

KIC 009947653

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})
009947653-01	OBS	4647.01	37.903182	163.774008	98.0	6.855	9.0	8.2	1.96	5303	2.22	54.47
009947653-02	OBS	4647.02	12.008662	141.696320	71.6	4.497	8.0	8.9	1.96	5303	1.99	252.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009947653-01	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009947653-02	OBS	PC	0.97	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.

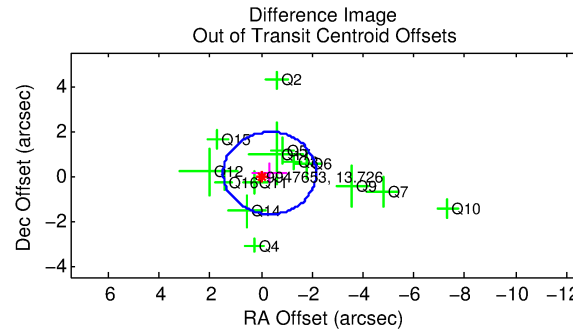
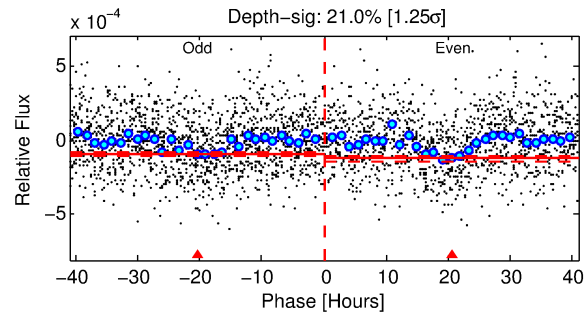
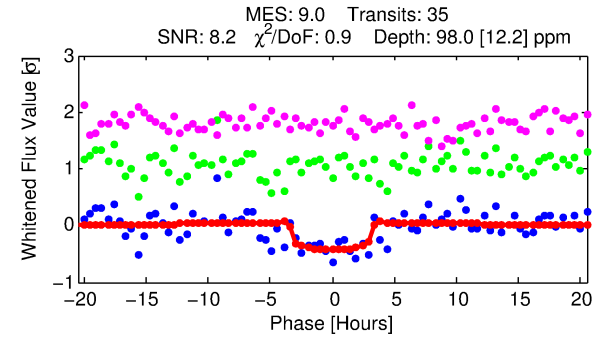
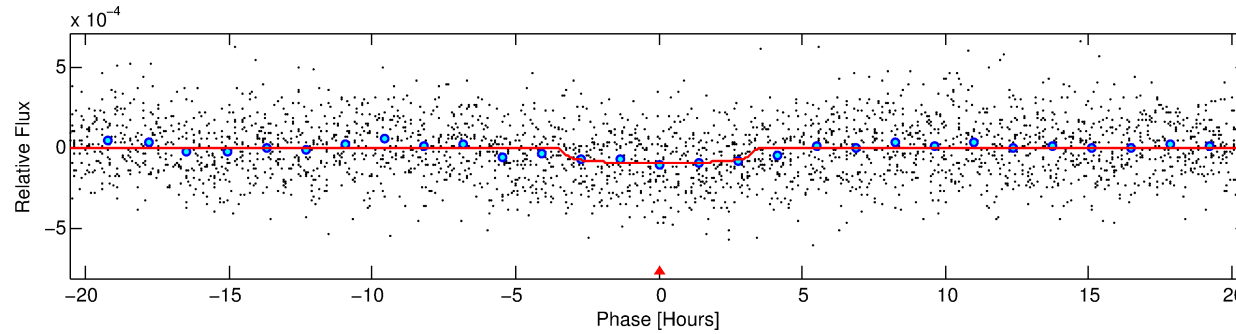
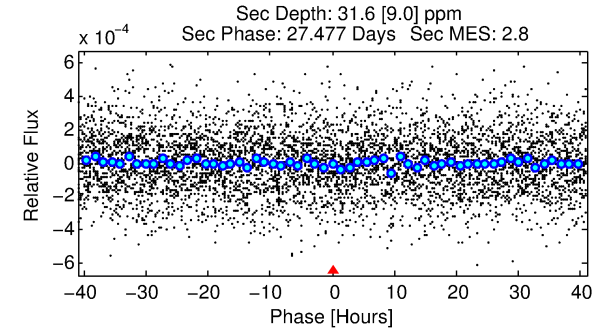
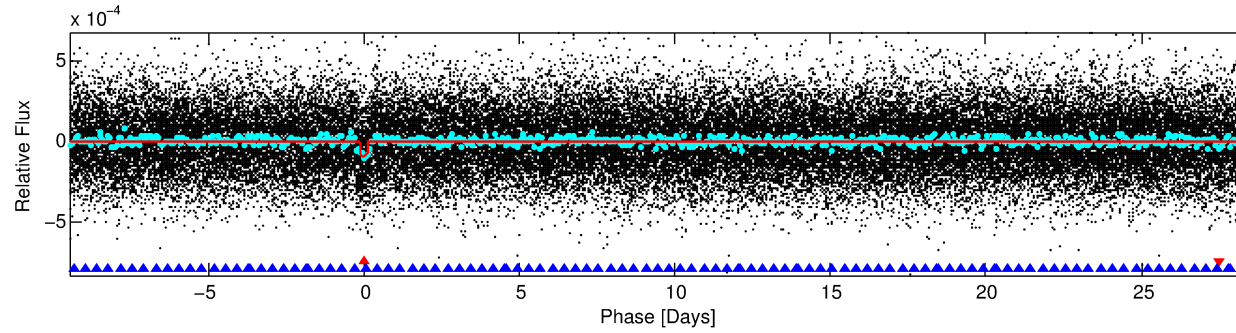
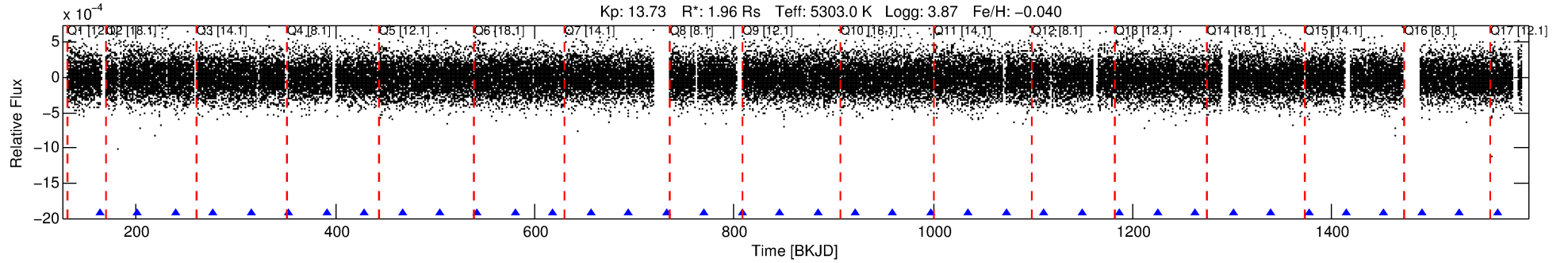
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009947653-01

No Significant Match Found

DV One-Page Summary

KIC: 9947653 Candidate: 1 of 2 Period: 37.903 d
KOI: K04647.01 Corr: 0.775



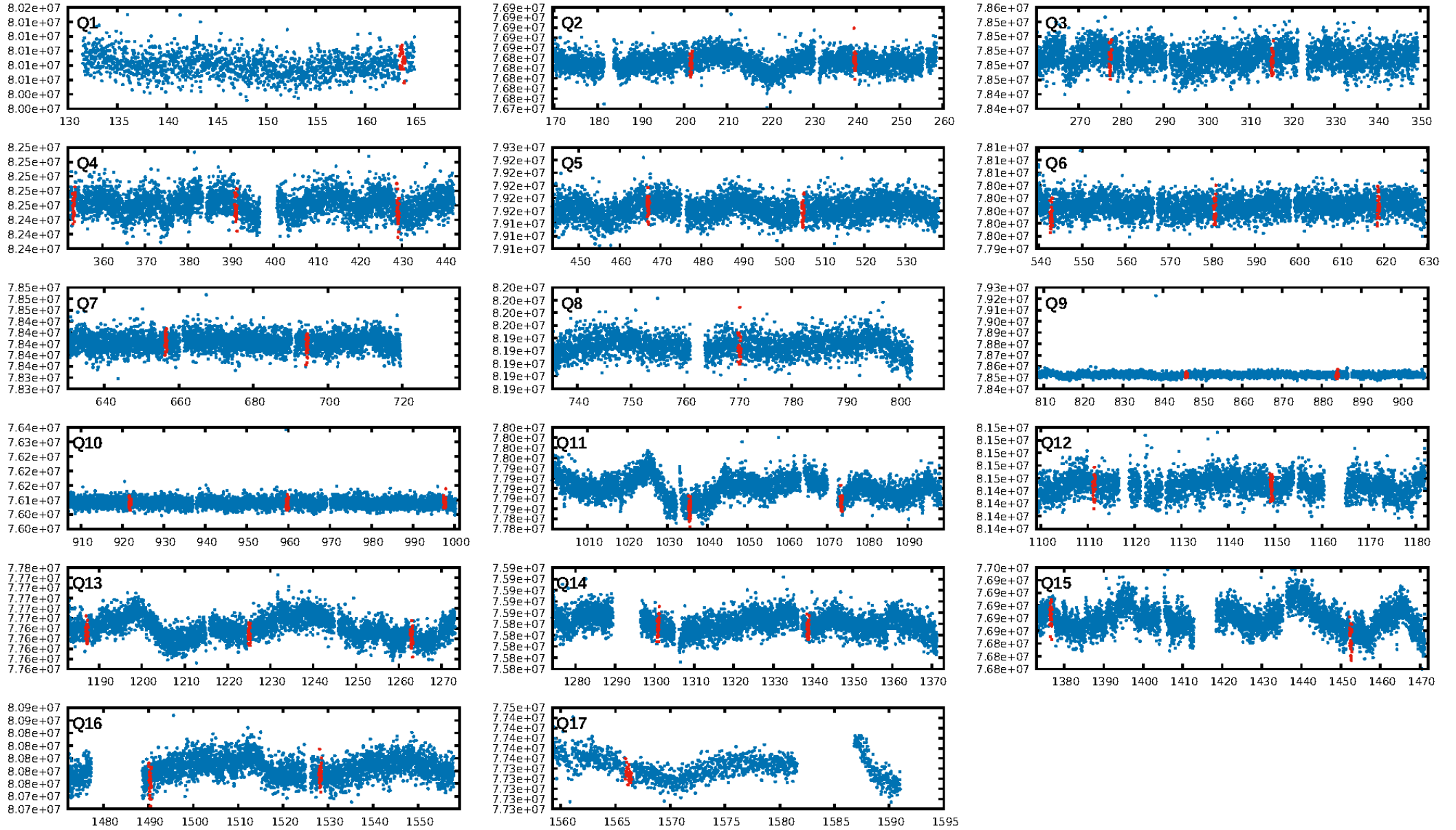
DV Fit Results:

Period = 37.90318 [0.00065] d
Epoch = 163.7740 [0.0139] BKJD
Rp/R* = 0.0104 [0.0064]
a/R* = 23.64 [60.68]
b = 0.84 [0.90]
Seff = 54.47 [57.32]
Teff = 693 [182] K
Rp = 2.22 [1.90] Re
a = 0.2240 [0.1396] AU
Ag = 176.58 [290.45] [0.60σ]
Teffp = 3904 [1247] K [2.55σ]

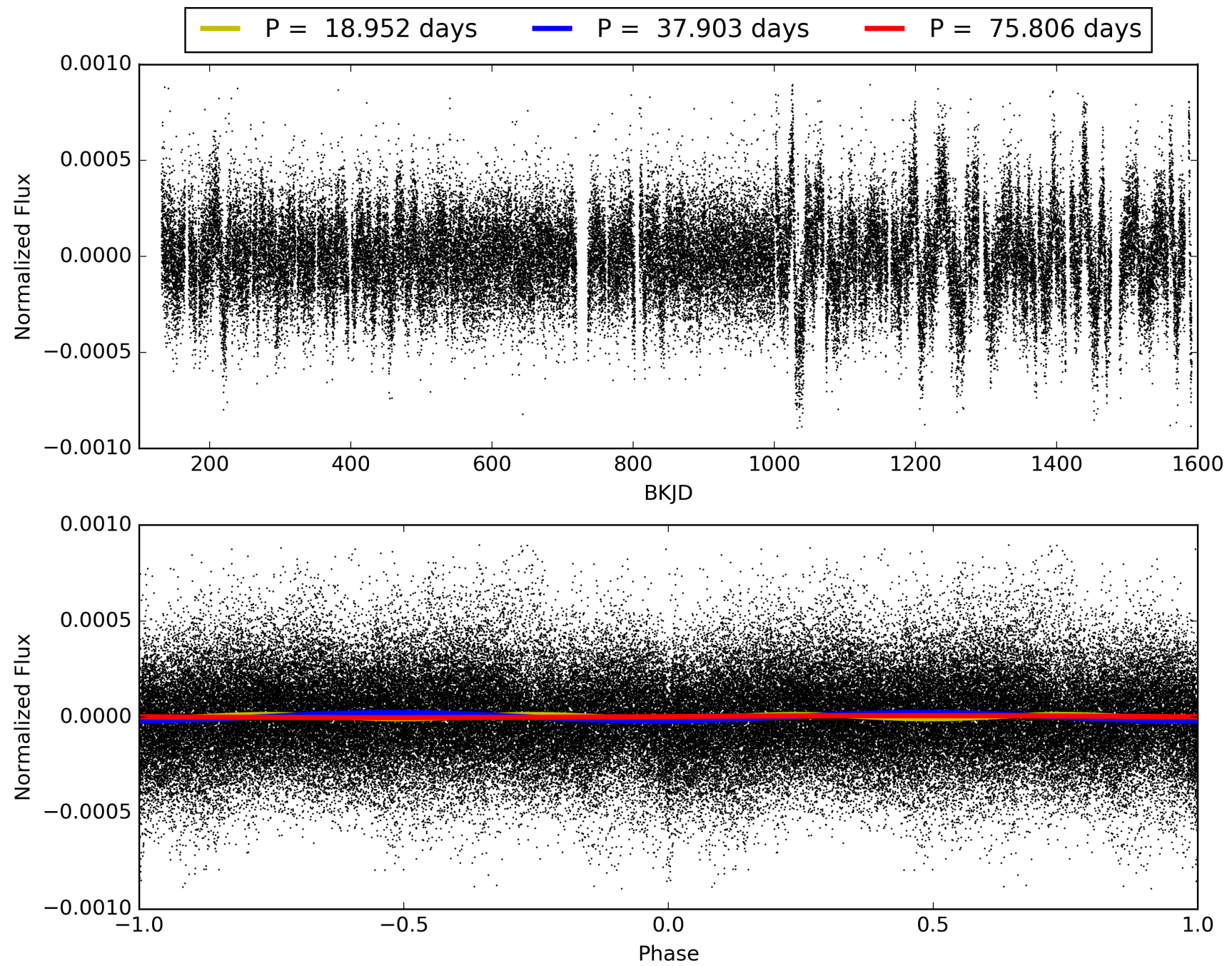
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [75.80σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 73.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.79e-18
RollingBand-fgt: 1.00 [33/33]
GhostDiagnostic-chr: 2.01
Centroid-sig: 75.3%
Centroid-so: 0.482 arcsec [0.52σ]
OotOffset-rm: 0.361 arcsec [0.59σ]
KicOffset-rm: 0.331 arcsec [0.49σ]
OotOffset-st: 4/4/3/3 [14]
KicOffset-st: 4/4/3/3 [14]
DiffImageQuality-fgm: 0.71 [10/14]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009947653-01, PDC Light Curves

