

KIC 009413816

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})
009413816-01	OBS	No	1.596843	131.834525	182.8	6.000	8.7	-1.0	1.75	7286	2.41	8472.65
009413816-02	OBS	No	323.637315	411.888478	523.9	11.625	8.1	9.4	1.75	7286	5.07	7.12

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413816-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_NOFITS
009413816-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

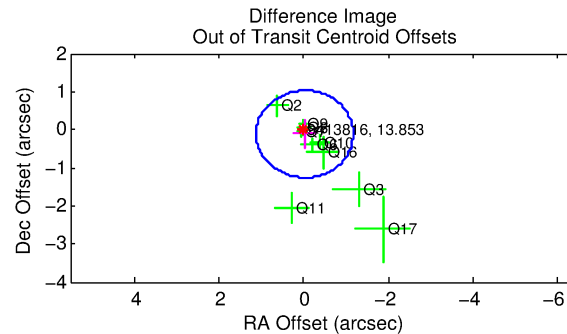
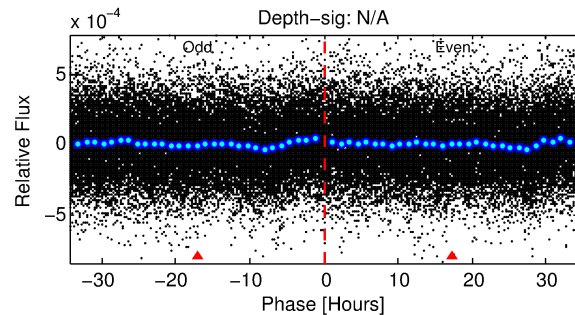
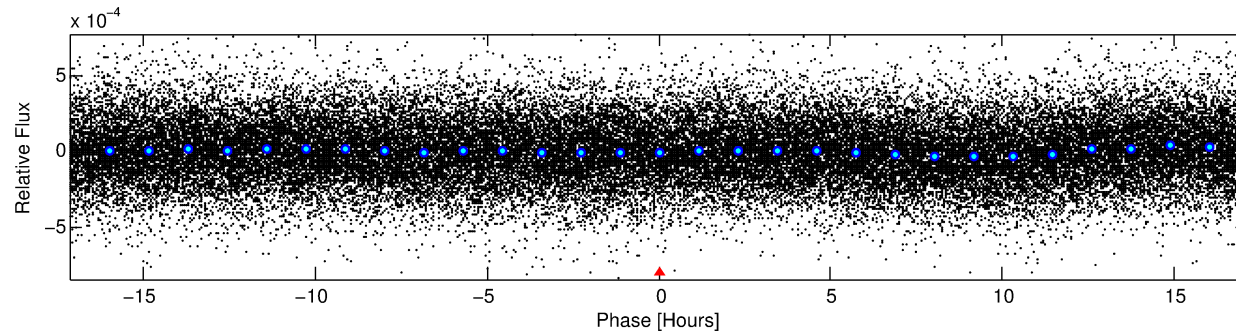
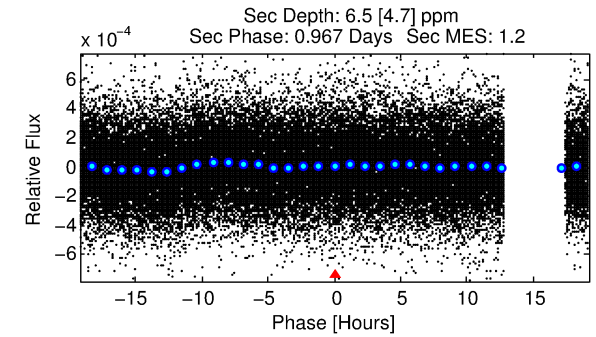
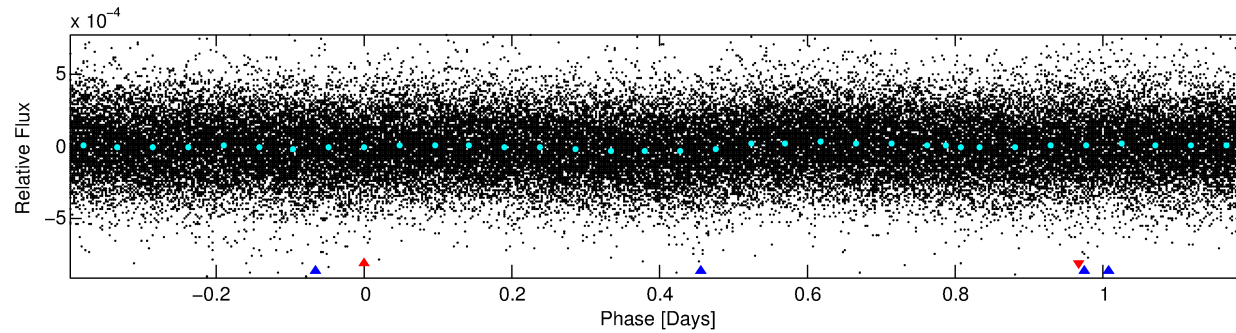
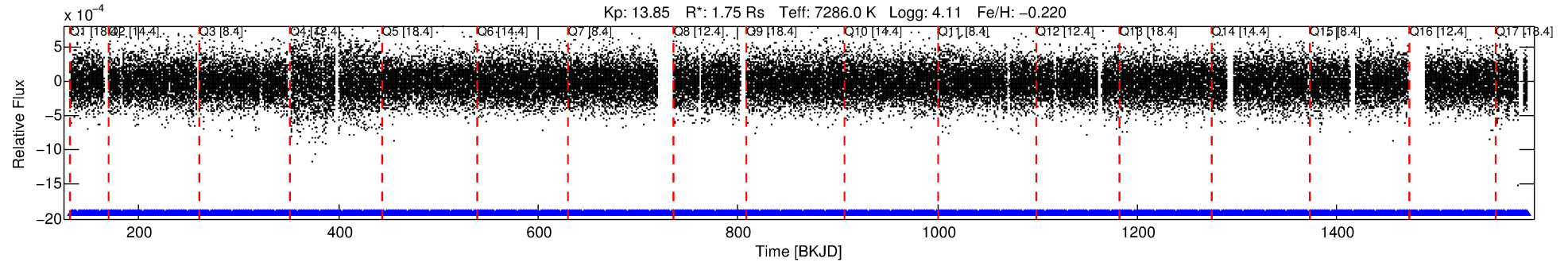
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009413816-01

No Significant Match Found

DV One-Page Summary

KIC: 9413816 Candidate: 1 of 2 Period: 1.597 d



TPS TCE Results:

Period = 1.59684 d
Epoch = 131.8345 BKJD

DV fit results are unavailable

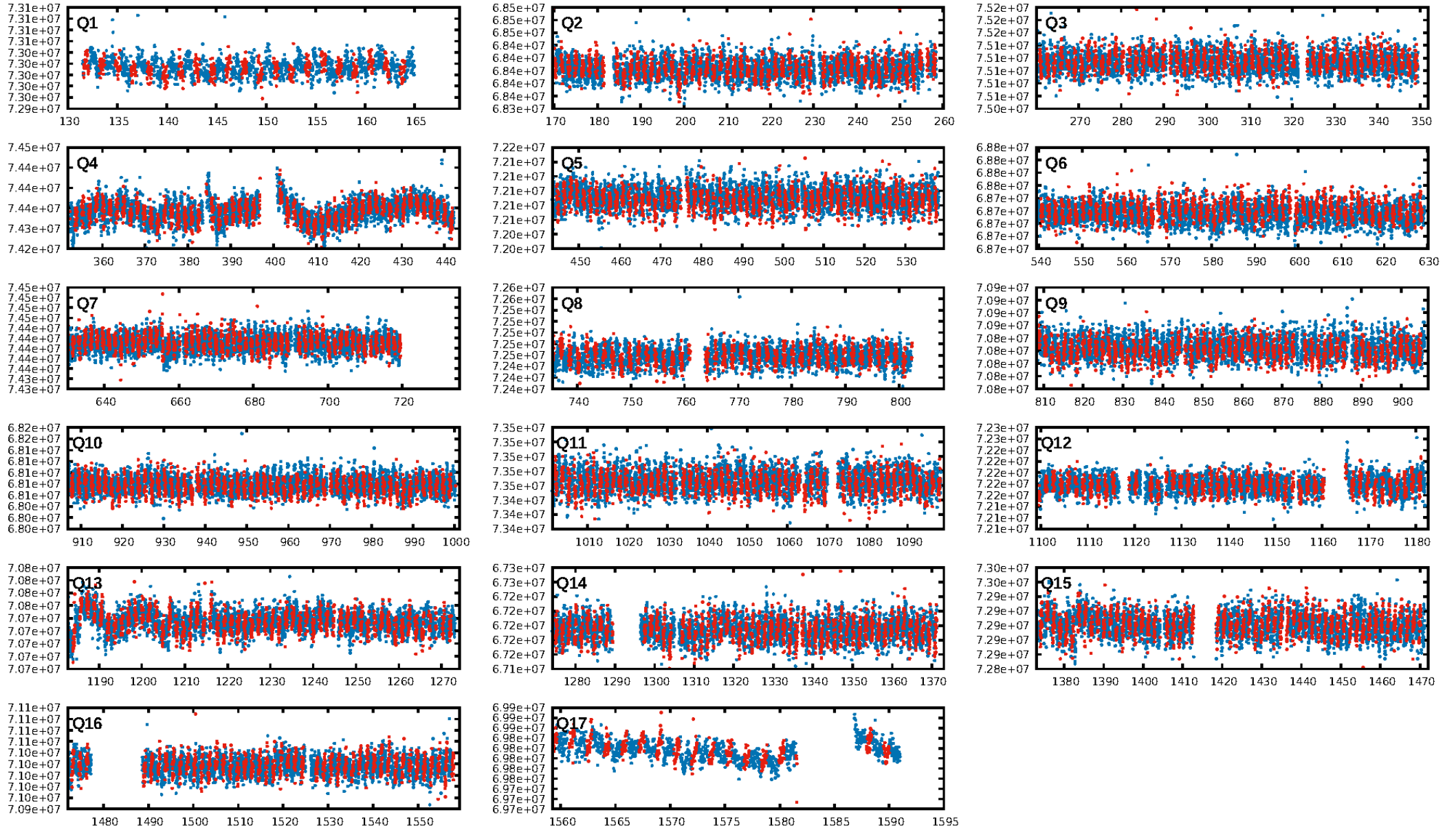
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [590.82σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.49e-14
RollingBand-fgt: 1.00 [805/805]
GhostDiagnostic-chr: 2.944
Centroid-sig: 9.6%
Centroid-so: 0.488 arcsec [0.85σ]
OotOffset-rm: 0.118 arcsec [0.31σ]
KicOffset-rm: 0.083 arcsec [0.26σ]
OotOffset-st: 3/3/2/2 [10]
KicOffset-st: 3/3/2/2 [10]
DiffImageQuality-fgm: 0.90 [9/10]
DiffImageOverlap-fno: 1.00 [17/17]

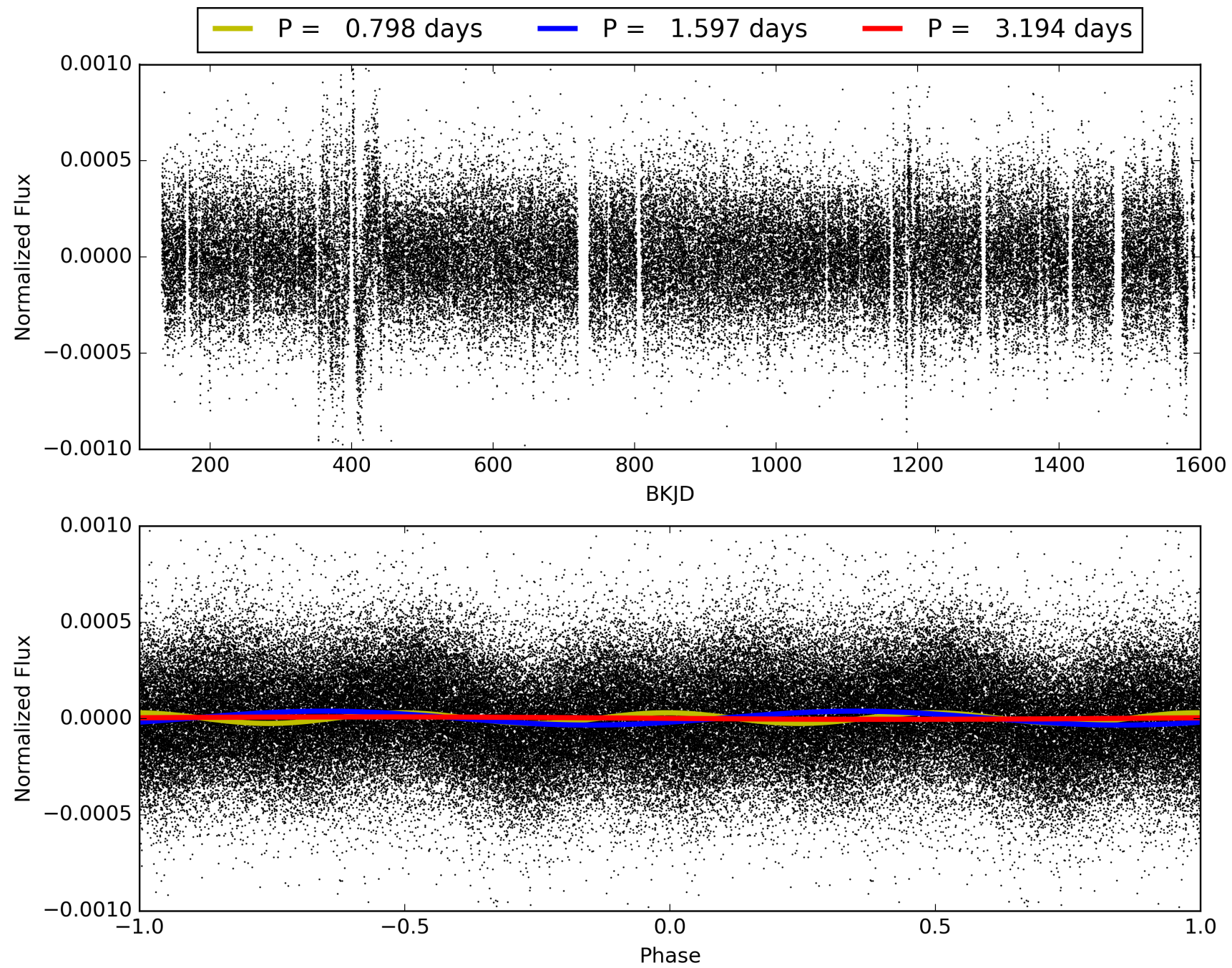
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:35:52 Z

