

KIC 004139816

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})
004139816-01	OBS	0812.01	3.340219	131.896558	1617.9	2.155	58.2	65.4	0.49	3950	2.35	43.80
004139816-02	OBS	0812.02	20.060415	147.463520	1513.7	3.285	27.2	28.3	0.49	3950	2.03	4.01
004139816-03	OBS	0812.03	46.184467	165.234382	1317.1	4.768	18.0	20.6	0.49	3950	1.87	1.32
004139816-04	OBS	0812.04	7.824990	136.555262	493.3	2.215	12.6	13.5	0.49	3950	1.29	14.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004139816-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-04	OBS	PC	0.99	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.

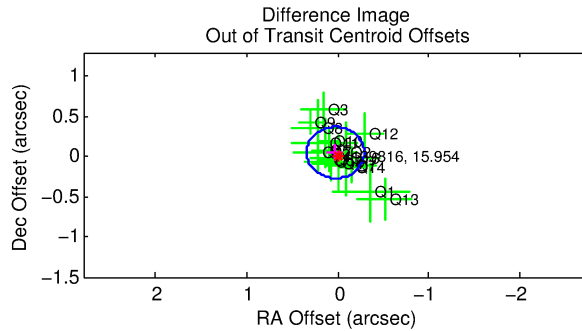
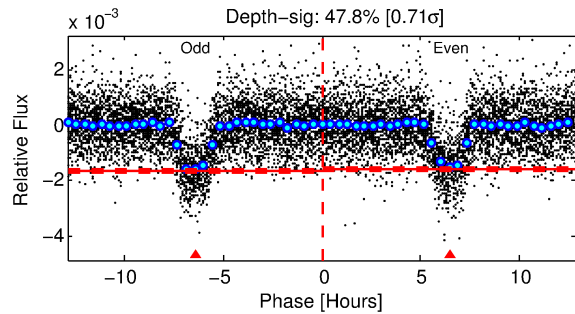
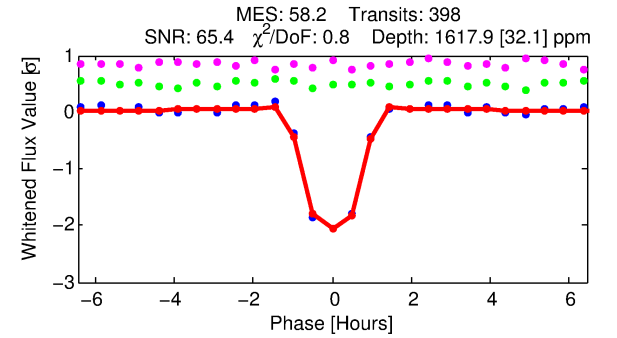
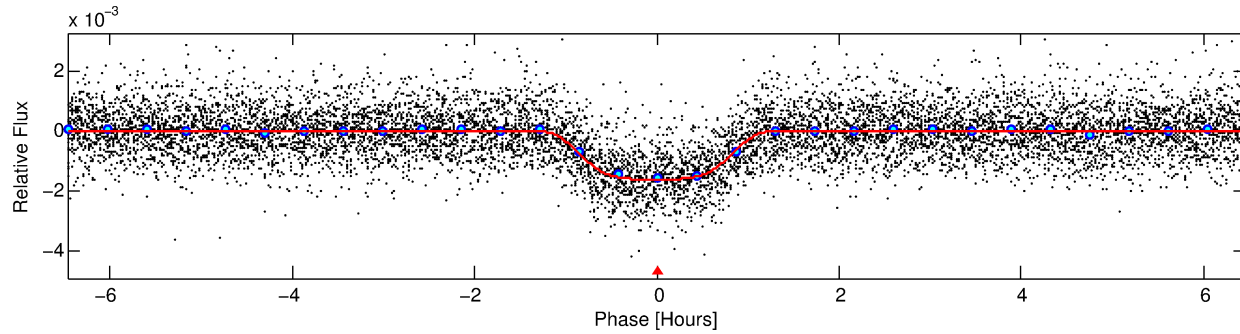
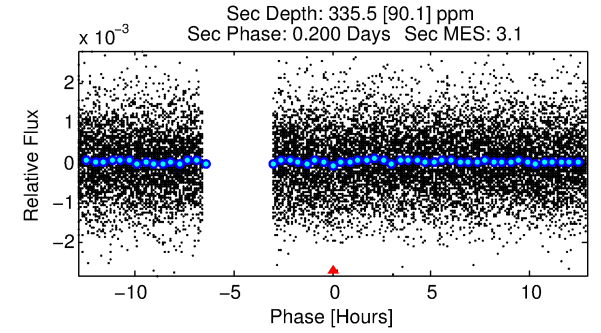
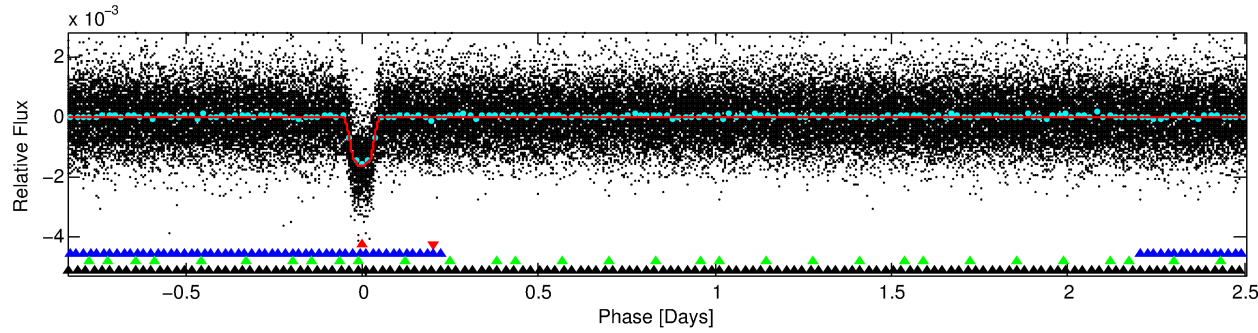
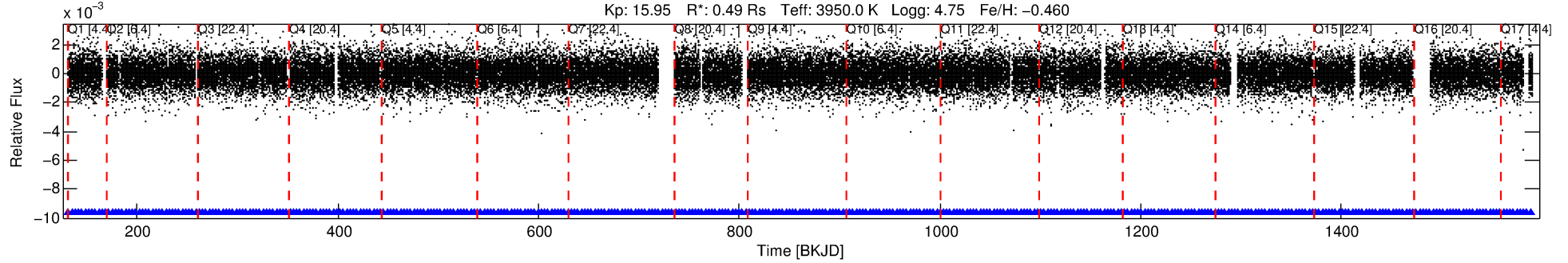
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004139816-01

No Significant Match Found

DV One-Page Summary

KIC: 4139816 Candidate: 1 of 4 Period: 3.340 d
KOI: K00812.01 Name: Kepler-235b Corr: 0.942



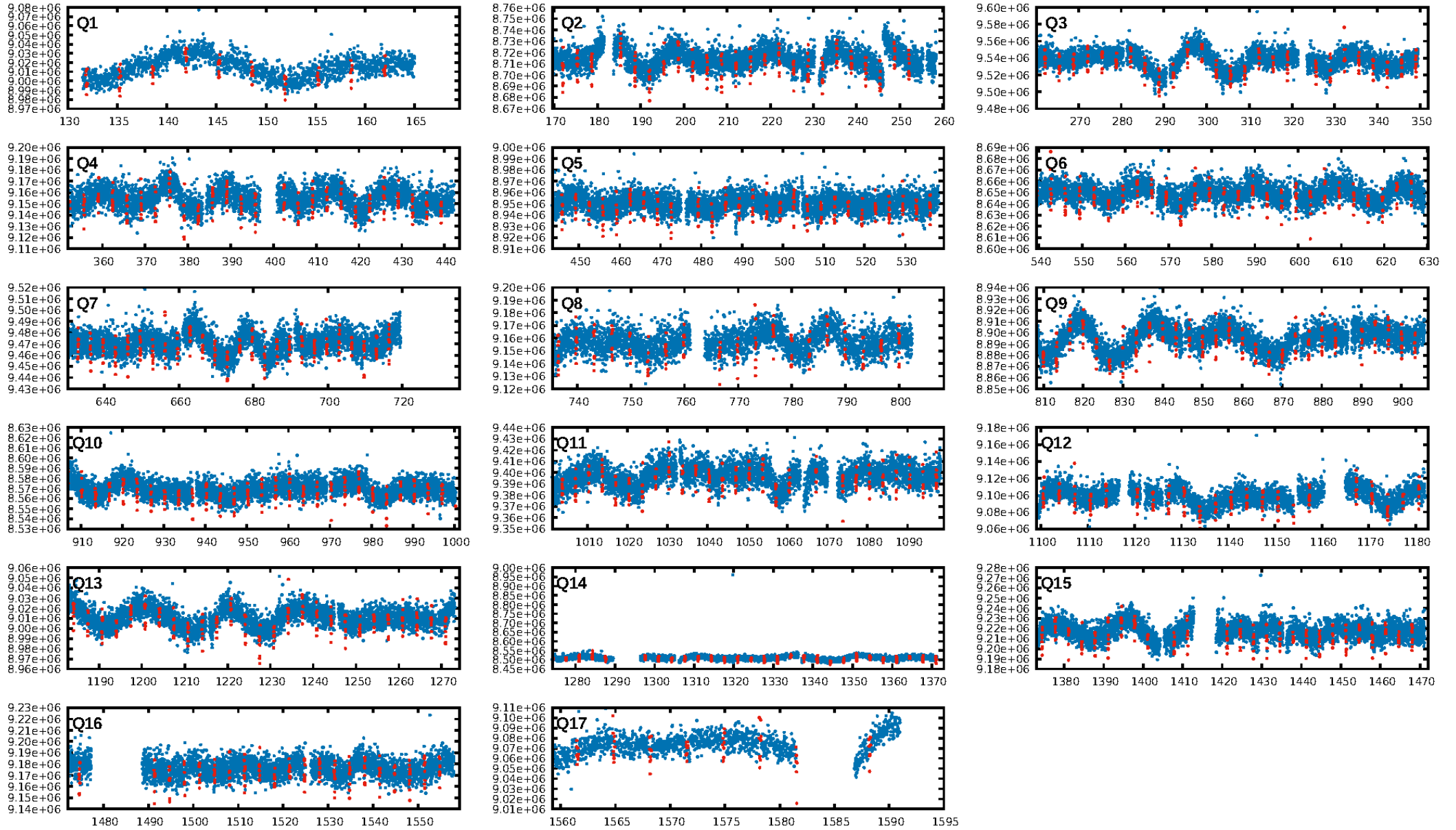
DV Fit Results:

Period = 3.34022 [0.00000] d
Epoch = 131.8966 [0.0006] BKJD
Rp/R* = 0.0437 [0.0013]
a/R* = 6.29 [0.76]
b = 0.90 [0.03]
Seff = 43.80 [5.30]
Teq = 656 [20] K
Rp = 2.35 [0.20] Re
a = 0.0348 [0.0022] AU
Ag = 40.49 [11.65] [3.39σ]
Teffp = 2558 [185] K [10.25σ]

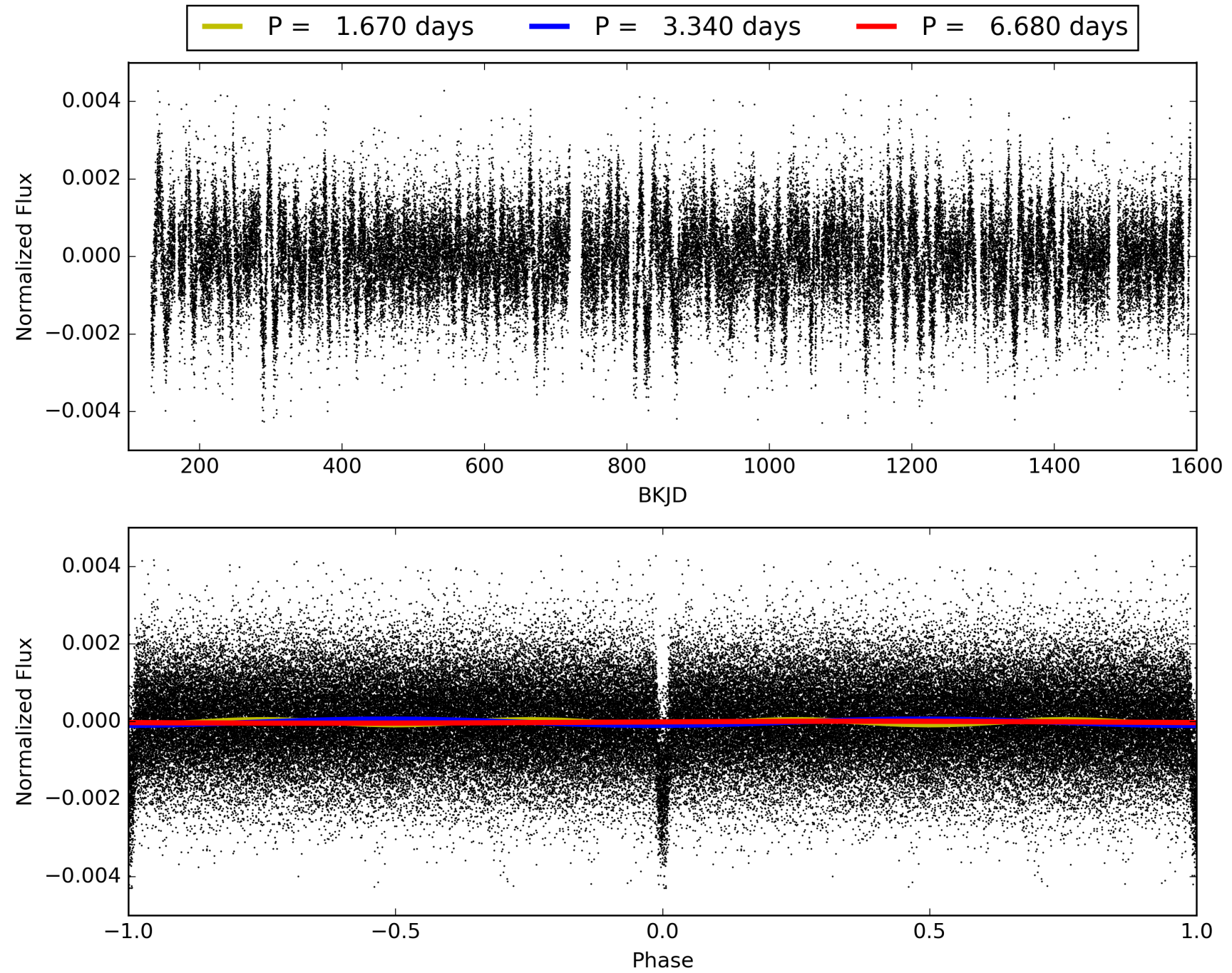
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [34.83σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [380/380]
GhostDiagnostic-chr: 3.285
Centroid-sig: 5.8%
Centroid-so: 0.588 arcsec [2.92σ]
OotOffset-rm: 0.056 arcsec [0.53σ]
KicOffset-rm: 0.154 arcsec [1.69σ]
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 004139816-01, PDC Light Curves

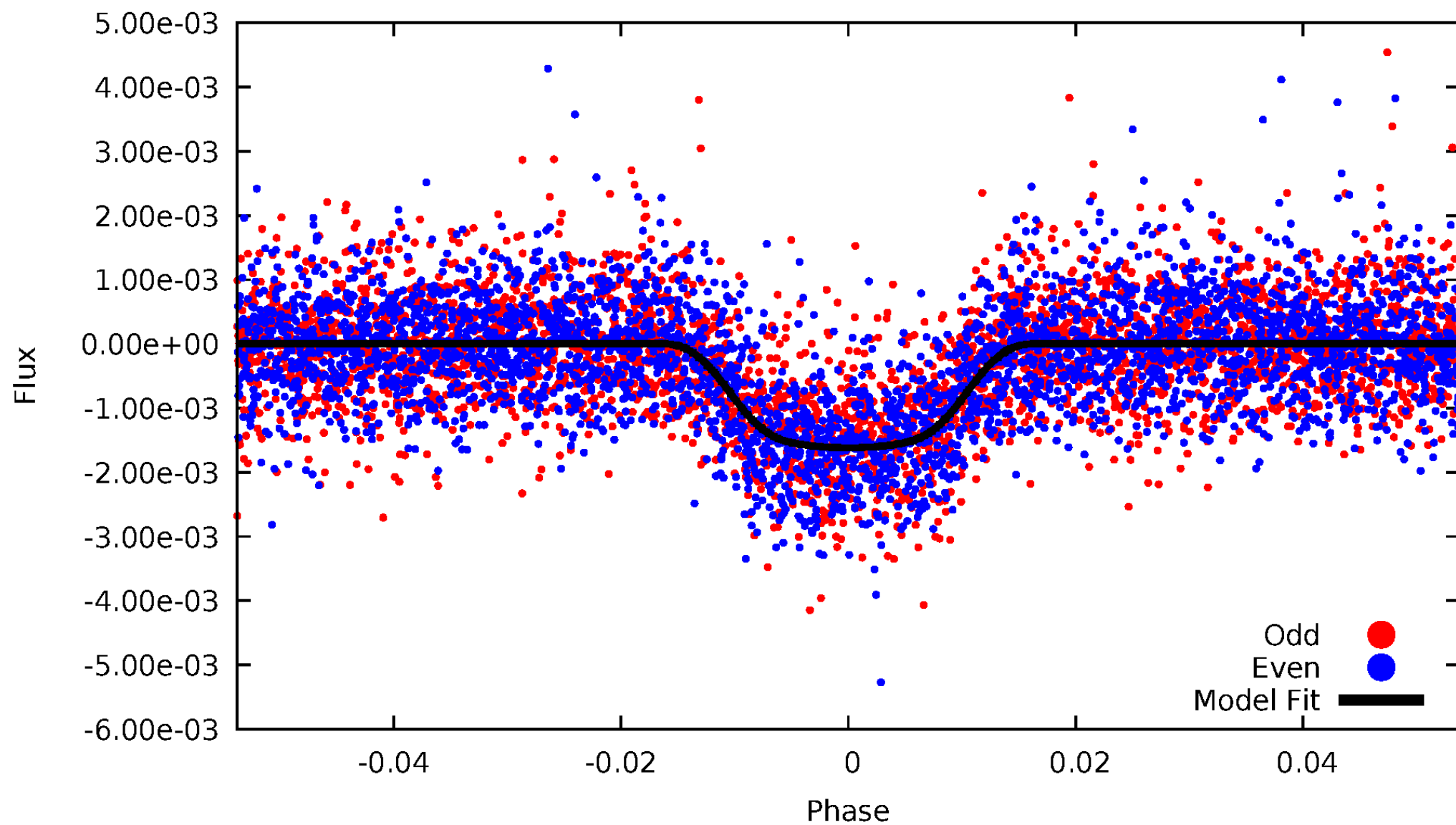


TCE 004139816-01



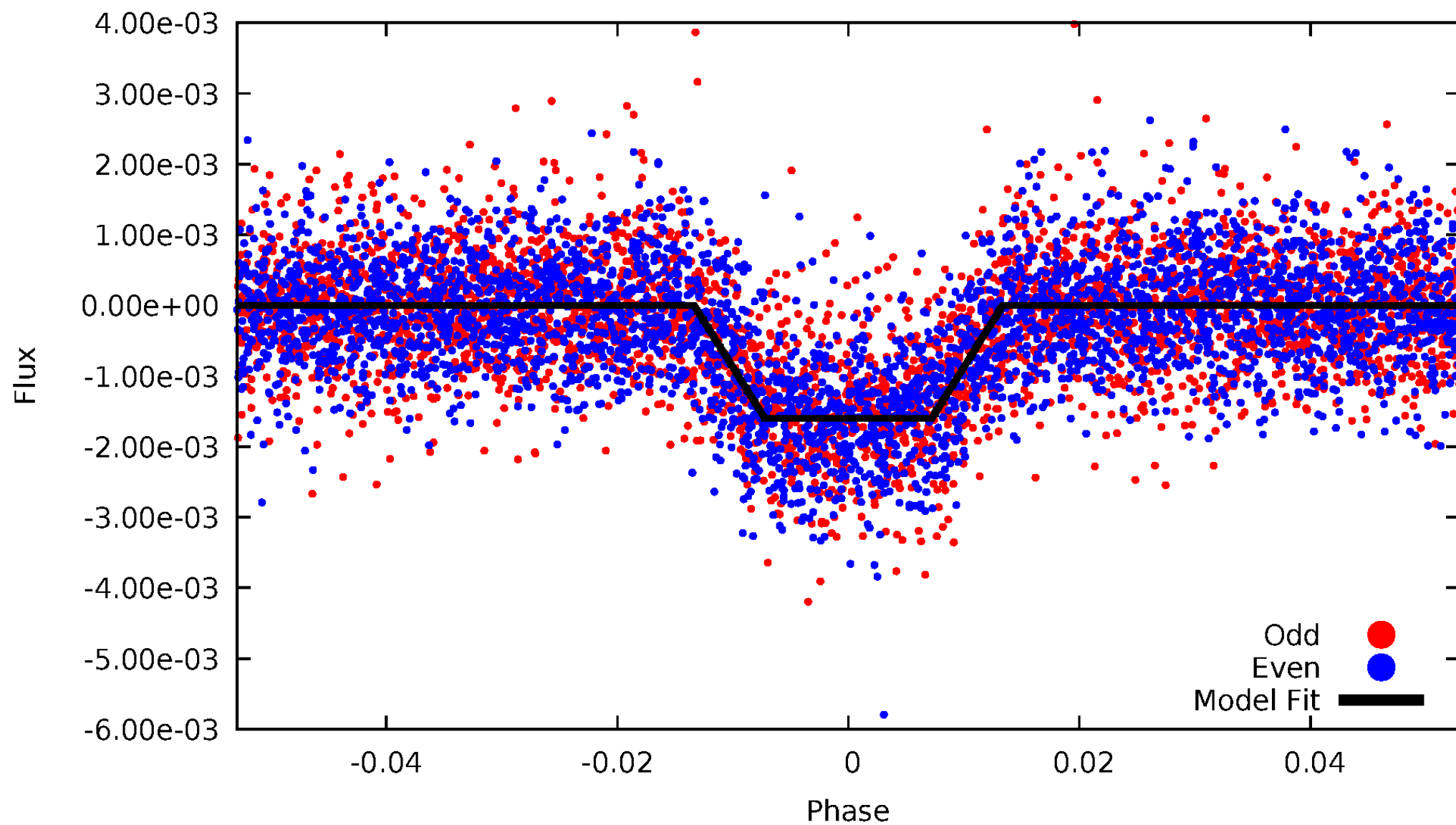
DV Odd/Even

TCE 004139816-01



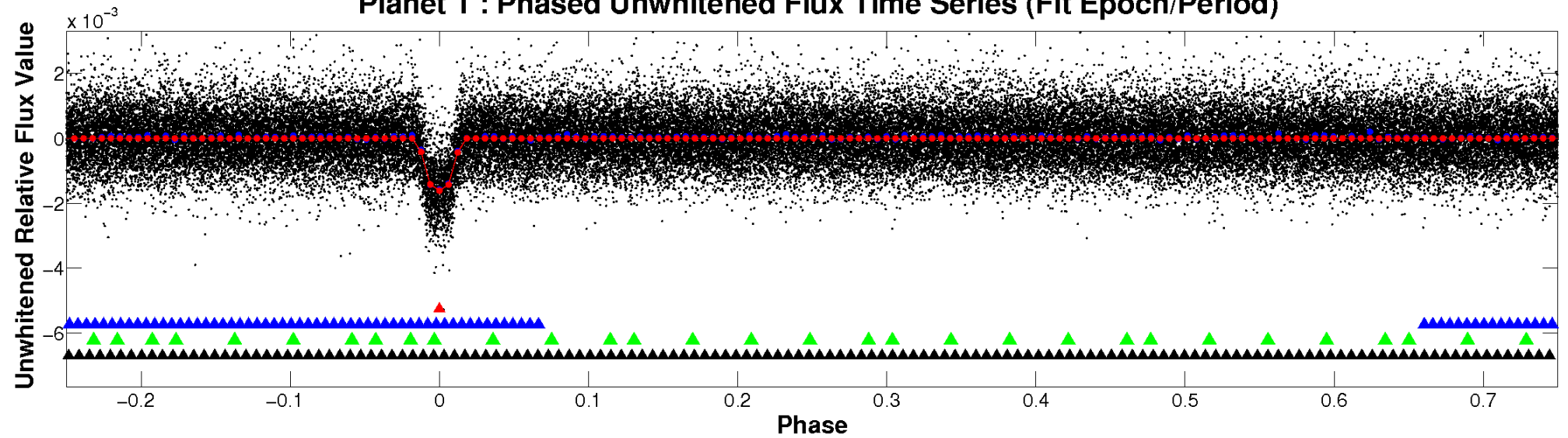
ALT Odd/Even

TCE 004139816-01

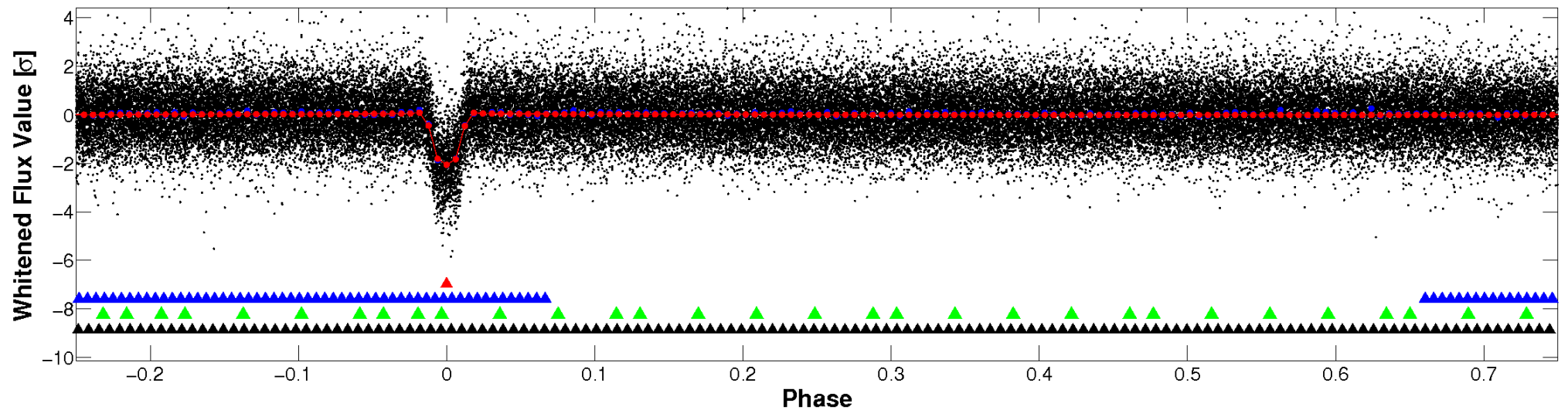


Non-Whitened Vs. Whitened Light Curve

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

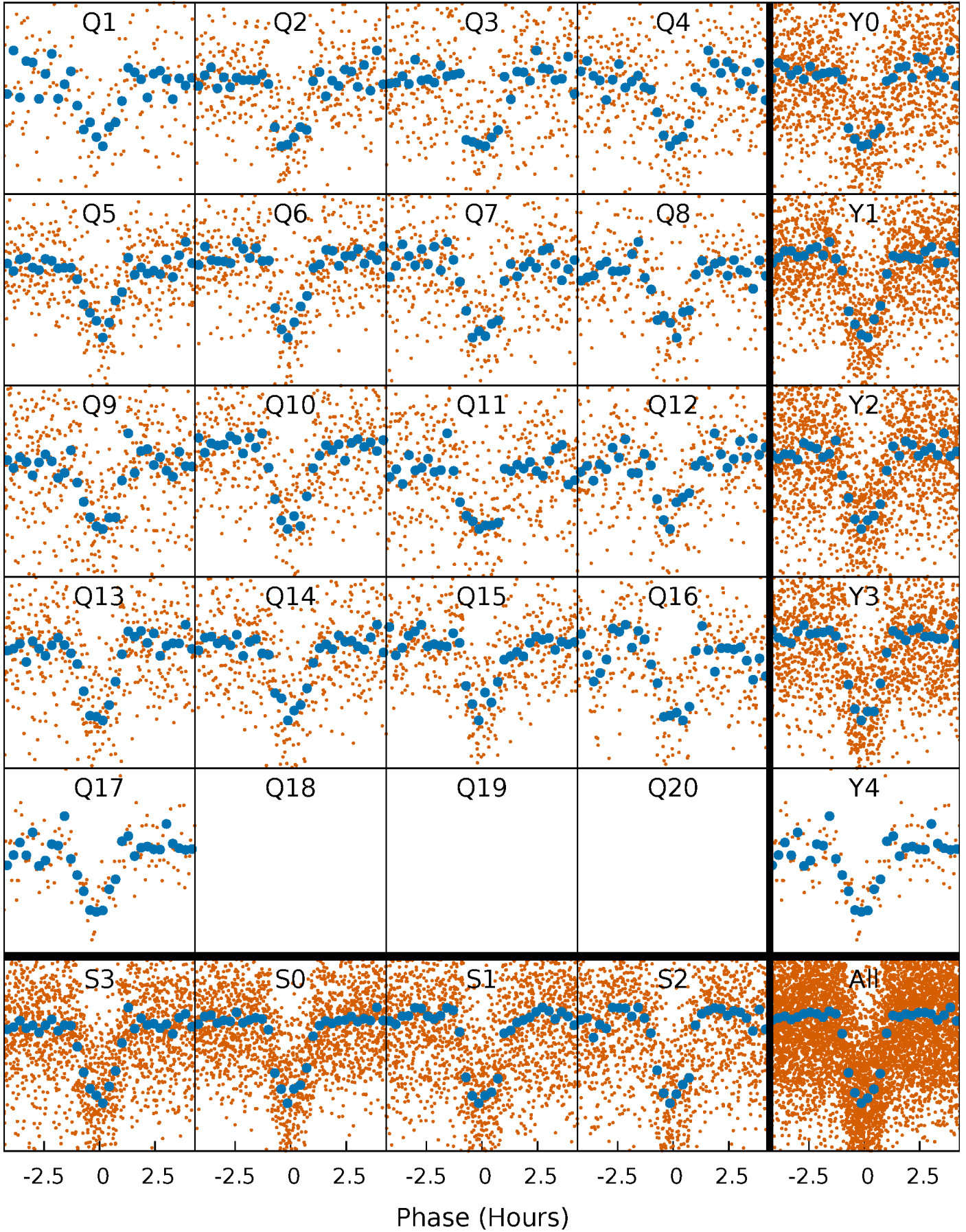


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



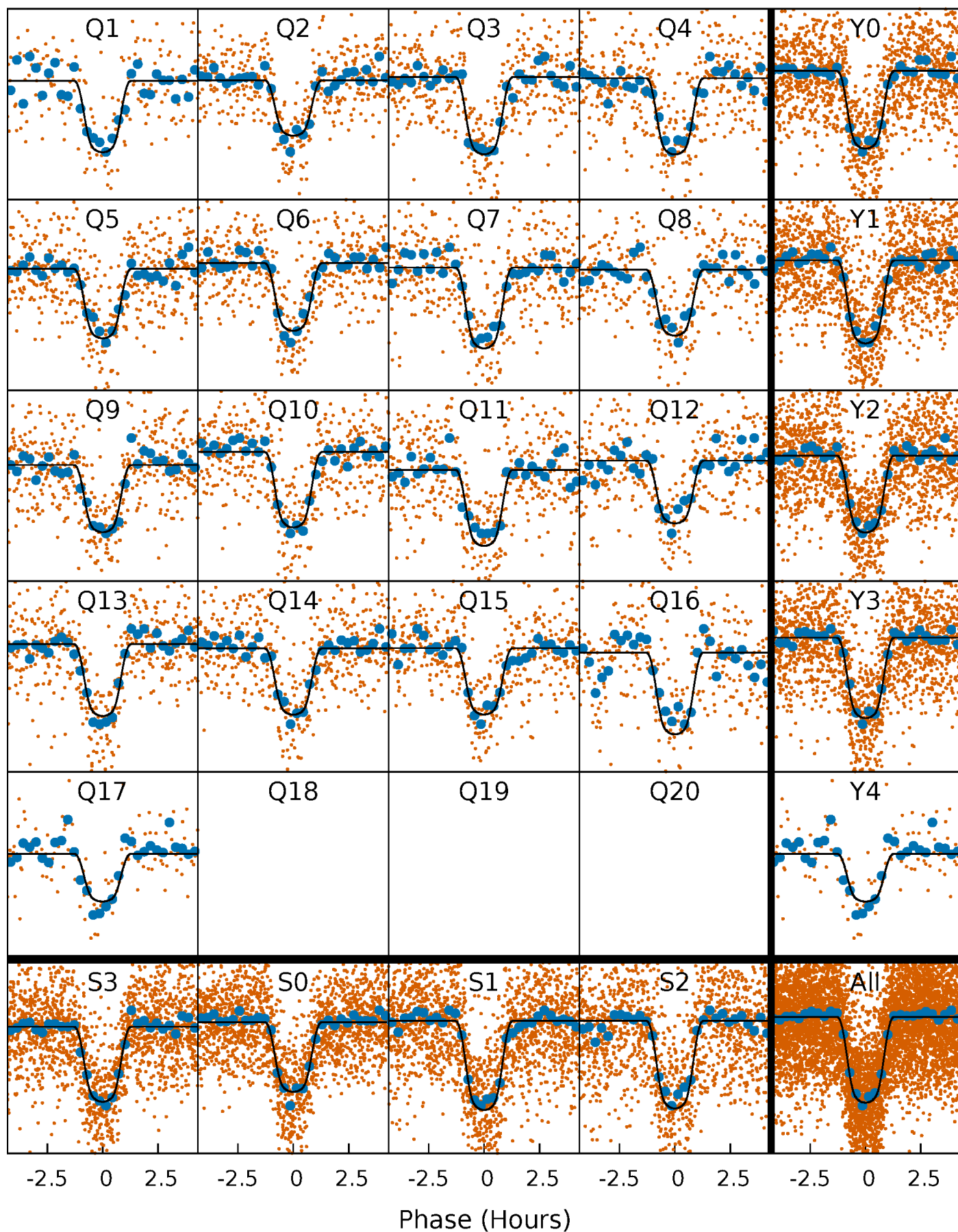
PDC Quarter-Phased Transit Curves

TCE 004139816-01 P= 3.340219 Days $T_0=131.896558$ (BKJD)



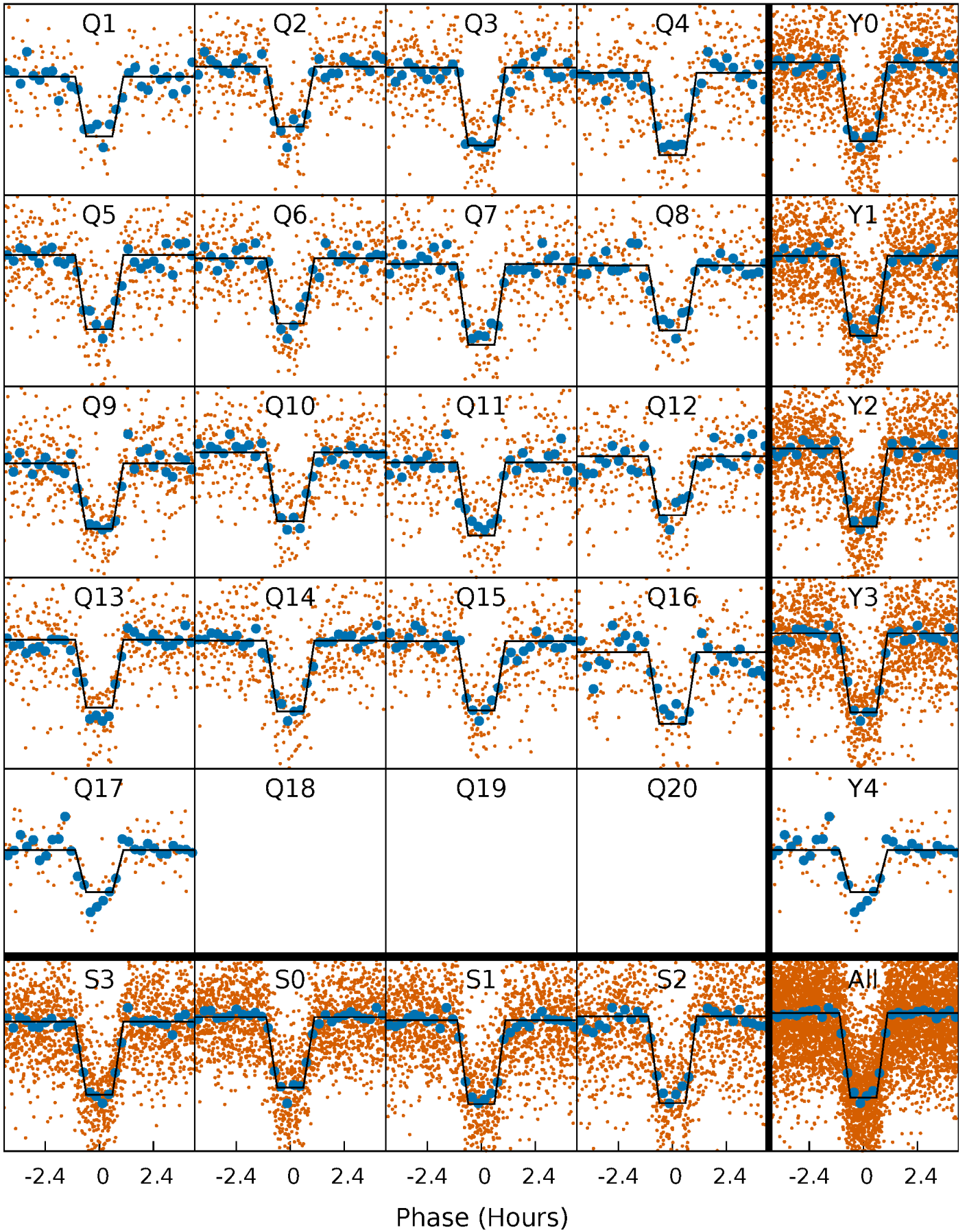
DV Quarter-Phased Transit Curves

TCE 004139816-01 P= 3.340219 Days $T_0=131.896558$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

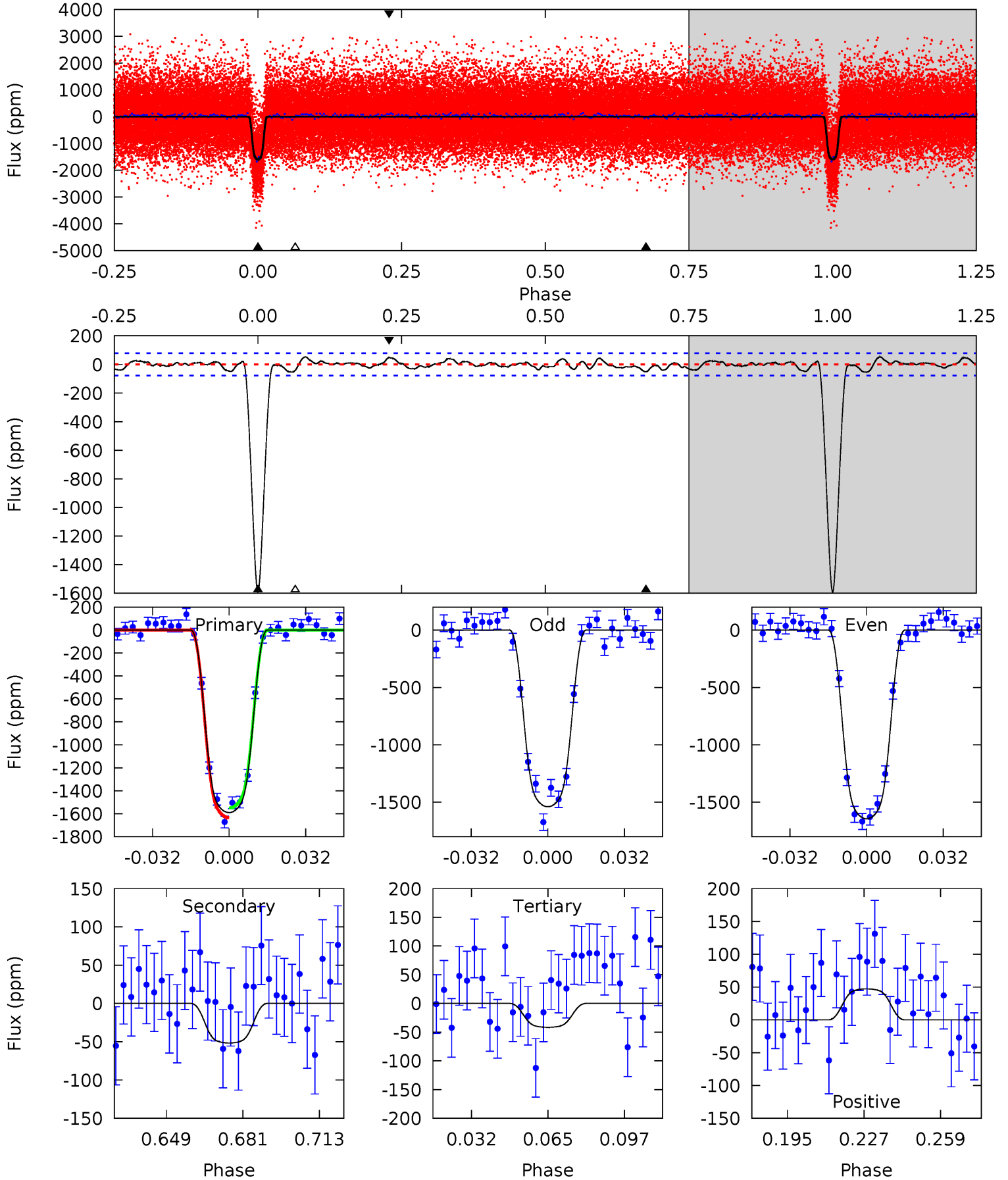
TCE 004139816-01 P= 3.340216 Days $T_0=131.897312$ (BKJD)



