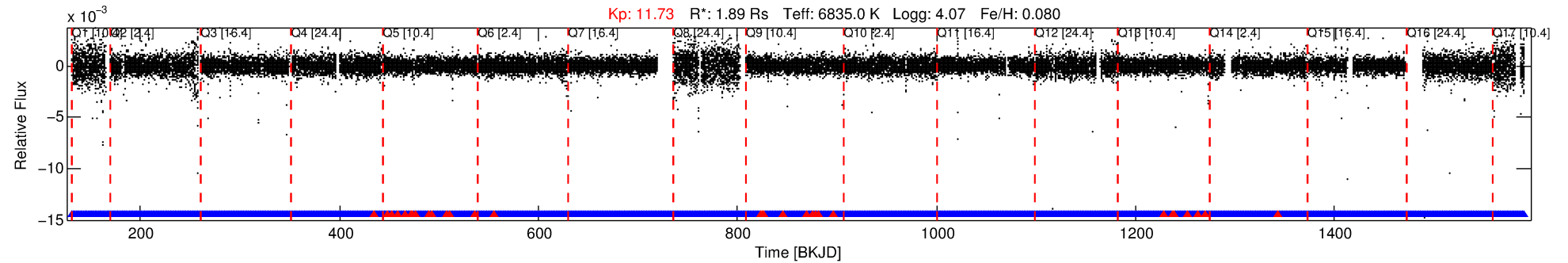
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001870849-02

No Significant Match Found

DV One-Page Summary

KIC: 1870849 Candidate: 2 of 2 Period: 0.531 d



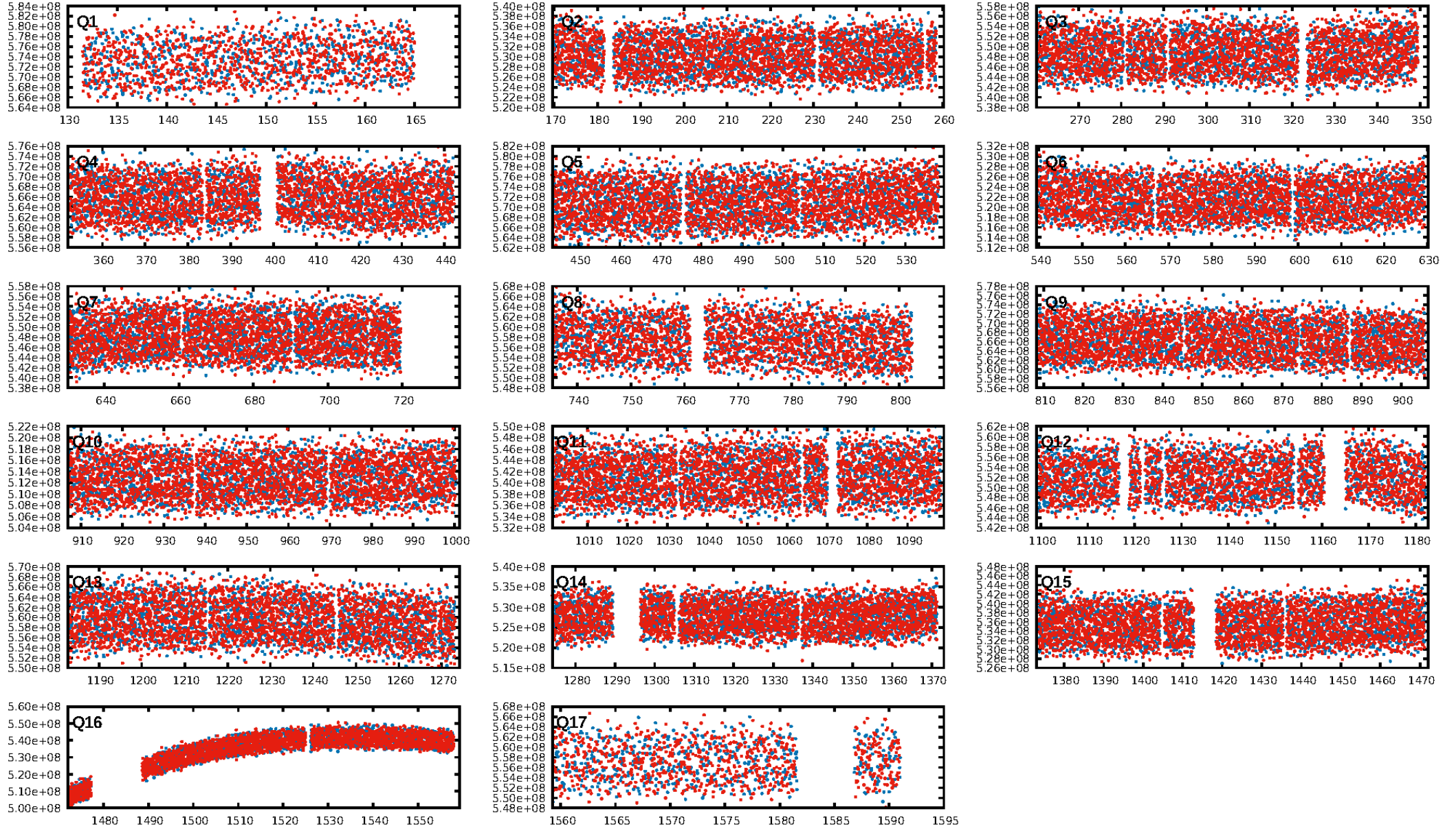
DV Fit Results:

Period = 0.53122 [0.00000] d
Epoch = 131.5249 [0.0017] BKJD
 $R_p/R^* = 0.0099$ [0.0050]
 $a/R^* = 1.14$ [0.77]
 $b = 0.70$ [2.15]
 $\text{Seff} = 32168.35$ [12649.57]
 $T_{\text{eq}} = 3415$ [336] K
 $R_p = 2.04$ [1.20] R_{e}
 $a = 0.0148$ [0.0036] AU

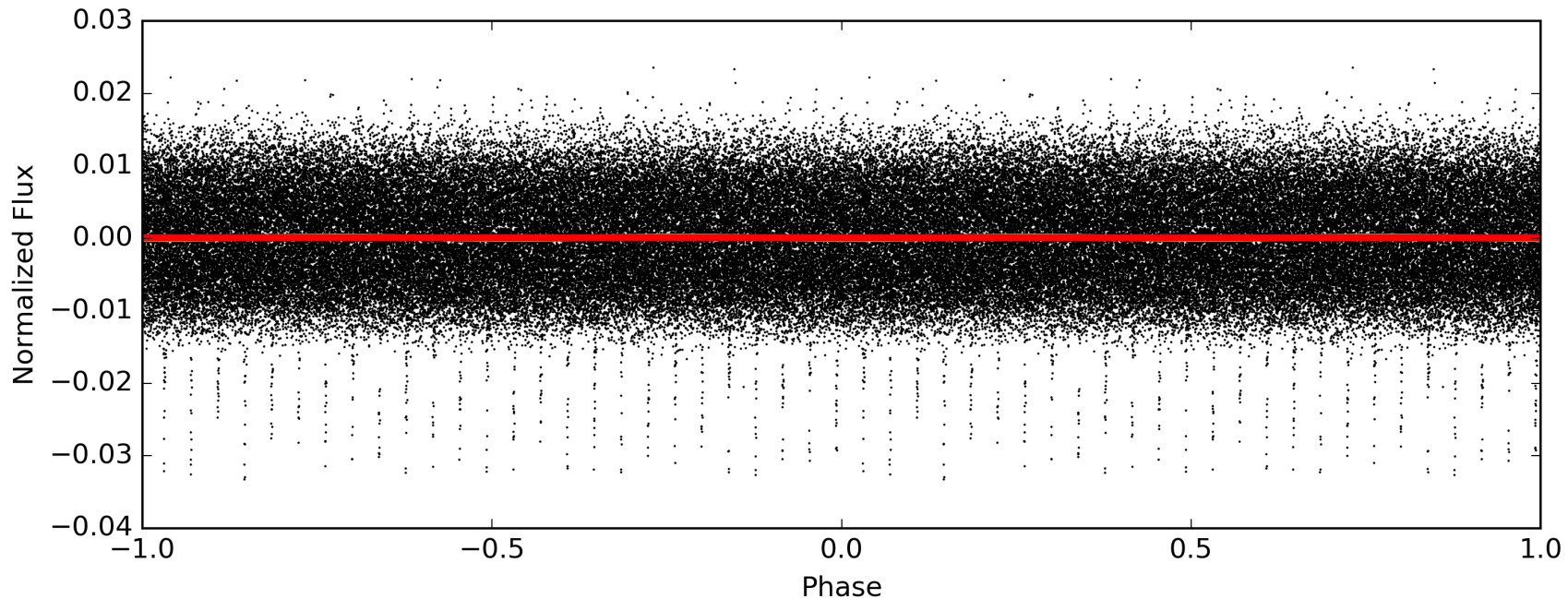
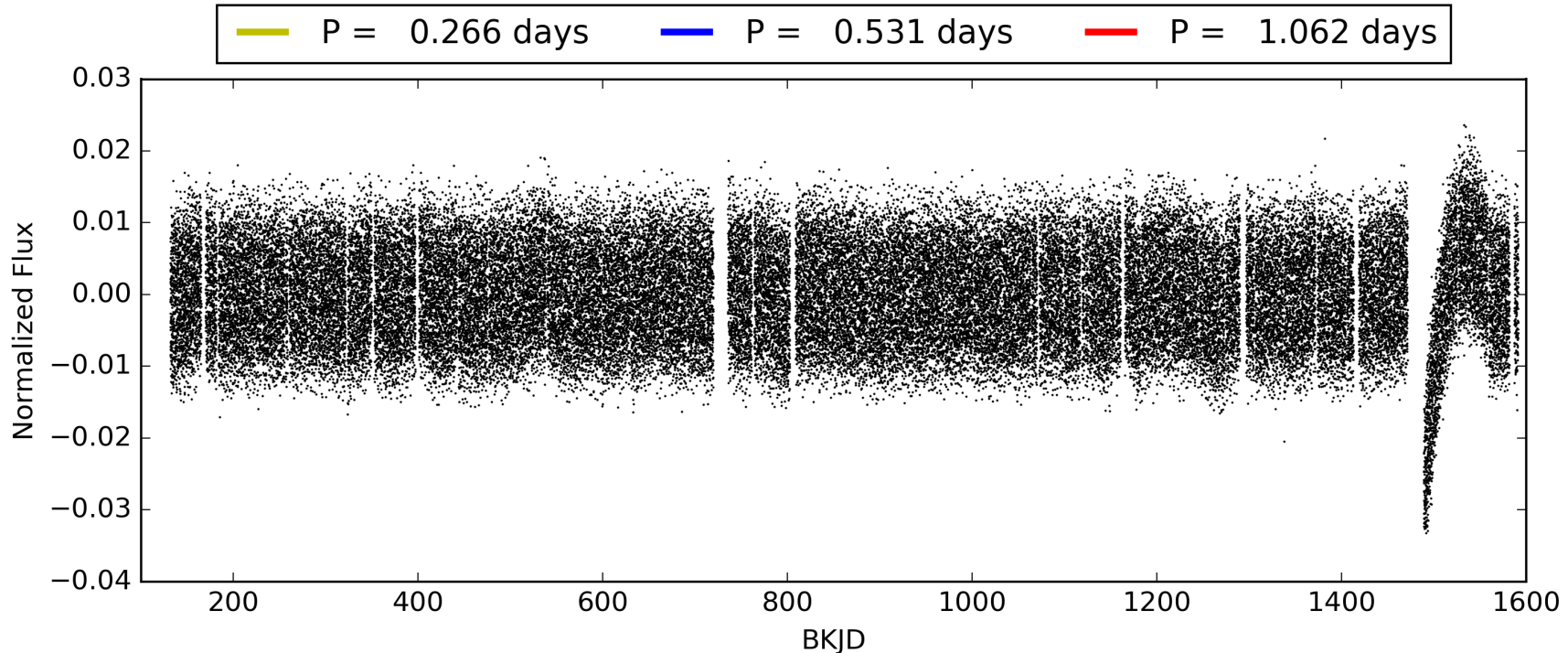
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.99 [2389/2421]
GhostDiagnostic-chr: 1.633
Centroid-sig: 0.0%
Centroid-so: 0.245 arcsec [2.36 σ]
OotOffset-rm: 1.088 arcsec [0.57 σ]
KicOffset-rm: 1.135 arcsec [0.53 σ]
OotOffset-st: 1/4/0/3 [8]
KicOffset-st: 1/4/0/3 [8]
DiffImageQuality-fgm: 0.25 [2/8]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 001870849-02, PDC Light Curves

