

KIC 009241509

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})
009241509-01	OBS	No	0.586089	131.933227	21.3	1.990	11.8	8.4	2.48	6883	1.32	50945.30
009241509-02	OBS	No	1.172169	132.244767	28.1	3.408	9.6	9.2	2.48	6883	1.53	20217.86

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009241509-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009241509-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_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.

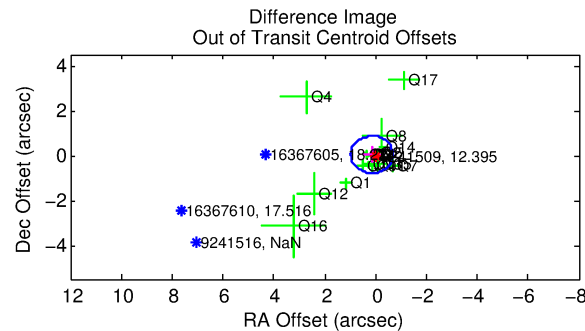
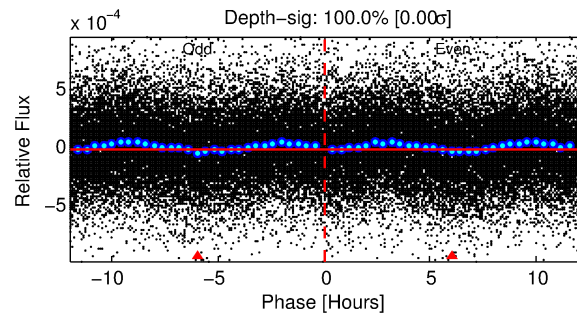
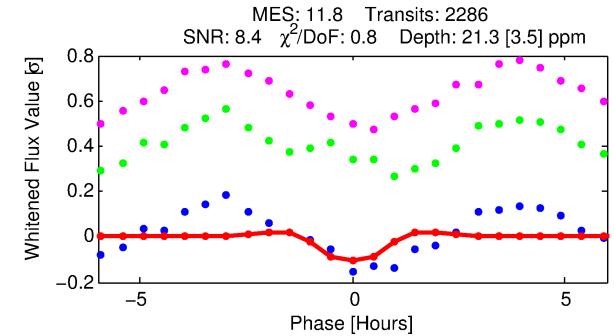
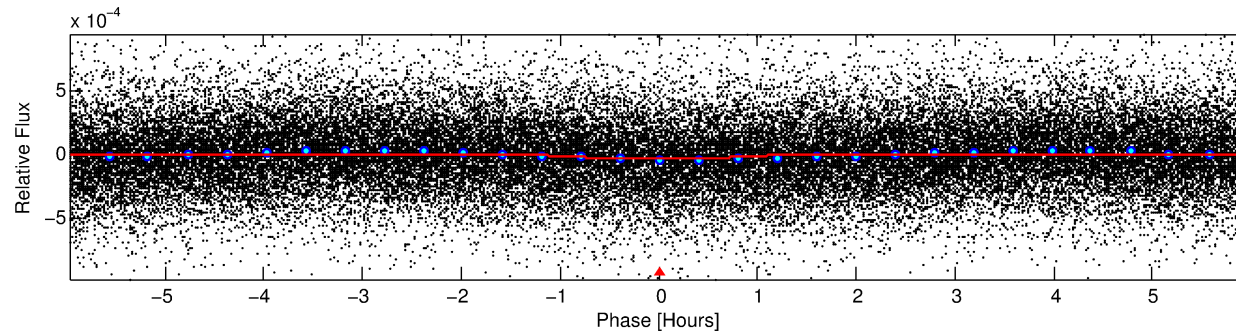
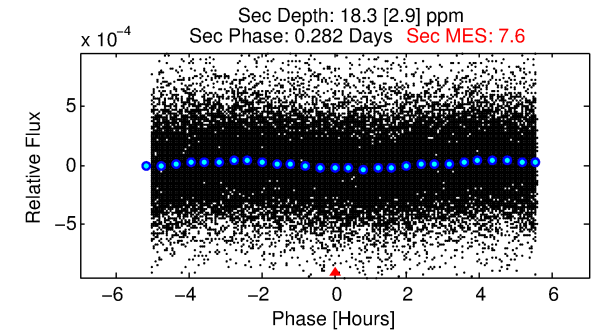
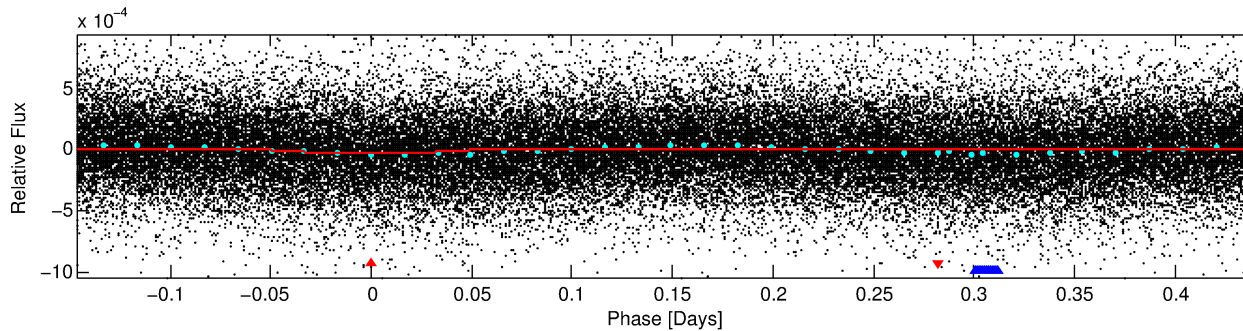
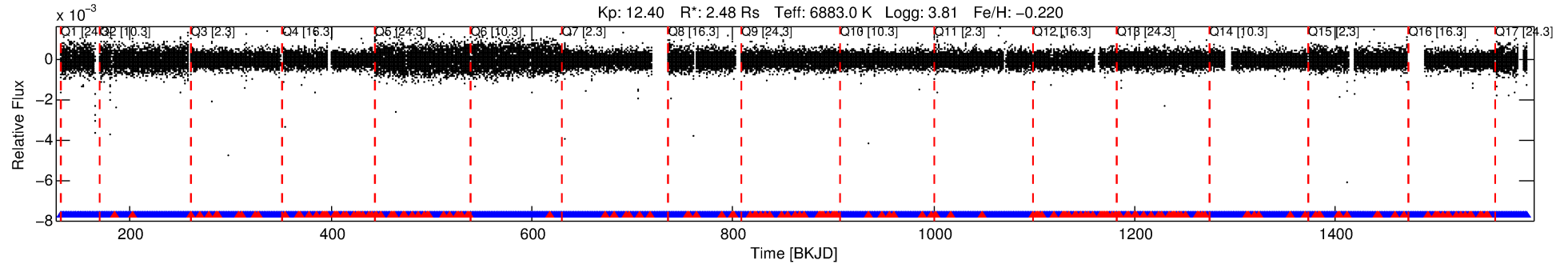
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009241509-01

No Significant Match Found

DV One-Page Summary

KIC: 9241509 Candidate: 1 of 2 Period: 0.586 d



DV Fit Results:

Period = 0.58609 [0.00001] d
Epoch = 131.9332 [0.0031] BKJD
Rp/R* = 0.0049 [0.0019]
a/R* = 1.42 [1.67]
b = 0.89 [0.58]
Seff = 50945.30 [36443.78]
Teq = 3831 [685] K
Rp = 1.32 [0.77] Re
a = 0.0155 [0.0066] AU
Ag = 1.40 [1.50] [0.27σ]
Teffp = 6442 [1325] K [1.75σ]

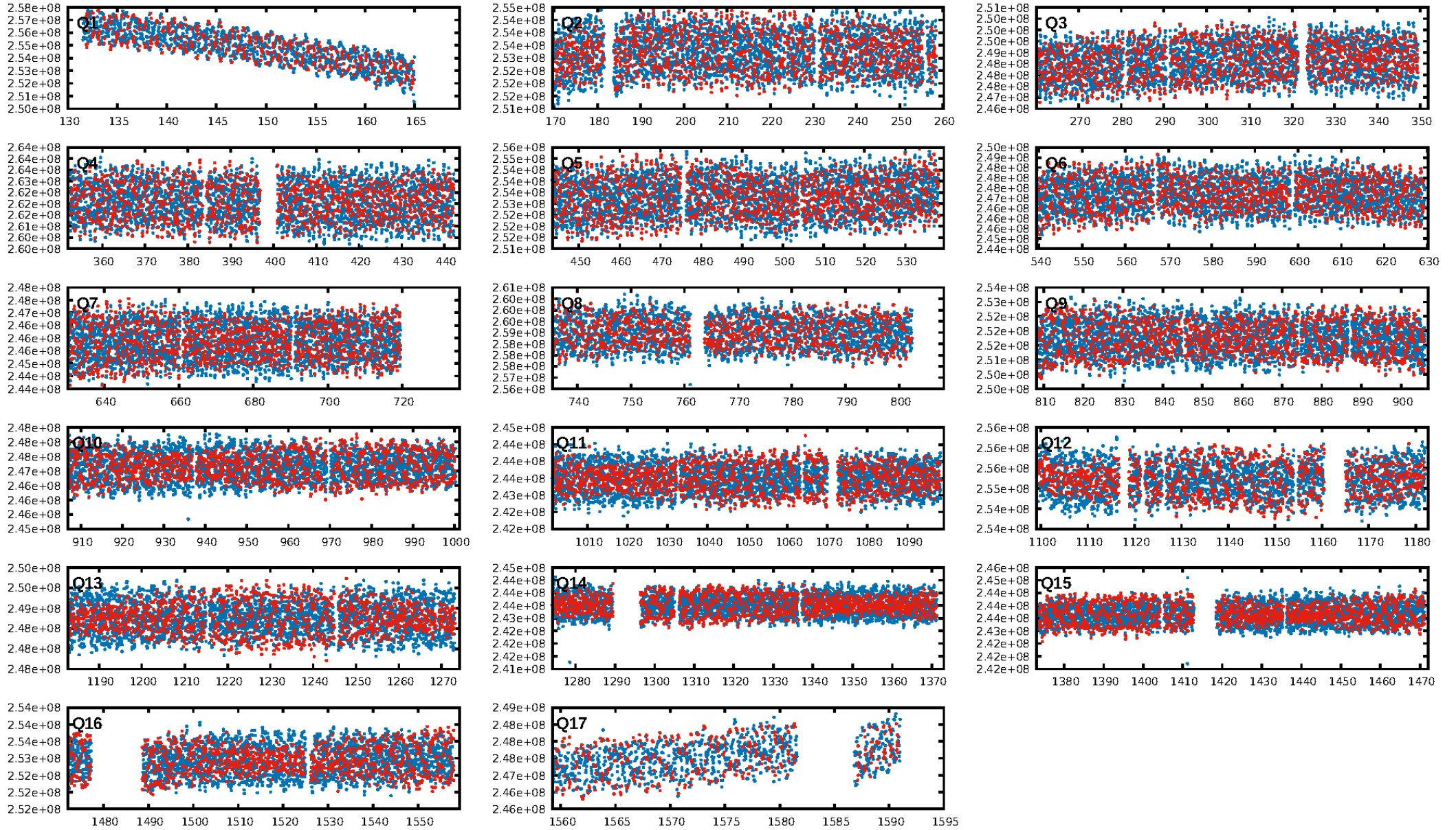
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [3.56σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 7.62e-31
RollingBand-fgt: 0.91 [1998/2184]
GhostDiagnostic-chr: 2.525
Centroid-sig: N/A
Centroid-so: 1.211 arcsec [1.62σ]
OotOffset-rm: 0.155 arcsec [0.56σ]
KicOffset-rm: 0.122 arcsec [0.48σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.71 [12/17]
DiffImageOverlap-fno: 0.00 [0/17]

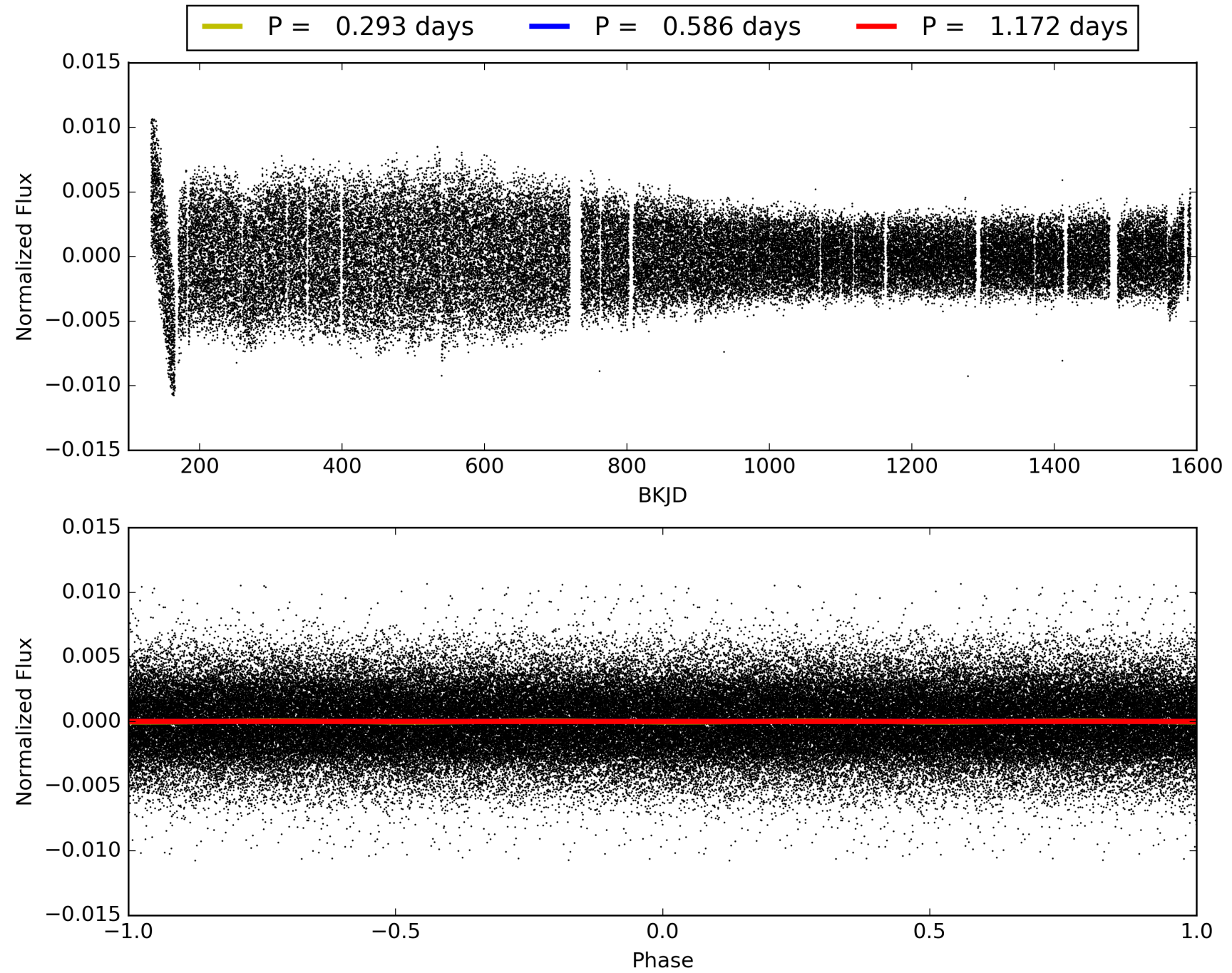
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:14:13 Z