DV Model-Shift Uniqueness Test

004139816-01, P = 3.340219 Days, E = 128.556339 Days

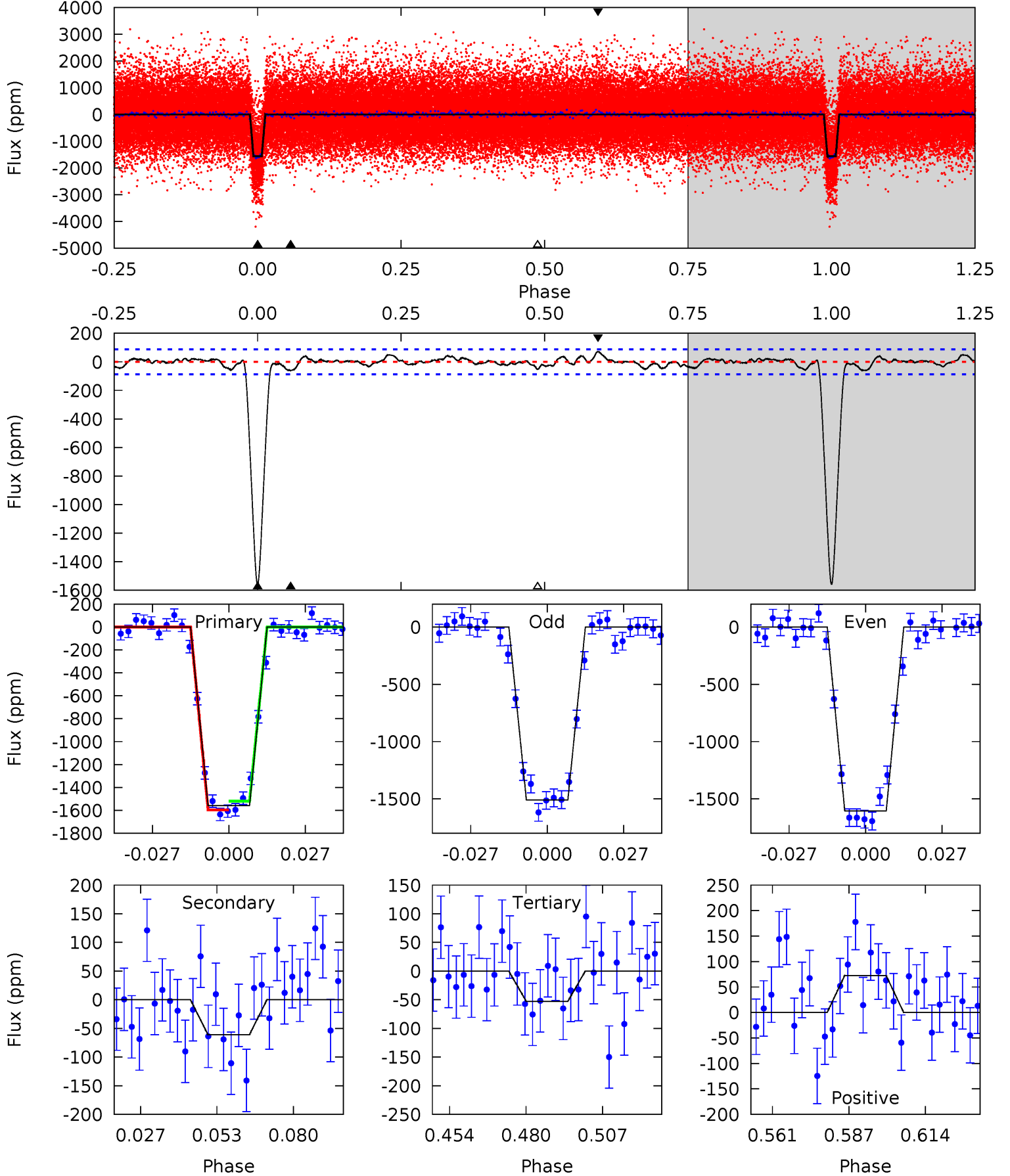
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
97.6	3.18	2.55	2.90	4.80	2.14	1.27	95.1	94.7	0.62	0.28	3.23	1.00	0.03	2.58



Alt Model-Shift Uniqueness Test

004139816-01, P = 3.340216 Days, E = 128.557096 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
86.2	3.37	2.93	4.01	4.83	2.22	1.22	83.3	82.2	0.44	-0.64	2.65	0.99	0.04	2.12



Stellar Parameters For KIC 004139816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3950^{+70}_{-86}	$4.754^{+0.042}_{-0.031}$	$-0.460^{+0.150}_{-0.150}$	$0.493^{+0.033}_{-0.040}$	$0.502^{+0.031}_{-0.038}$	$5.920^{+1.261}_{-0.715}$
	+2%/-2%	+1%/-1%	+33%/-33%	+7%/-8%	+6%/-8%	+21%/-12%
Source	SPE70	SPE60	SPE70	DSEP		

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

Secondary Eclipse Parameters for KIC 004139816-01 / KOI 0812.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-52 ± 16	$2.35^{+0.12}_{-0.13}$	914^{+22}_{-23}	2346^{+88}_{-110}	$6.234^{+2.190}_{-2.046}$
Alt.	-61 ± 18	$2.14^{+0.11}_{-0.10}$	914^{+22}_{-25}	2449^{+91}_{-111}	$8.885^{+2.660}_{-2.787}$

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

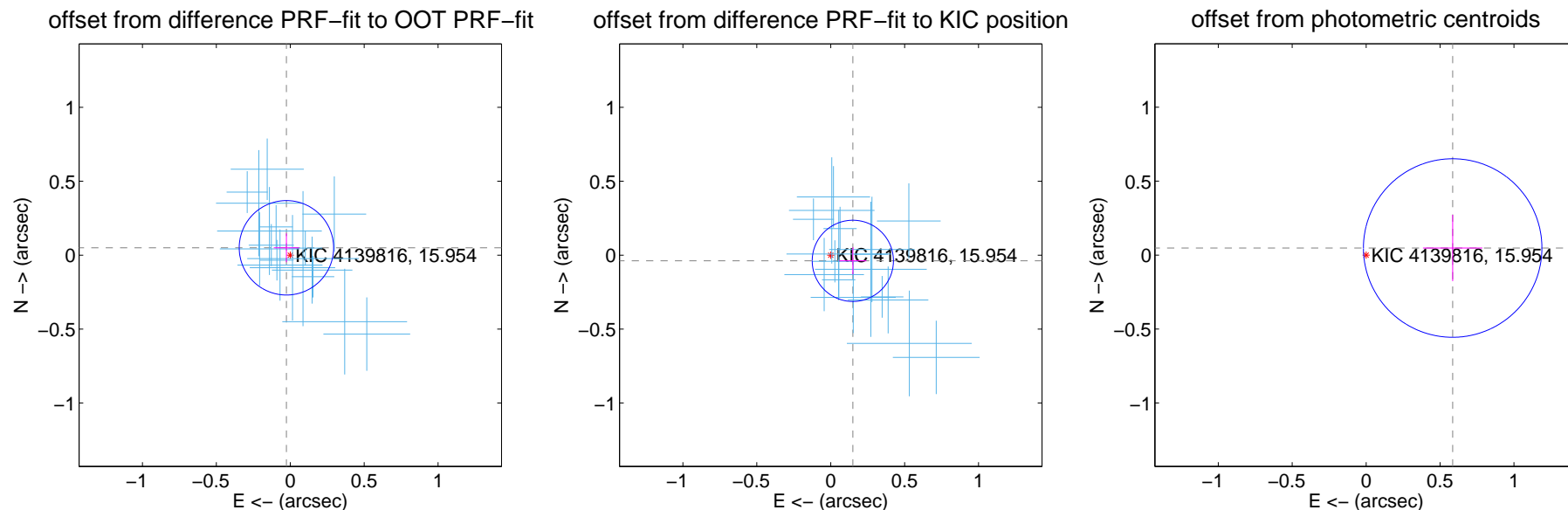
DV Centroid Data

Supplemental centroid analysis for 004139816-01. Kepler magnitude: 15.95. Transit SNR 65.38

There are 17 quarters with good PRF difference image offsets

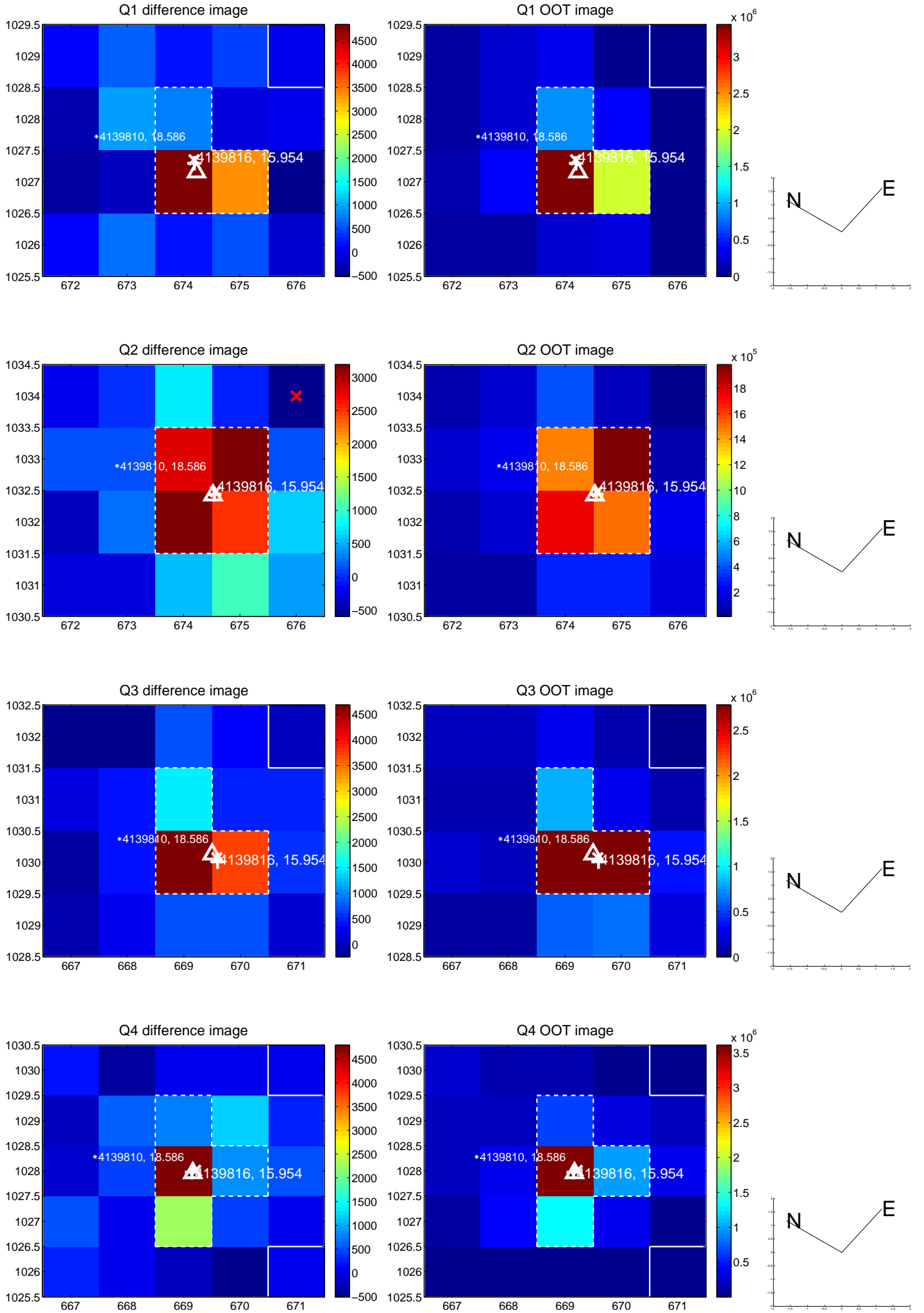
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.056 ± 0.106	0.53	0.026 ± 0.086	0.050 ± 0.097
PRF-fit source offset from KIC position	0.154 ± 0.092	1.69	-0.150 ± 0.092	-0.039 ± 0.092
photometric centroid source offset	0.59 ± 0.20	2.92	-0.59 ± 0.20	0.05 ± 0.22

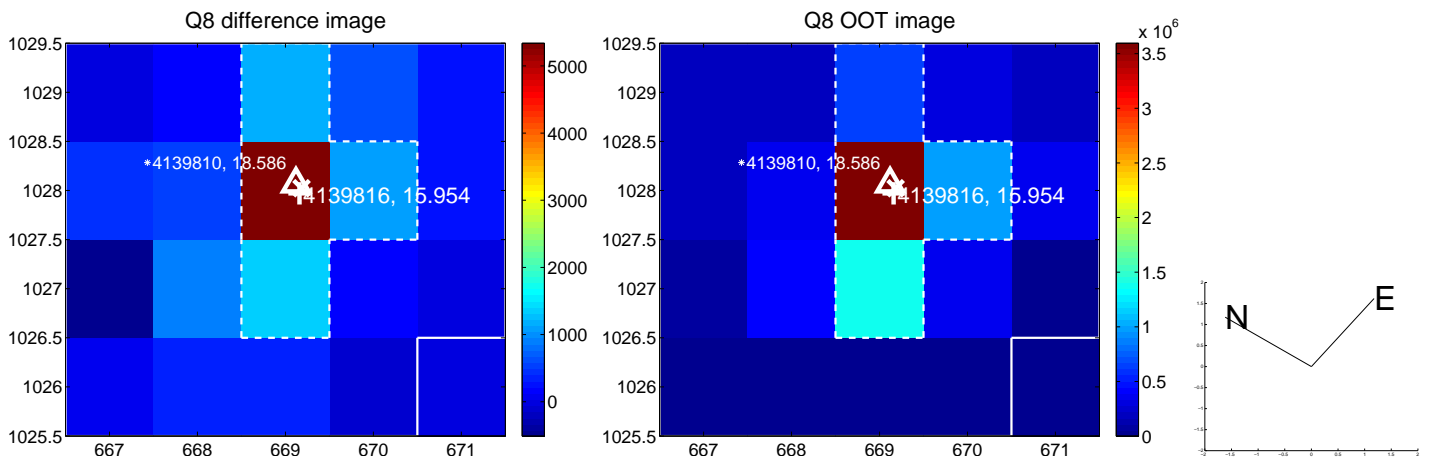
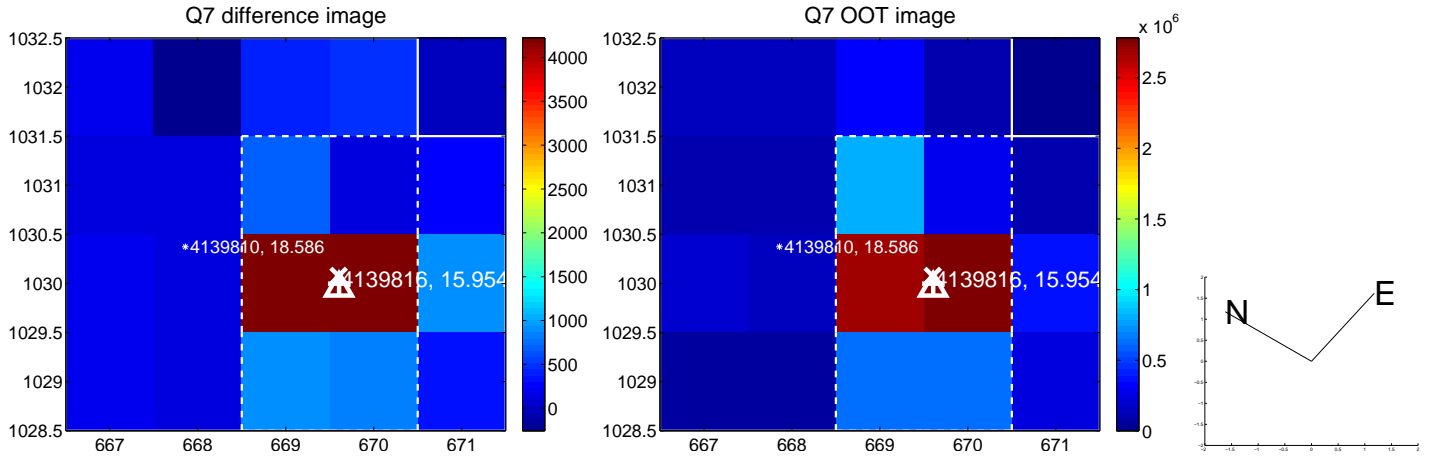
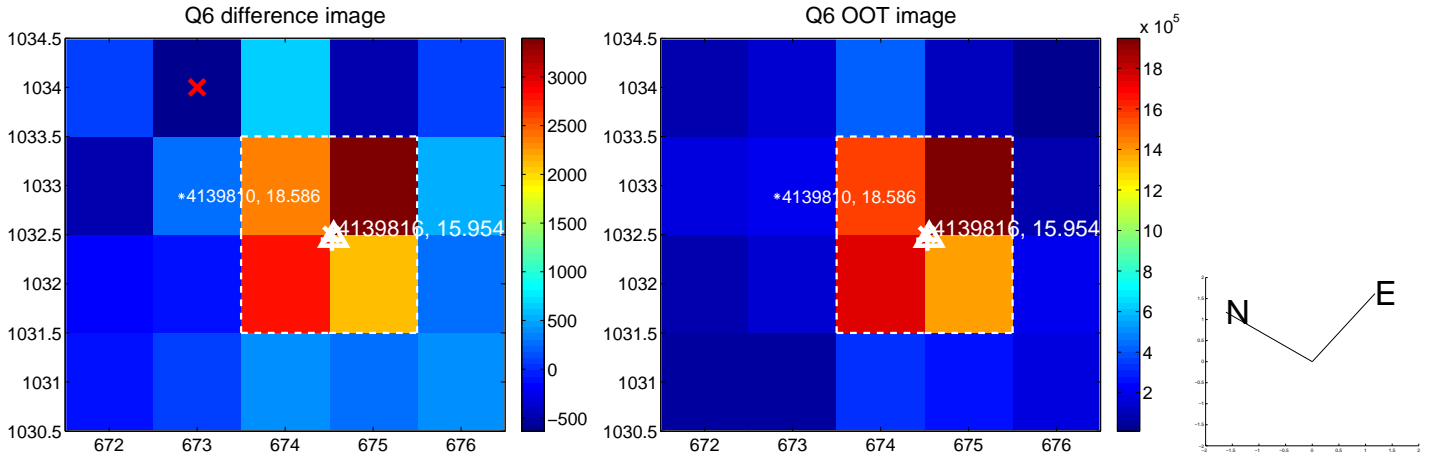
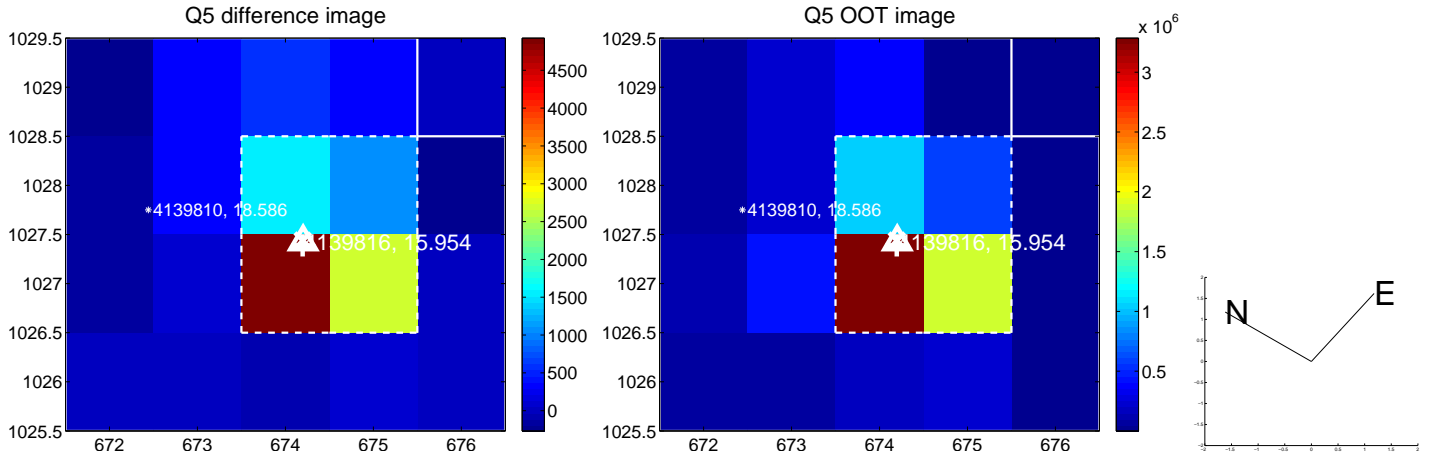


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

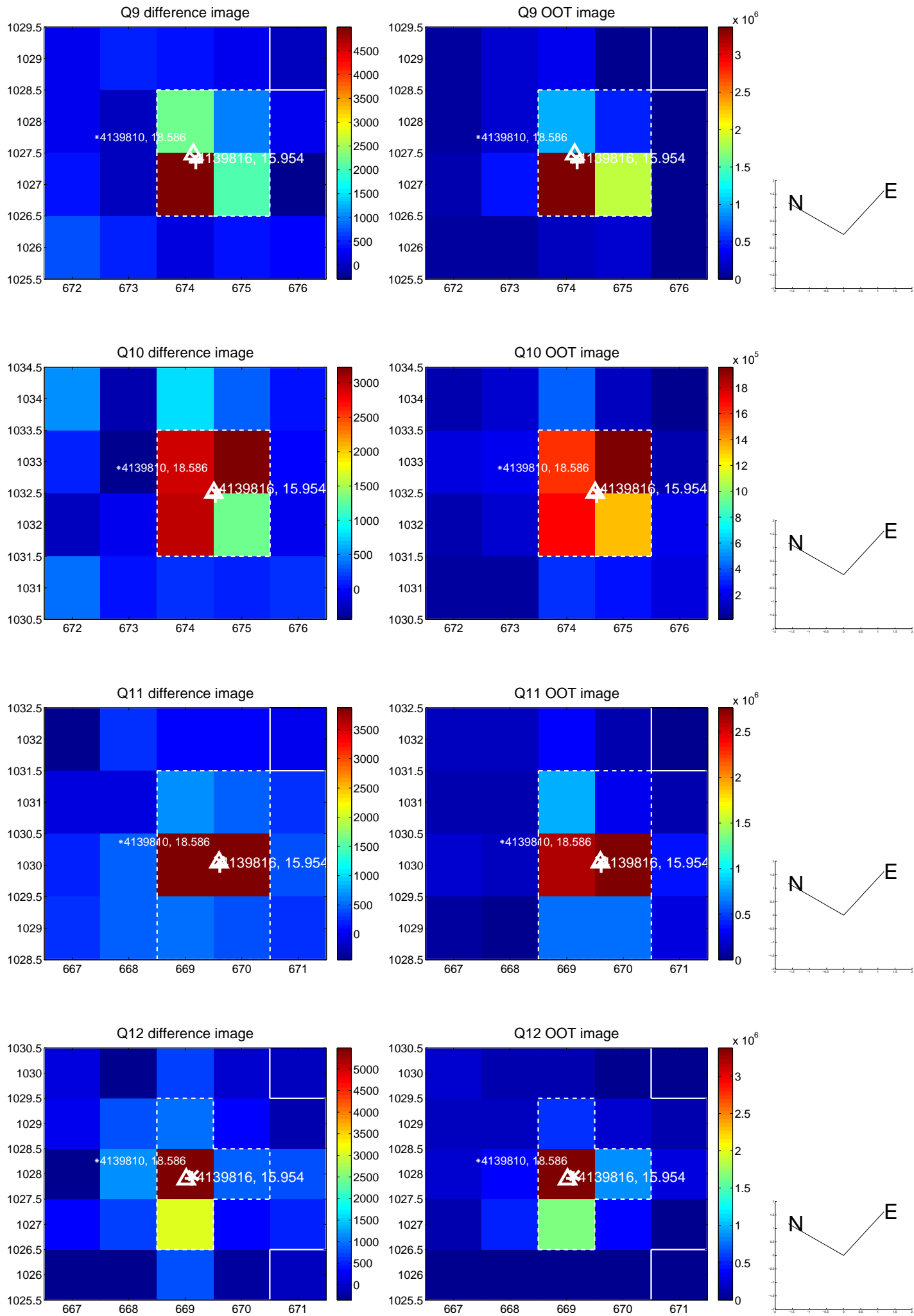
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



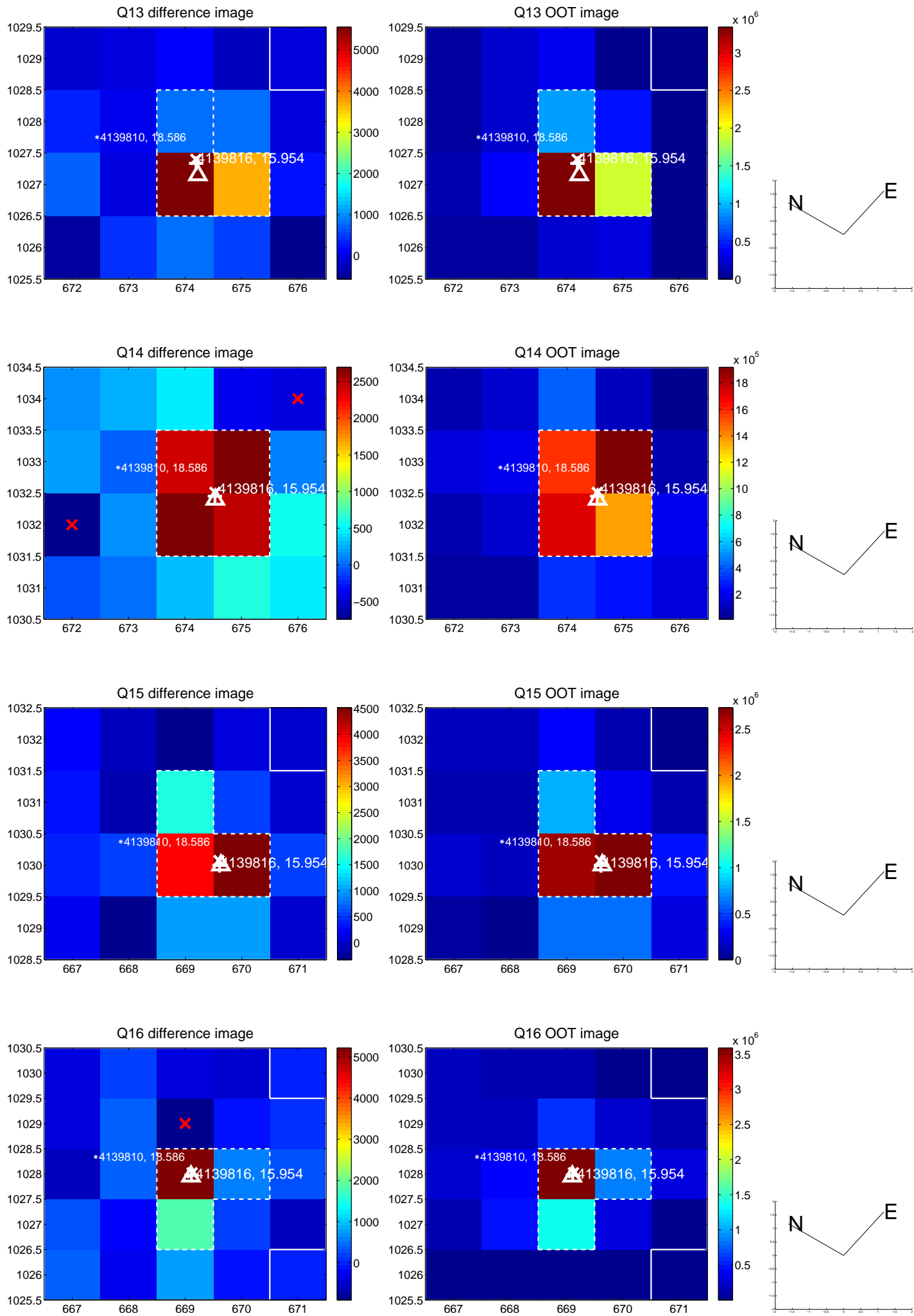
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



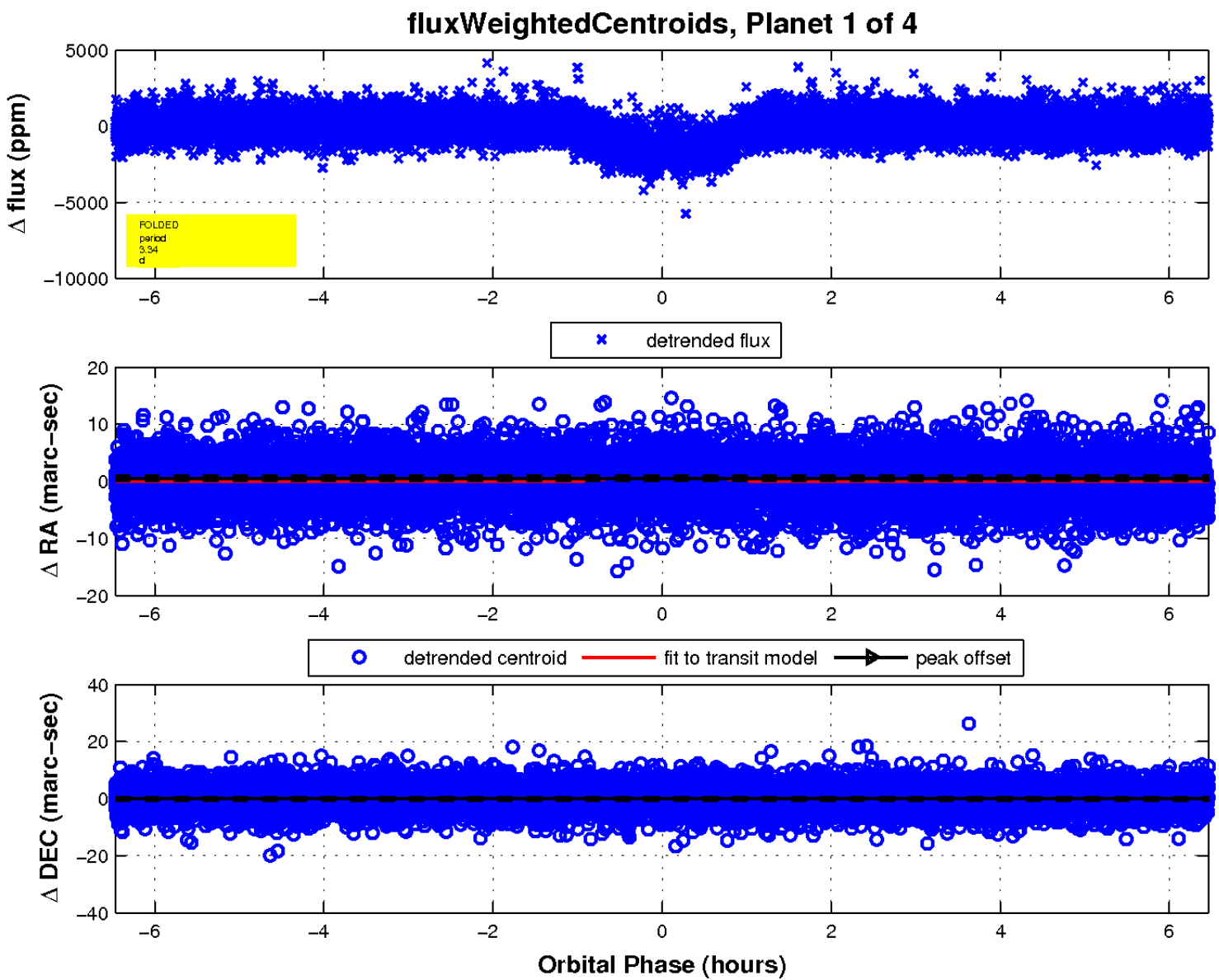
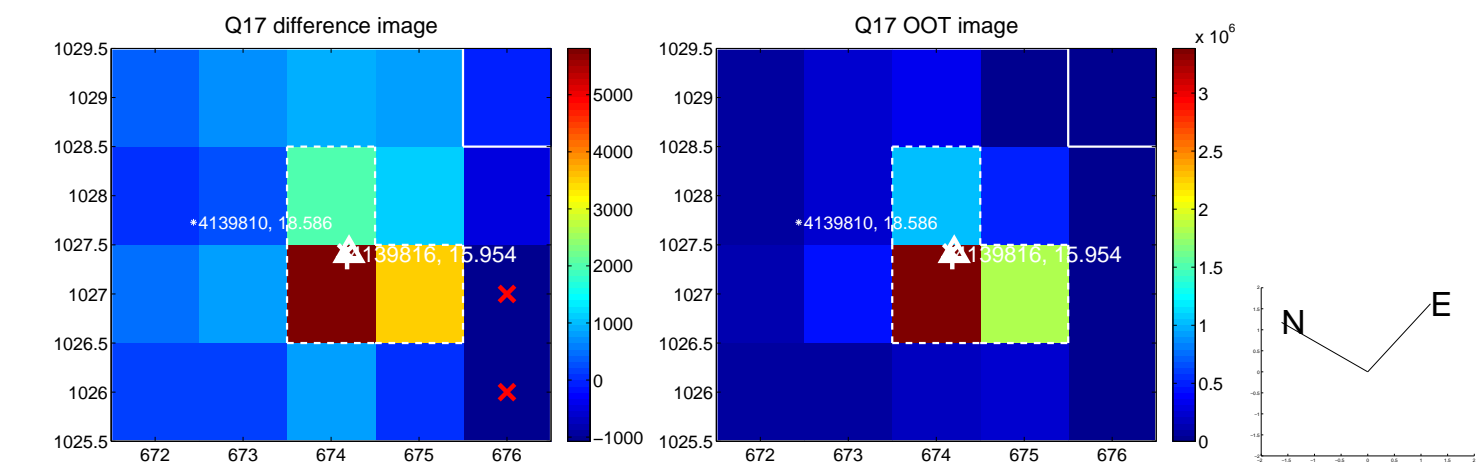
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

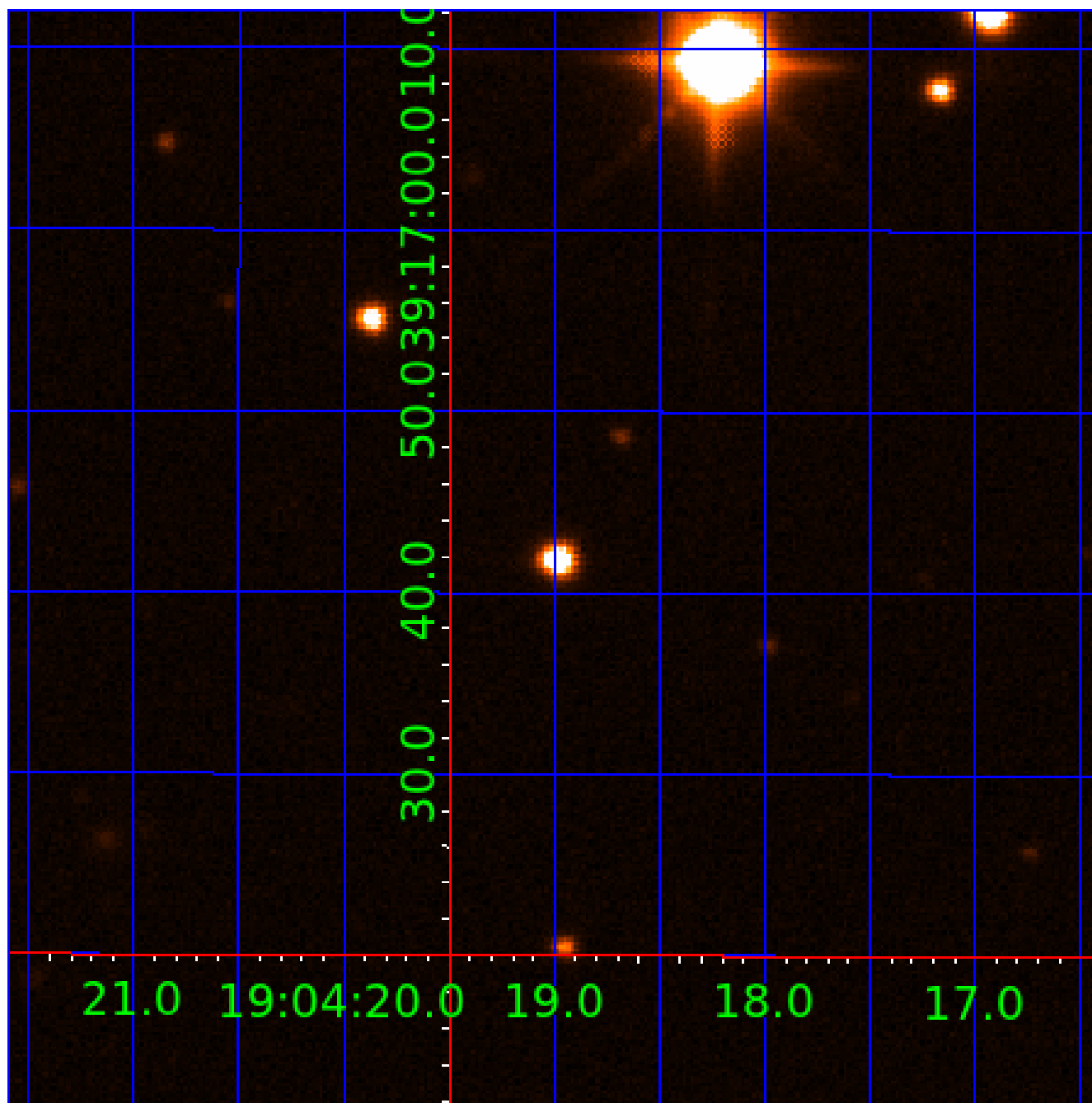


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004139816

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})
004139816-01	OBS	0812.01	3.340219	131.896558	1617.9	2.155	58.2	65.4	0.49	3950	2.35	43.80
004139816-02	OBS	0812.02	20.060415	147.463520	1513.7	3.285	27.2	28.3	0.49	3950	2.03	4.01
004139816-03	OBS	0812.03	46.184467	165.234382	1317.1	4.768	18.0	20.6	0.49	3950	1.87	1.32
004139816-04	OBS	0812.04	7.824990	136.555262	493.3	2.215	12.6	13.5	0.49	3950	1.29	14.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004139816-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-04	OBS	PC	0.99	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.

