

KIC 010002787

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})
010002787-01	OBS	No	458.780141	154.600854	260.7	6.338	12.8	8.3	1.59	6123	2.90	2.67
010002787-02	OBS	No	339.719931	305.438852	129.6	10.095	7.7	5.1	1.59	6123	2.13	3.98

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010002787-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
010002787-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

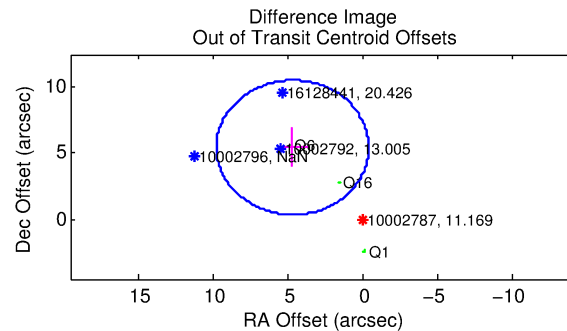
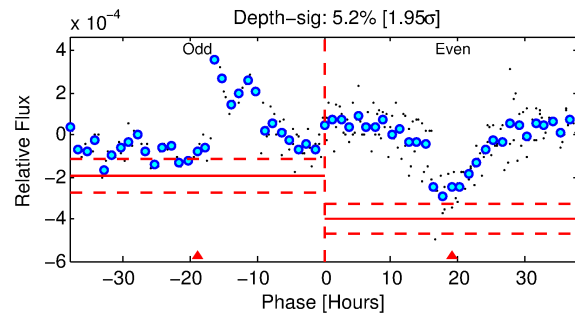
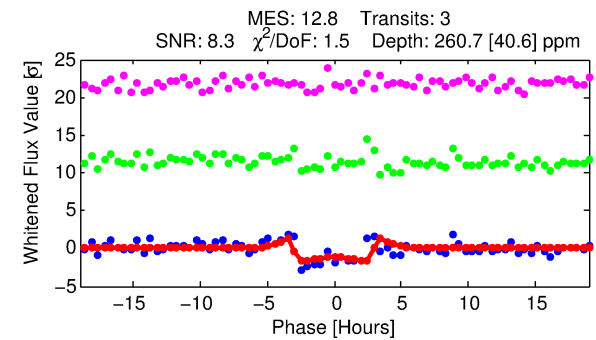
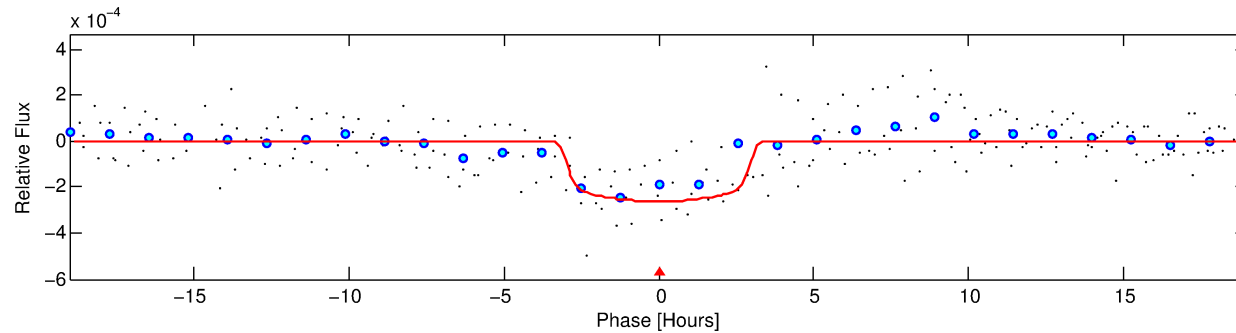
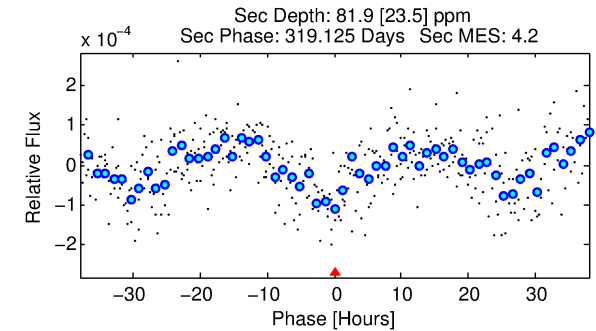
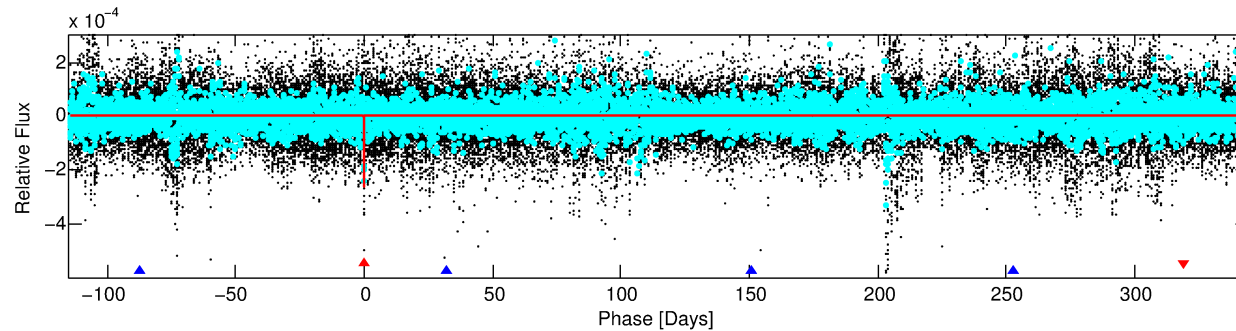
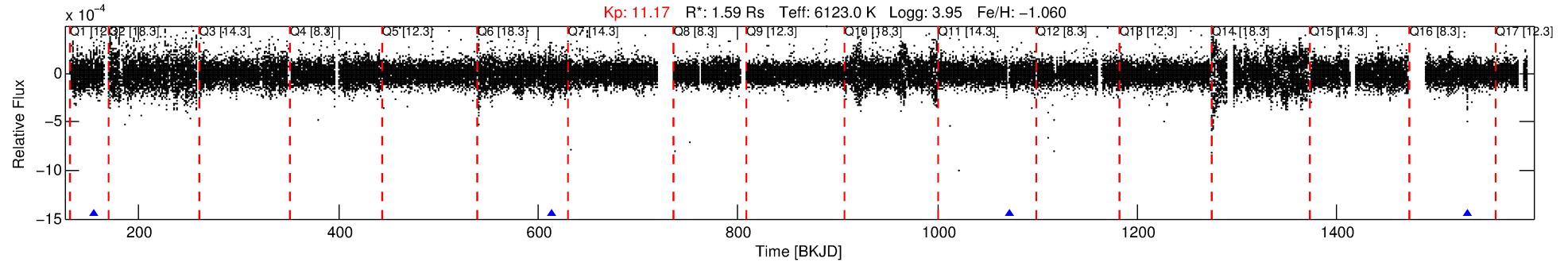
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010002787-01

No Significant Match Found

DV One-Page Summary

KIC: 10002787 Candidate: 1 of 2 Period: 458.780 d



DV Fit Results:

Period = 458.78014 [0.00325] d
Epoch = 154.6009 [0.0060] BKJD
Rp/R* = 0.0167 [0.0088]
a/R* = 309.35 [884.12]
b = 0.85 [0.94]
Seff = 2.67 [1.66]
Teq = 326 [51] K
Rp = 2.90 [1.82] Re
a = 1.0924 [0.3977] AU
Ag = 6388.09 [7953.23] [0.80σ]
Teffp = 4505 [1230] K [3.39σ]

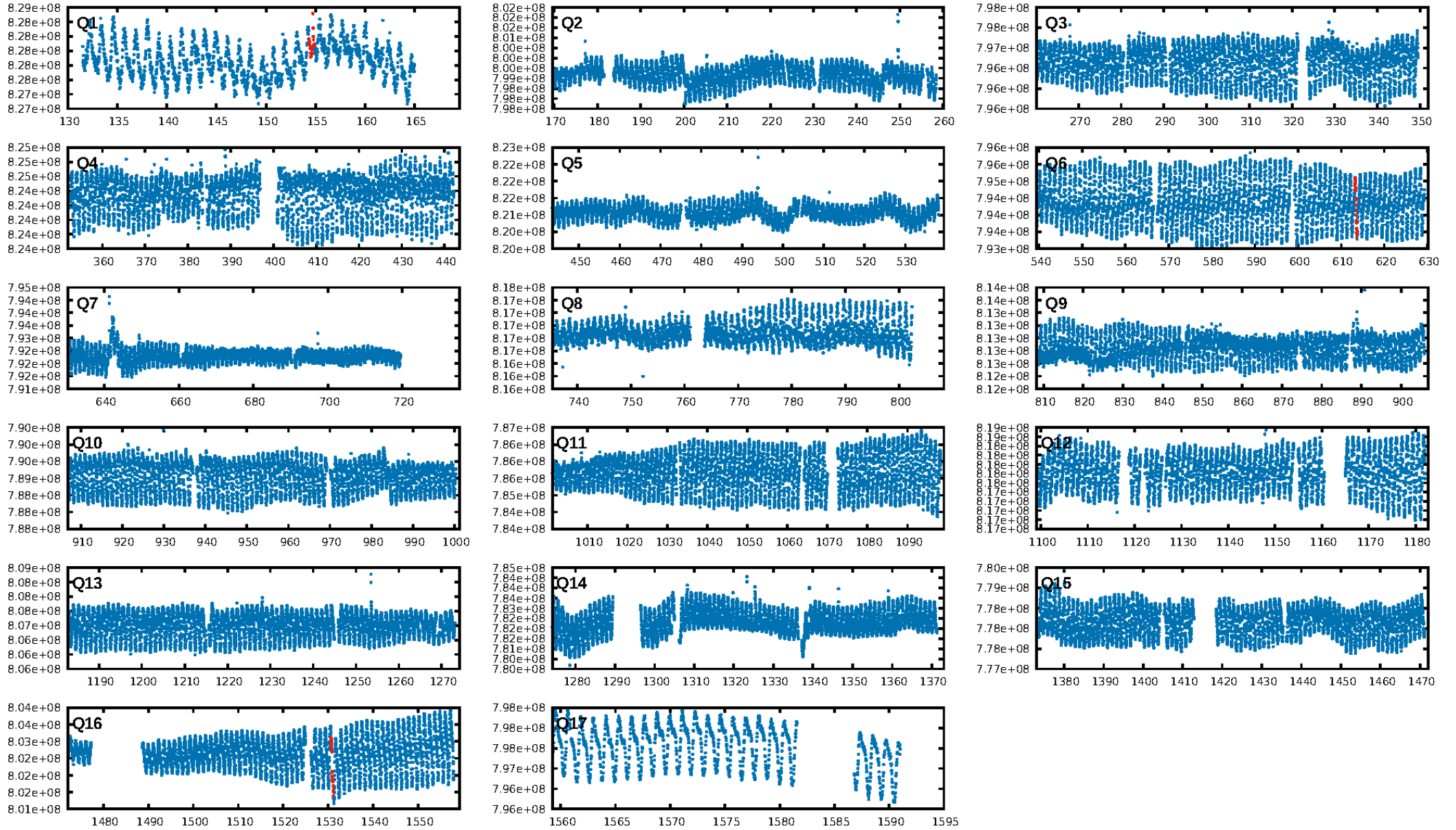
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [239.72σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 65.4%
Bootstrap-pfa: 5.45e-20
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.05378
Centroid-sig: 3.1%
Centroid-so: 9.244 arcsec [1.61σ]
OotOffset-rm: 7.162 arcsec [4.22σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-rm: 7.421 arcsec [2.85σ]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

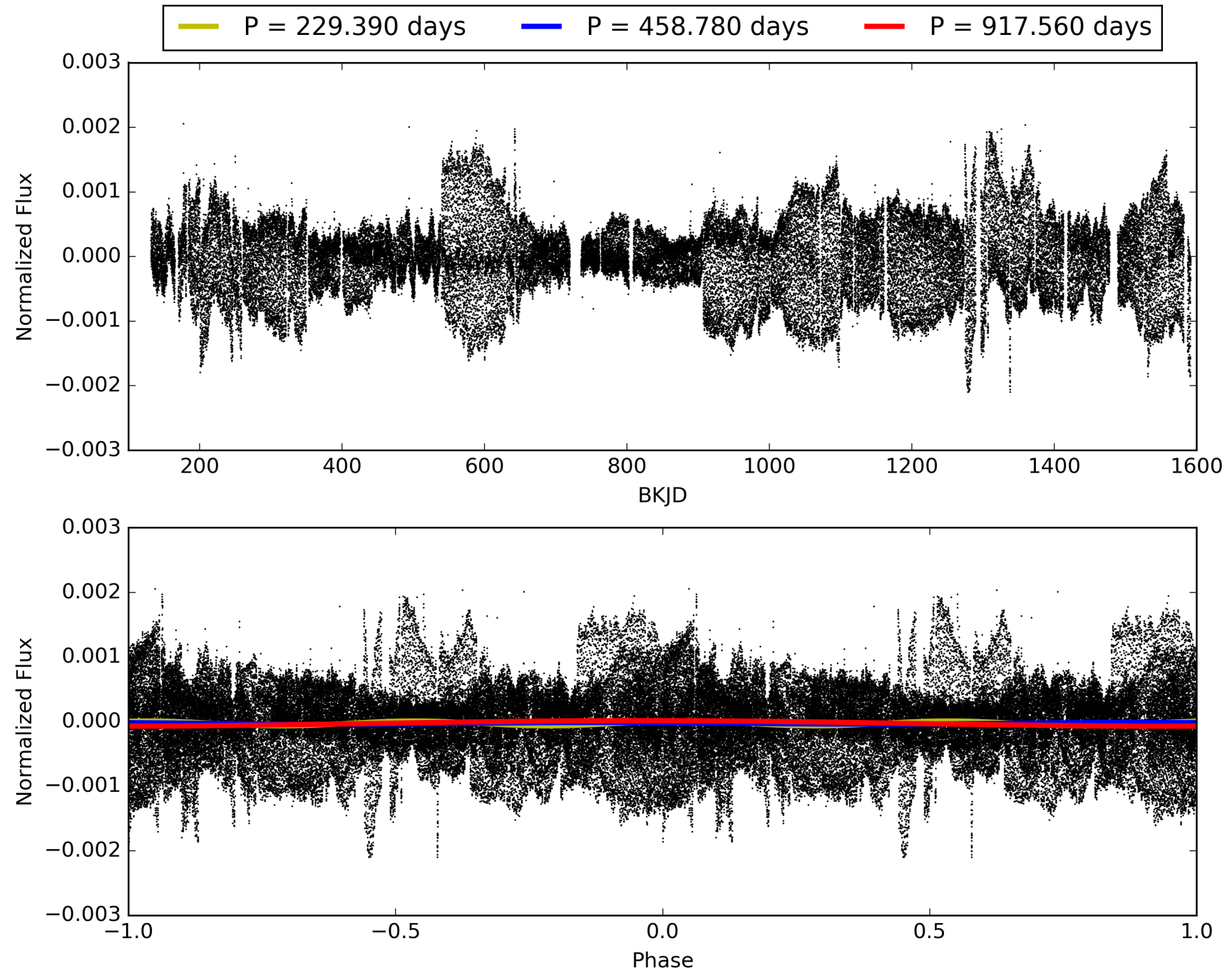
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:31:51 Z

