

KIC 011904151

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})
011904151-01	OBS	0072.02	45.294268	138.677640	489.2	7.022	93.4	95.7	1.04	5676	2.50	17.79
011904151-02	OBS	0072.01	0.837484	131.579116	41.1	1.612	30.4	37.1	1.04	5676	0.80	3638.28

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011904151-01	OBS	PC	0.98	0	0	0	0	CENT_SATURATED
011904151-02	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED

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.

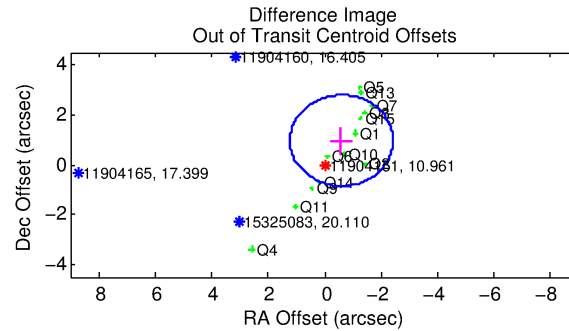
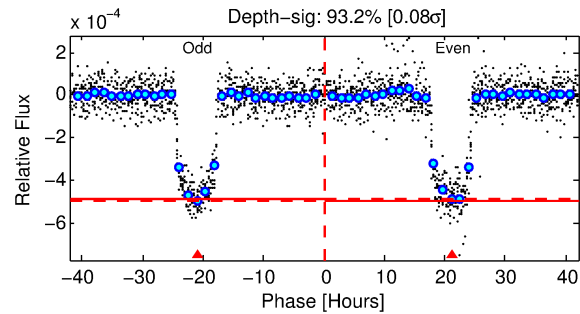
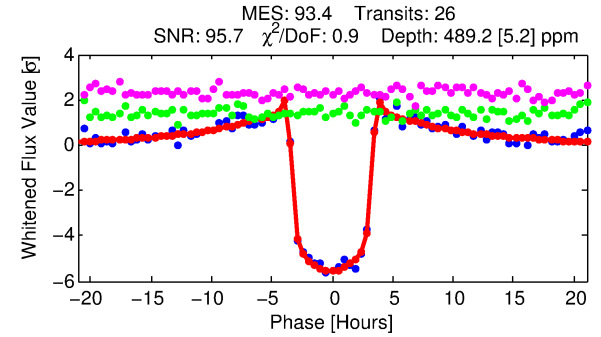
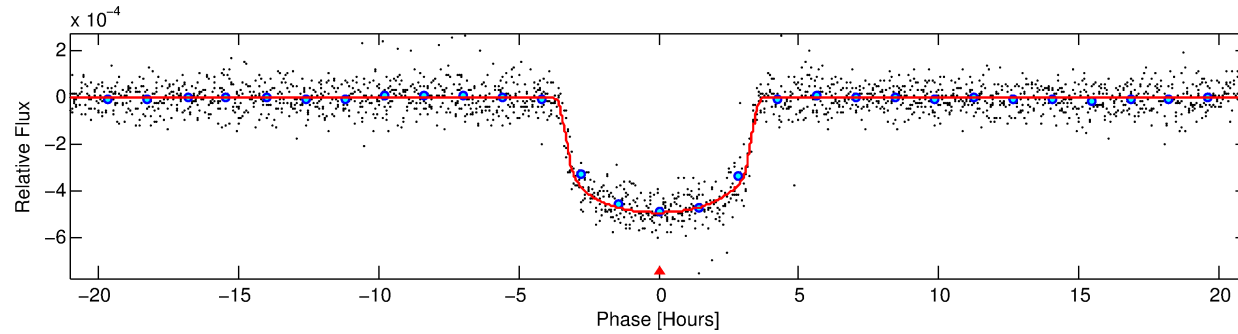
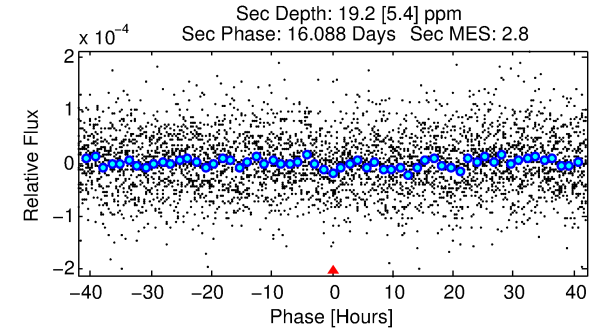
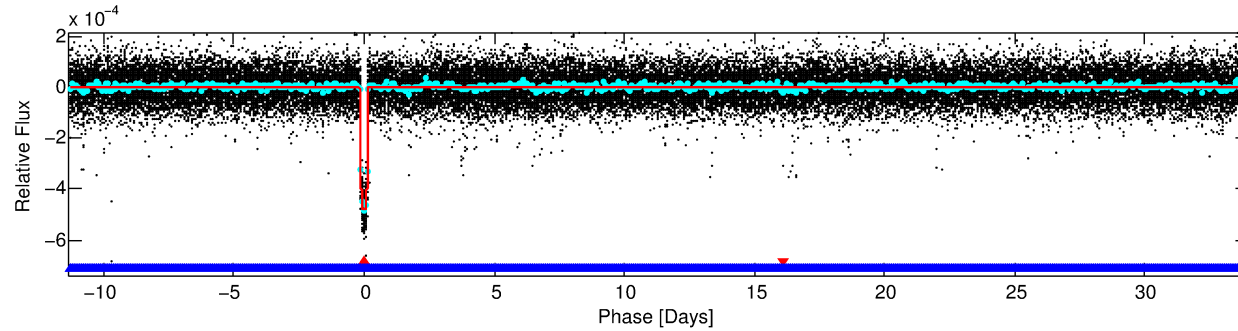
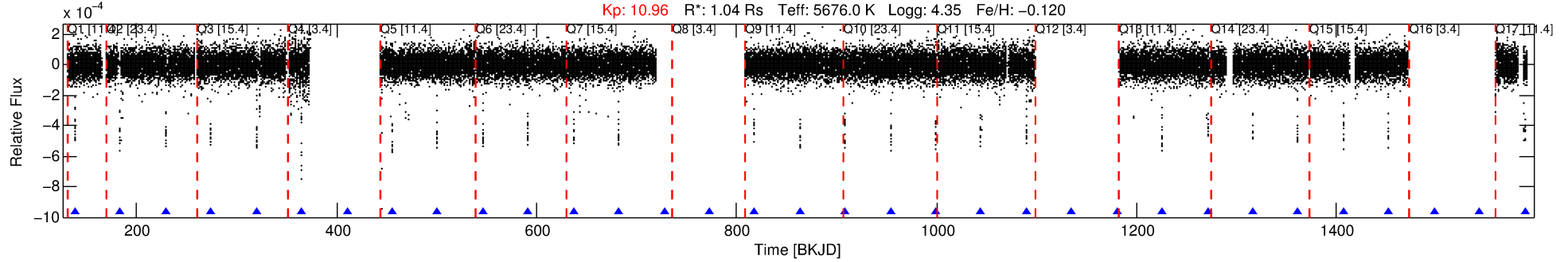
Ephemeris Match Information For 011904151-01

No Significant Match Found

DV One-Page Summary

KIC: 11904151 Candidate: 1 of 2 Period: 45.294 d
KOI: K00072.02 Name: Kepler-10c Corr: 0.990

Kp: 10.96 R*: 1.04 Rs Teff: 5676.0 K Logg: 4.35 Fe/H: -0.120



DV Fit Results:

Period = 45.29427 [0.00005] d
Epoch = 138.6776 [0.0010] BKJD
Rp/R* = 0.0219 [0.0009]
a/R* = 34.82 [6.45]
b = 0.74 [0.12]
Seff = 17.79 [1.49]
Teq = 524 [11] K
Rp = 2.50 [0.17] Re
a = 0.2387 [0.0103] AU
Ag = 96.75 [28.90] [3.31σ]
Teffp = 2539 [190] K [10.61σ]

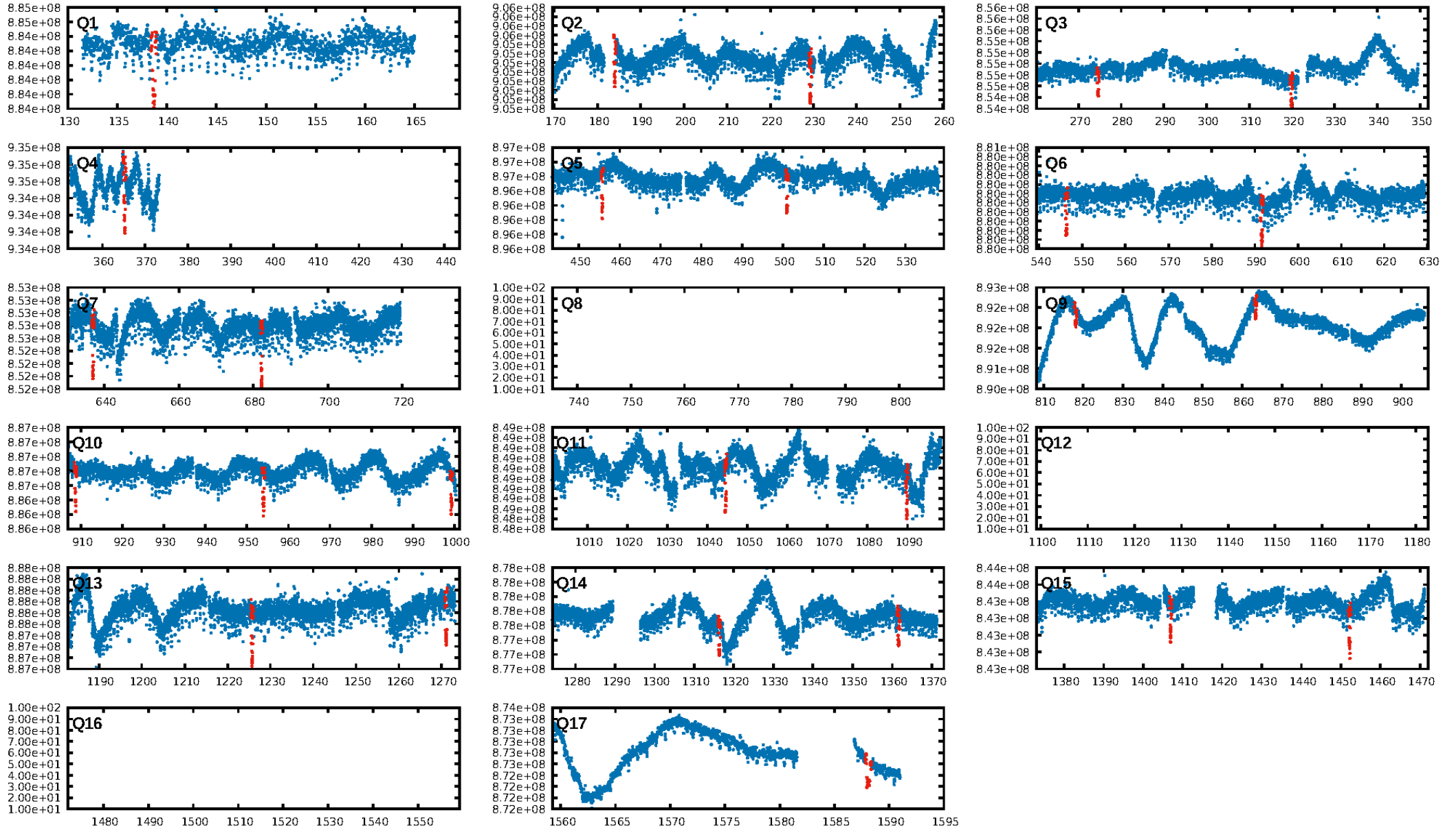
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [148.09σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 32.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [23/23]
GhostDiagnostic-chr: 12.26
Centroid-sig: 19.1%
Centroid-so: 0.376 arcsec [2.99σ]
OotOffset-rm: 1.135 arcsec [1.87σ]
KicOffset-rm: 1.654 arcsec [2.79σ]
OotOffset-st: 4/4/1/4 [13]
KicOffset-st: 4/4/1/4 [13]
DiffImageQuality-fgm: 0.92 [12/13]
DiffImageOverlap-fno: 0.00 [0/13]

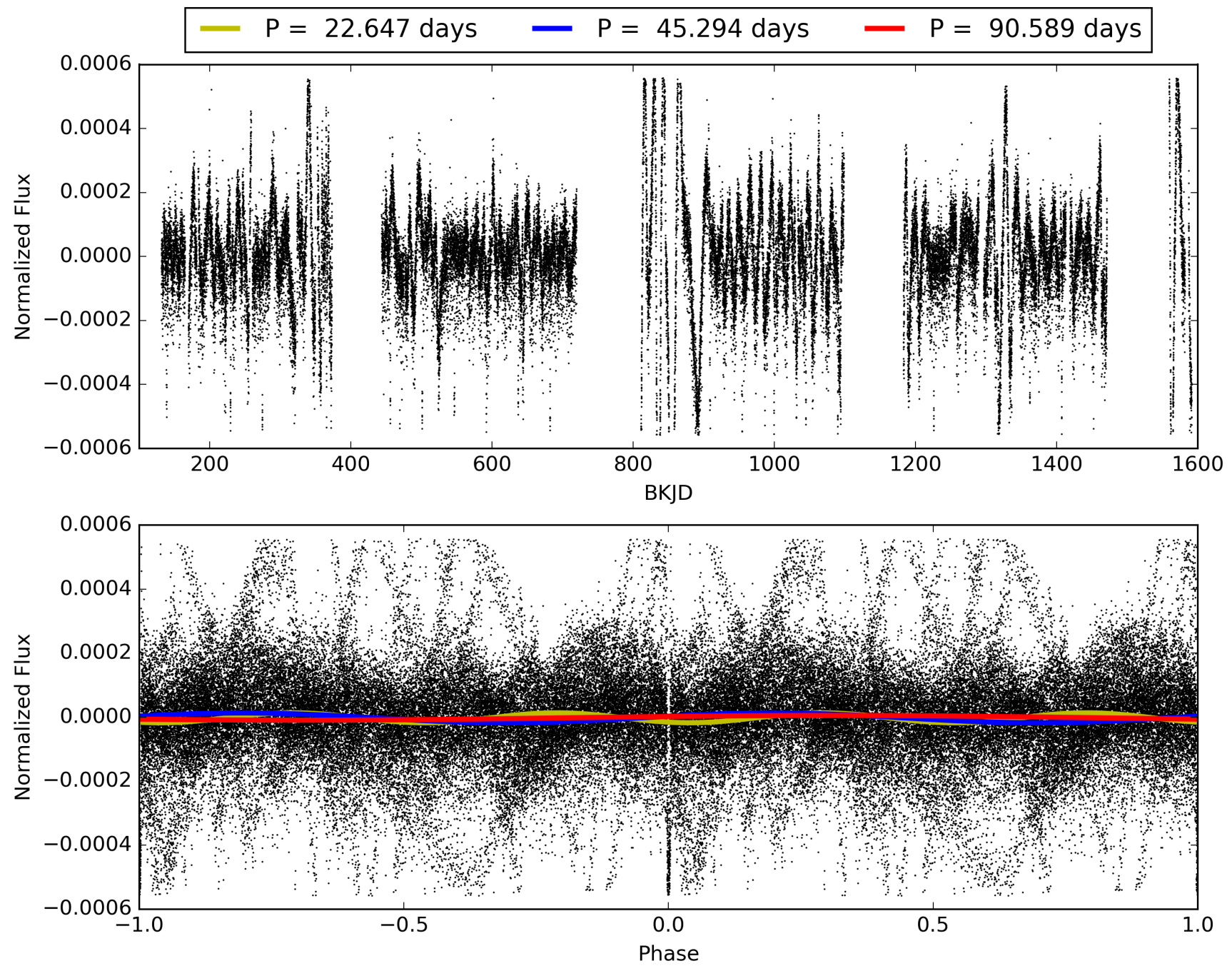
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:15:56 Z

