

KIC 009410930

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})
009410930-01	OBS	0196.01	1.855558	131.614337	10567.5	2.452	1905.8	1840.5	0.95	5657	10.42	1008.11
009410930-02	OBS	No	1.855551	132.545232	58.4	1.845	8.7	10.1	0.95	5657	0.88	1008.11

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009410930-01	OBS	PC	1.00	0	1	0	0	MOD_SEC_DV—PLANET_OCCULT_DV—HAS_SEC_TCE
009410930-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

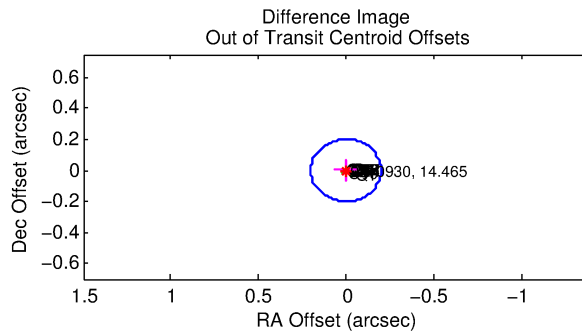
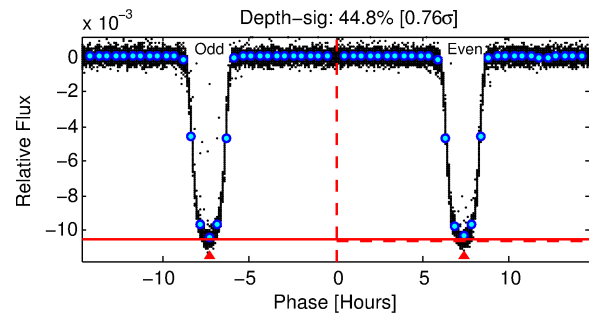
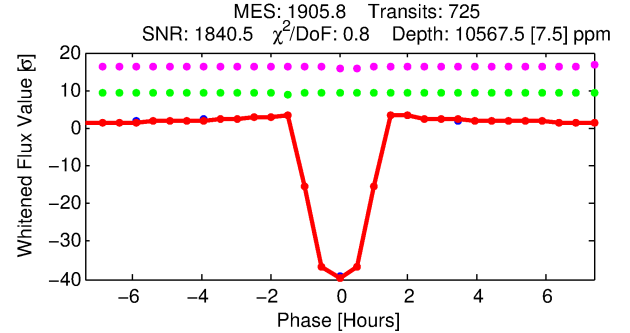
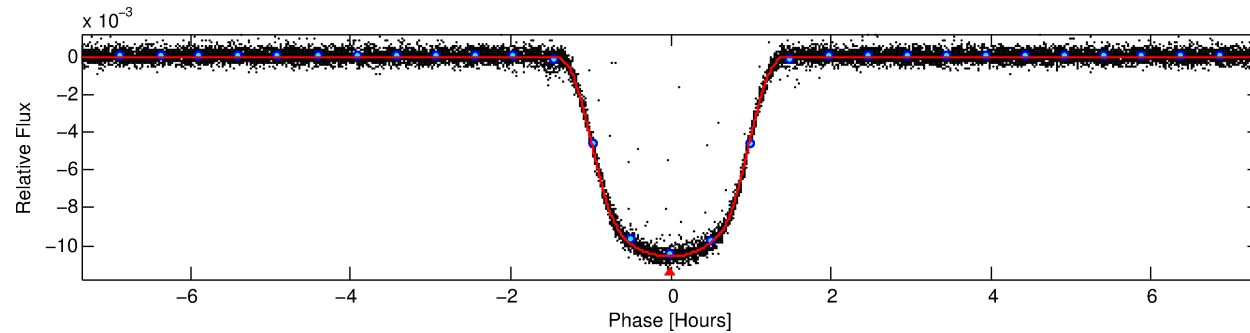
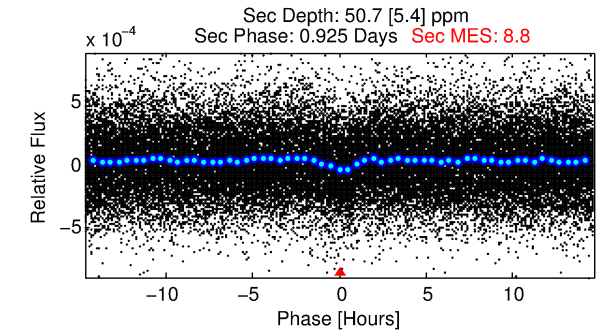
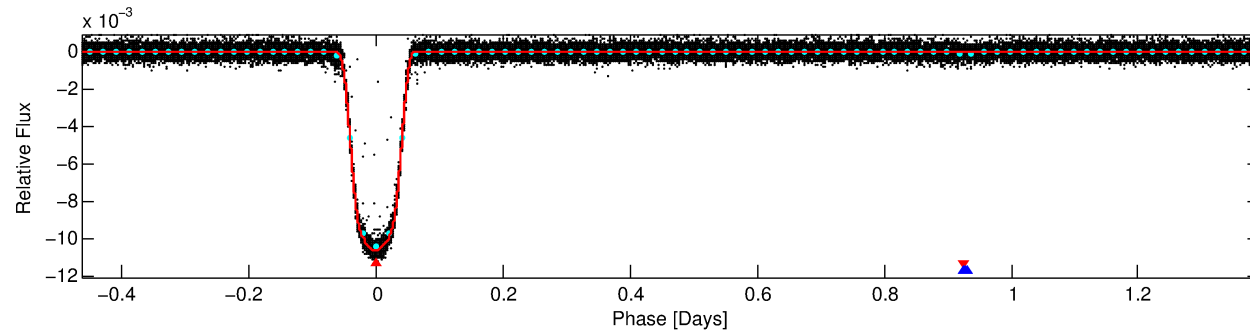
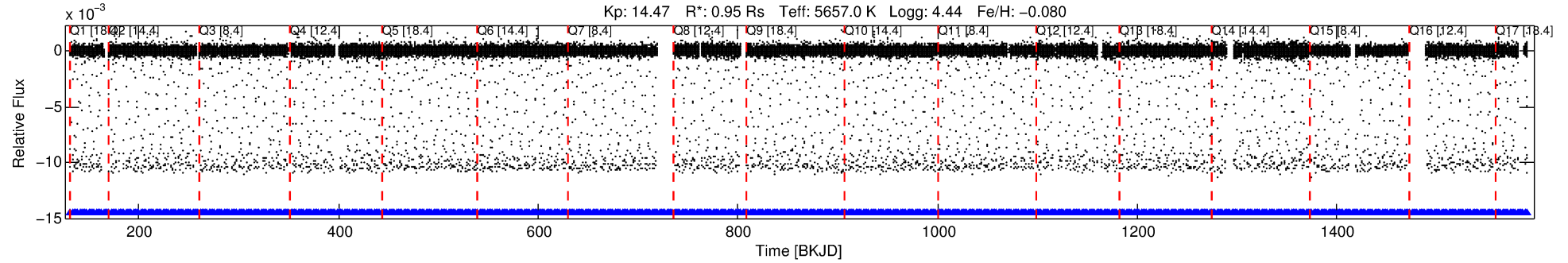
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009410930-01

No Significant Match Found

DV One-Page Summary

KIC: 9410930 Candidate: 1 of 2 Period: 1.856 d
KOI: K00196.01 Name: Kepler-41b Corr: 0.980



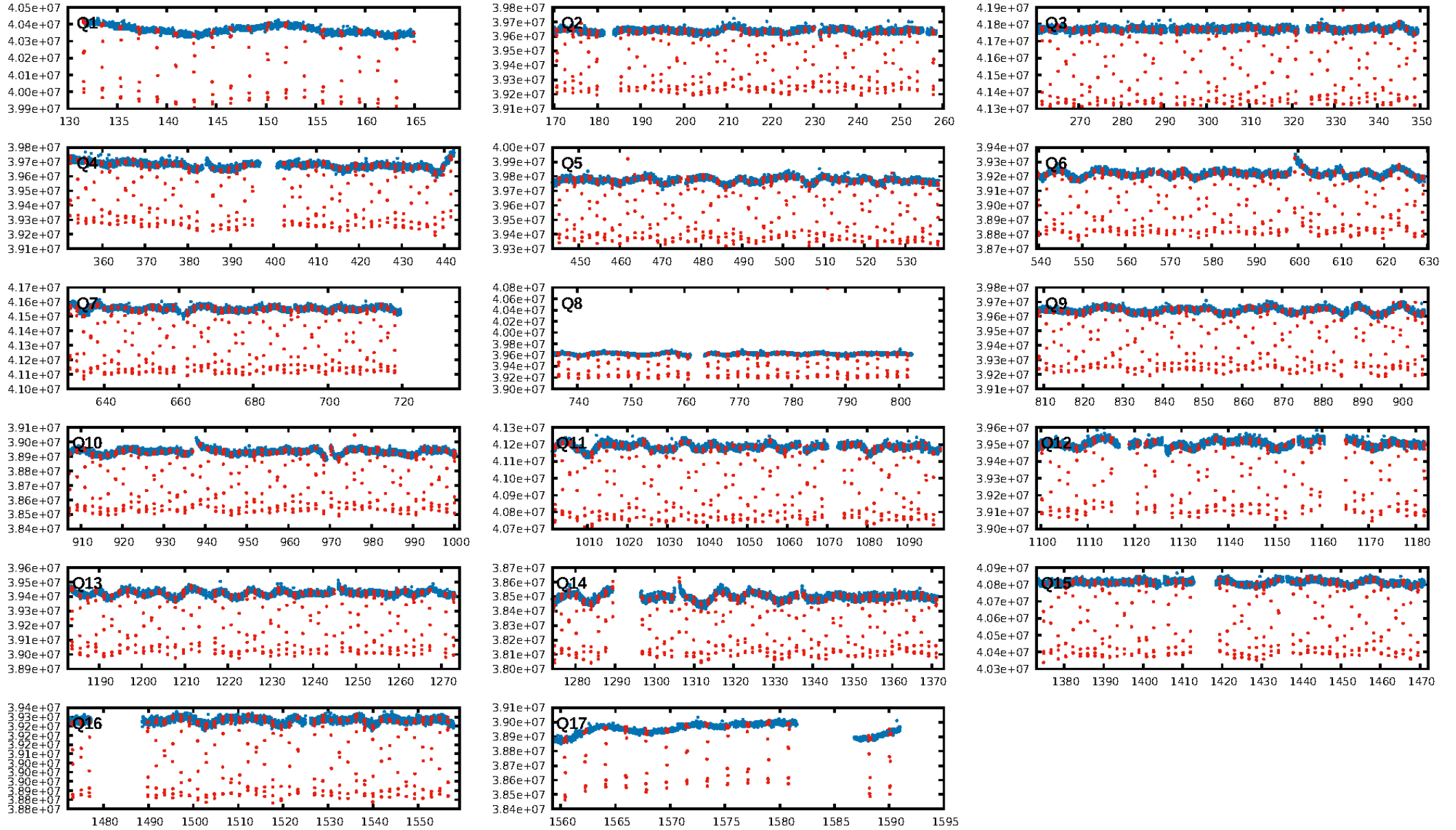
DV Fit Results:

Period = 1.85556 [0.00000] d
Epoch = 131.6143 [0.0000] BKJD
Rp/R* = 0.1008 [0.0001]
a/R* = 5.01 [0.03]
b = 0.70 [0.00]
Seff = 1008.11 [120.05]
Teff = 1437 [43] K
Rp = 10.42 [0.68] Re
a = 0.0286 [0.0017] AU
Ag = 0.21 [0.03] [-27.27 σ]
Teffp = 1503 [50] K [1.01 σ]

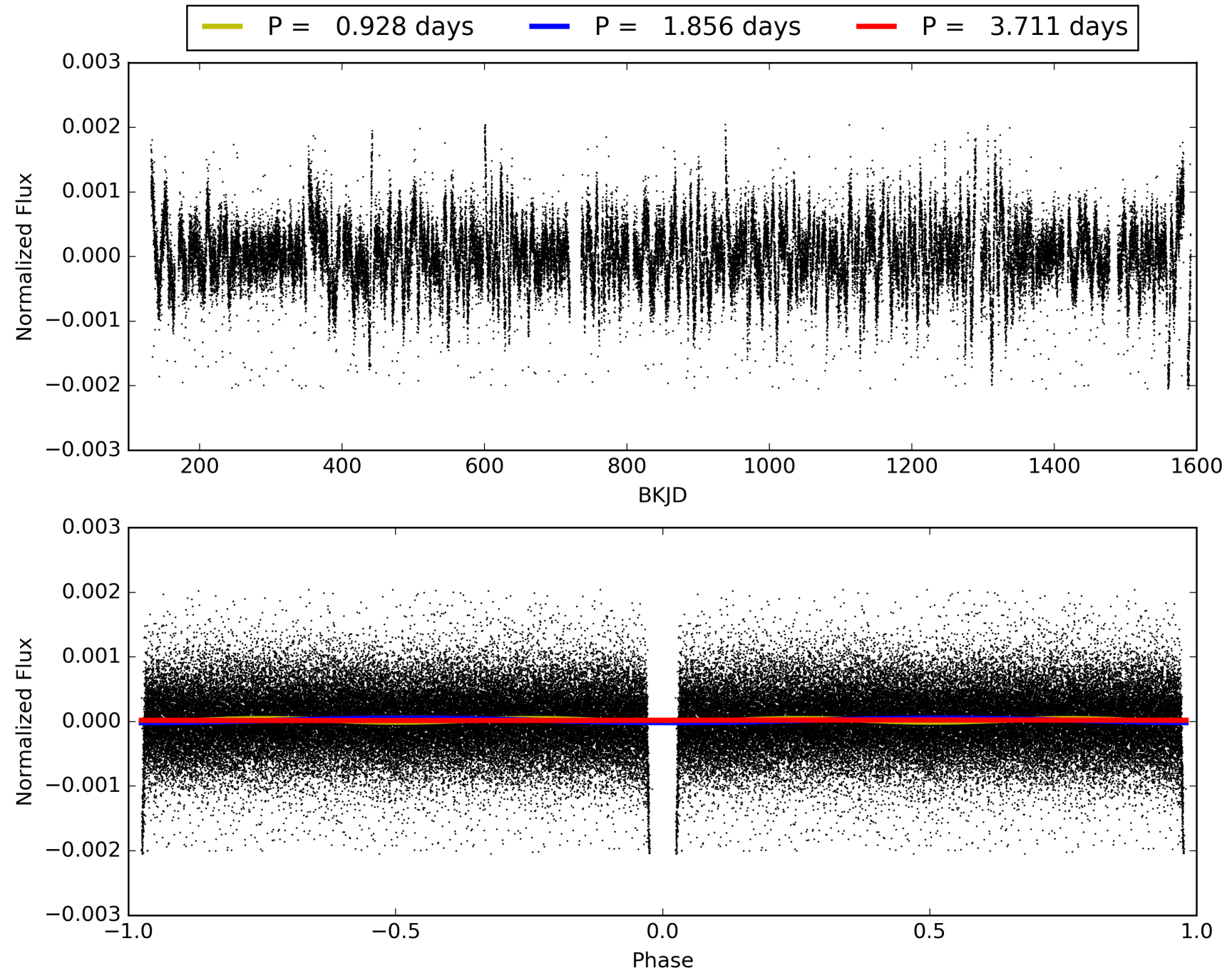
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [692/692]
GhostDiagnostic-chr: 6.163
Centroid-sig: 0.0%
Centroid-so: 0.058 arcsec [8.88 σ]
OotOffset-rm: 0.003 arcsec [0.05 σ]
KicOffset-rm: 0.110 arcsec [1.63 σ]
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 009410930-01, PDC Light Curves

