

KIC 004078157

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})
004078157-01	OBS	1319.01	16.025647	143.320070	25816.2	3.505	294.4	220.7	0.79	5776	22.20	44.09
004078157-02	OBS	No	16.024967	137.123312	840.8	3.091	12.6	13.2	0.79	5776	2.53	44.09

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004078157-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS
004078157-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS

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 004078157-01

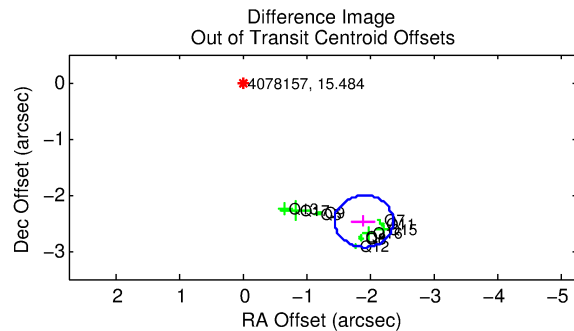
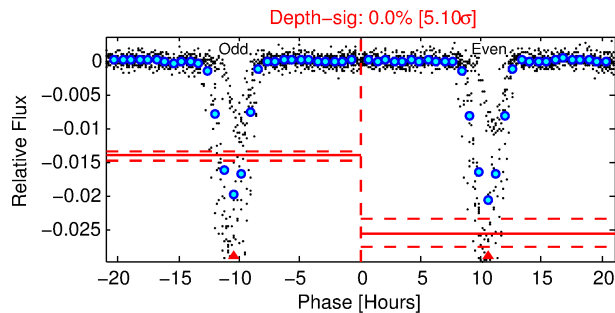
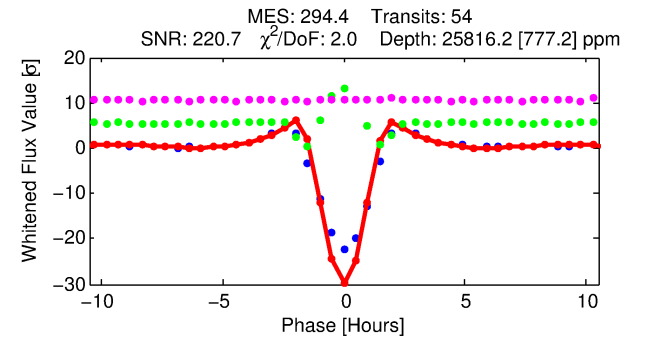
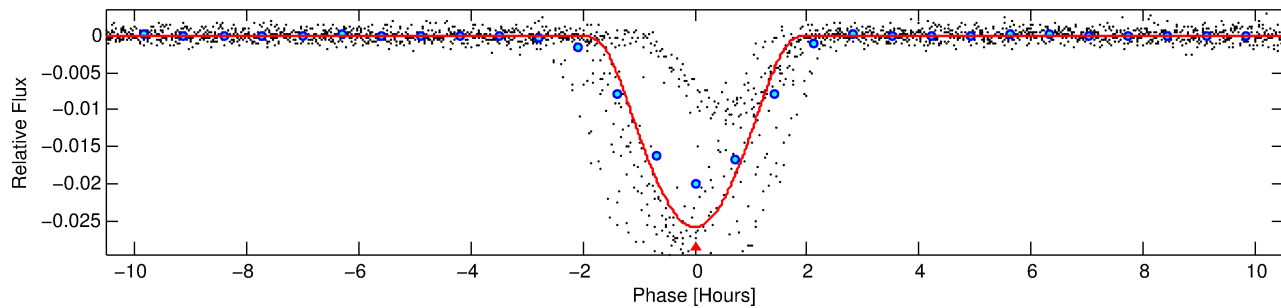
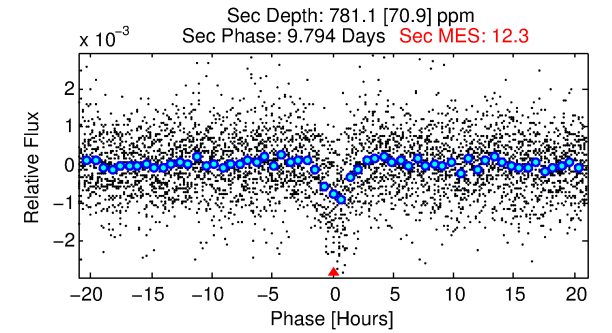
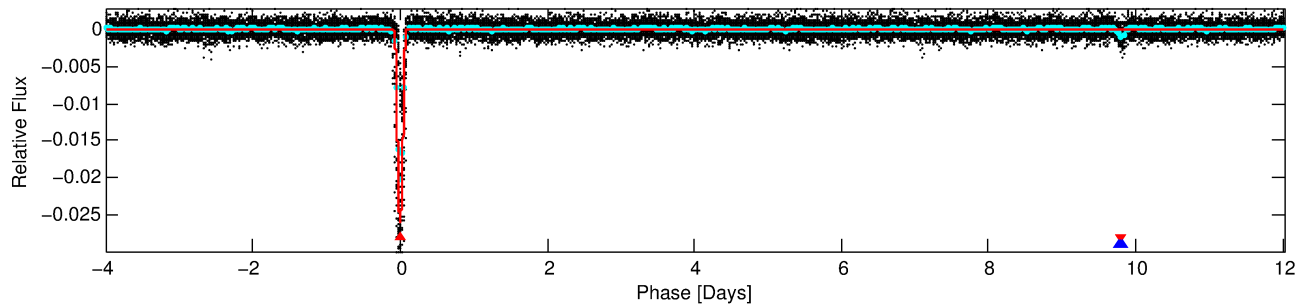
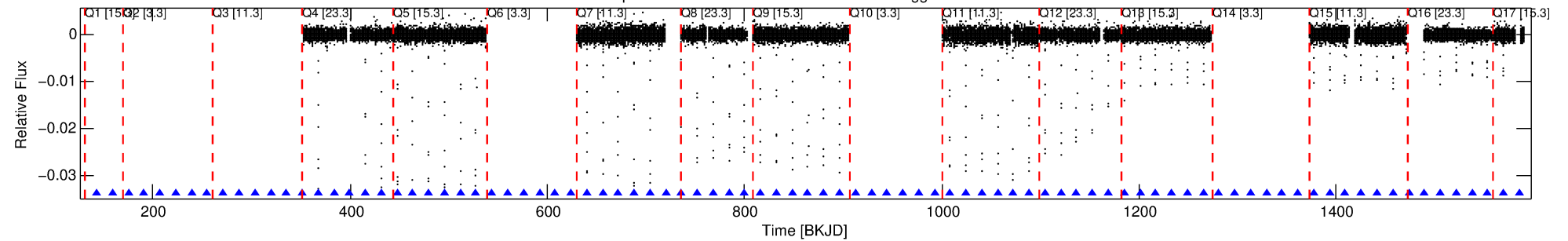
No Significant Match Found

DV One-Page Summary

KIC: 4078157 Candidate: 1 of 2 Period: 16.026 d

KOI: K01319.01 Corr: 0.943

Kp: 15.48 R*: 0.79 Rs Teff: 5776.0 K Logg: 4.58 Fe/H: -0.420



DV Fit Results:

Period = 16.02565 [0.00001] d
Epoch = 143.3201 [0.0004] BKJD
Rp/R* = 0.2578 [0.0737]
a/R* = 26.68 [0.59]
b = 1.00 [0.11]
Seff = 44.09 [14.88]
Teff = 657 [55] K
Rp = 22.20 [8.58] Re
a = 0.1187 [0.0256] AU
Ag = 12.28 [8.07] [1.40σ]
Teffp = 1902 [282] K [4.33σ]

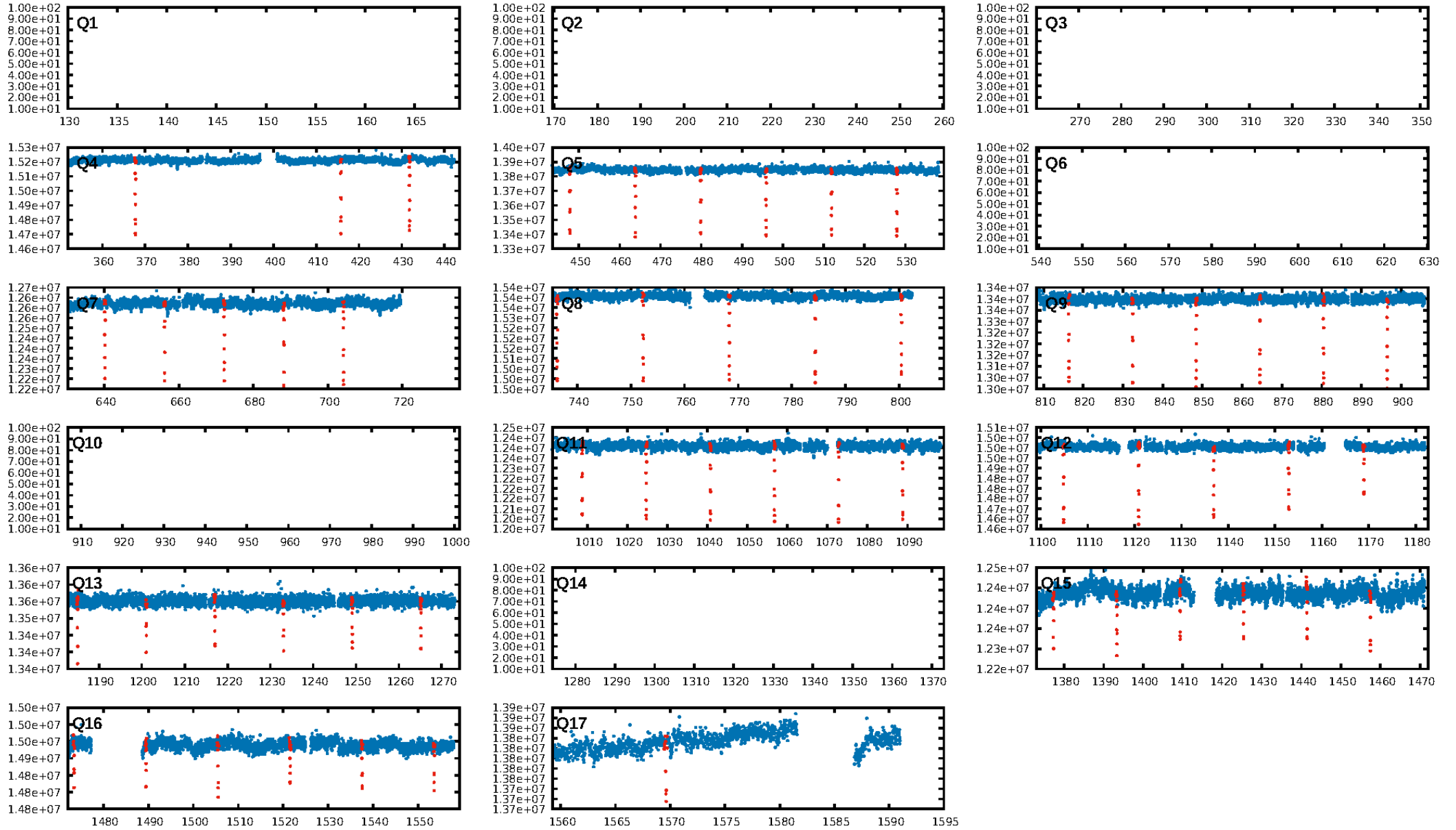
DV Diagnostic Results:

ShortPeriod-sig: 0.3% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 1.3%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [53/53]
GhostDiagnostic-chr: 3.067
Centroid-sig: 0.0%
Centroid-so: 1.233 arcsec [84.78σ]
OotOffset-rm: 3.116 arcsec [20.32σ]
KicOffset-rm: 0.095 arcsec [1.27σ]
OotOffset-st: 0/3/4/4 [11]
KicOffset-st: 0/3/4/4 [11]
DiffImageQuality-fgm: 1.00 [11/11]
DiffImageOverlap-fno: 1.00 [11/11]

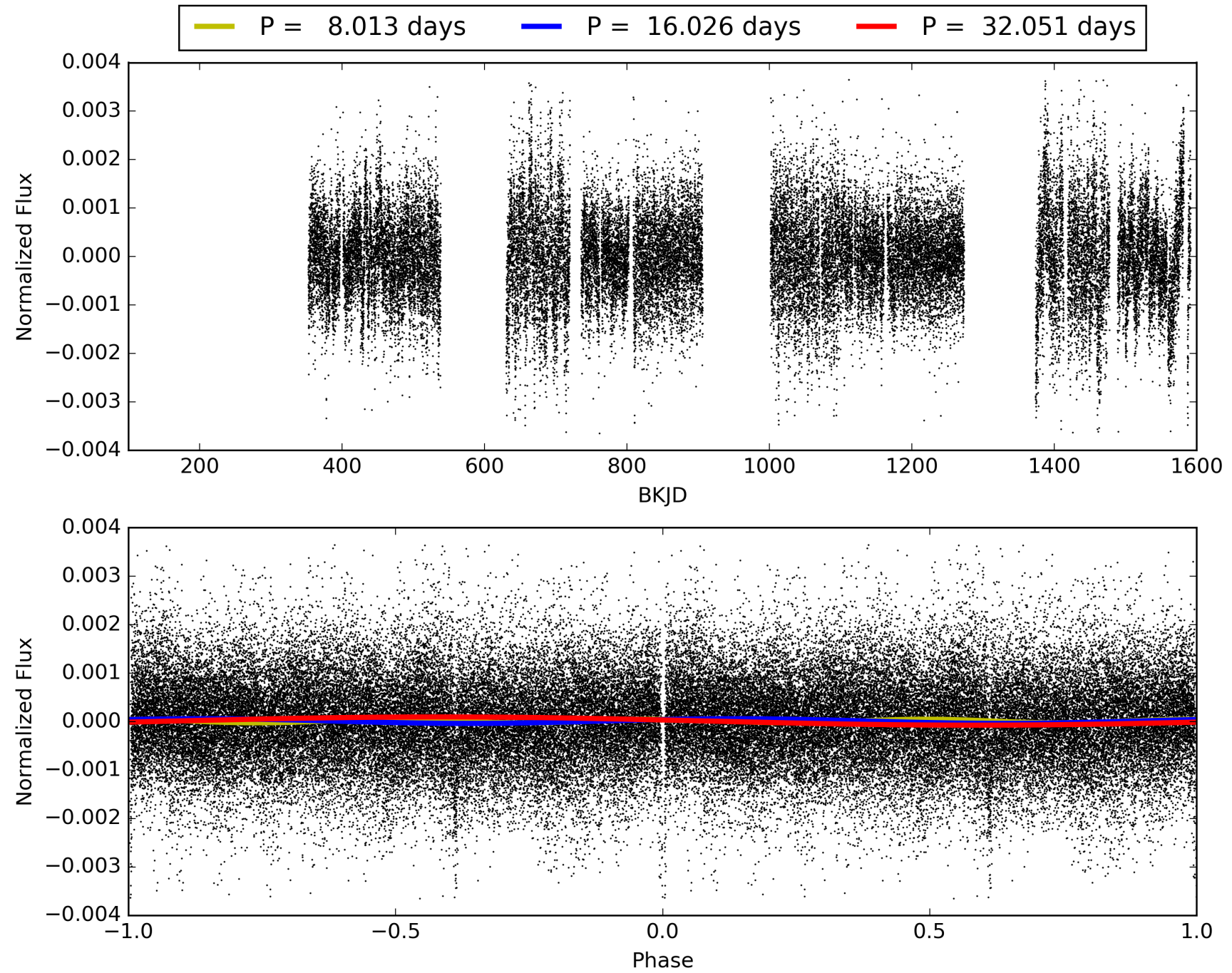
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:25:15 Z