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

TCE 009241509-01, PDC Light Curves

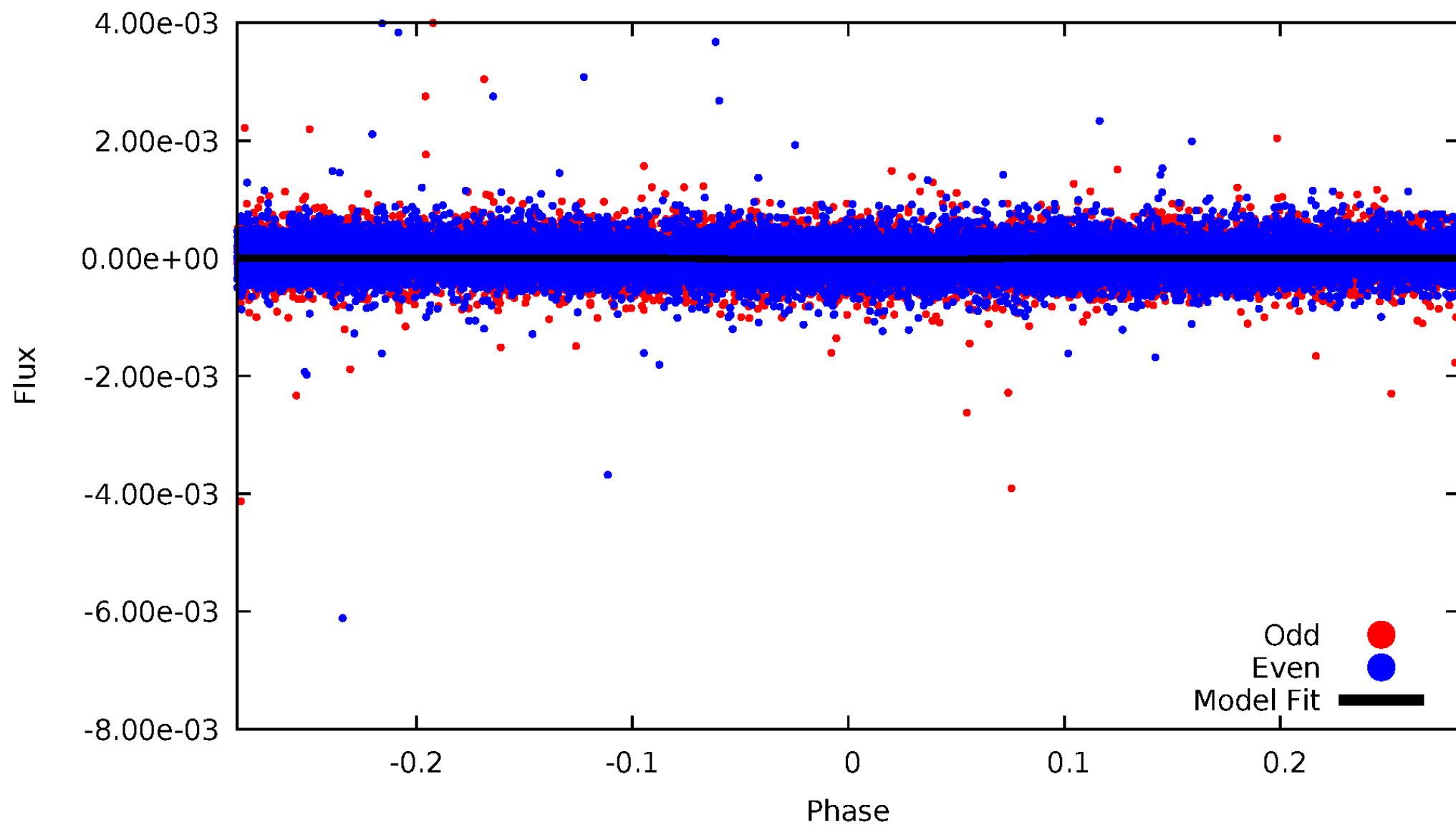


TCE 009241509-01



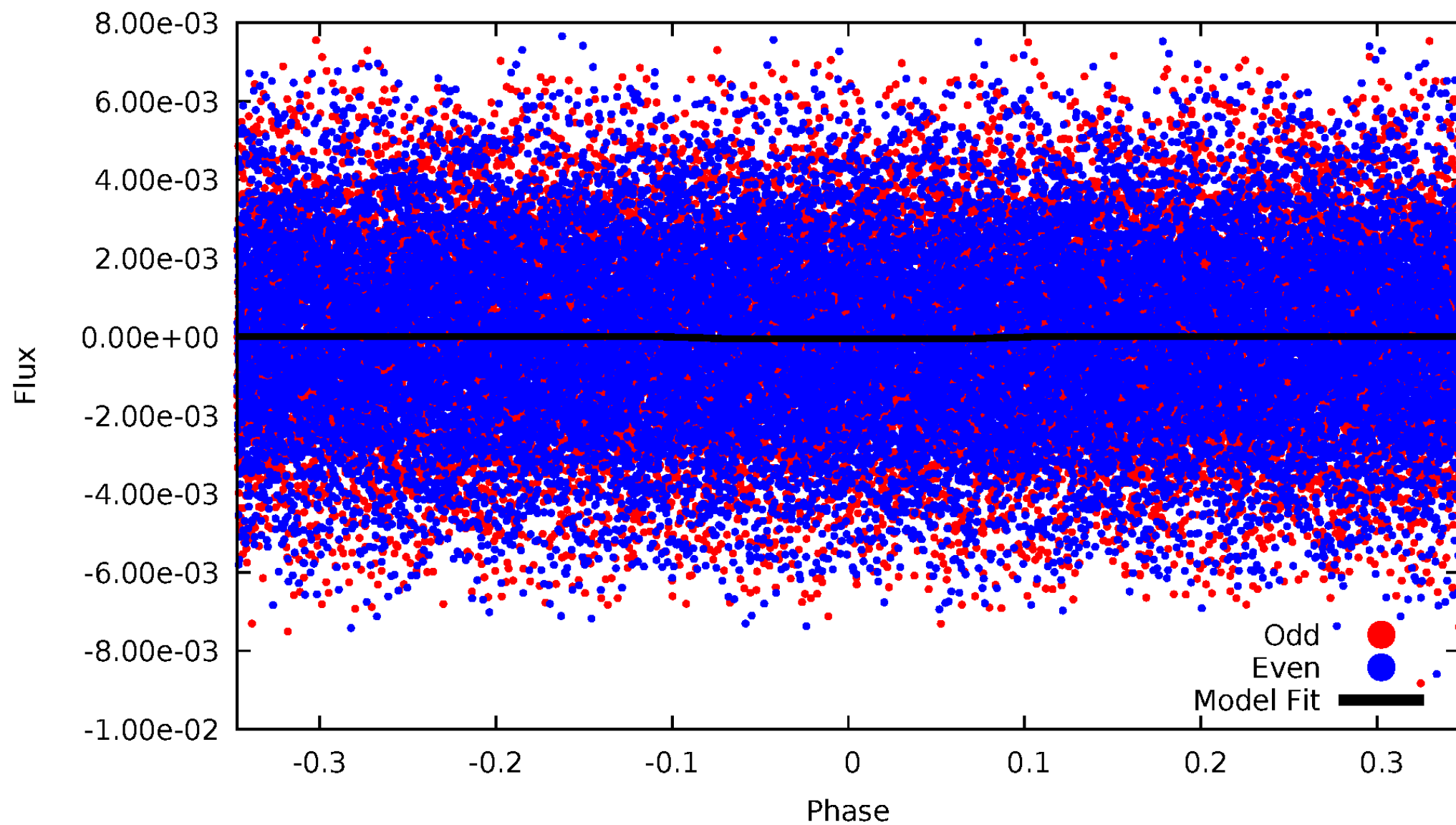
DV Odd/Even

TCE 009241509-01



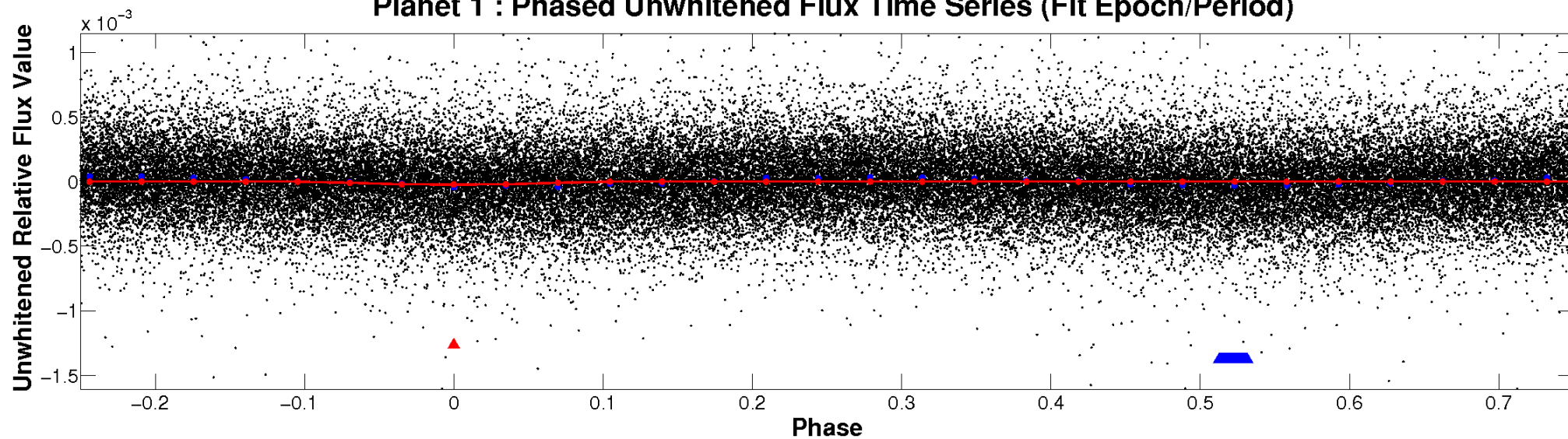
ALT Odd/Even

TCE 009241509-01

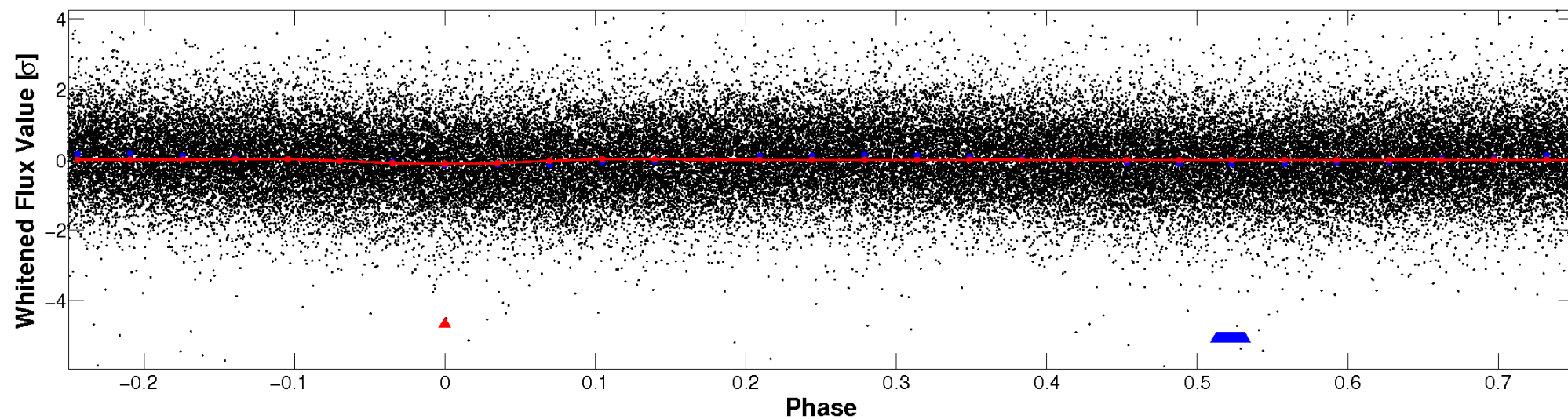


Non-Whitened Vs. Whitened Light Curve

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

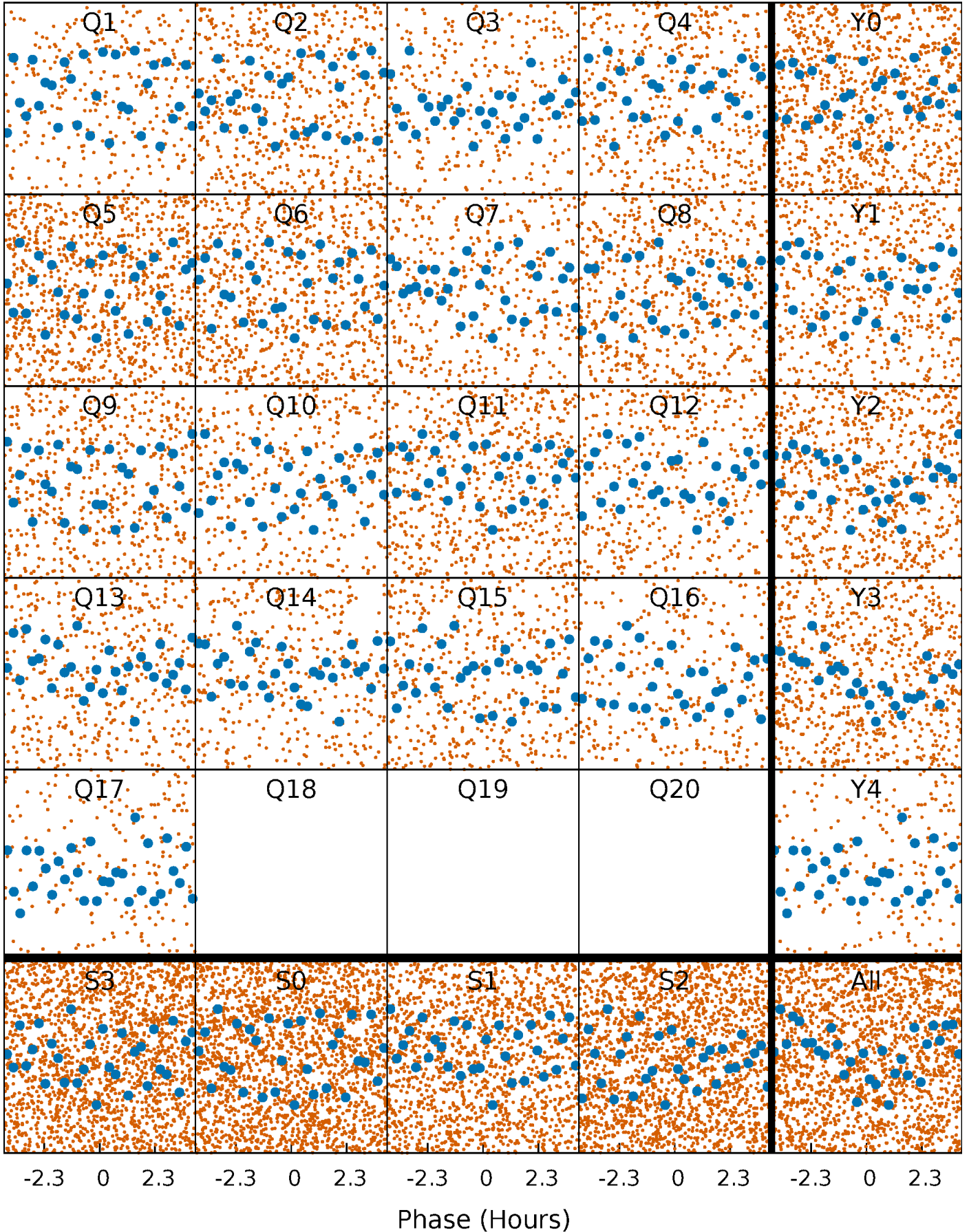


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



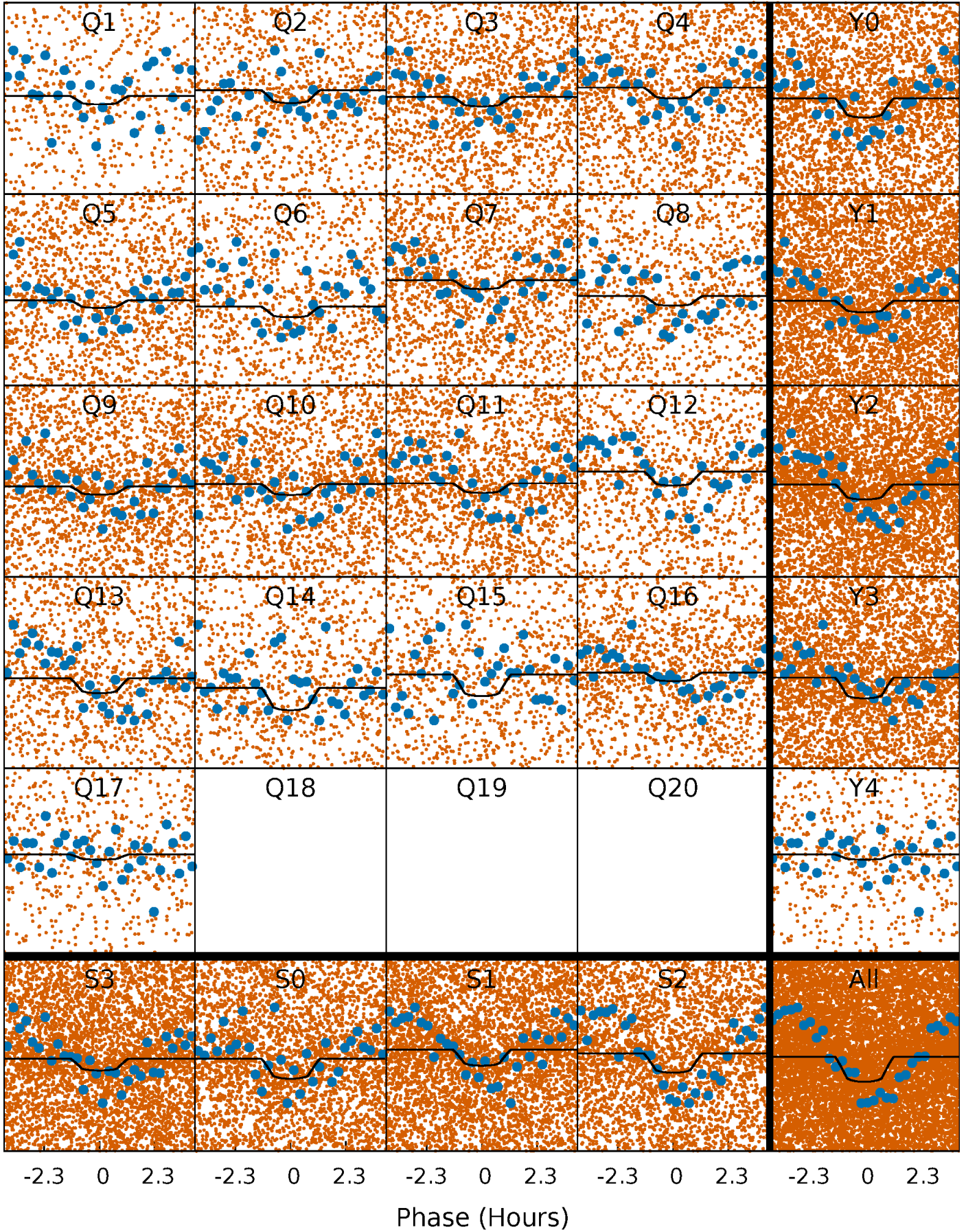
PDC Quarter-Phased Transit Curves

TCE 009241509-01 P= 0.586089 Days $T_0=131.933227$ (BKJD)



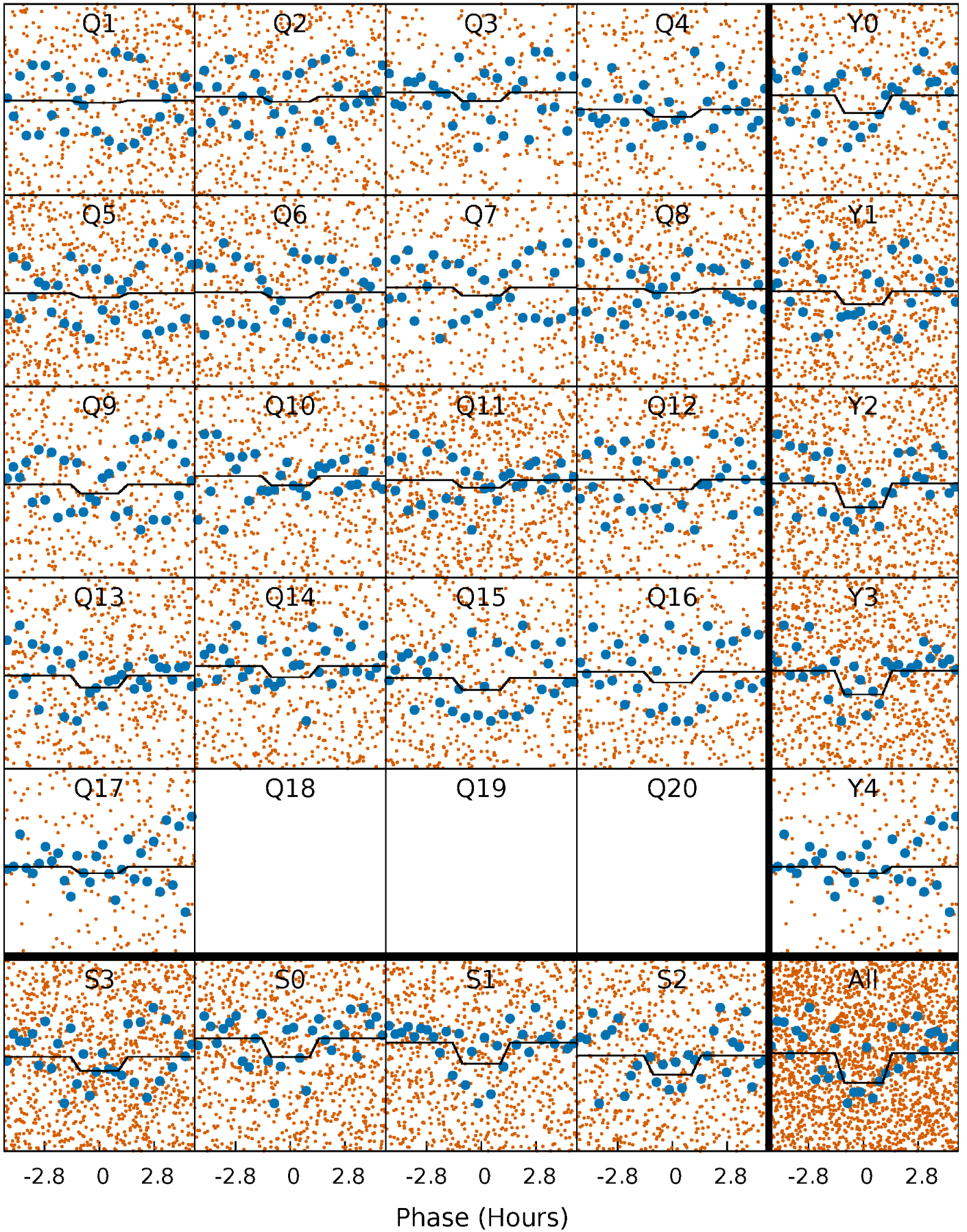
DV Quarter-Phased Transit Curves

TCE 009241509-01 P= 0.586089 Days $T_0=131.933227$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

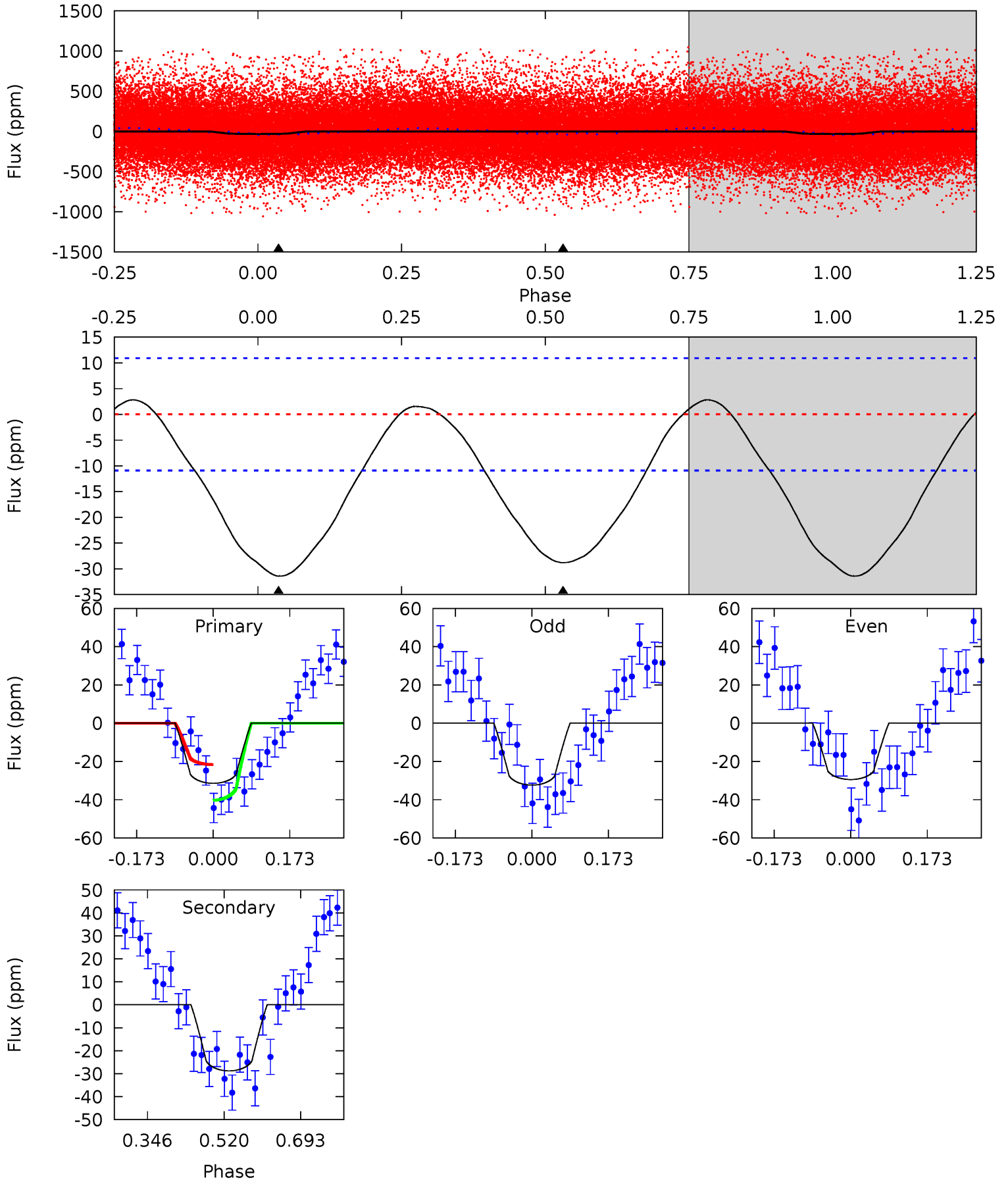
TCE 009241509-01 P= 0.586116 Days $T_0=131.929622$ (BKJD)



