

KIC 002159852

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})
002159852-01	OBS	No	1.385342	132.020007	67.6	3.090	7.8	6.1	0.94	6748	0.92	3093.66
002159852-02	OBS	No	1.385279	132.314256	97.1	2.965	9.6	7.2	0.94	6748	1.08	3093.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002159852-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
002159852-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

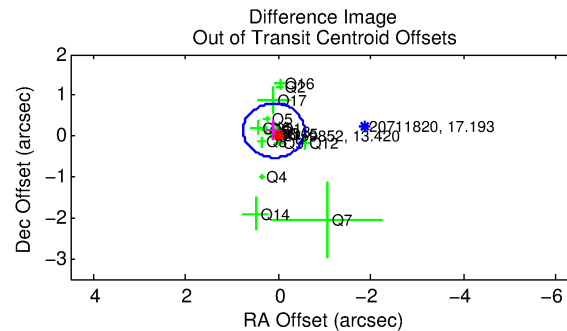
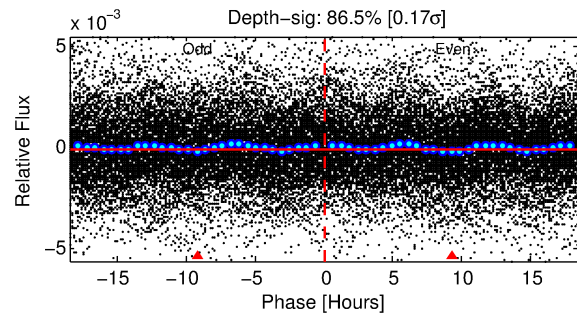
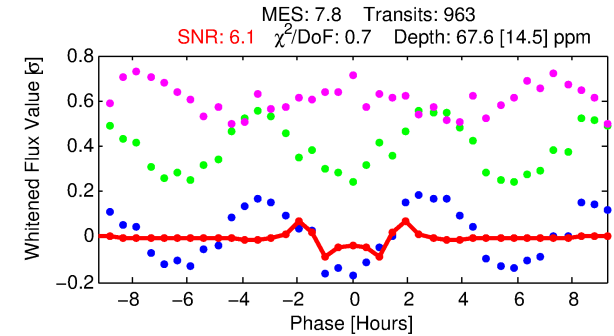
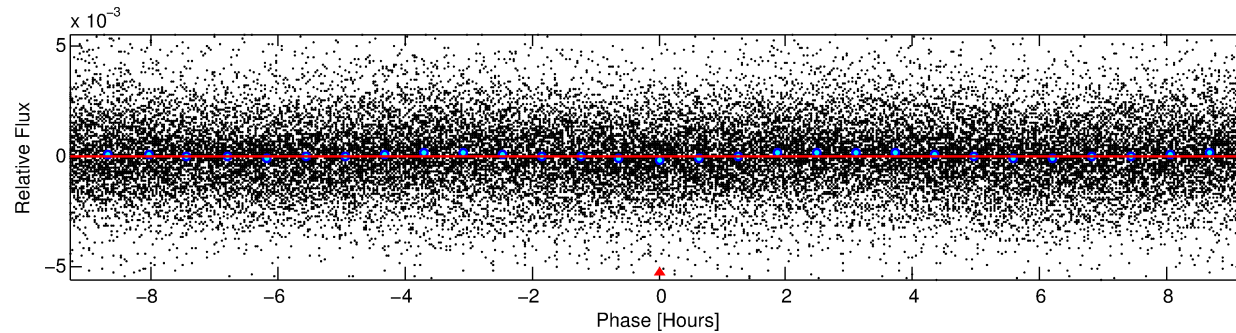
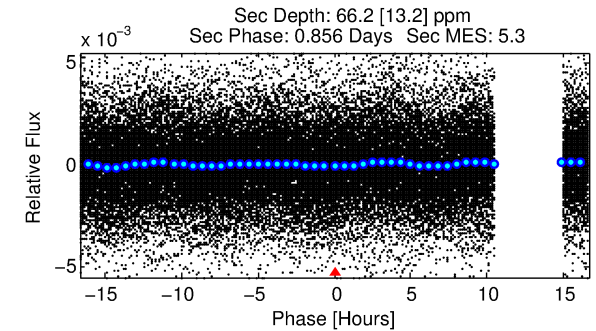
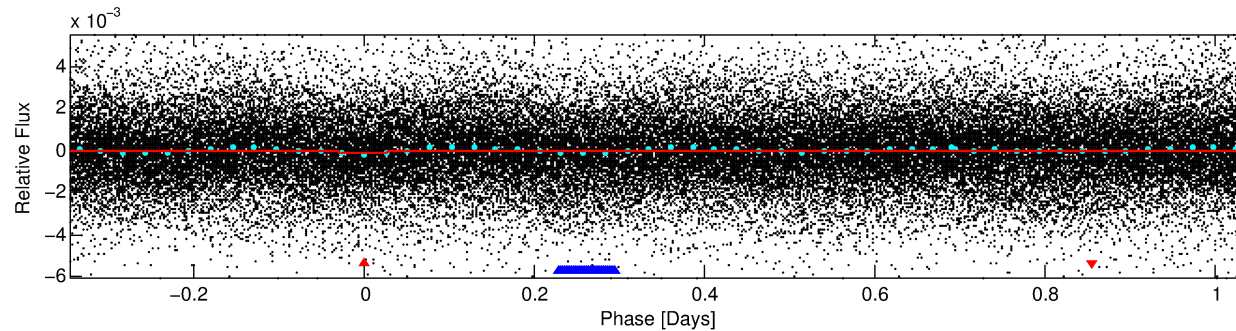
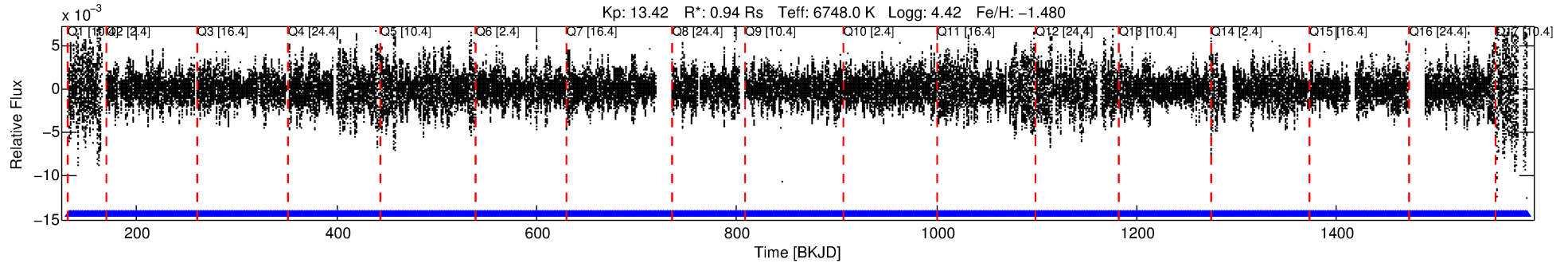
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002159852-01

No Significant Match Found

DV One-Page Summary

KIC: 2159852 Candidate: 1 of 2 Period: 1.385 d



DV Fit Results:

Period = 1.38534 [0.00002] d
Epoch = 132.0200 [0.0021] BKJD
Rp/R* = 0.0089 [0.0022]
a/R* = 1.69 [1.32]
b = 0.92 [0.20]
Seff = 3093.66 [1004.59]
Teq = 1902 [154] K
Rp = 0.92 [0.30] Re
a = 0.0232 [0.0045] AU
Ag = 22.95 [13.86] [1.58σ]
Teffp = 6435 [863] K [5.17σ]

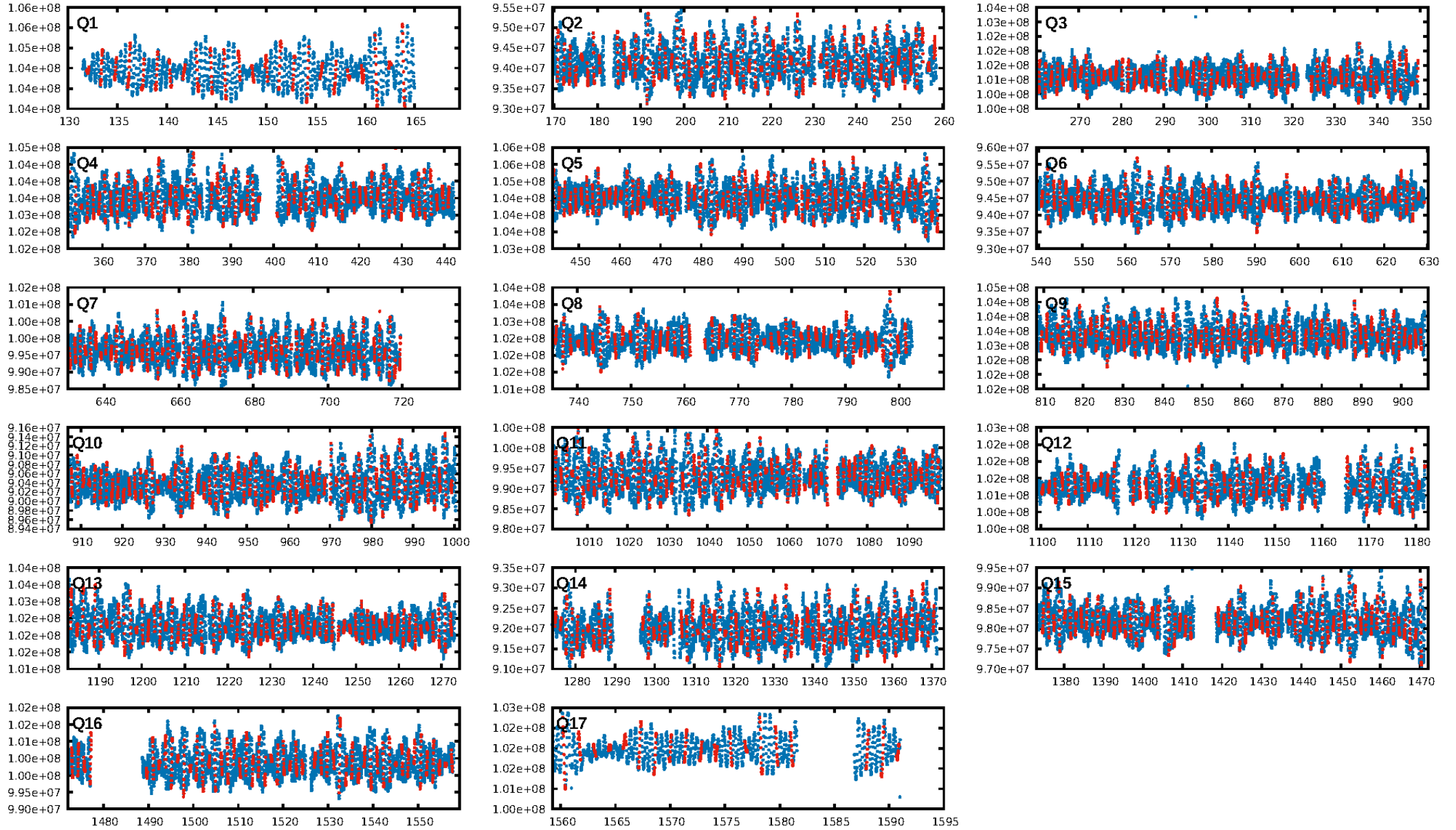
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.72e-14
RollingBand-fgt: 1.00 [920/920]
GhostDiagnostic-chr: 1.088
Centroid-sig: 2.9%
Centroid-so: 0.623 arcsec [1.11σ]
OotOffset-rm: 0.169 arcsec [0.77σ]
OotOffset-st: 3/4/4/5 [16]
KicOffset-rm: 0.161 arcsec [0.70σ]
KicOffset-st: 3/4/4/5 [16]
DiffImageQuality-fgm: 0.81 [13/16]
DiffImageOverlap-fno: 0.00 [0/17]

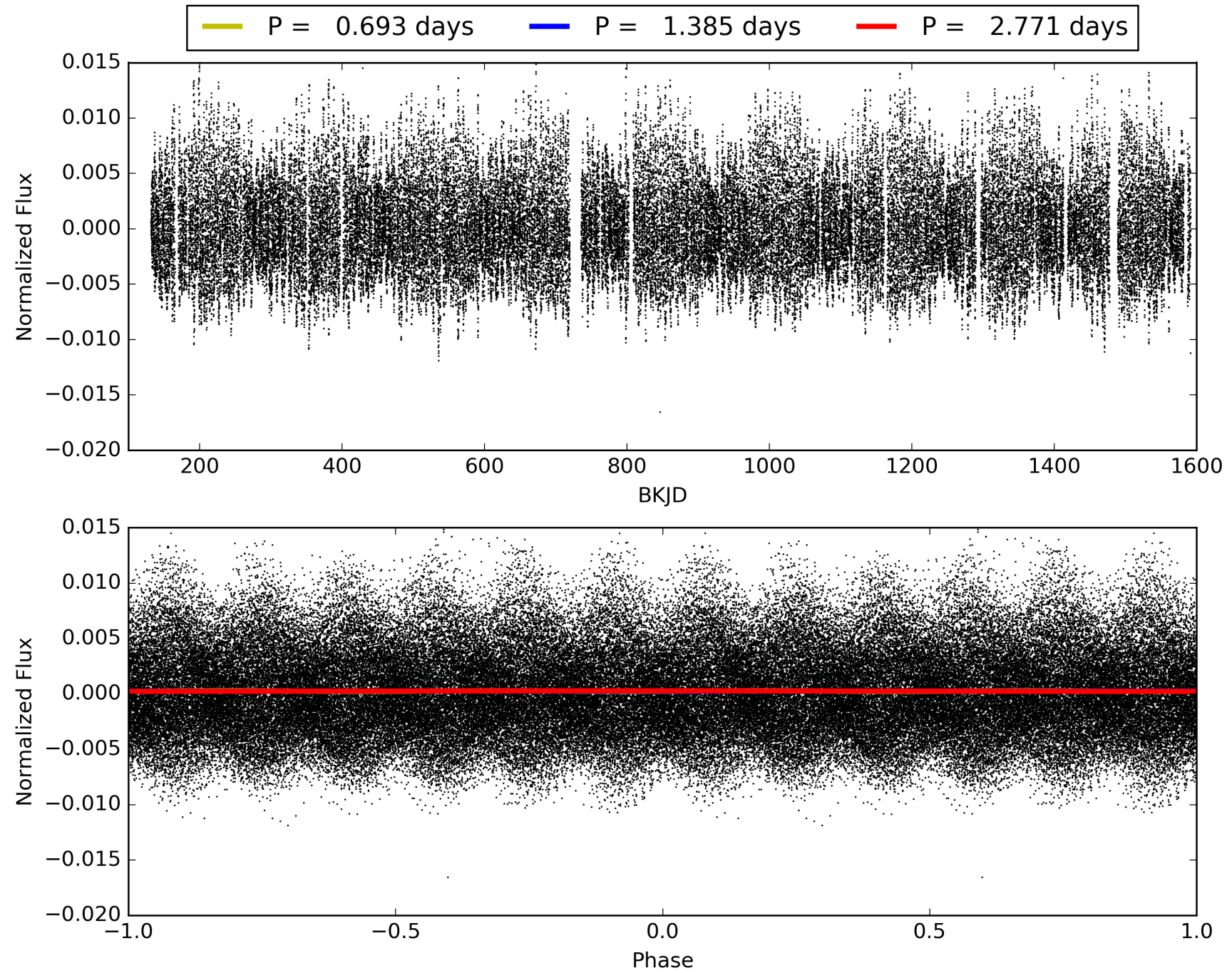
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:06:13 Z

