

KIC 008874090

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})
008874090-01	OBS	1404.01	13.323943	135.244494	797.3	3.451	21.4	23.4	0.45	3751	1.45	4.84
008874090-02	OBS	1404.02	18.906285	140.822663	414.5	4.874	10.1	10.7	0.45	3751	1.19	3.04

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008874090-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008874090-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT

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

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

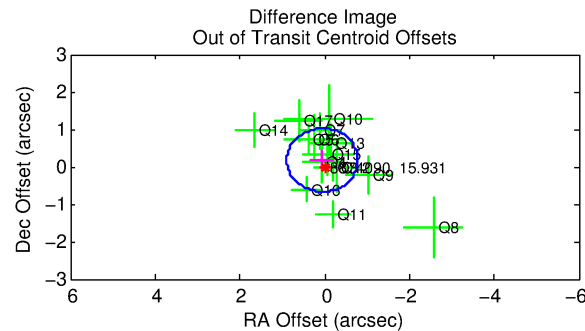
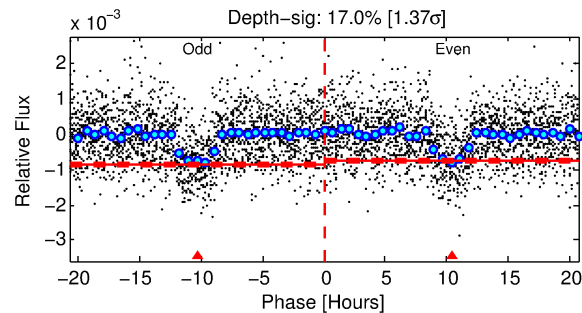
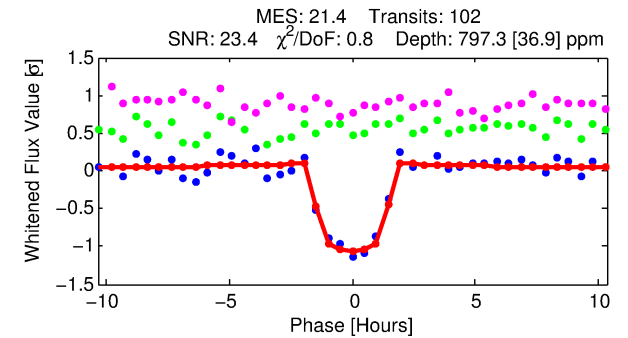
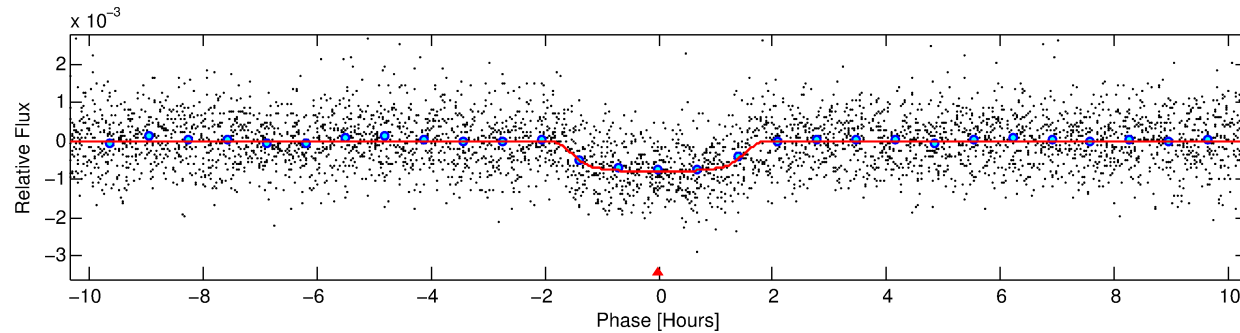
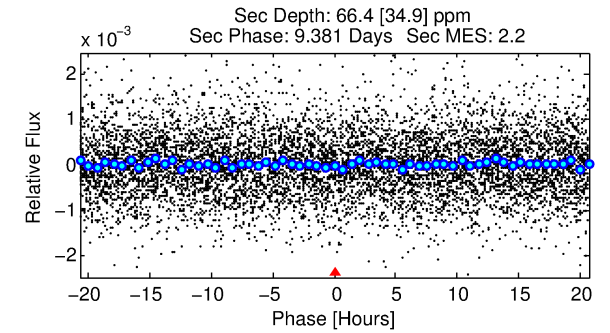
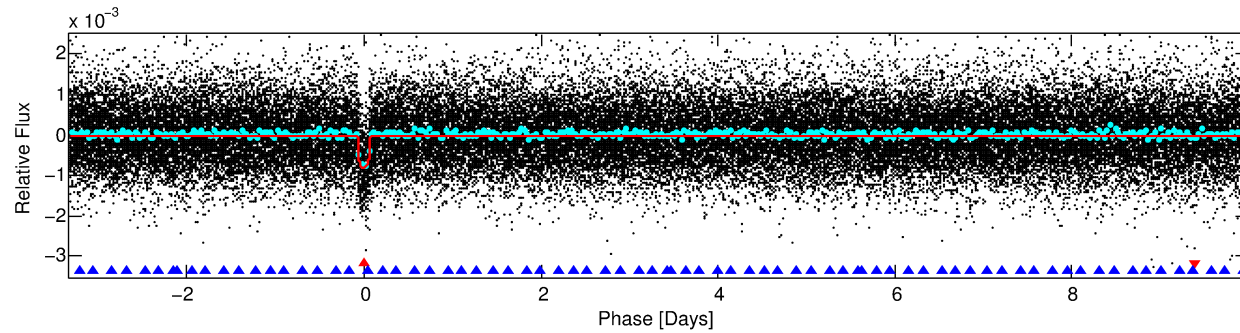
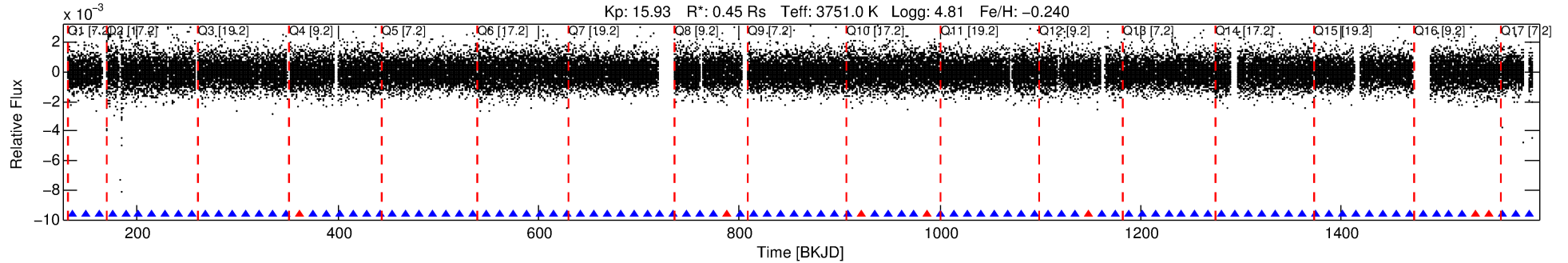
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008874090-01

No Significant Match Found

DV One-Page Summary

KIC: 8874090 Candidate: 1 of 2 Period: 13.324 d
KOI: K01404.01 Corr: 0.970



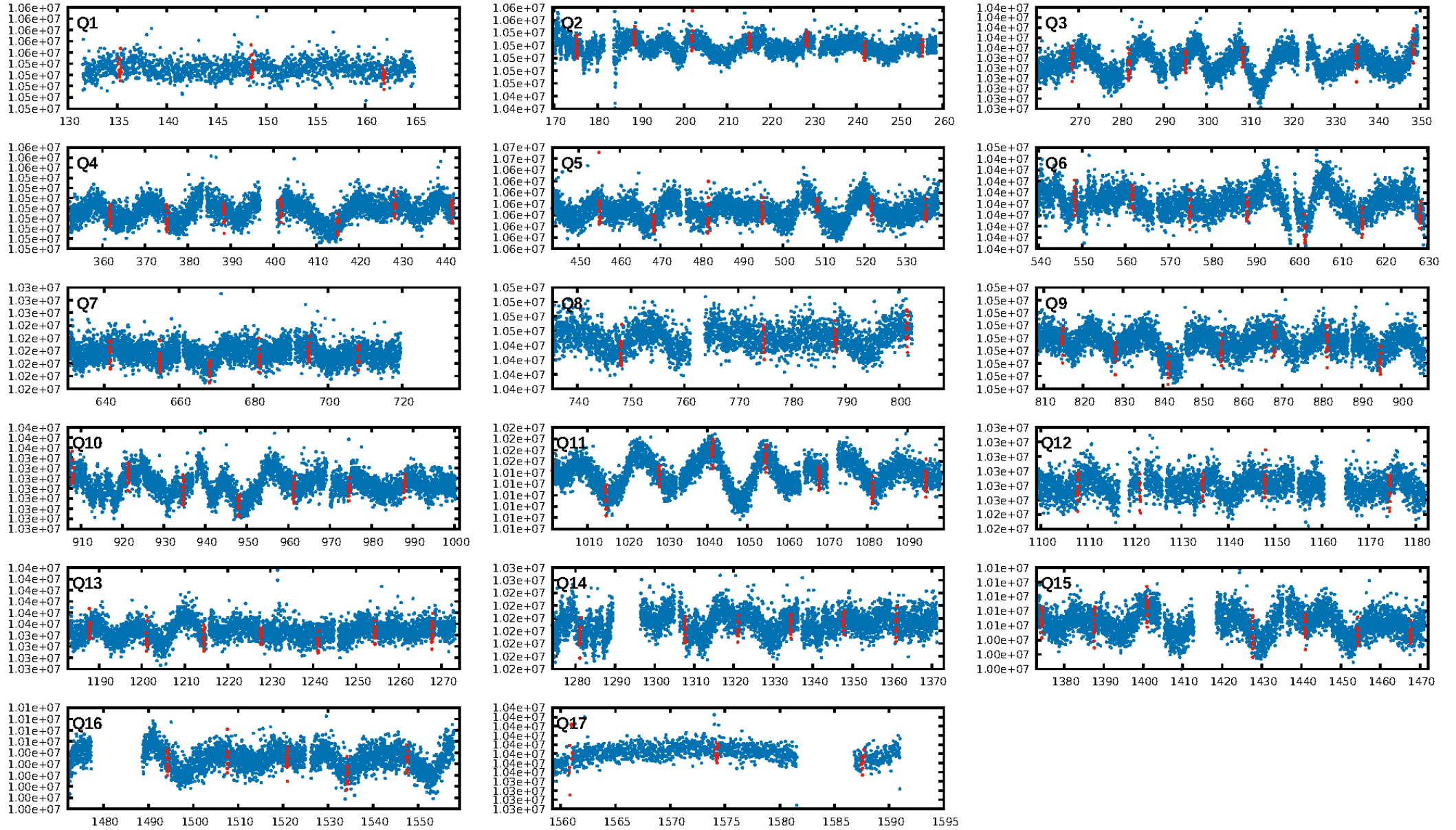
DV Fit Results:

Period = 13.32394 [0.00005] d
Epoch = 135.2445 [0.0031] BKJD
Rp/R* = 0.0295 [0.0038]
a/R* = 16.85 [10.18]
b = 0.86 [0.19]
Seff = 4.84 [1.58]
Teq = 378 [31] K
Rp = 1.45 [0.40] Re
a = 0.0862 [0.0156] AU
Ag = 129.23 [81.30] [1.58σ]
Teffp = 1972 [311] K [5.10σ]

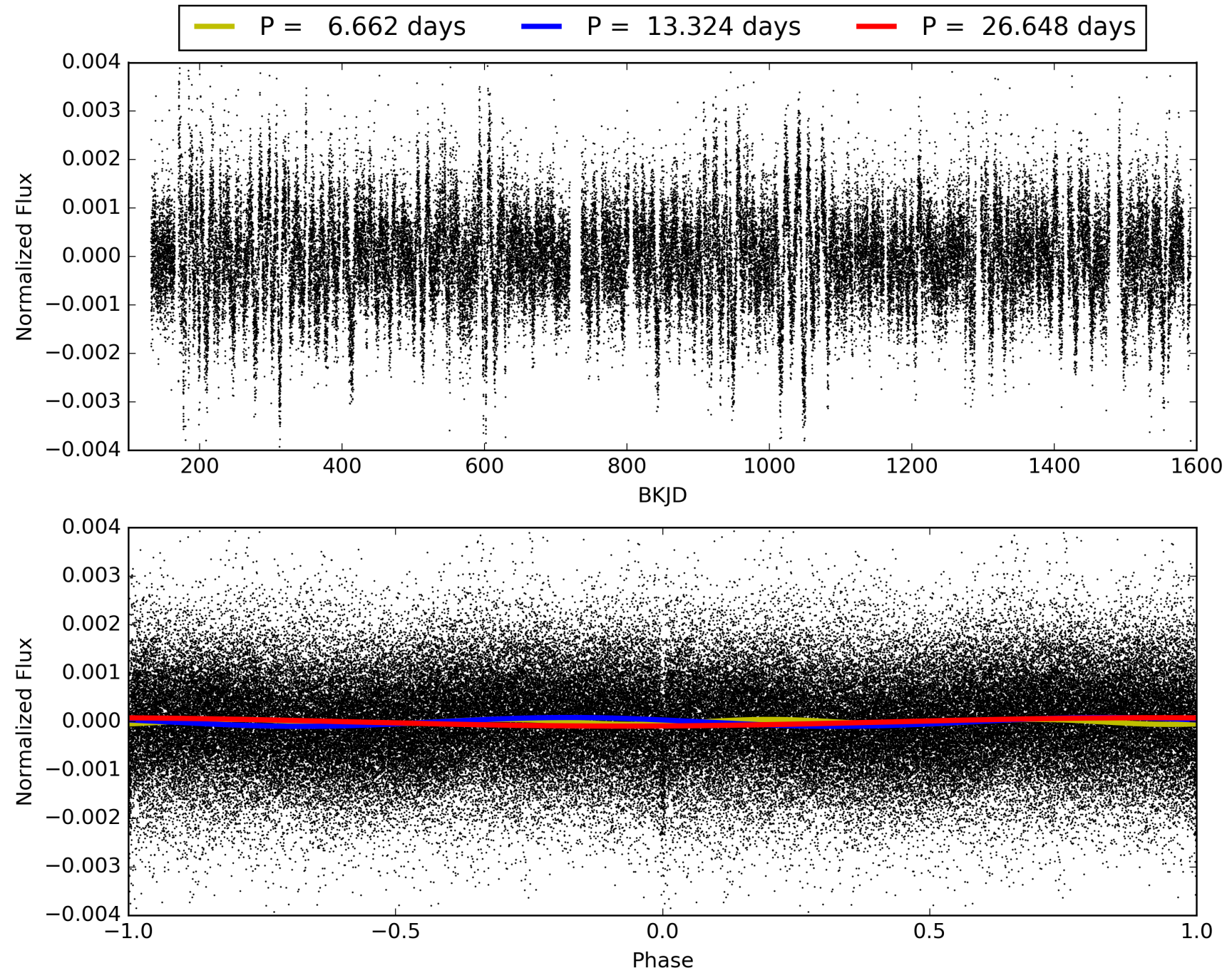
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [22.44σ]
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.00e-98
RollingBand-fgt: 0.93 [89/96]
GhostDiagnostic-chr: 10.57
Centroid-sig: 70.1%
Centroid-so: 0.176 arcsec [0.27σ]
OotOffset-rm: 0.184 arcsec [0.66σ]
KicOffset-rm: 0.100 arcsec [0.43σ]
OotOffset-st: 3/4/4/4 [15]
KicOffset-st: 3/4/4/4 [15]
DiffImageQuality-fgm: 0.87 [13/15]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008874090-01, PDC Light Curves