DV Model-Shift Uniqueness Test

009241509-01, P = 0.586089 Days, E = 131.347138 Days

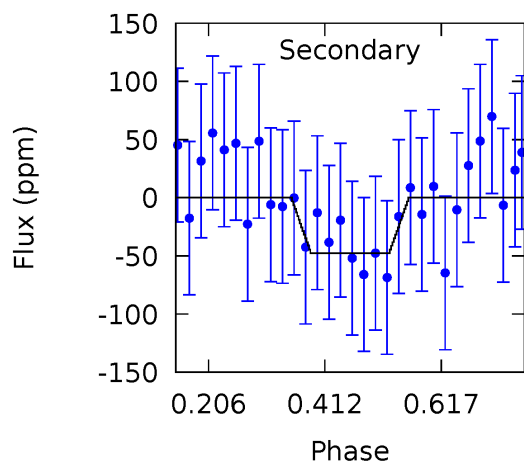
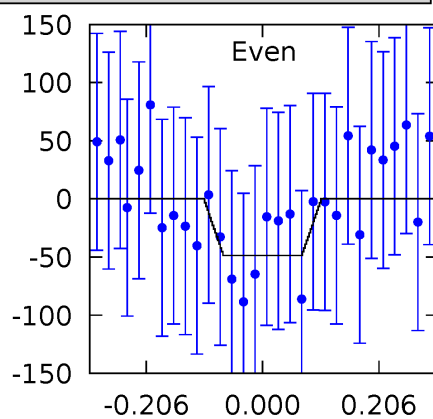
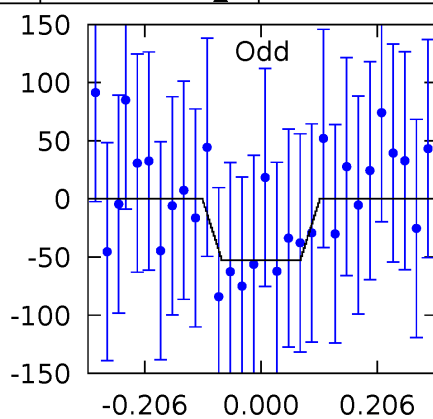
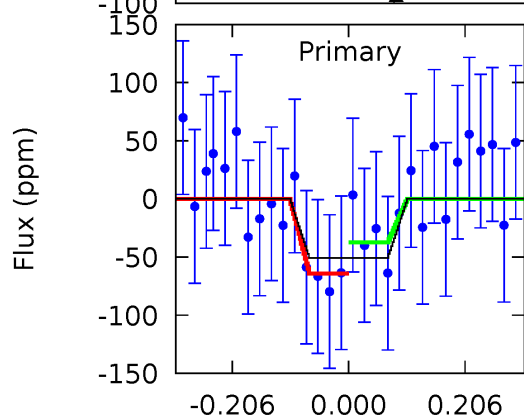
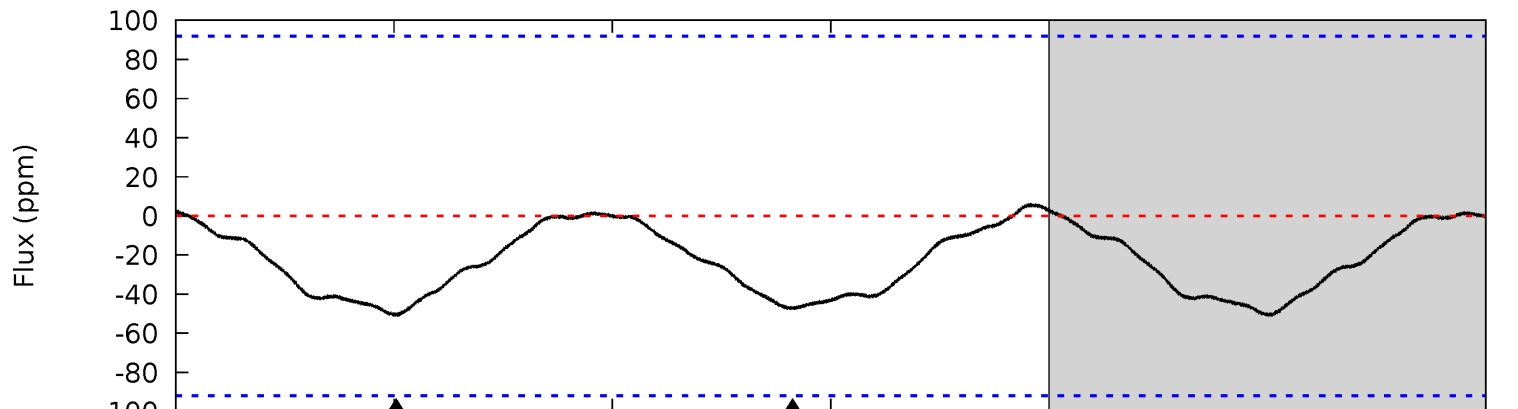
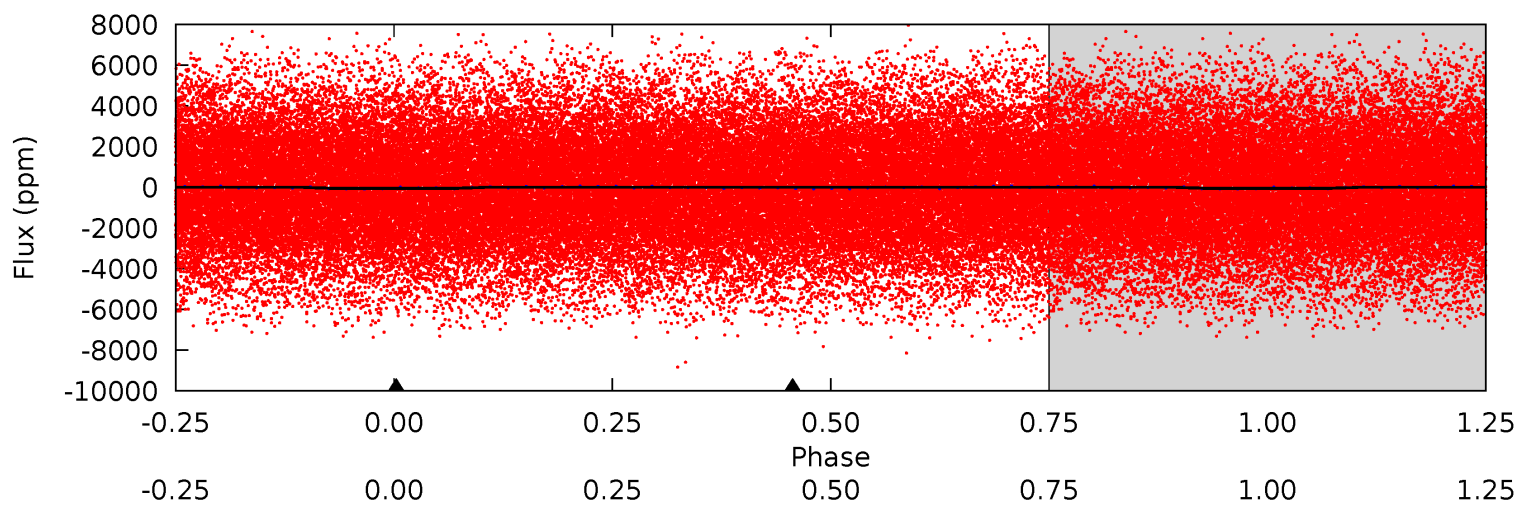
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	11.7	0	0	4.45	1.36	0.97	12.8	12.8	11.7	11.7	0.59	1.13	0.08	3.80



Alt Model-Shift Uniqueness Test

009241509-01, P = 0.586116 Days, E = 131.343506 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.44	2.29	0	0	4.41	1.27	0.19	2.44	2.44	2.29	2.29	0.10	1.00	0.11	0.65



Stellar Parameters For KIC 009241509

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	ρ_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6883^{+190}_{-262}	$3.815^{+0.416}_{-0.104}$	$-0.220^{+0.250}_{-0.300}$	$2.475^{+0.568}_{-1.055}$	$1.460^{+0.231}_{-0.308}$	$0.136^{+0.482}_{-0.054}$
	+3%/-4%	+11%/-3%	+114%/-136%	+23%/-43%	+16%/-21%	+355%/-40%
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 009241509-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-29 ± 2	$1.18^{+0.61}_{-0.49}$	5206^{+386}_{-599}	7042^{+3117}_{-1399}	$2.780^{+5.267}_{-1.574}$
Alt.	-48 ± 21	$1.74^{+0.61}_{-0.60}$	5181^{+388}_{-565}	6494^{+1902}_{-1357}	$2.083^{+2.943}_{-1.184}$

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

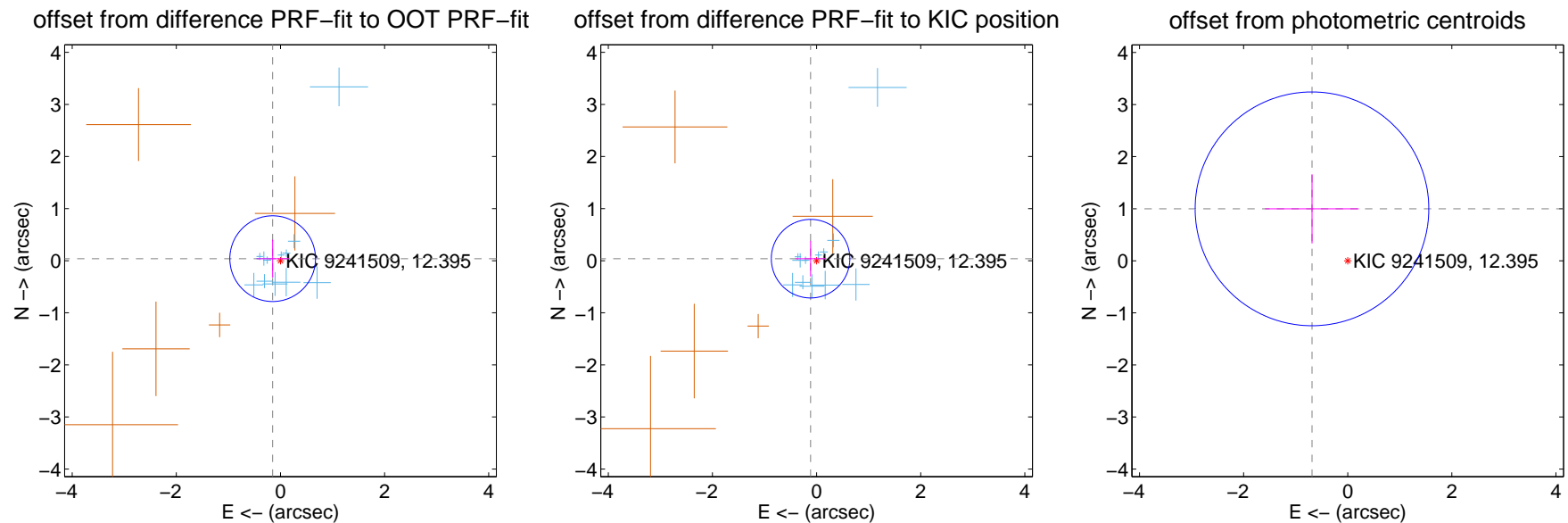
DV Centroid Data

Supplemental centroid analysis for 009241509-01. Kepler magnitude: 12.39. Transit SNR 8.45

There are 12 quarters with good PRF difference image offsets

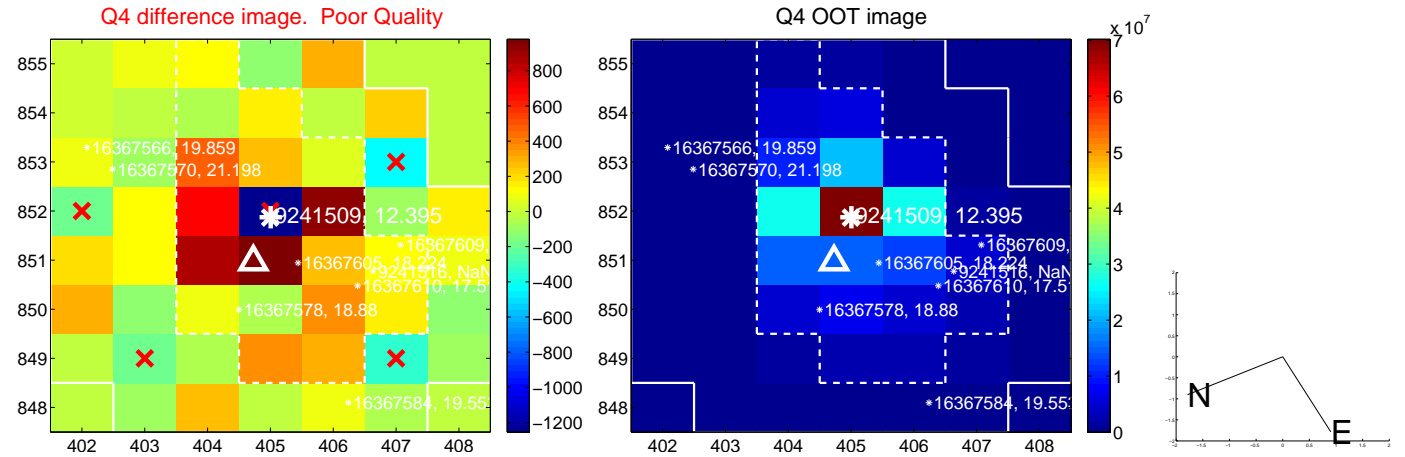
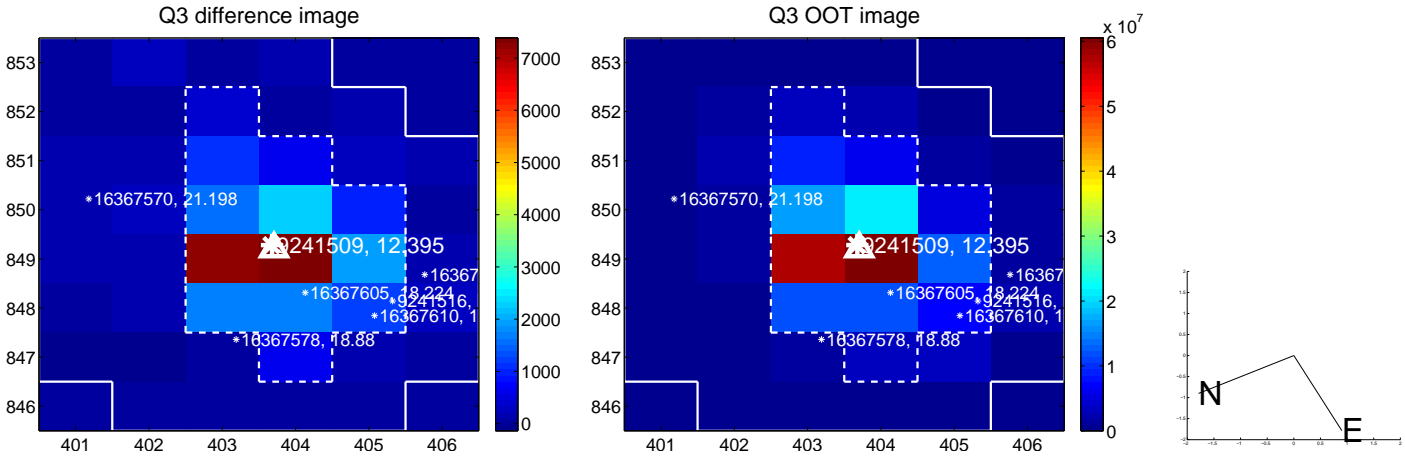
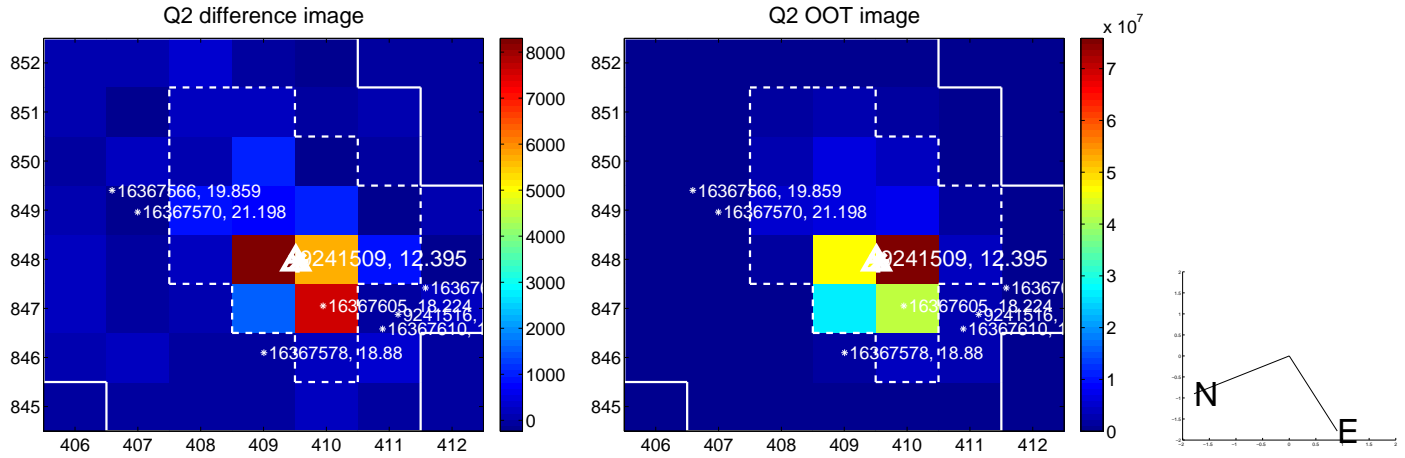
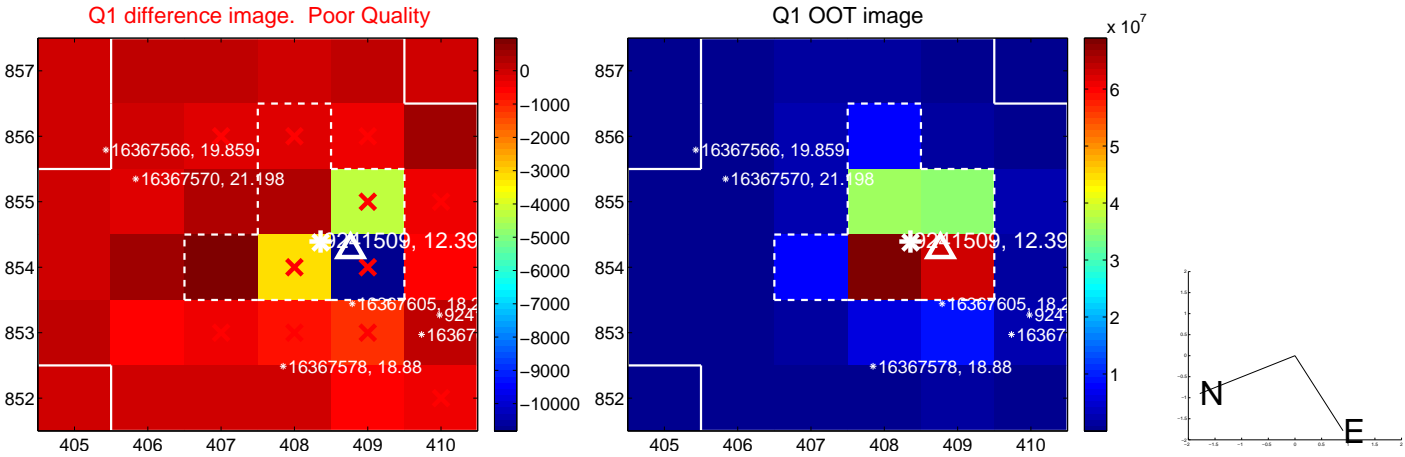
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.155 ± 0.274	0.56	0.150 ± 0.309	0.039 ± 0.364
PRF-fit source offset from KIC position	0.122 ± 0.251	0.48	0.115 ± 0.289	0.039 ± 0.342
photometric centroid source offset	1.21 ± 0.75	1.62	0.69 ± 0.90	1.00 ± 0.66

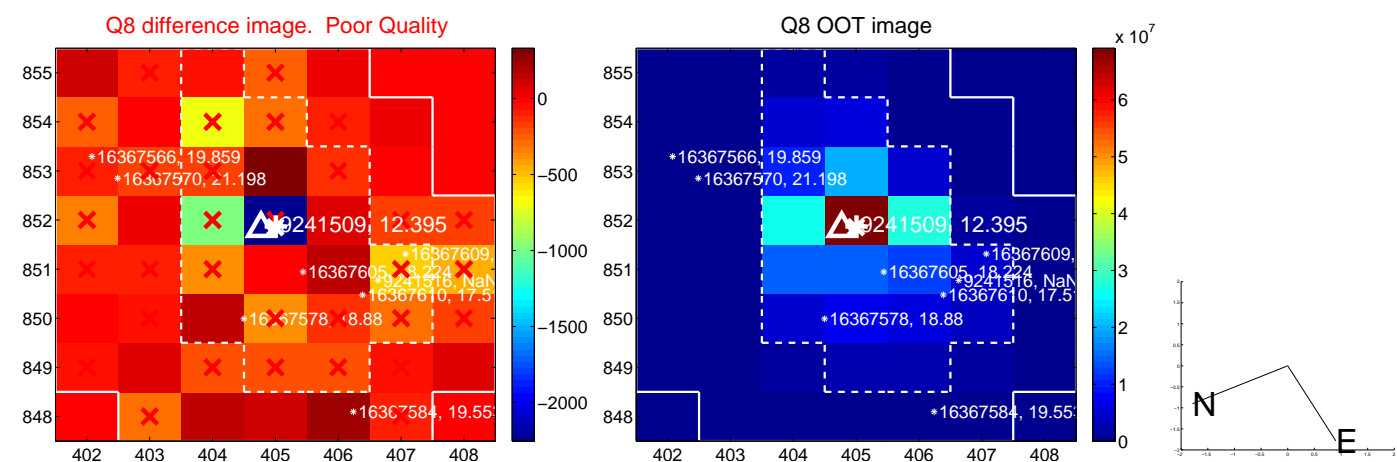
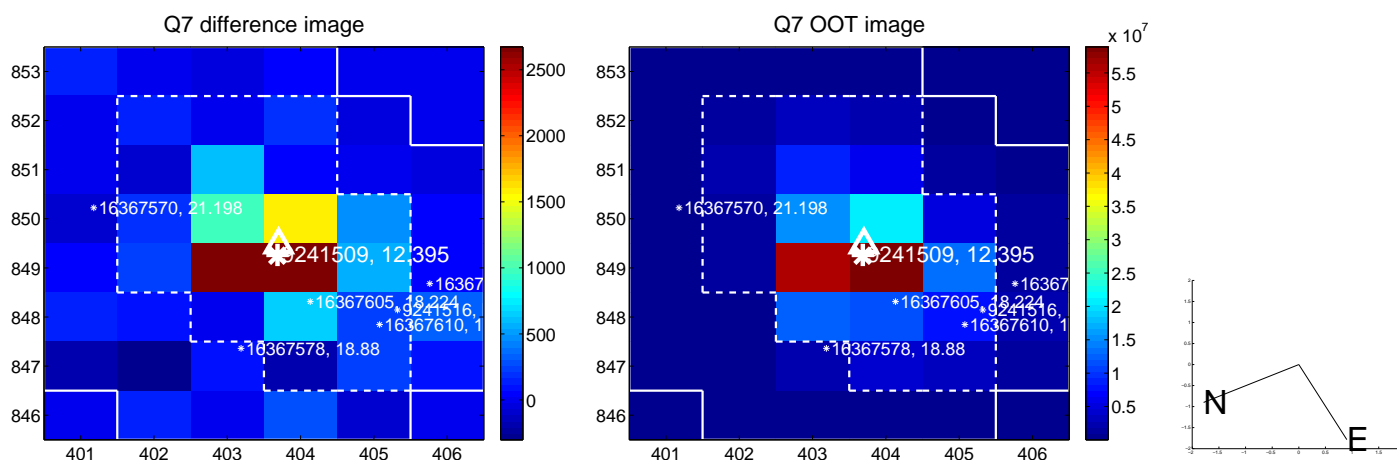
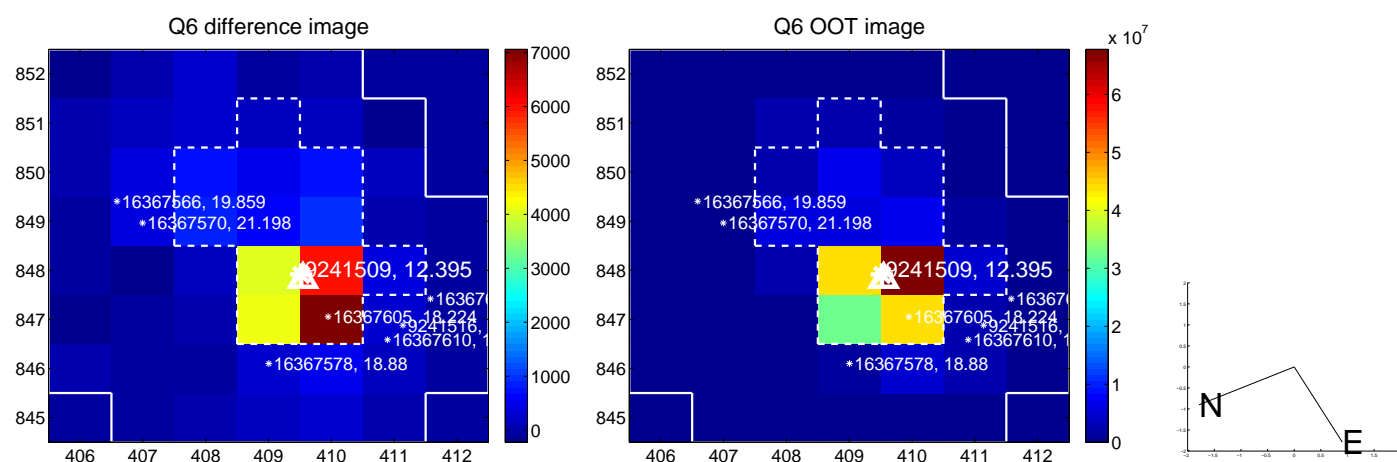
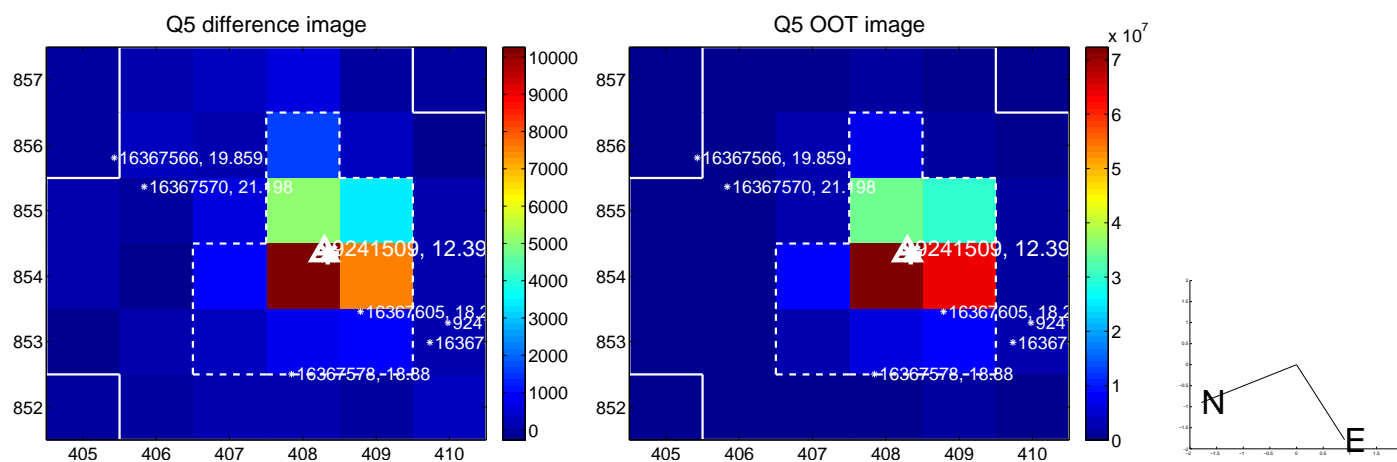