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

TCE 002159852-01, PDC Light Curves

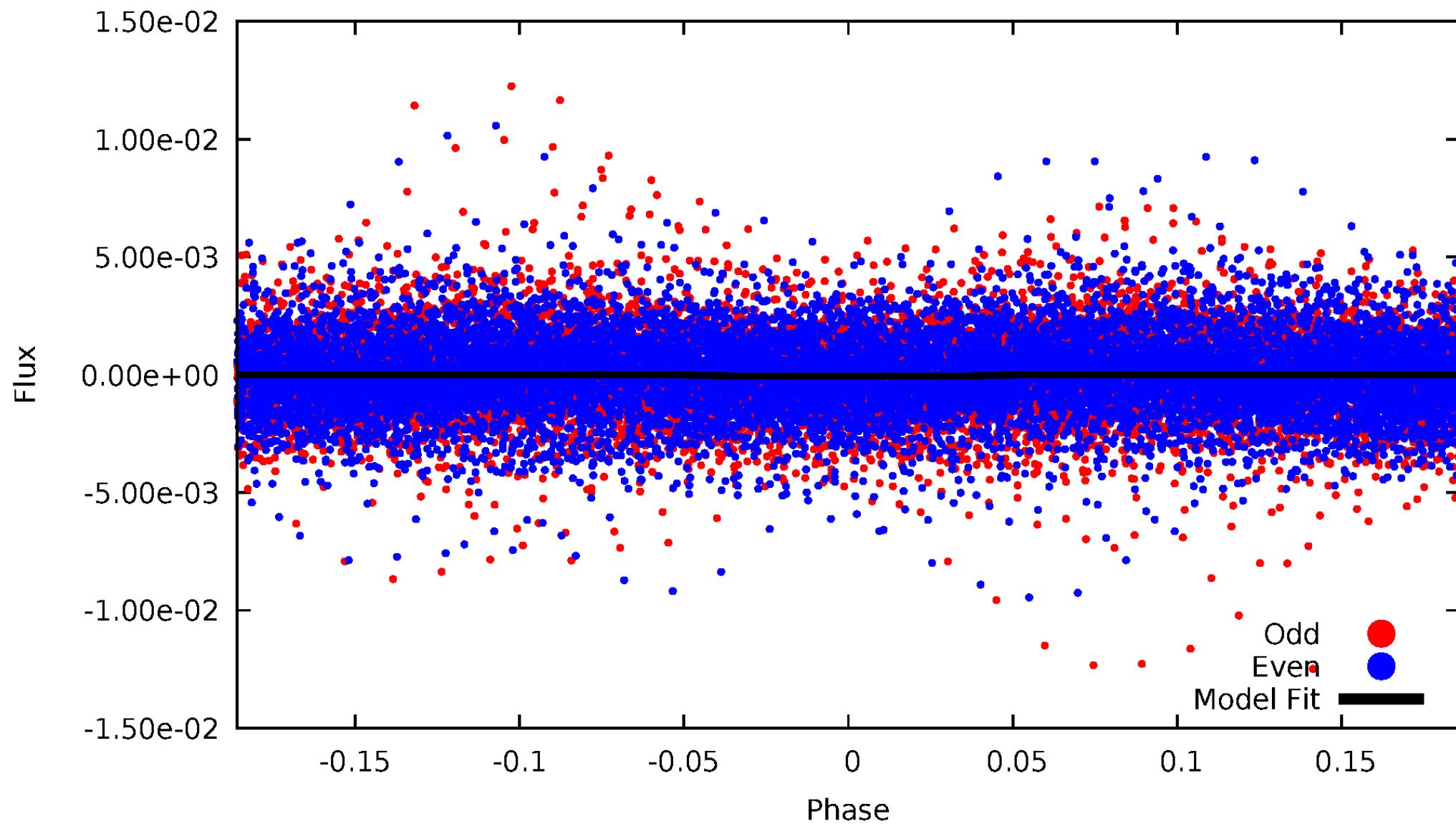


TCE 002159852-01



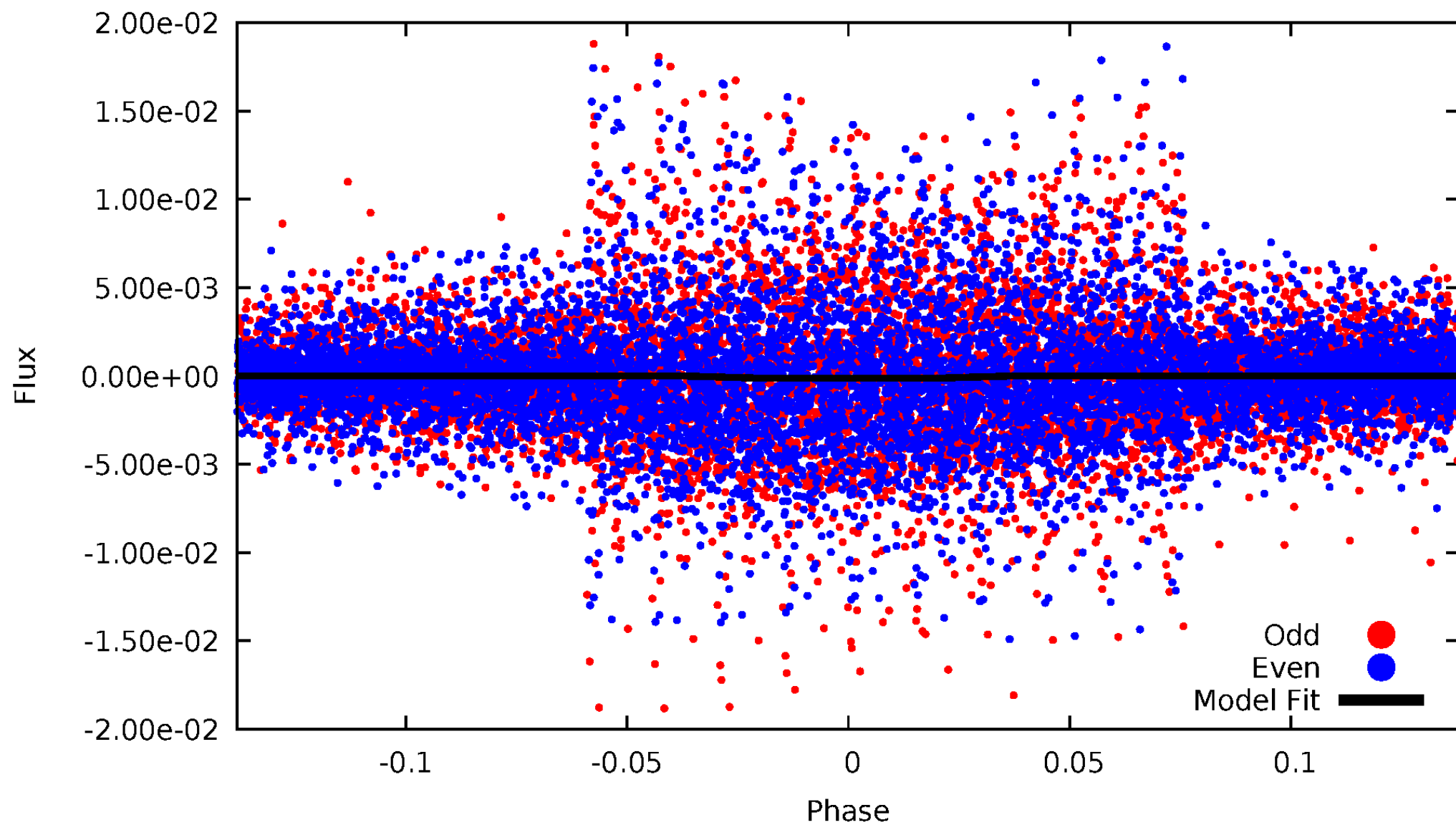
DV Odd/Even

TCE 002159852-01

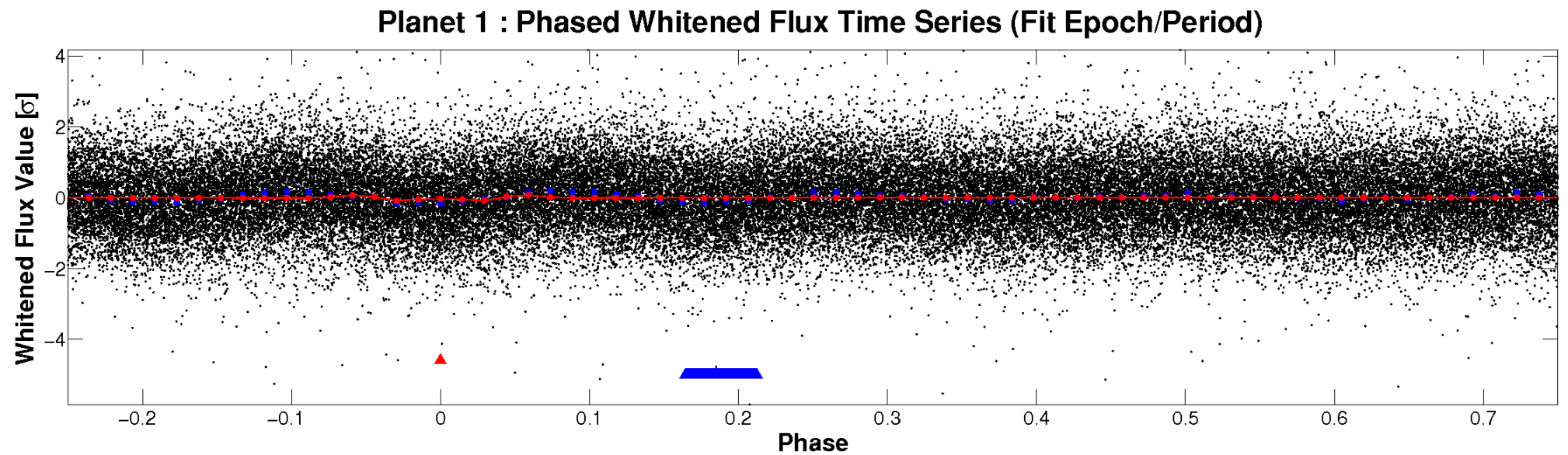
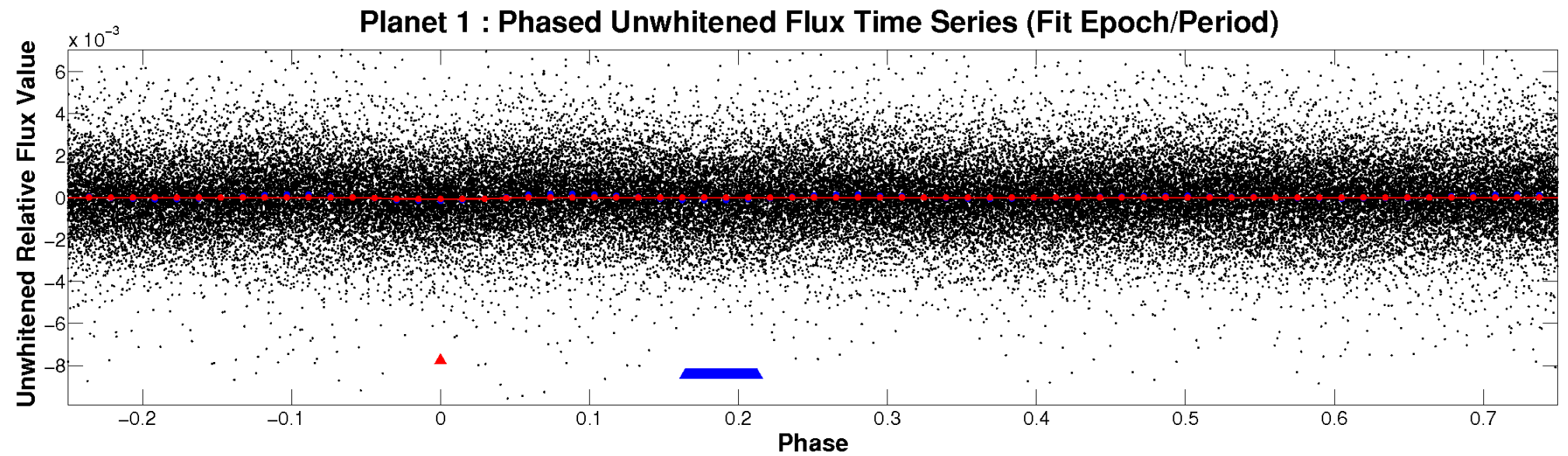


ALT Odd/Even

TCE 002159852-01

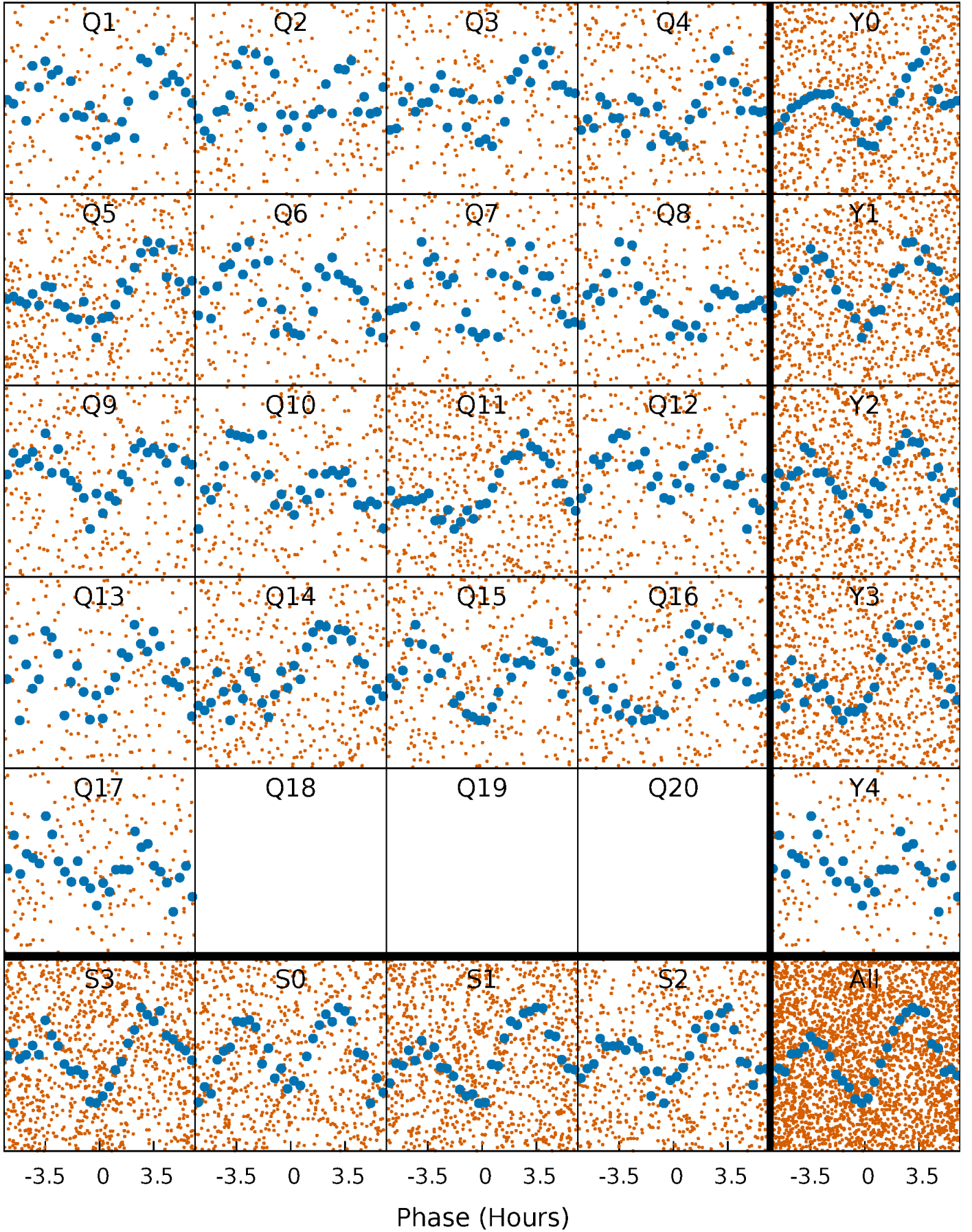


Non-Whitened Vs. Whitened Light Curve



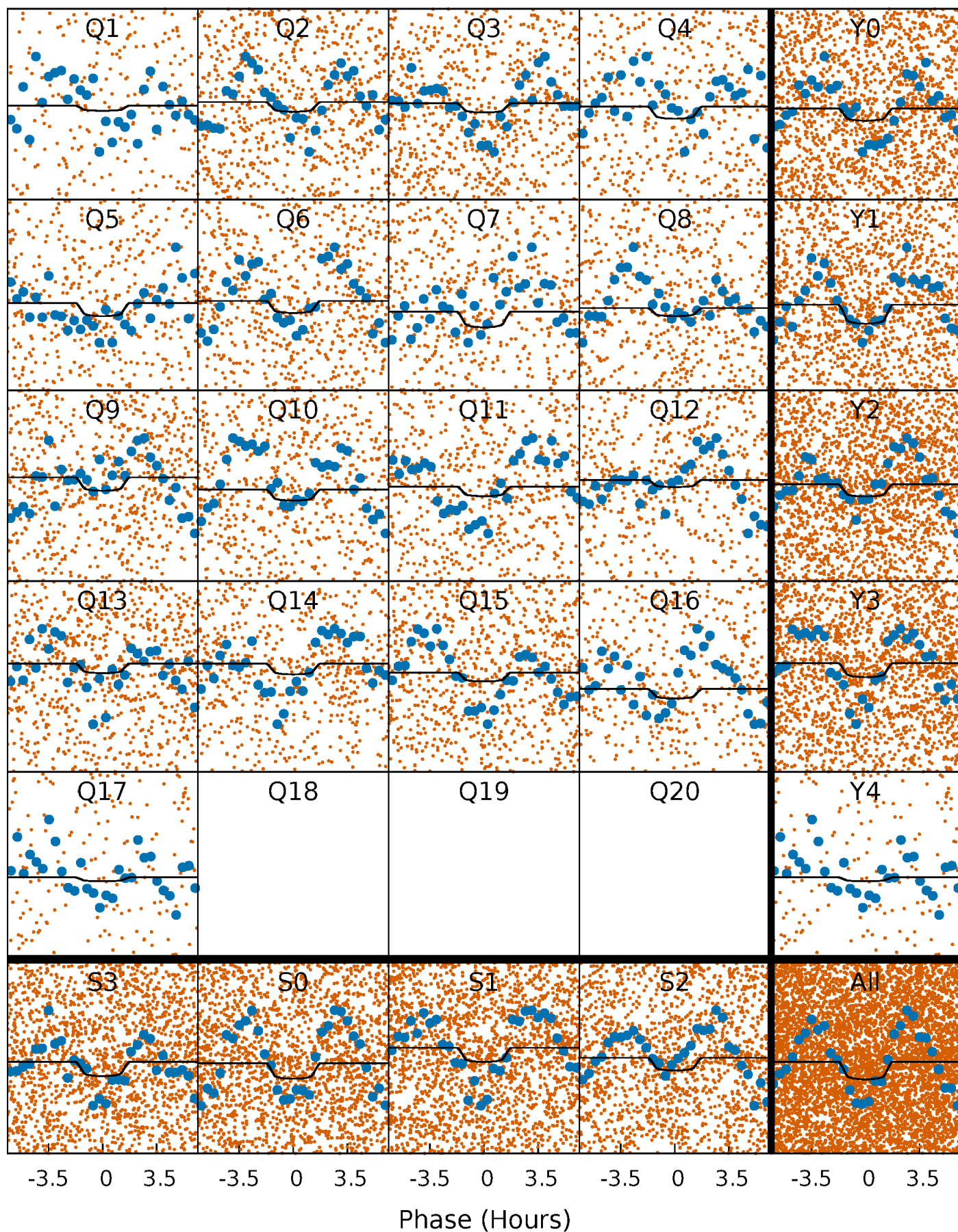
PDC Quarter-Phased Transit Curves

TCE 002159852-01 P= 1.385342 Days $T_0=132.020007$ (BKJD)



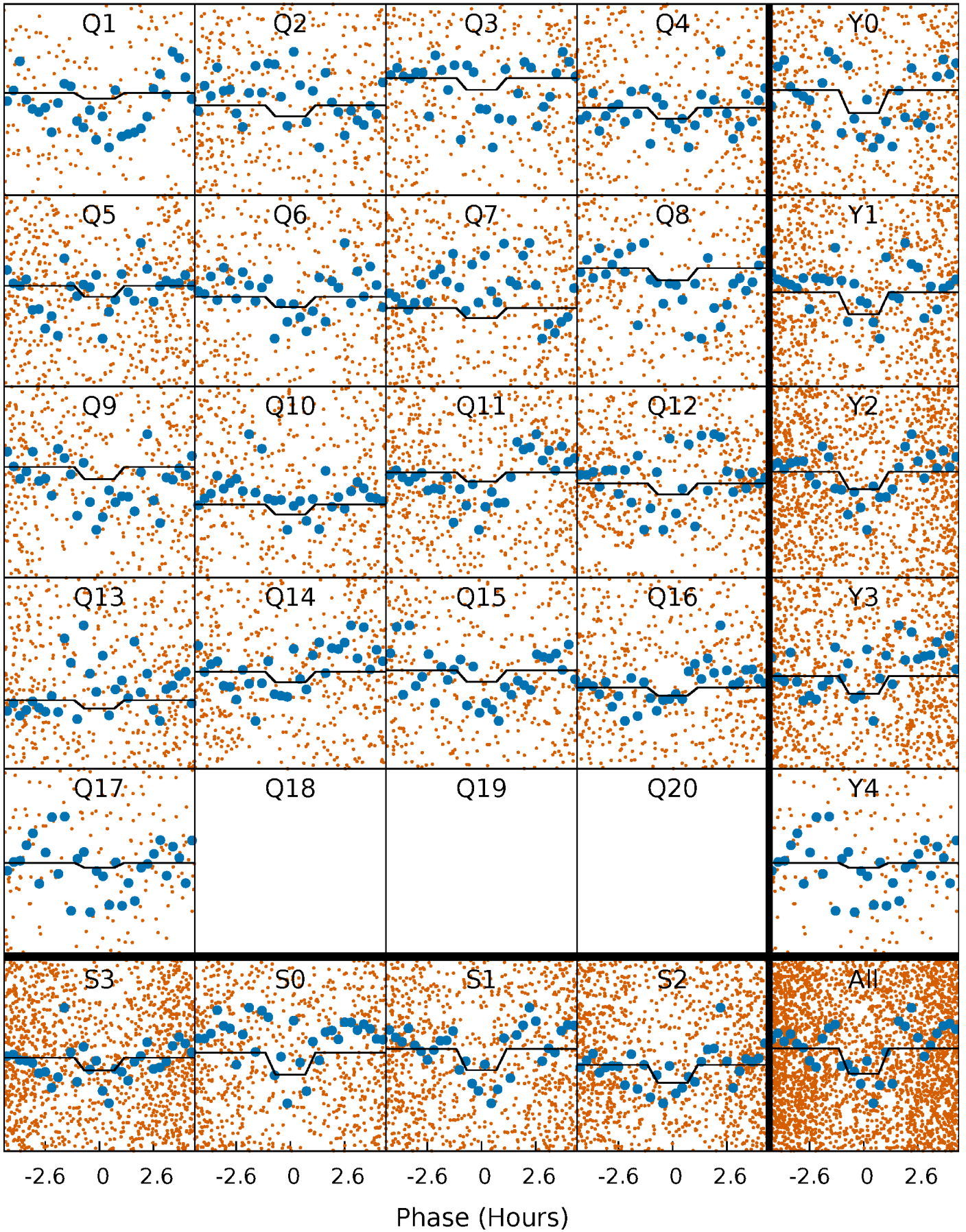
DV Quarter-Phased Transit Curves

TCE 002159852-01 P= 1.385342 Days $T_0=132.020007$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

