

KIC 009180906

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})
009180906-01	OBS	No	0.916699	131.936588	68.9	4.054	11.6	9.0	1.39	6773	1.35	8432.07
009180906-02	OBS	No	1.024368	131.540254	124.9	10.499	9.0	15.7	1.39	6773	1.56	7271.58

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009180906-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009180906-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT

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

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

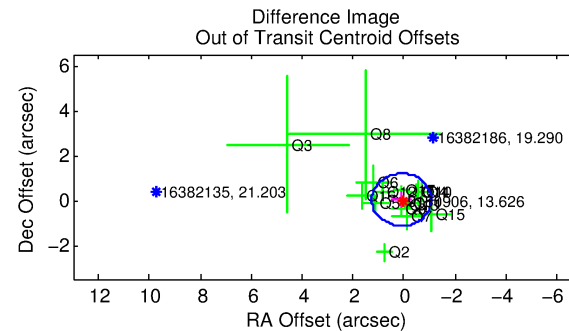
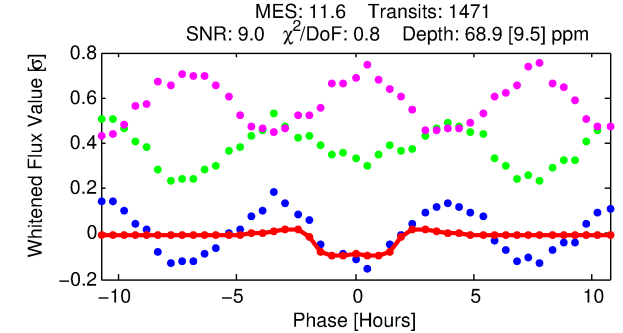
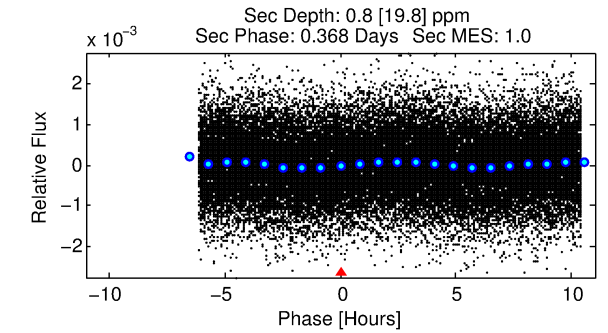
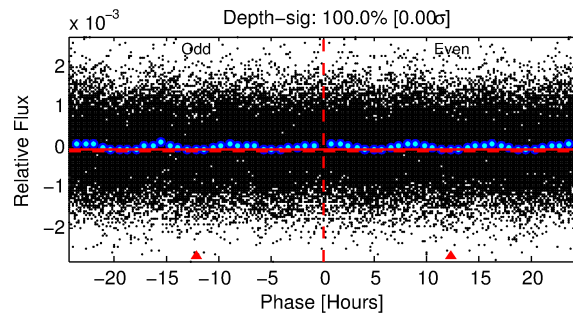
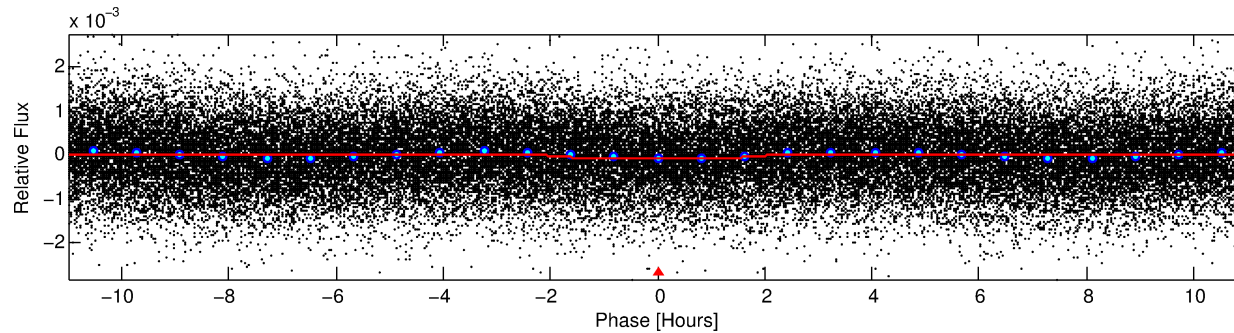
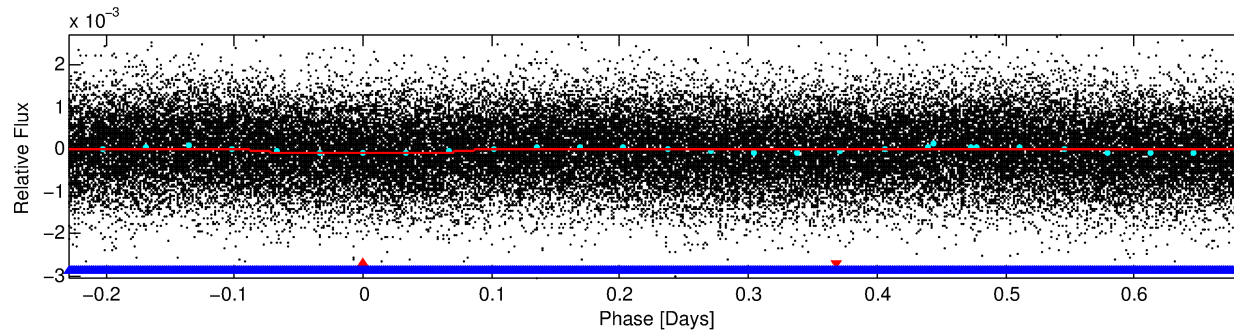
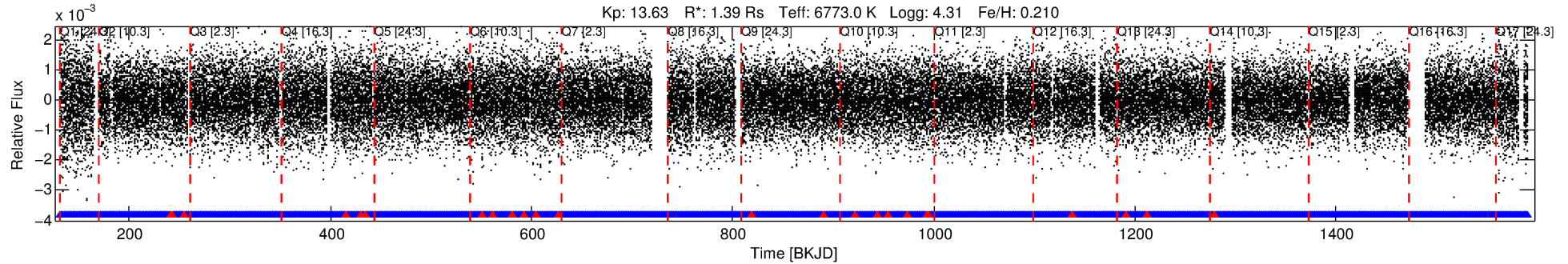
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009180906-01

No Significant Match Found

DV One-Page Summary

KIC: 9180906 Candidate: 1 of 2 Period: 0.917 d



DV Fit Results:

Period = 0.91670 [0.00001] d
Epoch = 131.9366 [0.0046] BKJD
Rp/R* = 0.0089 [0.0053]
a/R* = 1.23 [1.45]
b = 0.90 [0.76]
Seff = 8432.07 [3119.75]
Teq = 2443 [226] K
Rp = 1.35 [0.90] Re
a = 0.0208 [0.0050] AU
Ag = 0.11 [2.61] [-0.34σ]
Teffp = 2173 [12947] K [-0.02σ]

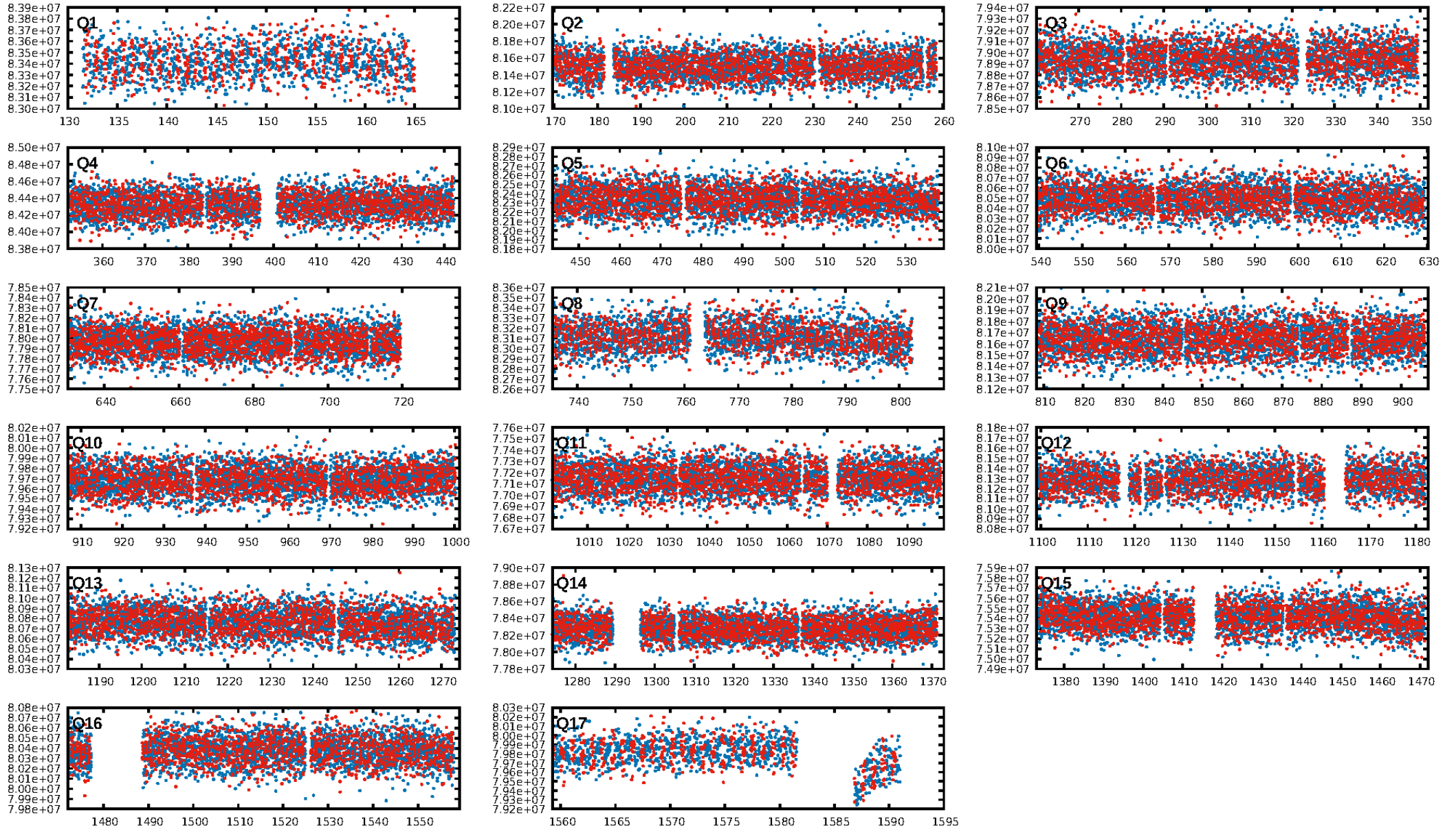
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 18.2% [0.23σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.98 [1380/1404]
GhostDiagnostic-chr: 2.238
Centroid-sig: 53.5%
Centroid-so: 0.489 arcsec [1.03σ]
OotOffset-rm: 0.100 arcsec [0.26σ]
KicOffset-rm: 0.120 arcsec [0.32σ]
OotOffset-st: 4/4/4 [16]
KicOffset-st: 4/4/4 [16]
DiffImageQuality-fgm: 0.81 [13/16]
DiffImageOverlap-fno: 0.00 [0/17]

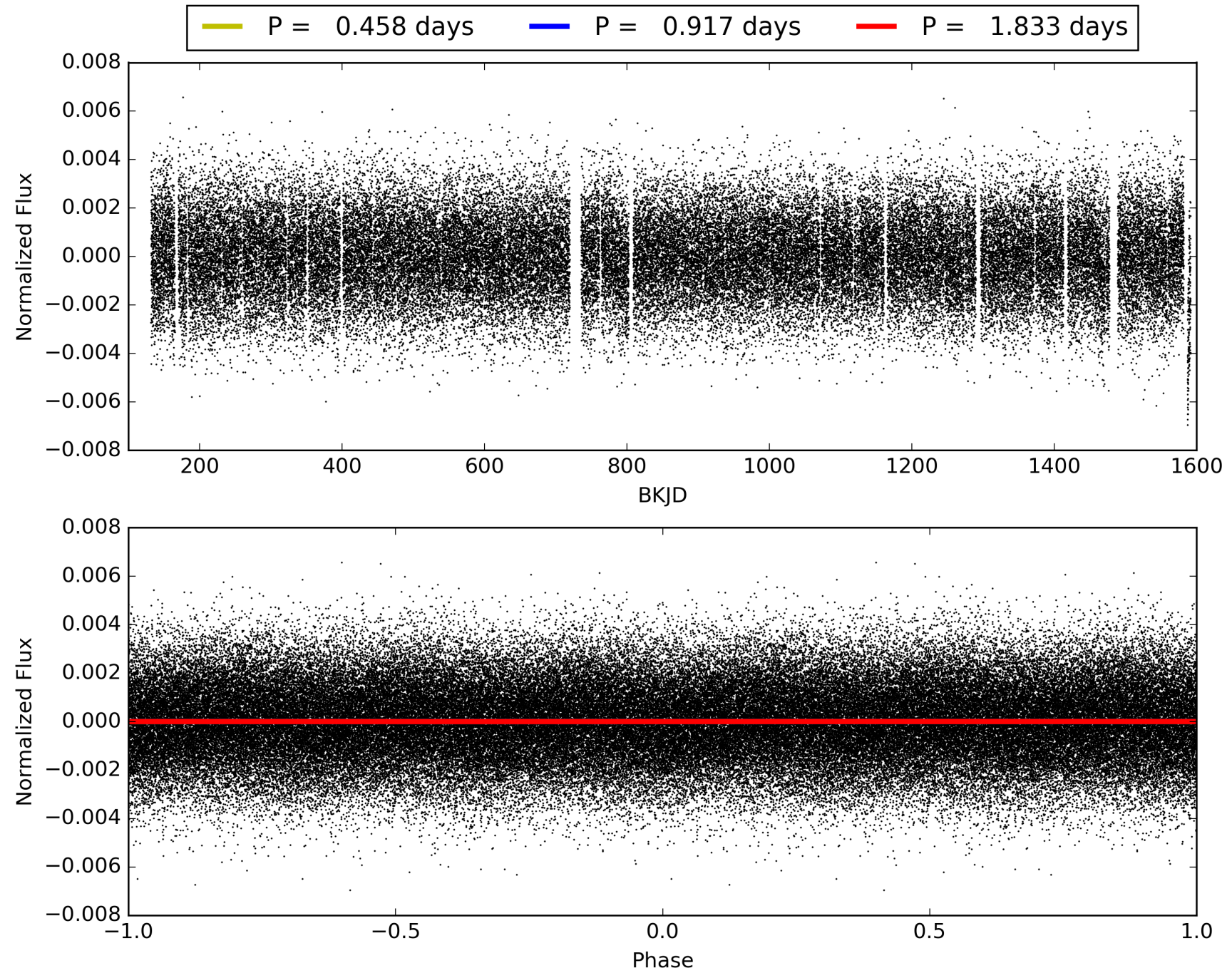
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:43:14 Z

