

KIC 009278021

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})
009278021-01	OBS	7152.01	3.359474	133.951765	2654.3	2.132	593.7	574.0	3.51	6587	29.22	8137.38
009278021-02	OBS	No	3.359469	132.308789	1824.9	2.425	432.4	429.4	3.51	6587	27.96	8137.39

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009278021-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009278021-02	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.

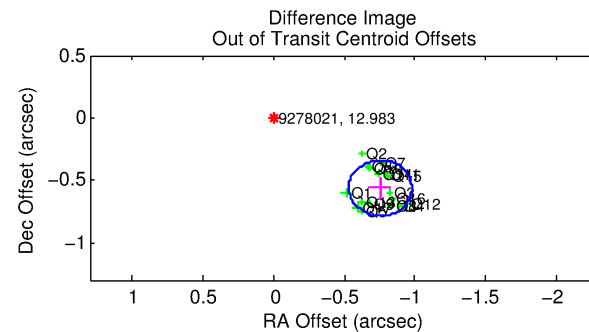
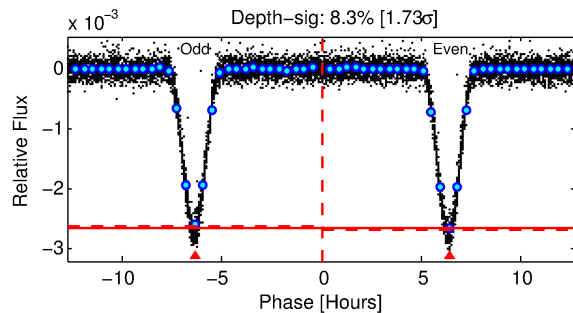
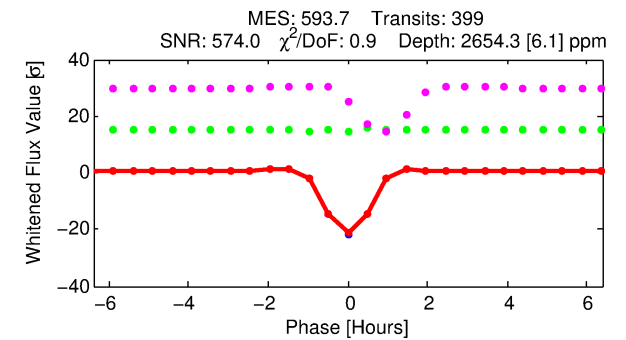
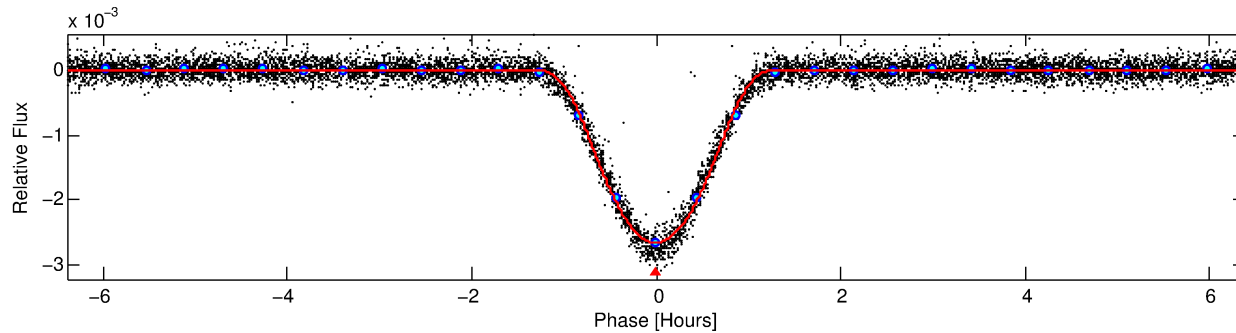
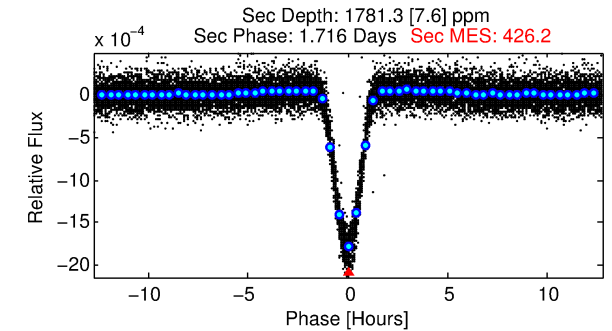
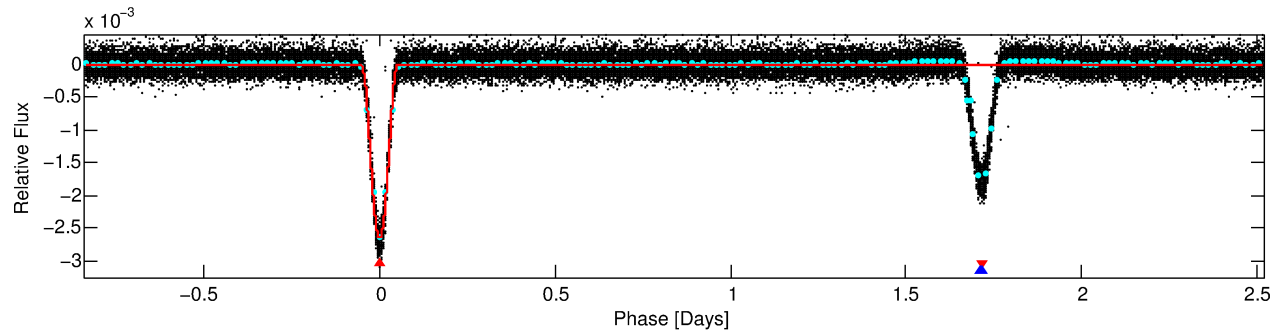
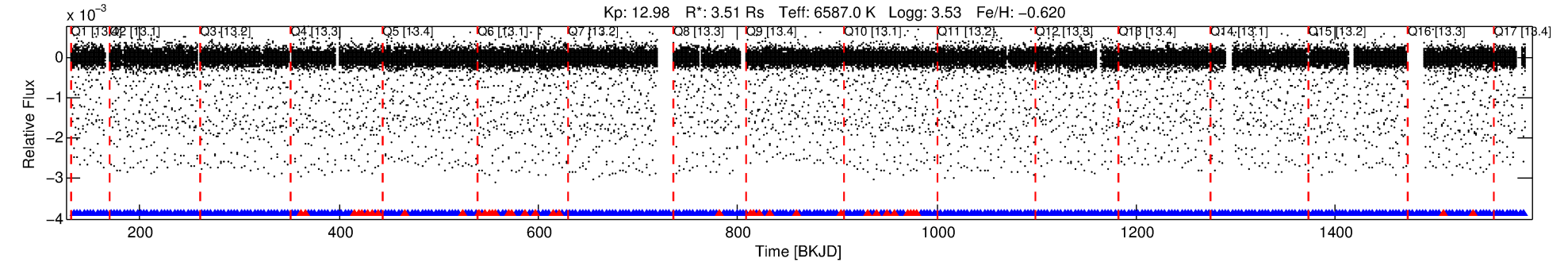
Ephemeris Match Information For 009278021-01

No Significant Match Found

DV One-Page Summary

KIC: 9278021 Candidate: 1 of 2 Period: 3.359 d

KOI: K07152.01 Corr: 0.995



DV Fit Results:

Period = 3.35947 [0.00000] d
Epoch = 133.9518 [0.0001] BKJD
Rp/R* = 0.0762 [0.0048]
a/R* = 5.37 [0.09]
b = 0.98 [0.01]
Seff = 8137.38 [5124.30]
Teq = 2422 [381] K
Rp = 29.22 [12.07] Re
a = 0.0506 [0.0196] AU
Ag = 2.94 [1.85] [1.05σ]
Teffp = 4902 [222] K [5.62σ]

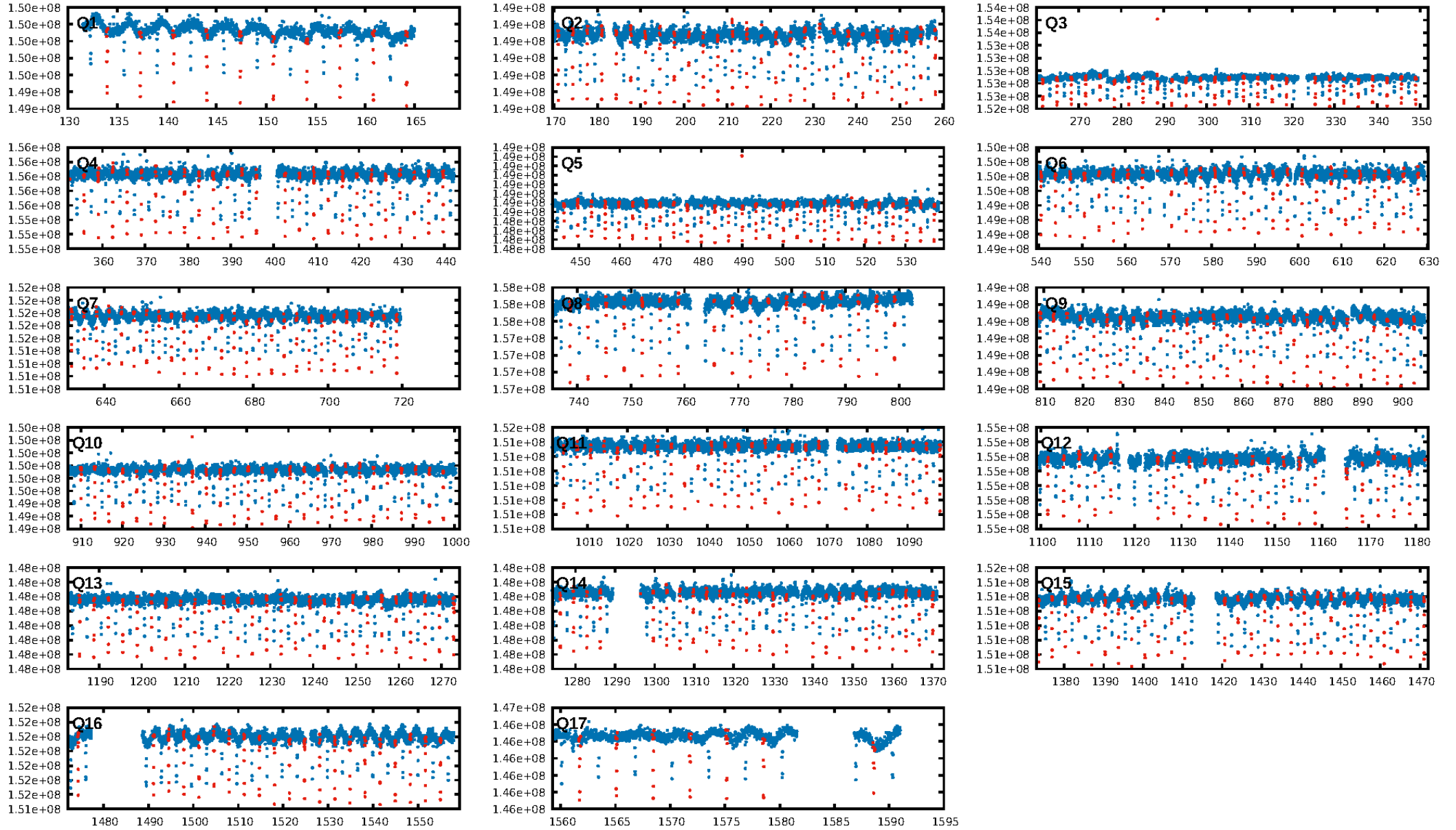
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.90 [344/382]
GhostDiagnostic-chr: 5.286
Centroid-sig: 0.0%
Centroid-so: 0.789 arcsec [36.58σ]
OotOffset-rm: 0.942 arcsec [12.68σ]
KicOffset-rm: 0.987 arcsec [13.27σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
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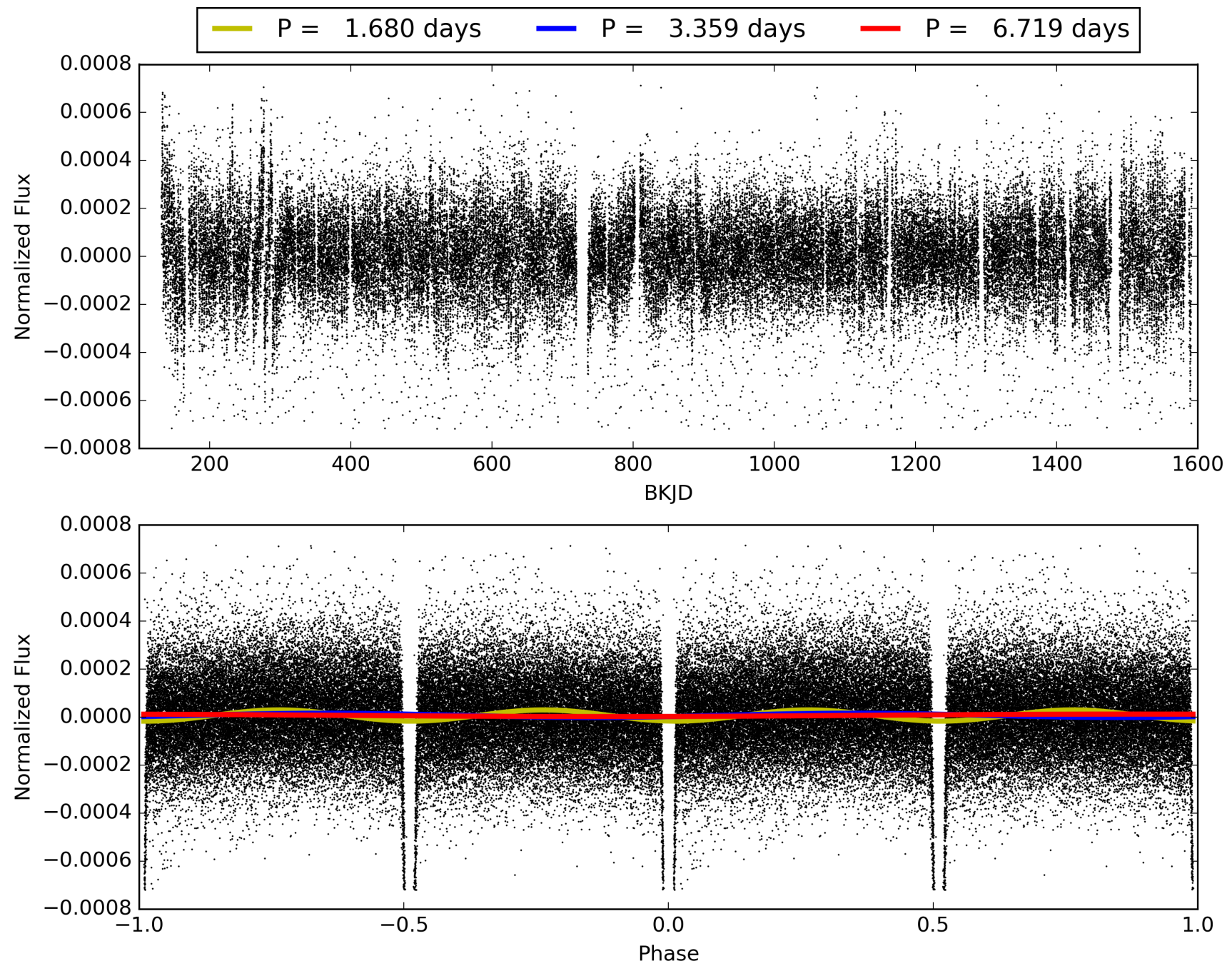
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009278021-01, PDC Light Curves

