

KIC 009778689

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})
009778689-01	OBS	No	278.706947	315.447090	103449.5	15.000	20.9	-1.0	1.00	5780	32.01	1.43
009778689-02	OBS	No	294.018495	256.925374	97676.3	15.000	18.7	-1.0	1.00	5780	31.09	1.33
009778689-03	OBS	No	167.692670	260.246293	117308.6	21.794	16.0	10.5	1.00	5780	34.06	2.82
009778689-04	OBS	No	280.214307	308.228824	102111.5	21.804	9.9	9.2	1.00	5780	47.74	1.42

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009778689-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009778689-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

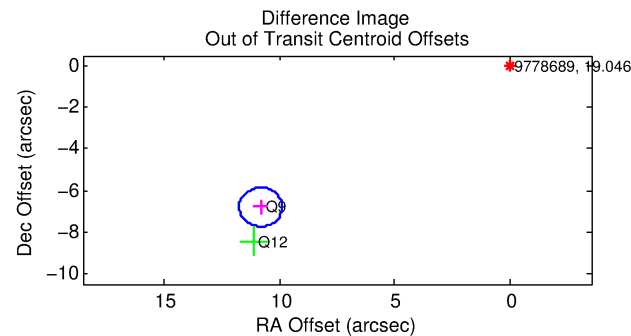
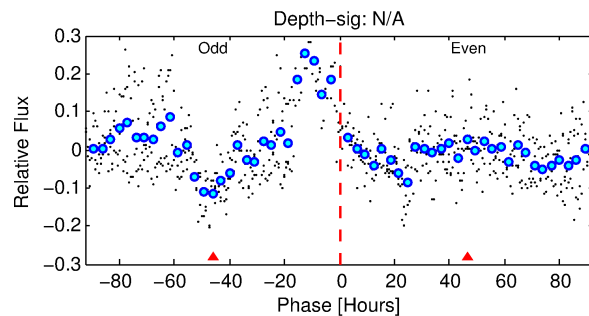
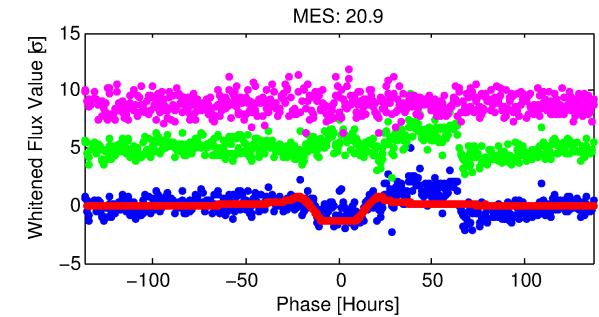
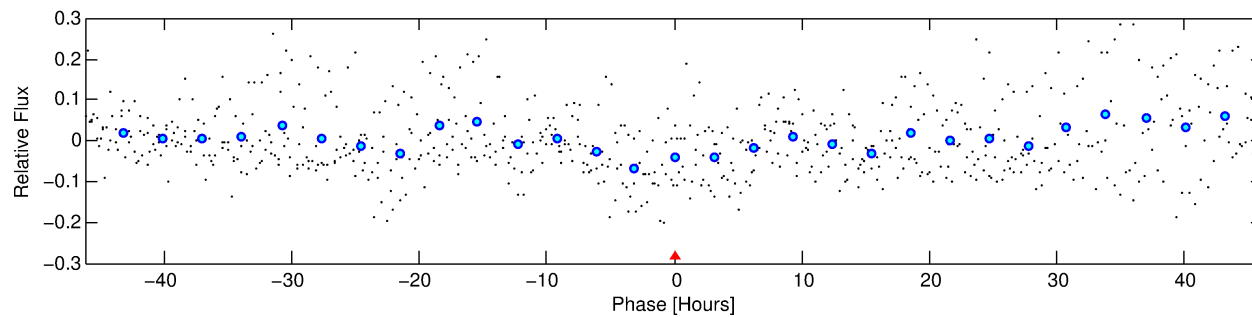
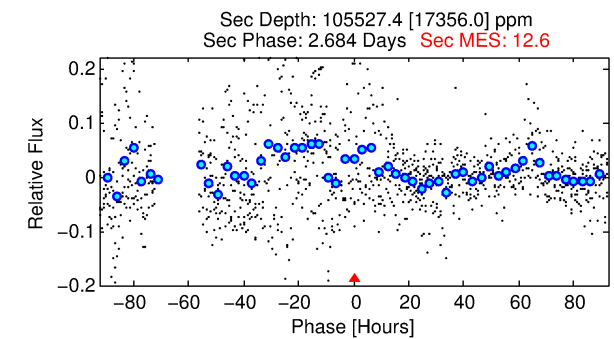
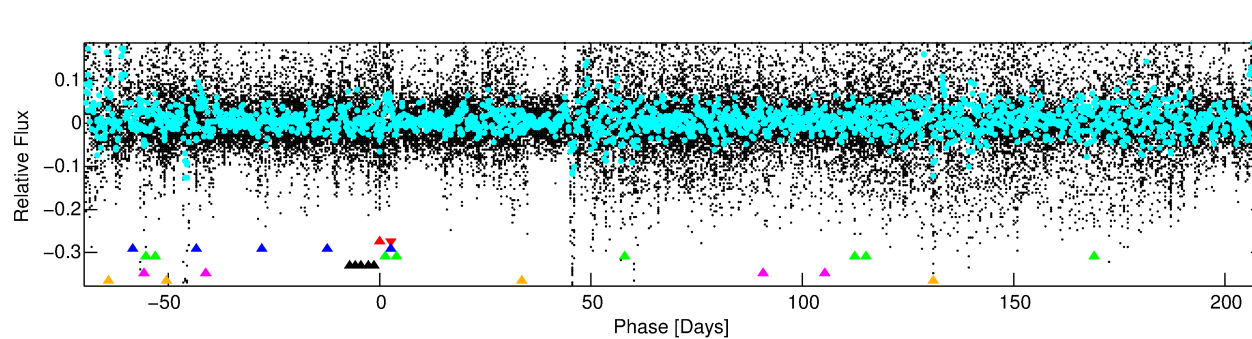
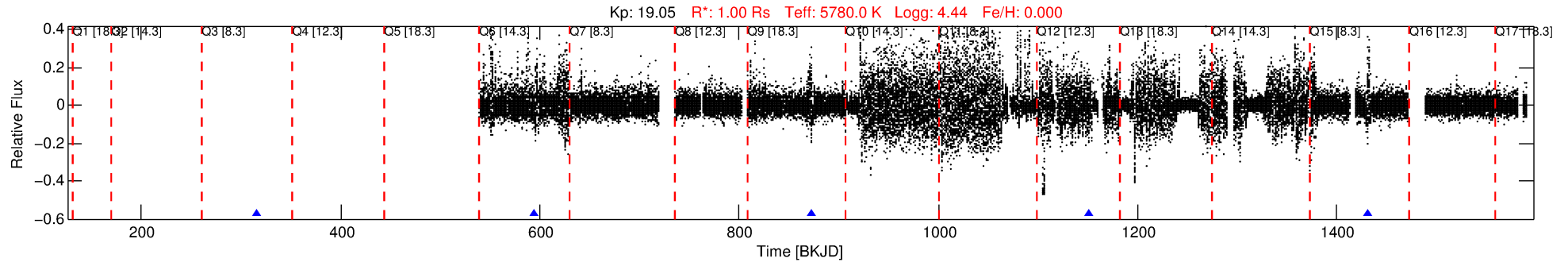
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009778689-01

No Significant Match Found

DV One-Page Summary

KIC: 9778689 Candidate: 1 of 6 Period: 278.707 d



TPS TCE Results:

Period = 278.70695 d
Epoch = 315.4471 BKJD

DV fit results are unavailable

DV Diagnostic Results:

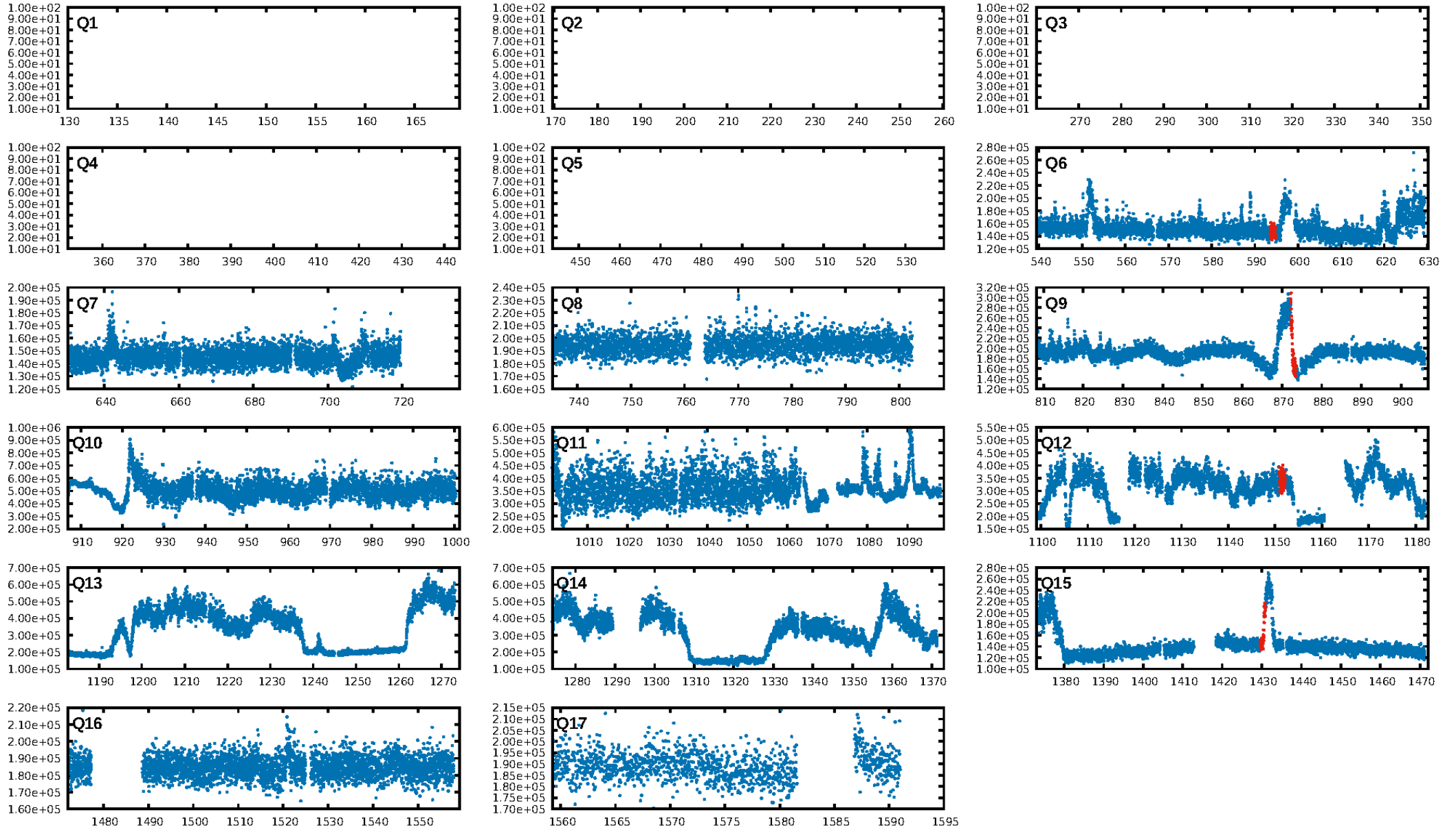
ShortPeriod-sig: 100.0% [100.71σ]
LongPeriod-sig: 82.8% [1.37σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.29e-27
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 3.746

Centroid-sig: 0.0%
Centroid-so: 5.321 arcsec [14.49σ]
OotOffset-rm: 12.774 arcsec [41.16σ]
KicOffset-rm: 0.273 arcsec [1.27σ]
OotOffset-st: 0/0/1/1 [2]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 0.50 [2/4]

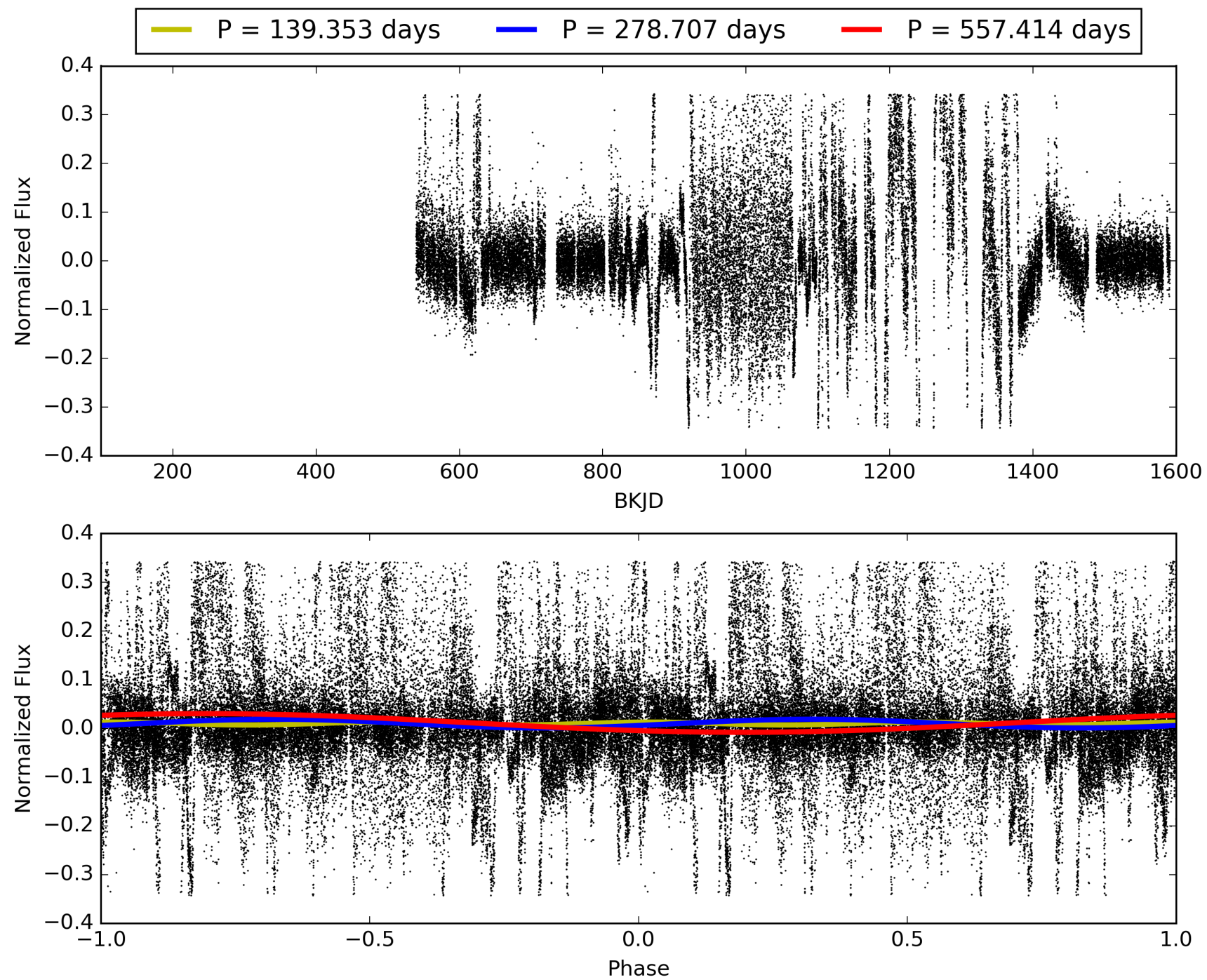
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:45:30 Z

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

TCE 009778689-01, PDC Light Curves

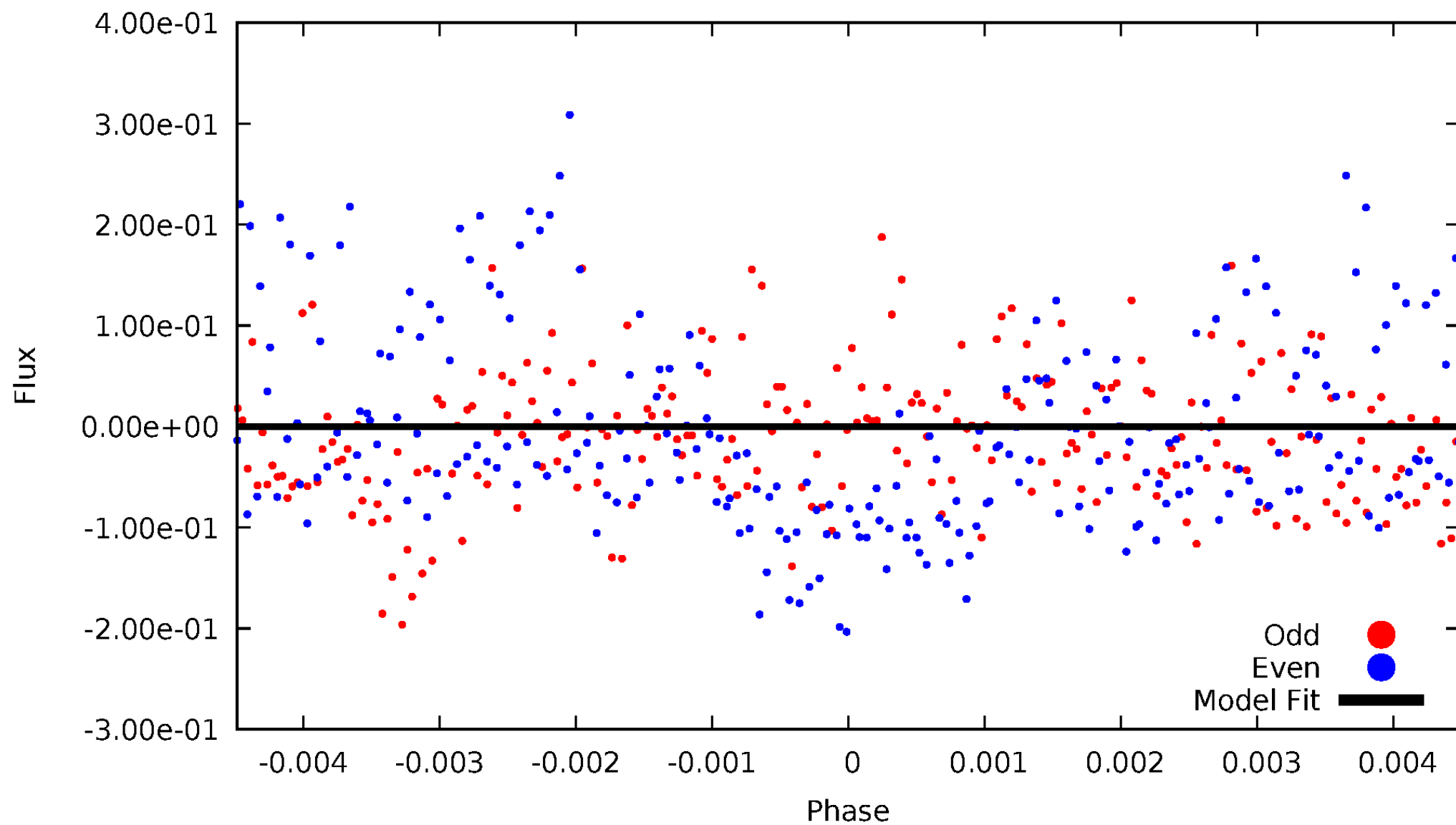


TCE 009778689-01



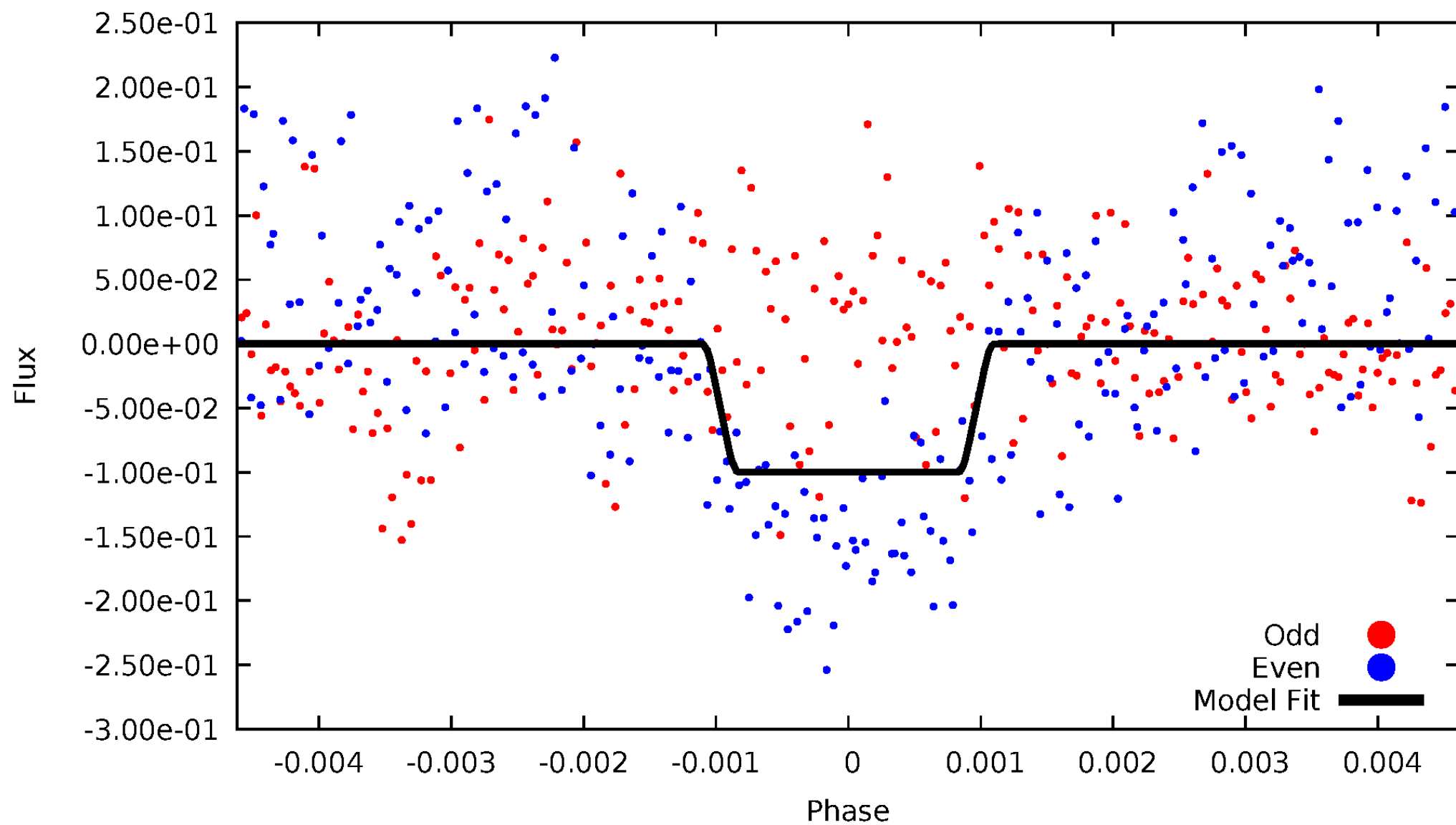
DV Odd/Even

TCE 009778689-01



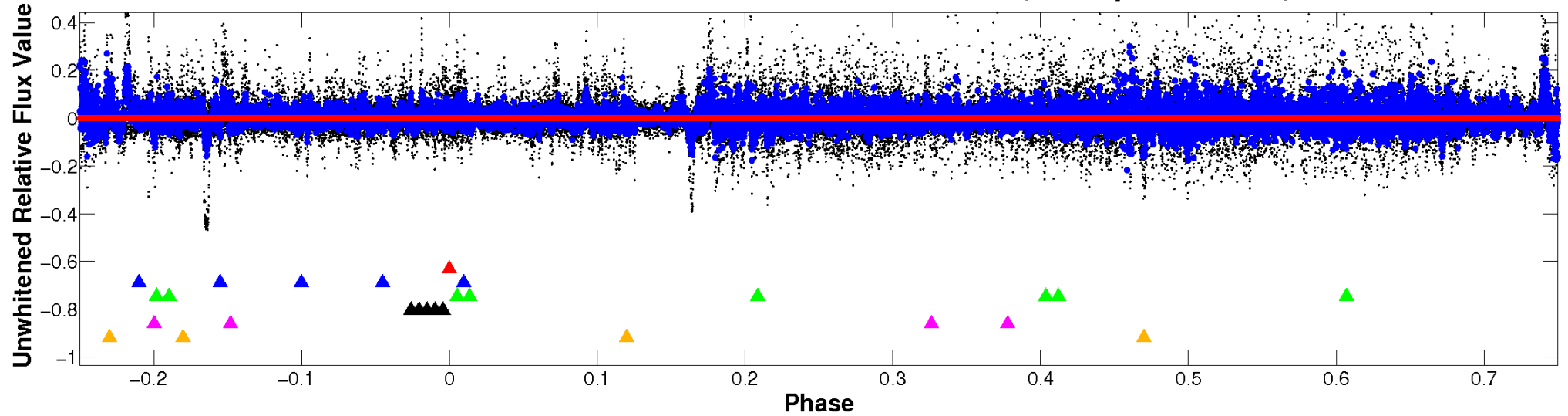
ALT Odd/Even

TCE 009778689-01

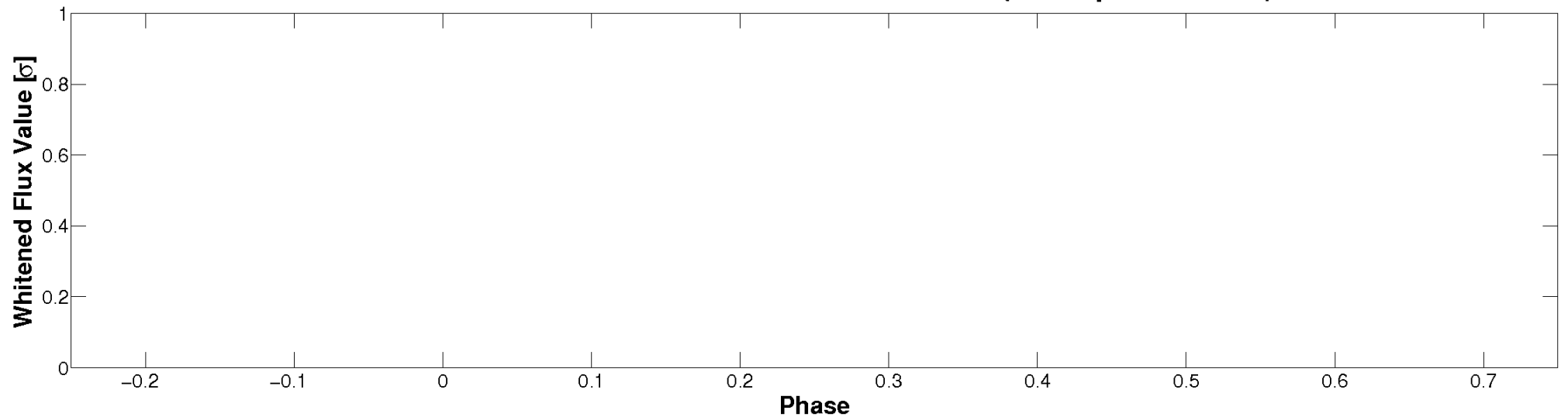


Non-Whitened Vs. Whitened Light Curve

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

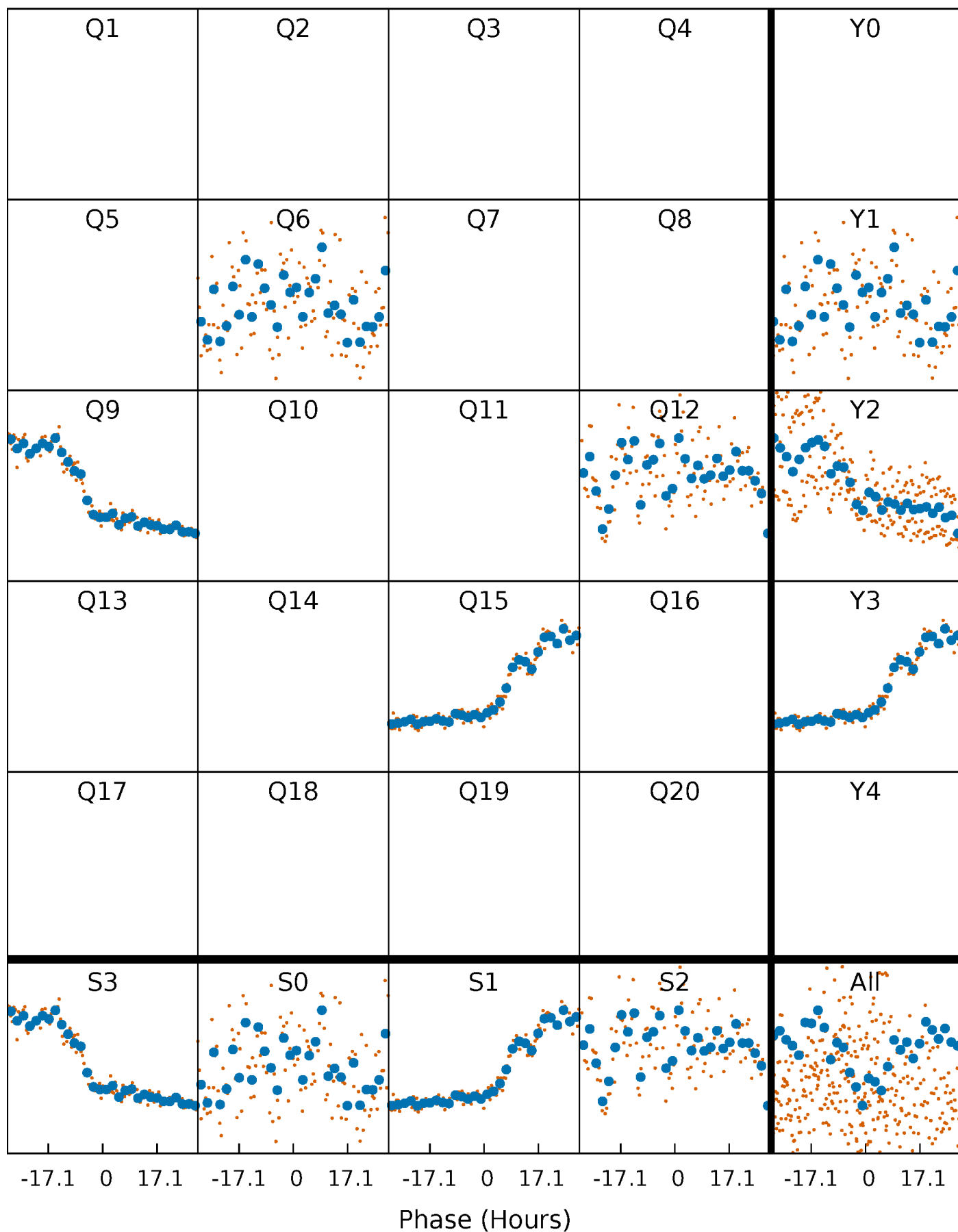


Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)



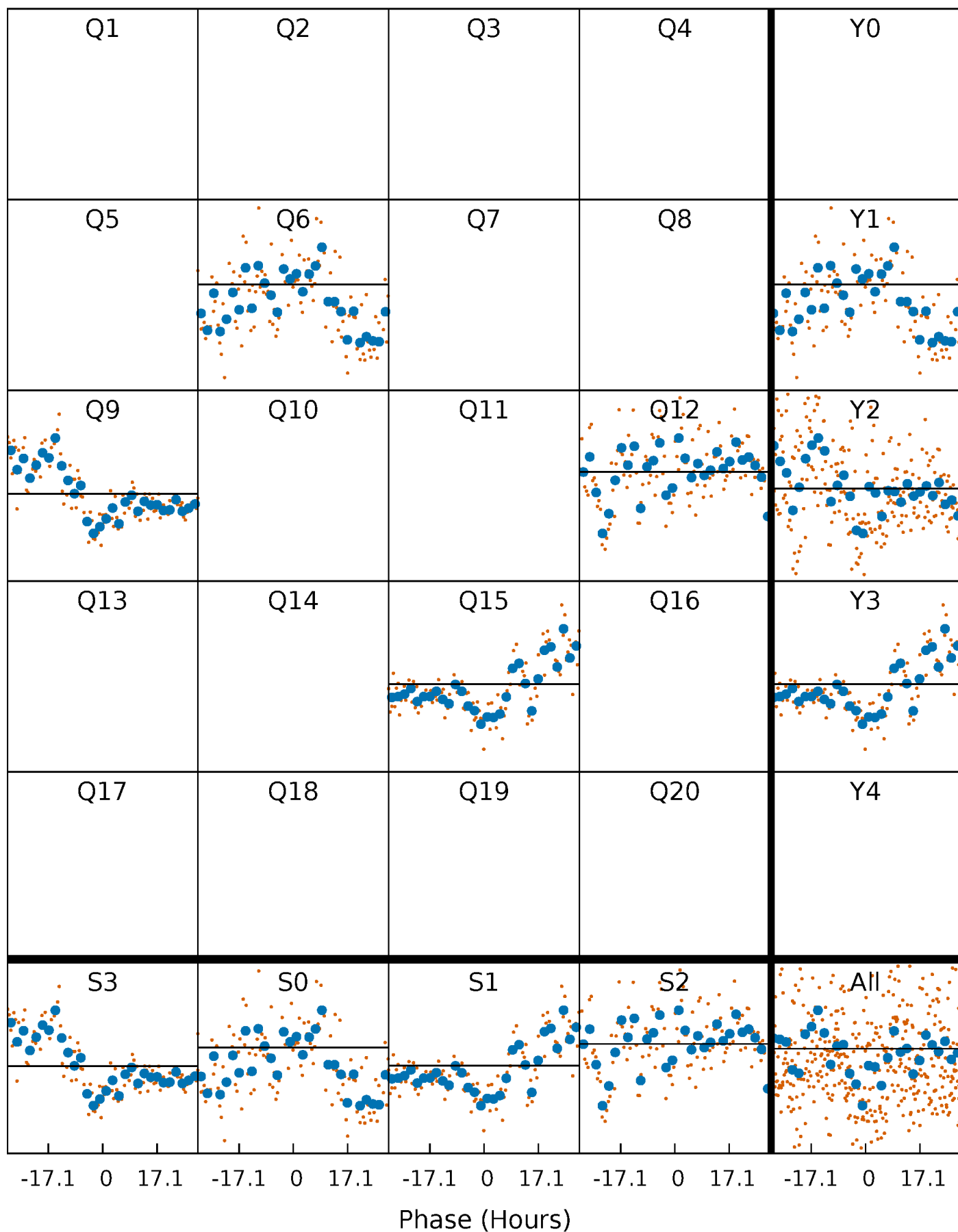
PDC Quarter-Phased Transit Curves

TCE 009778689-01 P=278.706947 Days $T_0=315.447090$ (BKJD)



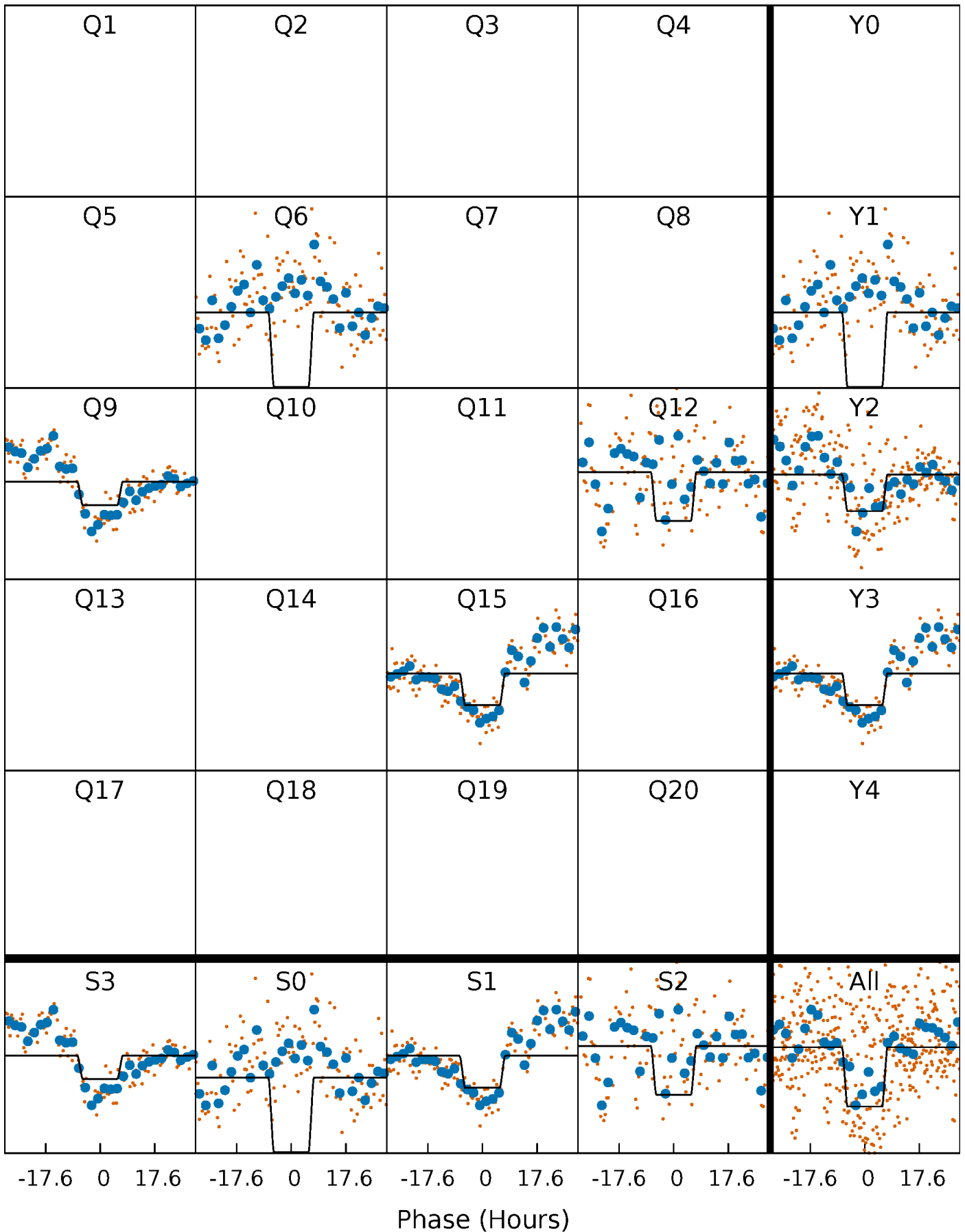
DV Quarter-Phased Transit Curves

TCE 009778689-01 P=278.706947 Days $T_0=315.447090$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