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

TCE 010002787-01, PDC Light Curves

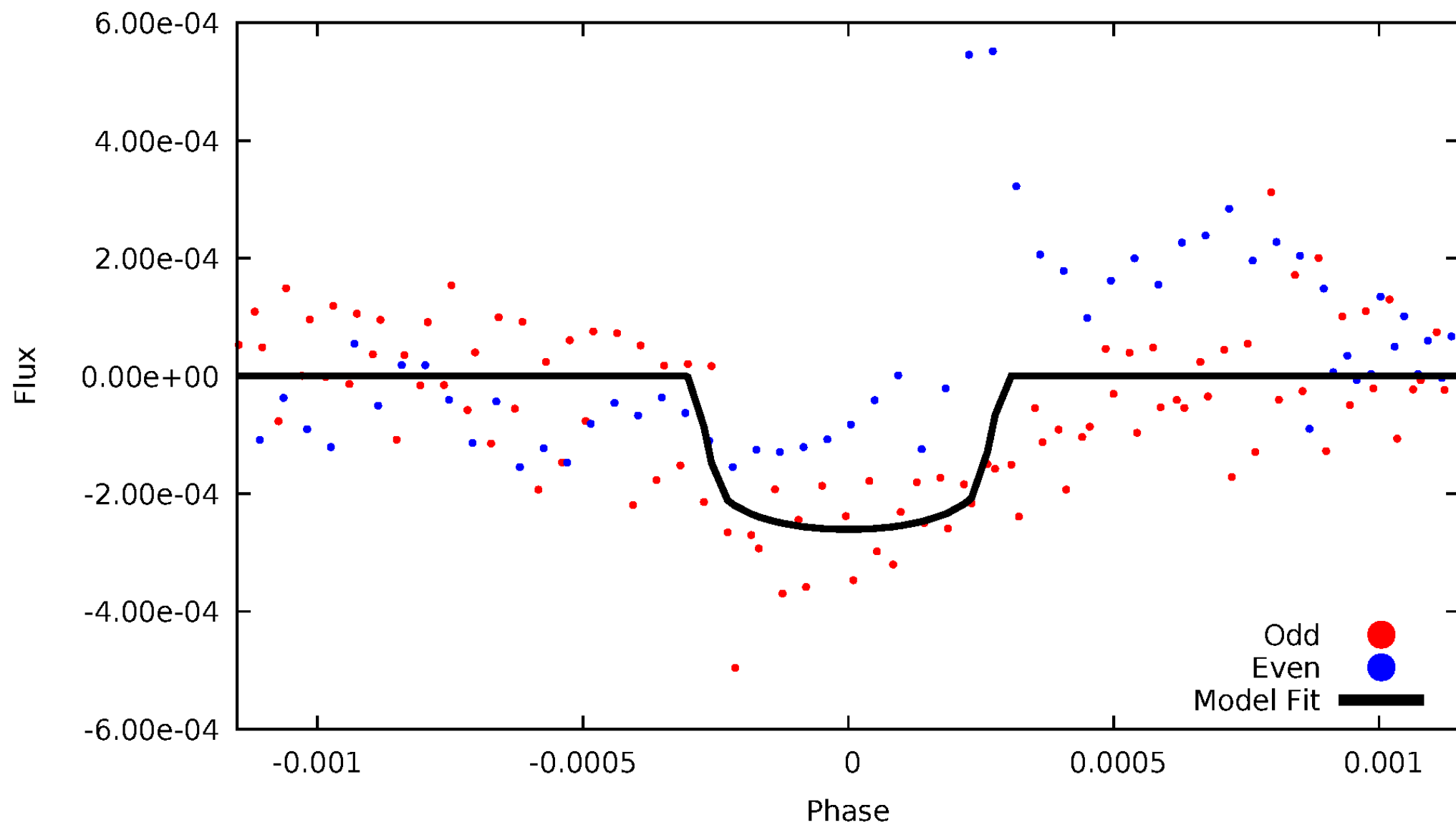


TCE 010002787-01



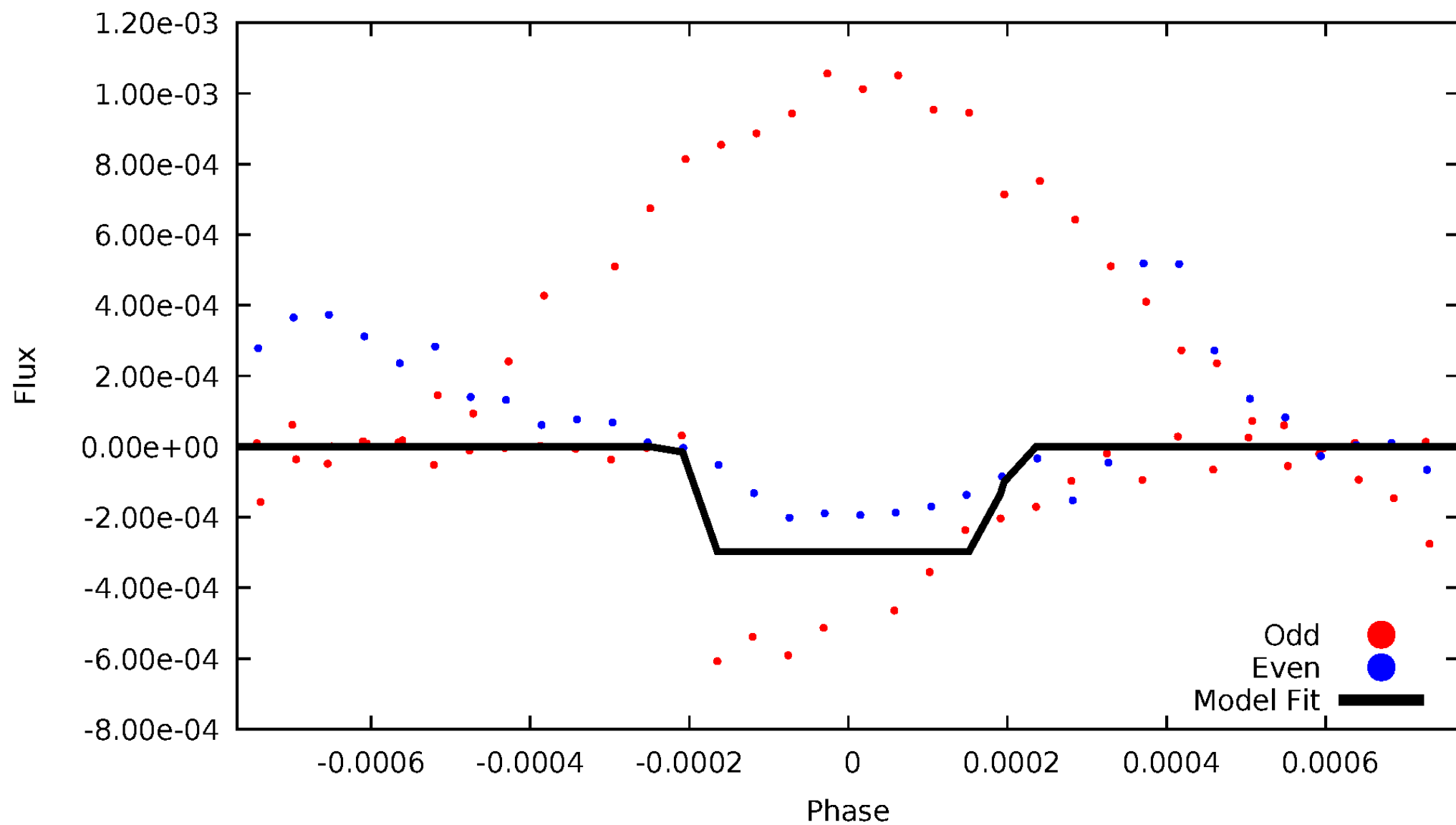
DV Odd/Even

TCE 010002787-01



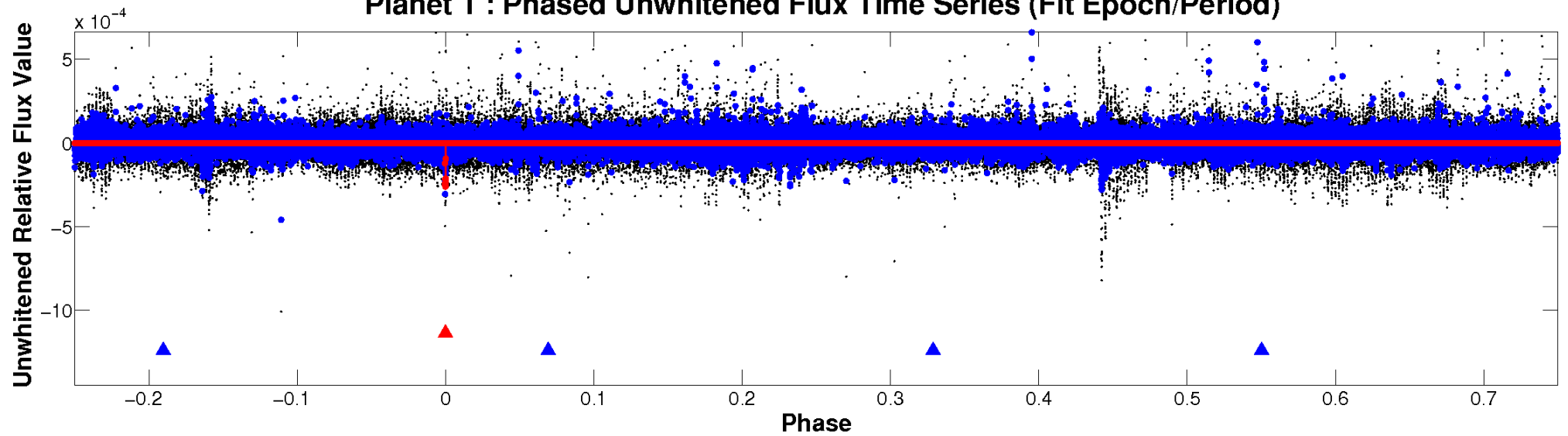
ALT Odd/Even

TCE 010002787-01

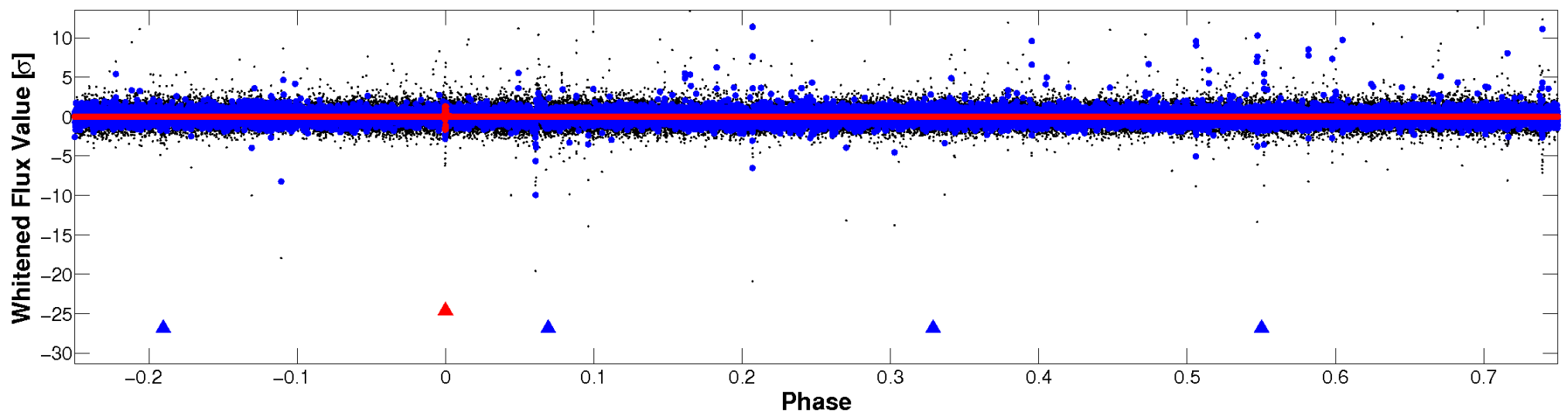


Non-Whitened Vs. Whitened Light Curve

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

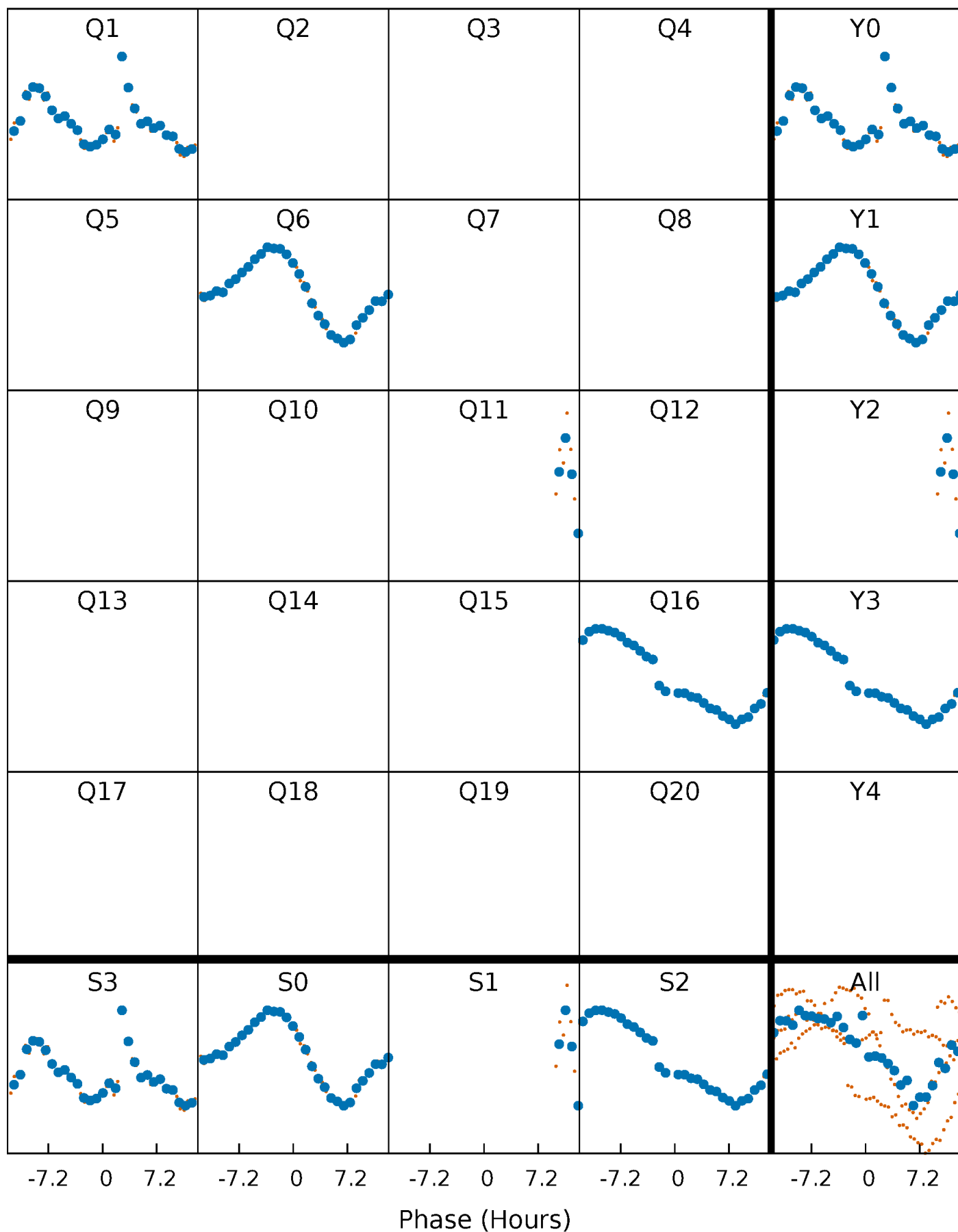


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



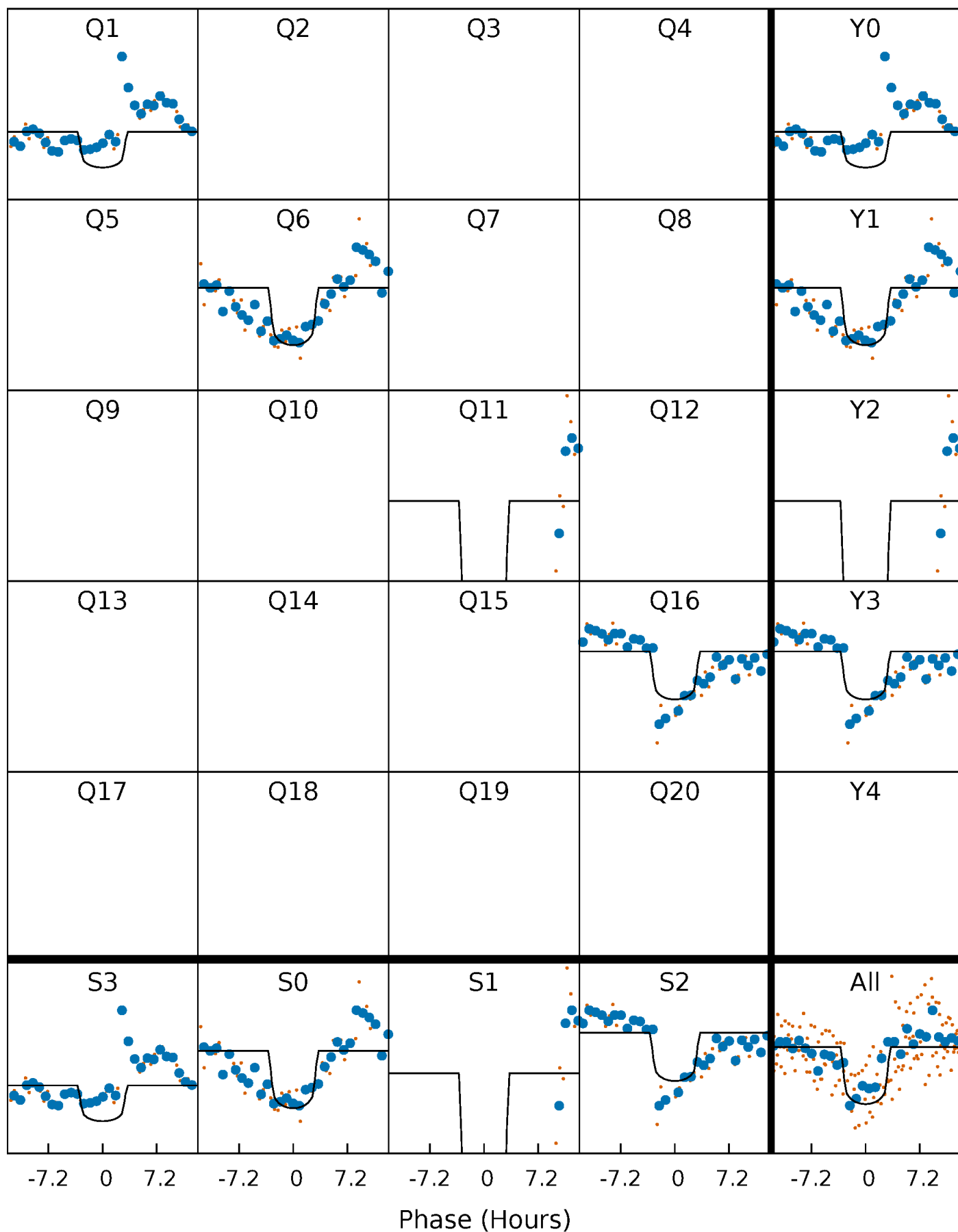
PDC Quarter-Phased Transit Curves

TCE 010002787-01 P=458.780141 Days $T_0=154.600854$ (BKJD)



