

KIC 012520187

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})
012520187-01	OBS	No	0.714946	131.809400	5.2	3.348	10.6	2.5	8.28	6756	1.96	0.00
012520187-02	OBS	No	131.484206	201.781286	218.0	2.199	21.3	4.8	8.28	6756	14.32	250.61

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012520187-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
012520187-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

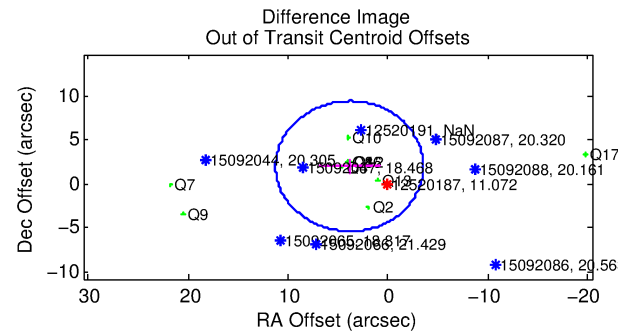
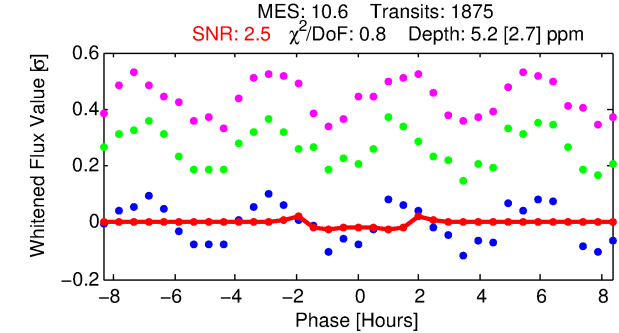
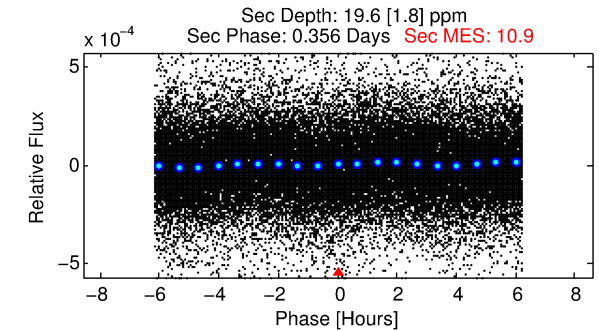
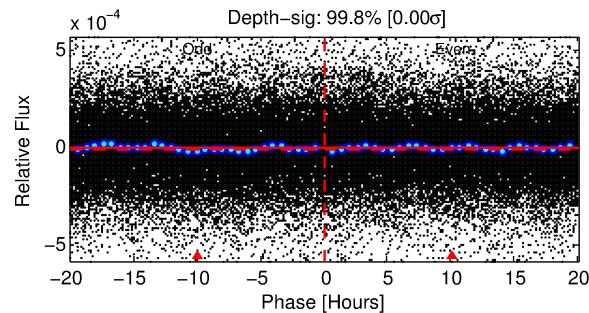
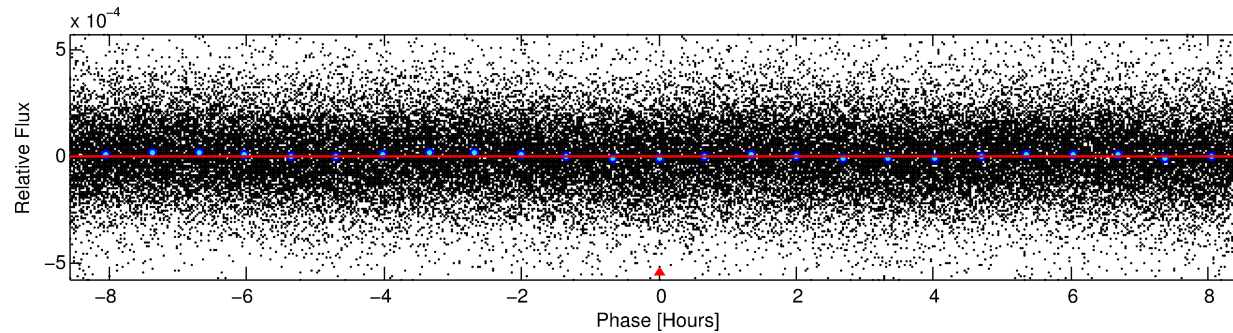
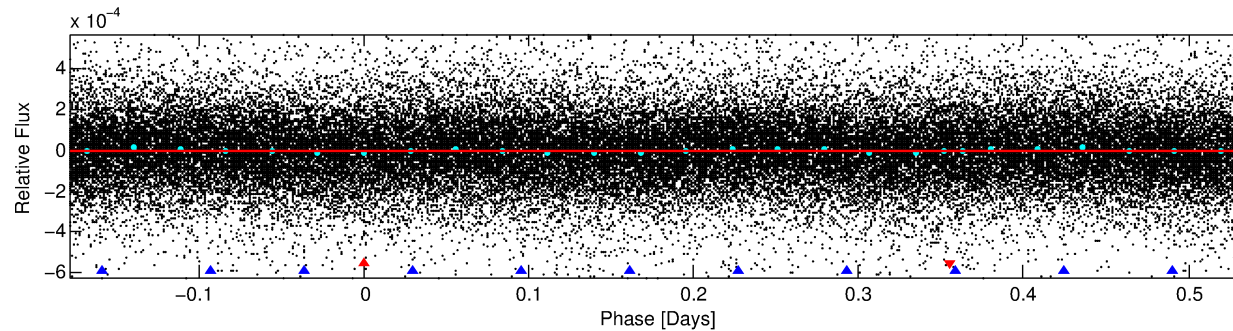
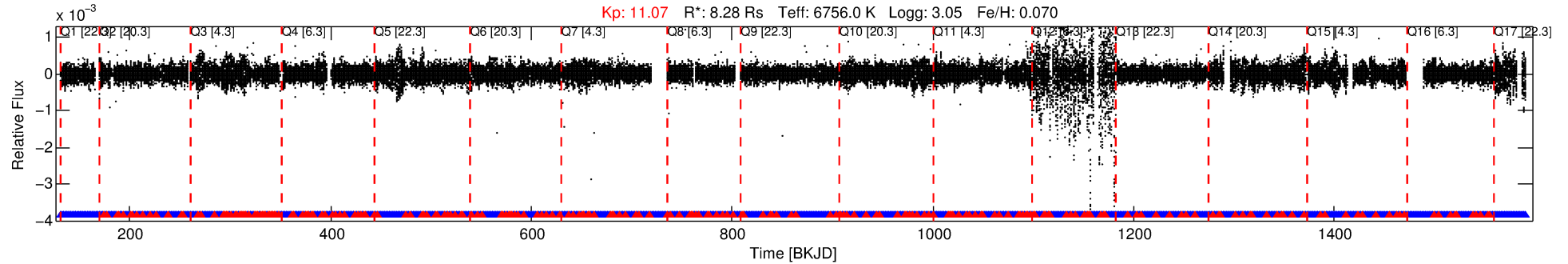
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012520187-01

No Significant Match Found

DV One-Page Summary

KIC: 12520187 Candidate: 1 of 2 Period: 0.715 d



DV Fit Results:

Period = 0.71495 [0.00004] d
Epoch = 131.8094 [0.0063] BKJD
Rp/R* = 0.0022 [0.0008]
a/R* = 1.58 [1.38]
b = 0.52 [2.08]
Seff = N/A
Teq = N/A
Rp = 1.96 [1.35] Re
a = N/A
Ag = N/A
Teff = N/A

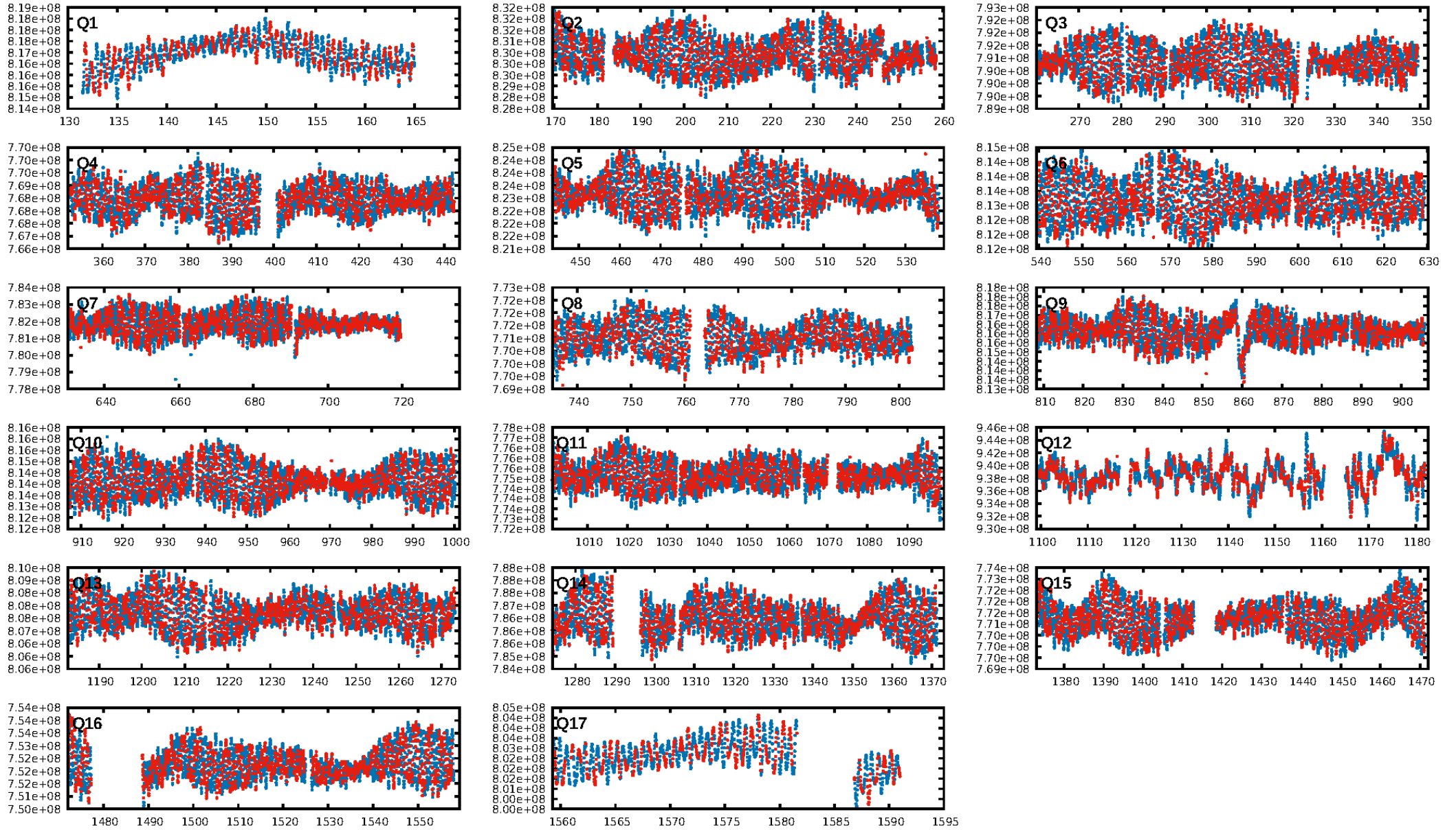
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [783.59 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.51e-18
RollingBand-fgt: 0.86 [1538/1791]
GhostDiagnostic-chr: -1.045
Centroid-sig: N/A
Centroid-so: 1.071 arcsec [0.33 σ]
OotOffset-rm: 4.330 arcsec [1.76 σ]
KicOffset-rm: 17.141 arcsec [8.04 σ]
OotOffset-st: 3/1/4/3 [11]
KicOffset-st: 4/1/4/3 [12]
DiffImageQuality-fgm: 0.08 [1/12]
DiffImageOverlap-fno: 1.00 [17/17]

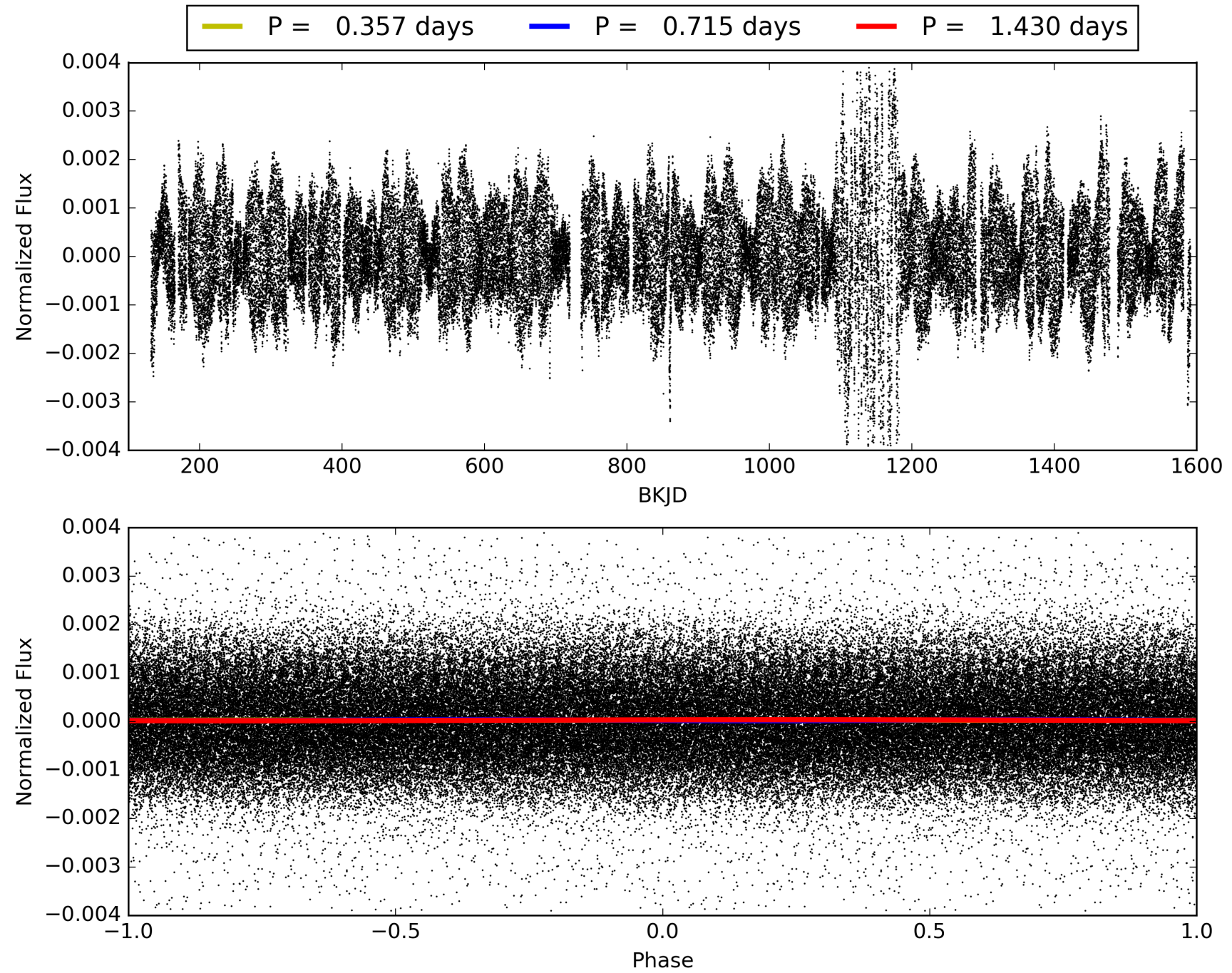
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:08:35 Z