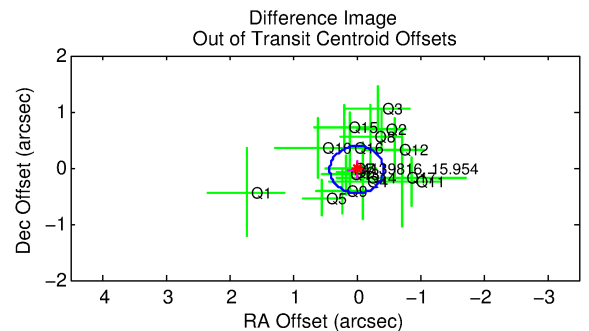
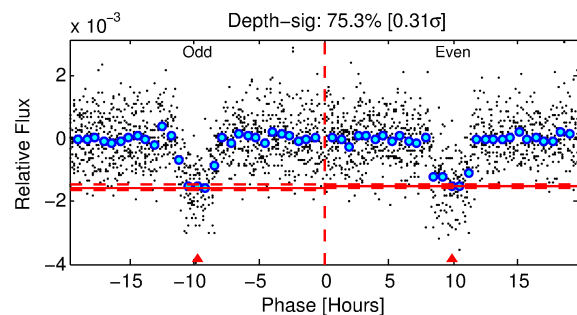
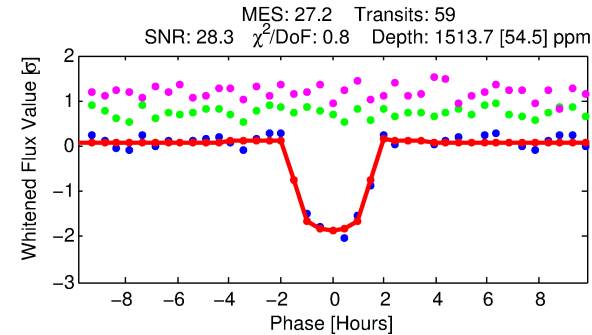
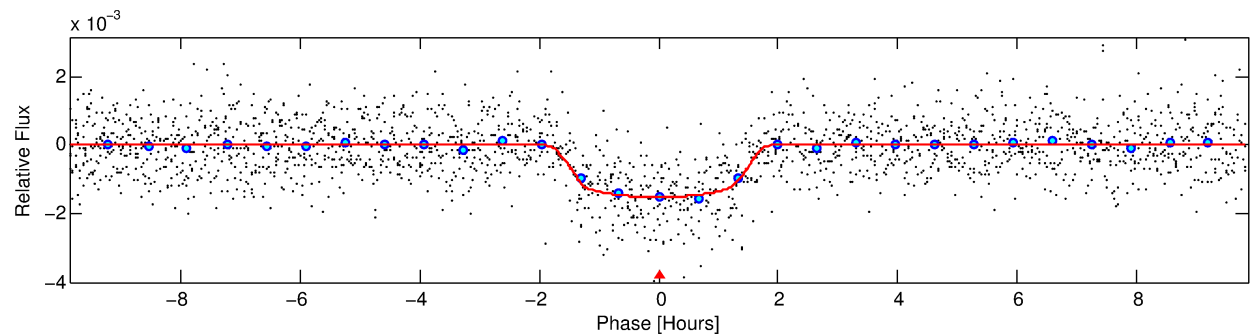
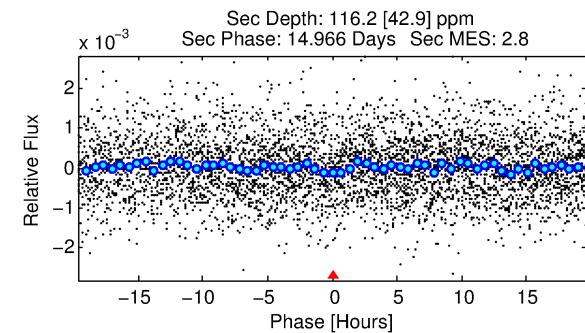
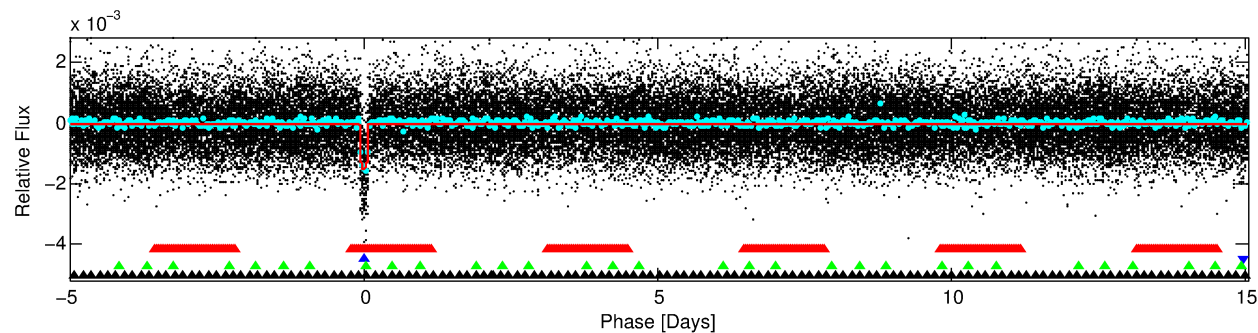
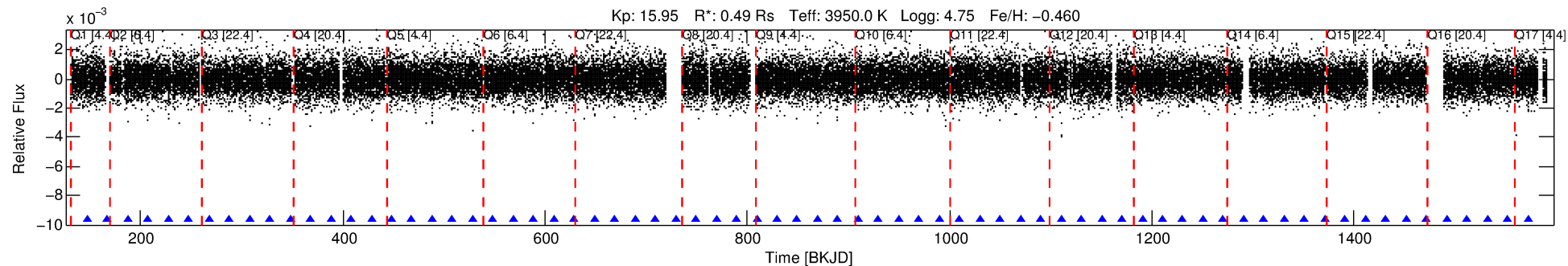
Ephemeris Match Information For 004139816-02

No Significant Match Found

DV One-Page Summary

KIC: 4139816 Candidate: 2 of 4 Period: 20.060 d
KOI: K00812.02 Name: Kepler-235d Corr: 0.992

Kp: 15.95 R*: 0.49 Rs Teff: 3950.0 K Logg: 4.75 Fe/H: -0.460



DV Fit Results:

Period = 20.06042 [0.00007] d
Epoch = 147.4635 [0.0024] BKJD
Rp/R* = 0.0378 [0.0099]
a/R* = 37.07 [46.82]
b = 0.67 [1.06]
Seff = 4.01 [0.49]
Teq = 361 [11] K
Rp = 2.03 [0.56] Re
a = 0.1149 [0.0072] AU
Ag = 204.43 [132.14] [1.54σ]
Teffp = 2110 [341] K [5.12σ]

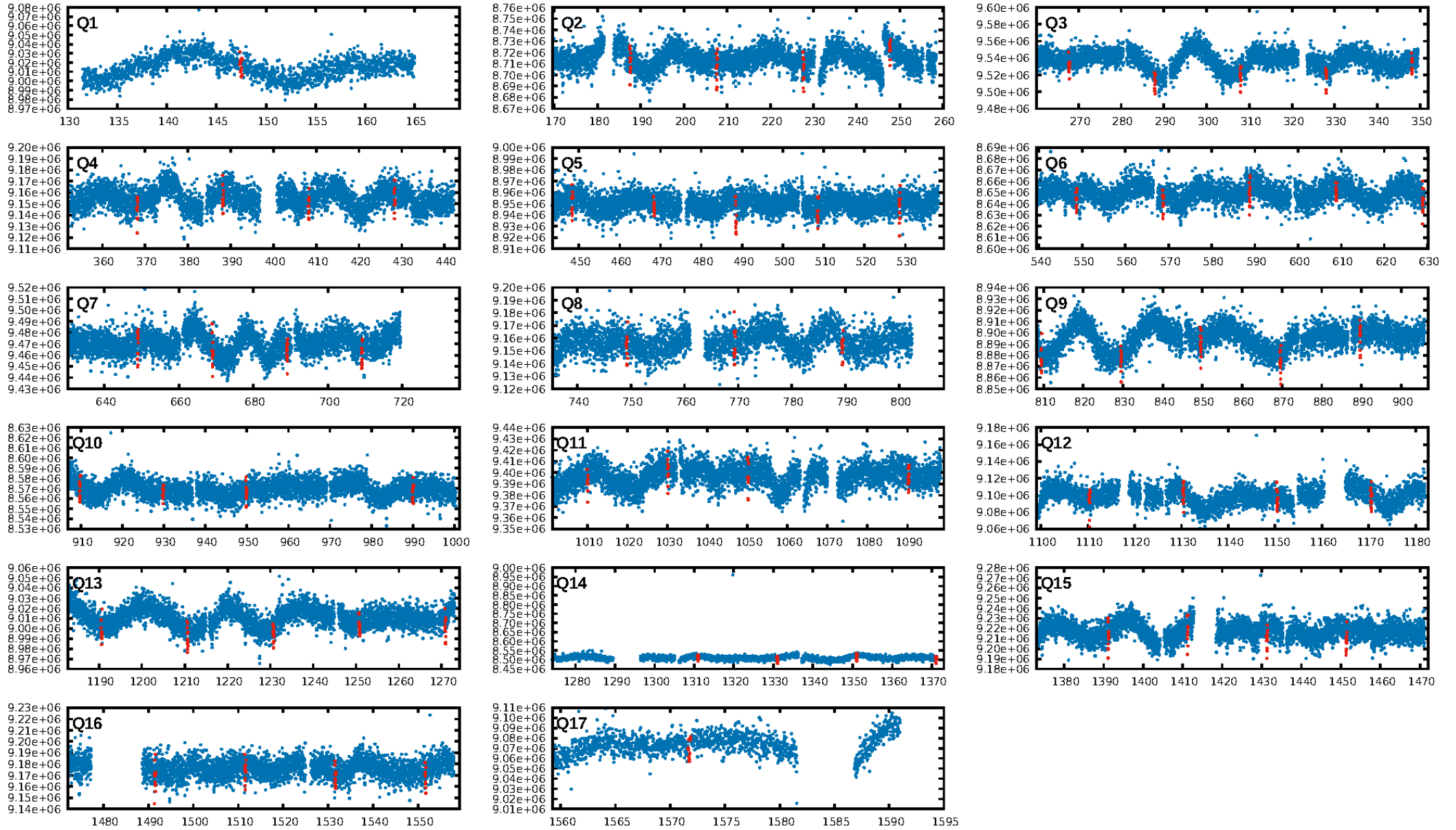
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [74.12σ]
LongPeriod-sig: 100.0% [108.28σ]
ModelChiSquare2-sig: 99.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.23e-158
RollingBand-fgt: 1.00 [57/57]
GhostDiagnostic-chr: 3.585
Centroid-sig: 1.6%
Centroid-so: 0.563 arcsec [1.41σ]
OotOffset-rm: 0.035 arcsec [0.25σ]
KicOffset-rm: 0.233 arcsec [1.67σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
DiffImageOverlap-fno: 0.59 [10/17]

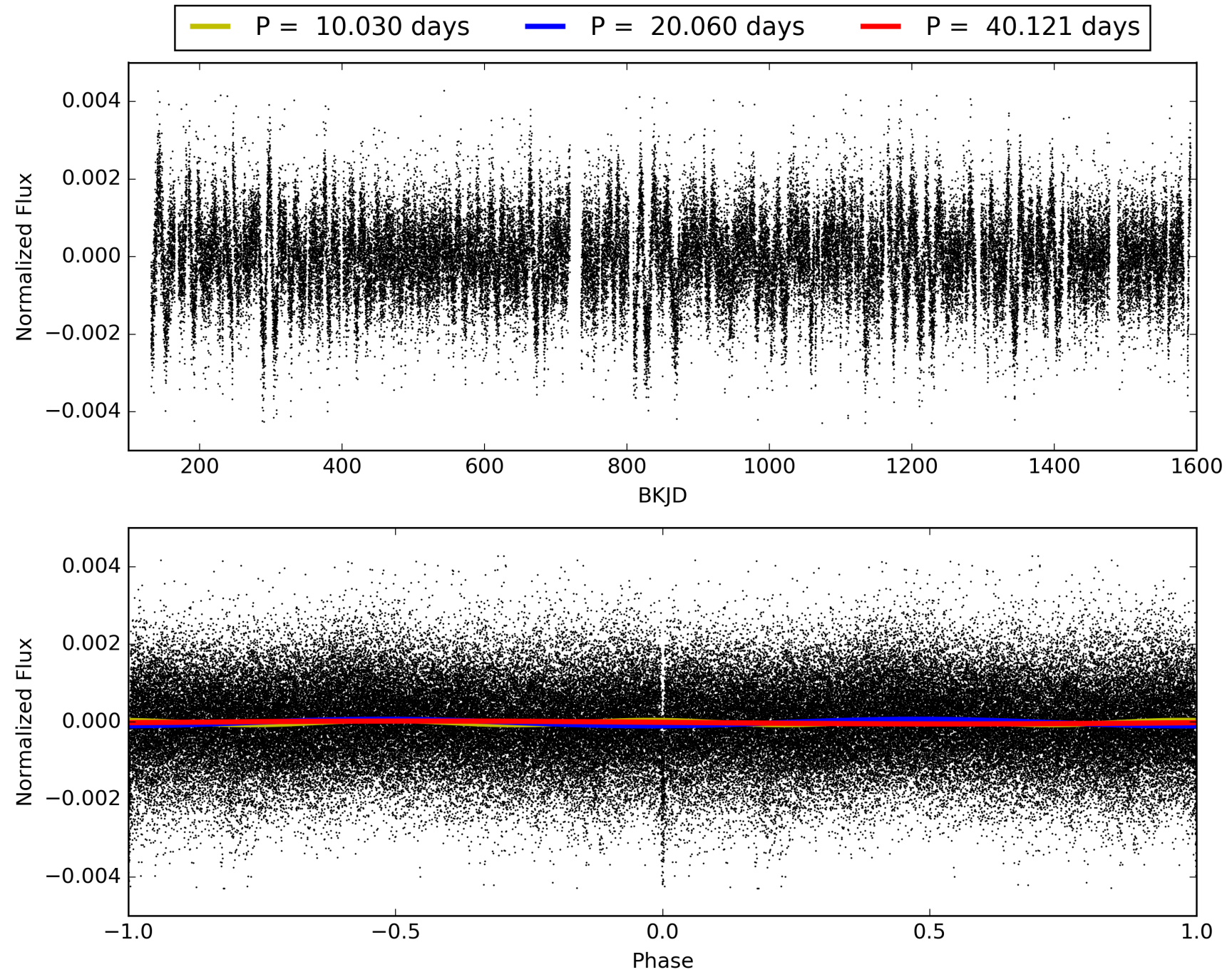
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:49:30 Z

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

TCE 004139816-02, PDC Light Curves

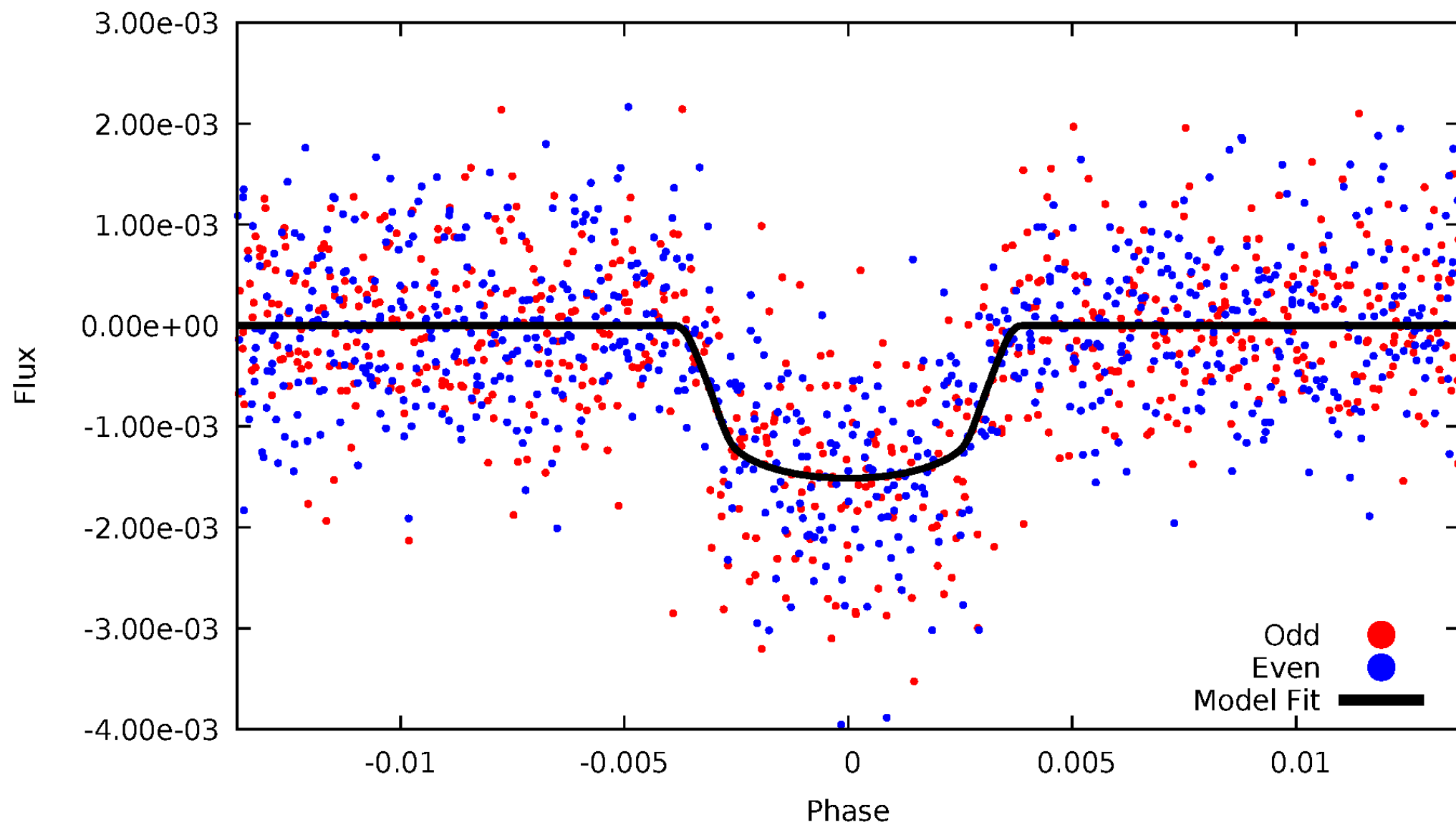


TCE 004139816-02



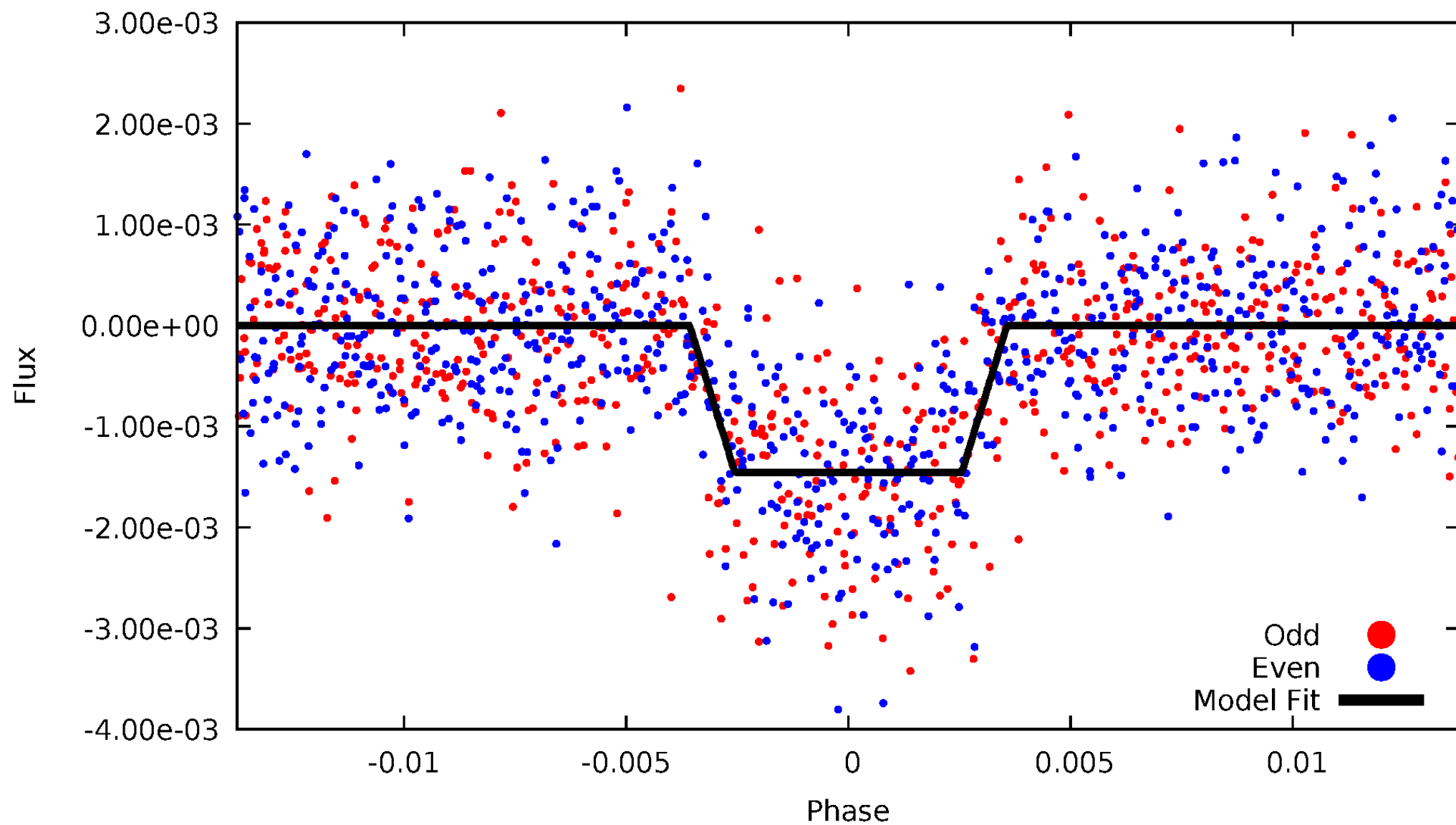
DV Odd/Even

TCE 004139816-02



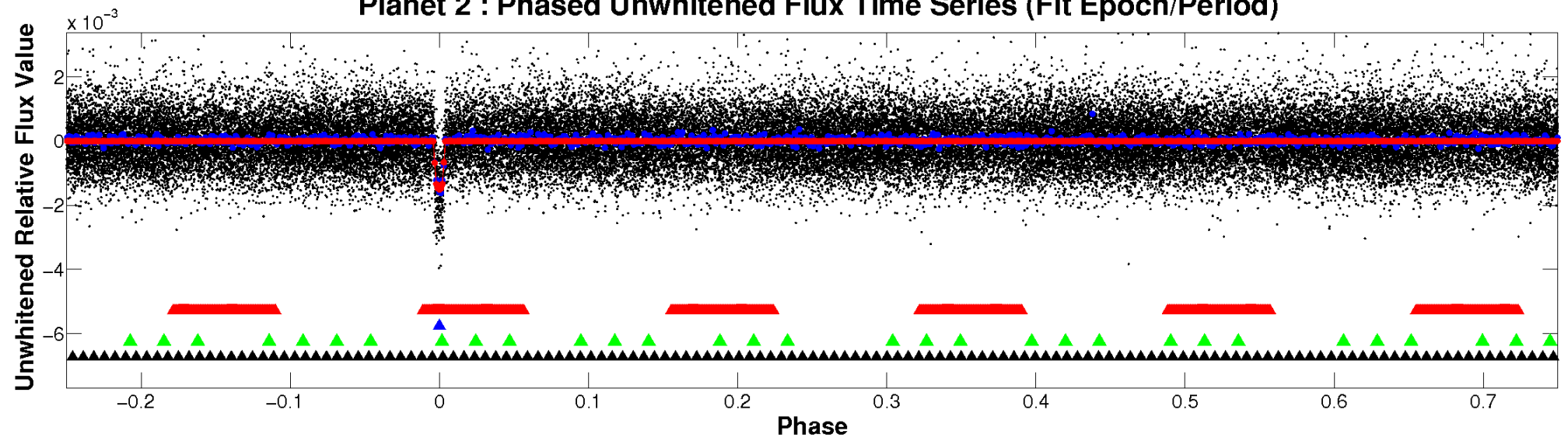
ALT Odd/Even

TCE 004139816-02

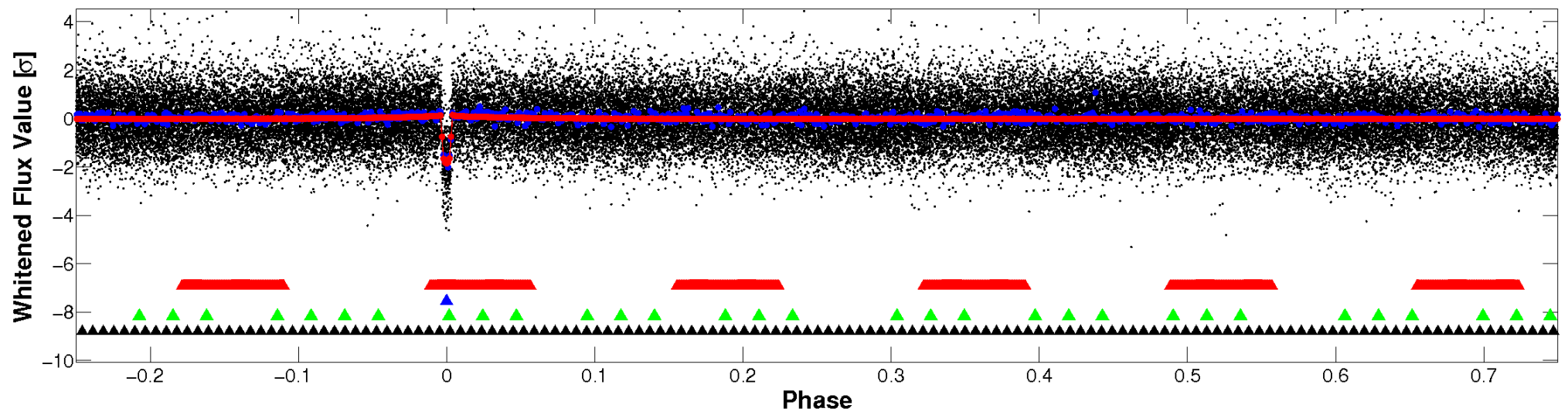


Non-Whitened Vs. Whitened Light Curve

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

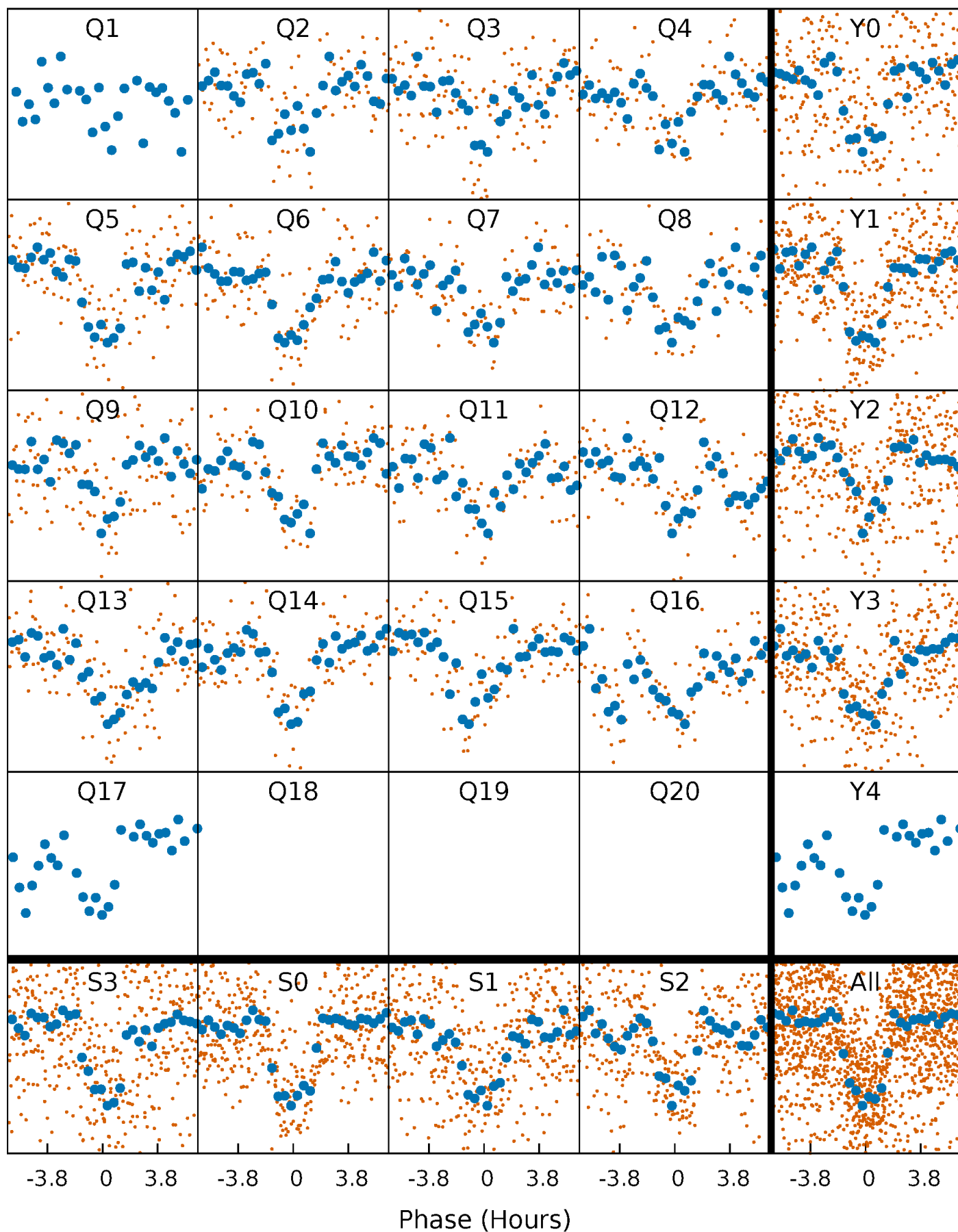


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



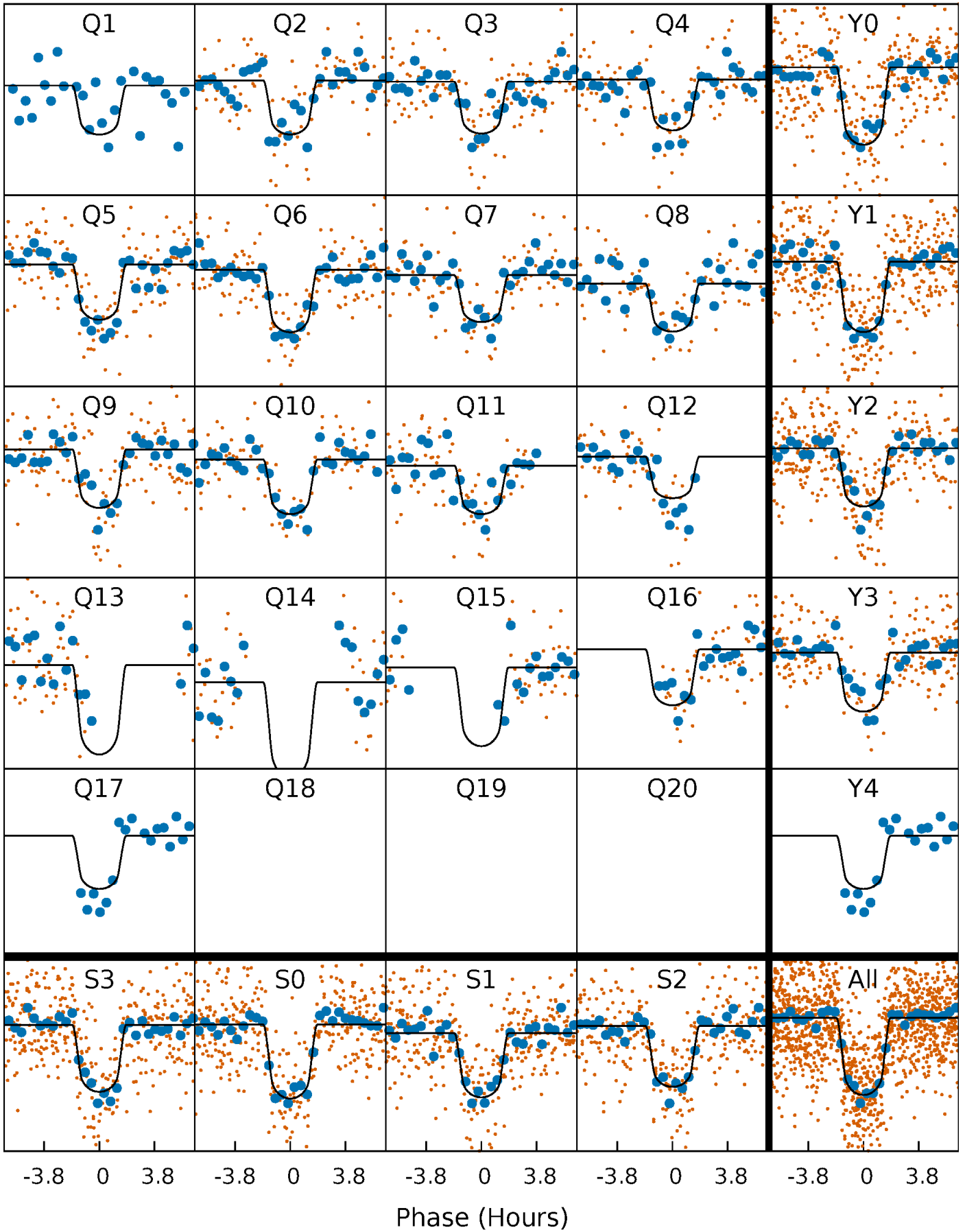
PDC Quarter-Phased Transit Curves

TCE 004139816-02 P= 20.060415 Days $T_0=147.463520$ (BKJD)



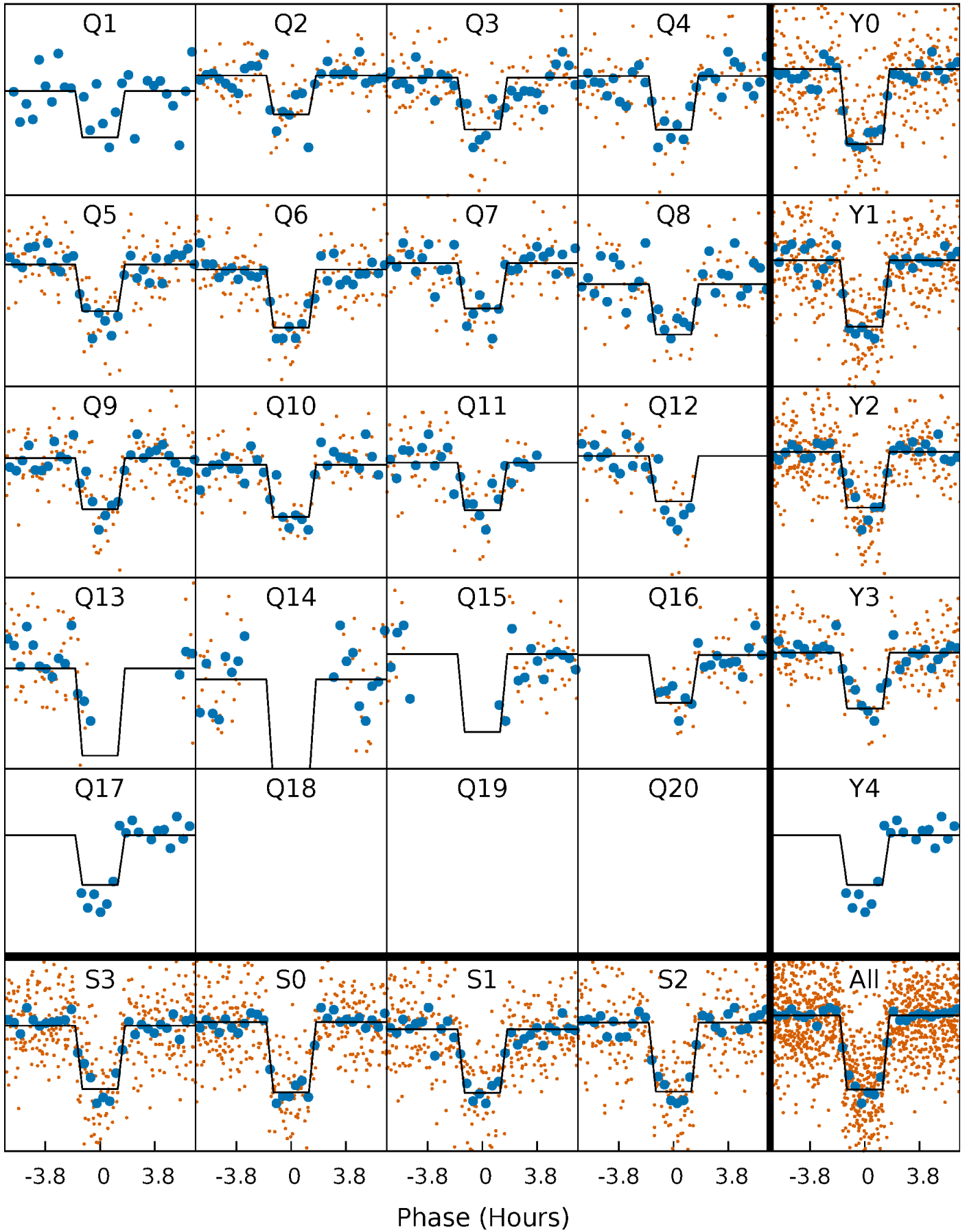
DV Quarter-Phased Transit Curves

TCE 004139816-02 P= 20.060415 Days $T_0=147.463520$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

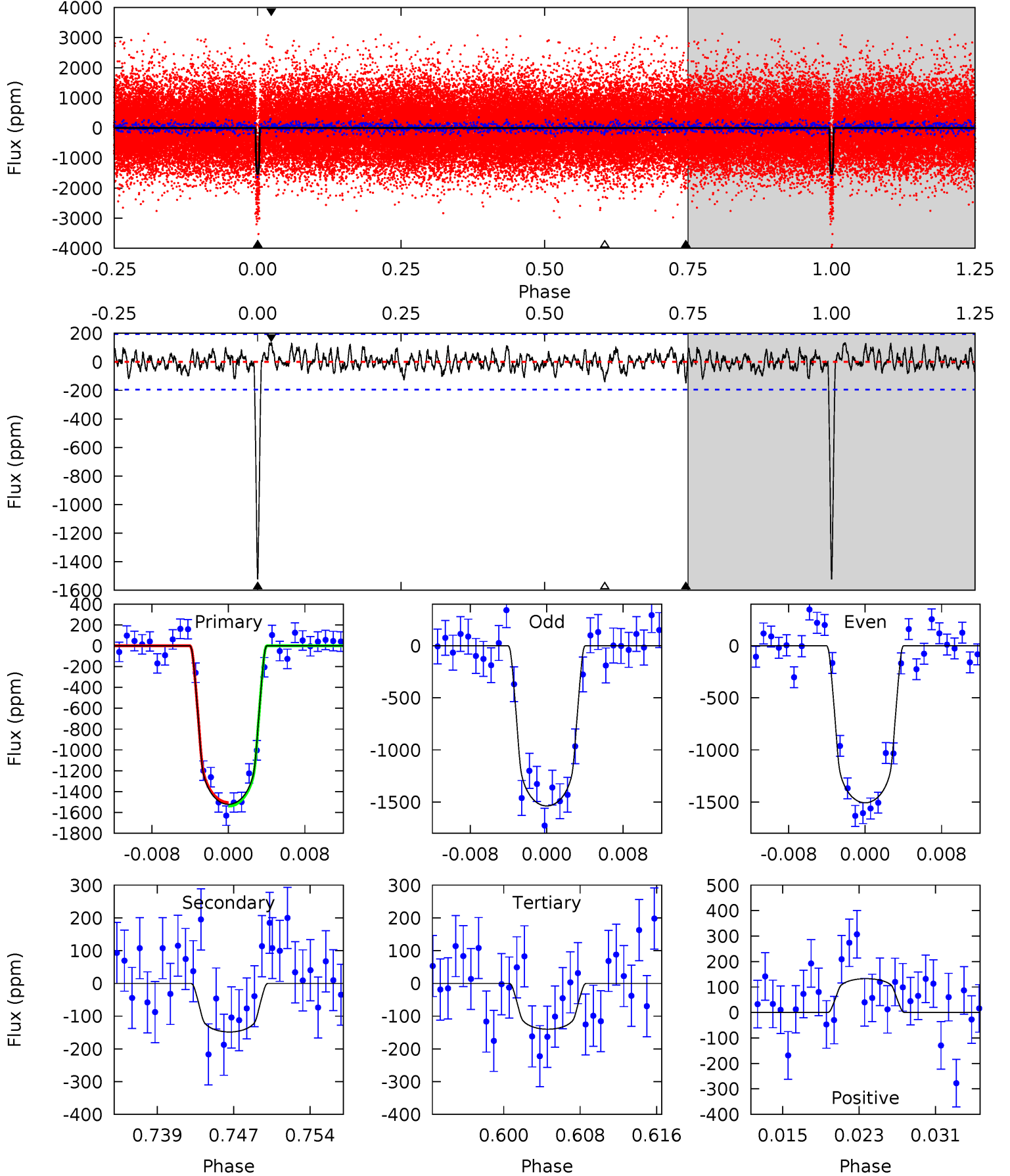
TCE 004139816-02 P= 20.060413 Days $T_0=147.465063$ (BKJD)



DV Model-Shift Uniqueness Test

004139816-02, P = 20.060415 Days, E = 127.403105 Days

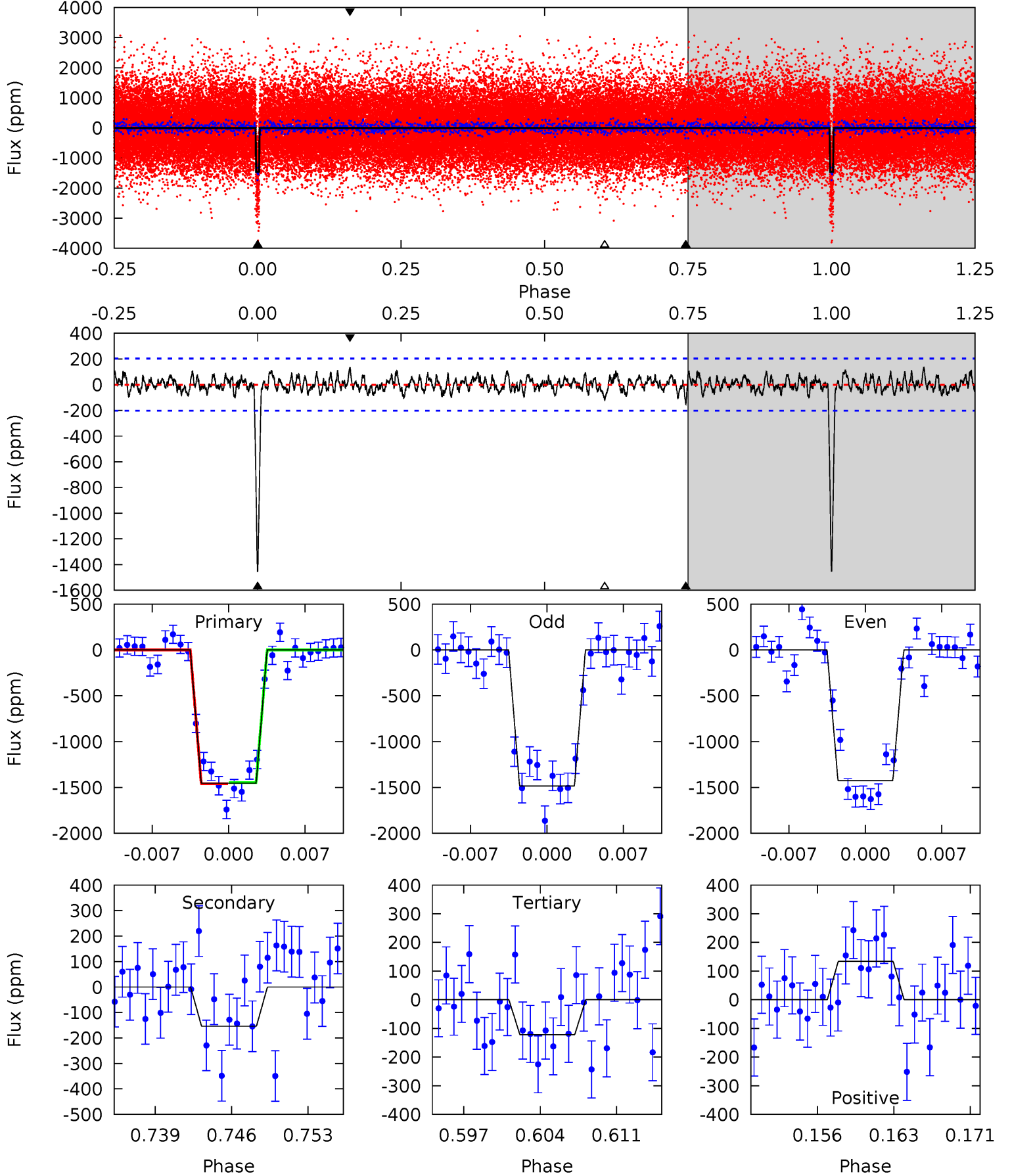
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.7	3.87	3.65	3.46	5.08	2.67	1.22	36.0	36.2	0.22	0.41	0.39	1.01	0.08	0.47



Alt Model-Shift Uniqueness Test

004139816-02, $P = 20.060413$ Days, $E = 127.404650$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.5	3.87	3.06	3.37	5.09	2.69	1.09	33.5	33.2	0.81	0.51	0.74	0.99	0.08	0.18



