

KIC 004164922

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})
004164922-01	OBS	3864.01	1.210699	132.391744	149.5	1.501	29.1	42.6	0.76	5014	1.13	789.34
004164922-02	OBS	3864.02	18.257431	134.439728	134.6	3.557	10.2	10.6	0.76	5014	1.07	21.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004164922-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004164922-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

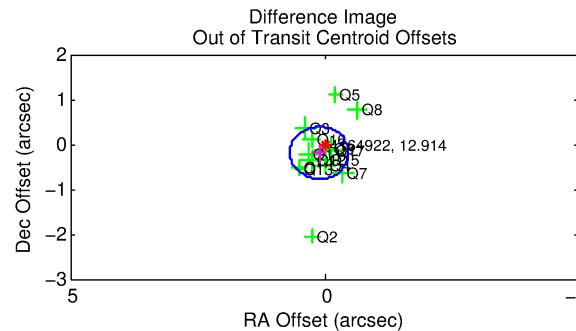
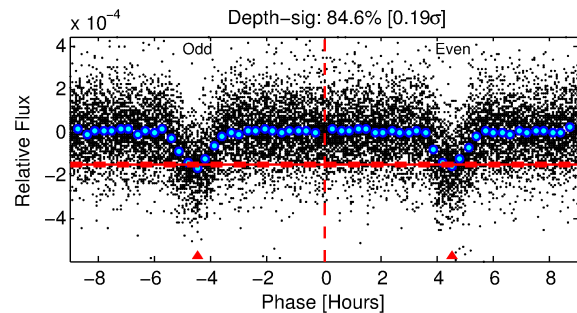
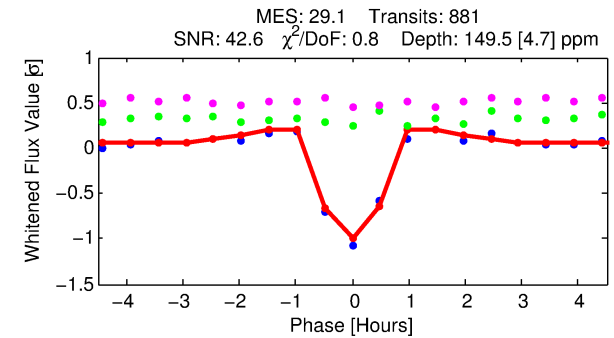
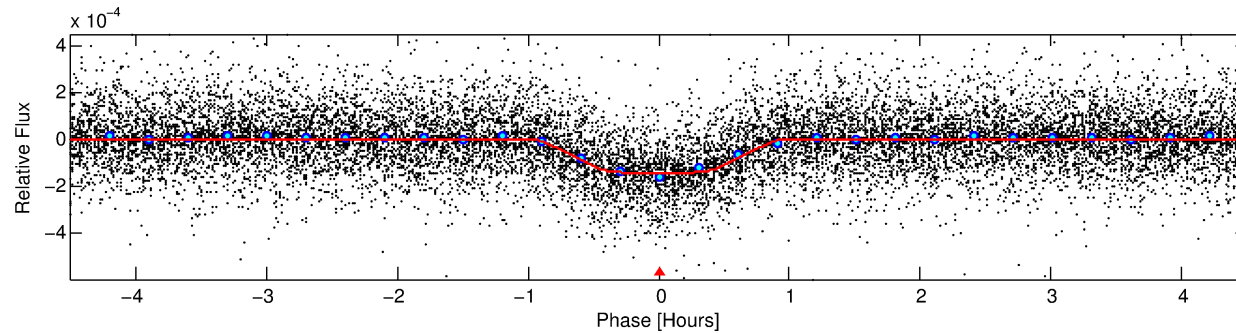
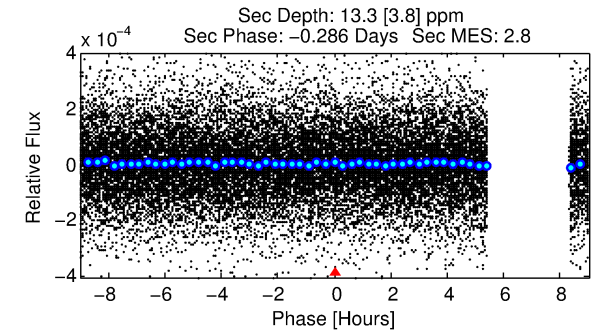
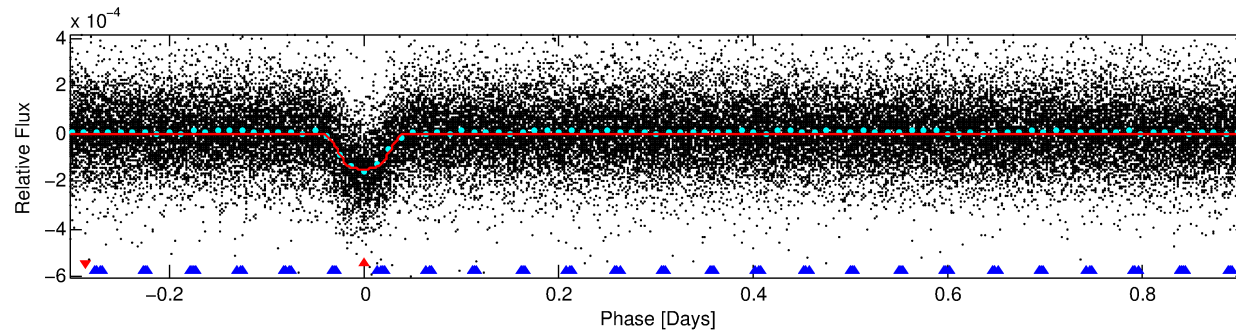
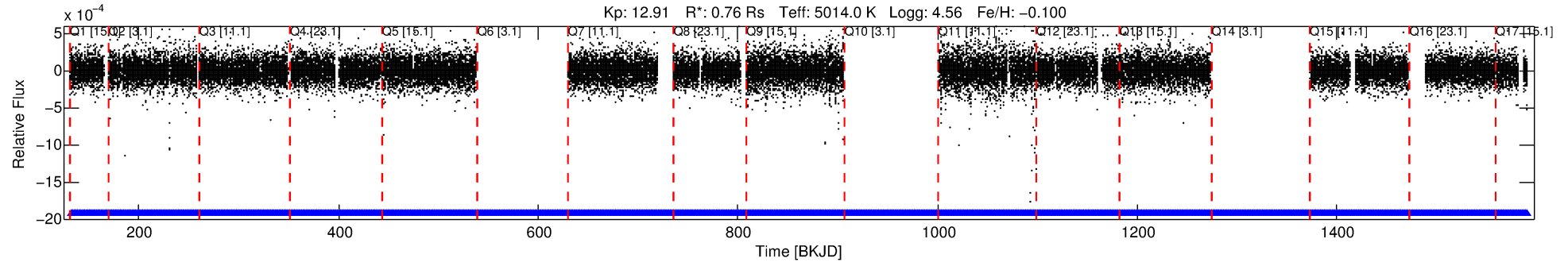
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004164922-01

No Significant Match Found

DV One-Page Summary

KIC: 4164922 Candidate: 1 of 2 Period: 1.211 d
KOI: K03864.01 Corr: 0.878



DV Fit Results:

Period = 1.21070 [0.00000] d
Epoch = 132.3917 [0.0004] BKJD
Rp/R* = 0.0137 [0.0027]
a/R* = 3.01 [2.13]
b = 0.90 [0.17]
Seff = 789.34 [87.77]
Teq = 1352 [38] K
Rp = 1.13 [0.23] Re
a = 0.0202 [0.0010] AU
Ag = 2.35 [1.16] [1.16σ]
Teffp = 2586 [320] K [3.83σ]

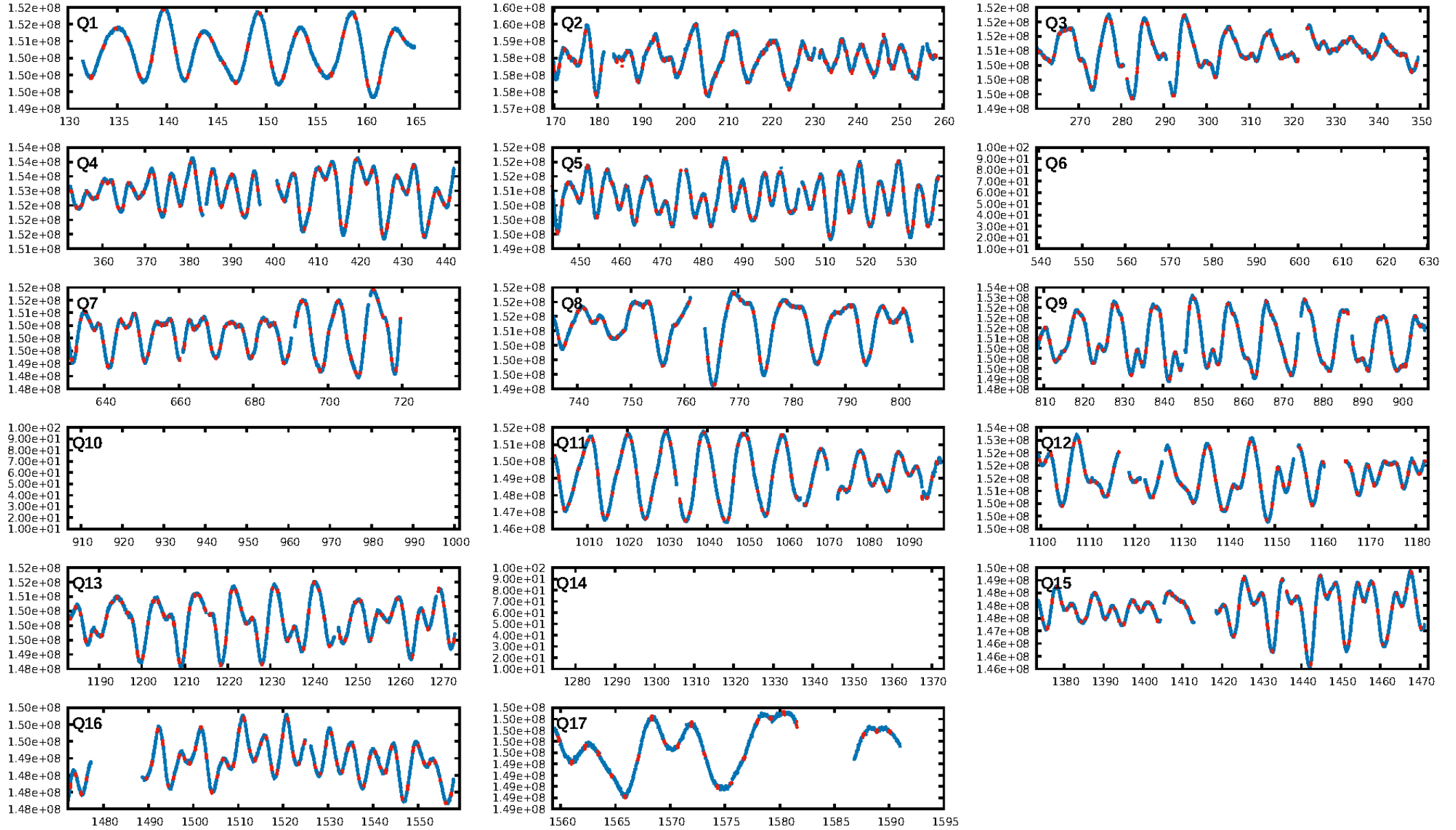
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [105.98σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.74e-165
RollingBand-fgt: 1.00 [832/832]
GhostDiagnostic-chr: 3.026
Centroid-sig: N/A
Centroid-so: 0.504 arcsec [2.26σ]
OotOffset-rm: 0.221 arcsec [1.15σ]
KicOffset-rm: 0.350 arcsec [1.81σ]
OotOffset-st: 1/4/4/5 [14]
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DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

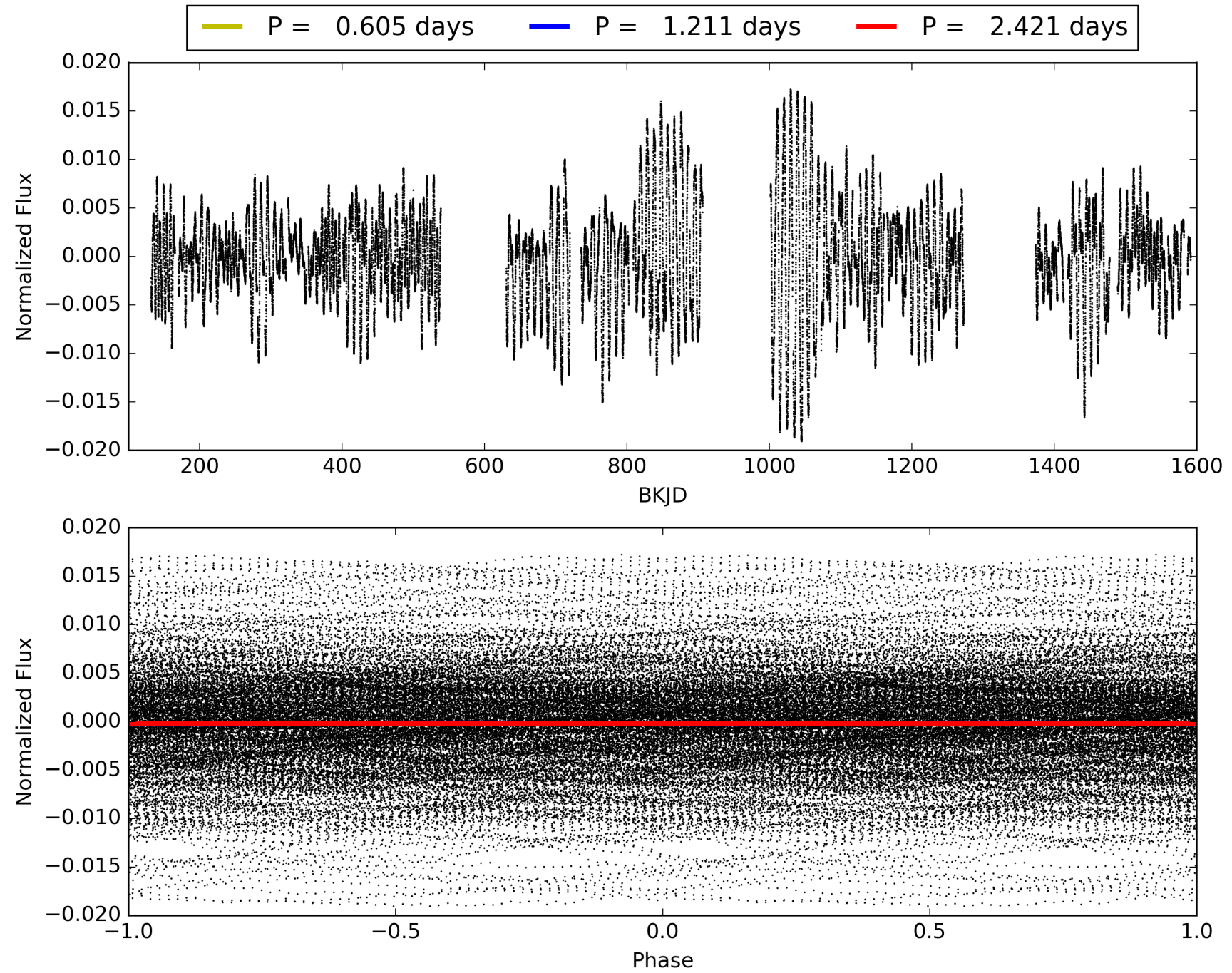
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 12:55:00 Z