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

TCE 009413816-01, PDC Light Curves

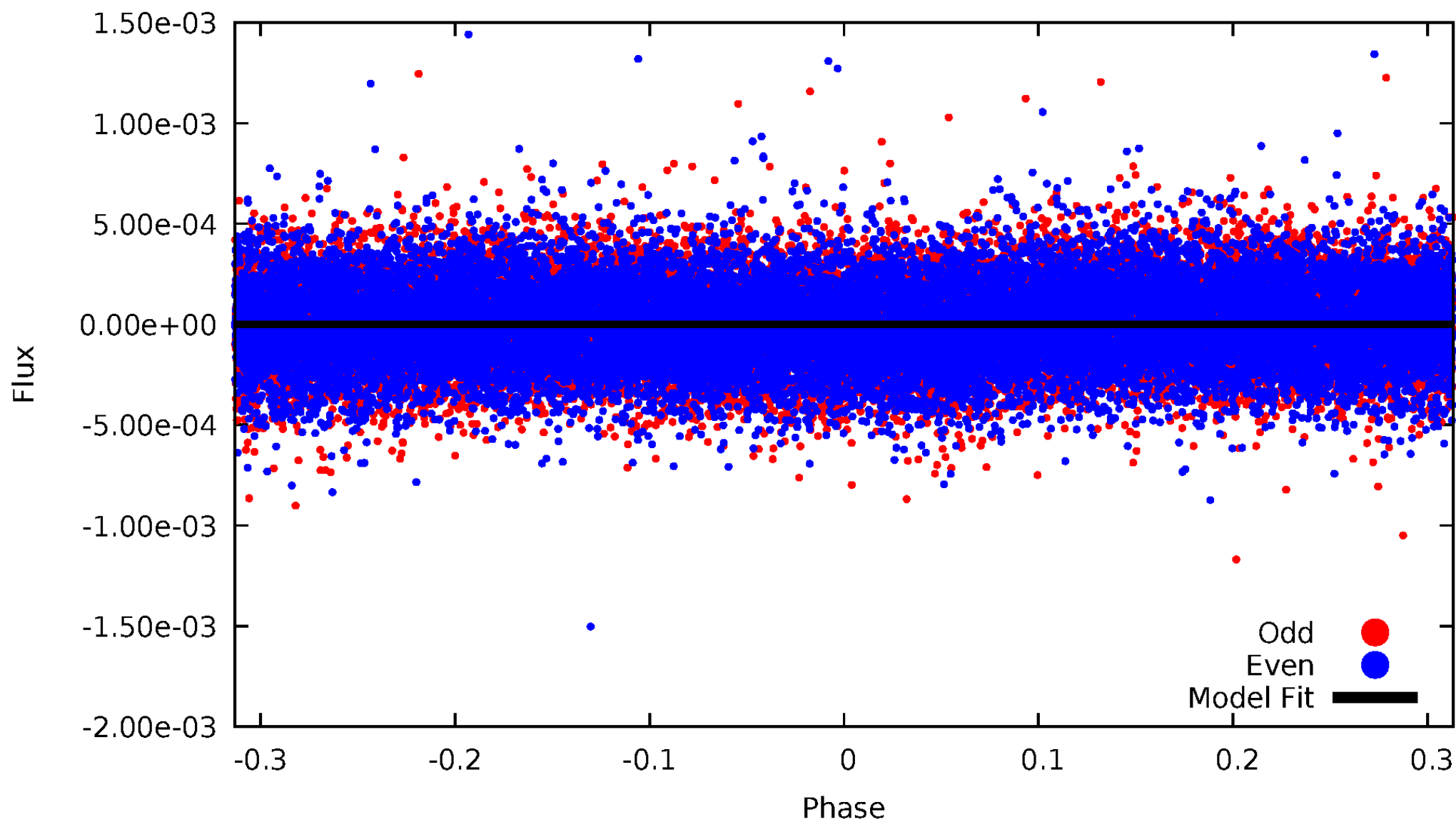


TCE 009413816-01



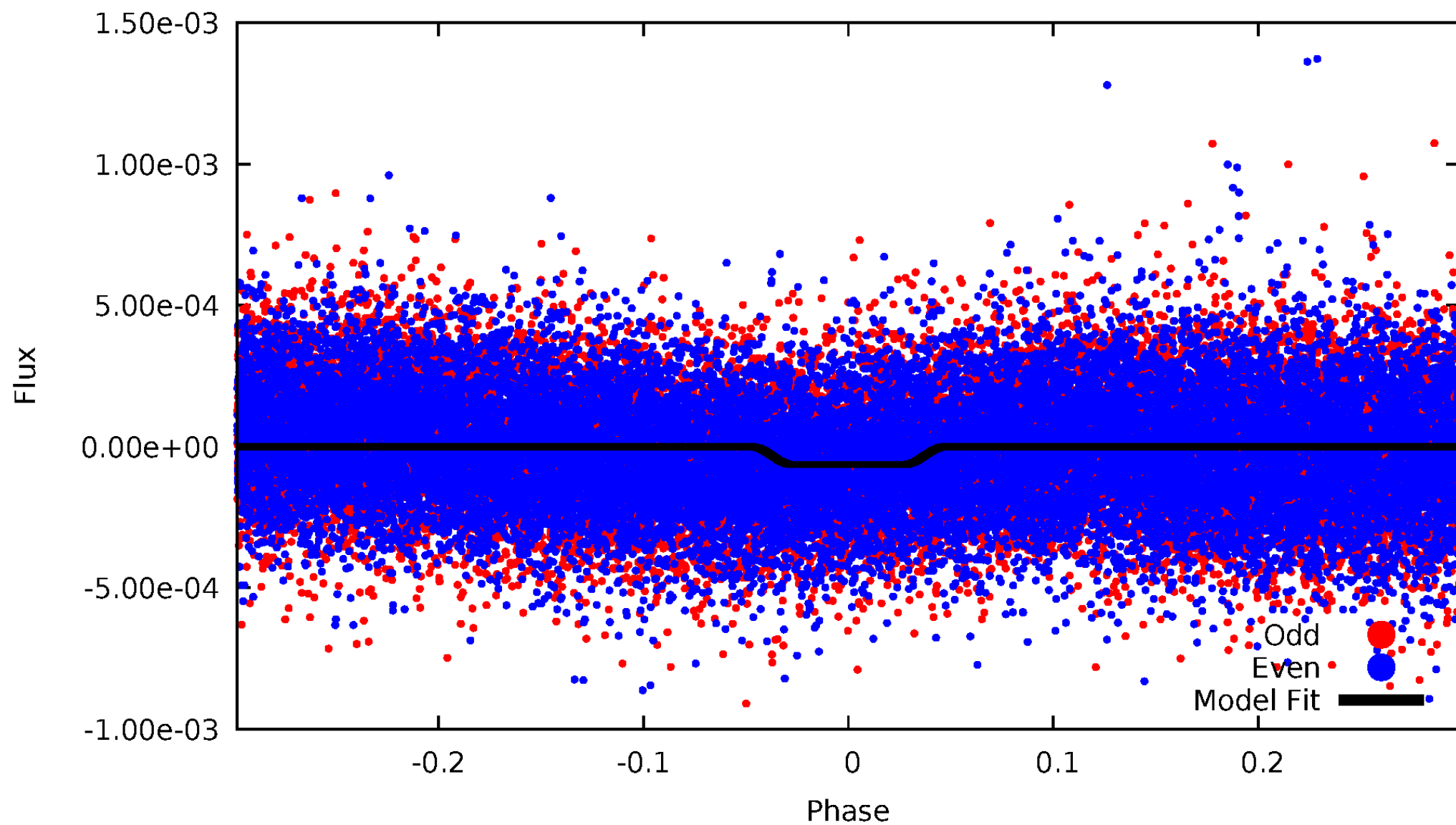
DV Odd/Even

TCE 009413816-01

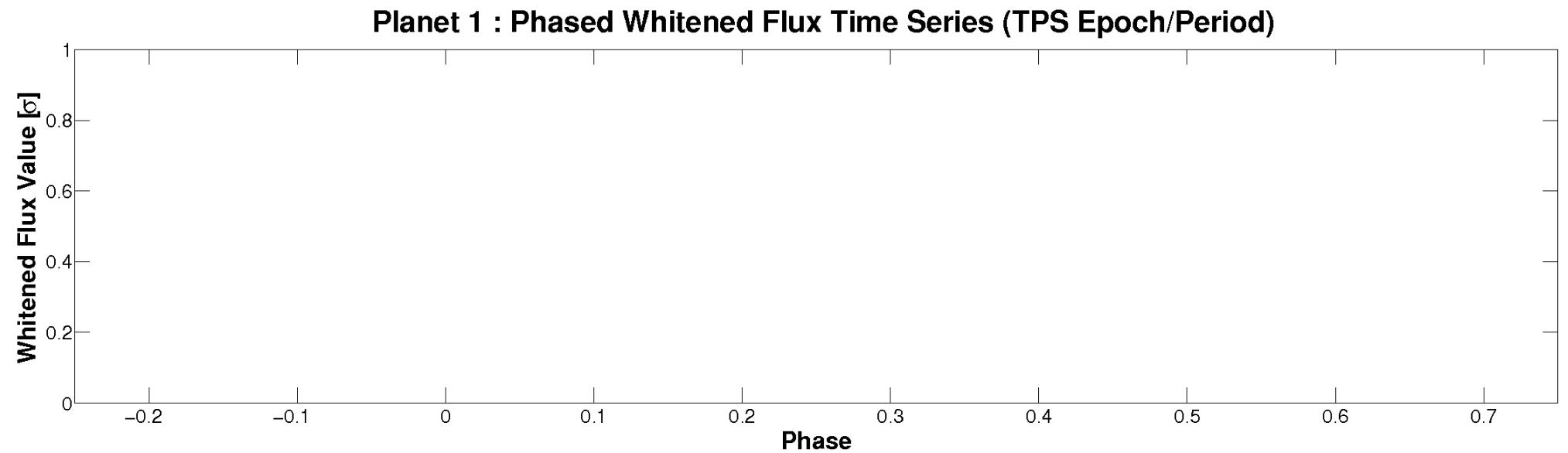
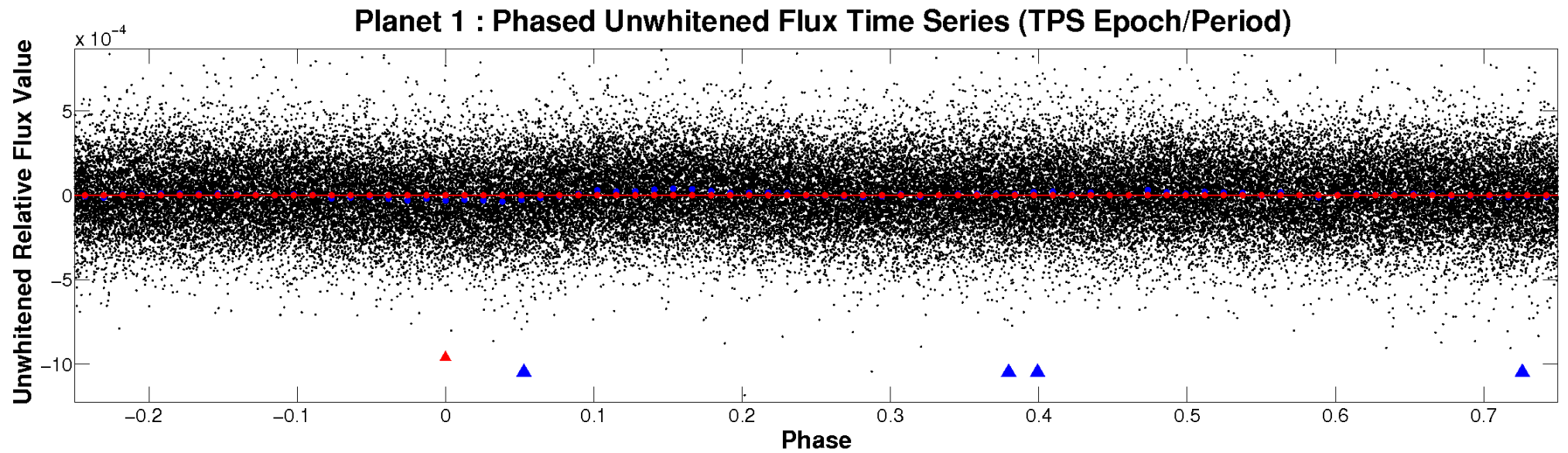


ALT Odd/Even

TCE 009413816-01

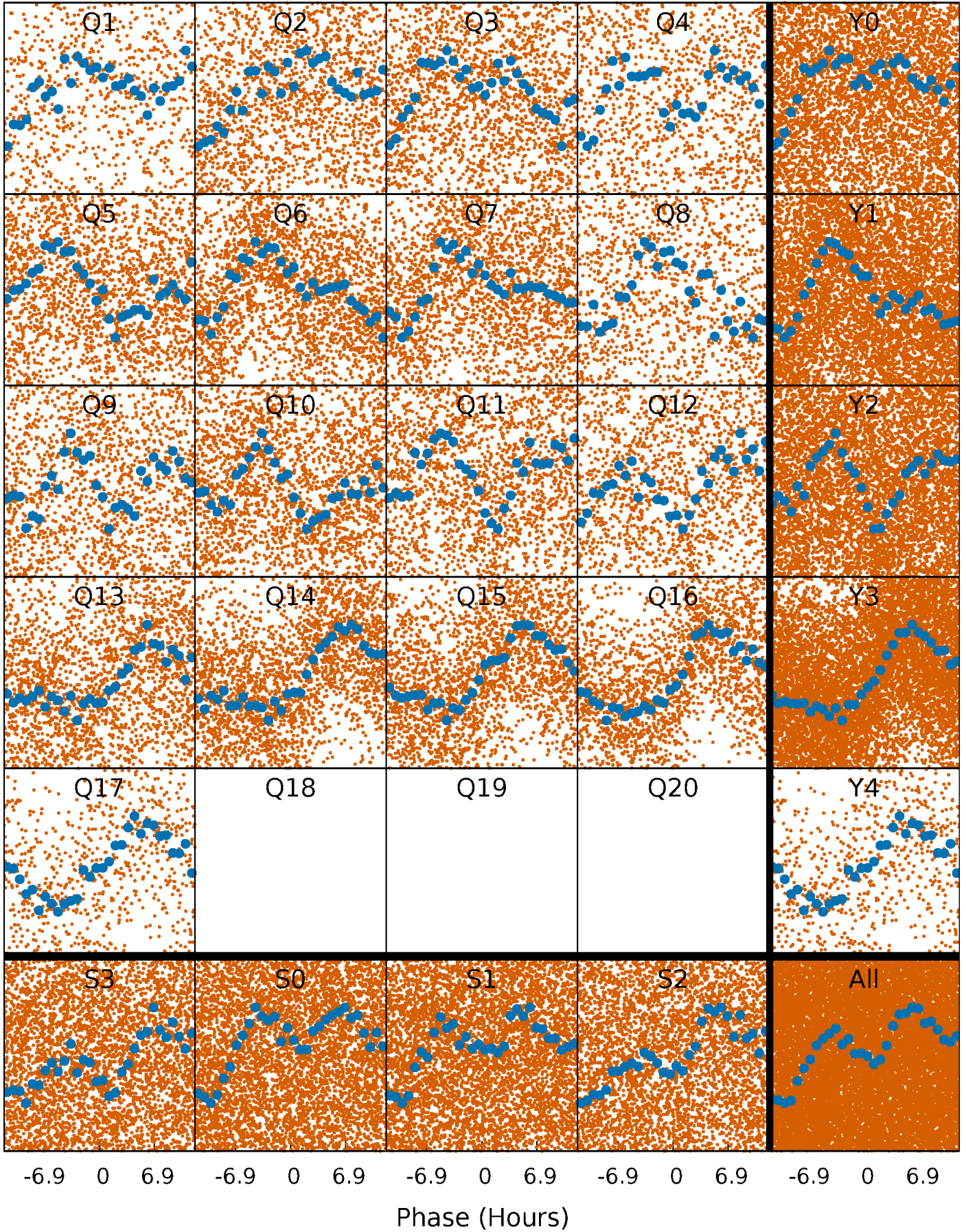


Non-Whitened Vs. Whitened Light Curve



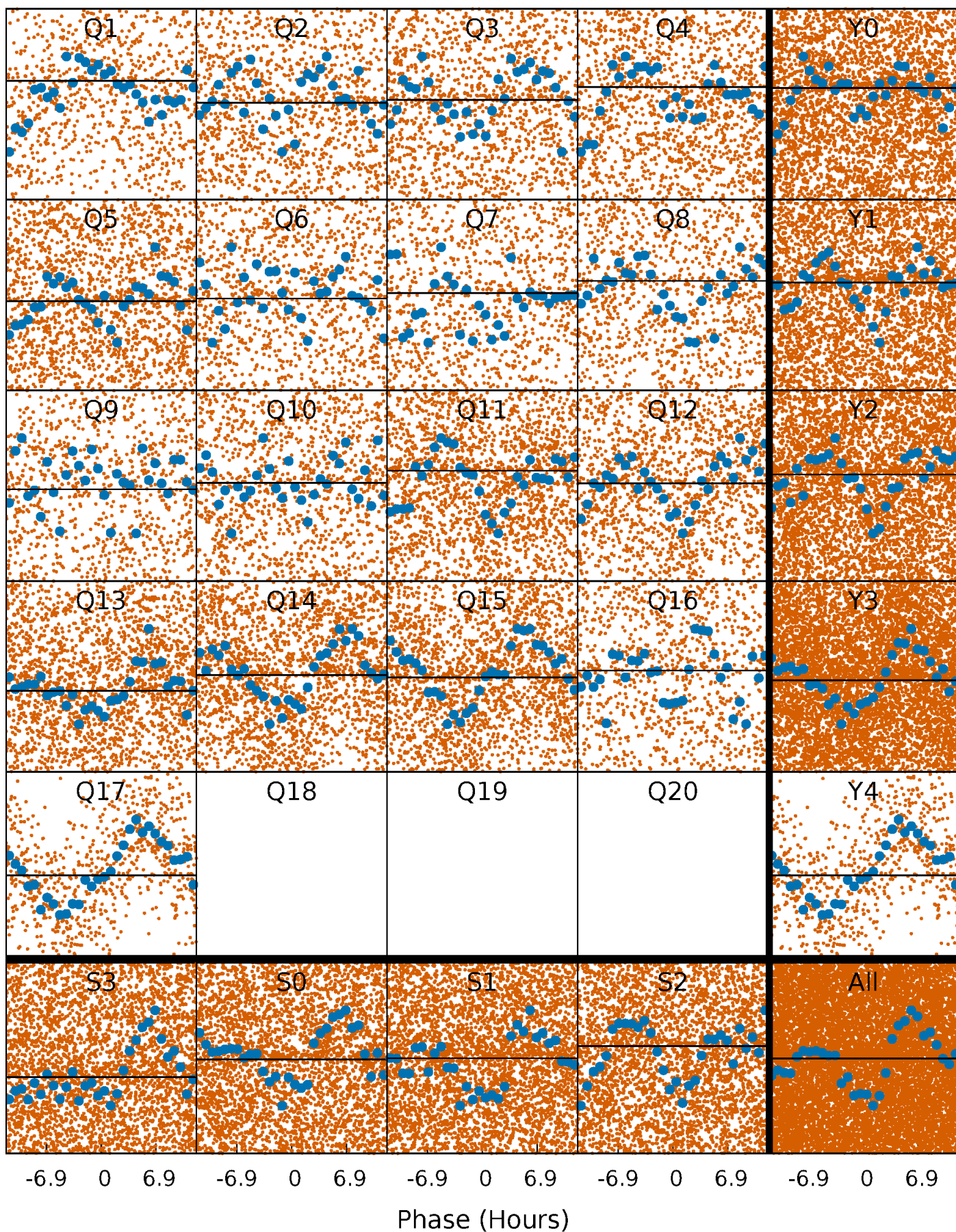
PDC Quarter-Phased Transit Curves

TCE 009413816-01 P= 1.596843 Days $T_0=131.834525$ (BKJD)



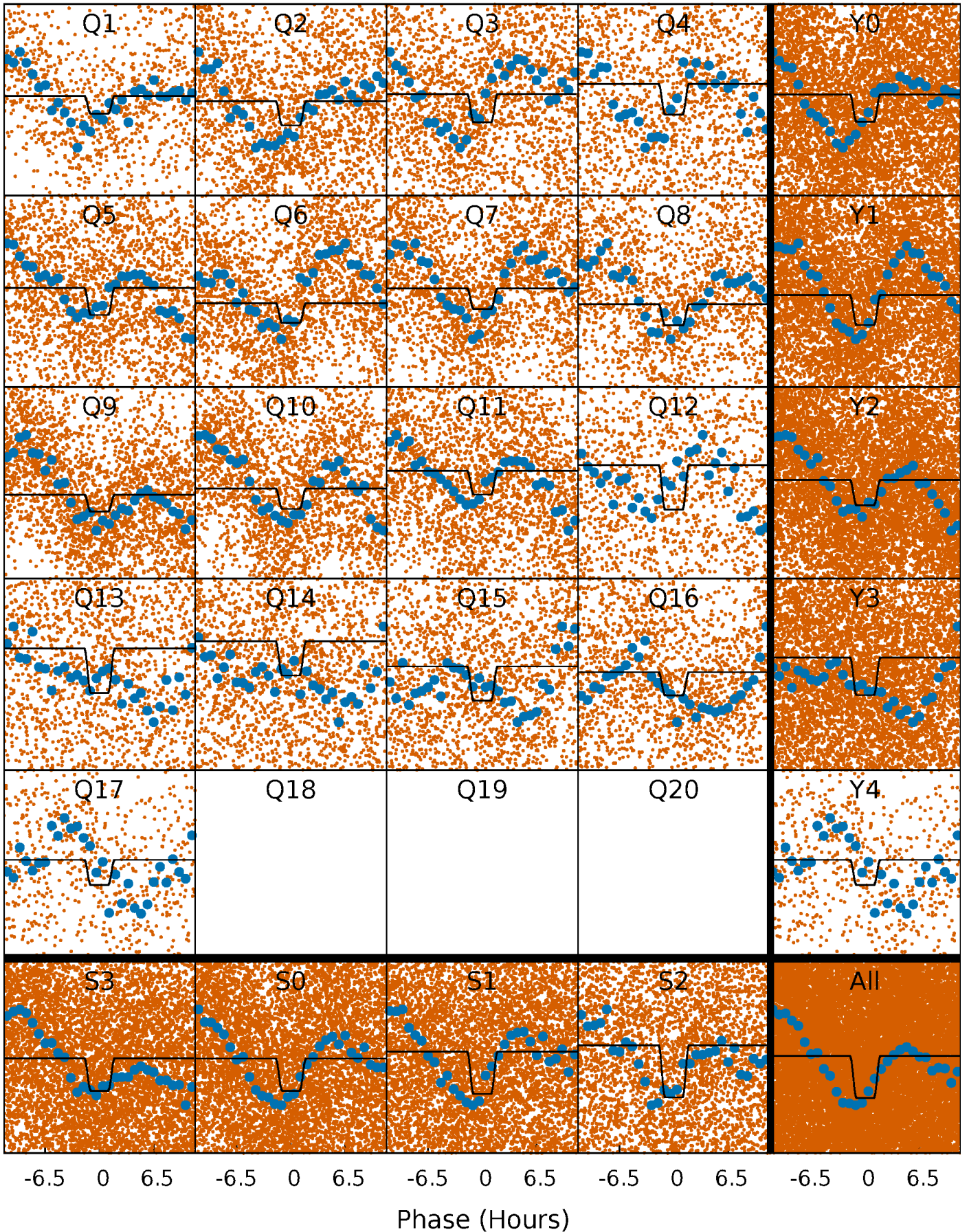
DV Quarter-Phased Transit Curves

TCE 009413816-01 P= 1.596843 Days $T_0=131.834525$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