Stellar Parameters For KIC 004139816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3950^{+70}_{-86}	$4.754^{+0.042}_{-0.031}$	$-0.460^{+0.150}_{-0.150}$	$0.493^{+0.033}_{-0.040}$	$0.502^{+0.031}_{-0.038}$	$5.920^{+1.261}_{-0.715}$
	+2%/-2%	+1%/-1%	+33%/-33%	+7%/-8%	+6%/-8%	+21%/-12%
Source	SPE70	SPE60	SPE70	DSEP		

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

Secondary Eclipse Parameters for KIC 004139816-02 / KOI 0812.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-148 ± 38	$2.04^{+0.54}_{-0.53}$	503^{+12}_{-14}	2790^{+262}_{-198}	256^{+228}_{-106}
Alt.	-154 ± 40	$2.06^{+0.50}_{-0.54}$	503^{+12}_{-14}	2788^{+274}_{-196}	259^{+241}_{-105}

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 $A_{obs} \gg 1.0$

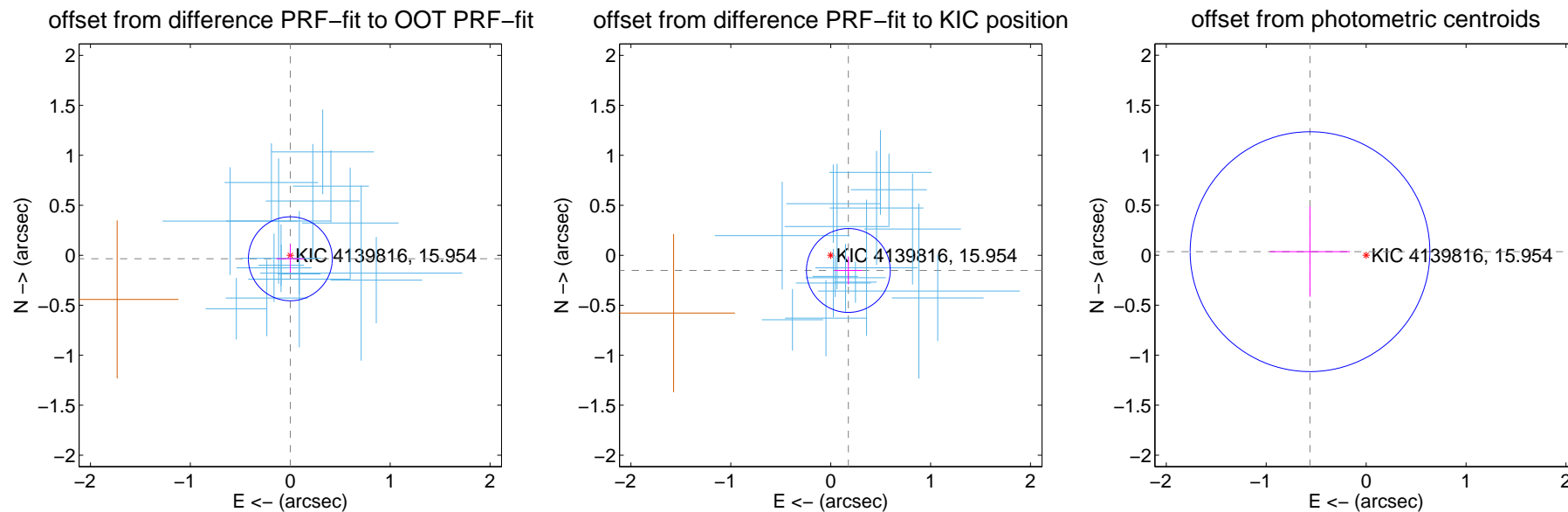
DV Centroid Data

Supplemental centroid analysis for 004139816-02. Kepler magnitude: 15.95. Transit SNR 28.29

There are 16 quarters with good PRF difference image offsets

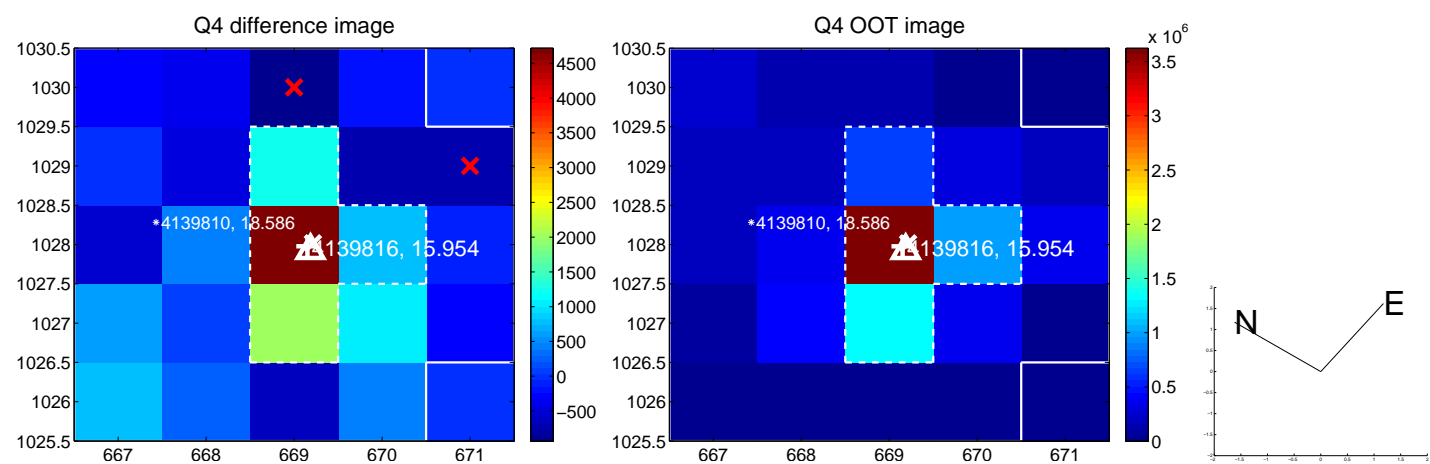
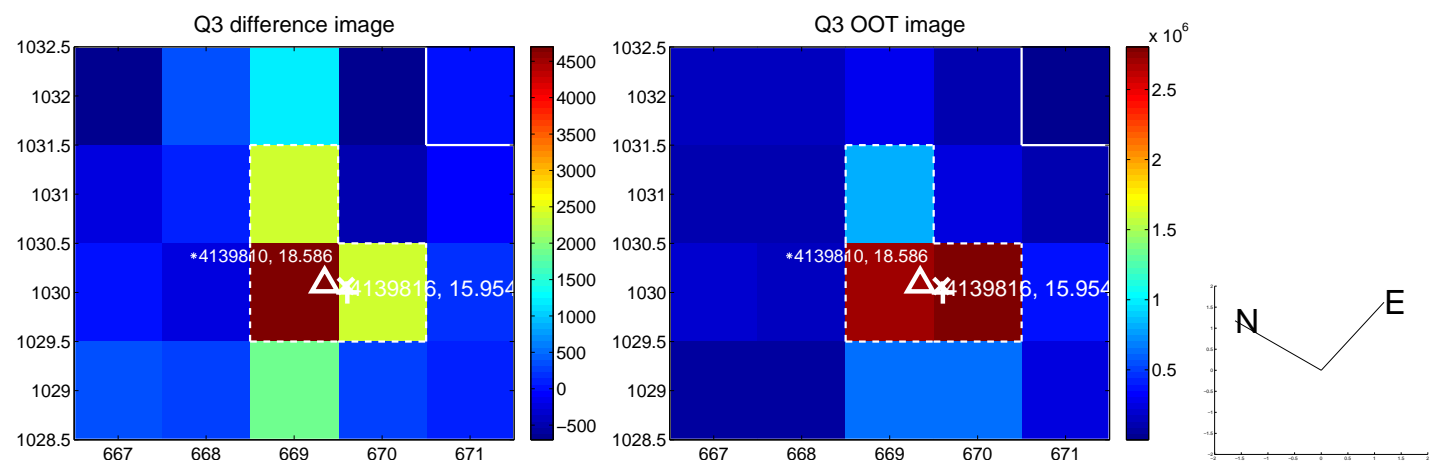
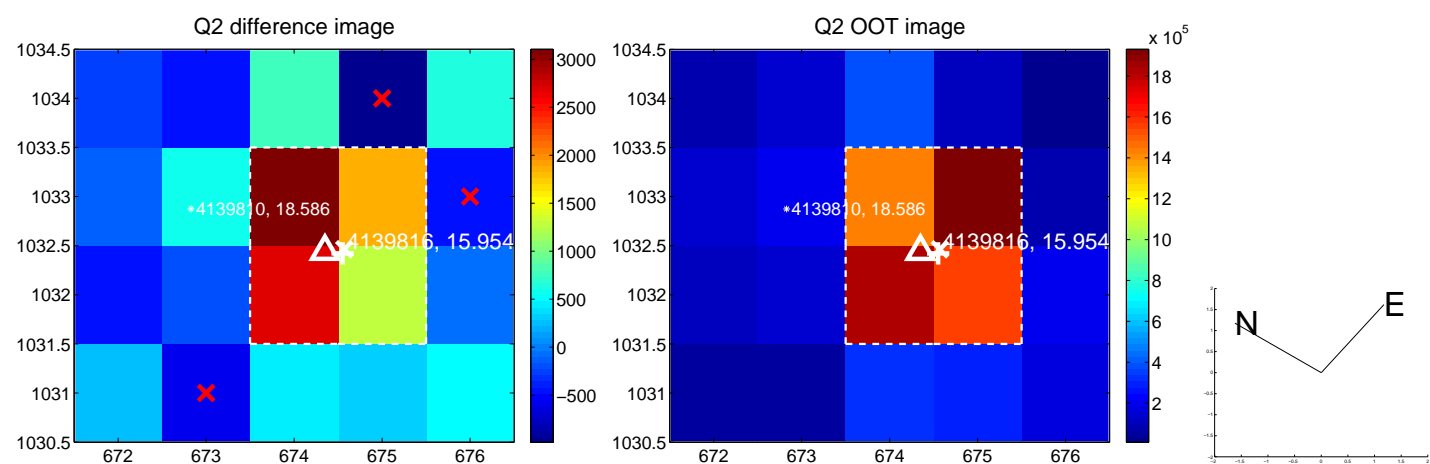
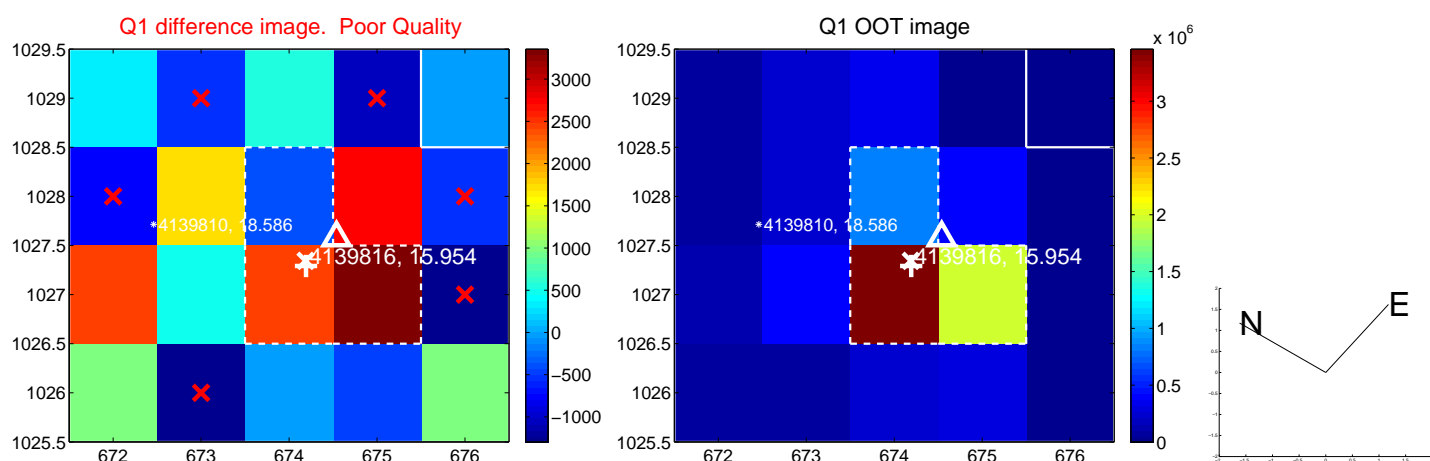
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.035 ± 0.140	0.25	-0.001 ± 0.140	-0.035 ± 0.140
PRF-fit source offset from KIC position	0.233 ± 0.140	1.67	-0.176 ± 0.140	-0.152 ± 0.140
photometric centroid source offset	0.56 ± 0.40	1.41	0.56 ± 0.40	0.04 ± 0.45

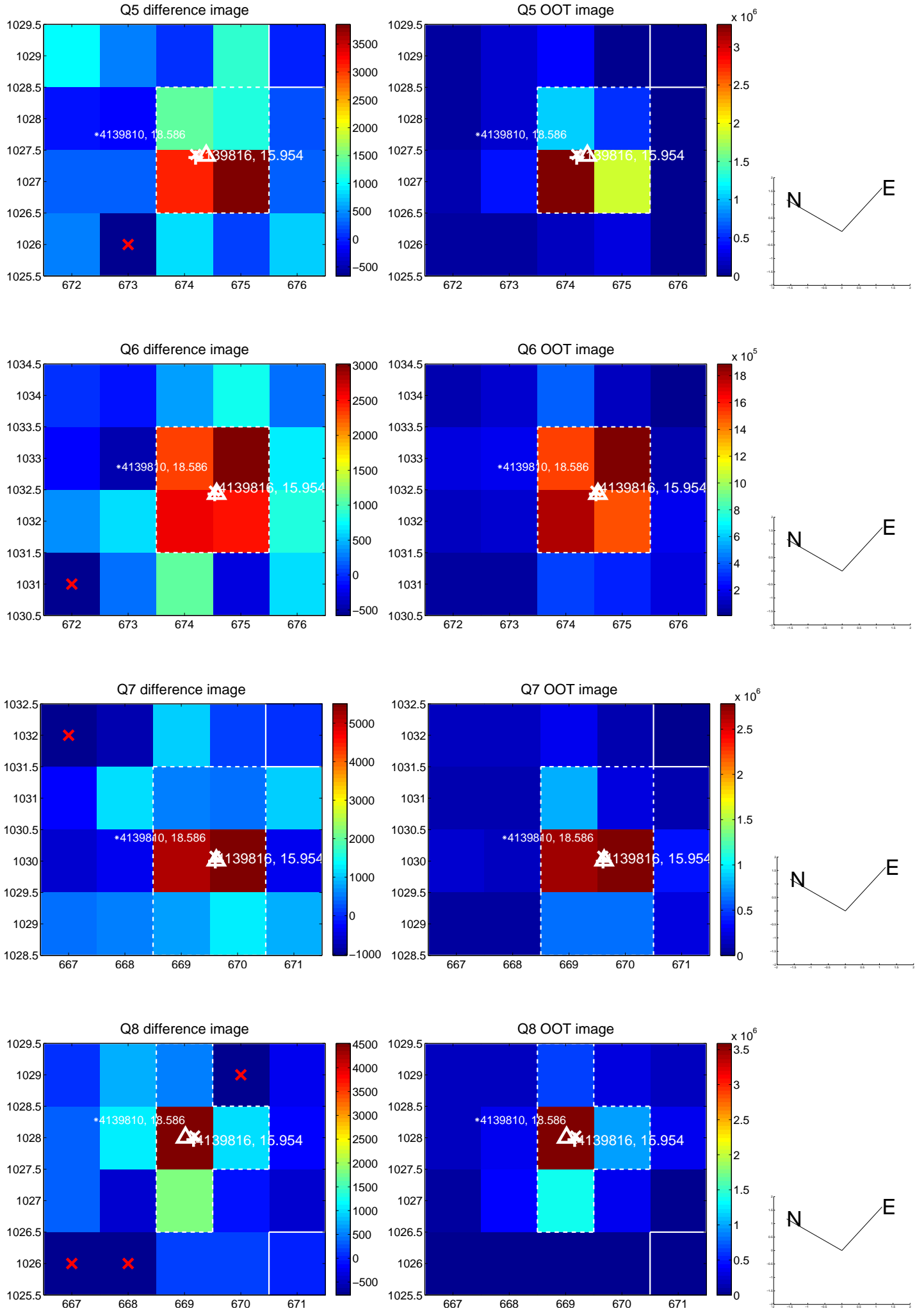


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

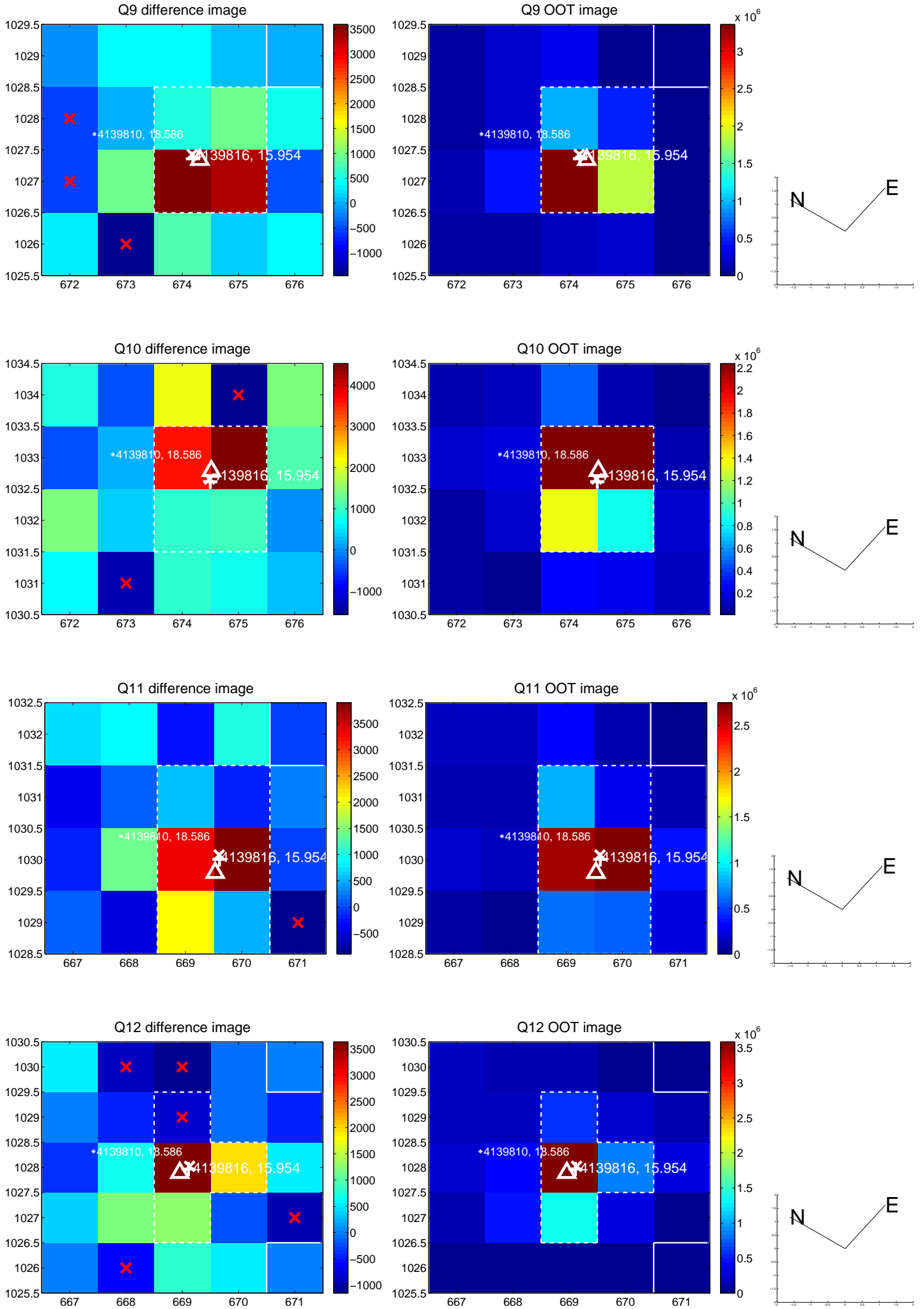
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



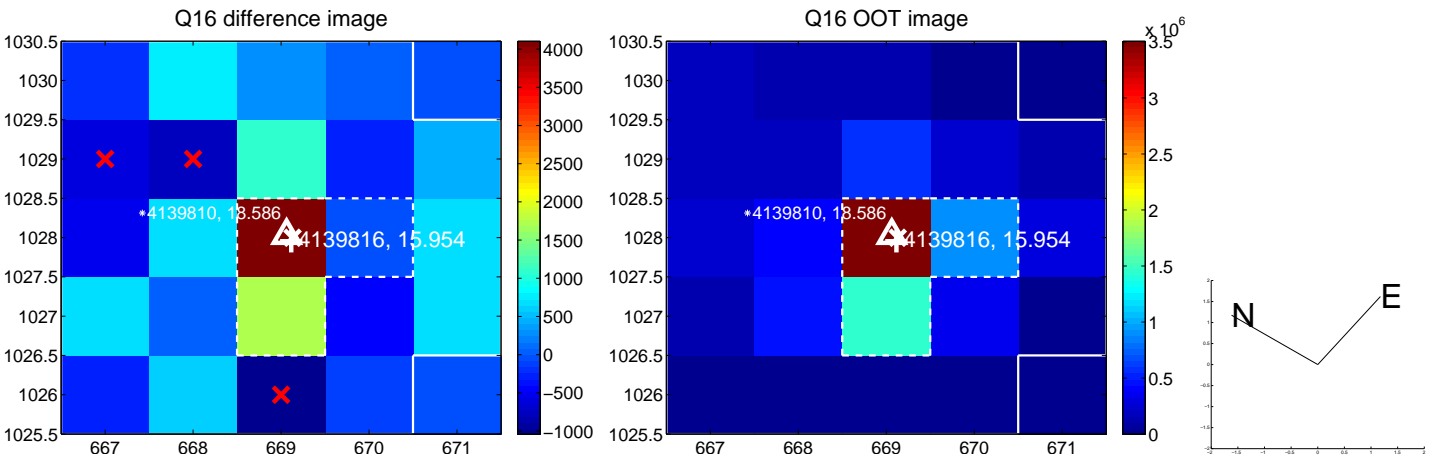
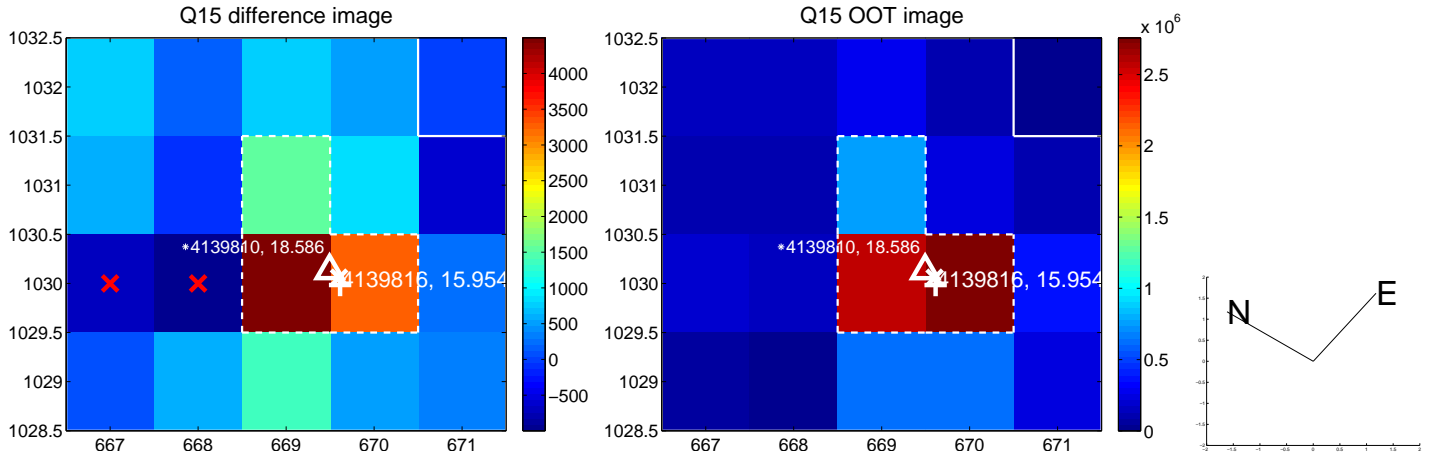
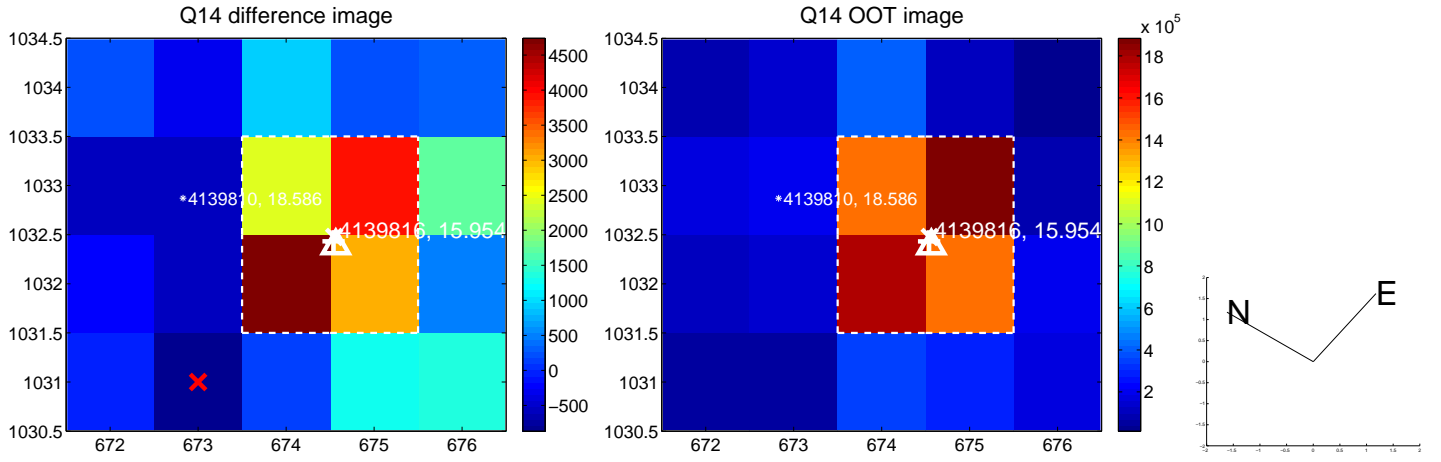
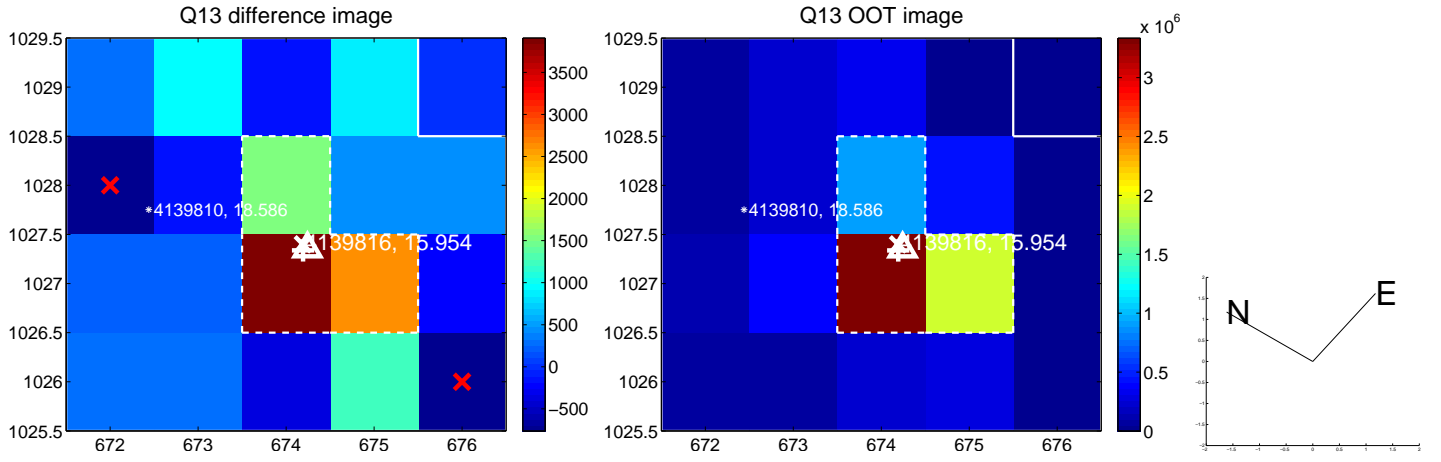
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



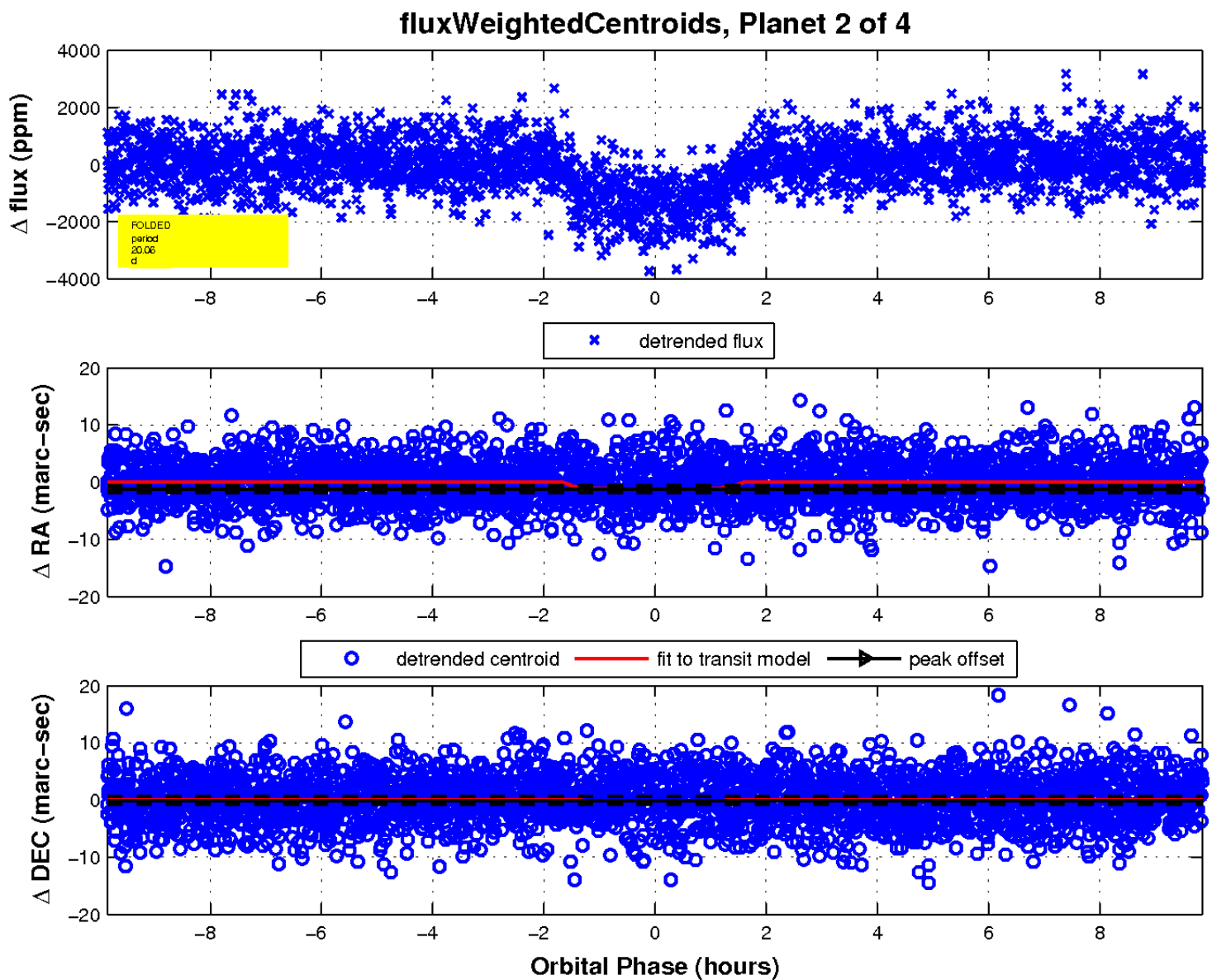
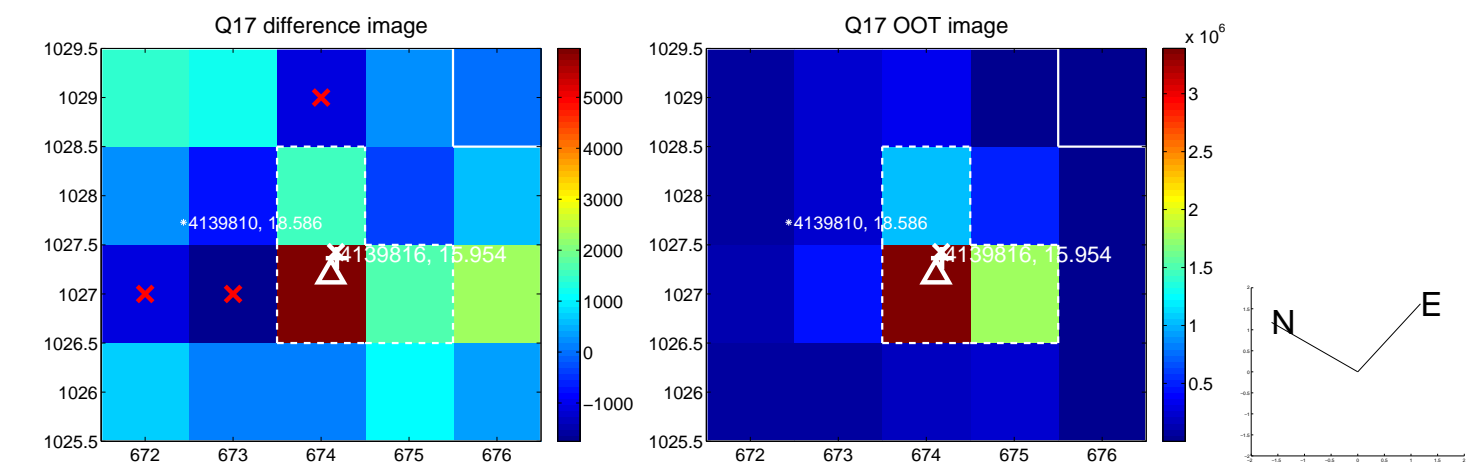
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

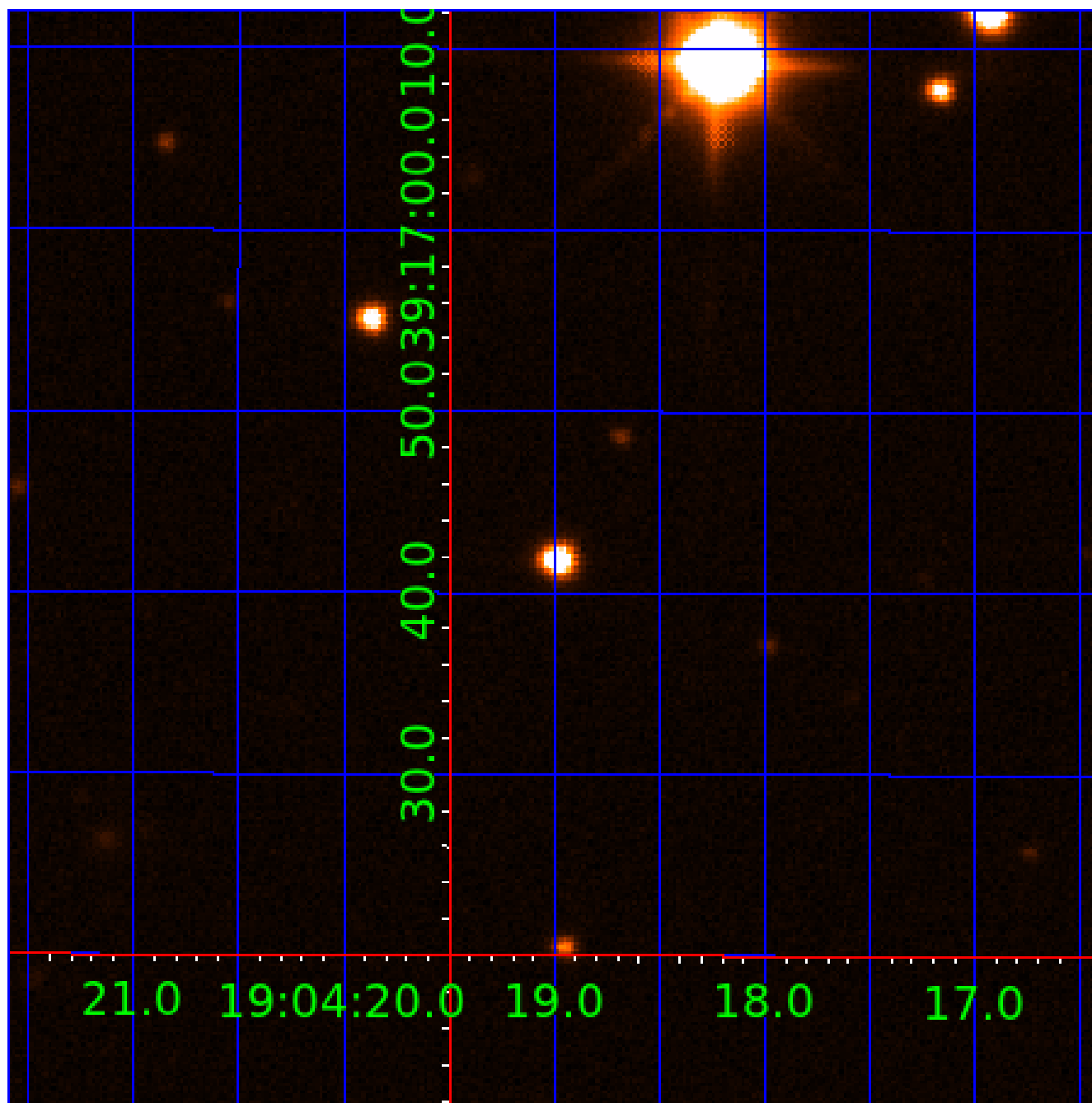


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004139816

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})
004139816-01	OBS	0812.01	3.340219	131.896558	1617.9	2.155	58.2	65.4	0.49	3950	2.35	43.80
004139816-02	OBS	0812.02	20.060415	147.463520	1513.7	3.285	27.2	28.3	0.49	3950	2.03	4.01
004139816-03	OBS	0812.03	46.184467	165.234382	1317.1	4.768	18.0	20.6	0.49	3950	1.87	1.32
004139816-04	OBS	0812.04	7.824990	136.555262	493.3	2.215	12.6	13.5	0.49	3950	1.29	14.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004139816-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-04	OBS	PC	0.99	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.