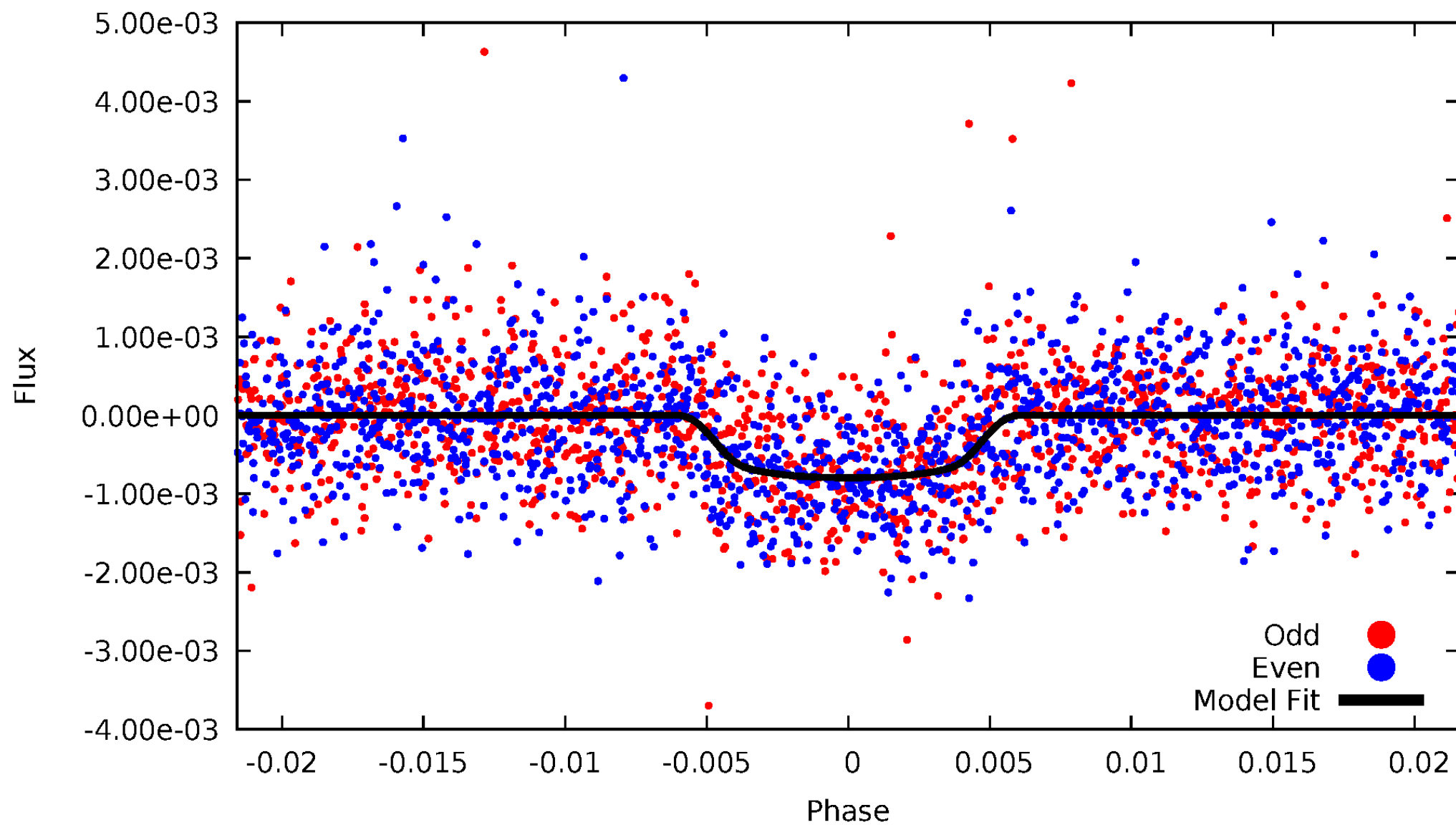


TCE 008874090-01



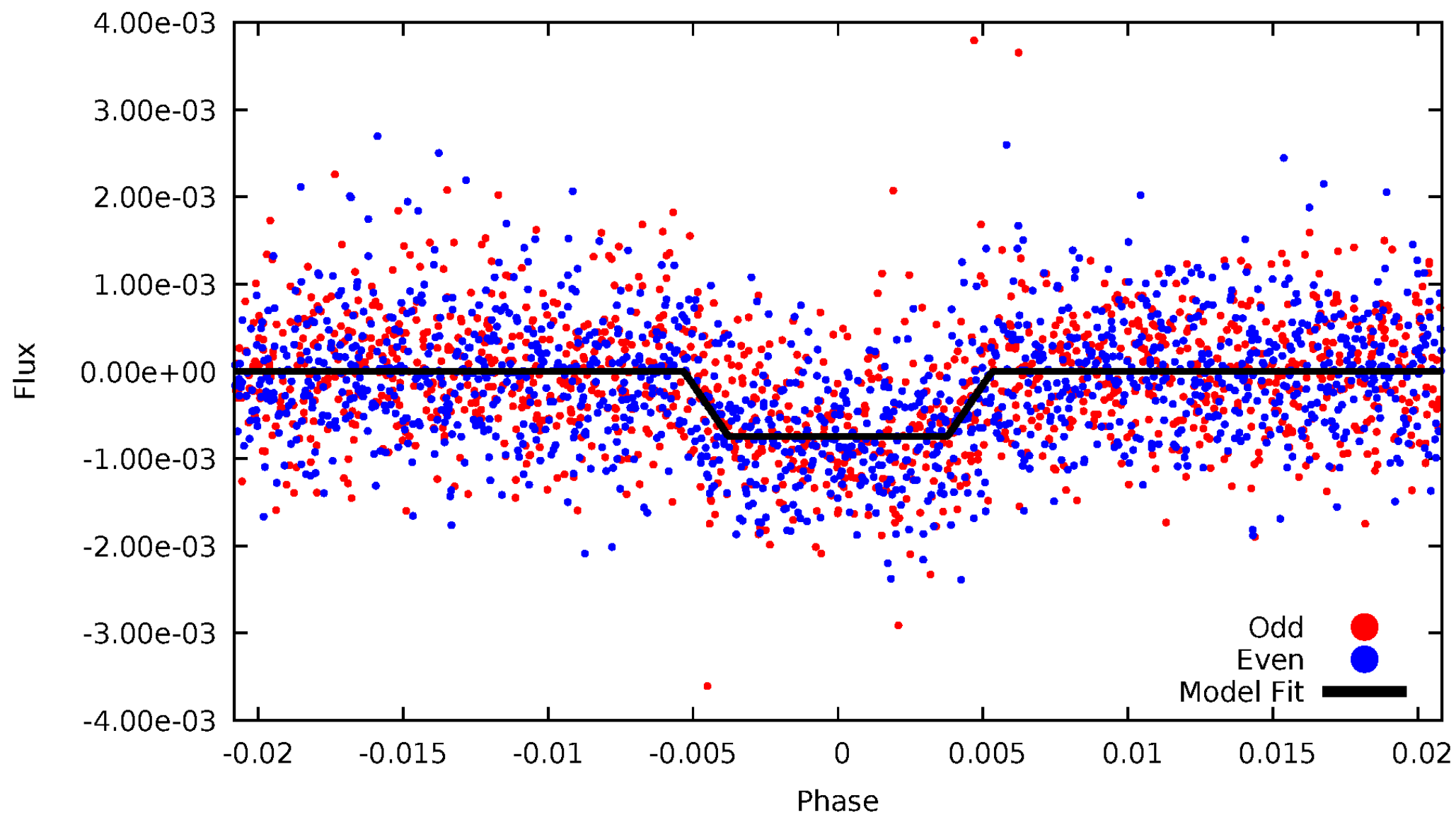
DV Odd/Even

TCE 008874090-01

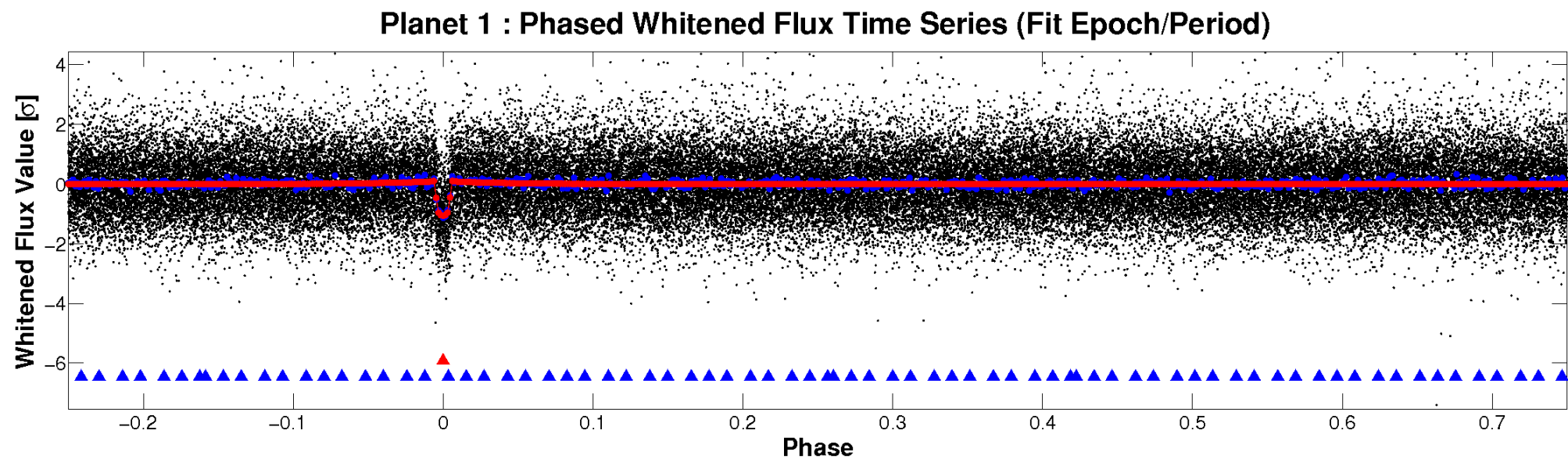
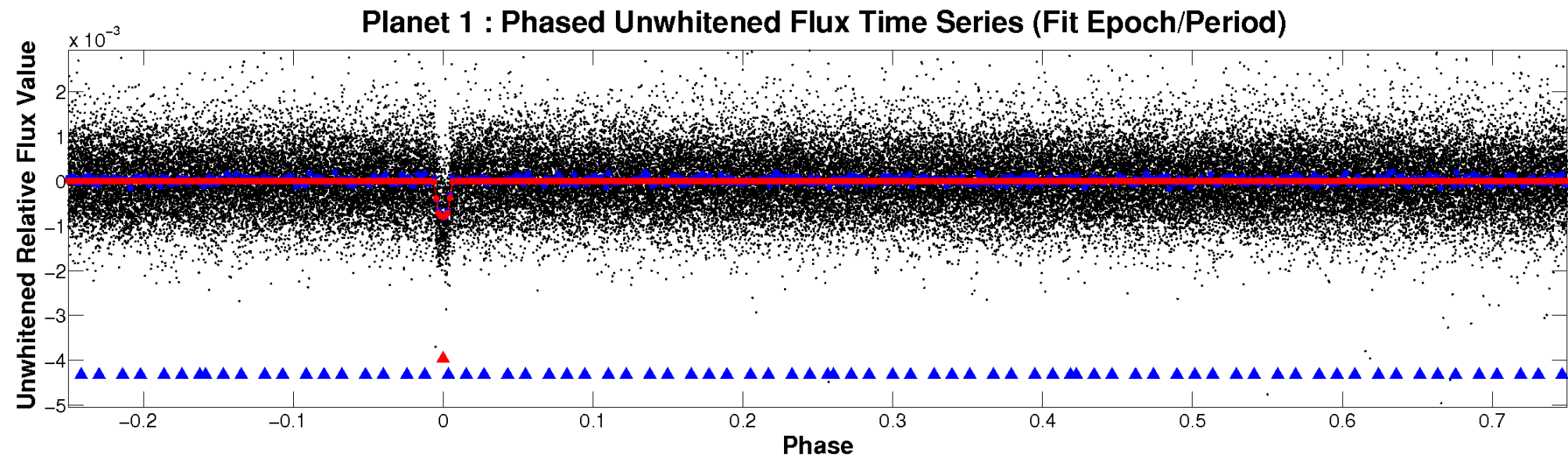


ALT Odd/Even

TCE 008874090-01

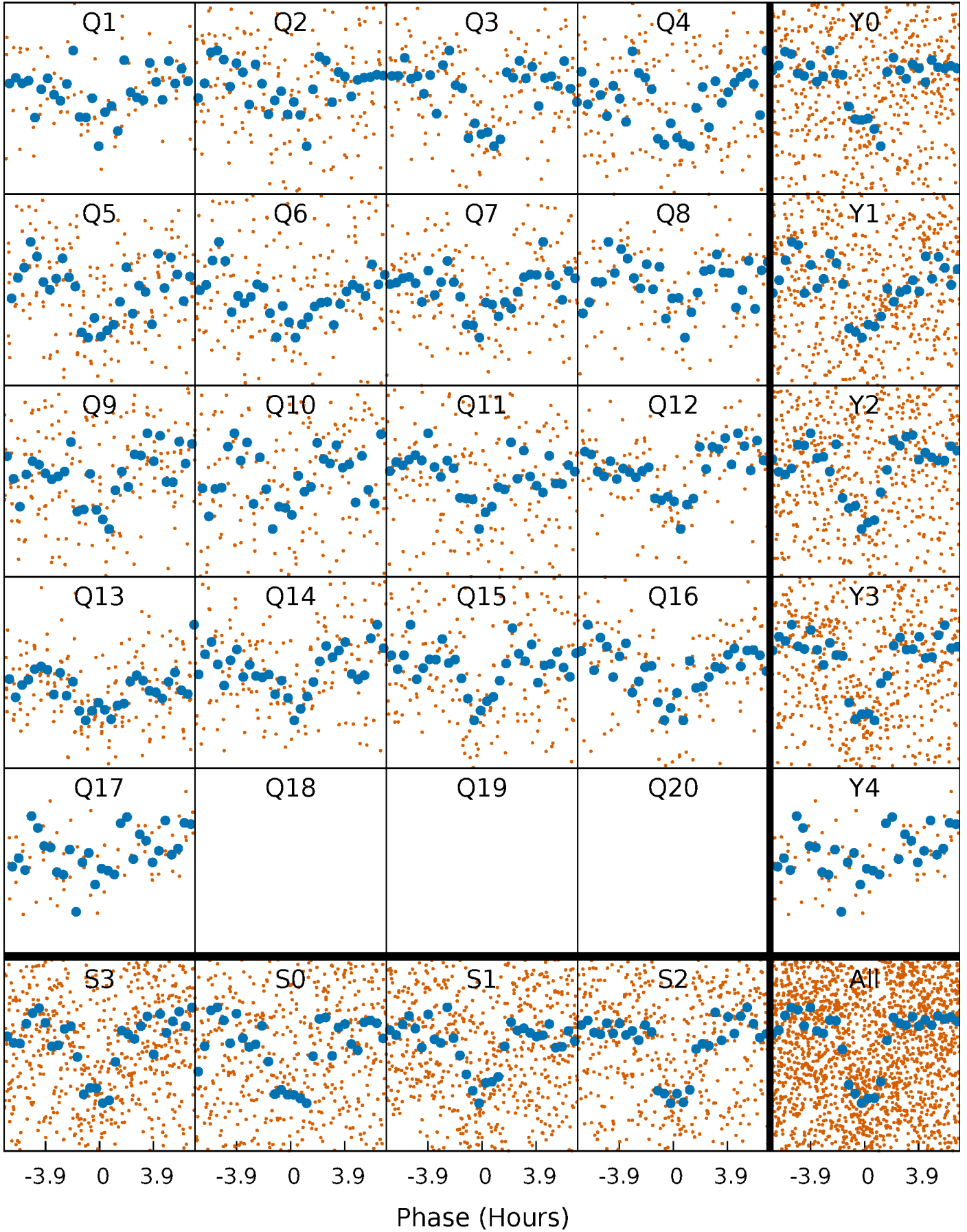


Non-Whitened Vs. Whitened Light Curve



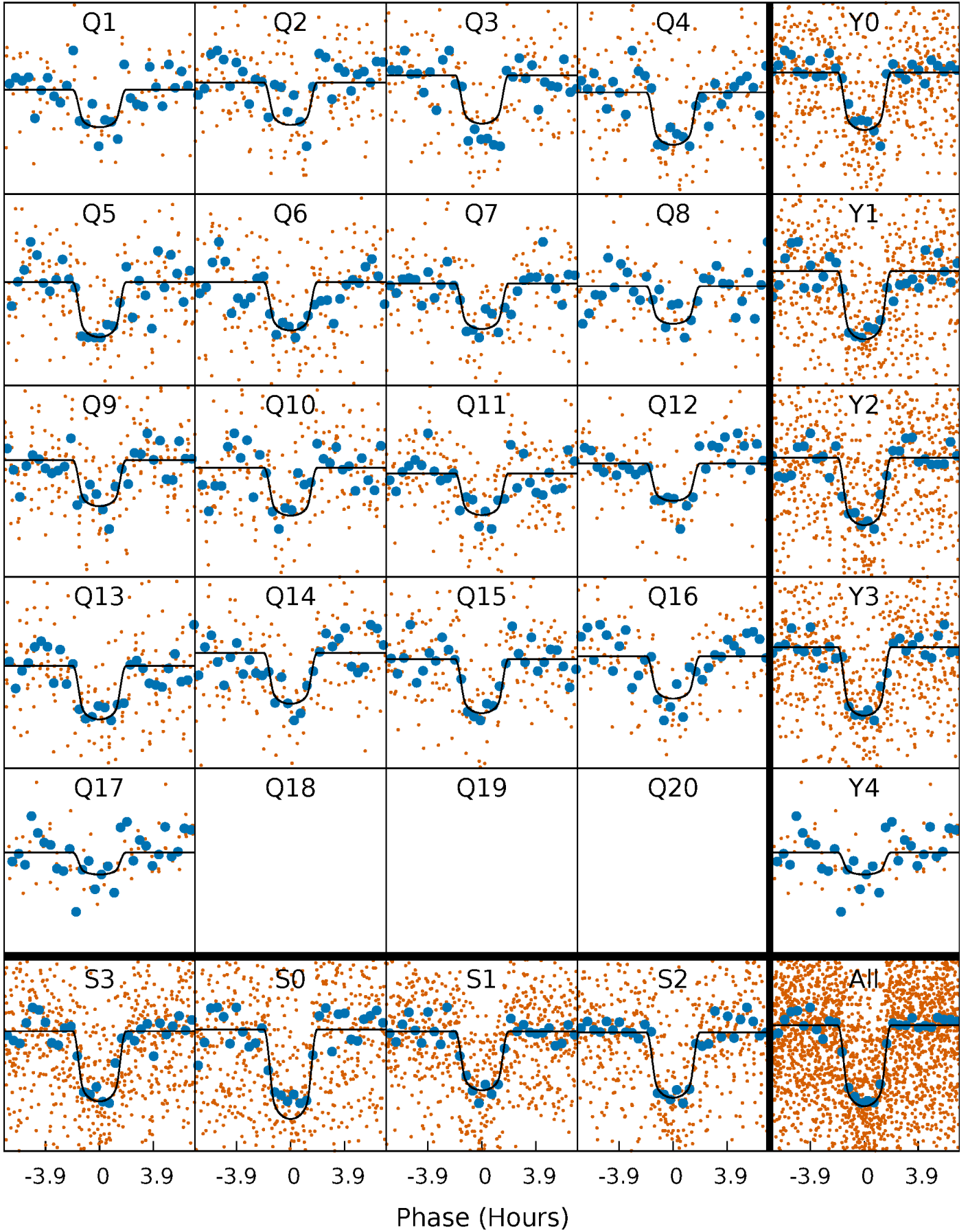
PDC Quarter-Phased Transit Curves

TCE 008874090-01 P= 13.323943 Days $T_0=135.244495$ (BKJD)



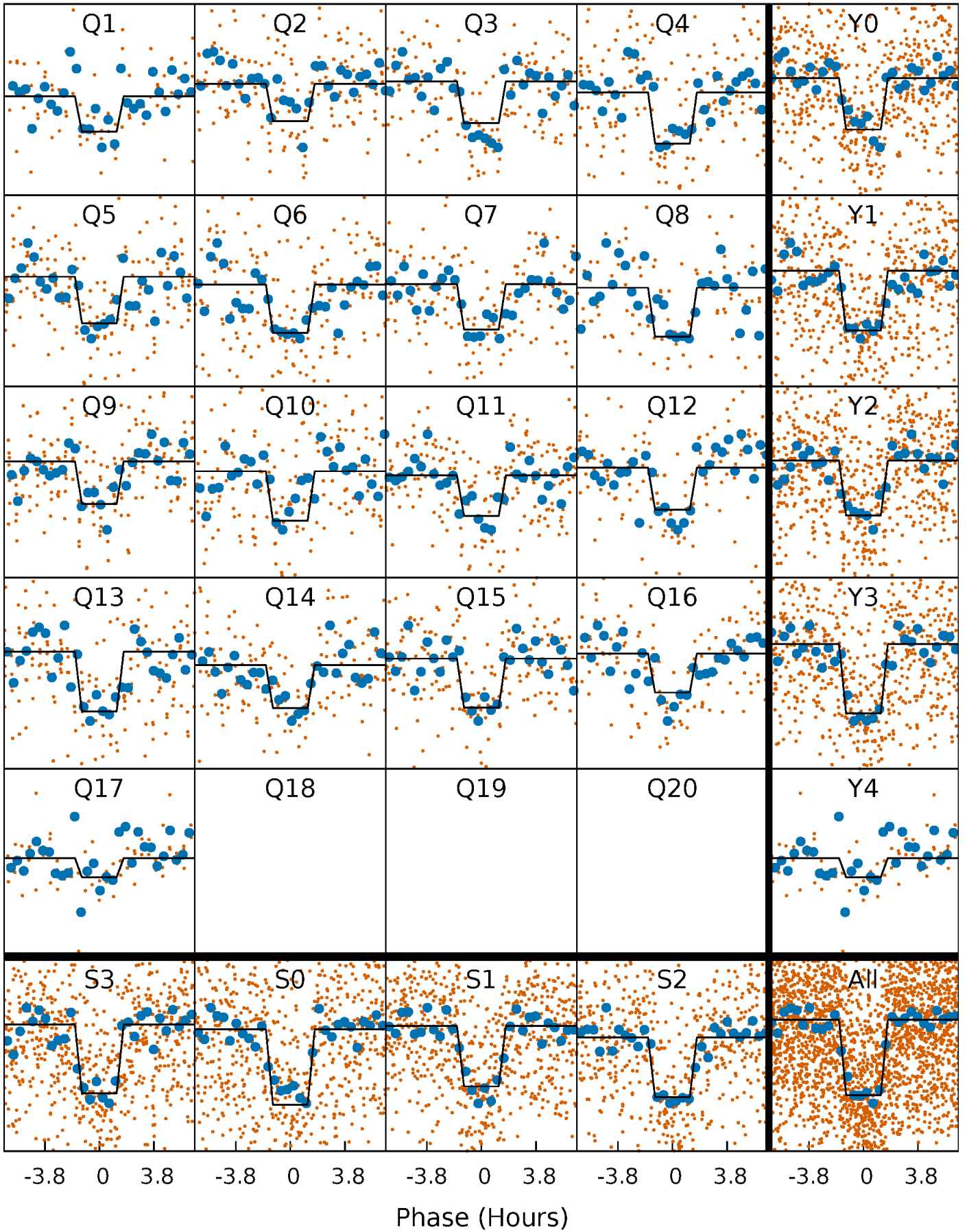
DV Quarter-Phased Transit Curves

TCE 008874090-01 P= 13.323943 Days $T_0=135.244495$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

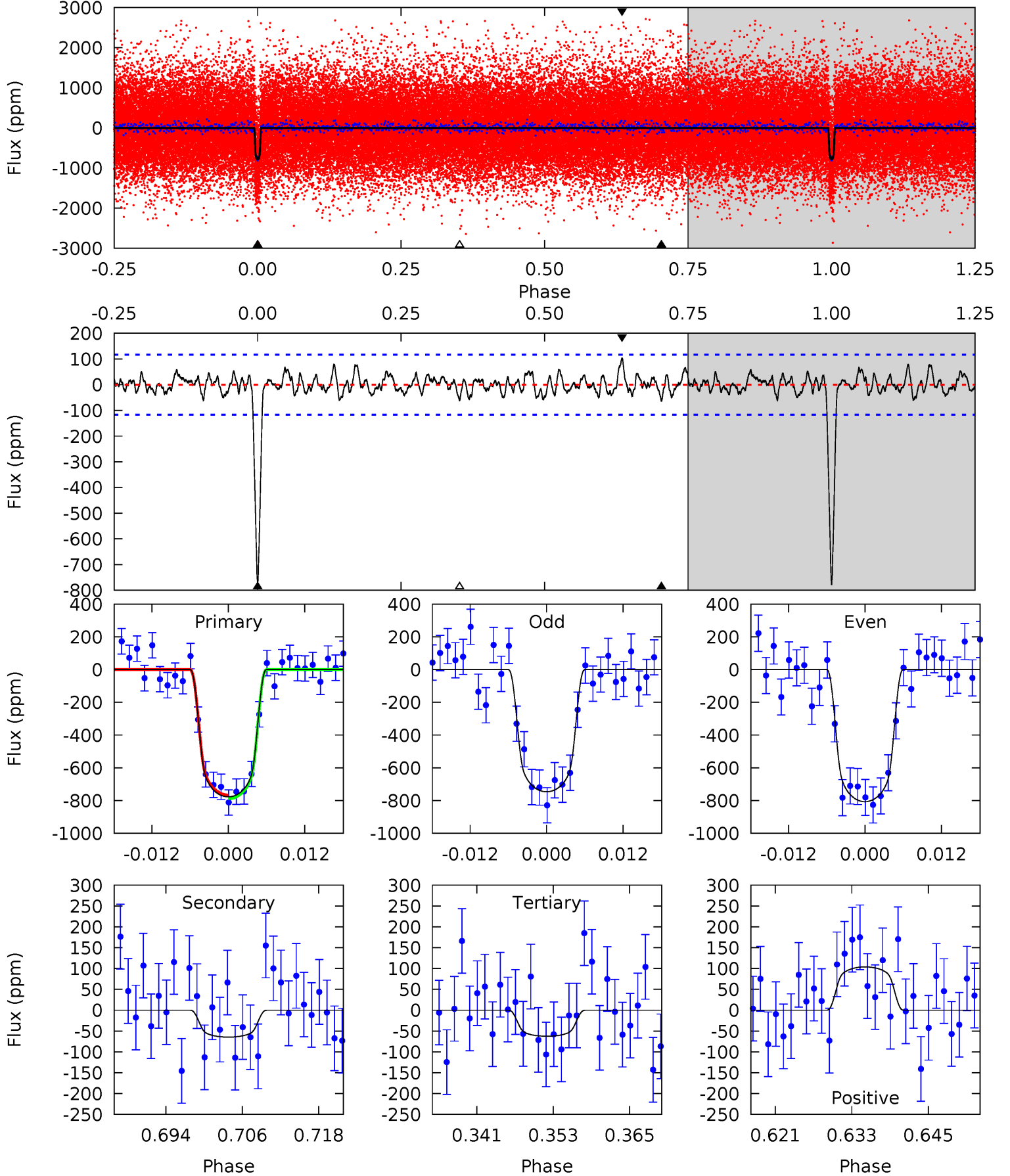
TCE 008874090-01 P= 13.323882 Days $T_0=135.245279$ (BKJD)



