

KIC 004377638

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})
004377638-01	OBS	No	2.821291	131.523948	0.0	10.515	35.6	0.0	3.21	9338	0.00	24324.58
004377638-02	OBS	No	337.036713	193.253677	135.6	13.533	21.8	8.4	3.21	9338	4.16	41.34
004377638-03	OBS	No	2.821679	132.041493	10.5	0.515	7.6	1.7	3.21	9338	1.09	24320.12
004377638-04	OBS	No	441.495510	242.267431	97.5	6.925	8.6	6.4	3.21	9338	3.45	28.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004377638-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
004377638-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_SATURATED
004377638-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—TRANS_GAPPED—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED—HALO_GHOST
004377638-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—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.

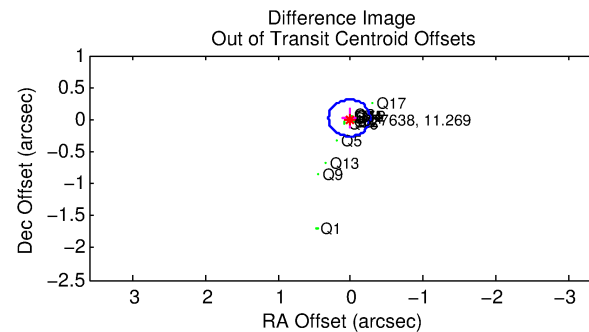
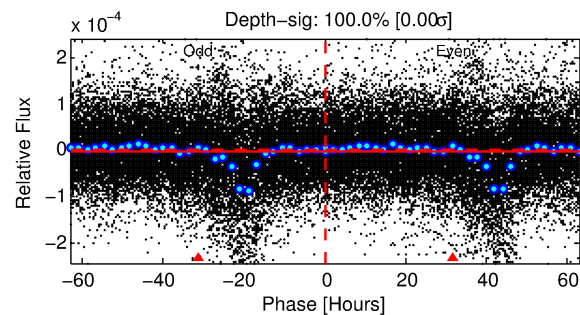
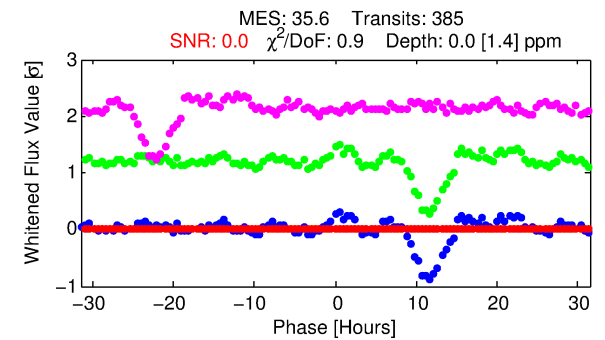
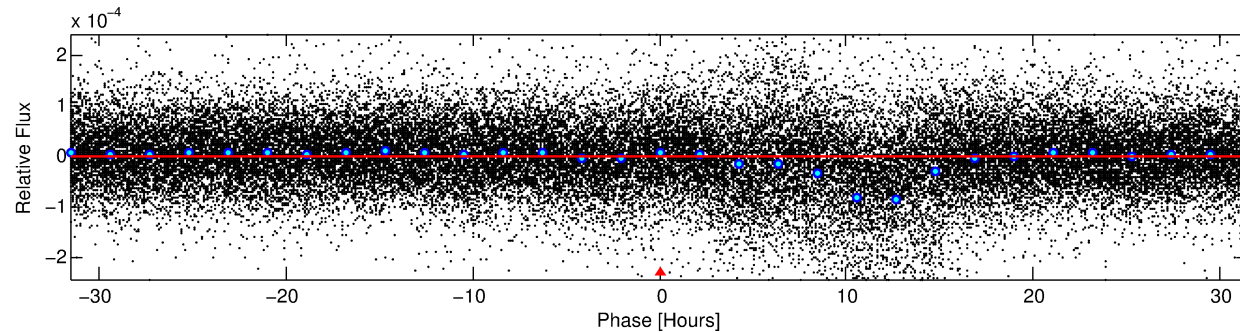
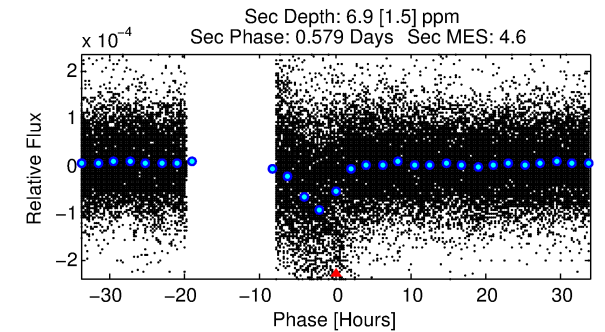
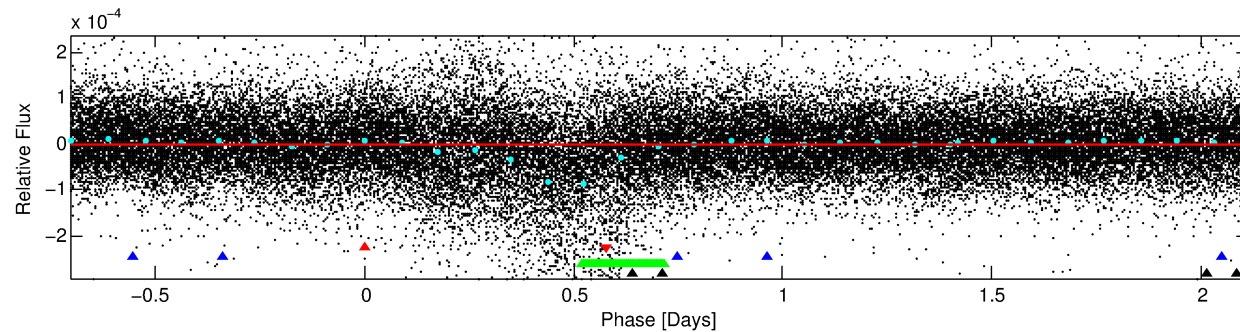
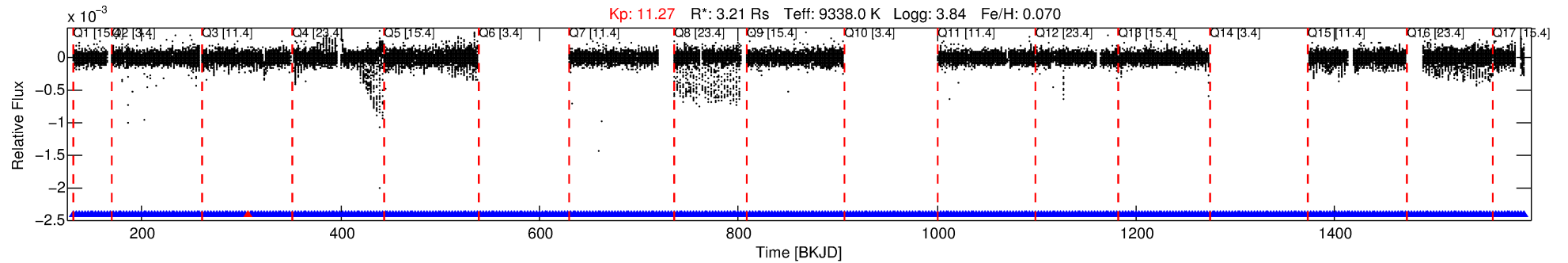
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004377638-01

No Significant Match Found

DV One-Page Summary

KIC: 4377638 Candidate: 1 of 4 Period: 2.821 d



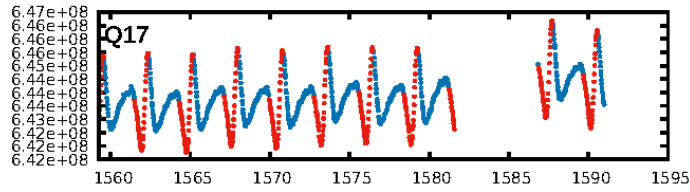
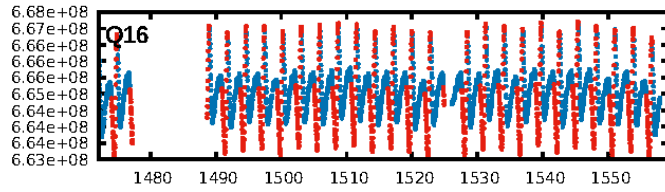
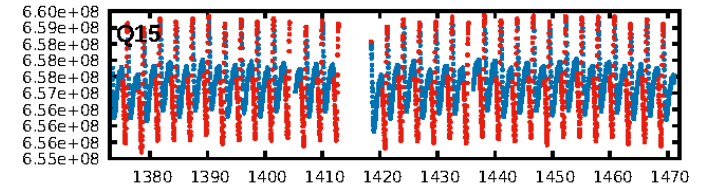
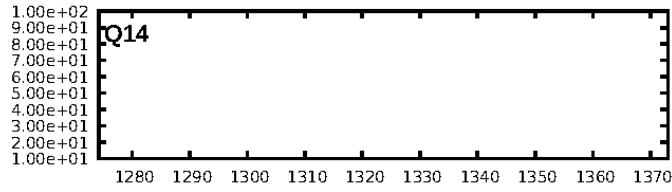
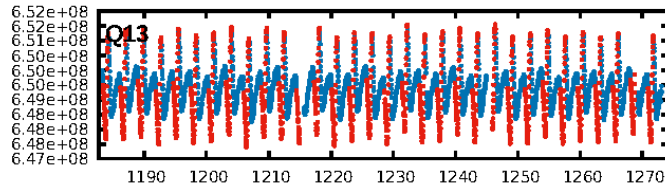
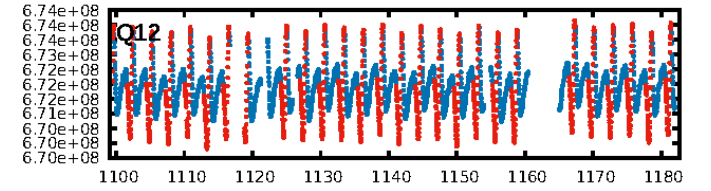
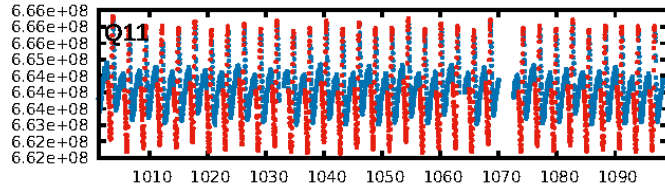
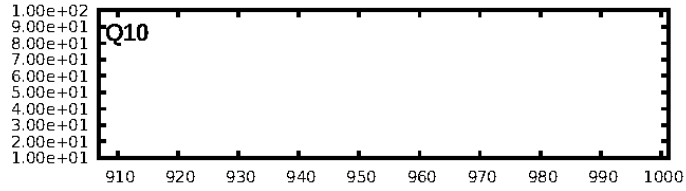
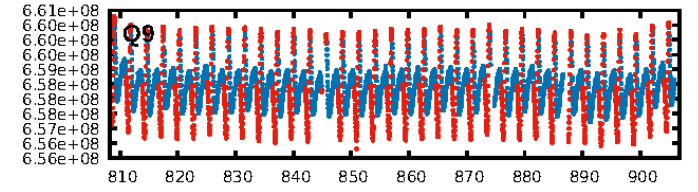
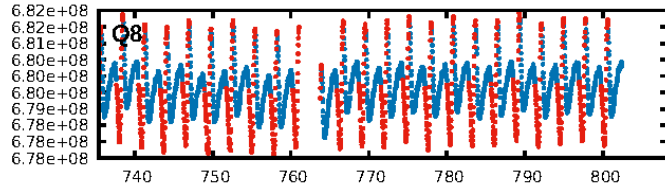
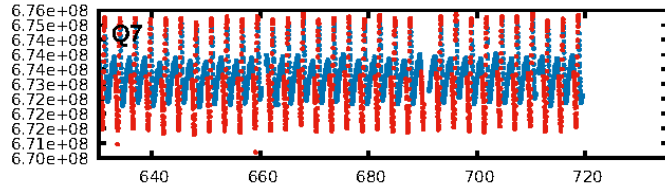
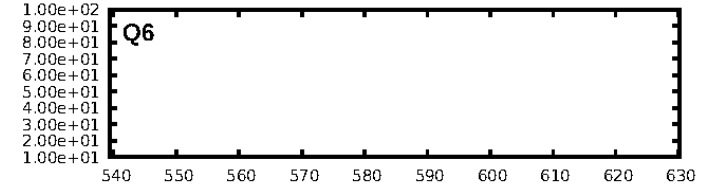
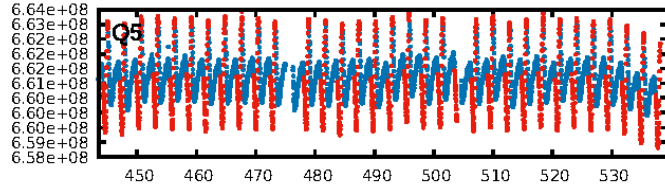
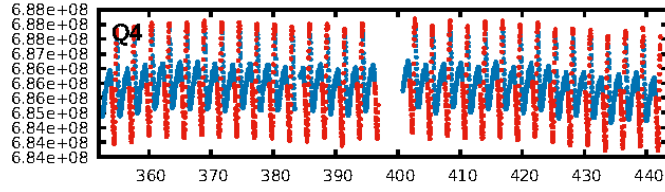
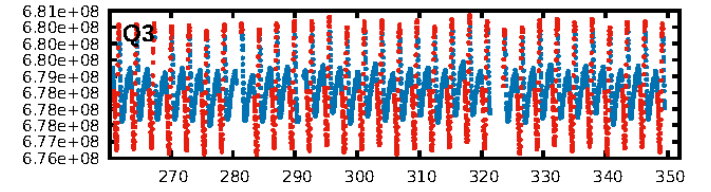
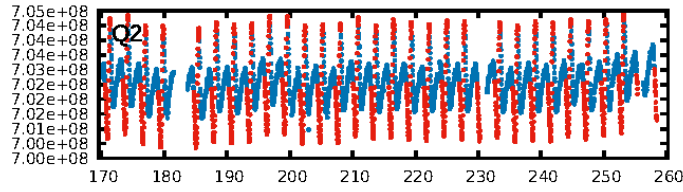
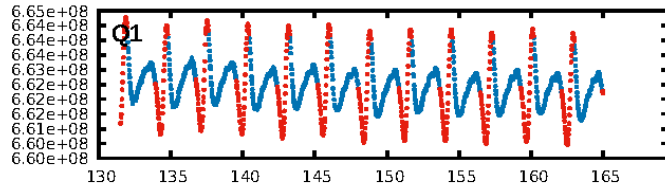
DV Fit Results:

Period = 2.82129 [2.28117] d
Epoch = 131.5239 [422.0610] BKJD
 R_p/R^* = 0.0000 [0.0611]
 a/R^* = 1.31 [202.50]
 b = 0.90 [249.56]
 S_{eff} = 24324.57 [31255.76]
 T_{eq} = 3184 [1023] K
 R_p = 0.00 [21.38] R_e
 a = 0.0537 [0.0368] AU
 A_g = 547276.23 [5229195625.36] [0.00σ]
 T_{eff} = 133915 [319897060] K [0.00σ]

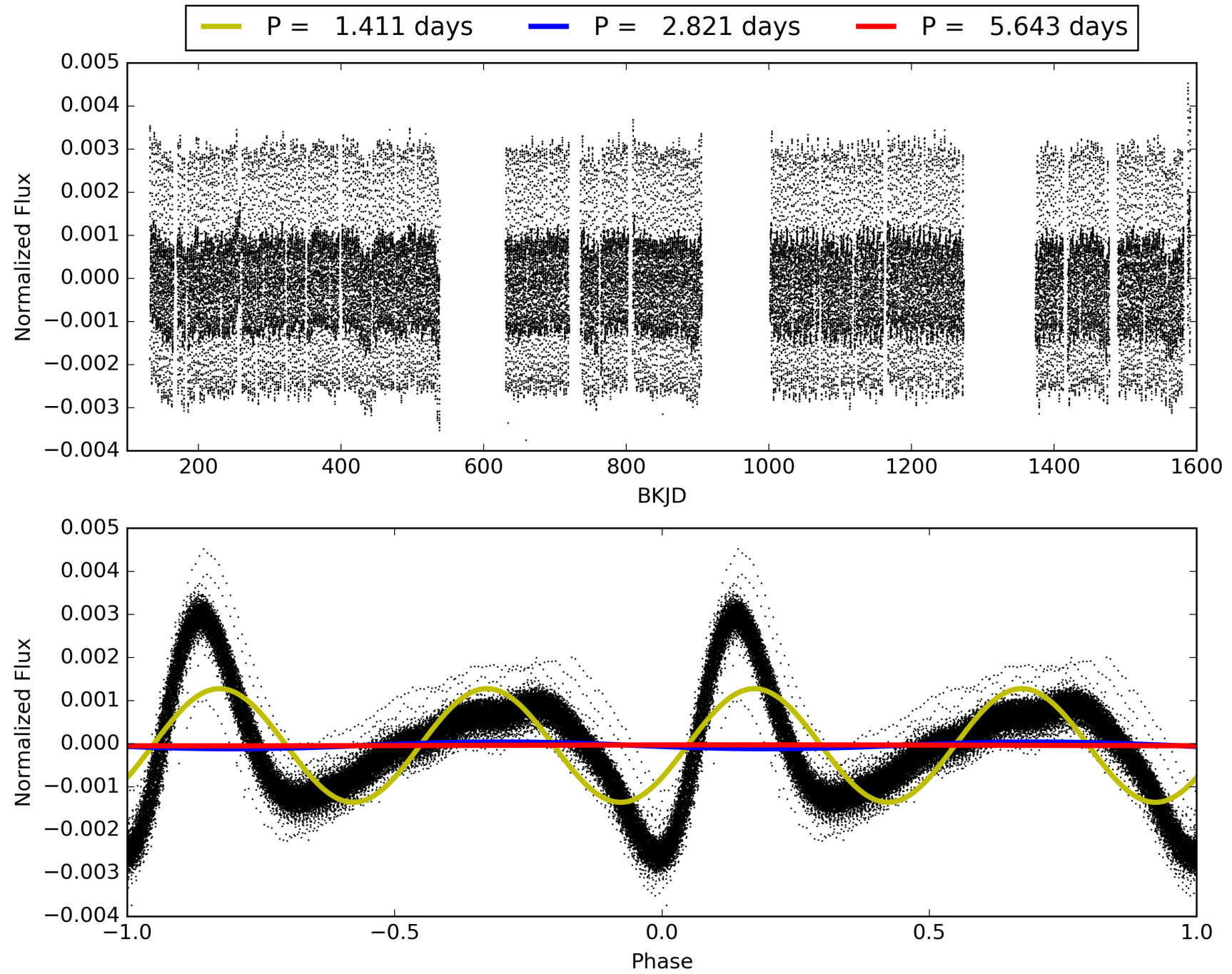
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.1% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.54e-179
RollingBand-fgt: 1.00 [361/362]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
QotOffset-rm: 0.033 arcsec [0.35σ]
KicOffset-rm: 0.116 arcsec [0.67σ]
QotOffset-st: 1/4/4/5 [14]
KicOffset-st: 1/4/4/5 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 0.00 [0/14]