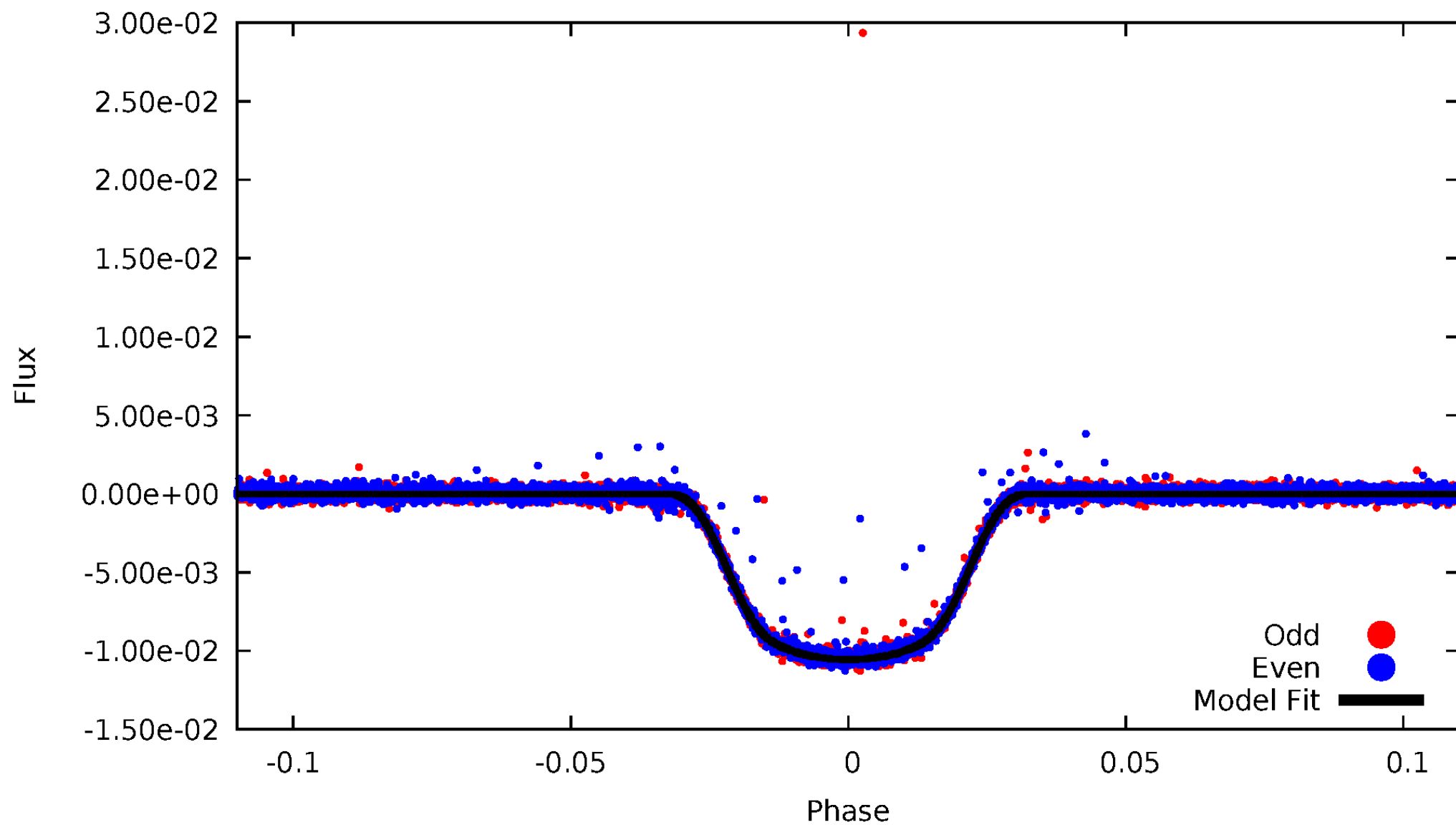


TCE 009410930-01



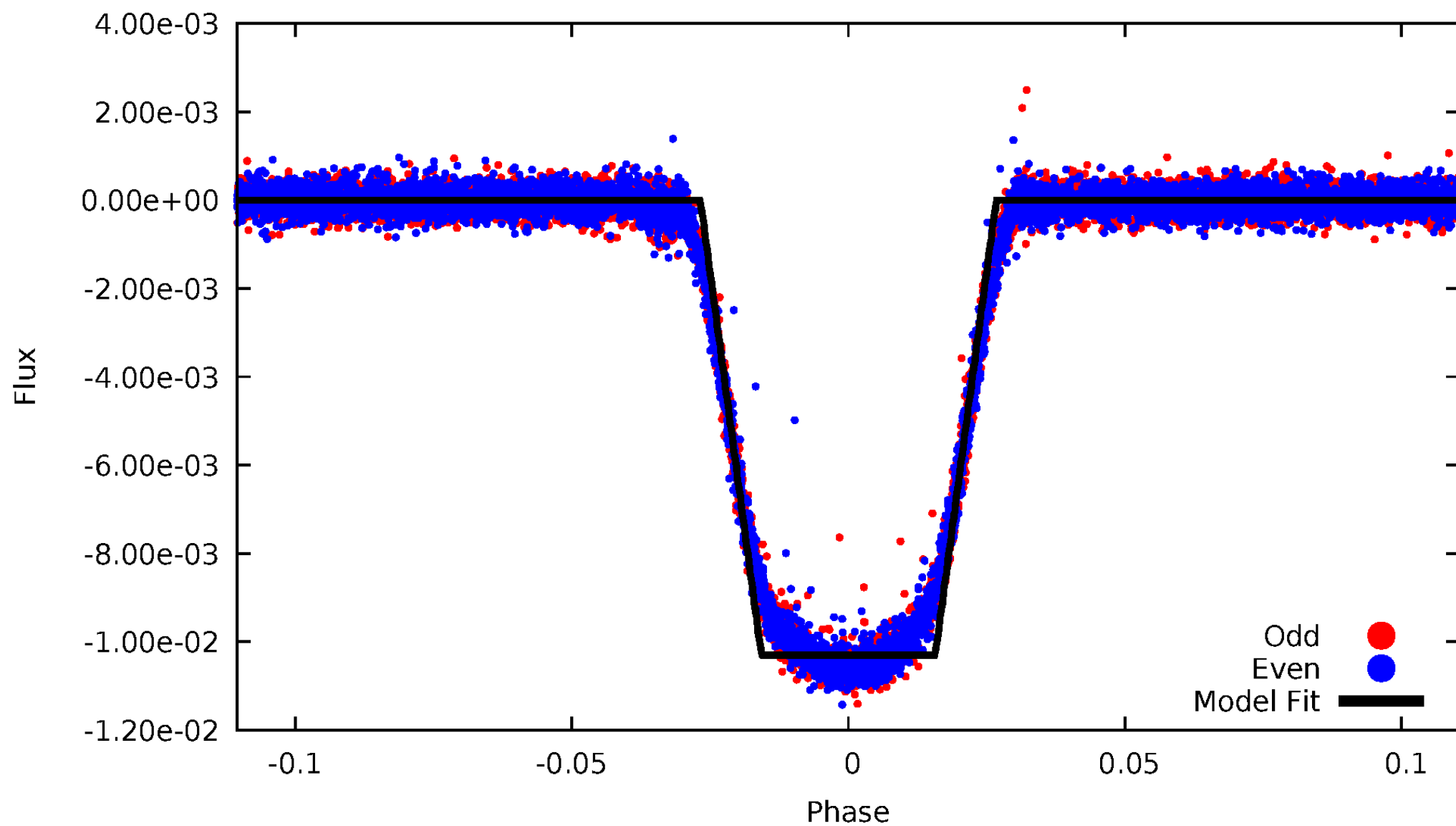
DV Odd/Even

TCE 009410930-01



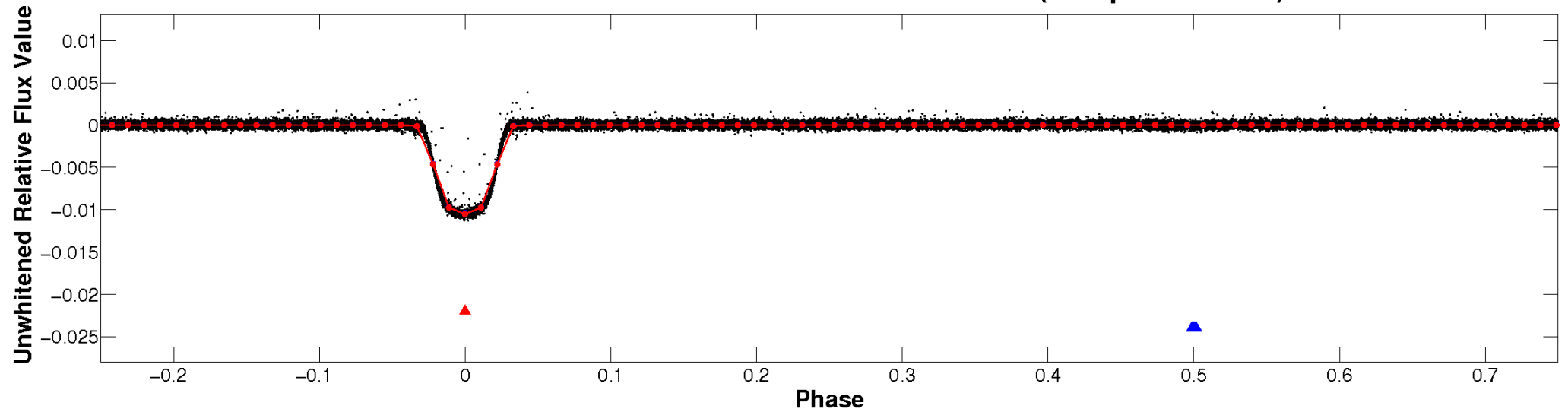
ALT Odd/Even

TCE 009410930-01

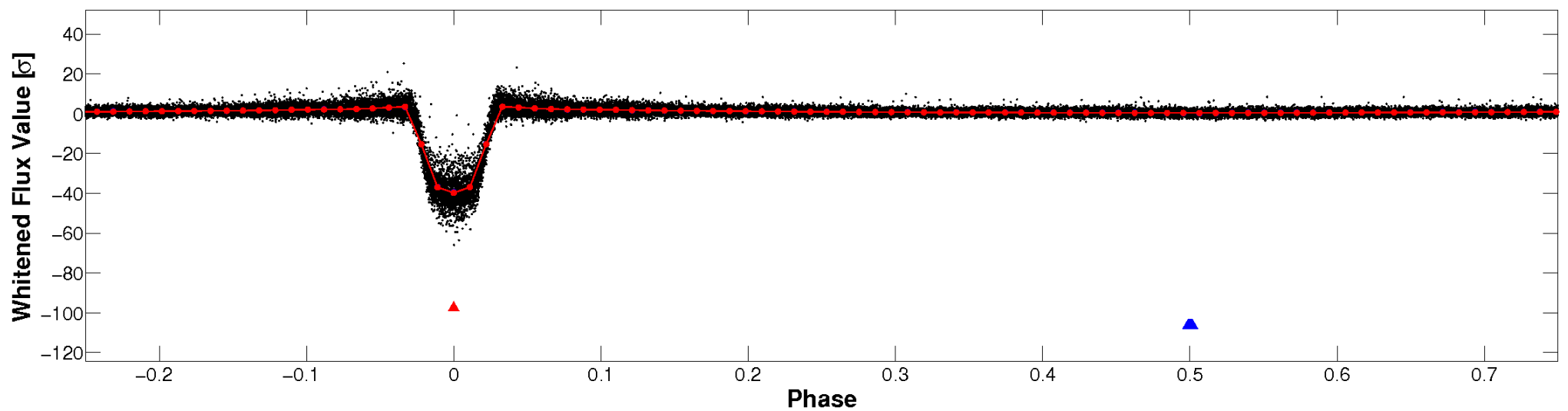


Non-Whitened Vs. Whitened Light Curve

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

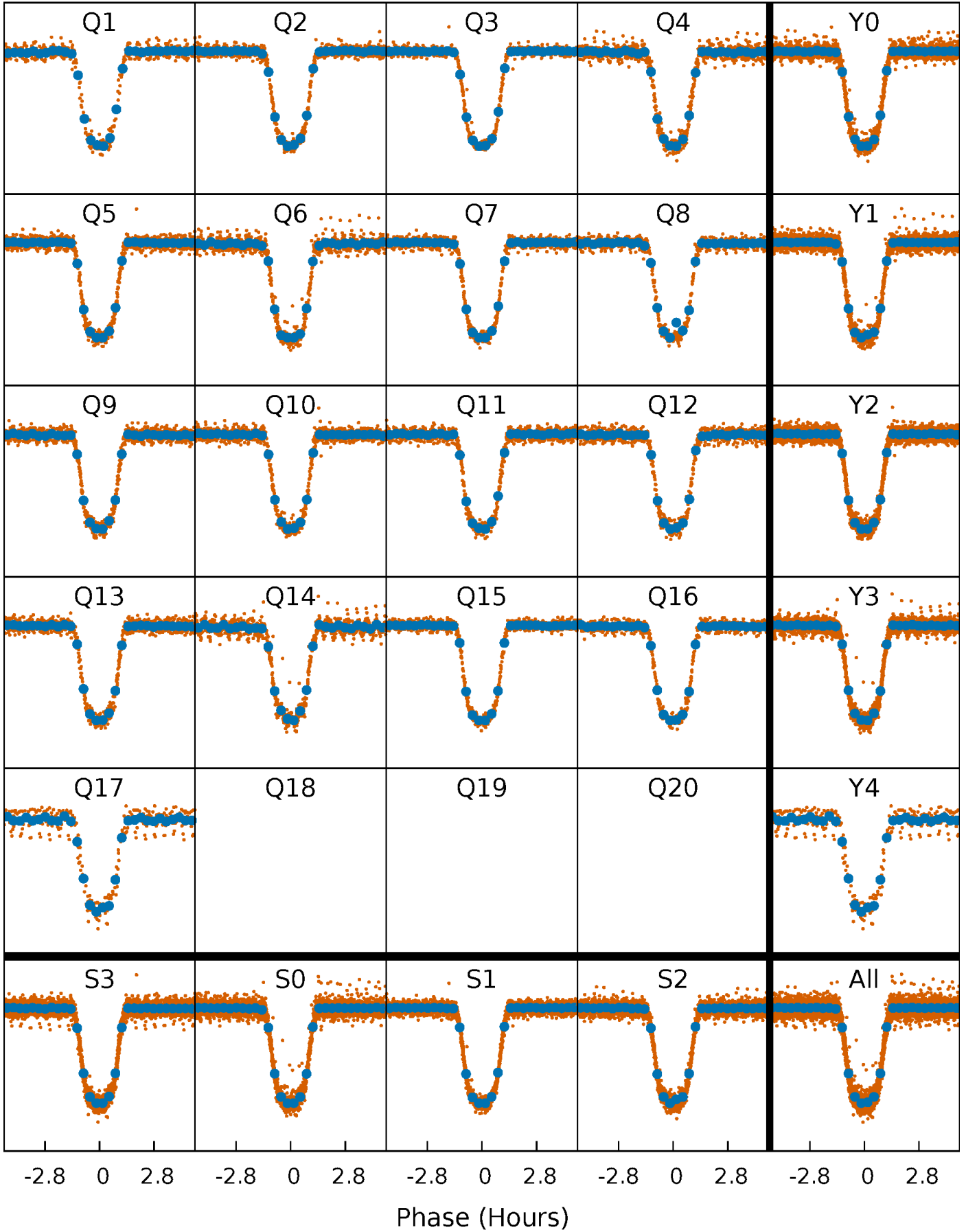


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



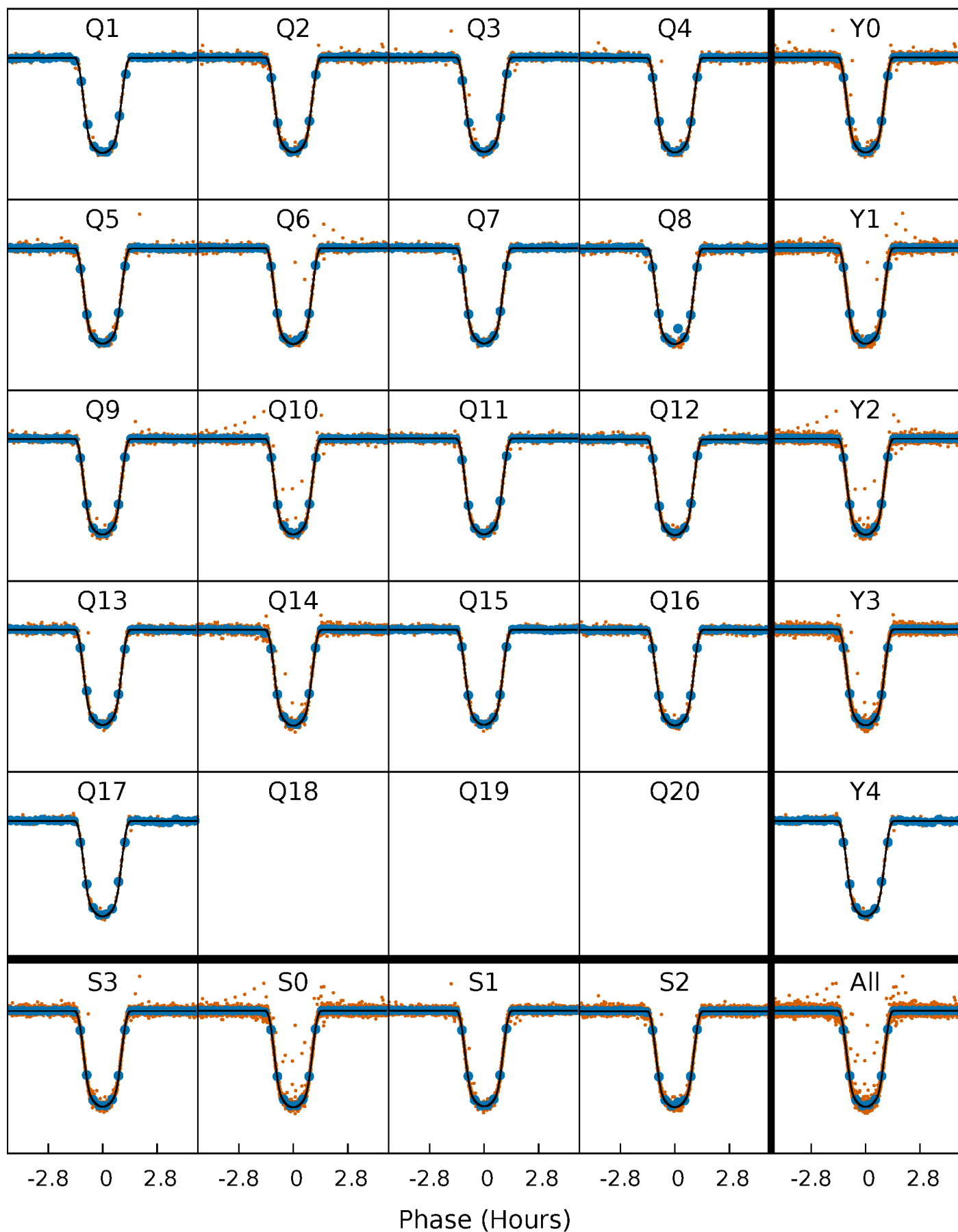
PDC Quarter-Phased Transit Curves

TCE 009410930-01 P= 1.855558 Days $T_0=131.614337$ (BKJD)



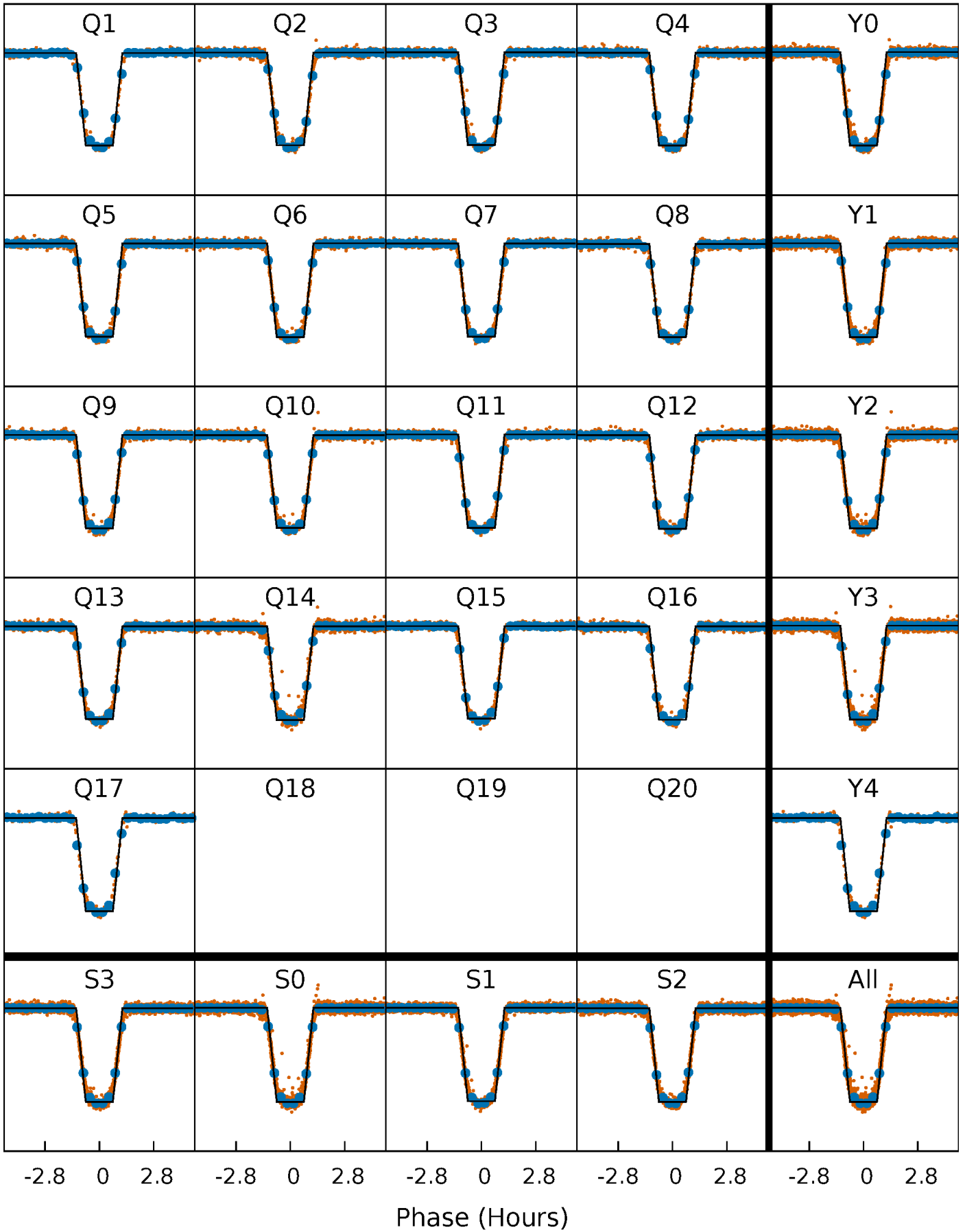
DV Quarter-Phased Transit Curves

TCE 009410930-01 P= 1.855558 Days $T_0=131.614337$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

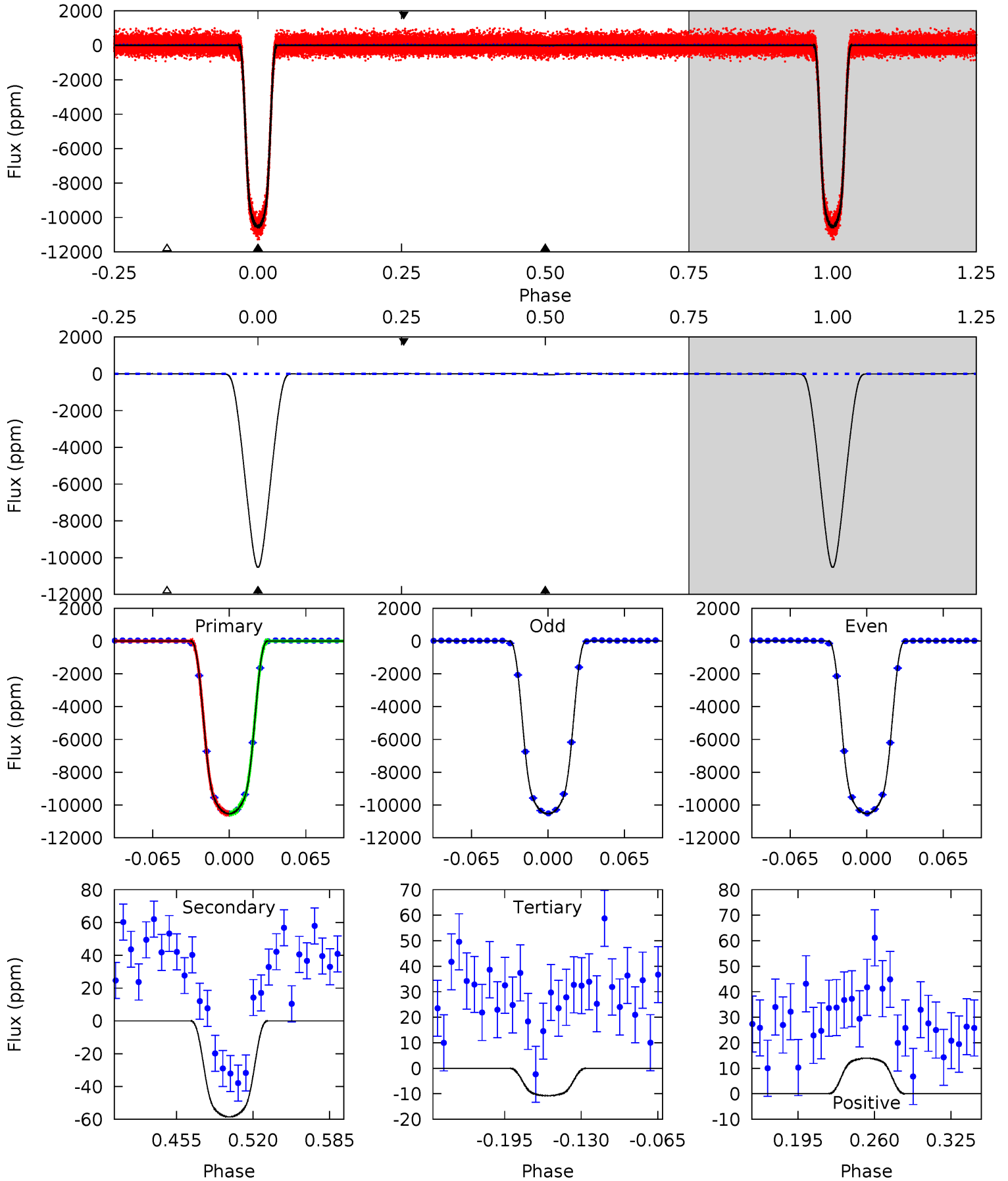
TCE 009410930-01 P= 1.855561 Days $T_0=131.613022$ (BKJD)



DV Model-Shift Uniqueness Test

009410930-01, P = 1.855558 Days, E = 129.758779 Days

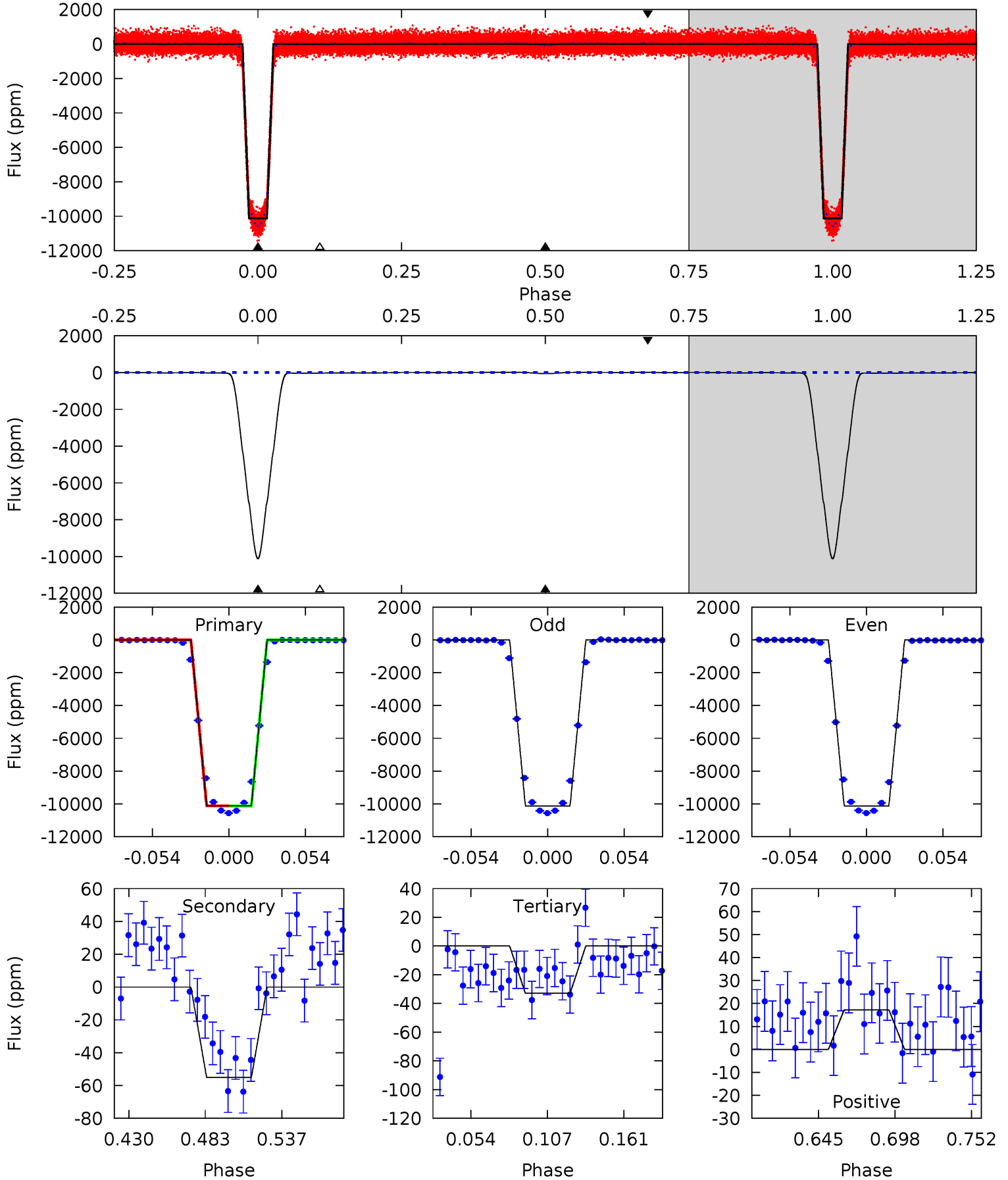
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2817	15.7	2.88	3.73	4.65	1.85	2.02	2814	2813	12.8	11.9	1.79	0.99	0.00	0.30