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

TCE 009180906-01, PDC Light Curves

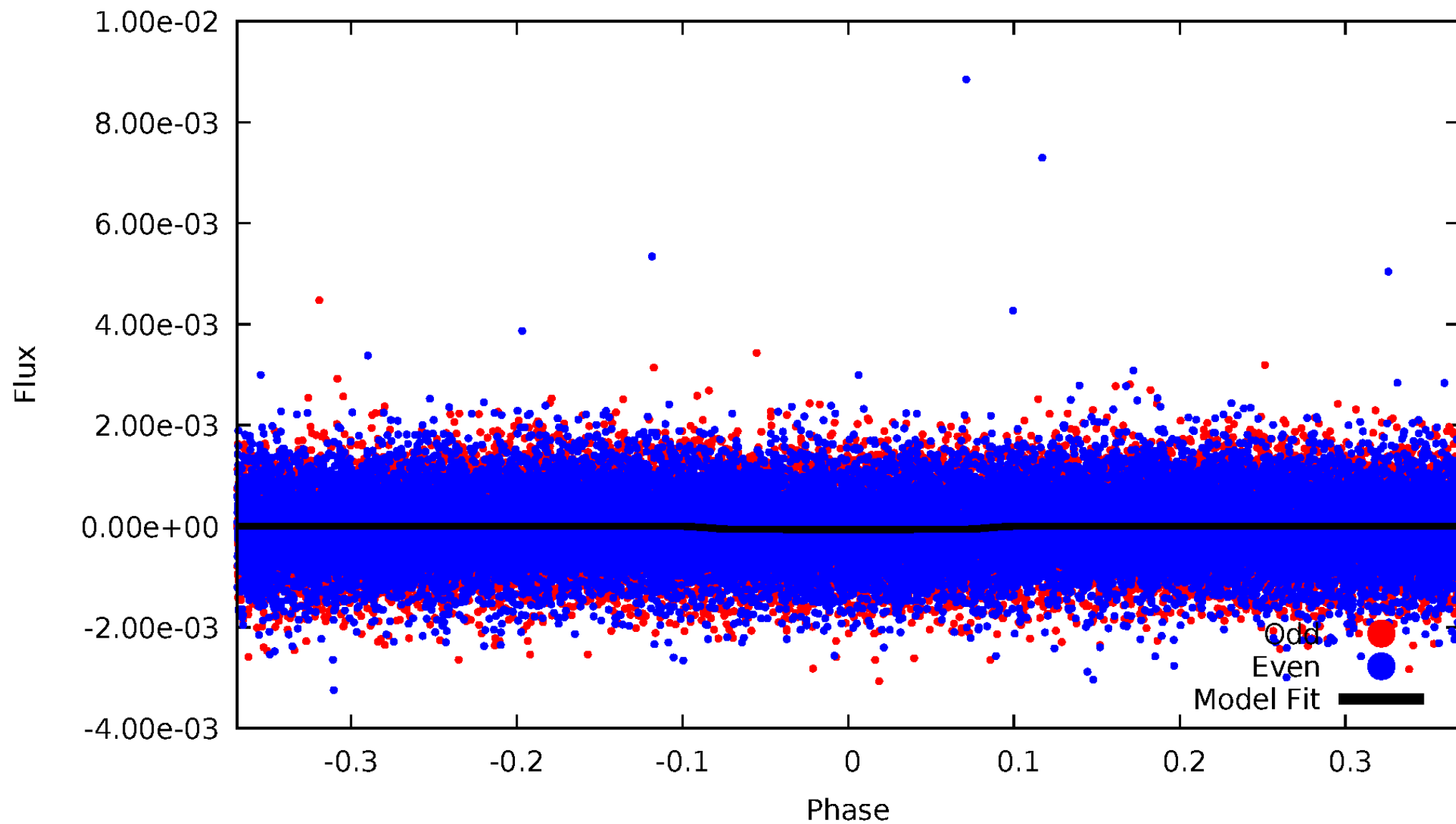


TCE 009180906-01



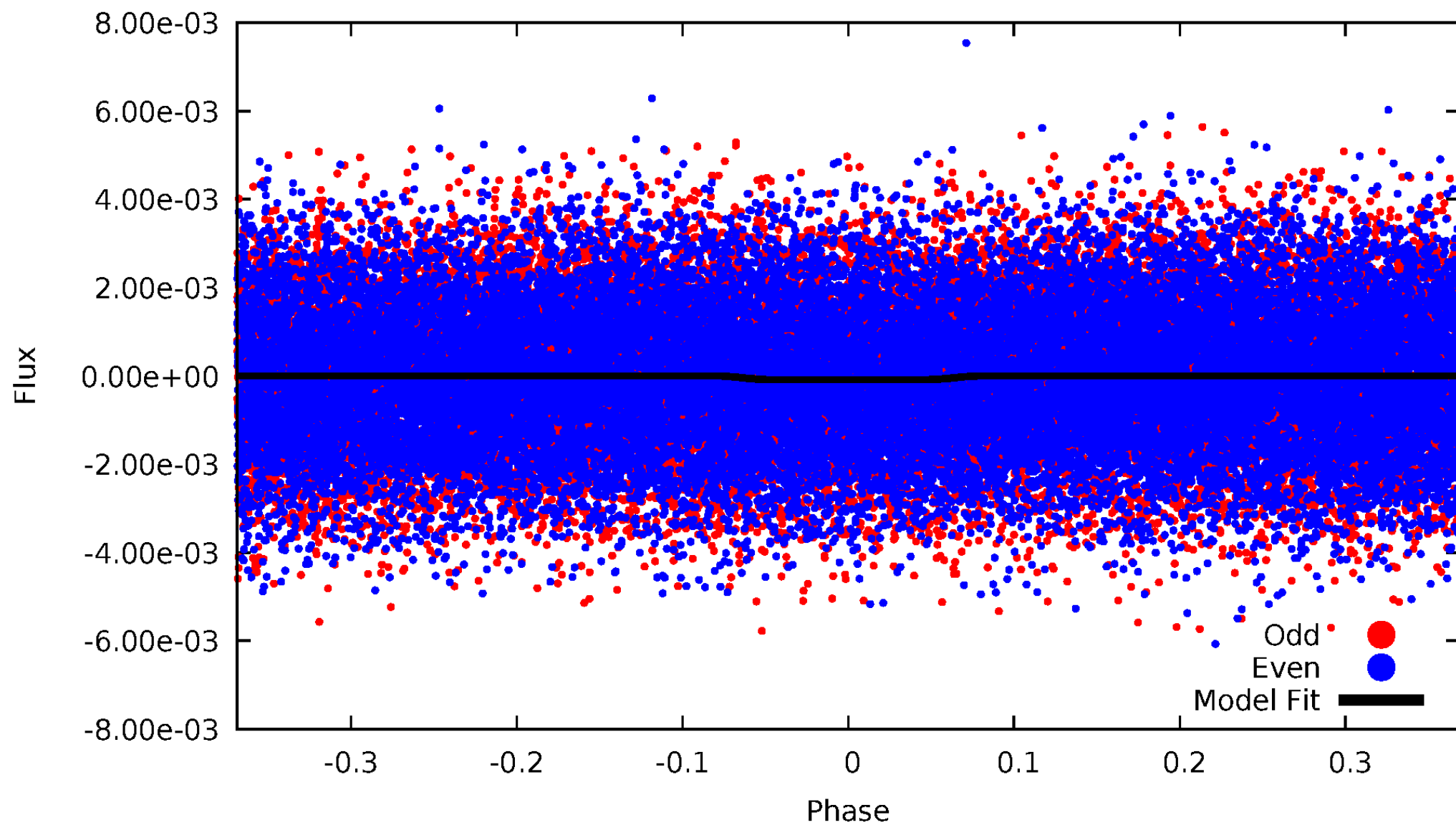
DV Odd/Even

TCE 009180906-01

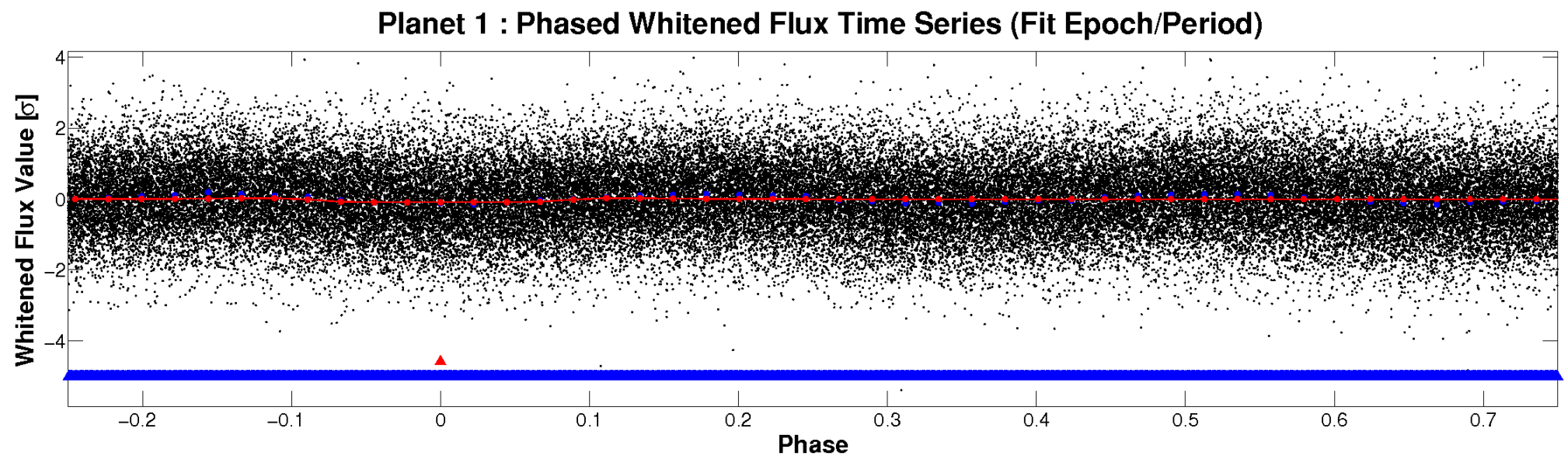
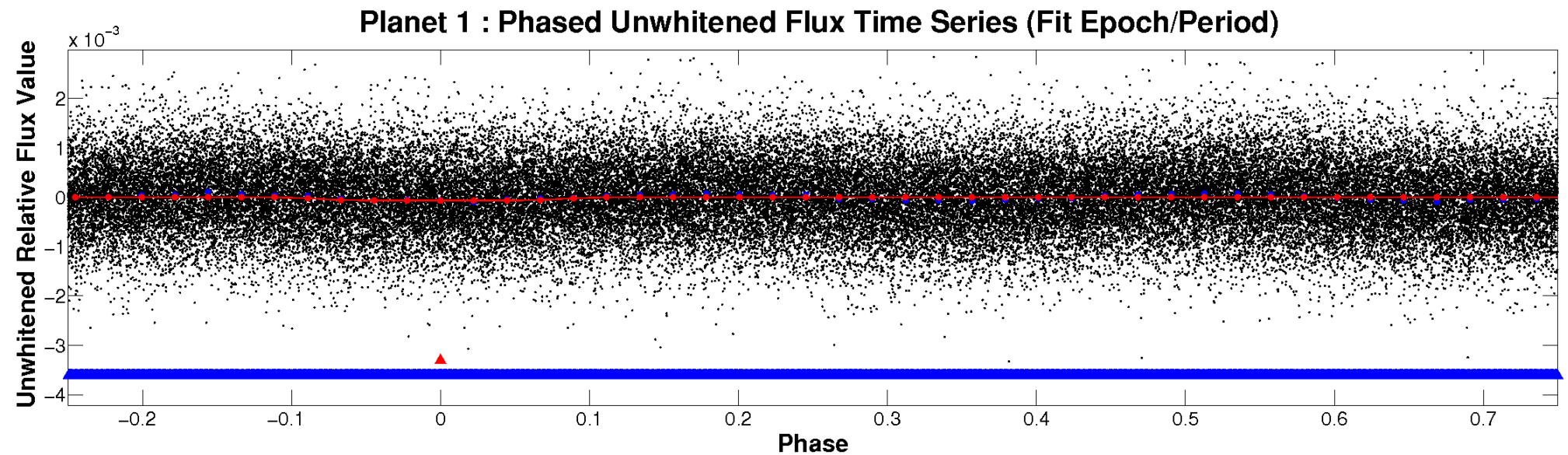


ALT Odd/Even

TCE 009180906-01

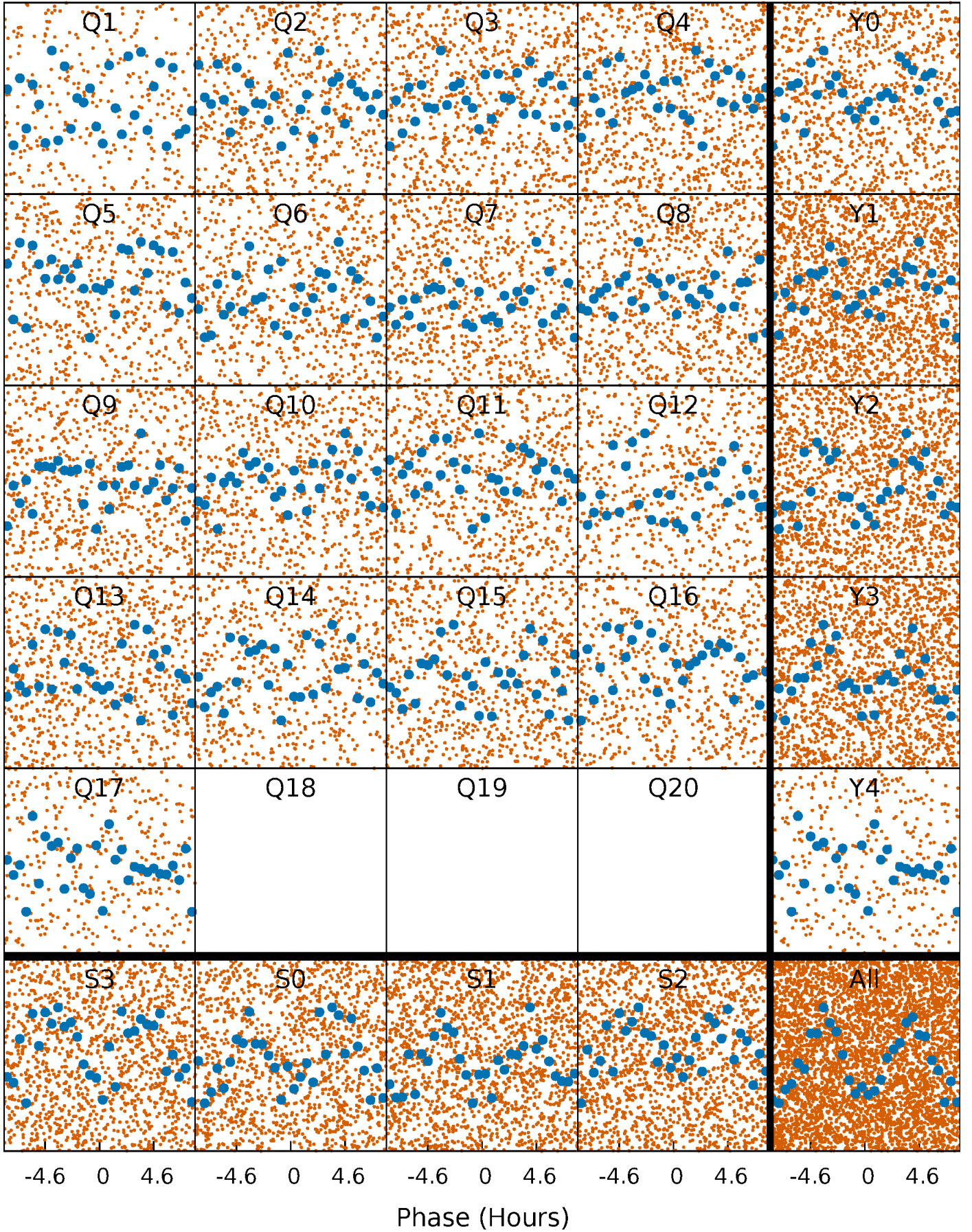


Non-Whitened Vs. Whitened Light Curve



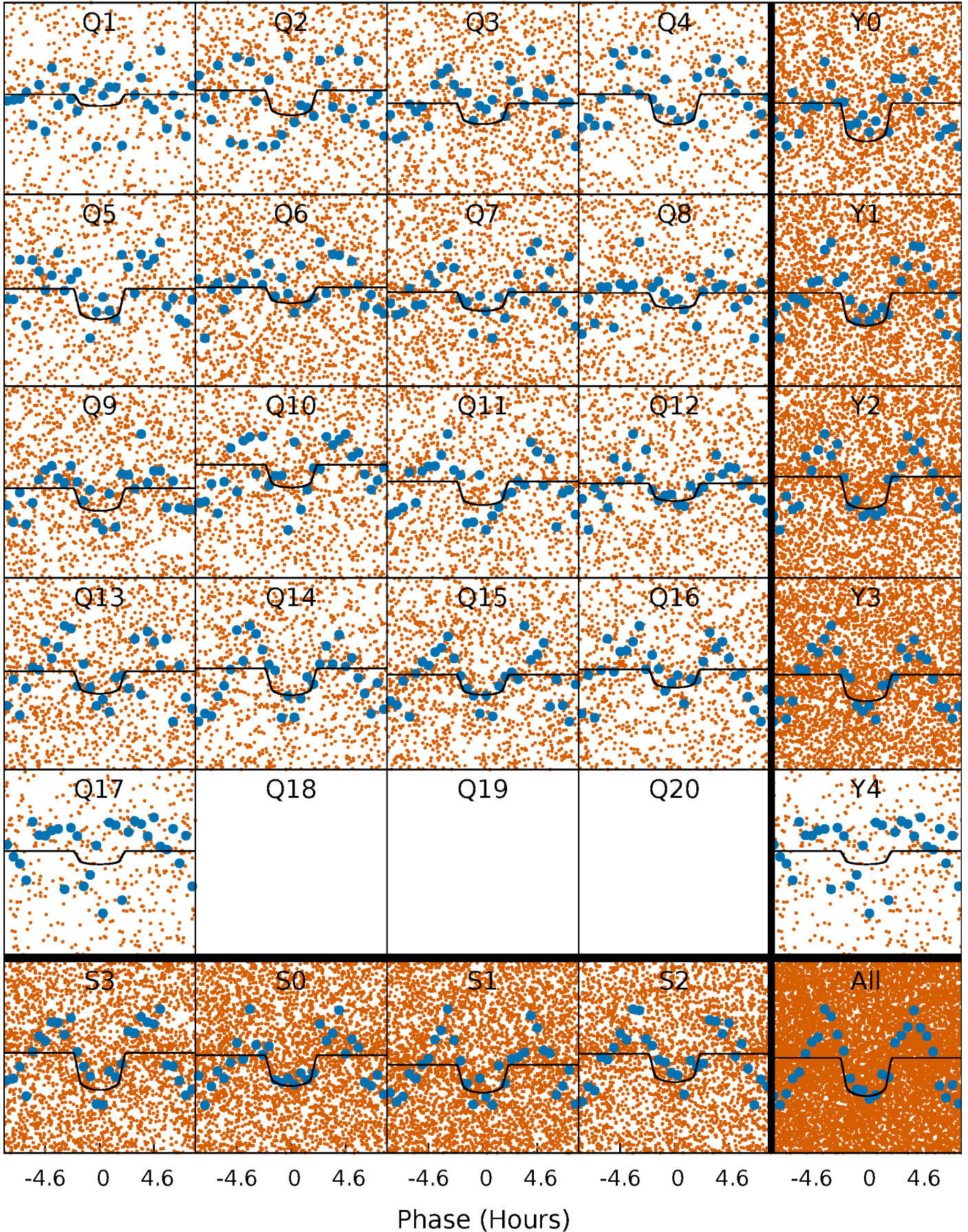
PDC Quarter-Phased Transit Curves

TCE 009180906-01 P= 0.916699 Days $T_0=131.936588$ (BKJD)



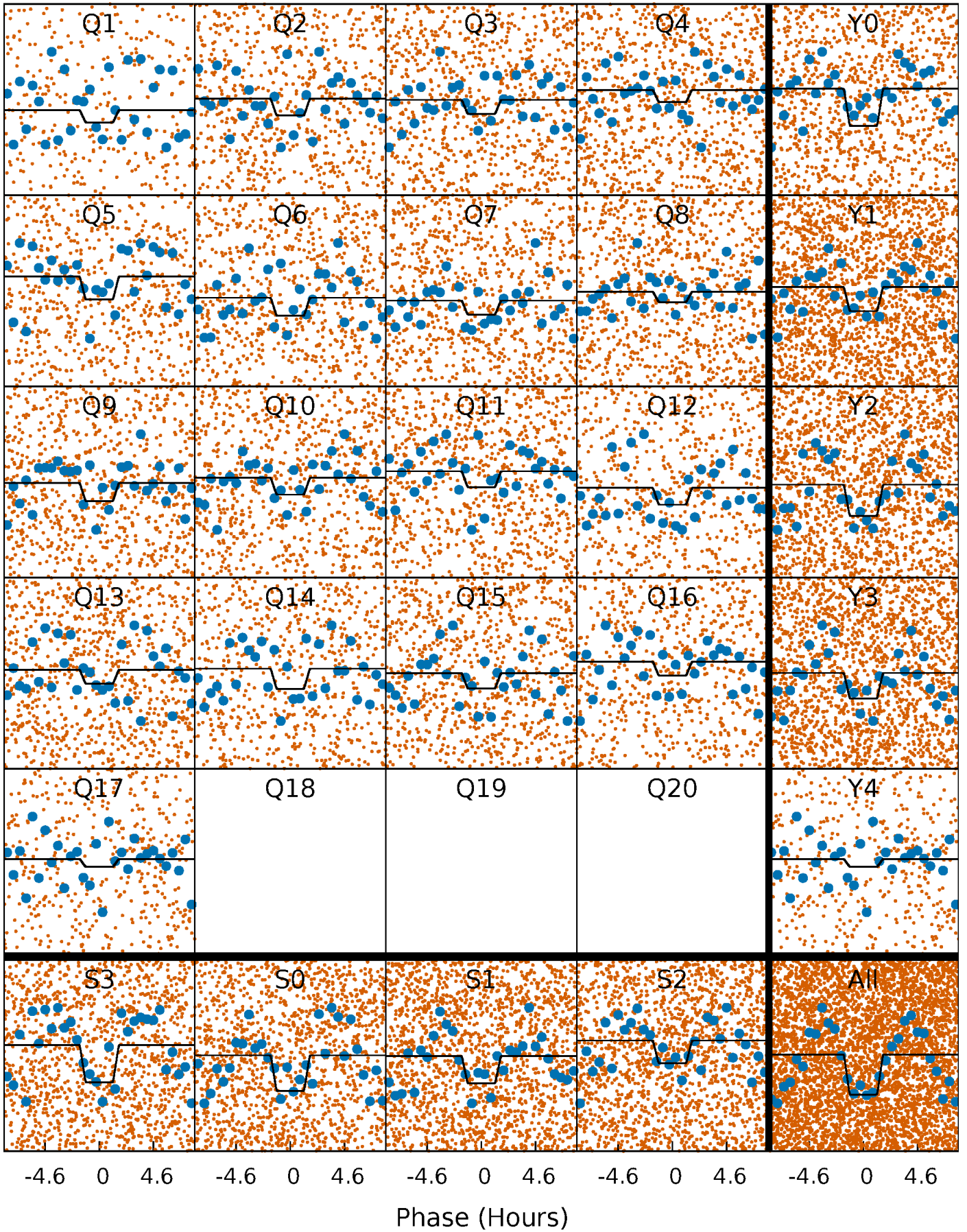
DV Quarter-Phased Transit Curves

TCE 009180906-01 P= 0.916699 Days $T_0=131.936588$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

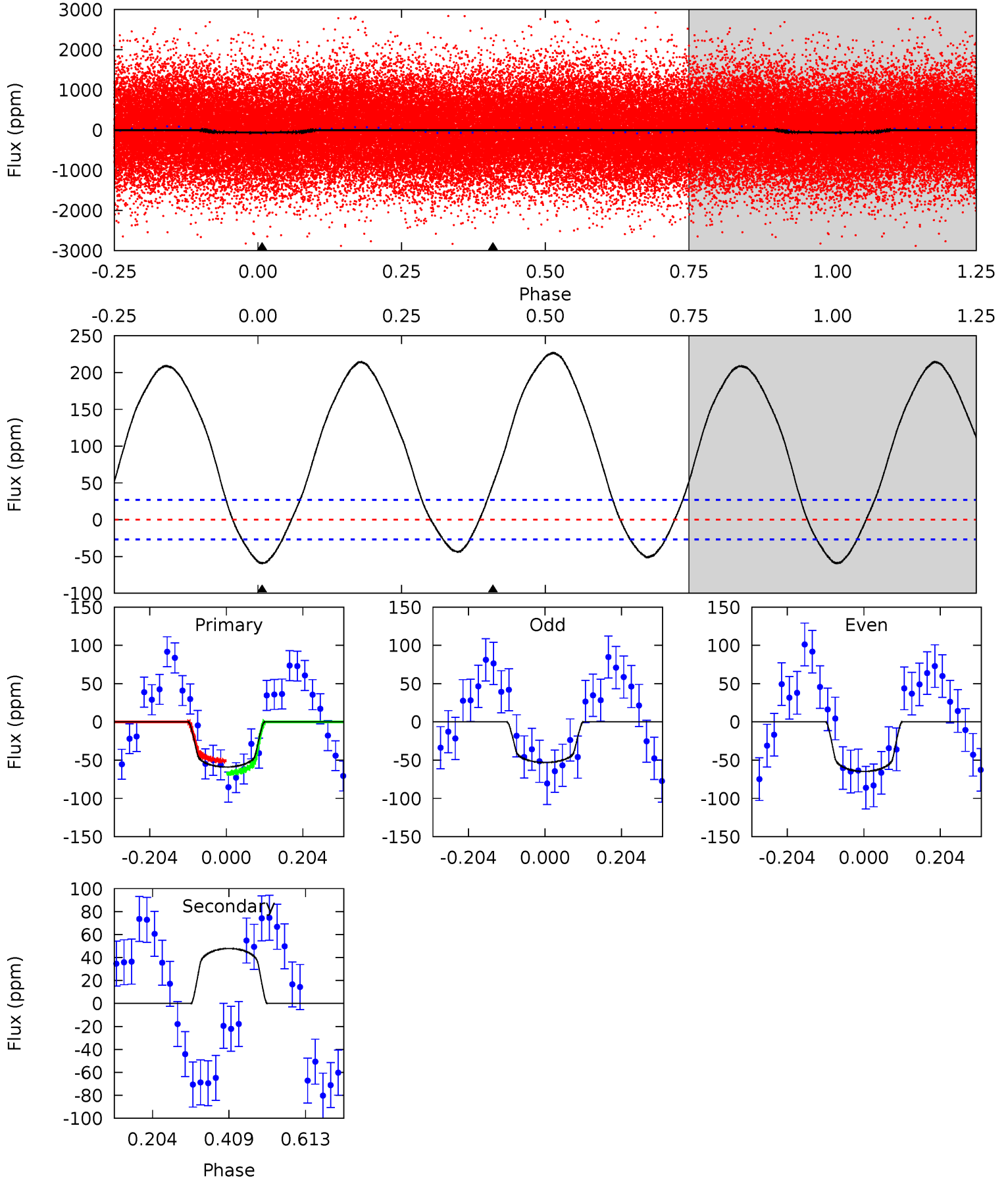
TCE 009180906-01 P= 0.916699 Days $T_0=131.936588$ (BKJD)



DV Model-Shift Uniqueness Test

009180906-01, P = 0.916699 Days, E = 131.019889 Days

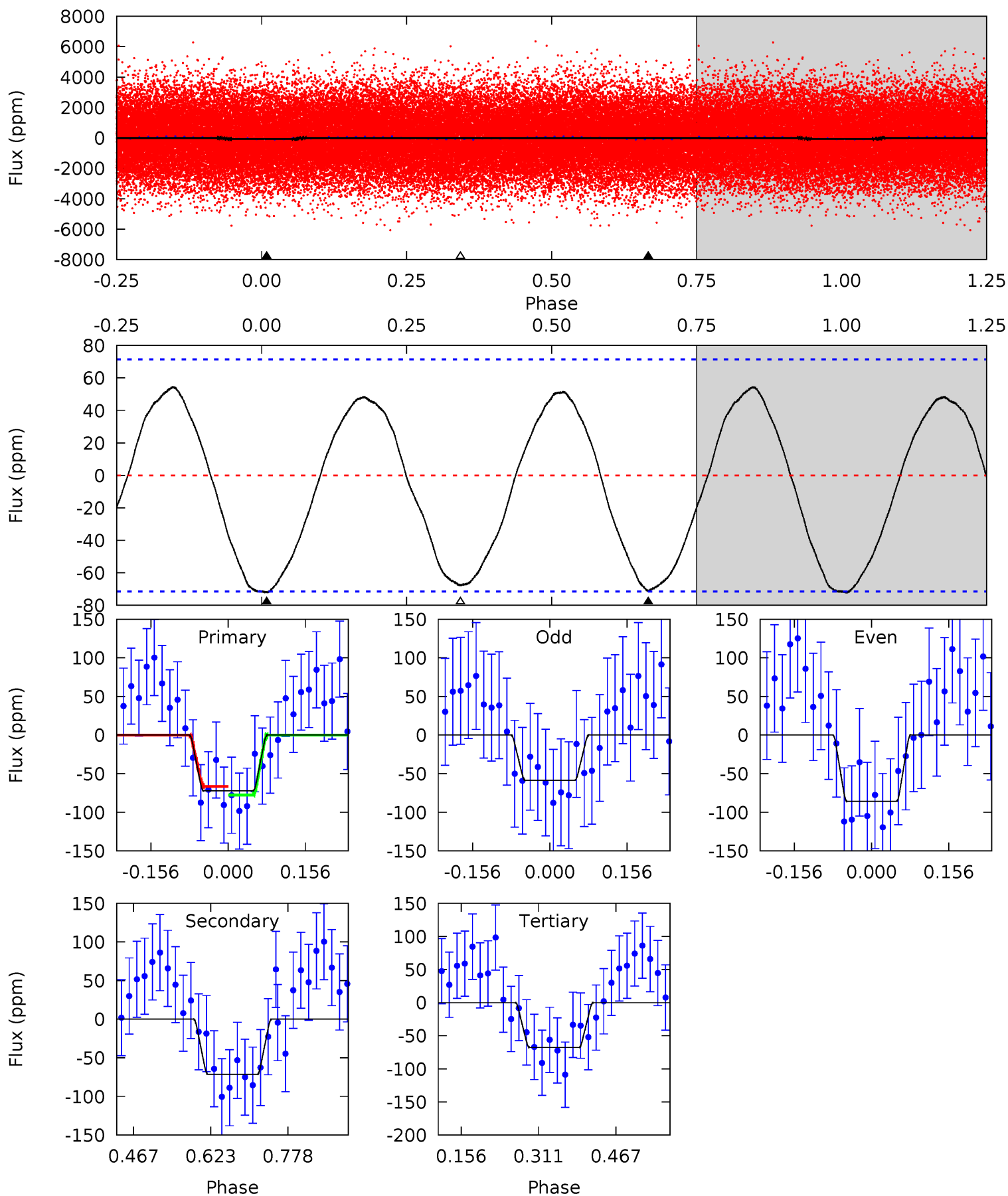
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.64	-7.83	0	0	4.41	1.27	11.2	9.64	9.64	-7.83	-7.83	0.95	1.00	0.79	1.32