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

TCE 004078157-01, PDC Light Curves

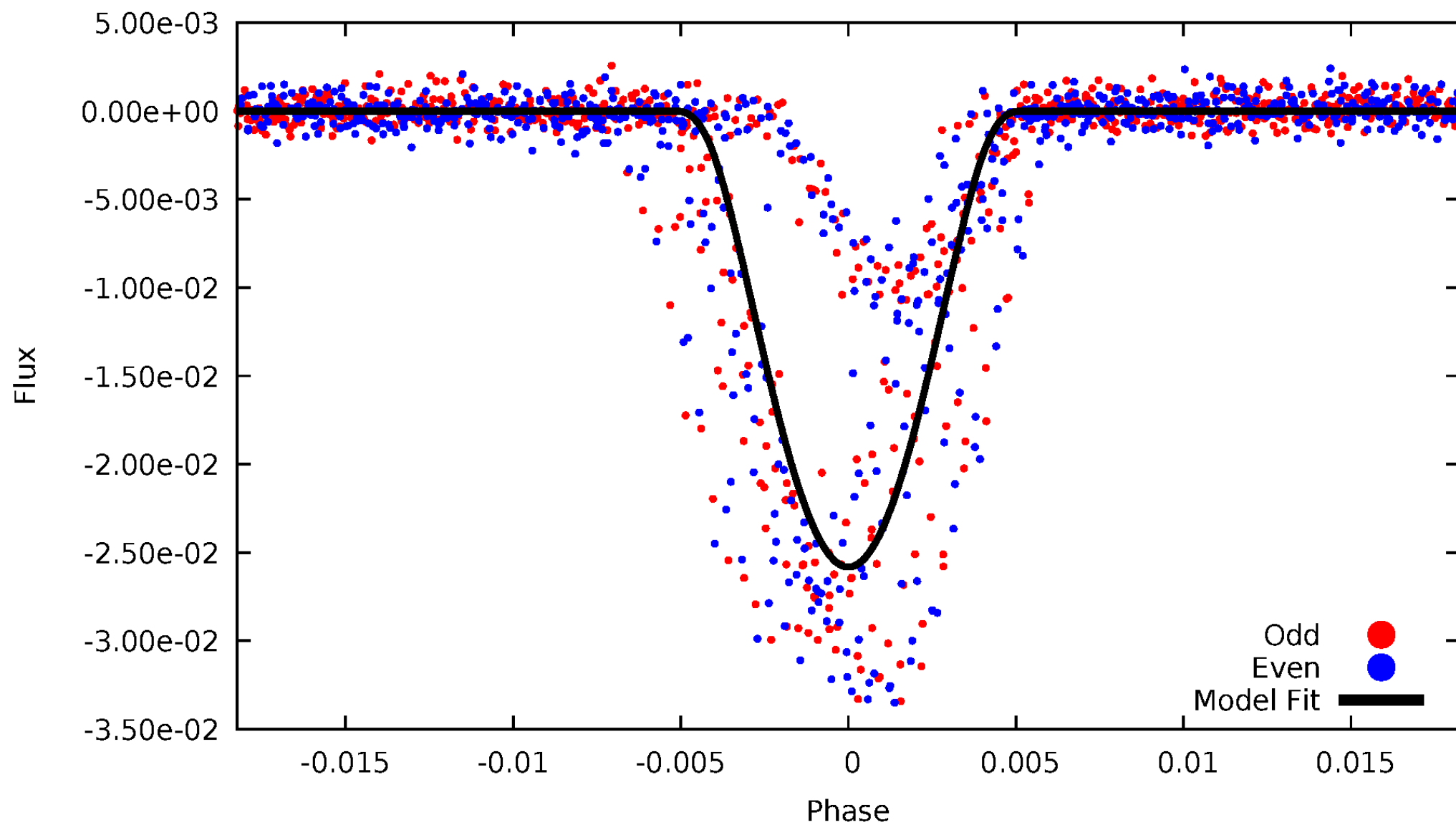


TCE 004078157-01



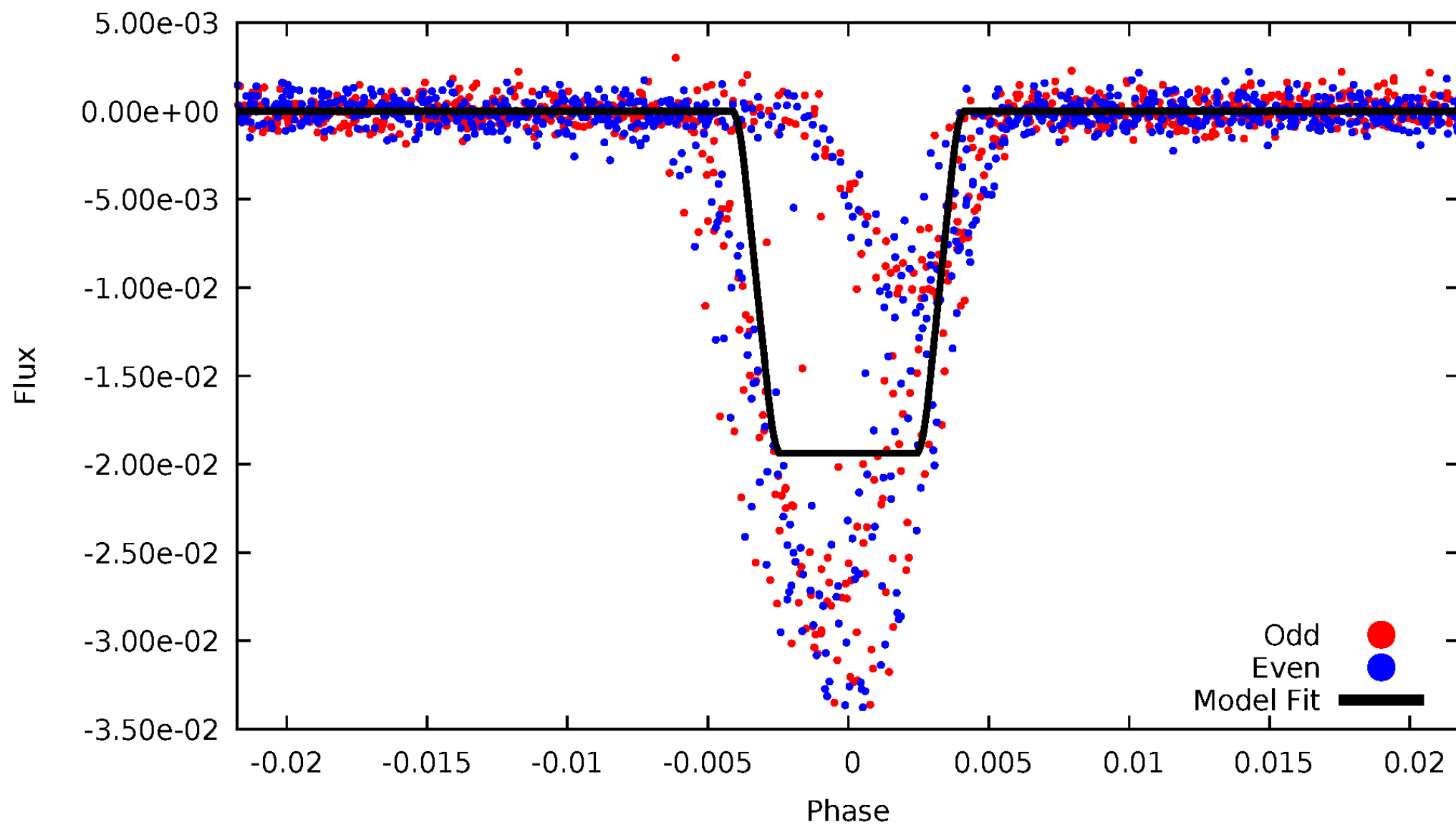
DV Odd/Even

TCE 004078157-01



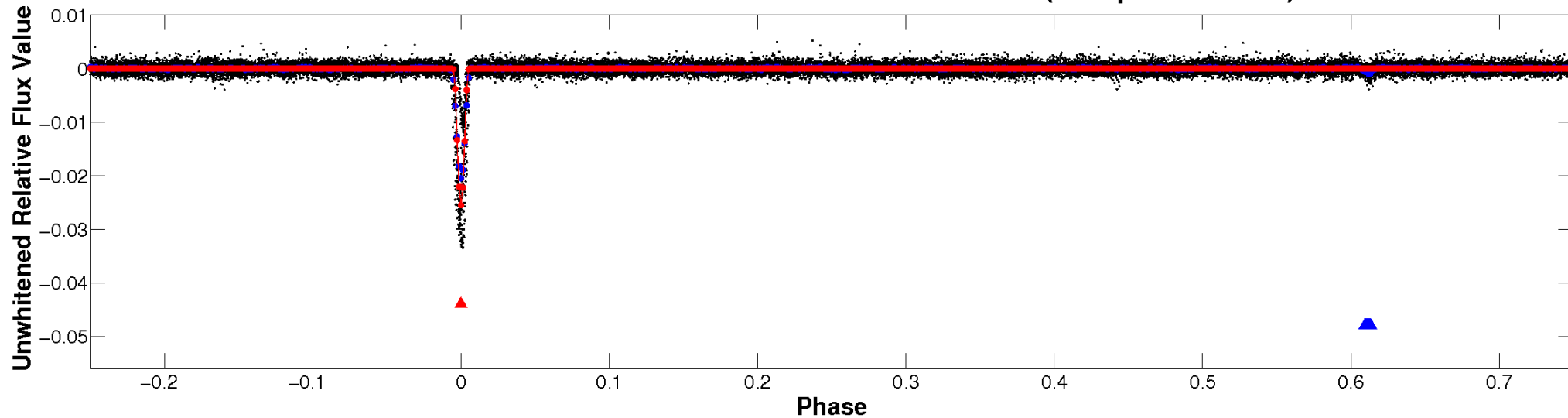
ALT Odd/Even

TCE 004078157-01

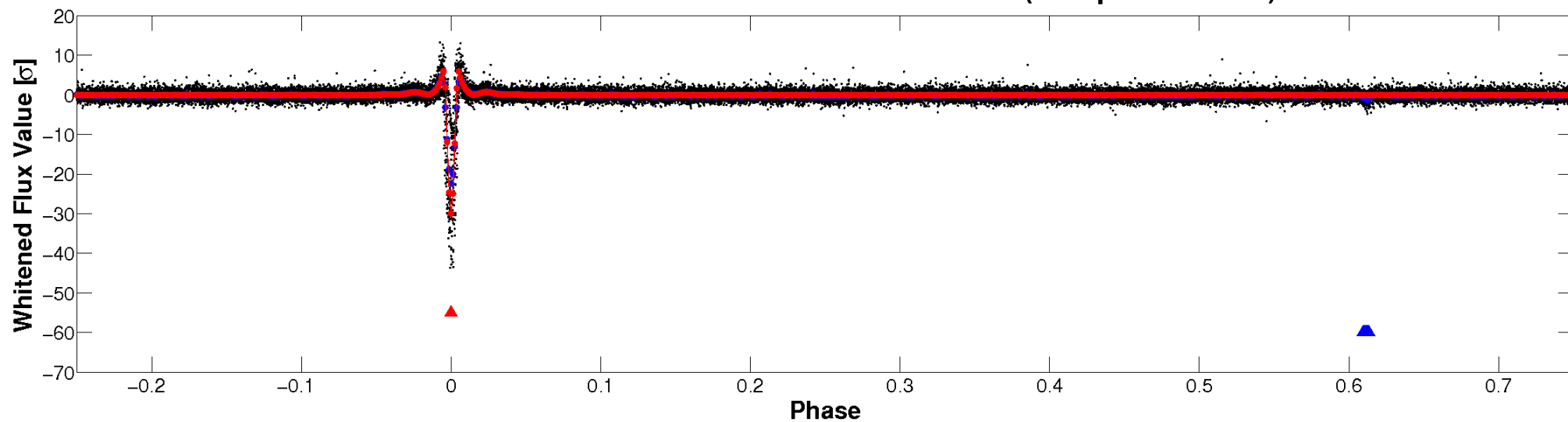


Non-Whitened Vs. Whitened Light Curve

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

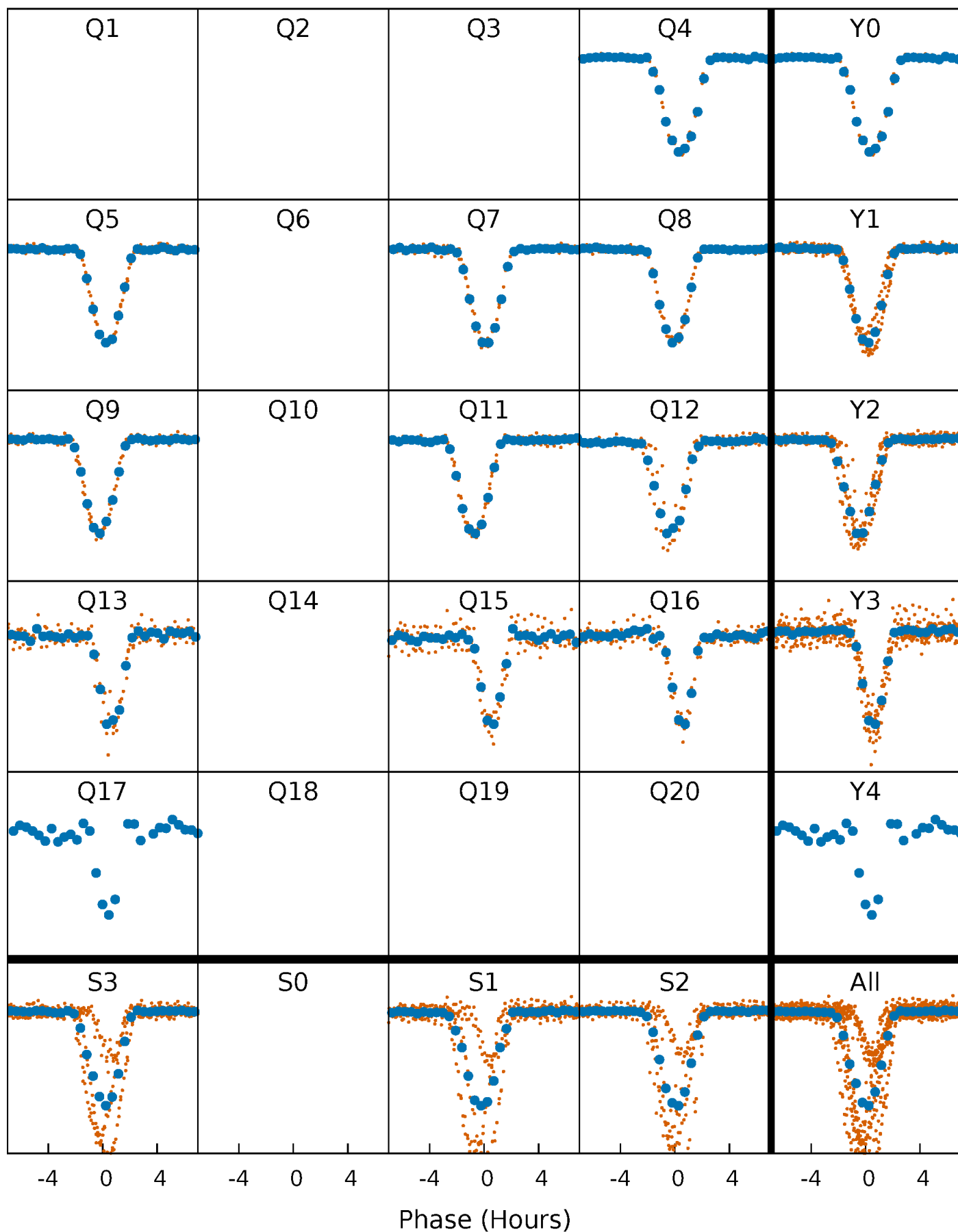


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



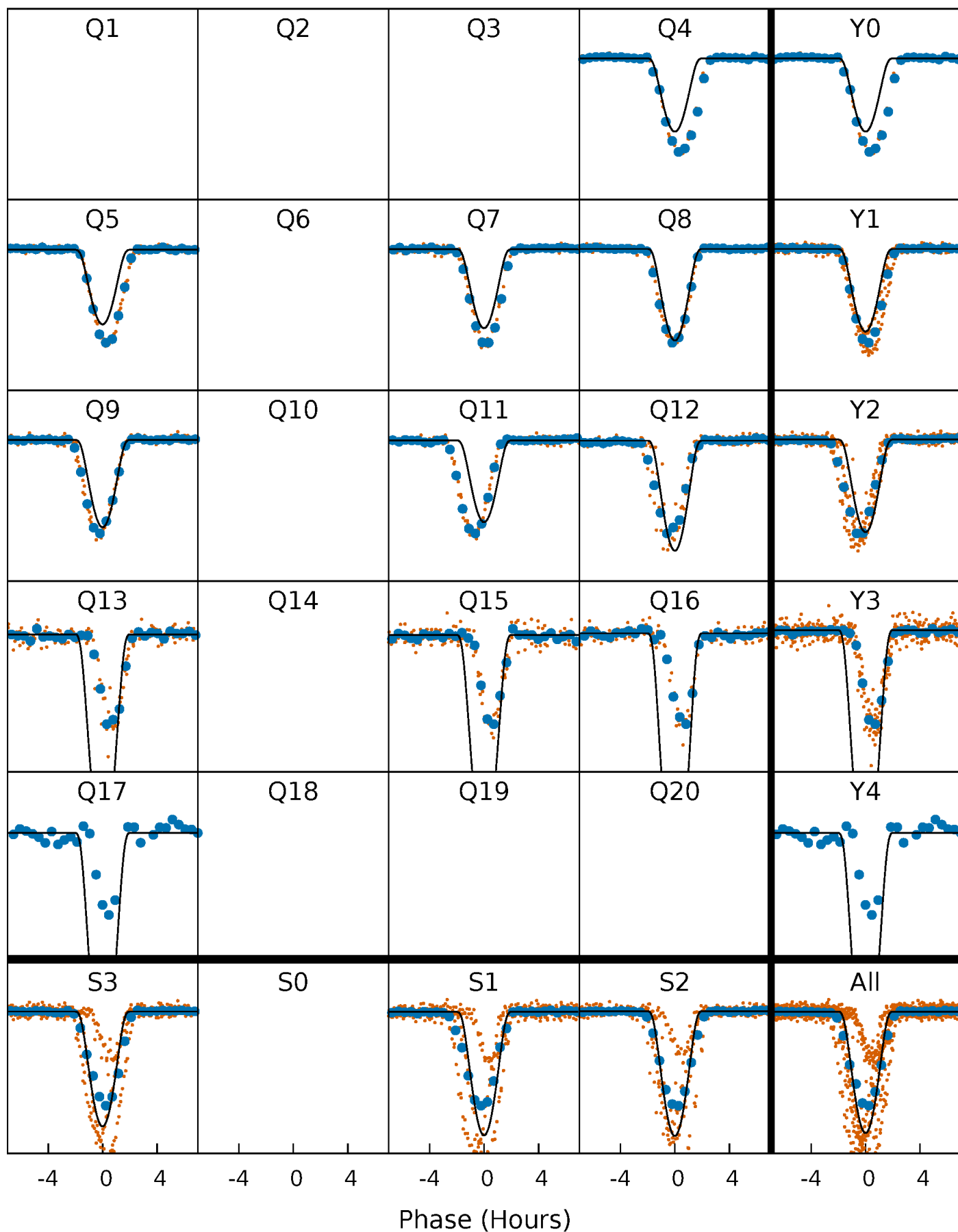
PDC Quarter-Phased Transit Curves

TCE 004078157-01 P= 16.025647 Days $T_0=143.320070$ (BKJD)



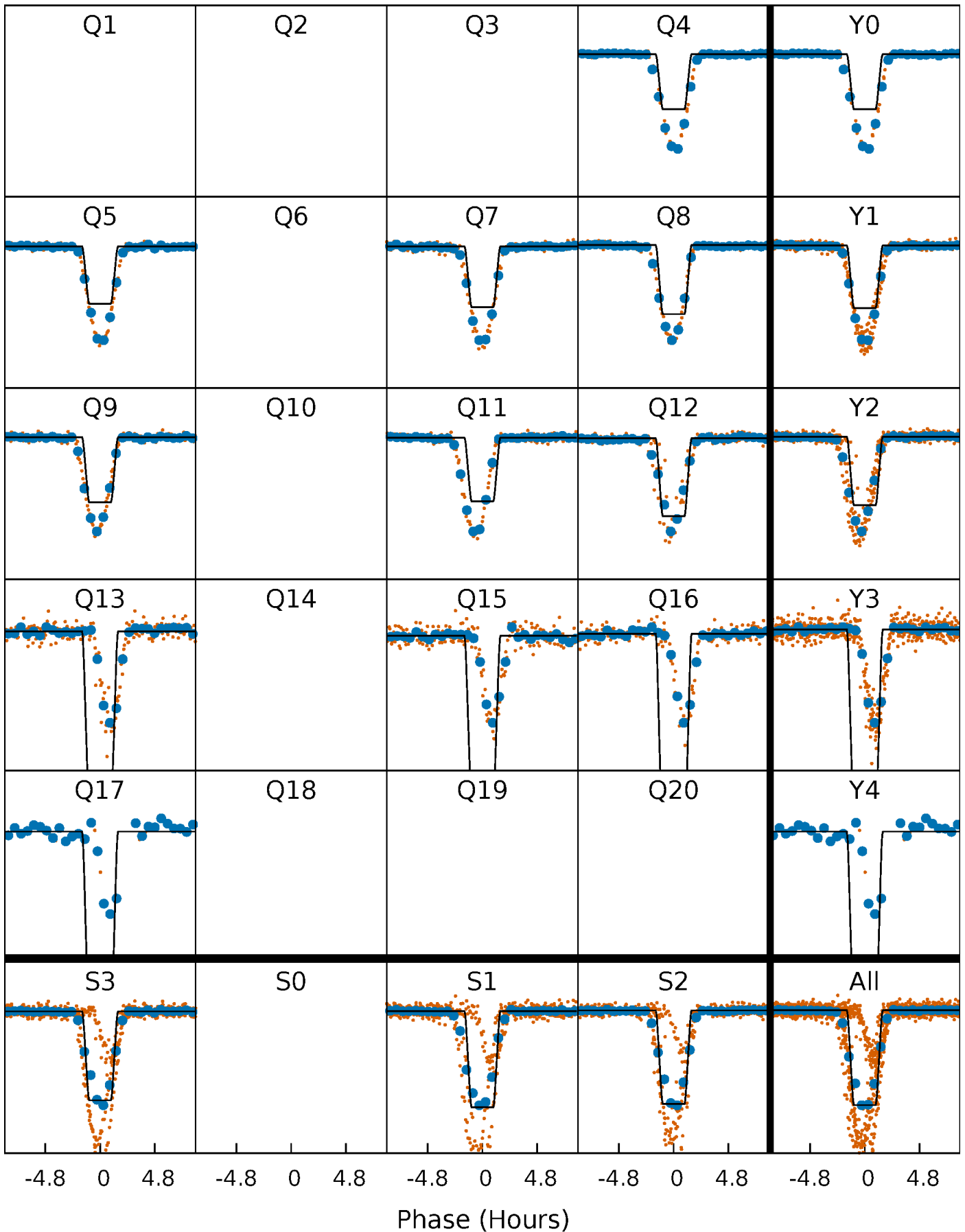
DV Quarter-Phased Transit Curves

TCE 004078157-01 P= 16.025647 Days $T_0=143.320070$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

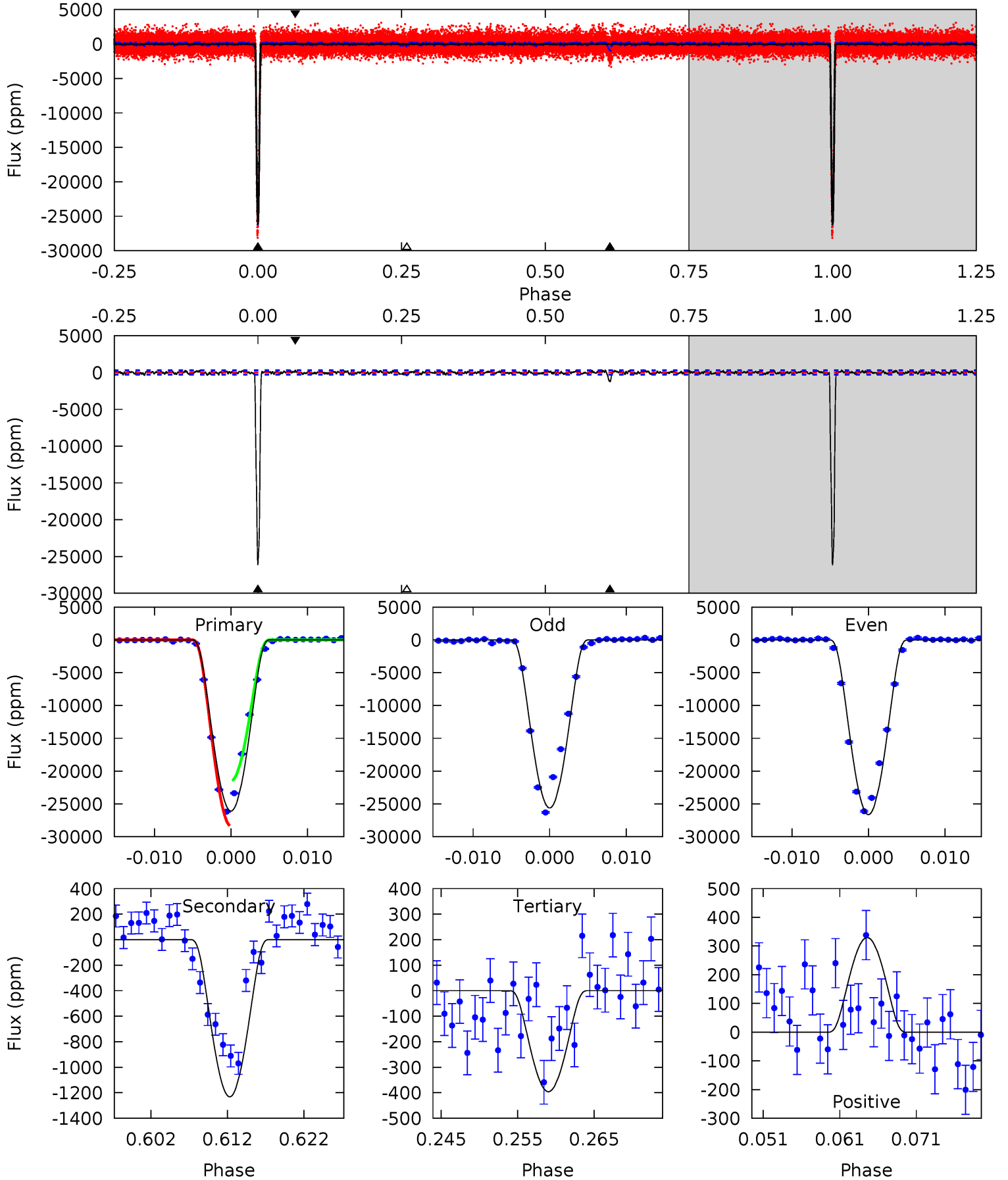
TCE 004078157-01 P= 16.025222 Days $T_0=143.339772$ (BKJD)