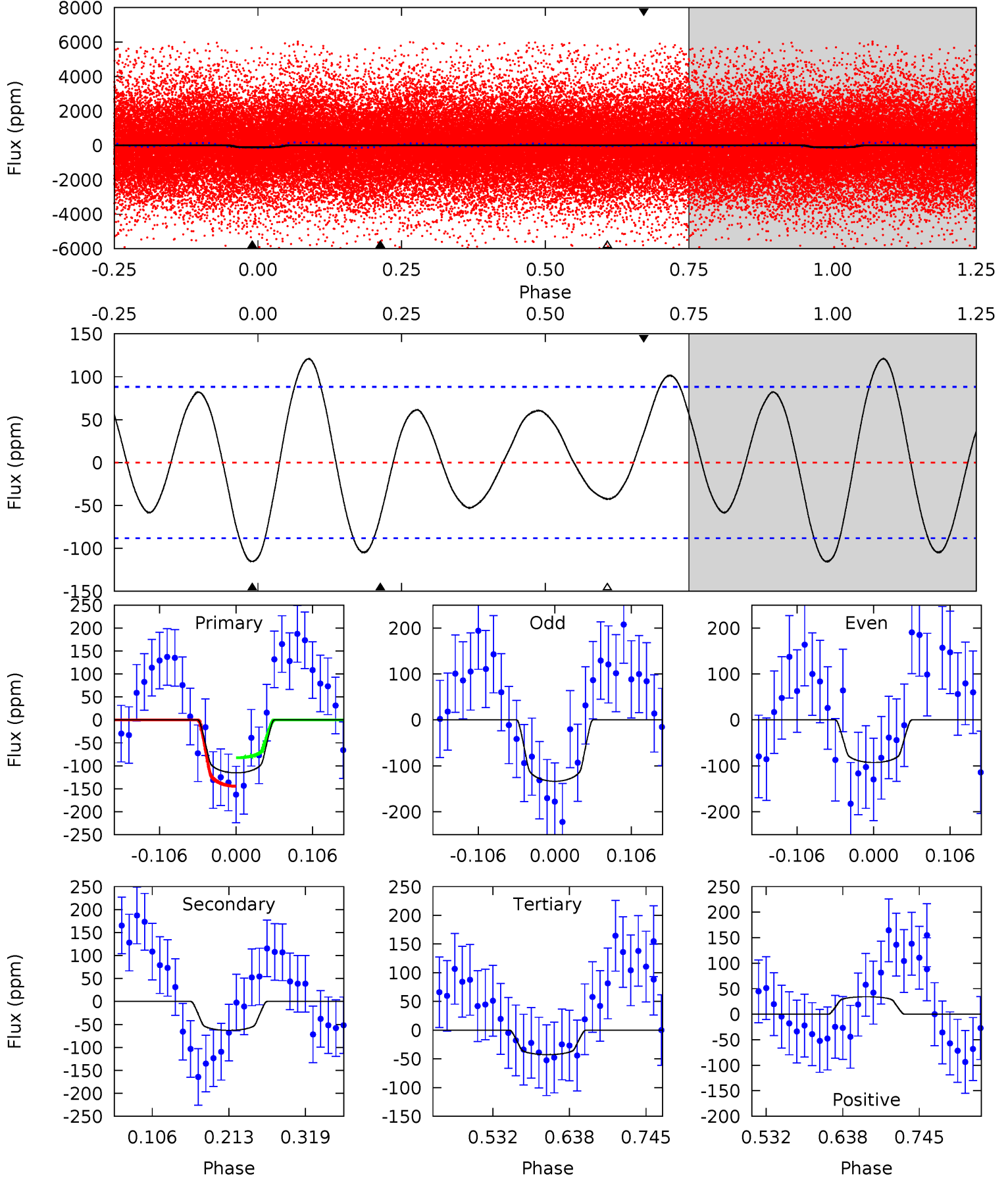
TCE 002159852-01 P= 1.385318 Days $T_0=132.011736$ (BKJD)



DV Model-Shift Uniqueness Test

002159852-01, P = 1.385342 Days, E = 130.634665 Days

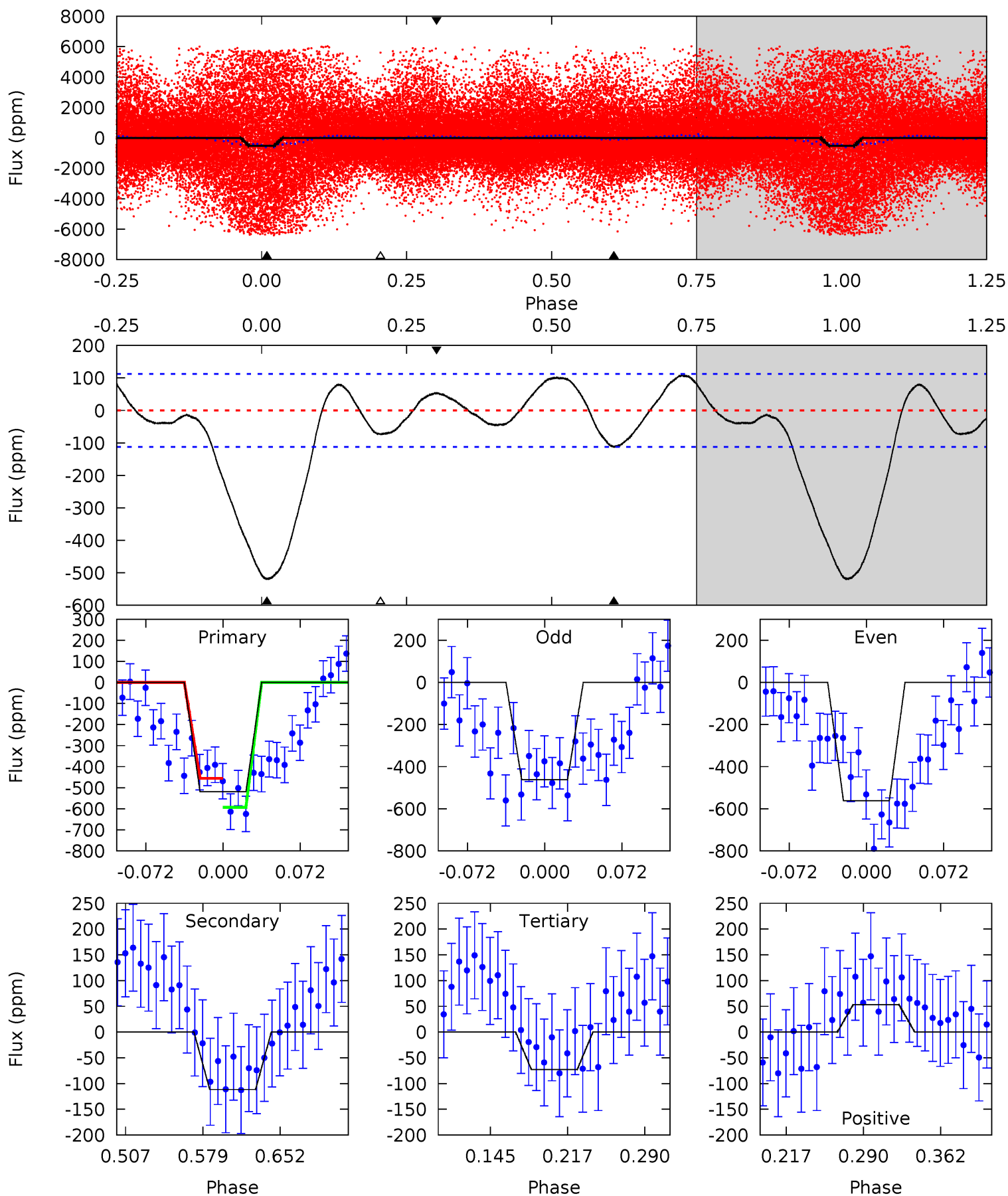
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.96	3.25	2.20	1.77	4.55	1.61	2.46	3.76	4.19	1.06	1.48	1.06	1.78	0.51	1.61



Alt Model-Shift Uniqueness Test

002159852-01, P = 1.385318 Days, E = 130.626418 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.4	4.60	3.00	2.19	4.63	1.80	2.60	18.4	19.2	1.60	2.41	2.05	0.49	0.17	2.83



Stellar Parameters For KIC 002159852

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6748^{+181}_{-201}	$4.423^{+0.116}_{-0.174}$	$-1.480^{+0.300}_{-0.300}$	$0.945^{+0.200}_{-0.108}$	$0.864^{+0.066}_{-0.054}$	$1.439^{+0.689}_{-0.642}$
	+3%/-3%	+3%/-4%	+20%/-20%	+21%/-11%	+8%/-6%	+48%/-45%
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 002159852-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-63 ± 19	$0.92^{+0.26}_{-0.23}$	2669^{+168}_{-127}	6278^{+1233}_{-849}	21^{+19}_{-9}
Alt.	-112 ± 24	$1.15^{+0.27}_{-0.26}$	2666^{+169}_{-134}	6577^{+1058}_{-727}	25^{+19}_{-10}

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 $A_{obs} \gg 1.0$

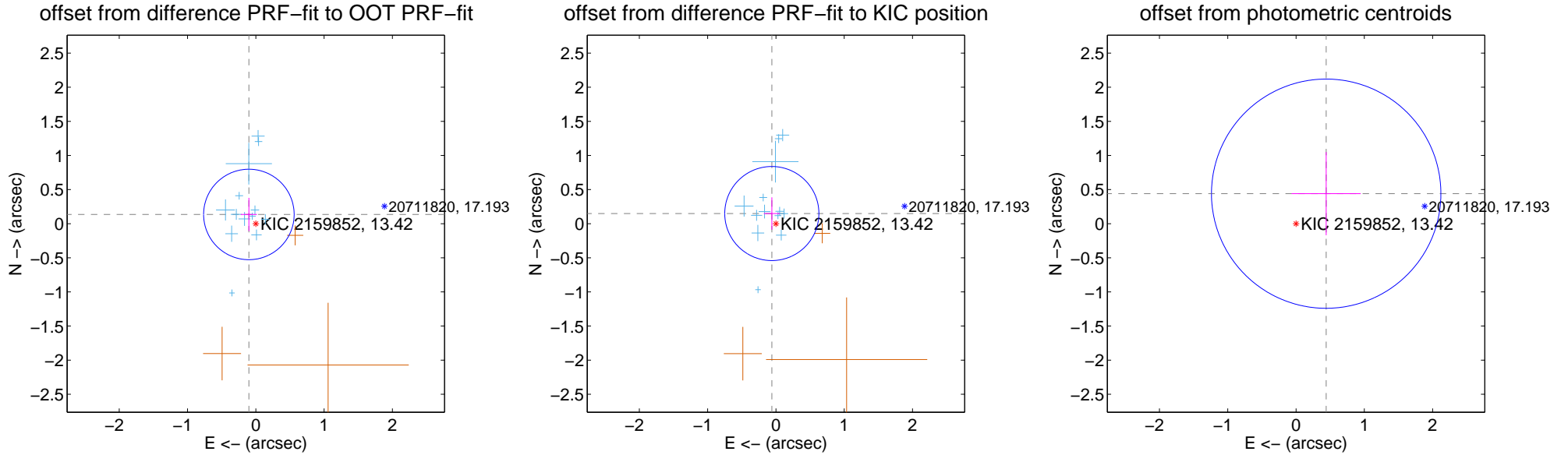
DV Centroid Data

Supplemental centroid analysis for 002159852-01. Kepler magnitude: 13.42. Transit SNR 6.13

There are 13 quarters with good PRF difference image offsets

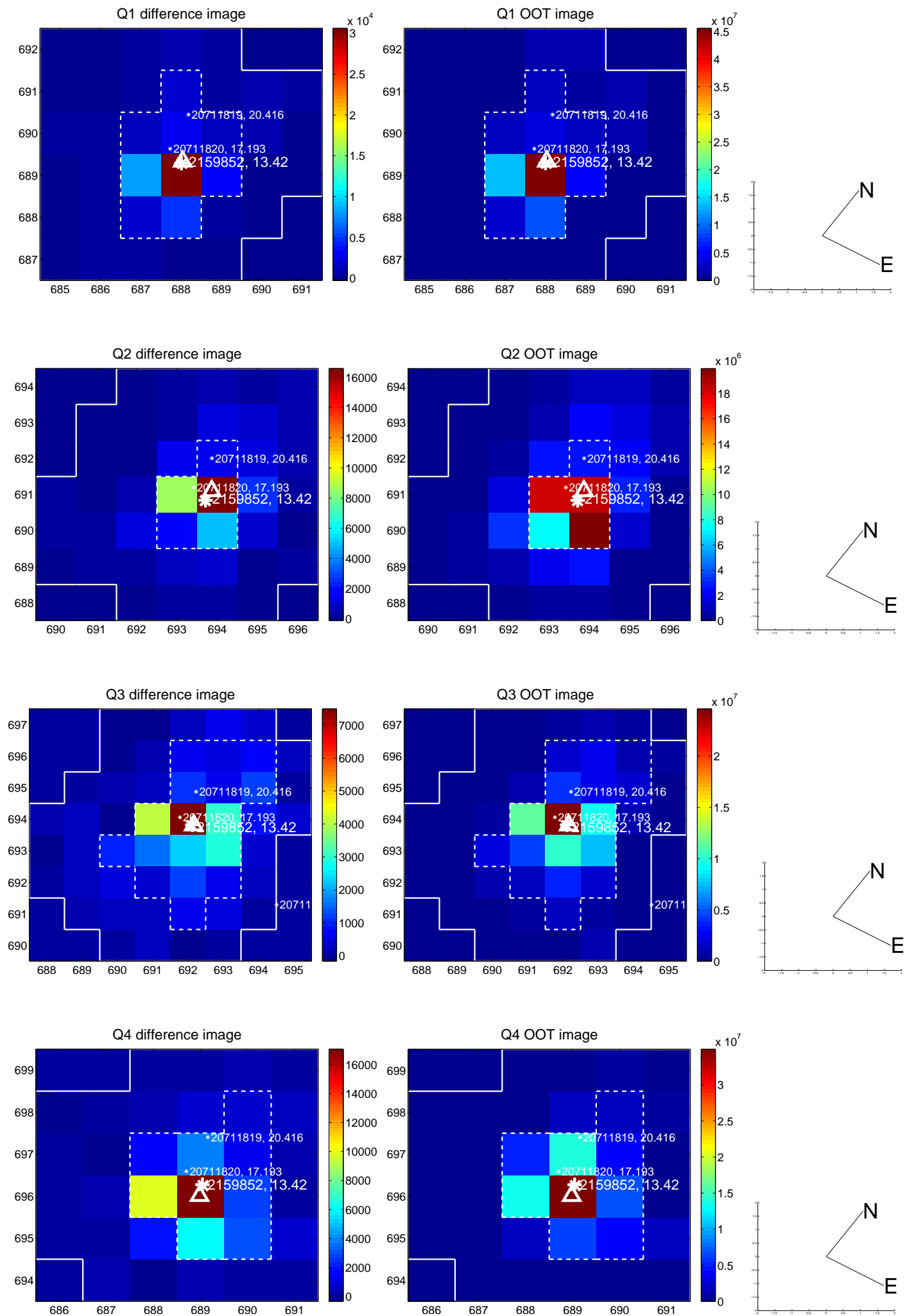
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.169 ± 0.221	0.77	0.102 ± 0.118	0.135 ± 0.243
PRF-fit source offset from KIC position	0.161 ± 0.230	0.70	0.060 ± 0.118	0.149 ± 0.237
photometric centroid source offset	0.62 ± 0.56	1.11	-0.44 ± 0.51	0.44 ± 0.61