Alt Model-Shift Uniqueness Test

009410930-01, P = 1.855561 Days, E = 129.757461 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2353	12.8	7.65	4.01	4.69	1.93	3.30	2345	2349	5.16	8.80	0.21	1.00	0.00	0.85



Stellar Parameters For KIC 009410930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5657^{+113}_{-113}	$4.441^{+0.050}_{-0.045}$	$-0.080^{+0.150}_{-0.150}$	$0.947^{+0.056}_{-0.062}$	$0.903^{+0.064}_{-0.057}$	$1.497^{+0.281}_{-0.215}$
	+2%/-2%	+1%/-1%	+188%/-188%	+6%/-7%	+7%/-6%	+19%/-14%
Source	SPE40	TRA40	SPE40	DSEP		

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

Secondary Eclipse Parameters for KIC 009410930-01 / KOI 0196.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-59 ± 4	$10.43^{+0.40}_{-0.48}$	2007^{+52}_{-50}	-2071^{+118}_{-86}	$0.242^{+0.023}_{-0.021}$
Alt.	-55 ± 4	$10.48^{+0.42}_{-0.39}$	2005^{+53}_{-53}	-2130^{+101}_{-72}	$0.226^{+0.024}_{-0.022}$

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

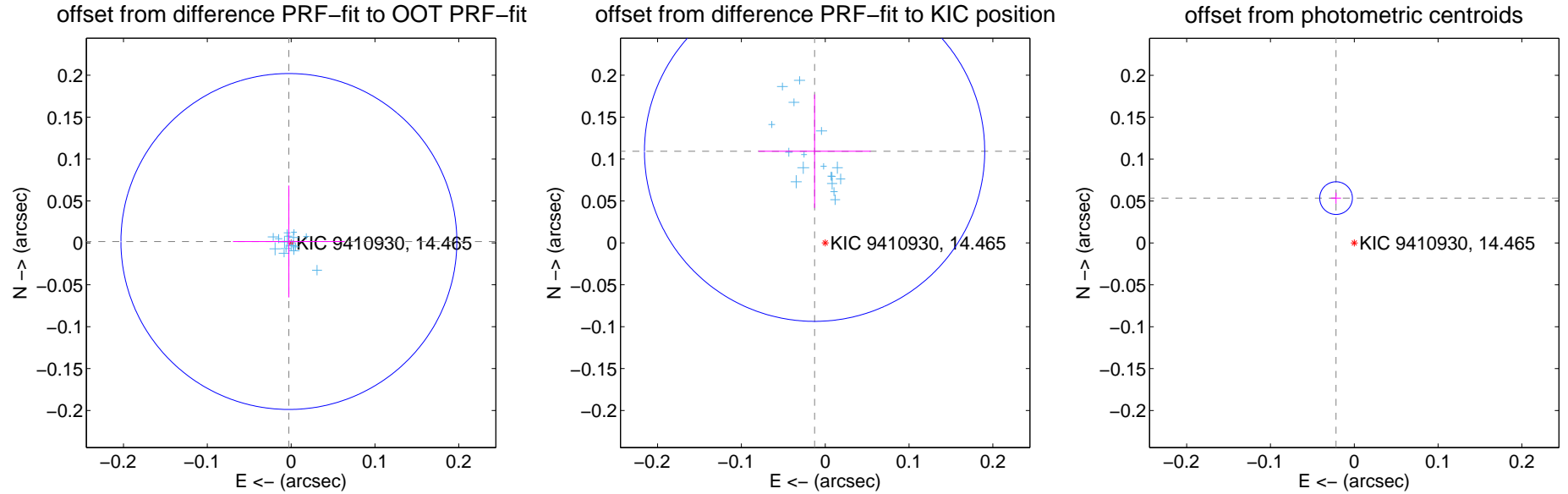
DV Centroid Data

Supplemental centroid analysis for 009410930-01. Kepler magnitude: 14.46. Transit SNR 1840.45

There are 17 quarters with good PRF difference image offsets

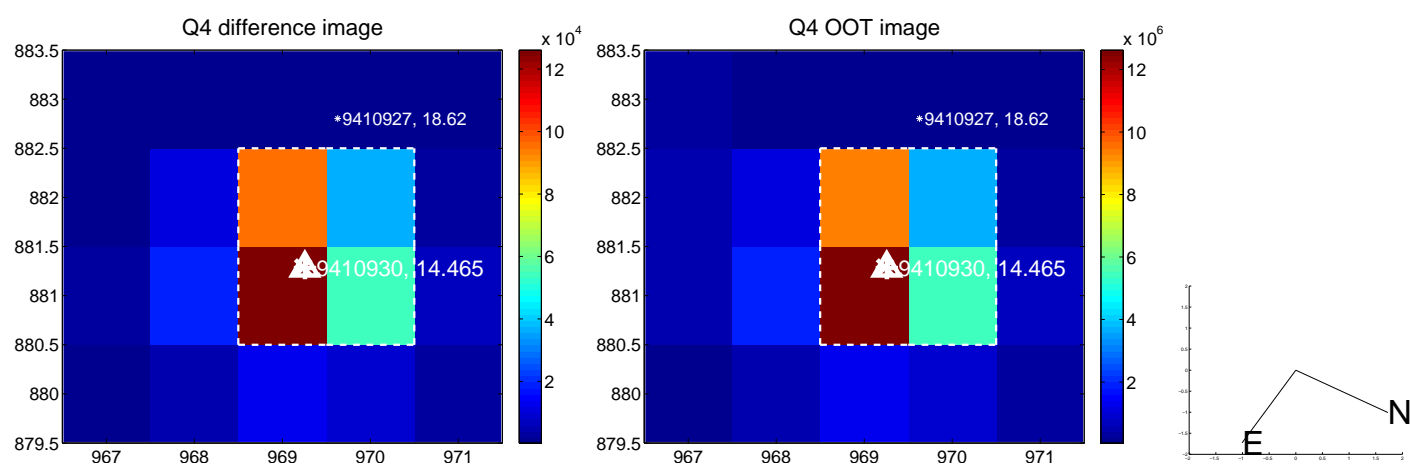
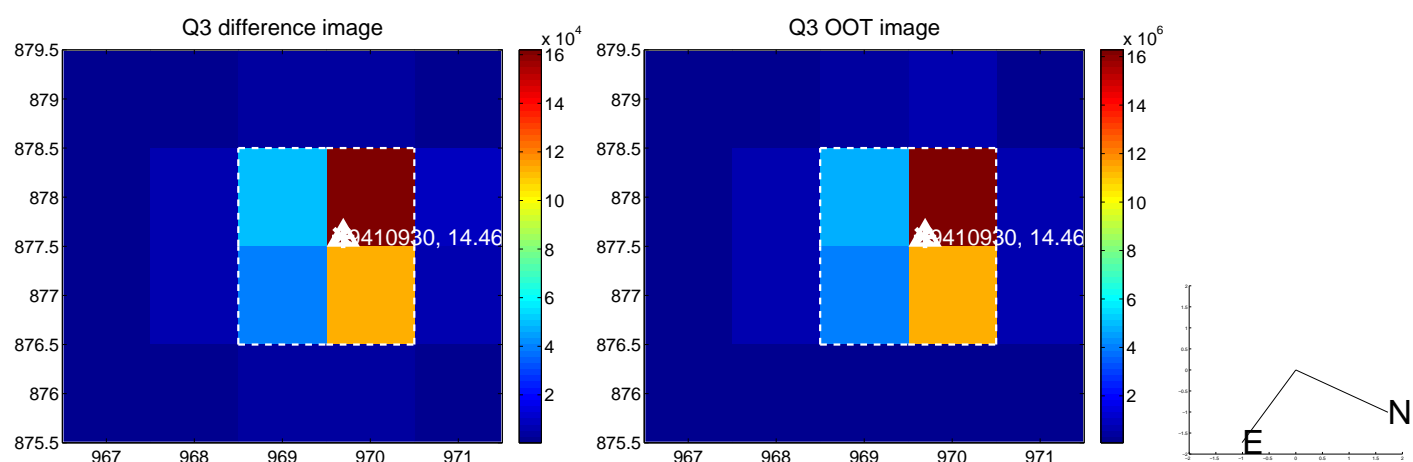
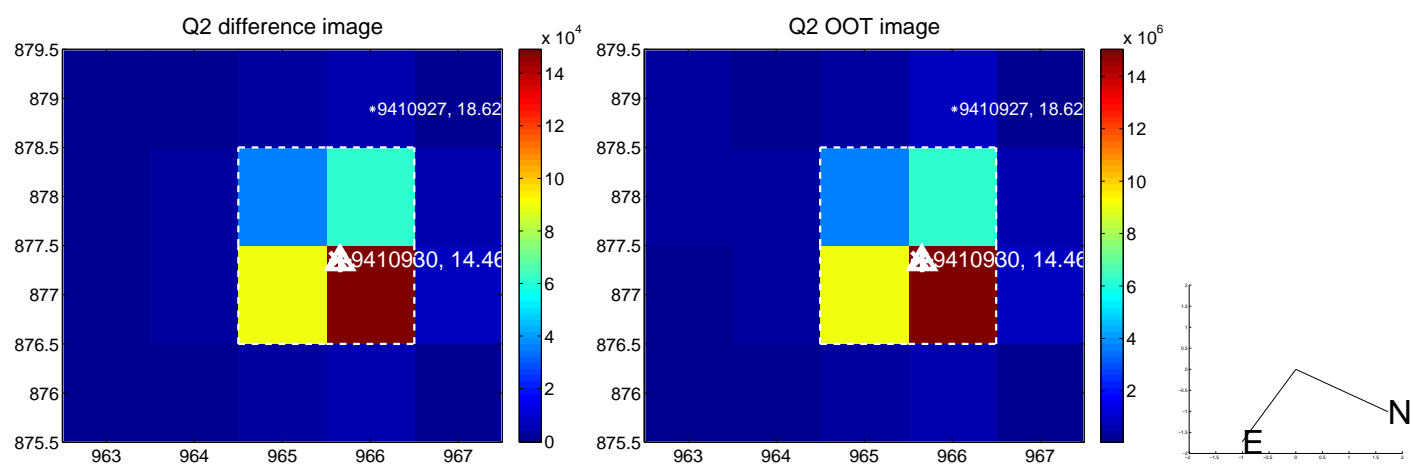
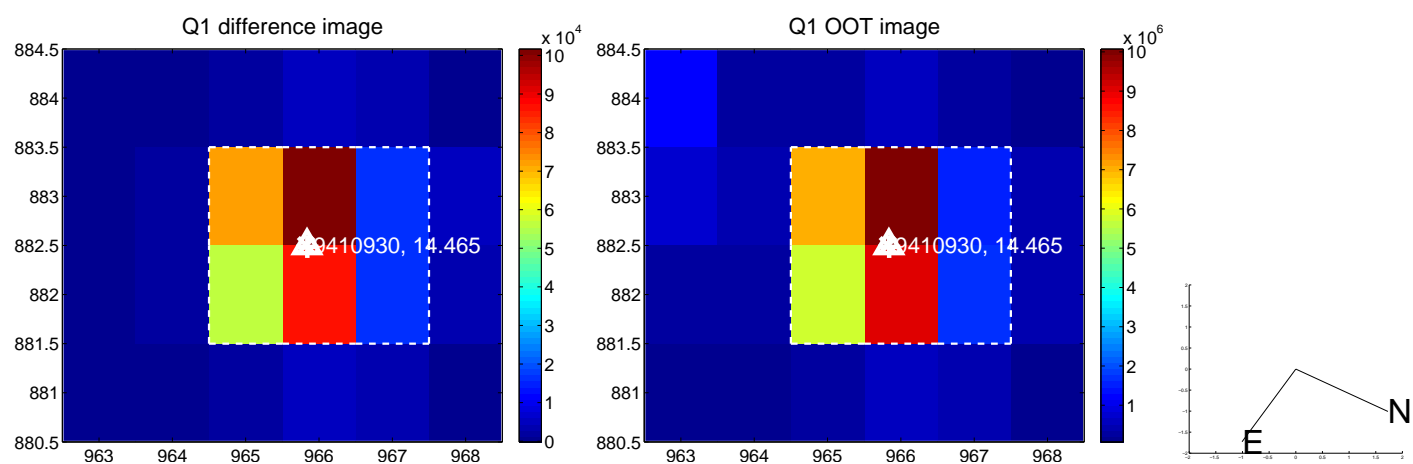
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.003 ± 0.067	0.05	0.003 ± 0.067	0.002 ± 0.067
PRF-fit source offset from KIC position	0.110 ± 0.068	1.63	0.013 ± 0.067	0.109 ± 0.068
photometric centroid source offset	0.06 ± 0.01	8.88	0.02 ± 0.01	0.05 ± 0.01

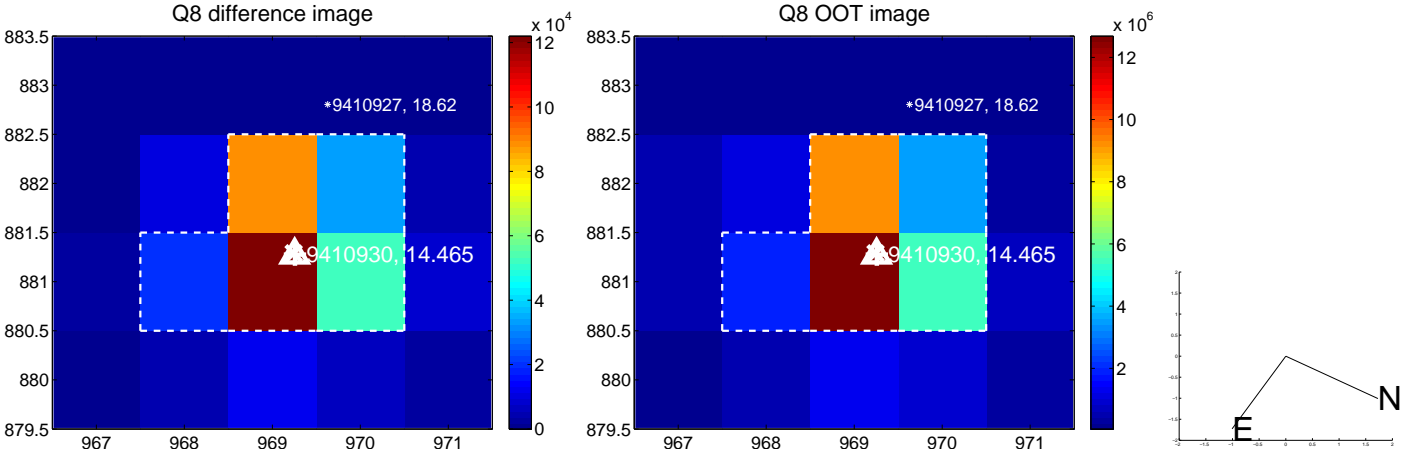
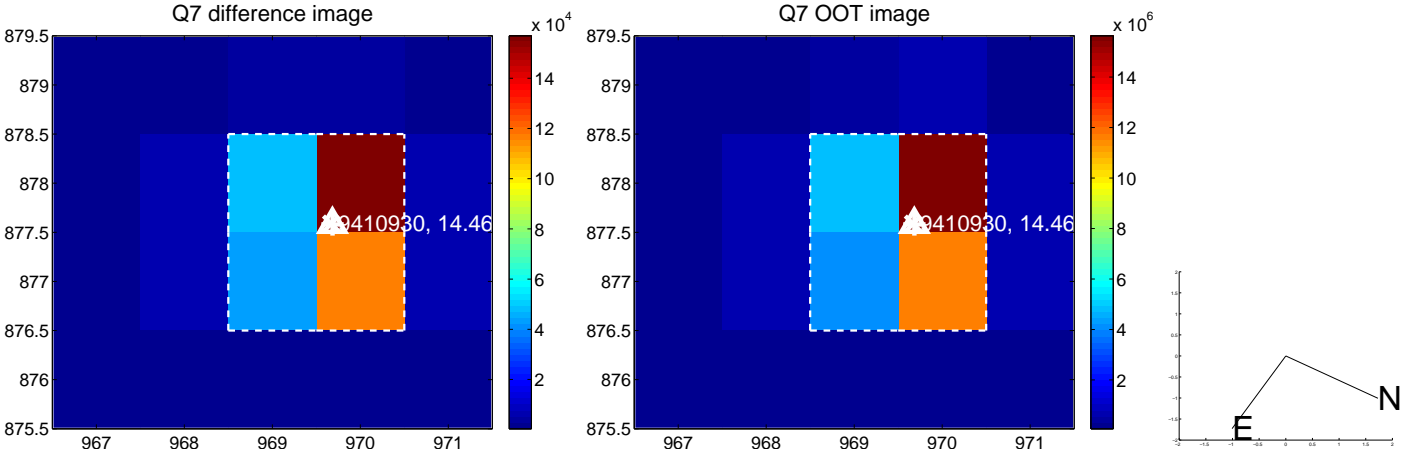
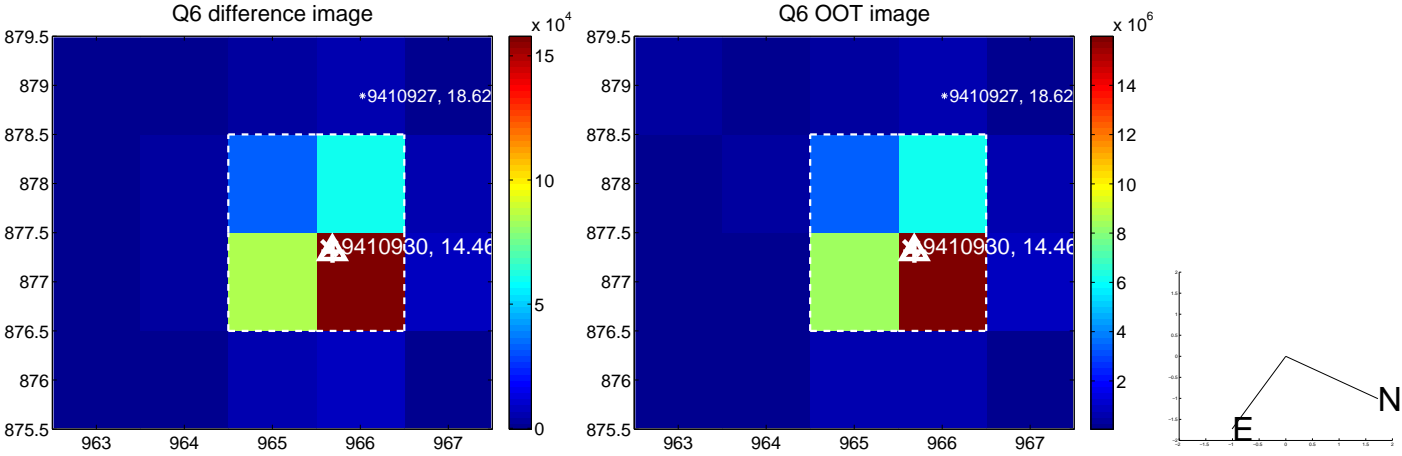
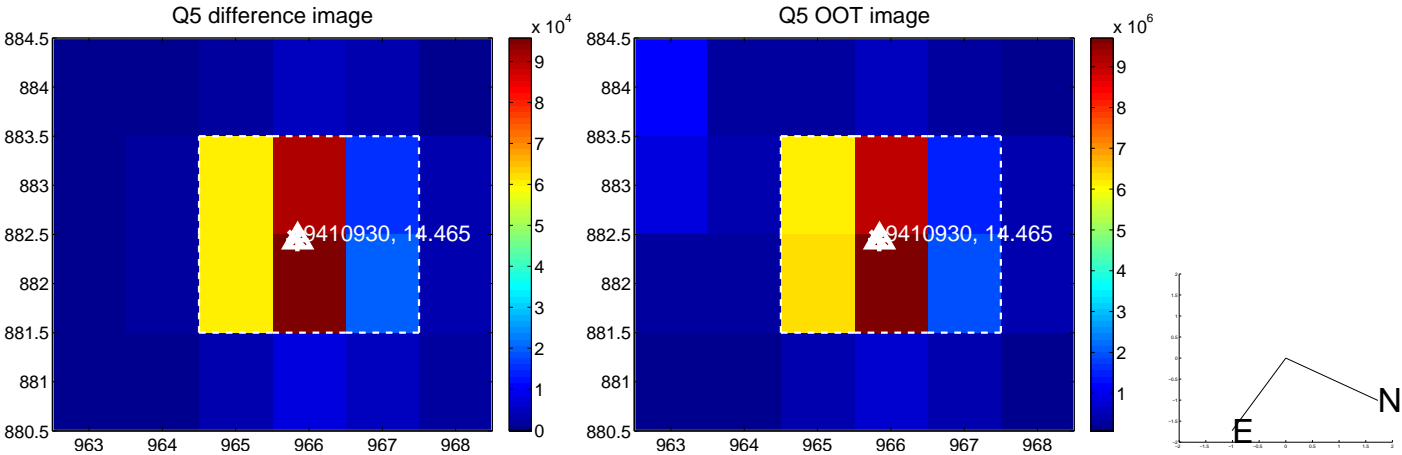


