

KIC 009176068

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})
009176068-01	OBS	No	402.690292	434.158088	596.4	5.280	7.3	7.1	0.86	5433	2.28	0.60
009176068-02	OBS	No	571.417505	214.629744	646.0	10.262	7.8	8.7	0.86	5433	2.27	0.38

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009176068-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009176068-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_MEAS

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

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

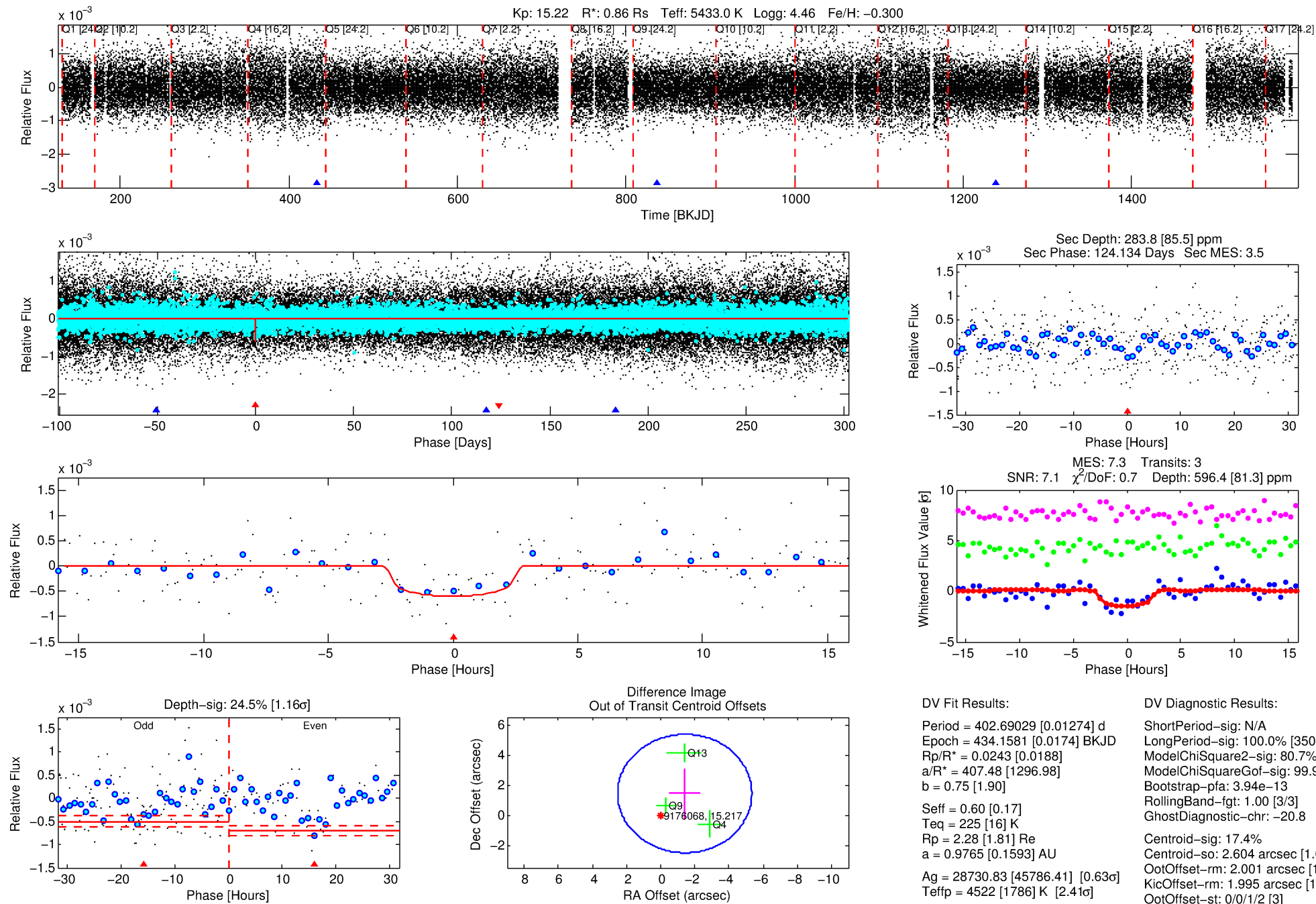
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009176068-01

No Significant Match Found

DV One-Page Summary

KIC: 9176068 Candidate: 1 of 2 Period: 402.690 d



DV Fit Results:

Period = 402.69029 [0.01274] d
Epoch = 434.1581 [0.0174] BKJD
Rp/R* = 0.0243 [0.0188]
a/R* = 407.48 [1296.98]
b = 0.75 [1.90]
Seff = 0.60 [0.17]
Teq = 225 [16] K
Rp = 2.28 [1.81] Re
a = 0.9765 [0.1593] AU
Ag = 28730.83 [45786.41] [0.63 σ]
Teff = 4522 [1786] K [2.41 σ]

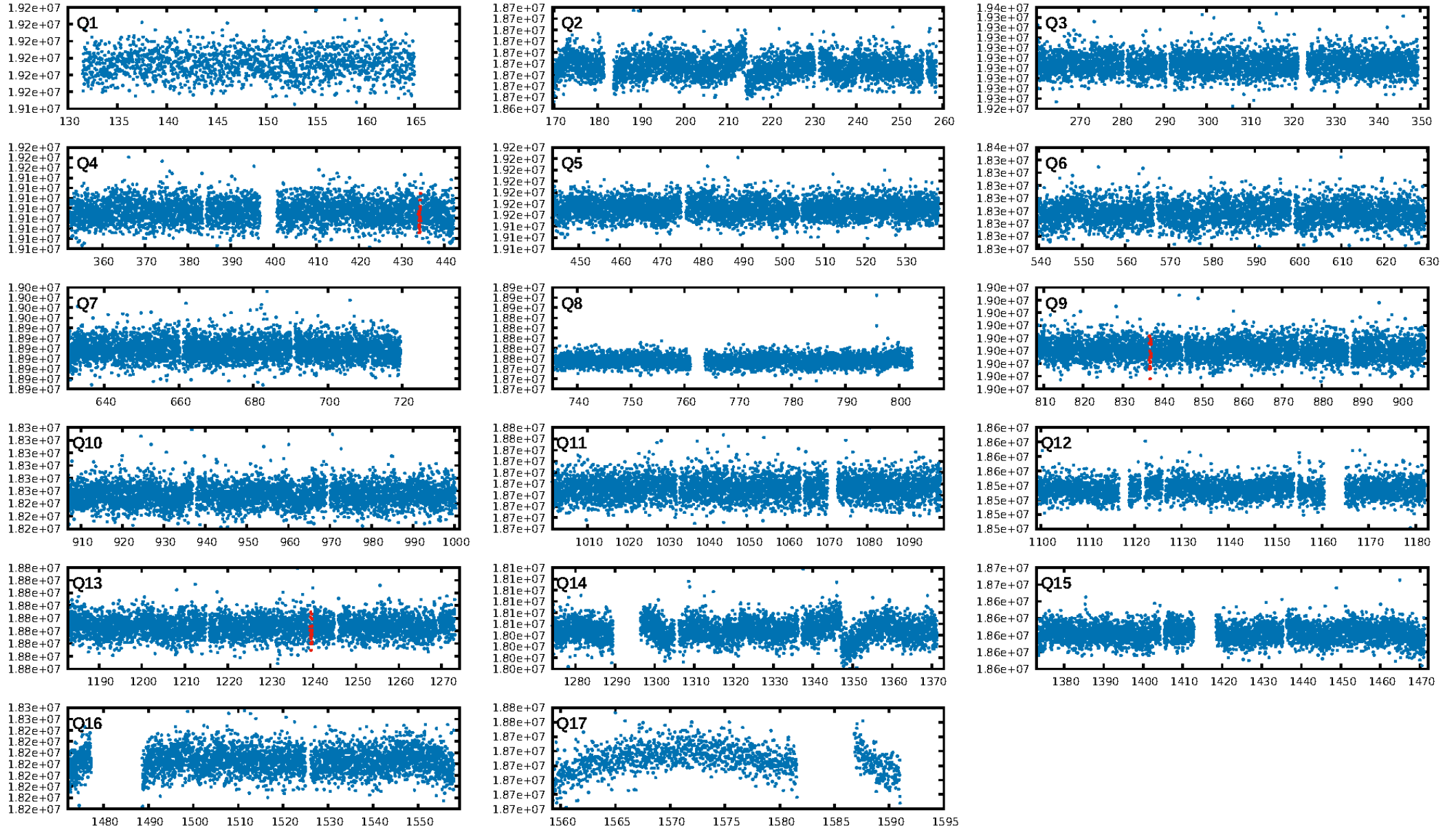
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [350.87 σ]
ModelChiSquare2-sig: 80.7%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 3.94e-13
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -20.8
Centroid-sig: 17.4%
Centroid-so: 2.604 arcsec [1.08 σ]
OotOffset-rm: 2.001 arcsec [1.53 σ]
KicOffset-rm: 1.995 arcsec [1.49 σ]
OotOffset-st: 0/0/1/2 [3]
KicOffset-st: 0/0/1/2 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

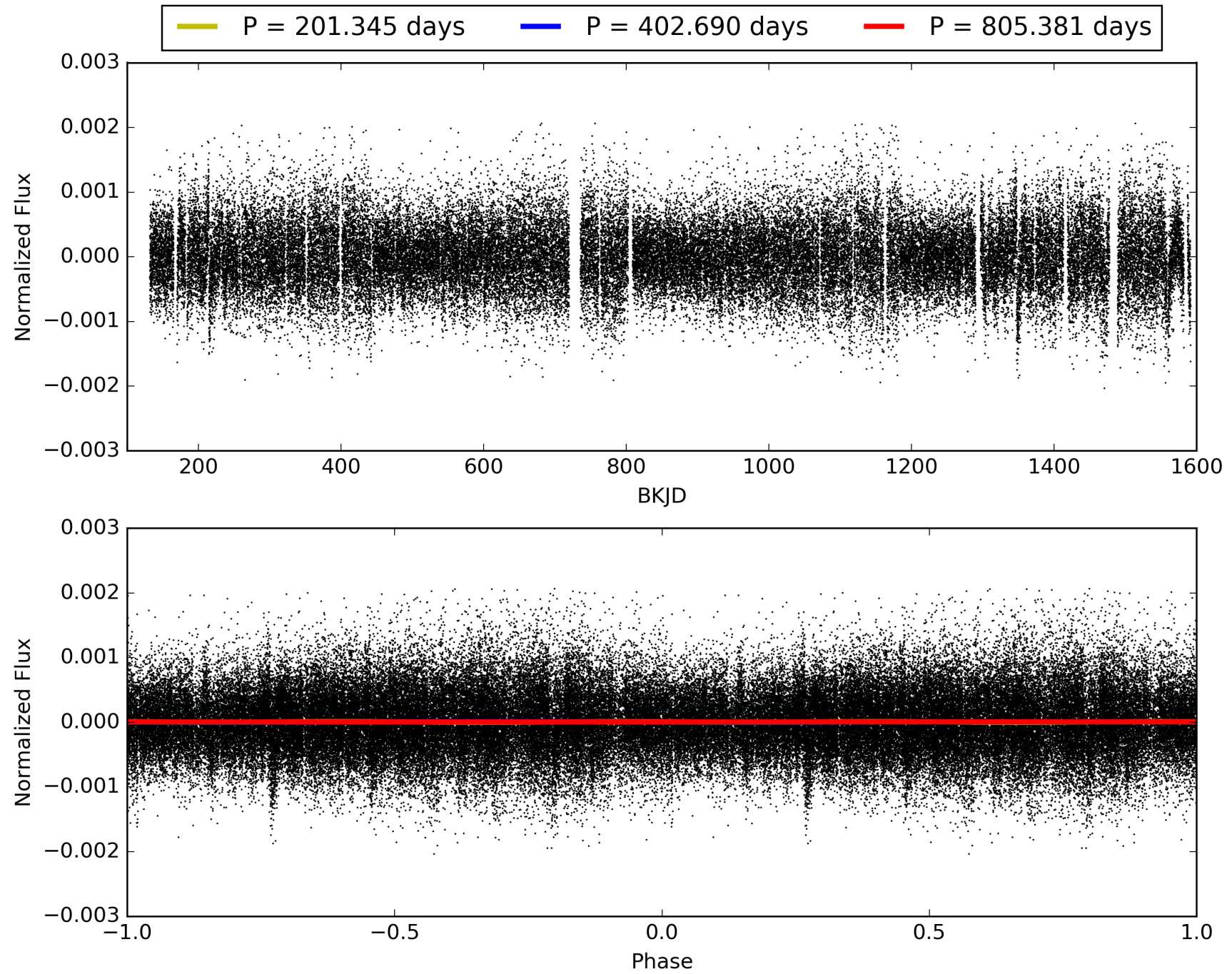
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:37:04 Z