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

TCE 012520187-01, PDC Light Curves

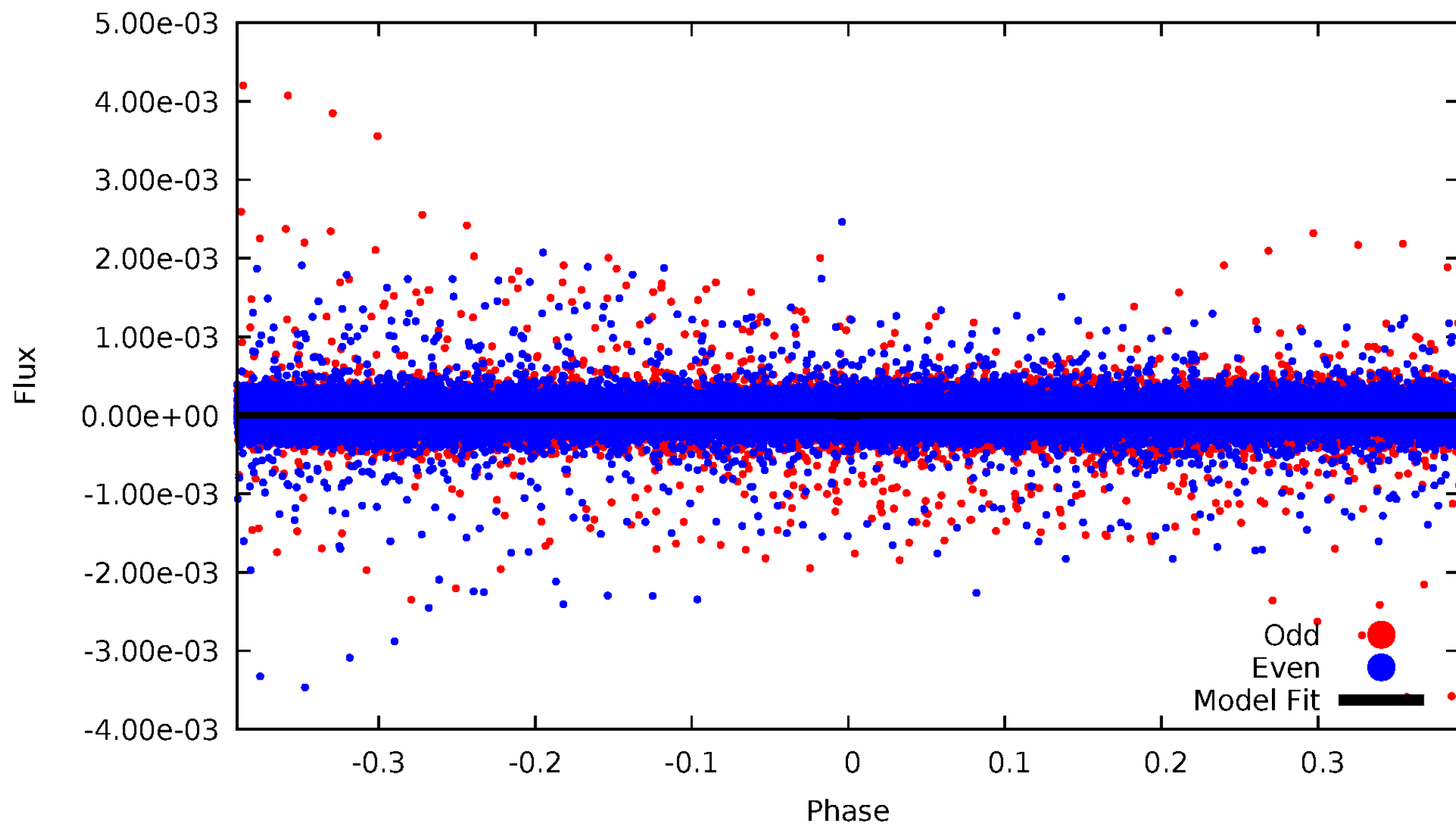


TCE 012520187-01



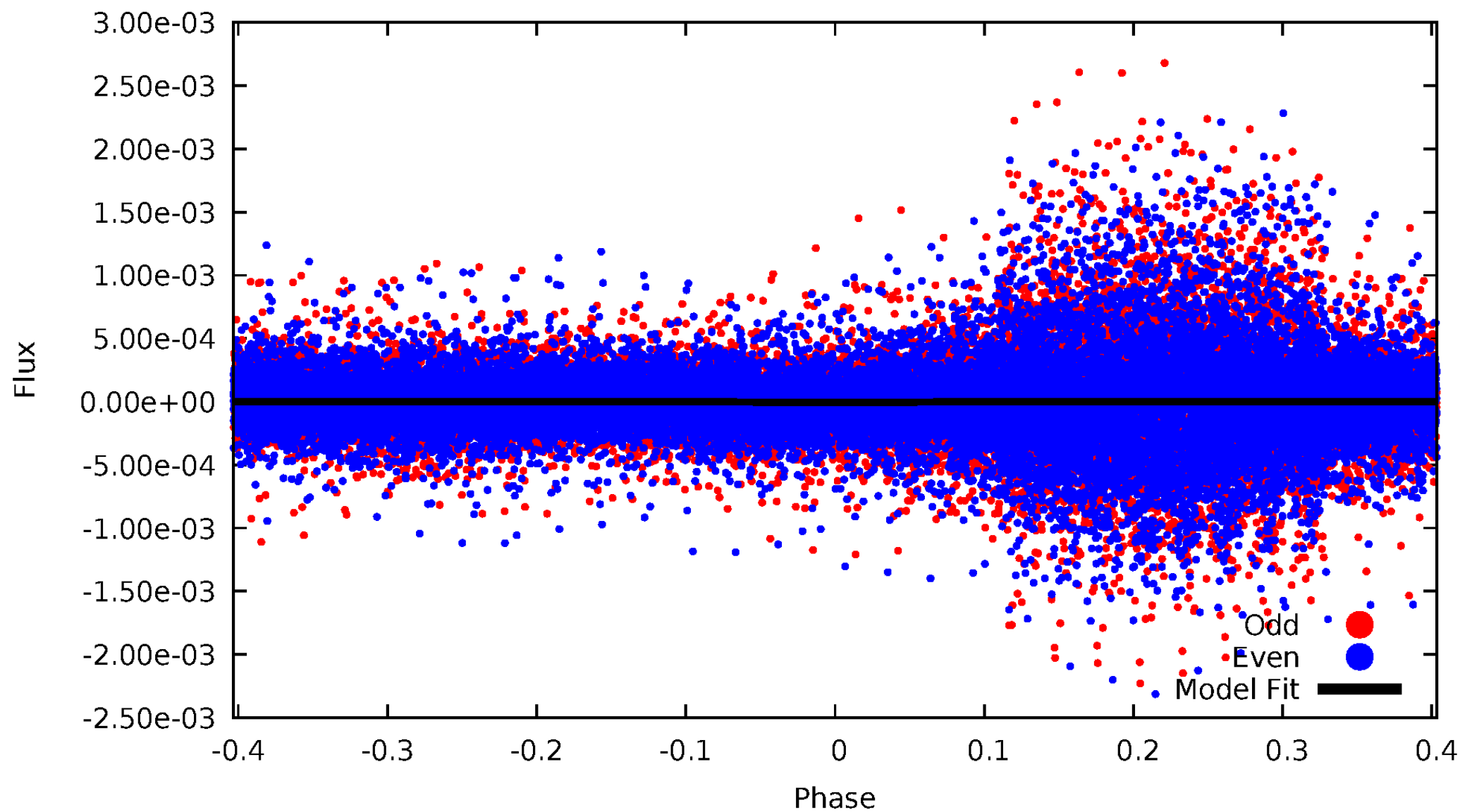
DV Odd/Even

TCE 012520187-01



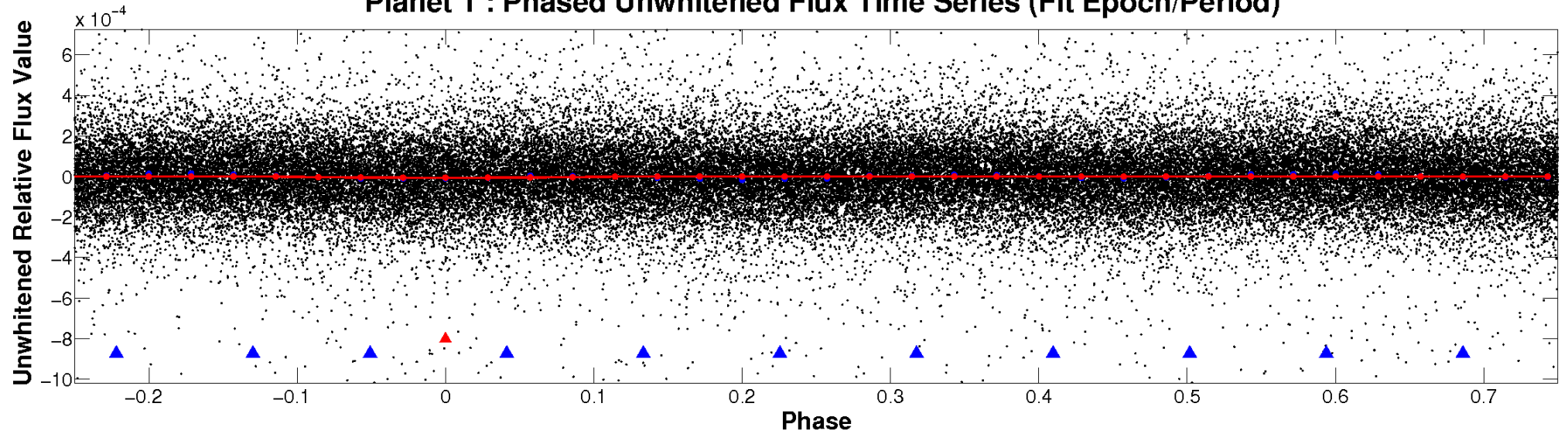
ALT Odd/Even

TCE 012520187-01

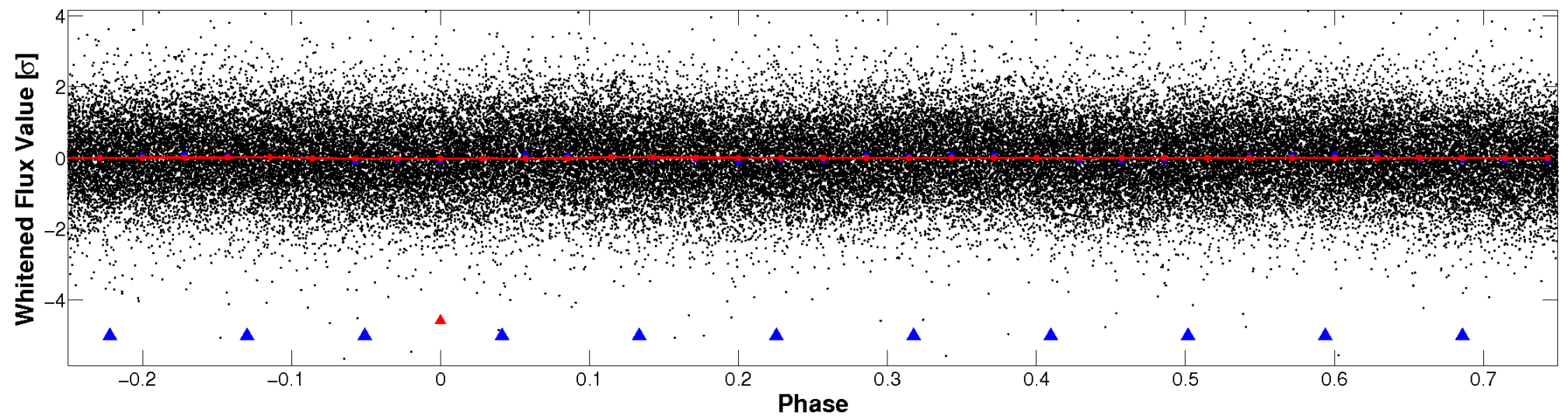


Non-Whitened Vs. Whitened Light Curve

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

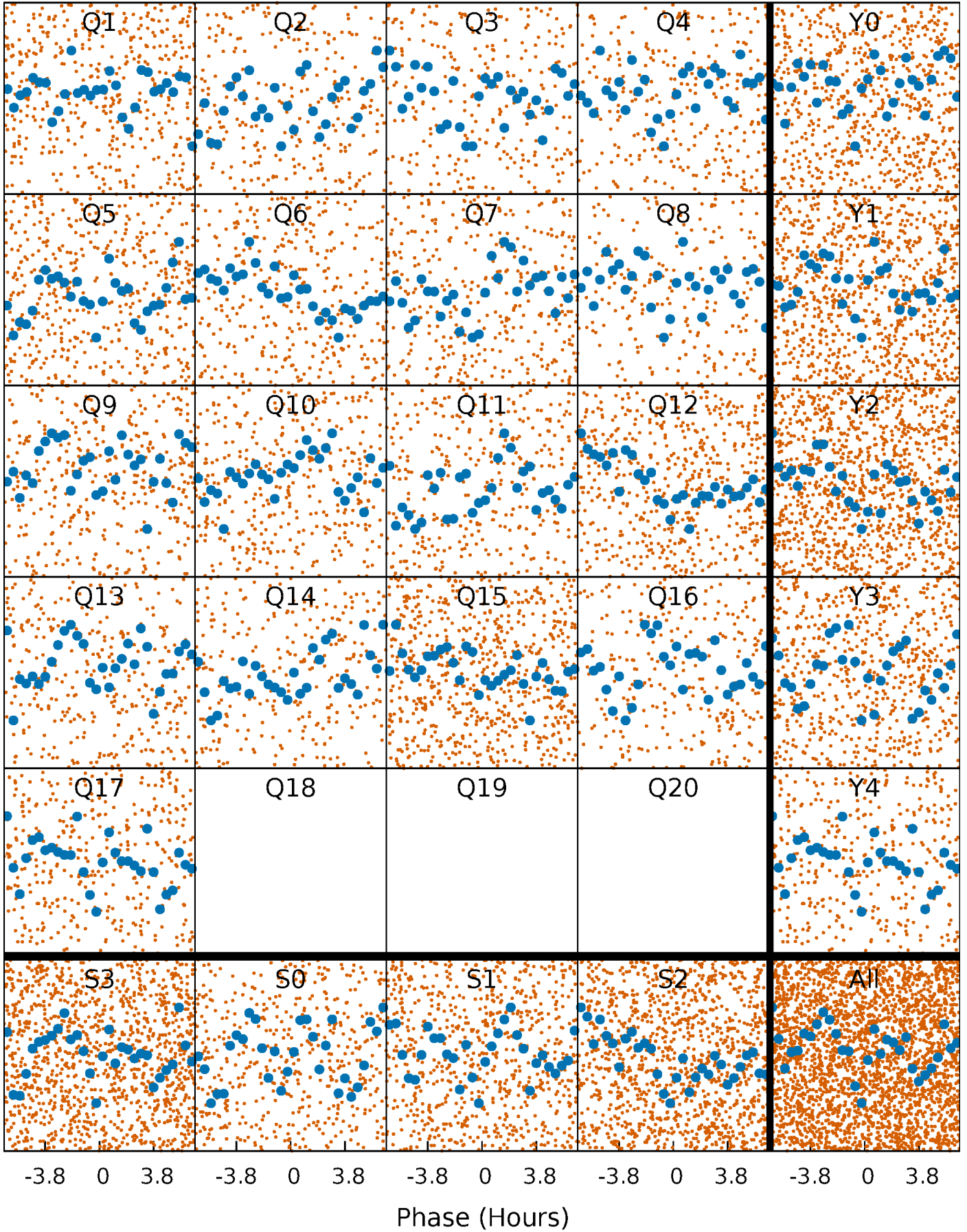


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



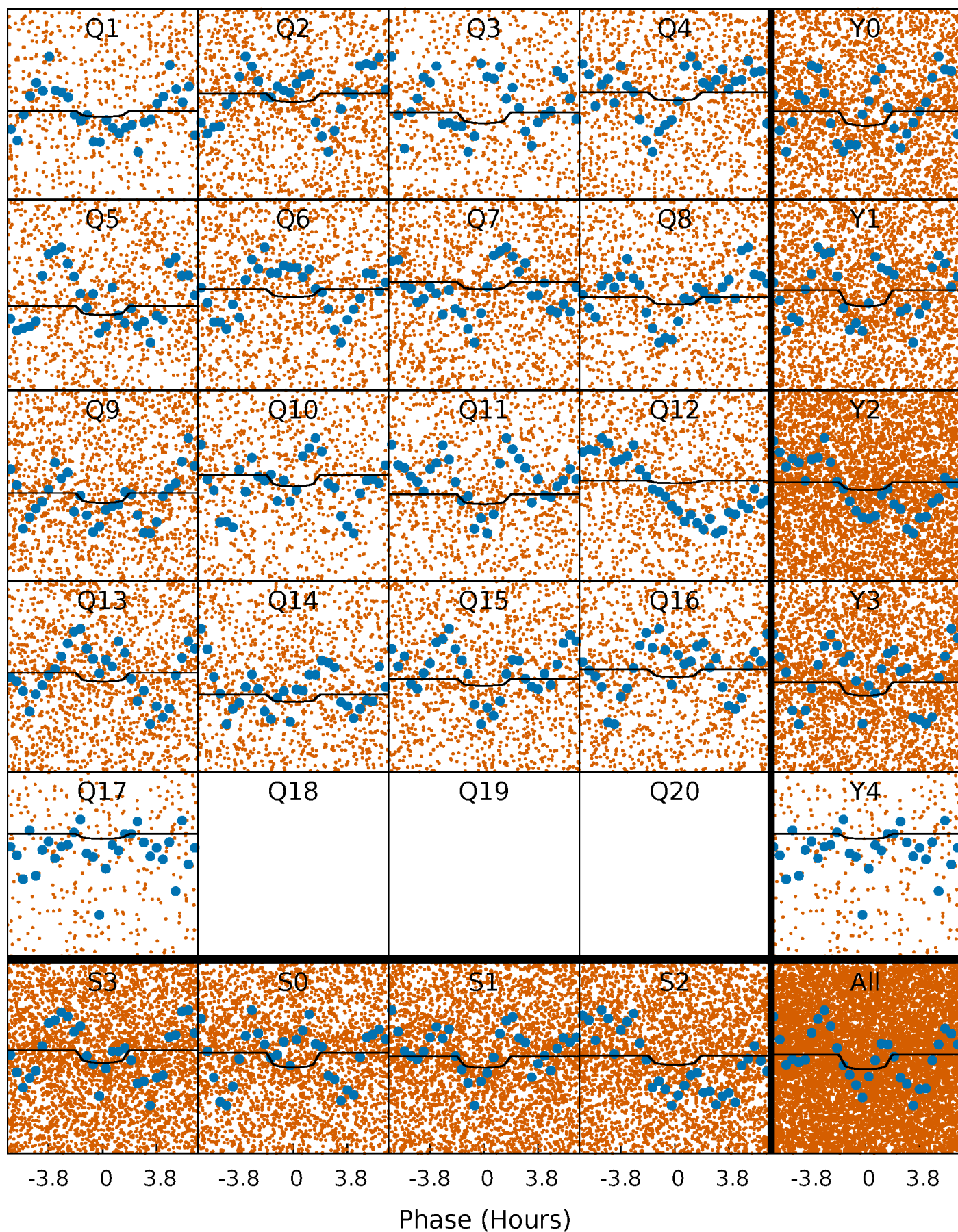
PDC Quarter-Phased Transit Curves

TCE 012520187-01 P= 0.714946 Days $T_0=131.809400$ (BKJD)



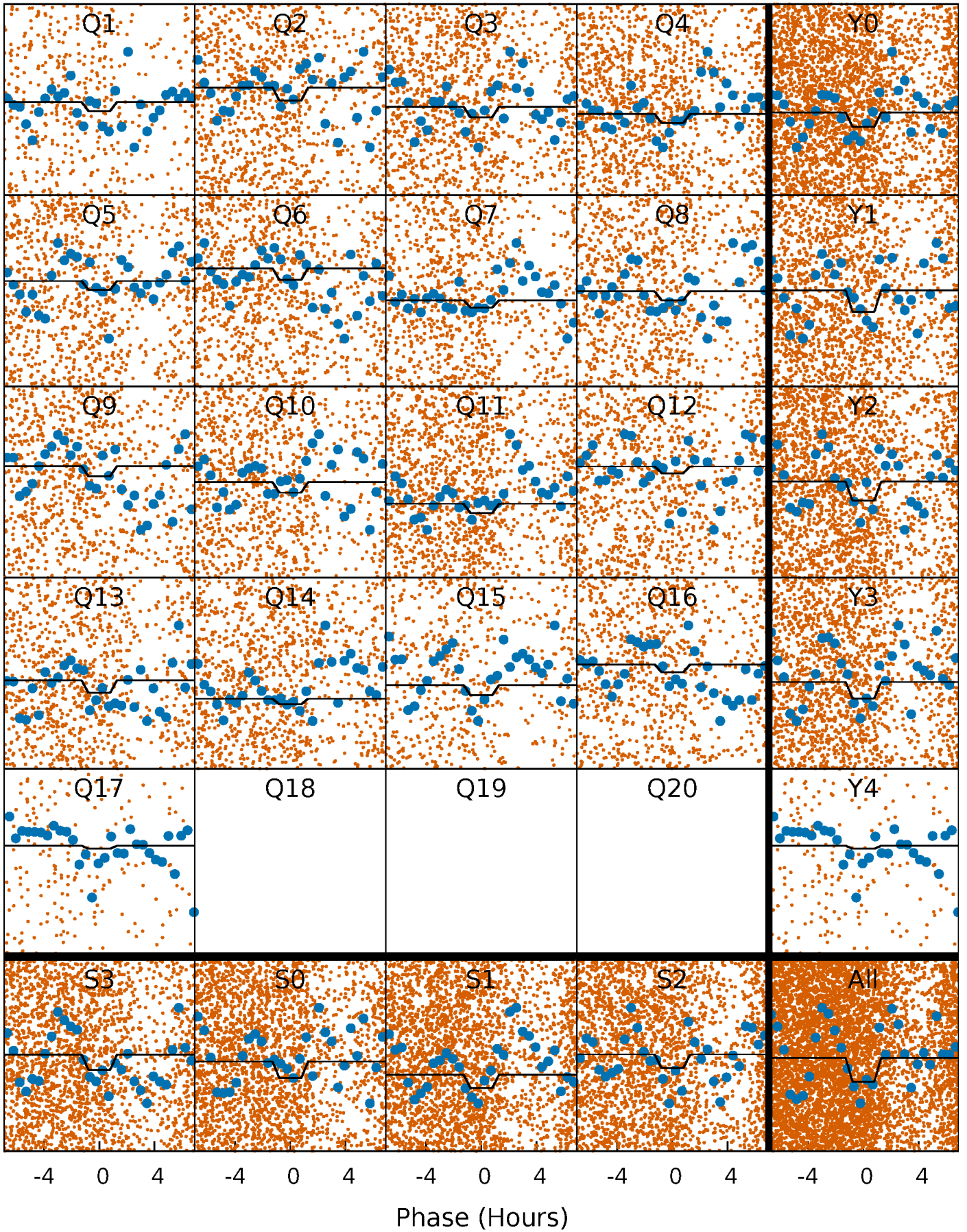
DV Quarter-Phased Transit Curves

TCE 012520187-01 P= 0.714946 Days $T_0=131.809400$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