DV Model-Shift Uniqueness Test

004078157-01, P = 16.025647 Days, E = 143.320070 Days

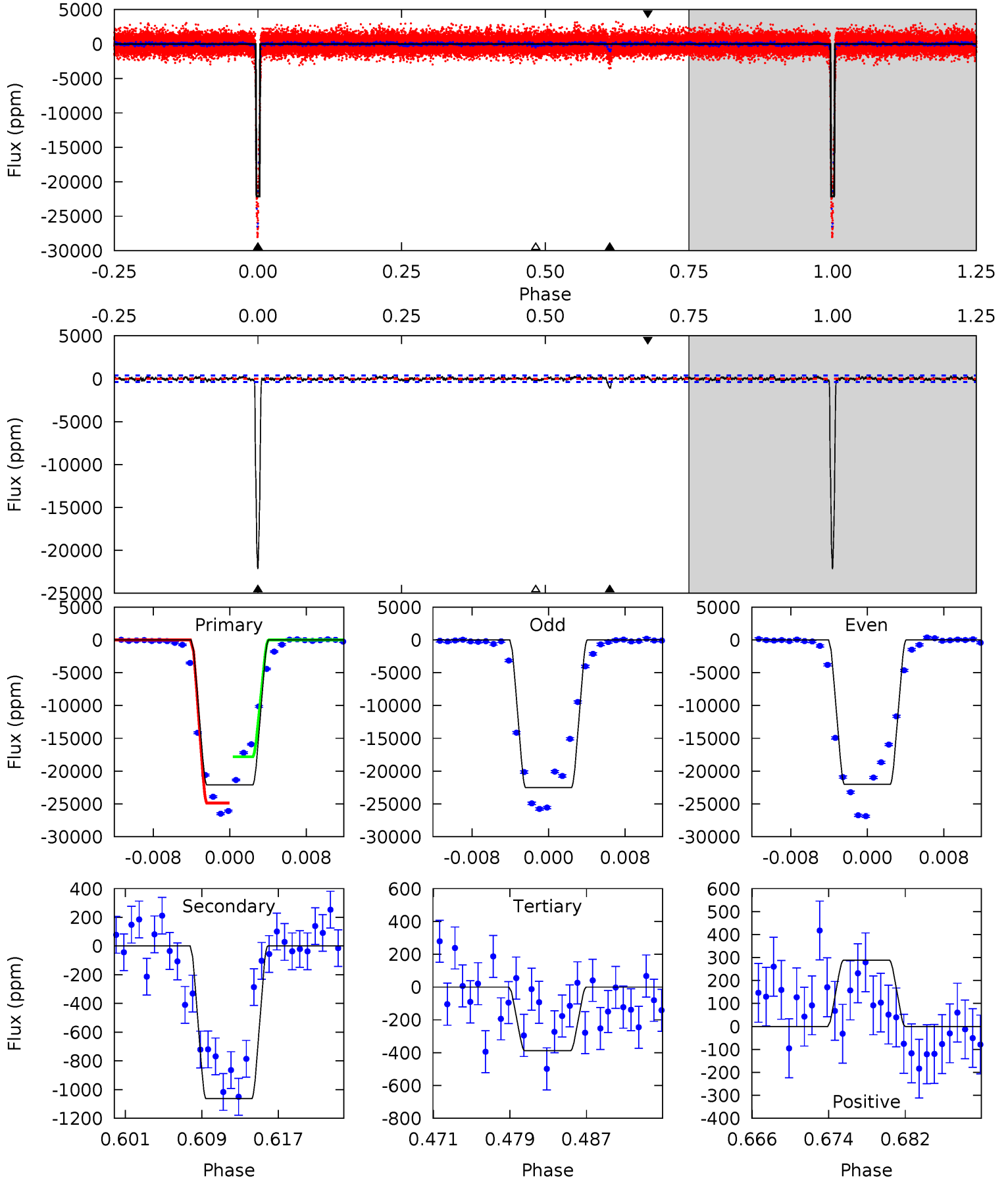
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
453.4	21.4	6.88	5.72	5.02	2.57	1.97	446.5	447.6	14.5	15.7	8.61	0.84	0.01	0



Alt Model-Shift Uniqueness Test

004078157-01, P = 16.025222 Days, E = 143.339772 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
296.6	14.3	5.21	3.87	5.07	2.65	1.32	291.4	292.8	9.05	10.4	3.16	0.81	0.01	0



Stellar Parameters For KIC 004078157

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5776^{+190}_{-190}	$4.582^{+0.042}_{-0.168}$	$-0.420^{+0.300}_{-0.300}$	$0.789^{+0.205}_{-0.068}$	$0.879^{+0.096}_{-0.096}$	$2.517^{+0.425}_{-1.167}$
	+3%/-3%	+1%/-4%	+71%/-71%	+26%/-9%	+11%/-11%	+17%/-46%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004078157-01 / KOI 1319.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1232 ± 58	$23.20^{+7.35}_{-7.29}$	938^{+62}_{-42}	2861^{+310}_{-207}	18^{+19}_{-7}
Alt.	-1063 ± 75	$13.00^{+6.52}_{-6.70}$	940^{+59}_{-47}	3320^{+821}_{-372}	49^{+143}_{-28}

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 $A_{obs} \gg 1.0$

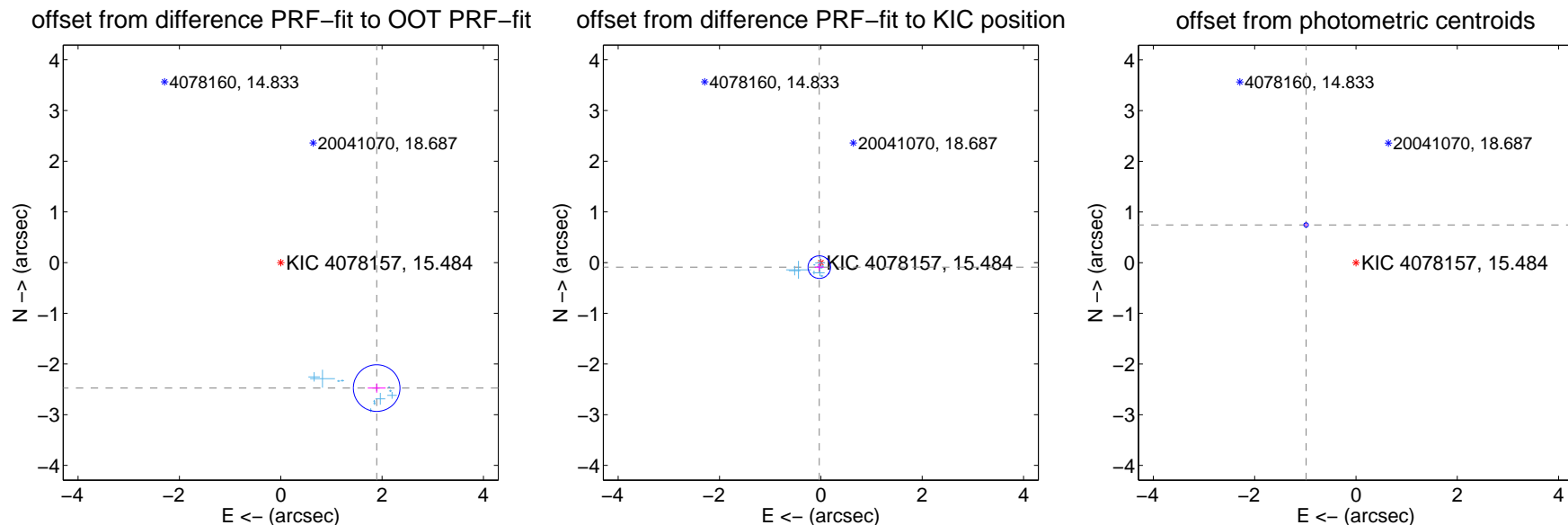
DV Centroid Data

Supplemental centroid analysis for 004078157-01. Kepler magnitude: 15.48. Transit SNR 220.67

There are 11 quarters with good PRF difference image offsets

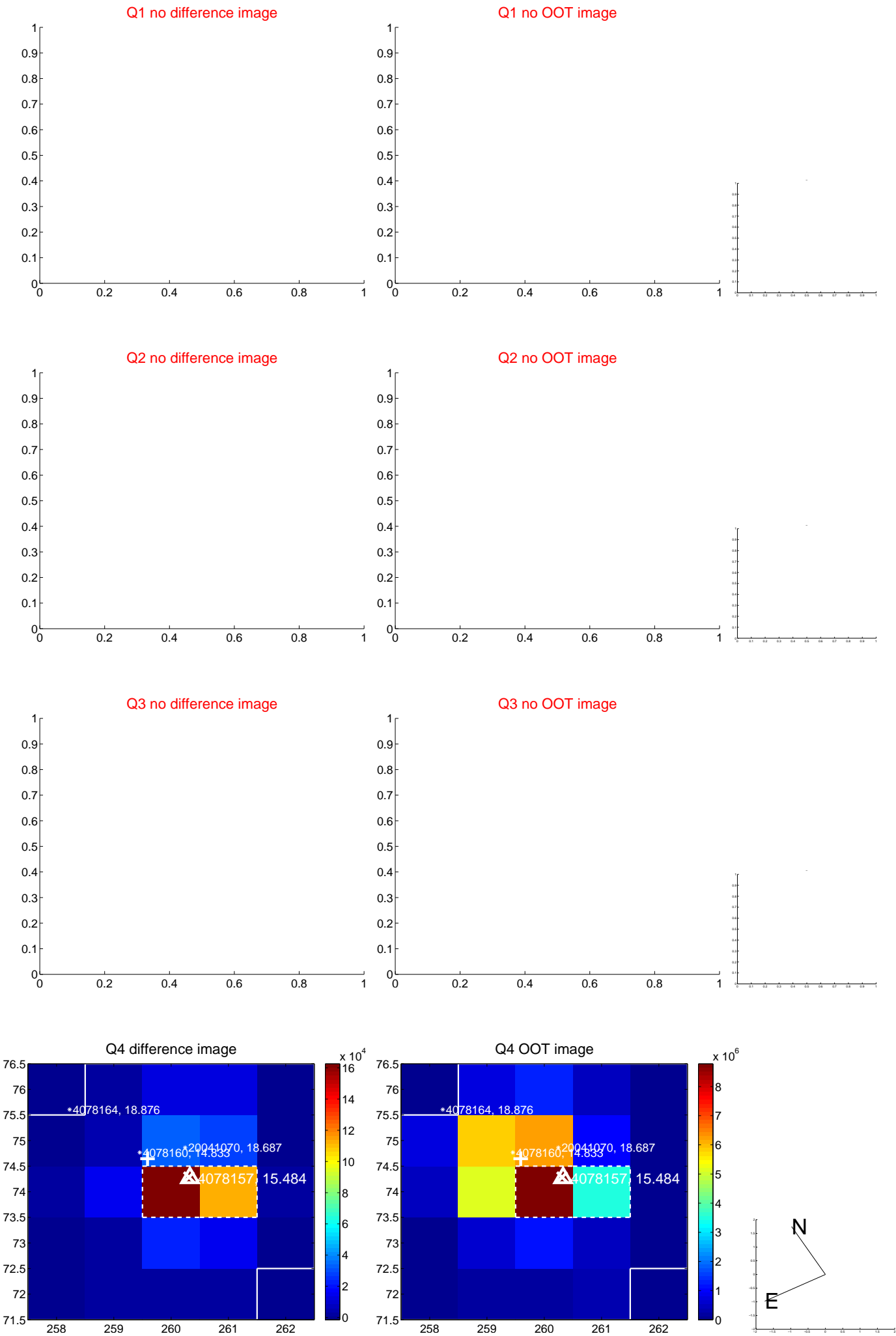
The OOT PRF centroid is offset from the target star catalog position by about 2.49 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.116 ± 0.153	20.32	-1.893 ± 0.175	-2.475 ± 0.092
PRF-fit source offset from KIC position	0.095 ± 0.074	1.27	0.031 ± 0.090	-0.089 ± 0.070
photometric centroid source offset	1.23 ± 0.01	84.78	0.98 ± 0.01	0.74 ± 0.01

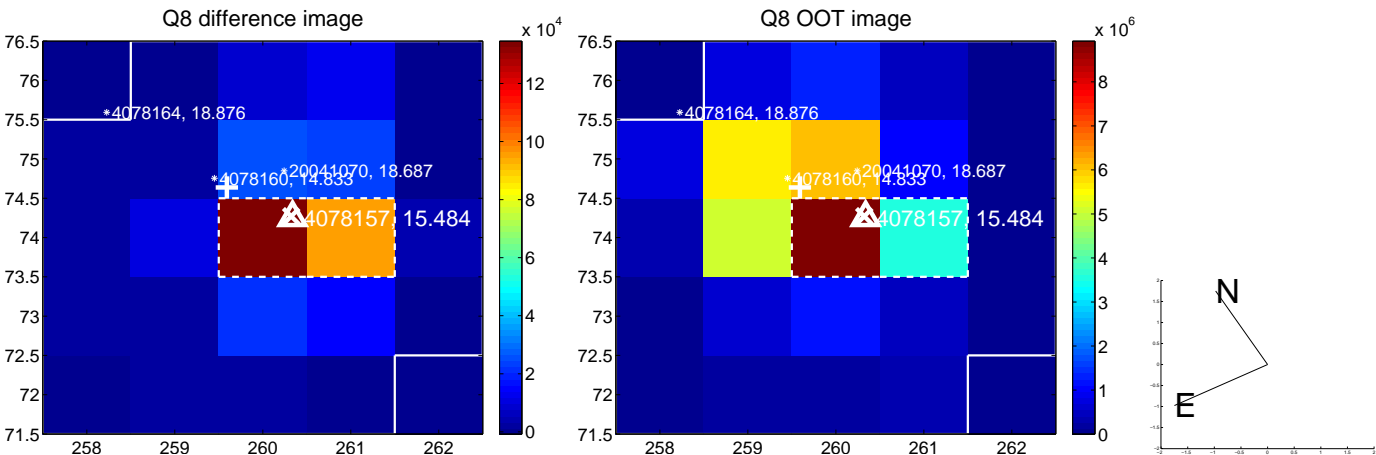
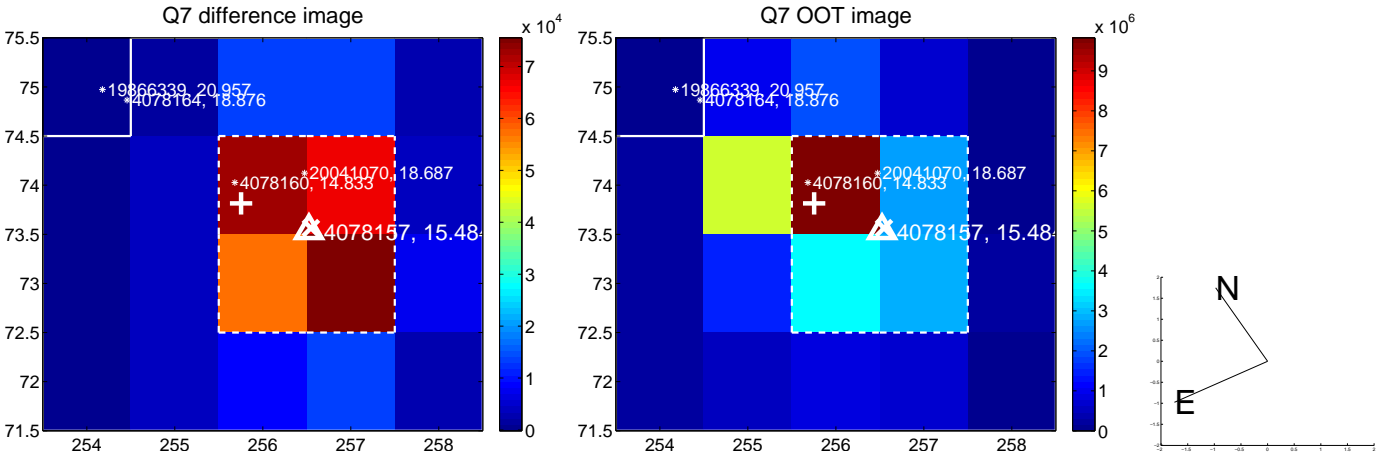
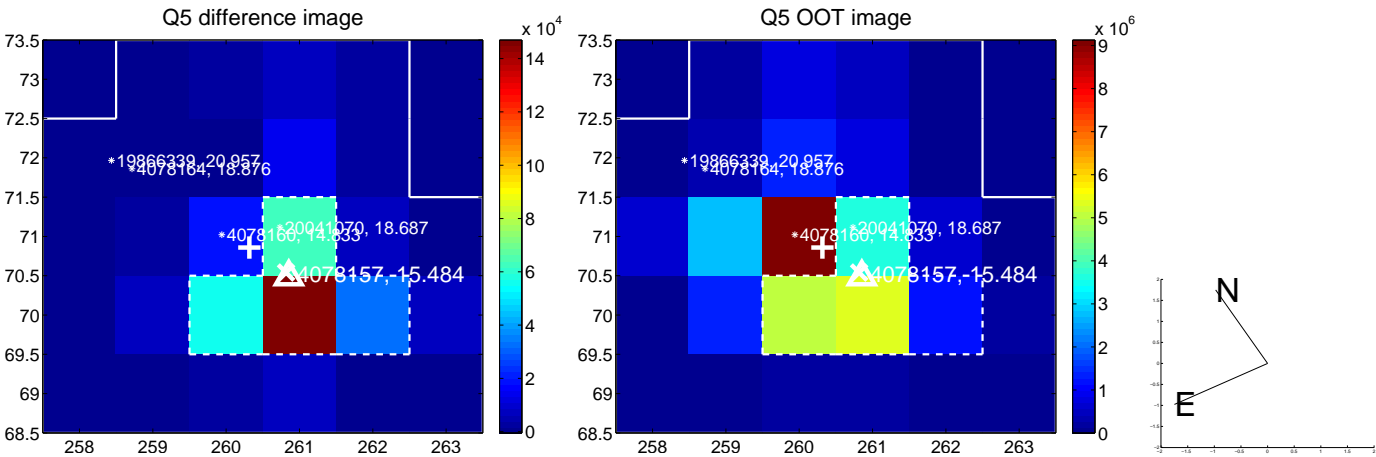