DV Model-Shift Uniqueness Test

008874090-01, $P = 13.323943$ Days, $E = 121.920552$ Days

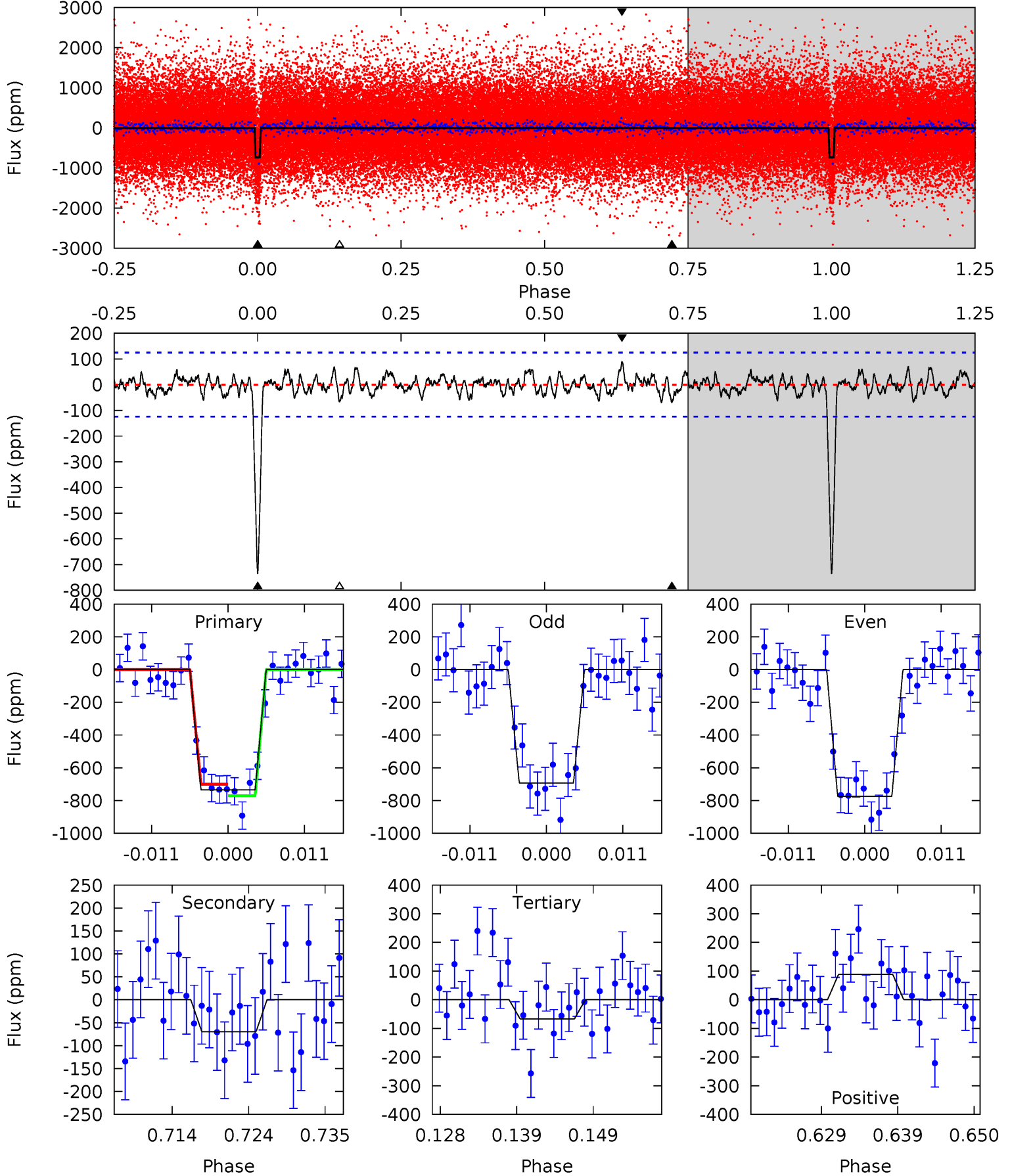
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.2	2.76	2.67	4.43	4.99	2.51	1.19	30.5	28.8	0.09	-1.67	1.29	0.94	0.12	0.48



Alt Model-Shift Uniqueness Test

008874090-01, $P = 13.323882$ Days, $E = 121.921397$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.6	2.80	2.70	3.56	5.01	2.55	1.08	26.9	26.0	0.10	-0.76	1.66	0.98	0.11	1.38



Stellar Parameters For KIC 008874090

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3751^{+219}_{-219}	$4.813^{+0.104}_{-0.085}$	$-0.240^{+0.150}_{-0.150}$	$0.450^{+0.082}_{-0.110}$	$0.479^{+0.065}_{-0.121}$	$7.426^{+5.096}_{-2.180}$
	+6%/-6%	+2%/-2%	+62%/-62%	+18%/-24%	+14%/-25%	+69%/-29%
Source	SPE5	SPE5	SPE5	DSEP		

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

Secondary Eclipse Parameters for KIC 008874090-01 / KOI 1404.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-65 ± 23	$1.43^{+0.25}_{-0.27}$	526^{+38}_{-36}	2566^{+195}_{-197}	125^{+80}_{-50}
Alt.	-70 ± 25	$1.32^{+0.28}_{-0.23}$	527^{+38}_{-38}	2642^{+210}_{-187}	161^{+89}_{-64}

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

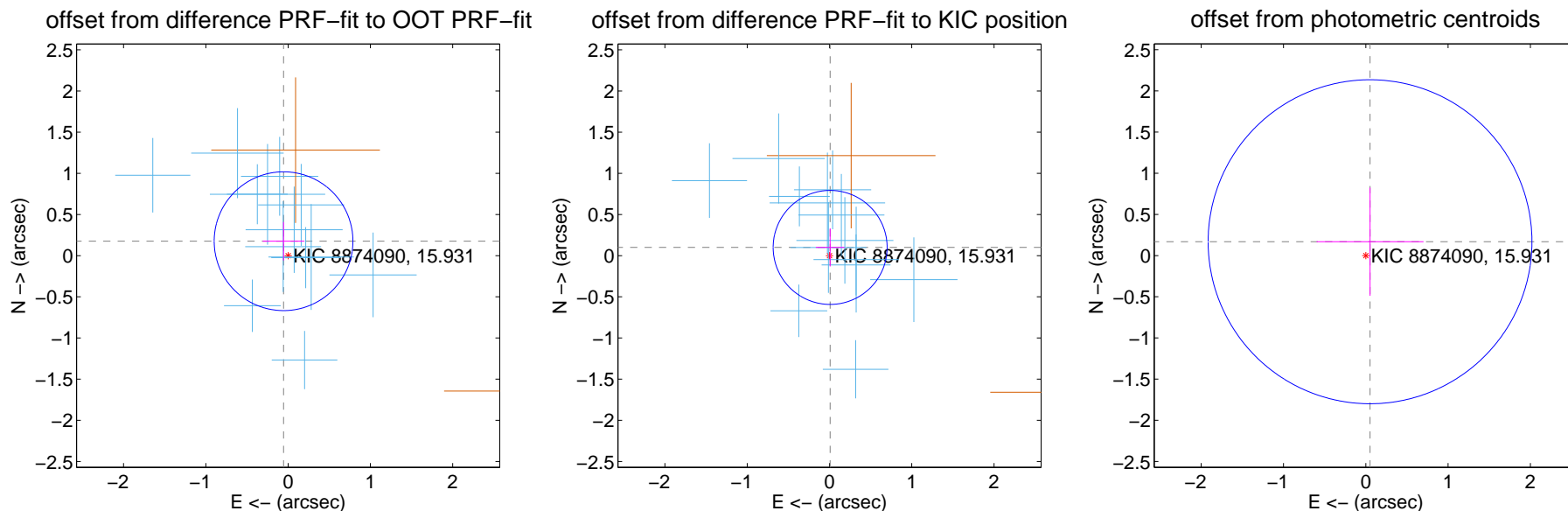
DV Centroid Data

Supplemental centroid analysis for 008874090-01. Kepler magnitude: 15.93. Transit SNR 23.38

There are 13 quarters with good PRF difference image offsets

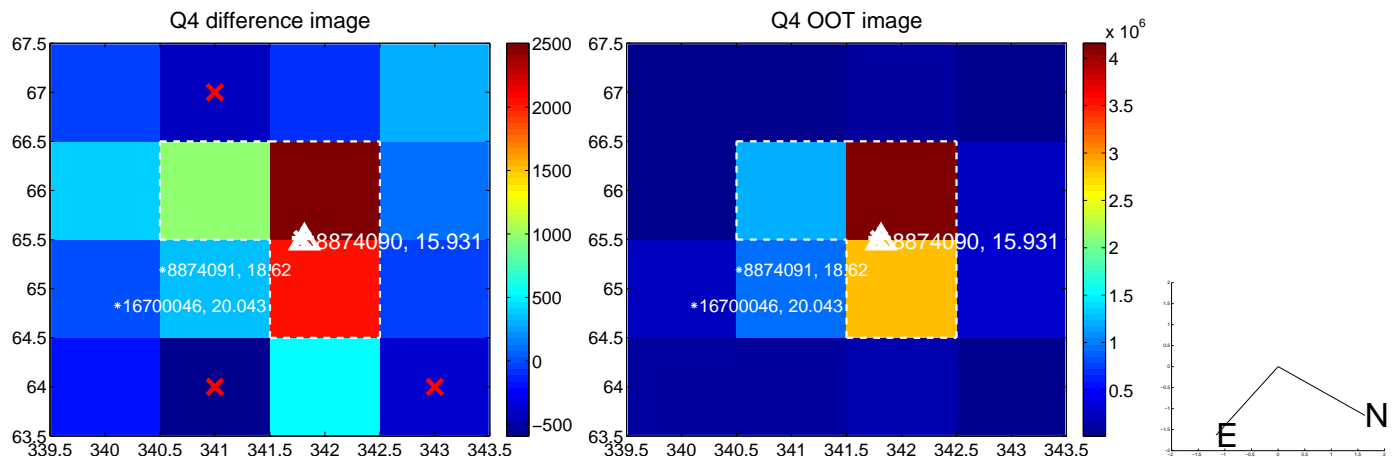
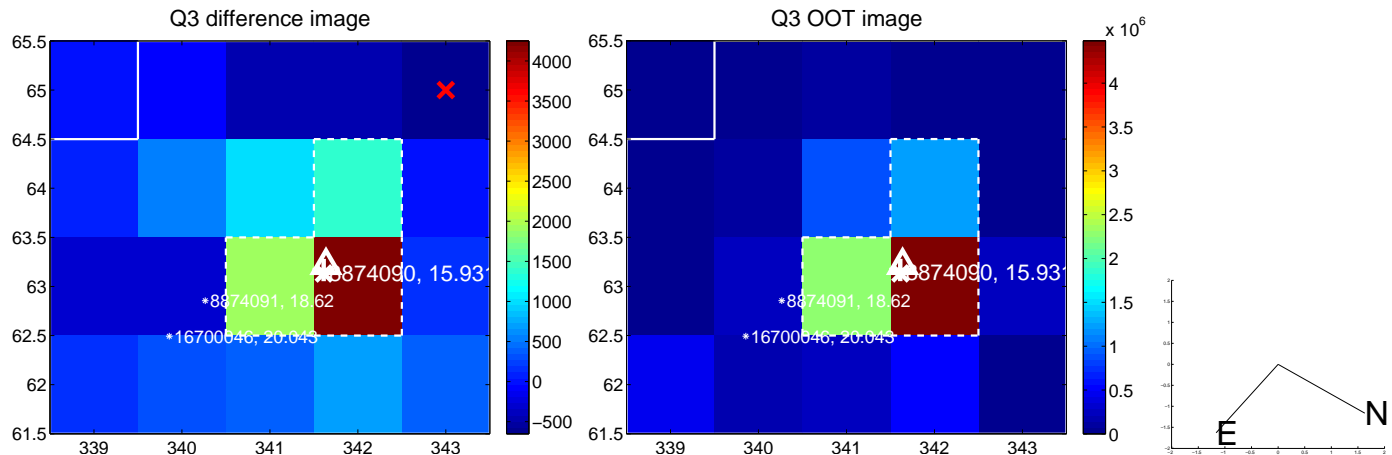
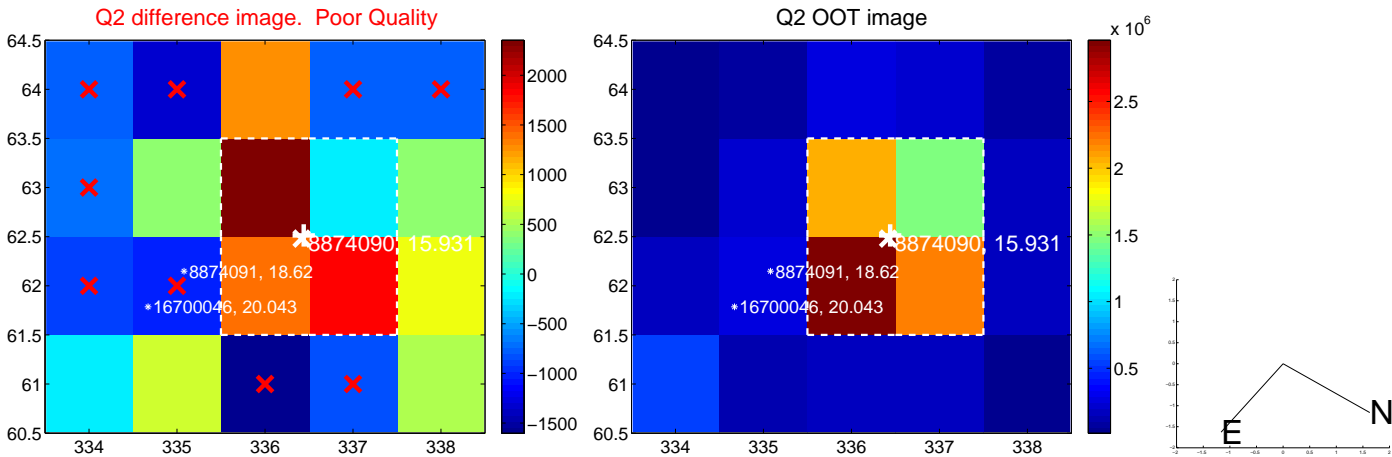
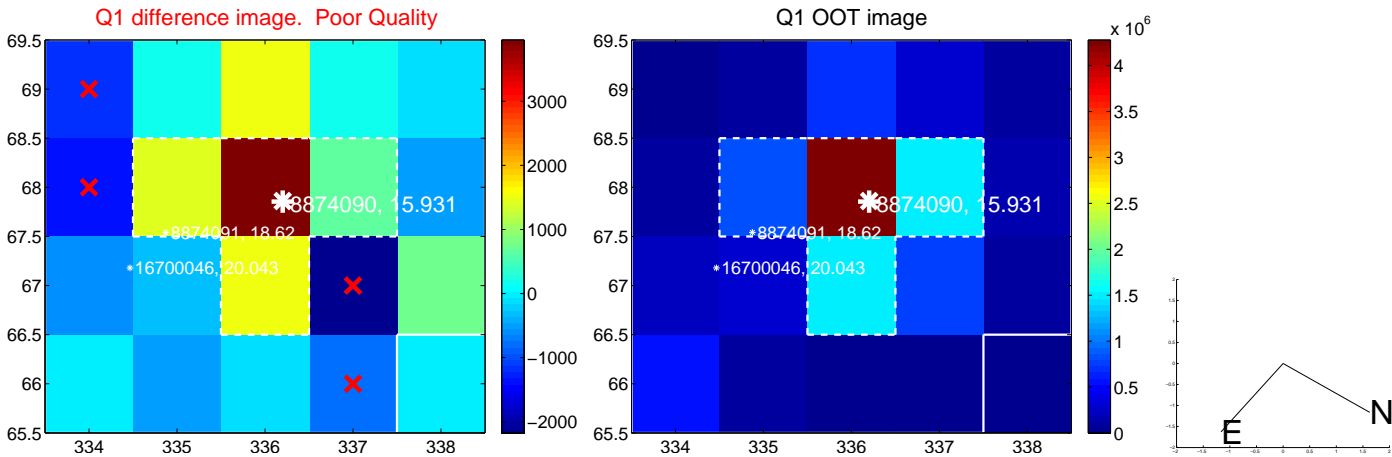
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.184 ± 0.281	0.66	0.056 ± 0.254	0.175 ± 0.233
PRF-fit source offset from KIC position	0.100 ± 0.231	0.43	-0.008 ± 0.174	0.100 ± 0.231
photometric centroid source offset	0.18 ± 0.66	0.27	-0.05 ± 0.65	0.17 ± 0.66

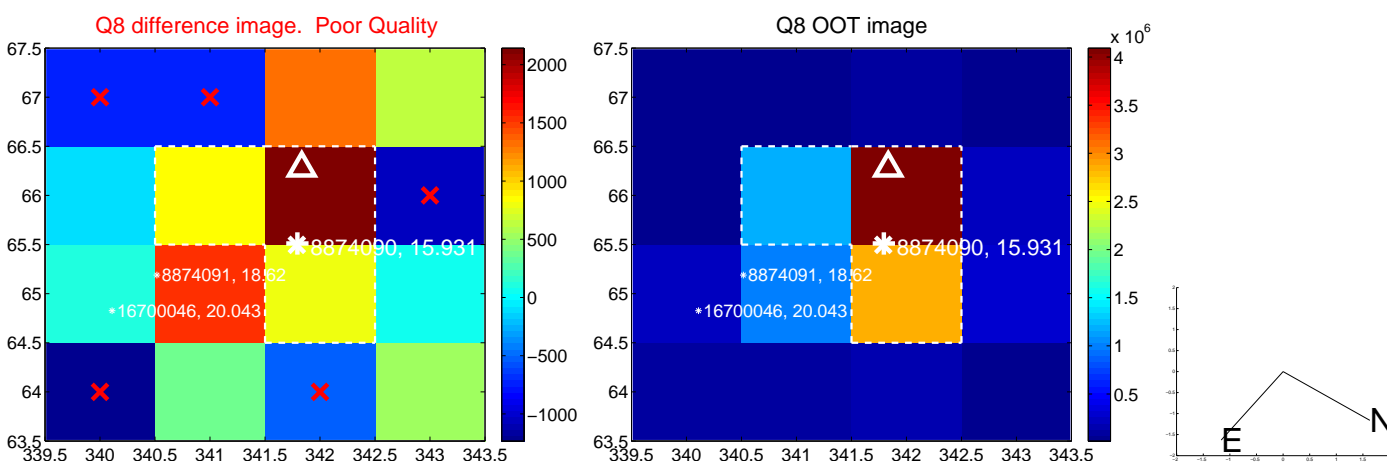
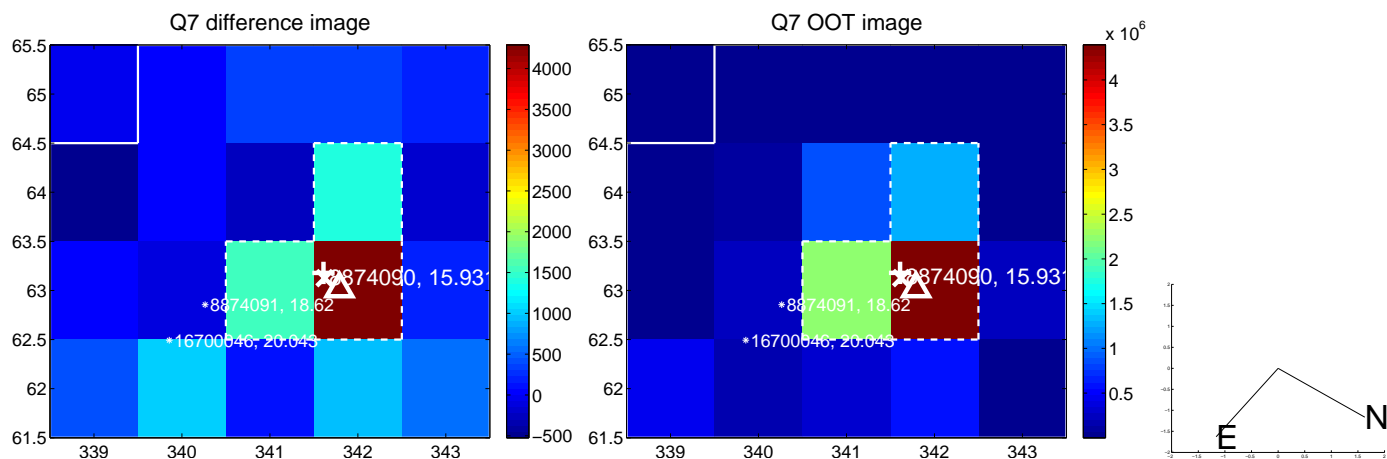
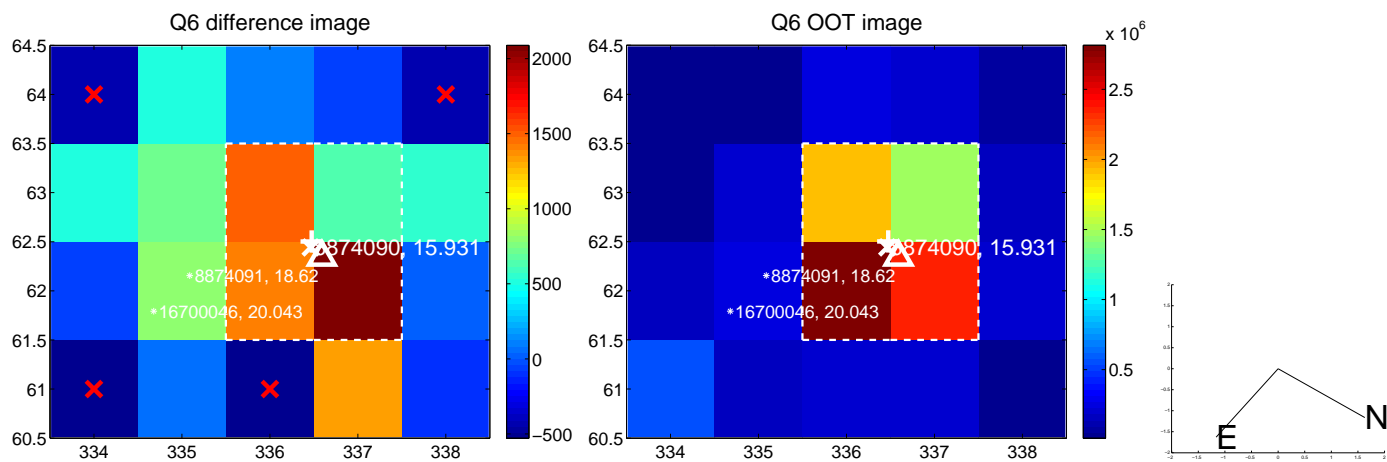
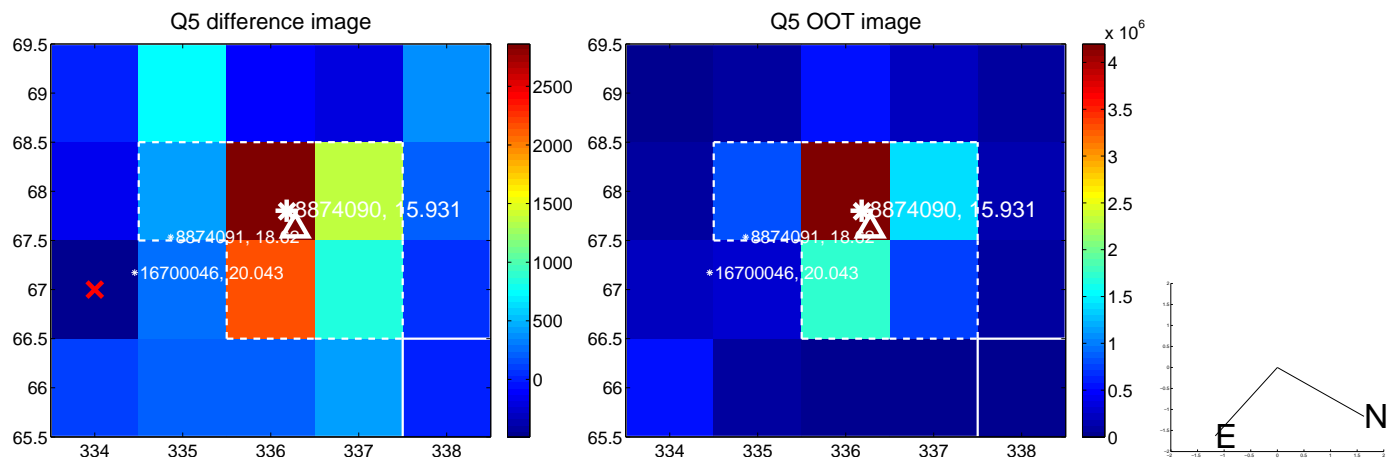