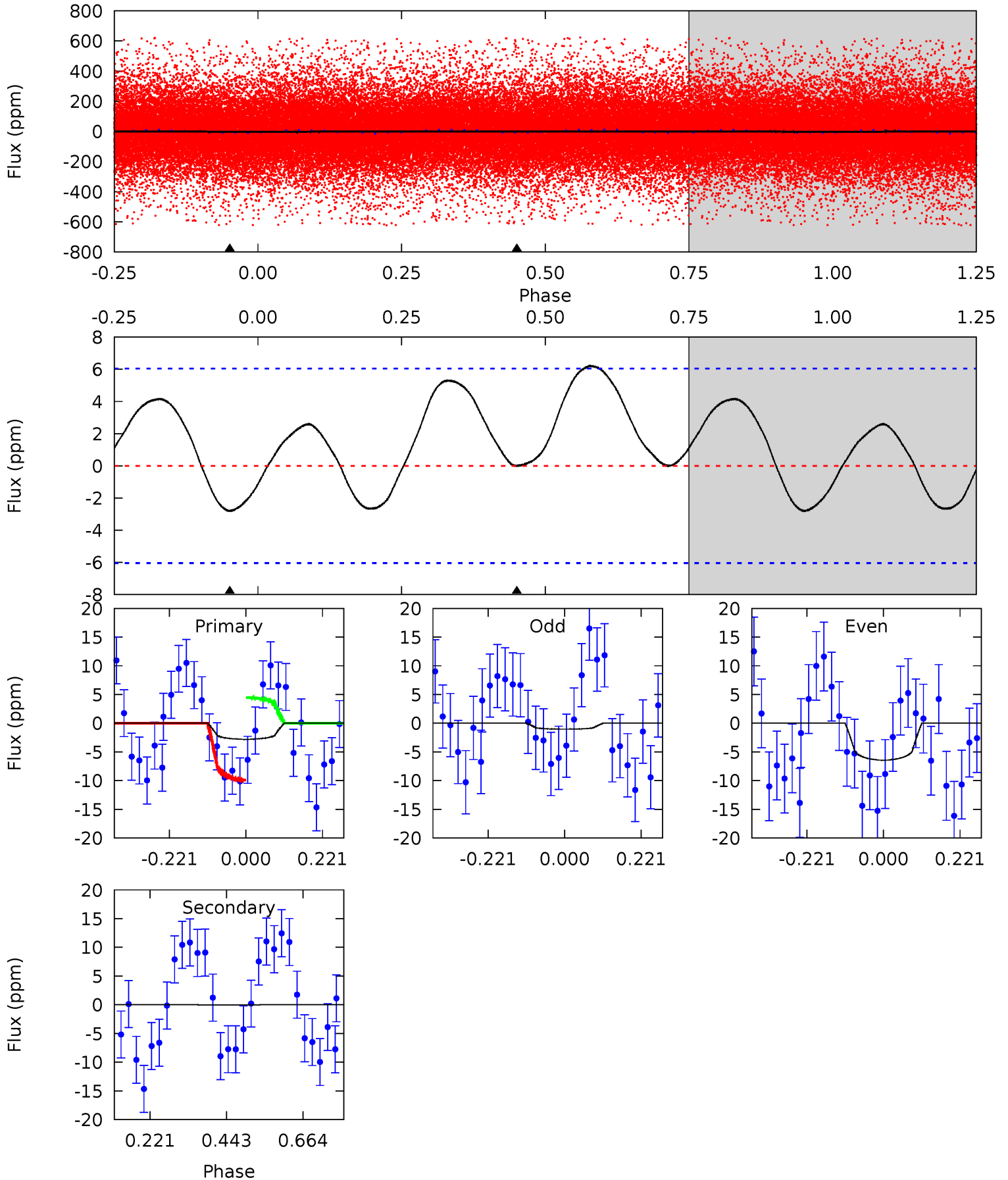
TCE 012520187-01 P= 0.714975 Days $T_0=131.764076$ (BKJD)



DV Model-Shift Uniqueness Test

012520187-01, P = 0.714946 Days, E = 131.094454 Days

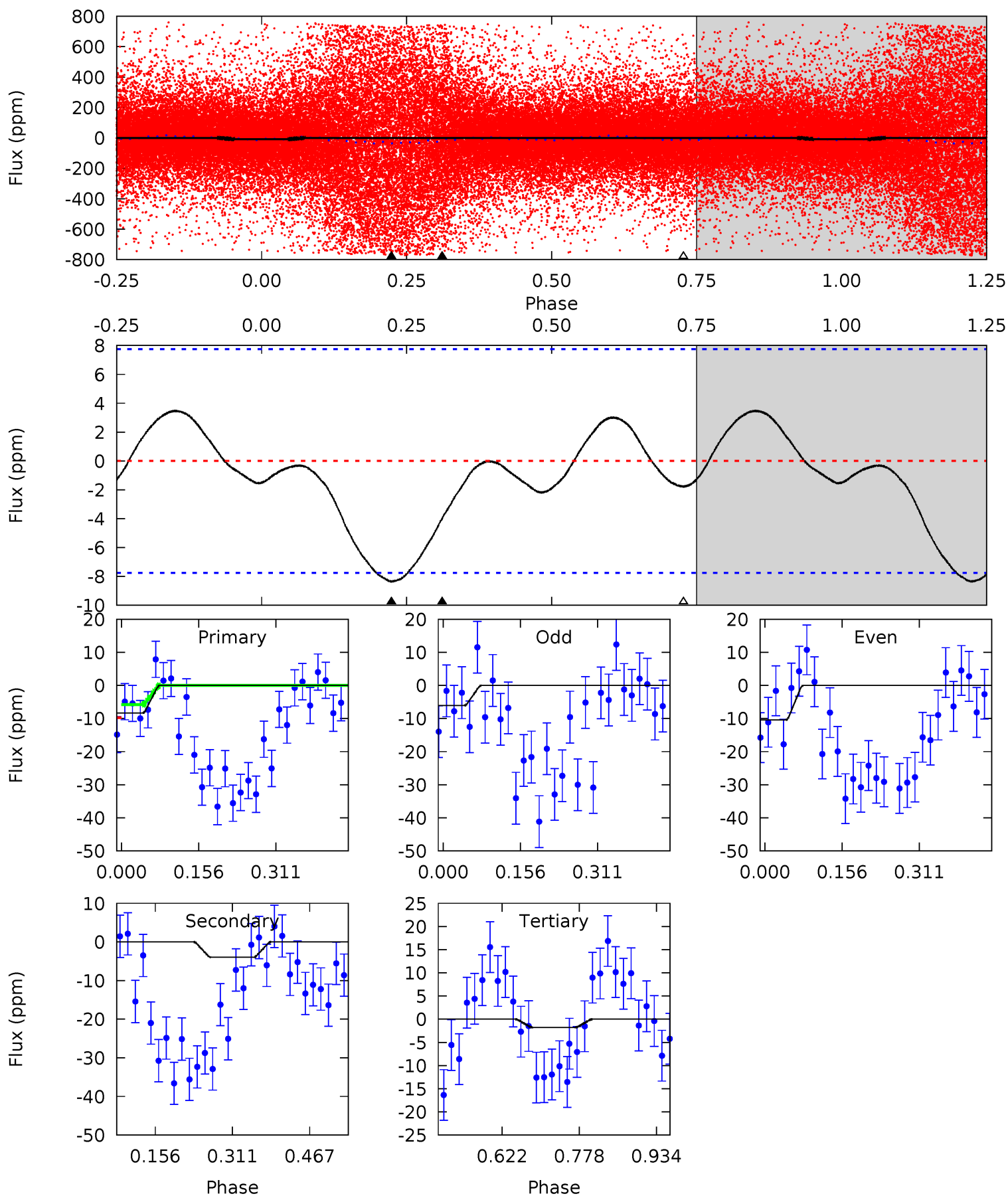
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.04	0	0	0	4.40	1.22	1.06	2.04	2.04	0	0	2.00	2.35	0.69	2.01



Alt Model-Shift Uniqueness Test

012520187-01, P = 0.714975 Days, E = 131.049101 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.83	2.30	1.02	0	4.47	1.42	1.03	3.80	4.83	1.27	2.30	1.26	1.70	0.29	1.09



Stellar Parameters For KIC 012520187

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6756^{+140}_{-240}	$3.051^{+0.544}_{-0.136}$	$0.070^{+0.200}_{-0.450}$	$8.275^{+1.625}_{-4.876}$	$2.811^{+0.325}_{-0.974}$	$0.007^{+0.048}_{-0.003}$
	+2%/-4%	+18%/-4%	+286%/-643%	+20%/-59%	+12%/-35%	+693%/-41%
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 012520187-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-0 \pm 1	$1.80^{+0.78}_{-0.78}$	7888^{+635}_{-1154}	-6428^{+1322}_{-872}	$-0.008^{+0.139}_{-0.122}$
Alt.	-4 \pm 2	$1.98^{+0.91}_{-0.78}$	7903^{+554}_{-1271}	-4113^{+10307}_{-1865}	$0.263^{+0.446}_{-0.163}$

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

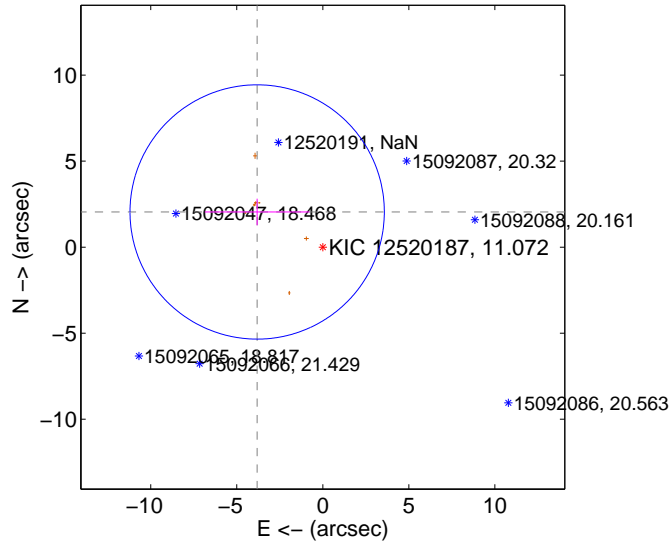
Supplemental centroid analysis for 012520187-01. **Kepler magnitude: 11.07.** Transit SNR 2.53

There are 1 quarters with good PRF difference image offsets

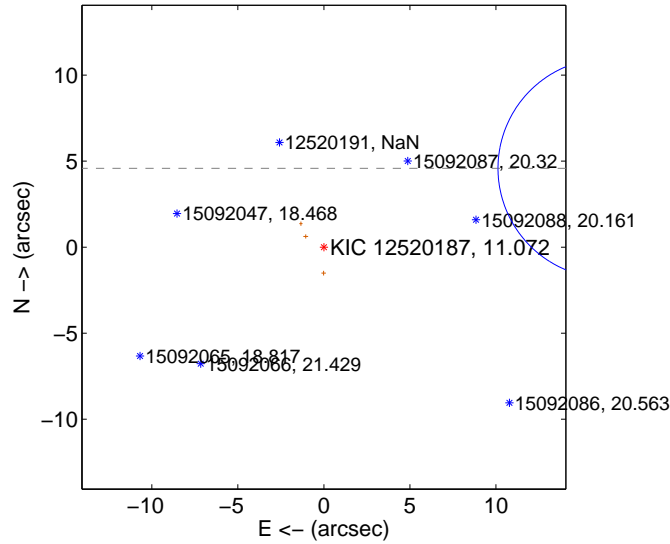
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.330 ± 2.464	1.76	3.816 ± 3.042	2.047 ± 0.772
PRF-fit source offset from KIC position	17.141 ± 2.131	8.04	-16.516 ± 2.093	4.587 ± 0.713
photometric centroid source offset	1.07 ± 3.24	0.33	-0.33 ± 4.11	-1.02 ± 3.13

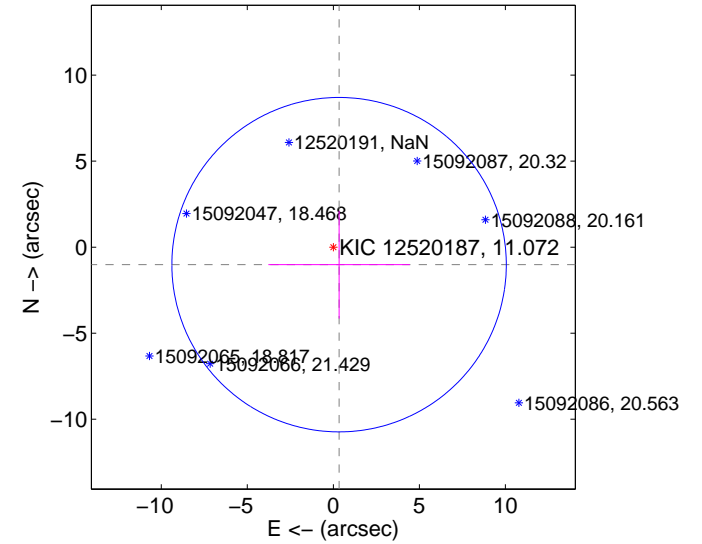
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

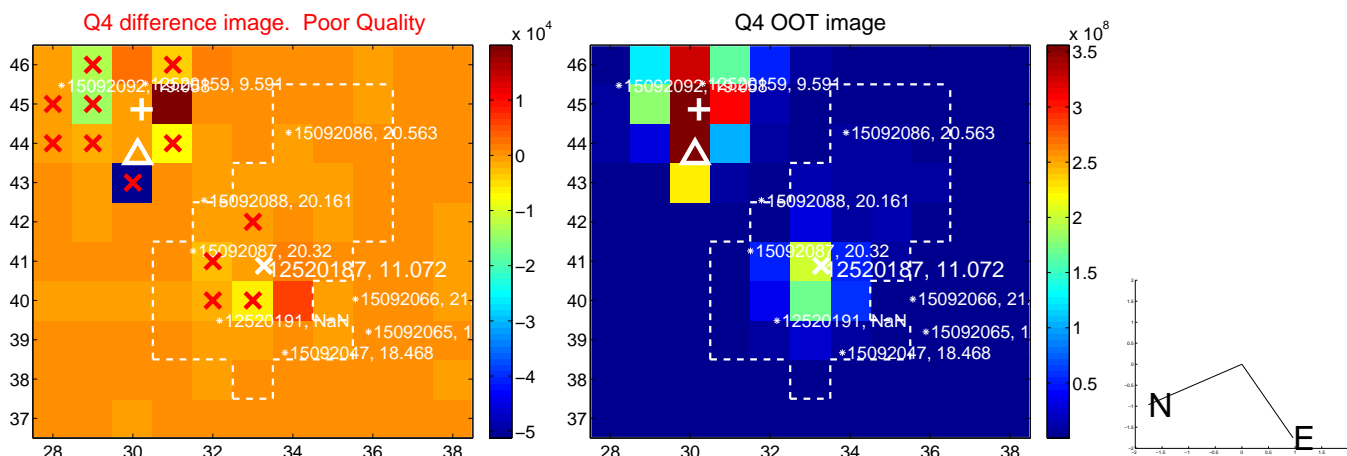
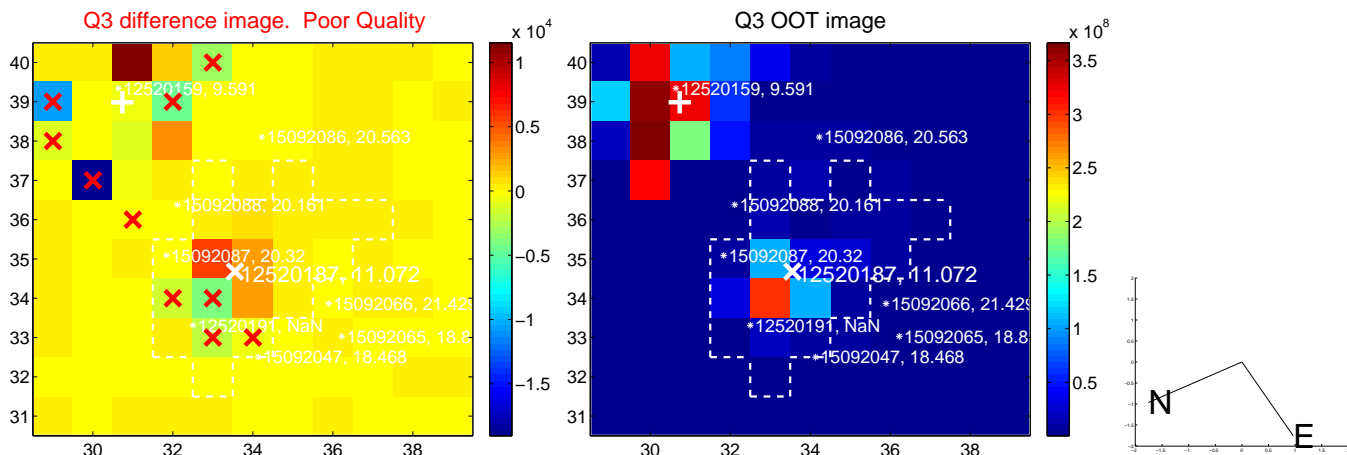
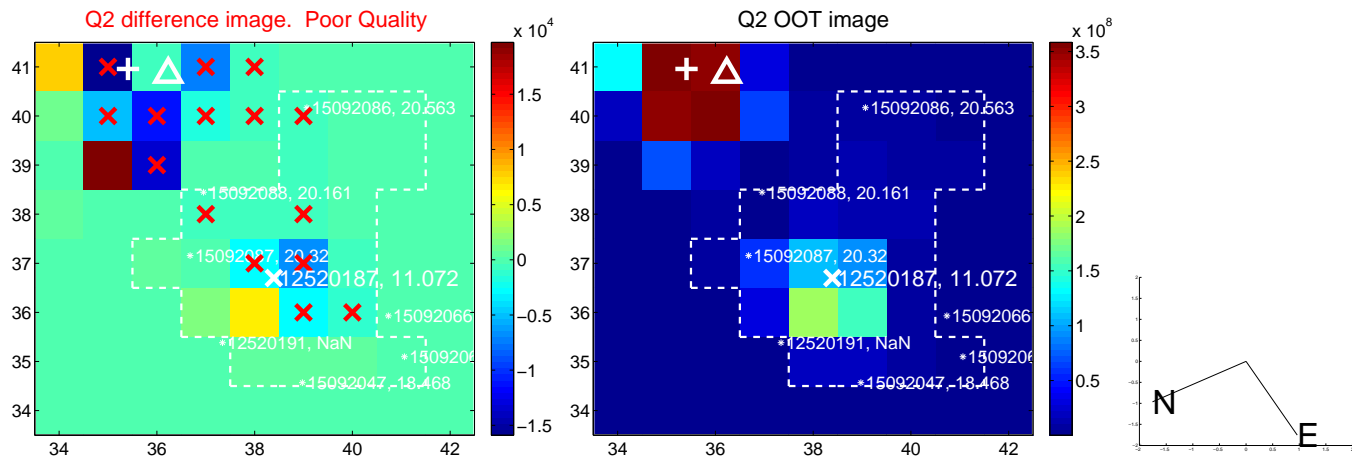
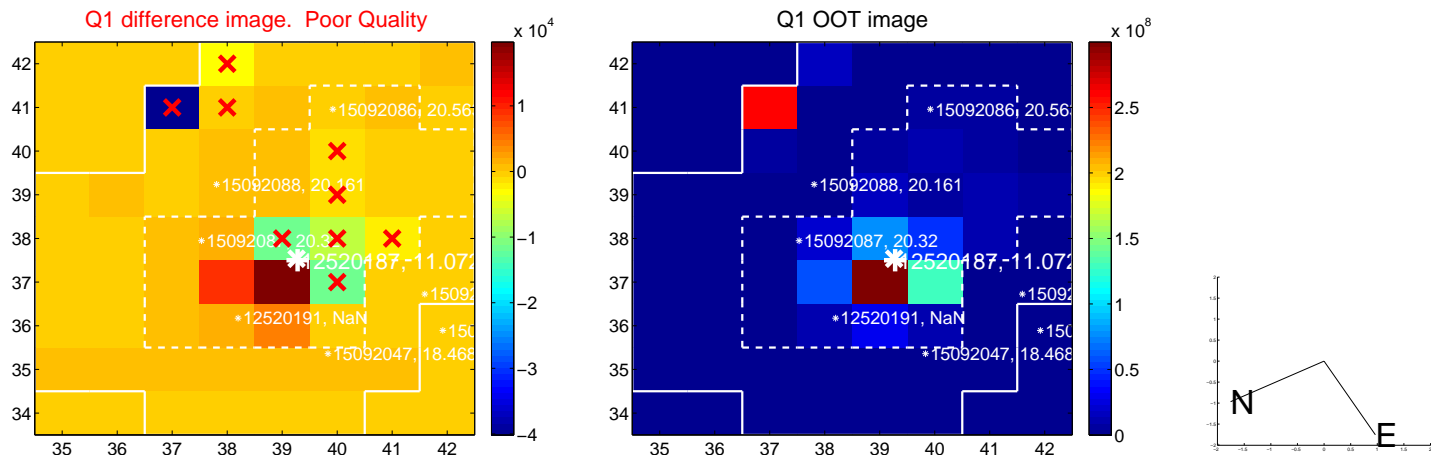