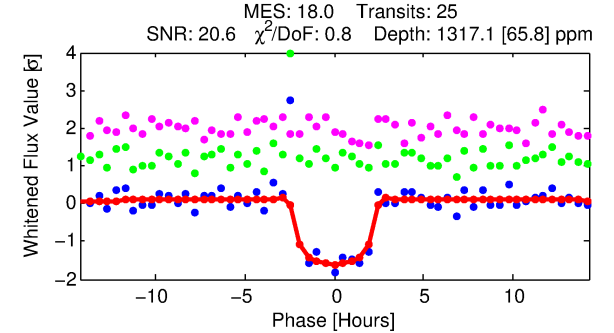
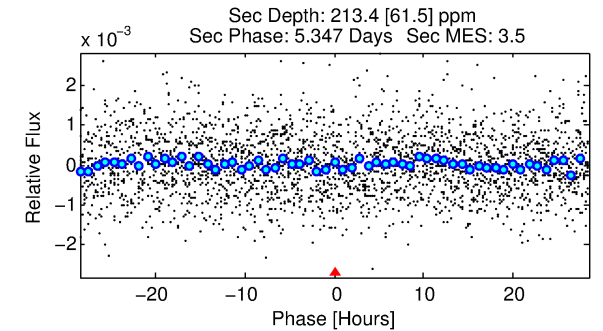
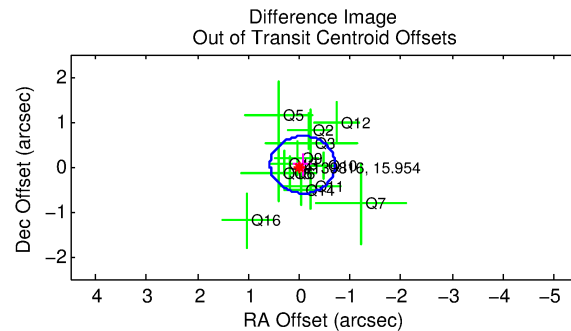
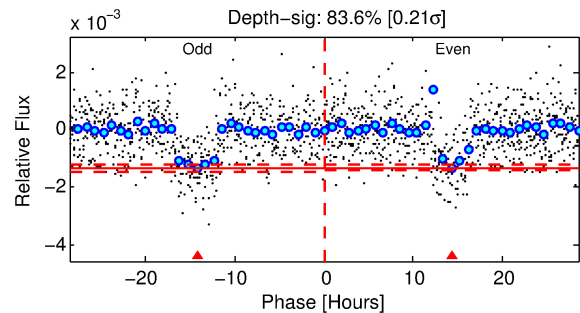
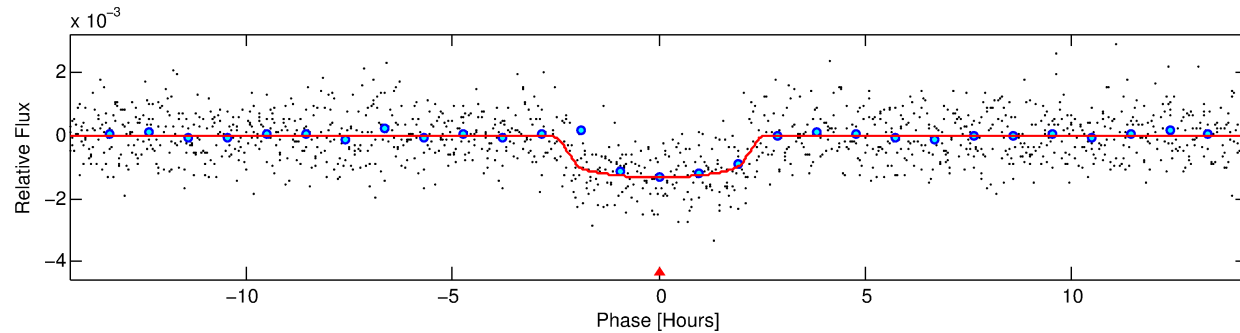
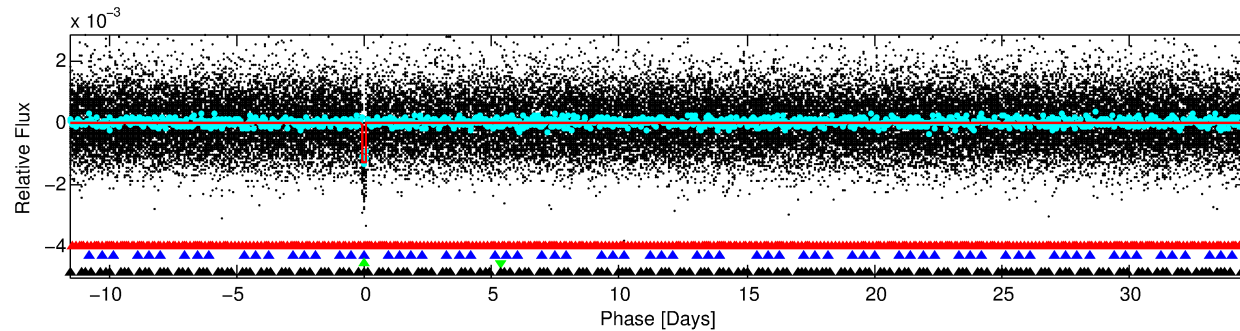
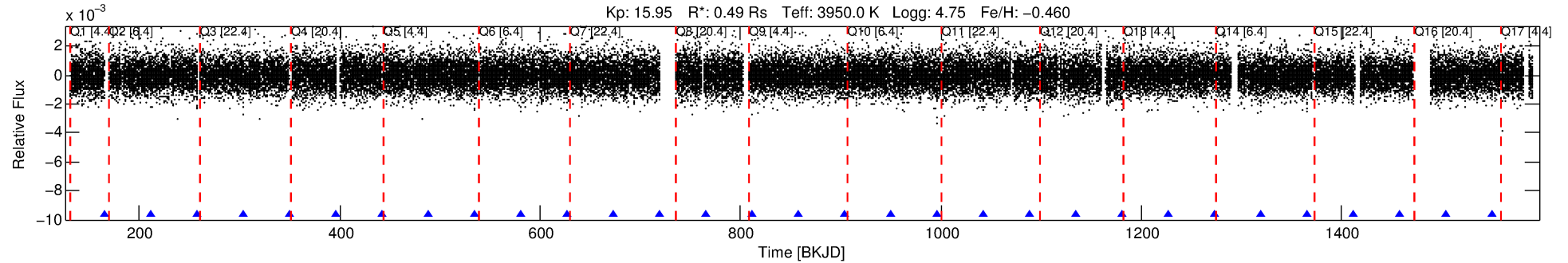
Ephemeris Match Information For 004139816-03

No Significant Match Found

DV One-Page Summary

KIC: 4139816 Candidate: 3 of 4 Period: 46.184 d
KOI: K00812.03 Name: Kepler-235e Corr: 0.982

Kp: 15.95 R*: 0.49 Rs Teff: 3950.0 K Logg: 4.75 Fe/H: -0.460



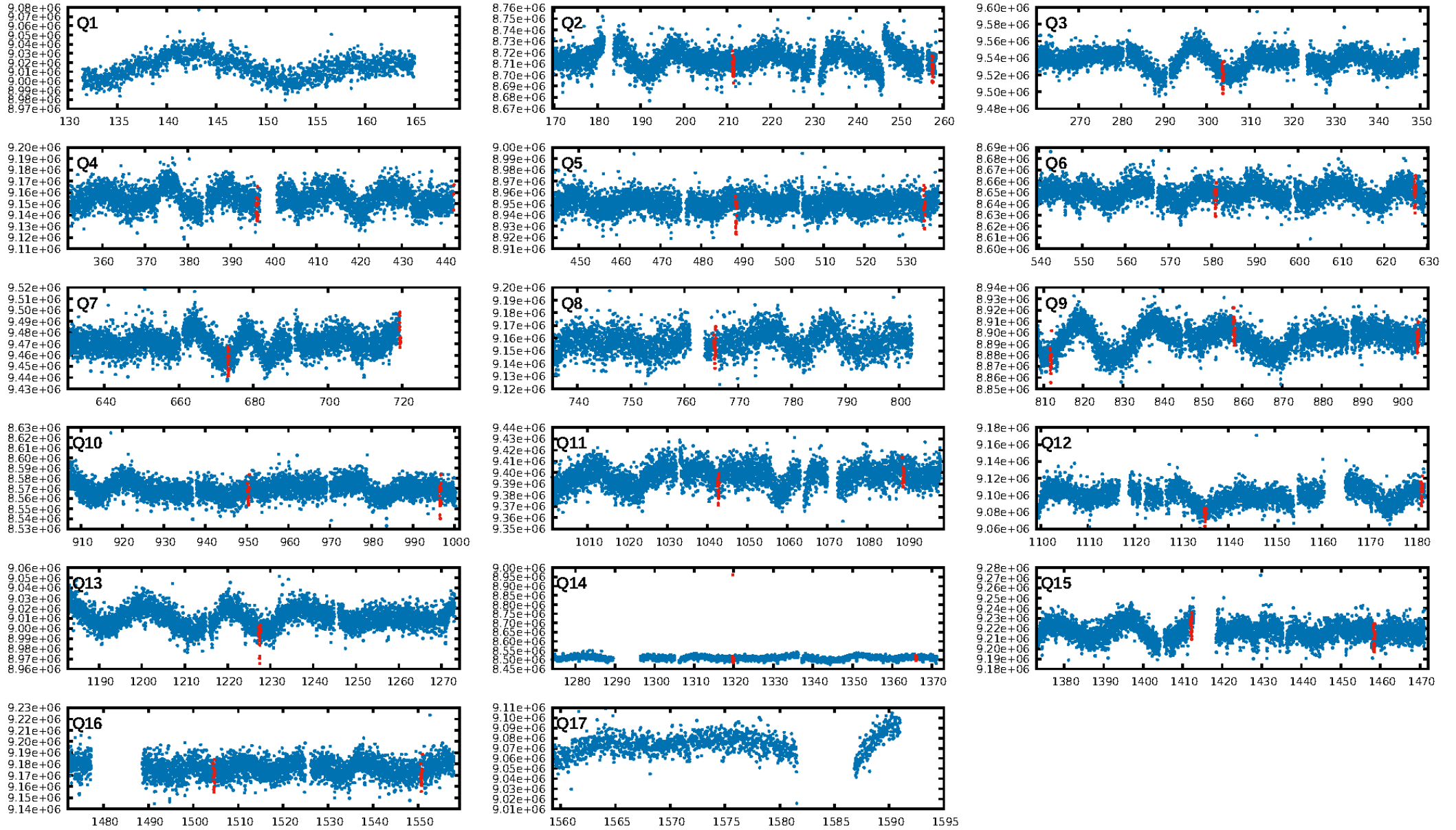
DV Fit Results:

Period = 46.18447 [0.00027] d
Epoch = 165.2344 [0.0049] BKJD
Rp/R* = 0.0348 [0.0128]
a/R* = 61.51 [108.94]
b = 0.62 [1.79]
Seff = 1.32 [0.16]
Teq = 273 [8] K
Rp = 1.87 [0.70] Re
a = 0.2004 [0.0126] AU
Ag = 1343.04 [1065.50] [1.26σ]
Teffp = 2558 [508] K [4.50σ]

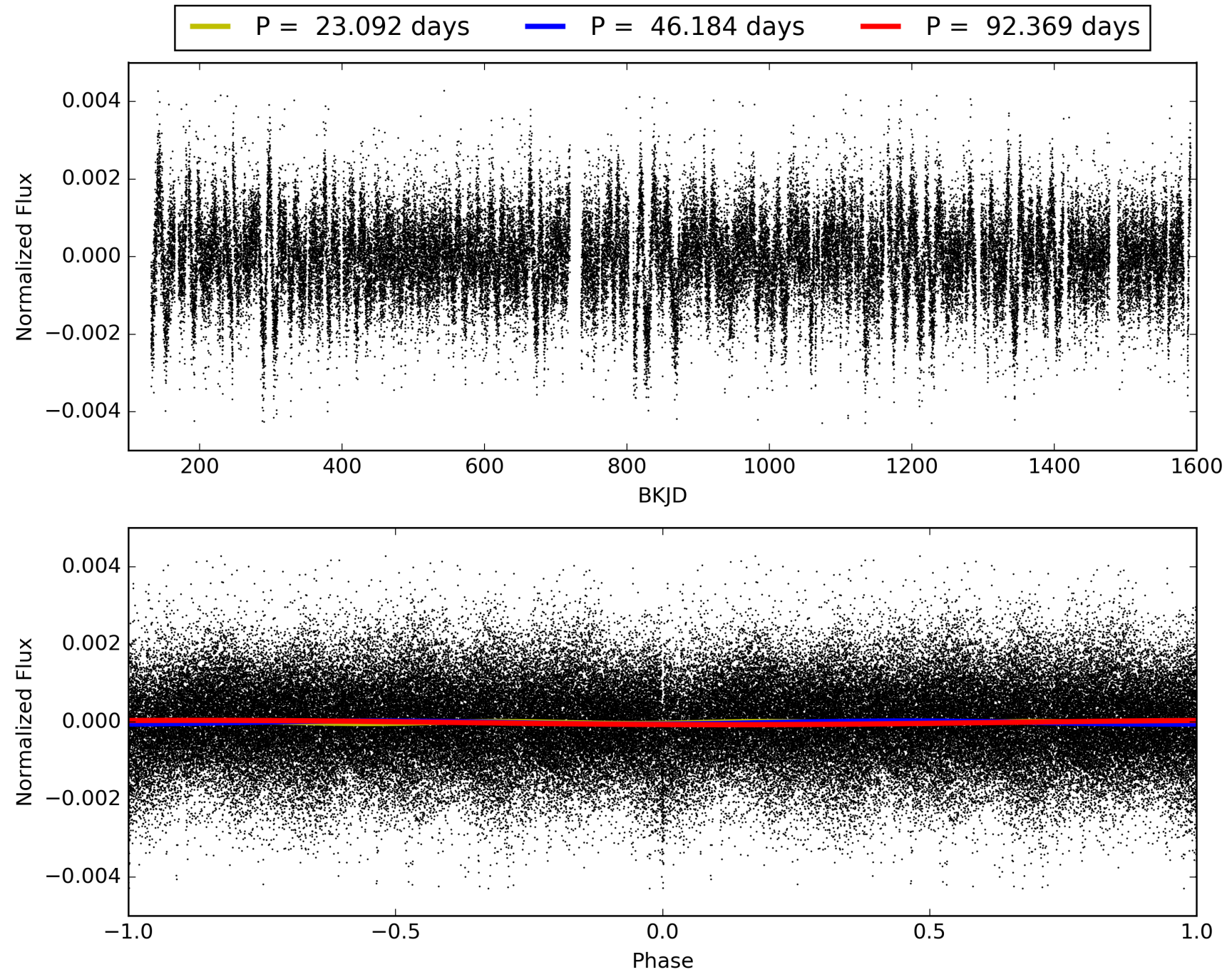
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [108.28σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 42.1%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.33e-70
RollingBand-fgt: 1.00 [25/25]
GhostDiagnostic-chr: 2.402
Centroid-sig: 0.6%
Centroid-so: 1.123 arcsec [1.67σ]
OotOffset-rm: 0.079 arcsec [0.37σ]
KicOffset-rm: 0.257 arcsec [1.51σ]
OotOffset-st: 4/4/2/3 [13]
KicOffset-st: 4/4/2/3 [13]
DiffImageQuality-fgm: 0.85 [11/13]
DiffImageOverlap-fno: 0.67 [10/15]

TCE 004139816-03, PDC Light Curves

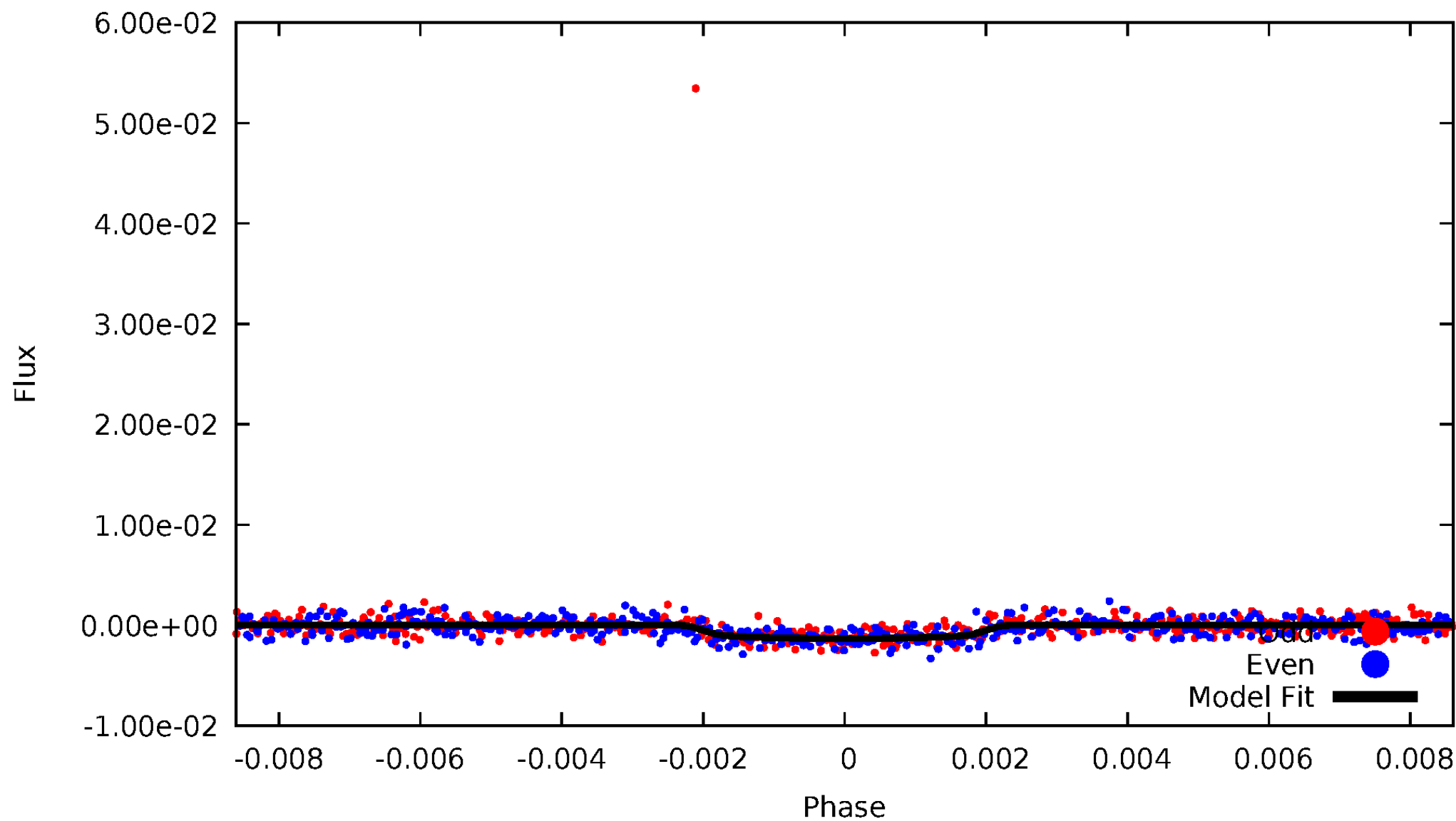


TCE 004139816-03



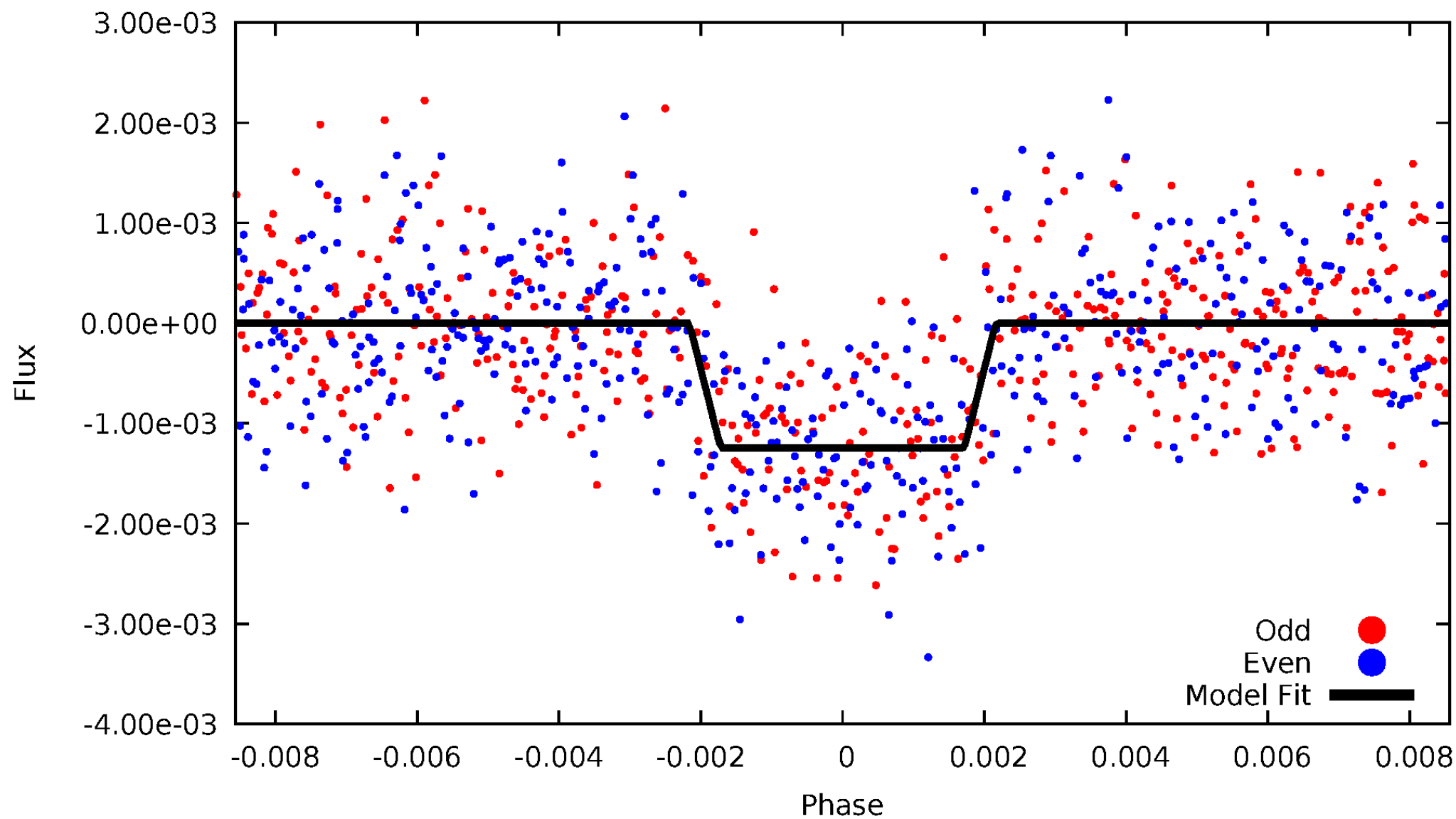
DV Odd/Even

TCE 004139816-03



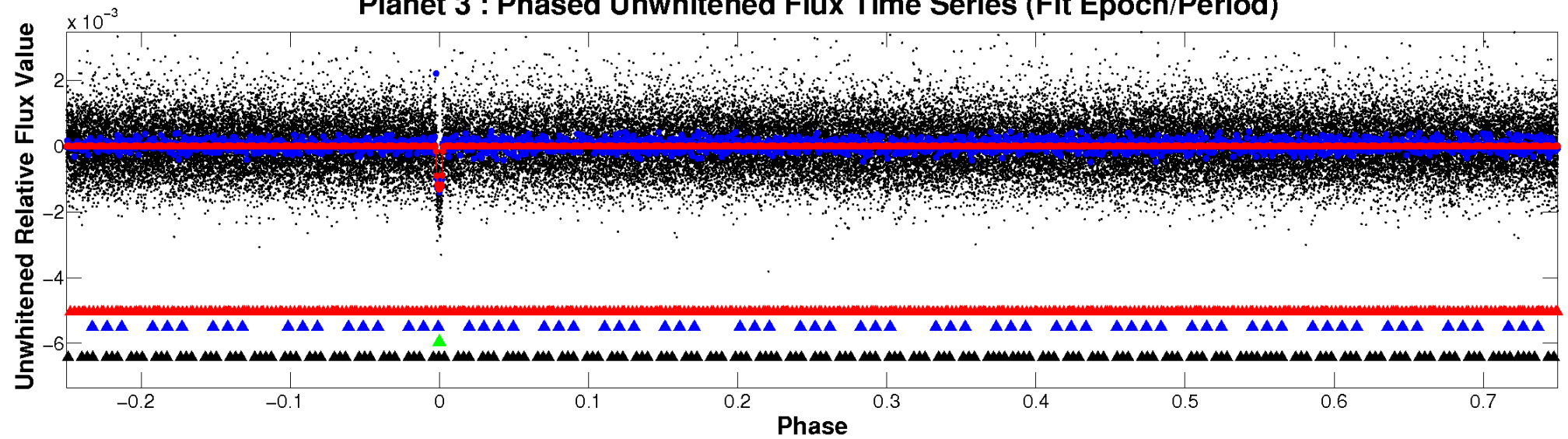
ALT Odd/Even

TCE 004139816-03

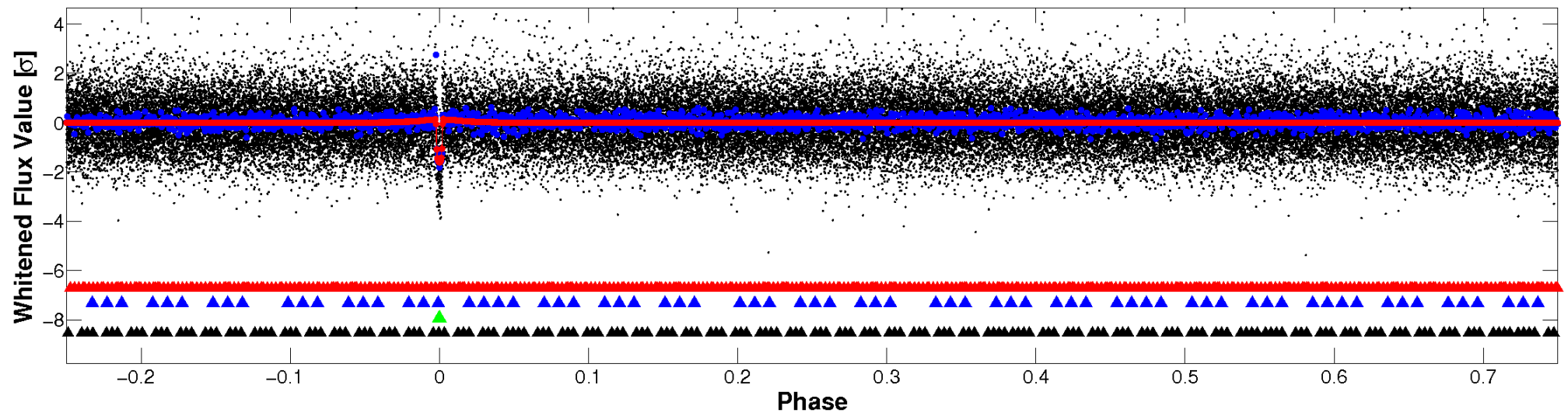


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

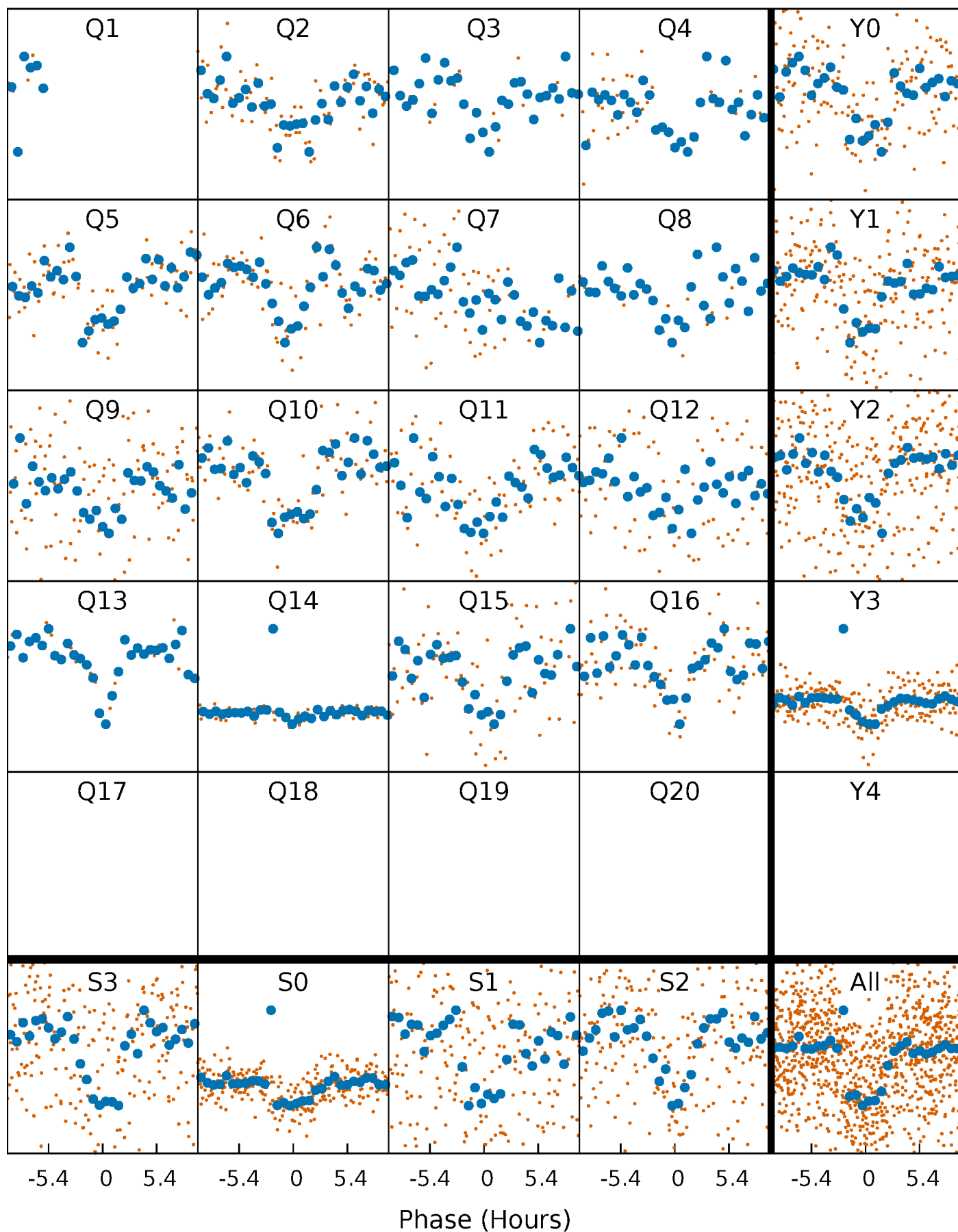


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



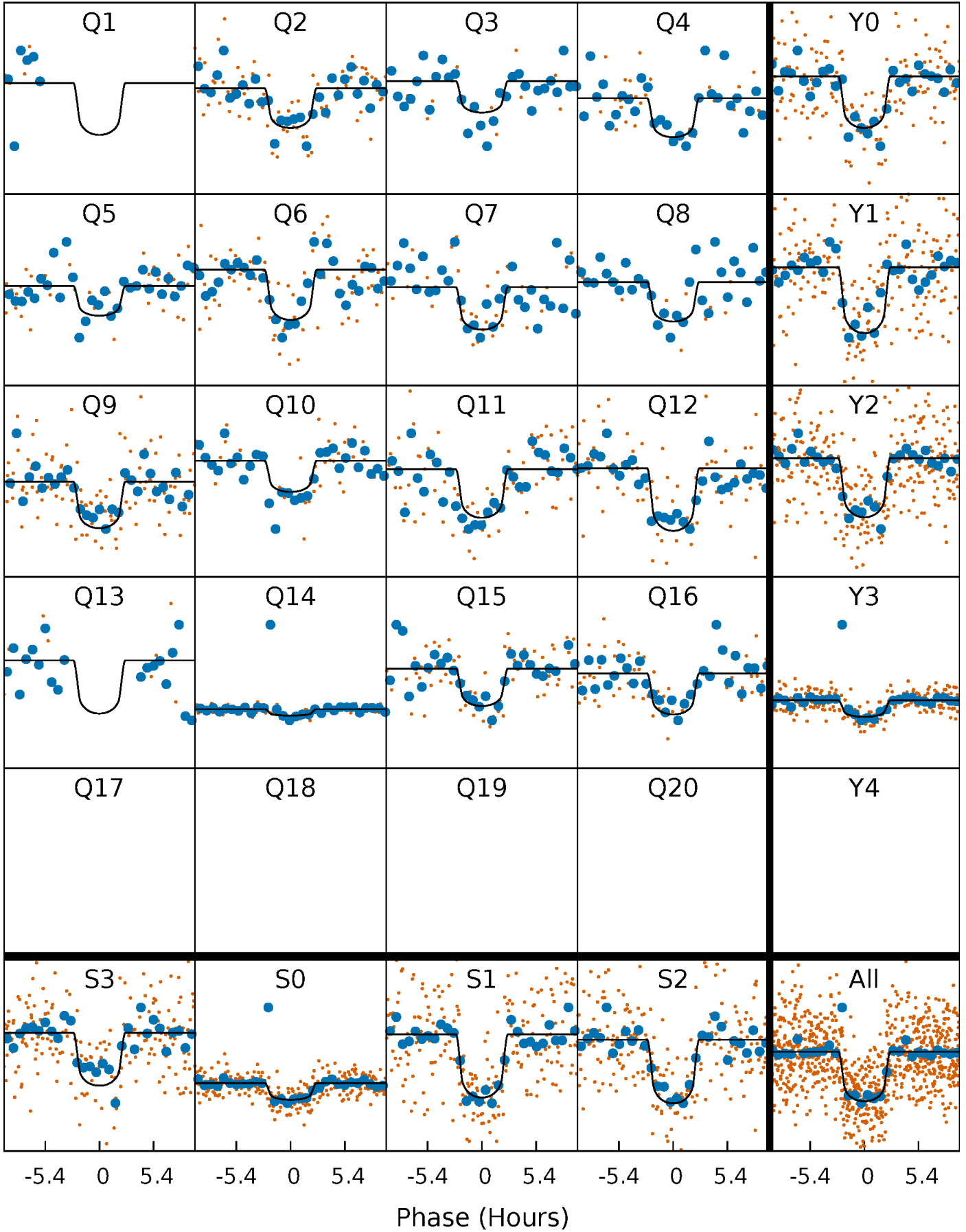
PDC Quarter-Phased Transit Curves

TCE 004139816-03 P= 46.184467 Days $T_0=165.234382$ (BKJD)



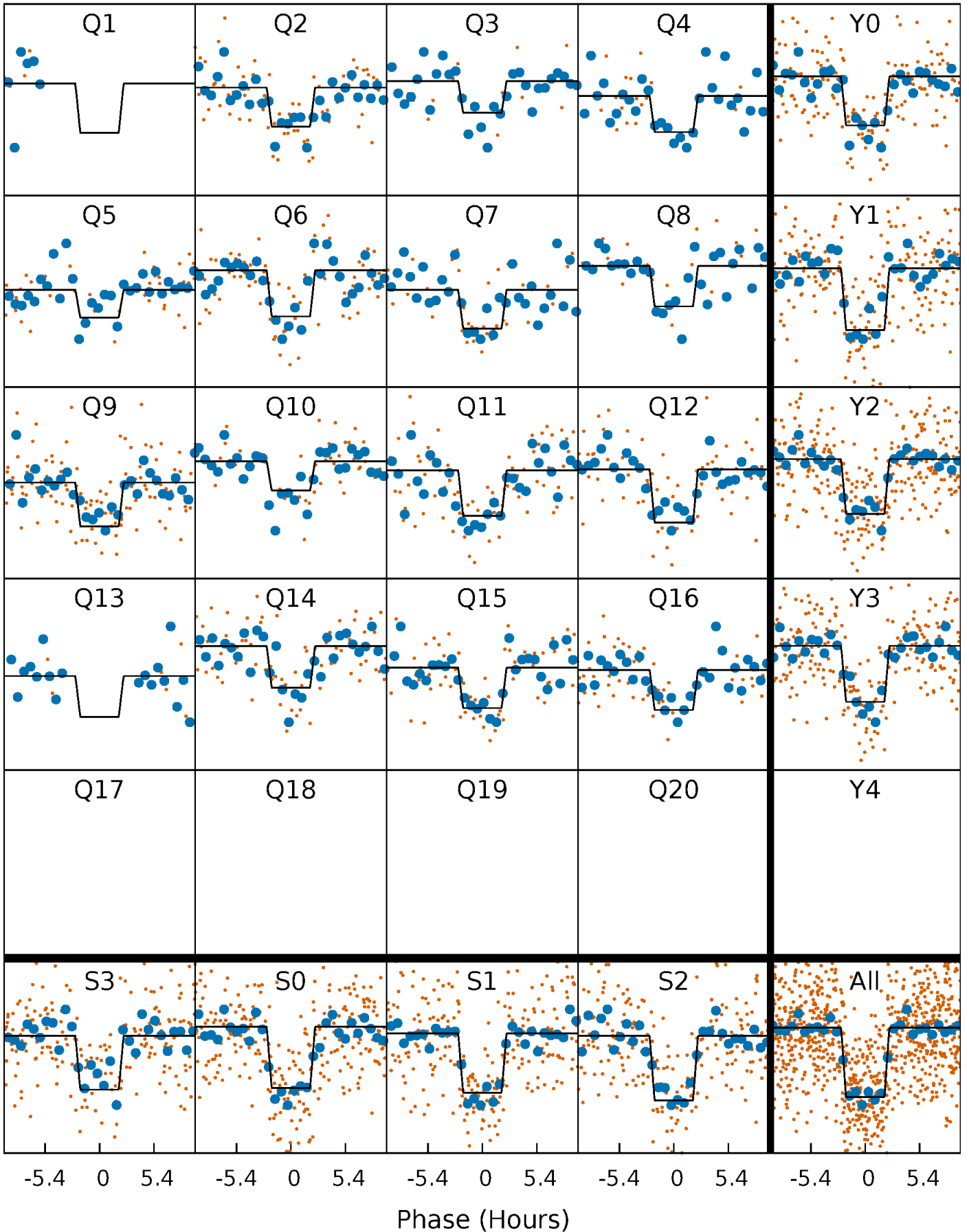
DV Quarter-Phased Transit Curves

TCE 004139816-03 P= 46.184467 Days $T_0=165.234382$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

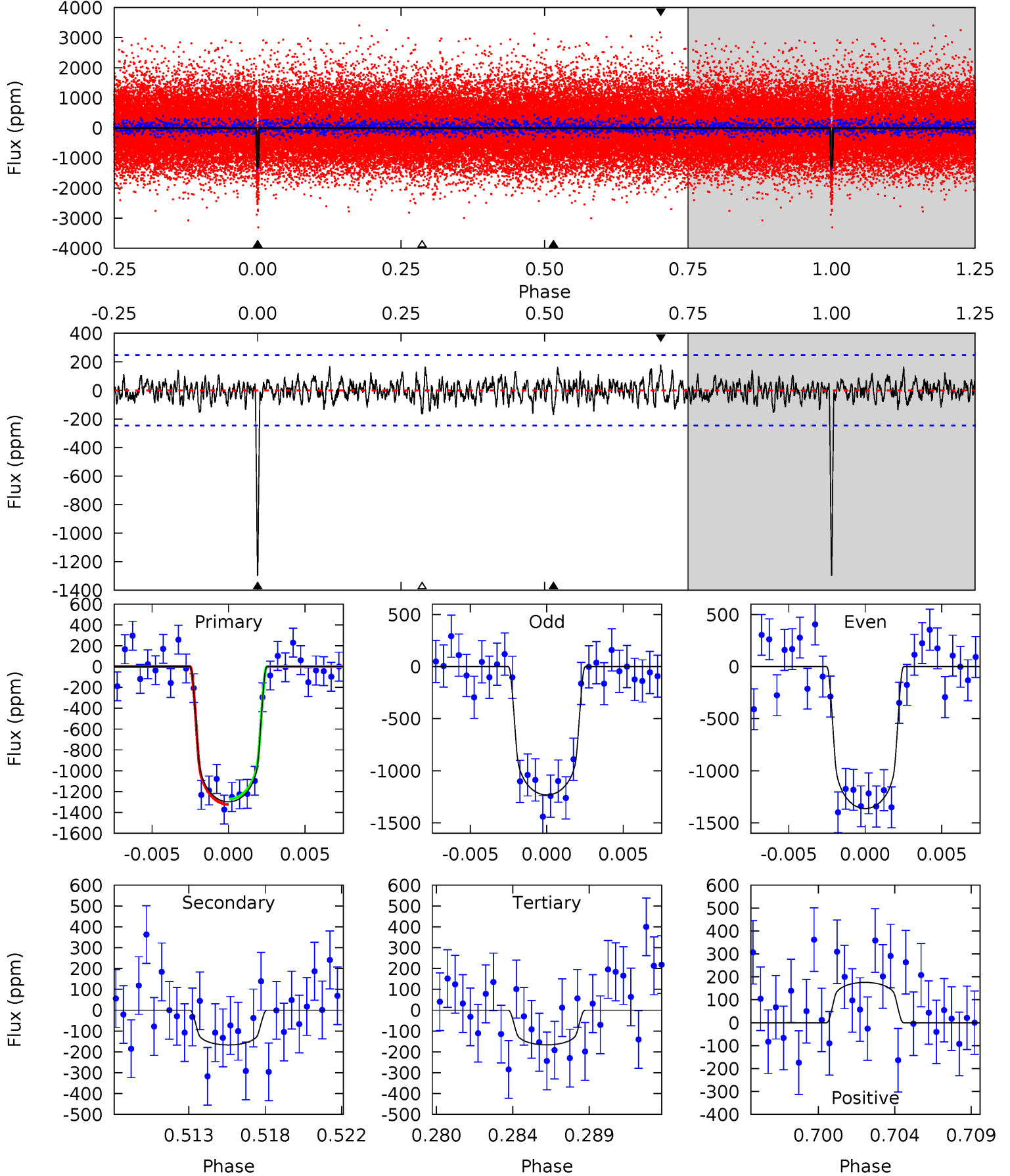
TCE 004139816-03 P= 46.184623 Days $T_0=165.231907$ (BKJD)



DV Model-Shift Uniqueness Test

004139816-03, $P = 46.184467$ Days, $E = 119.049915$ Days

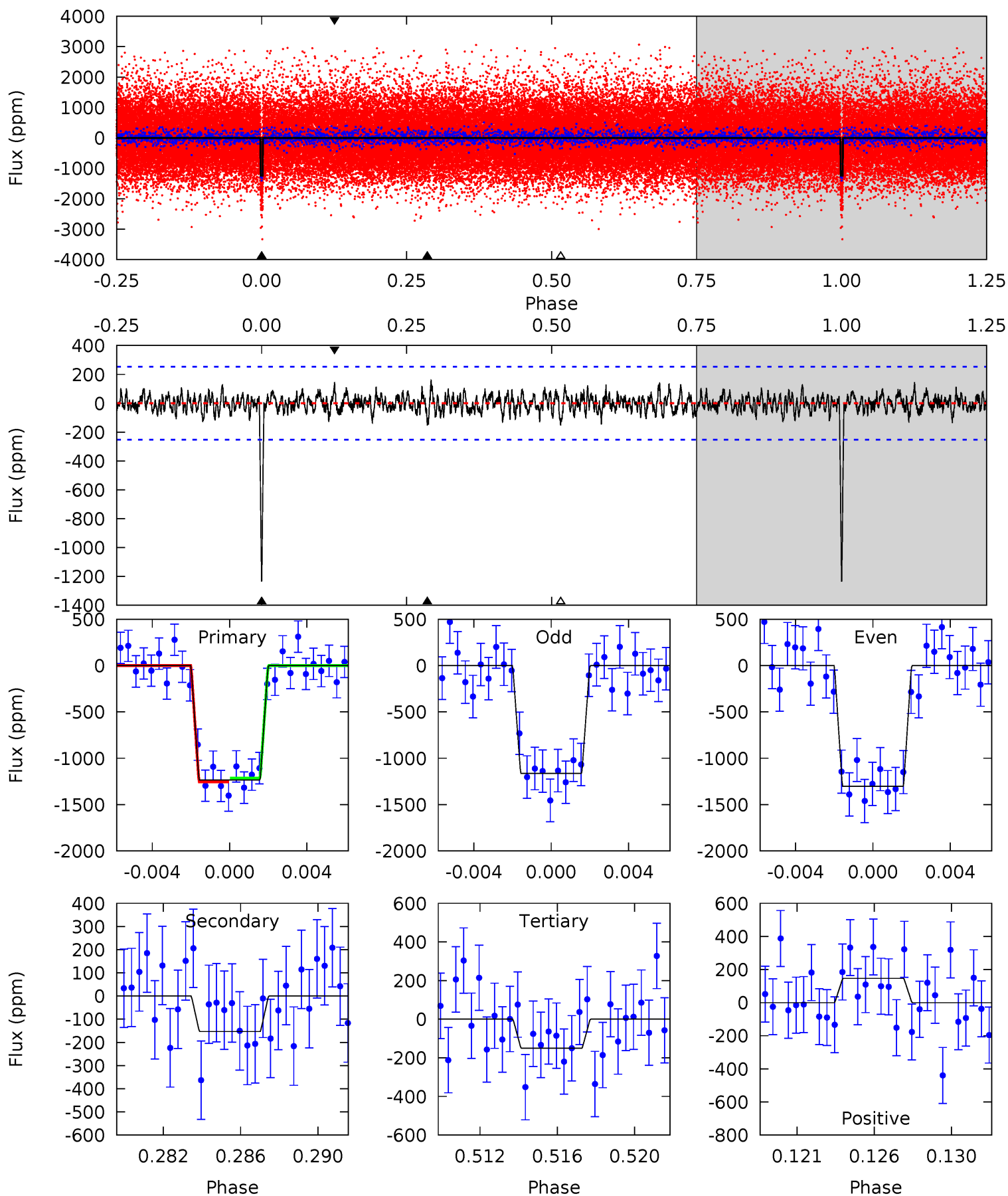
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.3	3.51	3.49	3.69	5.17	2.83	1.15	23.8	23.6	0.01	-0.19	1.37	0.99	0.12	0.53