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

TCE 011904151-01, PDC Light Curves

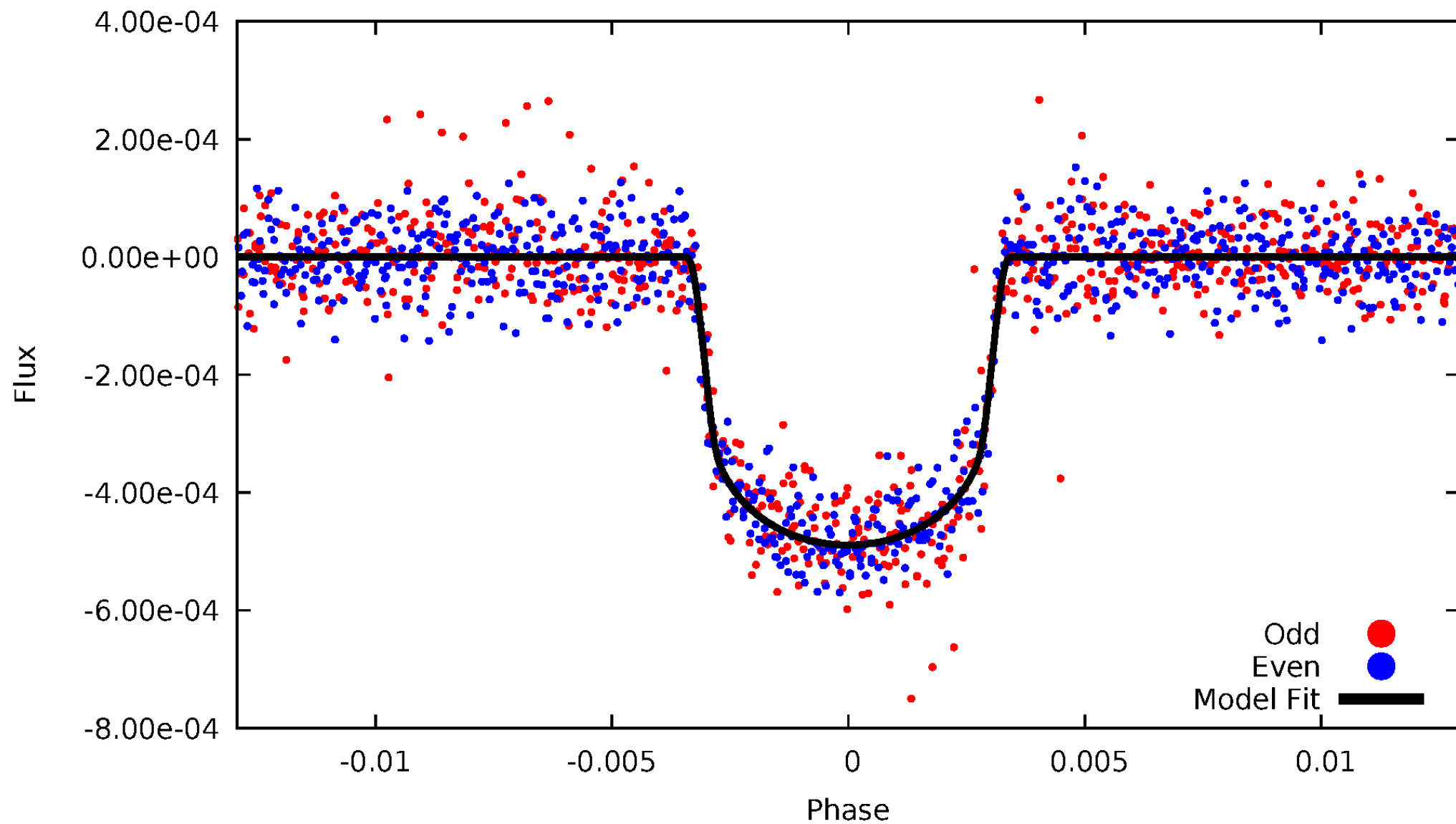


TCE 011904151-01



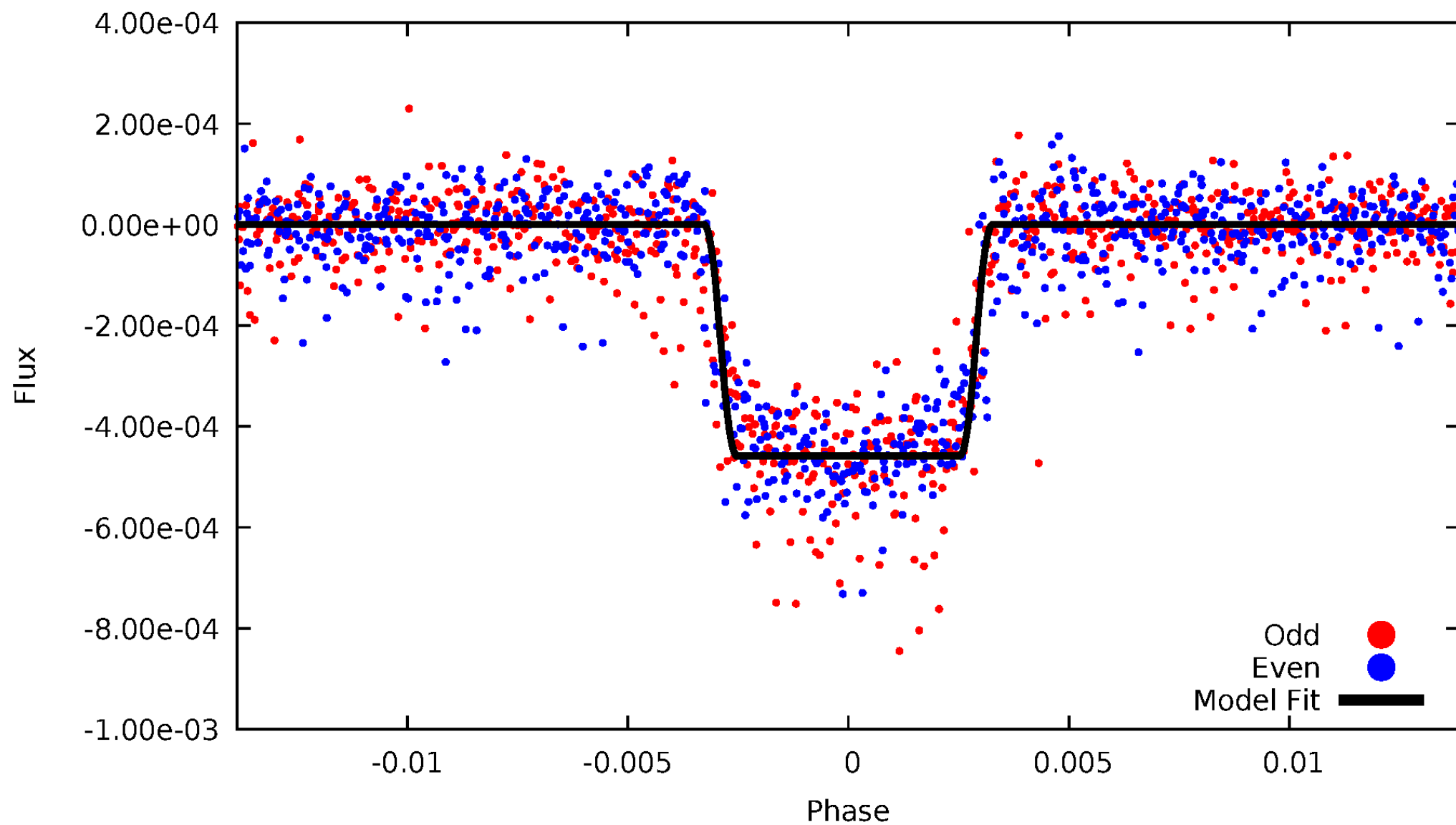
DV Odd/Even

TCE 011904151-01

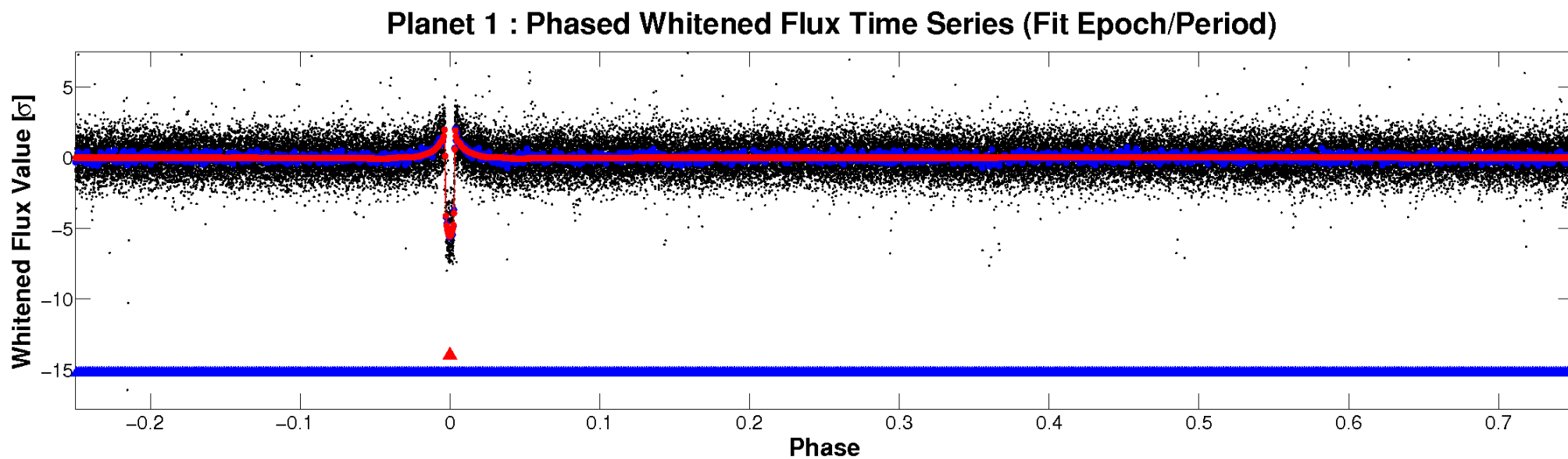
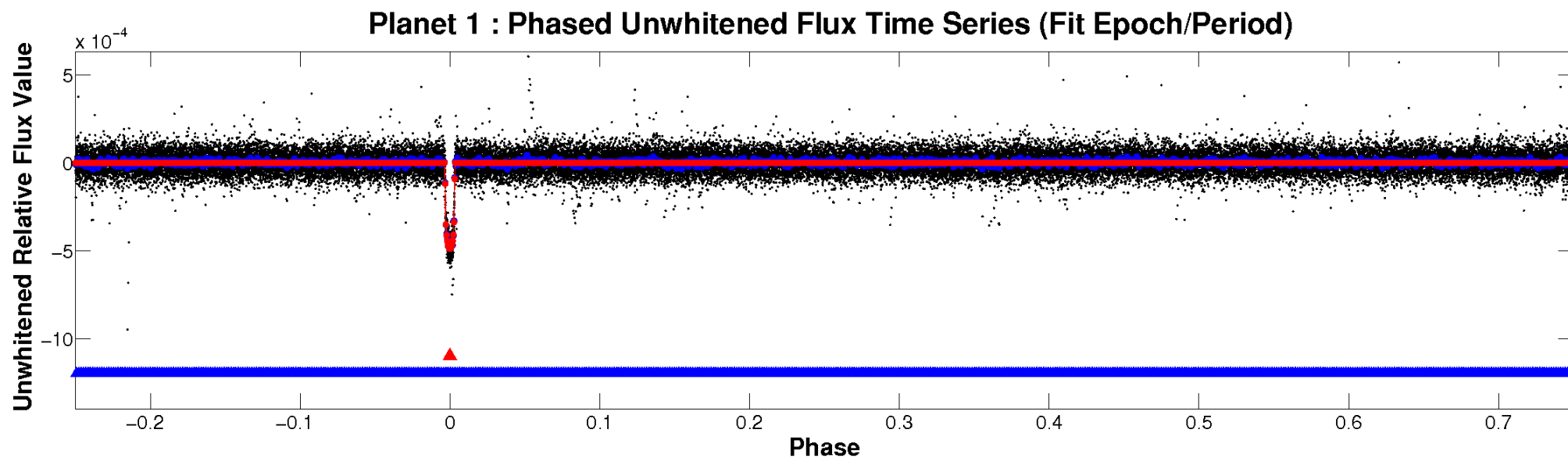


ALT Odd/Even

TCE 011904151-01

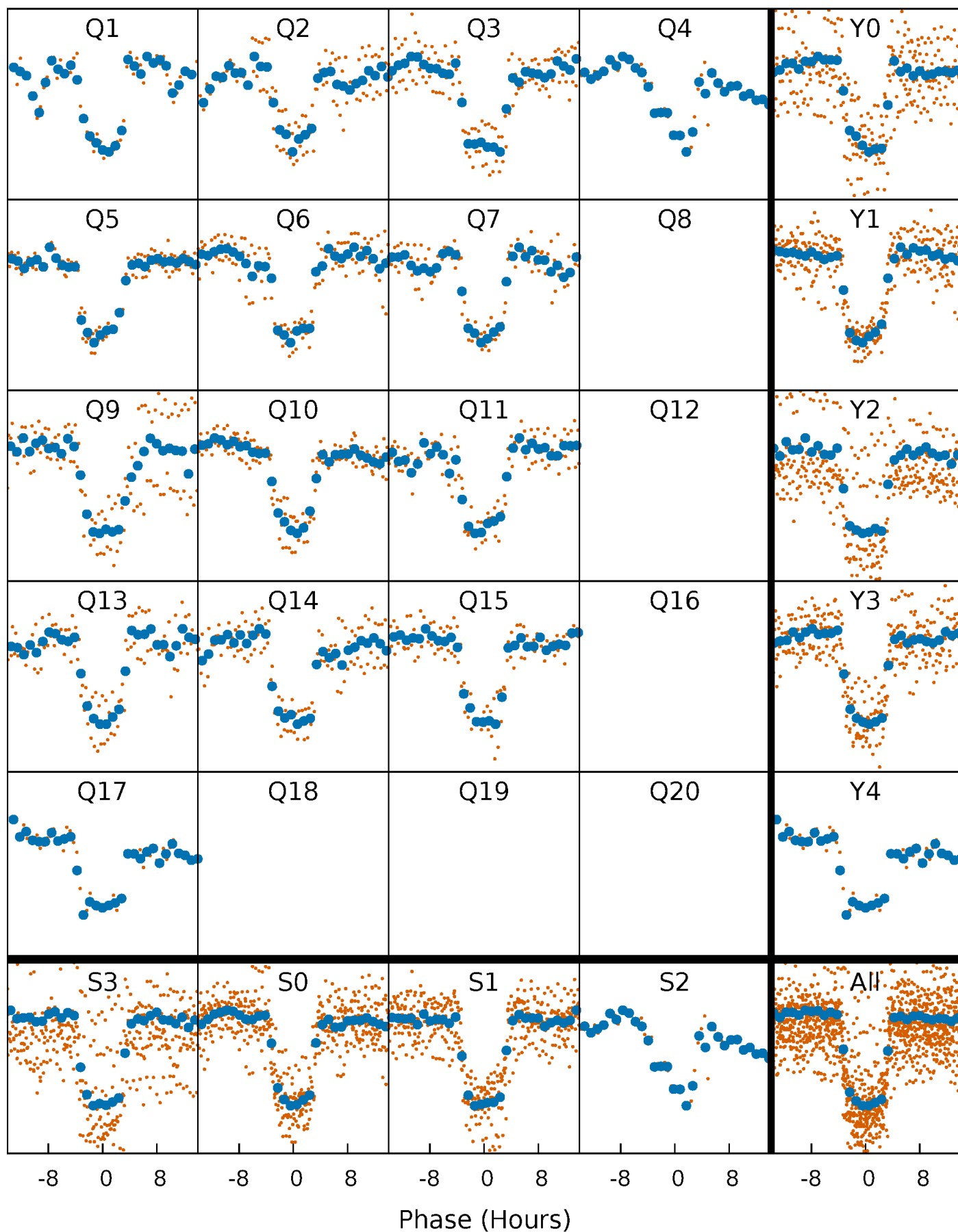


Non-Whitened Vs. Whitened Light Curve



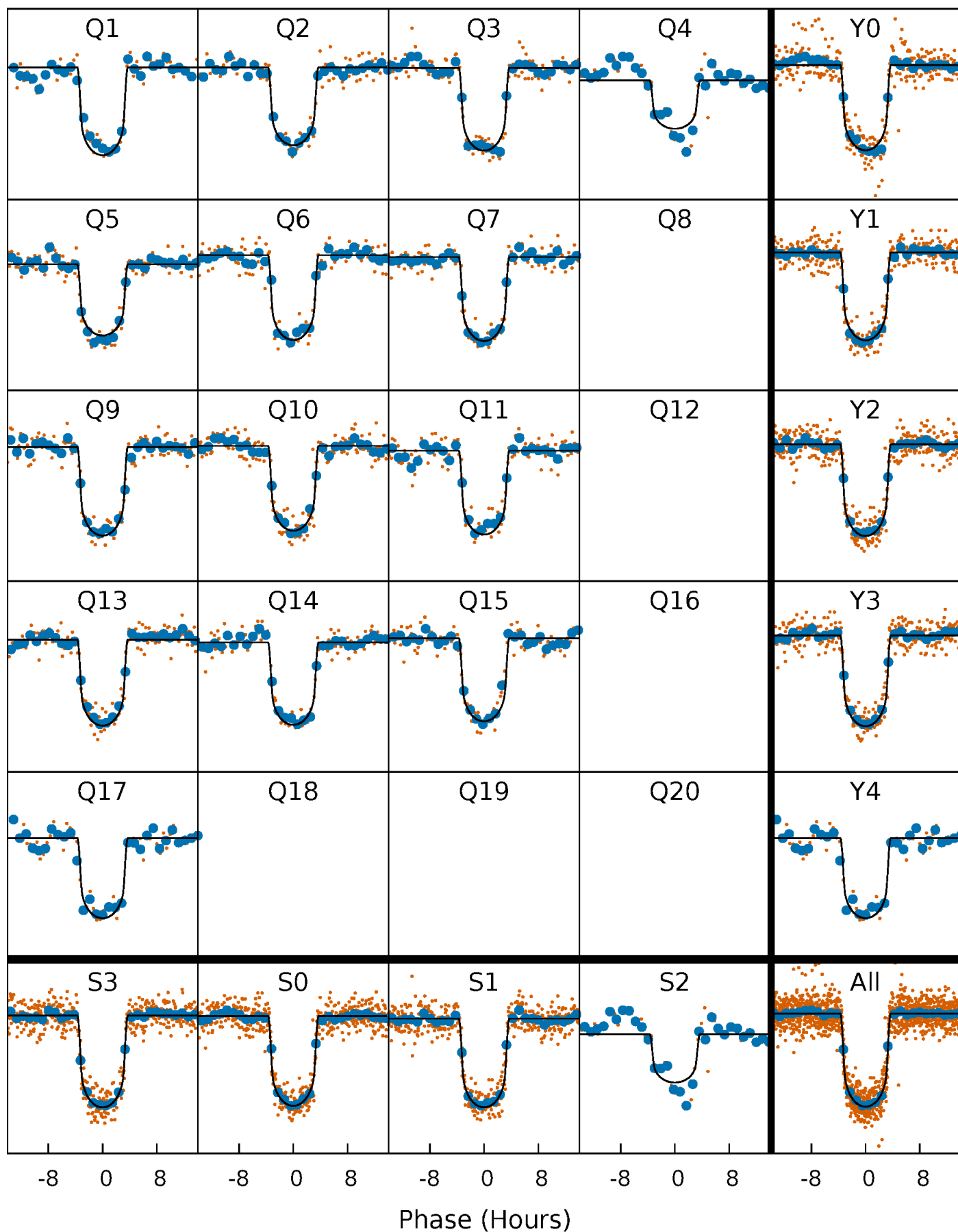
PDC Quarter-Phased Transit Curves

TCE 011904151-01 P= 45.294268 Days $T_0=138.677640$ (BKJD)



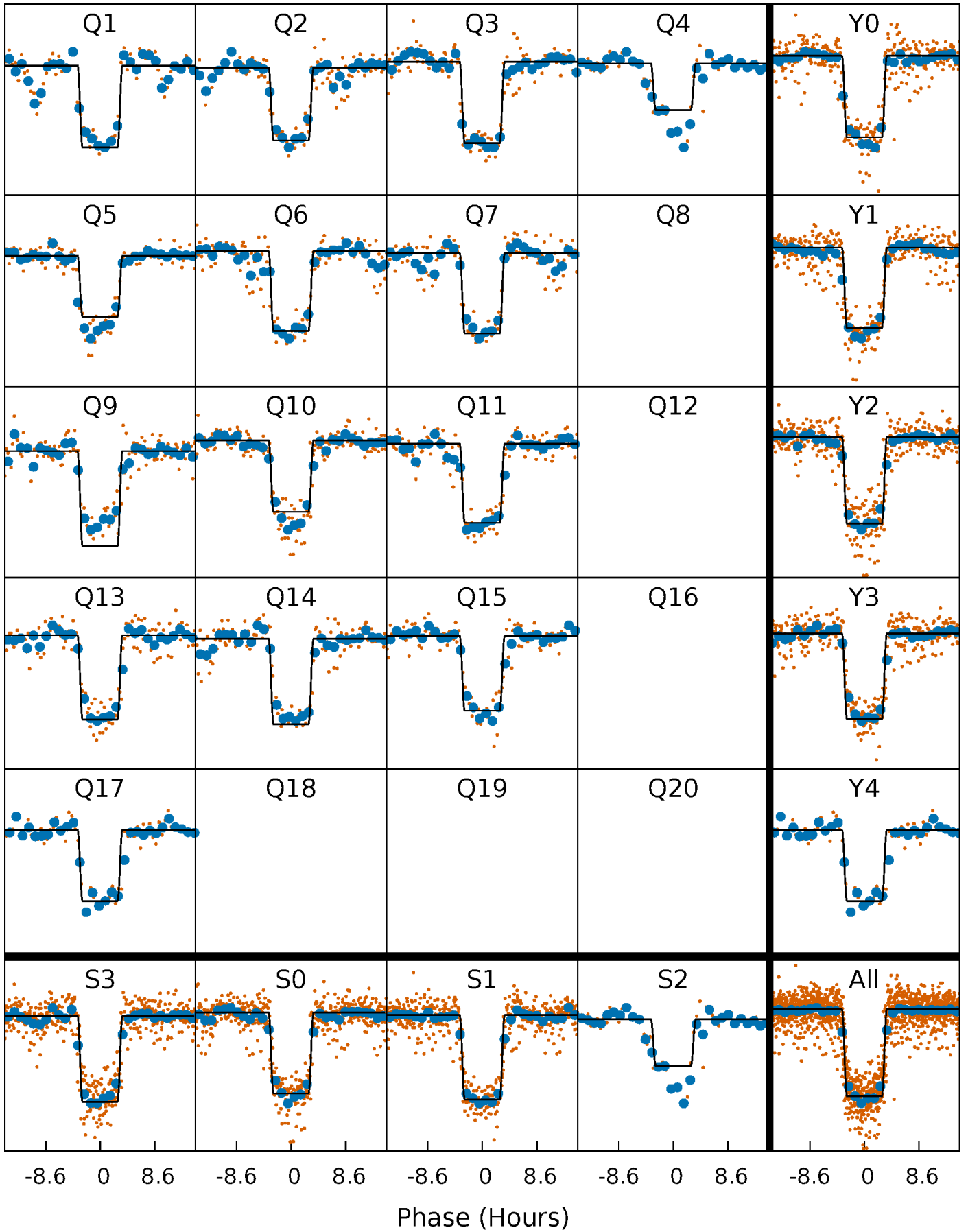
DV Quarter-Phased Transit Curves

TCE 011904151-01 P= 45.294268 Days $T_0=138.677640$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

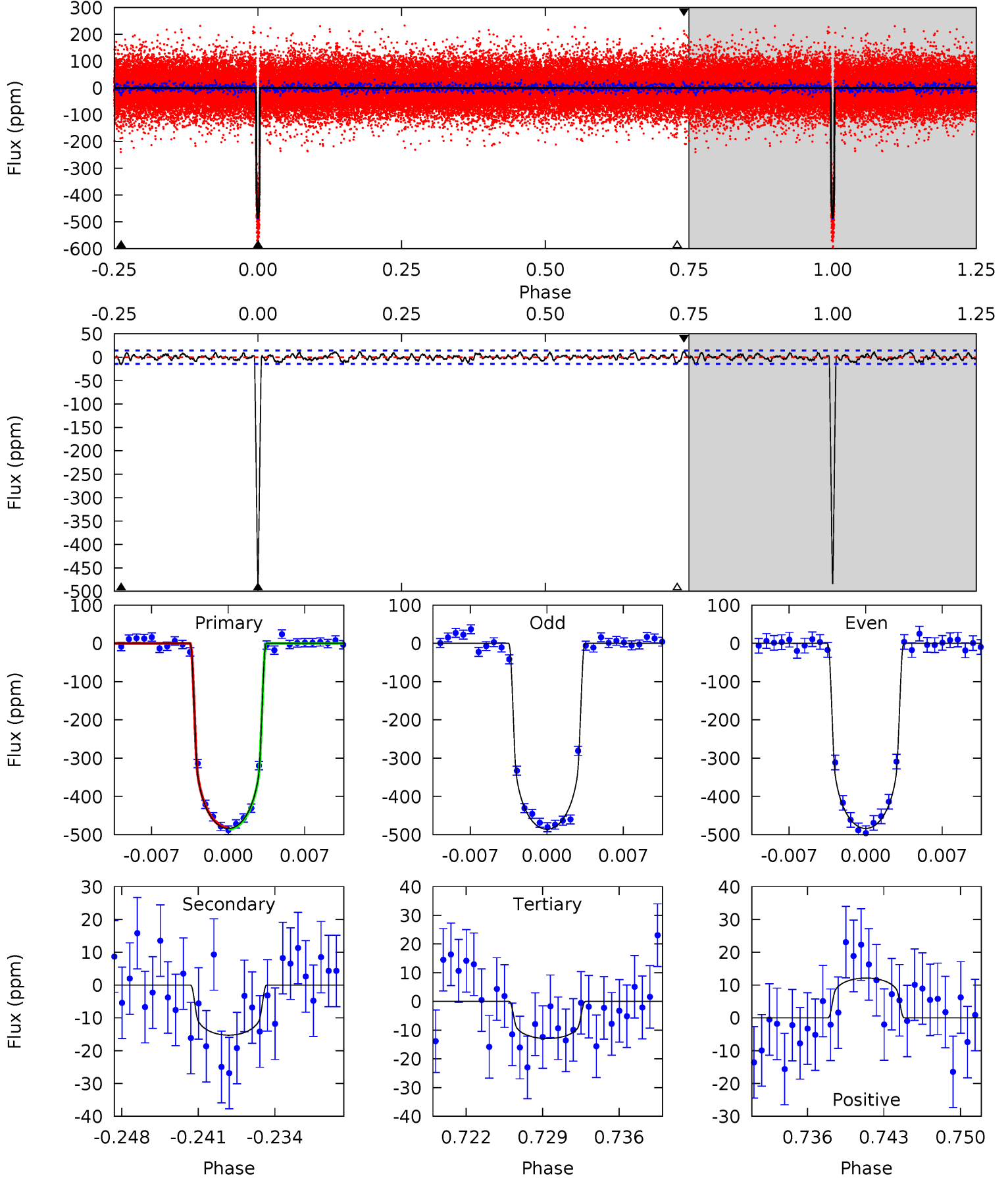
TCE 011904151-01 P= 45.293452 Days $T_0=138.689494$ (BKJD)