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

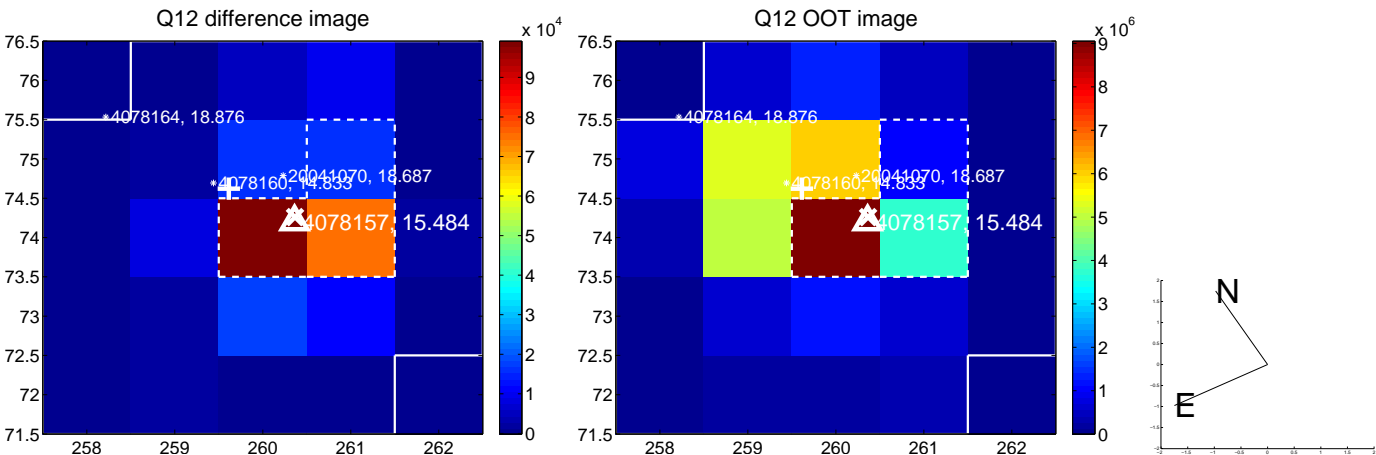
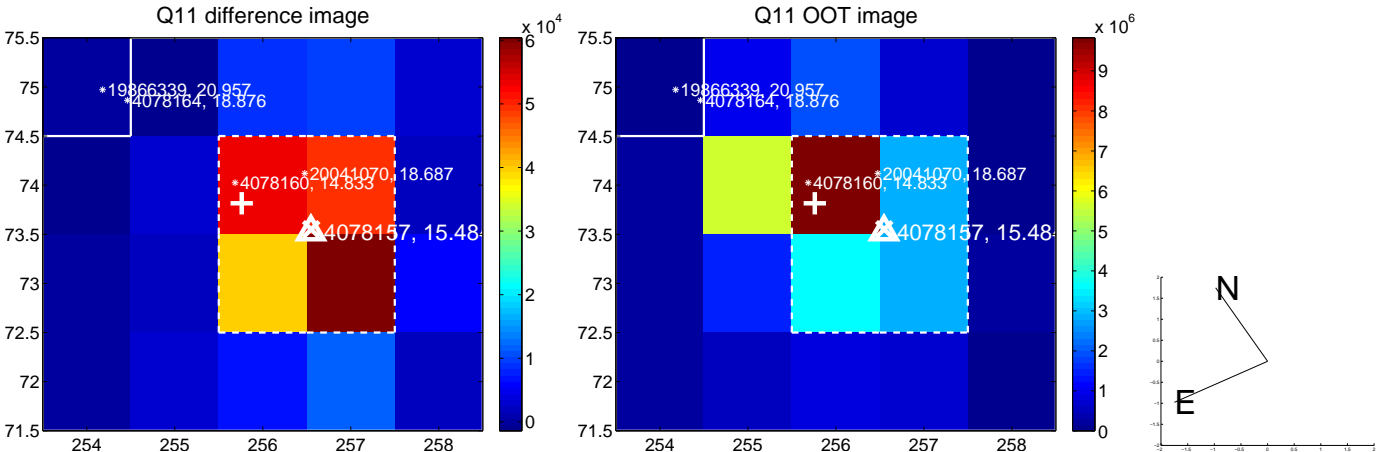
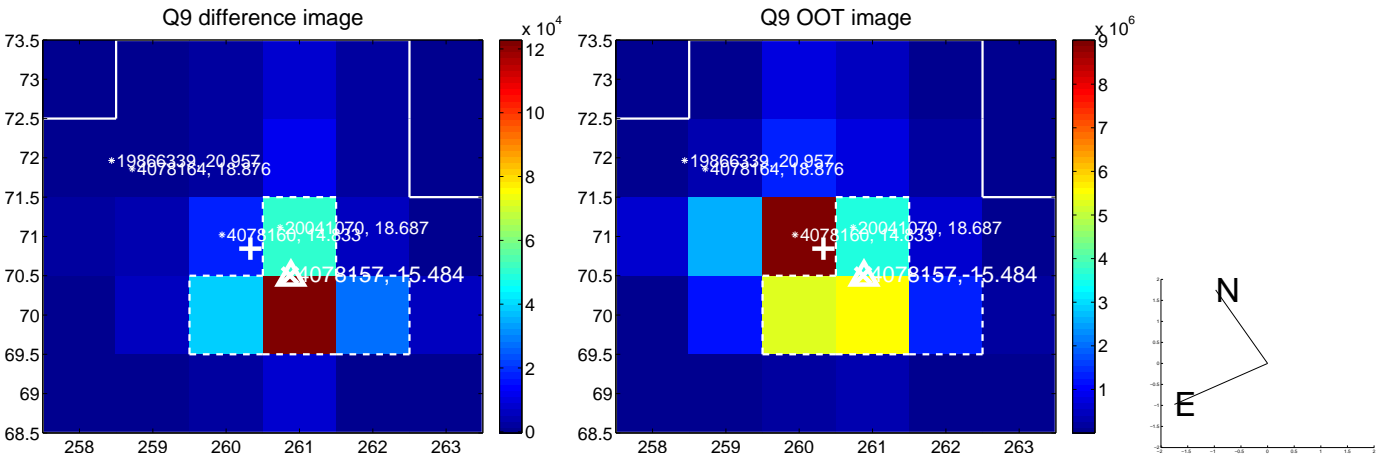
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



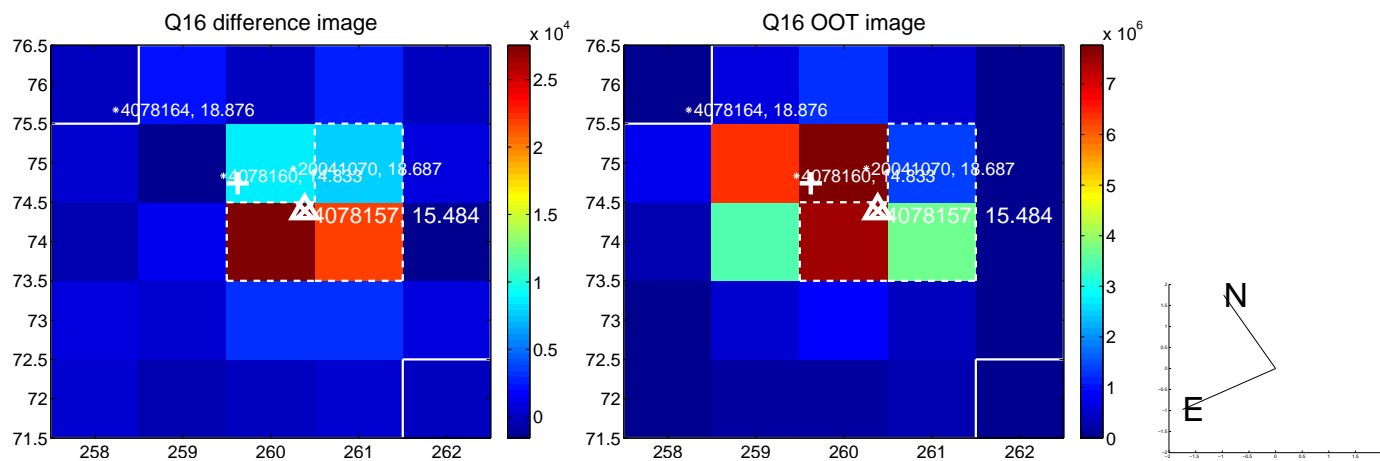
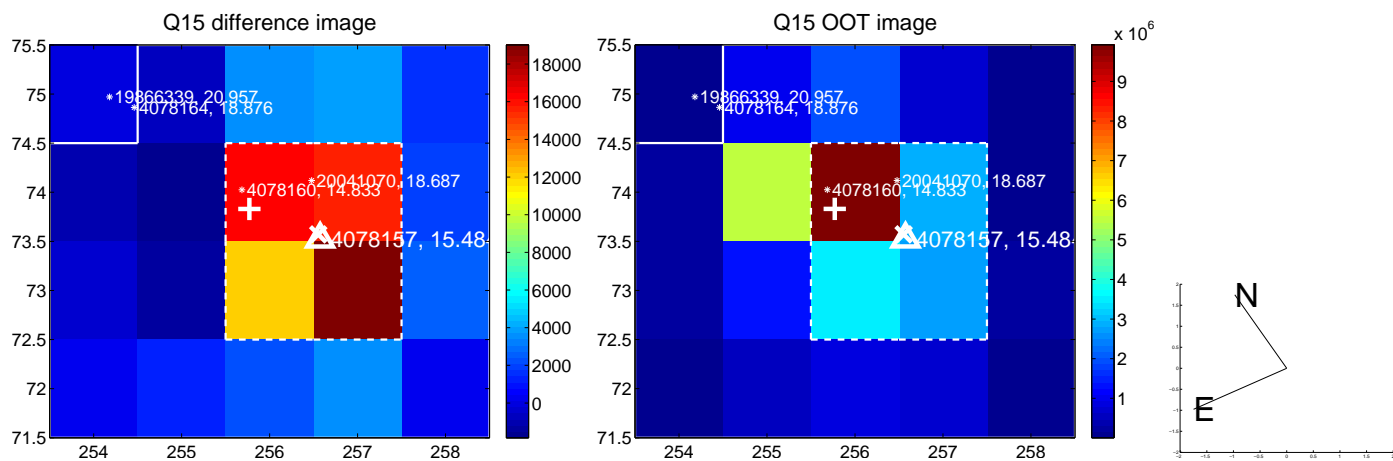
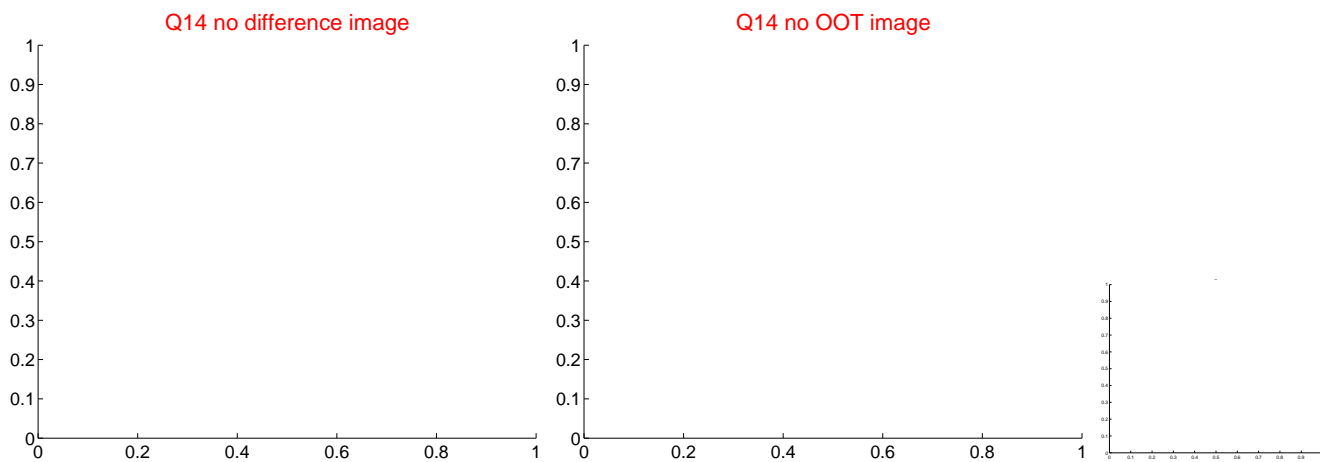
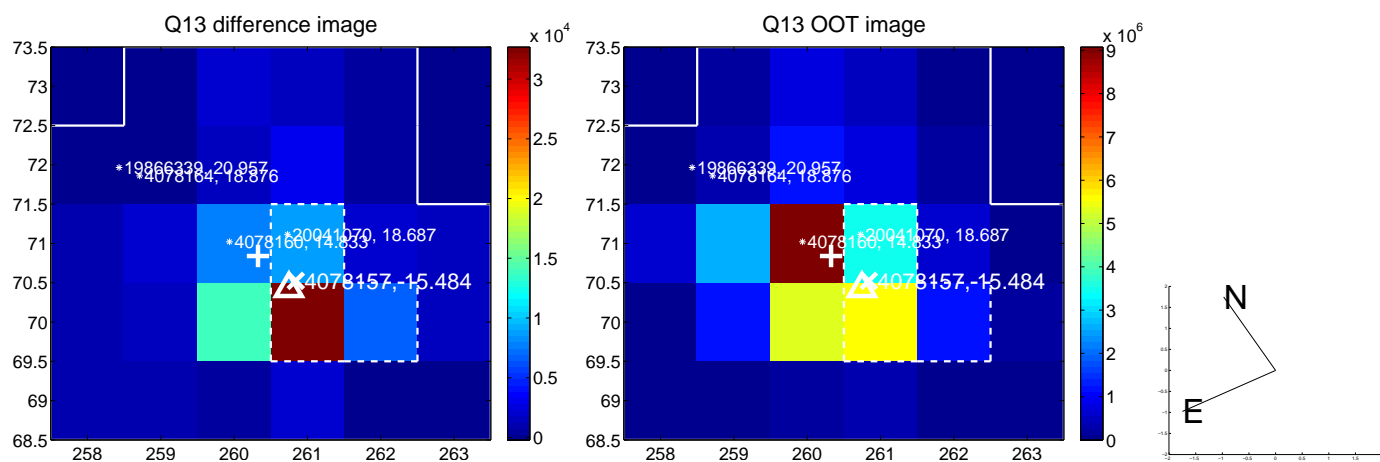
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



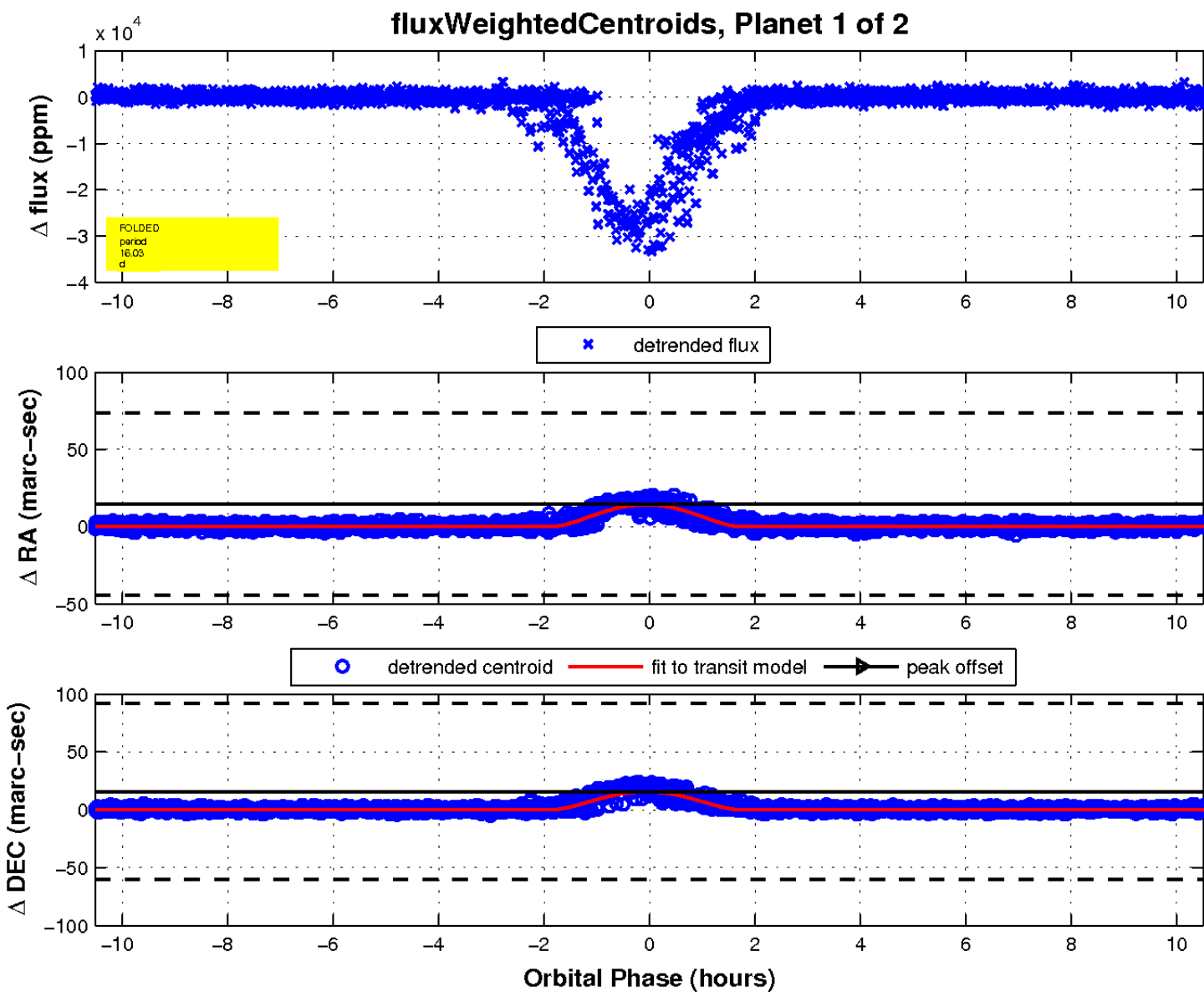
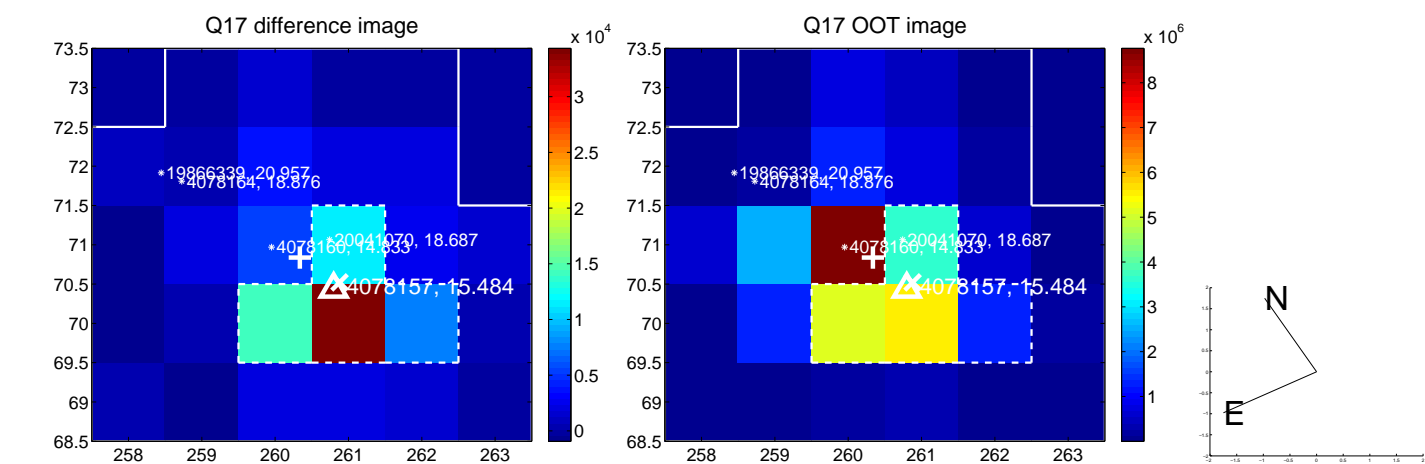
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

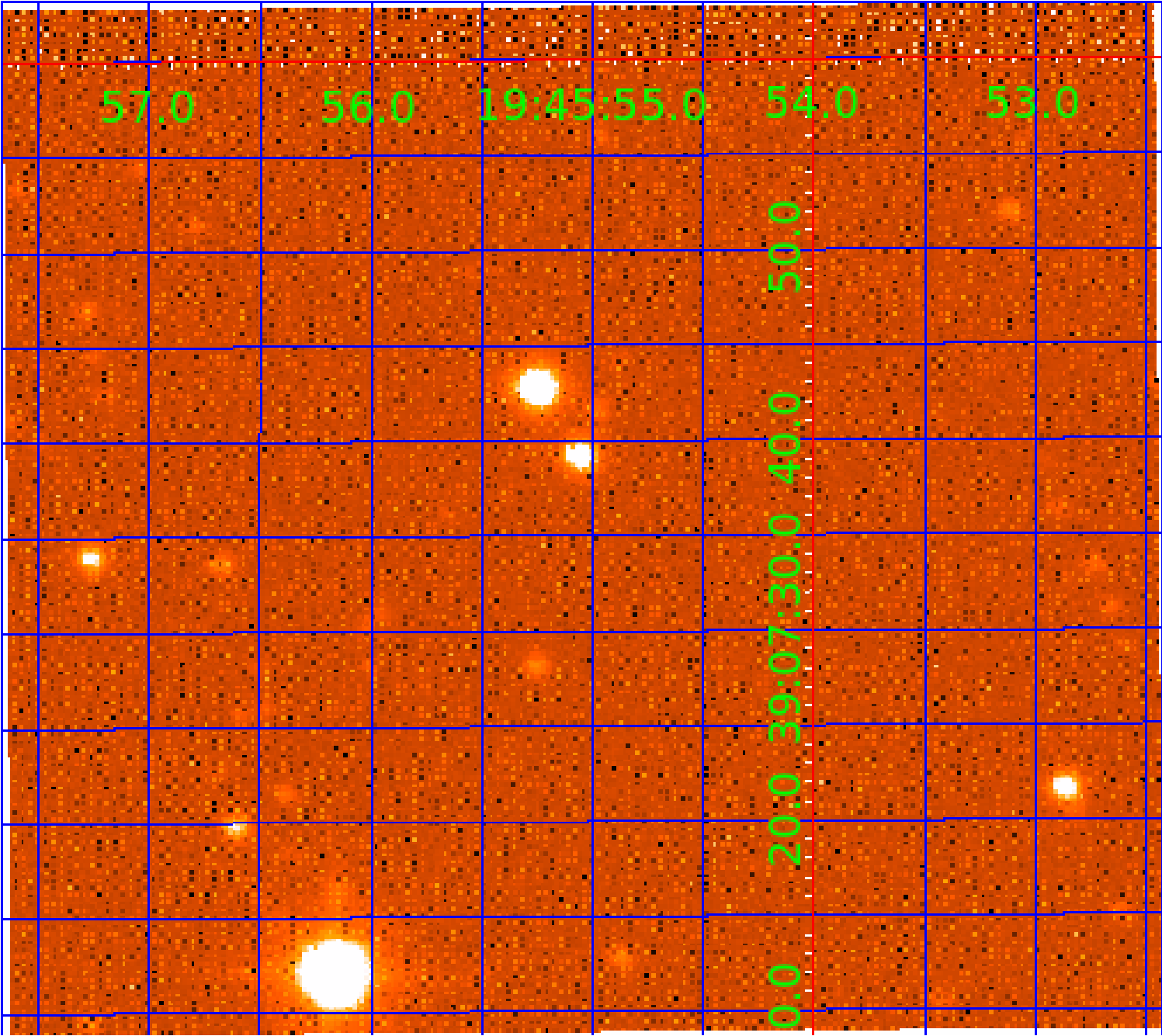


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004078157

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})
004078157-01	OBS	1319.01	16.025647	143.320070	25816.2	3.505	294.4	220.7	0.79	5776	22.20	44.09
004078157-02	OBS	No	16.024967	137.123312	840.8	3.091	12.6	13.2	0.79	5776	2.53	44.09