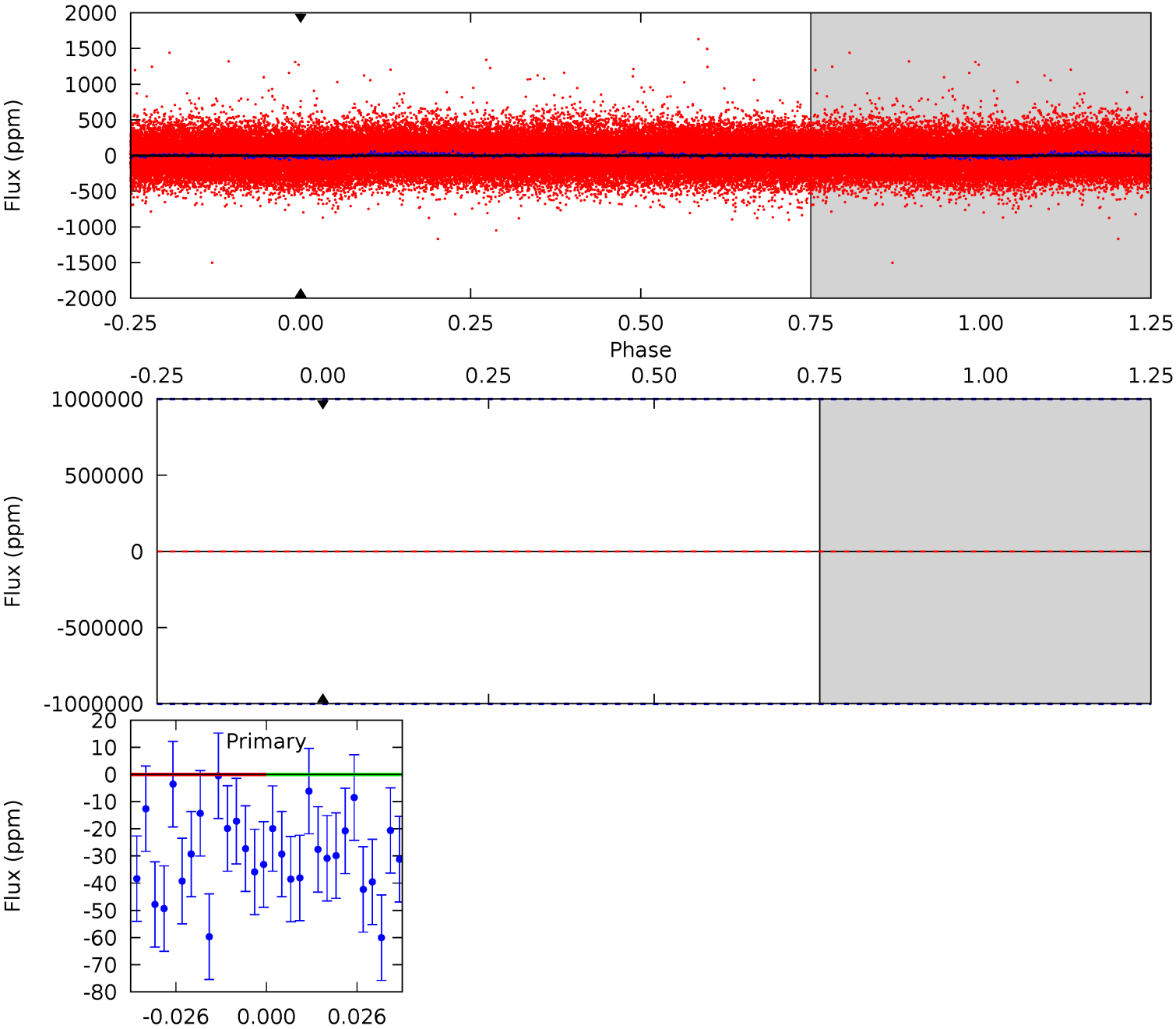
TCE 009413816-01 P= 1.596843 Days $T_0=133.060765$ (BKJD)



DV Model-Shift Uniqueness Test

009413816-01, P = 1.596843 Days, E = 130.237682 Days

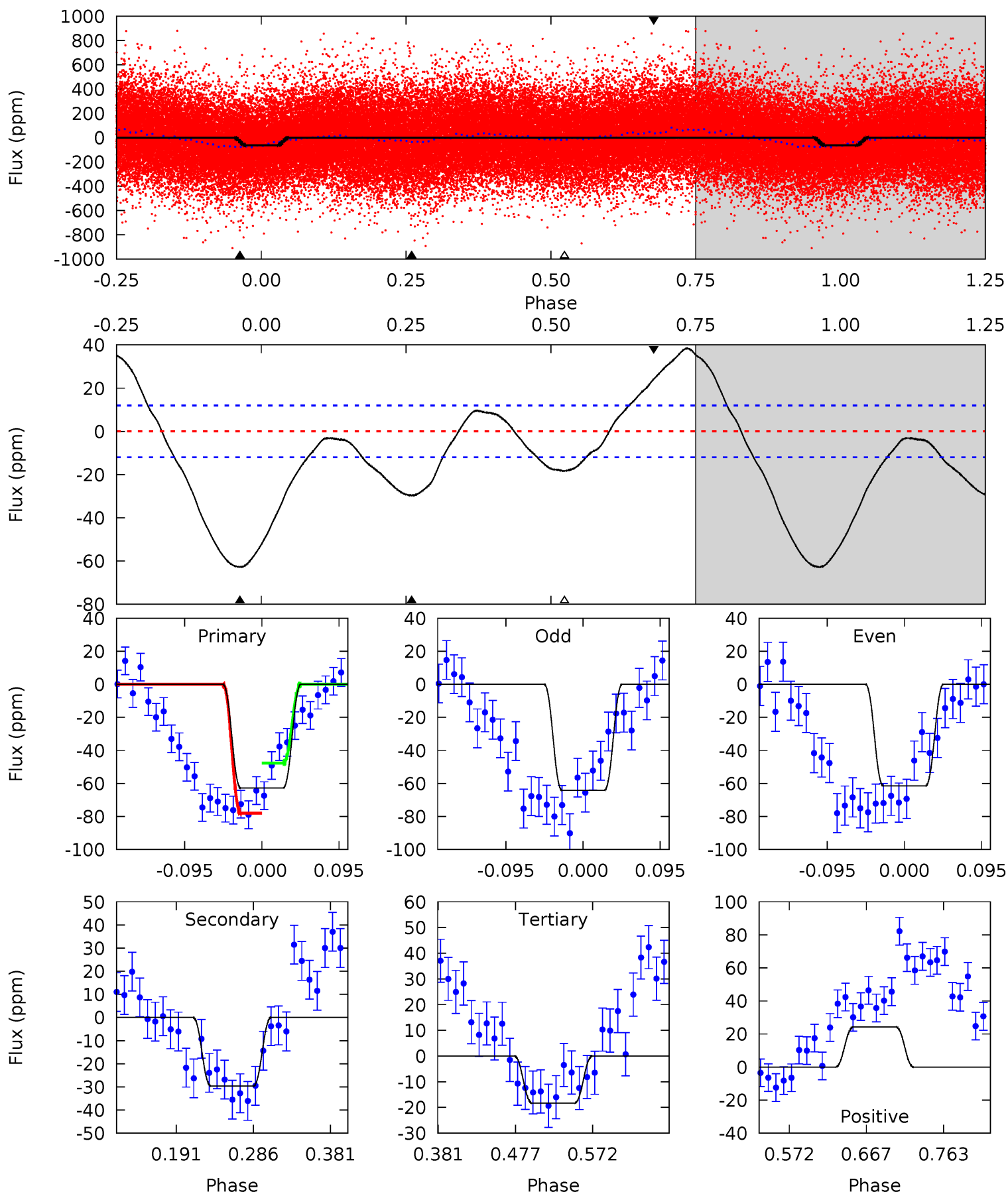
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009413816-01, P = 1.596843 Days, E = 131.463922 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.0	11.3	7.00	9.26	4.57	1.67	6.42	17.0	14.8	4.33	2.07	0.52	1.06	0.38	5.59



Stellar Parameters For KIC 009413816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7286^{+228}_{-304}	$4.112^{+0.158}_{-0.175}$	$-0.220^{+0.250}_{-0.350}$	$1.755^{+0.528}_{-0.384}$	$1.454^{+0.211}_{-0.257}$	$0.379^{+0.356}_{-0.183}$
	+3%/-4%	+4%/-4%	+114%/-159%	+30%/-22%	+15%/-18%	+94%/-48%
Source	KIC0	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 009413816-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$14.39^{+14.42}_{-9.50}$	3437^{+272}_{-250}	-4634^{+41633}_{-27465}	$-1.698^{+448.199}_{-372.098}$
Alt.	-30 ± 3	$13.50^{+15.56}_{-9.39}$	3415^{+277}_{-230}	-3104^{+6804}_{-253}	$0.079^{+0.824}_{-0.062}$

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 $A_{obs} \gg 1.0$

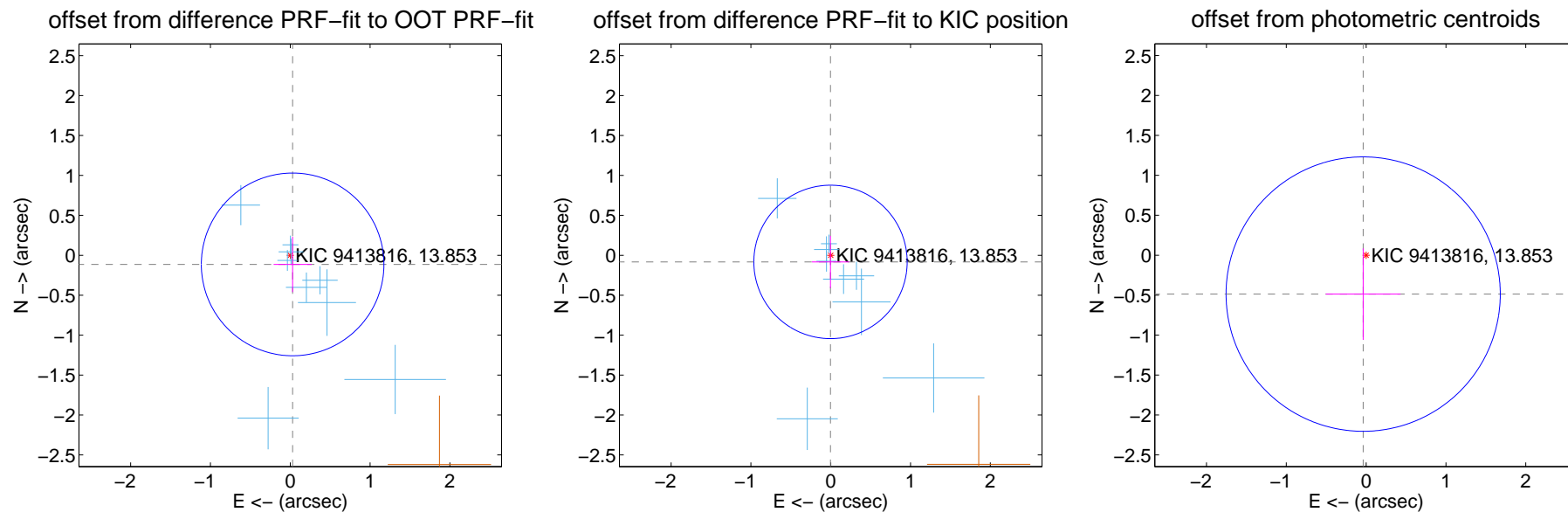
DV Centroid Data

Supplemental centroid analysis for 009413816-01. Kepler magnitude: 13.85. Transit SNR -1.00

There are 9 quarters with good PRF difference image offsets

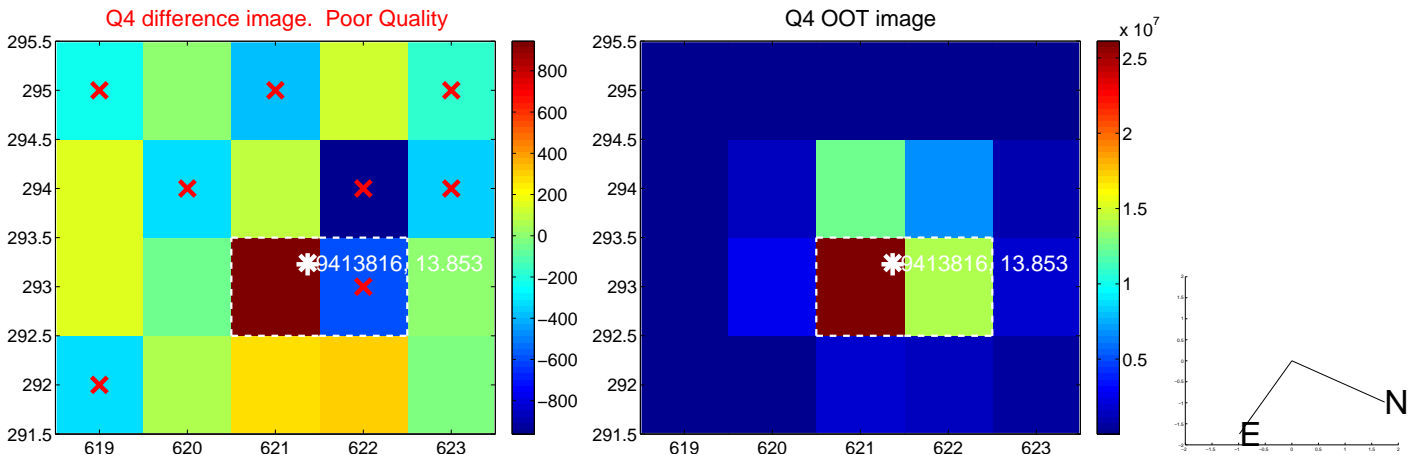
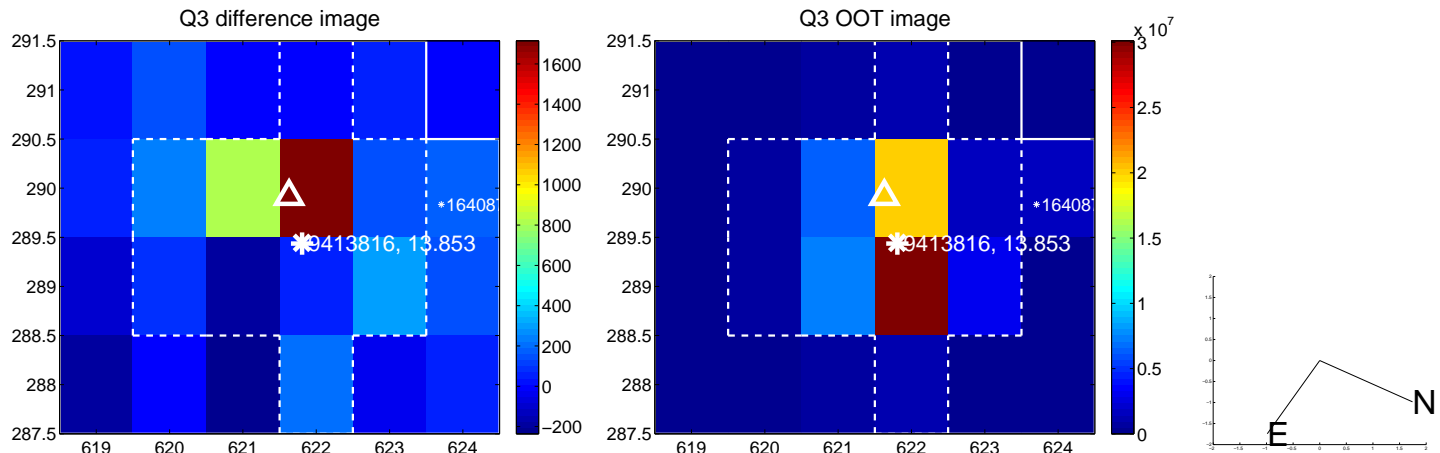
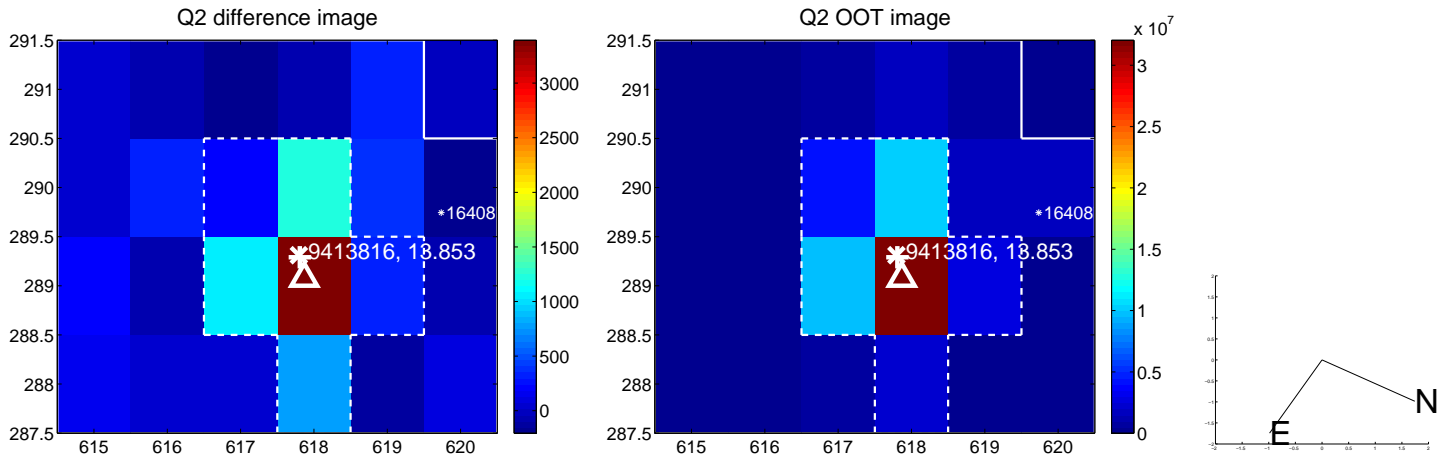
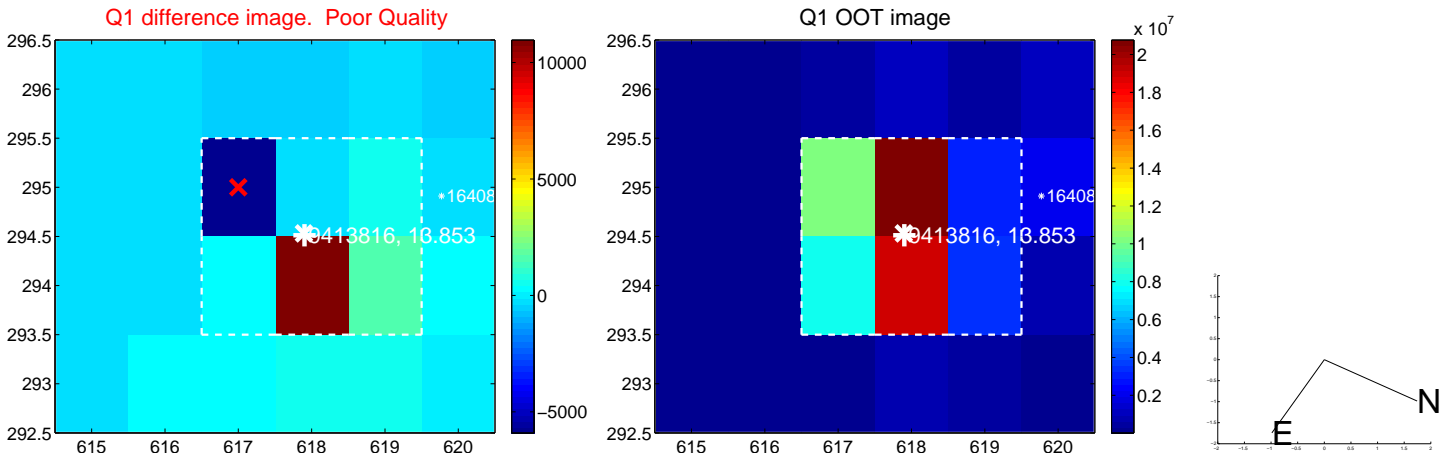
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.118 ± 0.381	0.31	-0.030 ± 0.238	-0.114 ± 0.346
PRF-fit source offset from KIC position	0.083 ± 0.320	0.26	0.003 ± 0.233	-0.083 ± 0.326
photometric centroid source offset	0.49 ± 0.57	0.85	0.04 ± 0.47	-0.49 ± 0.57