DV Model-Shift Uniqueness Test

011904151-01, P = 45.294268 Days, E = 93.383372 Days

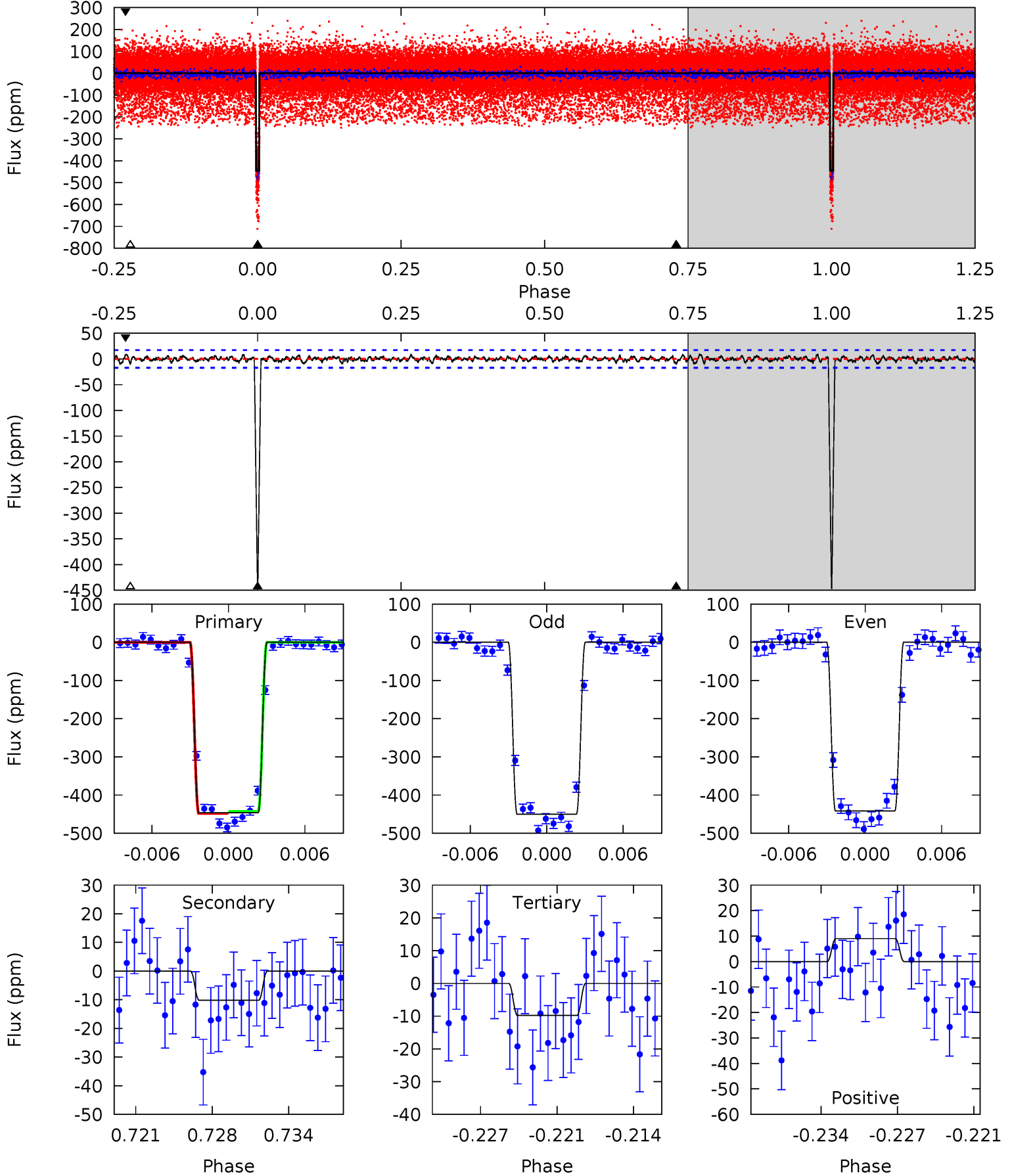
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
173.1	5.46	4.62	4.34	5.10	2.70	1.60	168.5	168.7	0.84	1.12	0.35	1.00	0.02	0.71



Alt Model-Shift Uniqueness Test

011904151-01, P = 45.293452 Days, E = 93.396042 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
131.8	3.01	2.89	2.66	5.11	2.72	0.91	128.9	129.2	0.12	0.35	1.26	1.01	0.02	0.80



Stellar Parameters For KIC 011904151

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5676^{+85}_{-68}	$4.347^{+0.030}_{-0.030}$	$-0.120^{+0.150}_{-0.150}$	$1.044^{+0.057}_{-0.042}$	$0.884^{+0.069}_{-0.042}$	$1.095^{+0.120}_{-0.119}$
	+1%/-1%	+1%/-1%	+125%/-125%	+5%/-4%	+8%/-5%	+11%/-11%
Source	SPE72	AST69	SPE72	DSEP		

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

Secondary Eclipse Parameters for KIC 011904151-01 / KOI 0072.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-15 ± 3	$2.51^{+0.13}_{-0.14}$	733^{+13}_{-12}	3048^{+88}_{-99}	77^{+16}_{-15}
Alt.	-10 ± 3	$2.45^{+0.13}_{-0.14}$	733^{+12}_{-13}	2898^{+132}_{-164}	53^{+20}_{-18}

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 $A_{obs} \gg 1.0$

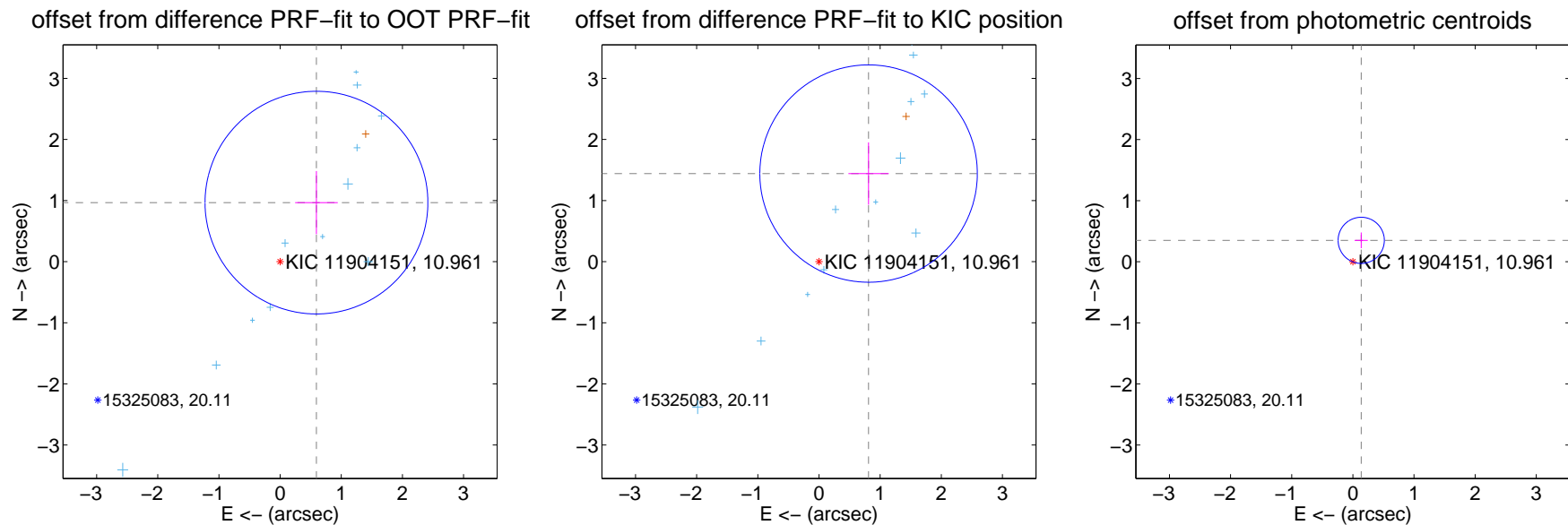
DV Centroid Data

Supplemental centroid analysis for 011904151-01. **Kepler magnitude: 10.96.** Transit SNR 95.69

There are 12 quarters with good PRF difference image offsets

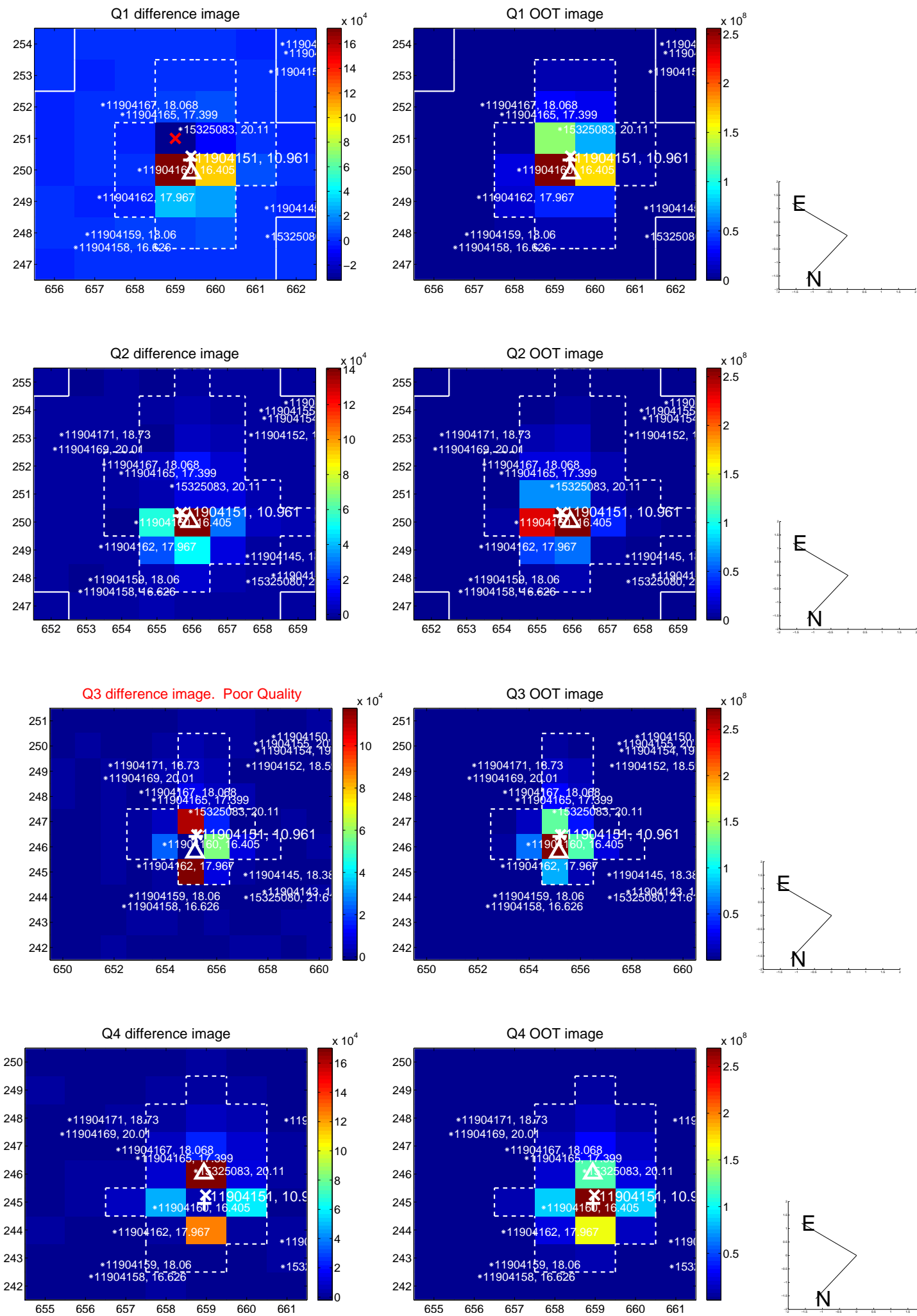
The direct PRF centroid is offset from the target star catalog position by about 0.79 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.135 ± 0.607	1.87	-0.594 ± 0.348	0.967 ± 0.517
PRF-fit source offset from KIC position	1.654 ± 0.593	2.79	-0.811 ± 0.330	1.442 ± 0.510
photometric centroid source offset	0.38 ± 0.13	2.99	-0.14 ± 0.11	0.35 ± 0.13

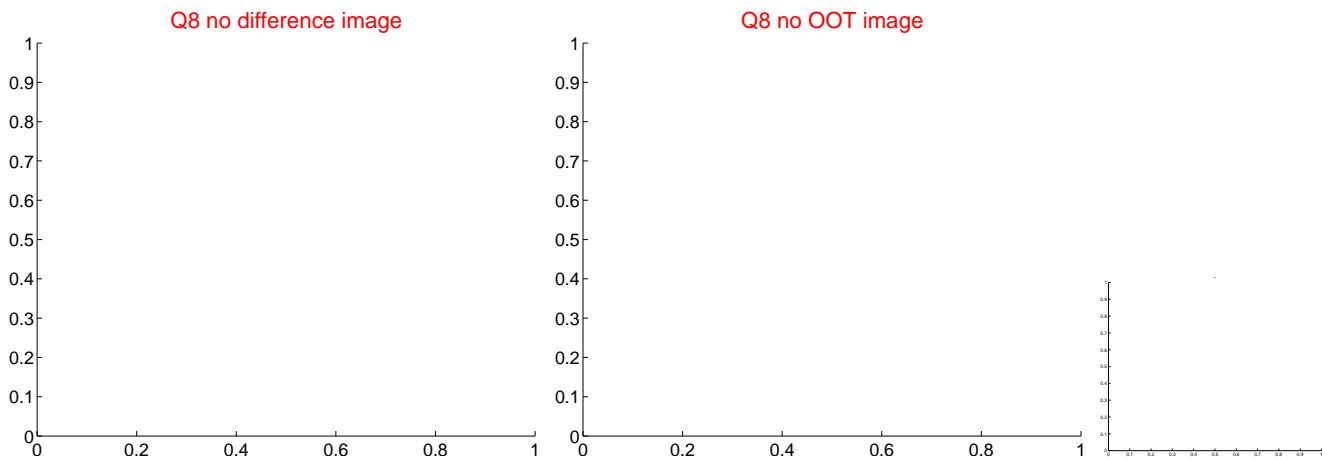
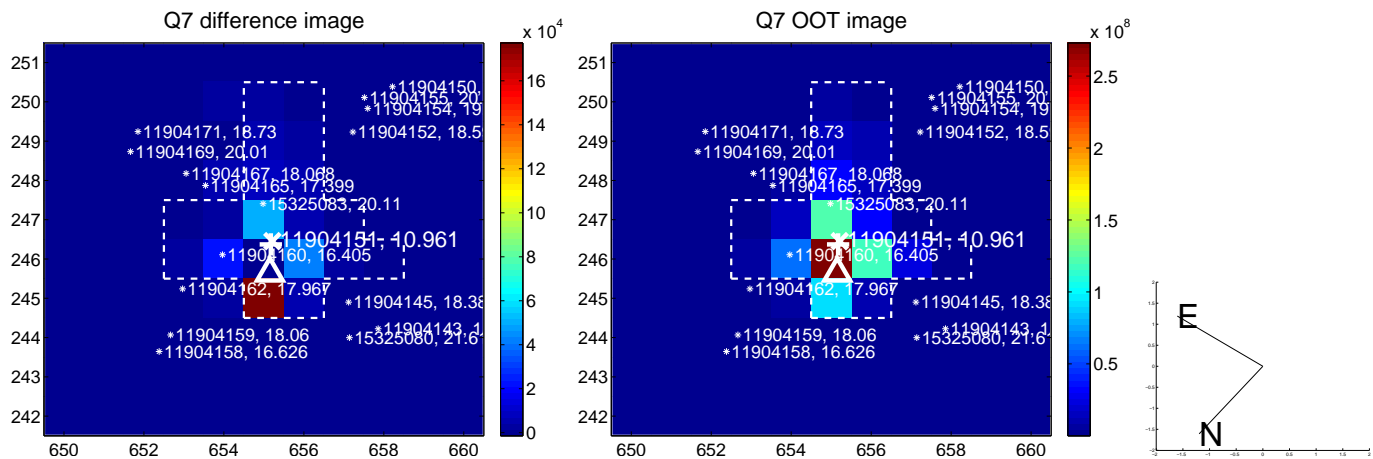
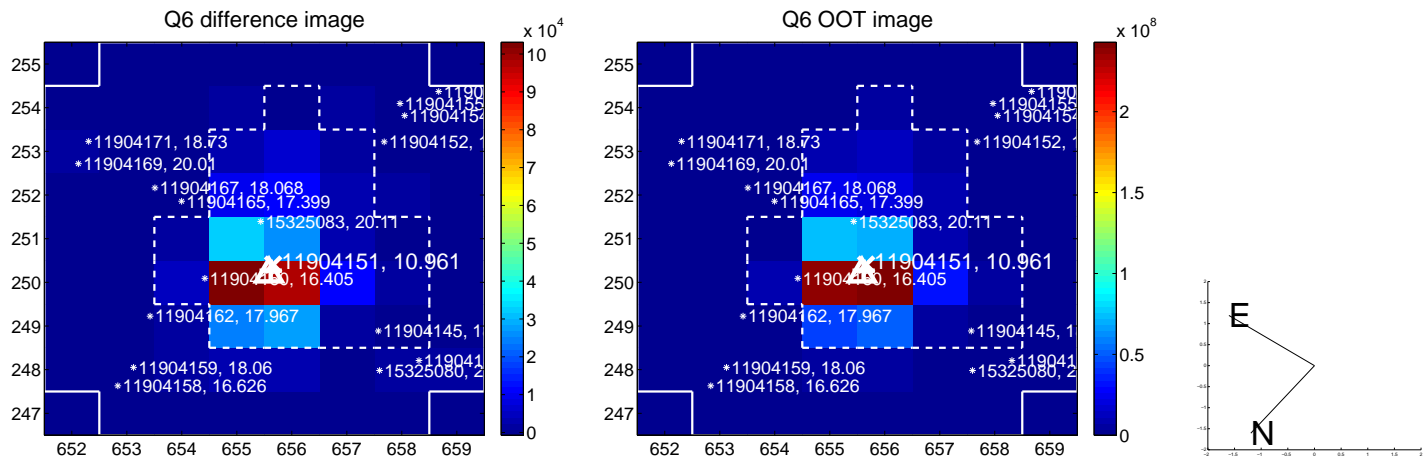
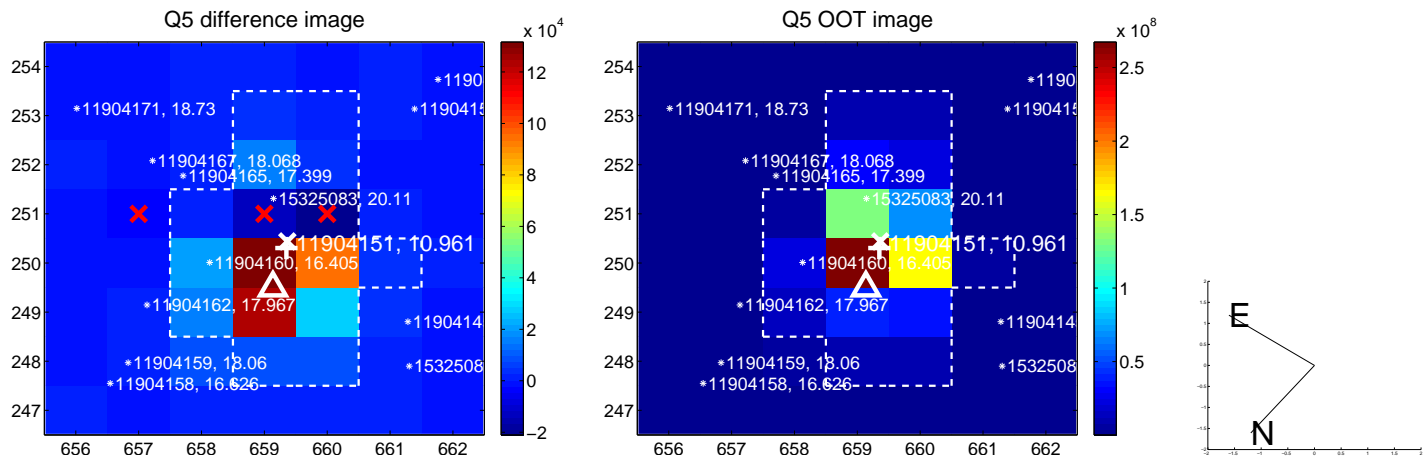