Alt Model-Shift Uniqueness Test

004139816-03, P = 46.184623 Days, E = 119.047284 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.4	3.14	3.10	3.00	5.18	2.85	1.00	22.3	22.4	0.05	0.14	1.44	0.96	0.11	0.44



Stellar Parameters For KIC 004139816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3950^{+70}_{-86}	$4.754^{+0.042}_{-0.031}$	$-0.460^{+0.150}_{-0.150}$	$0.493^{+0.033}_{-0.040}$	$0.502^{+0.031}_{-0.038}$	$5.920^{+1.261}_{-0.715}$
	+2%/-2%	+1%/-1%	+33%/-33%	+7%/-8%	+6%/-8%	+21%/-12%
Source	SPE70	SPE60	SPE70	DSEP		

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

Secondary Eclipse Parameters for KIC 004139816-03 / KOI 0812.03

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-167 ± 48	$1.89^{+0.67}_{-0.72}$	380^{+10}_{-9}	2878^{+468}_{-257}	1010^{+1893}_{-500}
Alt.	-153 ± 49	$1.83^{+0.70}_{-0.67}$	381^{+9}_{-10}	2877^{+413}_{-285}	991^{+1498}_{-537}

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 $A_{obs} \gg 1.0$

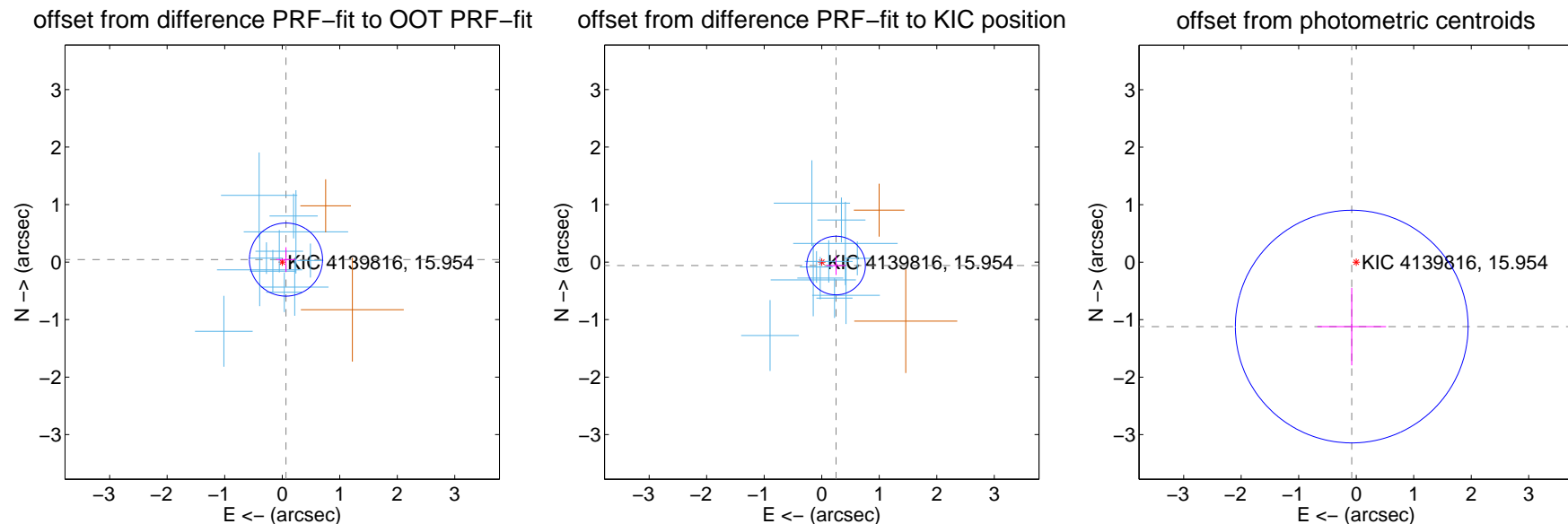
DV Centroid Data

Supplemental centroid analysis for 004139816-03. Kepler magnitude: 15.95. Transit SNR 20.64

There are 11 quarters with good PRF difference image offsets

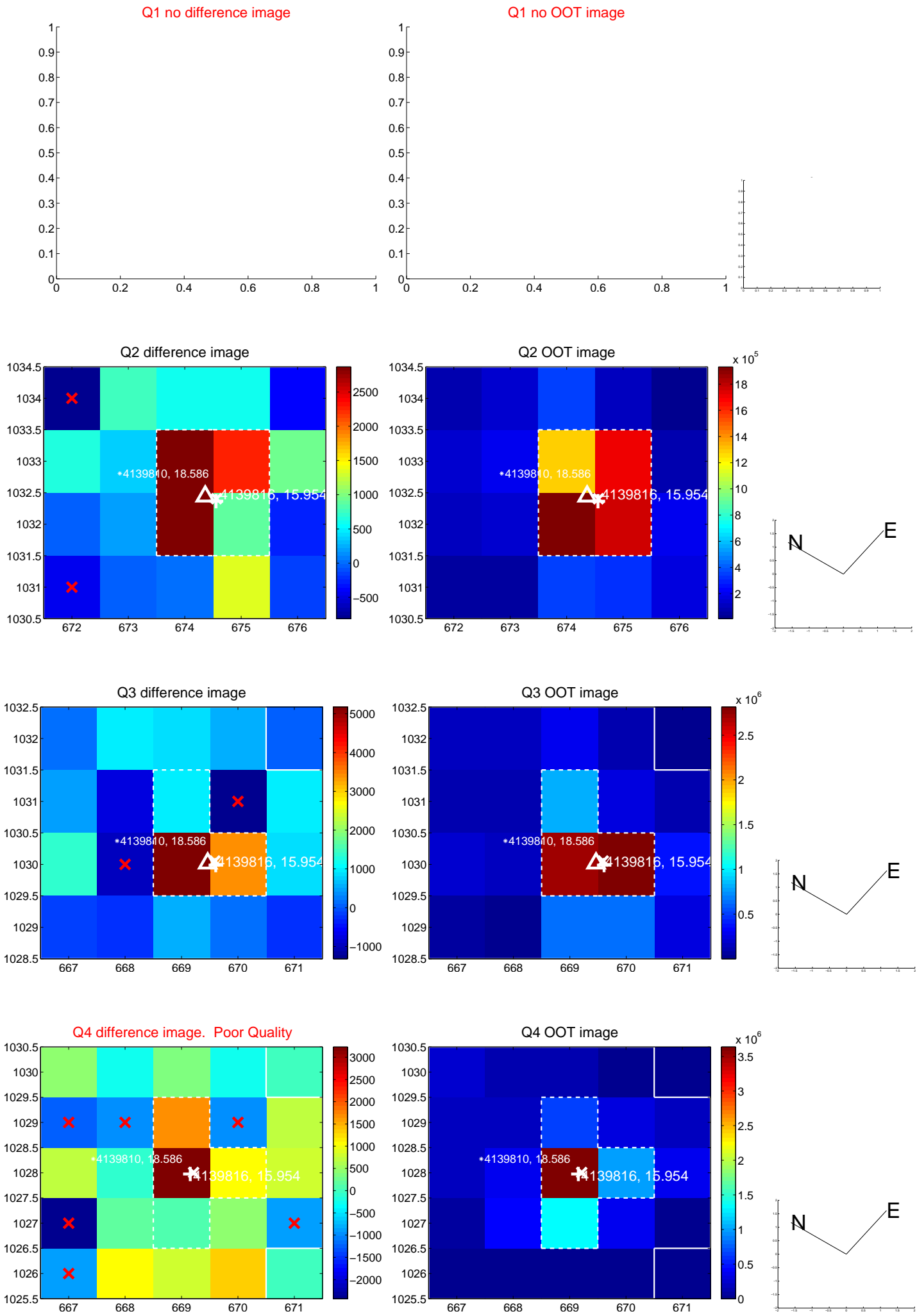
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.079 ± 0.212	0.37	-0.065 ± 0.169	0.044 ± 0.215
PRF-fit source offset from KIC position	0.257 ± 0.170	1.51	-0.250 ± 0.170	-0.060 ± 0.165
photometric centroid source offset	1.12 ± 0.67	1.67	0.08 ± 0.60	-1.12 ± 0.67

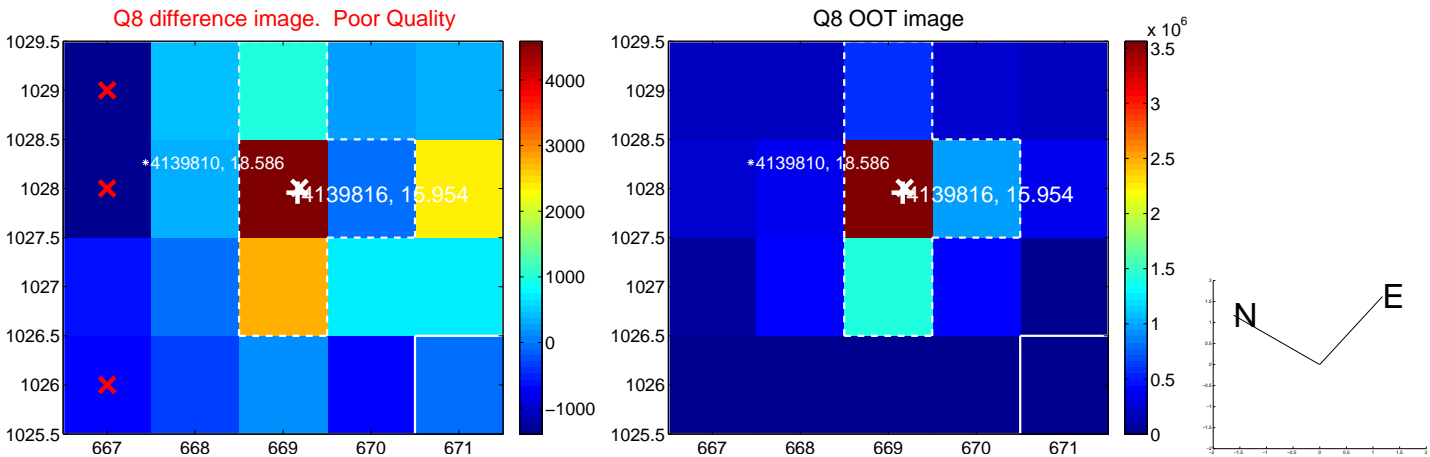
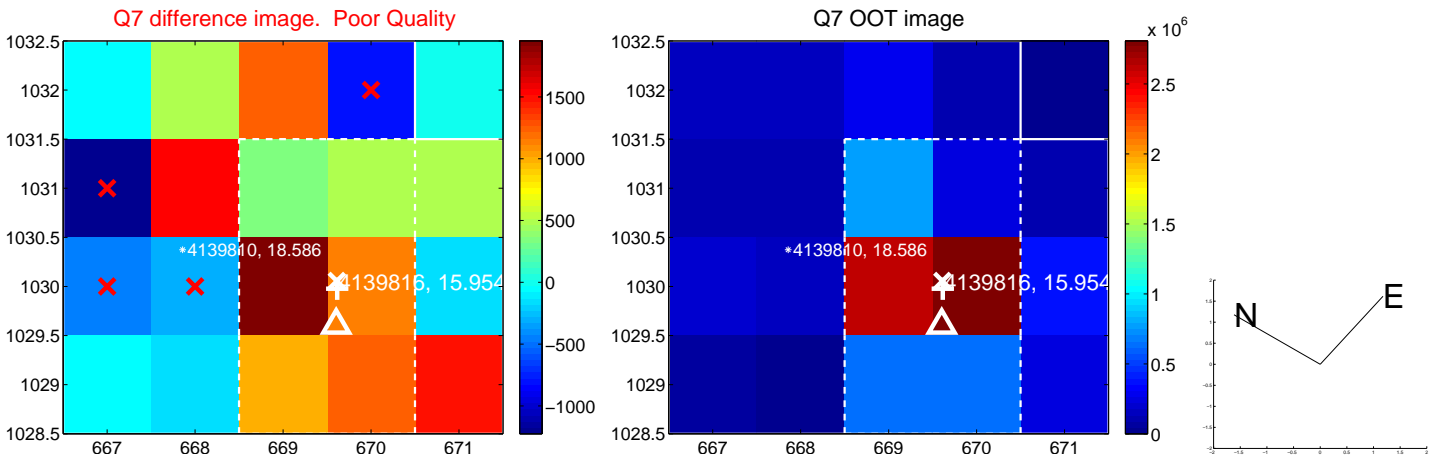
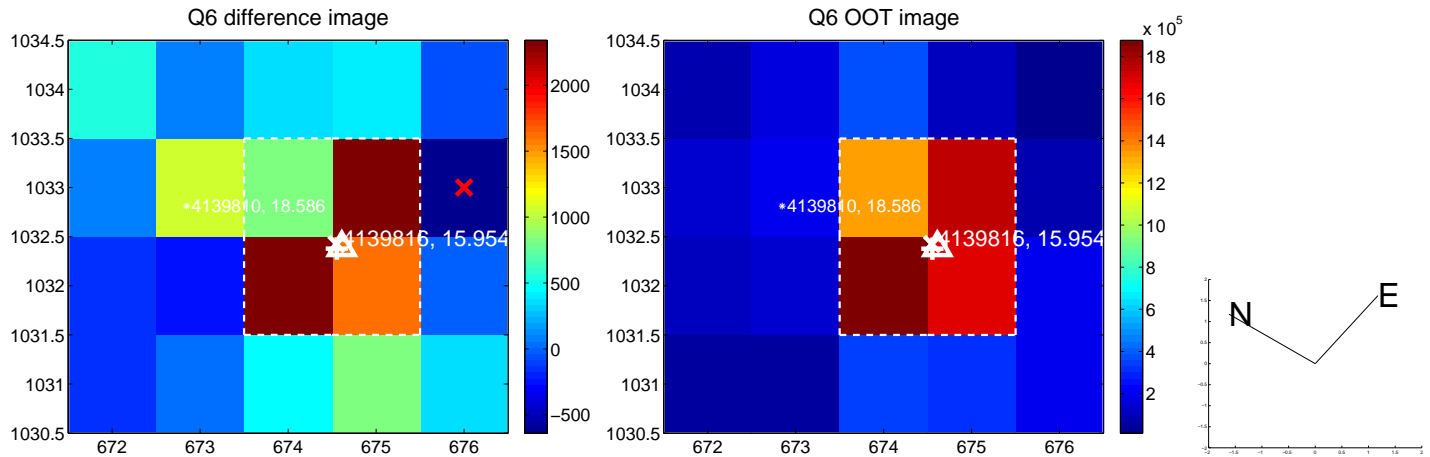
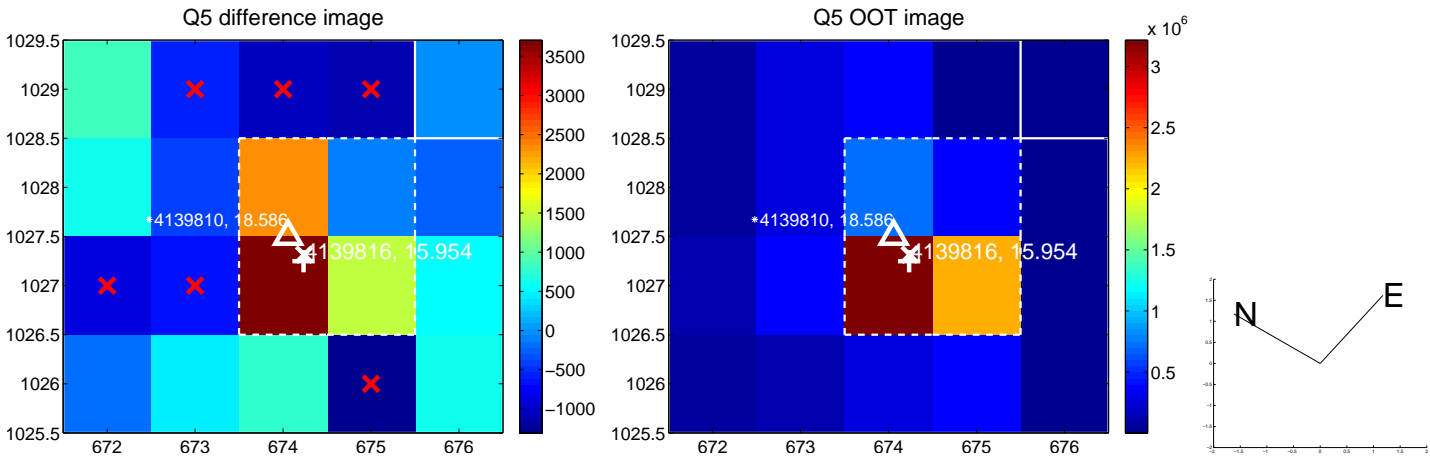


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

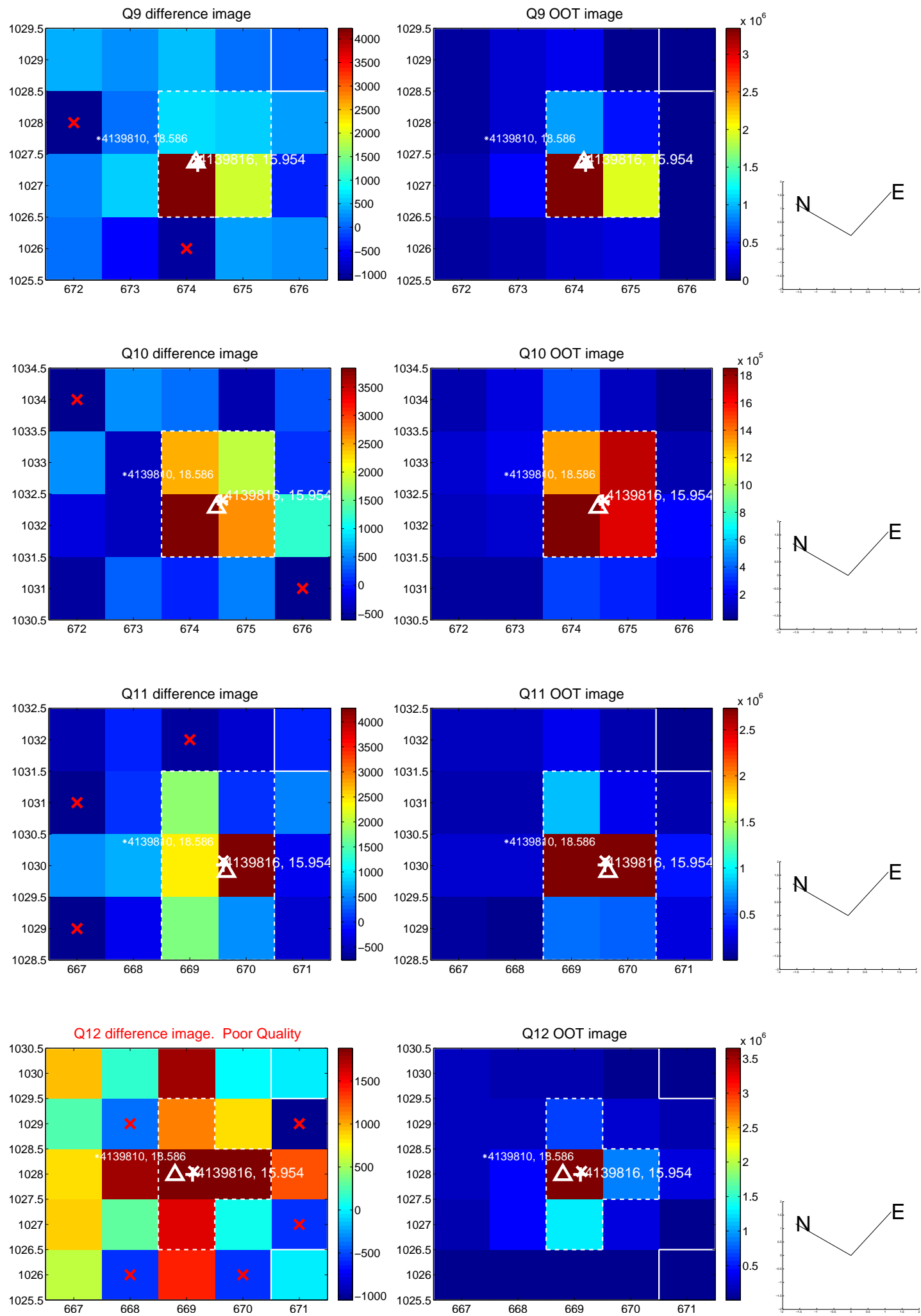
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



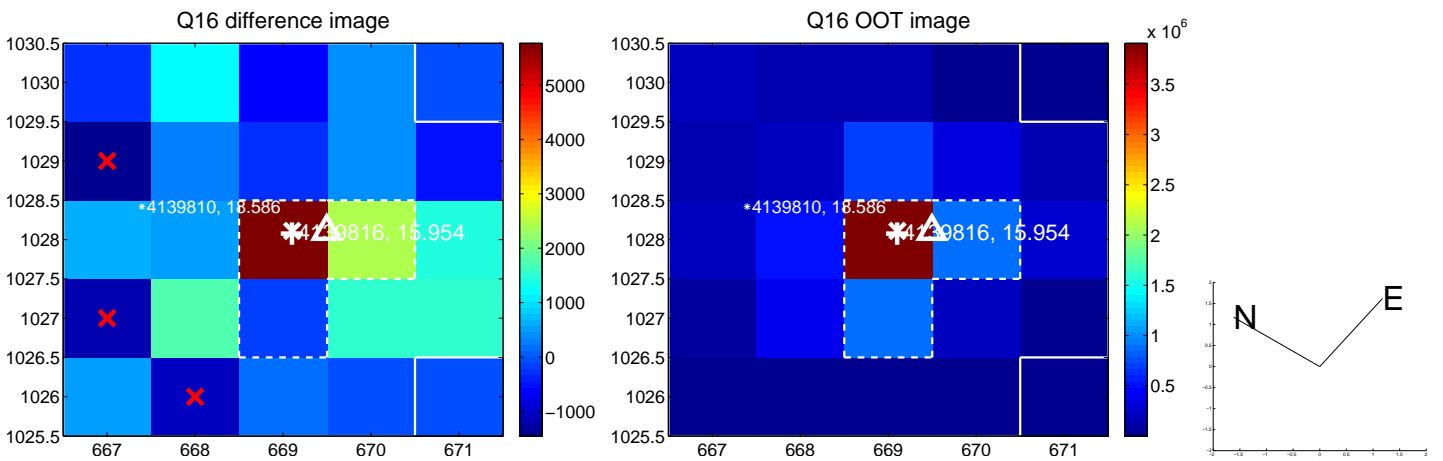
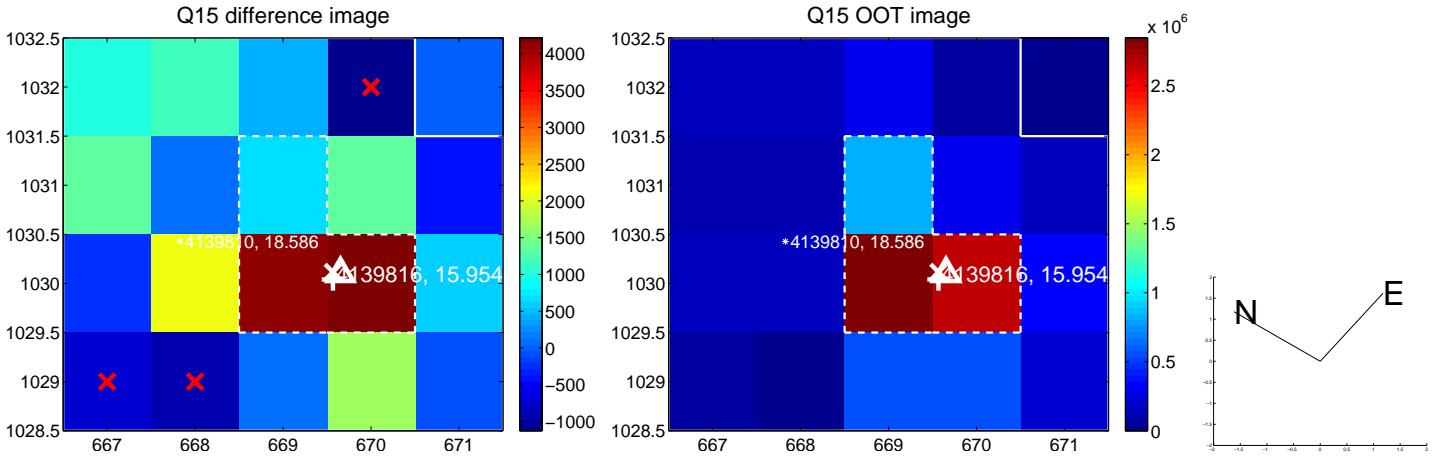
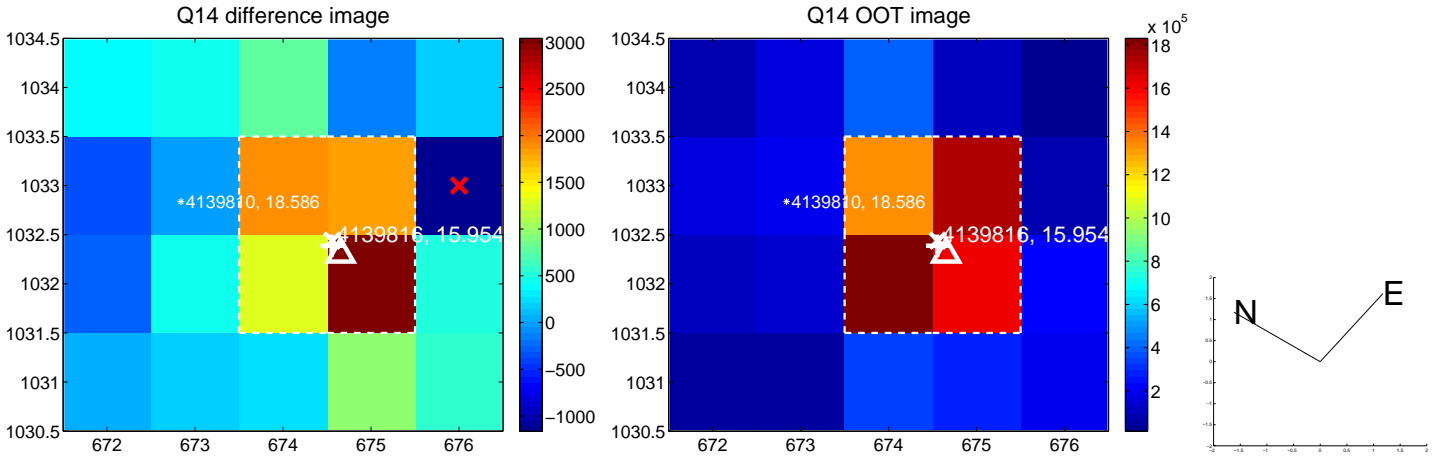
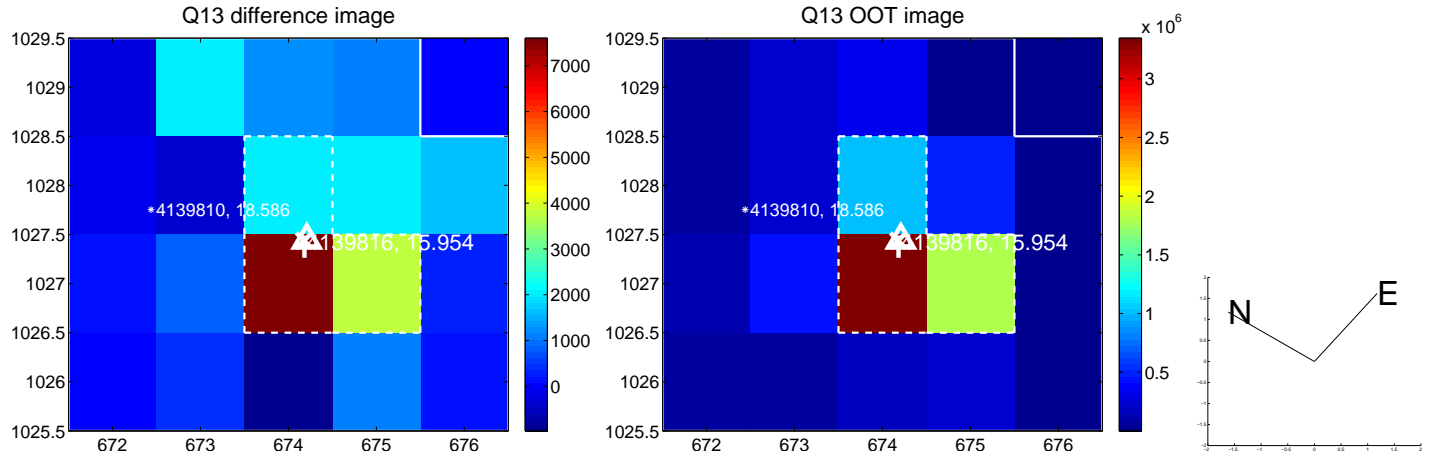
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



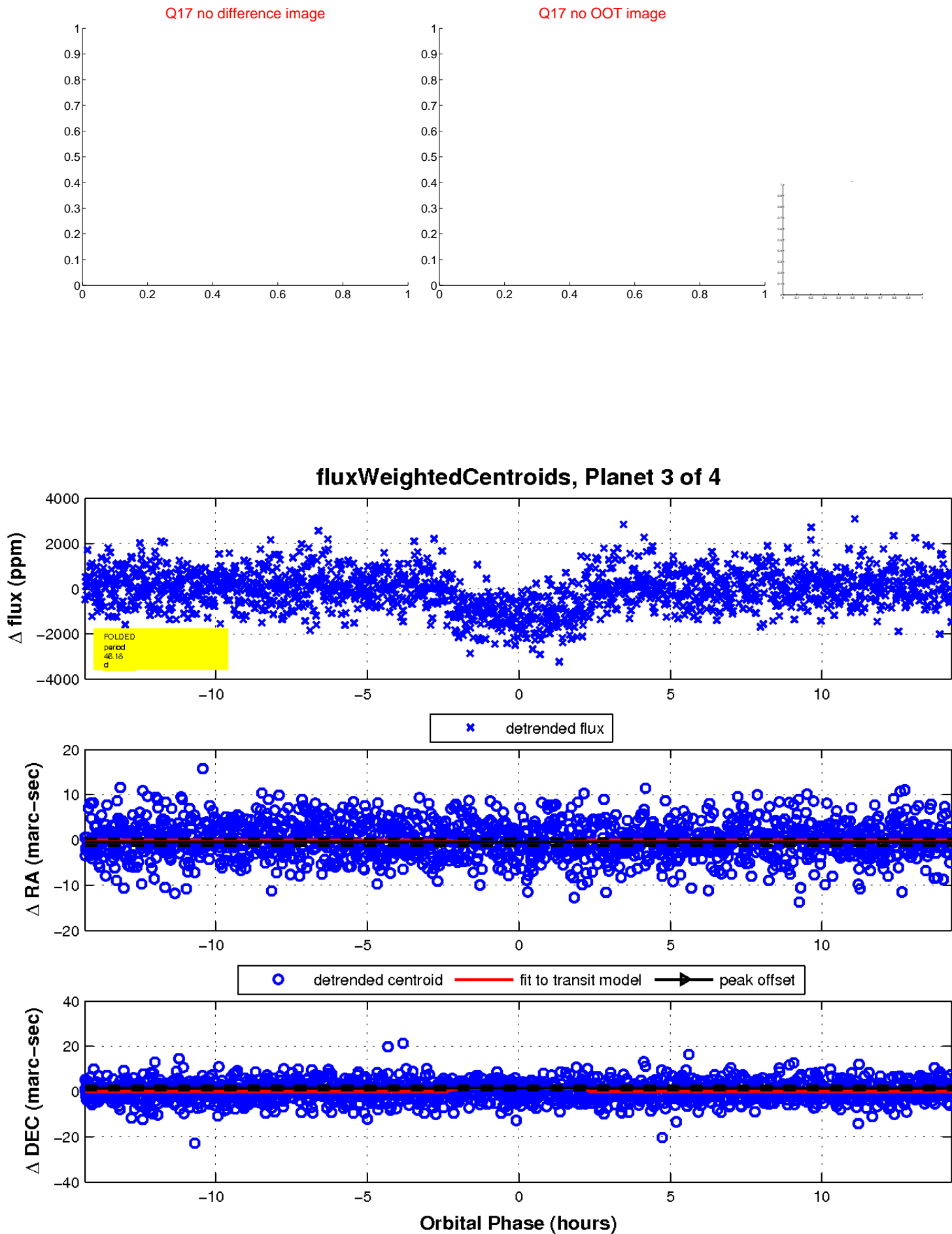
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

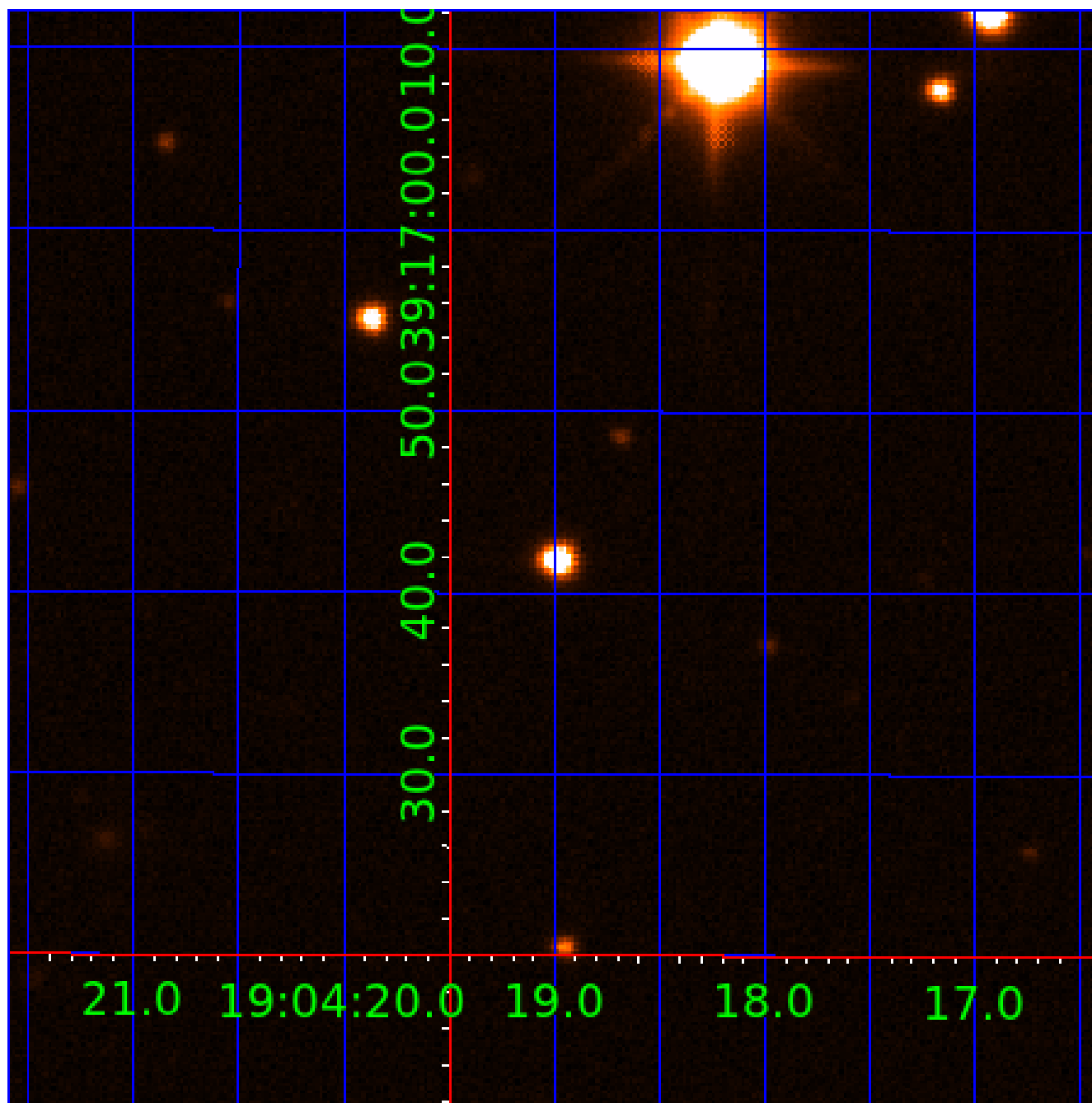


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004139816

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})
004139816-01	OBS	0812.01	3.340219	131.896558	1617.9	2.155	58.2	65.4	0.49	3950	2.35	43.80
004139816-02	OBS	0812.02	20.060415	147.463520	1513.7	3.285	27.2	28.3	0.49	3950	2.03	4.01
004139816-03	OBS	0812.03	46.184467	165.234382	1317.1	4.768	18.0	20.6	0.49	3950	1.87	1.32
004139816-04	OBS	0812.04	7.824990	136.555262	493.3	2.215	12.6	13.5	0.49	3950	1.29	14.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004139816-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004139816-04	OBS	PC	0.99	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.