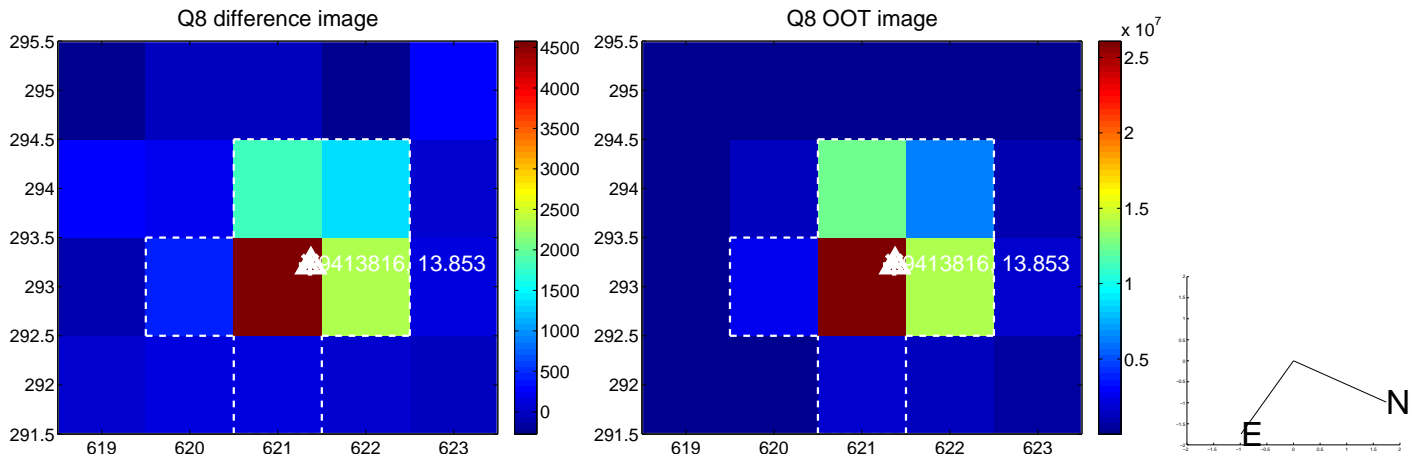
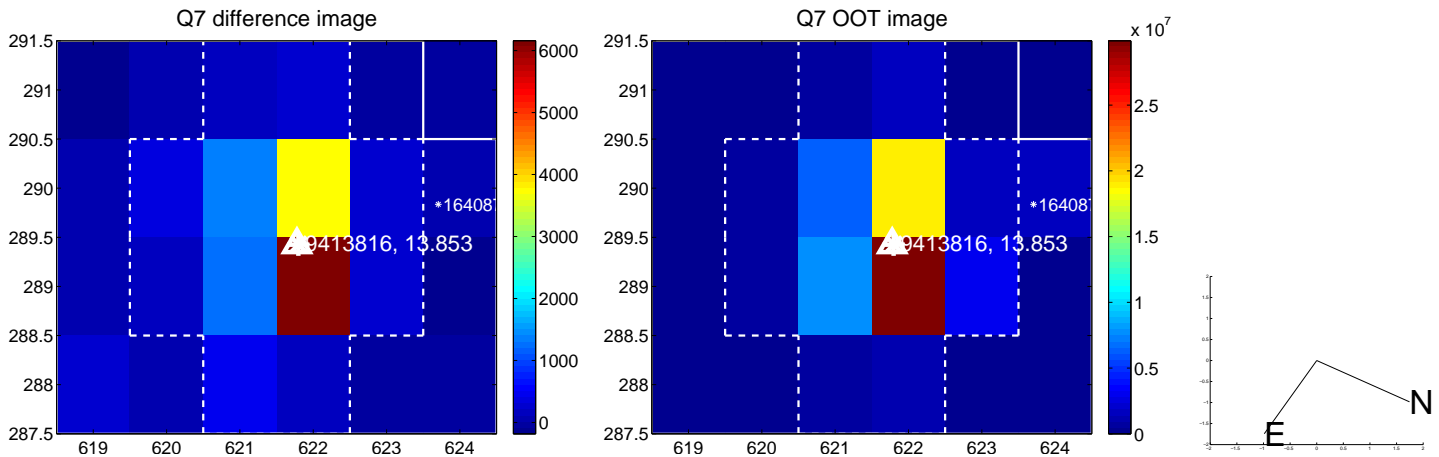
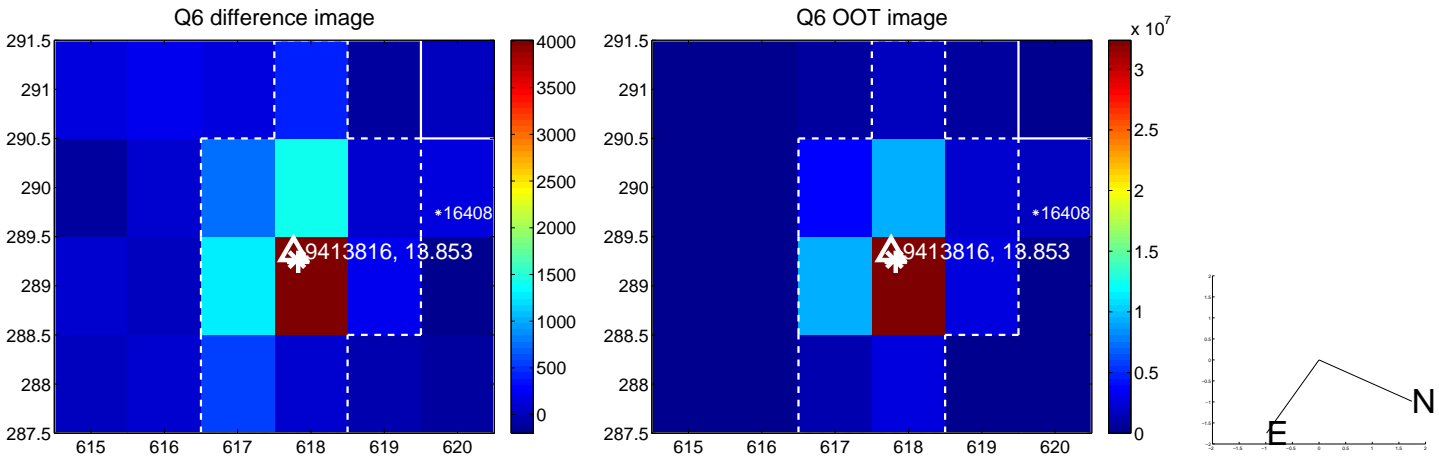
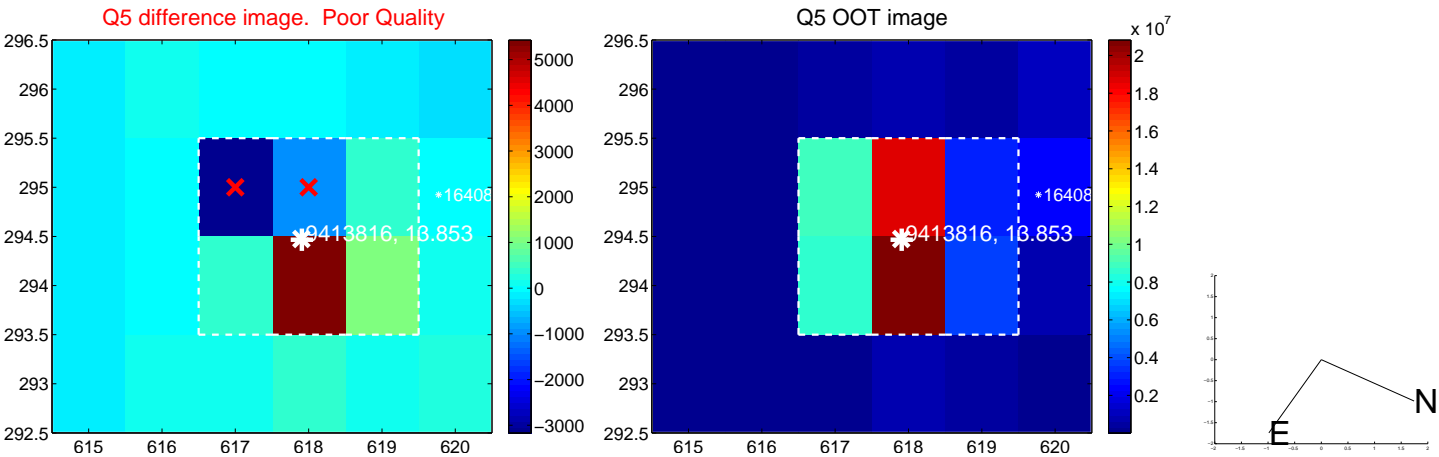


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

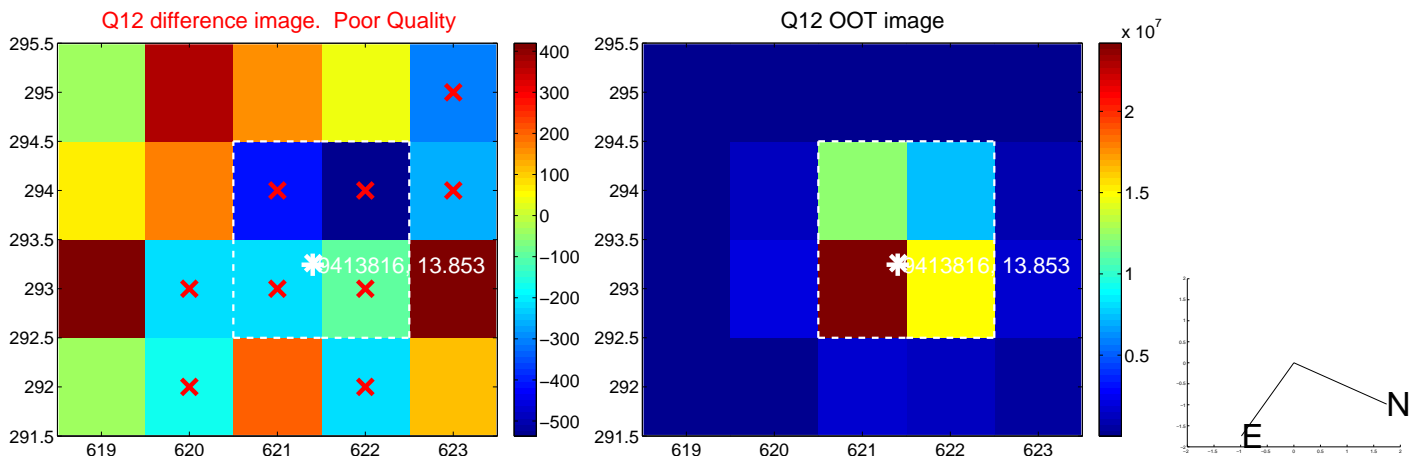
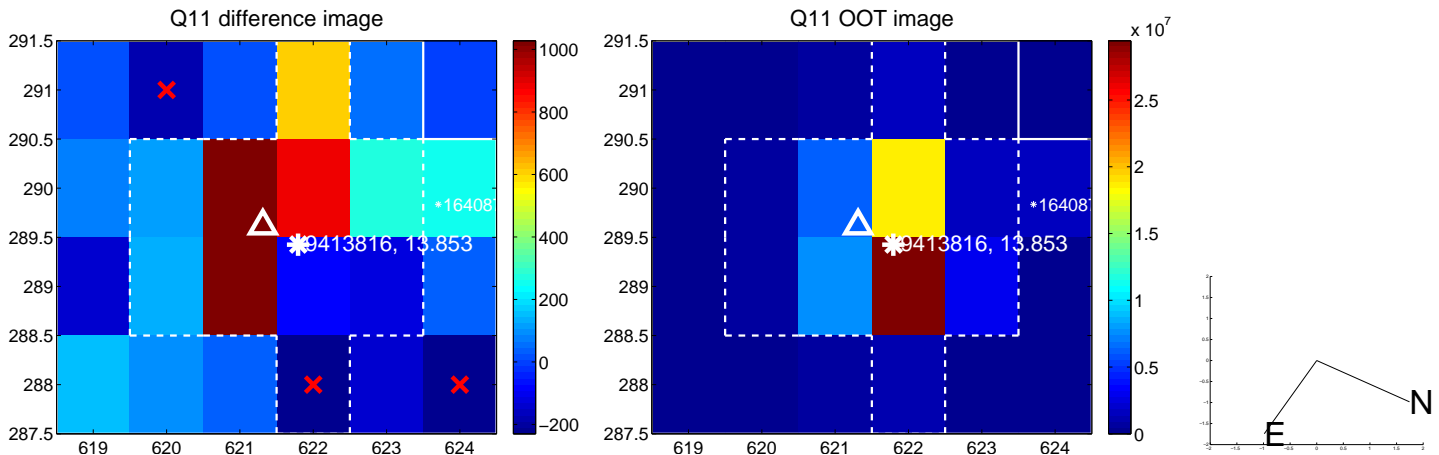
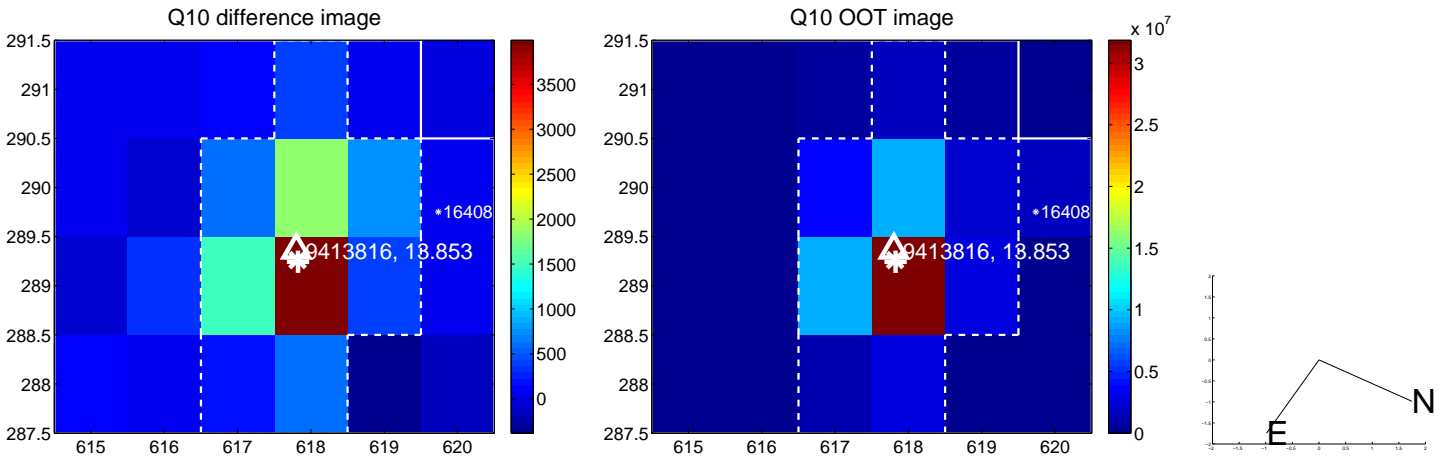
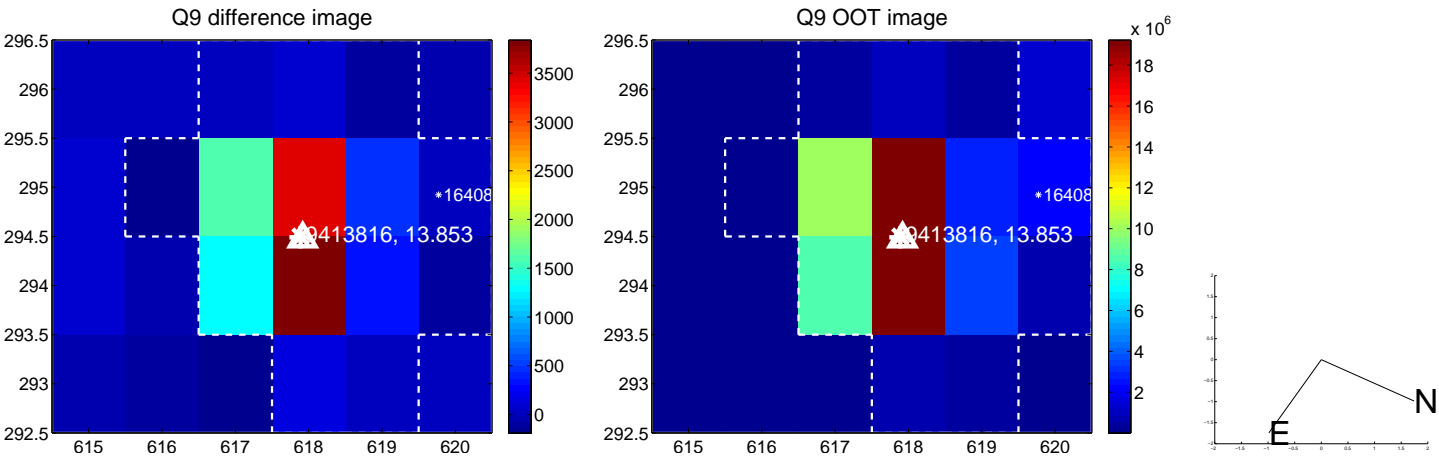
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