TCE 004377638-01, PDC Light Curves

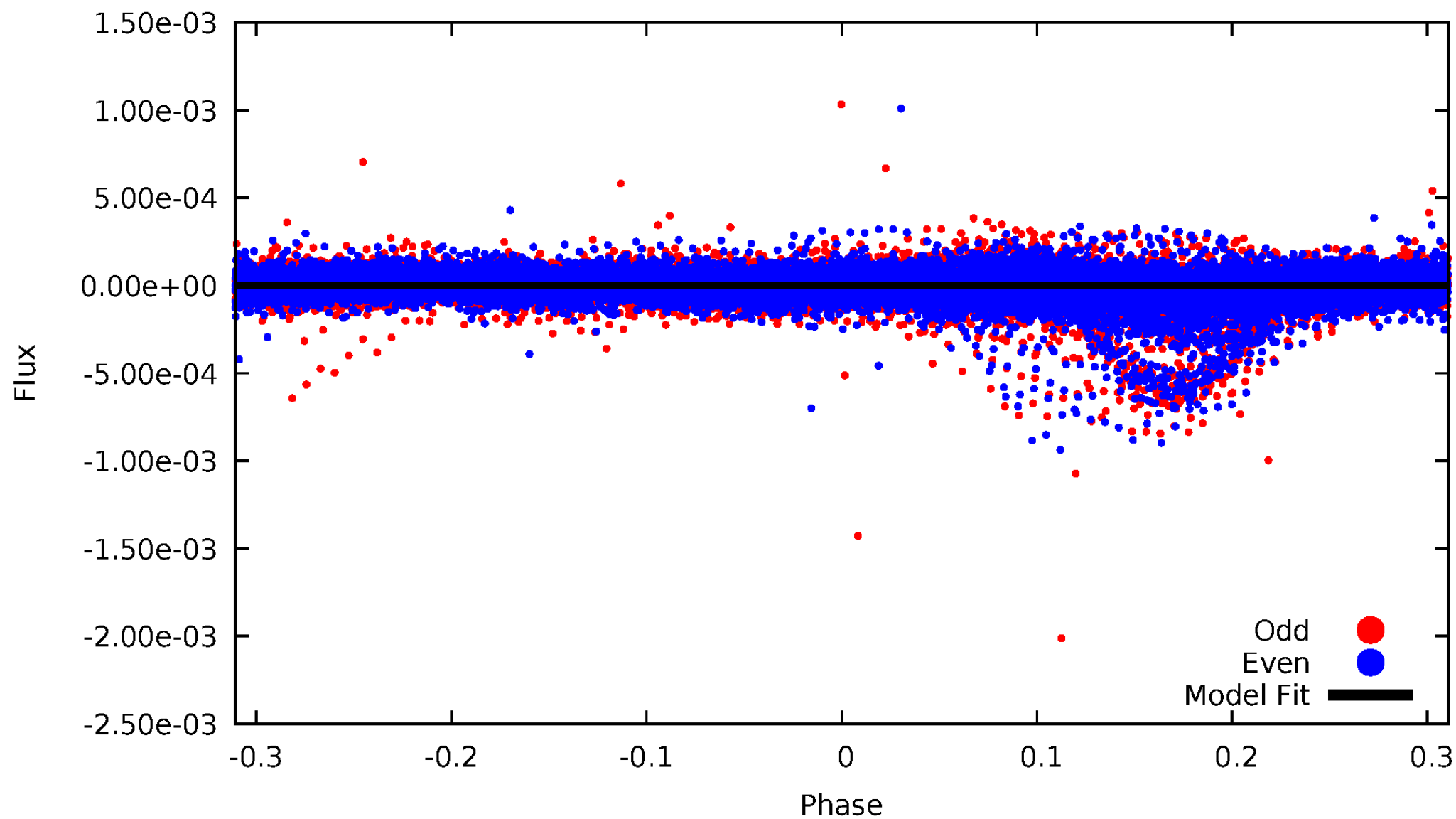


TCE 004377638-01



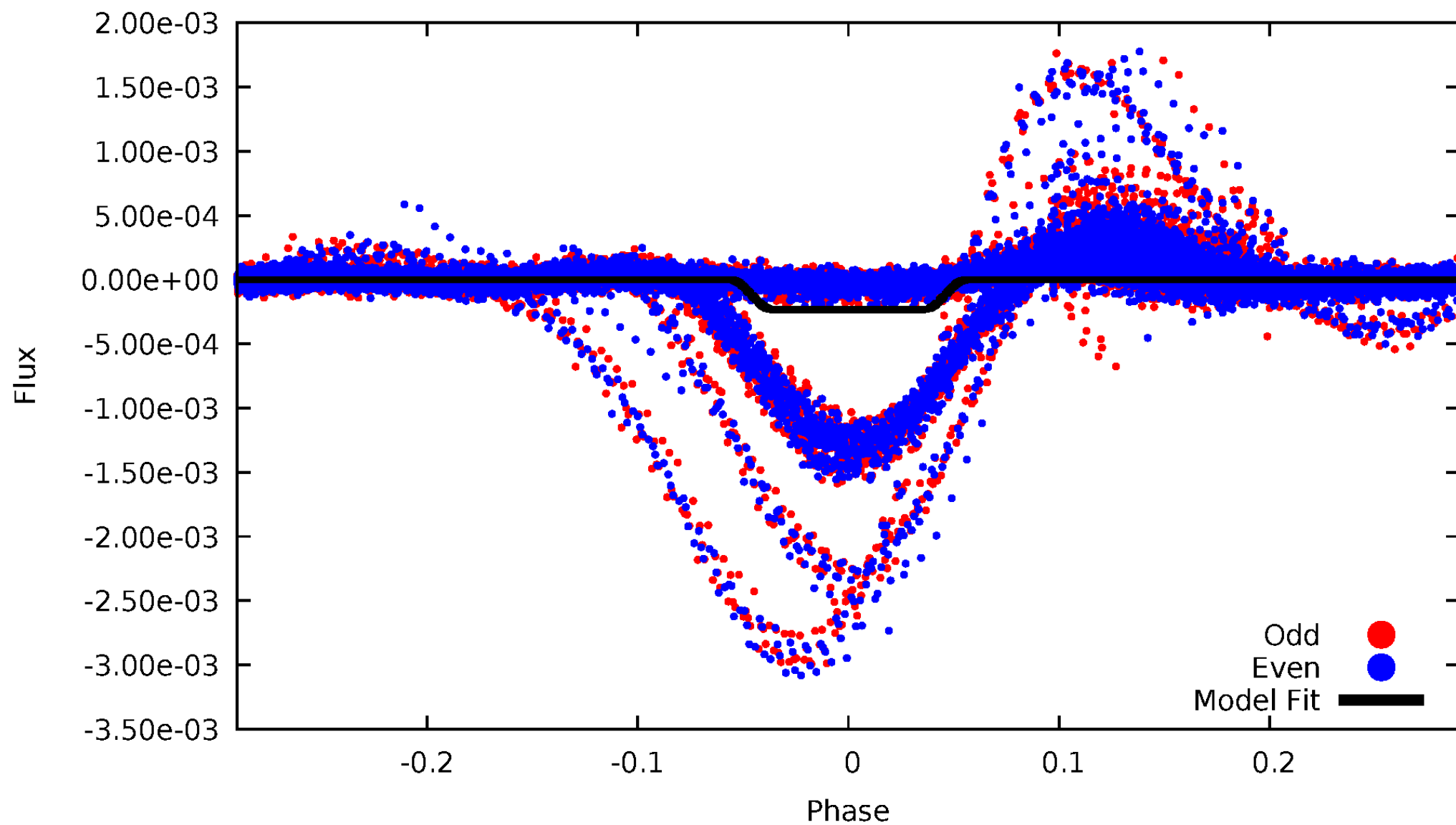
DV Odd/Even

TCE 004377638-01



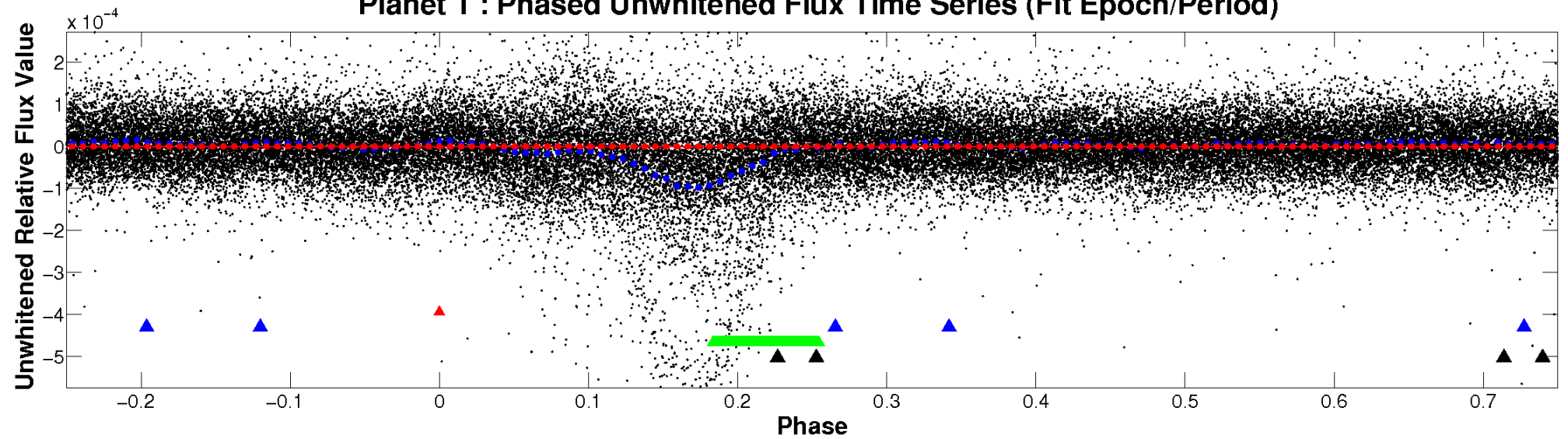
ALT Odd/Even

TCE 004377638-01

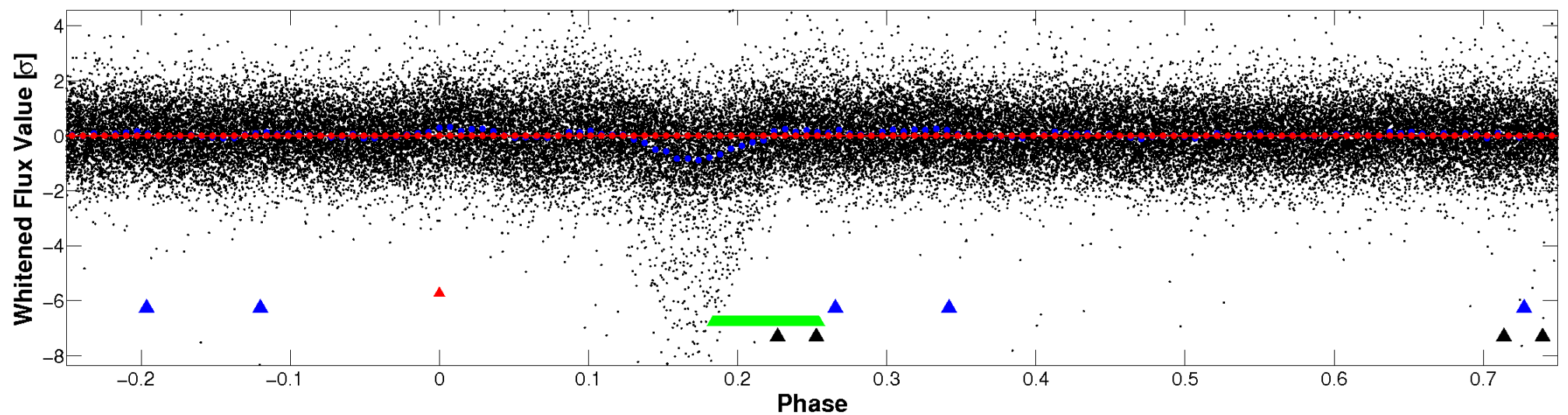


Non-Whitened Vs. Whitened Light Curve

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

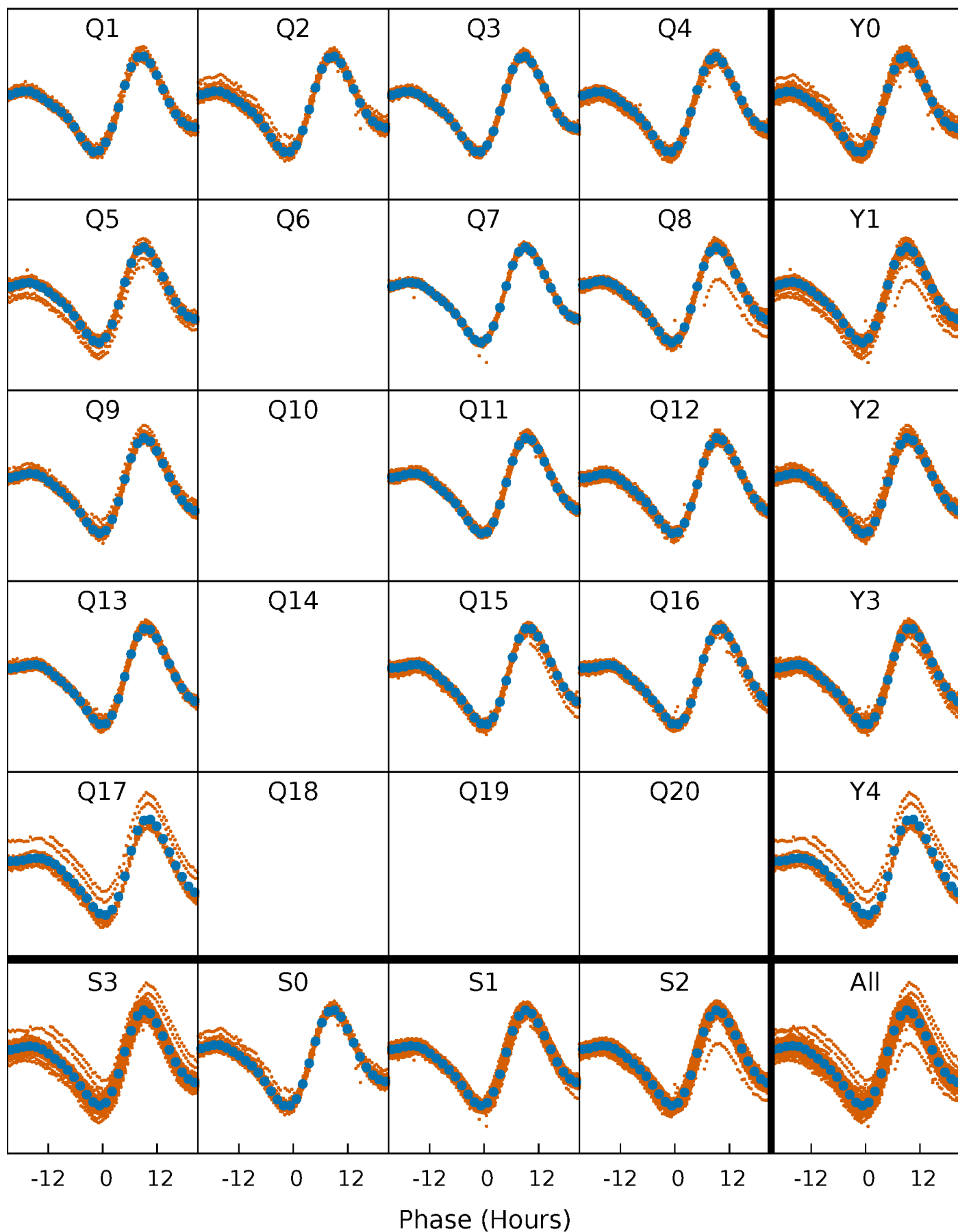


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



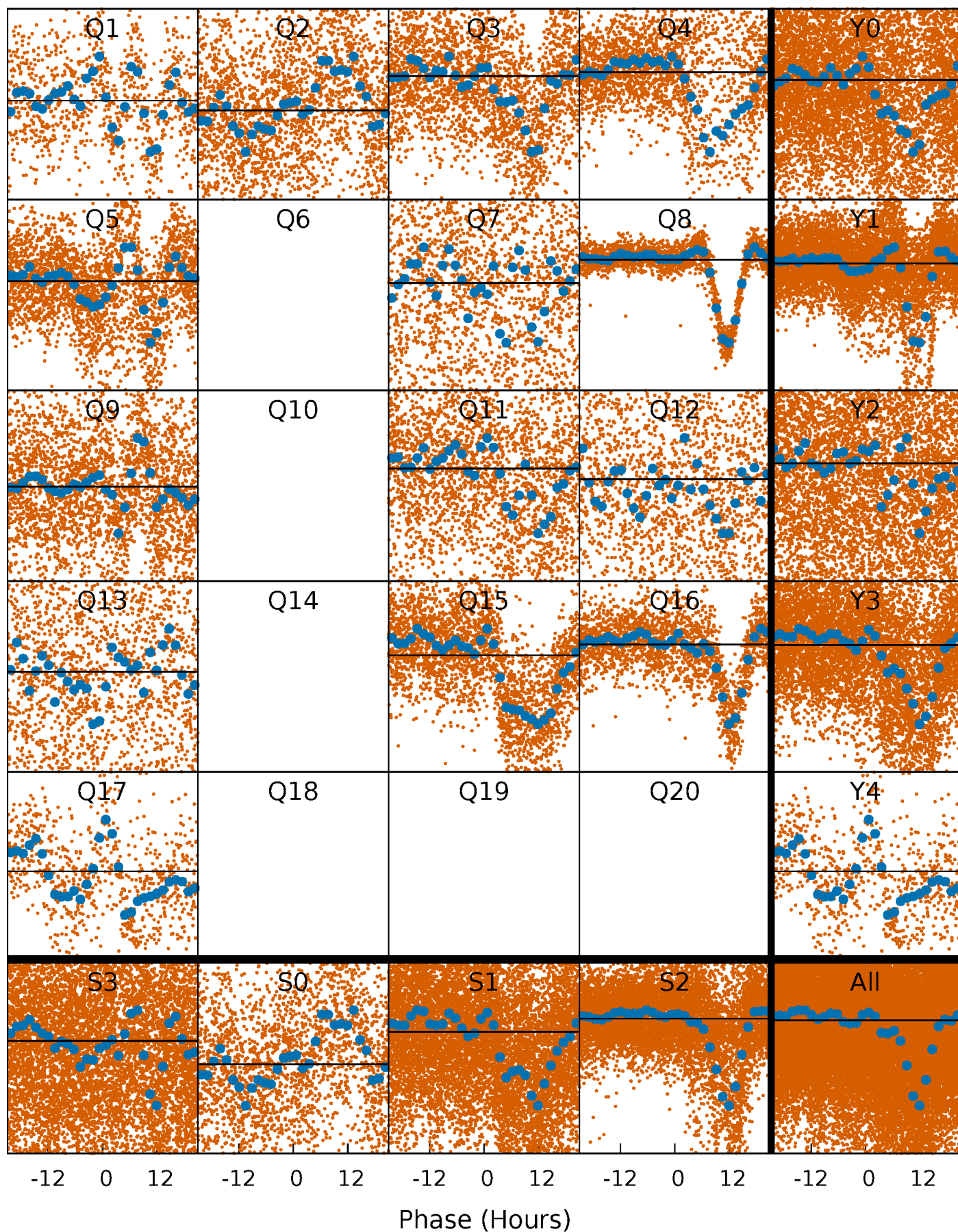
PDC Quarter-Phased Transit Curves

TCE 004377638-01 P= 2.821291 Days $T_0=131.523948$ (BKJD)



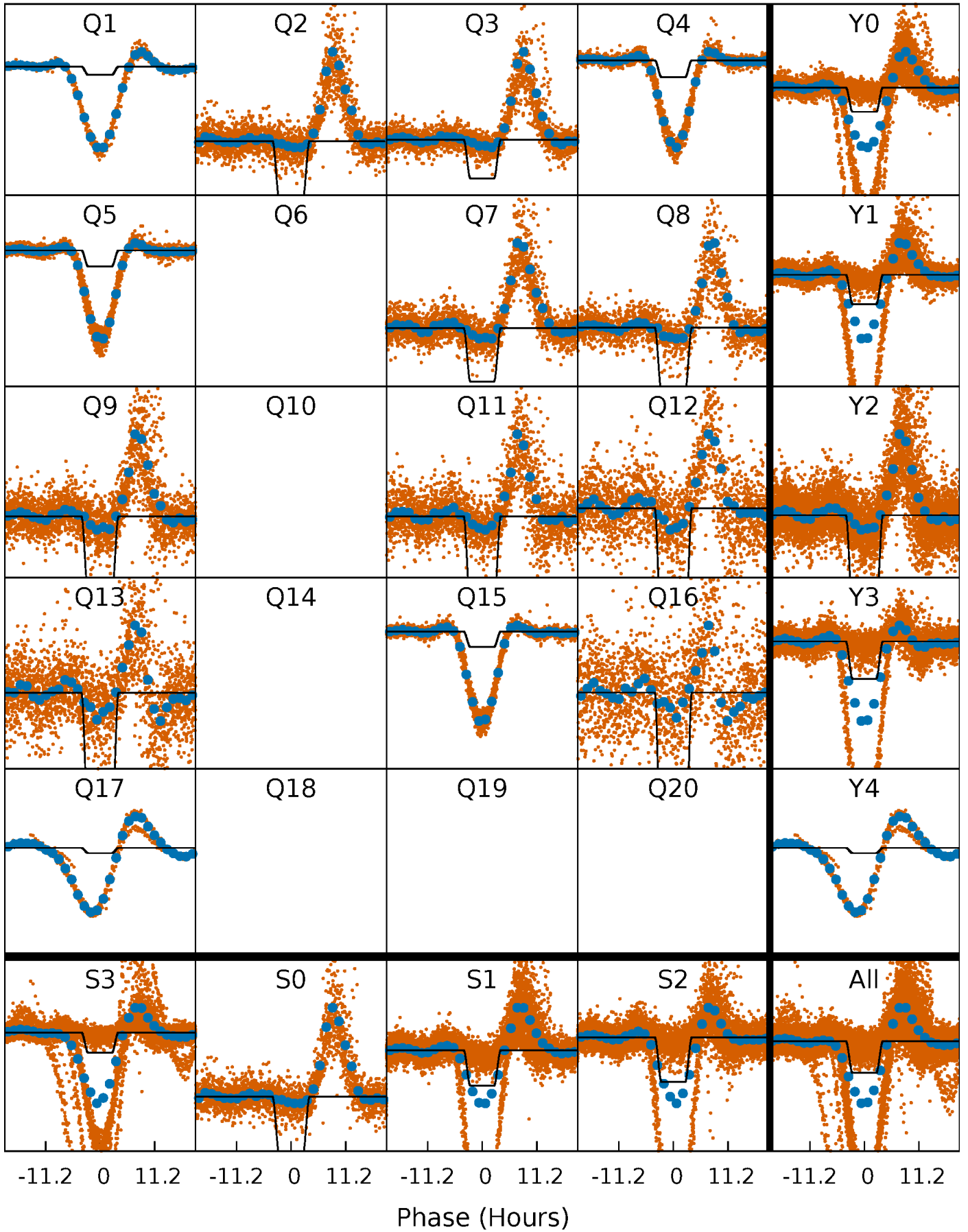
DV Quarter-Phased Transit Curves

TCE 004377638-01 P= 2.821291 Days $T_0=131.523948$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

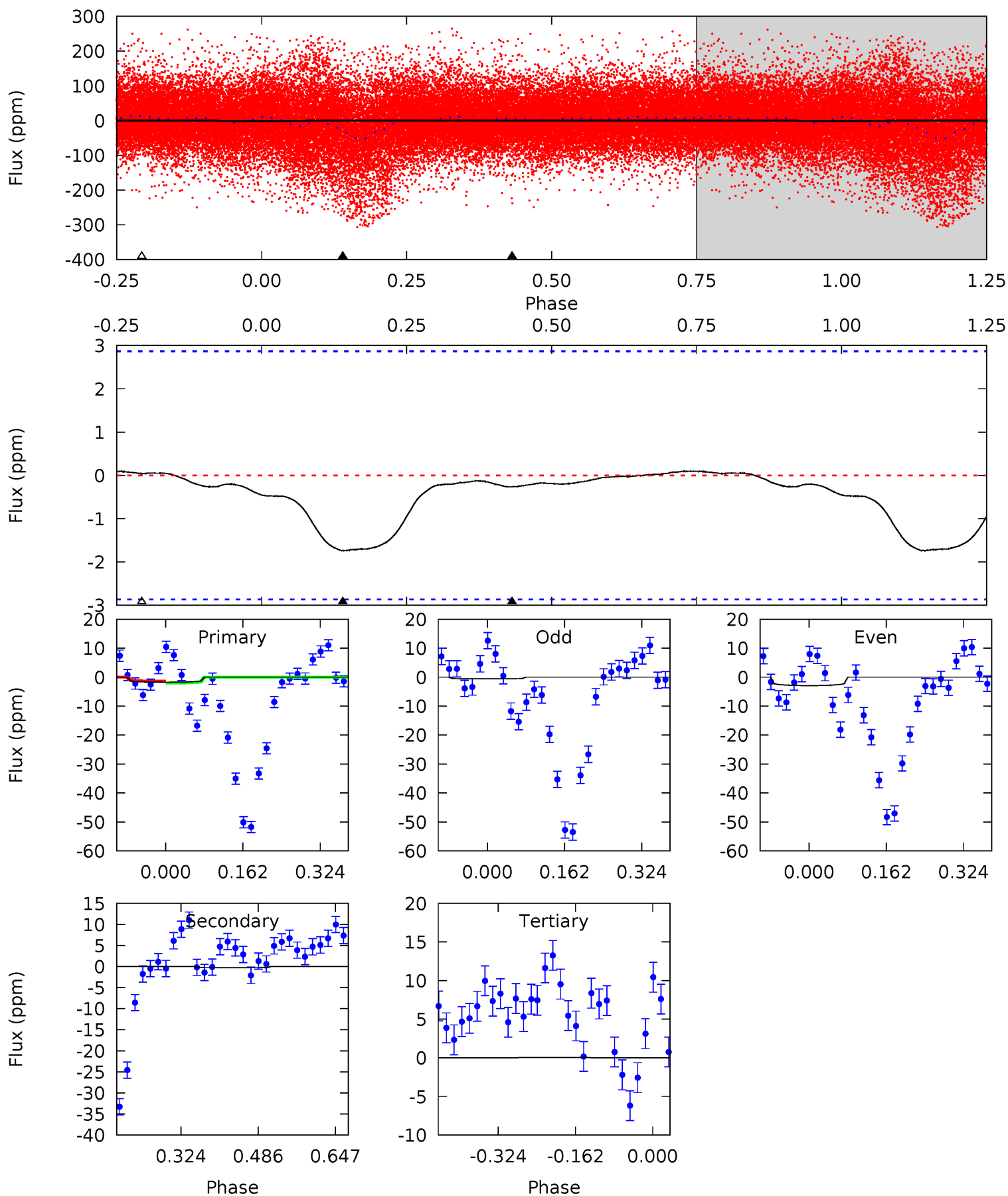
TCE 004377638-01 P= 2.821498 Days $T_0=131.534407$ (BKJD)



DV Model-Shift Uniqueness Test

004377638-01, P = 2.821291 Days, E = 128.702657 Days

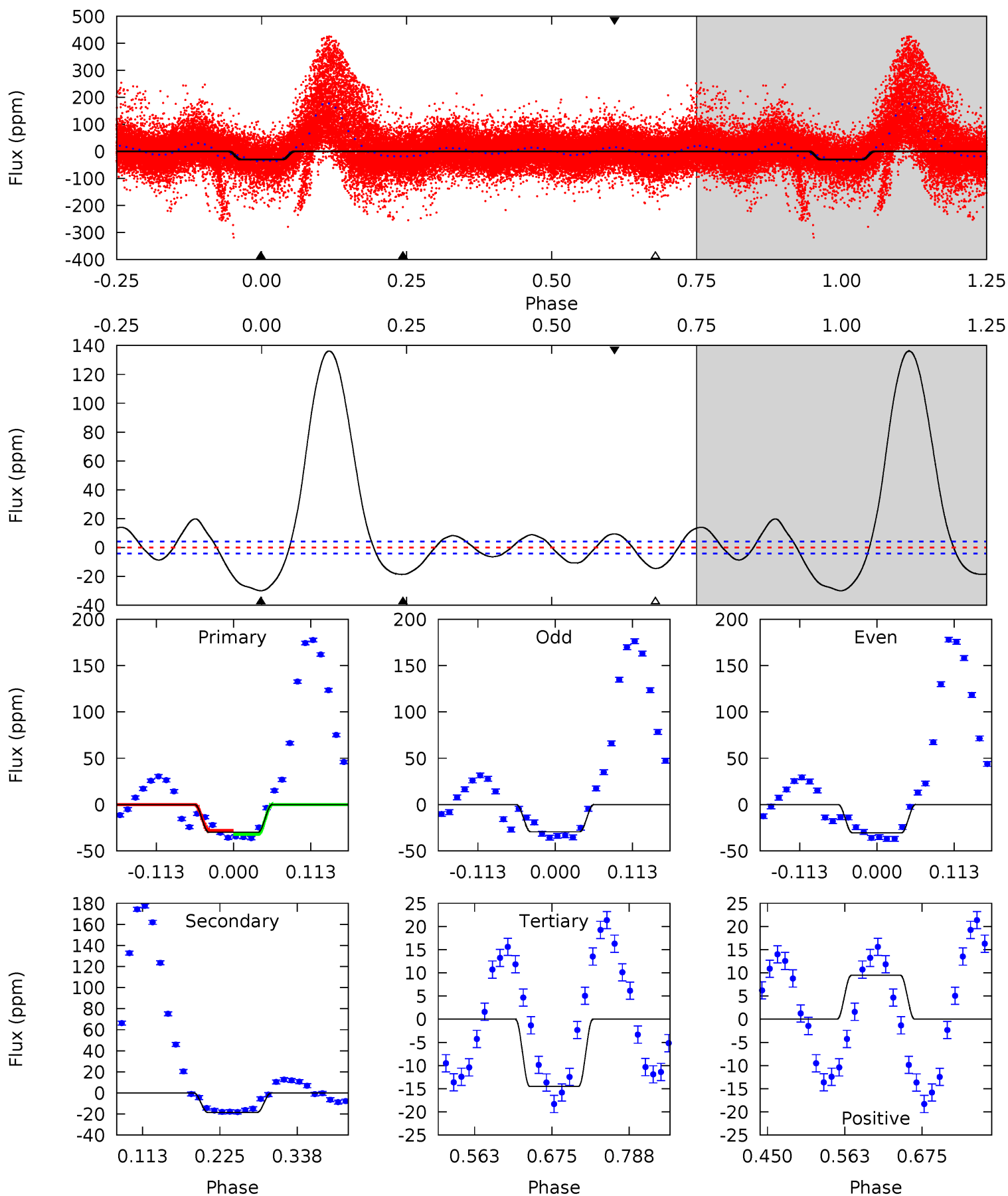
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.71	0.41	-0.06	0	4.46	1.40	0.19	2.77	2.71	0.47	0.41	1.81	1.28	0.05	0.51



Alt Model-Shift Uniqueness Test

004377638-01, P = 2.821498 Days, E = 131.534407 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.8	20.3	15.9	10.4	4.54	1.59	26.4	16.9	22.4	4.46	9.96	0.64	12.5	0.82	1.91



Stellar Parameters For KIC 004377638

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	9338^{+254}_{-471}	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.150}_{-0.750}$	$3.207^{+0.840}_{-1.441}$	$2.587^{+0.316}_{-0.949}$	$0.110^{+0.367}_{-0.052}$
	+3%/-5%	+10%/-4%	+214%/-1071%	+26%/-45%	+12%/-37%	+333%/-47%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004377638-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-0 ± 1	$13.12^{+16.42}_{-9.37}$	4148^{+1308}_{-770}	-3621^{+492}_{-838}	$0.001^{+0.027}_{-0.004}$
Alt.	-19 ± 1	$15.03^{+17.52}_{-10.41}$	4154^{+1342}_{-799}	-3098^{+7428}_{-1094}	$0.136^{+1.247}_{-0.115}$

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

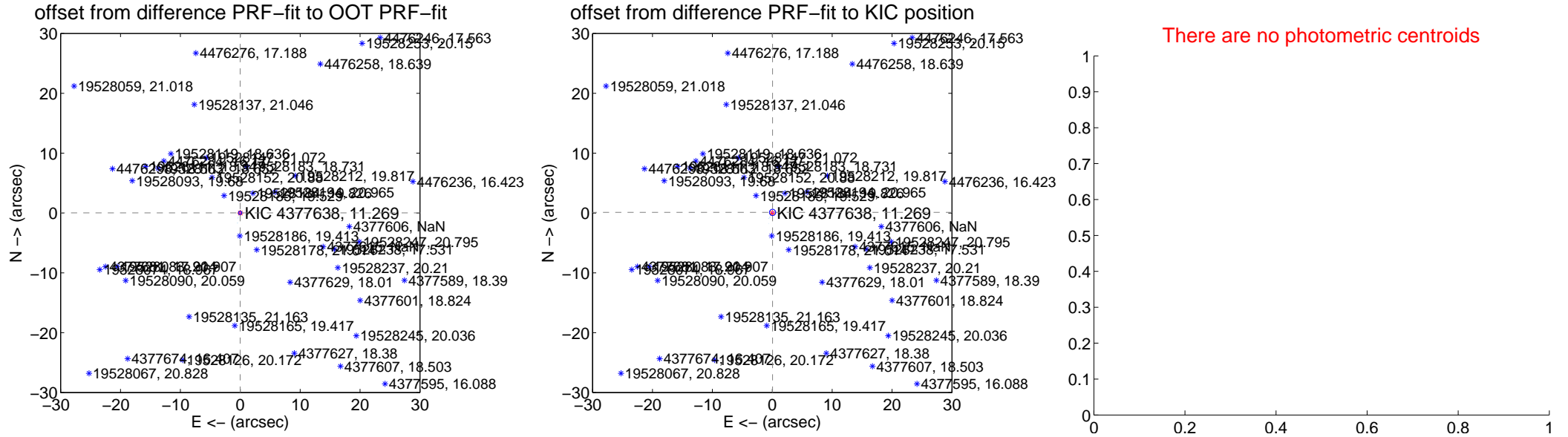
DV Centroid Data

Supplemental centroid analysis for 004377638-01. **Kepler magnitude: 11.27.** Transit SNR 0.00

There are 14 quarters with good PRF difference image offsets

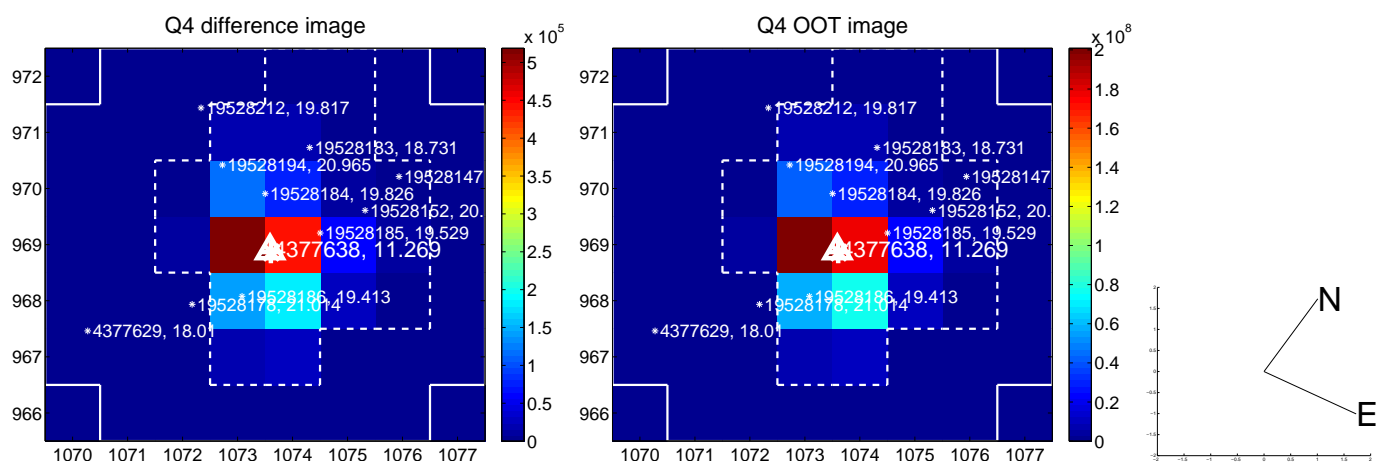
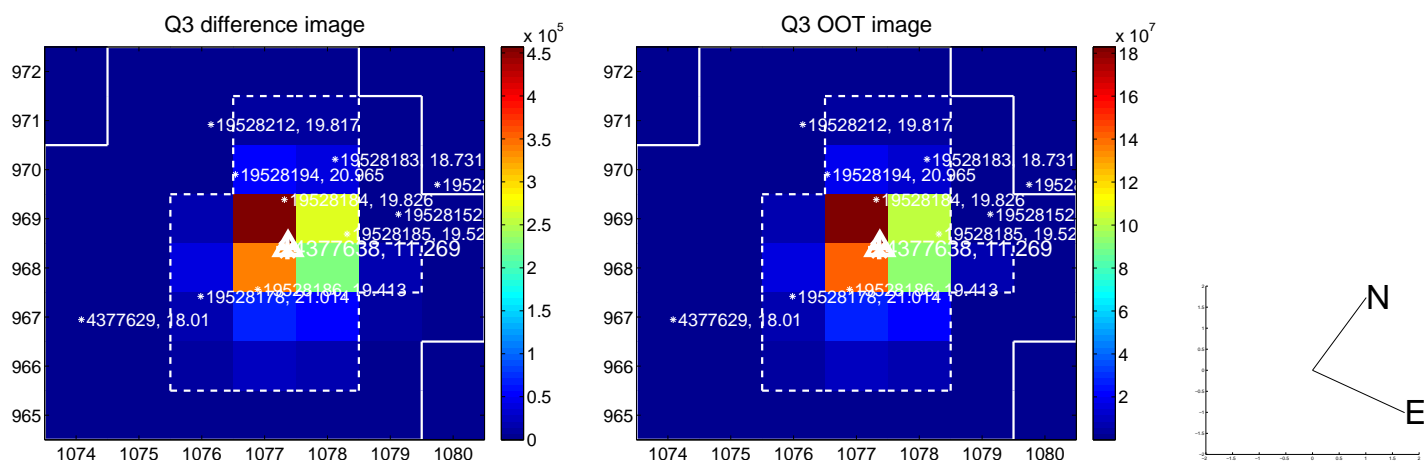
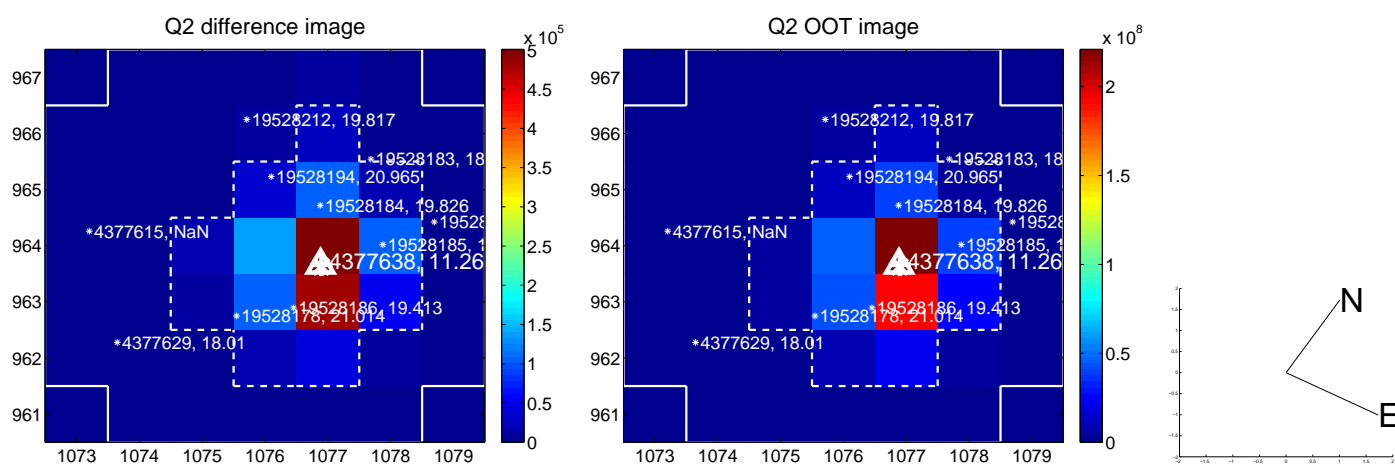
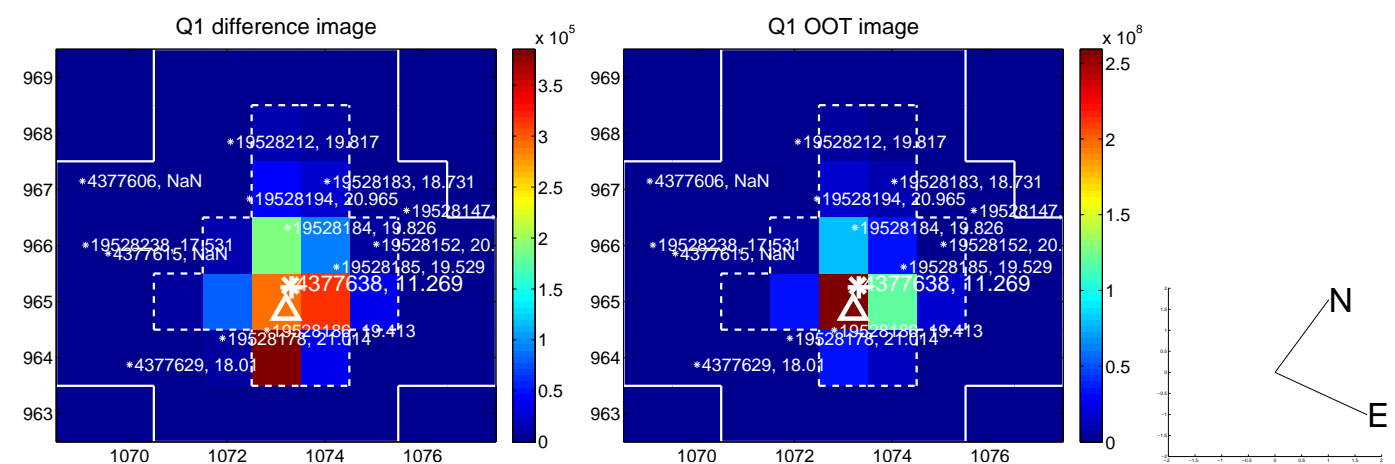
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.033 ± 0.095	0.35	0.022 ± 0.083	0.024 ± 0.147
PRF-fit source offset from KIC position	0.116 ± 0.174	0.67	-0.050 ± 0.095	0.105 ± 0.162
photometric centroid source offset	—	—	—	—