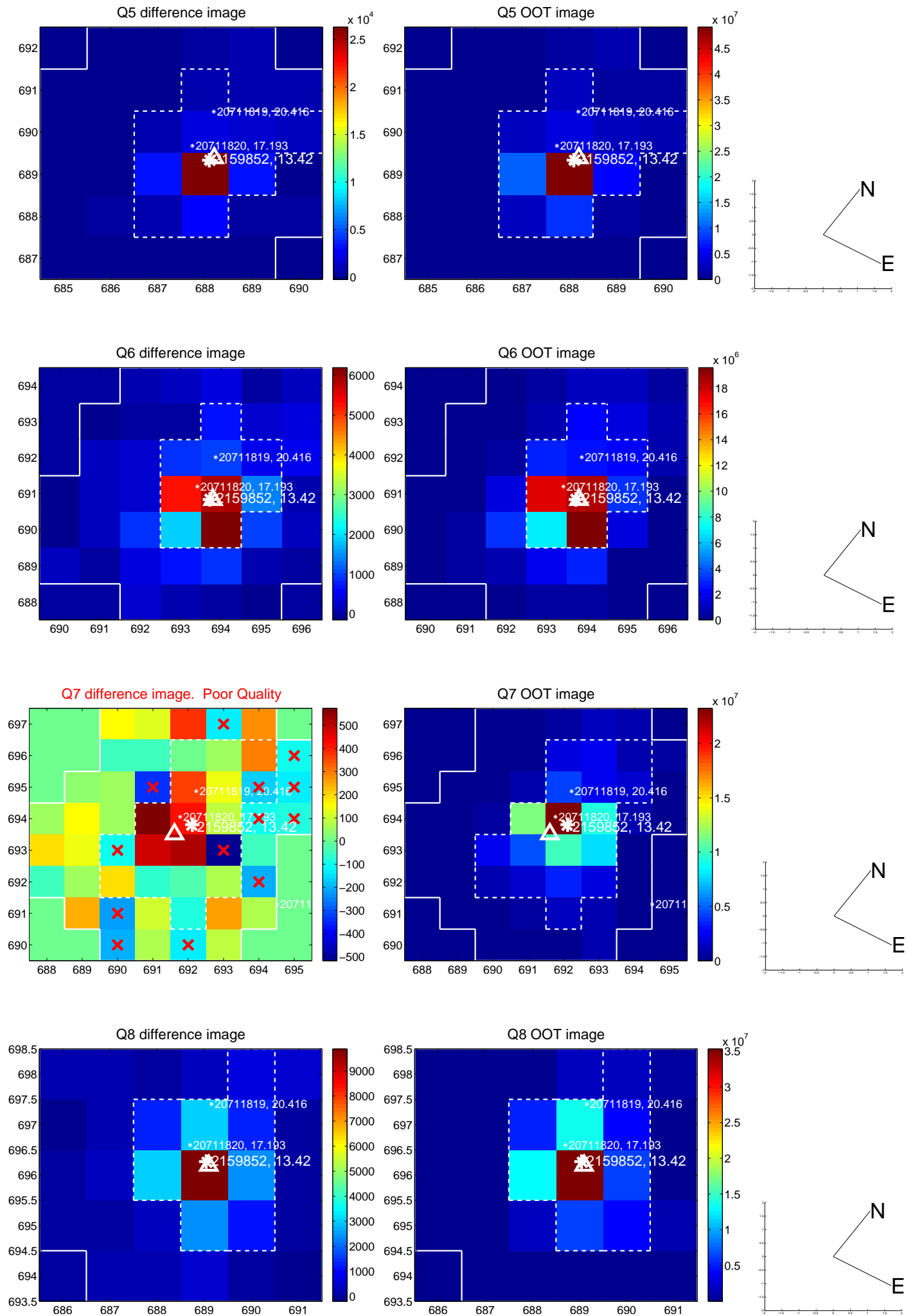


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

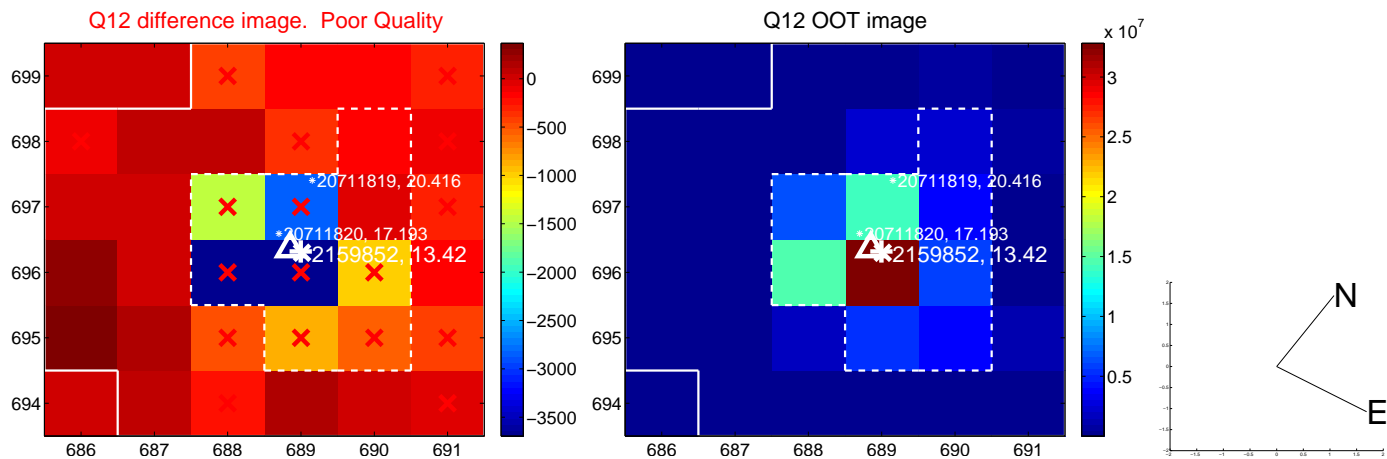
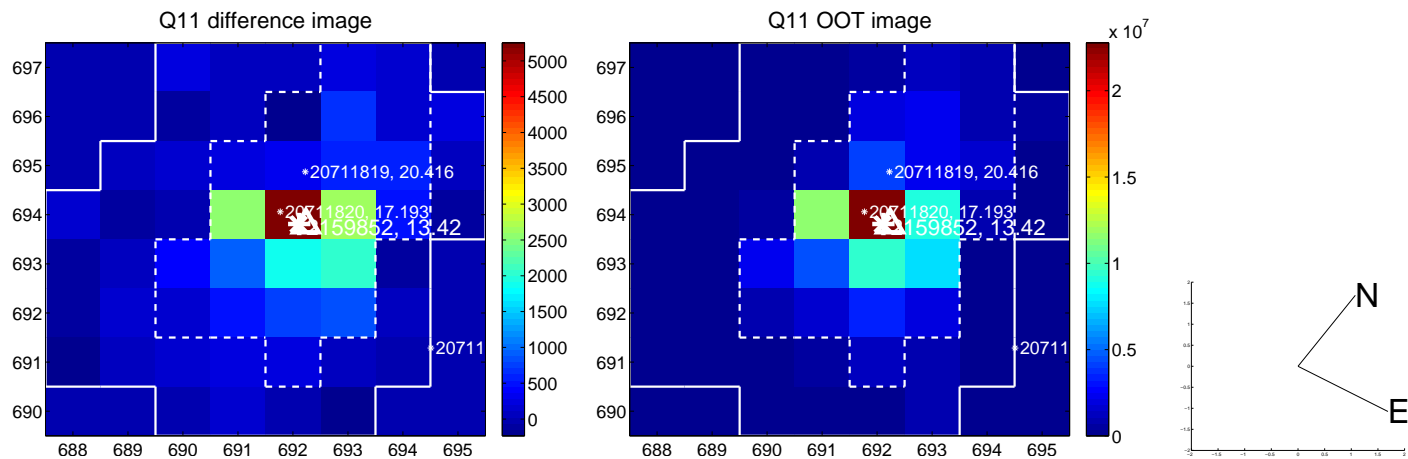
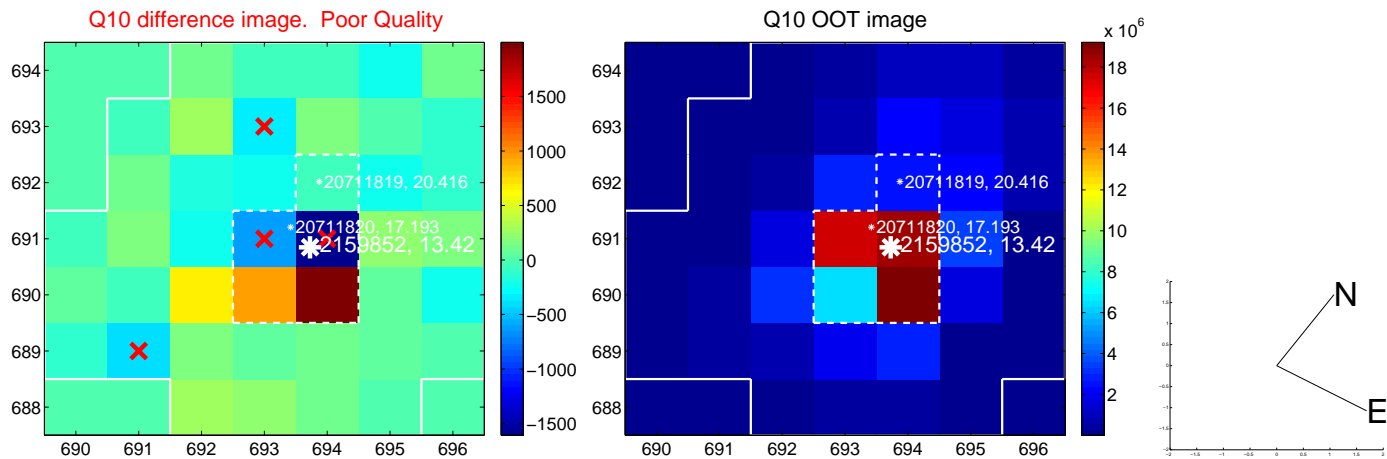
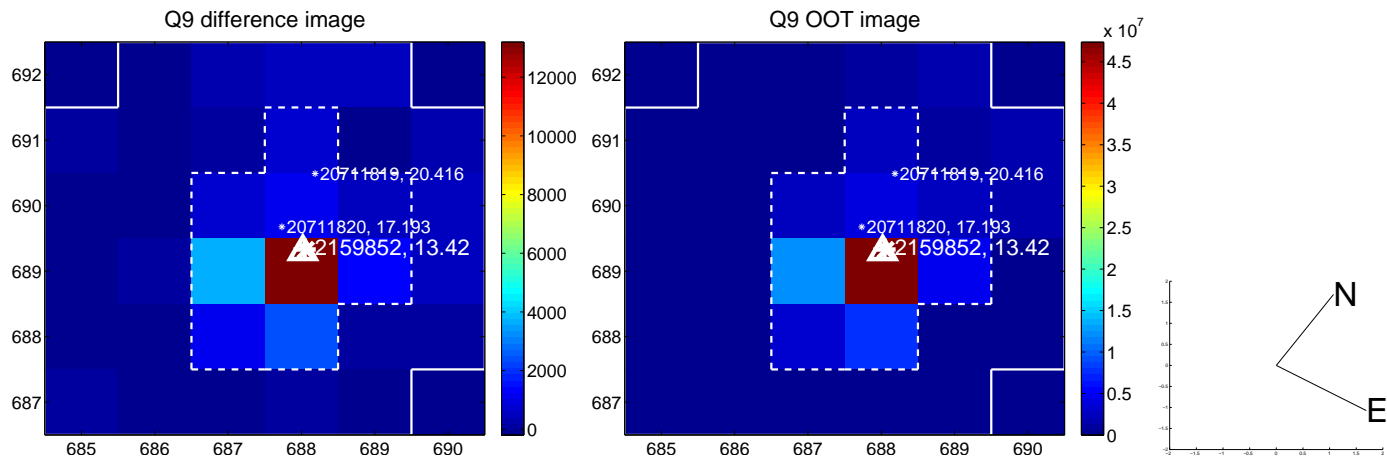
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



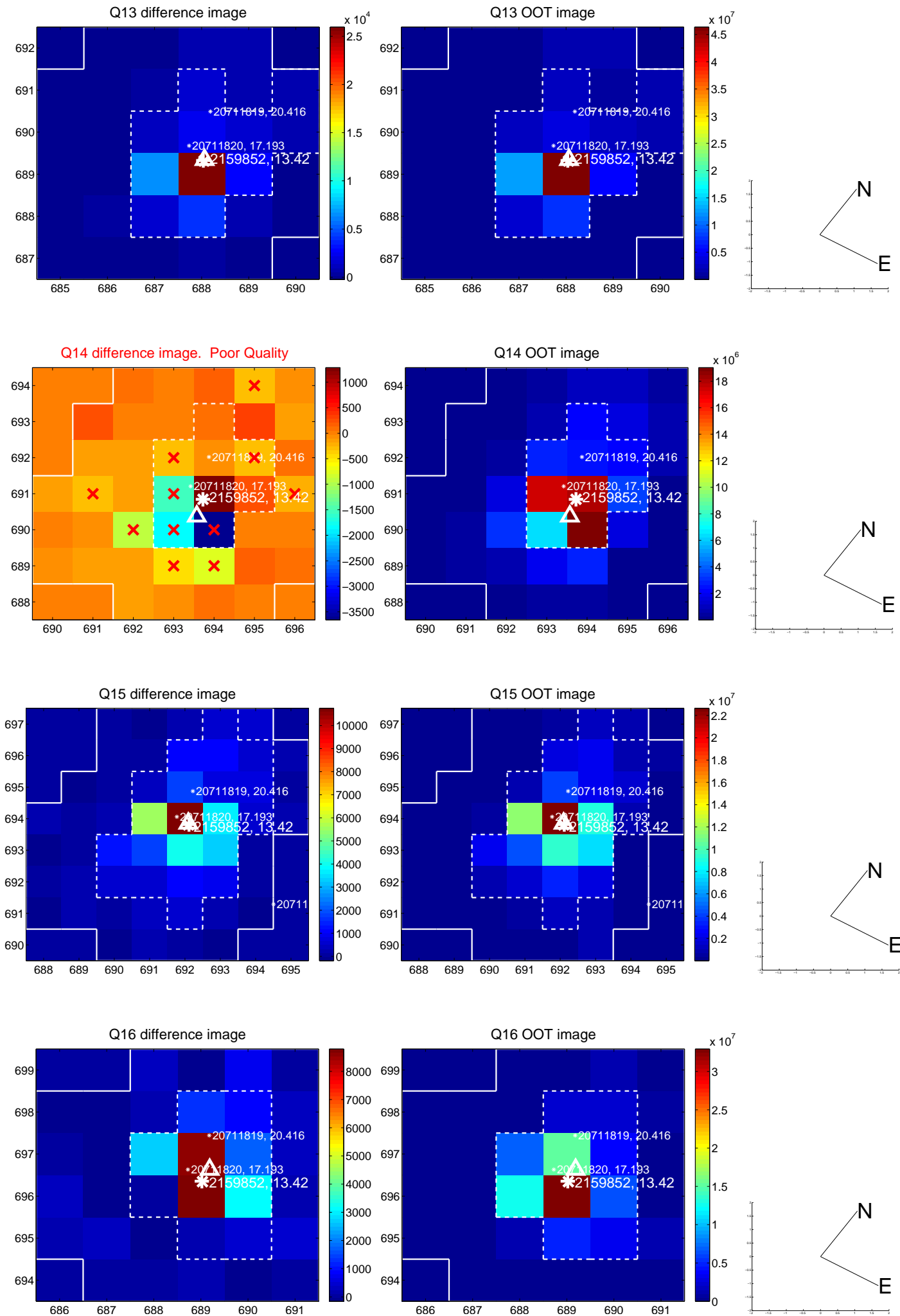
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



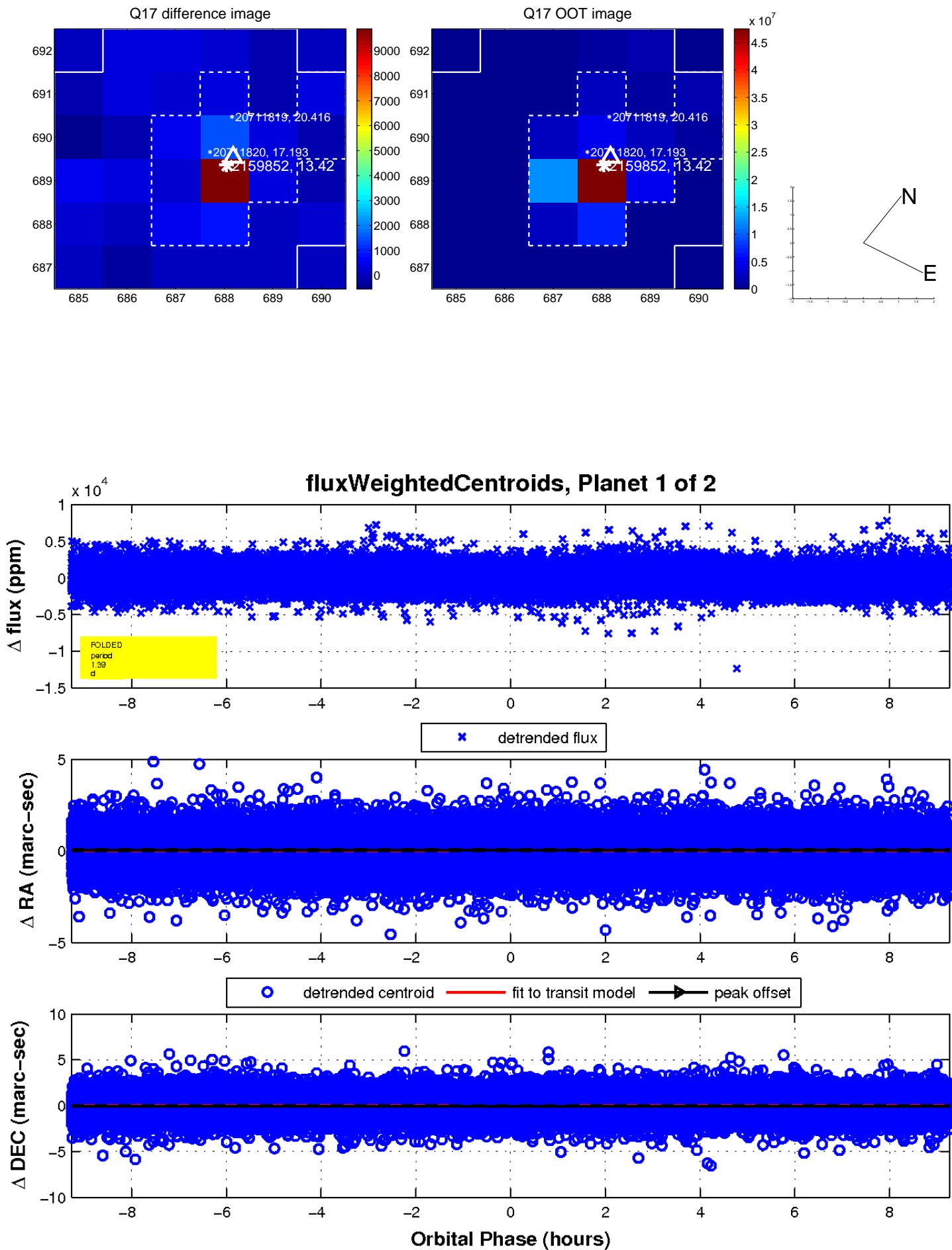
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

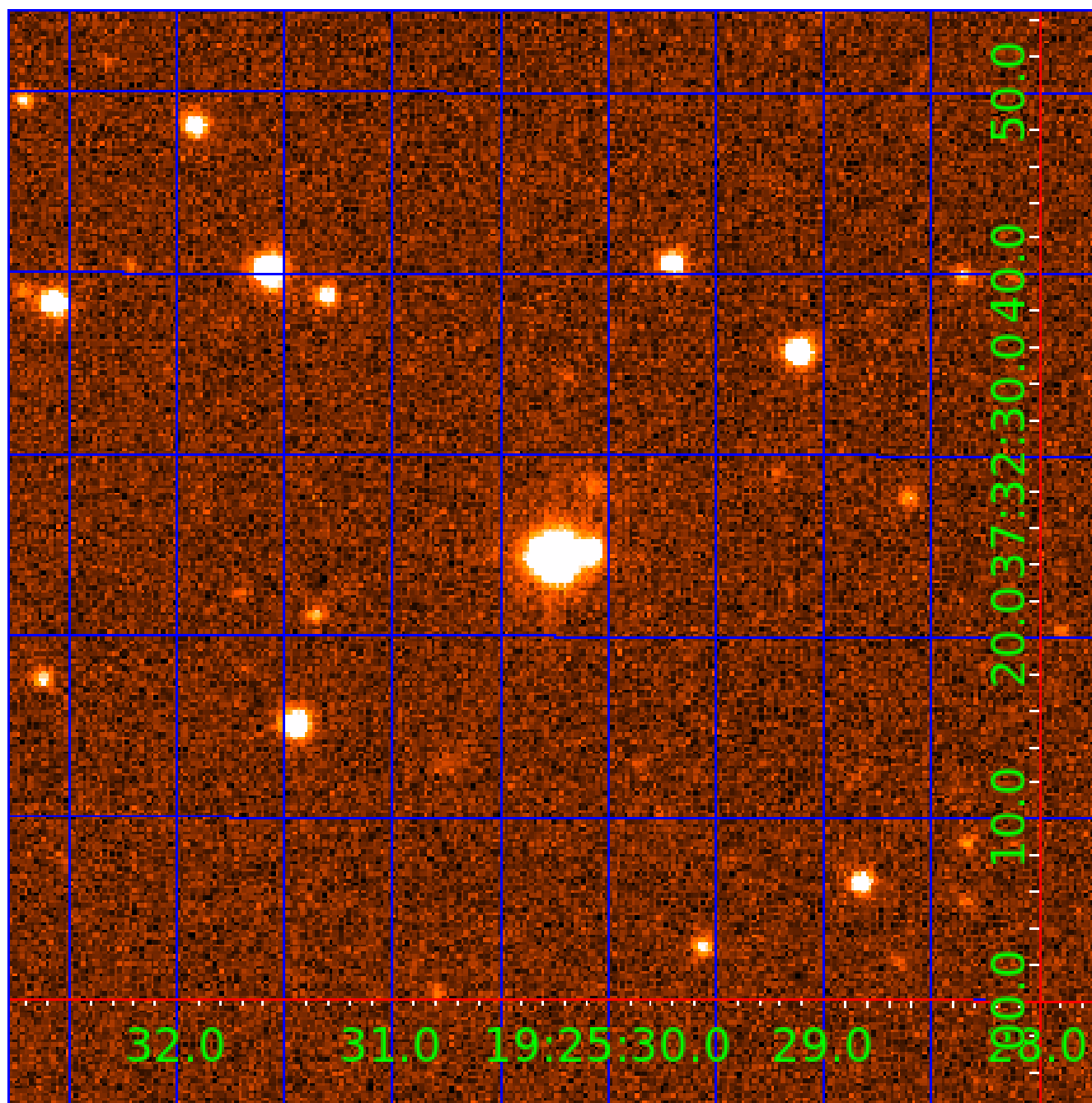


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002159852

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})
002159852-01	OBS	No	1.385342	132.020007	67.6	3.090	7.8	6.1	0.94	6748	0.92	3093.66
002159852-02	OBS	No	1.385279	132.314256	97.1	2.965	9.6	7.2	0.94	6748	1.08	3093.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002159852-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
002159852-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