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

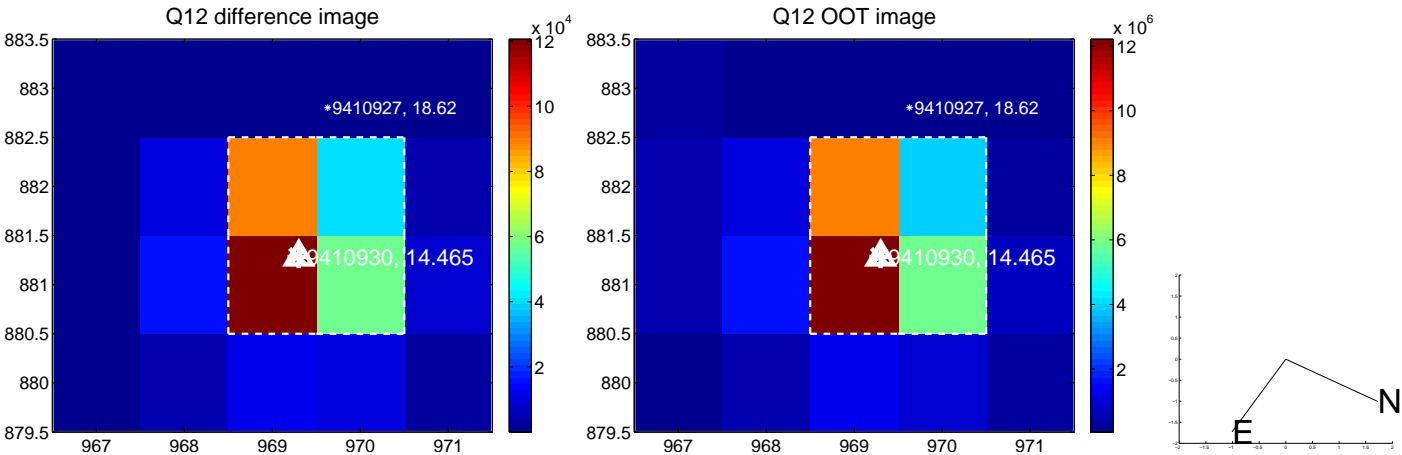
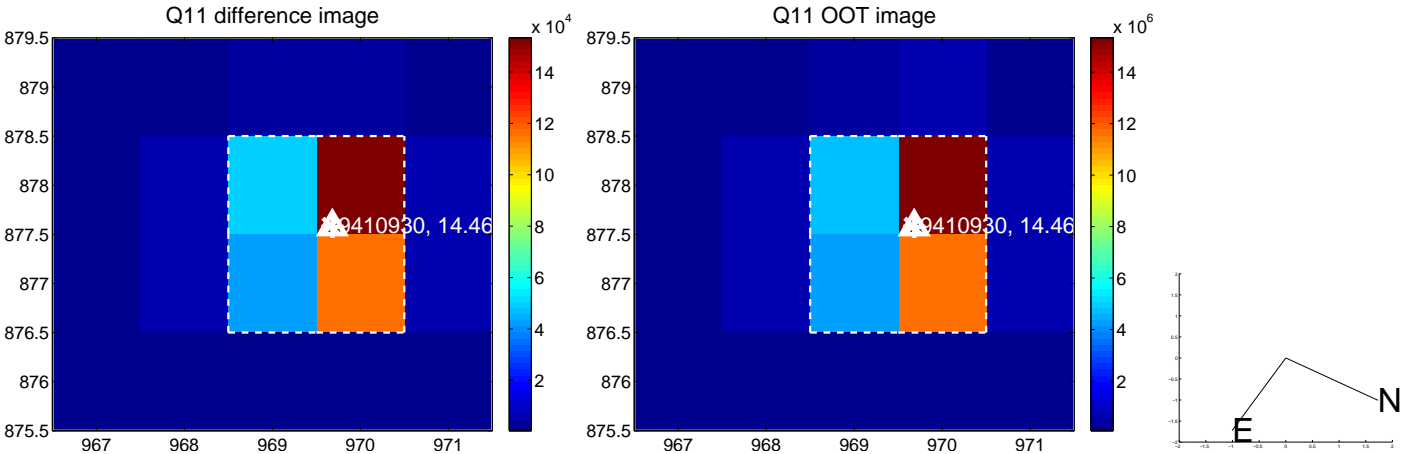
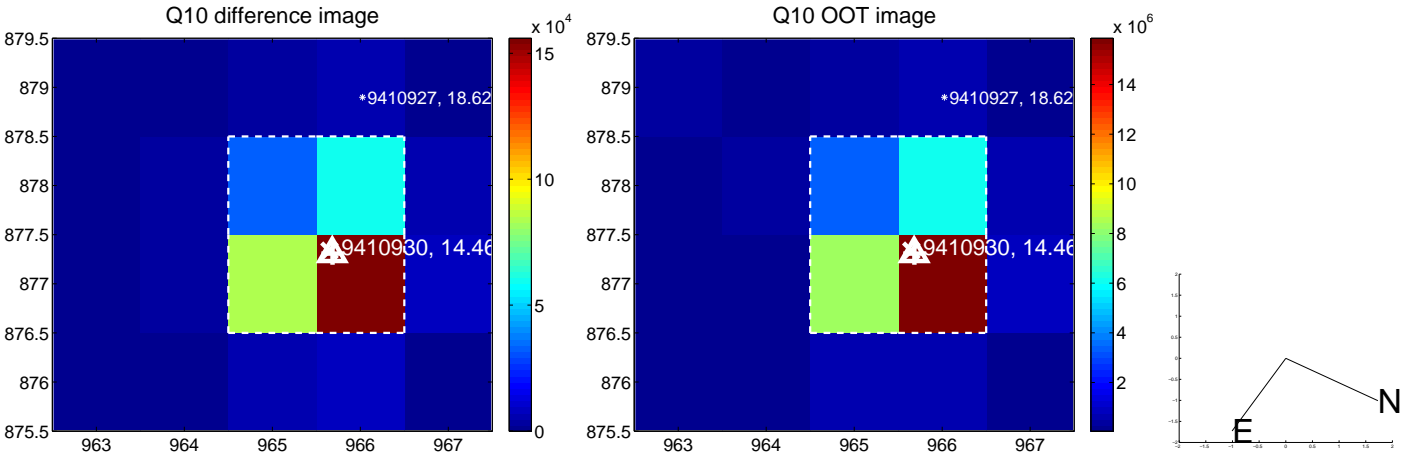
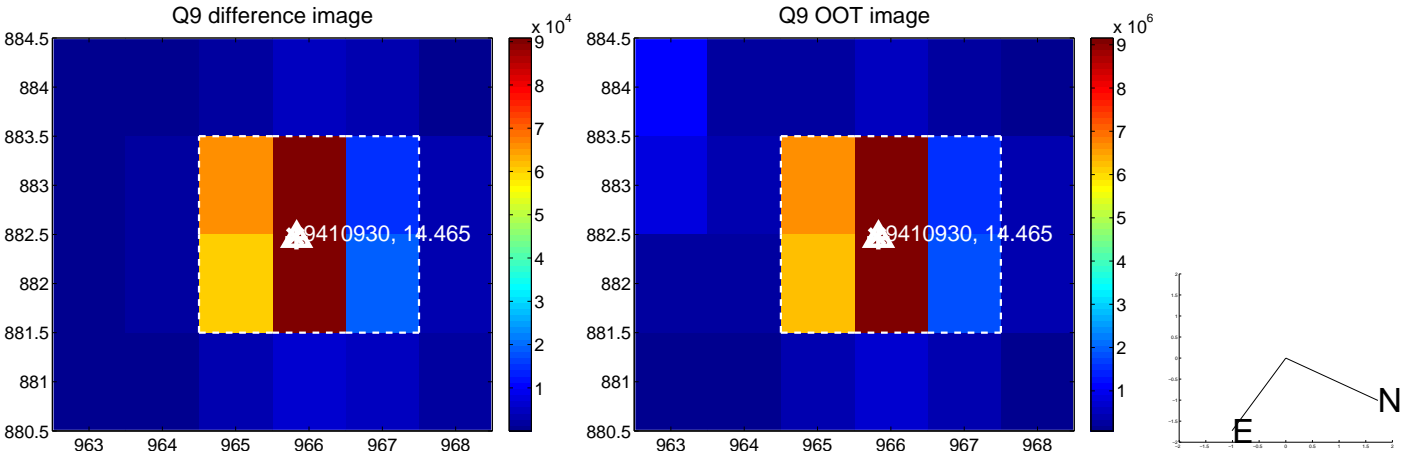
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



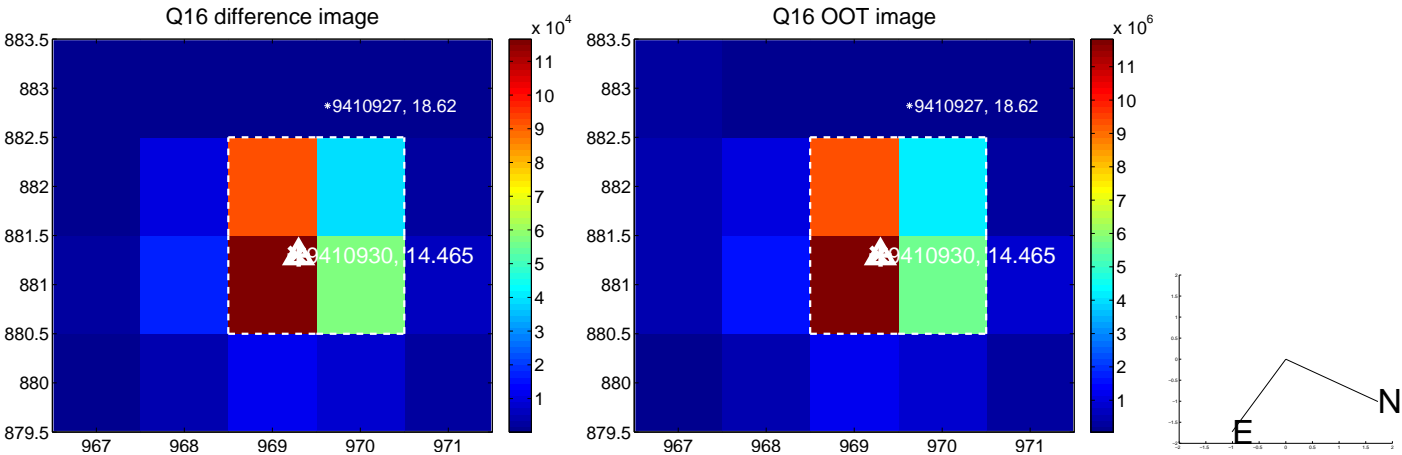
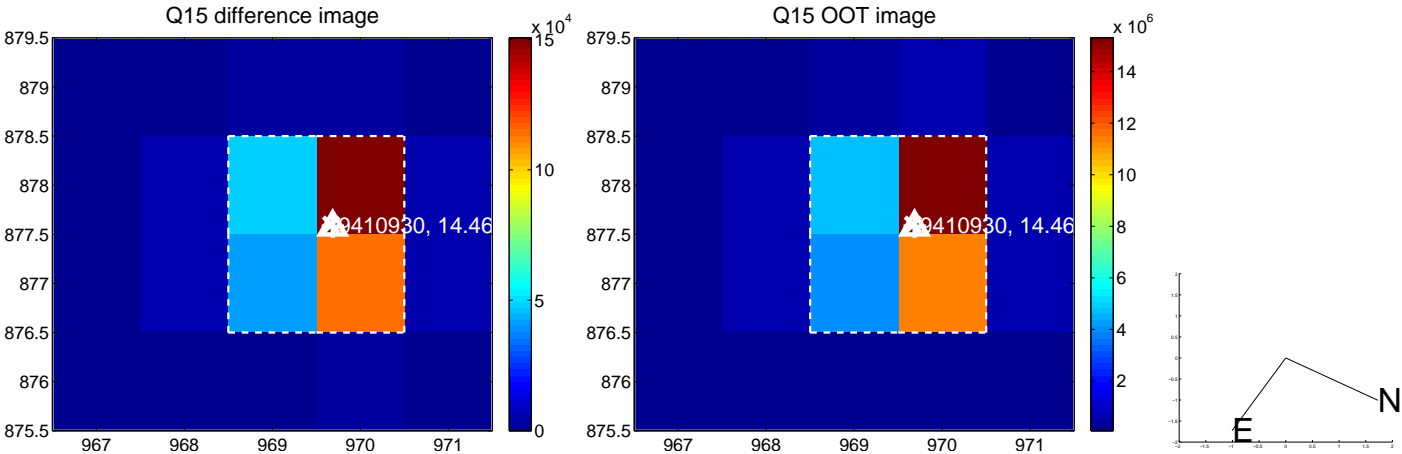
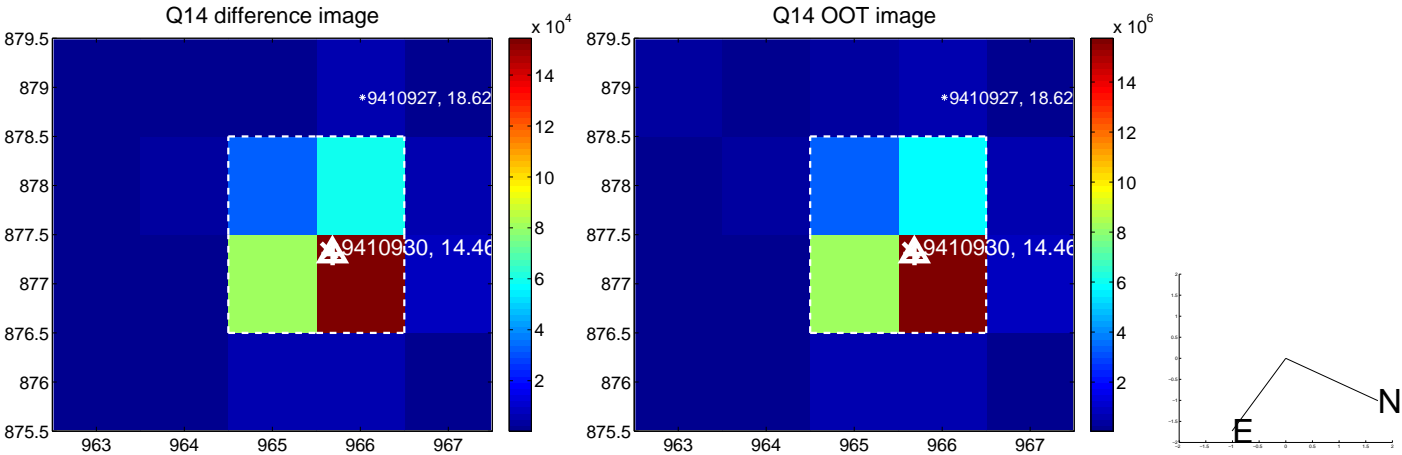
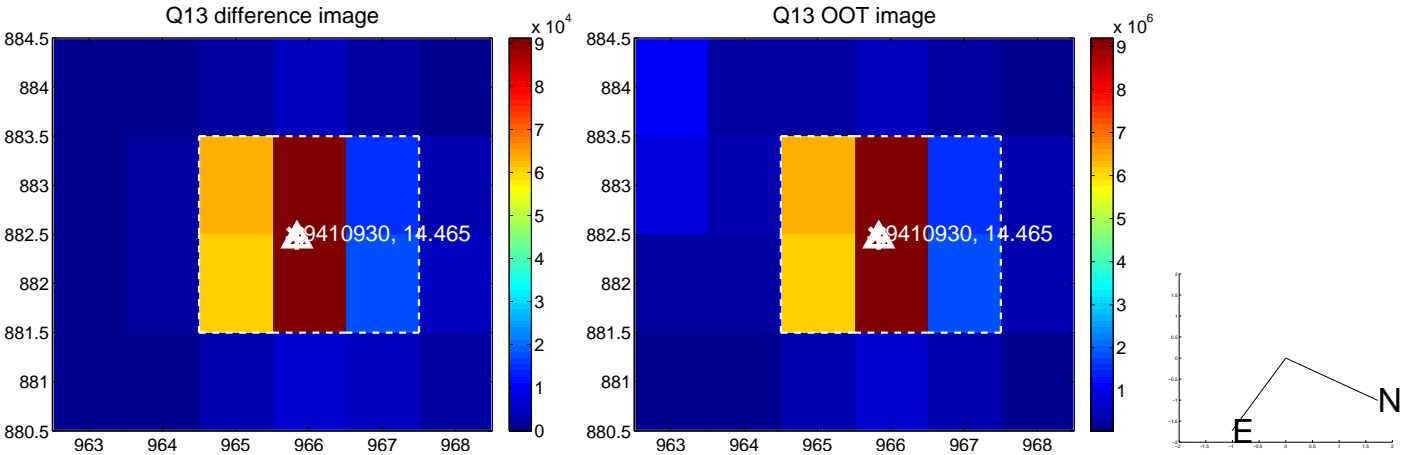
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



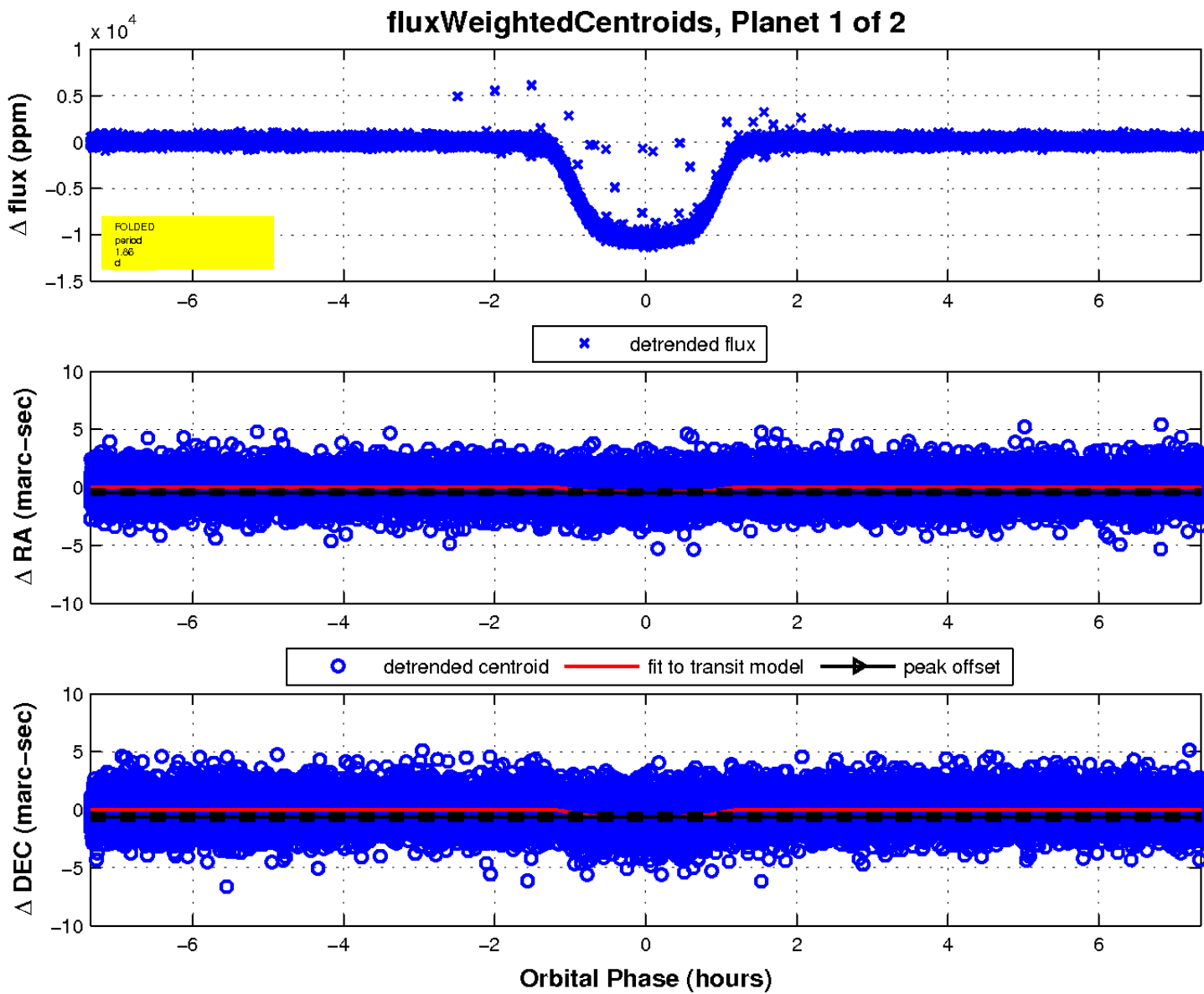
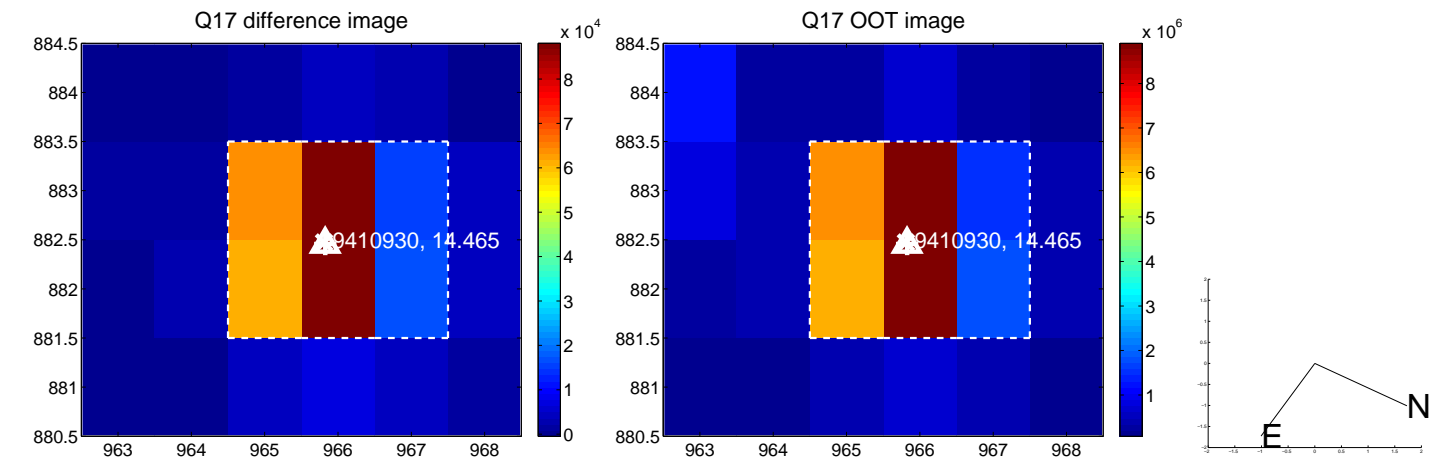
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



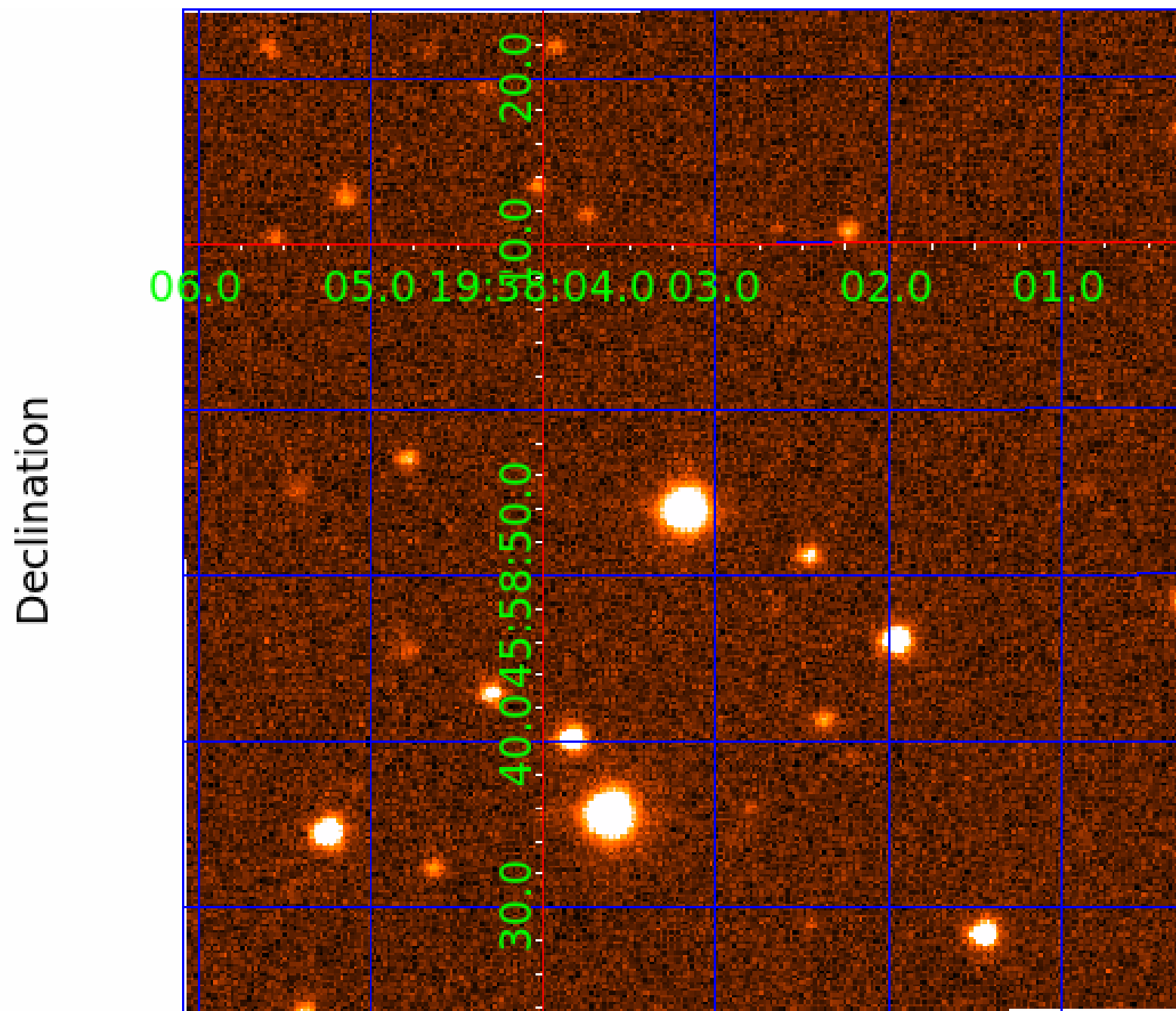
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009410930