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004078157-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS
004078157-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS

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

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

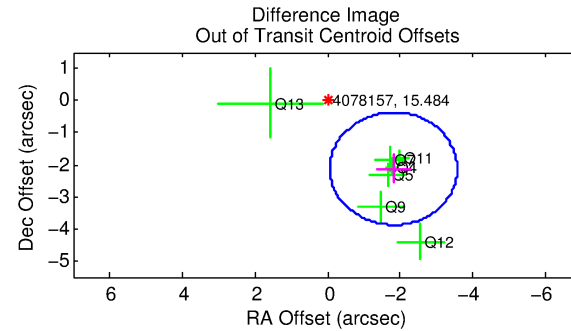
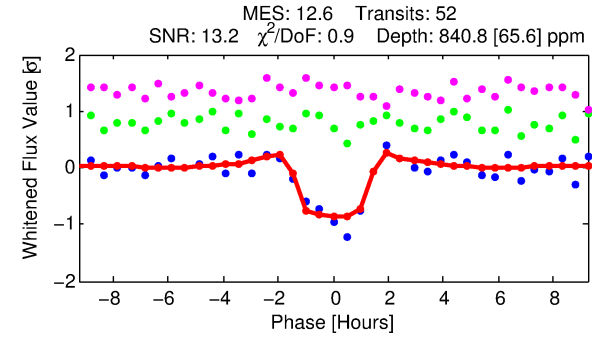
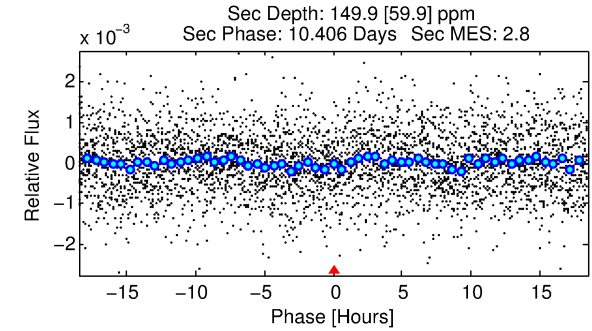
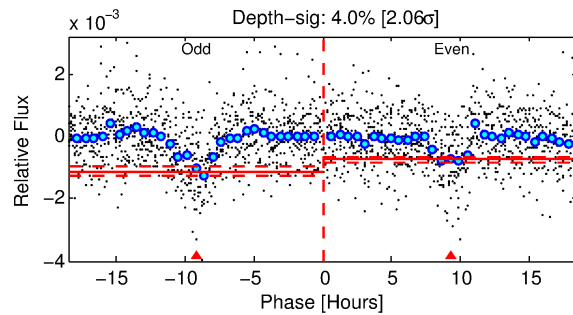
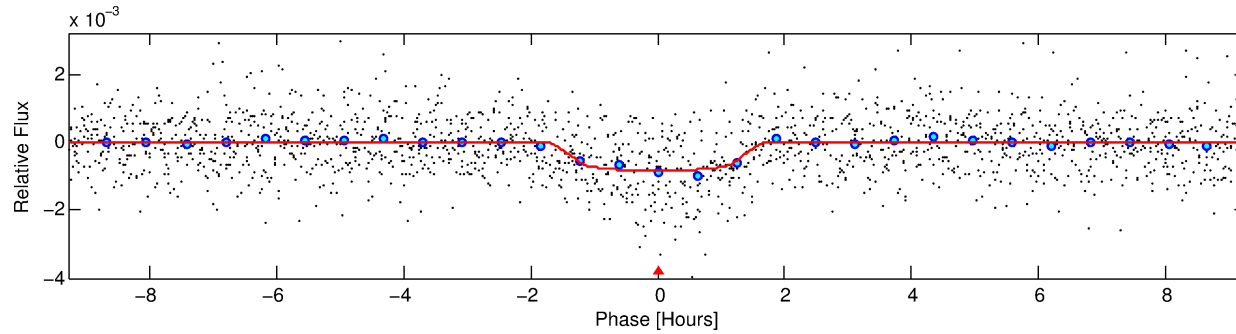
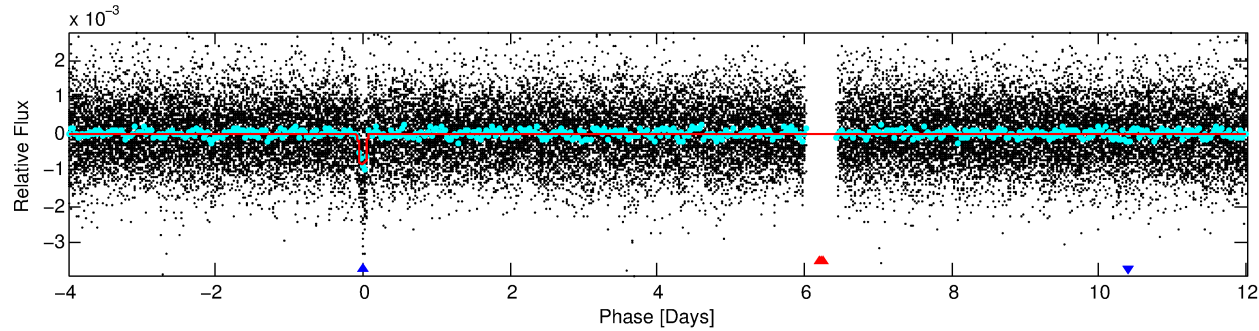
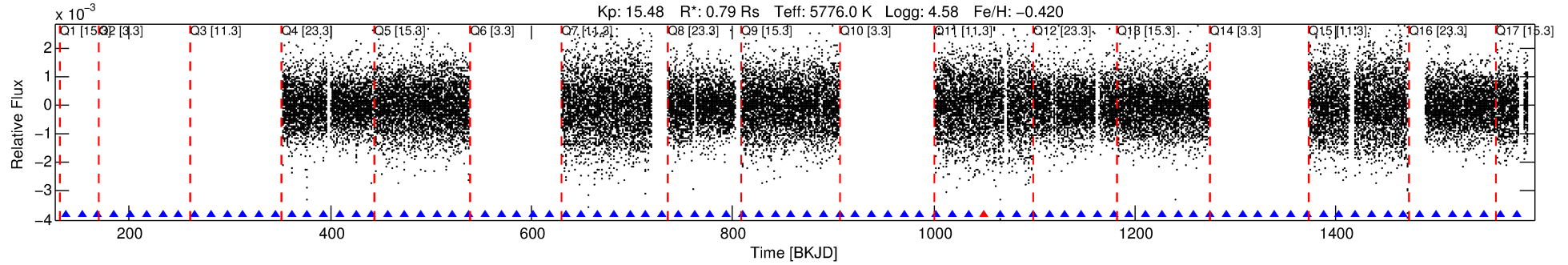
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004078157-02

No Significant Match Found

DV One-Page Summary

KIC: 4078157 Candidate: 2 of 2 Period: 16.025 d
KOI: K01319 Corr: No Ephemeris Match



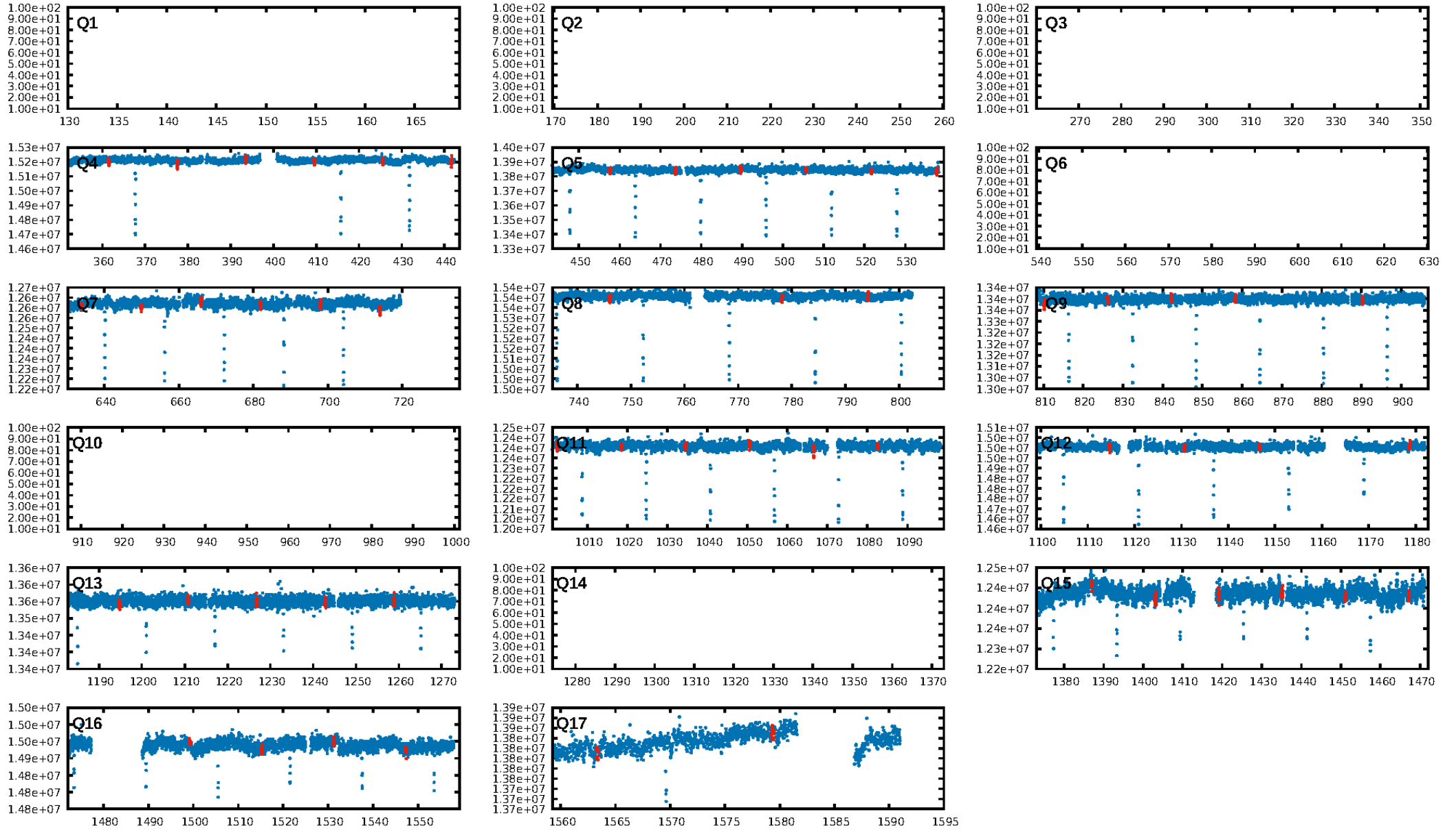
DV Fit Results:

Period = 16.02497 [0.00009] d
Epoch = 137.1233 [0.0050] BKJD
Rp/R* = 0.0294 [0.0114]
a/R* = 25.89 [46.75]
b = 0.80 [0.85]
Seff = 44.10 [14.88]
Teq = 657 [55] K
Rp = 2.53 [1.18] Re
a = 0.1187 [0.0256] AU
Ag = 181.15 [167.56] [1.08 σ]
Teffp = 3727 [821] K [3.73 σ]

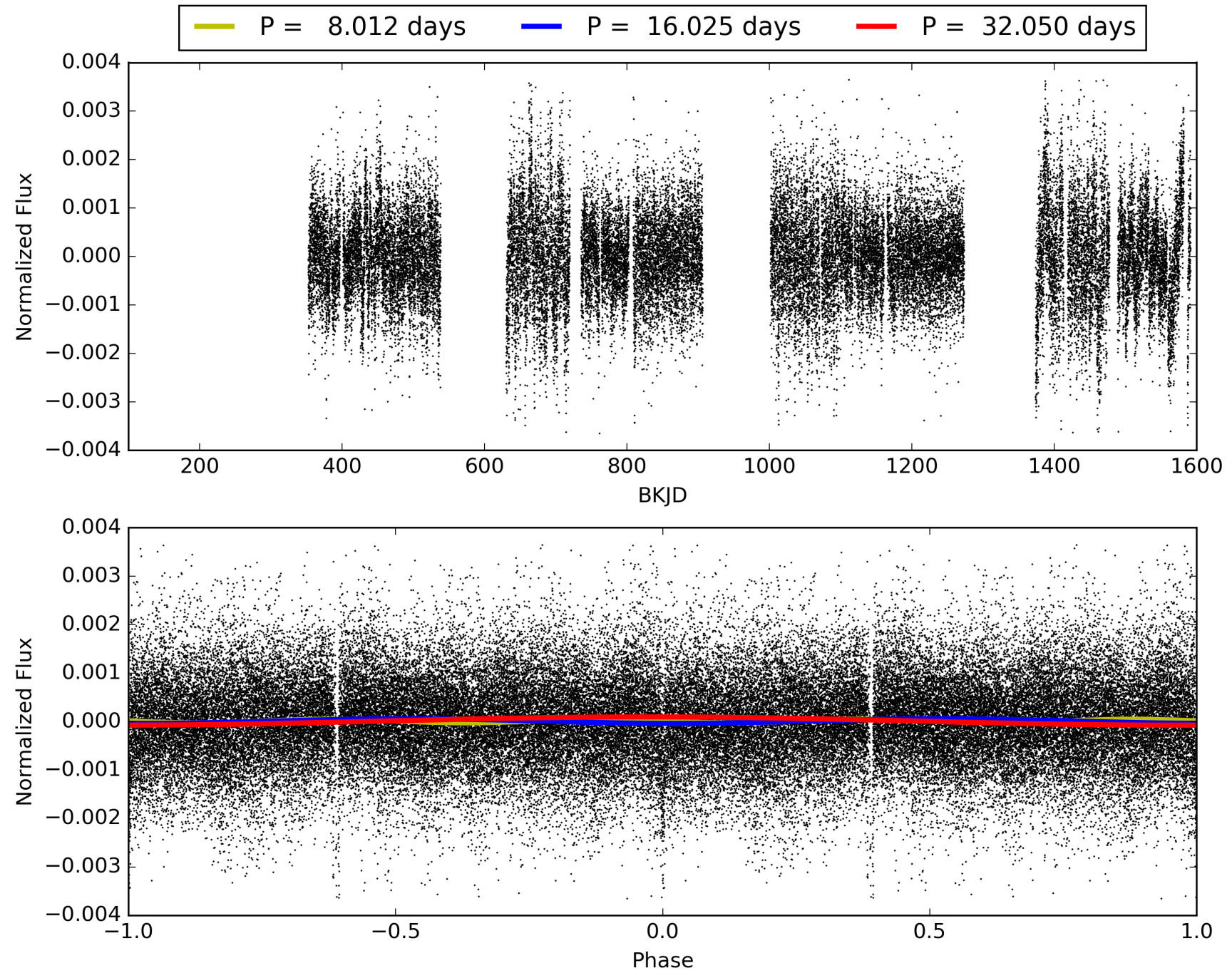
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.3% [0.00 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.86e-35
RollingBand-fgt: 0.98 [49/50]
GhostDiagnostic-chr: 27.38
Centroid-sig: 0.0%
Centroid-so: 1.018 arcsec [2.82 σ]
OotOffset-rm: 2.794 arcsec [4.78 σ]
OotOffset-st: 0/2/2/3 [7]
KicOffset-rm: 0.362 arcsec [0.77 σ]
KicOffset-st: 0/2/2/3 [7]
DiffImageQuality-fgm: 0.86 [6/7]
DiffImageOverlap-fno: 1.00 [11/11]