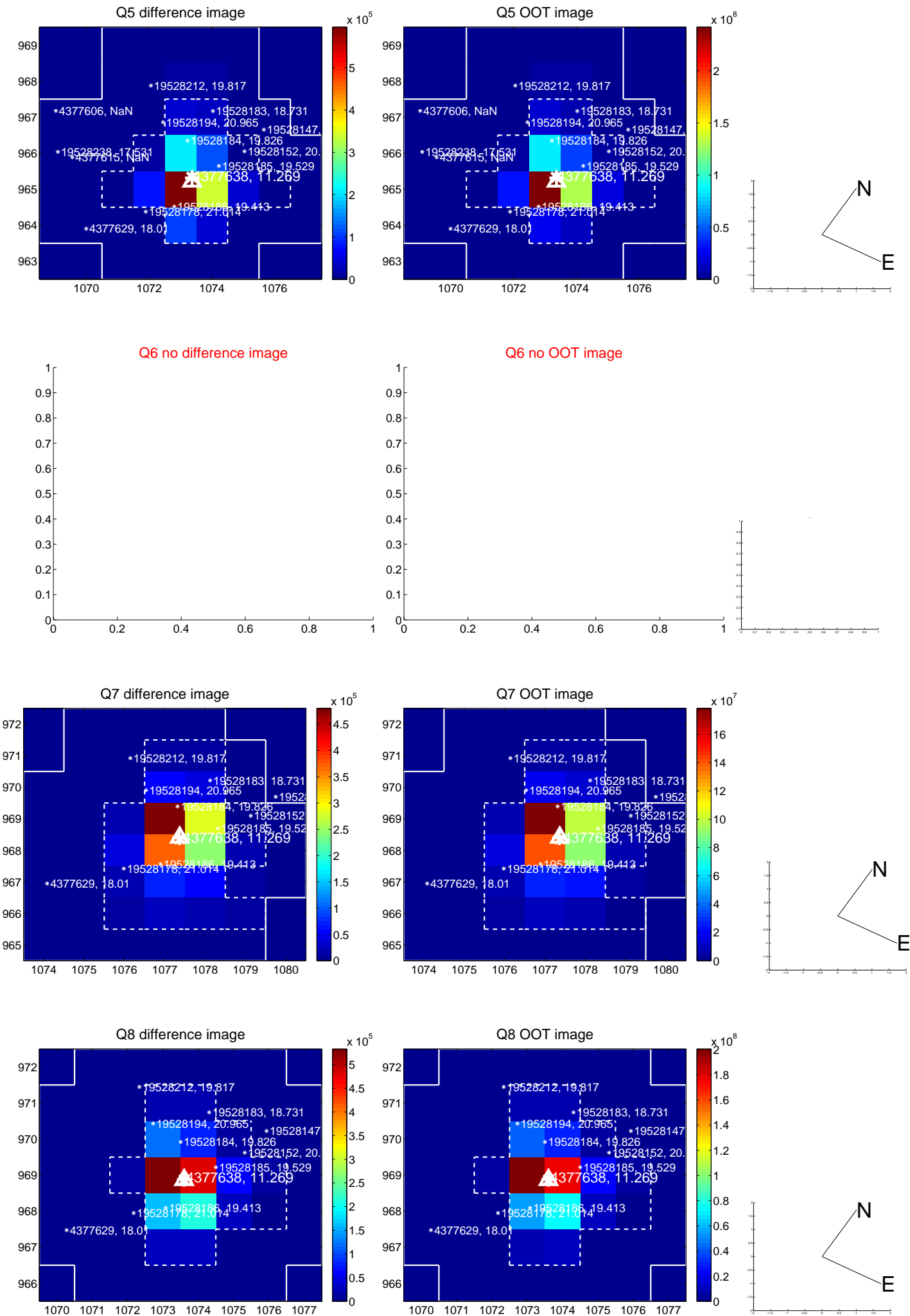


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

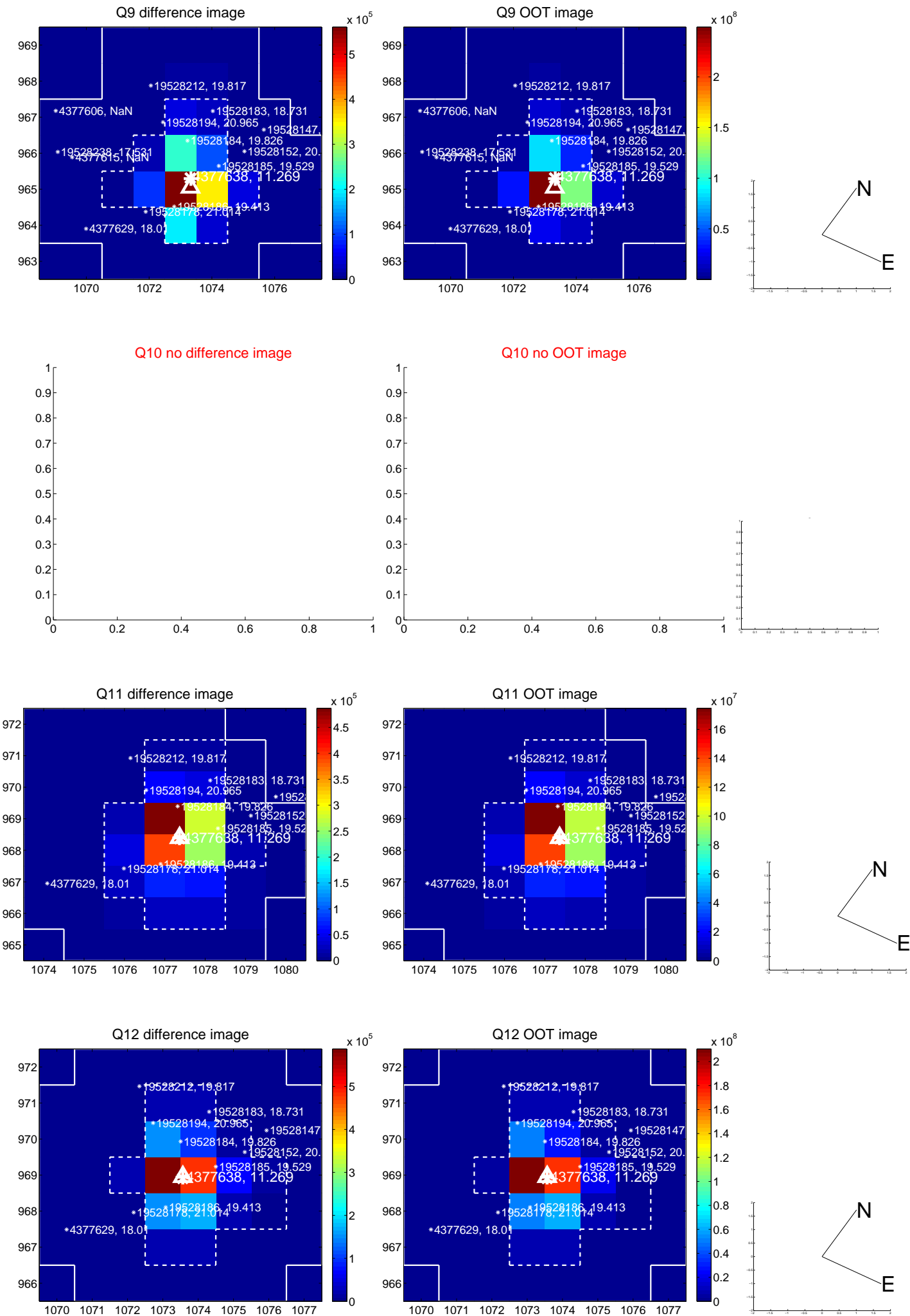
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



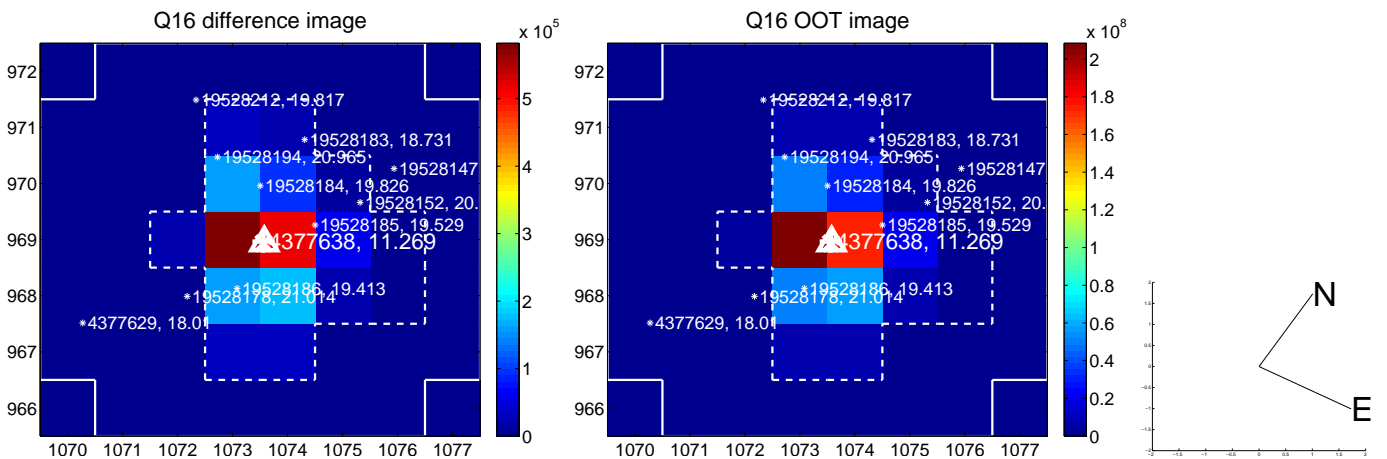
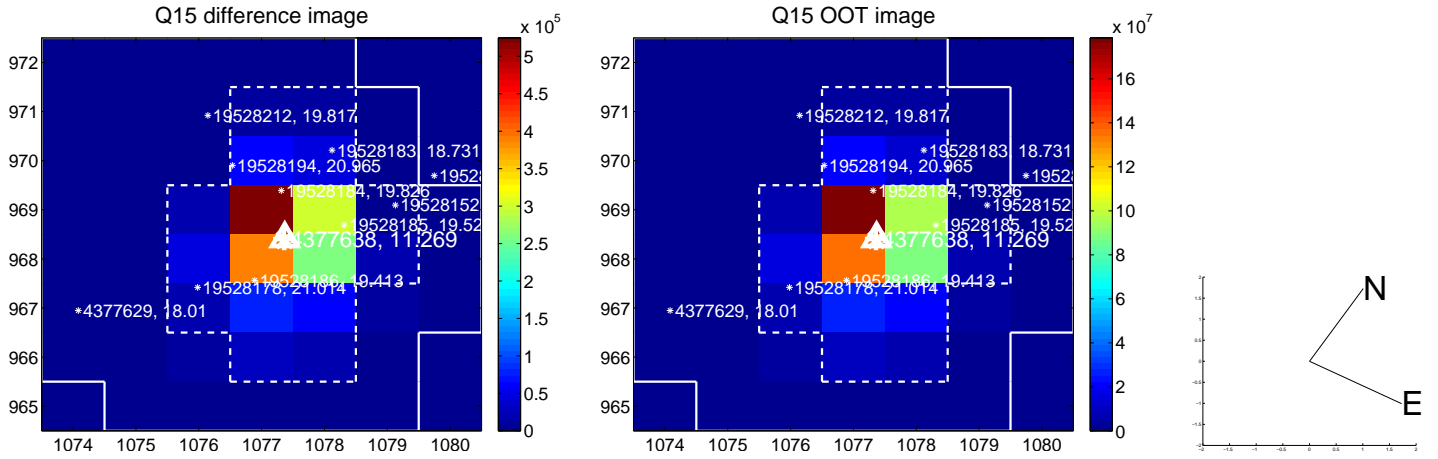
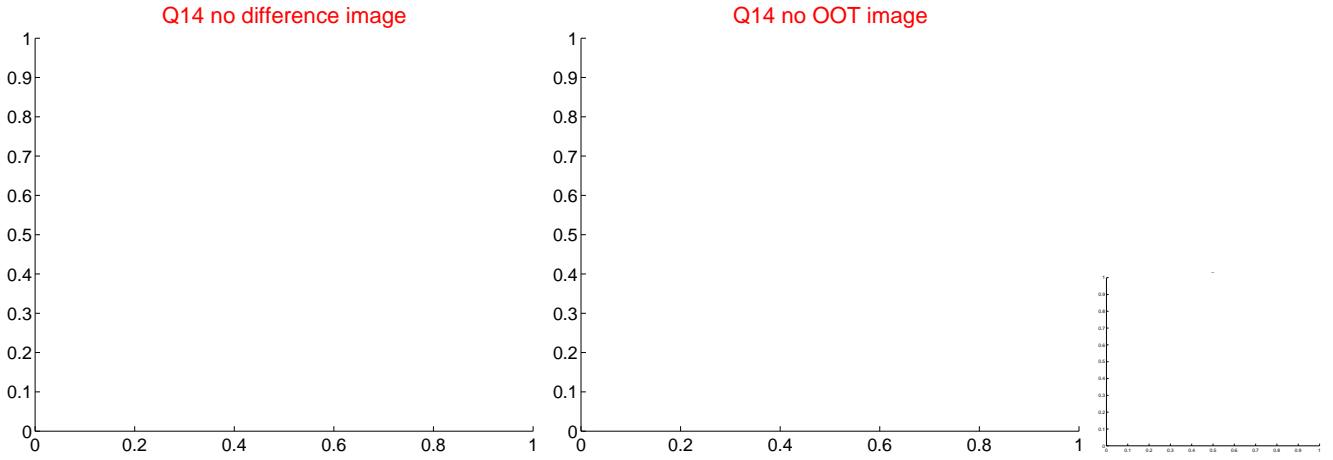
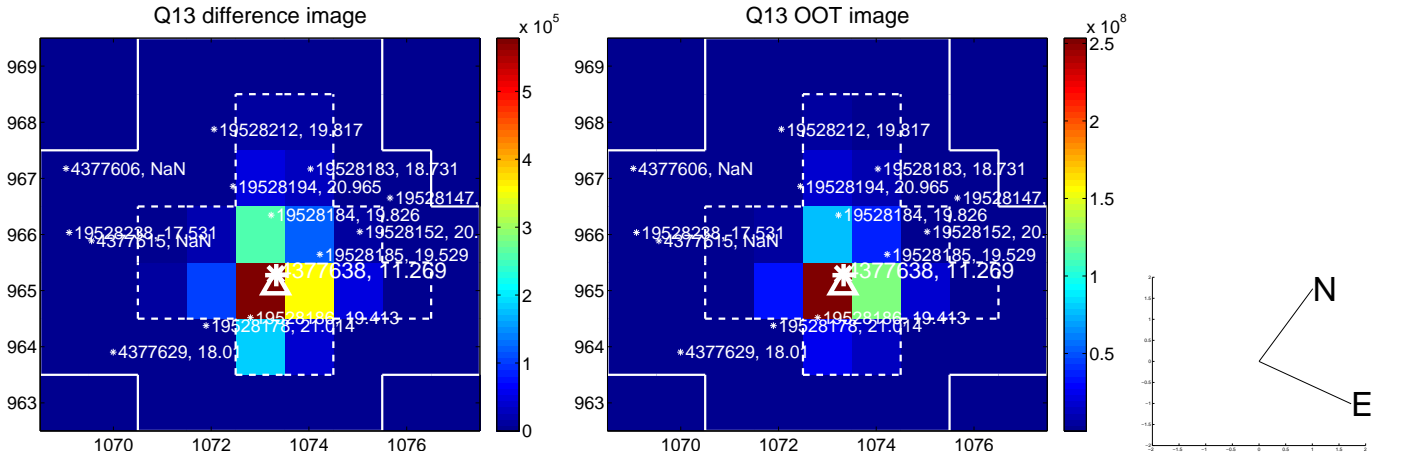
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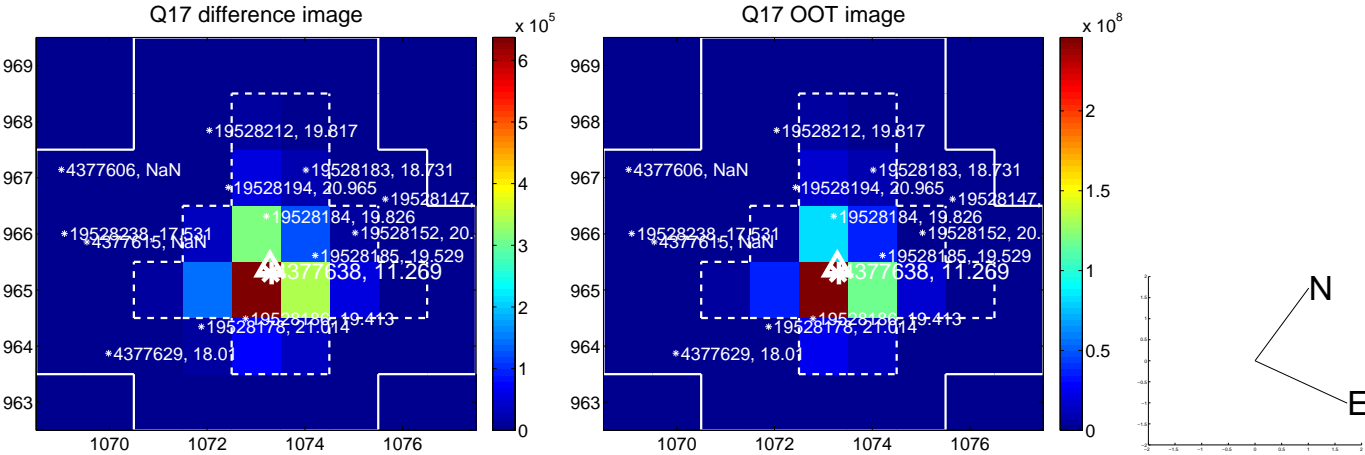
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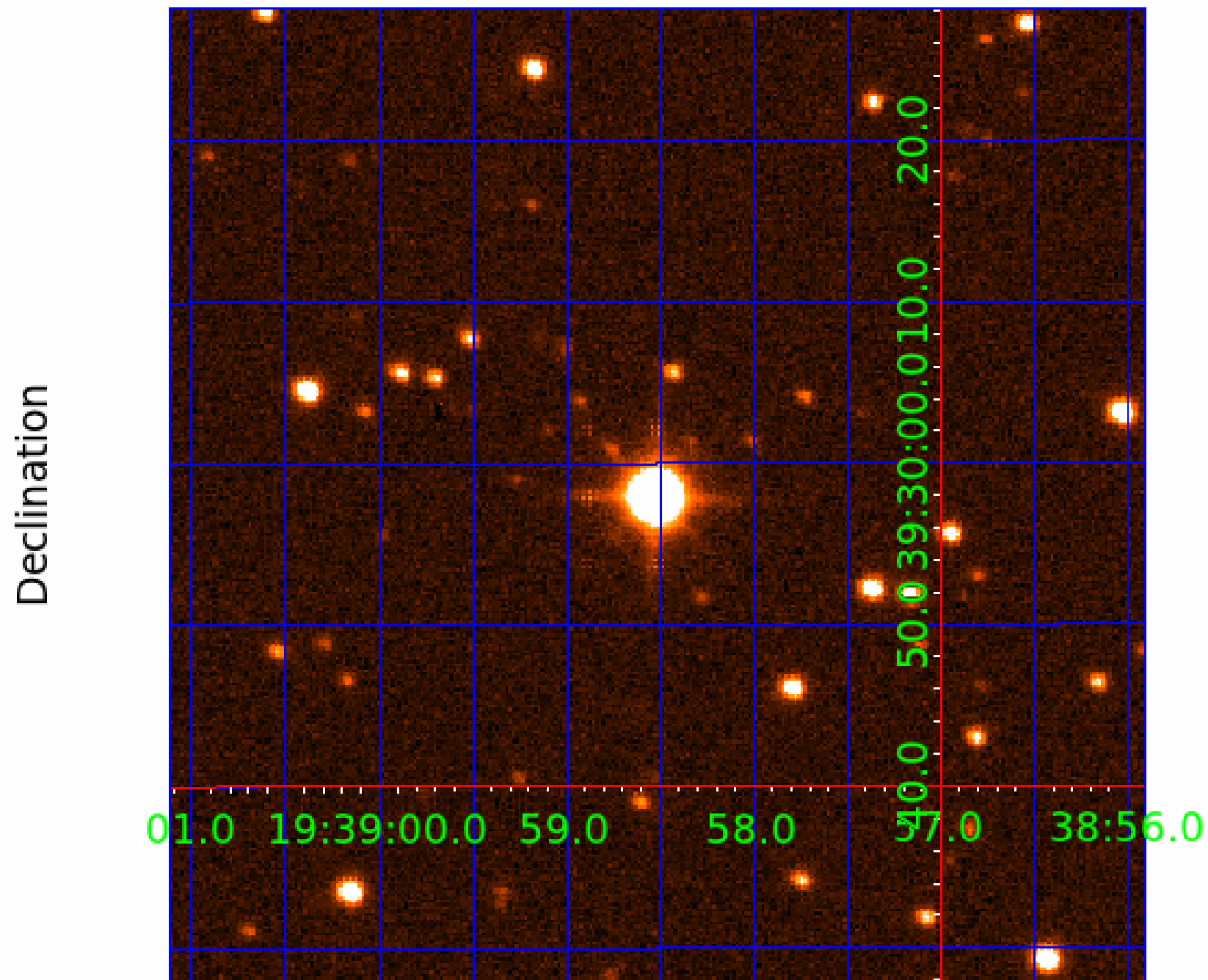


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image



KIC 004377638

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})
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004377638-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—TRANS_GAPPED—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED—HALO_GHOST
004377638-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—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.

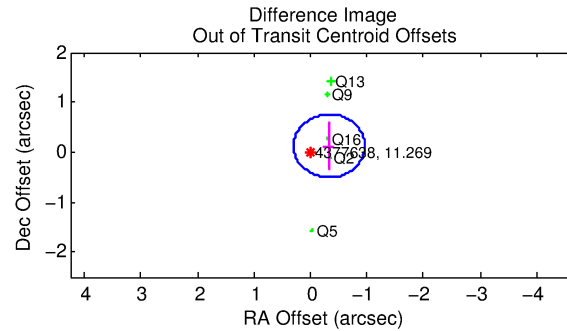
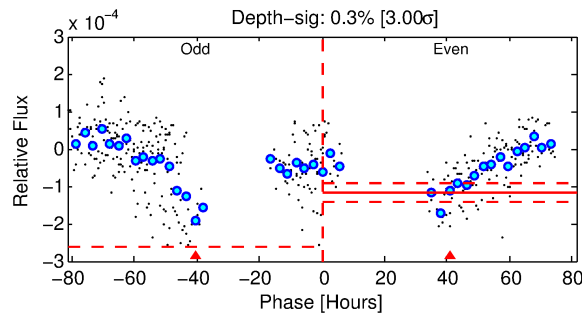
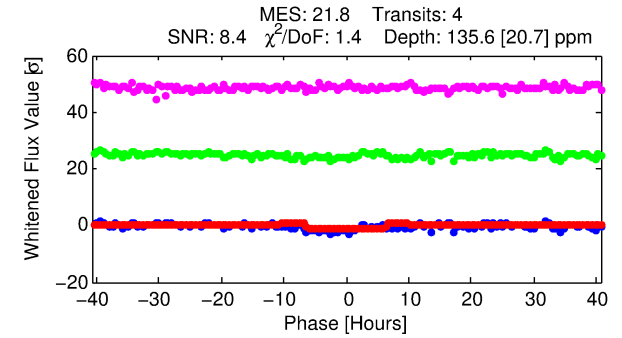
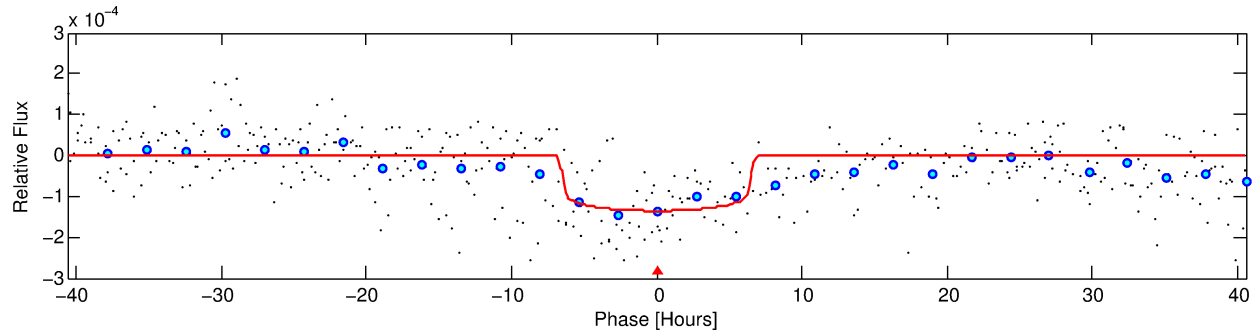
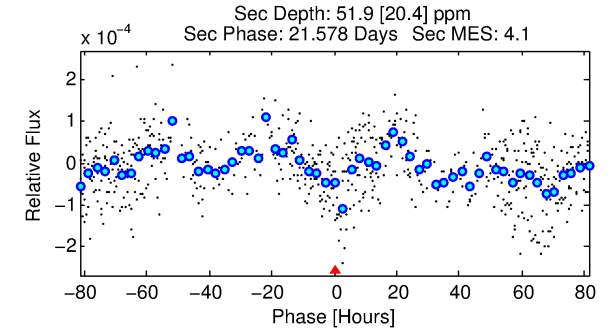
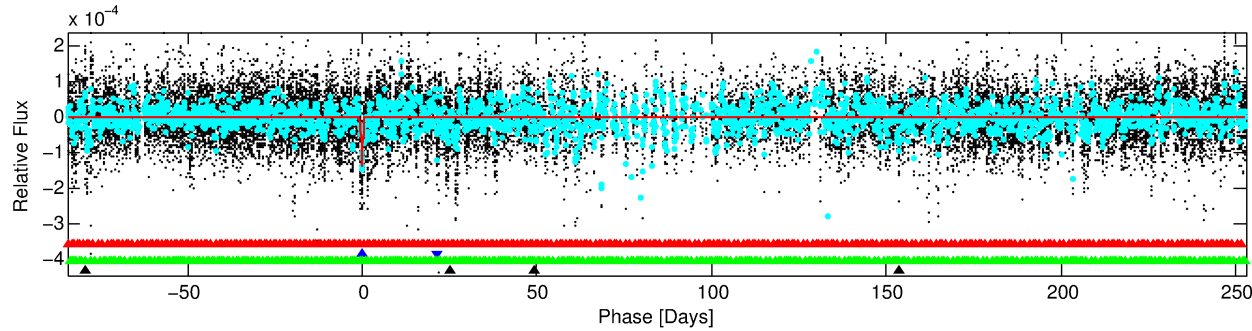
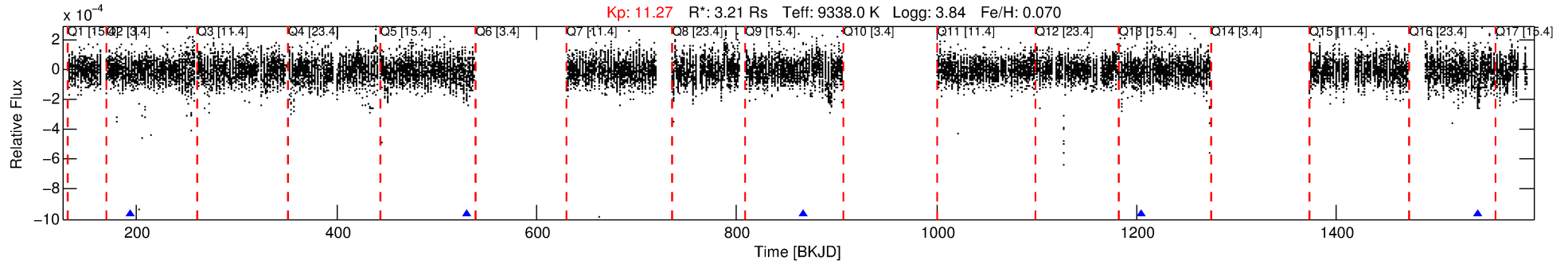
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004377638-02

No Significant Match Found

DV One-Page Summary

KIC: 4377638 Candidate: 2 of 4 Period: 337.037 d



DV Fit Results:

Period = 337.03671 [0.00766] d
Epoch = 193.2537 [0.0171] BKJD
Rp/R* = 0.0119 [0.0016]
a/R* = 108.66 [81.73]
b = 0.84 [0.27]
Seff = 41.34 [28.91]
Teq = 647 [113] K
Rp = 4.16 [1.95] Re
a = 1.3018 [0.5513] AU
Ag = 2794.82 [2299.96] [1.21 σ]
Teffp = 7269 [944] K [6.97 σ]