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

TCE 009176068-01, PDC Light Curves

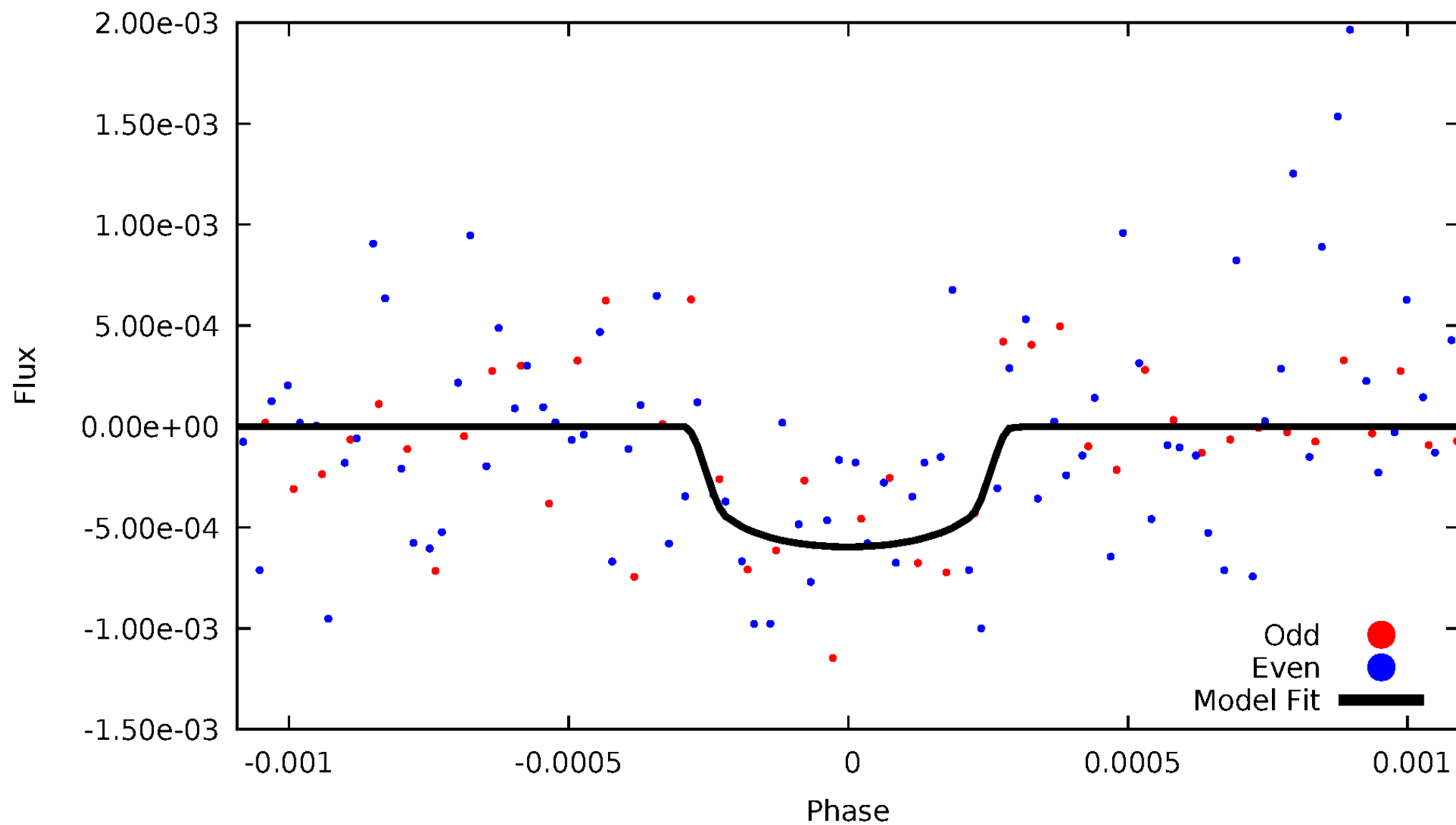


TCE 009176068-01



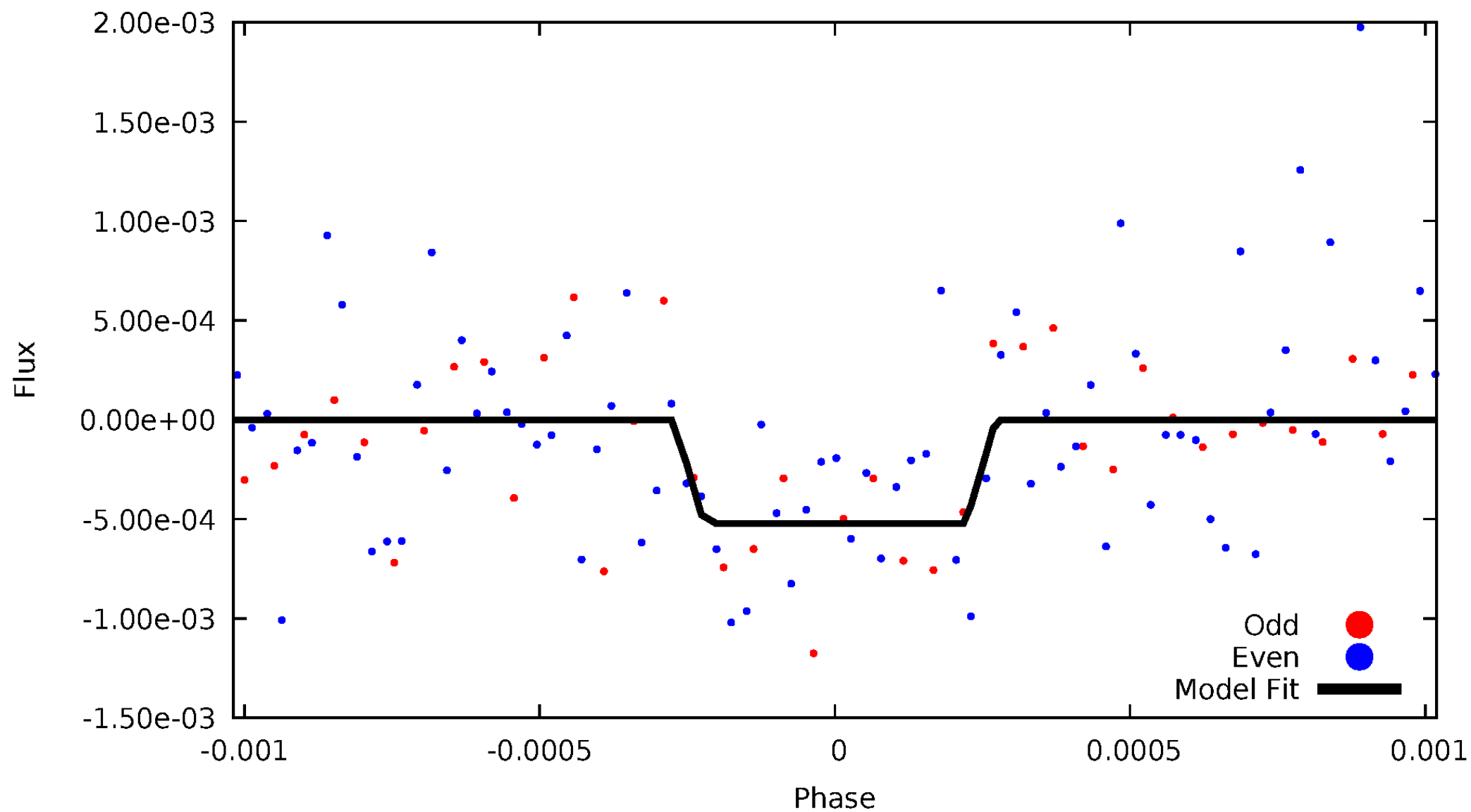
DV Odd/Even

TCE 009176068-01

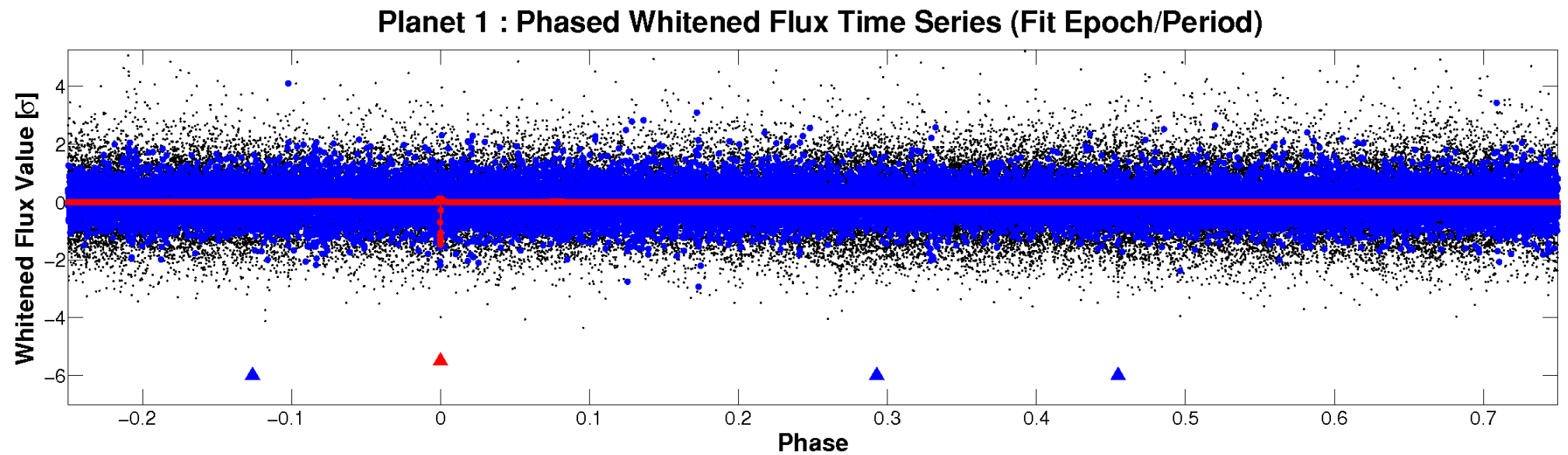
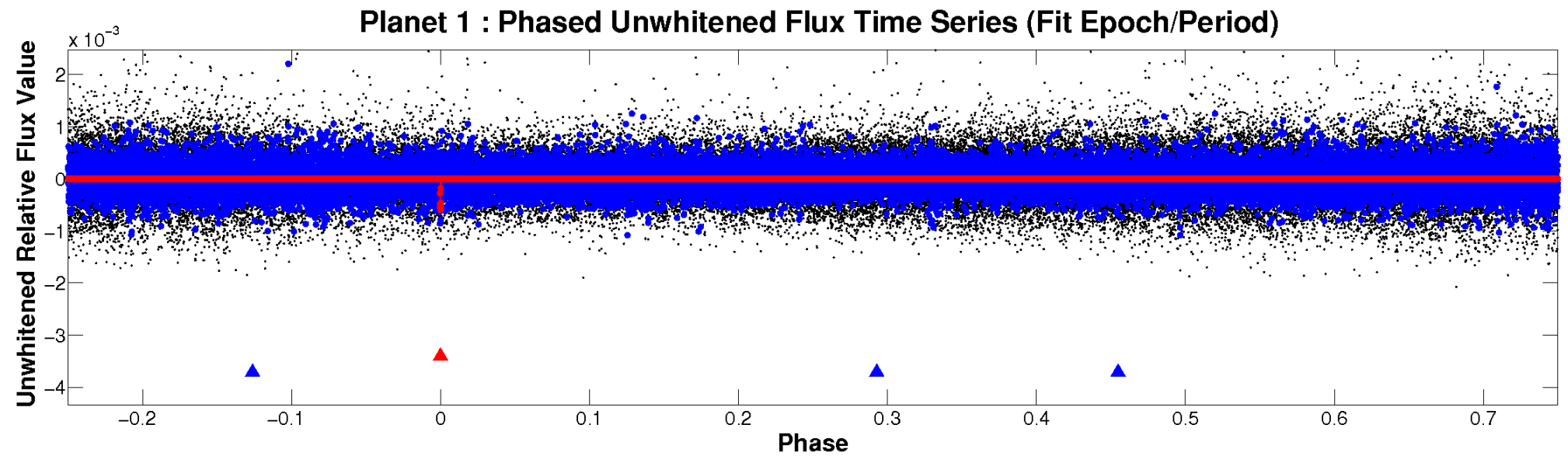


ALT Odd/Even

TCE 009176068-01

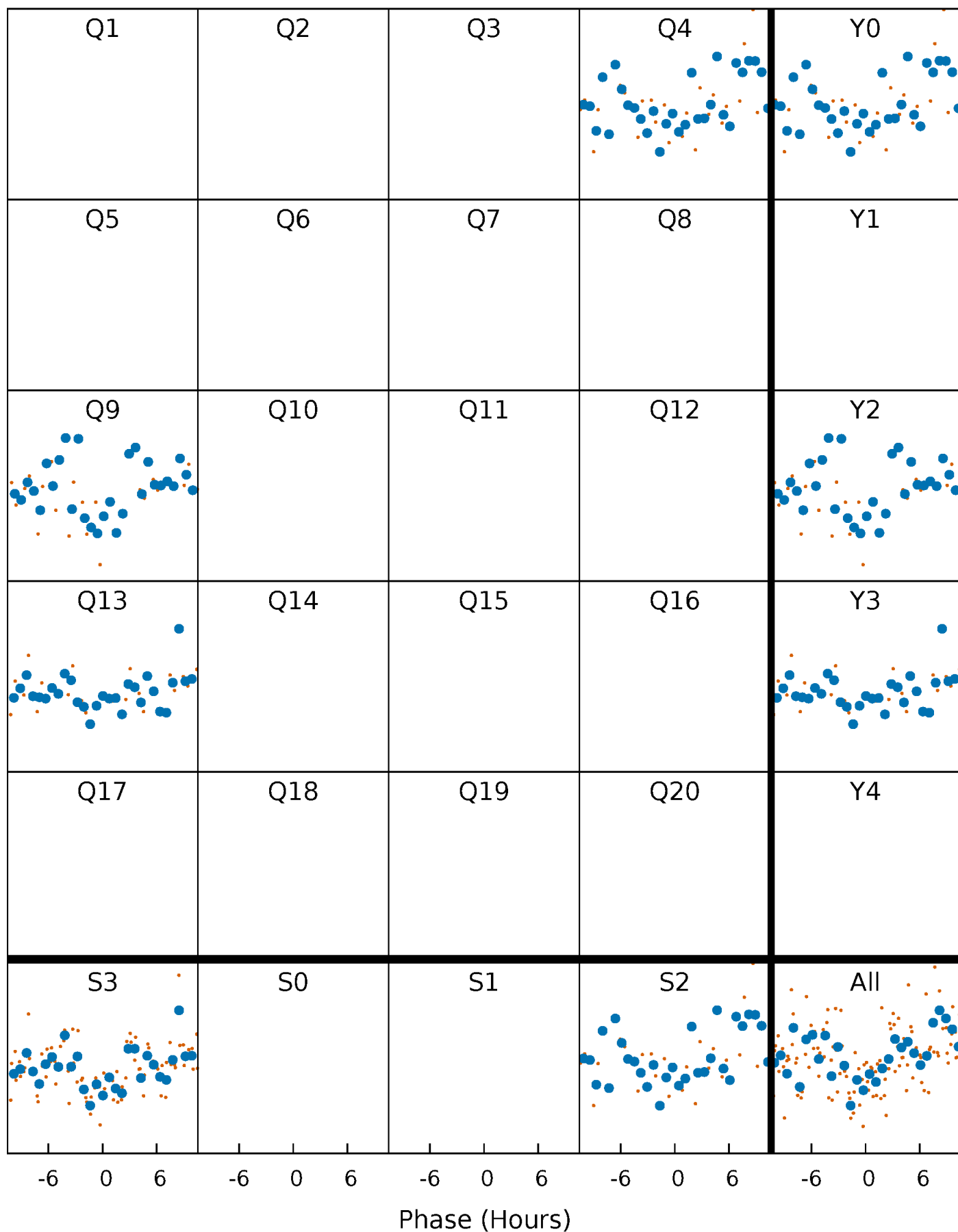


Non-Whitened Vs. Whitened Light Curve



PDC Quarter-Phased Transit Curves

TCE 009176068-01 P=402.690292 Days $T_0=434.158088$ (BKJD)