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

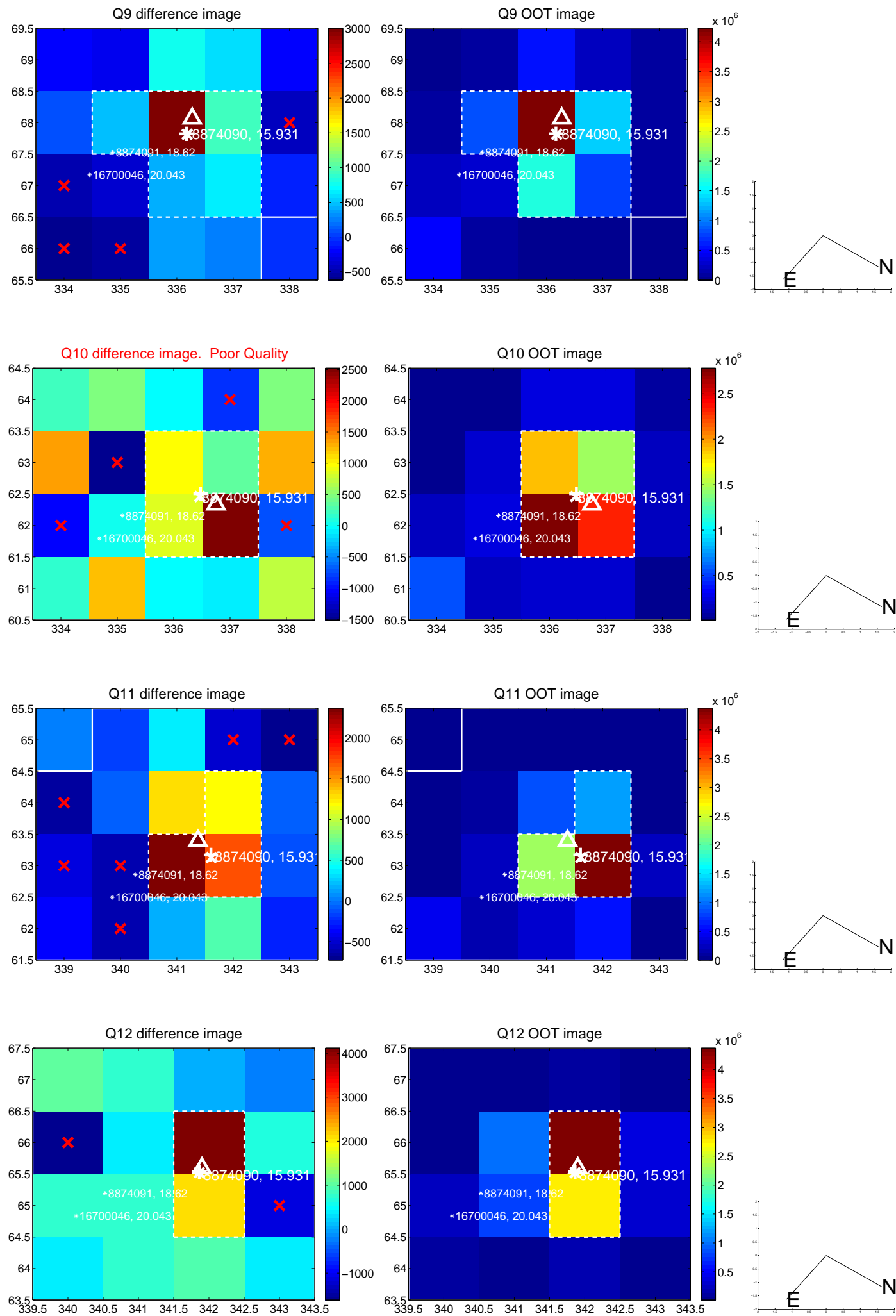
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



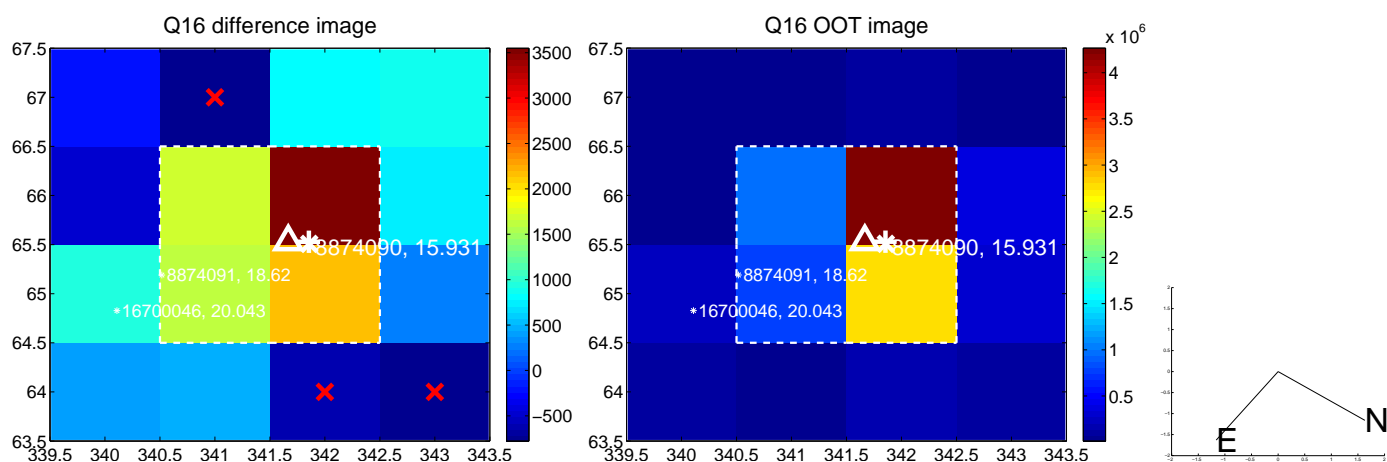
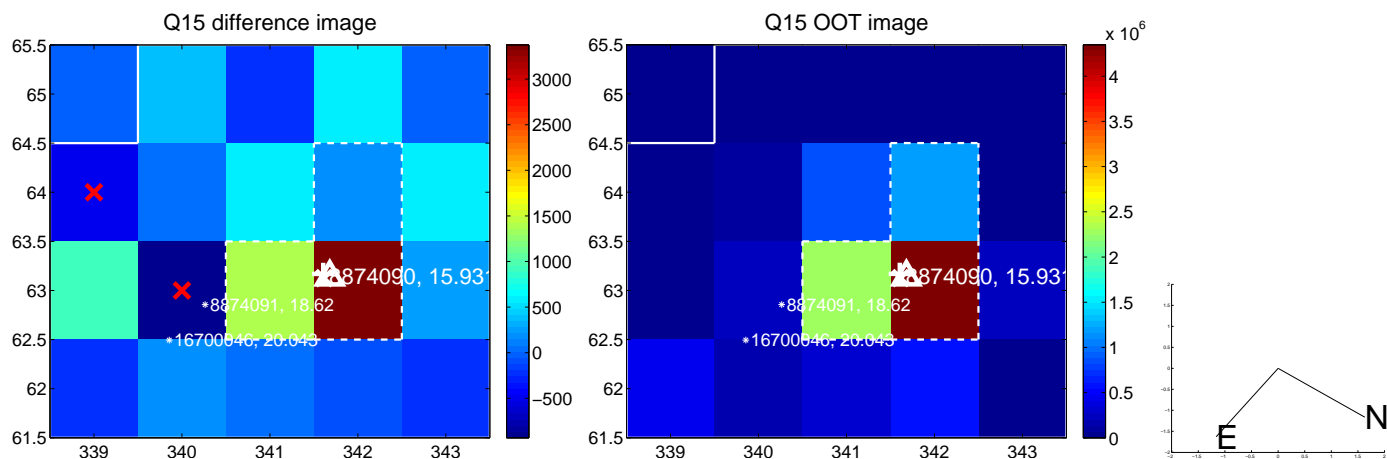
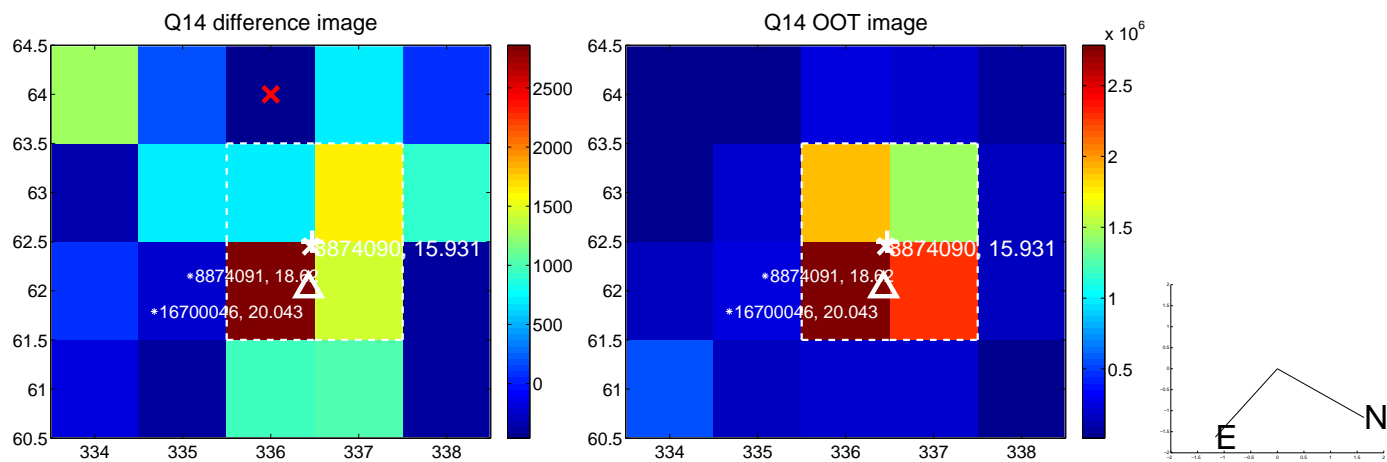
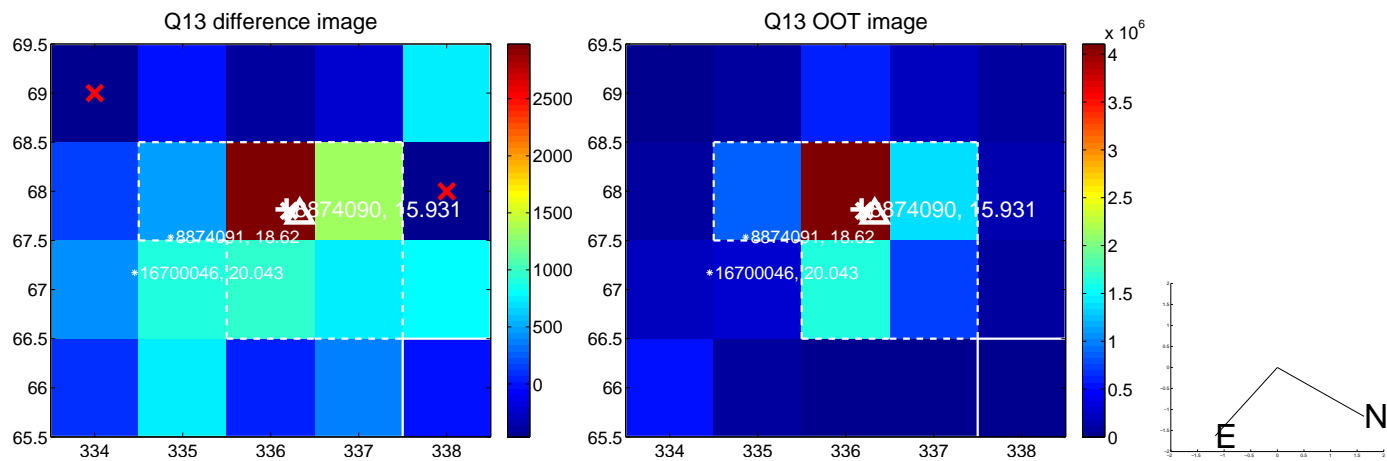
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



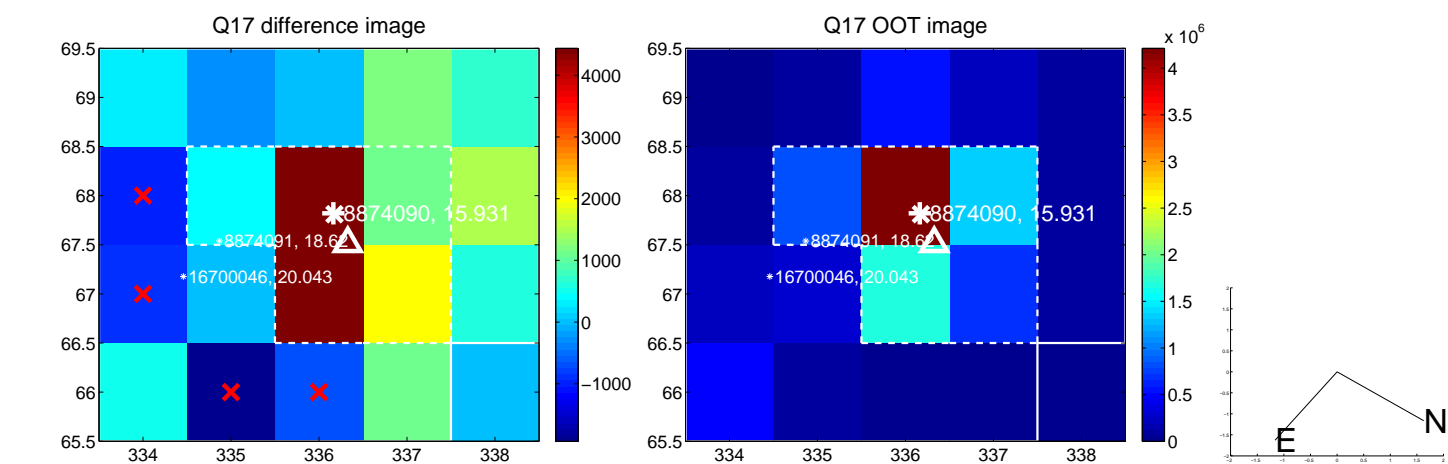
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



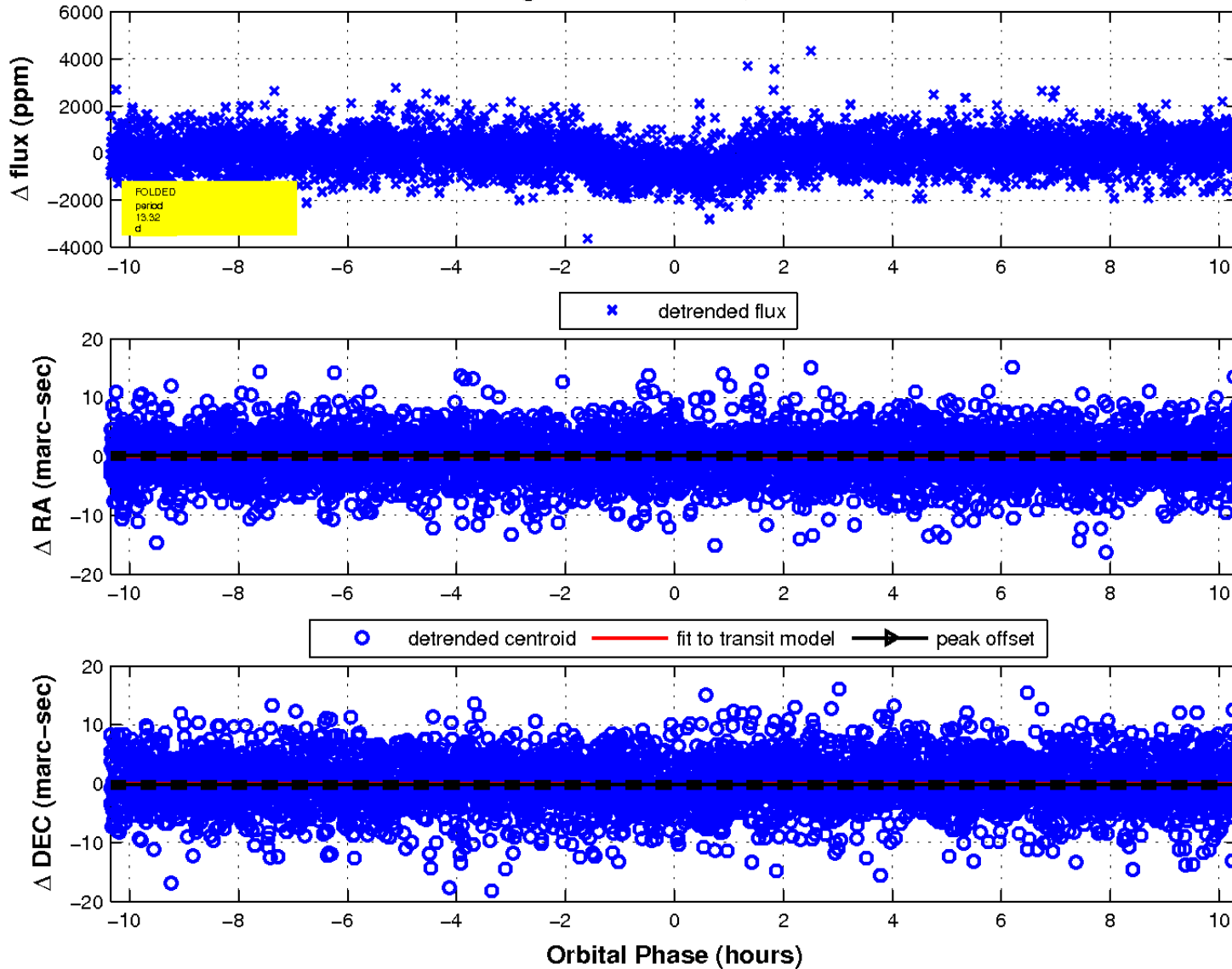
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

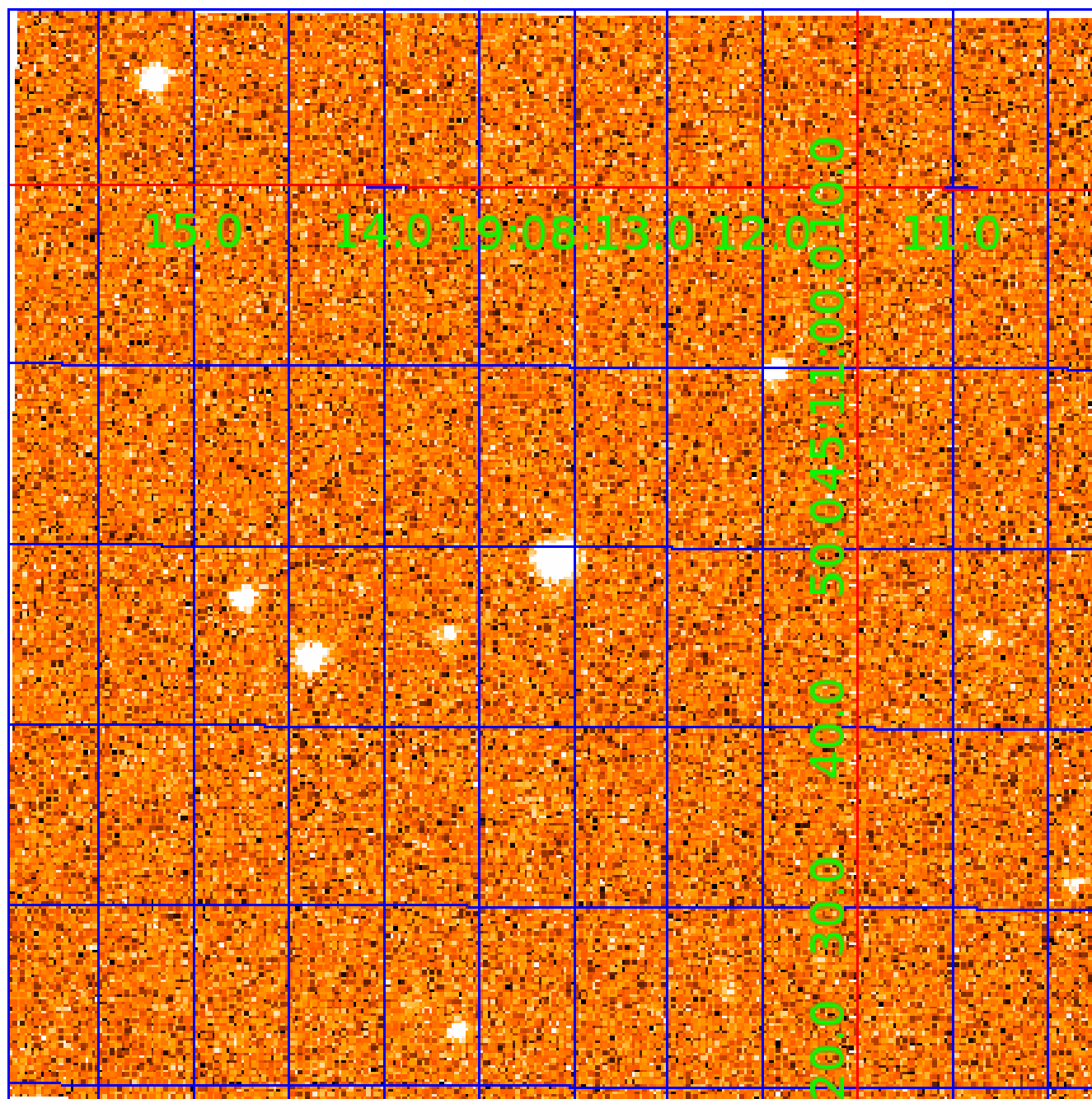


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 008874090

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})
008874090-01	OBS	1404.01	13.323943	135.244494	797.3	3.451	21.4	23.4	0.45	3751	1.45	4.84
008874090-02	OBS	1404.02	18.906285	140.822663	414.5	4.874	10.1	10.7	0.45	3751	1.19	3.04