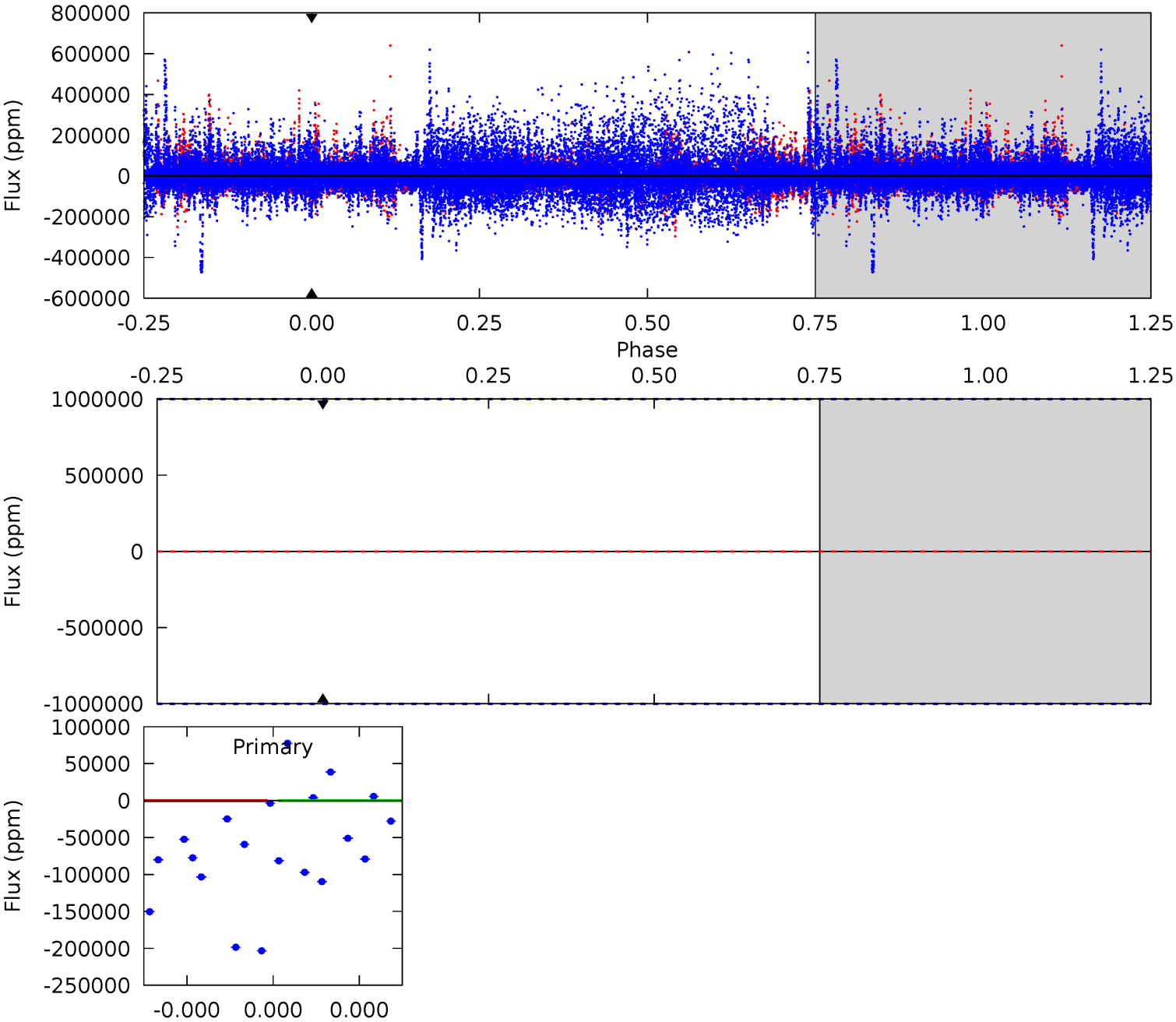
TCE 009778689-01 P=278.706947 Days $T_0=315.474625$ (BKJD)



DV Model-Shift Uniqueness Test

009778689-01, P = 278.706947 Days, E = 315.447090 Days

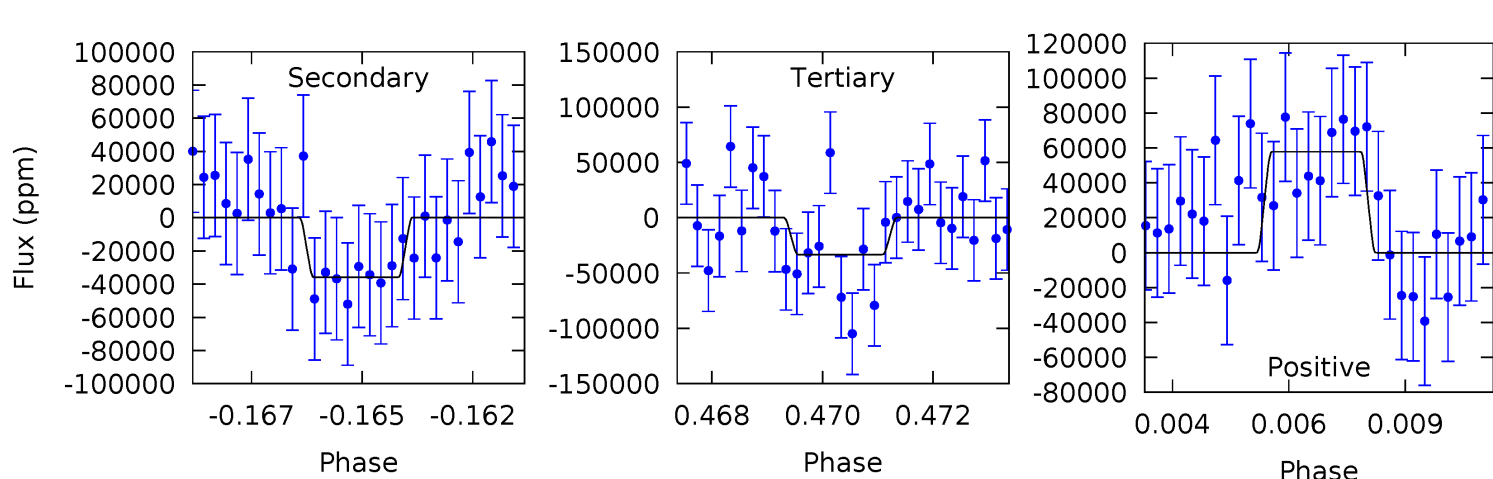
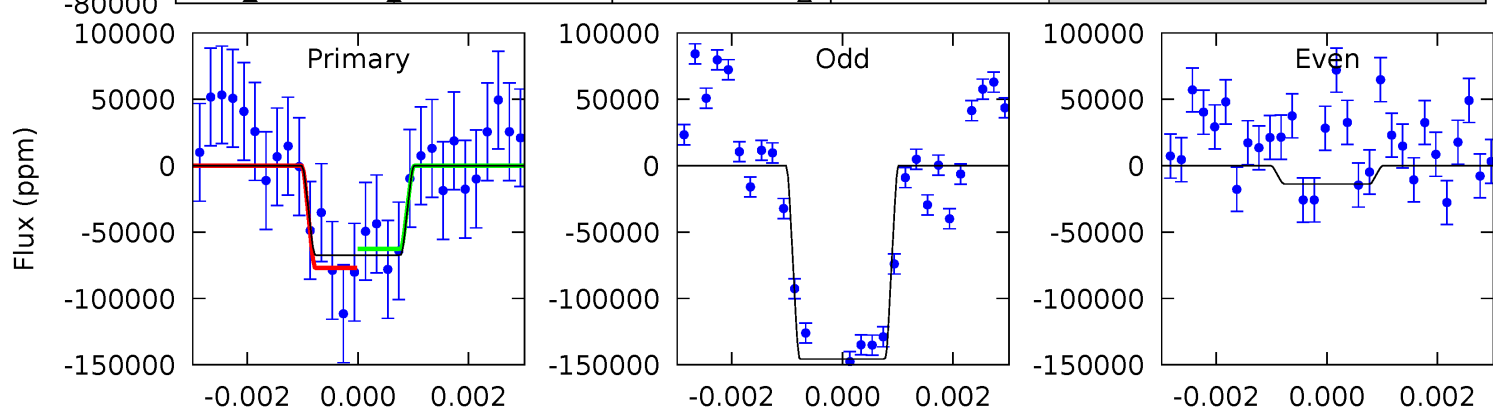
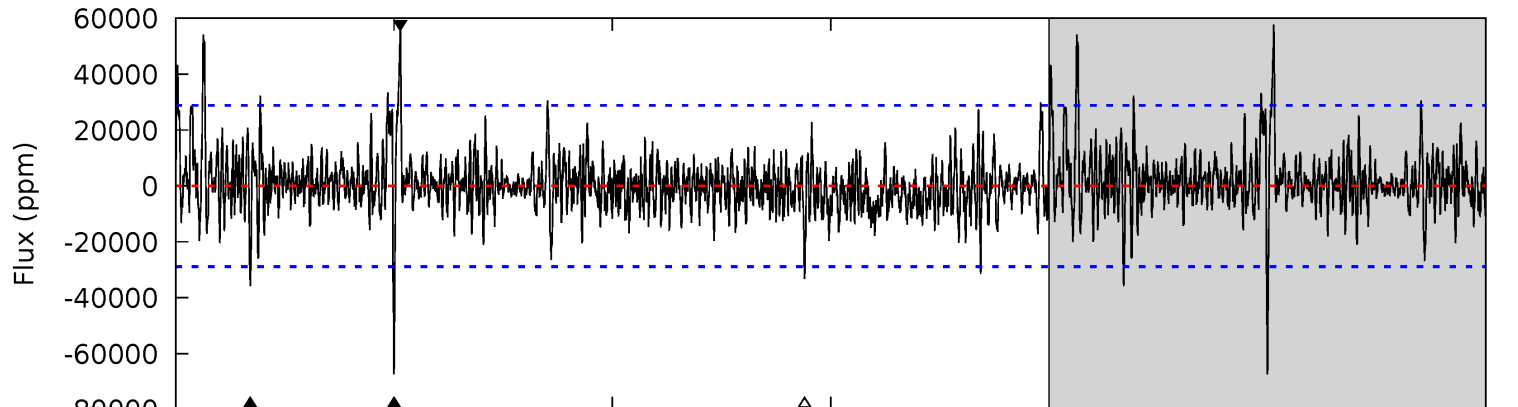
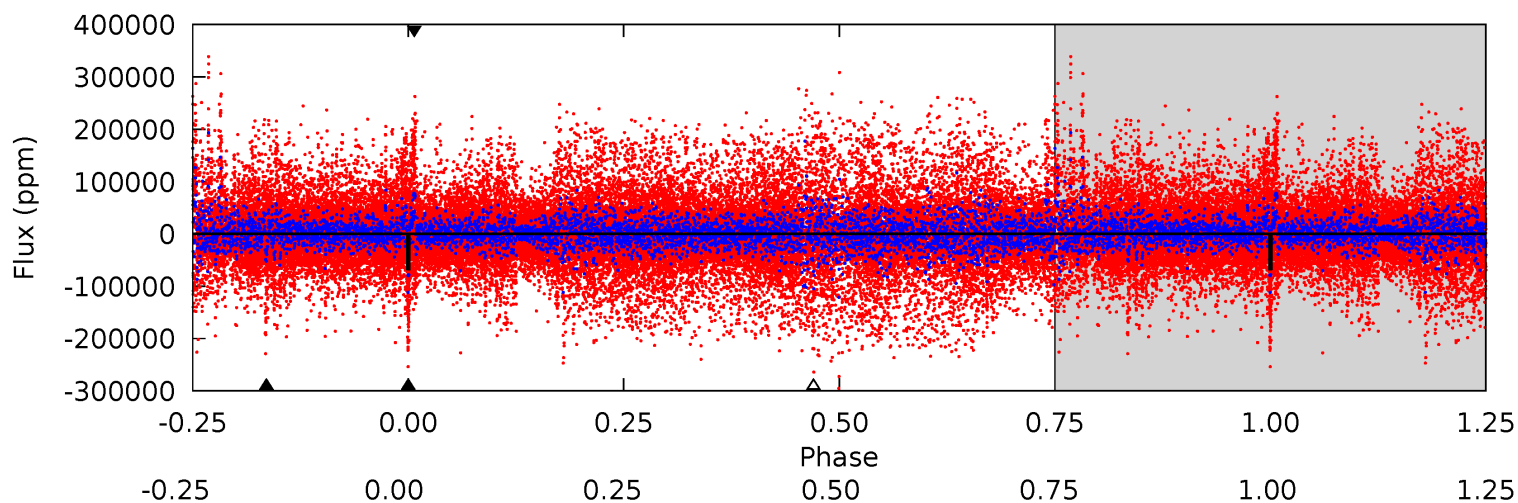
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009778689-01, P = 278.706947 Days, E = 315.474625 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.4	6.60	6.11	10.6	5.31	3.07	1.60	6.29	1.77	0.48	-4.03	11.5	0.98	0.46	1.34



Stellar Parameters For KIC 009778689

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+1}_{-1}	$4.438^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$
	+0%/-0%	+23%/-23%	+inf%/-inf%	+100%/-100%	+100%/-100%	+100%/-100%
Source	Solar	Solar	Solar	Solar		

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

Secondary Eclipse Parameters for KIC 009778689-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$32.27^{+11.24}_{-11.38}$	390^{+19}_{-17}	-3093^{+9301}_{-3111}	$-1057.796^{+43393.035}_{-40349.692}$
Alt.	-35859 ± 5434	$34.51^{+11.58}_{-11.26}$	389^{+19}_{-18}	4667^{+811}_{-556}	12181^{+14555}_{-5698}

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 $A_{obs} \gg 1.0$

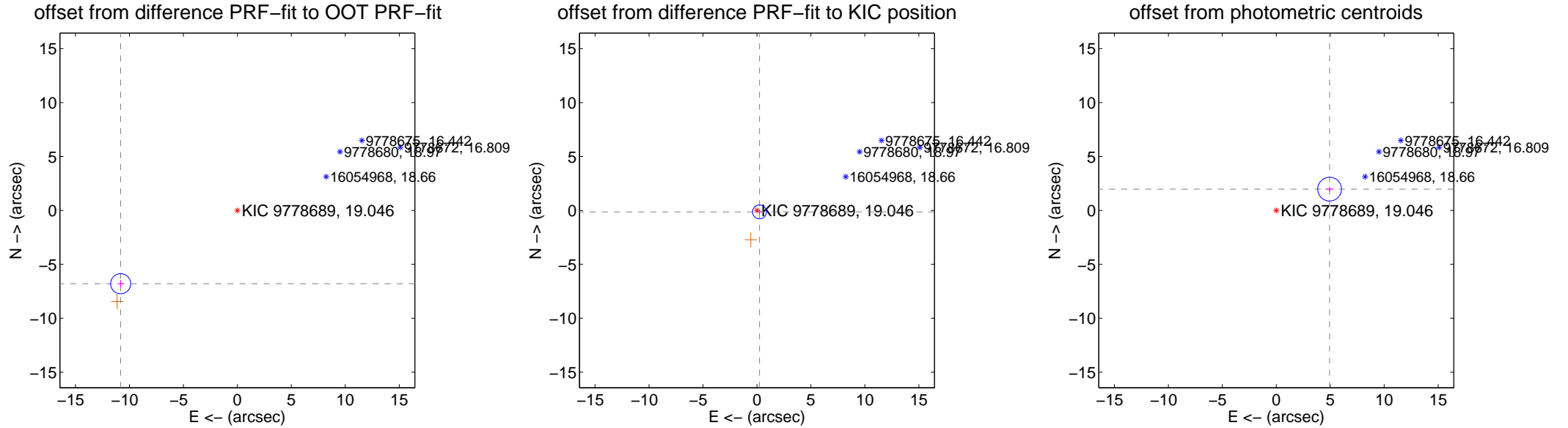
DV Centroid Data

Supplemental centroid analysis for 009778689-01. Kepler magnitude: 19.05. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

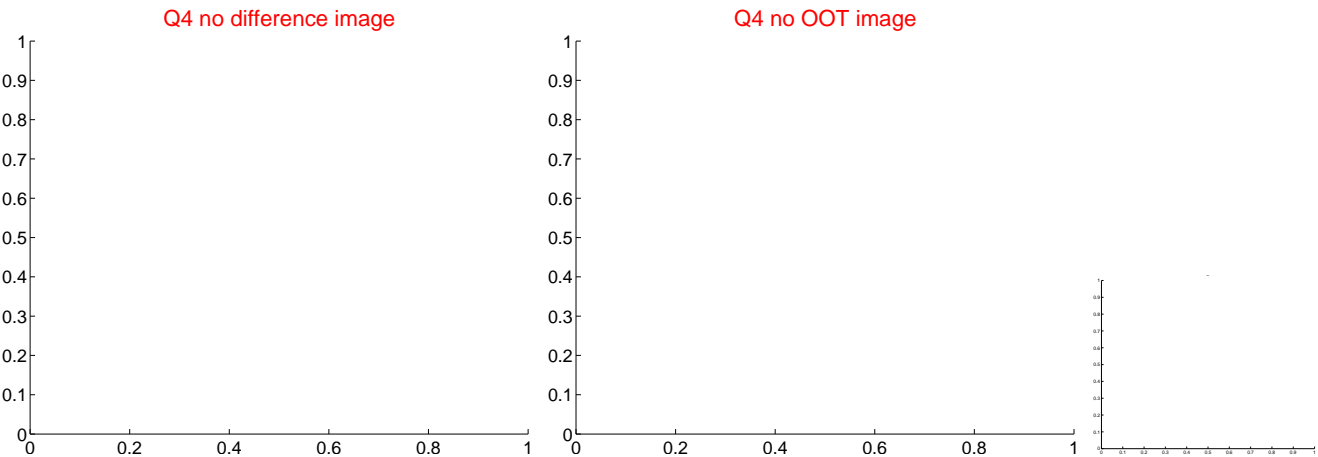
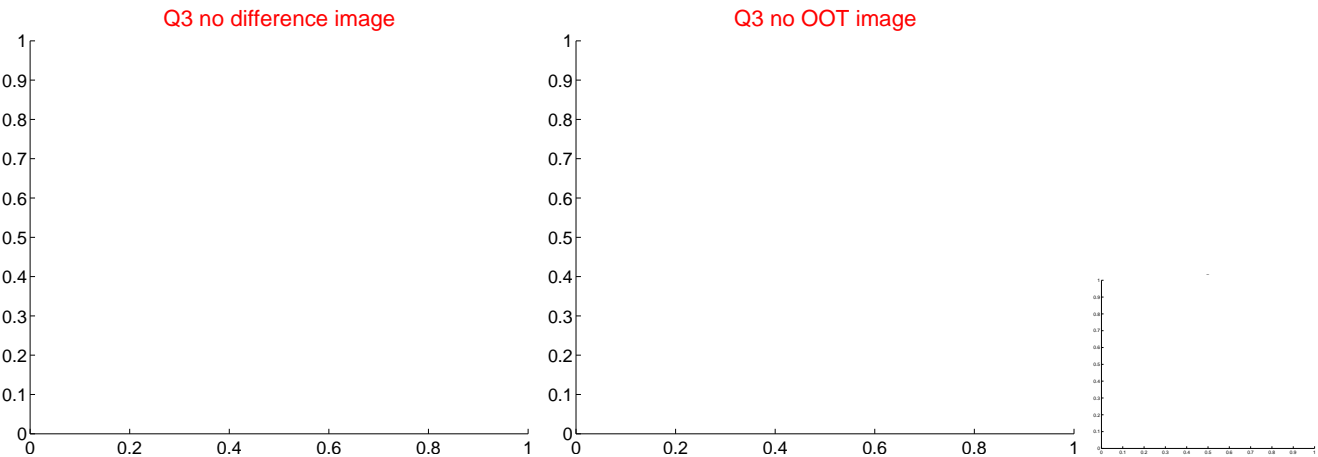
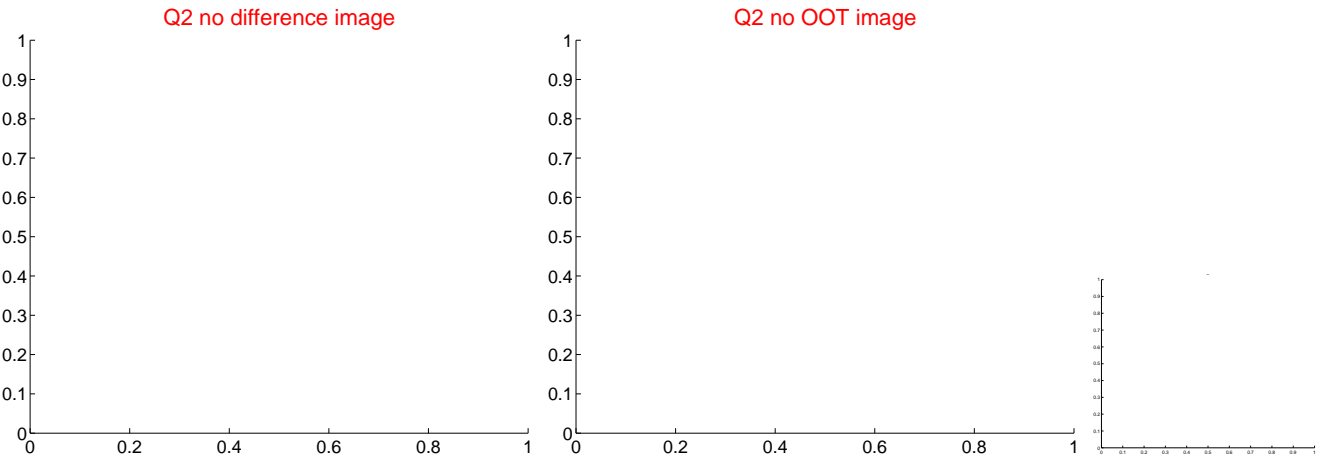
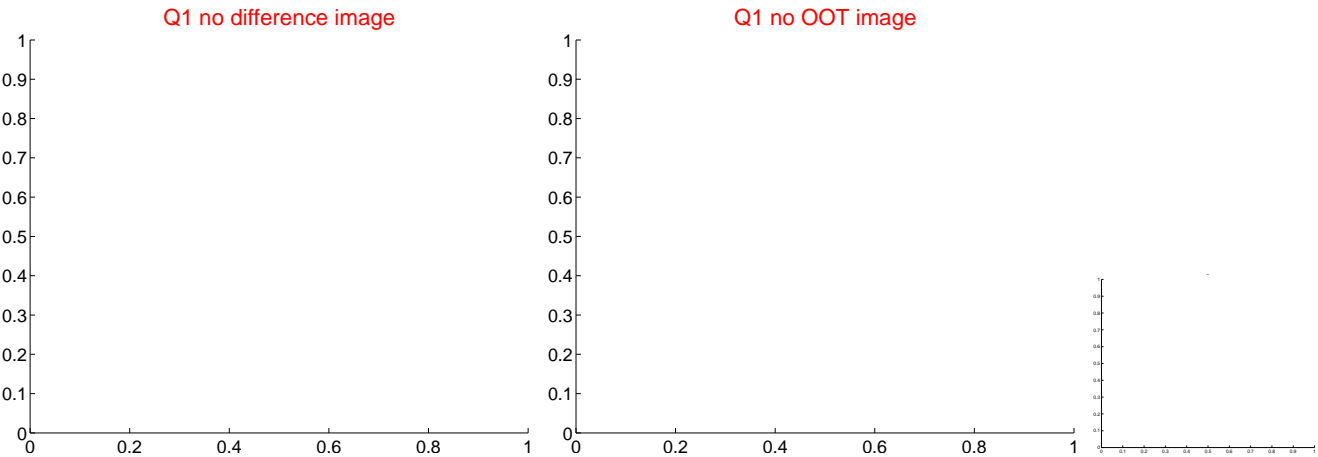
The OOT PRF centroid is offset from the target star catalog position by about 12.02 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	12.774 ± 0.310	41.16	10.814 ± 0.292	-6.799 ± 0.353
PRF-fit source offset from KIC position	0.273 ± 0.214	1.27	-0.236 ± 0.203	-0.138 ± 0.244
photometric centroid source offset	5.32 ± 0.37	14.49	-4.94 ± 0.38	1.97 ± 0.24

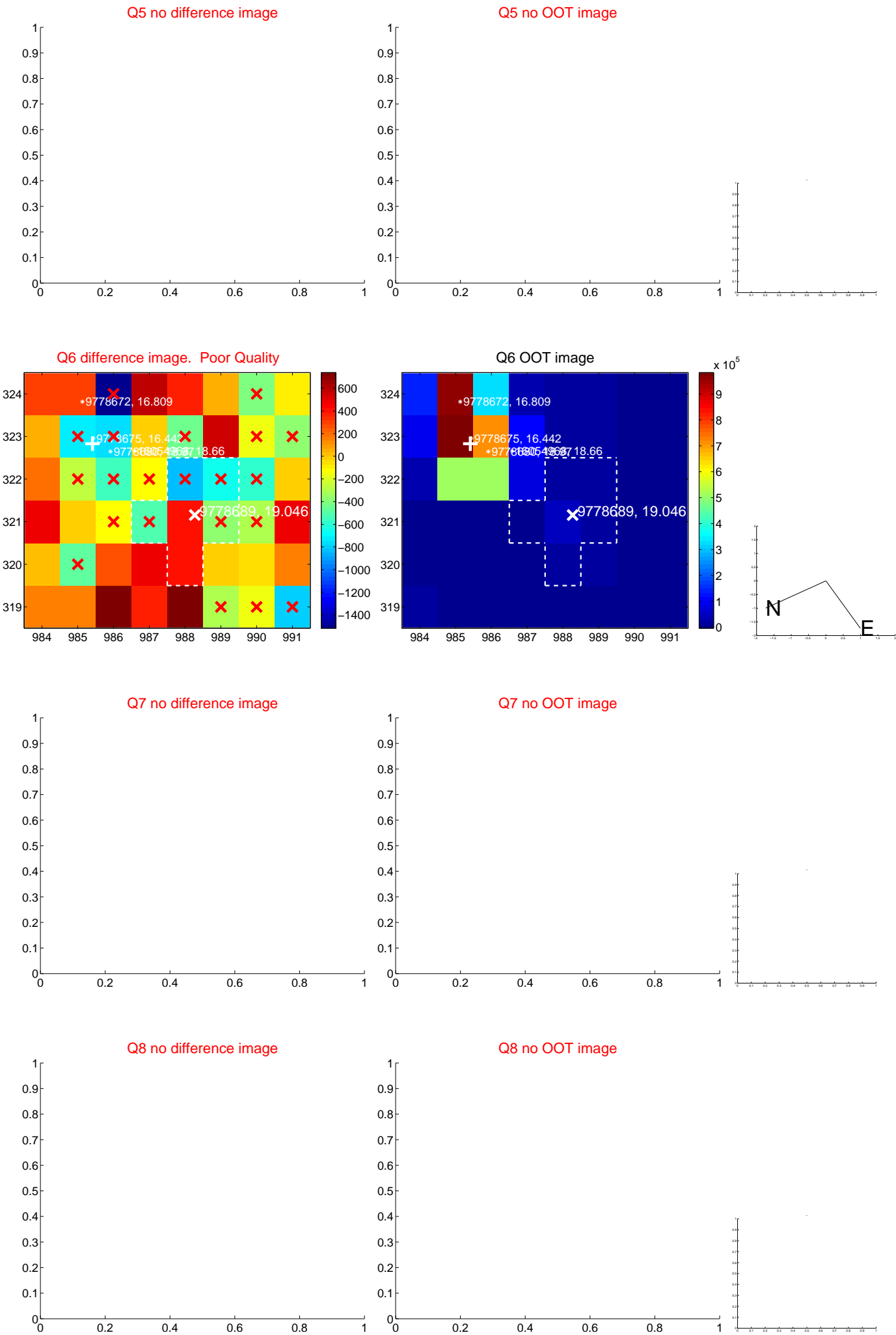


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

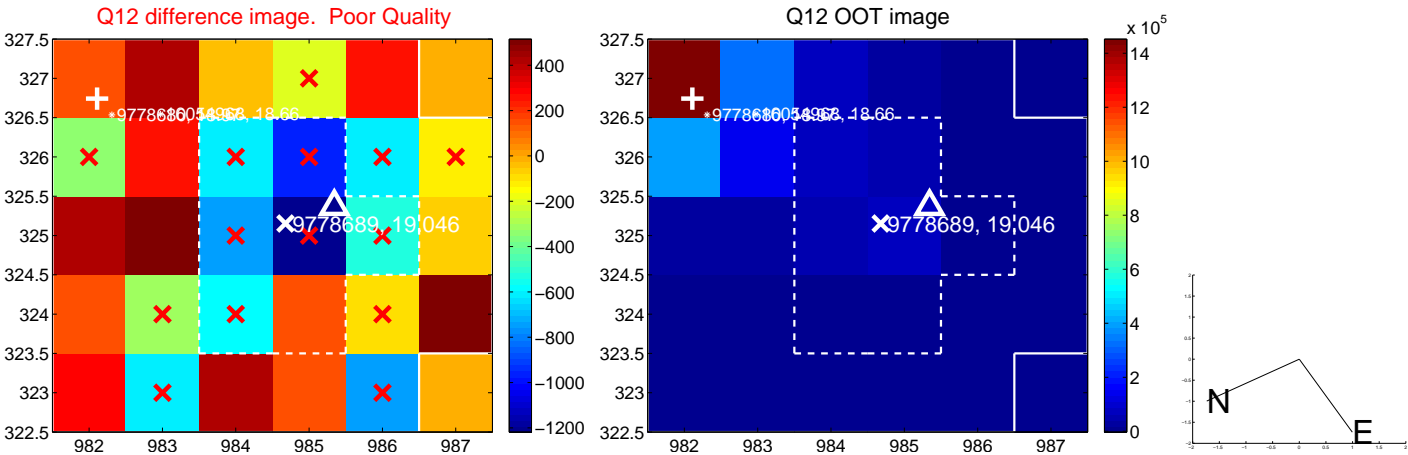
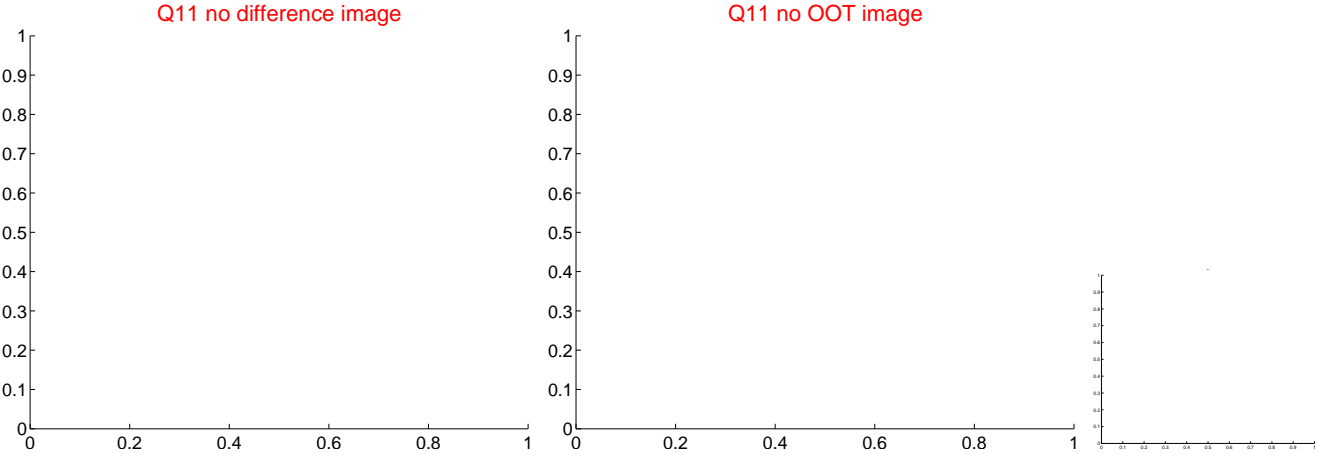
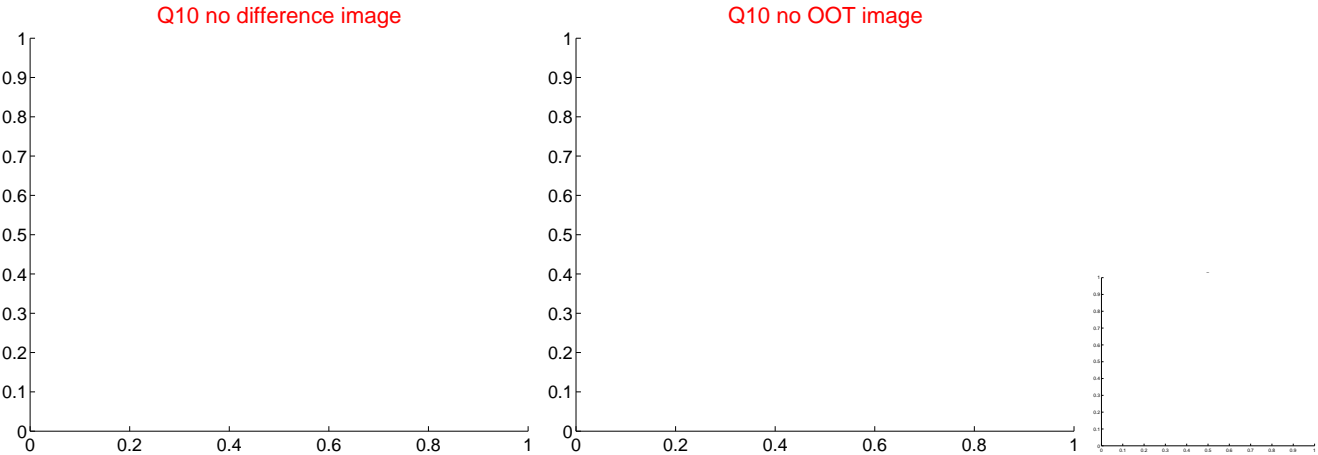
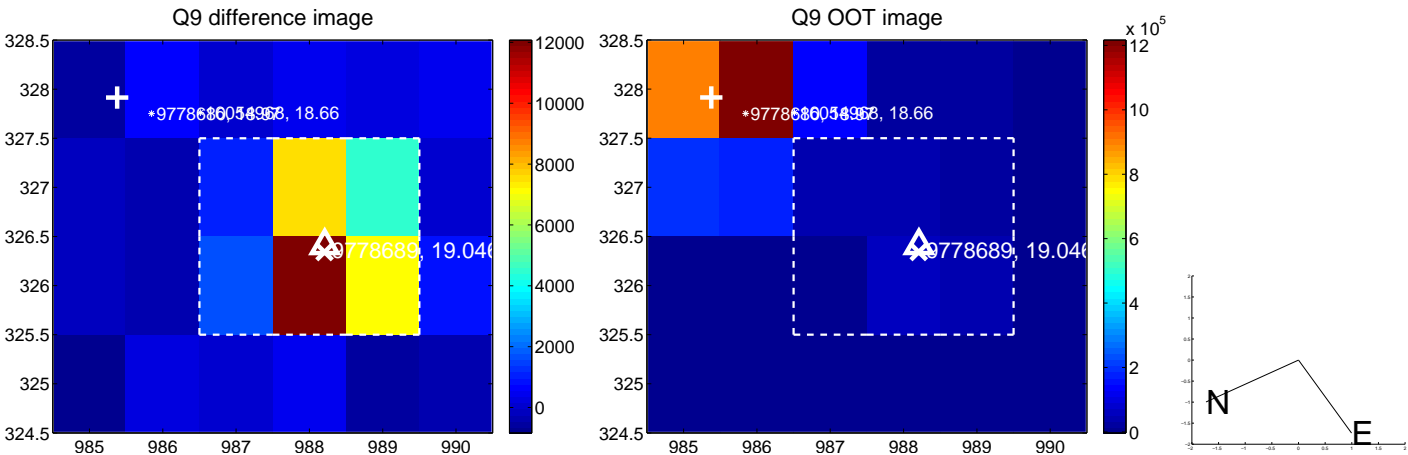
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