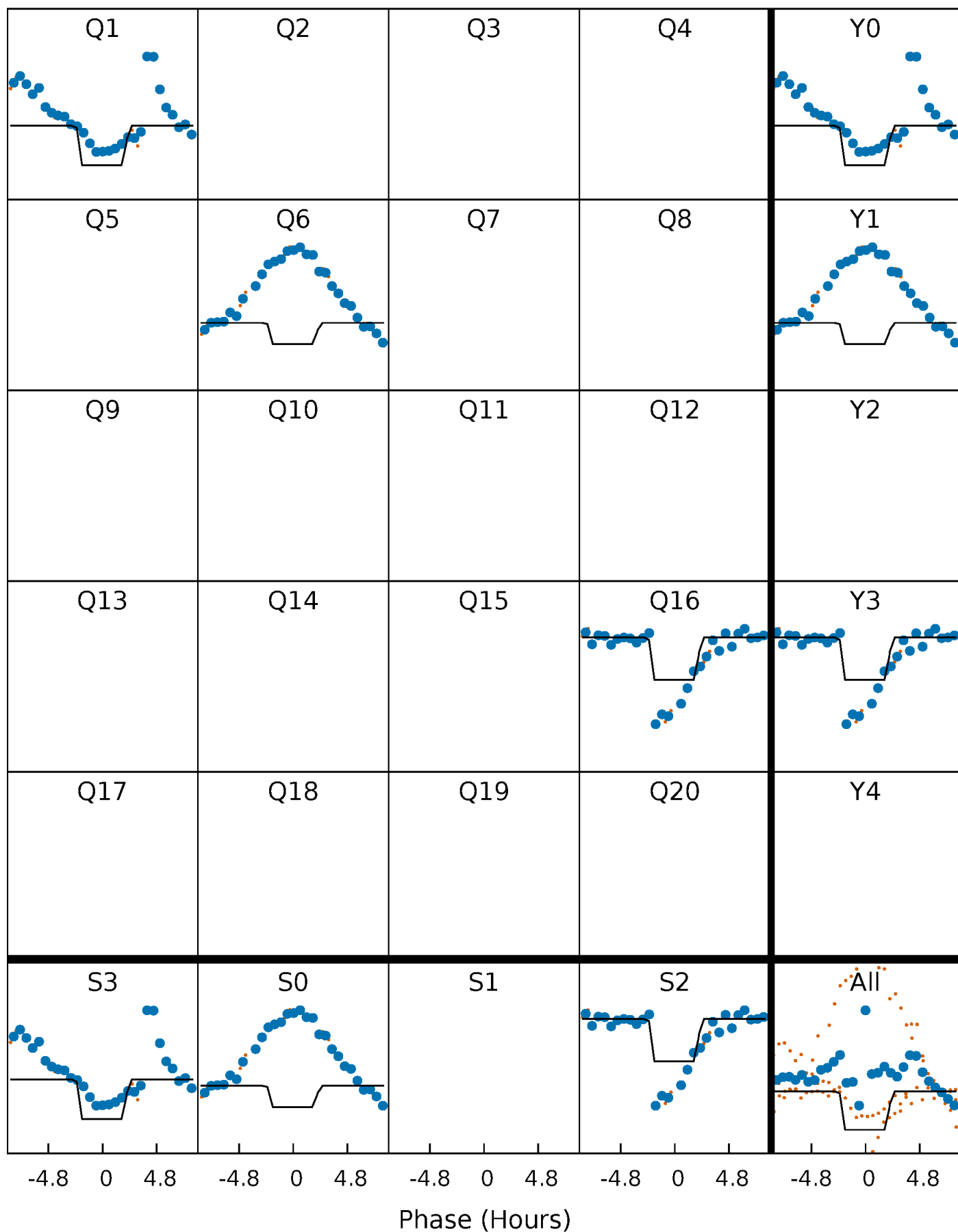
DV Quarter-Phased Transit Curves

TCE 010002787-01 P=458.780141 Days $T_0=154.600854$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

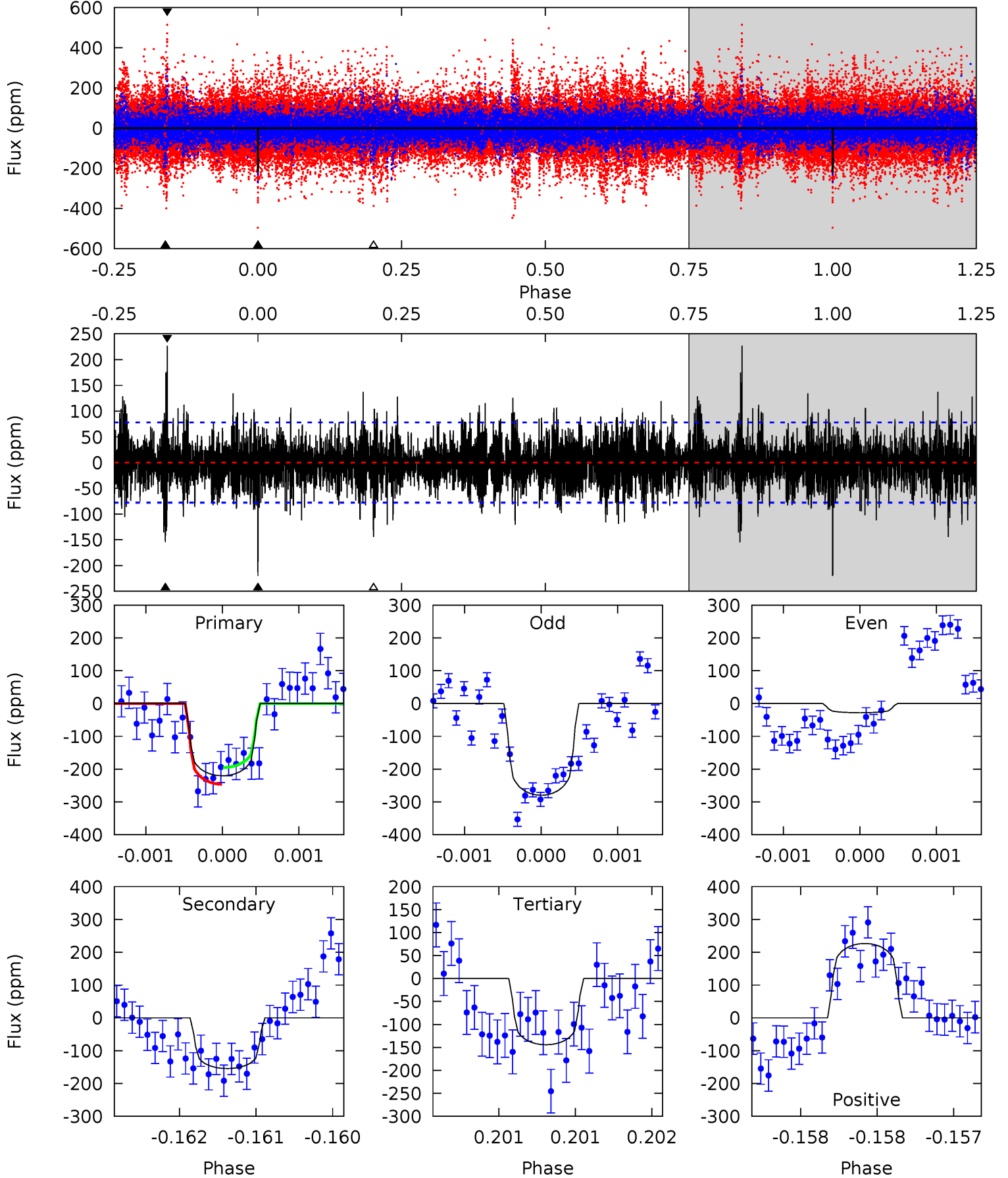
TCE 010002787-01 P=458.794723 Days $T_0=154.534877$ (BKJD)



DV Model-Shift Uniqueness Test

010002787-01, P = 458.780141 Days, E = 154.600854 Days

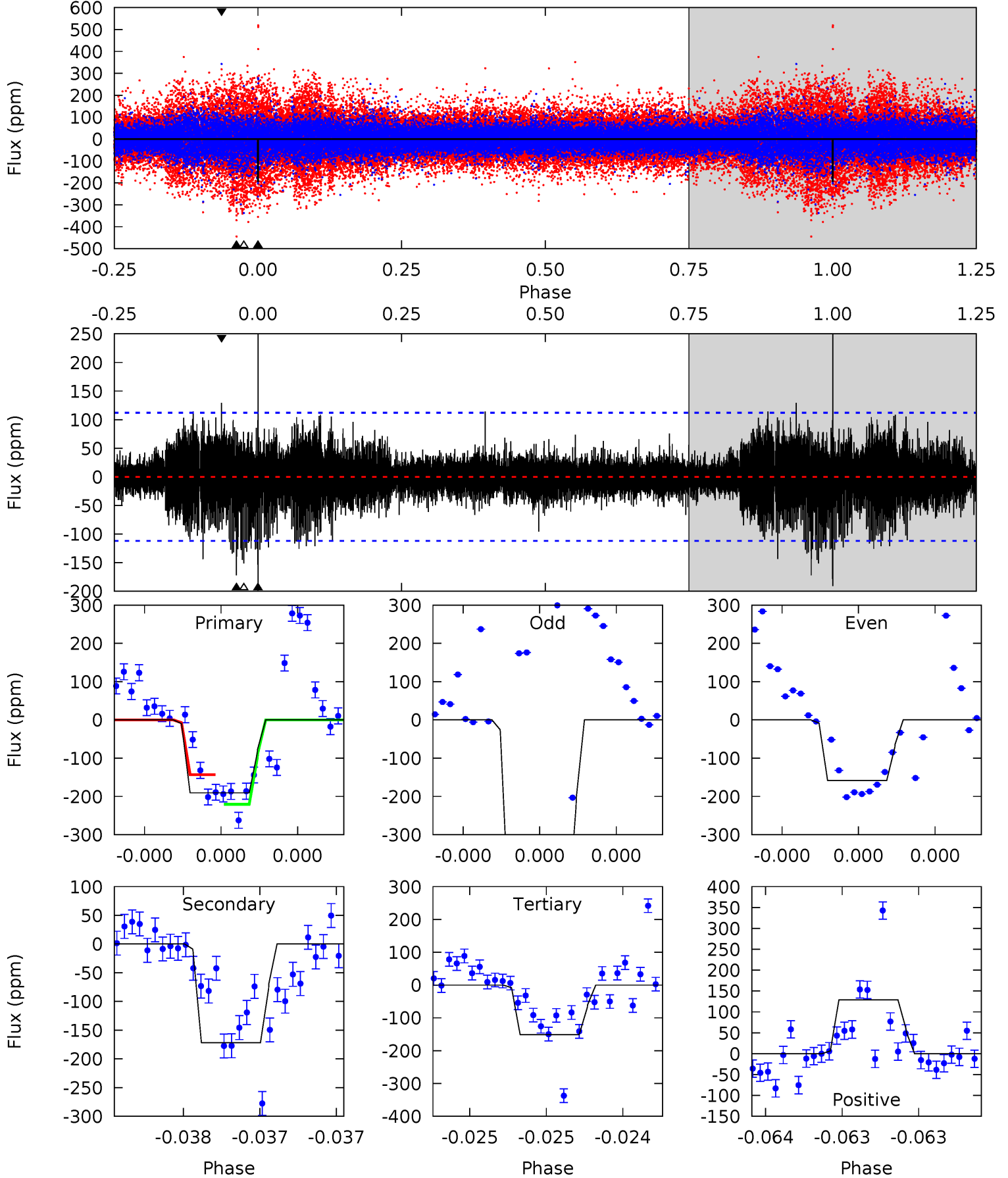
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.6	11.0	10.2	16.1	5.53	3.42	2.69	5.40	-0.46	0.73	-5.13	8.17	0.82	0.51	1.82



Alt Model-Shift Uniqueness Test

010002787-01, P = 458.794723 Days, E = 154.534877 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.55	8.62	7.57	6.46	5.61	3.54	1.43	1.98	3.08	1.05	2.15	11.2	-0.76	0.57	0



Stellar Parameters For KIC 010002787

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6123^{+184}_{-138}	$3.952^{+0.368}_{-0.123}$	$-1.060^{+0.350}_{-0.200}$	$1.590^{+0.365}_{-0.548}$	$0.825^{+0.096}_{-0.052}$	$0.289^{+0.757}_{-0.114}$
	+3%/-2%	+9%/-3%	+33%/-19%	+23%/-34%	+12%/-6%	+262%/-39%
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 010002787-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-154 ± 14	$2.68^{+1.62}_{-1.38}$	451^{+29}_{-44}	5361^{+2327}_{-837}	14164^{+48487}_{-8708}
Alt.	-172 ± 20	$2.83^{+1.80}_{-1.42}$	452^{+30}_{-39}	5370^{+2508}_{-909}	14696^{+44746}_{-9348}

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

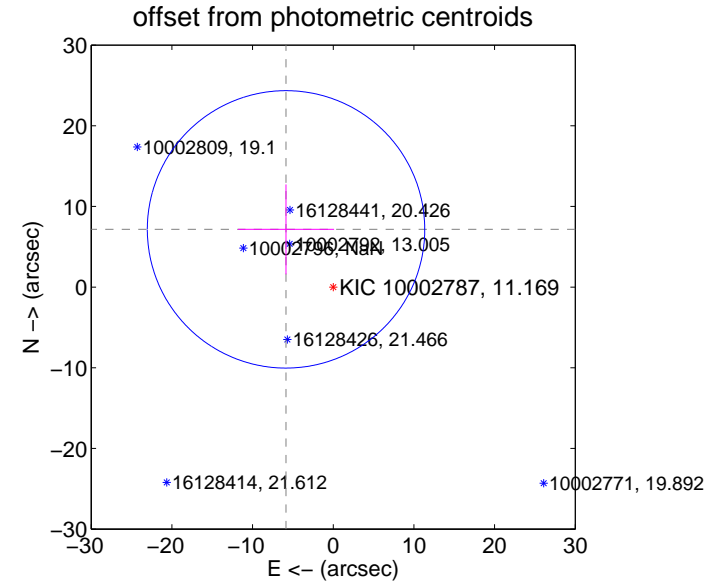
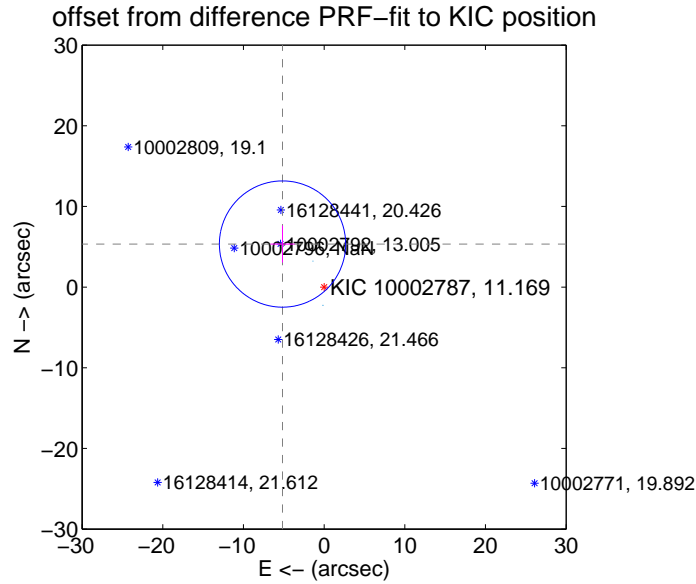
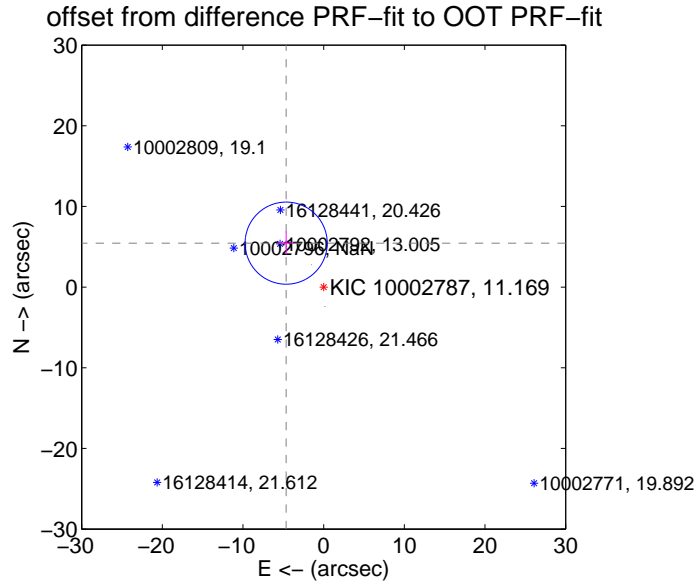
DV Centroid Data

Supplemental centroid analysis for 010002787-01. **Kepler magnitude: 11.17.** Transit SNR 8.34