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

TCE 004164922-01, PDC Light Curves

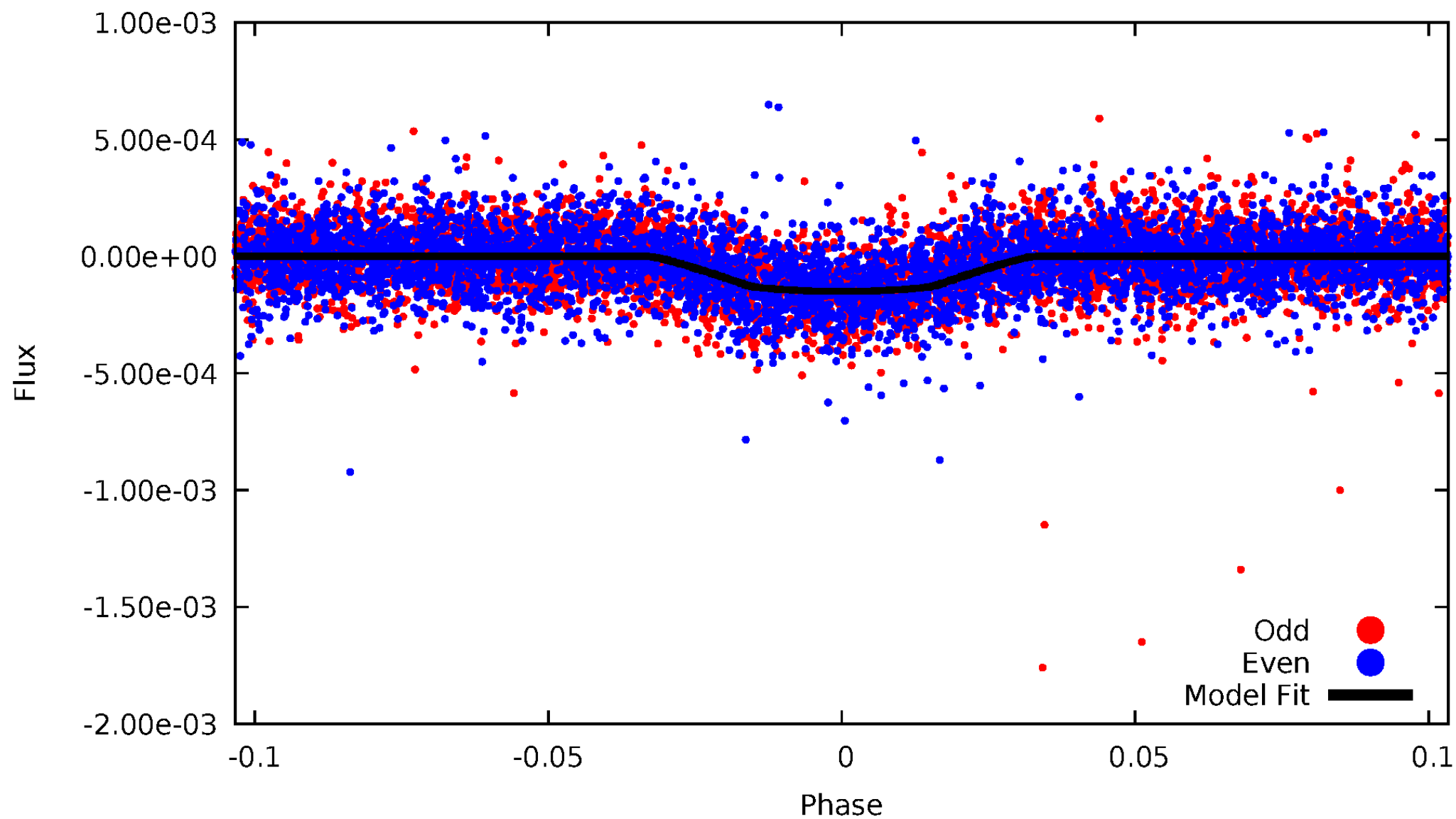


TCE 004164922-01



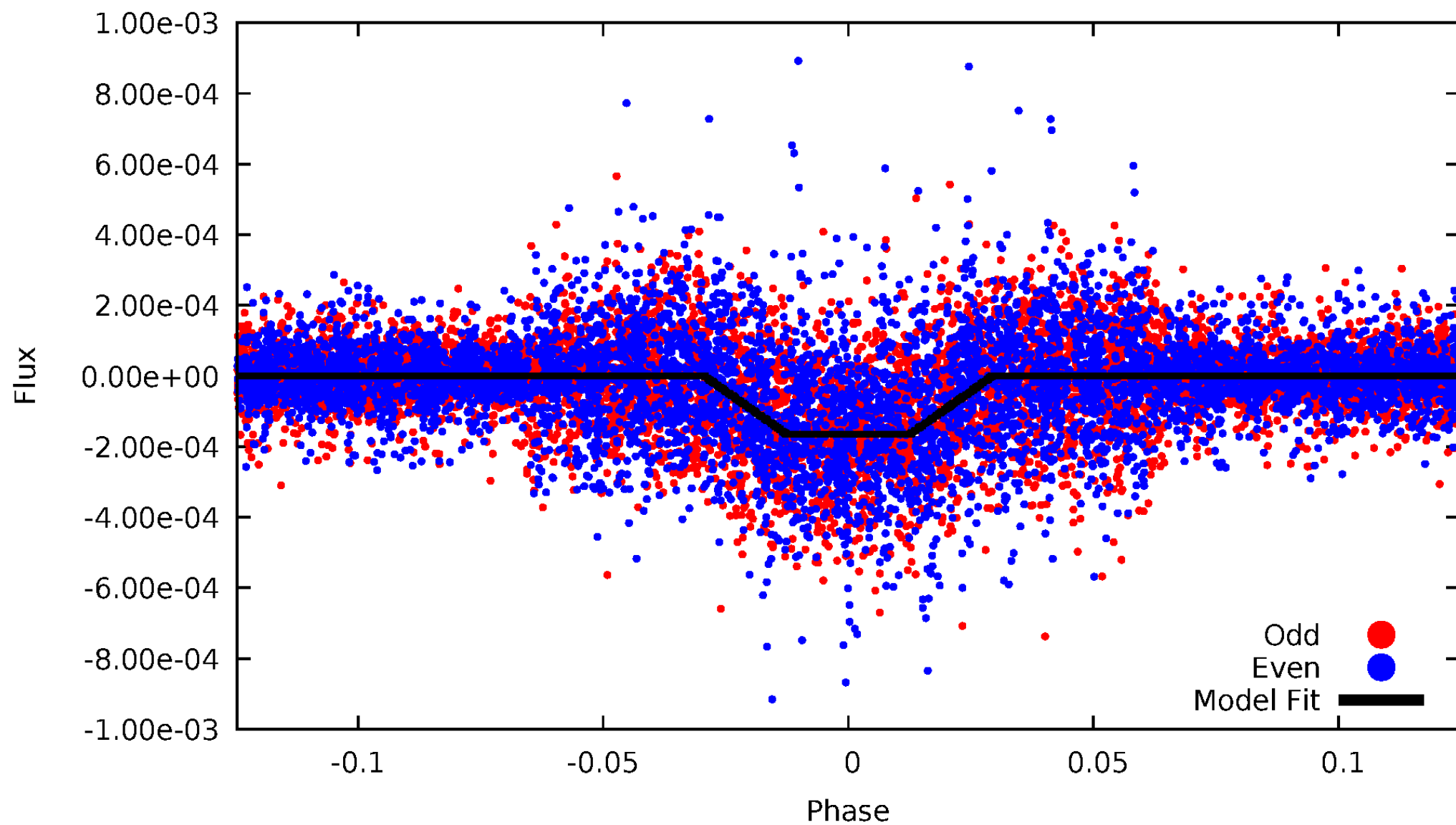
DV Odd/Even

TCE 004164922-01

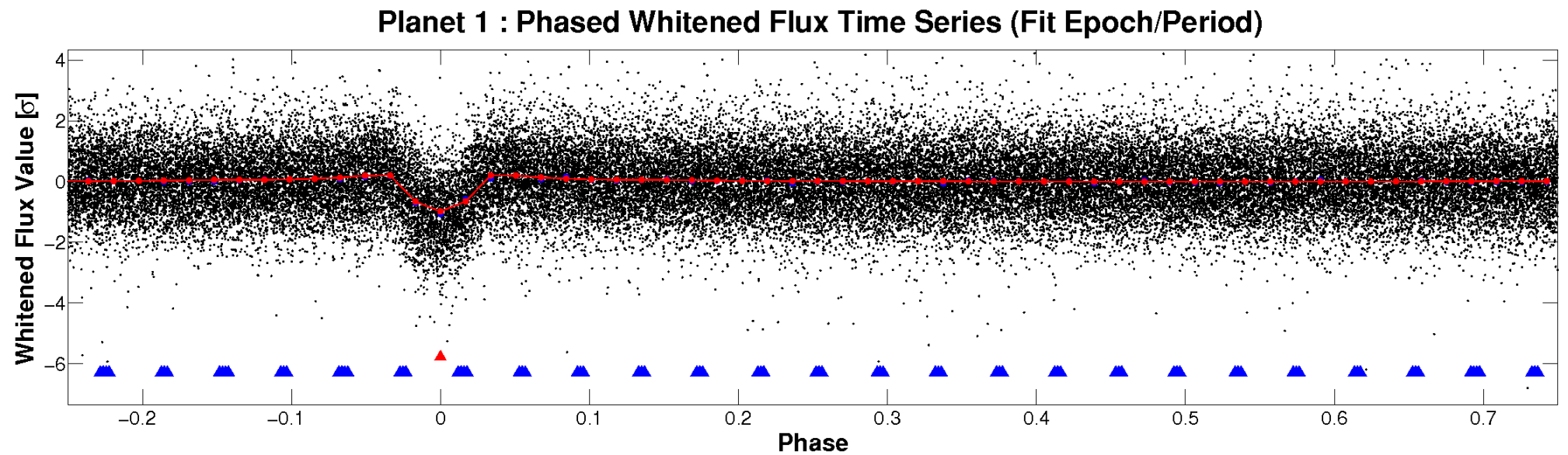
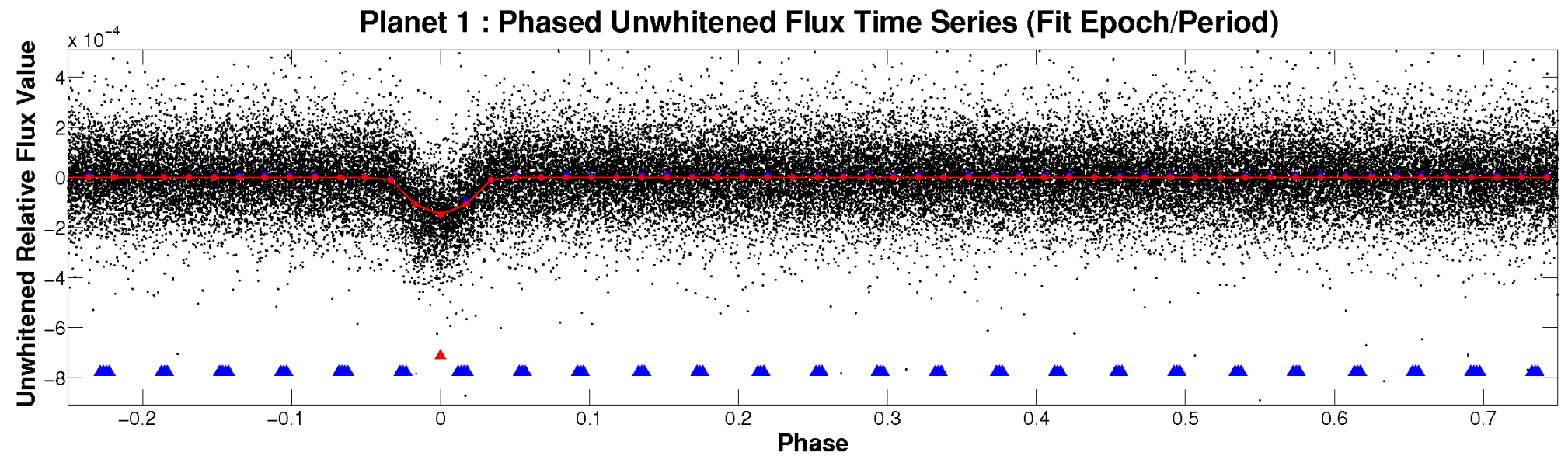


ALT Odd/Even

TCE 004164922-01

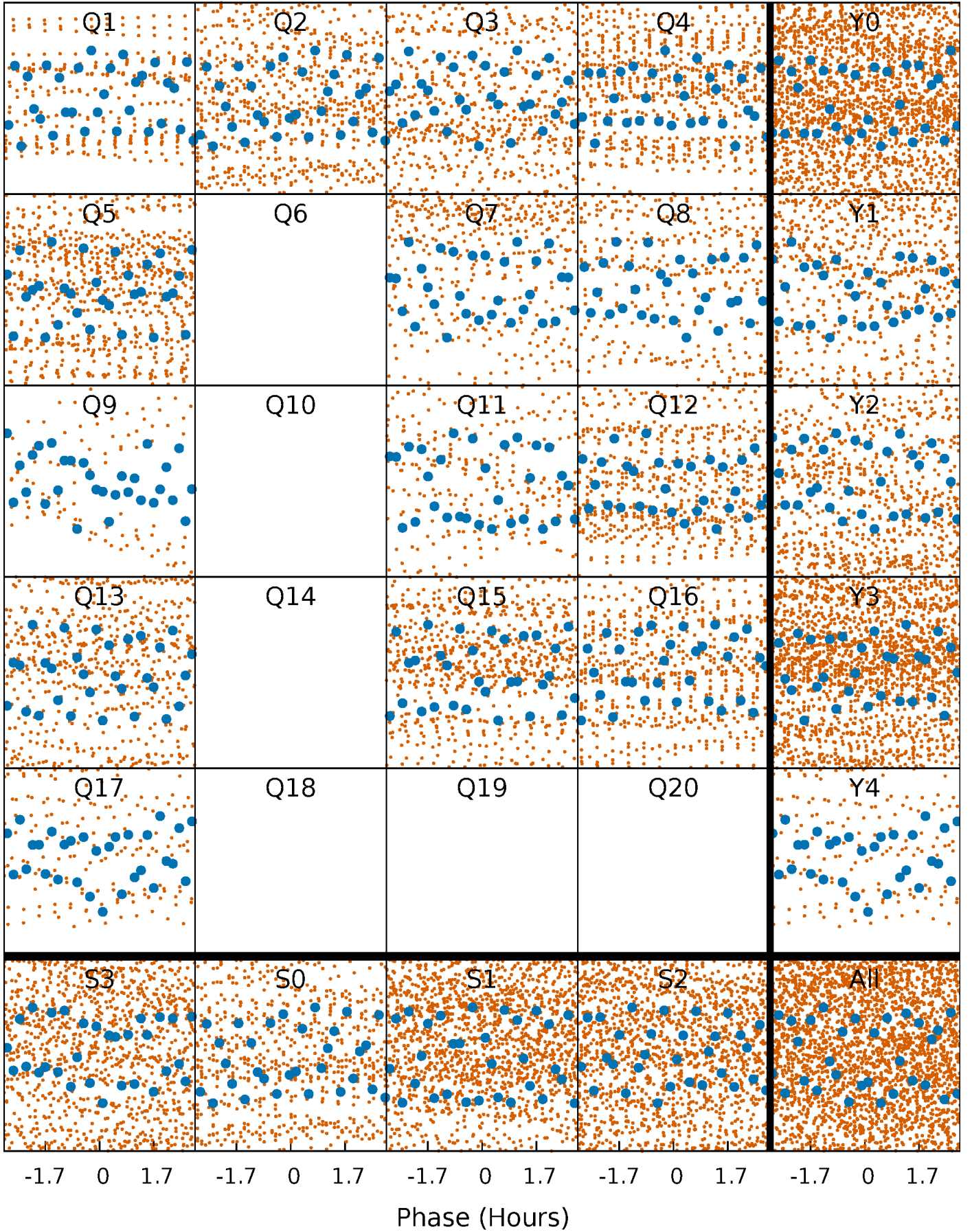


Non-Whitened Vs. Whitened Light Curve



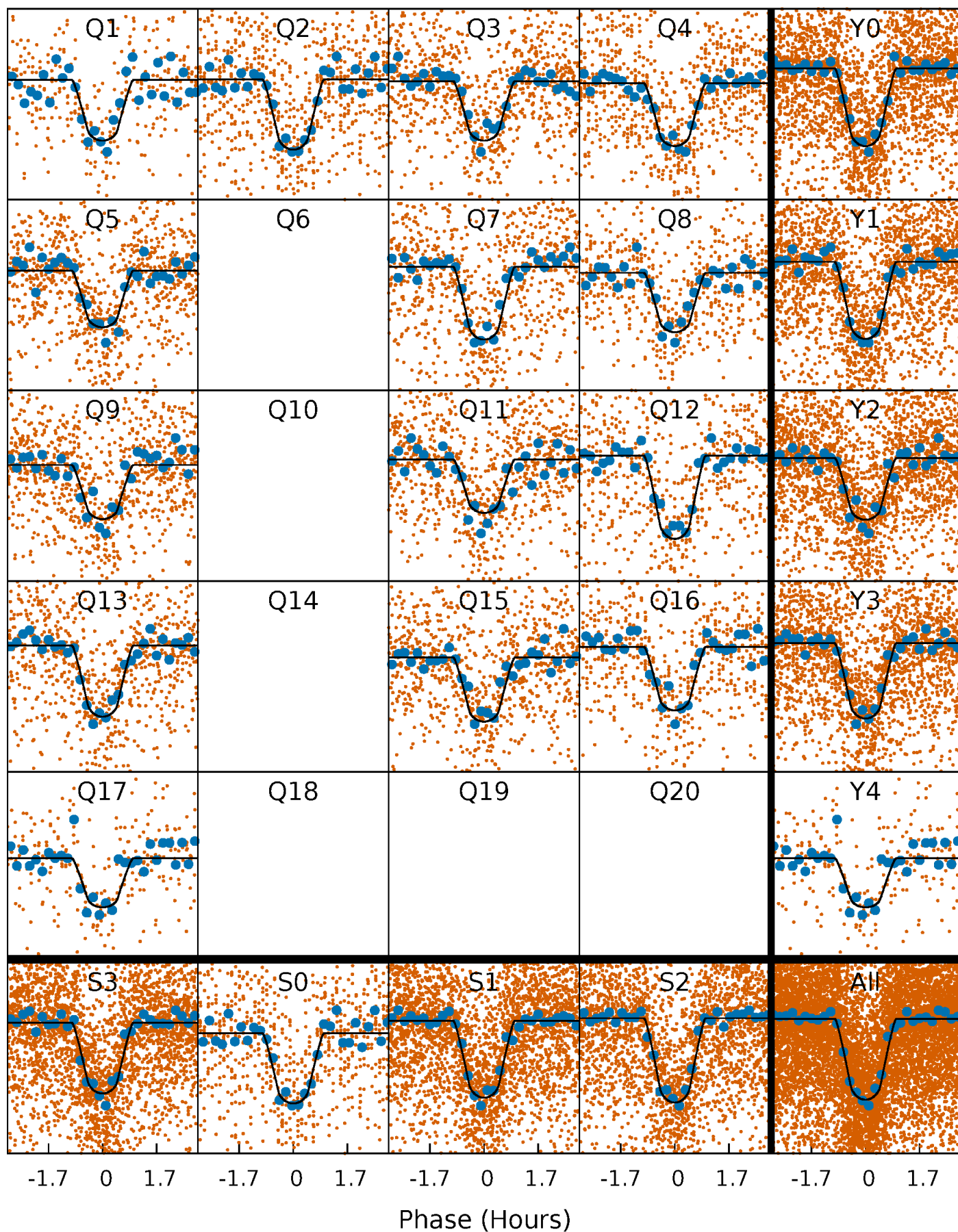
PDC Quarter-Phased Transit Curves

TCE 004164922-01 P= 1.210699 Days $T_0=132.391744$ (BKJD)



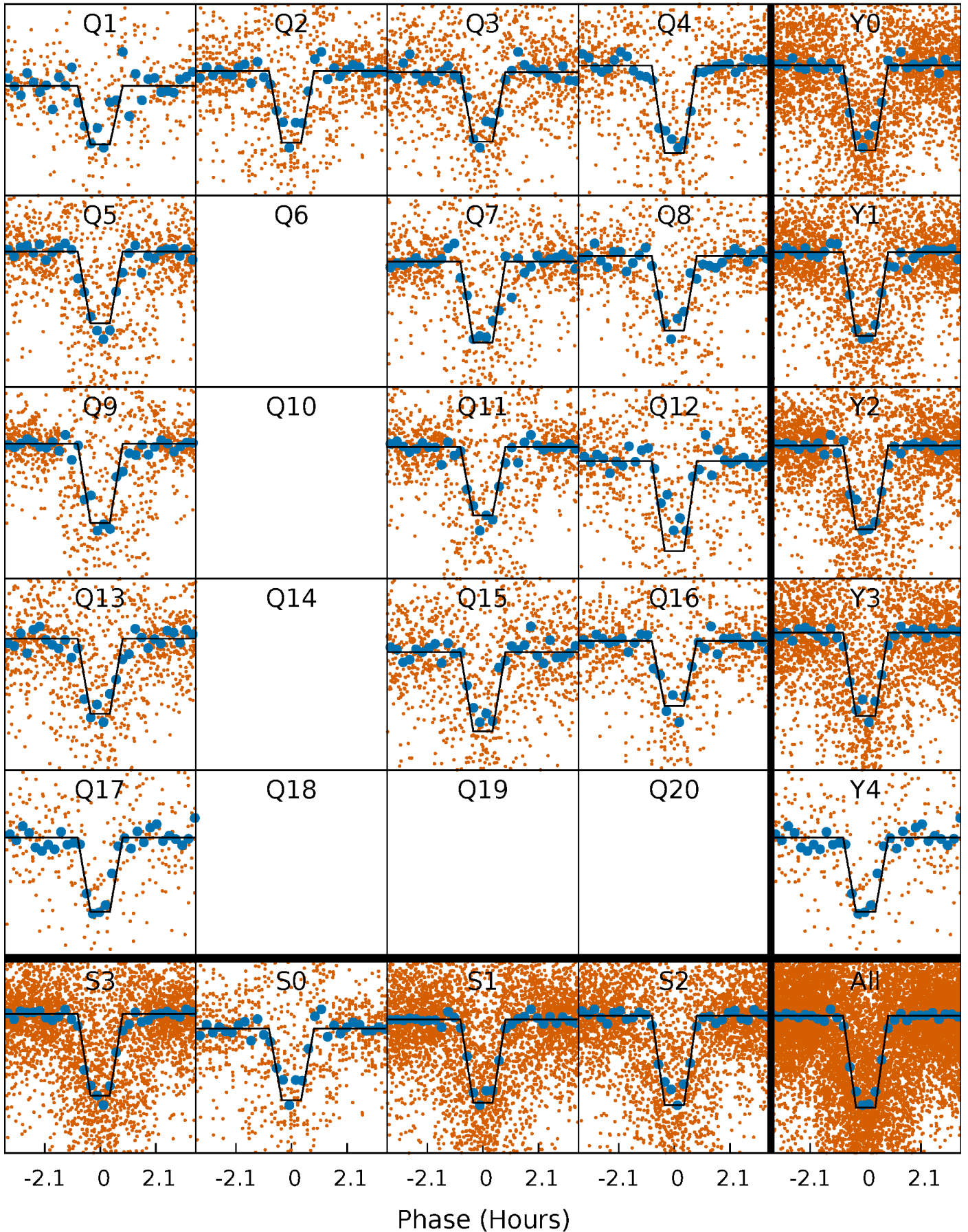
DV Quarter-Phased Transit Curves

TCE 004164922-01 P= 1.210699 Days $T_0=132.391744$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

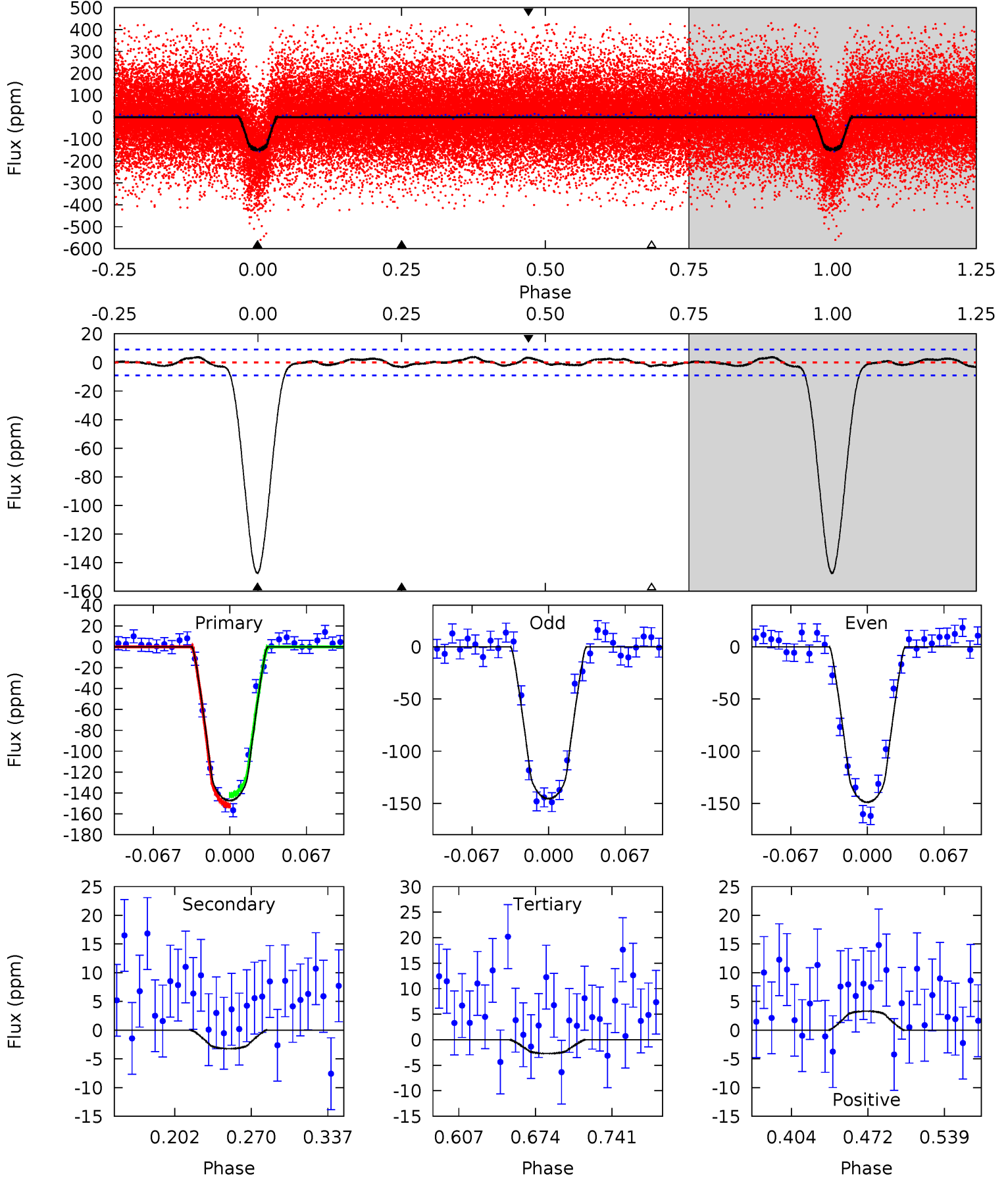
TCE 004164922-01 P= 1.210694 Days $T_0=132.393429$ (BKJD)