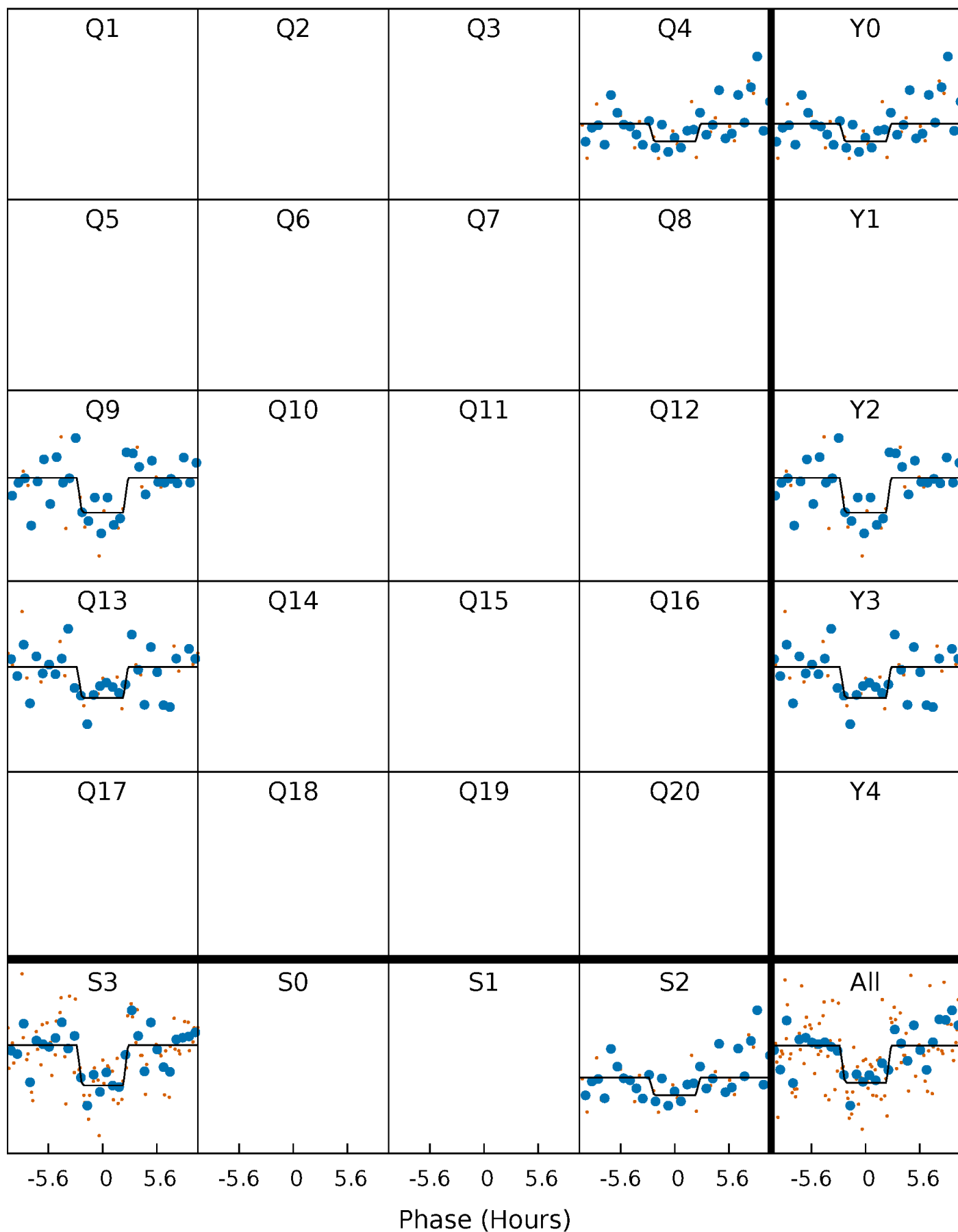
DV Quarter-Phased Transit Curves

TCE 009176068-01 P=402.690292 Days $T_0=434.158088$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

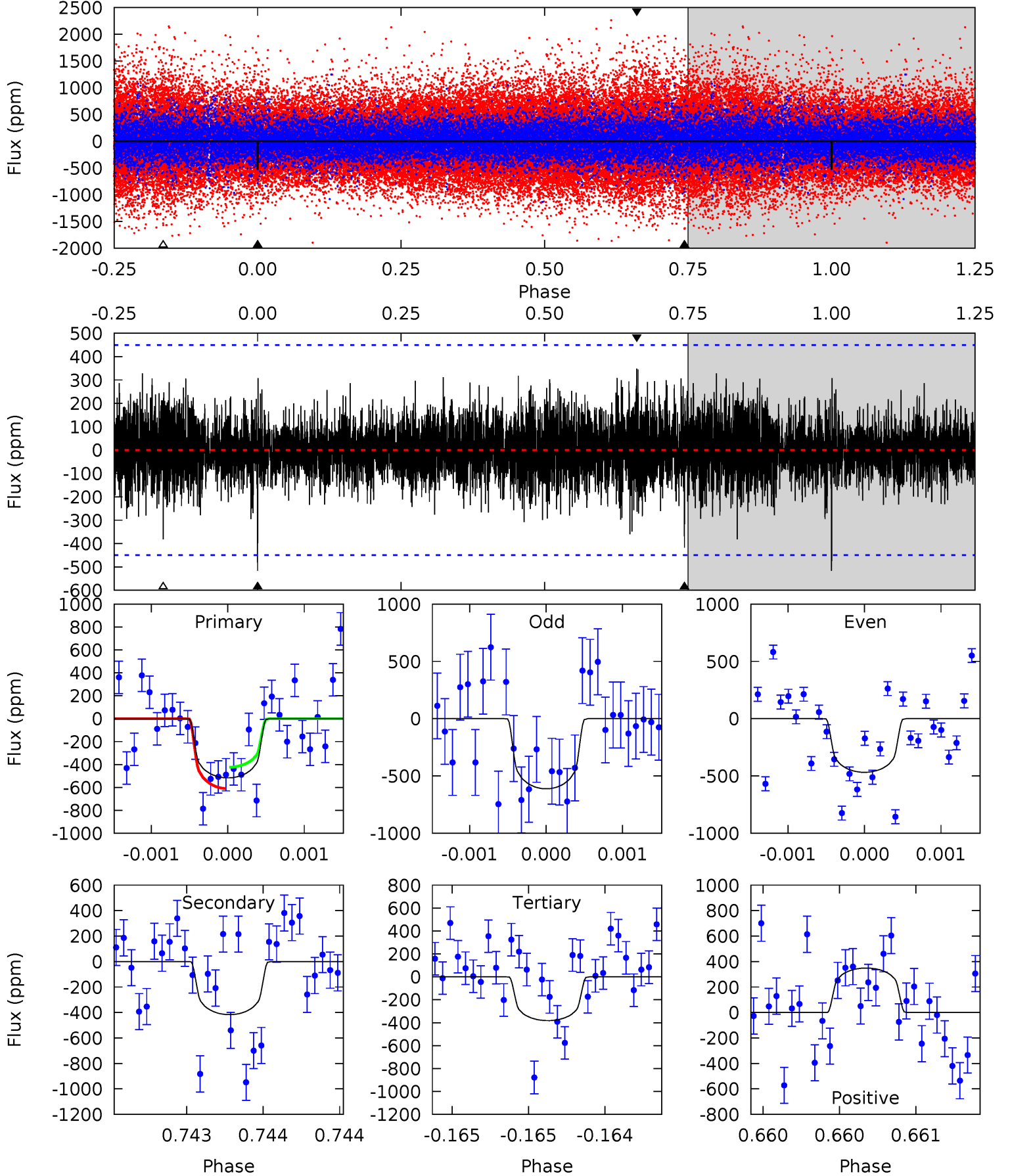
TCE 009176068-01 P=402.690978 Days $T_0=434.160840$ (BKJD)



DV Model-Shift Uniqueness Test

009176068-01, $P = 402.690292$ Days, $E = 31.467796$ Days

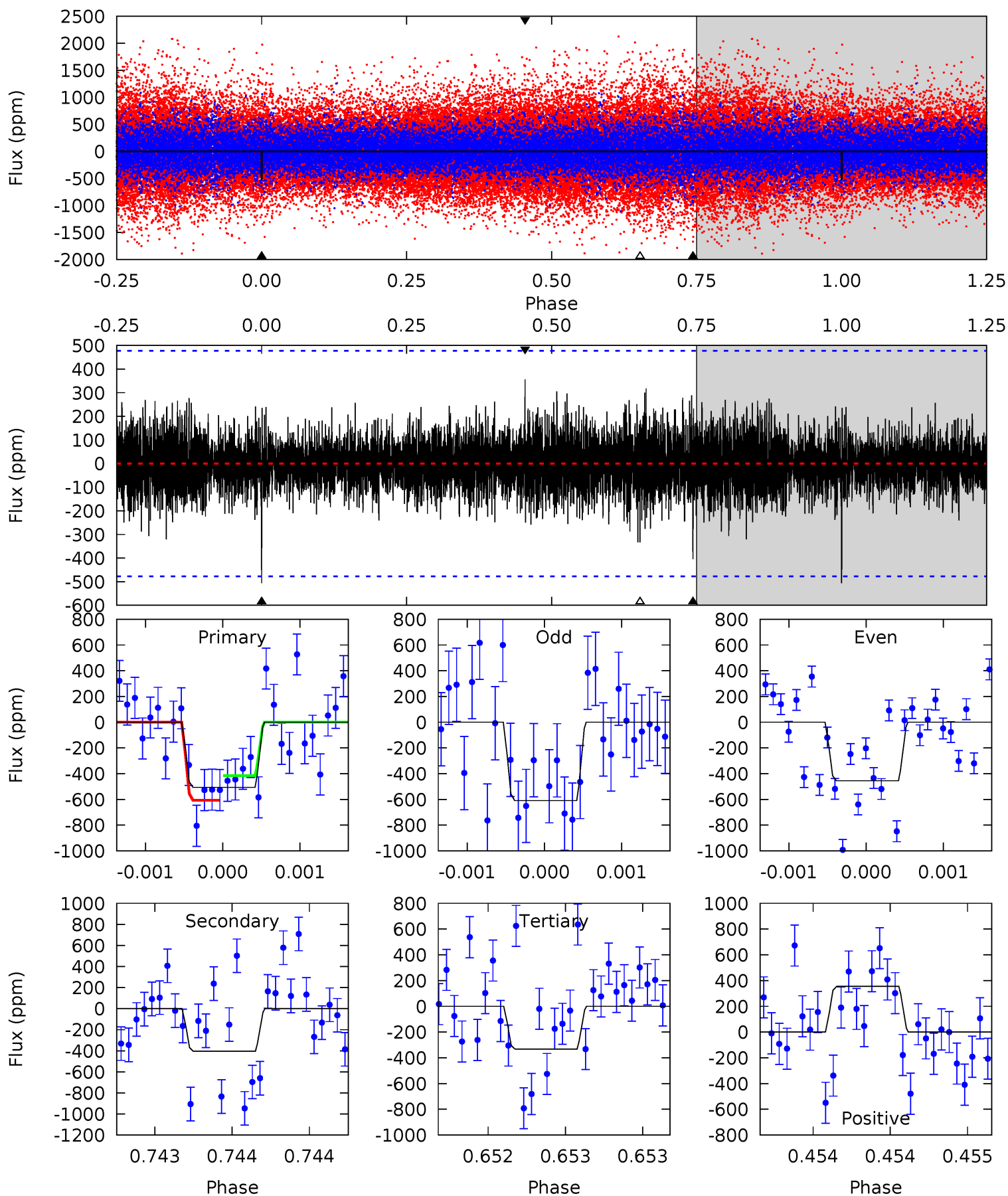
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.37	5.14	4.71	4.30	5.55	3.44	1.14	1.66	2.06	0.43	0.84	0.86	1.01	0.40	1.15



Alt Model-Shift Uniqueness Test

009176068-01, $P = 402.690978$ Days, $E = 31.469862$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.90	4.72	3.88	4.15	5.57	3.47	0.97	2.02	1.76	0.84	0.57	0.85	1.06	0.41	1.10



Stellar Parameters For KIC 009176068

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5433^{+178}_{-162}	$4.455^{+0.126}_{-0.140}$	$-0.300^{+0.300}_{-0.300}$	$0.858^{+0.158}_{-0.115}$	$0.765^{+0.122}_{-0.052}$	$1.709^{+0.916}_{-0.651}$
	+3%/-3%	+3%/-3%	+100%/-100%	+18%/-13%	+16%/-7%	+54%/-38%
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 009176068-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-417 ± 81	$2.52^{+1.70}_{-1.46}$	316^{+18}_{-17}	4885^{+2527}_{-912}	$35284^{+157831}_{-23083}$
Alt.	-405 ± 86	$2.38^{+1.73}_{-1.39}$	316^{+18}_{-17}	4952^{+2682}_{-951}	$37822^{+171493}_{-25324}$

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 $A_{obs} \gg 1.0$

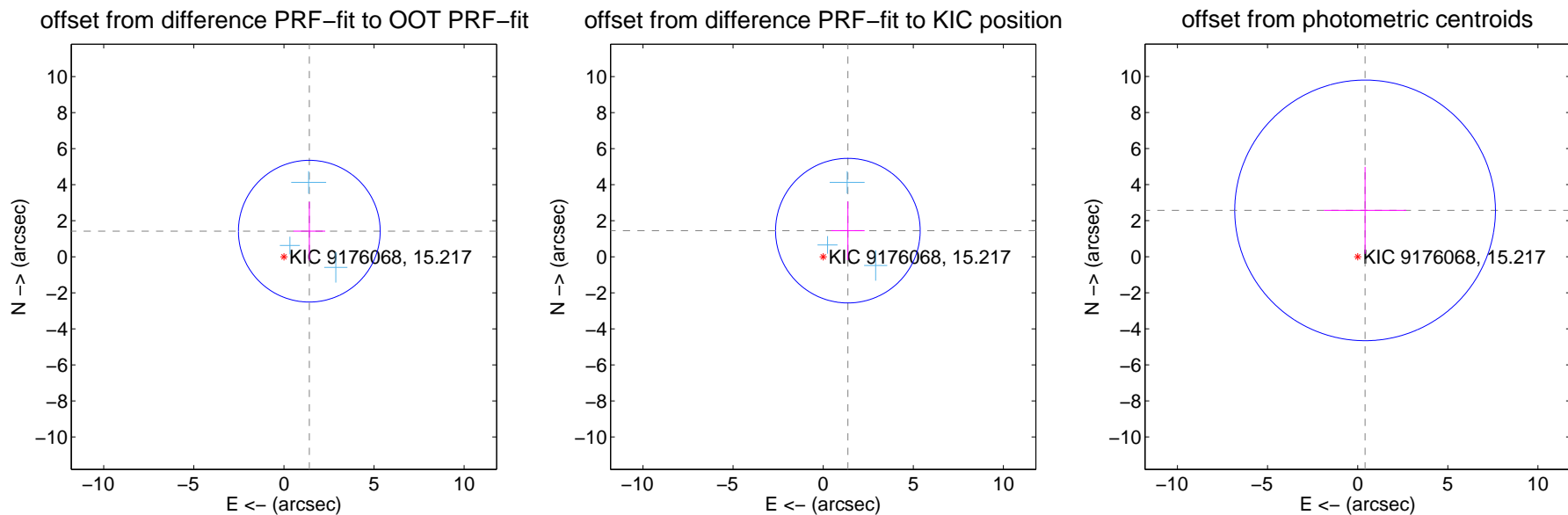
DV Centroid Data

Supplemental centroid analysis for 009176068-01. Kepler magnitude: 15.22. Transit SNR 7.14