Alt Model-Shift Uniqueness Test

009180906-01, P = 0.916699 Days, E = 131.019889 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.51	4.46	4.23	0	4.47	1.42	2.70	0.28	4.51	0.22	4.46	0.86	1.38	0.43	0.35



Stellar Parameters For KIC 009180906

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6773^{+162}_{-255}	$4.306^{+0.060}_{-0.180}$	$0.210^{+0.150}_{-0.350}$	$1.391^{+0.406}_{-0.174}$	$1.427^{+0.172}_{-0.172}$	$0.746^{+0.237}_{-0.354}$
	+2%/-4%	+1%/-4%	+71%/-167%	+29%/-13%	+12%/-12%	+32%/-47%
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 009180906-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	48 ± 6	$1.48^{+0.83}_{-0.75}$	3462^{+245}_{-162}	-5861^{+996}_{-2709}	$-4.915^{+2.901}_{-15.870}$
Alt.	-71 ± 16	$1.52^{+0.89}_{-0.77}$	3466^{+242}_{-187}	6228^{+3242}_{-1302}	$7.310^{+22.306}_{-4.453}$

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

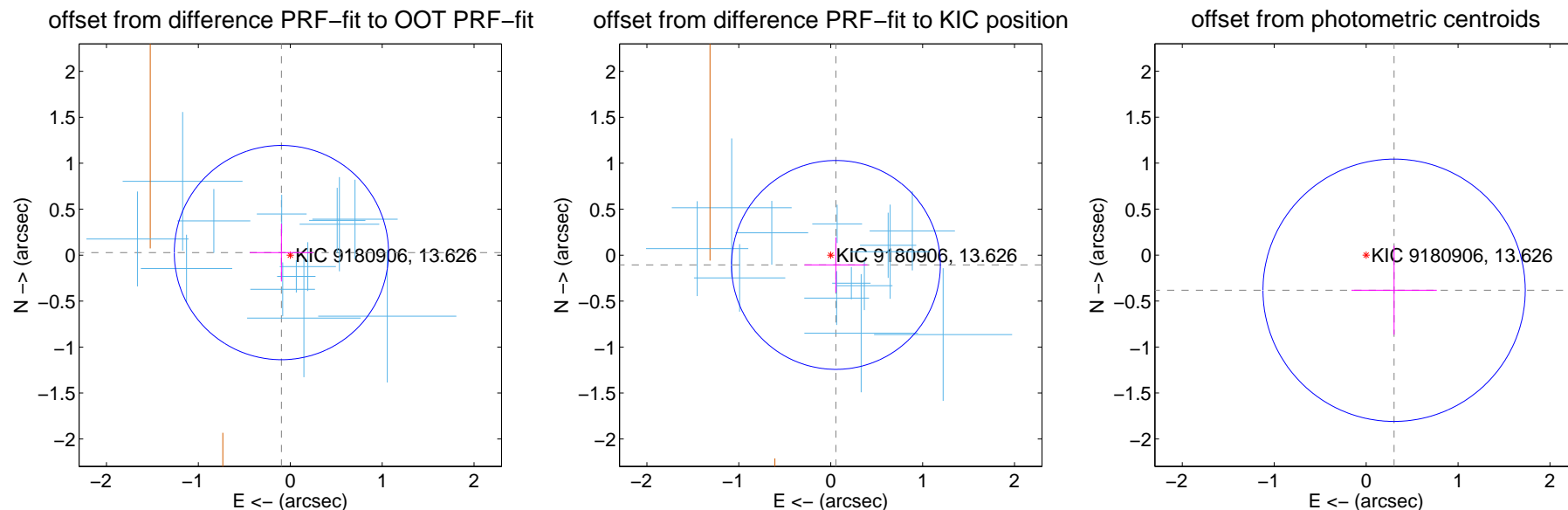
DV Centroid Data

Supplemental centroid analysis for 009180906-01. Kepler magnitude: 13.63. Transit SNR 8.97

There are 13 quarters with good PRF difference image offsets

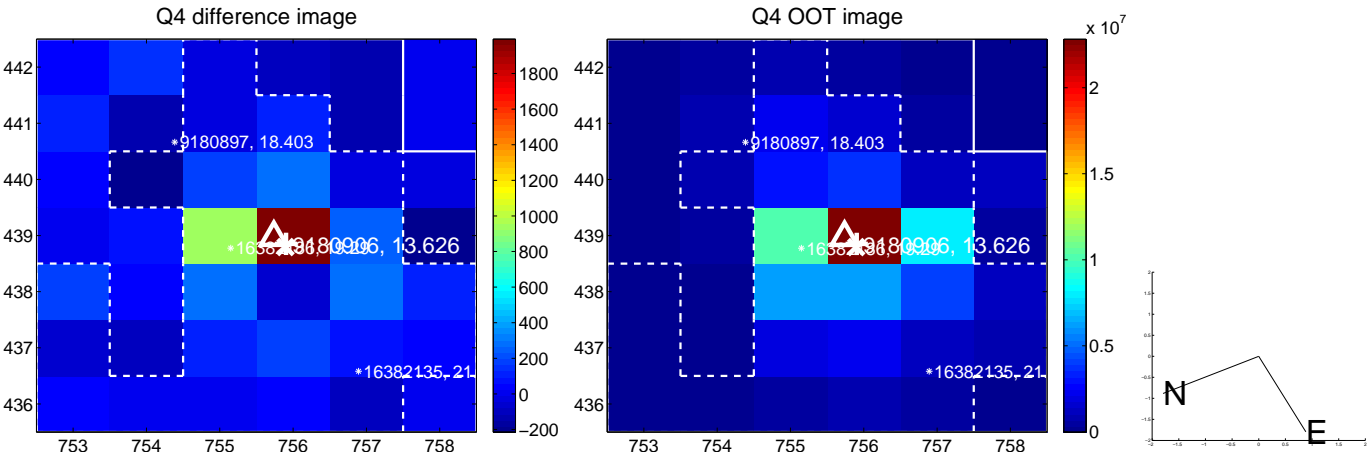
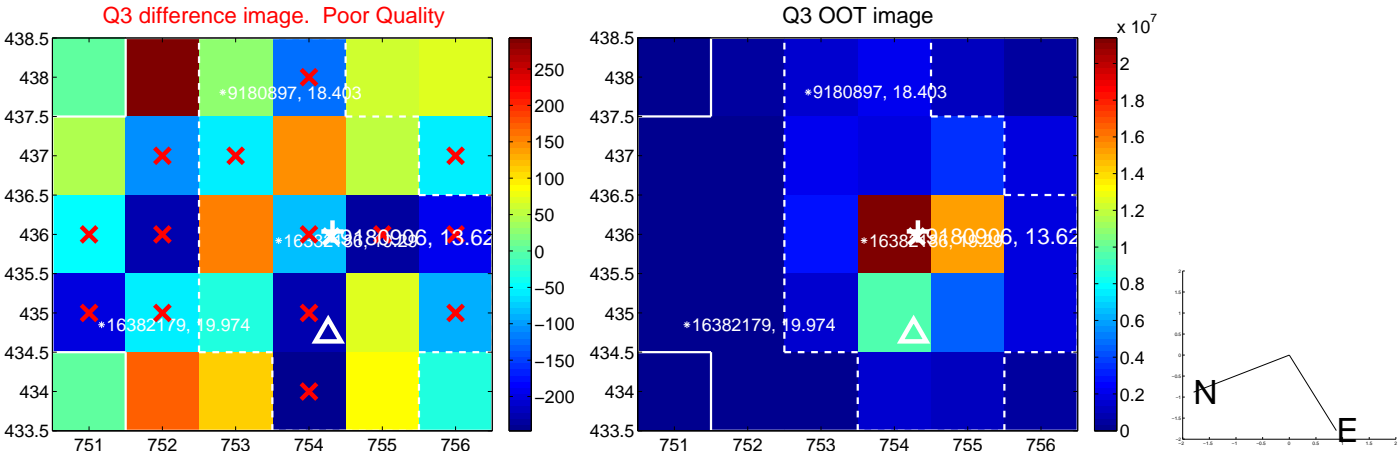
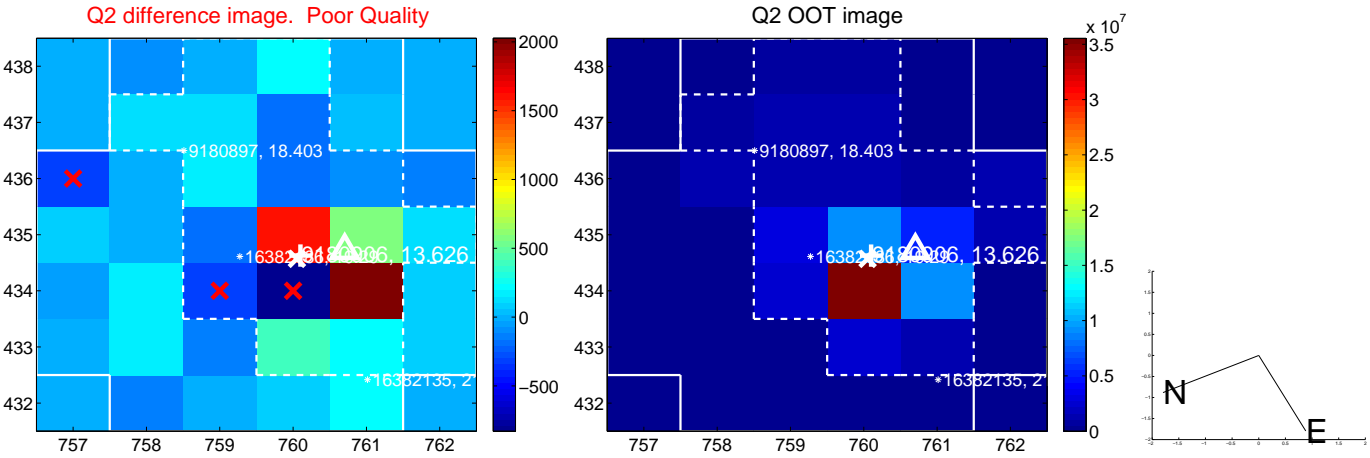
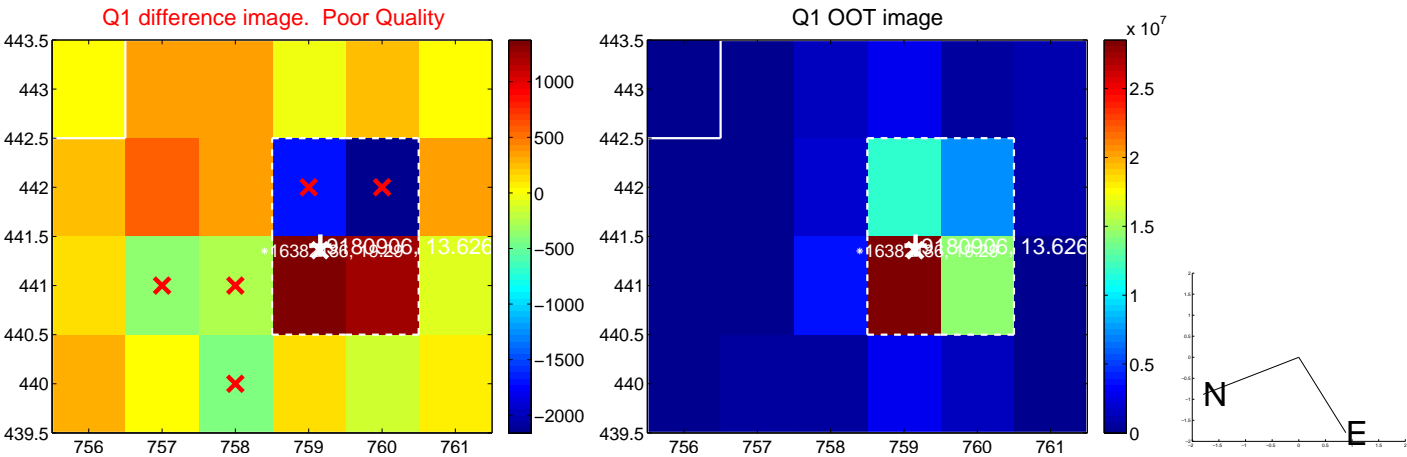
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.100 ± 0.389	0.26	0.096 ± 0.345	0.028 ± 0.314
PRF-fit source offset from KIC position	0.120 ± 0.379	0.32	-0.057 ± 0.343	-0.106 ± 0.299
photometric centroid source offset	0.49 ± 0.48	1.03	-0.30 ± 0.46	-0.38 ± 0.48

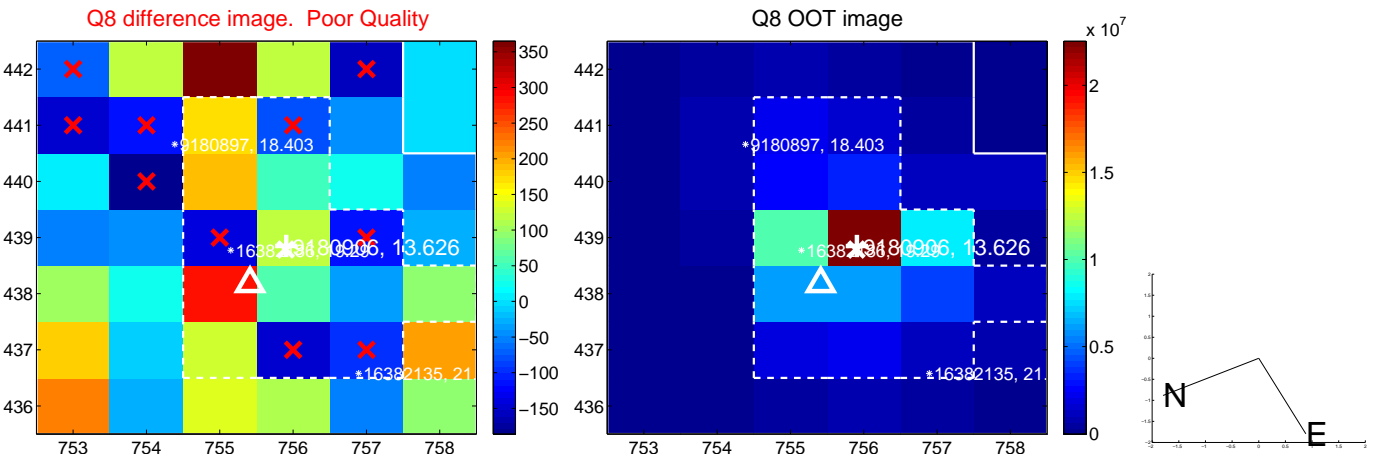
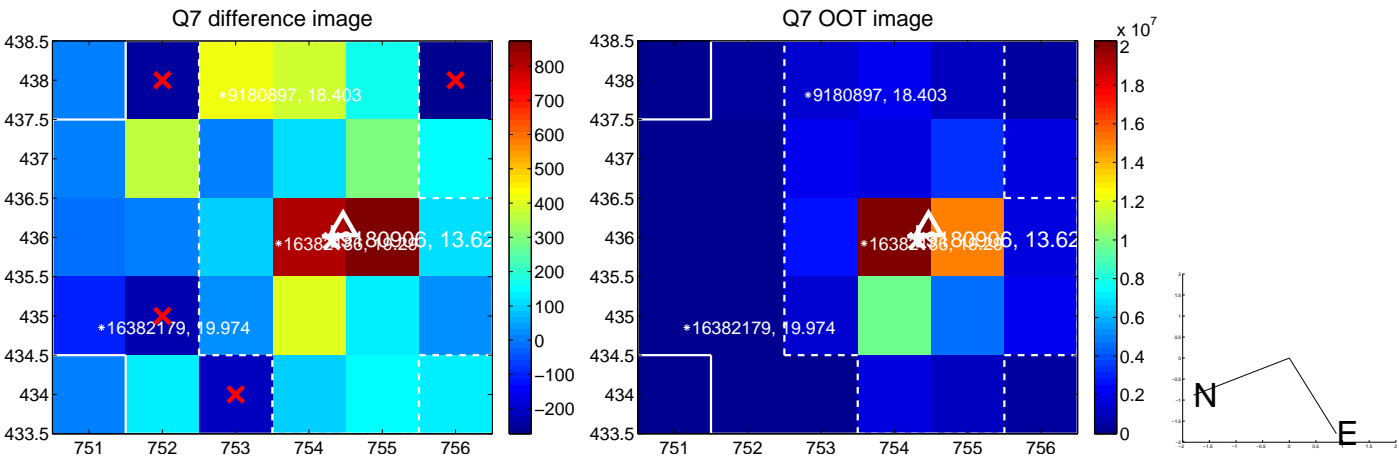
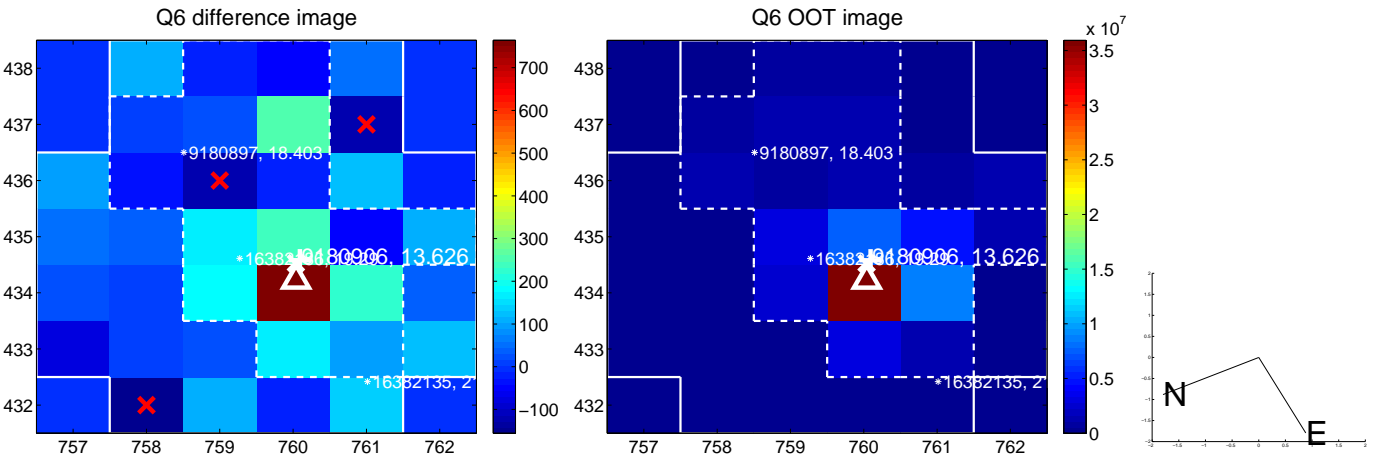
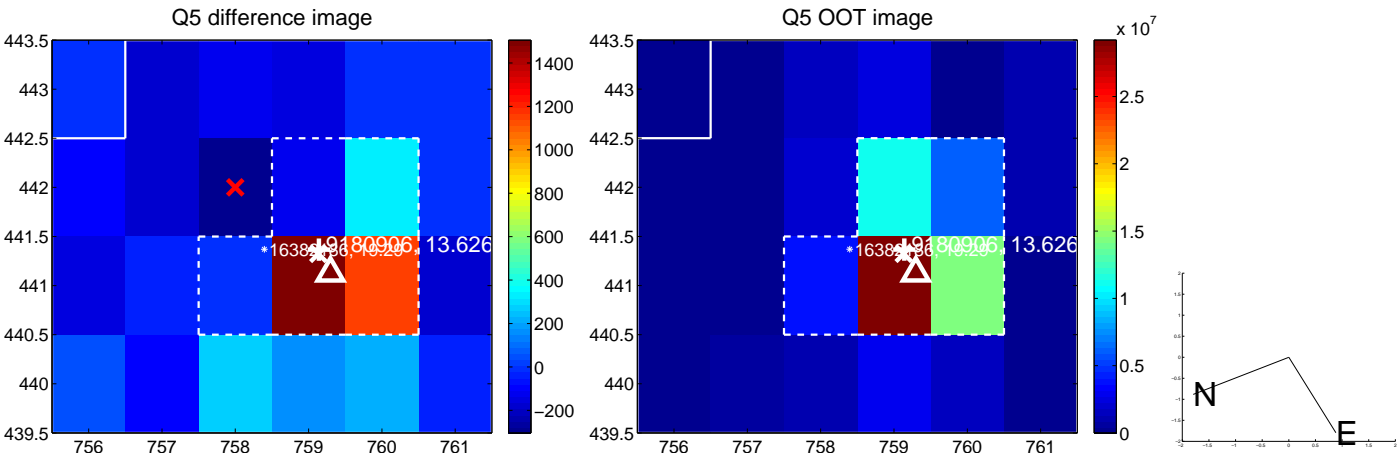