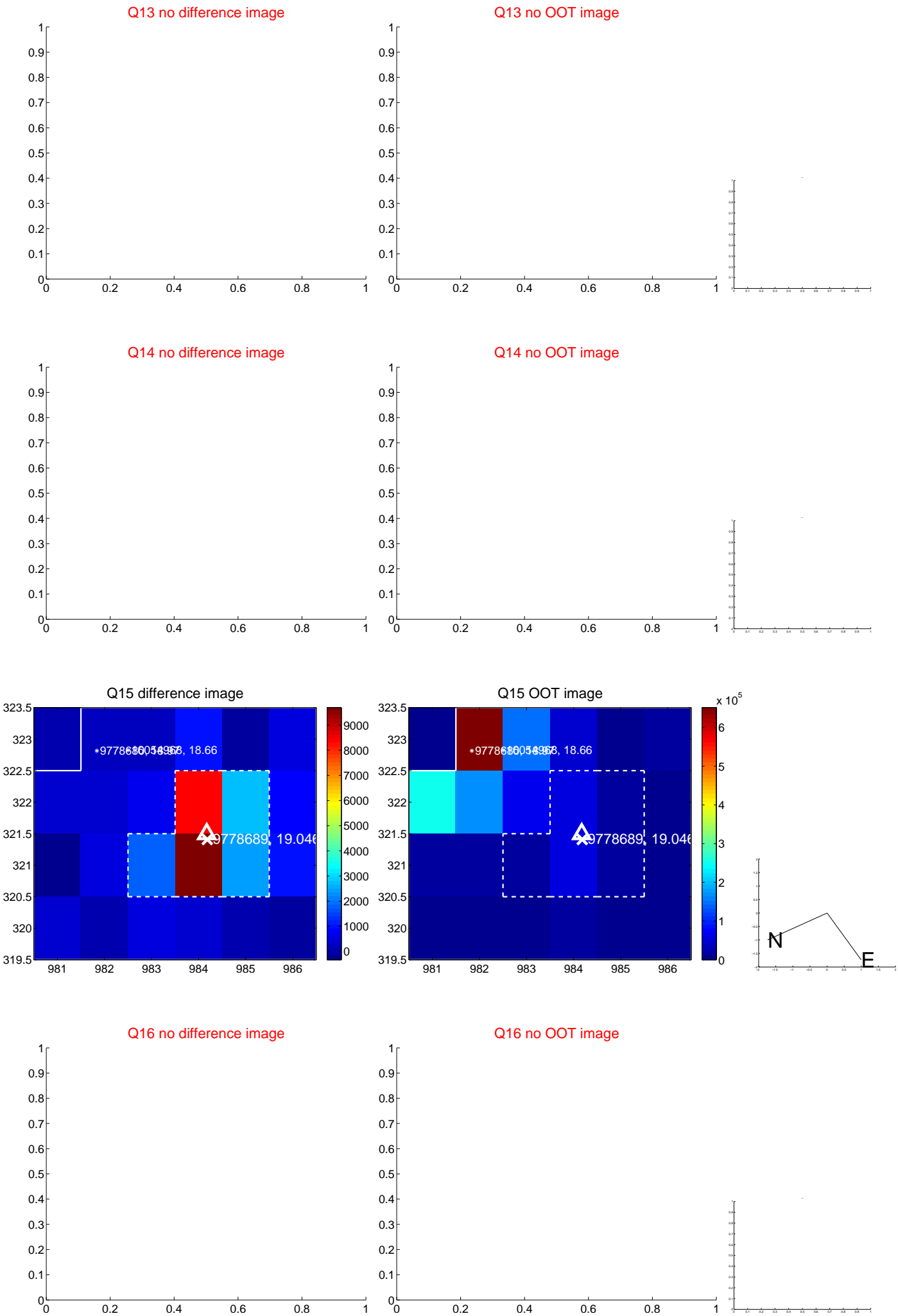
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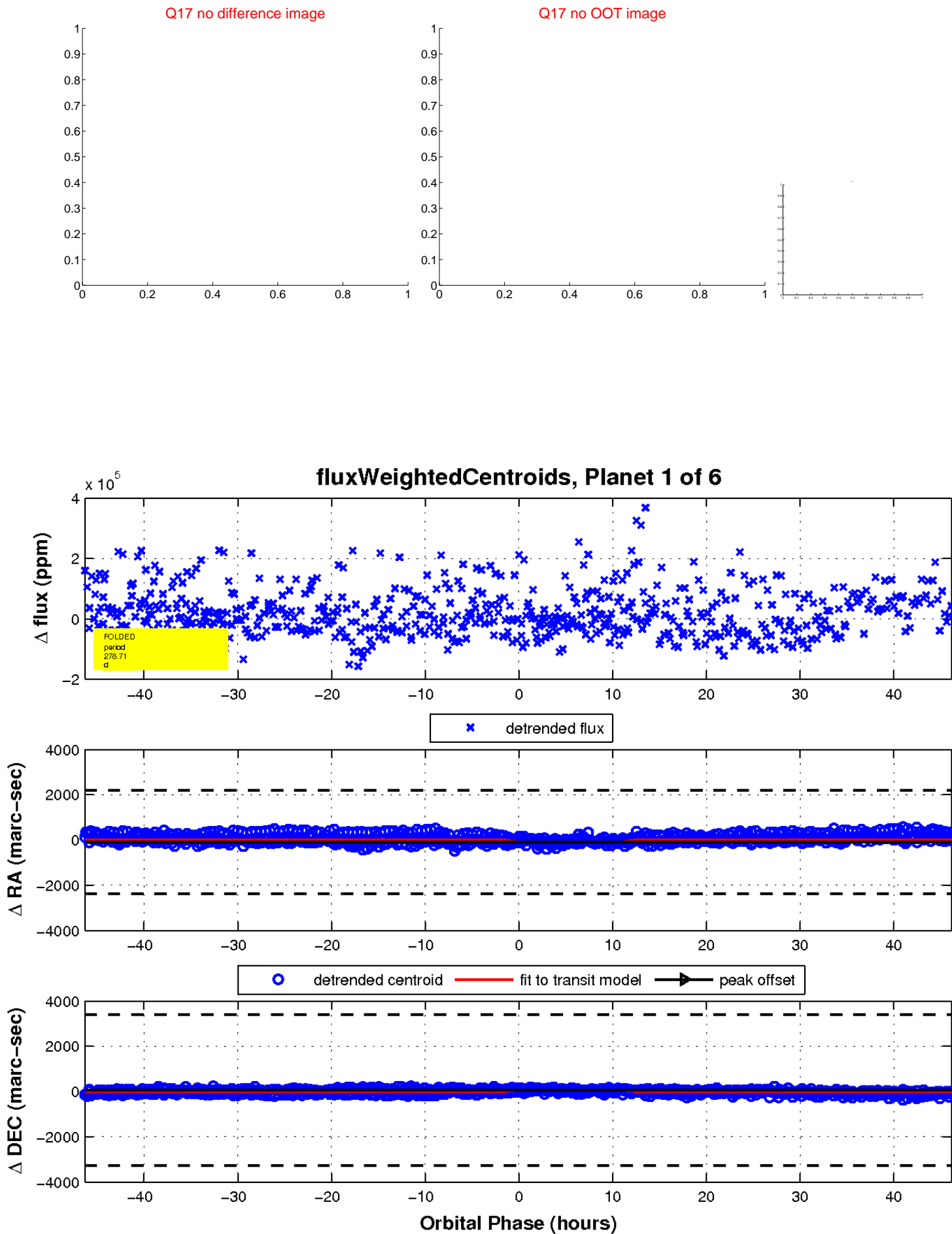
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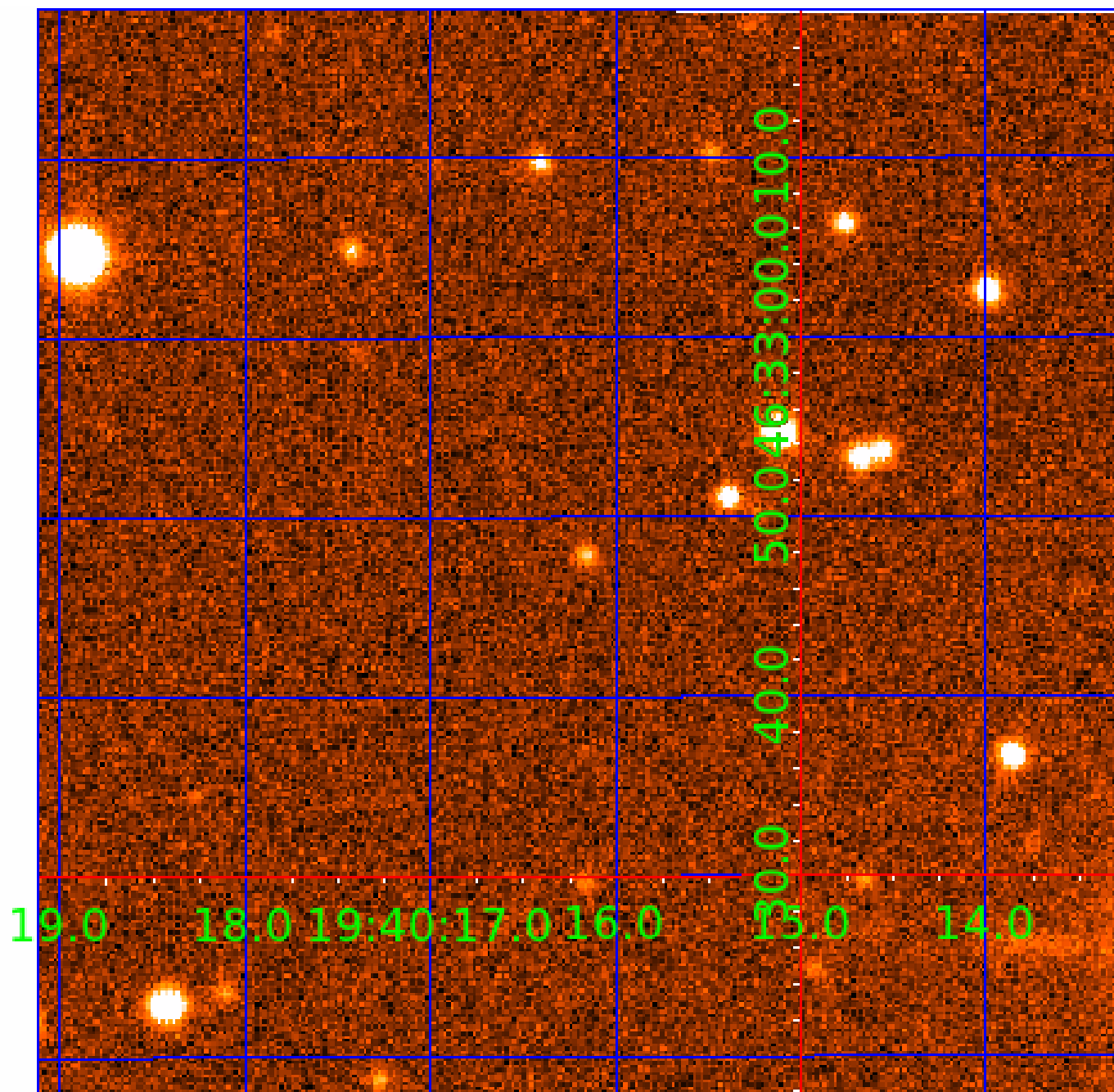


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009778689

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})
009778689-01	OBS	No	278.706947	315.447090	103449.5	15.000	20.9	-1.0	1.00	5780	32.01	1.43
009778689-02	OBS	No	294.018495	256.925374	97676.3	15.000	18.7	-1.0	1.00	5780	31.09	1.33
009778689-03	OBS	No	167.692670	260.246293	117308.6	21.794	16.0	10.5	1.00	5780	34.06	2.82
009778689-04	OBS	No	280.214307	308.228824	102111.5	21.804	9.9	9.2	1.00	5780	47.74	1.42

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009778689-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009778689-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

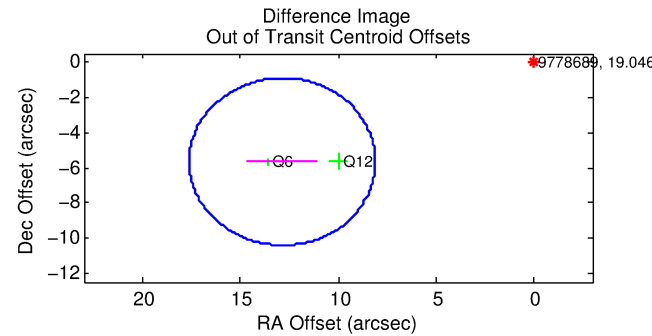
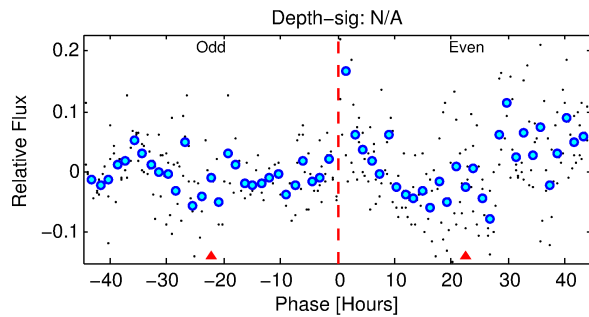
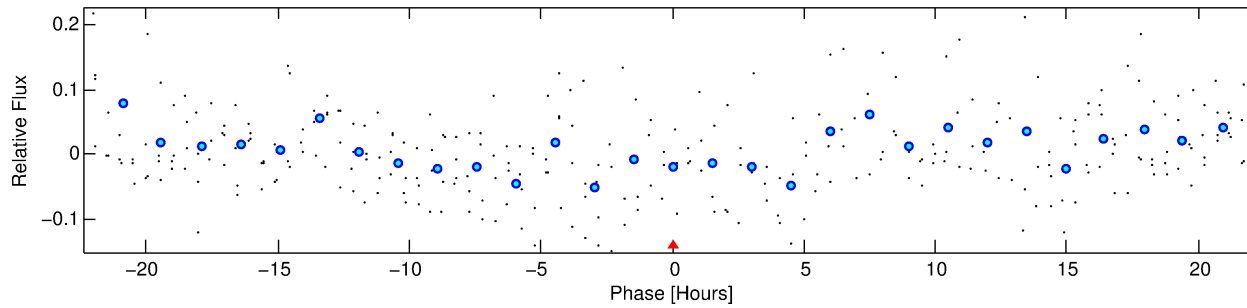
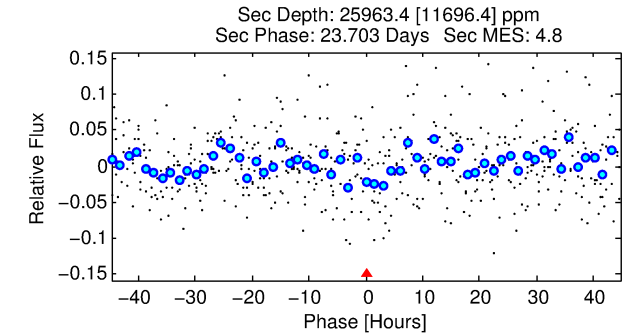
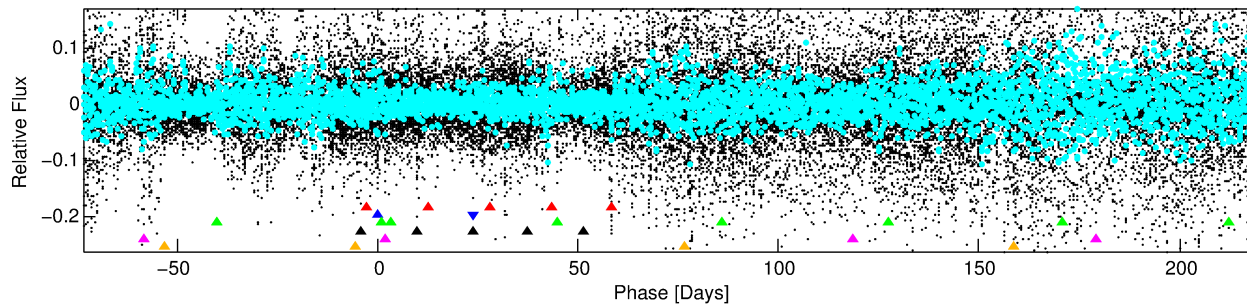
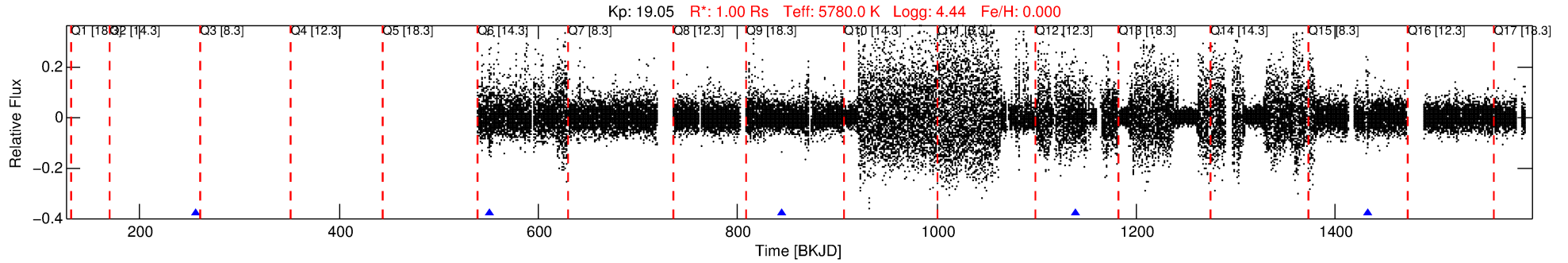
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009778689-02

No Significant Match Found

DV One-Page Summary

KIC: 9778689 Candidate: 2 of 6 Period: 294.018 d



TPS TCE Results:

Period = 294.01849 d
Epoch = 256.9254 BKJD

DV fit results are unavailable

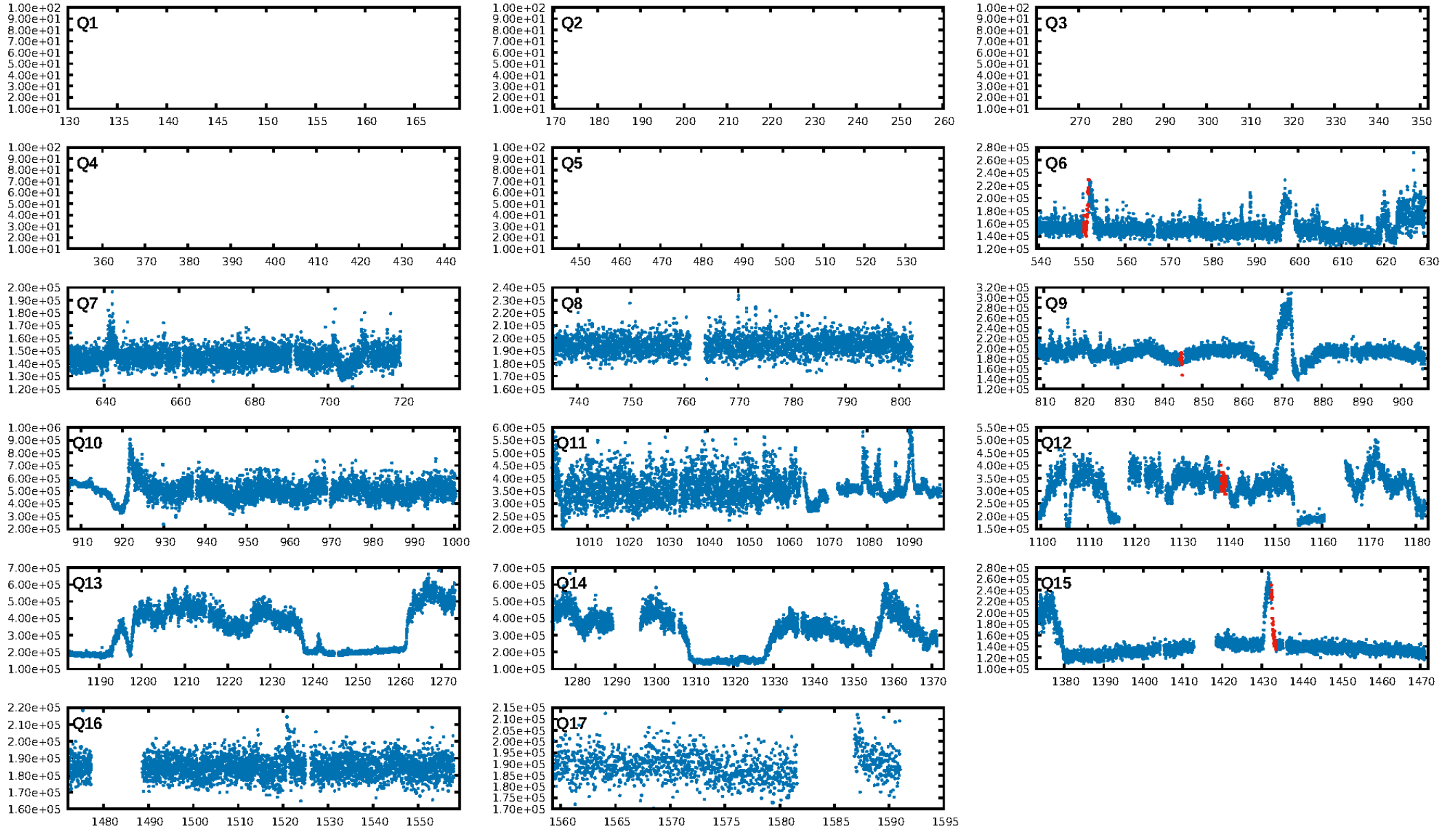
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [12.52σ]
LongPeriod-sig: 100.0% [67.84σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.40e-23
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.6574
Centroid-sig: 0.9%
Centroid-so: 3.549 arcsec [1.26σ]
OotOffset-rm: 14.045 arcsec [8.85σ]
KicOffset-rm: 0.316 arcsec [1.62σ]
OotOffset-st: 1/0/1/0 [2]
KicOffset-st: 1/1/1/0 [3]
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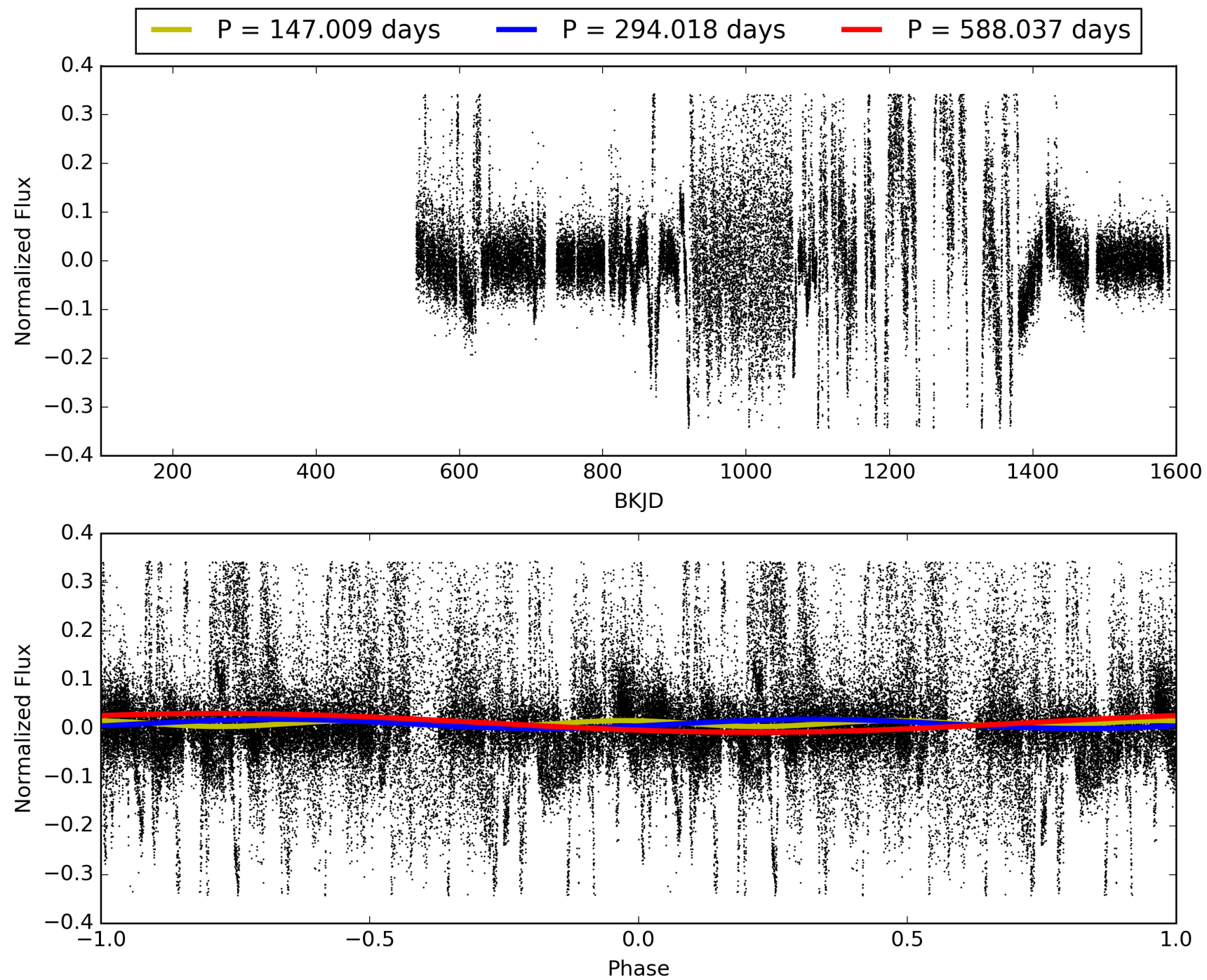
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:45:38 Z

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

TCE 009778689-02, PDC Light Curves

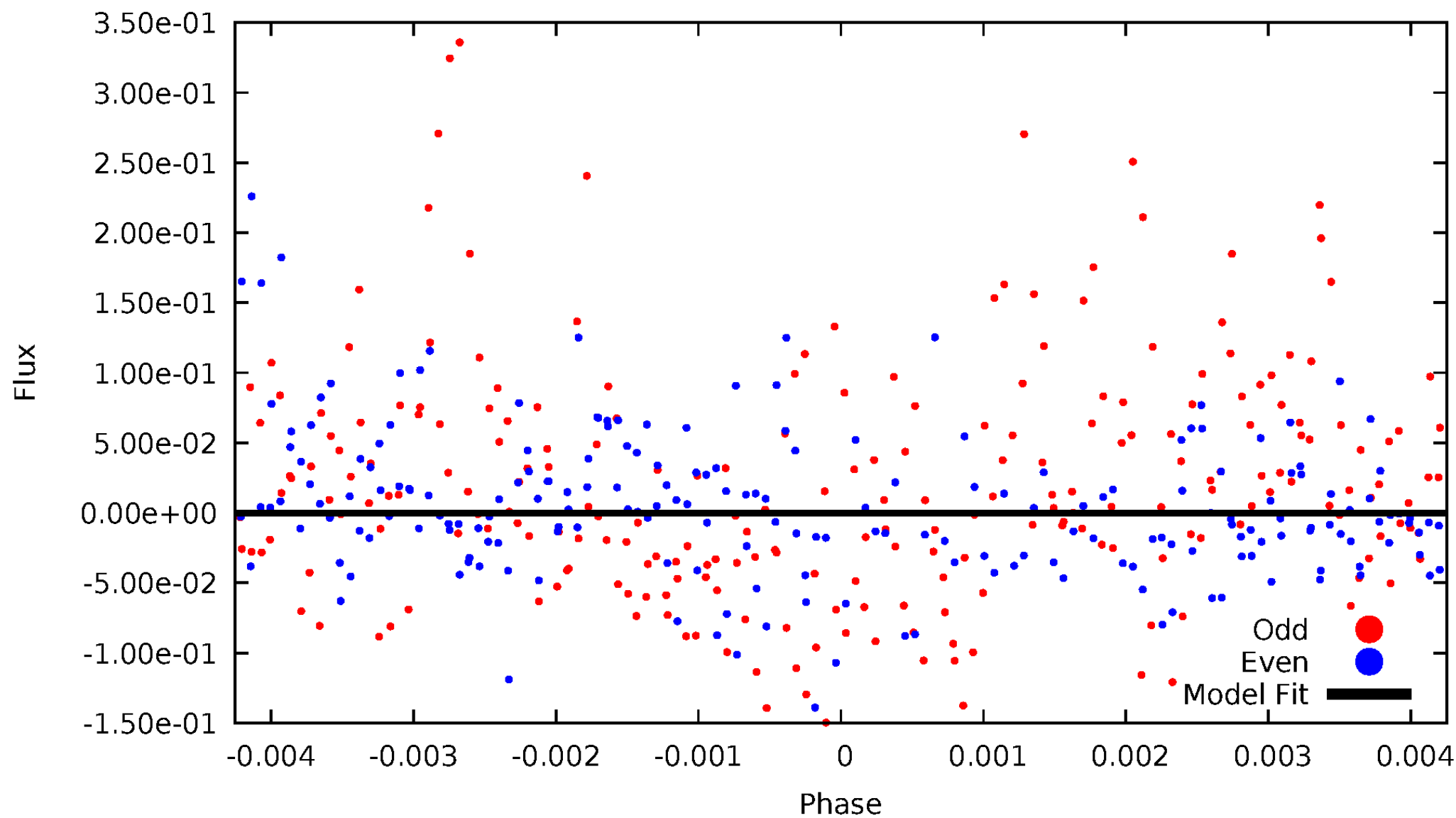


TCE 009778689-02



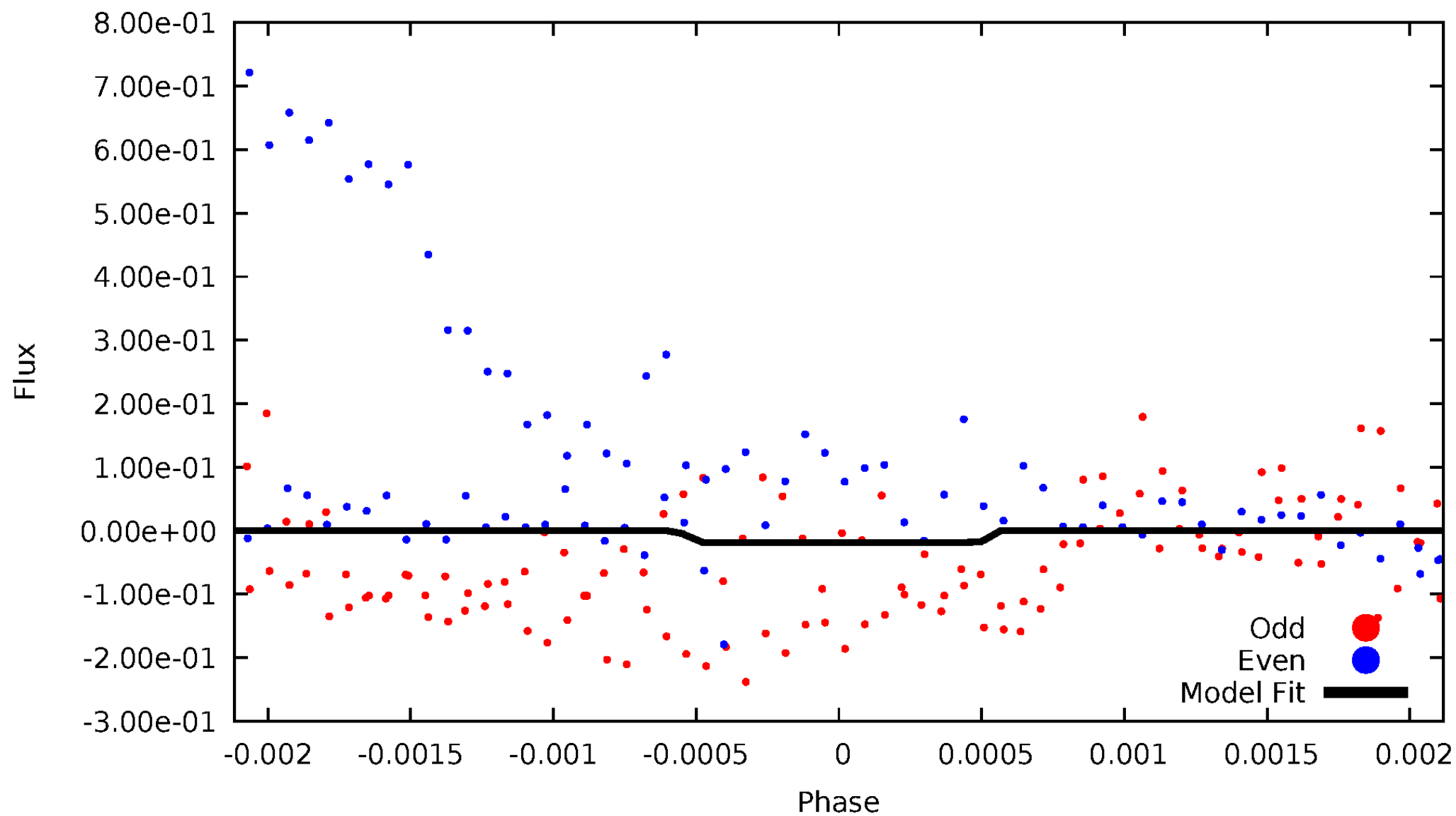
DV Odd/Even

TCE 009778689-02



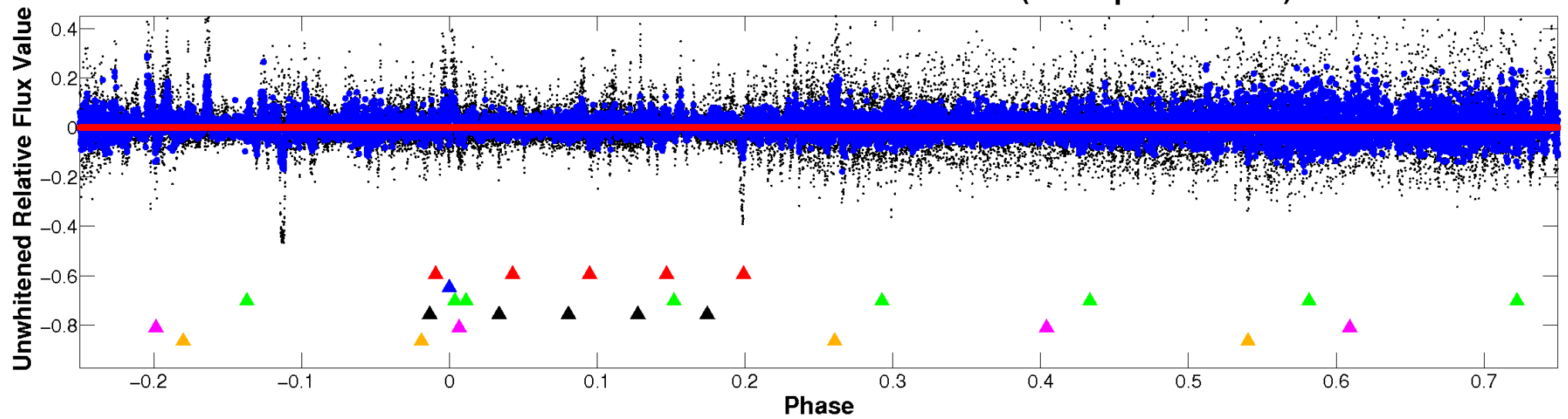
ALT Odd/Even

TCE 009778689-02

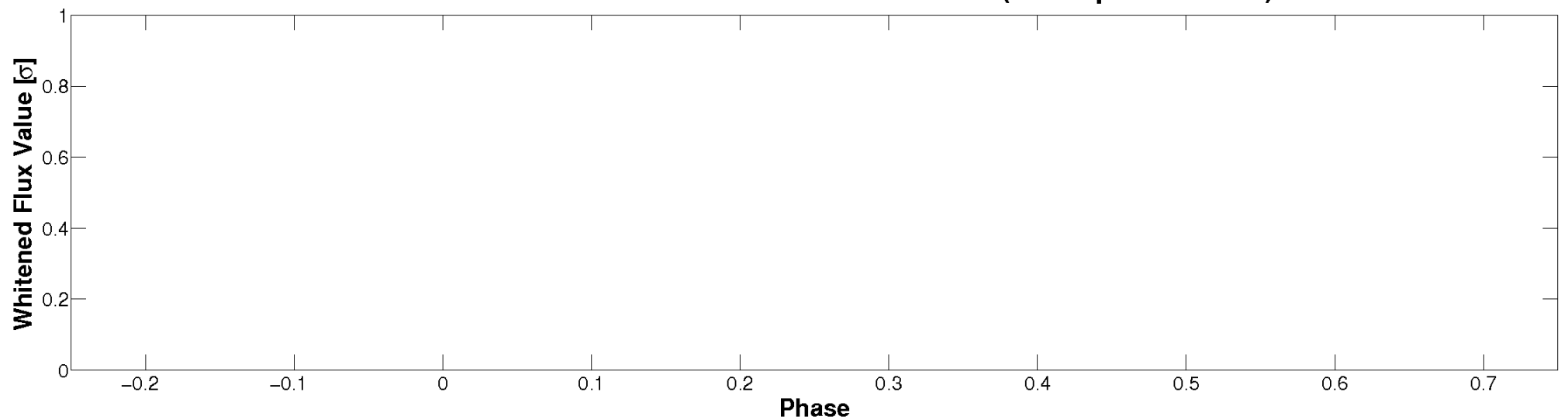


Non-Whitened Vs. Whitened Light Curve

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

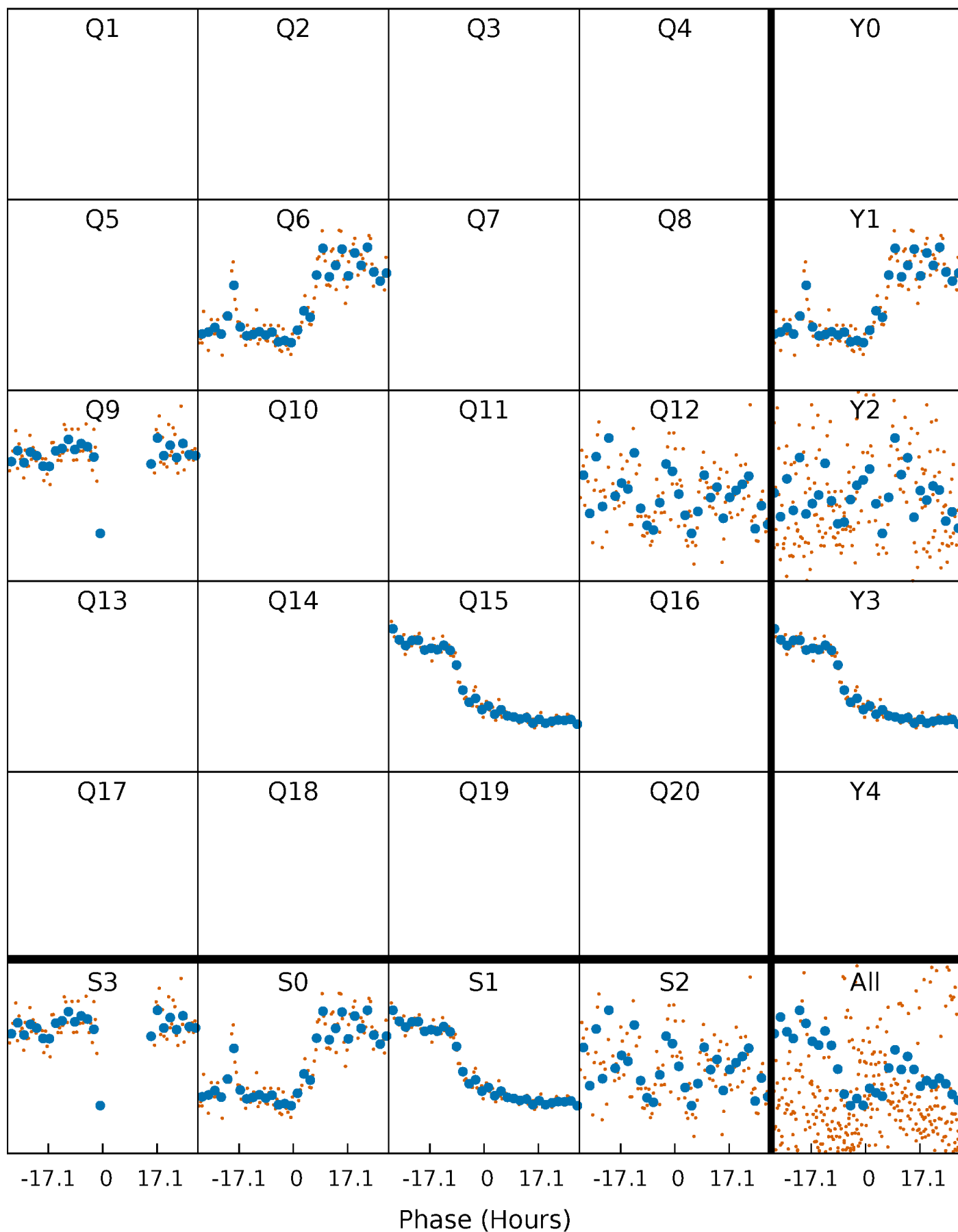


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



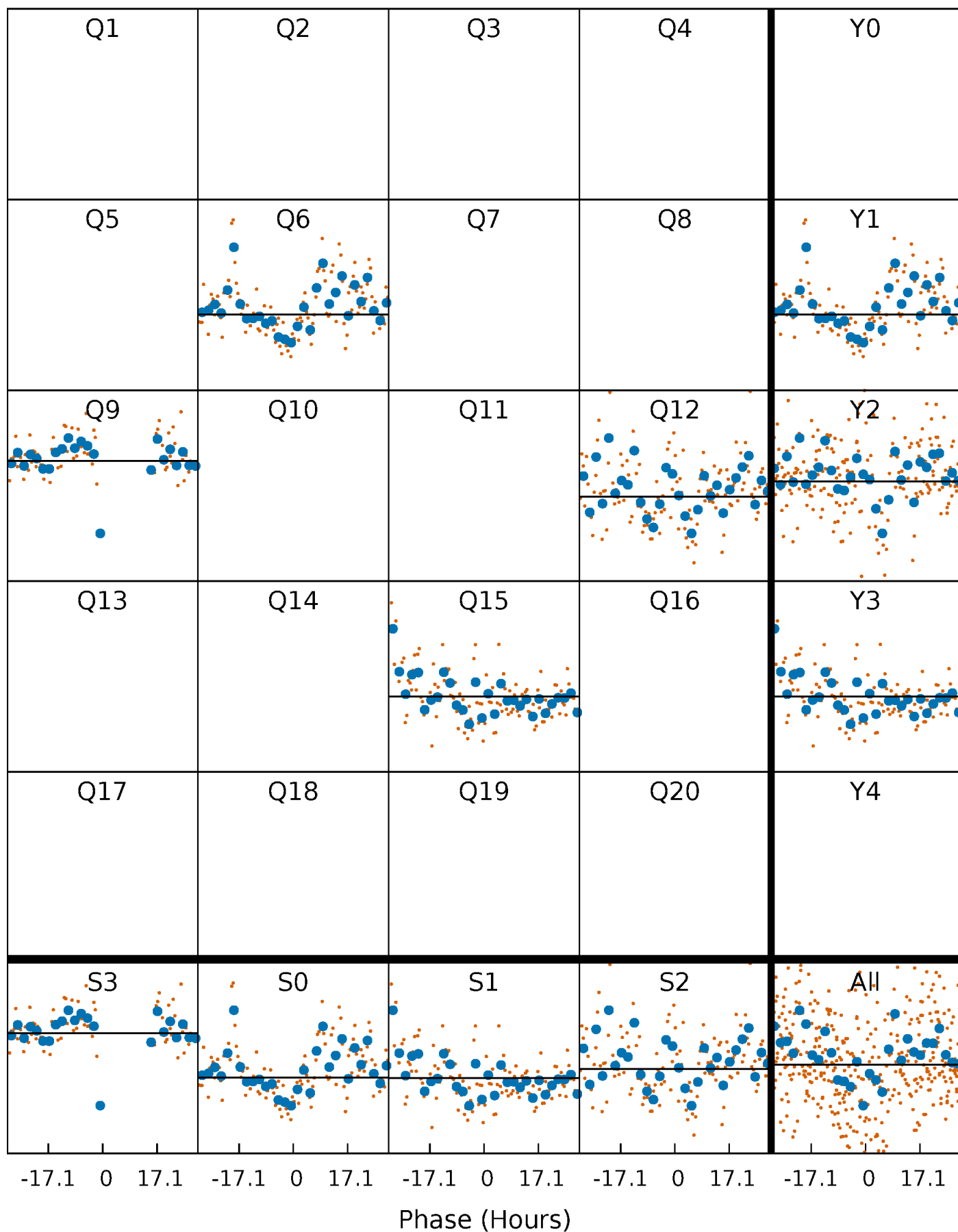
PDC Quarter-Phased Transit Curves

TCE 009778689-02 P=294.018495 Days $T_0=256.925374$ (BKJD)