offset from photometric centroids

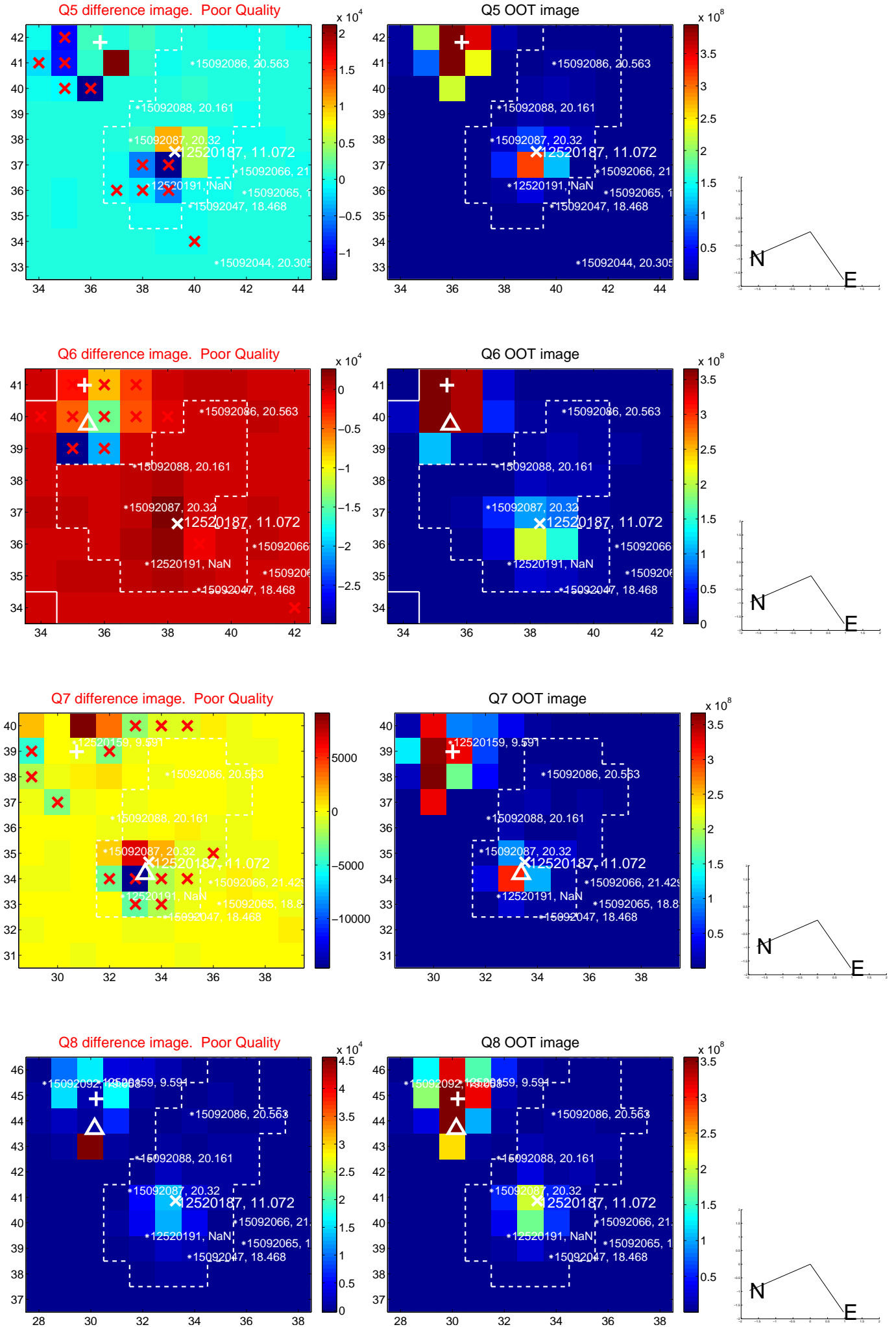


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

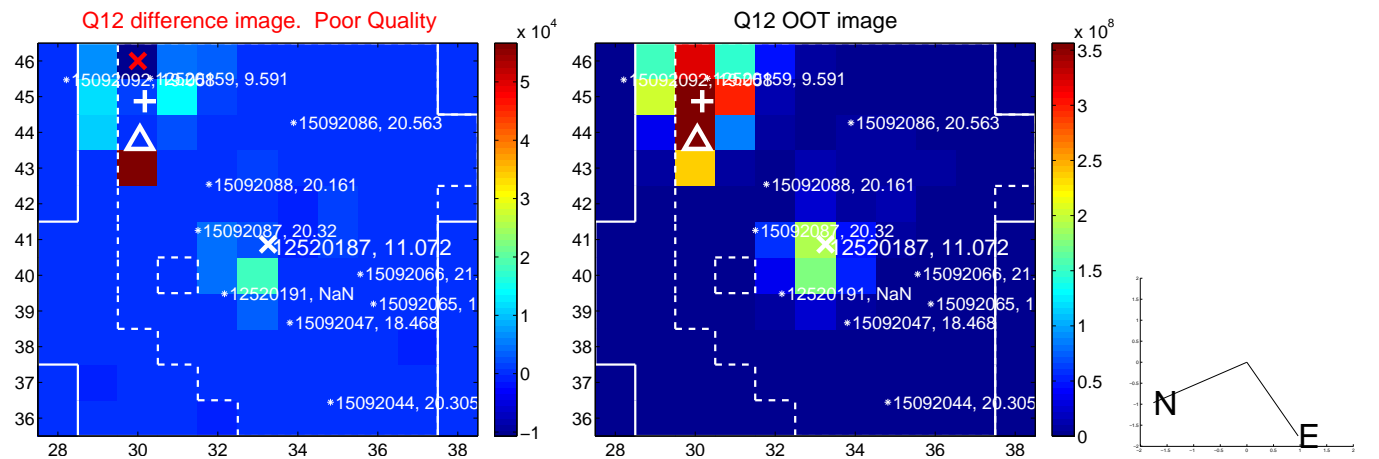
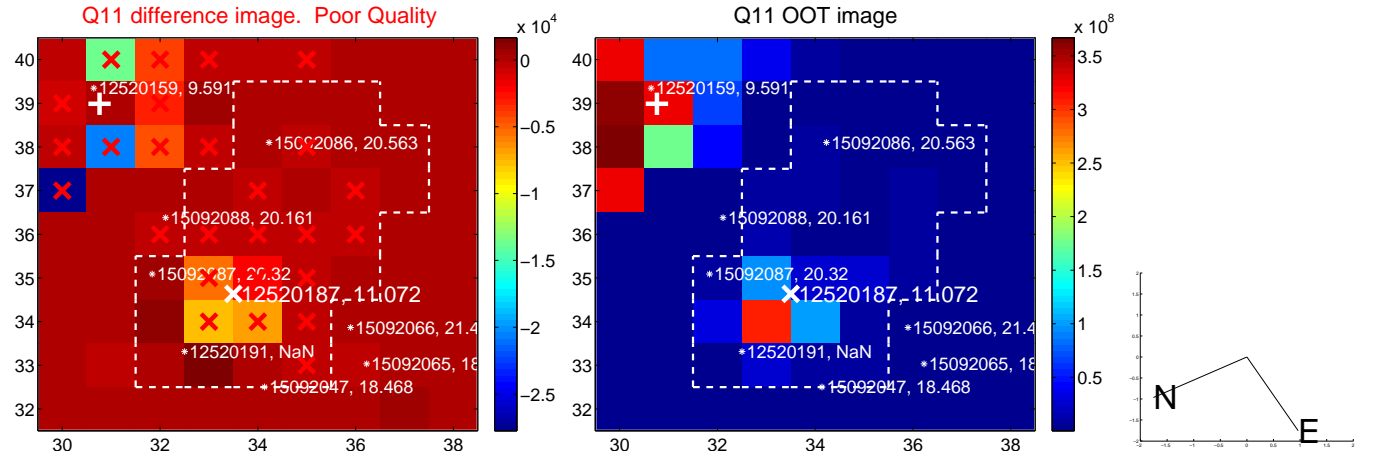
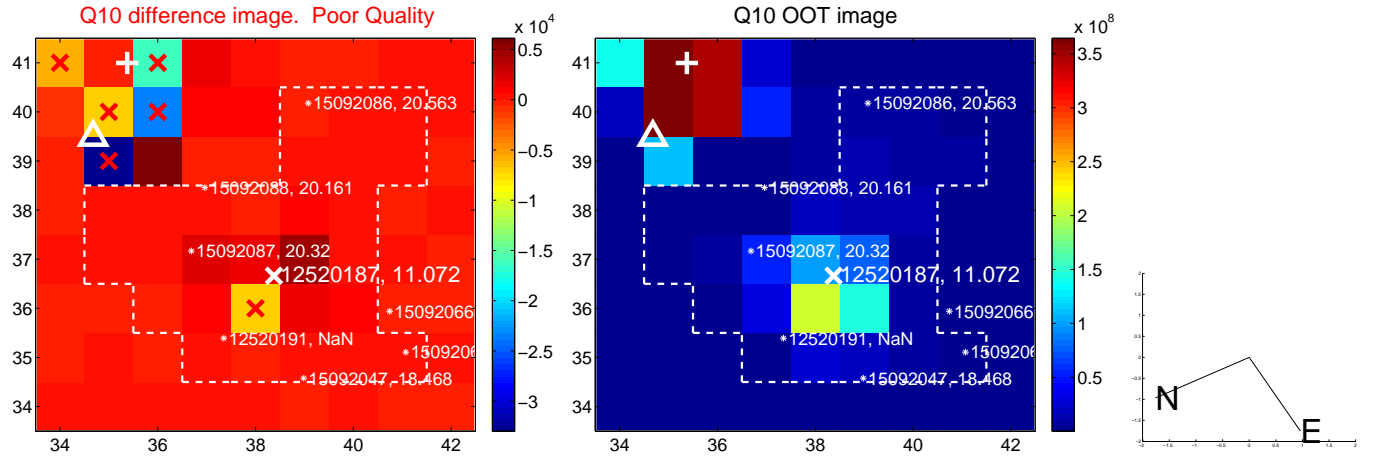
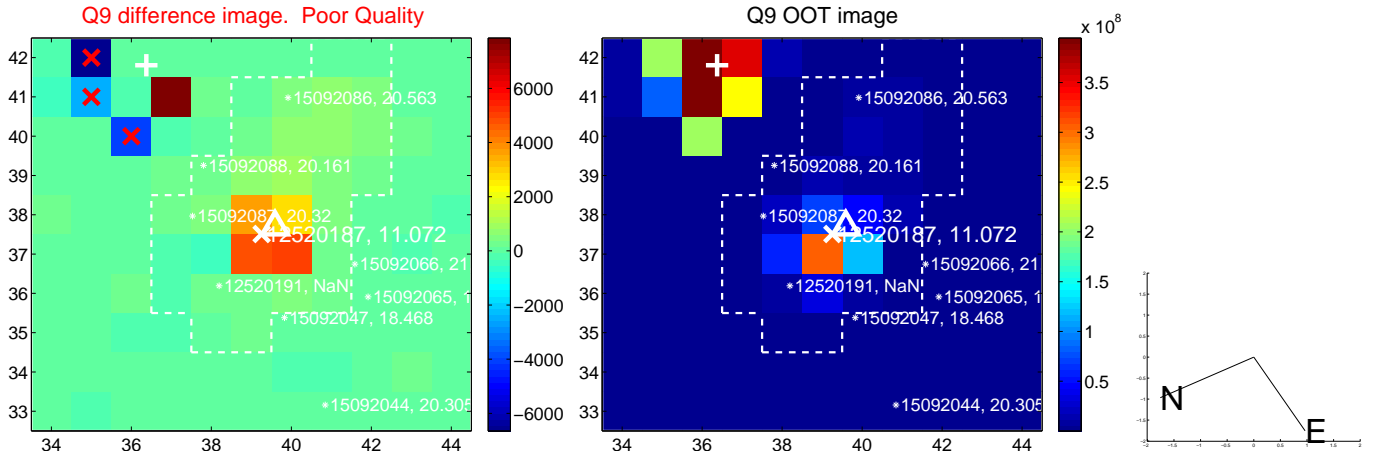
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



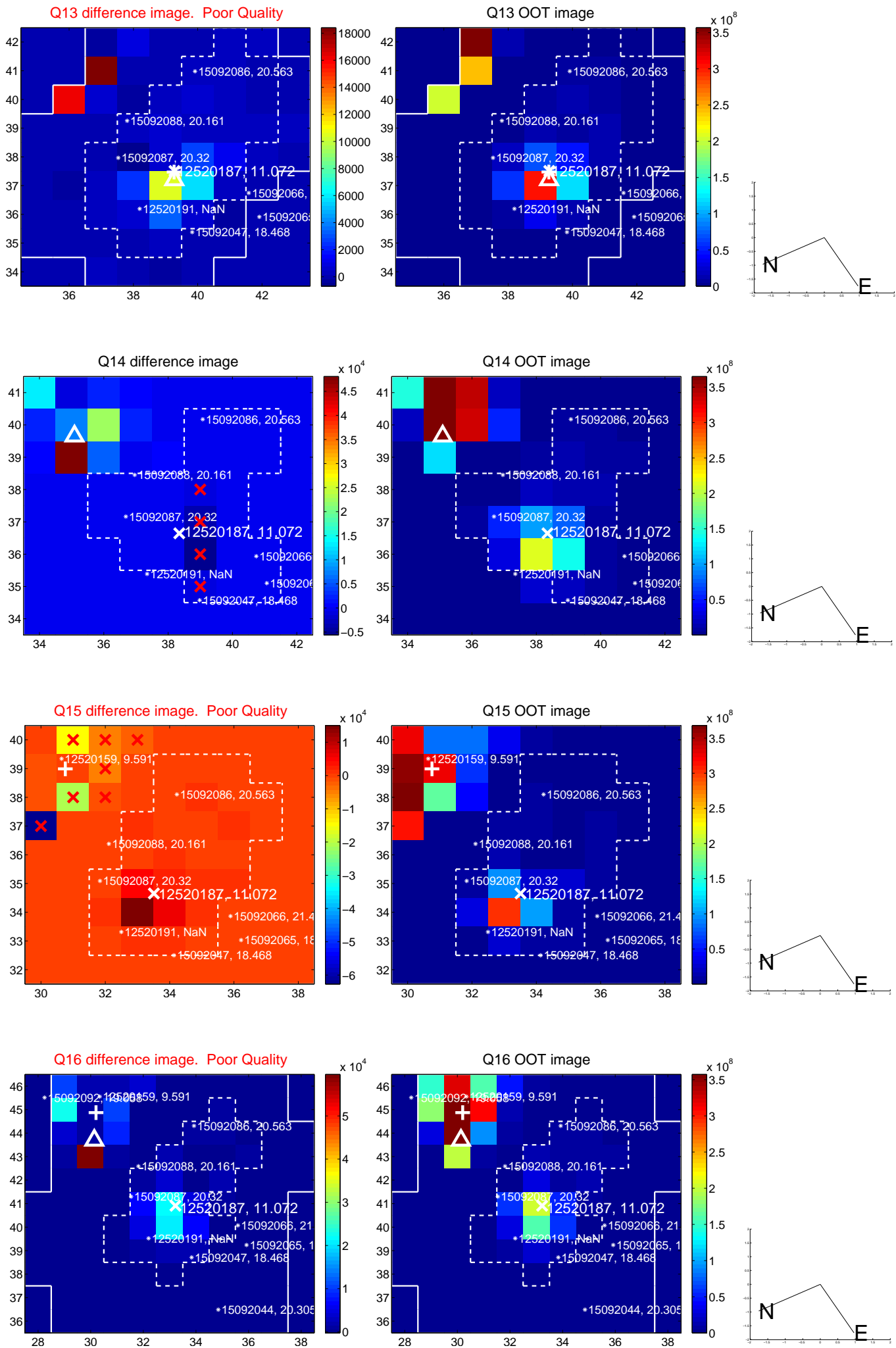
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



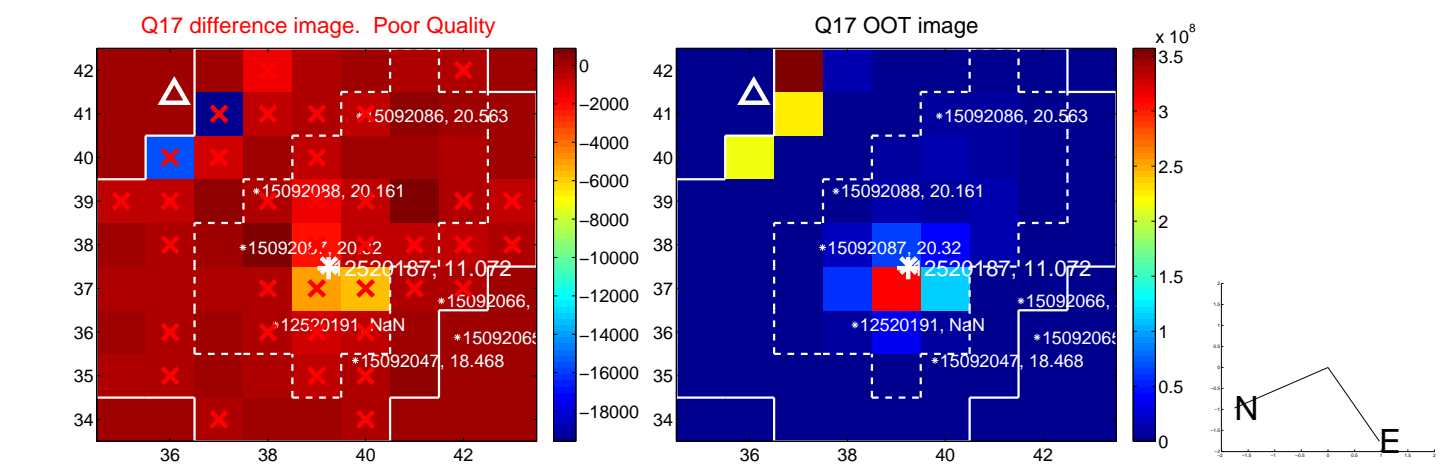
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