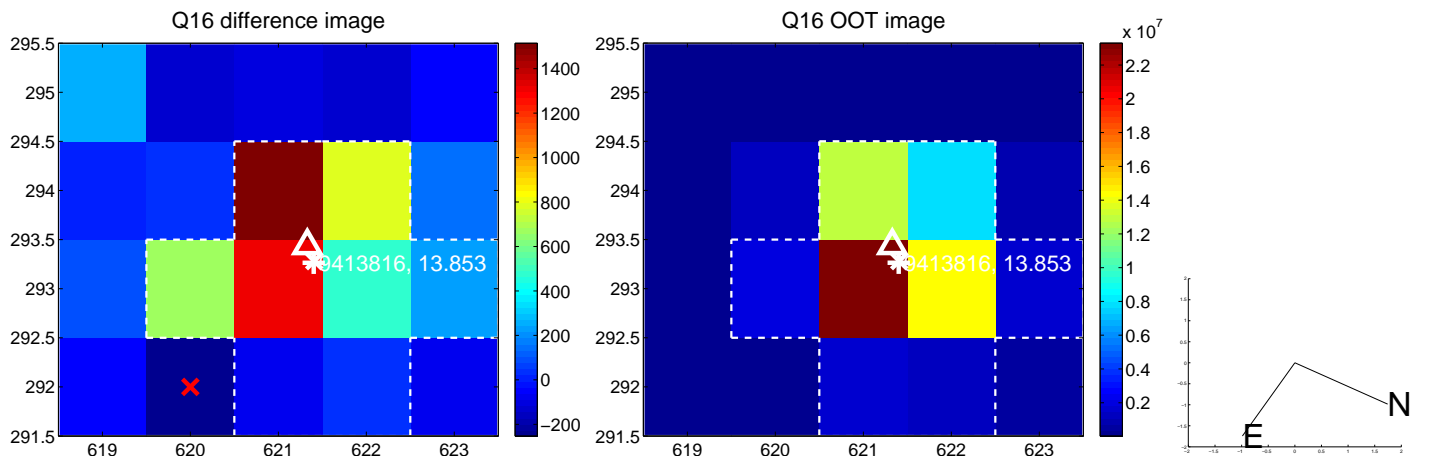
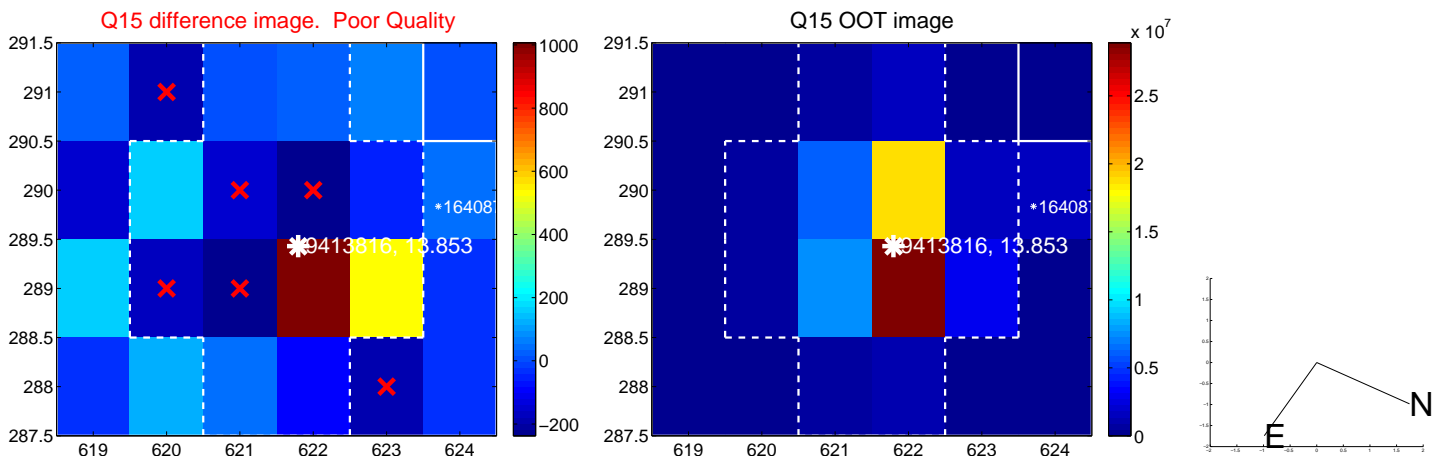
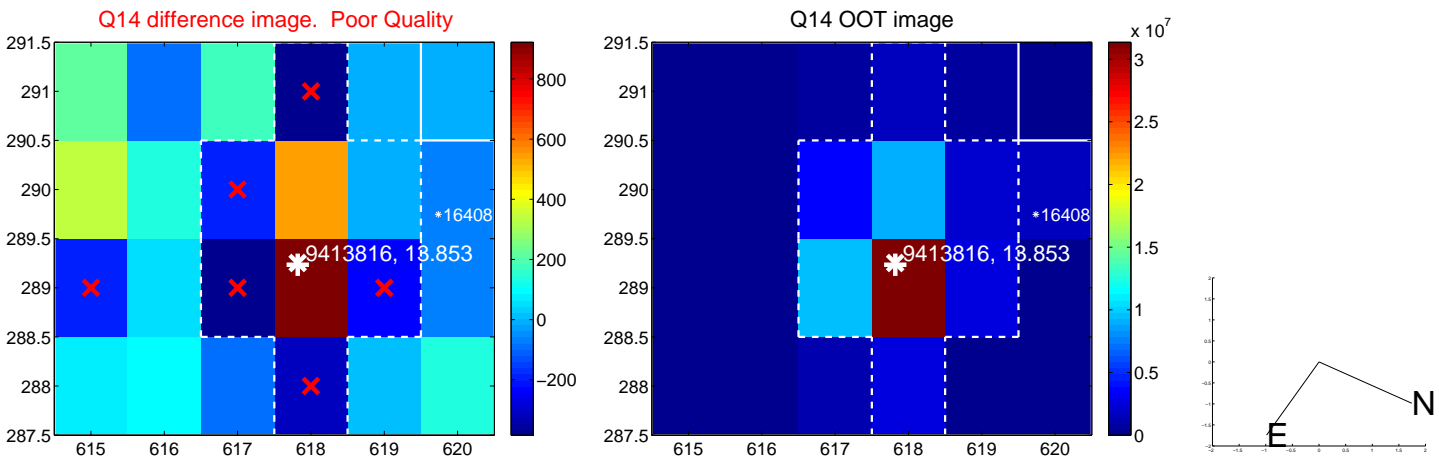
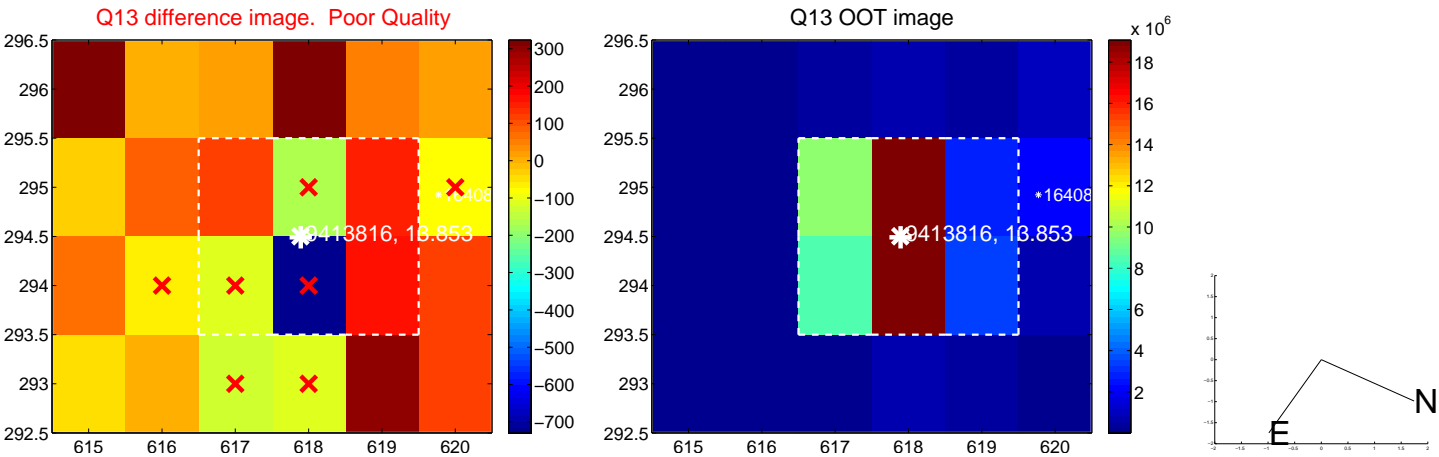
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



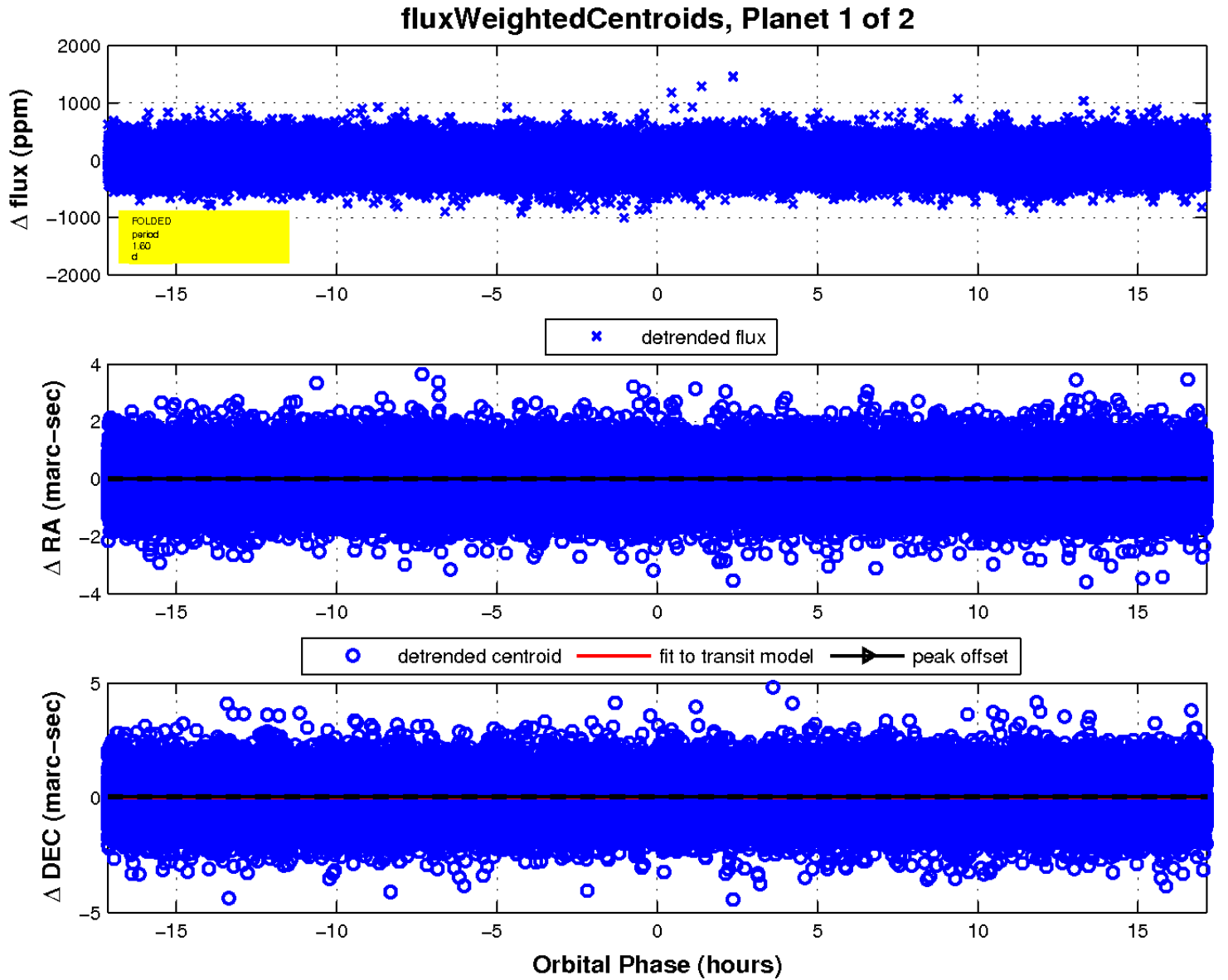
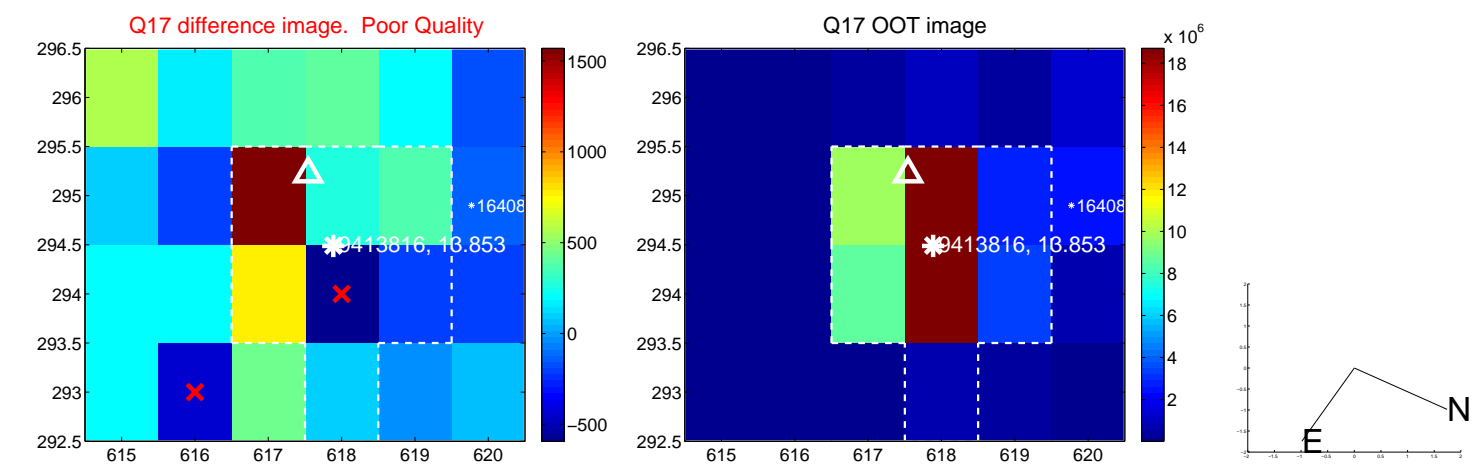
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

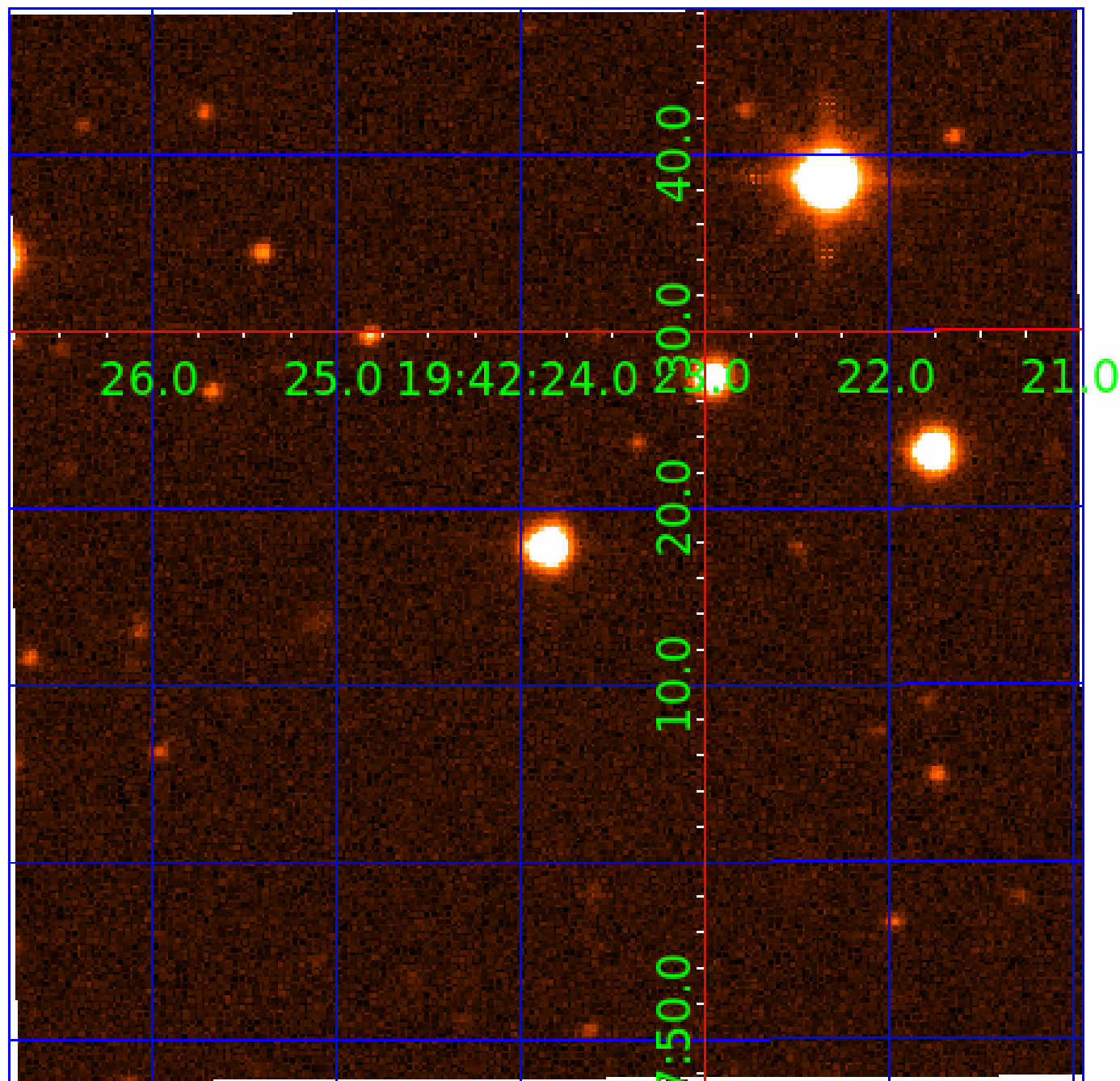


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009413816

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})
009413816-01	OBS	No	1.596843	131.834525	182.8	6.000	8.7	-1.0	1.75	7286	2.41	8472.65
009413816-02	OBS	No	323.637315	411.888478	523.9	11.625	8.1	9.4	1.75	7286	5.07	7.12

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413816-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_NOFITS
009413816-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