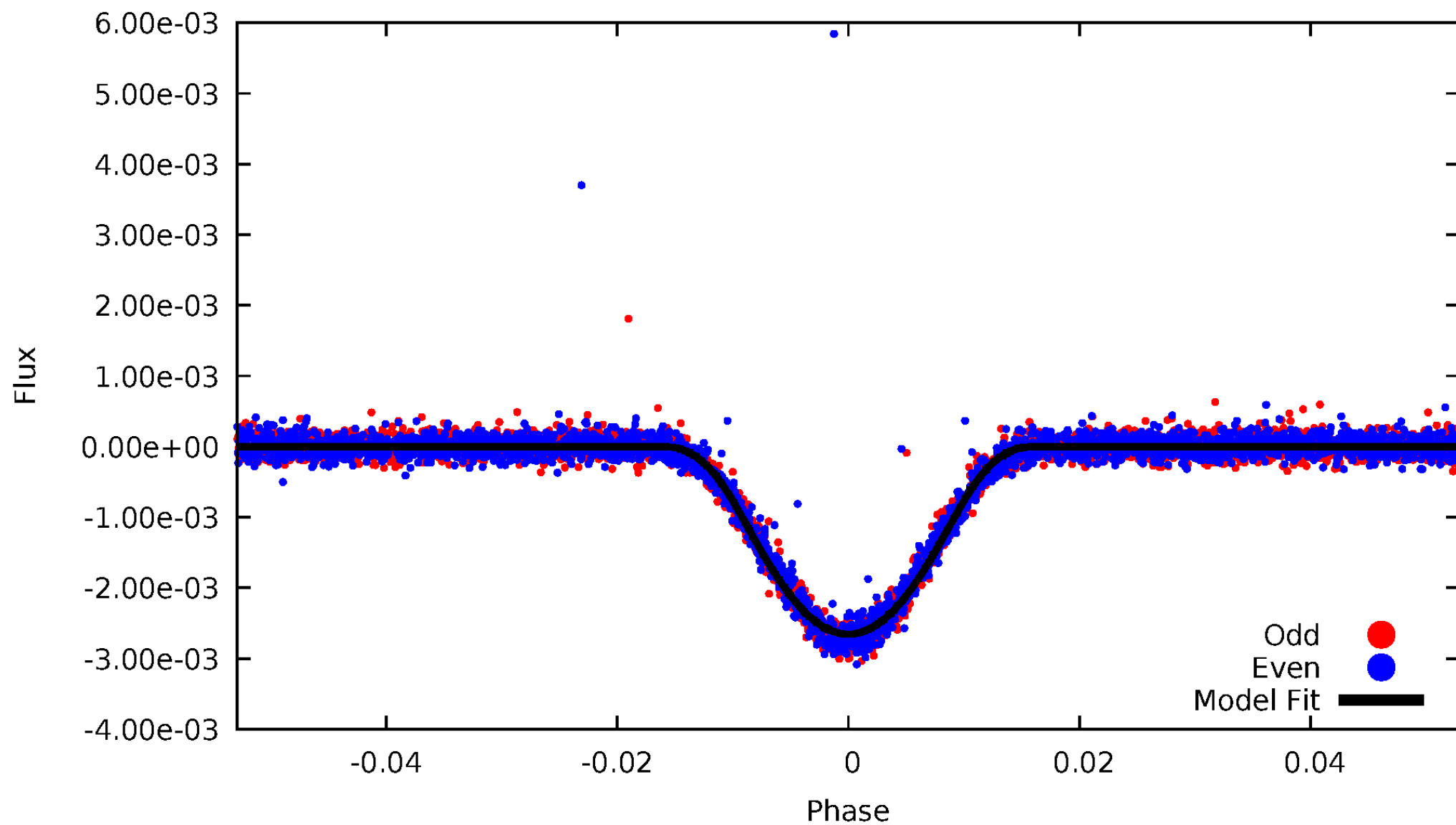


TCE 009278021-01



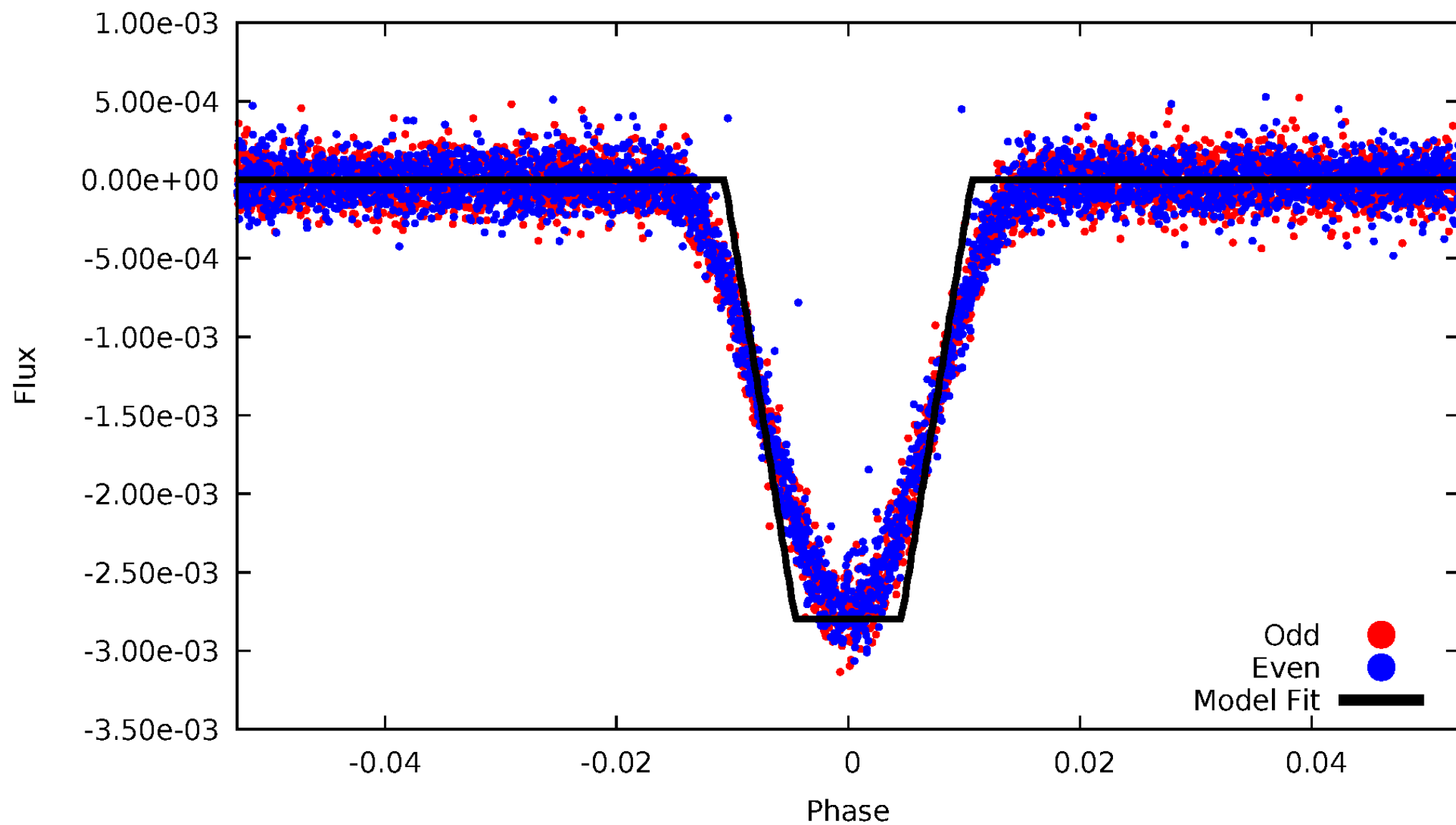
DV Odd/Even

TCE 009278021-01



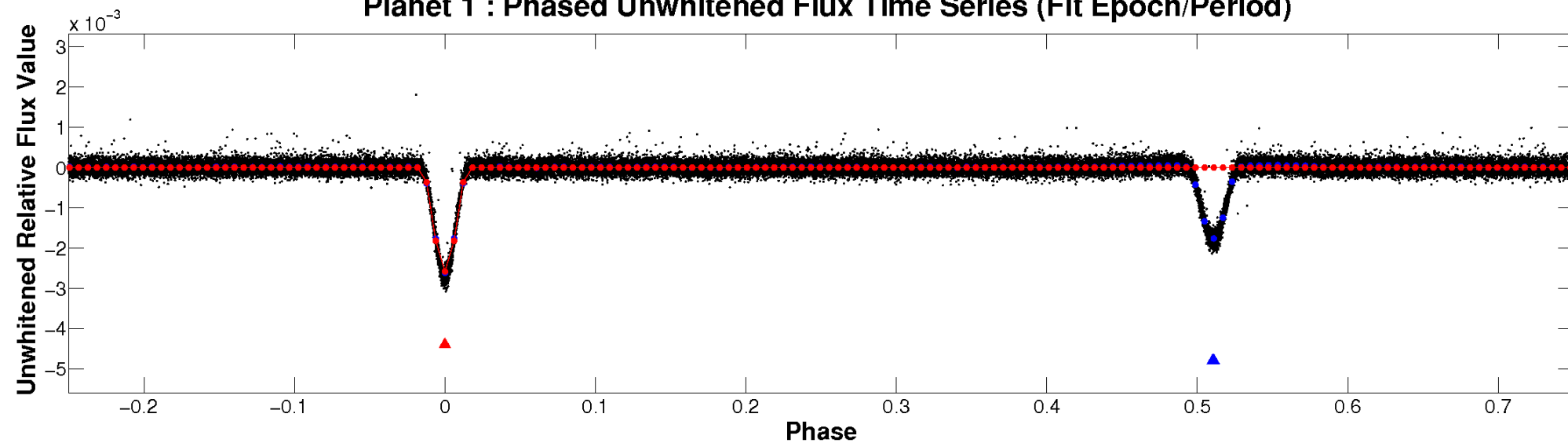
ALT Odd/Even

TCE 009278021-01

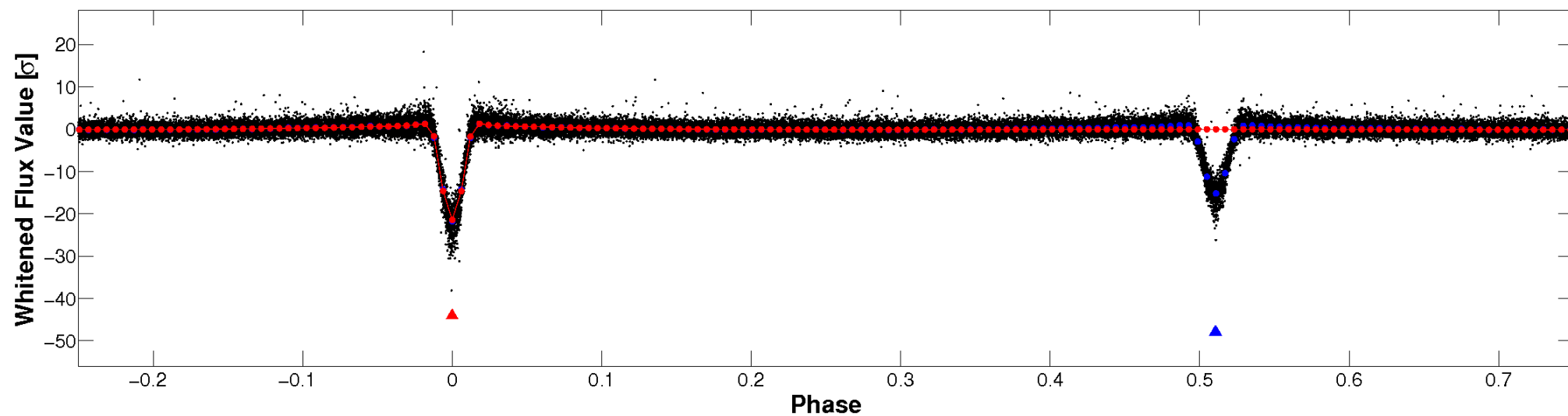


Non-Whitened Vs. Whitened Light Curve

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

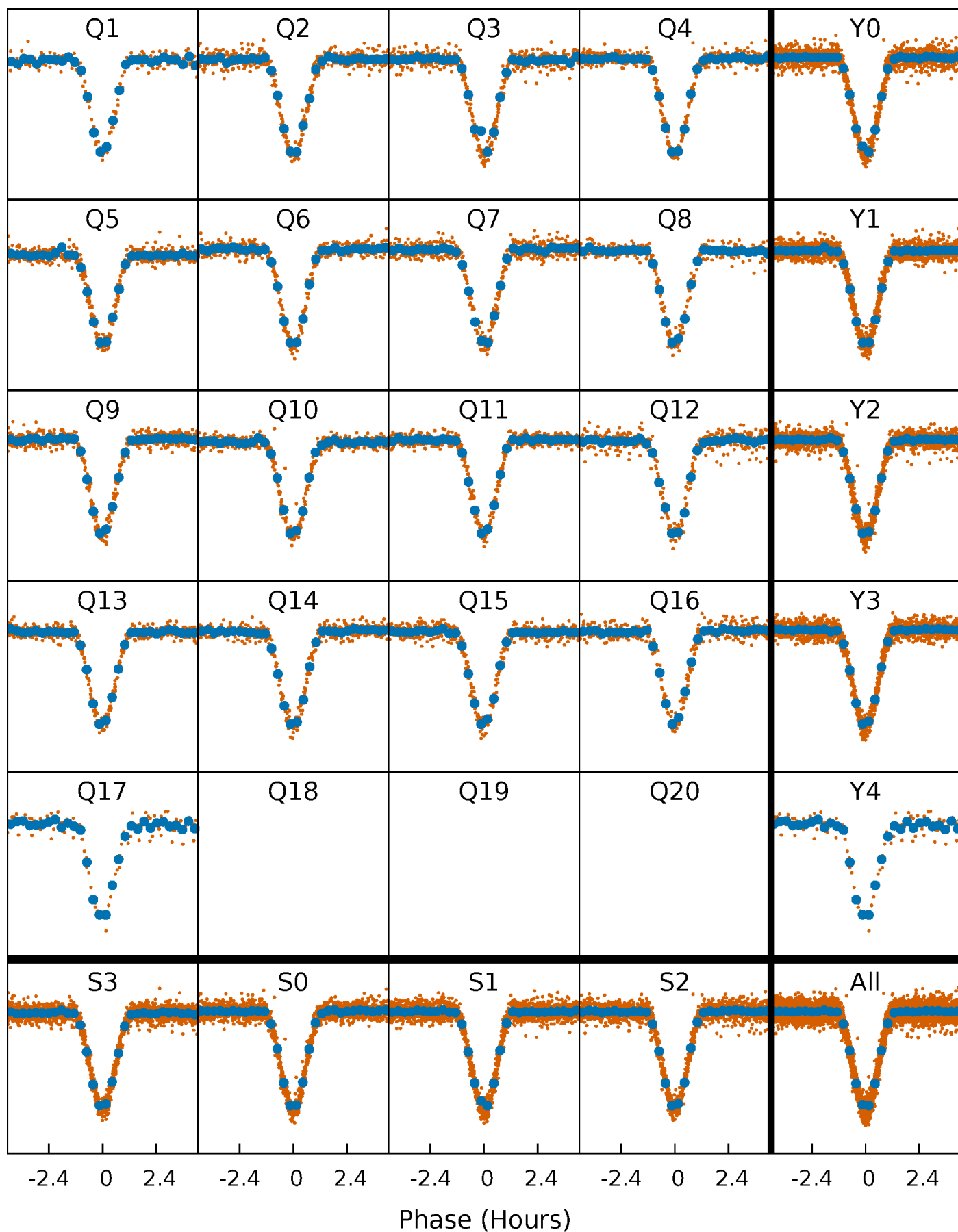


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



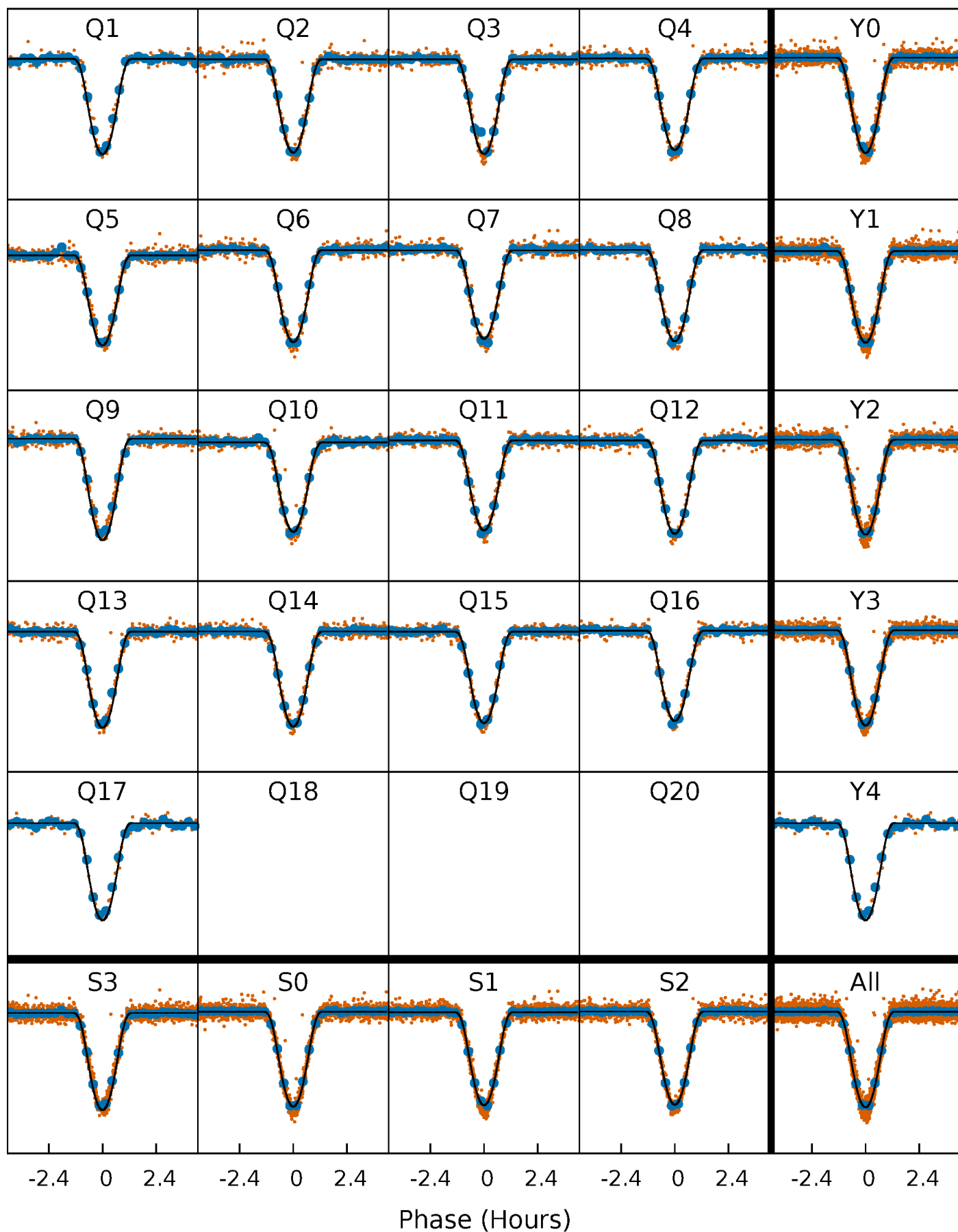
PDC Quarter-Phased Transit Curves

TCE 009278021-01 P= 3.359474 Days $T_0=133.951765$ (BKJD)



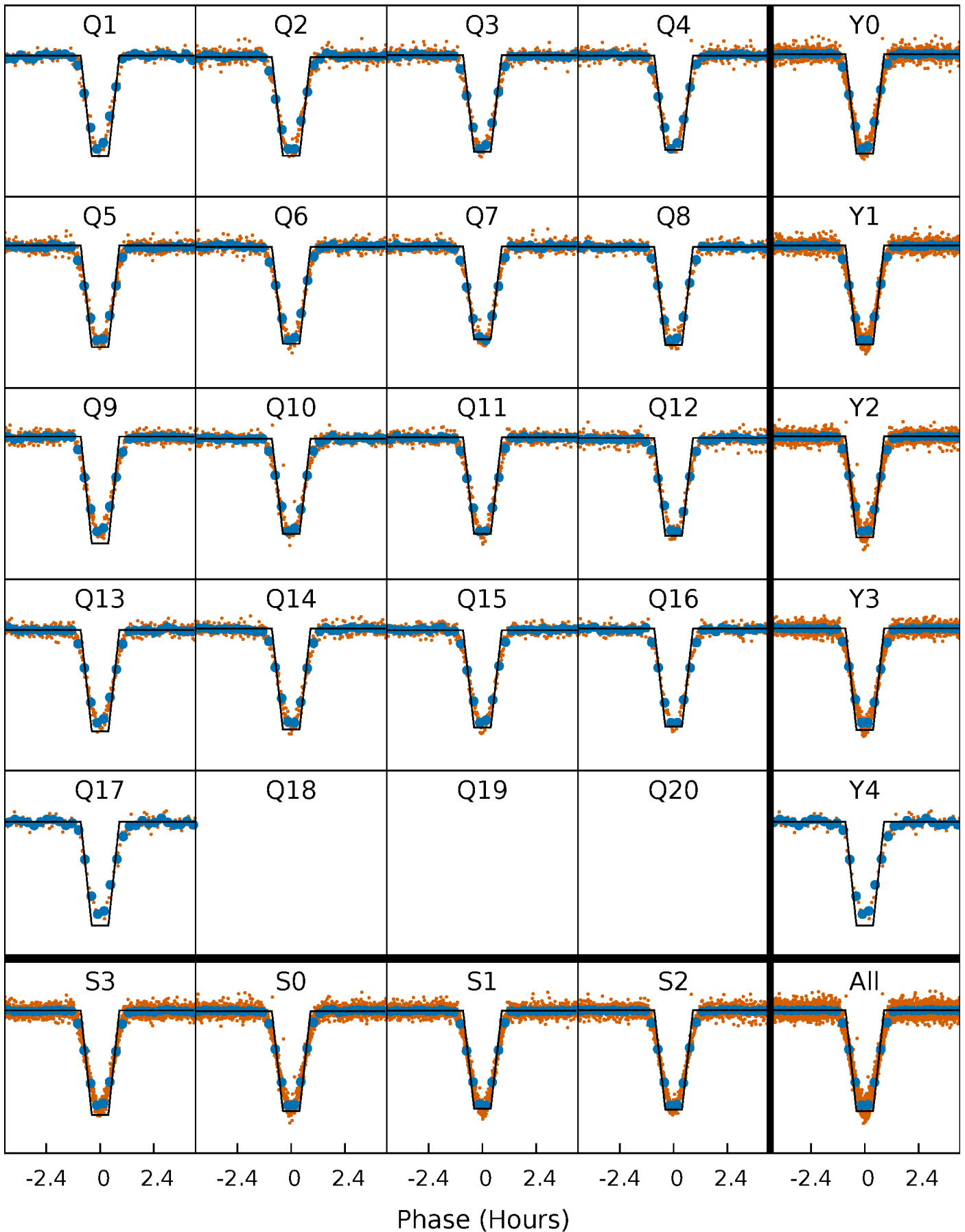
DV Quarter-Phased Transit Curves

TCE 009278021-01 P= 3.359474 Days $T_0=133.951765$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

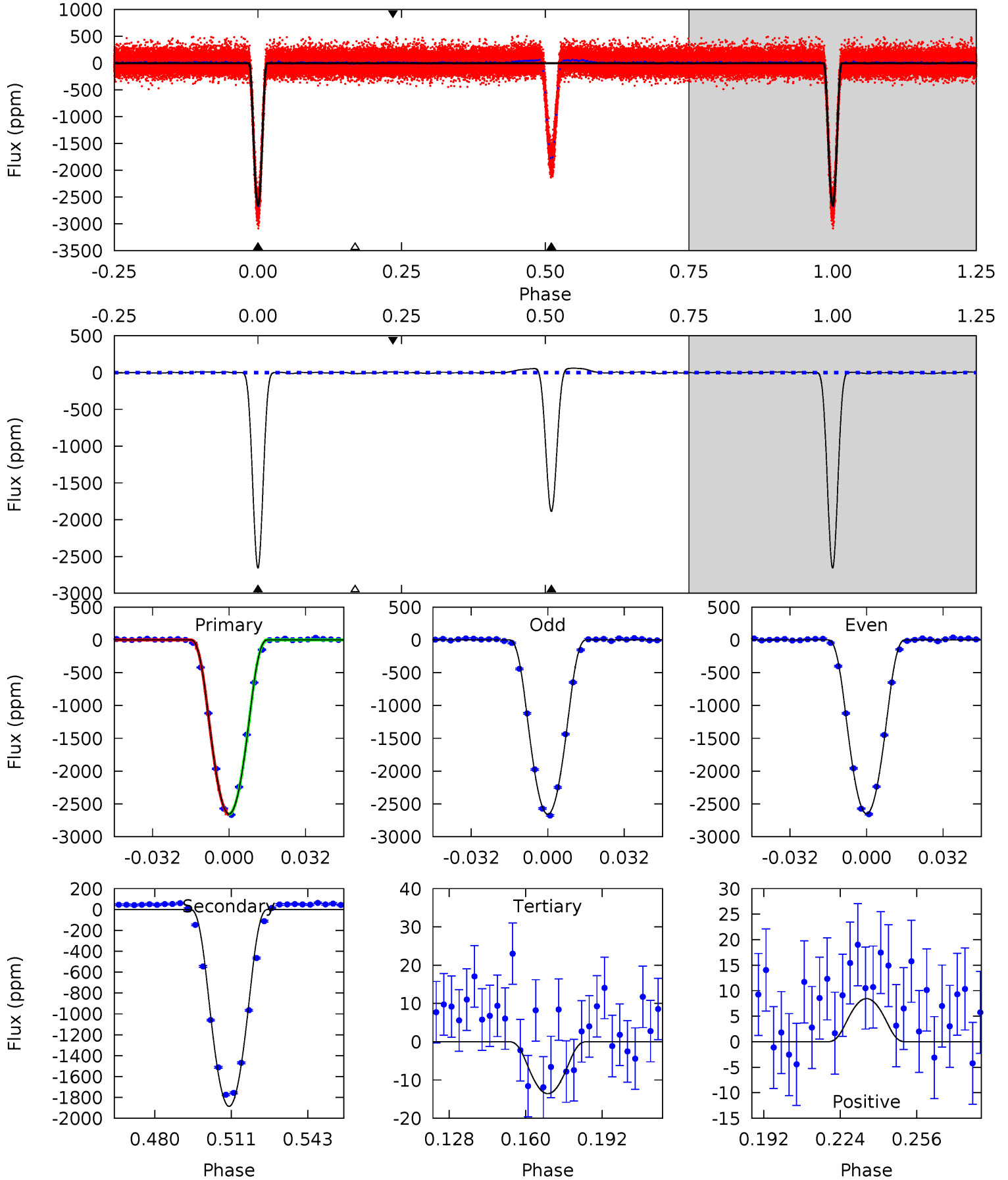
TCE 009278021-01 P= 3.359466 Days $T_0=133.953377$ (BKJD)



DV Model-Shift Uniqueness Test

009278021-01, P = 3.359474 Days, E = 130.592291 Days

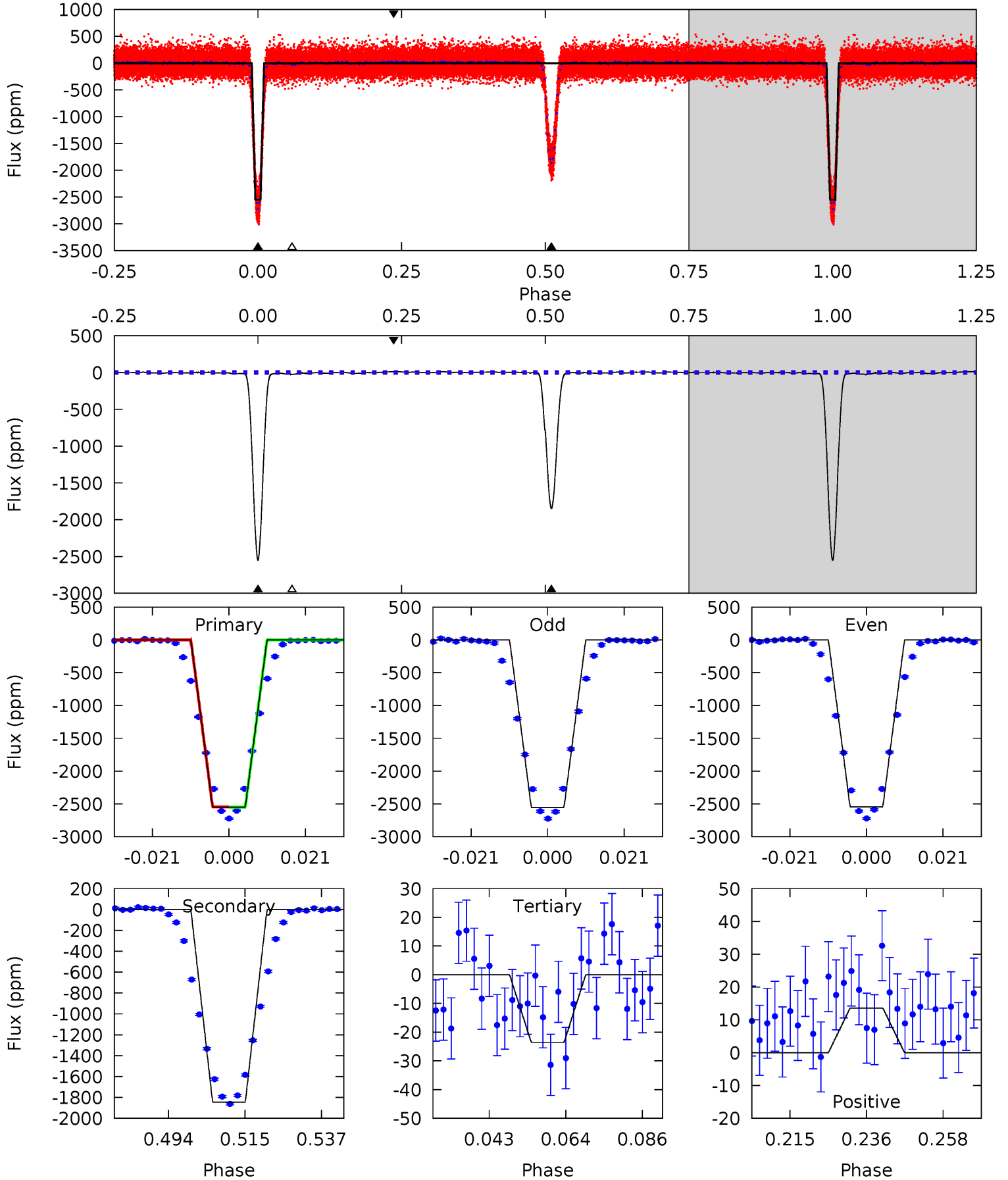
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1043	740.9	5.33	3.32	4.80	2.14	5.53	1038	1040	735.5	737.5	1.65	0.99	0.02	1.53