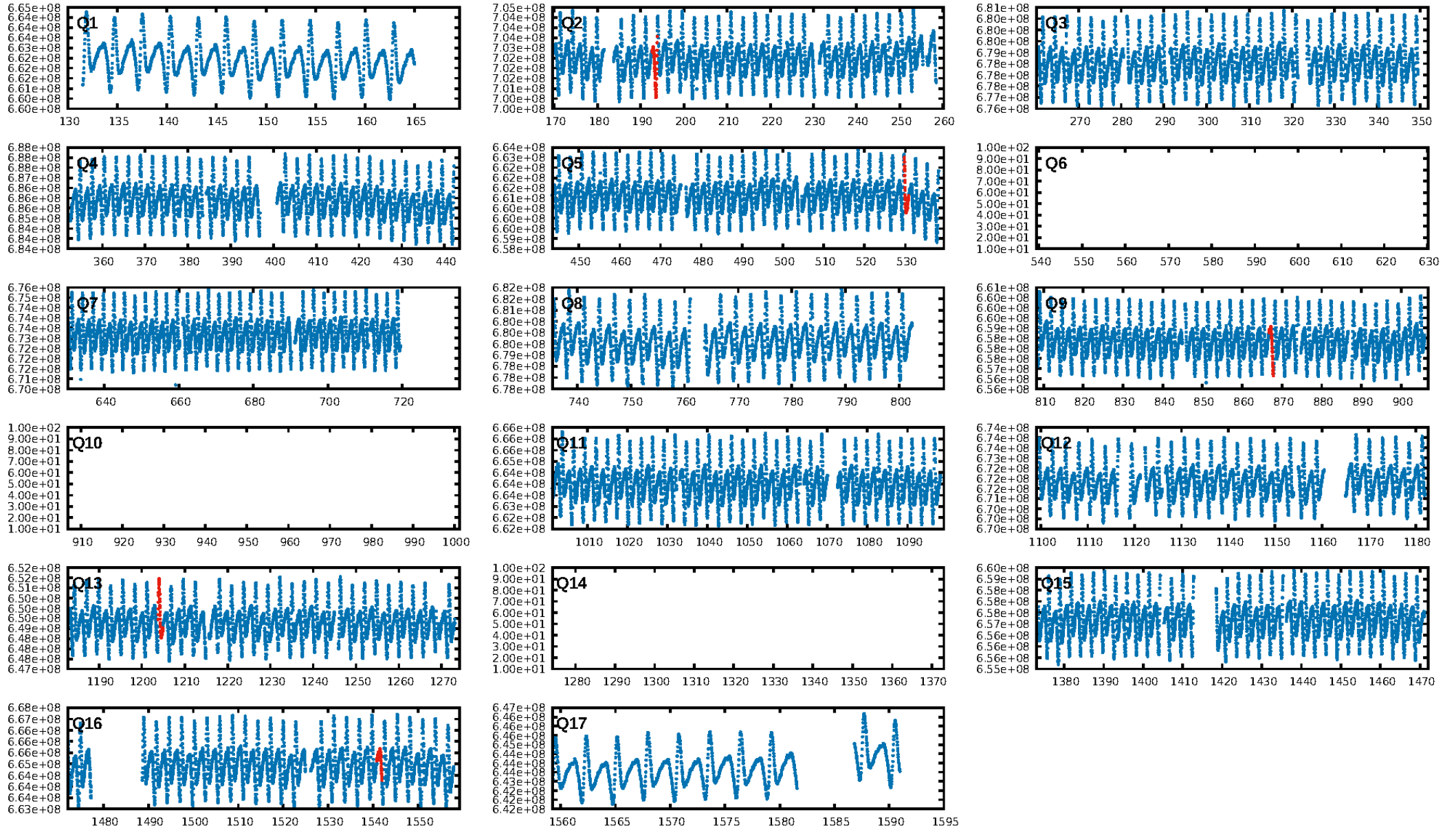
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [592.28 σ]
LongPeriod-sig: 100.0% [164.91 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 78.5%
Bootstrap-pfa: 4.18e-46
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 75.76
Centroid-sig: 7.7%
Centroid-so: 1.564 arcsec [1.54 σ]
OotOffset-rm: 0.349 arcsec [1.66 σ]
KicOffset-rm: 0.332 arcsec [0.76 σ]
OotOffset-st: 1/0/1/3 [5]
KicOffset-st: 1/0/1/3 [5]
DiffImageQuality-fgm: 0.40 [2/5]
DiffImageOverlap-fno: 0.00 [0/5]

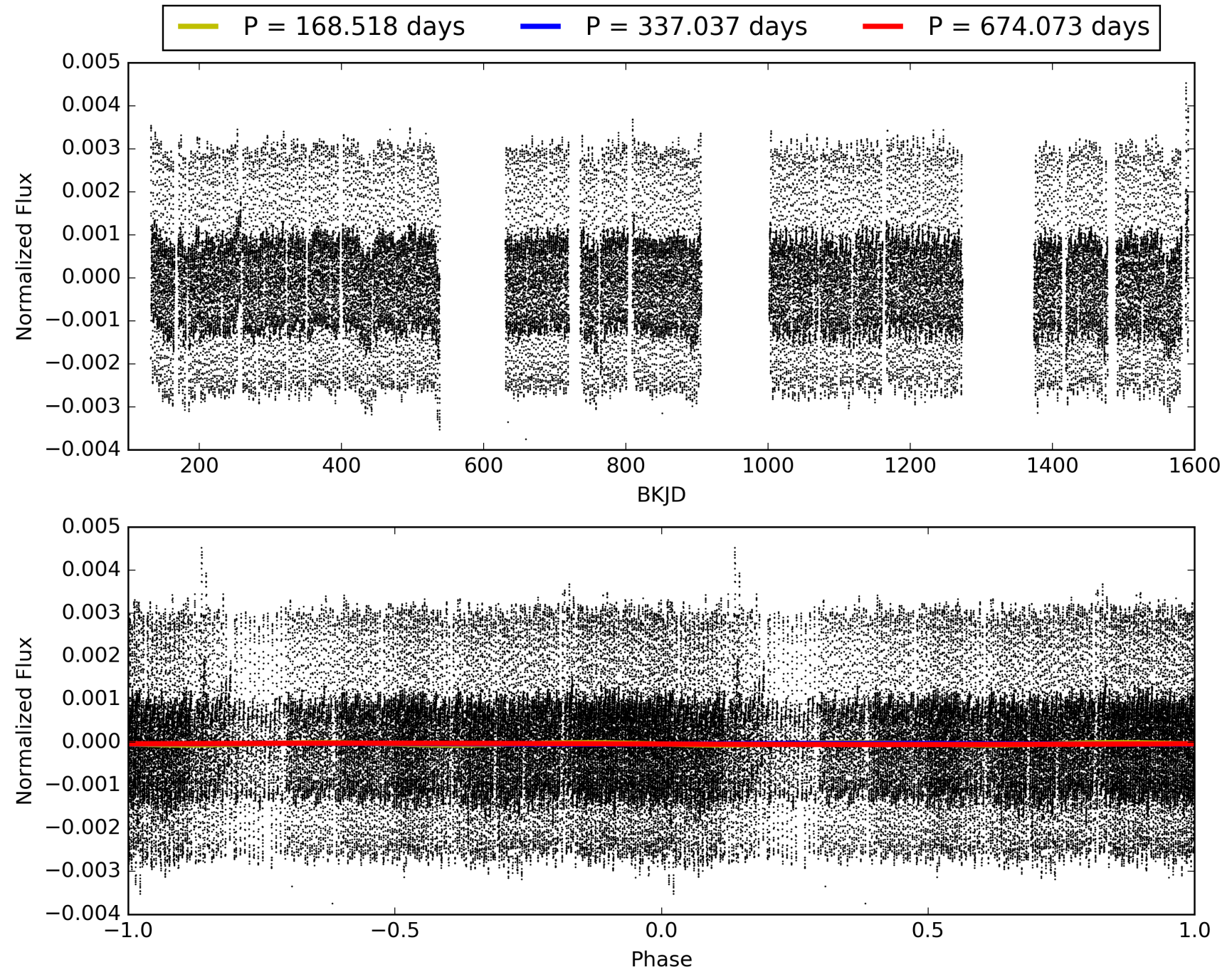
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:31:29 Z

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

TCE 004377638-02, PDC Light Curves

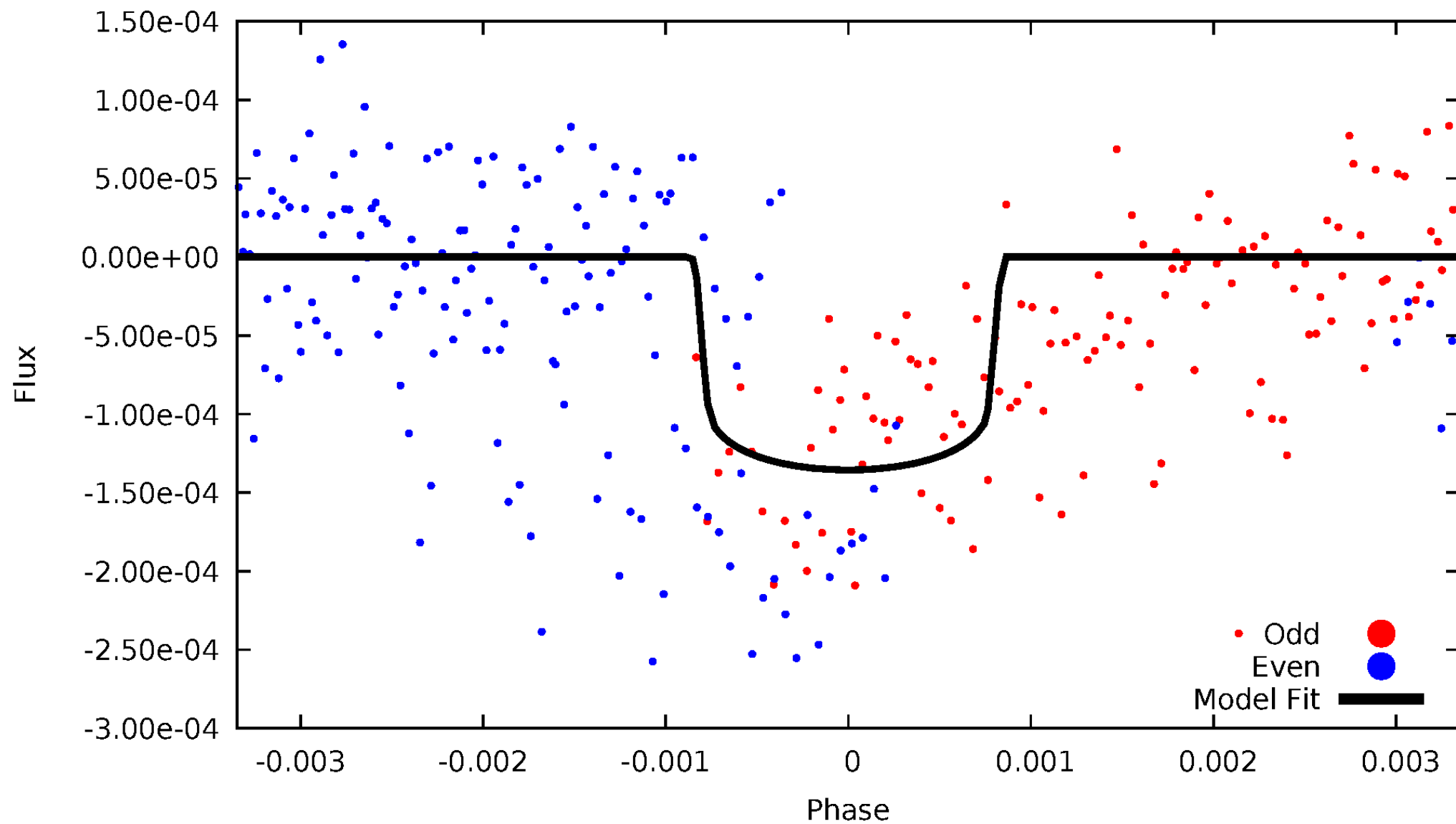


TCE 004377638-02



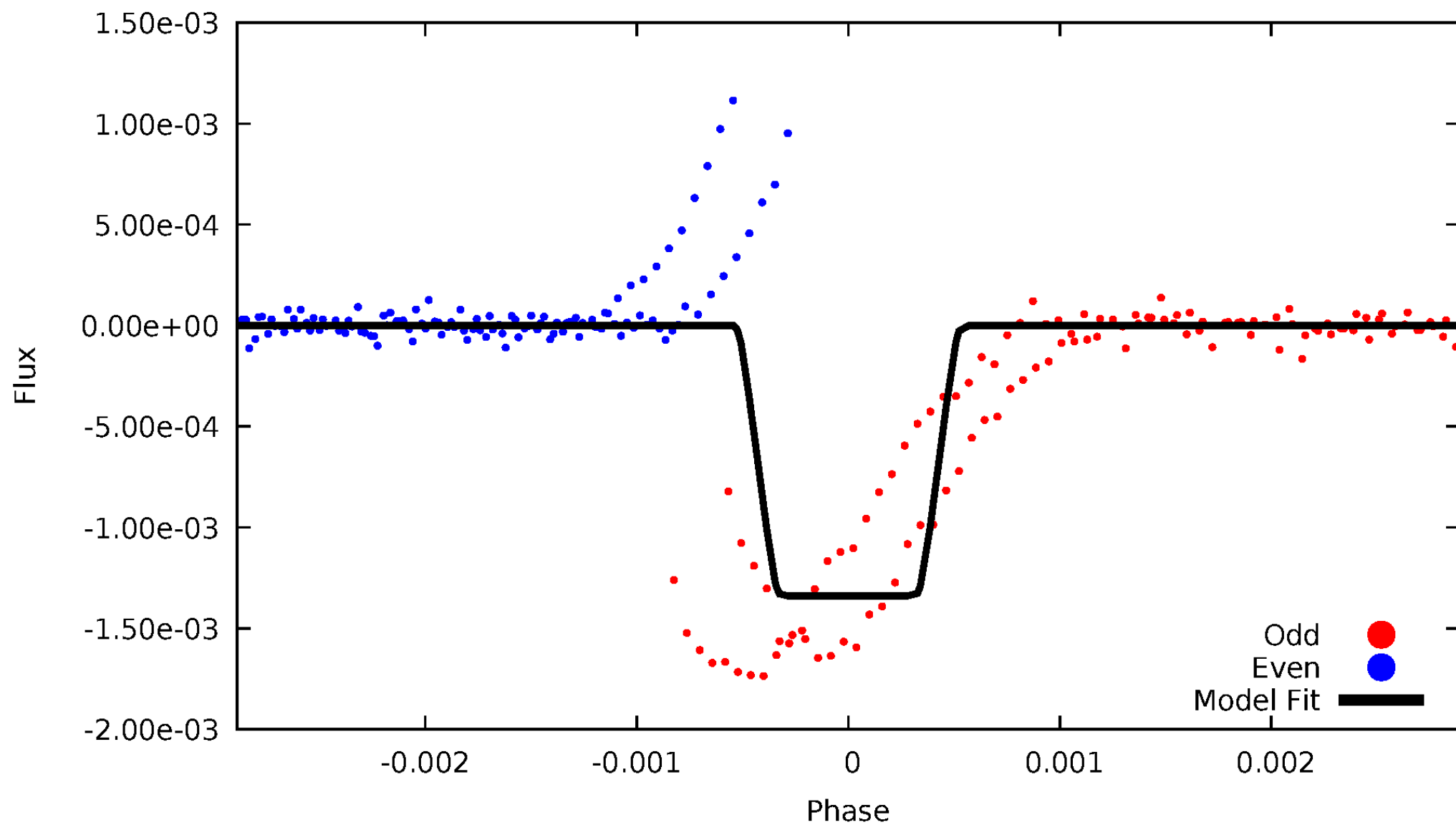
DV Odd/Even

TCE 004377638-02



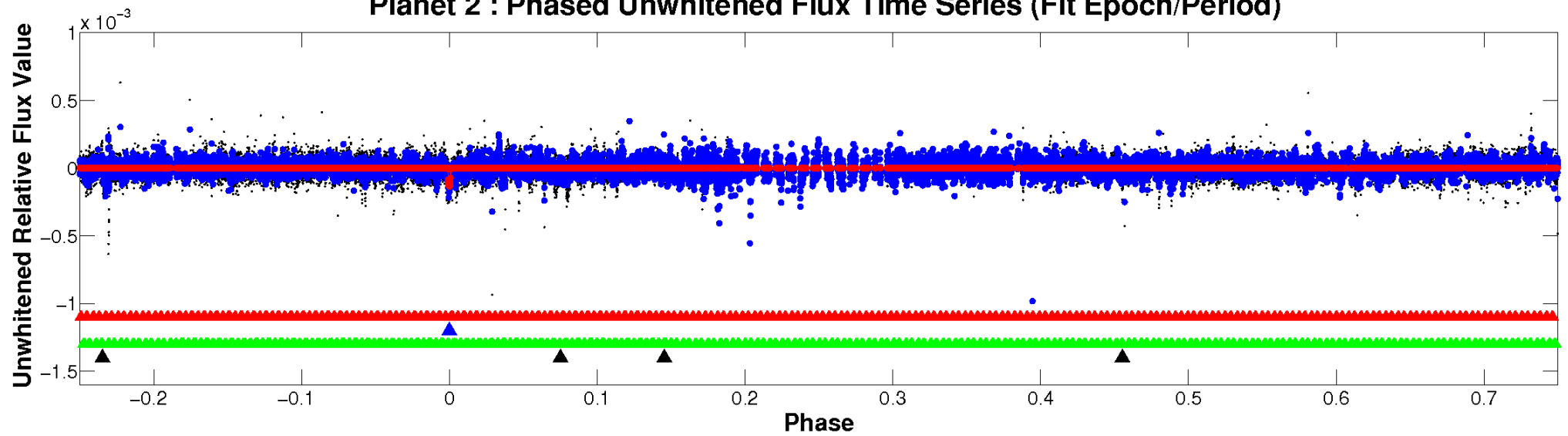
ALT Odd/Even

TCE 004377638-02

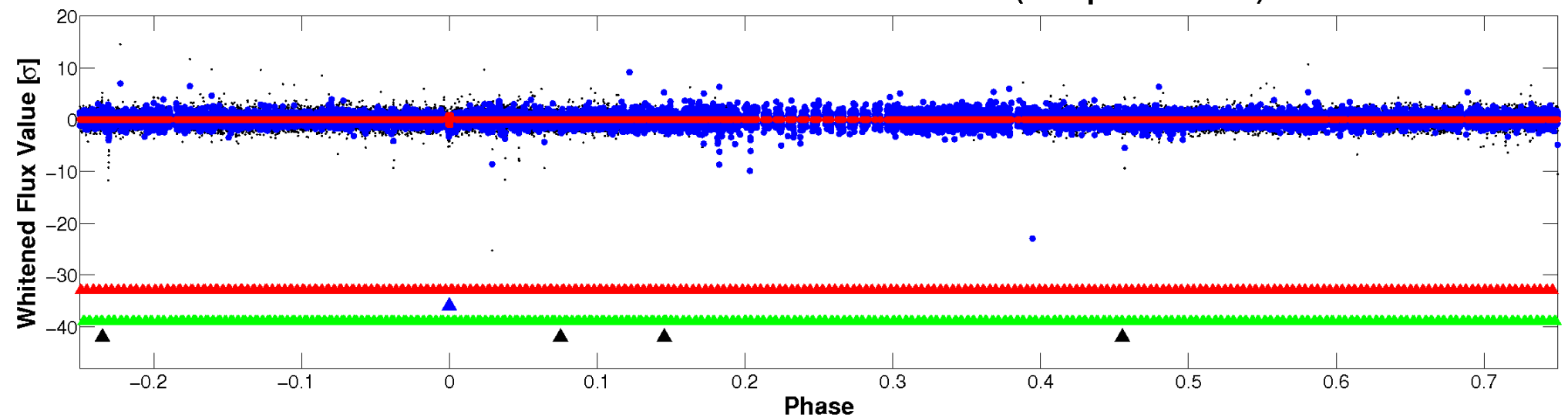


Non-Whitened Vs. Whitened Light Curve

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

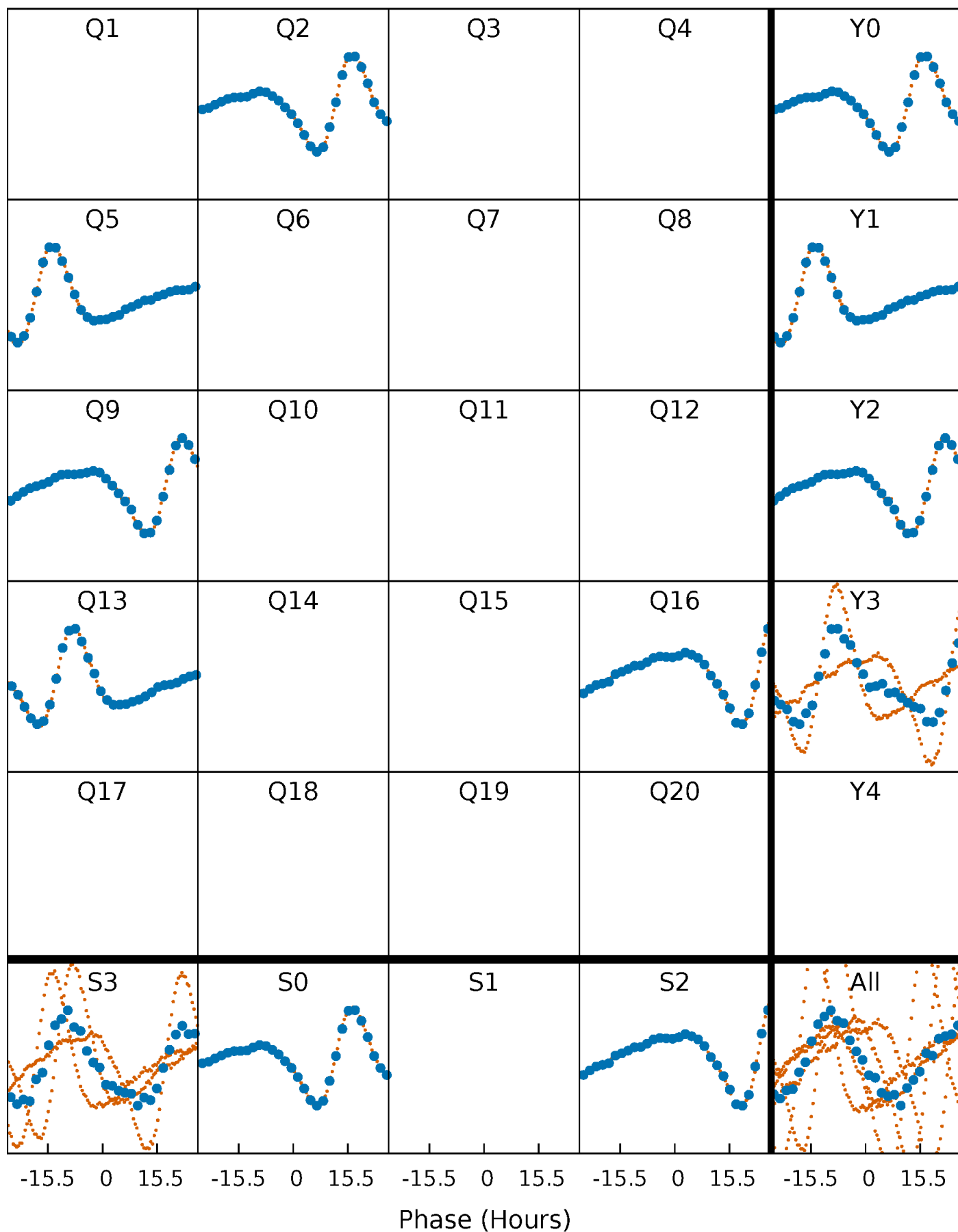


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



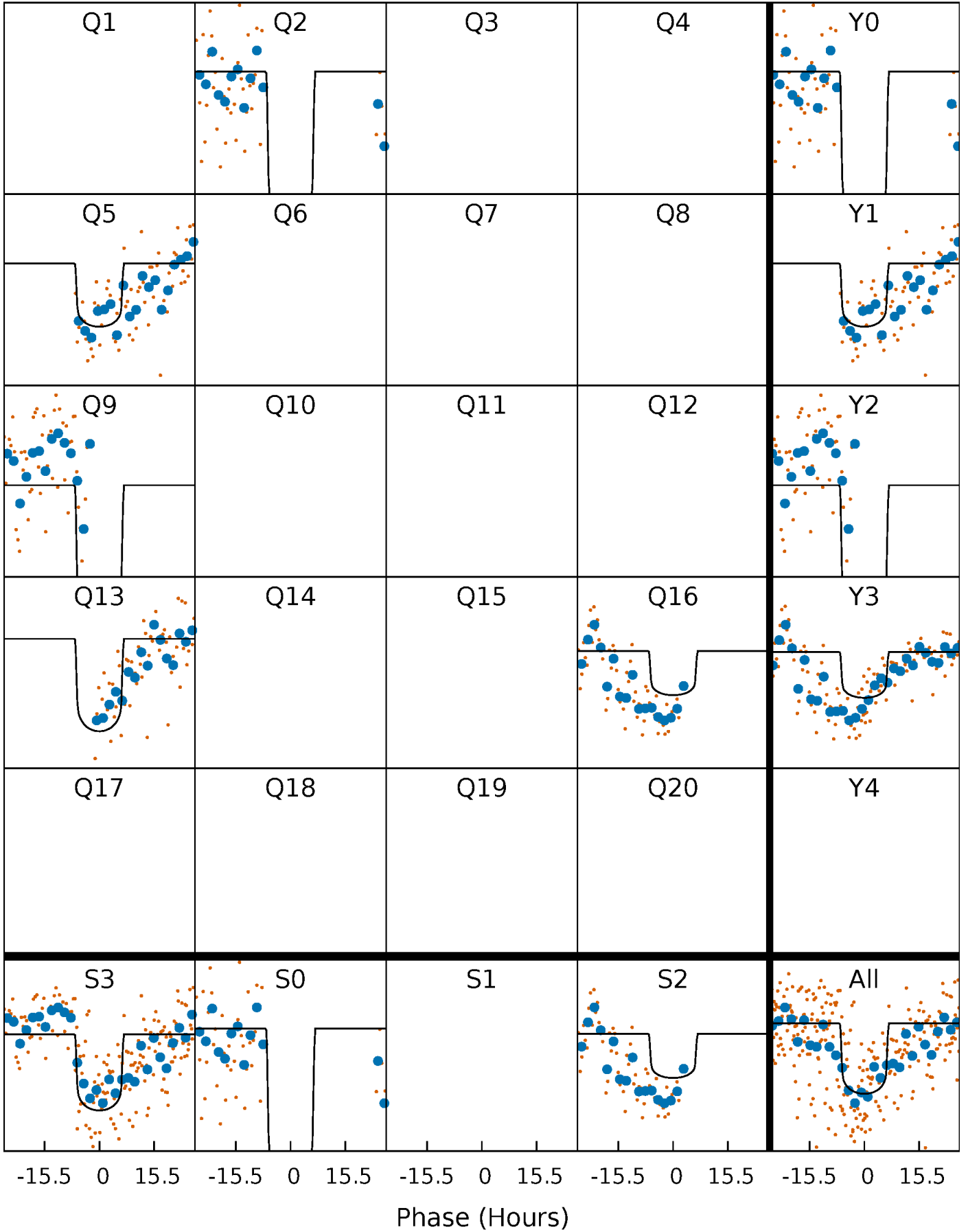
PDC Quarter-Phased Transit Curves

TCE 004377638-02 $P=337.036713$ Days $T_0=193.253677$ (BKJD)



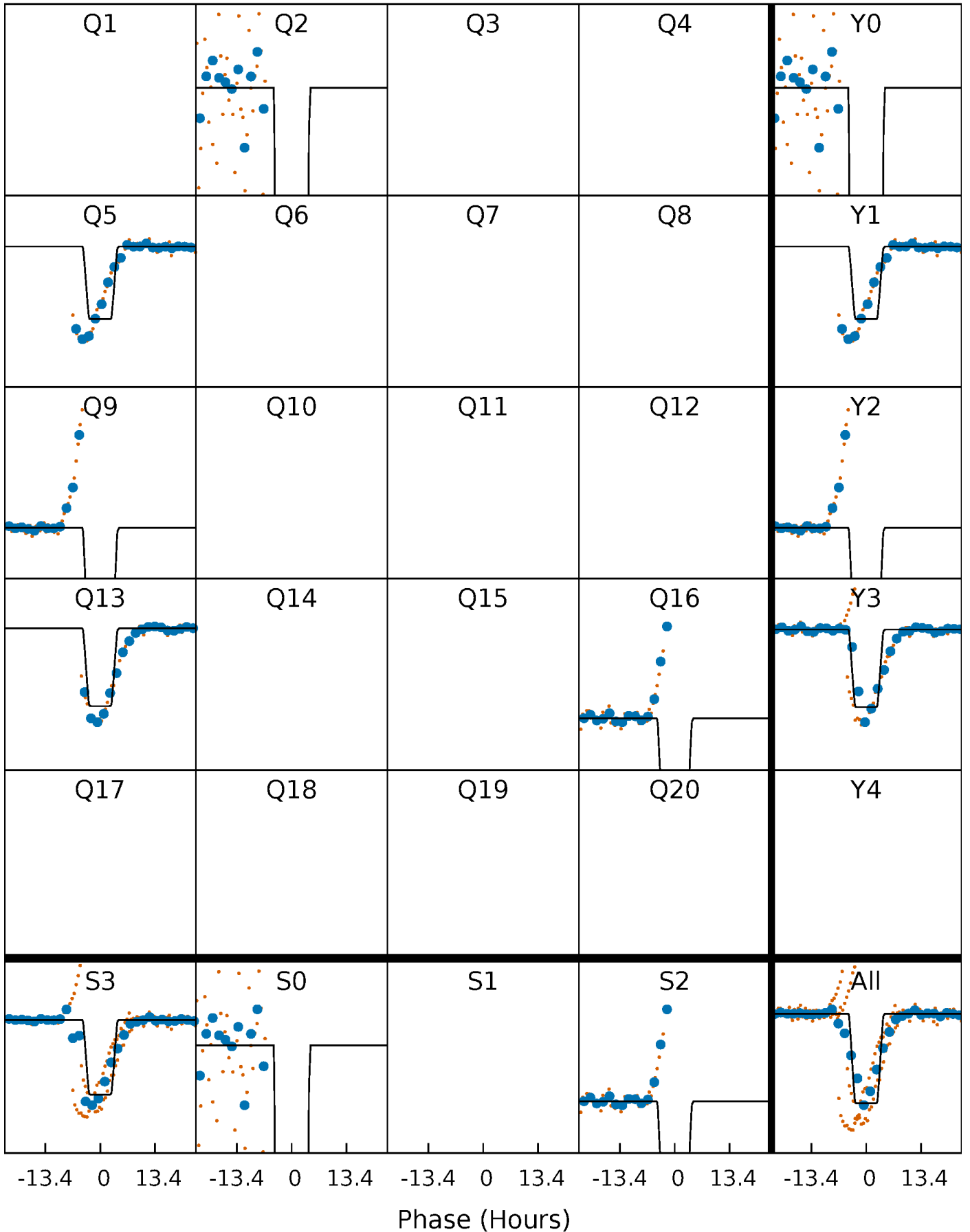
DV Quarter-Phased Transit Curves

TCE 004377638-02 $P=337.036713$ Days $T_0=193.253677$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