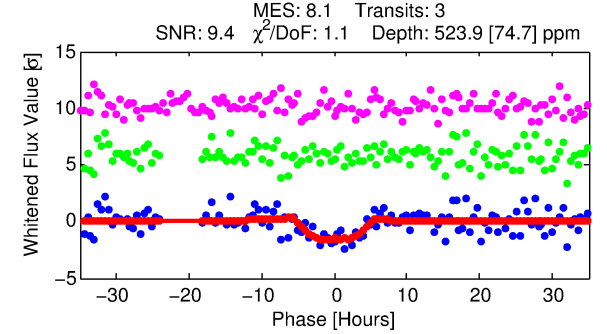
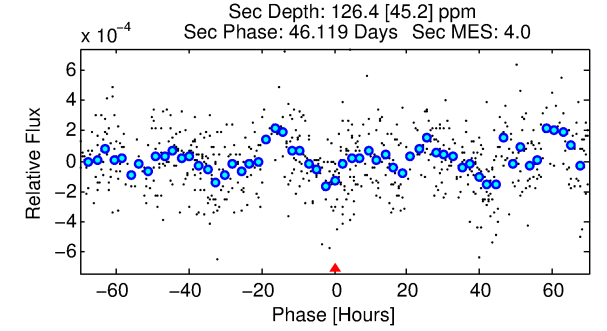
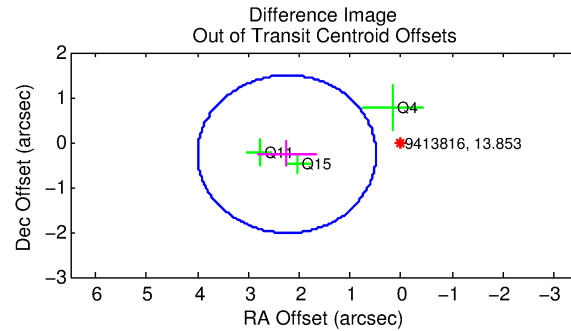
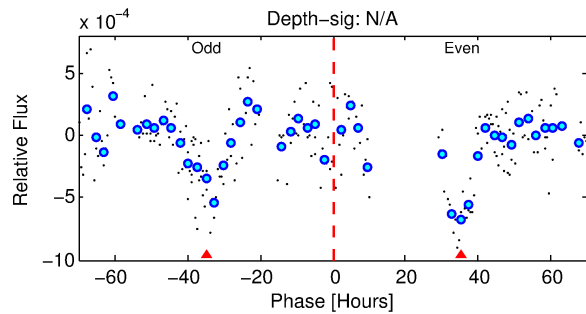
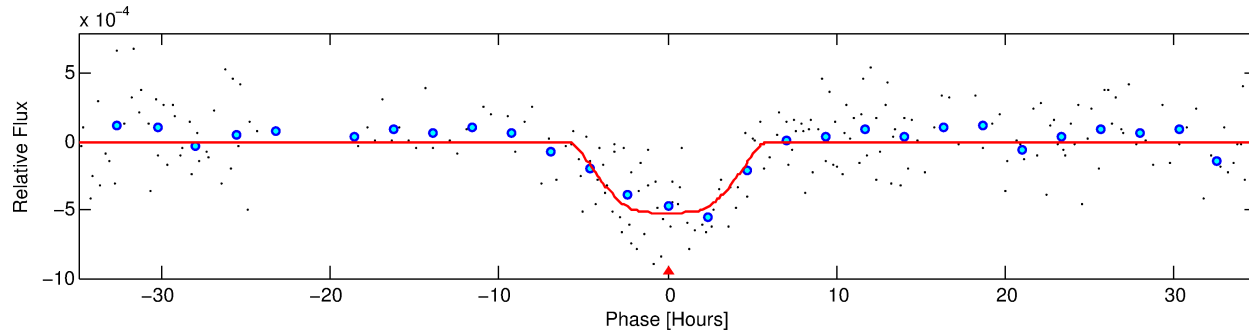
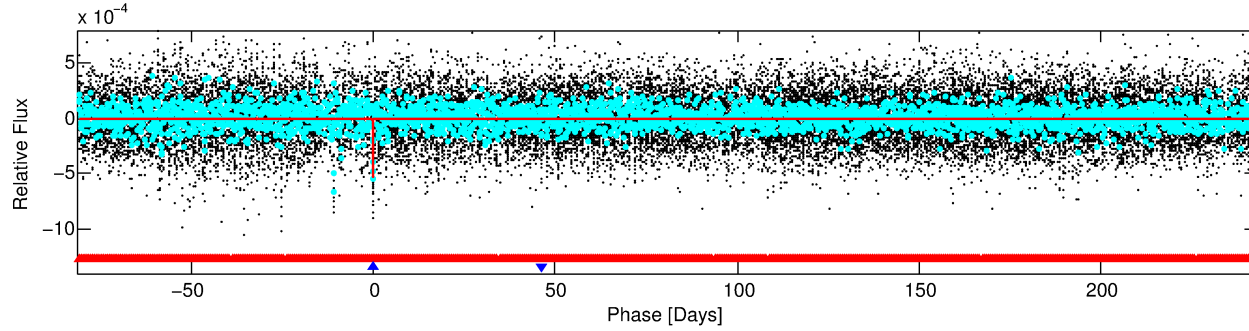
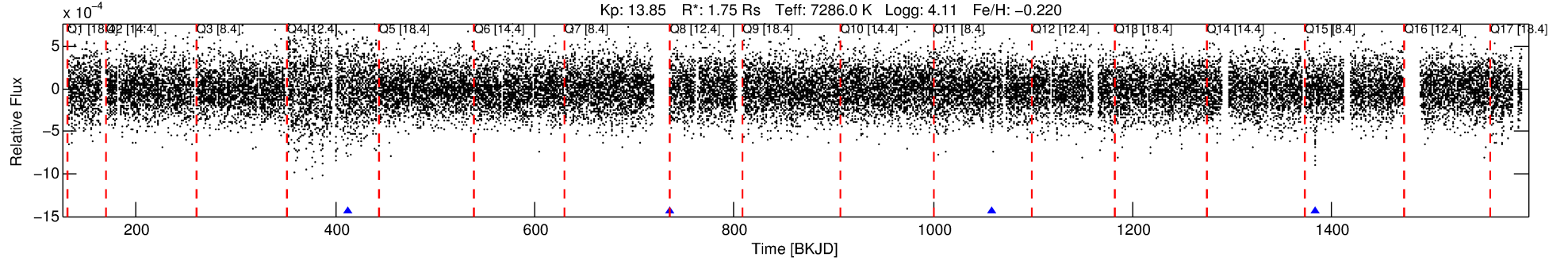
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009413816-02

No Significant Match Found

DV One-Page Summary

KIC: 9413816 Candidate: 2 of 2 Period: 323.637 d



DV Fit Results:

Period = 323.63731 [0.01155] d
Epoch = 411.8885 [0.0272] BKJD
Rp/R* = 0.0265 [0.0023]
a/R* = 73.05 [13.14]
b = 0.97 [0.01]
Seff = 7.12 [2.67]
Teq = 416 [39] K
Rp = 5.07 [1.59] Re
a = 1.0453 [0.2523] AU
Ag = 2960.37 [1543.55] [1.92σ]
Teffp = 4750 [514] K [8.41σ]

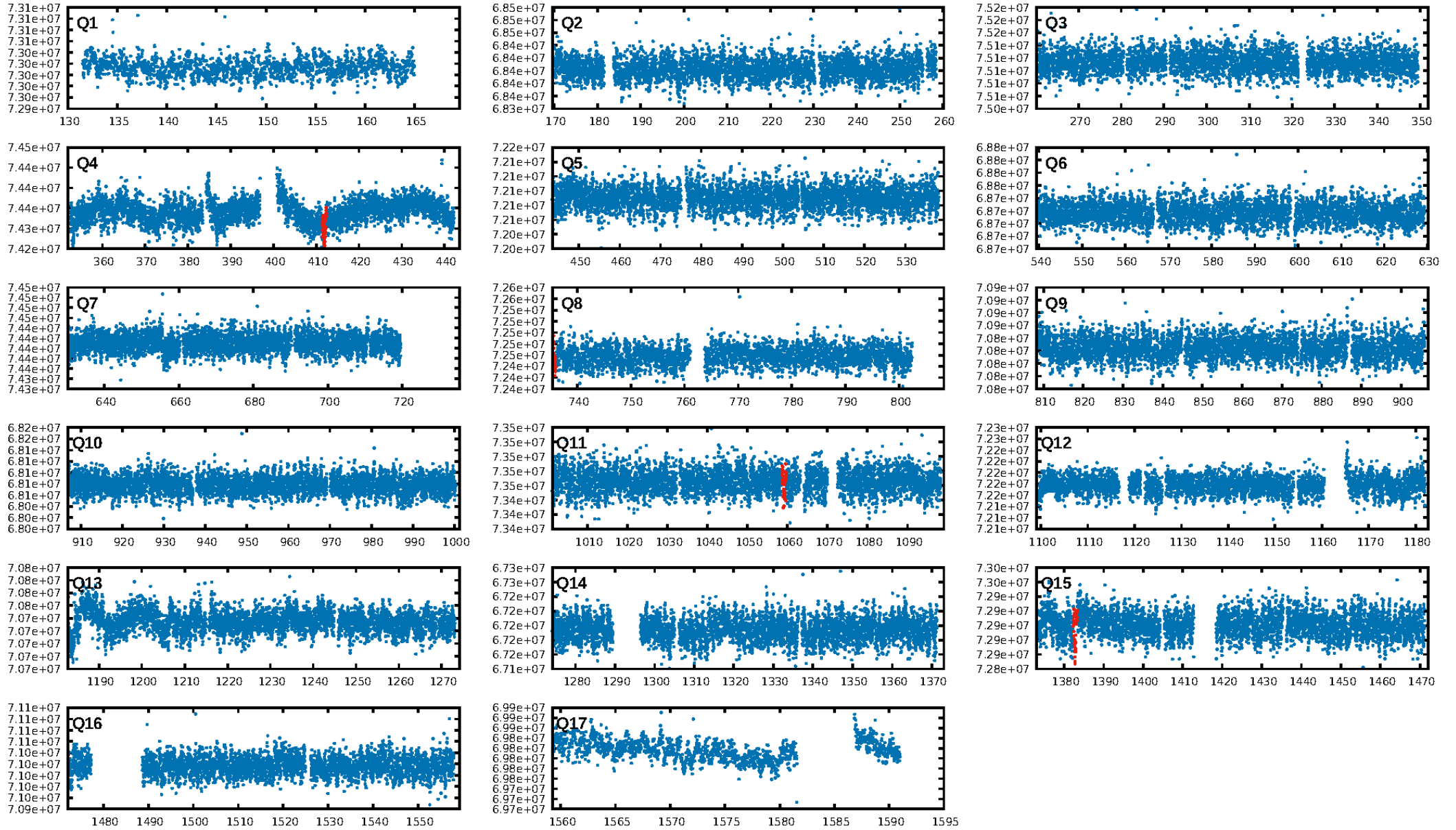
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [590.82σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 2.2%
ModelChiSquareGof-sig: 99.8%
Bootstrap-pfa: 2.28e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -6.287
Centroid-sig: 6.9%
Centroid-so: 0.852 arcsec [1.47σ]
OotOffset-rm: 2.259 arcsec [3.86σ]
OotOffset-st: 0/2/1/0 [3]
KicOffset-rm: 2.280 arcsec [2.78σ]
KicOffset-st: 0/2/1/0 [3]
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DiffImageOverlap-fno: 0.00 [0/3]

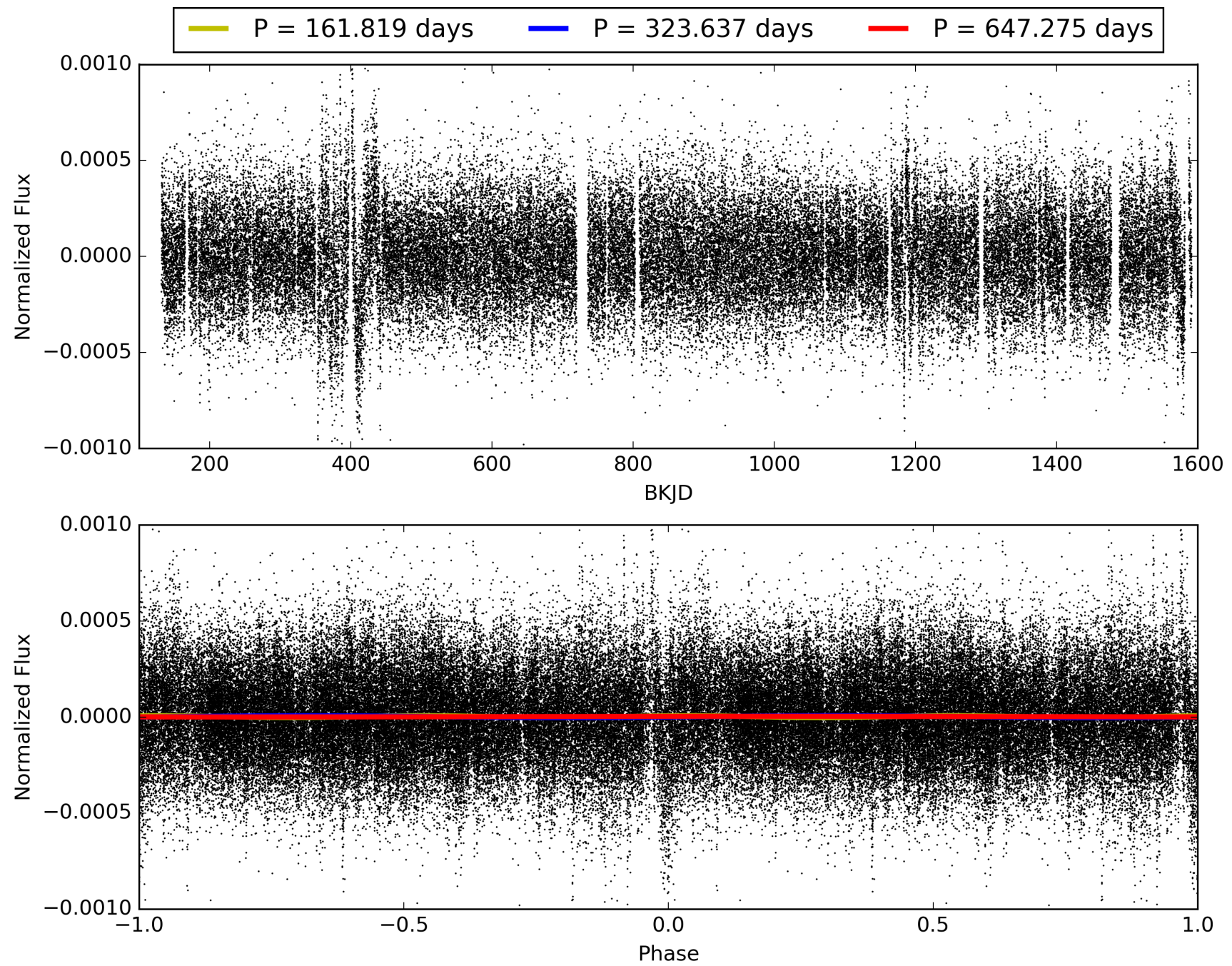
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:36:23 Z