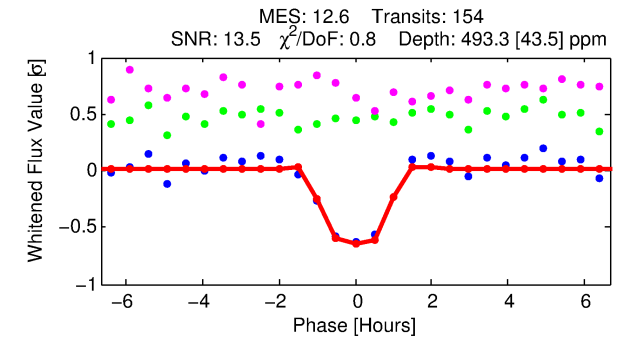
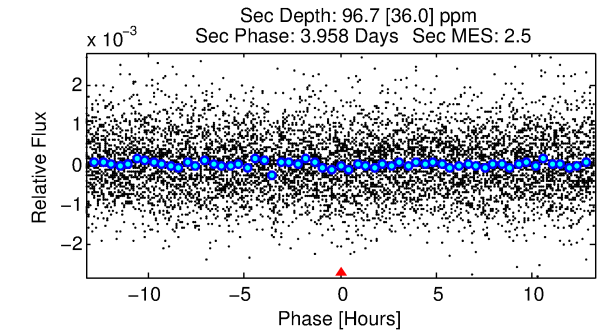
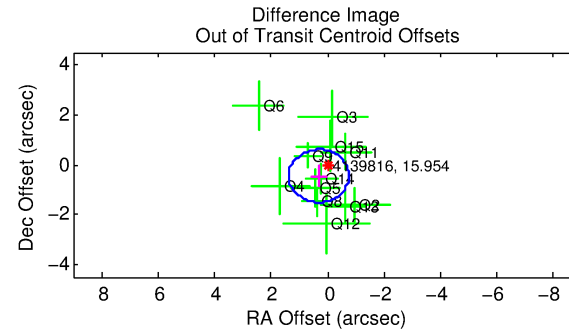
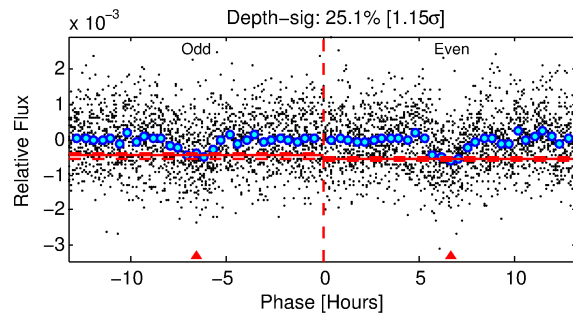
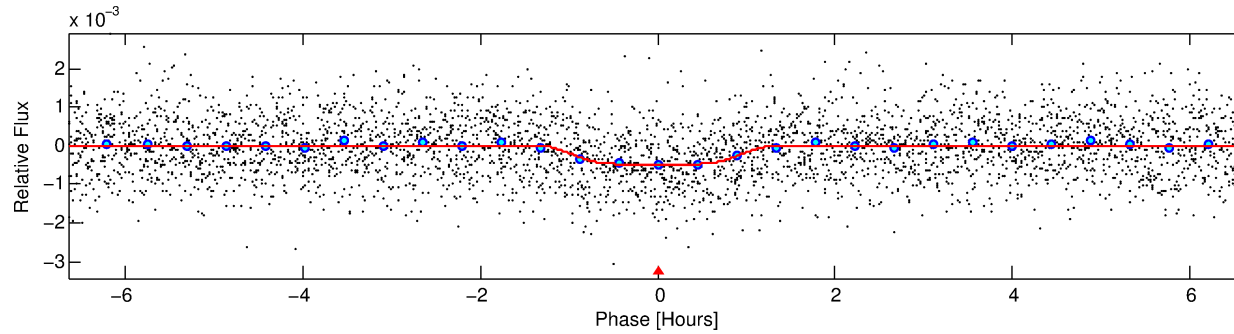
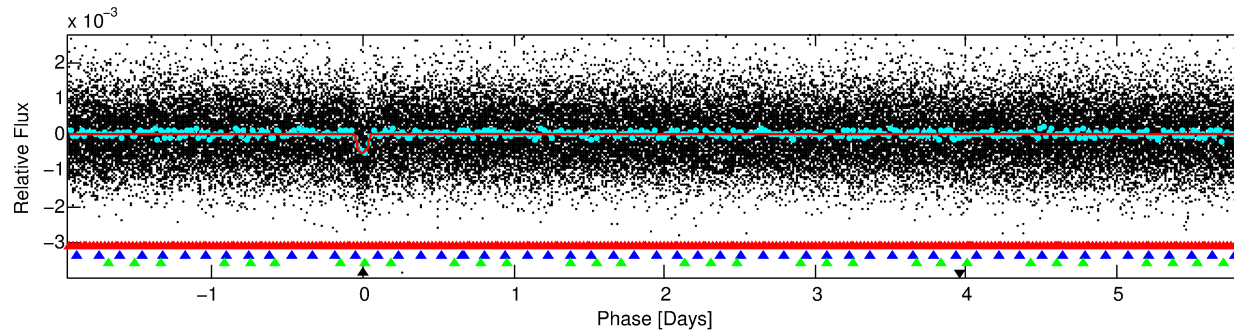
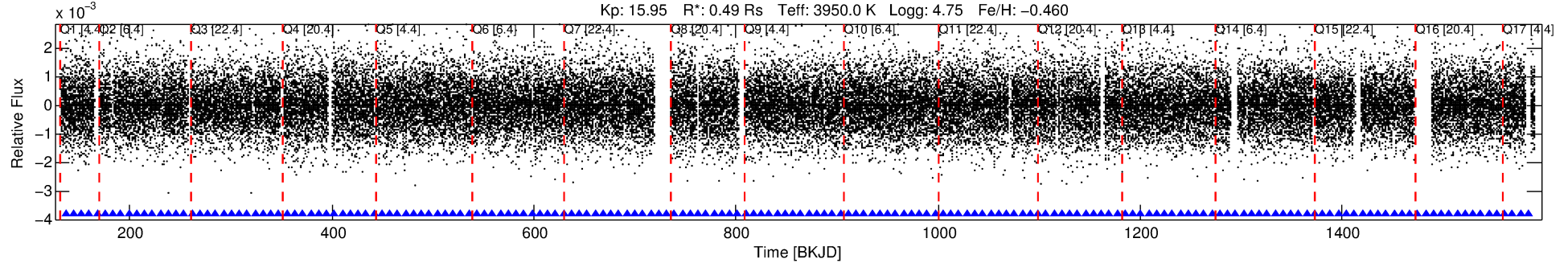
Ephemeris Match Information For 004139816-04

No Significant Match Found

DV One-Page Summary

KIC: 4139816 Candidate: 4 of 4 Period: 7.825 d
KOI: K00812.04 Name: Kepler-235c Corr: 0.979

Kp: 15.95 R*: 0.49 Rs Teff: 3950.0 K Logg: 4.75 Fe/H: -0.460



DV Fit Results:

Period = 7.82499 [0.00004] d
Epoch = 136.5553 [0.0035] BKJD
Rp/R* = 0.0240 [0.0073]
a/R* = 13.22 [19.57]
b = 0.90 [0.32]
Seff = 14.08 [1.70]
Teff = 494 [15] K
Rp = 1.29 [0.41] Re
a = 0.0614 [0.0039] AU
Ag = 120.13 [86.30] [1.38σ]
Teffp = 2528 [454] K [4.48σ]

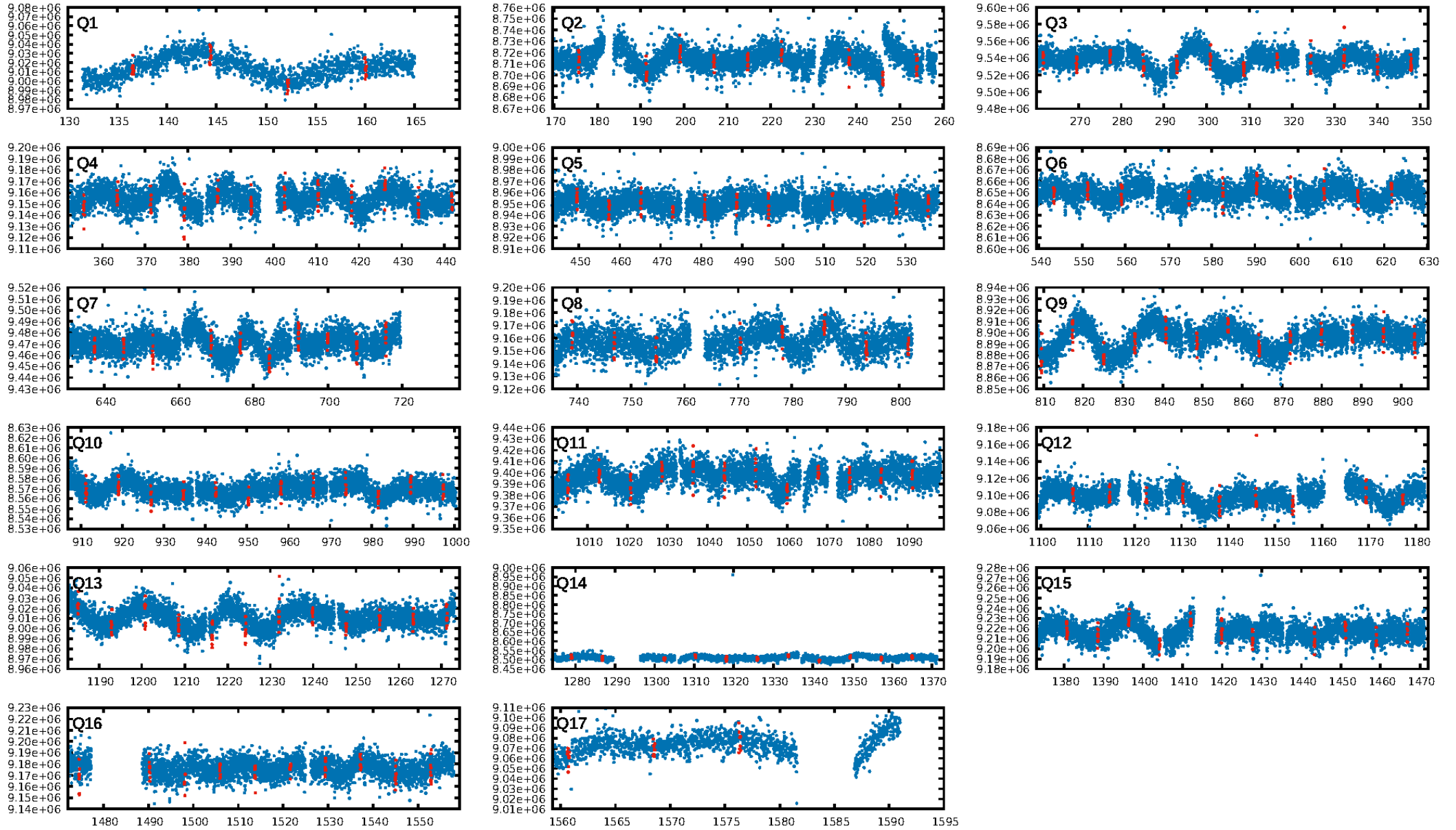
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [34.83σ]
LongPeriod-sig: 100.0% [74.12σ]
ModelChiSquare2-sig: 99.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.91e-36
RollingBand-fgt: 1.00 [147/147]
GhostDiagnostic-chr: 158.6
Centroid-sig: 4.8%
Centroid-so: 1.356 arcsec [1.38σ]
OotOffset-rm: 0.548 arcsec [1.55σ]
KicOffset-rm: 0.587 arcsec [1.49σ]
OotOffset-st: 3/3/3/3 [12]
KicOffset-st: 3/3/3/3 [12]
DiffImageQuality-fgm: 0.58 [7/12]
DiffImageOverlap-fno: 1.00 [17/17]

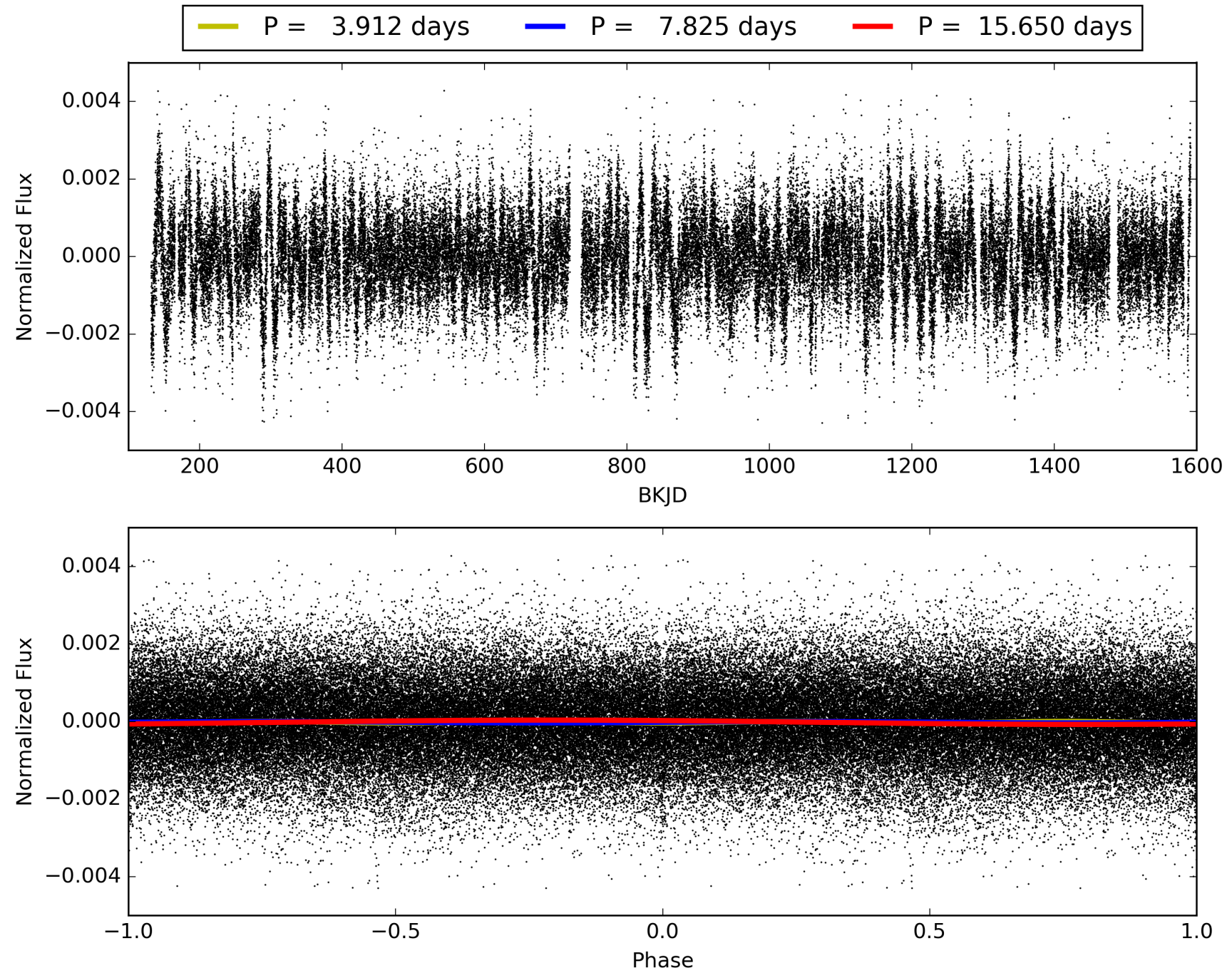
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:49:42 Z

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

TCE 004139816-04, PDC Light Curves

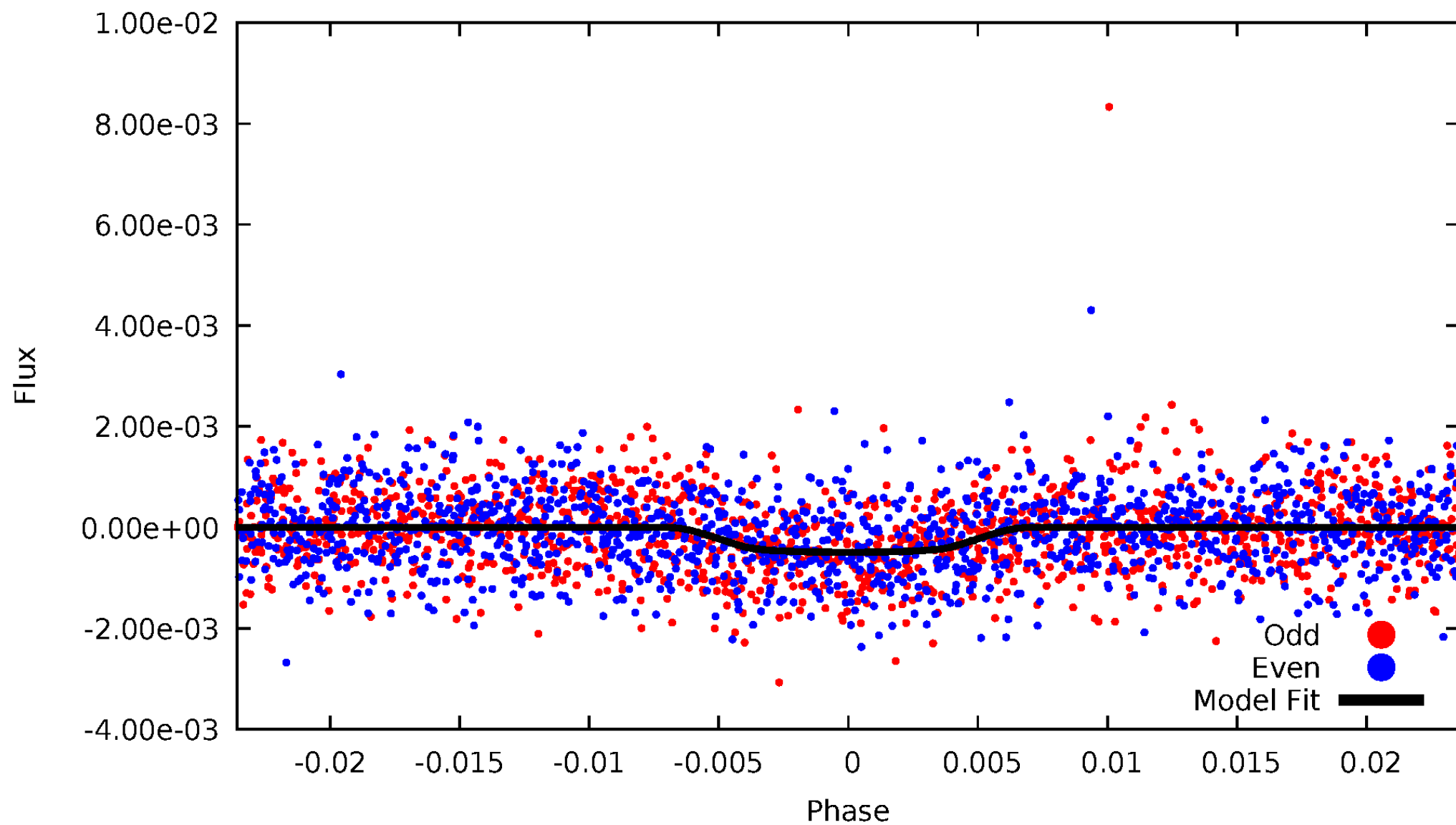


TCE 004139816-04



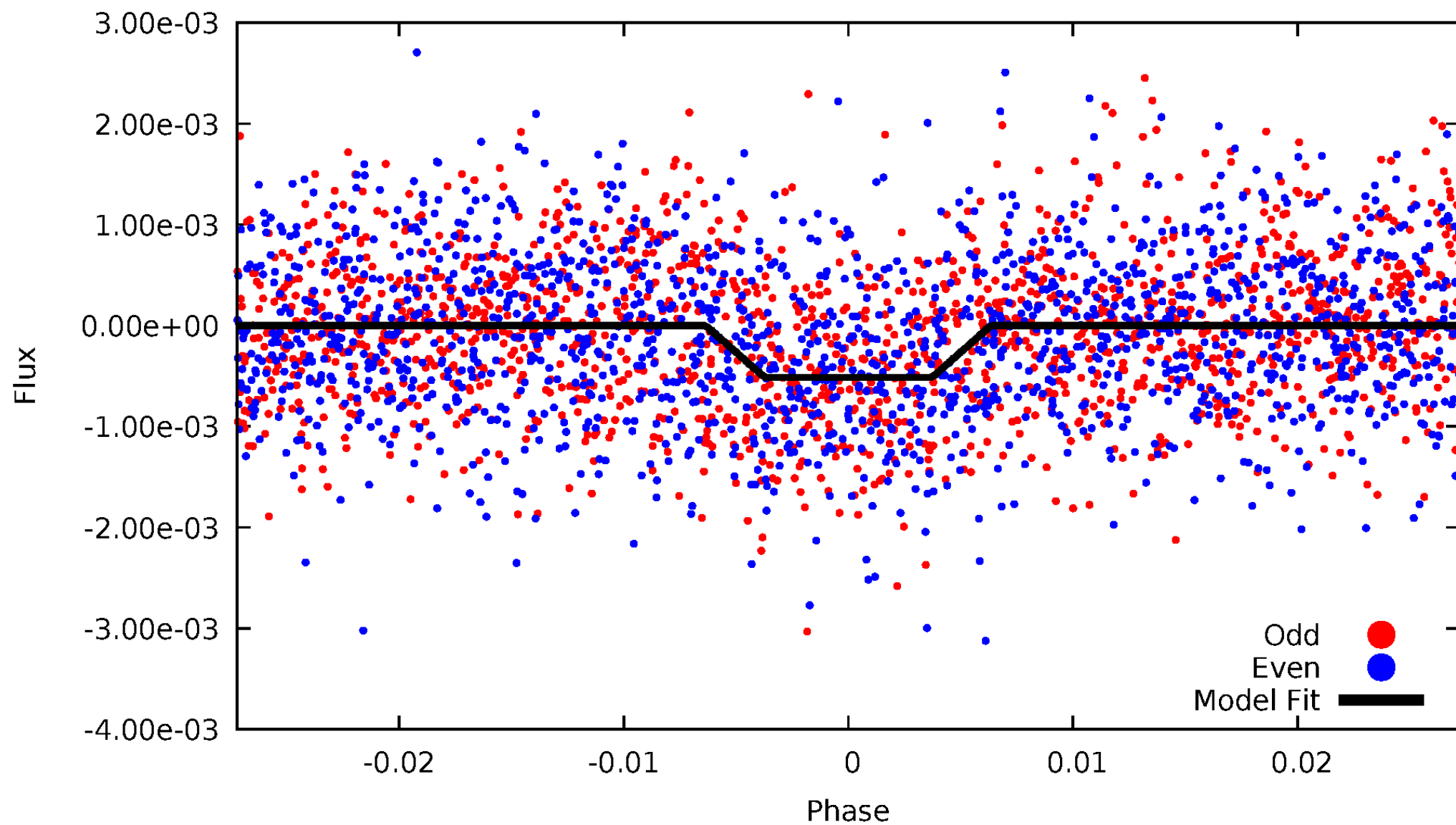
DV Odd/Even

TCE 004139816-04



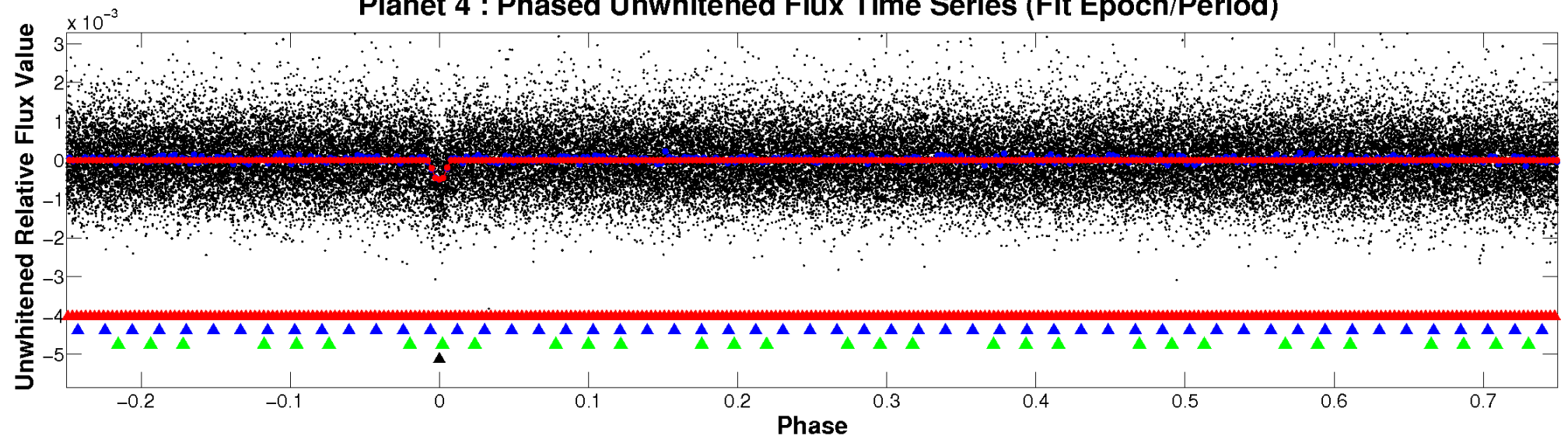
ALT Odd/Even

TCE 004139816-04

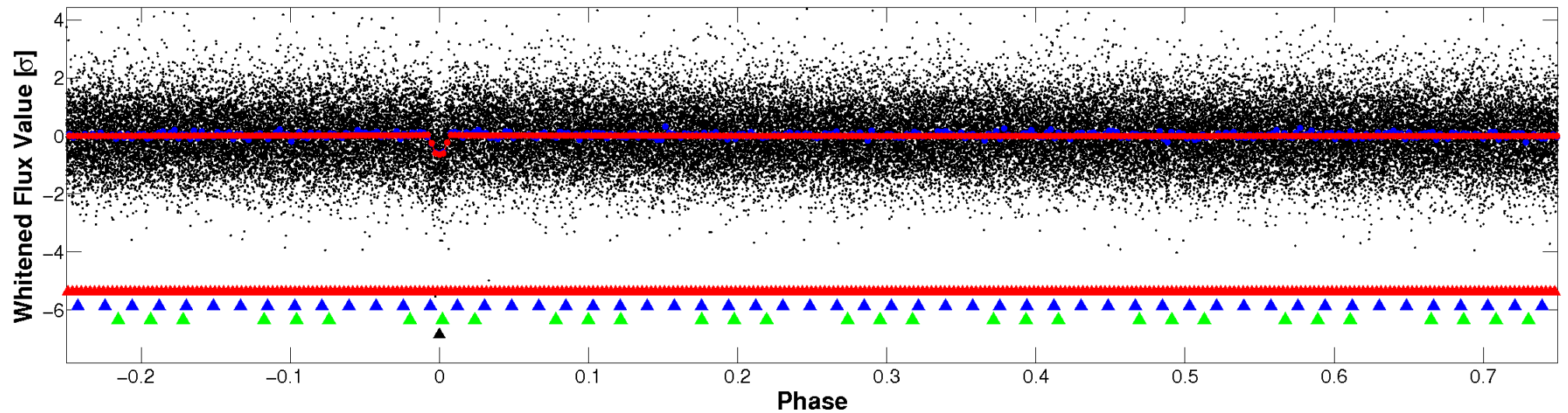


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

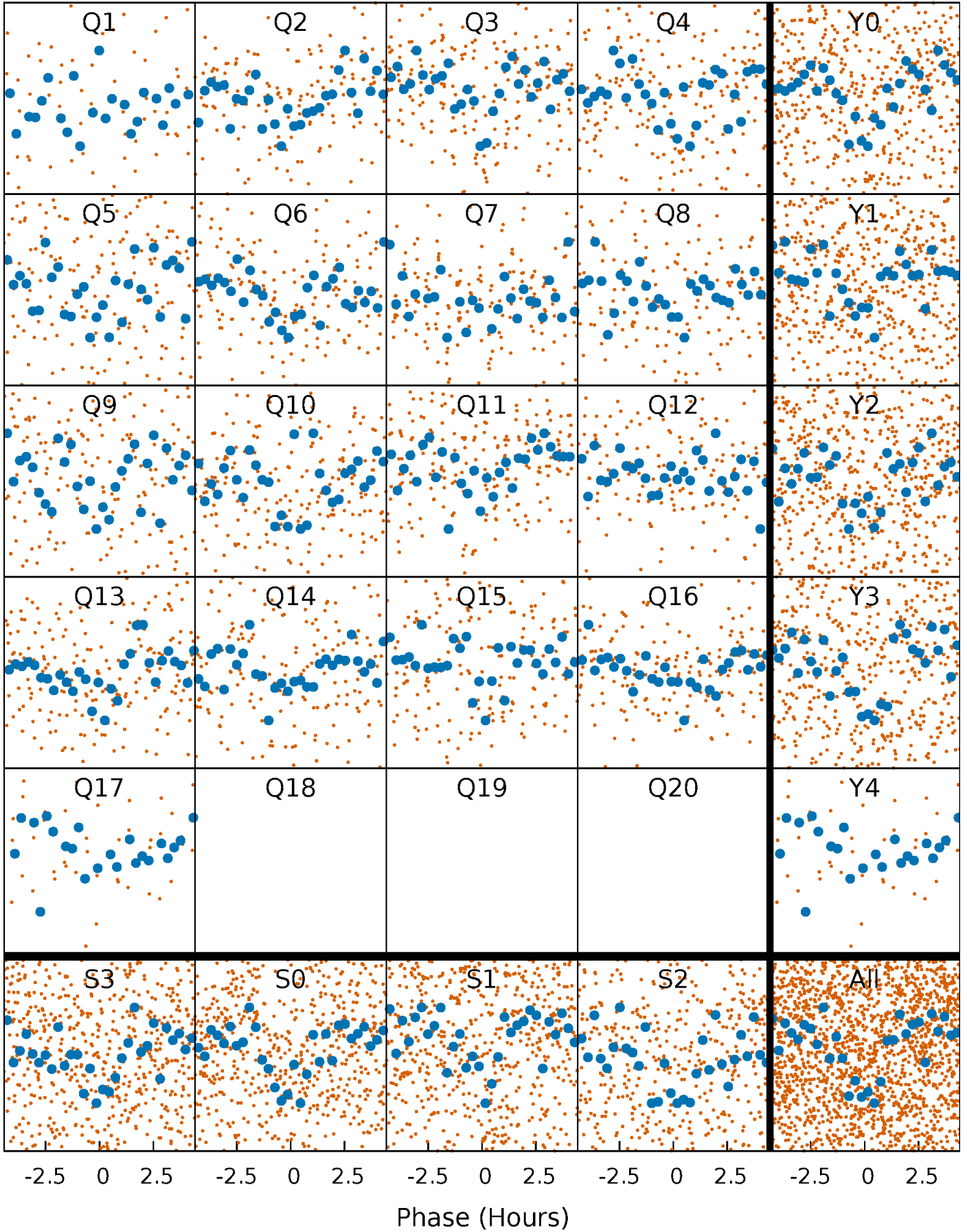


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



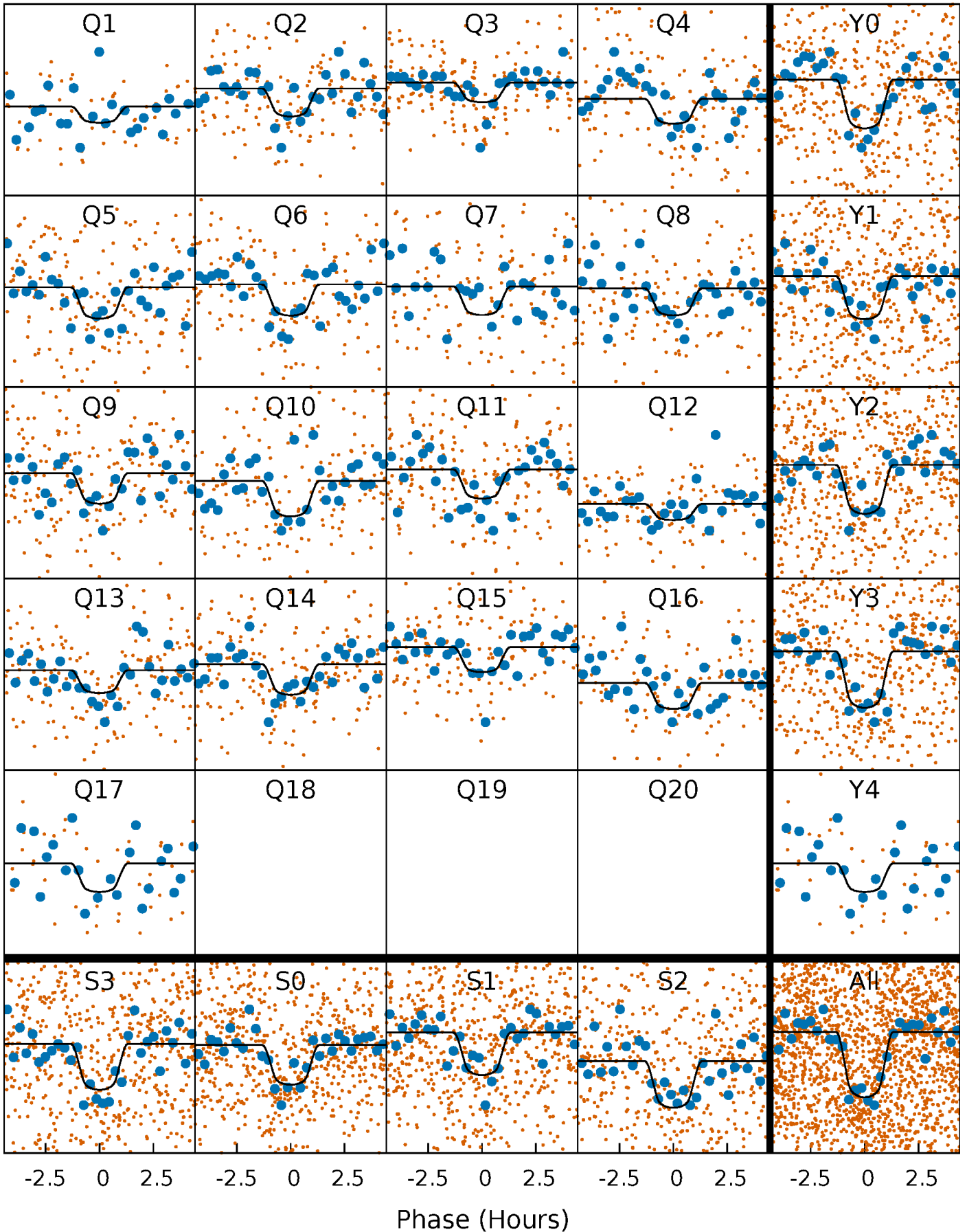
PDC Quarter-Phased Transit Curves

TCE 004139816-04 P= 7.824990 Days $T_0=136.555262$ (BKJD)



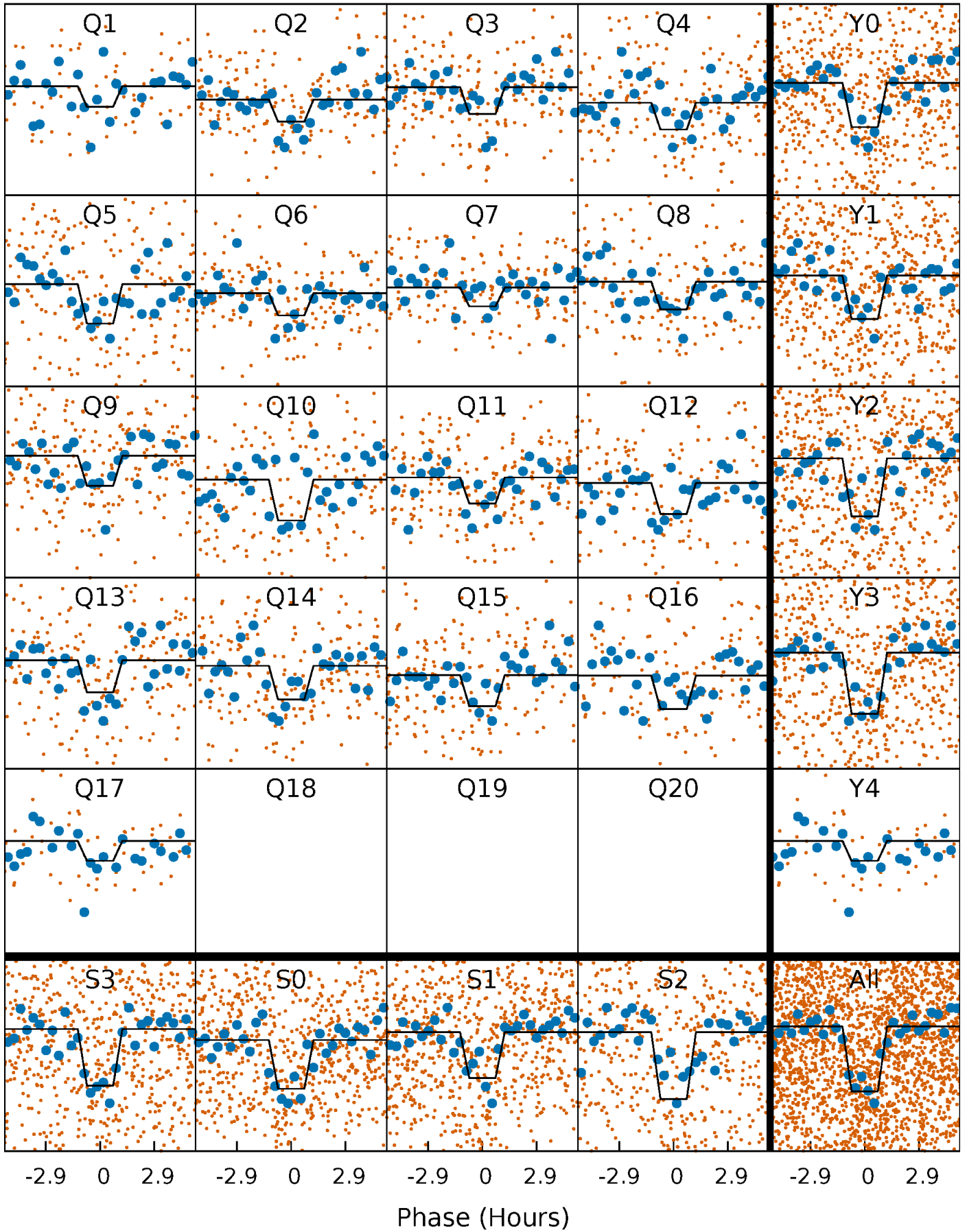
DV Quarter-Phased Transit Curves

TCE 004139816-04 $P = 7.824990$ Days $T_0 = 136.555262$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

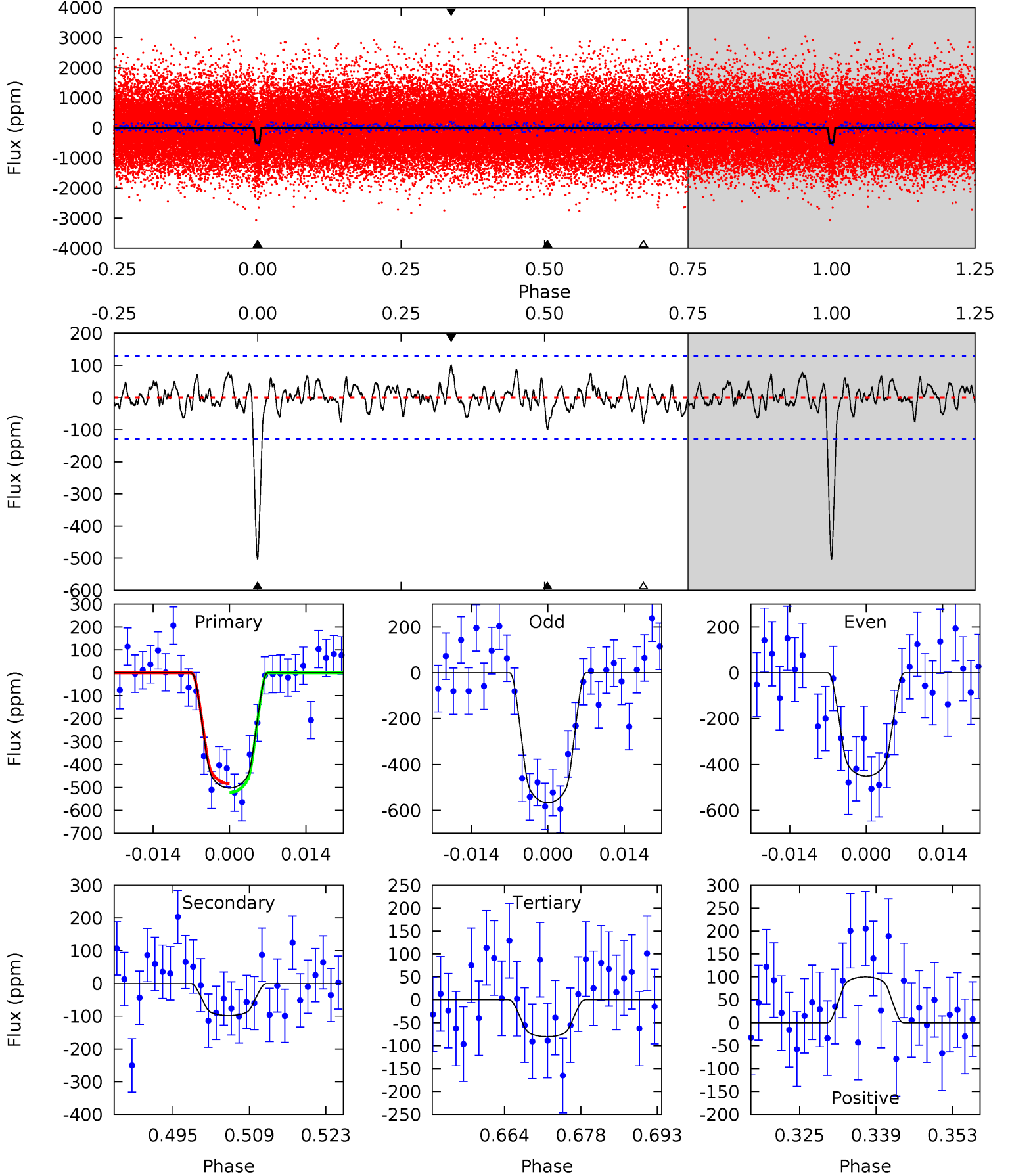
TCE 004139816-04 P= 7.825042 Days $T_0=136.547978$ (BKJD)



DV Model-Shift Uniqueness Test

004139816-04, P = 7.824990 Days, E = 128.730272 Days

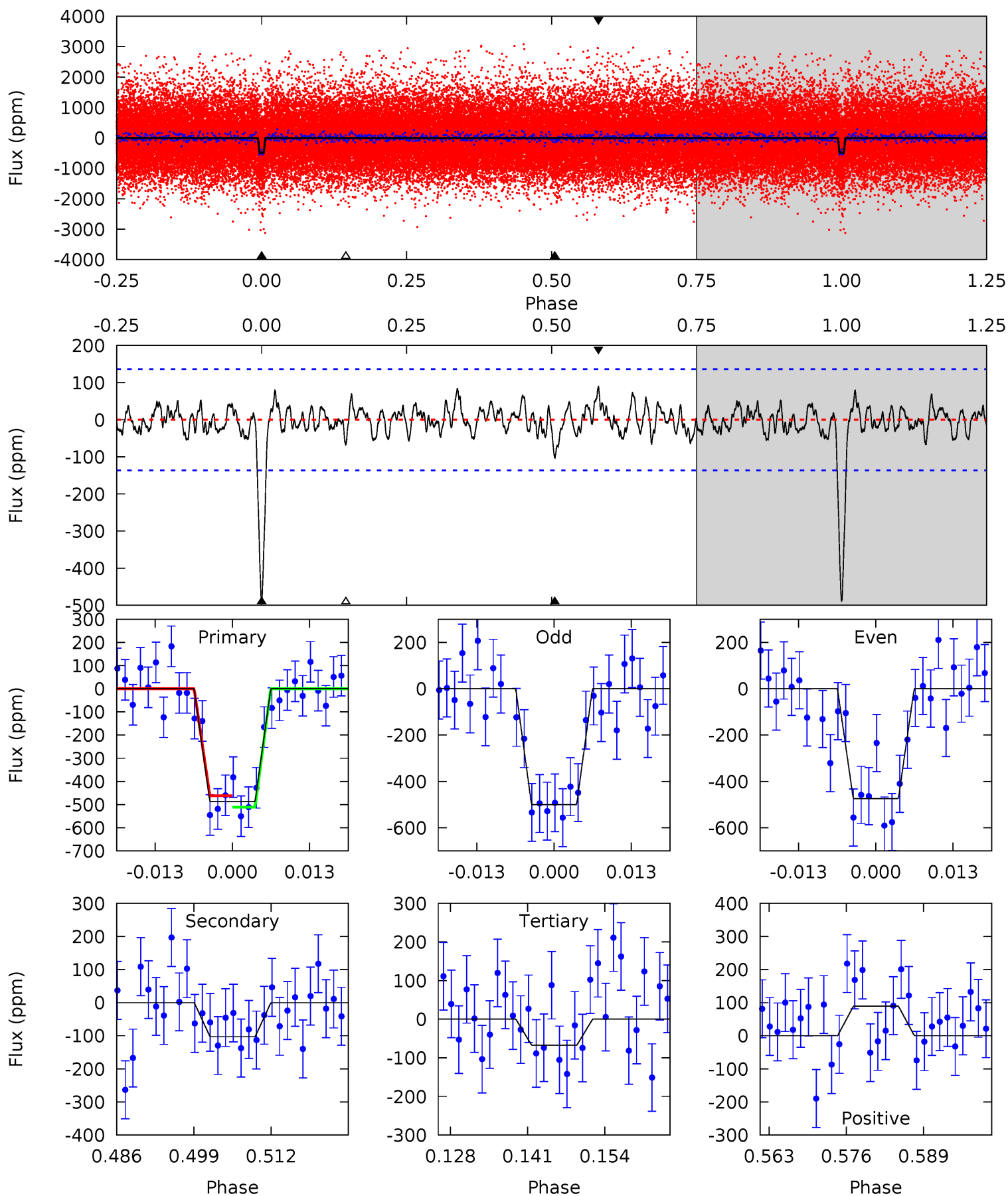
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.4	3.79	3.10	3.85	4.96	2.45	1.14	16.3	15.5	0.69	-0.06	2.24	1.02	0.17	0.73



Alt Model-Shift Uniqueness Test

004139816-04, P = 7.825042 Days, E = 128.722936 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.8	3.75	2.47	3.25	4.98	2.49	1.06	15.3	14.5	1.28	0.50	0.48	1.00	0.15	0.91



Stellar Parameters For KIC 004139816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3950^{+70}_{-86}	$4.754^{+0.042}_{-0.031}$	$-0.460^{+0.150}_{-0.150}$	$0.493^{+0.033}_{-0.040}$	$0.502^{+0.031}_{-0.038}$	$5.920^{+1.261}_{-0.715}$
	+2%/-2%	+1%/-1%	+33%/-33%	+7%/-8%	+6%/-8%	+21%/-12%
Source	SPE70	SPE60	SPE70	DSEP		

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

Secondary Eclipse Parameters for KIC 004139816-04 / KOI 0812.04

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-98 ± 26	$1.28^{+0.39}_{-0.37}$	689^{+16}_{-19}	2978^{+343}_{-239}	118^{+129}_{-51}
Alt.	-103 ± 27	$1.22^{+0.37}_{-0.37}$	687^{+18}_{-17}	3041^{+380}_{-263}	138^{+158}_{-66}