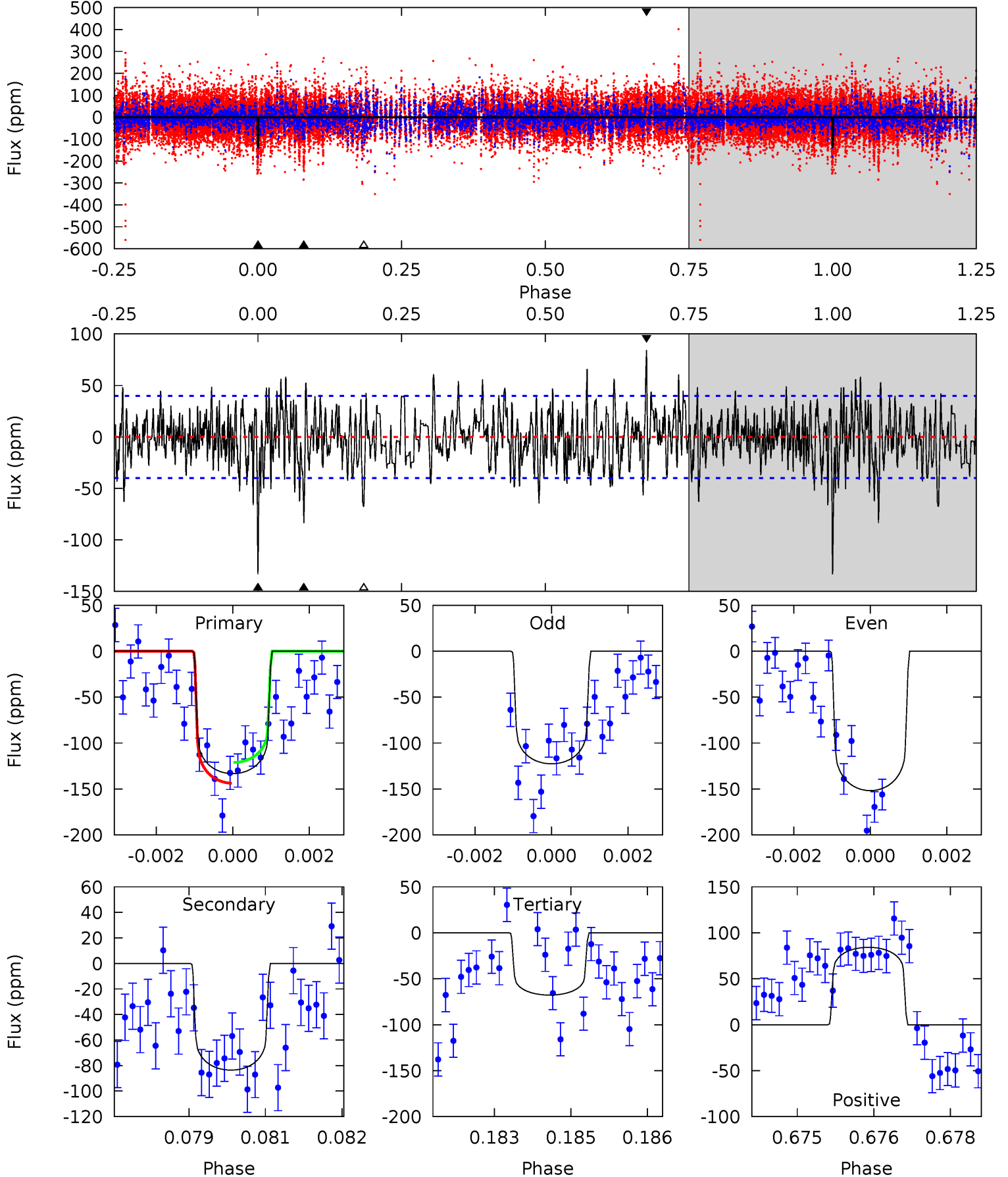
TCE 004377638-02 $P=337.099250$ Days $T_0=193.188338$ (BKJD)



DV Model-Shift Uniqueness Test

004377638-02, P = 337.036713 Days, E = 193.253677 Days

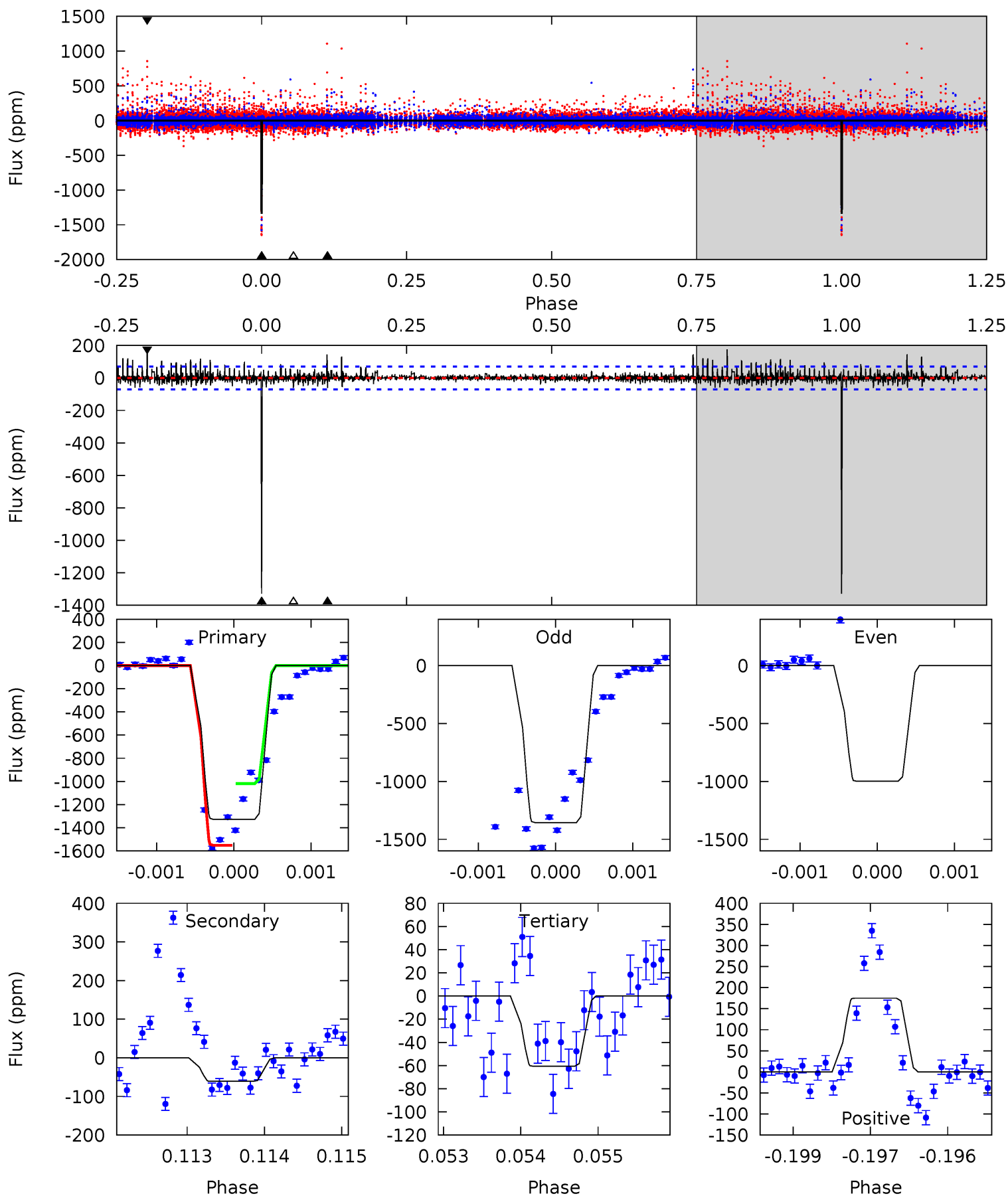
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	11.2	9.12	11.3	5.36	3.14	2.89	8.81	6.60	2.12	-0.08	1.91	0.95	0.39	1.49



Alt Model-Shift Uniqueness Test

004377638-02, P = 337.099250 Days, E = 193.188338 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
103.1	4.74	4.71	13.6	5.44	3.28	1.43	98.4	89.5	0.03	-8.85	7.88	0.50	0.12	19.3



Stellar Parameters For KIC 004377638

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	9338^{+254}_{-471}	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.150}_{-0.750}$	$3.207^{+0.840}_{-1.441}$	$2.587^{+0.316}_{-0.949}$	$0.110^{+0.367}_{-0.052}$
	+3%/-5%	+10%/-4%	+214%/-1071%	+26%/-45%	+12%/-37%	+333%/-47%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004377638-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-84 ± 7	$3.92^{+0.98}_{-0.96}$	878^{+80}_{-100}	7820^{+838}_{-641}	4988^{+3251}_{-1726}
Alt.	-61 ± 13	$12.37^{+2.38}_{-3.28}$	885^{+81}_{-114}	4266^{+199}_{-230}	363^{+248}_{-125}

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 $A_{obs} \gg 1.0$

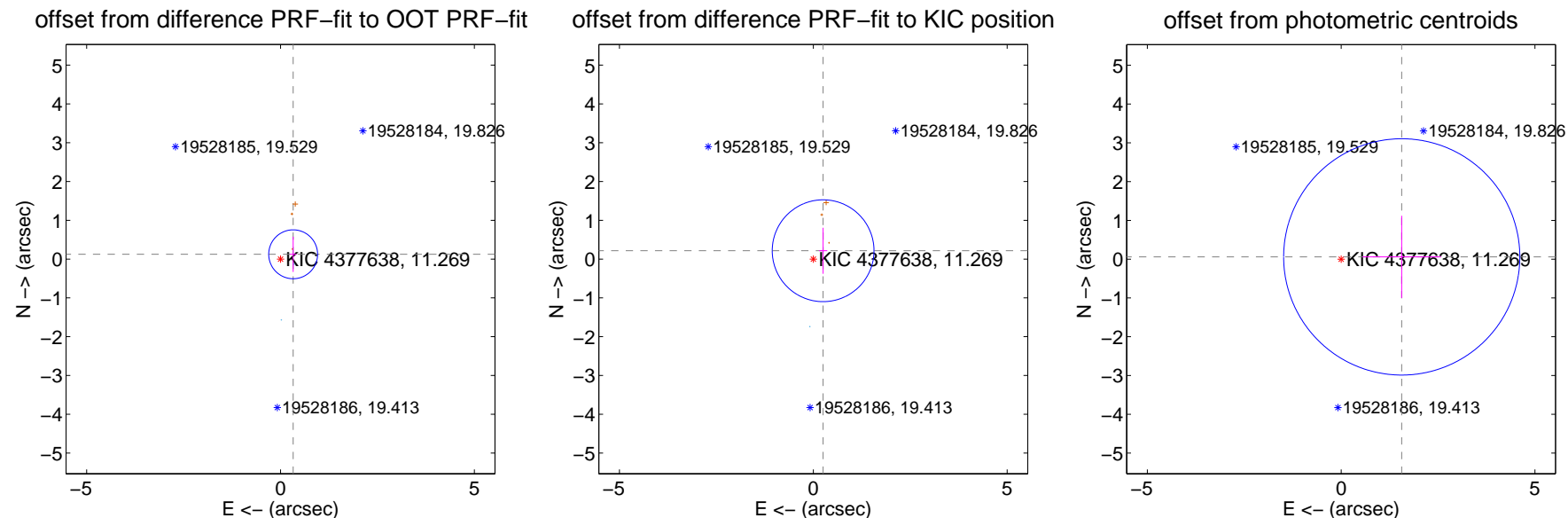
DV Centroid Data

Supplemental centroid analysis for 004377638-02. **Kepler magnitude: 11.27.** Transit SNR 8.36

There are 2 quarters with good PRF difference image offsets

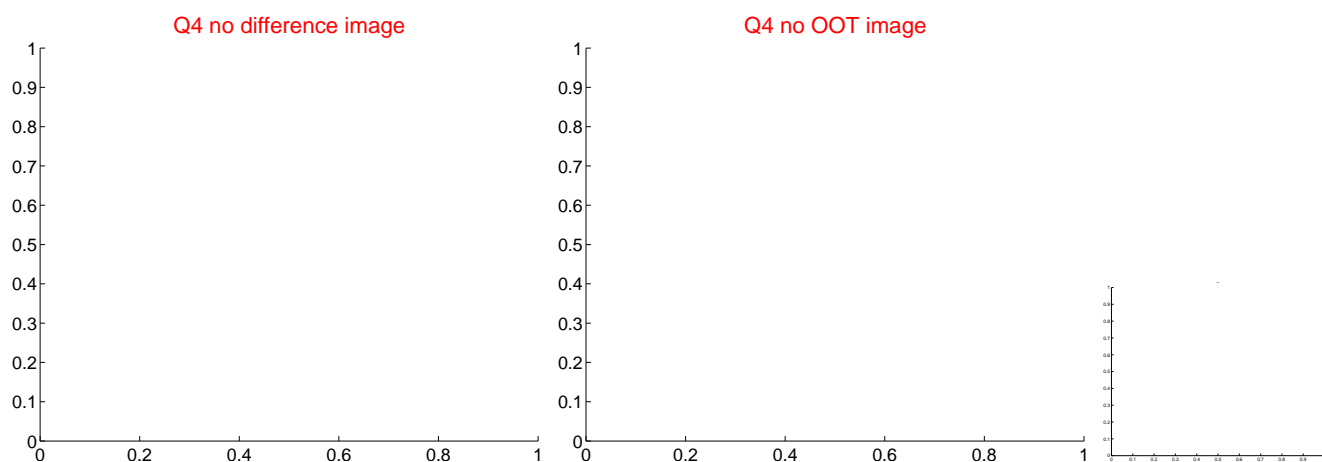
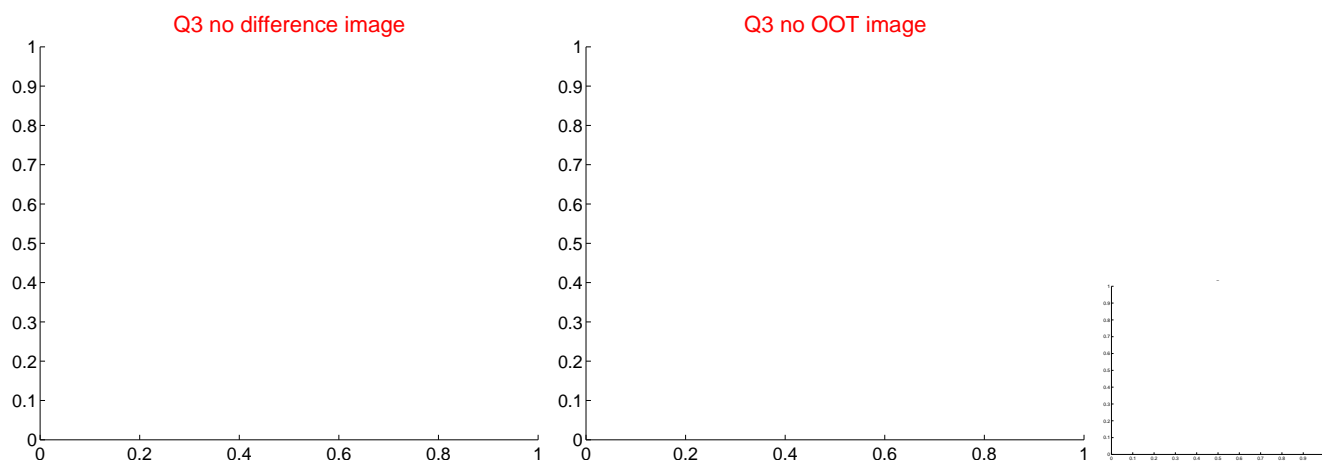
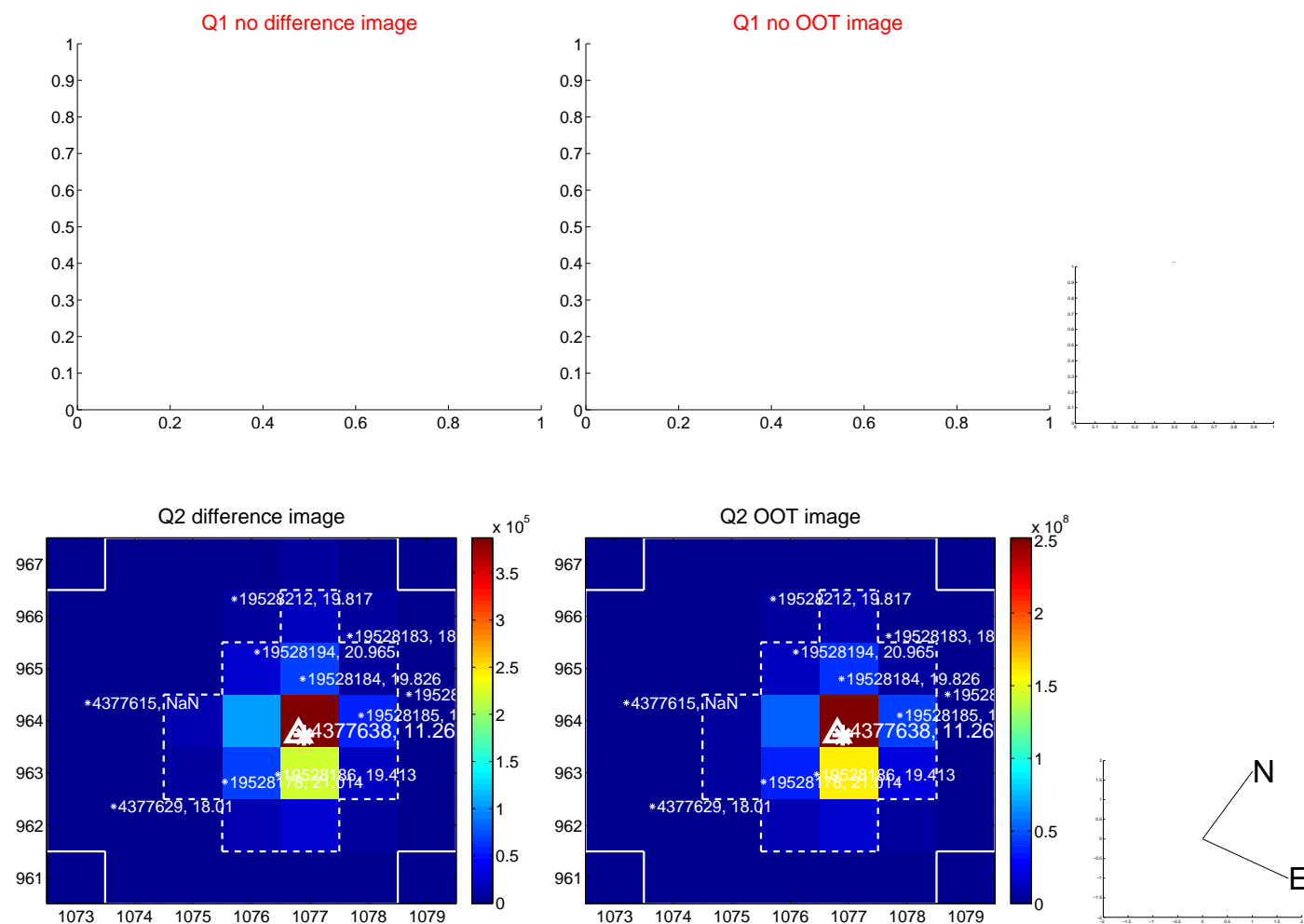
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.349 ± 0.210	1.66	-0.326 ± 0.085	0.124 ± 0.454
PRF-fit source offset from KIC position	0.332 ± 0.437	0.76	-0.253 ± 0.106	0.215 ± 0.593
photometric centroid source offset	1.56 ± 1.02	1.54	-1.56 ± 1.02	0.06 ± 1.06

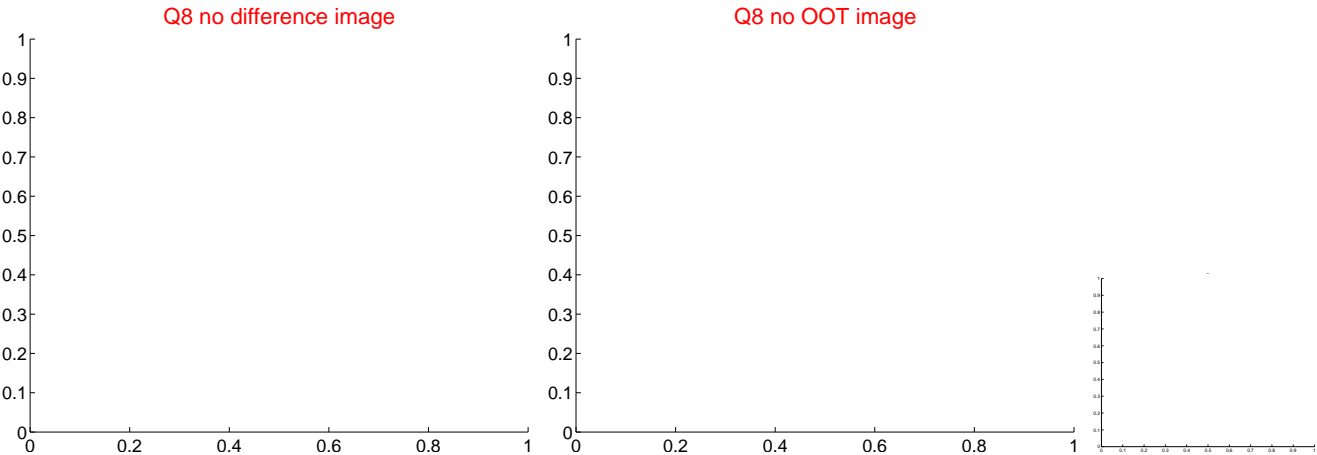
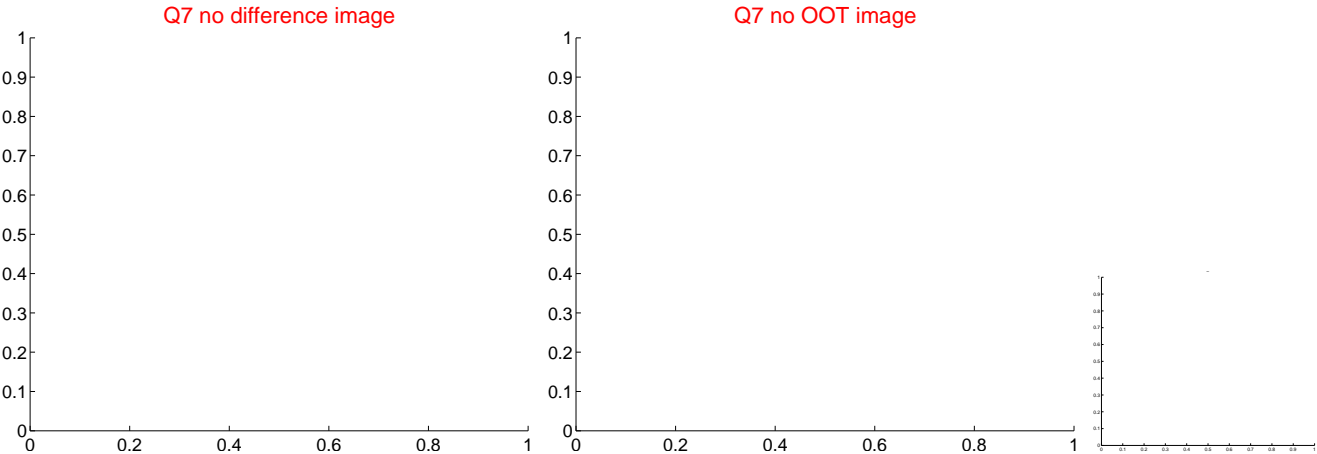
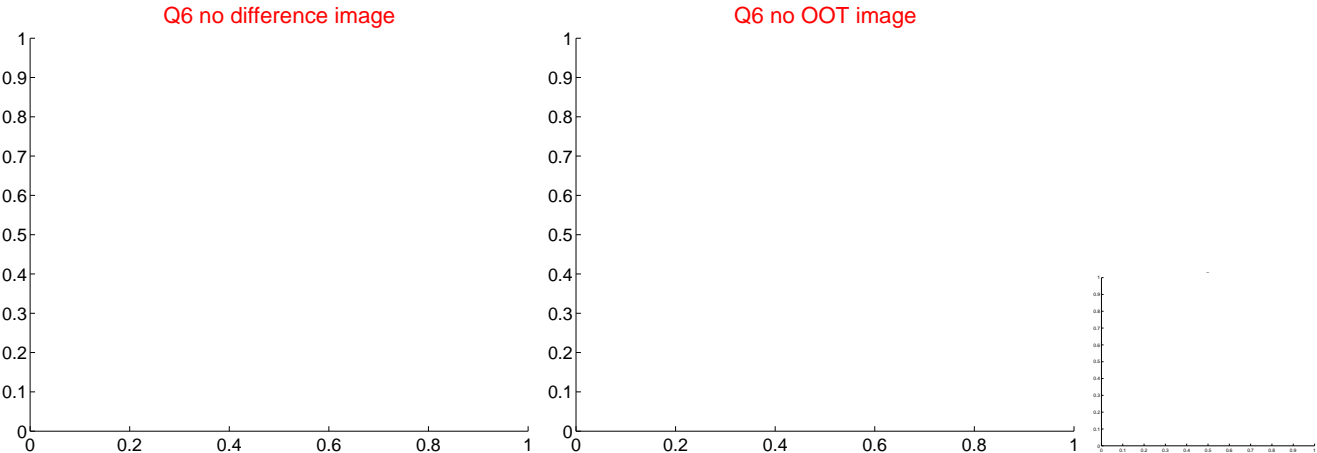
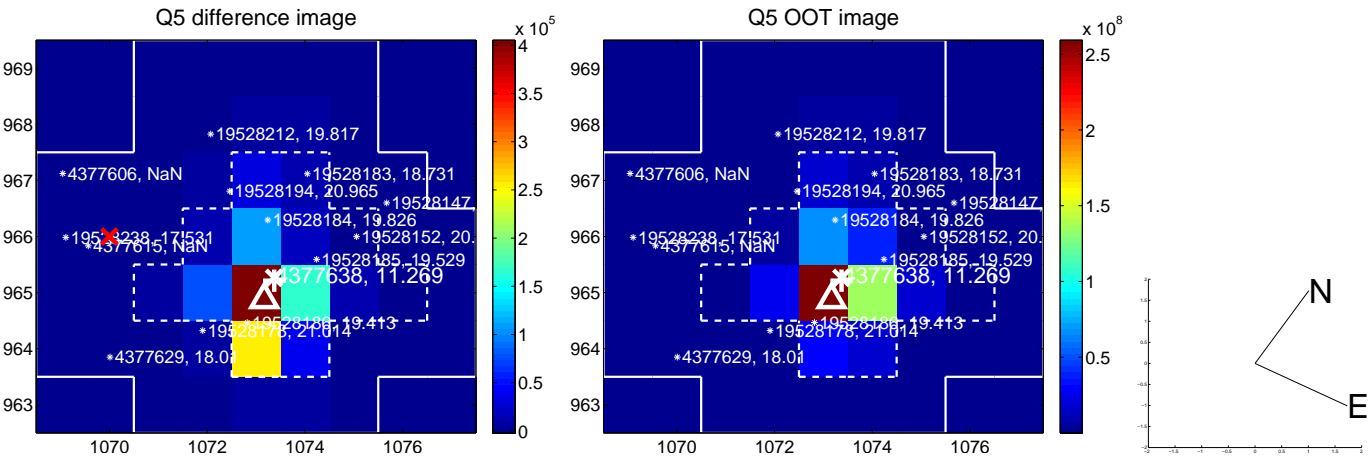


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

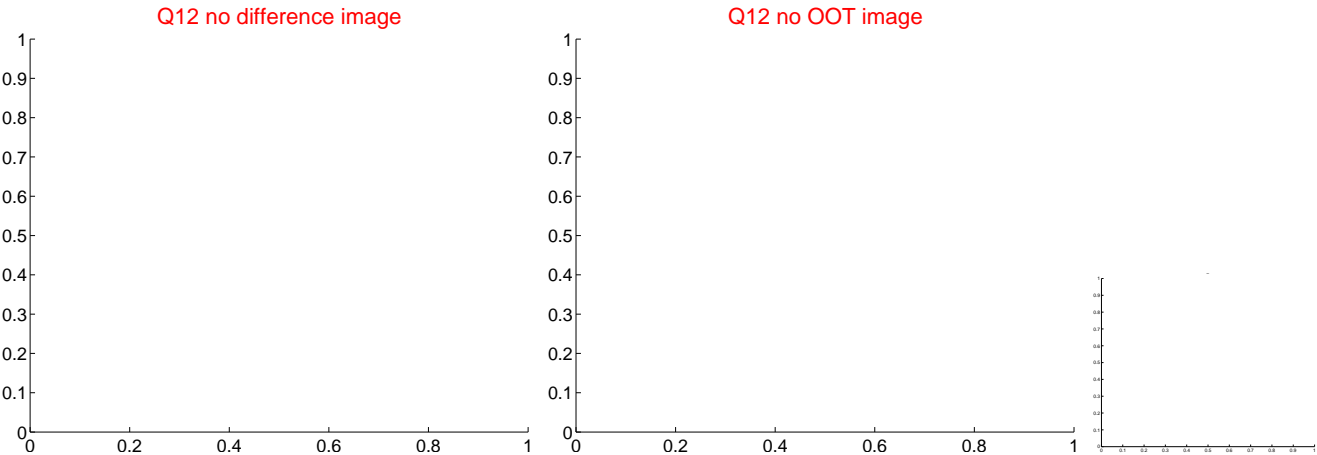
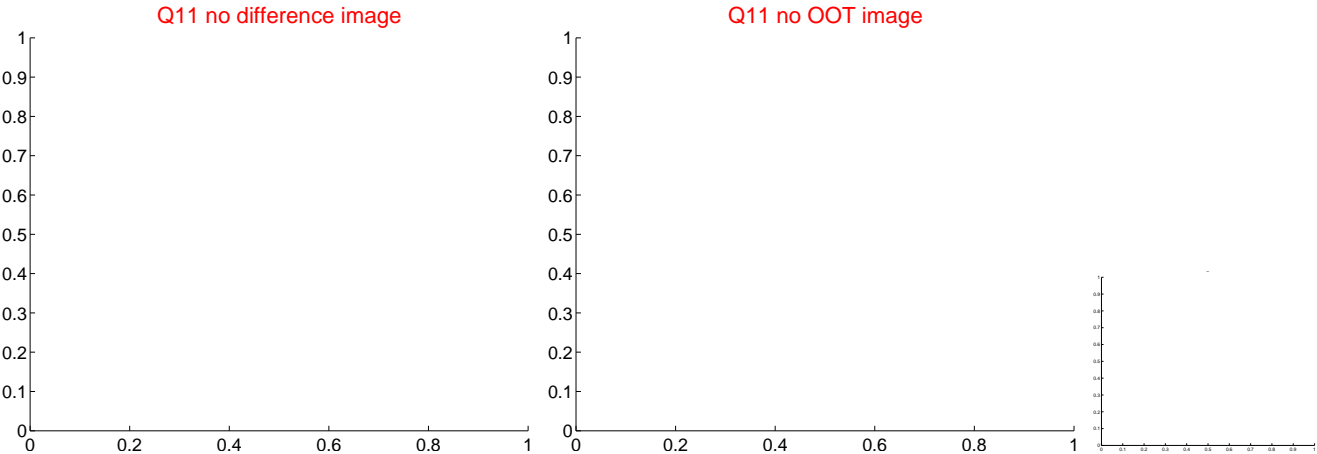
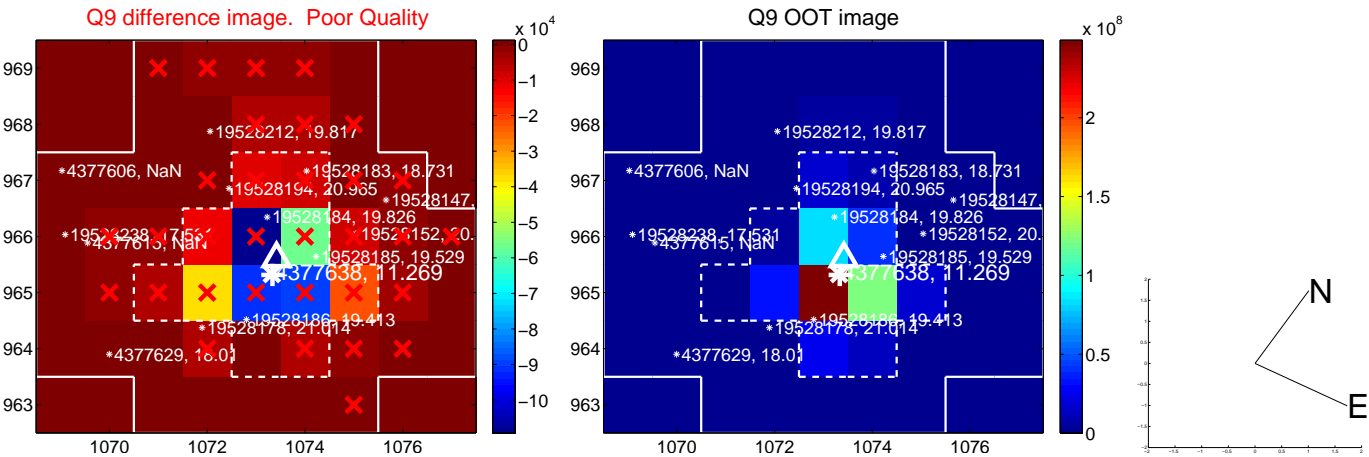
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



