

KIC 009474222

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})
009474222-01	OBS	7177.01	13.691790	133.791476	97732.9	5.655	10078.4	9552.4	1.55	6295	49.26	231.15
009474222-02	OBS	No	13.691789	143.529467	3124.2	6.016	338.4	334.9	1.55	6295	10.00	231.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009474222-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009474222-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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 009474222-01

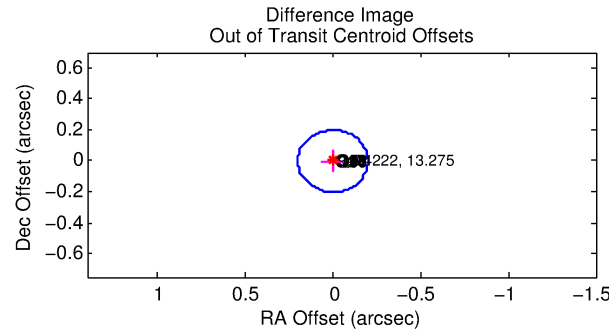
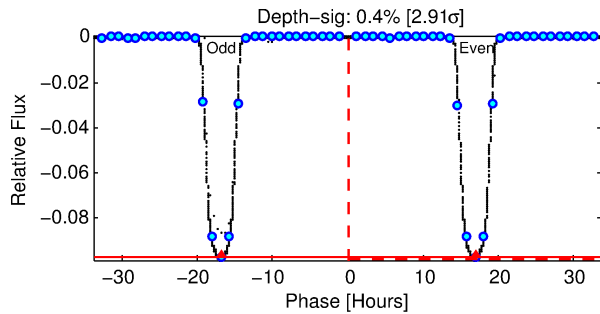
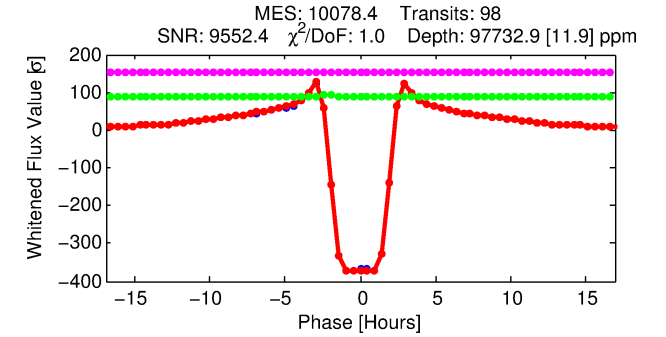
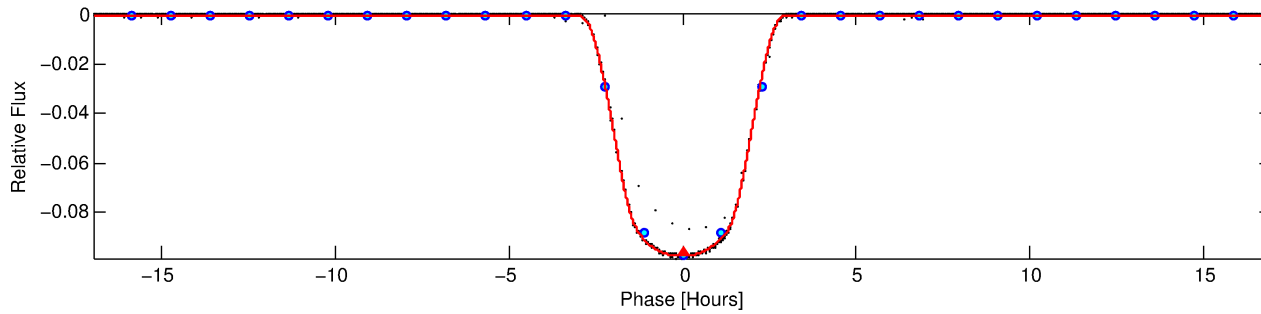
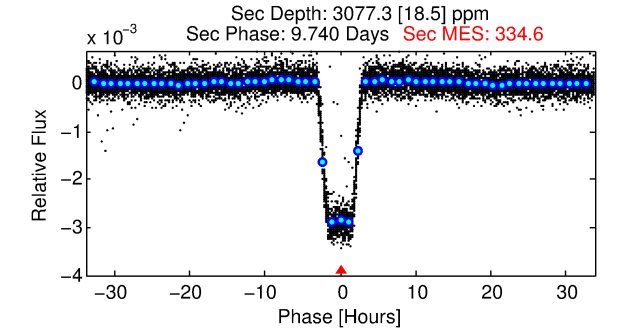
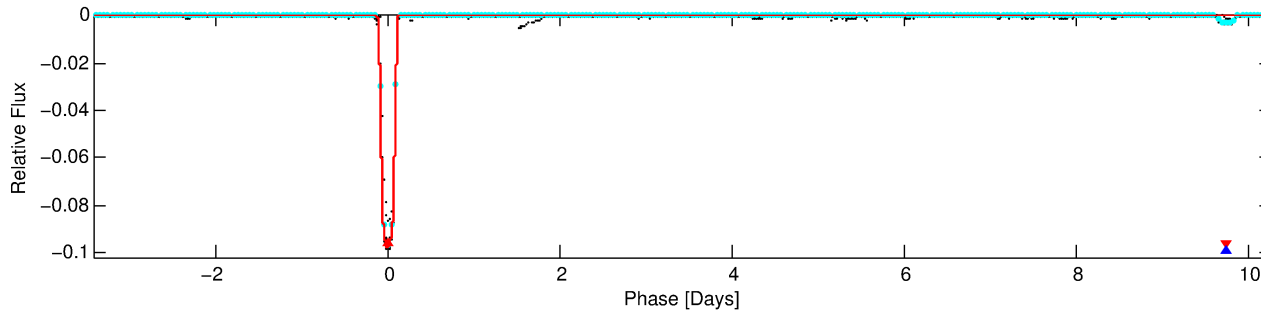
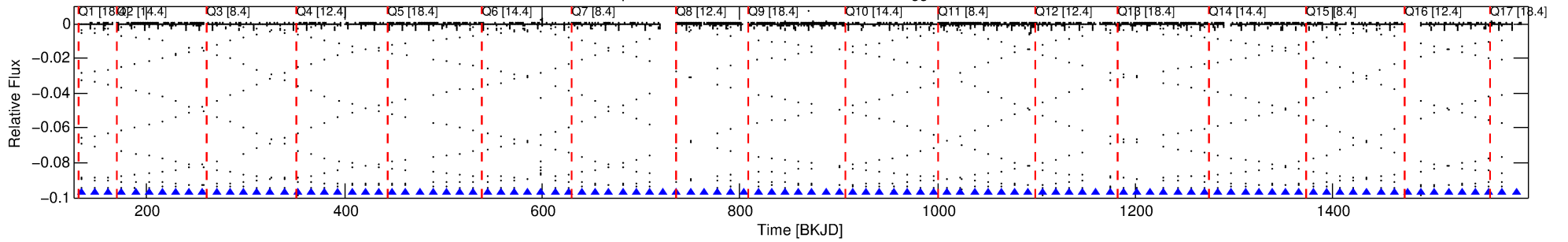
No Significant Match Found

DV One-Page Summary

KIC: 9474222 Candidate: 1 of 2 Period: 13.692 d

KOI: K07177.01 Corr: 0.999

Kp: 13.27 R*: 1.55 Rs Teff: 6295.0 K Logg: 4.16 Fe/H: 0.060



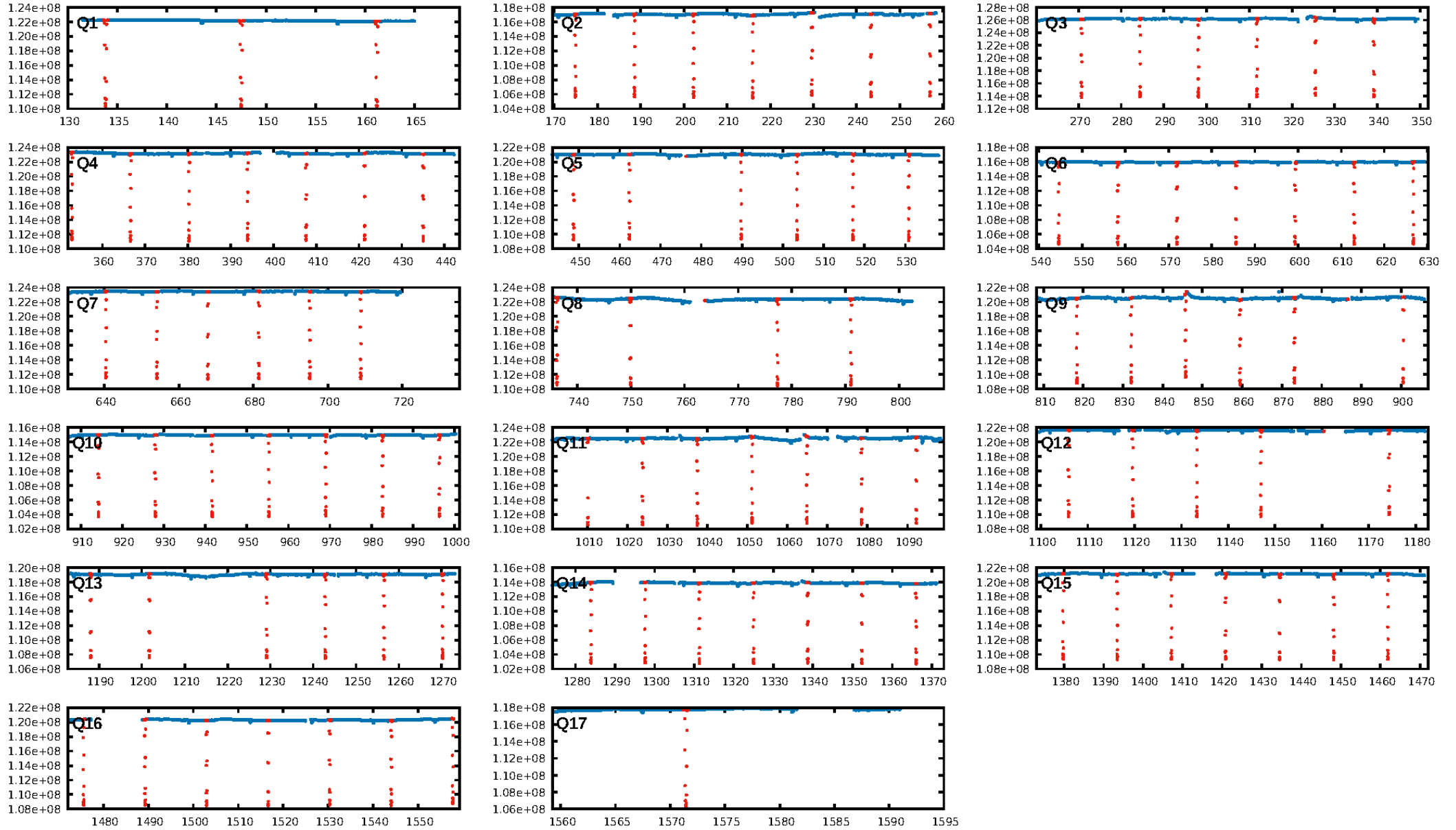
DV Fit Results:

Period = 13.69179 [0.00000] d
Epoch = 133.7915 [0.0000] BKJD
Rp/R* = 0.2905 [0.0000]
a/R* = 23.29 [0.01]
b = 0.29 [0.00]
Seff = 231.15 [61.05]
Teq = 994 [66] K
Rp = 49.26 [9.10] Re
a = 0.1212 [0.0204] AU
Ag = 10.25 [2.66] [3.47σ]
Teffp = 2751 [33] K [23.90σ]

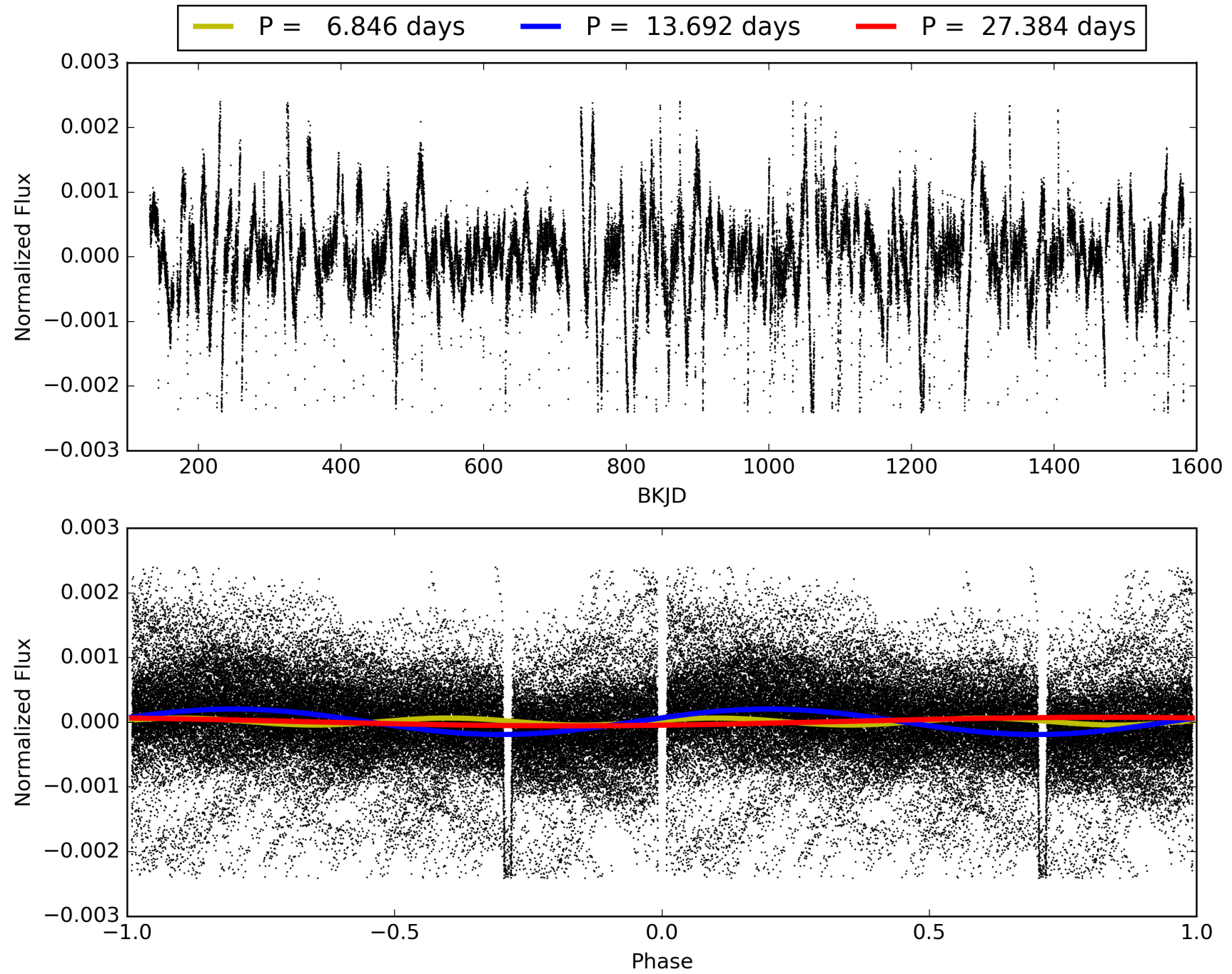
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [94/94]
GhostDiagnostic-chr: 8.438
Centroid-sig: N/A
Centroid-so: 0.030 arcsec [41.03σ]
OotOffset-rm: 0.002 arcsec [0.04σ]
KicOffset-rm: 0.069 arcsec [1.02σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009474222-01, PDC Light Curves