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

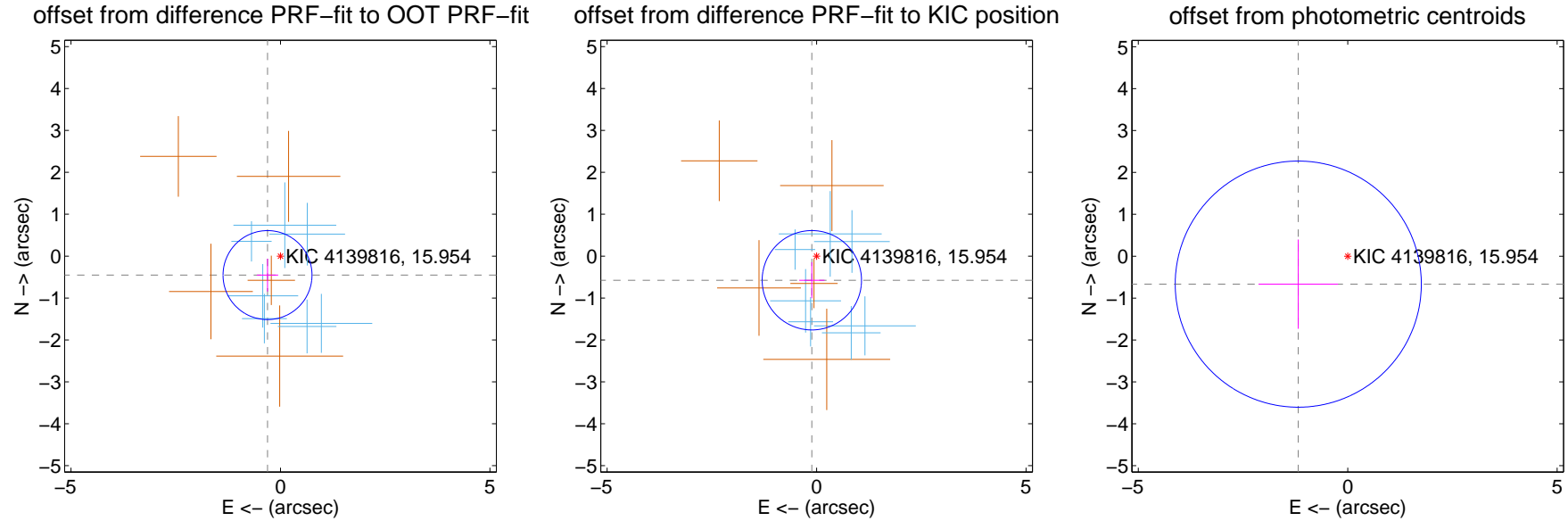
DV Centroid Data

Supplemental centroid analysis for 004139816-04. Kepler magnitude: 15.95. Transit SNR 13.49

There are 7 quarters with good PRF difference image offsets

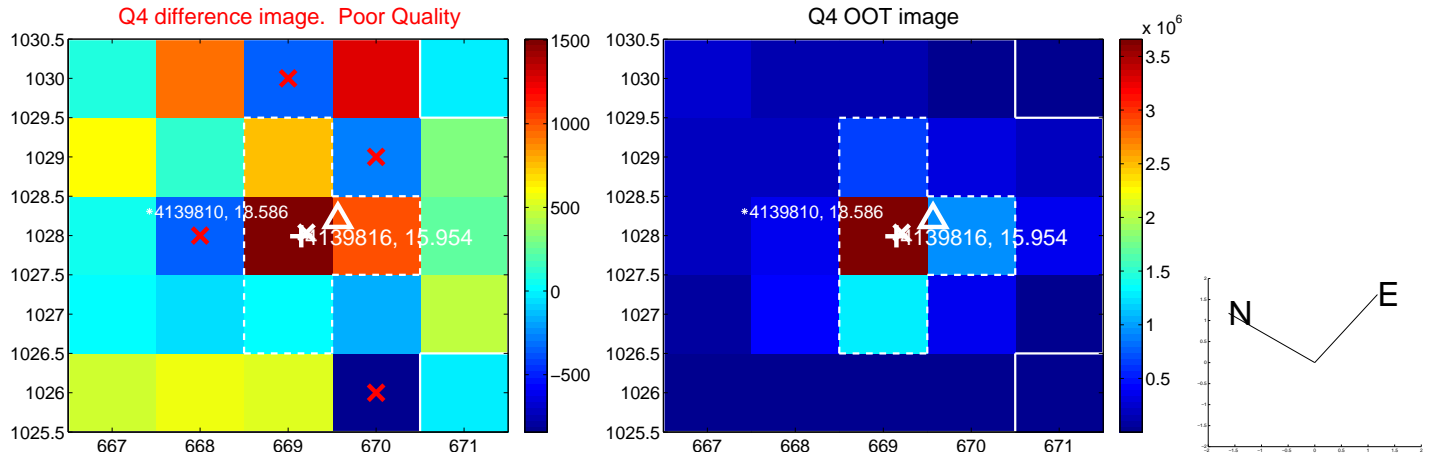
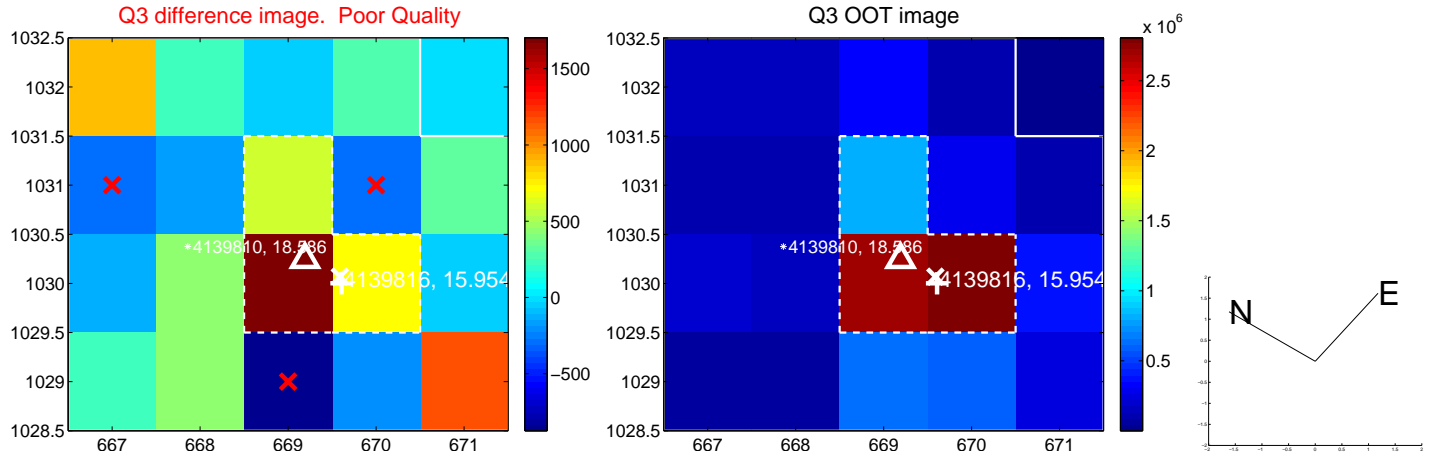
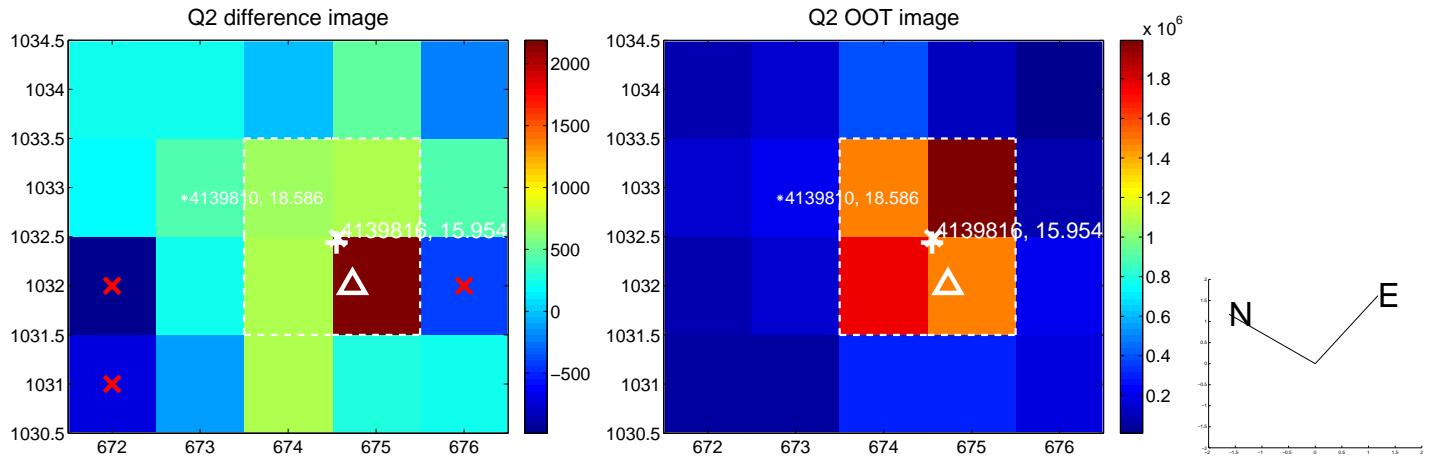
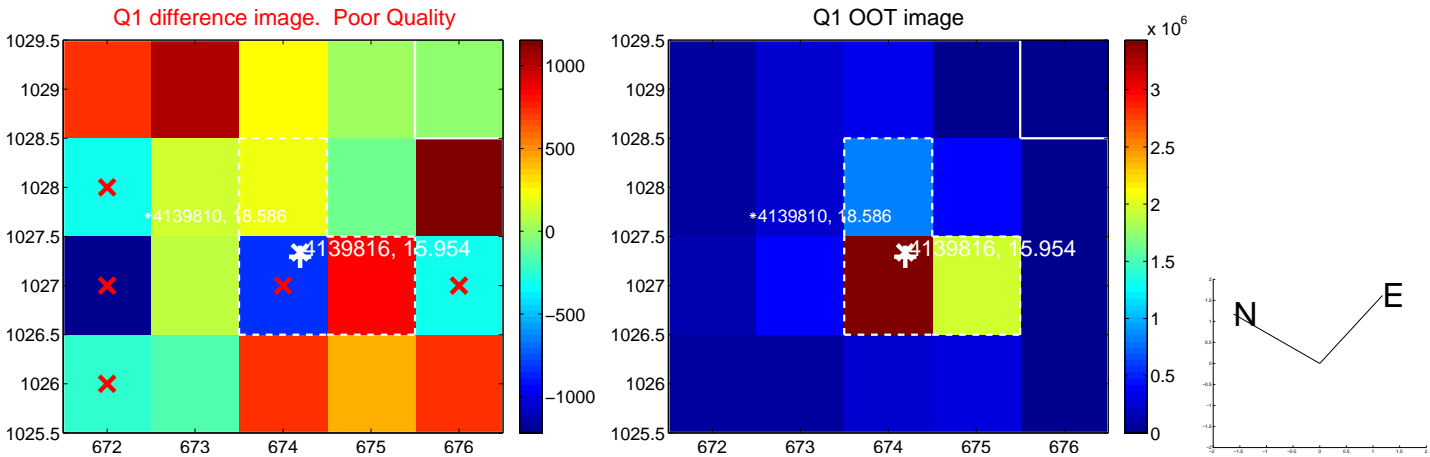
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.548 ± 0.354	1.55	0.309 ± 0.254	-0.453 ± 0.392
PRF-fit source offset from KIC position	0.587 ± 0.395	1.49	0.113 ± 0.302	-0.576 ± 0.431
photometric centroid source offset	1.36 ± 0.98	1.38	1.18 ± 0.95	-0.67 ± 1.06

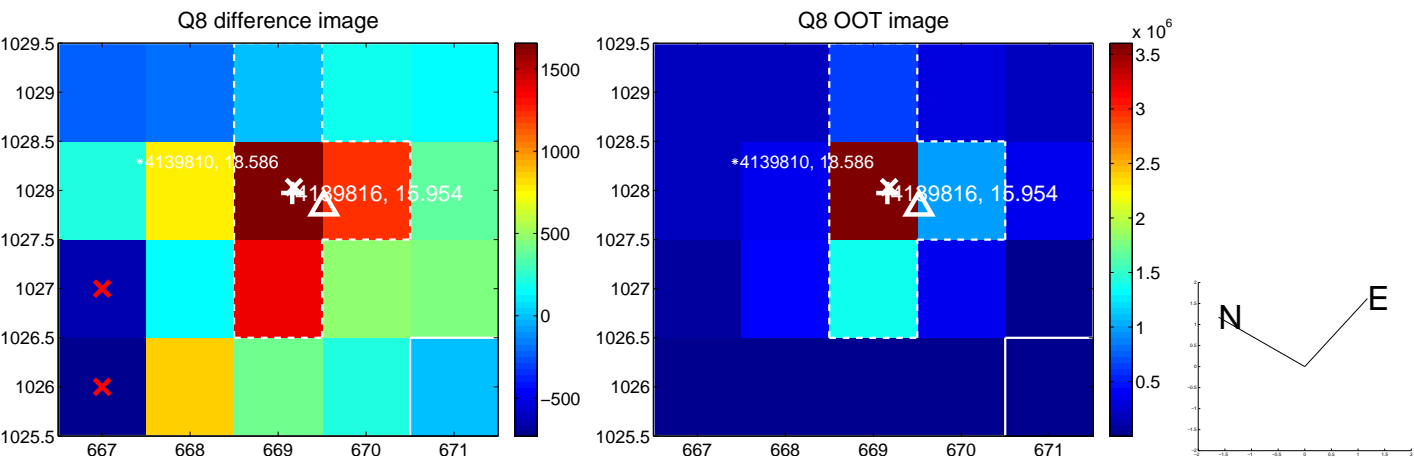
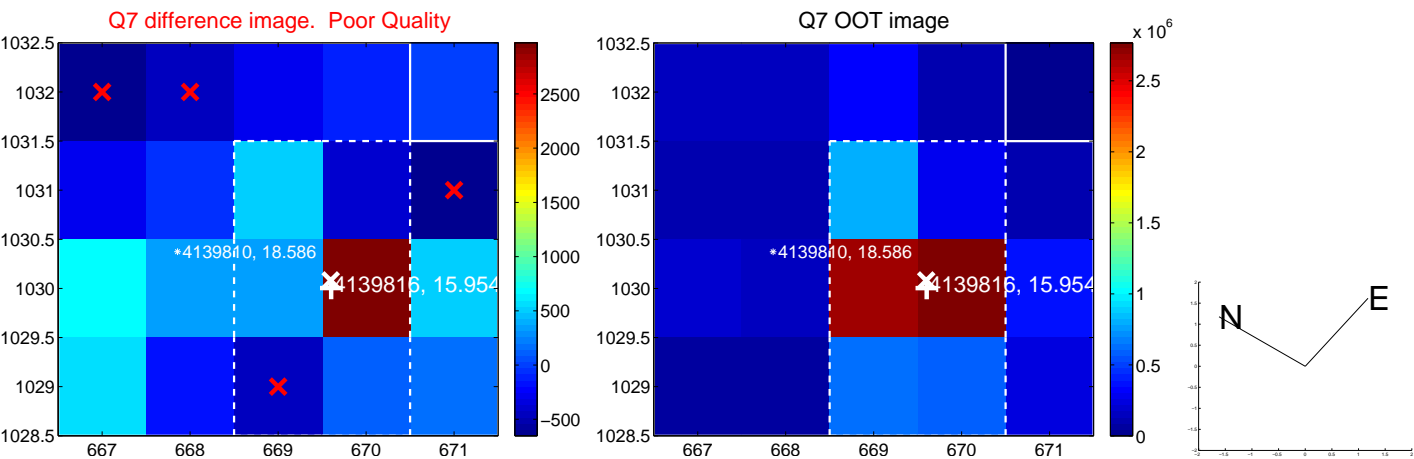
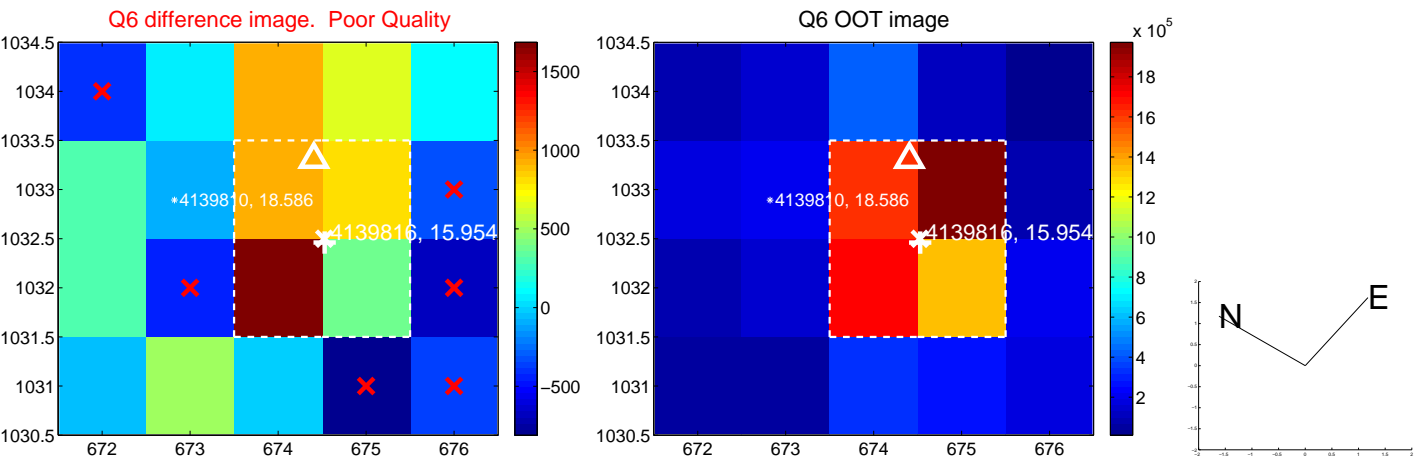
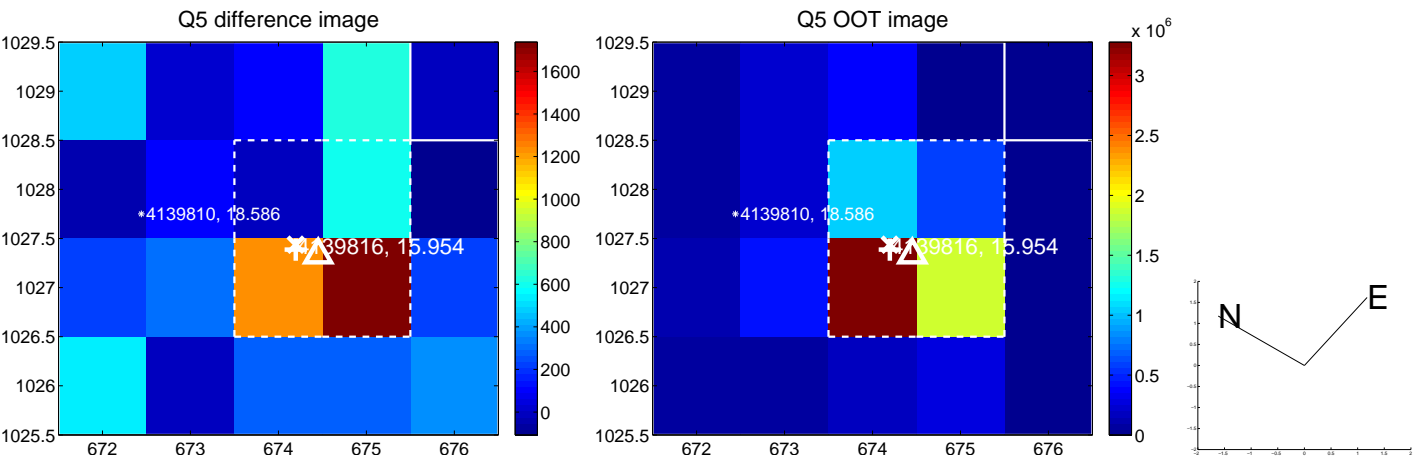


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

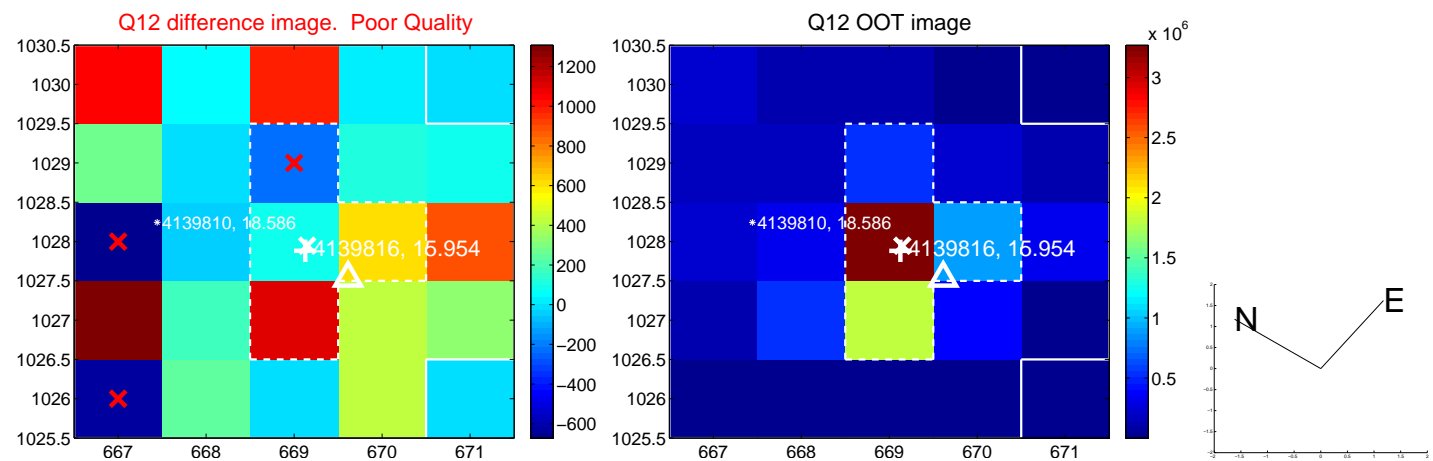
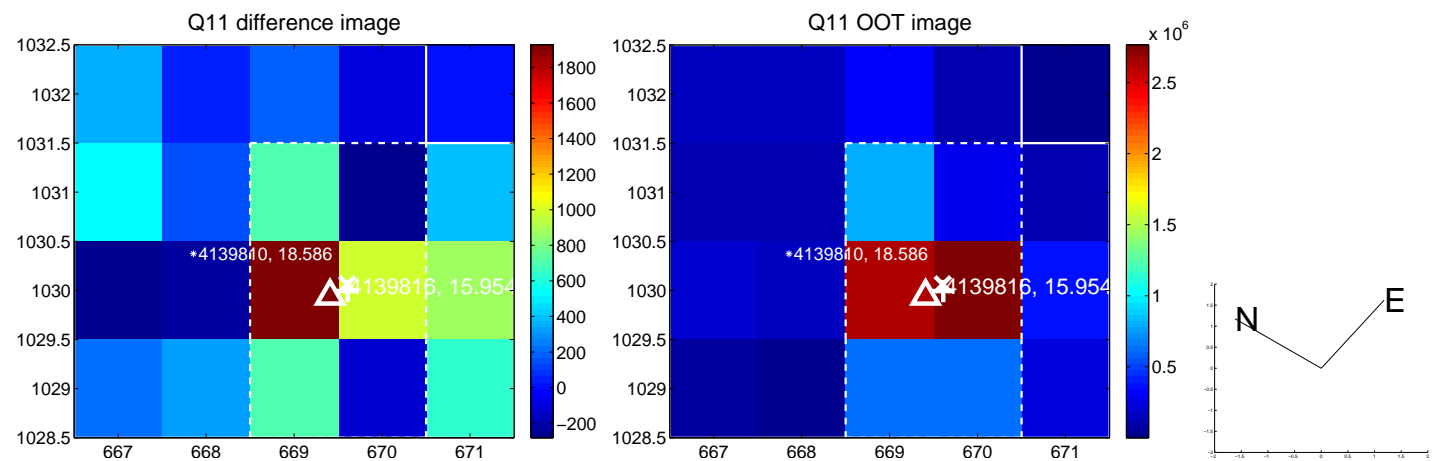
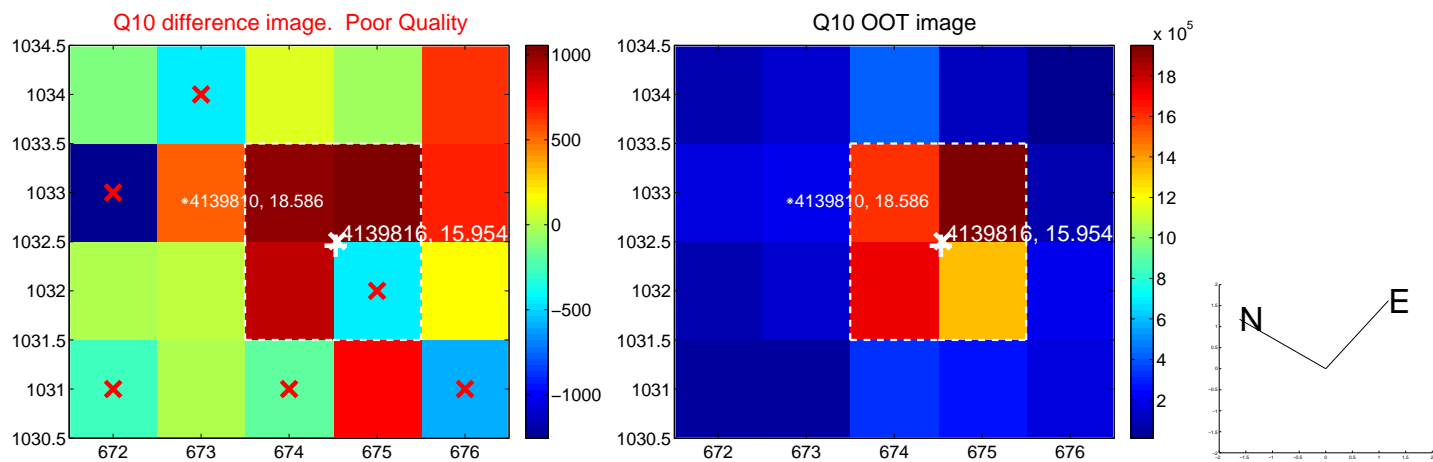
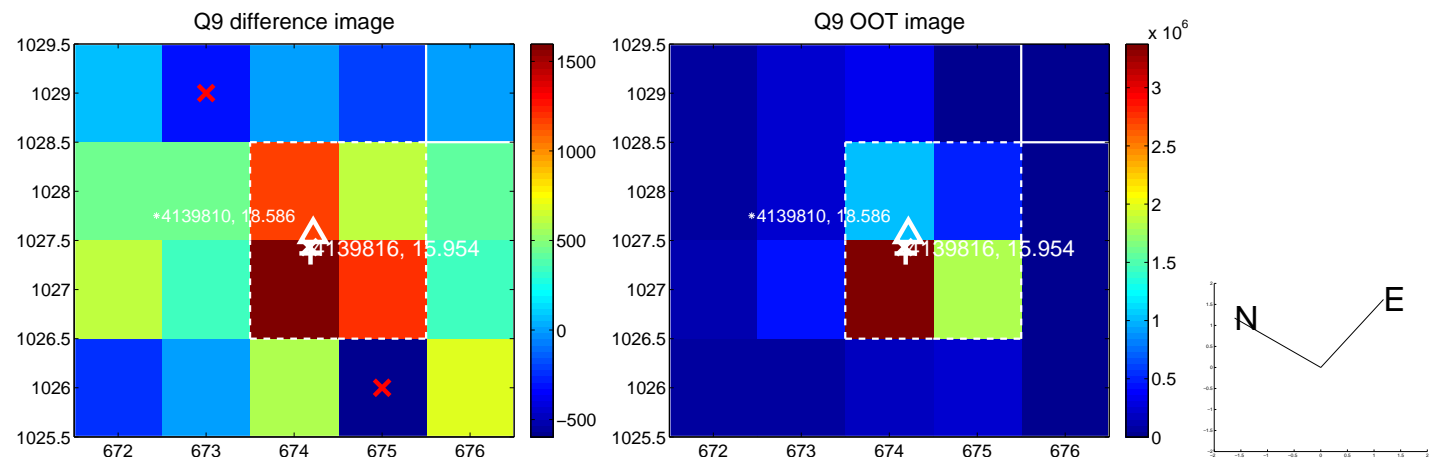
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



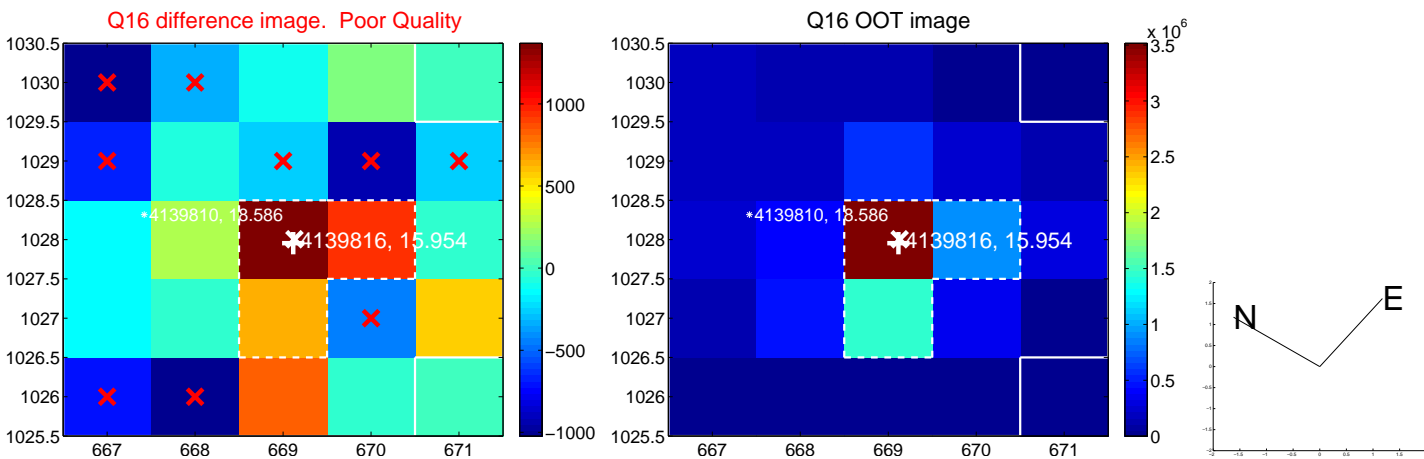
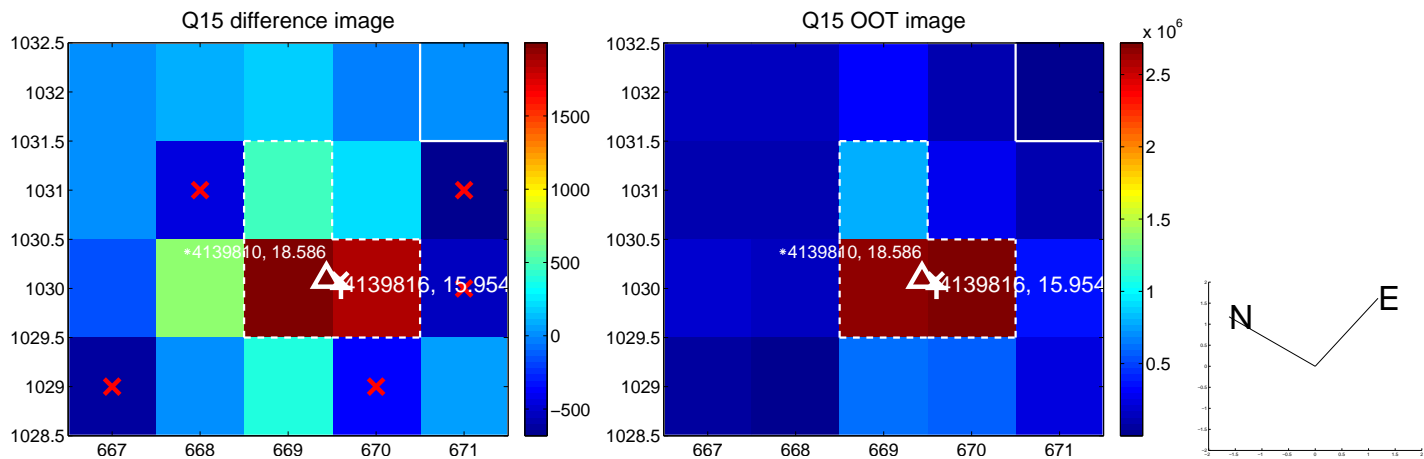
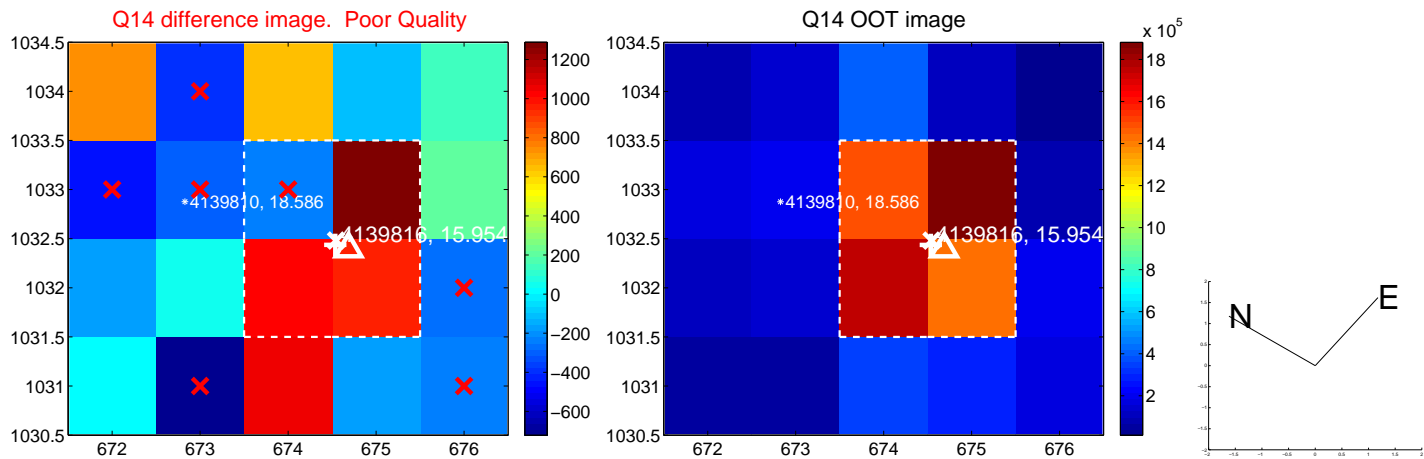
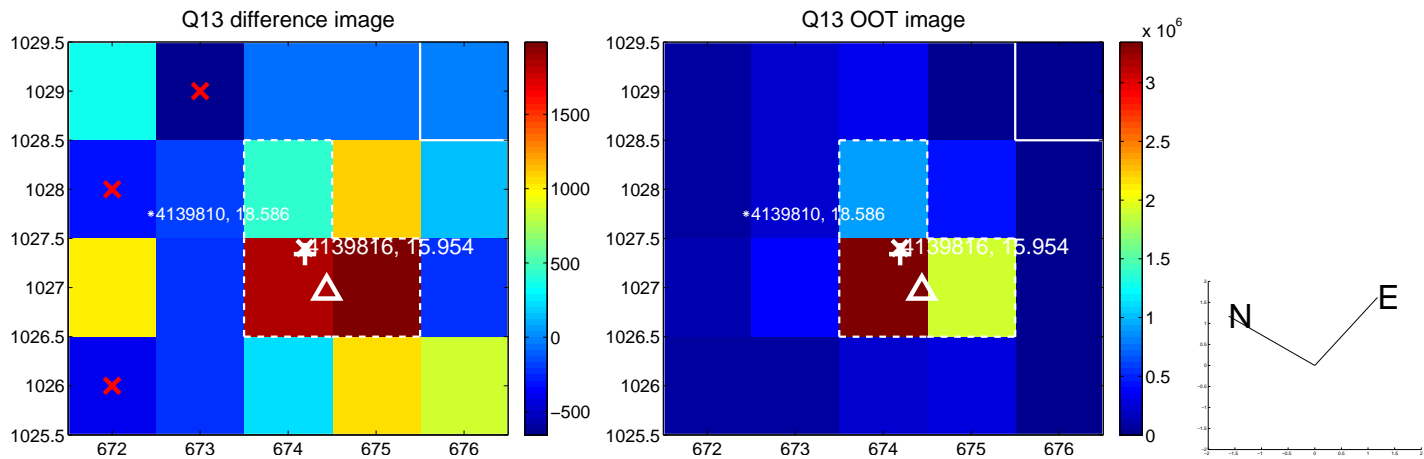
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



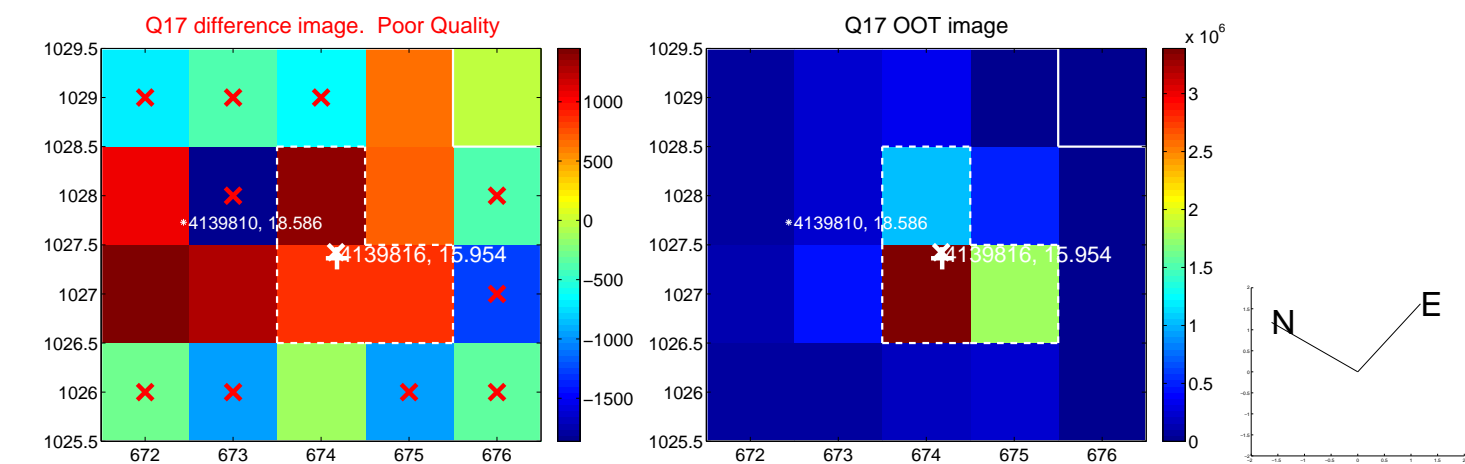
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



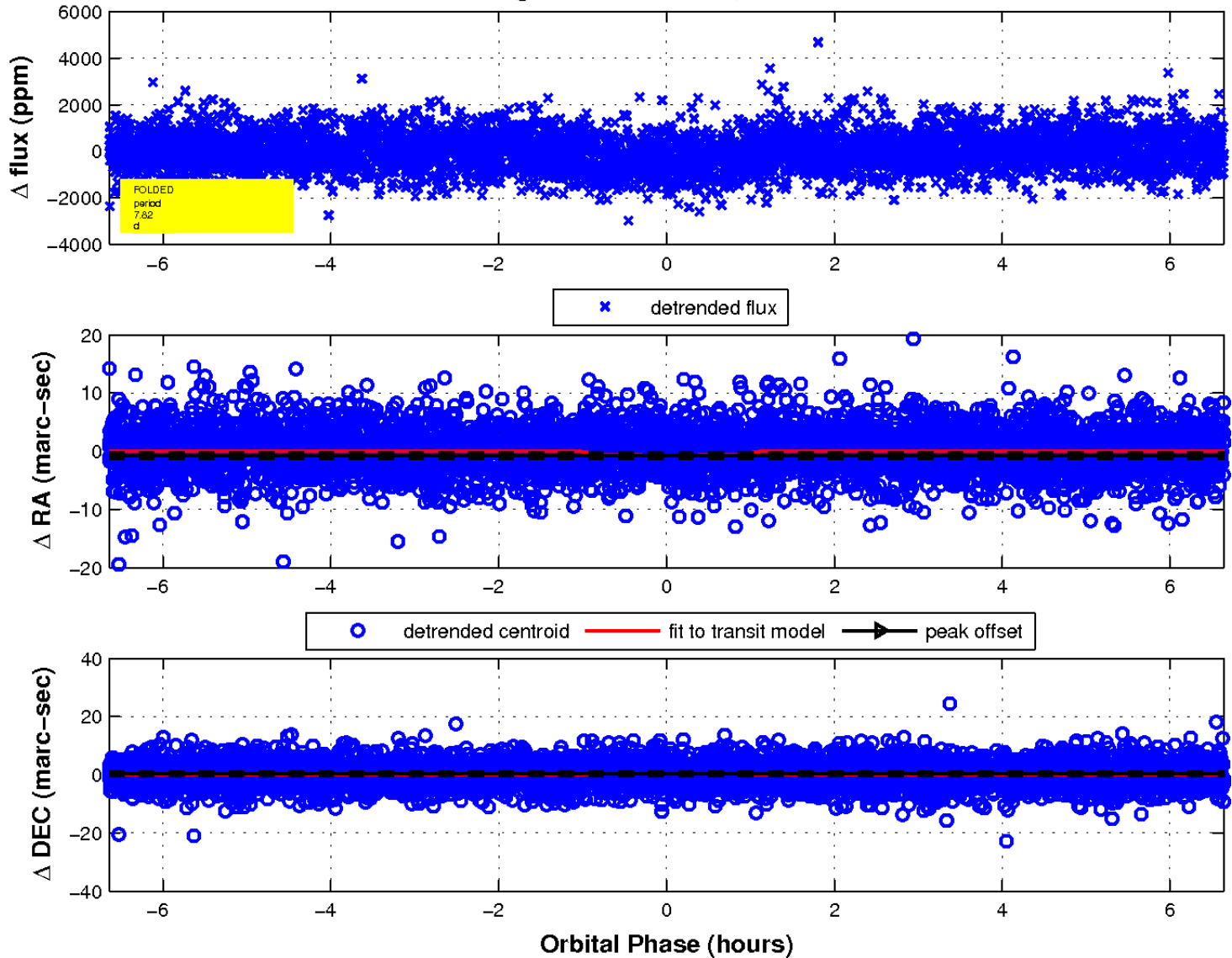
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