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

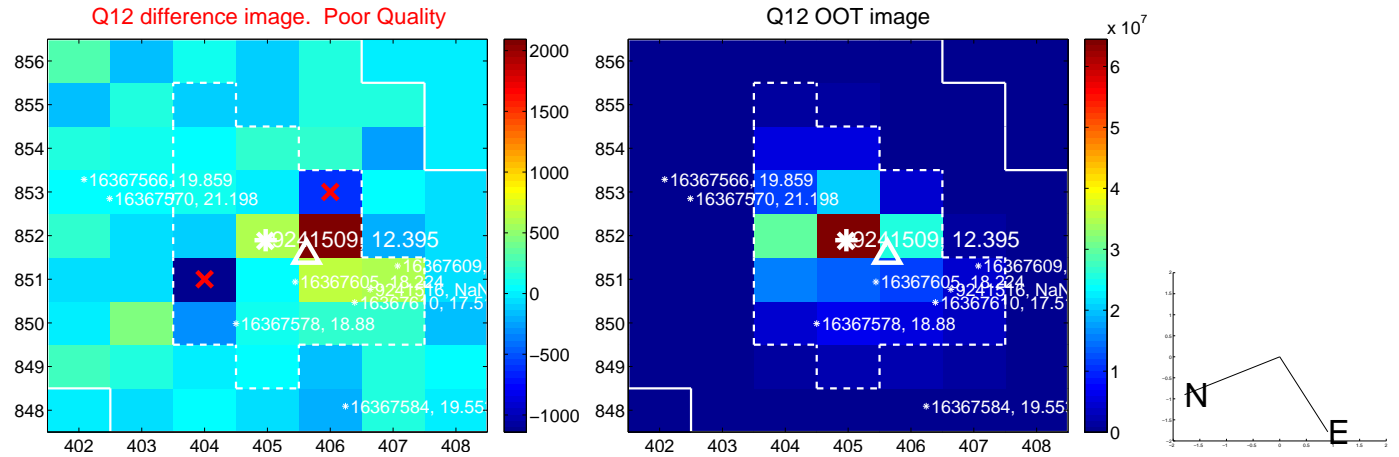
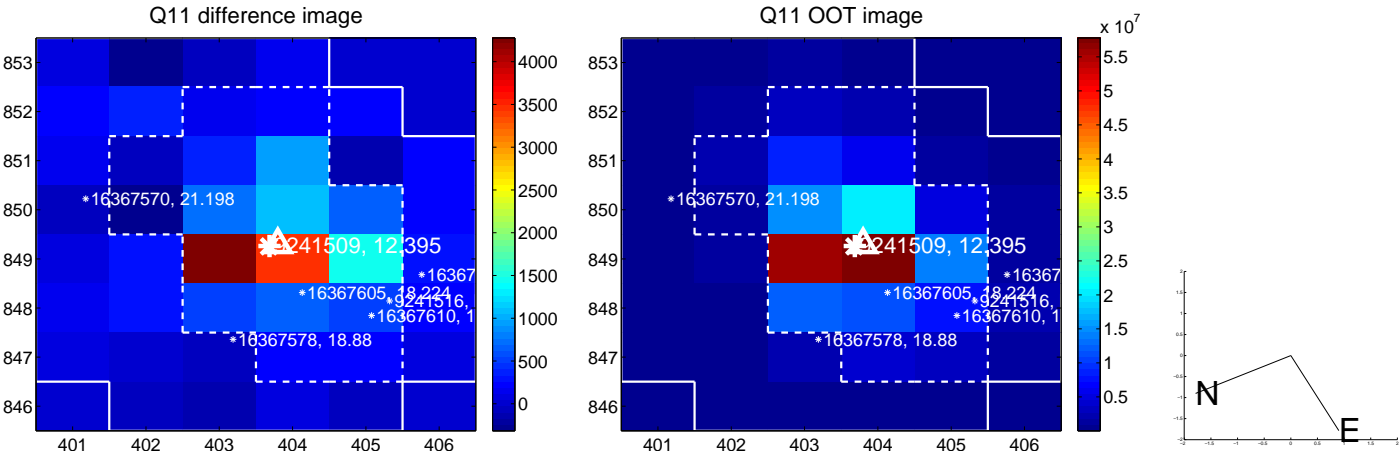
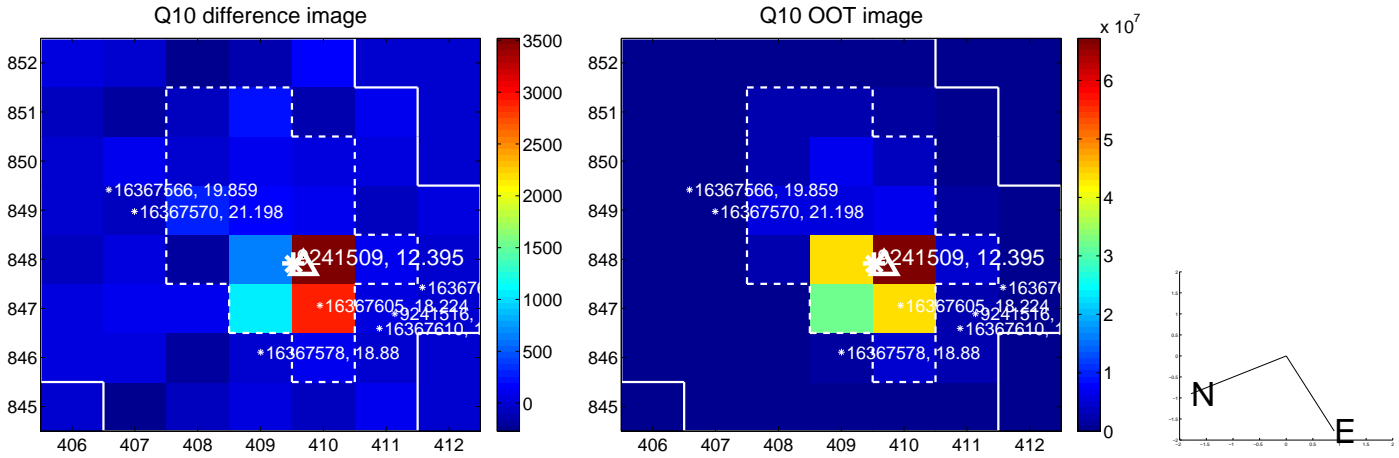
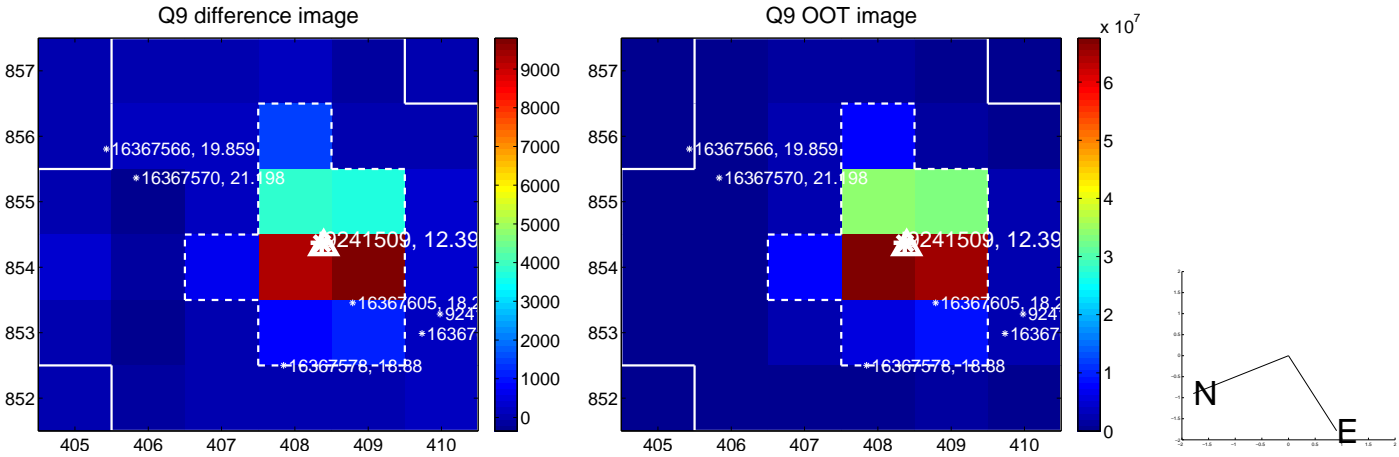
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



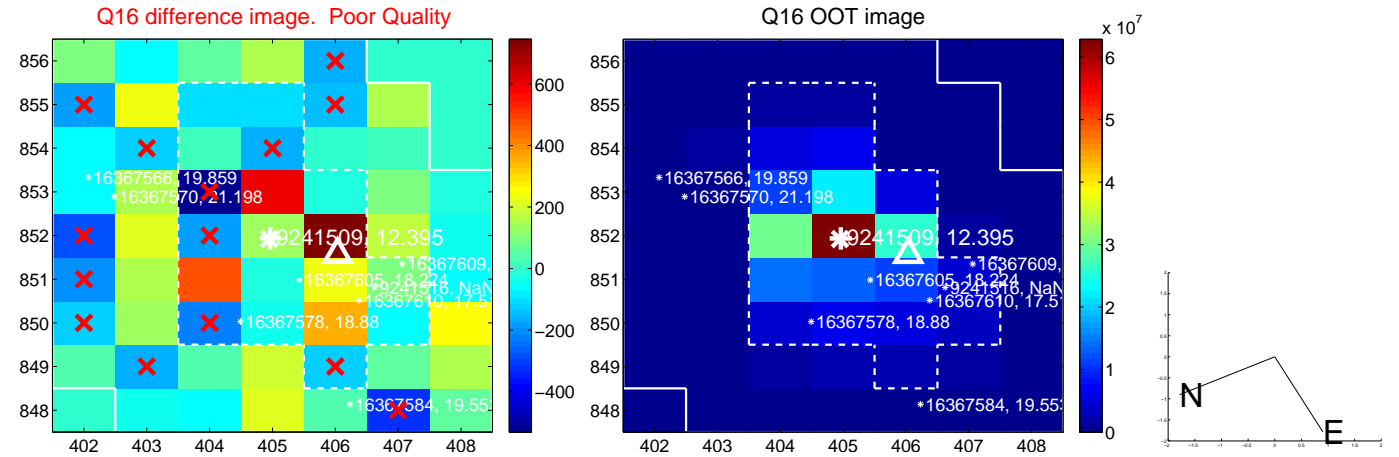
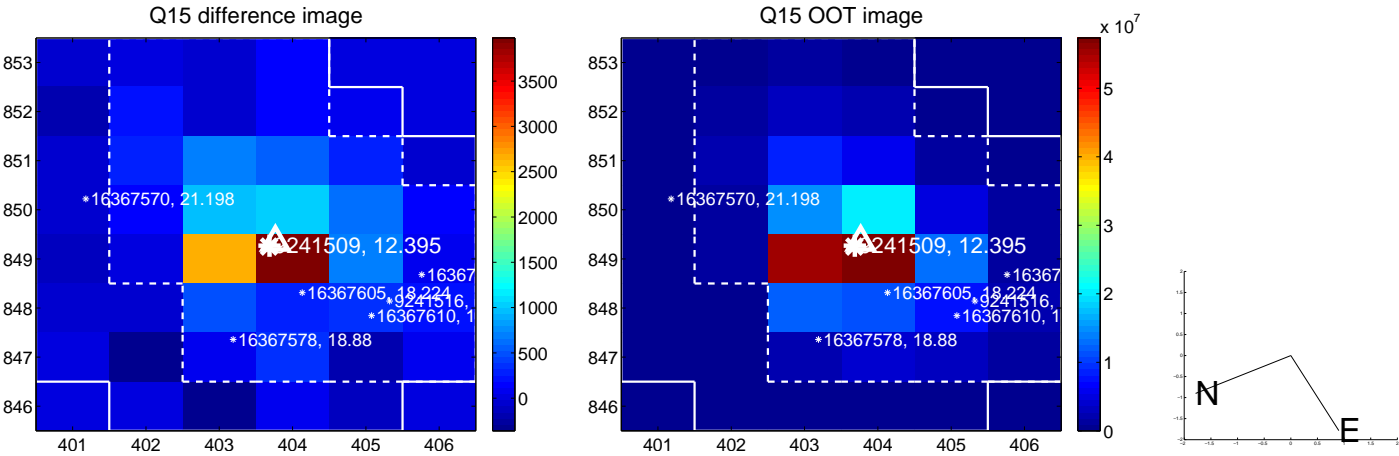
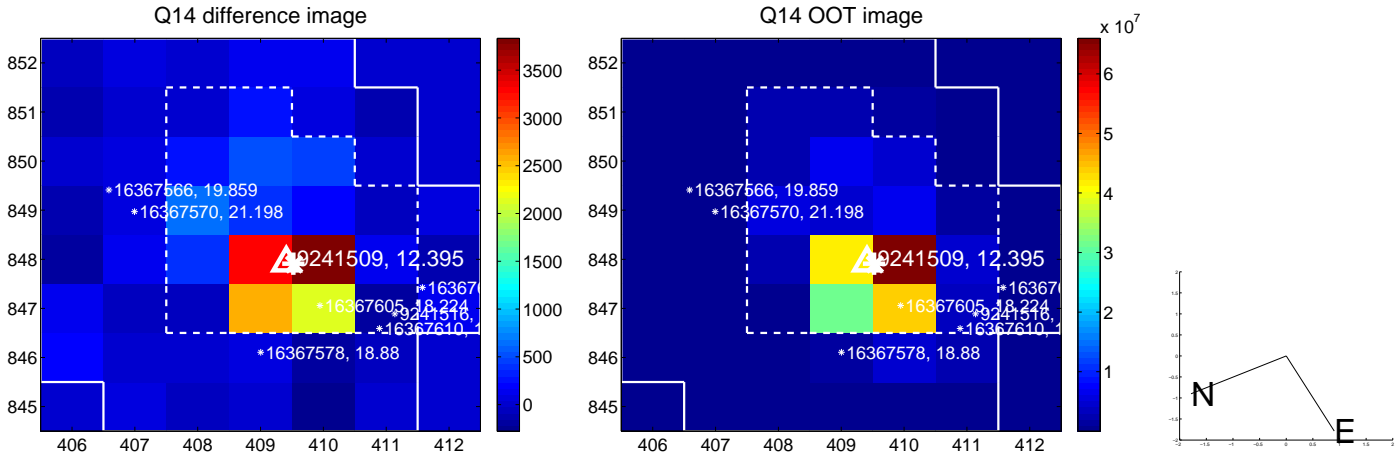
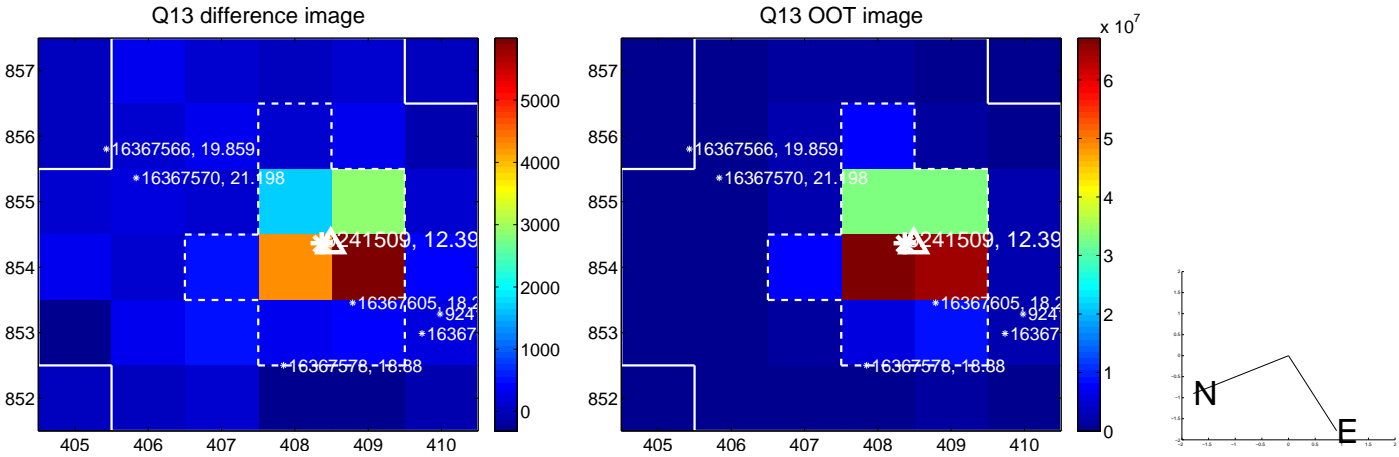
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