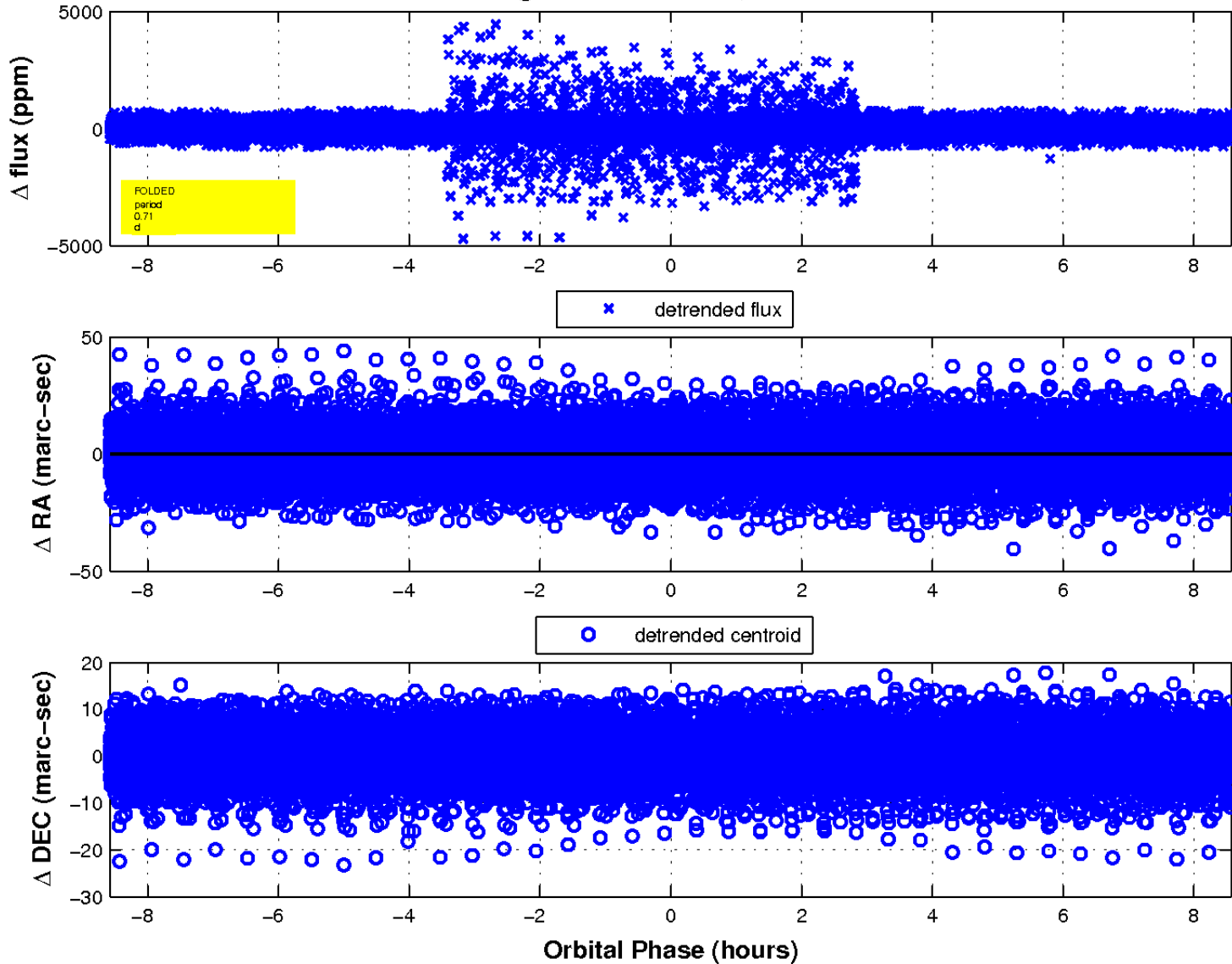
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



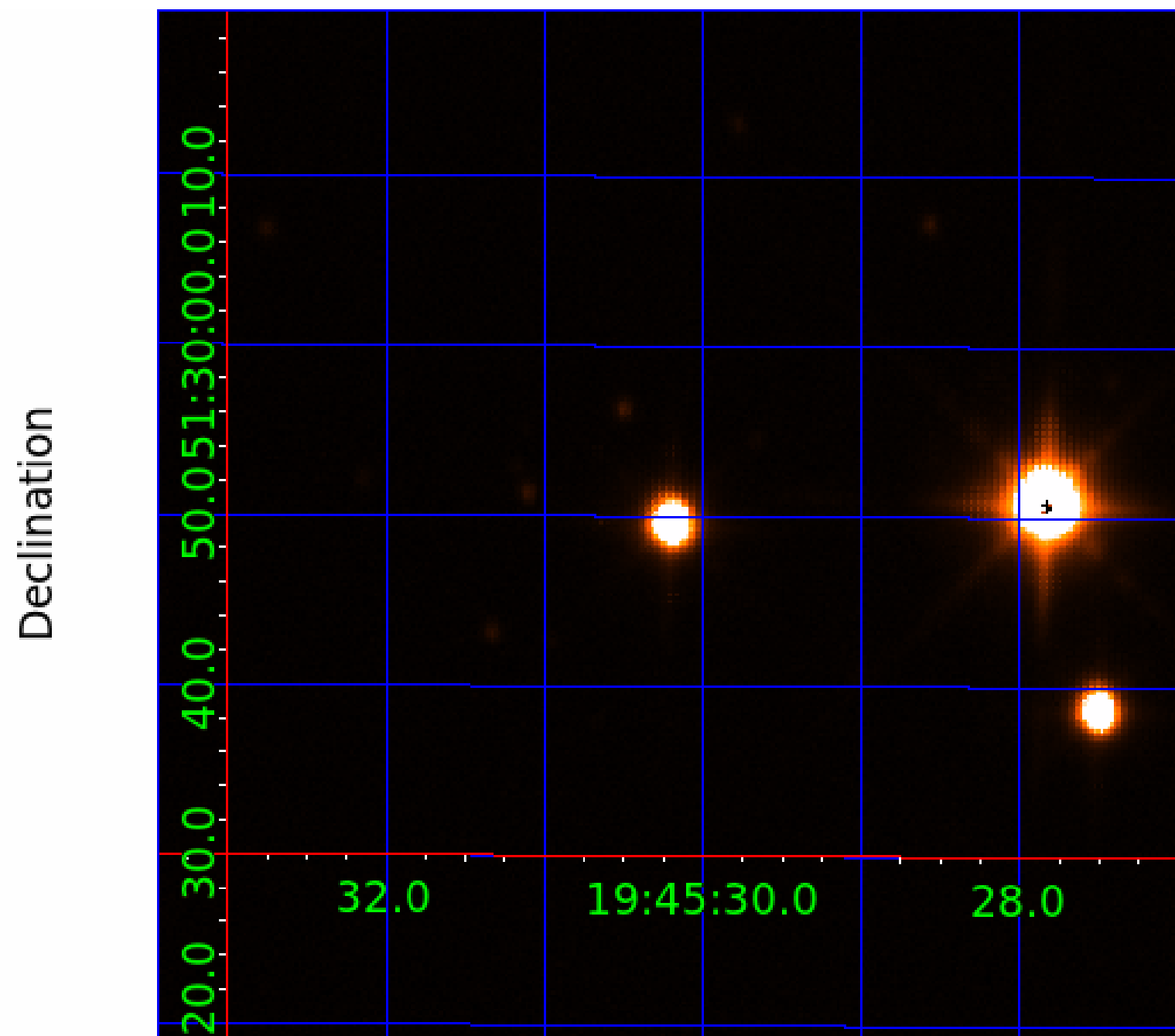
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 012520187

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})
012520187-01	OBS	No	0.714946	131.809400	5.2	3.348	10.6	2.5	8.28	6756	1.96	0.00
012520187-02	OBS	No	131.484206	201.781286	218.0	2.199	21.3	4.8	8.28	6756	14.32	250.61

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012520187-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
012520187-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

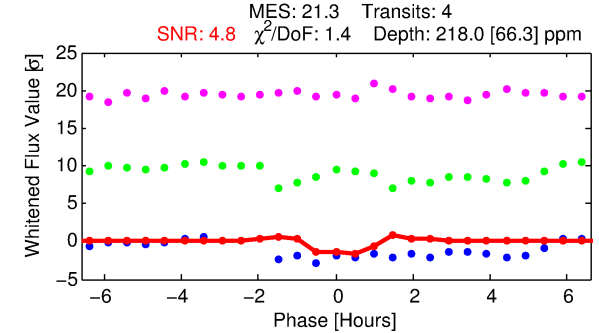
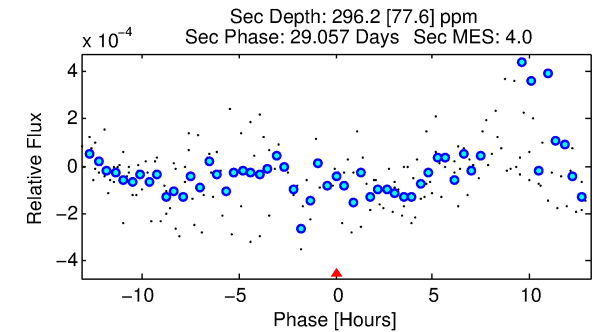
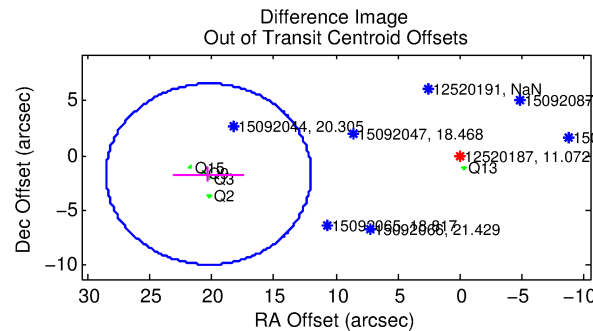
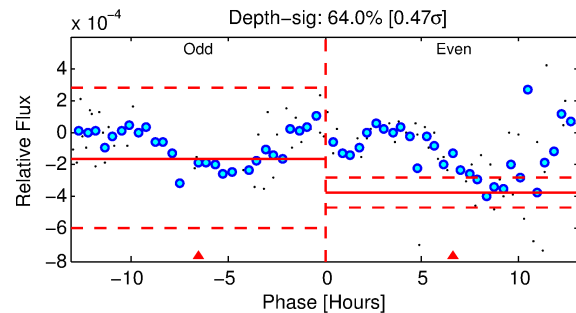
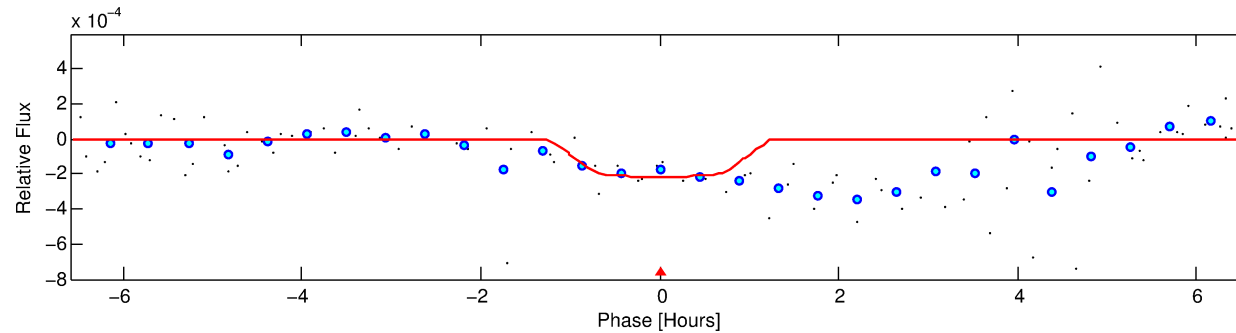
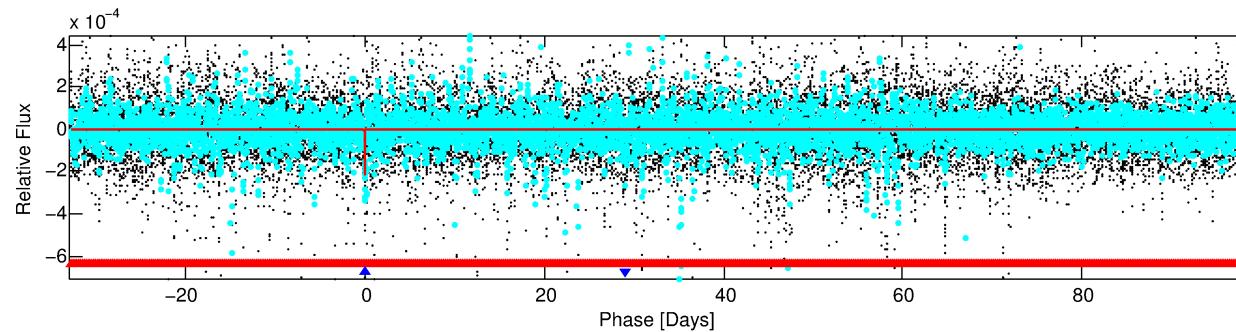
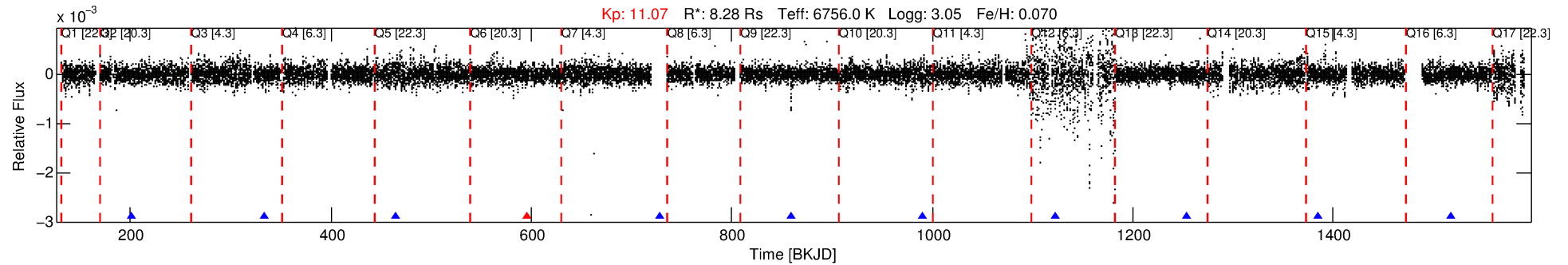
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012520187-02

No Significant Match Found

DV One-Page Summary

KIC: 12520187 Candidate: 2 of 2 Period: 131.484 d



DV Fit Results:

Period = 131.48421 [0.00393] d
Epoch = 201.7813 [0.0165] BKJD
Rp/R* = 0.0159 [0.0131]
a/R* = 208.53 [993.02]
b = 0.91 [0.95]
Seff = 250.61 [234.00]
Teq = 1015 [237] K
Rp = 14.32 [14.52] Re
a = 0.7142 [0.4094] AU
Ag = 405.03 [772.61] [0.52 σ]
Teff = 7037 [2948] K [2.04 σ]

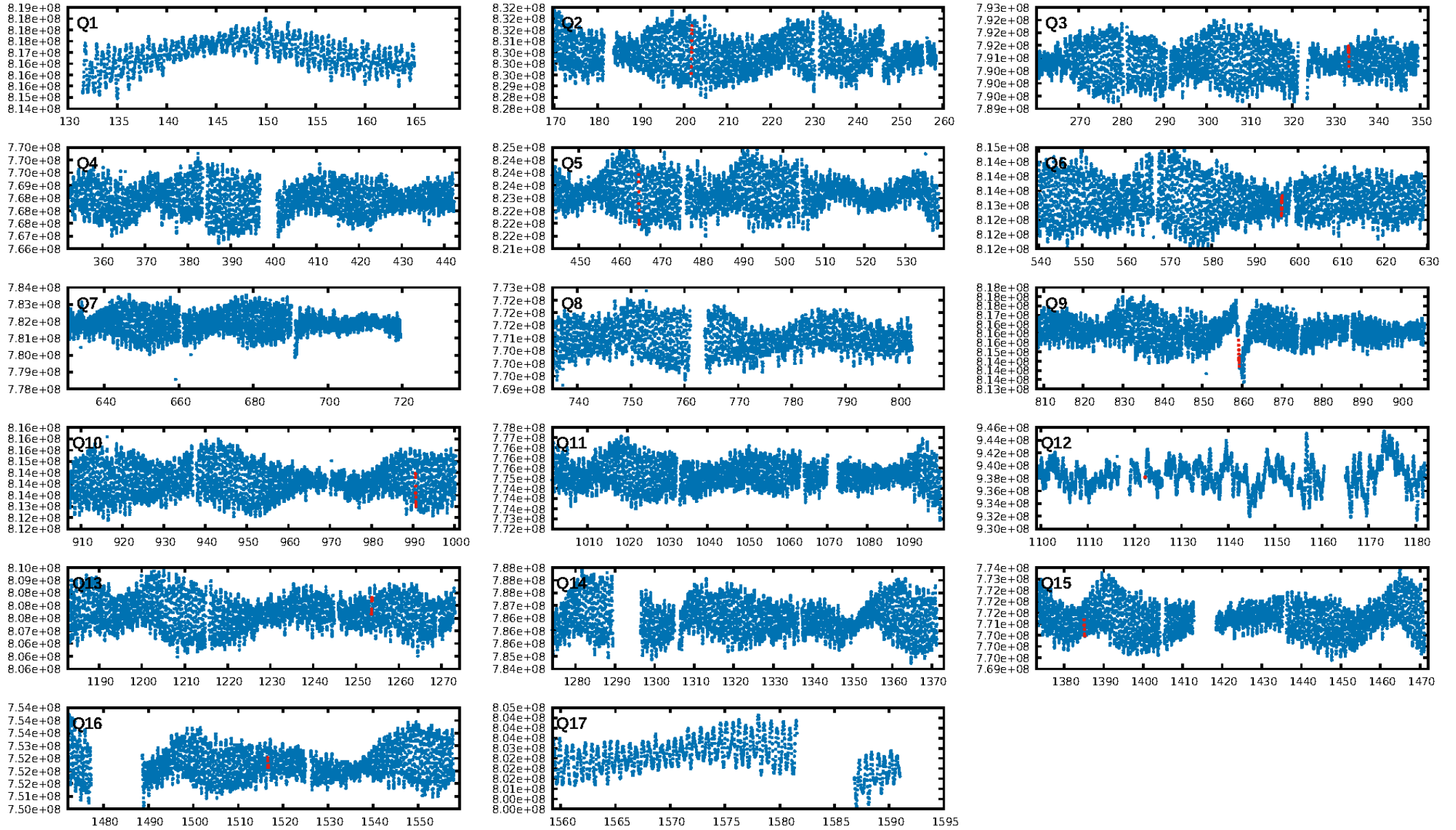
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [783.59 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.1%
ModelChiSquareGof-sig: 80.6%
Bootstrap-pfa: 1.29e-53
RollingBand-fgt: 0.75 [3/4]
GhostDiagnostic-chr: -0.2785
Centroid-sig: N/A
Centroid-so: 2.245 arcsec [1.18 σ]
OotOffset-rm: 20.320 arcsec [7.38 σ]
KicOffset-rm: 0.371 arcsec [1.04 σ]
OotOffset-st: 1/2/0/2 [5]
KicOffset-st: 1/2/0/2 [5]
DiffImageQuality-fgm: 0.40 [2/5]
DiffImageOverlap-fno: 0.00 [0/9]