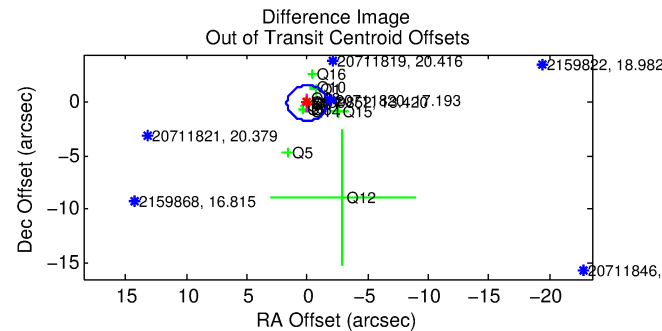
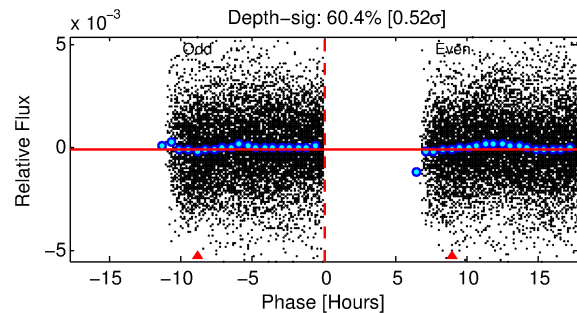
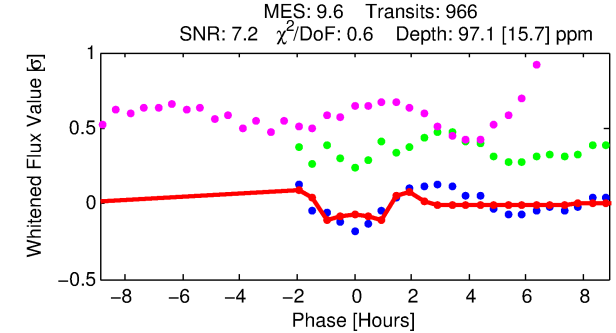
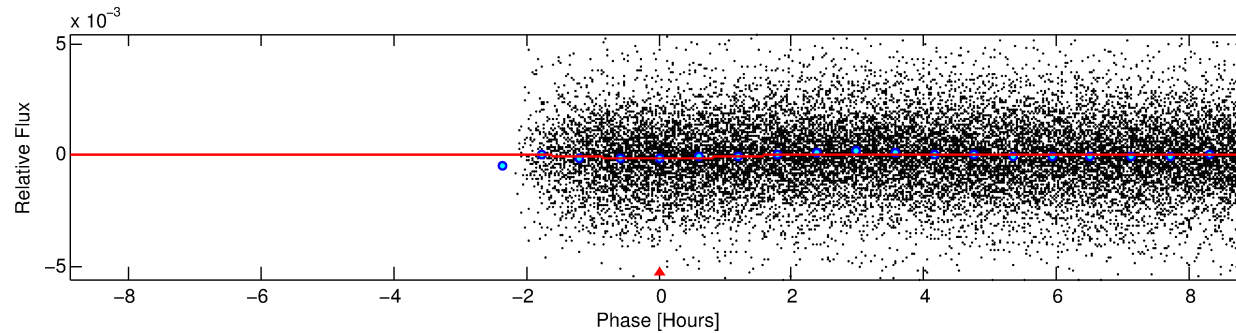
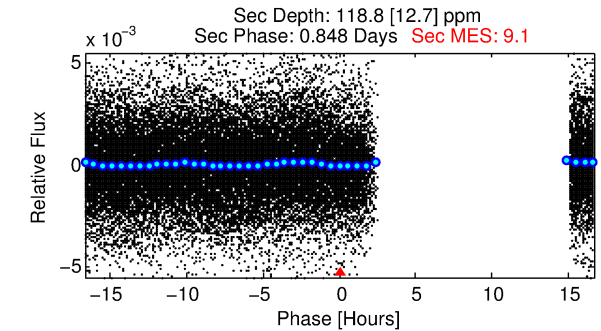
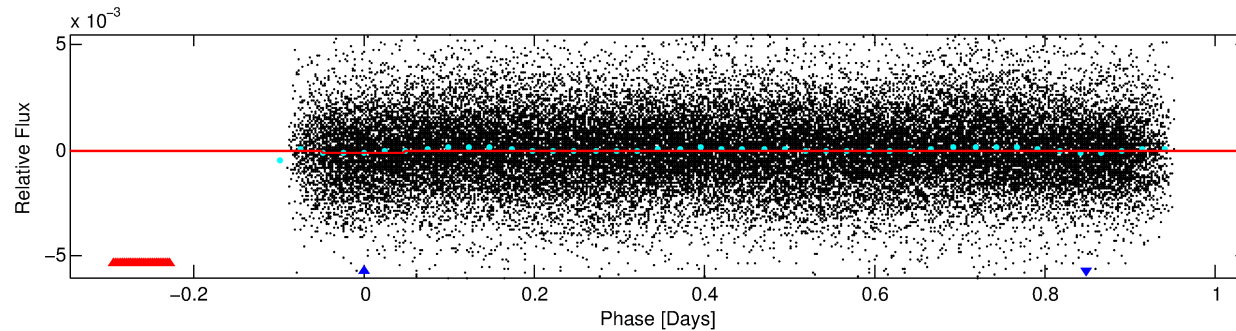
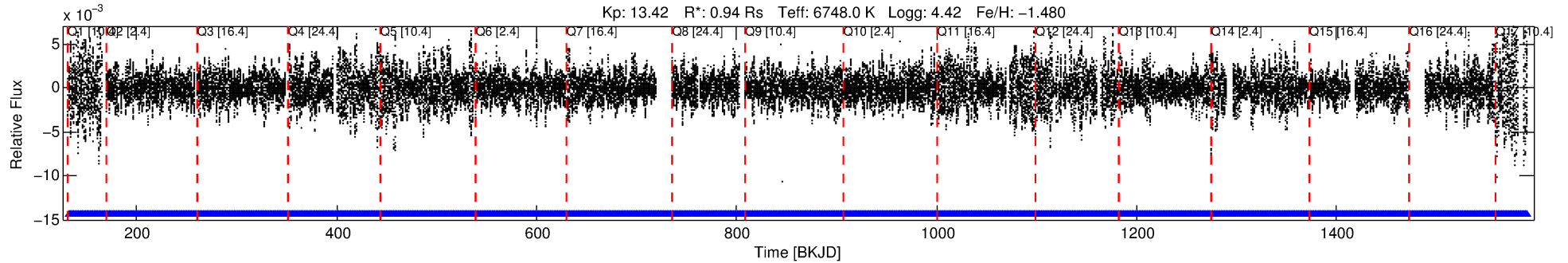
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002159852-02

No Significant Match Found

DV One-Page Summary

KIC: 2159852 Candidate: 2 of 2 Period: 1.385 d



DV Fit Results:

Period = 1.38528 [0.00001] d
Epoch = 132.3143 [0.0021] BKJD
Rp/R* = 0.0105 [0.0028]
a/R* = 1.92 [2.01]
b = 0.89 [0.32]
Seff = 3093.85 [1004.65]
Teff = 1902 [154] K
Rp = 1.08 [0.36] Re
a = 0.0232 [0.0045] AU
Ag = 30.09 [18.52] [1.57σ]
Teffp = 6886 [946] K [5.20σ]

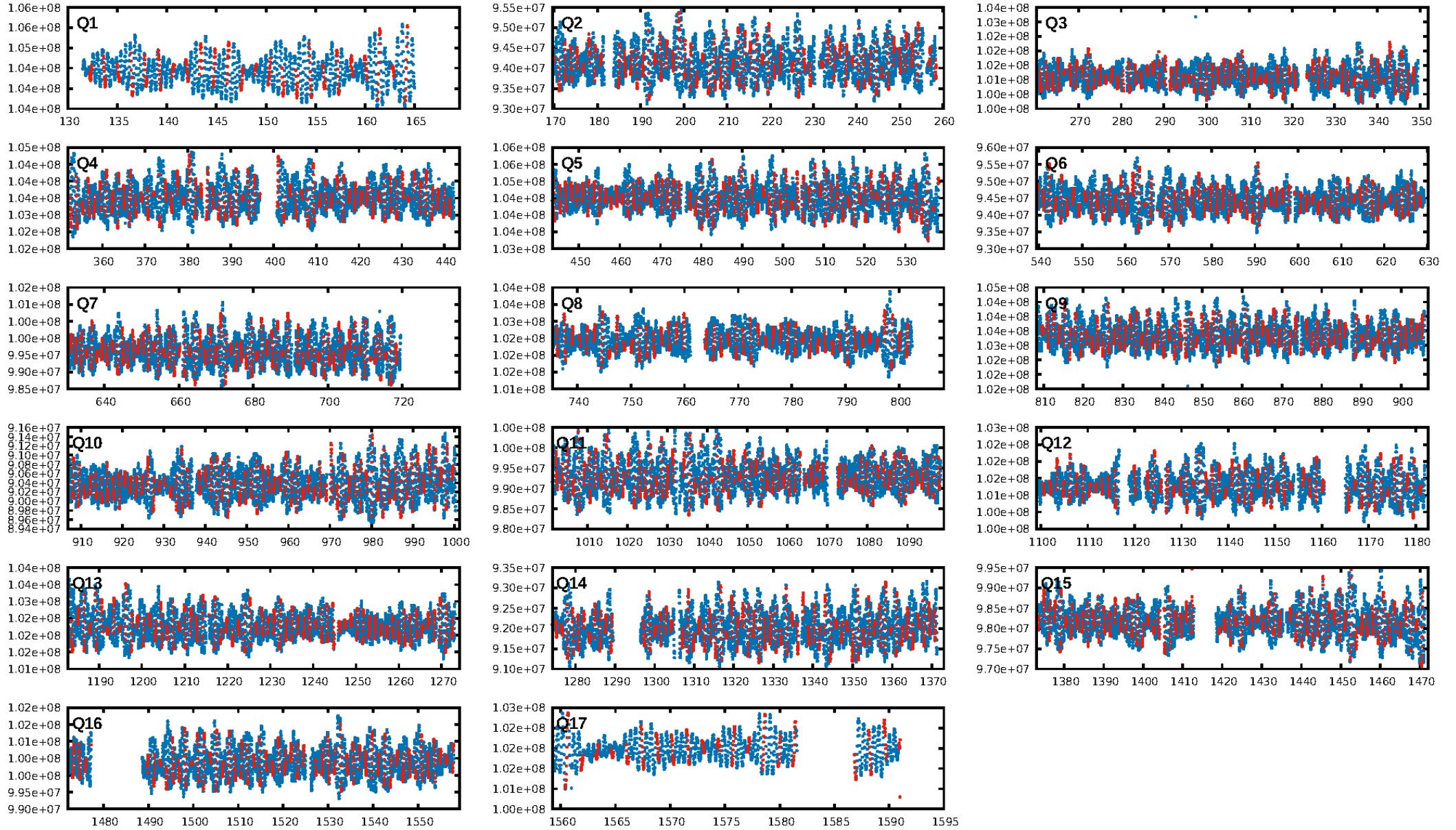
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.76e-21
RollingBand-fgt: 1.00 [922/922]
GhostDiagnostic-chr: 1.162
Centroid-sig: 4.0%
Centroid-so: 0.919 arcsec [2.19σ]
OotOffset-rm: 0.067 arcsec [0.12σ]
KicOffset-rm: 0.020 arcsec [0.05σ]
OotOffset-st: 4/4/2/5 [15]
KicOffset-st: 4/4/2/5 [15]
DiffImageQuality-fgm: 0.47 [7/15]
DiffImageOverlap-fno: 0.00 [0/17]

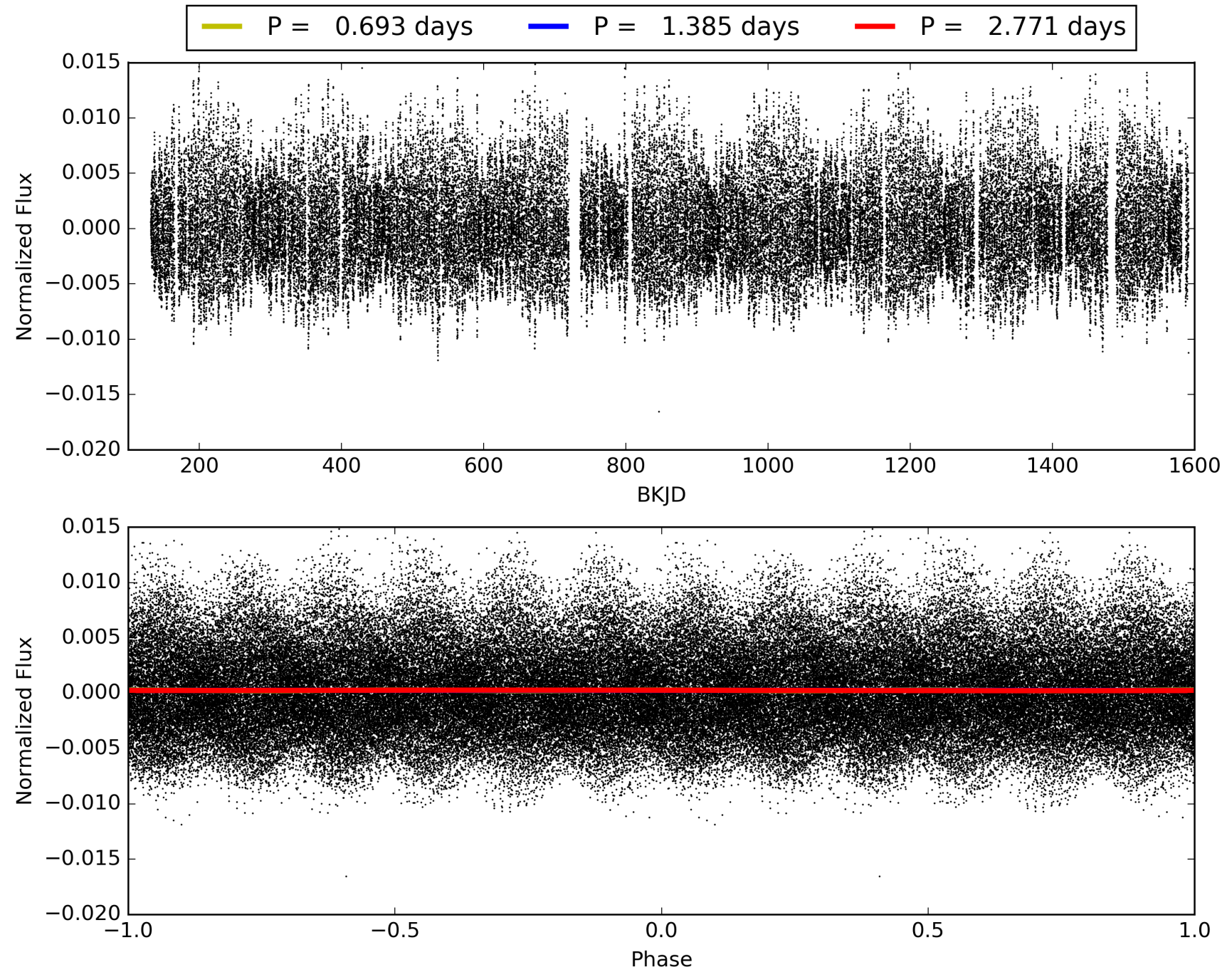
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:06:24 Z