TCE 004078157-02, PDC Light Curves

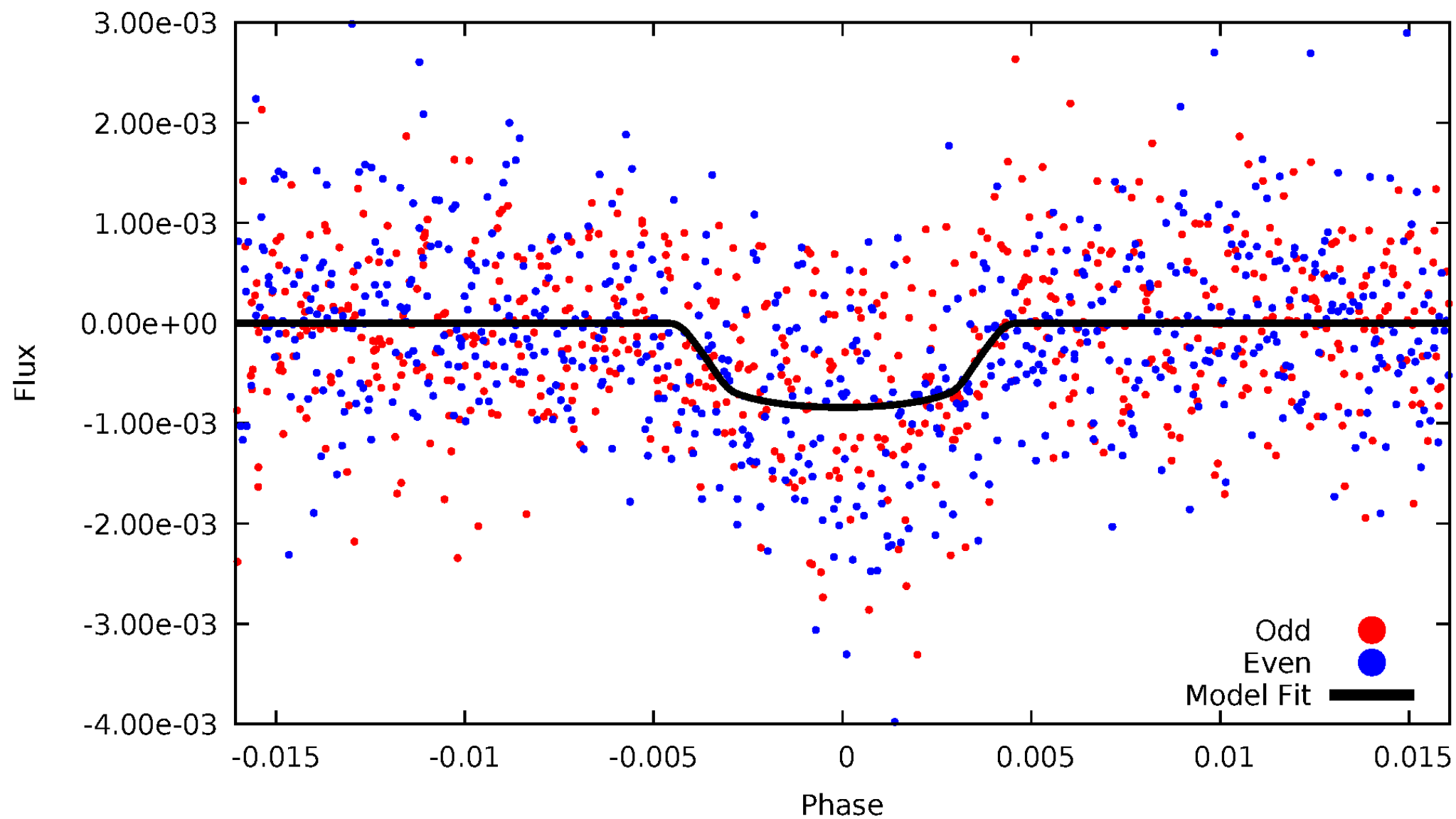


TCE 004078157-02



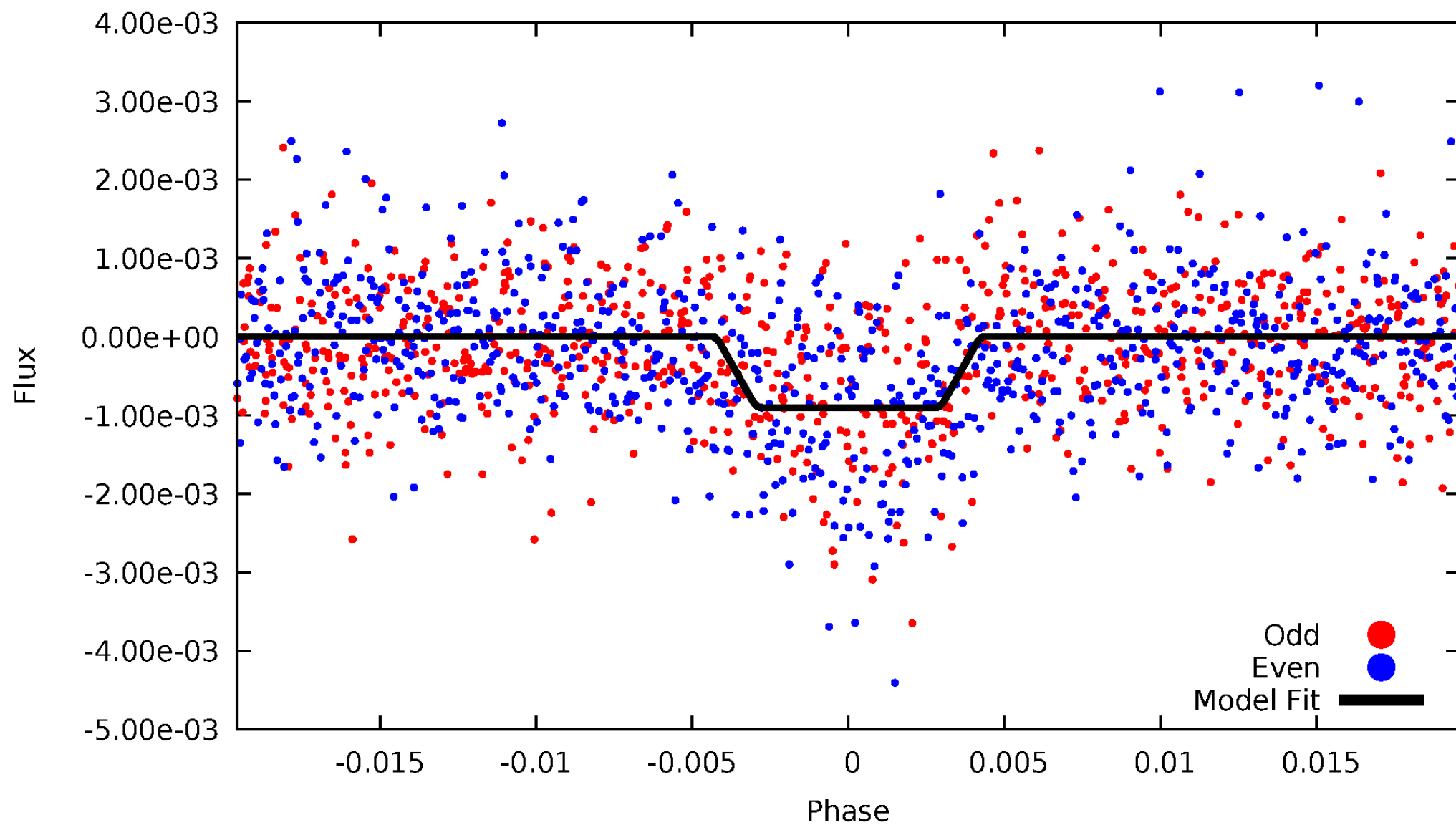
DV Odd/Even

TCE 004078157-02



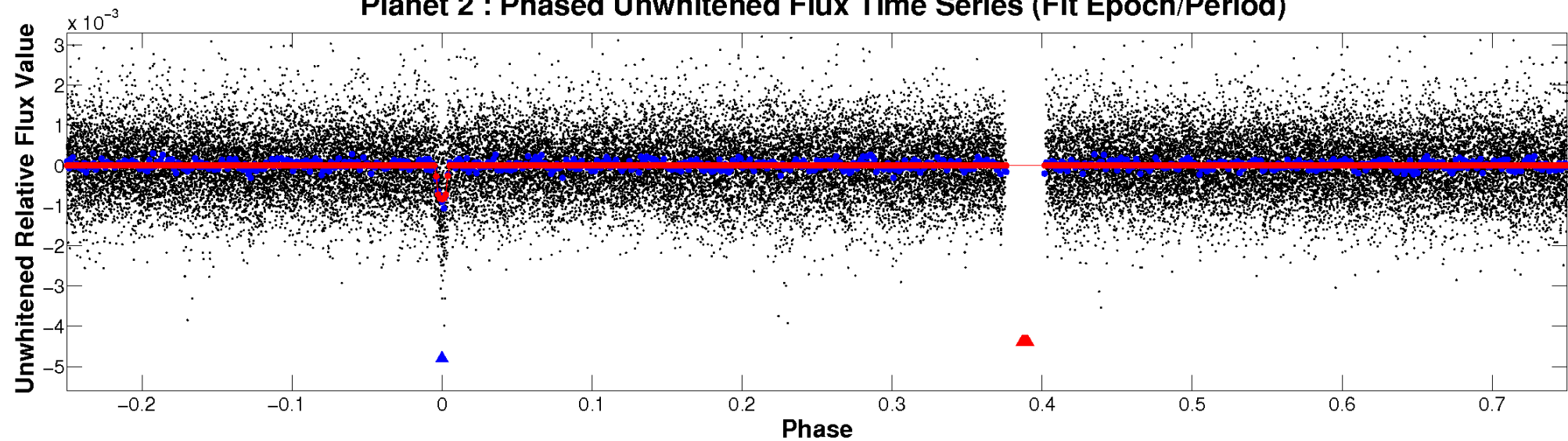
ALT Odd/Even

TCE 004078157-02

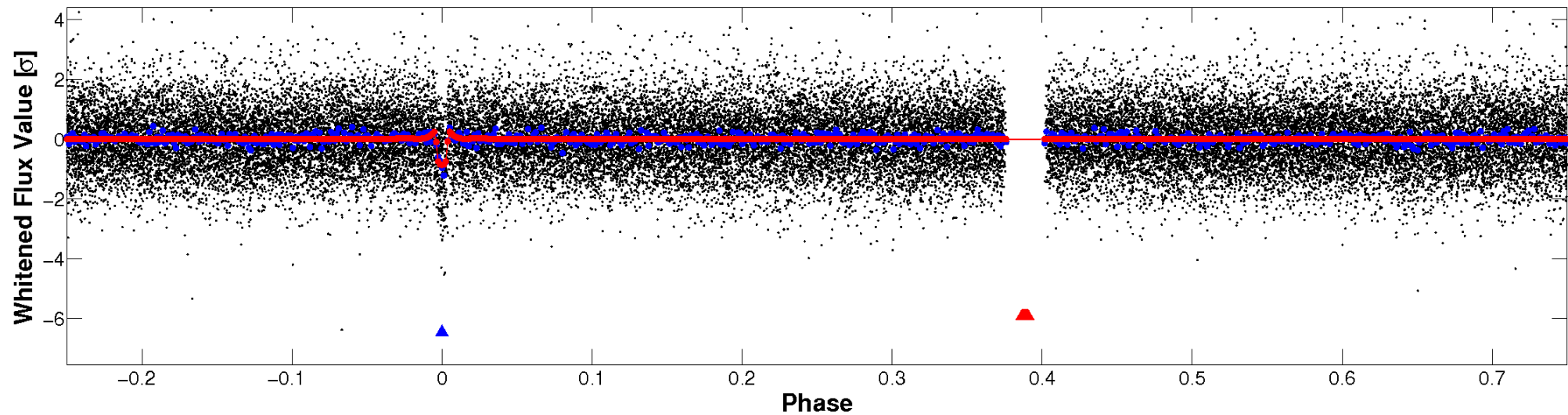


Non-Whitened Vs. Whitened Light Curve

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

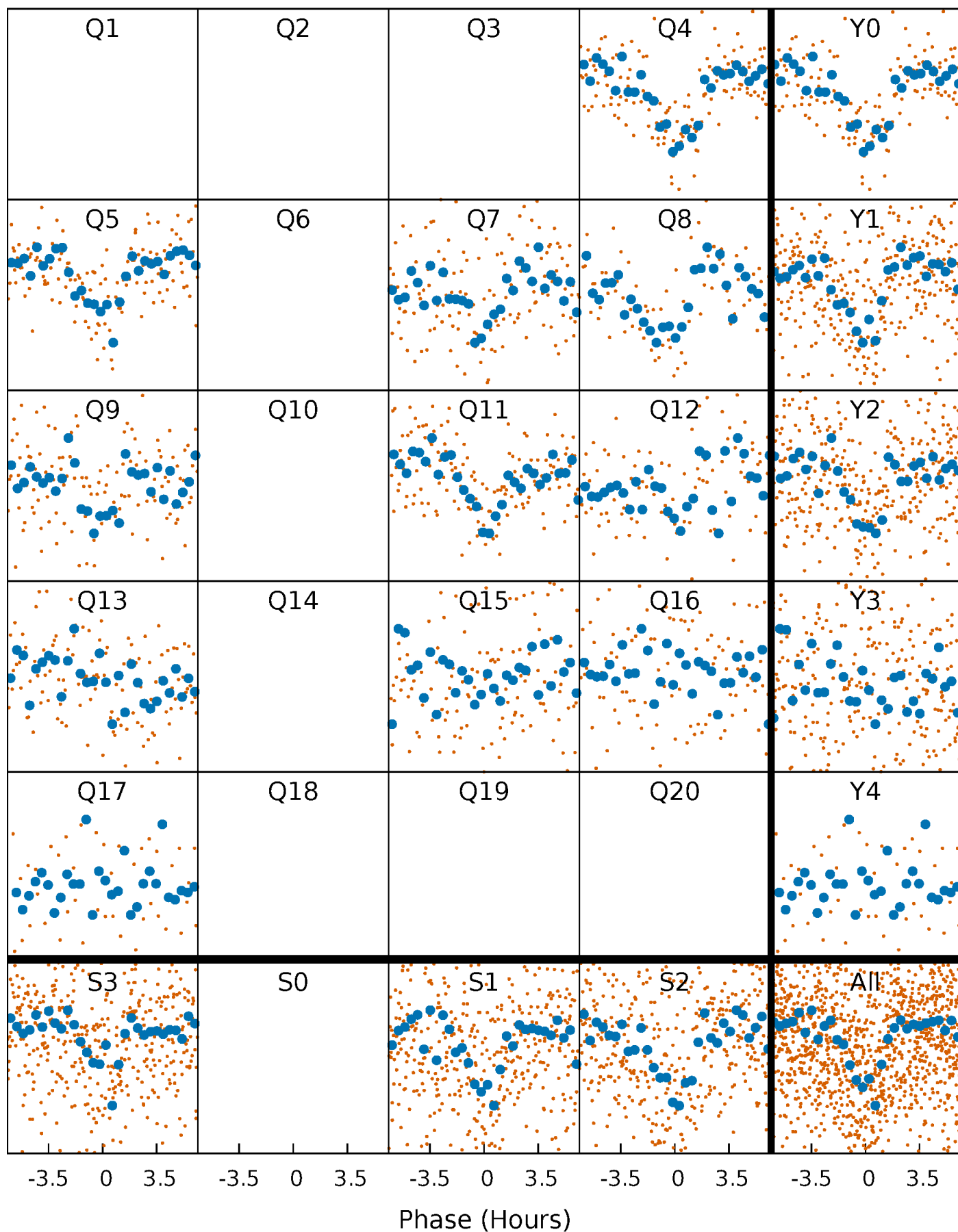


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



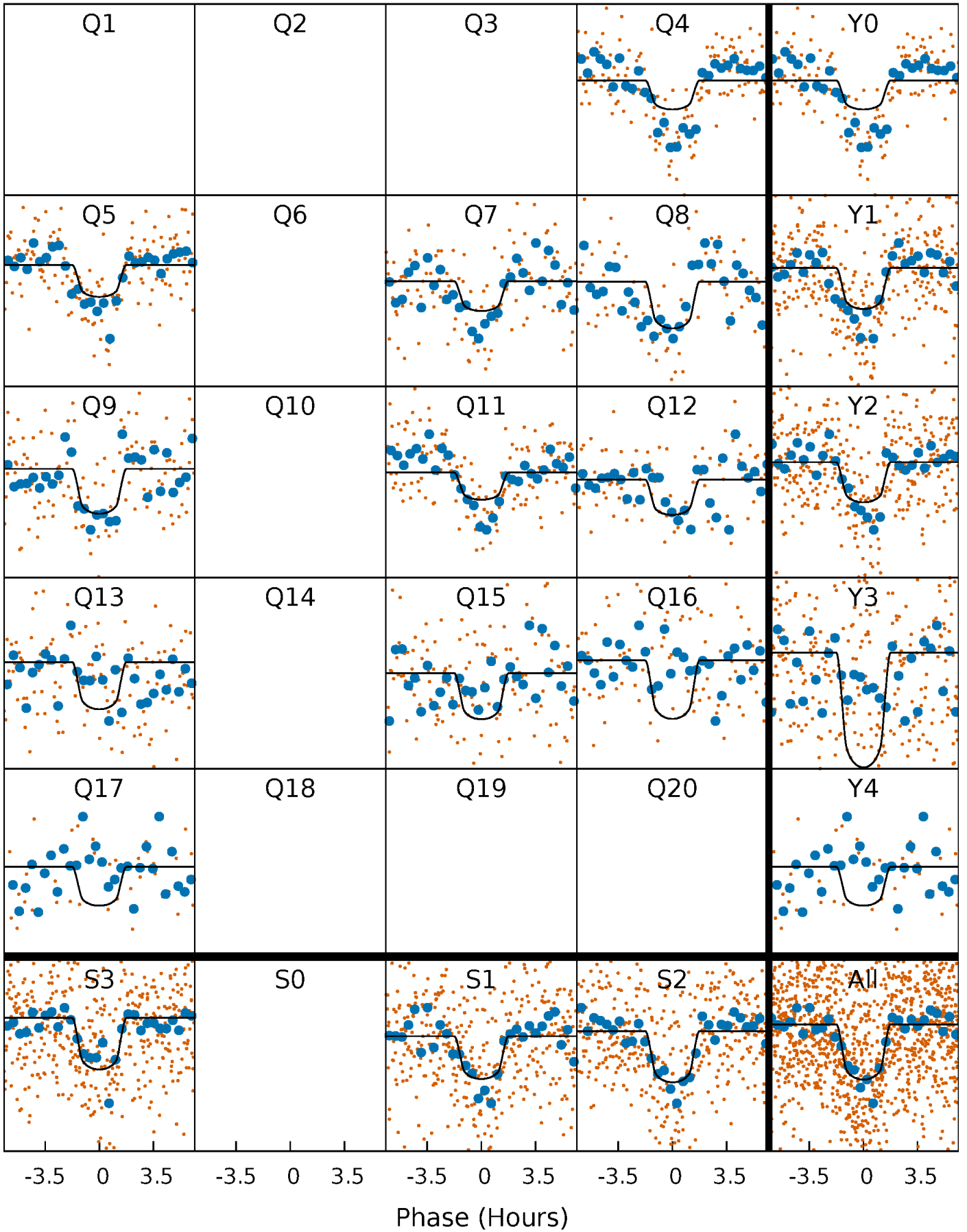
PDC Quarter-Phased Transit Curves

TCE 004078157-02 P= 16.024967 Days $T_0=137.123312$ (BKJD)



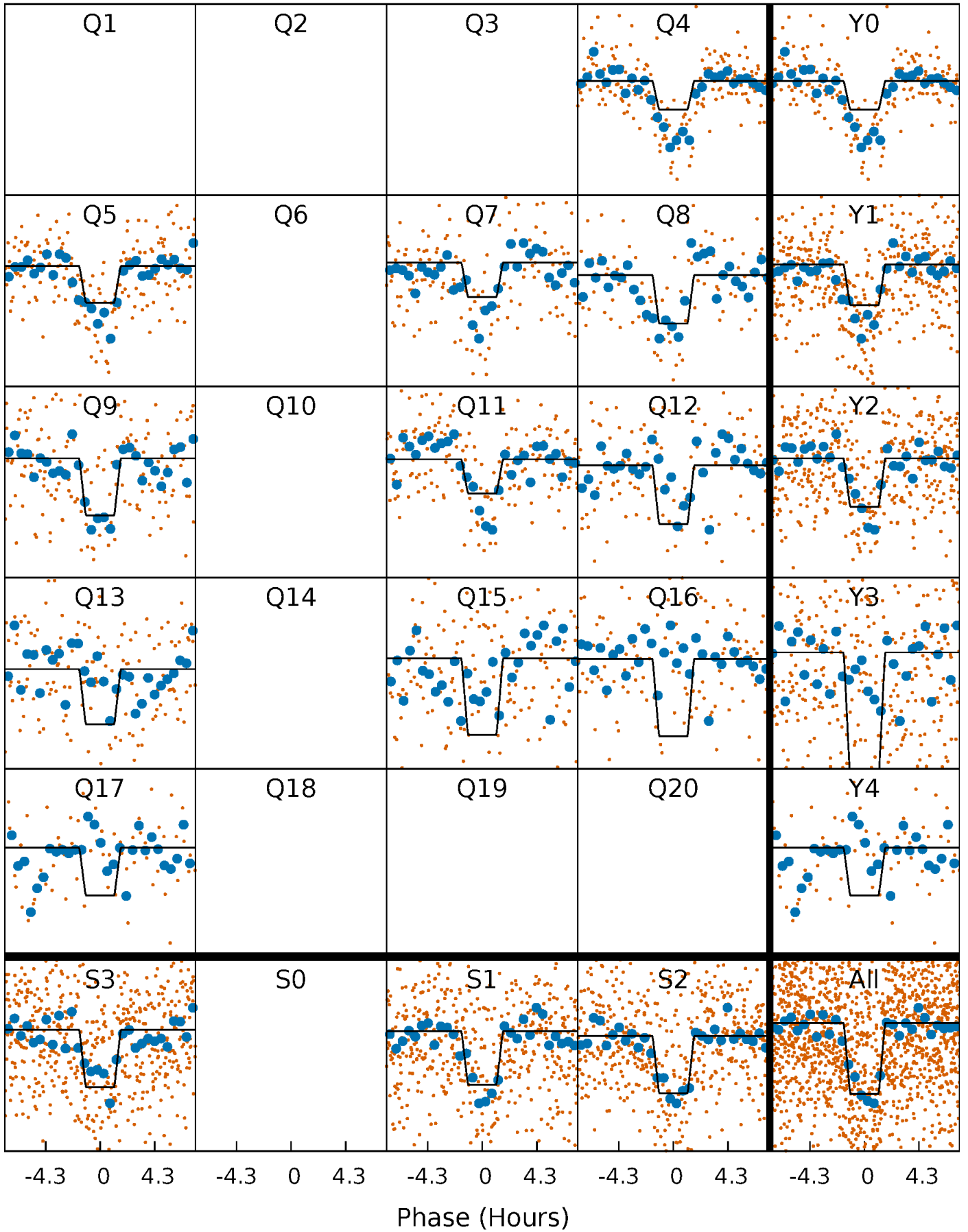
DV Quarter-Phased Transit Curves

TCE 004078157-02 P= 16.024967 Days $T_0=137.123312$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

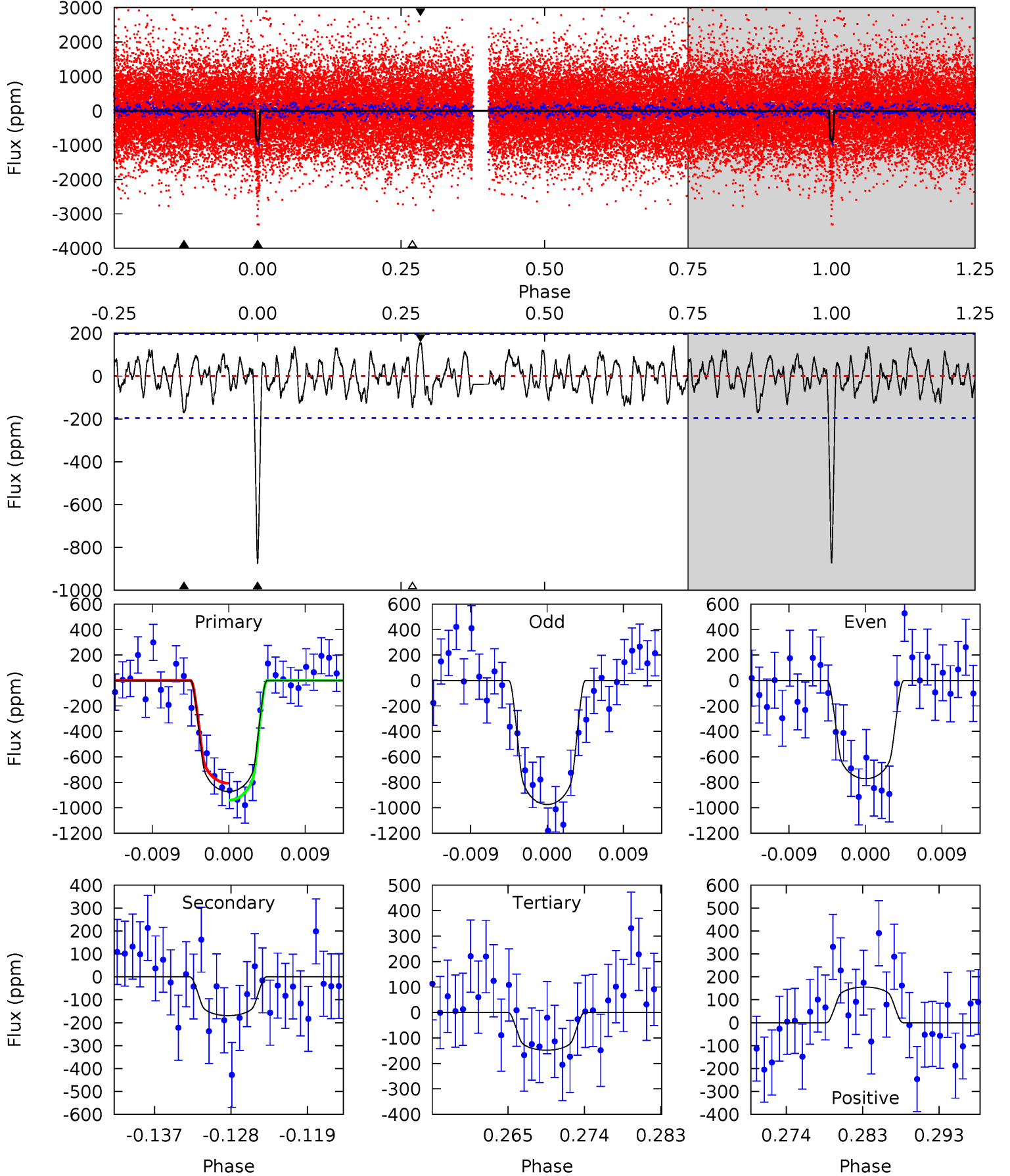
TCE 004078157-02 P= 16.024951 Days $T_0=137.122477$ (BKJD)