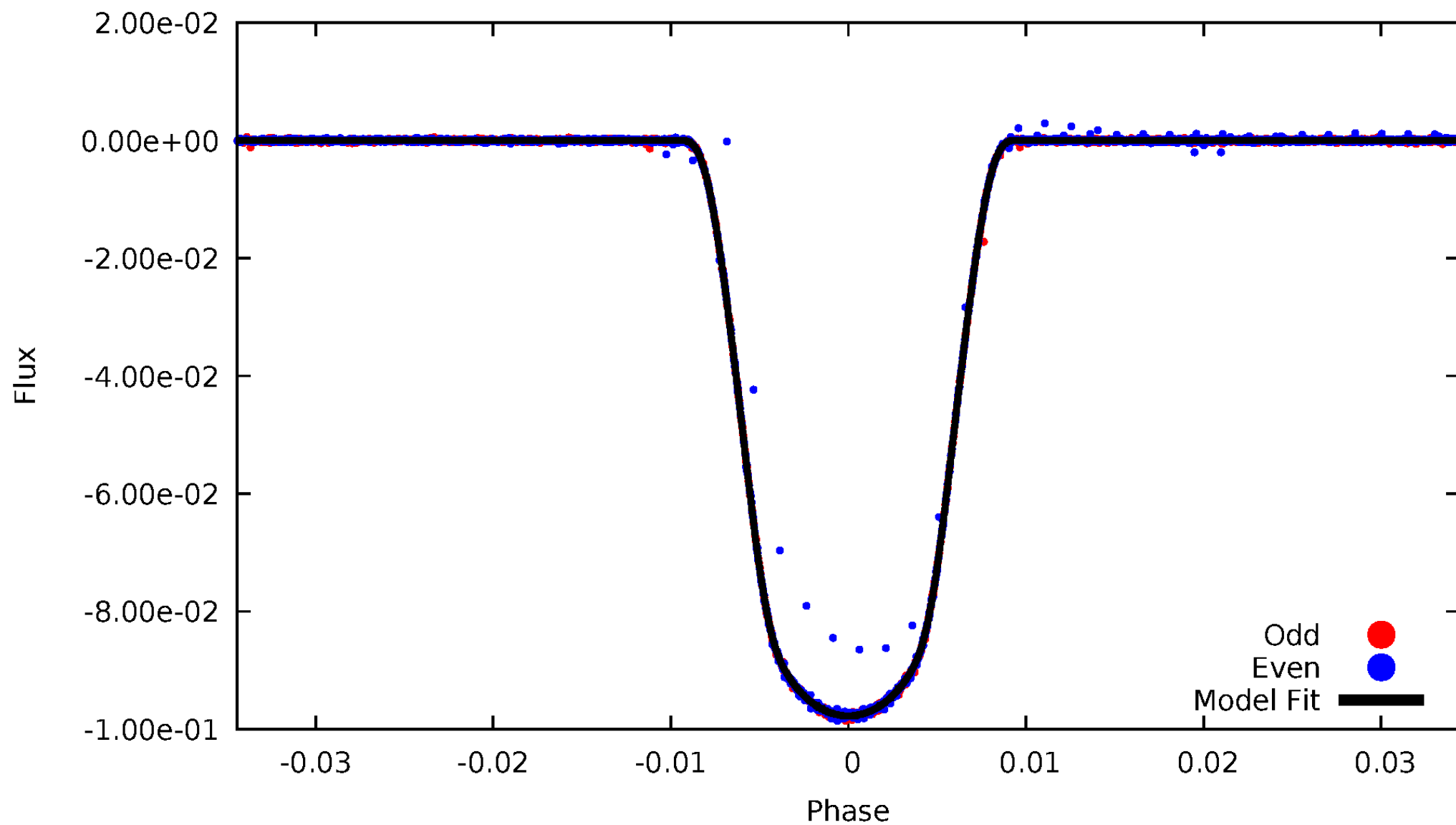


TCE 009474222-01



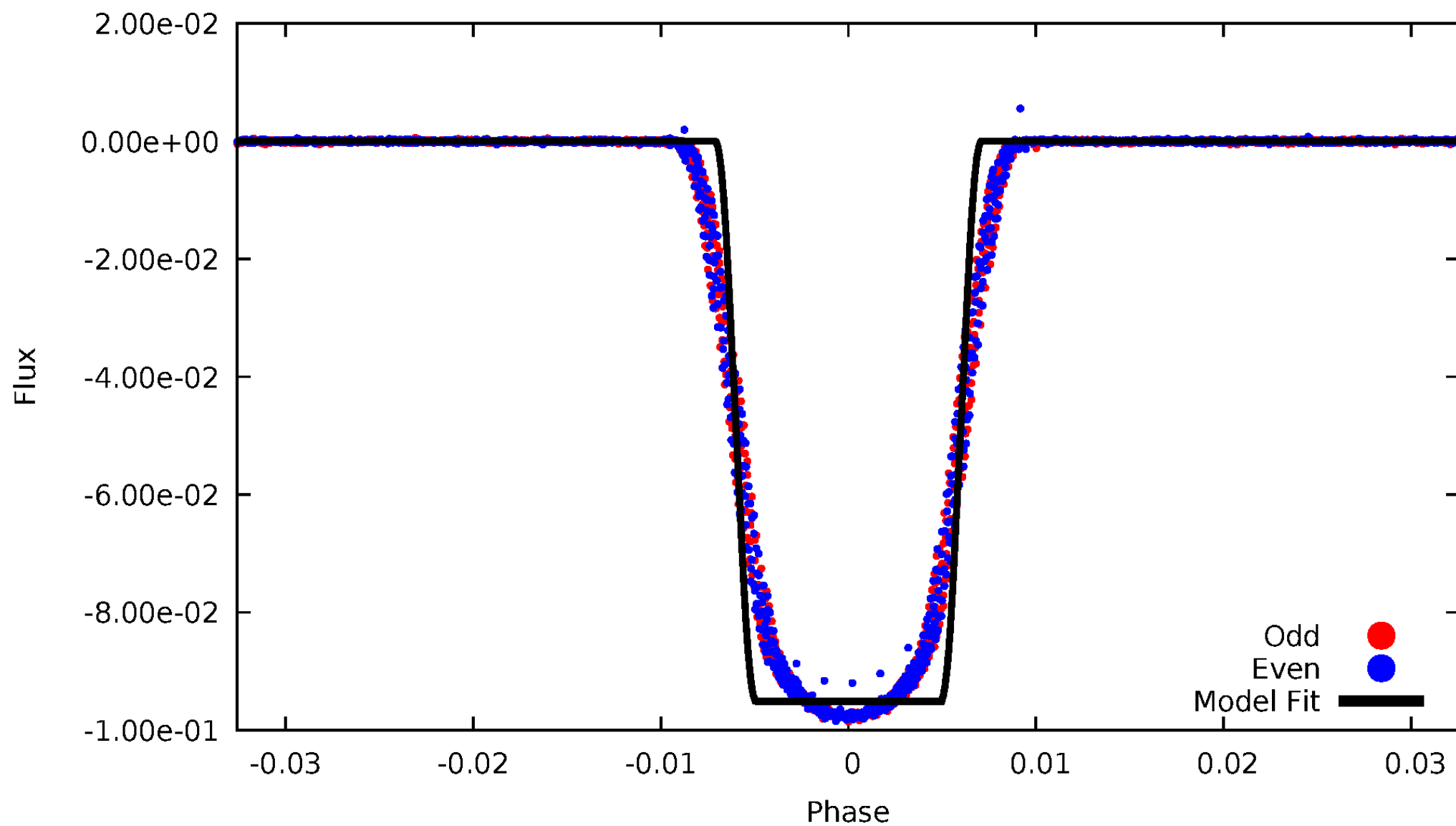
DV Odd/Even

TCE 009474222-01



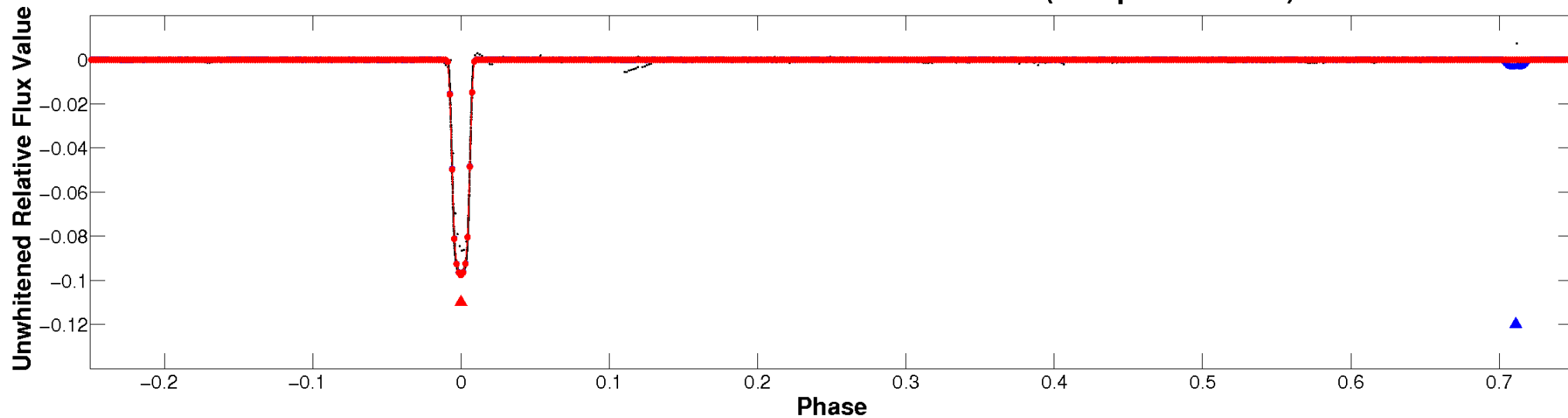
ALT Odd/Even

TCE 009474222-01

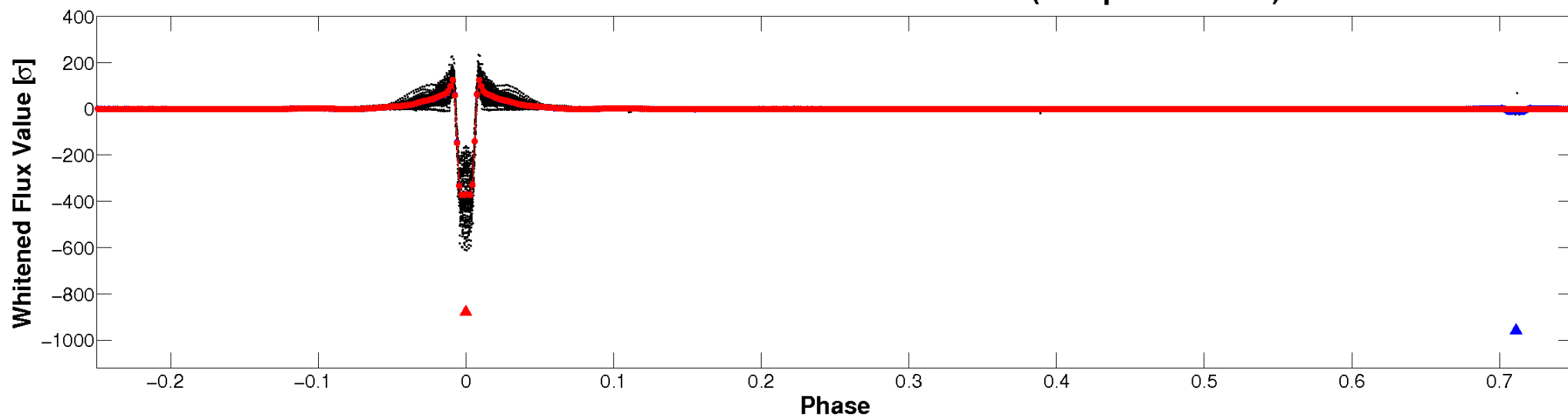


Non-Whitened Vs. Whitened Light Curve

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

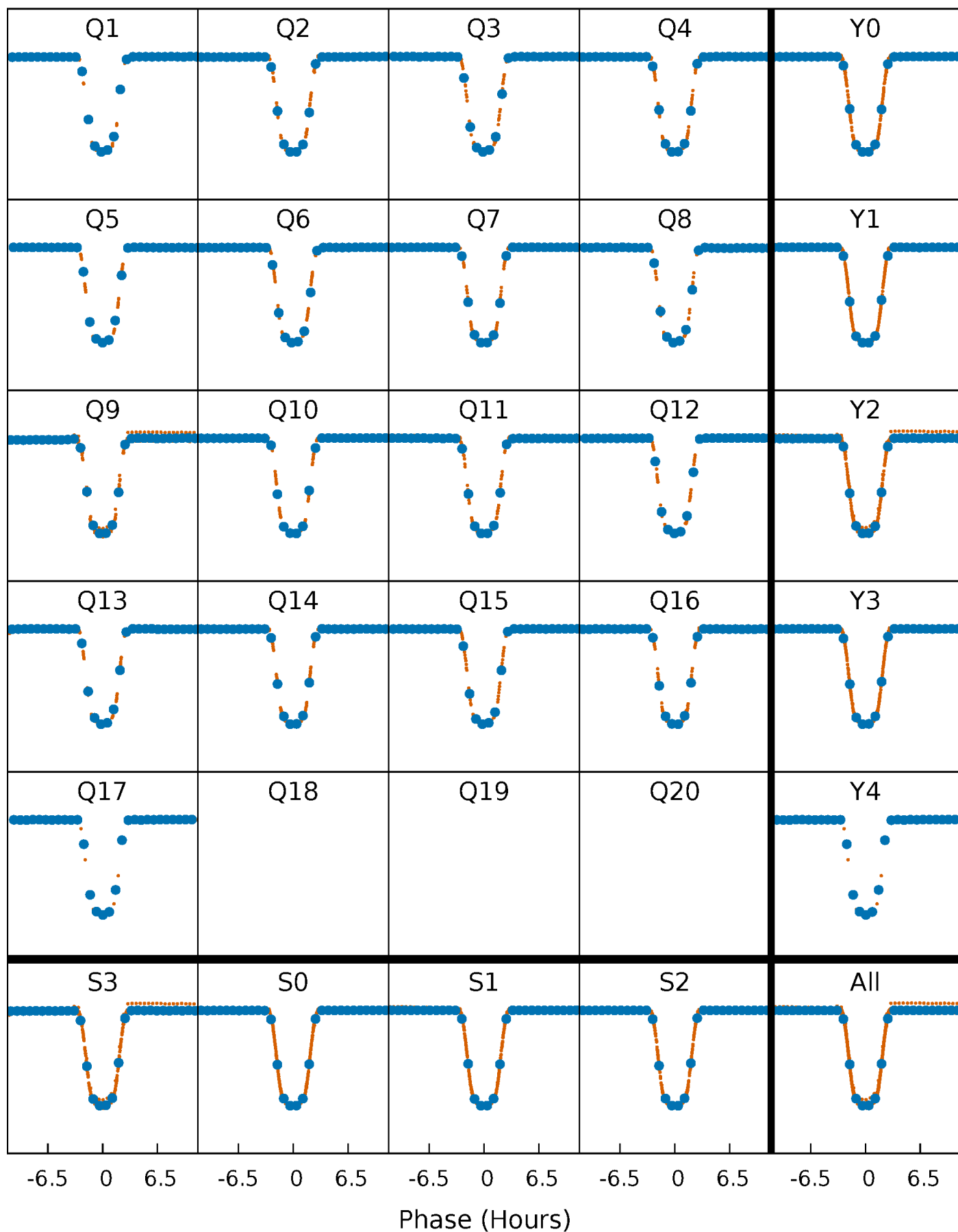


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



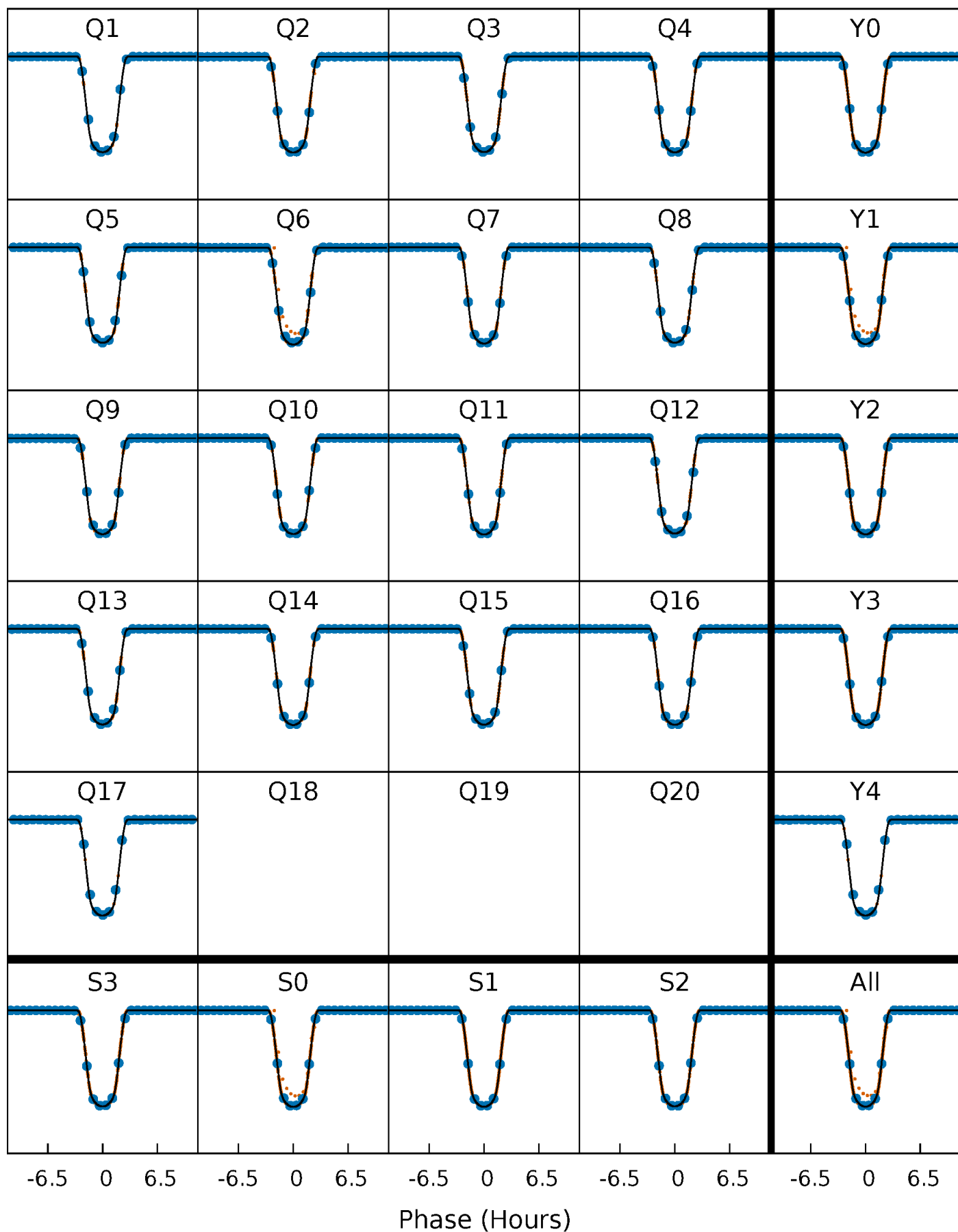
PDC Quarter-Phased Transit Curves

TCE 009474222-01 P= 13.691790 Days $T_0=133.791476$ (BKJD)



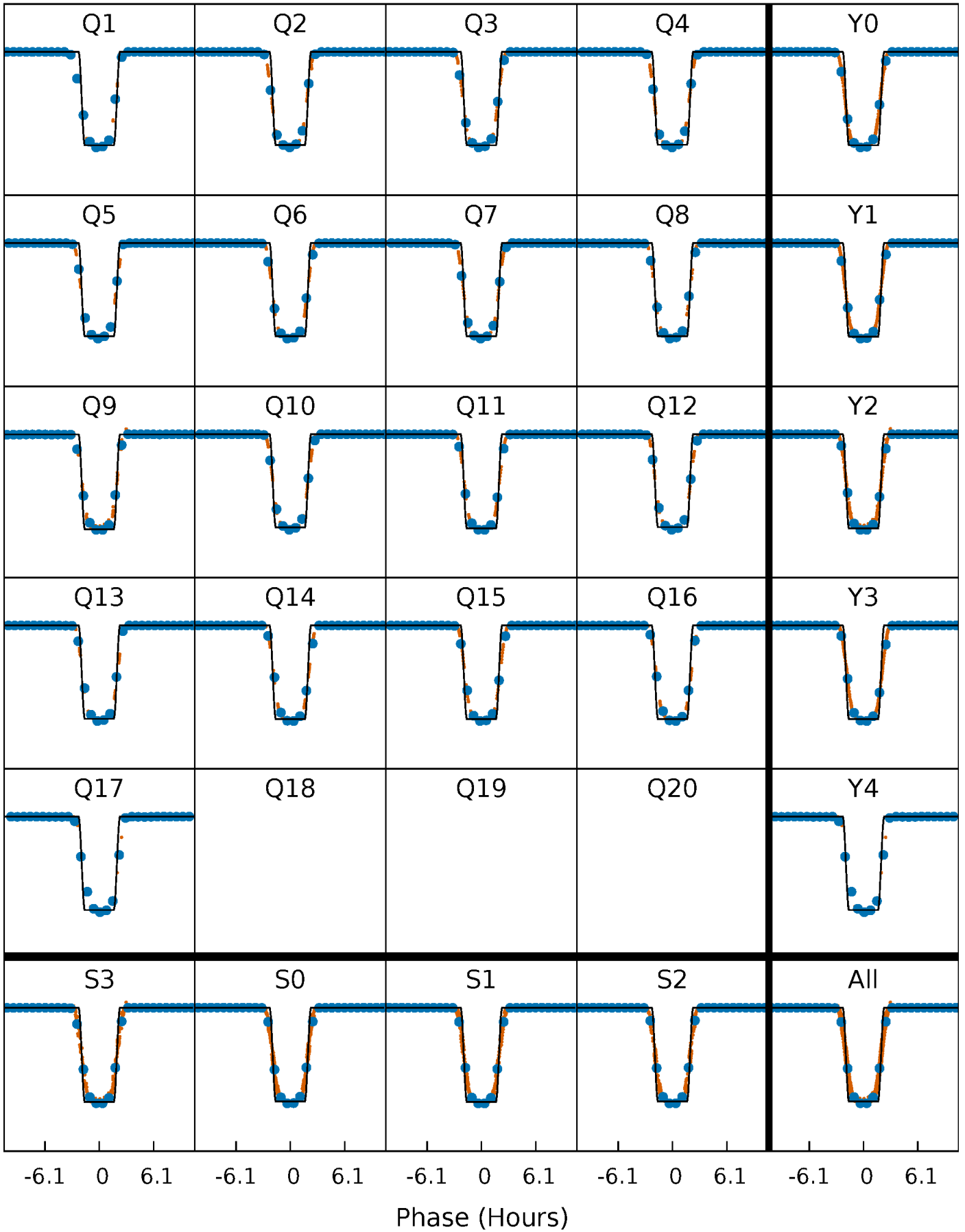
DV Quarter-Phased Transit Curves

TCE 009474222-01 P= 13.691790 Days $T_0=133.791476$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

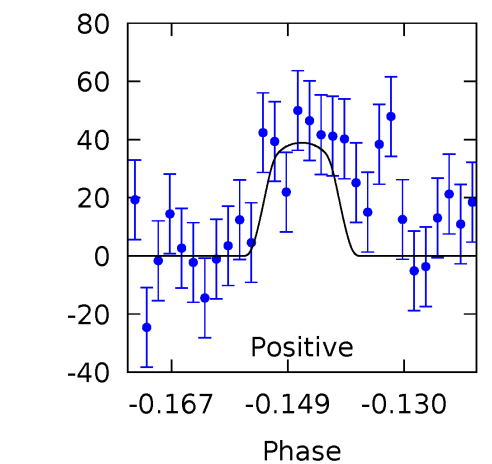
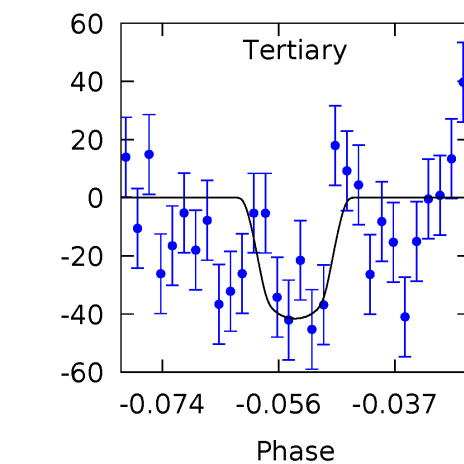
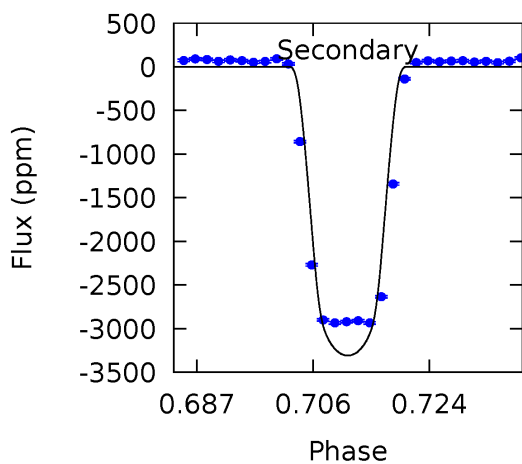
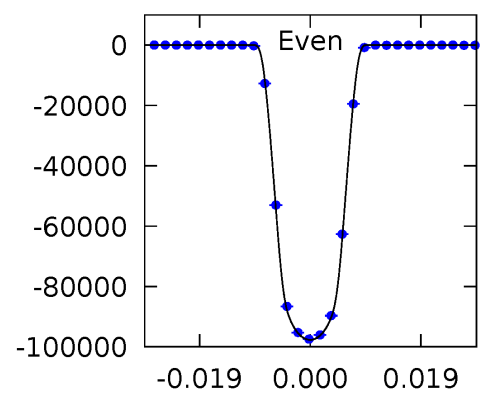
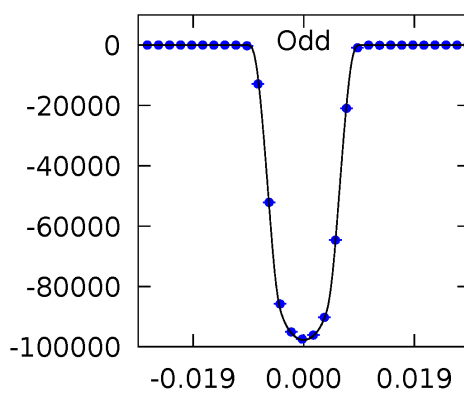
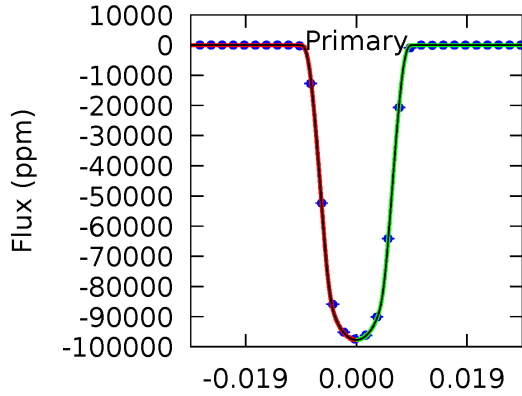
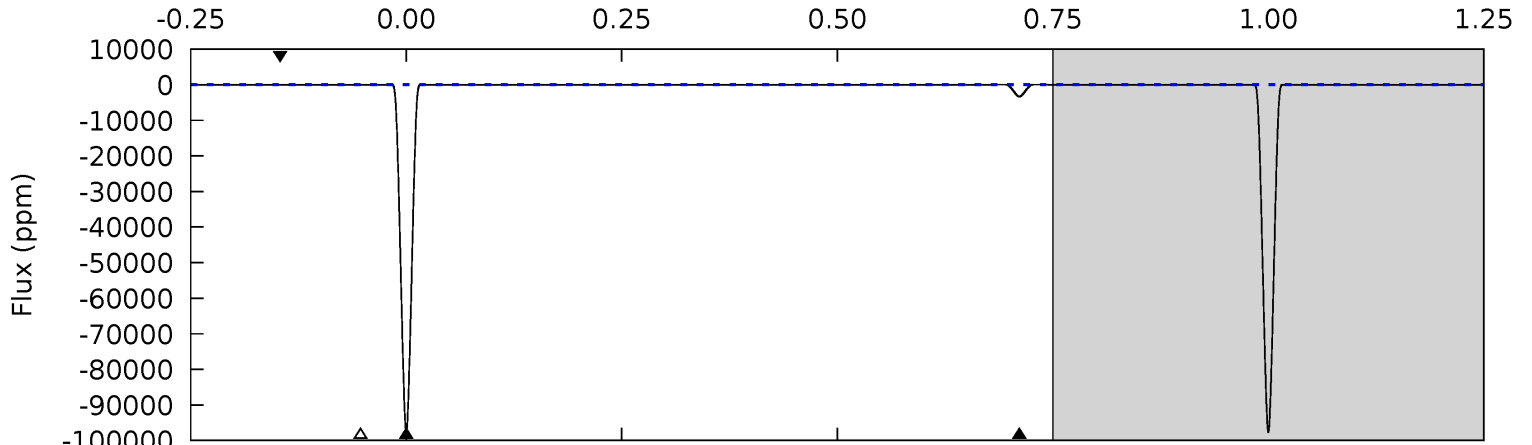
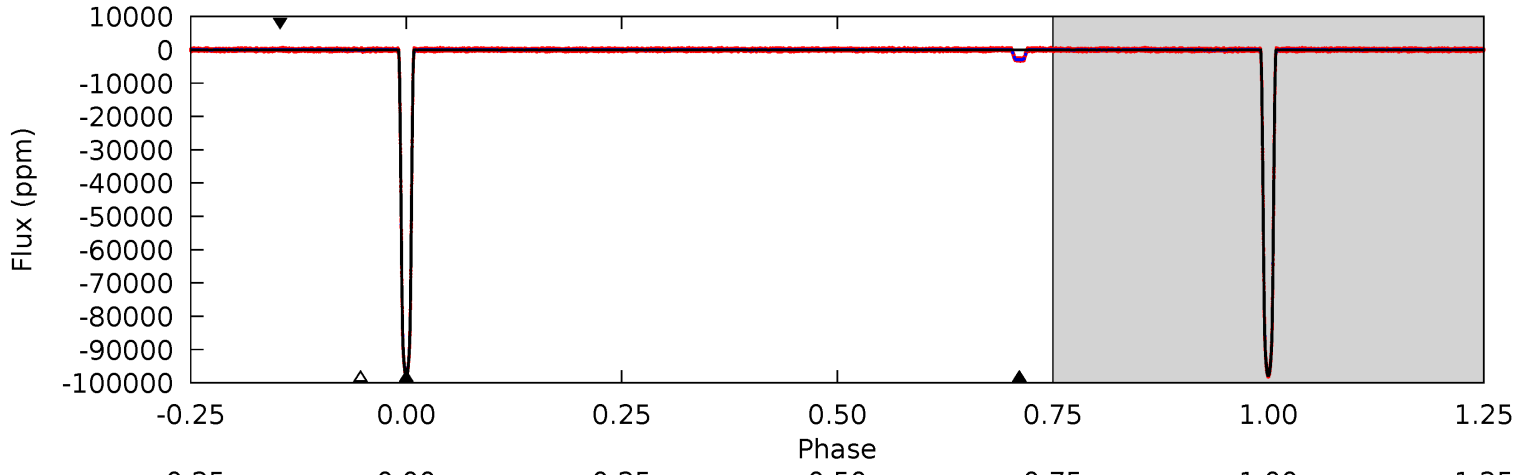
TCE 009474222-01 P= 13.691681 Days $T_0=133.796975$ (BKJD)