Alt Model-Shift Uniqueness Test

009278021-01, P = 3.359466 Days, E = 130.593911 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
756.1	547.6	7.00	4.04	4.88	2.30	2.08	749.1	752.0	540.6	543.5	1.34	0.99	0.01	0.44



Stellar Parameters For KIC 009278021

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6587^{+176}_{-215}	$3.531^{+0.360}_{-0.112}$	$-0.620^{+0.400}_{-0.300}$	$3.514^{+0.615}_{-1.435}$	$1.530^{+0.212}_{-0.394}$	$0.050^{+0.137}_{-0.018}$
	+3%/-3%	+10%/-3%	+65%/-48%	+18%/-41%	+14%/-26%	+277%/-37%
Source	PHO1	FLK73	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 009278021-01 / KOI 7152.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1885 ± 3	$28.18^{+4.72}_{-5.76}$	3315^{+215}_{-318}	4927^{+203}_{-171}	$3.352^{+1.757}_{-0.771}$
Alt.	-1846 ± 3	$19.37^{+3.52}_{-4.22}$	3308^{+221}_{-345}	5858^{+303}_{-289}	$7.029^{+3.991}_{-1.932}$

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 $A_{obs} \gg 1.0$

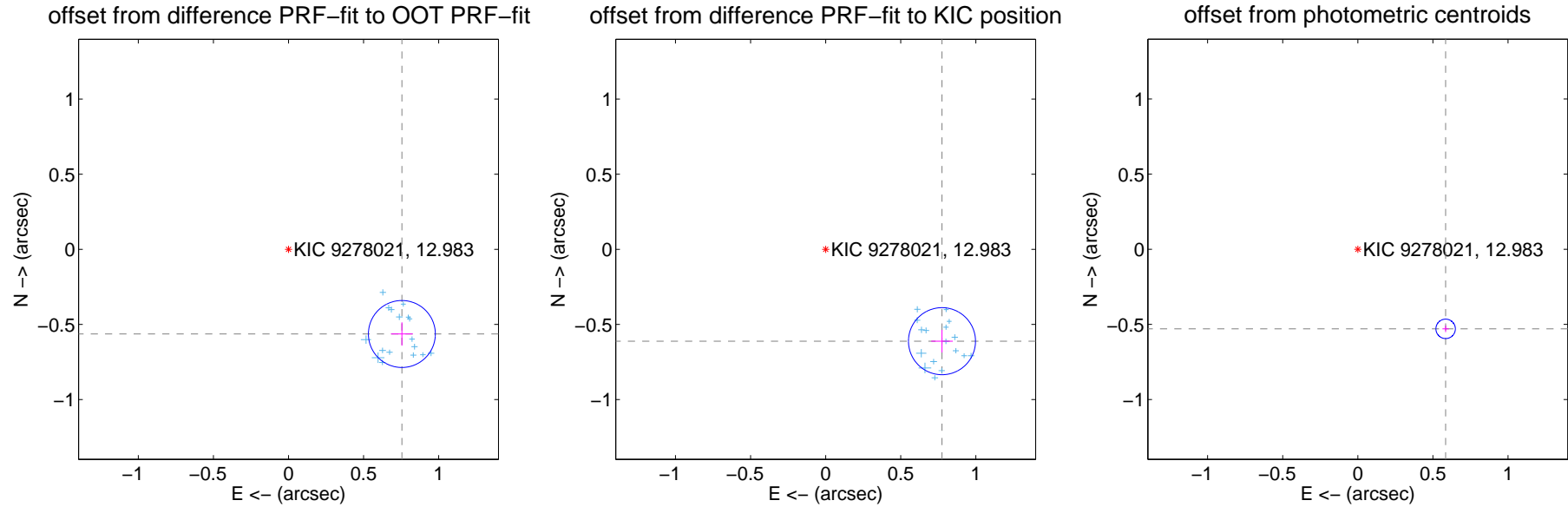
DV Centroid Data

Supplemental centroid analysis for 009278021-01. Kepler magnitude: 12.98. Transit SNR 574.00

There are 17 quarters with good PRF difference image offsets

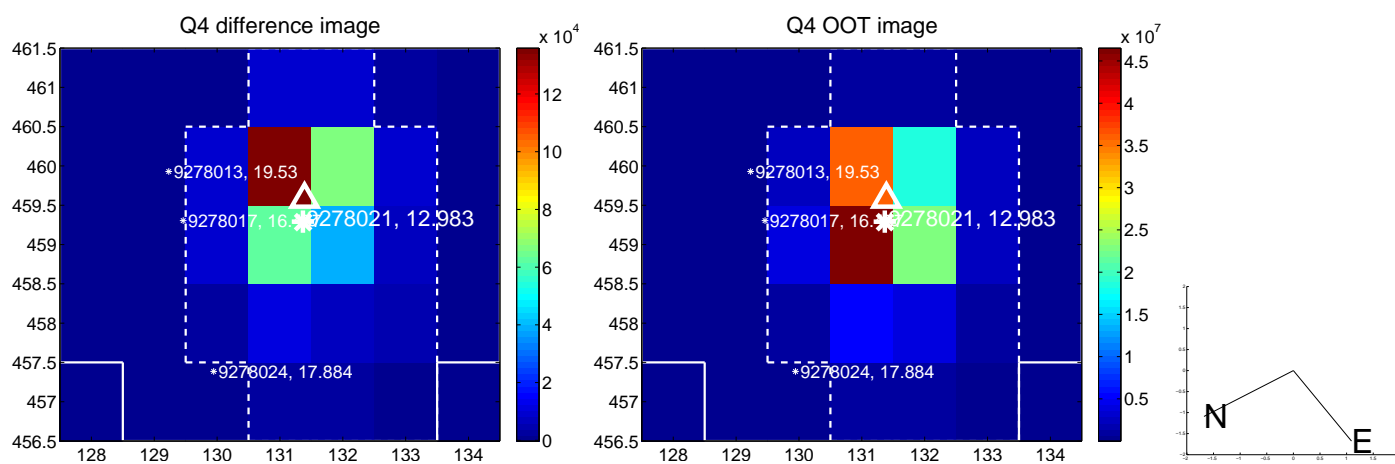
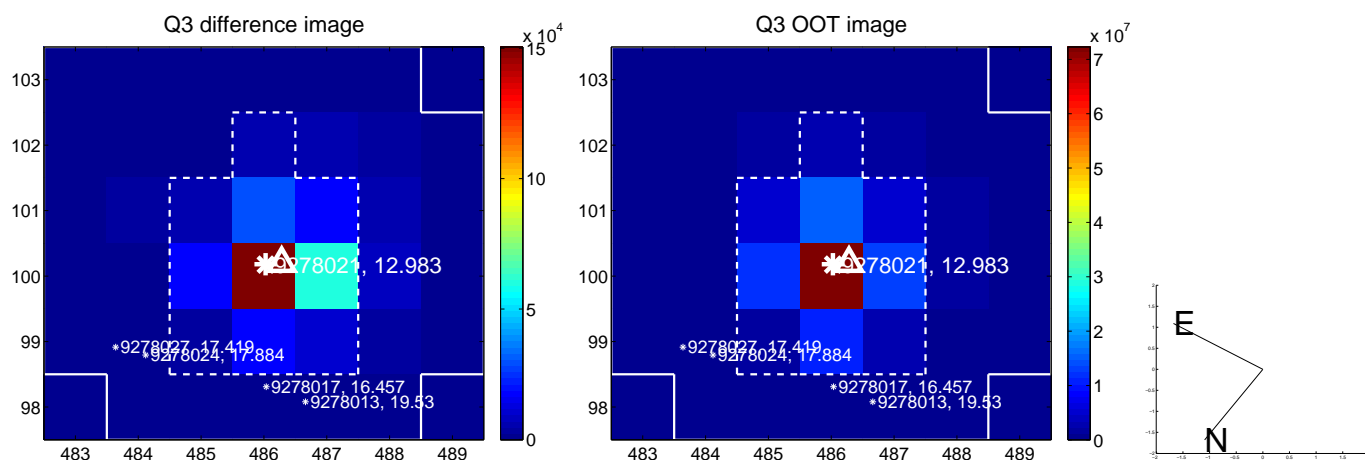
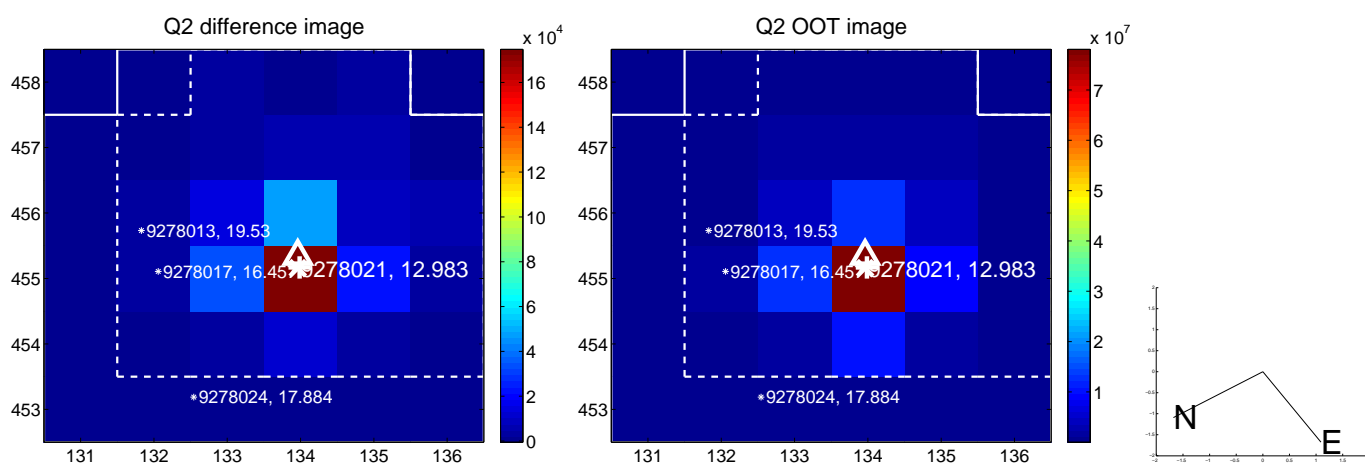
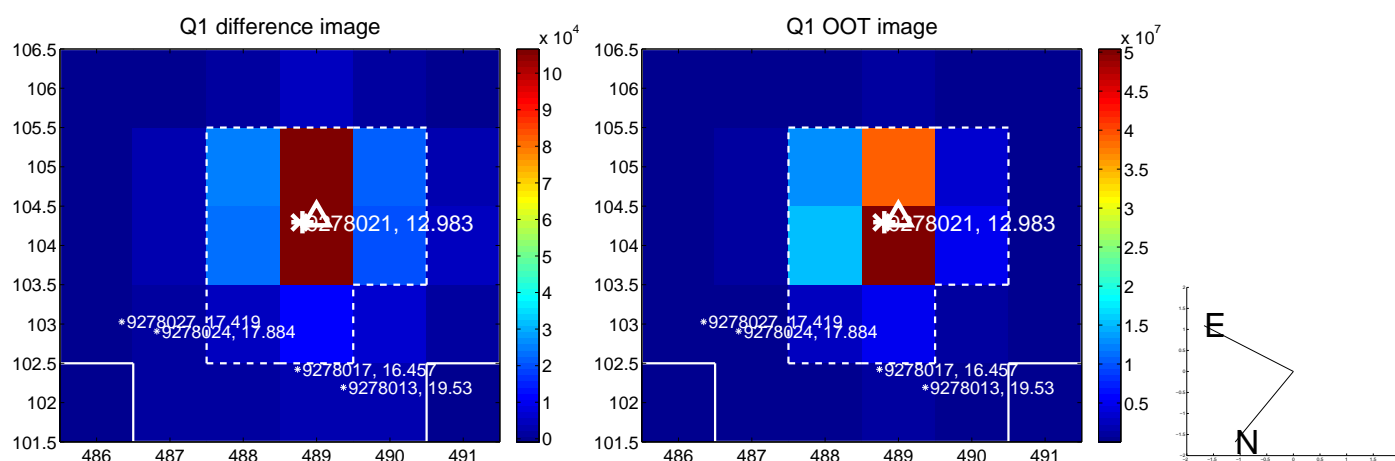
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.942 ± 0.074	12.68	-0.755 ± 0.072	-0.564 ± 0.078
PRF-fit source offset from KIC position	0.987 ± 0.074	13.27	-0.775 ± 0.072	-0.611 ± 0.075
photometric centroid source offset	0.79 ± 0.02	36.58	-0.58 ± 0.02	-0.53 ± 0.02

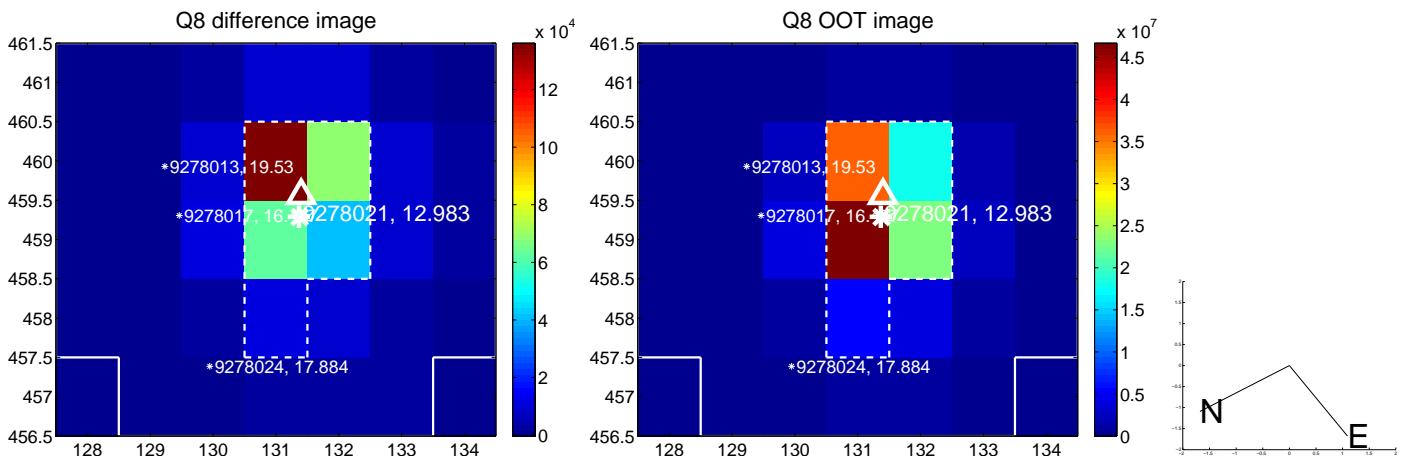
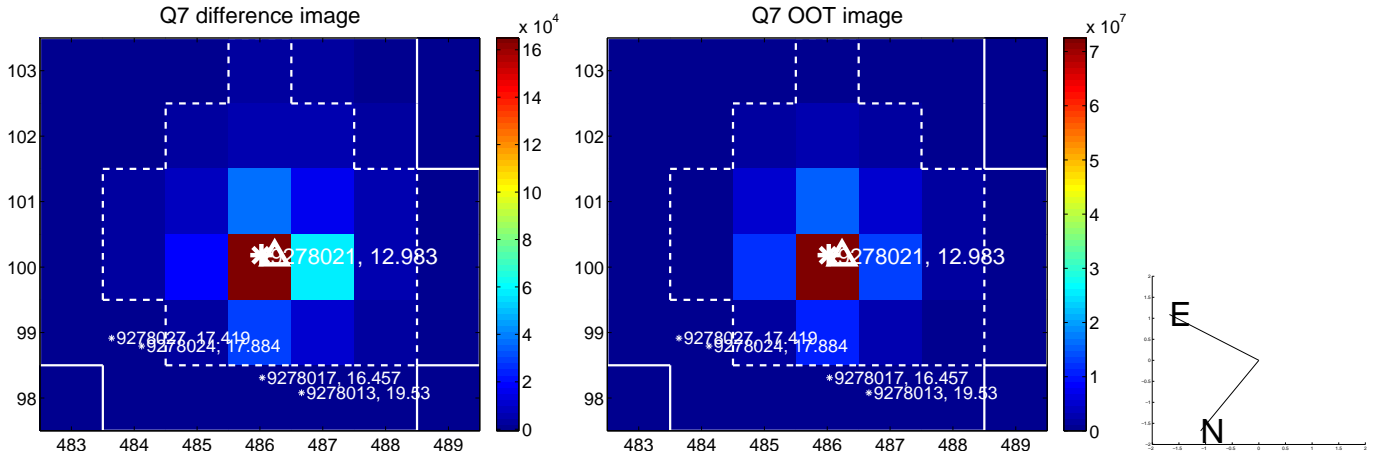
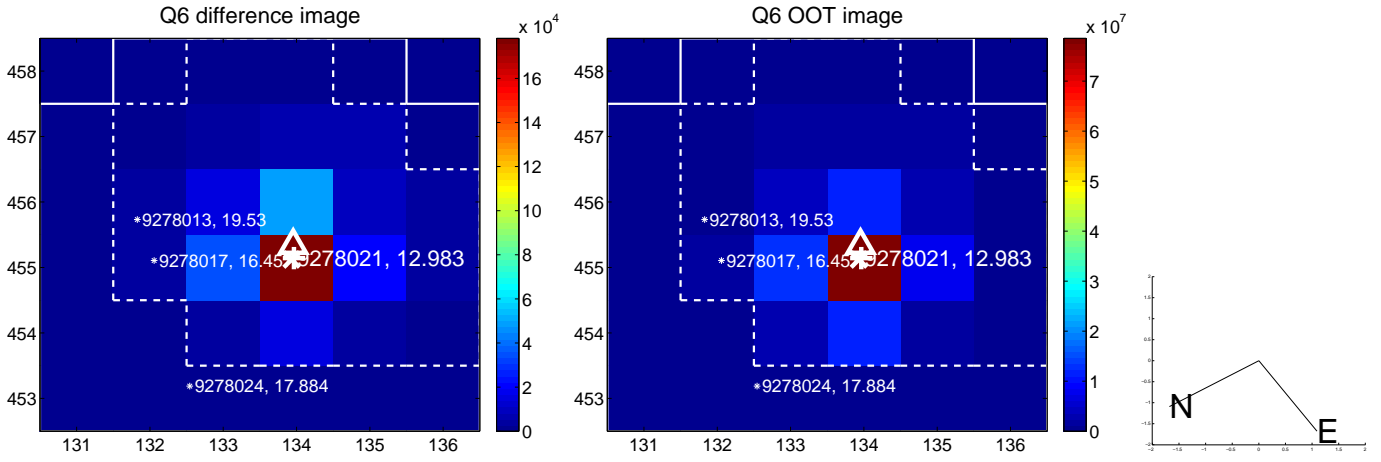
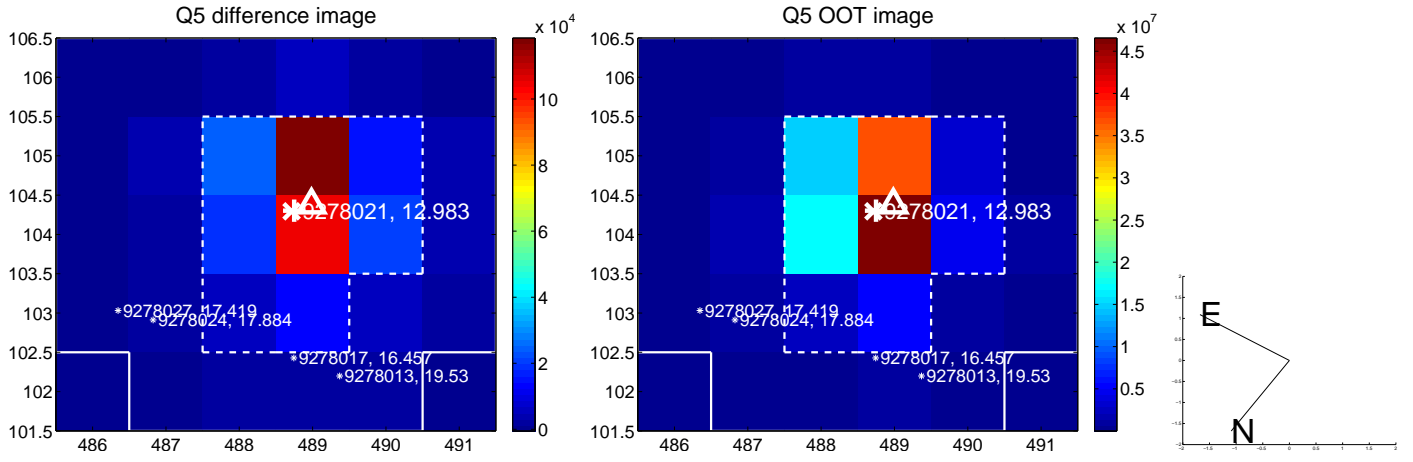