DV Model-Shift Uniqueness Test

004164922-01, P = 1.210699 Days, E = 131.181045 Days

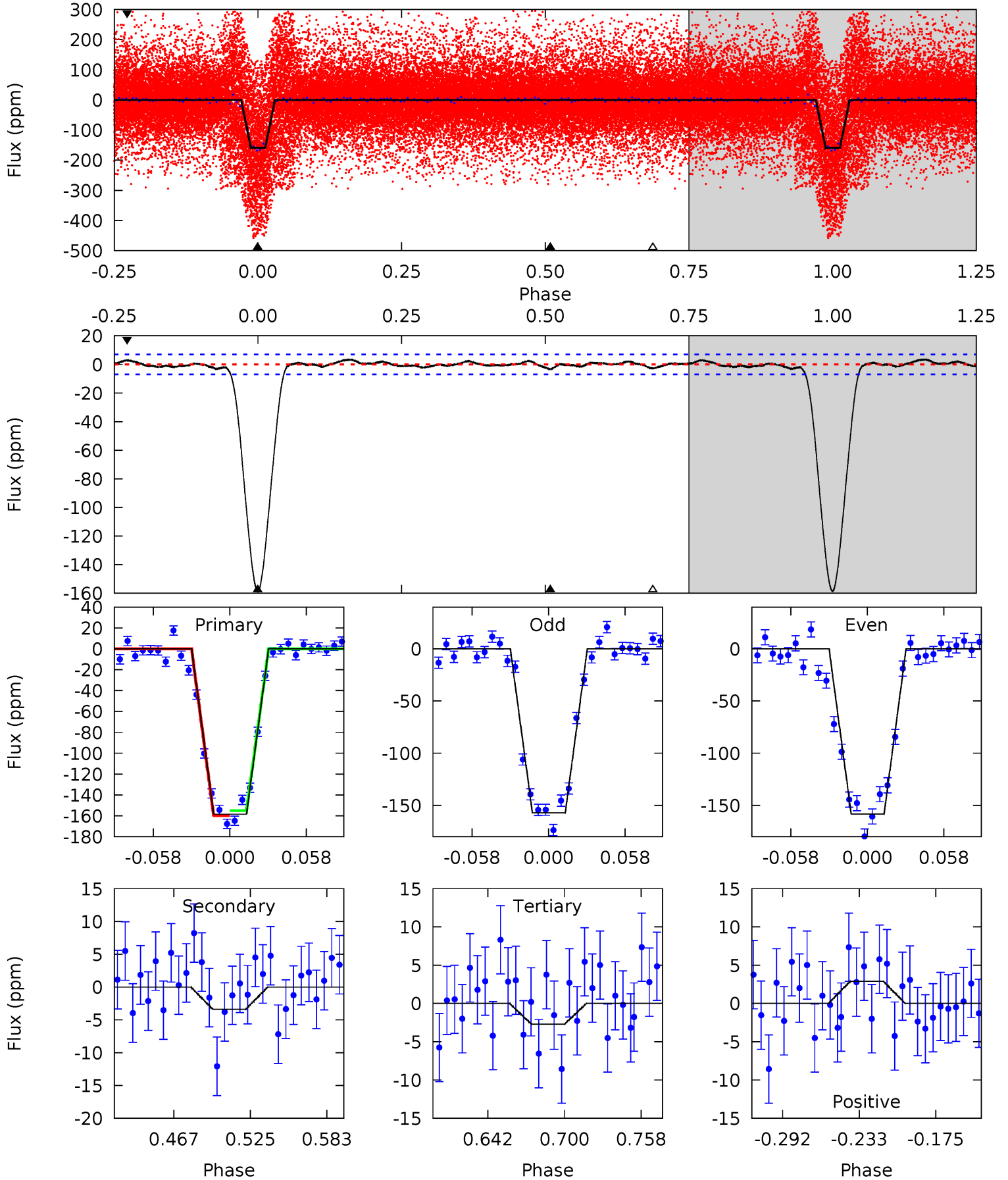
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
75.8	1.66	1.39	1.71	4.65	1.83	0.88	74.4	74.1	0.27	-0.05	0.85	1.01	0.03	2.54



Alt Model-Shift Uniqueness Test

004164922-01, P = 1.210694 Days, E = 131.182735 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
106.4	2.28	1.82	1.95	4.68	1.89	0.88	104.6	104.4	0.45	0.32	0.40	1.03	0.02	1.65



Stellar Parameters For KIC 004164922

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5014^{+100}_{-100}	$4.559^{+0.044}_{-0.032}$	$-0.100^{+0.150}_{-0.150}$	$0.756^{+0.039}_{-0.043}$	$0.756^{+0.051}_{-0.032}$	$2.461^{+0.446}_{-0.289}$
	+2%/-2%	+1%/-1%	+150%/-150%	+5%/-6%	+7%/-4%	+18%/-12%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 004164922-01 / KOI 3864.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-3 ± 2	$1.12^{+0.22}_{-0.21}$	1882^{+47}_{-44}	2371^{+330}_{-4511}	$0.570^{+0.487}_{-0.374}$
Alt.	-3 ± 1	$1.06^{+0.23}_{-0.21}$	1886^{+46}_{-46}	2492^{+280}_{-501}	$0.695^{+0.527}_{-0.343}$

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

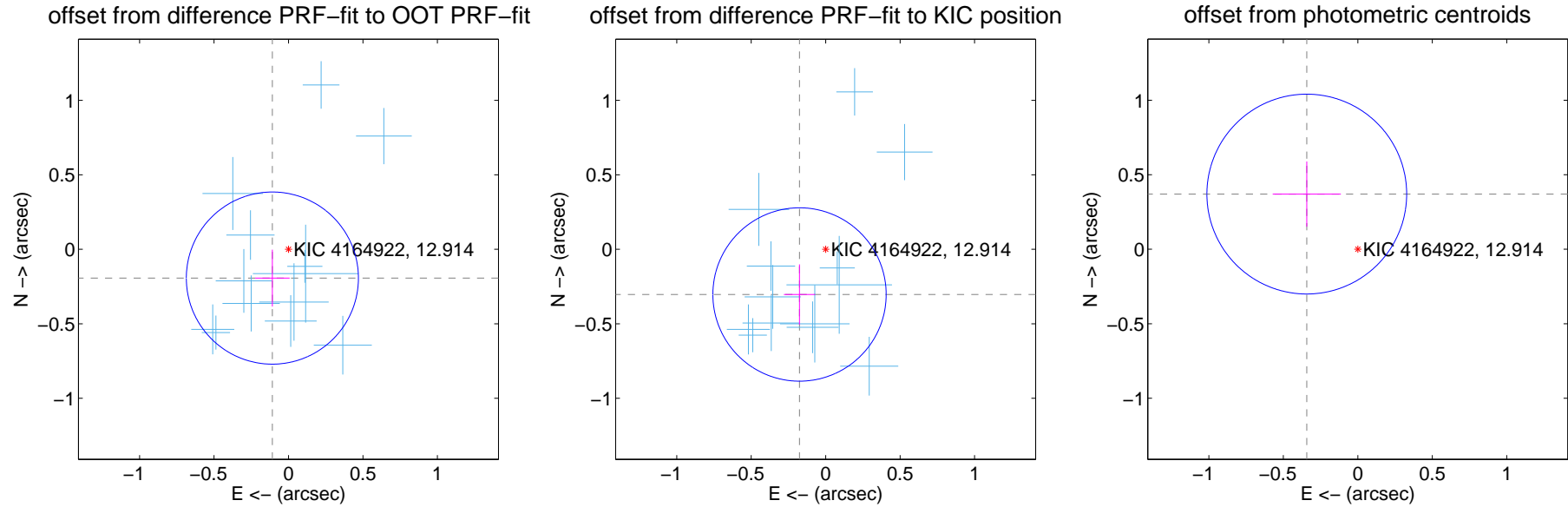
DV Centroid Data

Supplemental centroid analysis for 004164922-01. Kepler magnitude: 12.91. Transit SNR 42.55

There are 14 quarters with good PRF difference image offsets

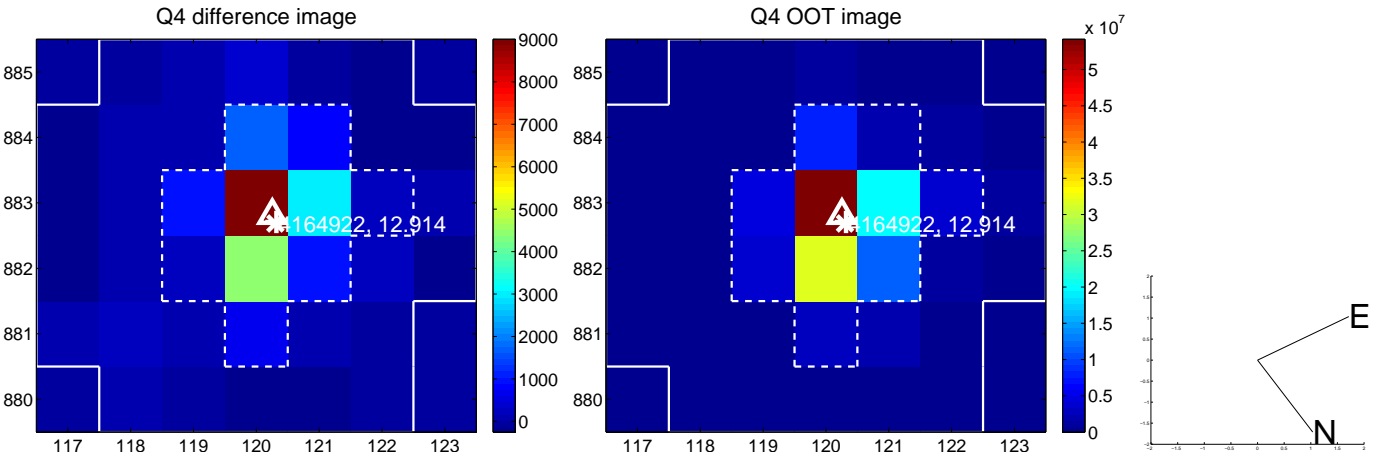
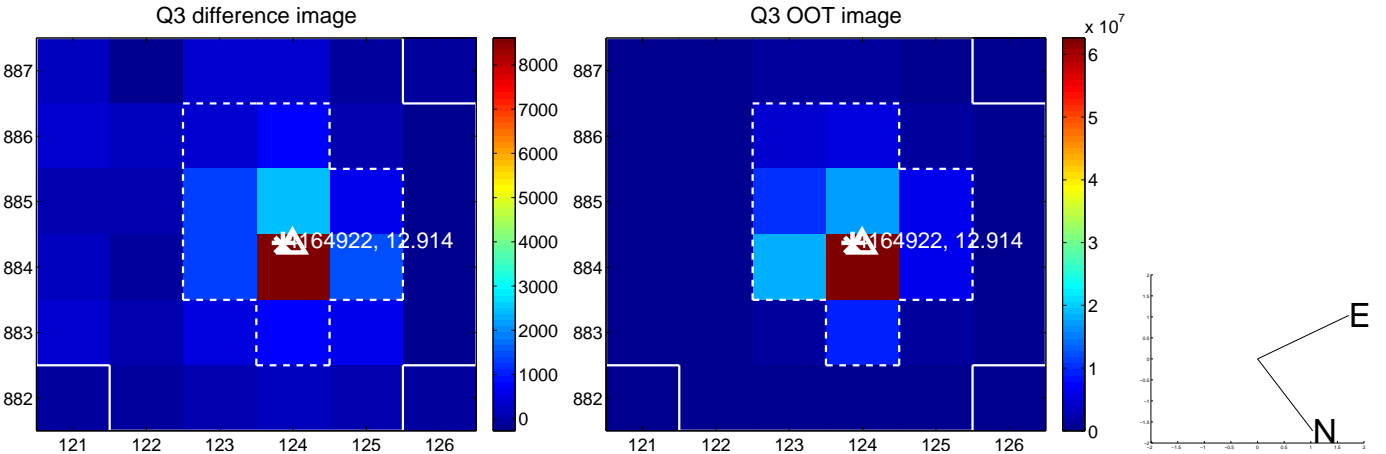
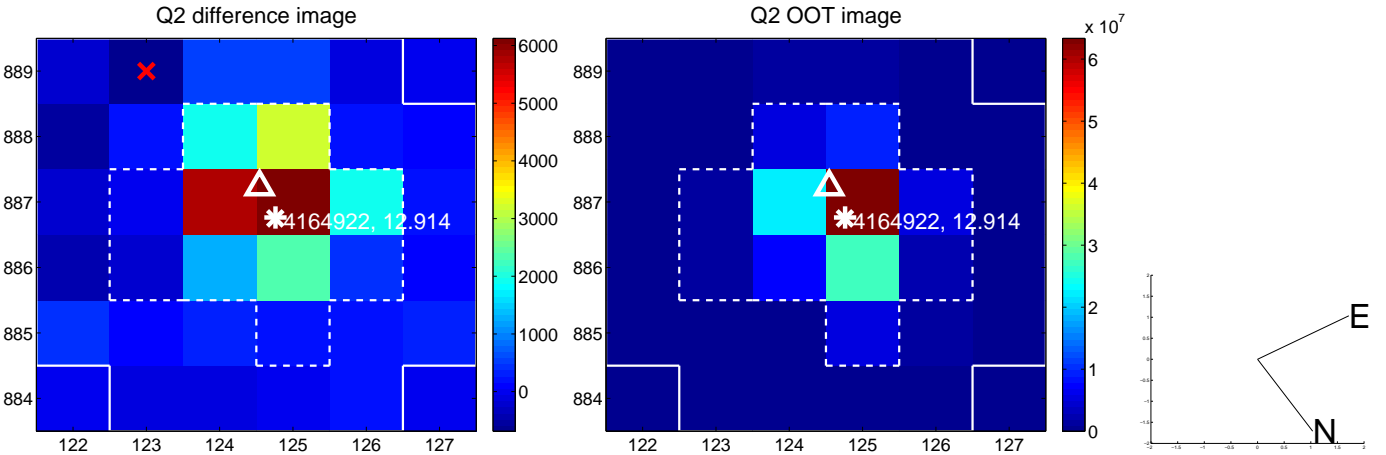
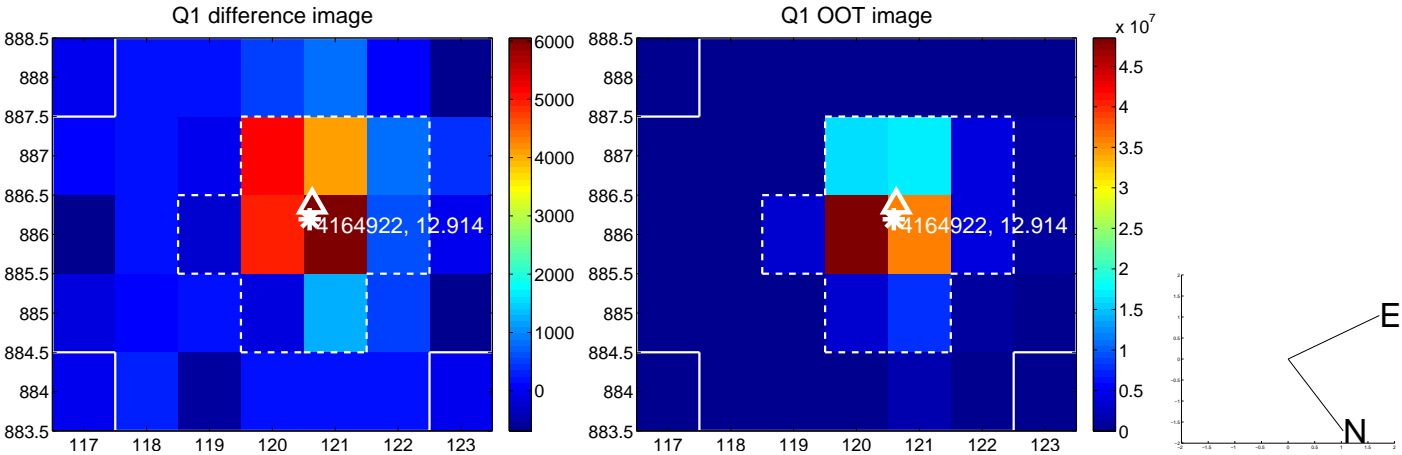
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.221 ± 0.193	1.15	0.108 ± 0.116	-0.193 ± 0.191
PRF-fit source offset from KIC position	0.350 ± 0.194	1.81	0.176 ± 0.105	-0.303 ± 0.202
photometric centroid source offset	0.50 ± 0.22	2.26	0.34 ± 0.23	0.37 ± 0.22

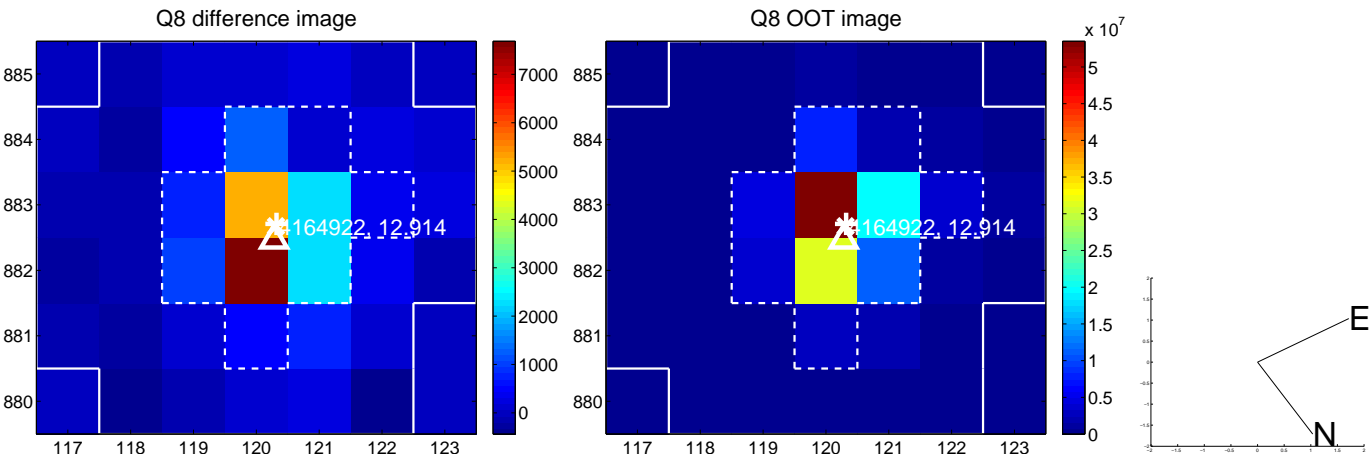
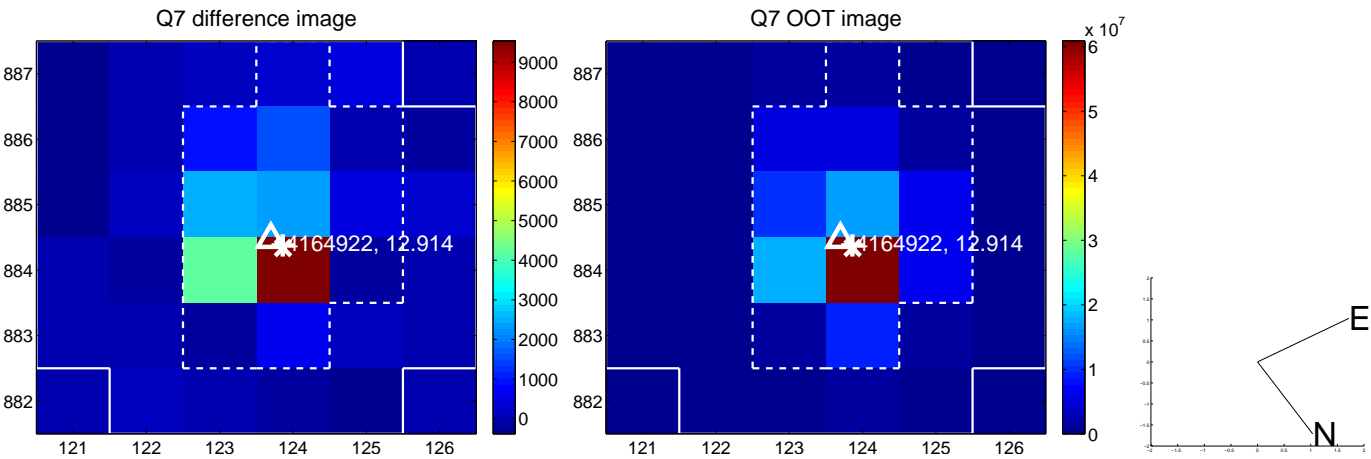
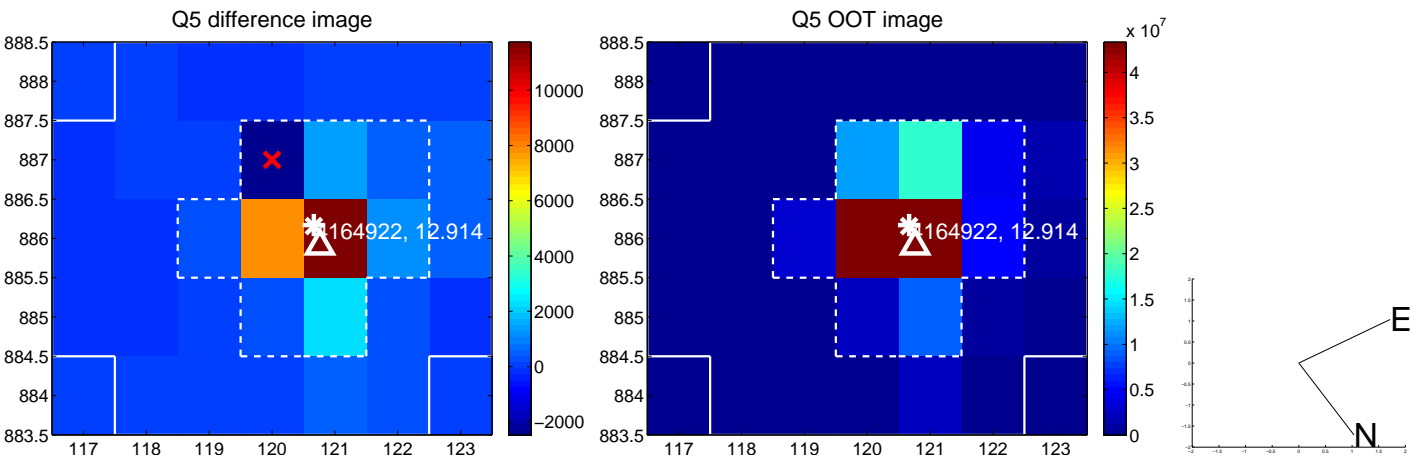