There are 2 quarters with good PRF difference image offsets

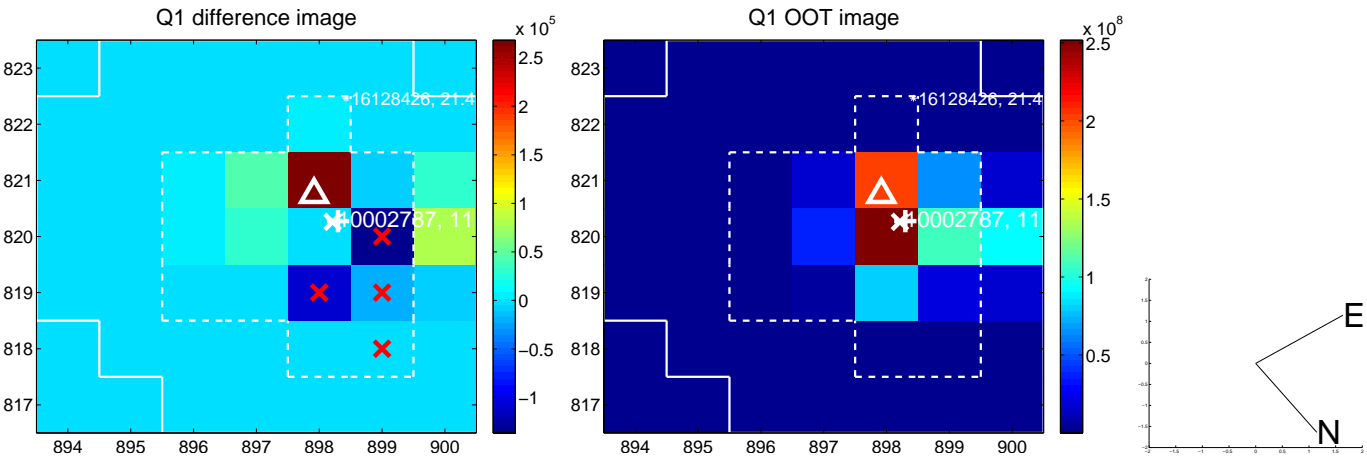
The direct PRF centroid is offset from the target star catalog position by about 0.46 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	7.162 ± 1.697	4.22	4.648 ± 0.972	5.449 ± 1.445
PRF-fit source offset from KIC position	7.421 ± 2.608	2.85	5.157 ± 1.503	5.337 ± 2.289
photometric centroid source offset	9.24 ± 5.73	1.61	5.85 ± 5.96	7.16 ± 5.58

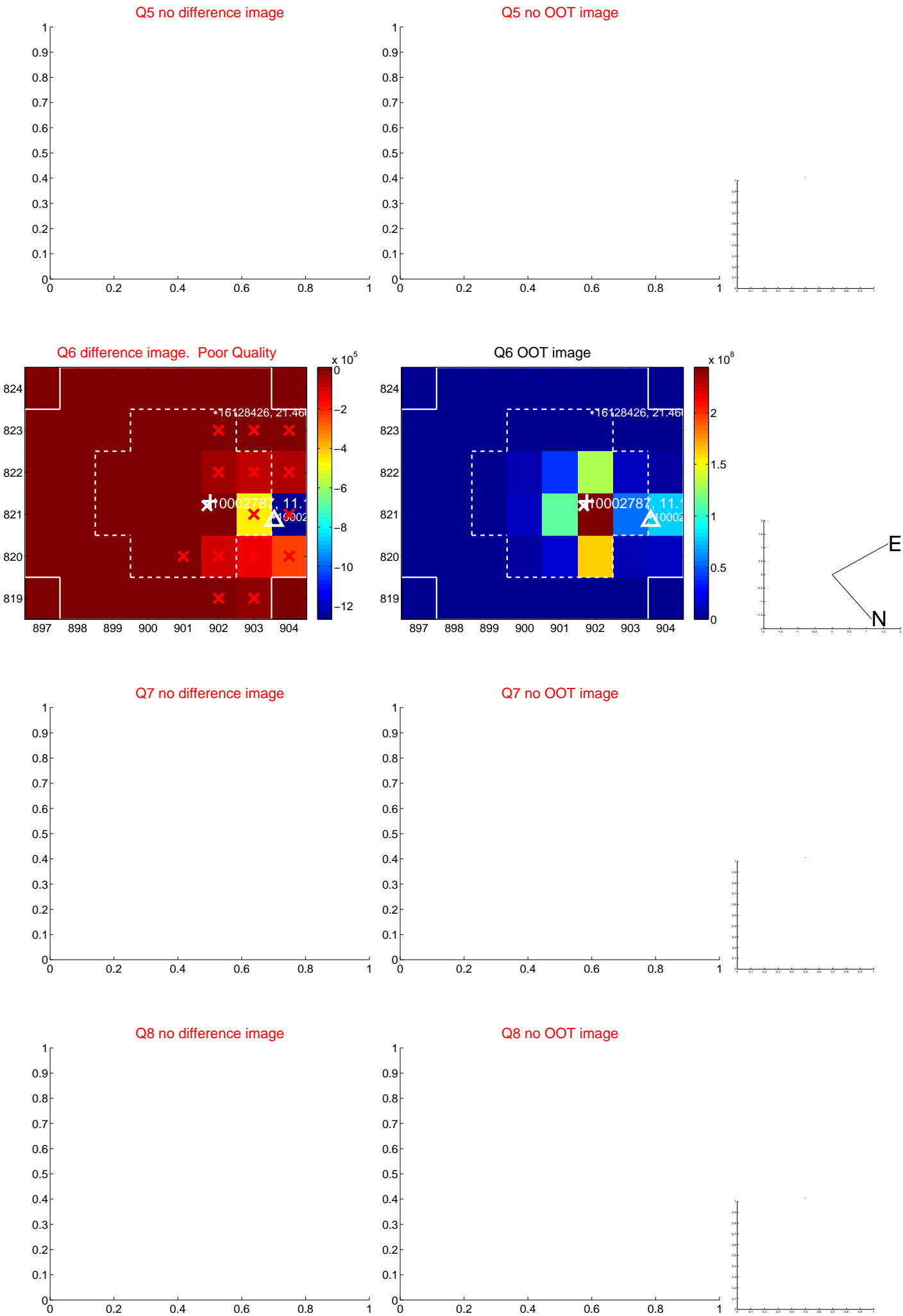


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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



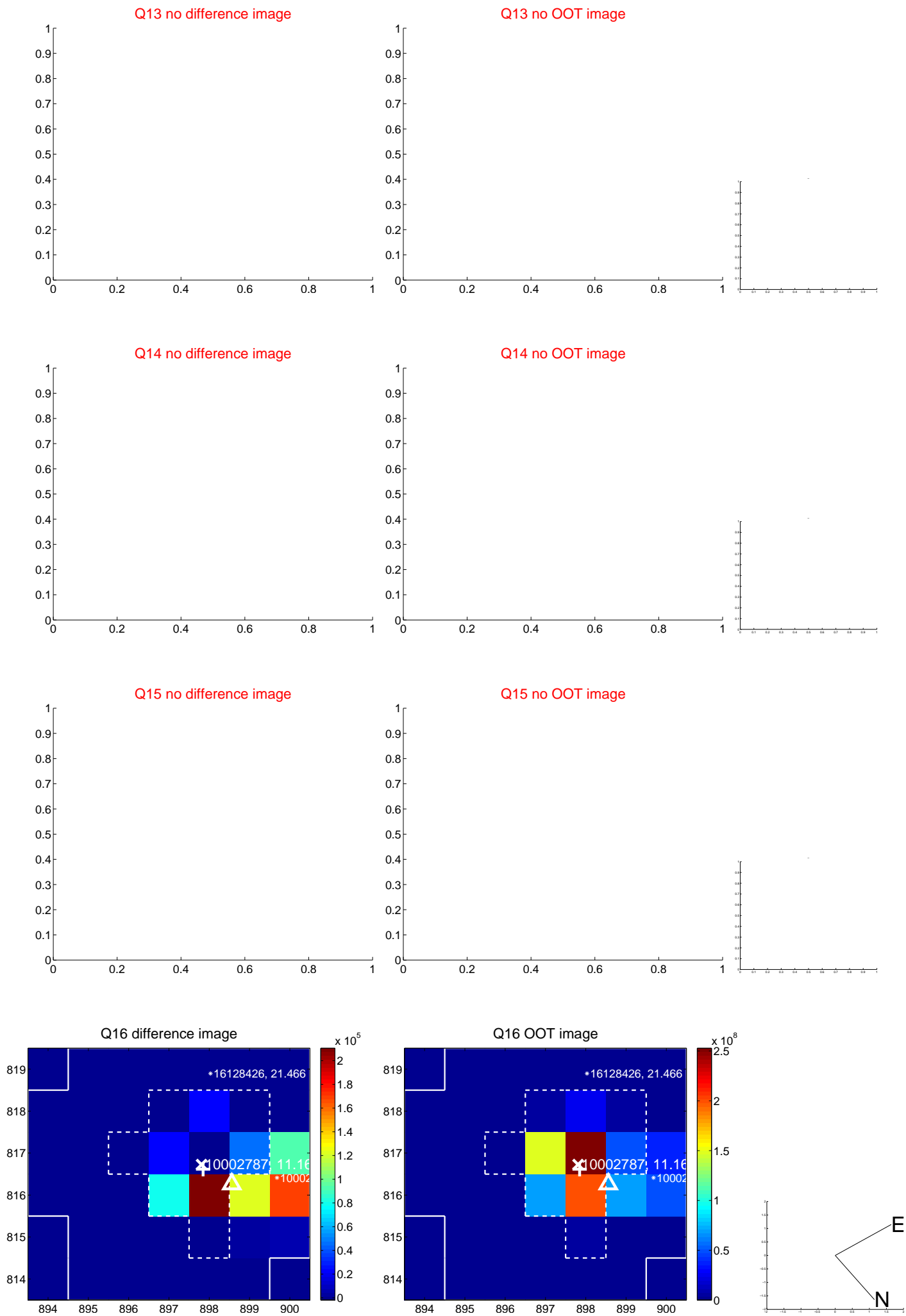
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



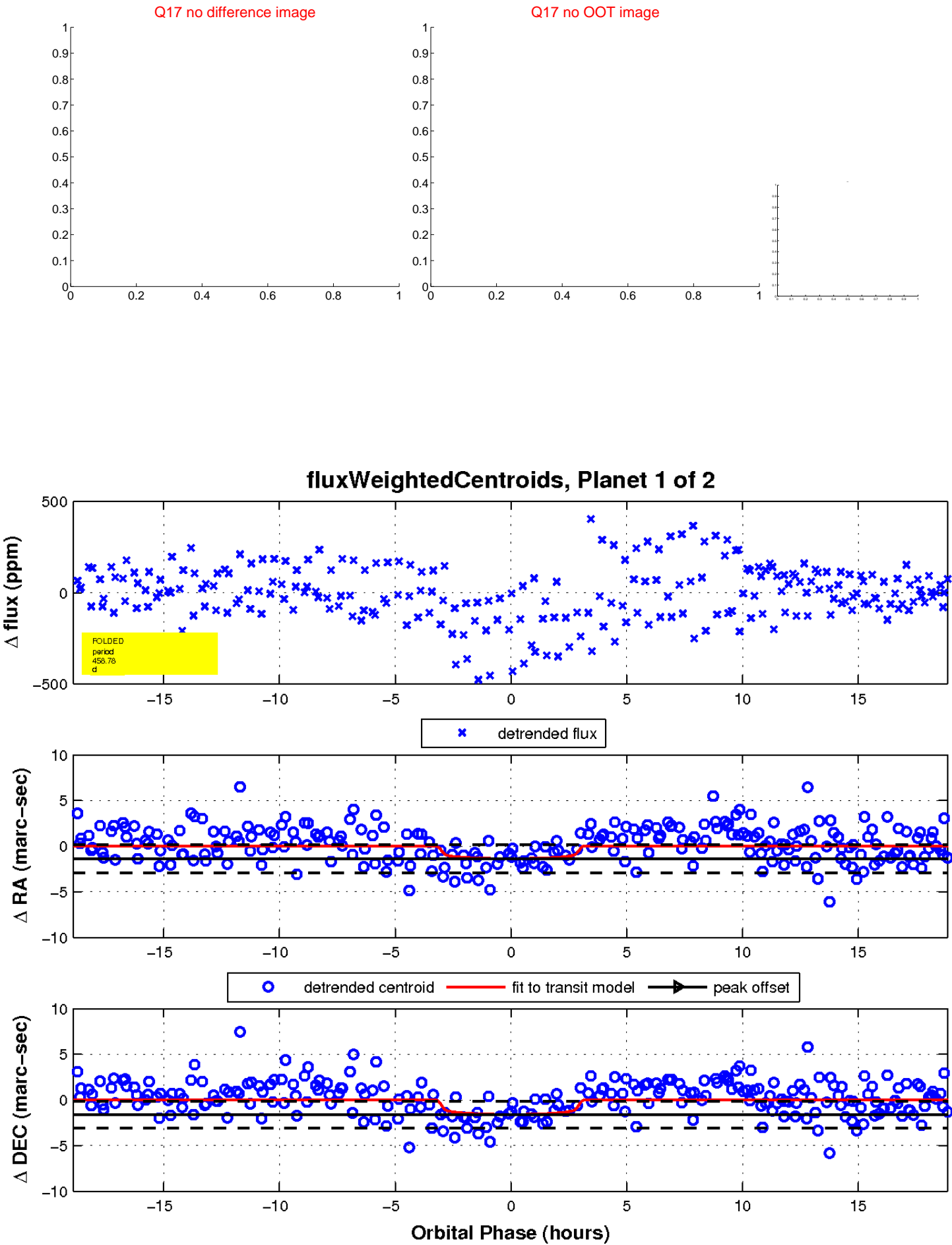
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



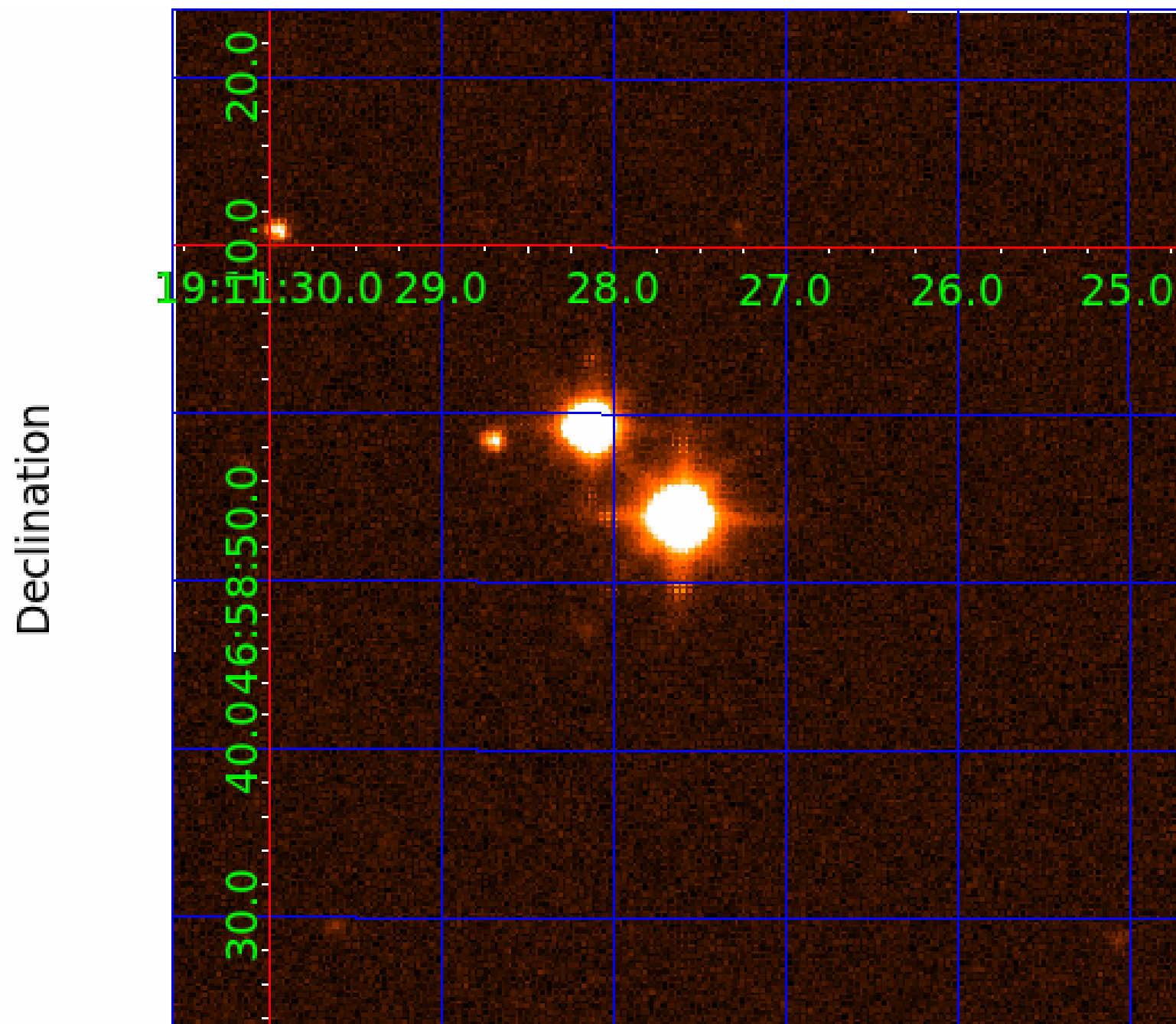
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 010002787

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})
010002787-01	OBS	No	458.780141	154.600854	260.7	6.338	12.8	8.3	1.59	6123	2.90	2.67
010002787-02	OBS	No	339.719931	305.438852	129.6	10.095	7.7	5.1	1.59	6123	2.13	3.98

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010002787-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
010002787-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