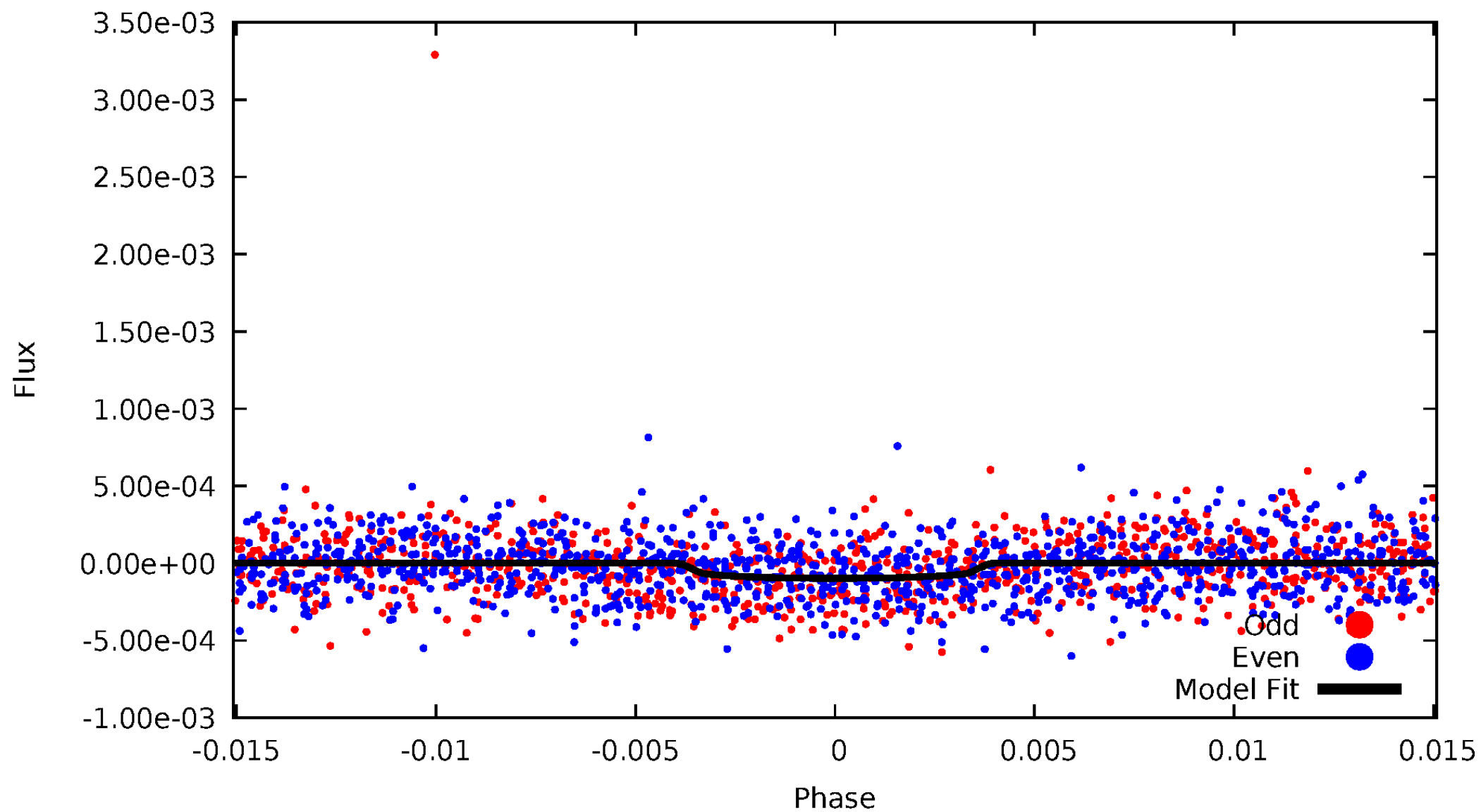


TCE 009947653-01



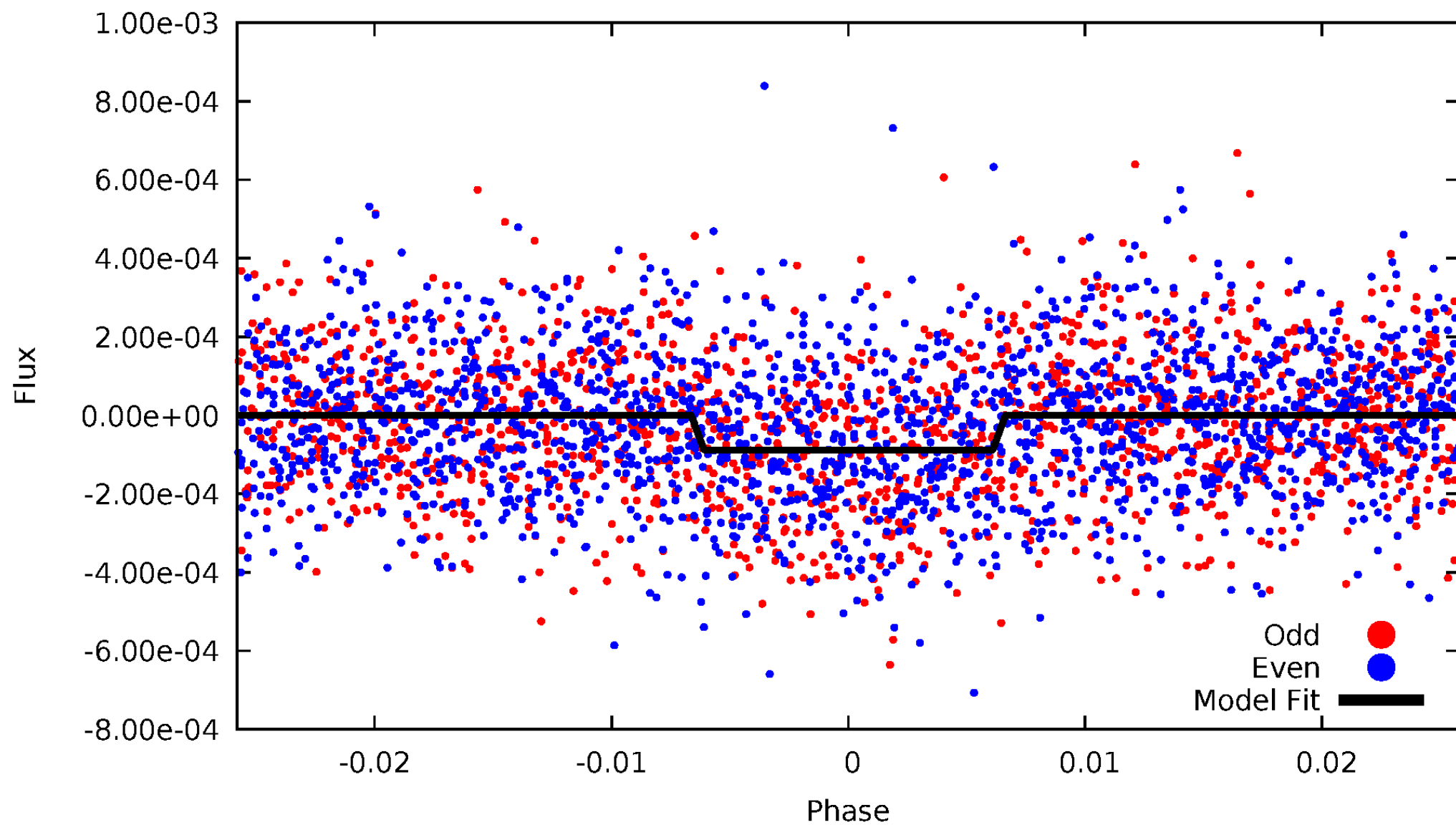
DV Odd/Even

TCE 009947653-01



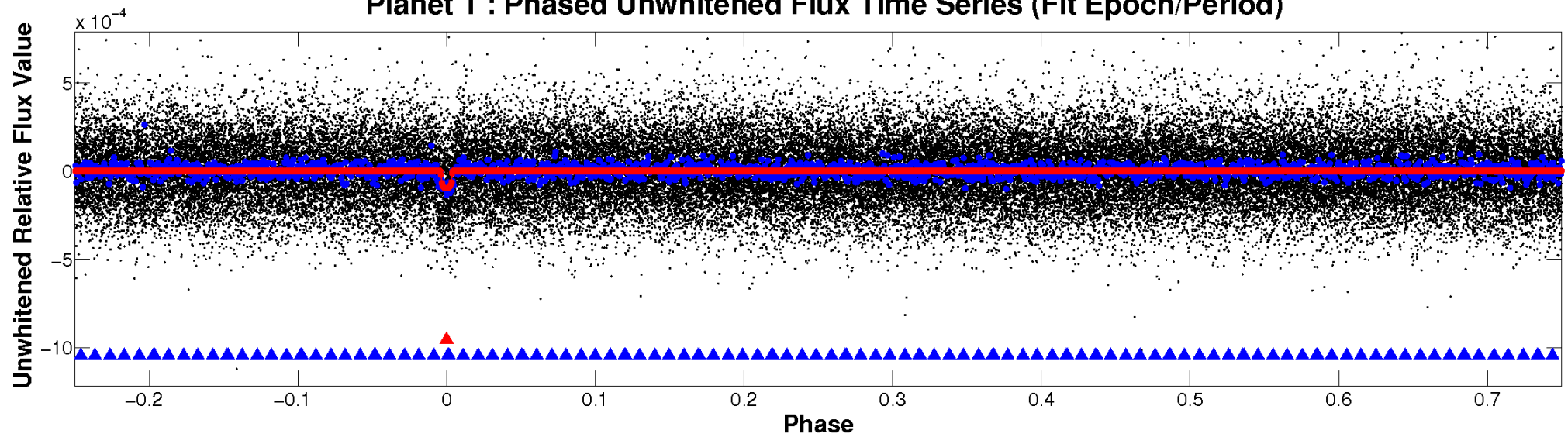
ALT Odd/Even

TCE 009947653-01

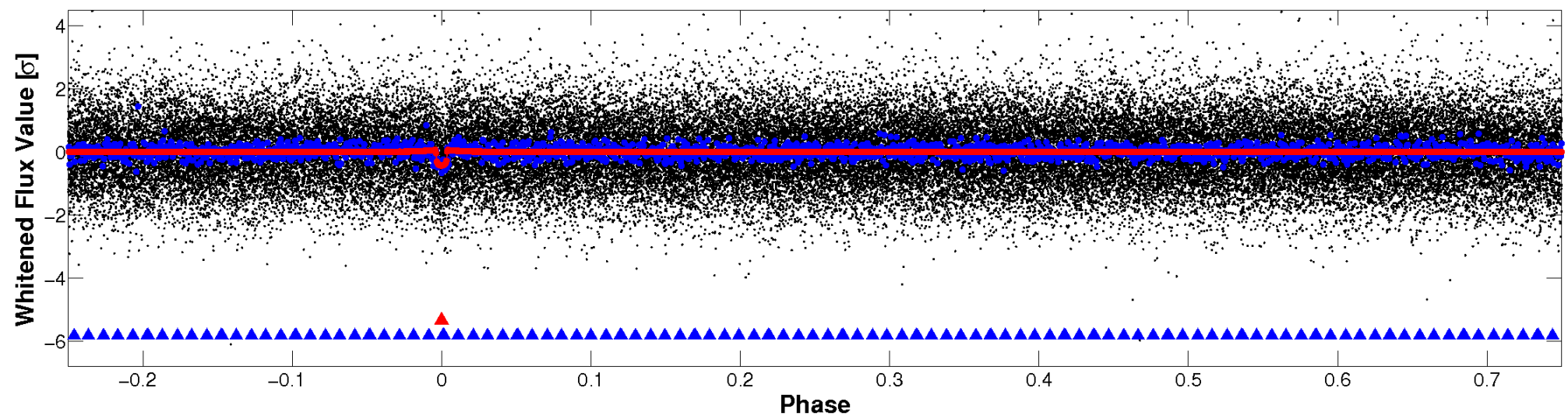


Non-Whitened Vs. Whitened Light Curve

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

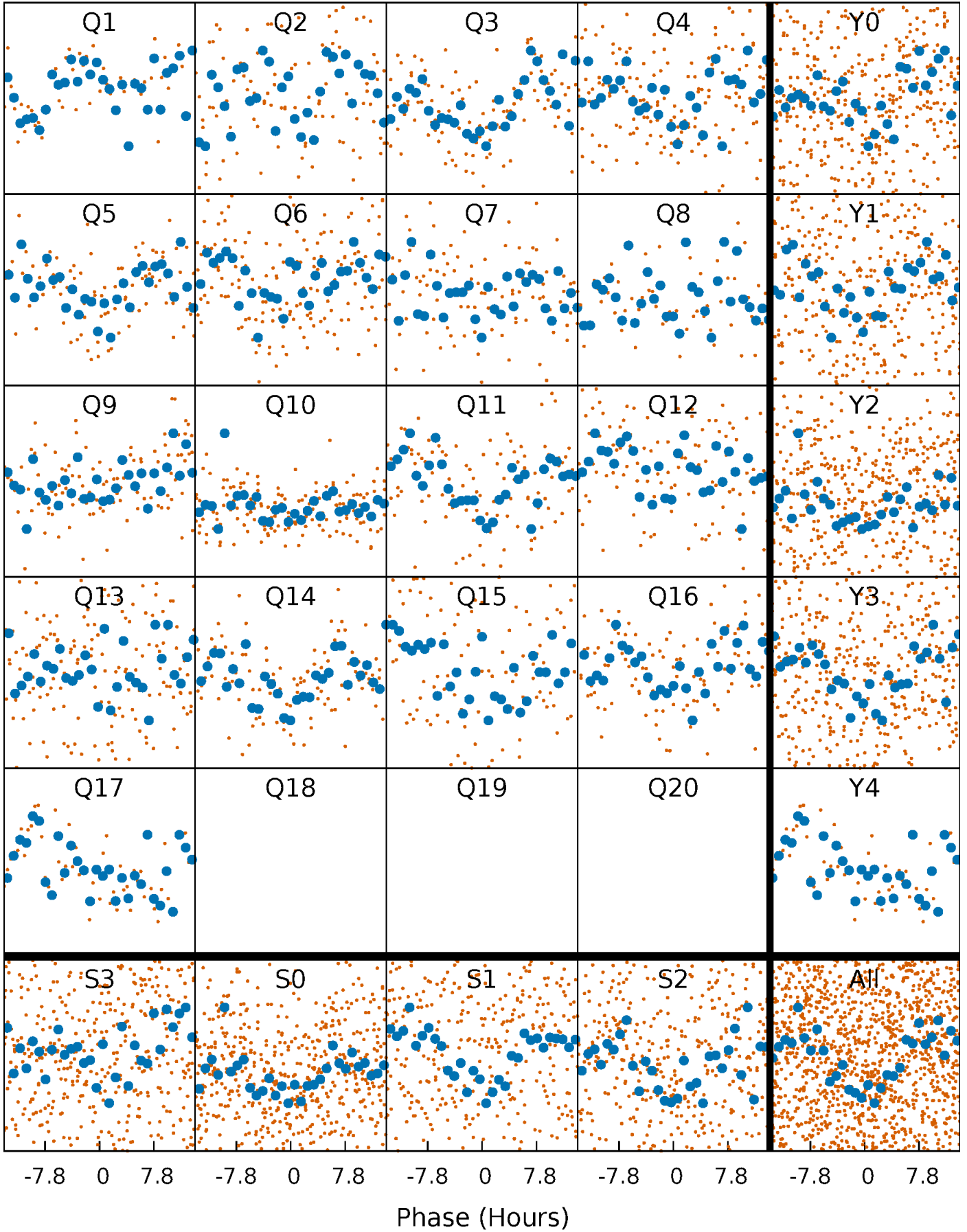


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



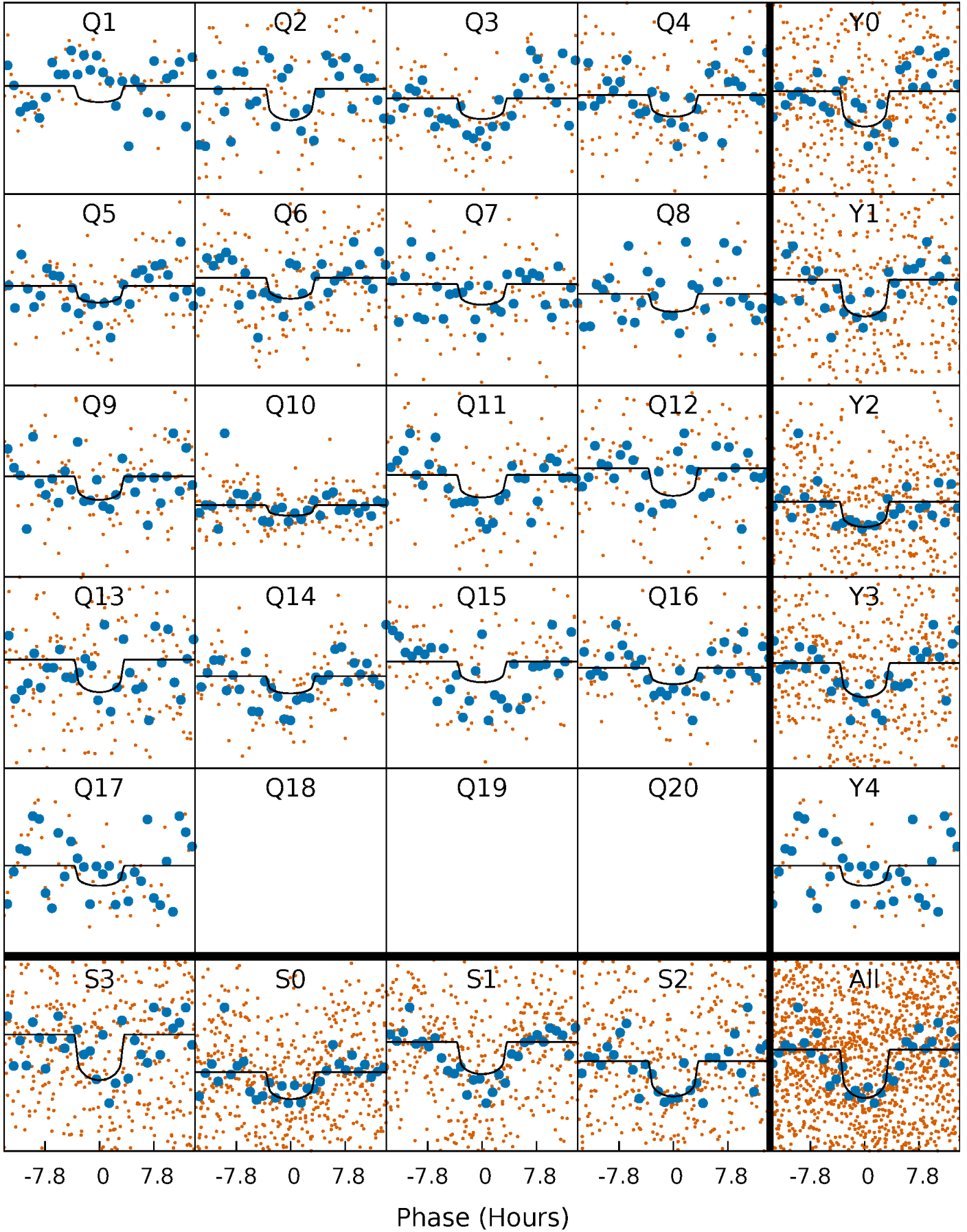
PDC Quarter-Phased Transit Curves

TCE 009947653-01 P= 37.903182 Days $T_0=163.774008$ (BKJD)



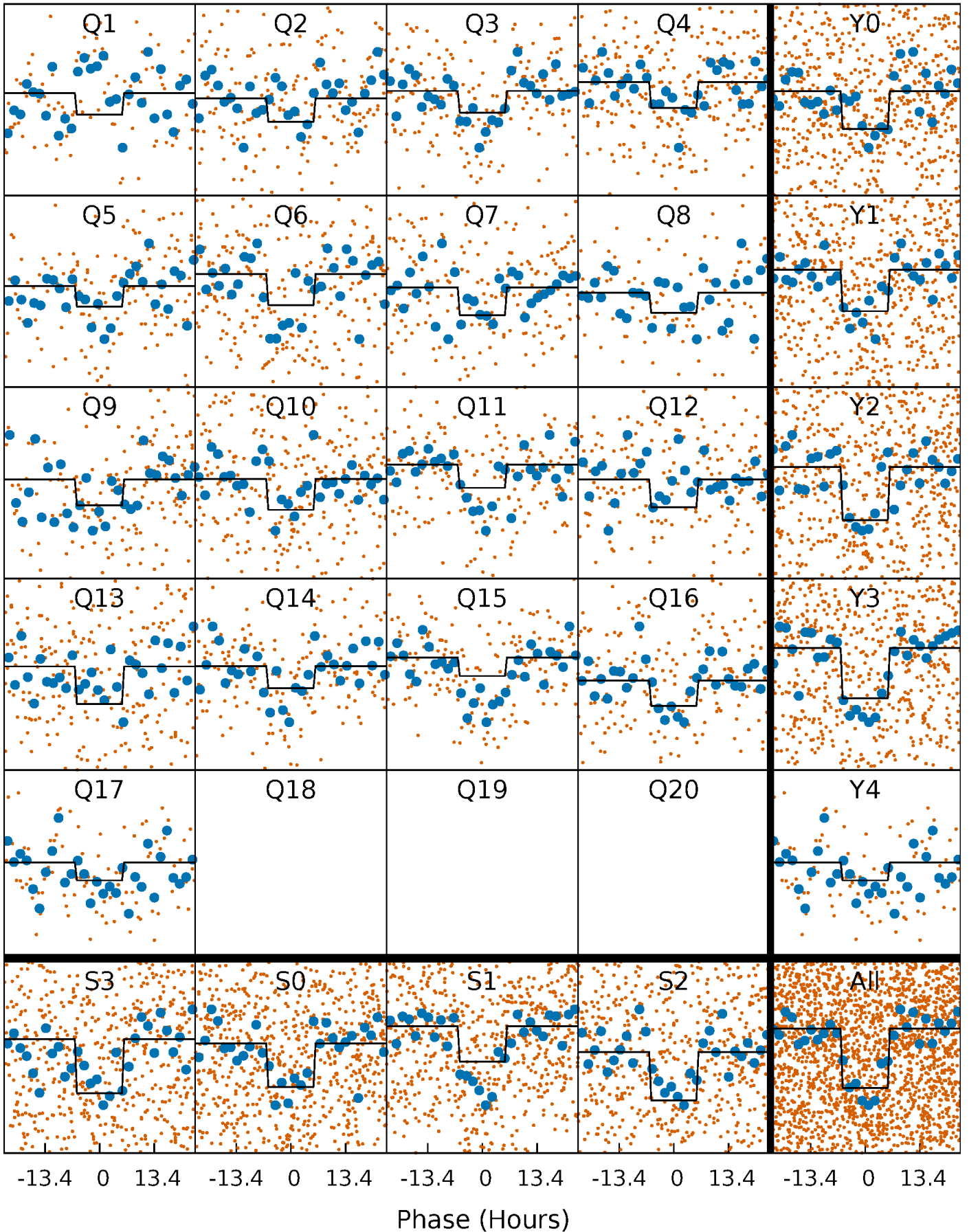
DV Quarter-Phased Transit Curves

TCE 009947653-01 P= 37.903182 Days $T_0=163.774008$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

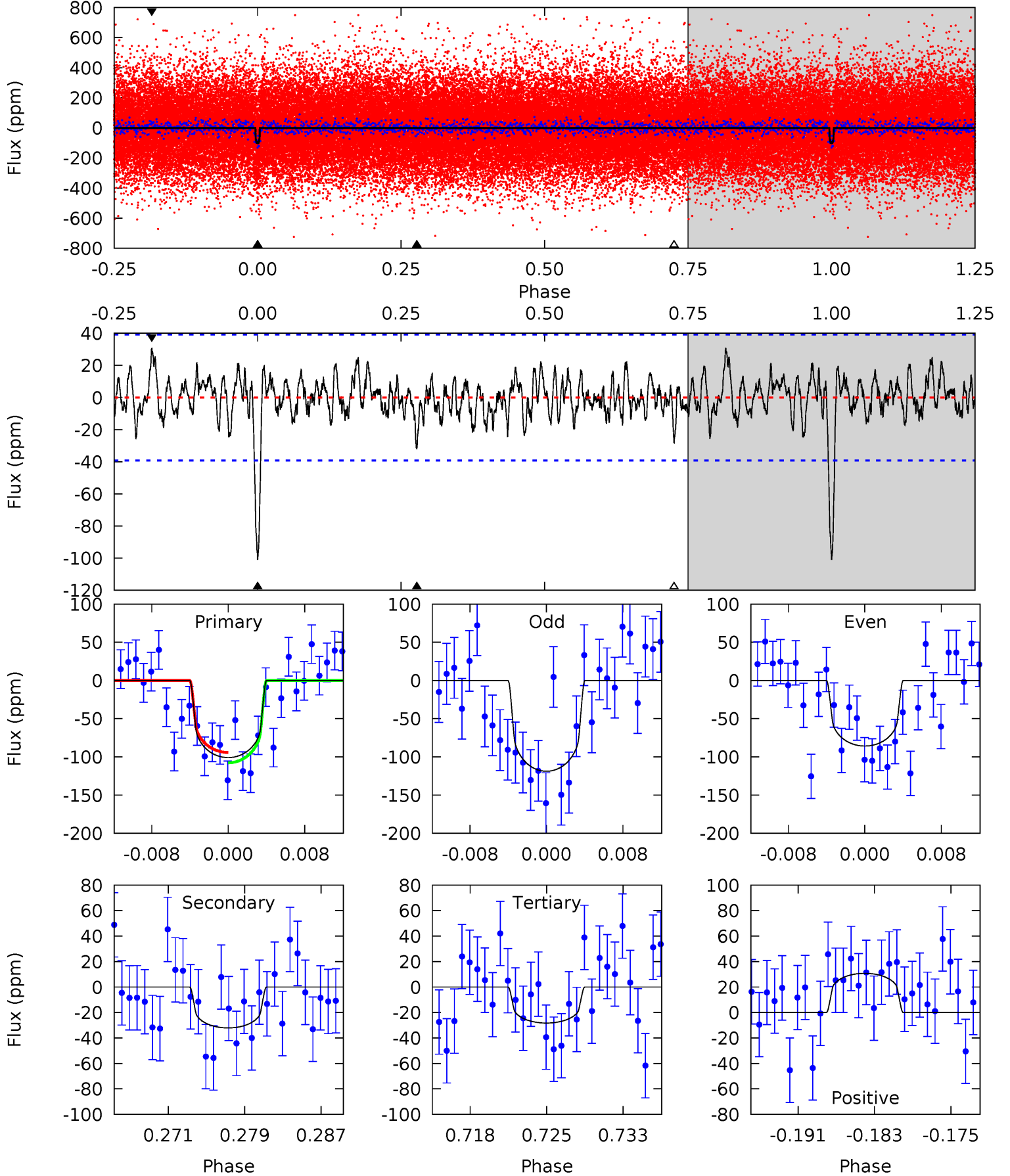
TCE 009947653-01 P= 37.905398 Days $T_0=163.726546$ (BKJD)



DV Model-Shift Uniqueness Test

009947653-01, $P = 37.903182$ Days, $E = 125.870826$ Days

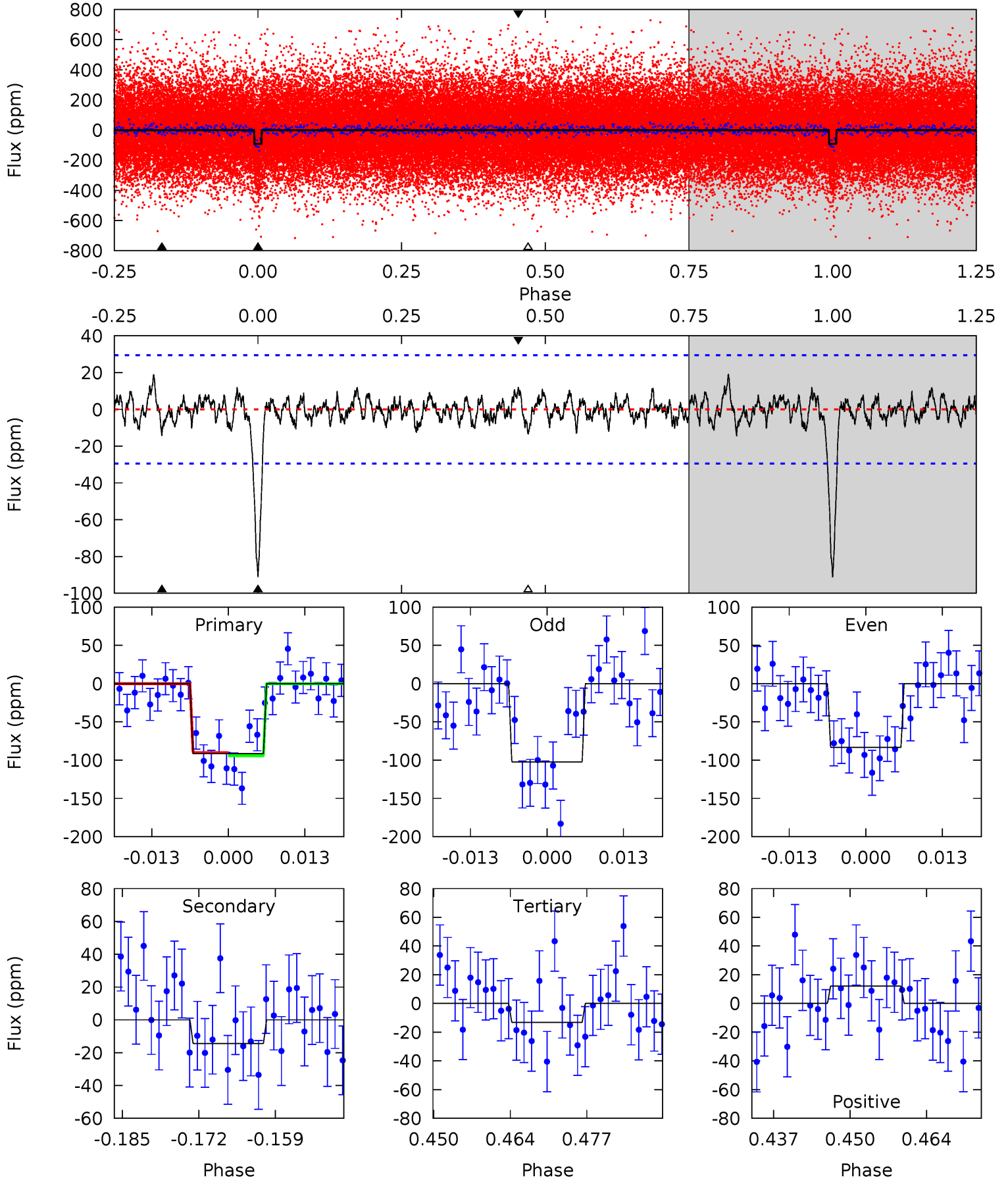
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	4.15	3.66	3.98	5.07	2.65	1.27	9.39	9.08	0.50	0.18	2.13	0.94	0.23	0.87