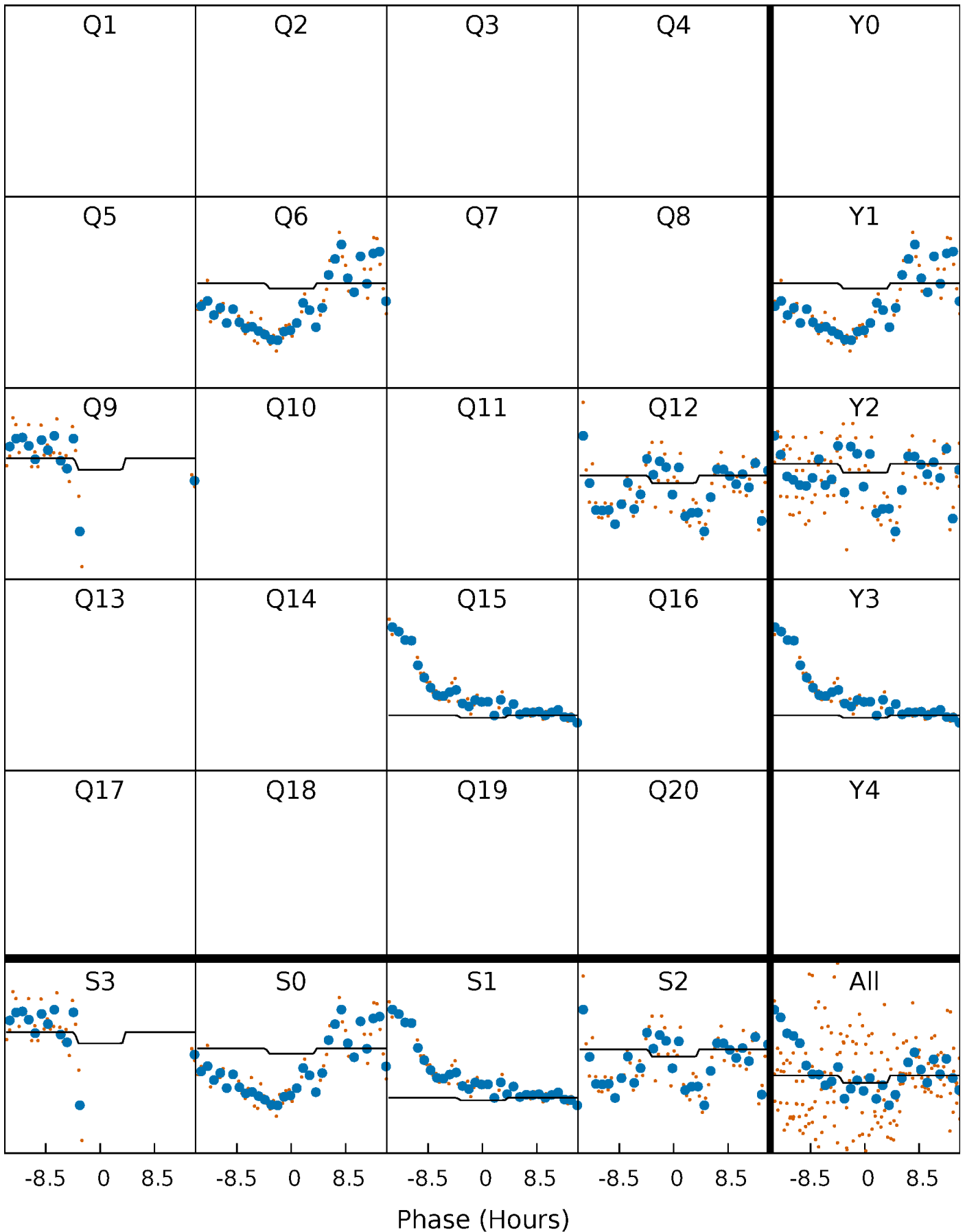
DV Quarter-Phased Transit Curves

TCE 009778689-02 $P=294.018495$ Days $T_0=256.925374$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

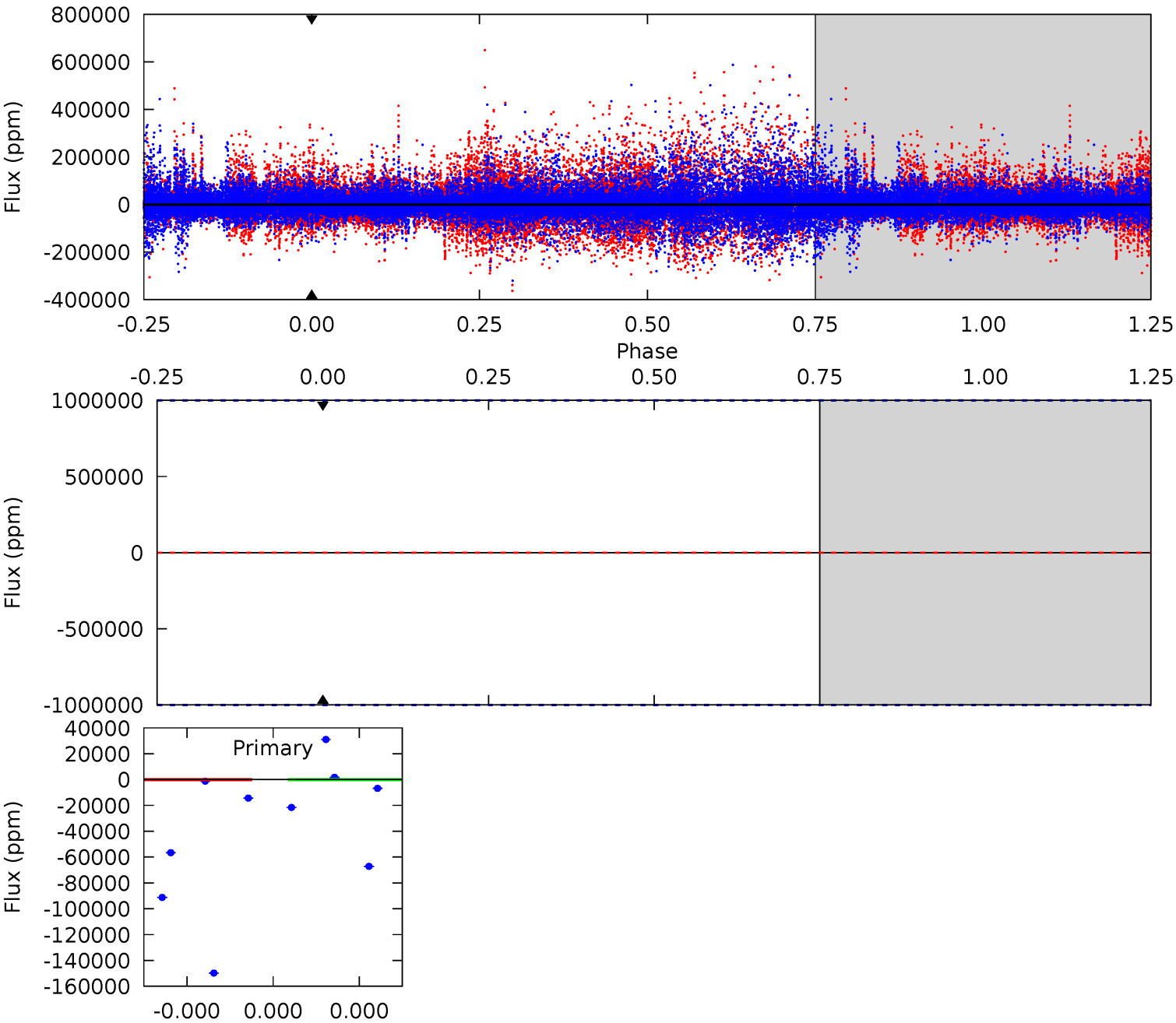
TCE 009778689-02 P=294.018495 Days $T_0=256.990507$ (BKJD)



DV Model-Shift Uniqueness Test

009778689-02, P = 294.018495 Days, E = 256.925374 Days

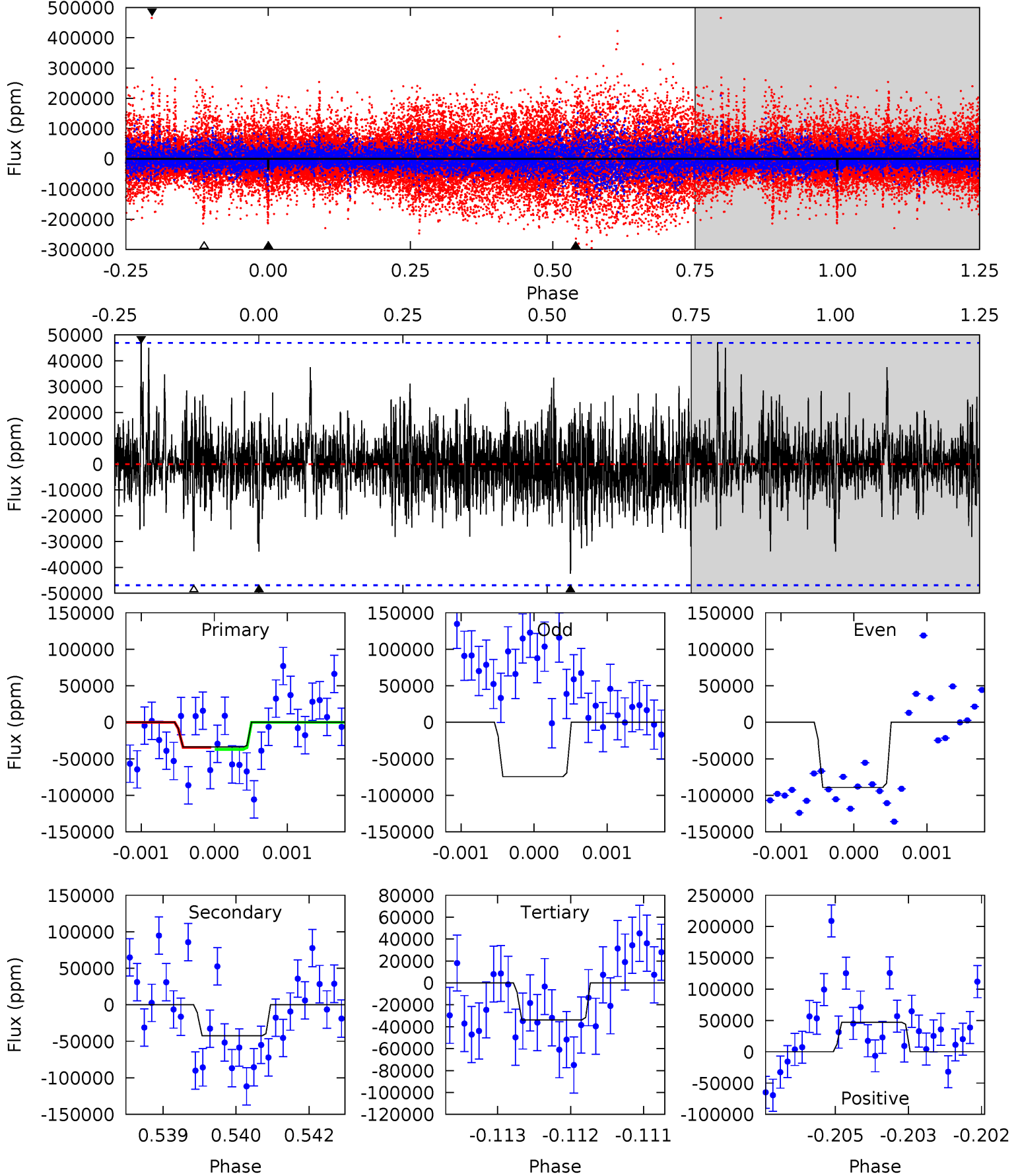
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009778689-02, P = 294.018495 Days, E = 256.990507 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.92	4.91	3.91	5.46	5.43	3.26	1.07	0.02	-1.54	1.00	-0.56	0.78	0.75	0.53	0.16



Stellar Parameters For KIC 009778689

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+1}_{-1}	$4.438^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$
	+0%/-0%	+23%/-23%	+inf%/-inf%	+100%/-100%	+100%/-100%	+100%/-100%
Source	Solar	Solar	Solar	Solar		

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

Secondary Eclipse Parameters for KIC 009778689-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$30.98^{+11.96}_{-11.16}$	383^{+20}_{-17}	3230^{+3294}_{-9522}	1487^{+54160}_{-48025}
Alt.	-42379 ± 8635	$16.17^{+10.47}_{-9.47}$	382^{+20}_{-18}	6906^{+5293}_{-1561}	$69331^{+317627}_{-44217}$

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 $A_{obs} \gg 1.0$

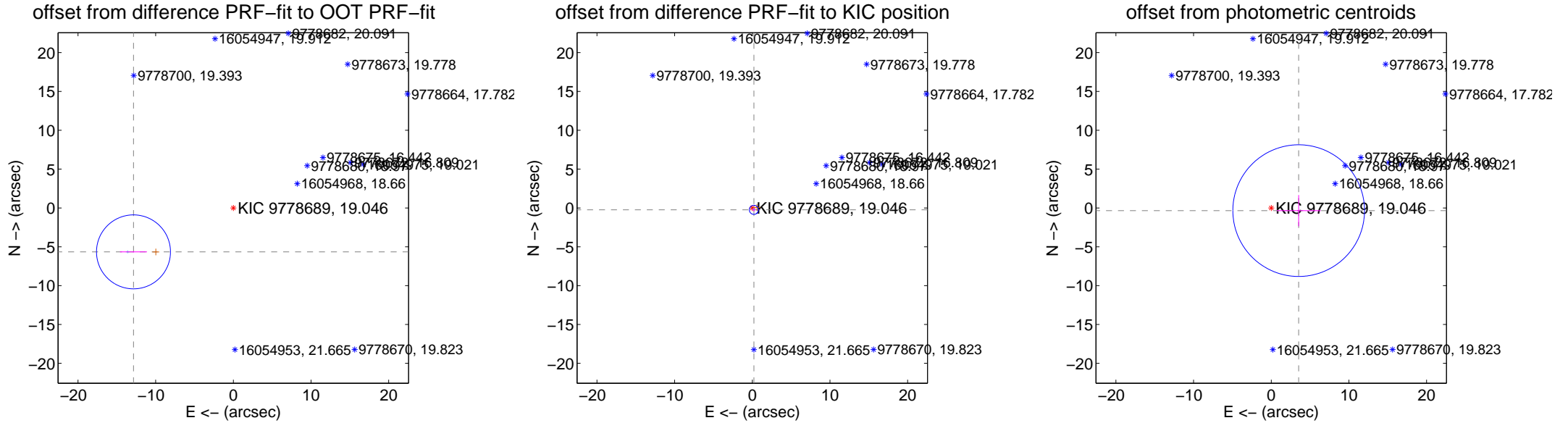
DV Centroid Data

Supplemental centroid analysis for 009778689-02. Kepler magnitude: 19.05. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

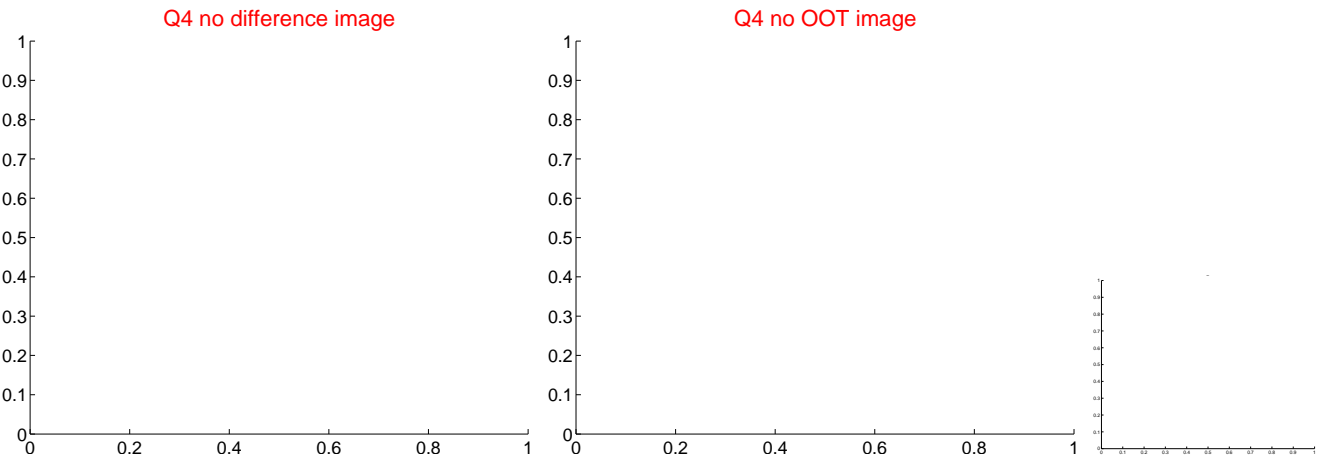
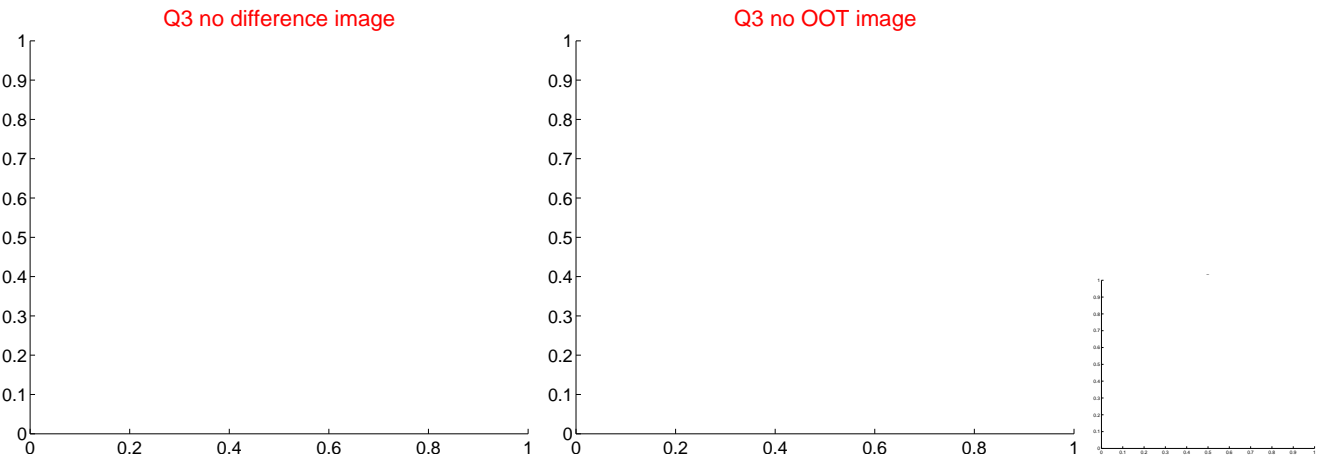
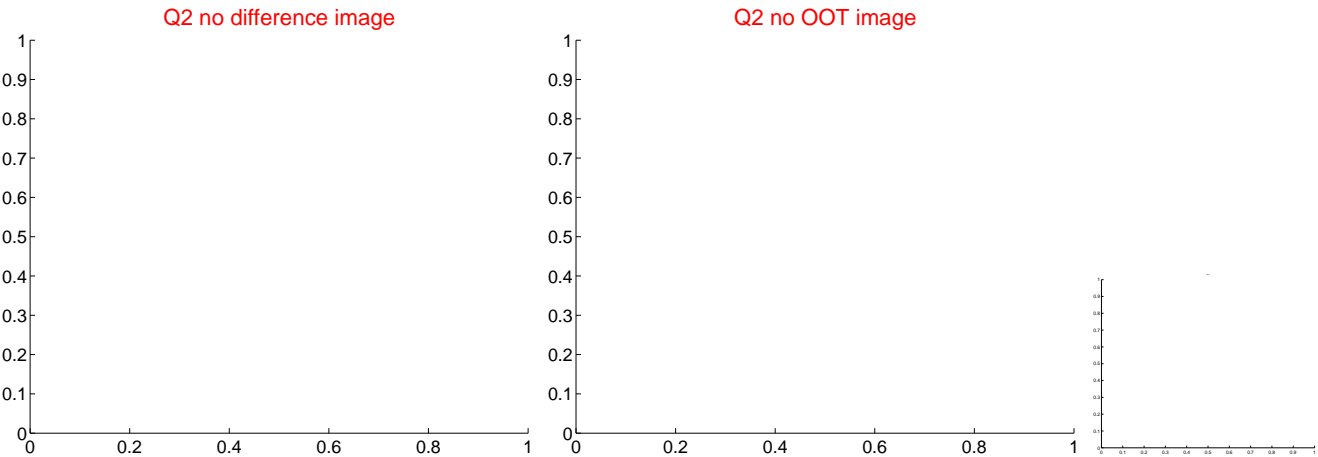
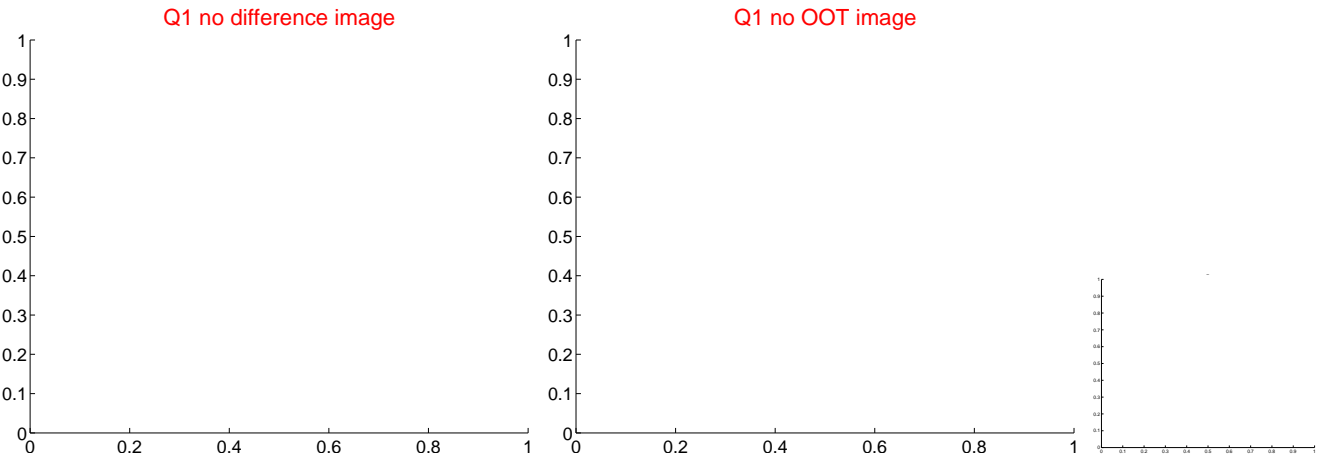
The OOT PRF centroid is offset from the target star catalog position by about 12.02 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	14.045 \pm 1.587	8.85	12.857 \pm 1.737	-5.653 \pm 0.067
PRF-fit source offset from KIC position	0.316 \pm 0.195	1.62	-0.203 \pm 0.194	-0.242 \pm 0.196
photometric centroid source offset	3.55 \pm 2.83	1.26	-3.53 \pm 2.83	-0.34 \pm 2.01



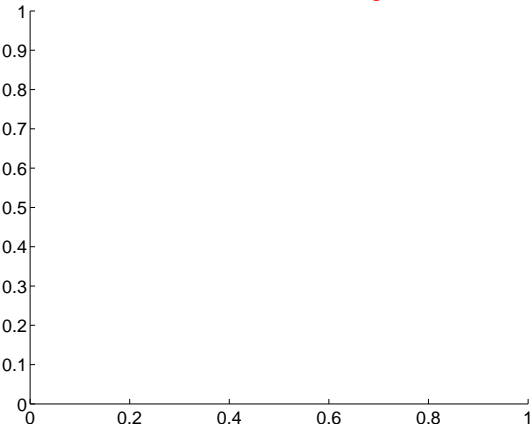
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

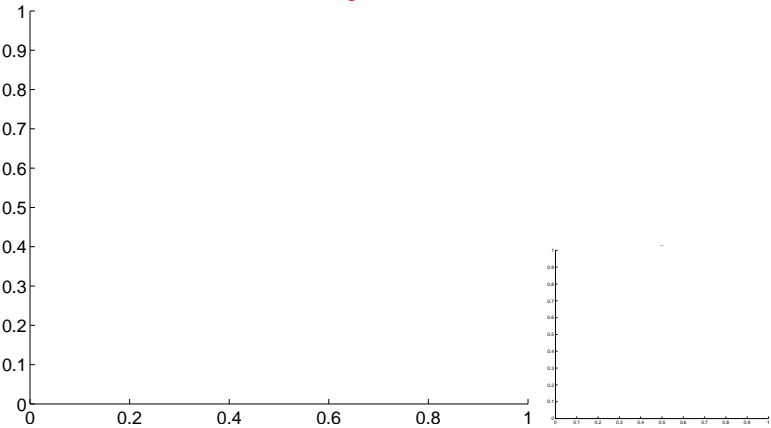


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

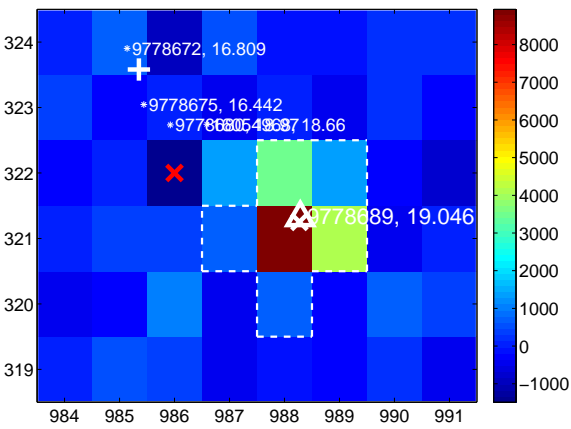
Q5 no difference image



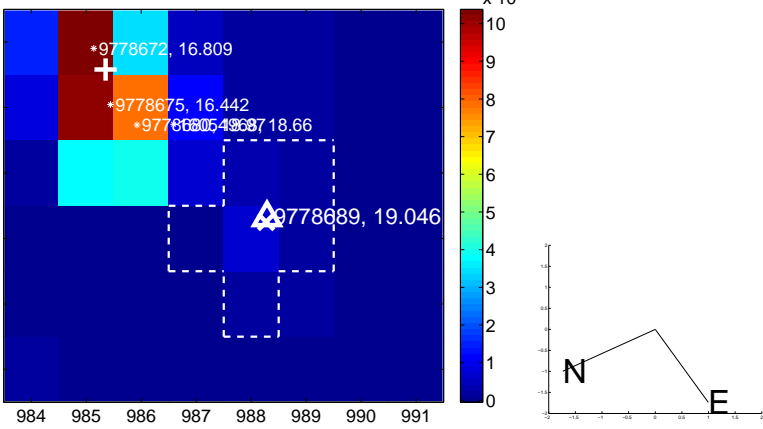
Q5 no OOT image



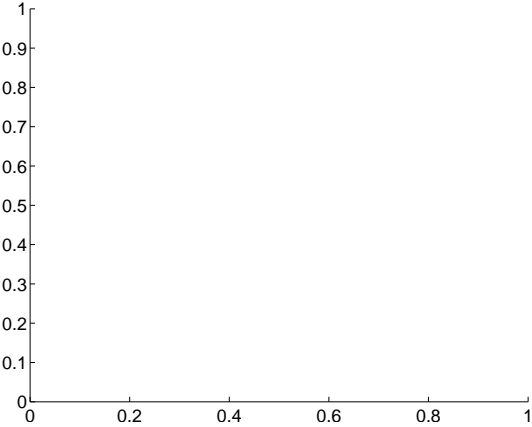
Q6 difference image



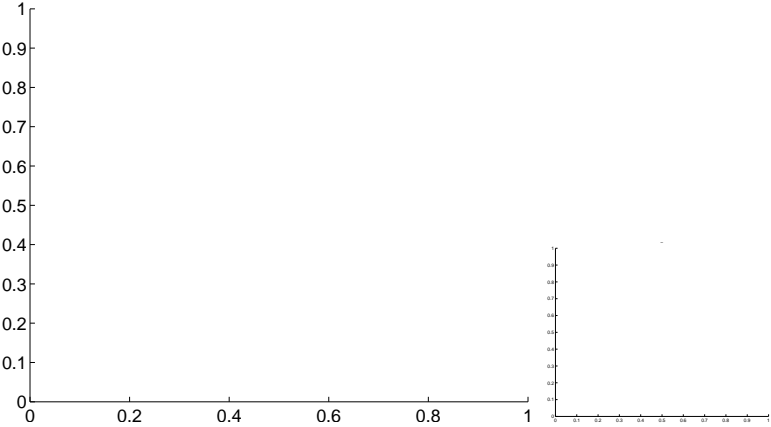
Q6 OOT image



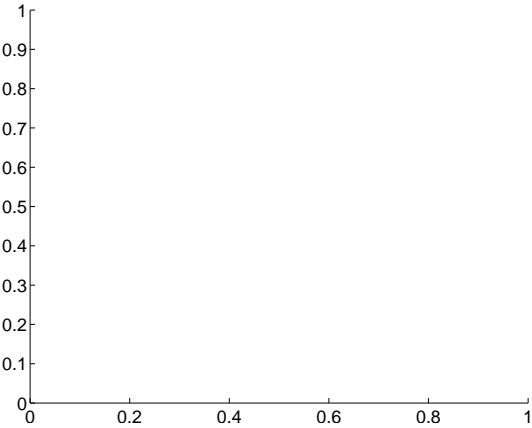
Q7 no difference image



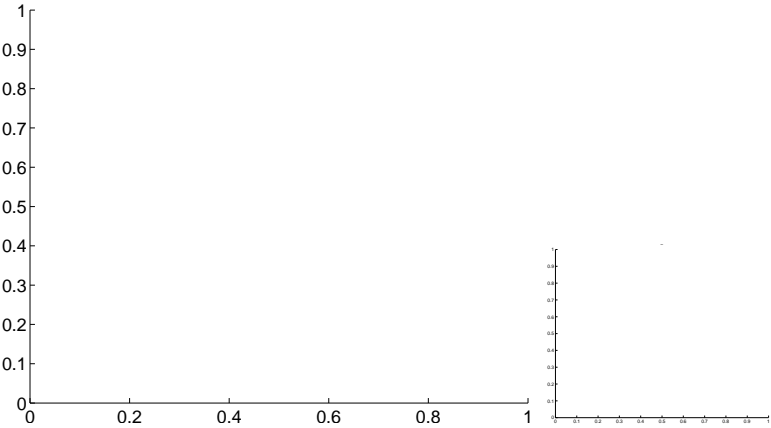
Q7 no OOT image



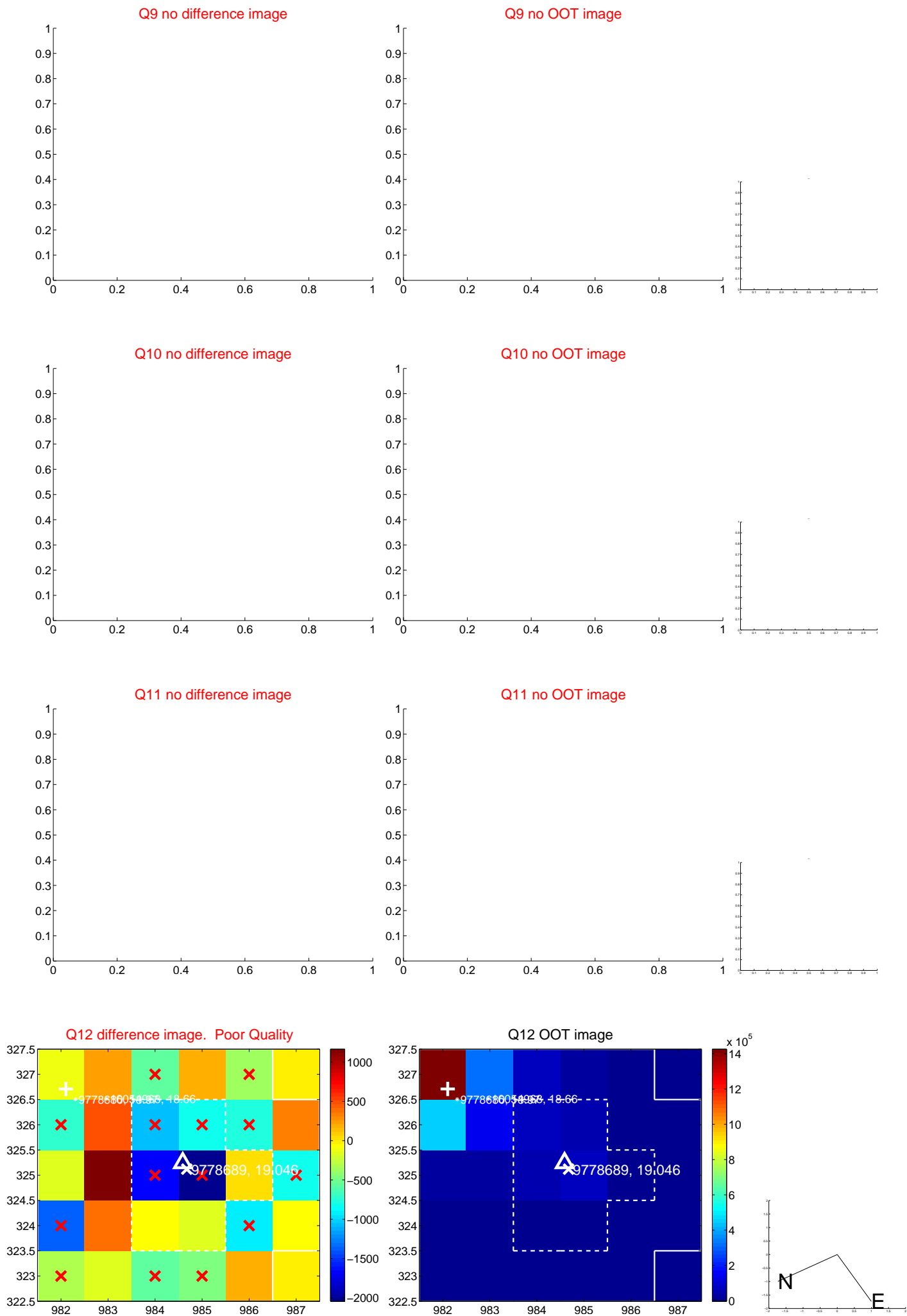
Q8 no difference image



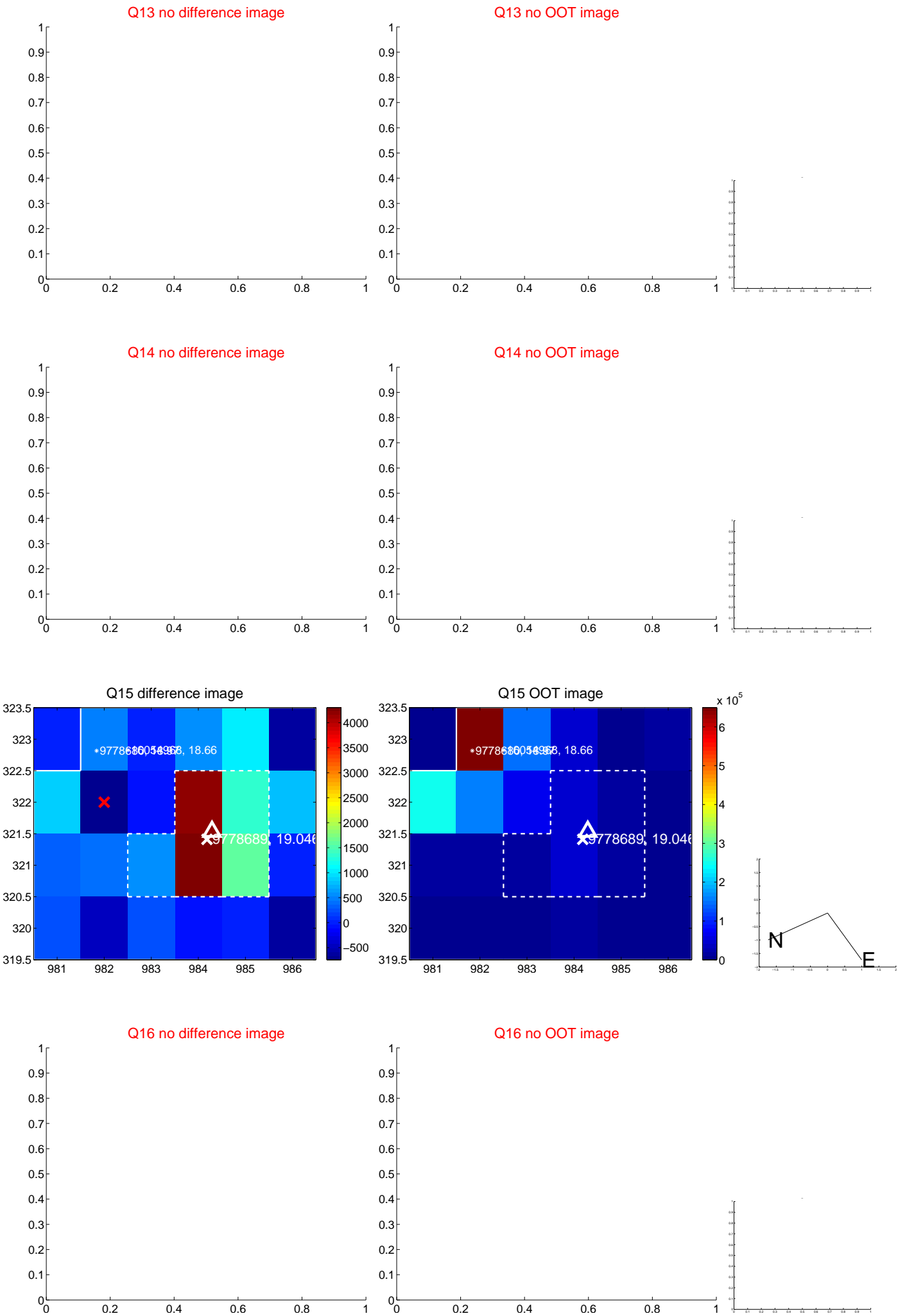
Q8 no OOT image



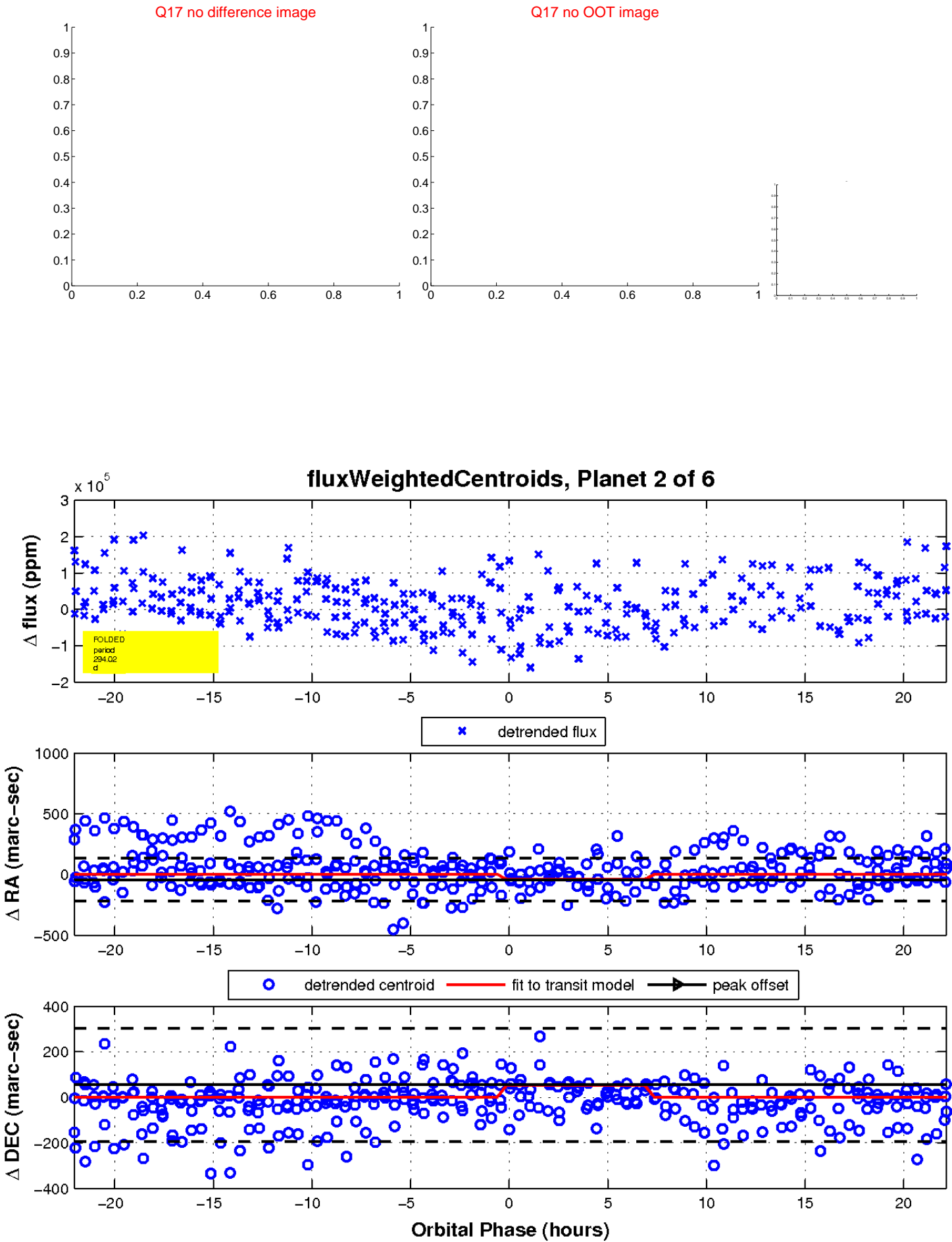
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