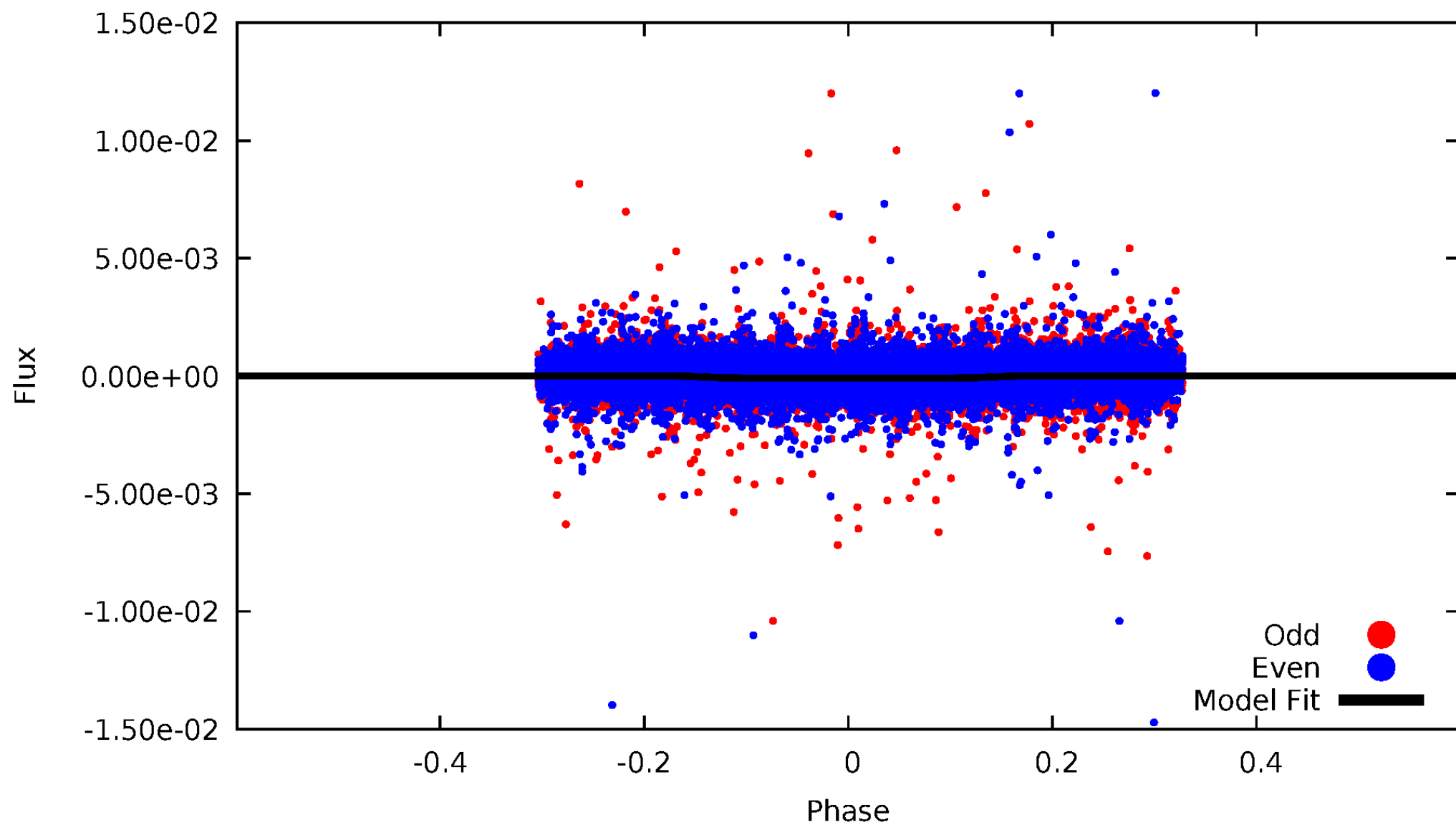


TCE 001870849-02



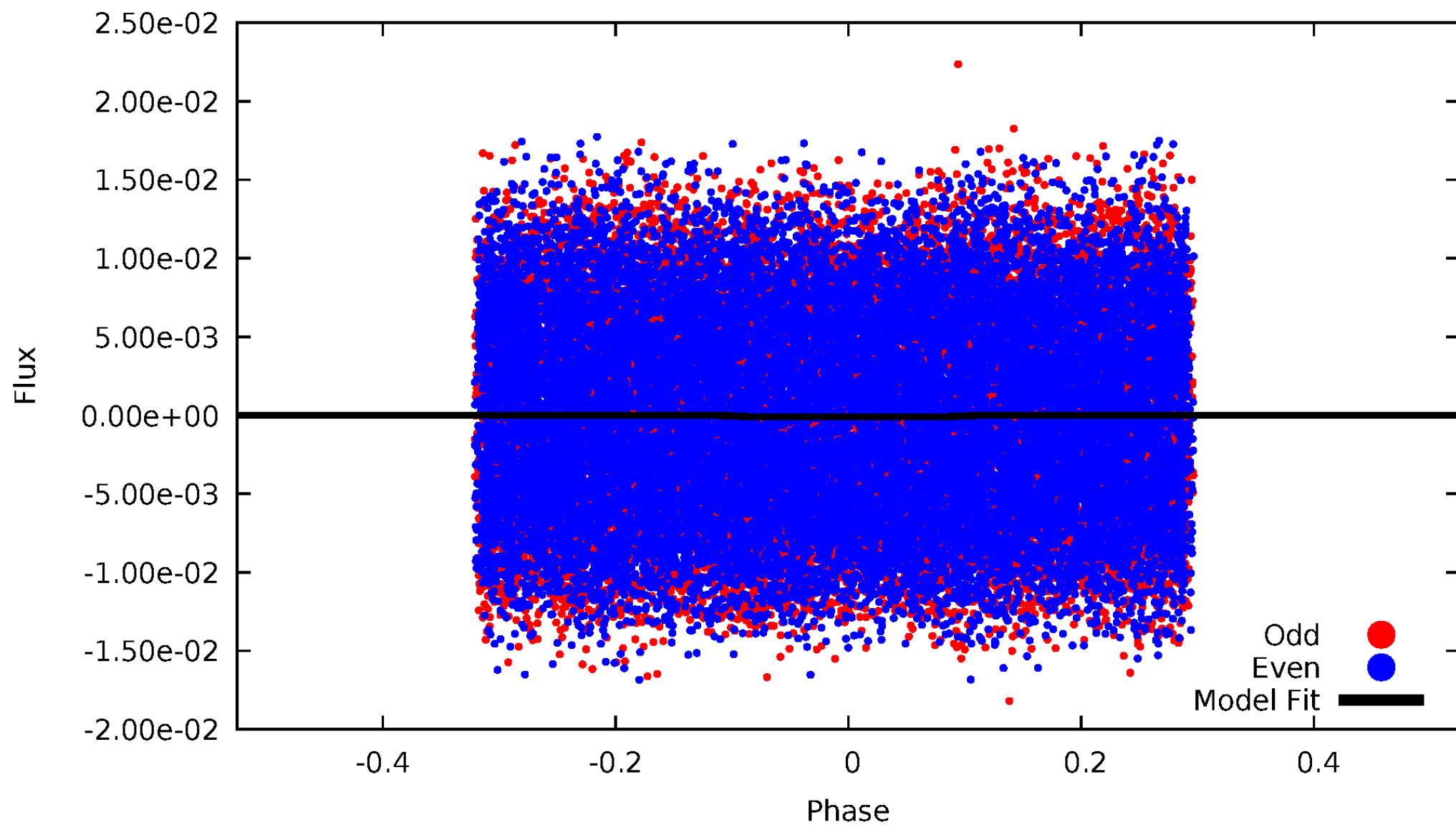
DV Odd/Even

TCE 001870849-02



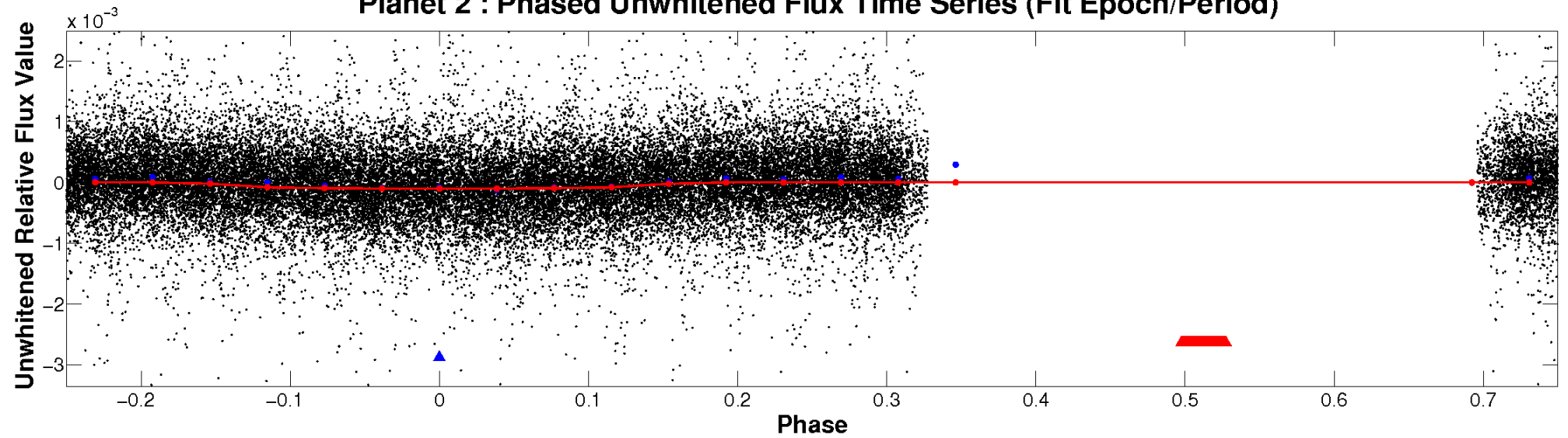
ALT Odd/Even

TCE 001870849-02

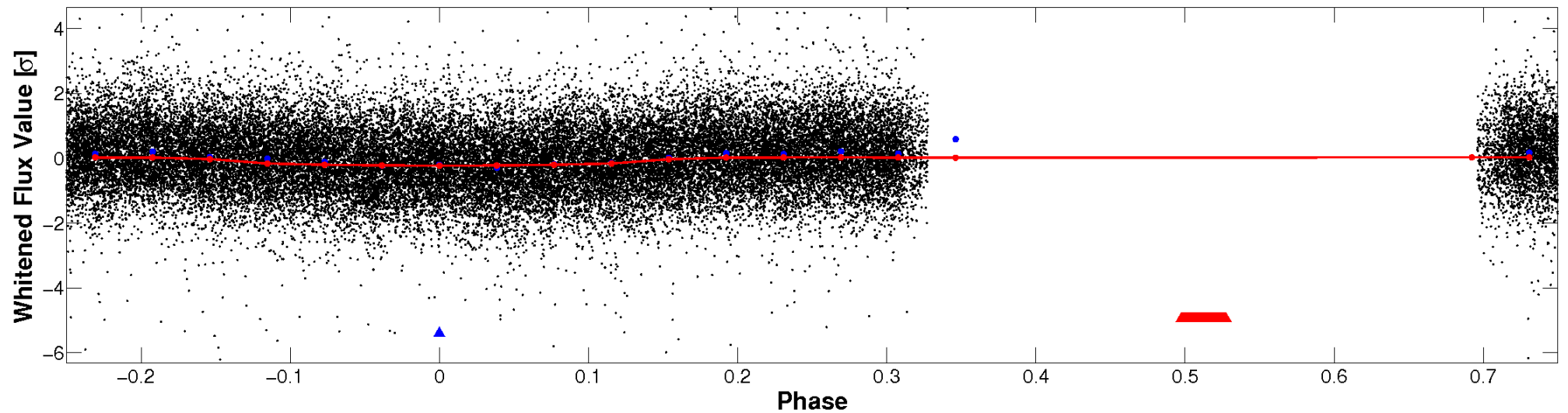