Alt Model-Shift Uniqueness Test

009947653-01, $P = 37.905398$ Days, $E = 125.821148$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.4	2.43	2.22	2.04	4.97	2.48	0.84	13.2	13.4	0.21	0.39	1.59	0.89	0.17	0.33



Stellar Parameters For KIC 009947653

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5303^{+175}_{-159}	$3.870^{+0.630}_{-0.270}$	$-0.040^{+0.300}_{-0.250}$	$1.964^{+0.773}_{-1.159}$	$1.042^{+0.180}_{-0.200}$	$0.194^{+1.725}_{-0.123}$
	+3%/-3%	+16%/-7%	+750%/-625%	+39%/-59%	+17%/-19%	+890%/-64%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009947653-01 / KOI 4647.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-32 ± 8	$2.17^{+1.41}_{-1.26}$	969^{+110}_{-147}	4094^{+1540}_{-600}	182^{+800}_{-116}
Alt.	-14 ± 6	$2.01^{+1.55}_{-1.15}$	957^{+114}_{-154}	3626^{+1283}_{-578}	93^{+414}_{-67}

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

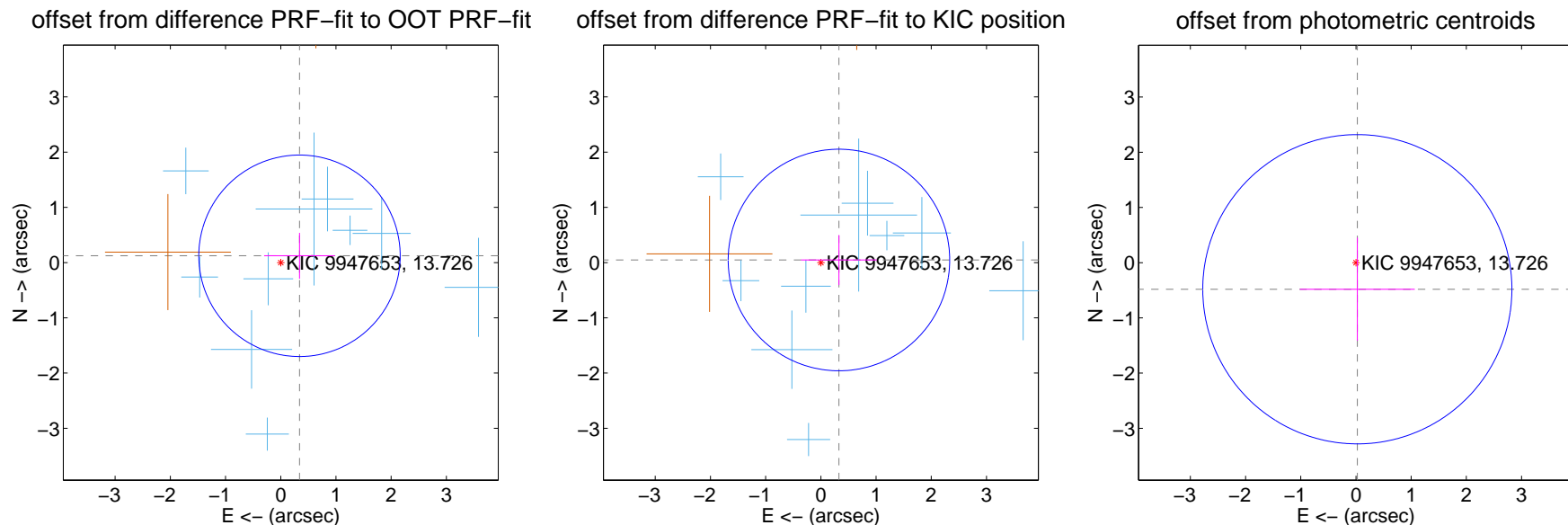
DV Centroid Data

Supplemental centroid analysis for 009947653-01. Kepler magnitude: 13.73. Transit SNR 8.22

There are 10 quarters with good PRF difference image offsets

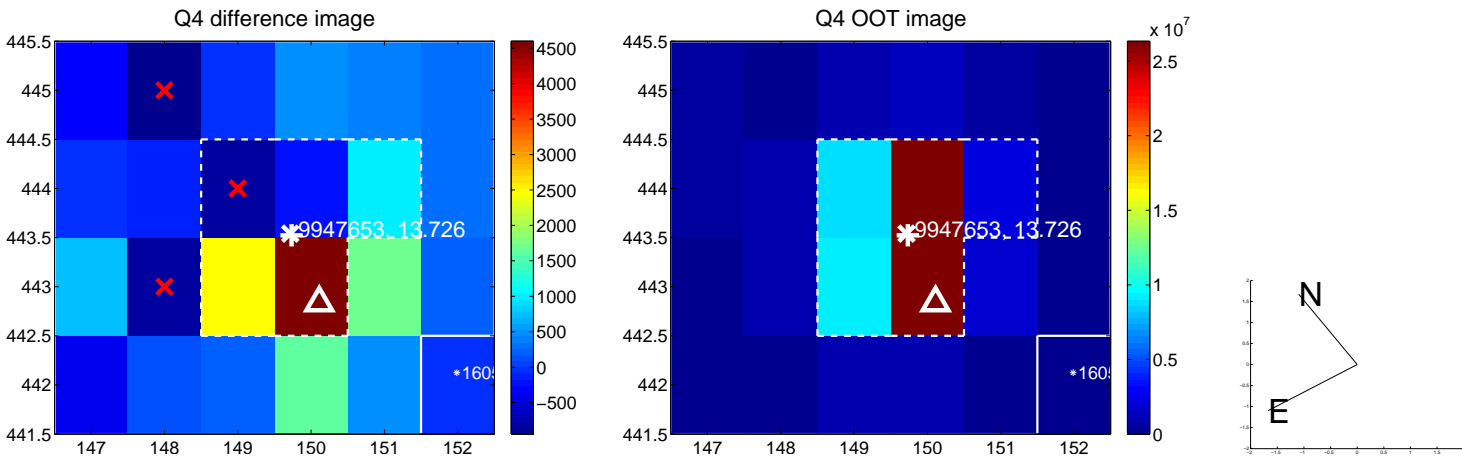
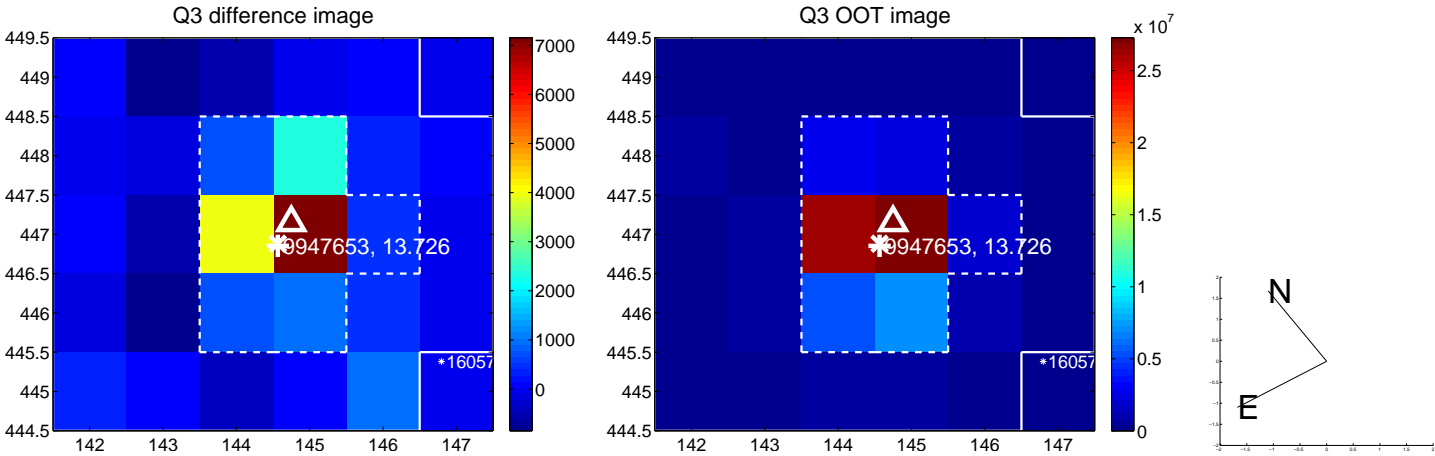
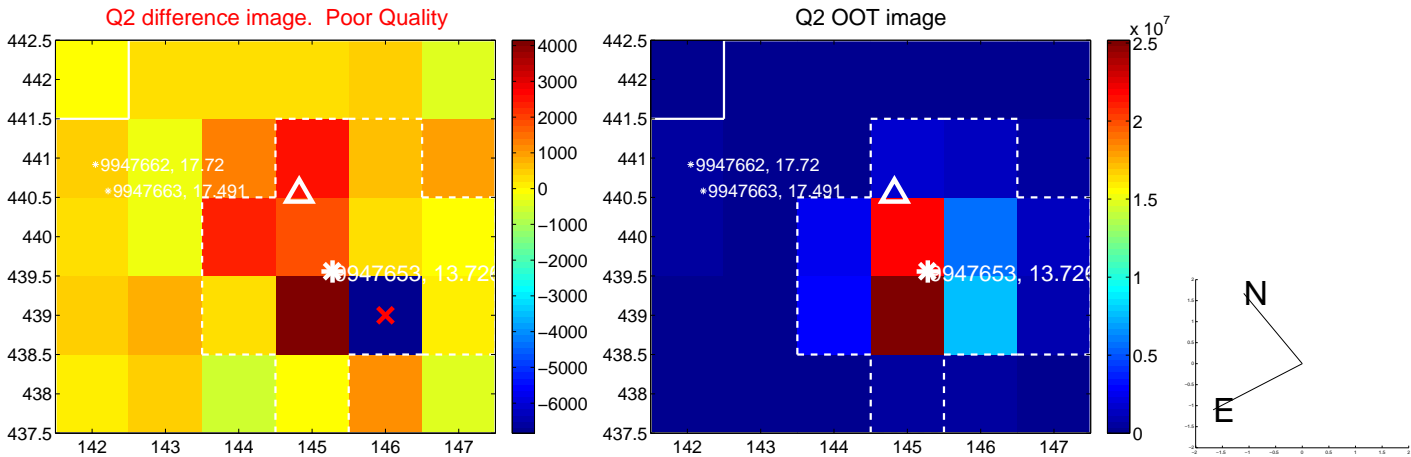
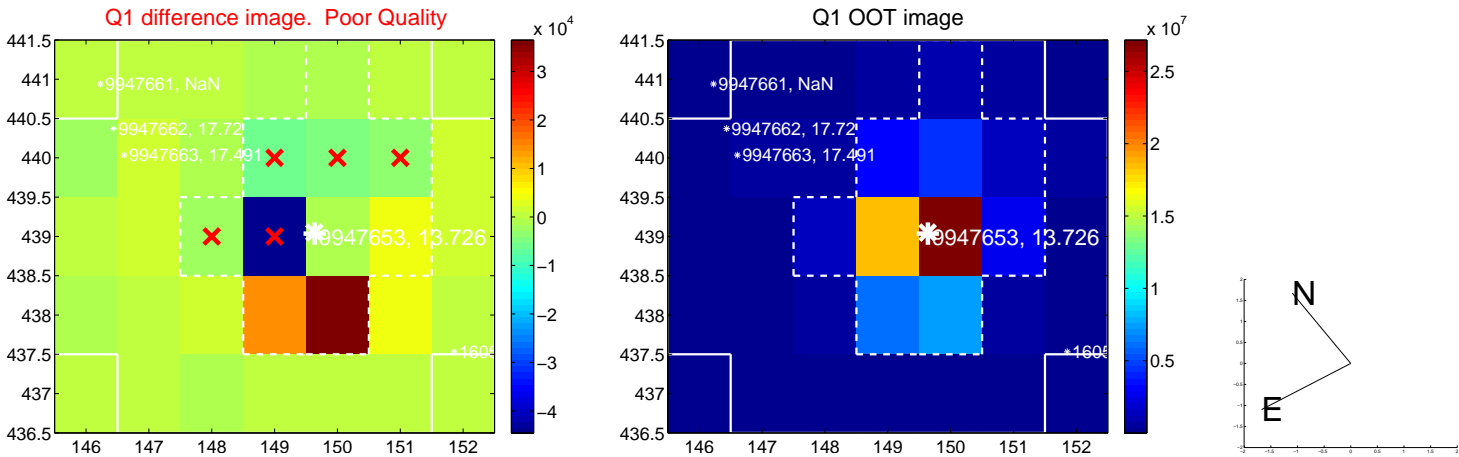
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.361 ± 0.608	0.59	-0.340 ± 0.640	0.123 ± 0.415
PRF-fit source offset from KIC position	0.331 ± 0.669	0.49	-0.327 ± 0.686	0.047 ± 0.452
photometric centroid source offset	0.48 ± 0.93	0.52	-0.02 ± 1.04	-0.48 ± 0.93

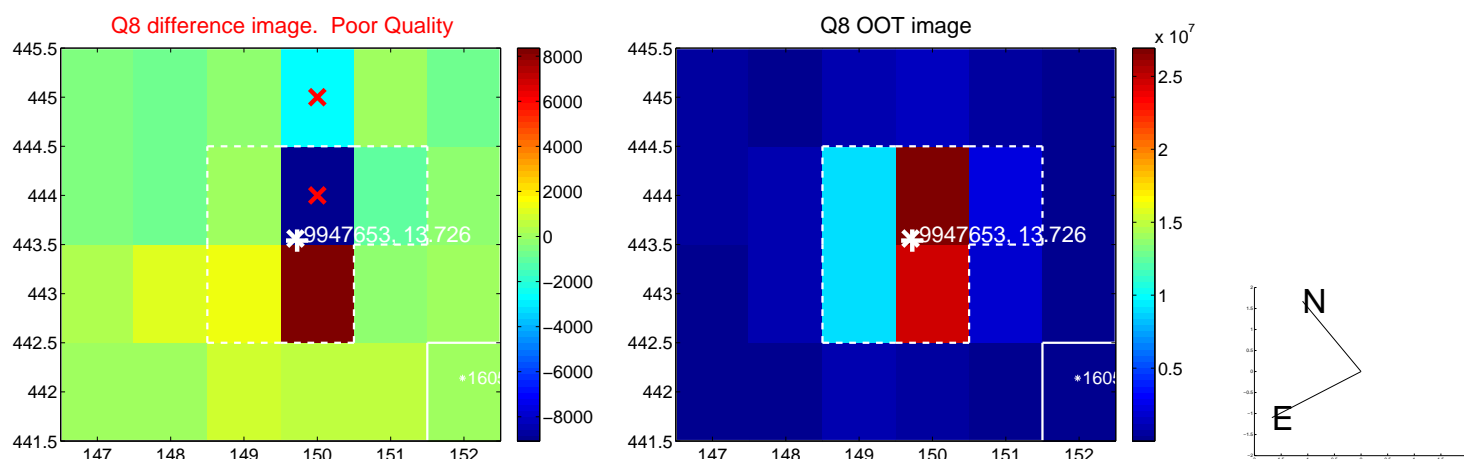
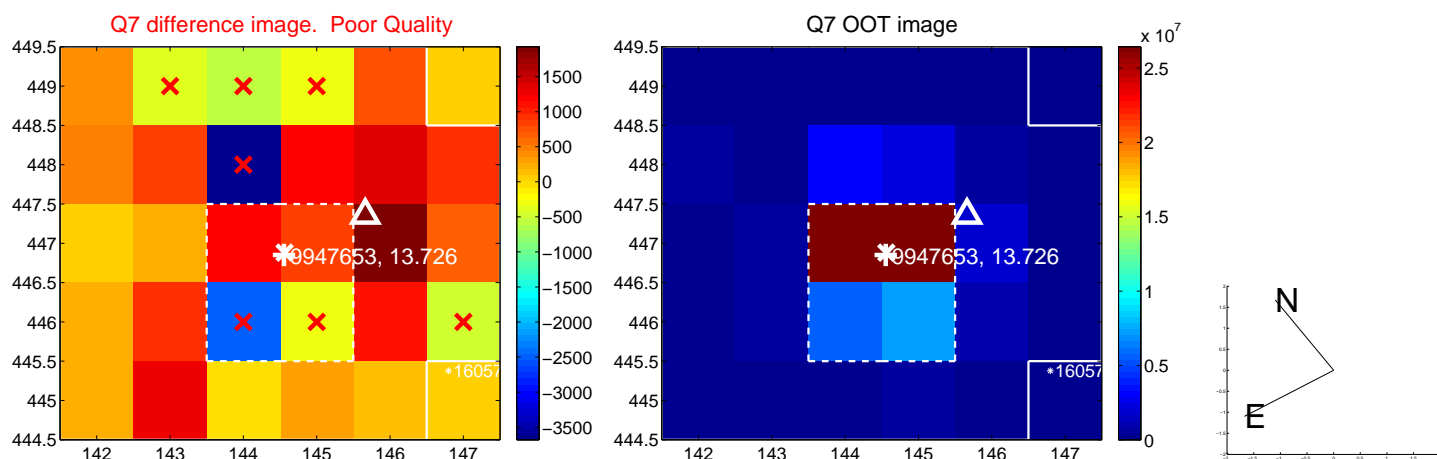
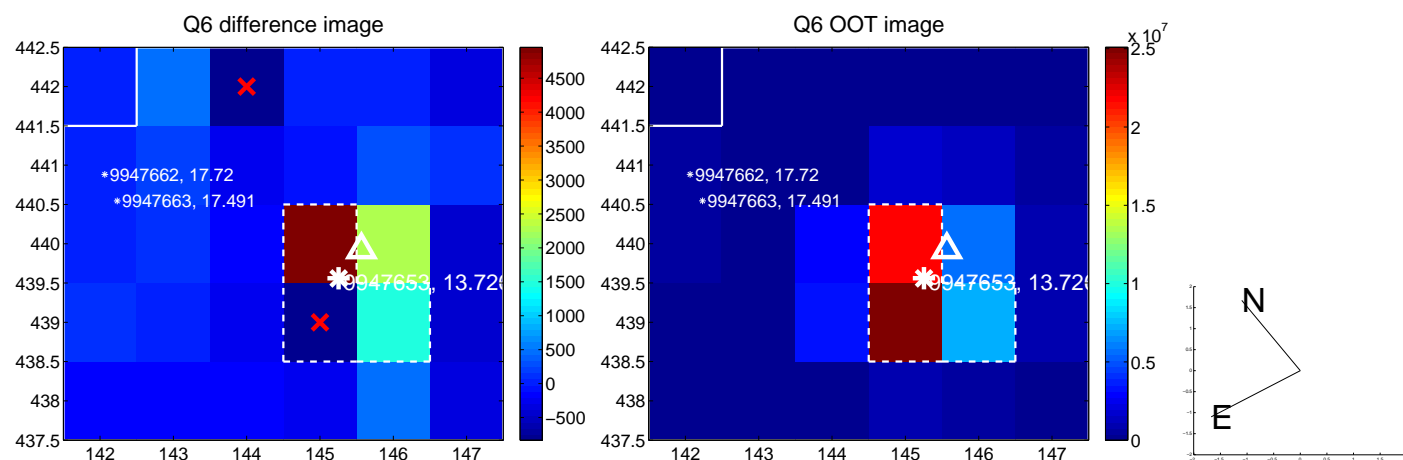
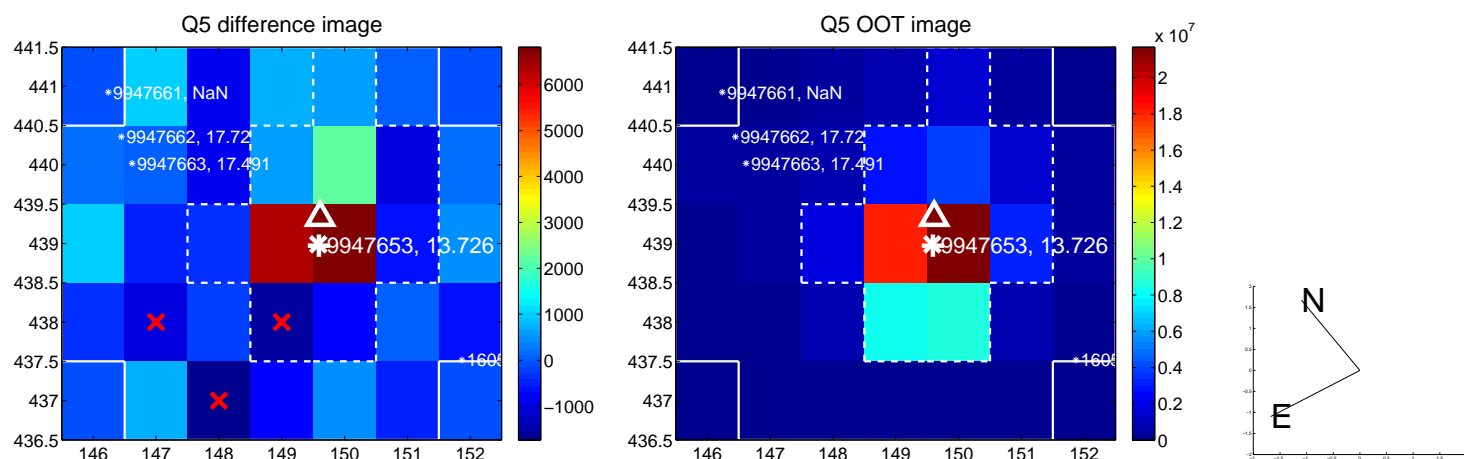