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

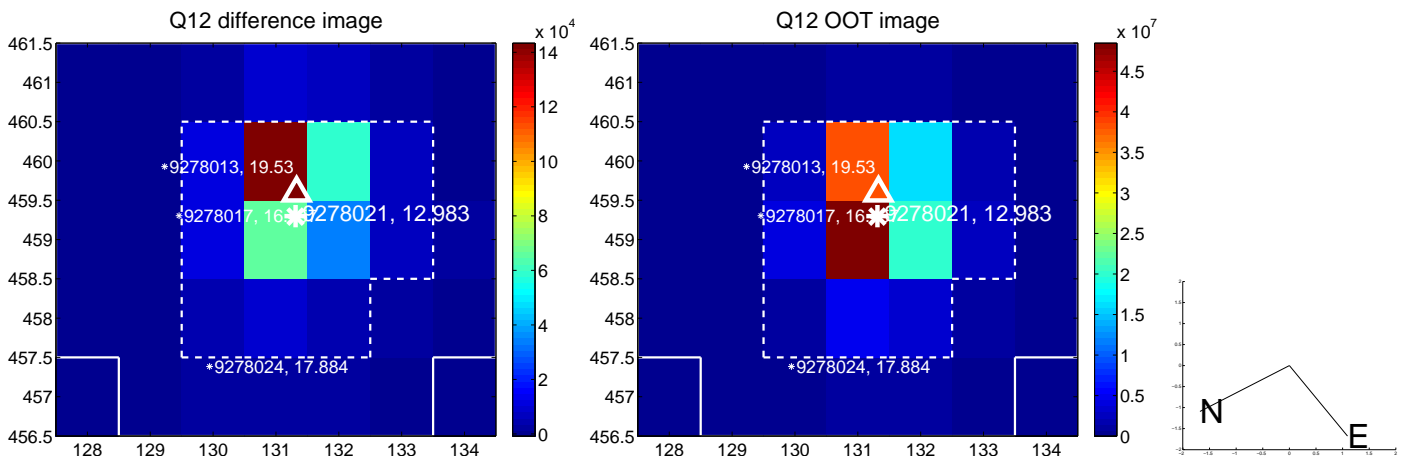
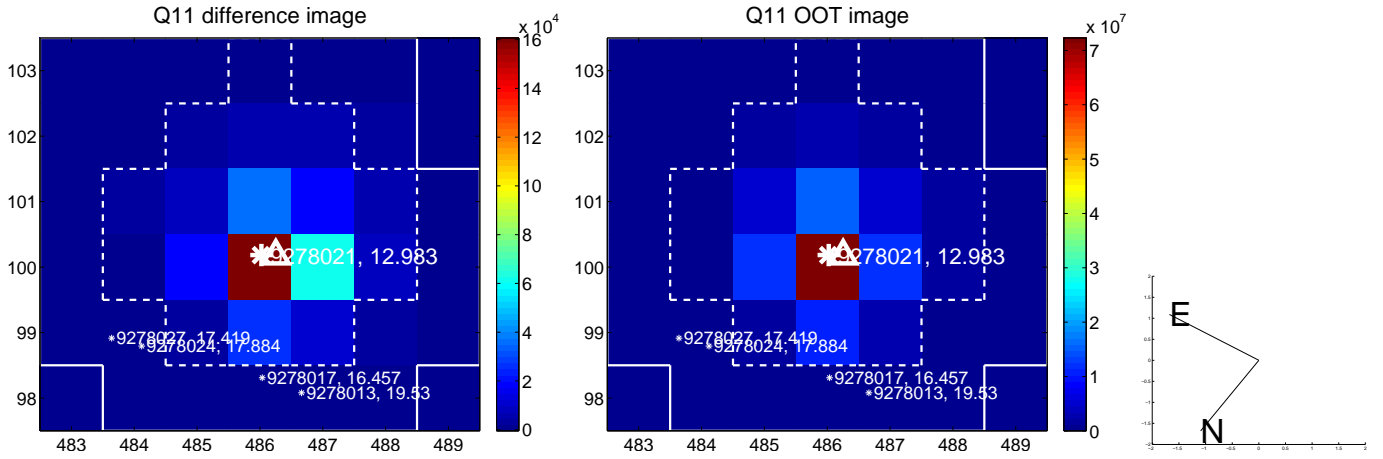
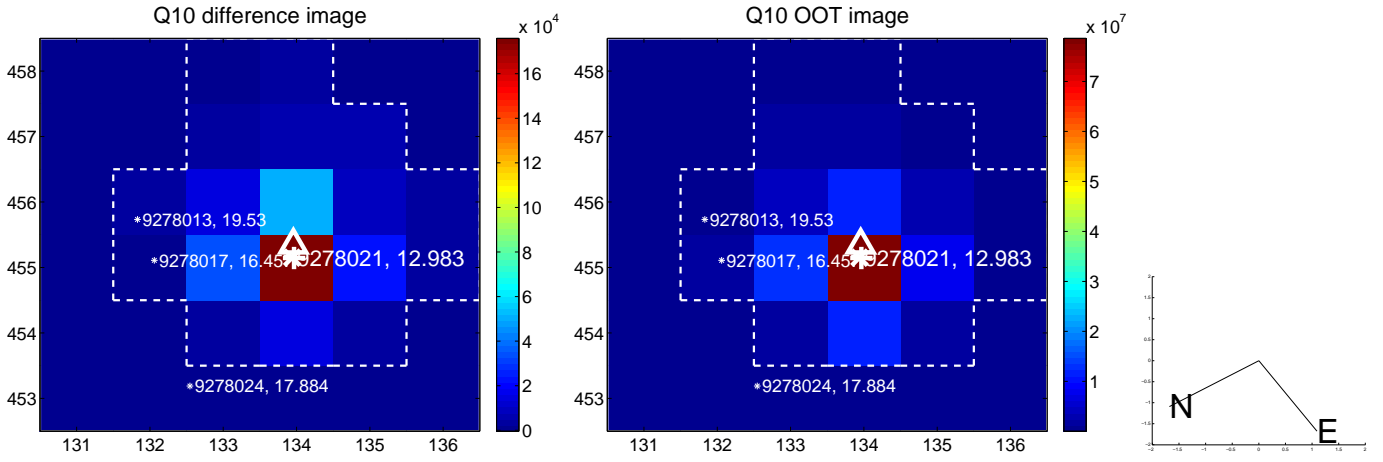
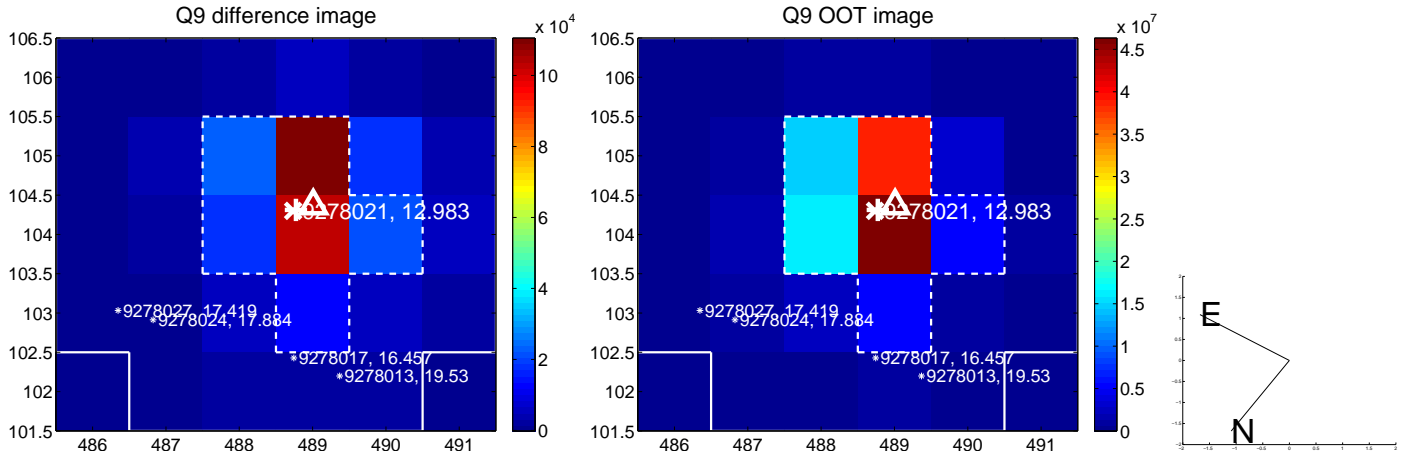
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



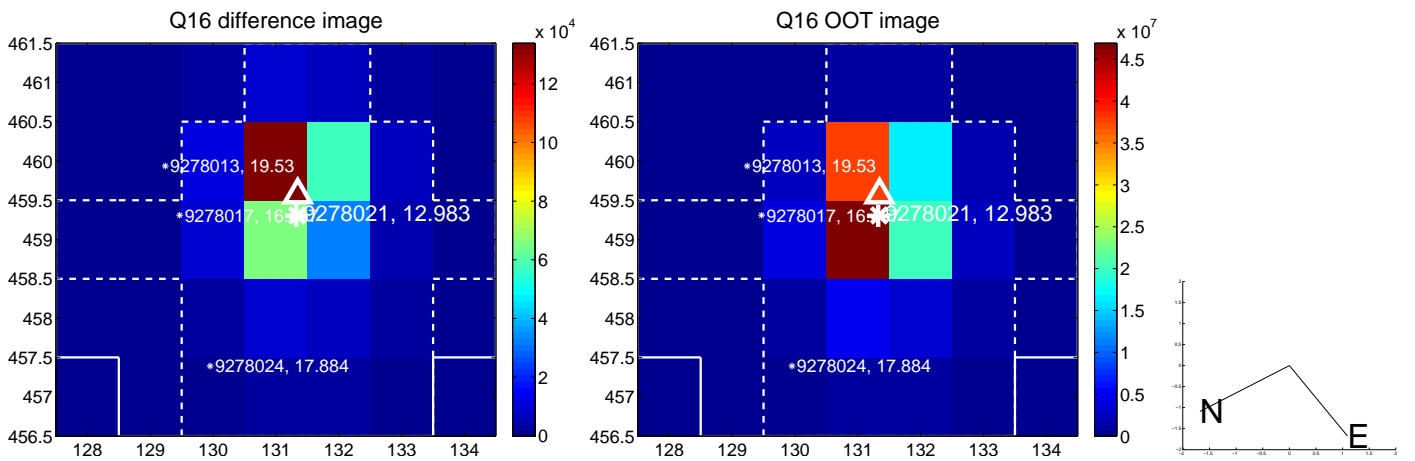
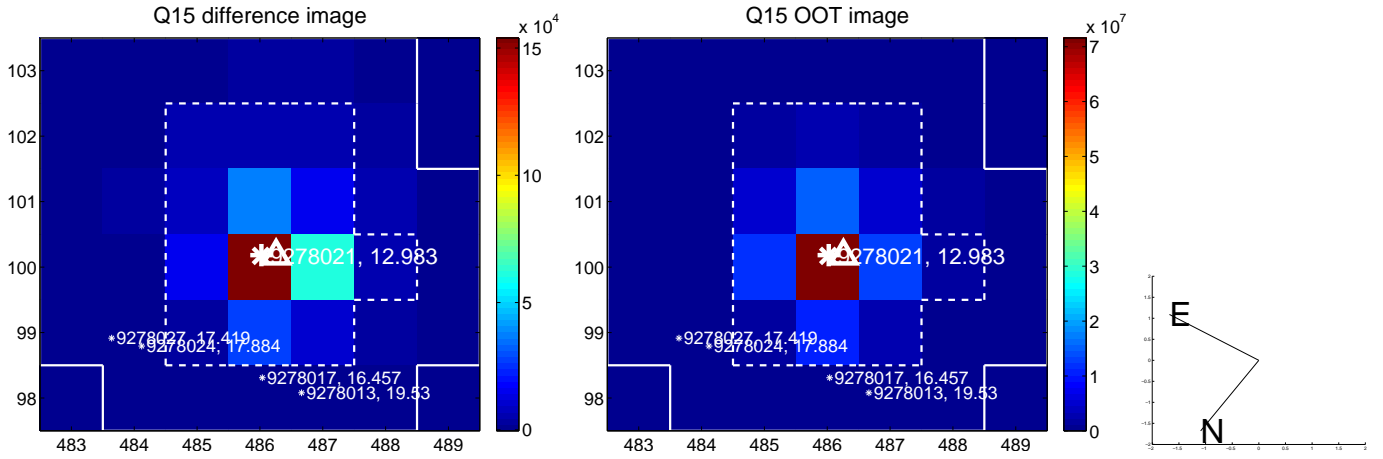
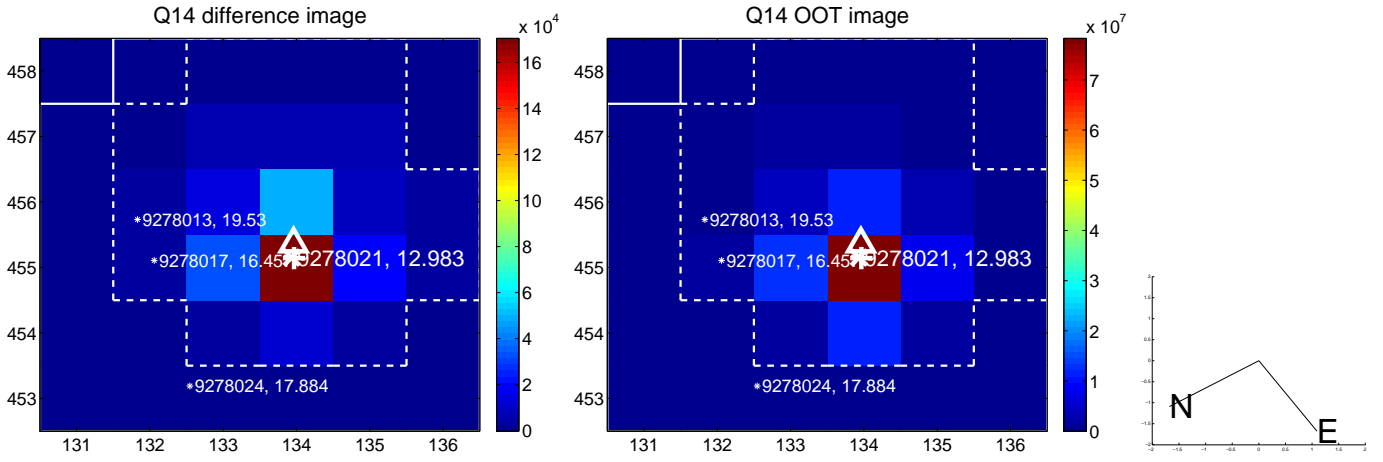
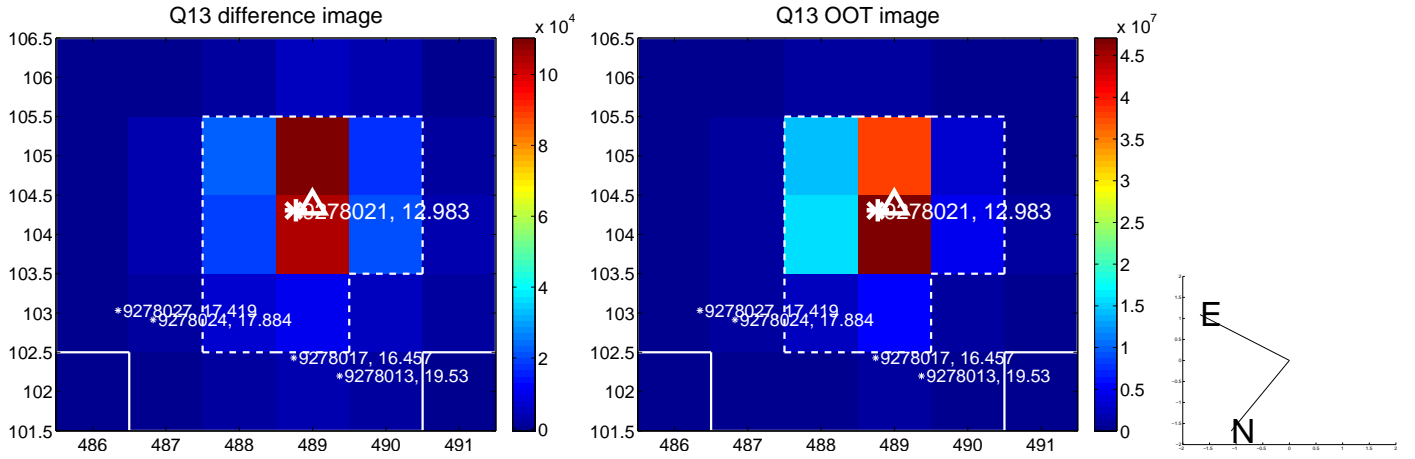
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



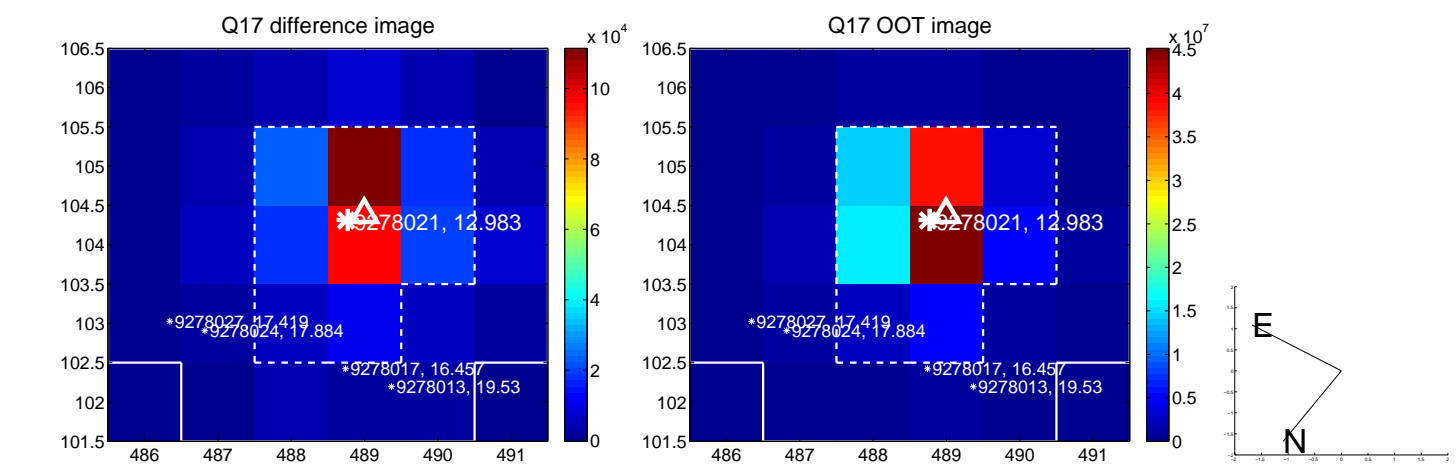
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



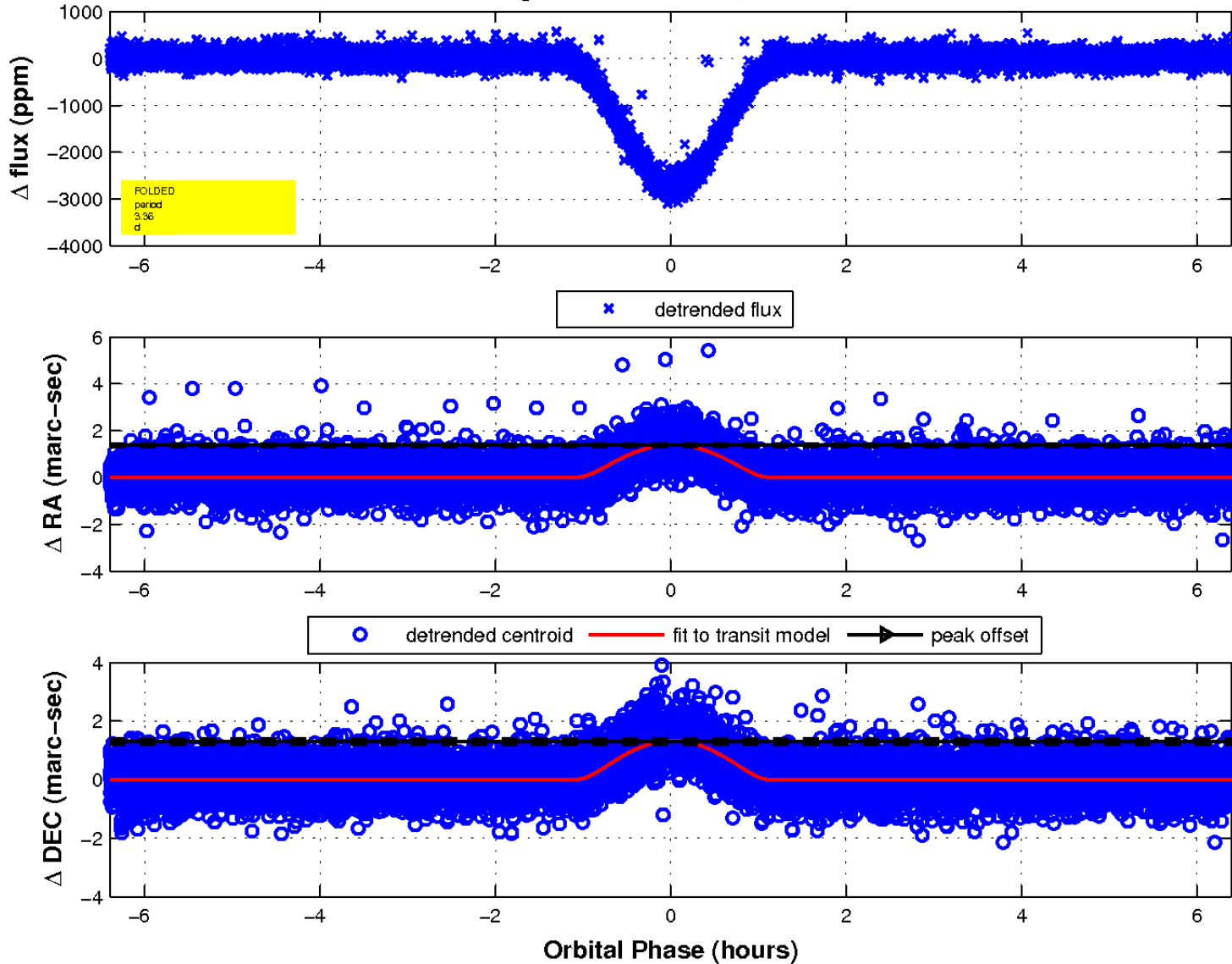
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

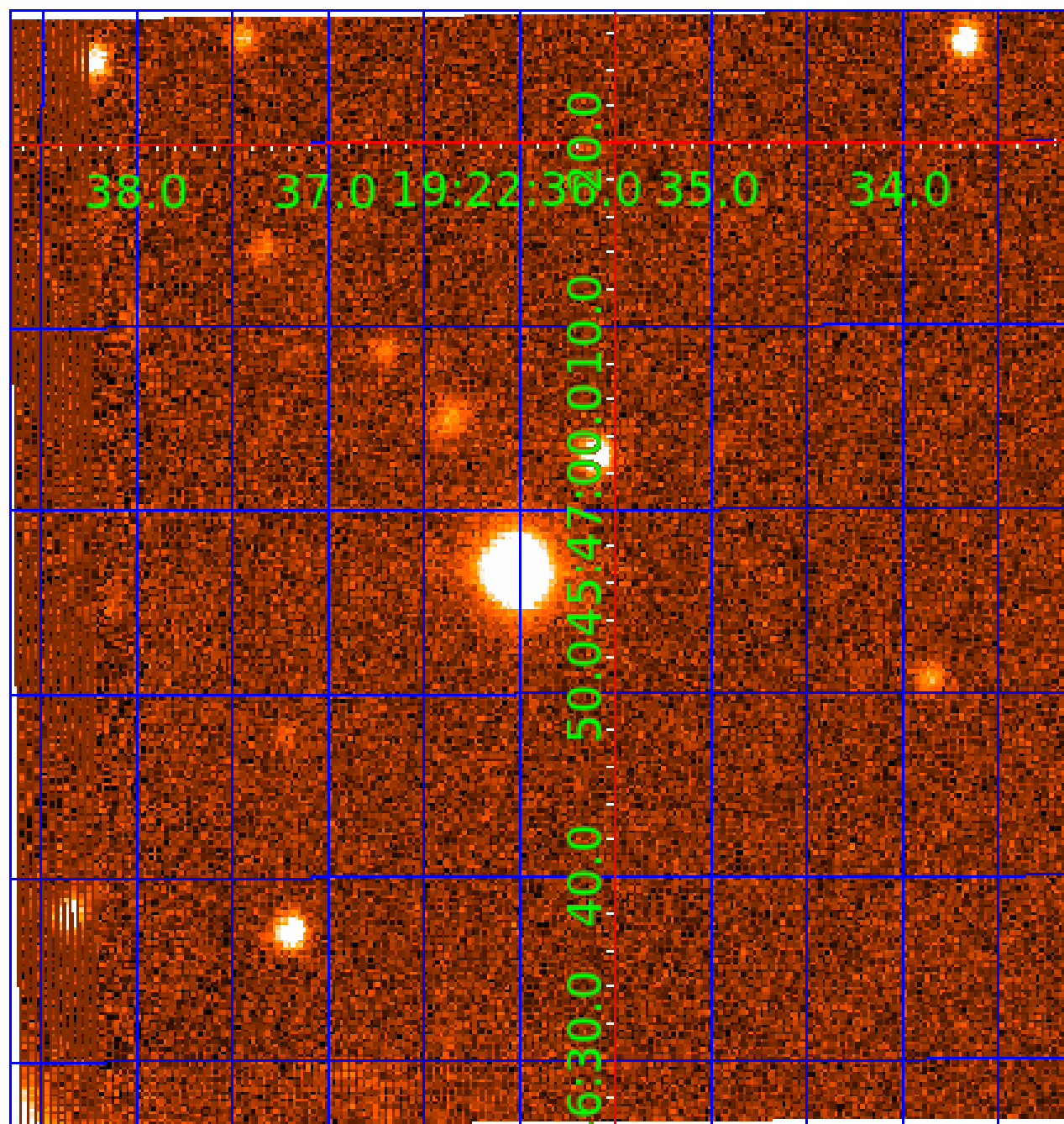


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009278021

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})
009278021-01	OBS	7152.01	3.359474	133.951765	2654.3	2.132	593.7	574.0	3.51	6587	29.22	8137.38
009278021-02	OBS	No	3.359469	132.308789	1824.9	2.425	432.4	429.4	3.51	6587	27.96	8137.39

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009278021-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009278021-02	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.