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

TCE 002159852-02, PDC Light Curves

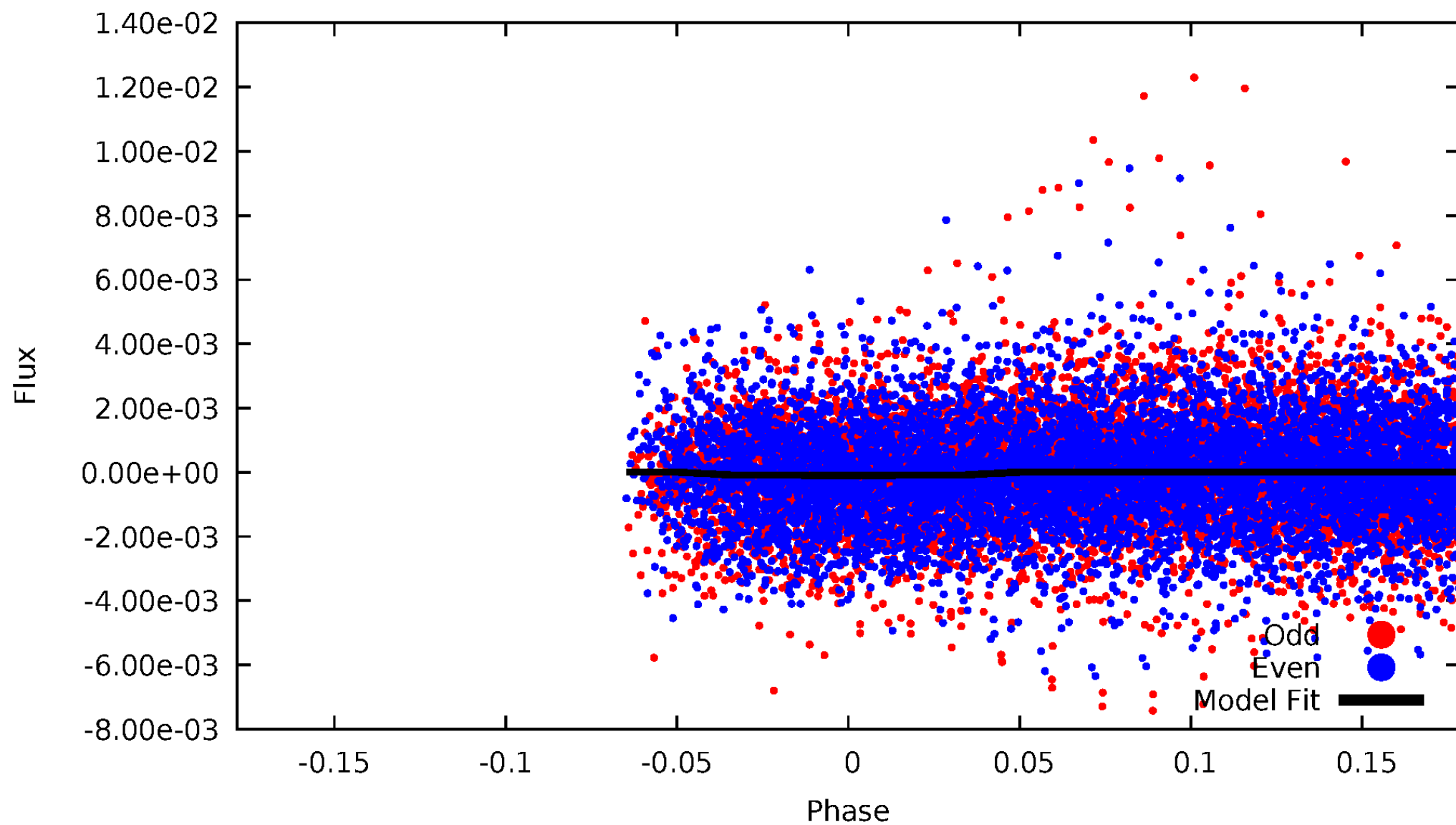


TCE 002159852-02



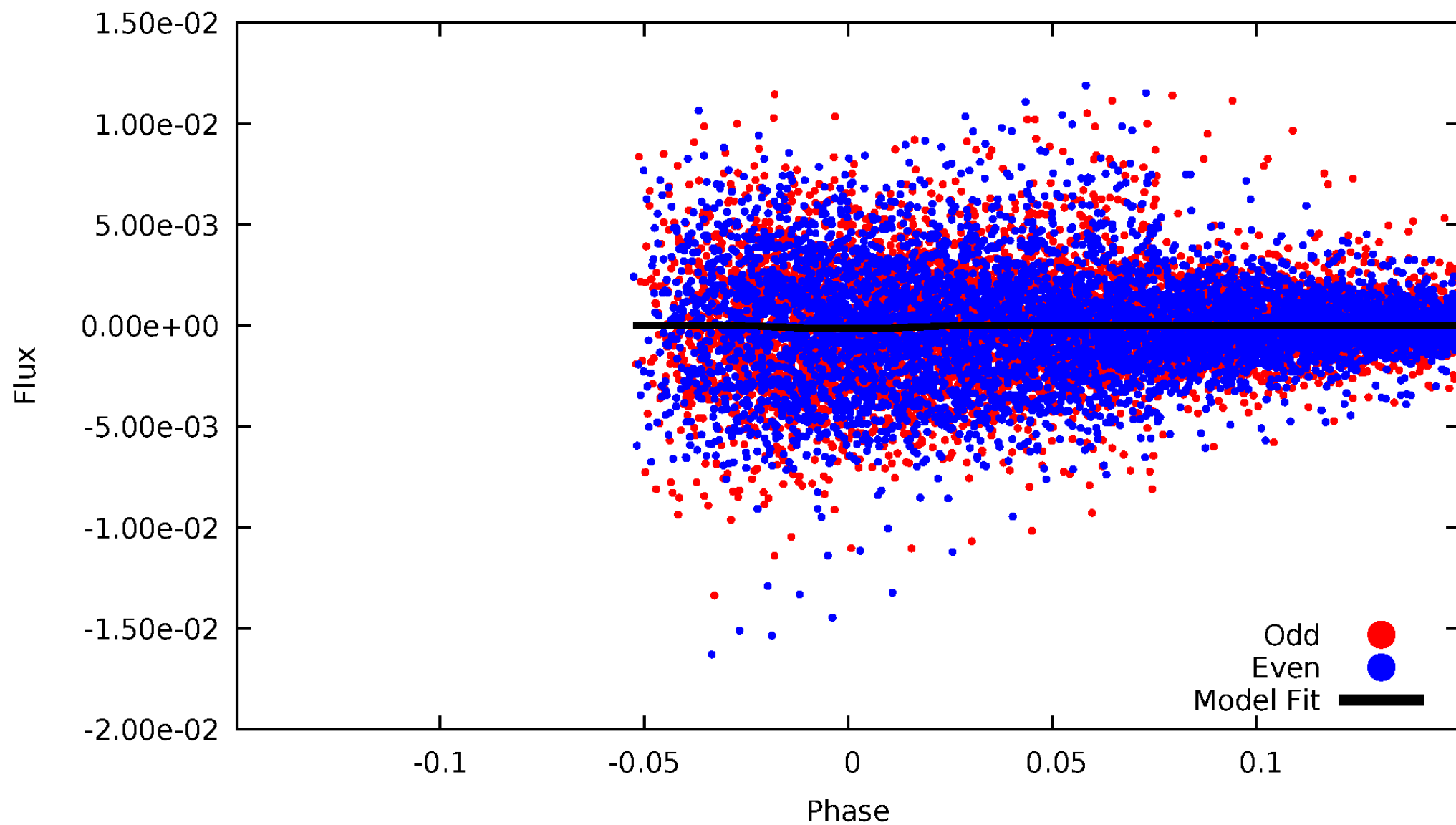
DV Odd/Even

TCE 002159852-02



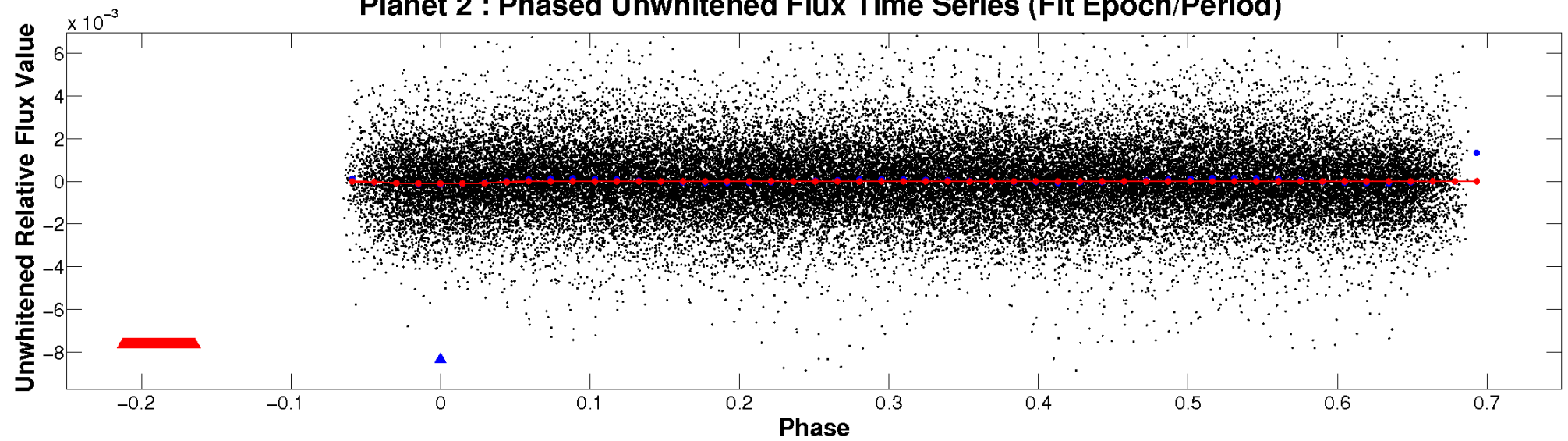
ALT Odd/Even

TCE 002159852-02

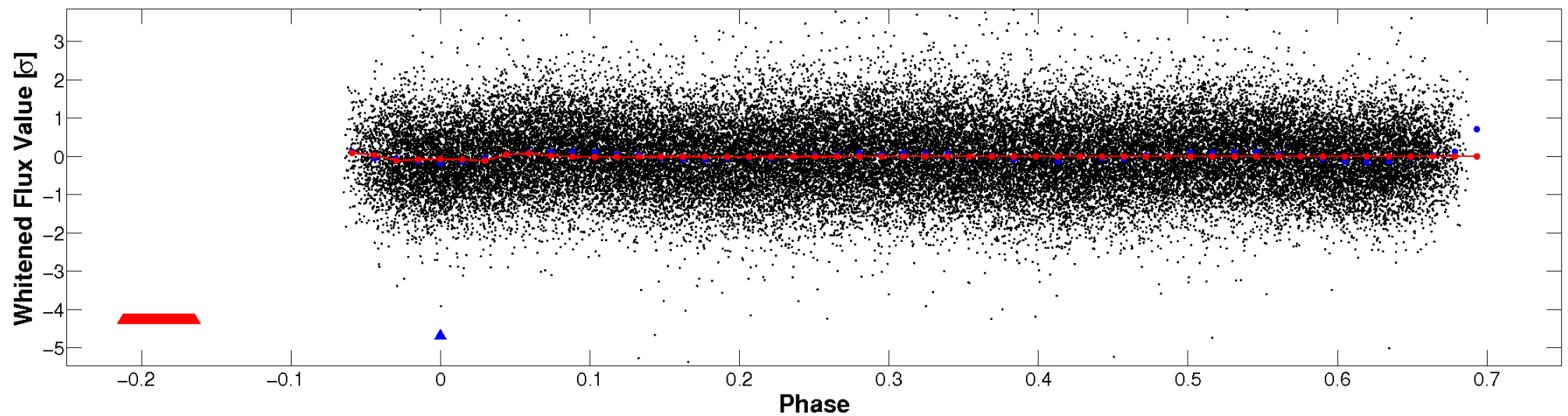


Non-Whitened Vs. Whitened Light Curve

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

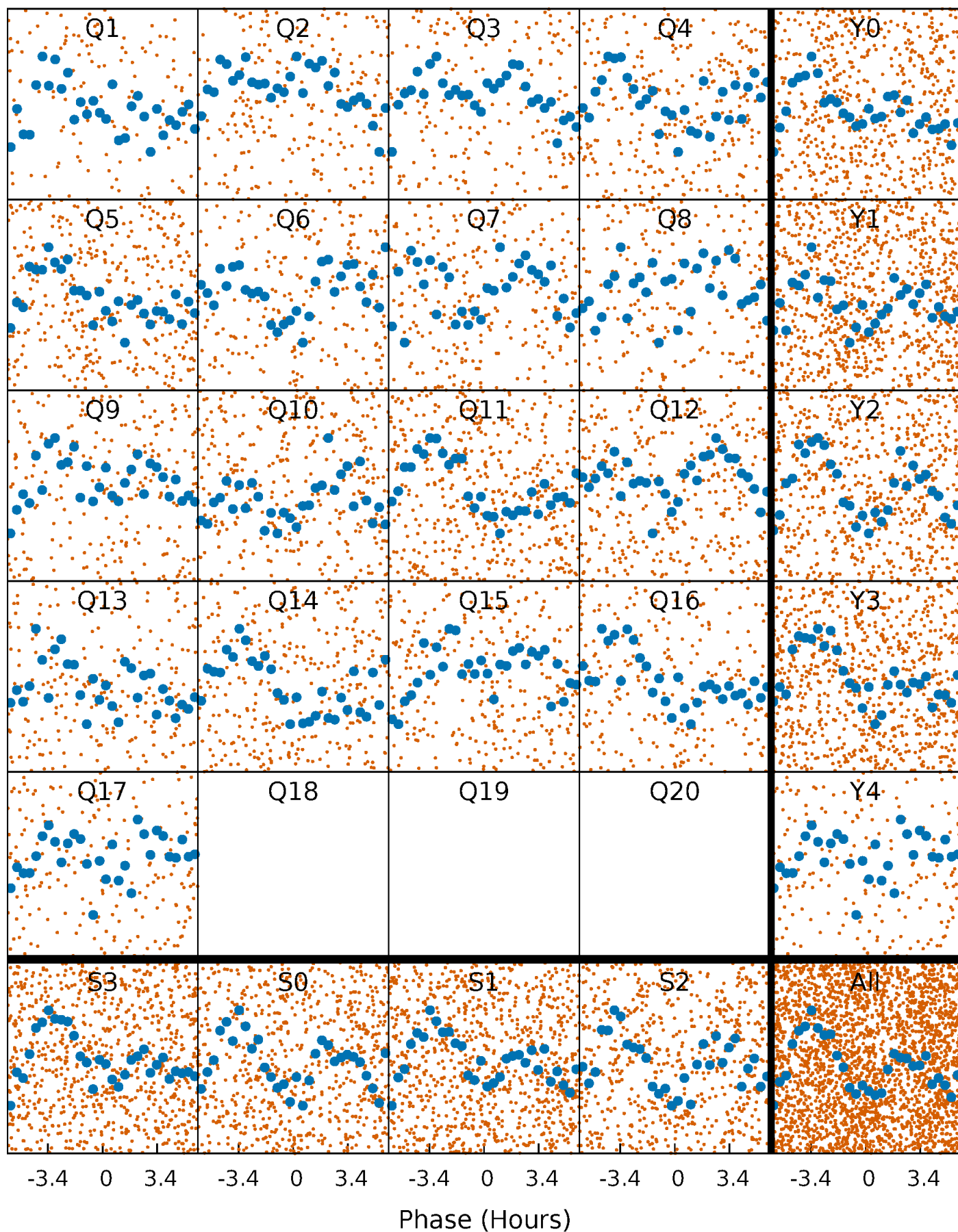


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



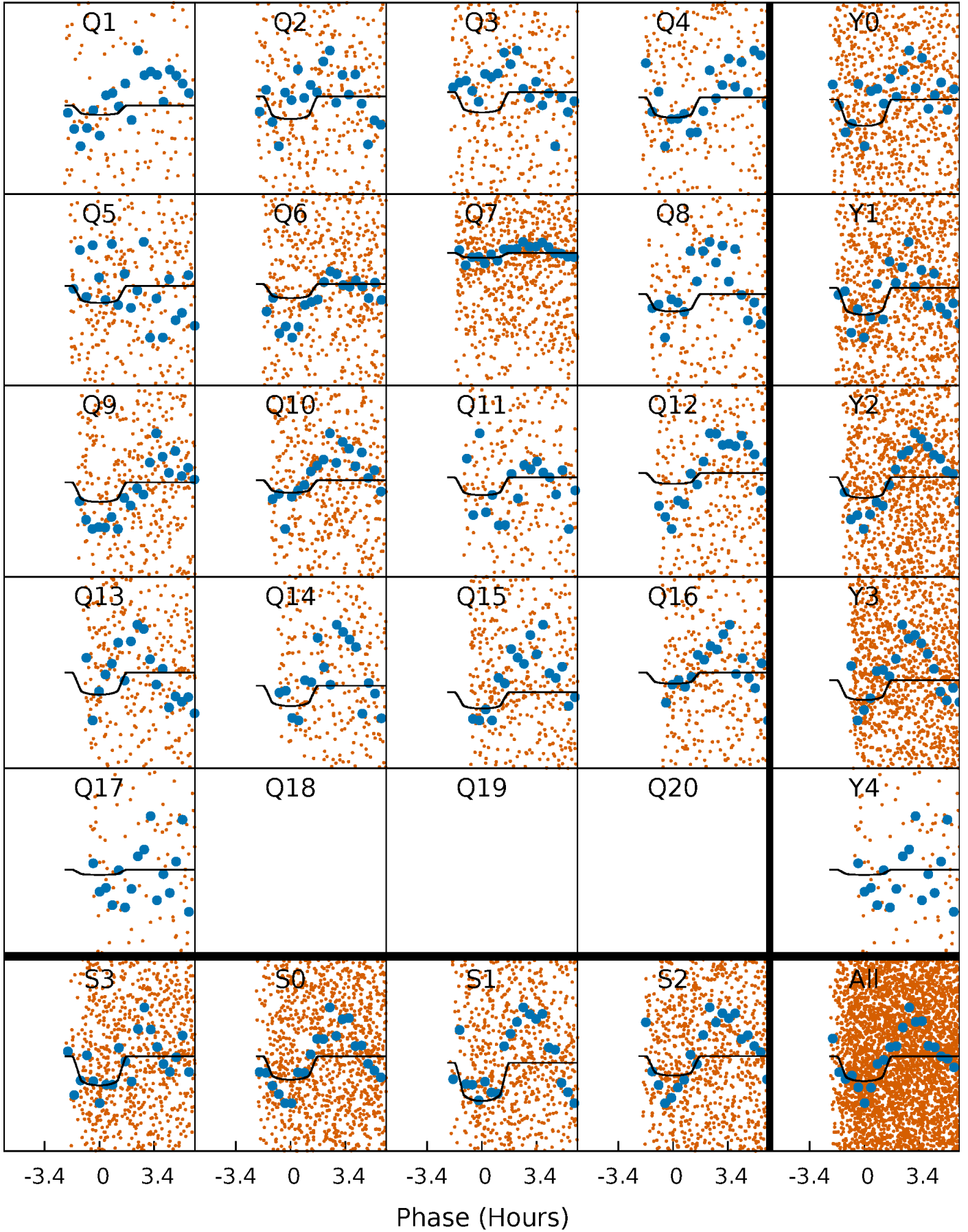
PDC Quarter-Phased Transit Curves

TCE 002159852-02 $P = 1.385279$ Days $T_0 = 132.314256$ (BKJD)



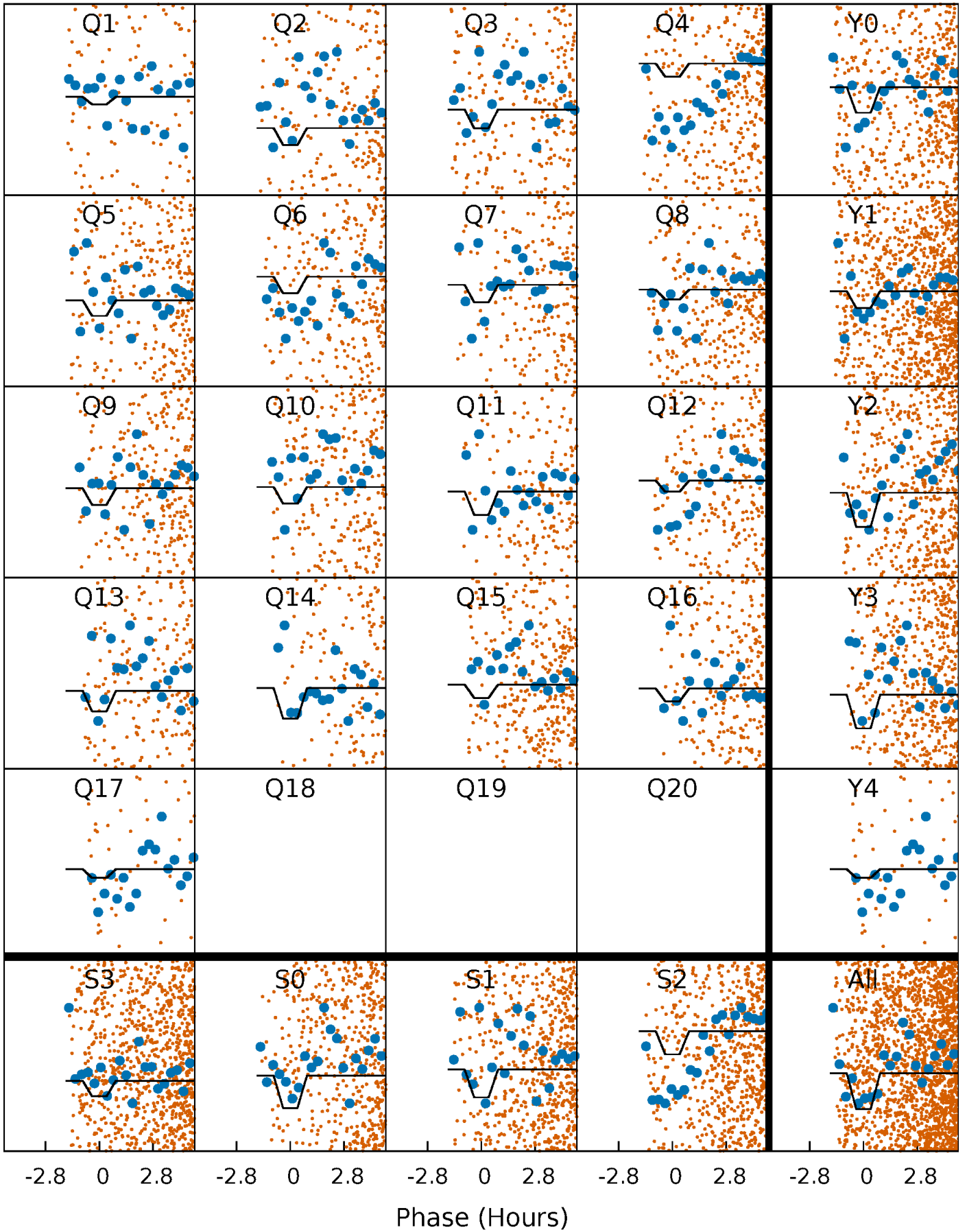
DV Quarter-Phased Transit Curves

TCE 002159852-02 P= 1.385279 Days $T_0=132.314256$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

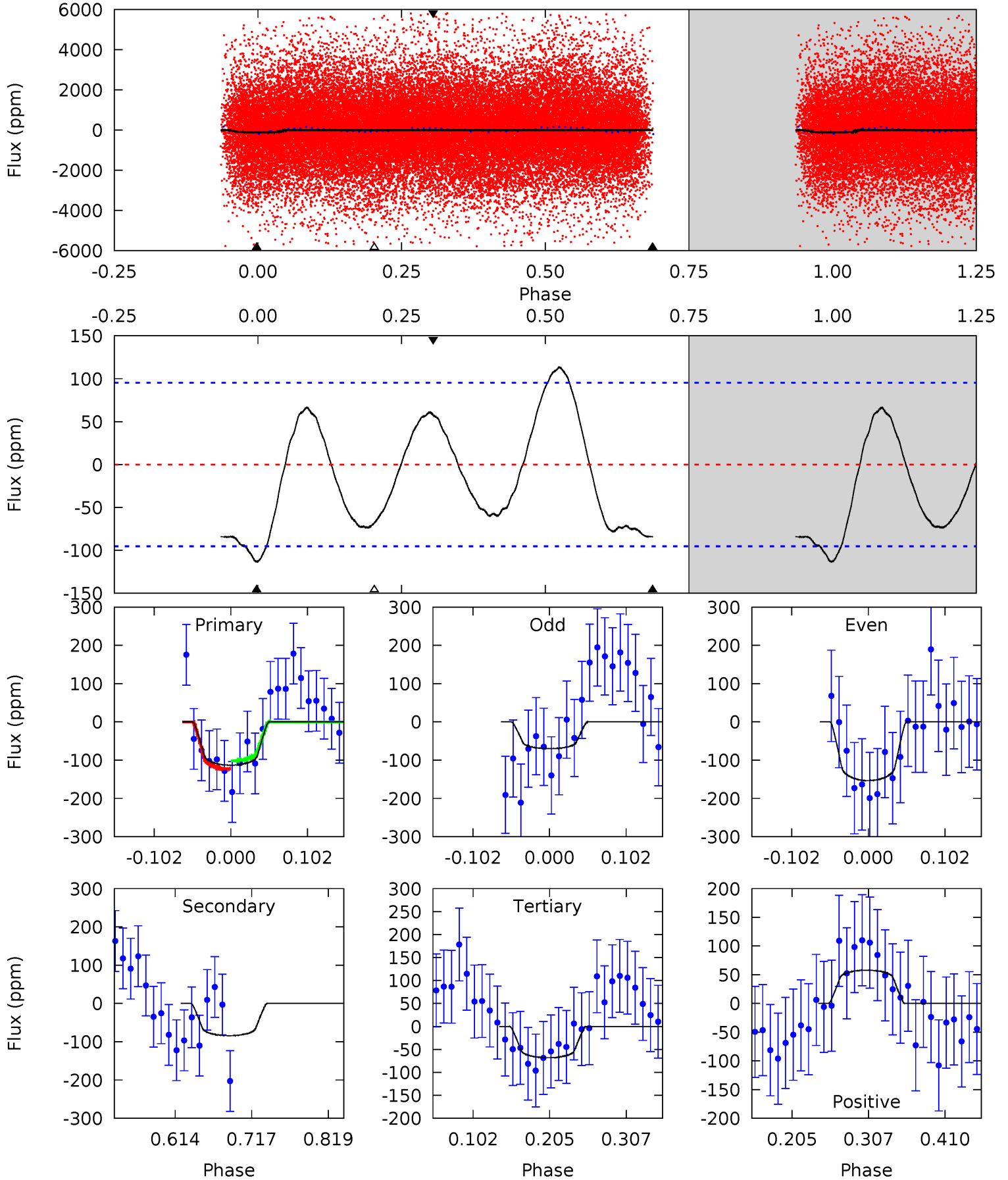
TCE 002159852-02 P= 1.385294 Days $T_0=132.297324$ (BKJD)