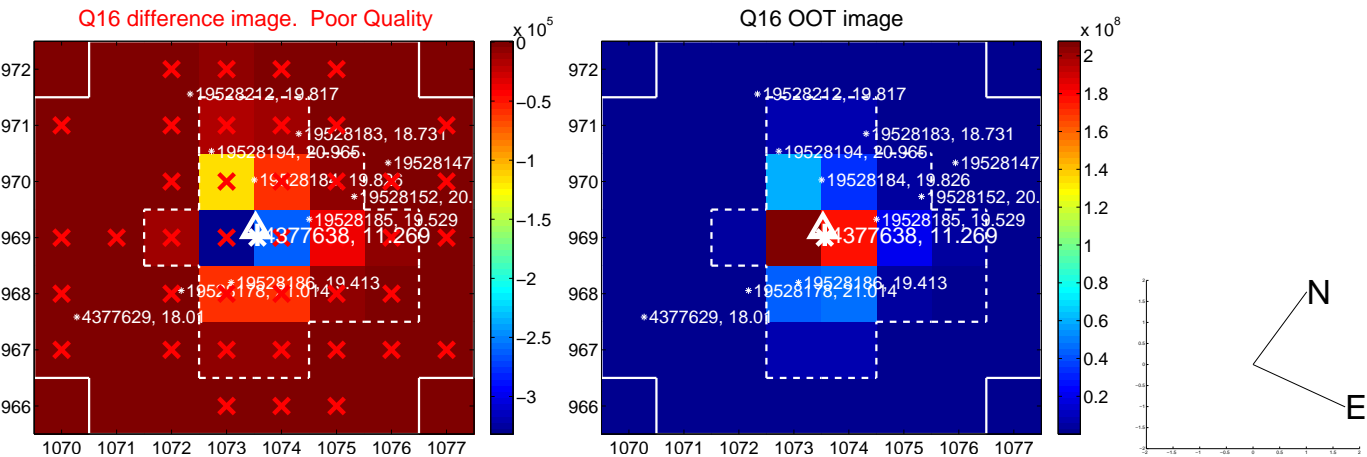
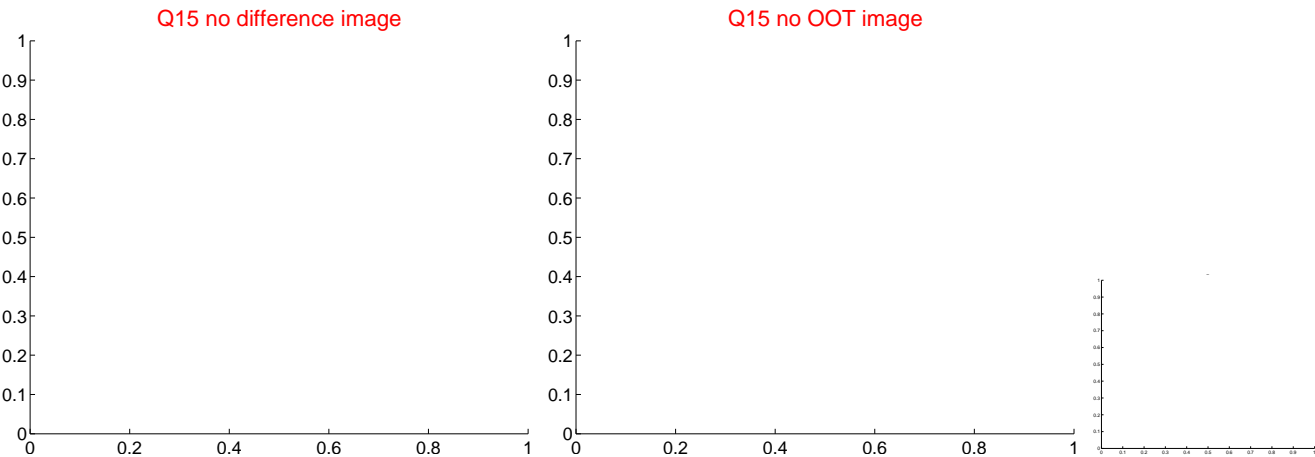
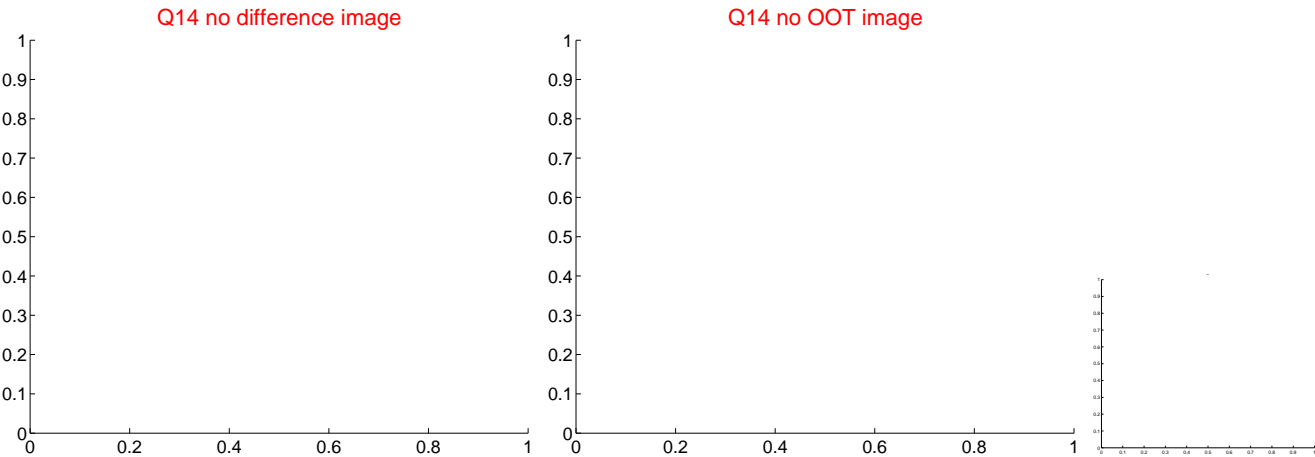
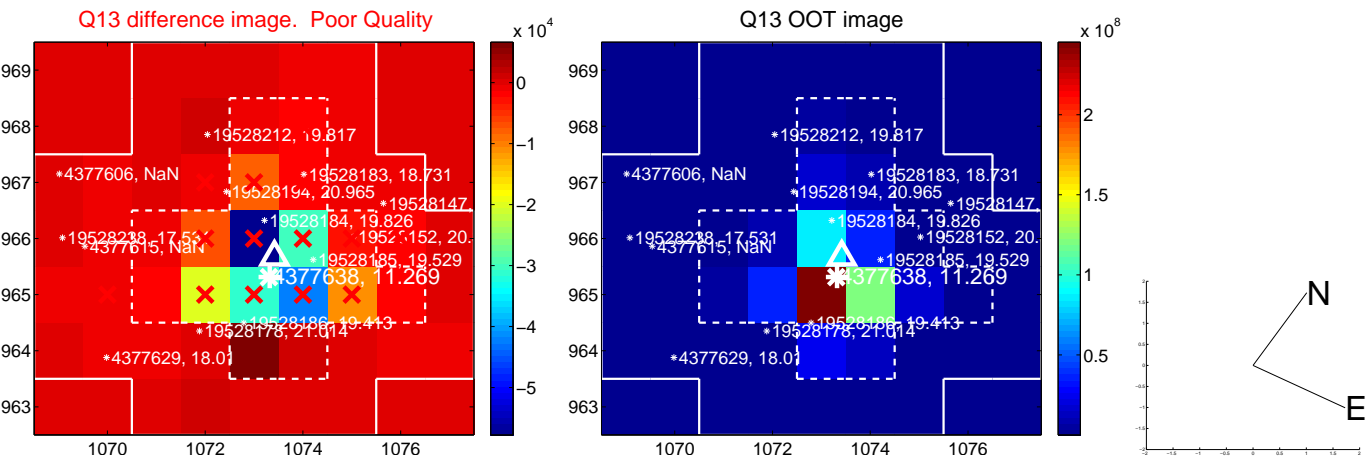
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



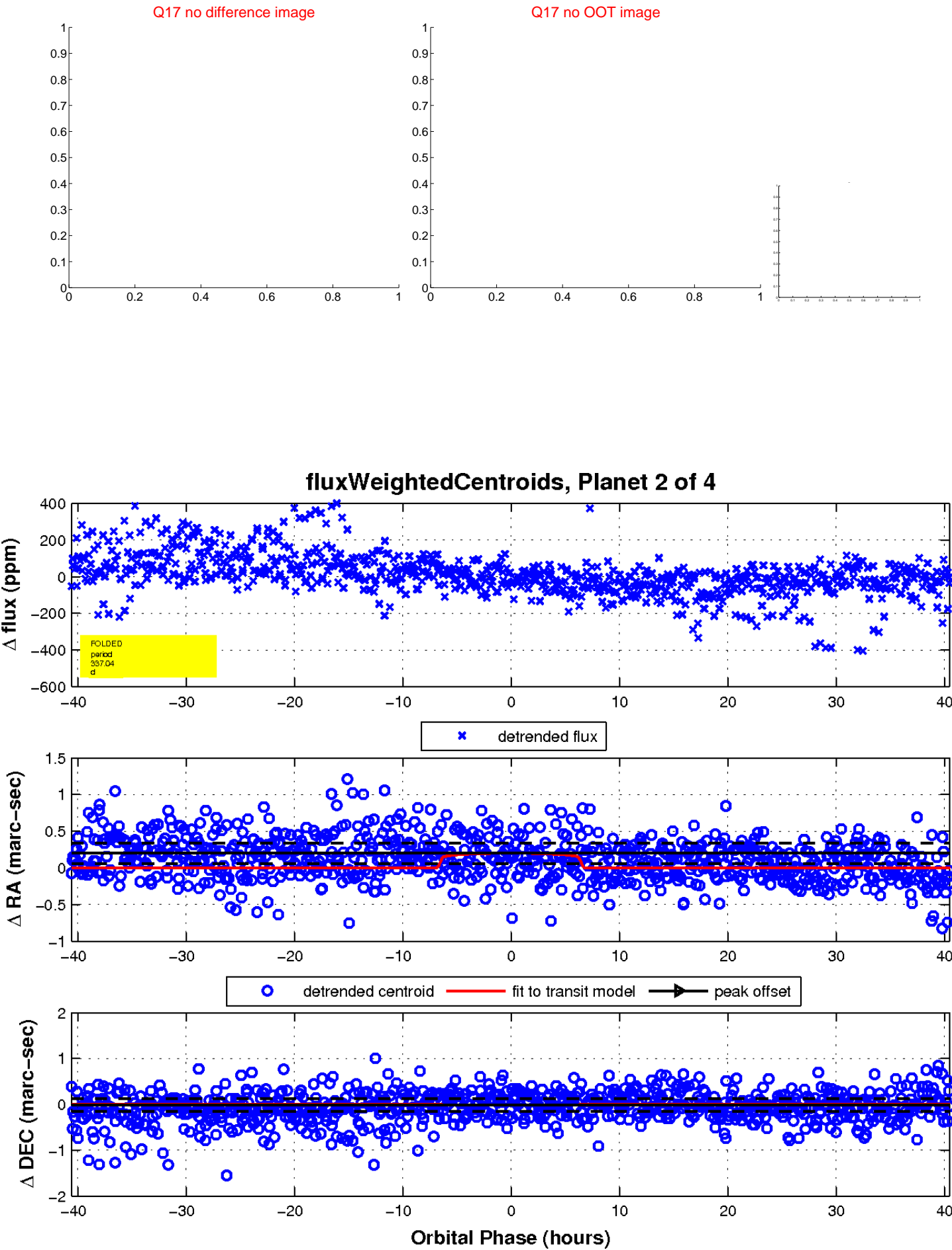
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



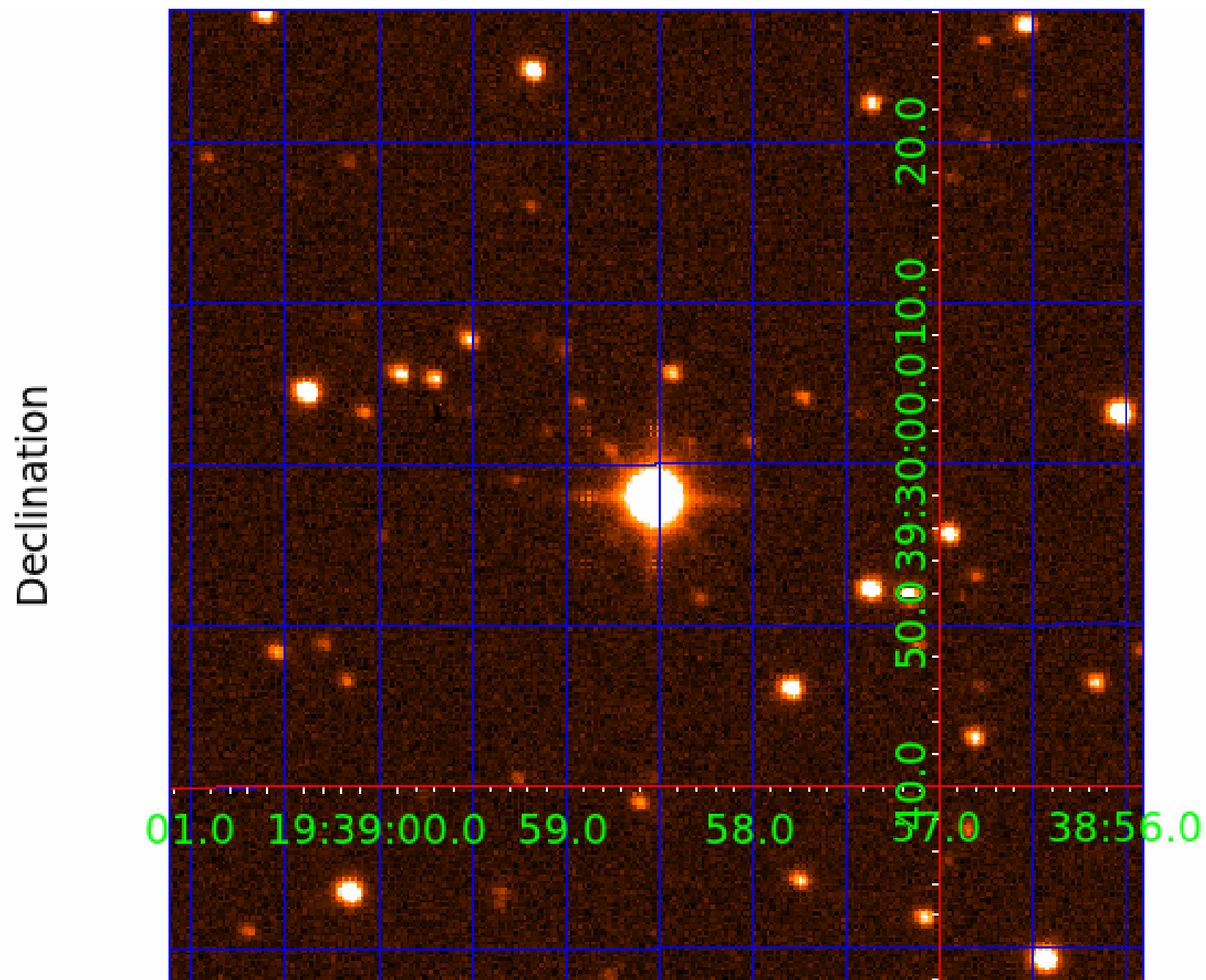
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 004377638

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})
004377638-01	OBS	No	2.821291	131.523948	0.0	10.515	35.6	0.0	3.21	9338	0.00	24324.58
004377638-02	OBS	No	337.036713	193.253677	135.6	13.533	21.8	8.4	3.21	9338	4.16	41.34
004377638-03	OBS	No	2.821679	132.041493	10.5	0.515	7.6	1.7	3.21	9338	1.09	24320.12
004377638-04	OBS	No	441.495510	242.267431	97.5	6.925	8.6	6.4	3.21	9338	3.45	28.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004377638-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
004377638-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_SATURATED
004377638-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—TRANS_GAPPED—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED—HALO_GHOST
004377638-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—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.

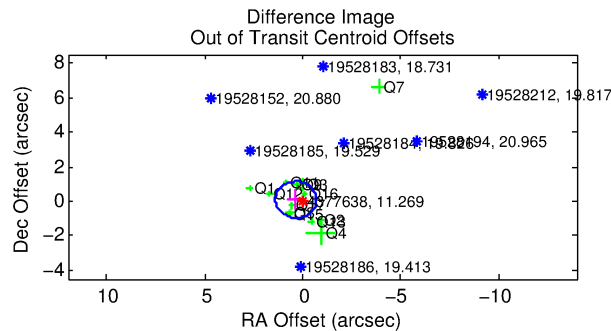
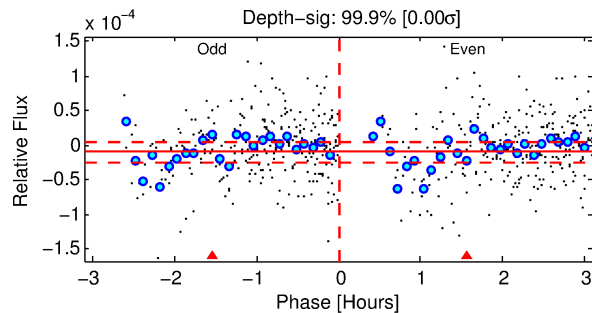
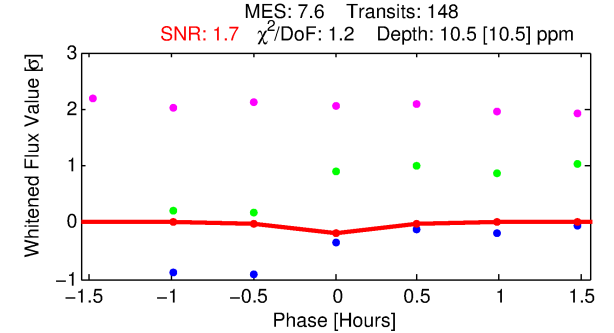
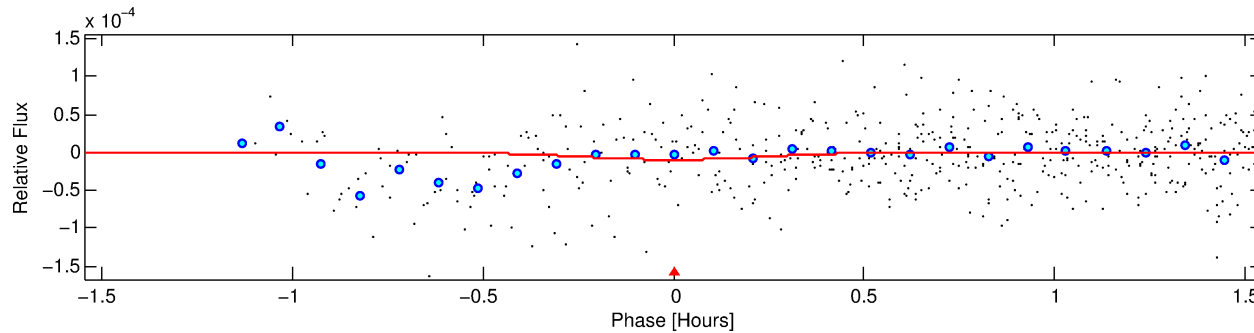
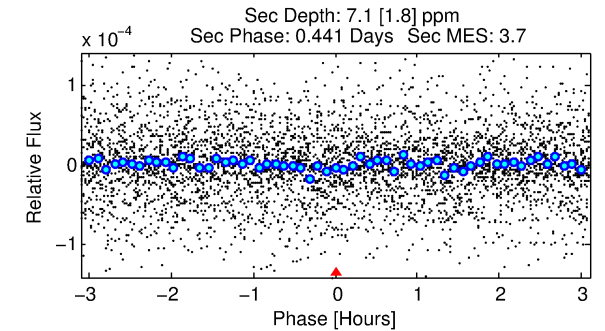
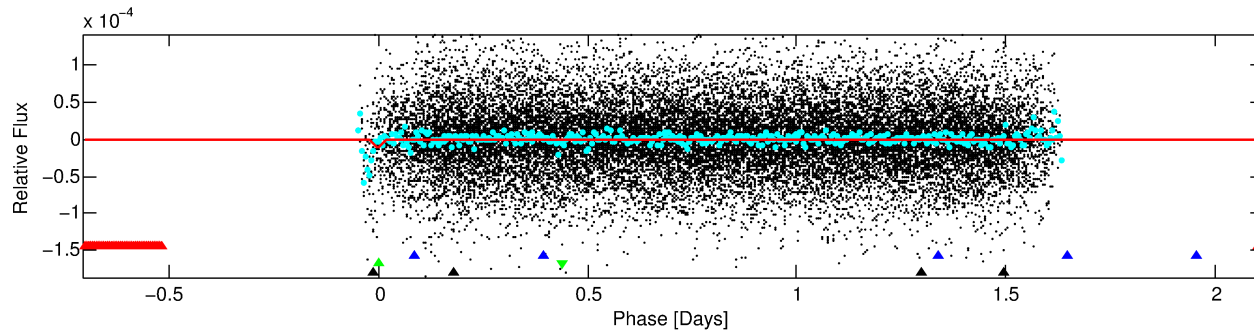
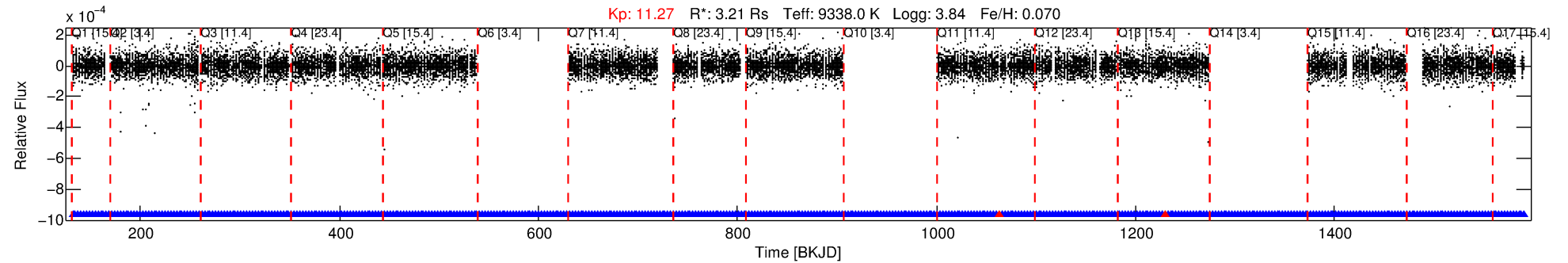
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004377638-03

No Significant Match Found

DV One-Page Summary

KIC: 4377638 Candidate: 3 of 4 Period: 2.822 d



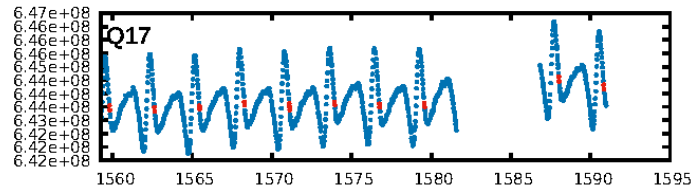
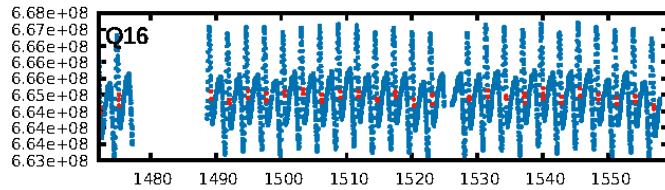
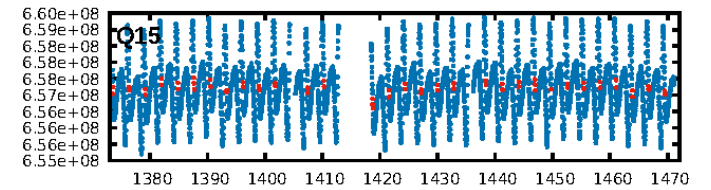
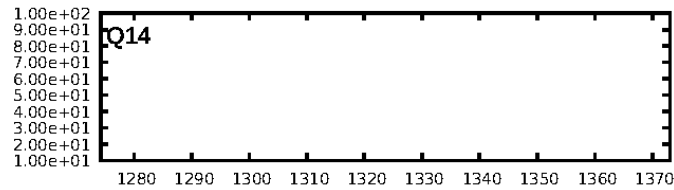
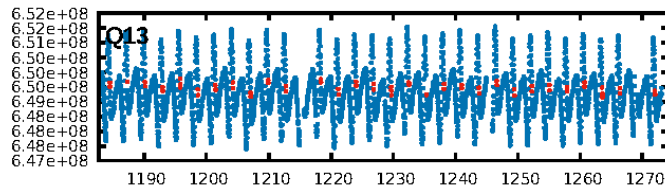
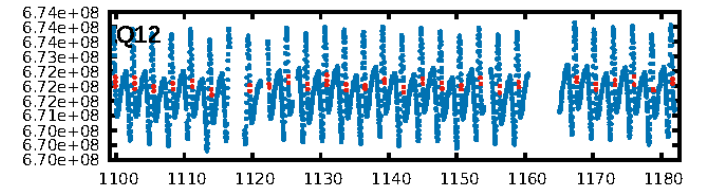
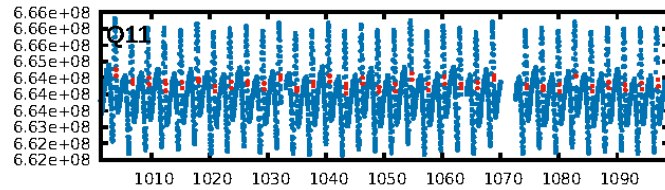
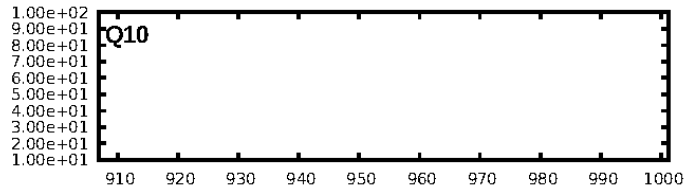
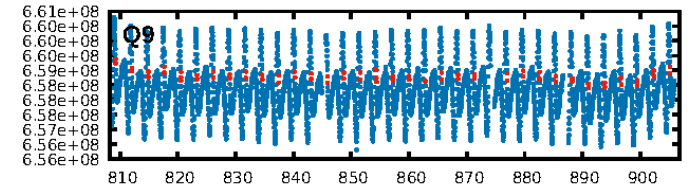
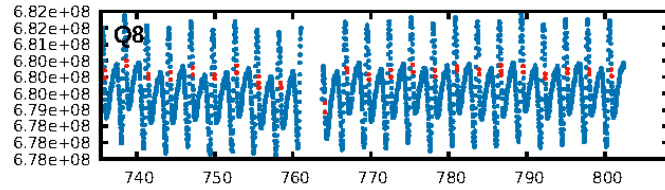
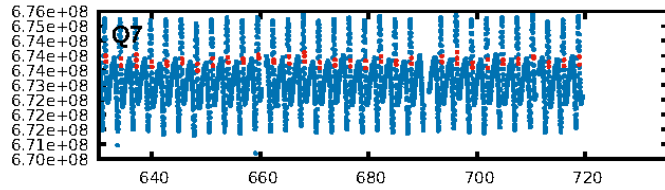
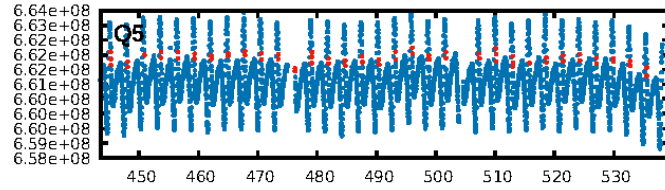
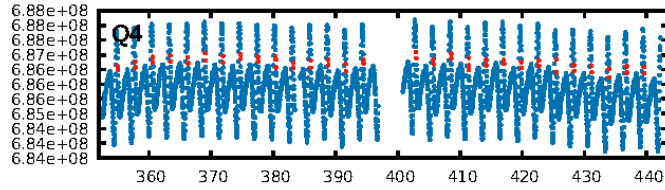
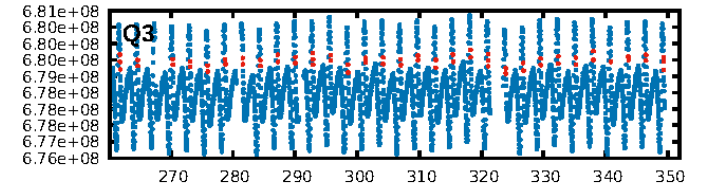
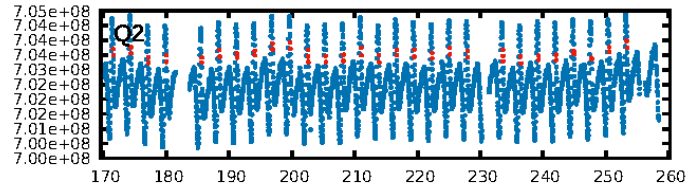
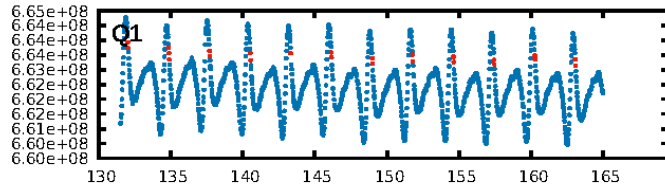
DV Fit Results:

Period = 2.82168 [0.00005] d
Epoch = 132.0415 [0.0078] BKJD
 $R_p/R^* = 0.0031$ [0.0380]
 $a/R^* = 41.83$ [3442.93]
 $b = 0.08$ [1056.94]
 $S_{\text{eff}} = 24320.12$ [17004.02]
 $T_{\text{eq}} = 3184$ [557] K
 $R_p = 1.10$ [13.32] R_e
 $a = 0.0537$ [0.0227] AU
 $A_g = 9.39$ [228.40] [0.04σ]
 $T_{\text{eff}} = 8619$ [52378] K [0.10σ]