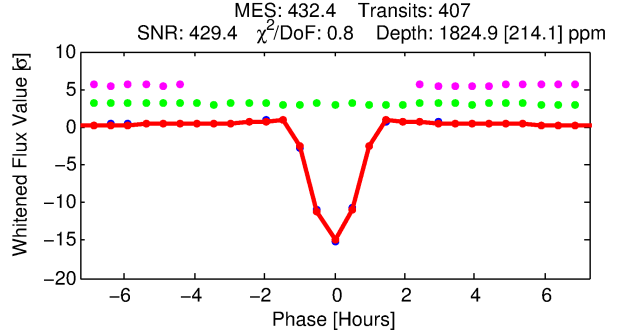
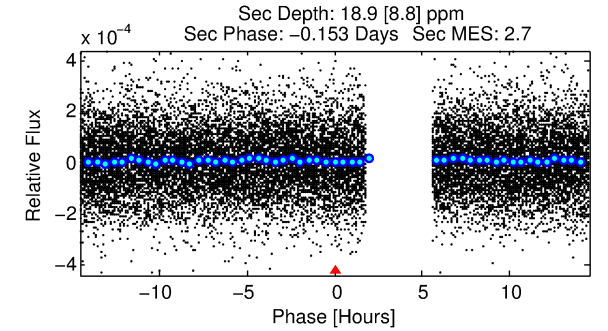
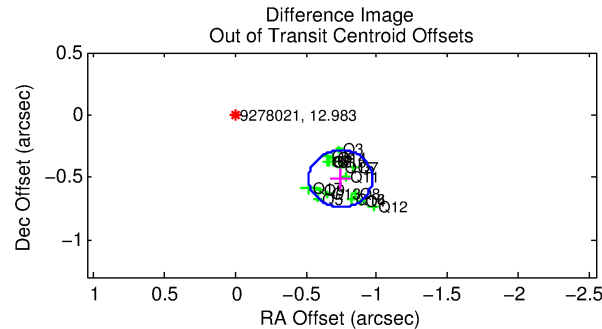
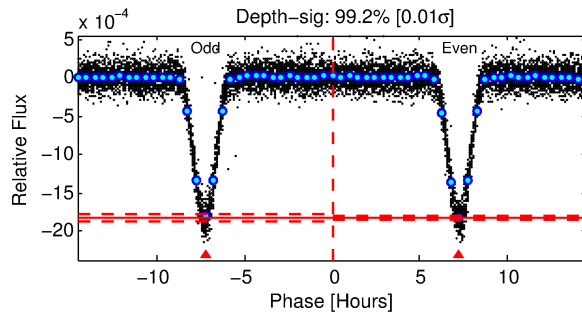
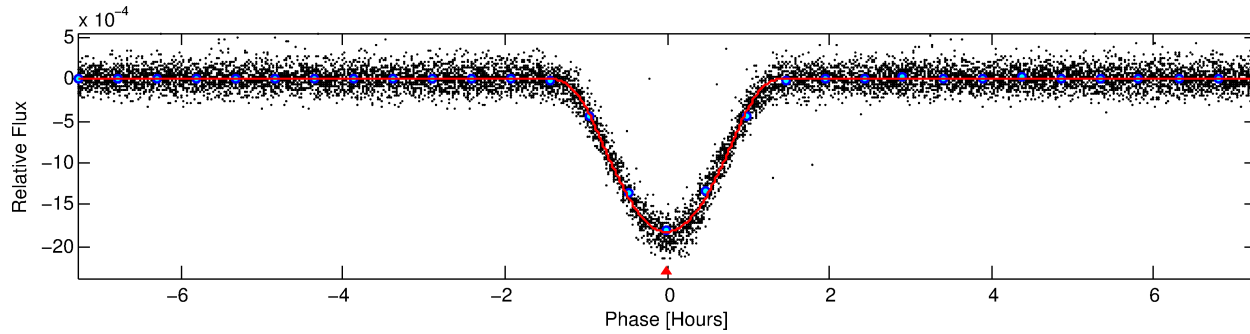
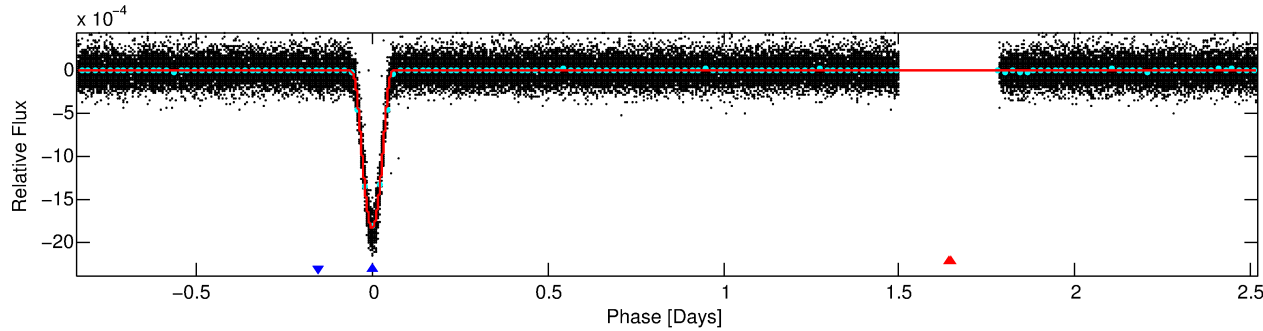
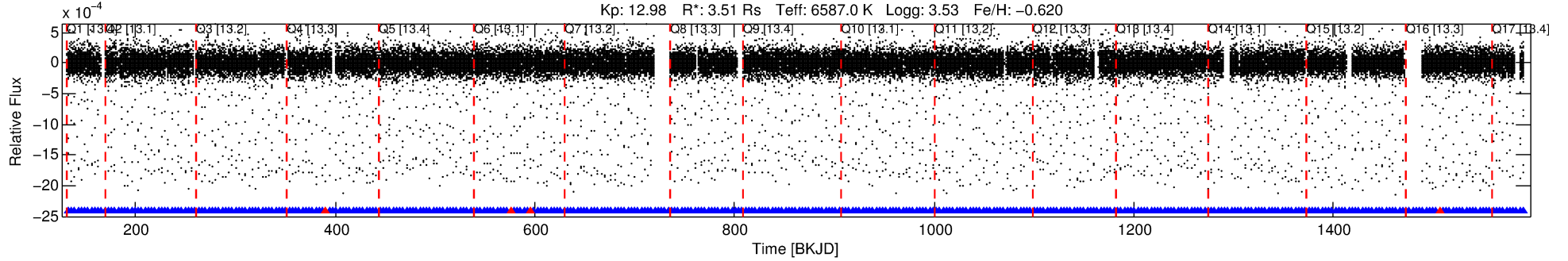
Ephemeris Match Information For 009278021-02

No Significant Match Found

DV One-Page Summary

KIC: 9278021 Candidate: 2 of 2 Period: 3.359 d
KOI: K07152 Corr: No Ephemeris Match

Kp: 12.98 R*: 3.51 Rs Teff: 6587.0 K Logg: 3.53 Fe/H: -0.620



DV Fit Results:

Period = 3.35947 [0.00000] d
Epoch = 132.3088 [0.0001] BKJD
Rp/R* = 0.0729 [0.0089]
a/R* = 4.24 [0.11]
b = 1.00 [0.02]
Seff = 8137.39 [5124.31]
Teq = 2422 [381] K
Rp = 27.96 [11.92] Re
a = 0.0506 [0.0196] AU
Ag = 0.03 [0.03] [-35.06σ]
Teffp = 1608 [218] K [-1.85σ]

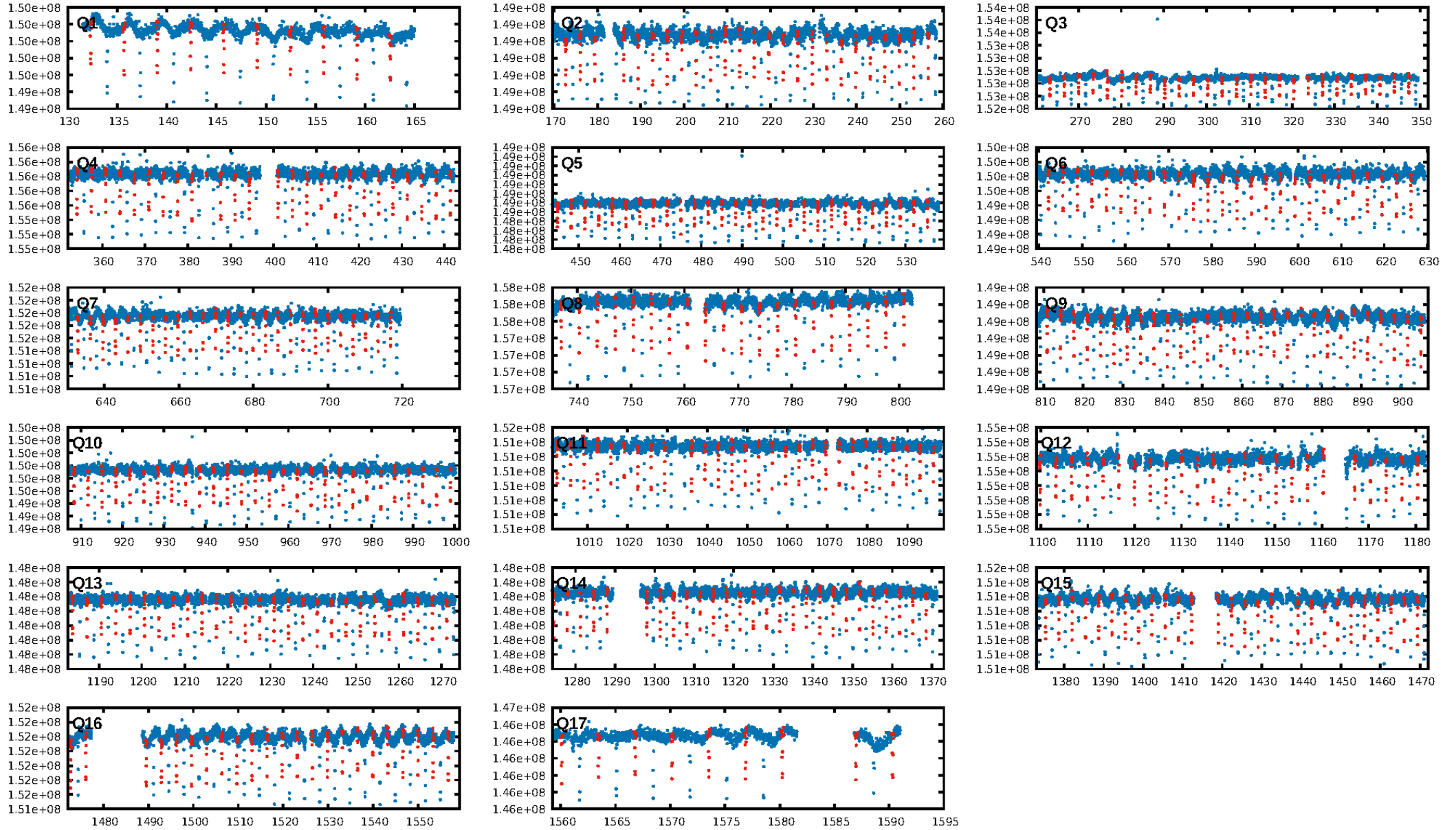
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.99 [384/388]
GhostDiagnostic-chr: 5.759
Centroid-sig: 0.0%
Centroid-so: 0.813 arcsec [27.51σ]
OotOffset-rm: 0.903 arcsec [11.95σ]
KicOffset-rm: 0.947 arcsec [12.52σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
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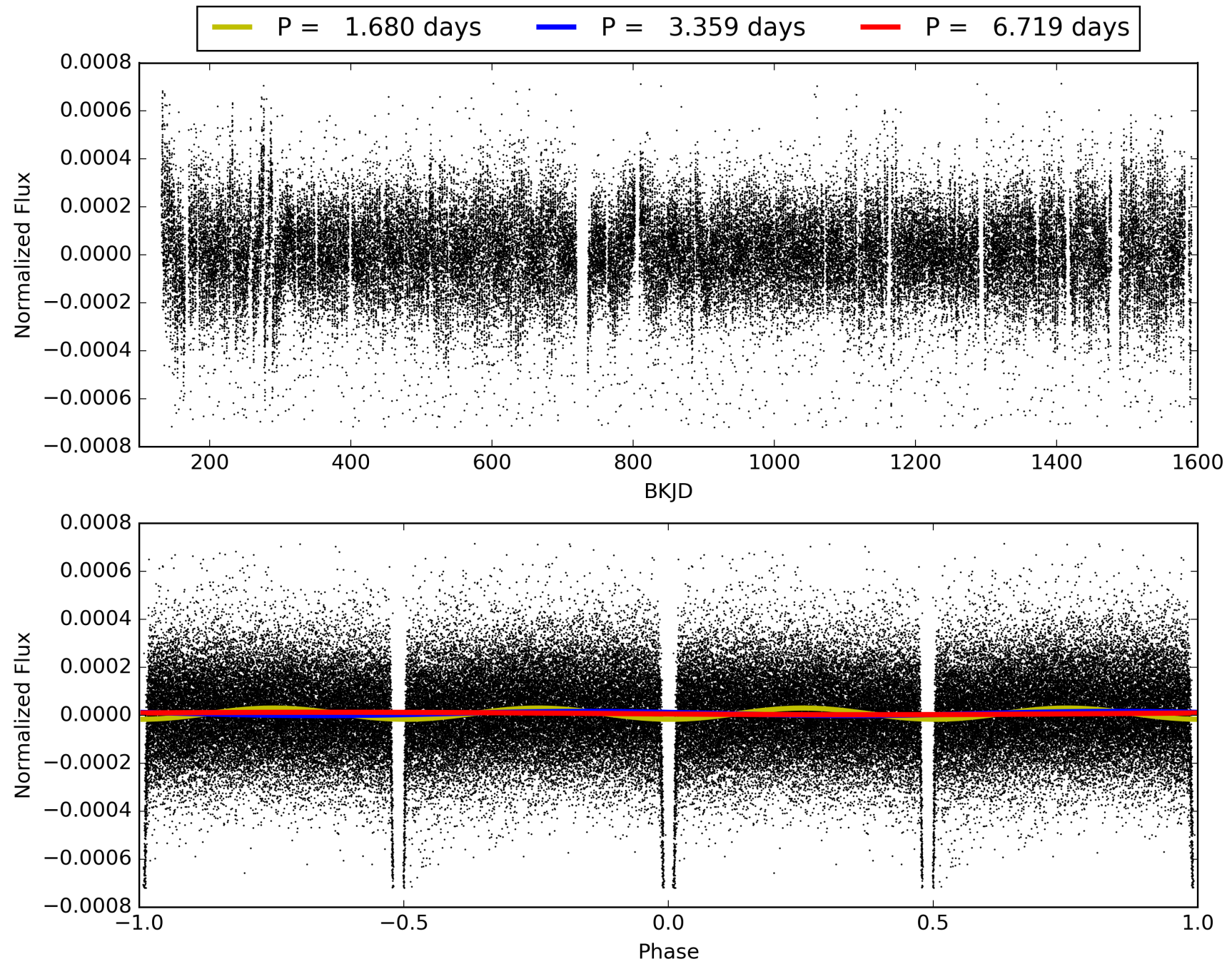
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:11:21 Z

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

TCE 009278021-02, PDC Light Curves

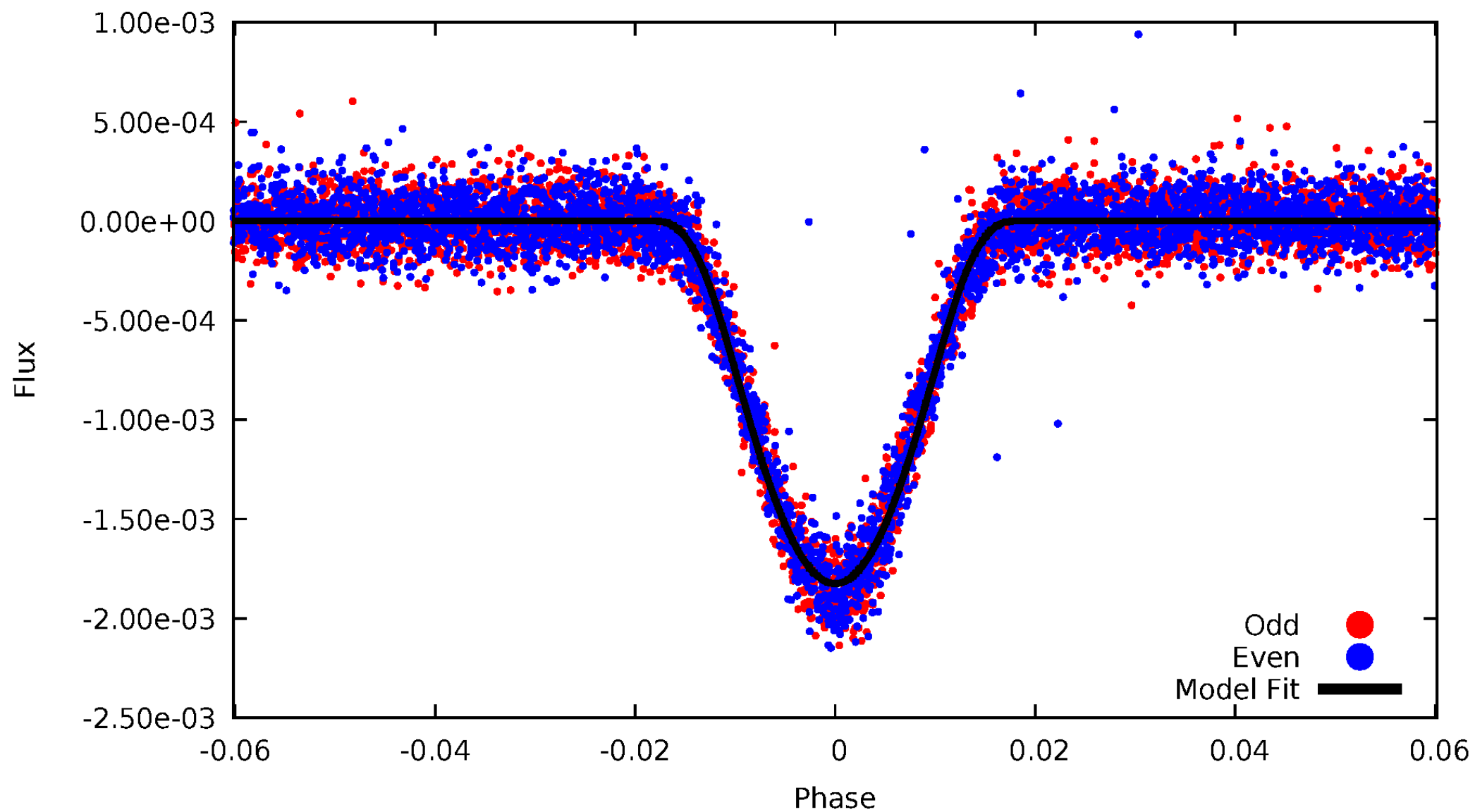


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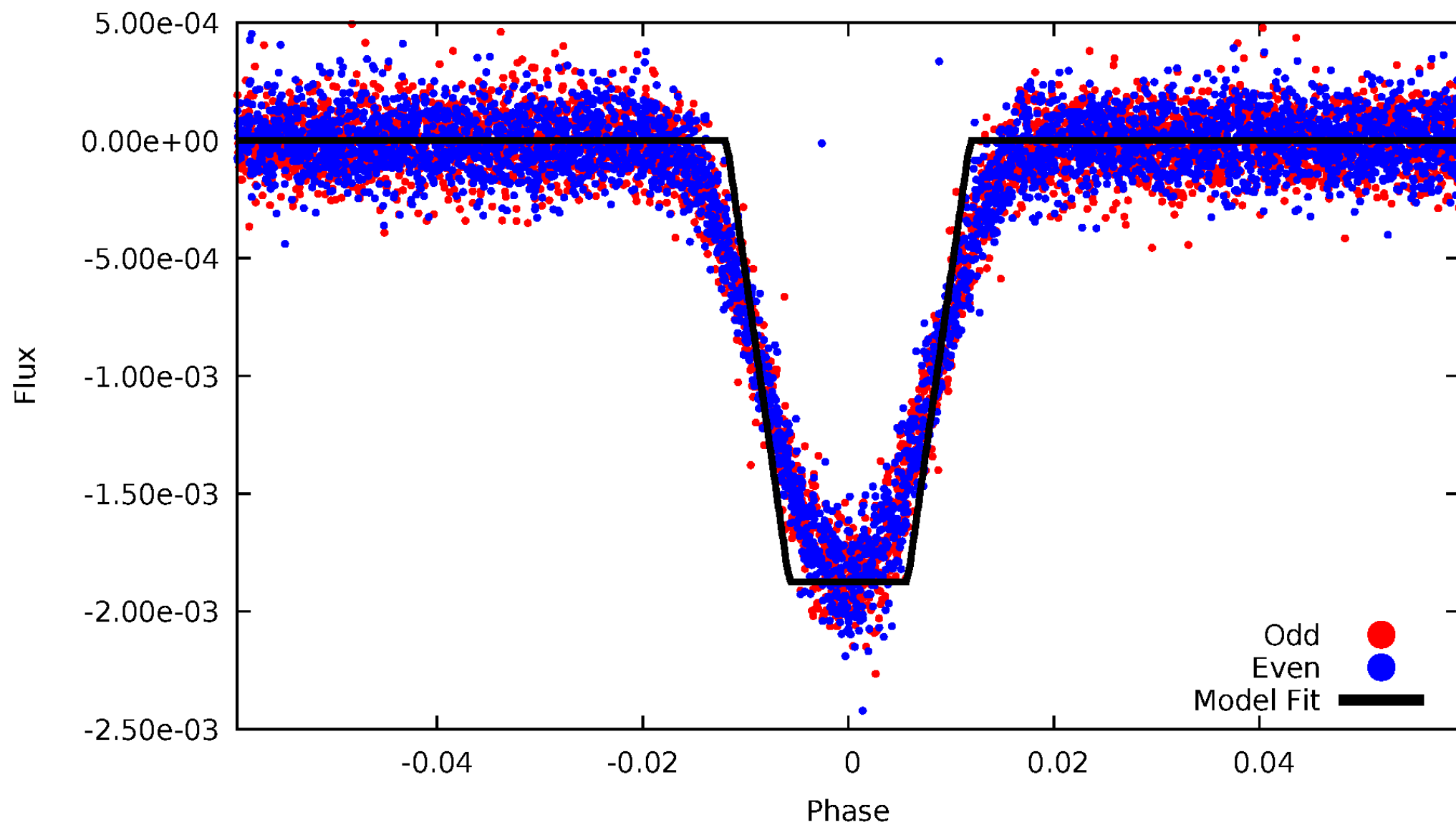
DV Odd/Even