DV Model-Shift Uniqueness Test

009474222-01, P = 13.691790 Days, E = 120.099686 Days

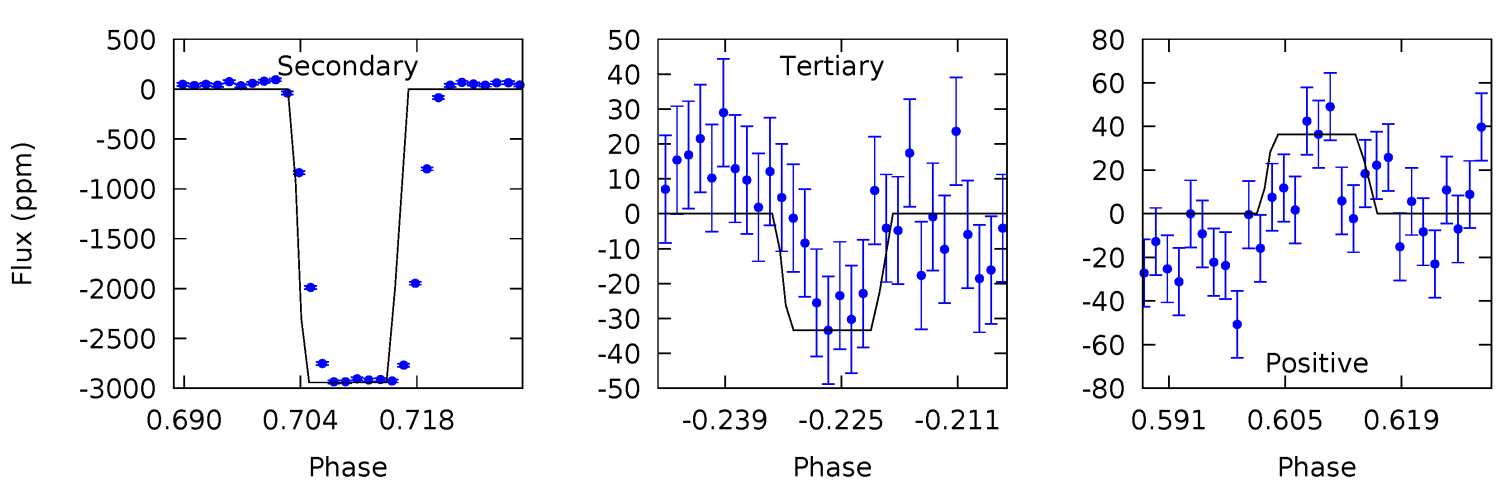
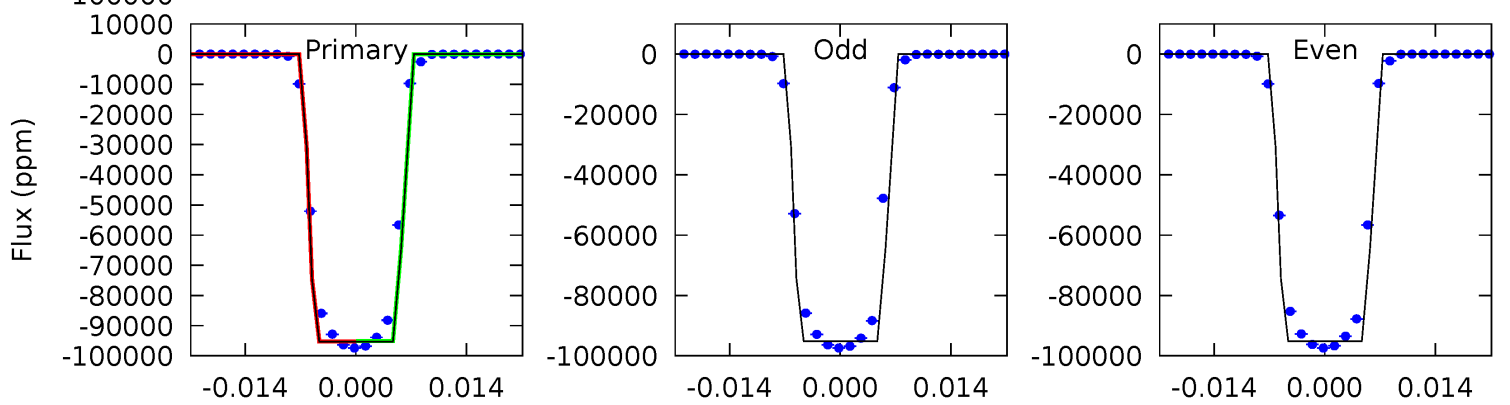
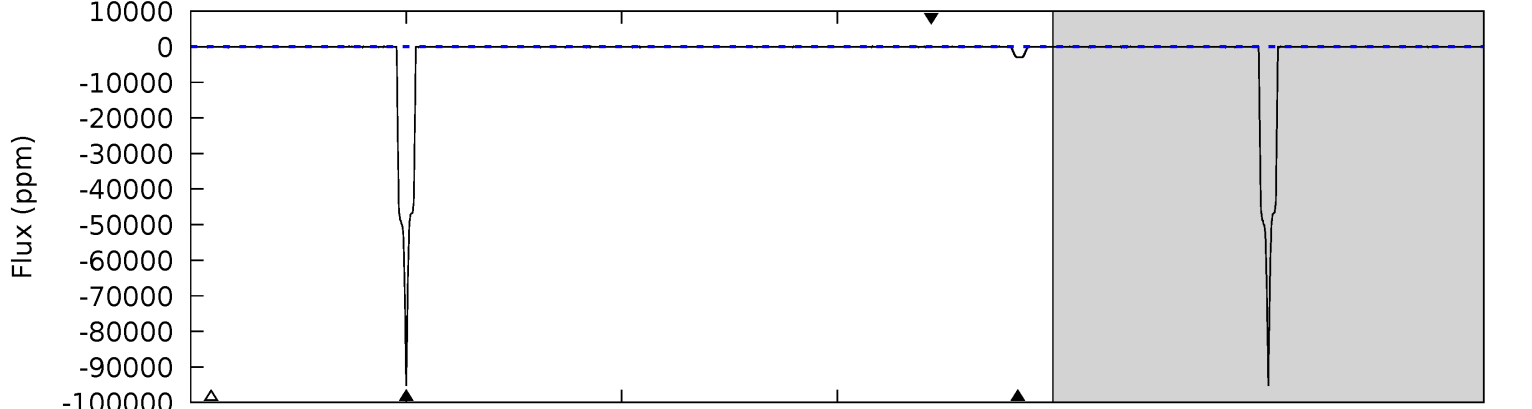
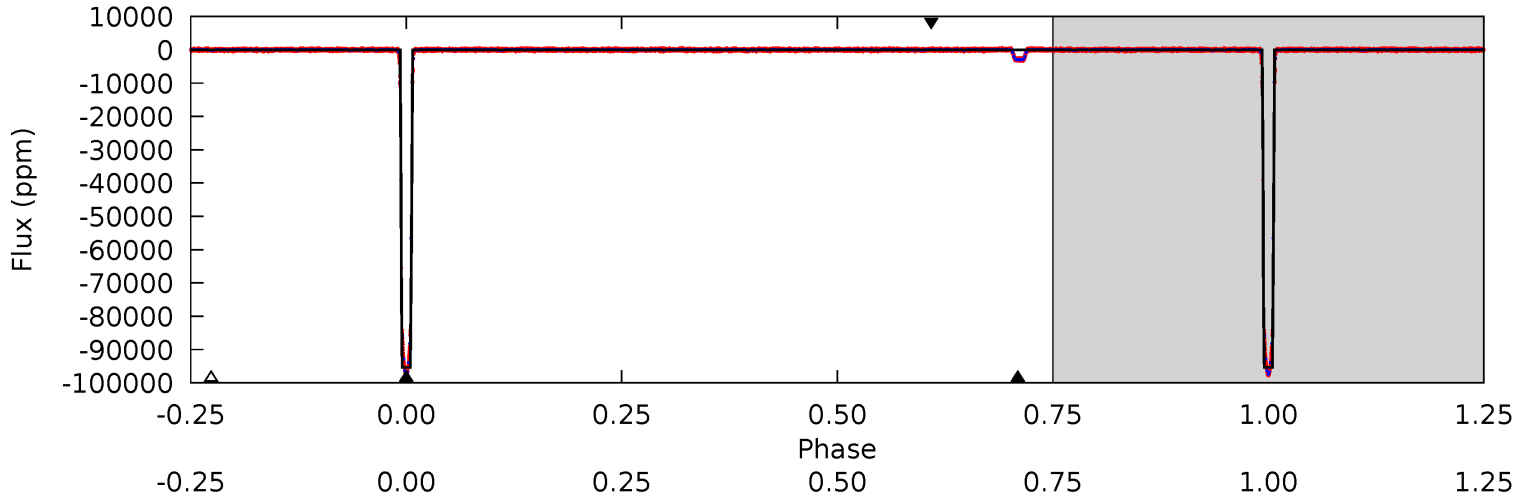
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20343	688.9	8.65	8.10	4.91	2.35	4.07	20334	20335	680.3	680.8	4.63	1.00	0.00	1.20



Alt Model-Shift Uniqueness Test

009474222-01, P = 13.691681 Days, E = 120.105294 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11299	348.7	3.96	4.30	4.96	2.46	1.69	11295	11294	344.8	344.4	0.65	1.00	0.00	0



Stellar Parameters For KIC 009474222

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6295^{+75}_{-75}	$4.158^{+0.149}_{-0.135}$	$0.060^{+0.150}_{-0.150}$	$1.554^{+0.287}_{-0.287}$	$1.267^{+0.106}_{-0.129}$	$0.475^{+0.338}_{-0.168}$
	+1%/-1%	+4%/-3%	+250%/-250%	+18%/-18%	+8%/-10%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009474222-01 / KOI 7177.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-3309 ± 5	$49.00^{+5.66}_{-4.82}$	1390^{+74}_{-70}	3333^{+25}_{-28}	11^{+2}_{-2}
Alt.	-2942 ± 8	$52.15^{+5.73}_{-5.08}$	1386^{+75}_{-62}	3210^{+25}_{-23}	$8.722^{+1.817}_{-1.519}$

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 $A_{obs} \gg 1.0$

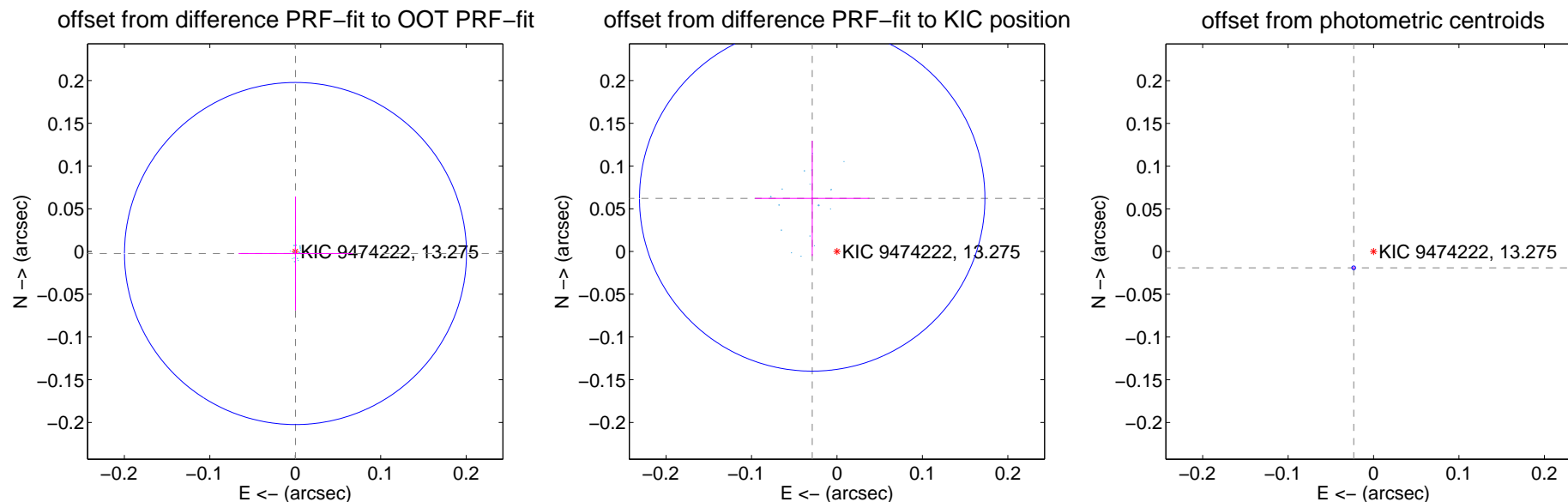
DV Centroid Data

Supplemental centroid analysis for 009474222-01. Kepler magnitude: 13.28. Transit SNR 9552.38

There are 17 quarters with good PRF difference image offsets

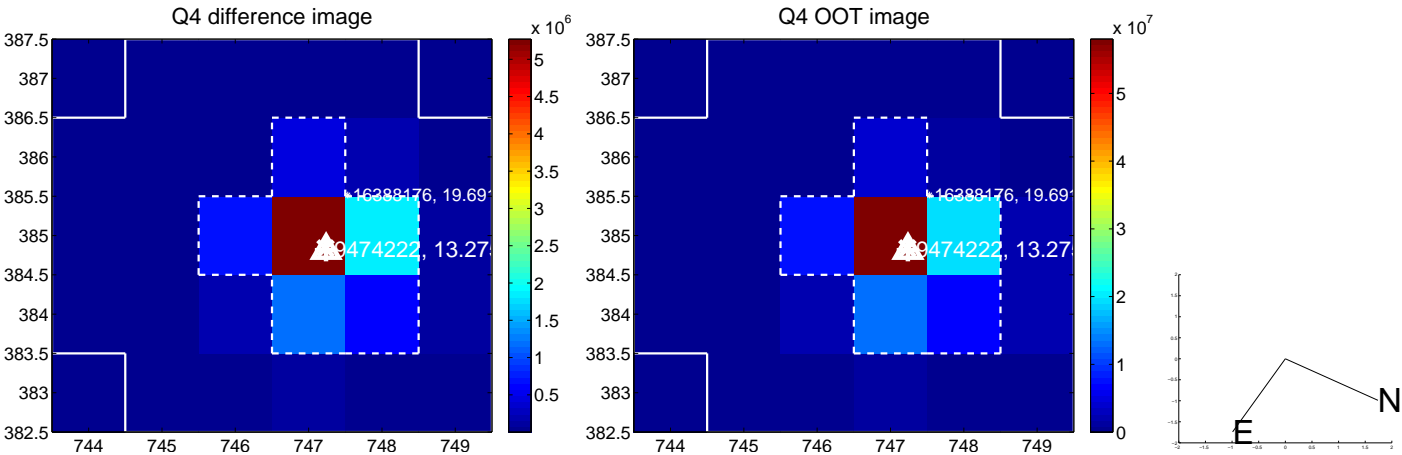
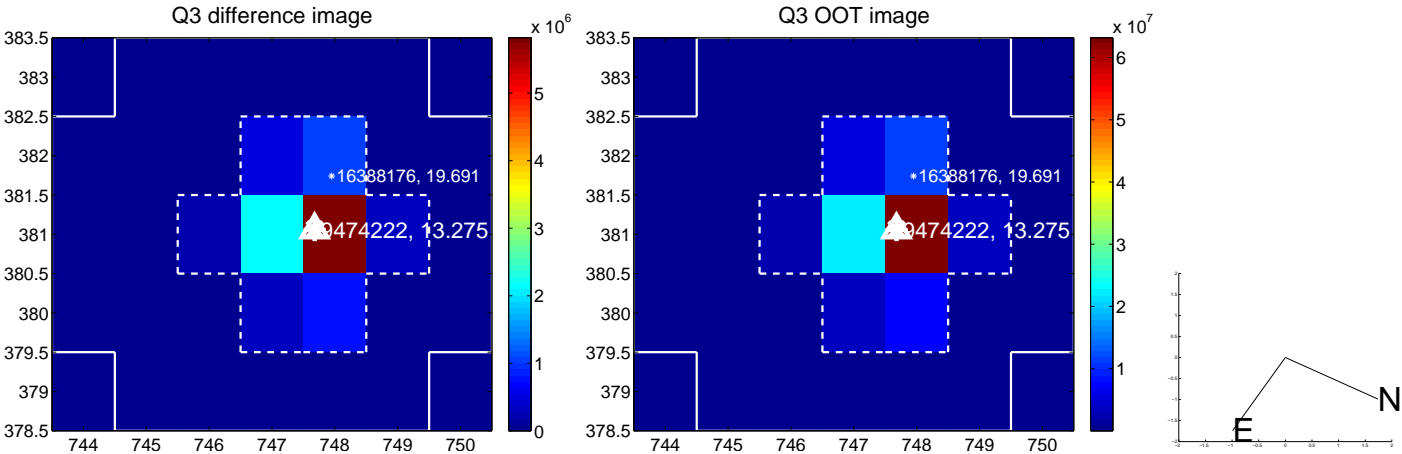
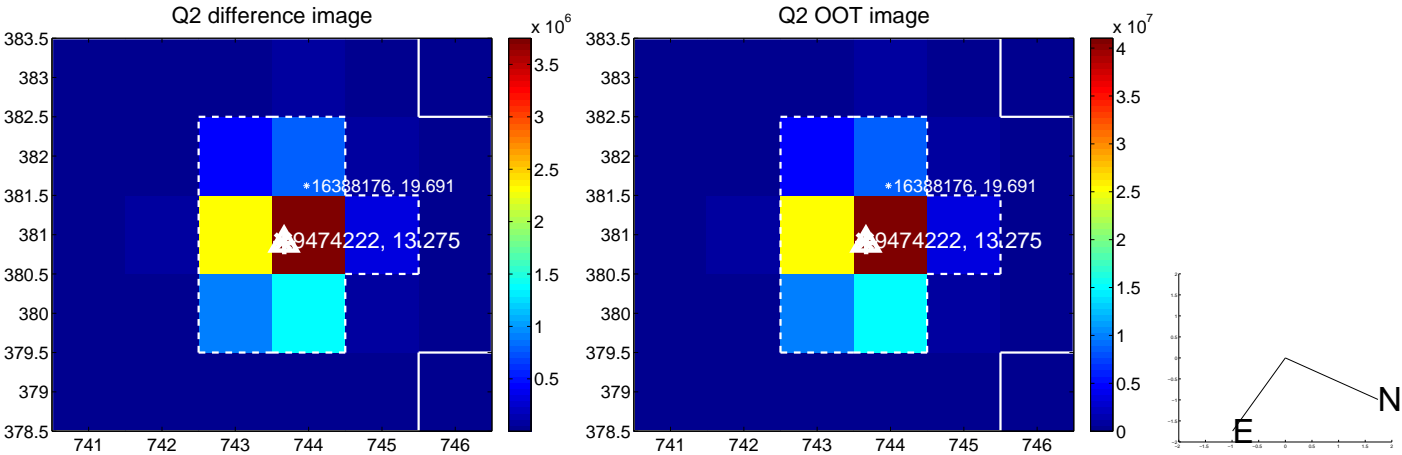
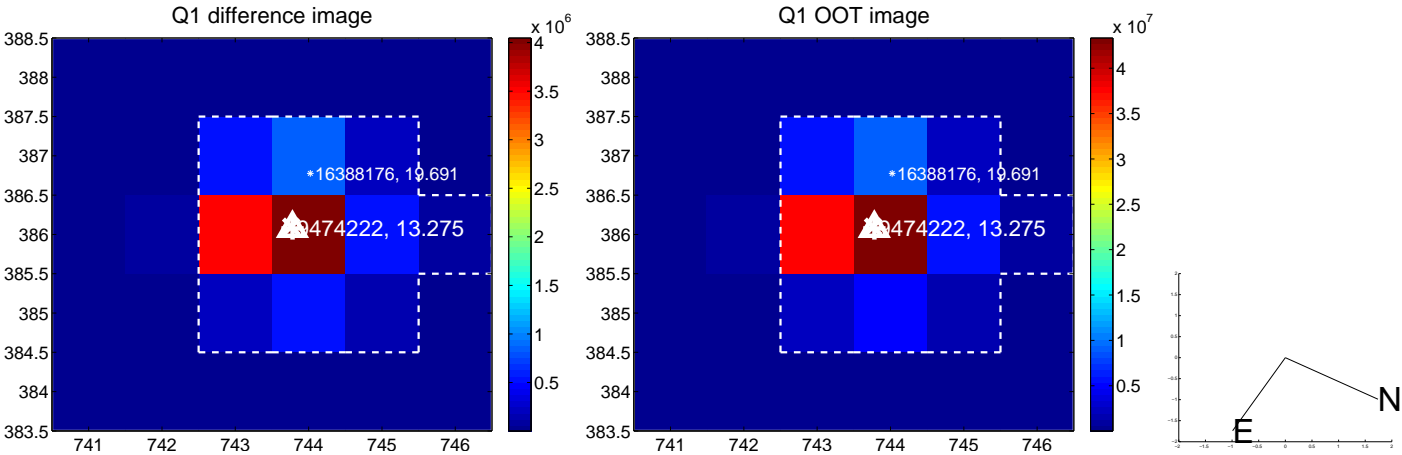
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.002 ± 0.067	0.04	-0.000 ± 0.067	-0.002 ± 0.067
PRF-fit source offset from KIC position	0.069 ± 0.067	1.02	0.029 ± 0.067	0.062 ± 0.067
photometric centroid source offset	0.03 ± 0.00	41.03	0.02 ± 0.00	-0.02 ± 0.00