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

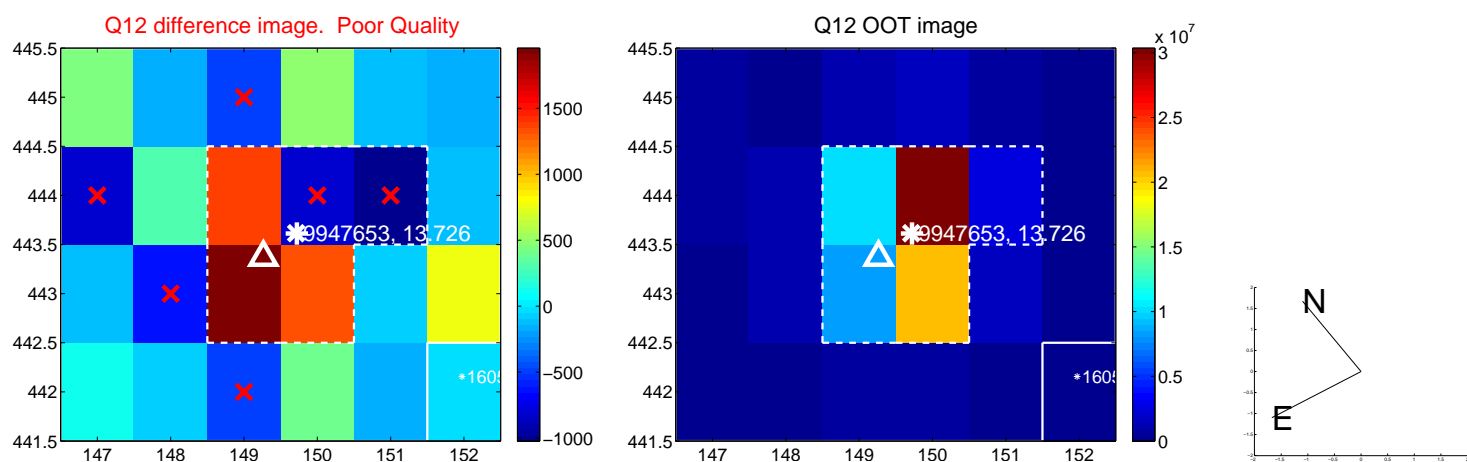
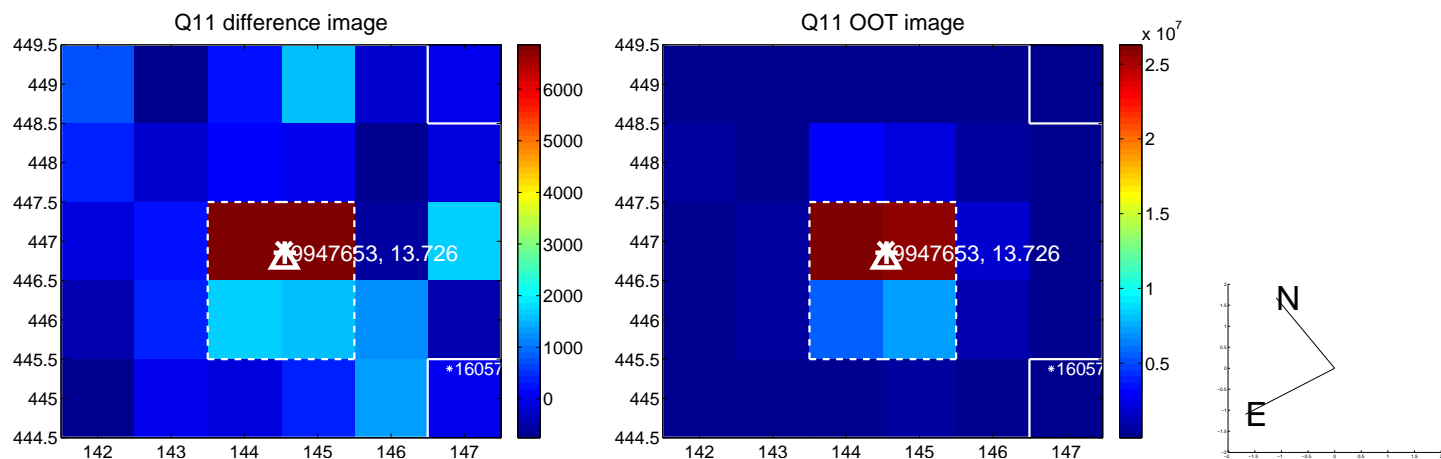
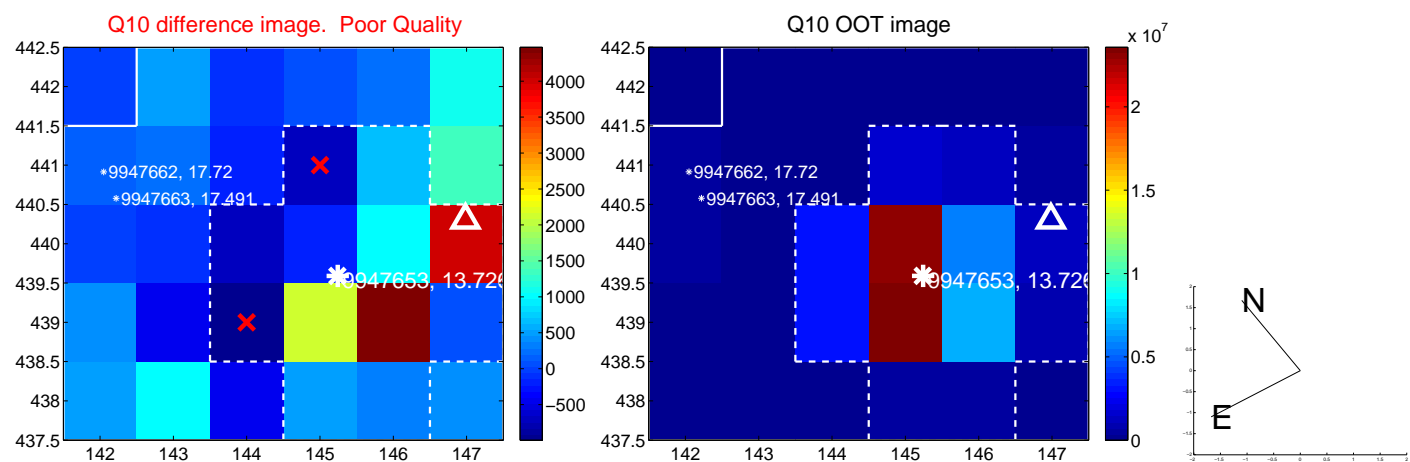
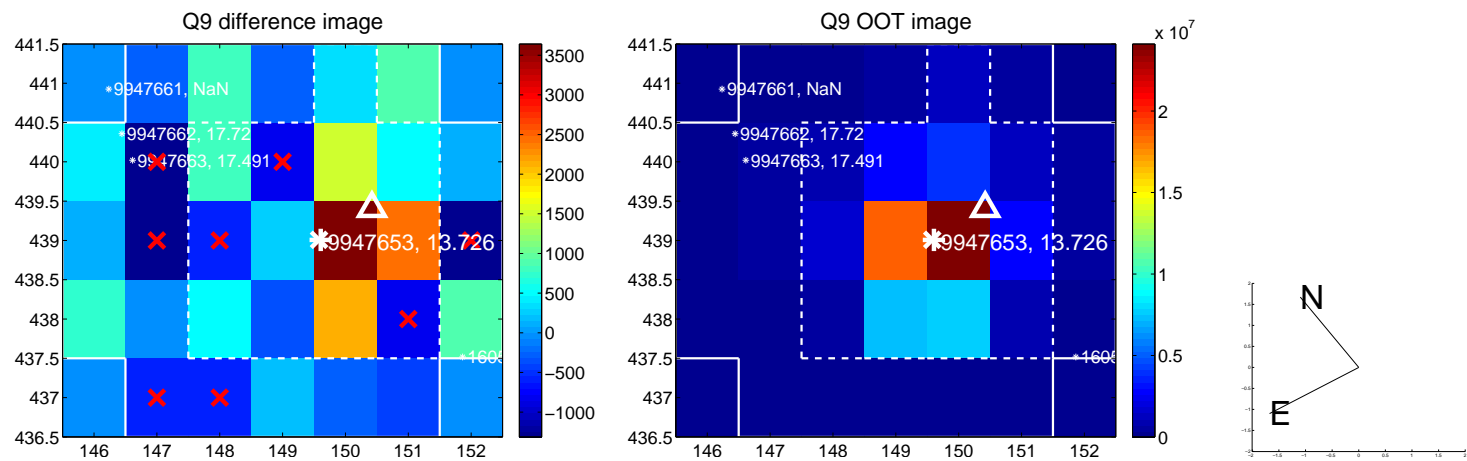
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



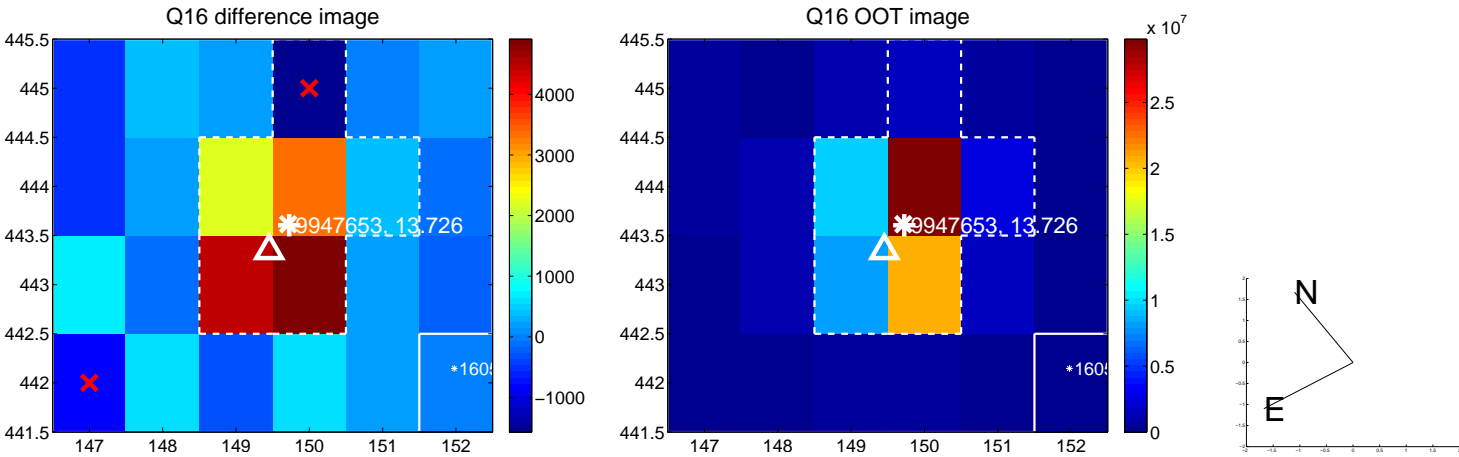
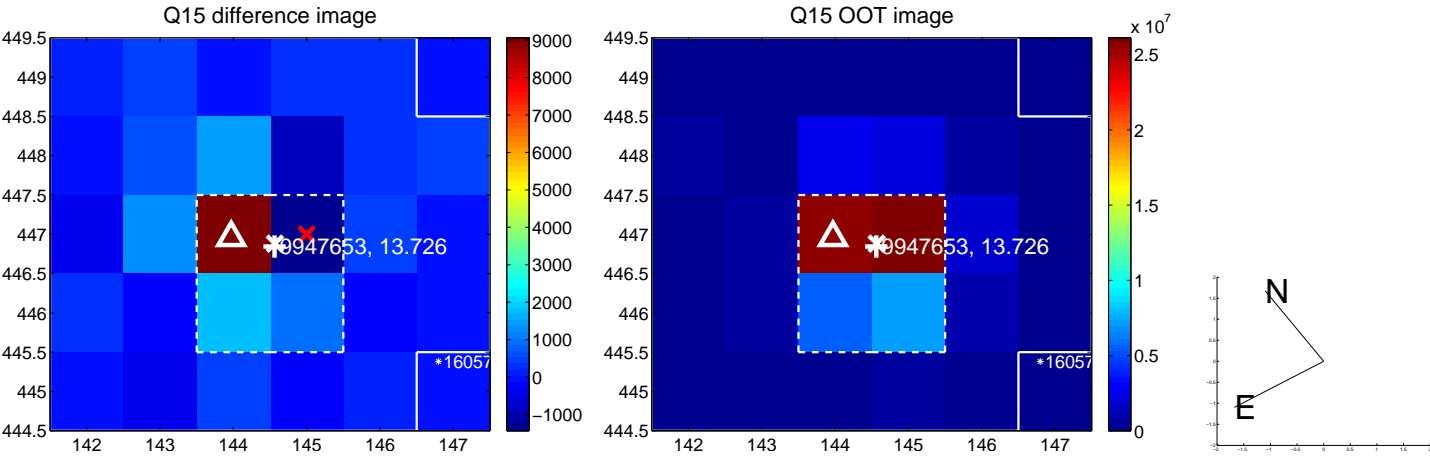
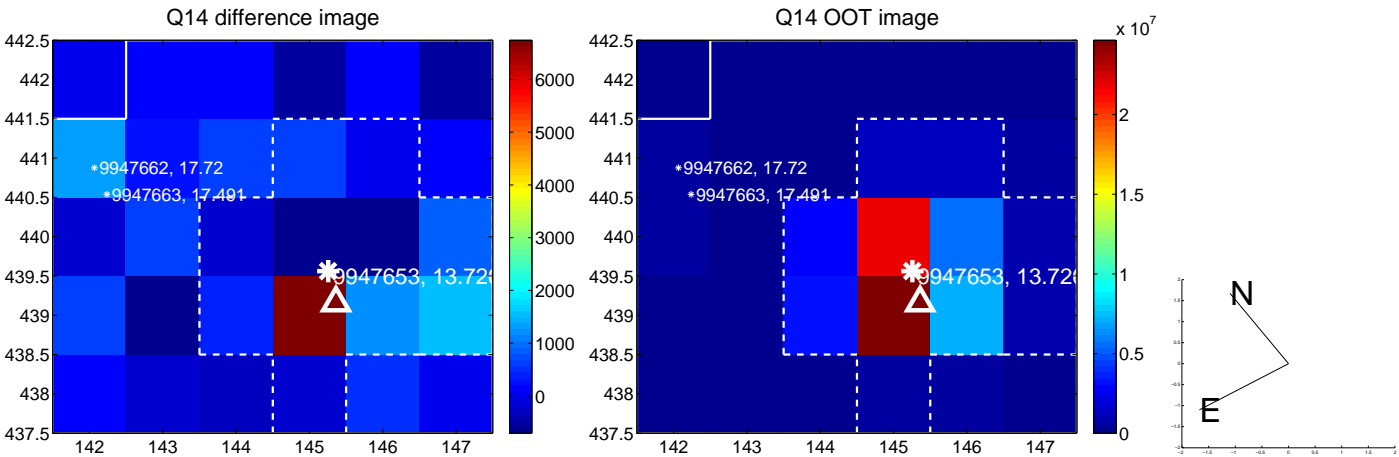
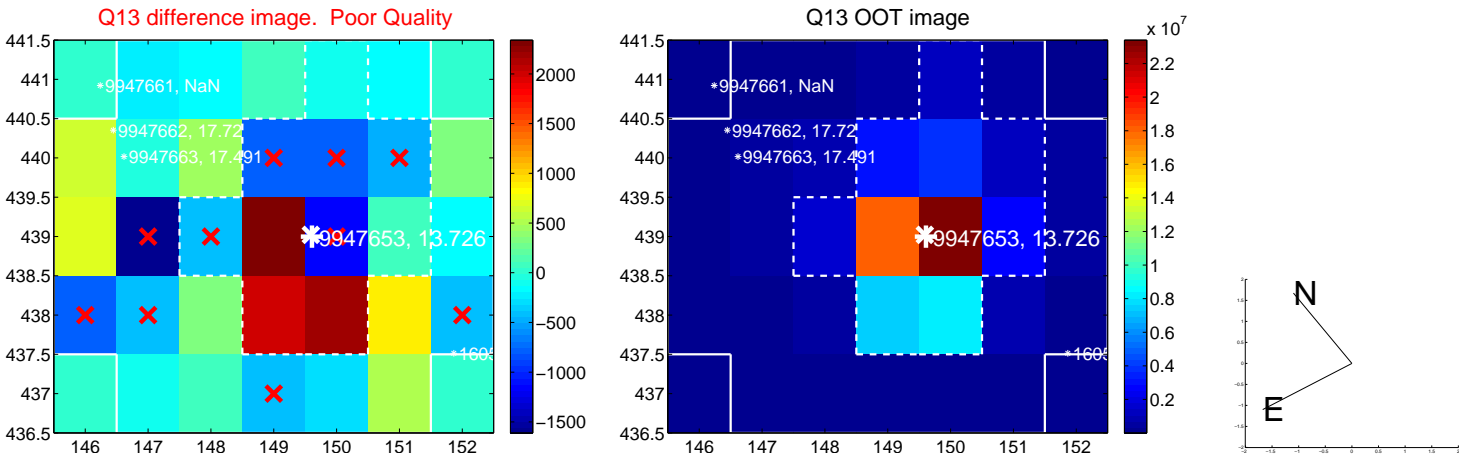
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



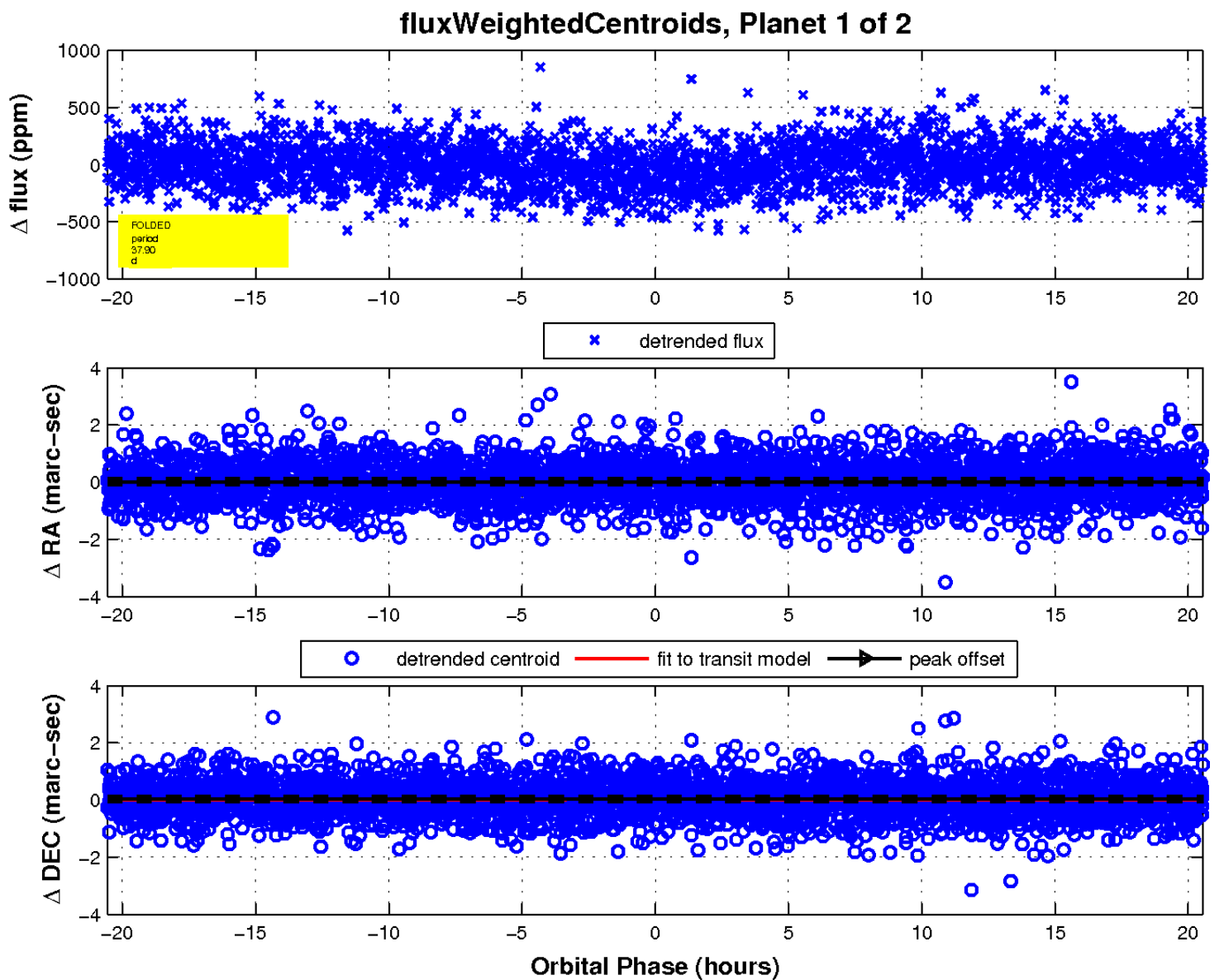
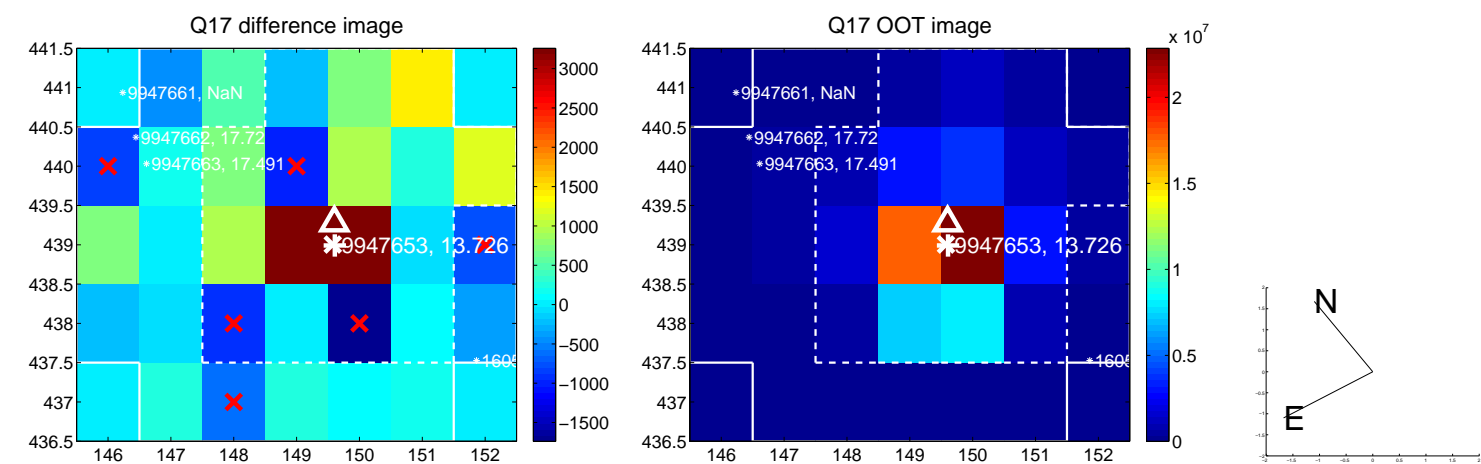
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

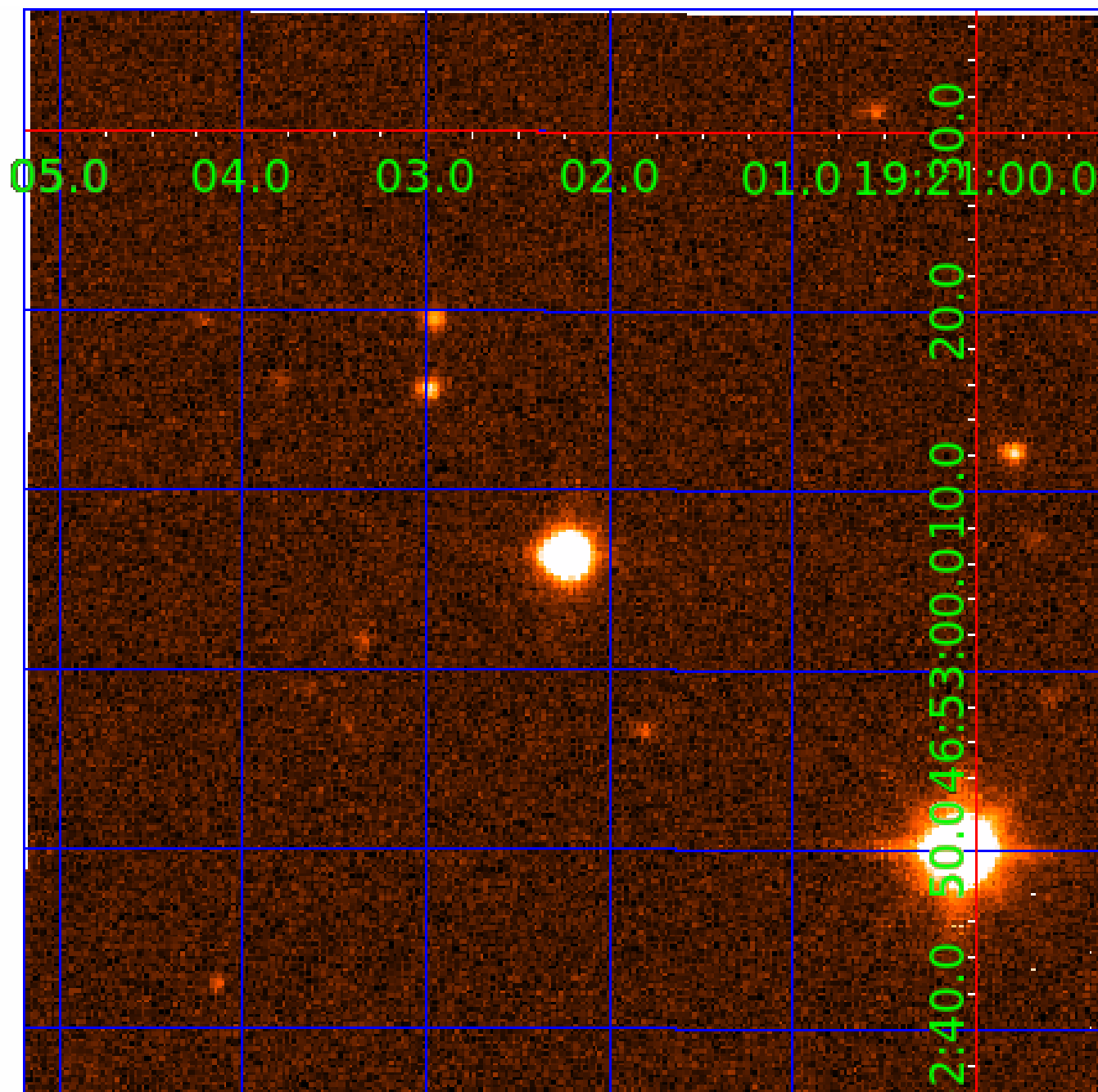


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009947653

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})
009947653-01	OBS	4647.01	37.903182	163.774008	98.0	6.855	9.0	8.2	1.96	5303	2.22	54.47
009947653-02	OBS	4647.02	12.008662	141.696320	71.6	4.497	8.0	8.9	1.96	5303	1.99	252.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009947653-01	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009947653-02	OBS	PC	0.97	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.