There are 3 quarters with good PRF difference image offsets

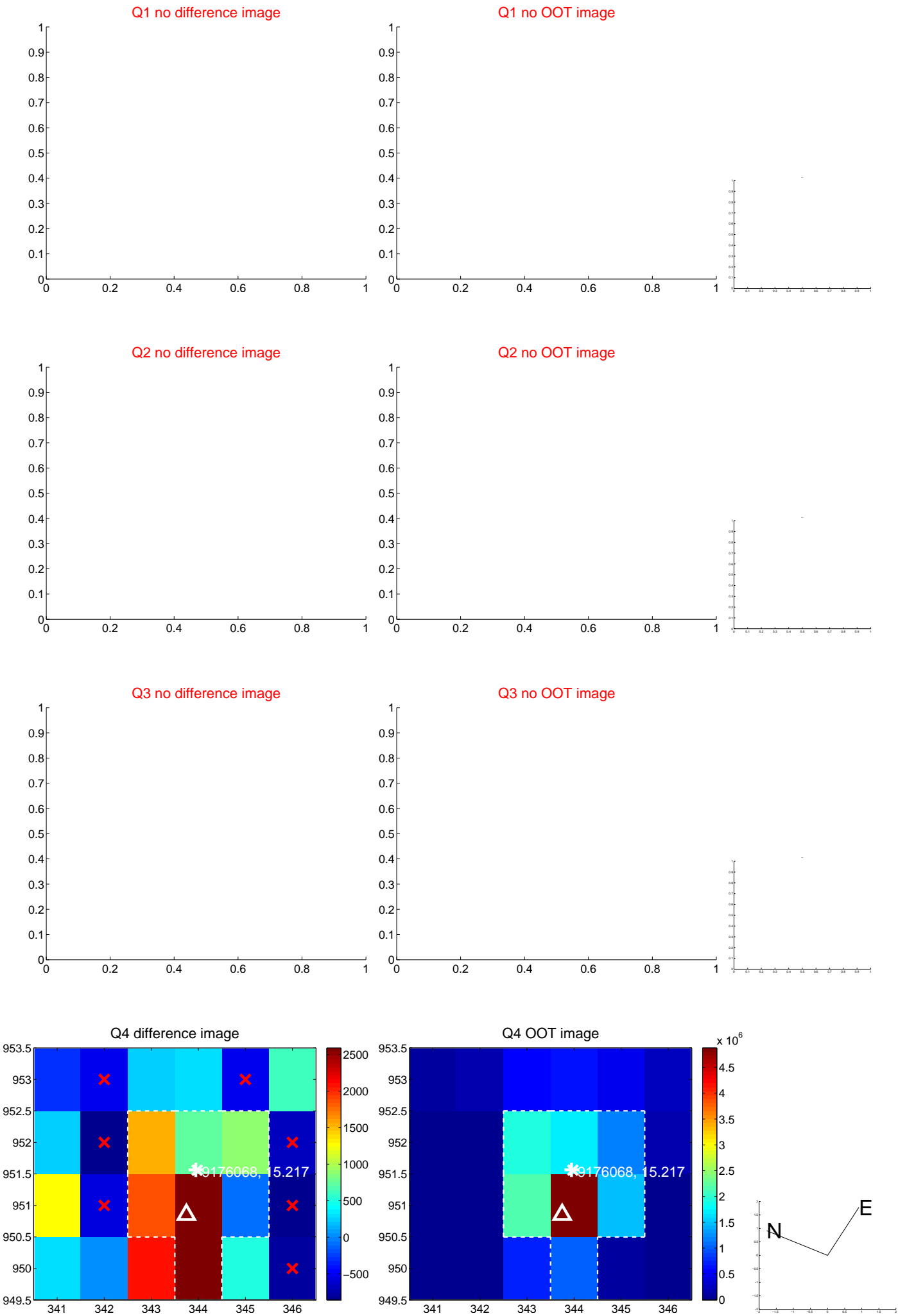
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.001 ± 1.311	1.53	-1.409 ± 0.885	1.421 ± 1.625
PRF-fit source offset from KIC position	1.995 ± 1.338	1.49	-1.370 ± 0.928	1.450 ± 1.618
photometric centroid source offset	2.60 ± 2.41	1.08	-0.41 ± 2.29	2.57 ± 2.41



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.

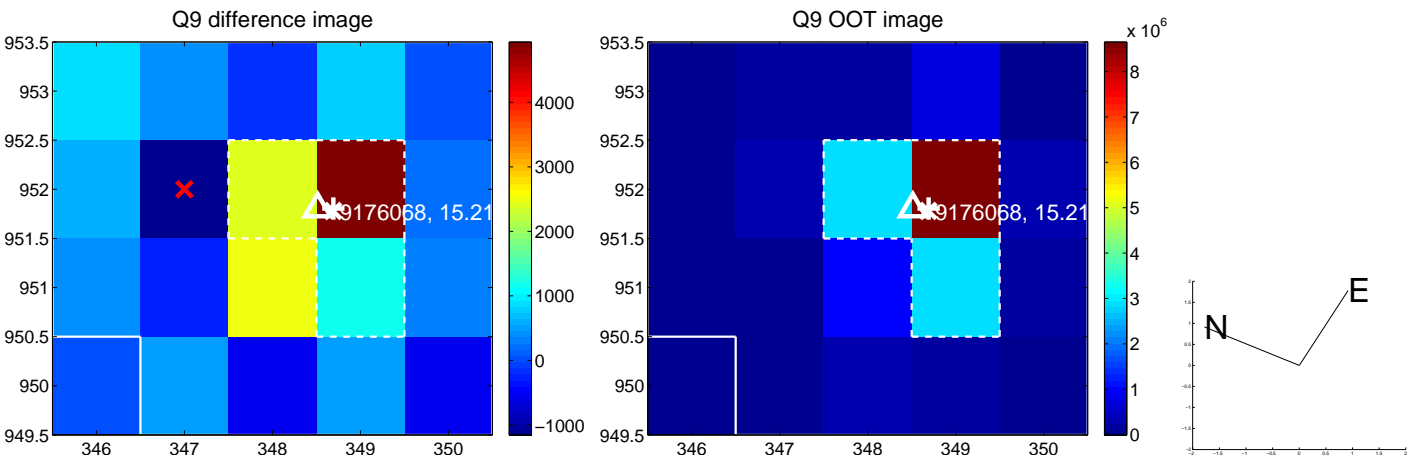
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



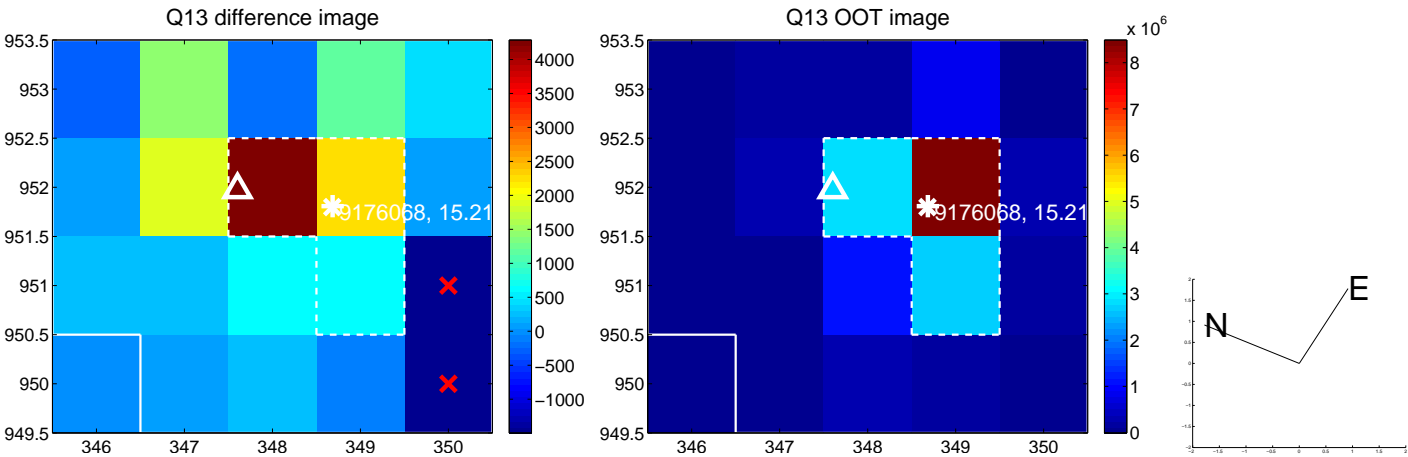
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



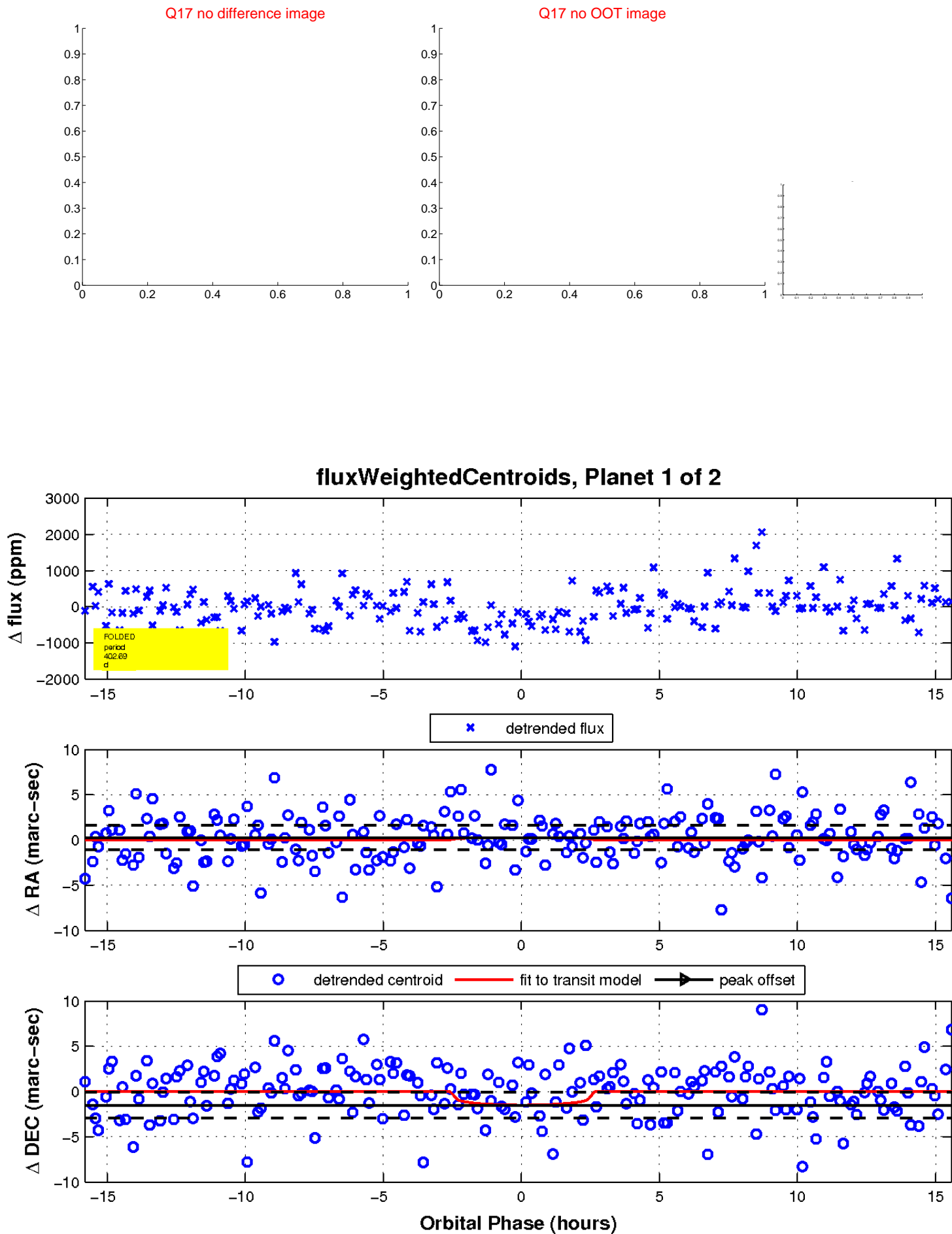
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

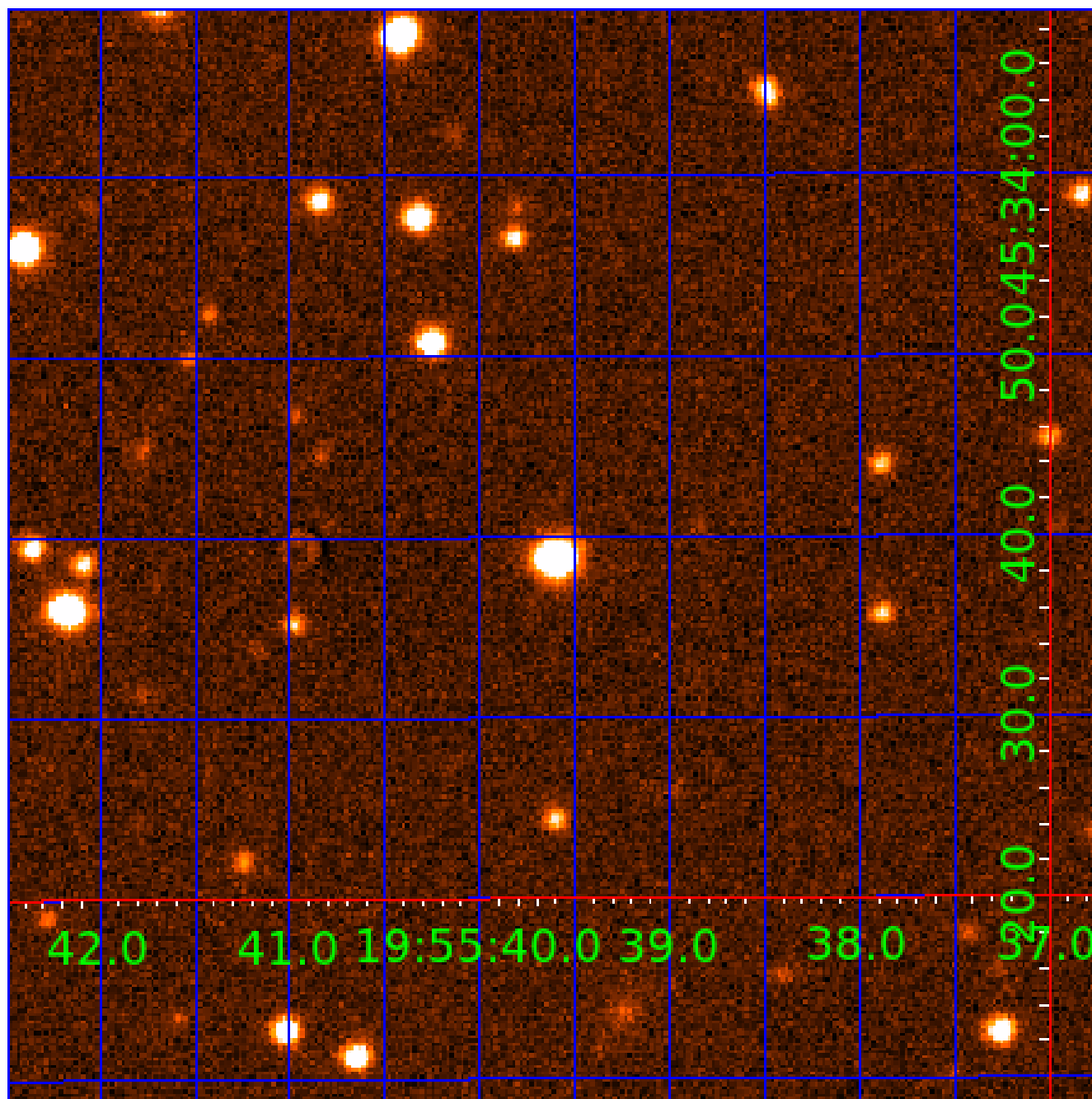


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009176068

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})
009176068-01	OBS	No	402.690292	434.158088	596.4	5.280	7.3	7.1	0.86	5433	2.28	0.60
009176068-02	OBS	No	571.417505	214.629744	646.0	10.262	7.8	8.7	0.86	5433	2.27	0.38

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009176068-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009176068-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_MEAS