Non-Whitened Vs. Whitened Light Curve

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

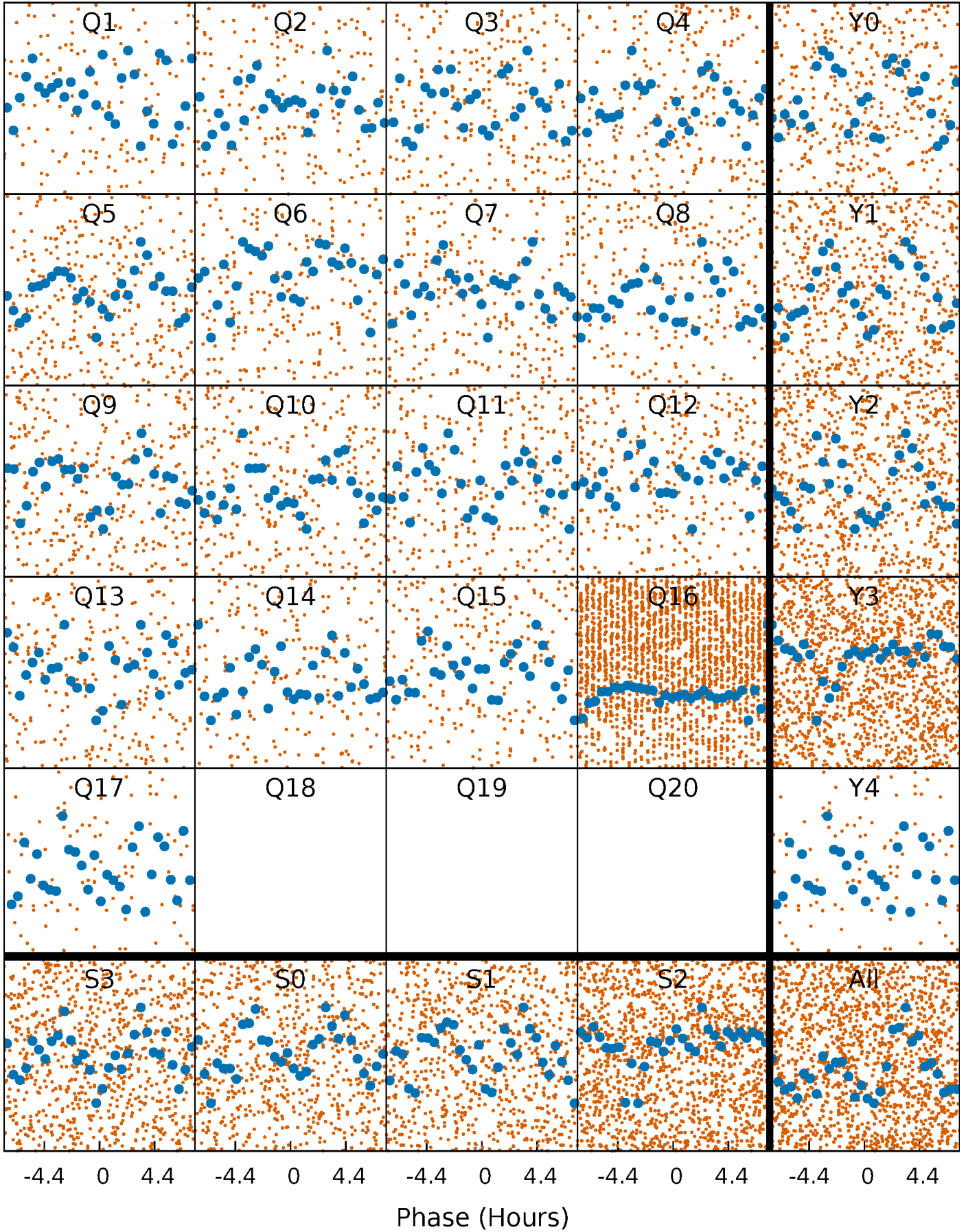


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



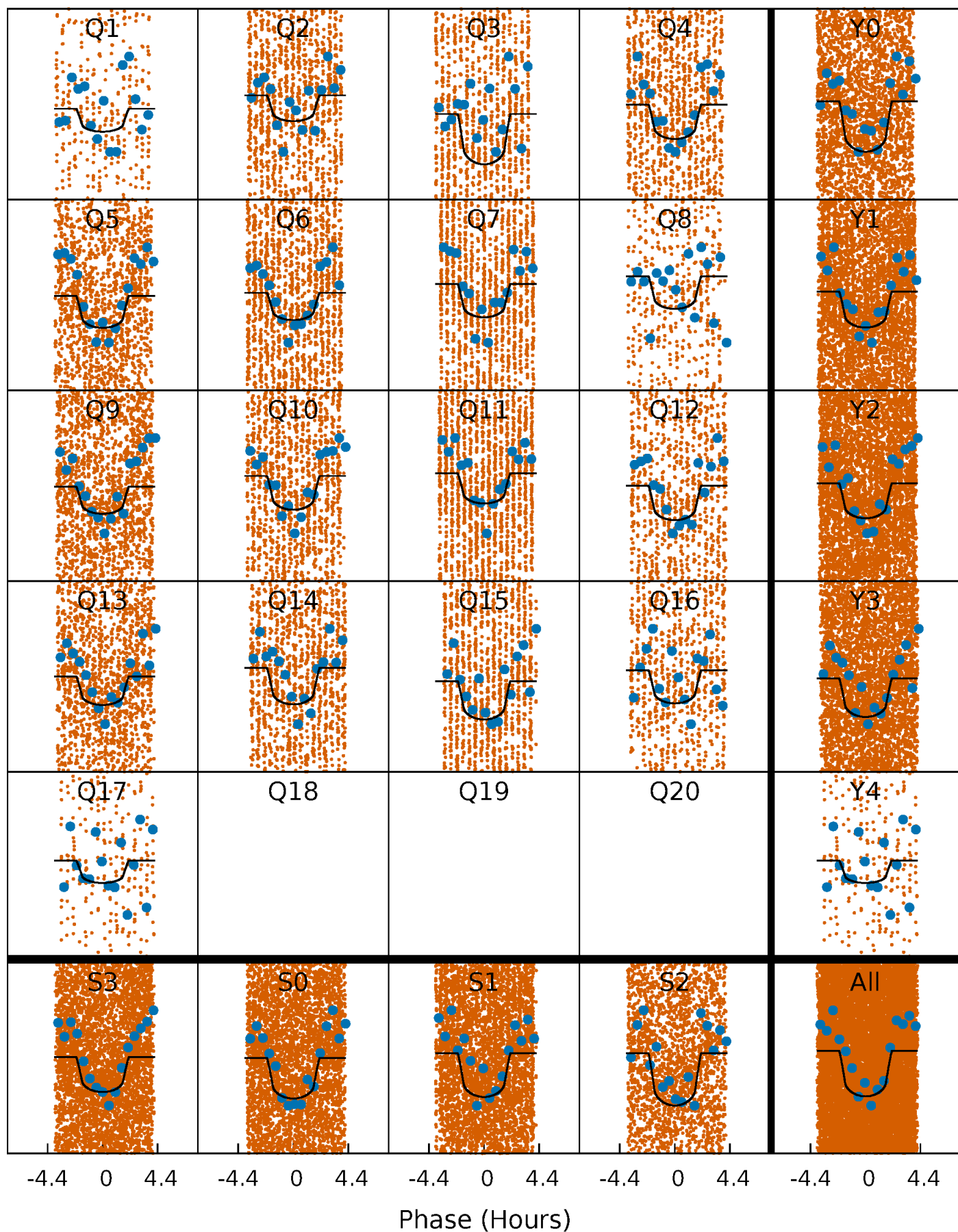
PDC Quarter-Phased Transit Curves