DV Model-Shift Uniqueness Test

002159852-02, P = 1.385279 Days, E = 130.928977 Days

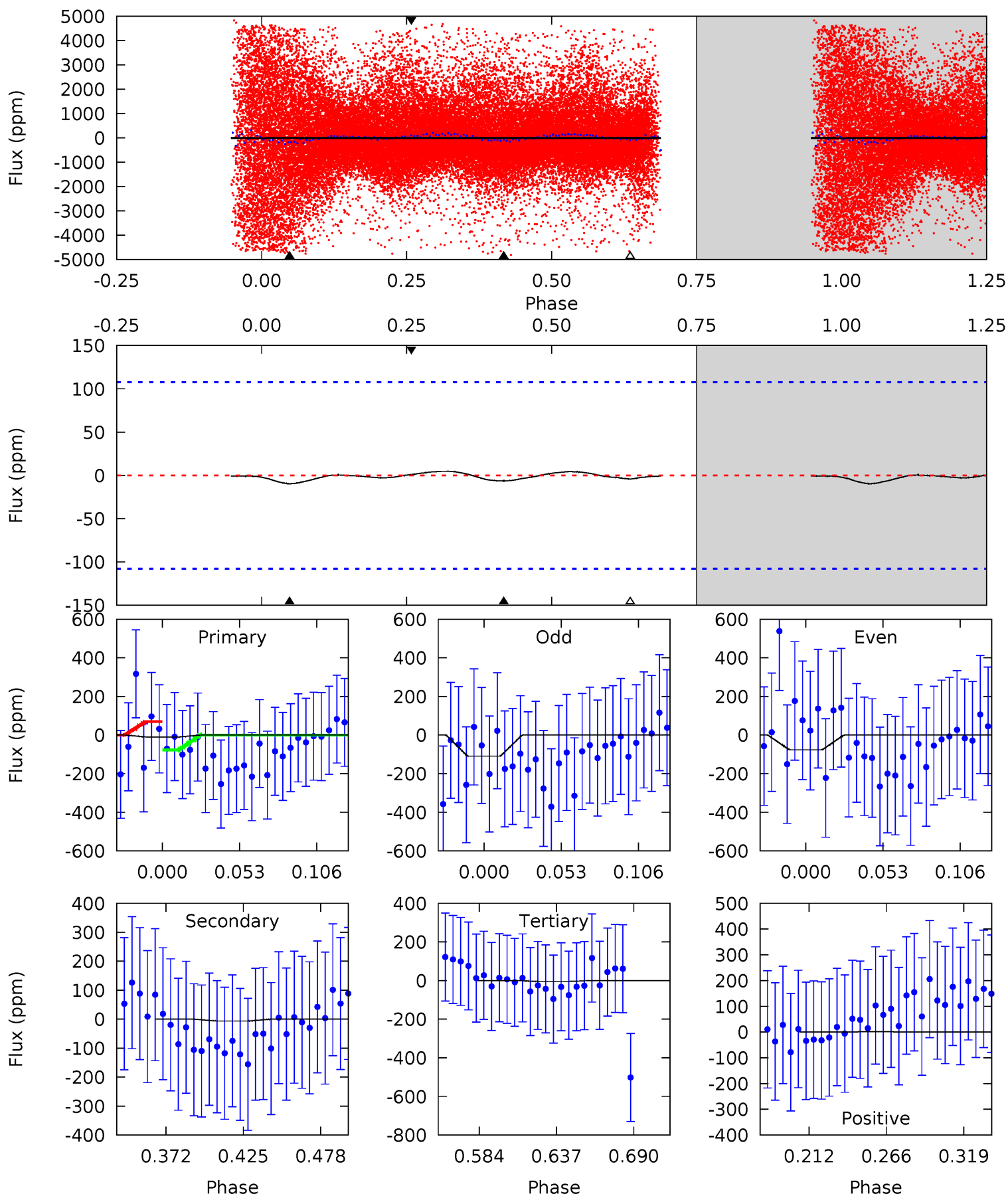
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.42	4.03	3.26	2.77	4.56	1.63	2.61	2.16	2.65	0.77	1.26	2.05	1.51	0.50	0.52



Alt Model-Shift Uniqueness Test

002159852-02, P = 1.385294 Days, E = 130.912030 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.42	0.28	0.18	0.04	4.70	1.93	0.11	0.24	0.38	0.10	0.23	0.71	-1.89	0.33	0.19



Stellar Parameters For KIC 002159852

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6748^{+181}_{-201}	$4.423^{+0.116}_{-0.174}$	$-1.480^{+0.300}_{-0.300}$	$0.945^{+0.200}_{-0.108}$	$0.864^{+0.066}_{-0.054}$	$1.439^{+0.689}_{-0.642}$
	+3%/-3%	+3%/-4%	+20%/-20%	+21%/-11%	+8%/-6%	+48%/-45%
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 002159852-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-84 ± 21	$1.09^{+0.34}_{-0.30}$	2671^{+168}_{-140}	6270^{+1159}_{-803}	20^{+19}_{-9}
Alt.	-6 ± 23	$1.16^{+0.31}_{-0.30}$	2661^{+159}_{-126}	3438^{+1447}_{-7815}	$1.224^{+6.288}_{-4.926}$

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 $A_{obs} \gg 1.0$

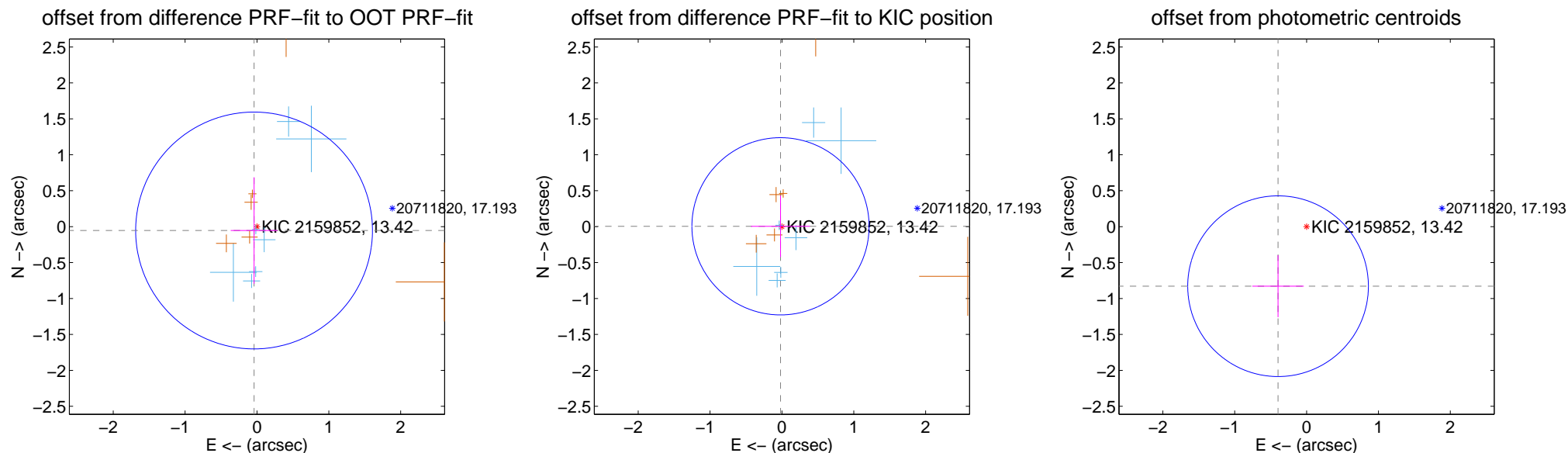
DV Centroid Data

Supplemental centroid analysis for 002159852-02. Kepler magnitude: 13.42. Transit SNR 7.19

There are 7 quarters with good PRF difference image offsets

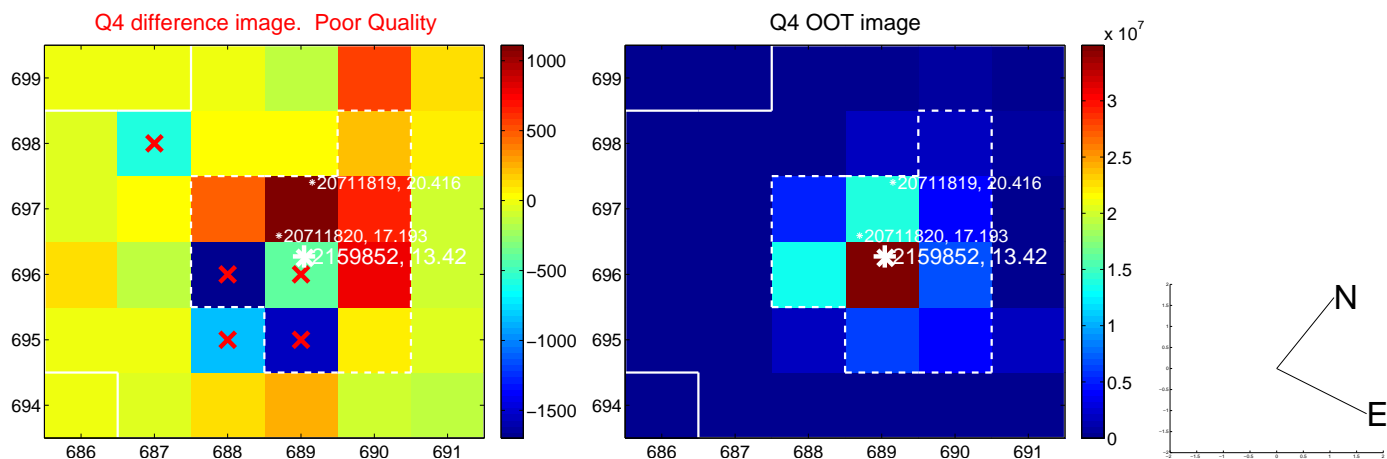
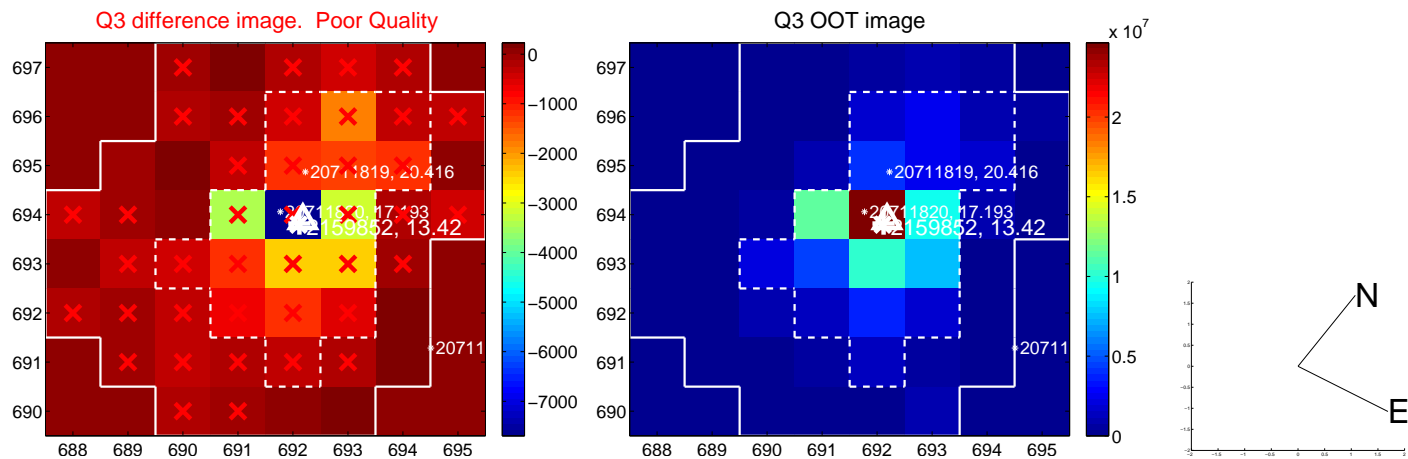
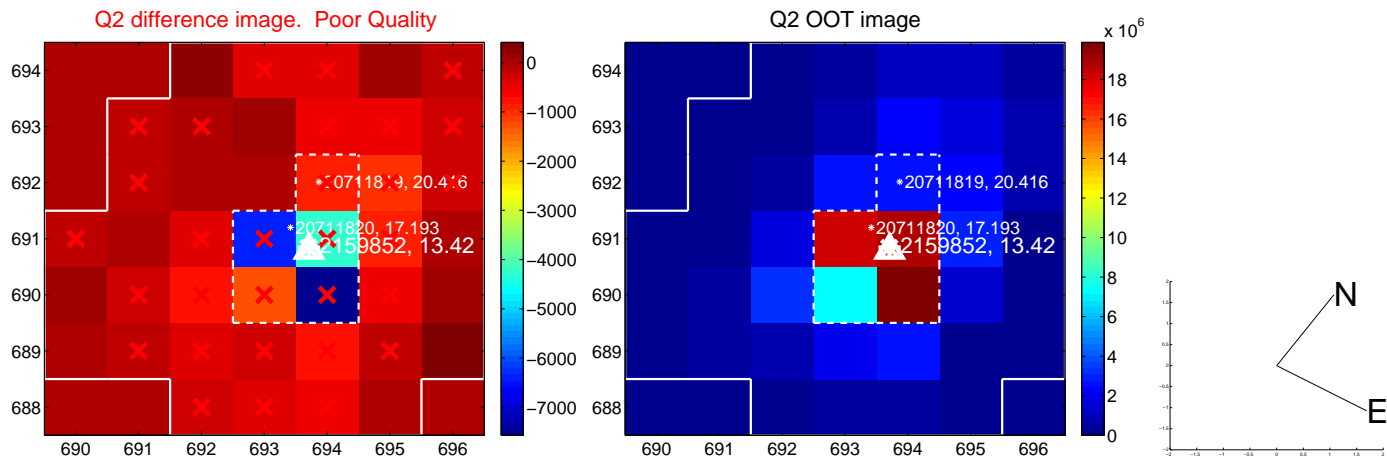
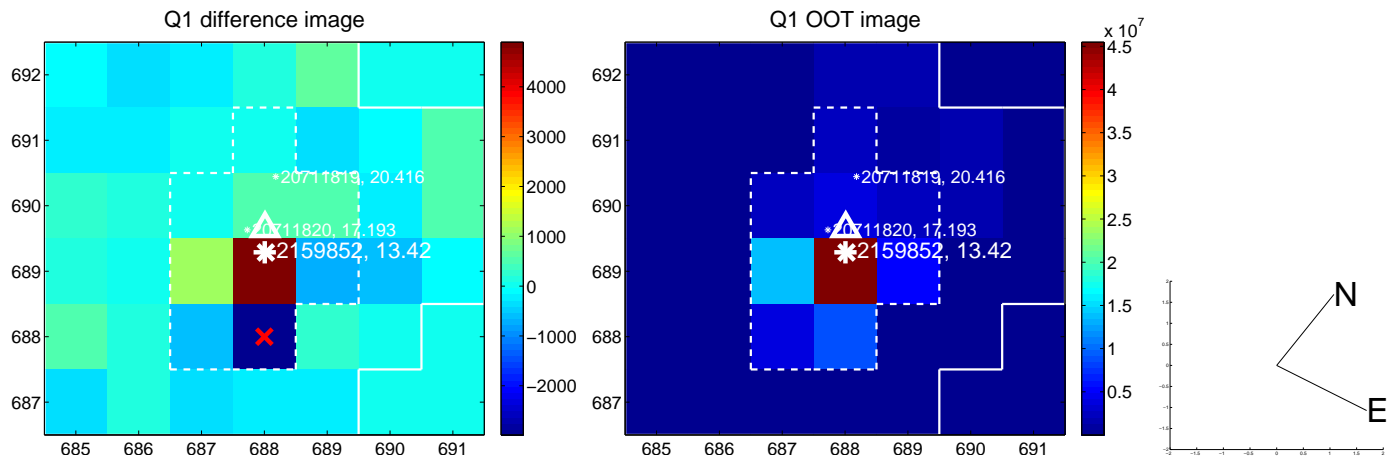
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.067 ± 0.549	0.12	0.040 ± 0.325	-0.054 ± 0.741
PRF-fit source offset from KIC position	0.020 ± 0.411	0.05	0.020 ± 0.410	0.005 ± 0.427
photometric centroid source offset	0.92 ± 0.42	2.19	0.40 ± 0.36	-0.83 ± 0.43