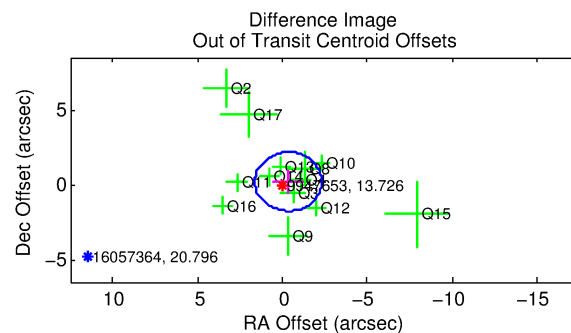
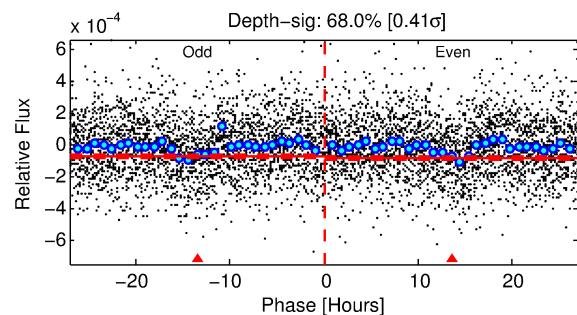
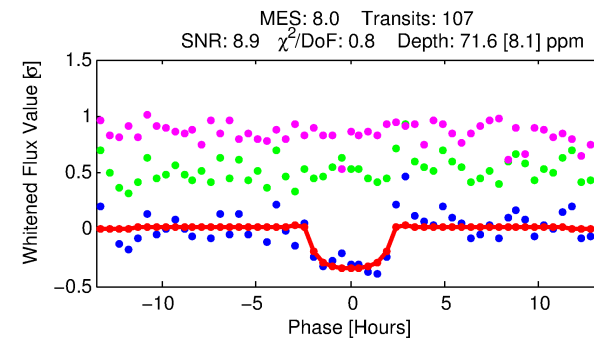
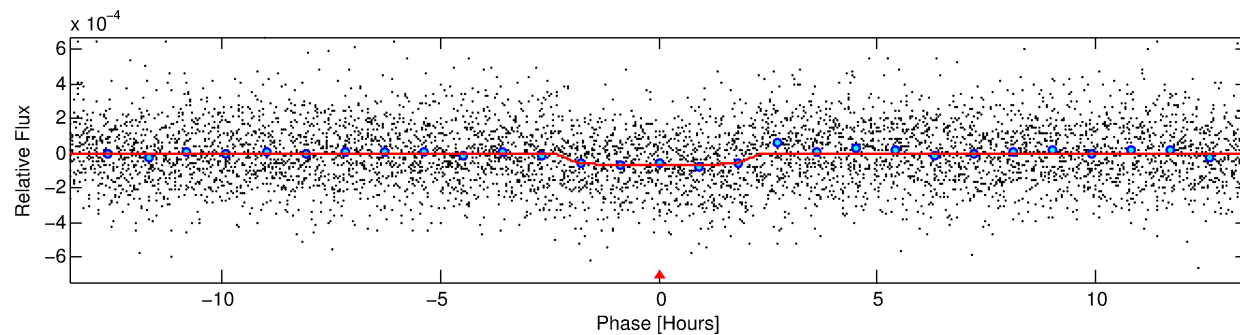
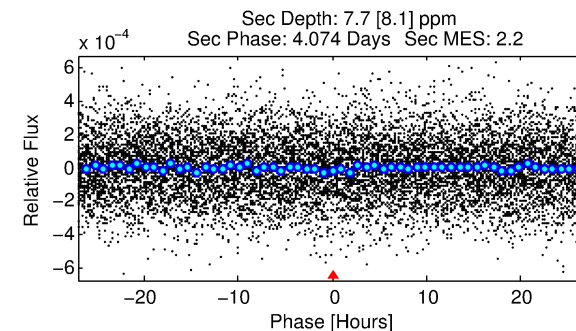
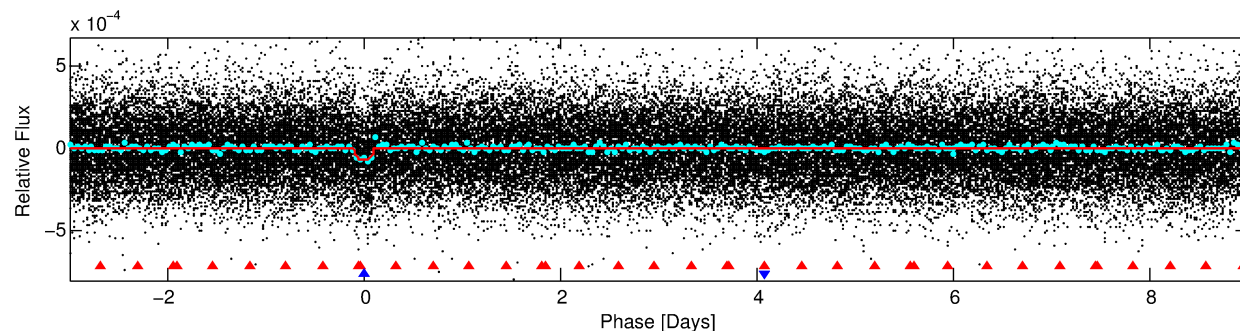
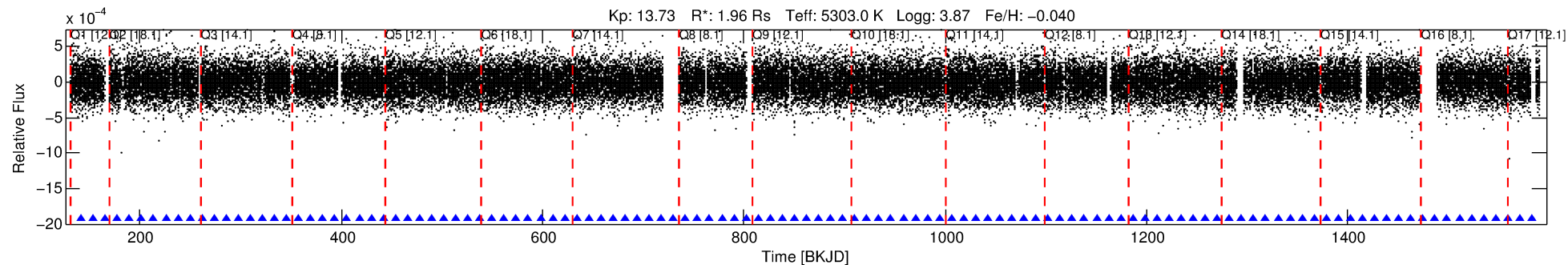
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009947653-02

No Significant Match Found

DV One-Page Summary

KIC: 9947653 Candidate: 2 of 2 Period: 12.009 d
KOI: K04647.02 Corr: 0.986



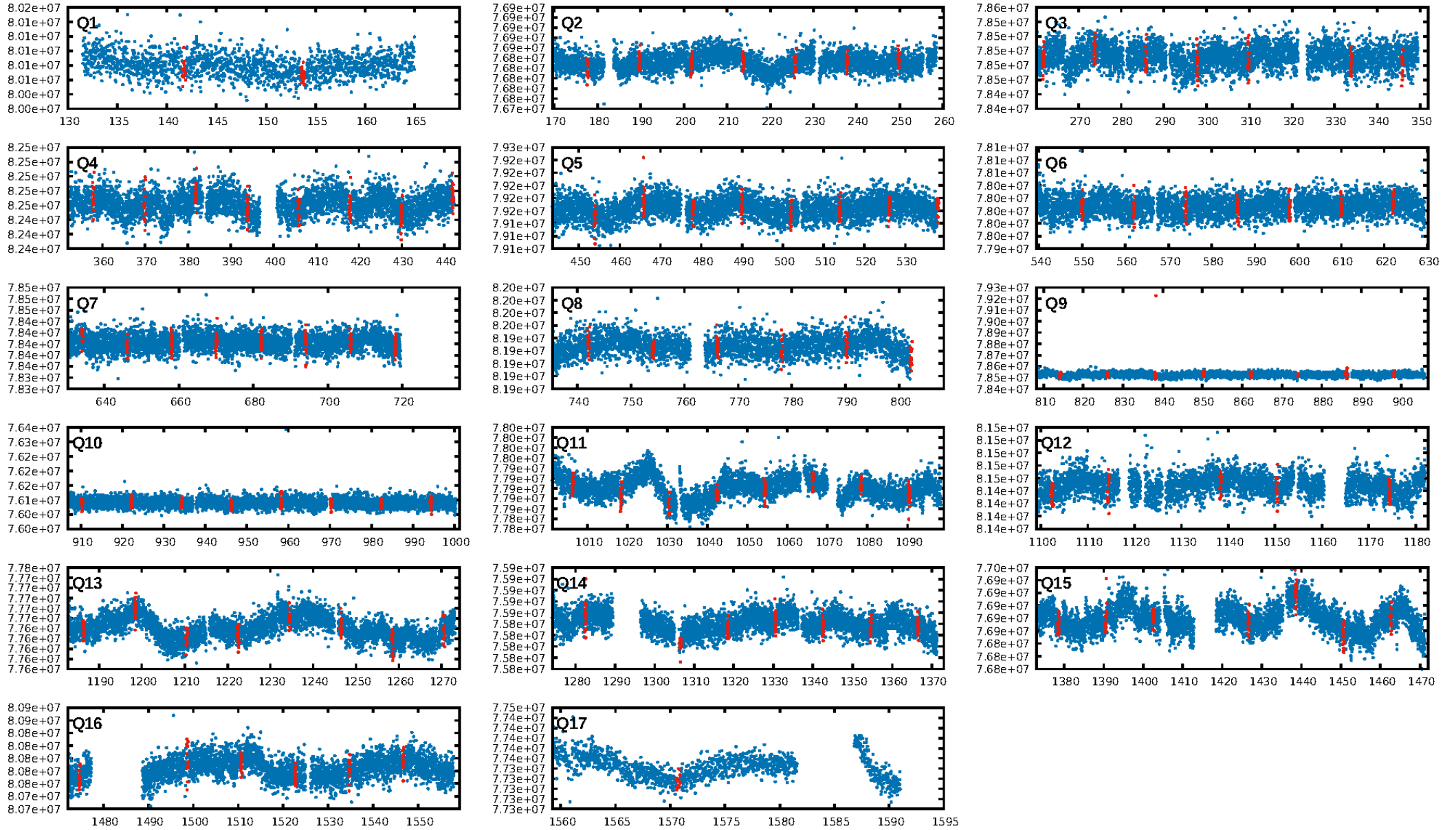
DV Fit Results:

Period = 12.00866 [0.00014] d
Epoch = 141.6963 [0.0092] BKJD
Rp/R* = 0.0093 [0.0053]
a/R* = 9.64 [23.84]
b = 0.89 [0.58]
Seff = 252.20 [265.41]
Teq = 1016 [267] K
Rp = 1.99 [1.64] Re
a = 0.1041 [0.0649] AU
Ag = 11.66 [21.90] [0.49σ]
Teffp = 2903 [1137] K [1.62σ]

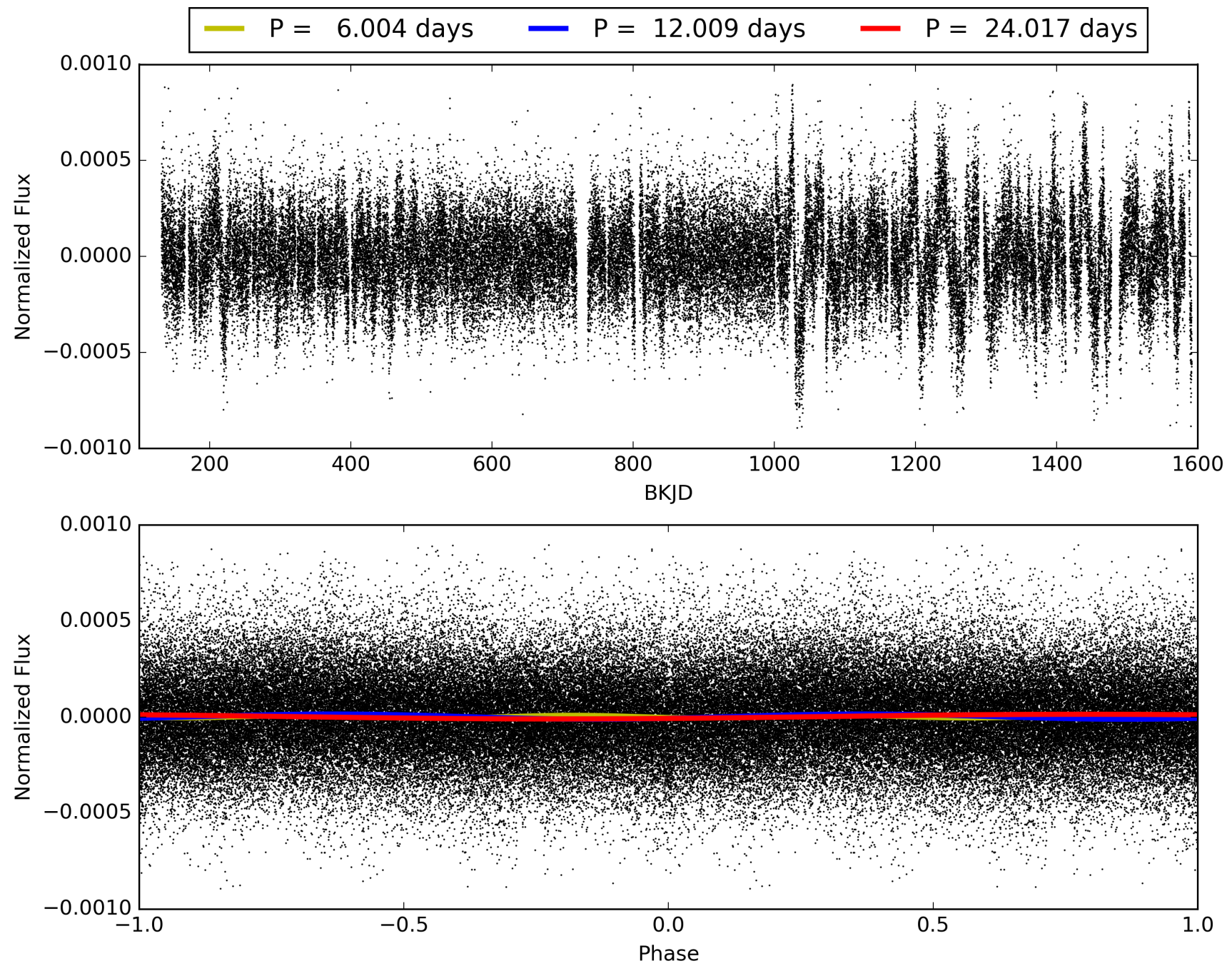
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [75.80σ]
ModelChiSquare2-sig: 99.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.01e-15
RollingBand-fgt: 1.00 [104/104]
GhostDiagnostic-chr: 3.649
Centroid-sig: 16.8%
Centroid-so: 0.842 arcsec [0.94σ]
OotOffset-rm: 0.409 arcsec [0.63σ]
OotOffset-st: 3/3/4/3 [13]
KicOffset-rm: 0.387 arcsec [0.56σ]
KicOffset-st: 3/3/4/3 [13]
DiffImageQuality-fgm: 0.62 [8/13]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009947653-02, PDC Light Curves