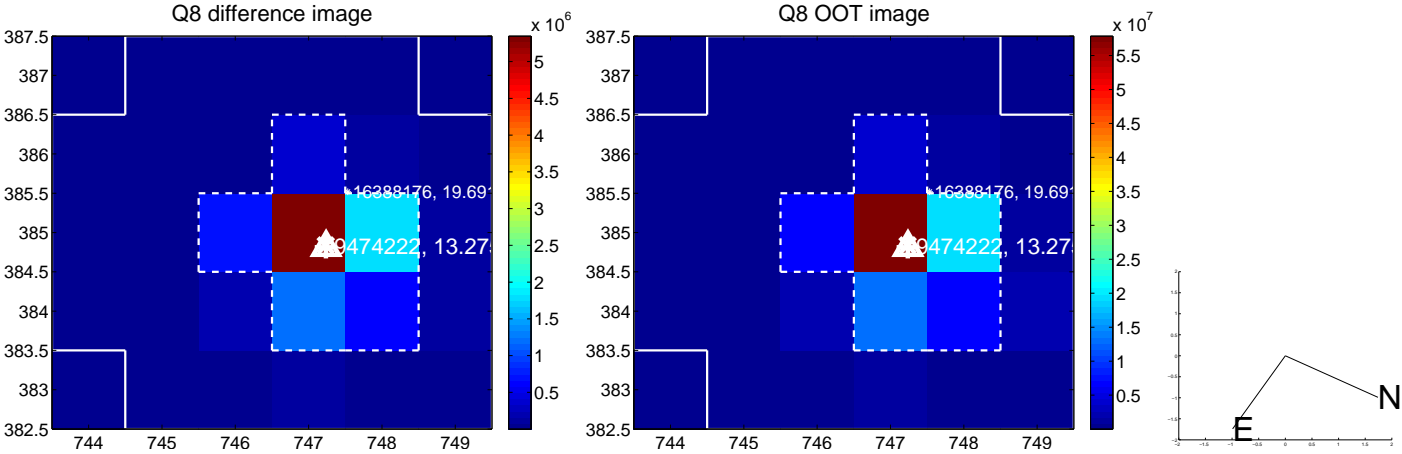
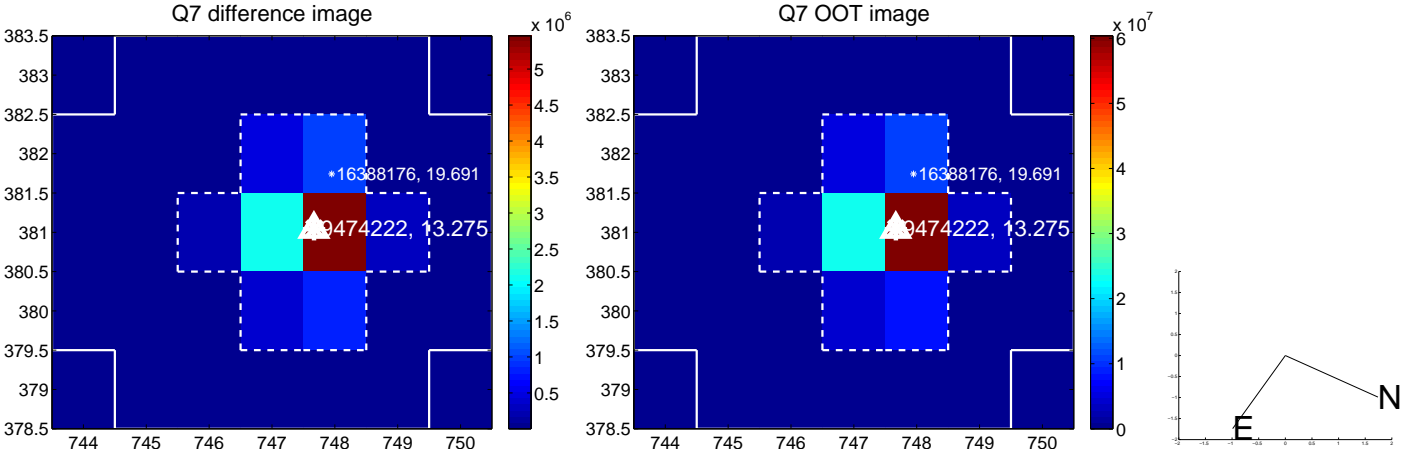
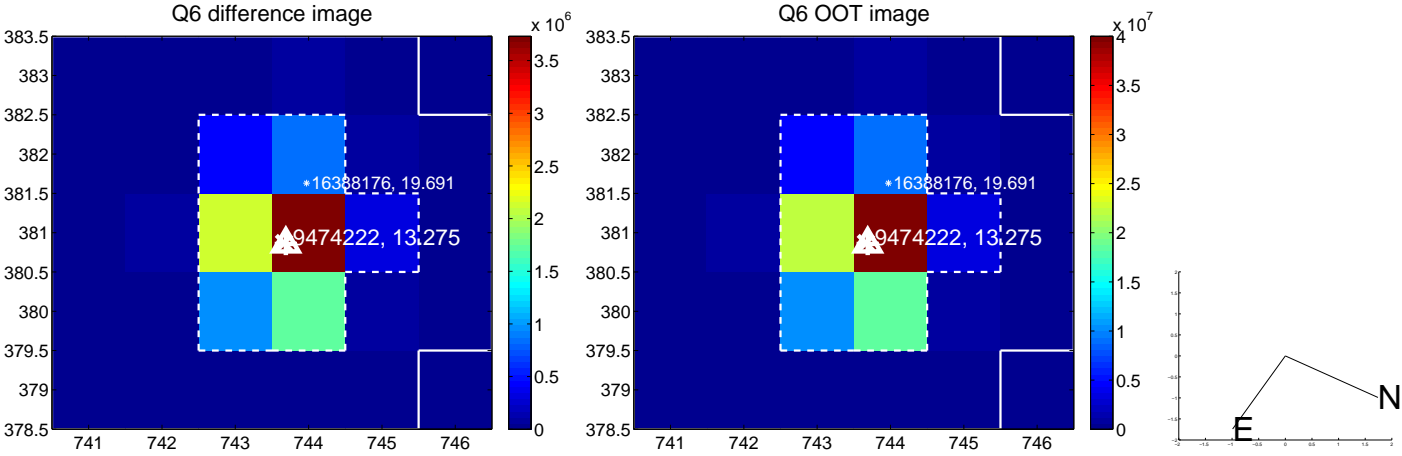
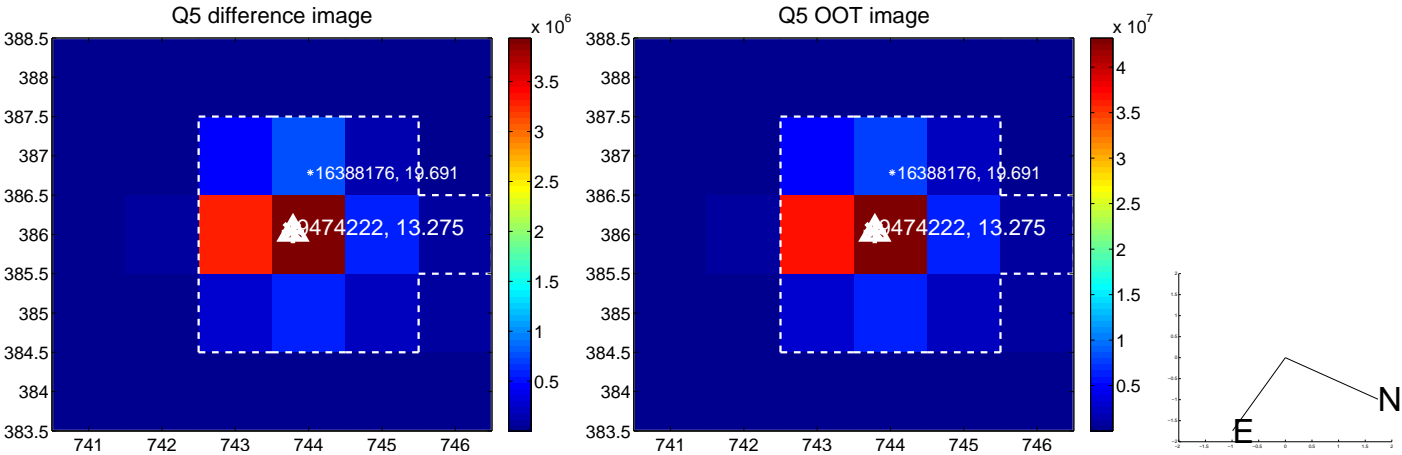


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

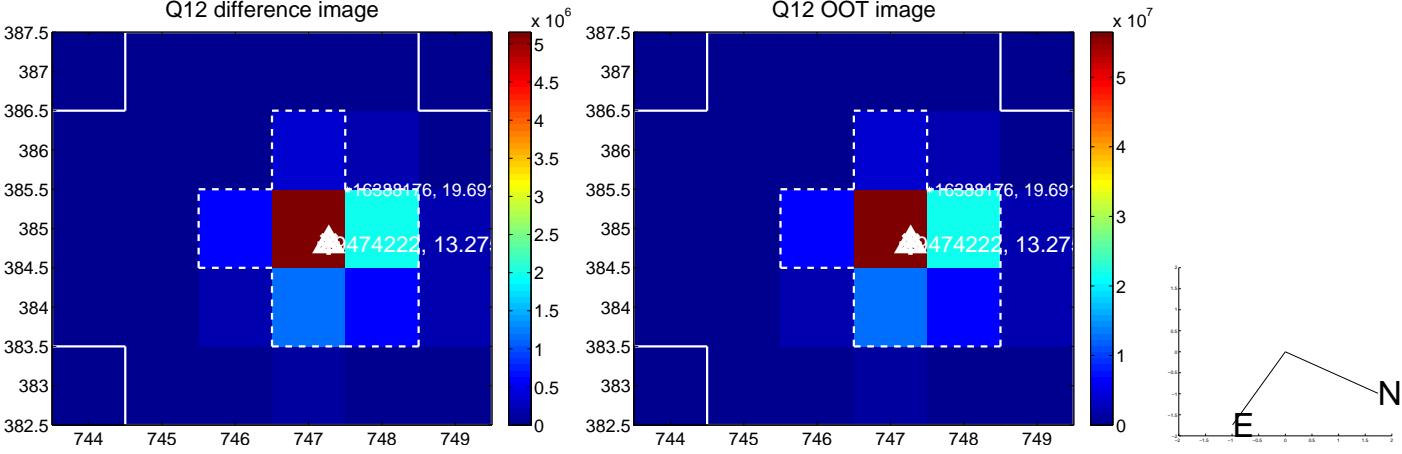
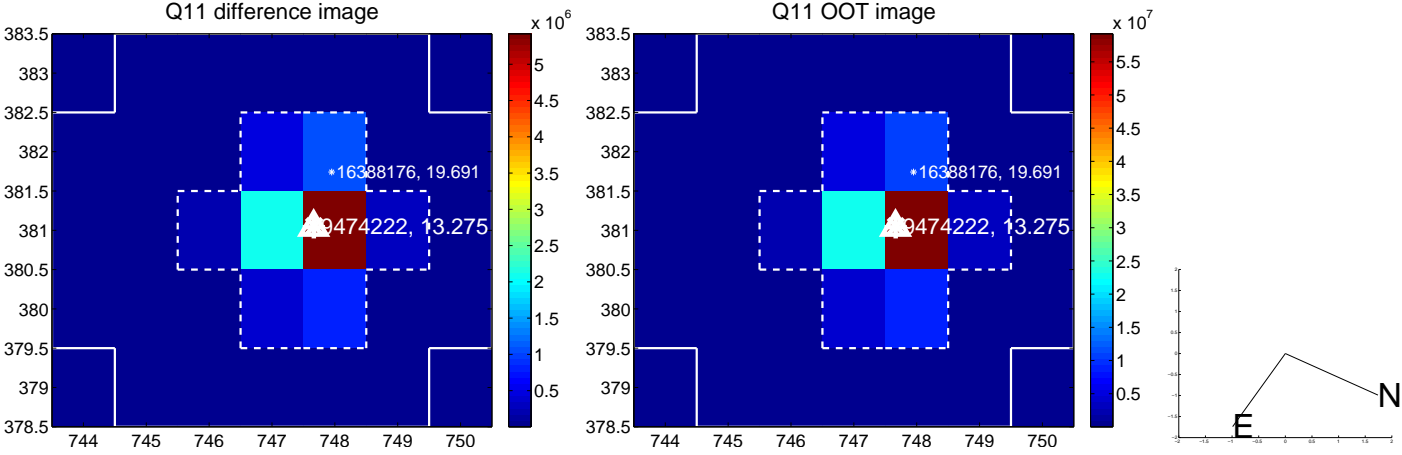
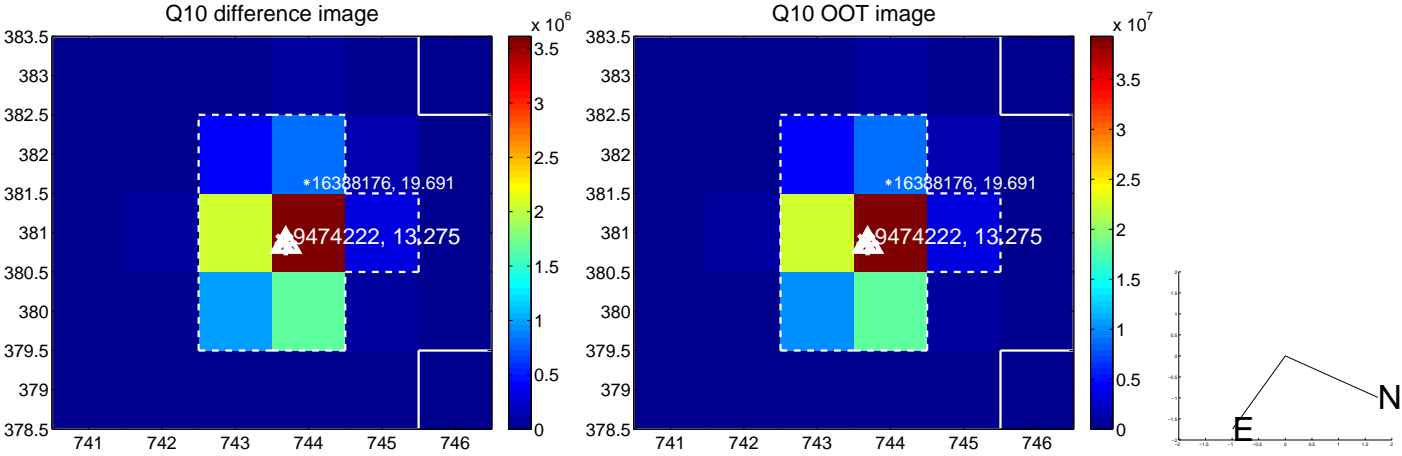
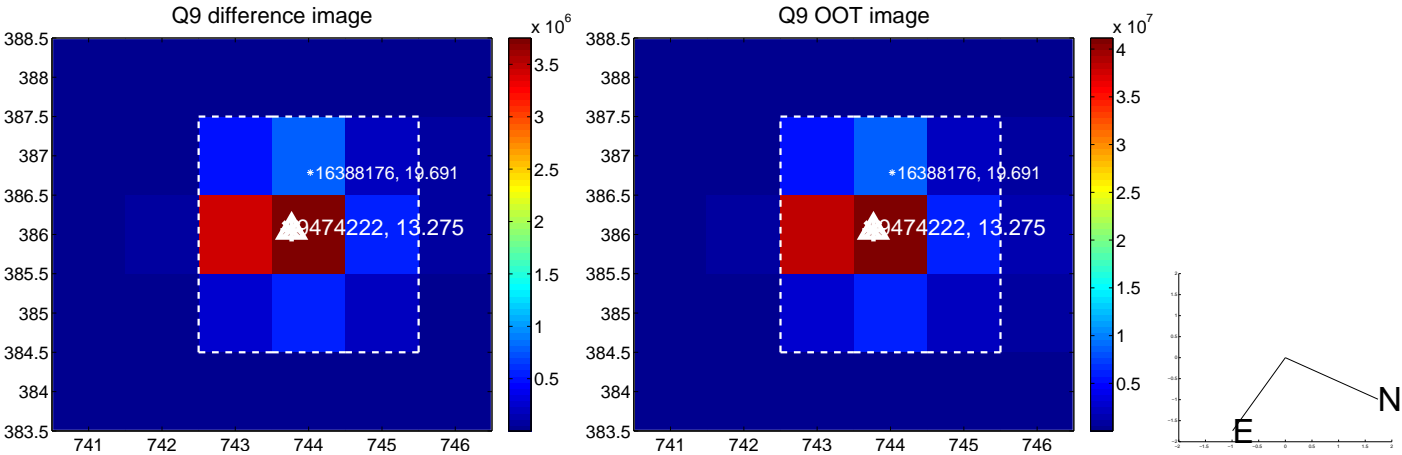
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



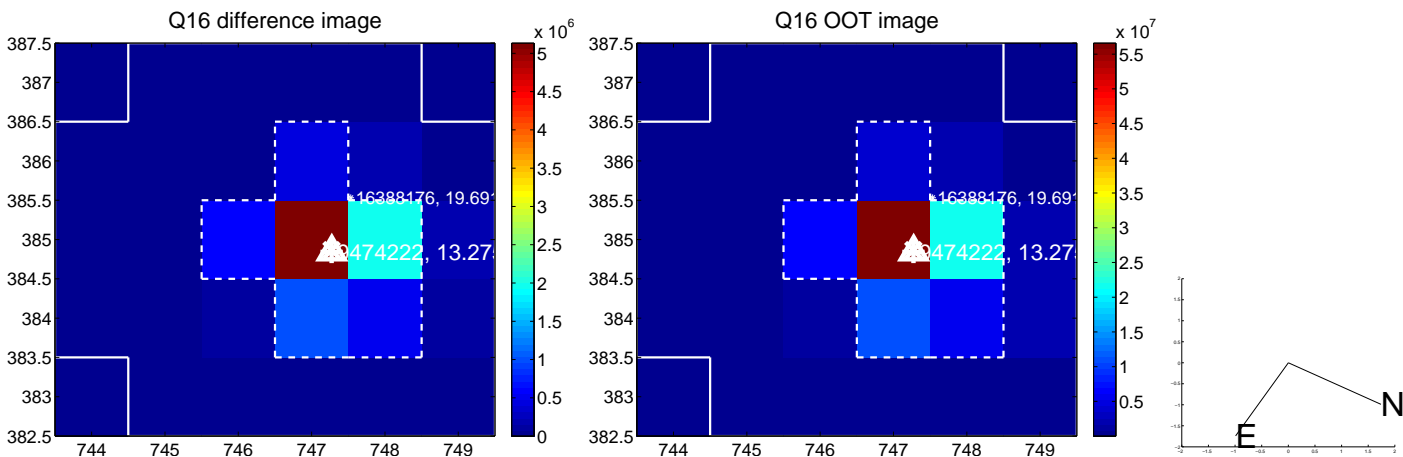
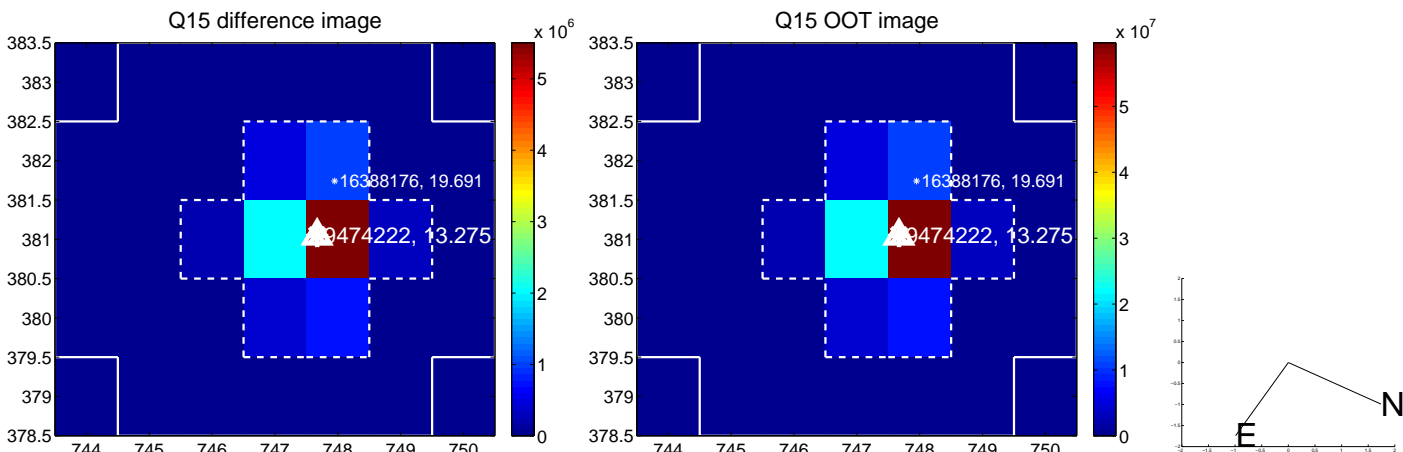
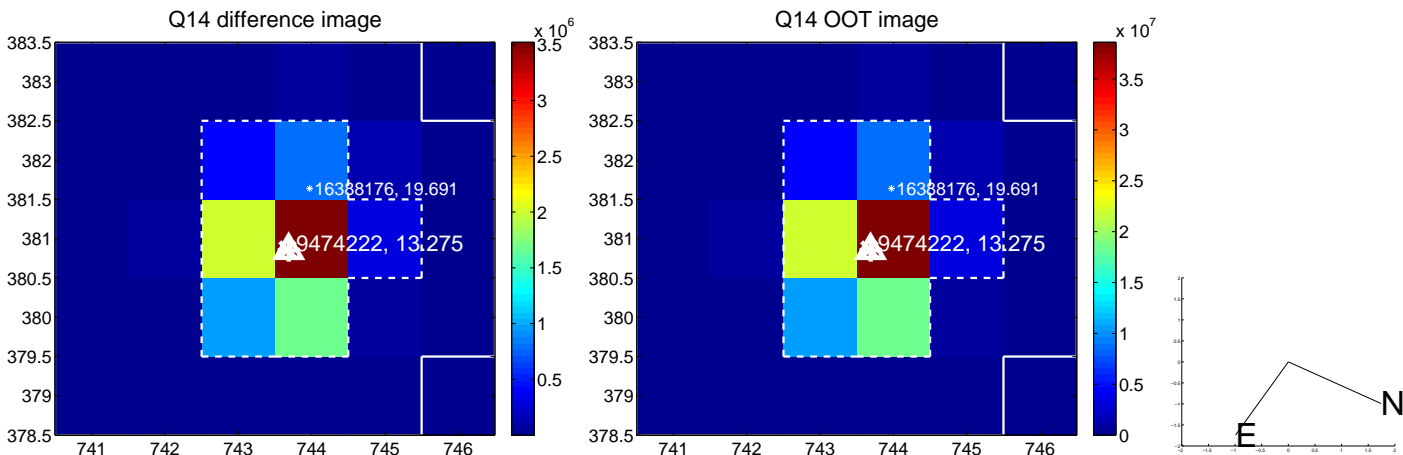
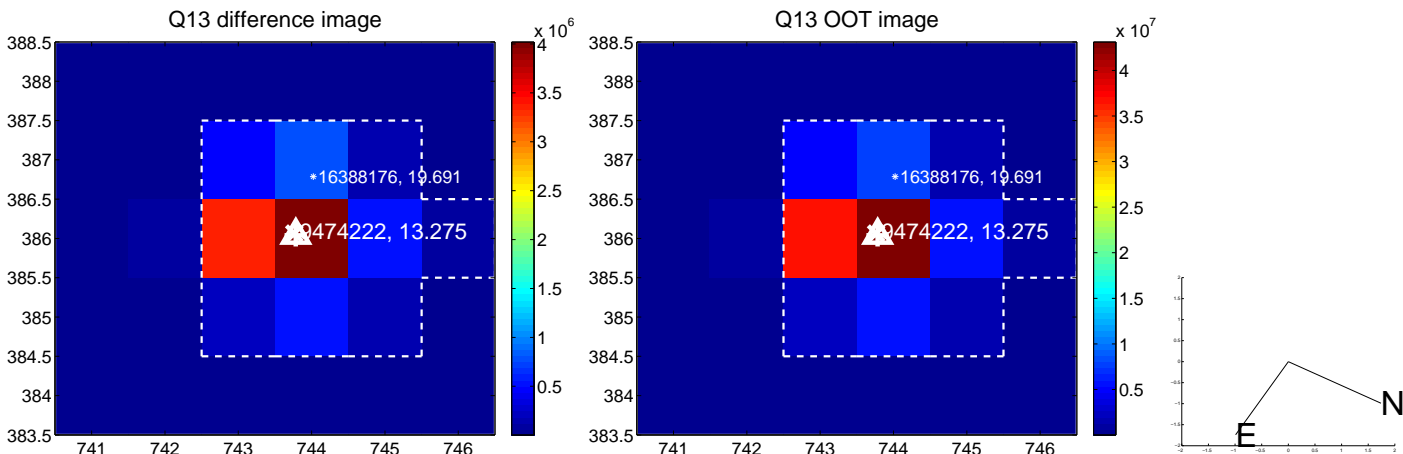
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