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})
009410930-01	OBS	0196.01	1.855558	131.614337	10567.5	2.452	1905.8	1840.5	0.95	5657	10.42	1008.11
009410930-02	OBS	No	1.855551	132.545232	58.4	1.845	8.7	10.1	0.95	5657	0.88	1008.11

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009410930-01	OBS	PC	1.00	0	1	0	0	MOD_SEC_DV—PLANET_OCCULT_DV—HAS_SEC_TCE
009410930-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

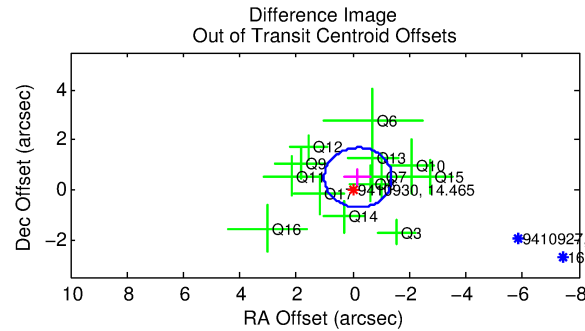
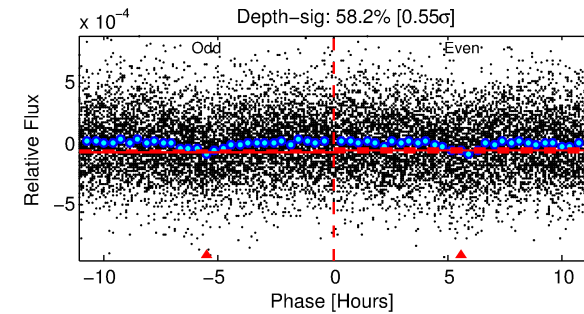
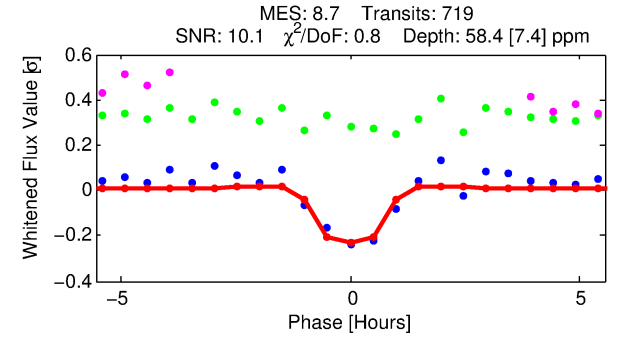
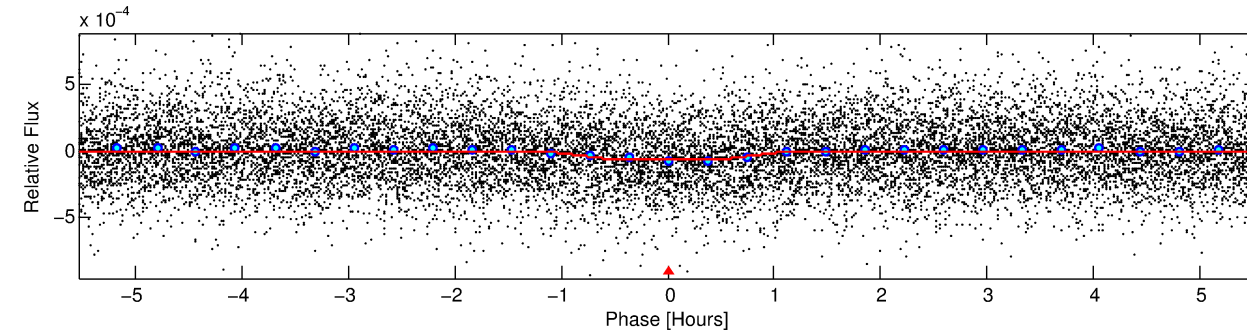
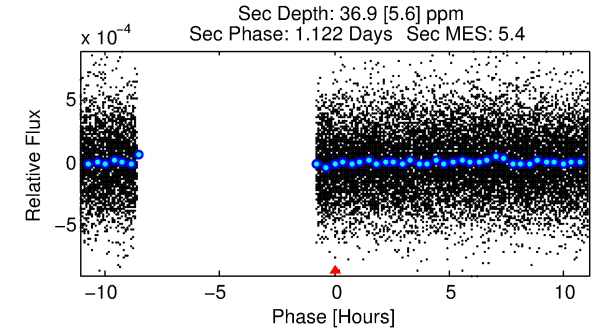
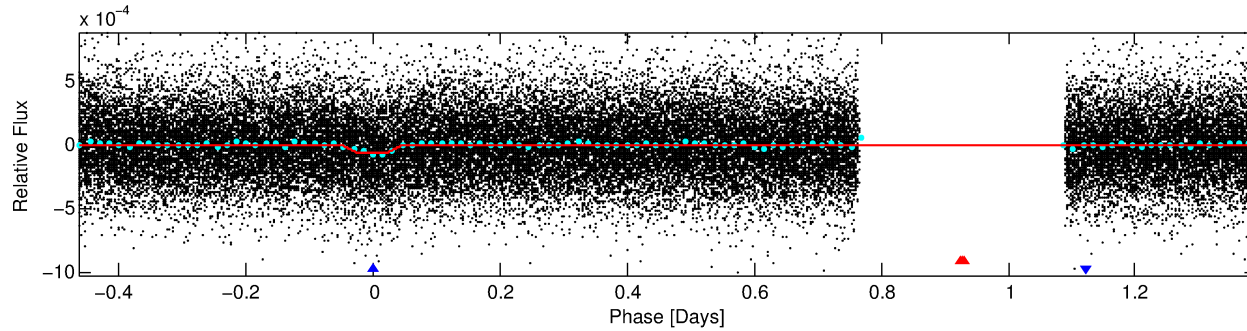
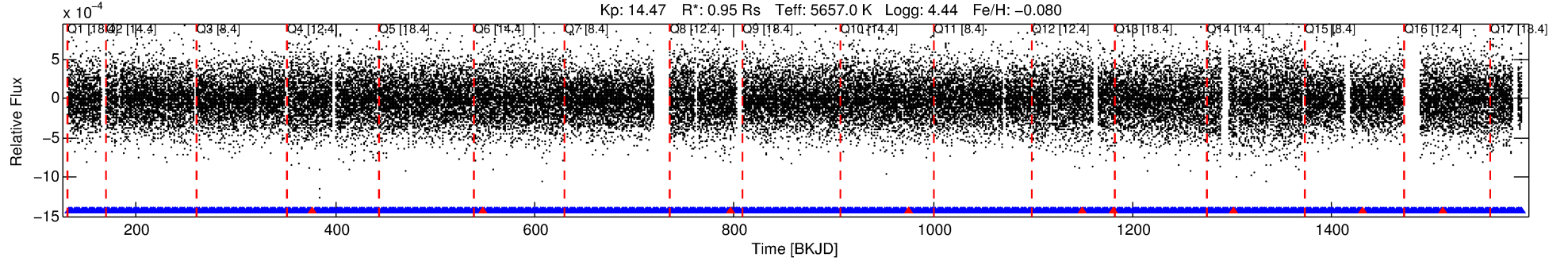
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009410930-02

No Significant Match Found

DV One-Page Summary

KIC: 9410930 Candidate: 2 of 2 Period: 1.856 d
KOI: K00196 Name: Kepler-41 Corr: No Ephemeris Match



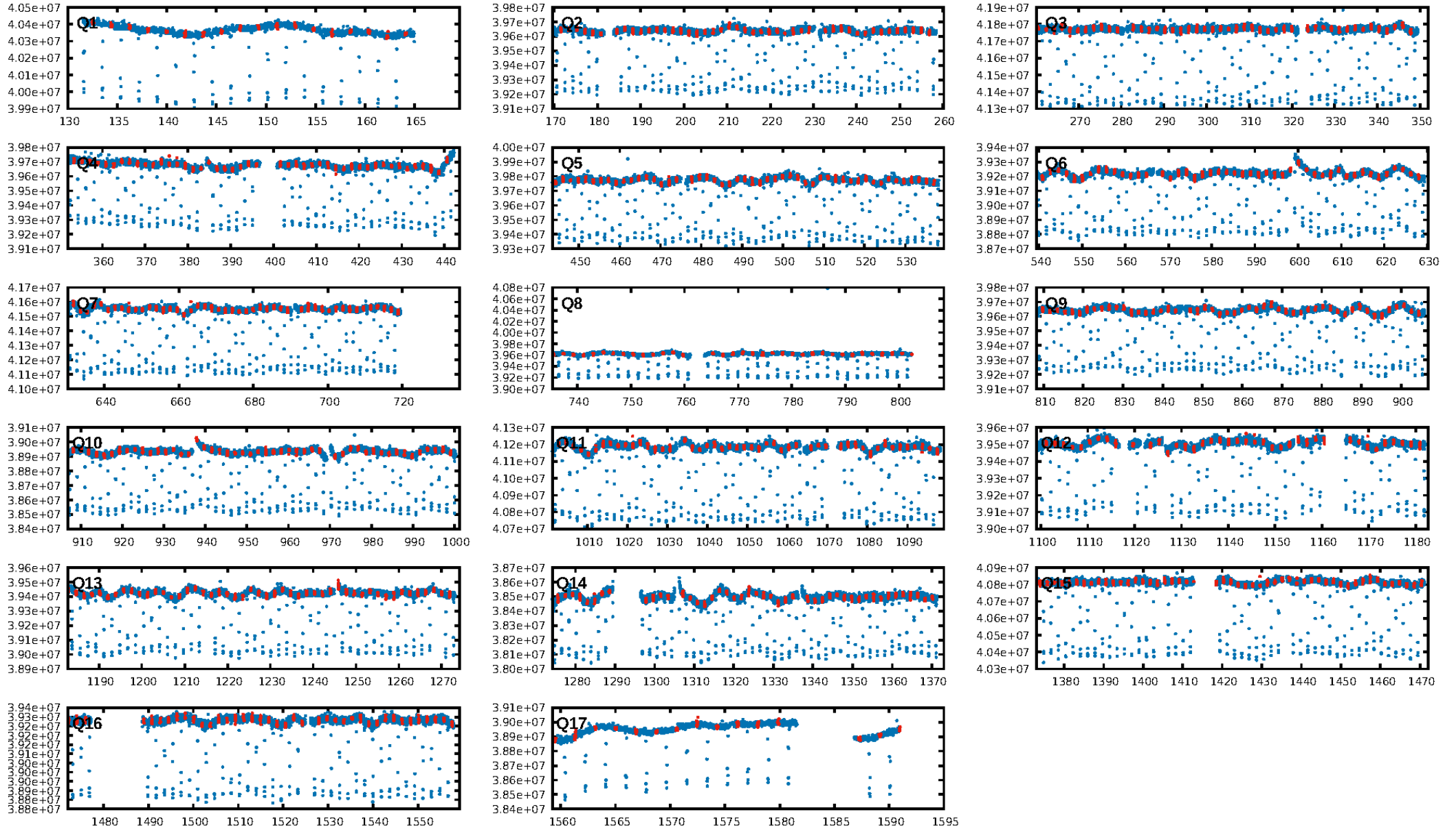
DV Fit Results:

Period = 1.85555 [0.00001] d
Epoch = 132.5452 [0.0028] BKJD
Rp/R* = 0.0085 [0.0045]
a/R* = 3.43 [8.01]
b = 0.91 [0.48]
Seff = 1008.11 [120.05]
Teq = 1437 [43] K
Rp = 0.88 [0.47] Re
a = 0.0286 [0.0017] AU
Ag = 21.66 [23.38] [0.88σ]
Teff = 4792 [1292] K [2.60σ]

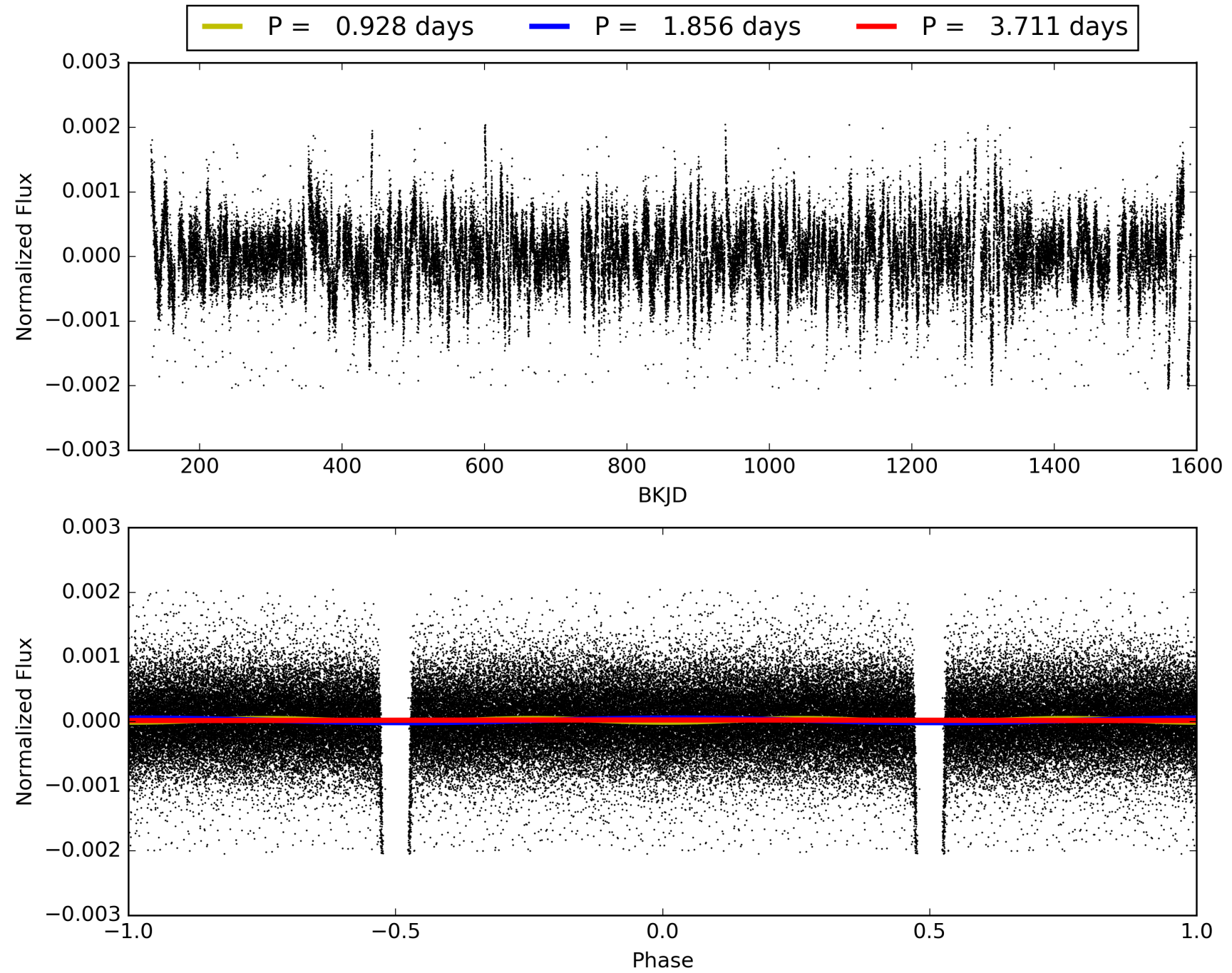
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 5.14e-18
RollingBand-fgt: 0.99 [677/686]
GhostDiagnostic-chr: 5.19
Centroid-sig: 49.7%
Centroid-so: 0.885 arcsec [0.72σ]
OotOffset-rm: 0.513 arcsec [1.28σ]
KicOffset-rm: 0.600 arcsec [1.61σ]
OotOffset-st: 3/4/3/3 [13]
KicOffset-st: 3/4/3/3 [13]
DiffImageQuality-fgm: 0.54 [7/13]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009410930-02, PDC Light Curves