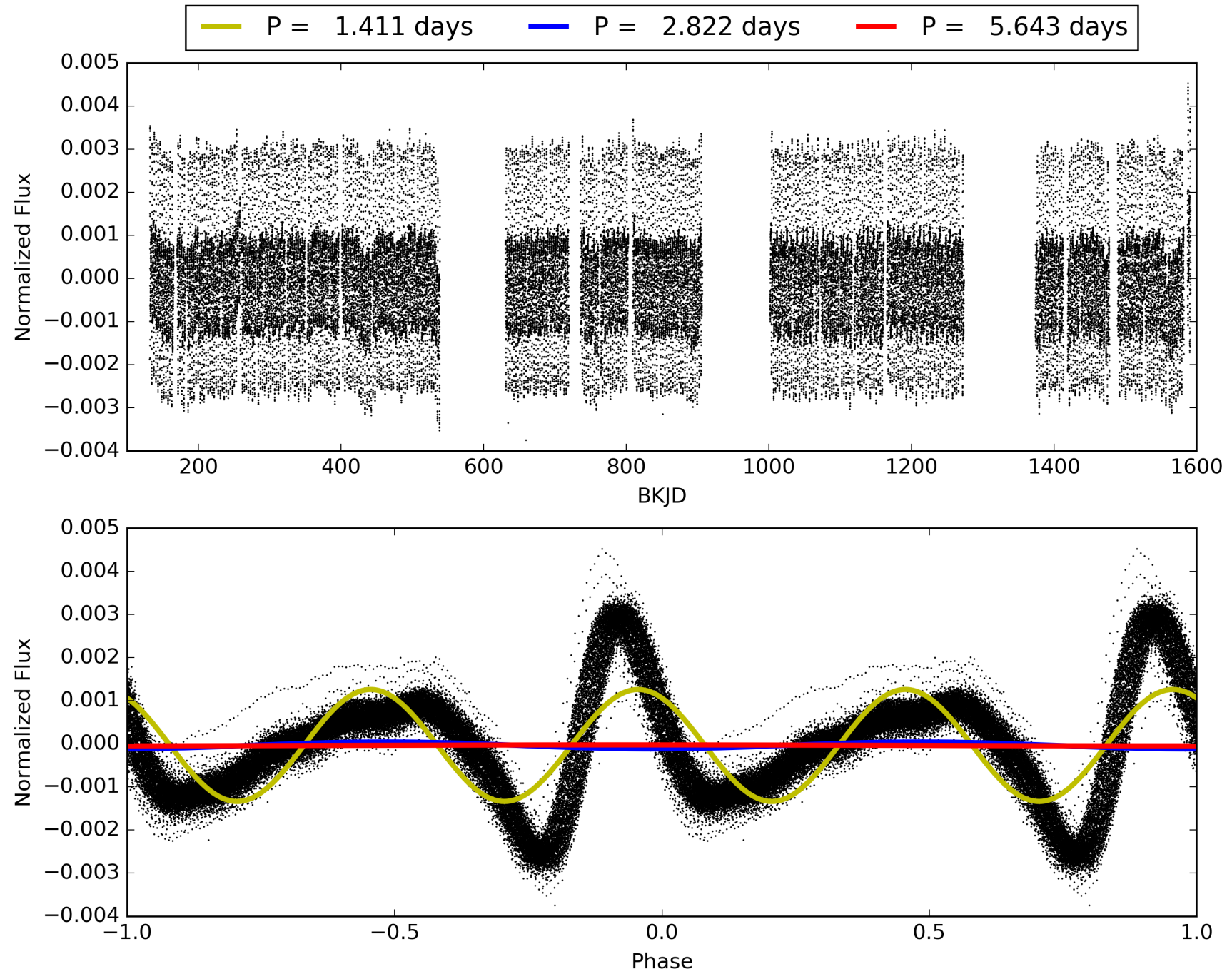
DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]
LongPeriod-sig: 100.0% [592.28σ]
ModelChiSquare2-sig: 11.7%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 7.51e-11
RollingBand-fgt: 0.99 [136/138]
GhostDiagnostic-chr: 0.2087
Centroid-sig: 37.3%
Centroid-so: 4.002 arcsec [0.93σ]
OotOffset-rm: 0.370 arcsec [1.05σ]
KicOffset-rm: 0.334 arcsec [0.98σ]
OotOffset-st: 1/4/4/4 [13]
KicOffset-st: 1/4/4/4 [13]
DiffImageQuality-fgm: 0.62 [8/13]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 004377638-03, PDC Light Curves

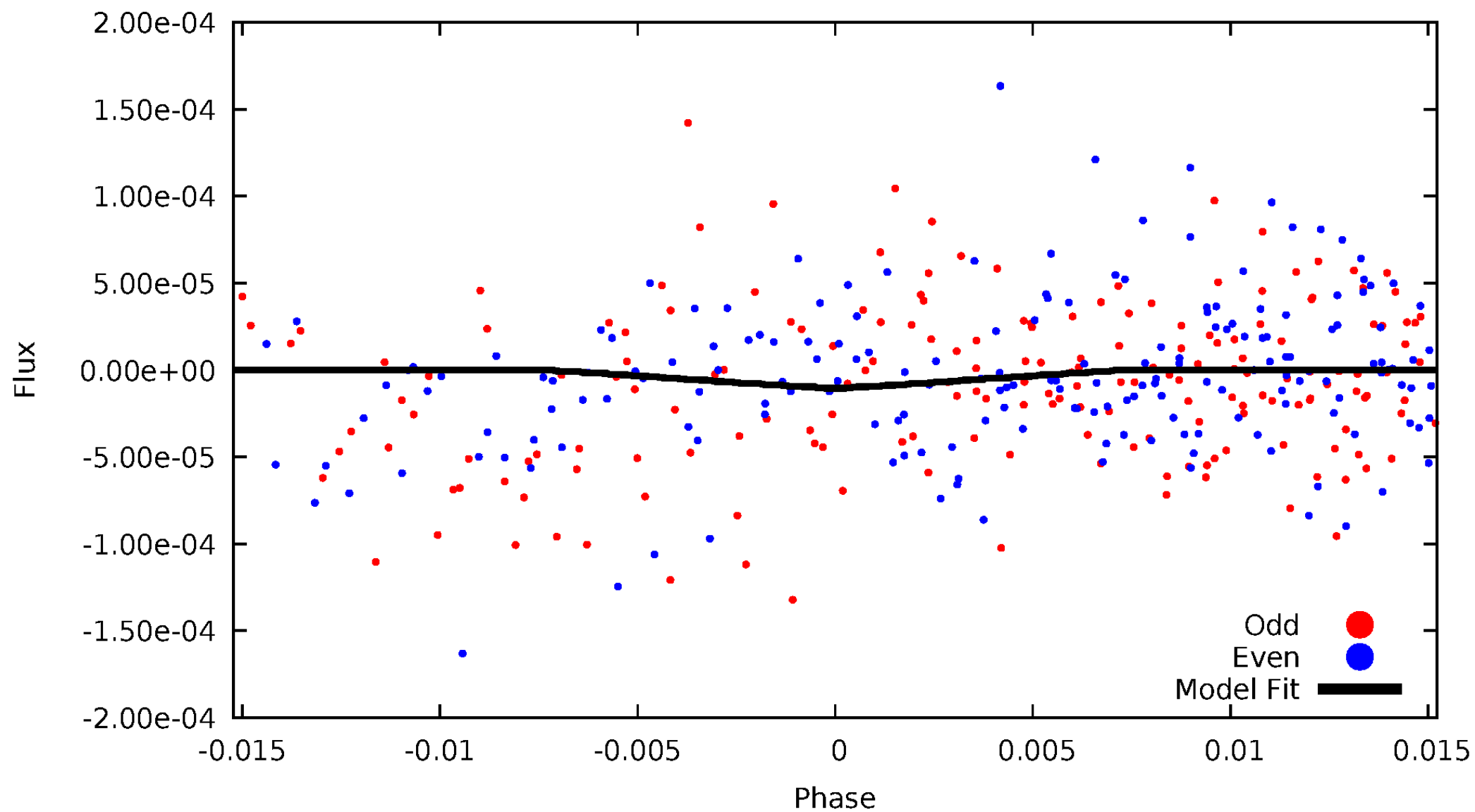


TCE 004377638-03



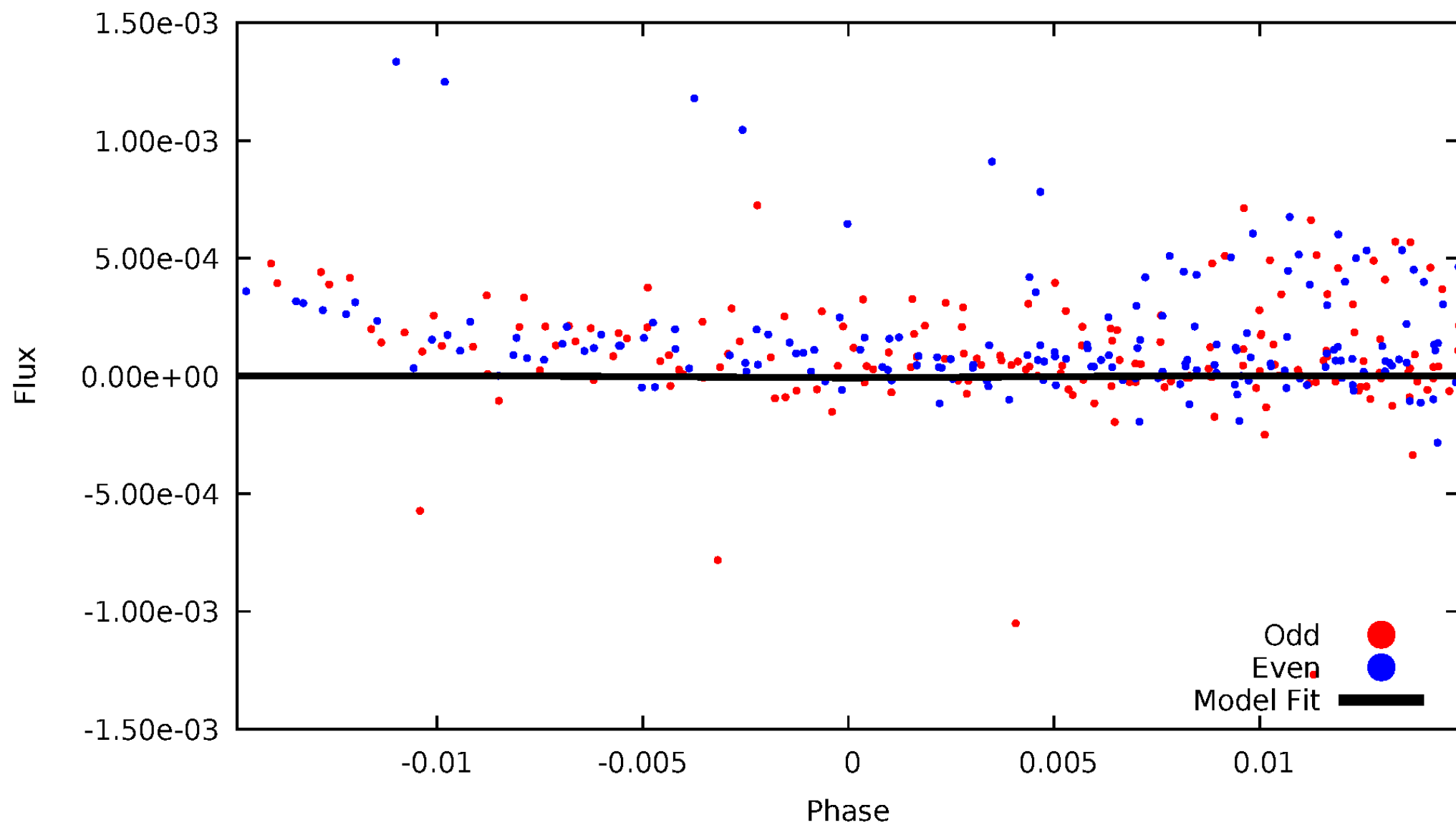
DV Odd/Even

TCE 004377638-03



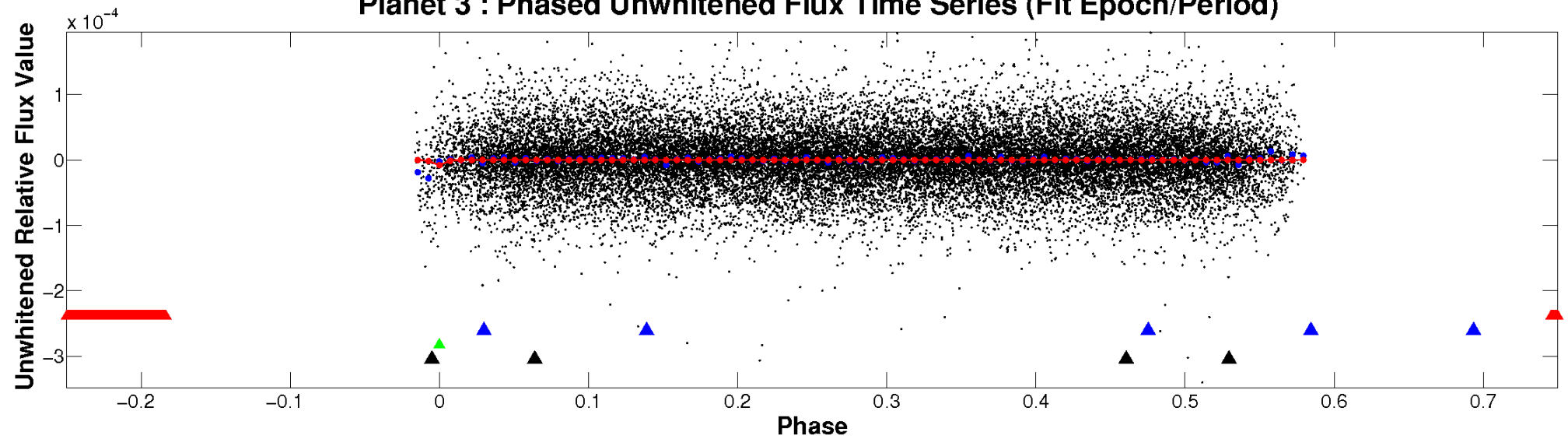
ALT Odd/Even

TCE 004377638-03

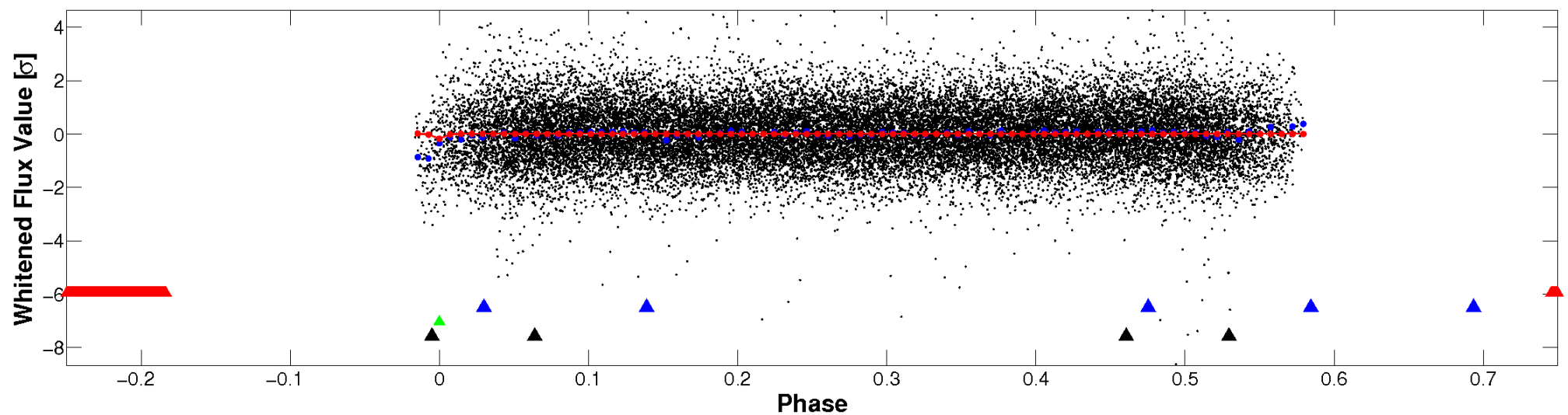


Non-Whitened Vs. Whitened Light Curve

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

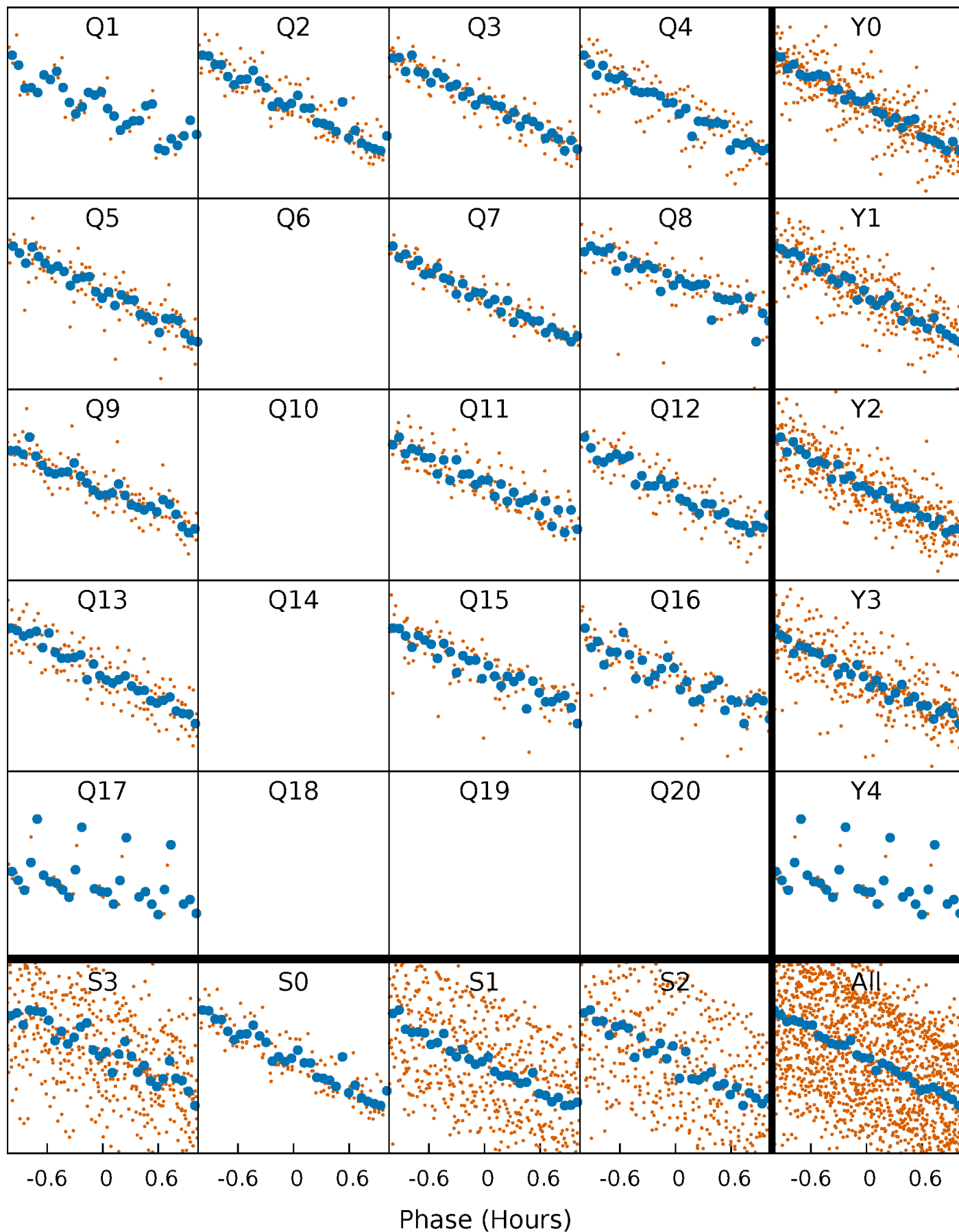


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 004377638-03 P= 2.821679 Days $T_0=132.041493$ (BKJD)



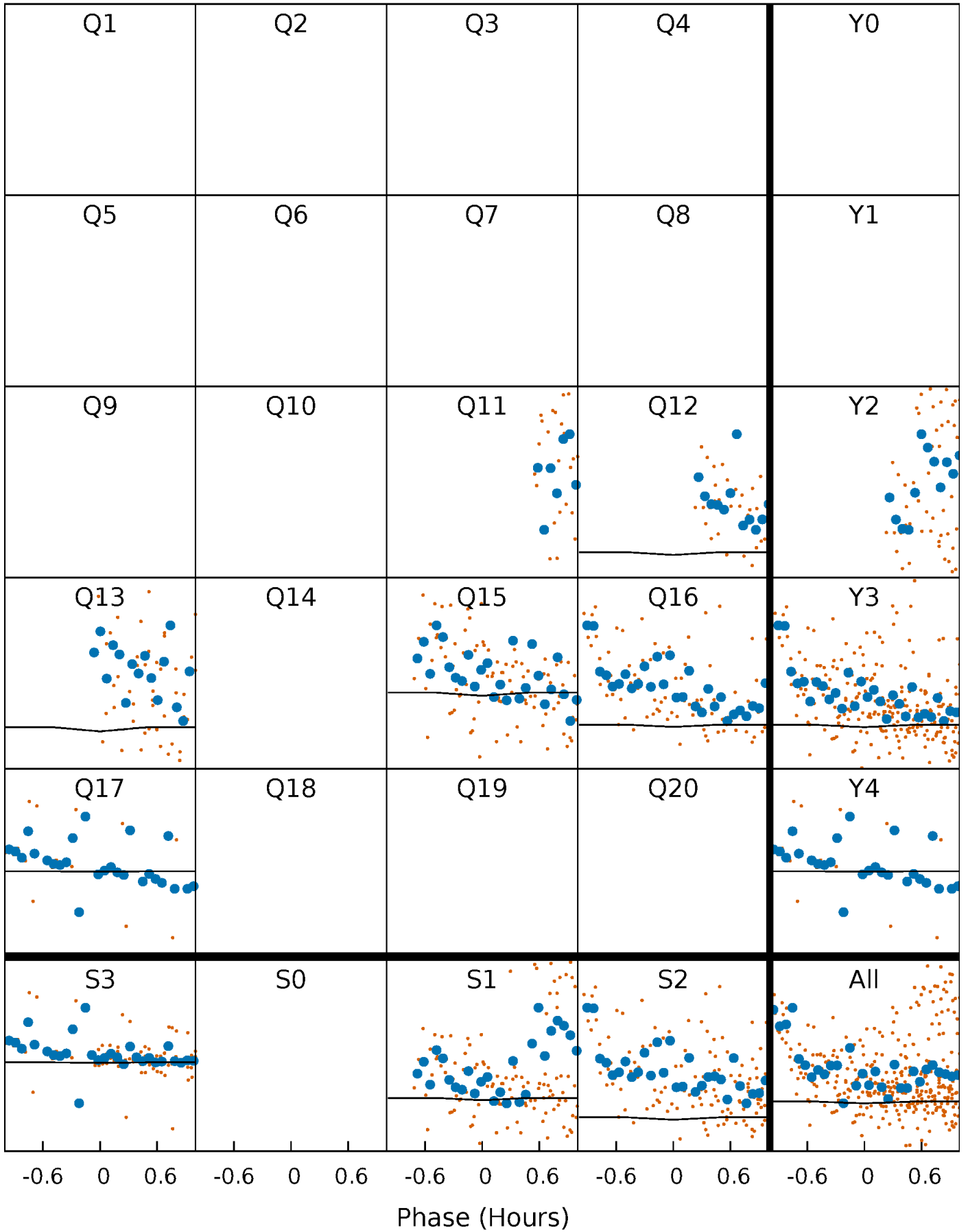
DV Quarter-Phased Transit Curves

TCE 004377638-03 P= 2.821679 Days $T_0=132.041493$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

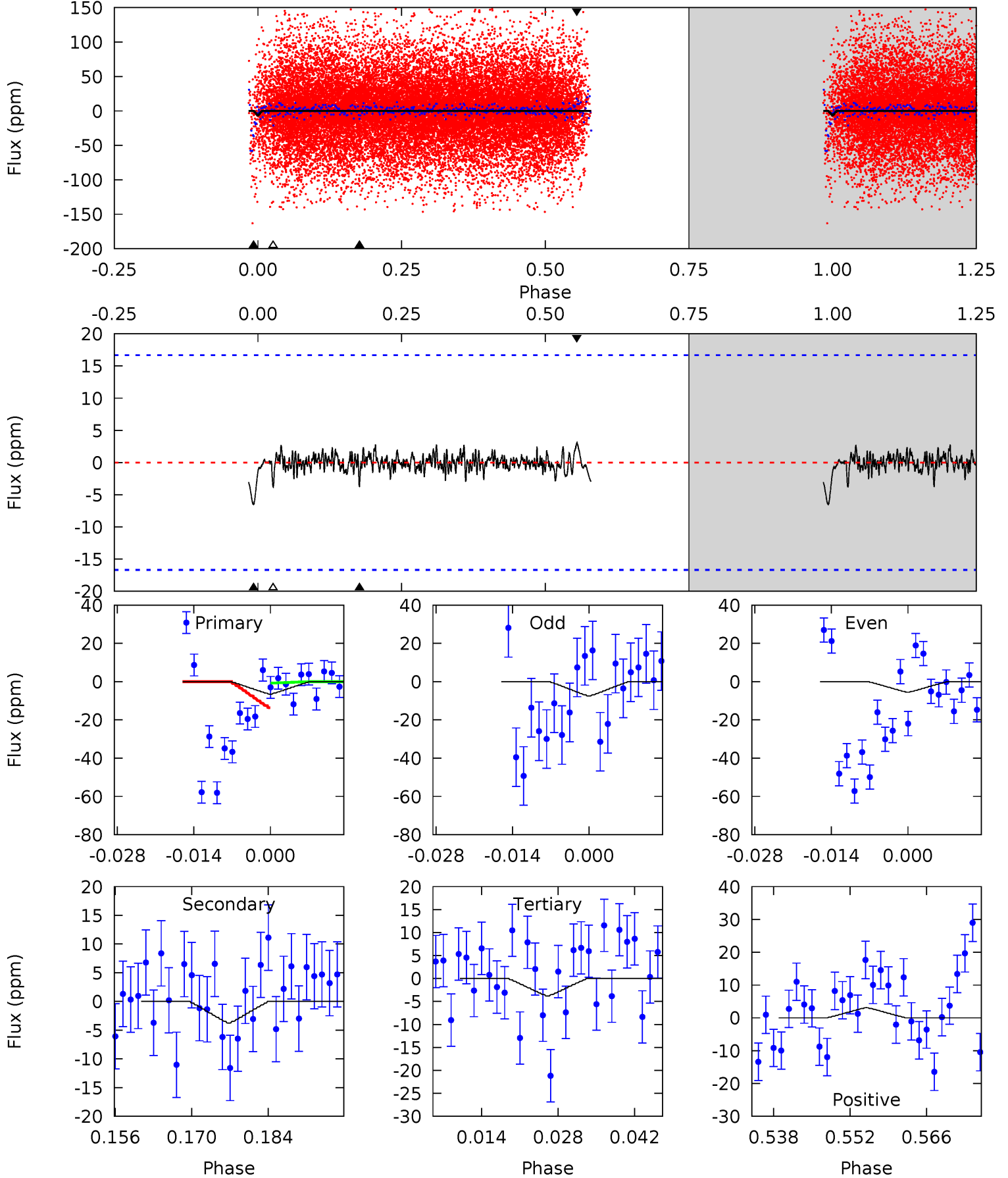
TCE 004377638-03 P= 2.821666 Days $T_0=132.045277$ (BKJD)



DV Model-Shift Uniqueness Test

004377638-03, P = 2.821679 Days, E = 132.041493 Days

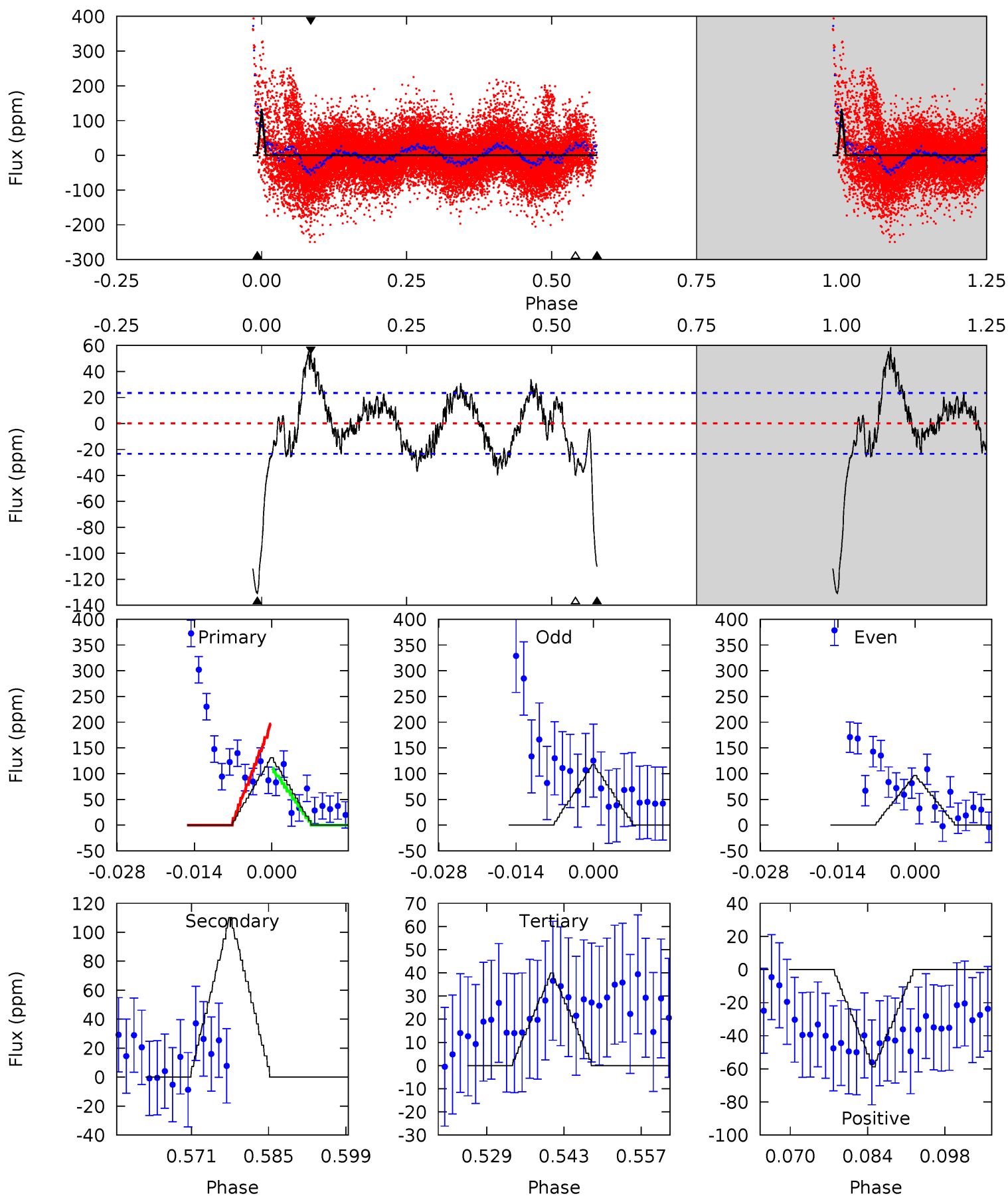
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.94	1.12	1.13	0.92	4.96	2.45	0.30	0.80	1.02	-0.01	0.20	0.29	1.40	0.32	1.90