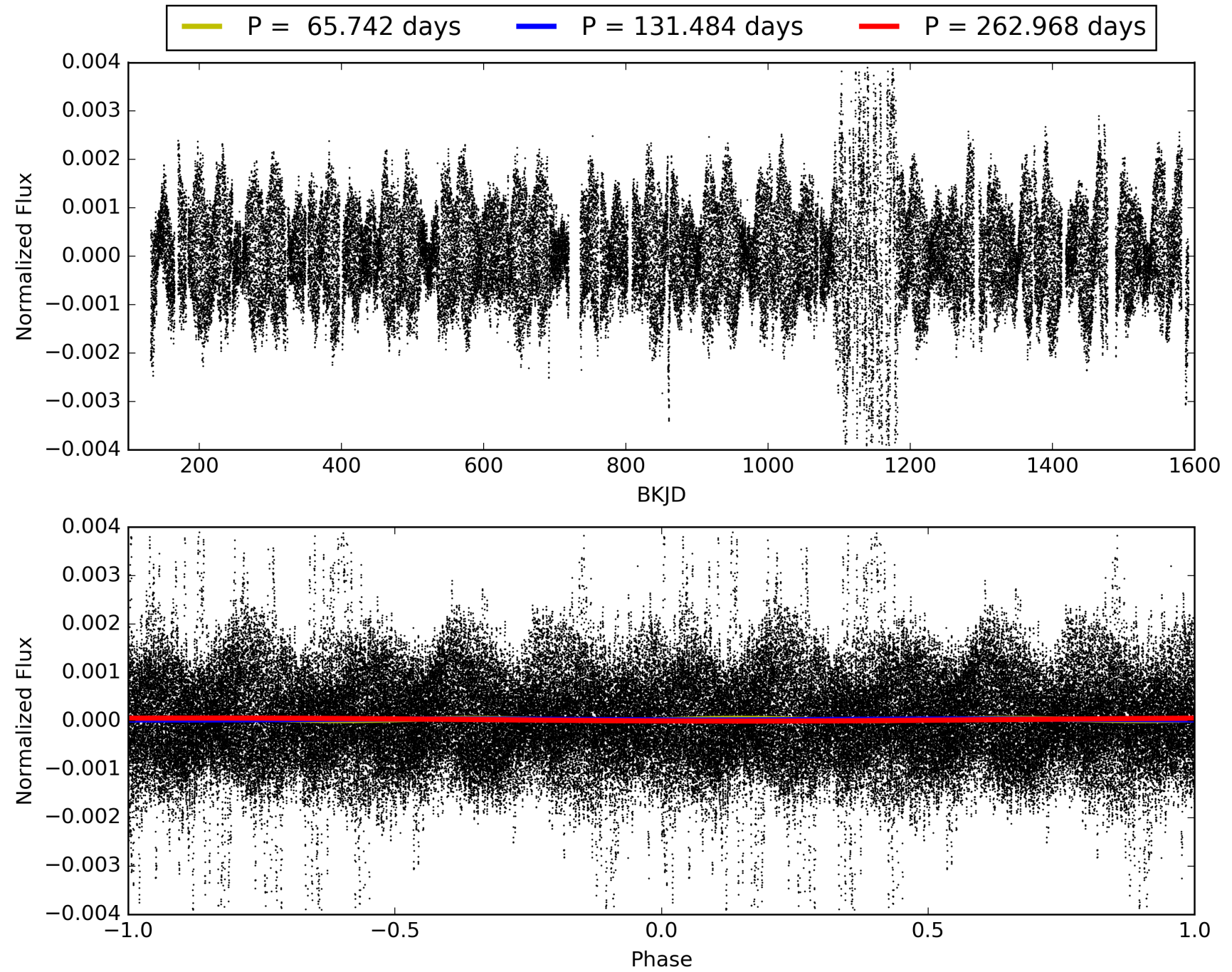
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:08:47 Z