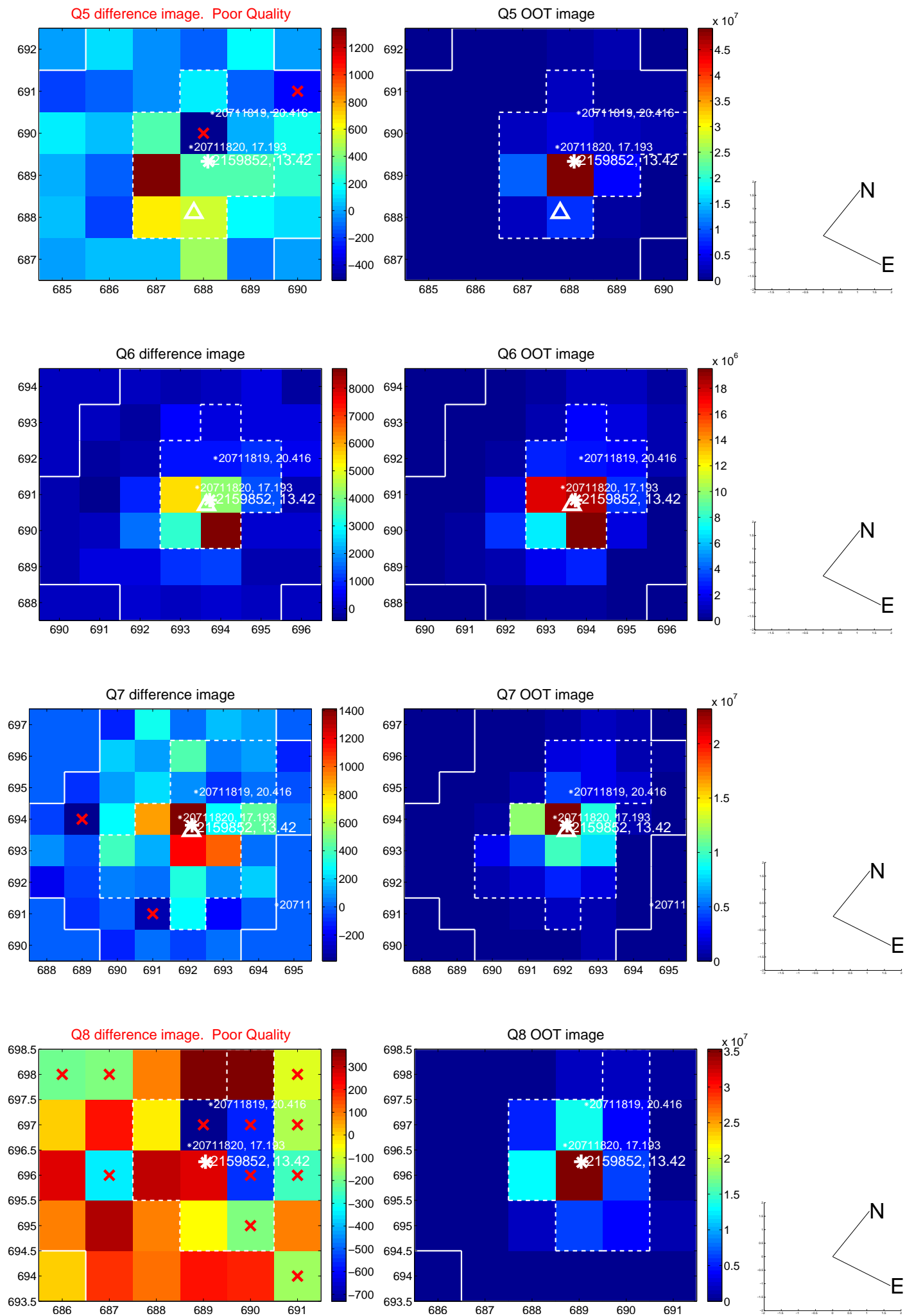


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

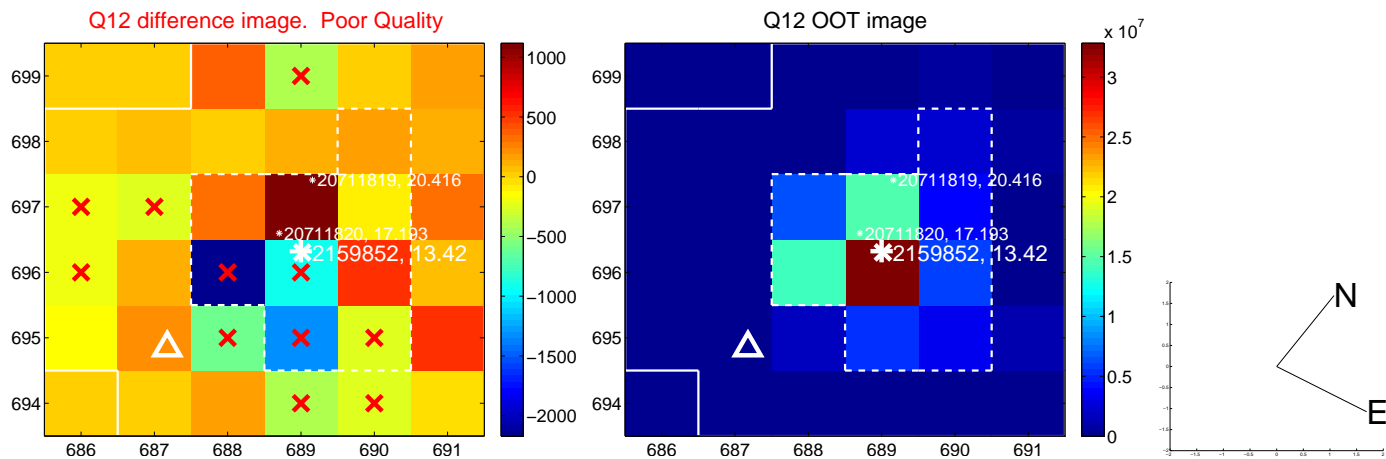
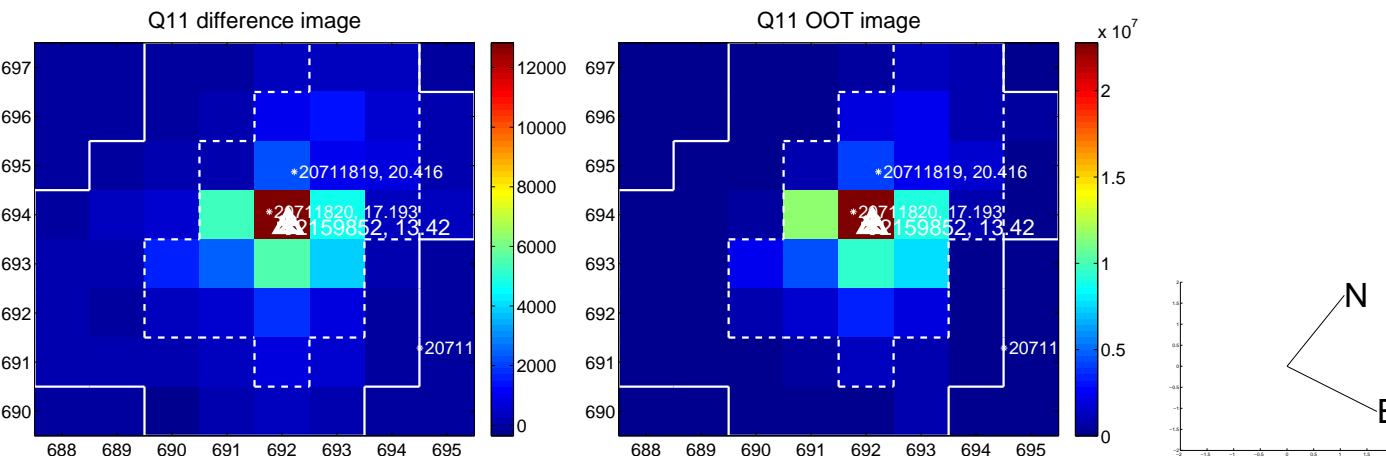
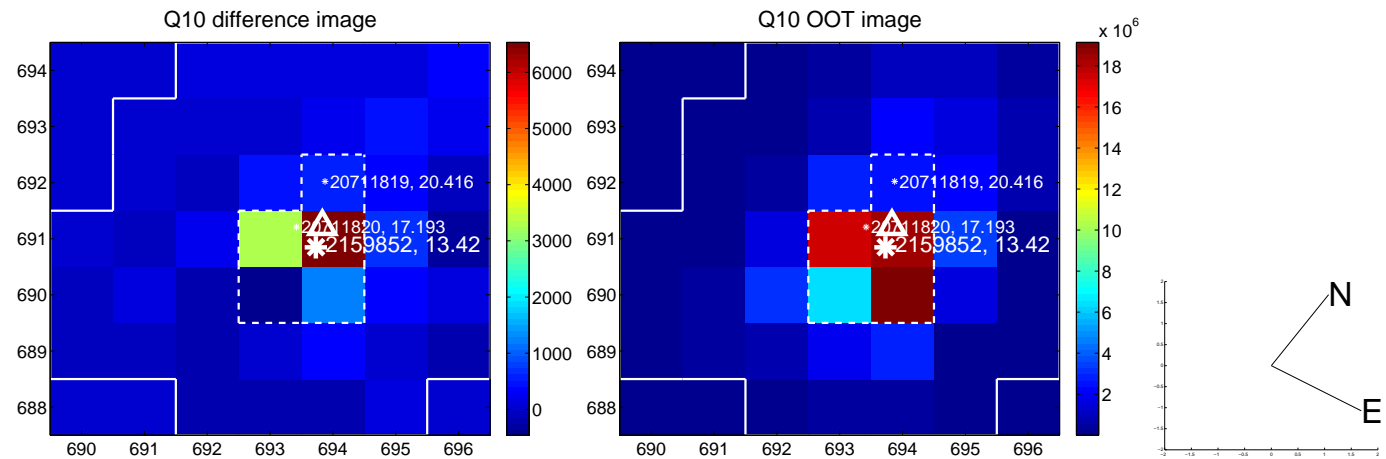
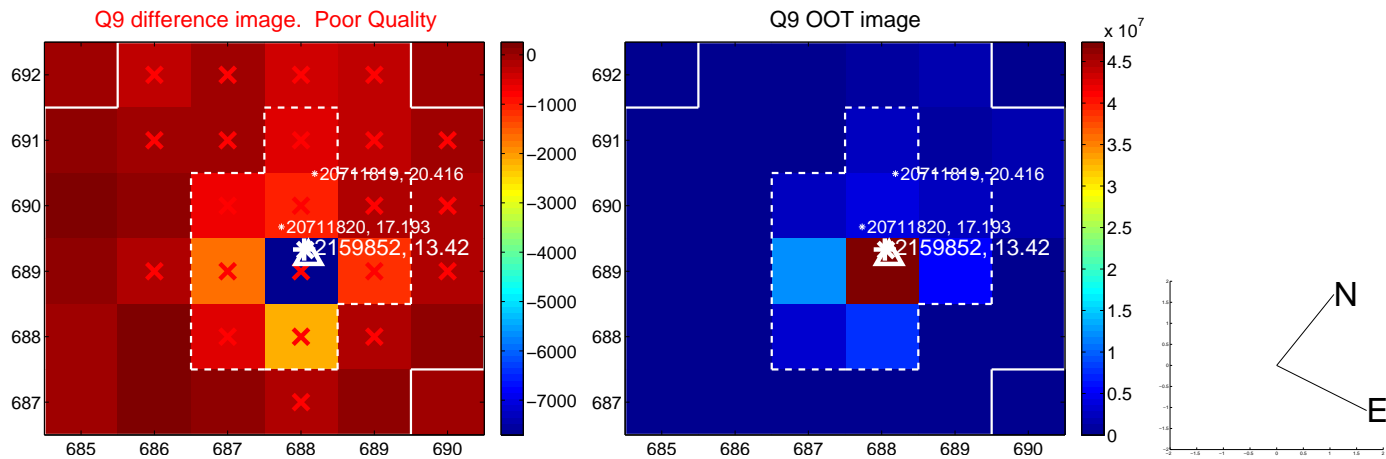
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



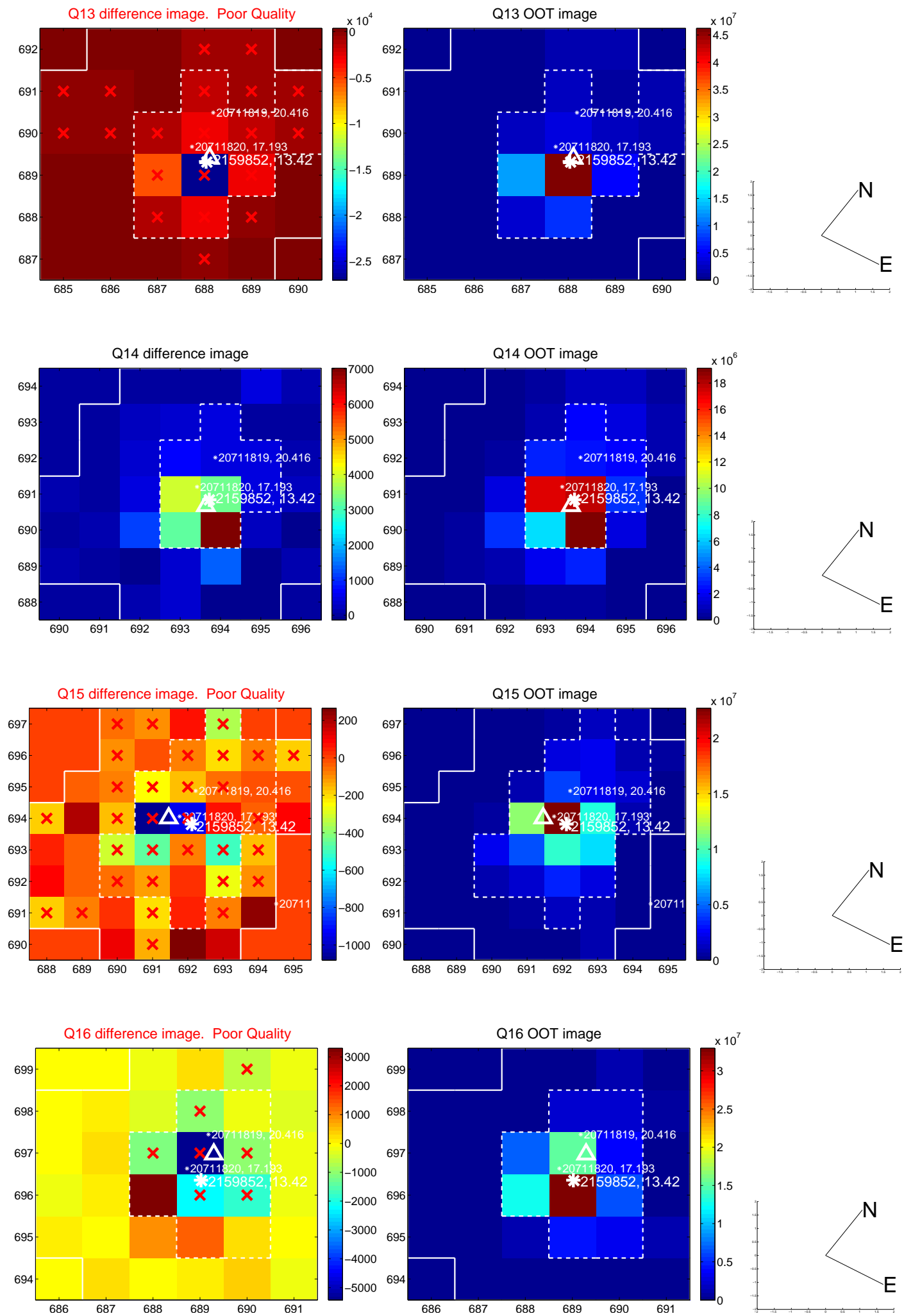
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



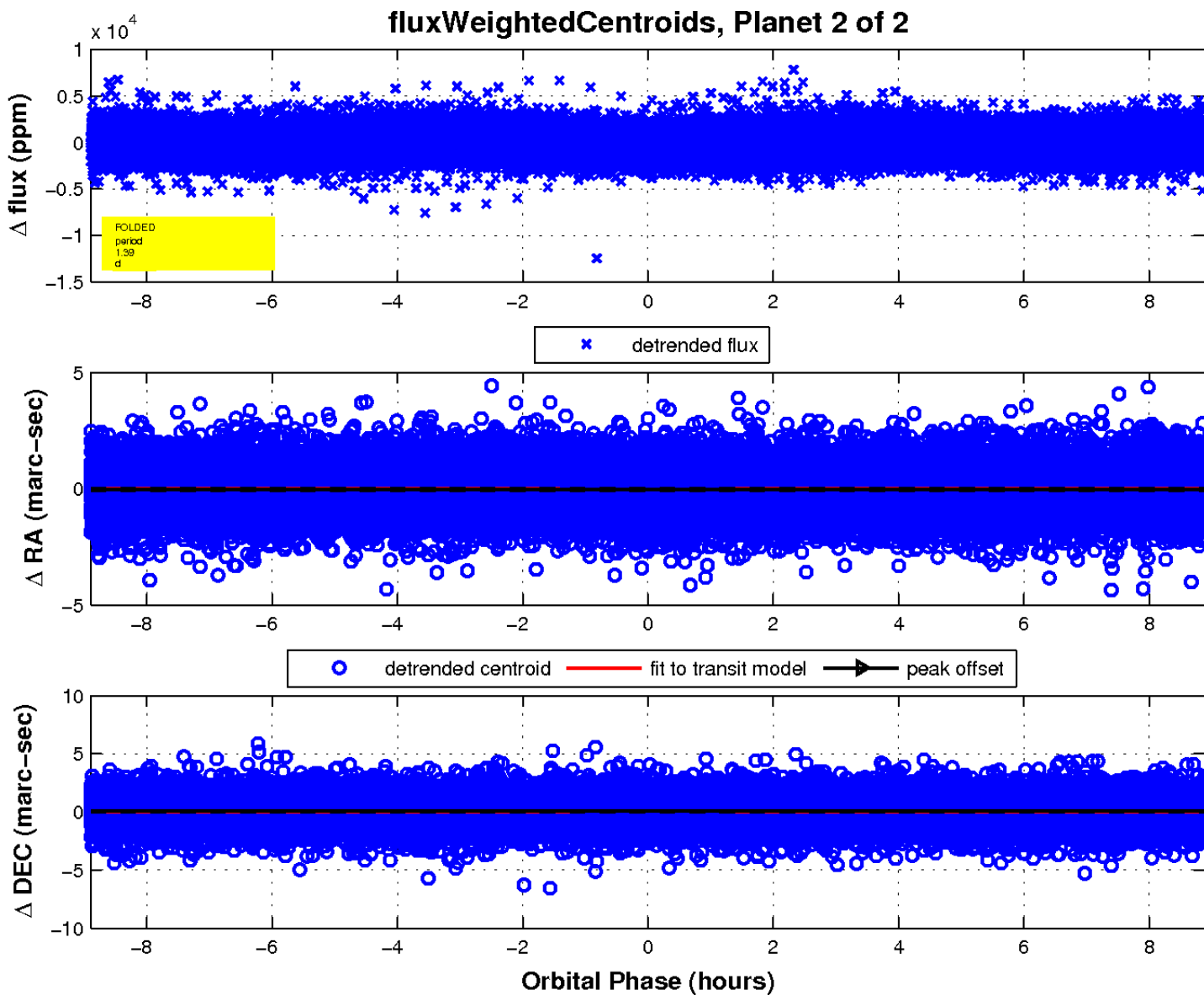
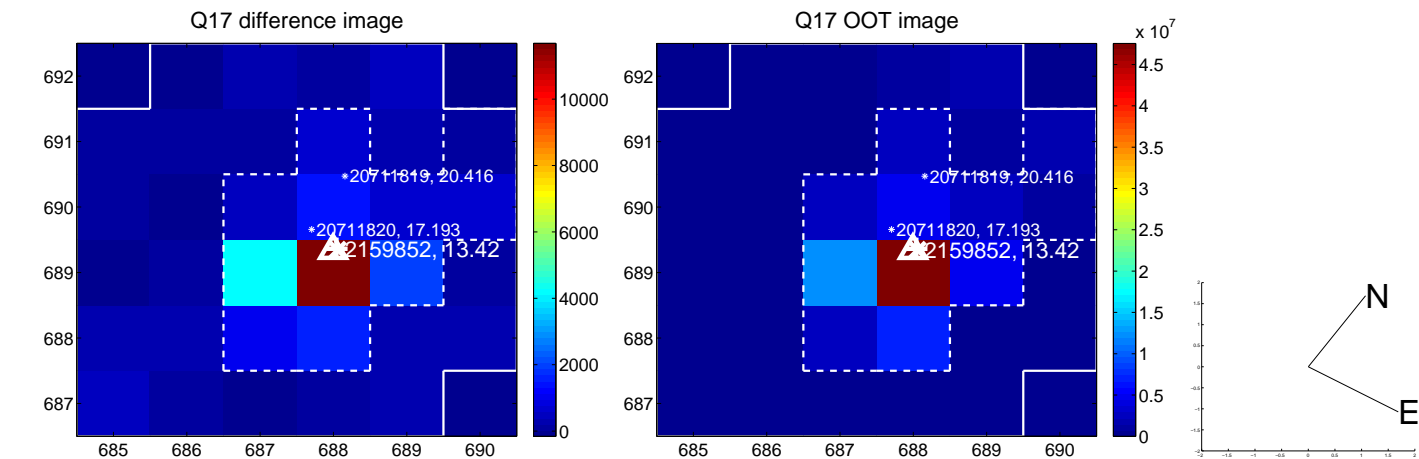
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