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

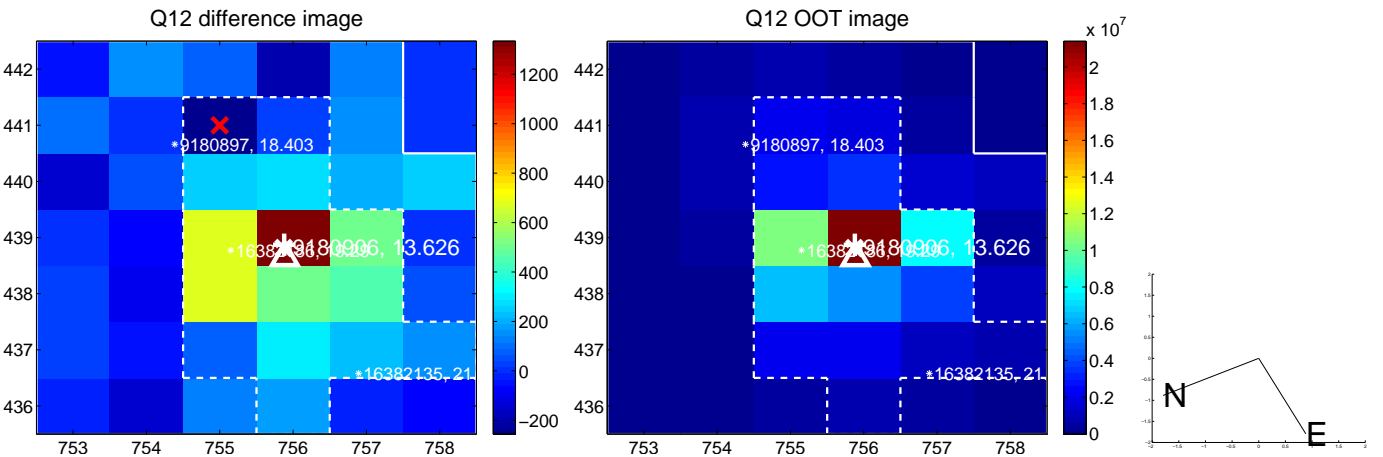
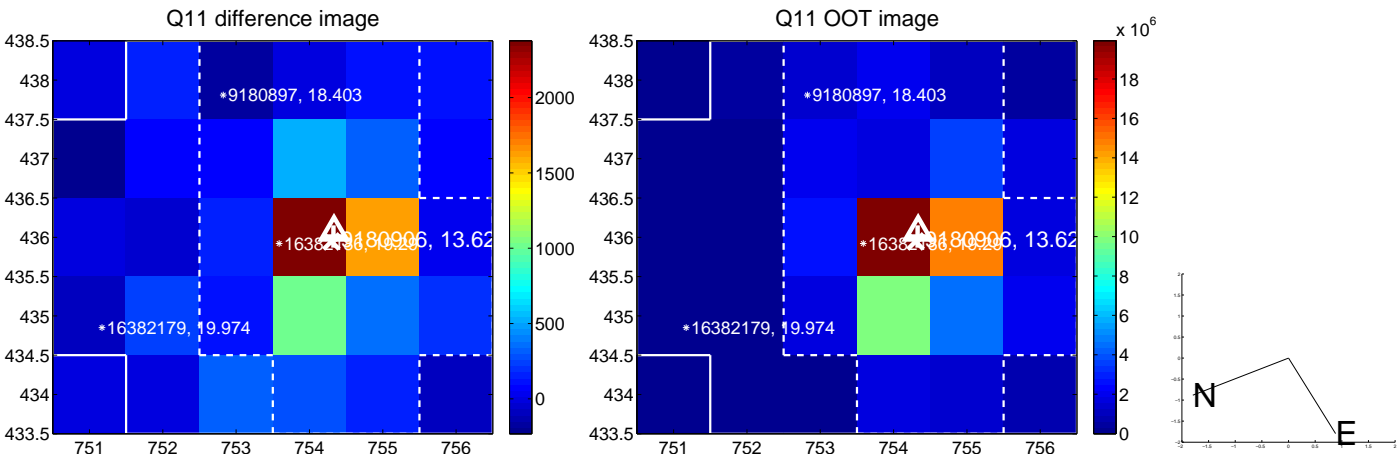
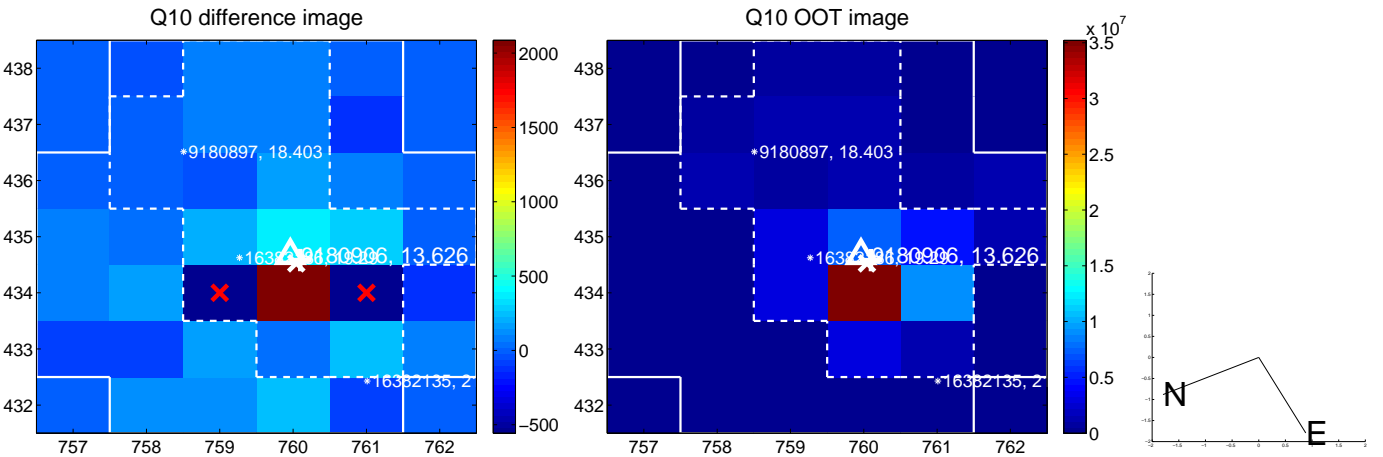
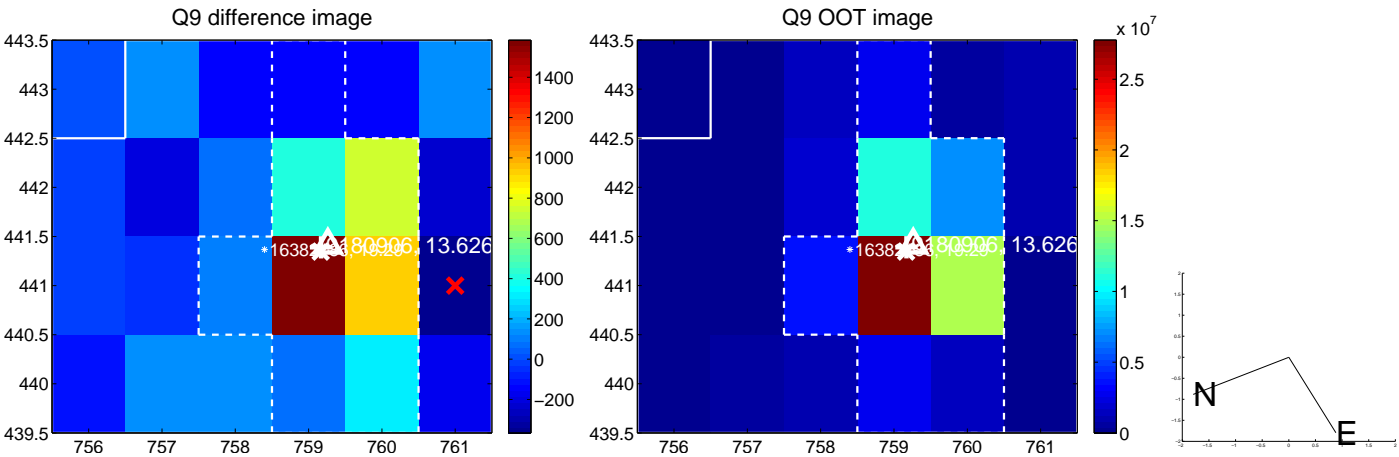
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



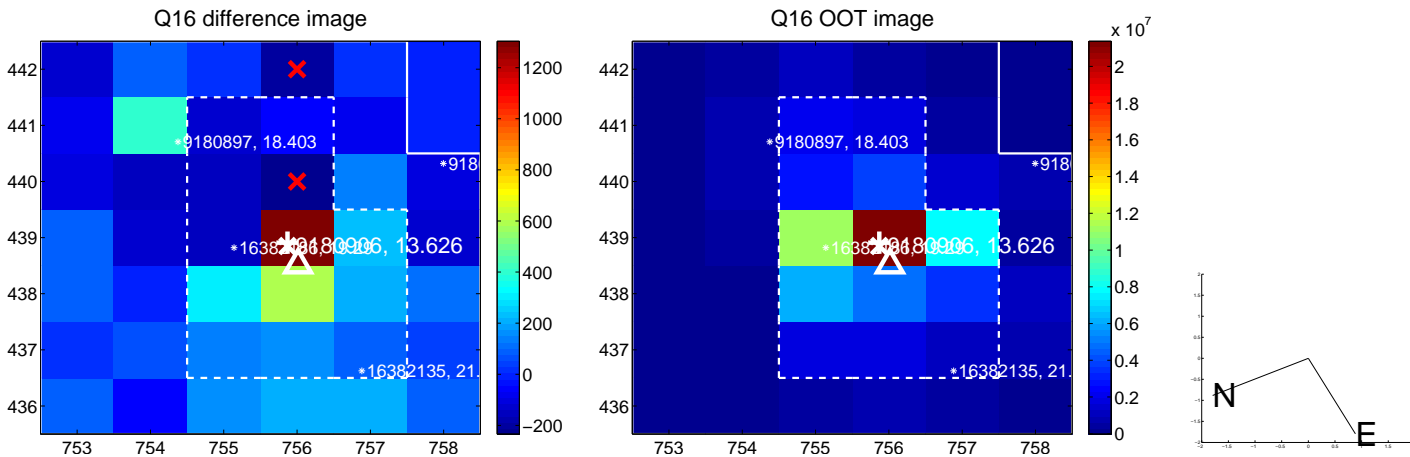
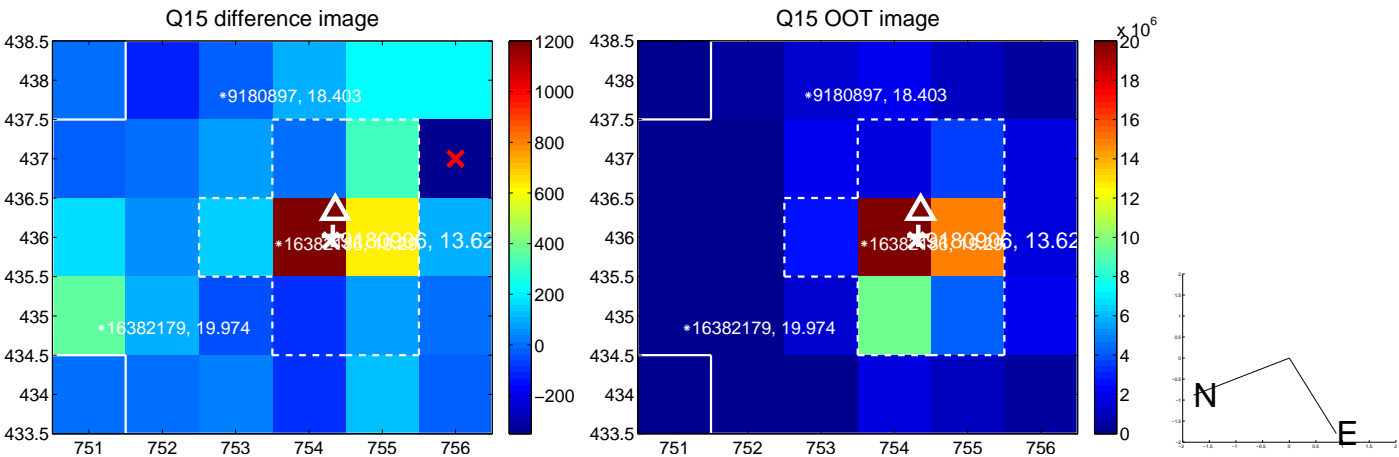
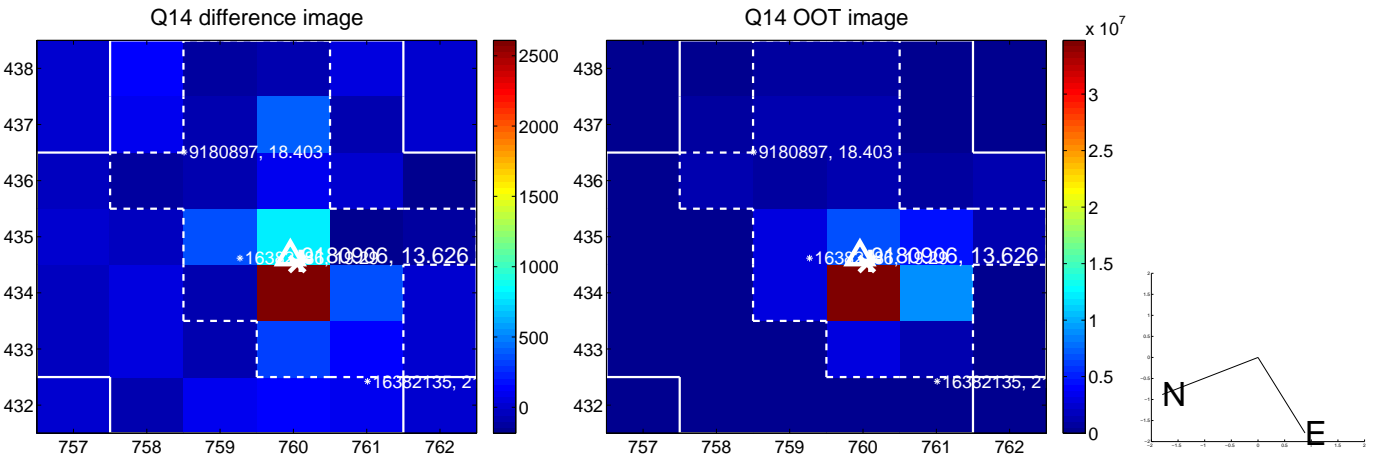
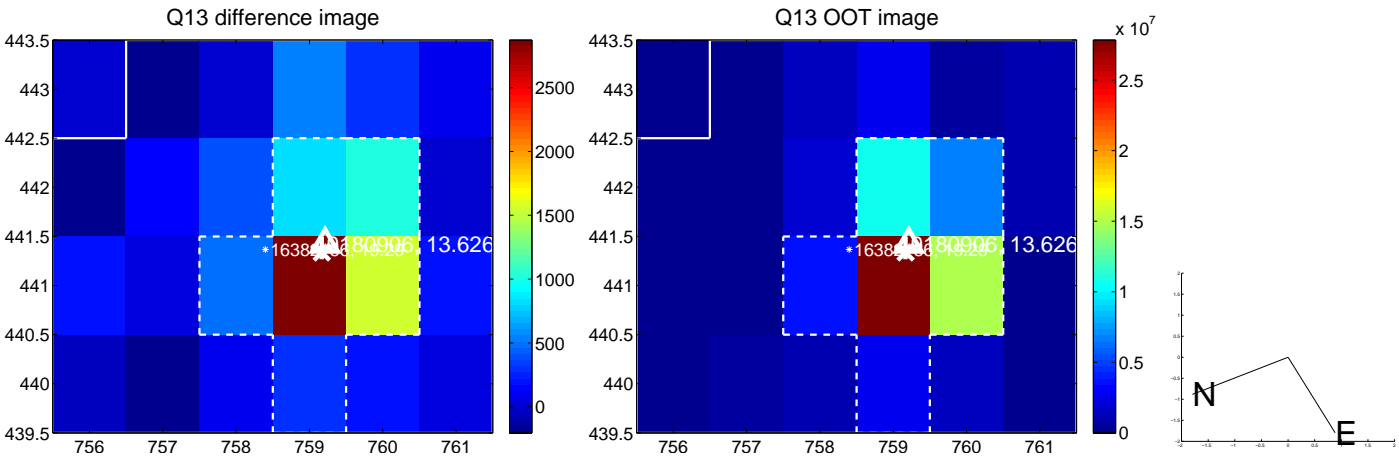
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



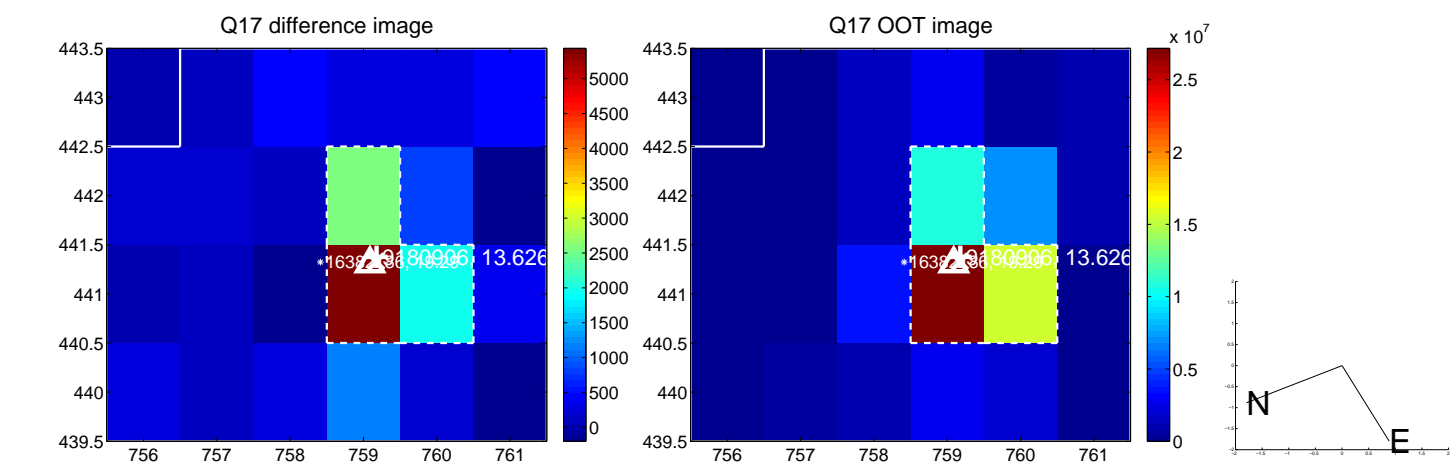
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



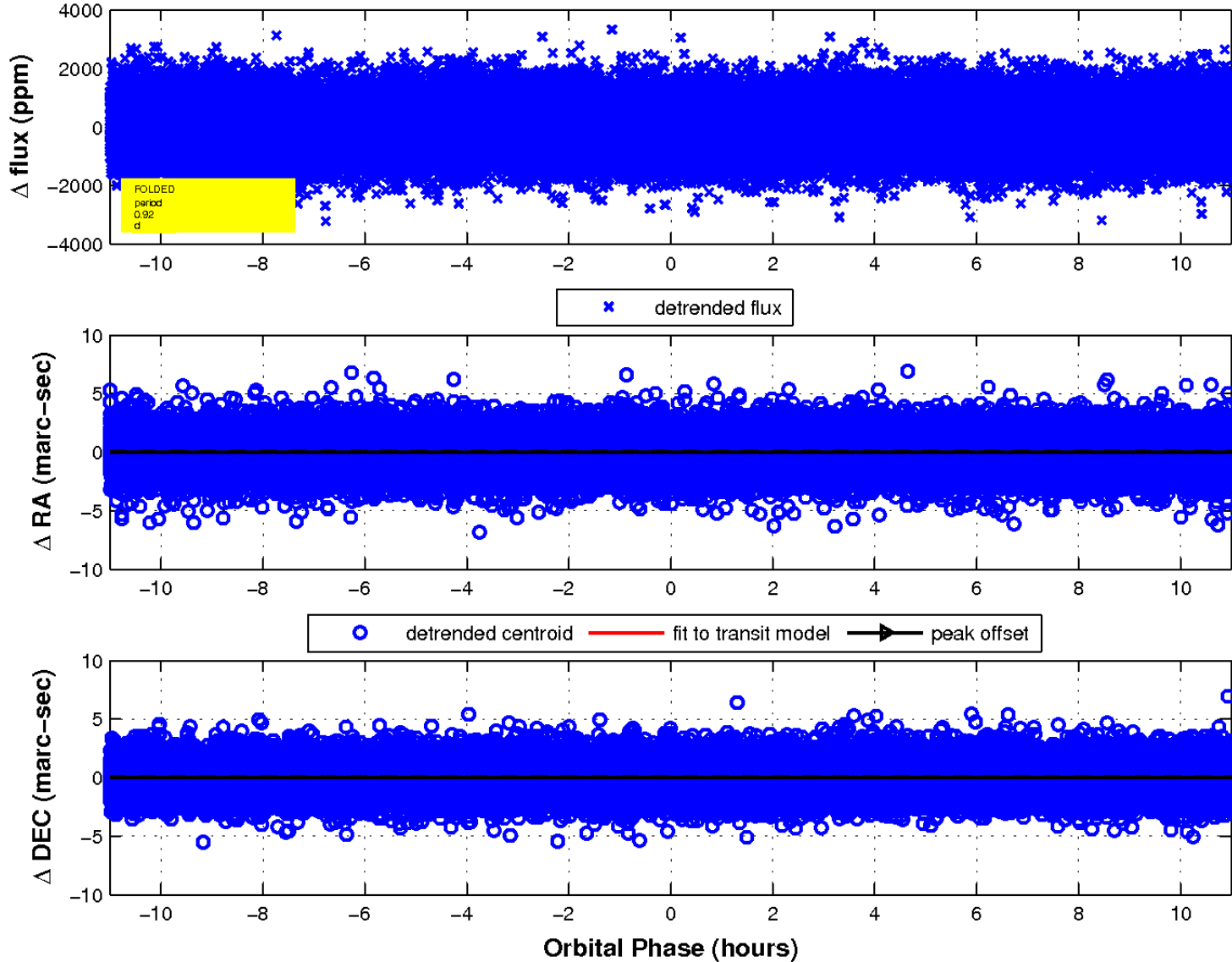
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

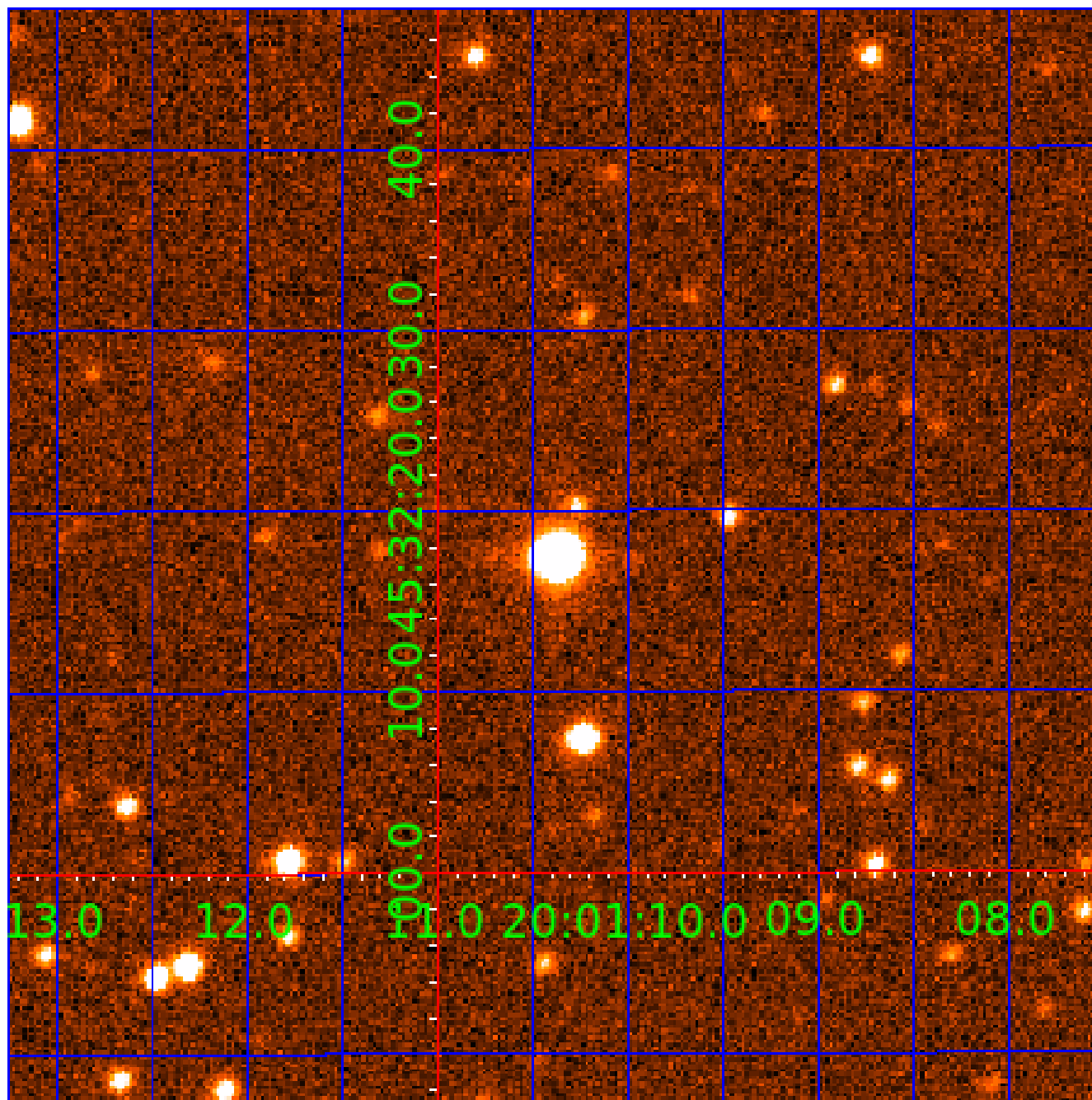


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009180906

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})
009180906-01	OBS	No	0.916699	131.936588	68.9	4.054	11.6	9.0	1.39	6773	1.35	8432.07
009180906-02	OBS	No	1.024368	131.540254	124.9	10.499	9.0	15.7	1.39	6773	1.56	7271.58