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

TCE 012520187-02, PDC Light Curves

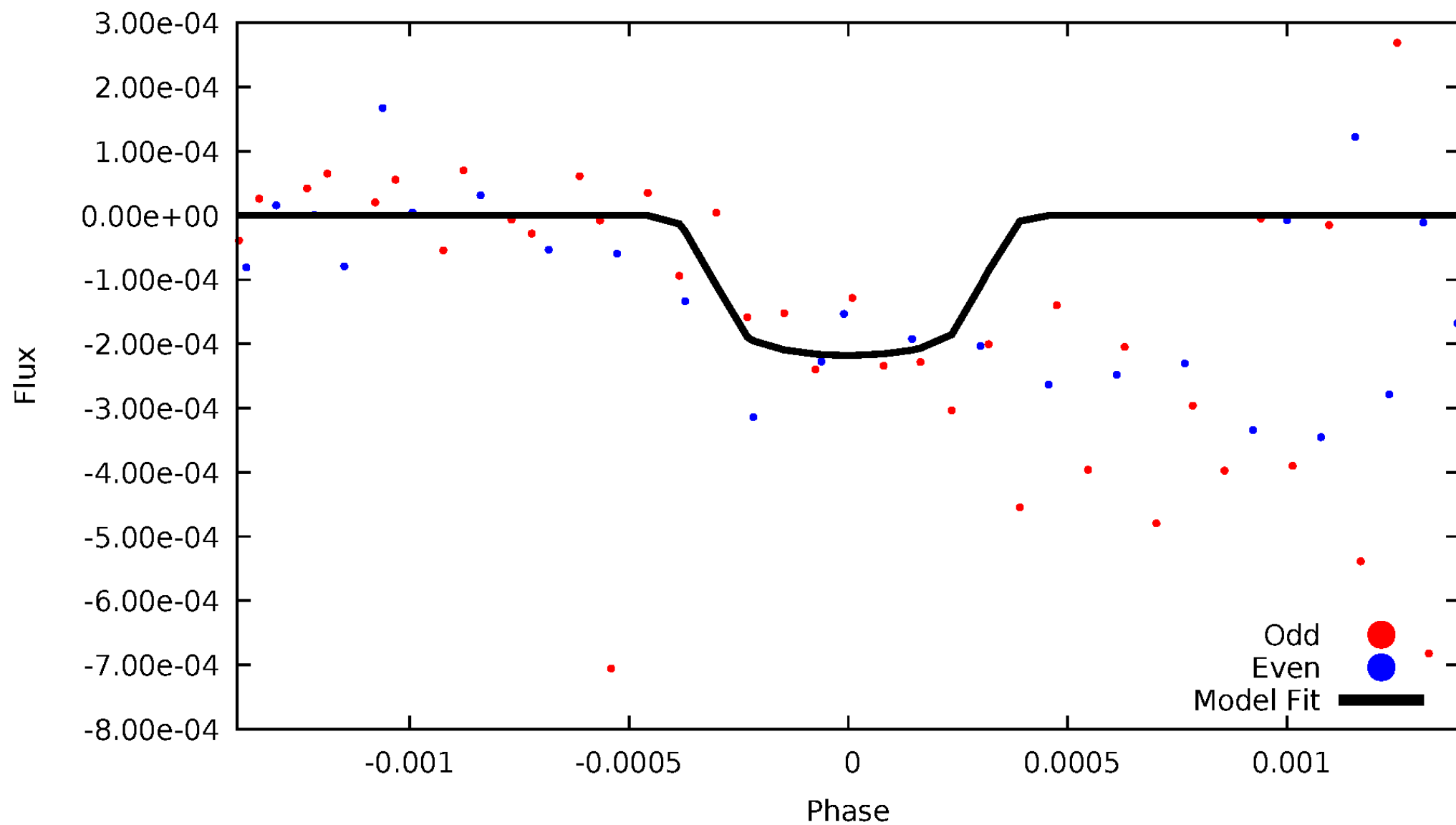


TCE 012520187-02



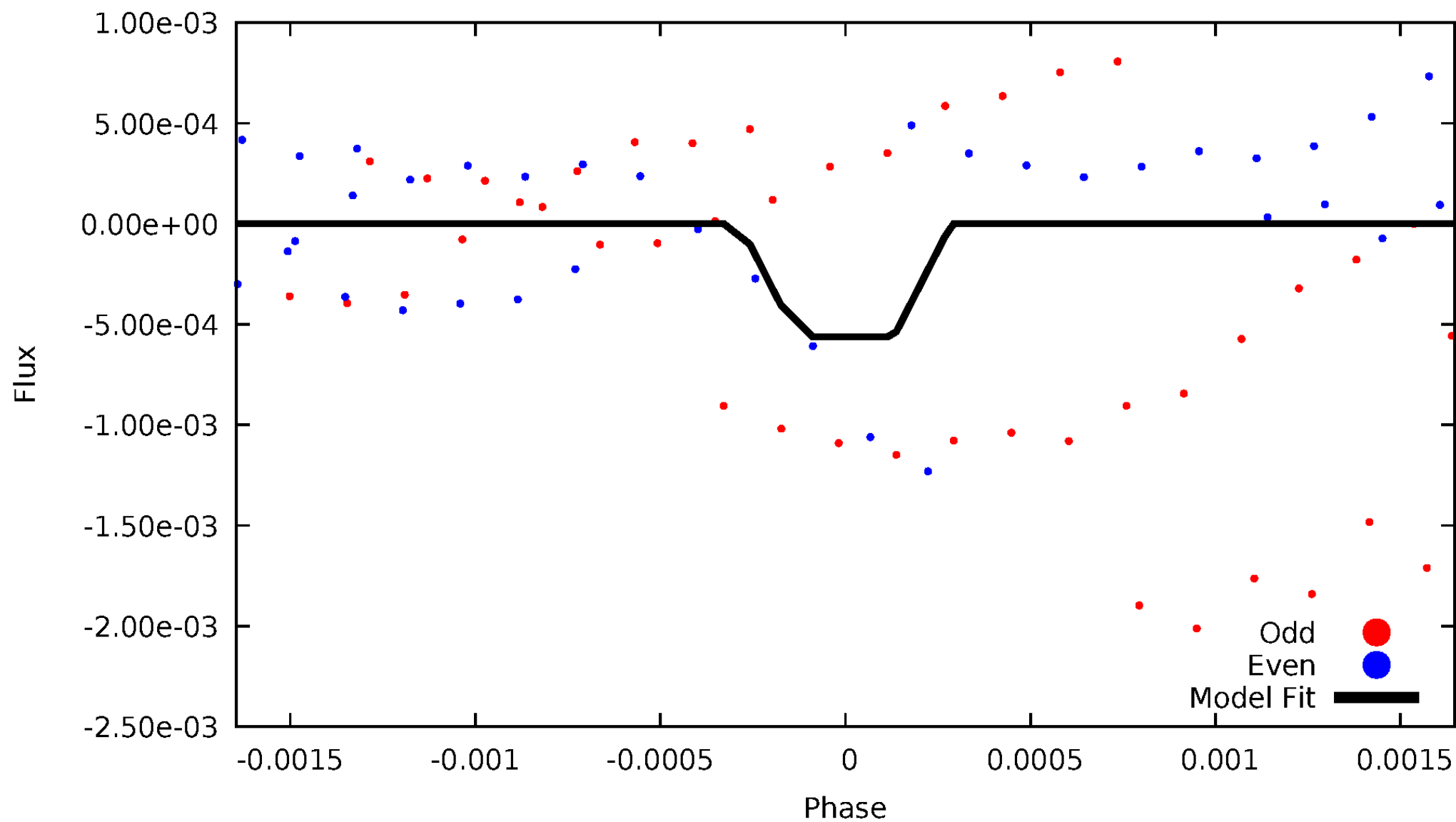
DV Odd/Even

TCE 012520187-02



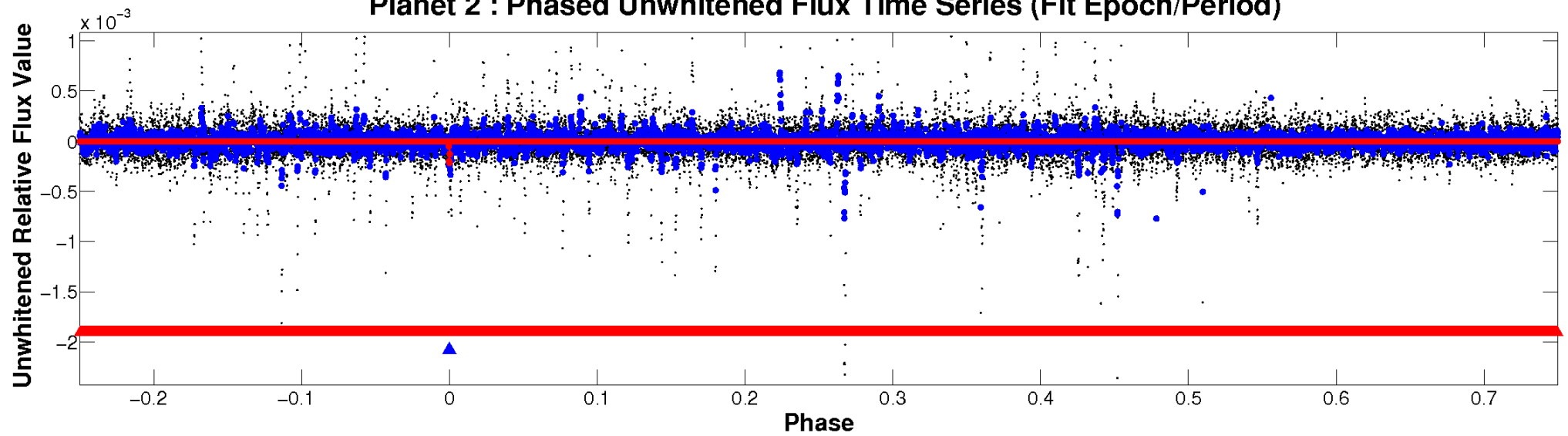
ALT Odd/Even

TCE 012520187-02

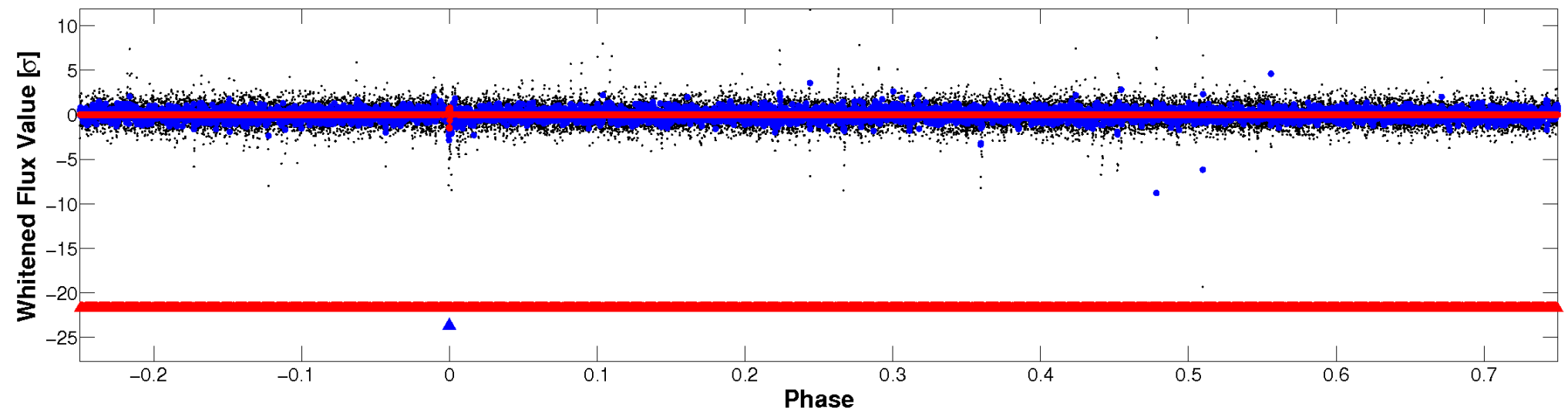


Non-Whitened Vs. Whitened Light Curve

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

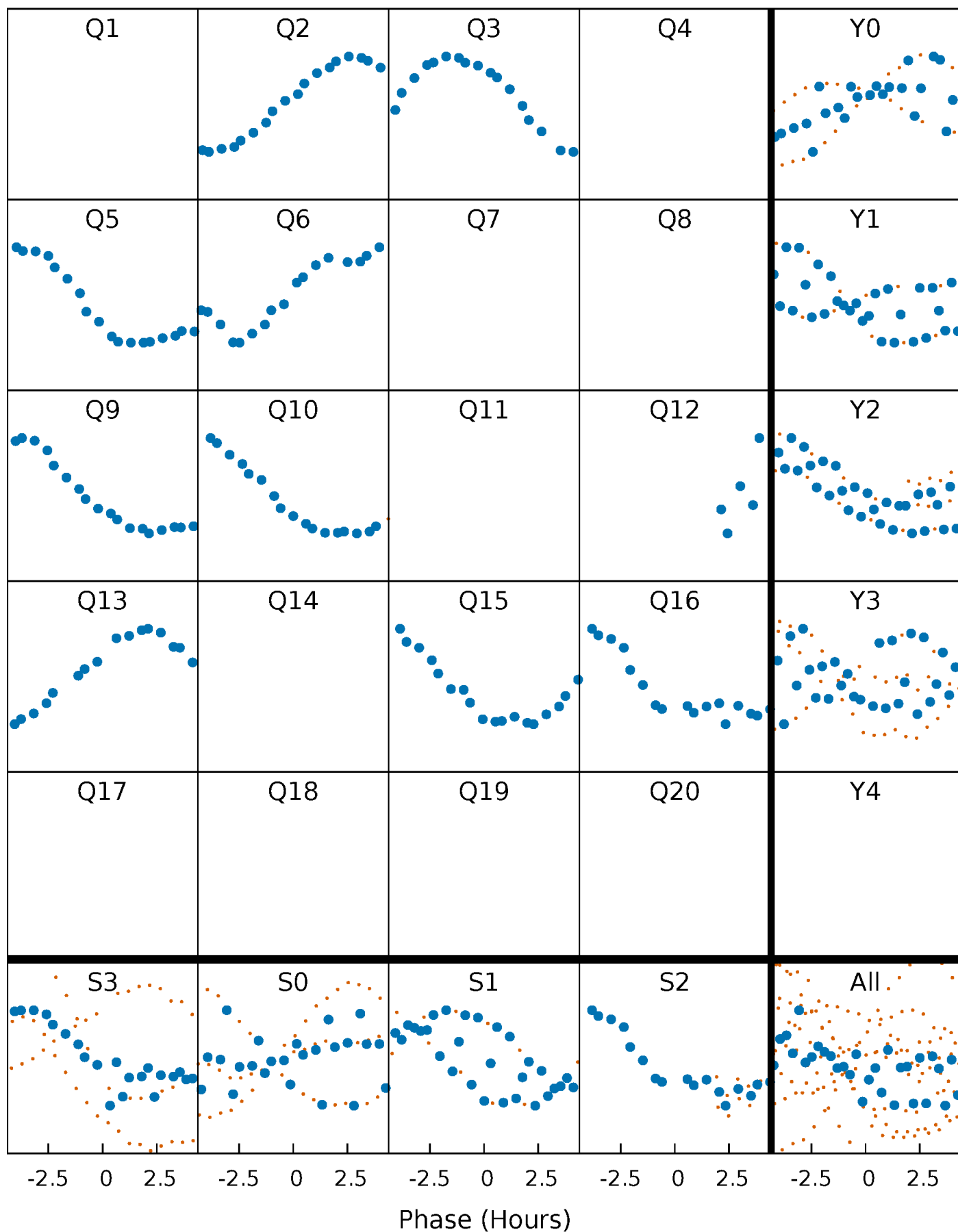


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



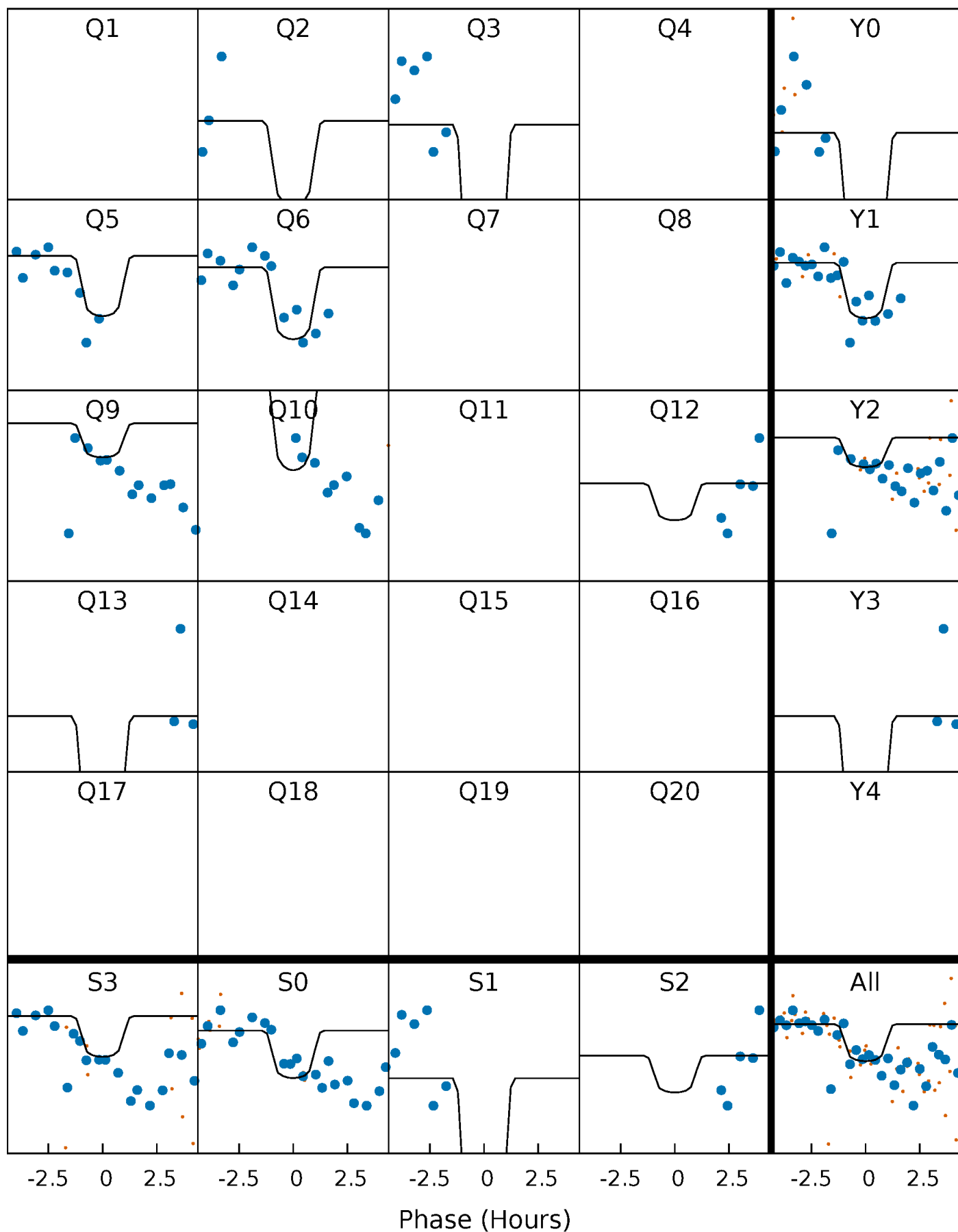
PDC Quarter-Phased Transit Curves

TCE 012520187-02 P=131.484206 Days $T_0=201.781286$ (BKJD)



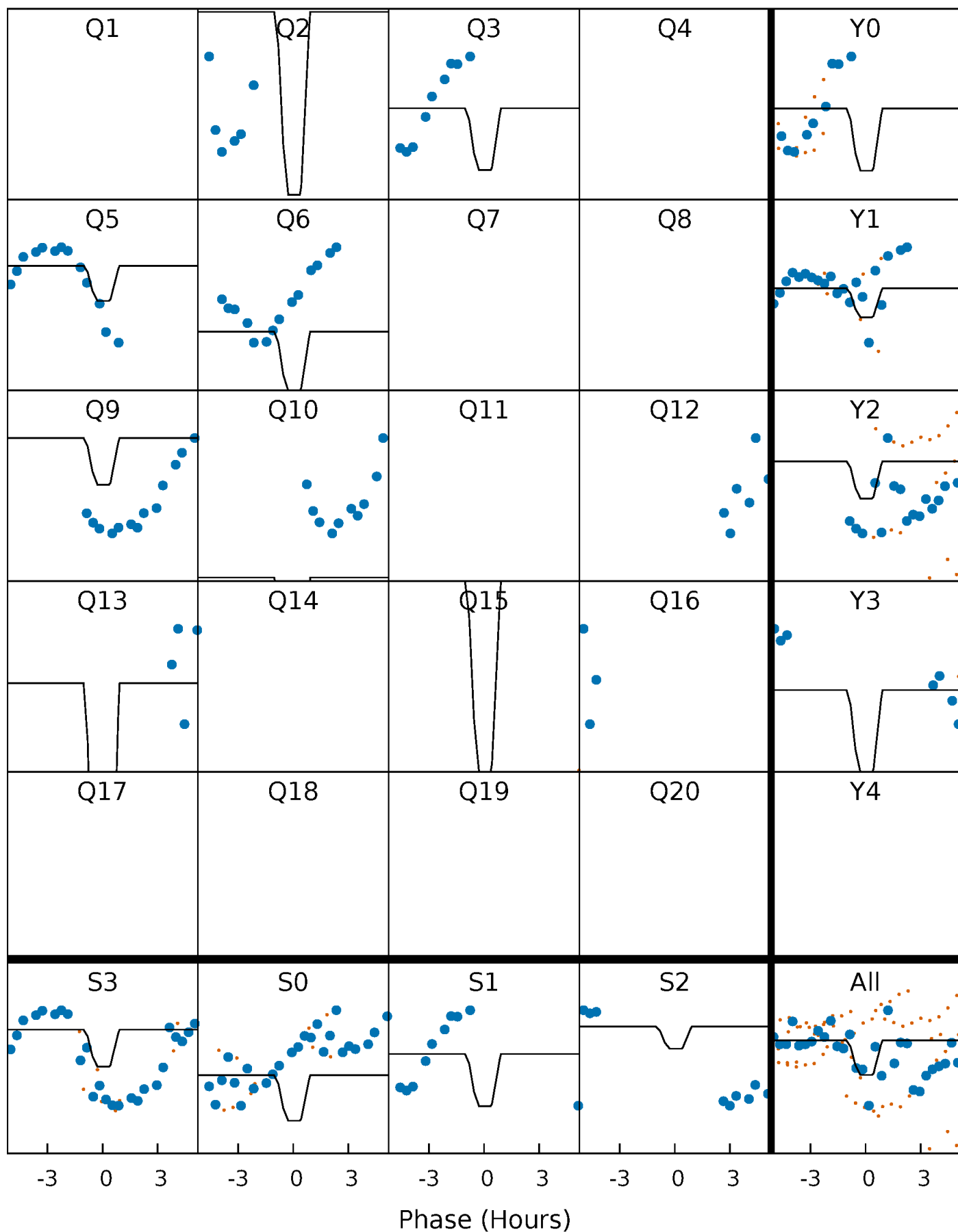
DV Quarter-Phased Transit Curves

TCE 012520187-02 P=131.484206 Days $T_0=201.781286$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

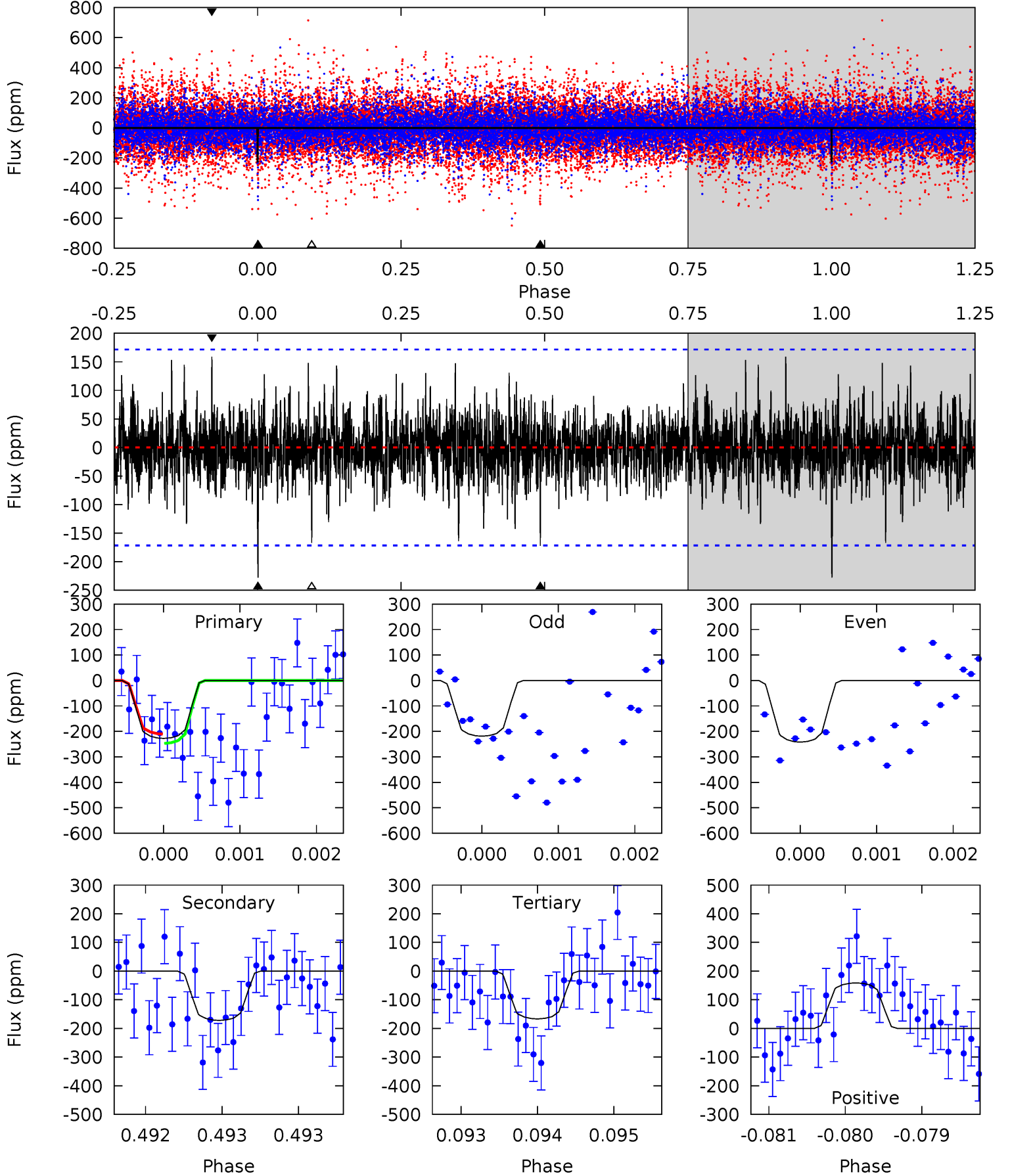
TCE 012520187-02 P=131.487369 Days $T_0=201.737572$ (BKJD)



DV Model-Shift Uniqueness Test

012520187-02, P = 131.484206 Days, E = 70.297080 Days

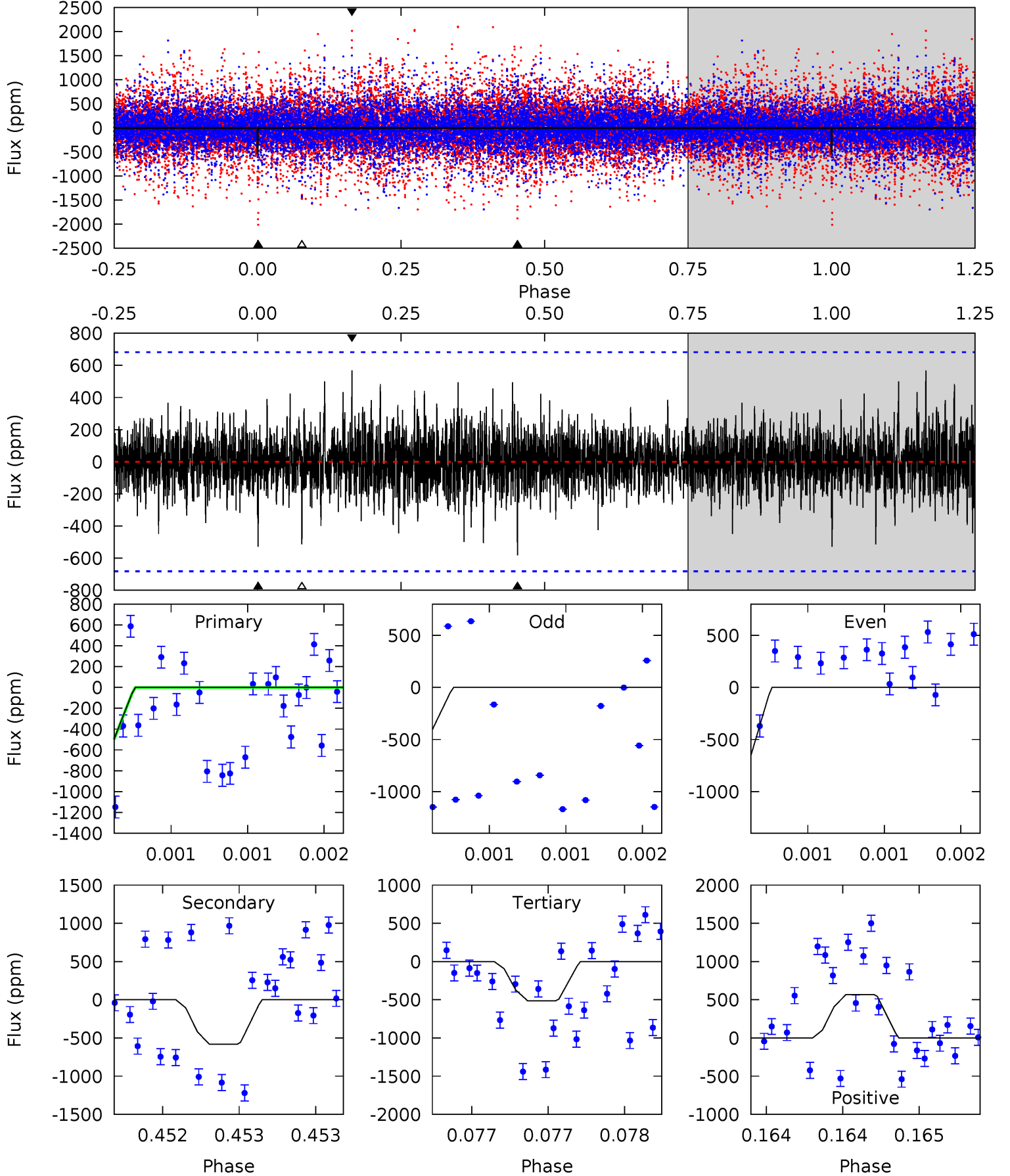
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.27	5.50	5.33	5.07	5.48	3.34	1.24	1.94	2.20	0.17	0.43	0.31	1.01	0.41	0.59



Alt Model-Shift Uniqueness Test

012520187-02, P = 131.487369 Days, E = 70.250203 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.30	4.74	4.18	4.63	5.56	3.45	1.05	0.12	-0.33	0.55	0.11	0.96	0.62	0.49	0.04



Stellar Parameters For KIC 012520187

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6756^{+140}_{-240}	$3.051^{+0.544}_{-0.136}$	$0.070^{+0.200}_{-0.450}$	$8.275^{+1.625}_{-4.876}$	$2.811^{+0.325}_{-0.974}$	$0.007^{+0.048}_{-0.003}$
	+2%/-4%	+18%/-4%	+286%/-643%	+20%/-59%	+12%/-35%	+693%/-41%
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 012520187-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-172 ± 31	$14.51^{+11.17}_{-8.80}$	1383^{+106}_{-208}	5588^{+3888}_{-1031}	216^{+1233}_{-144}
Alt.	-582 ± 123	$19.08^{+12.83}_{-9.36}$	1372^{+109}_{-188}	6610^{+3990}_{-1262}	431^{+1315}_{-272}

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 $A_{obs} \gg 1.0$

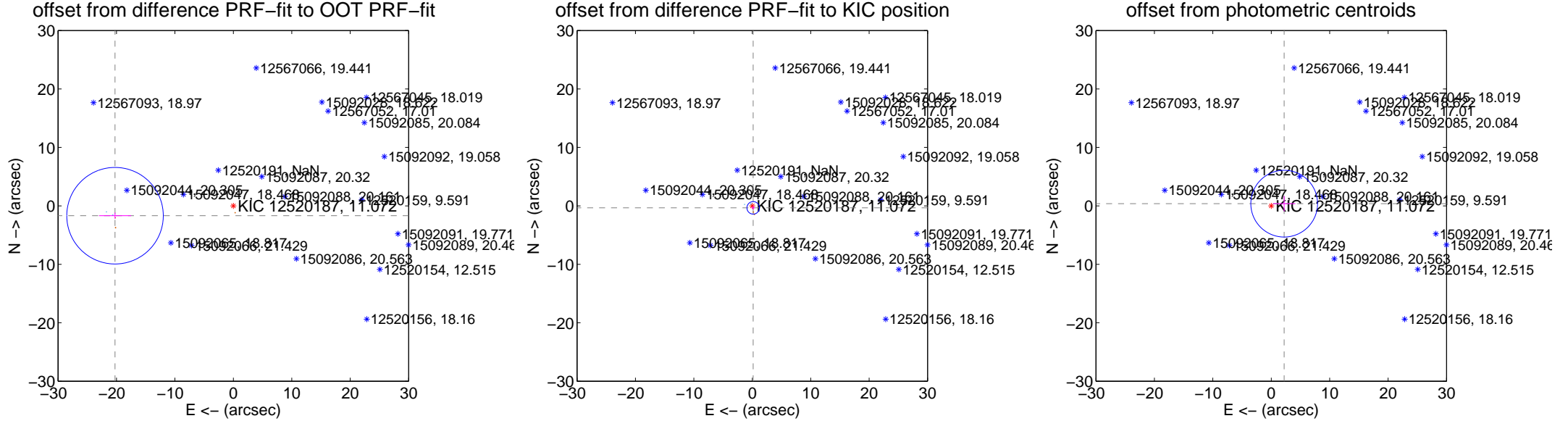
DV Centroid Data

Supplemental centroid analysis for 012520187-02. **Kepler magnitude: 11.07.** Transit SNR 4.78