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008874090-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008874090-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT

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

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

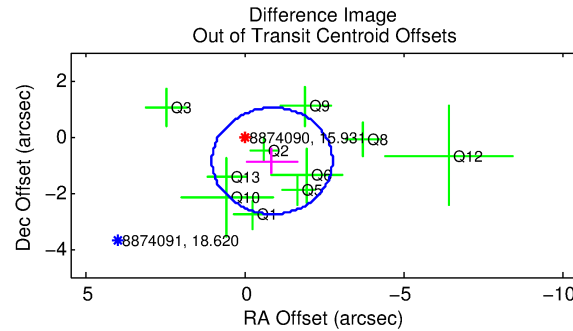
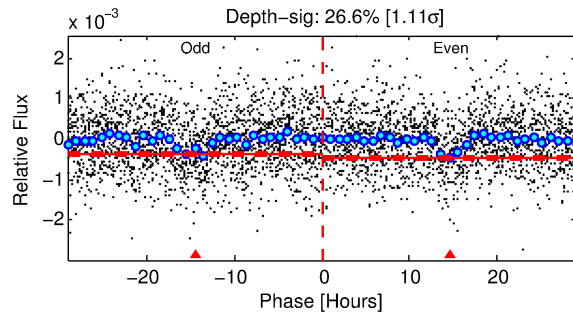
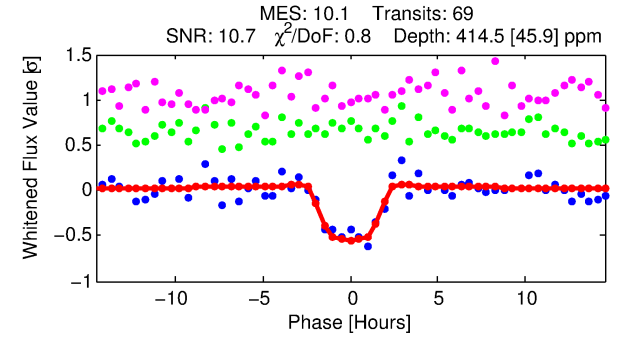
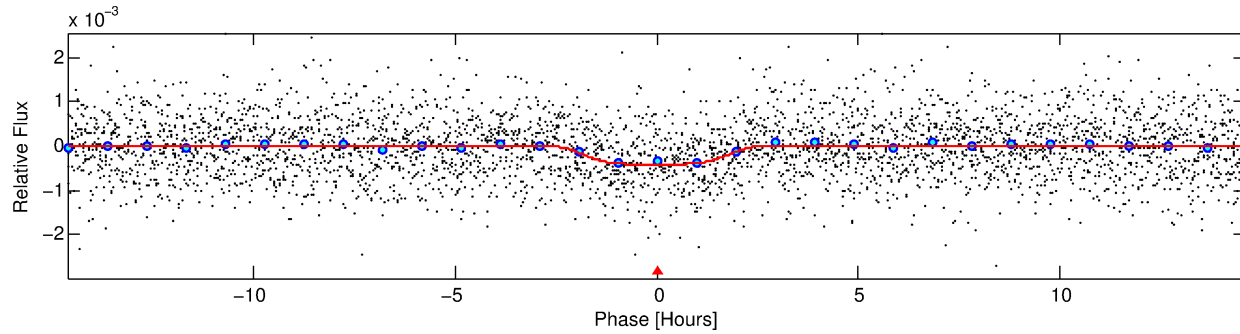
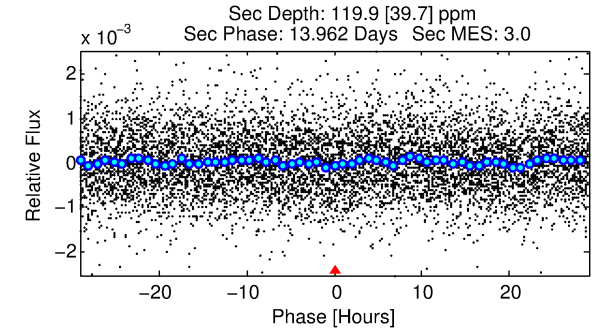
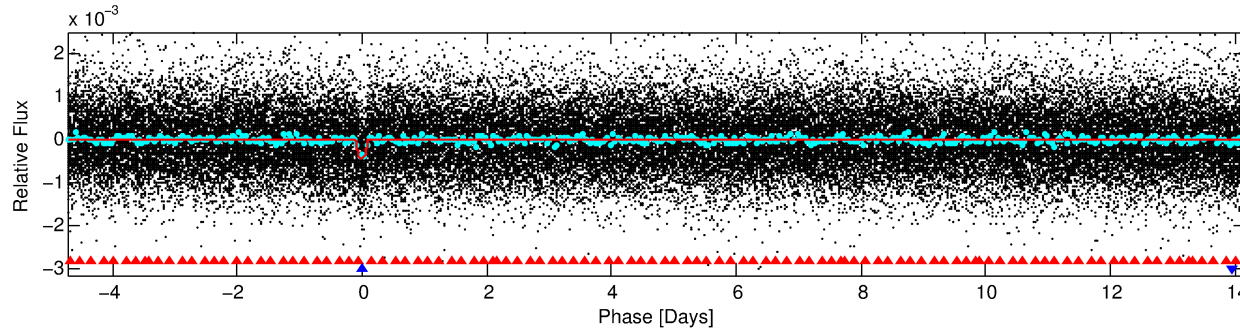
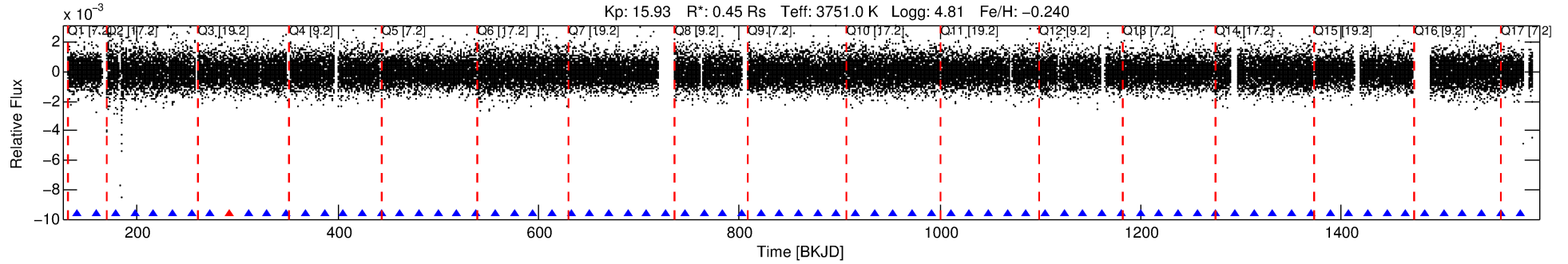
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008874090-02

No Significant Match Found

DV One-Page Summary

KIC: 8874090 Candidate: 2 of 2 Period: 18.906 d
KOI: K01404.02 Corr: 0.870



DV Fit Results:

Period = 18.90628 [0.00023] d
Epoch = 140.8227 [0.0100] BKJD
Rp/R* = 0.0242 [0.0023]
a/R* = 10.42 [2.65]
b = 0.96 [0.02]
Seff = 3.03 [0.99]
Teq = 337 [27] K
Rp = 1.19 [0.31] Re
a = 0.1088 [0.0197] AU
Ag = 551.86 [244.65] [2.25σ]
Teffp = 2522 [281] K [7.73σ]

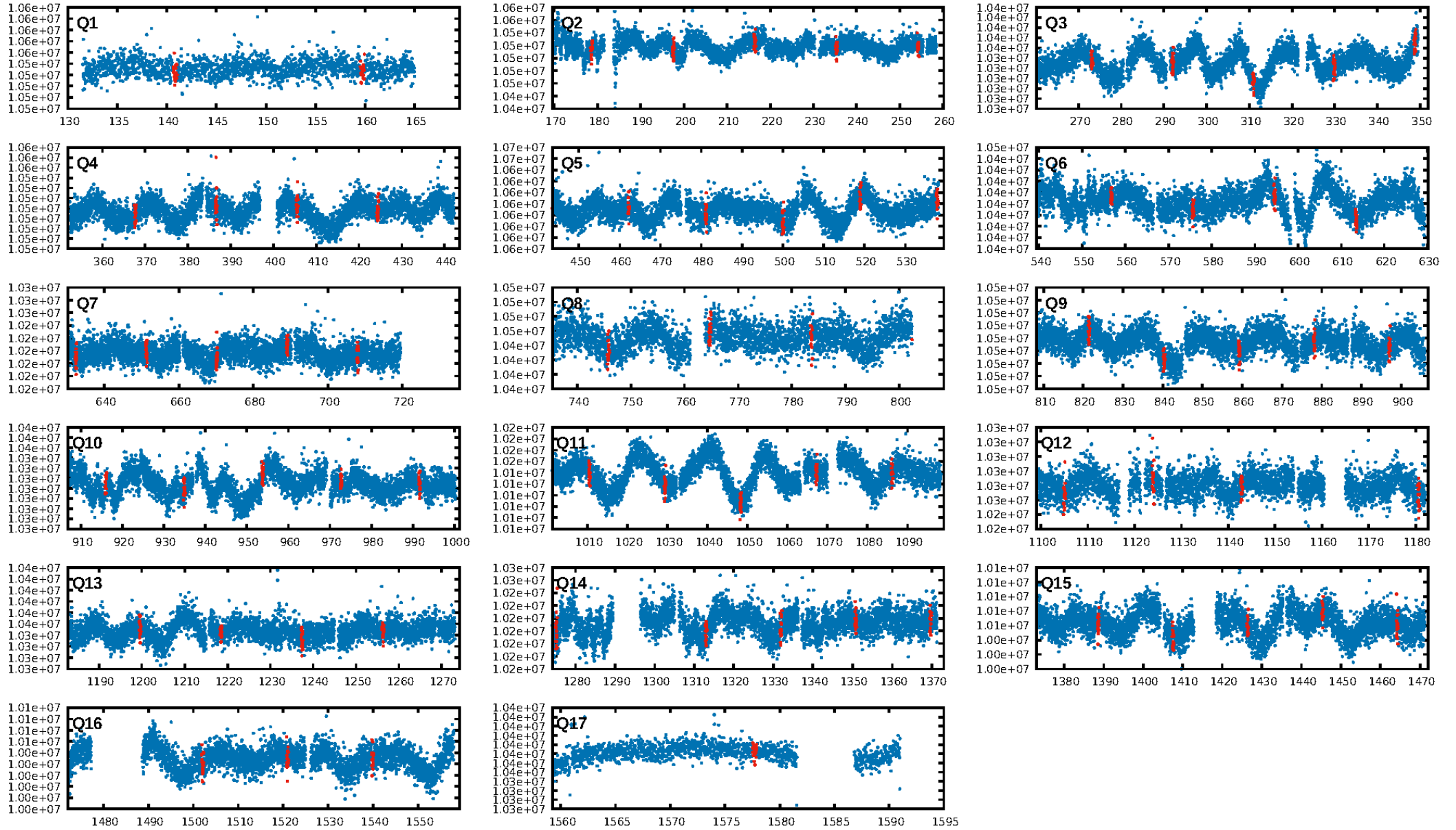
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [22.44σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 93.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.11e-23
RollingBand-fgt: 0.98 [65/66]
GhostDiagnostic-chr: -22.93
Centroid-sig: 79.1%
Centroid-so: 0.646 arcsec [0.46σ]
OotOffset-rm: 1.216 arcsec [1.93σ]
OotOffset-st: 3/1/2/4 [10]
KicOffset-rm: 1.290 arcsec [2.26σ]
KicOffset-st: 3/1/2/4 [10]
DiffImageQuality-fgm: 0.50 [5/10]
DiffImageOverlap-fno: 1.00 [17/17]

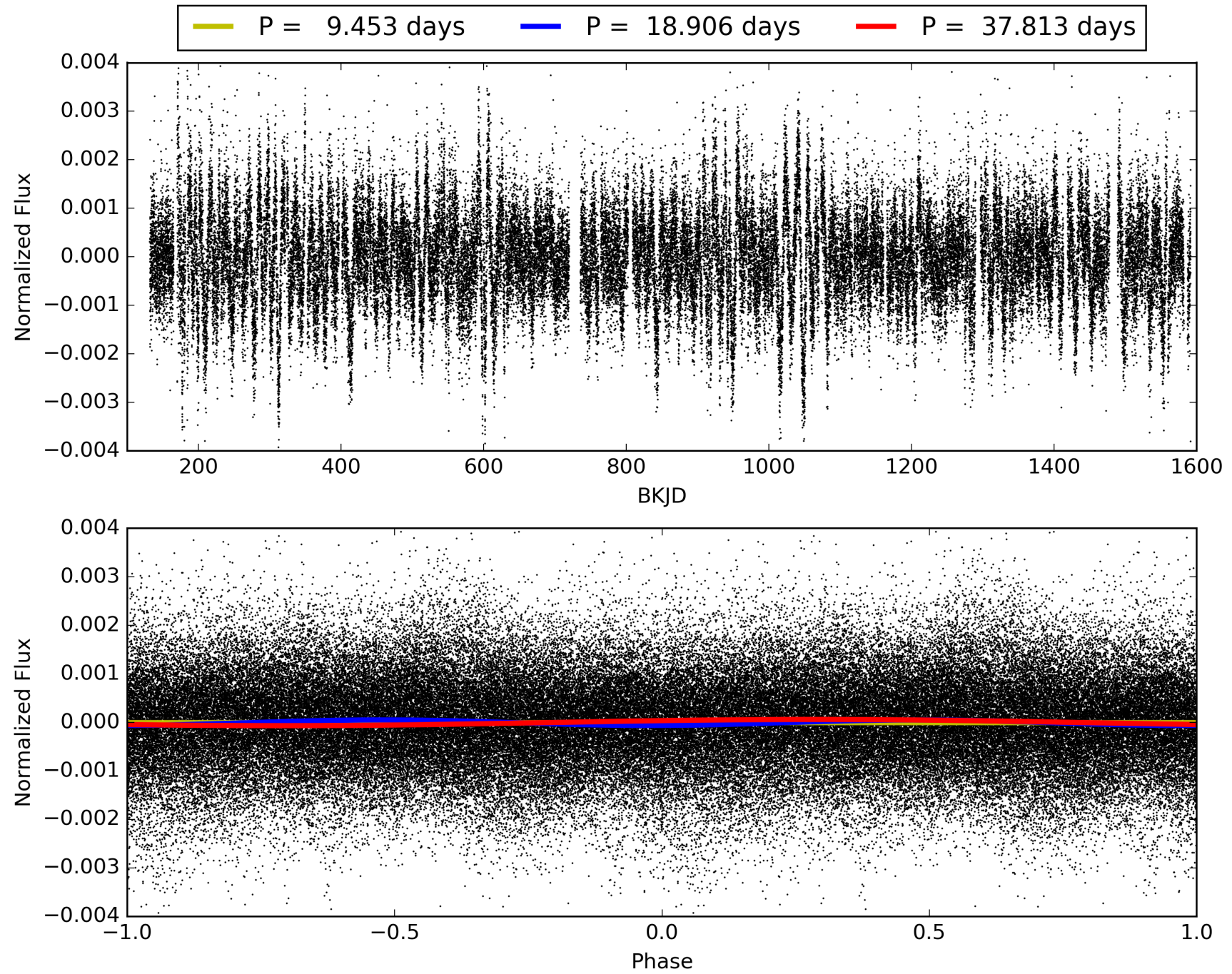
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 00:56:43 Z