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

TCE 009413816-02, PDC Light Curves

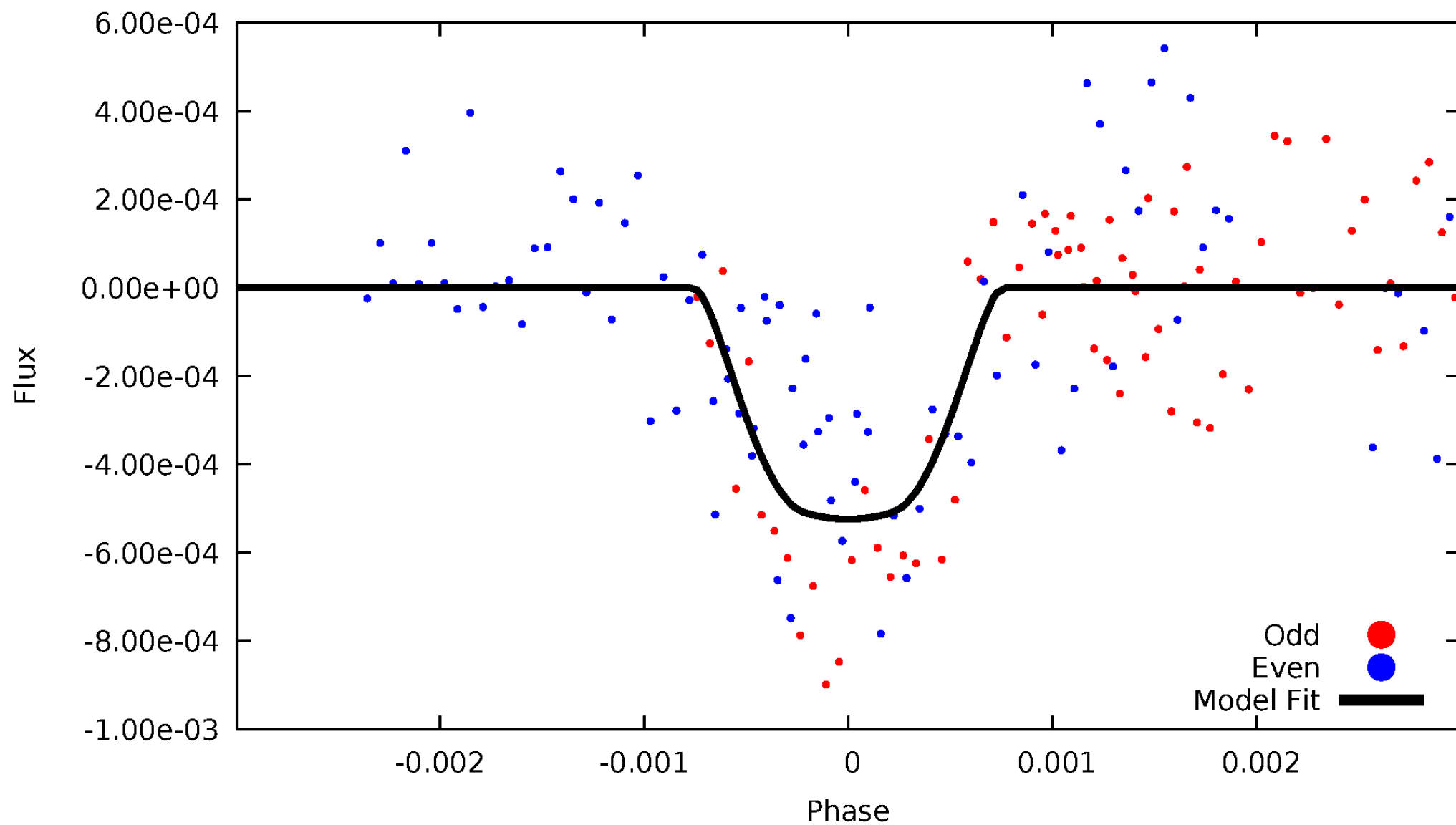


TCE 009413816-02



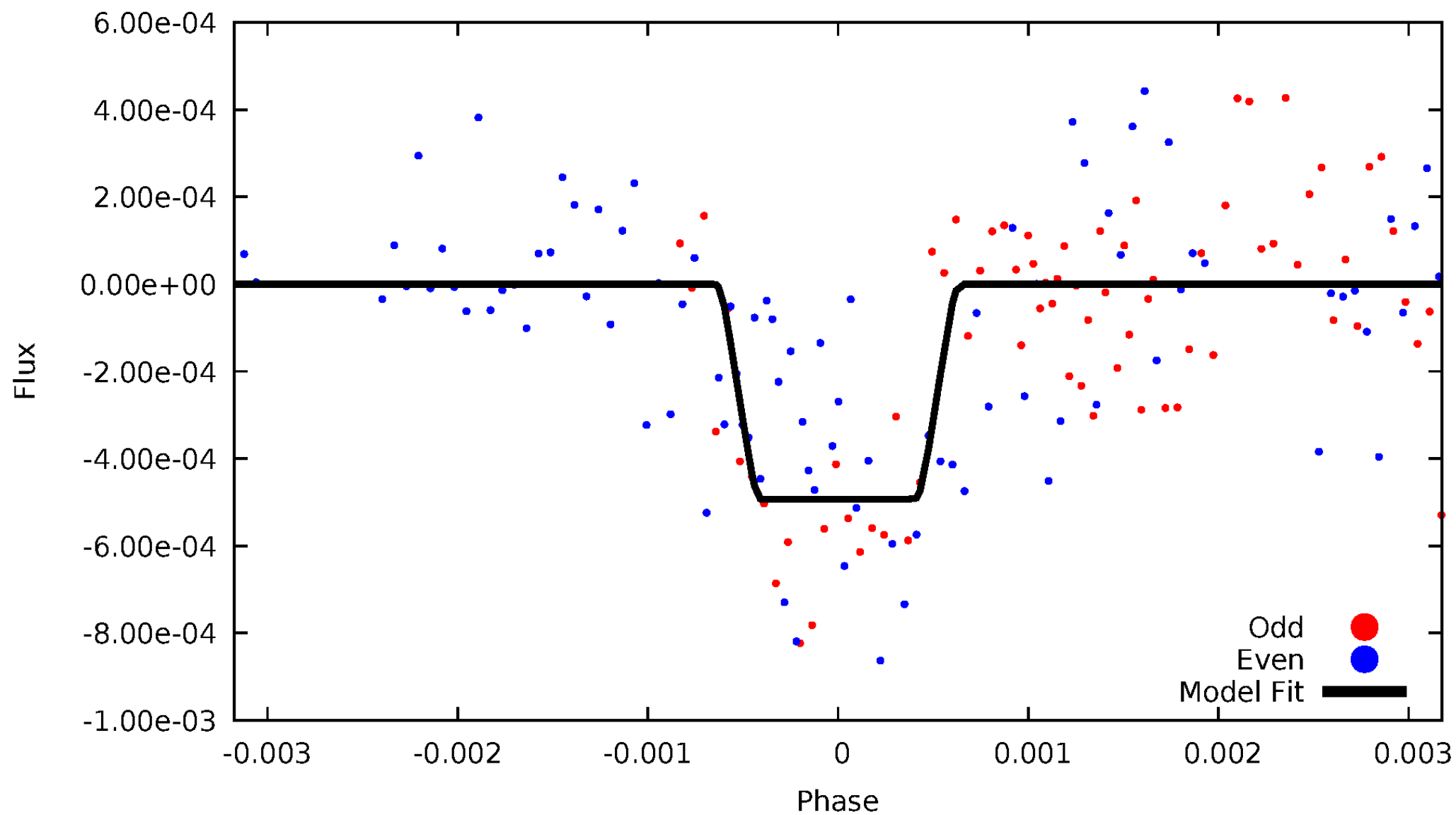
DV Odd/Even

TCE 009413816-02



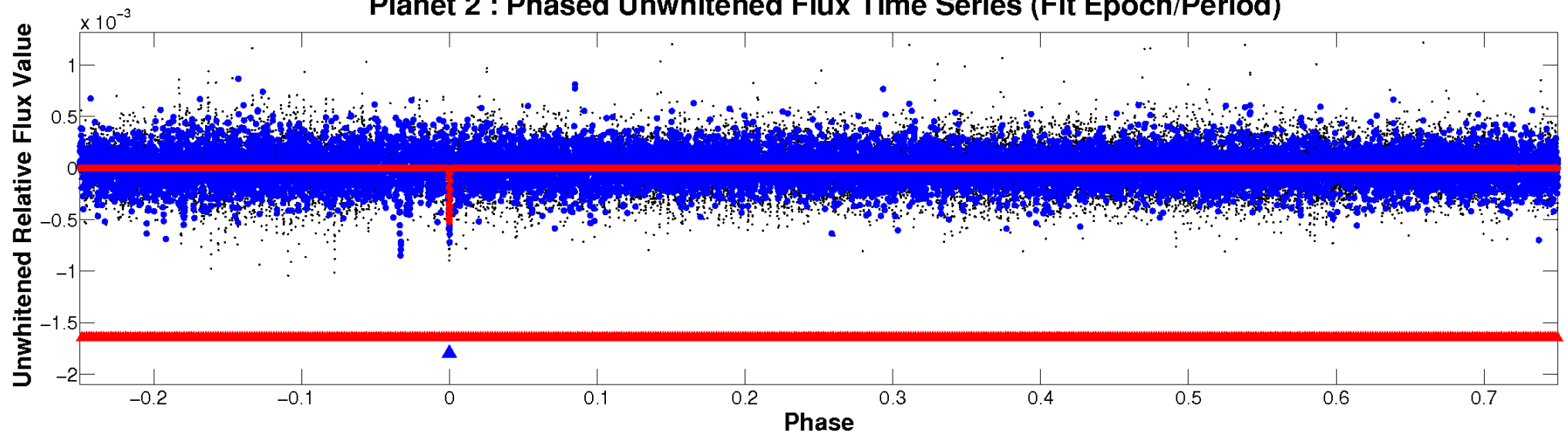
ALT Odd/Even

TCE 009413816-02

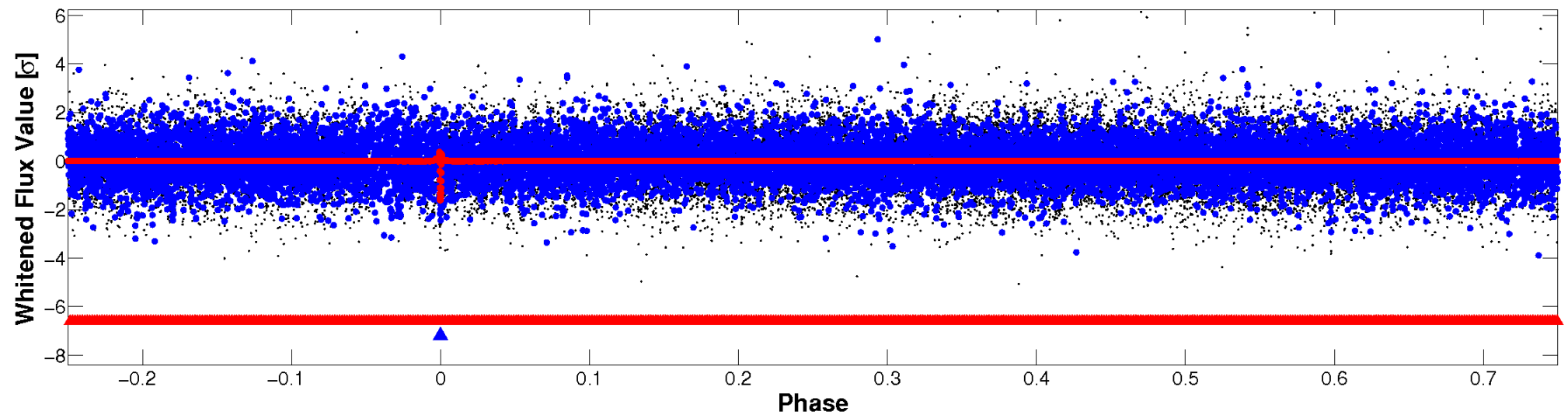


Non-Whitened Vs. Whitened Light Curve

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



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



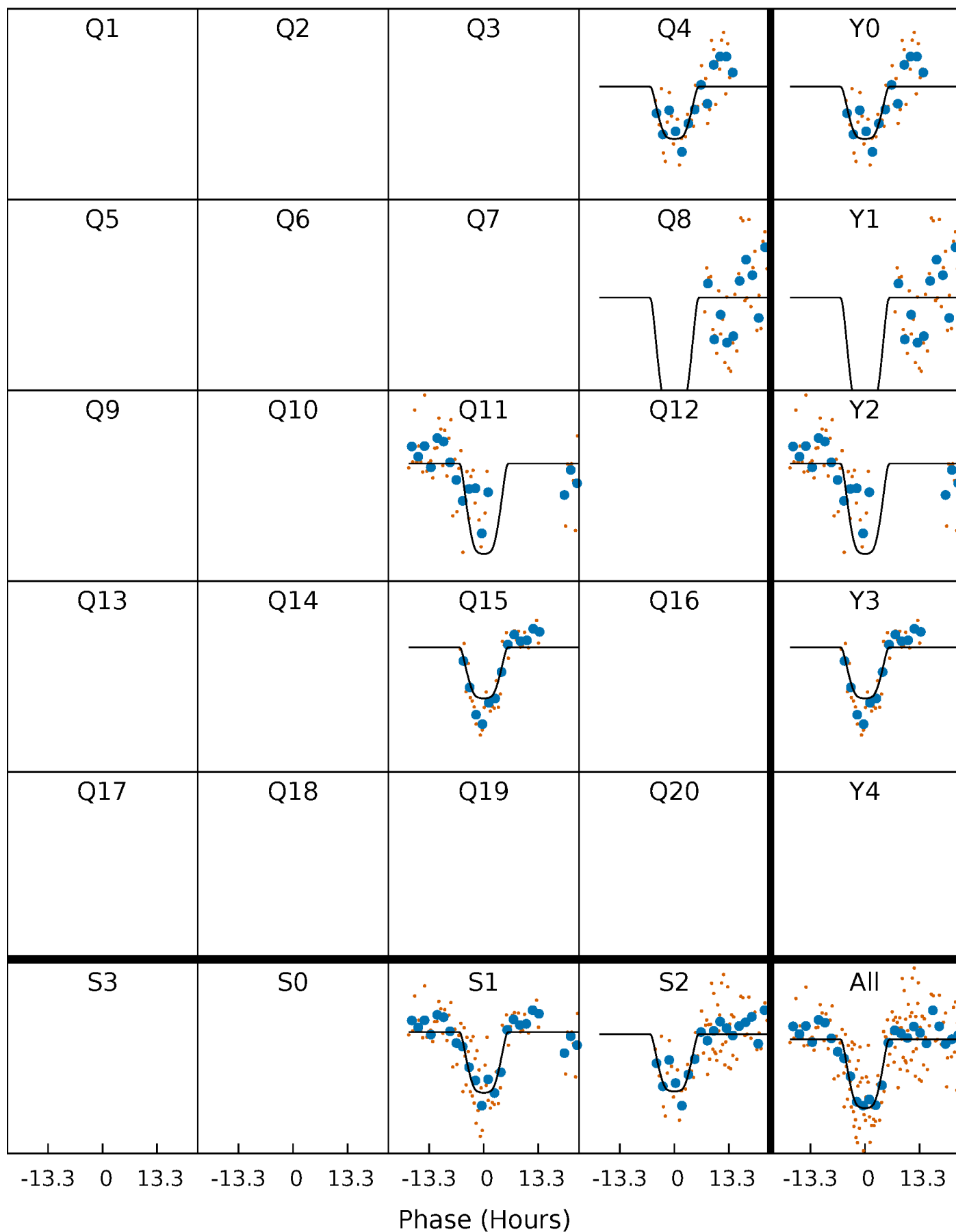
PDC Quarter-Phased Transit Curves

TCE 009413816-02 P=323.637315 Days $T_0=411.888478$ (BKJD)



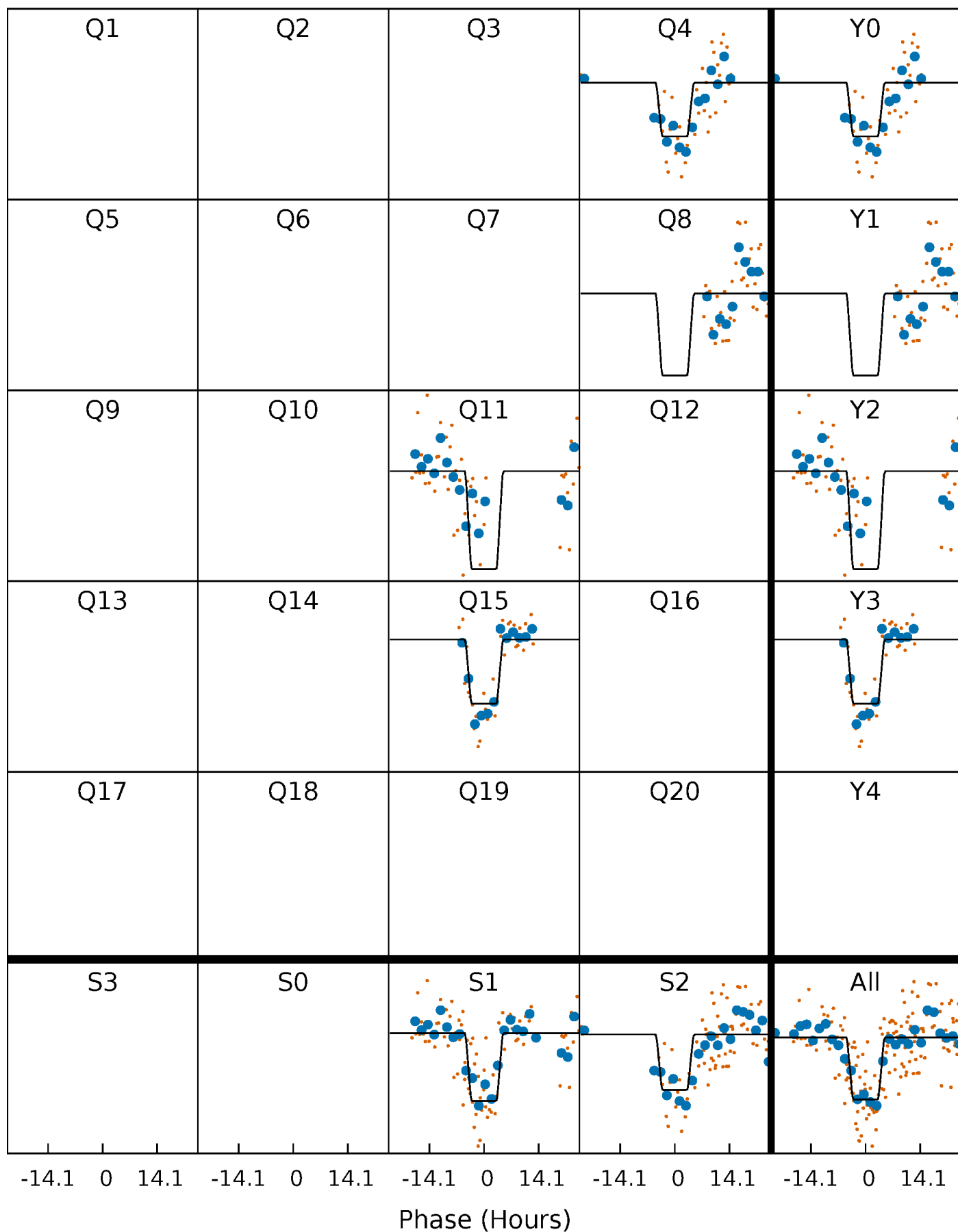
DV Quarter-Phased Transit Curves

TCE 009413816-02 P=323.637315 Days $T_0=411.888478$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

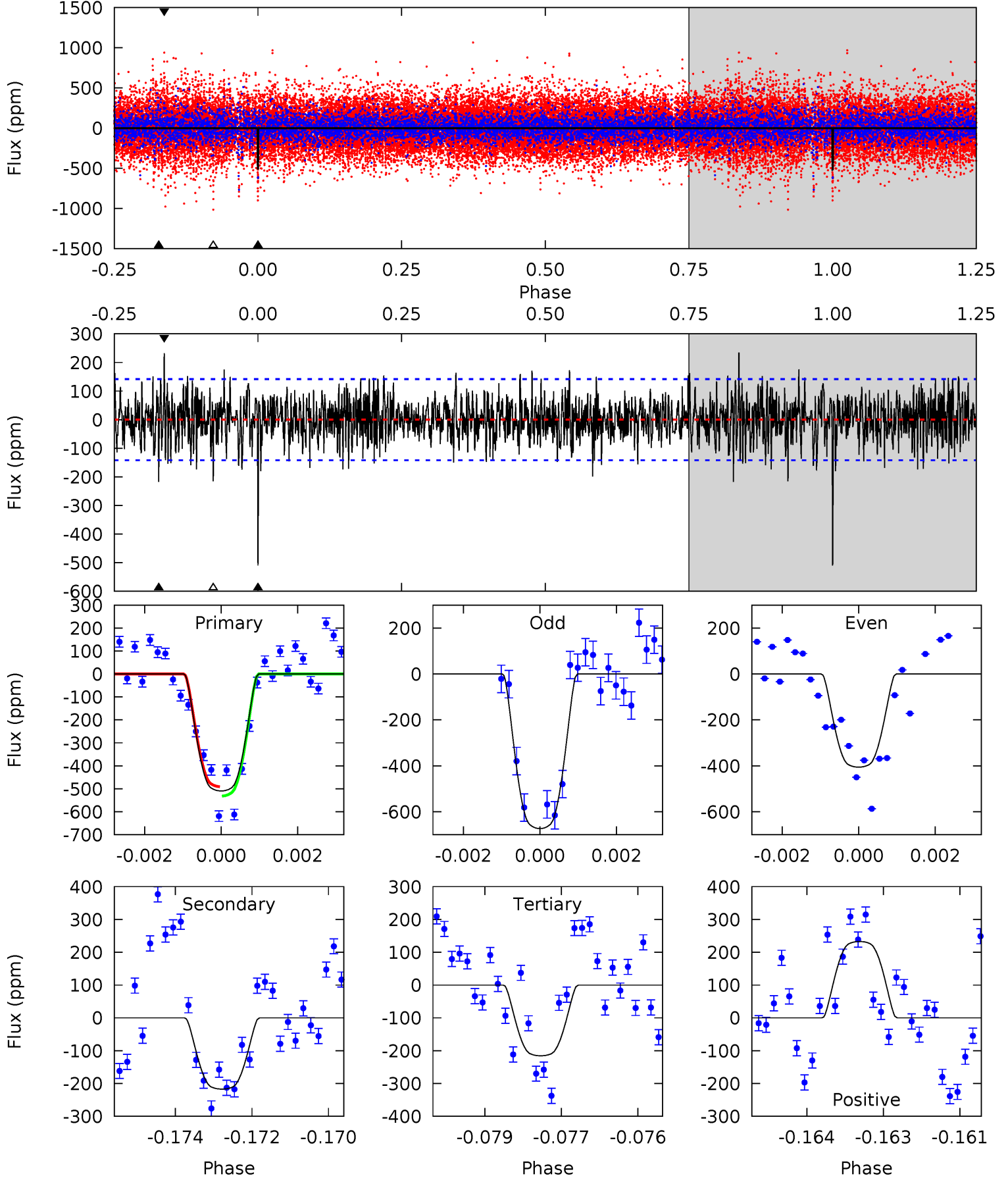
TCE 009413816-02 P=323.653968 Days $T_0=411.867765$ (BKJD)



DV Model-Shift Uniqueness Test

009413816-02, P = 323.637315 Days, E = 88.251163 Days

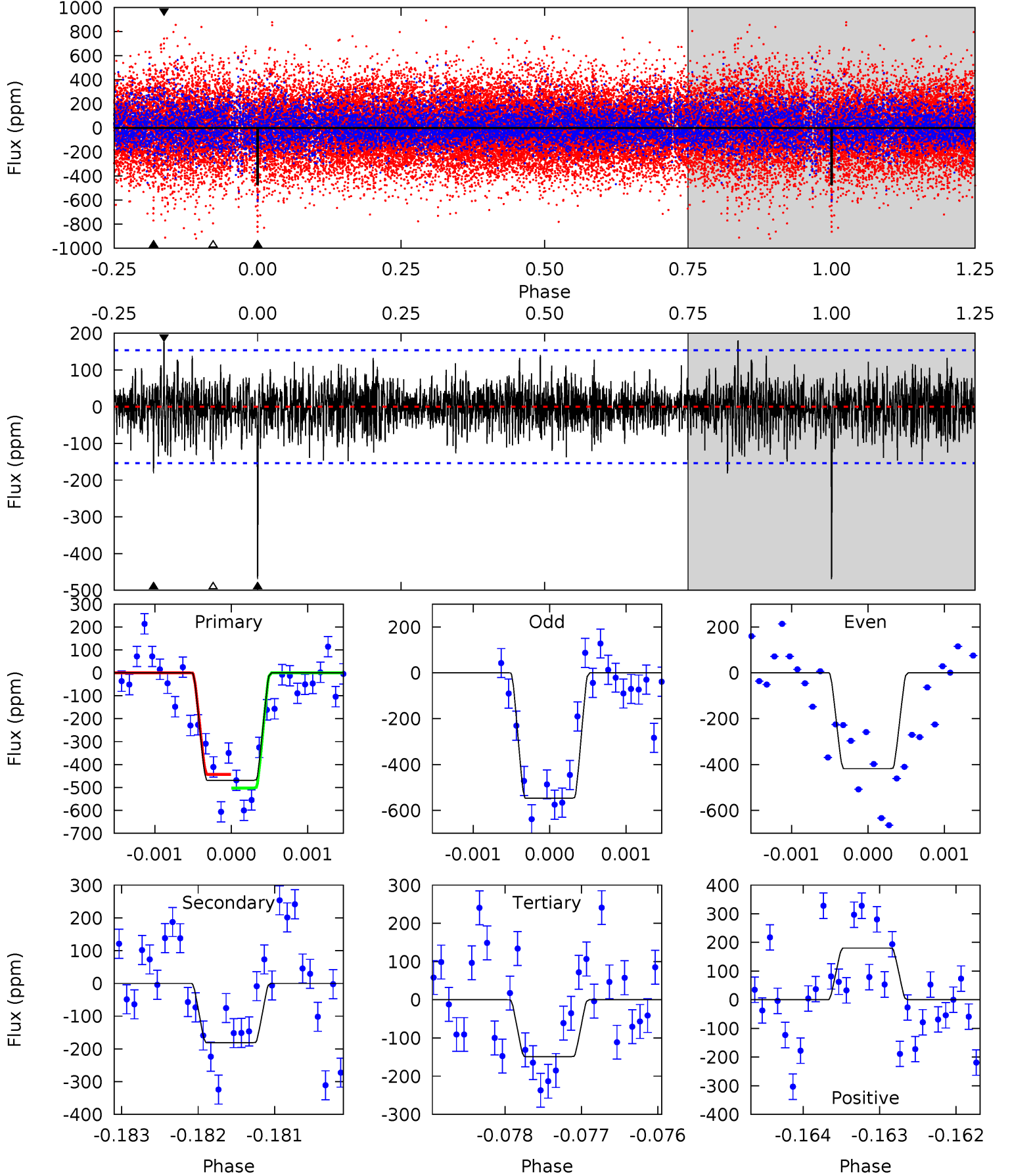
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.3	8.21	8.15	8.80	5.37	3.16	2.16	11.1	10.5	0.06	-0.59	4.98	0.95	0.31	0.77