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

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

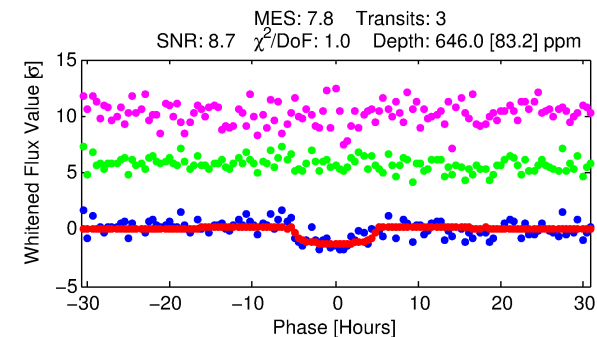
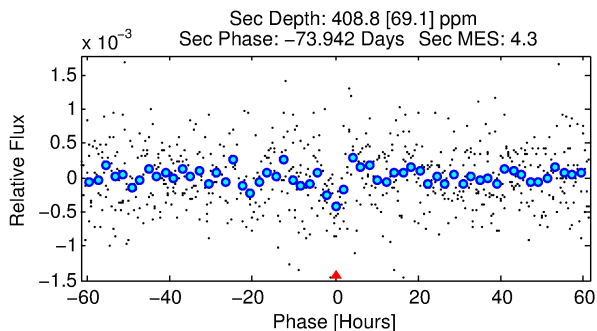
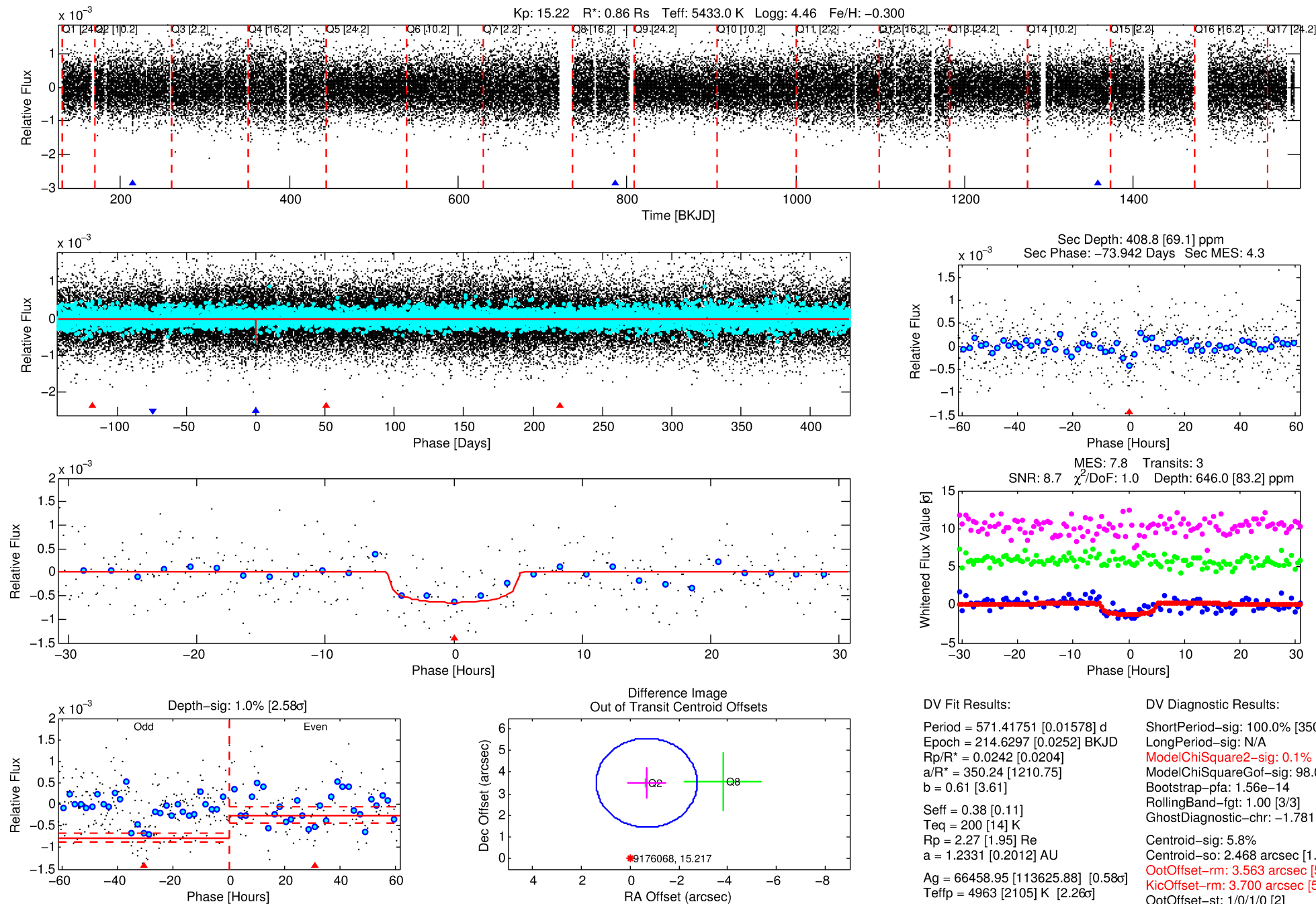
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009176068-02

No Significant Match Found

DV One-Page Summary

KIC: 9176068 Candidate: 2 of 2 Period: 571.418 d



DV Fit Results:

Period = 571.41751 [0.01578] d
Epoch = 214.6297 [0.0252] BKJD
Rp/R* = 0.0242 [0.0204]
a/R* = 350.24 [1210.75]
b = 0.61 [3.61]
Seff = 0.38 [0.11]
Teq = 200 [14] K
Rp = 2.27 [1.95] Re
a = 1.2331 [0.2012] AU
Ag = 66458.95 [113625.88] [0.58 σ]
Teffp = 4963 [2105] K [2.26 σ]

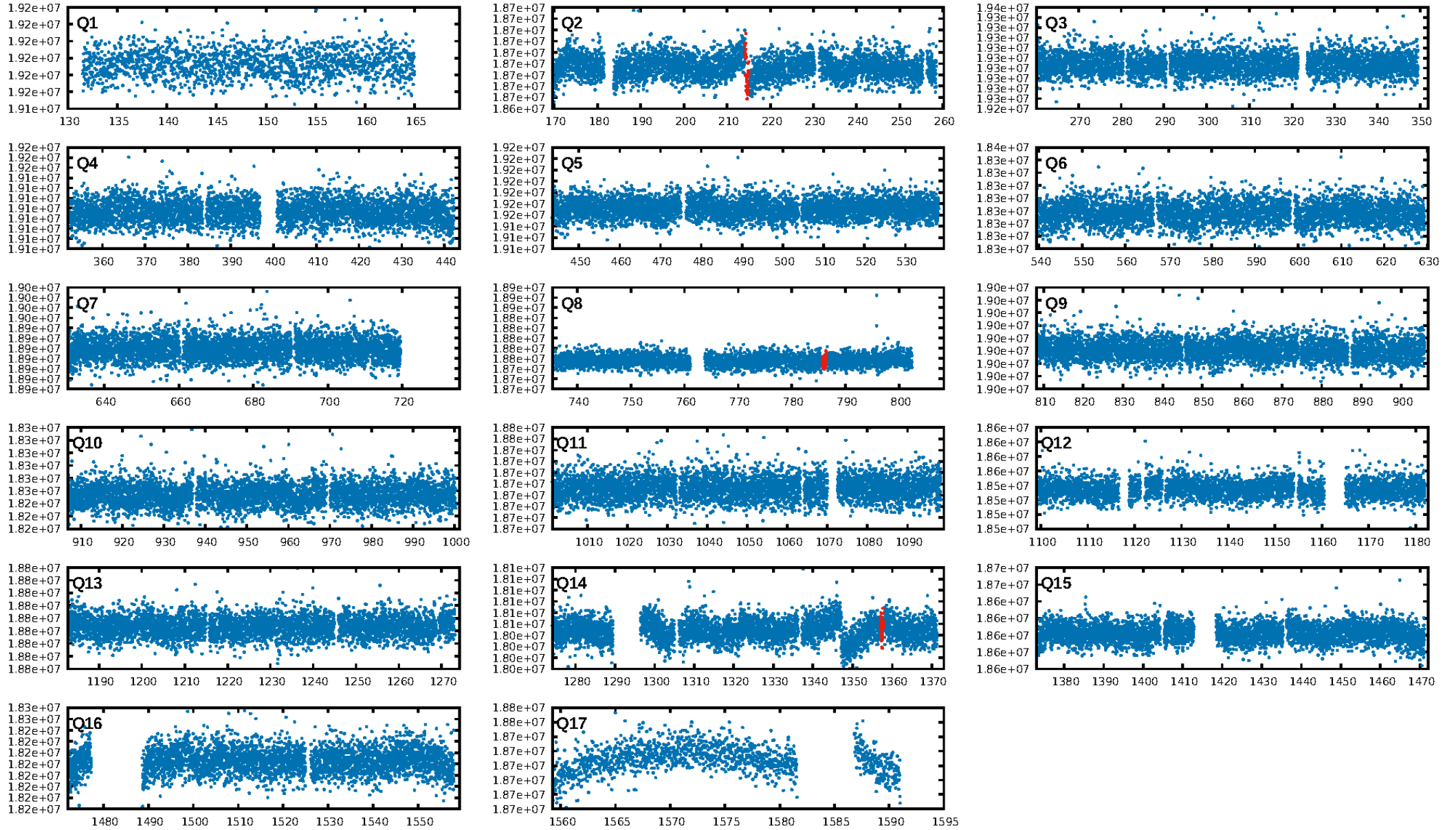
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [350.87 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.1%
ModelChiSquareGof-sig: 98.0%
Bootstrap-pfa: 1.56e-14
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -1.781
Centroid-sig: 5.8%
Centroid-so: 2.468 arcsec [1.28 σ]
OotOffset-rm: 3.563 arcsec [5.16 σ]
KicOffset-rm: 3.700 arcsec [5.36 σ]
OotOffset-st: 1/0/1/0 [2]
KicOffset-st: 1/0/1/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

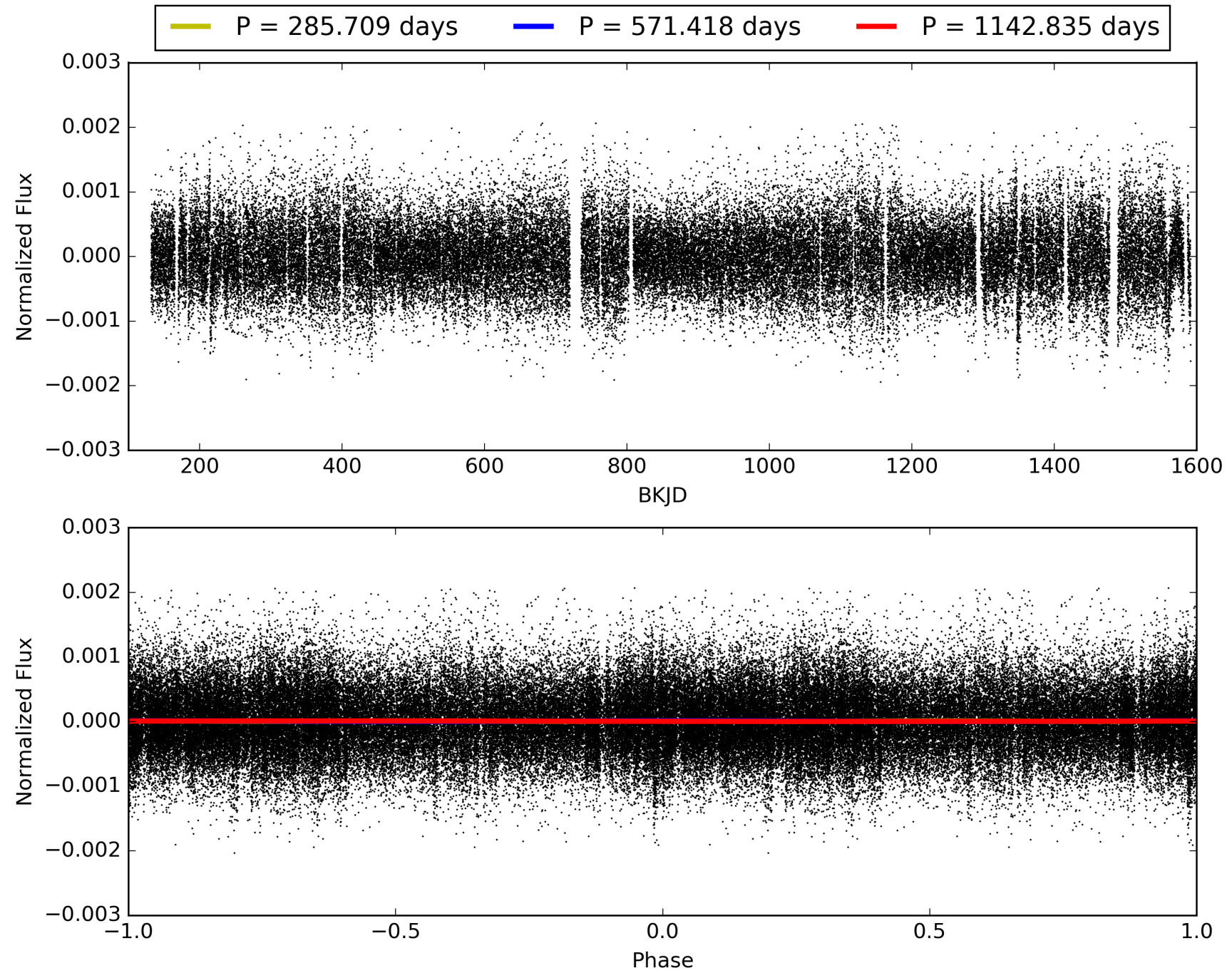
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:37:16 Z