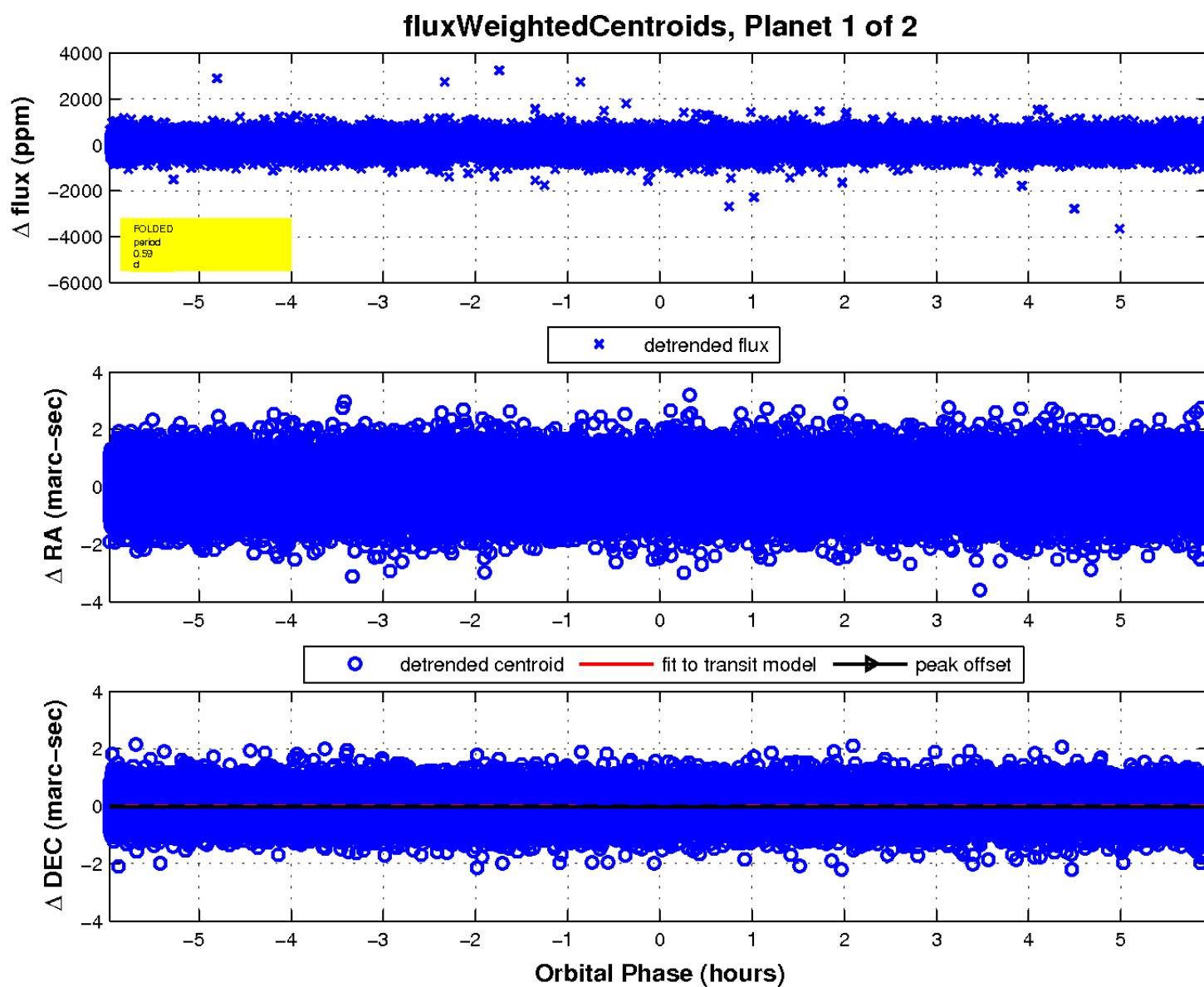
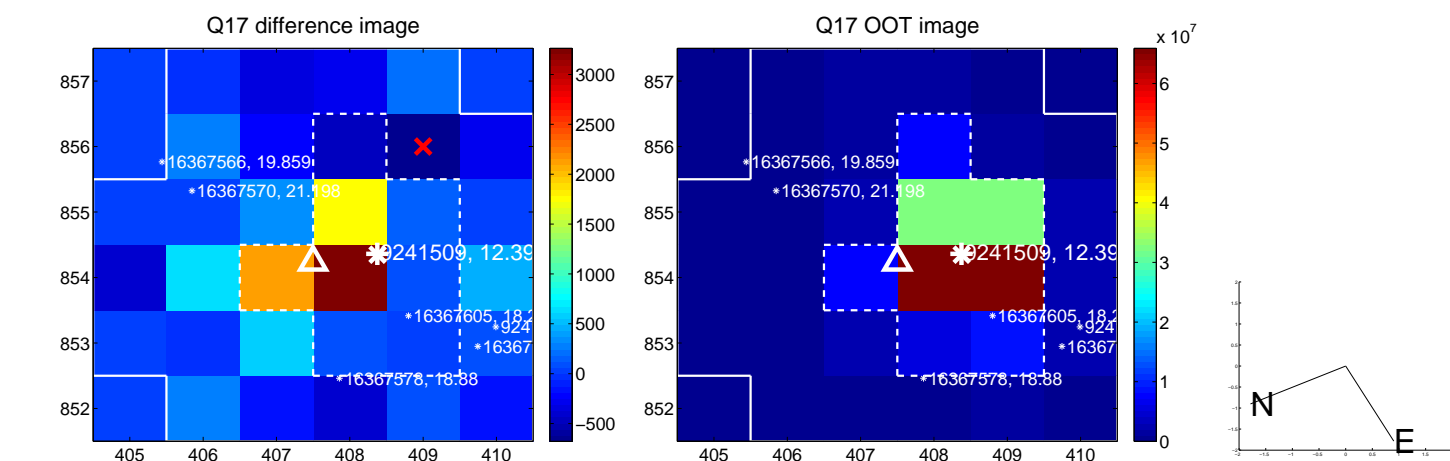
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

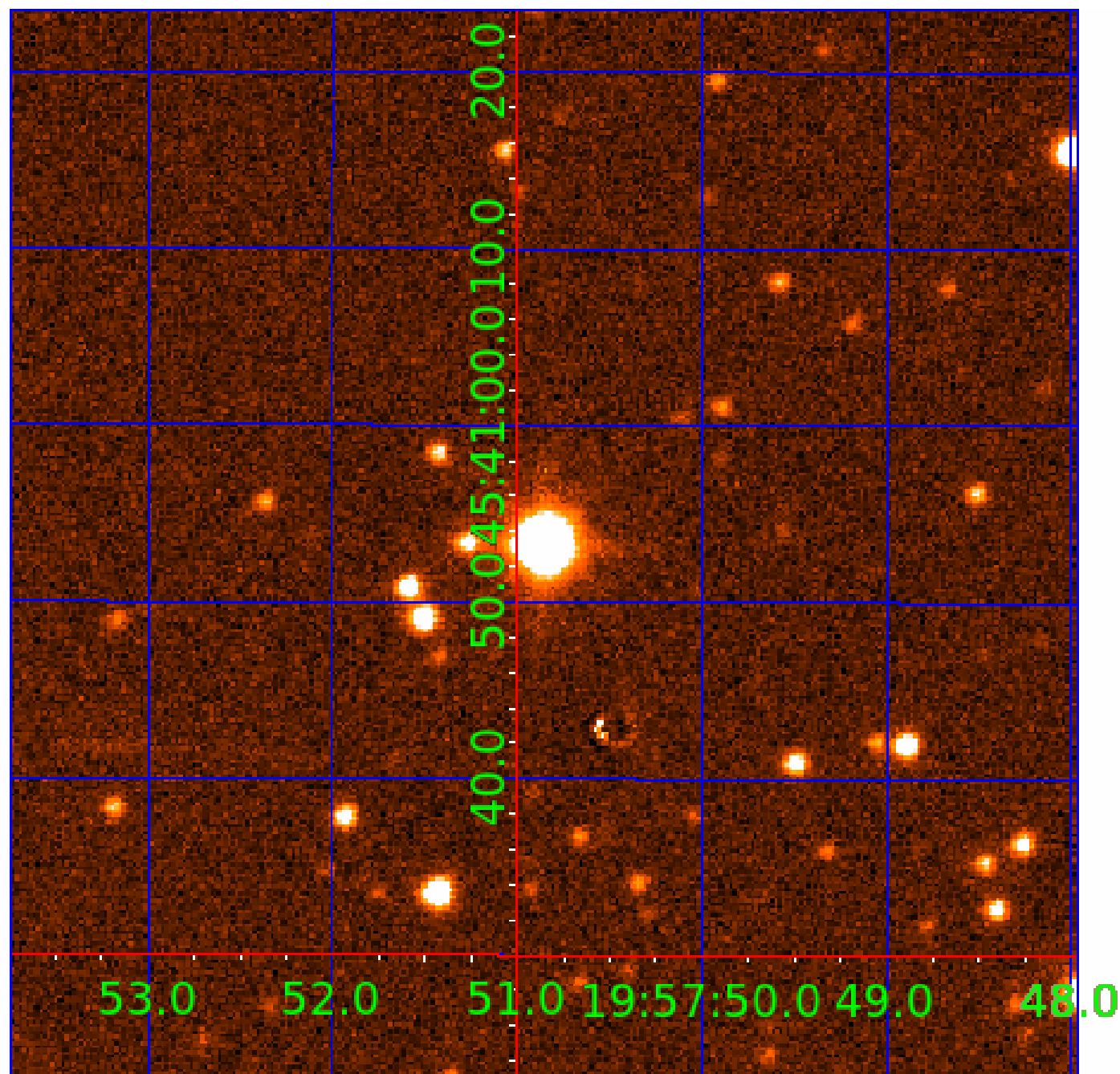


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009241509

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})
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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009241509-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_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.

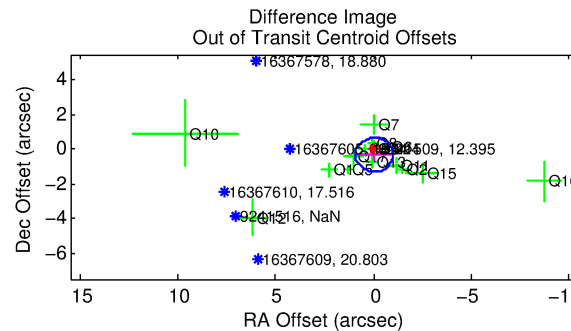
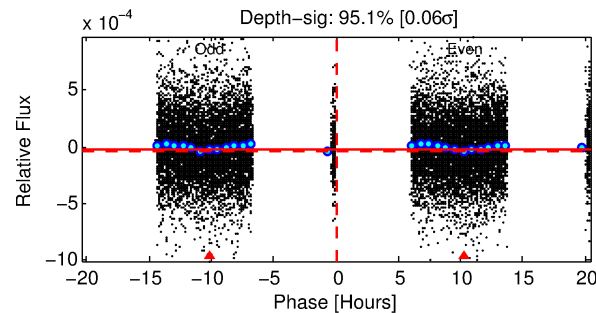
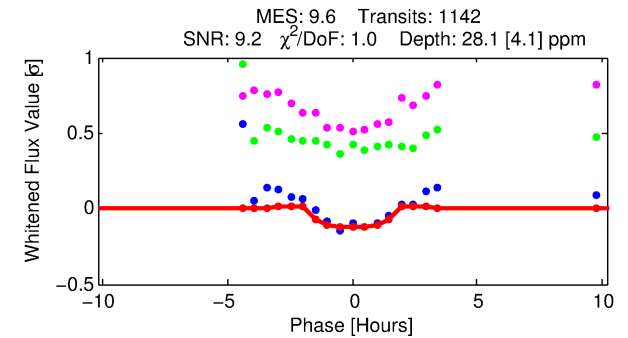
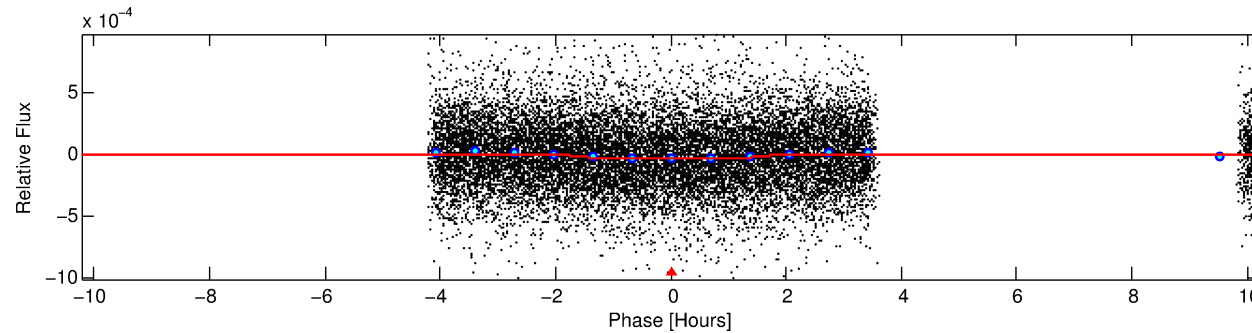
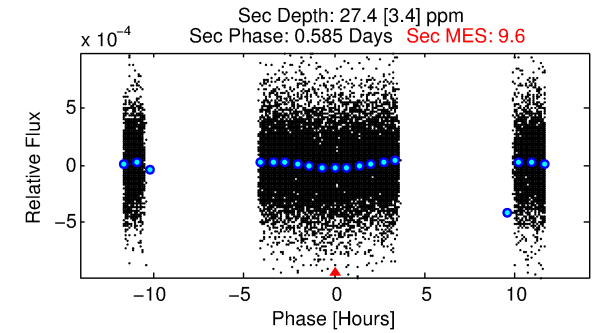
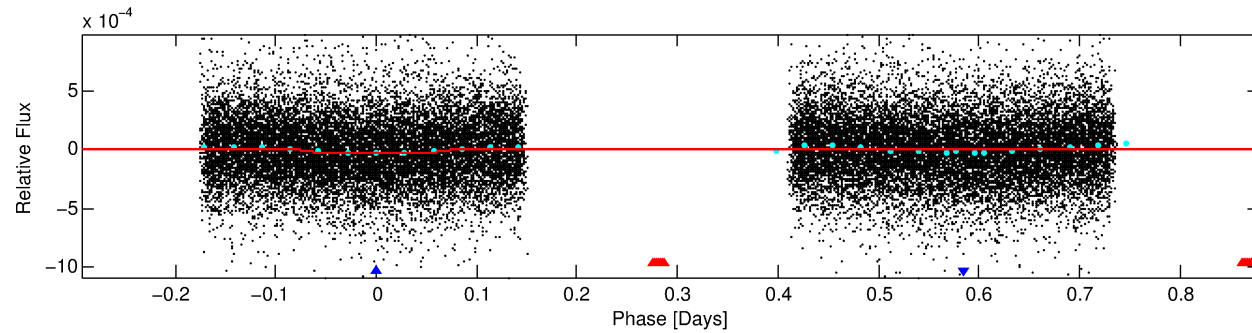
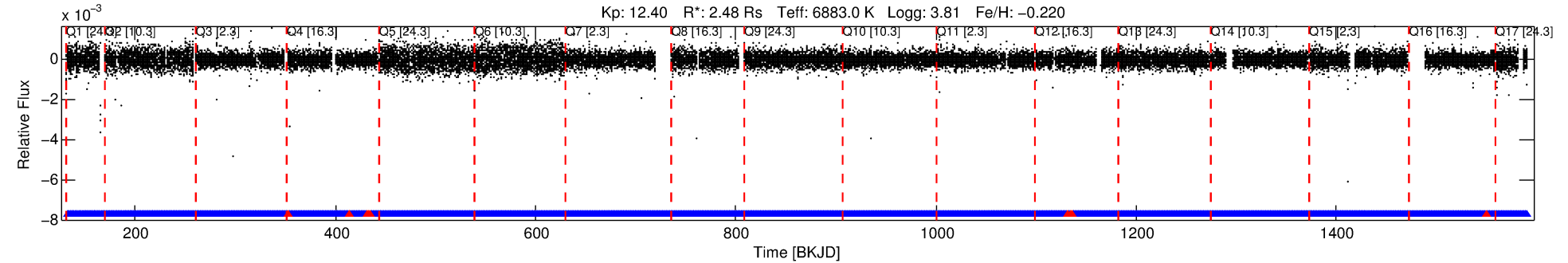
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009241509-02

No Significant Match Found

DV One-Page Summary

KIC: 9241509 Candidate: 2 of 2 Period: 1.172 d



DV Fit Results:

Period = 1.17217 [0.00001] d
Epoch = 132.2448 [0.0046] BKJD
Rp/R* = 0.0057 [0.0028]
a/R* = 1.51 [2.54]
b = 0.90 [0.65]
Seff = 20217.86 [14462.87]
Teq = 3041 [544] K
Rp = 1.53 [1.00] Re
a = 0.0247 [0.0106] AU
Ag = 3.94 [4.81] [0.61σ]
Teffp = 6625 [1674] K [2.04σ]

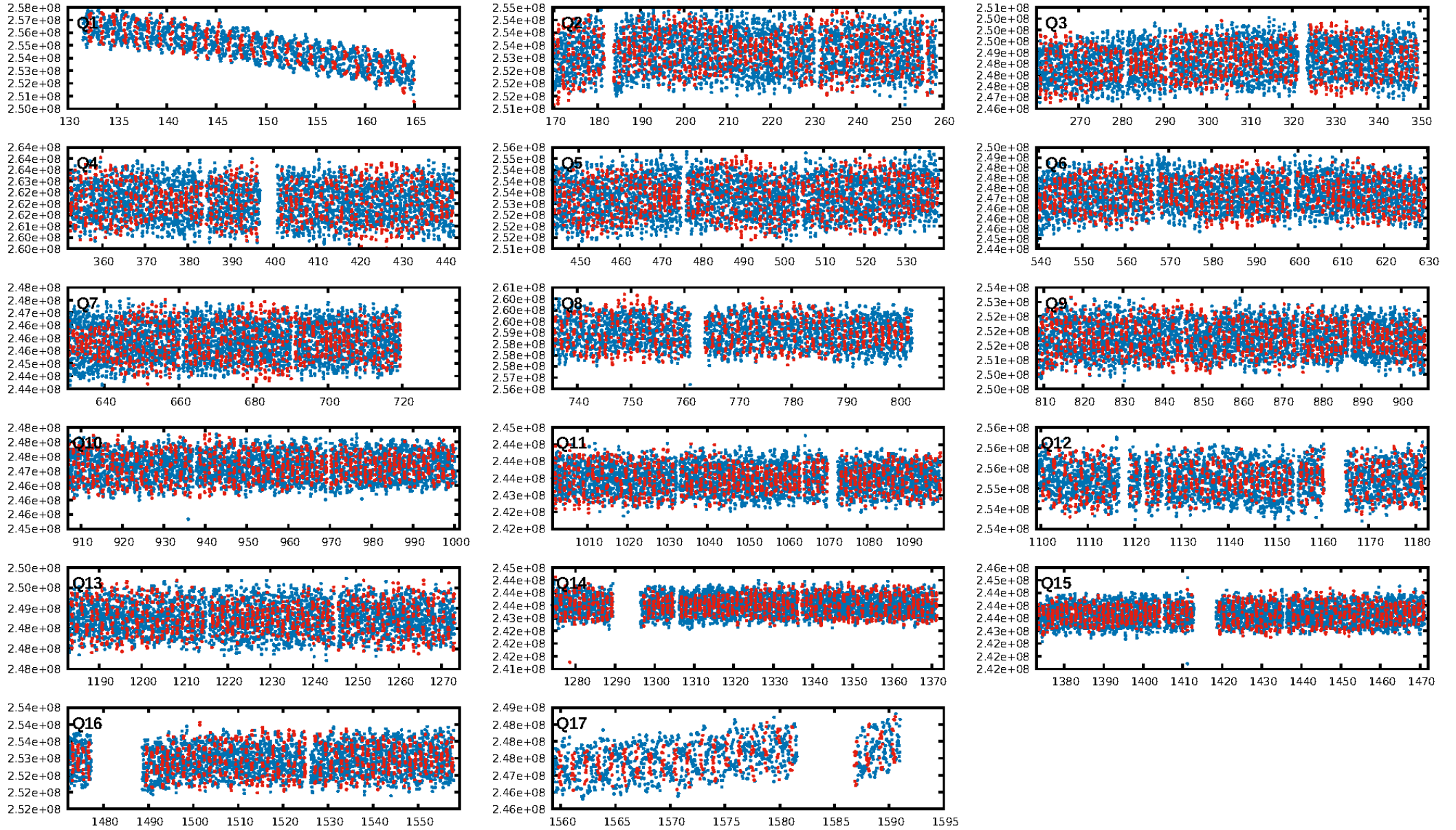
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.56σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.67e-16
RollingBand-fgt: 0.99 [1082/1091]
GhostDiagnostic-chr: 2.32
Centroid-sig: N/A
Centroid-so: 1.318 arcsec [2.18σ]
OotOffset-rm: 0.314 arcsec [0.97σ]
OotOffset-st: 4/4/3/5 [16]
KicOffset-rm: 0.331 arcsec [0.92σ]
KicOffset-st: 4/4/3/5 [16]
DiffImageQuality-fgm: 0.75 [12/16]
DiffImageOverlap-fno: 0.00 [0/17]

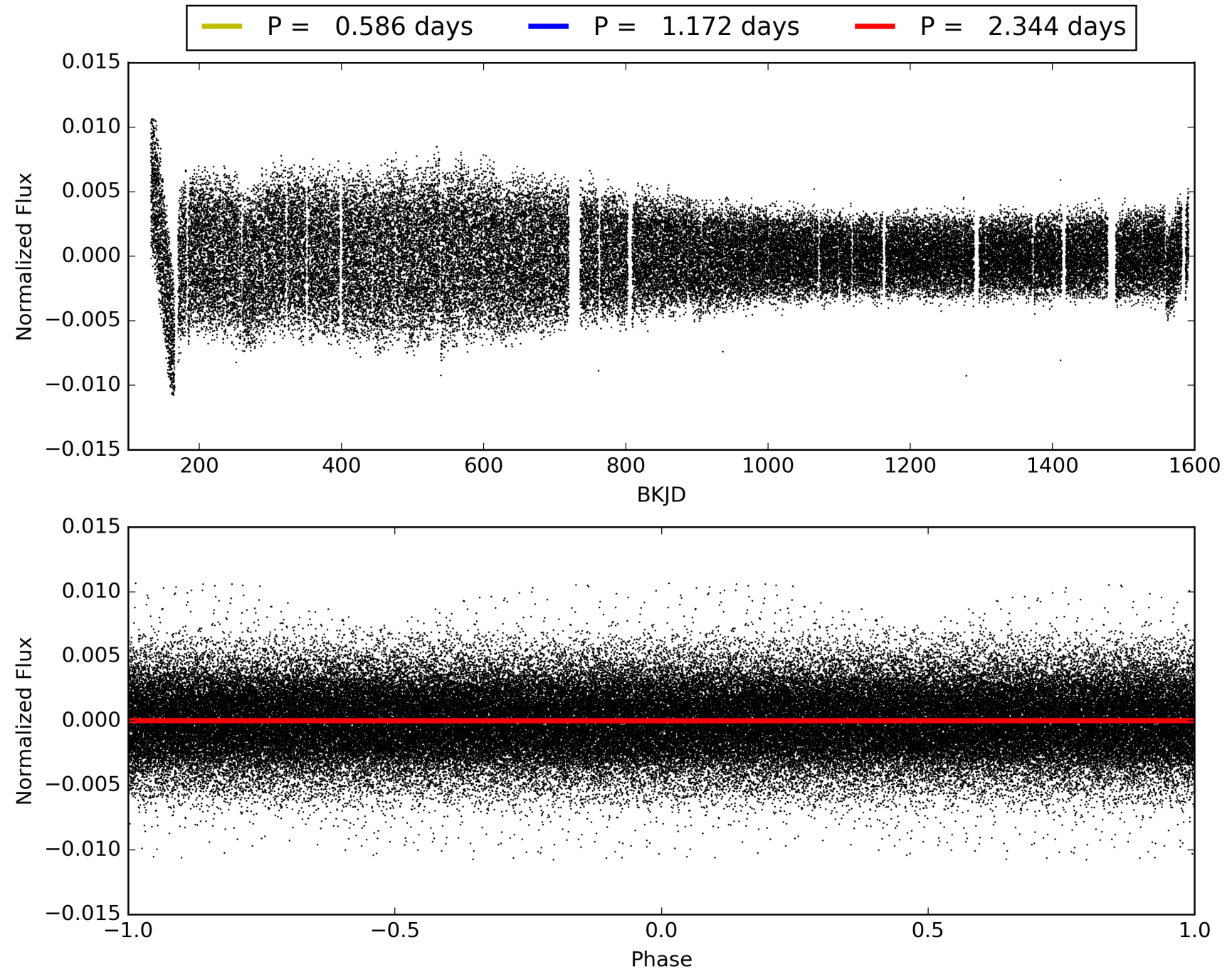
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:14:24 Z