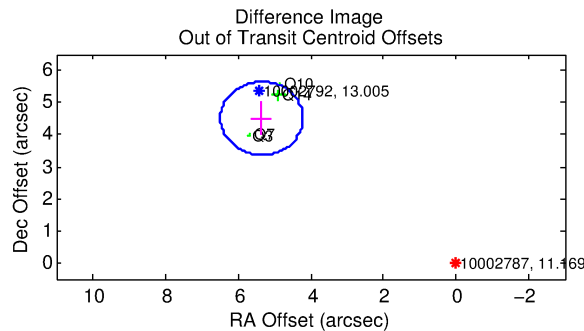
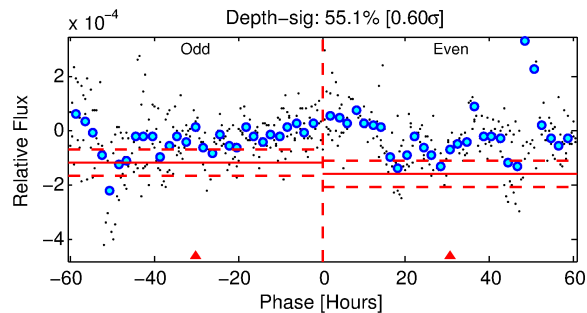
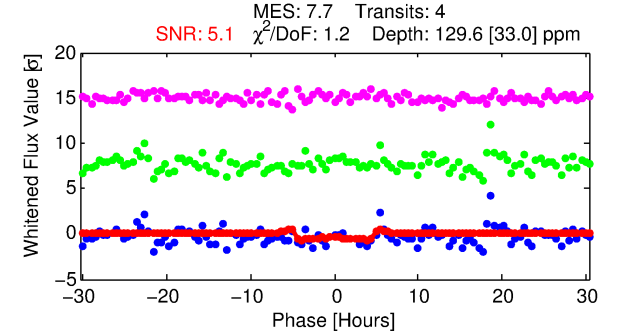
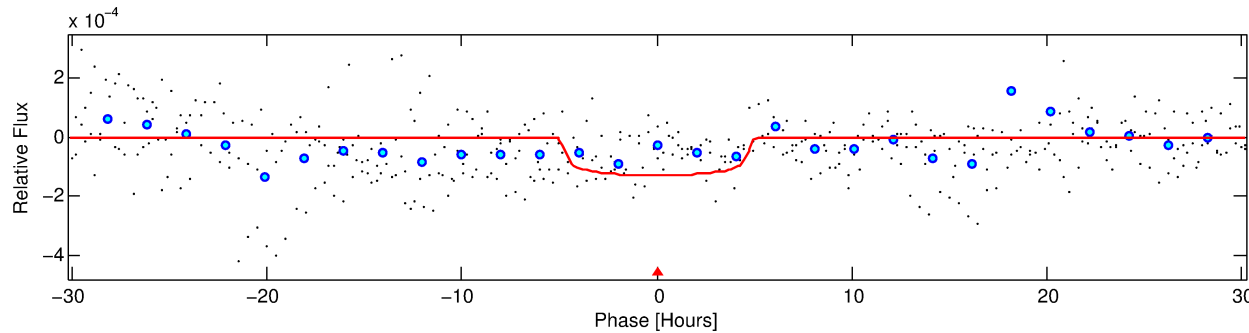
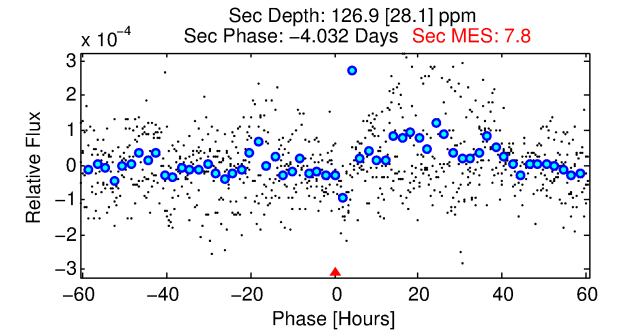
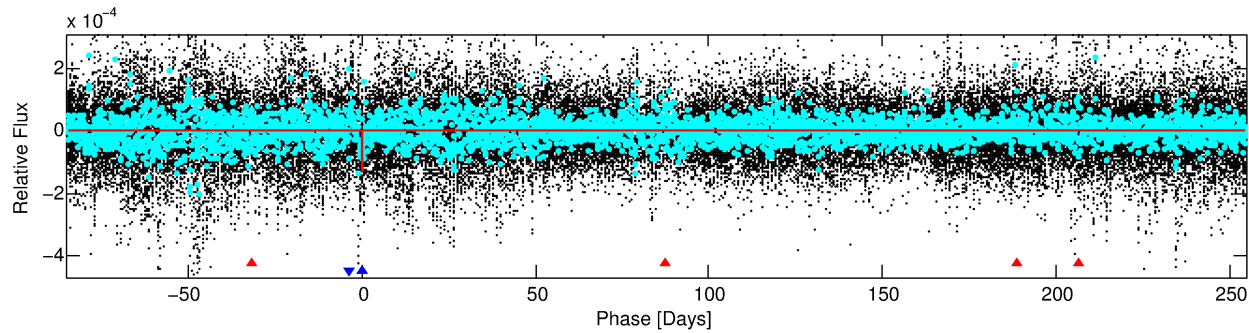
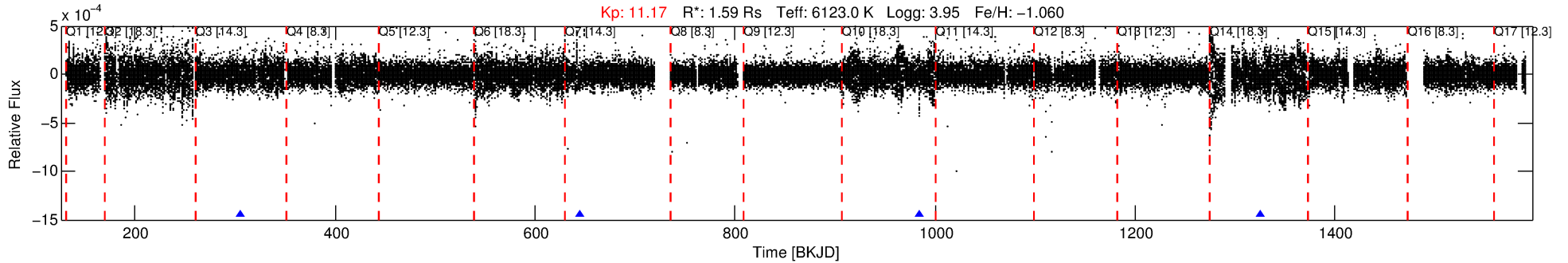
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010002787-02

No Significant Match Found

DV One-Page Summary

KIC: 10002787 Candidate: 2 of 2 Period: 339.720 d



DV Fit Results:

Period = 339.71993 [0.00696] d
Epoch = 305.4389 [0.0140] BKJD
Rp/R* = 0.0123 [0.0023]
a/R* = 114.95 [72.06]
b = 0.91 [0.12]
Seff = 3.98 [2.48]
Teq = 360 [56] K
Rp = 2.13 [0.83] Re
a = 0.8941 [0.3255] AU
Ag = 12301.41 [9183.32] [1.34σ]
Teff = 5865 [656] K [8.37σ]

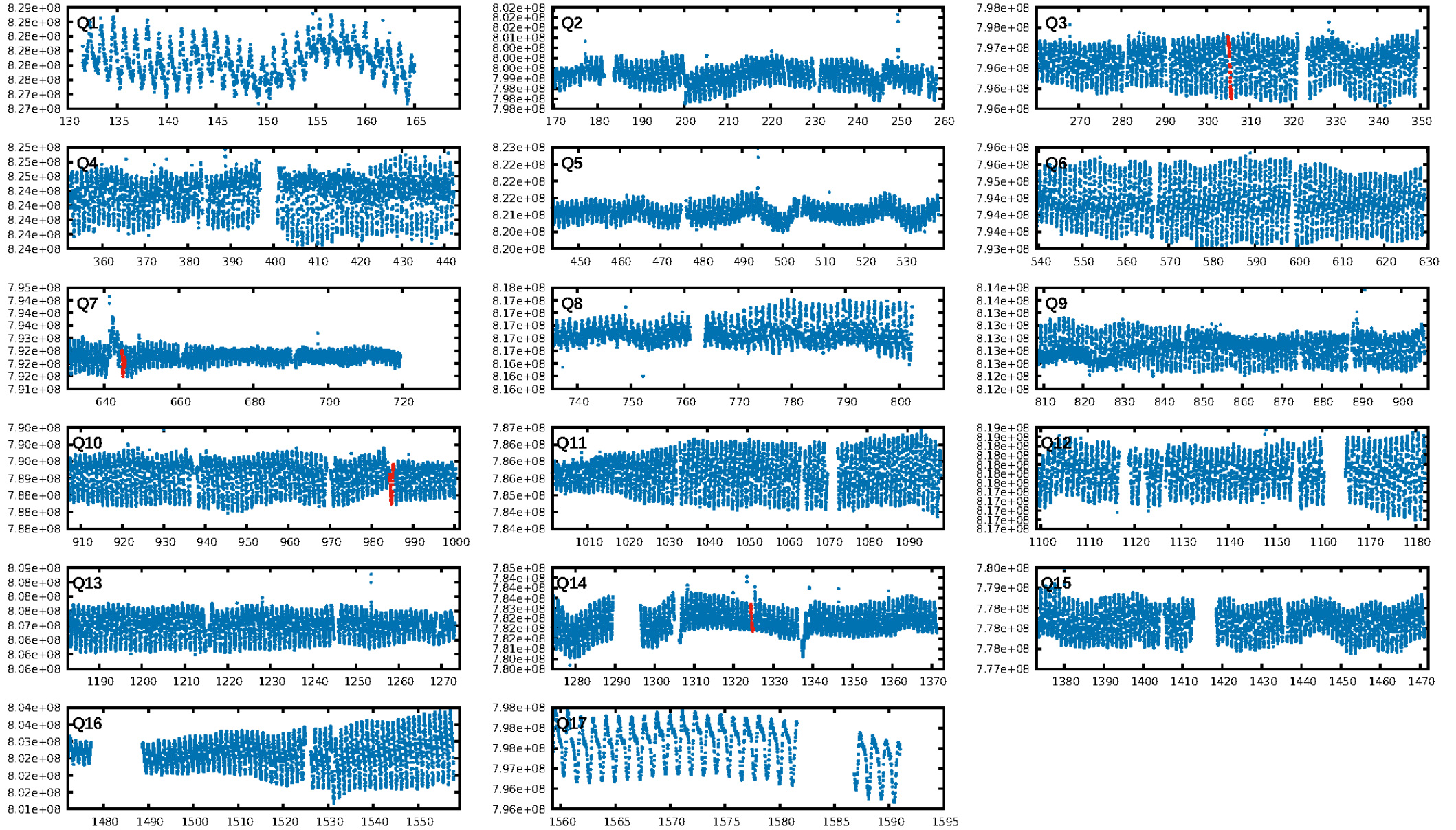
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [239.72σ]
ModelChiSquare2-sig: 12.1%
ModelChiSquareGof-sig: 99.3%
Bootstrap-pfa: 1.15e-10
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -9.323
Centroid-sig: 0.3%
Centroid-so: 15.935 arcsec [2.06σ]
OotOffset-rm: 6.994 arcsec [18.45σ]
KicOffset-rm: 7.727 arcsec [101.18σ]
OotOffset-st: 2/2/0/0 [4]
KicOffset-st: 2/2/0/0 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 1.00 [4/4]

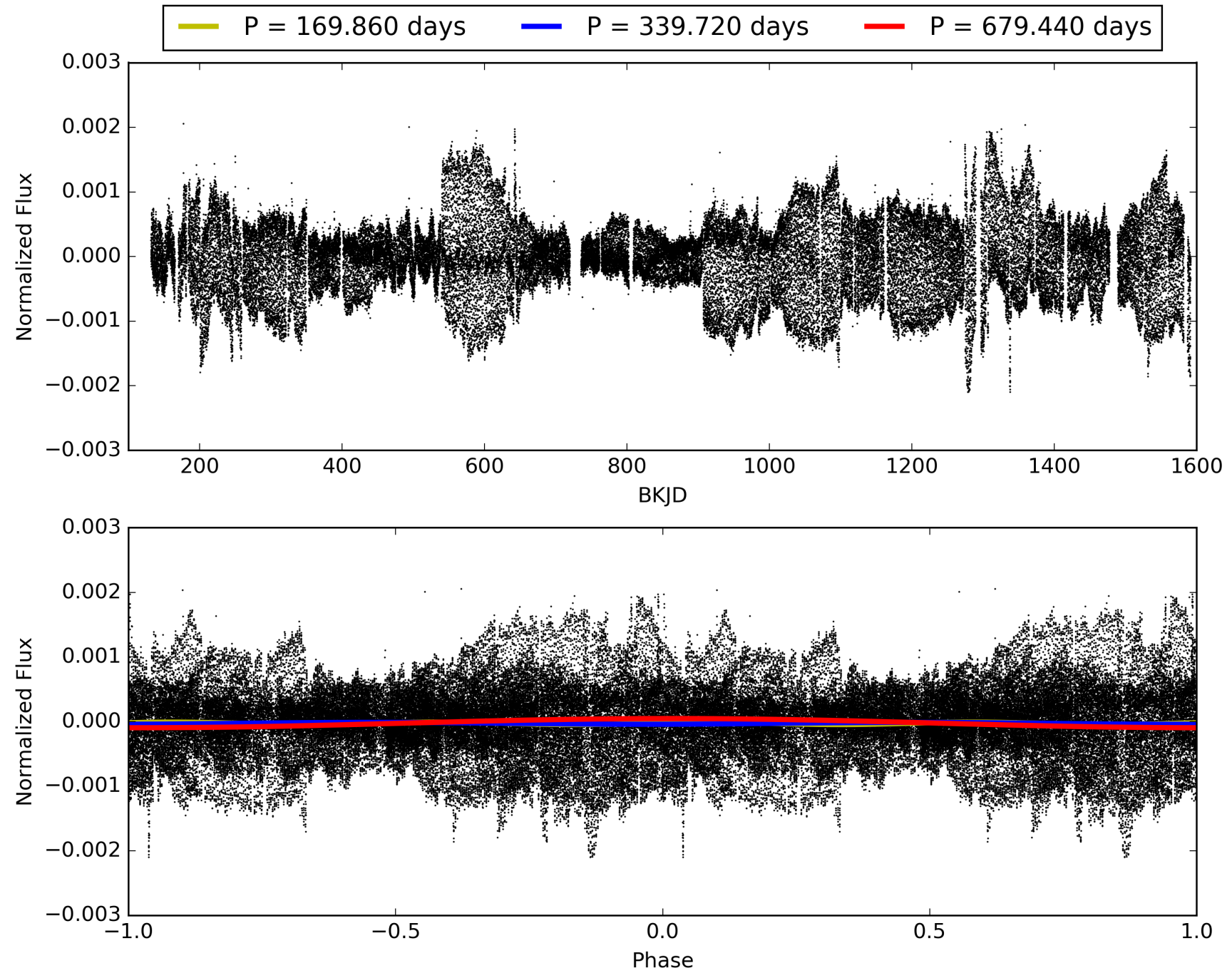
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:32:00 Z