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

TCE 009176068-02, PDC Light Curves

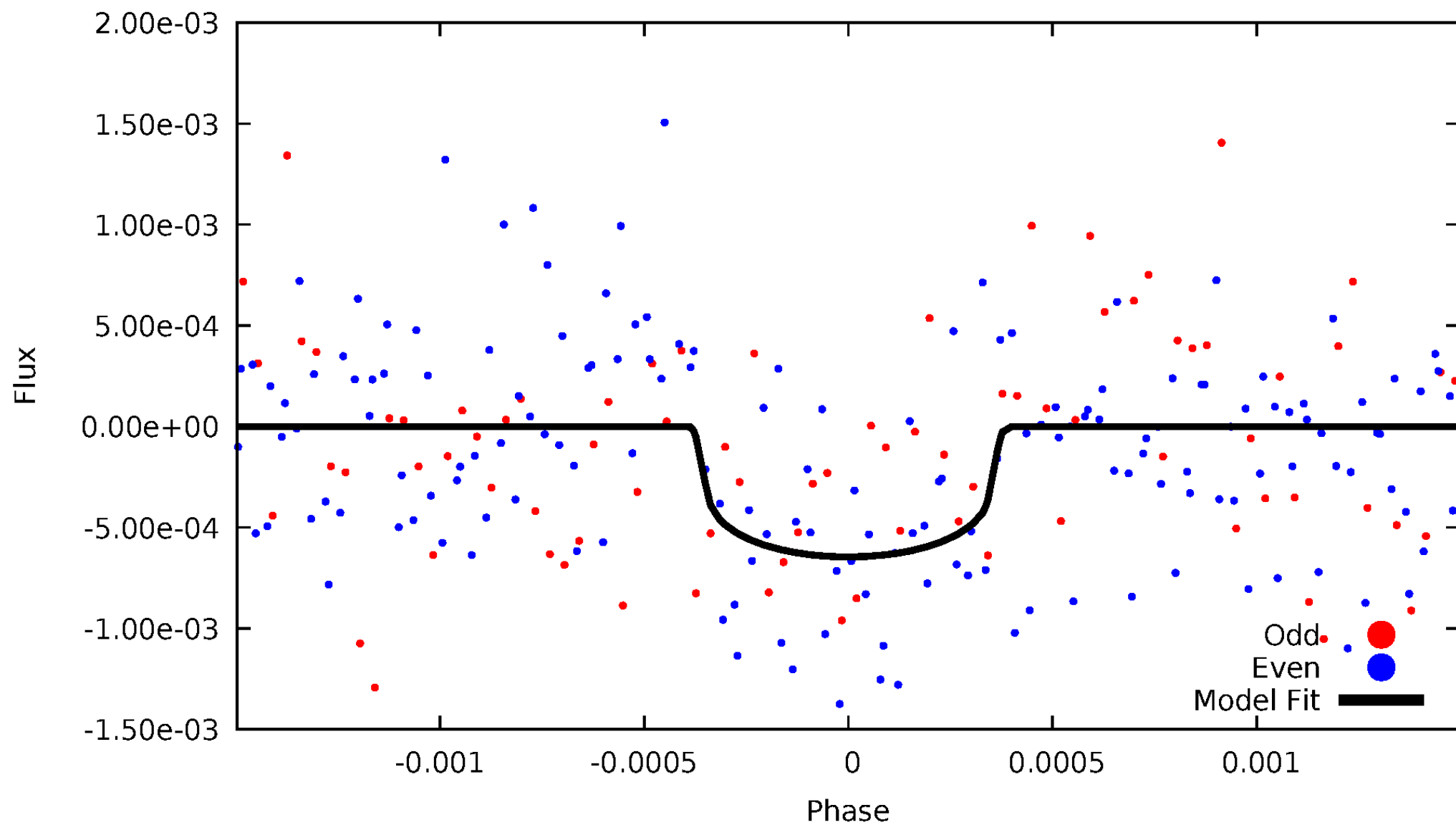


TCE 009176068-02



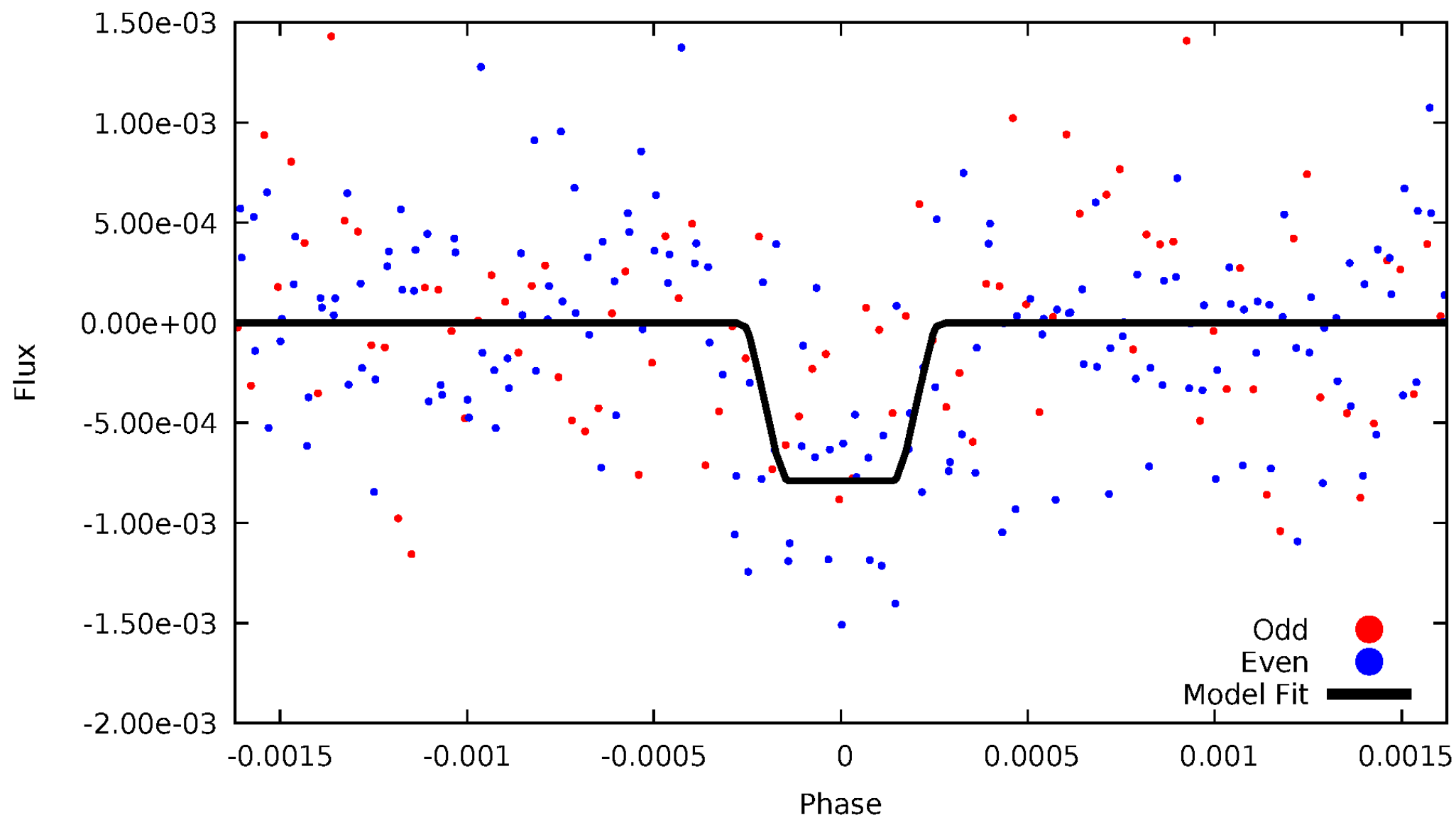
DV Odd/Even

TCE 009176068-02



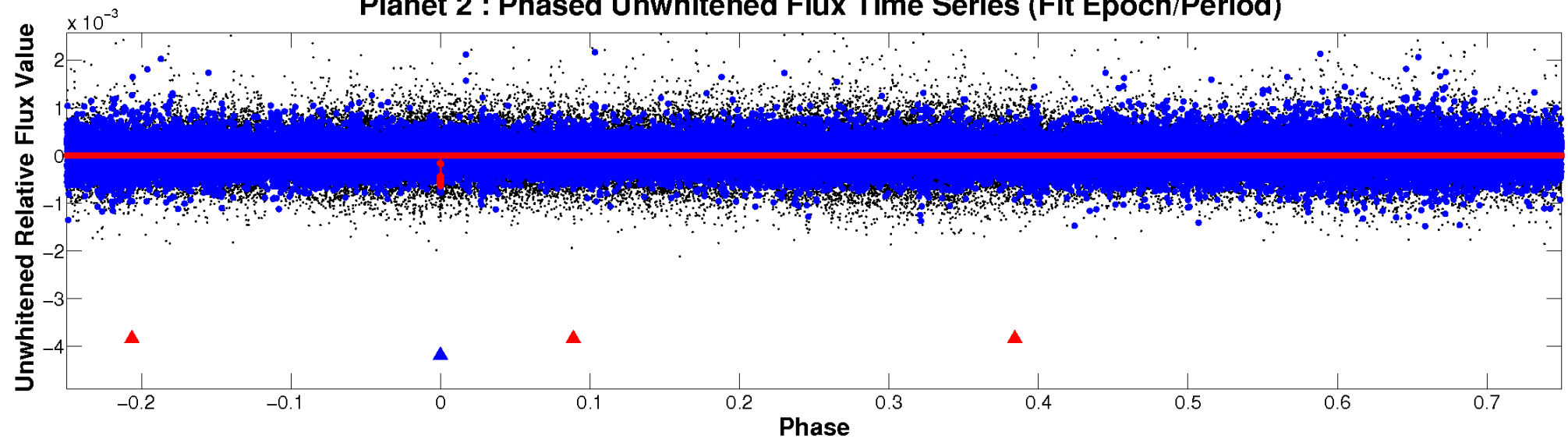
ALT Odd/Even

TCE 009176068-02

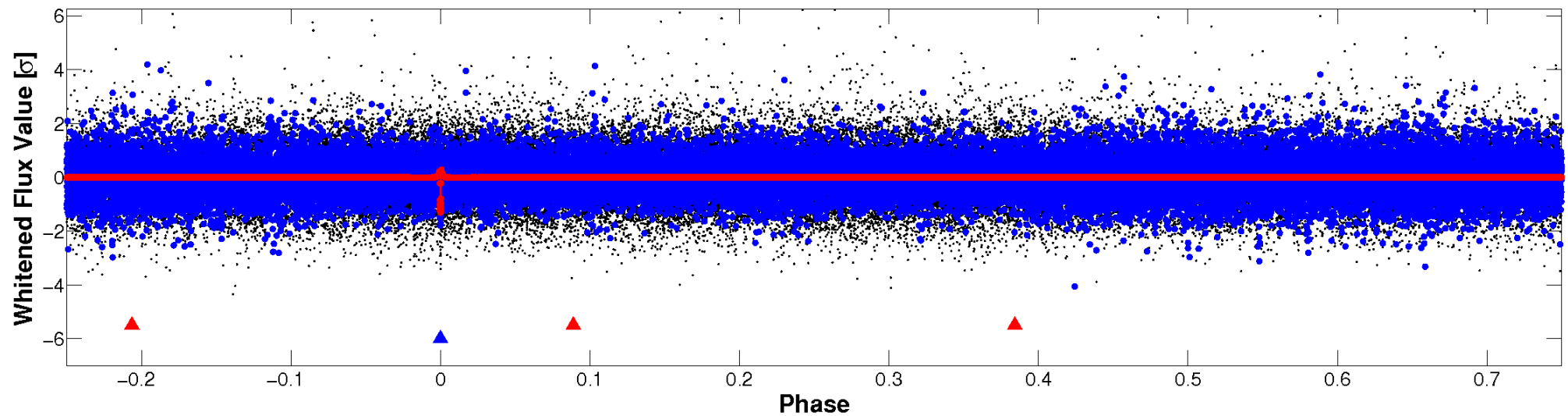


Non-Whitened Vs. Whitened Light Curve

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 009176068-02 P=571.417505 Days $T_0=214.629744$ (BKJD)



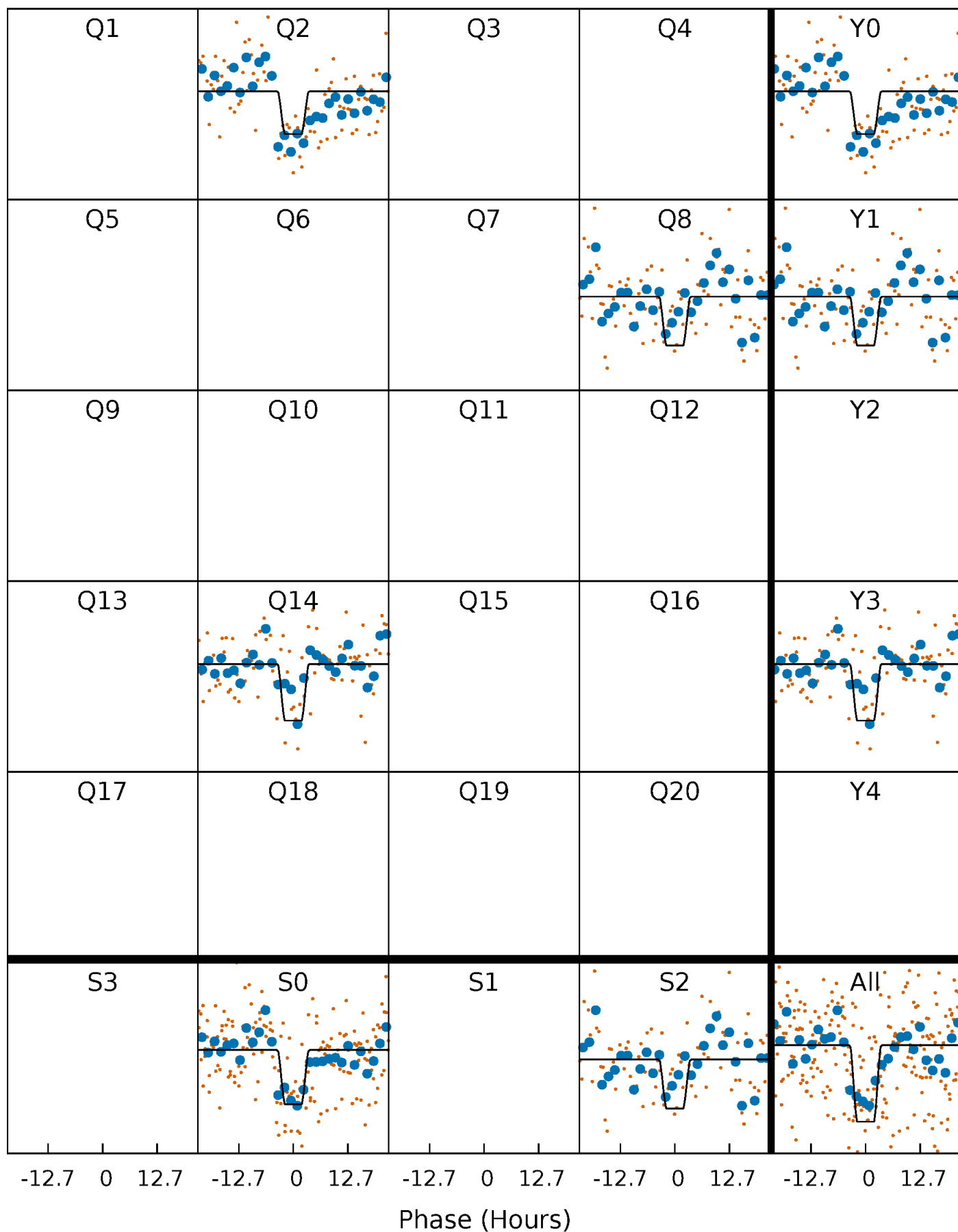
DV Quarter-Phased Transit Curves

TCE 009176068-02 P=571.417505 Days $T_0=214.629744$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