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

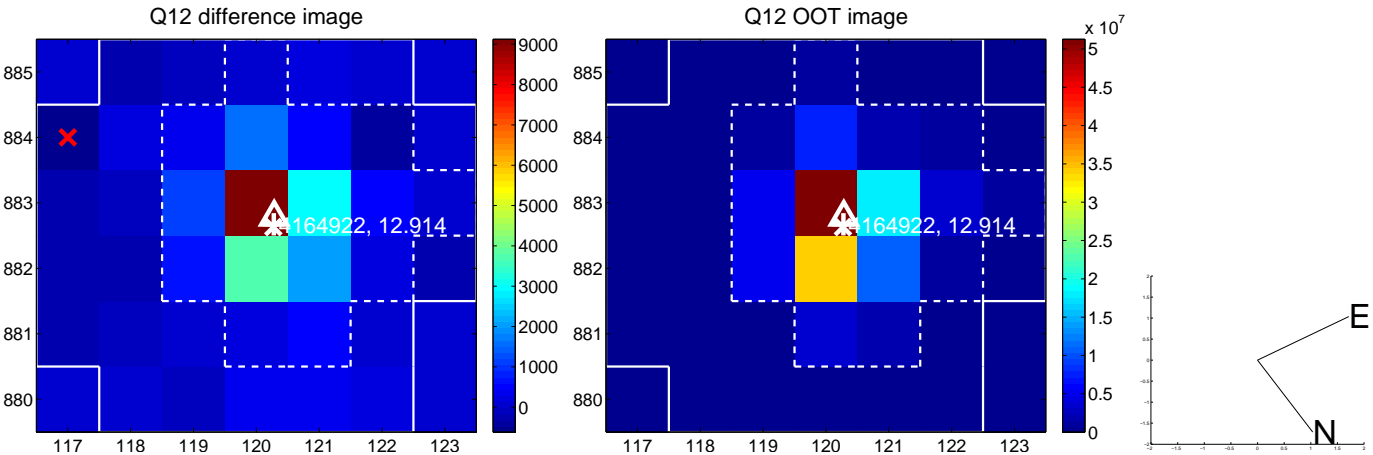
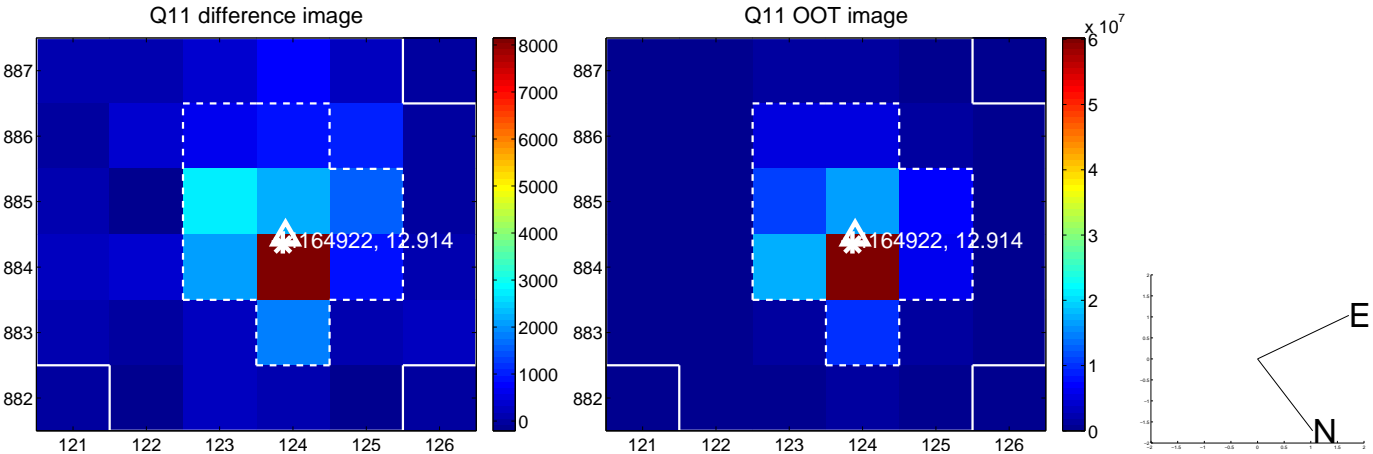
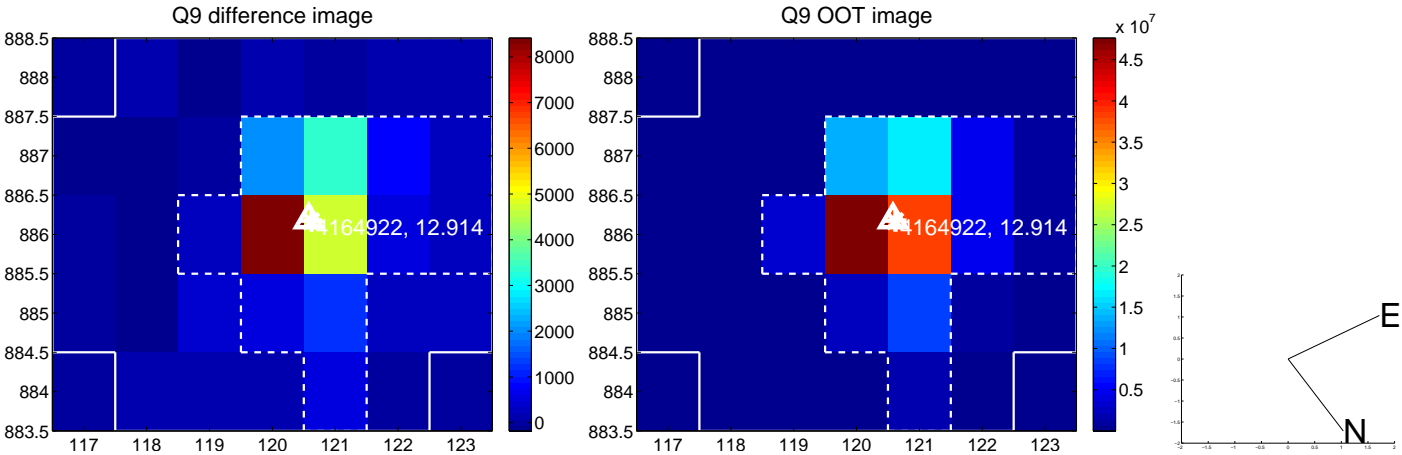
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



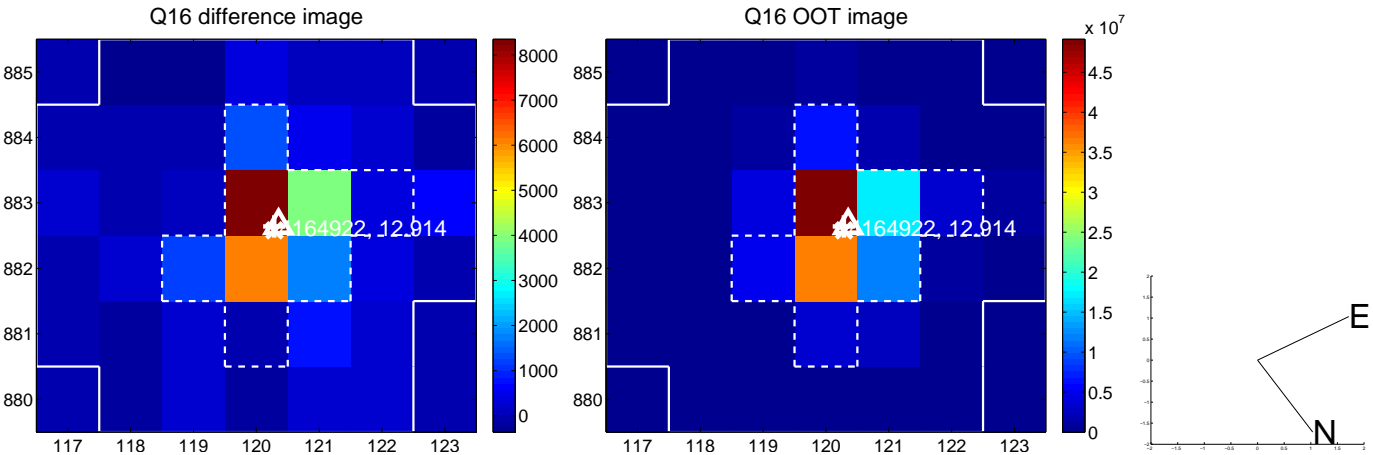
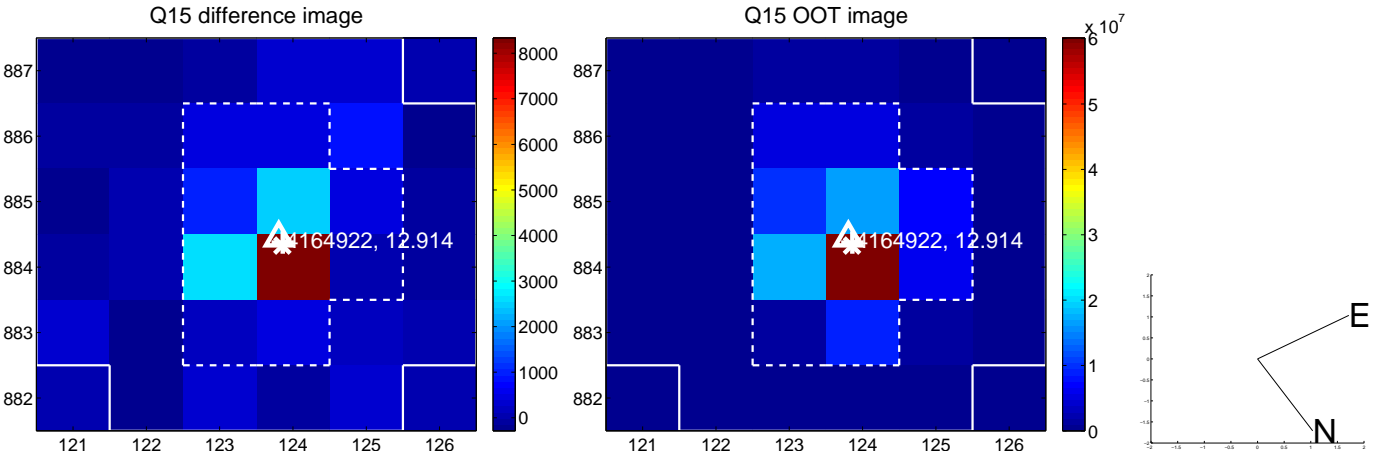
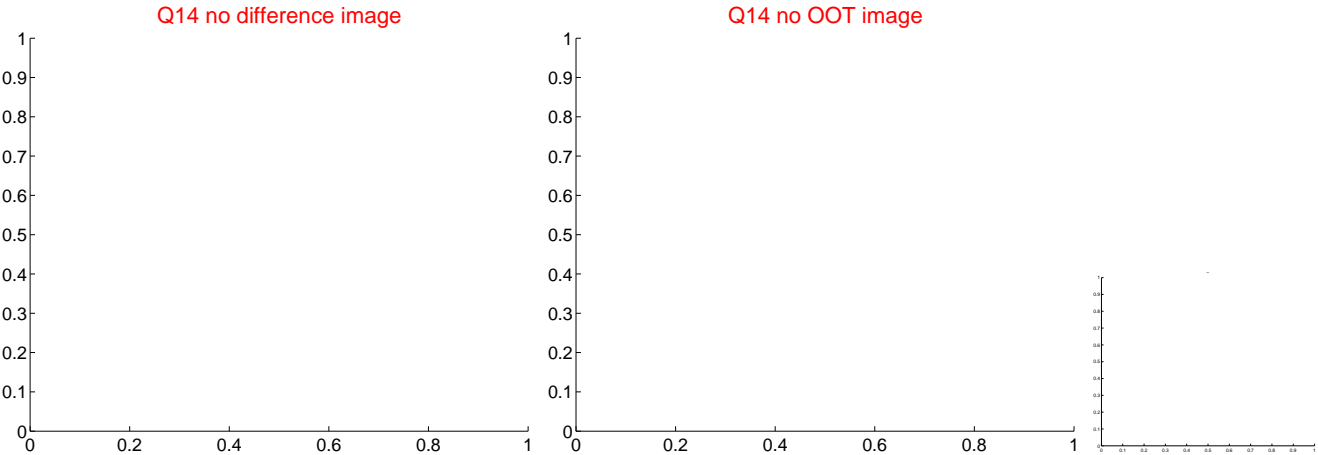
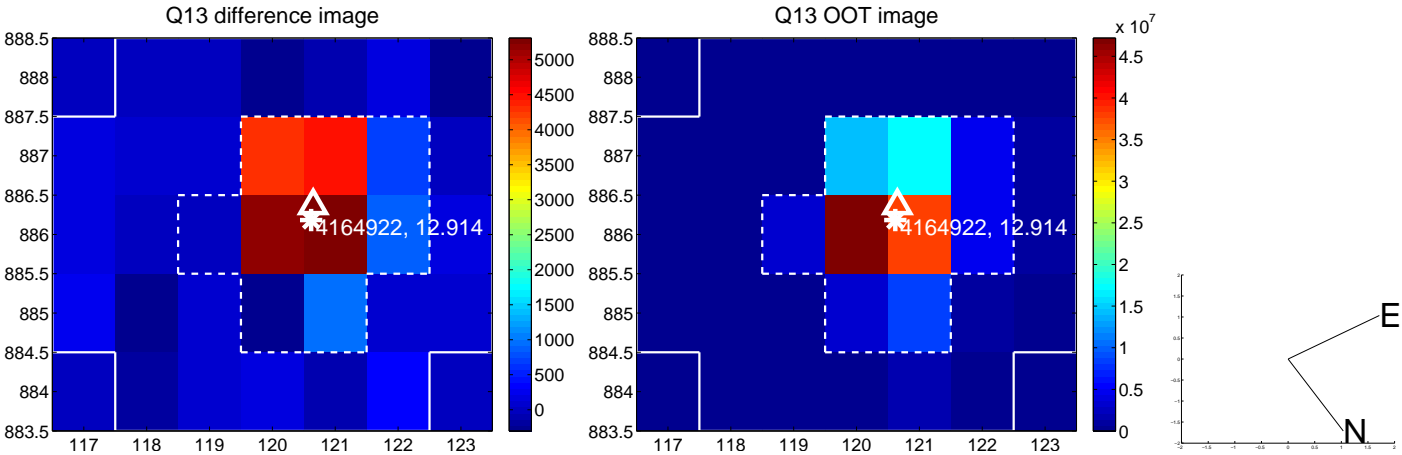
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



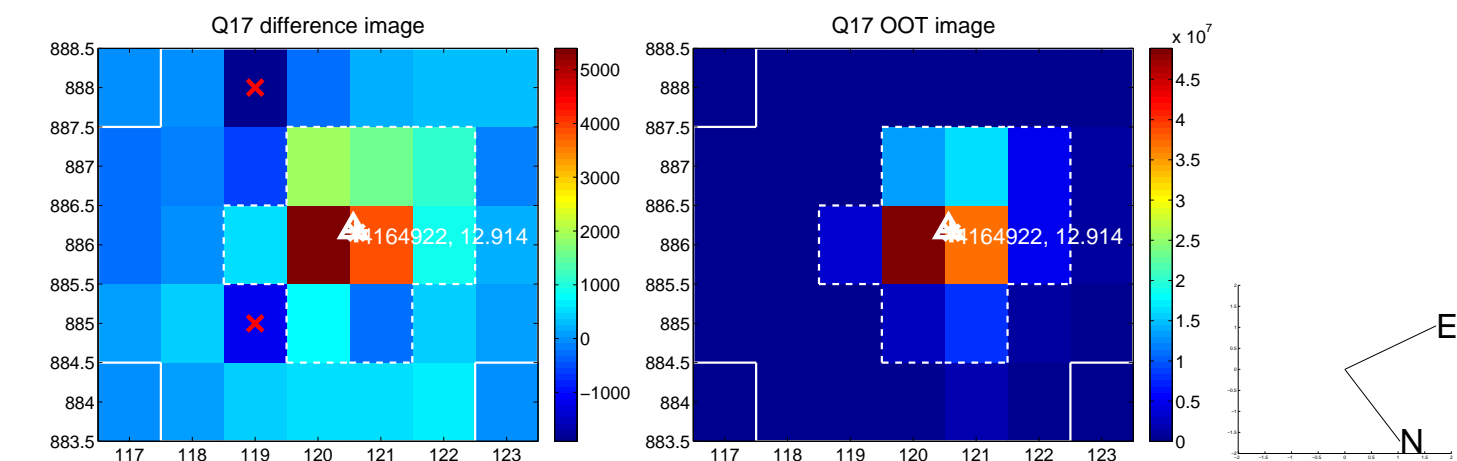
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



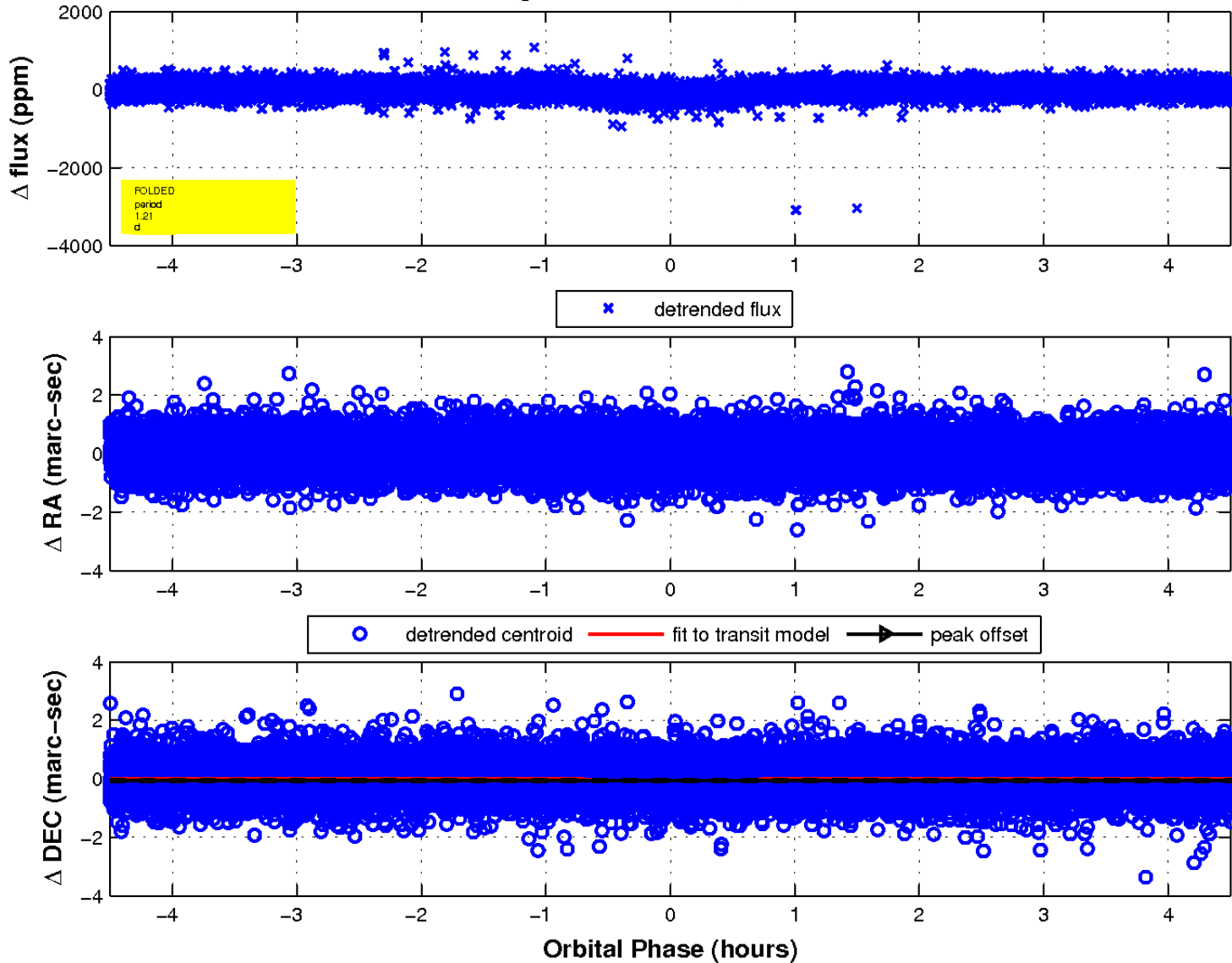
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

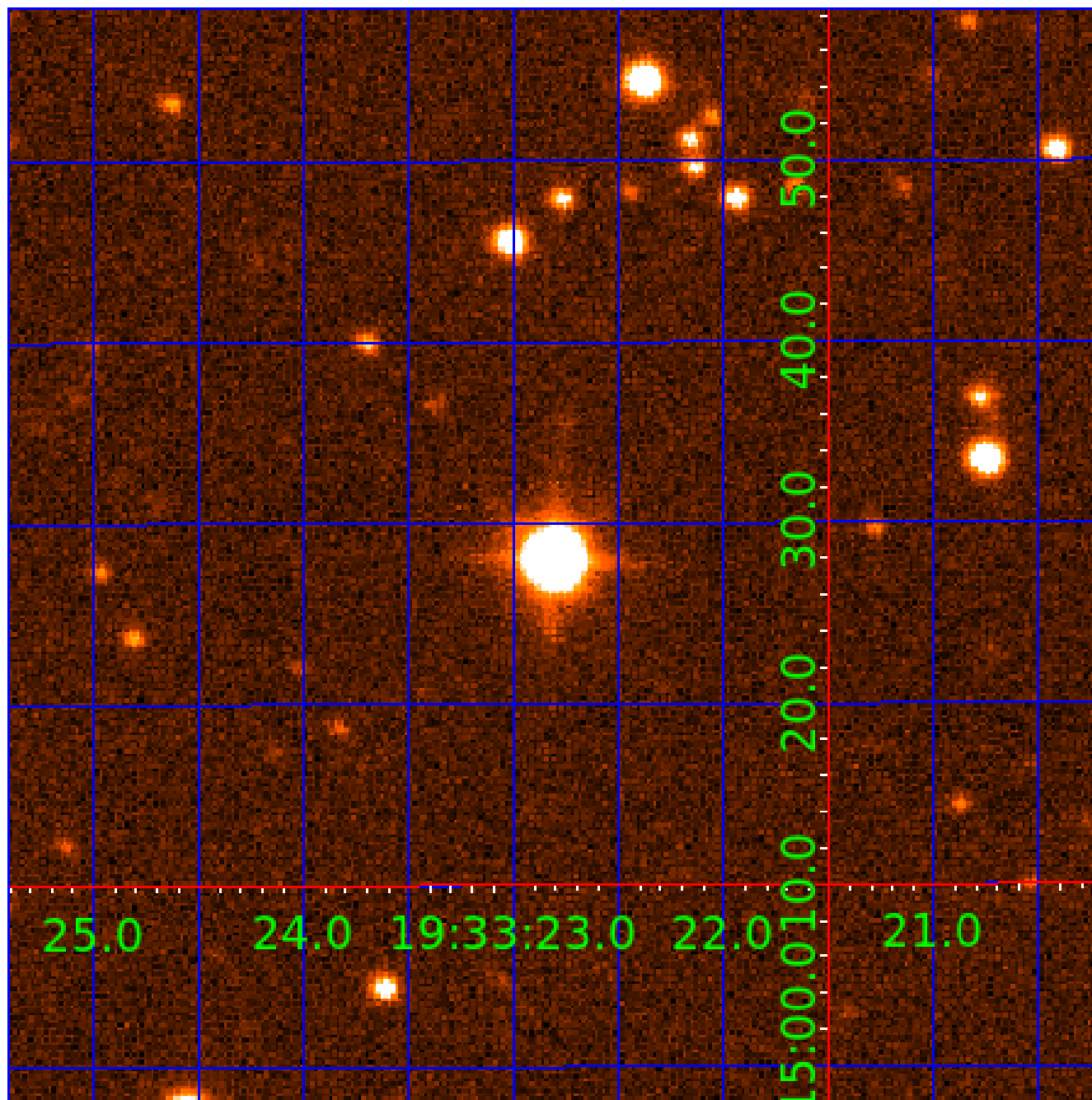


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 004164922

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})
004164922-01	OBS	3864.01	1.210699	132.391744	149.5	1.501	29.1	42.6	0.76	5014	1.13	789.34
004164922-02	OBS	3864.02	18.257431	134.439728	134.6	3.557	10.2	10.6	0.76	5014	1.07	21.19

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004164922-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
004164922-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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.