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009180906-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009180906-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT

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

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

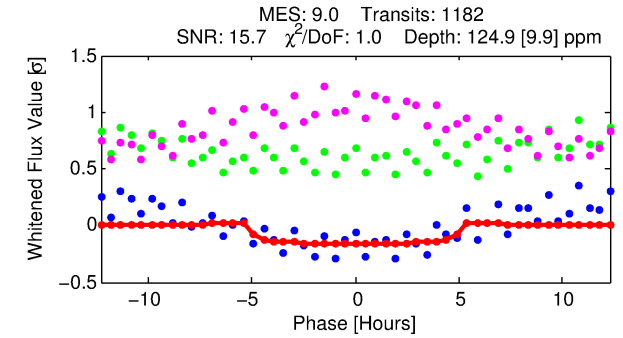
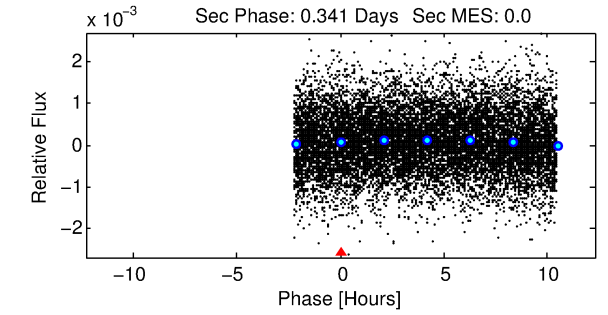
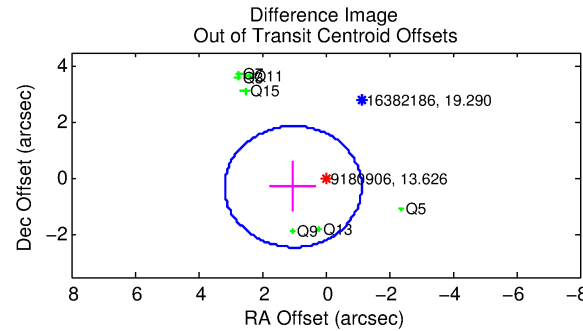
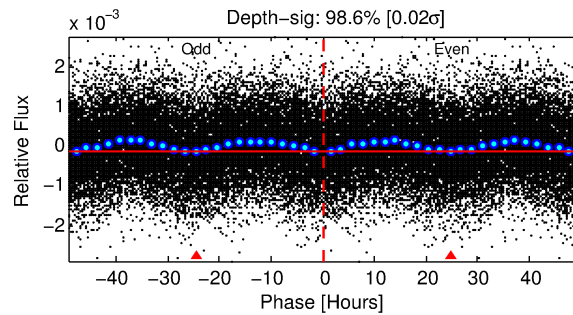
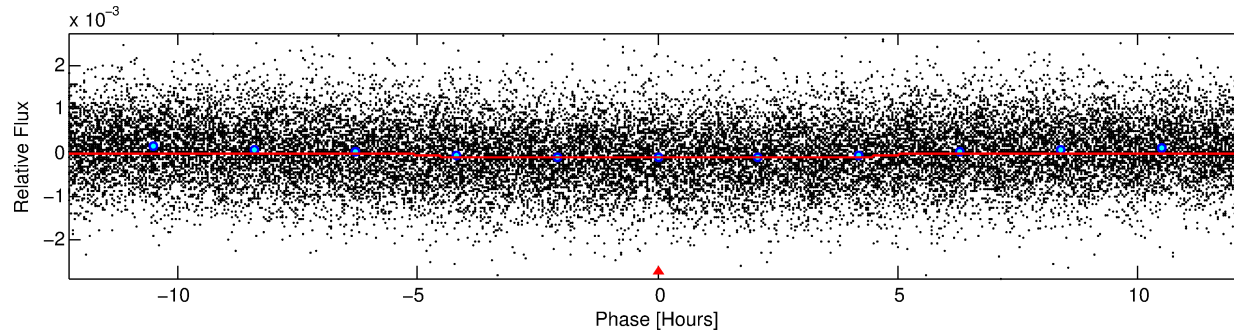
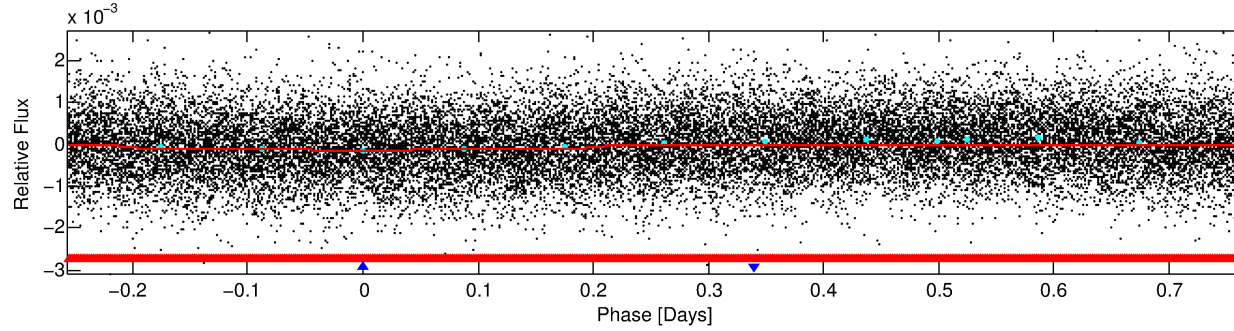
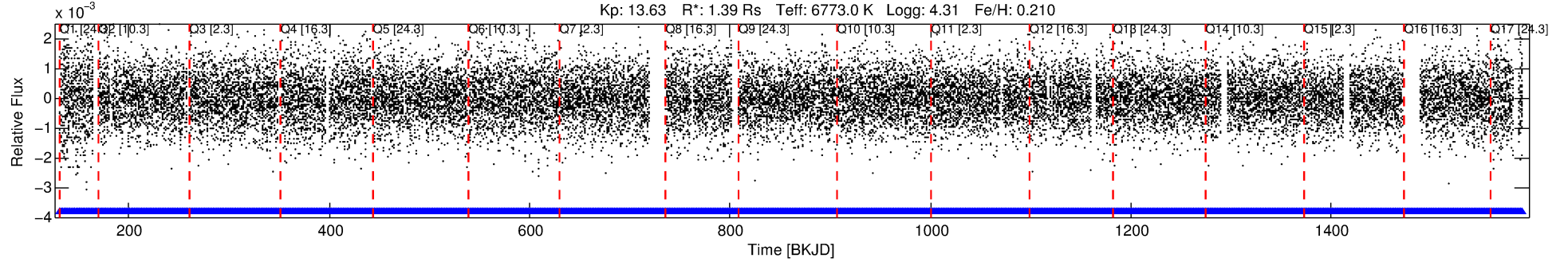
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009180906-02

No Significant Match Found

DV One-Page Summary

KIC: 9180906 Candidate: 2 of 2 Period: 1.024 d



DV Fit Results:

Period = 1.02437 [0.00001] d
Epoch = 131.5403 [0.0064] BKJD
Rp/R* = 0.0103 [0.0062]
a/R* = 1.04 [0.23]
b = 0.02 [132.46]
Seff = 7271.58 [2690.39]
Teq = 2355 [218] K
Rp = 1.56 [1.04] Re
a = 0.0224 [0.0053] AU
Ag = N/A
Teffp = N/A

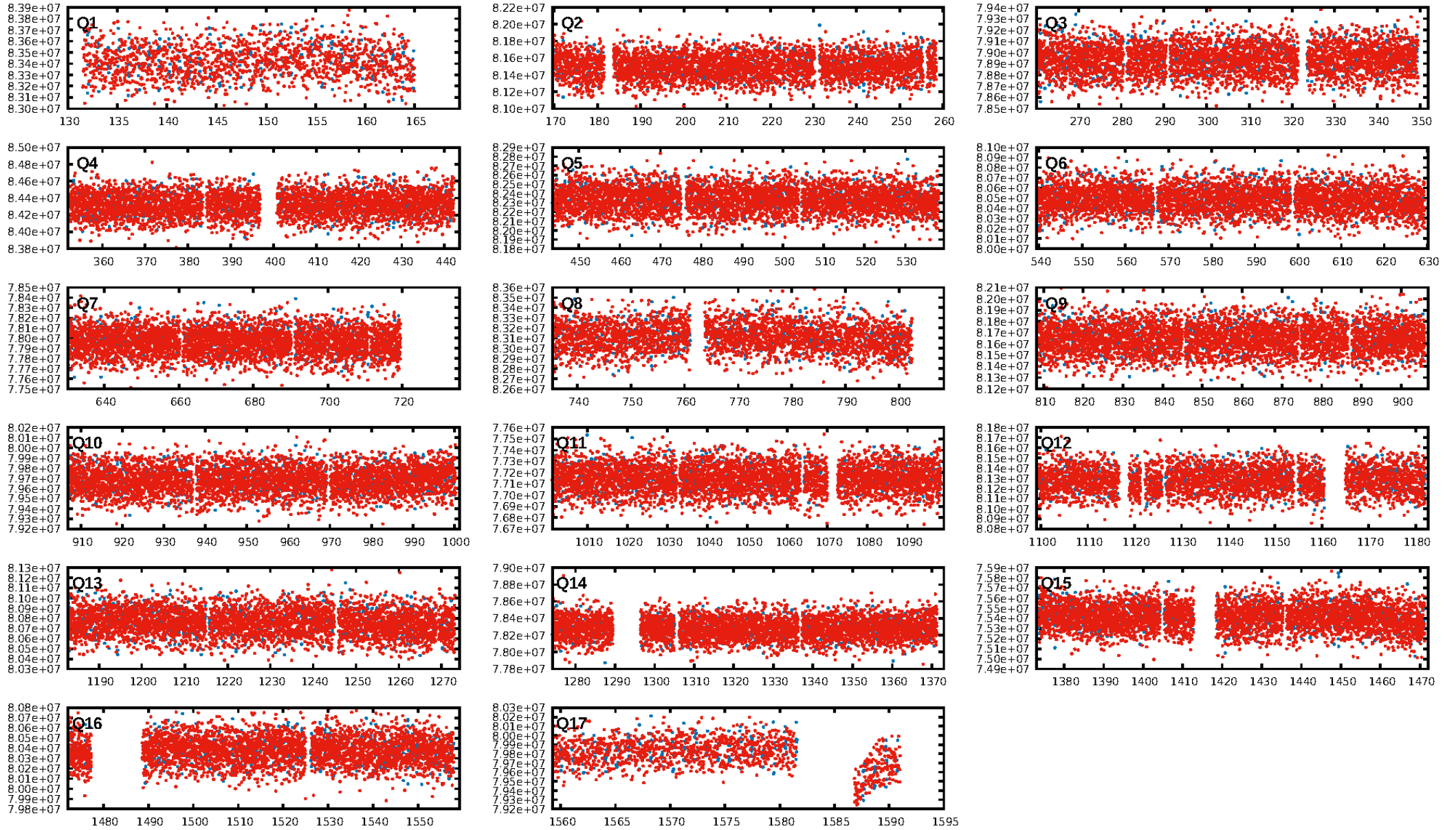
DV Diagnostic Results:

ShortPeriod-sig: 18.2% [0.23 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1128/1128]
GhostDiagnostic-chr: 2.76
Centroid-sig: 0.1%
Centroid-so: 0.353 arcsec [2.01 σ]
OotOffset-rm: 1.057 arcsec [1.47 σ]
KicOffset-rm: 0.945 arcsec [1.30 σ]
OotOffset-st: 0/4/0/3 [7]
KicOffset-st: 0/4/0/3 [7]
DiffImageQuality-fgm: 0.43 [3/7]
DiffImageOverlap-fno: 0.00 [0/17]

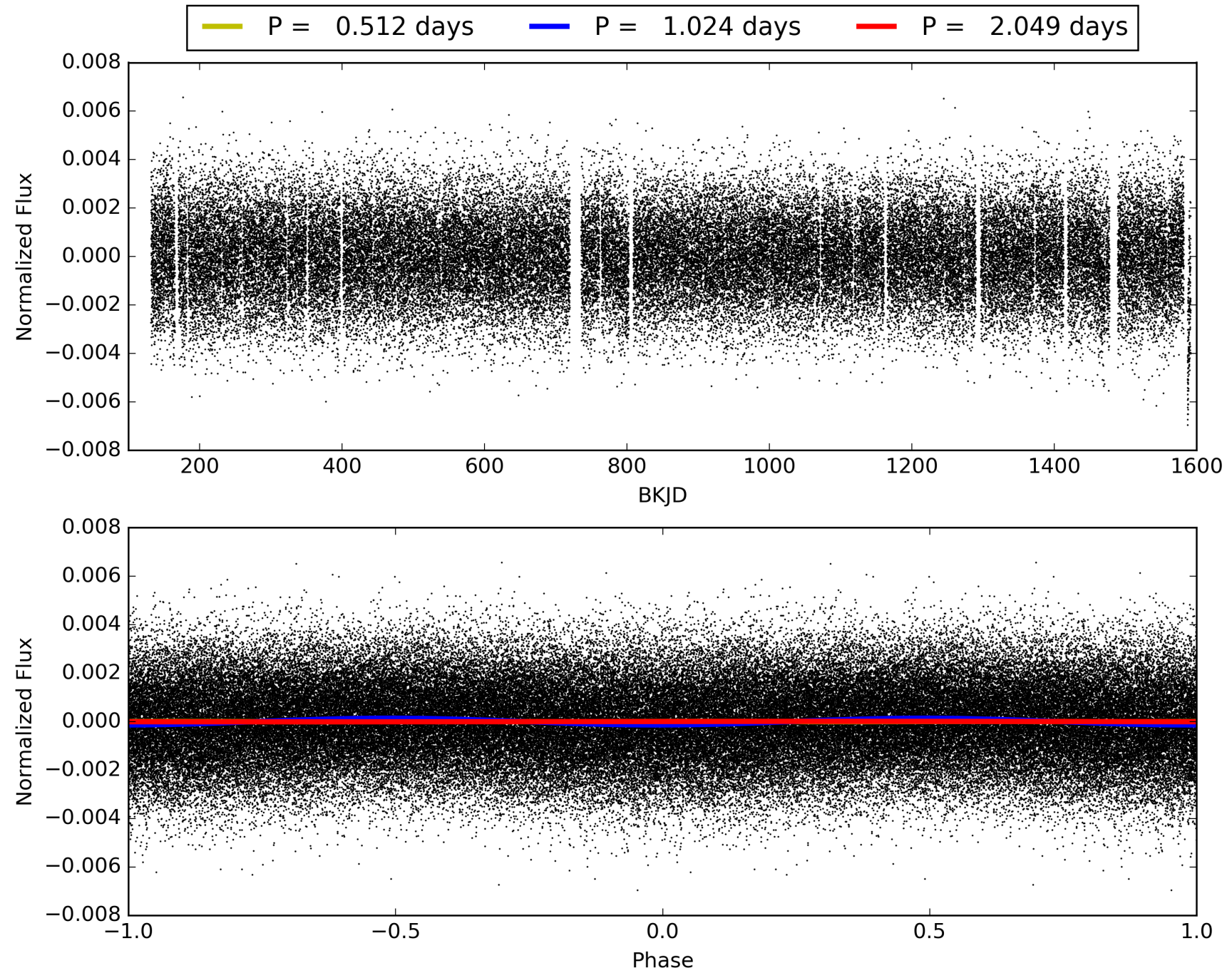
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:43:31 Z