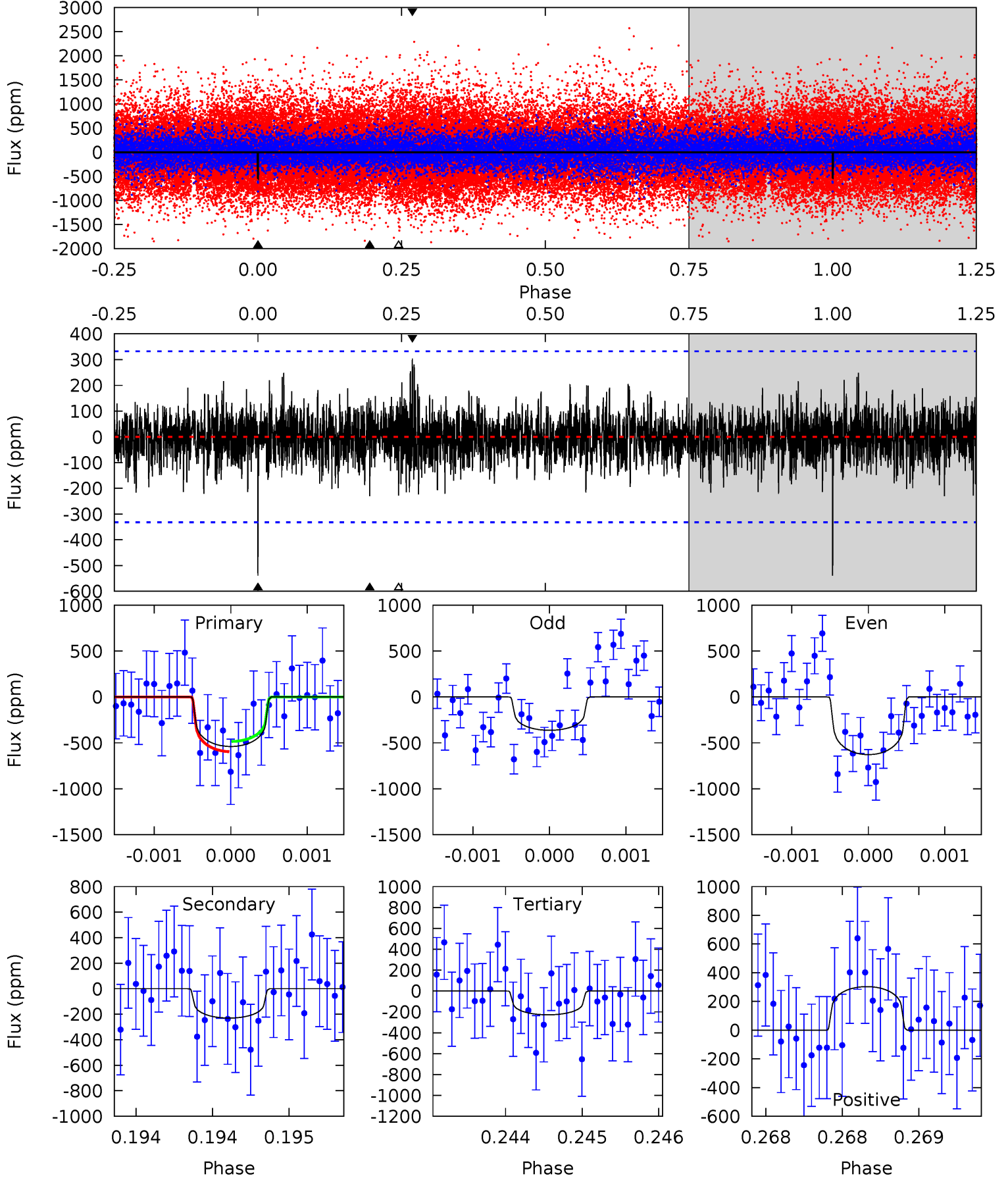
TCE 009176068-02 P=571.424505 Days $T_0=214.616409$ (BKJD)



DV Model-Shift Uniqueness Test

009176068-02, P = 571.417505 Days, E = 214.629744 Days

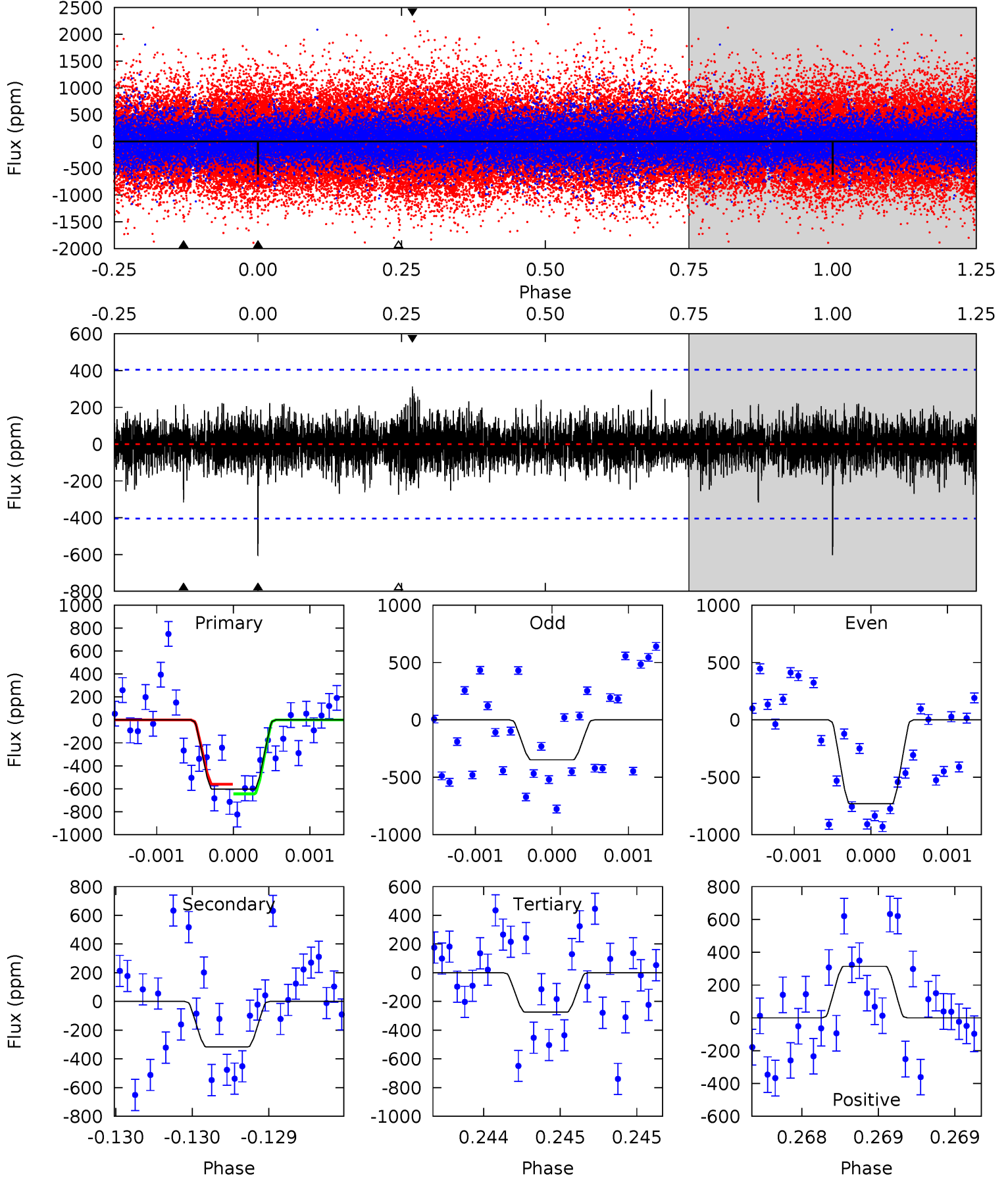
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.93	3.81	3.77	5.02	5.50	3.37	1.10	5.16	3.91	0.04	-1.21	2.11	1.26	0.36	0.92



Alt Model-Shift Uniqueness Test

009176068-02, P = 571.424505 Days, E = 214.616409 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.31	4.35	3.77	4.32	5.57	3.48	1.01	4.53	3.98	0.57	0.03	2.53	1.34	0.34	0.58



Stellar Parameters For KIC 009176068

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5433^{+178}_{-162}	$4.455^{+0.126}_{-0.140}$	$-0.300^{+0.300}_{-0.300}$	$0.858^{+0.158}_{-0.115}$	$0.765^{+0.122}_{-0.052}$	$1.709^{+0.916}_{-0.651}$
	+3%/-3%	+3%/-3%	+100%/-100%	+18%/-13%	+16%/-7%	+54%/-38%
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 009176068-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-230 ± 60	$2.56^{+1.99}_{-1.49}$	280^{+17}_{-16}	4269^{+1933}_{-810}	$29995^{+133131}_{-21220}$
Alt.	-316 ± 73	$2.93^{+1.92}_{-1.73}$	280^{+17}_{-14}	4356^{+2074}_{-712}	$32351^{+158988}_{-21005}$

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

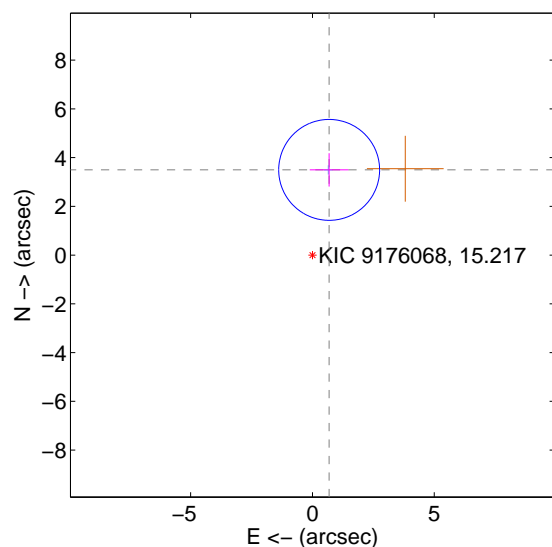
Supplemental centroid analysis for 009176068-02. Kepler magnitude: 15.22. Transit SNR 8.68

There are 1 quarters with good PRF difference image offsets

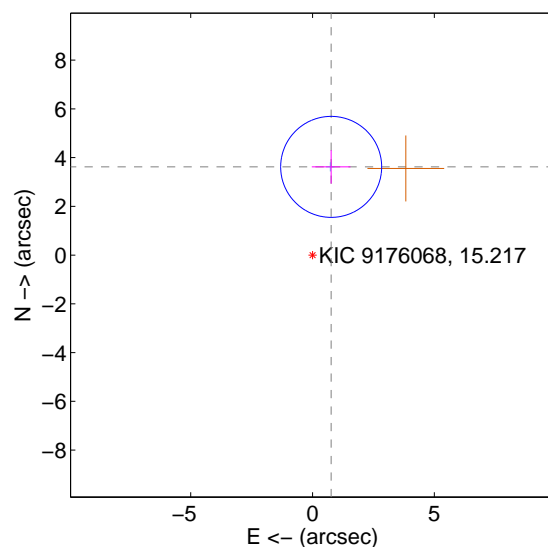
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.563 ± 0.690	5.16	-0.686 ± 0.794	3.496 ± 0.686
PRF-fit source offset from KIC position	3.700 ± 0.691	5.36	-0.765 ± 0.794	3.620 ± 0.686
photometric centroid source offset	2.47 ± 1.94	1.28	-0.67 ± 1.77	2.38 ± 1.95

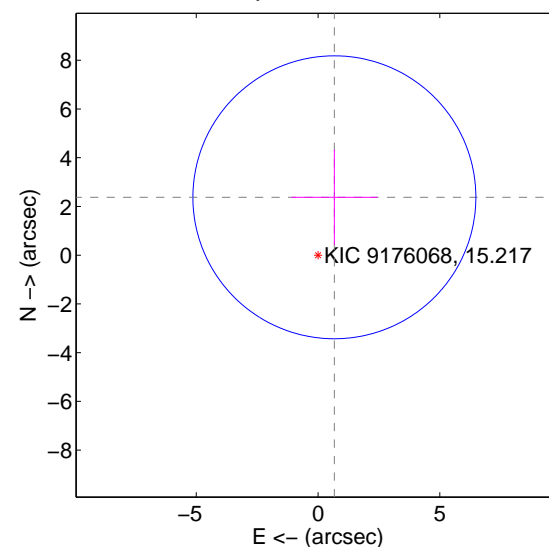
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