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

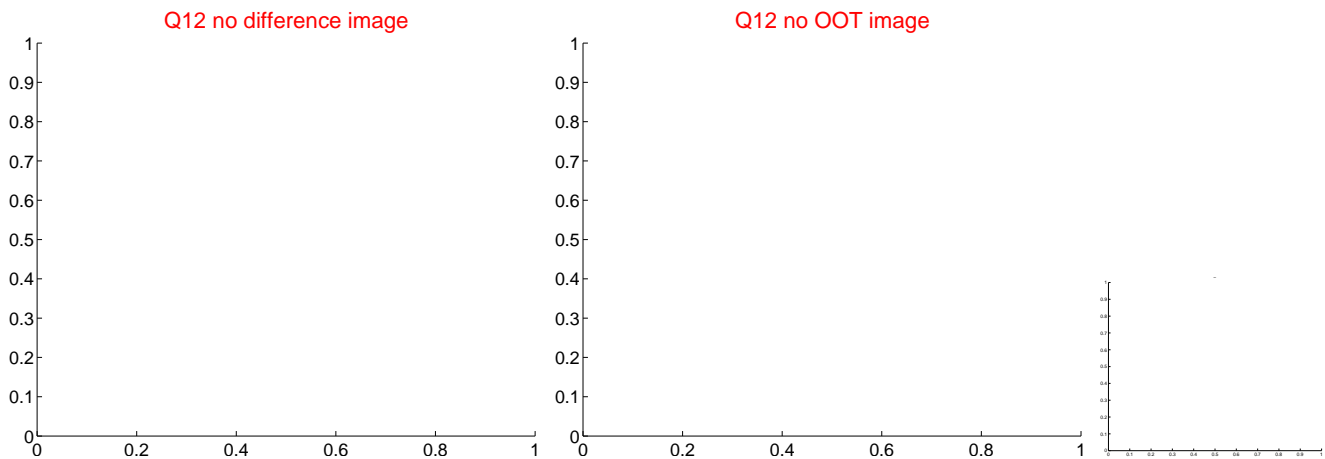
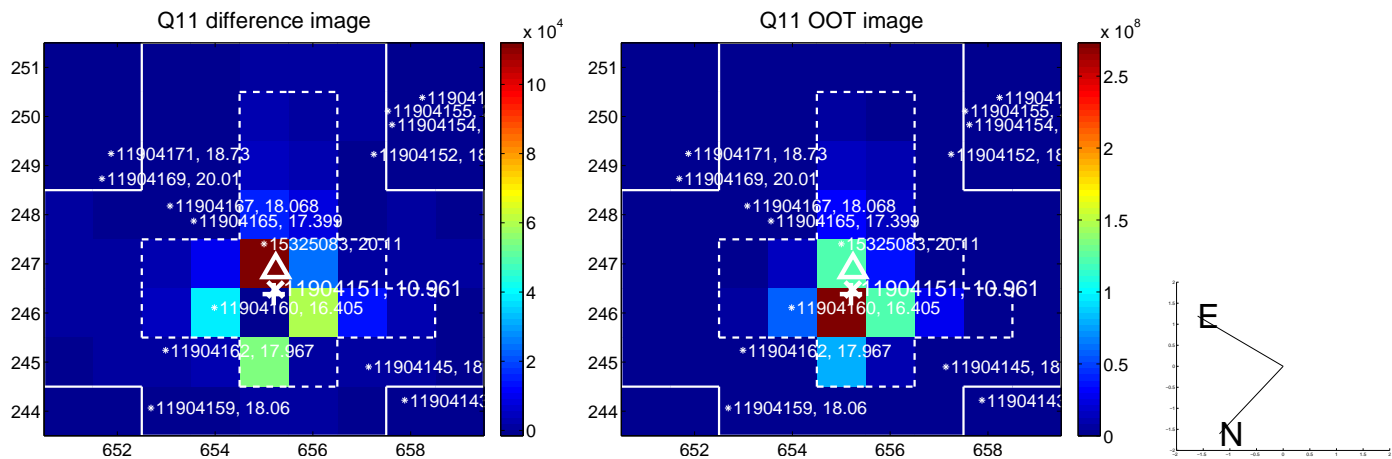
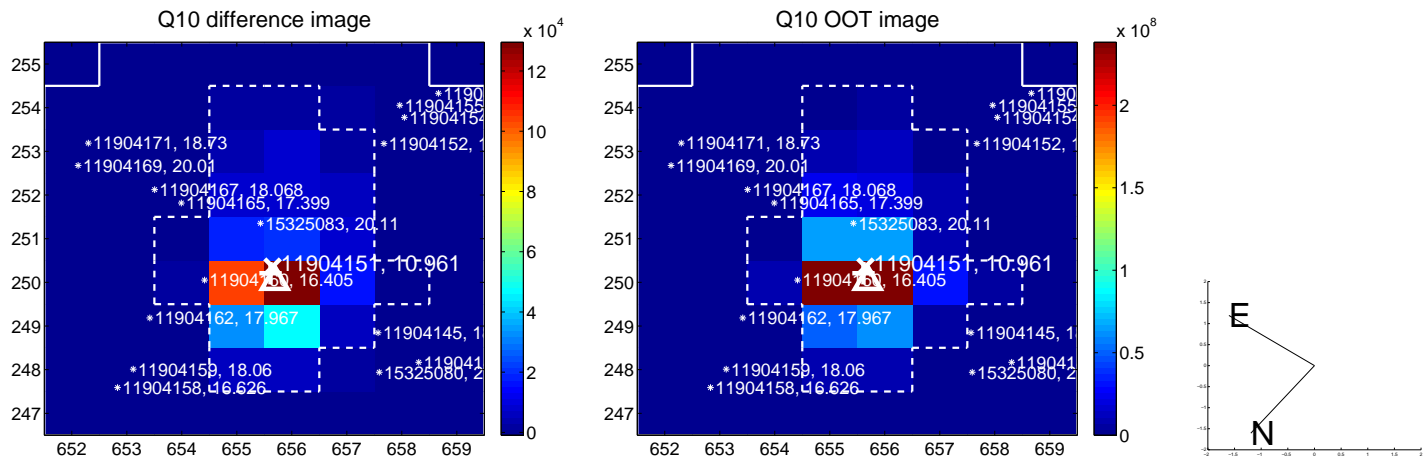
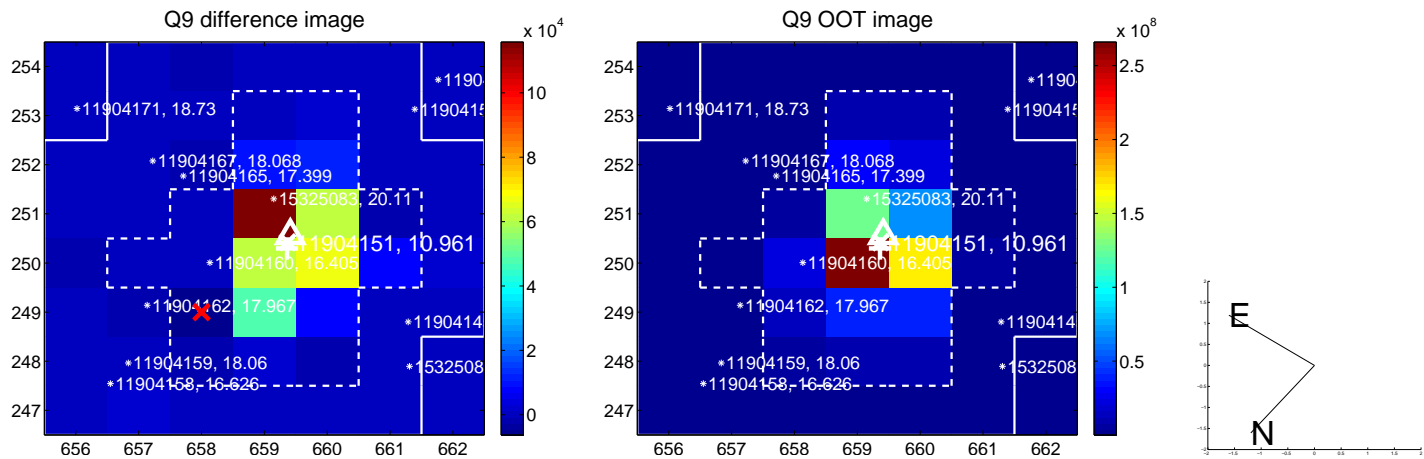
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



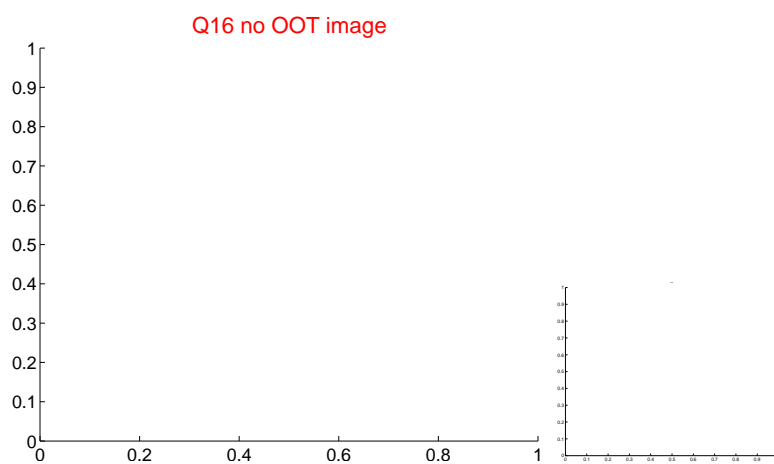
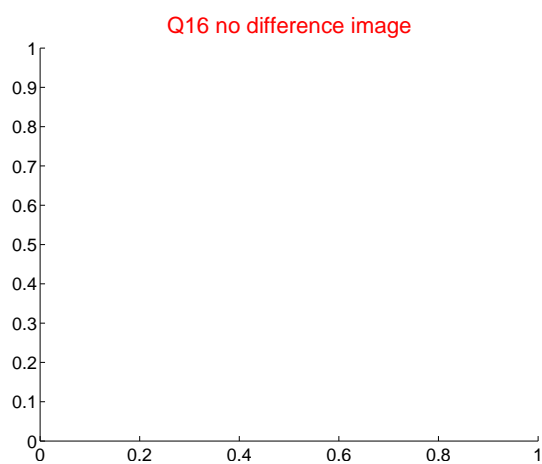
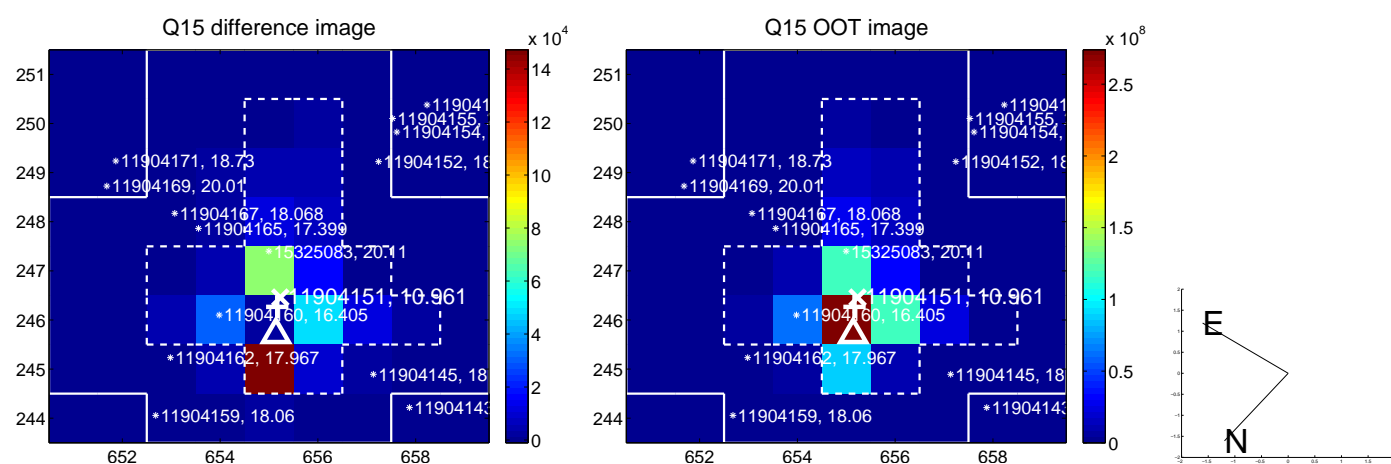
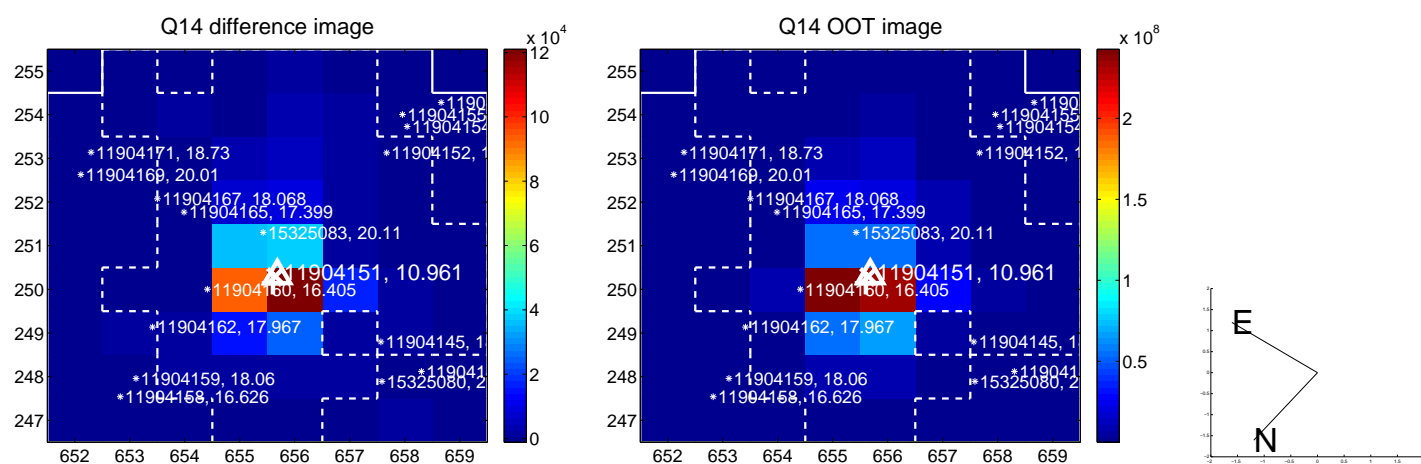
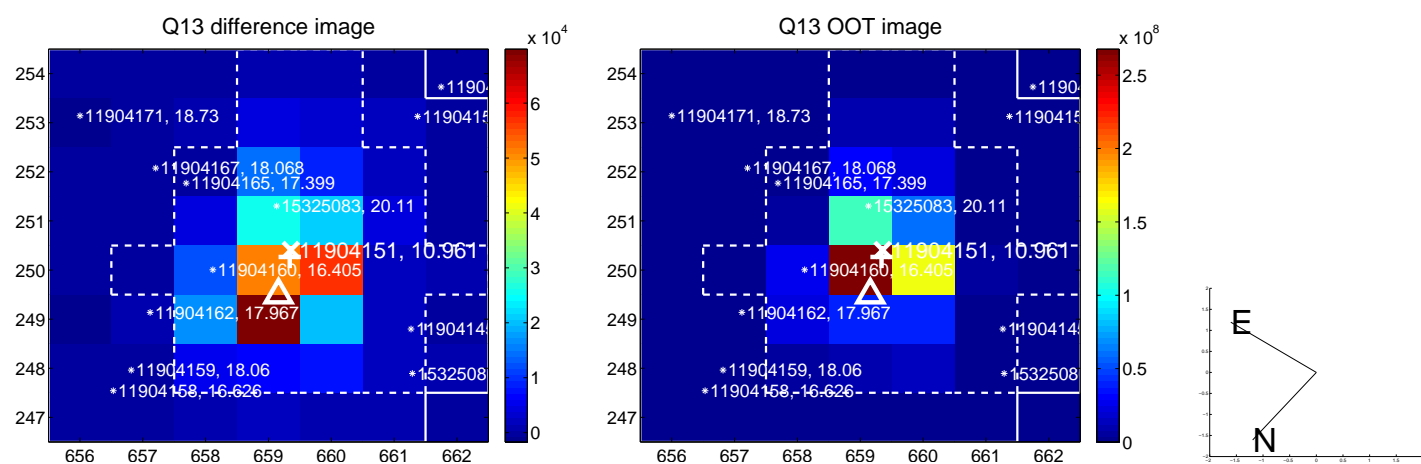
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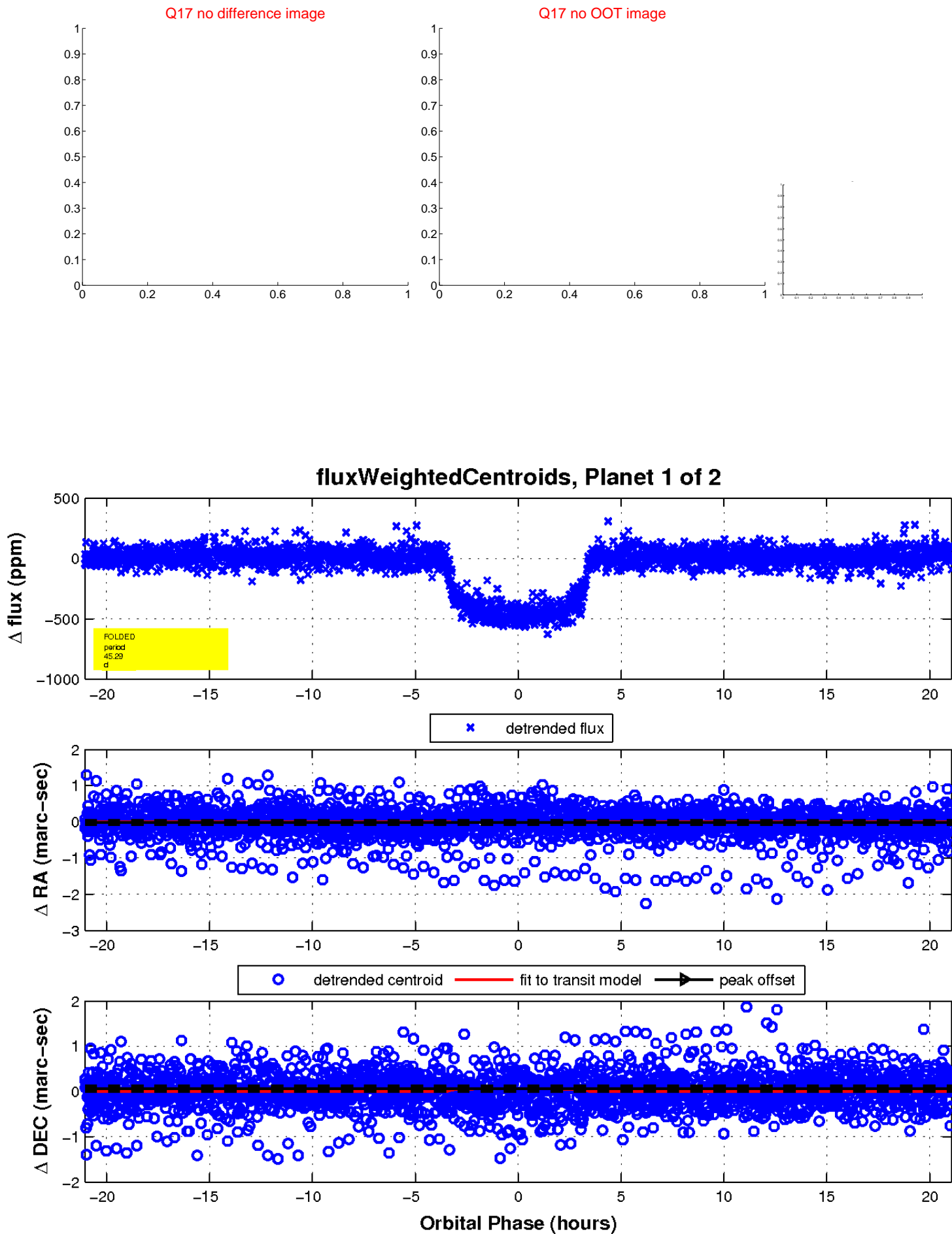
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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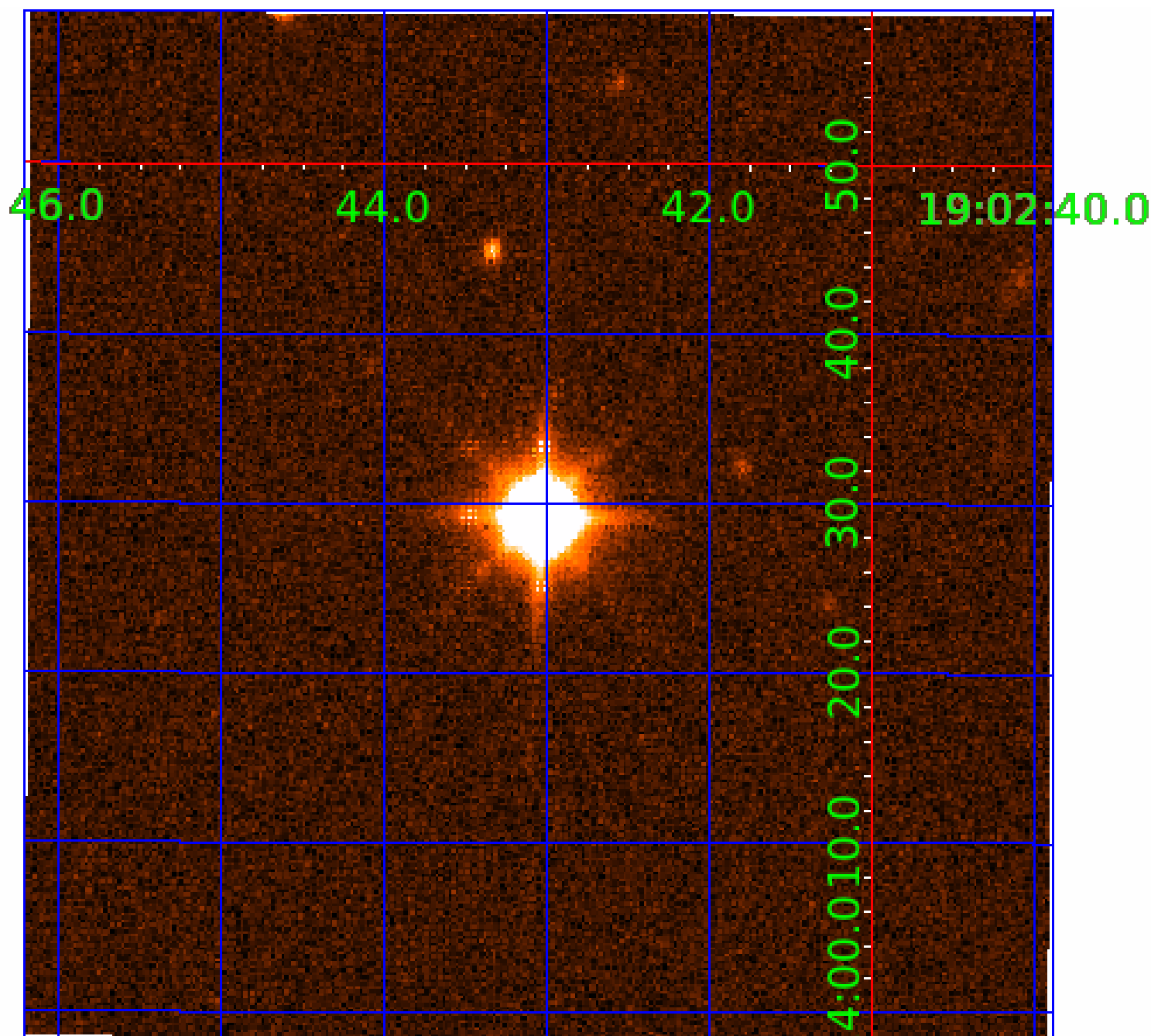


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 011904151

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})
011904151-01	OBS	0072.02	45.294268	138.677640	489.2	7.022	93.4	95.7	1.04	5676	2.50	17.79
011904151-02	OBS	0072.01	0.837484	131.579116	41.1	1.612	30.4	37.1	1.04	5676	0.80	3638.28

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011904151-01	OBS	PC	0.98	0	0	0	0	CENT_SATURATED
011904151-02	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED

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.