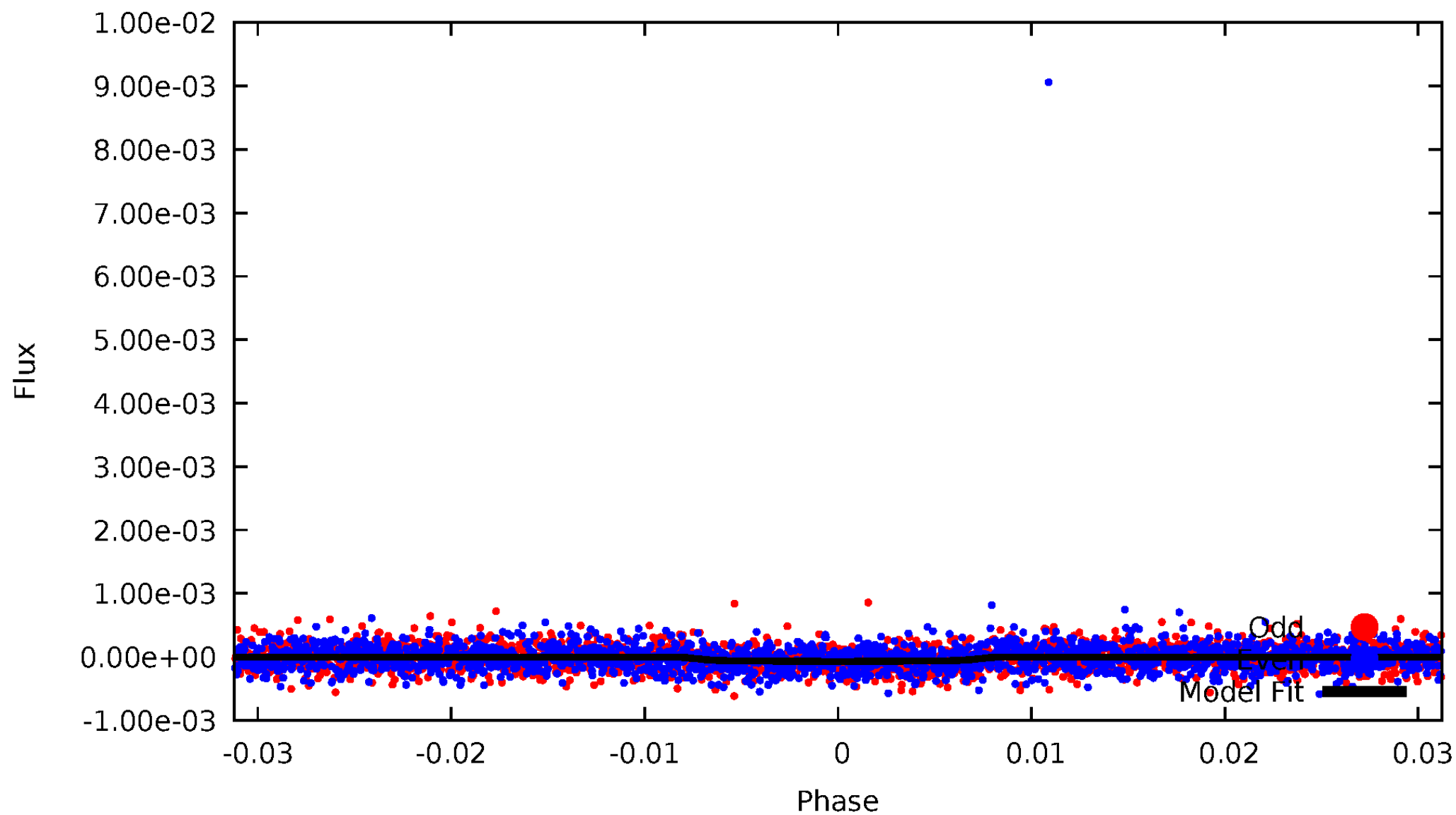


TCE 009947653-02



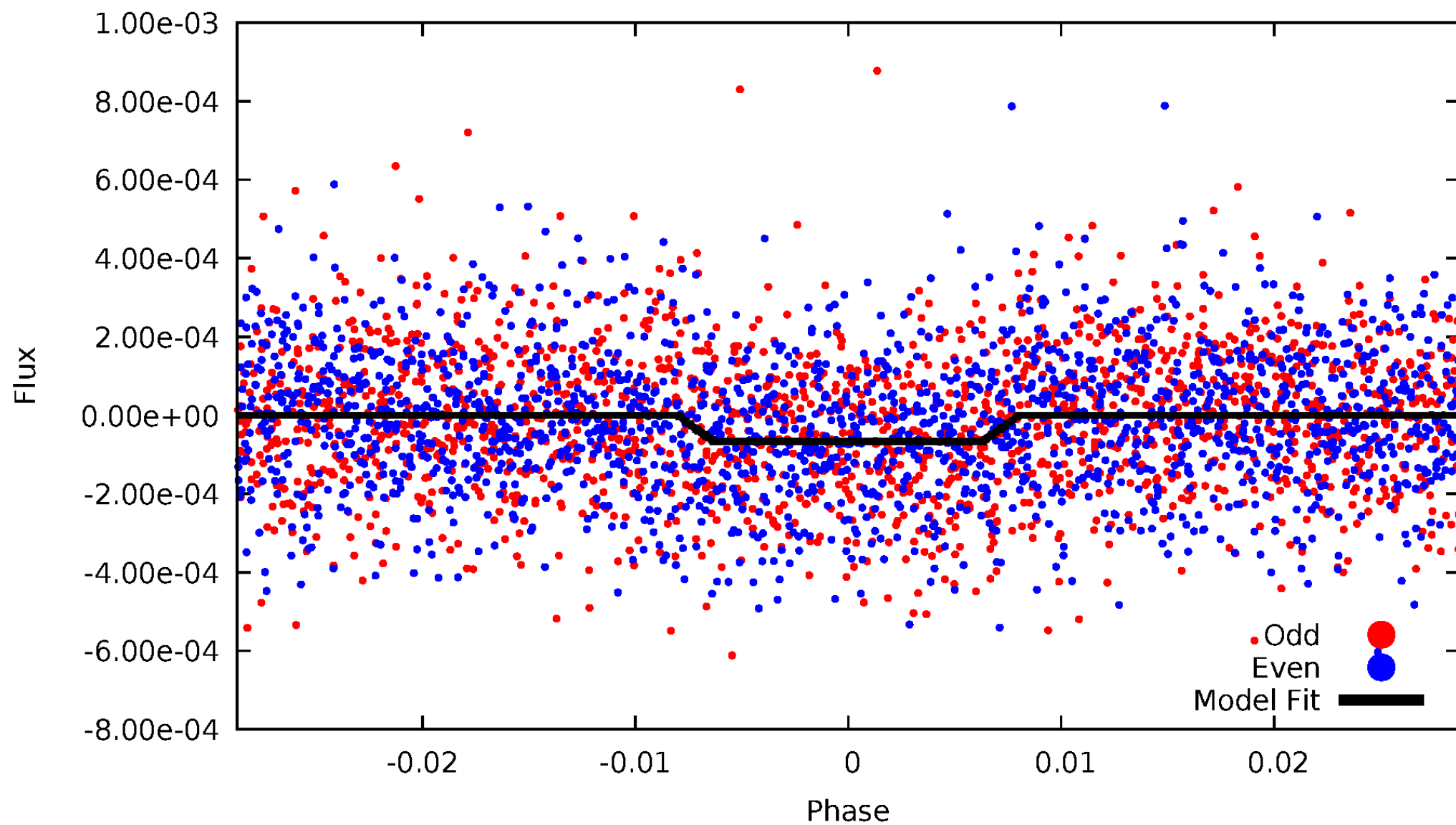
DV Odd/Even

TCE 009947653-02



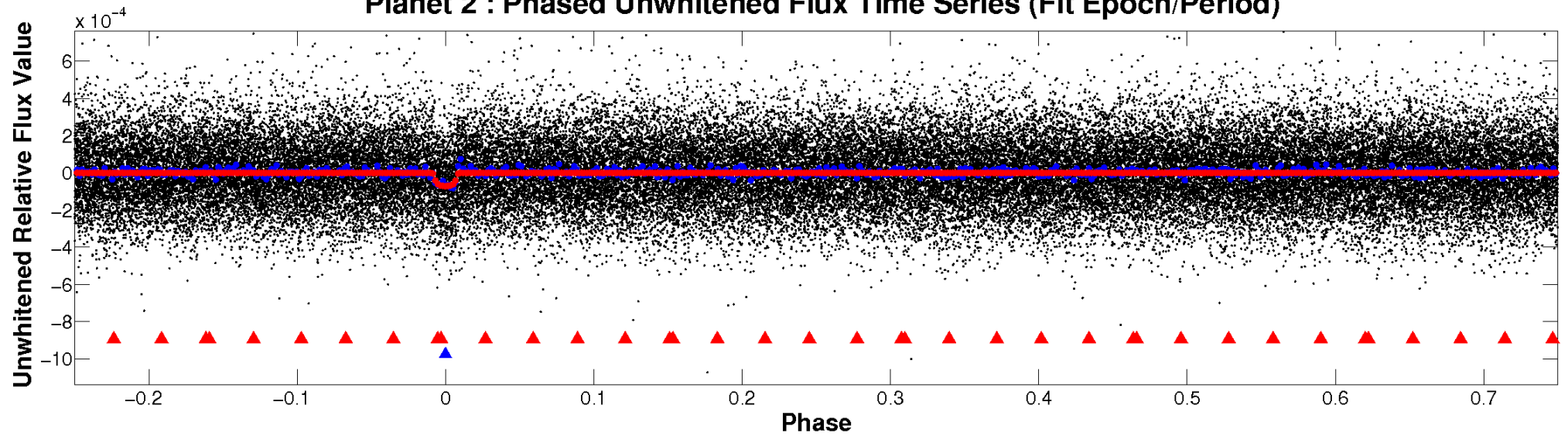
ALT Odd/Even

TCE 009947653-02

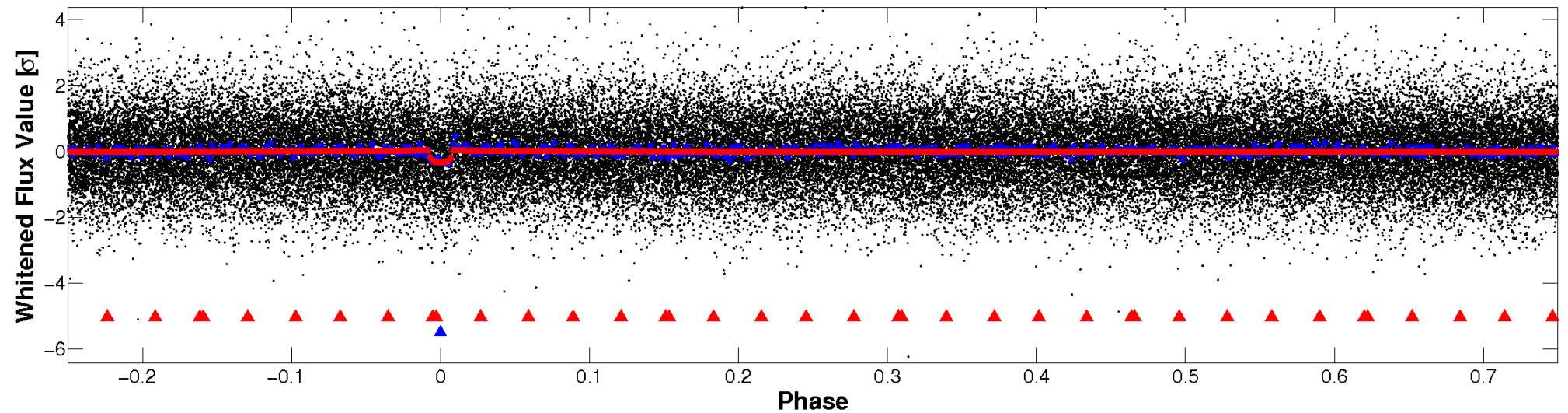


Non-Whitened Vs. Whitened Light Curve

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

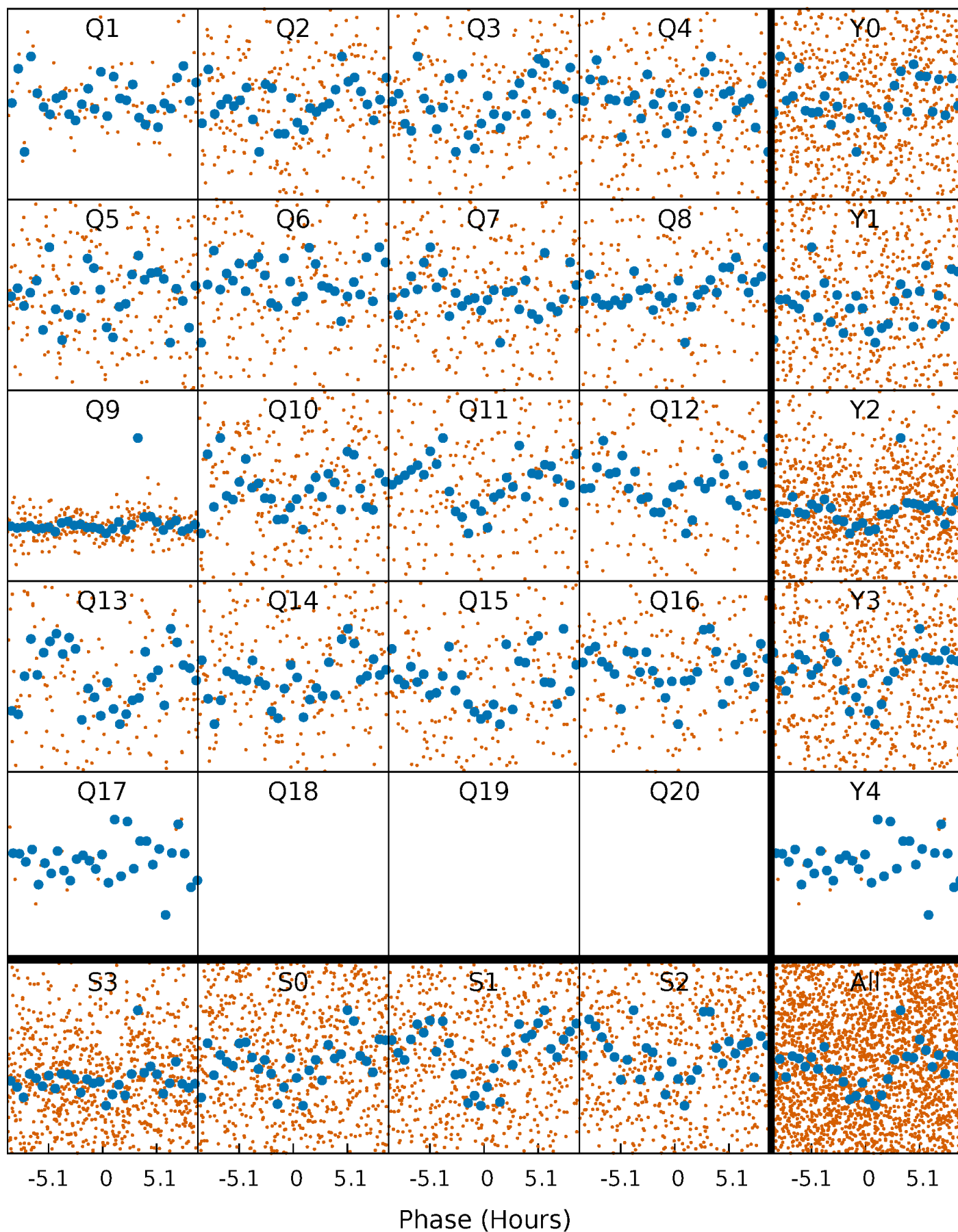


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



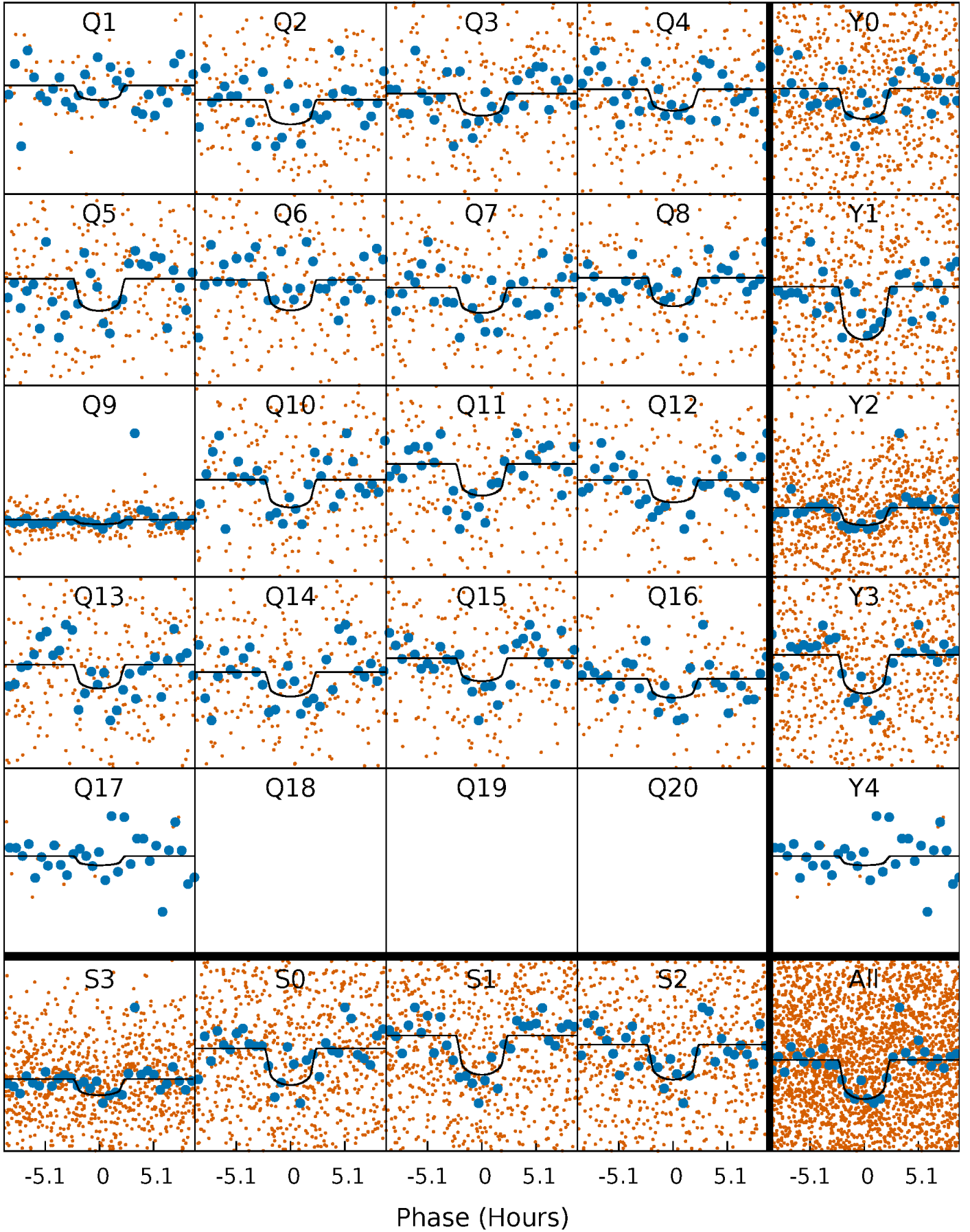
PDC Quarter-Phased Transit Curves

TCE 009947653-02 P= 12.008662 Days $T_0=141.696320$ (BKJD)



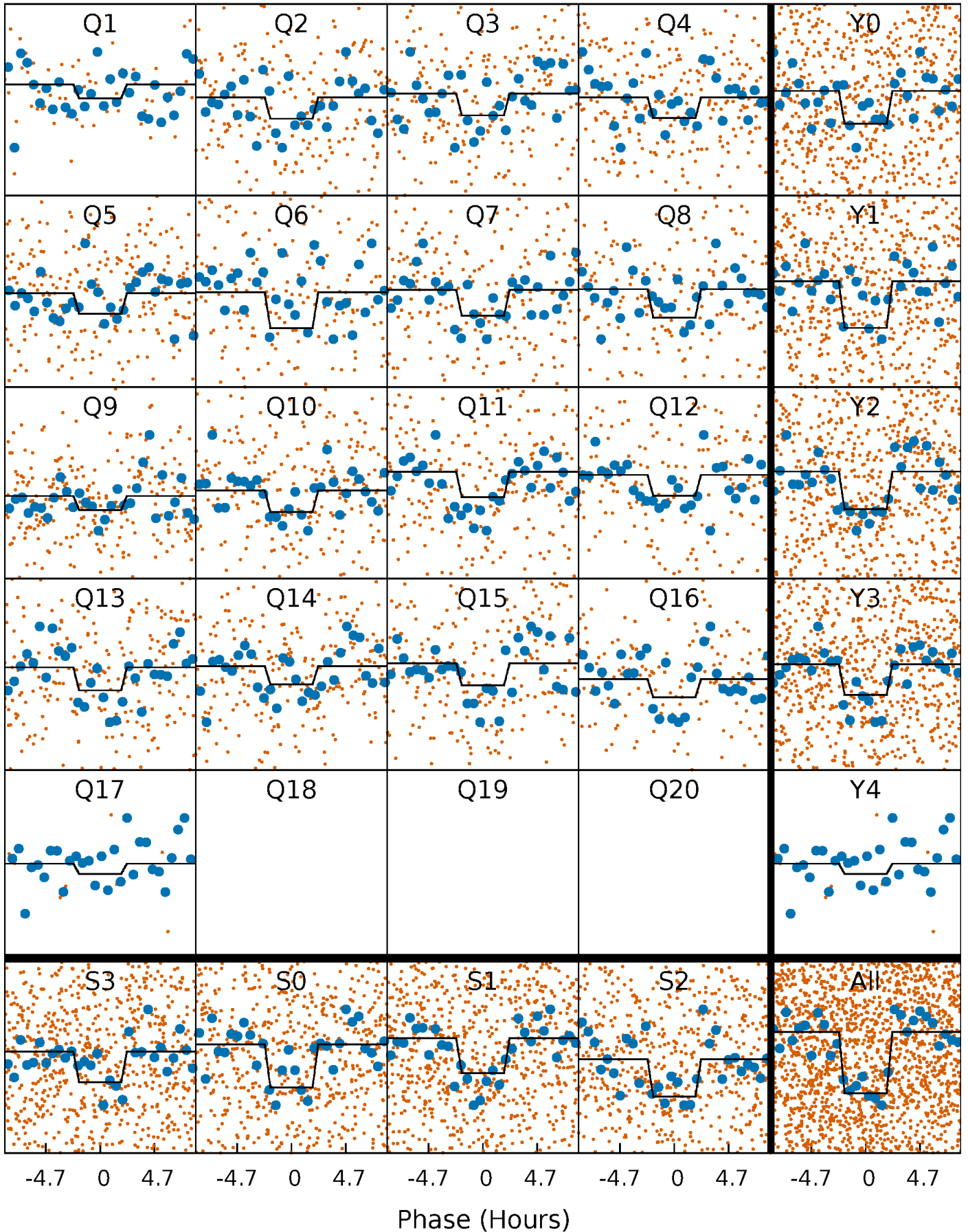
DV Quarter-Phased Transit Curves

TCE 009947653-02 P= 12.008662 Days $T_0=141.696320$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

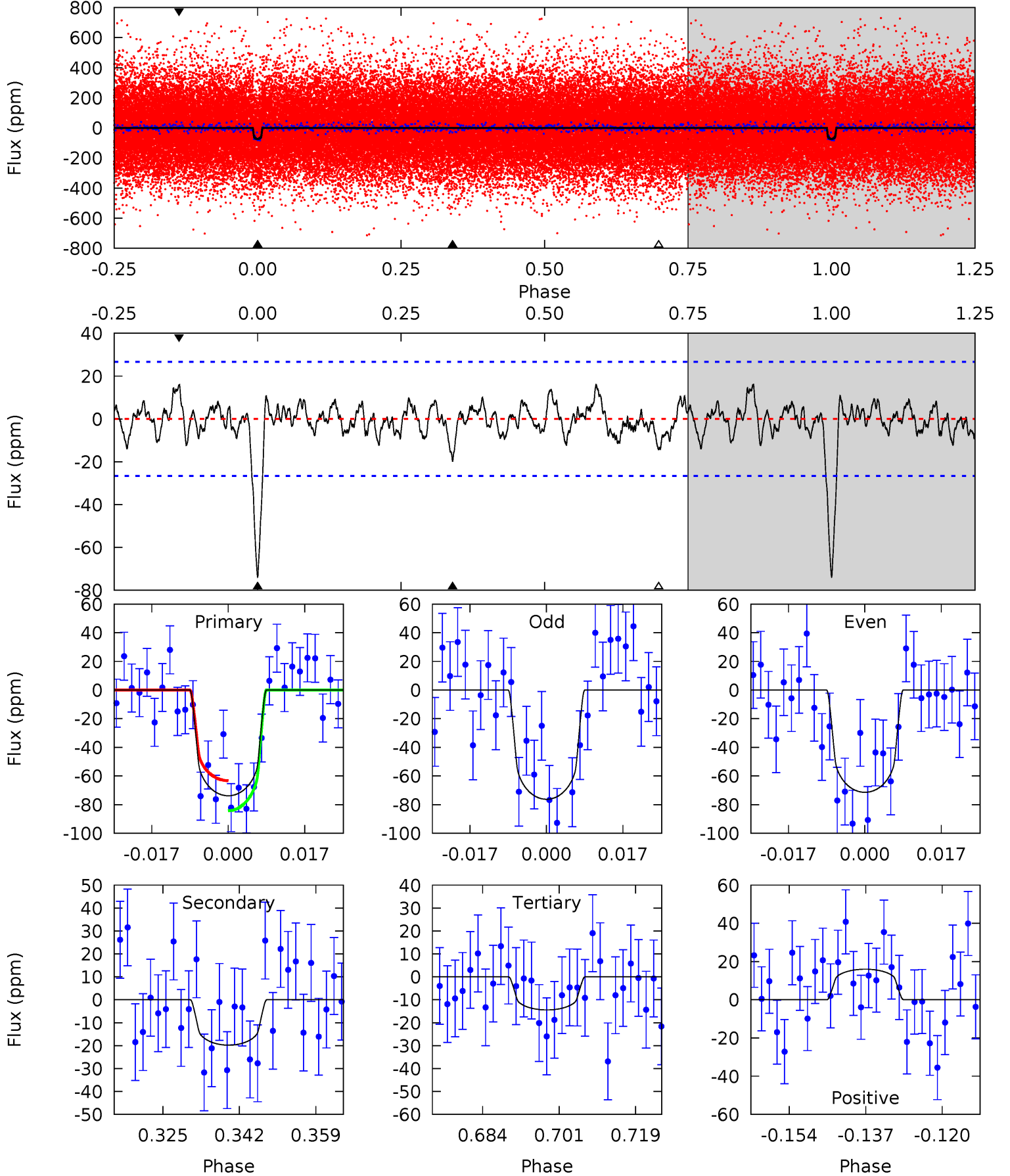
TCE 009947653-02 P= 12.008747 Days $T_0=141.690767$ (BKJD)