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

TCE 009180906-02, PDC Light Curves

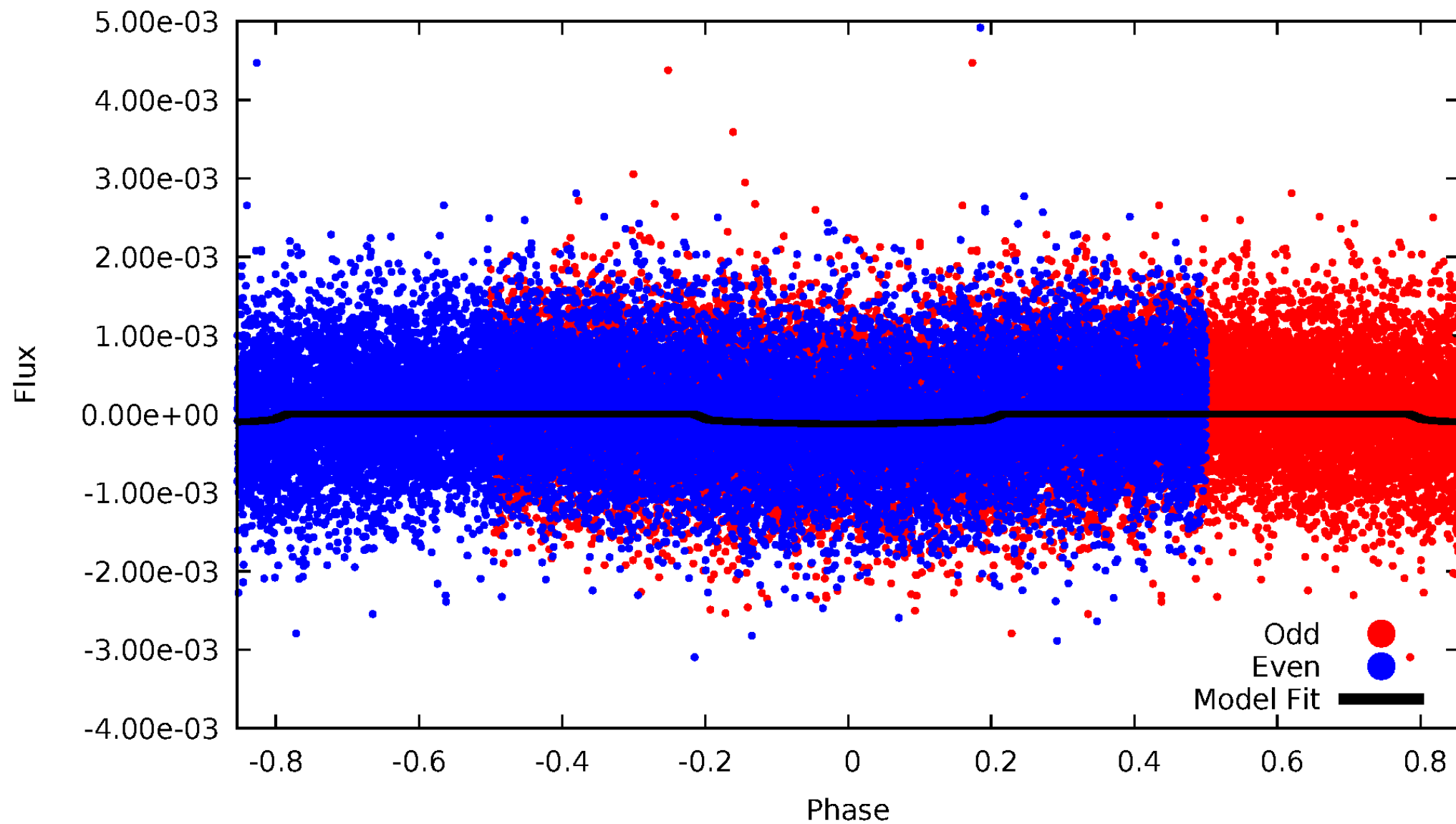


TCE 009180906-02



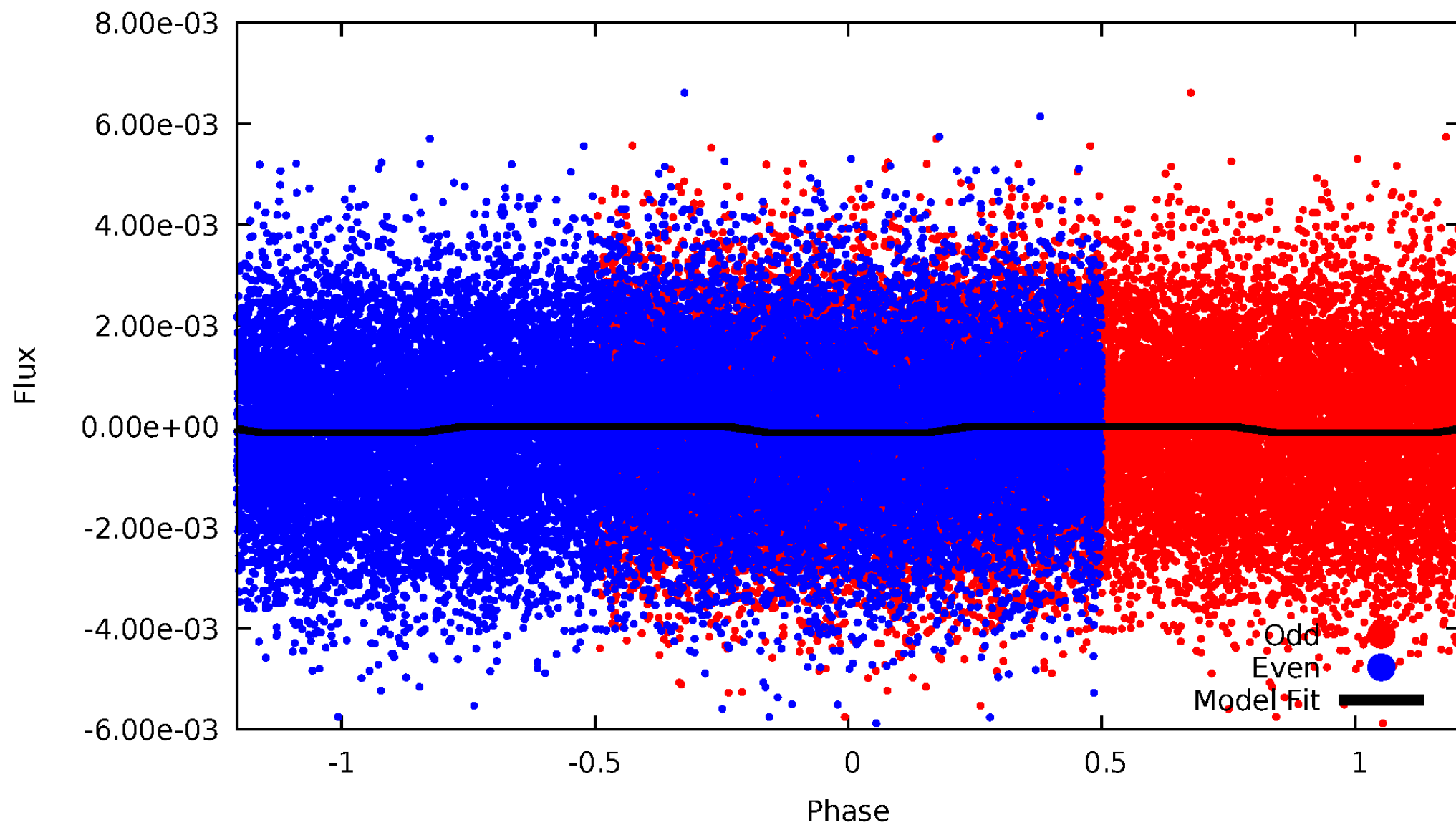
DV Odd/Even

TCE 009180906-02



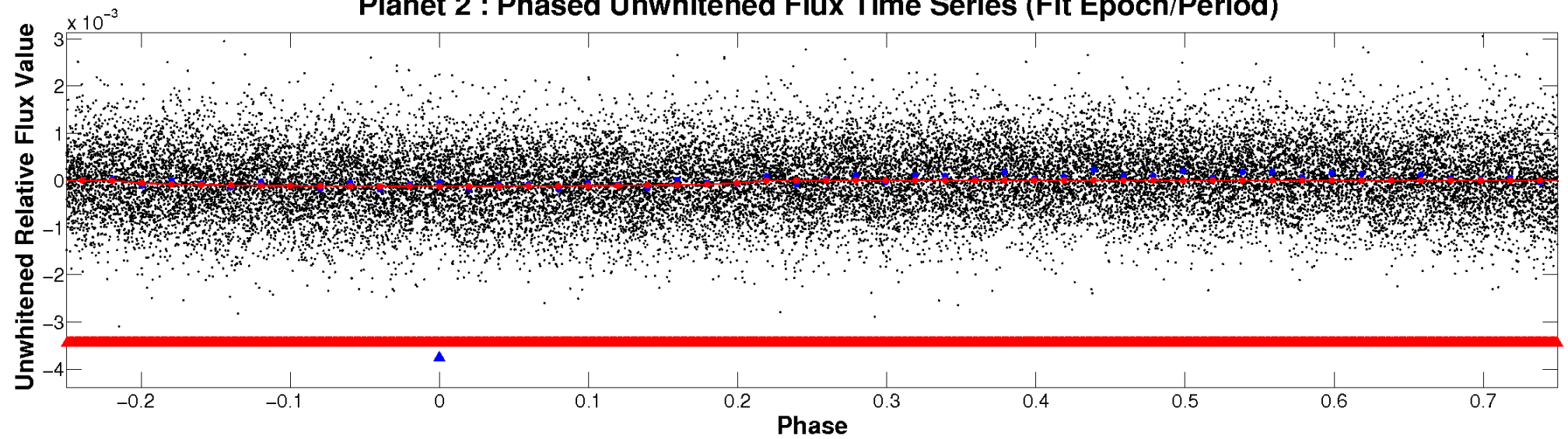
ALT Odd/Even

TCE 009180906-02

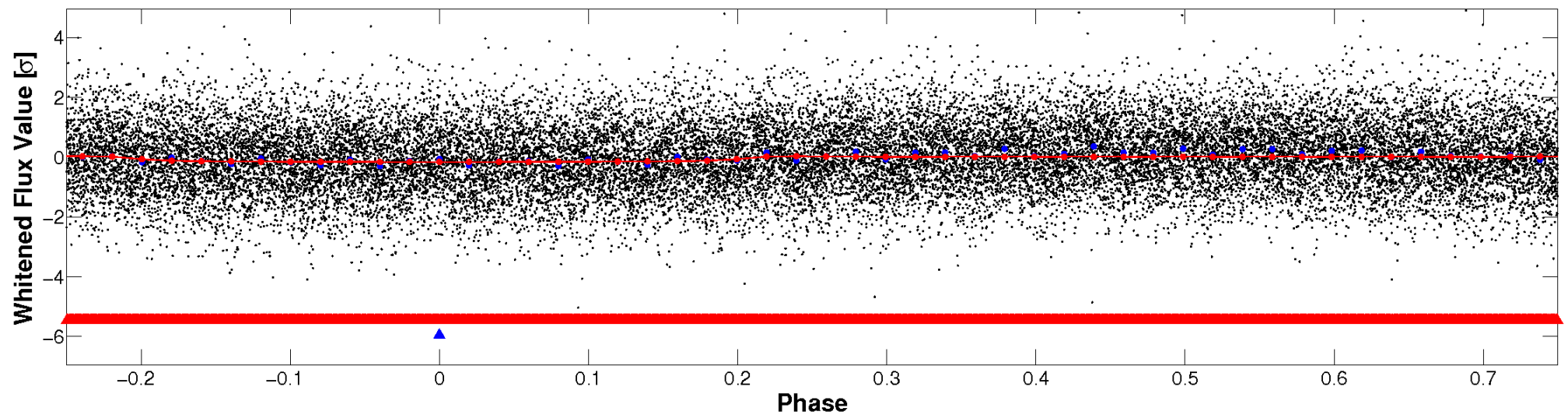


Non-Whitened Vs. Whitened Light Curve

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

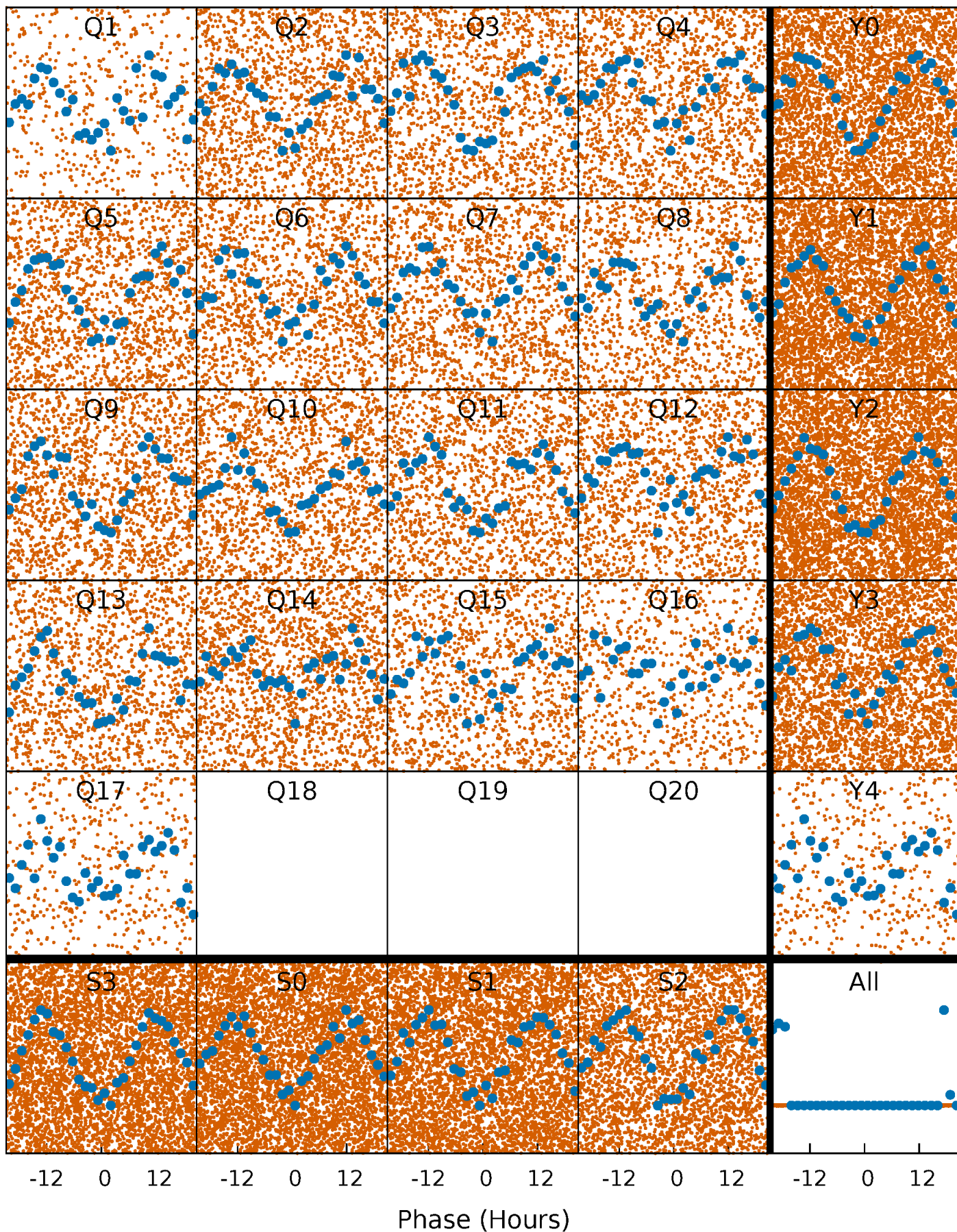


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



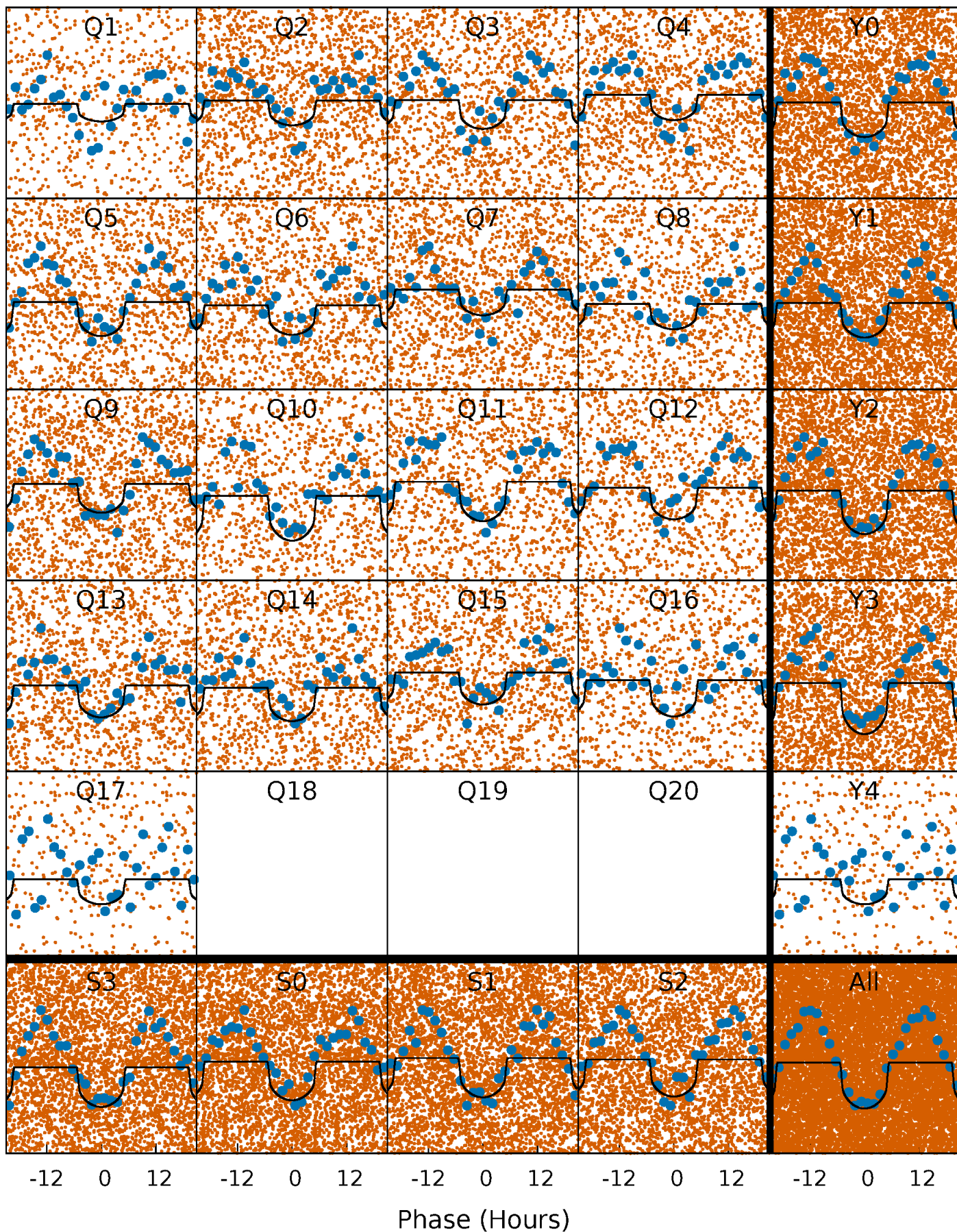
PDC Quarter-Phased Transit Curves

TCE 009180906-02 P= 1.024368 Days $T_0=131.540254$ (BKJD)



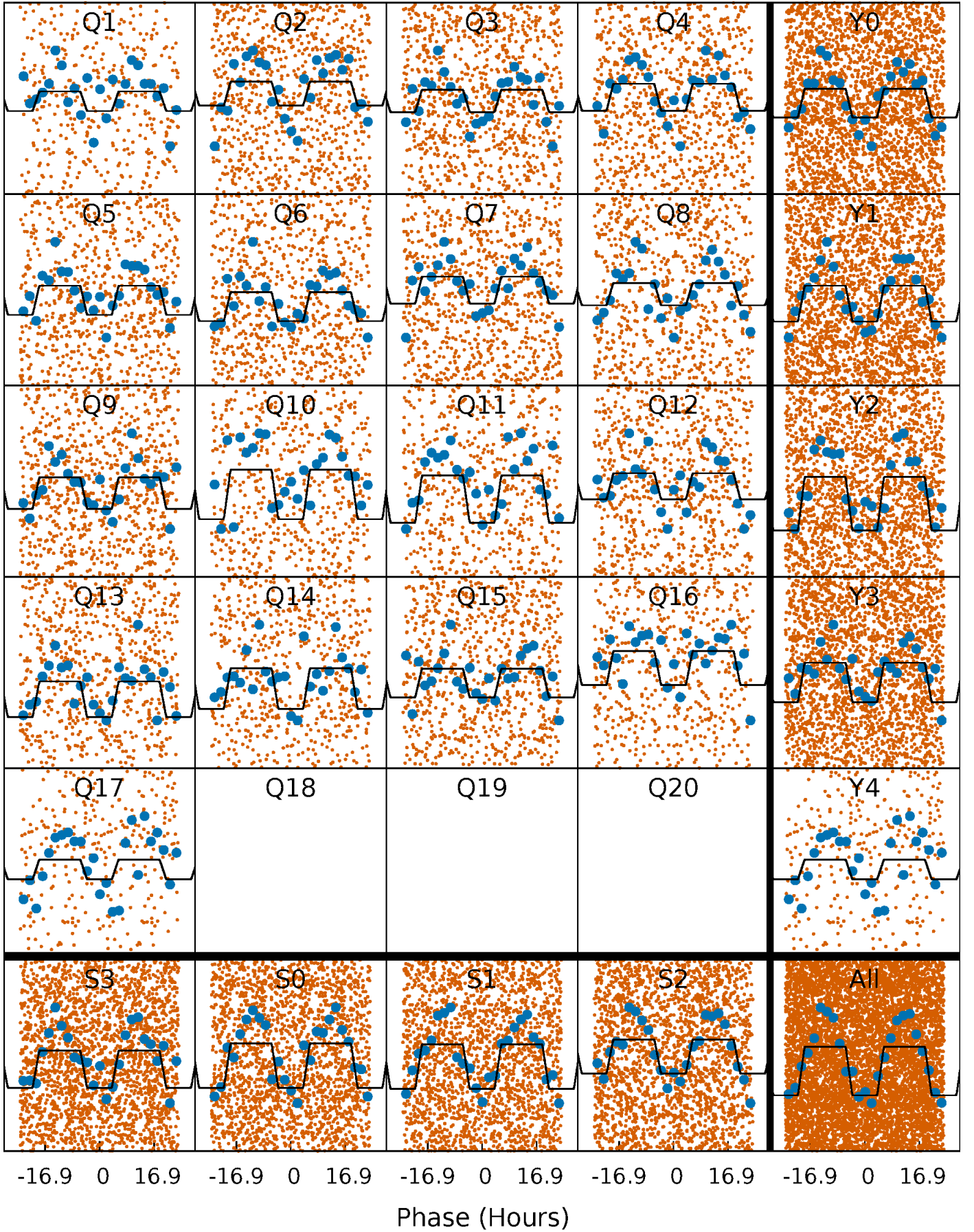
DV Quarter-Phased Transit Curves

TCE 009180906-02 P= 1.024368 Days $T_0=131.540254$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

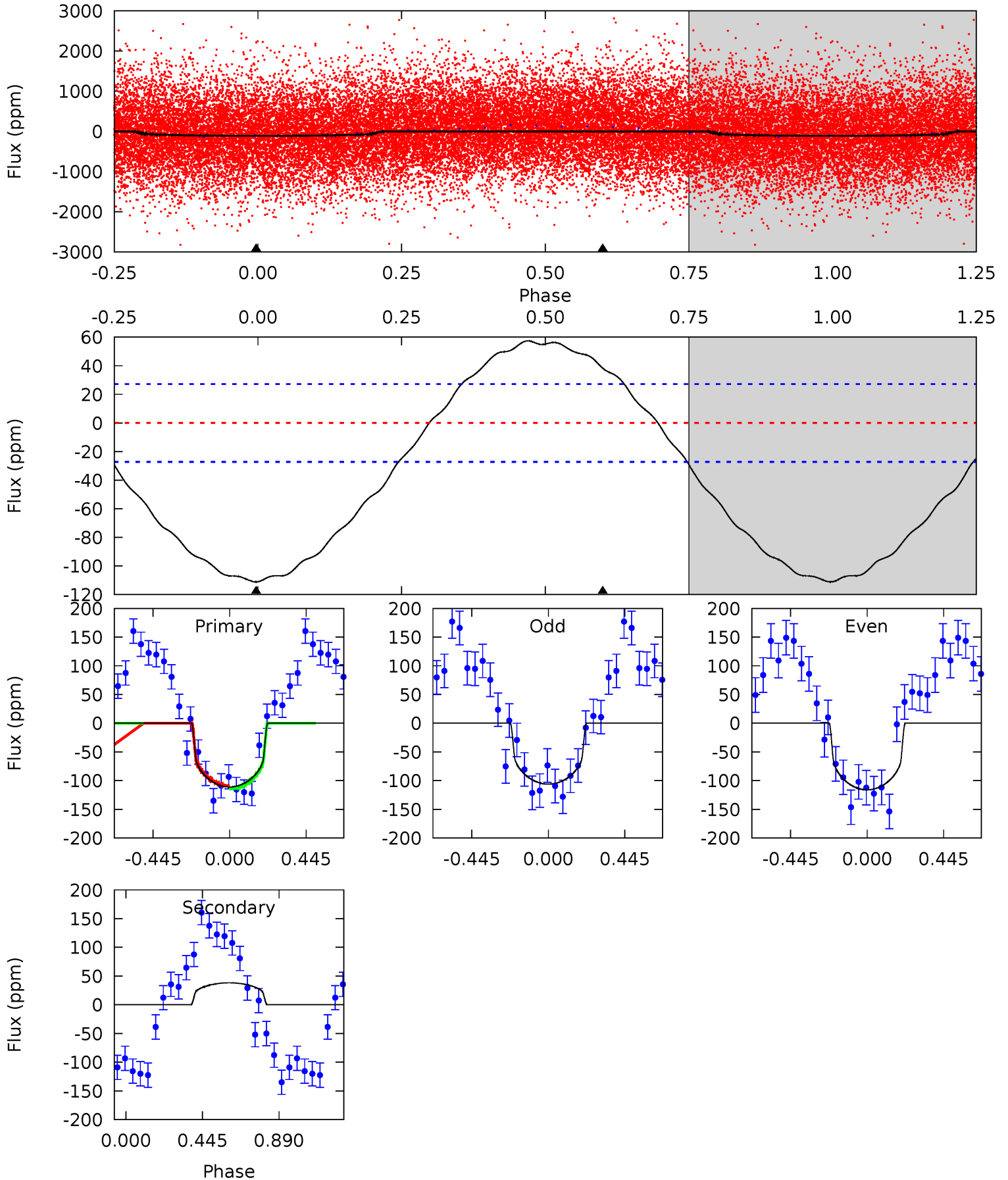
TCE 009180906-02 P= 1.024328 Days $T_0=131.564867$ (BKJD)