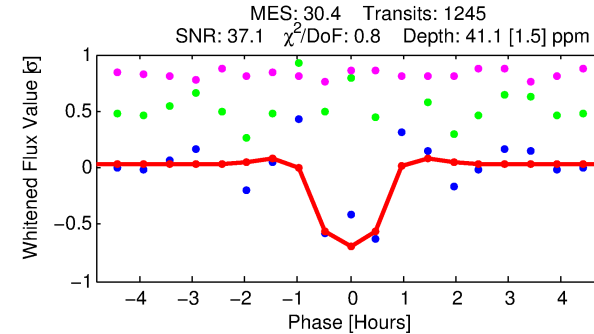
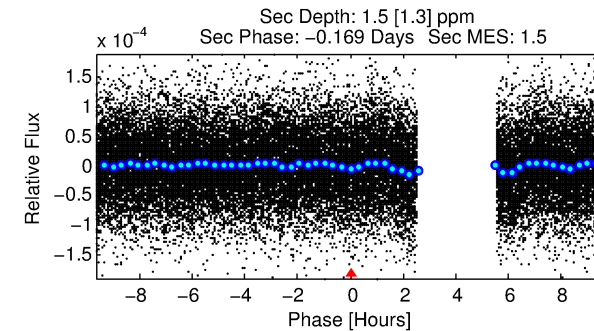
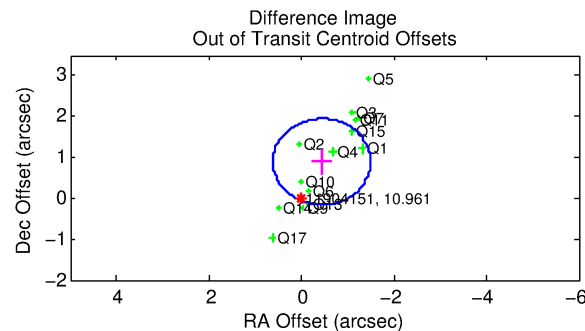
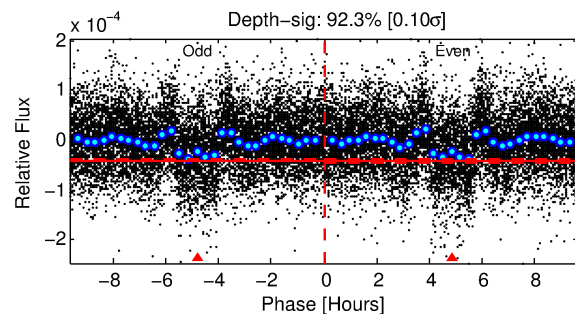
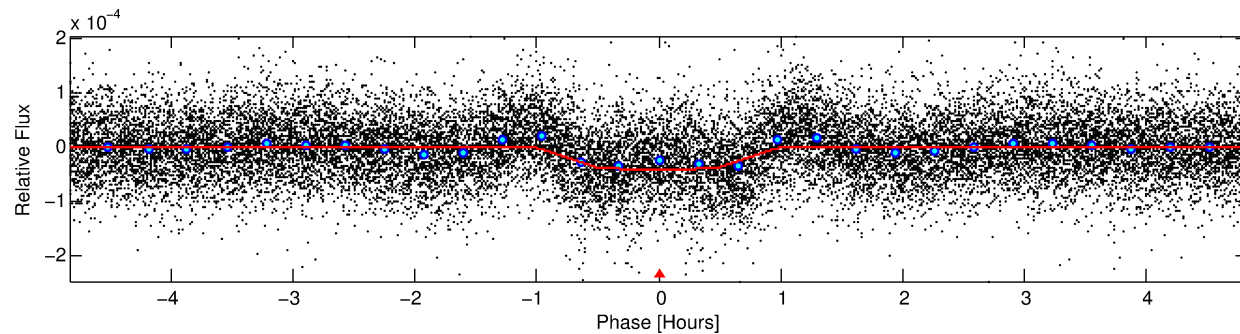
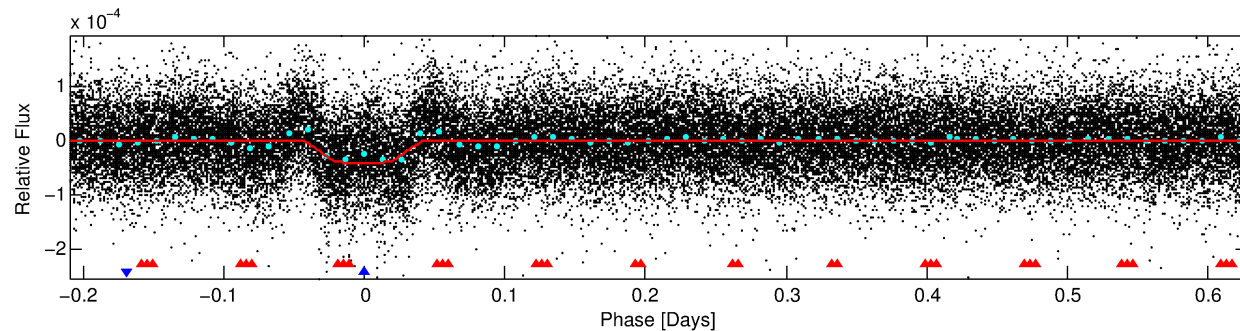
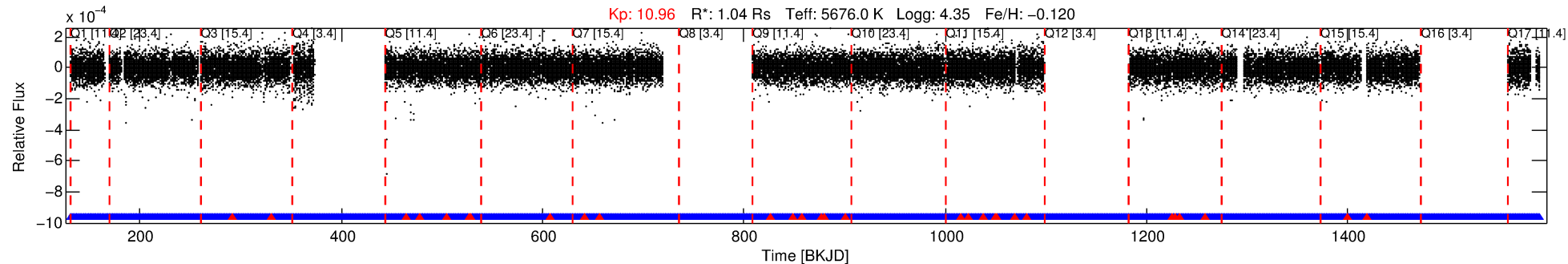
Ephemeris Match Information For 011904151-02

No Significant Match Found

DV One-Page Summary

KIC: 11904151 Candidate: 2 of 2 Period: 0.837 d
KOI: K00072.01 Name: Kepler-10b Corr: 0.935

Kp: 10.96 R*: 1.04 Rs Teff: 5676.0 K Logg: 4.35 Fe/H: -0.120



DV Fit Results:

Period = 0.83748 [0.00000] d
Epoch = 131.5791 [0.0006] BKJD
Rp/R* = 0.0070 [0.0010]
a/R* = 2.02 [1.08]
b = 0.90 [0.15]
Seff = 3638.27 [305.13]
Teq = 1980 [42] K
Rp = 0.80 [0.13] Re
a = 0.0167 [0.0007] AU
Ag = 0.37 [0.32] [-1.98σ]
Teffp = 2383 [520] K [0.77σ]

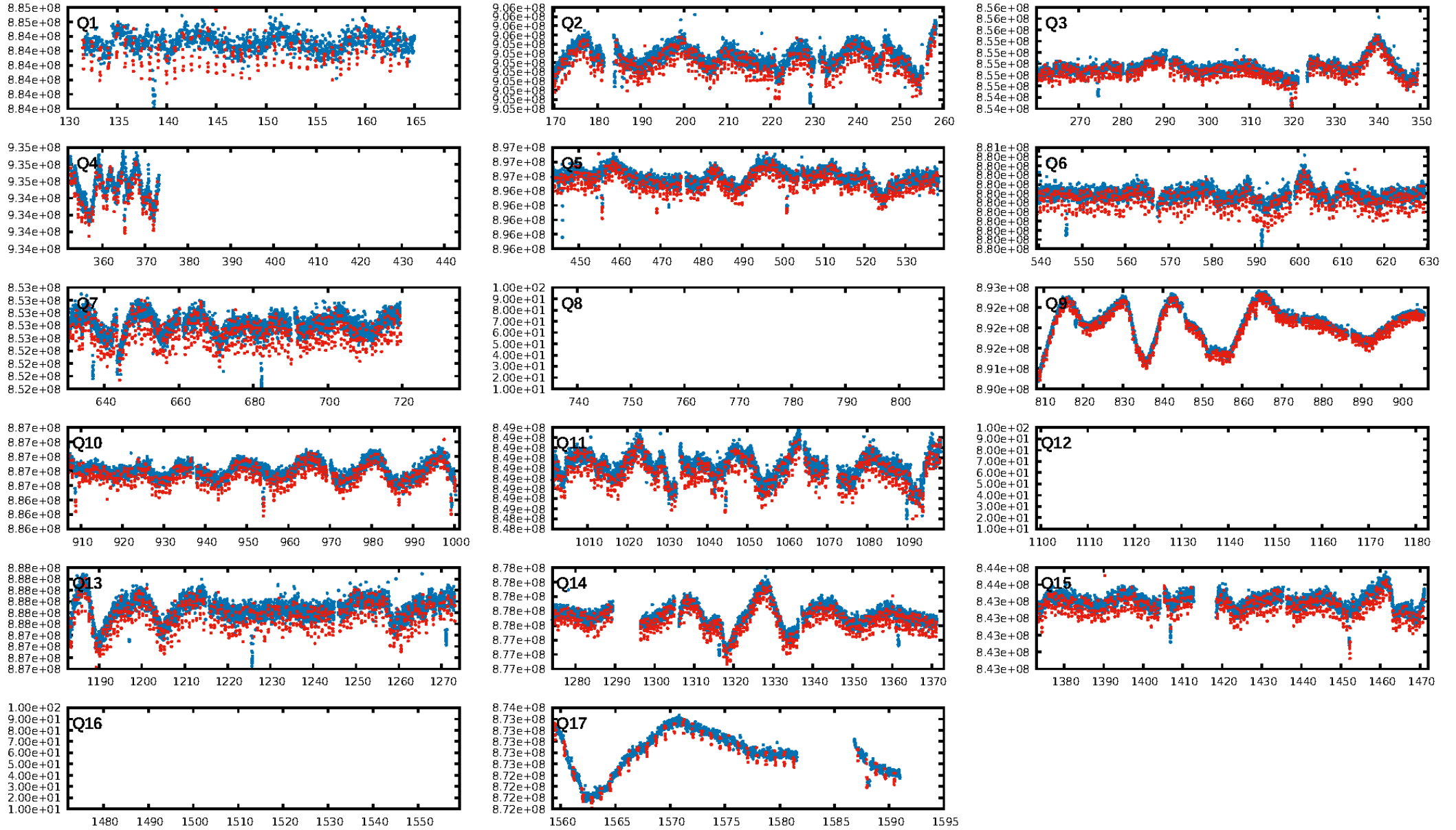
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [148.09σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.92e-175
RollingBand-fgt: 0.97 [1122/1151]
GhostDiagnostic-chr: 1.709
Centroid-sig: 1.5%
Centroid-so: 1.075 arcsec [3.04σ]
OotOffset-rm: 0.994 arcsec [2.83σ]
KicOffset-rm: 1.541 arcsec [4.25σ]
OotOffset-st: 4/4/1/5 [14]
KicOffset-st: 4/4/1/5 [14]
DiffImageQuality-fgm: 0.79 [11/14]
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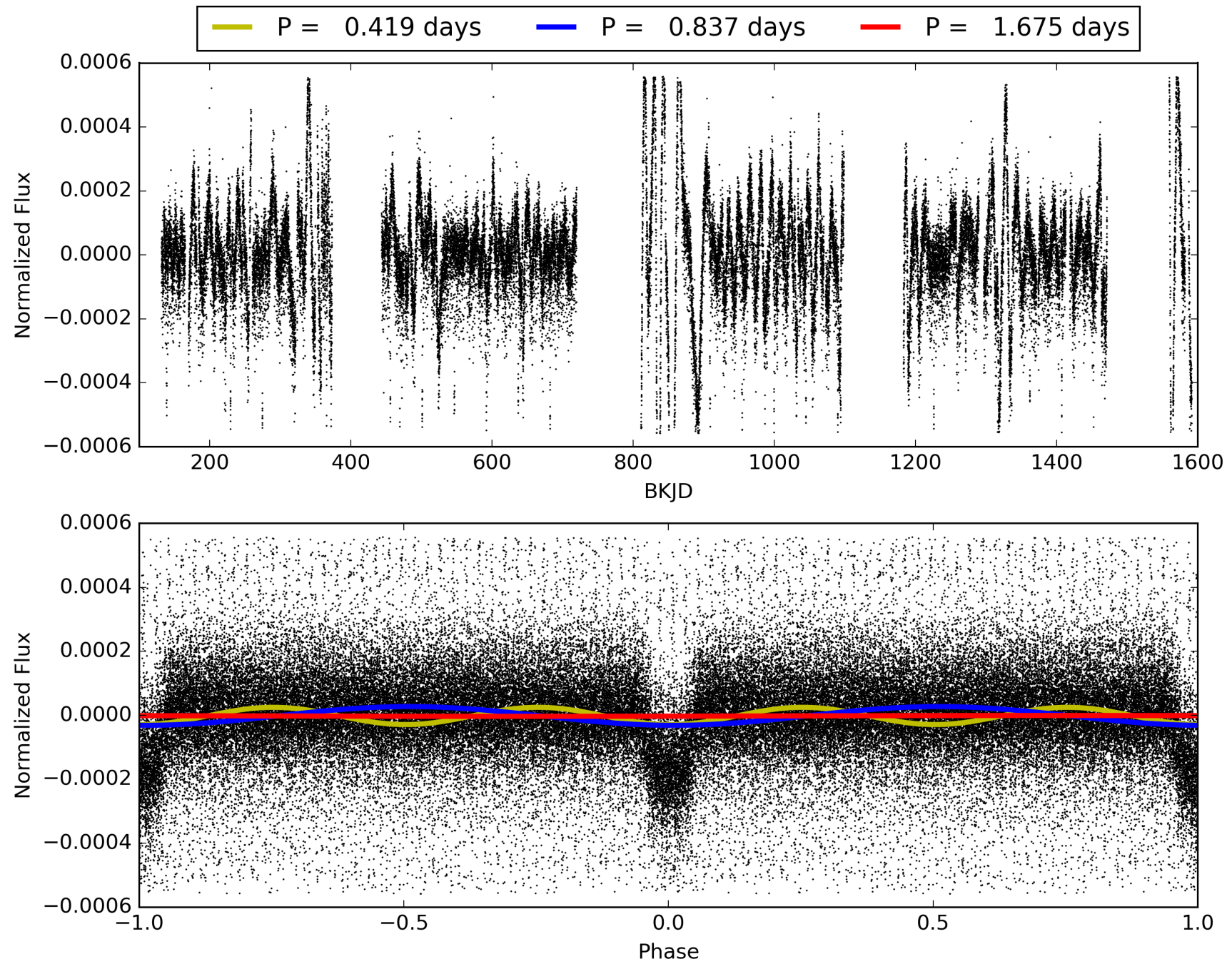
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 011904151-02, PDC Light Curves