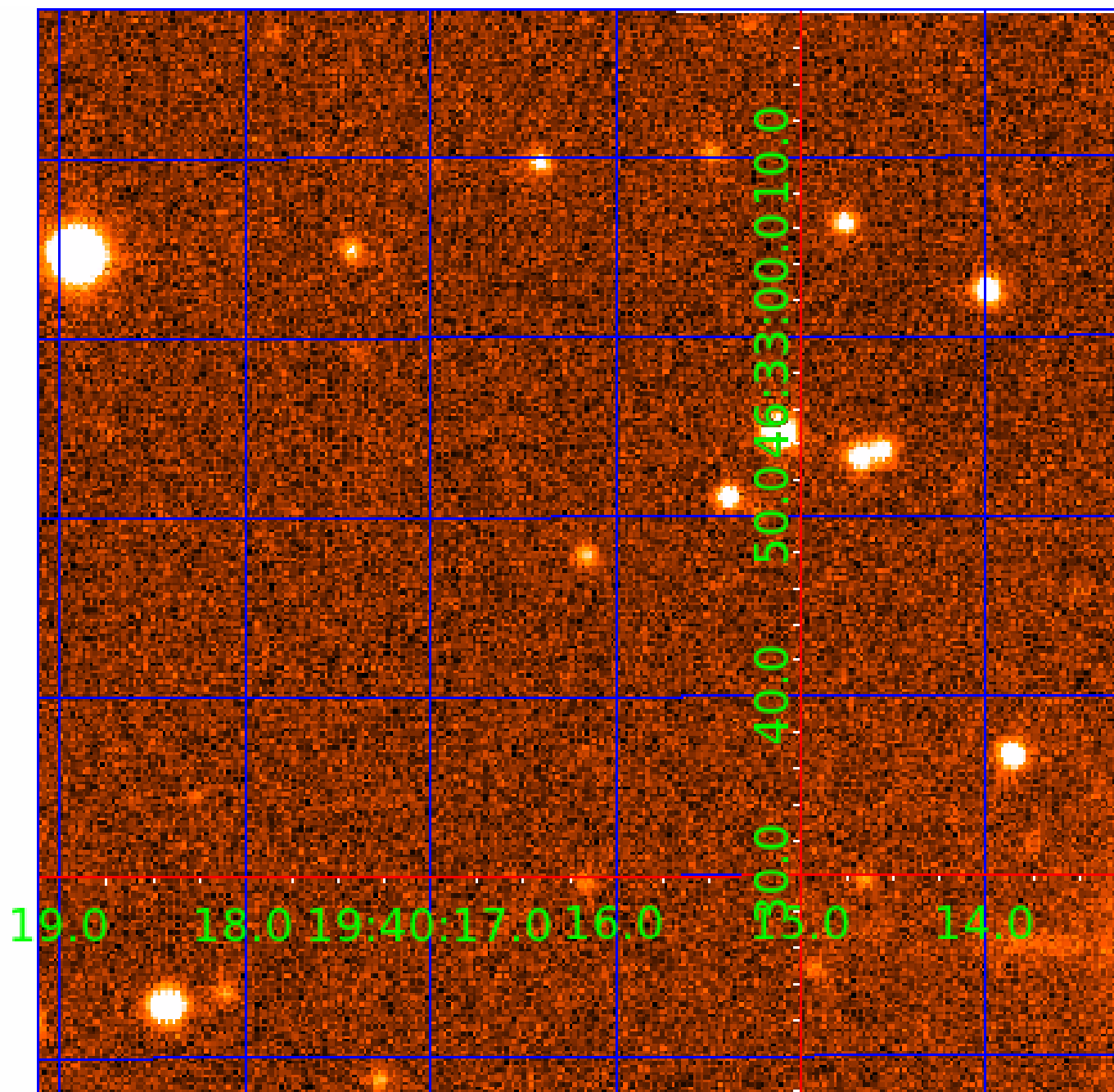


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009778689

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})
009778689-01	OBS	No	278.706947	315.447090	103449.5	15.000	20.9	-1.0	1.00	5780	32.01	1.43
009778689-02	OBS	No	294.018495	256.925374	97676.3	15.000	18.7	-1.0	1.00	5780	31.09	1.33
009778689-03	OBS	No	167.692670	260.246293	117308.6	21.794	16.0	10.5	1.00	5780	34.06	2.82
009778689-04	OBS	No	280.214307	308.228824	102111.5	21.804	9.9	9.2	1.00	5780	47.74	1.42

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009778689-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009778689-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

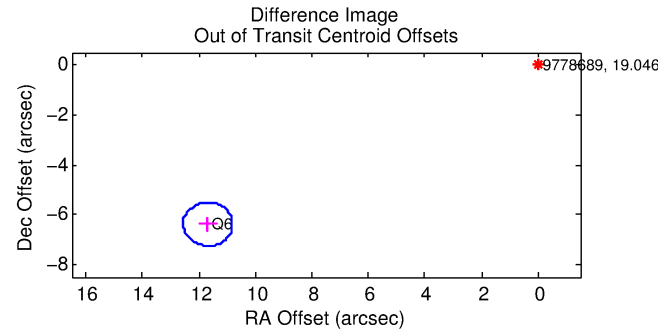
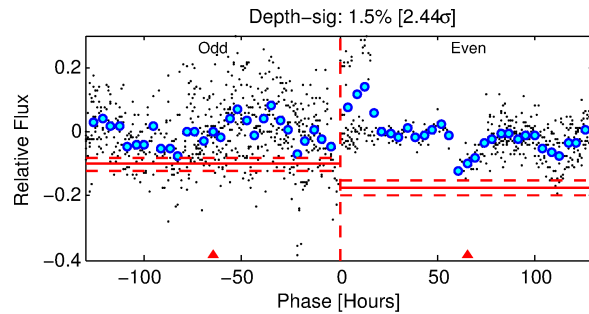
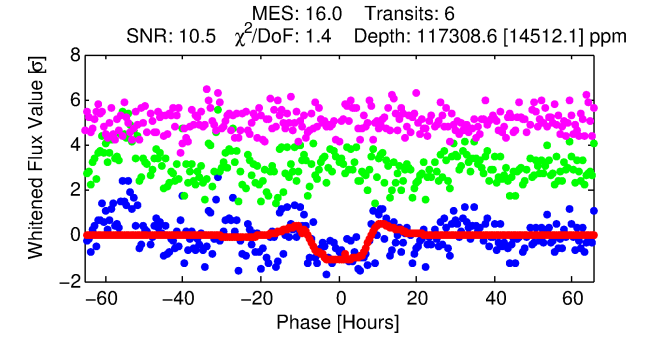
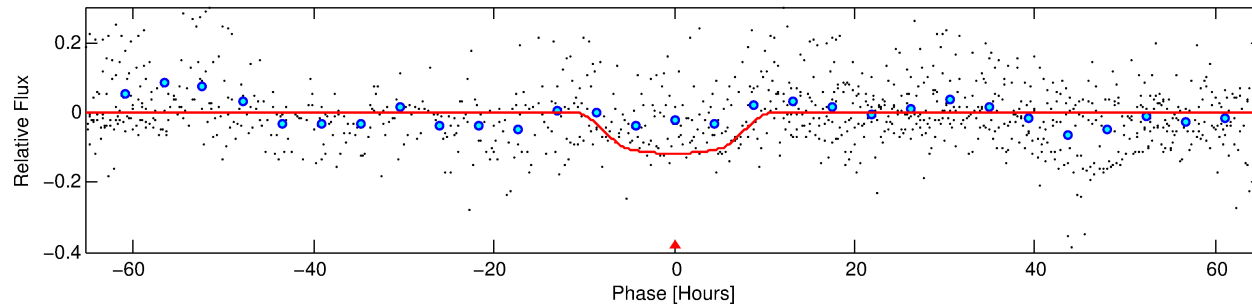
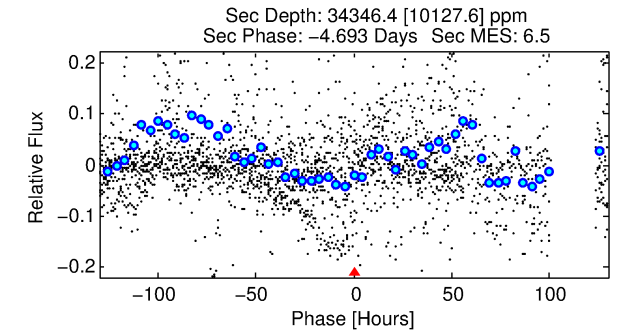
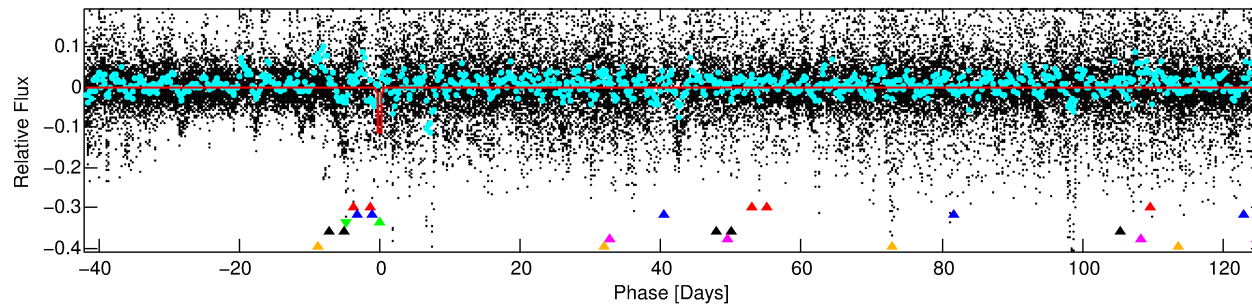
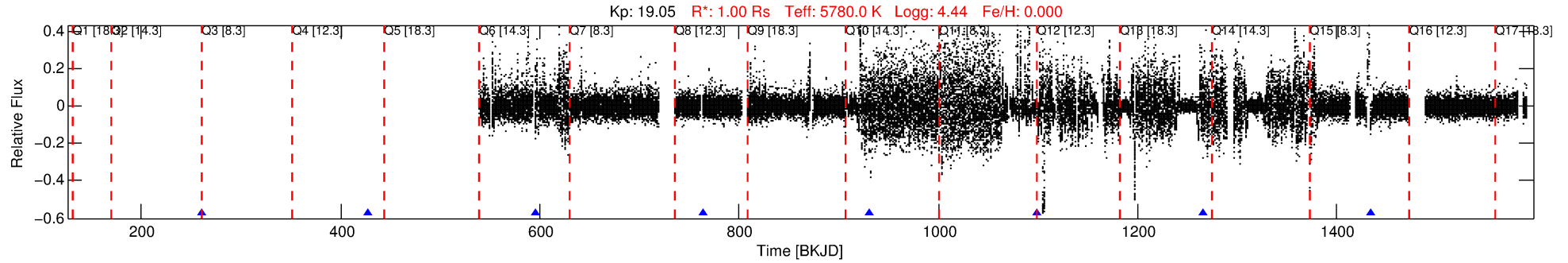
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009778689-03

No Significant Match Found

DV One-Page Summary

KIC: 9778689 Candidate: 3 of 6 Period: 167.693 d



DV Fit Results:

Period = 167.69267 [0.01160] d
Epoch = 260.2463 [0.0629] BKJD
Rp/R* = 0.3121 [0.0265]
a/R* = 77.13 [14.74]
b = 0.00 [2118.28]
Seff = 2.82 [0.00]
Teq = 331 [0] K
Rp = 34.06 [2.90] Re
a = 0.5953 [0.0000] AU
Ag = 5771.08 [1964.47] [2.94σ]
Teff = 4454 [379] K [10.88σ]

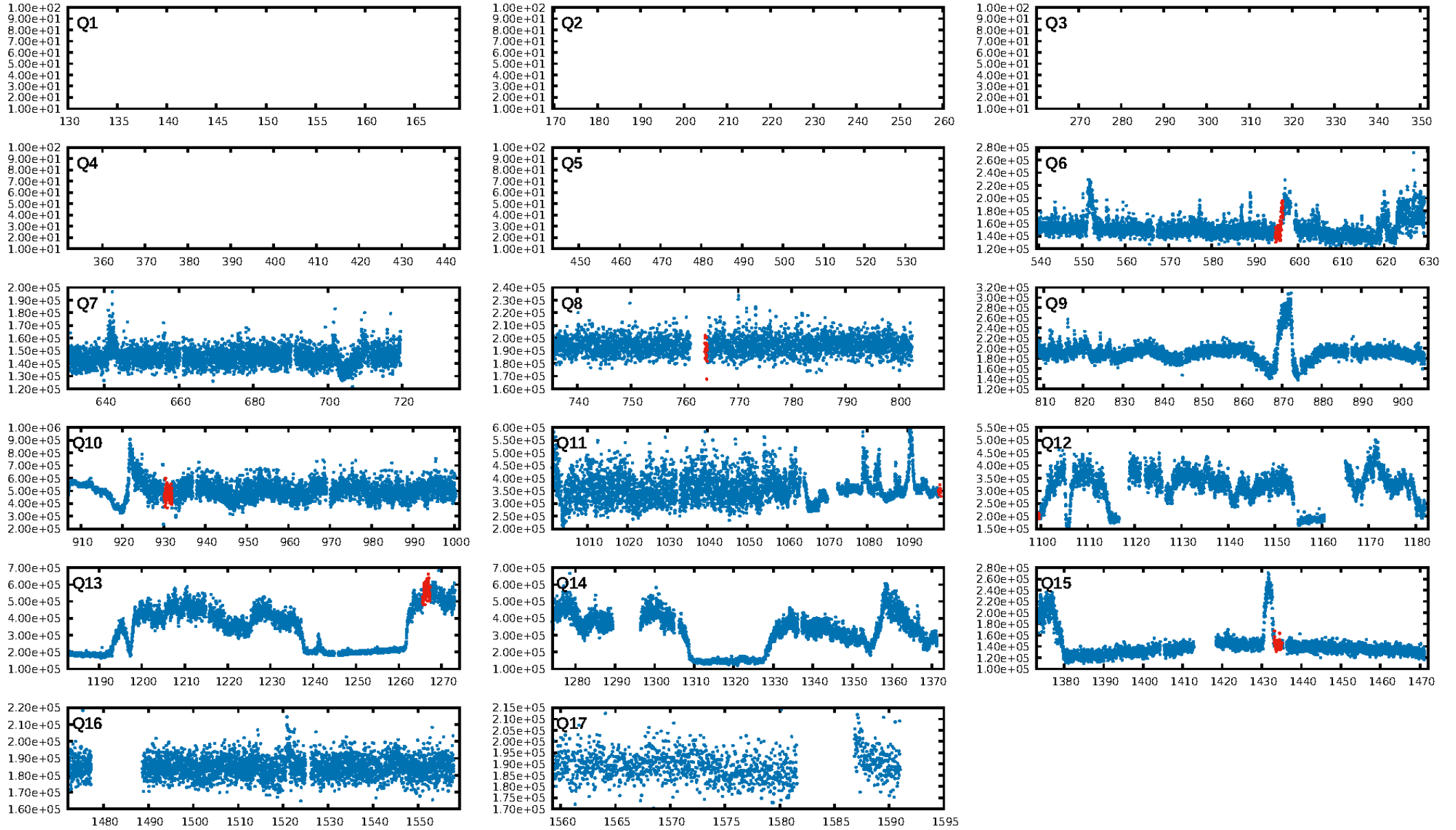
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [100.71σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.42e-19
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 2.76
Centroid-sig: 0.4%
Centroid-so: 5.461 arcsec [11.54σ]
OotOffset-rm: 13.316 arcsec [45.75σ]
KicOffset-rm: 0.303 arcsec [1.06σ]
OotOffset-st: 1/0/0/0 [1]
KicOffset-st: 1/0/0/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 0.00 [0/1]

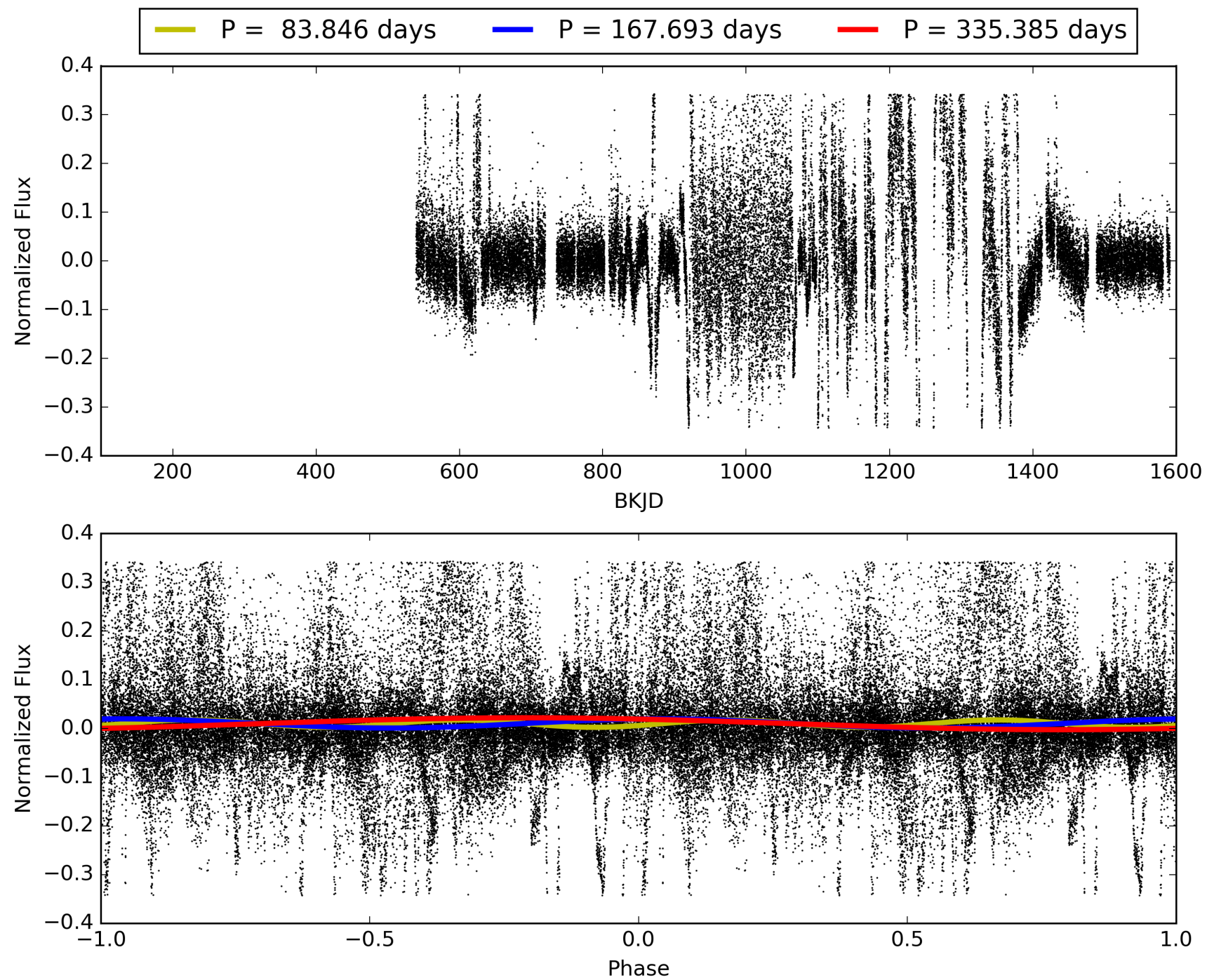
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:45:44 Z

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

TCE 009778689-03, PDC Light Curves

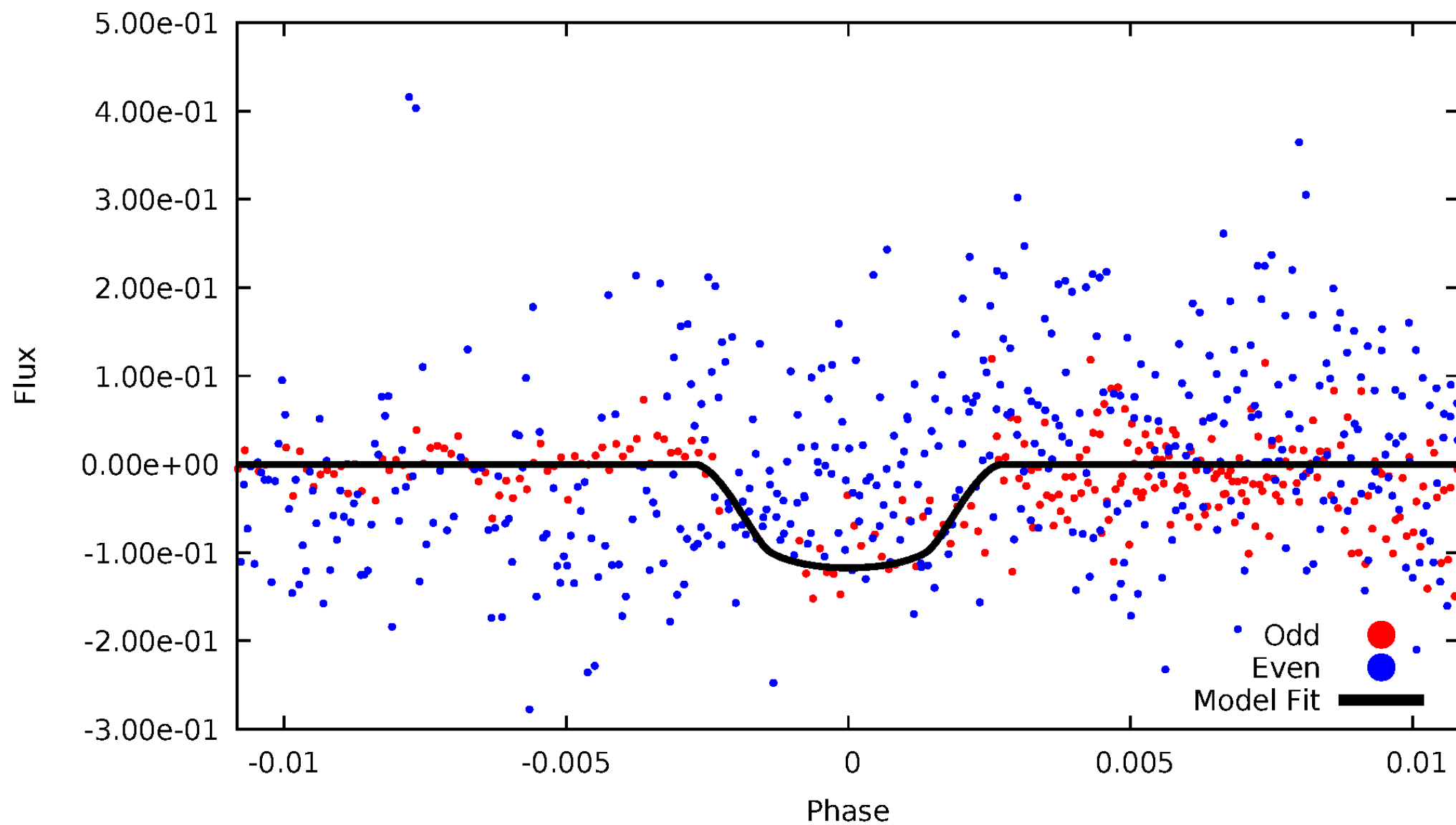


TCE 009778689-03



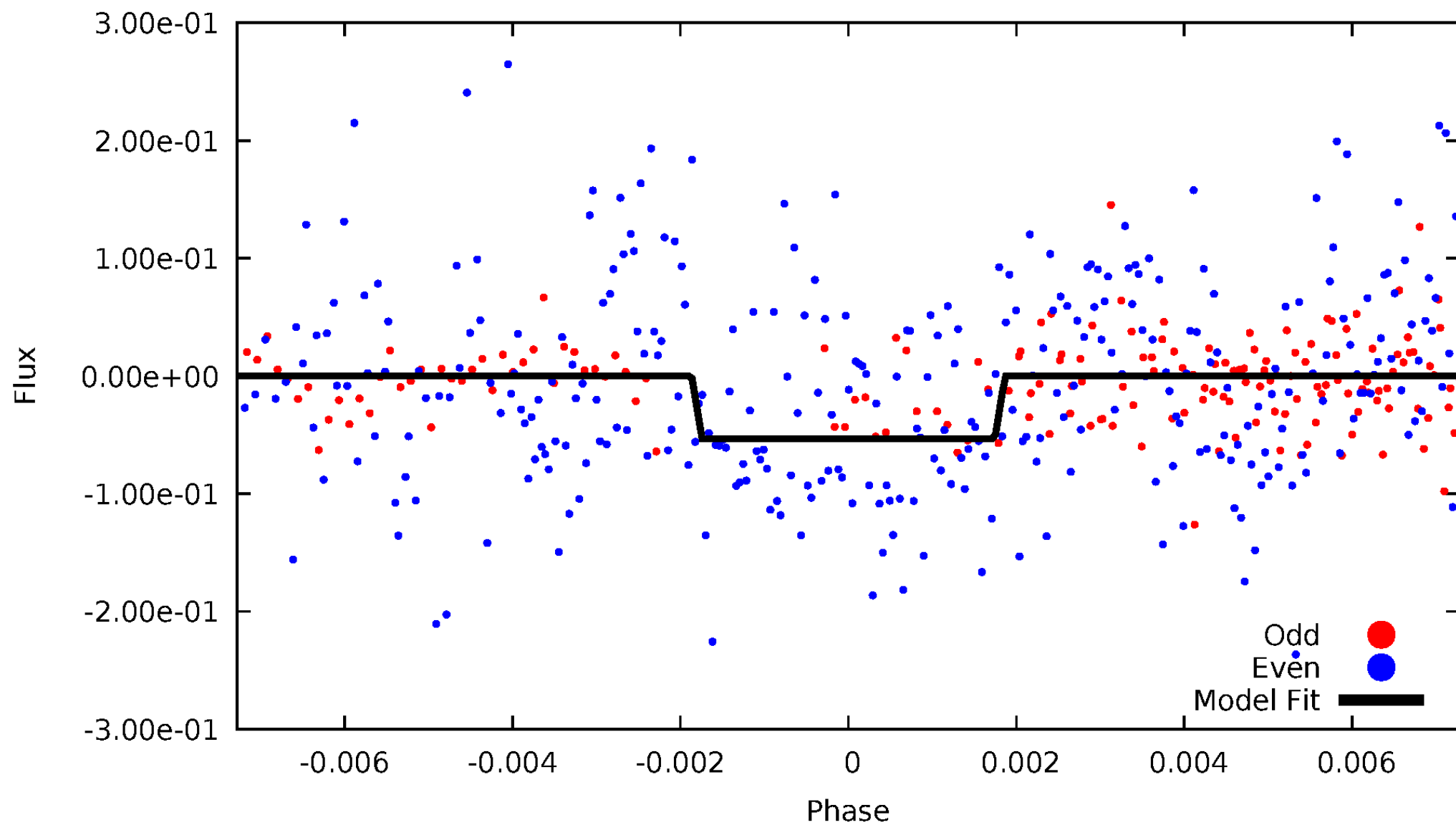
DV Odd/Even

TCE 009778689-03



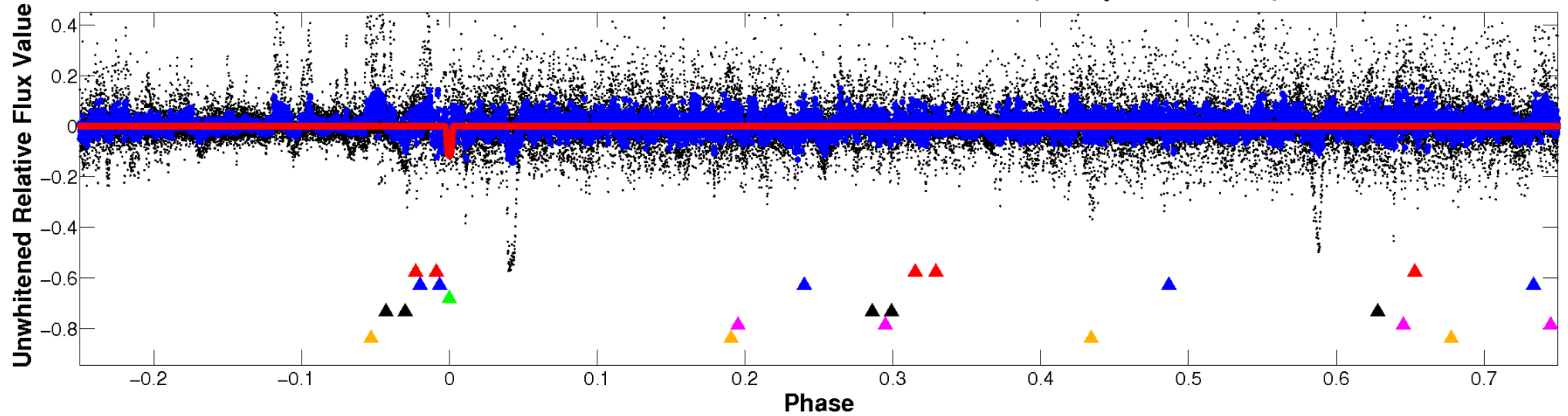
ALT Odd/Even

TCE 009778689-03

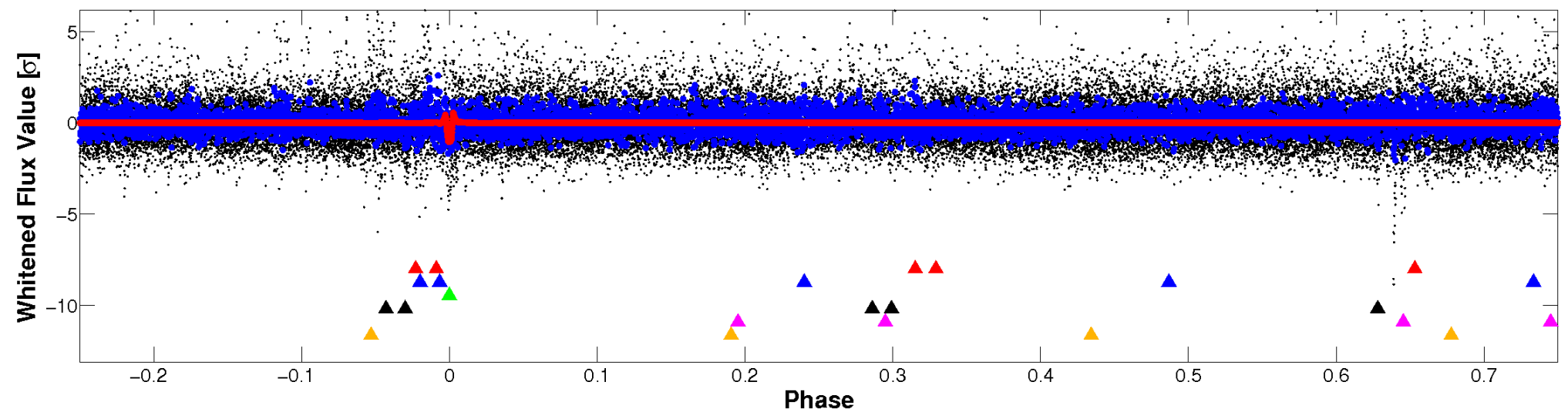


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



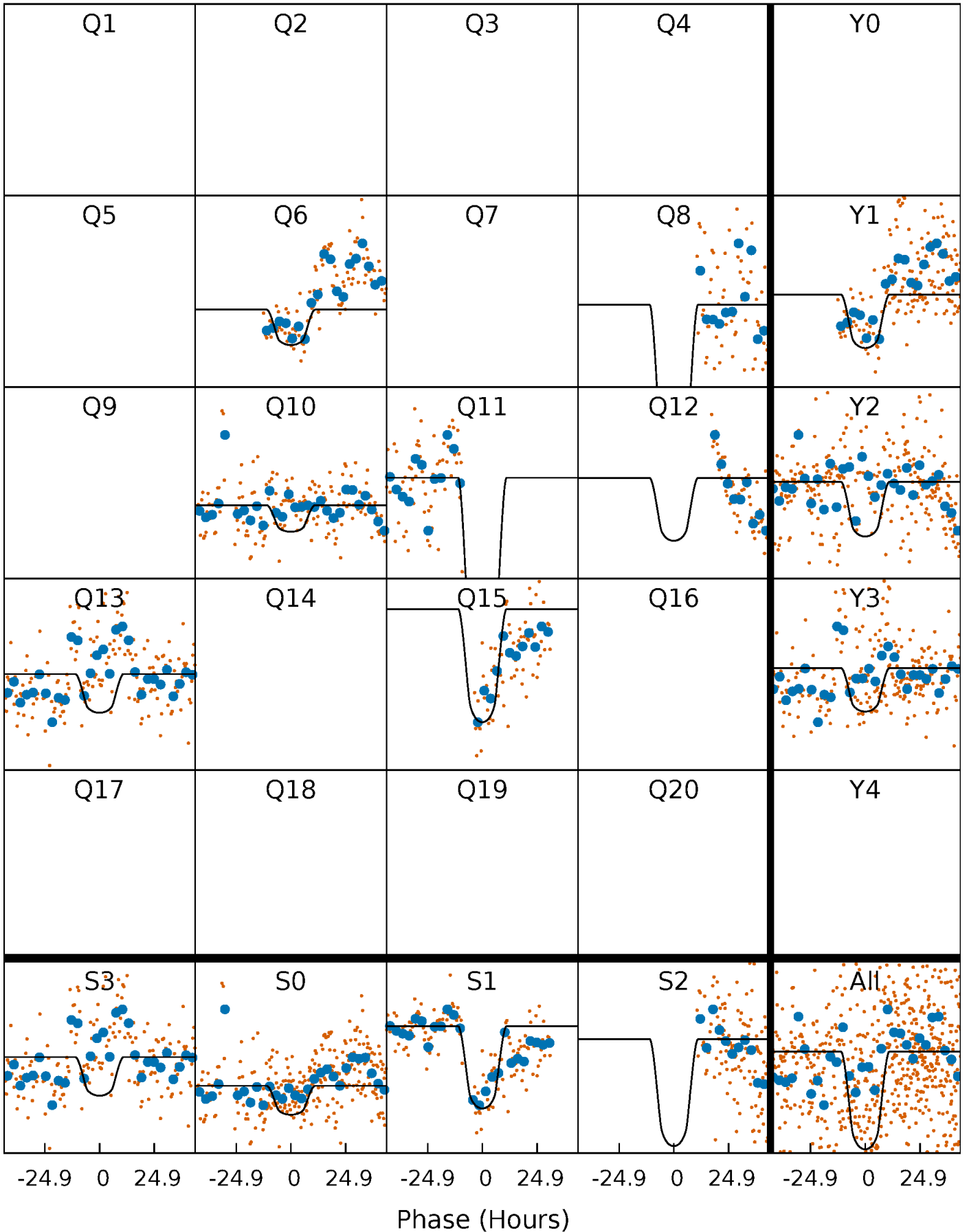
PDC Quarter-Phased Transit Curves

TCE 009778689-03 P=167.692670 Days $T_0=260.246293$ (BKJD)