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

TCE 008874090-02, PDC Light Curves

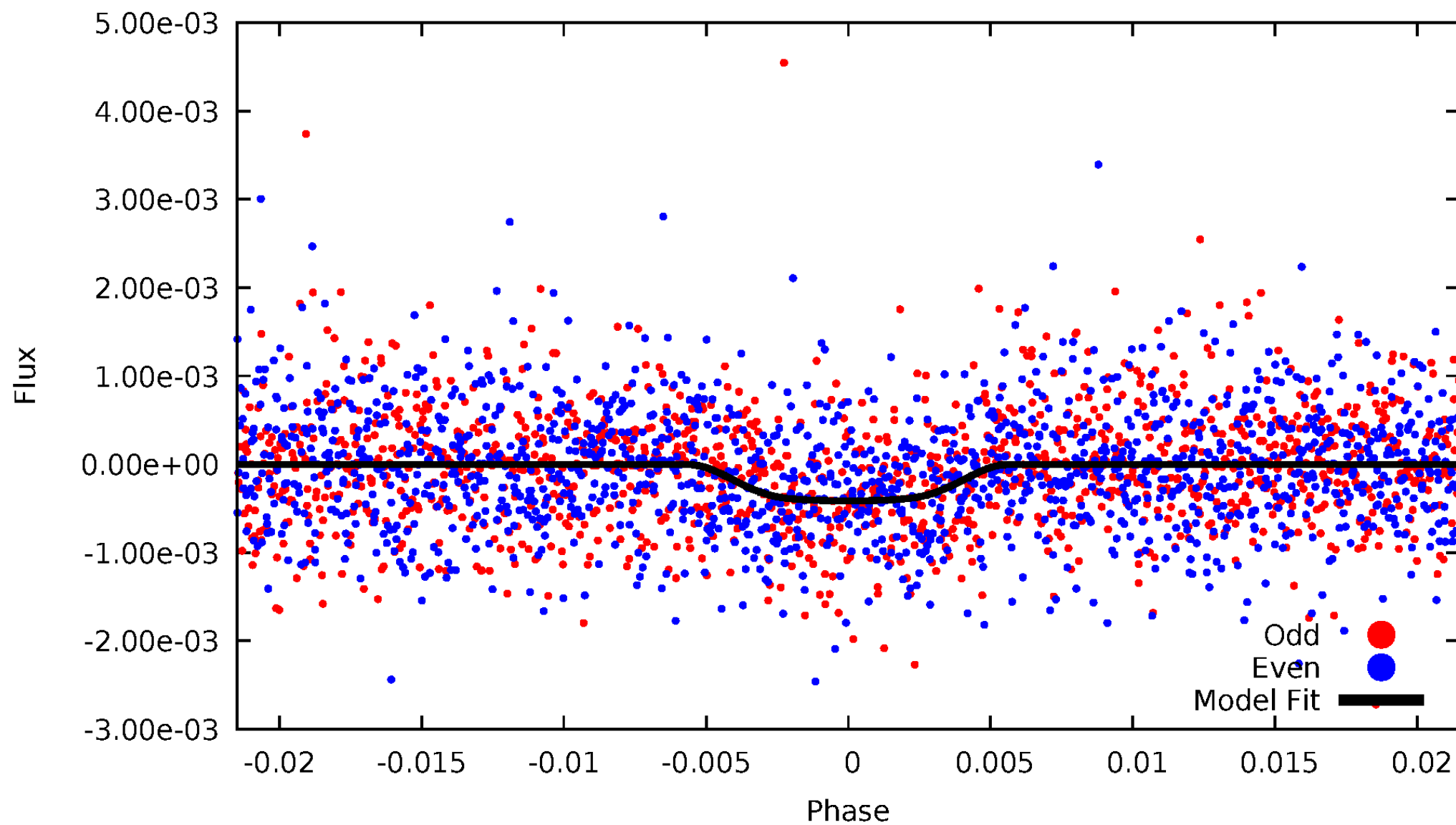


TCE 008874090-02



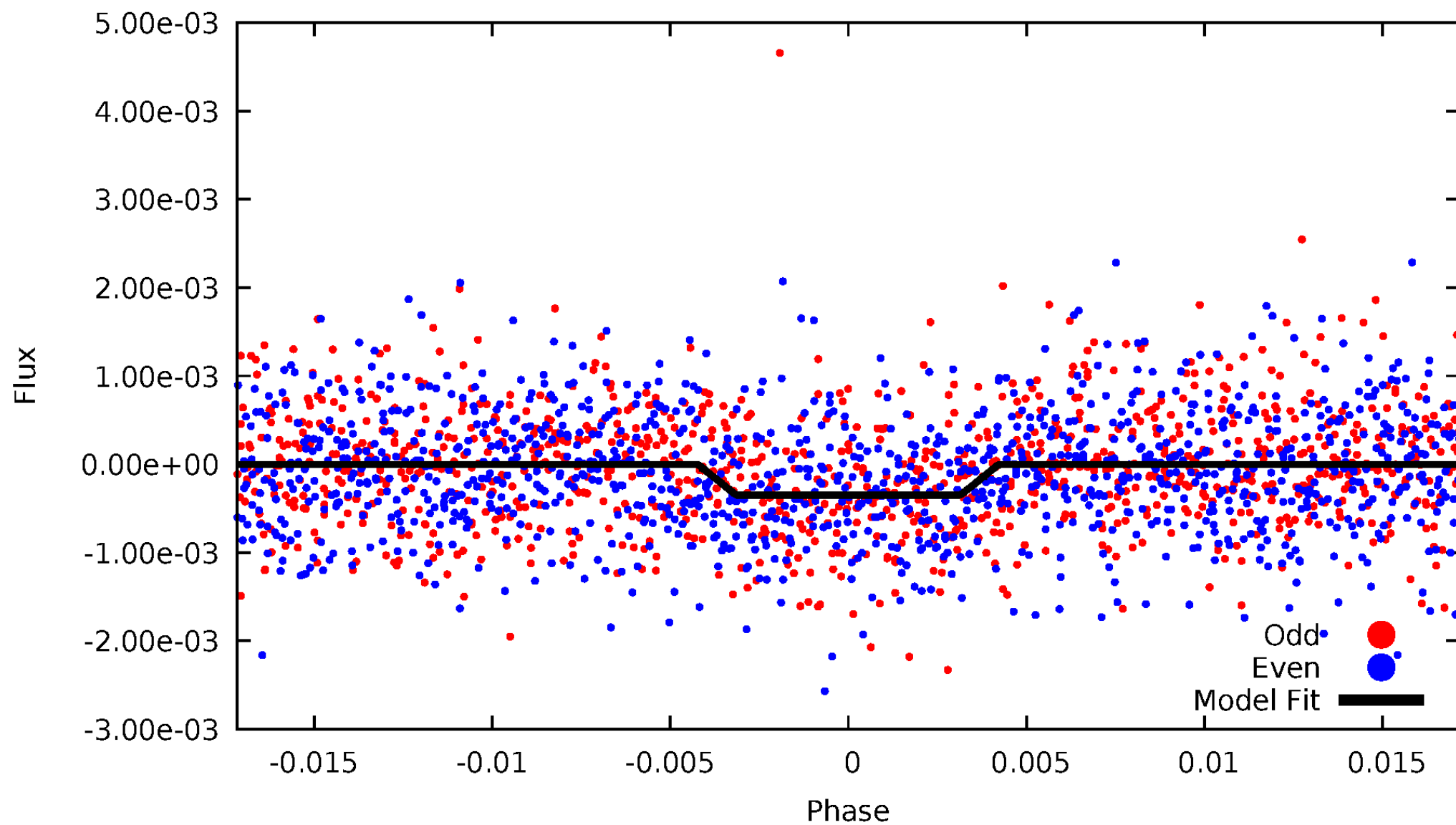
DV Odd/Even

TCE 008874090-02



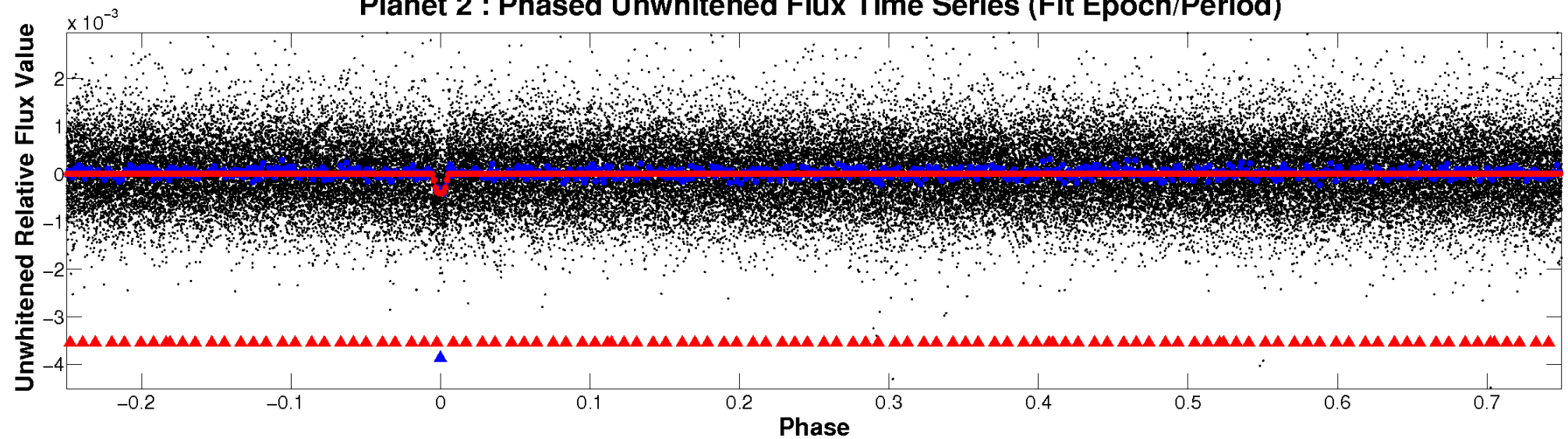
ALT Odd/Even

TCE 008874090-02

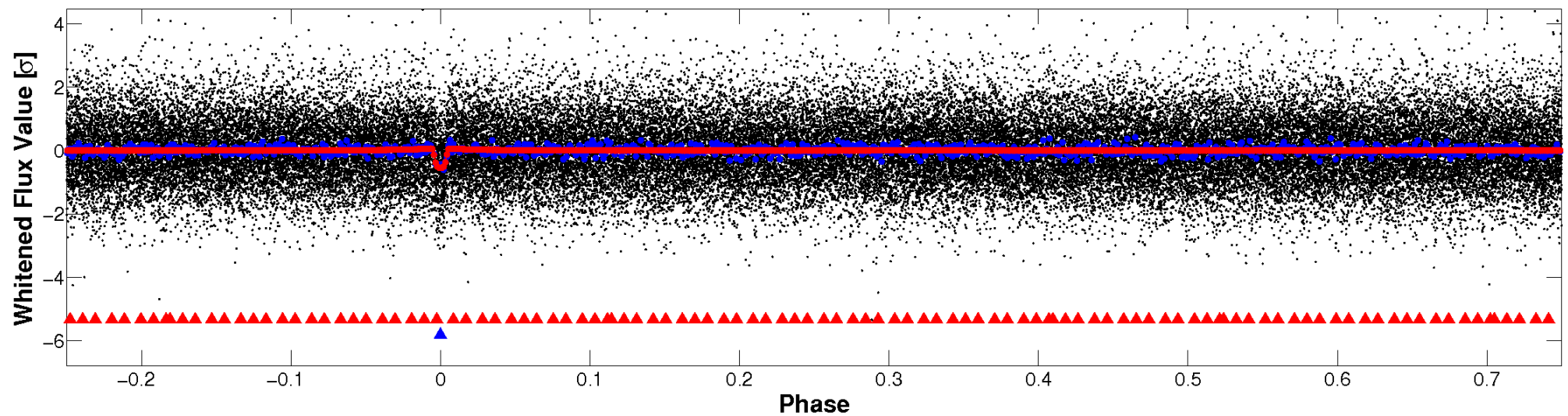


Non-Whitened Vs. Whitened Light Curve

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

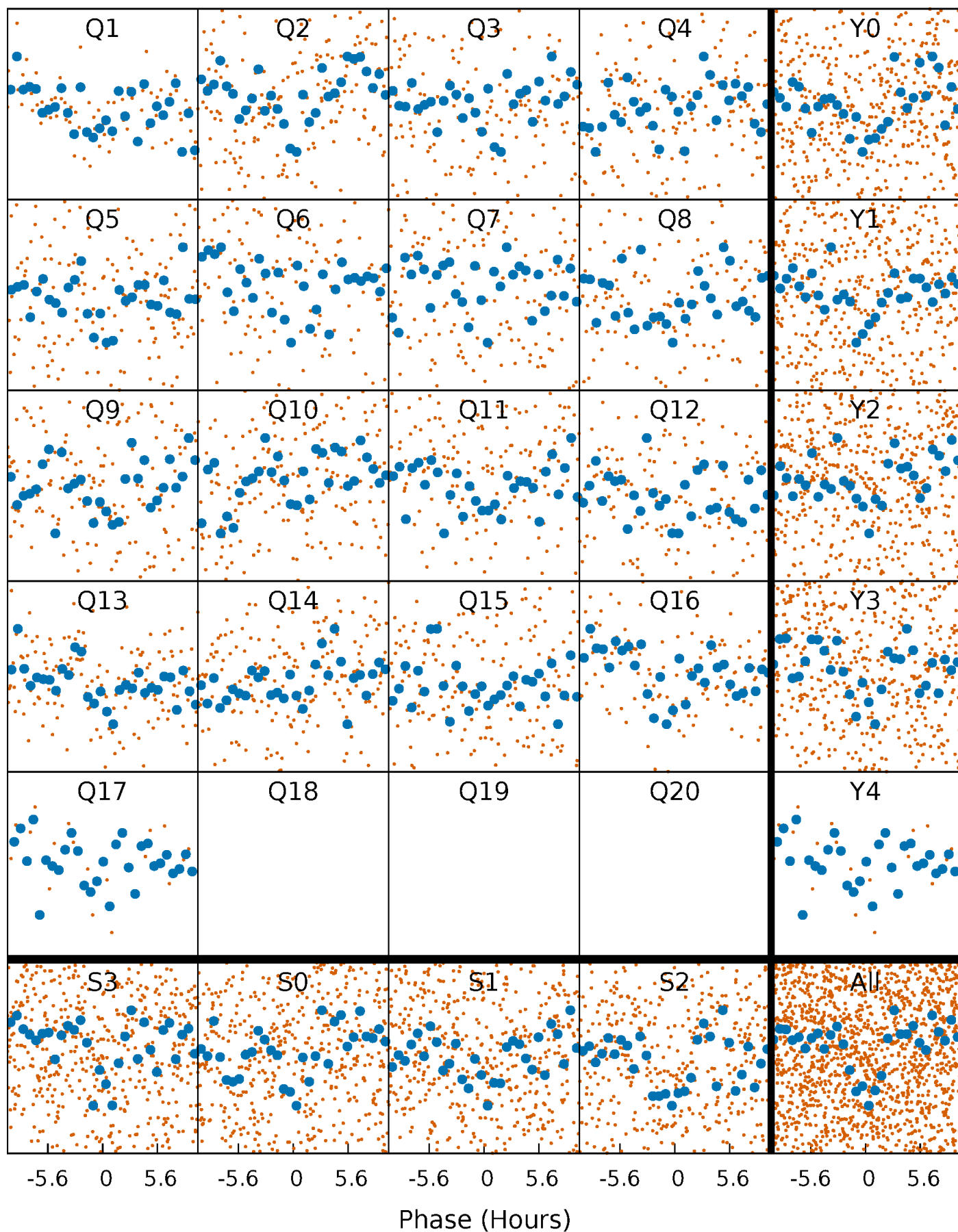


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



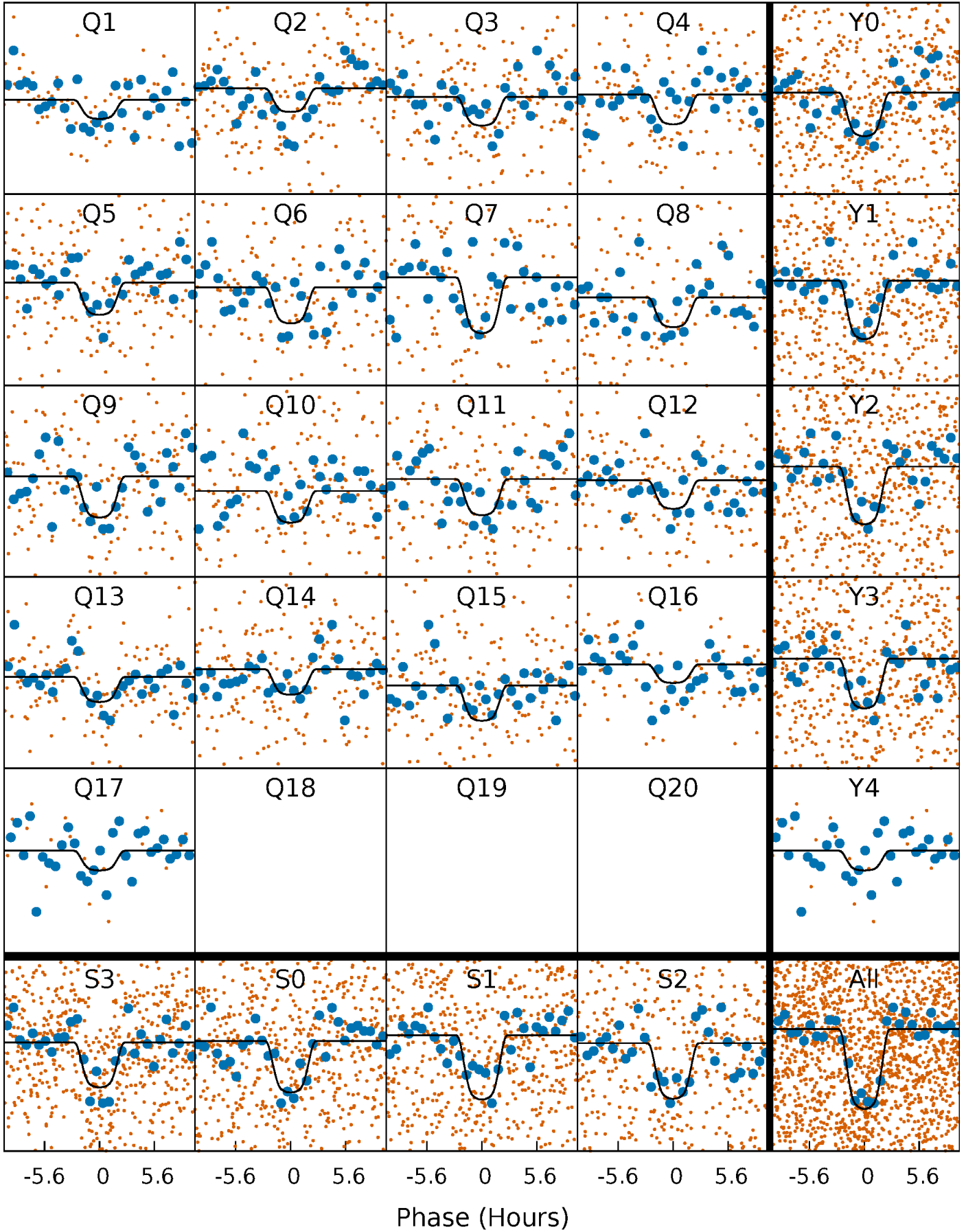
PDC Quarter-Phased Transit Curves

TCE 008874090-02 P= 18.906285 Days $T_0=140.822663$ (BKJD)



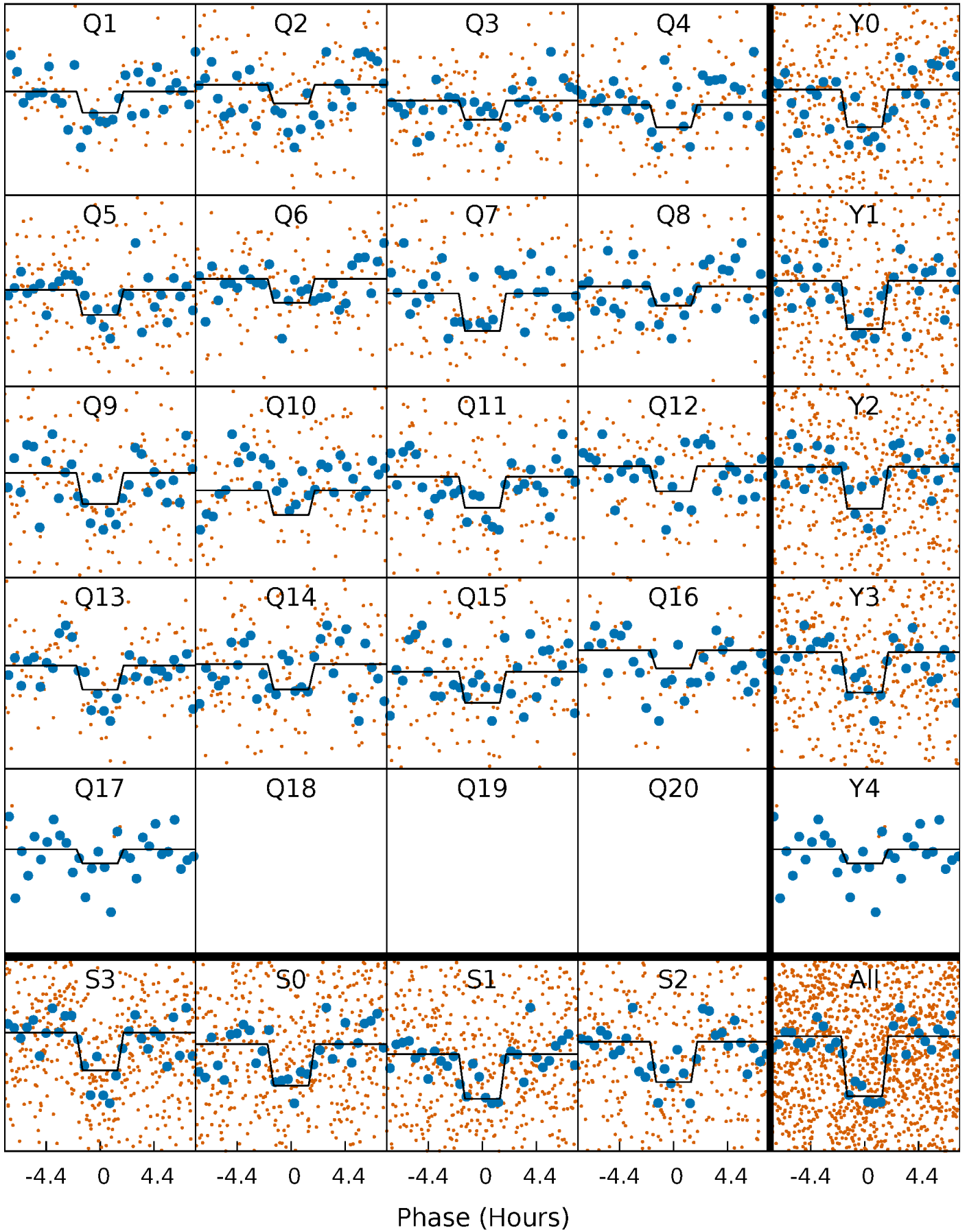
DV Quarter-Phased Transit Curves

TCE 008874090-02 P= 18.906285 Days $T_0=140.822663$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

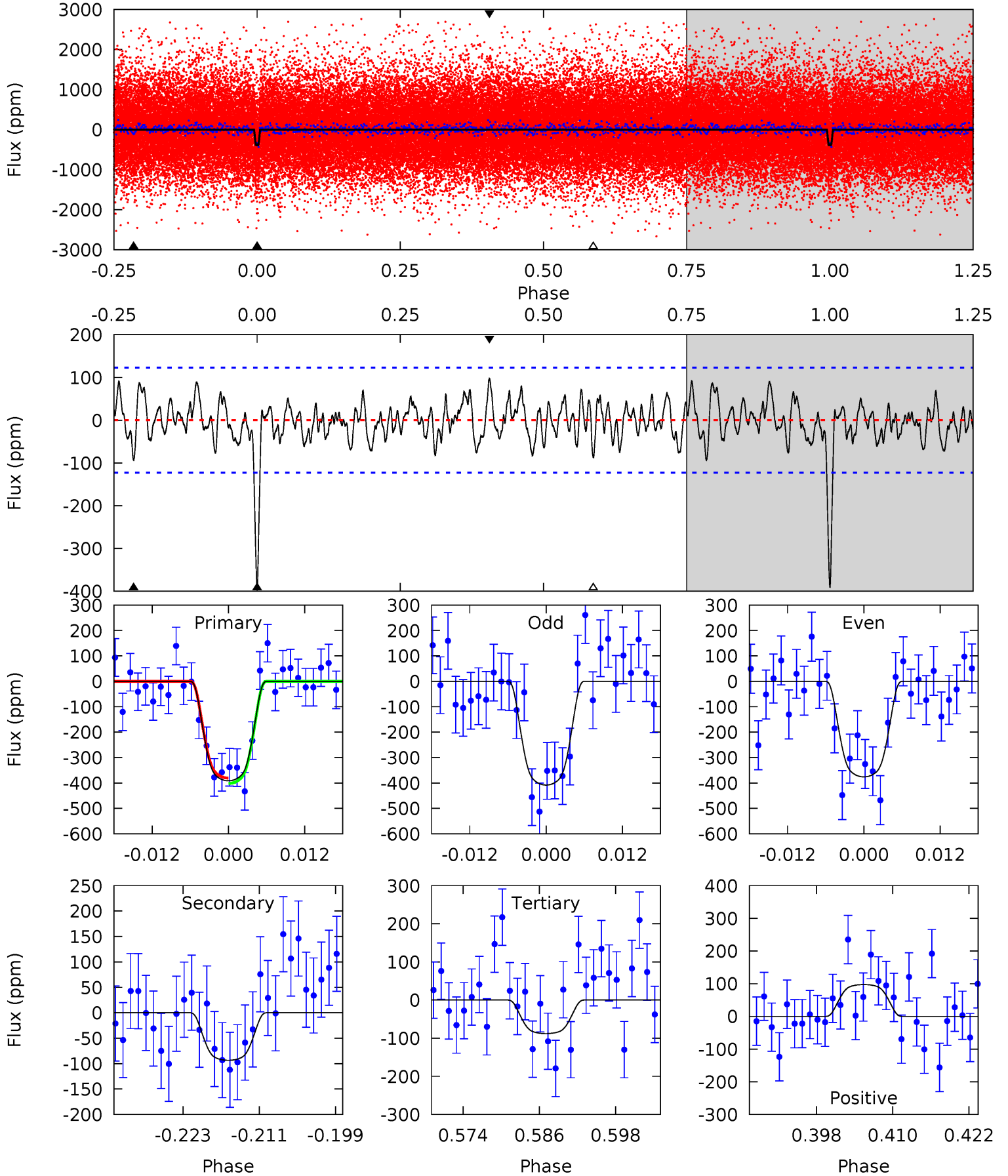
TCE 008874090-02 P= 18.906573 Days $T_0=140.812632$ (BKJD)



DV Model-Shift Uniqueness Test

008874090-02, $P = 18.906285$ Days, $E = 121.916378$ Days

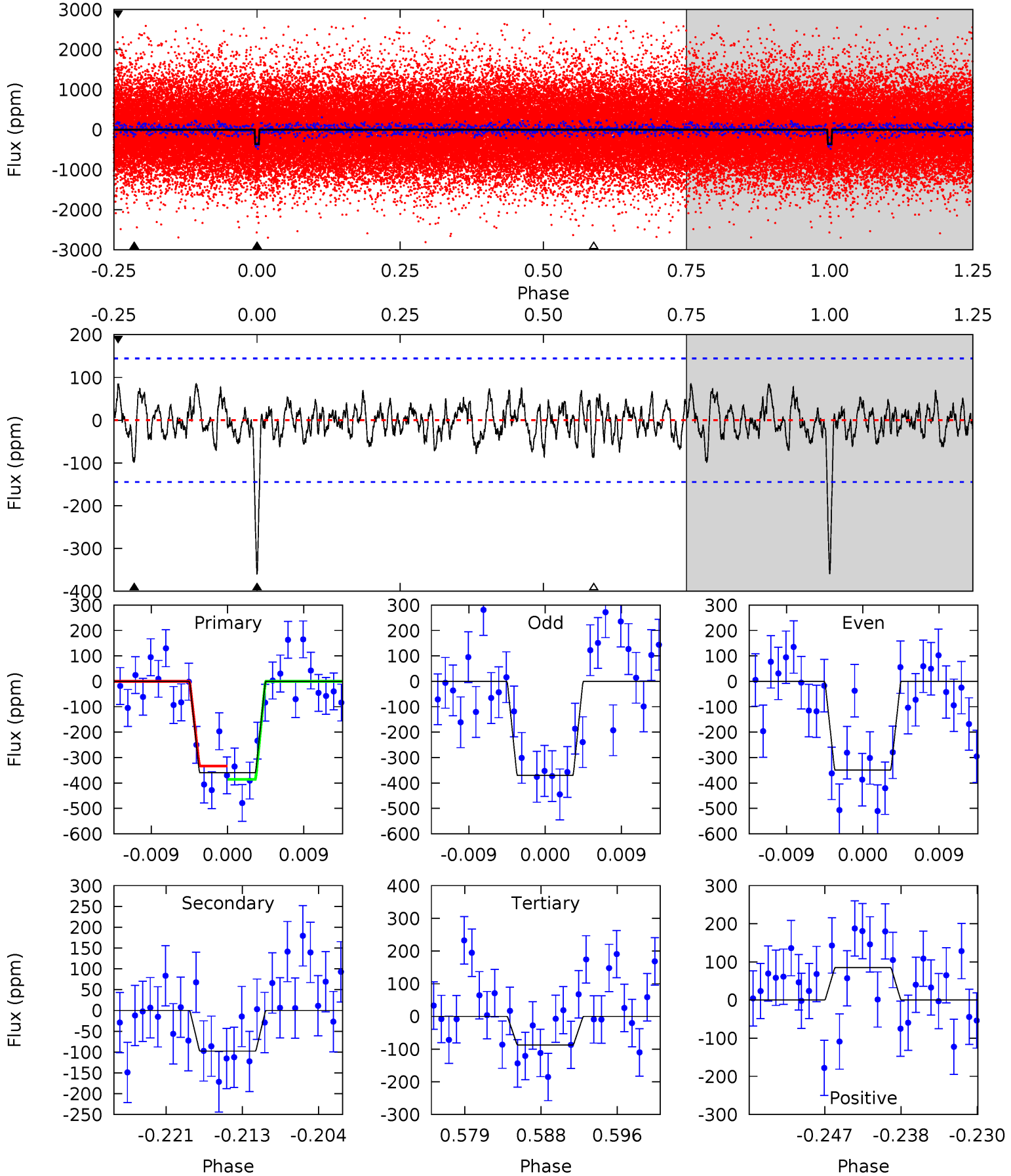
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.9	3.81	3.58	3.97	5.00	2.52	1.48	12.4	12.0	0.23	-0.16	0.66	1.25	0.20	0.43