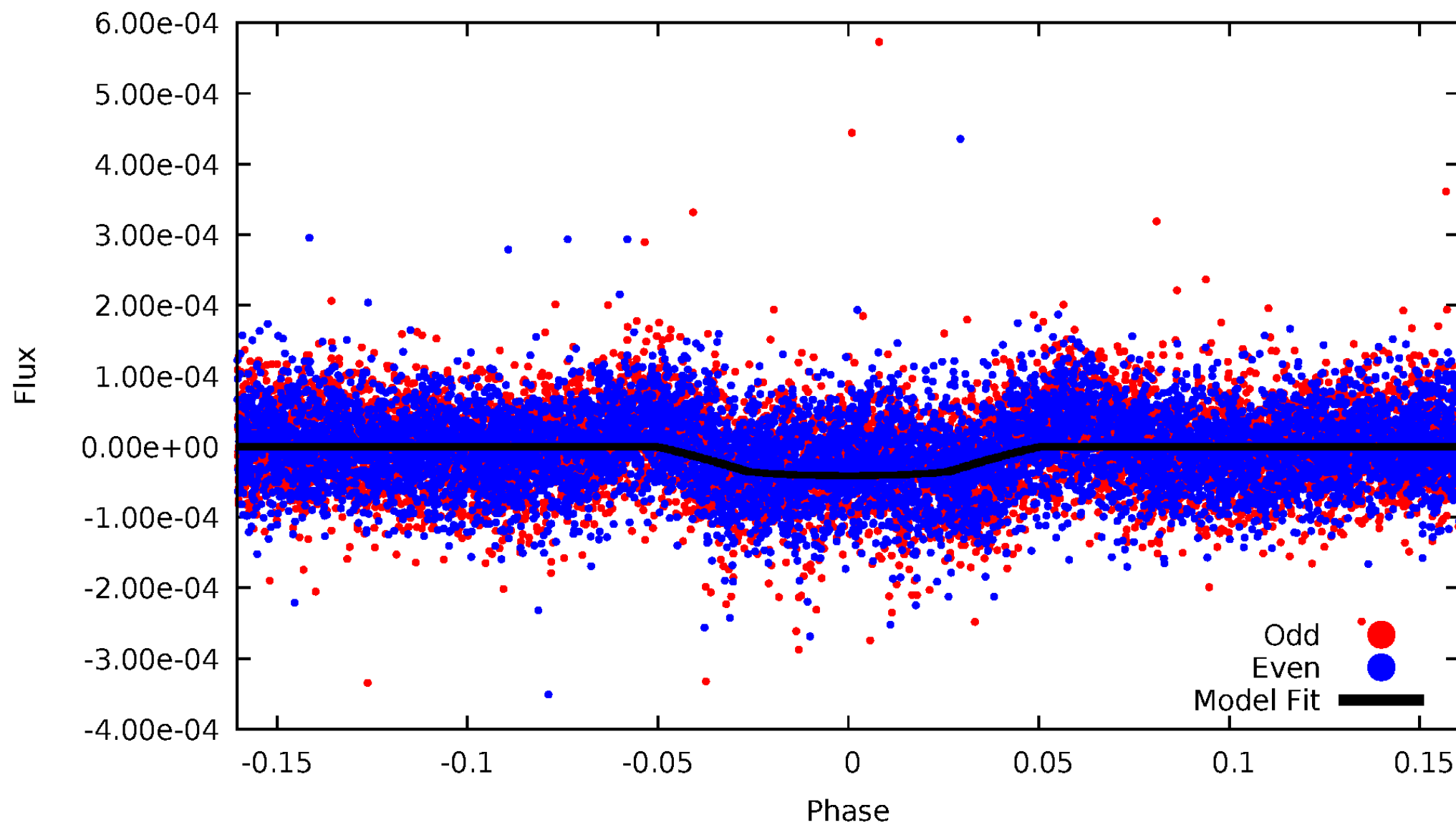


TCE 011904151-02



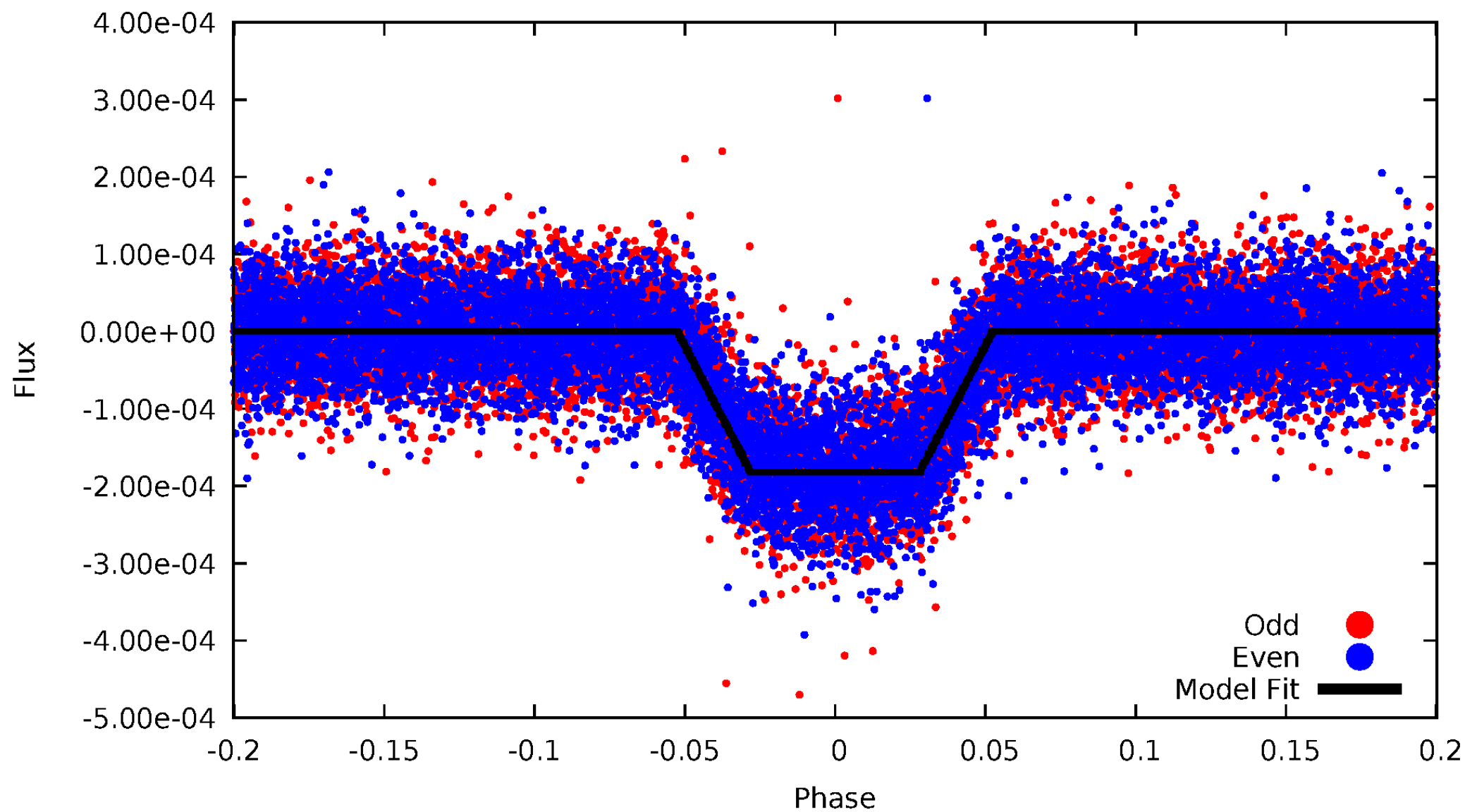
DV Odd/Even

TCE 011904151-02



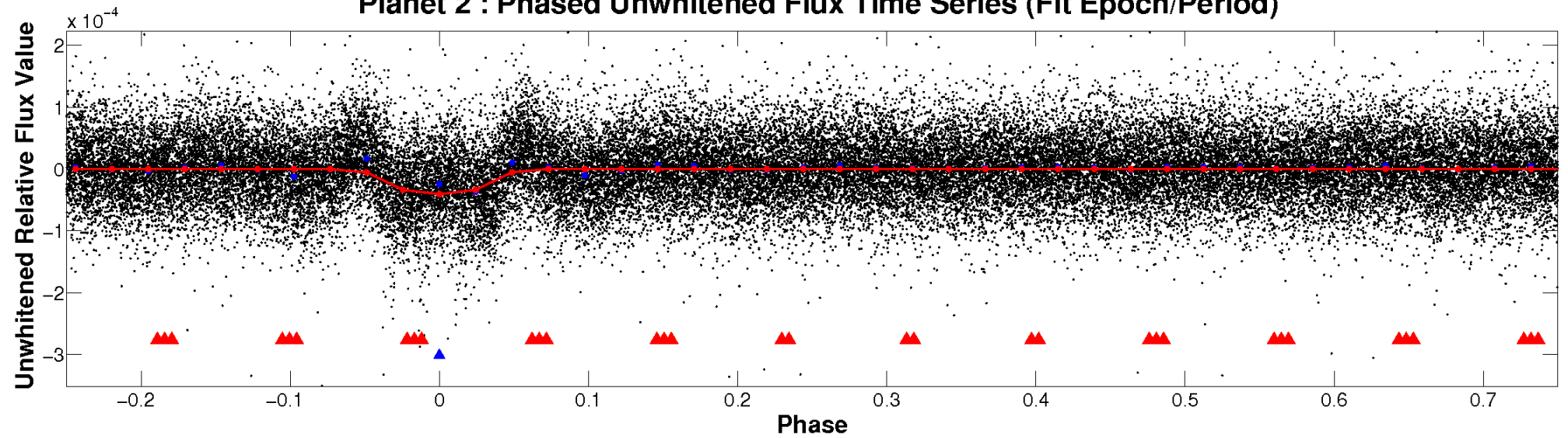
ALT Odd/Even

TCE 011904151-02

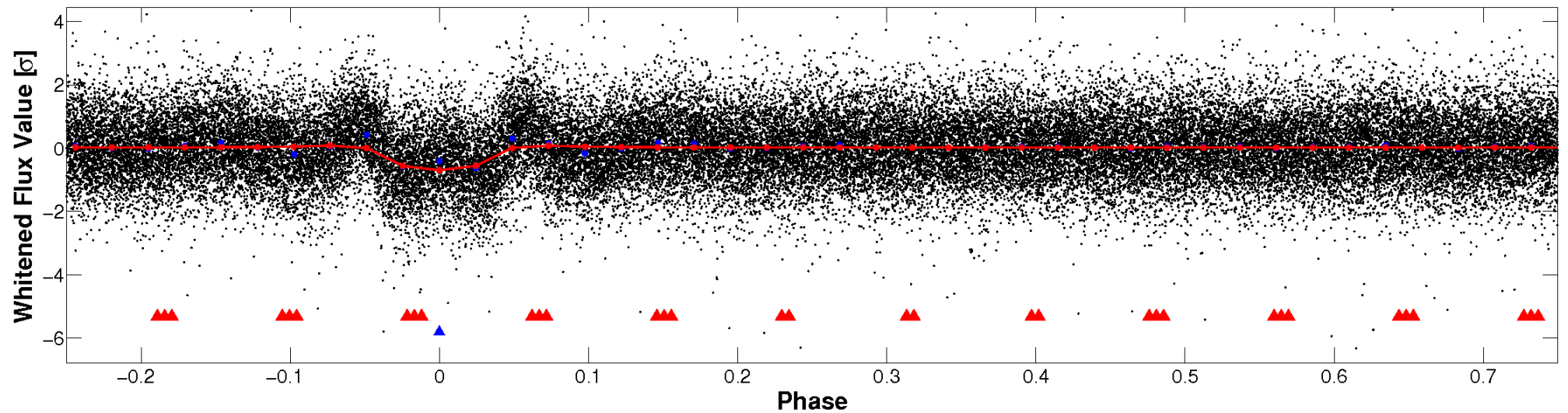


Non-Whitened Vs. Whitened Light Curve

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

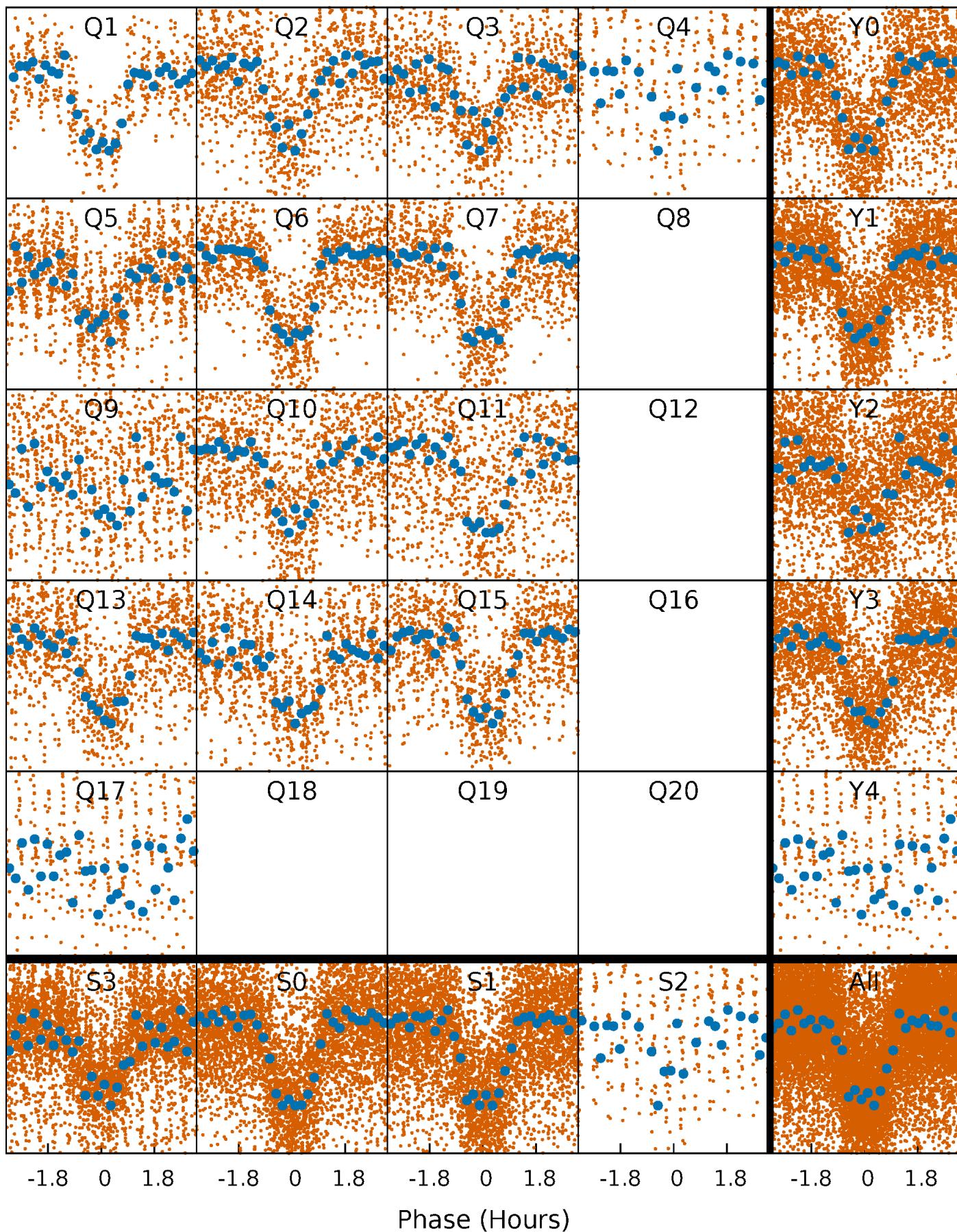


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



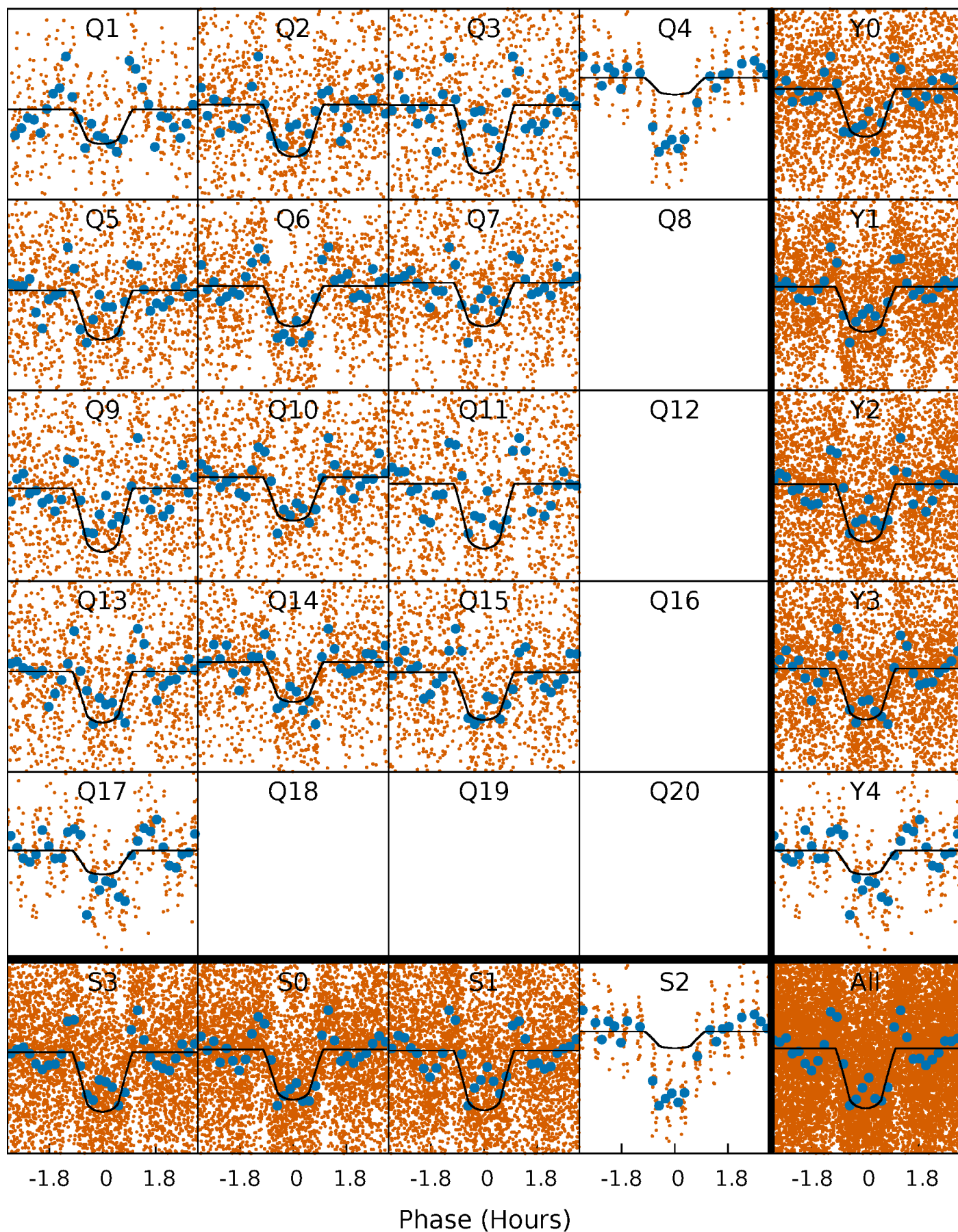
PDC Quarter-Phased Transit Curves

TCE 011904151-02 P= 0.837484 Days $T_0=131.579116$ (BKJD)



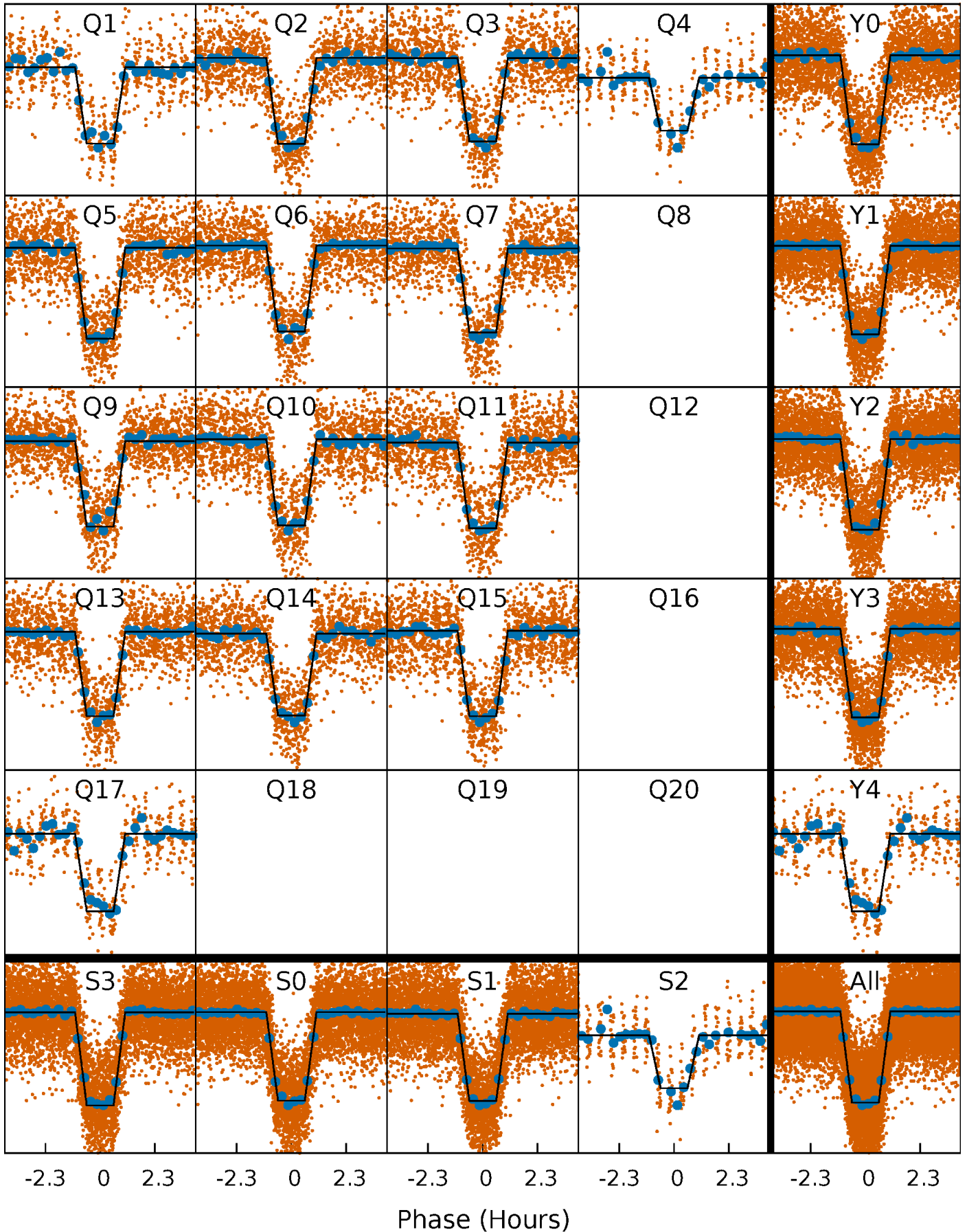
DV Quarter-Phased Transit Curves

TCE 011904151-02 P= 0.837484 Days $T_0=131.579116$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

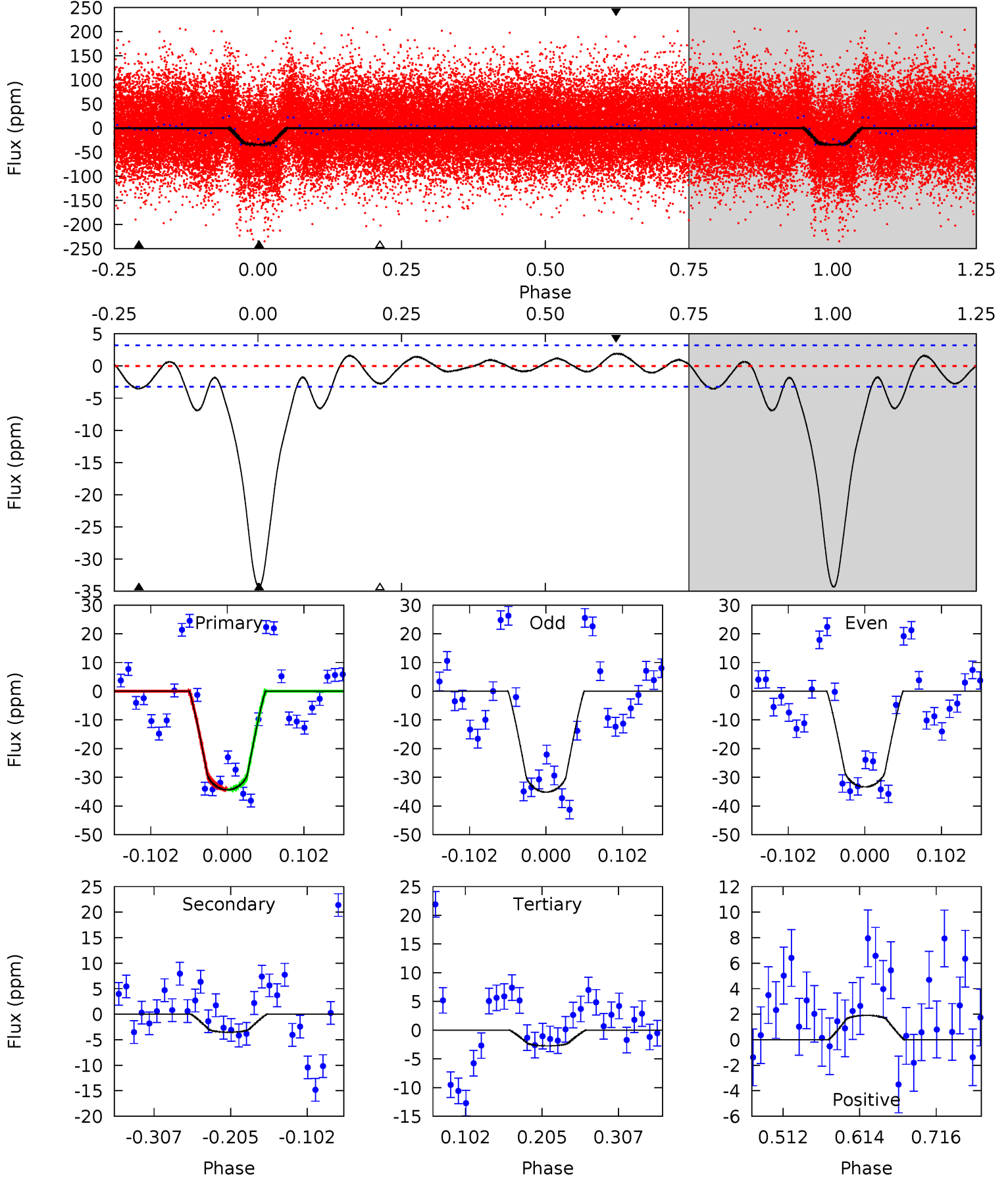
TCE 011904151-02 P= 0.837490 Days $T_0=131.575838$ (BKJD)