There are 2 quarters with good PRF difference image offsets

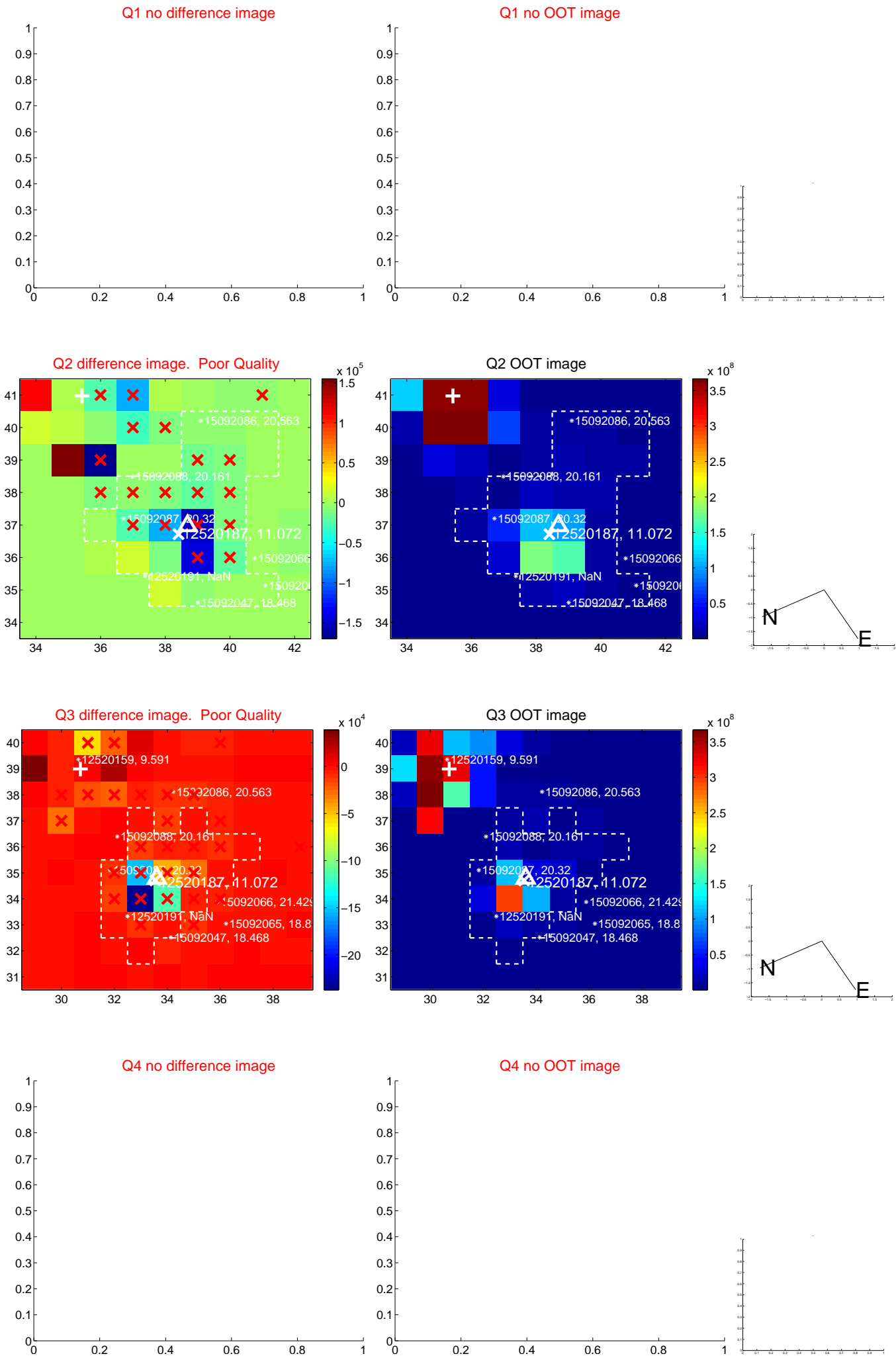
The OOT PRF centroid is offset from the target star catalog position by about 20.44 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	20.320 ± 2.753	7.38	20.250 ± 2.746	-1.685 ± 0.523
PRF-fit source offset from KIC position	0.371 ± 0.356	1.04	-0.149 ± 0.252	-0.340 ± 0.302
photometric centroid source offset	2.25 ± 1.90	1.18	-2.21 ± 1.92	0.38 ± 1.30

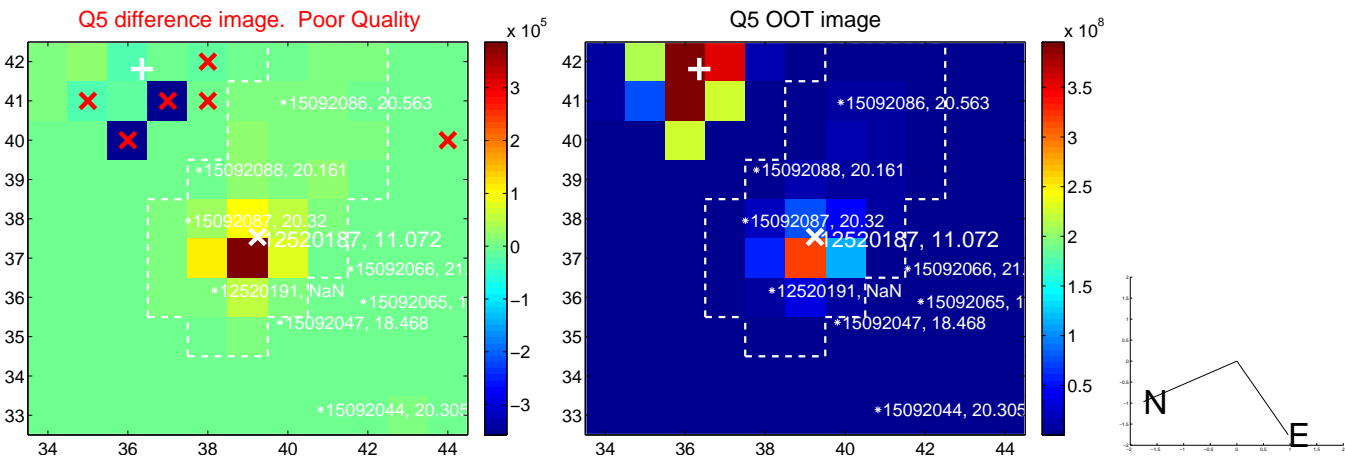


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

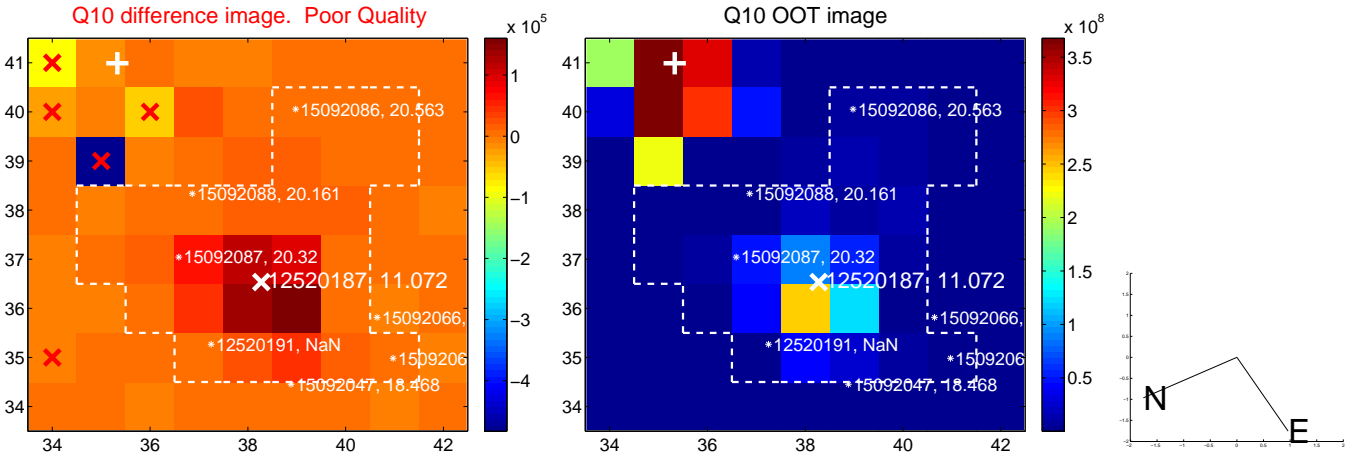
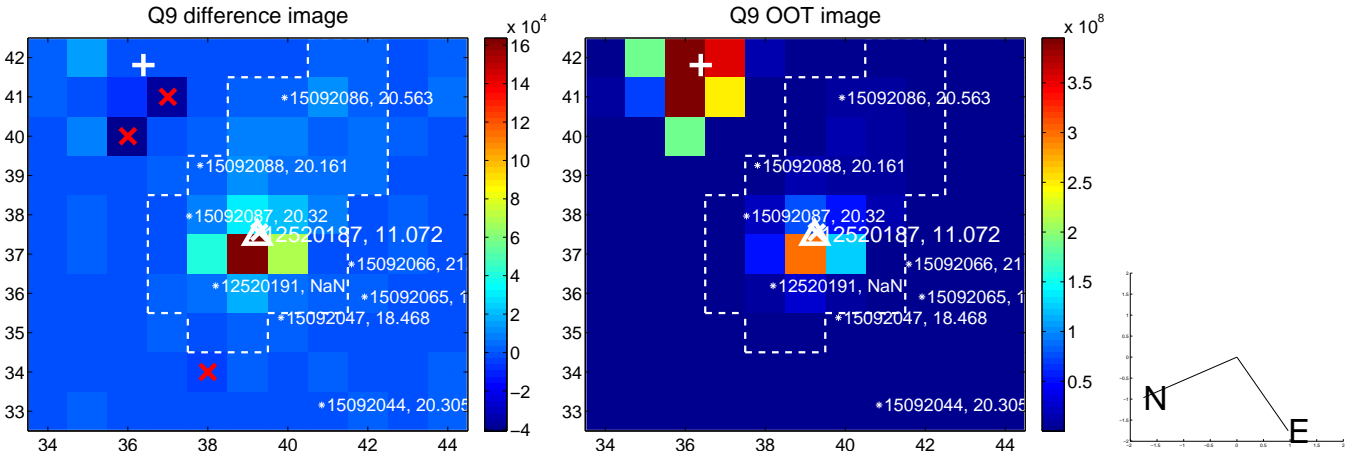
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



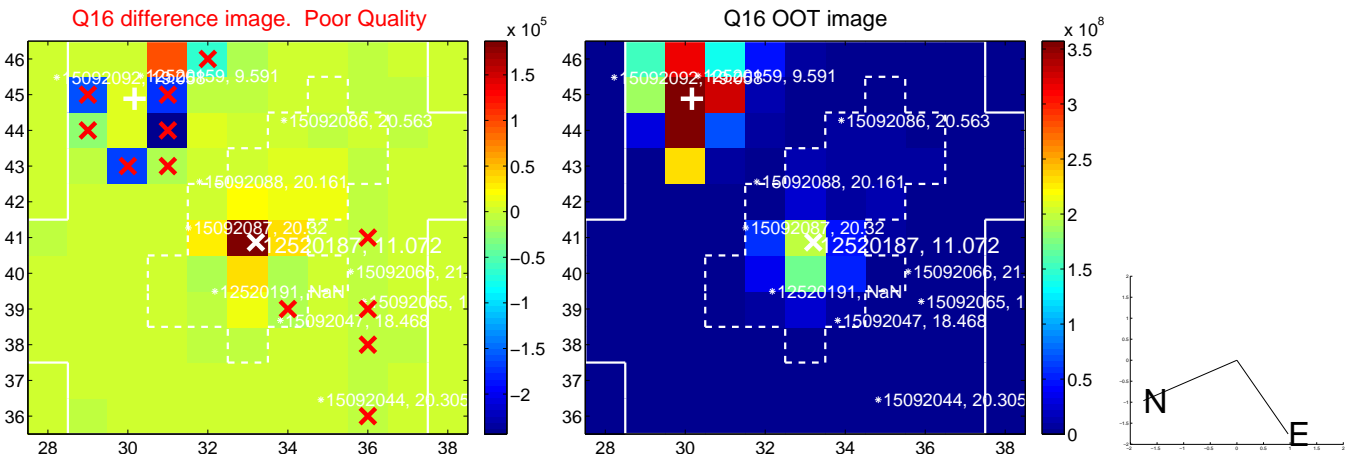
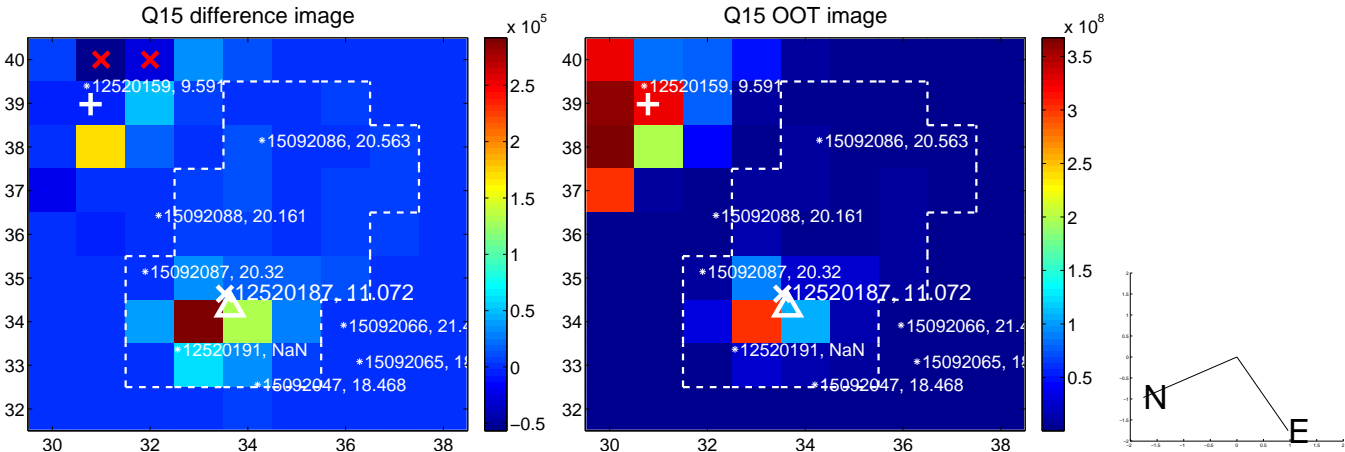
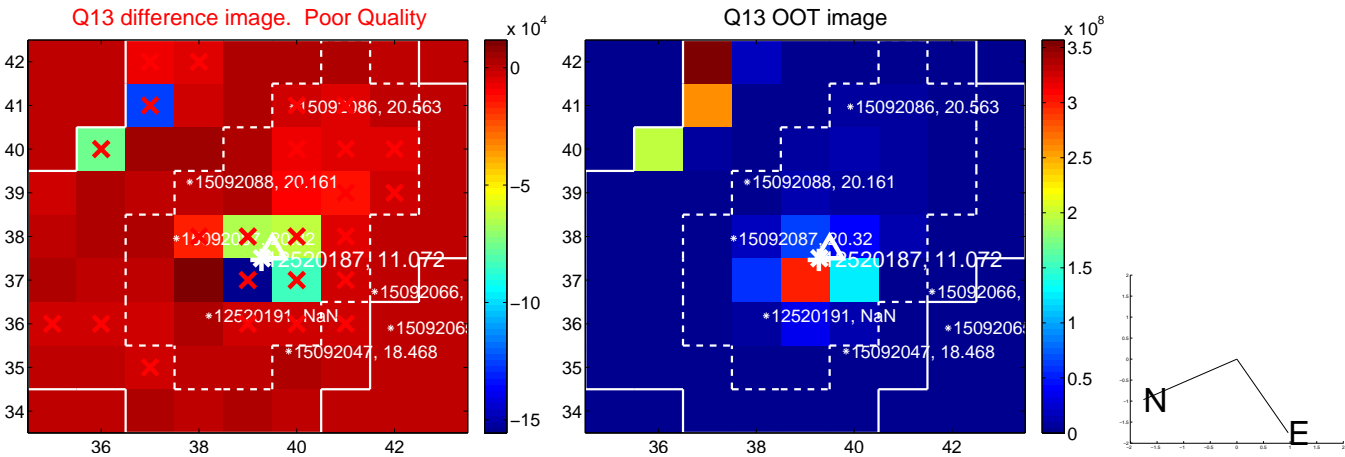
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



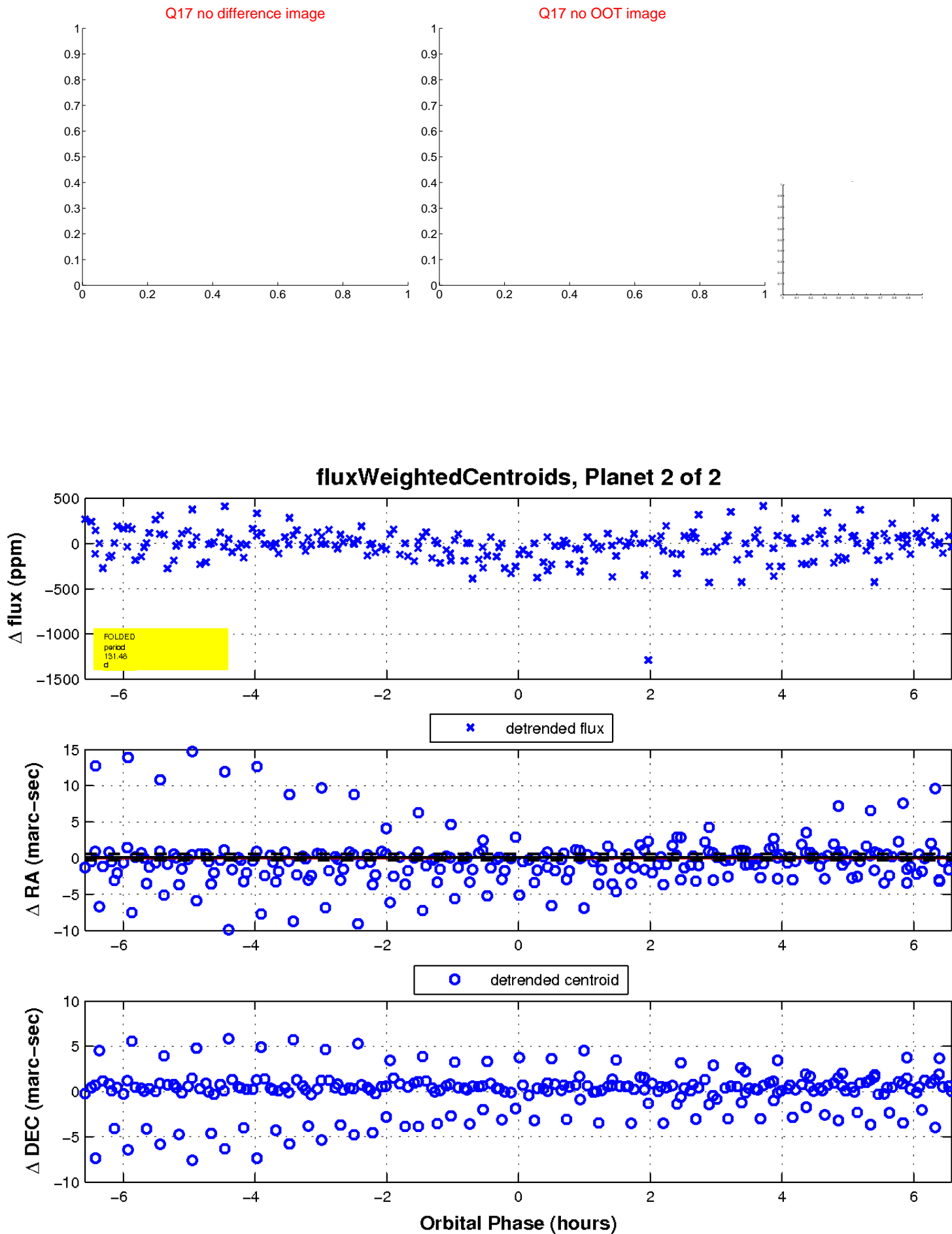
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