DV Model-Shift Uniqueness Test

009180906-02, P = 1.024368 Days, E = 130.515886 Days

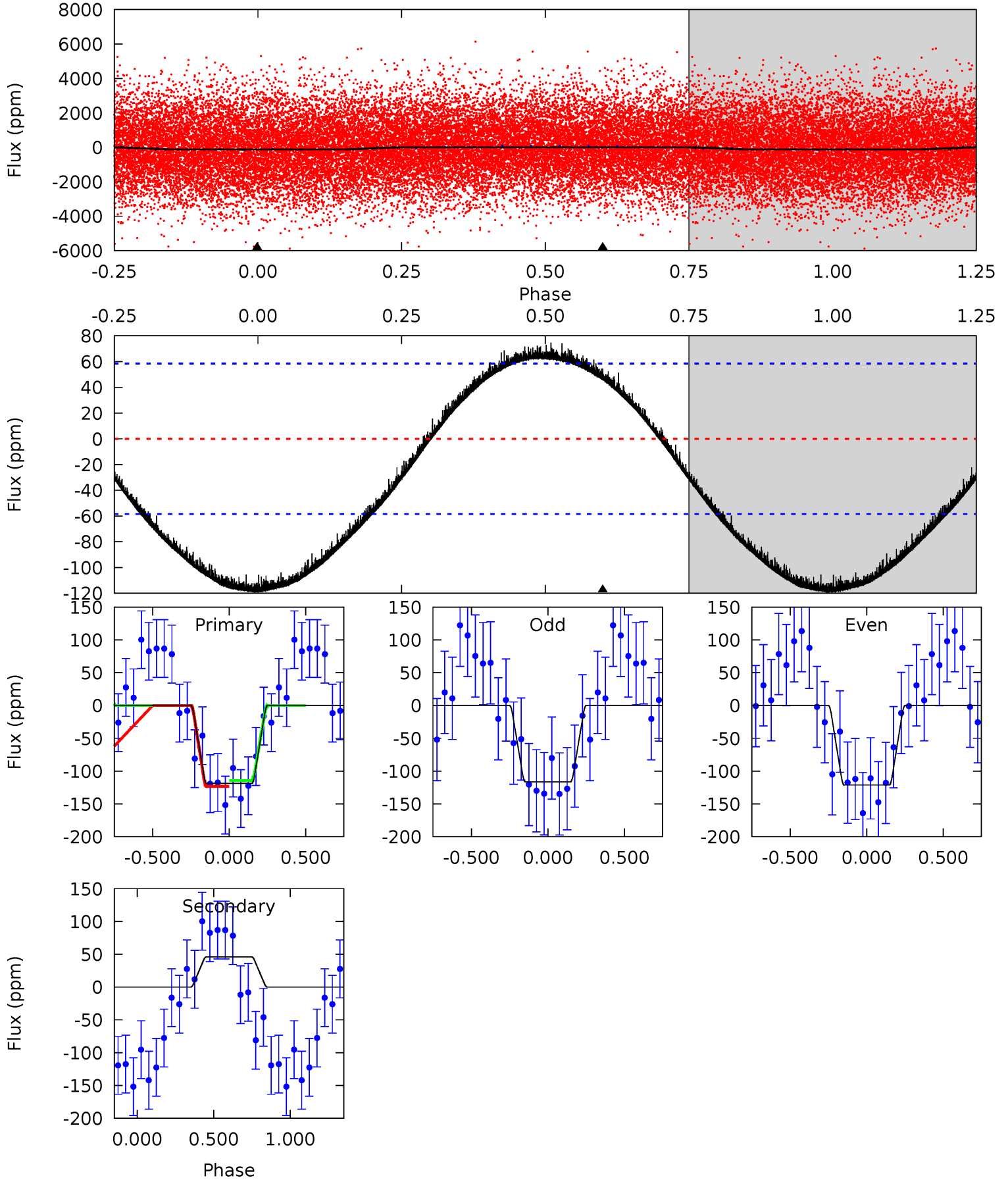
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.3	-5.96	0	0	4.24	0.76	2.22	17.3	17.3	-5.96	-5.96	0.77	0.96	0.34	0.42



Alt Model-Shift Uniqueness Test

009180906-02, P = 1.024328 Days, E = 130.540539 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.57	-3.31	0	0	4.21	0.67	1.25	8.57	8.57	-3.31	-3.31	0.18	1.41	0.39	0.32



Stellar Parameters For KIC 009180906

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6773^{+162}_{-255}	$4.306^{+0.060}_{-0.180}$	$0.210^{+0.150}_{-0.350}$	$1.391^{+0.406}_{-0.174}$	$1.427^{+0.172}_{-0.172}$	$0.746^{+0.237}_{-0.354}$
	+2%/-4%	+1%/-4%	+71%/-167%	+29%/-13%	+12%/-12%	+32%/-47%
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 009180906-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	38 ± 6	$1.62^{+1.01}_{-0.83}$	3337^{+231}_{-178}	-5323^{+872}_{-2327}	$-3.912^{+2.449}_{-13.664}$
Alt.	46 ± 14	$1.84^{+0.91}_{-0.88}$	3345^{+225}_{-166}	-5241^{+765}_{-1926}	$-3.593^{+2.089}_{-9.386}$

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

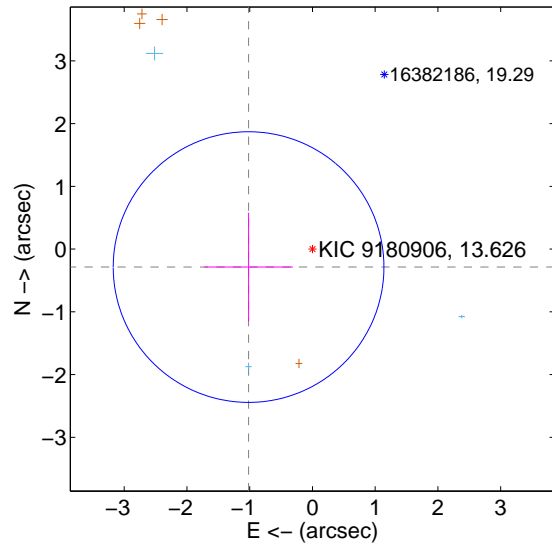
Supplemental centroid analysis for 009180906-02. Kepler magnitude: 13.63. Transit SNR 15.68

There are 3 quarters with good PRF difference image offsets

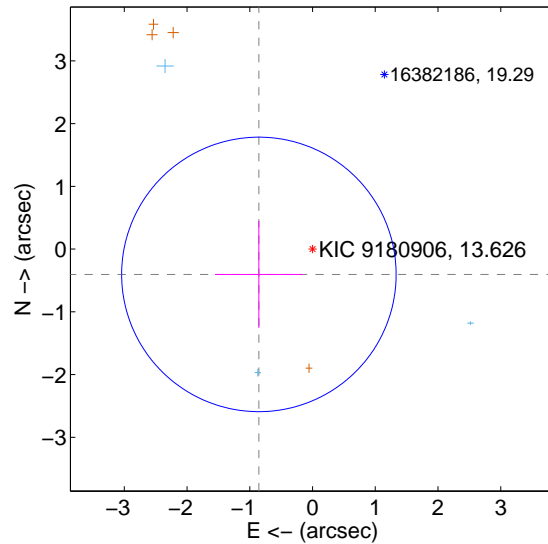
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.057 ± 0.719	1.47	1.018 ± 0.706	-0.286 ± 0.867
PRF-fit source offset from KIC position	0.945 ± 0.729	1.30	0.855 ± 0.699	-0.403 ± 0.852
photometric centroid source offset	0.35 ± 0.18	2.01	0.35 ± 0.18	0.04 ± 0.19

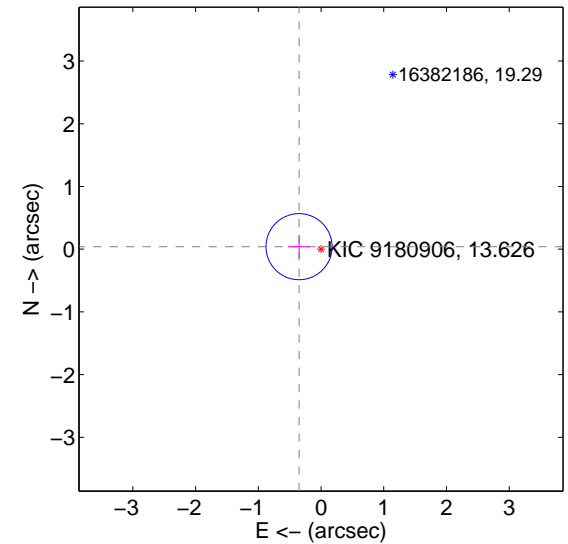
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

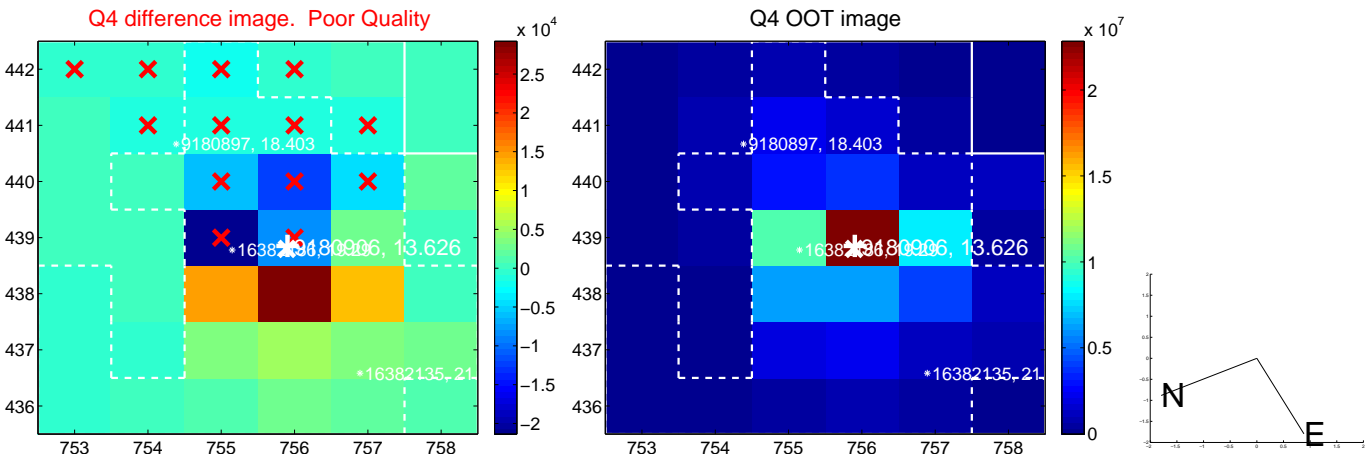
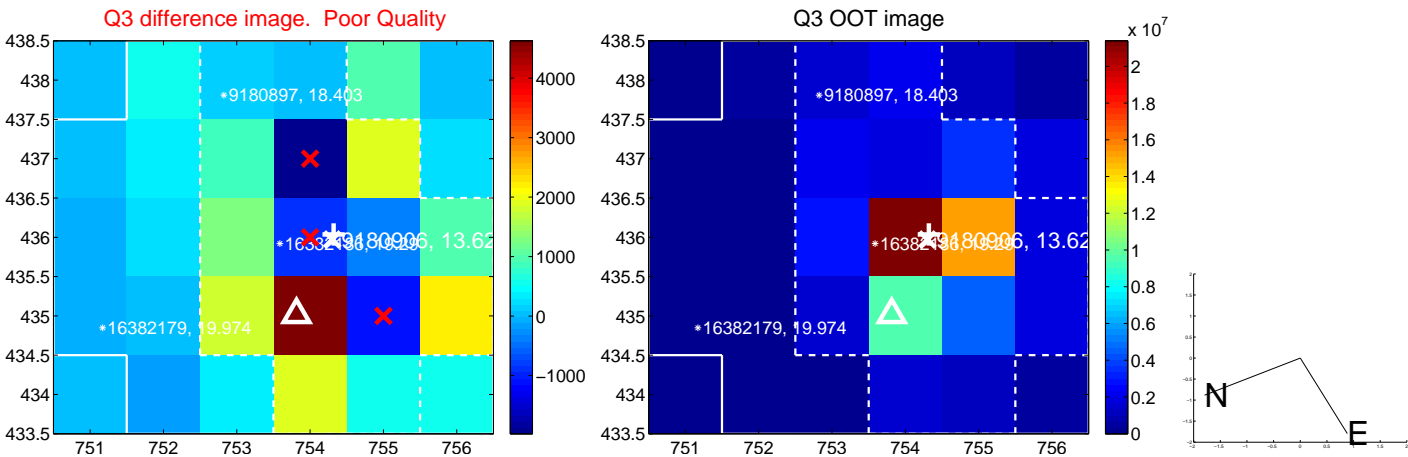
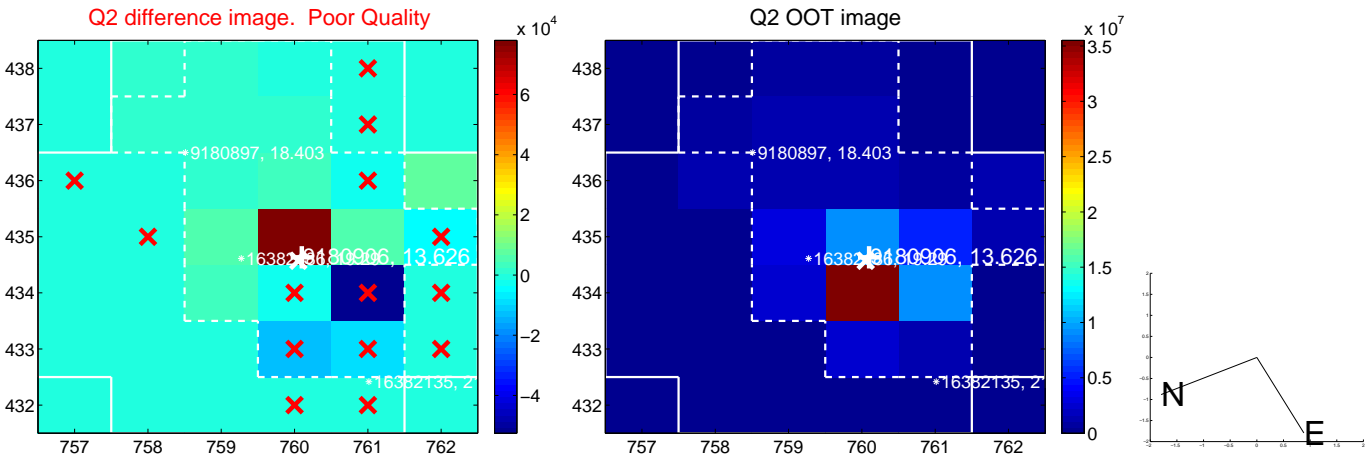
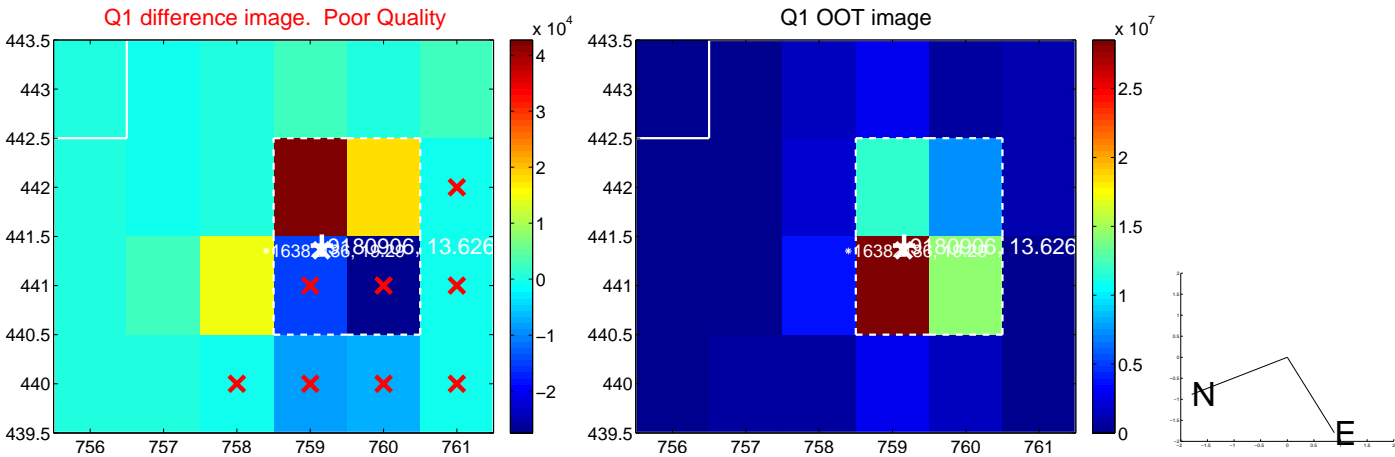


offset from photometric centroids

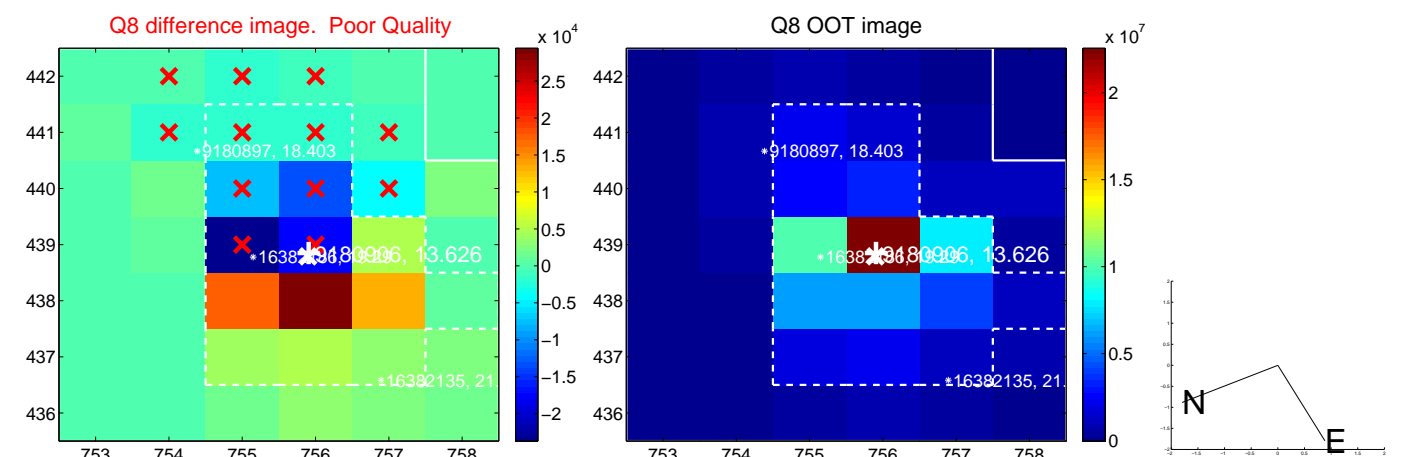
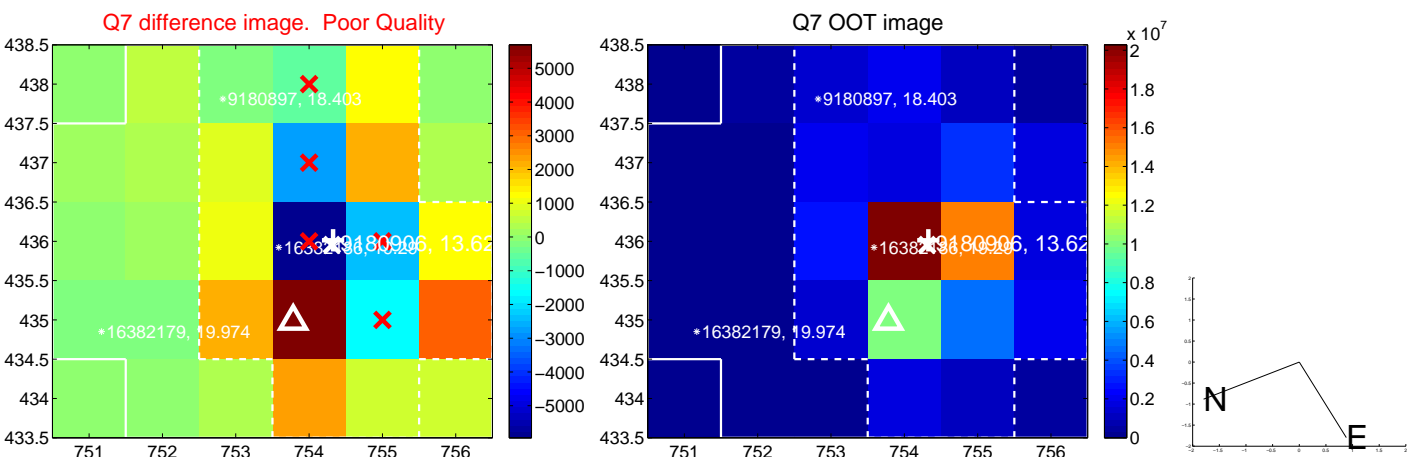
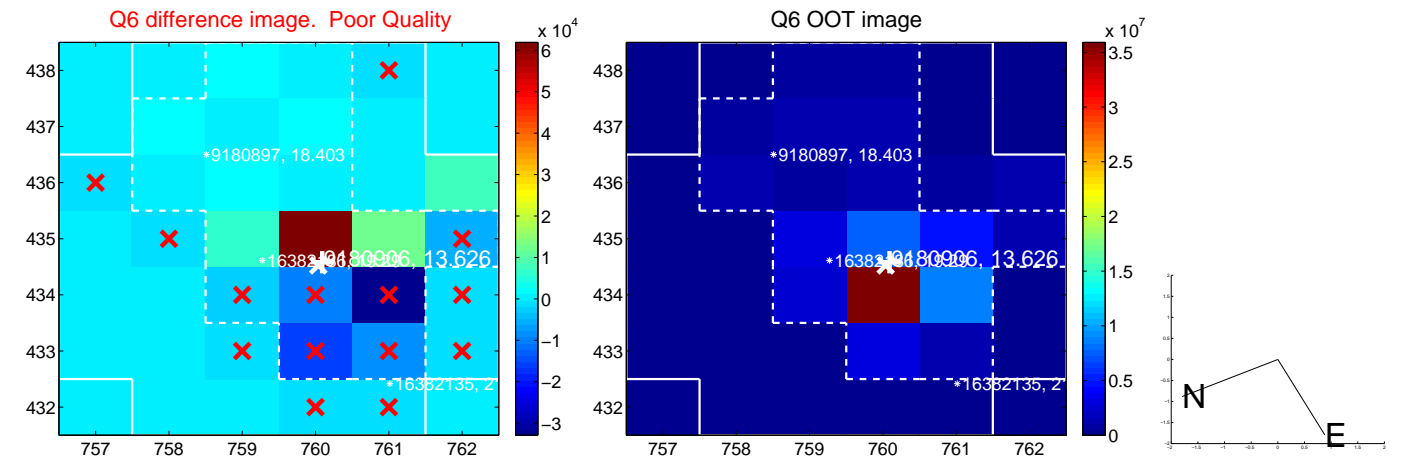
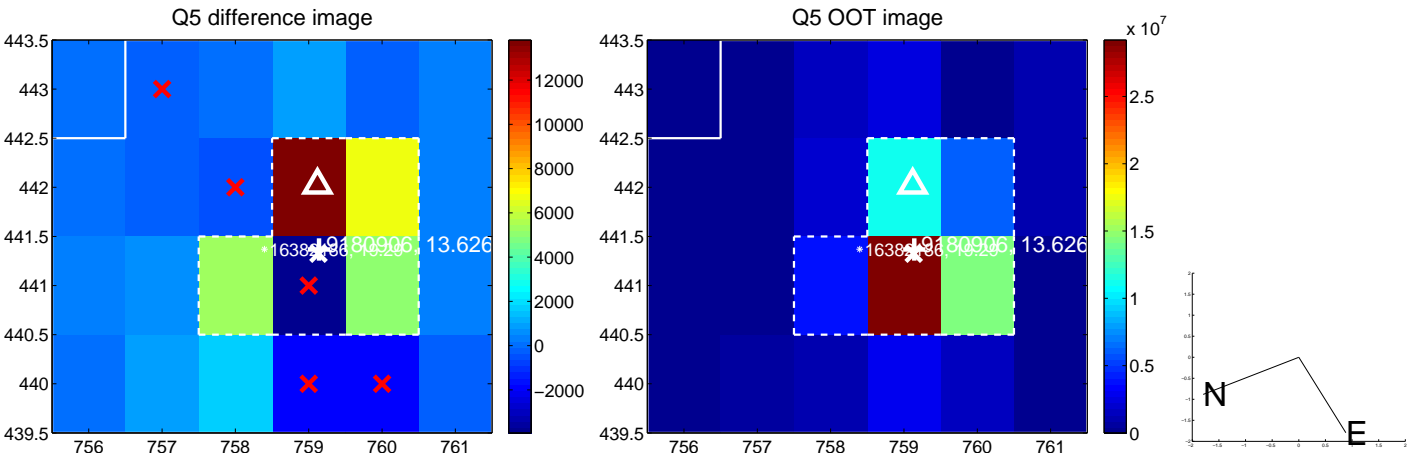