DV Model-Shift Uniqueness Test

009947653-02, $P = 12.008662$ Days, $E = 129.687658$ Days

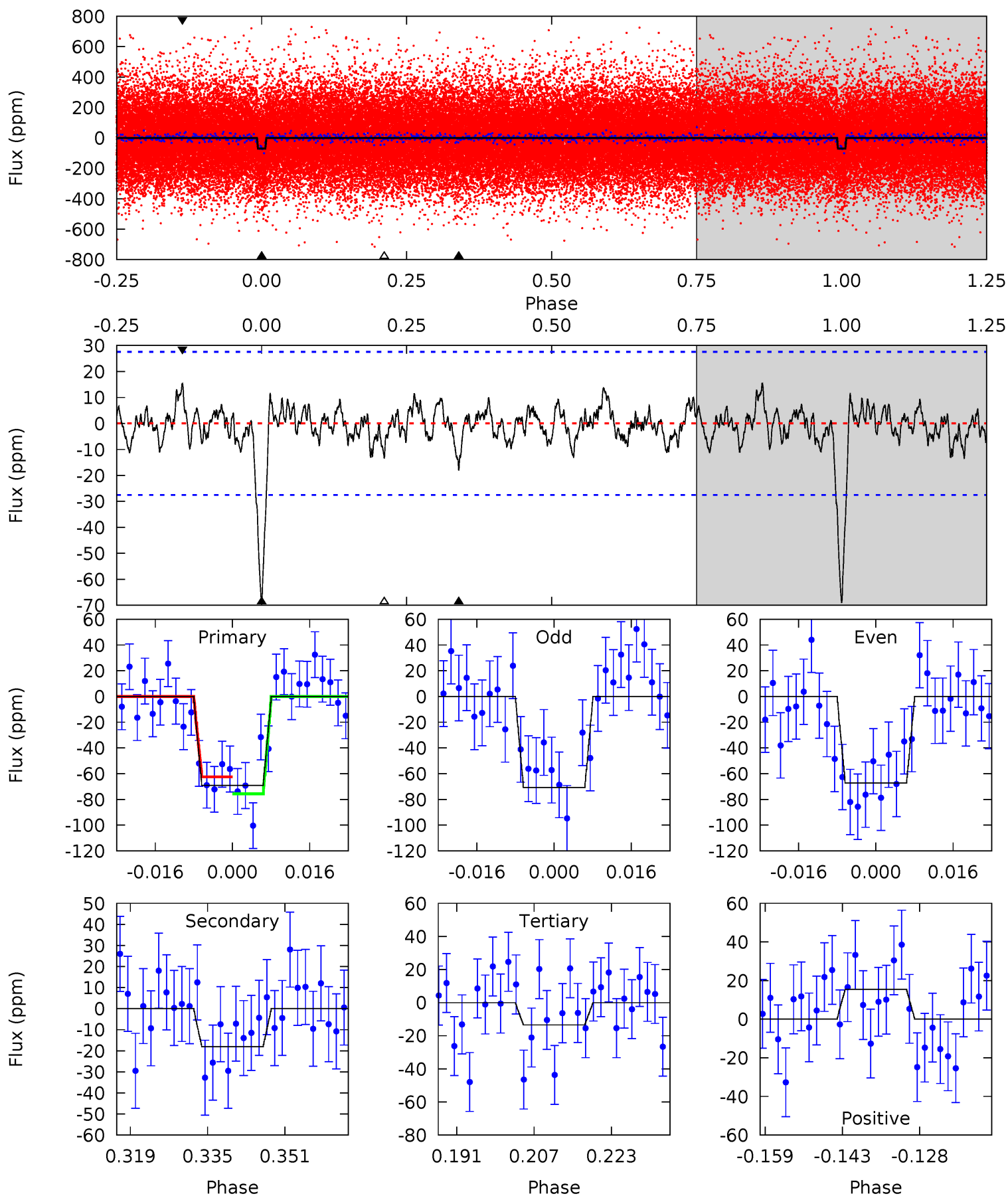
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.7	3.66	2.67	2.96	4.92	2.38	1.06	11.0	10.7	0.99	0.70	0.45	1.02	0.18	1.94



Alt Model-Shift Uniqueness Test

009947653-02, $P = 12.008747$ Days, $E = 129.682020$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.4	3.25	2.42	2.78	4.94	2.41	0.92	9.96	9.61	0.83	0.47	0.31	1.03	0.18	1.18



Stellar Parameters For KIC 009947653

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5303^{+175}_{-159}	$3.870^{+0.630}_{-0.270}$	$-0.040^{+0.300}_{-0.250}$	$1.964^{+0.773}_{-1.159}$	$1.042^{+0.180}_{-0.200}$	$0.194^{+1.725}_{-0.123}$
	+3%/-3%	+16%/-7%	+750%/-625%	+39%/-59%	+17%/-19%	+890%/-64%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009947653-02 / KOI 4647.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-20 ± 5	$1.92^{+1.30}_{-1.04}$	1415^{+169}_{-212}	3910^{+1262}_{-542}	32^{+118}_{-22}
Alt.	-18 ± 6	$1.75^{+1.32}_{-1.03}$	1408^{+169}_{-253}	3942^{+1503}_{-592}	34^{+175}_{-23}

T_{max} = Theoretical Maximum Planetary Temperature
 T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)
 A_{obs} = Observed Albedo (Assuming $T=0$)

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

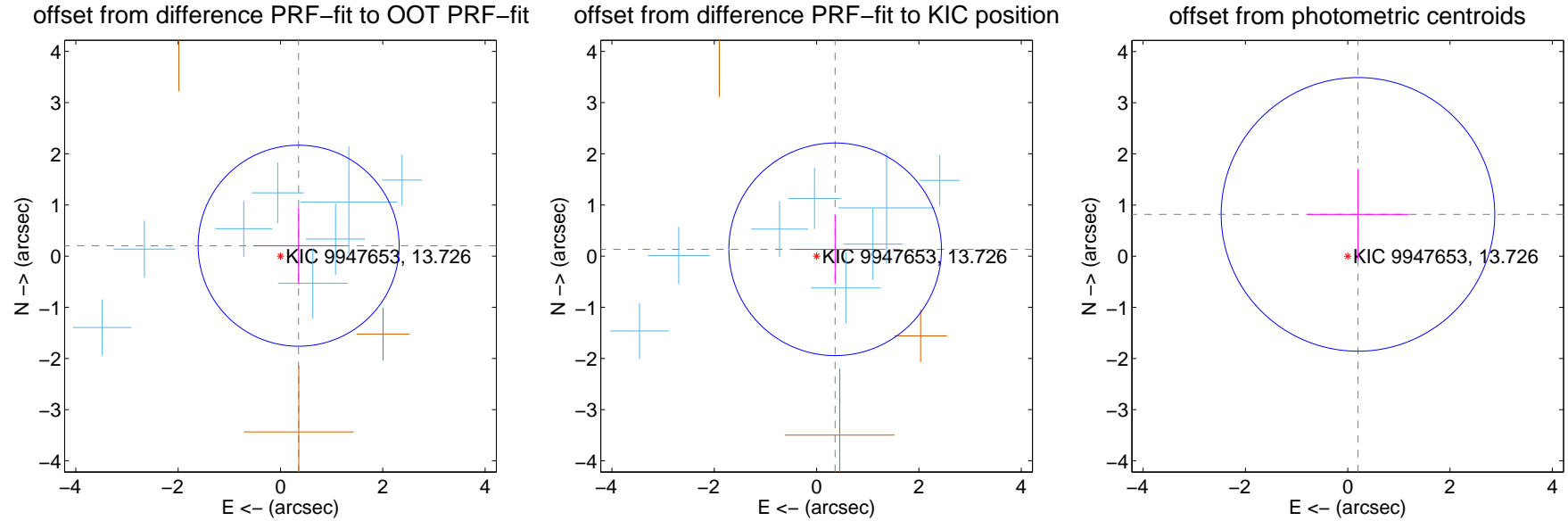
DV Centroid Data

Supplemental centroid analysis for 009947653-02. Kepler magnitude: 13.73. Transit SNR 8.92

There are 8 quarters with good PRF difference image offsets

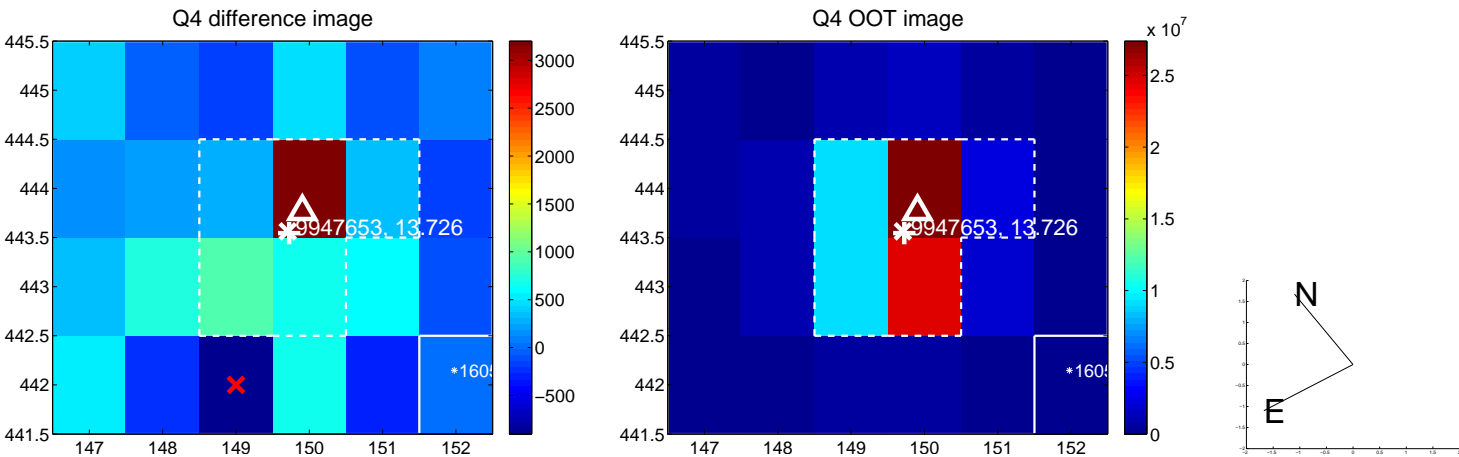
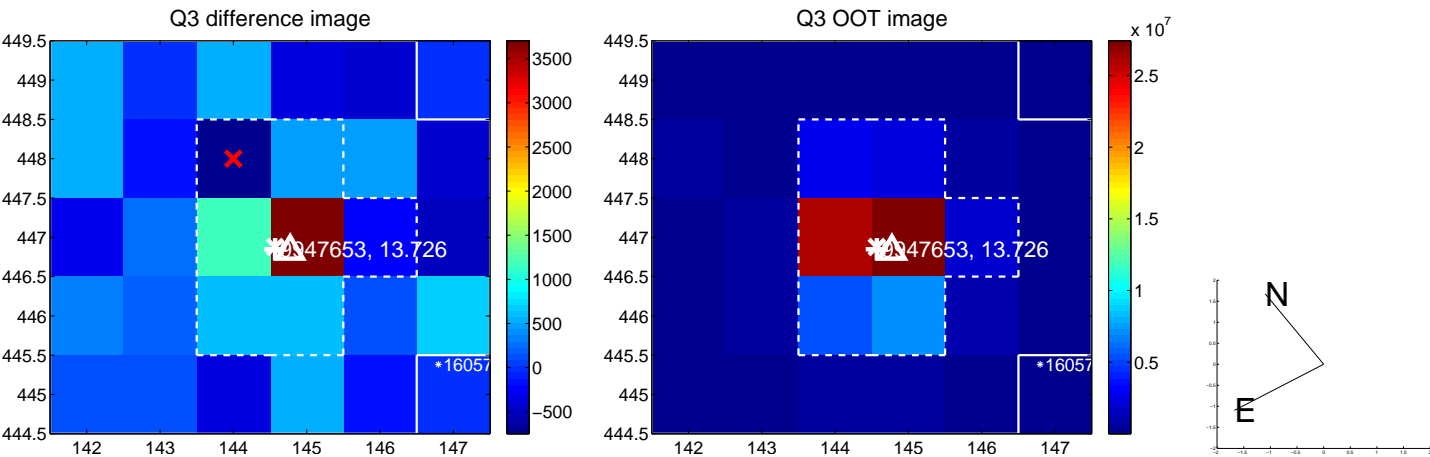
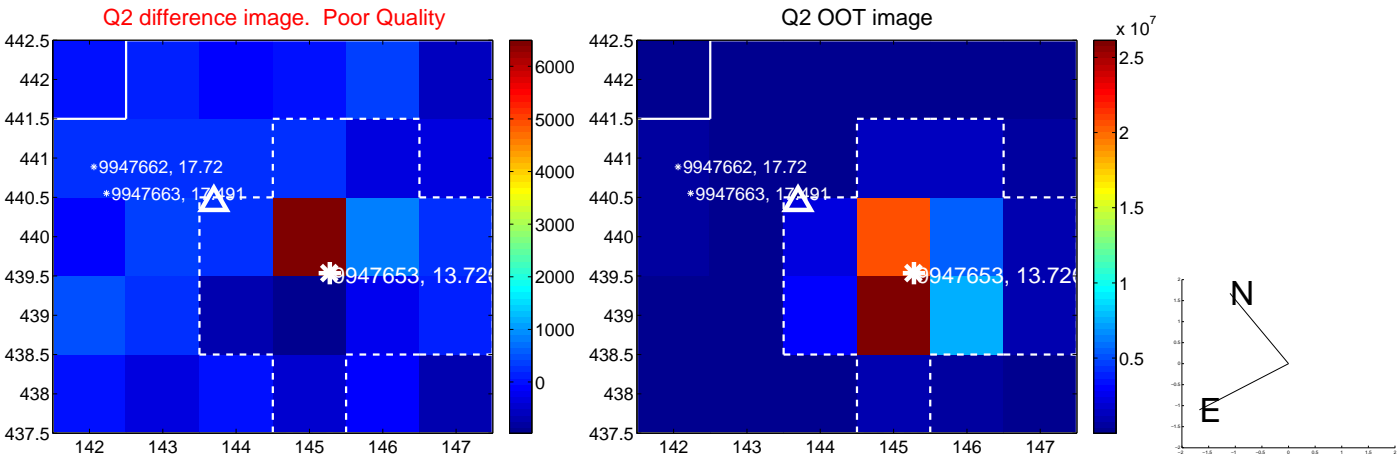
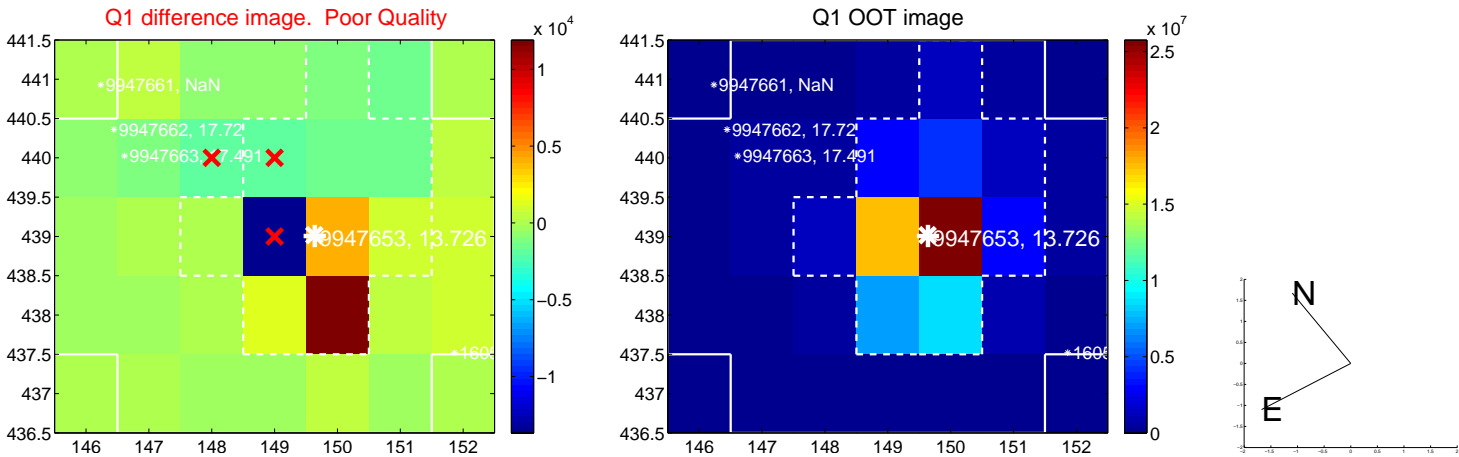
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.409 ± 0.655	0.63	-0.355 ± 0.892	0.204 ± 0.745
PRF-fit source offset from KIC position	0.387 ± 0.693	0.56	-0.363 ± 0.795	0.134 ± 0.672
photometric centroid source offset	0.84 ± 0.89	0.94	-0.20 ± 0.99	0.82 ± 0.89

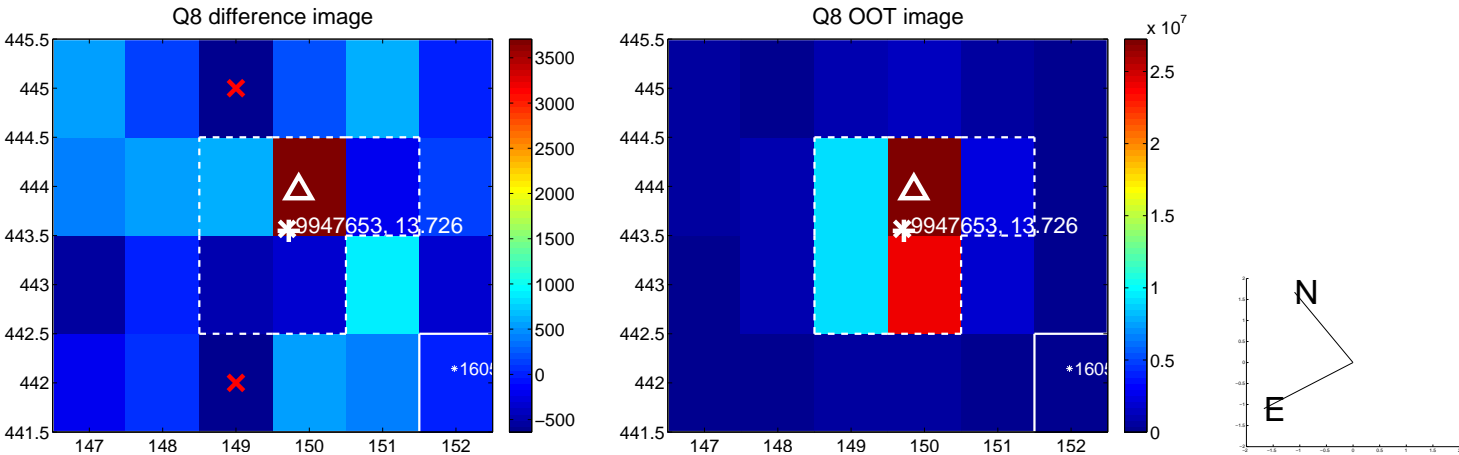
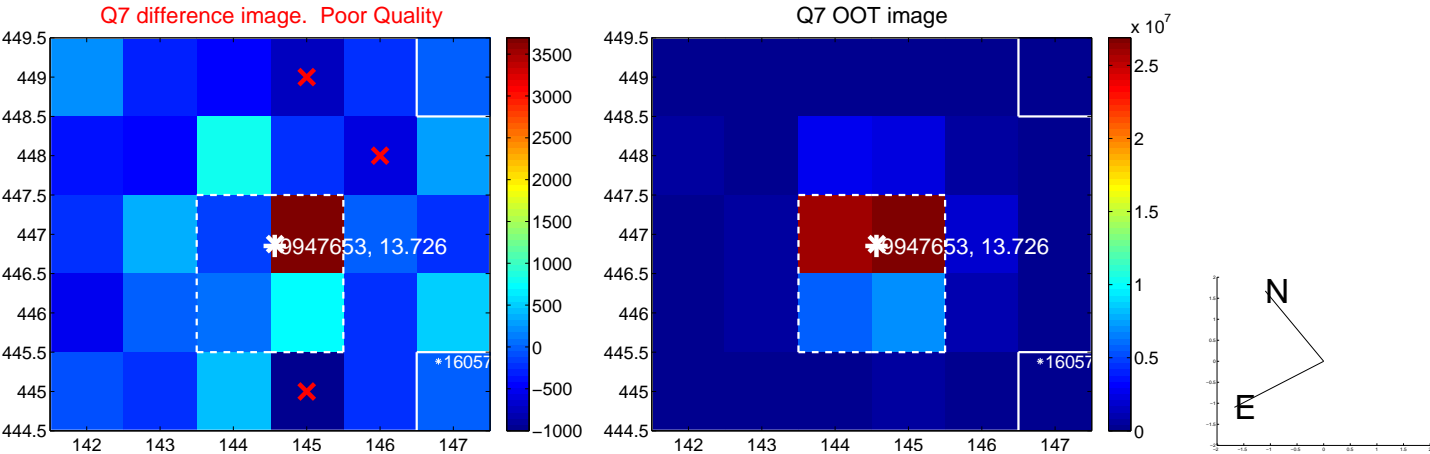
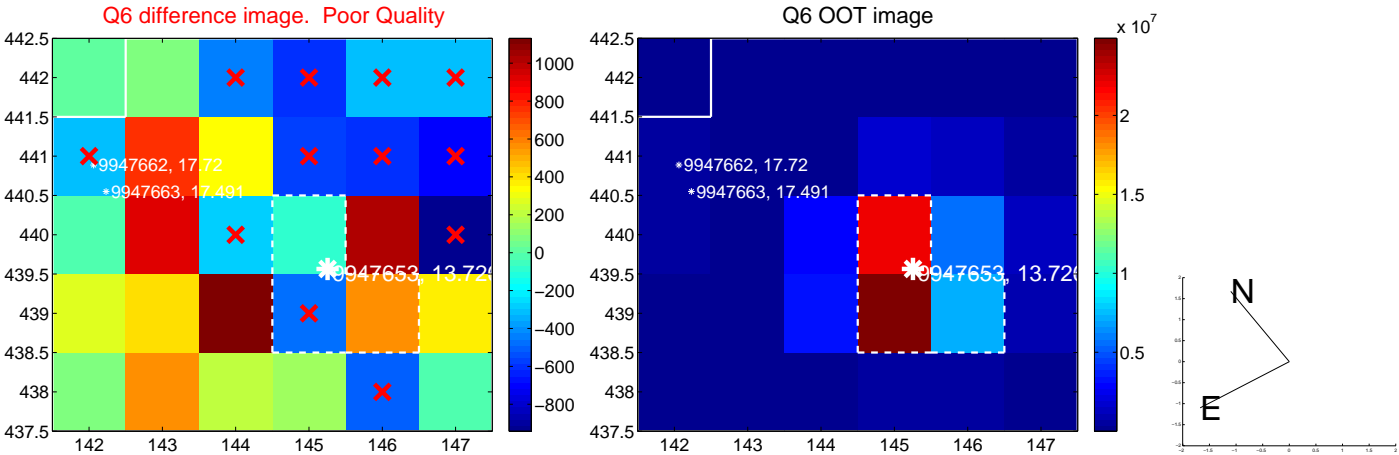
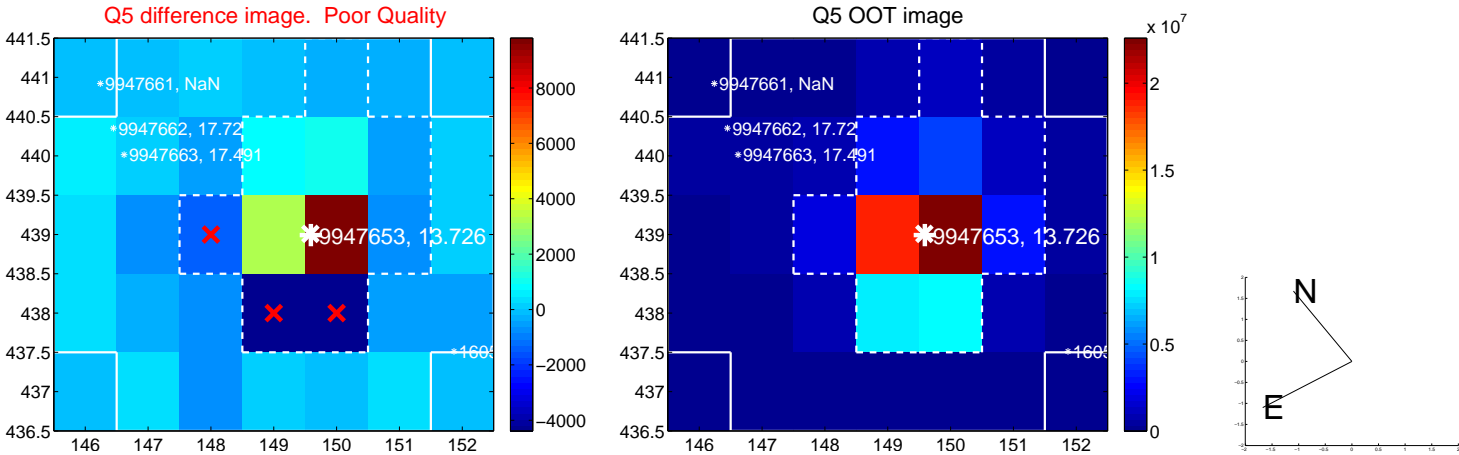