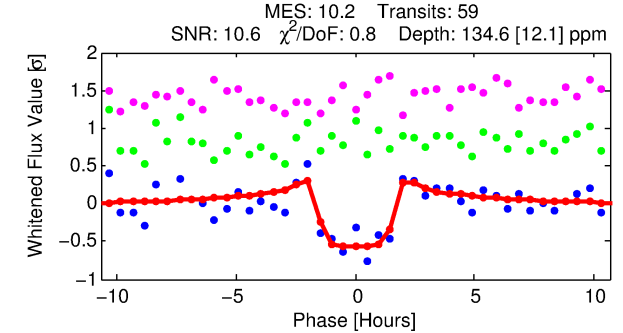
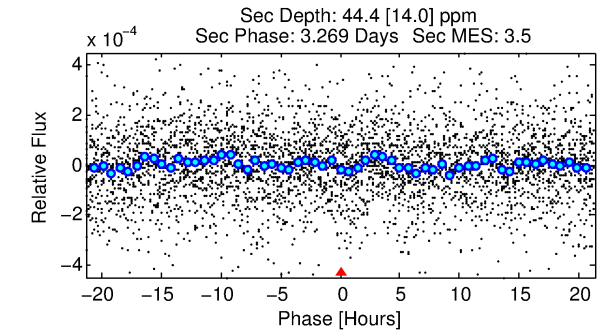
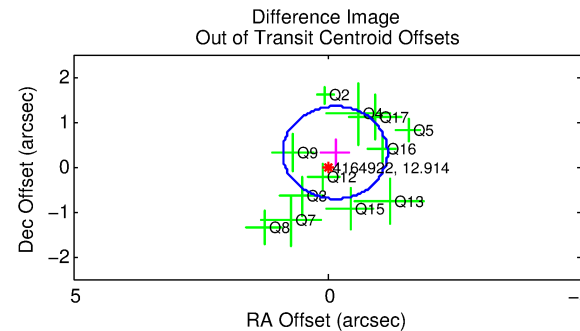
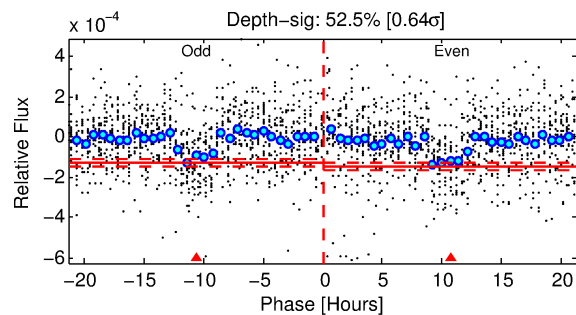
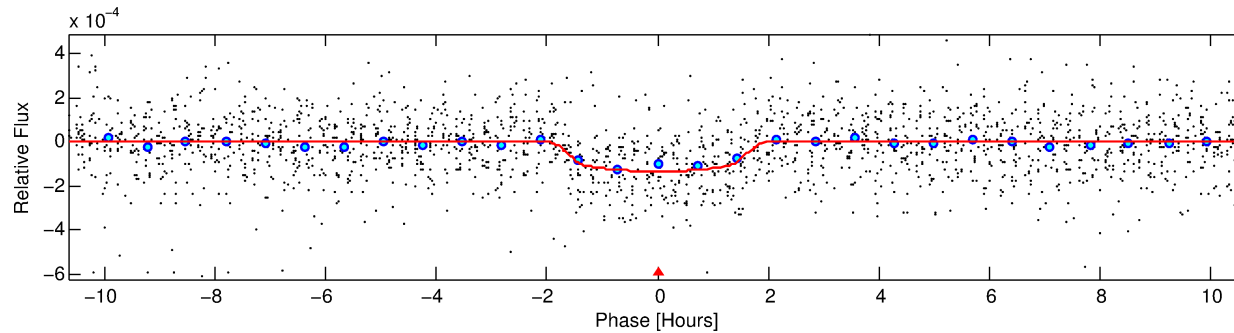
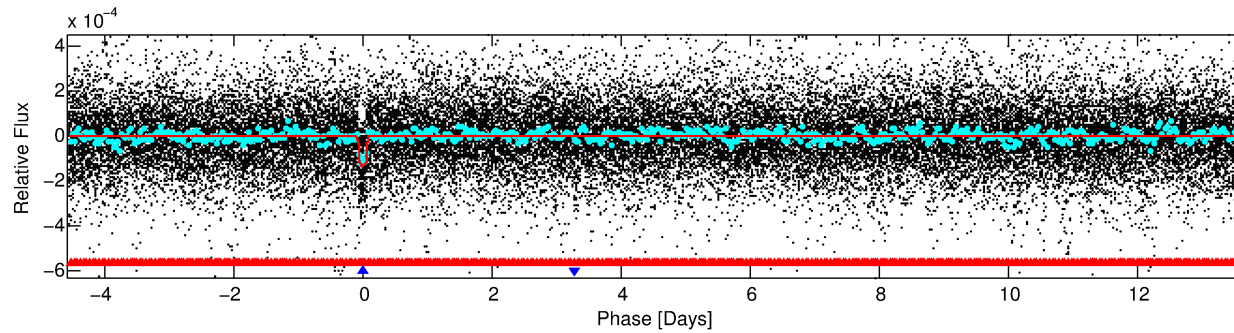
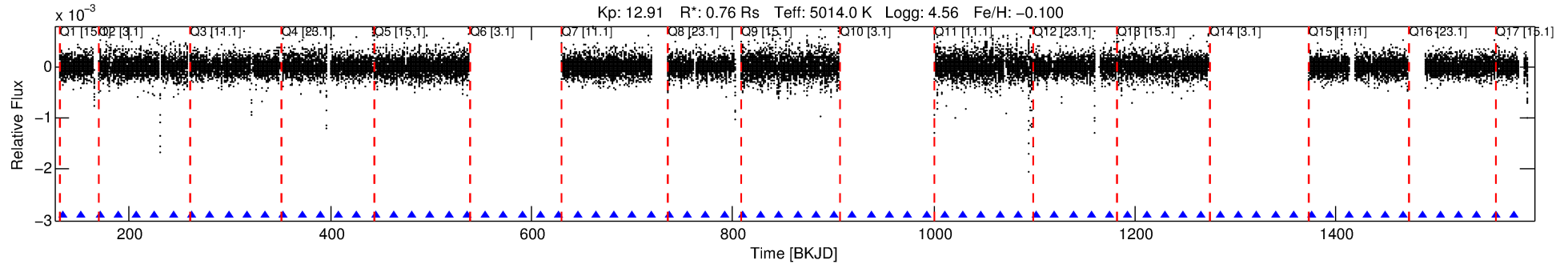
Ephemeris Match Information For 004164922-02

No Significant Match Found

DV One-Page Summary

KIC: 4164922 Candidate: 2 of 2 Period: 18.257 d

KOI: K03864.02 Corr: 0.981



DV Fit Results:

Period = 18.25743 [0.00010] d
Epoch = 134.4397 [0.0047] BKJD
Rp/R* = 0.0129 [0.0051]
a/R* = 18.25 [28.82]
b = 0.90 [0.34]
Seff = 21.19 [2.36]
Teq = 547 [15] K
Rp = 1.07 [0.42] Re
a = 0.1236 [0.0063] AU
Ag = 327.99 [279.55] [1.17 σ]
Teffp = 3600 [767] K [3.98 σ]

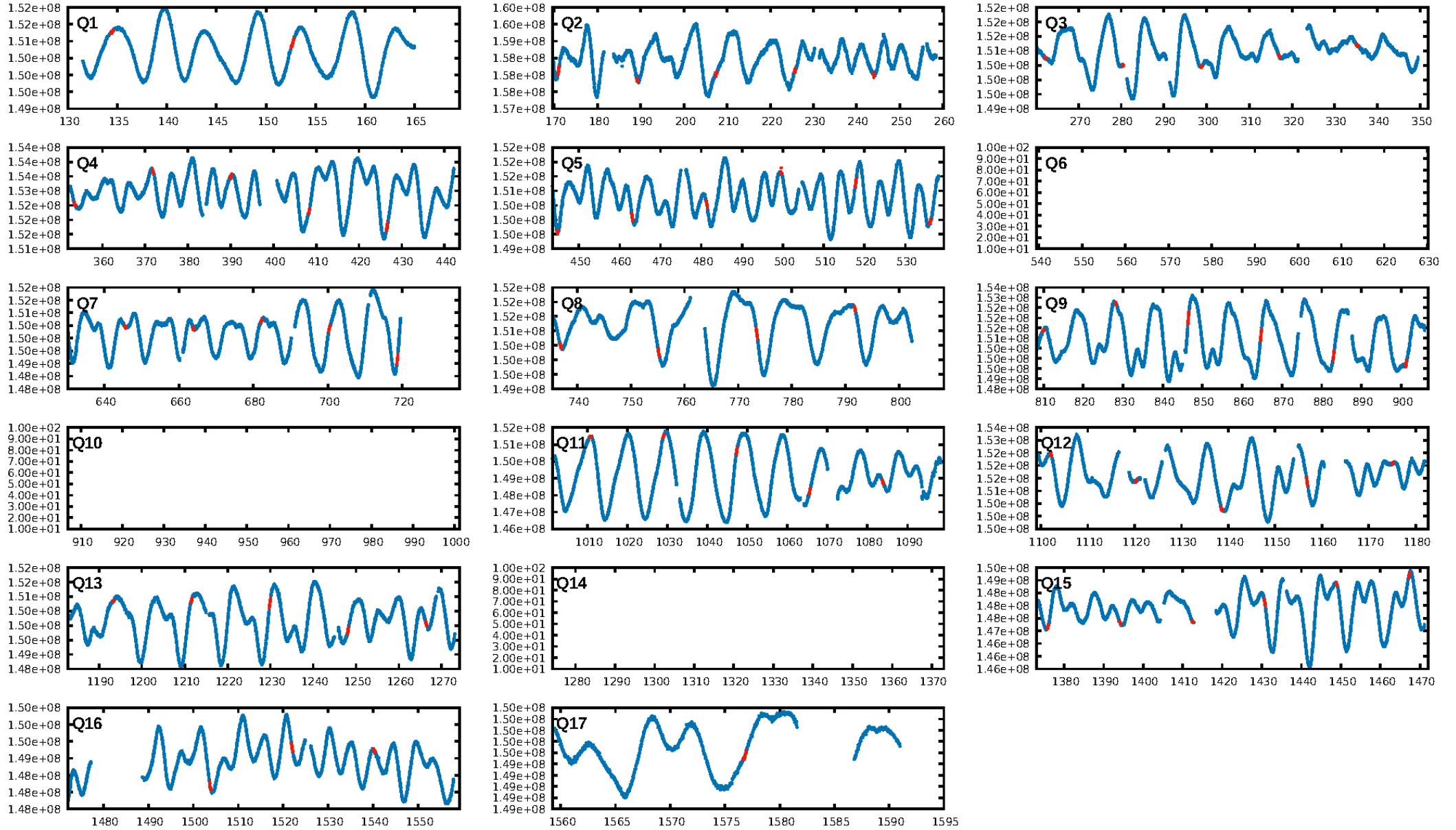
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [105.98 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 99.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.80e-20
RollingBand-fgt: 1.00 [56/56]
GhostDiagnostic-chr: 18.85
Centroid-sig: N/A
Centroid-so: 0.861 arcsec [1.35 σ]
OotOffset-rm: 0.346 arcsec [1.01 σ]
KicOffset-rm: 0.096 arcsec [0.30 σ]
OotOffset-st: 1/3/4/4 [12]
KicOffset-st: 1/3/4/4 [12]
DiffImageQuality-fgm: 0.92 [11/12]
DiffImageOverlap-fno: 0.50 [7/14]

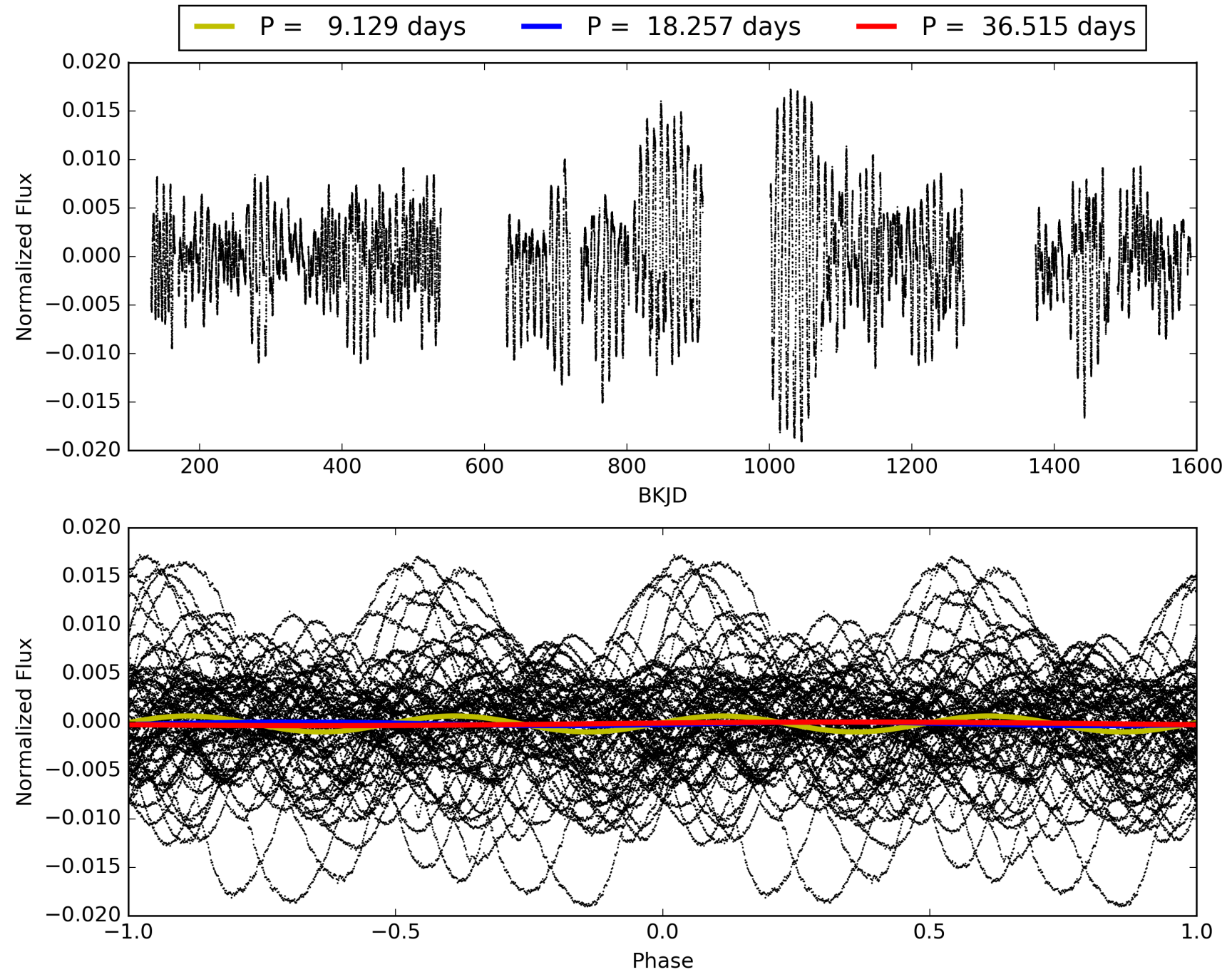
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 12:55:07 Z