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

TCE 010002787-02, PDC Light Curves

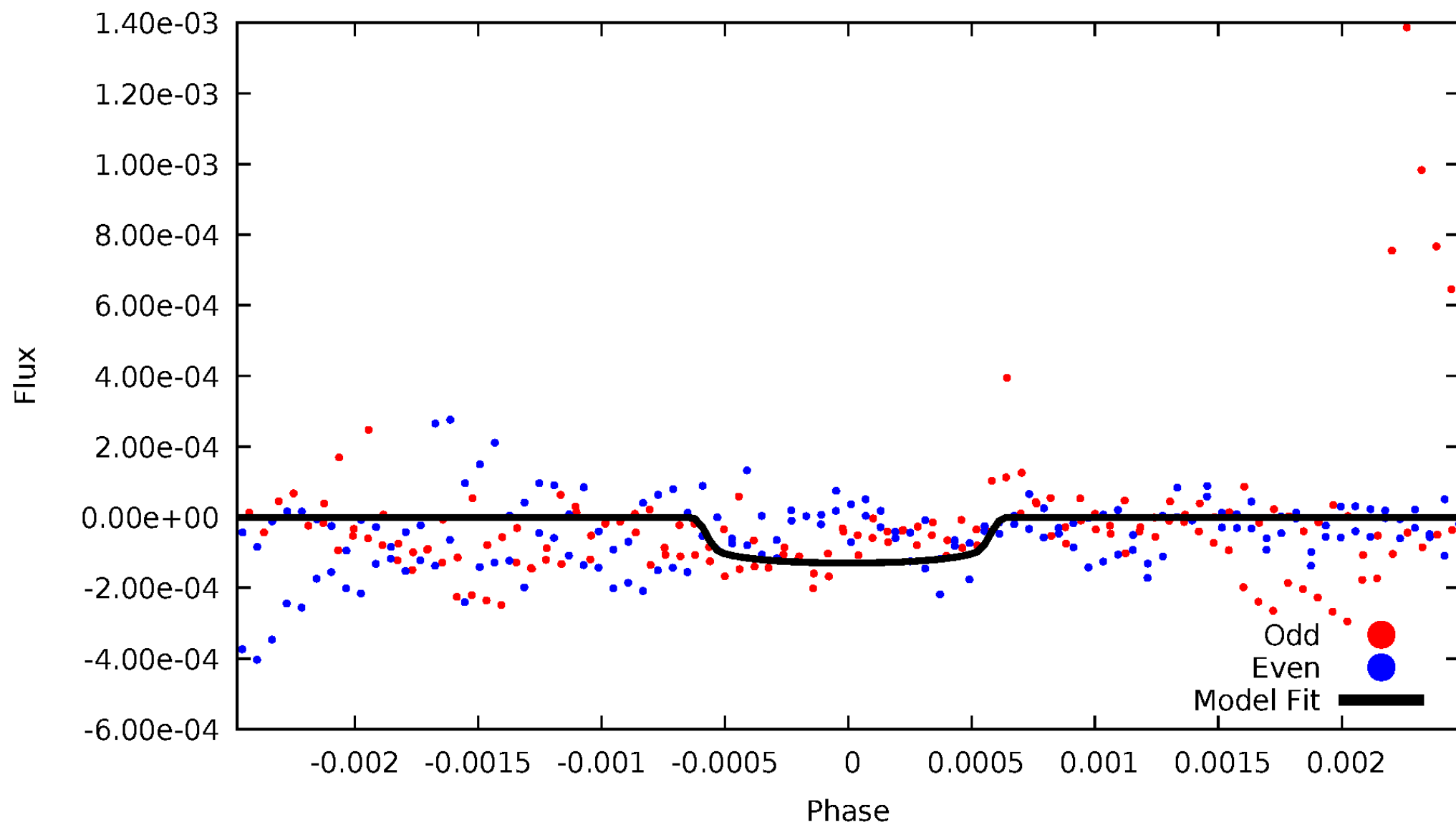


TCE 010002787-02



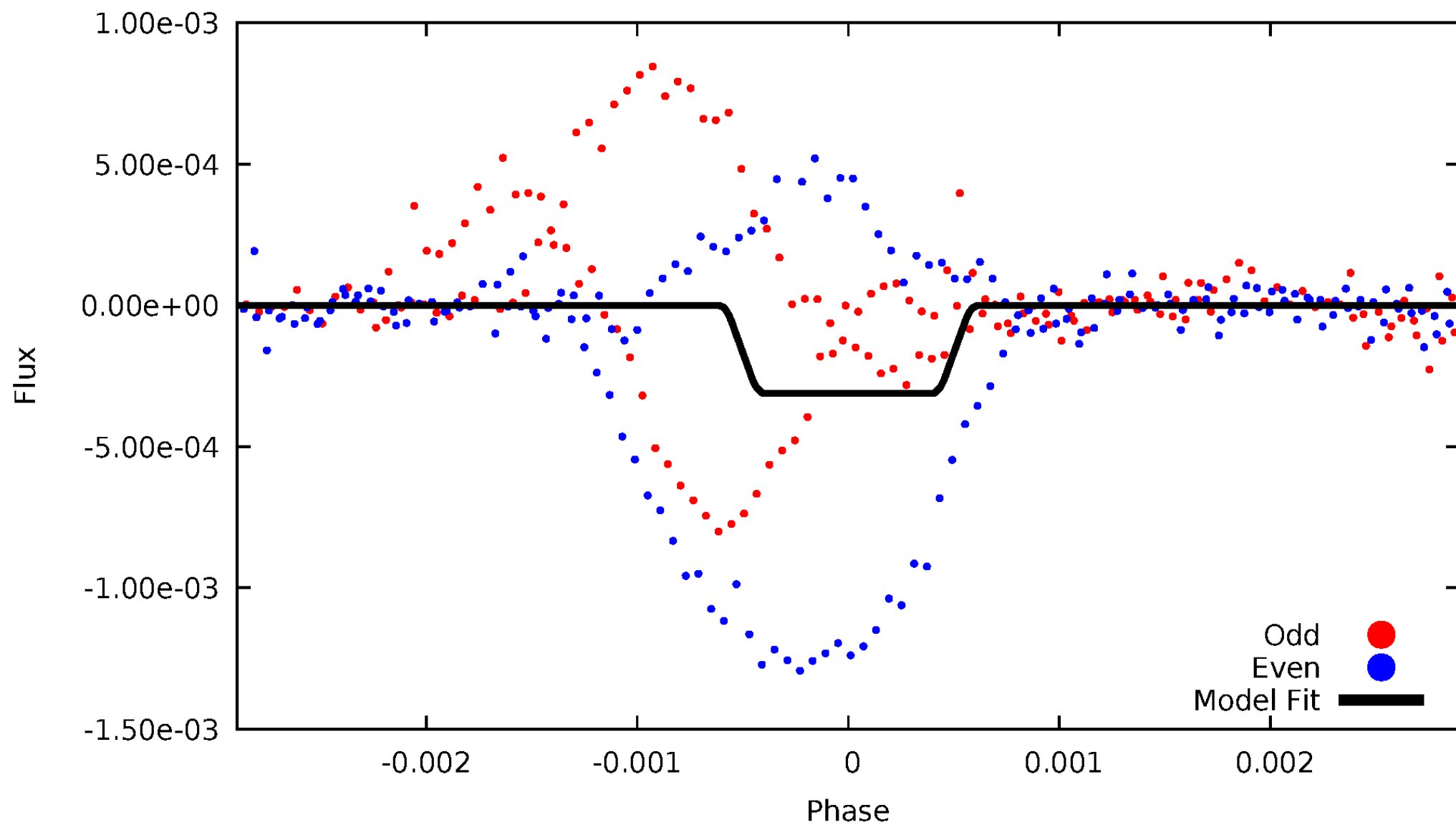
DV Odd/Even

TCE 010002787-02



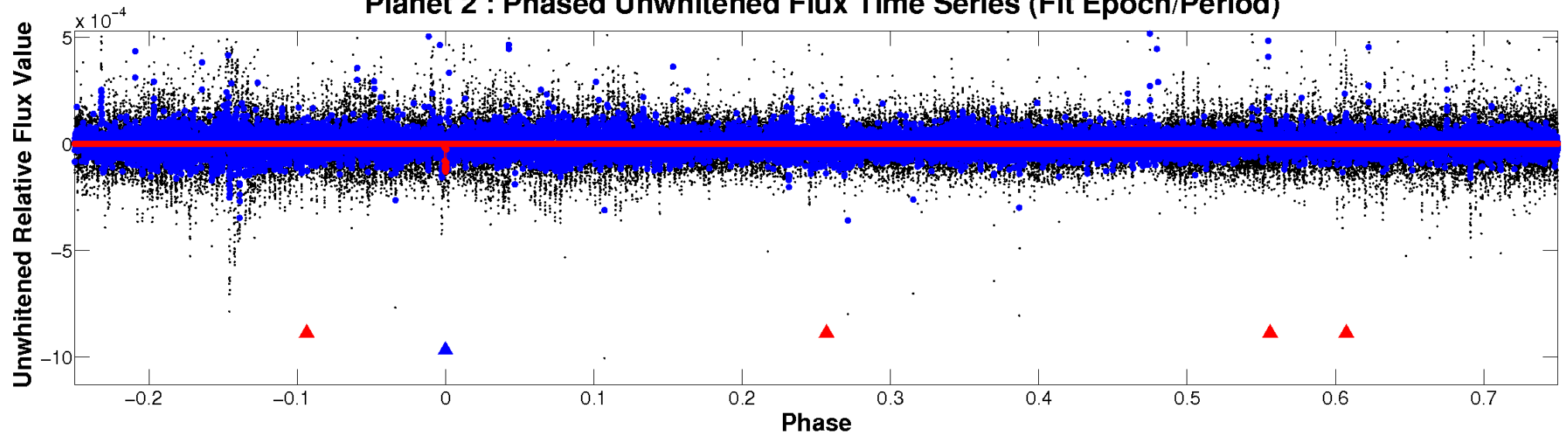
ALT Odd/Even

TCE 010002787-02

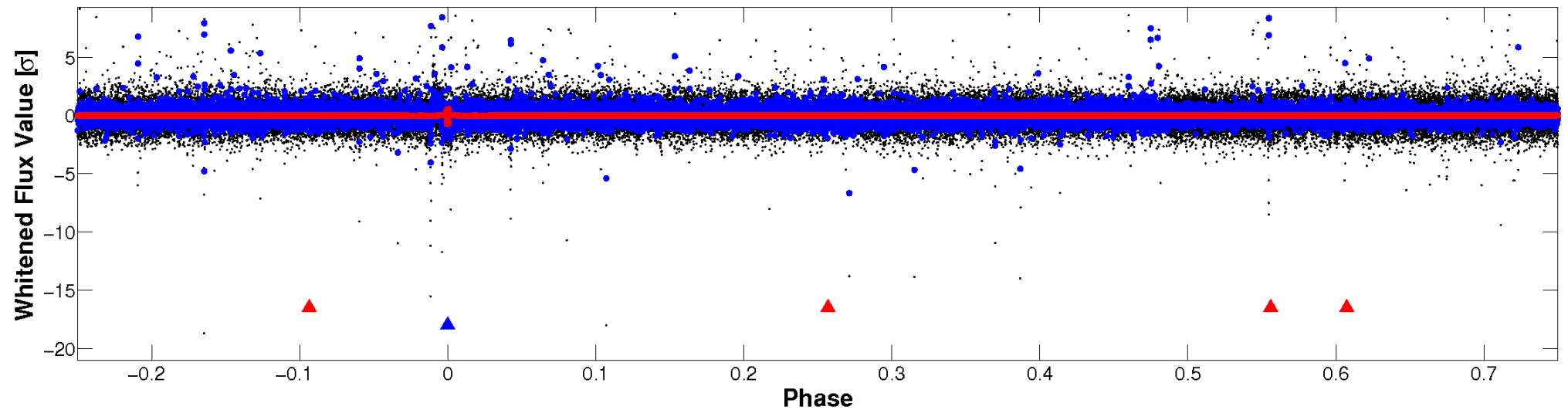


Non-Whitened Vs. Whitened Light Curve

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

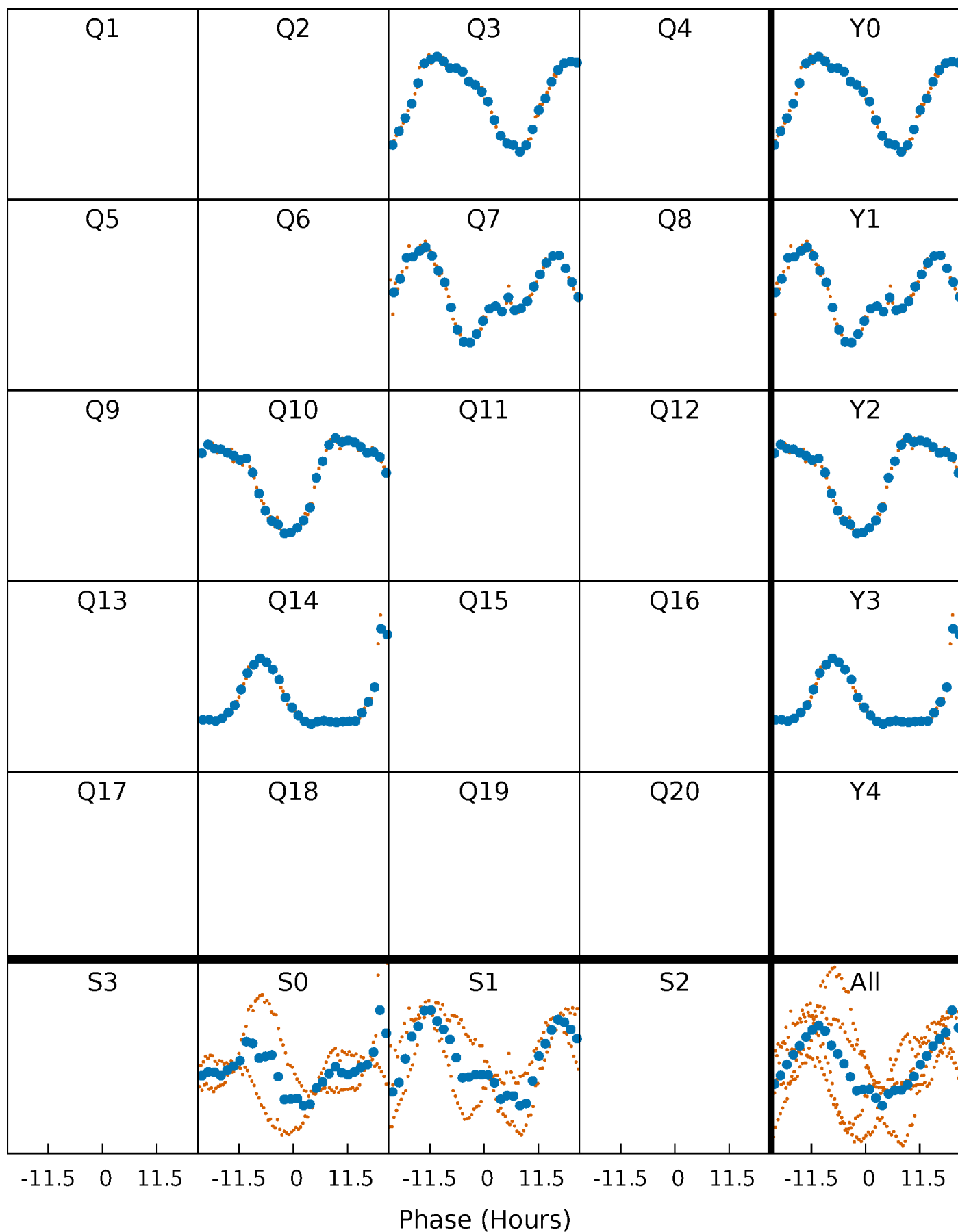


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



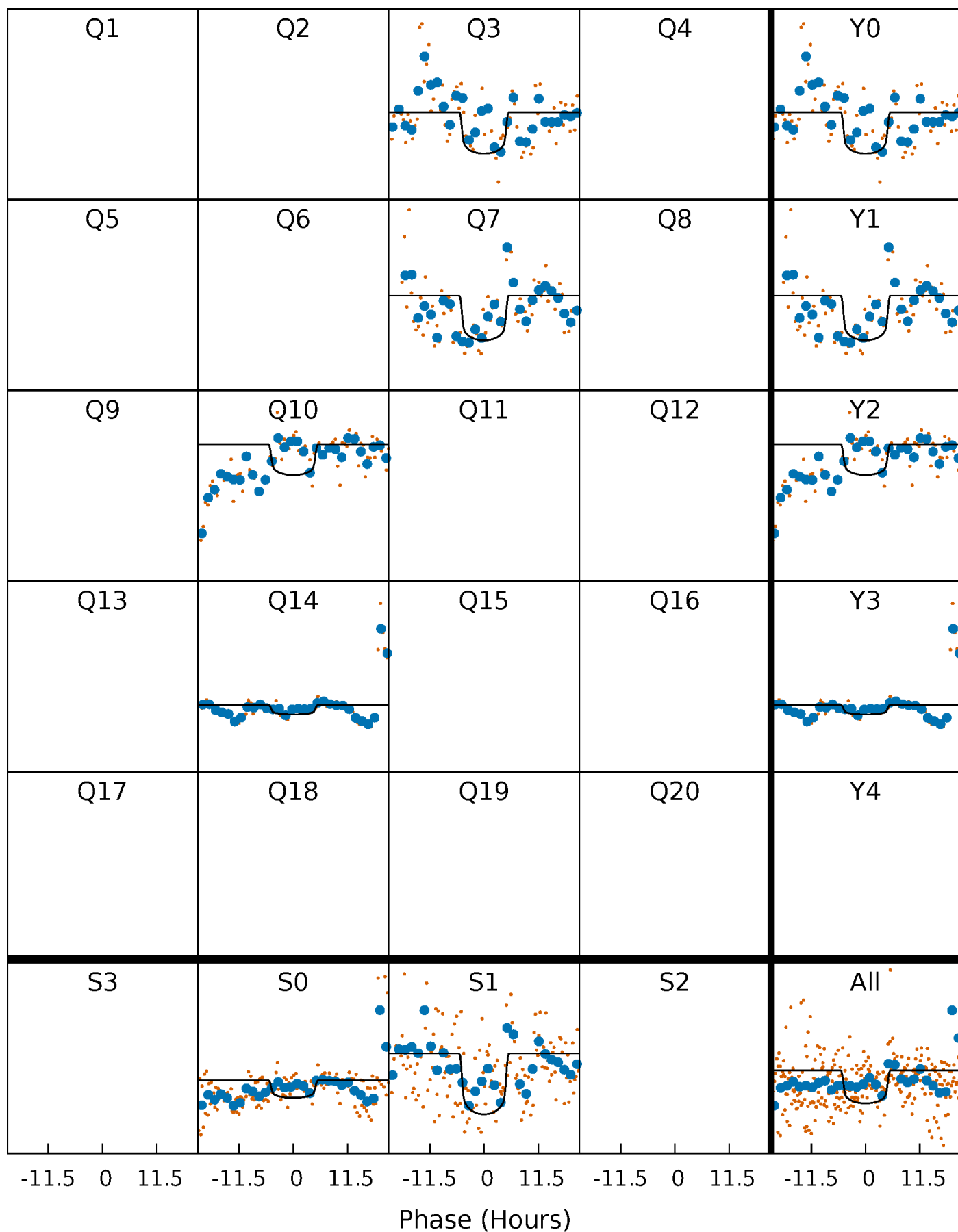
PDC Quarter-Phased Transit Curves

TCE 010002787-02 $P=339.719931$ Days $T_0=305.438852$ (BKJD)