TCE 009278021-02



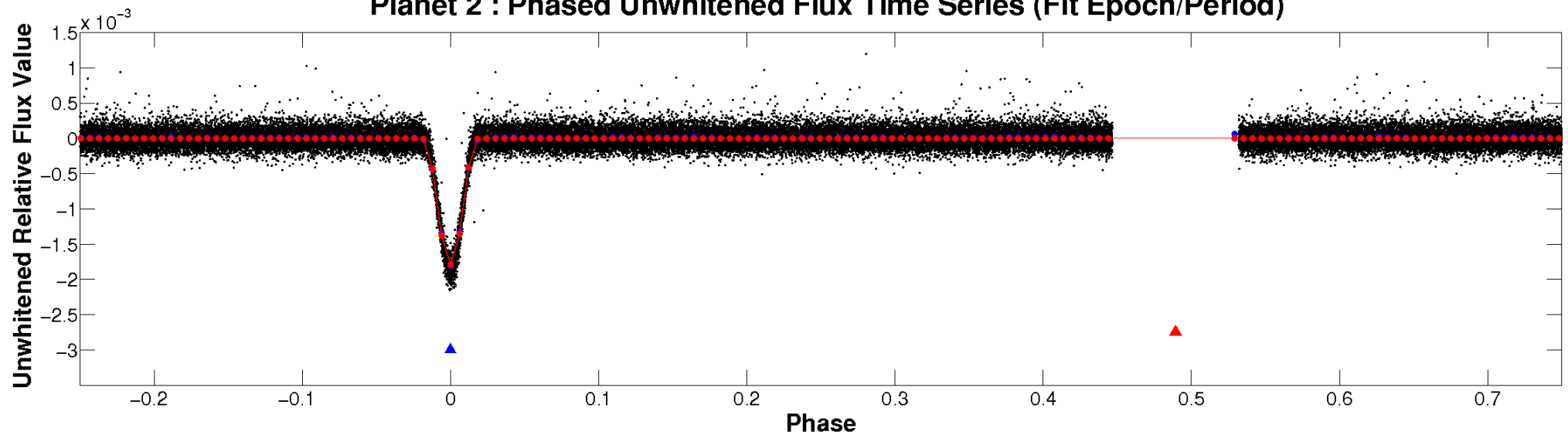
ALT Odd/Even

TCE 009278021-02

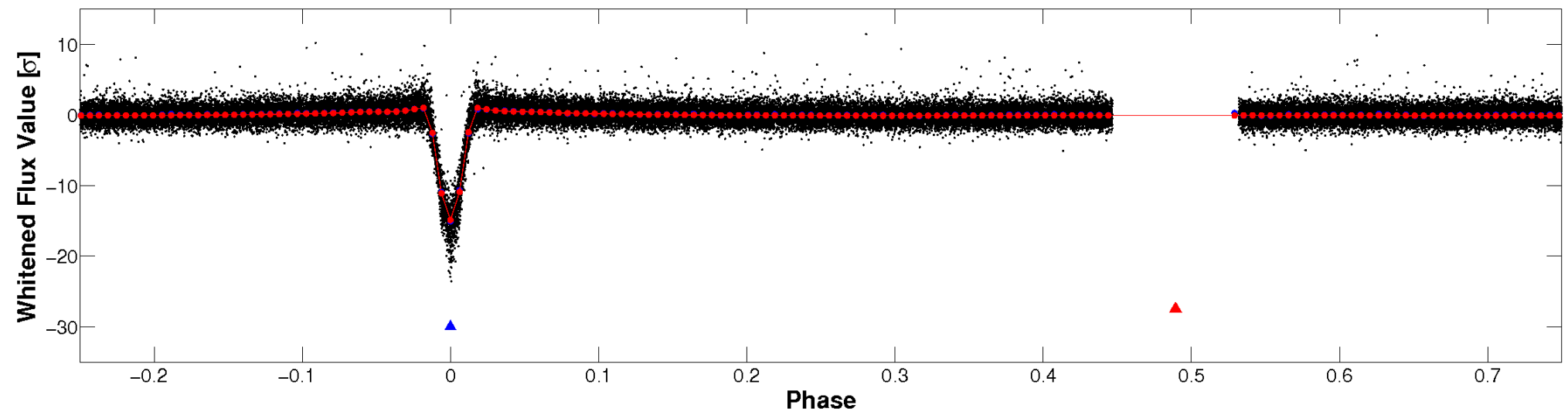


Non-Whitened Vs. Whitened Light Curve

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

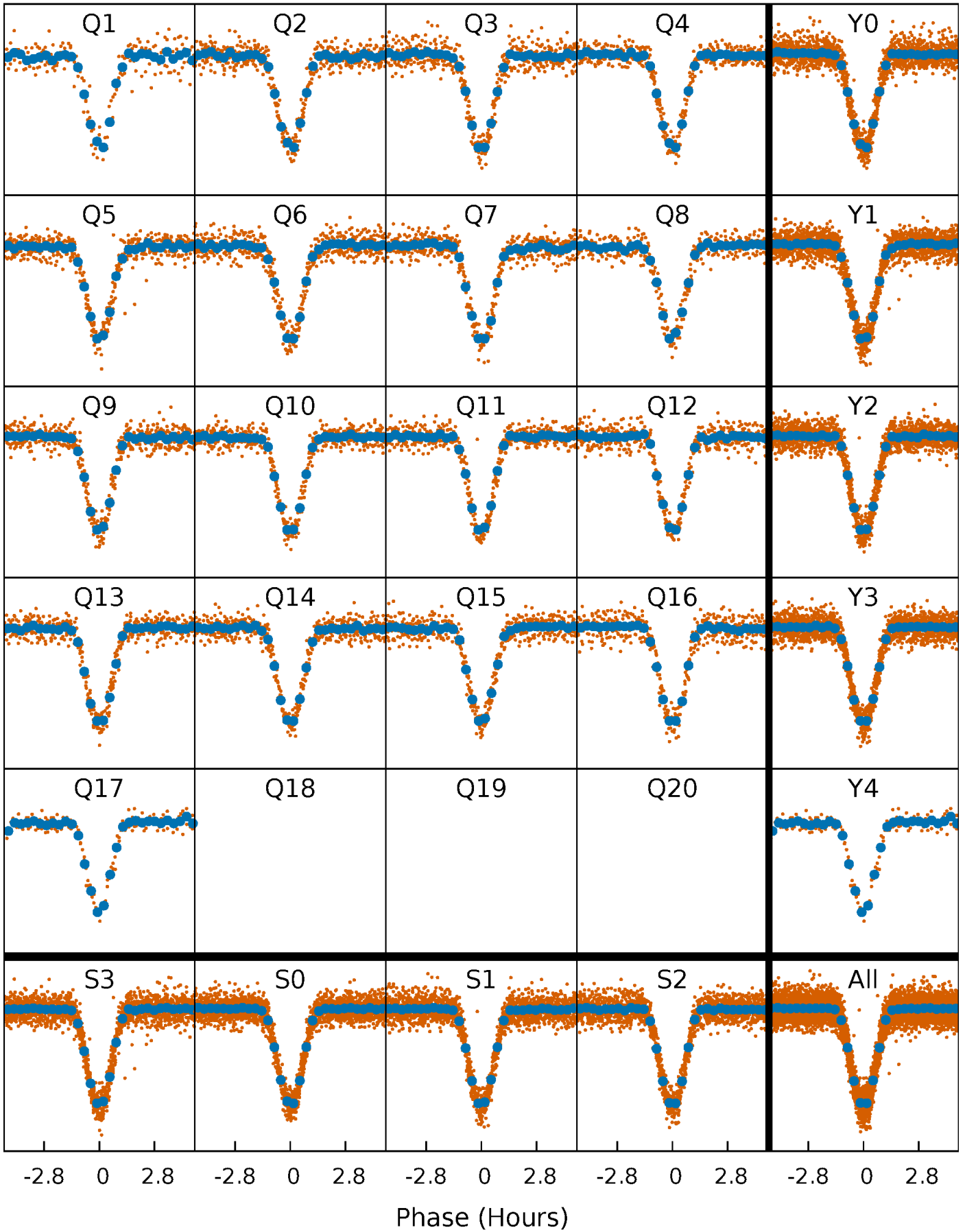


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



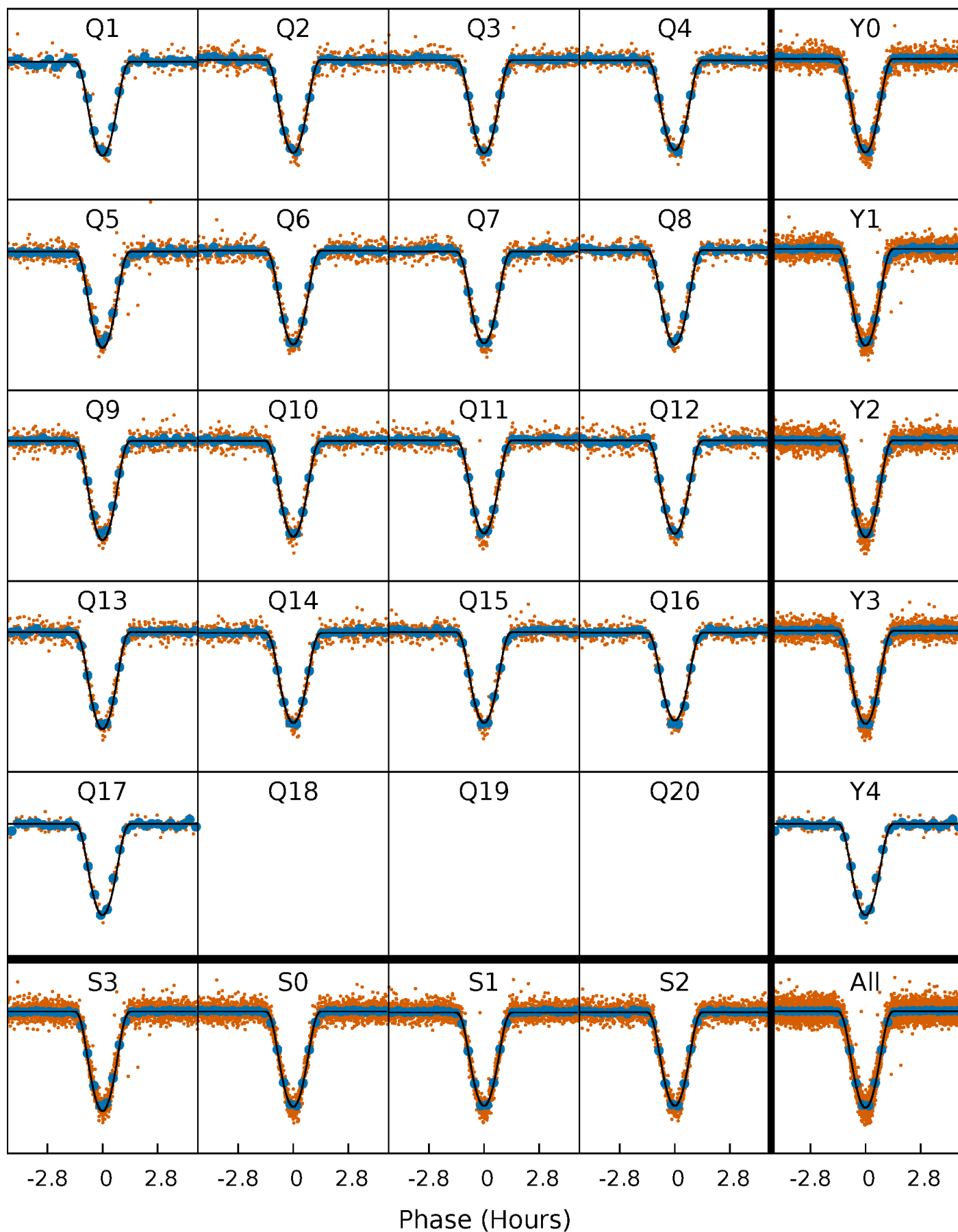
PDC Quarter-Phased Transit Curves

TCE 009278021-02 P= 3.359469 Days $T_0=132.308789$ (BKJD)



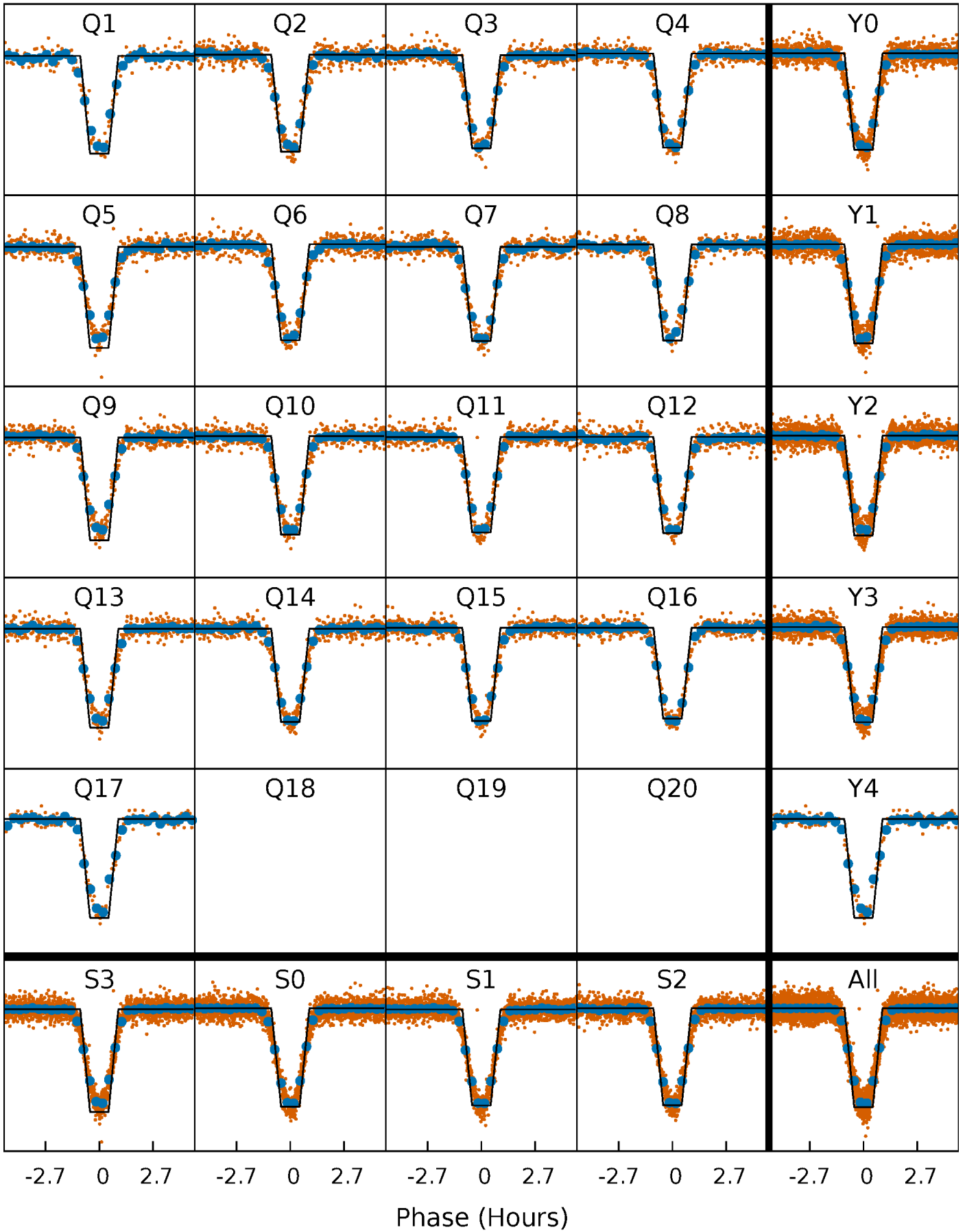
DV Quarter-Phased Transit Curves

TCE 009278021-02 P= 3.359469 Days $T_0=132.308789$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

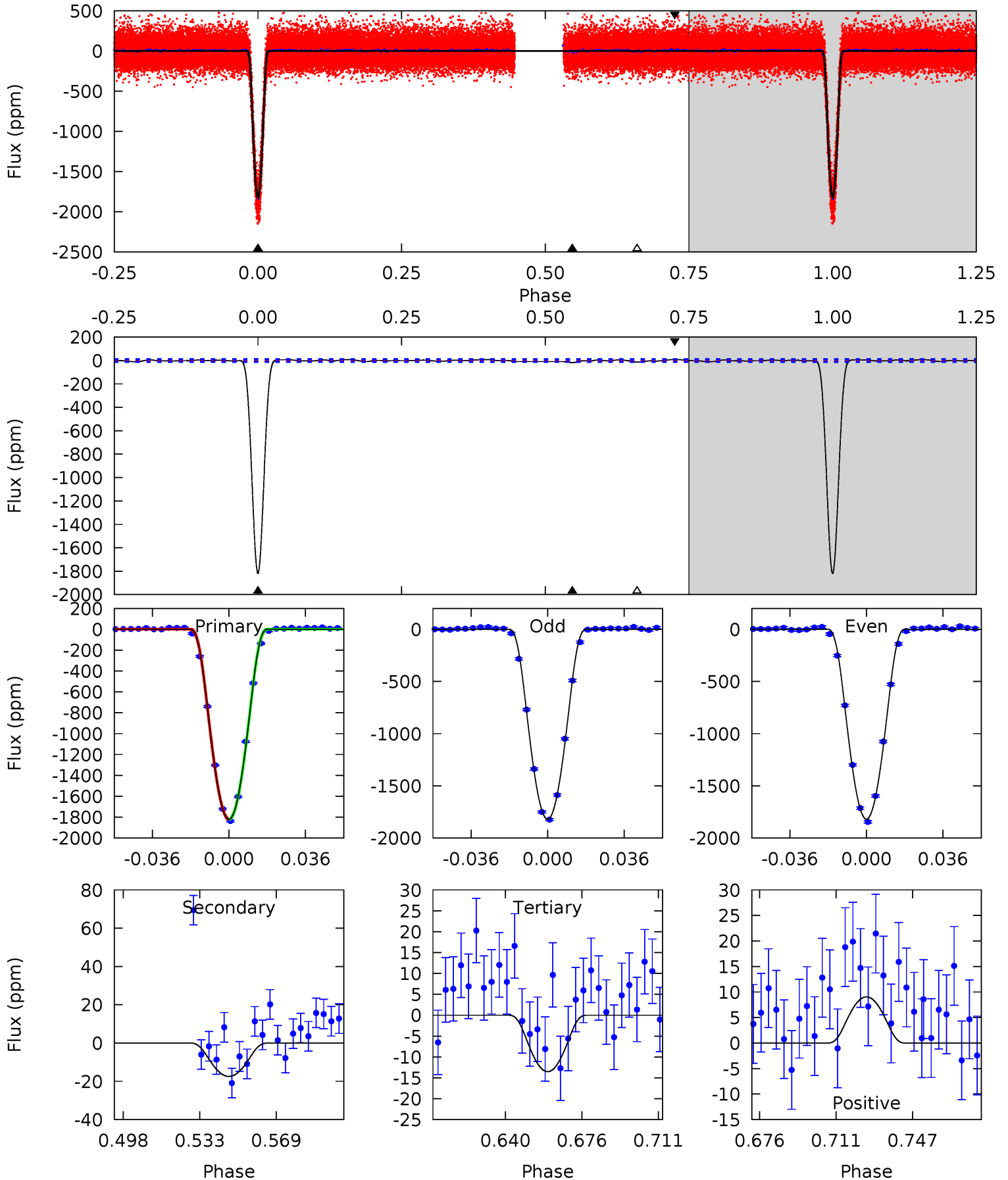
TCE 009278021-02 P= 3.359466 Days $T_0=132.309388$ (BKJD)