TCE 001870849-02 P= 0.531221 Days $T_0=131.524867$ (BKJD)



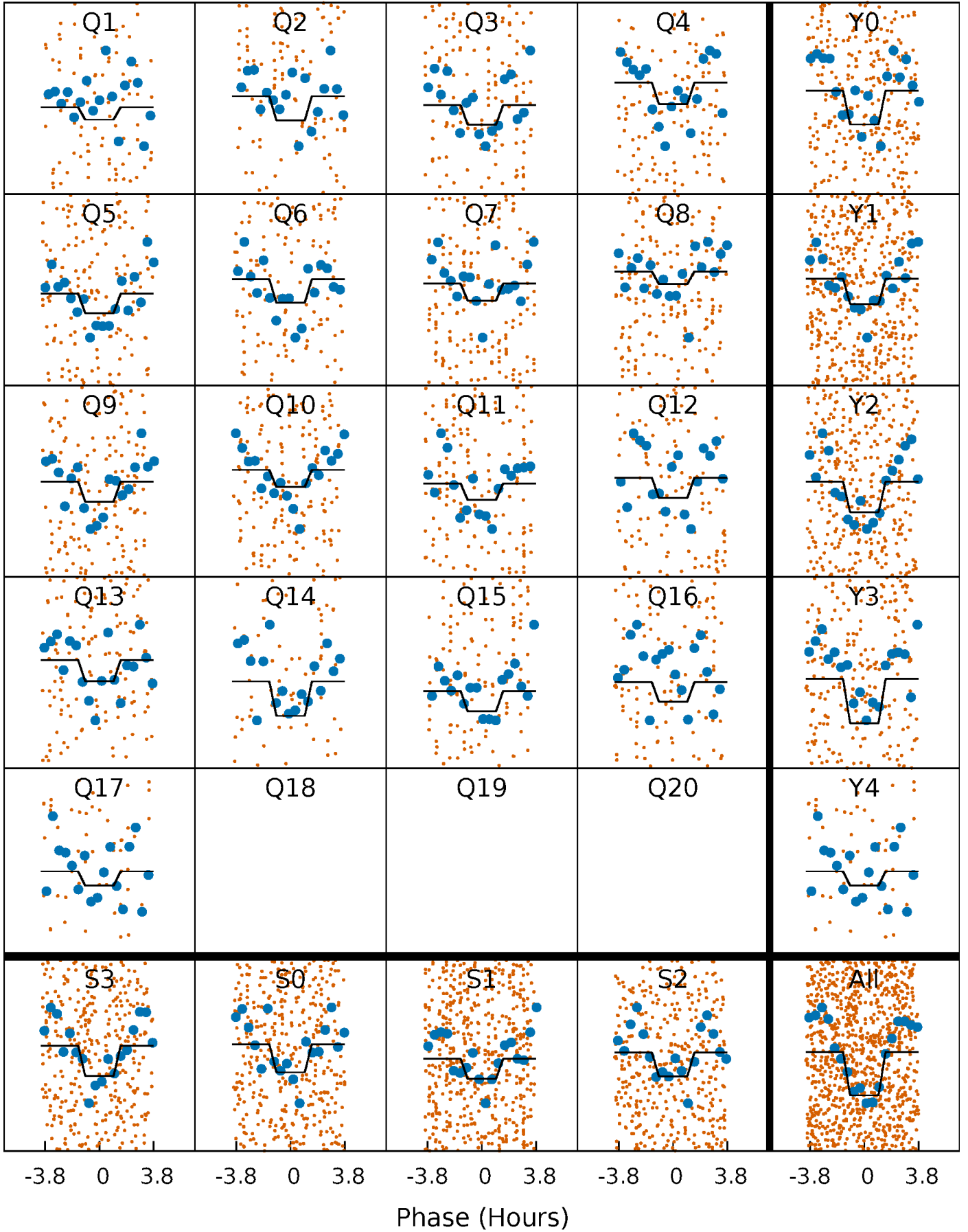
DV Quarter-Phased Transit Curves

TCE 001870849-02 P= 0.531221 Days $T_0=131.524867$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