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

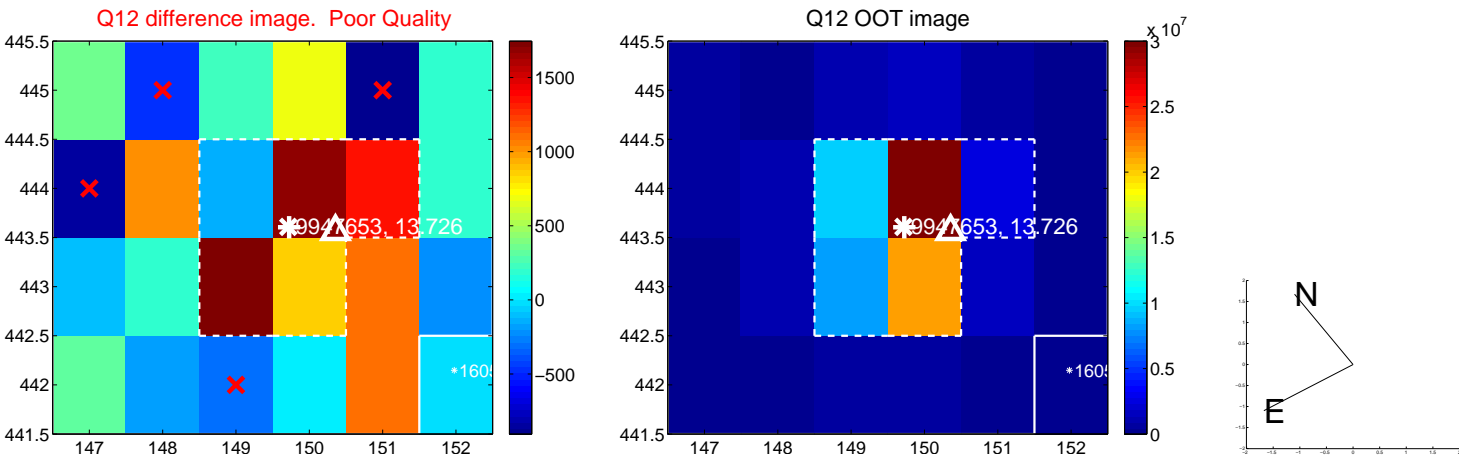
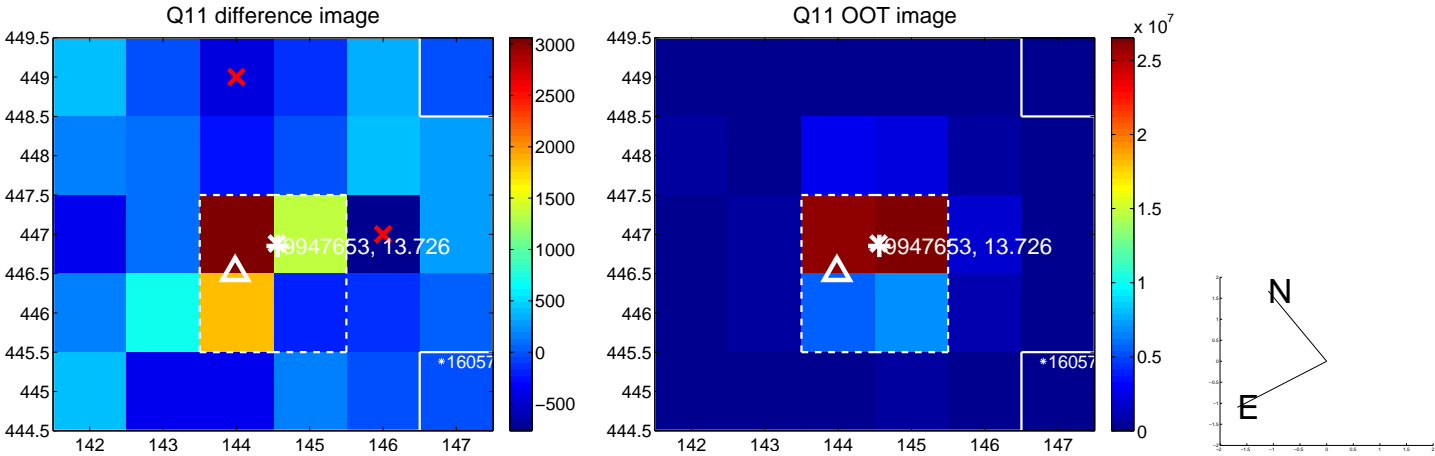
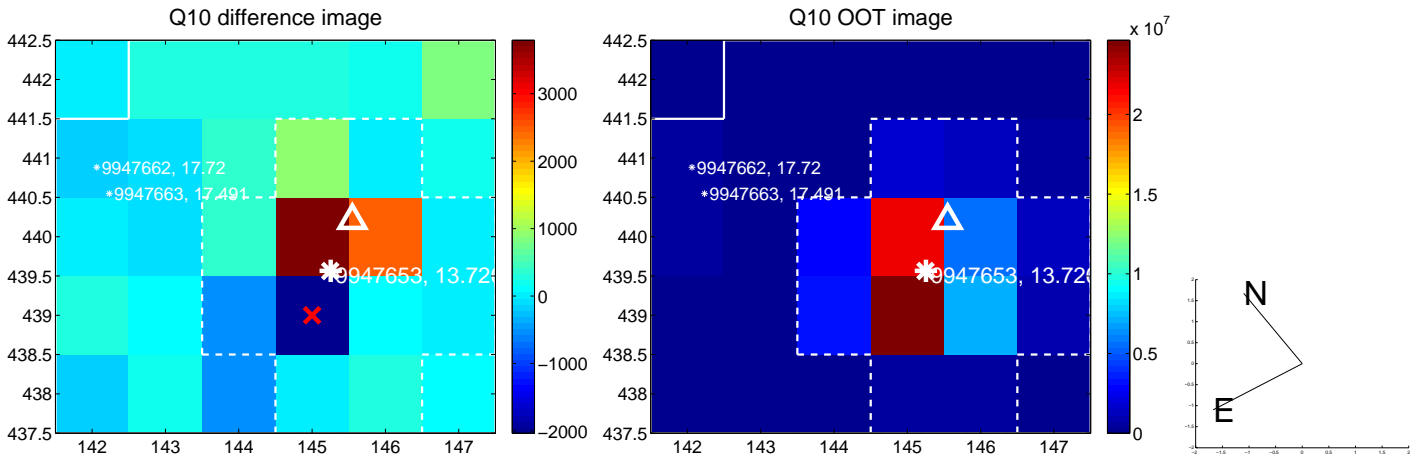
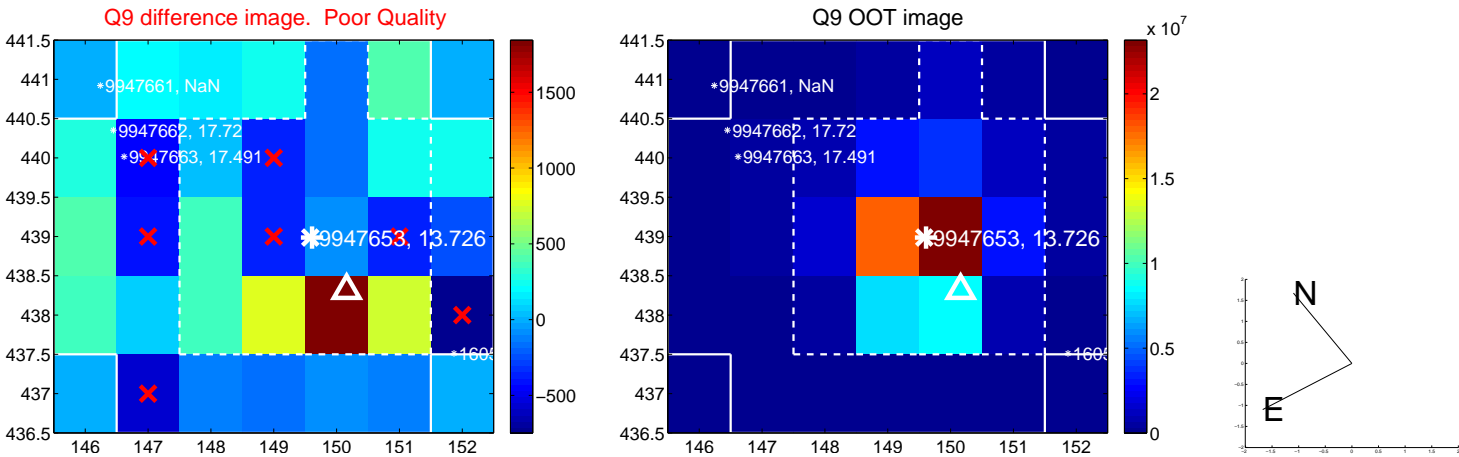
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



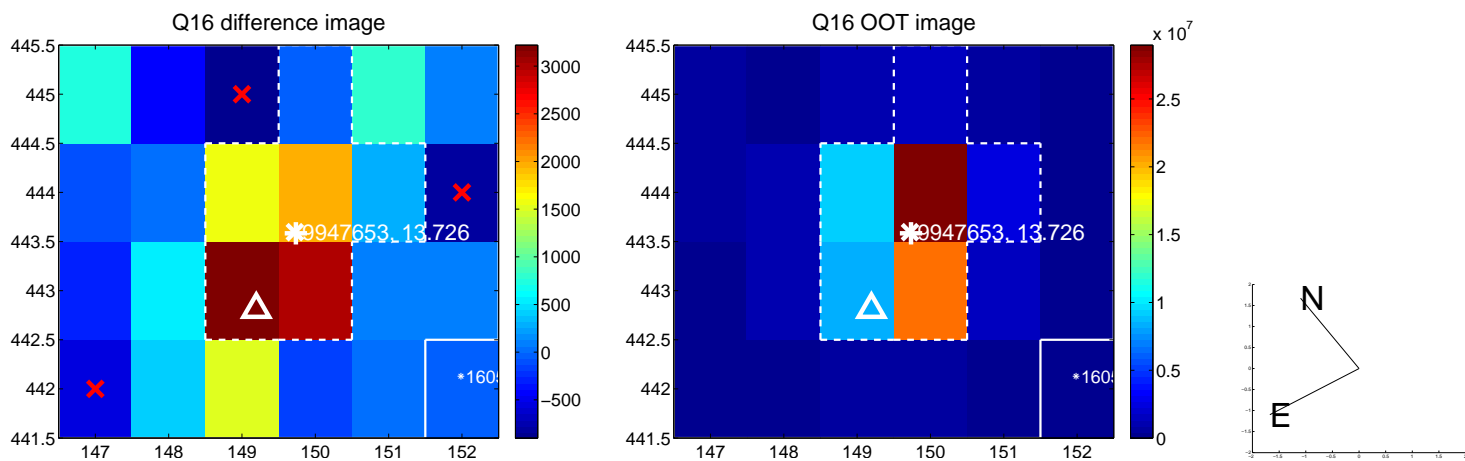
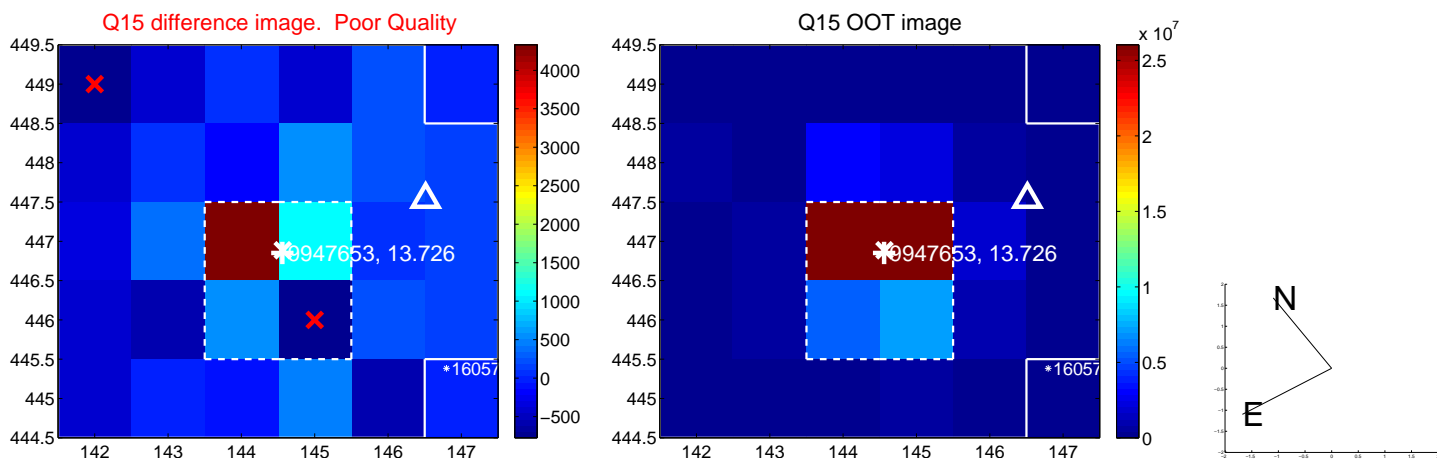
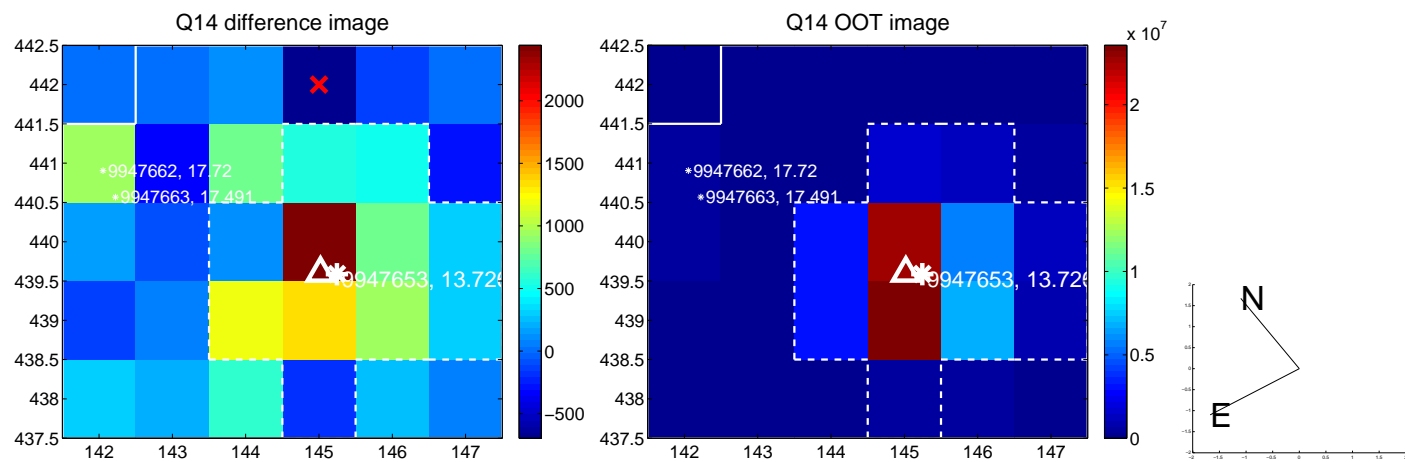
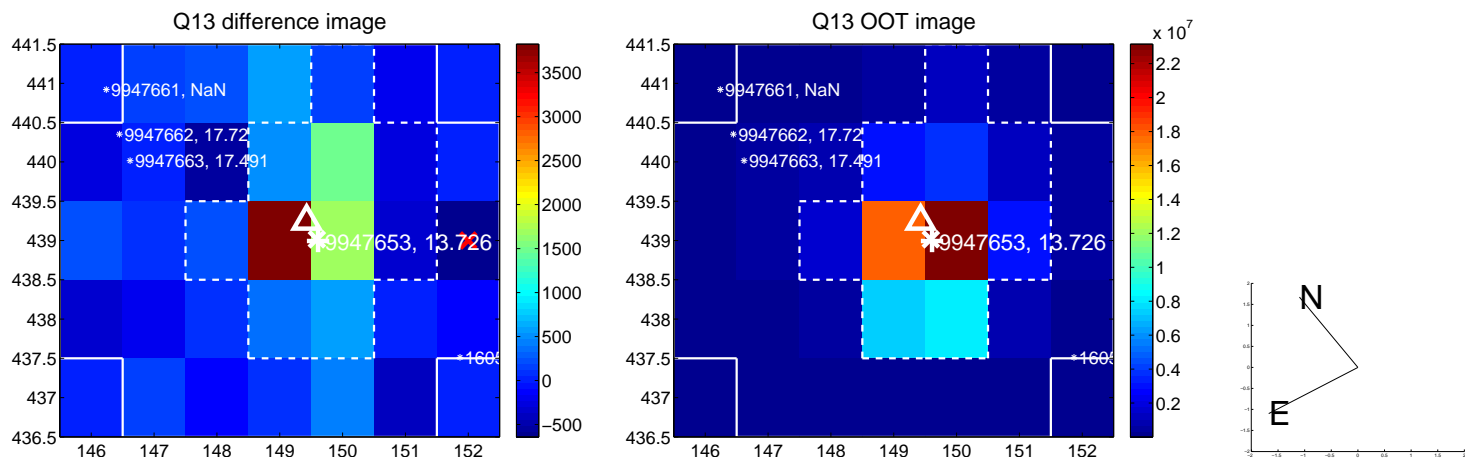
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



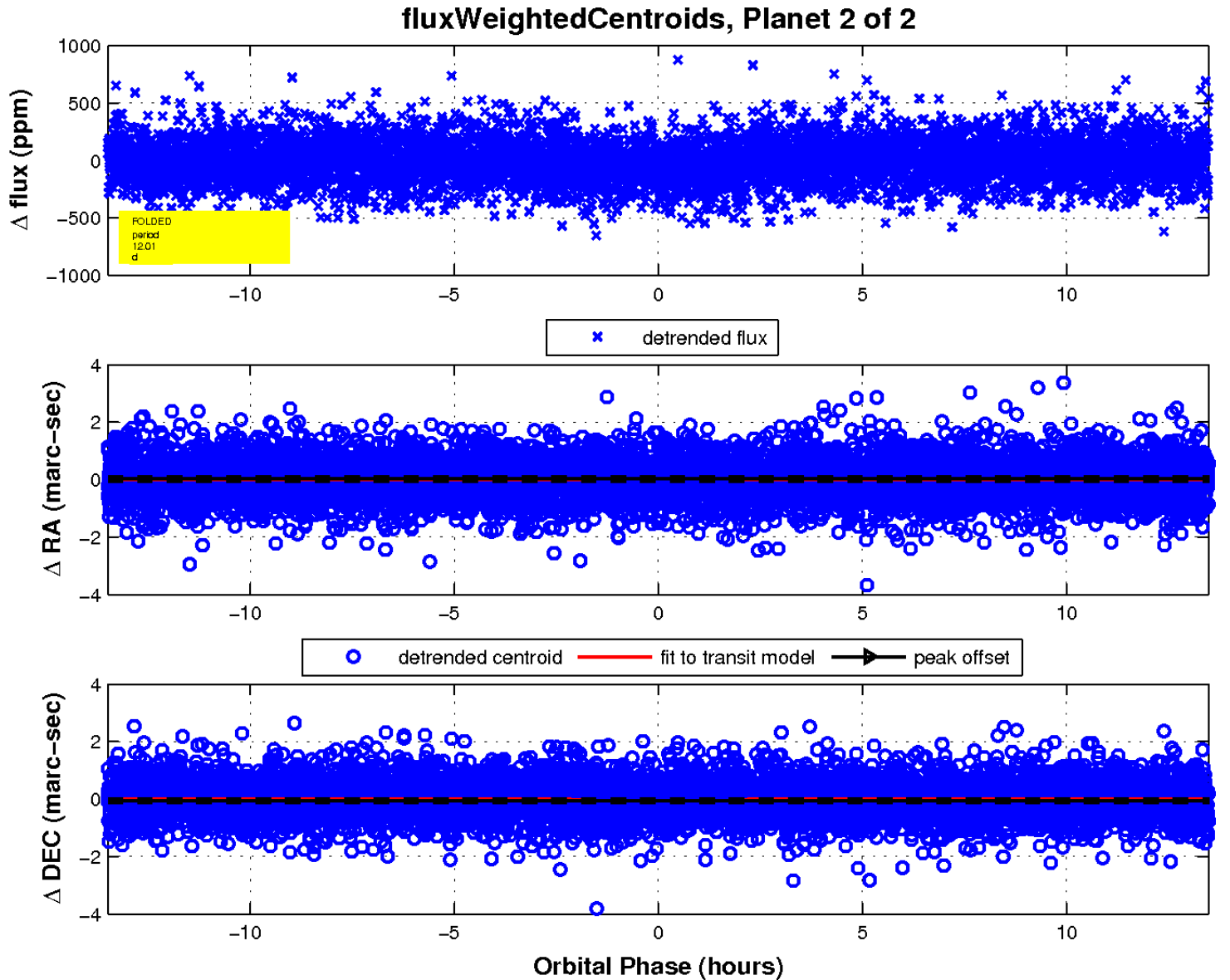
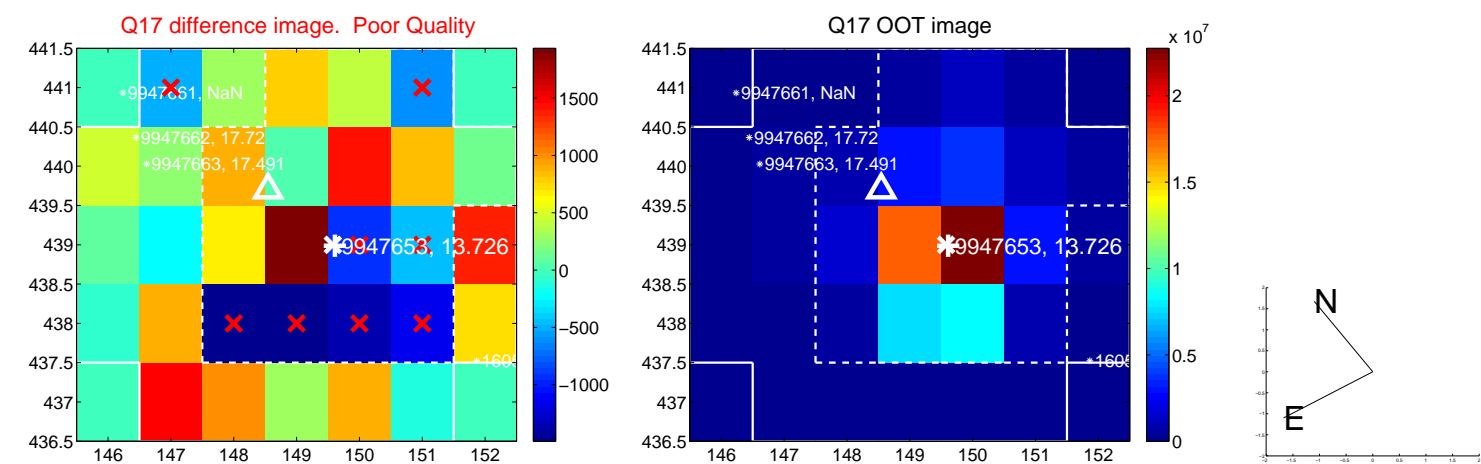
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