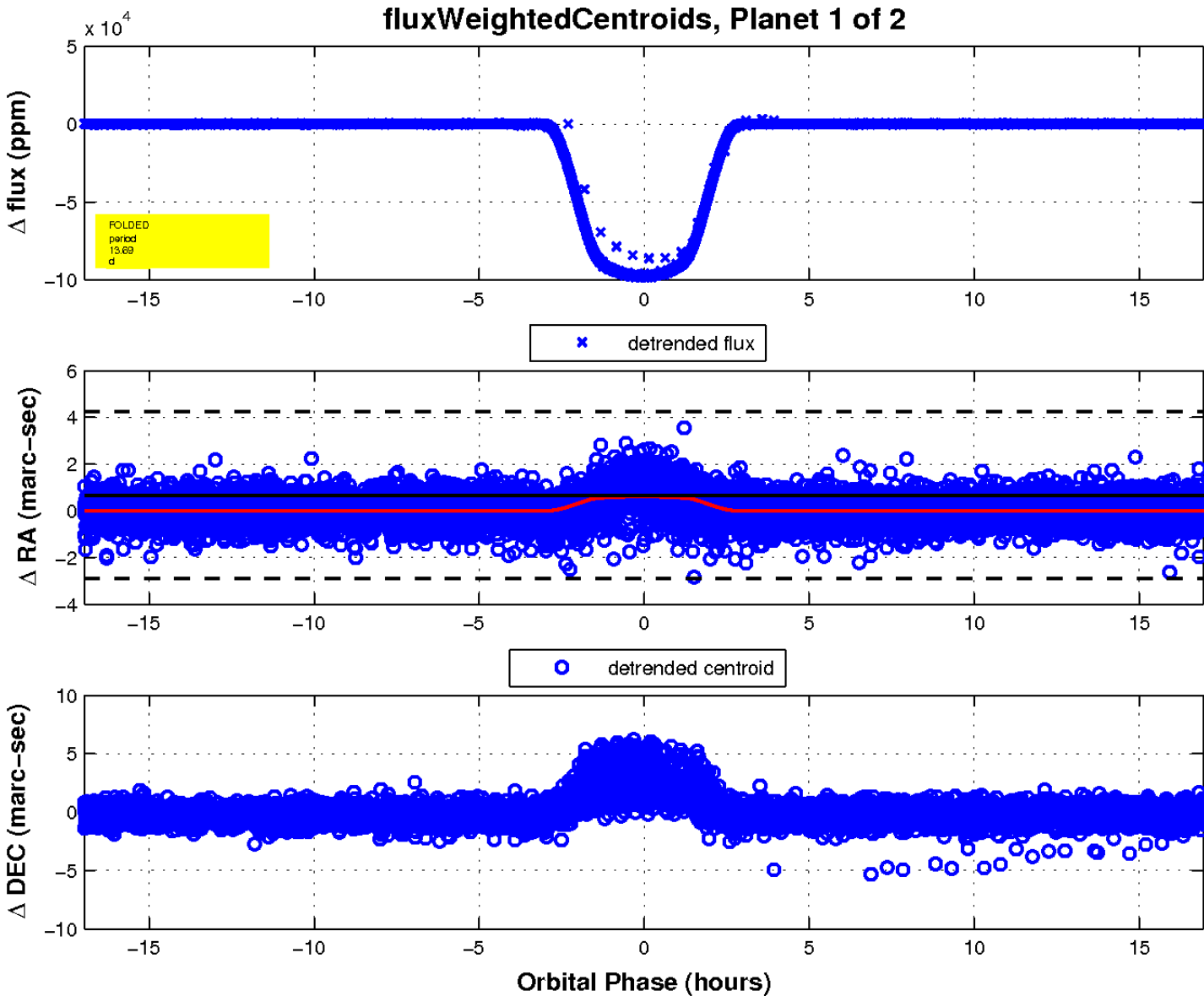
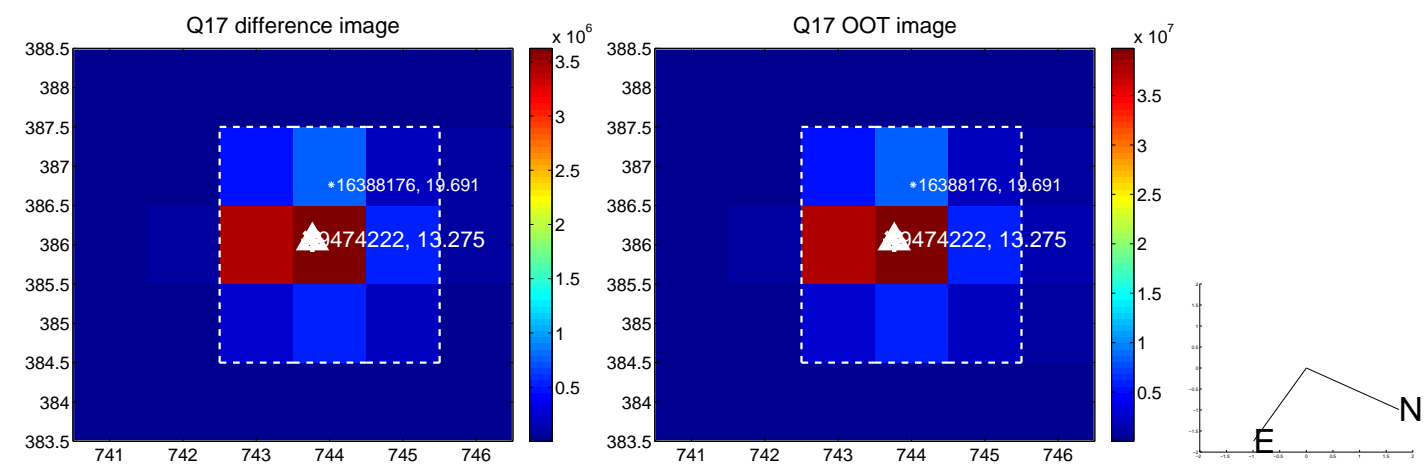
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

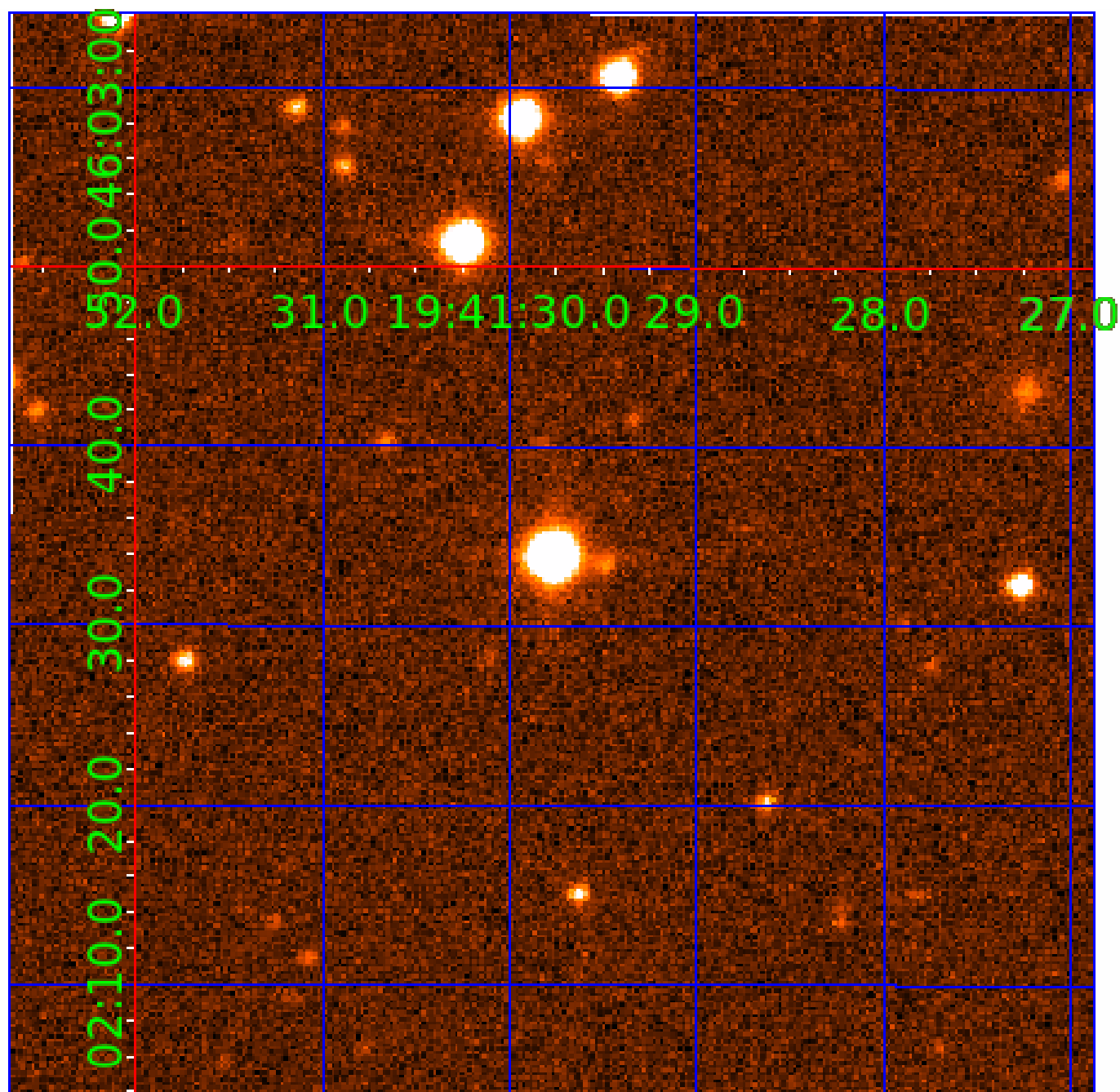


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009474222

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})
009474222-01	OBS	7177.01	13.691790	133.791476	97732.9	5.655	10078.4	9552.4	1.55	6295	49.26	231.15
009474222-02	OBS	No	13.691789	143.529467	3124.2	6.016	338.4	334.9	1.55	6295	10.00	231.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009474222-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009474222-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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.

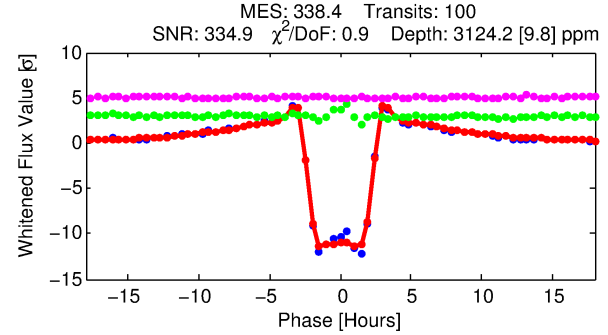
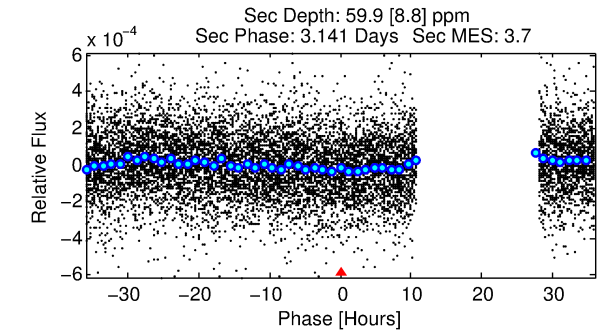
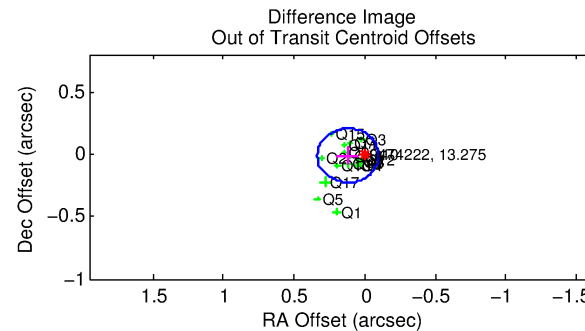
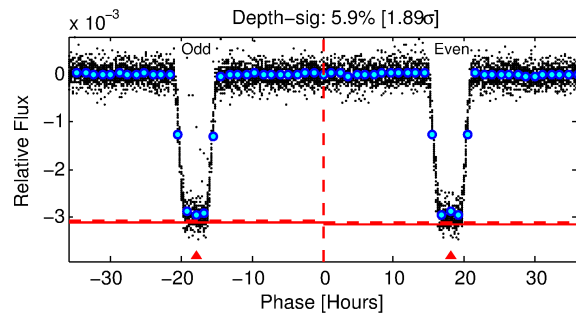
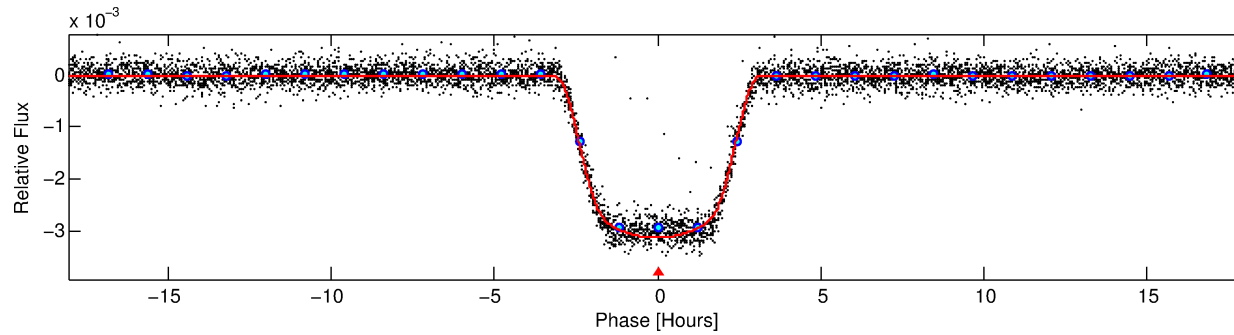
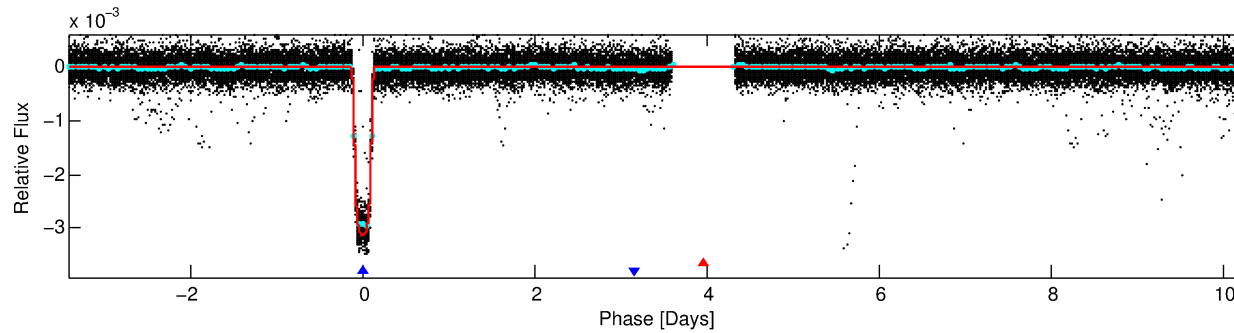
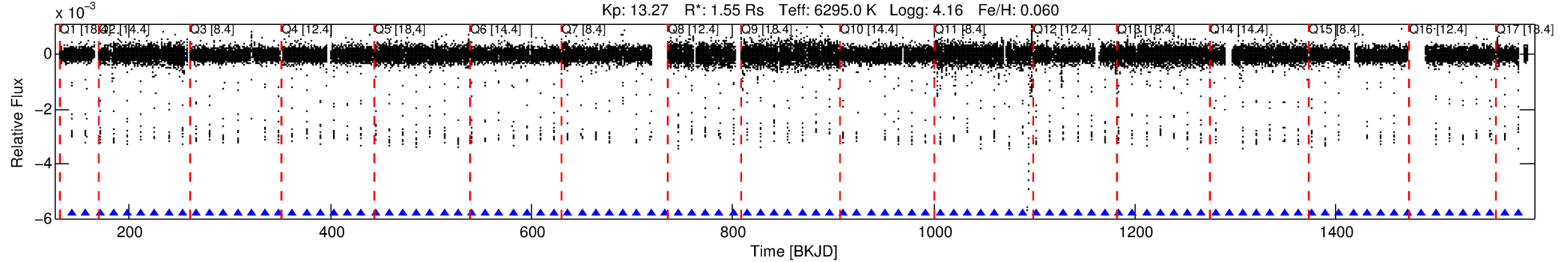
Ephemeris Match Information For 009474222-02

No Significant Match Found

DV One-Page Summary

KIC: 9474222 Candidate: 2 of 2 Period: 13.692 d
KOI: K07177 Corr: No Ephemeris Match

Kp: 13.27 R*: 1.55 Rs Teff: 6295.0 K Logg: 4.16 Fe/H: 0.060



DV Fit Results:

Period = 13.69179 [0.00000] d
Epoch = 143.5295 [0.0003] BKJD
Rp/R* = 0.0590 [0.0001]
a/R* = 10.49 [0.07]
b = 0.87 [0.00]
Seff = 231.15 [61.05]
Teq = 994 [66] K
Rp = 10.00 [1.85] Re
a = 0.1212 [0.0204] AU
Ag = 4.84 [1.44] [2.66σ]
Teffp = 2280 [88] K [11.74σ]

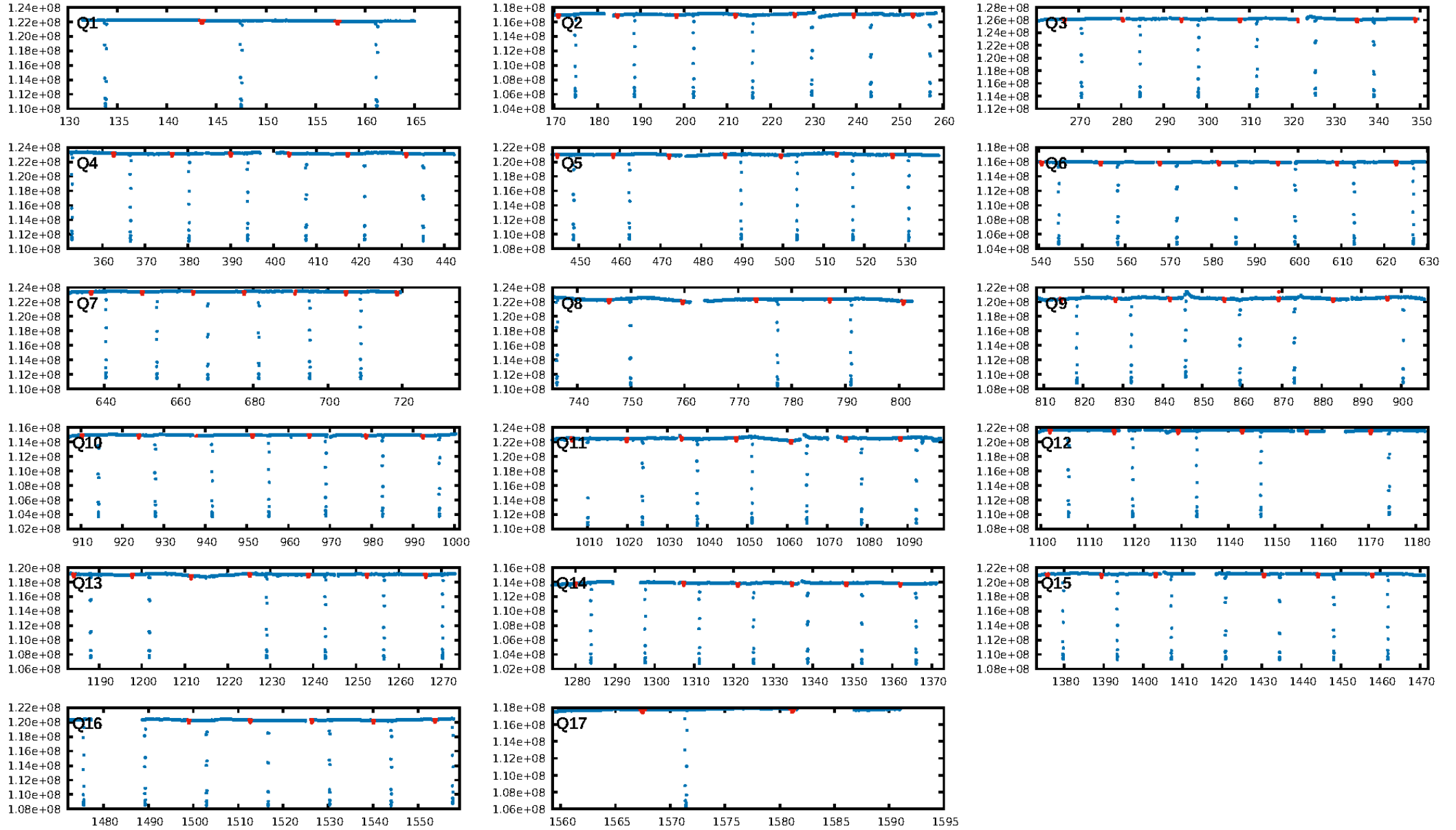
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 60.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [96/96]
GhostDiagnostic-chr: 5.745
Centroid-sig: N/A
Centroid-so: 0.079 arcsec [4.10σ]
OotOffset-rm: 0.120 arcsec [1.66σ]
KicOffset-rm: 0.163 arcsec [2.26σ]
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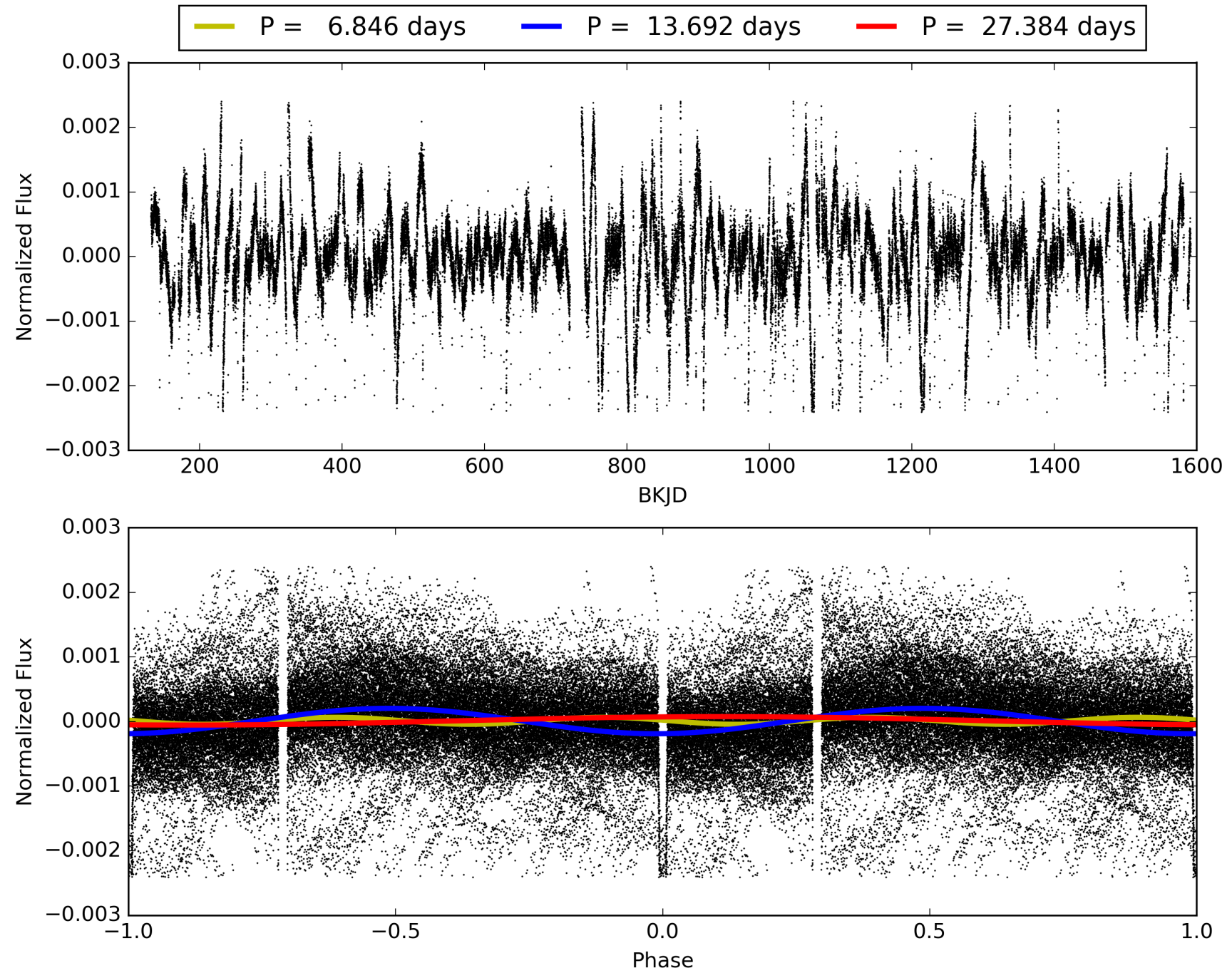
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009474222-02, PDC Light Curves