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

TCE 004164922-02, PDC Light Curves

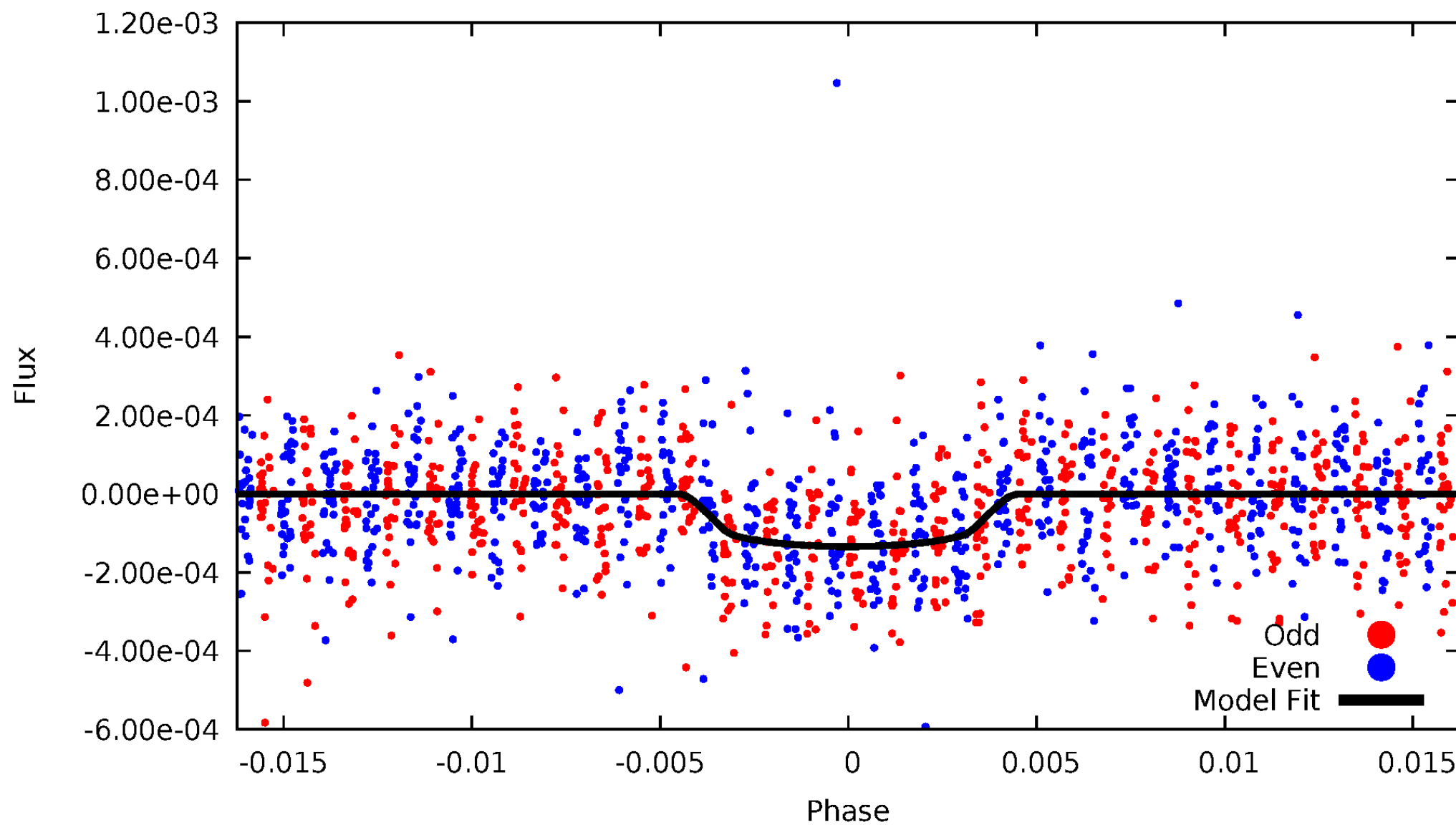


TCE 004164922-02



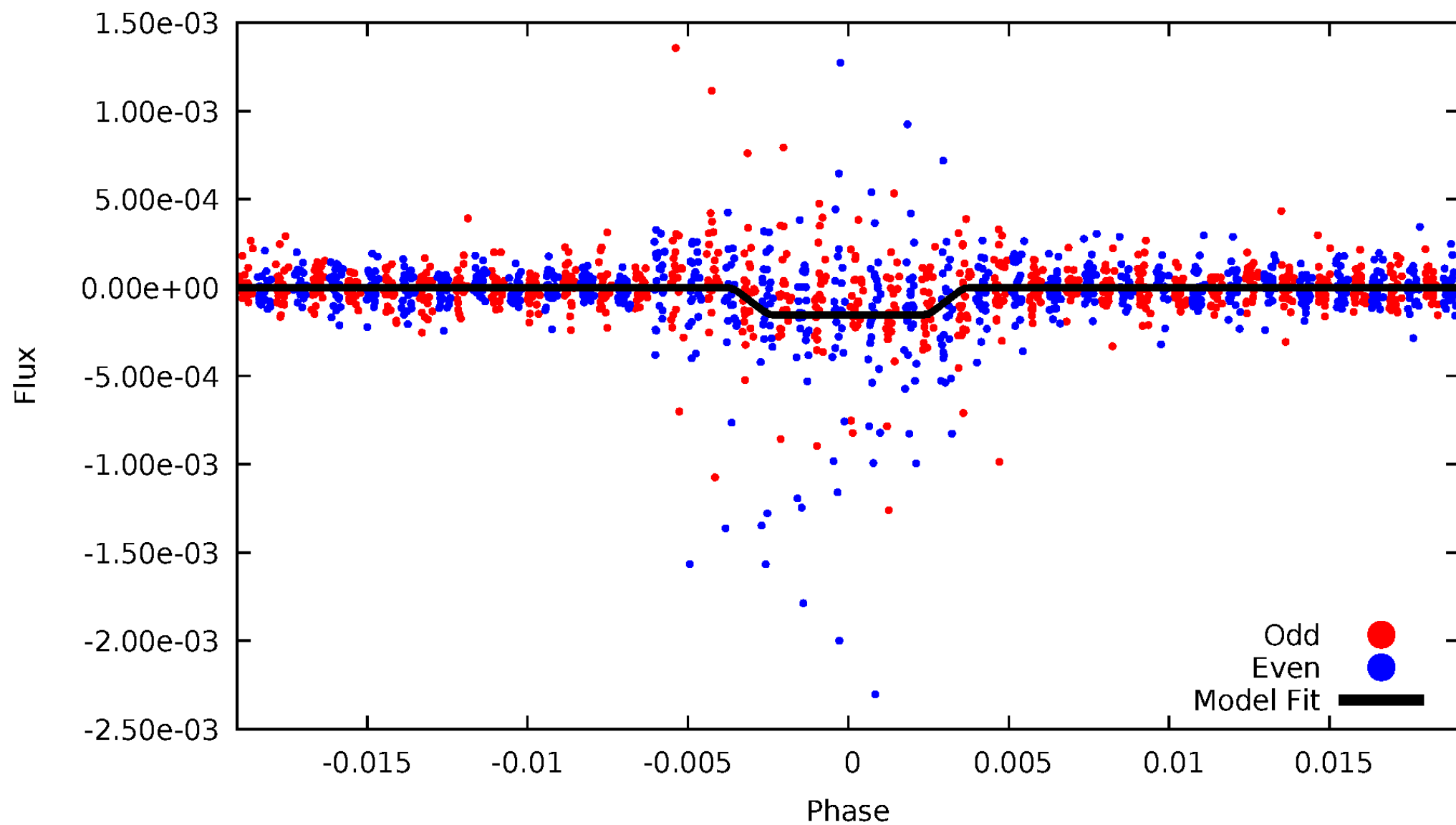
DV Odd/Even

TCE 004164922-02



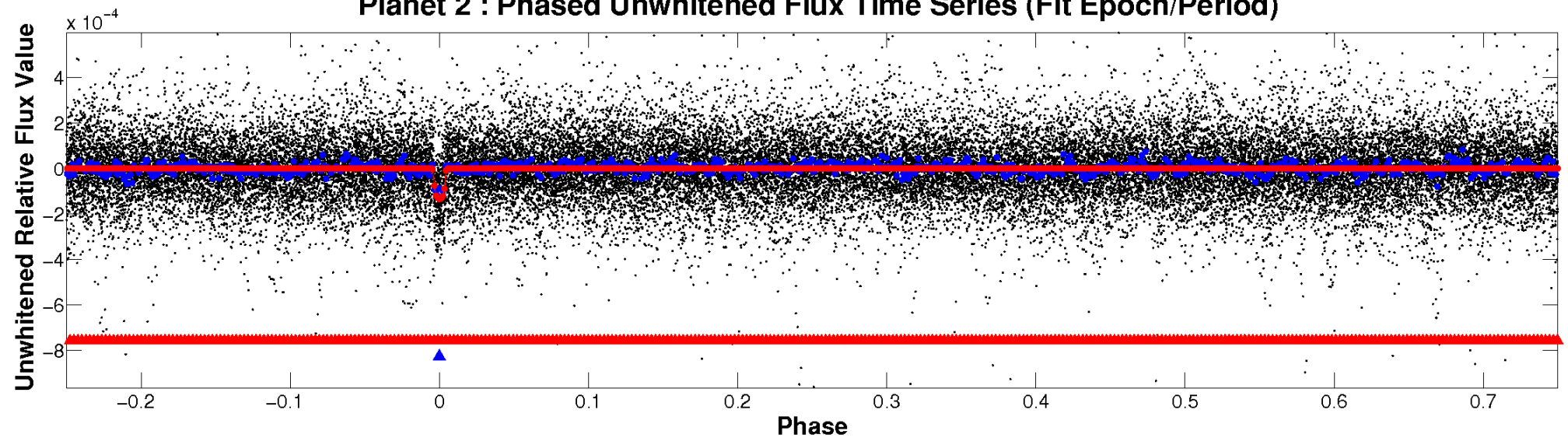
ALT Odd/Even

TCE 004164922-02

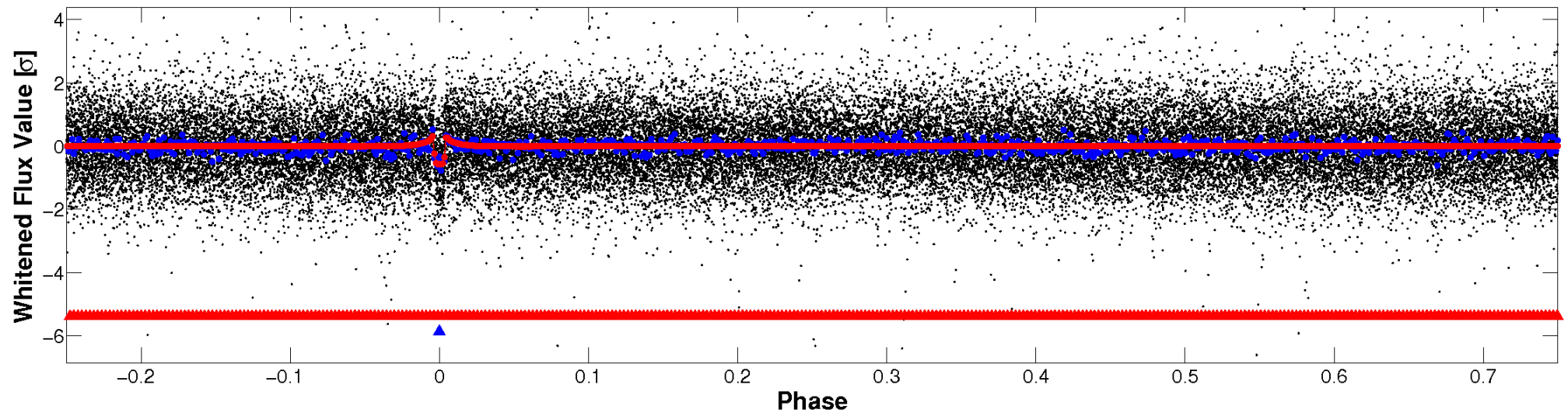


Non-Whitened Vs. Whitened Light Curve

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

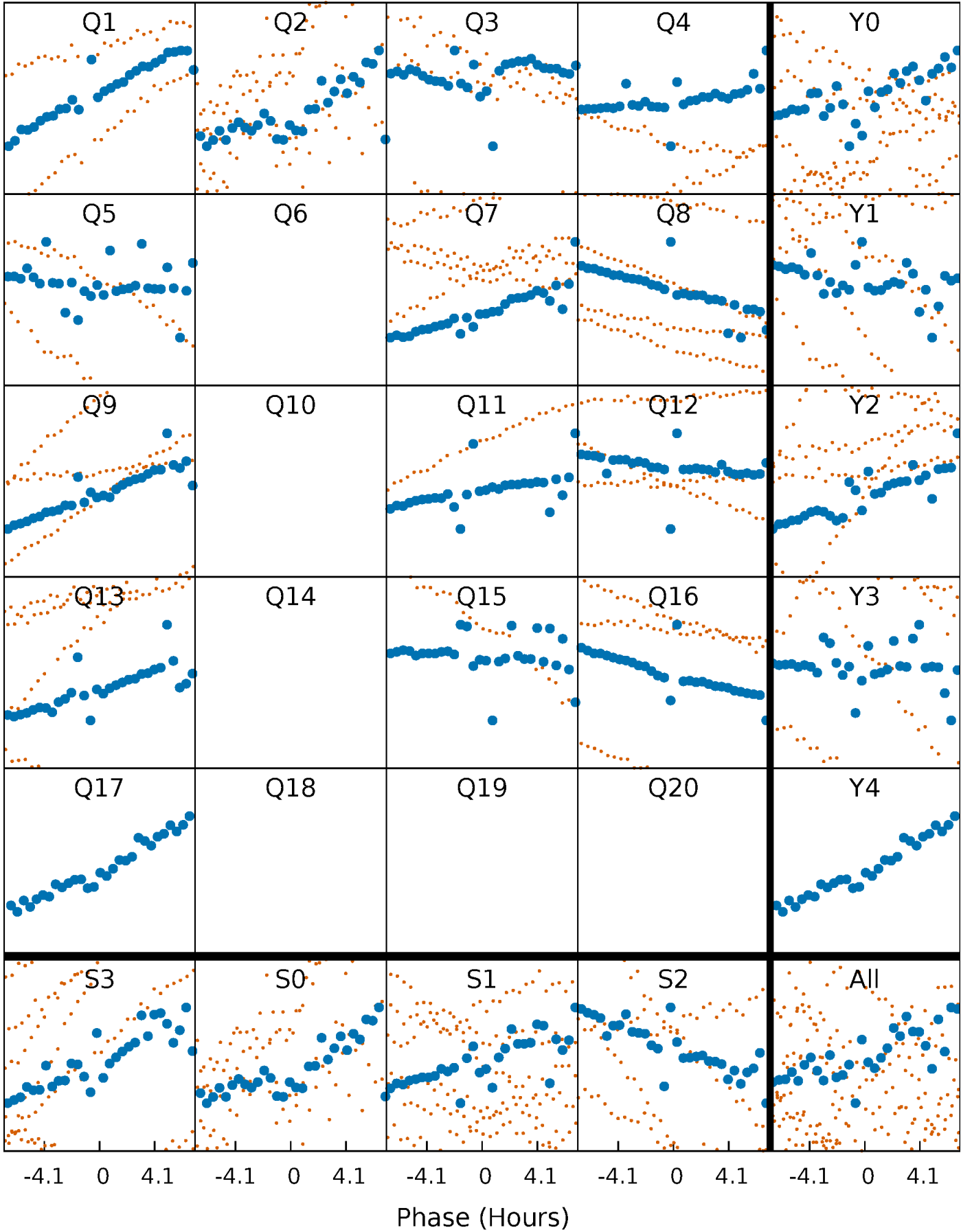


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



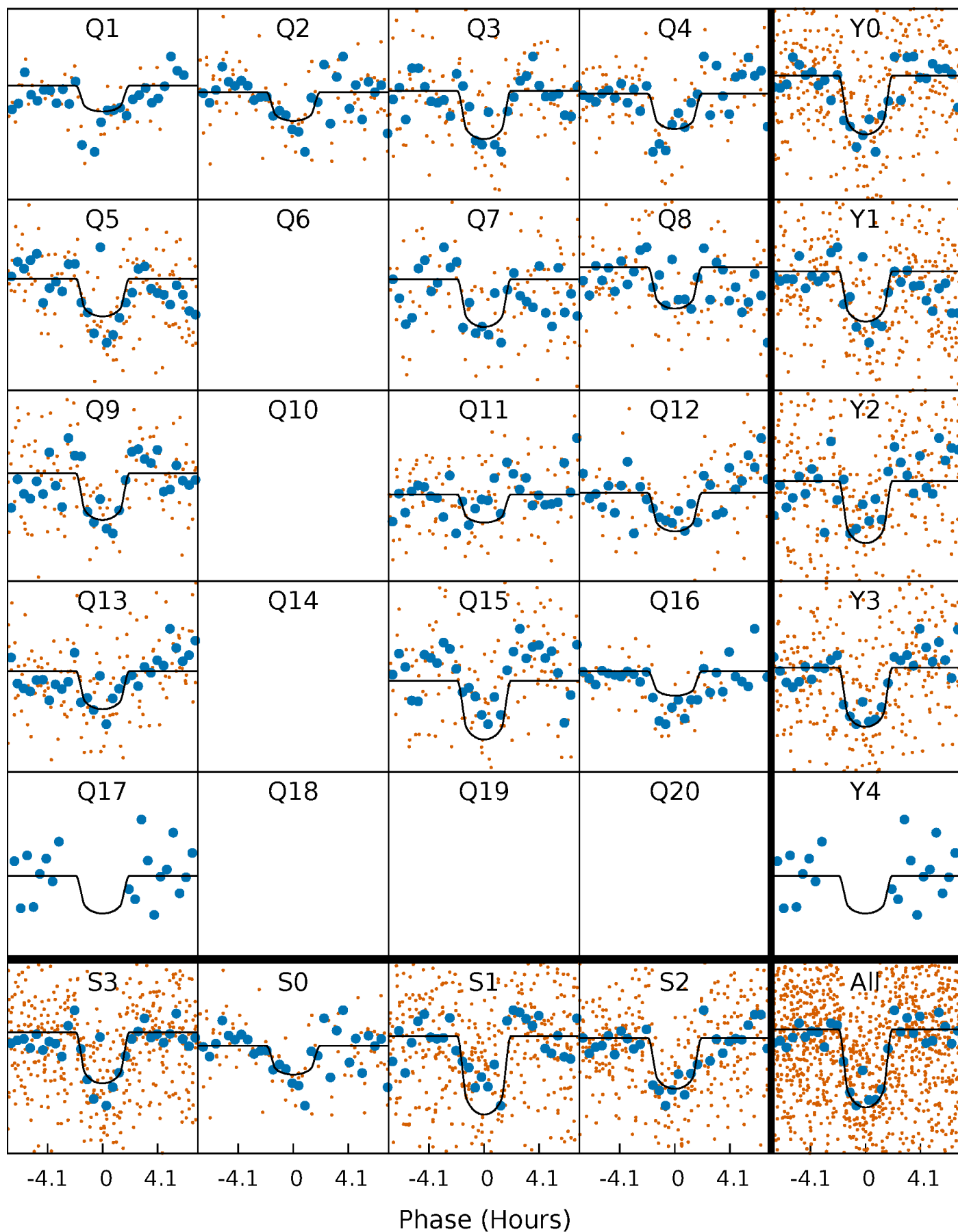
PDC Quarter-Phased Transit Curves

TCE 004164922-02 P= 18.257431 Days $T_0=134.439728$ (BKJD)



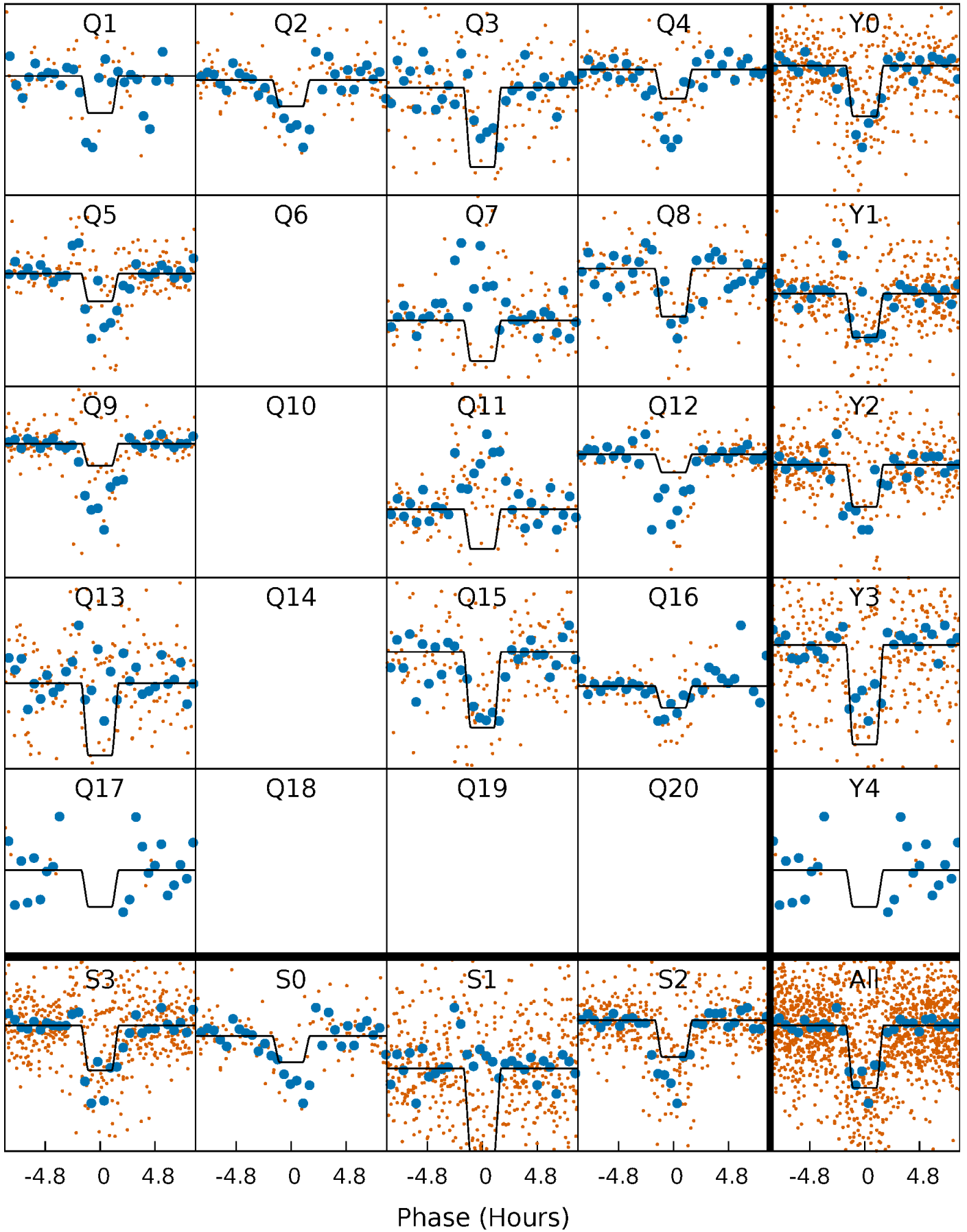
DV Quarter-Phased Transit Curves

TCE 004164922-02 P= 18.257431 Days $T_0=134.439728$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