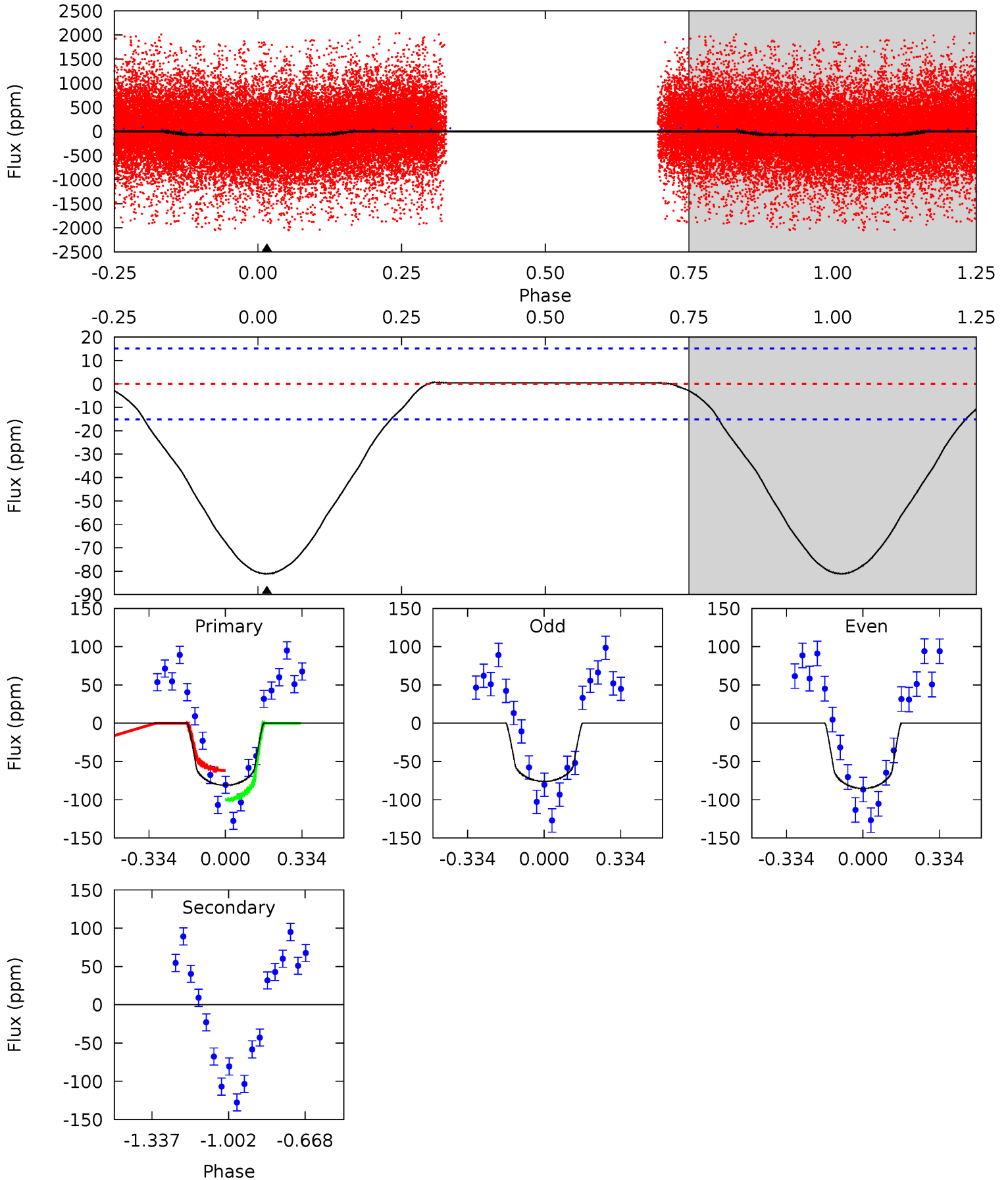
TCE 001870849-02 P= 0.531229 Days $T_0=131.527315$ (BKJD)



DV Model-Shift Uniqueness Test

001870849-02, P = 0.531221 Days, E = 130.993646 Days

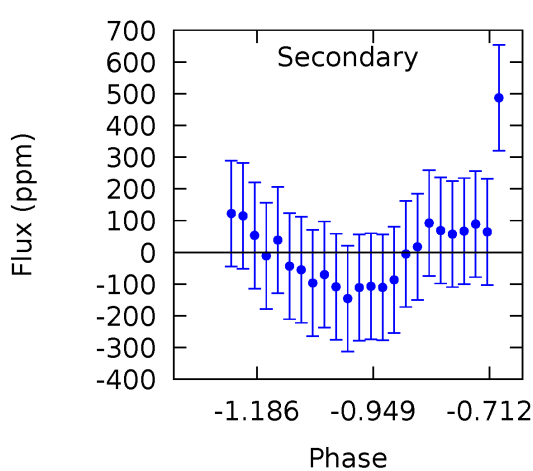
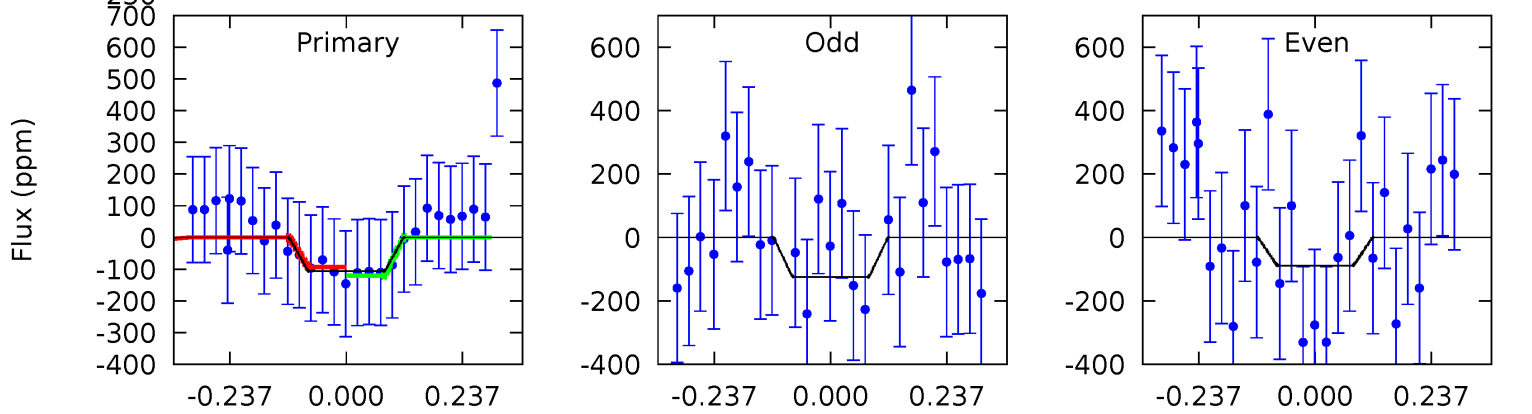
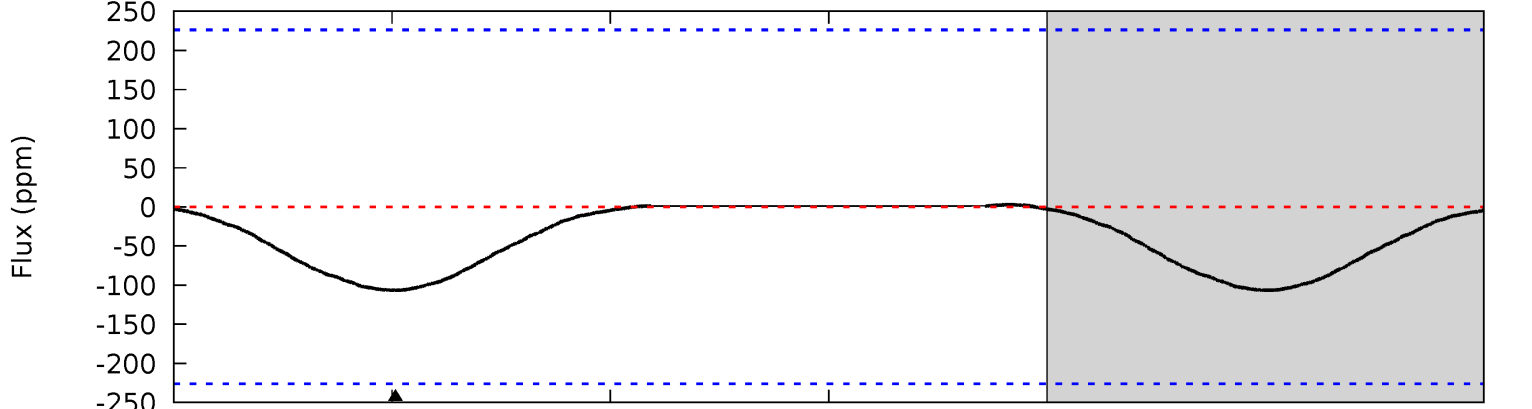
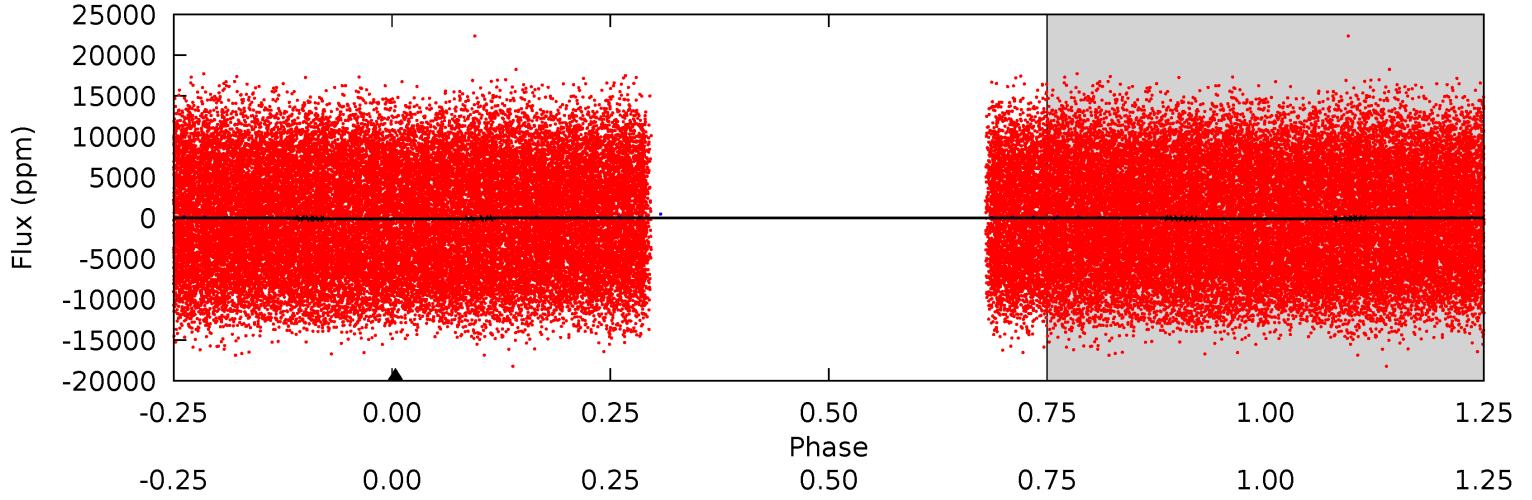
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.1	0	0	0	4.30	0.97	0.22	23.1	23.1	0	0	1.31	0.98	0.01	5.40