Alt Model-Shift Uniqueness Test

008874090-02, $P = 18.906573$ Days, $E = 121.906059$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	3.42	3.05	2.97	5.06	2.63	1.12	9.53	9.61	0.37	0.45	0.36	0.99	0.19	0.92



Stellar Parameters For KIC 008874090

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3751^{+219}_{-219}	$4.813^{+0.104}_{-0.085}$	$-0.240^{+0.150}_{-0.150}$	$0.450^{+0.082}_{-0.110}$	$0.479^{+0.065}_{-0.121}$	$7.426^{+5.096}_{-2.180}$
	+6%/-6%	+2%/-2%	+62%/-62%	+18%/-24%	+14%/-25%	+69%/-29%
Source	SPE5	SPE5	SPE5	DSEP		

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

Secondary Eclipse Parameters for KIC 008874090-02 / KOI 1404.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-93 ± 25	$1.19^{+0.16}_{-0.18}$	471^{+34}_{-33}	2842^{+169}_{-179}	422^{+177}_{-133}
Alt.	-98 ± 29	$0.92^{+0.15}_{-0.15}$	470^{+31}_{-34}	3064^{+235}_{-213}	746^{+362}_{-266}

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

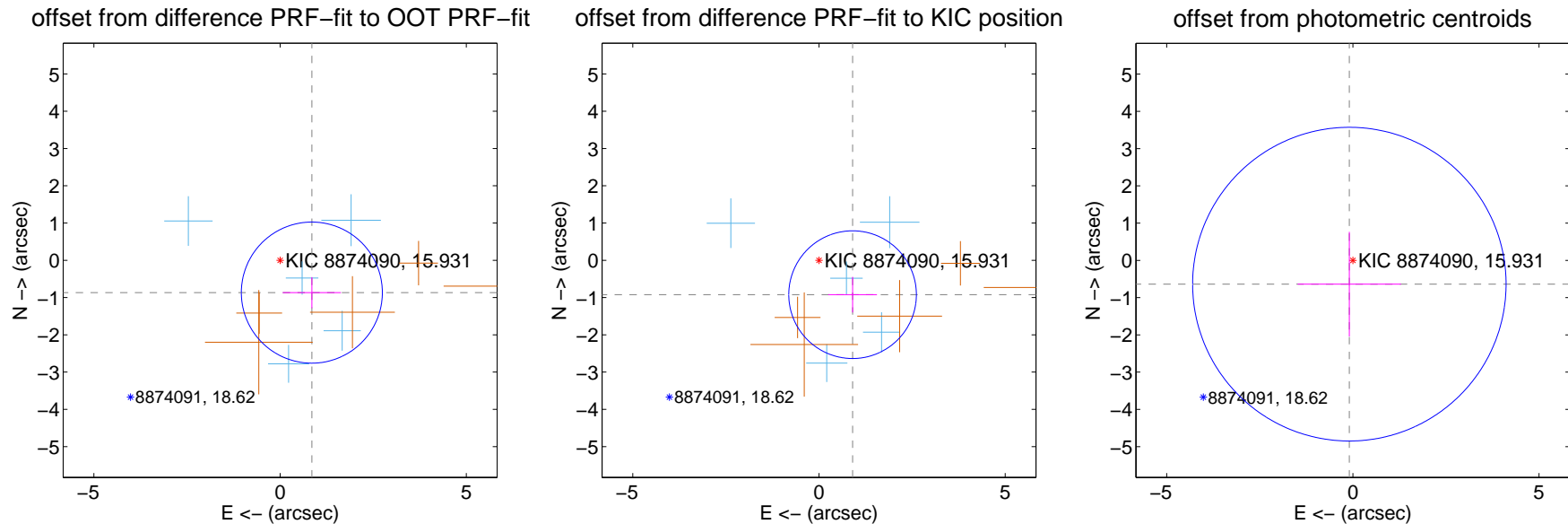
DV Centroid Data

Supplemental centroid analysis for 008874090-02. Kepler magnitude: 15.93. Transit SNR 10.73

There are 5 quarters with good PRF difference image offsets

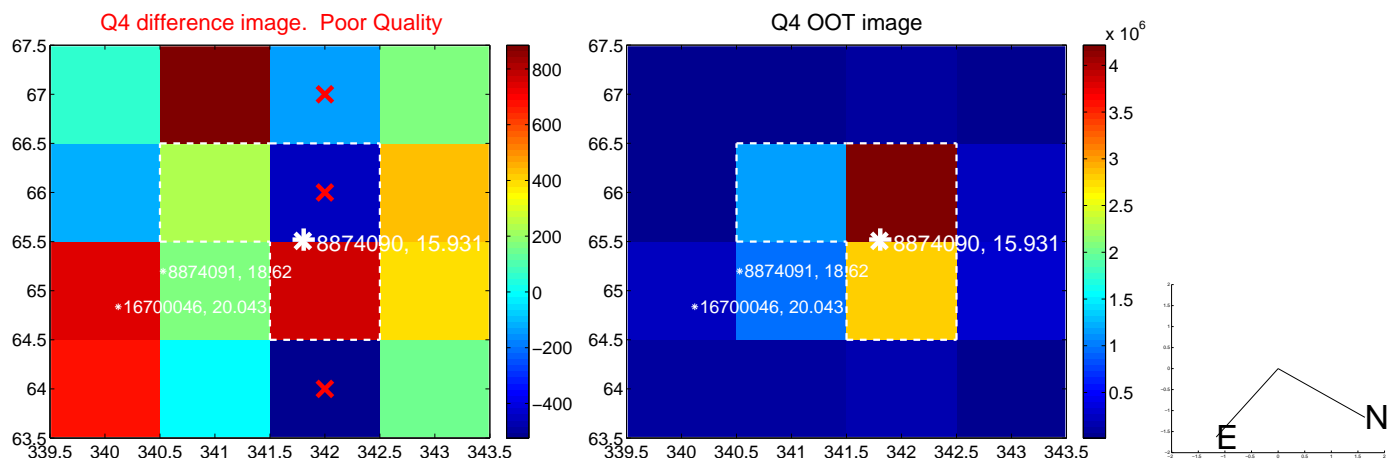
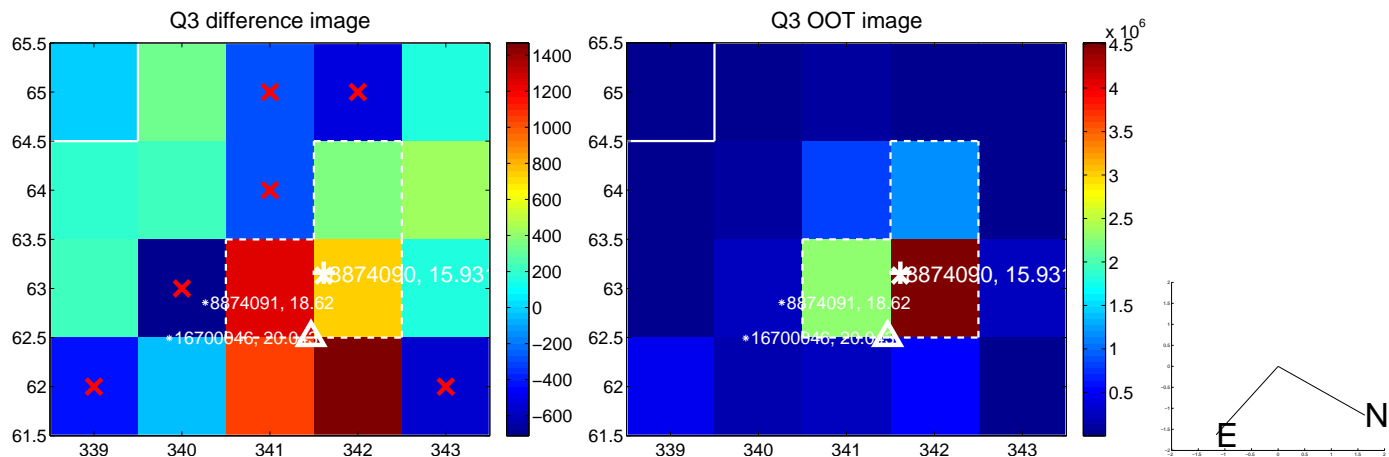
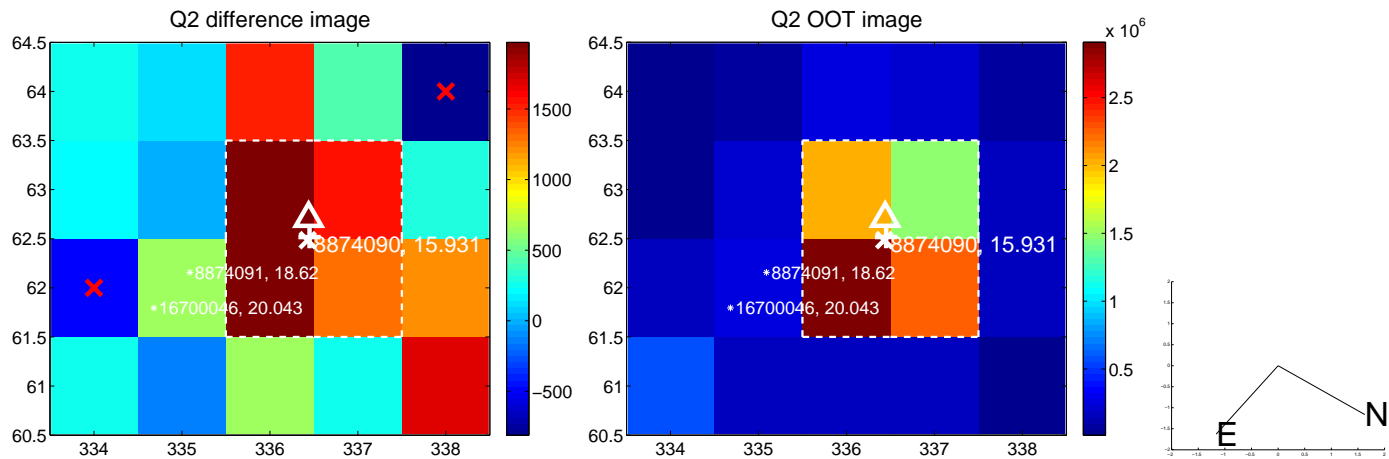
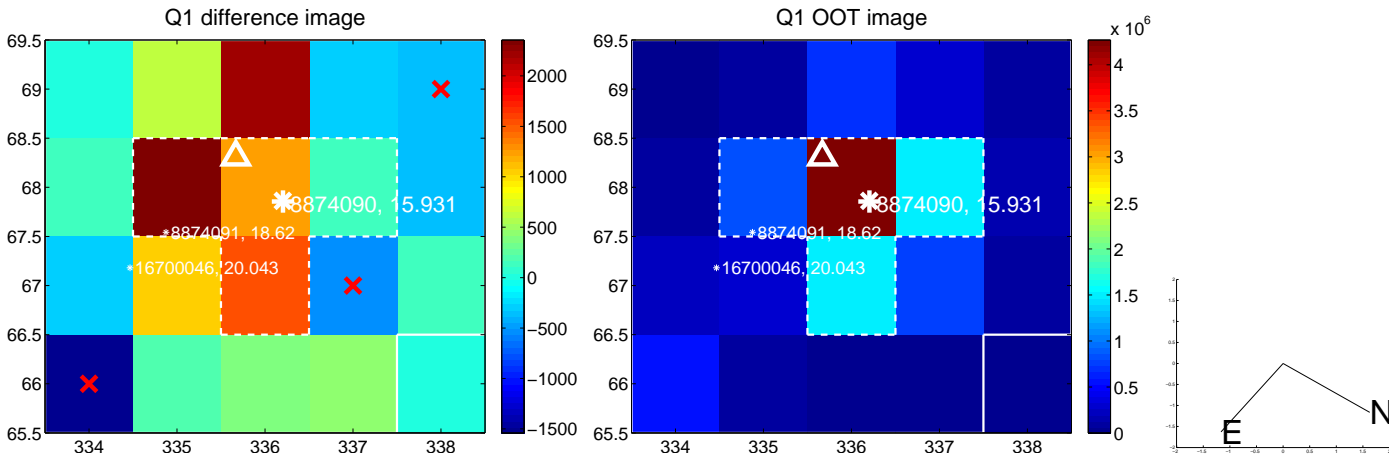
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.216 ± 0.631	1.93	-0.852 ± 0.781	-0.867 ± 0.417
PRF-fit source offset from KIC position	1.290 ± 0.571	2.26	-0.902 ± 0.654	-0.922 ± 0.478
photometric centroid source offset	0.65 ± 1.40	0.46	0.09 ± 1.39	-0.64 ± 1.40

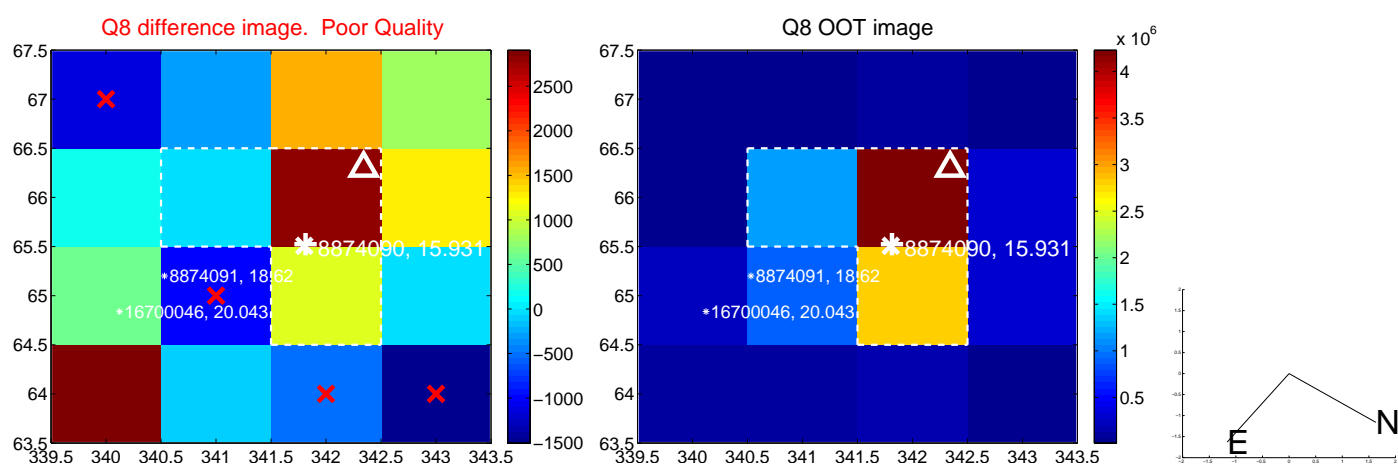
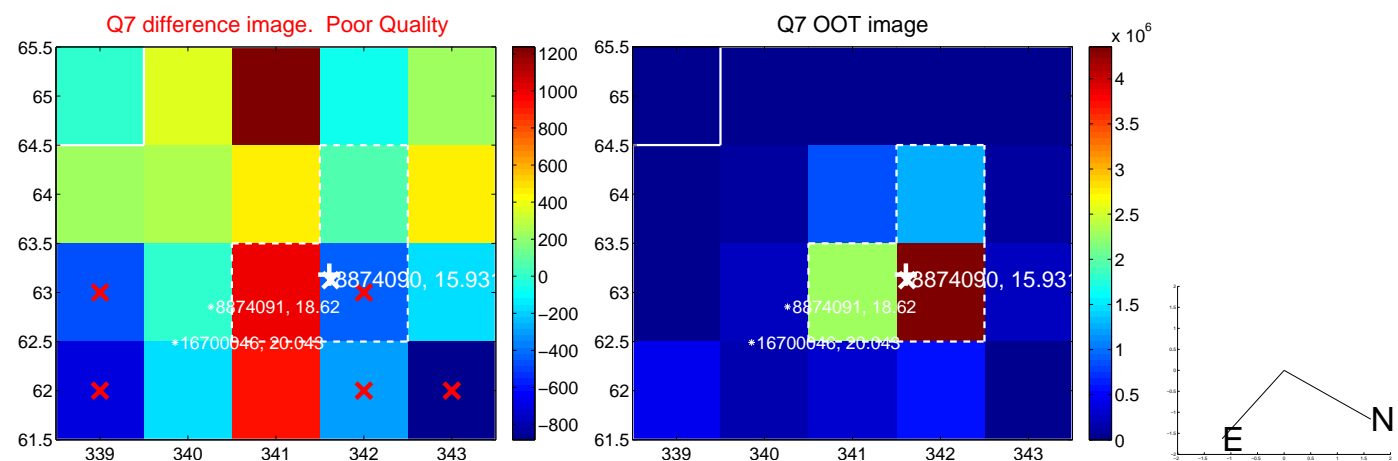
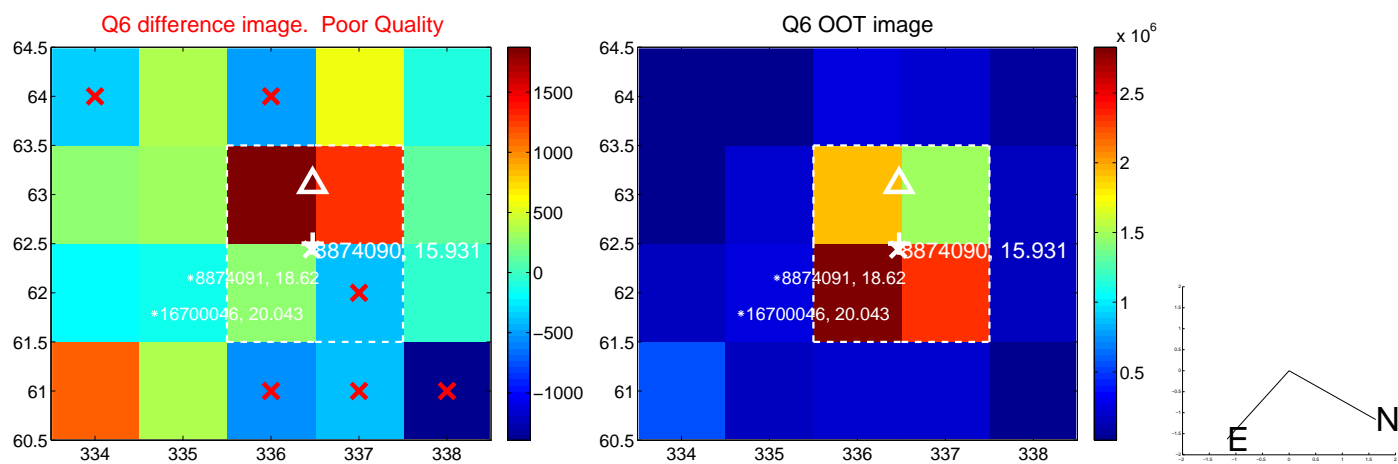
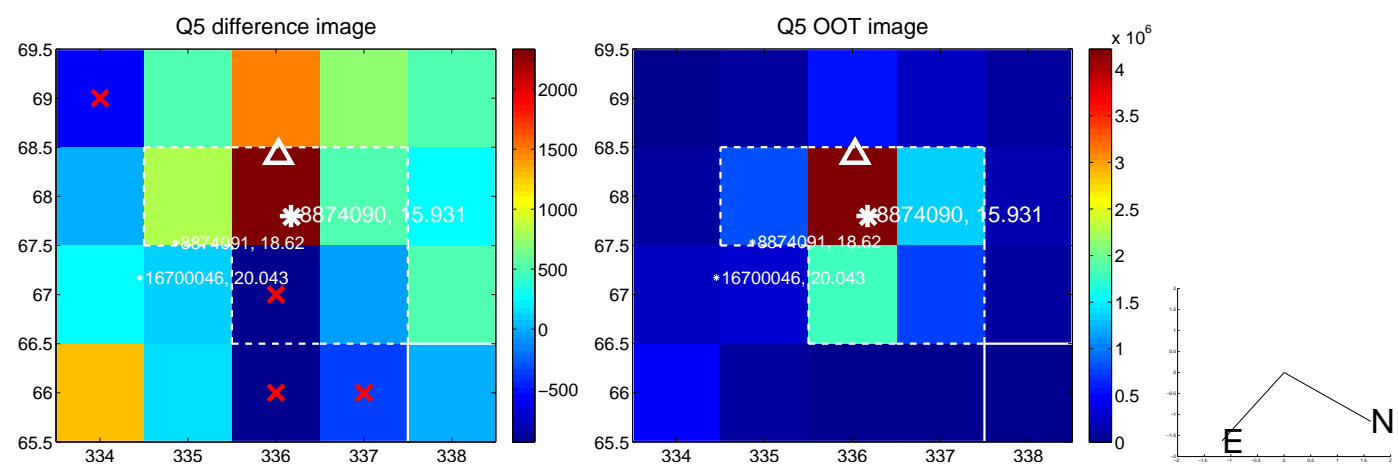