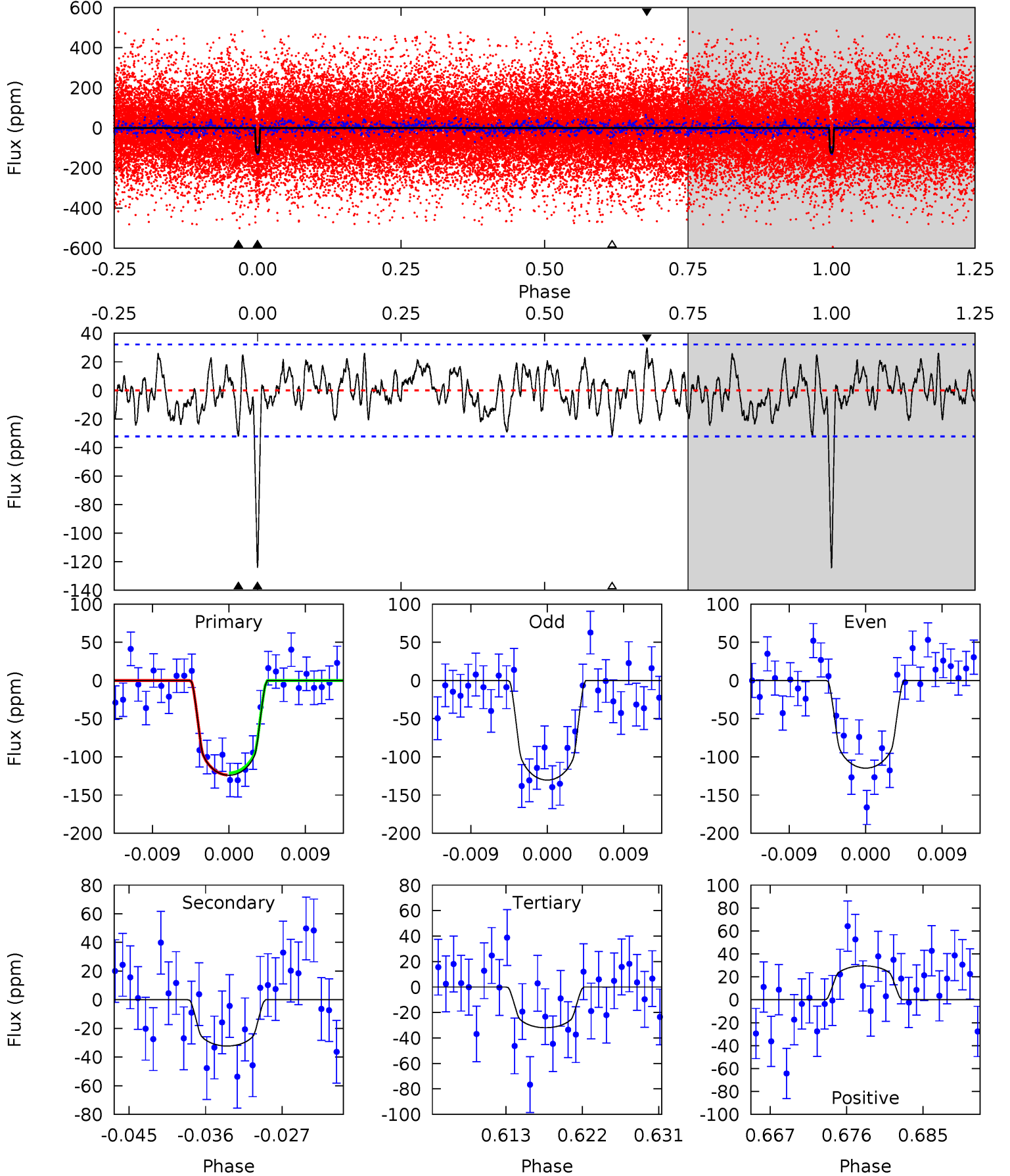
TCE 004164922-02 P= 18.257442 Days $T_0=134.438306$ (BKJD)



DV Model-Shift Uniqueness Test

004164922-02, P = 18.257431 Days, E = 116.182297 Days

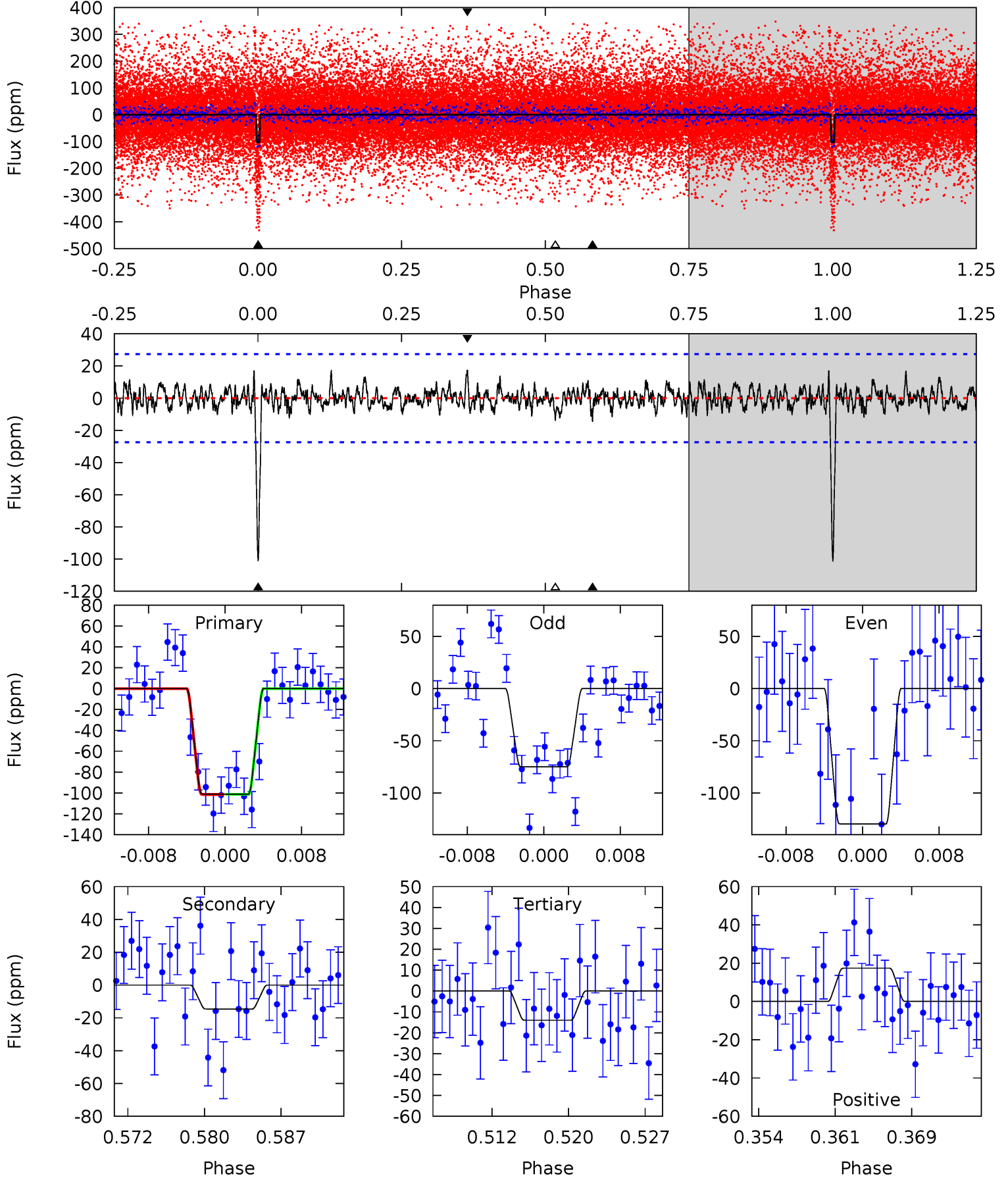
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.5	5.07	5.01	4.64	5.05	2.61	1.79	14.4	14.8	0.05	0.42	1.23	0.93	0.19	0.22



Alt Model-Shift Uniqueness Test

004164922-02, P = 18.257442 Days, E = 116.180864 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.8	2.71	2.60	3.23	5.08	2.67	0.89	16.2	15.6	0.12	-0.52	5.11	1.33	0.15	0.01



Stellar Parameters For KIC 004164922

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5014^{+100}_{-100}	$4.559^{+0.044}_{-0.032}$	$-0.100^{+0.150}_{-0.150}$	$0.756^{+0.039}_{-0.043}$	$0.756^{+0.051}_{-0.032}$	$2.461^{+0.446}_{-0.289}$
	+2%/-2%	+1%/-1%	+150%/-150%	+5%/-6%	+7%/-4%	+18%/-12%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 004164922-02 / KOI 3864.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-32 ± 6	$1.07^{+0.41}_{-0.41}$	763^{+18}_{-18}	3692^{+697}_{-404}	234^{+404}_{-117}
Alt.	-15 ± 5	$1.02^{+0.46}_{-0.41}$	763^{+18}_{-19}	3257^{+637}_{-343}	111^{+215}_{-60}

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

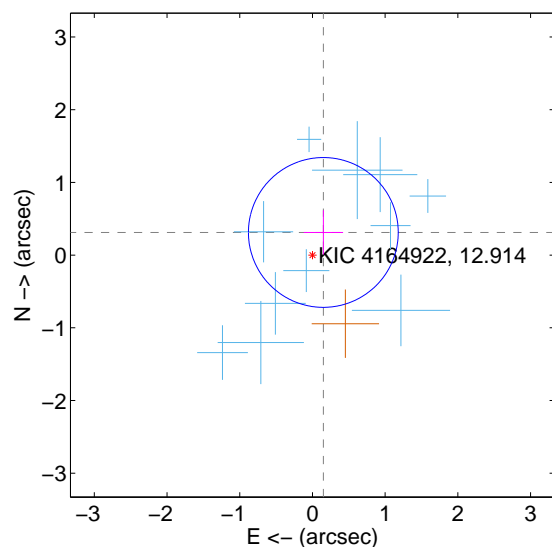
Supplemental centroid analysis for 004164922-02. Kepler magnitude: 12.91. Transit SNR 10.64

There are 11 quarters with good PRF difference image offsets

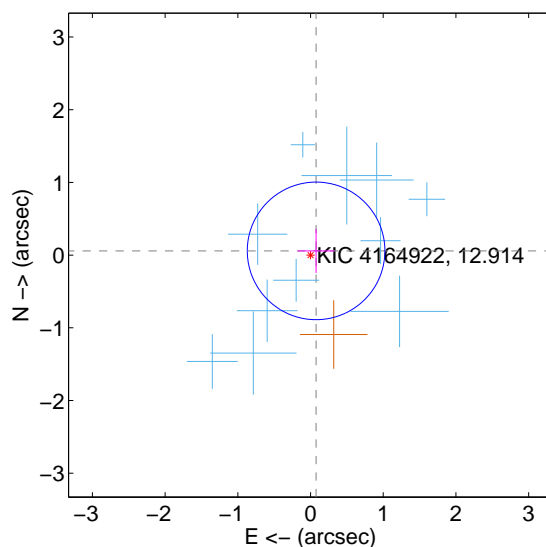
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.346 ± 0.343	1.01	-0.150 ± 0.271	0.311 ± 0.305
PRF-fit source offset from KIC position	0.096 ± 0.315	0.30	-0.077 ± 0.254	0.058 ± 0.302
photometric centroid source offset	0.86 ± 0.64	1.35	0.74 ± 0.64	0.44 ± 0.63

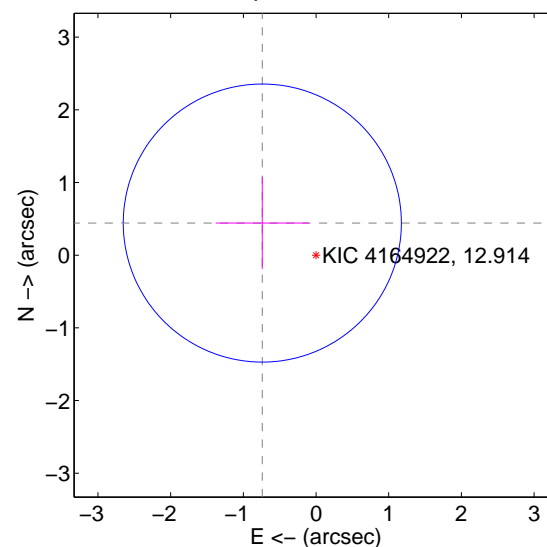
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

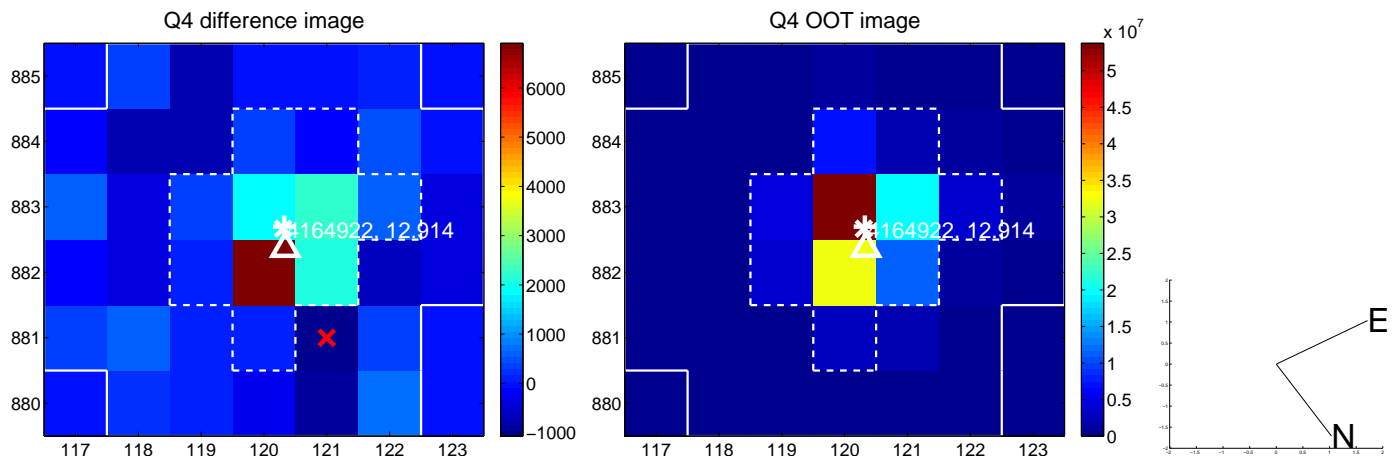
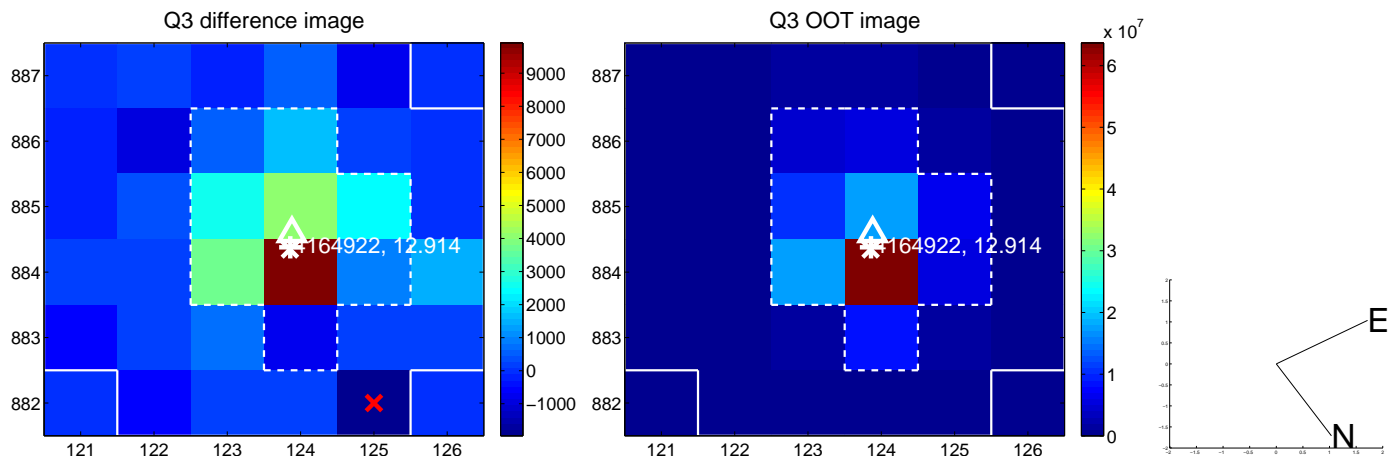
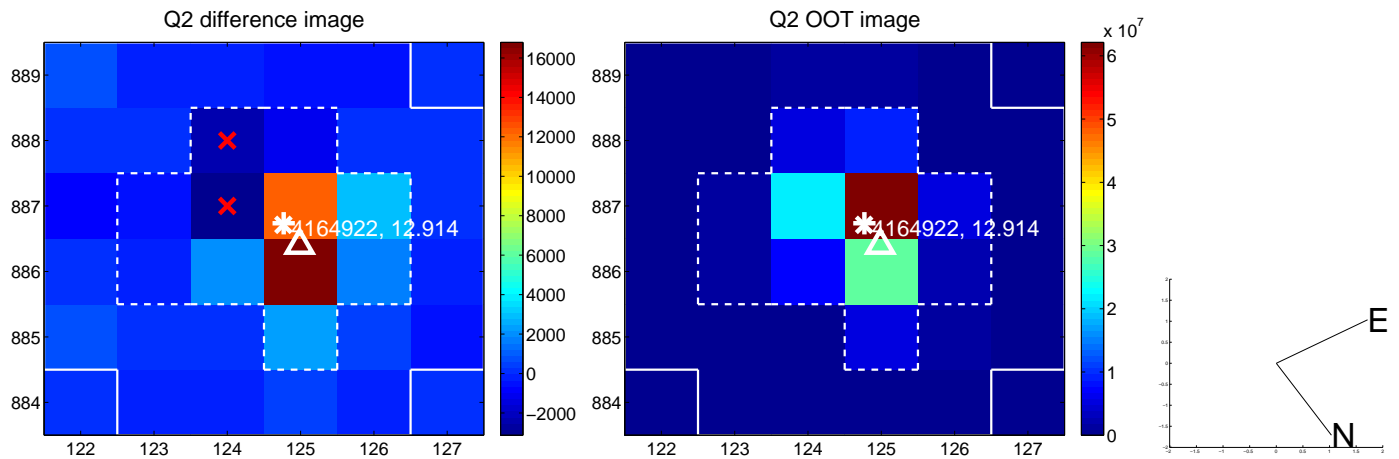
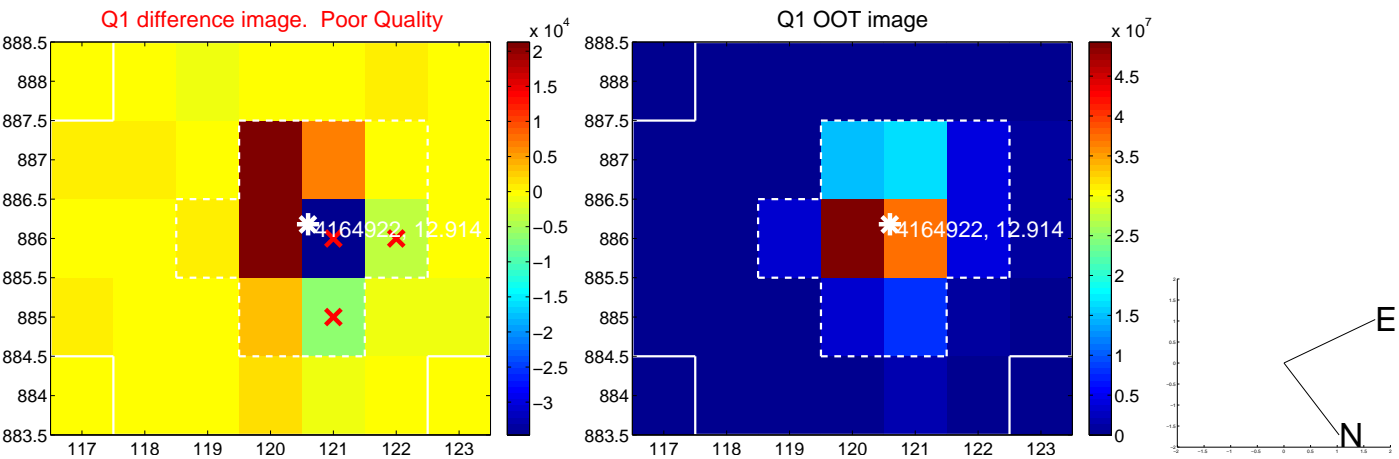