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

TCE 009241509-02, PDC Light Curves

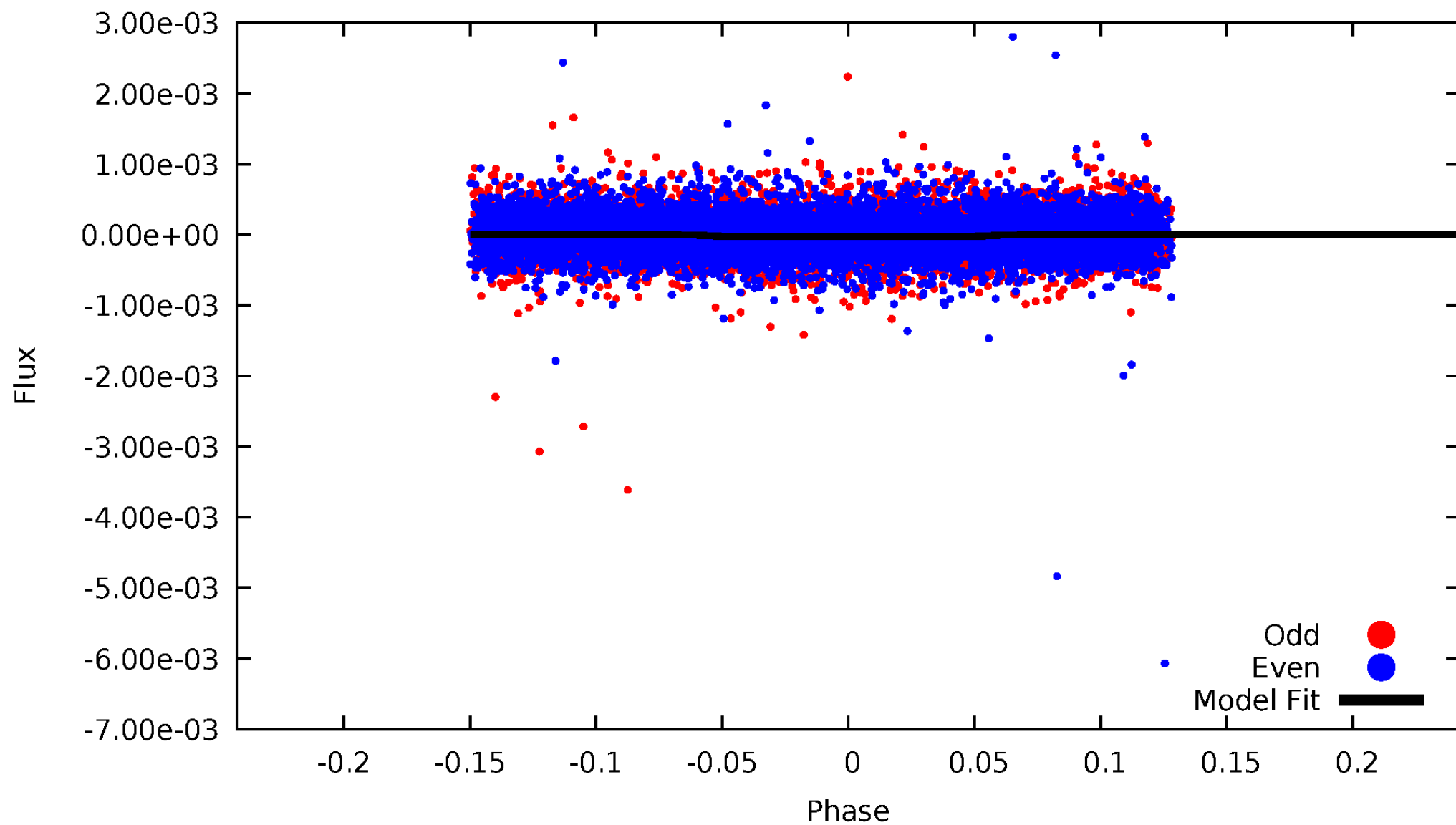


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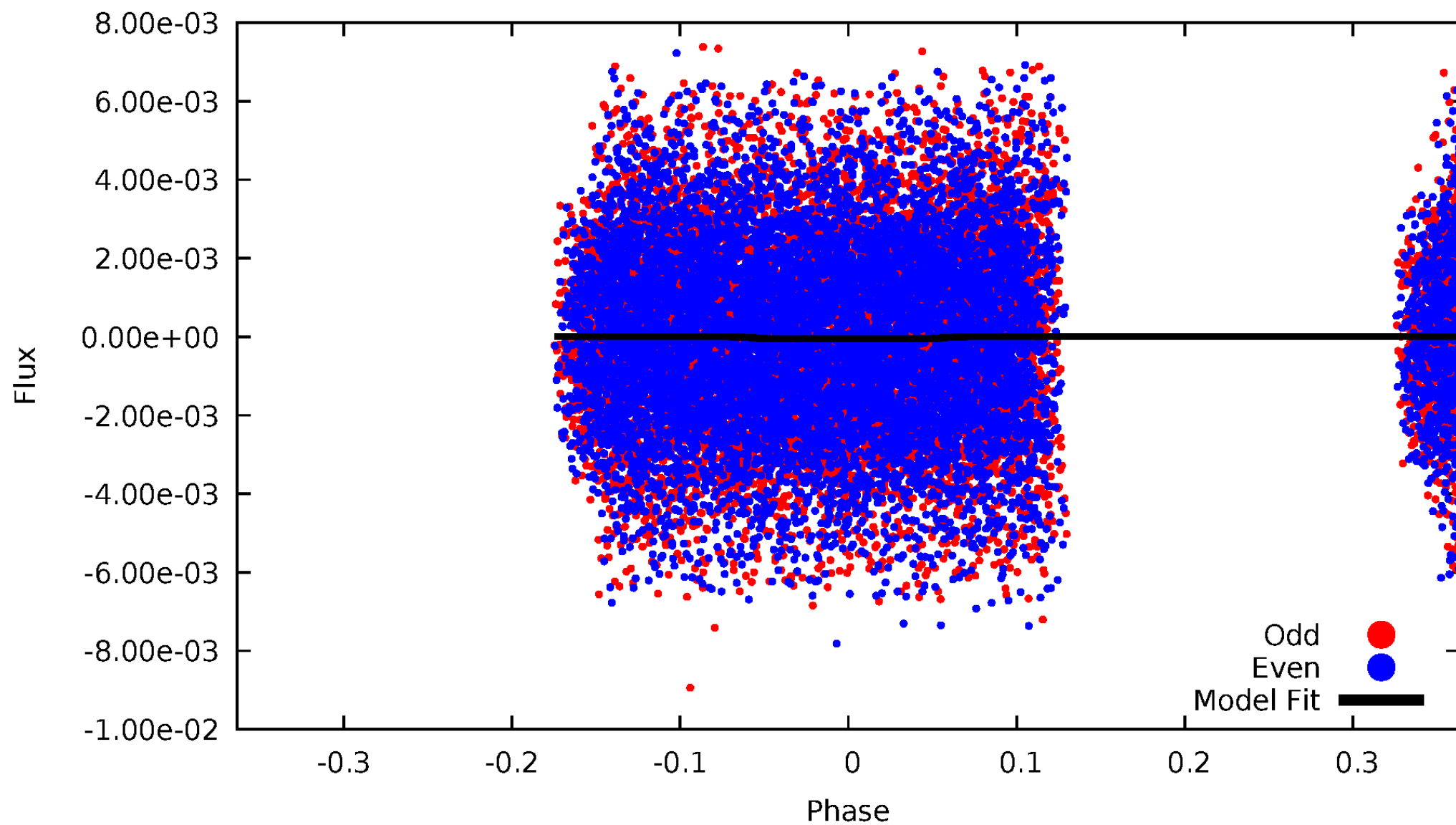
DV Odd/Even

TCE 009241509-02



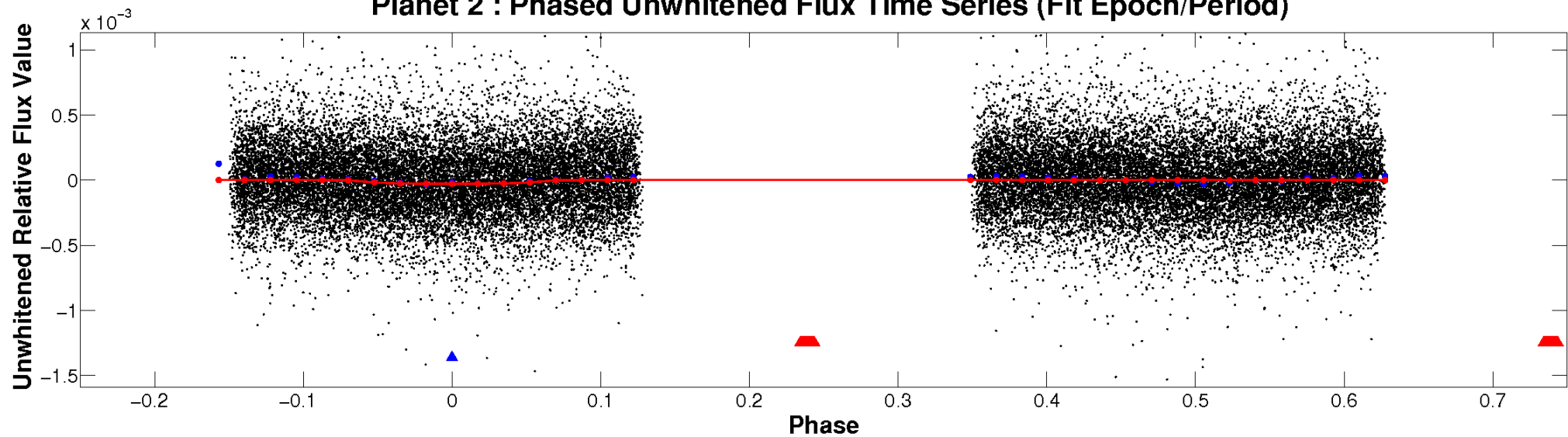
ALT Odd/Even

TCE 009241509-02

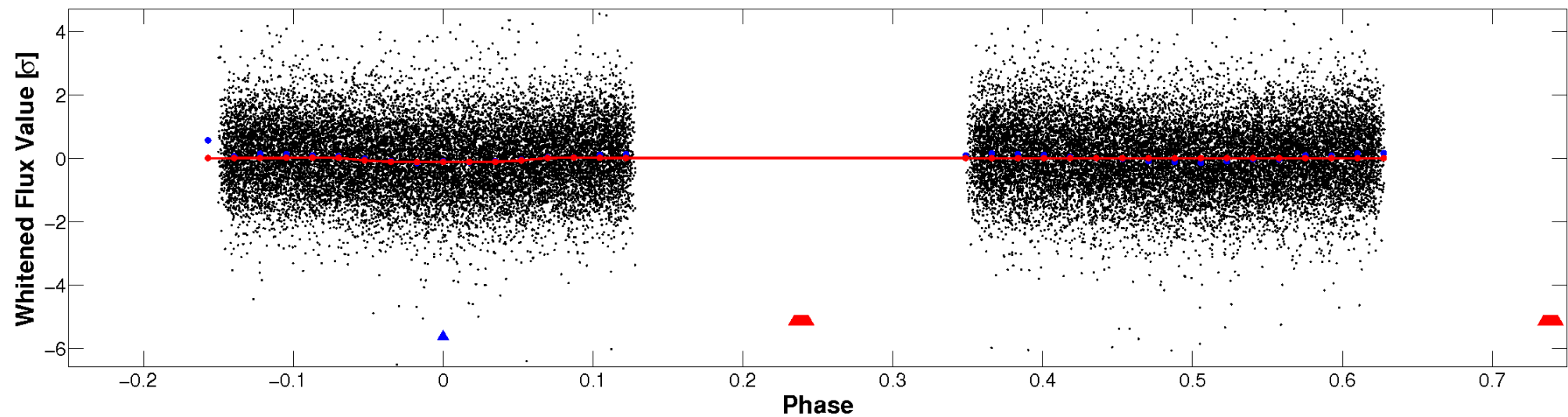


Non-Whitened Vs. Whitened Light Curve

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

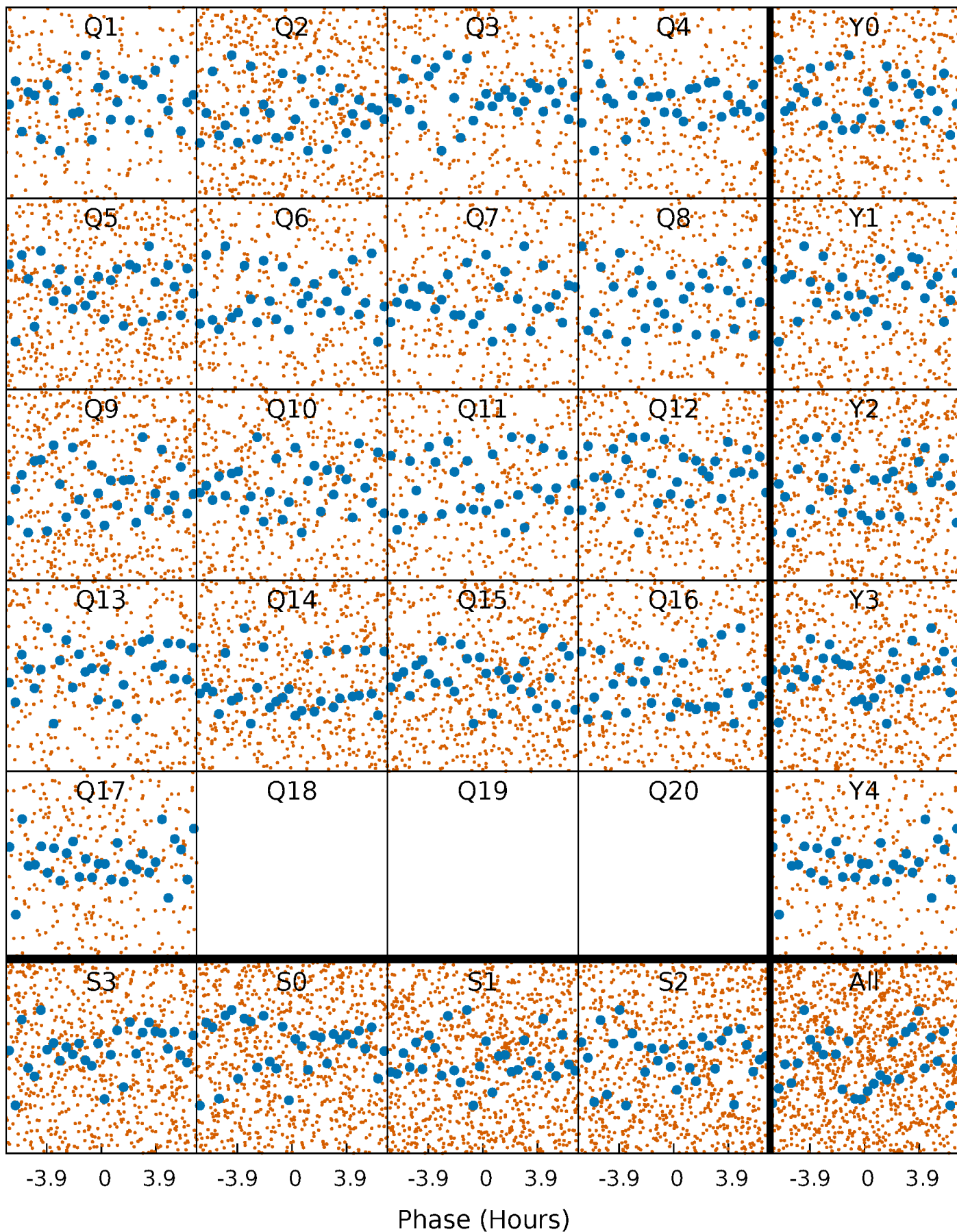


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



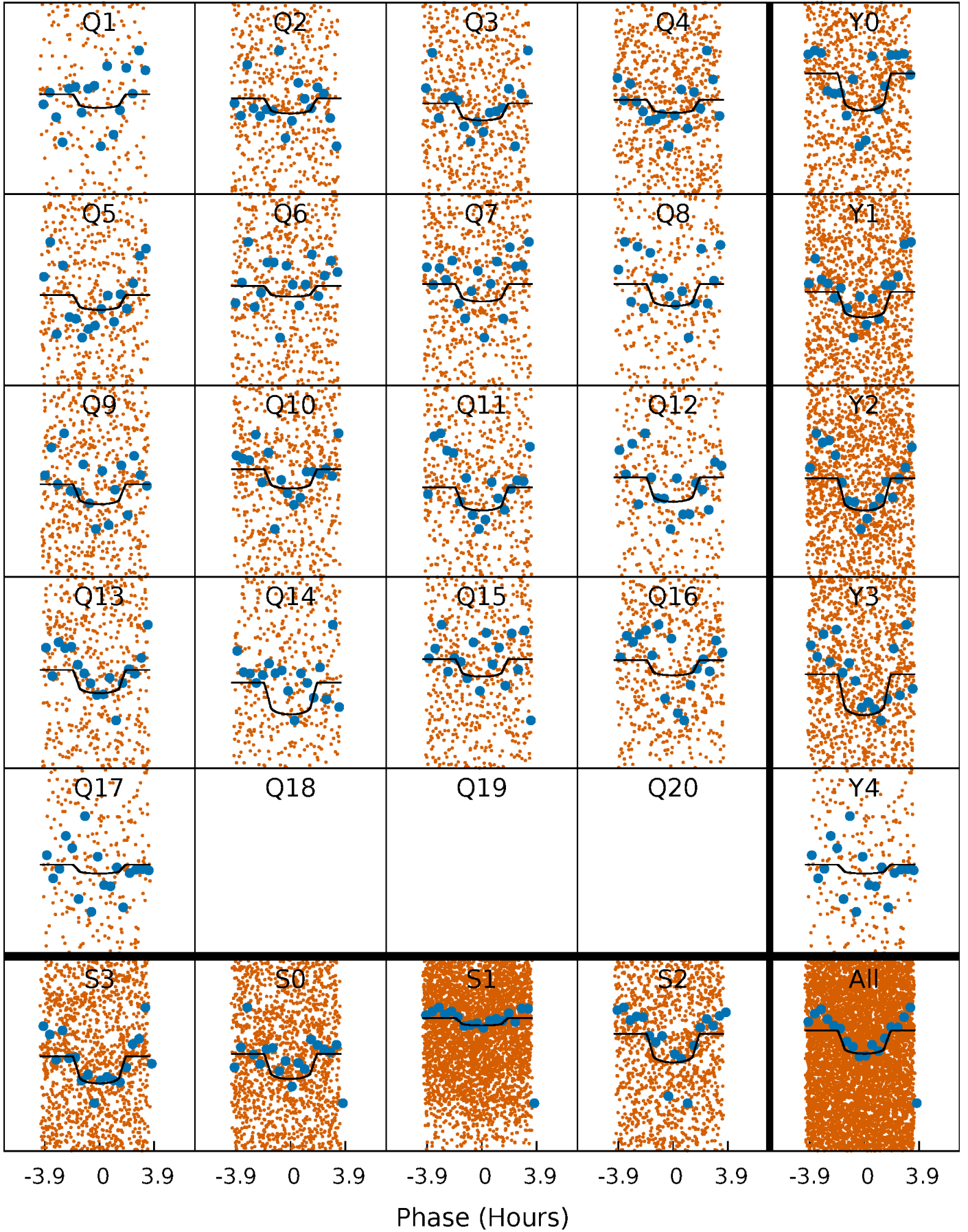
PDC Quarter-Phased Transit Curves

TCE 009241509-02 P= 1.172169 Days $T_0=132.244767$ (BKJD)



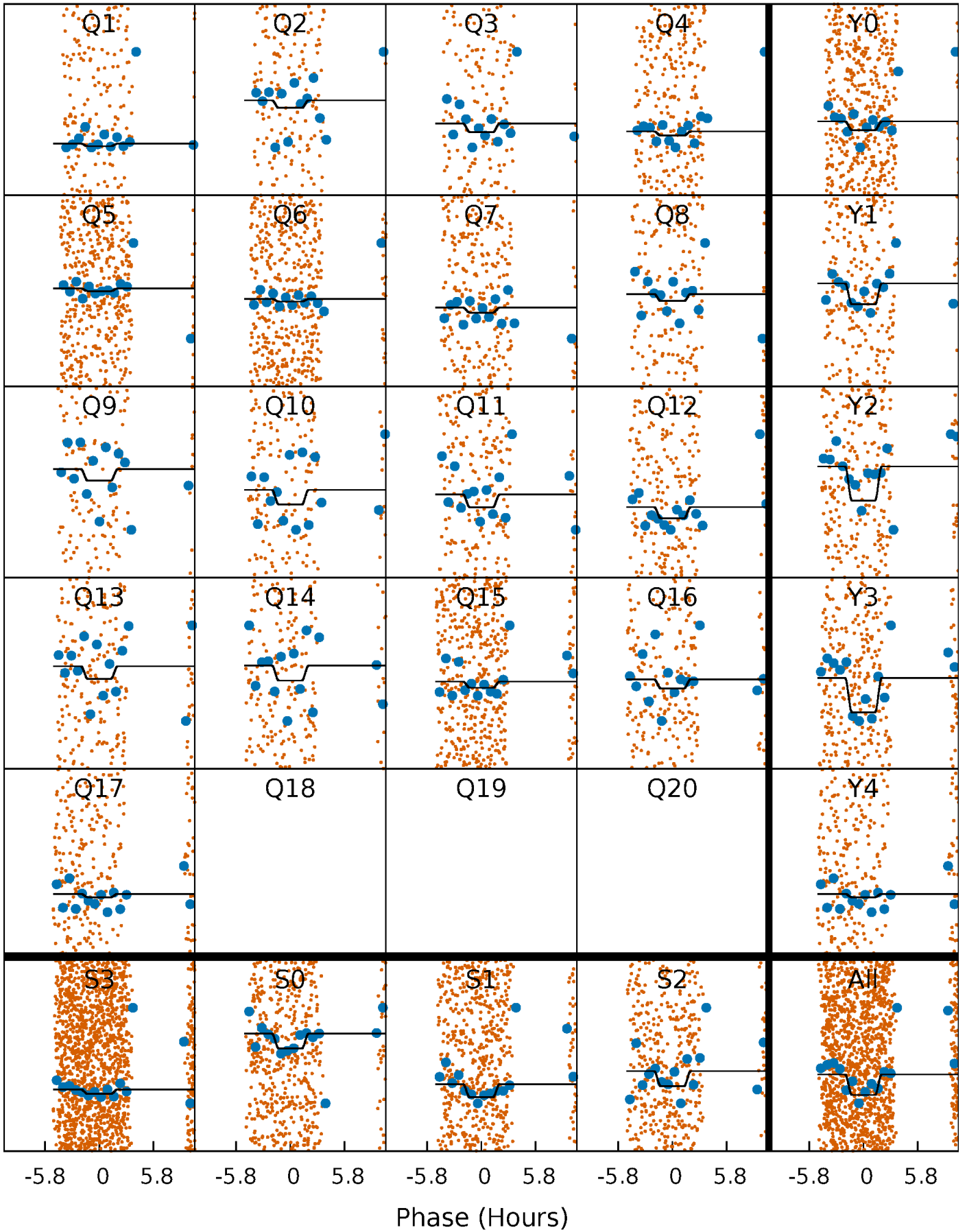
DV Quarter-Phased Transit Curves

TCE 009241509-02 $P = 1.172169$ Days $T_0 = 132.244767$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