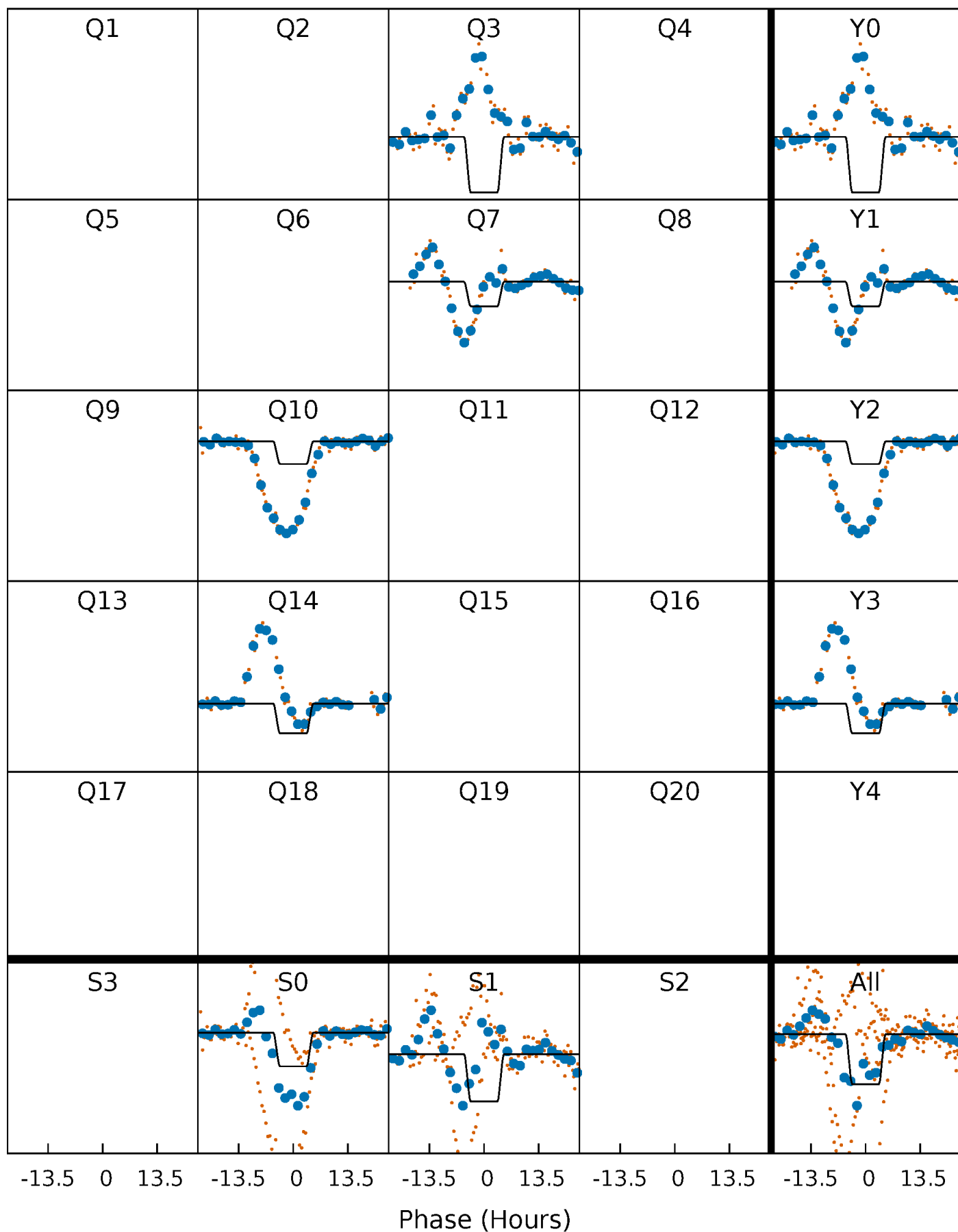
DV Quarter-Phased Transit Curves

TCE 010002787-02 $P=339.719931$ Days $T_0=305.438852$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

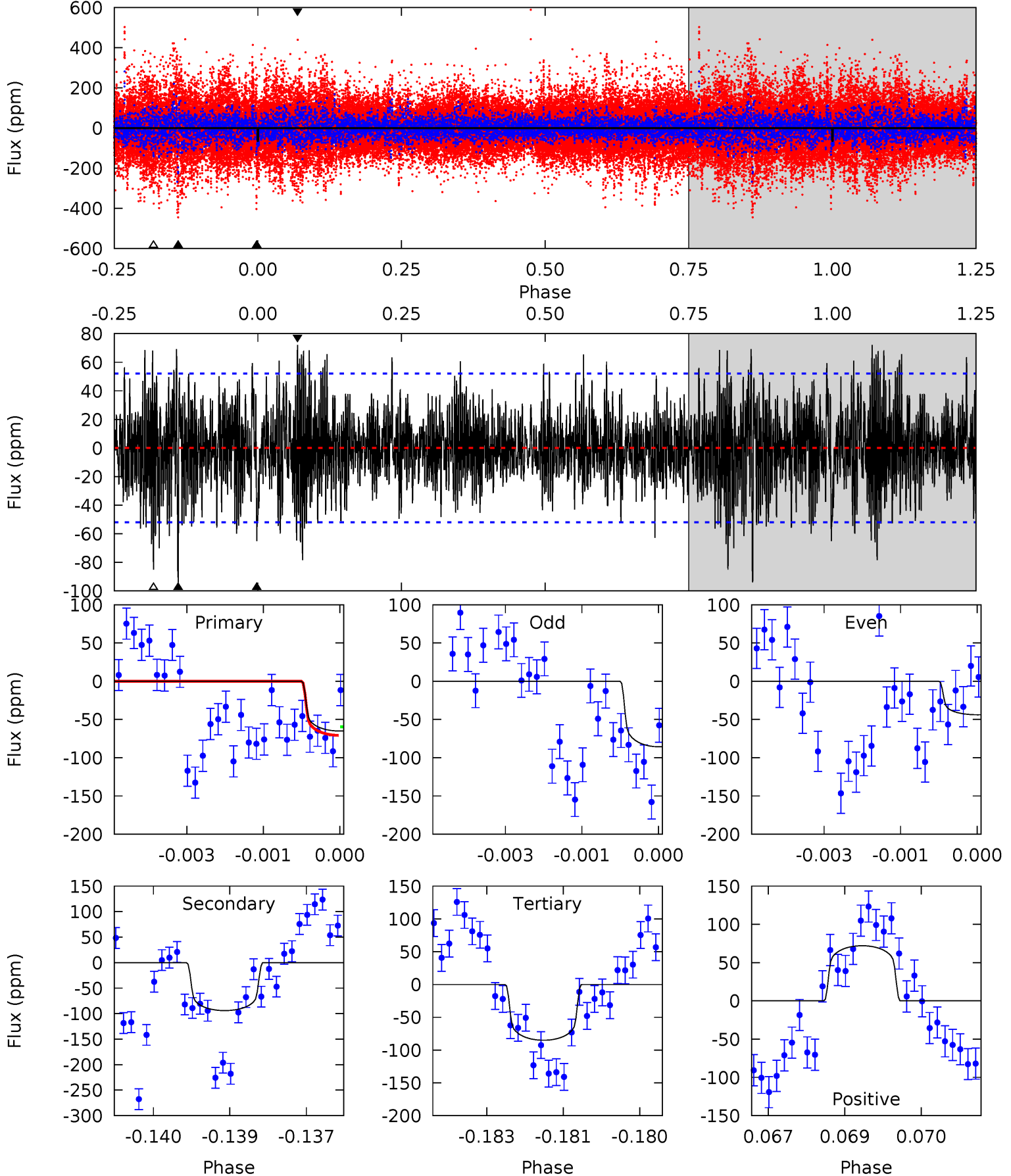
TCE 010002787-02 $P=339.721557$ Days $T_0=305.475937$ (BKJD)



DV Model-Shift Uniqueness Test

010002787-02, P = 339.719931 Days, E = 305.438852 Days

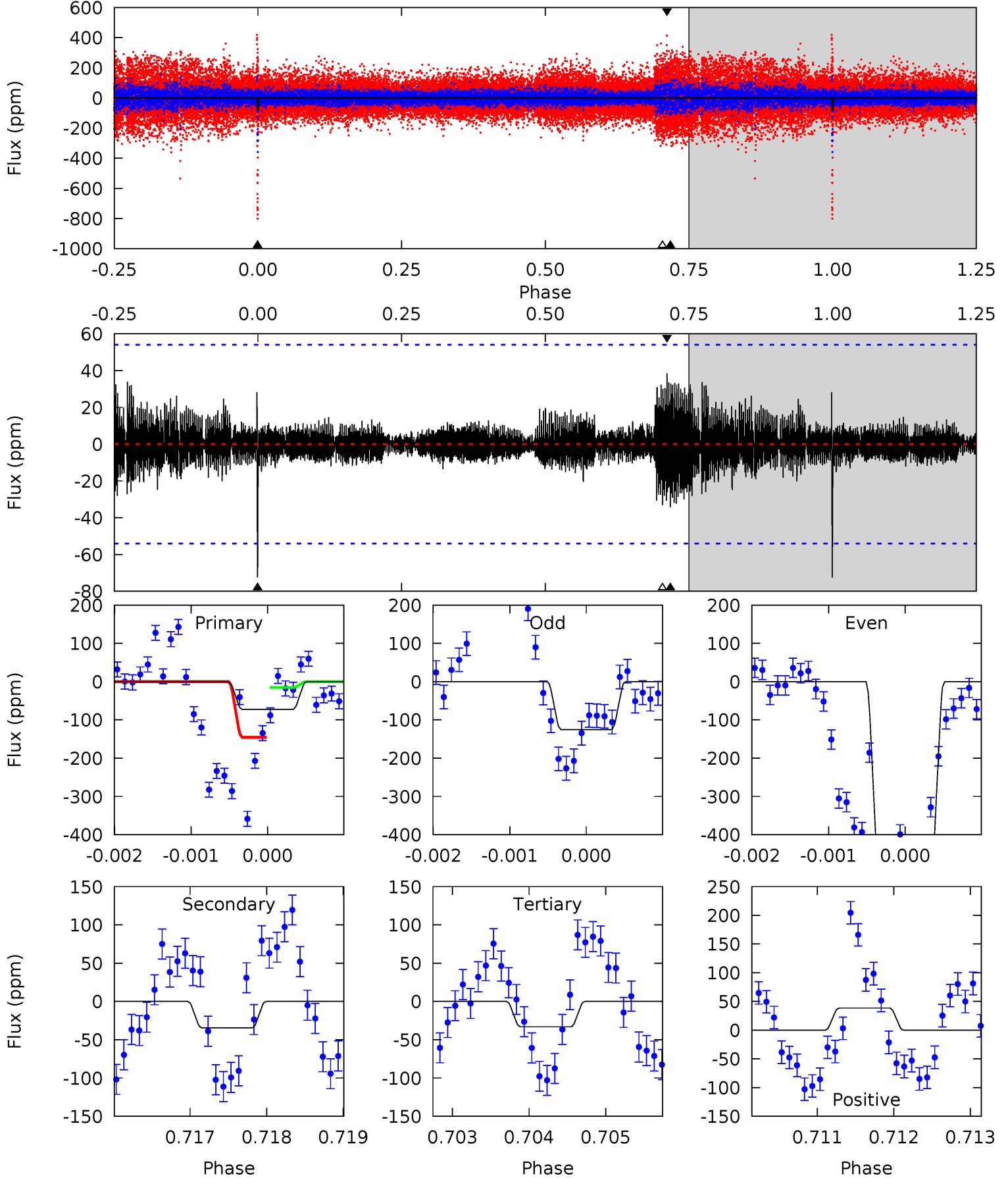
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.76	9.77	8.84	7.49	5.41	3.22	2.27	-2.08	-0.73	0.94	2.28	2.13	0.94	0.43	0.59



Alt Model-Shift Uniqueness Test

010002787-02, P = 339.721557 Days, E = 305.475937 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.26	3.44	3.31	3.86	5.42	3.24	0.80	3.95	3.40	0.13	-0.42	23.1	2.26	0.35	6.38



Stellar Parameters For KIC 010002787

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6123^{+184}_{-138}	$3.952^{+0.368}_{-0.123}$	$-1.060^{+0.350}_{-0.200}$	$1.590^{+0.365}_{-0.548}$	$0.825^{+0.096}_{-0.052}$	$0.289^{+0.757}_{-0.114}$
	+3%/-2%	+9%/-3%	+33%/-19%	+23%/-34%	+12%/-6%	+262%/-39%
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 010002787-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-94 ± 10	$2.05^{+0.47}_{-0.50}$	496^{+35}_{-47}	5486^{+580}_{-412}	10140^{+7573}_{-3576}
Alt.	-34 ± 10	$2.92^{+0.58}_{-0.64}$	492^{+37}_{-46}	3887^{+295}_{-275}	1809^{+1302}_{-718}

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

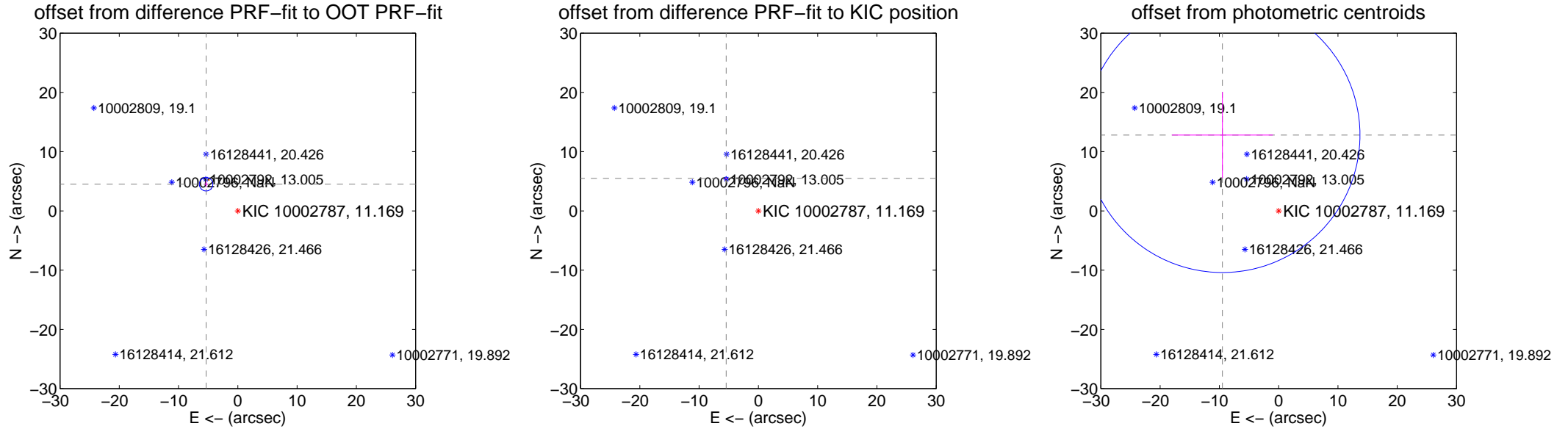
DV Centroid Data

Supplemental centroid analysis for 010002787-02. **Kepler magnitude: 11.17.** Transit SNR 5.15

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.65 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	6.994 ± 0.379	18.45	5.351 ± 0.270	4.505 ± 0.494
PRF-fit source offset from KIC position	7.727 ± 0.076	101.18	5.435 ± 0.078	5.493 ± 0.075
photometric centroid source offset	15.93 ± 7.73	2.06	9.49 ± 8.52	12.80 ± 7.26



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.

Q1 no difference image



Q1 no OOT image



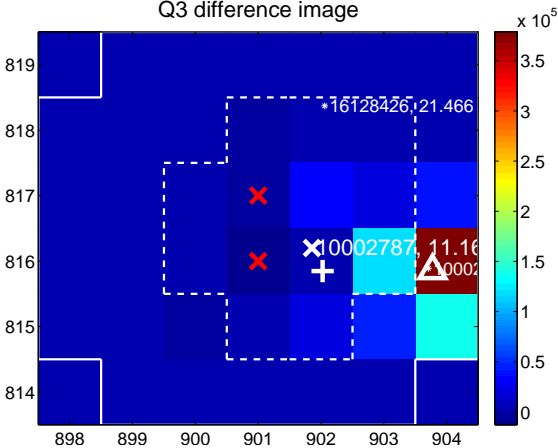
Q2 no difference image



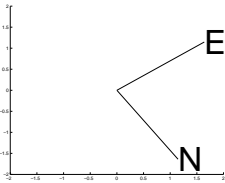
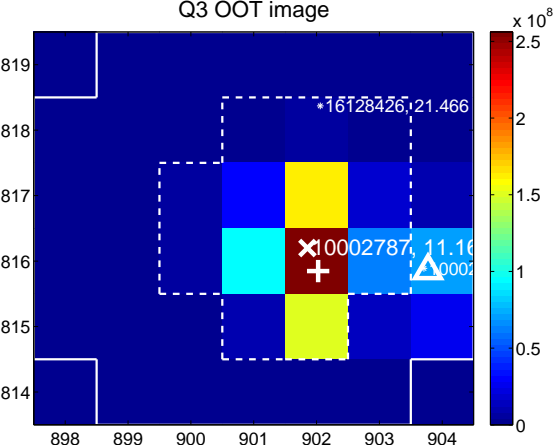
Q2 no OOT image