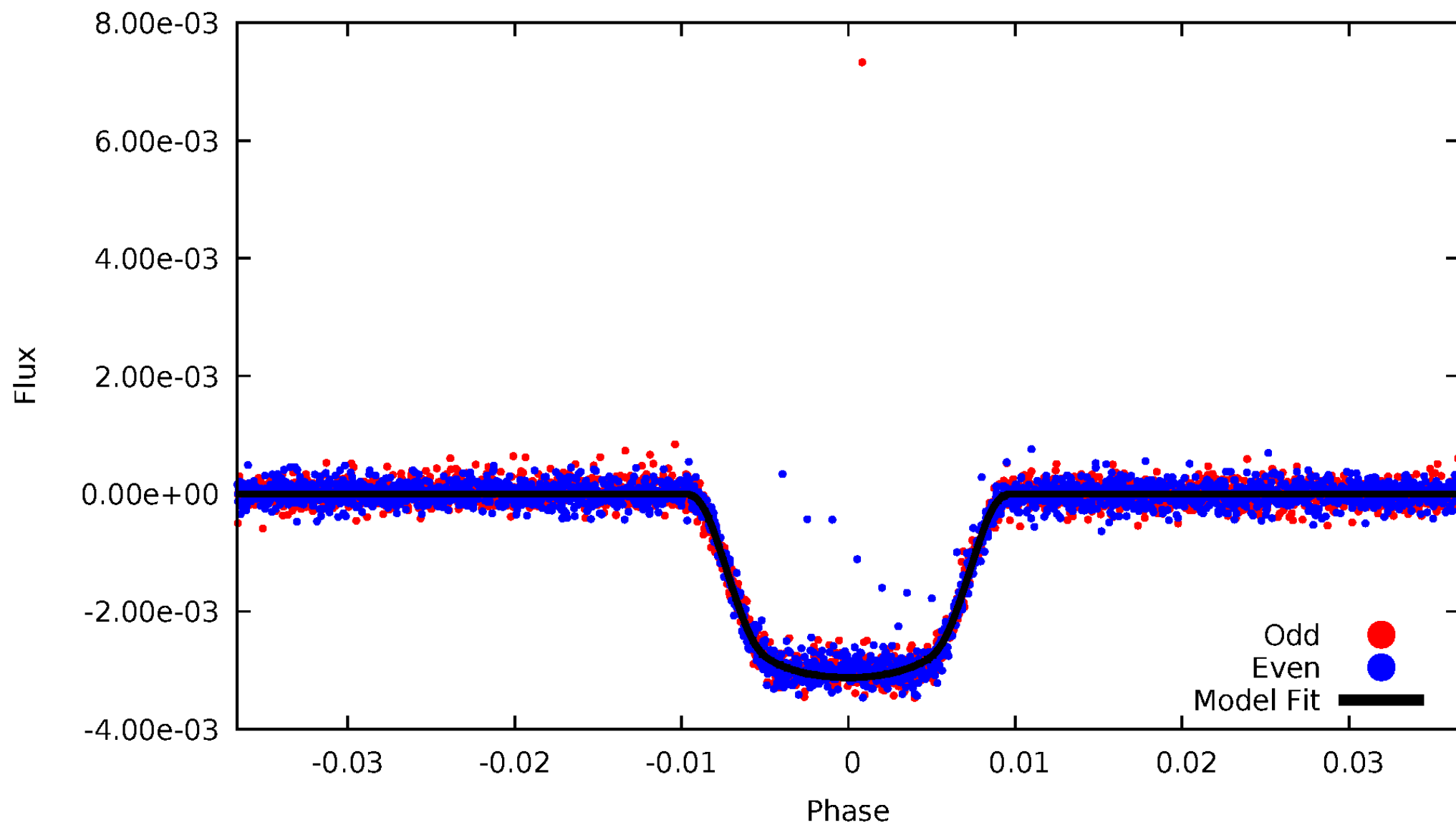


TCE 009474222-02



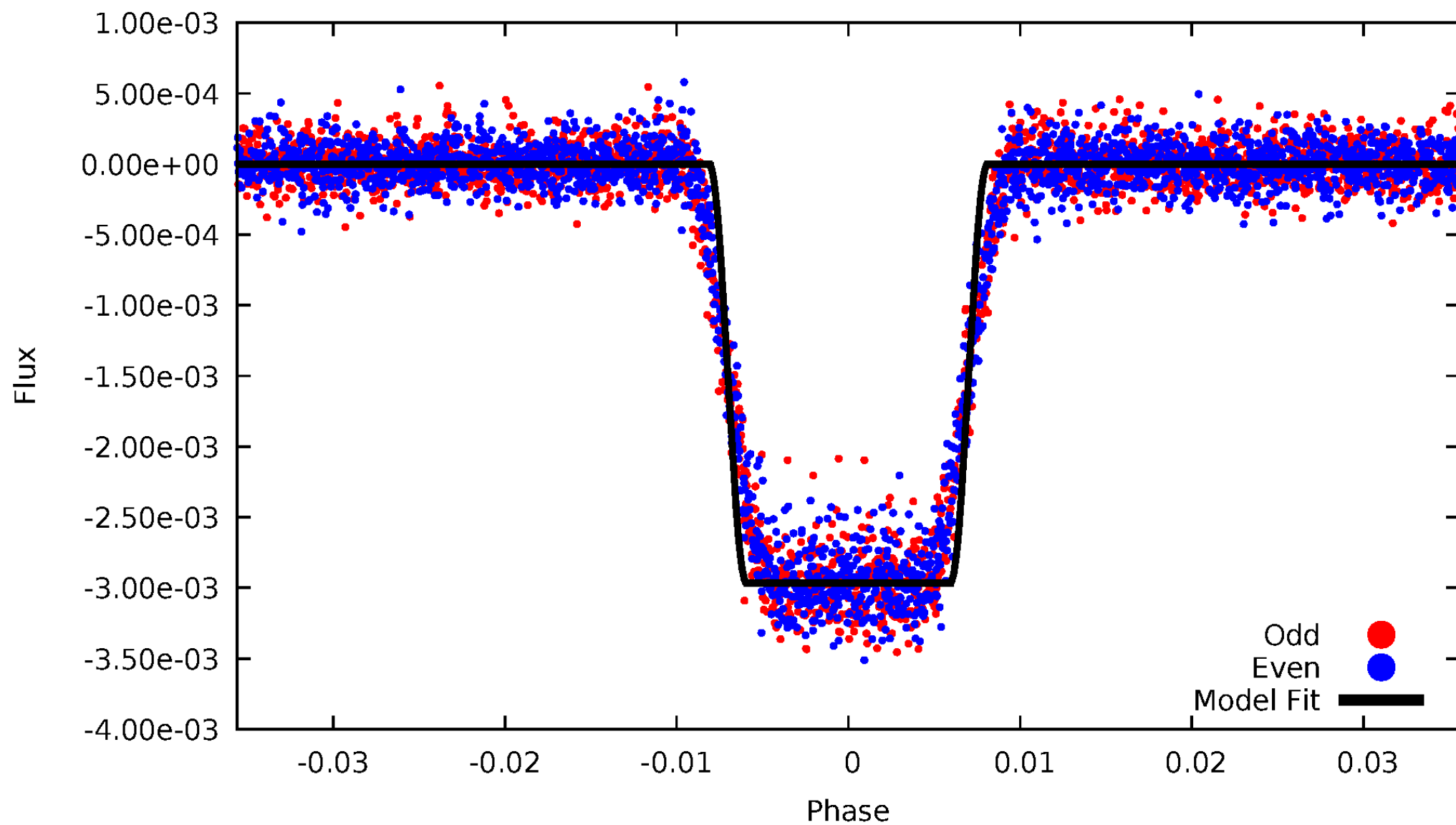
DV Odd/Even

TCE 009474222-02



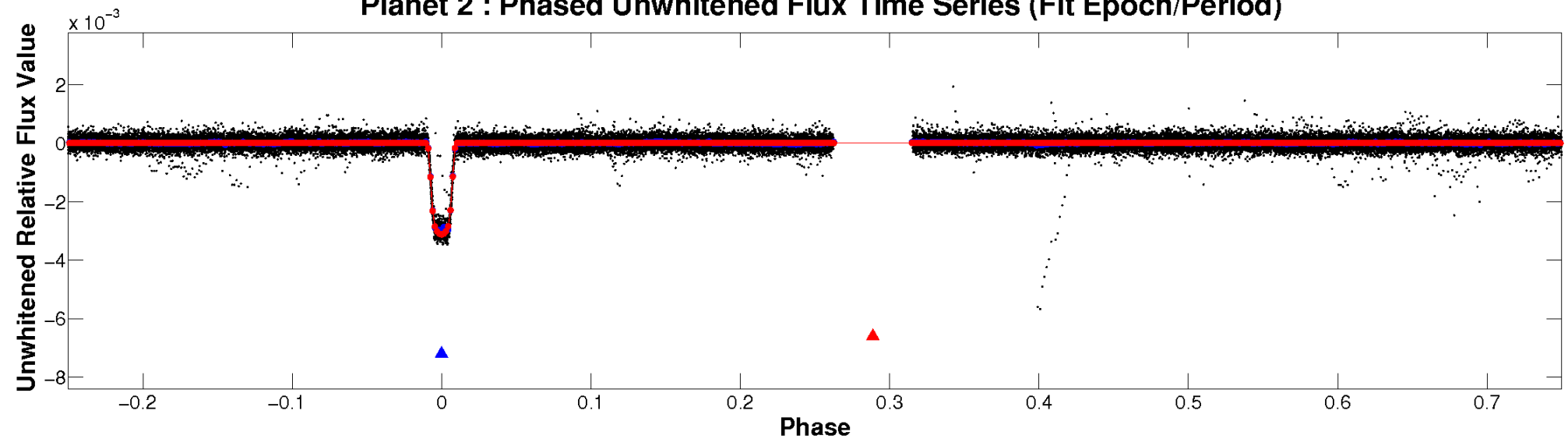
ALT Odd/Even

TCE 009474222-02

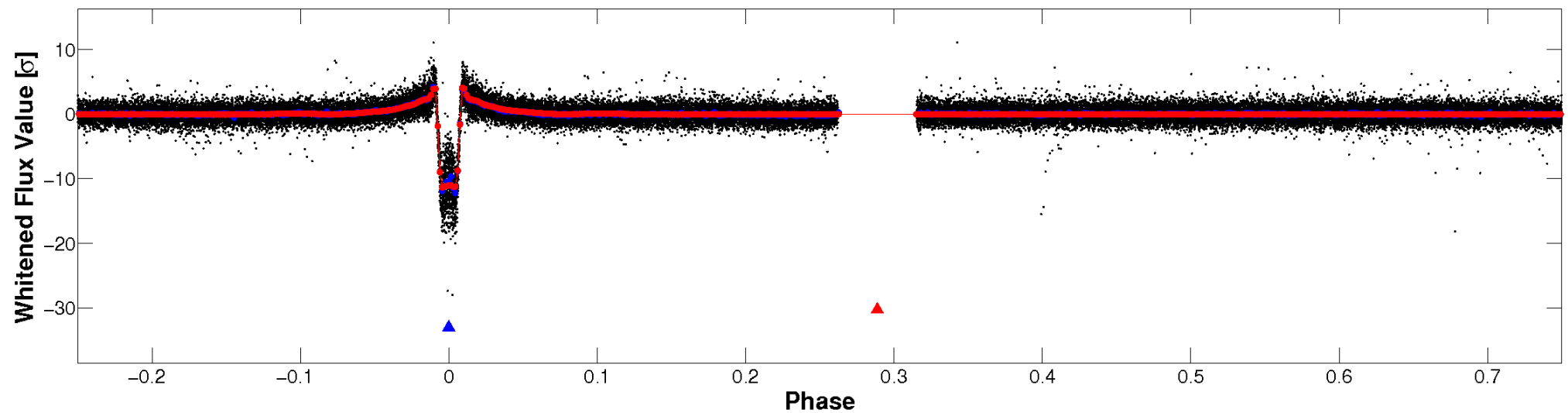


Non-Whitened Vs. Whitened Light Curve

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

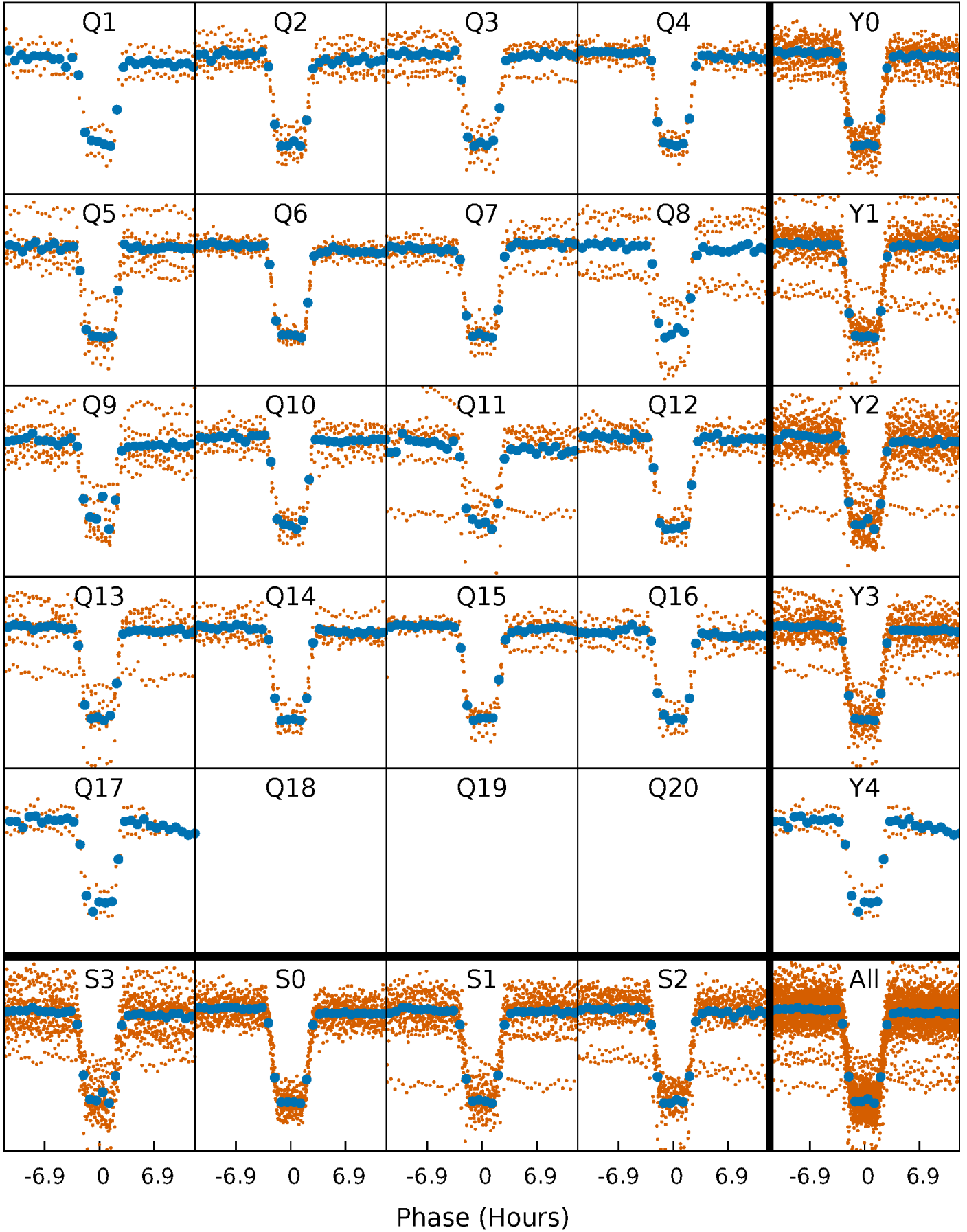


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



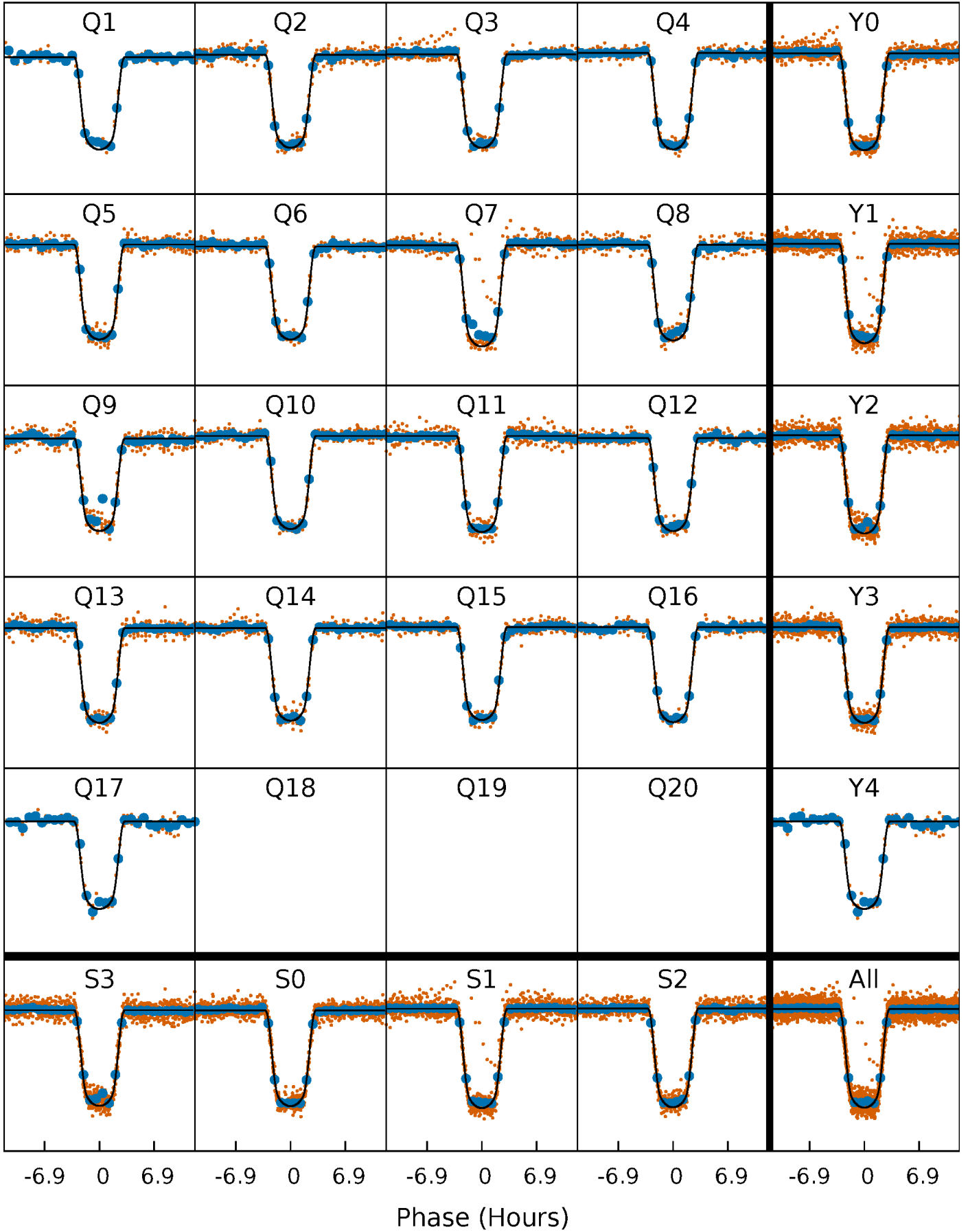
PDC Quarter-Phased Transit Curves

TCE 009474222-02 P= 13.691789 Days $T_0=143.529467$ (BKJD)



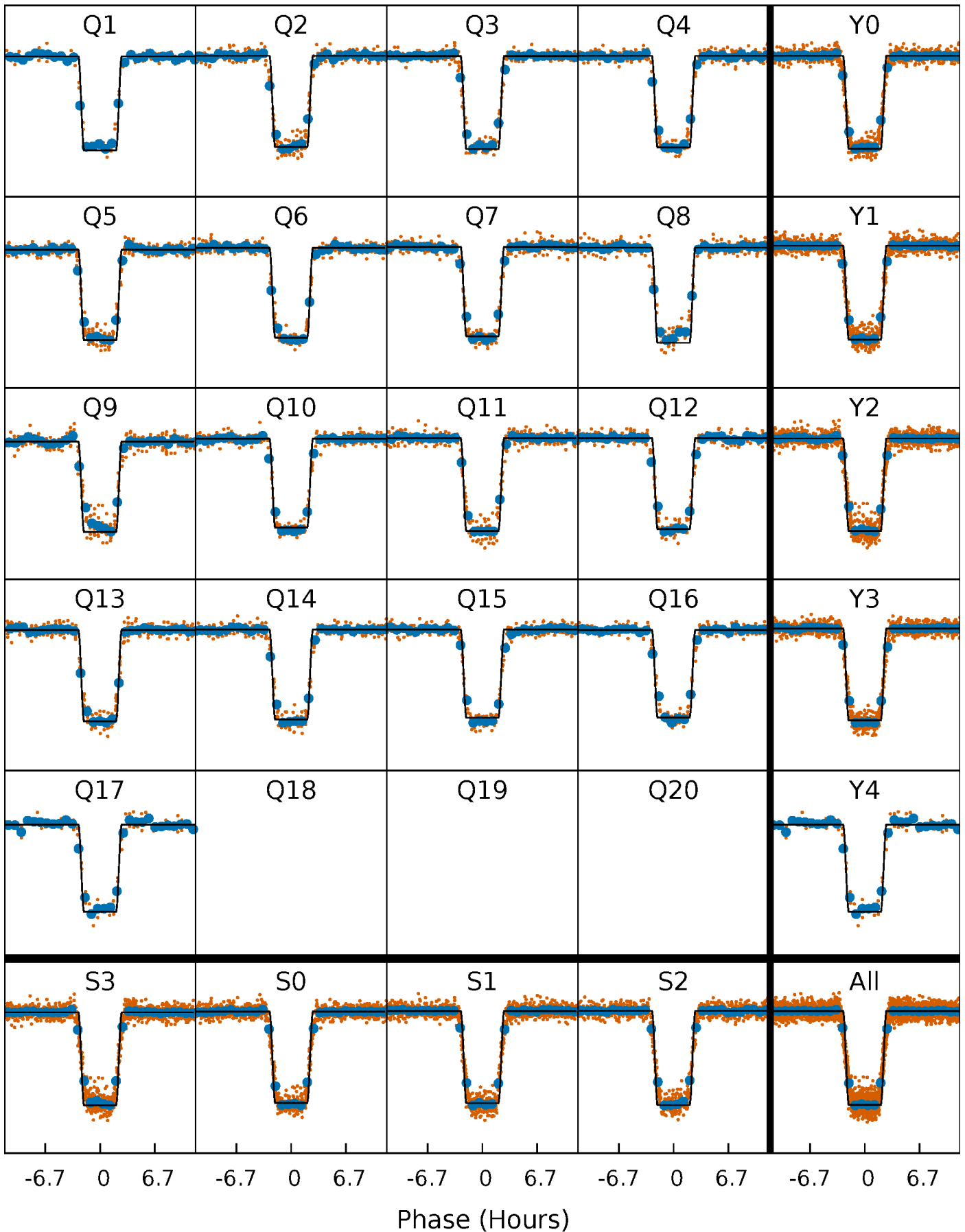
DV Quarter-Phased Transit Curves

TCE 009474222-02 P= 13.691789 Days $T_0=143.529467$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

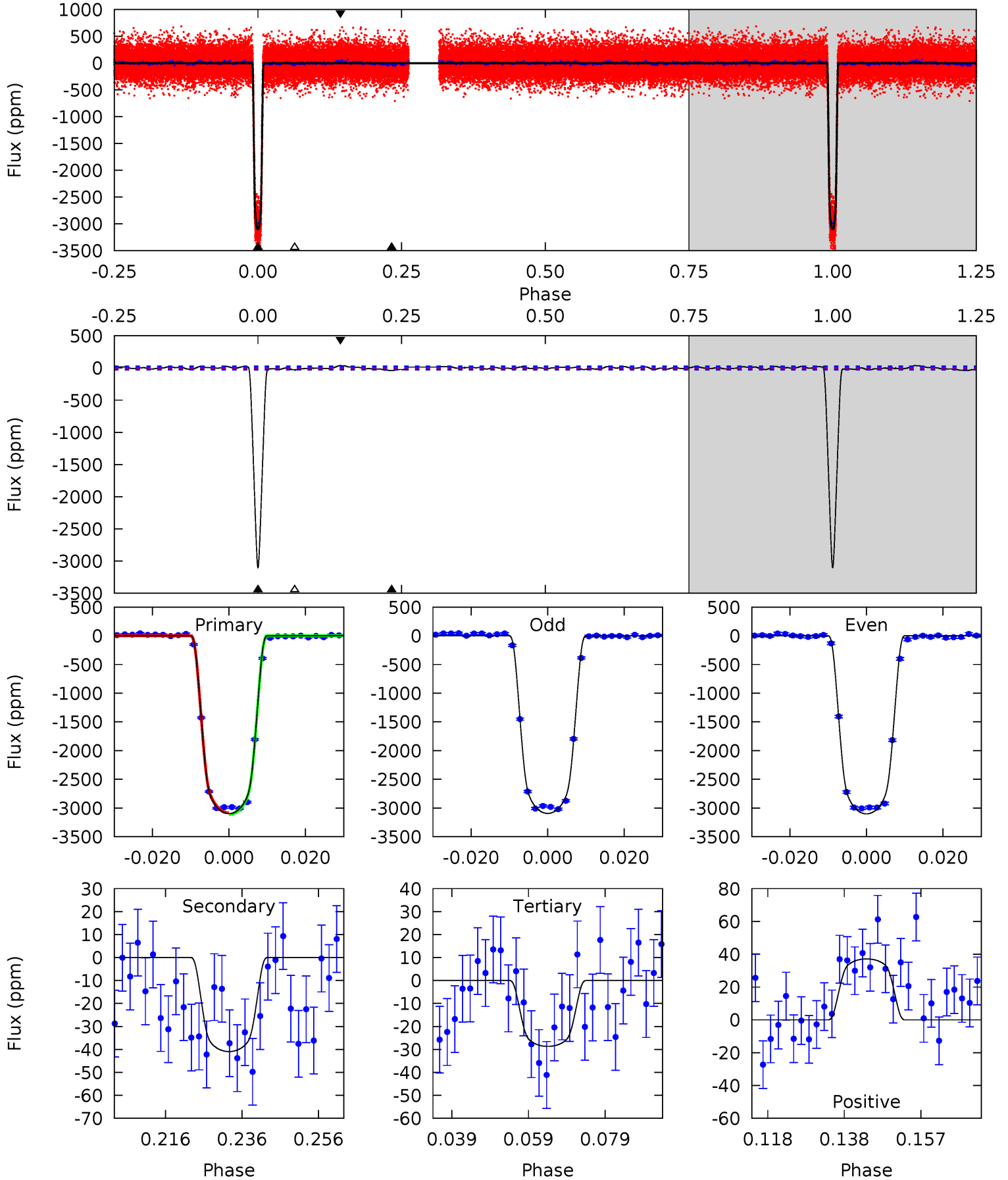
TCE 009474222-02 P= 13.691739 Days $T_0=143.531964$ (BKJD)