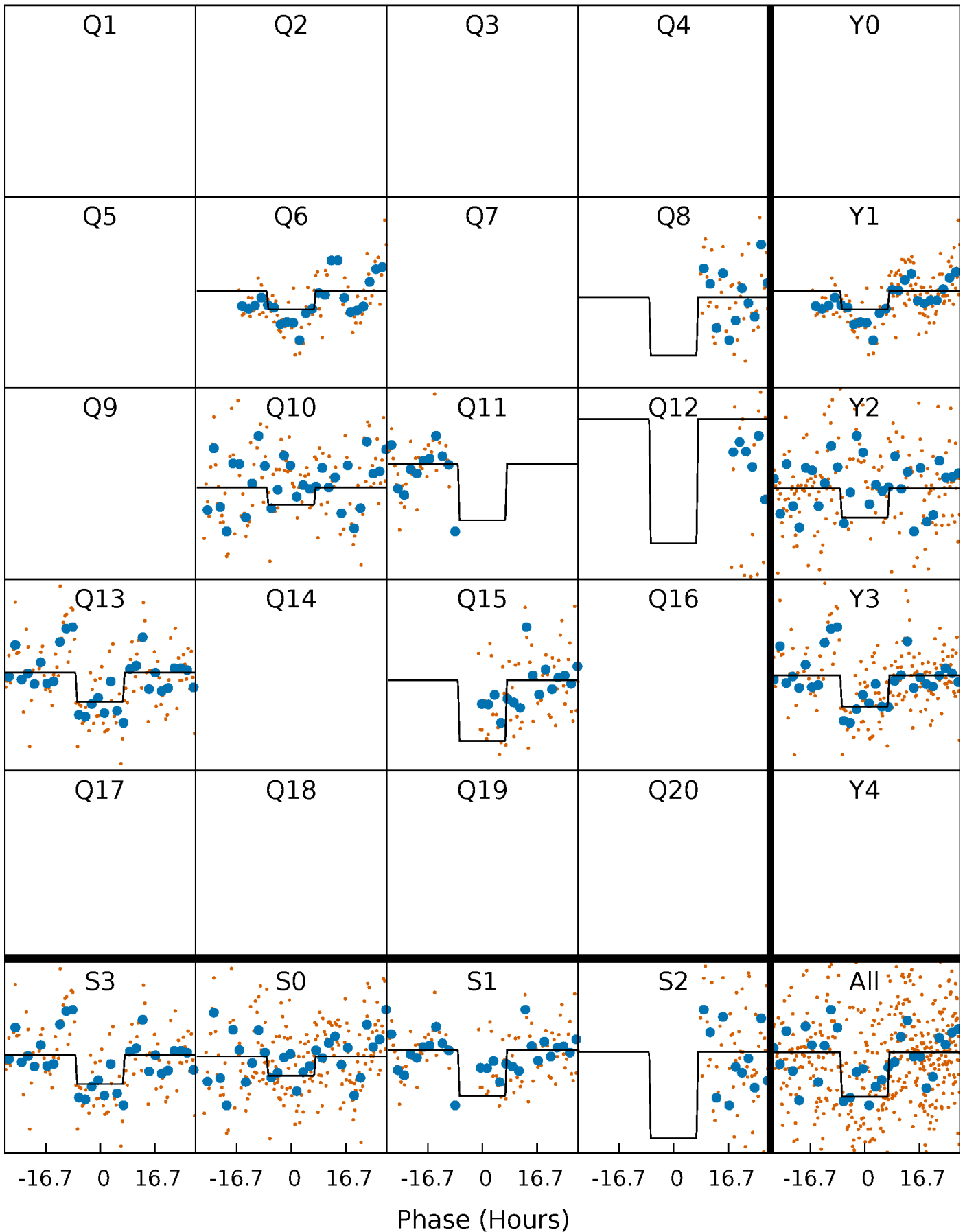
DV Quarter-Phased Transit Curves

TCE 009778689-03 $P=167.692670$ Days $T_0=260.246293$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

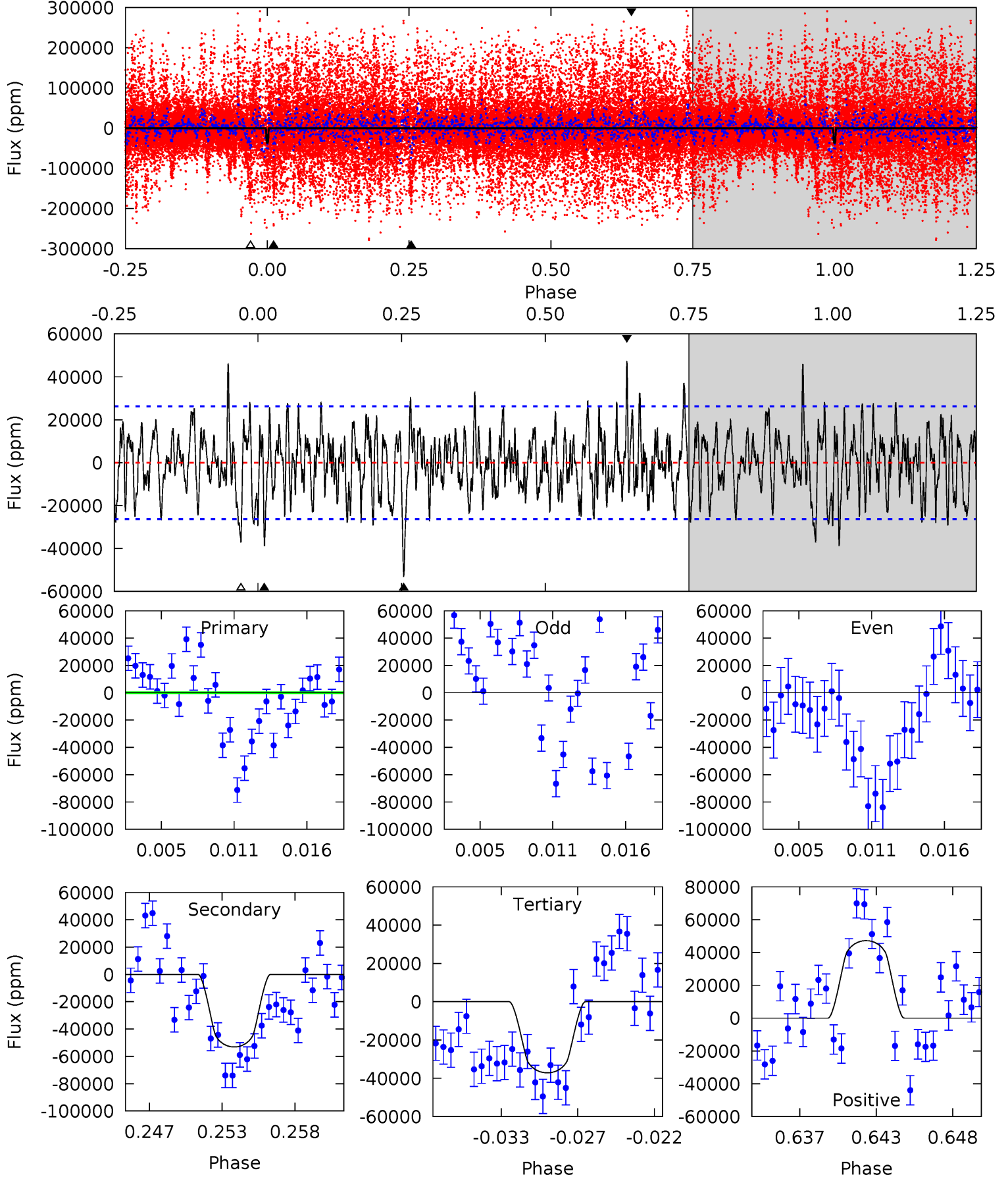
TCE 009778689-03 P=167.643737 Days $T_0=260.490690$ (BKJD)



DV Model-Shift Uniqueness Test

009778689-03, P = 167.692670 Days, E = 260.246293 Days

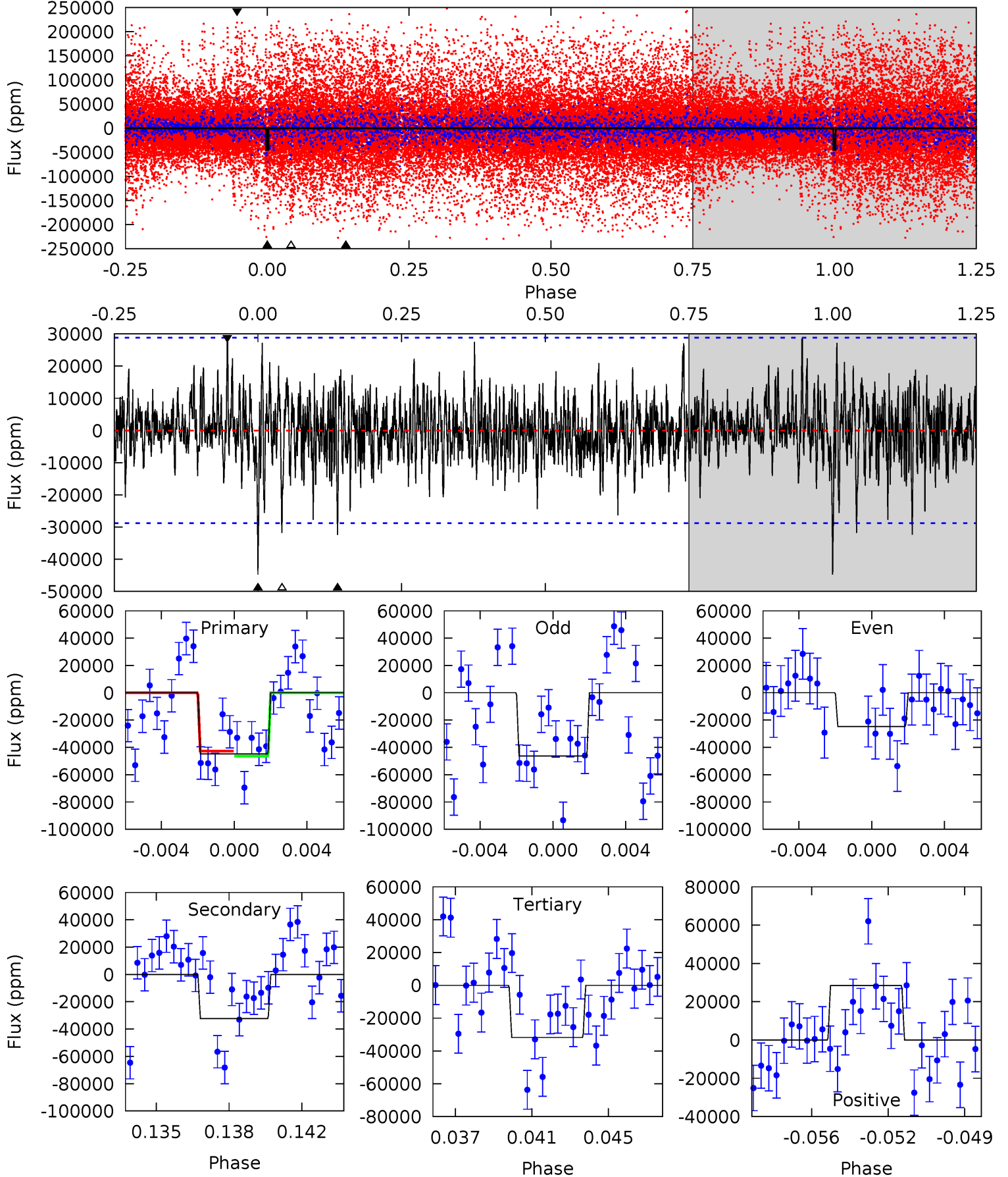
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.21	10.4	7.27	9.24	5.14	2.78	2.43	-0.06	-2.04	3.13	1.16	6.34	-10.2	0.47	1.03



Alt Model-Shift Uniqueness Test

009778689-03, P = 167.643737 Days, E = 260.490690 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.10	5.86	5.75	5.15	5.21	2.90	1.36	2.34	2.94	0.11	0.70	1.36	0.89	0.39	0.33



Stellar Parameters For KIC 009778689

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+1}_{-1}	$4.438^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$
	+0%/-0%	+23%/-23%	+inf%/-inf%	+100%/-100%	+100%/-100%	+100%/-100%
Source	Solar	Solar	Solar	Solar		

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

Secondary Eclipse Parameters for KIC 009778689-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-53129±5110	$33.84^{+4.02}_{-3.33}$	461^{+21}_{-21}	5077^{+327}_{-254}	9394^{+2704}_{-1967}
Alt.	-32380±5527	$25.48^{+3.41}_{-3.64}$	463^{+20}_{-21}	5191^{+425}_{-358}	10155^{+3876}_{-2809}

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 $A_{obs} \gg 1.0$

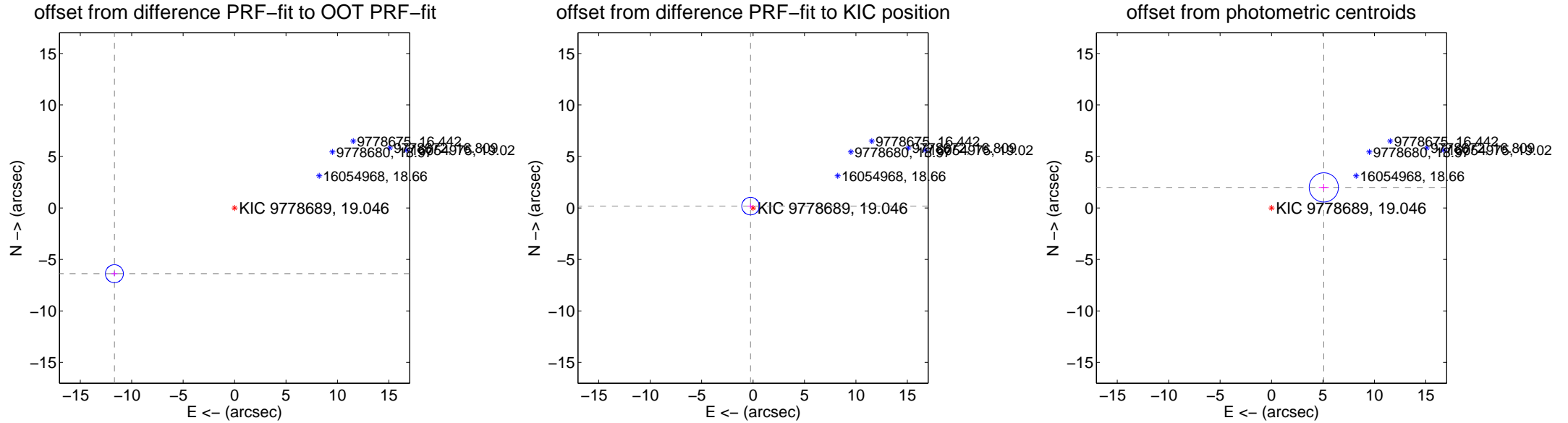
DV Centroid Data

Supplemental centroid analysis for 009778689-03. Kepler magnitude: 19.05. Transit SNR 10.55

There are 1 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 13.19 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	13.316 \pm 0.291	45.75	11.684 \pm 0.303	-6.387 \pm 0.246
PRF-fit source offset from KIC position	0.303 \pm 0.285	1.06	0.245 \pm 0.303	0.179 \pm 0.246
photometric centroid source offset	5.46 \pm 0.47	11.54	-5.08 \pm 0.49	1.99 \pm 0.34

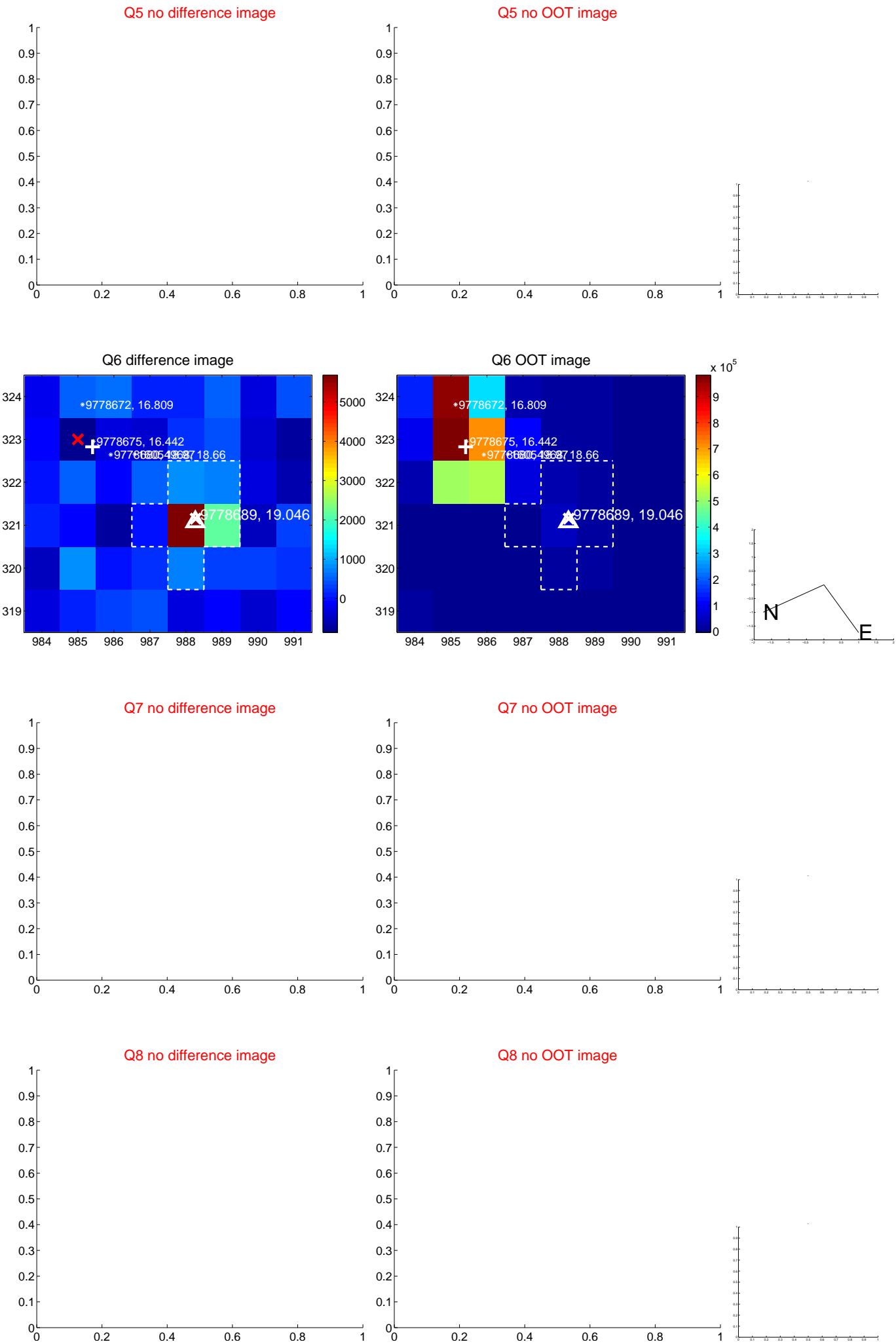


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

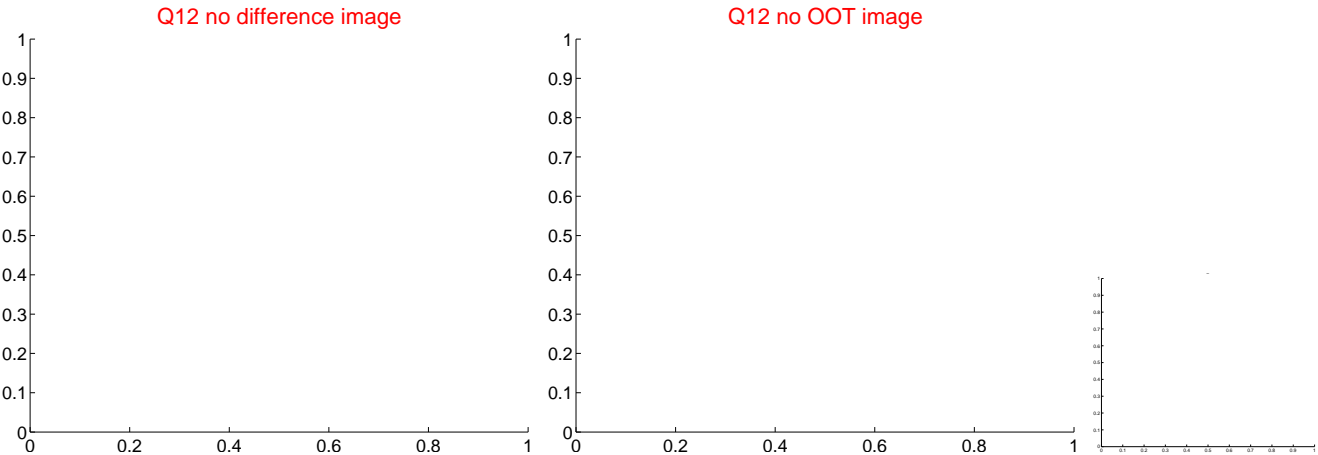
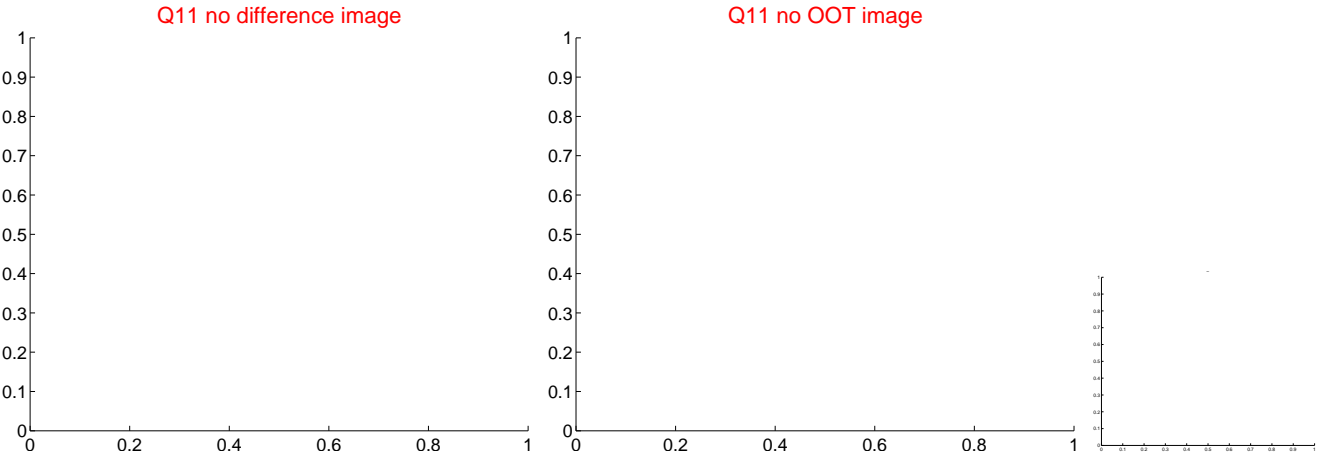
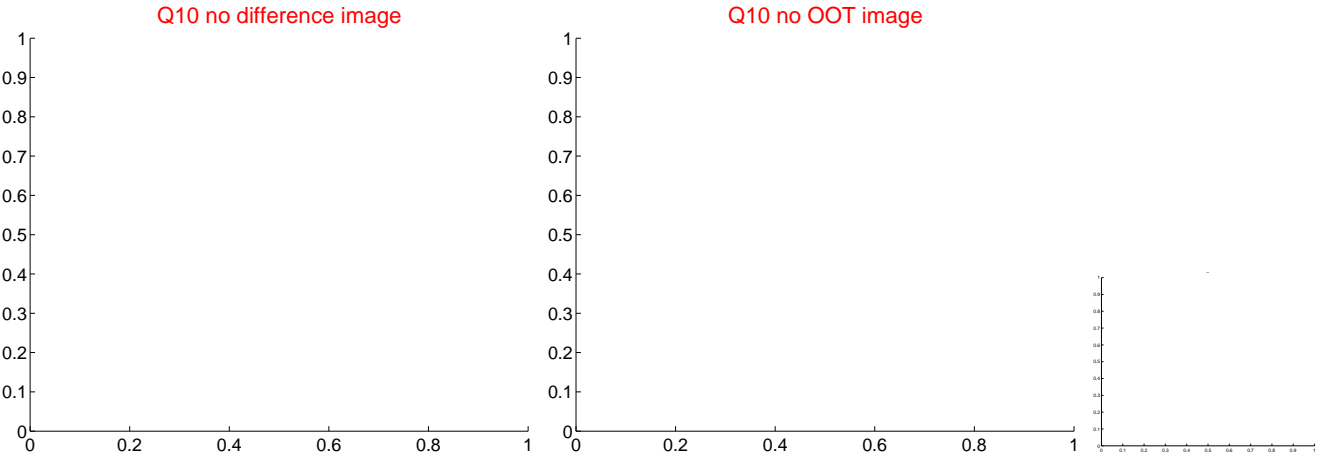
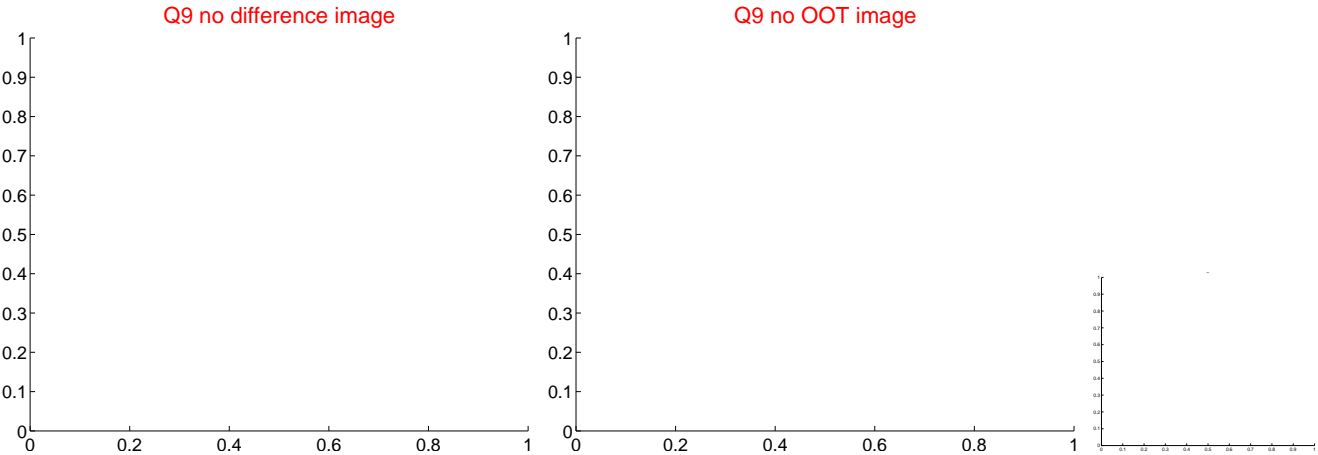
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



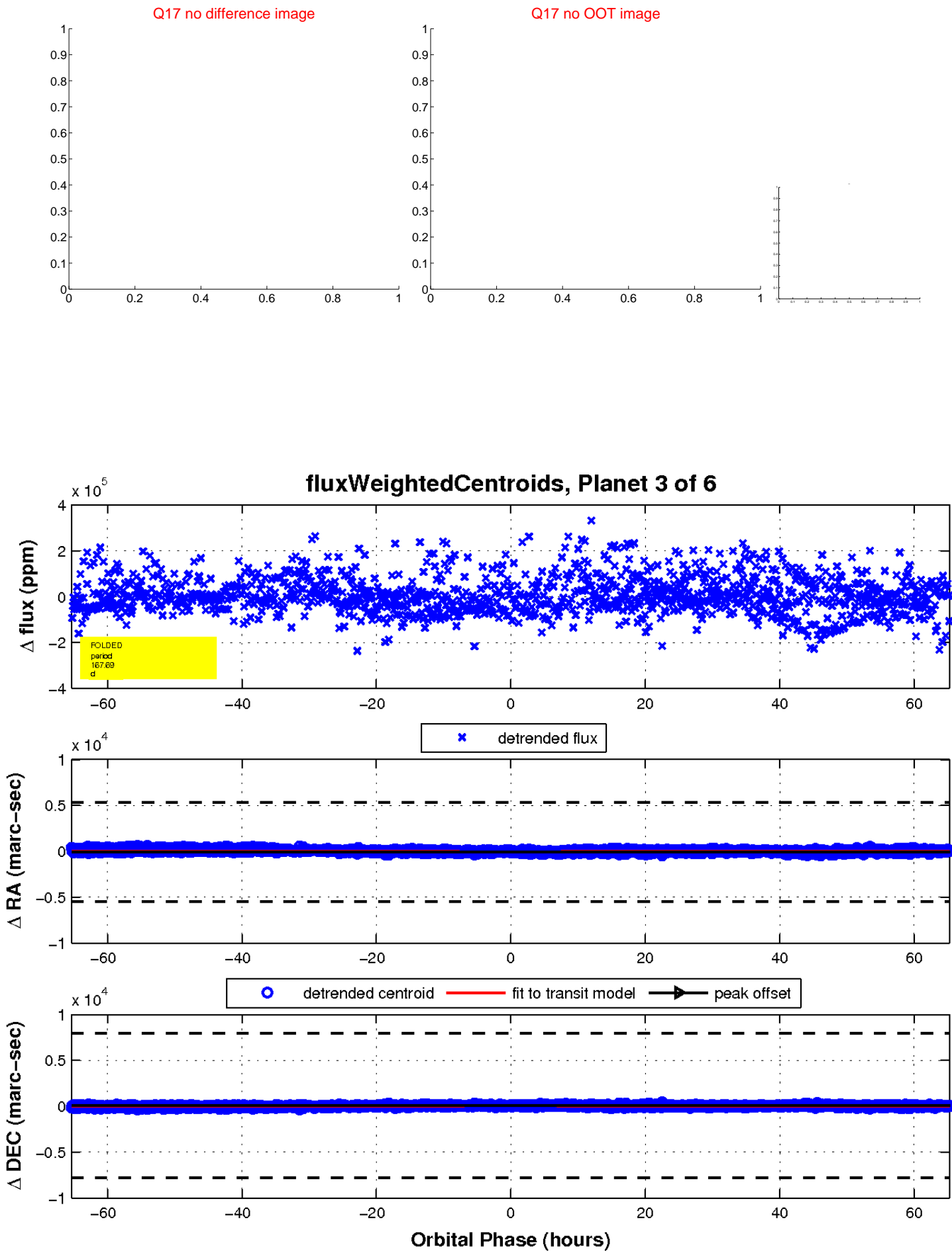
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

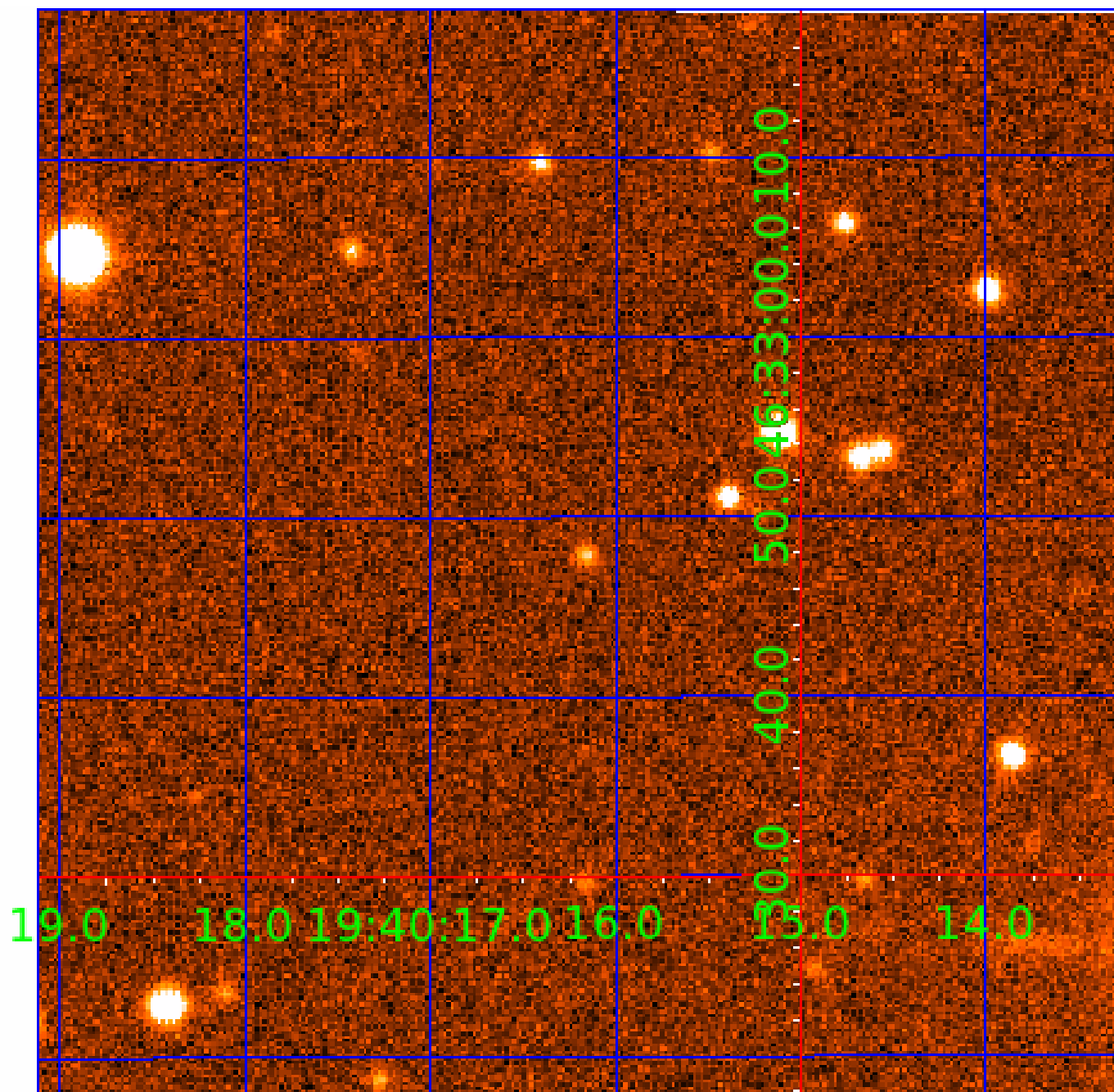


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009778689

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})
009778689-01	OBS	No	278.706947	315.447090	103449.5	15.000	20.9	-1.0	1.00	5780	32.01	1.43
009778689-02	OBS	No	294.018495	256.925374	97676.3	15.000	18.7	-1.0	1.00	5780	31.09	1.33
009778689-03	OBS	No	167.692670	260.246293	117308.6	21.794	16.0	10.5	1.00	5780	34.06	2.82
009778689-04	OBS	No	280.214307	308.228824	102111.5	21.804	9.9	9.2	1.00	5780	47.74	1.42

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009778689-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009778689-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009778689-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

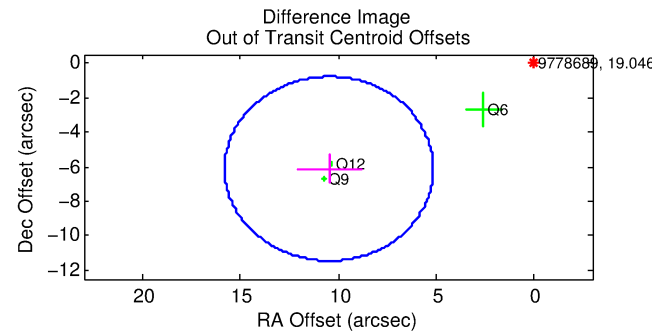
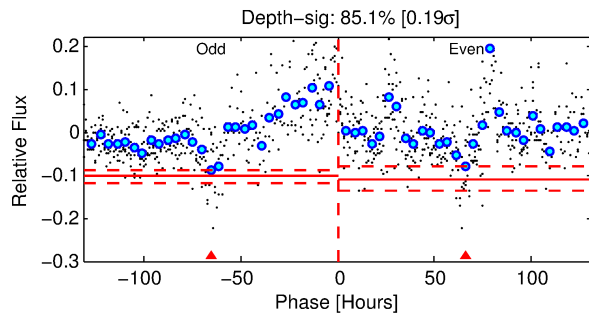
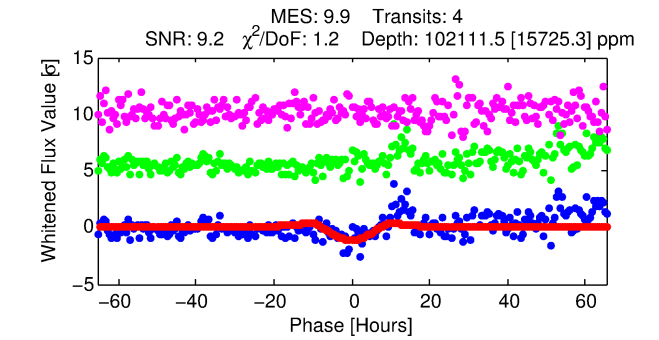
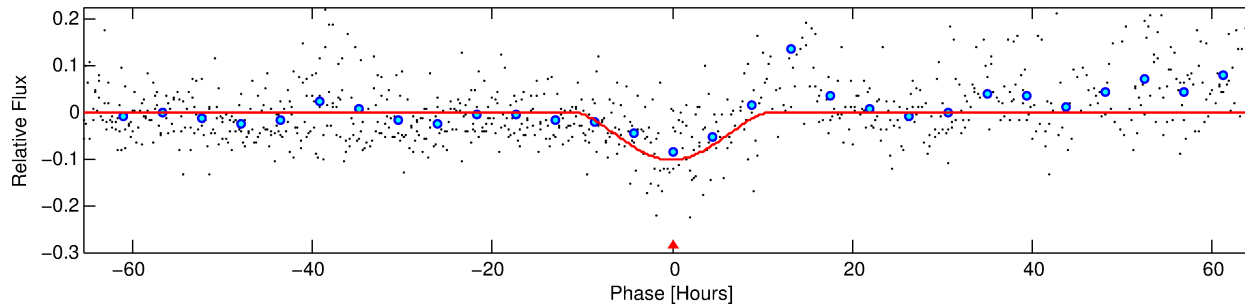
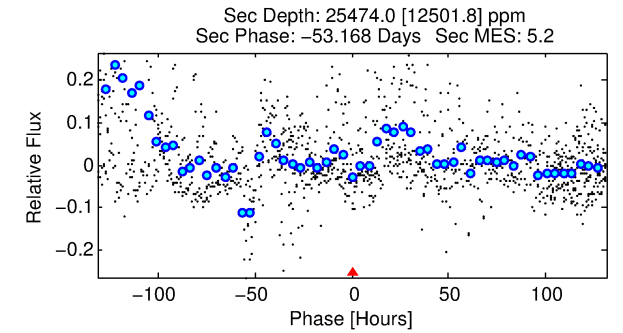
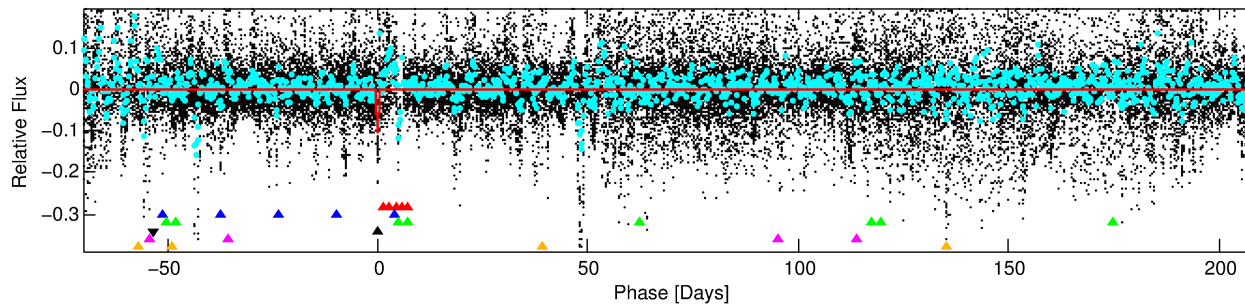
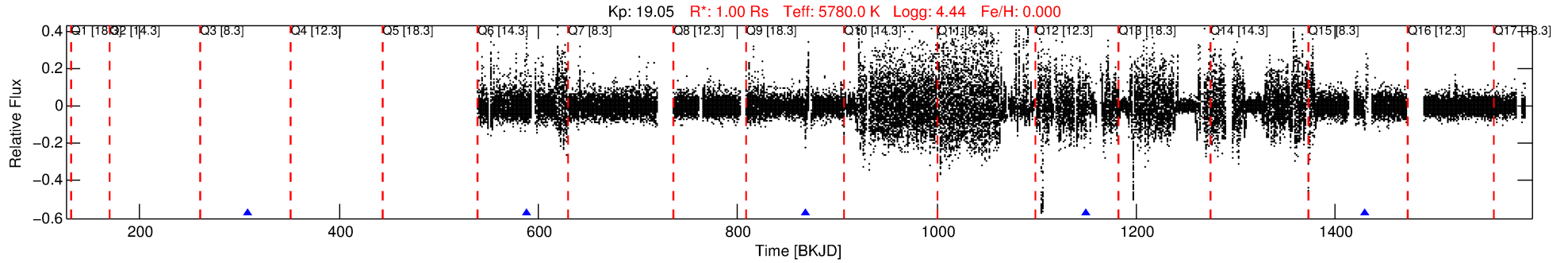
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009778689-04

No Significant Match Found

DV One-Page Summary

KIC: 9778689 Candidate: 4 of 6 Period: 280.214 d



DV Fit Results:

Period = 280.21431 [0.02409] d
Epoch = 308.2288 [0.0660] BKJD
Rp/R* = 0.4375 [4.8241]
a/R* = 108.66 [45.51]
b = 0.92 [6.91]
Seff = 1.42 [0.00]
Teq = 279 [0] K
Rp = 47.74 [526.42] Re
a = 0.8382 [0.0000] AU
Ag = 4320.55 [95309.75] [0.05σ]
Teffp = 3491 [19254] K [0.17σ]

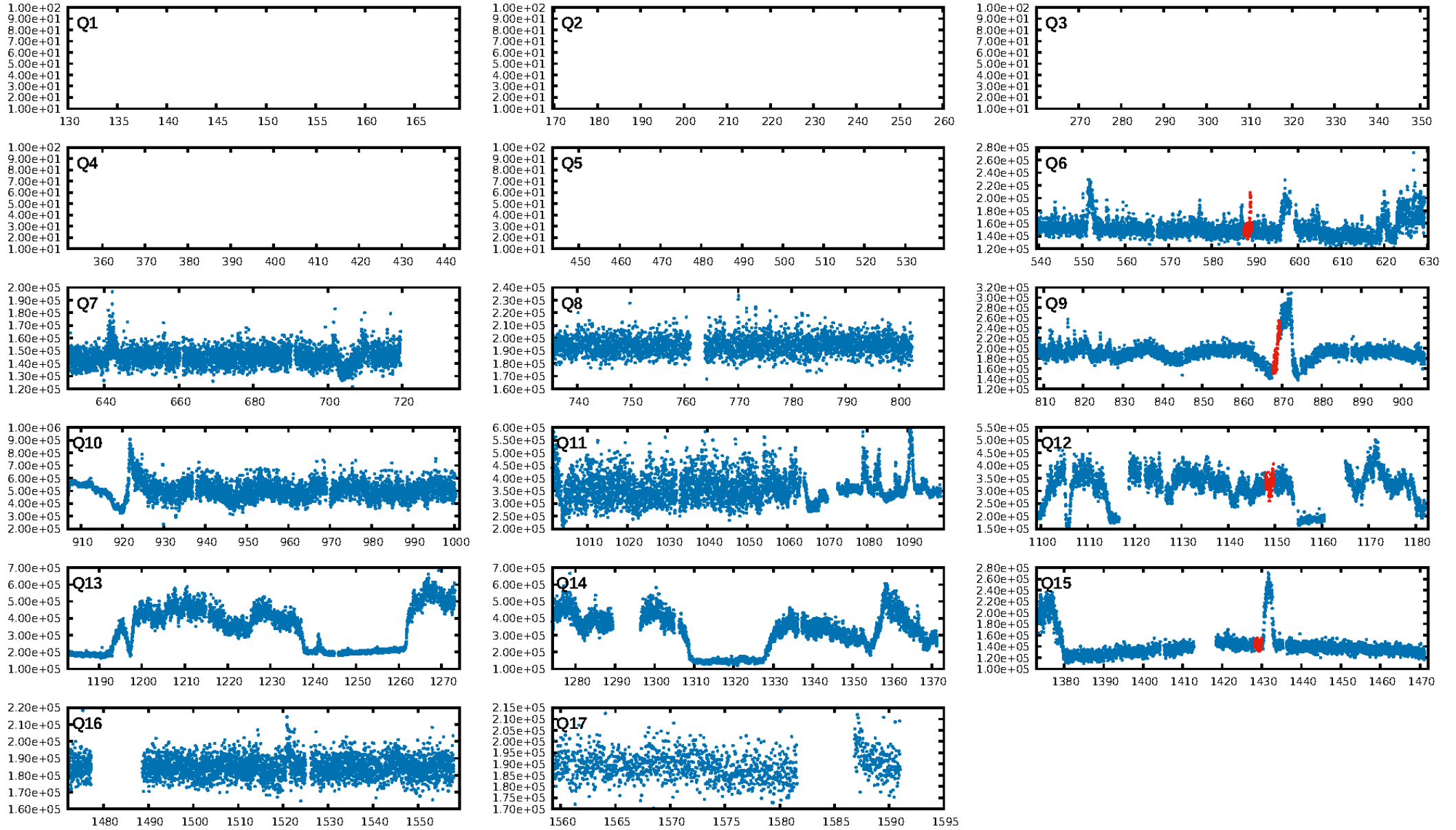
DV Diagnostic Results:

ShortPeriod-sig: 82.8% [1.37σ]
LongPeriod-sig: 100.0% [12.52σ]
ModelChiSquare2-sig: 81.7%
ModelChiSquareGof-sig: 99.2%
Bootstrap-pfa: 3.98e-09
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 1.537
Centroid-sig: 20.4%
Centroid-so: 5.639 arcsec [11.67σ]
OotOffset-rm: 12.127 arcsec [6.82σ]
KicOffset-rm: 0.243 arcsec [0.16σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-st: 1/1/1/1 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 0.75 [3/4]

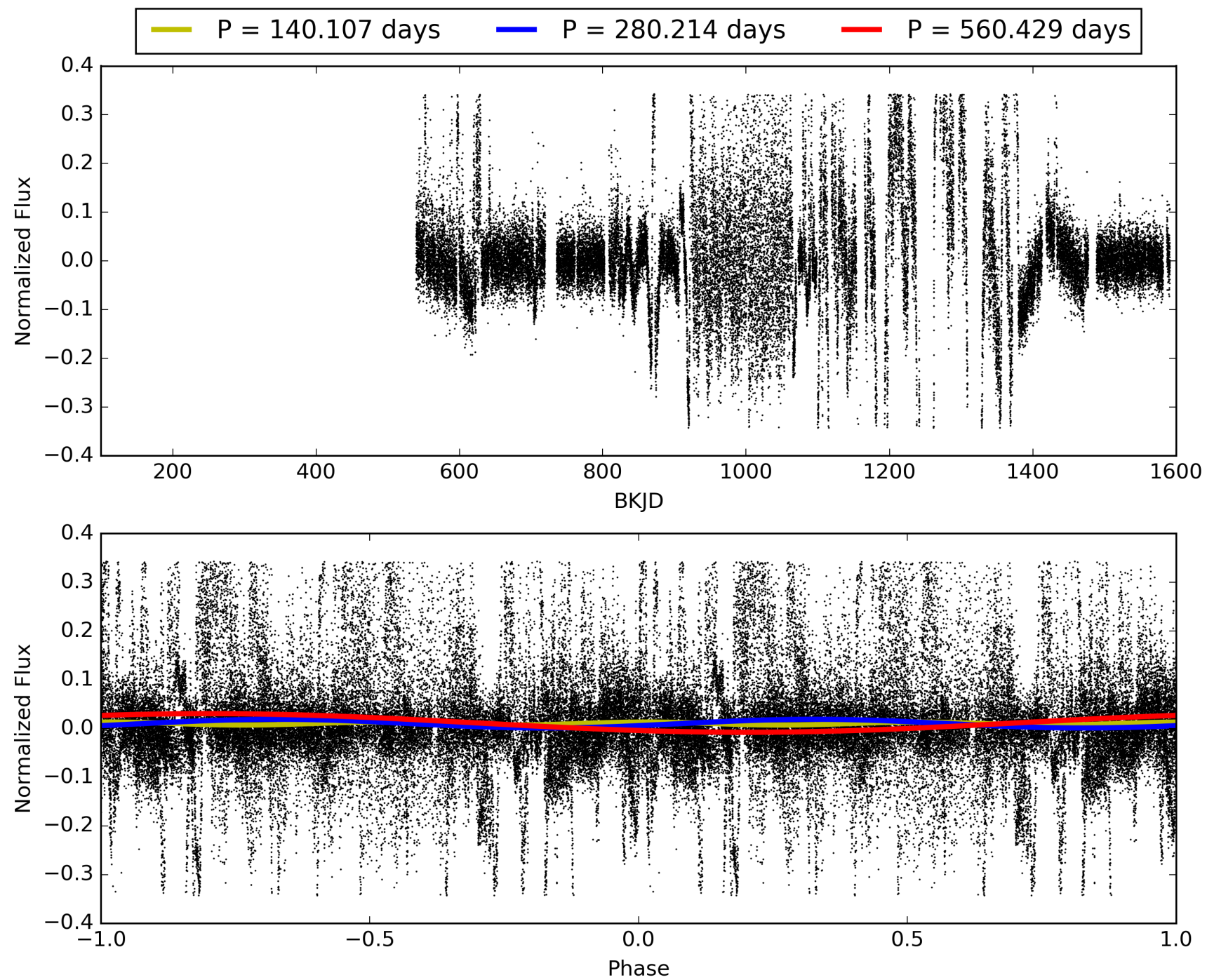
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:45:50 Z

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

TCE 009778689-04, PDC Light Curves

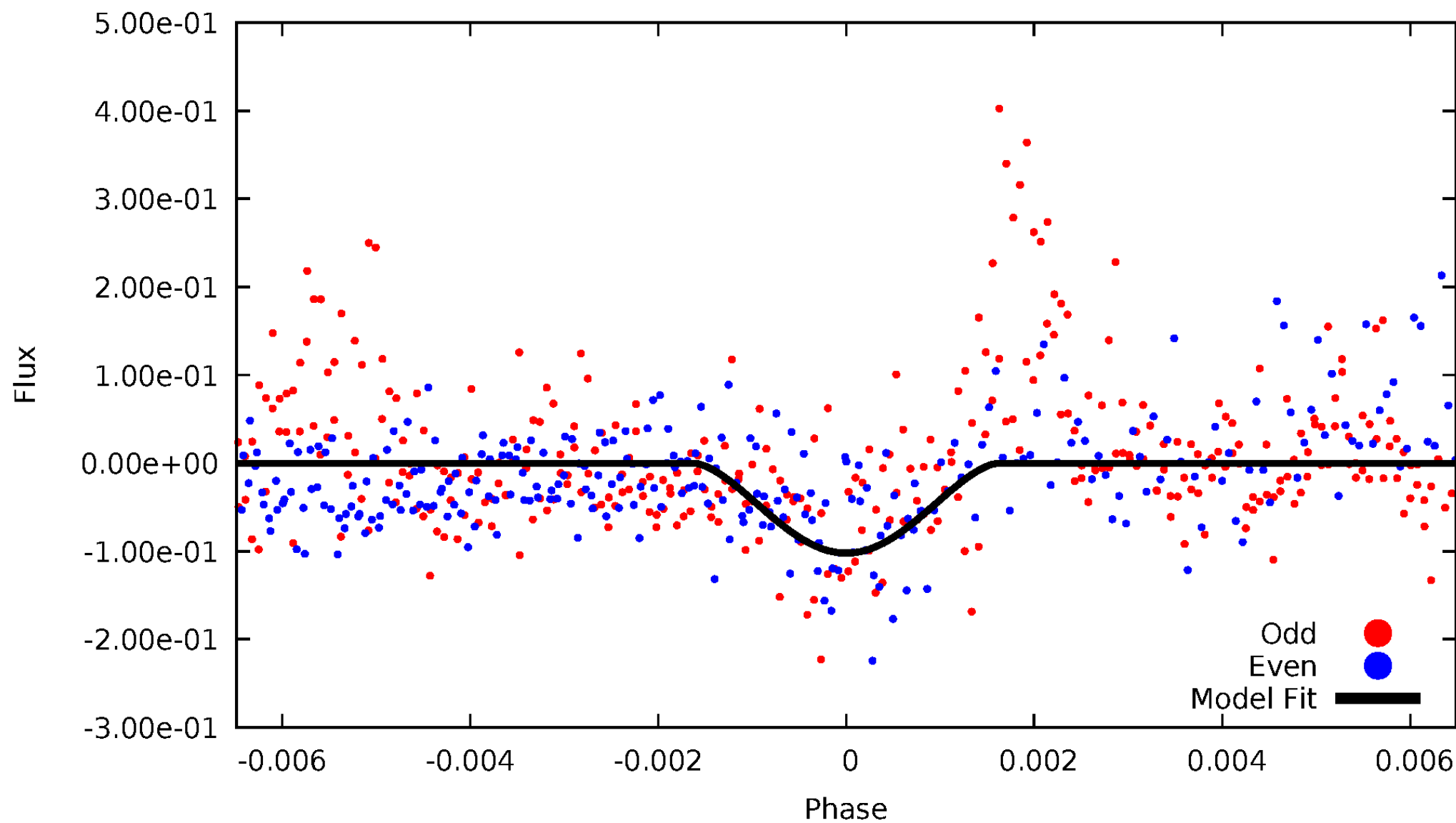


TCE 009778689-04



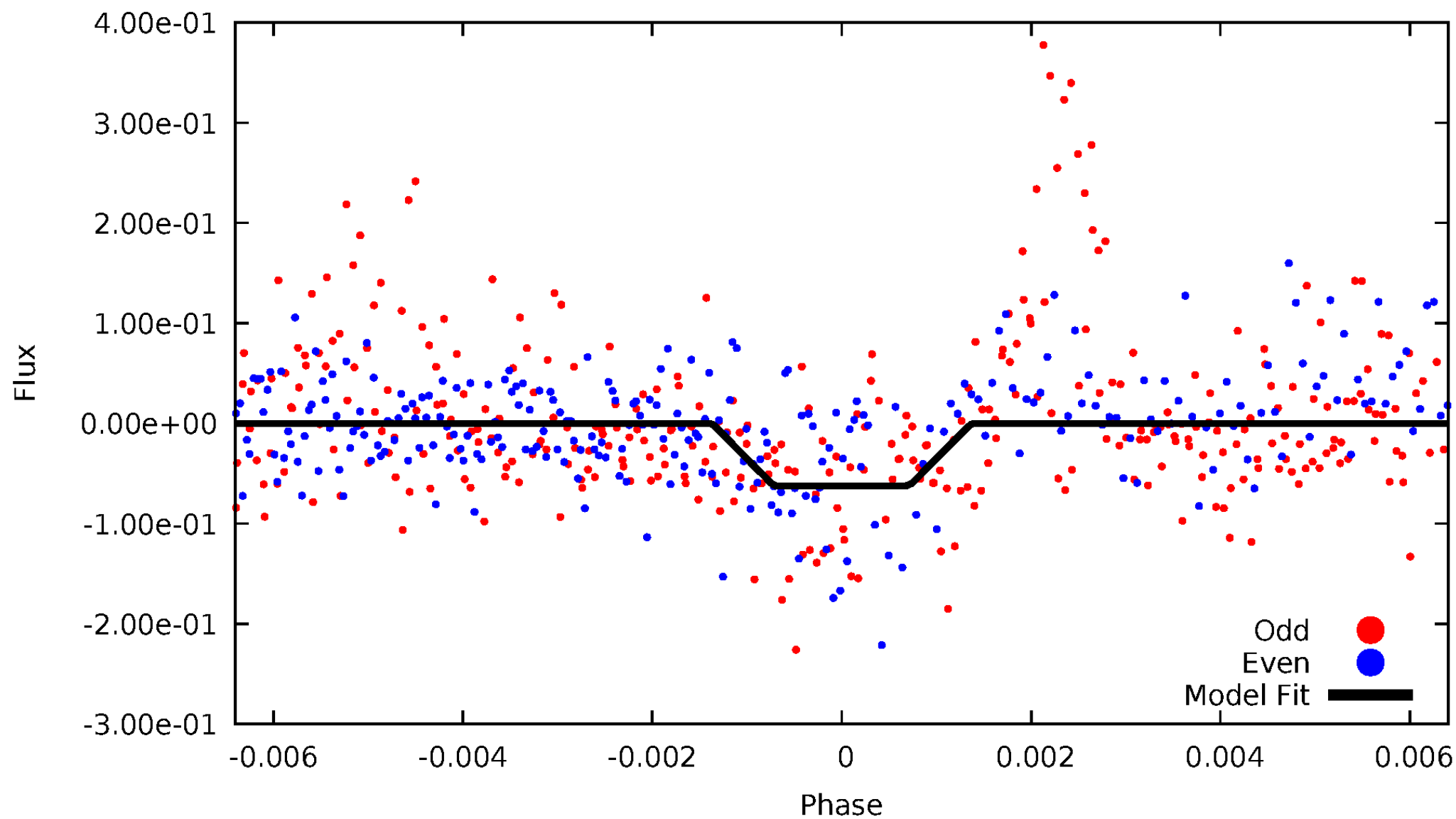
DV Odd/Even

TCE 009778689-04



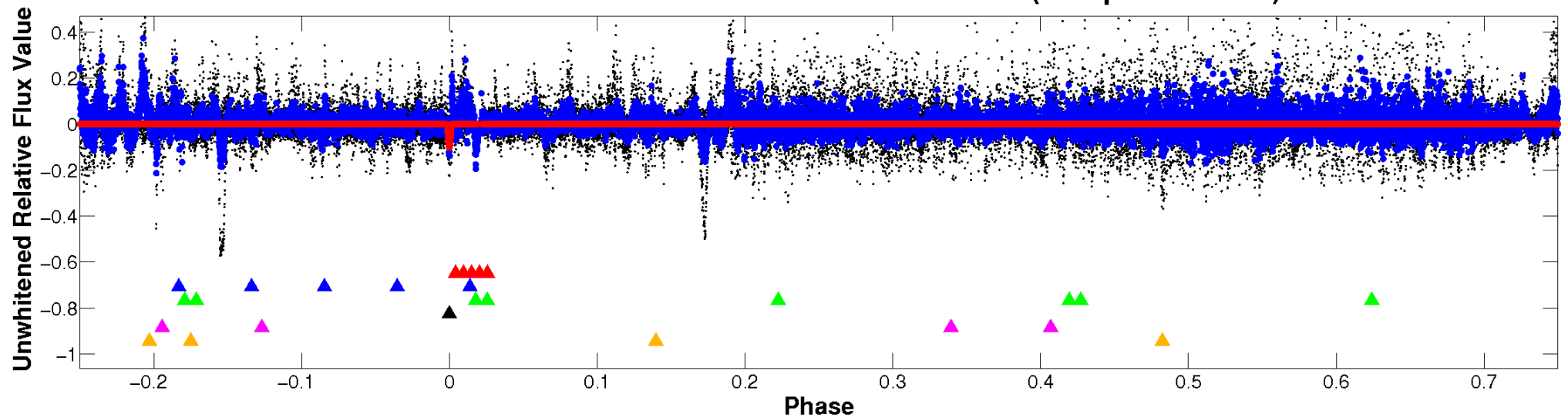
ALT Odd/Even

TCE 009778689-04

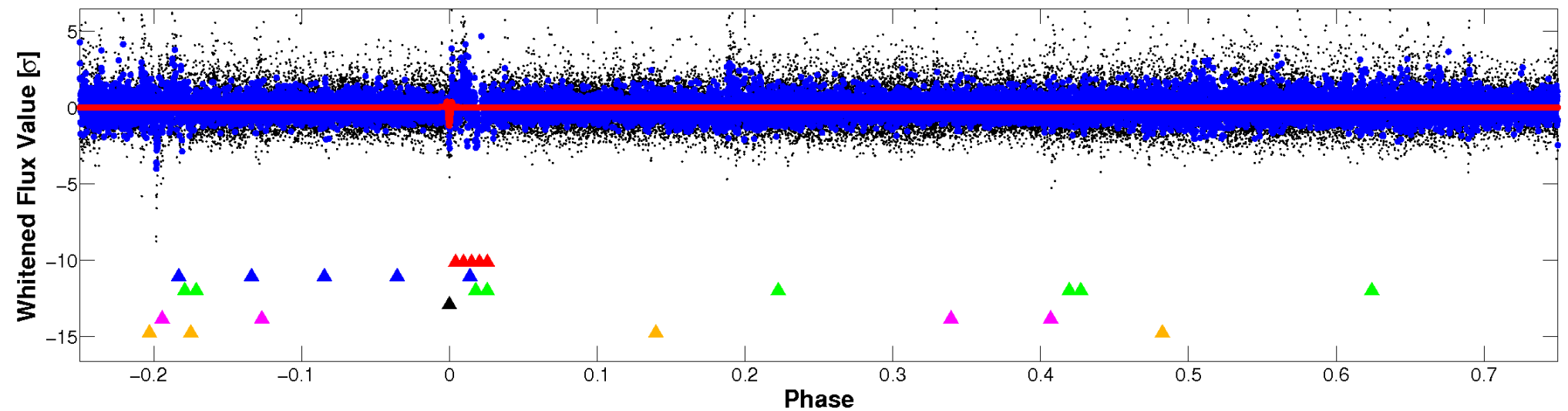


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

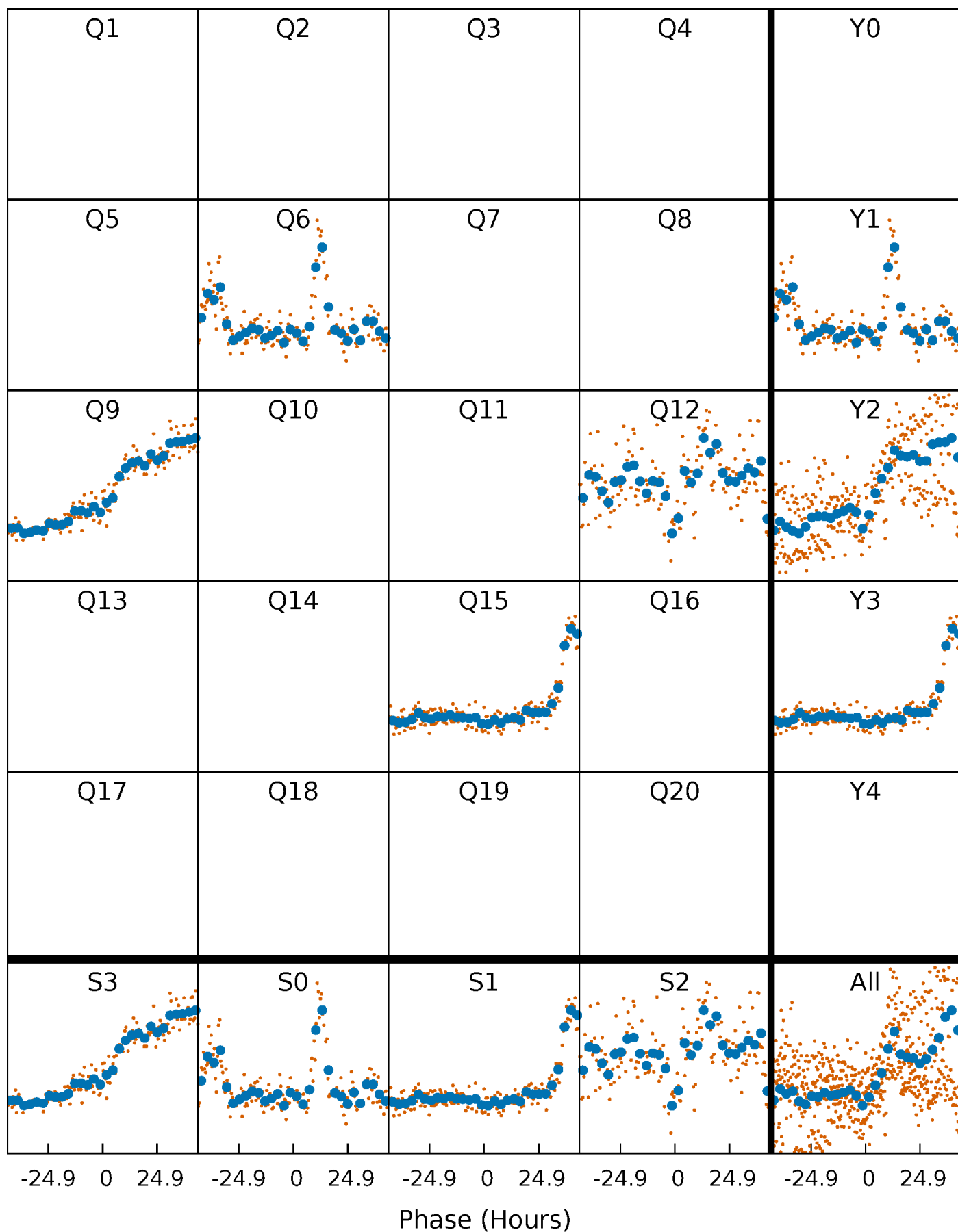


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



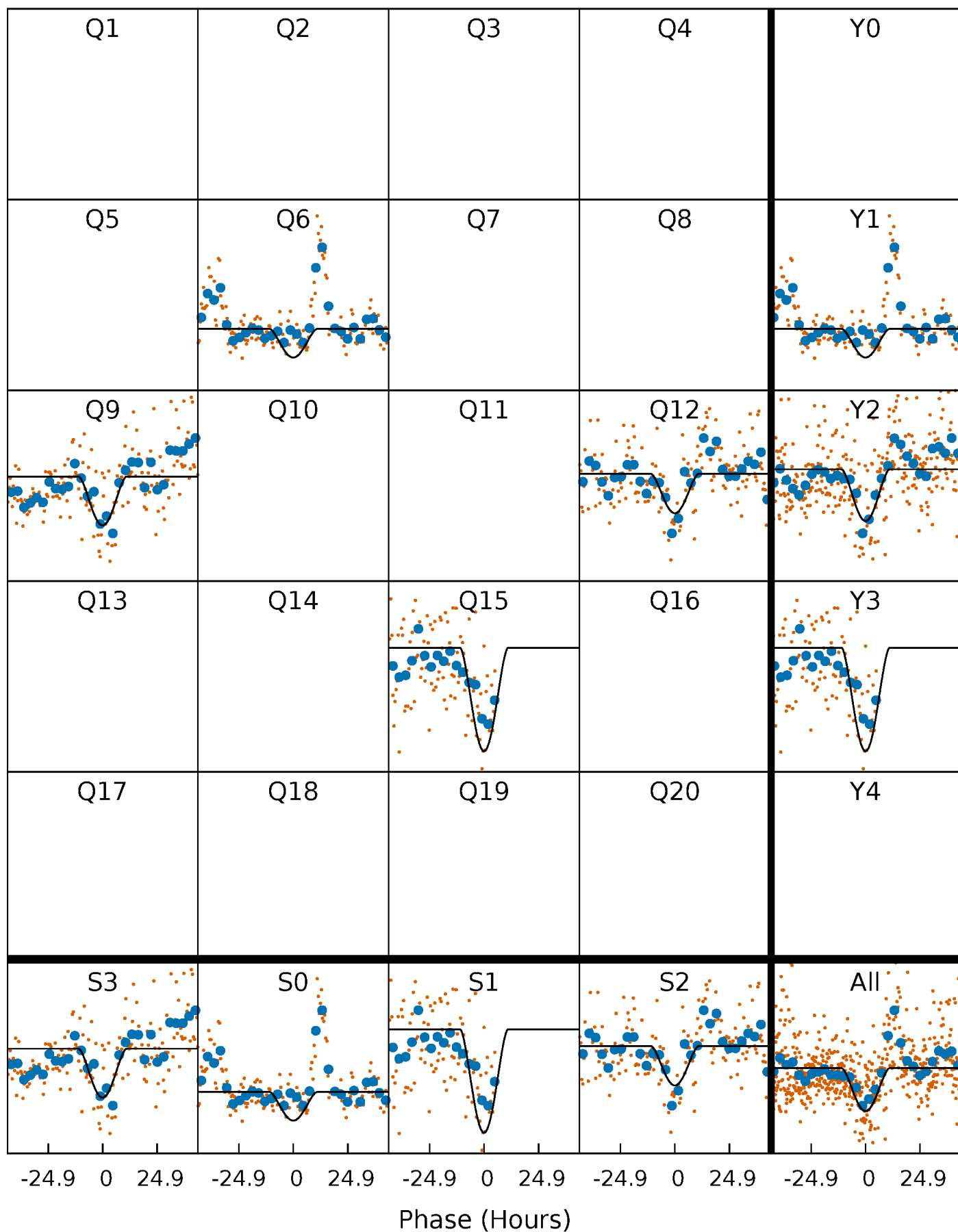
PDC Quarter-Phased Transit Curves

TCE 009778689-04 $P=280.214307$ Days $T_0=308.228824$ (BKJD)



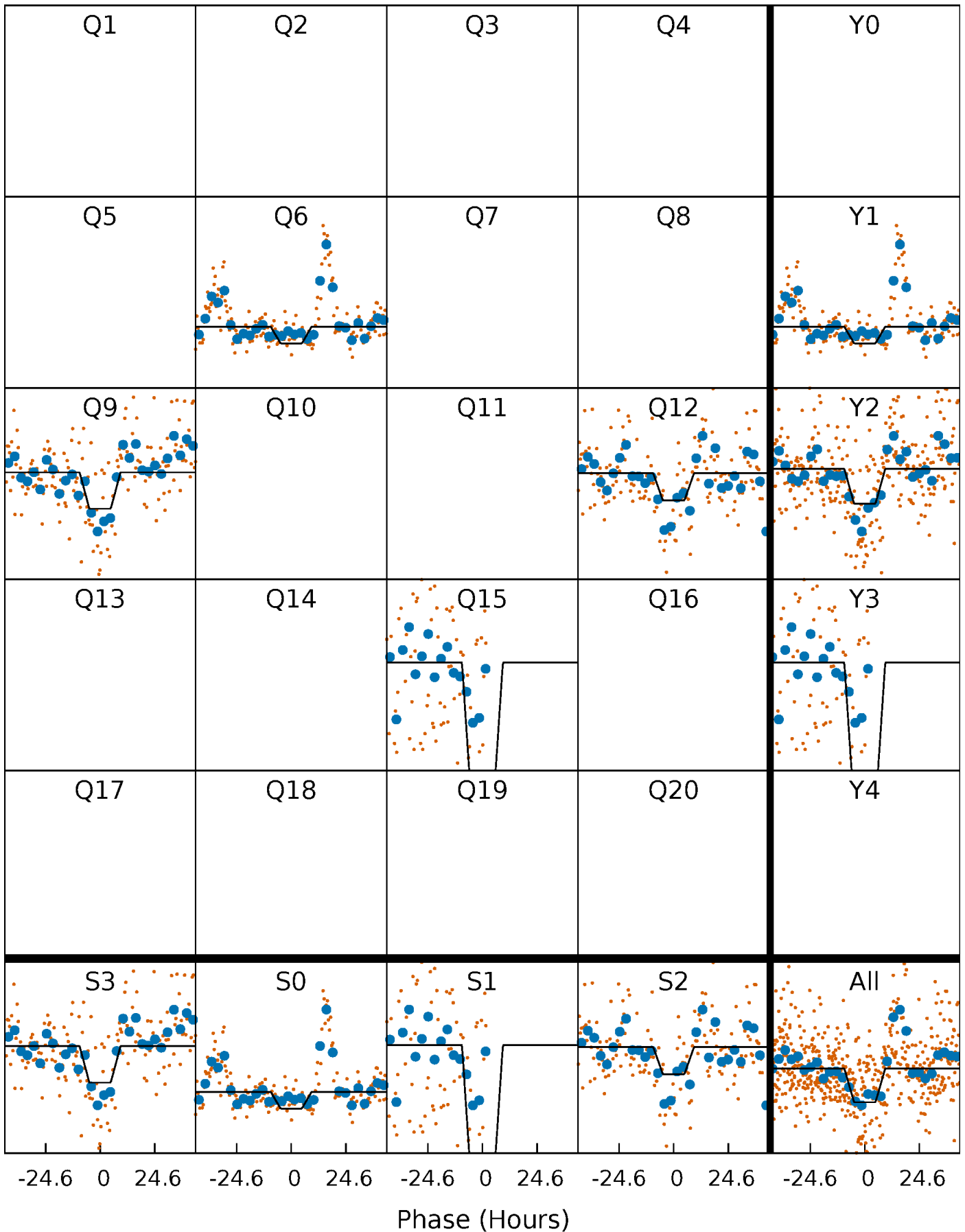
DV Quarter-Phased Transit Curves

TCE 009778689-04 P=280.214307 Days $T_0=308.228824$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

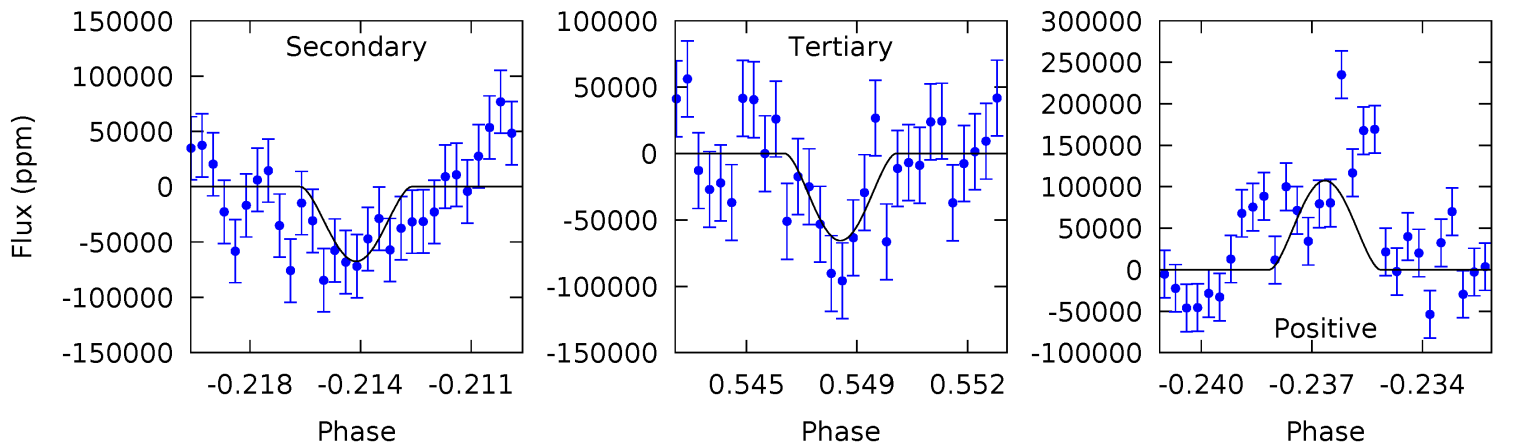
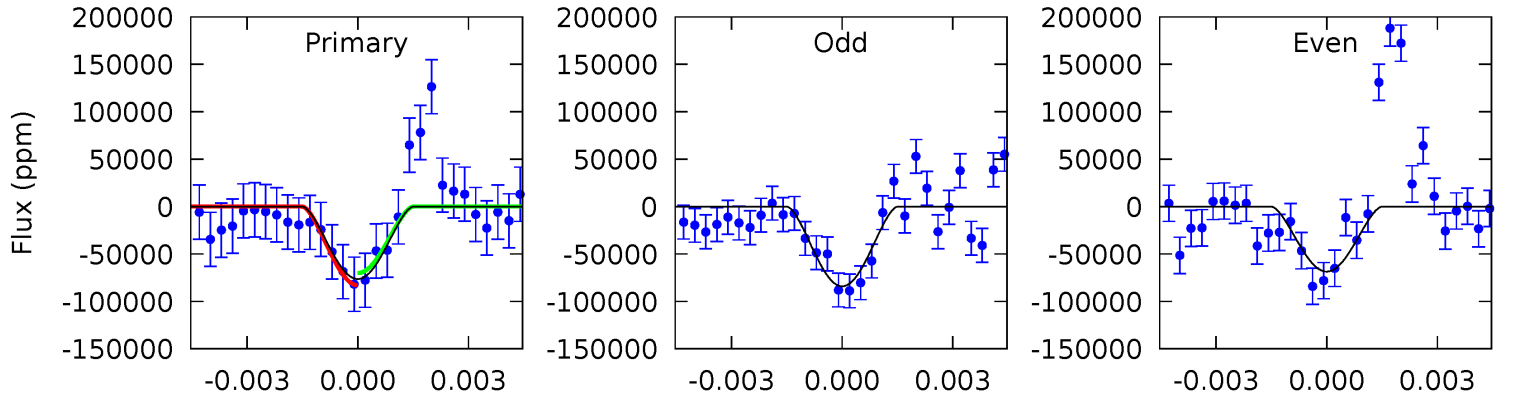
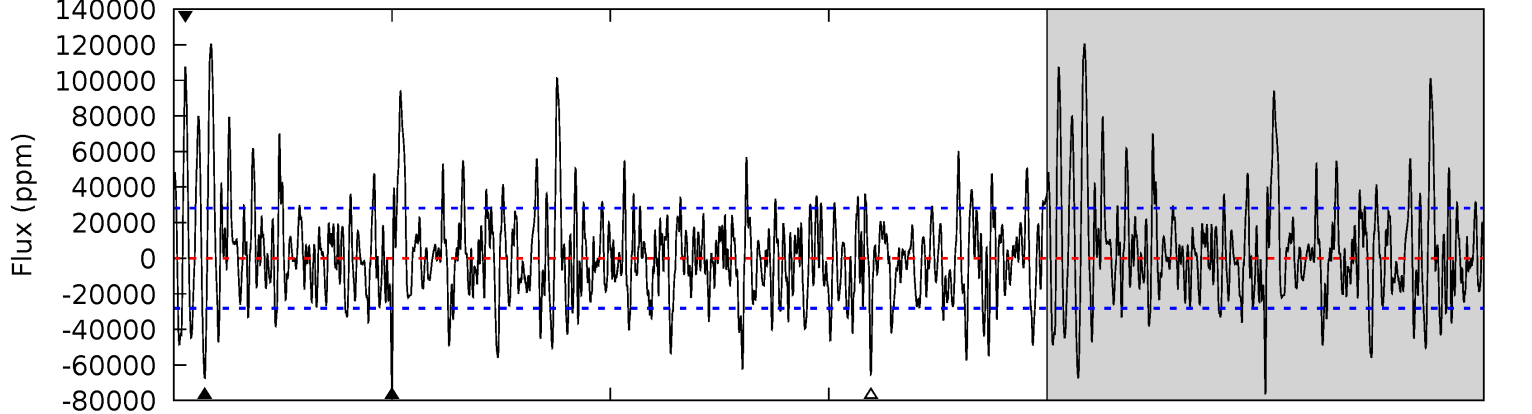
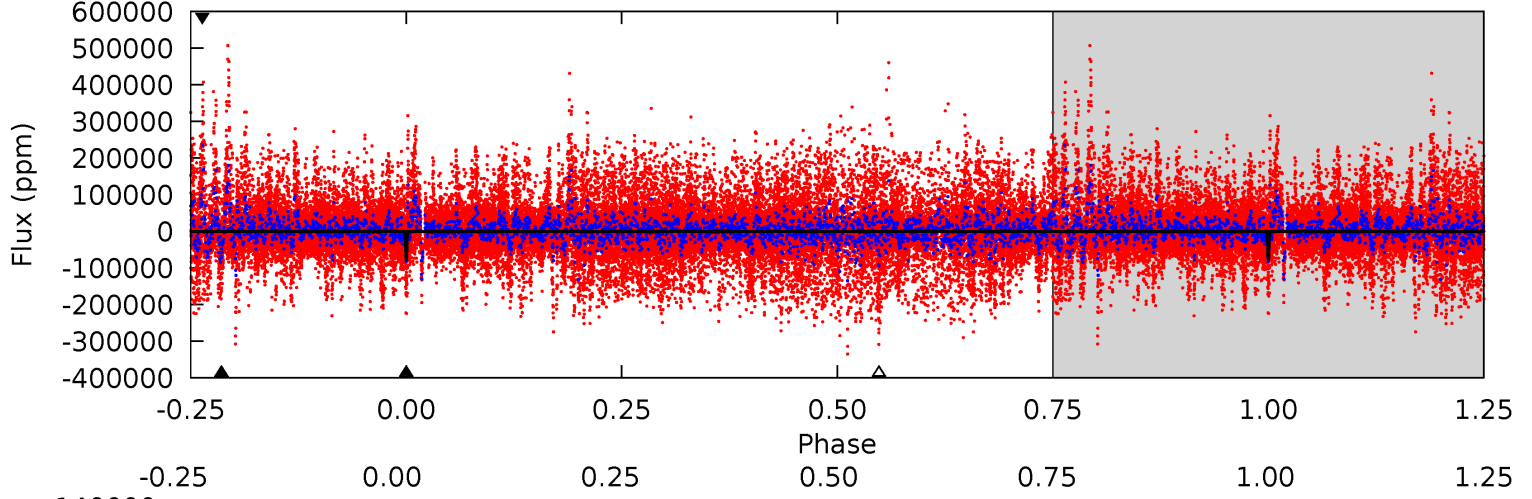
TCE 009778689-04 P=280.314387 Days $T_0=307.988286$ (BKJD)