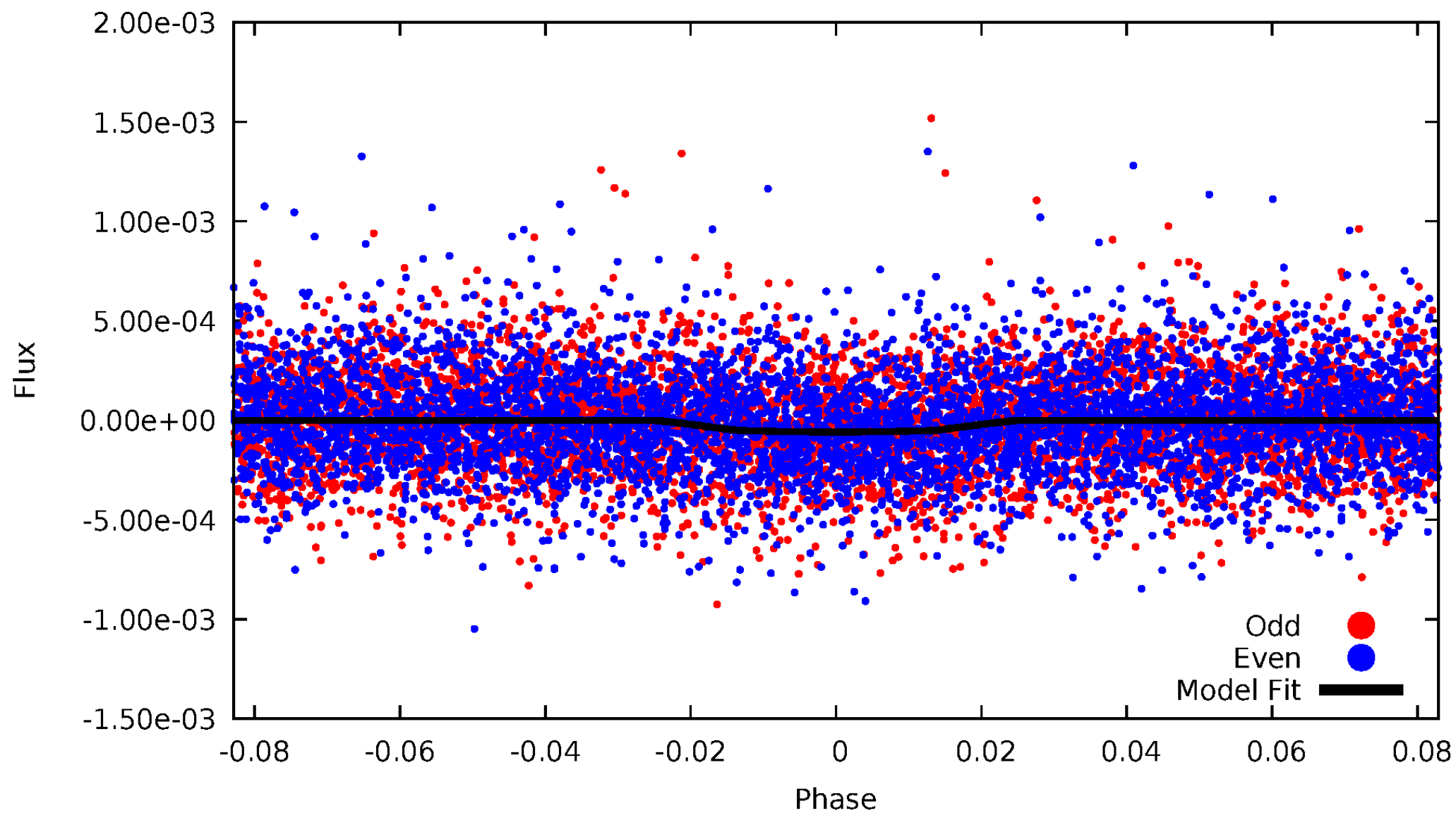


TCE 009410930-02



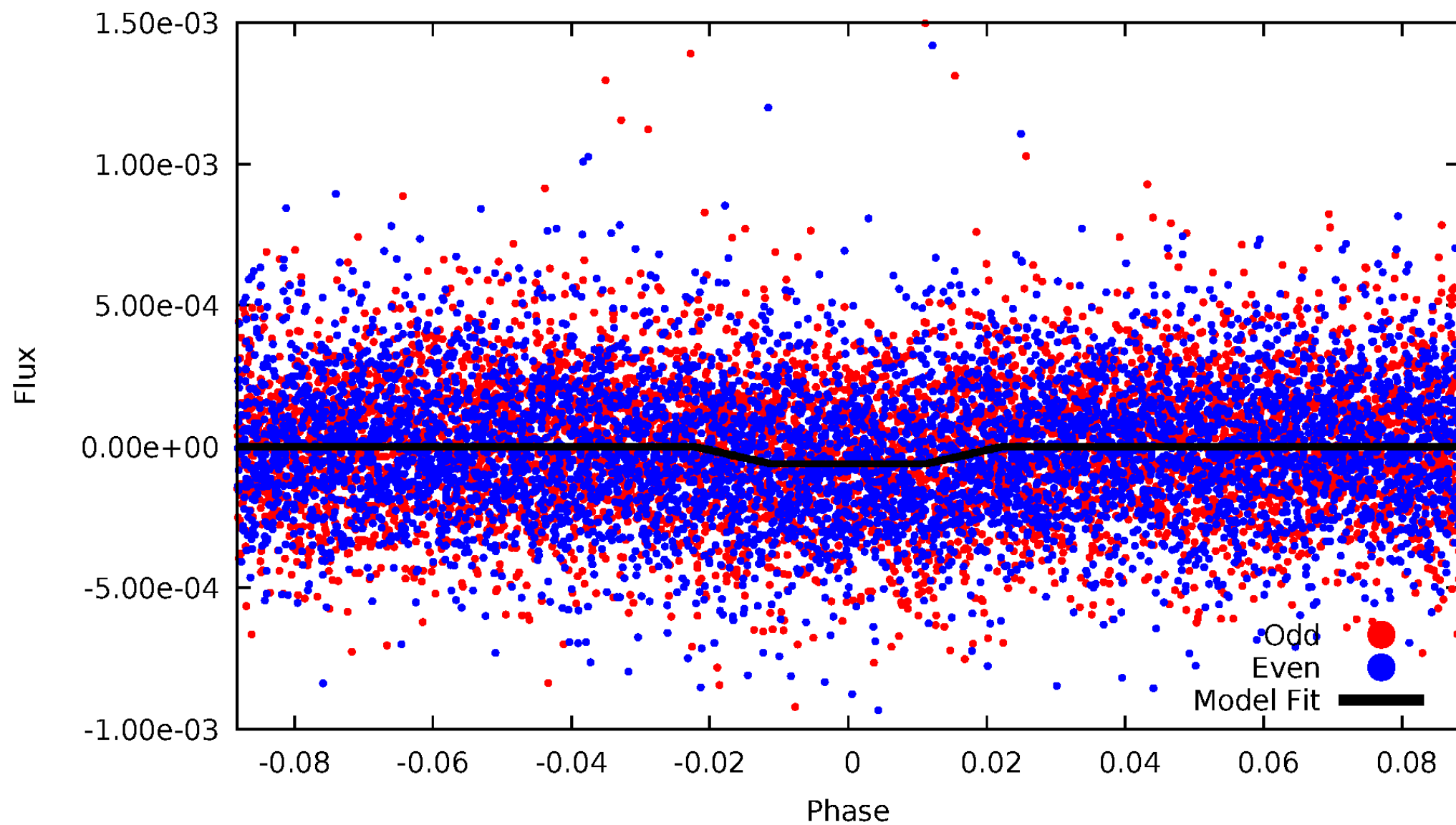
DV Odd/Even

TCE 009410930-02



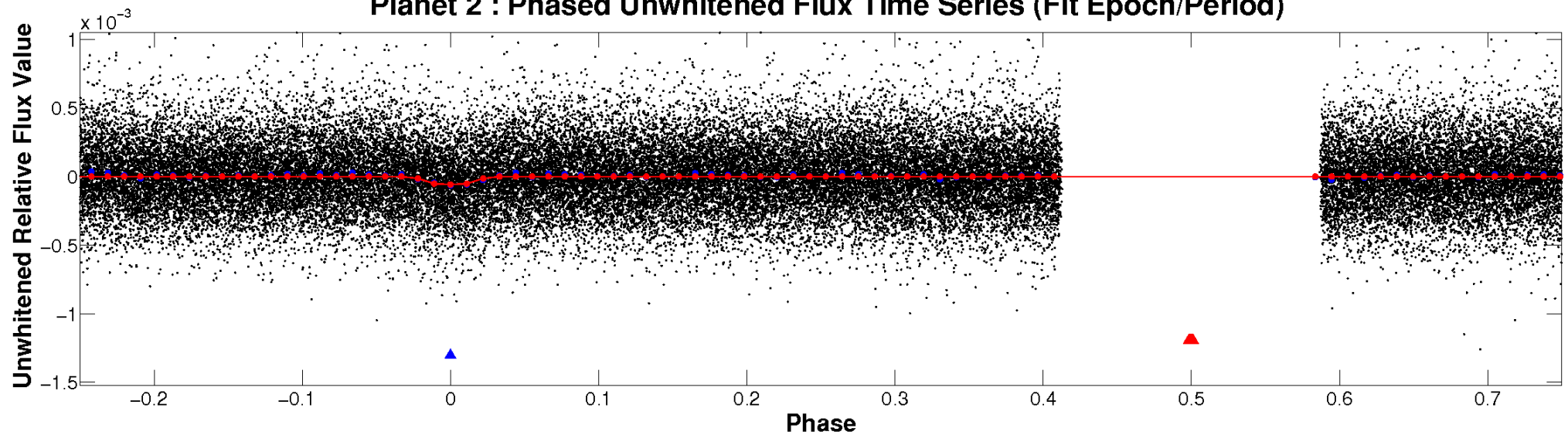
ALT Odd/Even

TCE 009410930-02

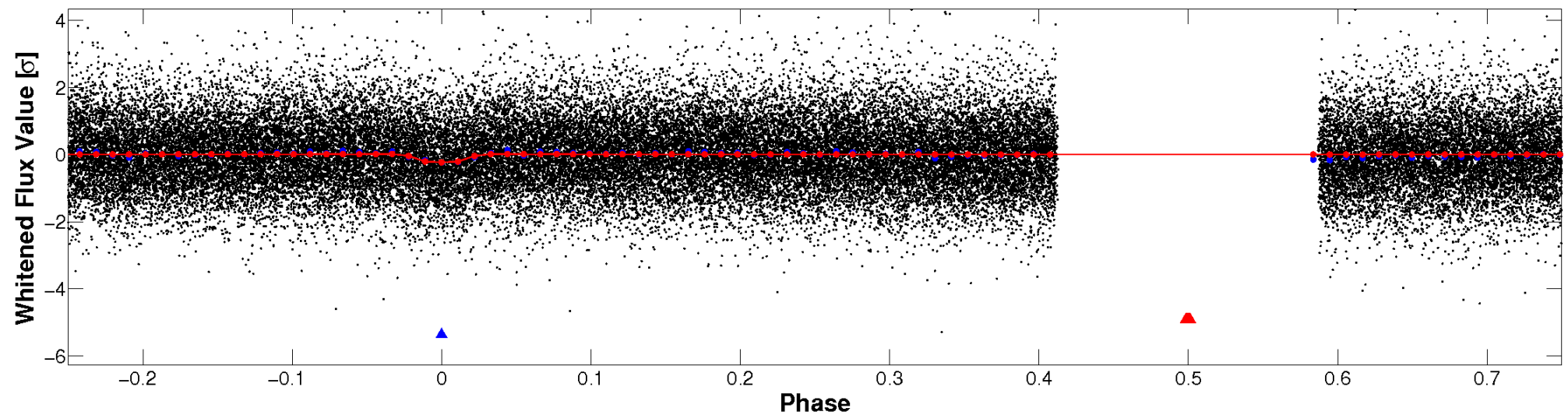


Non-Whitened Vs. Whitened Light Curve

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

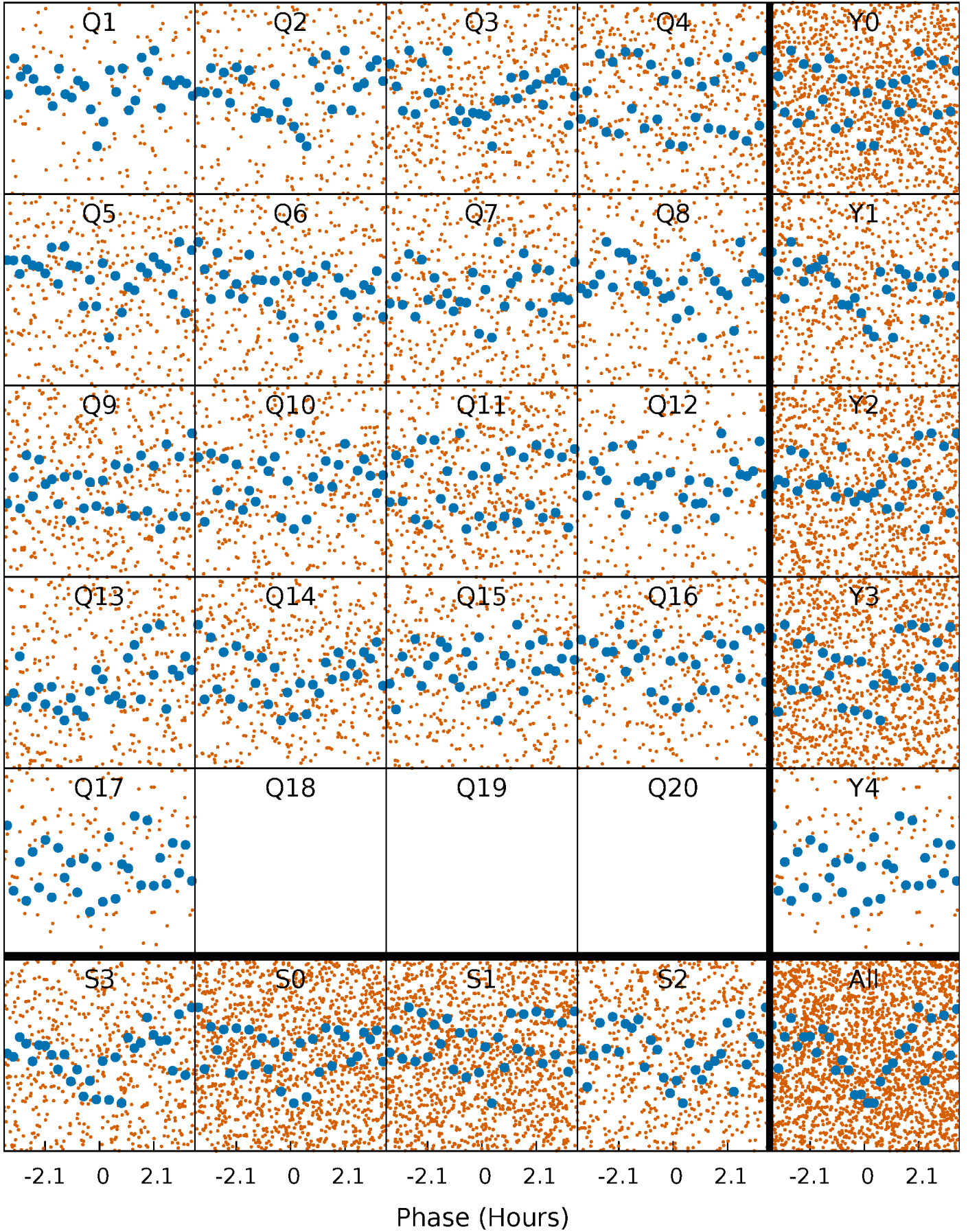


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



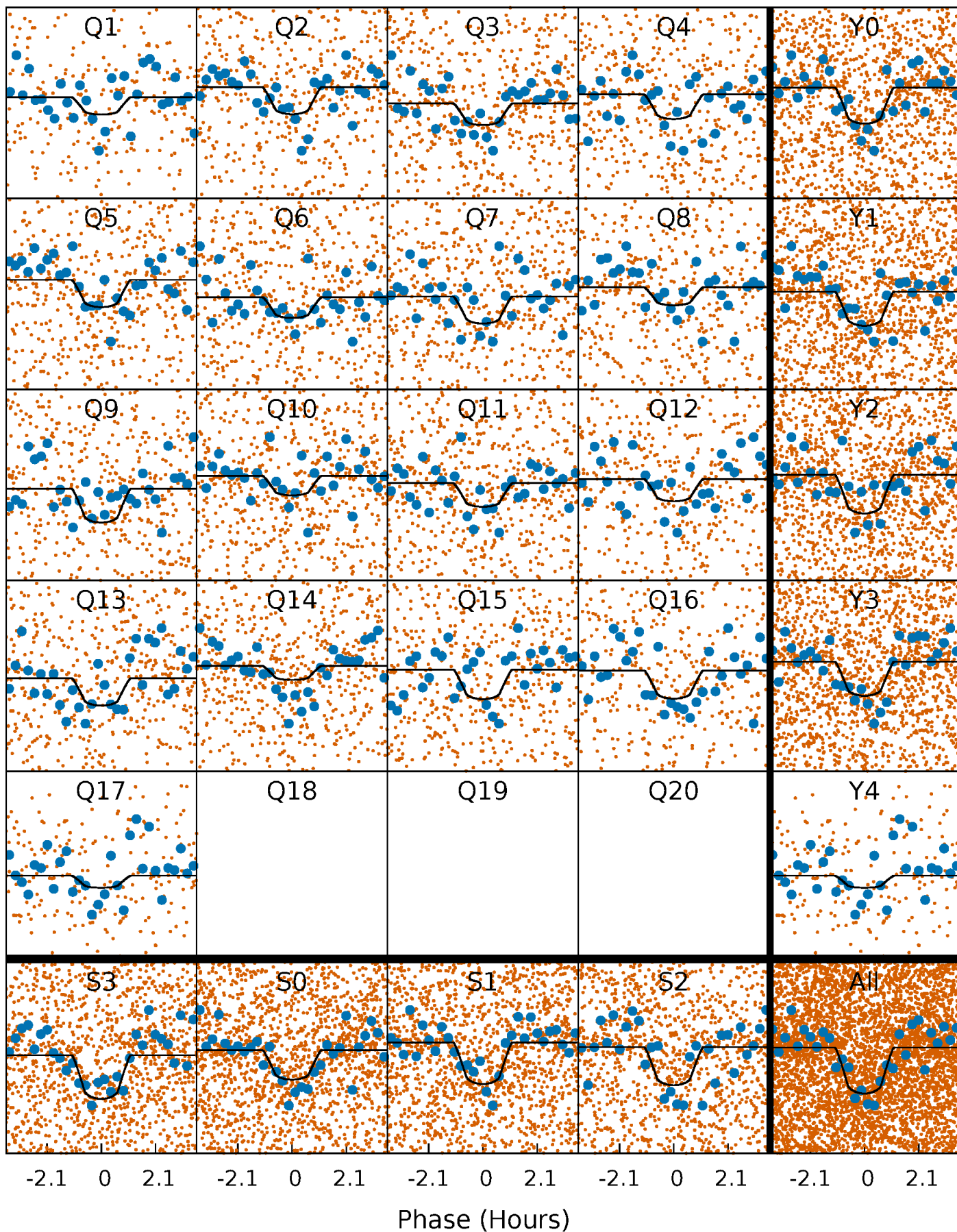
PDC Quarter-Phased Transit Curves

TCE 009410930-02 P= 1.855551 Days $T_0=132.545232$ (BKJD)



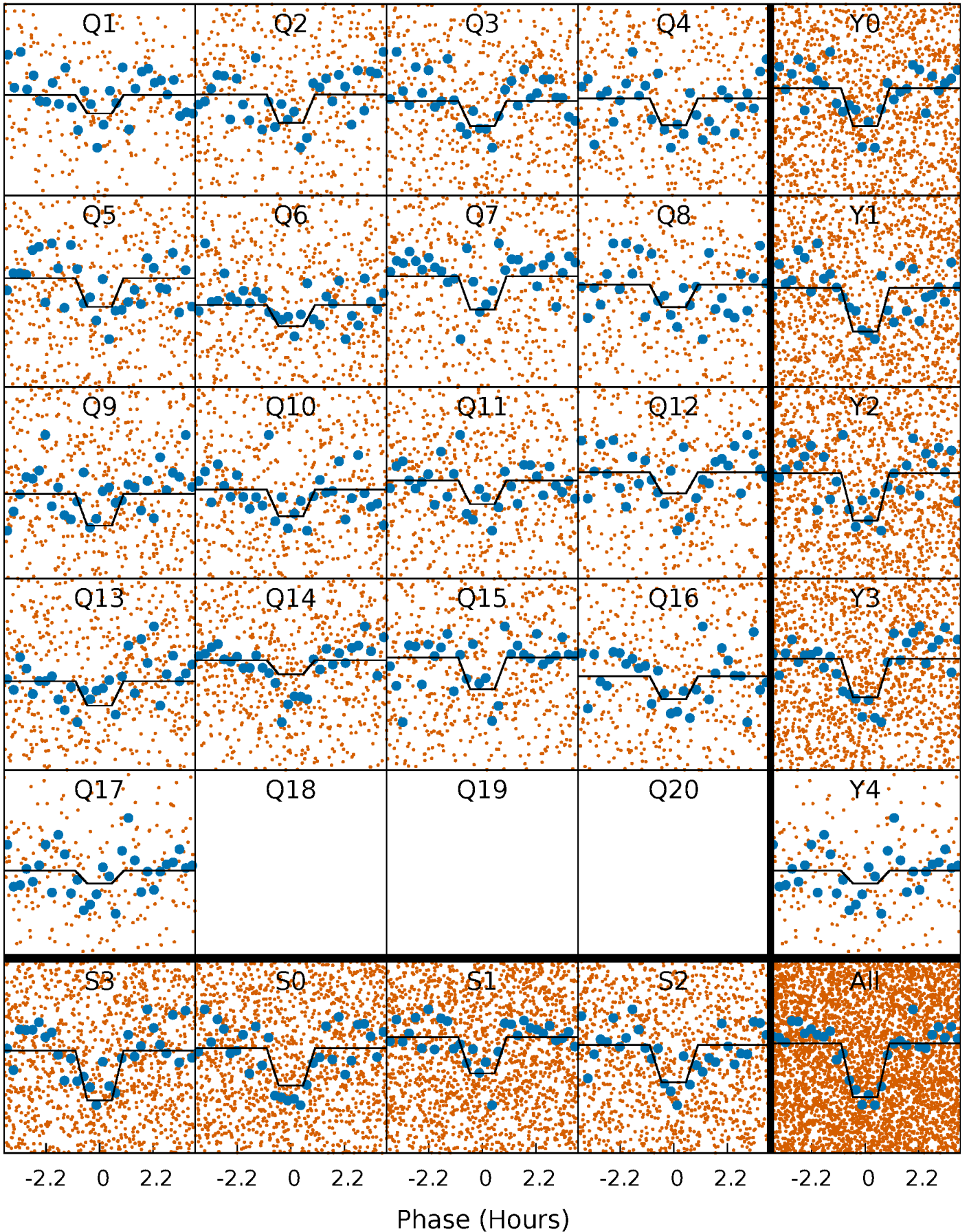
DV Quarter-Phased Transit Curves

TCE 009410930-02 P= 1.855551 Days $T_0=132.545232$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

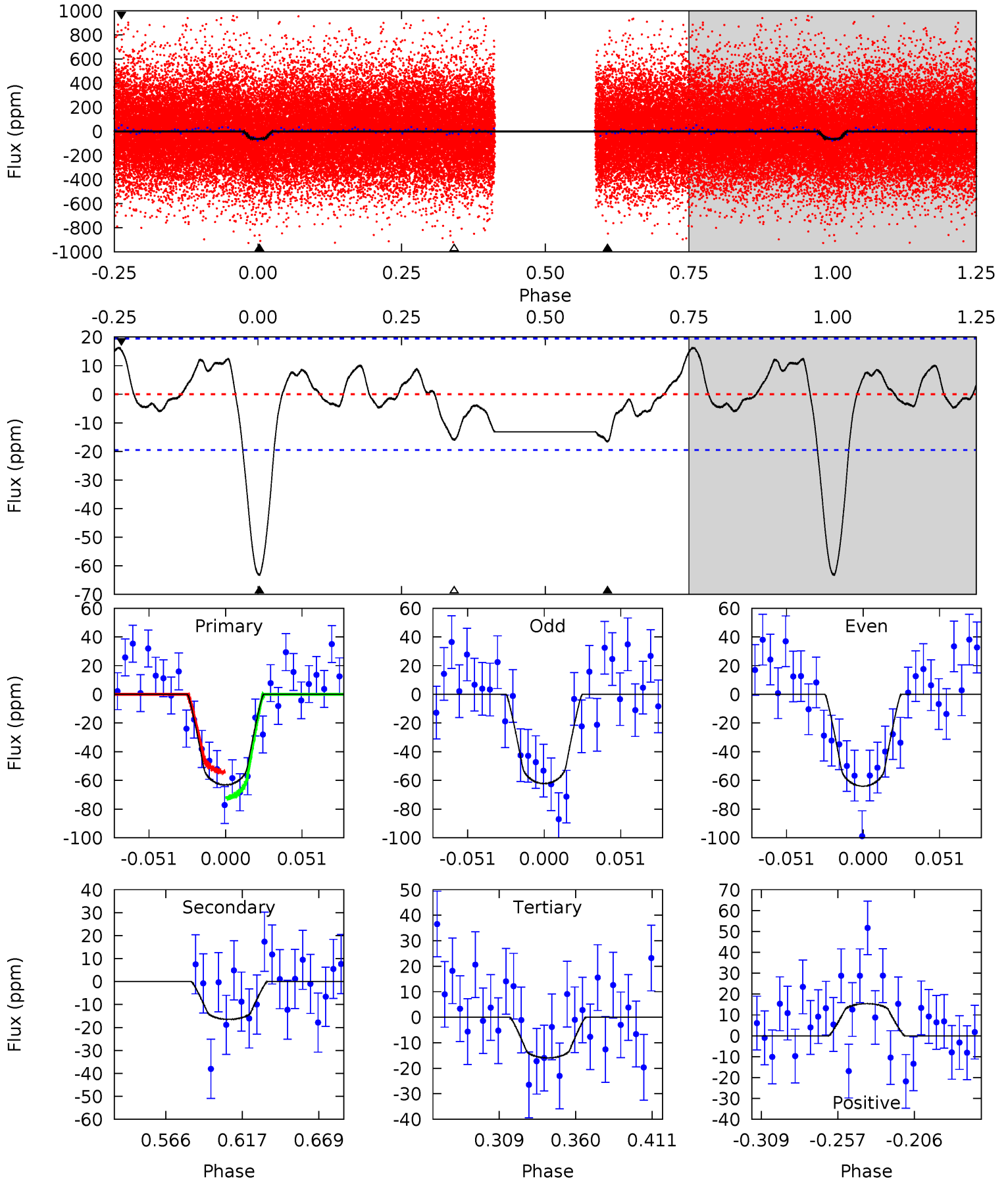
TCE 009410930-02 P= 1.855561 Days $T_0=132.543166$ (BKJD)