Alt Model-Shift Uniqueness Test

001870849-02, P = 0.531229 Days, E = 130.996086 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.07	0	0	0	4.38	1.18	0.05	2.07	2.07	0	0	0.35	0.87	0.03	0.26



Stellar Parameters For KIC 001870849

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6835^{+189}_{-307}	$4.065^{+0.190}_{-0.190}$	$0.080^{+0.250}_{-0.350}$	$1.892^{+0.548}_{-0.493}$	$1.515^{+0.208}_{-0.277}$	$0.315^{+0.380}_{-0.149}$
	+3%/-4%	+5%/-5%	+312%/-438%	+29%/-26%	+14%/-18%	+121%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 001870849-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	0 ± 4	$2.06^{+1.12}_{-0.97}$	4778^{+399}_{-350}	-4174^{+478}_{-422}	$0.001^{+0.119}_{-0.120}$
Alt.	0 ± 52	$2.12^{+1.14}_{-0.97}$	4748^{+383}_{-360}	-4213^{+10006}_{-1848}	$0.016^{+1.825}_{-1.676}$

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

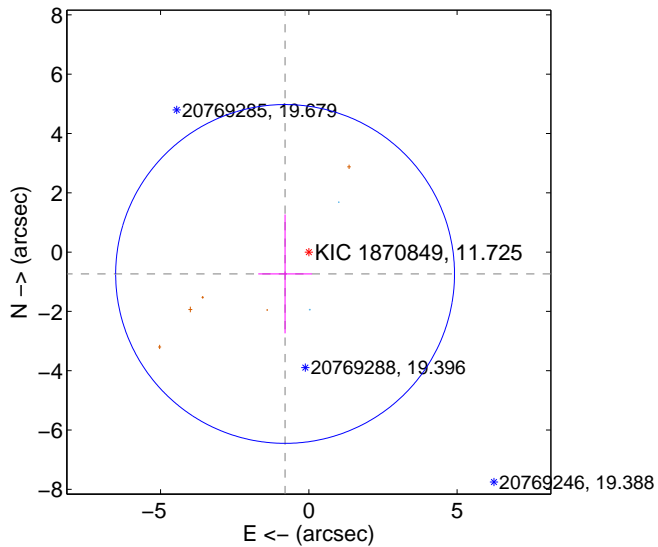
Supplemental centroid analysis for 001870849-02. **Kepler magnitude: 11.72.** Transit SNR 26.62

There are 2 quarters with good PRF difference image offsets

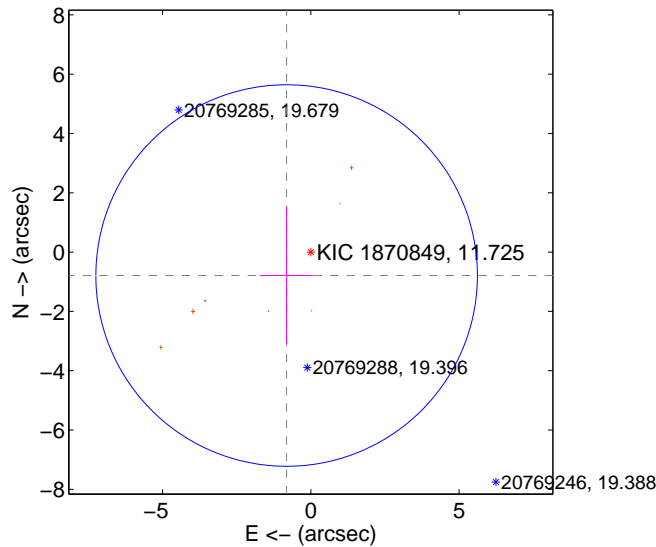
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.088 ± 1.904	0.57	0.800 ± 0.906	-0.737 ± 2.004
PRF-fit source offset from KIC position	1.135 ± 2.144	0.53	0.815 ± 0.908	-0.790 ± 2.318
photometric centroid source offset	0.24 ± 0.10	2.36	0.04 ± 0.07	0.24 ± 0.10

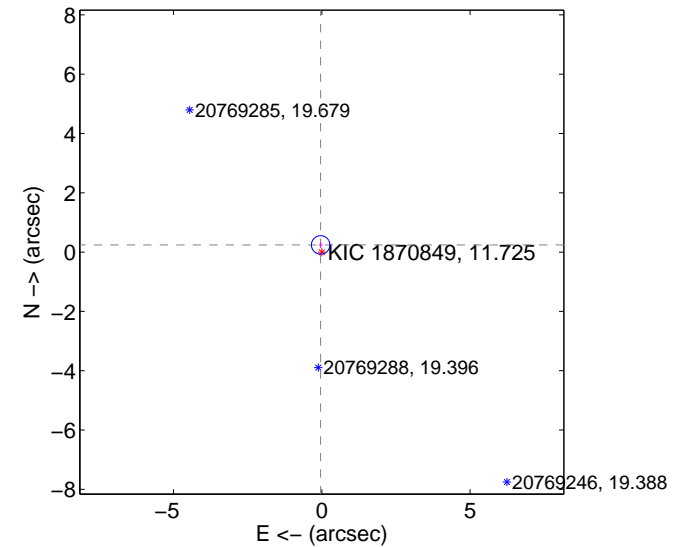
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