Q3 difference image



Q3 OOT image



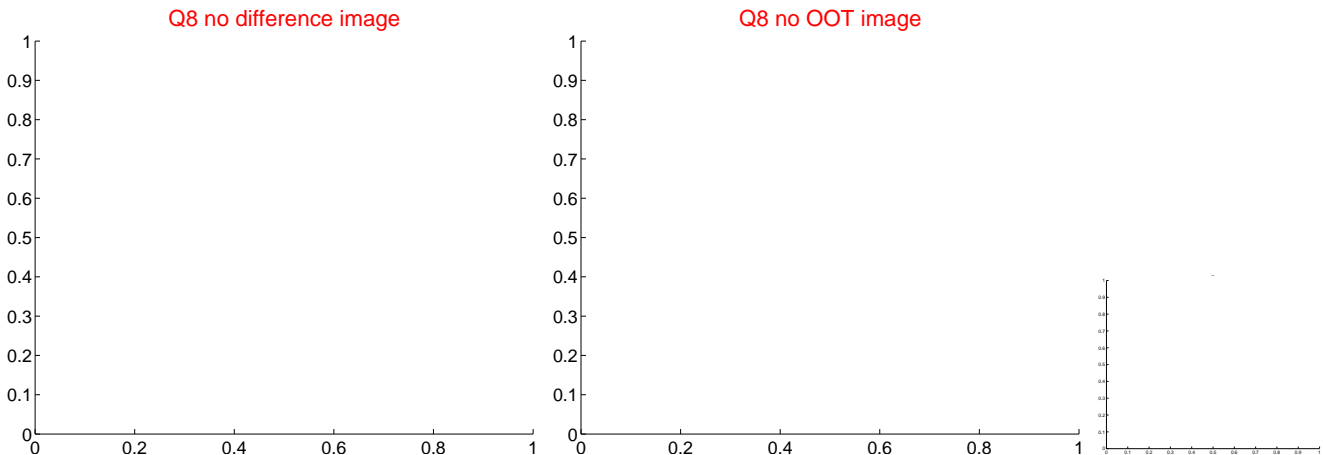
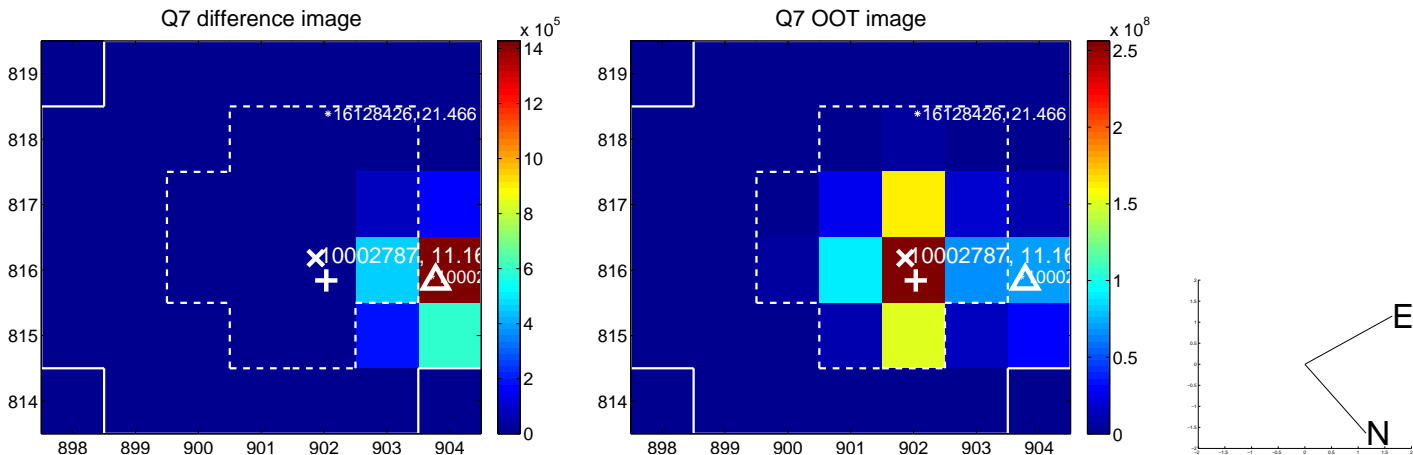
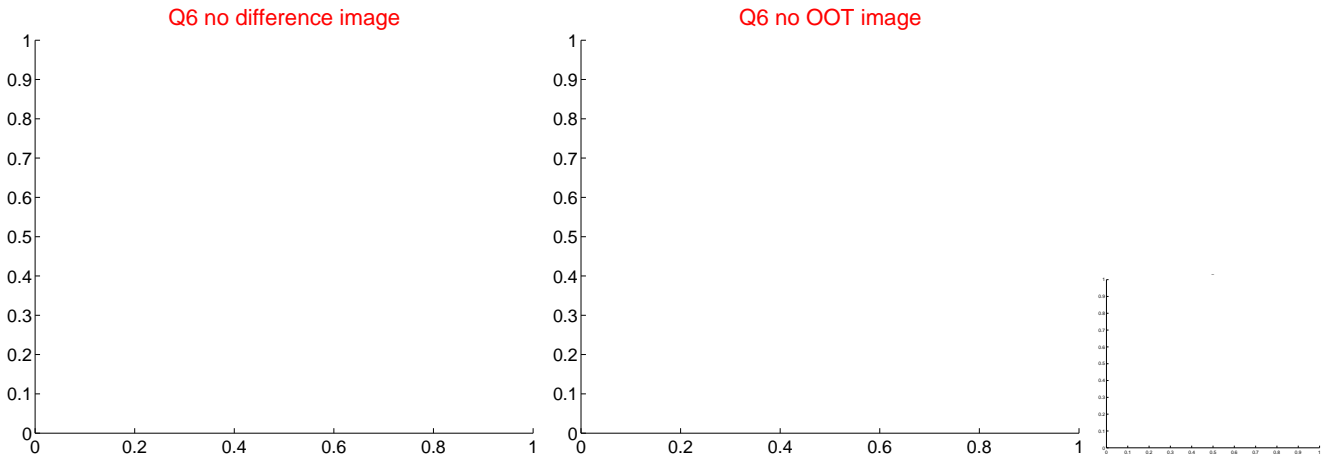
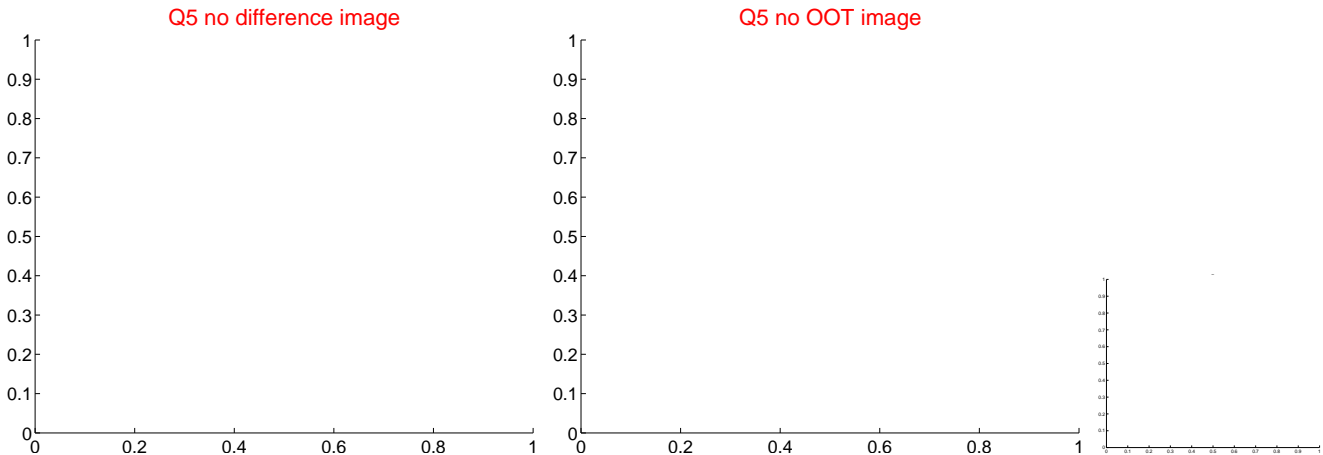
Q4 no difference image



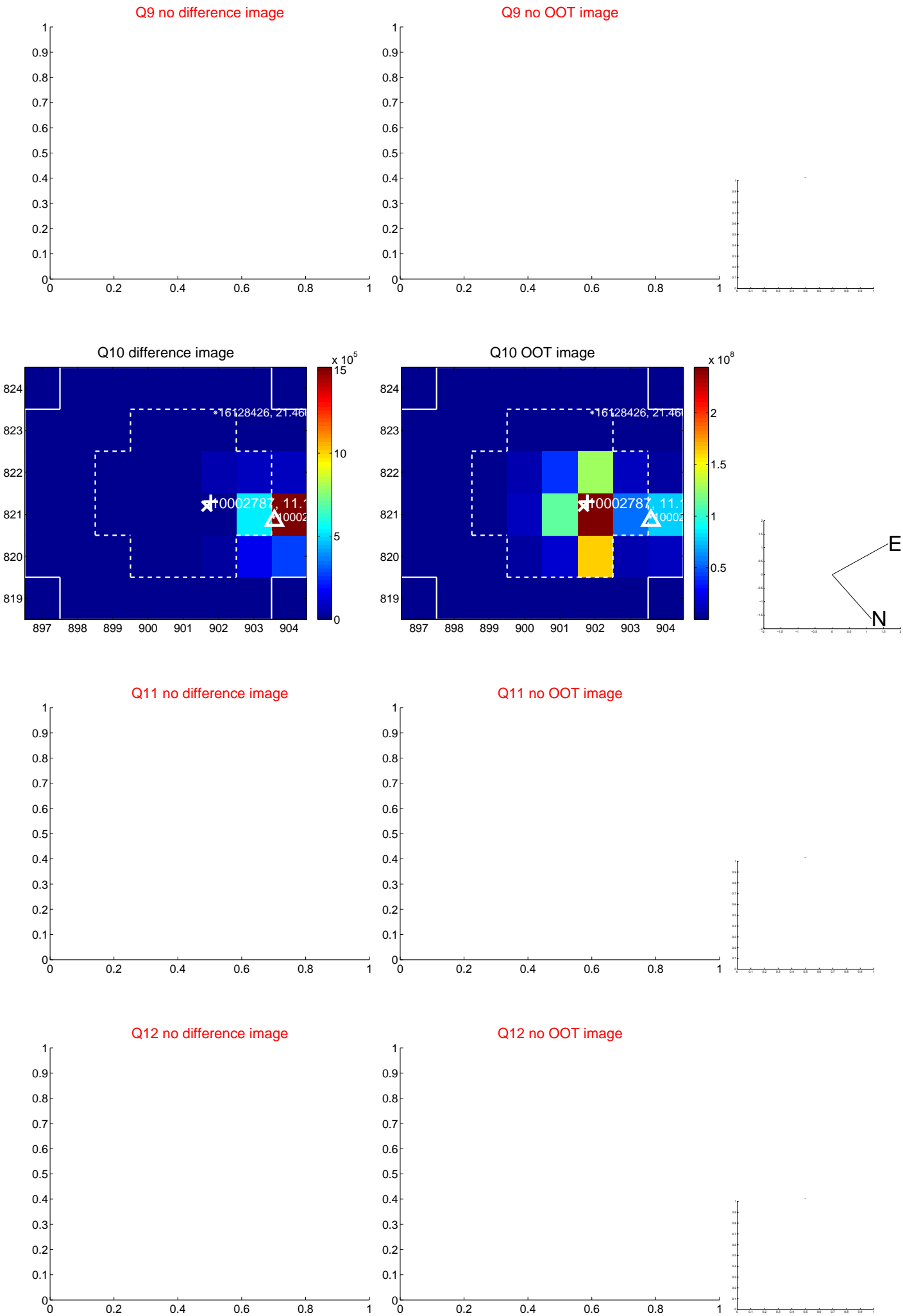
Q4 no OOT image



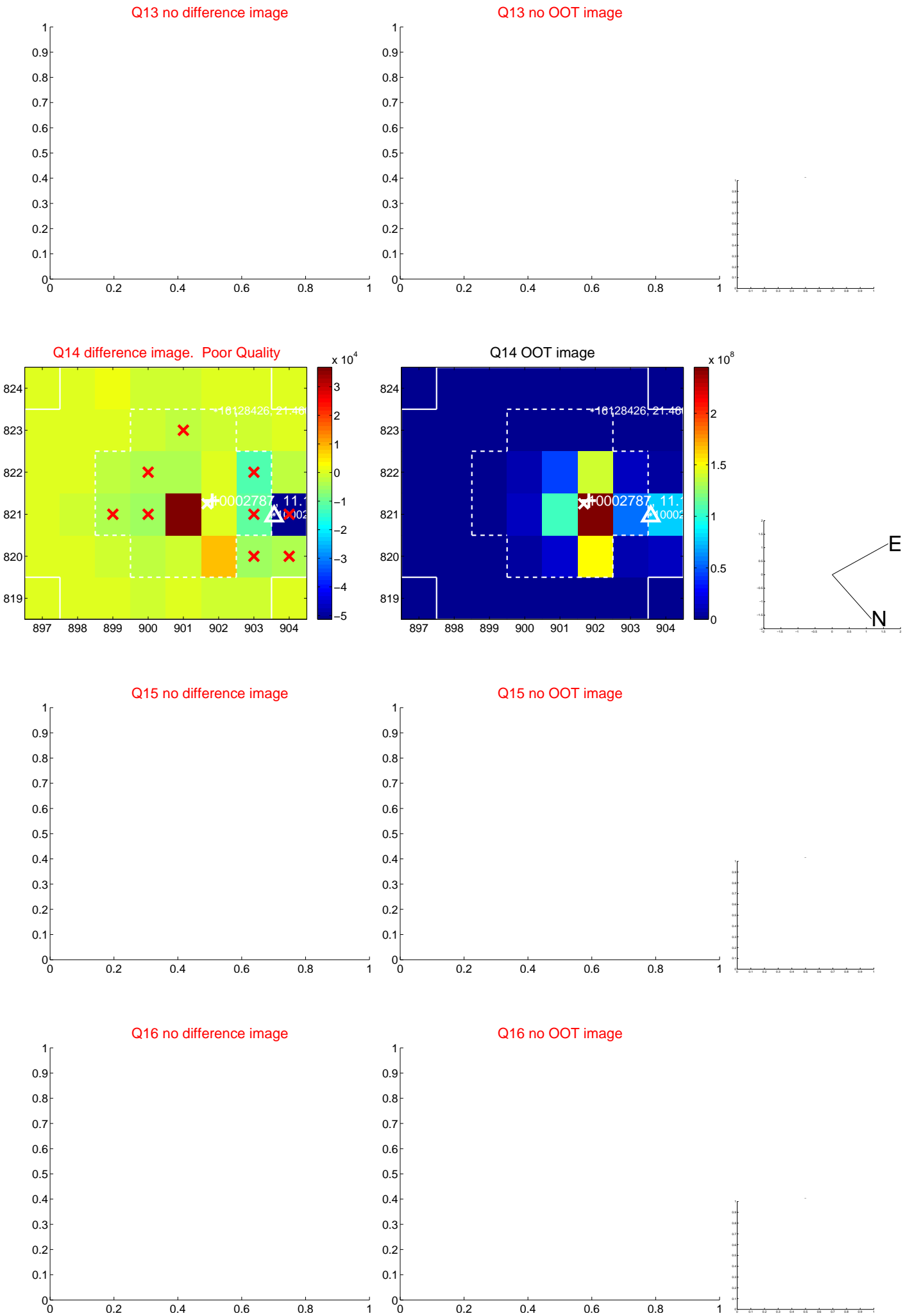
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



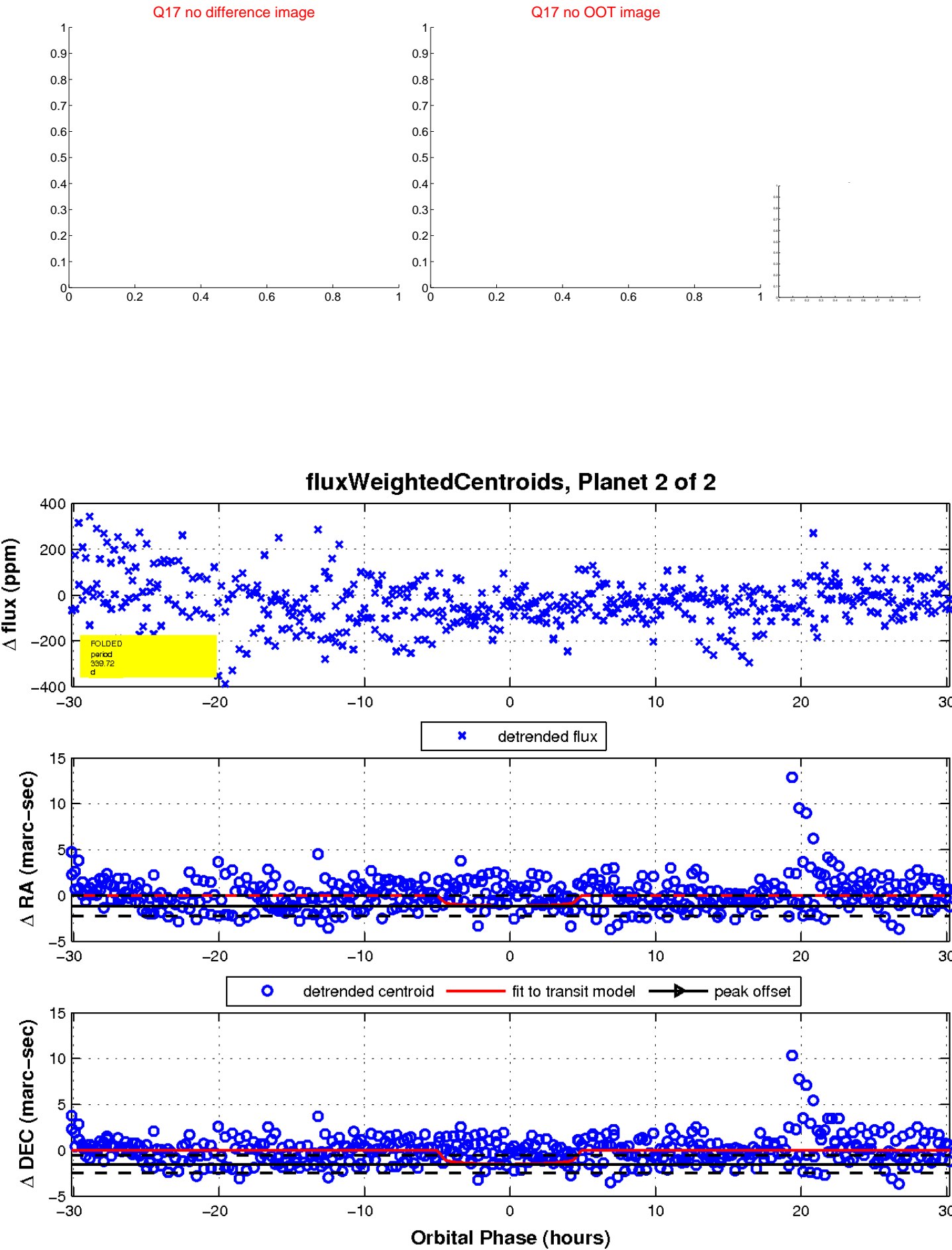
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