DV Model-Shift Uniqueness Test

009410930-02, P = 1.855551 Days, E = 130.689681 Days

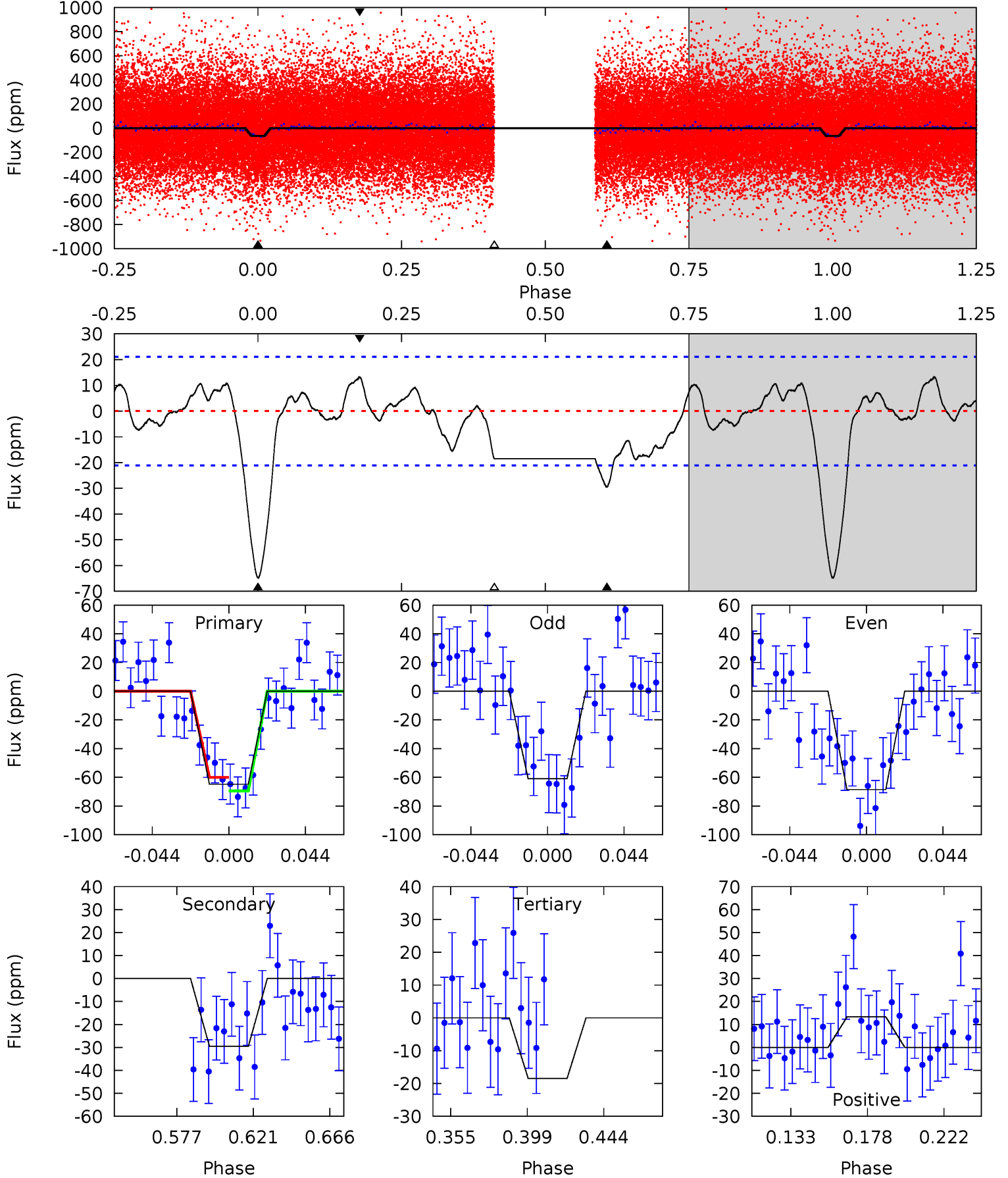
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.2	3.98	3.85	3.71	4.70	1.95	1.70	11.4	11.5	0.13	0.27	0.22	1.08	0.20	2.16



Alt Model-Shift Uniqueness Test

009410930-02, P = 1.855561 Days, E = 130.687605 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.5	6.64	4.15	2.98	4.73	2.01	1.73	10.4	11.6	2.48	3.66	0.84	0.93	0.17	1.06



Stellar Parameters For KIC 009410930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5657^{+113}_{-113}	$4.441^{+0.050}_{-0.045}$	$-0.080^{+0.150}_{-0.150}$	$0.947^{+0.056}_{-0.062}$	$0.903^{+0.064}_{-0.057}$	$1.497^{+0.281}_{-0.215}$
	+2%/-2%	+1%/-1%	+188%/-188%	+6%/-7%	+7%/-6%	+19%/-14%
Source	SPE40	TRA40	SPE40	DSEP		

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

Secondary Eclipse Parameters for KIC 009410930-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-16 ± 4	$0.86^{+0.46}_{-0.43}$	2009^{+51}_{-54}	4142^{+1365}_{-609}	$9.610^{+26.712}_{-5.687}$
Alt.	-30 ± 4	$0.85^{+0.44}_{-0.46}$	2009^{+49}_{-52}	4725^{+1931}_{-704}	18^{+64}_{-11}

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

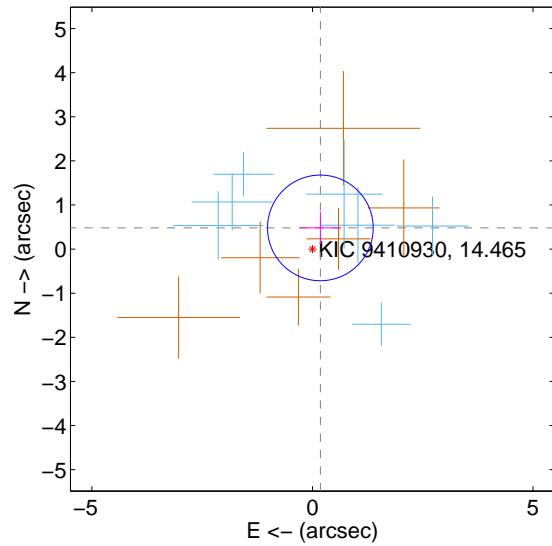
Supplemental centroid analysis for 009410930-02. Kepler magnitude: 14.46. Transit SNR 10.06

There are 7 quarters with good PRF difference image offsets

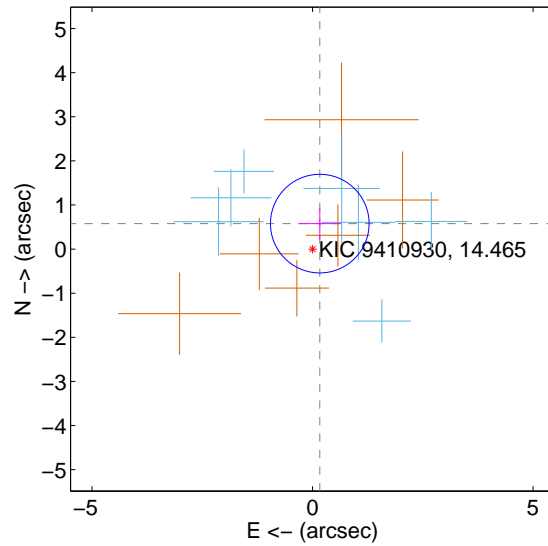
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.513 ± 0.399	1.28	-0.180 ± 0.470	0.480 ± 0.365
PRF-fit source offset from KIC position	0.600 ± 0.373	1.61	-0.165 ± 0.485	0.577 ± 0.362
photometric centroid source offset	0.89 ± 1.23	0.72	-0.55 ± 1.16	-0.69 ± 1.27

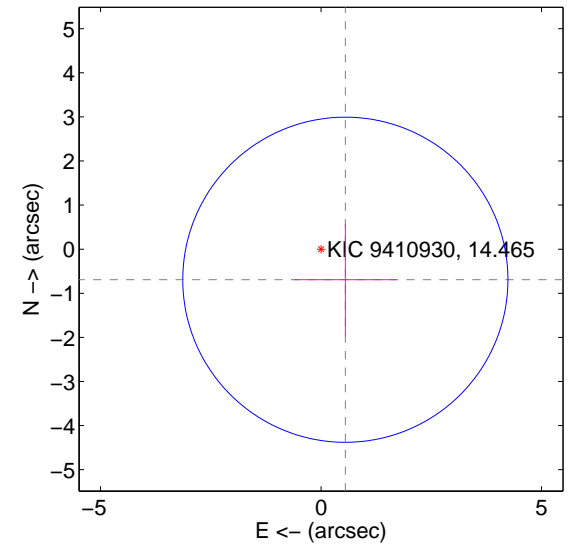
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

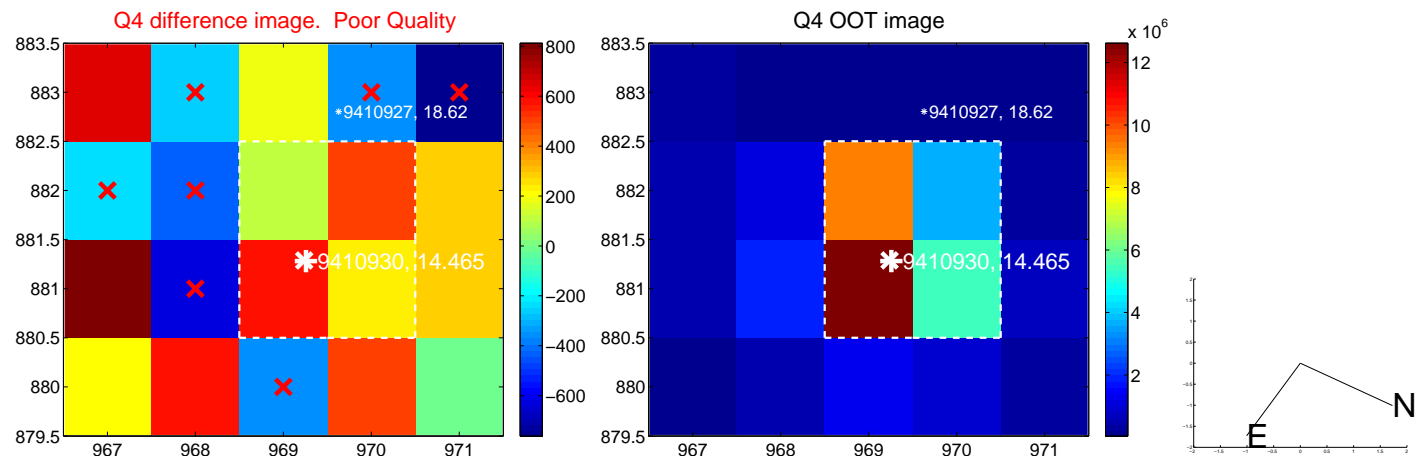
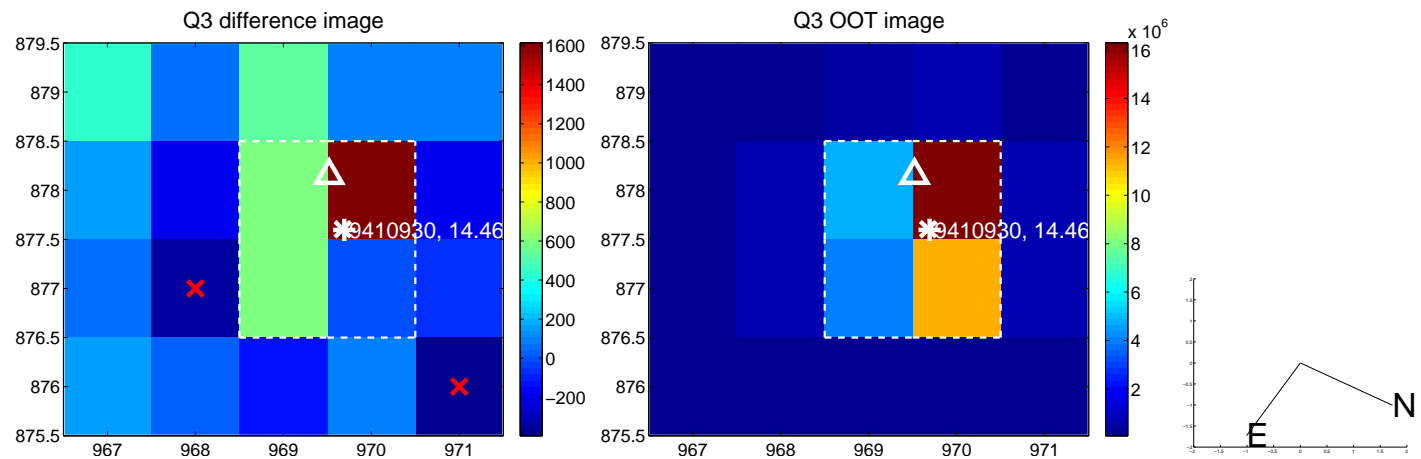
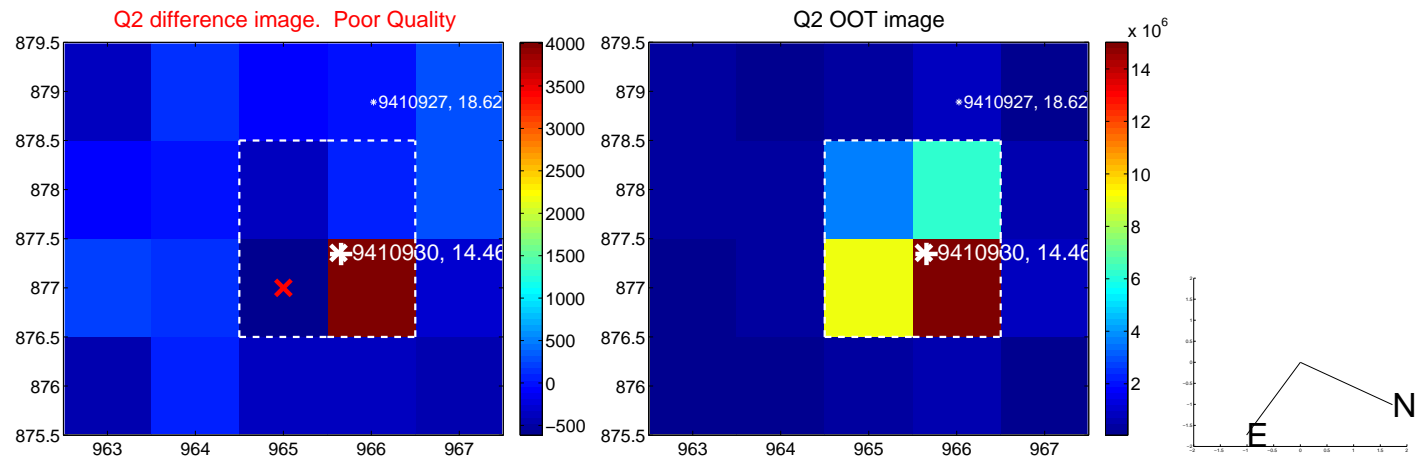
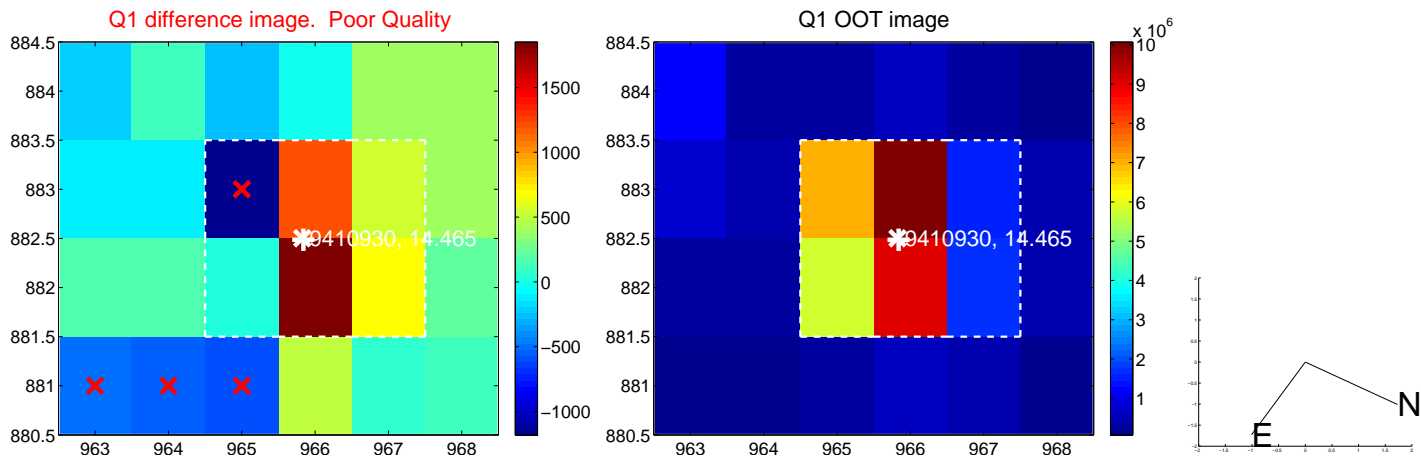


offset from photometric centroids

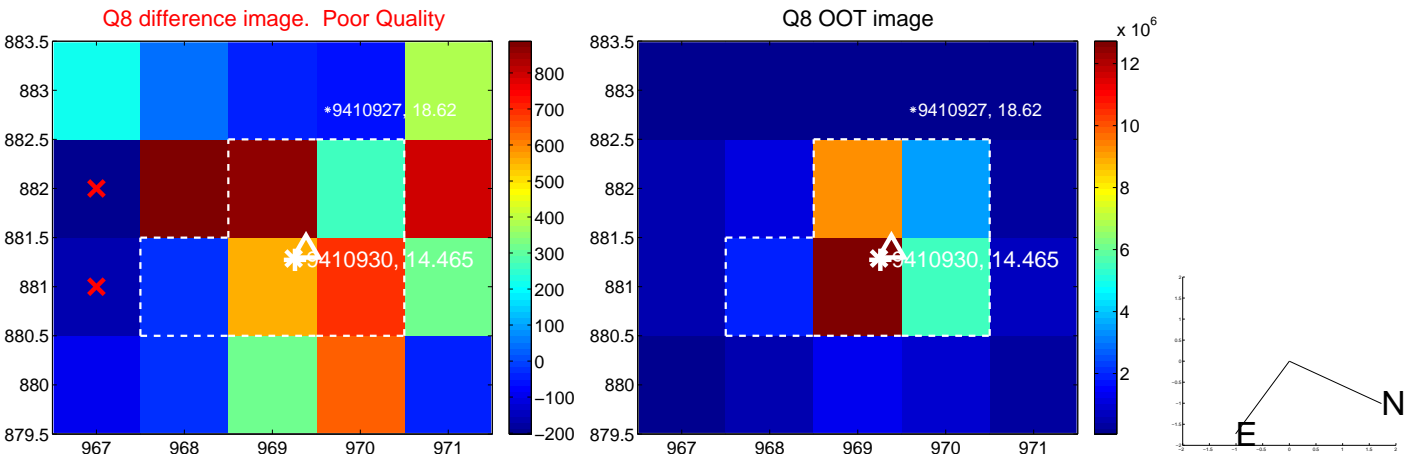
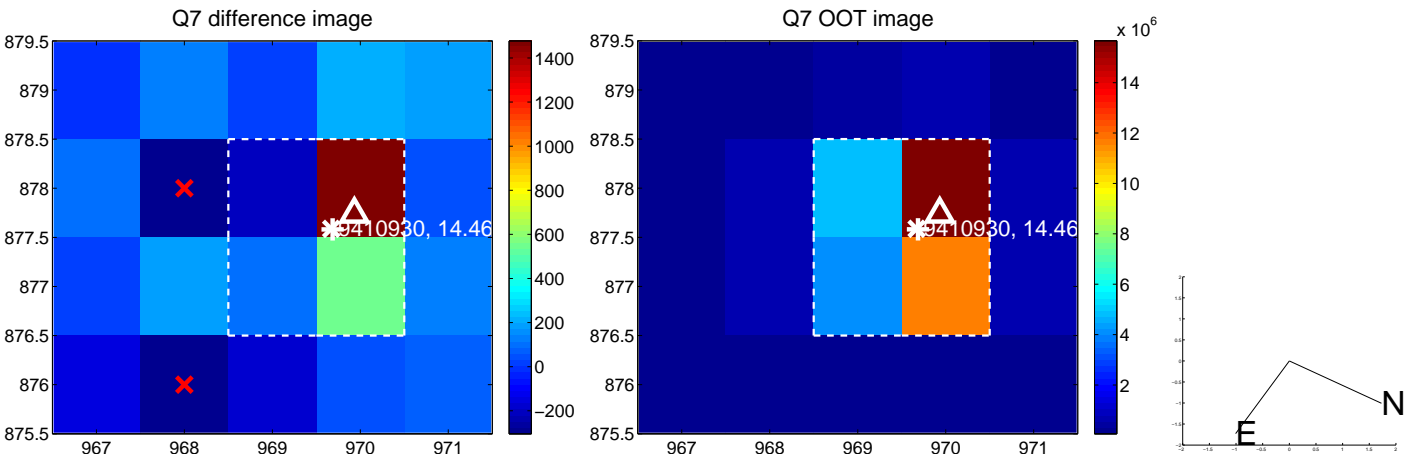
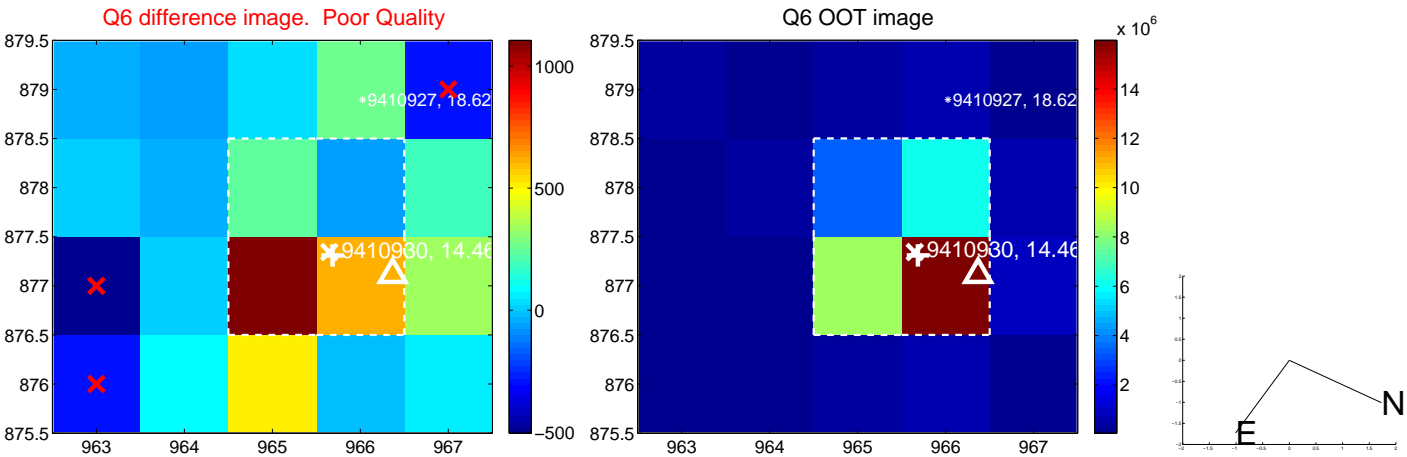
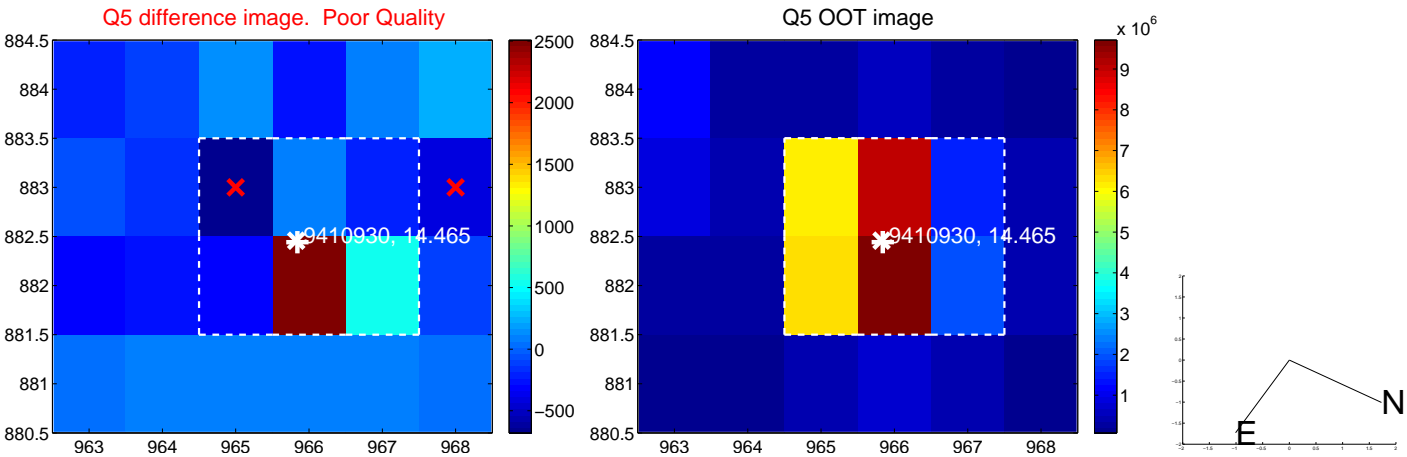