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

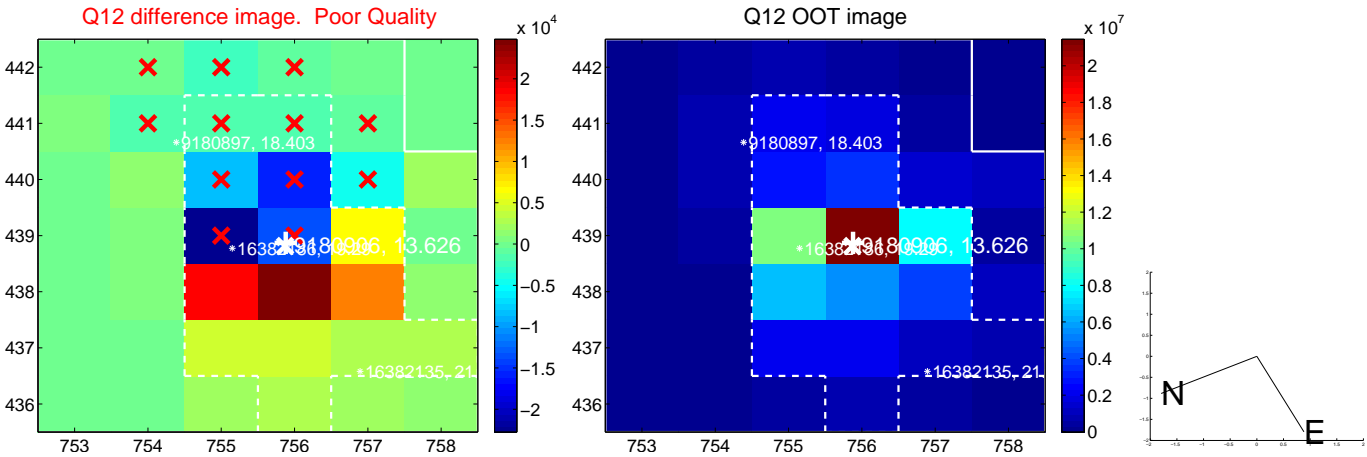
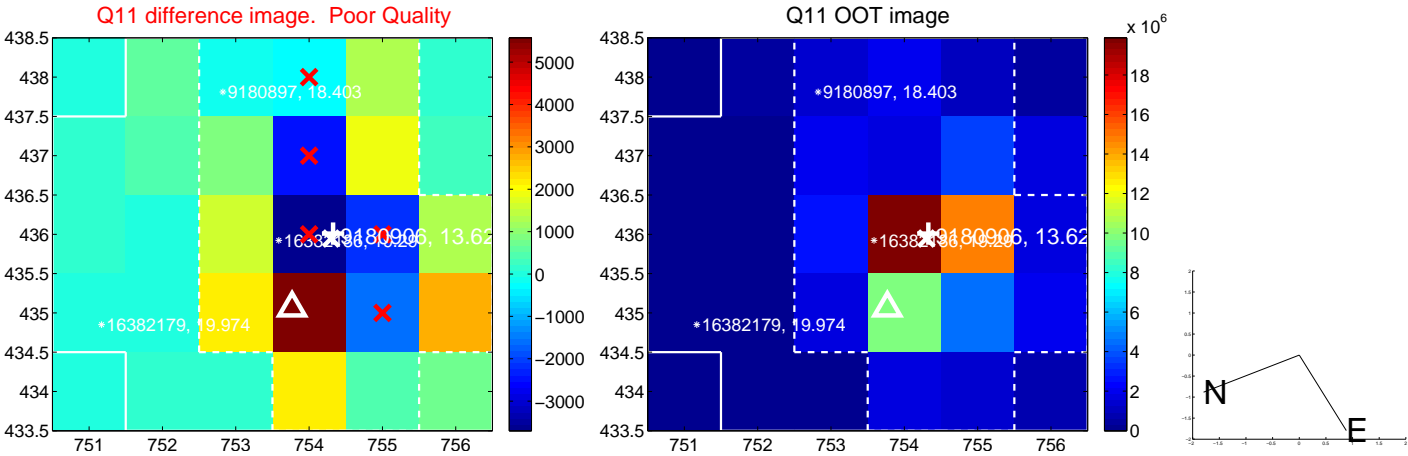
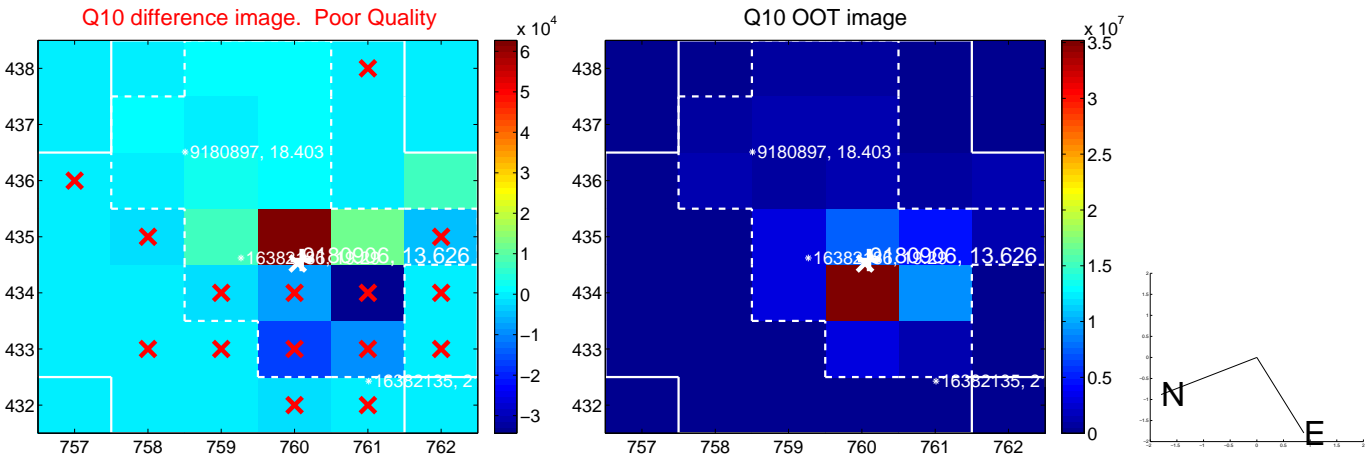
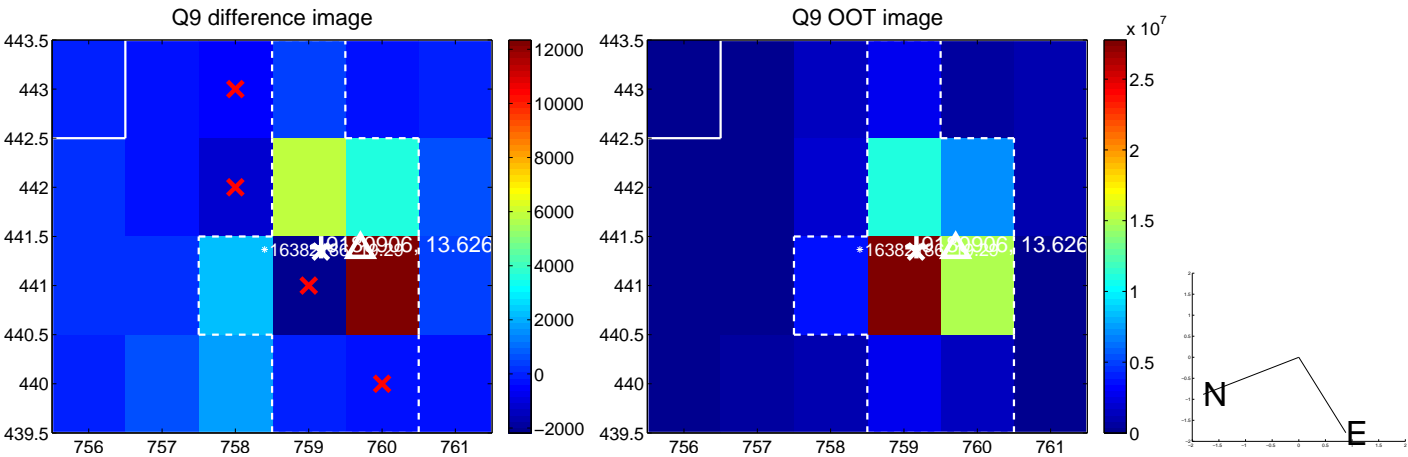
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



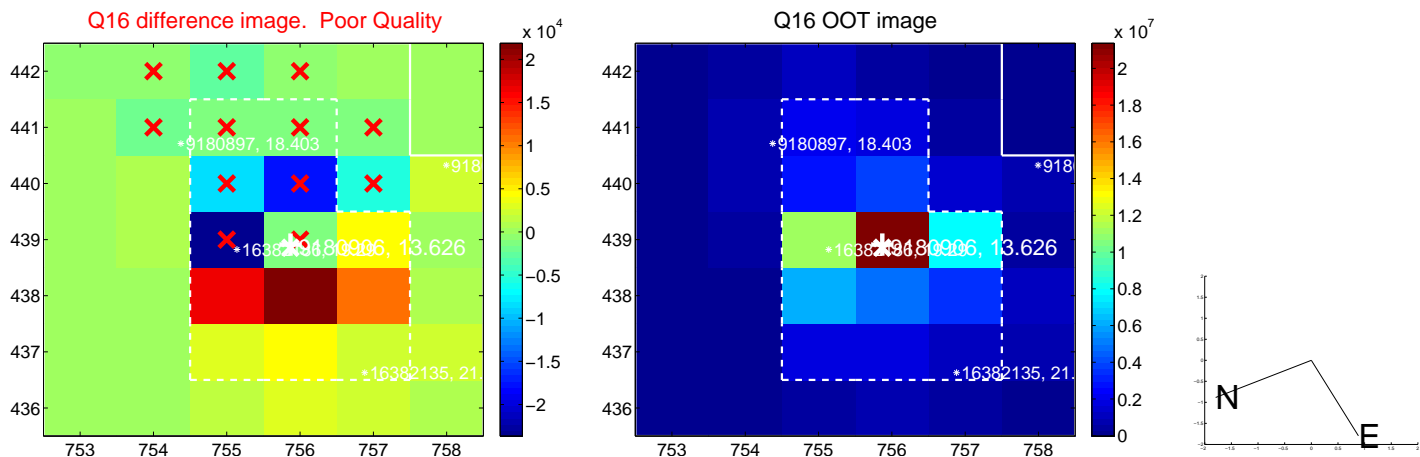
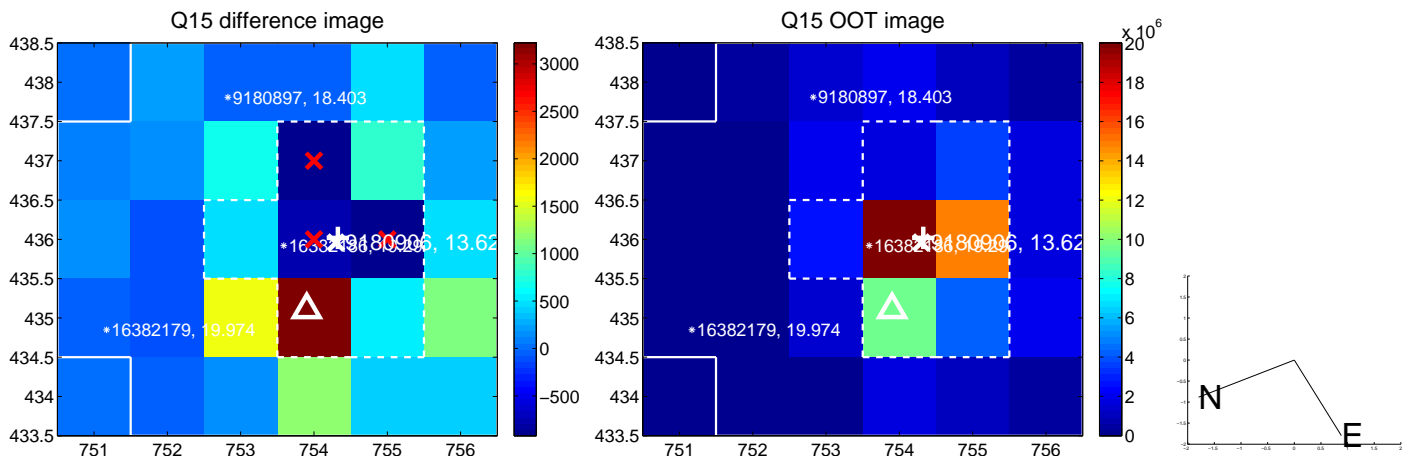
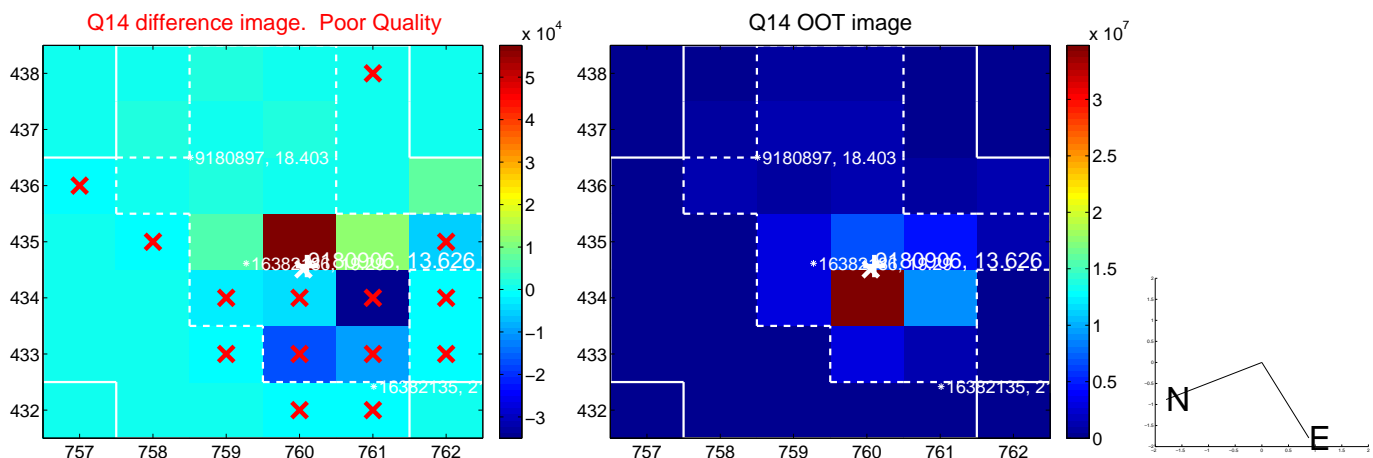
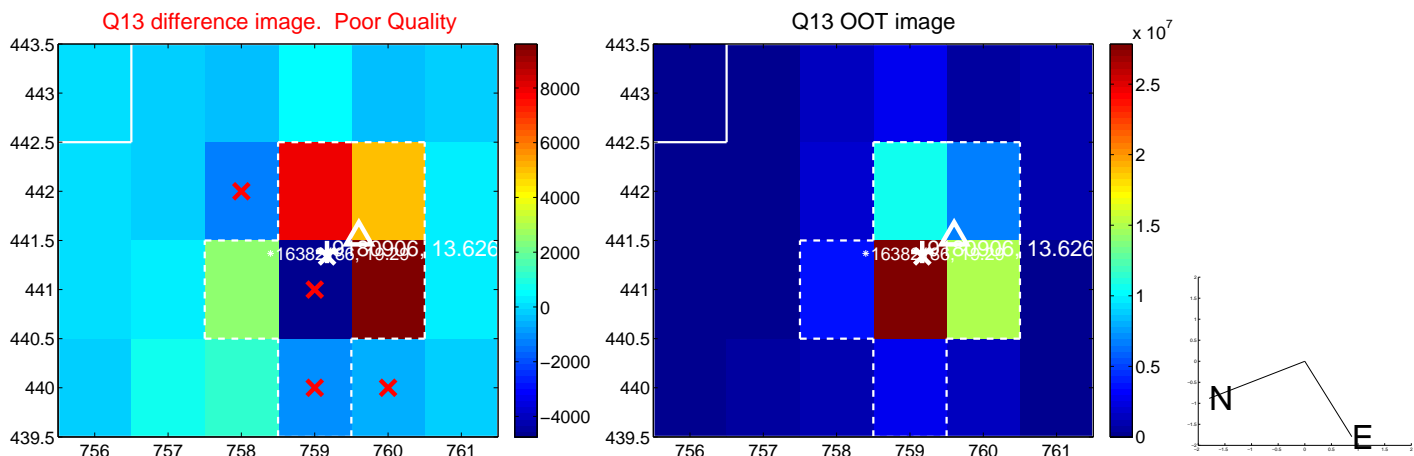
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



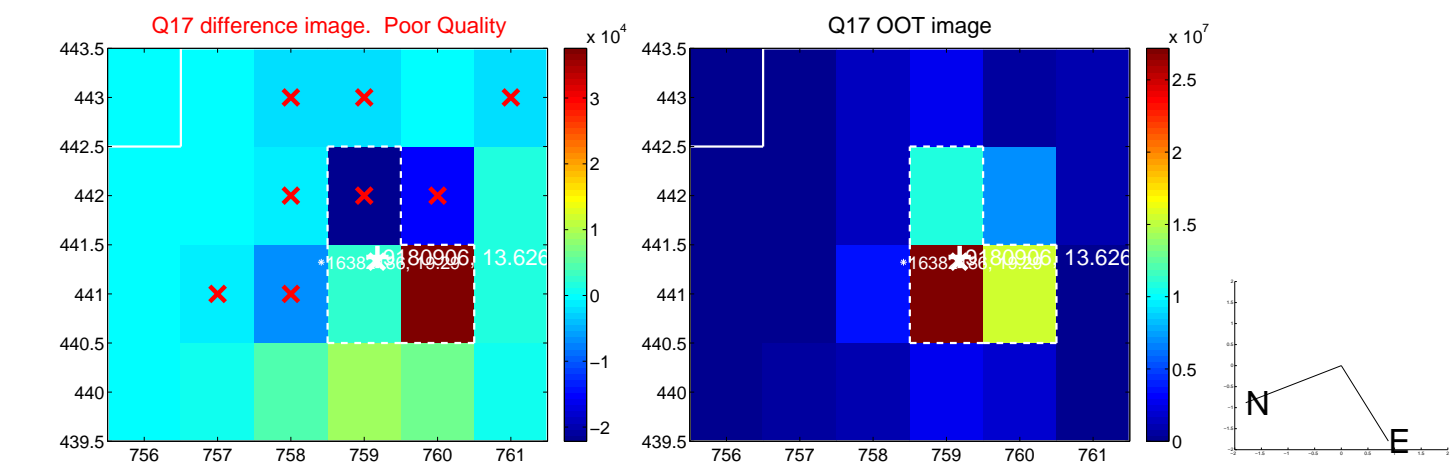
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



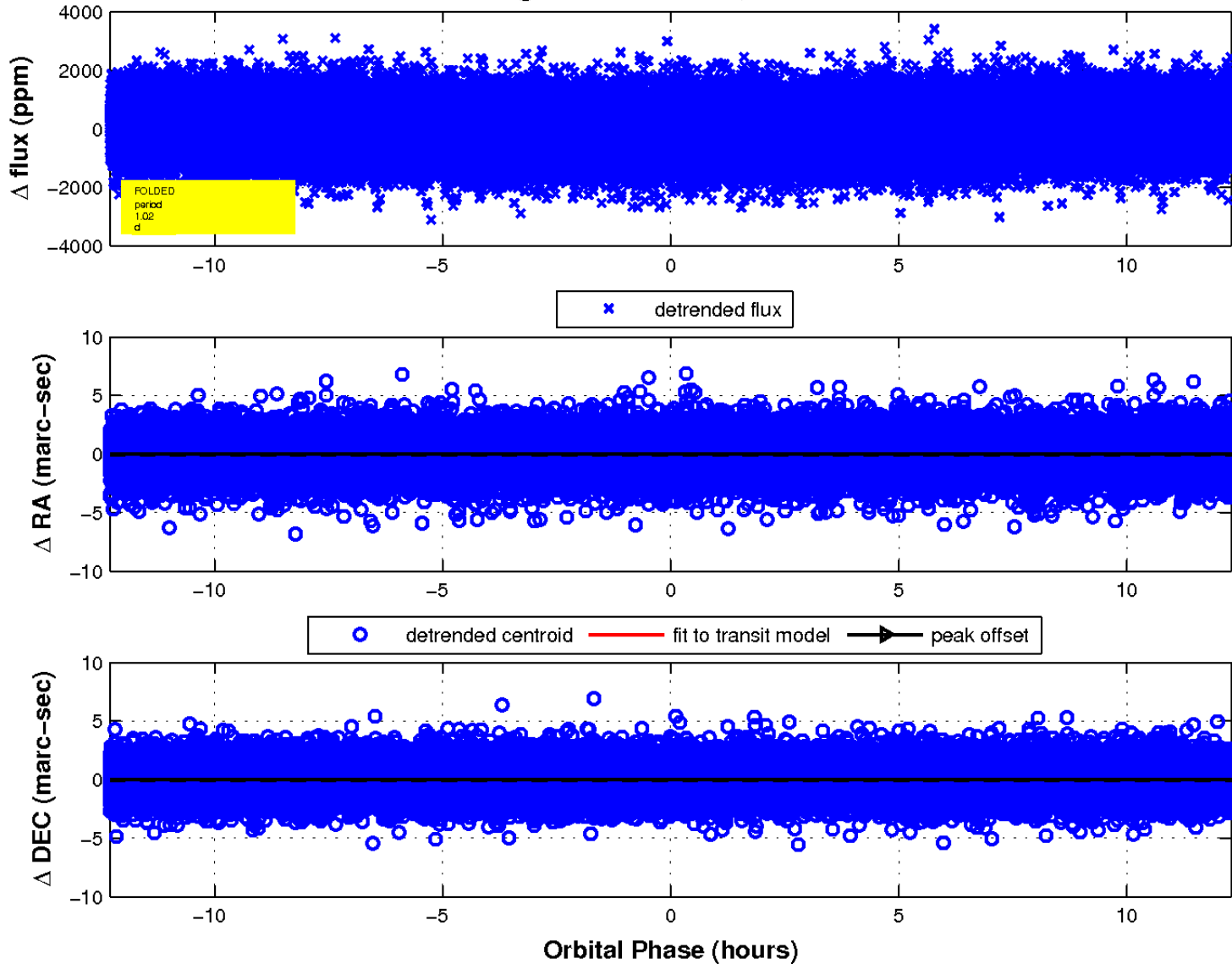
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