DV Model-Shift Uniqueness Test

009778689-04, P = 280.214307 Days, E = 308.228824 Days

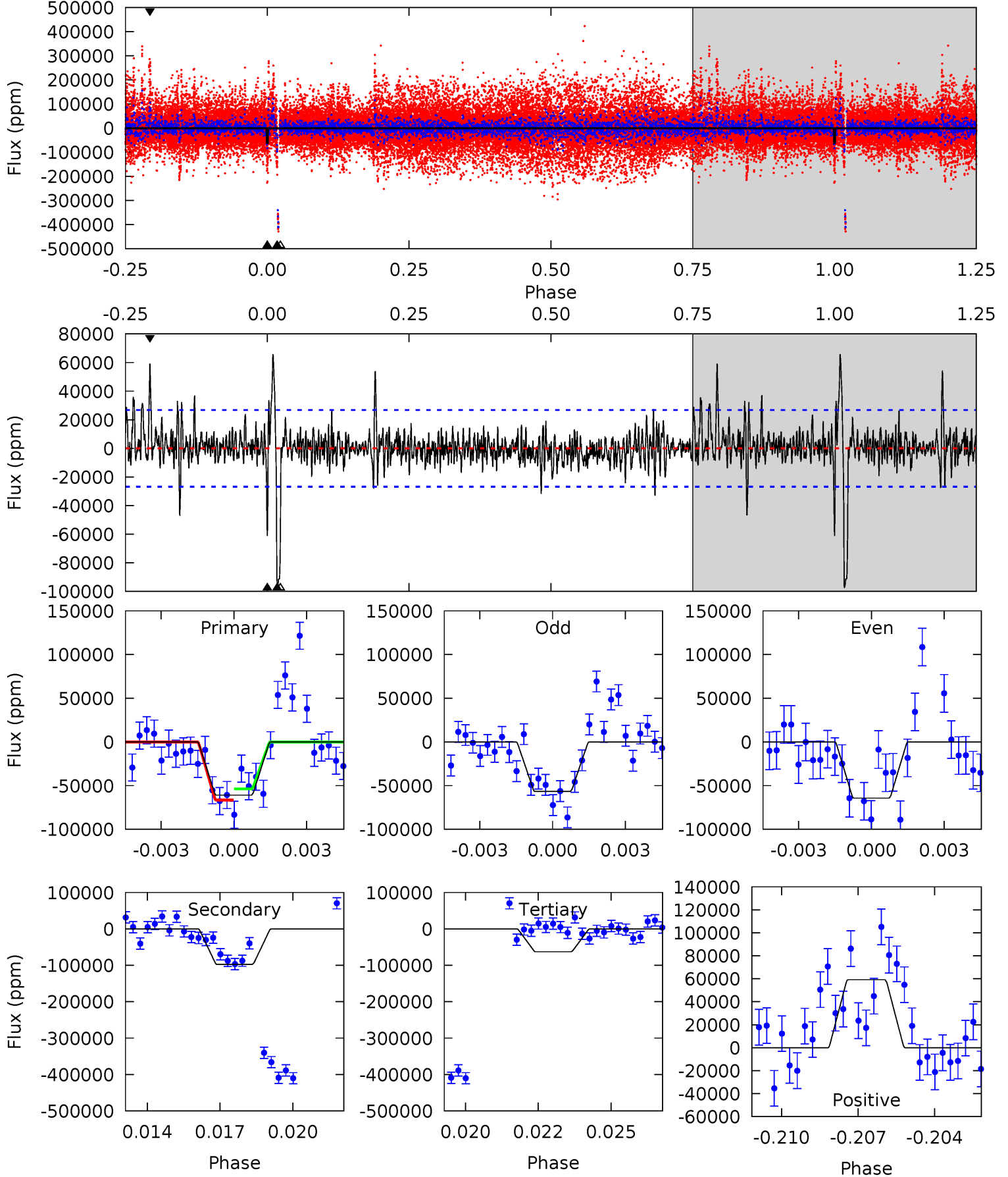
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.2	12.5	12.2	19.9	5.24	2.94	4.44	2.00	-5.74	0.34	-7.41	1.28	0.90	0.61	1.20



Alt Model-Shift Uniqueness Test

009778689-04, P = 280.314387 Days, E = 307.988286 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	19.1	12.3	11.6	5.27	2.99	1.92	-0.38	0.35	6.80	7.53	0.67	1.01	0.40	1.26



Stellar Parameters For KIC 009778689

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+1}_{-1}	$4.438^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$
	+0%/-0%	+23%/-23%	+inf%/-inf%	+100%/-100%	+100%/-100%	+100%/-100%
Source	Solar	Solar	Solar	Solar		

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

Secondary Eclipse Parameters for KIC 009778689-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-67438 ± 5393	$396.13^{+406.79}_{-279.47}$	389^{+20}_{-18}	2458^{+975}_{-366}	179^{+1980}_{-136}
Alt.	-97477 ± 5092	$353.96^{+403.49}_{-251.56}$	390^{+19}_{-19}	2640^{+1185}_{-437}	333^{+3584}_{-262}

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

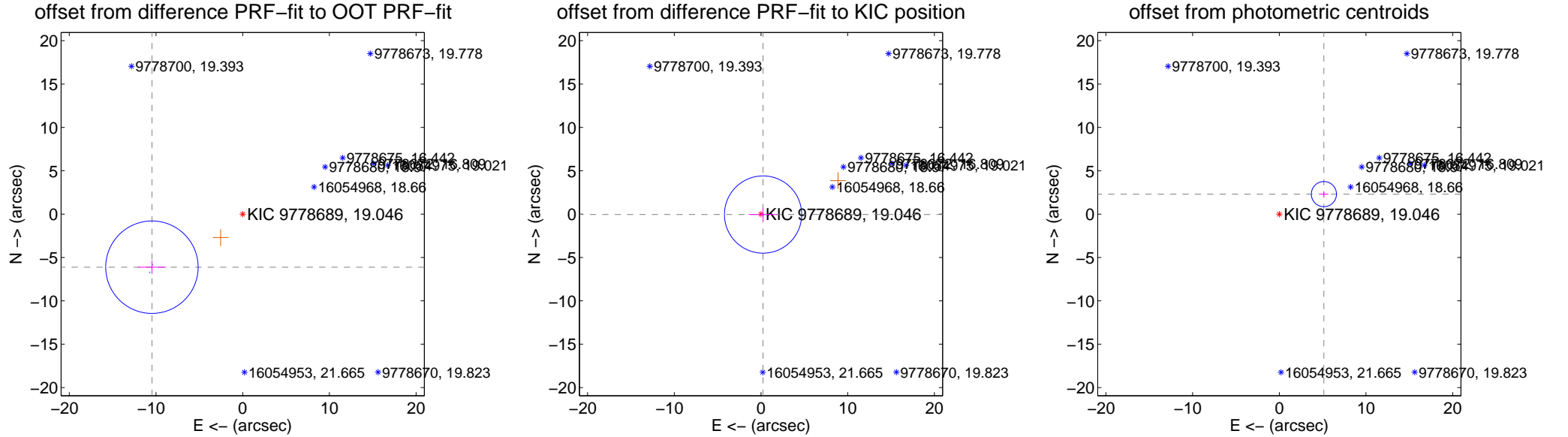
DV Centroid Data

Supplemental centroid analysis for 009778689-04. Kepler magnitude: 19.05. Transit SNR 9.16

There are 3 quarters with good PRF difference image offsets

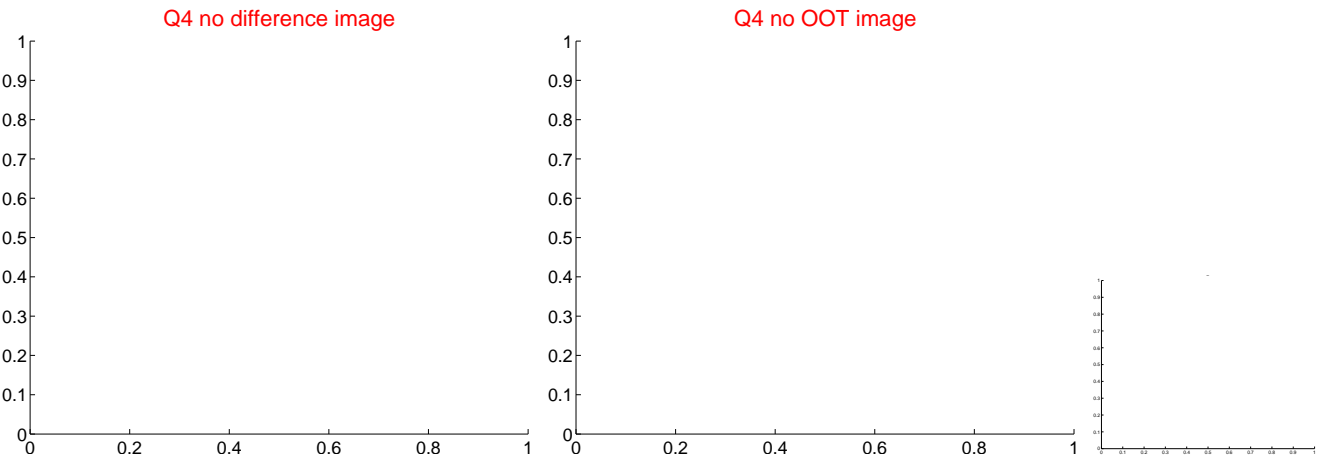
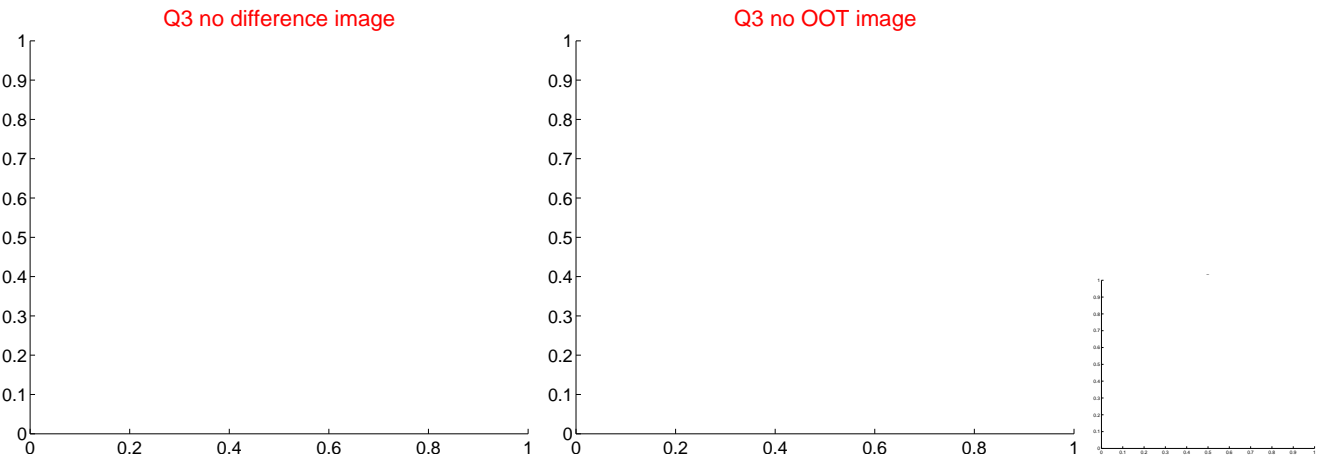
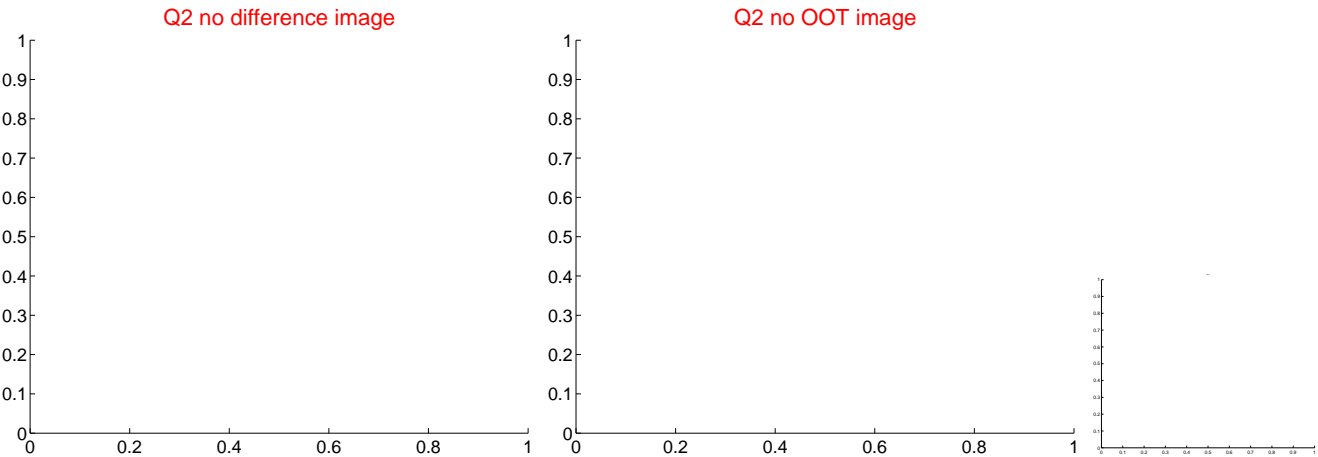
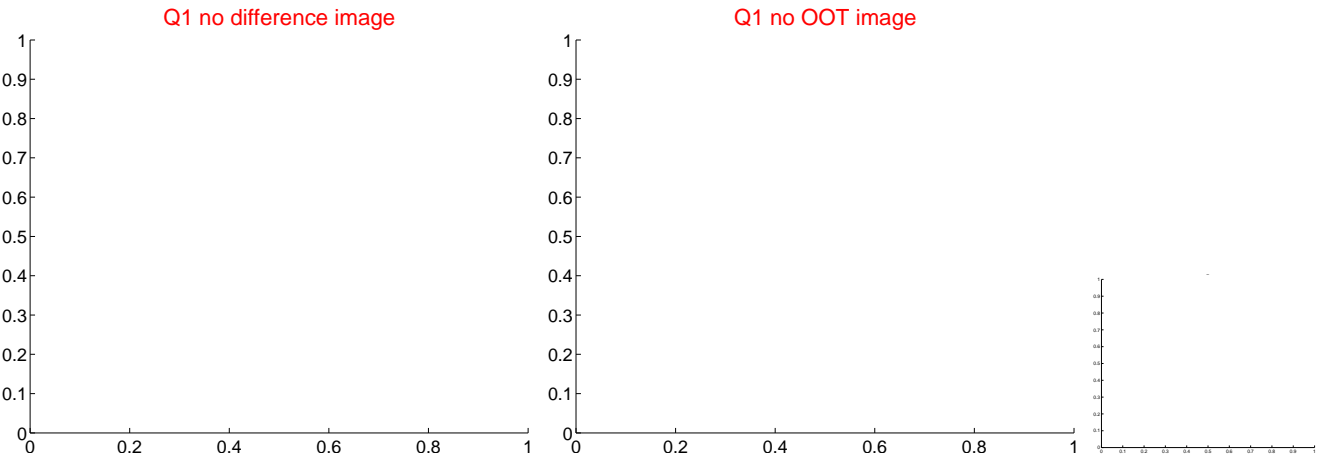
The OOT PRF centroid is offset from the target star catalog position by about 12.02 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	12.127 ± 1.777	6.82	10.469 ± 1.617	-6.120 ± 0.771
PRF-fit source offset from KIC position	0.243 ± 1.485	0.16	-0.238 ± 1.664	-0.048 ± 0.766
photometric centroid source offset	5.64 ± 0.48	11.67	-5.15 ± 0.51	2.31 ± 0.31

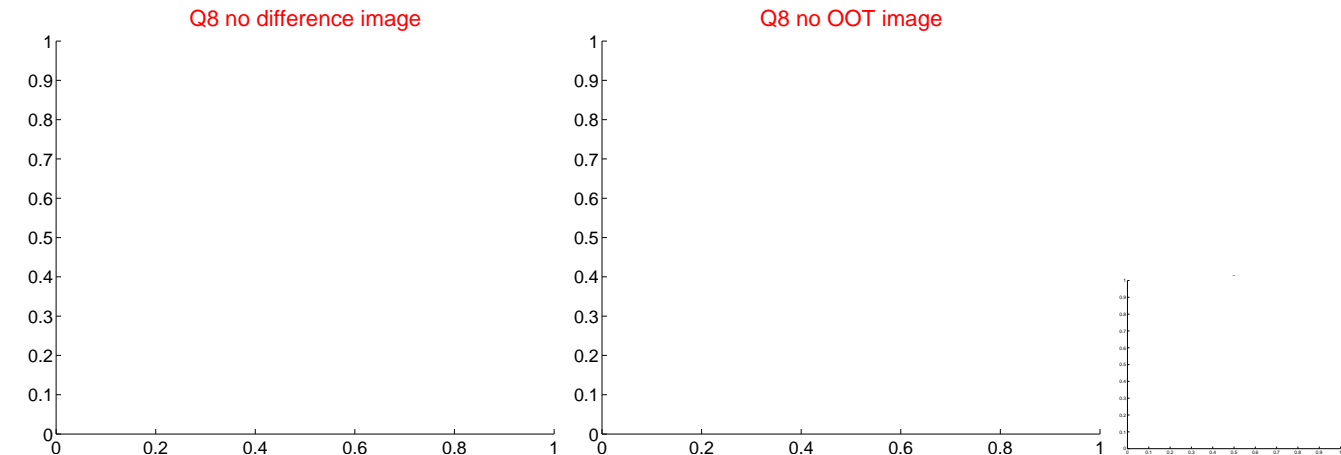
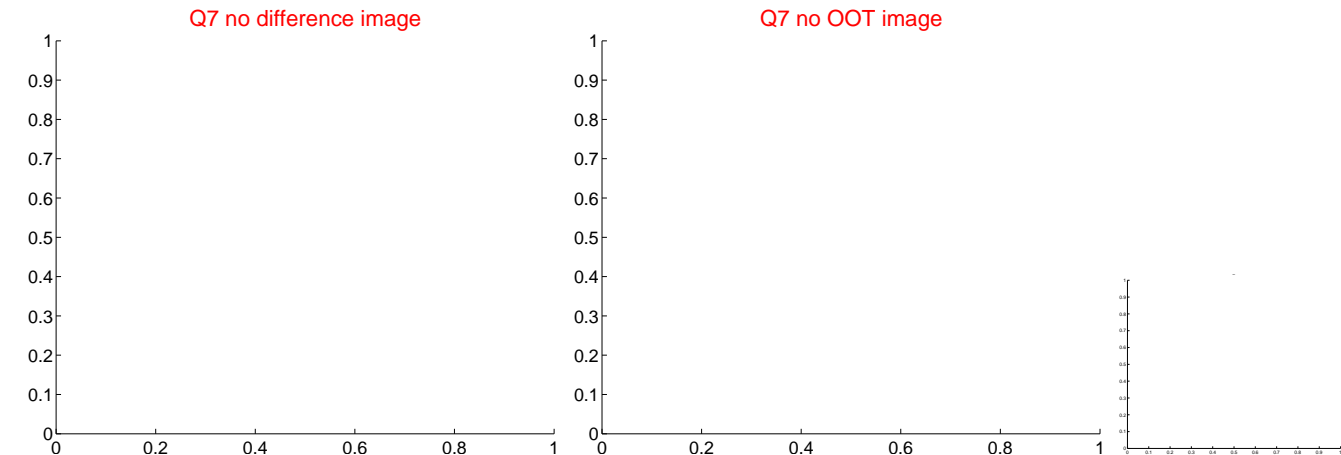
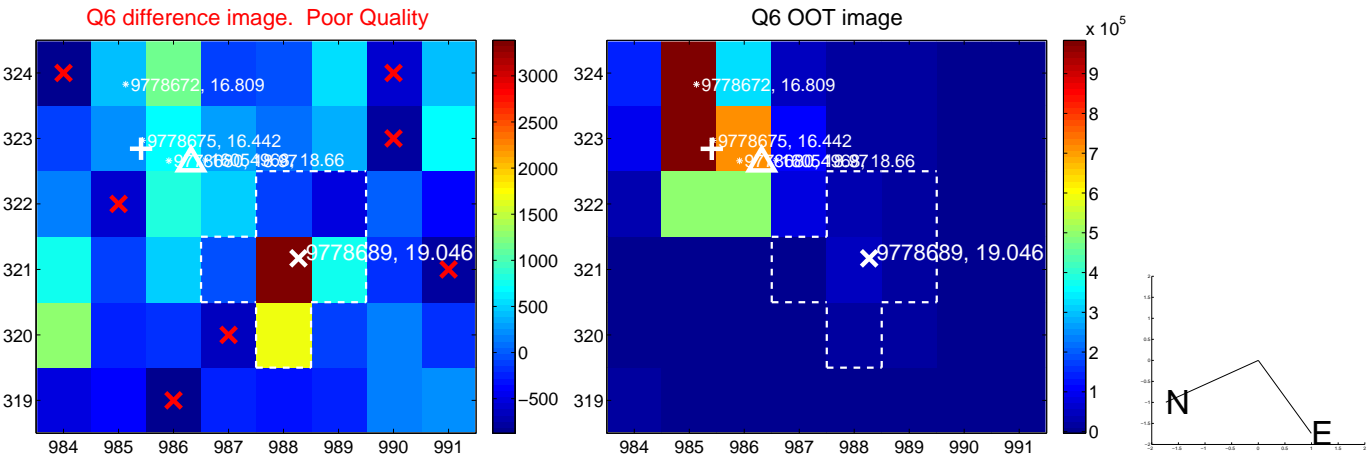
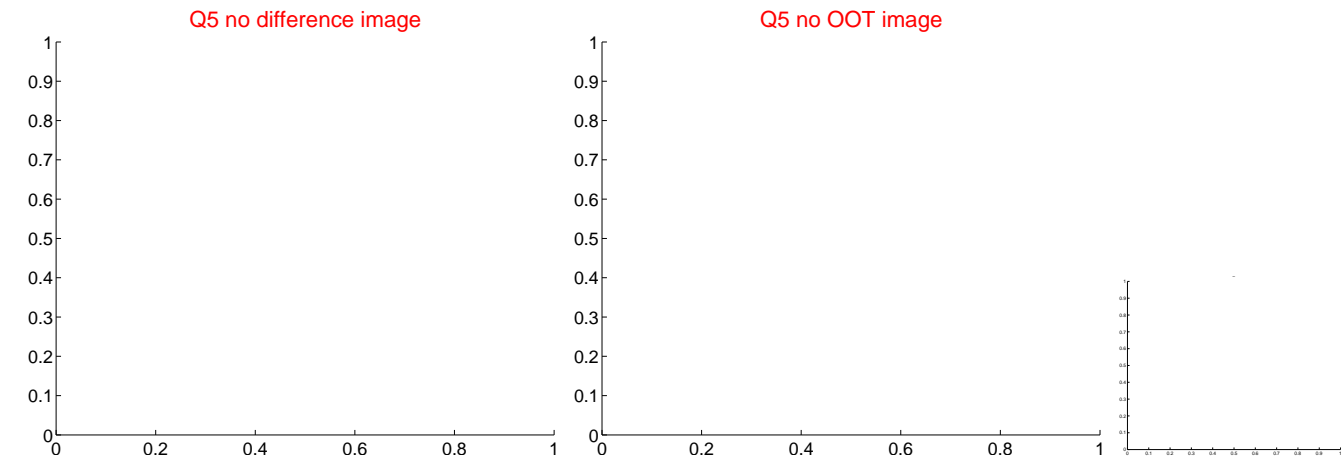


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

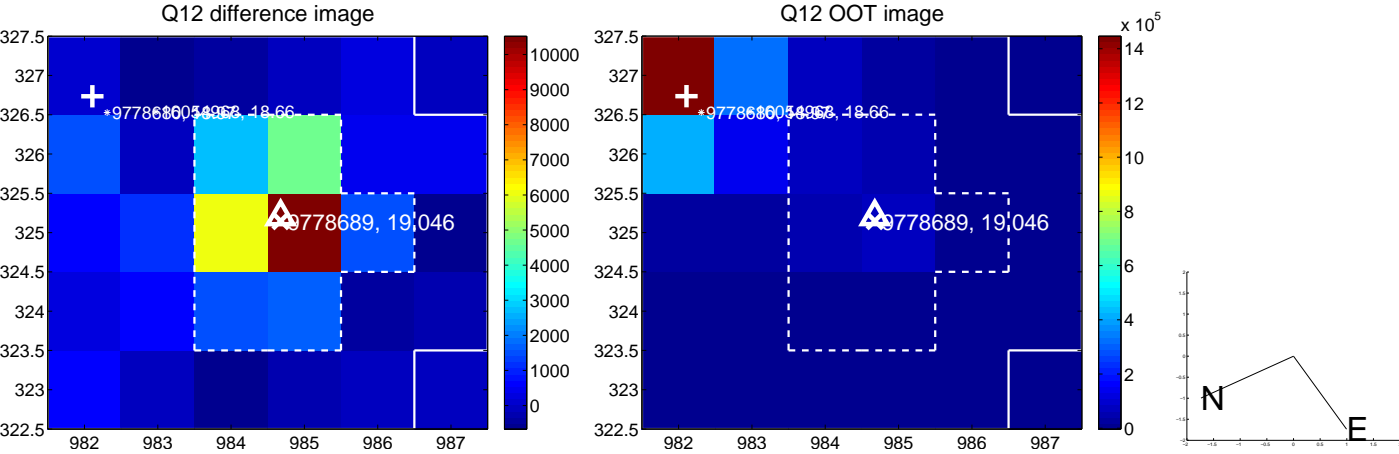
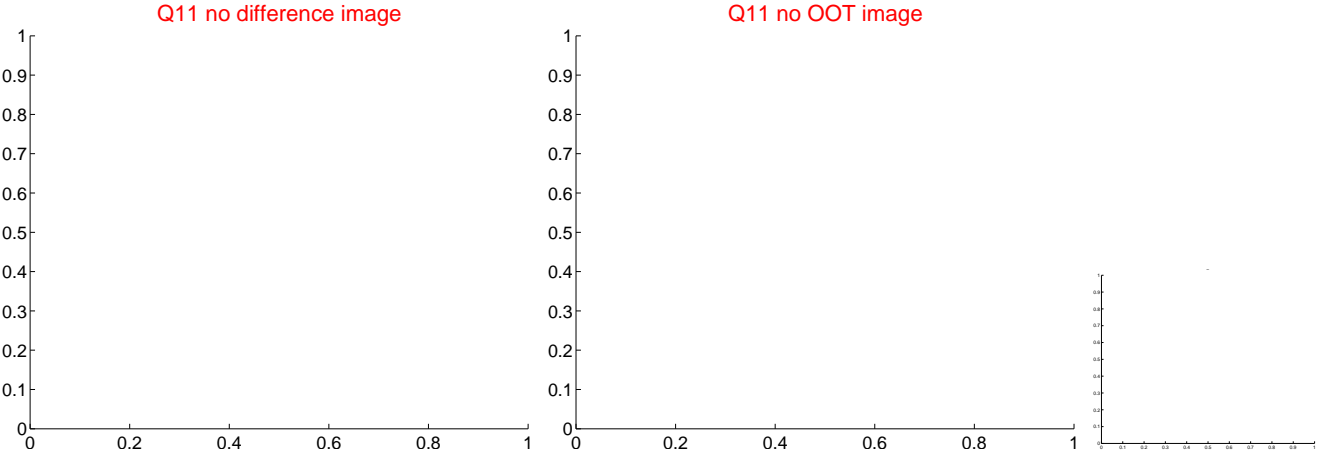
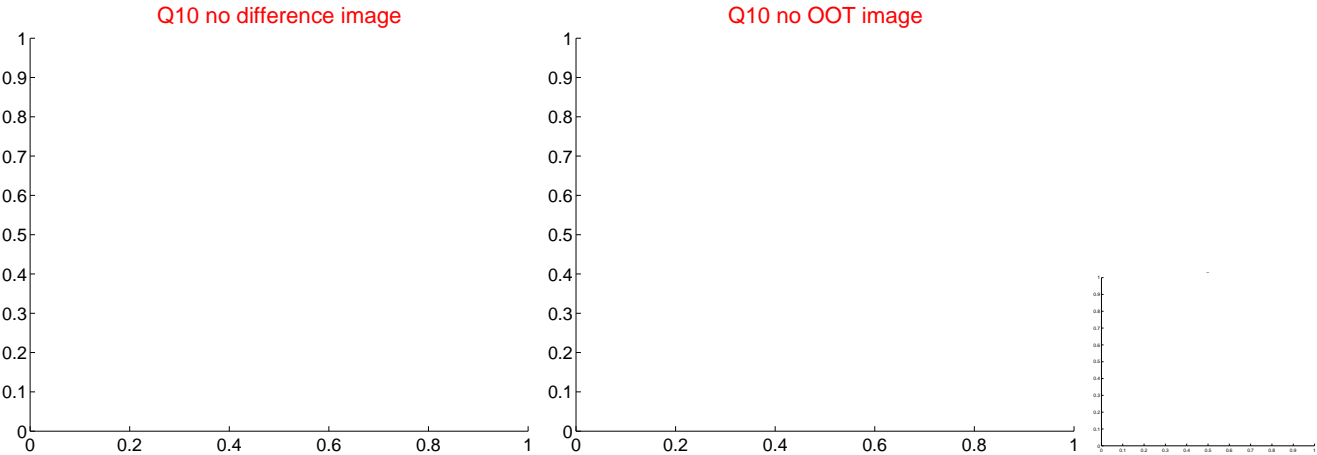
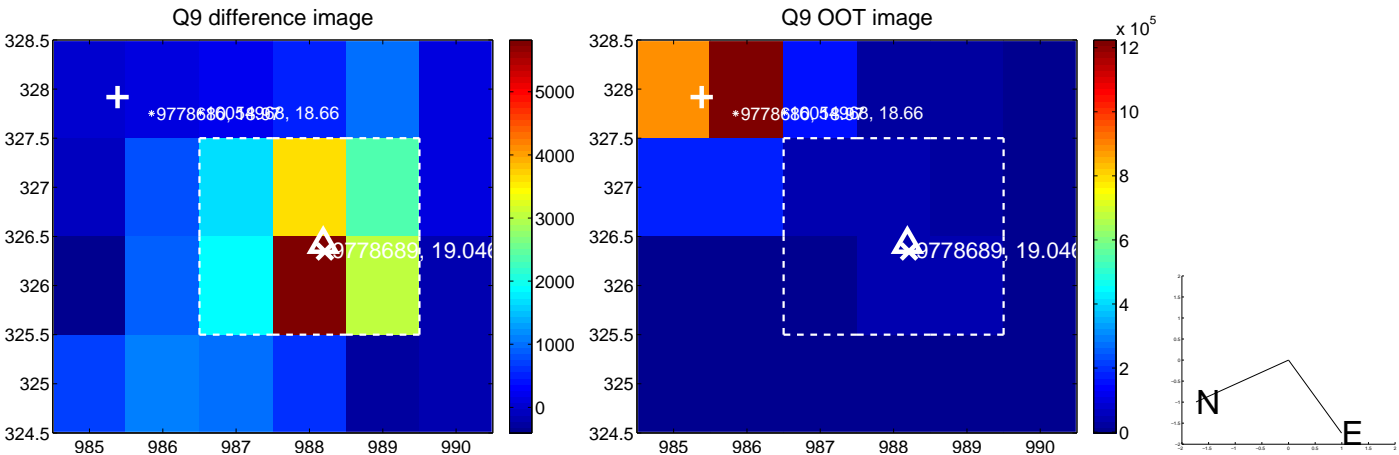
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



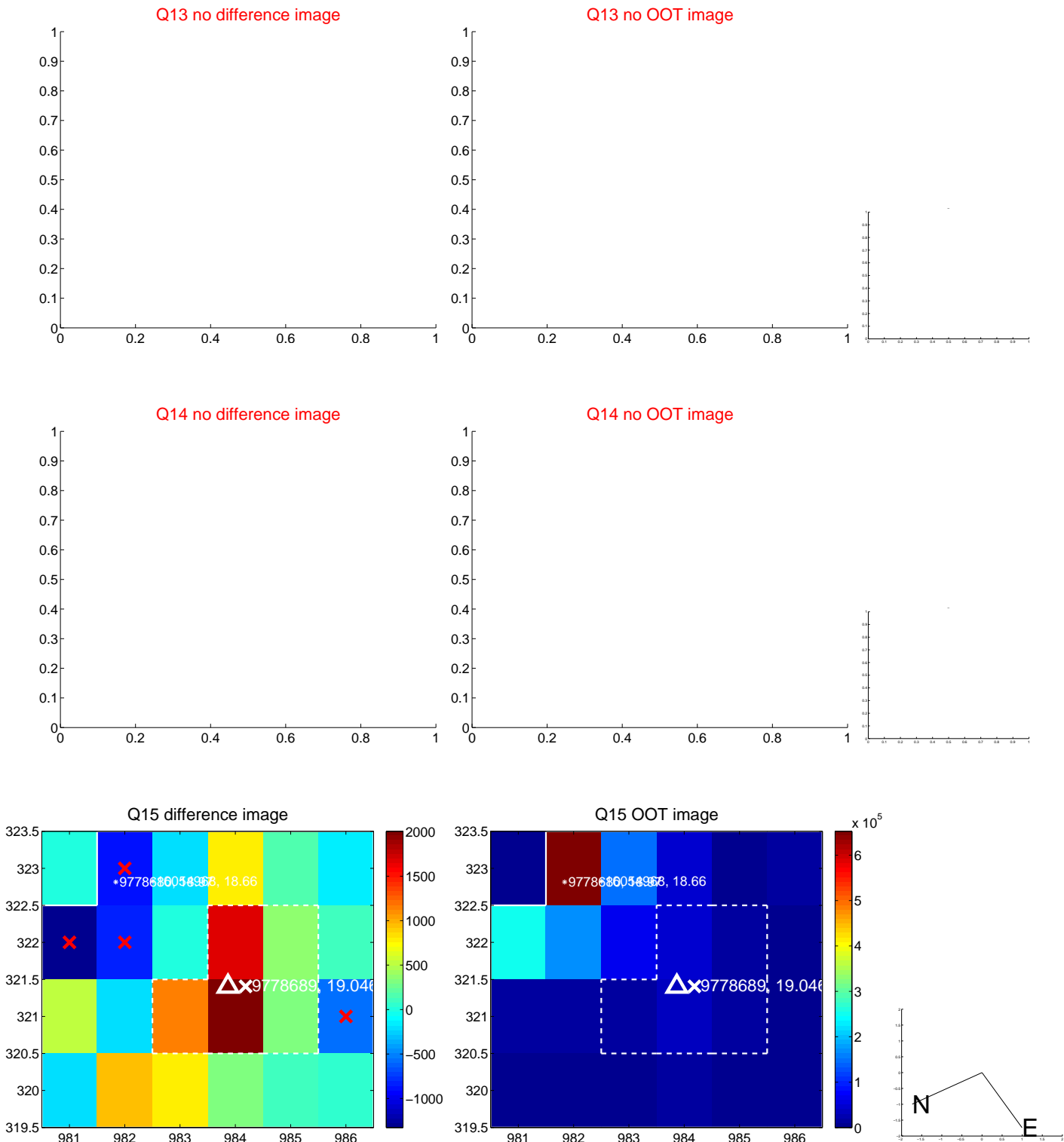
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



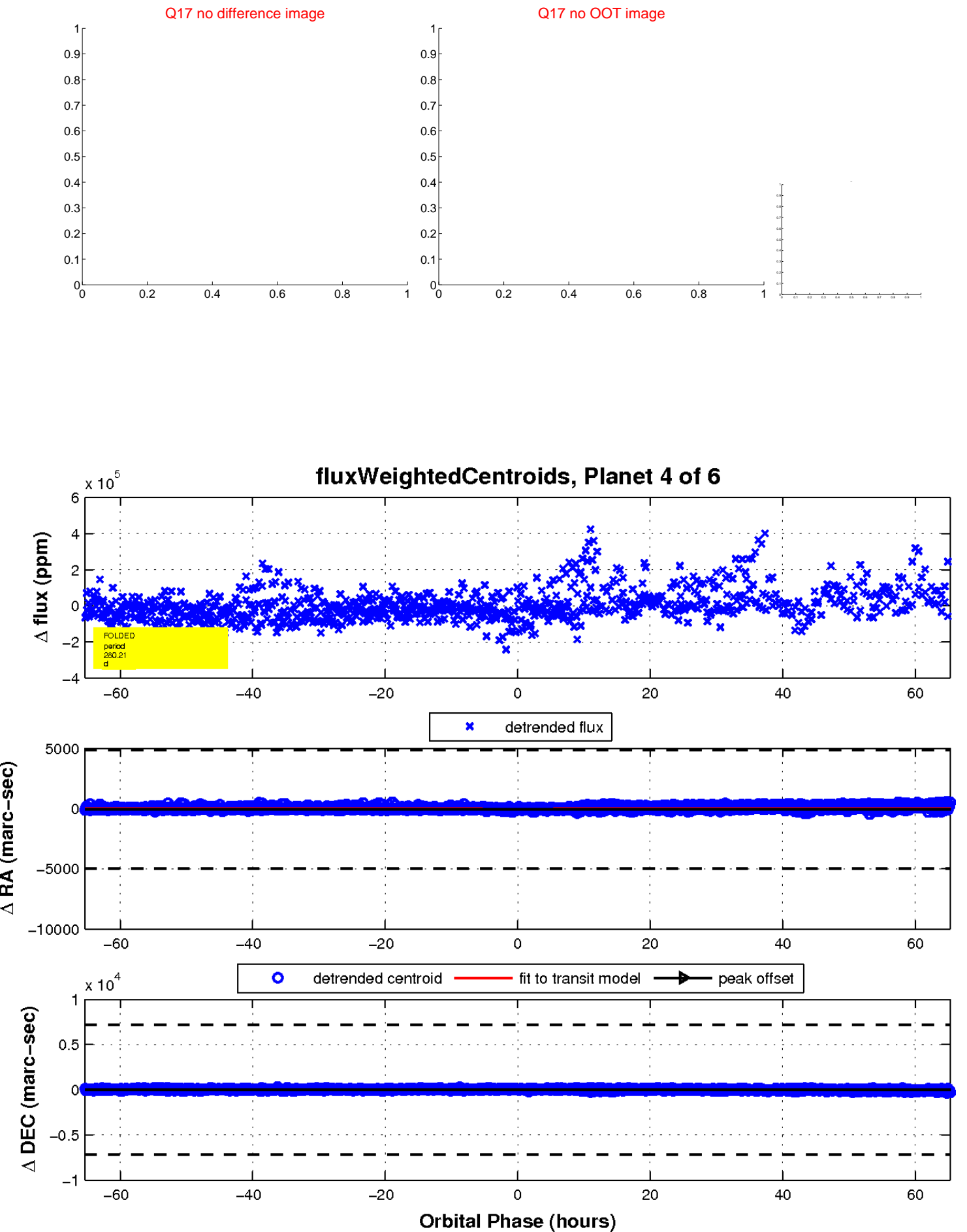
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; Δ : 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