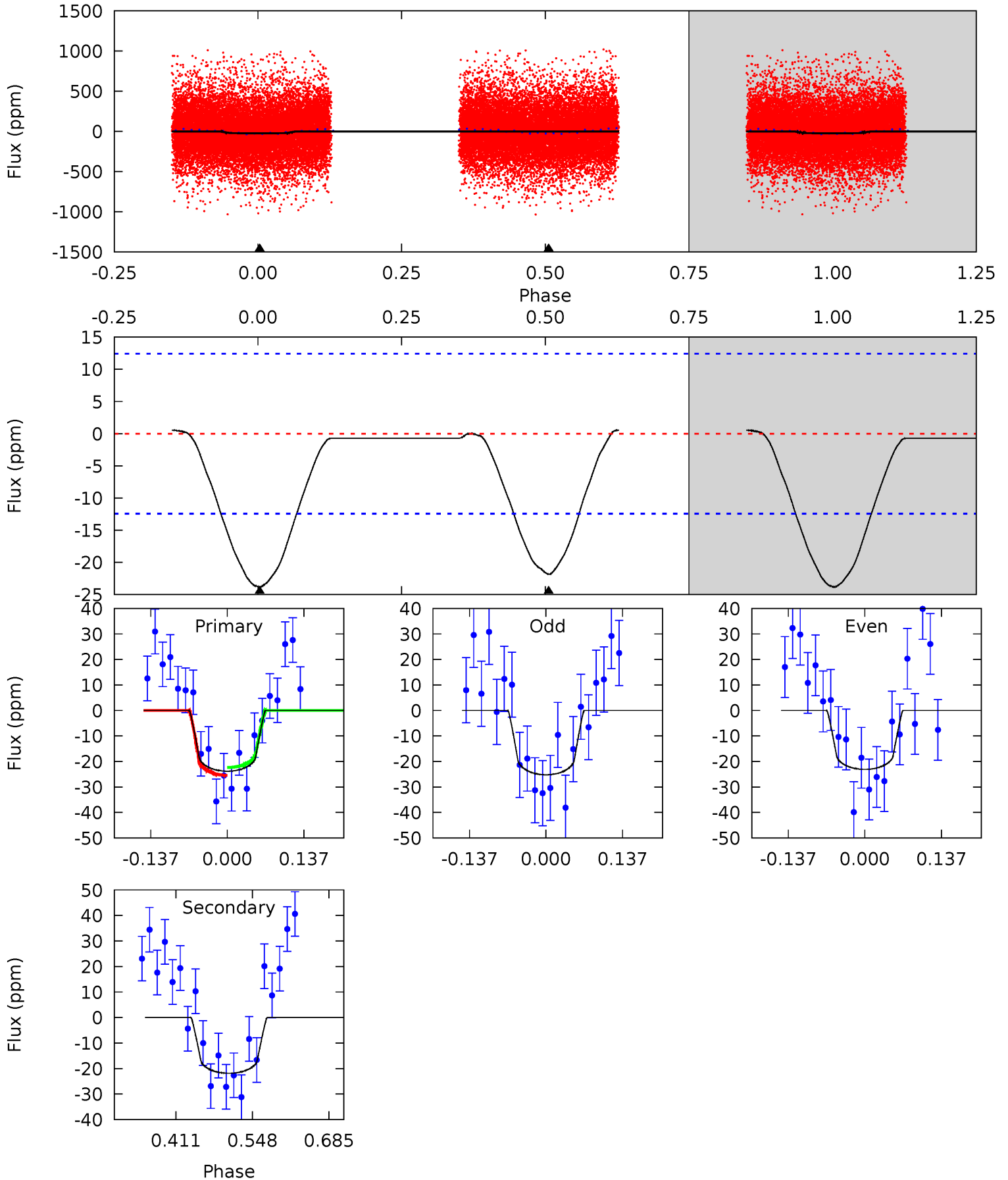
TCE 009241509-02 P= 1.172212 Days $T_0=132.230671$ (BKJD)



DV Model-Shift Uniqueness Test

009241509-02, P = 1.172169 Days, E = 131.072598 Days

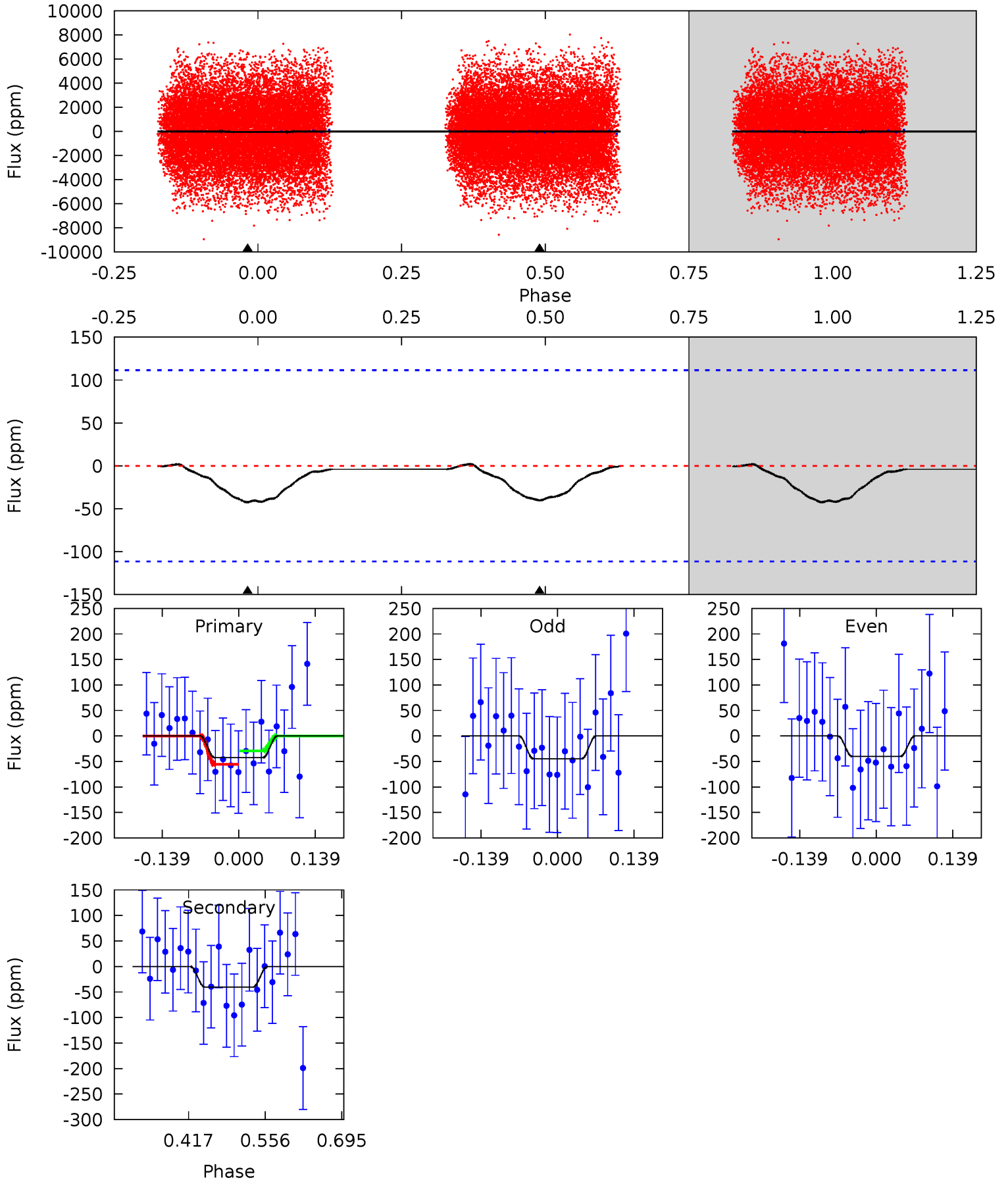
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.62	7.90	0	0	4.50	1.49	0.11	8.62	8.62	7.90	7.90	0.38	0.94	0.02	0.57



Alt Model-Shift Uniqueness Test

009241509-02, P = 1.172212 Days, E = 131.058459 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.71	1.62	0	0	4.50	1.48	0.10	1.71	1.71	1.62	1.62	0.09	1.17	0.05	0.56



Stellar Parameters For KIC 009241509

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	ρ_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6883^{+190}_{-262}	$3.815^{+0.416}_{-0.104}$	$-0.220^{+0.250}_{-0.300}$	$2.475^{+0.568}_{-1.055}$	$1.460^{+0.231}_{-0.308}$	$0.136^{+0.482}_{-0.054}$
	+3%/-4%	+11%/-3%	+114%/-136%	+23%/-43%	+16%/-21%	+355%/-40%
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 009241509-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-22 ± 3	$1.38^{+0.82}_{-0.64}$	4133^{+285}_{-485}	6056^{+2577}_{-1214}	$3.779^{+9.315}_{-2.271}$
Alt.	-40 ± 25	$1.73^{+0.82}_{-0.68}$	4116^{+317}_{-471}	6232^{+2343}_{-1711}	$4.068^{+9.993}_{-2.930}$

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

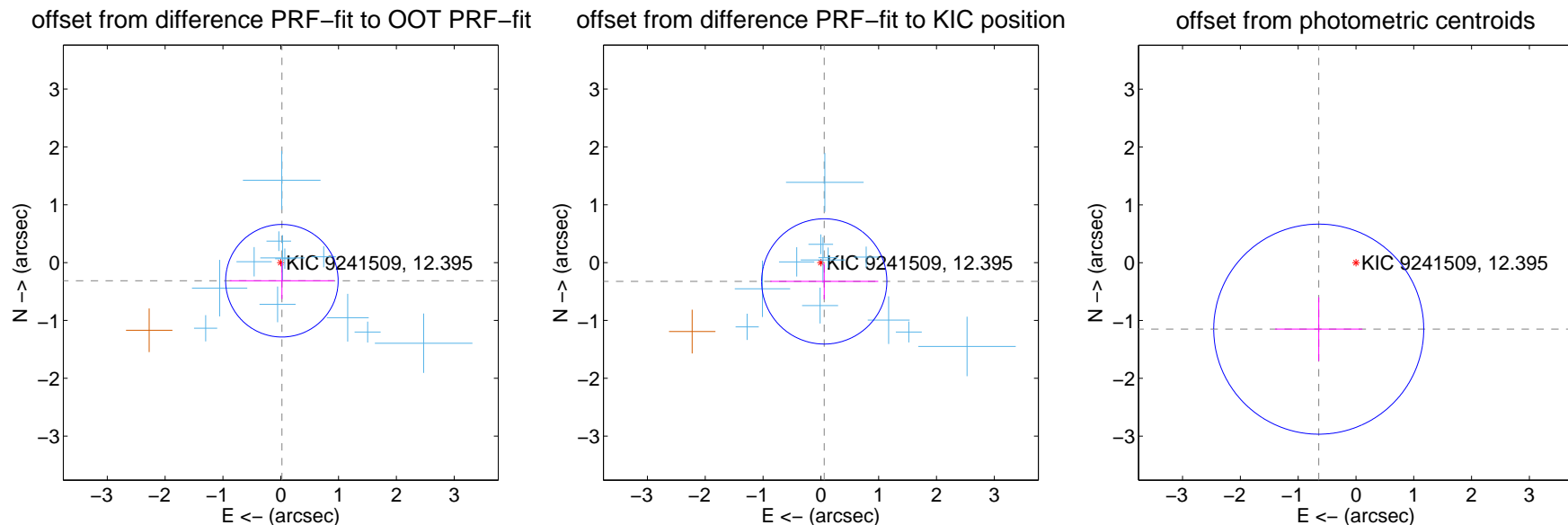
DV Centroid Data

Supplemental centroid analysis for 009241509-02. Kepler magnitude: 12.39. Transit SNR 9.19

There are 12 quarters with good PRF difference image offsets

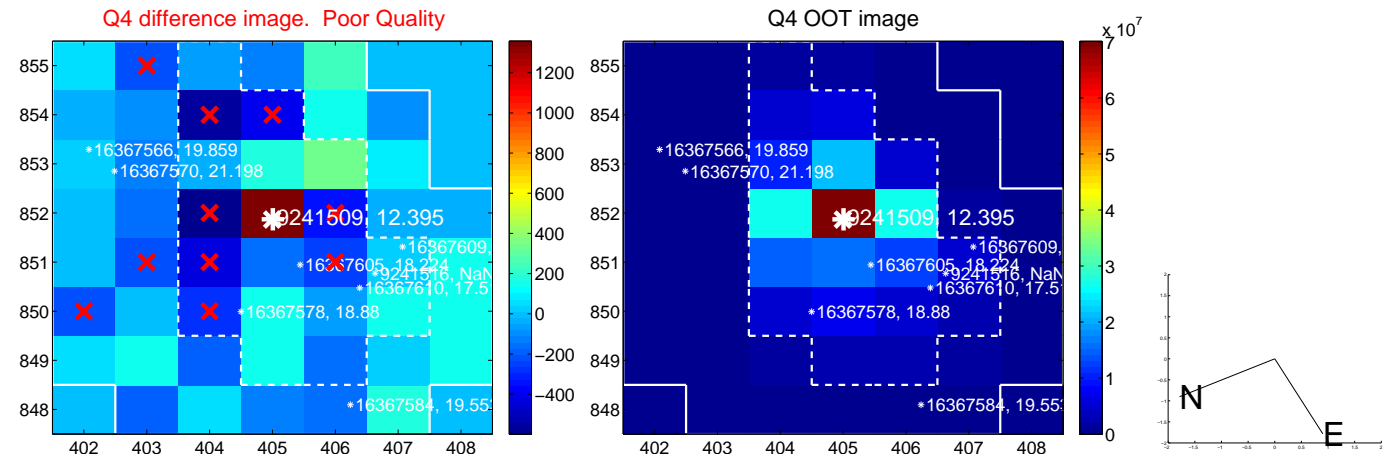
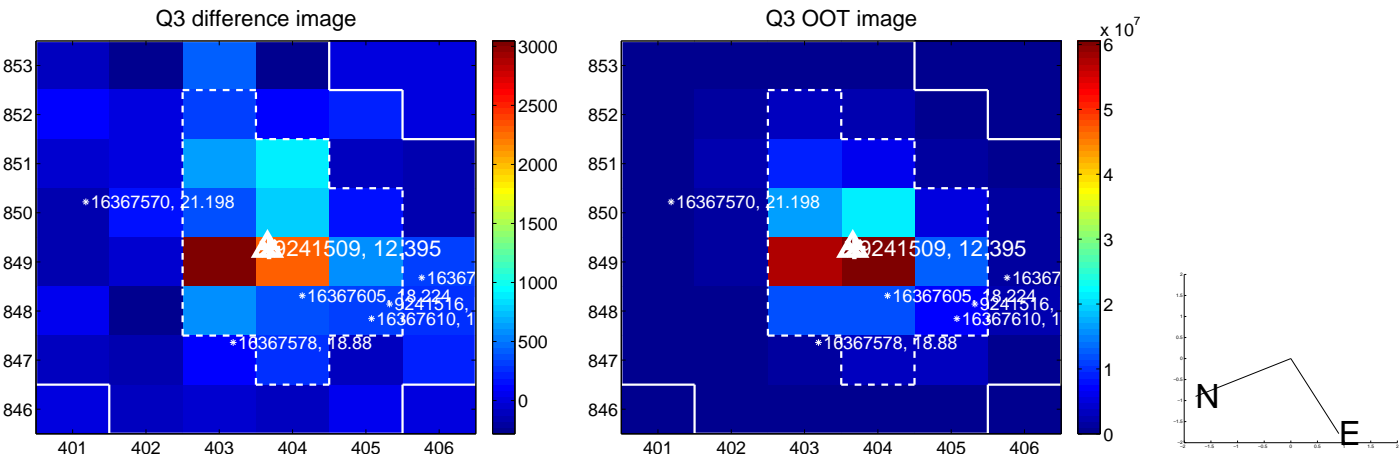
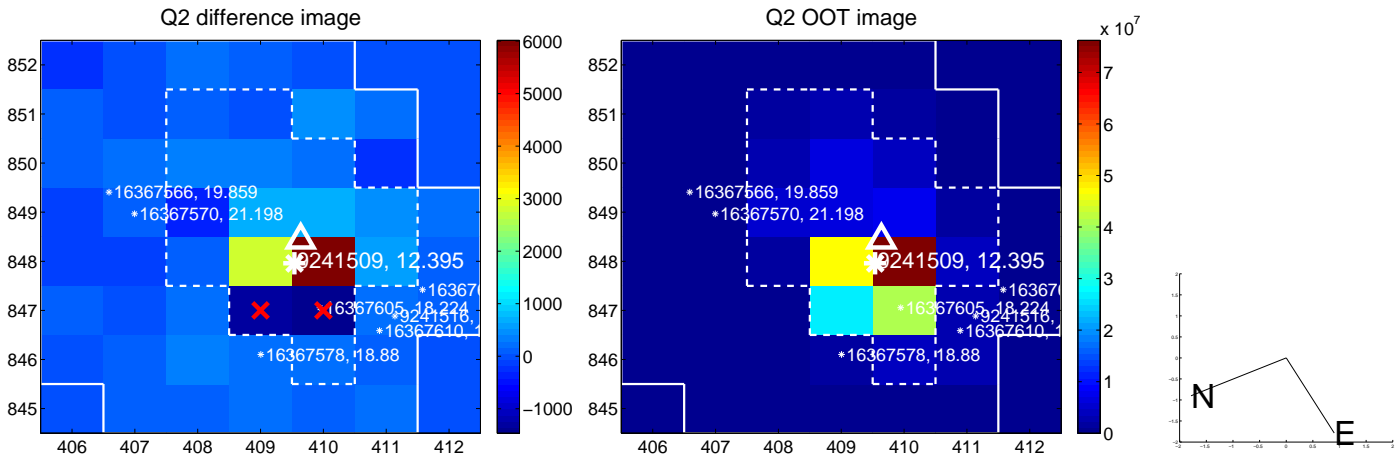
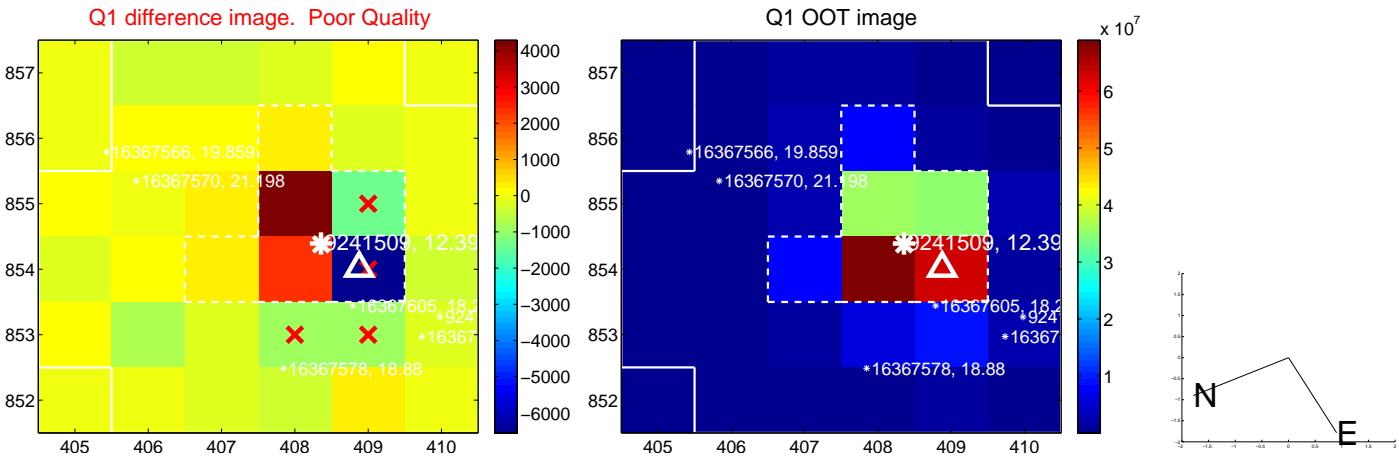
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.314 ± 0.324	0.97	-0.020 ± 0.903	-0.314 ± 0.315
PRF-fit source offset from KIC position	0.331 ± 0.361	0.92	-0.058 ± 0.933	-0.325 ± 0.309
photometric centroid source offset	1.32 ± 0.61	2.18	0.64 ± 0.75	-1.15 ± 0.55