offset from photometric centroids

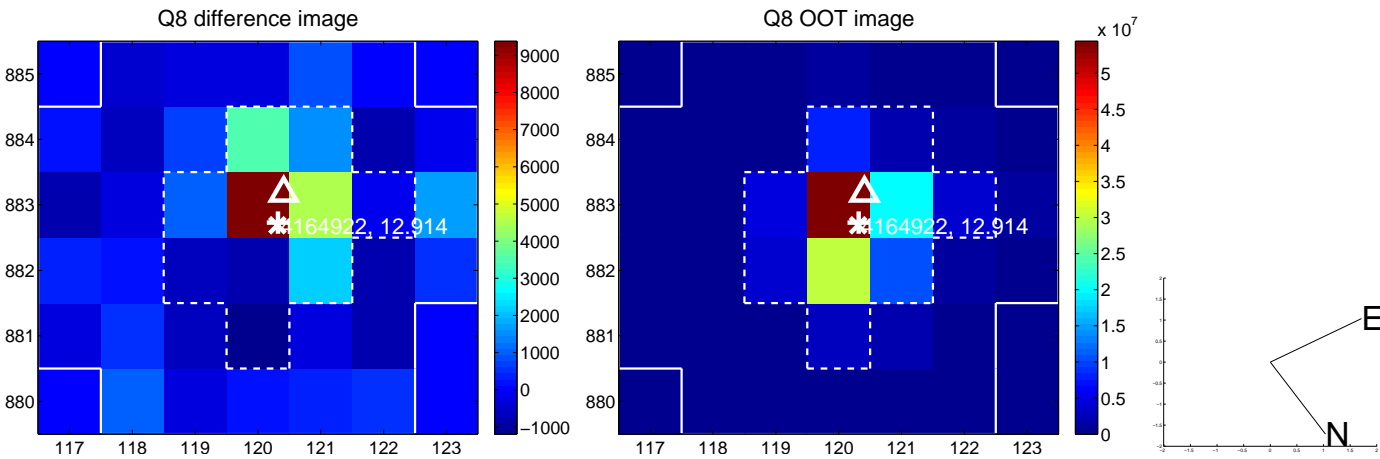
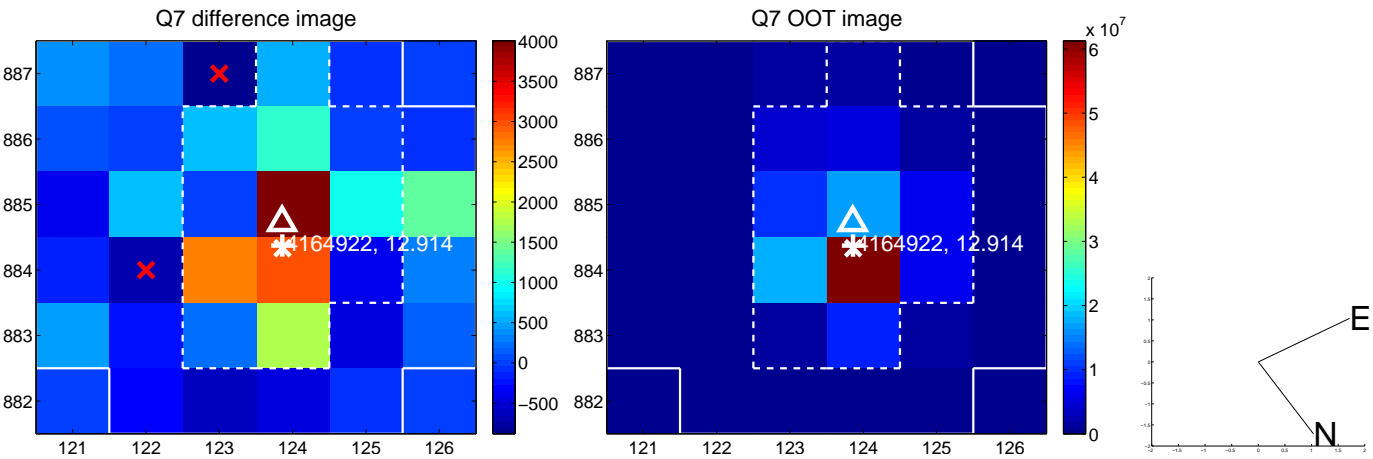
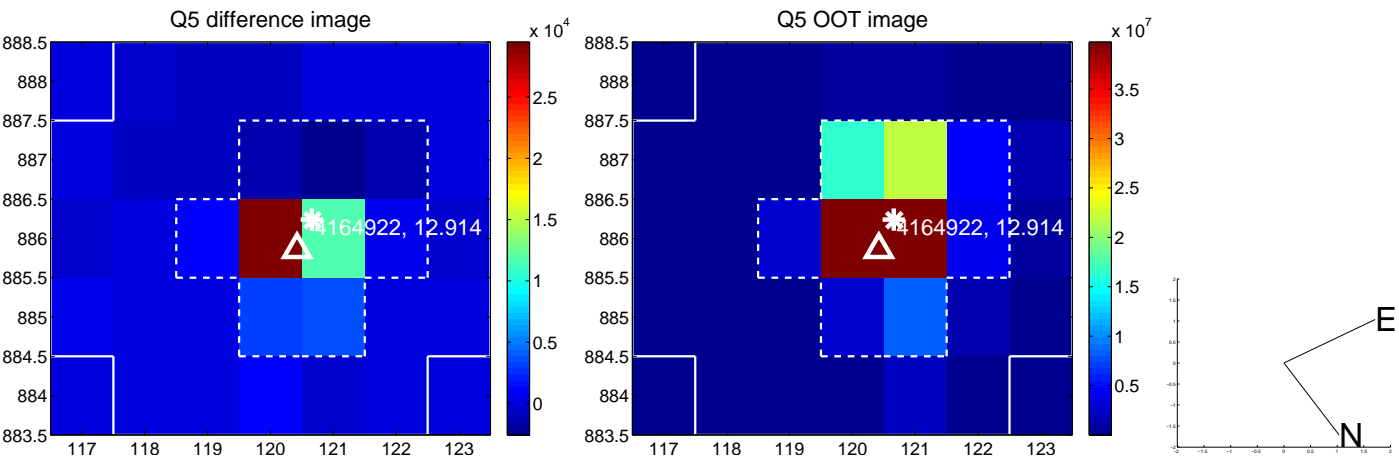


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

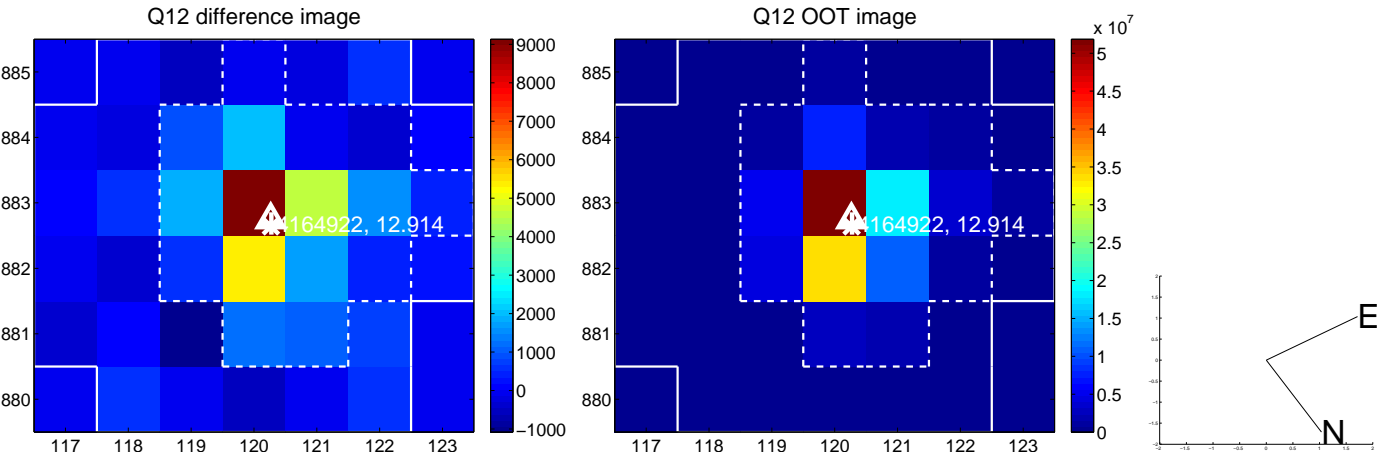
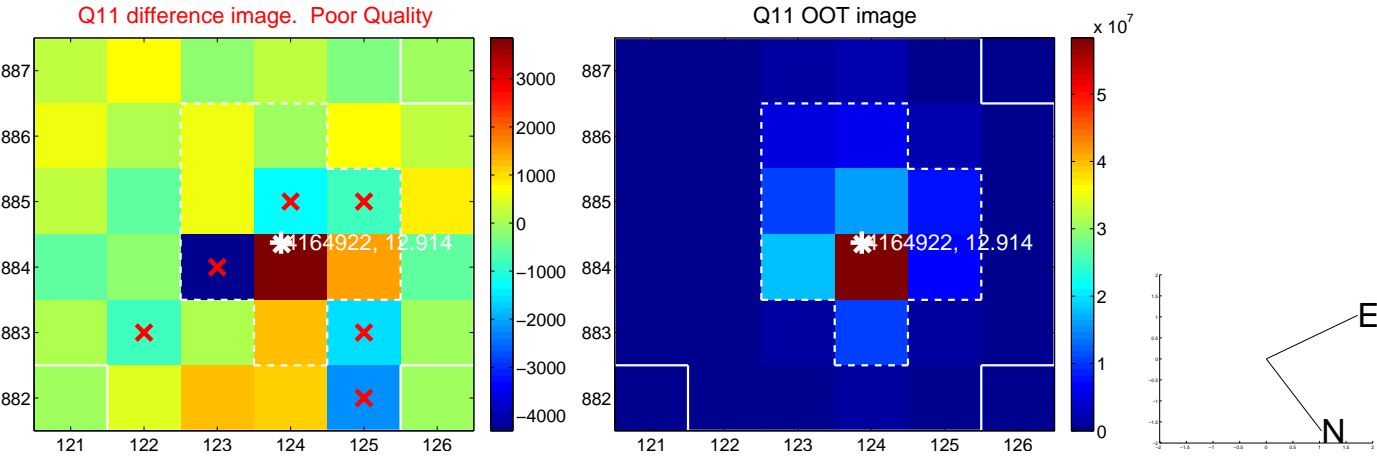
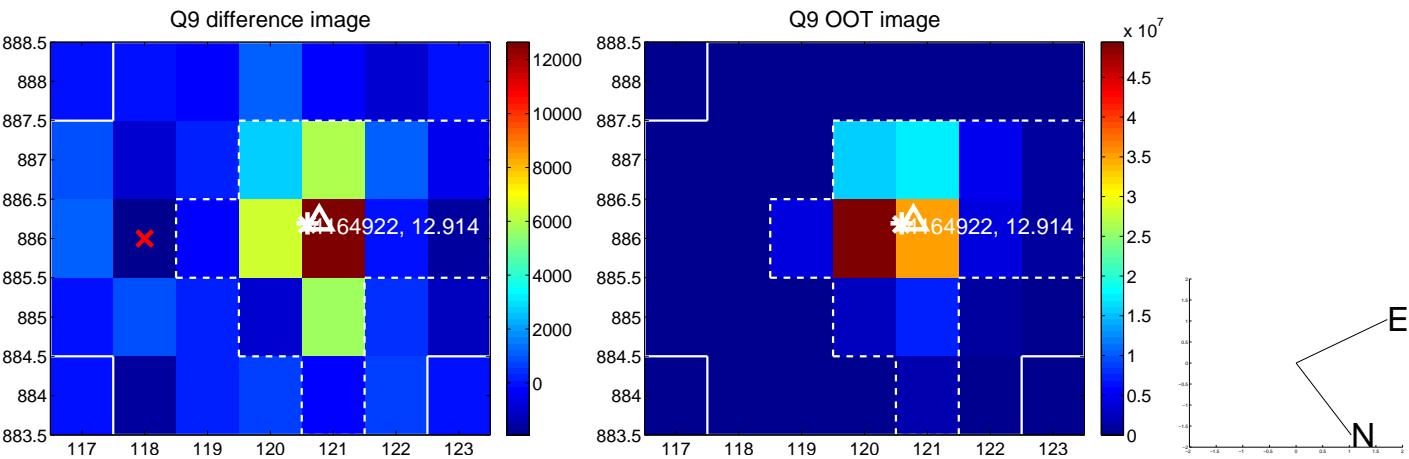
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



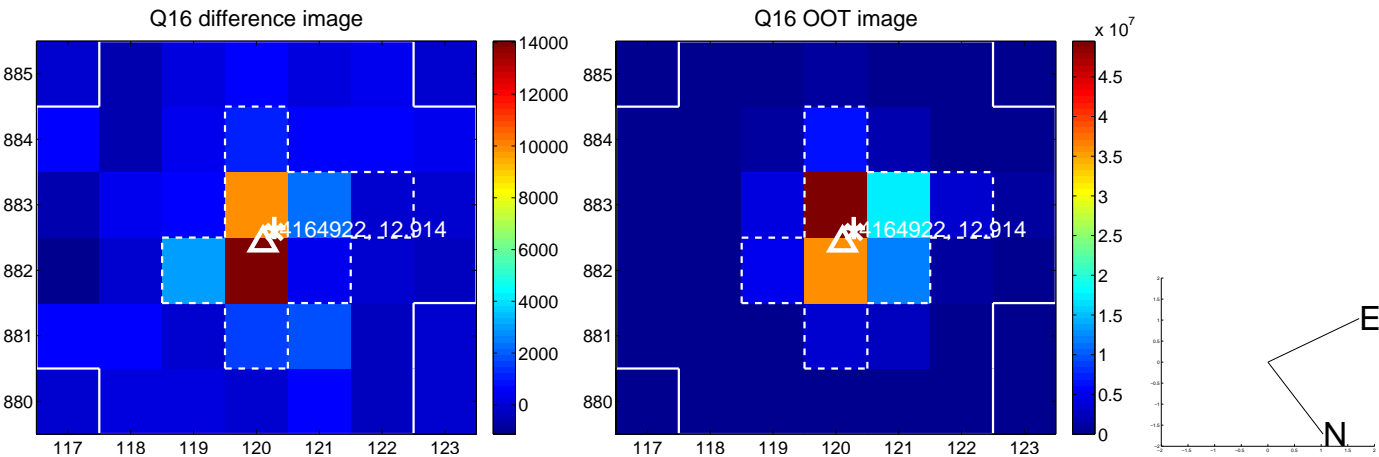
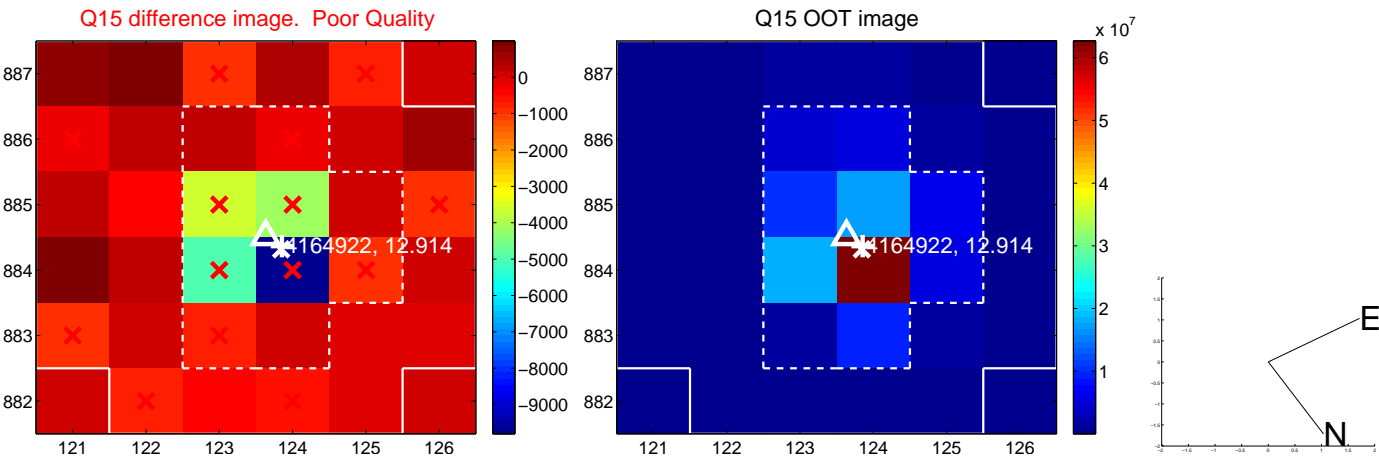
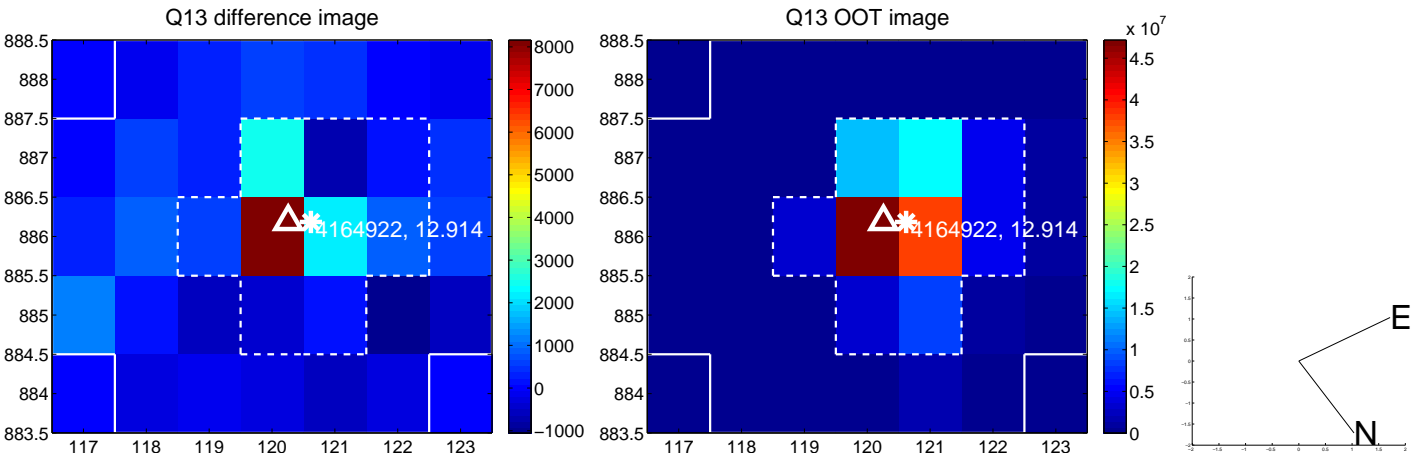
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



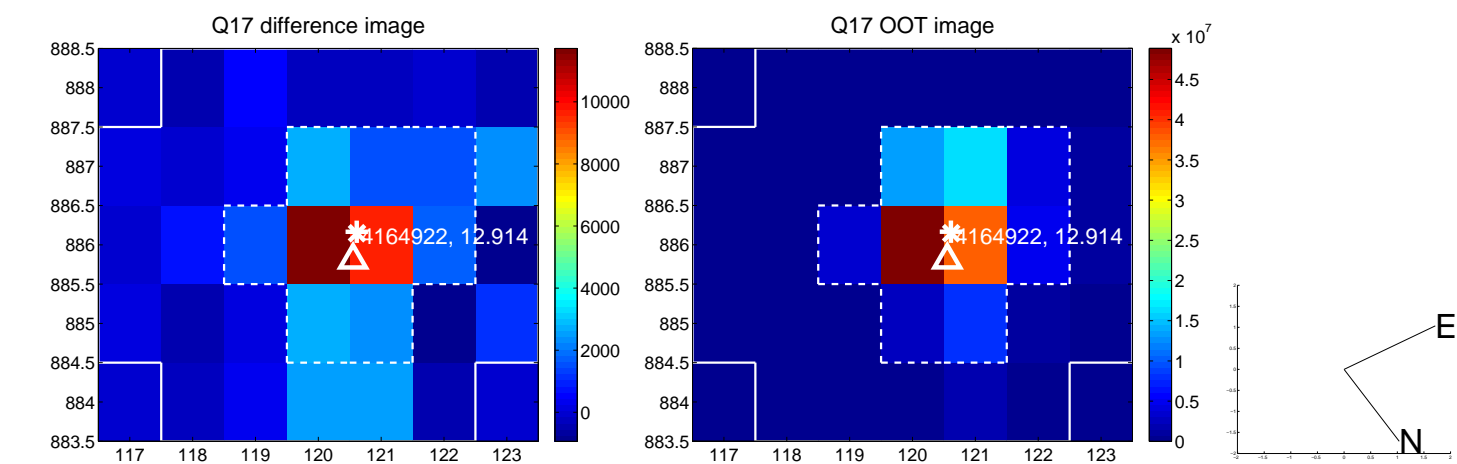
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



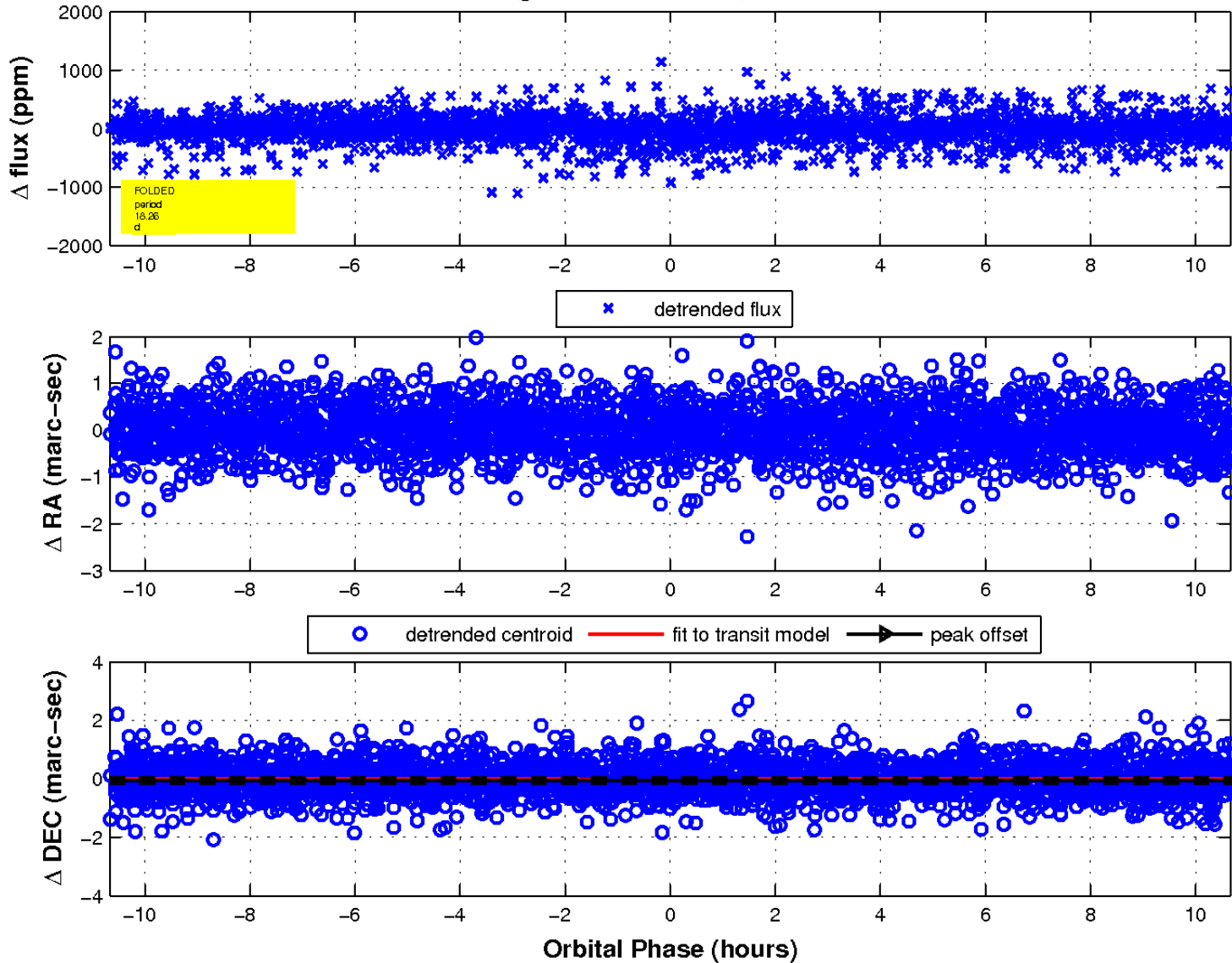
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