DV Model-Shift Uniqueness Test

009278021-02, P = 3.359469 Days, E = 128.949320 Days

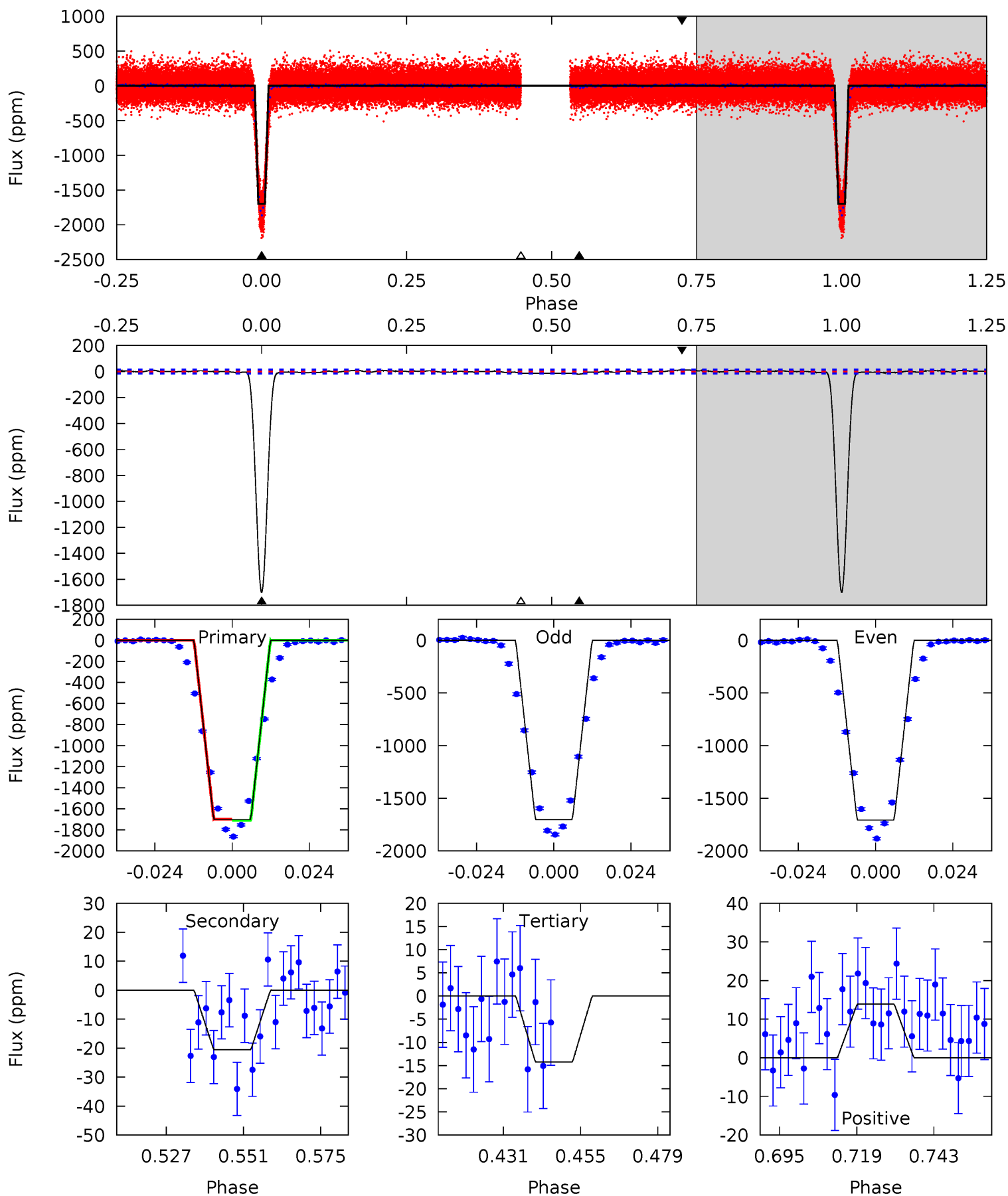
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
763.9	7.32	5.67	3.80	4.78	2.10	1.88	758.2	760.1	1.65	3.52	0.22	1.00	0.00	0.57



Alt Model-Shift Uniqueness Test

009278021-02, P = 3.359466 Days, E = 128.949922 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
556.7	6.73	4.66	4.55	4.86	2.26	1.65	552.1	552.2	2.07	2.18	0.85	1.00	0.01	2.15



Stellar Parameters For KIC 009278021

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6587^{+176}_{-215}	$3.531^{+0.360}_{-0.112}$	$-0.620^{+0.400}_{-0.300}$	$3.514^{+0.615}_{-1.435}$	$1.530^{+0.212}_{-0.394}$	$0.050^{+0.137}_{-0.018}$
	+3%/-3%	+10%/-3%	+65%/-48%	+18%/-41%	+14%/-26%	+277%/-37%
Source	PHO1	FLK73	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 009278021-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-17 ± 2	$26.39^{+5.51}_{-6.48}$	3293^{+227}_{-347}	-3204^{+243}_{-140}	$0.036^{+0.022}_{-0.012}$
Alt.	-21 ± 3	$15.57^{+4.73}_{-4.14}$	3323^{+222}_{-331}	-3037^{+447}_{-201}	$0.116^{+0.102}_{-0.044}$

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

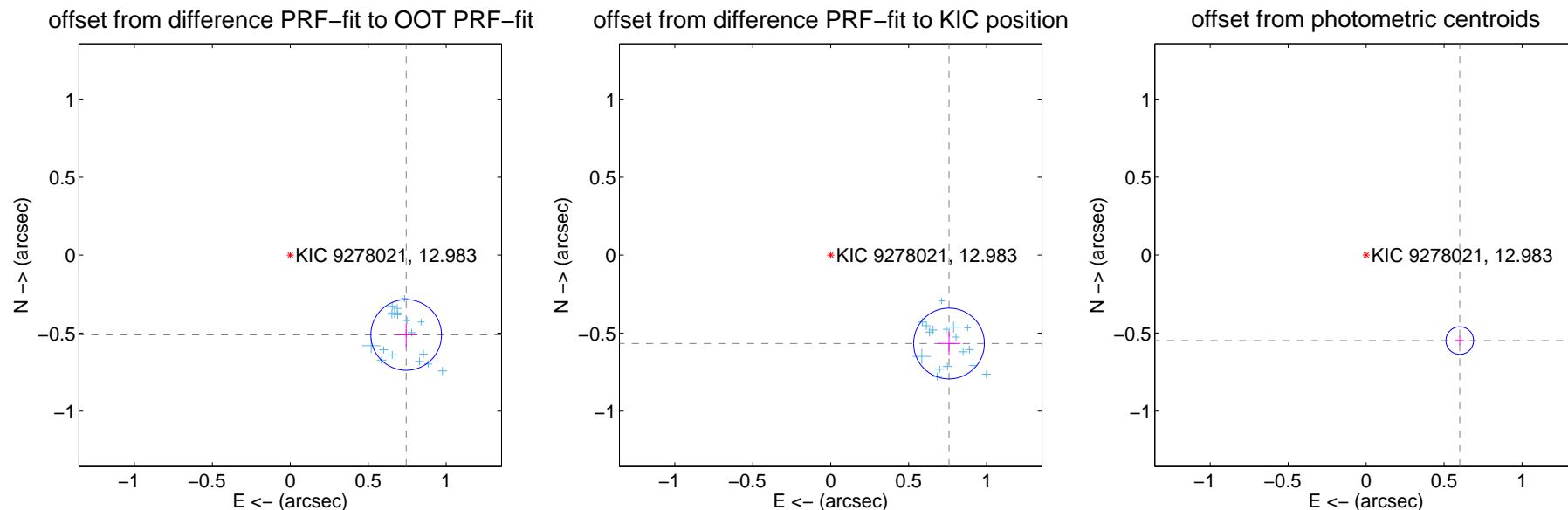
DV Centroid Data

Supplemental centroid analysis for 009278021-02. Kepler magnitude: 12.98. Transit SNR 429.42

There are 17 quarters with good PRF difference image offsets

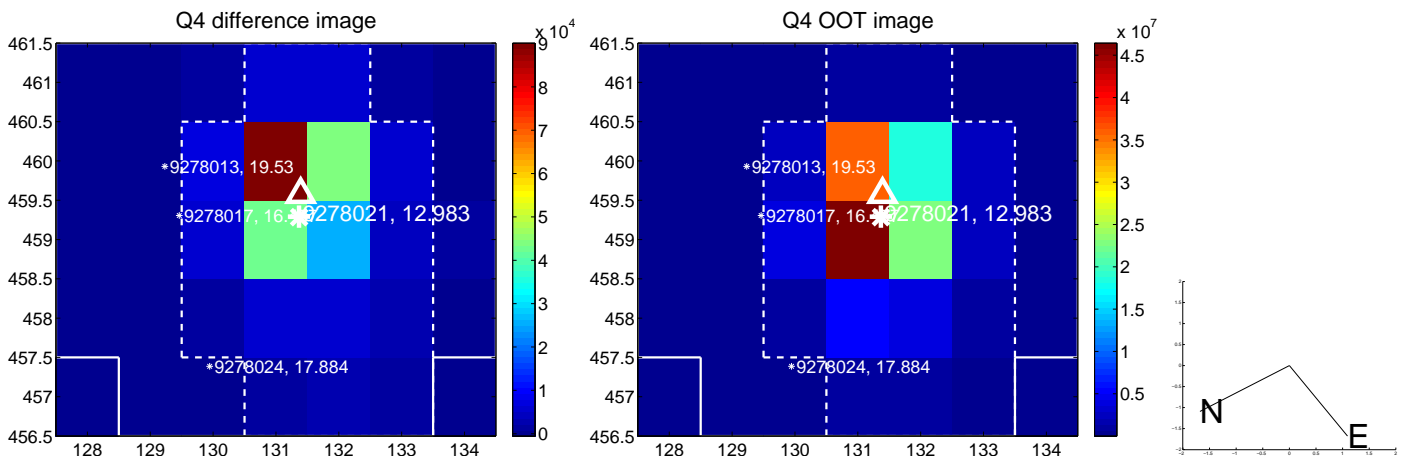
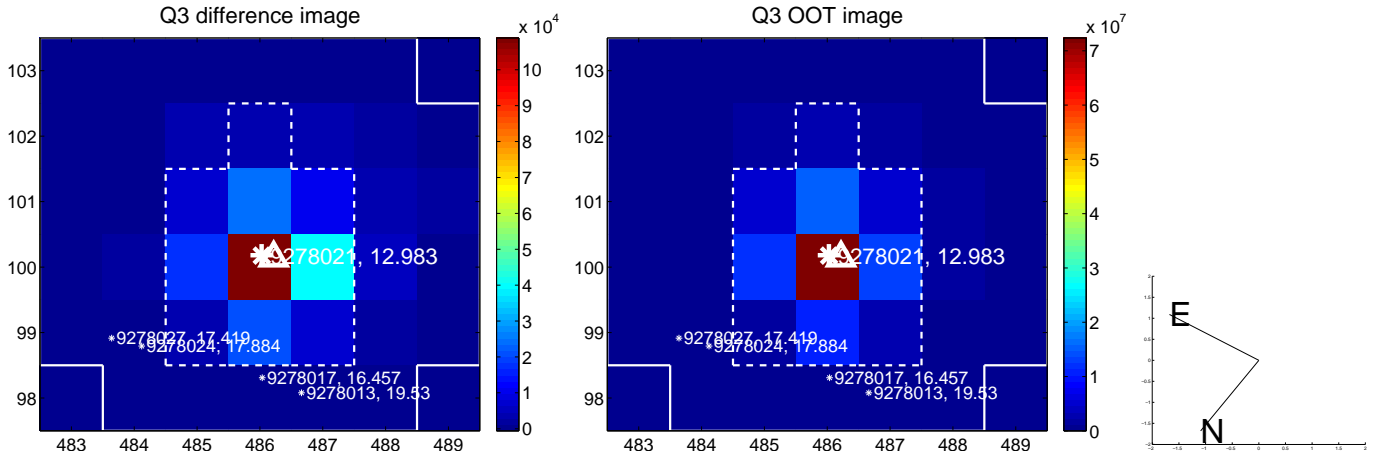
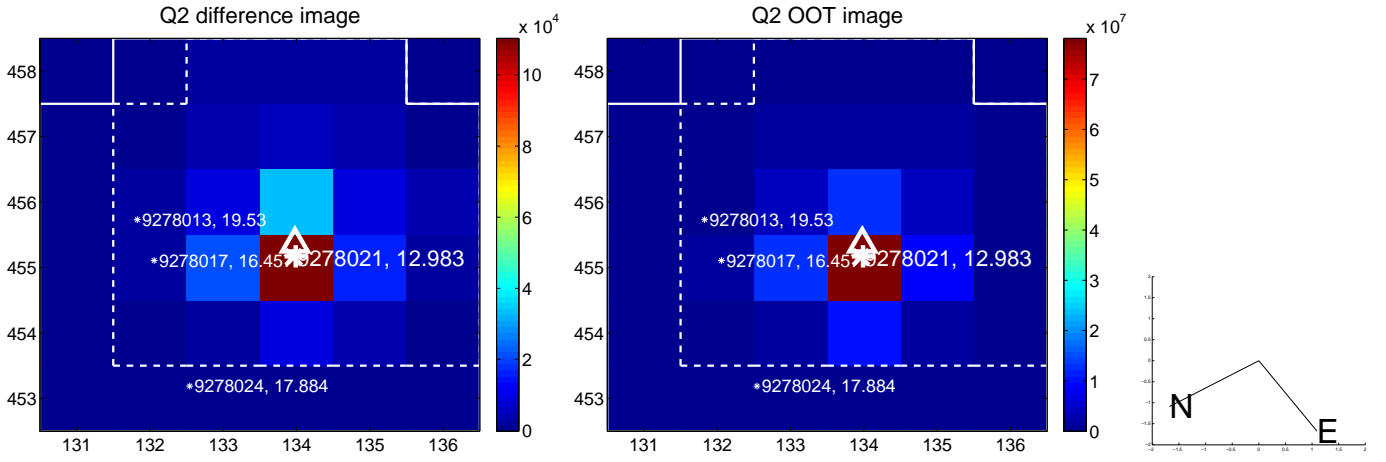
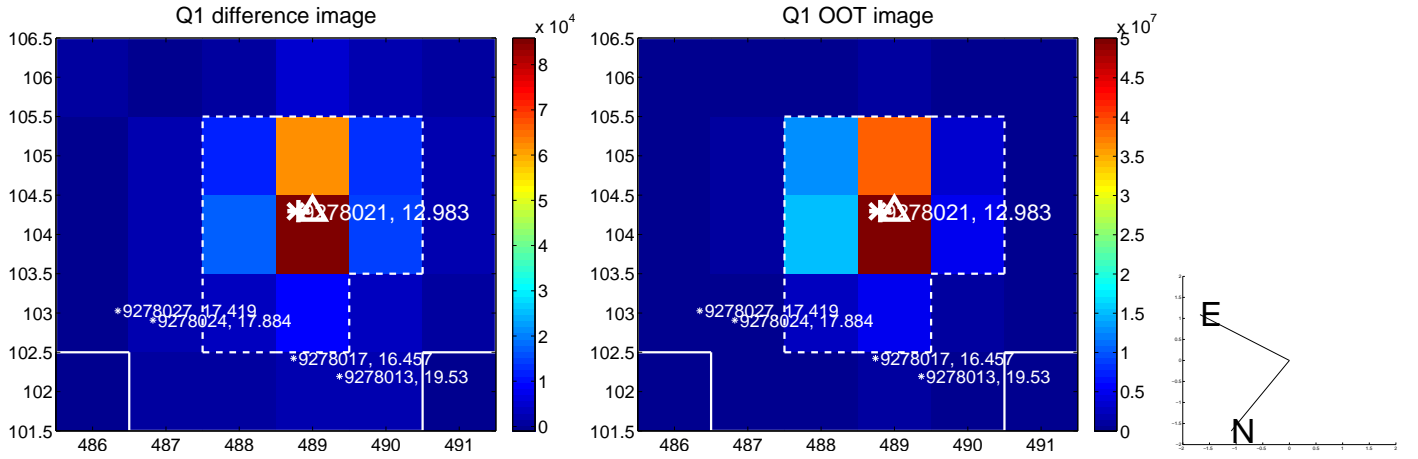
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.903 ± 0.076	11.95	-0.744 ± 0.073	-0.512 ± 0.075
PRF-fit source offset from KIC position	0.947 ± 0.076	12.52	-0.759 ± 0.073	-0.567 ± 0.075
photometric centroid source offset	0.81 ± 0.03	27.51	-0.60 ± 0.03	-0.55 ± 0.03

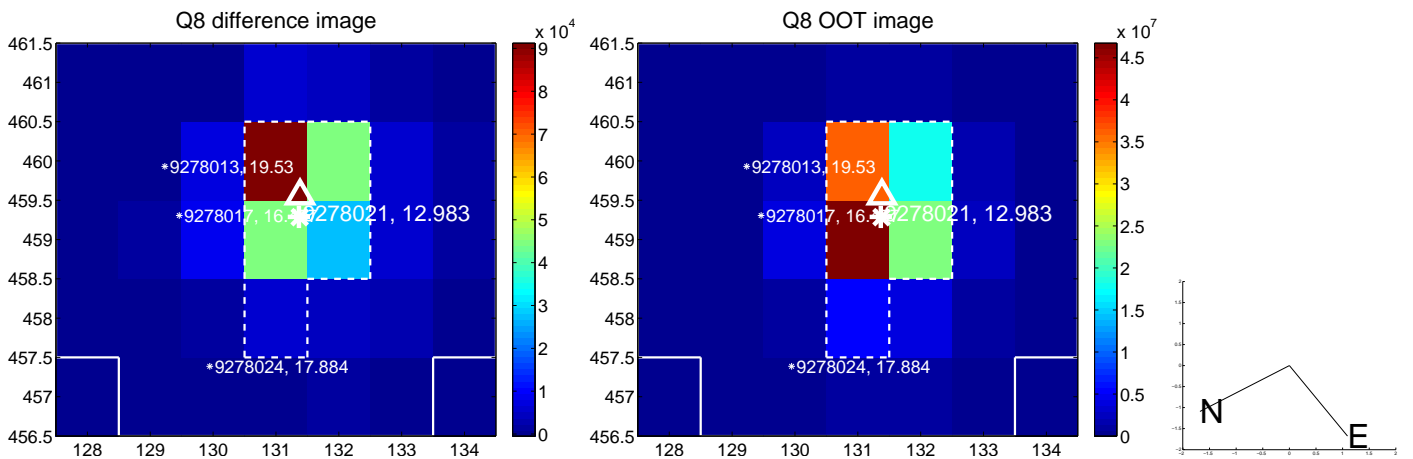
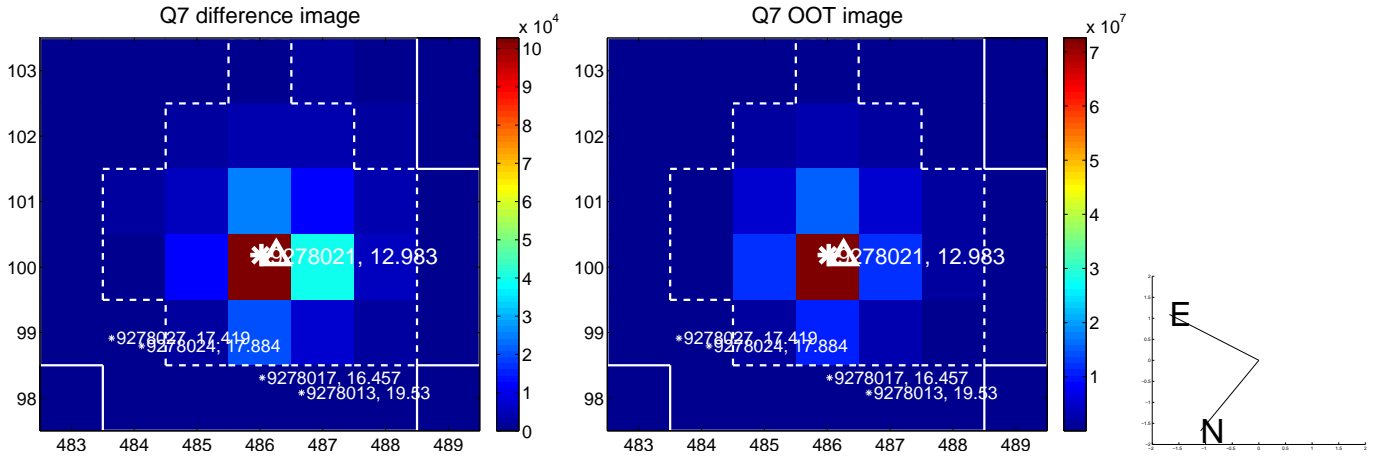
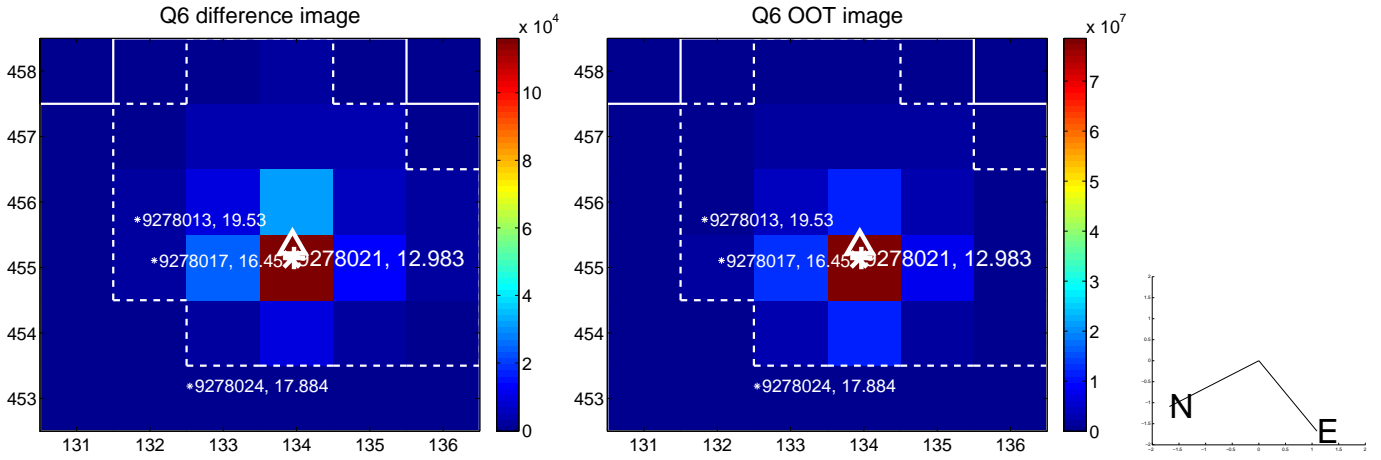
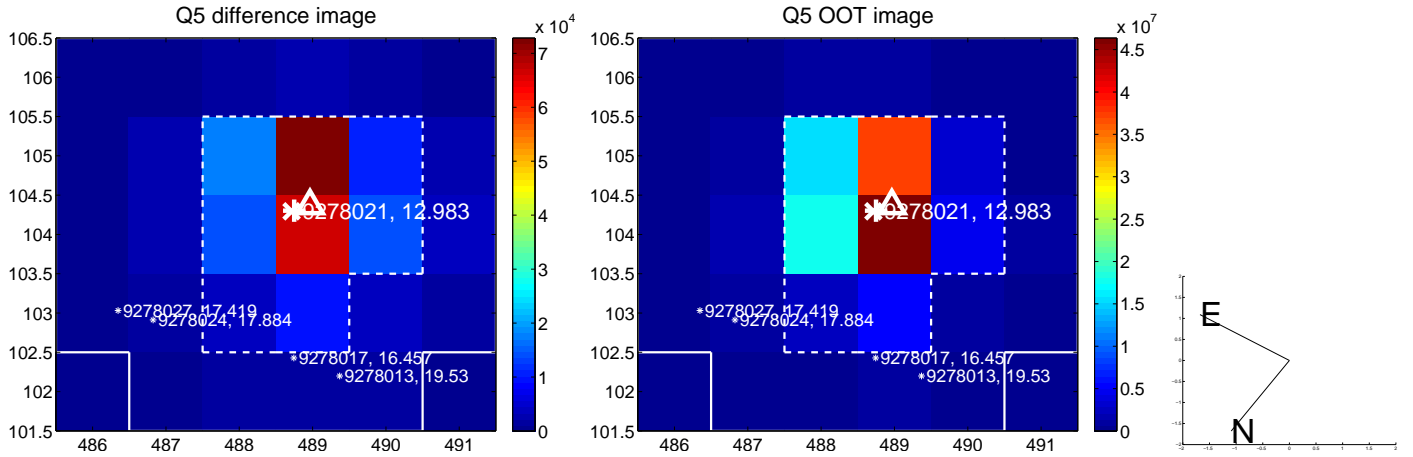