DV Model-Shift Uniqueness Test

009474222-02, P = 13.691789 Days, E = 129.837678 Days

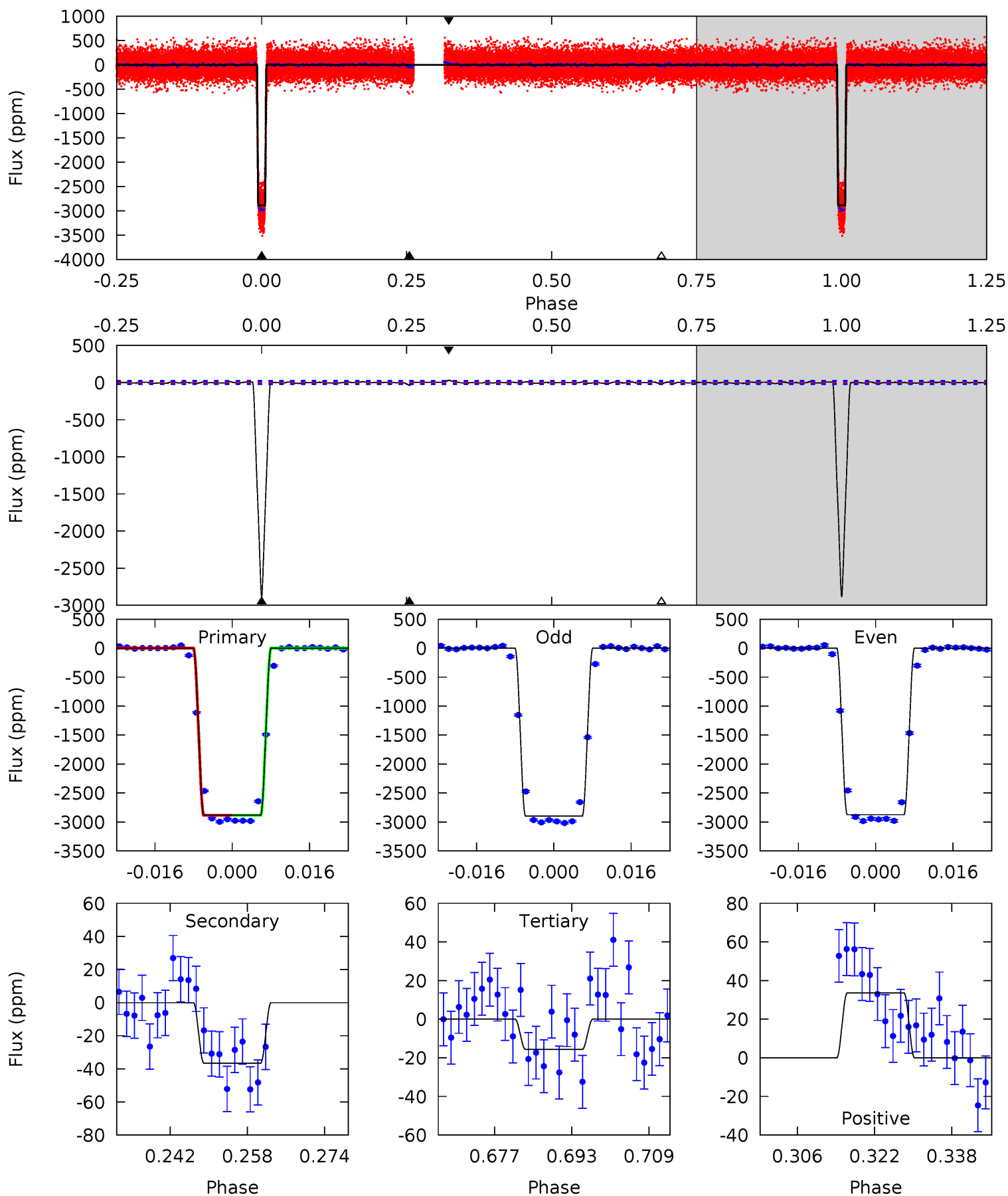
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
678.1	8.96	6.28	8.13	4.89	2.33	2.70	671.8	670.0	2.68	0.83	0.91	0.99	0.01	2.91



Alt Model-Shift Uniqueness Test

009474222-02, P = 13.691739 Days, E = 129.840225 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
663.6	8.41	3.60	7.74	4.93	2.41	1.33	660.0	655.9	4.81	0.67	2.62	0.99	0.01	0.04



Stellar Parameters For KIC 009474222

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6295^{+75}_{-75}	$4.158^{+0.149}_{-0.135}$	$0.060^{+0.150}_{-0.150}$	$1.554^{+0.287}_{-0.287}$	$1.267^{+0.106}_{-0.129}$	$0.475^{+0.338}_{-0.168}$
	+1%/-1%	+4%/-3%	+250%/-250%	+18%/-18%	+8%/-10%	+71%/-35%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009474222-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-41 ± 5	$10.03^{+1.15}_{-0.98}$	1395^{+73}_{-69}	2778^{+46}_{-50}	$3.261^{+0.792}_{-0.679}$
Alt.	-37 ± 4	$9.27^{+0.88}_{-0.95}$	1389^{+68}_{-66}	2796^{+53}_{-55}	$3.434^{+0.928}_{-0.712}$

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 $A_{obs} \gg 1.0$

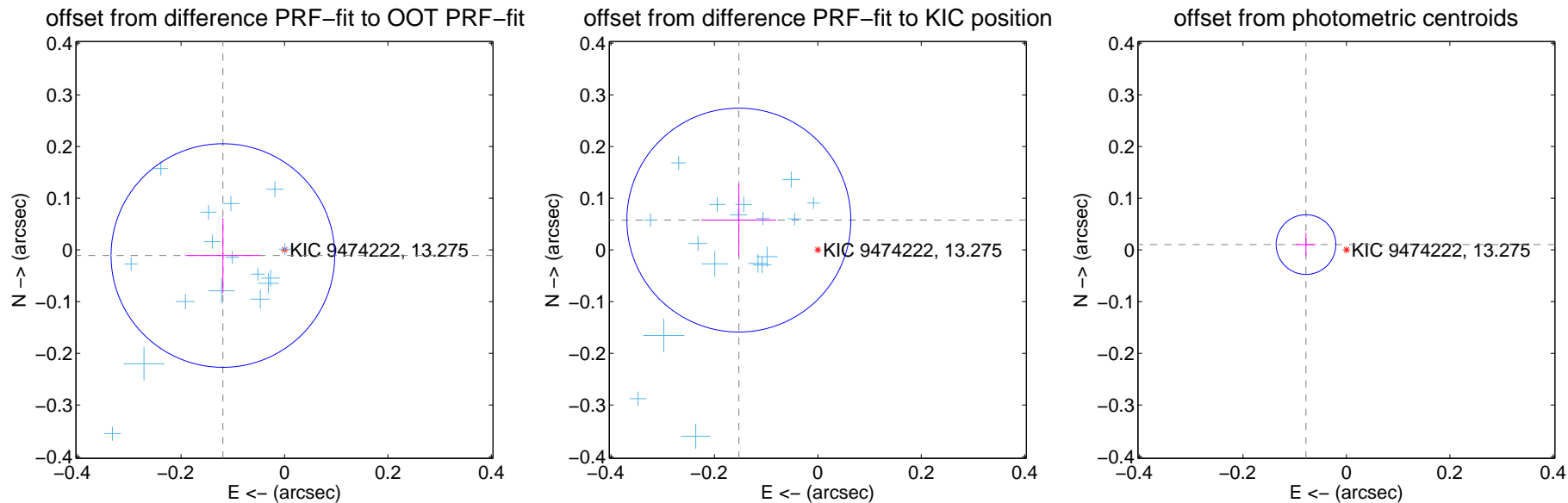
DV Centroid Data

Supplemental centroid analysis for 009474222-02. Kepler magnitude: 13.28. Transit SNR 334.91

There are 17 quarters with good PRF difference image offsets

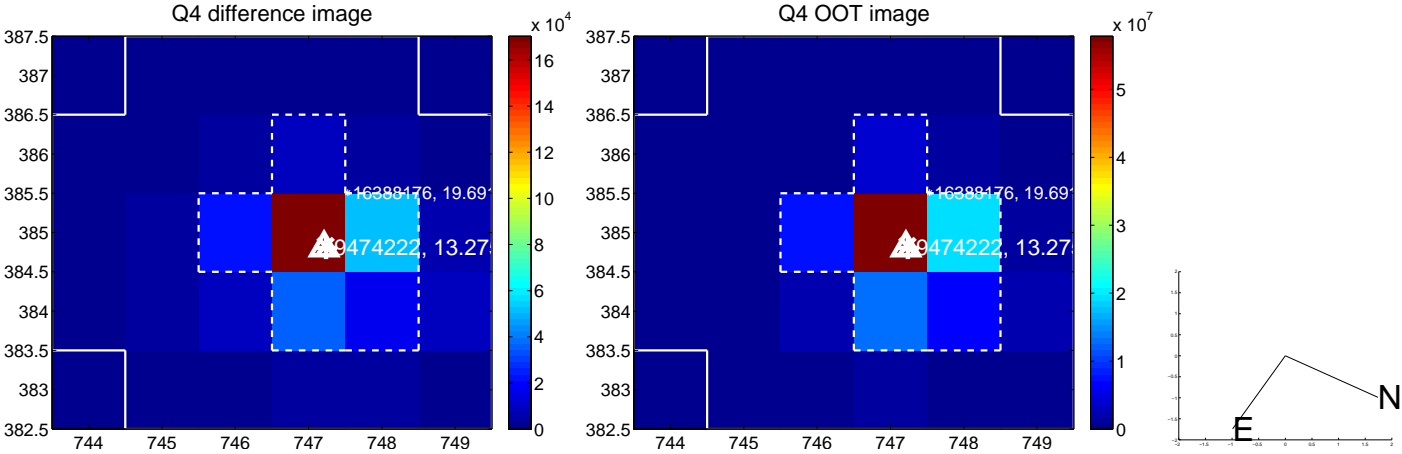
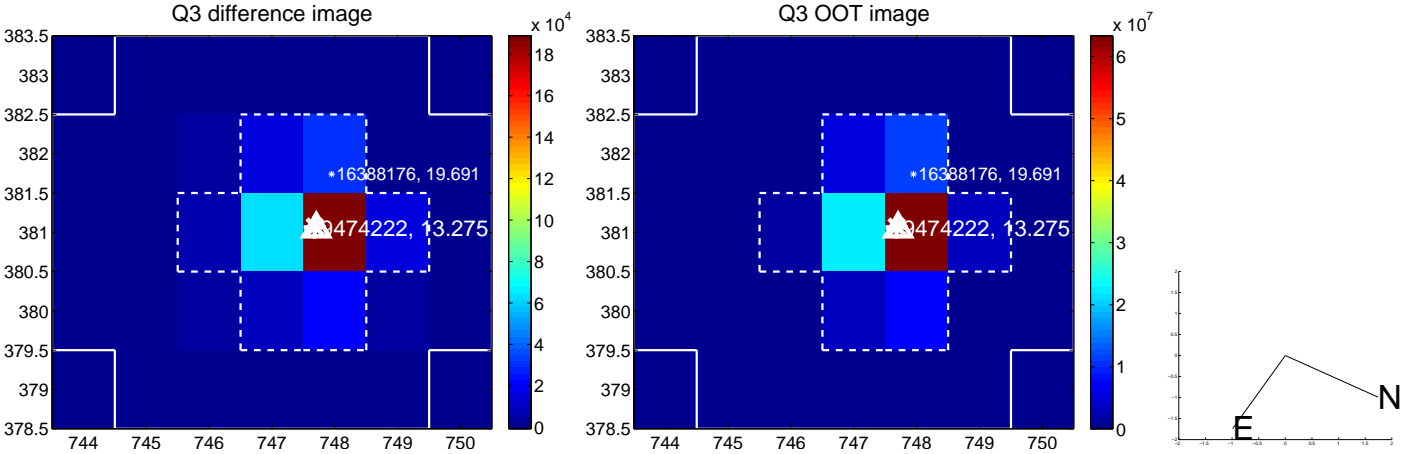
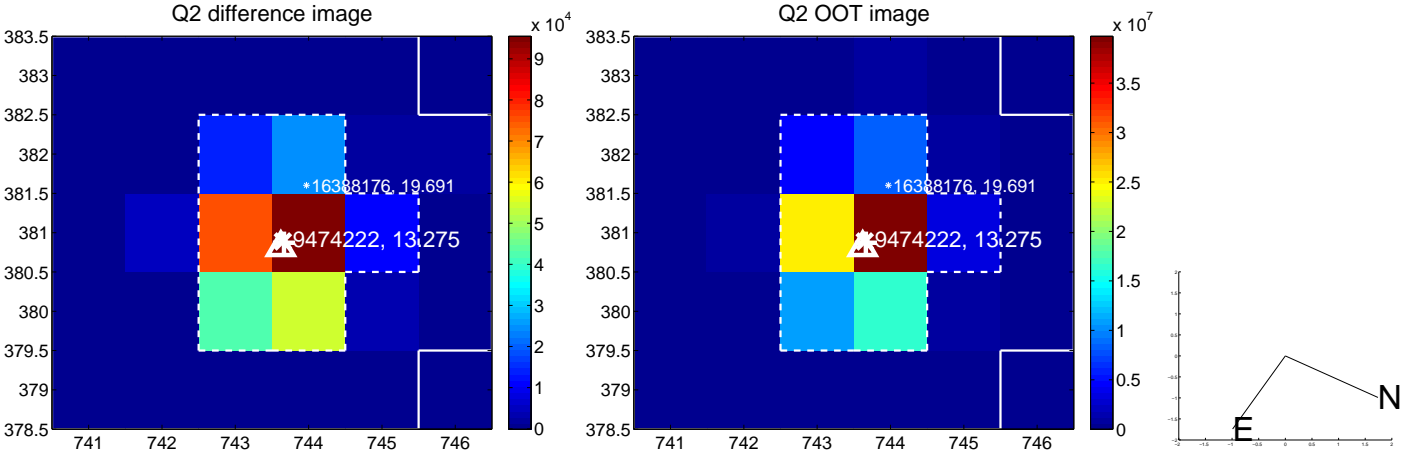
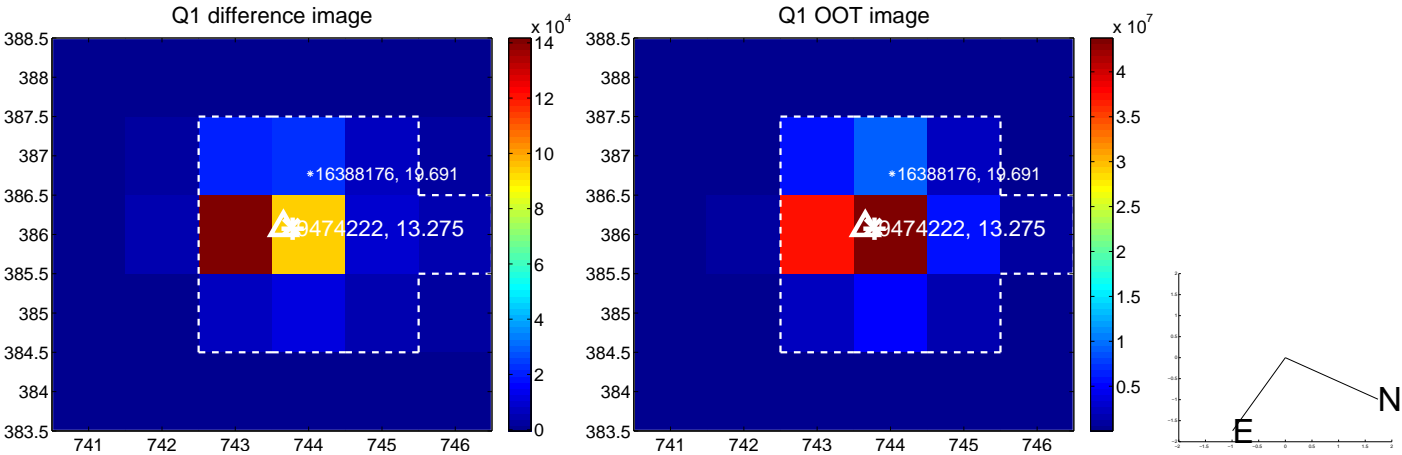
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.120 ± 0.072	1.66	0.119 ± 0.072	-0.011 ± 0.073
PRF-fit source offset from KIC position	0.163 ± 0.072	2.26	0.153 ± 0.073	0.058 ± 0.070
photometric centroid source offset	0.08 ± 0.02	4.10	0.08 ± 0.02	0.01 ± 0.02

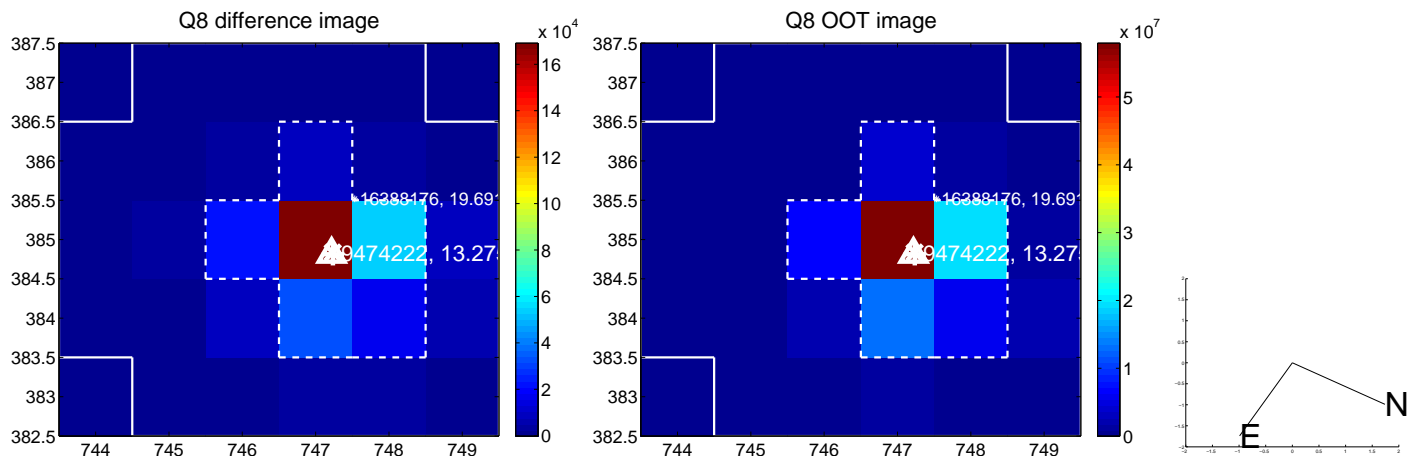
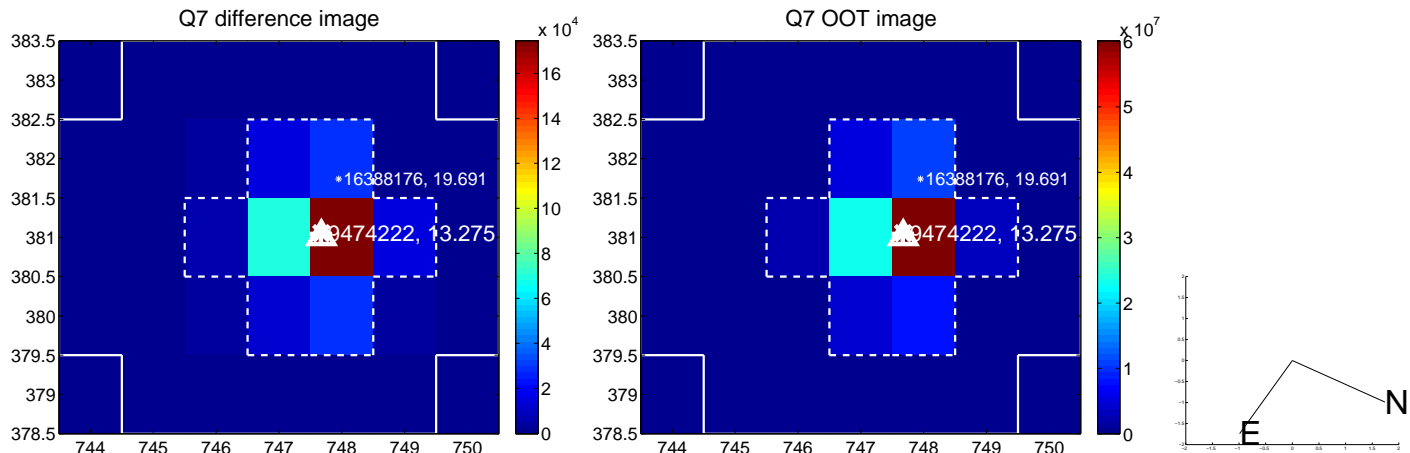
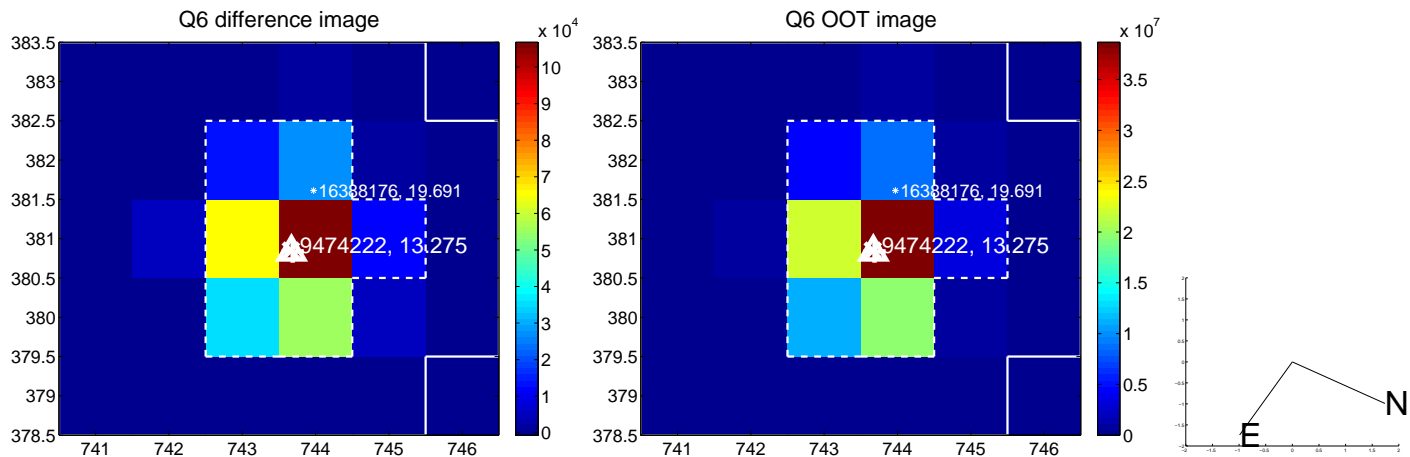
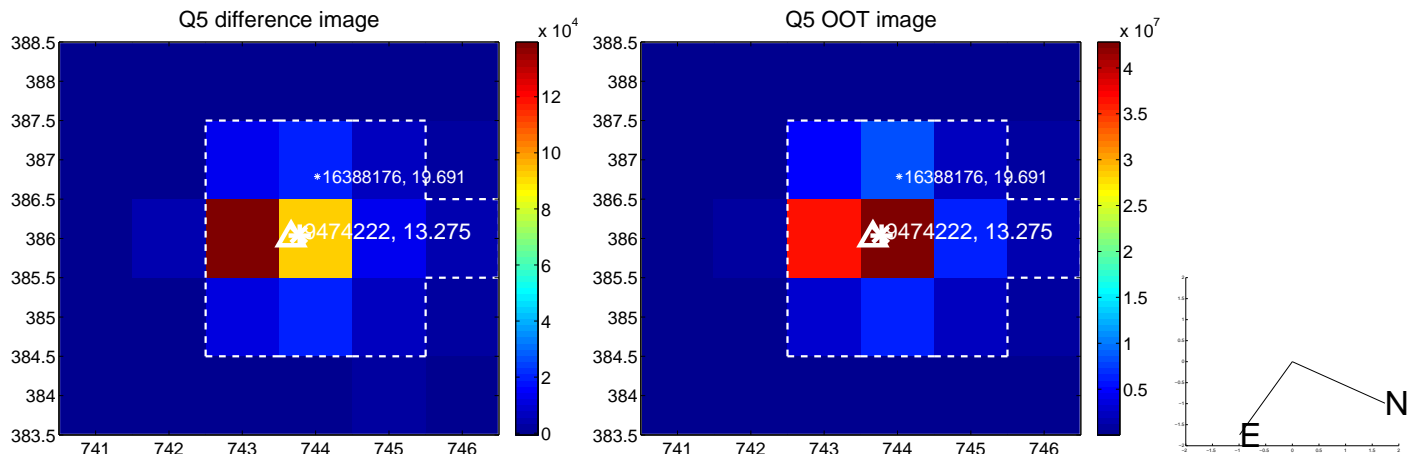