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

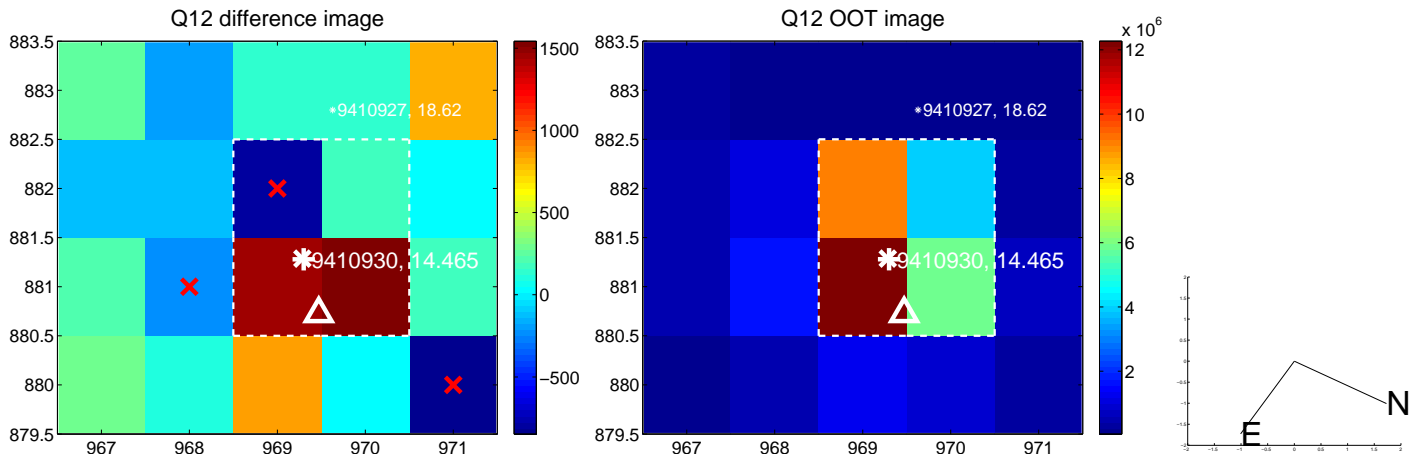
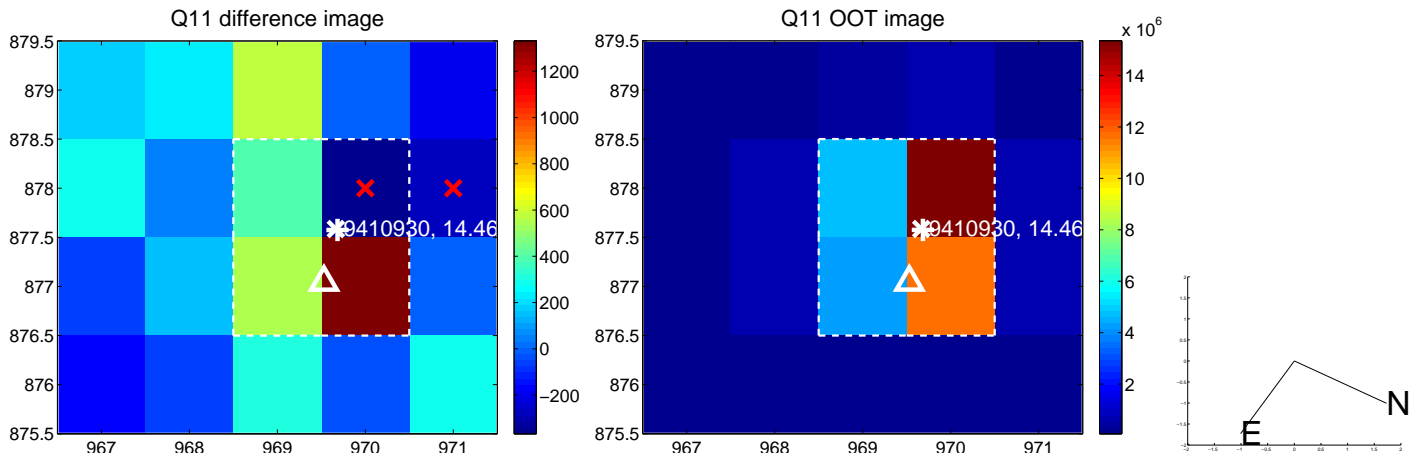
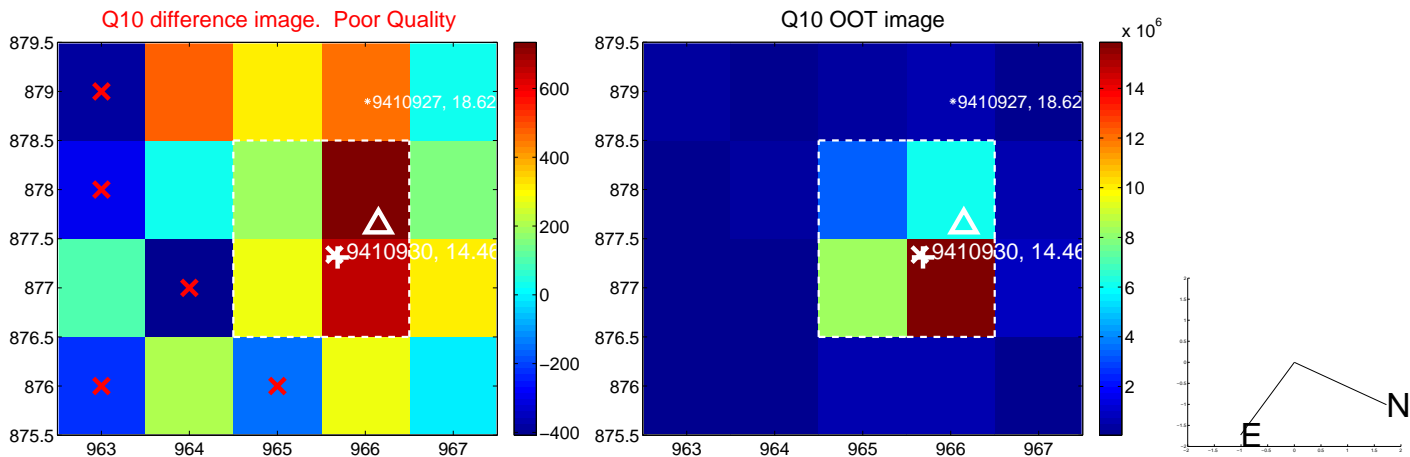
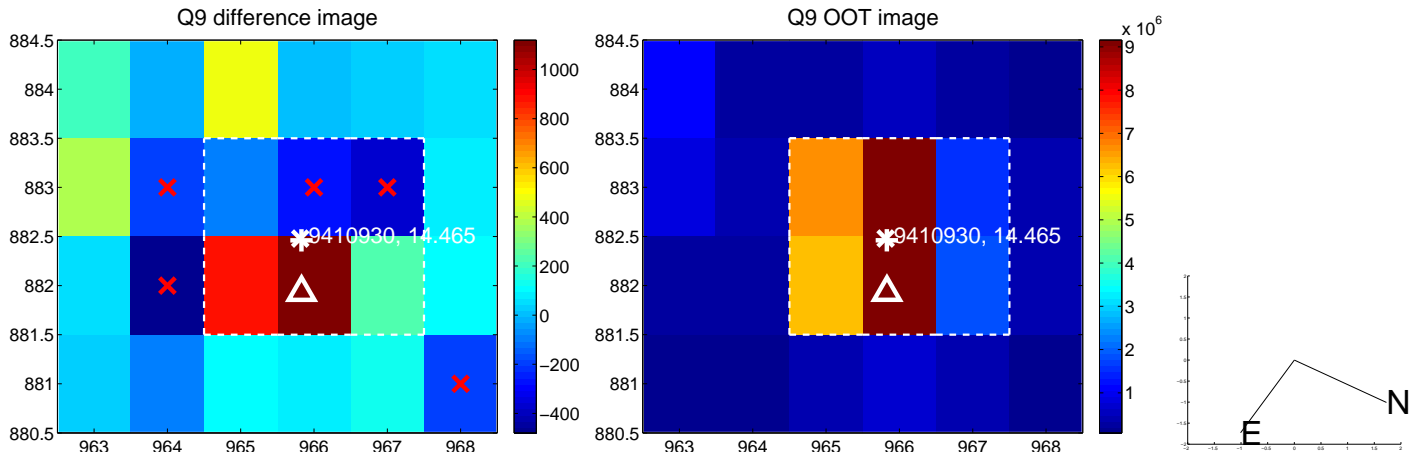
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



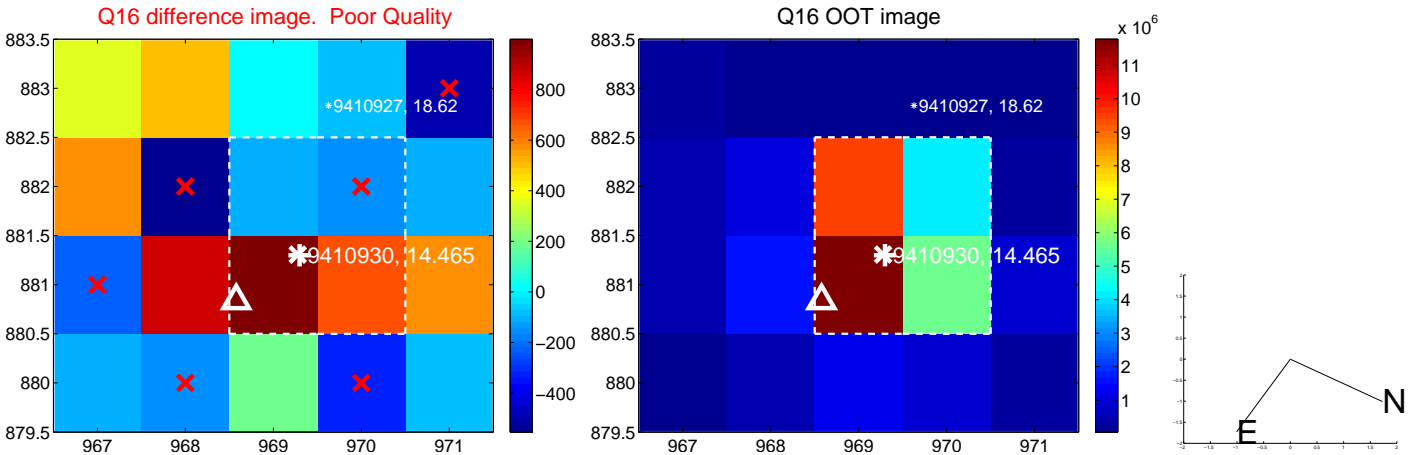
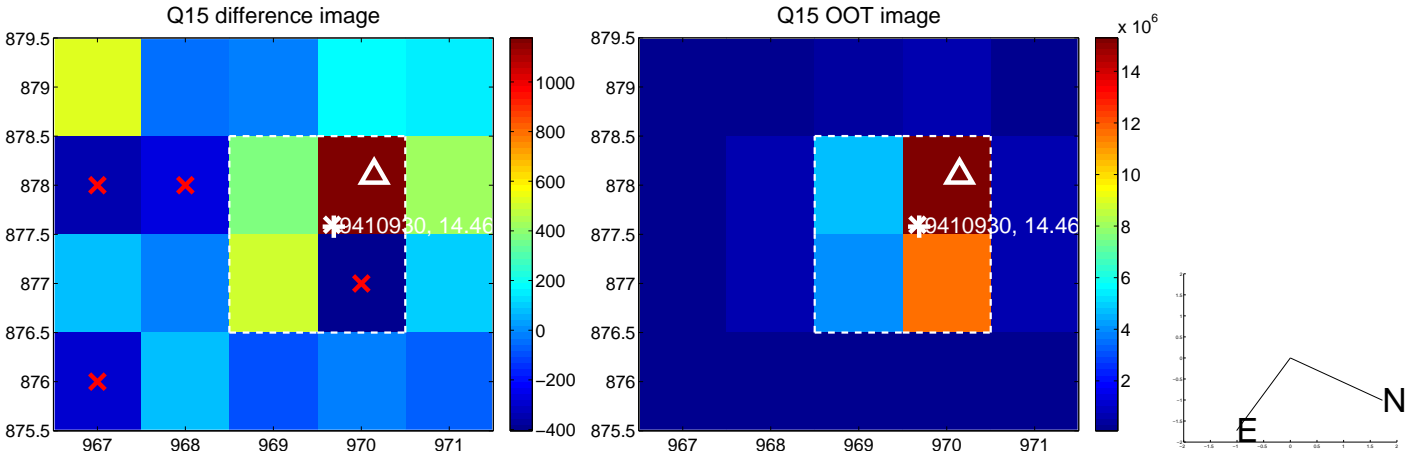
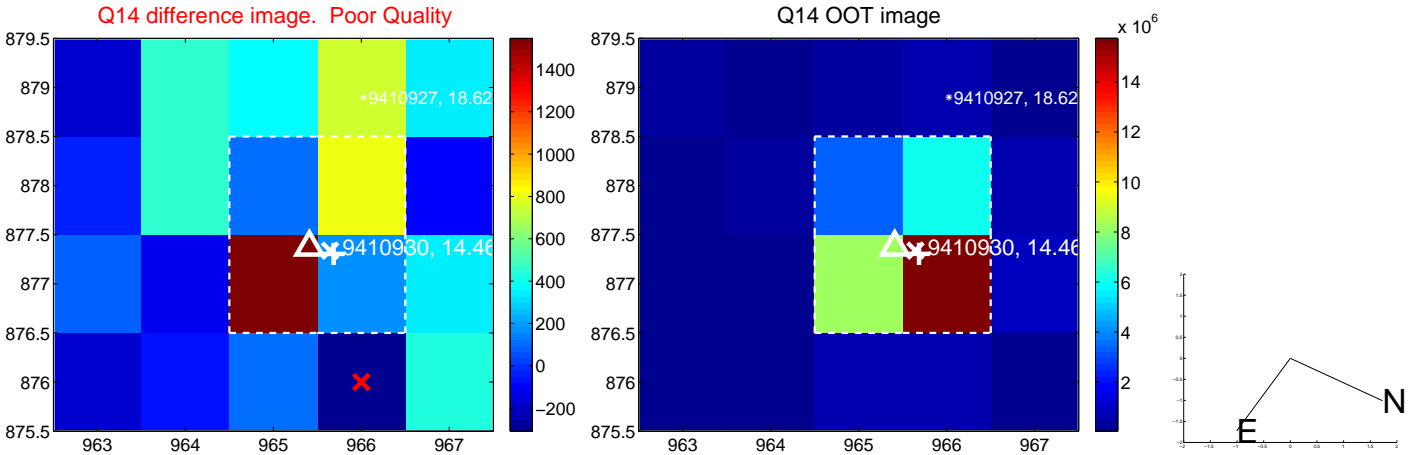
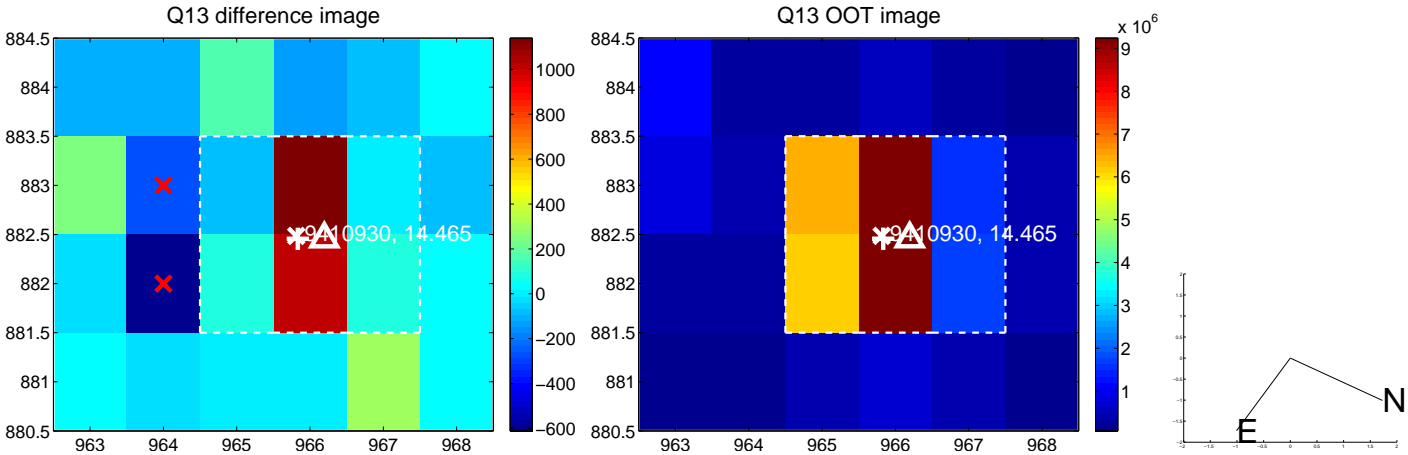
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



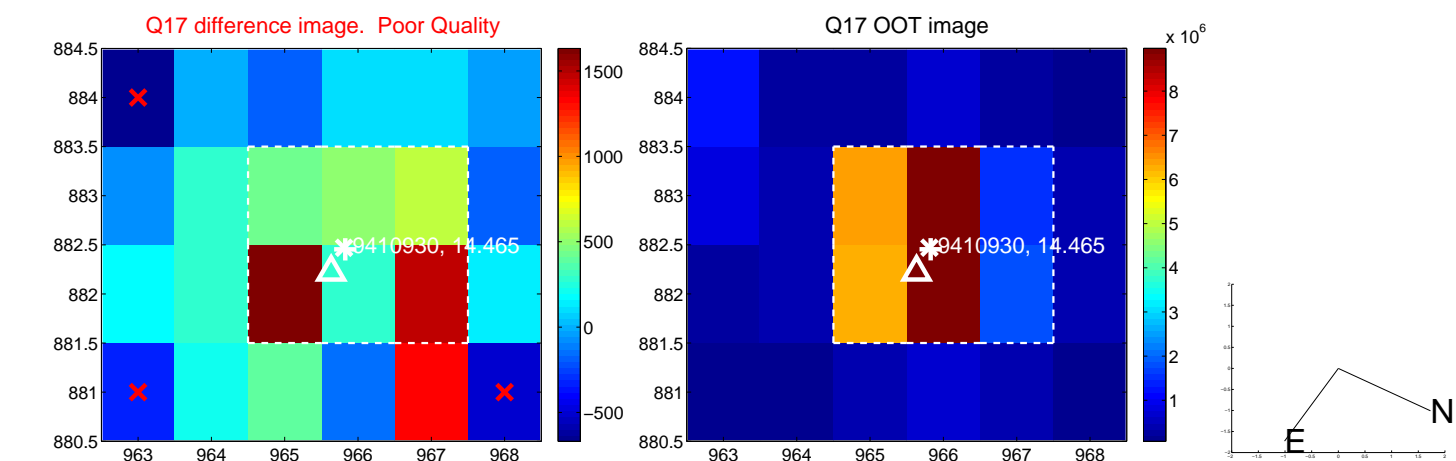
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



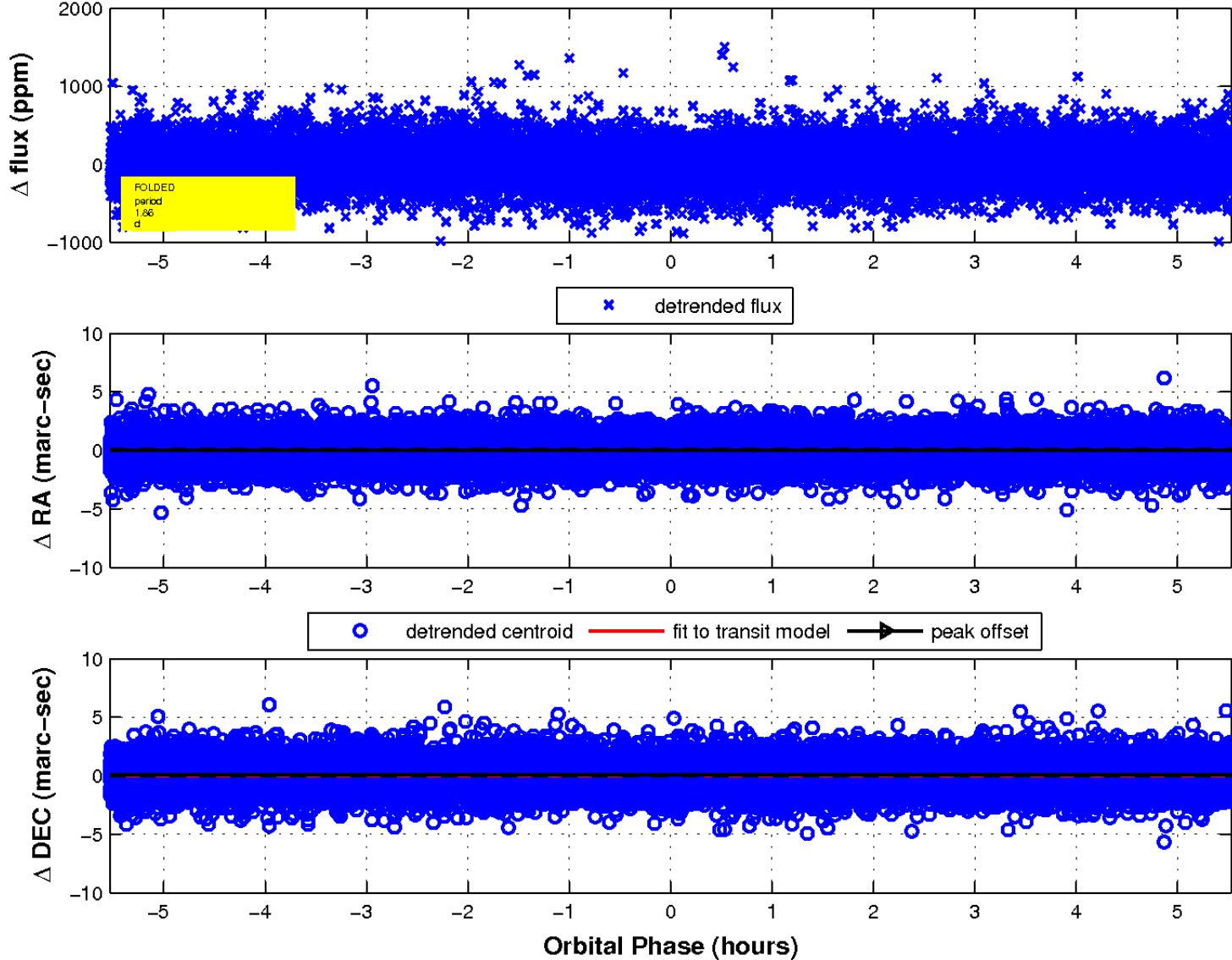
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