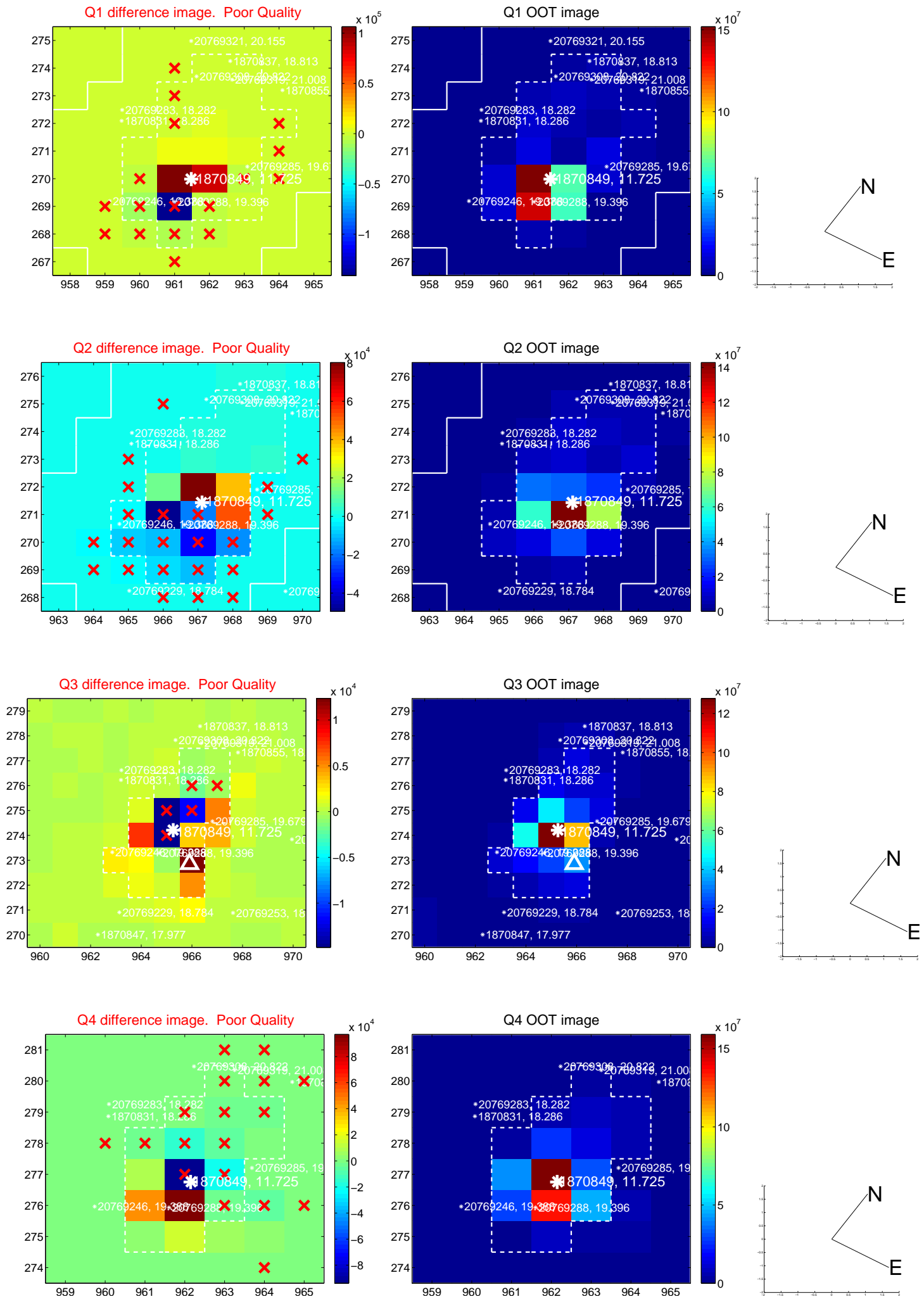


offset from photometric centroids

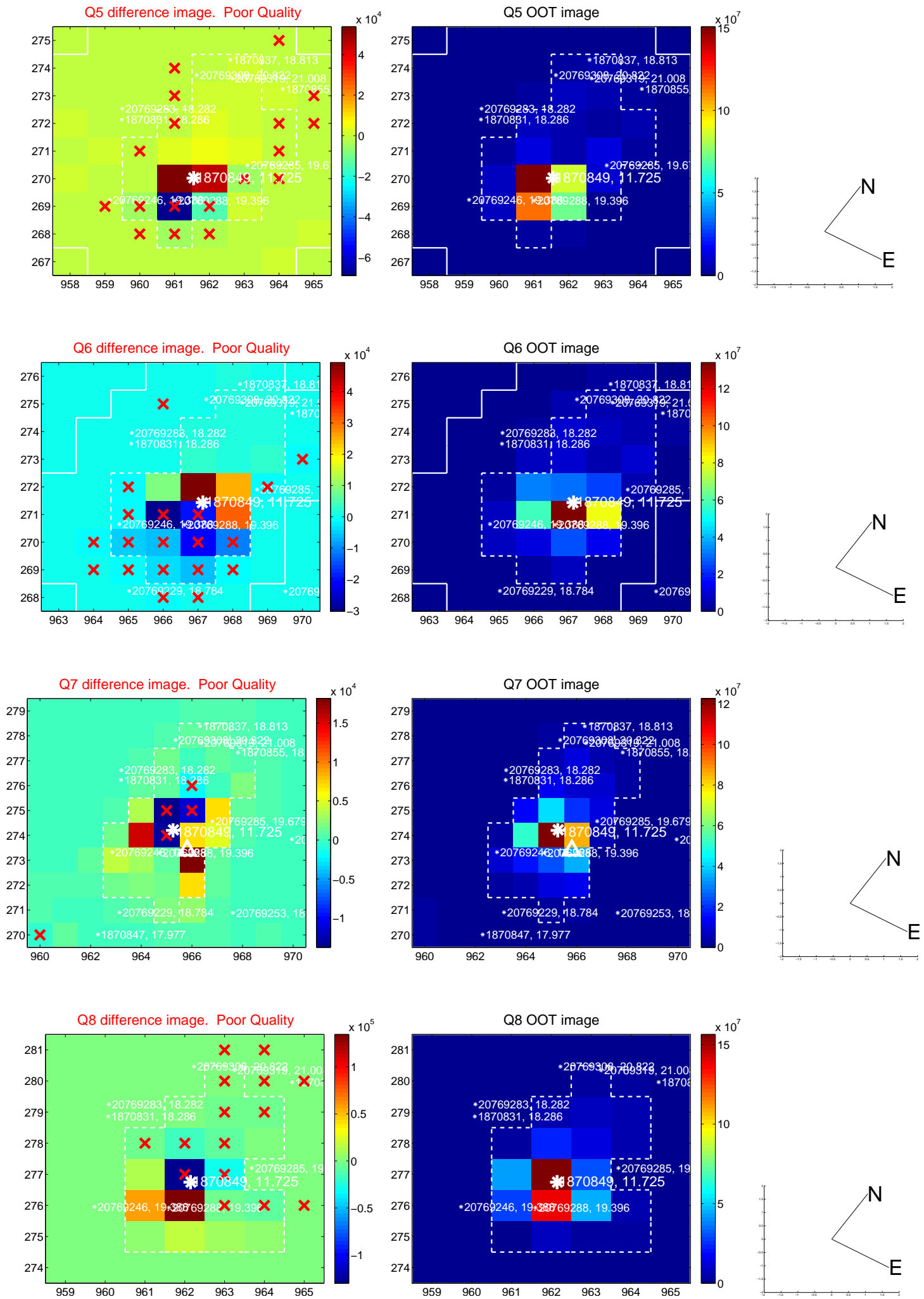


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

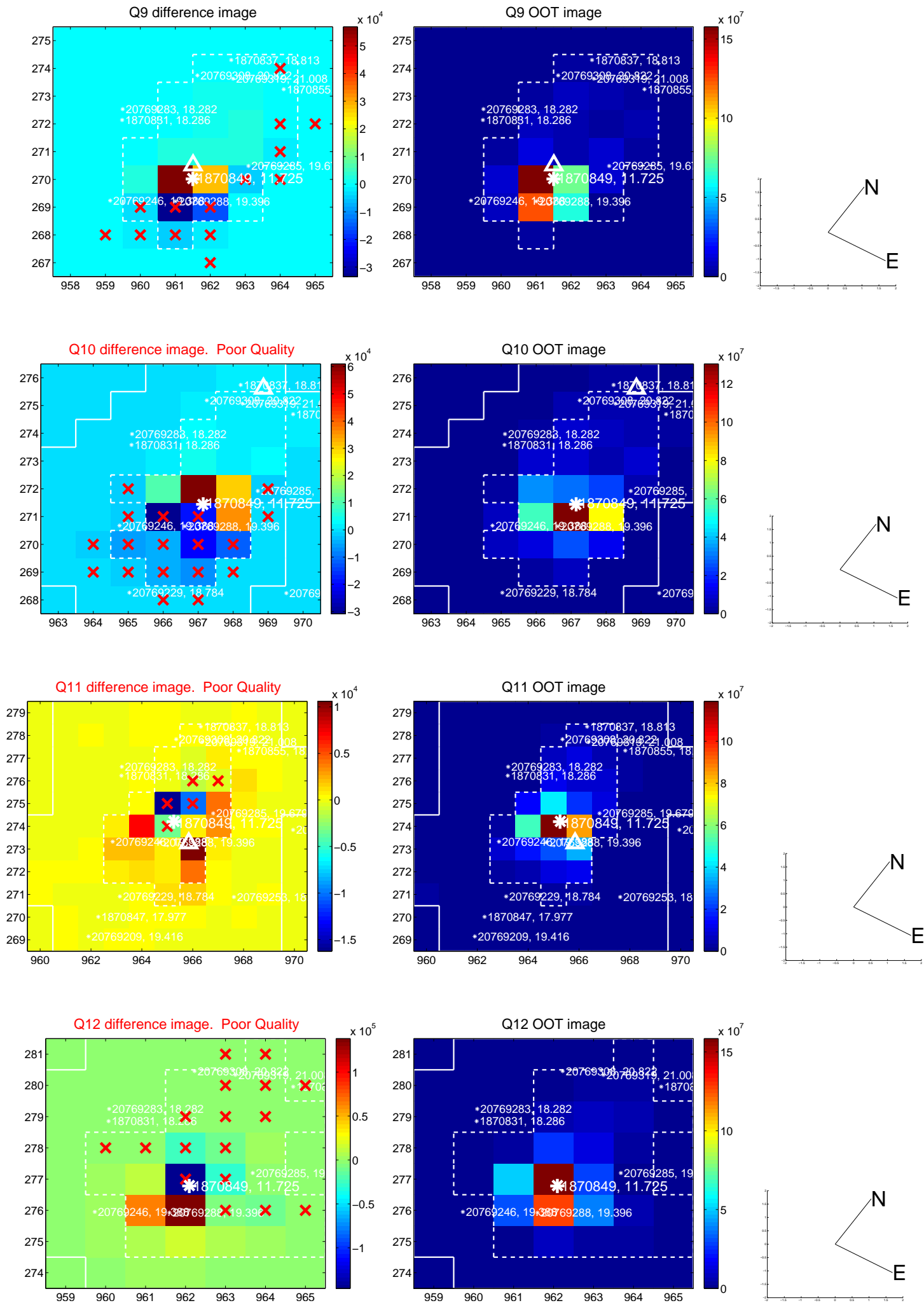
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