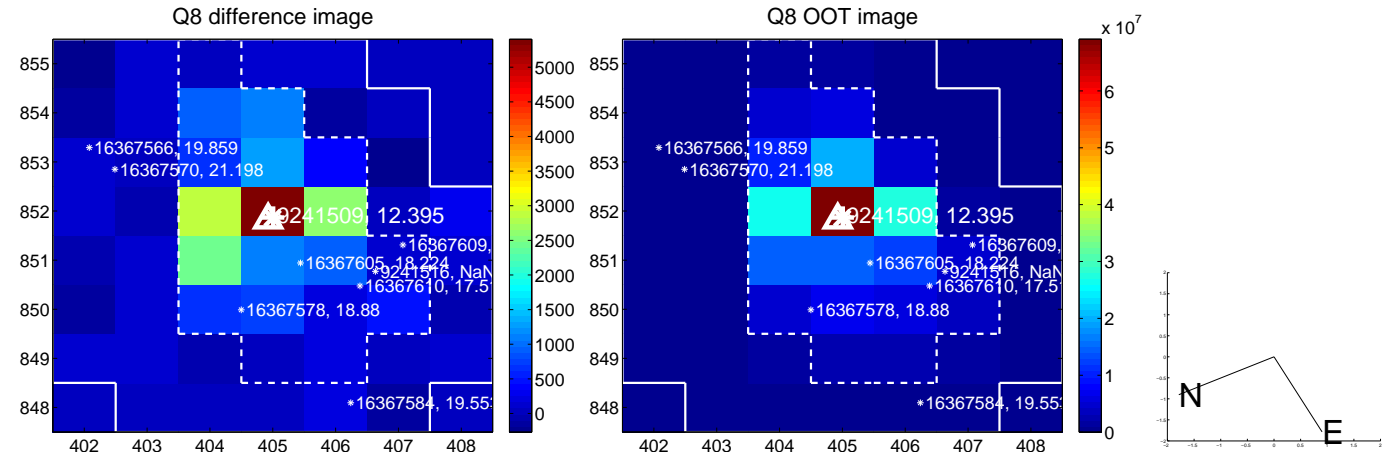
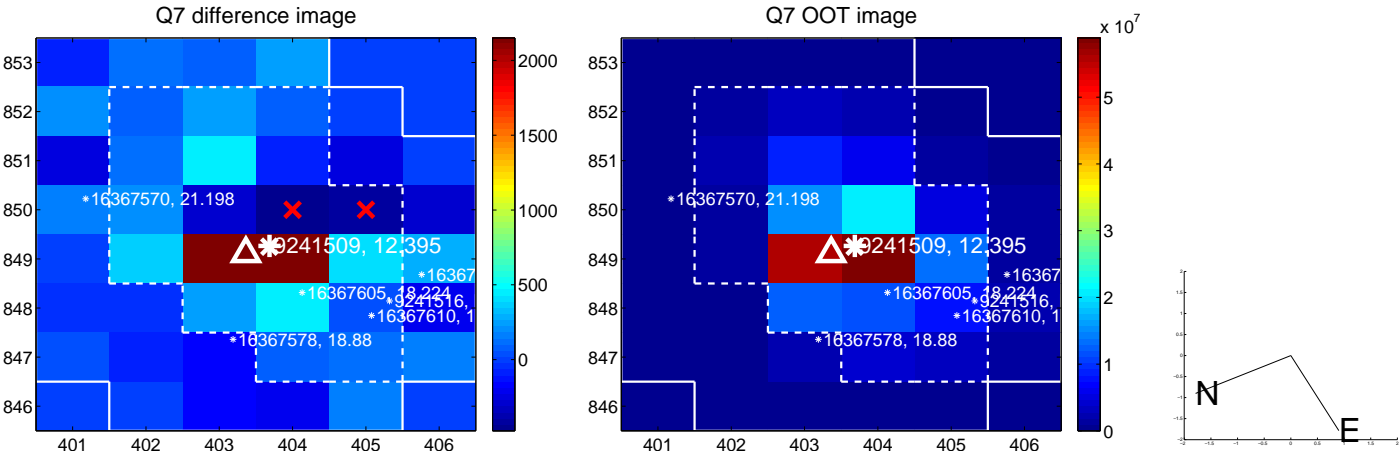
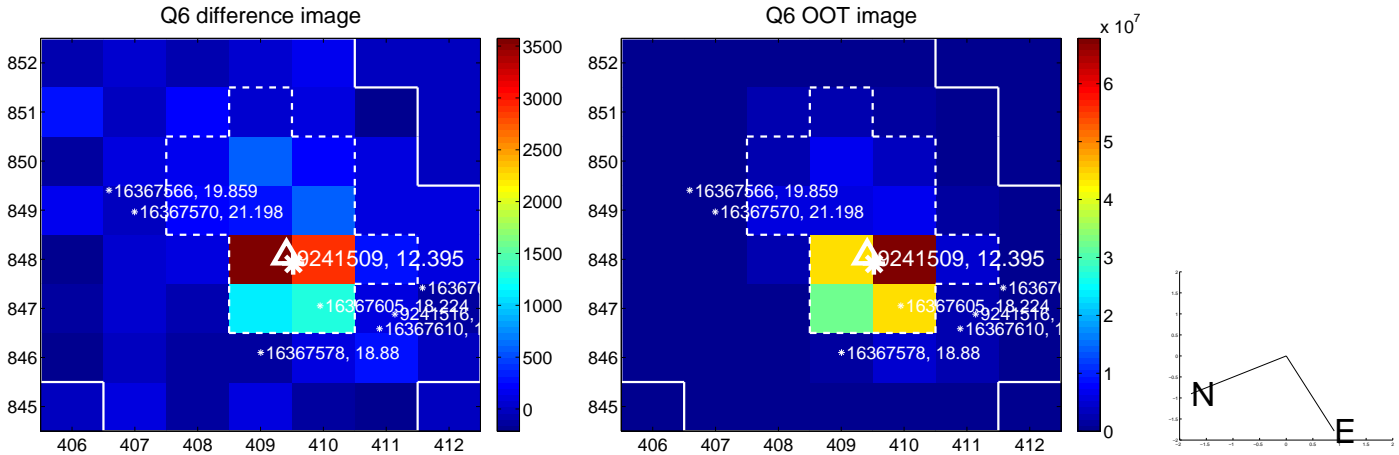
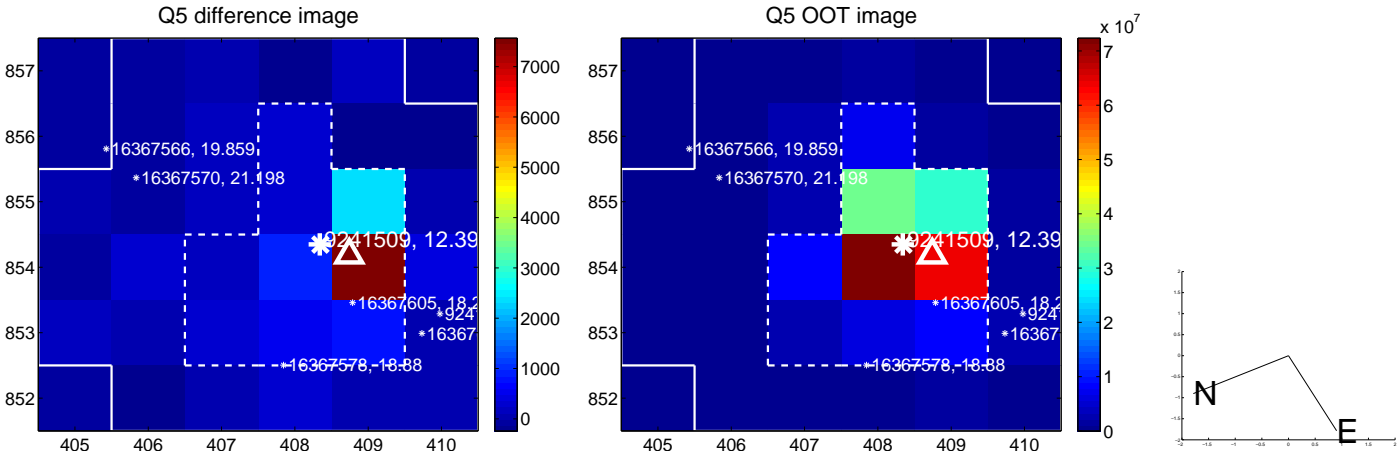


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

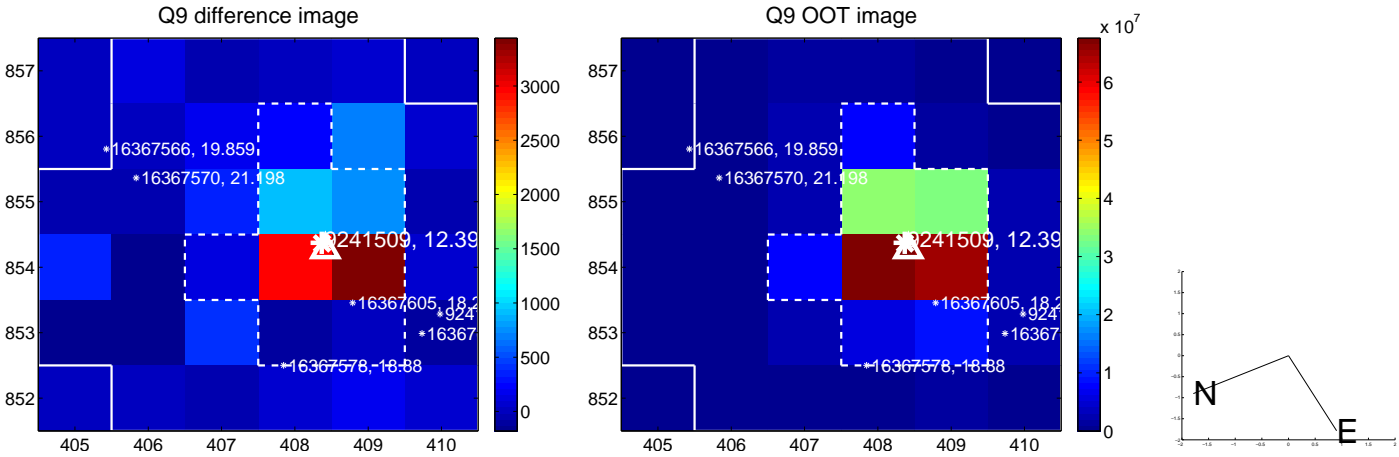
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



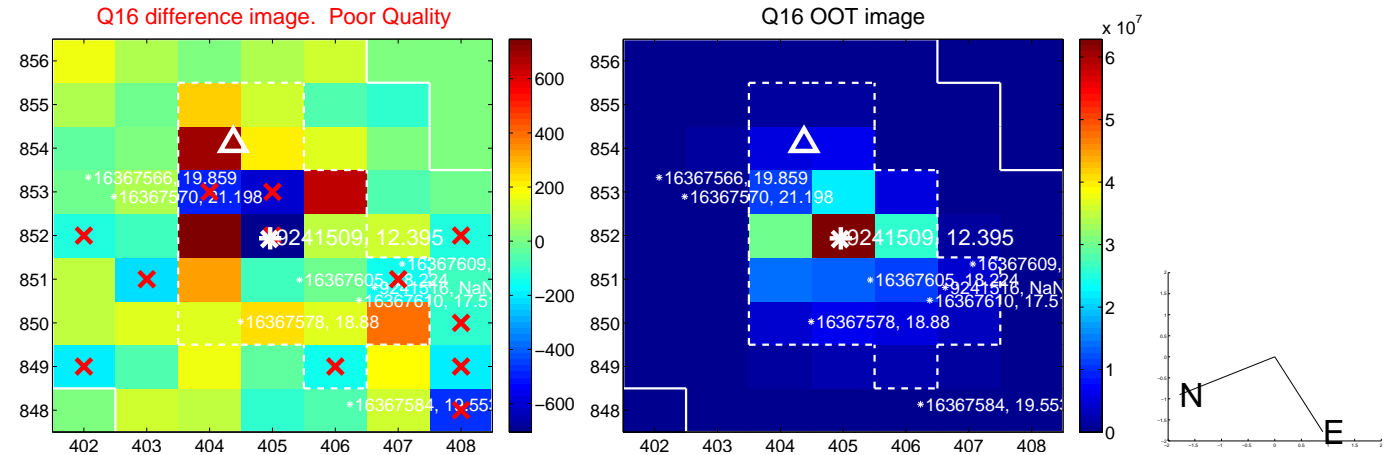
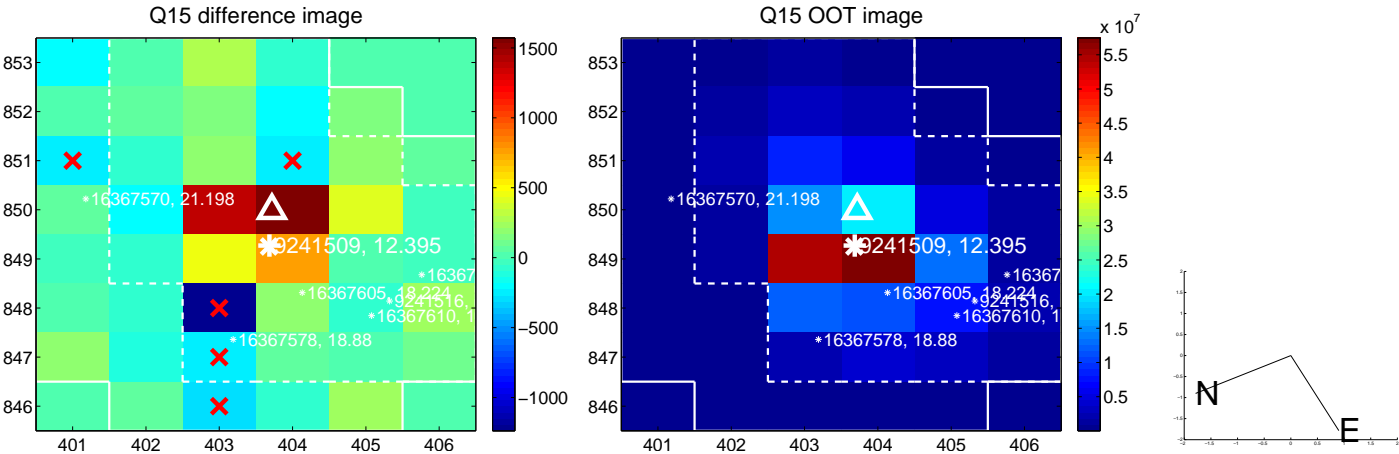
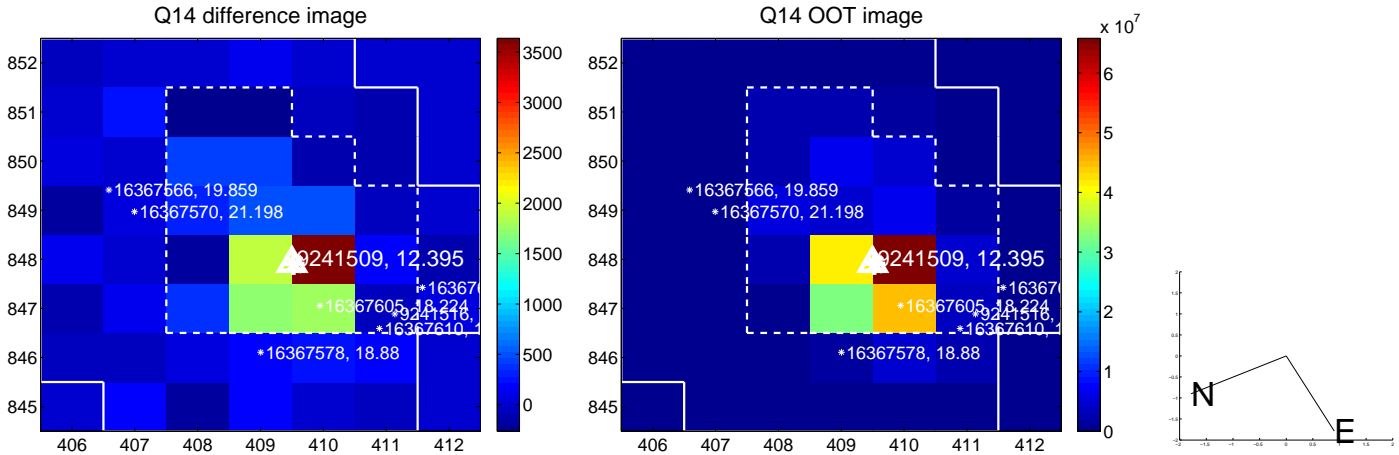
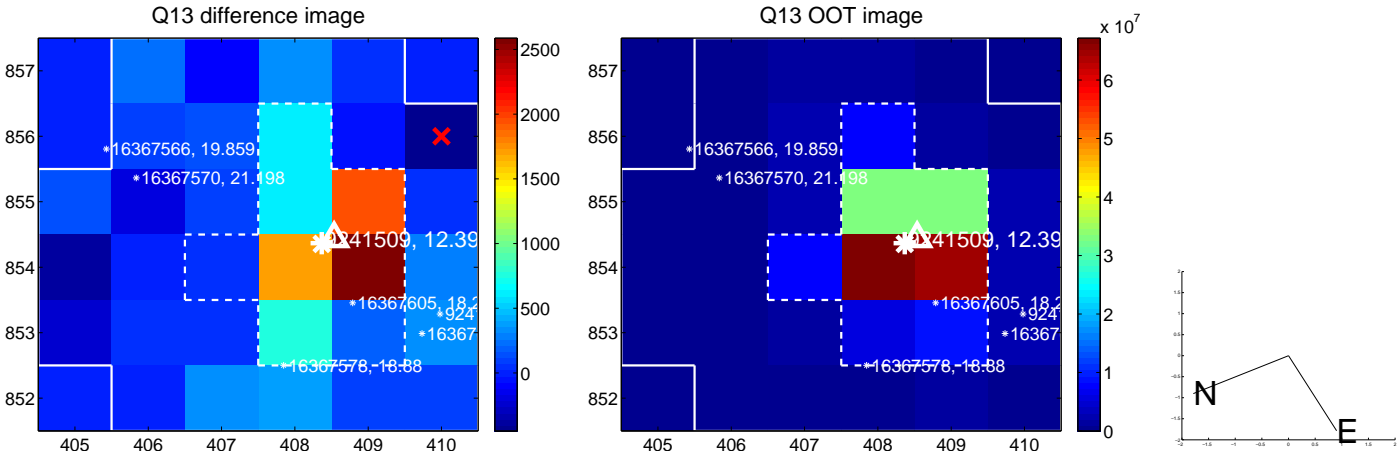
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



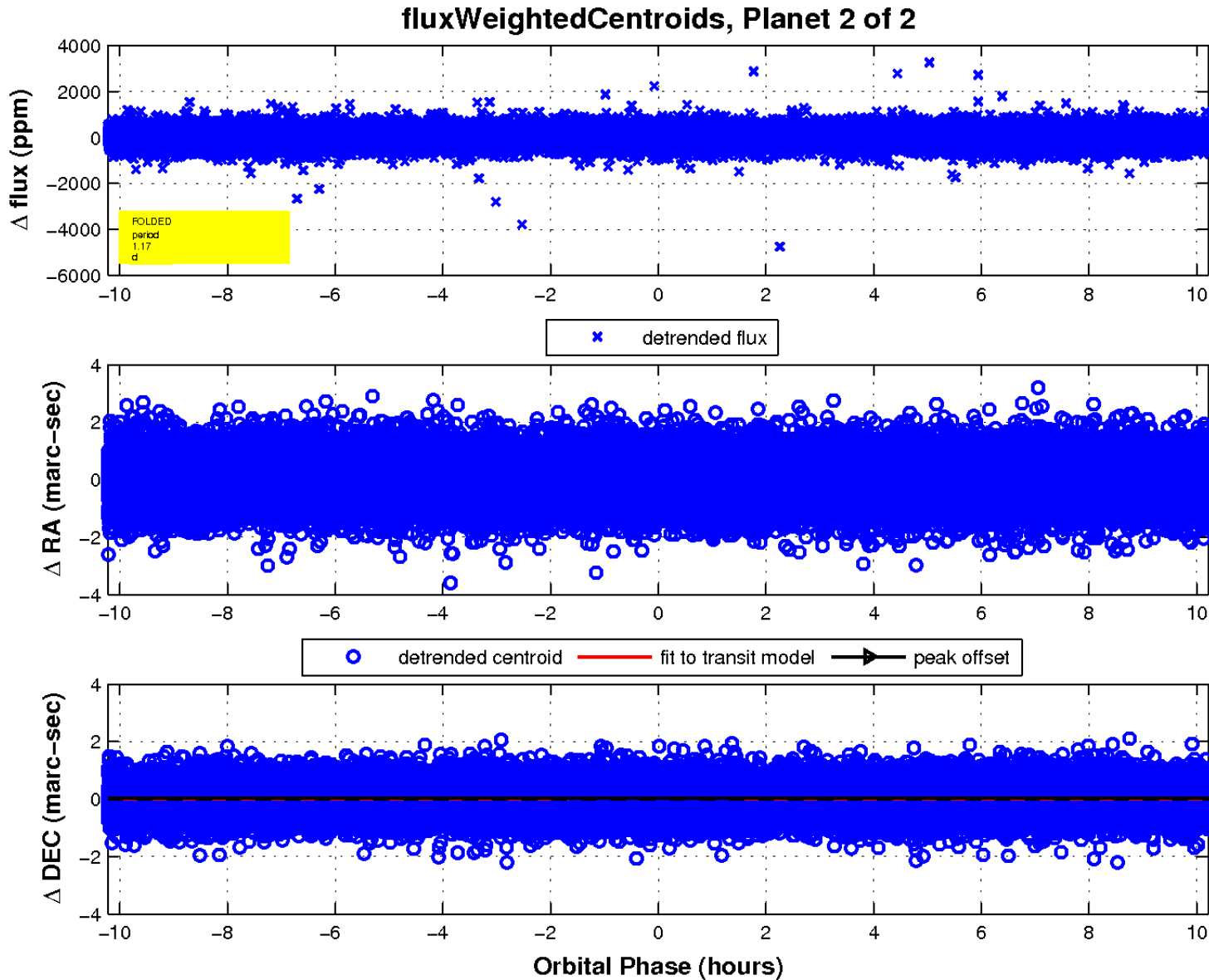
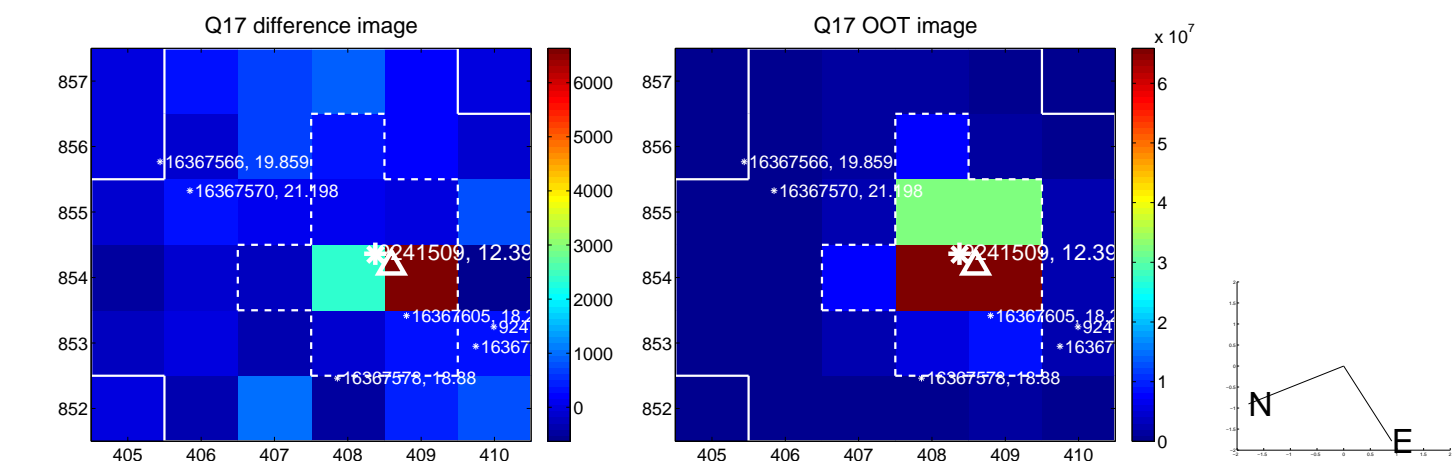
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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