DV Model-Shift Uniqueness Test

004078157-02, P = 16.024967 Days, E = 137.123312 Days

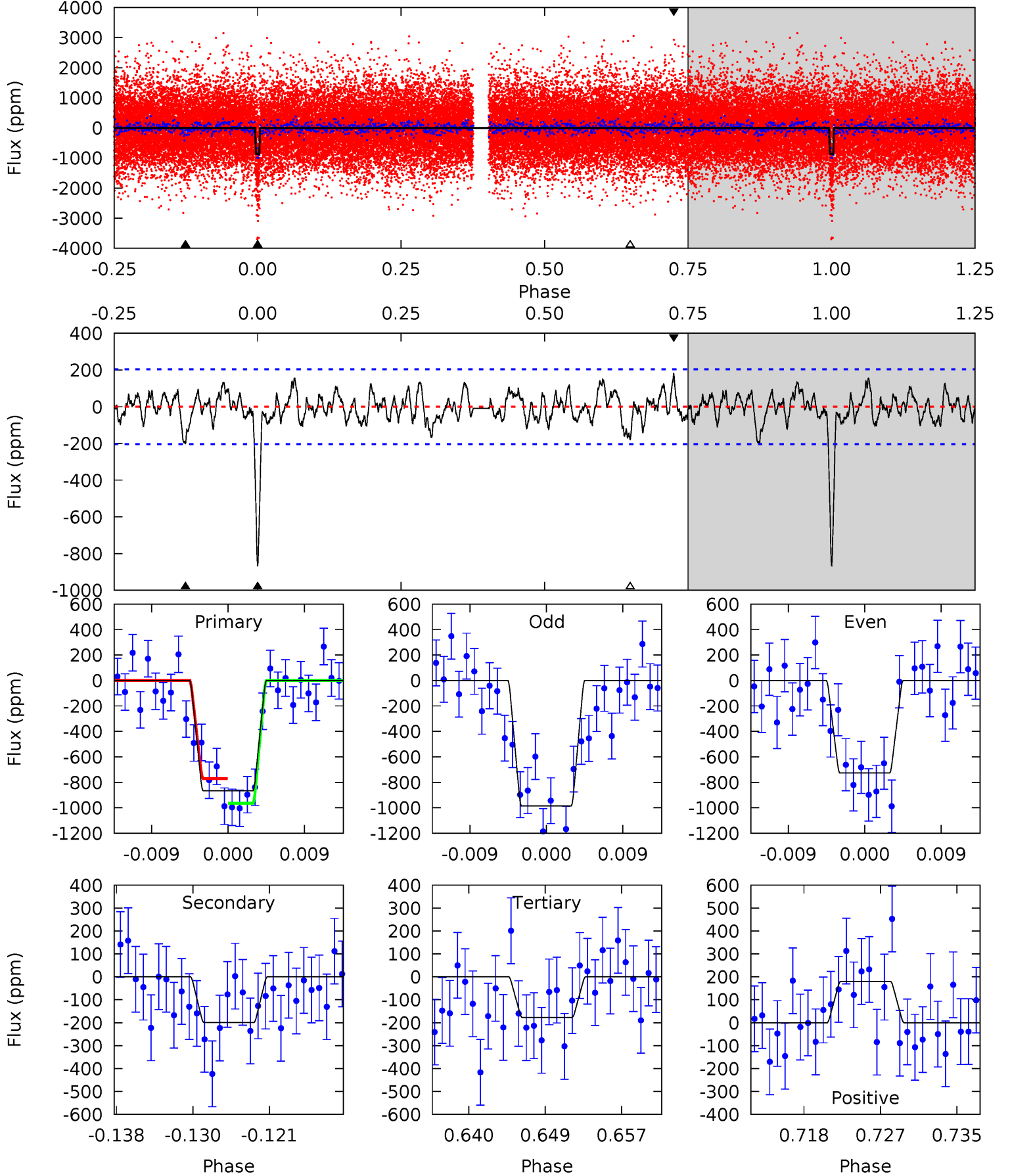
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.4	4.34	3.80	3.99	5.04	2.61	1.57	18.6	18.4	0.54	0.35	2.60	1.02	0.15	1.71



Alt Model-Shift Uniqueness Test

004078157-02, P = 16.024951 Days, E = 137.122477 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.5	4.95	4.40	4.46	5.05	2.63	1.57	17.1	17.0	0.55	0.49	3.20	0.97	0.17	2.40



Stellar Parameters For KIC 004078157

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5776^{+190}_{-190}	$4.582^{+0.042}_{-0.168}$	$-0.420^{+0.300}_{-0.300}$	$0.789^{+0.205}_{-0.068}$	$0.879^{+0.096}_{-0.096}$	$2.517^{+0.425}_{-1.167}$
	+3%/-3%	+1%/-4%	+71%/-71%	+26%/-9%	+11%/-11%	+17%/-46%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004078157-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-169 ± 39	$2.58^{+1.18}_{-0.94}$	937^{+56}_{-44}	4147^{+884}_{-537}	191^{+311}_{-105}
Alt.	-200 ± 40	$2.71^{+1.08}_{-1.01}$	938^{+59}_{-43}	4226^{+884}_{-513}	211^{+327}_{-108}

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

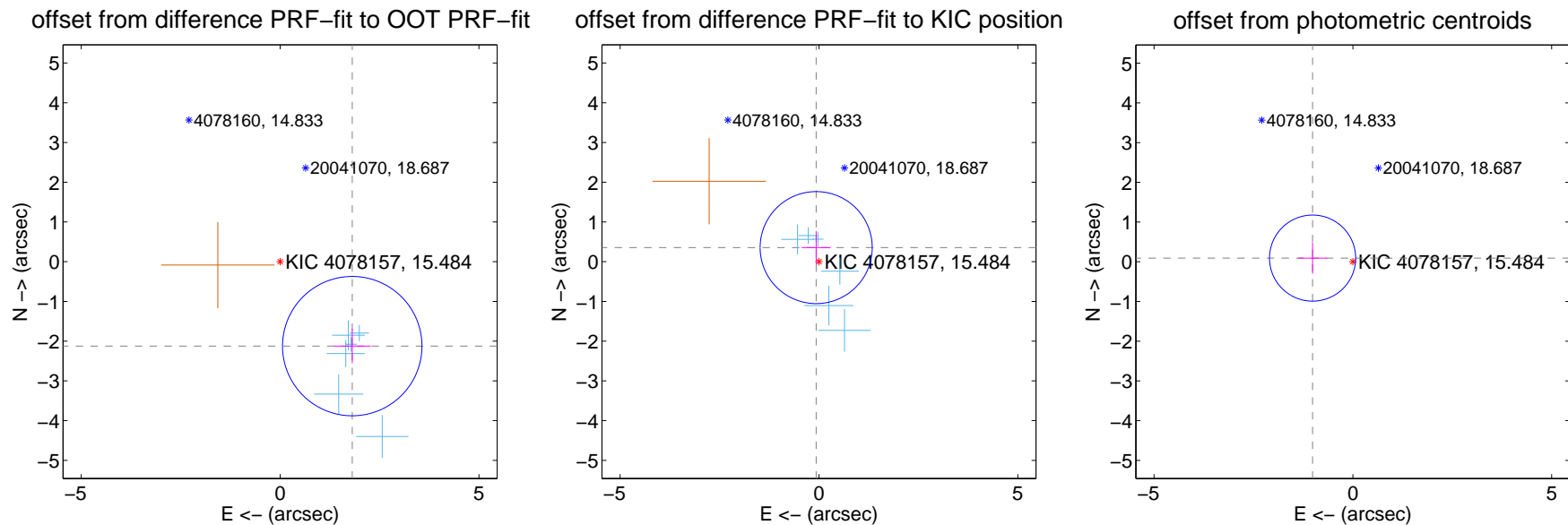
DV Centroid Data

Supplemental centroid analysis for 004078157-02. Kepler magnitude: 15.48. Transit SNR 13.22

There are 6 quarters with good PRF difference image offsets

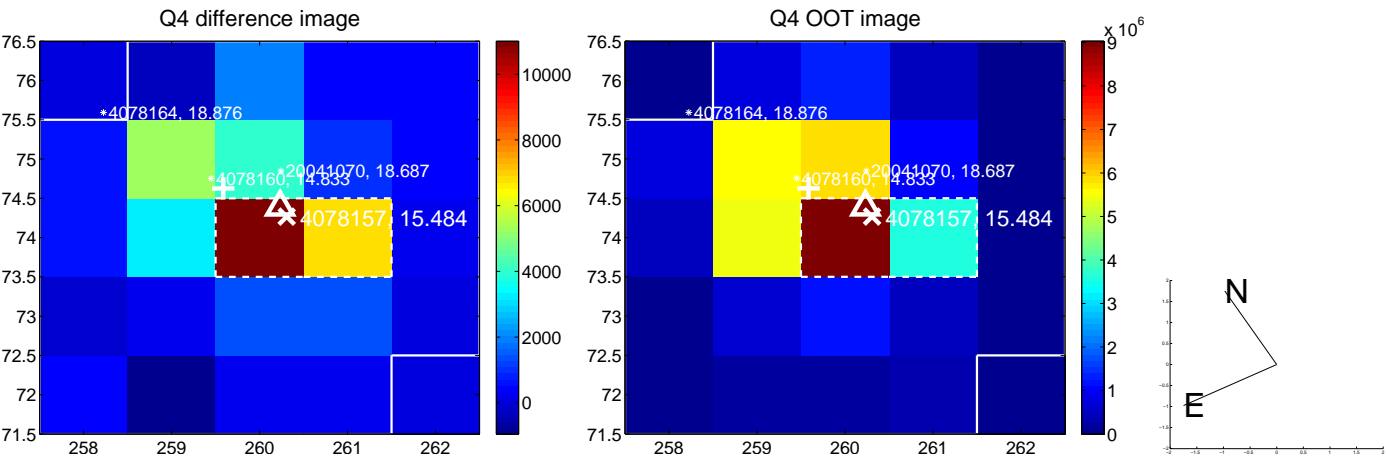
The OOT PRF centroid is offset from the target star catalog position by about 2.42 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.794 ± 0.584	4.78	-1.814 ± 0.459	-2.125 ± 0.430
PRF-fit source offset from KIC position	0.362 ± 0.470	0.77	0.071 ± 0.367	0.355 ± 0.415
photometric centroid source offset	1.02 ± 0.36	2.82	1.01 ± 0.36	0.09 ± 0.39

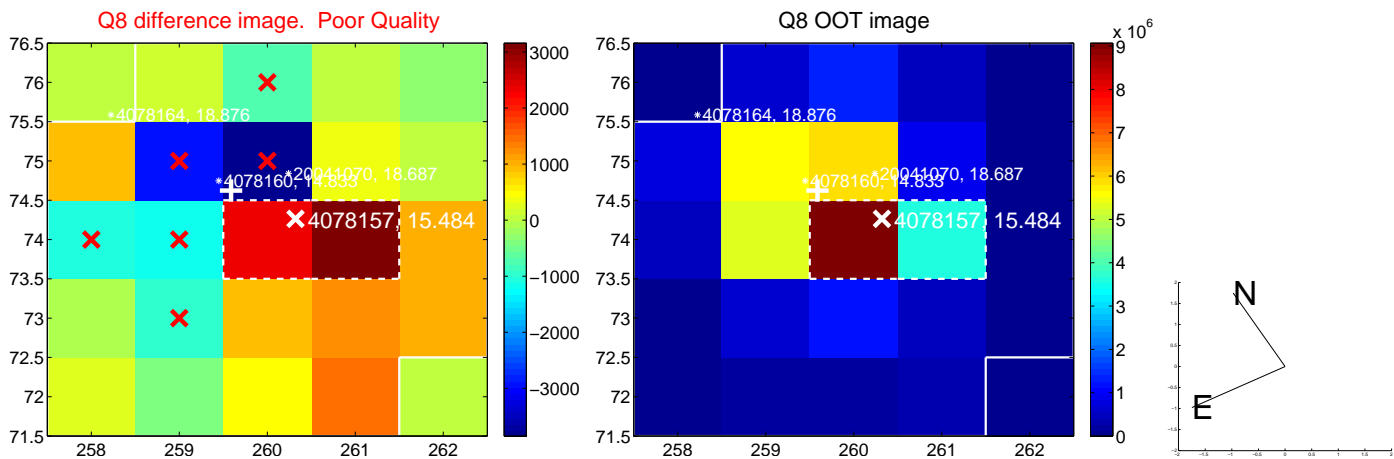
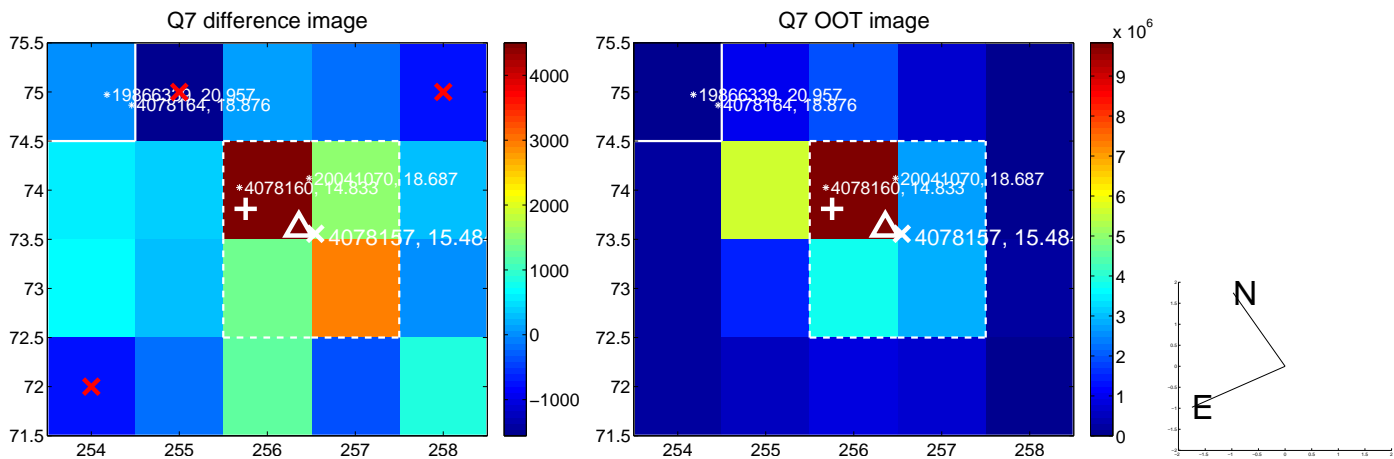
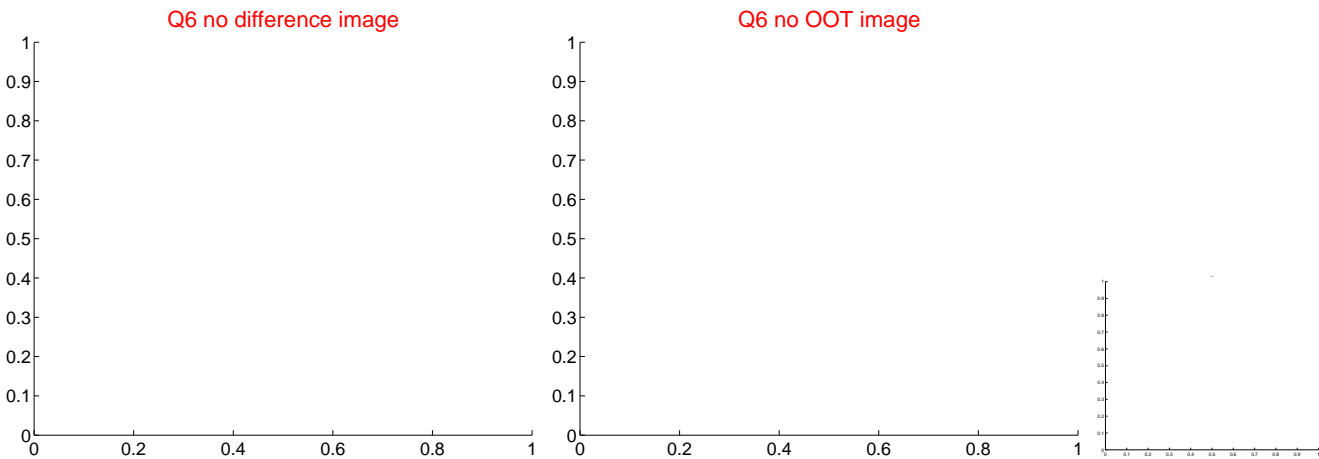
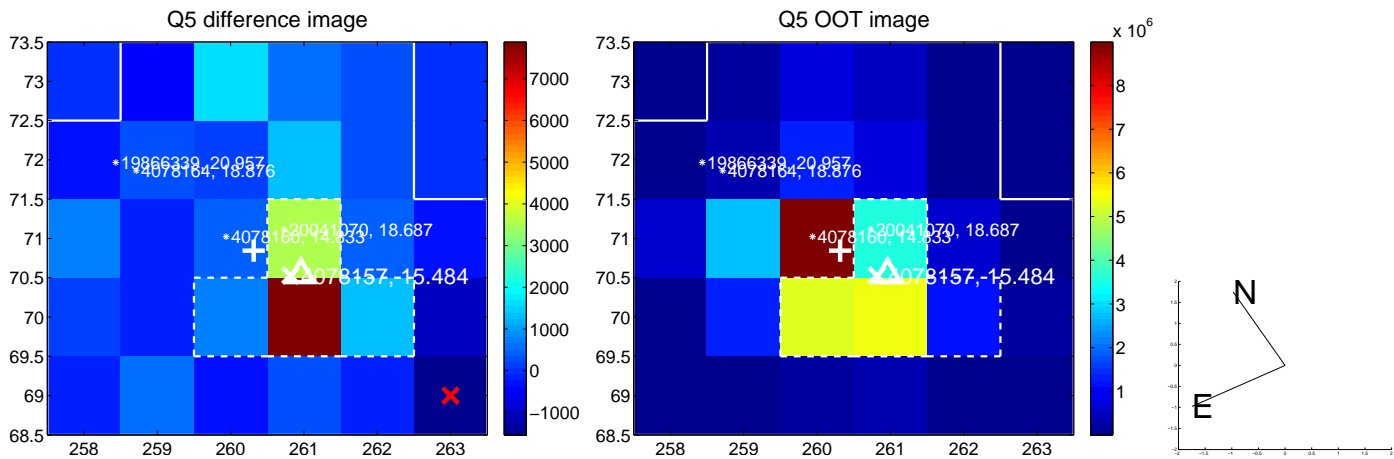