Alt Model-Shift Uniqueness Test

009413816-02, $P = 323.653968$ Days, $E = 88.213797$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	6.38	5.24	6.35	5.41	3.22	1.51	11.3	10.2	1.14	0.03	2.22	0.82	0.28	1.03



Stellar Parameters For KIC 009413816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7286^{+228}_{-304}	$4.112^{+0.158}_{-0.175}$	$-0.220^{+0.250}_{-0.350}$	$1.755^{+0.528}_{-0.384}$	$1.454^{+0.211}_{-0.257}$	$0.379^{+0.356}_{-0.183}$
	+3%/-4%	+4%/-4%	+114%/-159%	+30%/-22%	+15%/-18%	+94%/-48%
Source	KIC0	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 009413816-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-217 ± 26	$5.16^{+0.91}_{-0.81}$	585^{+45}_{-42}	5380^{+321}_{-287}	4828^{+1896}_{-1362}
Alt.	-181 ± 28	$4.27^{+0.82}_{-0.67}$	585^{+45}_{-41}	5608^{+390}_{-370}	5842^{+2575}_{-1830}

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

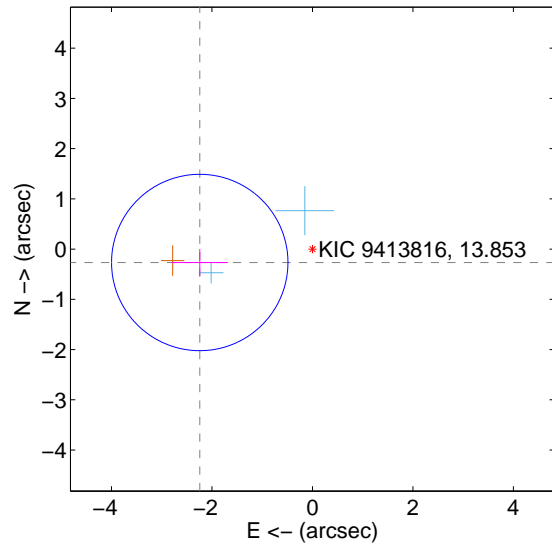
Supplemental centroid analysis for 009413816-02. Kepler magnitude: 13.85. Transit SNR 9.44

There are 2 quarters with good PRF difference image offsets

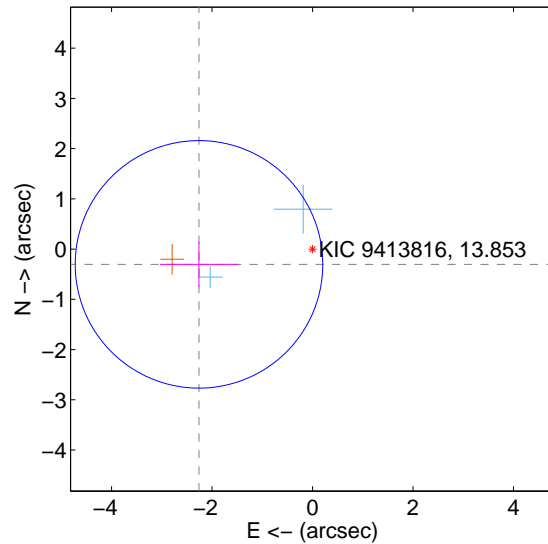
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.259 ± 0.585	3.86	2.243 ± 0.560	-0.267 ± 0.269
PRF-fit source offset from KIC position	2.280 ± 0.821	2.78	2.260 ± 0.776	-0.304 ± 0.448
photometric centroid source offset	0.85 ± 0.58	1.47	0.51 ± 0.51	0.68 ± 0.62

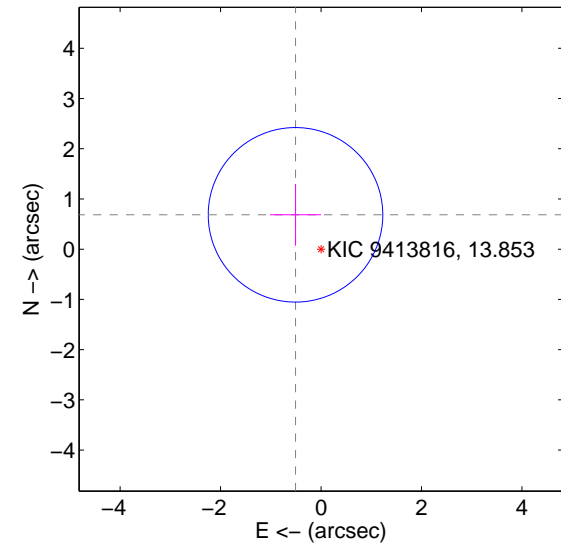
offset from difference PRF-fit to OOT PRF-fit



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.

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



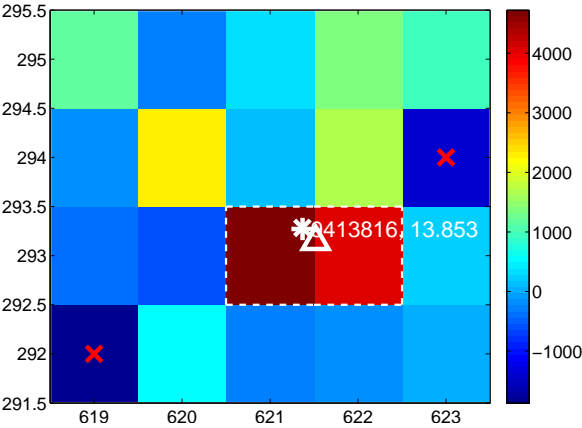
Q3 no difference image



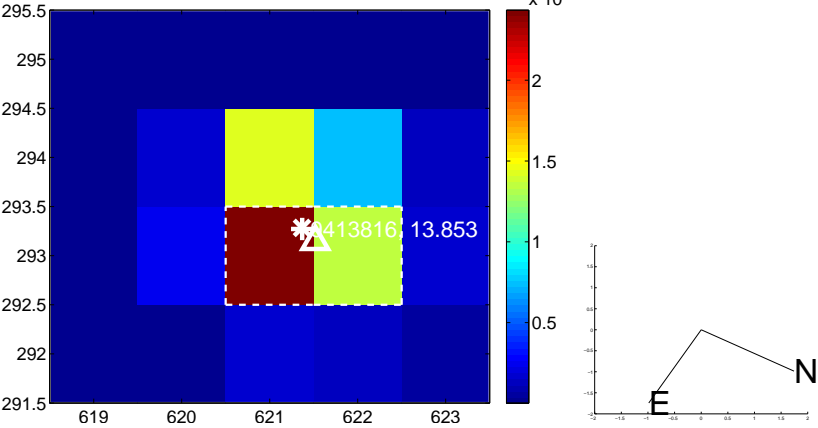
Q3 no OOT image



Q4 difference image



Q4 OOT image



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.

Q9 no difference image



Q9 no OOT image



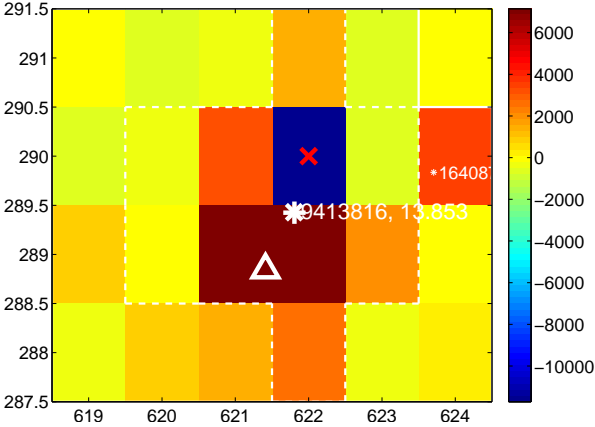
Q10 no difference image



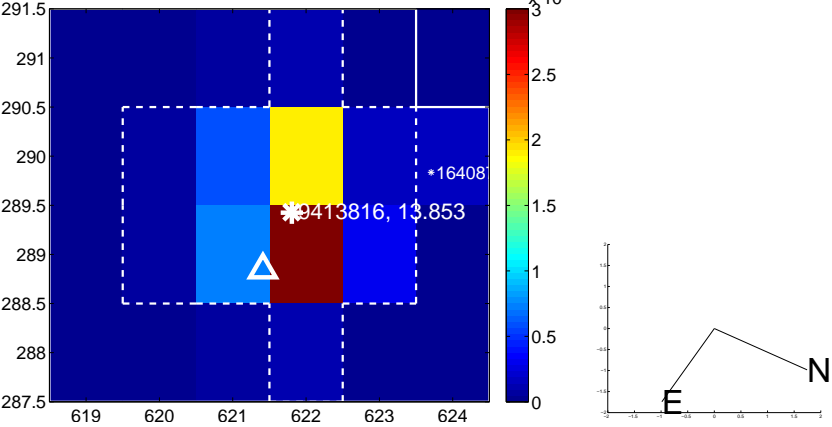
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



Q12 no difference image

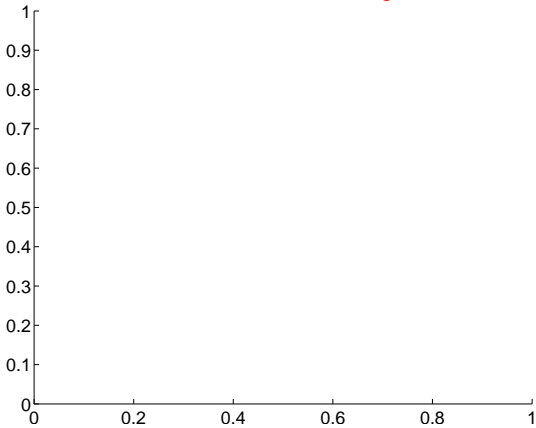


Q12 no OOT image



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

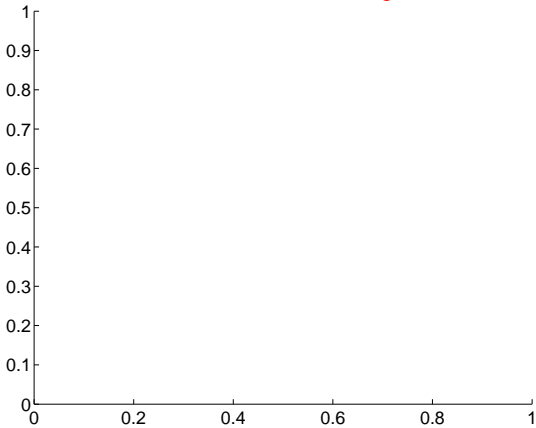
Q13 no difference image



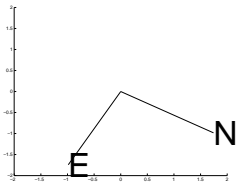
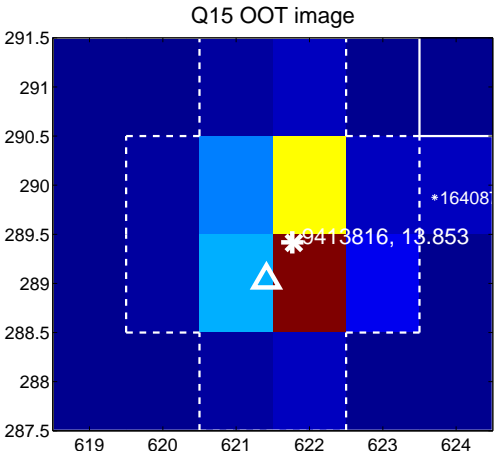
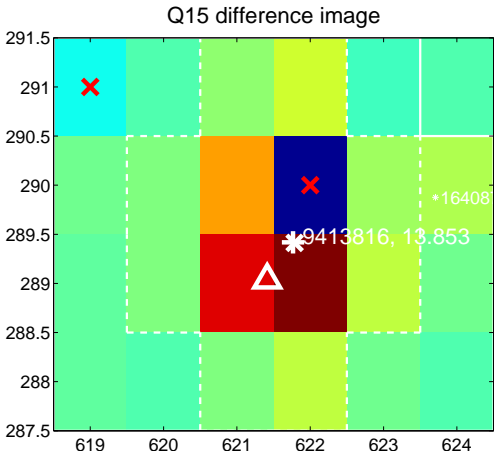
Q13 no OOT image



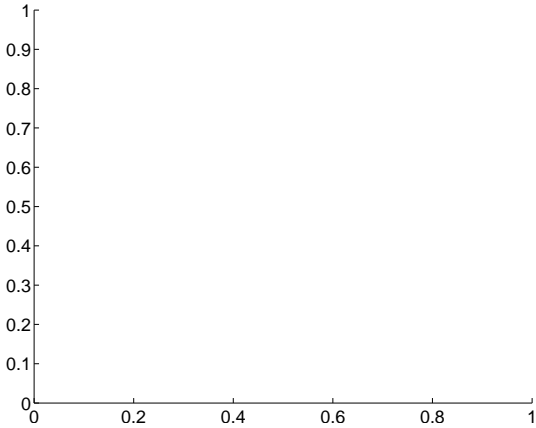
Q14 no difference image



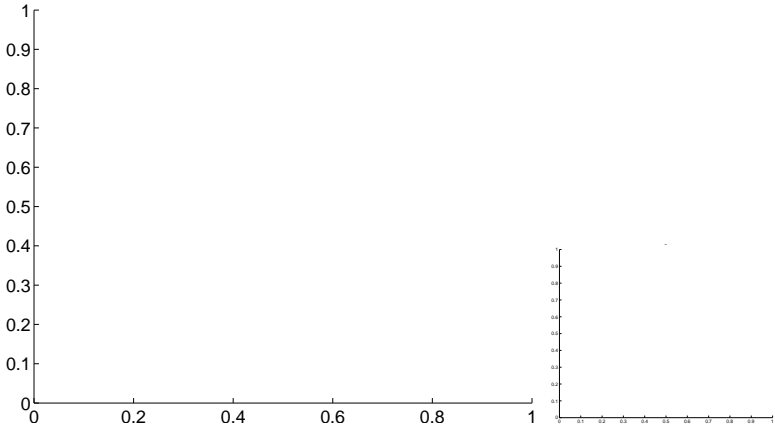
Q14 no OOT image



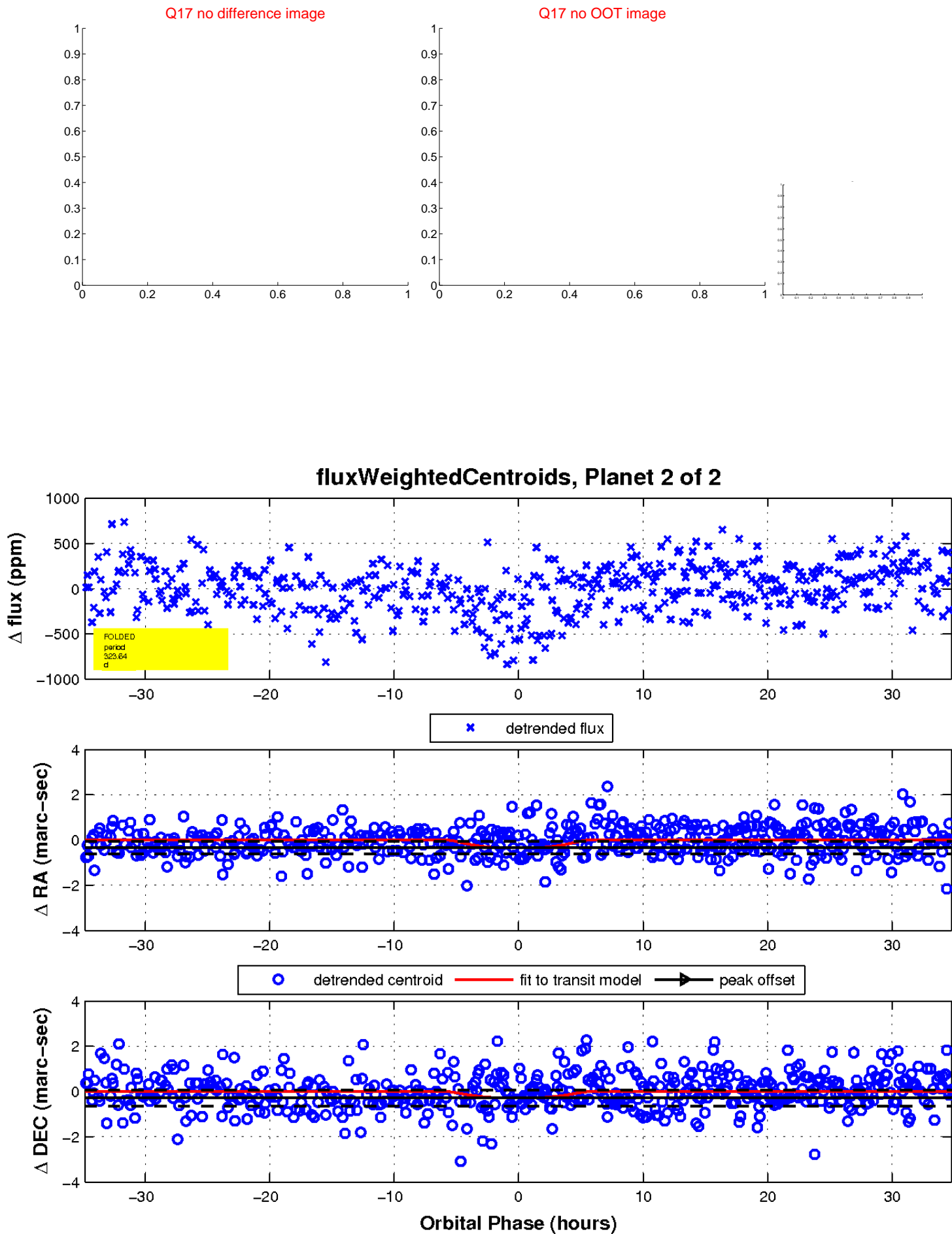
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