DV Model-Shift Uniqueness Test

011904151-02, P = 0.837484 Days, E = 130.741632 Days

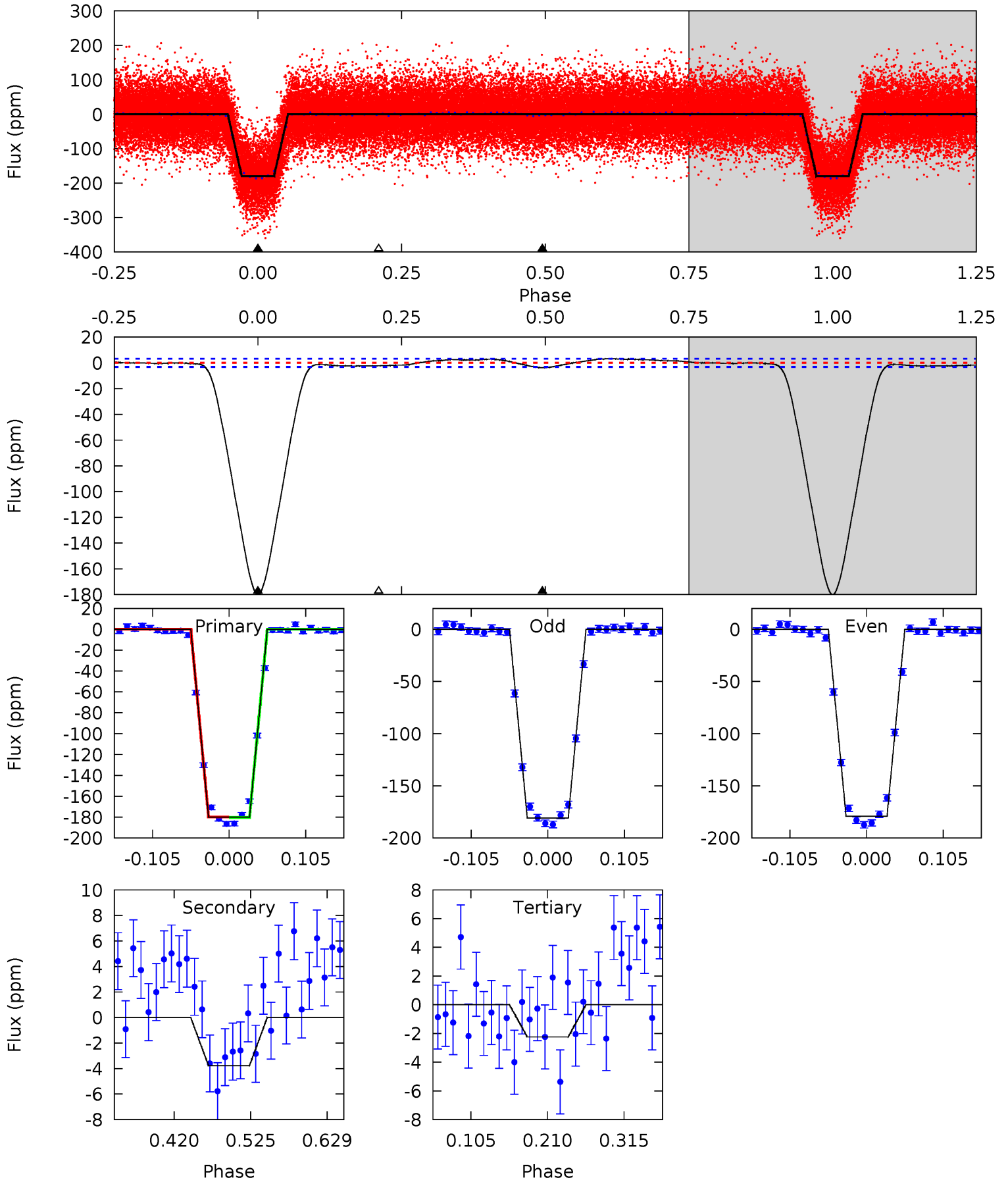
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
48.9	5.03	3.89	2.73	4.56	1.63	2.22	45.0	46.2	1.14	2.31	1.27	1.05	0.05	0.18



Alt Model-Shift Uniqueness Test

011904151-02, P = 0.837490 Days, E = 130.738348 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
260.0	5.45	3.23	0	4.55	1.62	2.64	256.8	260.0	2.22	5.45	1.13	0.99	0.02	0.35



Stellar Parameters For KIC 011904151

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5676^{+85}_{-68}	$4.347^{+0.030}_{-0.030}$	$-0.120^{+0.150}_{-0.150}$	$1.044^{+0.057}_{-0.042}$	$0.884^{+0.069}_{-0.042}$	$1.095^{+0.120}_{-0.119}$
	+1%/-1%	+1%/-1%	+125%/-125%	+5%/-4%	+8%/-5%	+11%/-11%
Source	SPE72	AST69	SPE72	DSEP		

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

Secondary Eclipse Parameters for KIC 011904151-02 / KOI 0072.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-4 ± 1	$0.80^{+0.11}_{-0.12}$	2766^{+51}_{-48}	3216^{+262}_{-256}	$0.846^{+0.377}_{-0.239}$
Alt.	-4 ± 1	$1.54^{+0.13}_{-0.13}$	2768^{+49}_{-47}	-2366^{+4450}_{-225}	$0.246^{+0.070}_{-0.058}$

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

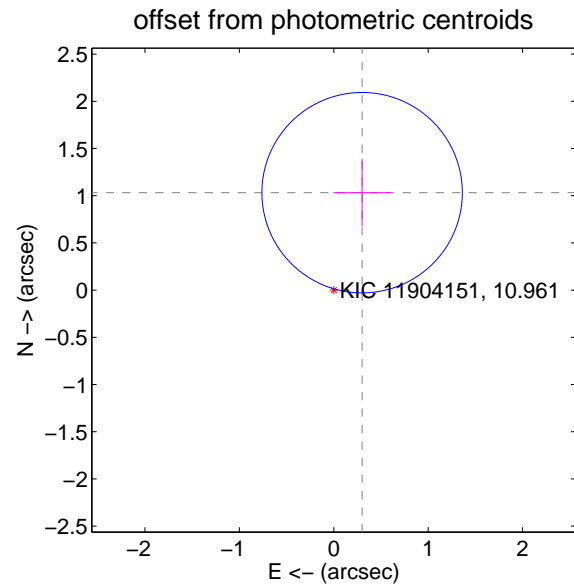
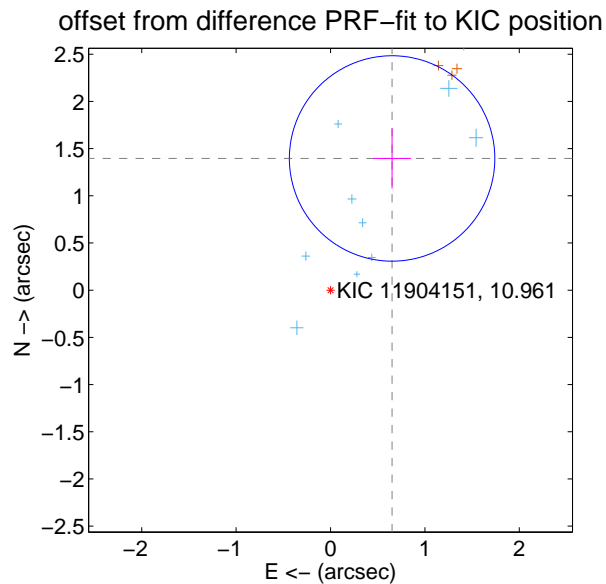
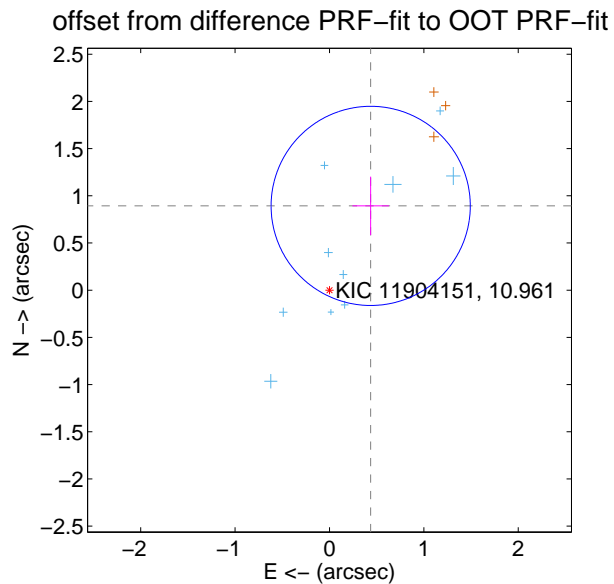
DV Centroid Data

Supplemental centroid analysis for 011904151-02. **Kepler magnitude: 10.96.** Transit SNR 37.10

There are 11 quarters with good PRF difference image offsets

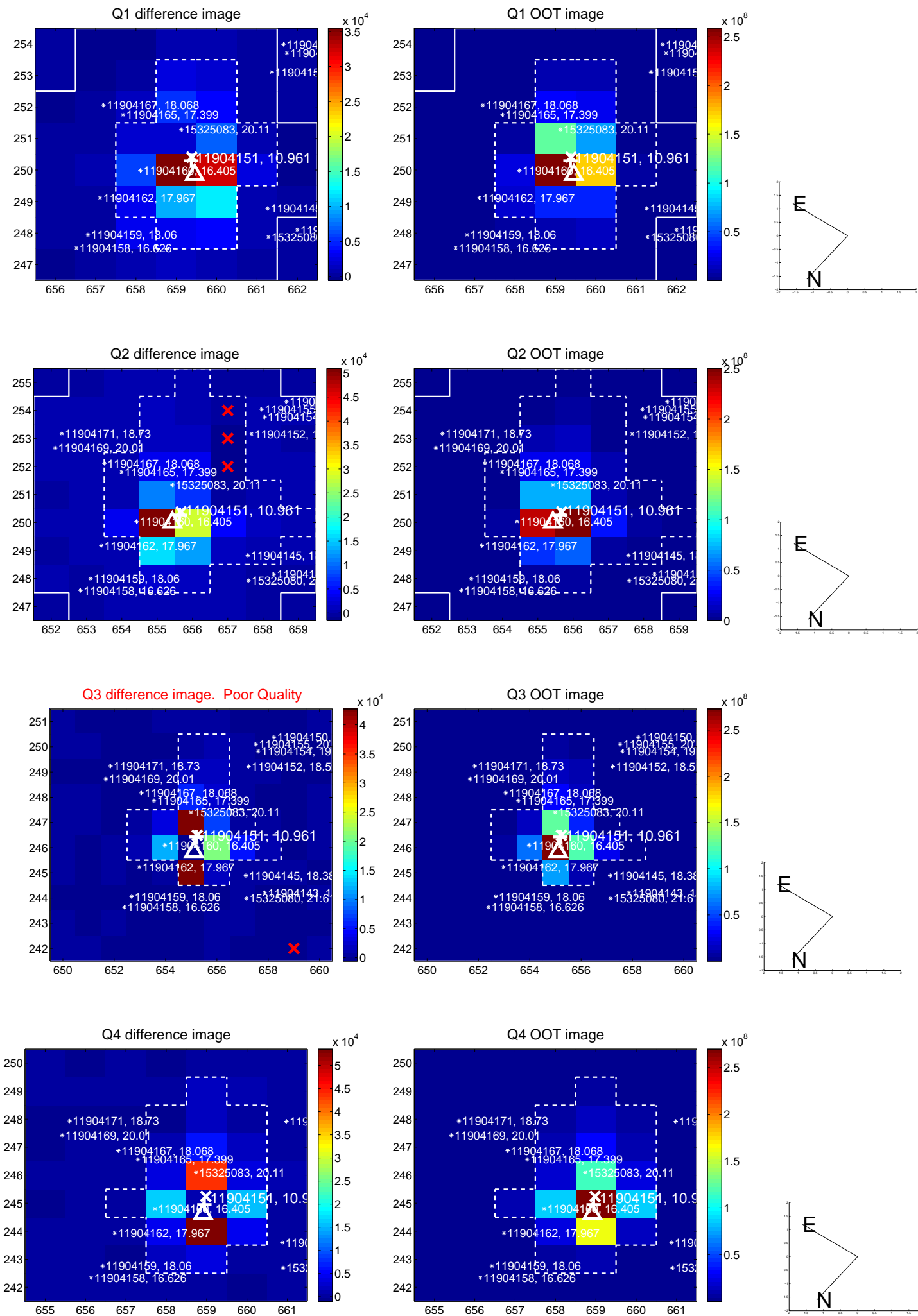
The direct PRF centroid is offset from the target star catalog position by about 0.63 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.994 ± 0.352	2.83	-0.437 ± 0.194	0.893 ± 0.310
PRF-fit source offset from KIC position	1.541 ± 0.363	4.25	-0.652 ± 0.201	1.396 ± 0.319
photometric centroid source offset	1.07 ± 0.35	3.04	-0.30 ± 0.30	1.03 ± 0.36

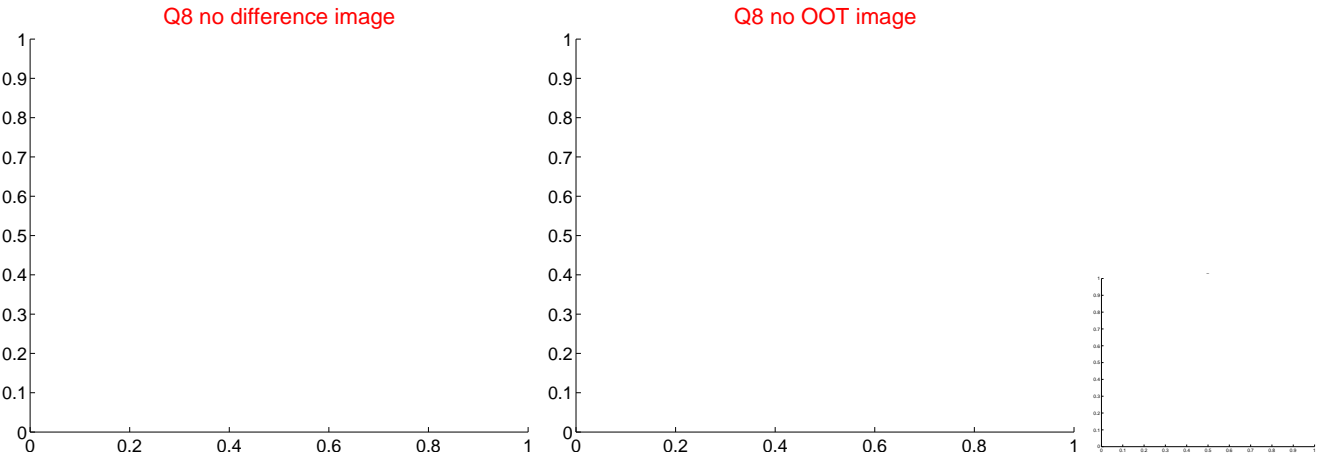
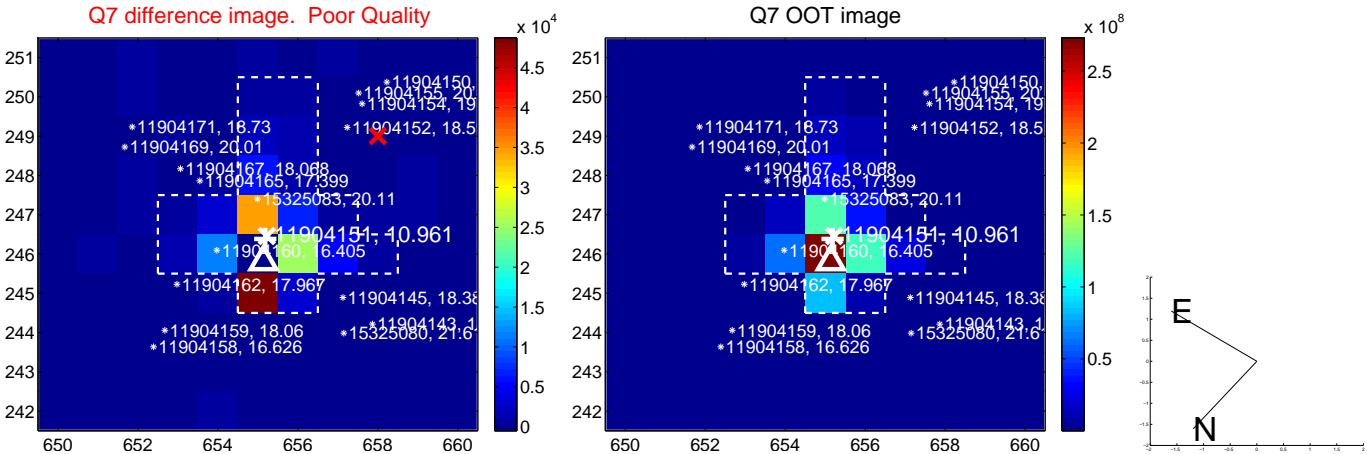
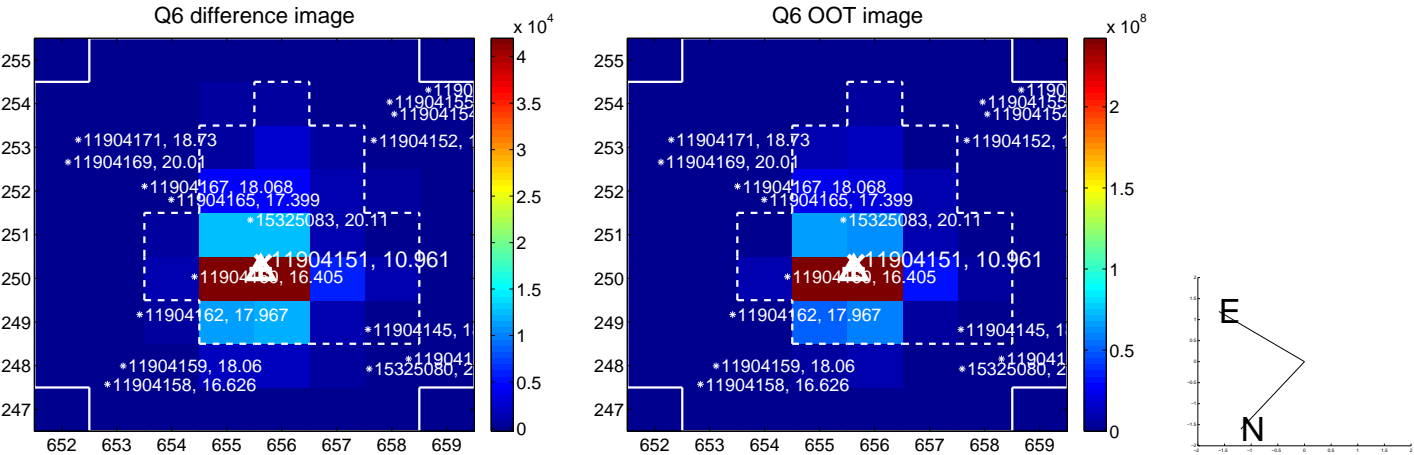
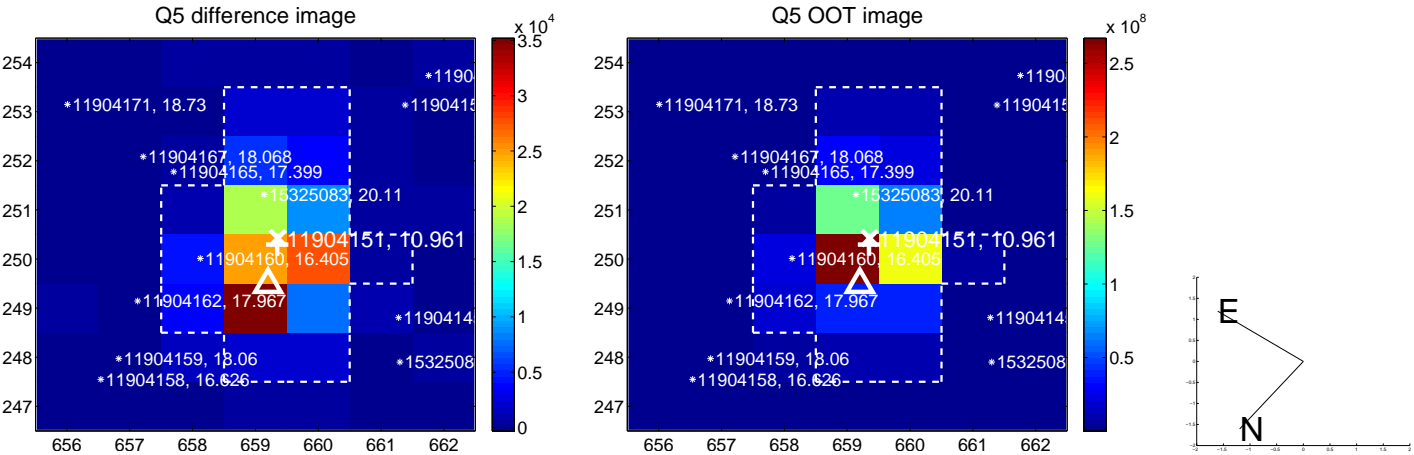