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

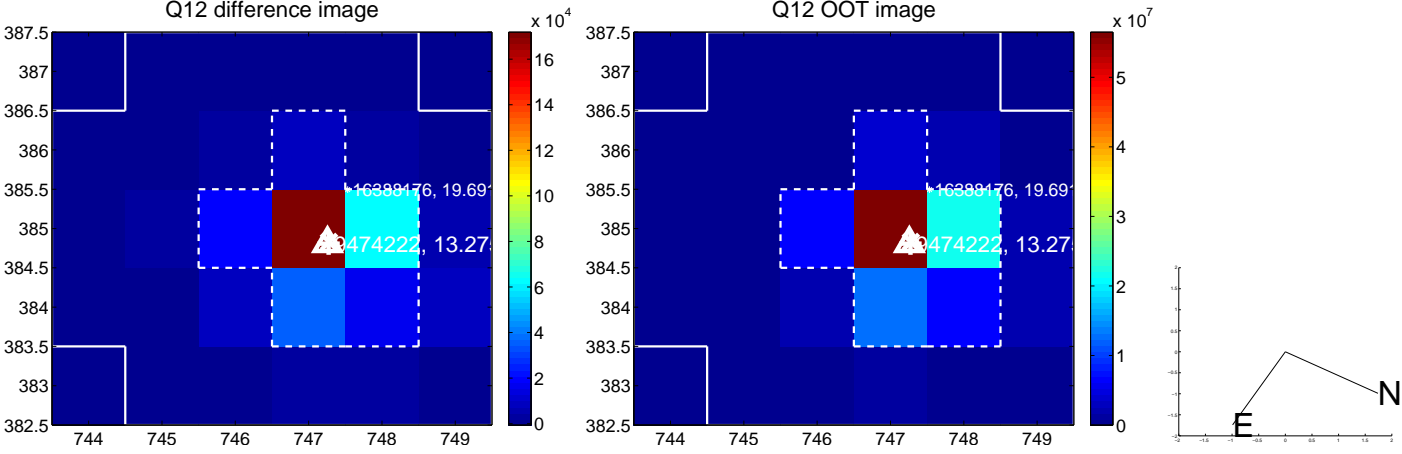
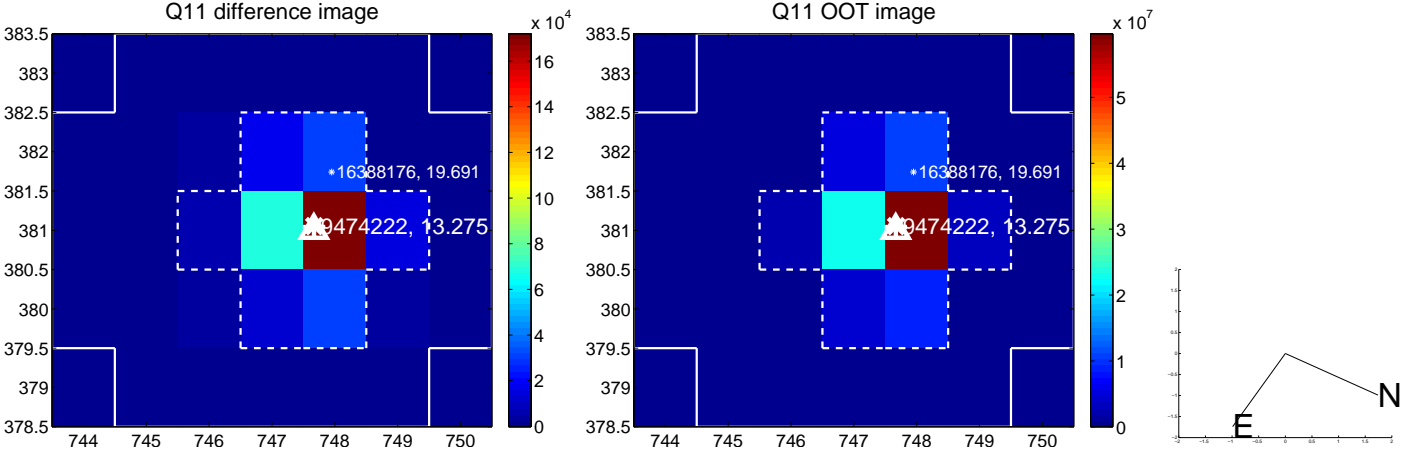
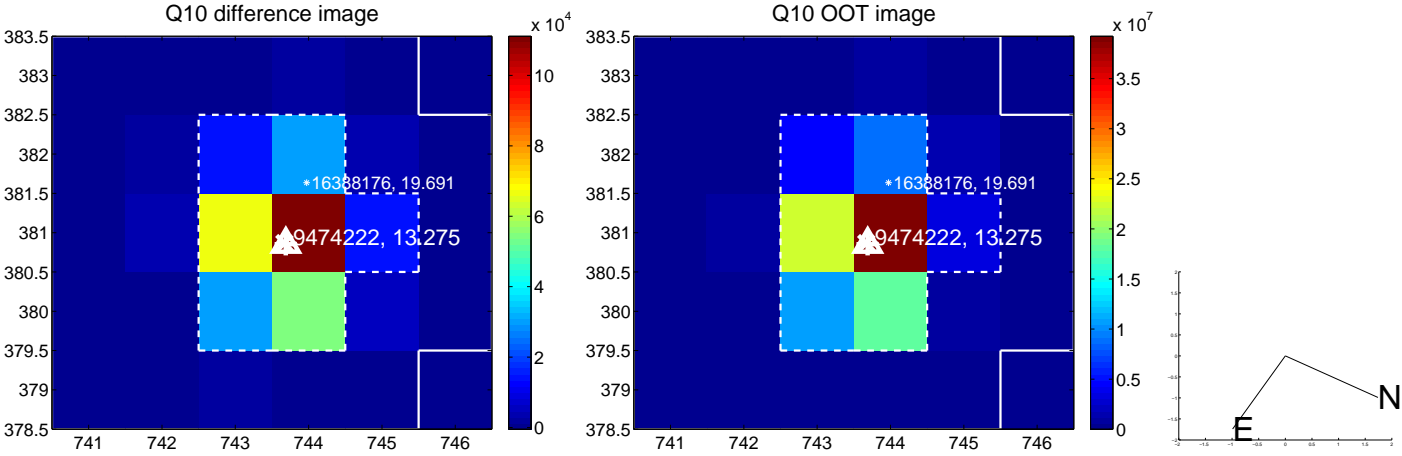
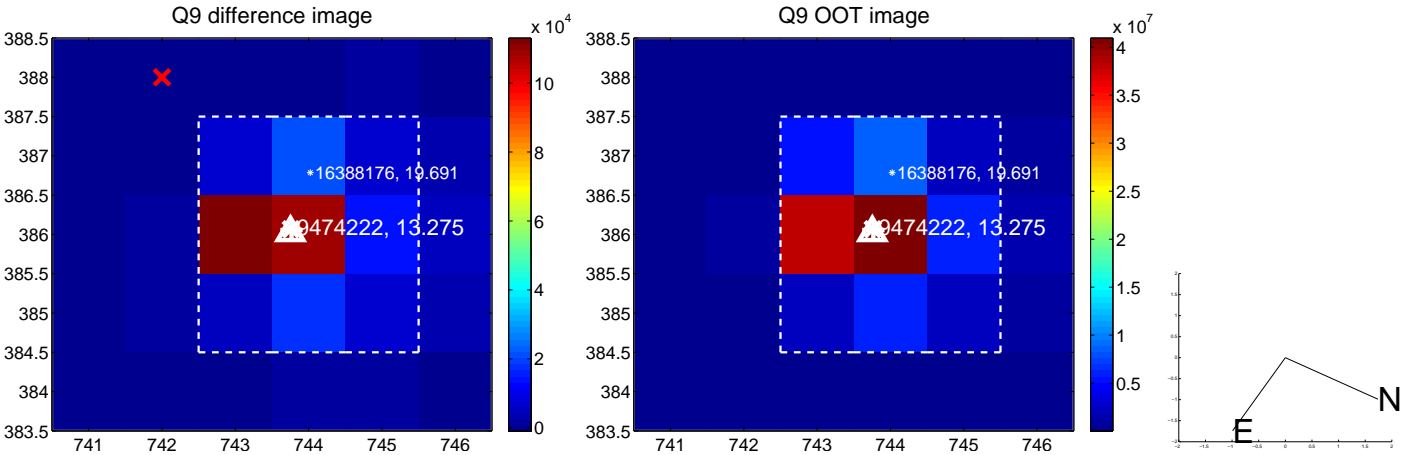
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



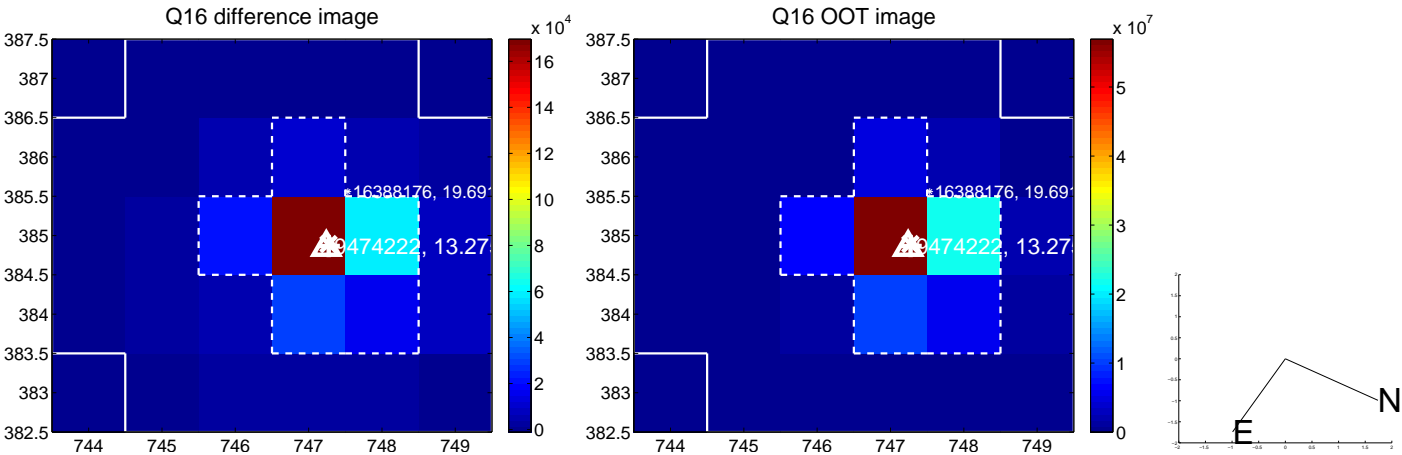
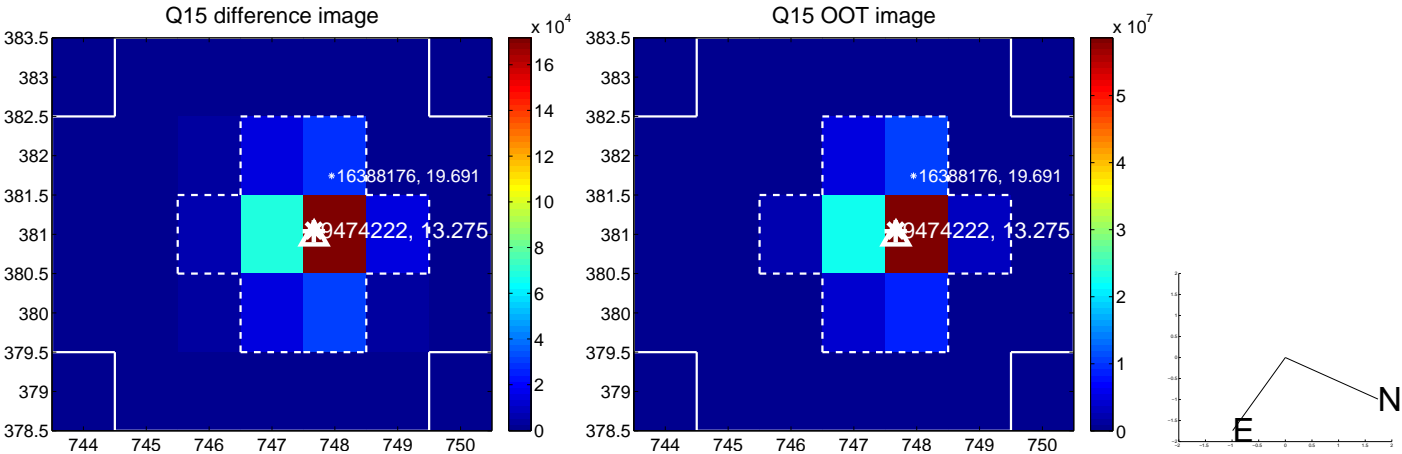
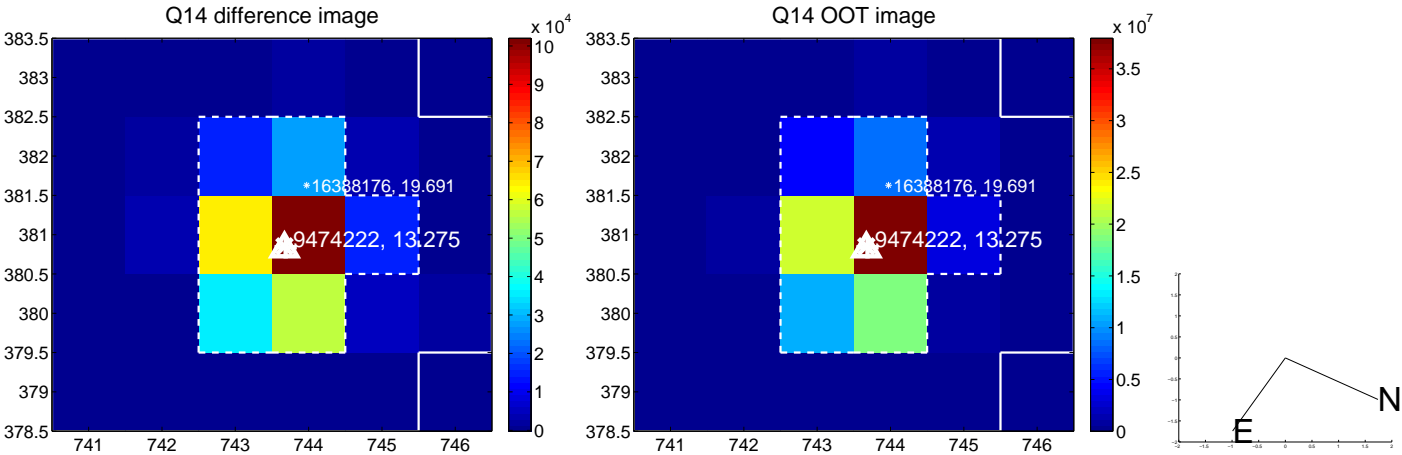
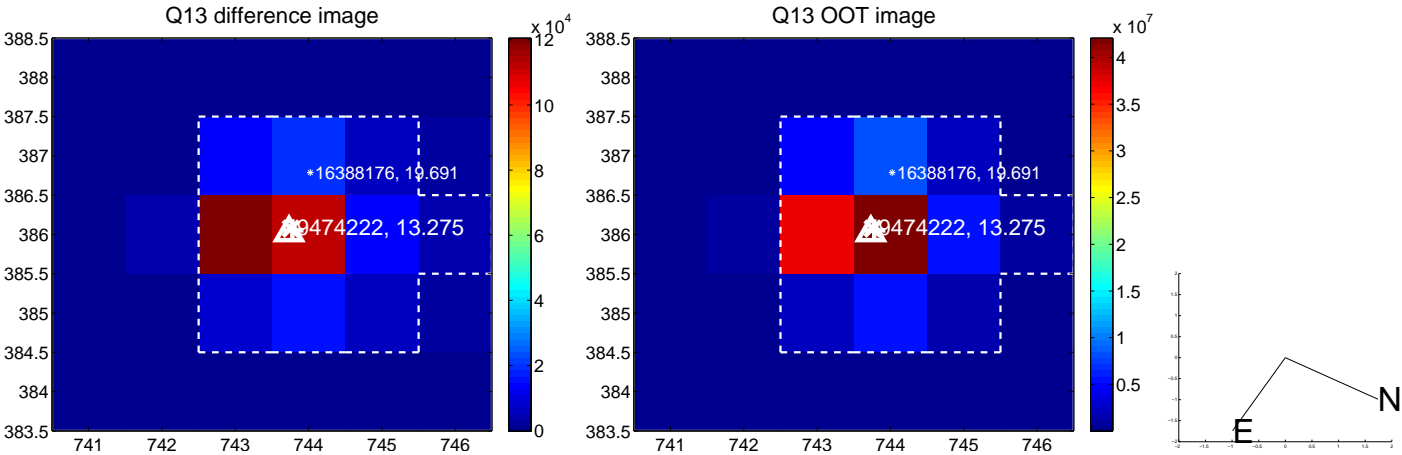
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



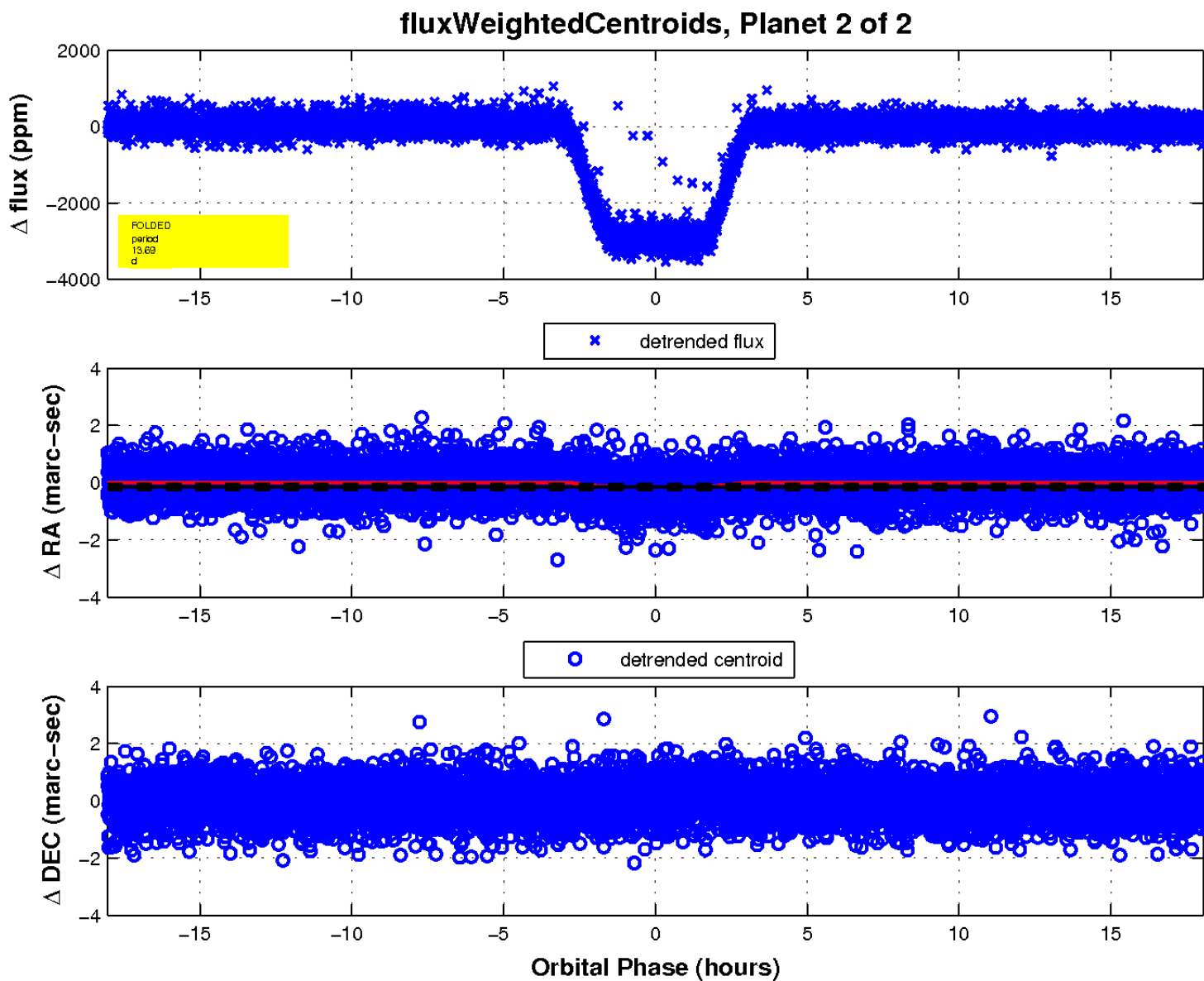
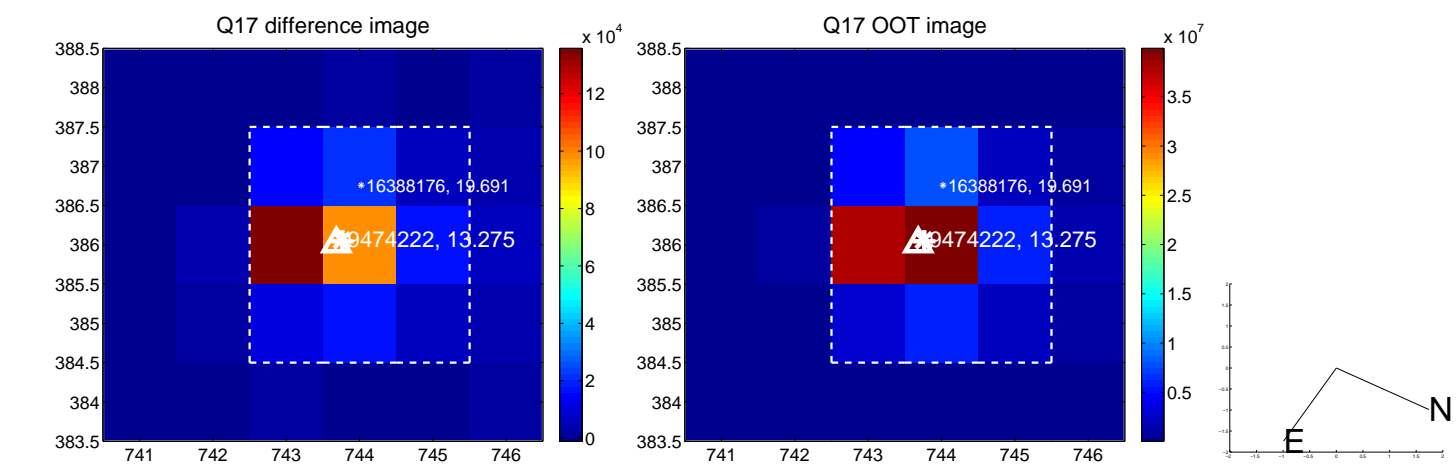
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