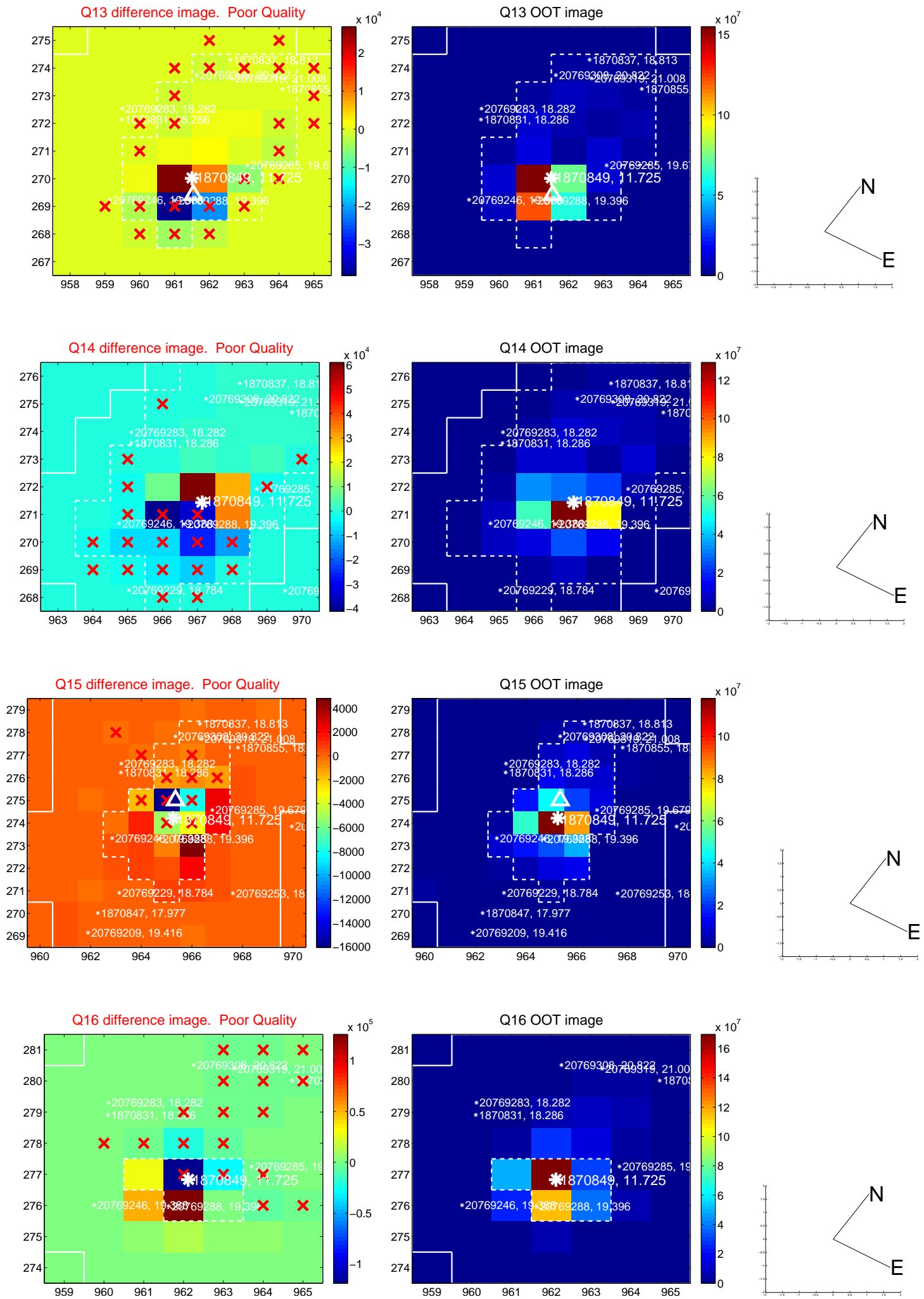
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



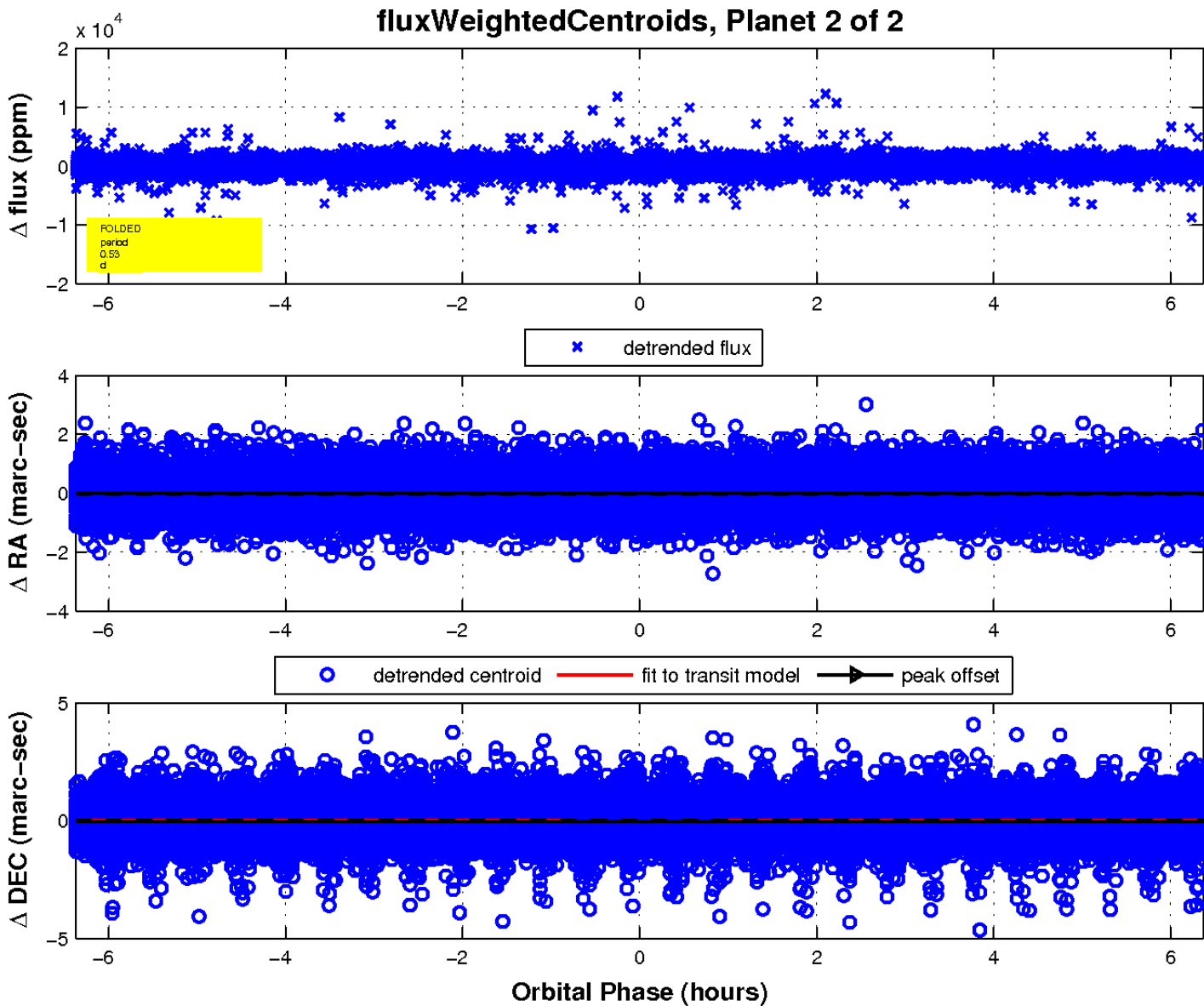
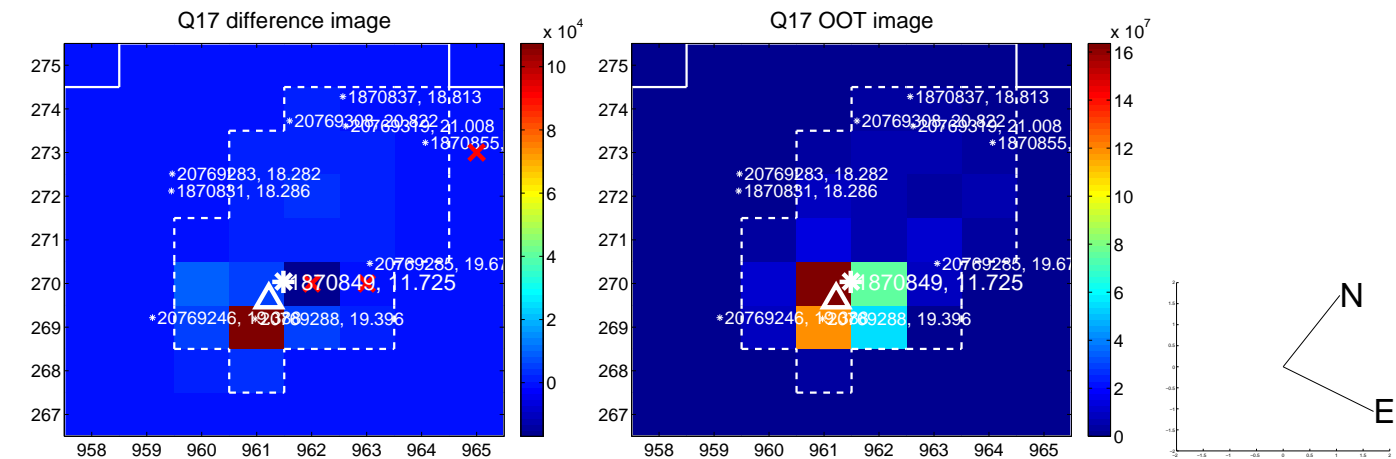
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