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

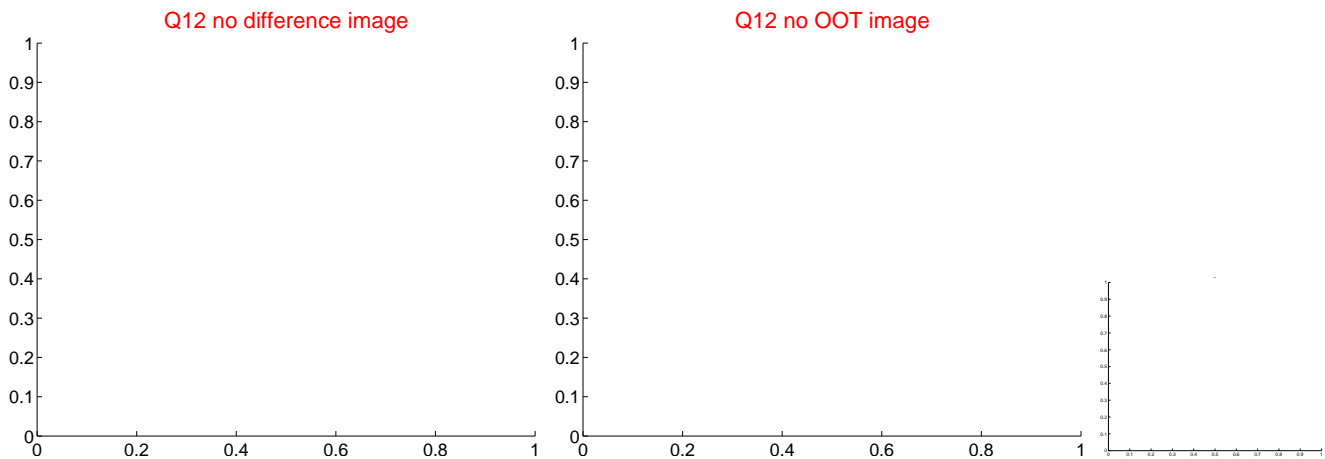
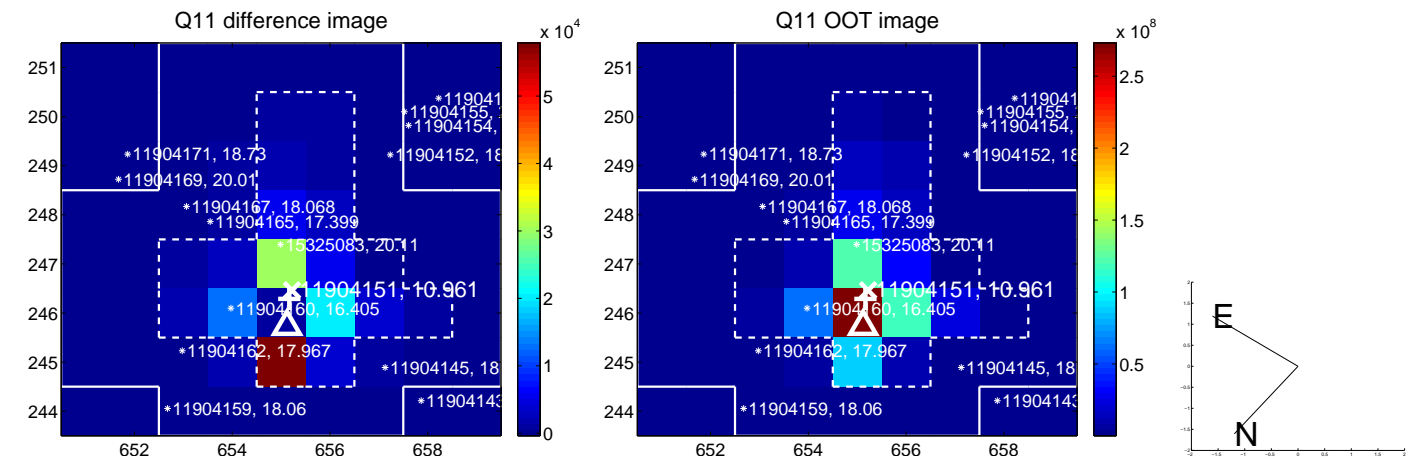
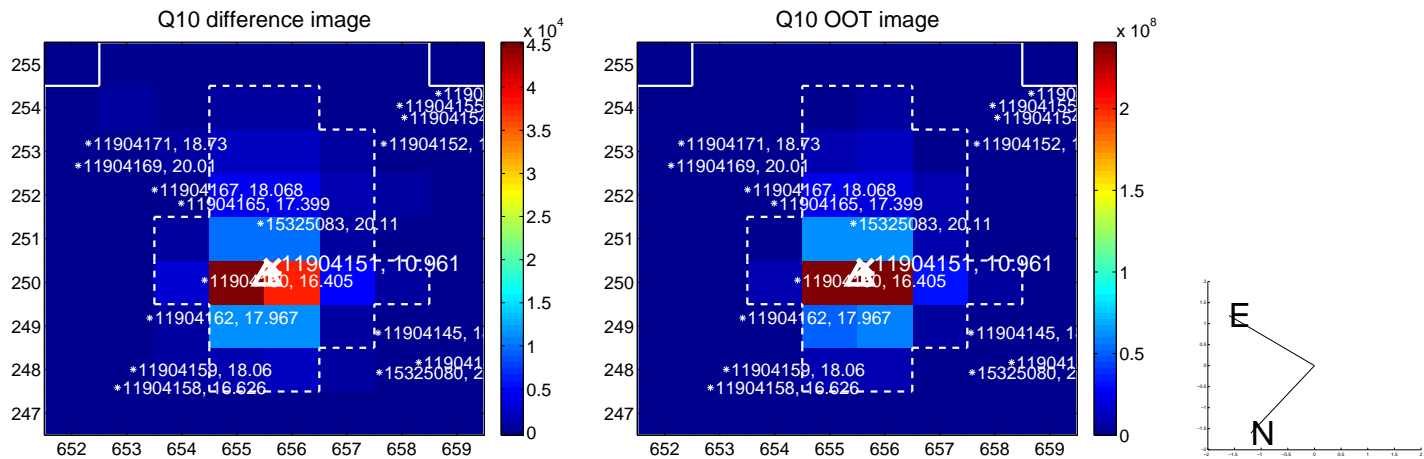
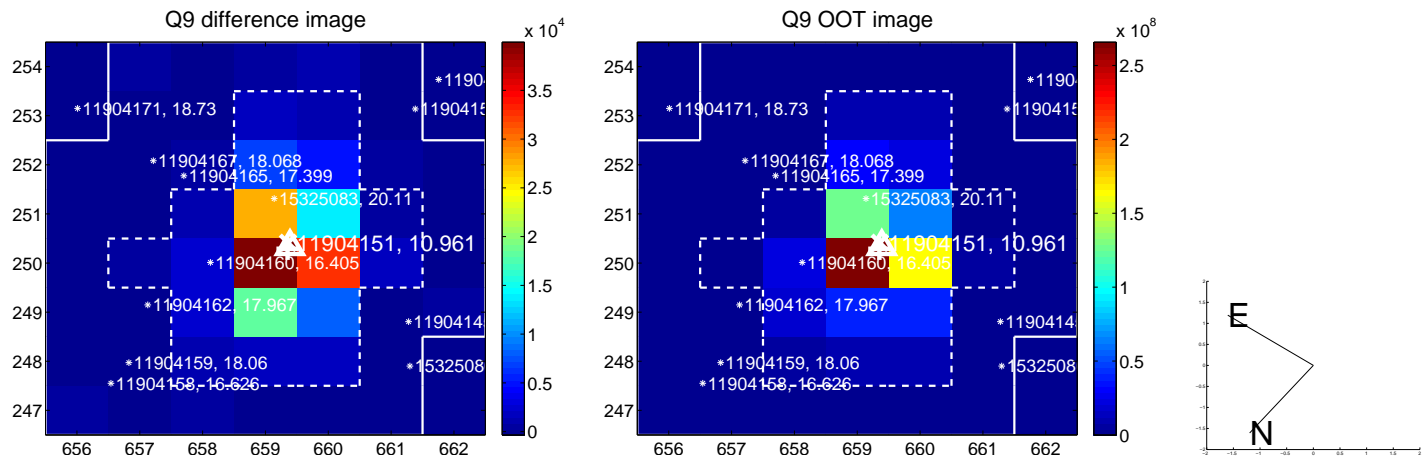
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



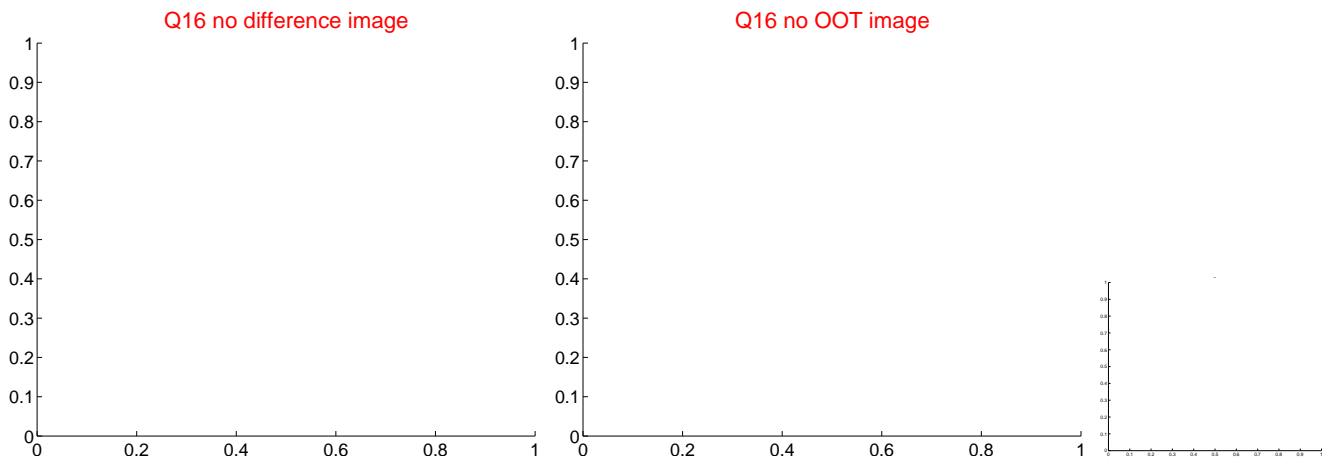
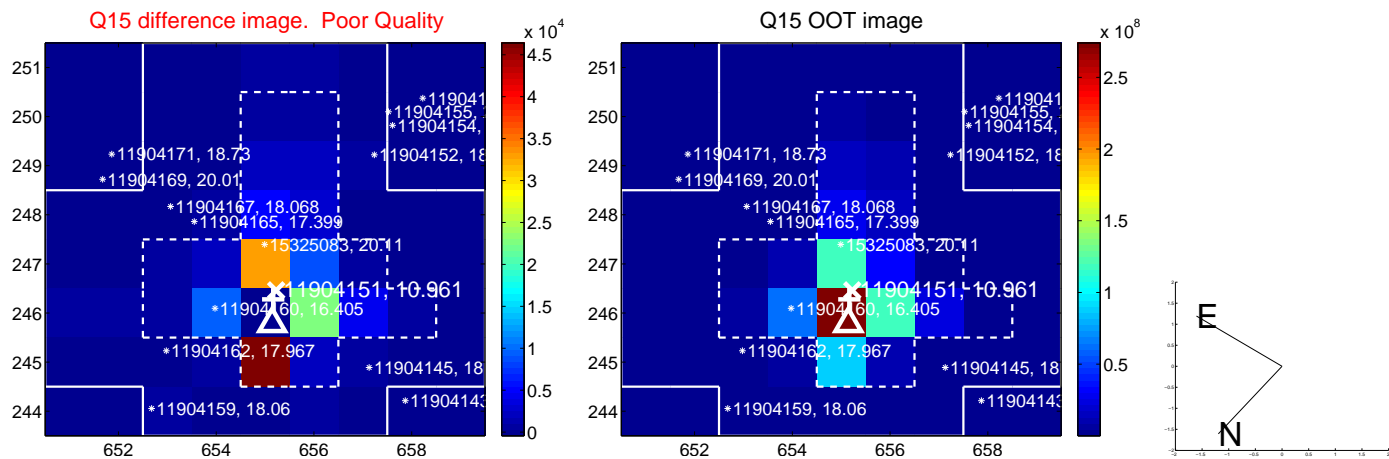
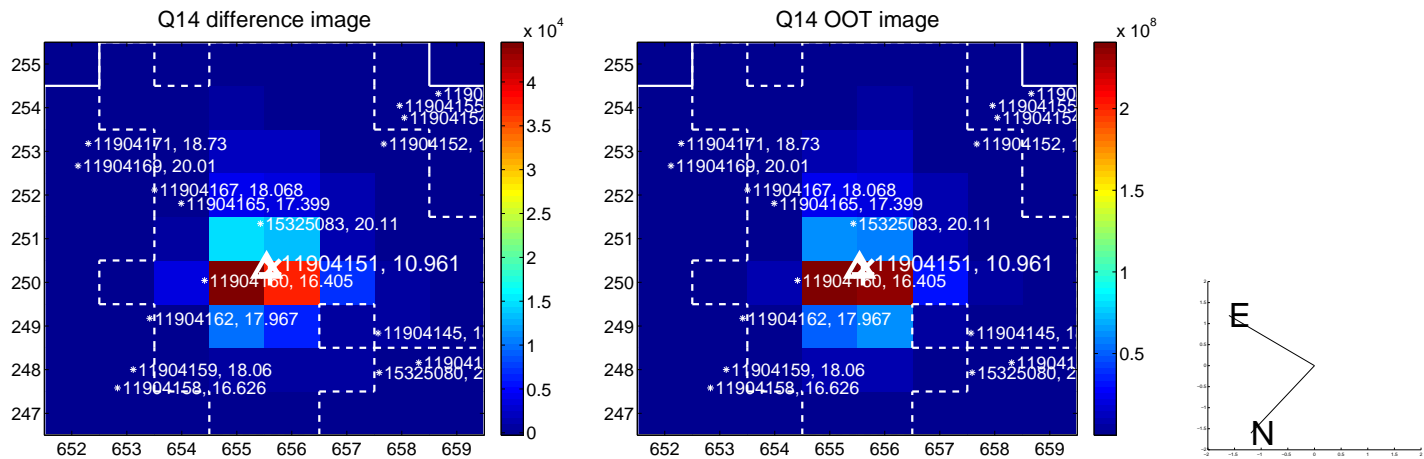
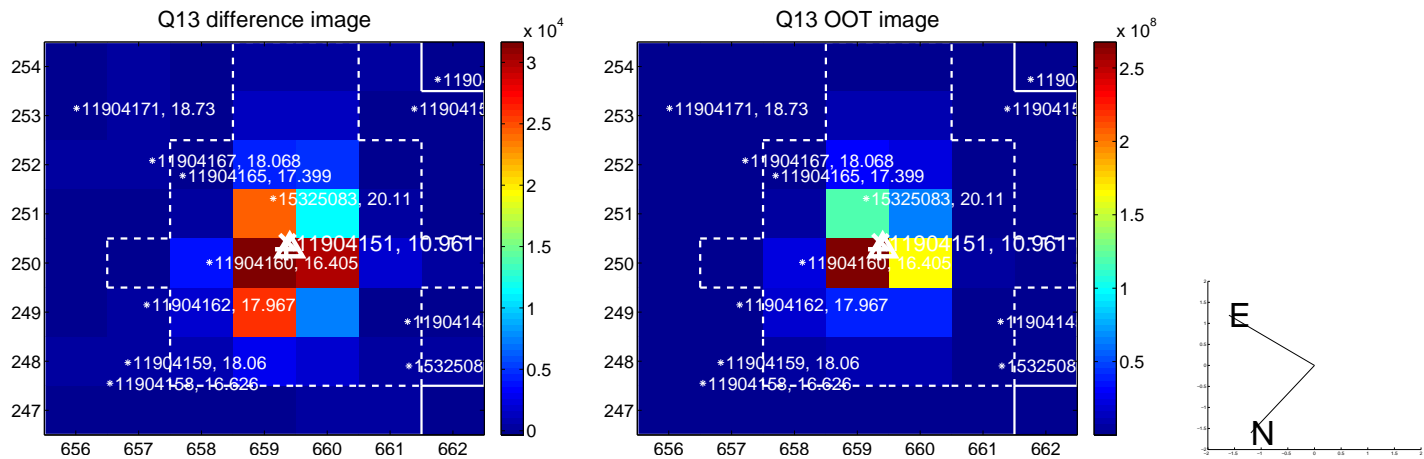
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



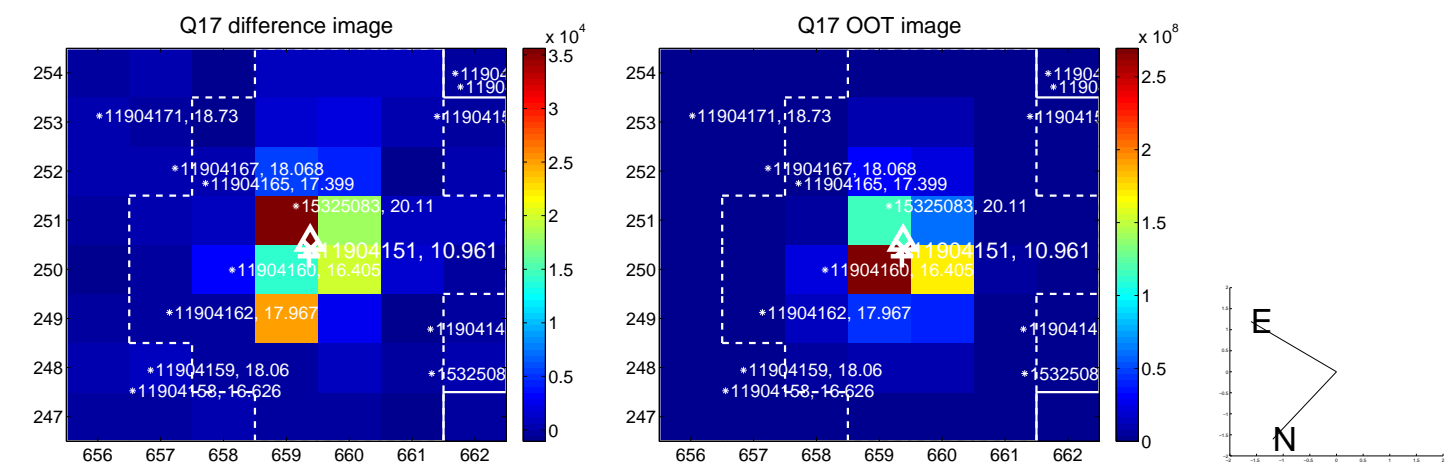
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



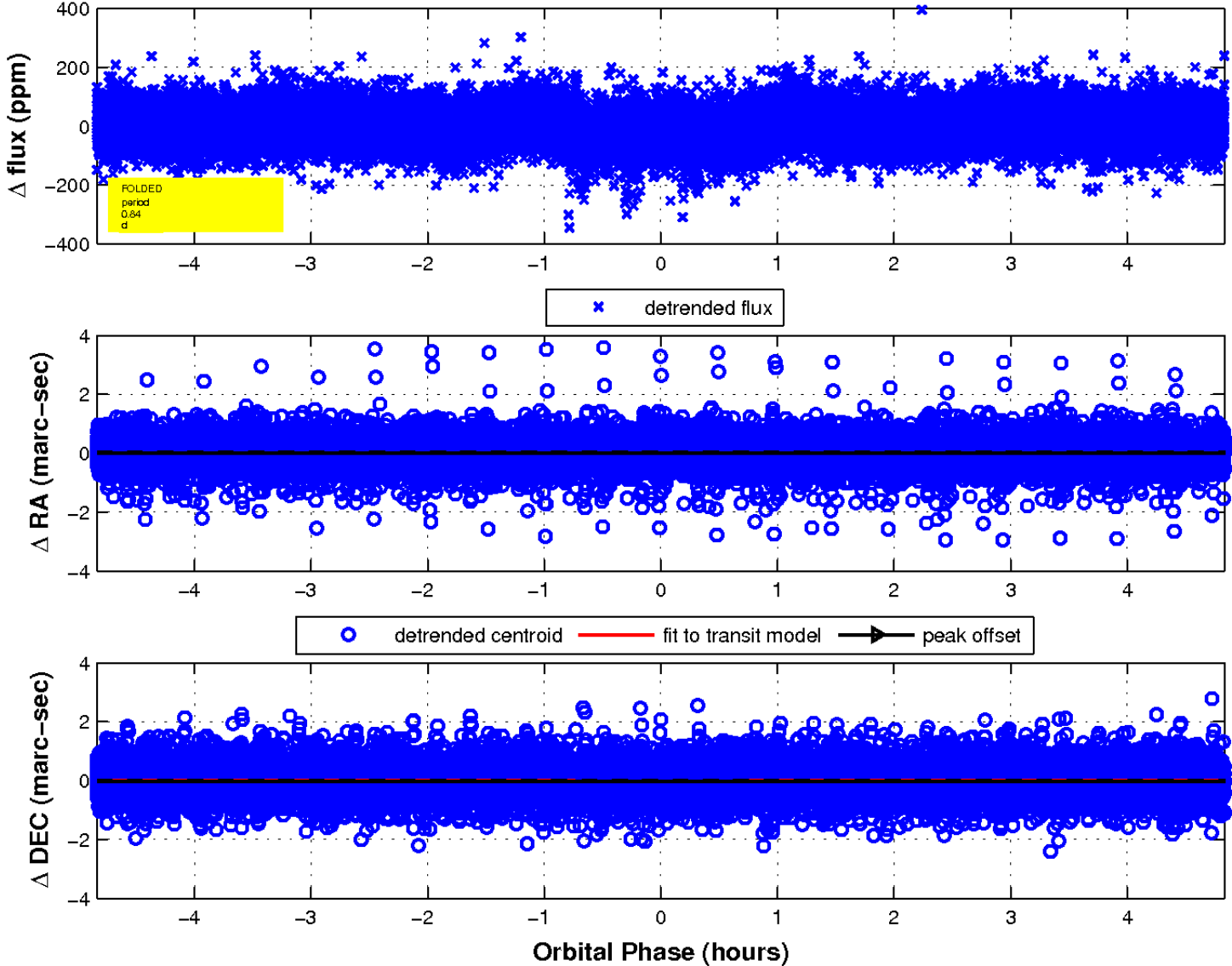
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