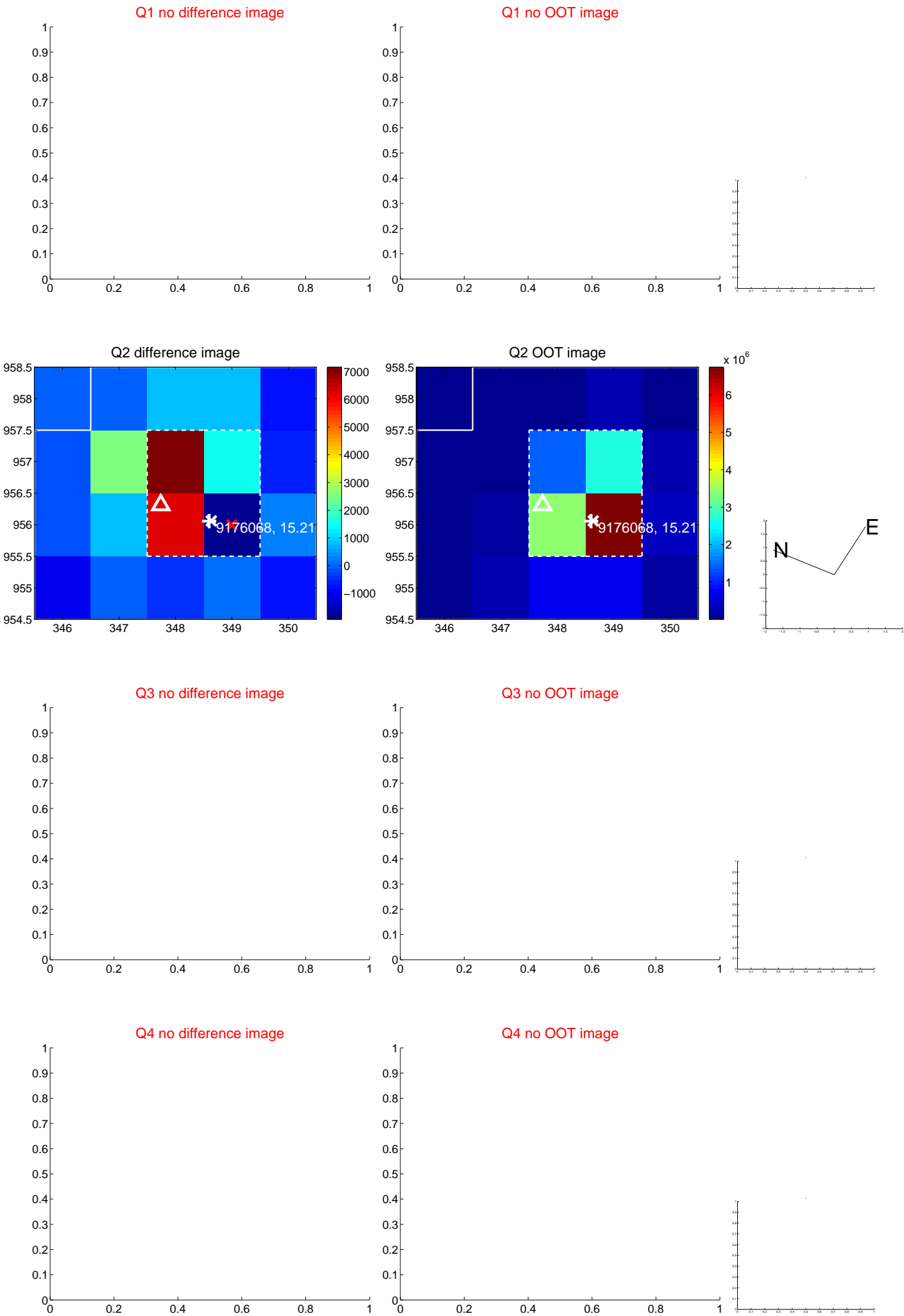


offset from photometric centroids

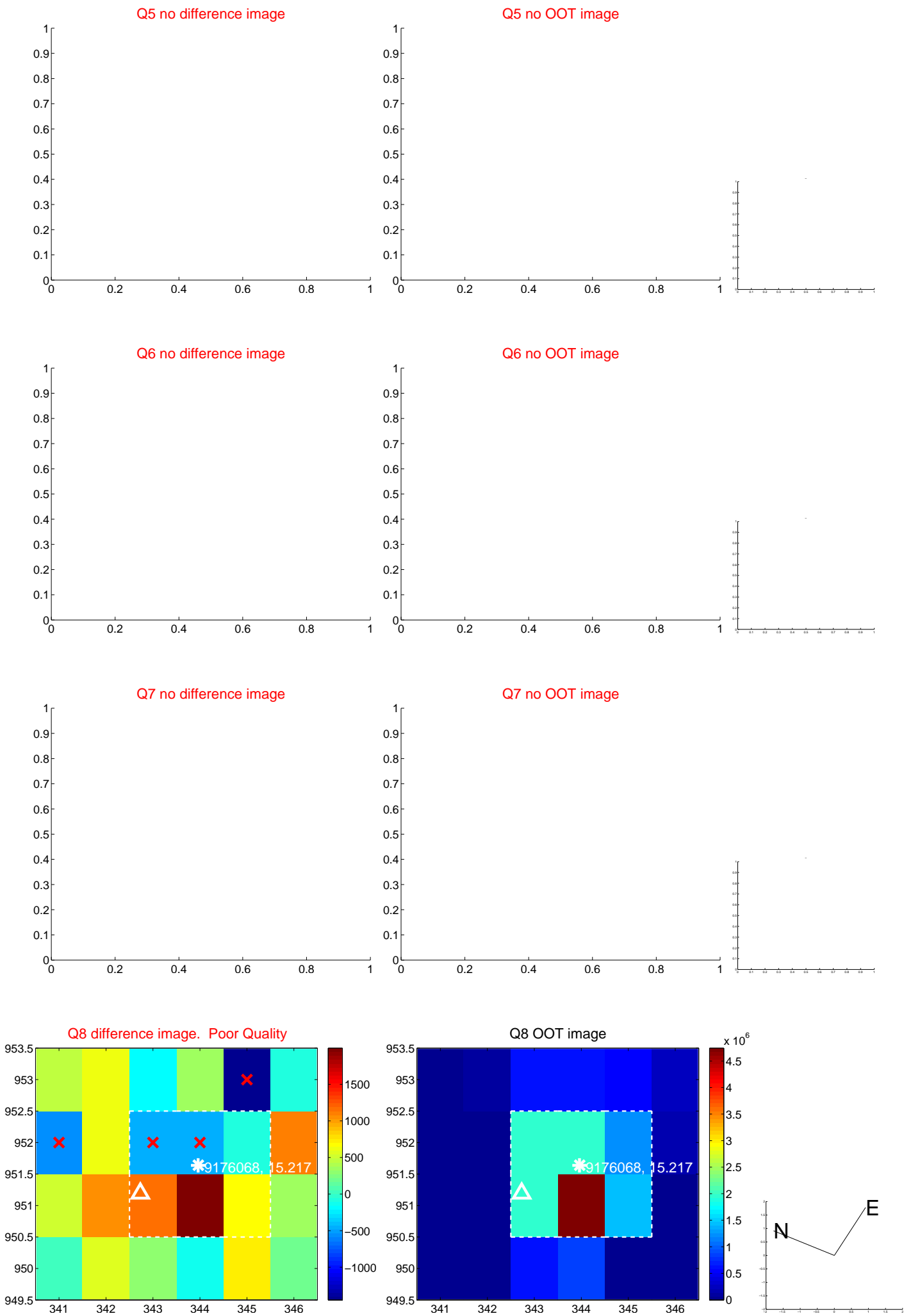


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



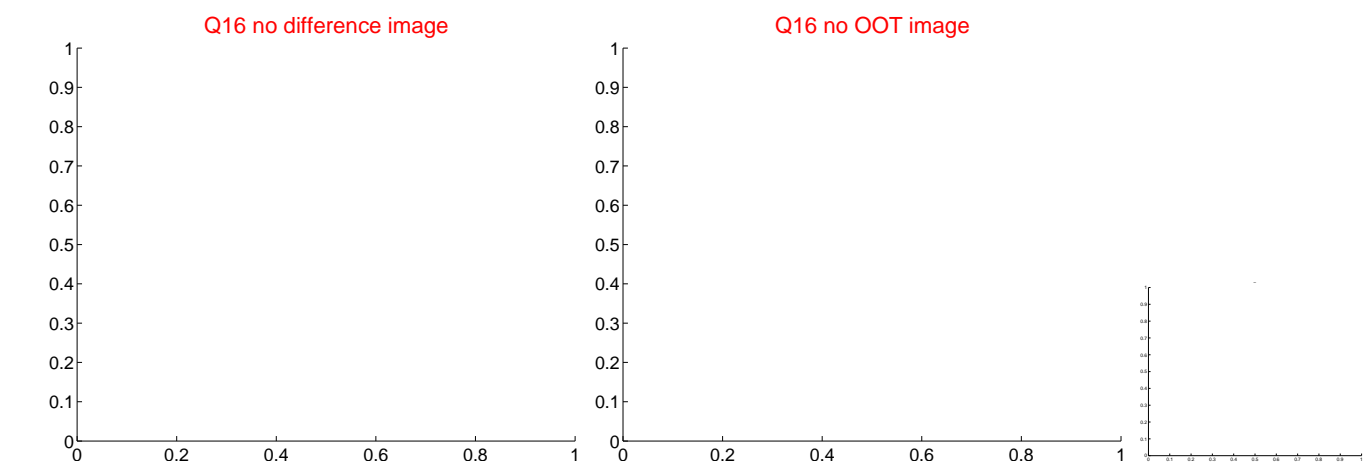
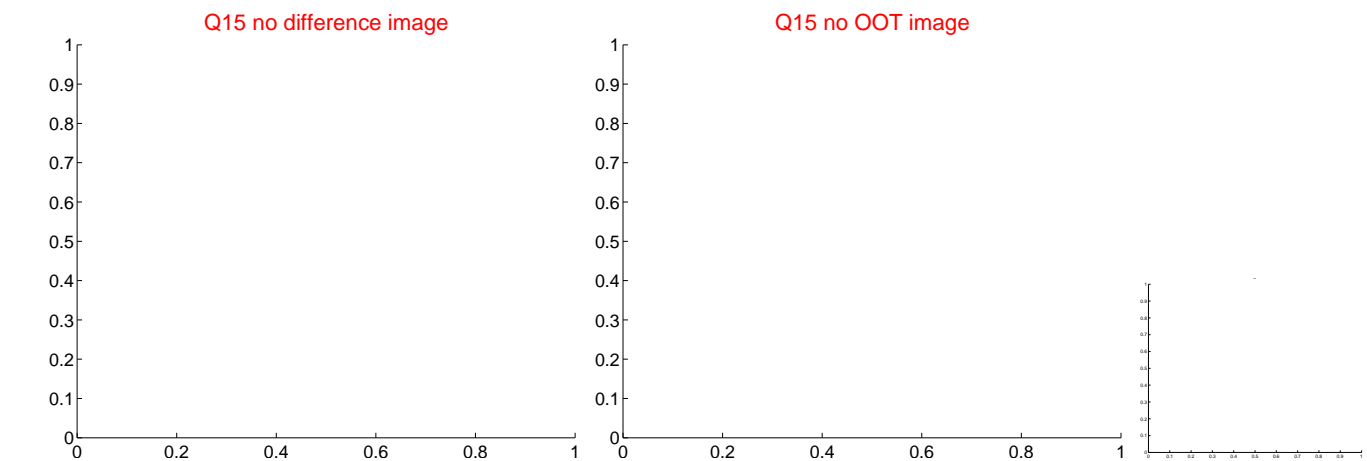
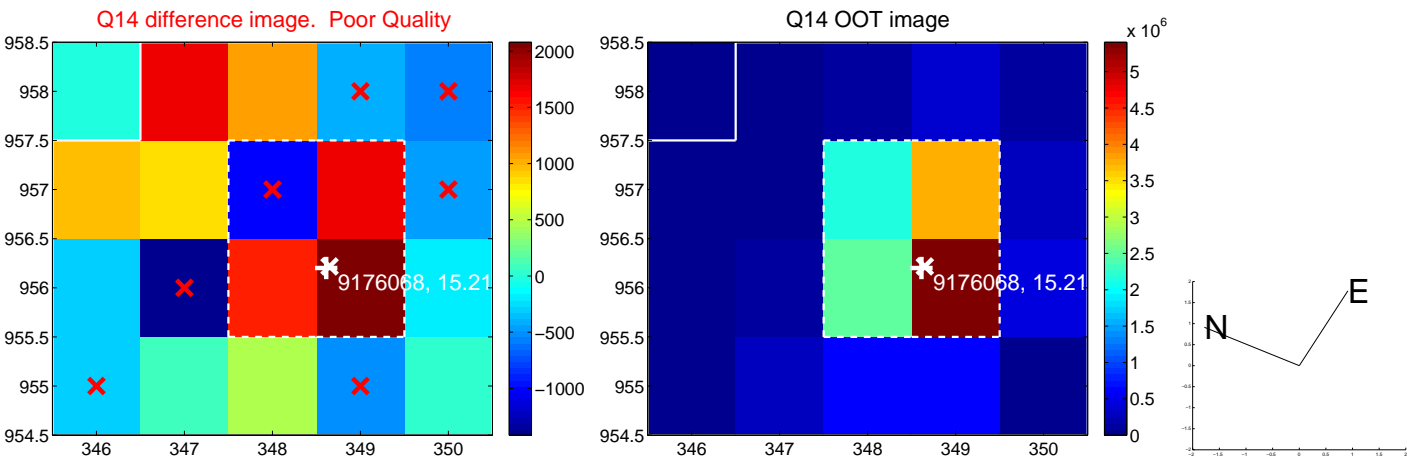
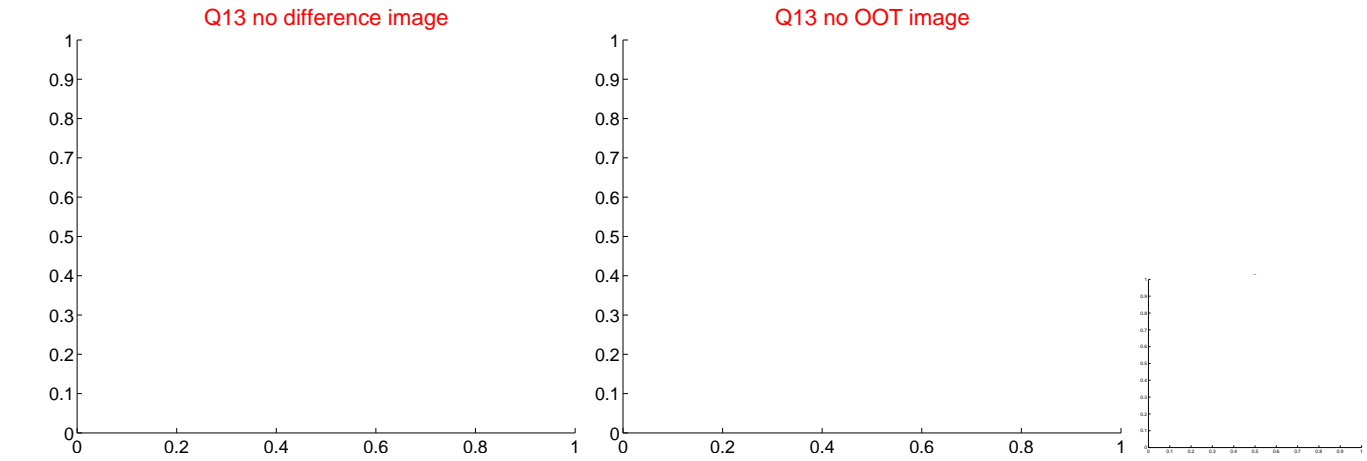
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



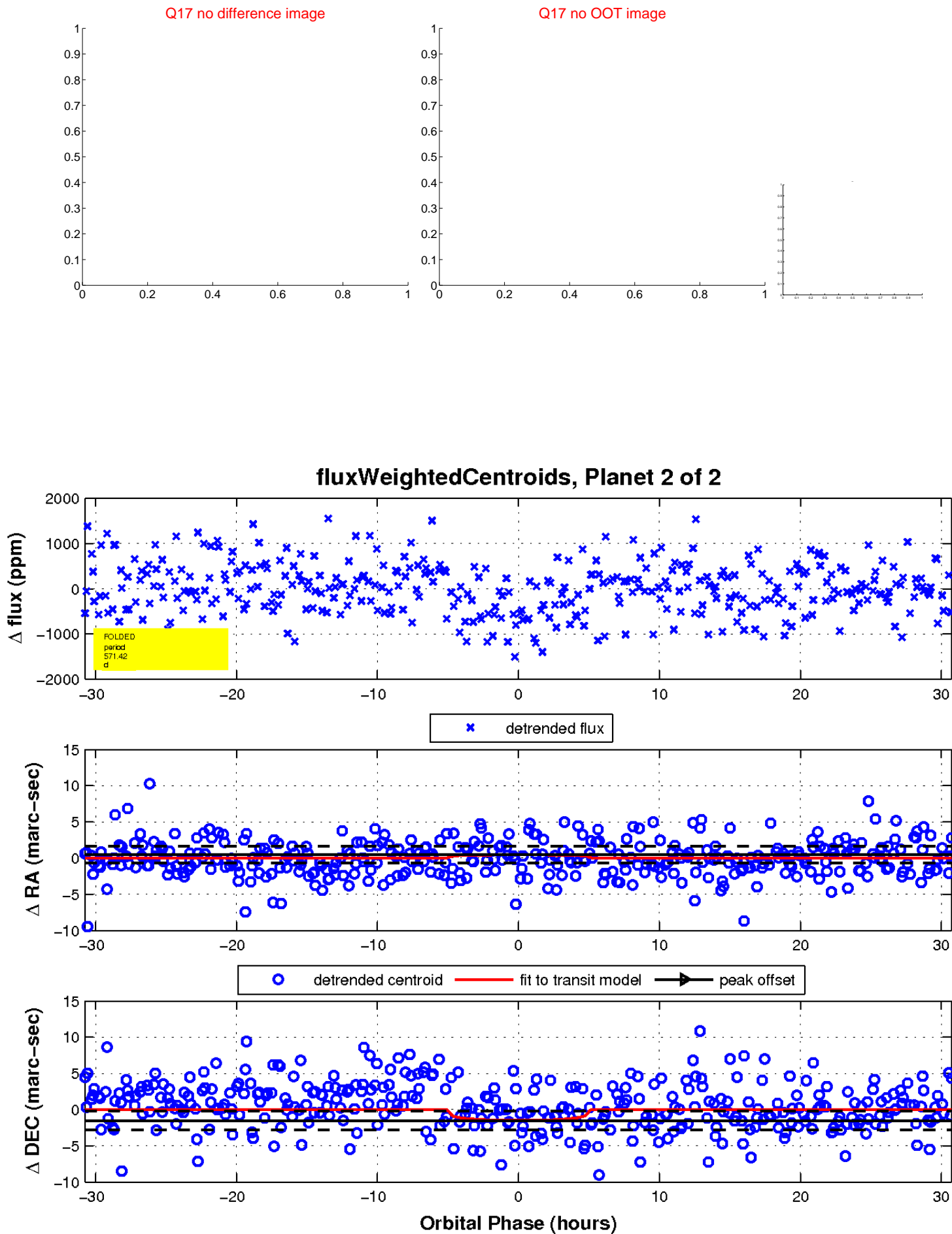
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



UKIRT Image

Declination