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

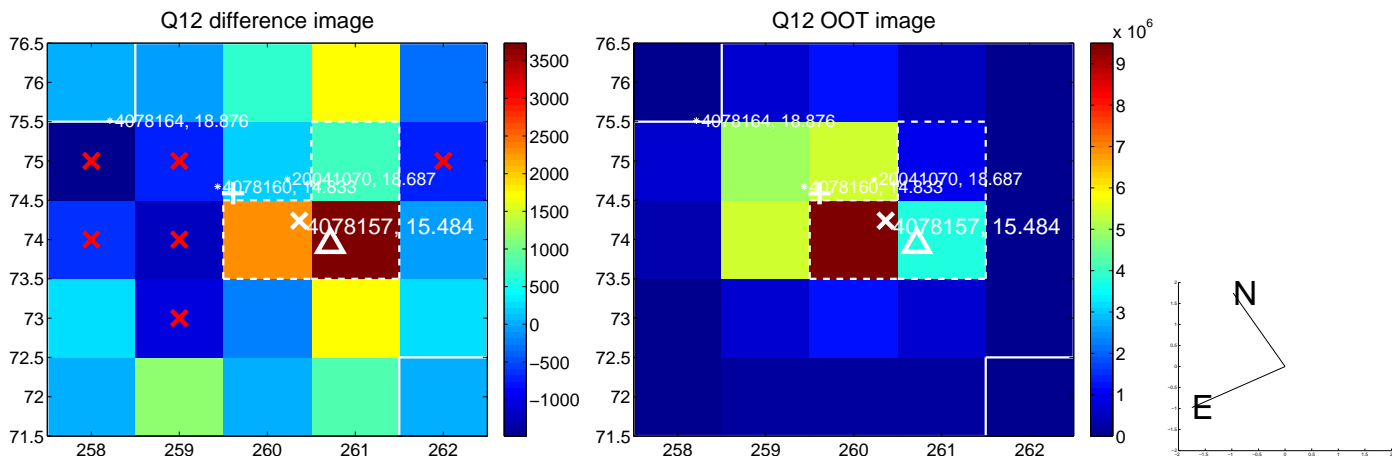
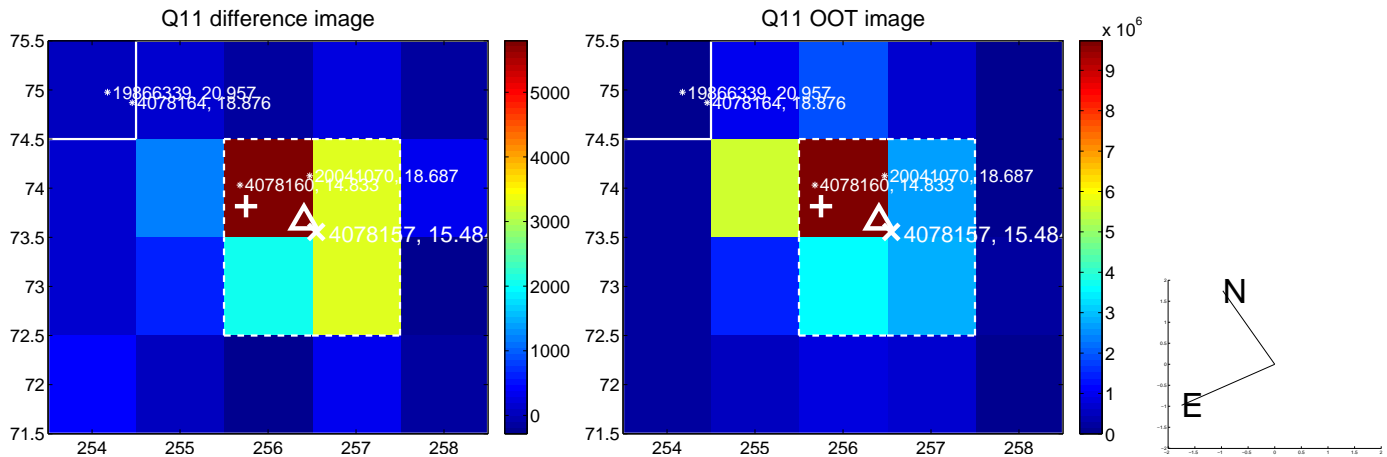
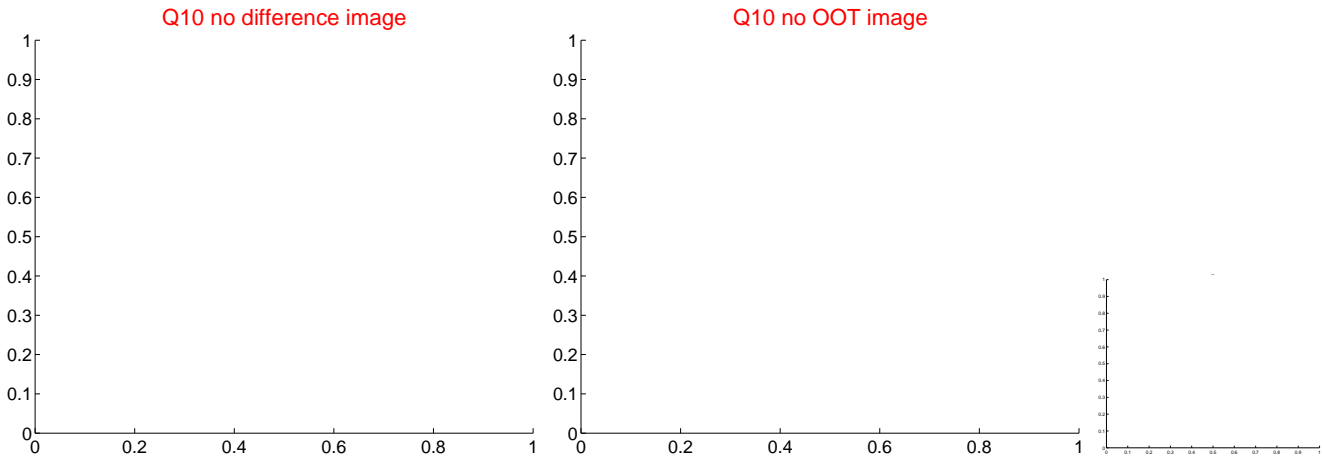
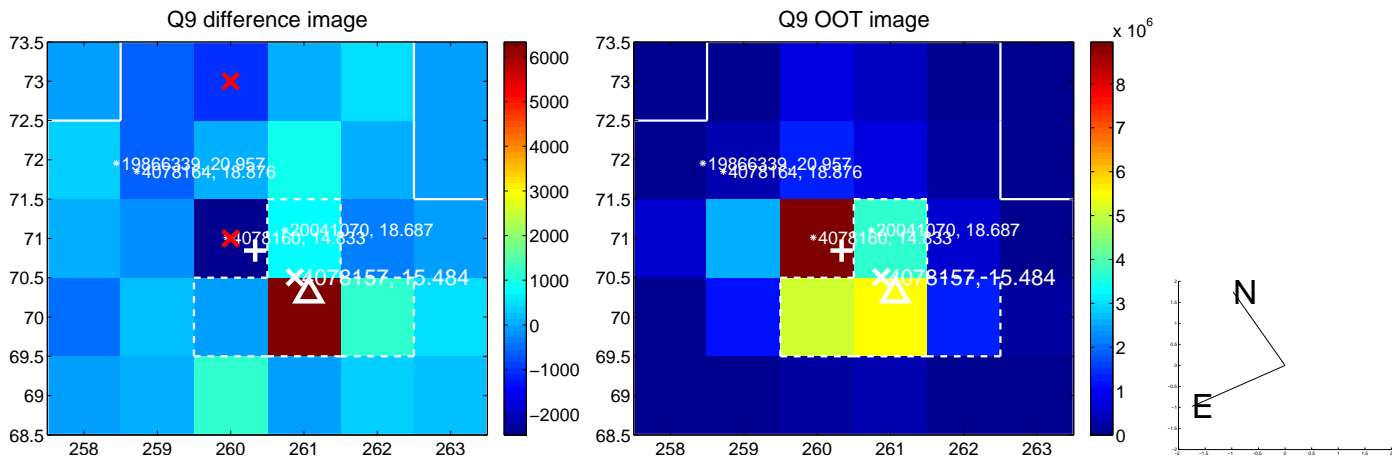
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



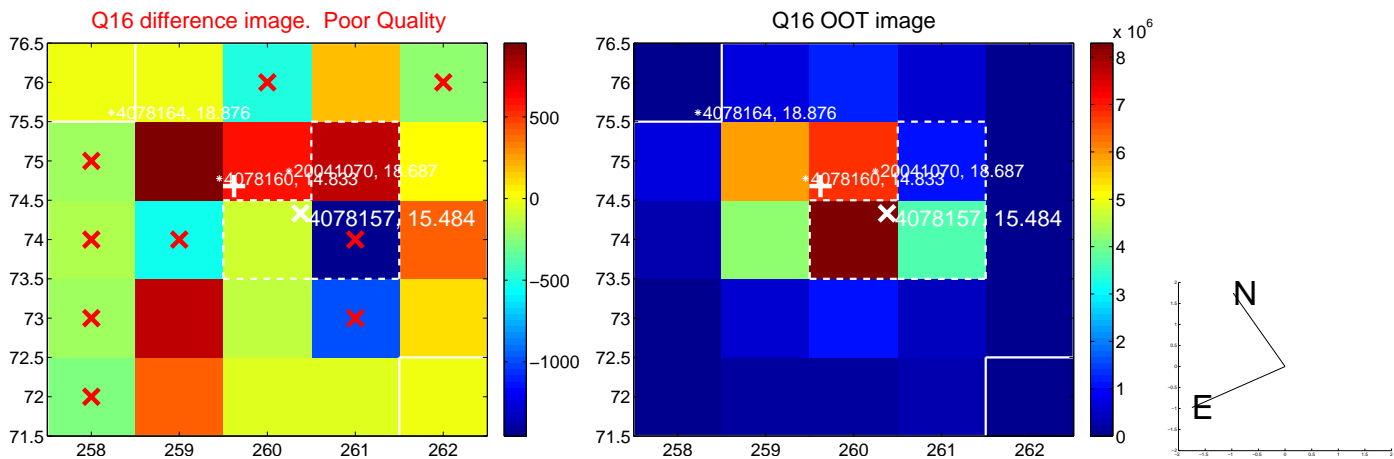
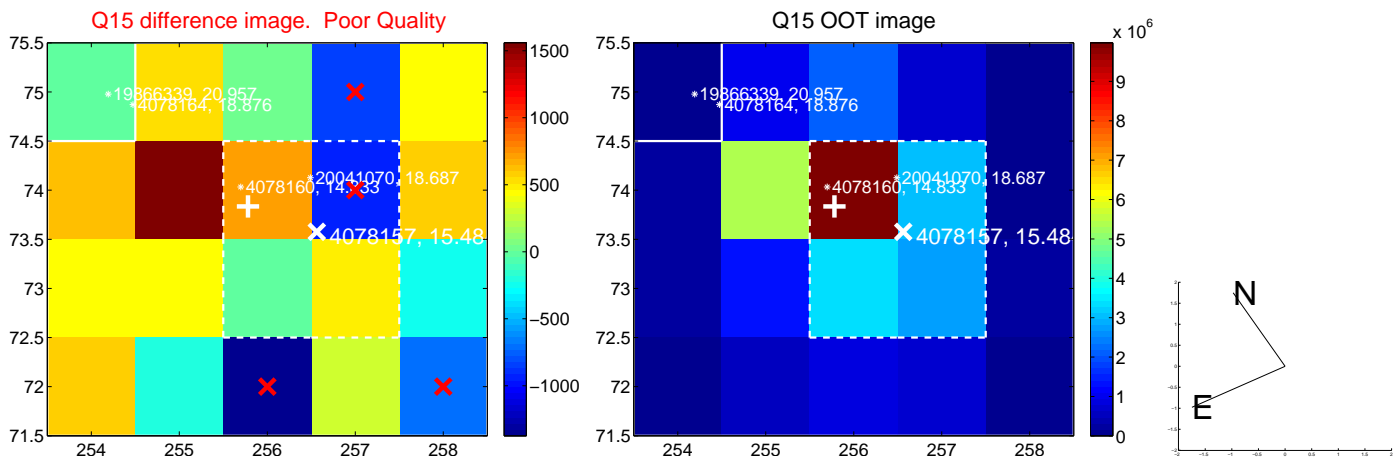
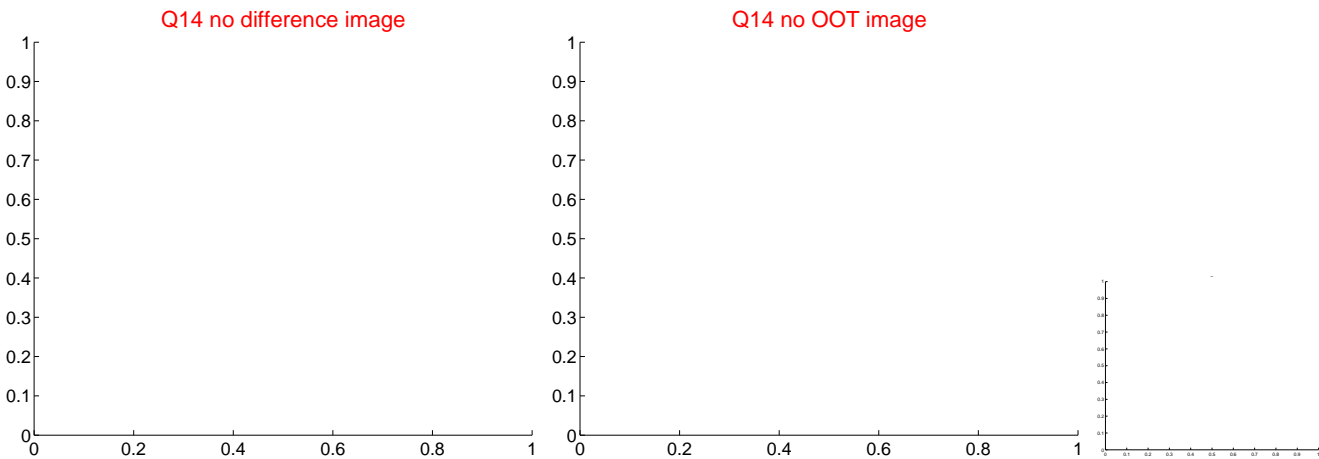
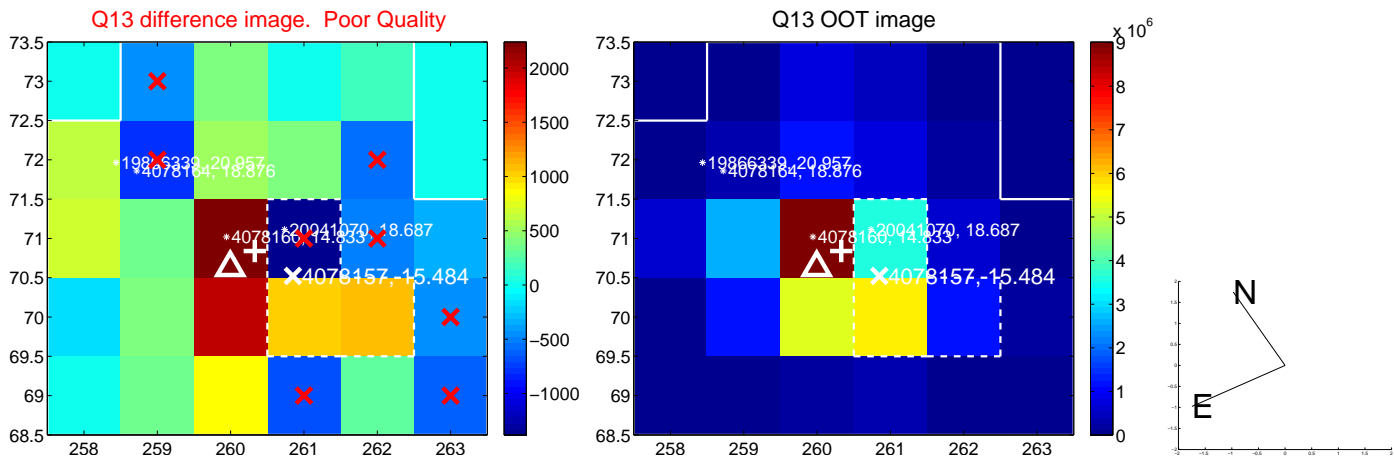
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



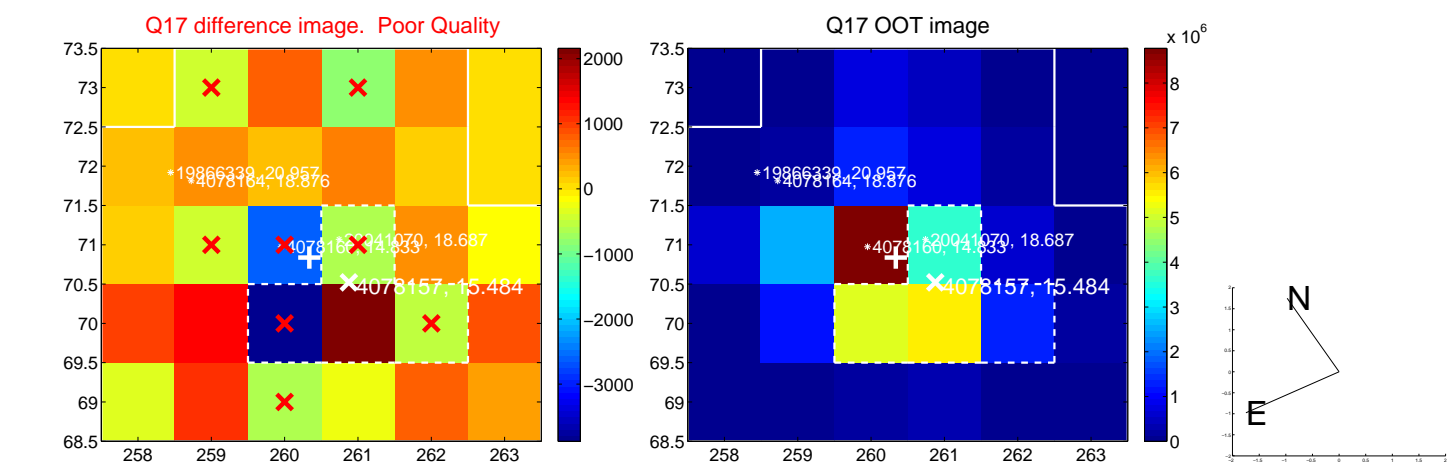
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



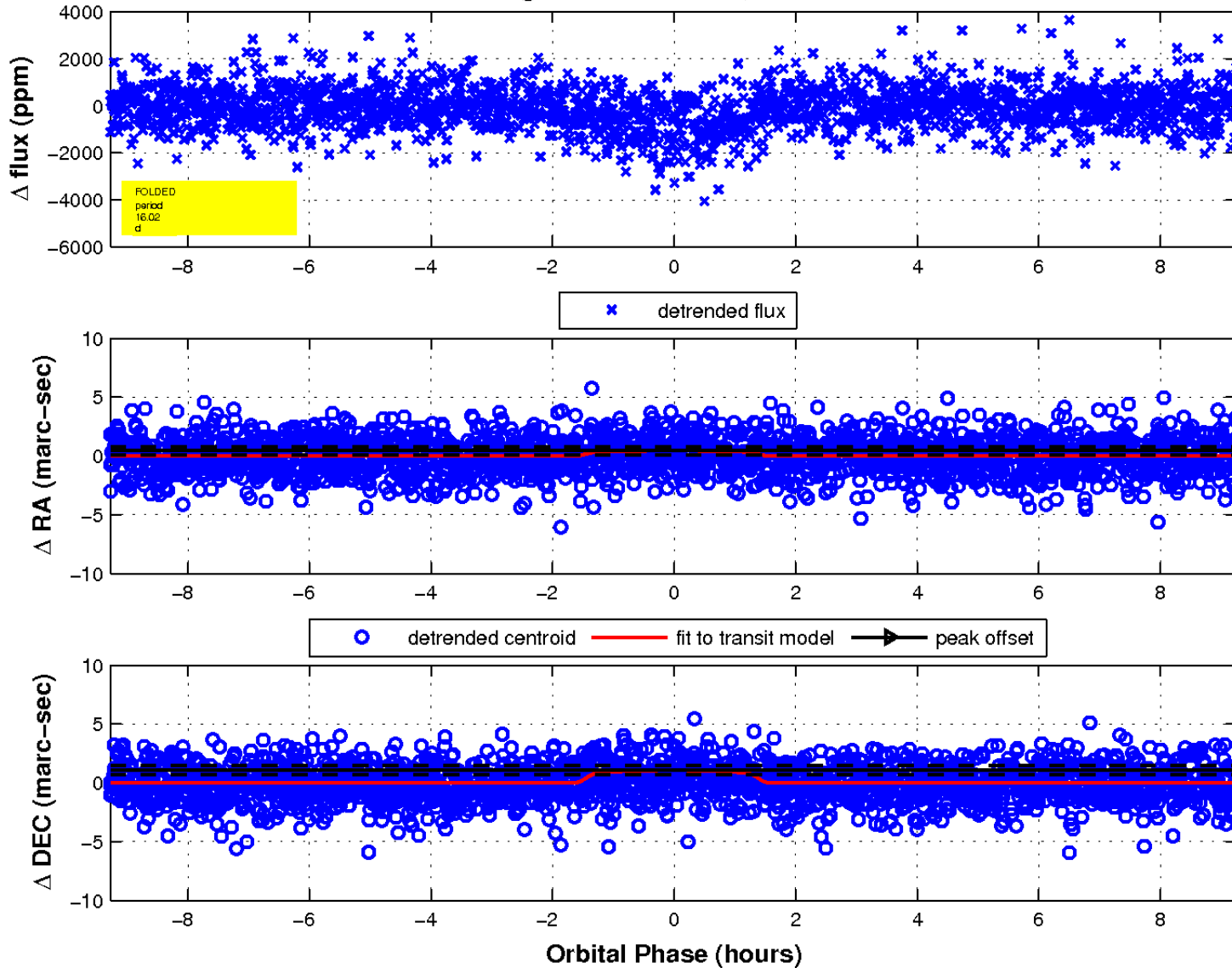
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