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

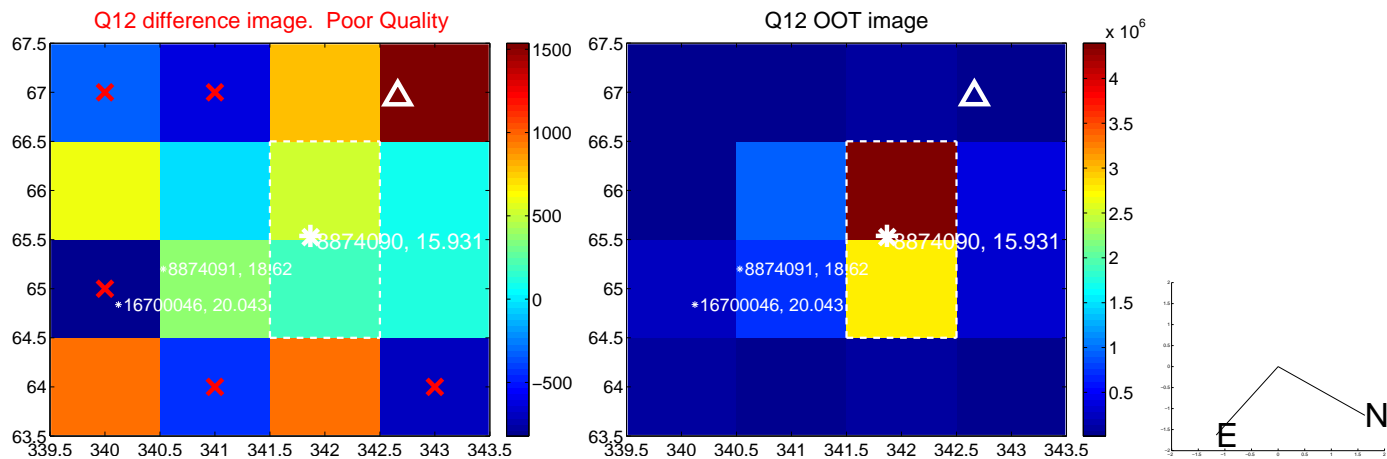
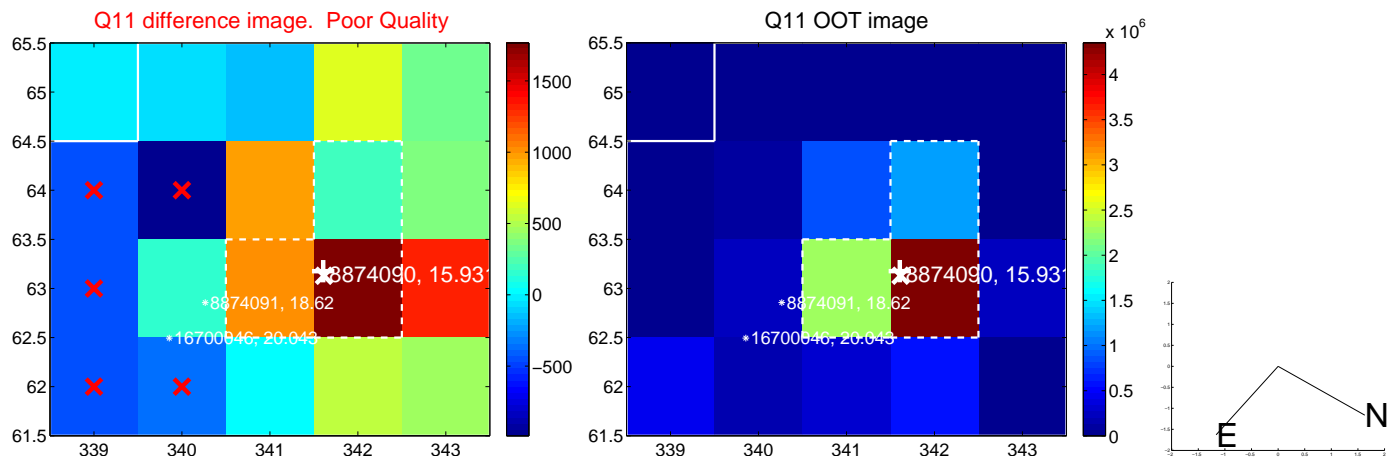
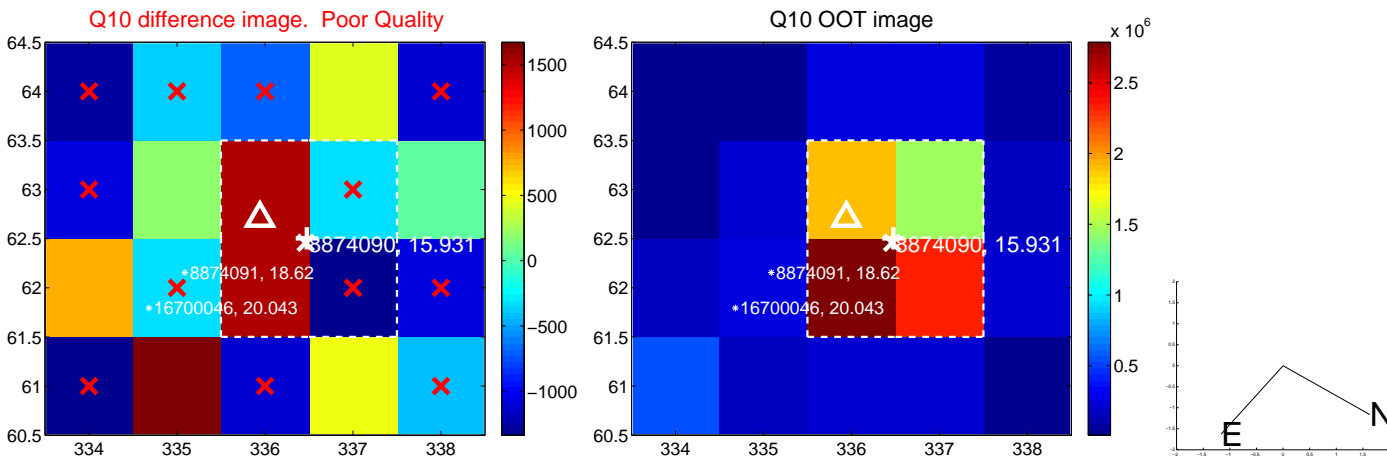
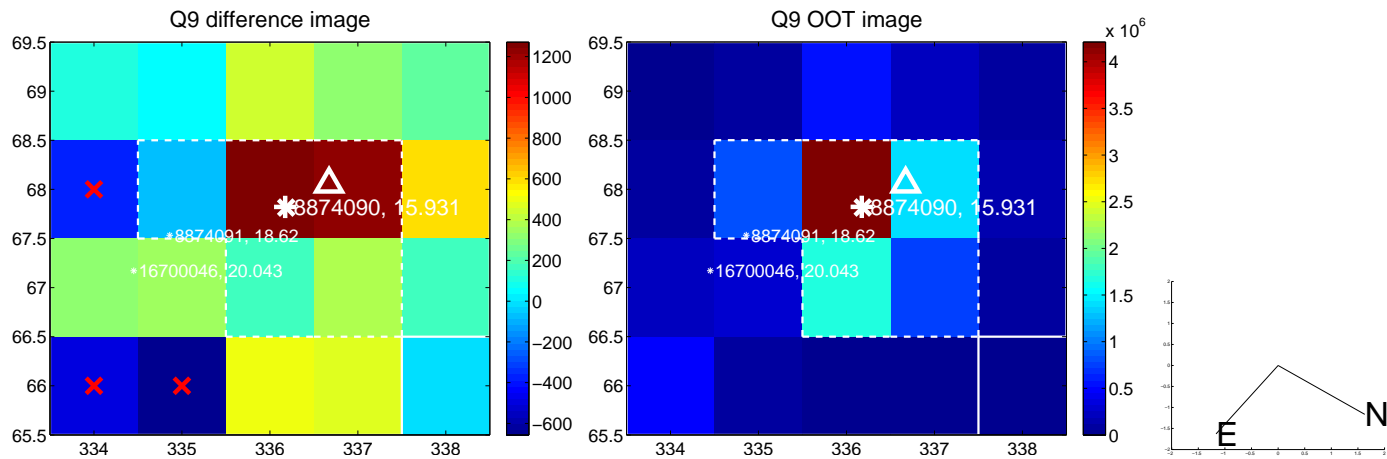
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



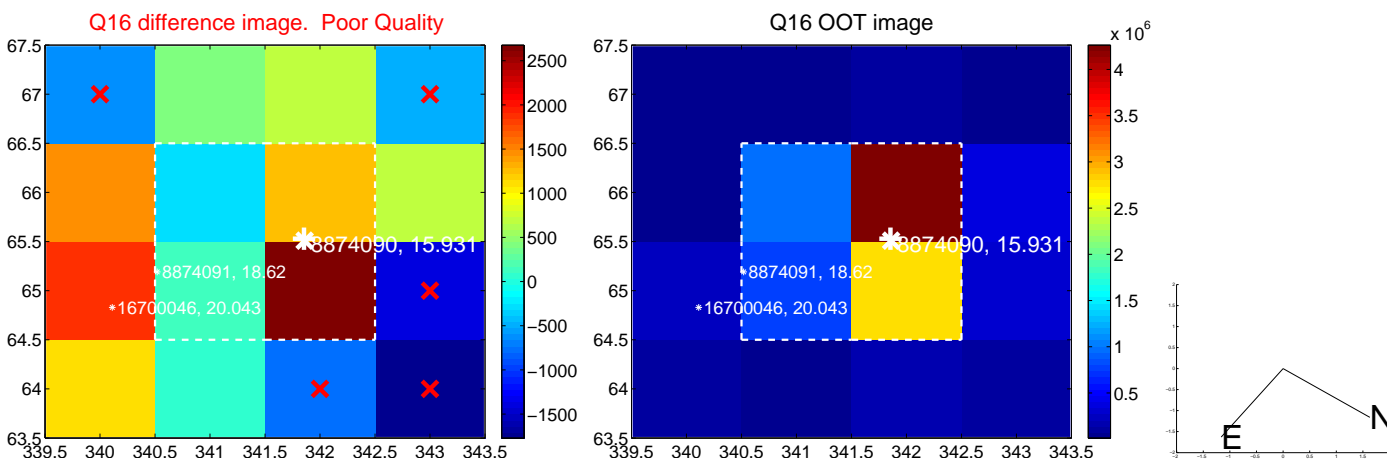
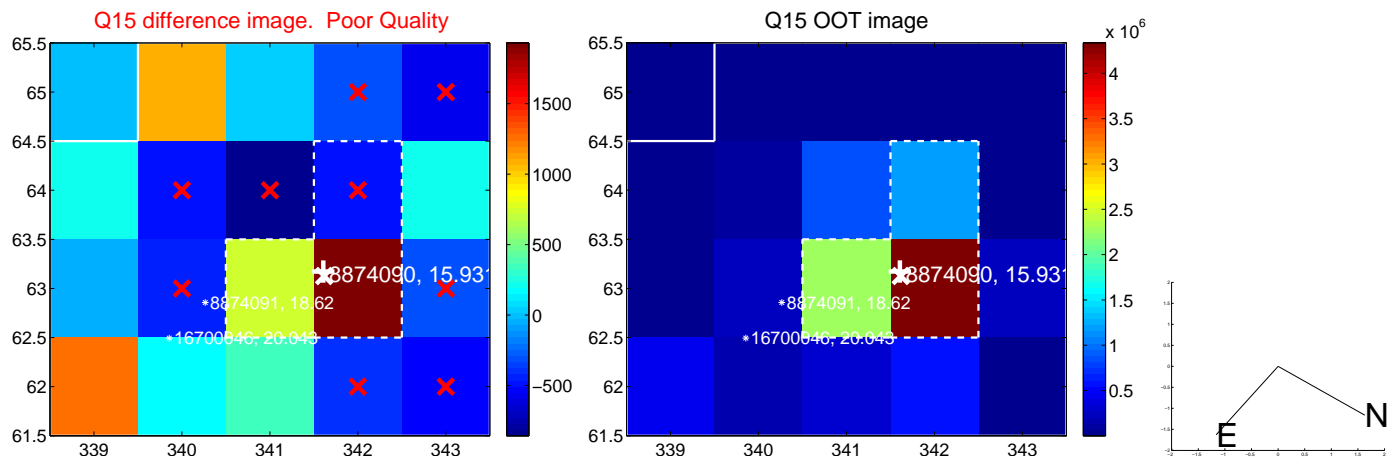
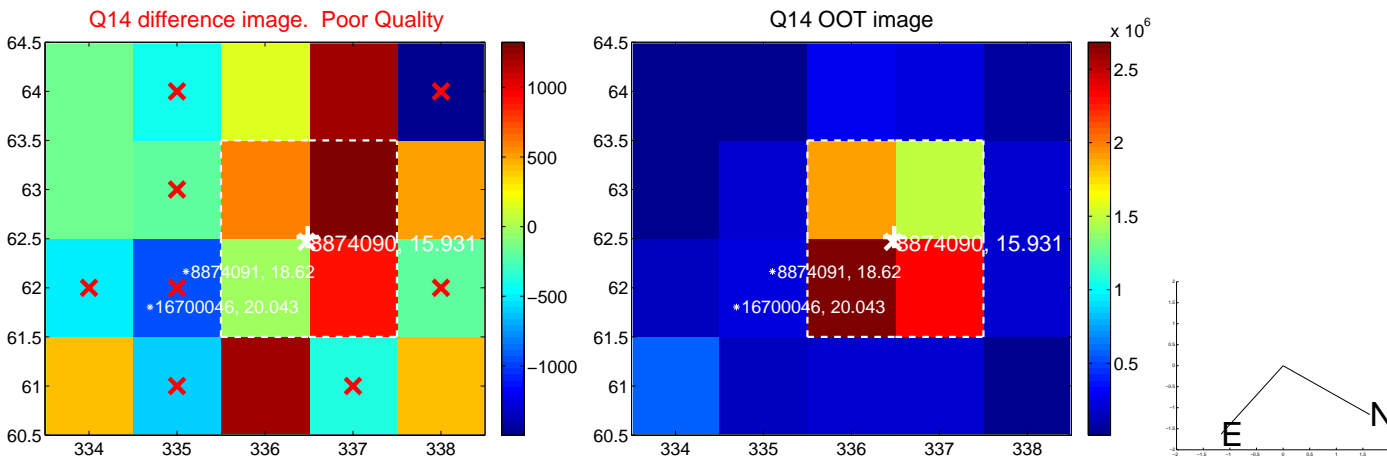
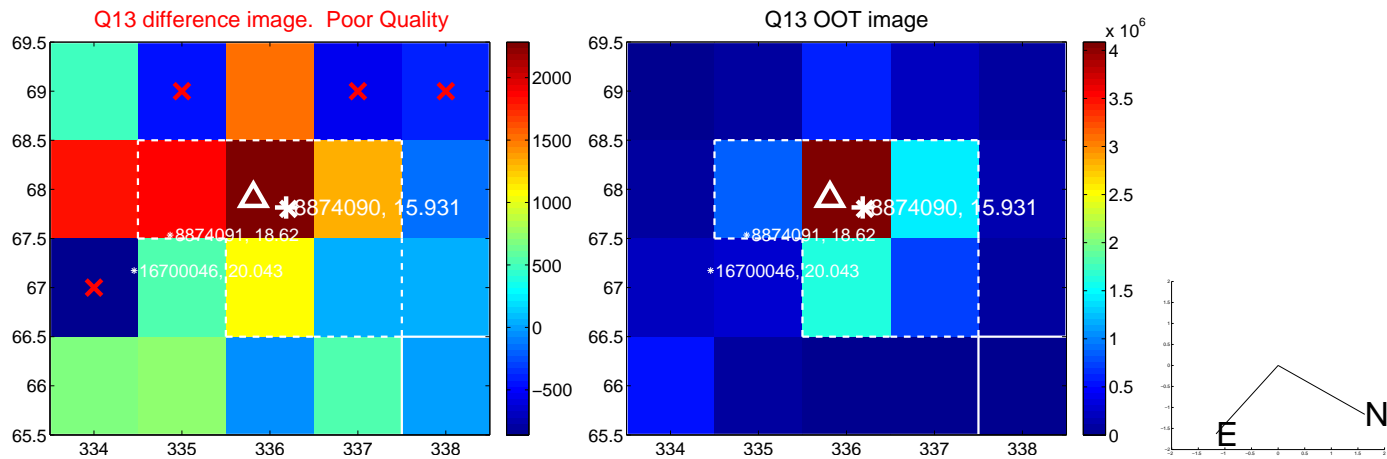
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



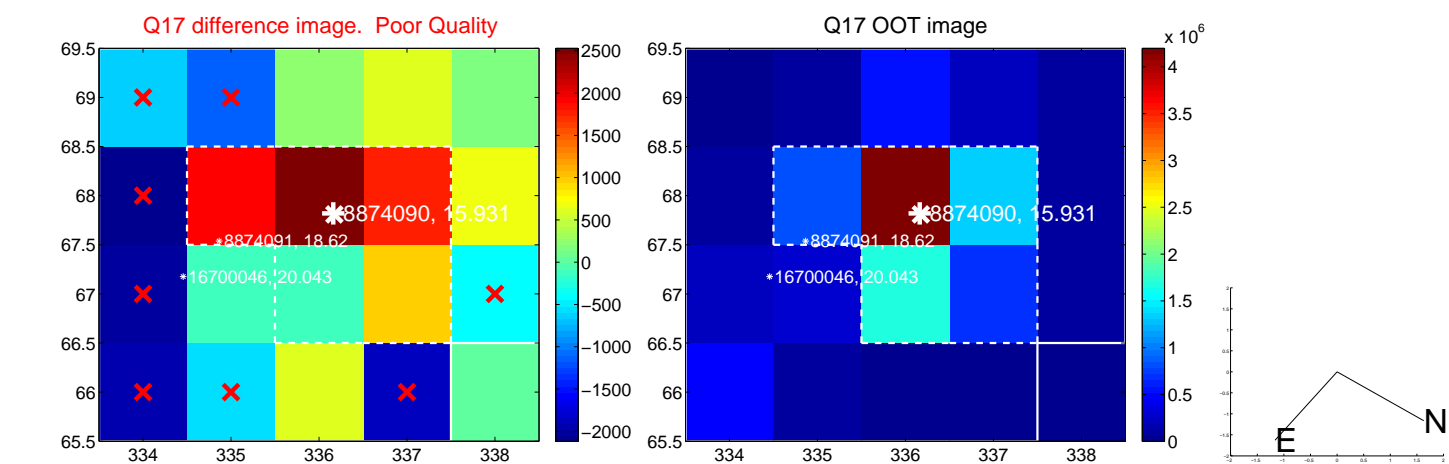
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



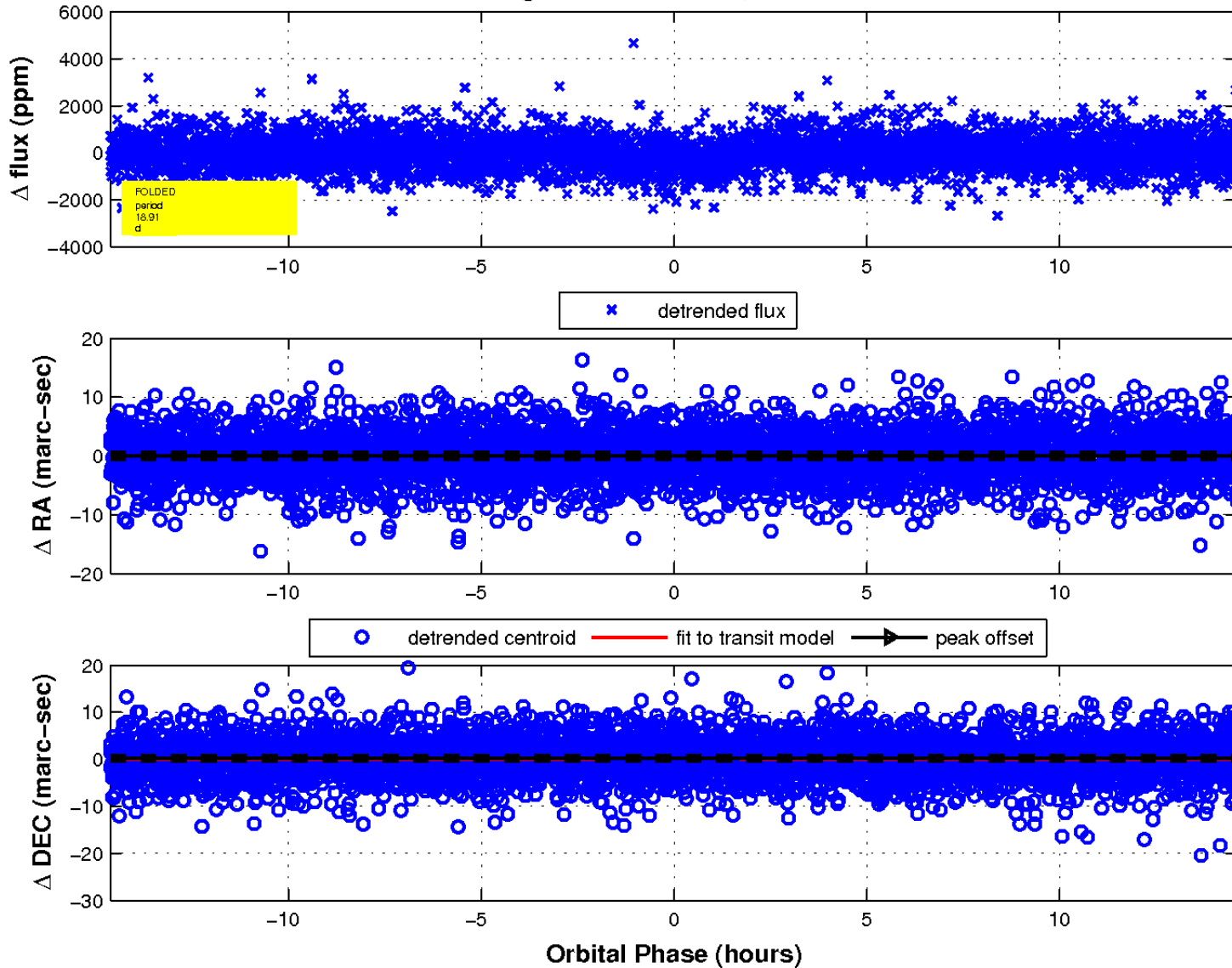
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