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

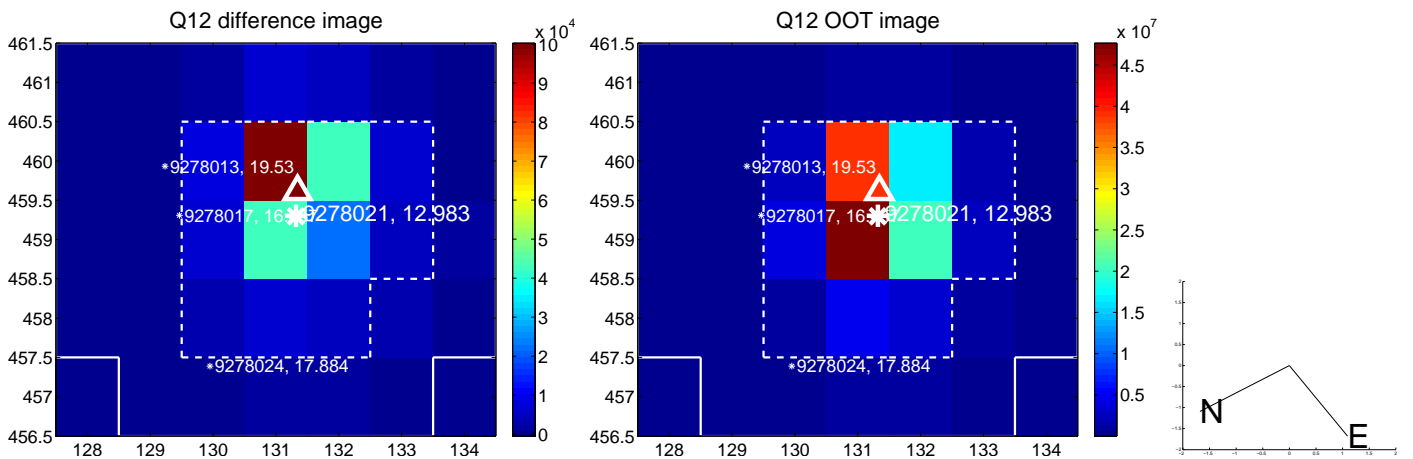
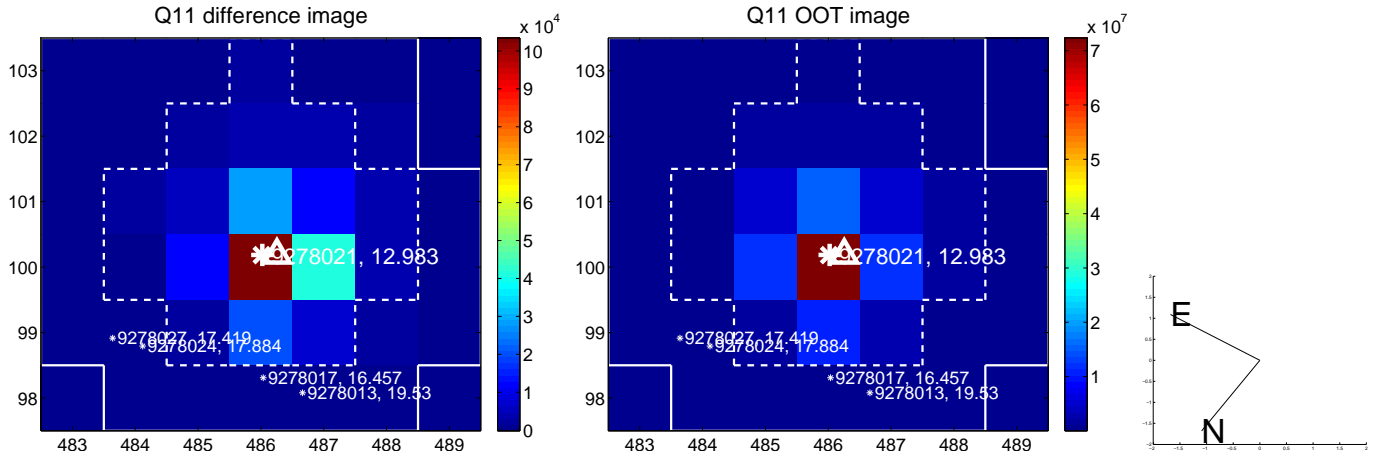
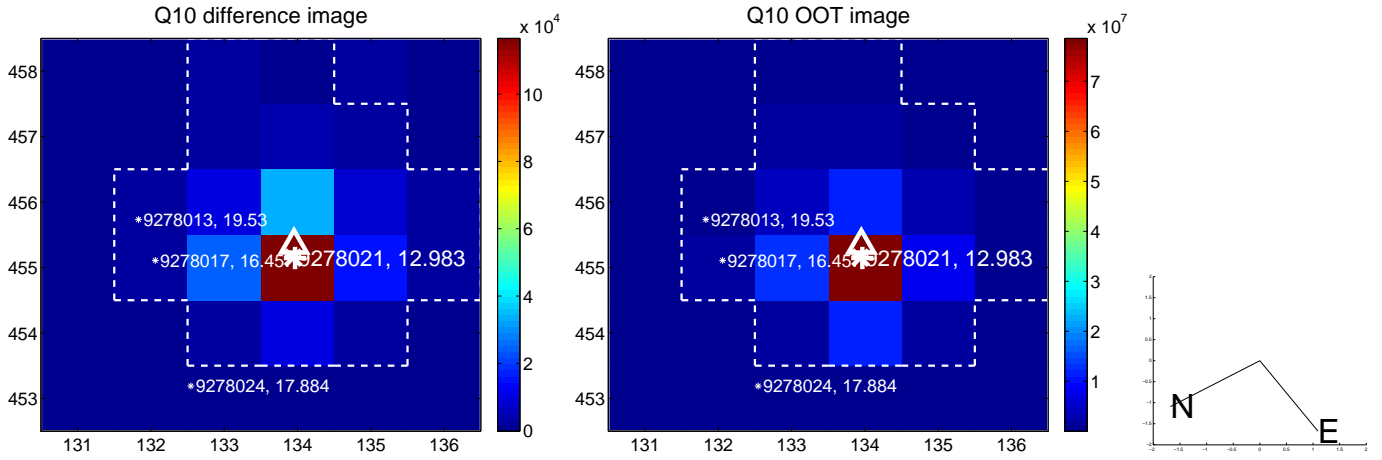
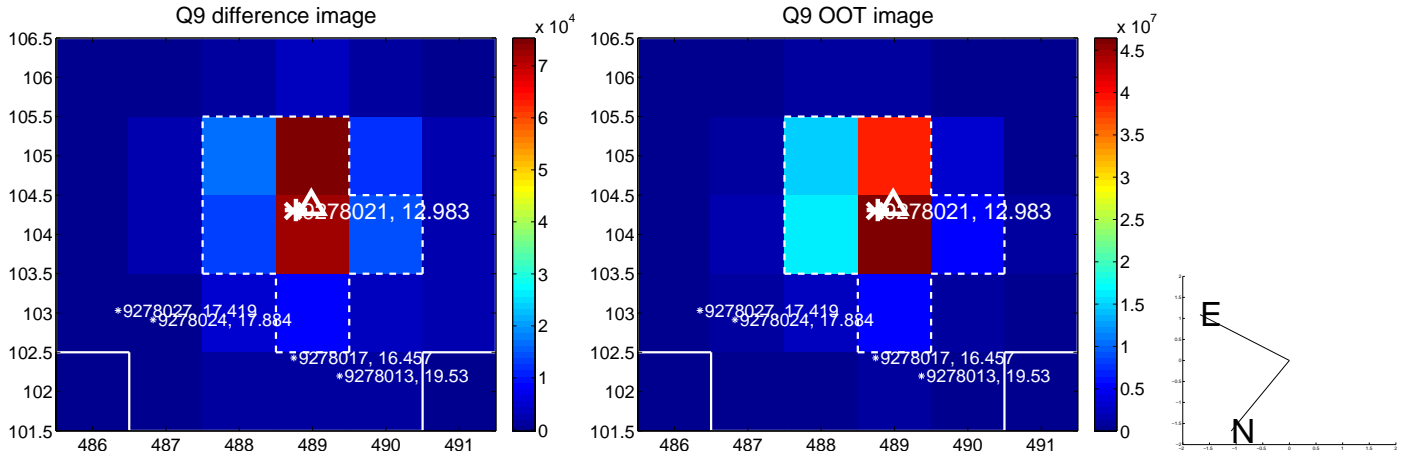
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



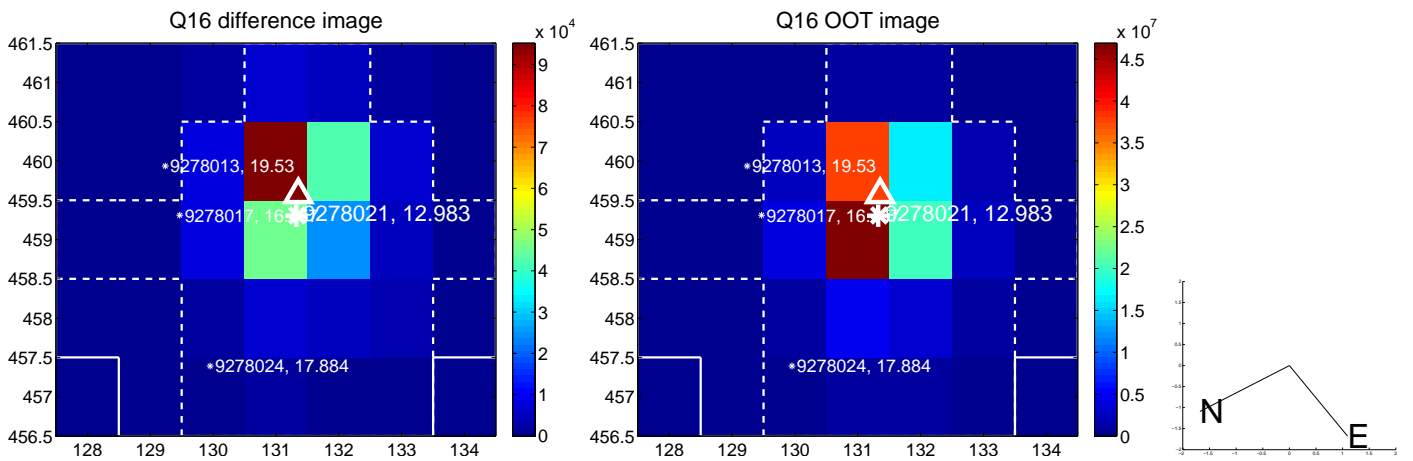
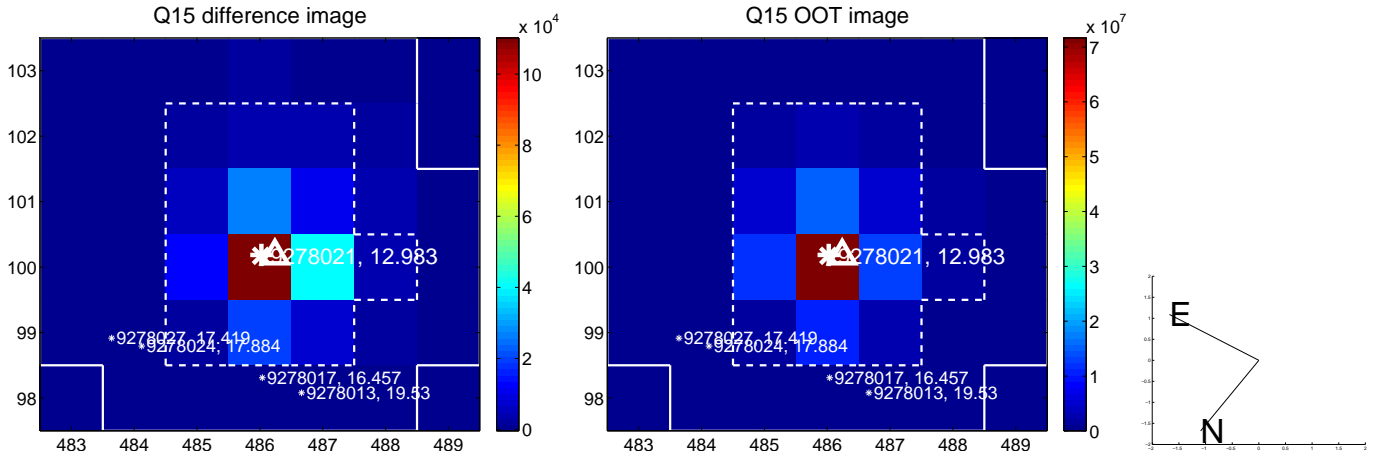
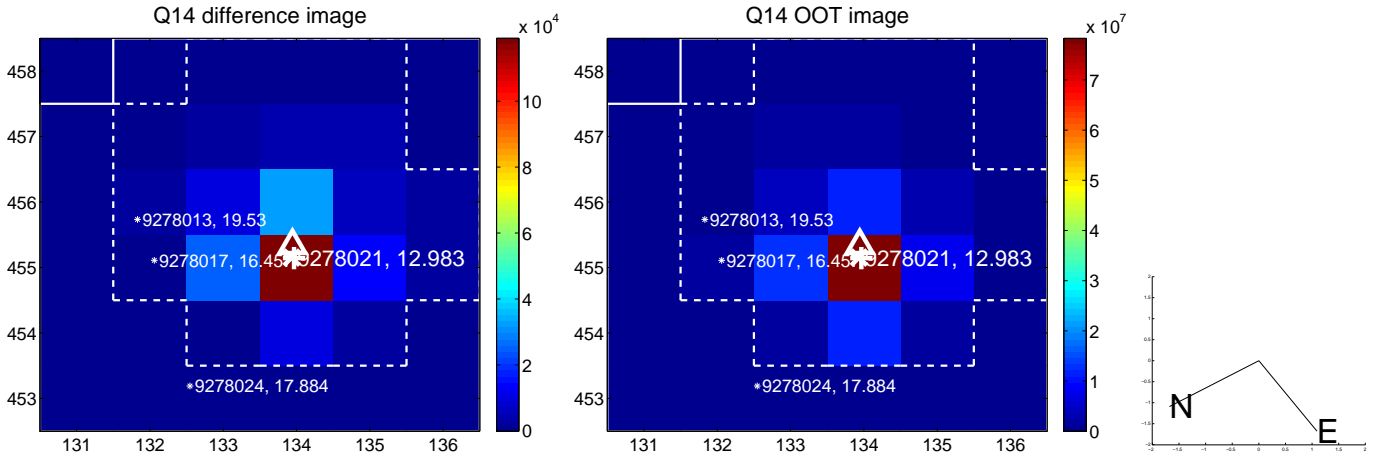
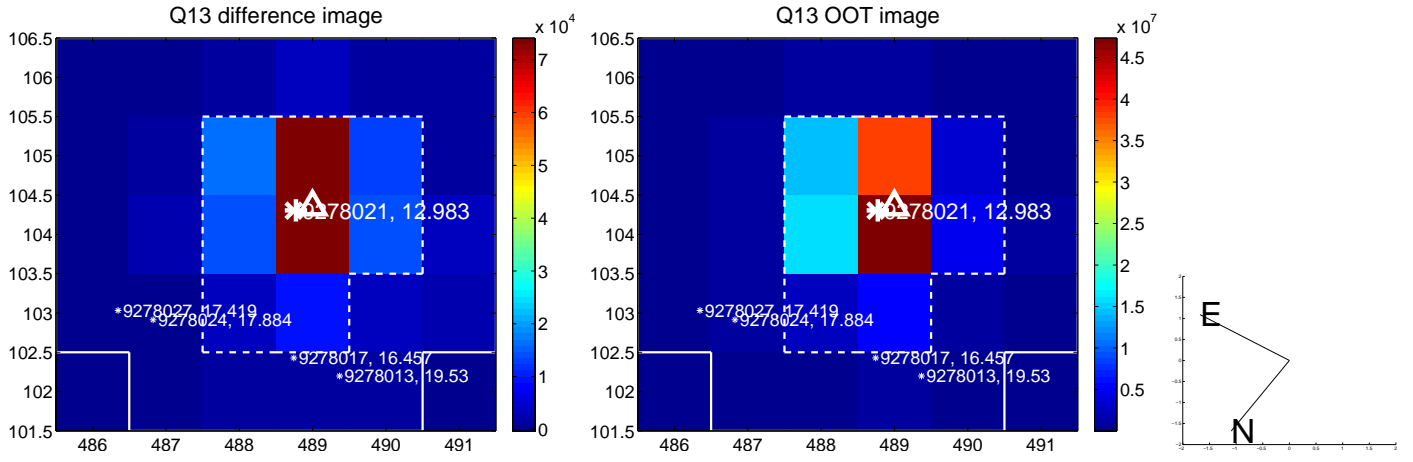
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



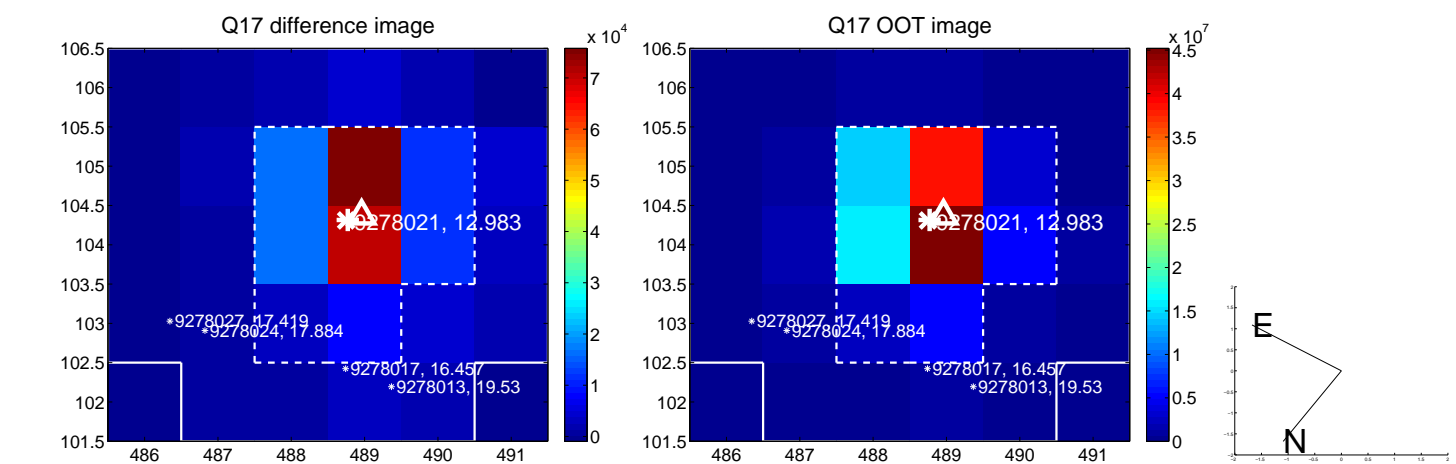
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



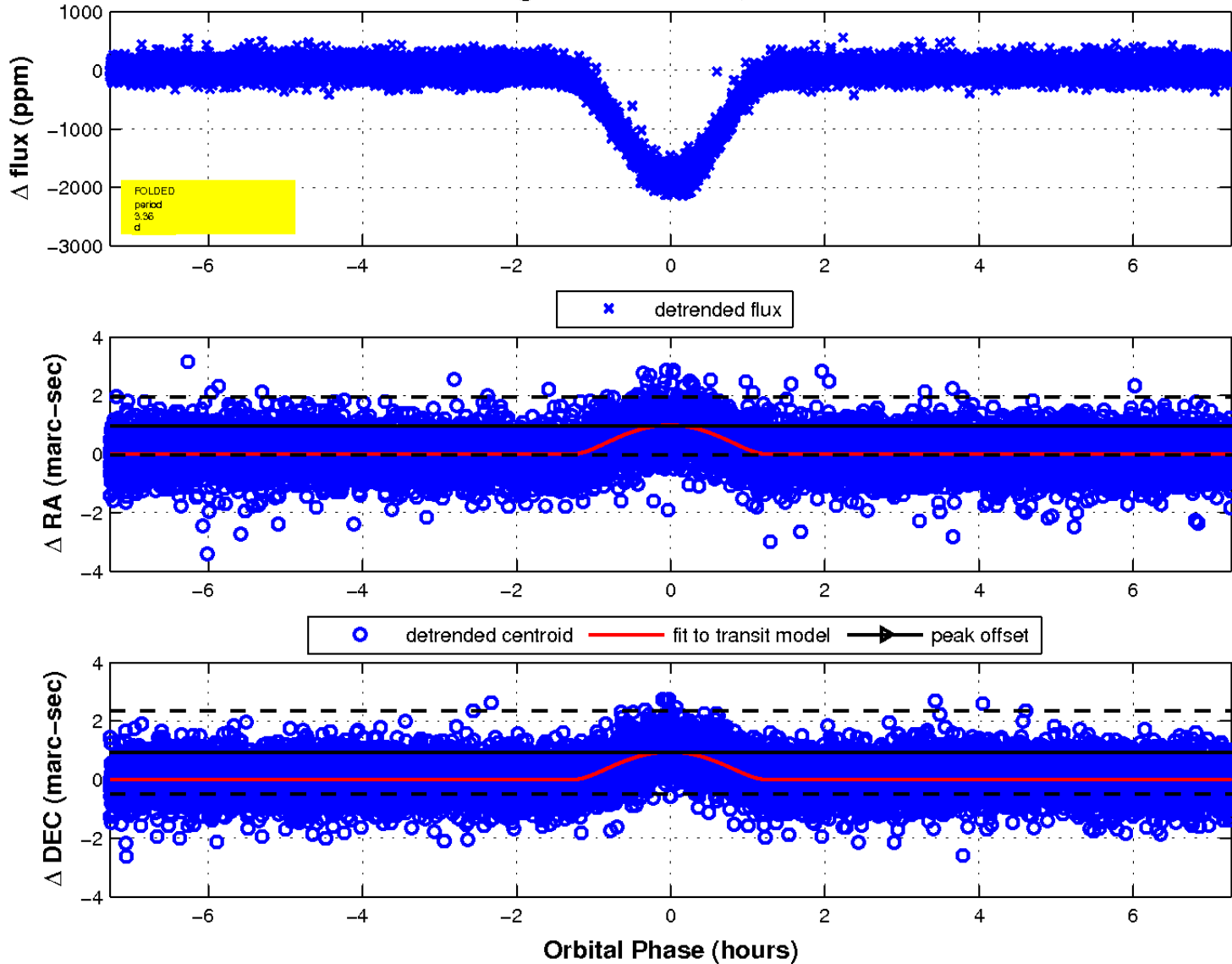
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