Alt Model-Shift Uniqueness Test

004377638-03, P = 2.821666 Days, E = 132.045277 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.7	23.3	8.46	12.4	4.96	2.46	4.18	19.3	15.3	14.9	10.9	2.22	1.43	0.31	0



Stellar Parameters For KIC 004377638

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	9338^{+254}_{-471}	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.150}_{-0.750}$	$3.207^{+0.840}_{-1.441}$	$2.587^{+0.316}_{-0.949}$	$0.110^{+0.367}_{-0.052}$
	+3%/-5%	+10%/-4%	+214%/-1071%	+26%/-45%	+12%/-37%	+333%/-47%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004377638-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-4 ± 3	$8.99^{+10.67}_{-6.07}$	4350^{+368}_{-474}	-3545^{+7326}_{-354}	$0.047^{+0.651}_{-0.046}$
Alt.	-110 ± 5	$8.50^{+9.48}_{-6.07}$	4332^{+351}_{-479}	5268^{+6031}_{-1767}	$2.222^{+24.546}_{-1.712}$

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

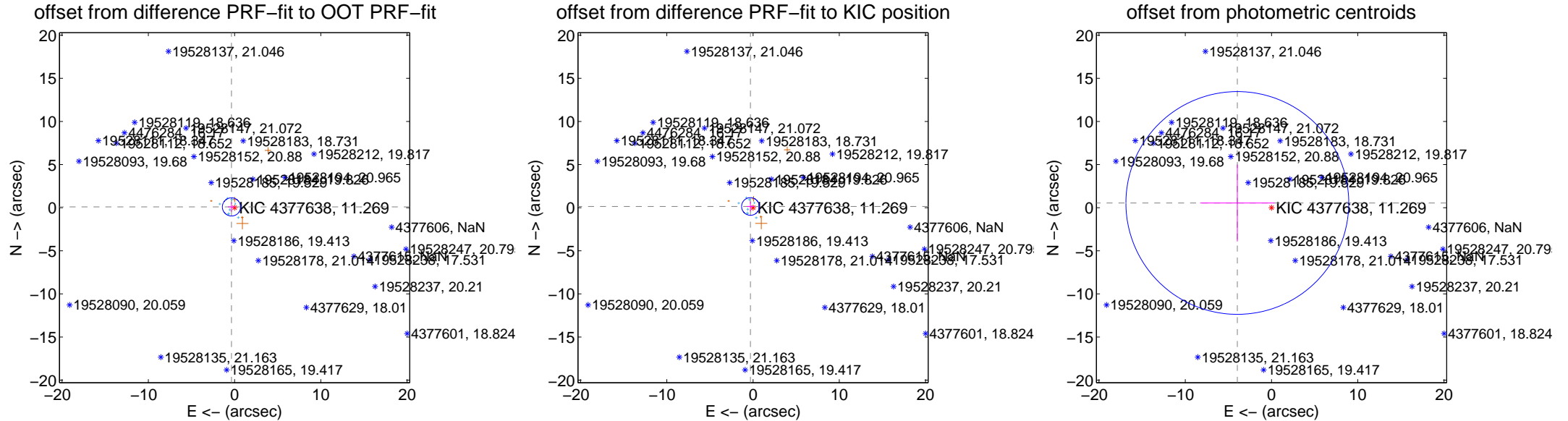
DV Centroid Data

Supplemental centroid analysis for 004377638-03. **Kepler magnitude: 11.27.** Transit SNR 1.71

There are 8 quarters with good PRF difference image offsets

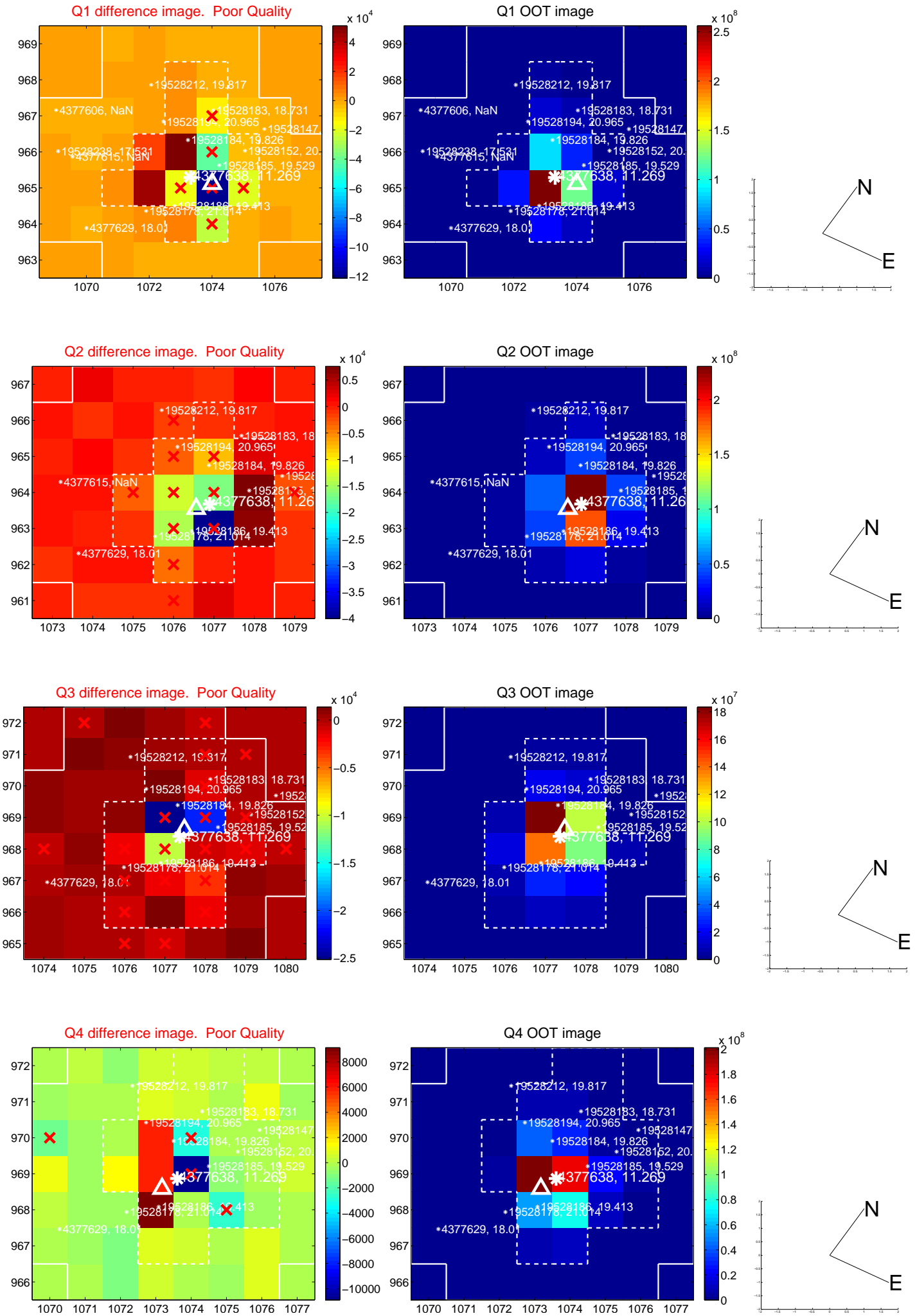
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.370 ± 0.352	1.05	0.359 ± 0.411	0.088 ± 0.555
PRF-fit source offset from KIC position	0.334 ± 0.341	0.98	0.304 ± 0.446	0.140 ± 0.565
photometric centroid source offset	4.00 ± 4.31	0.93	3.96 ± 4.30	0.55 ± 4.46

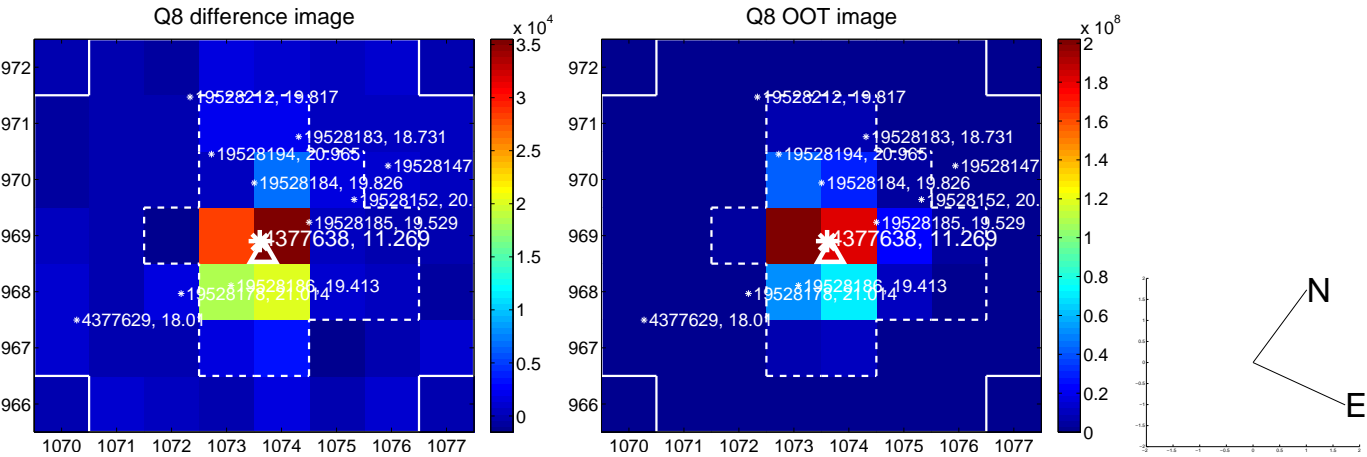
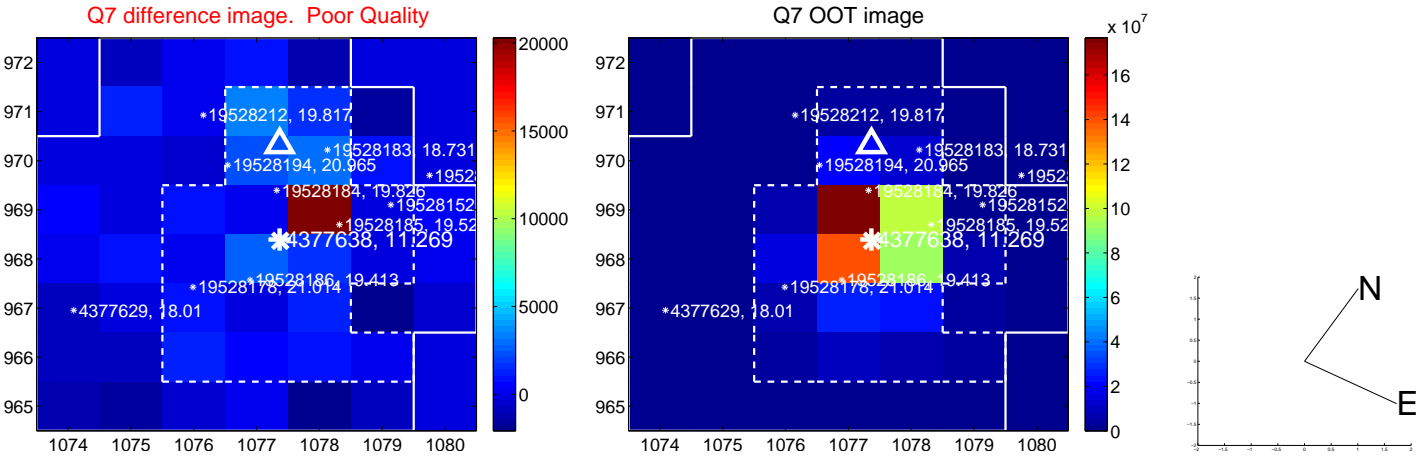
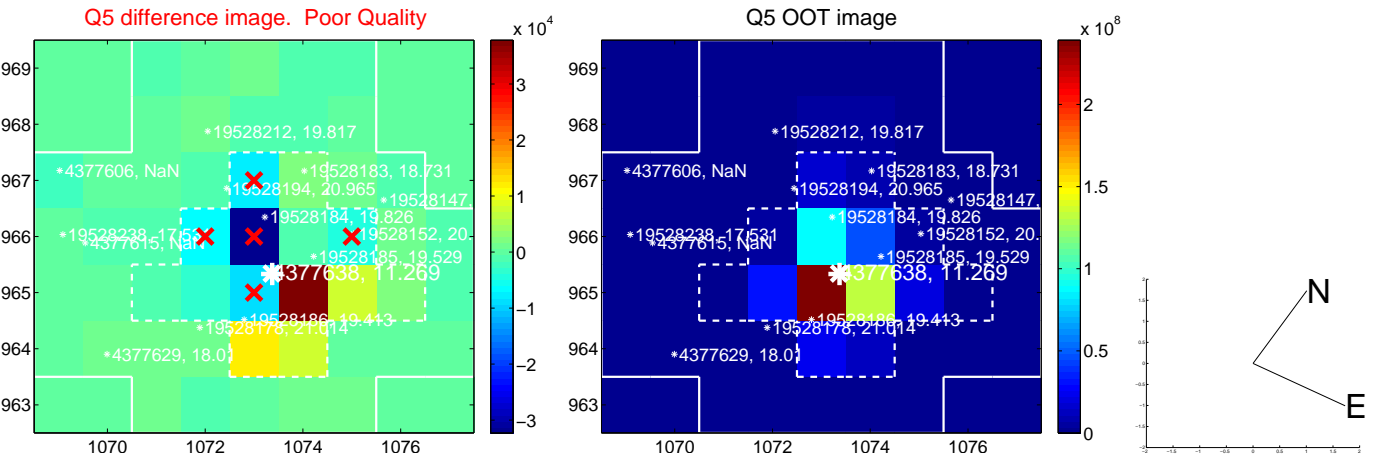


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

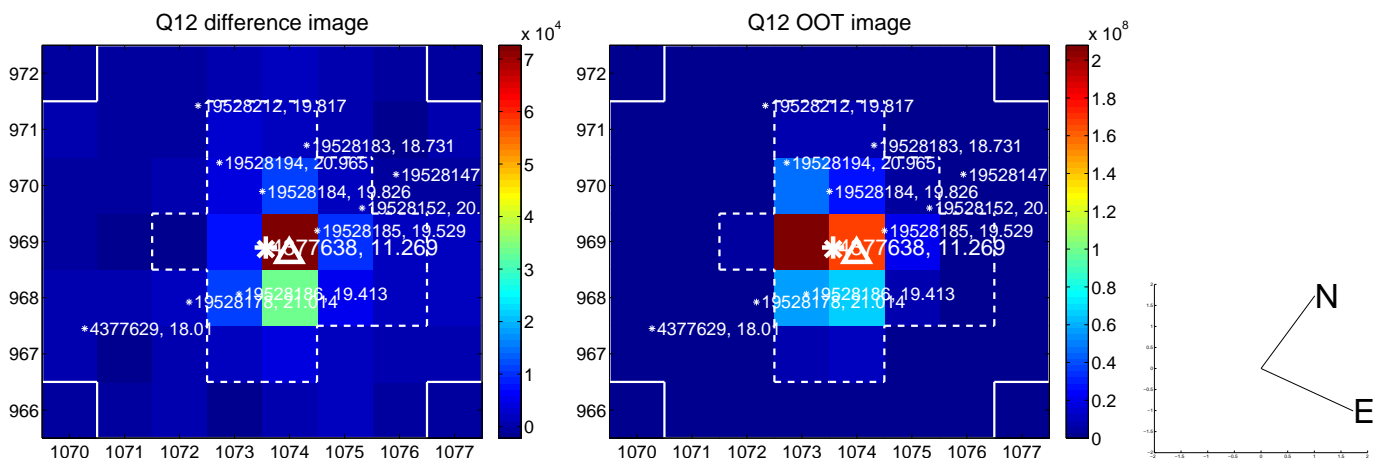
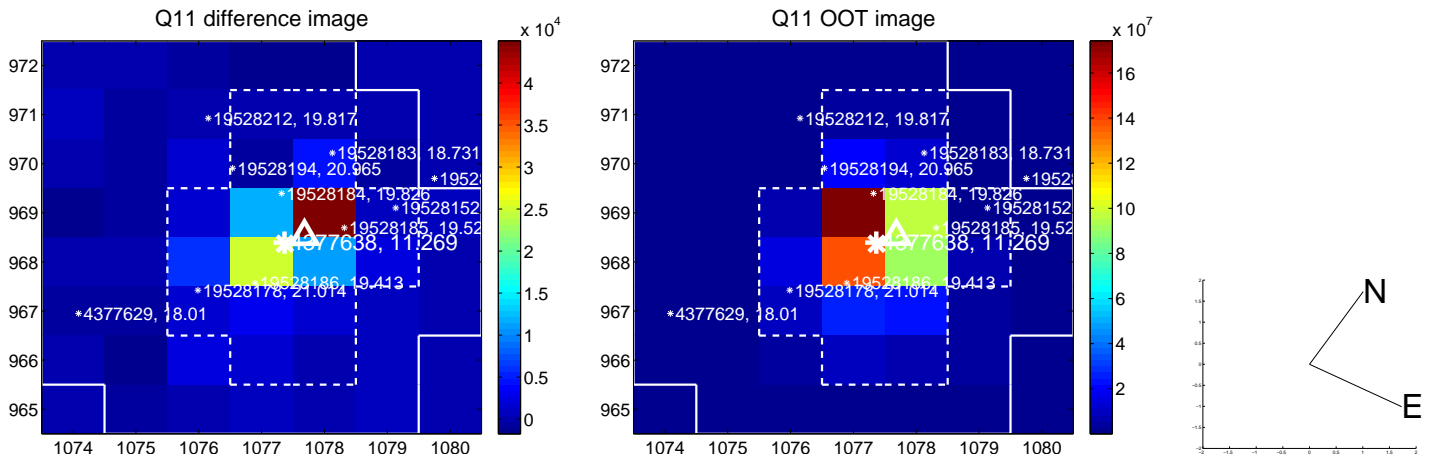
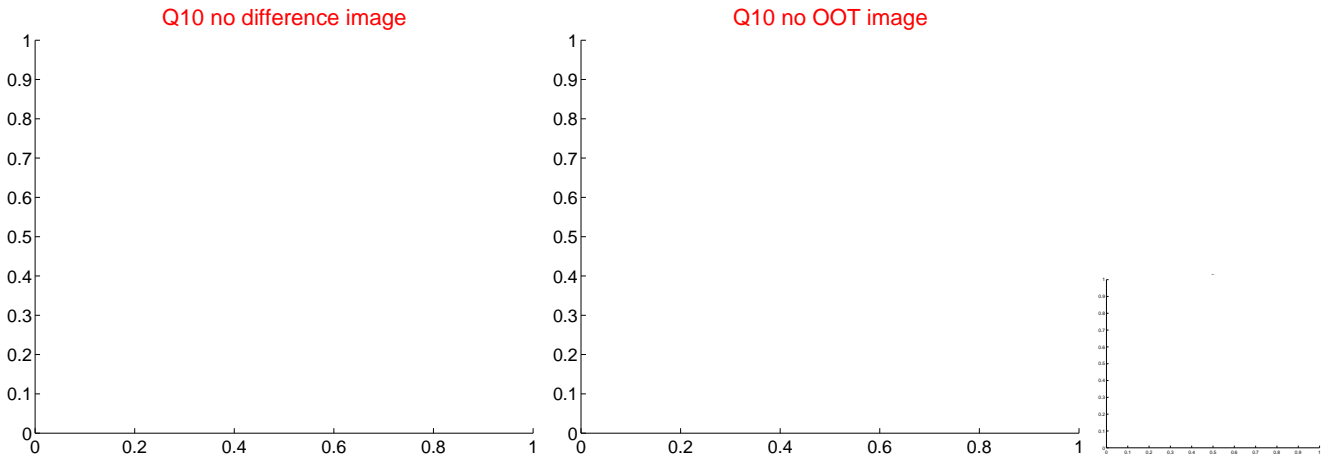
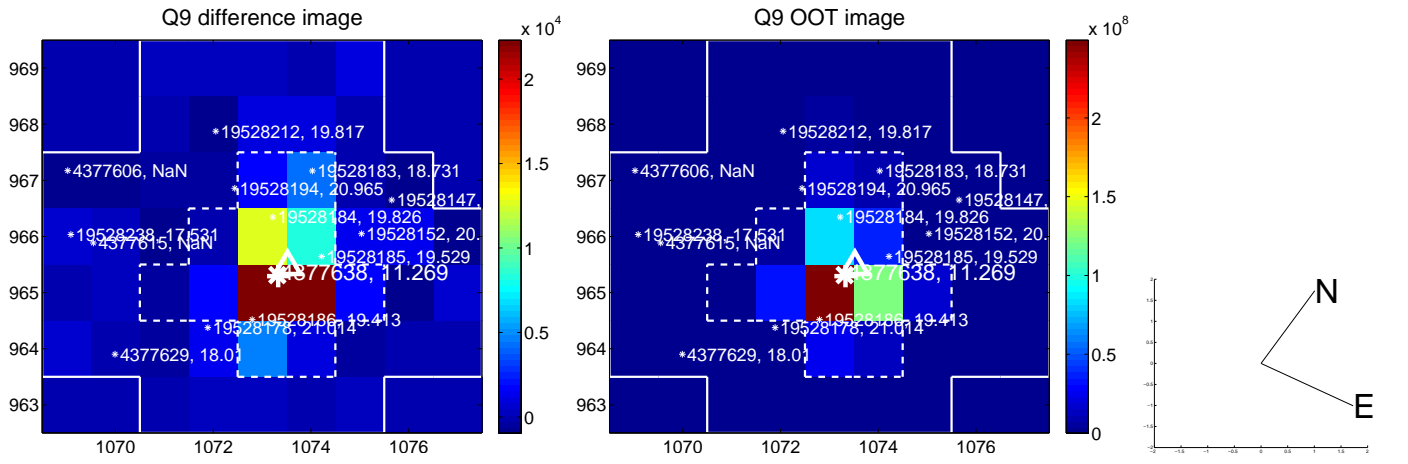
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



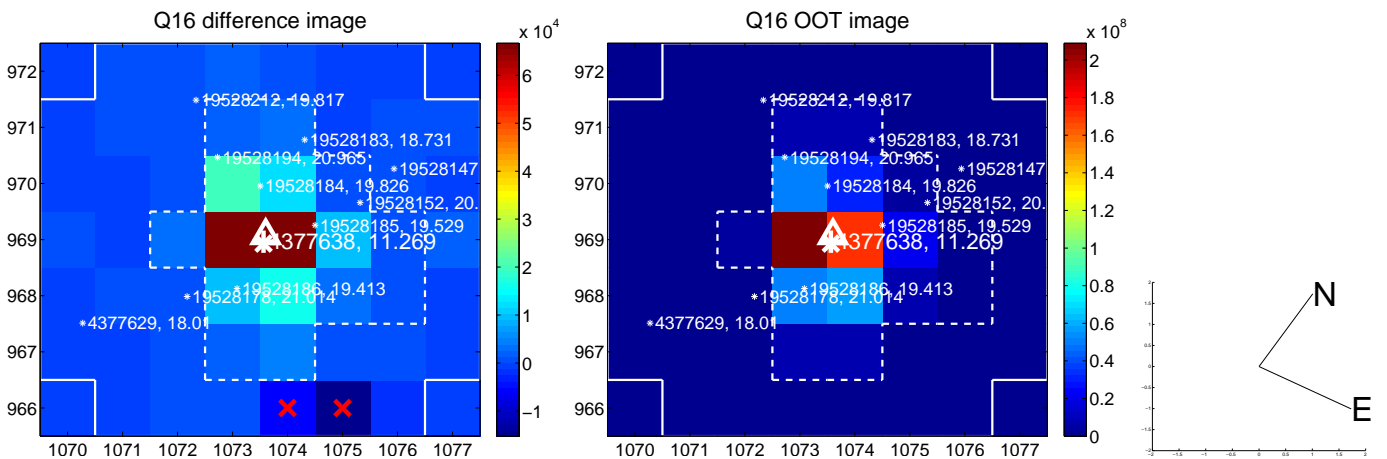
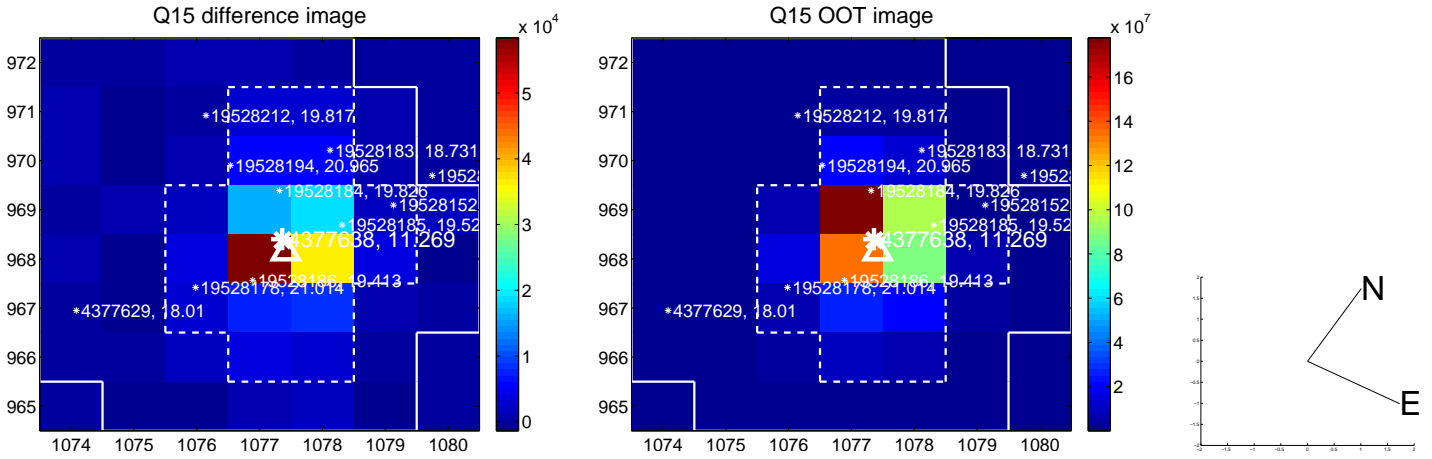
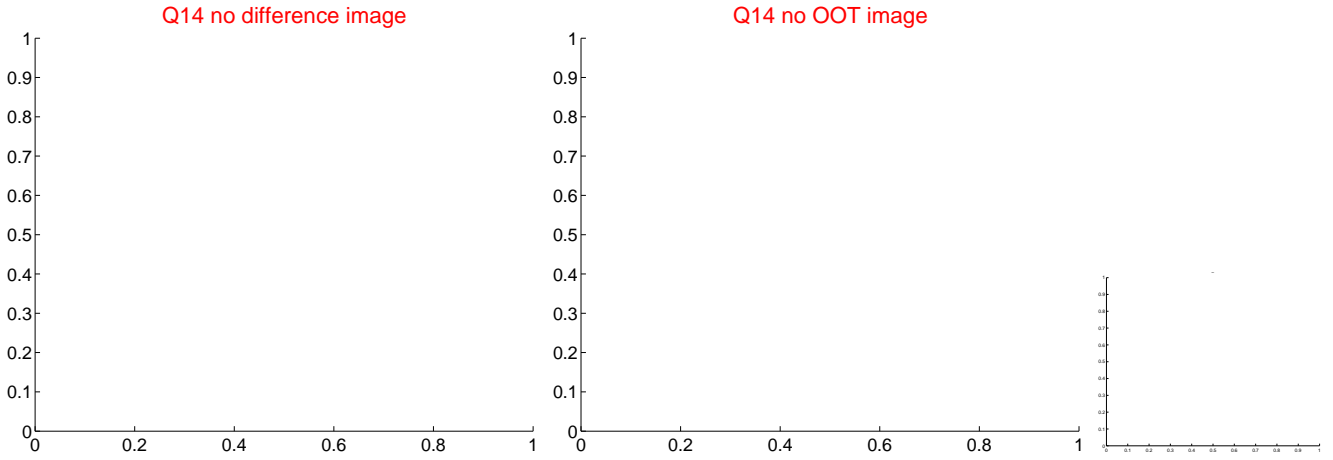
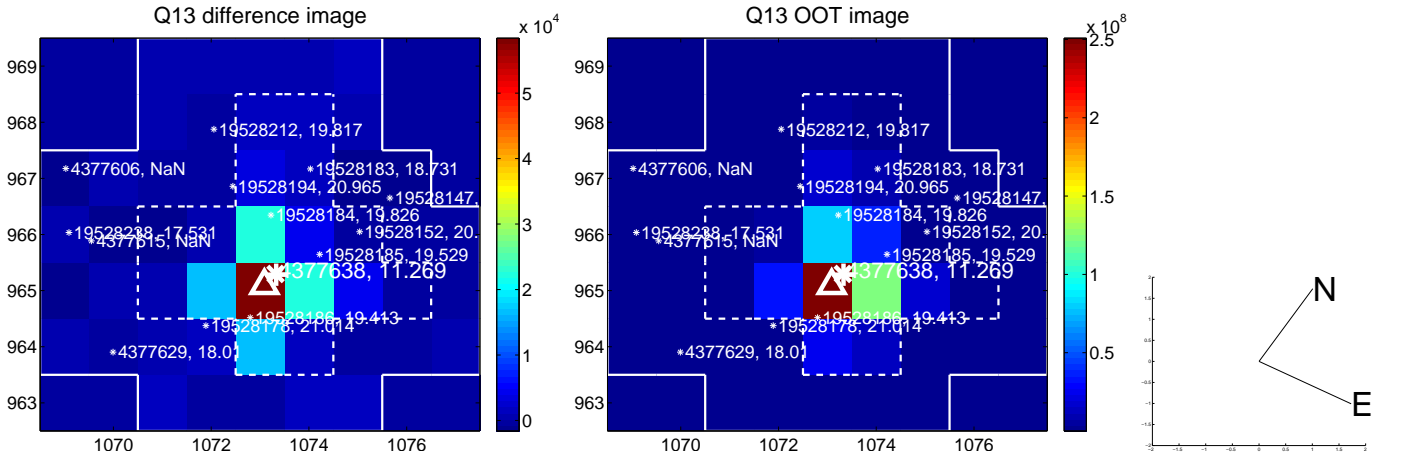
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



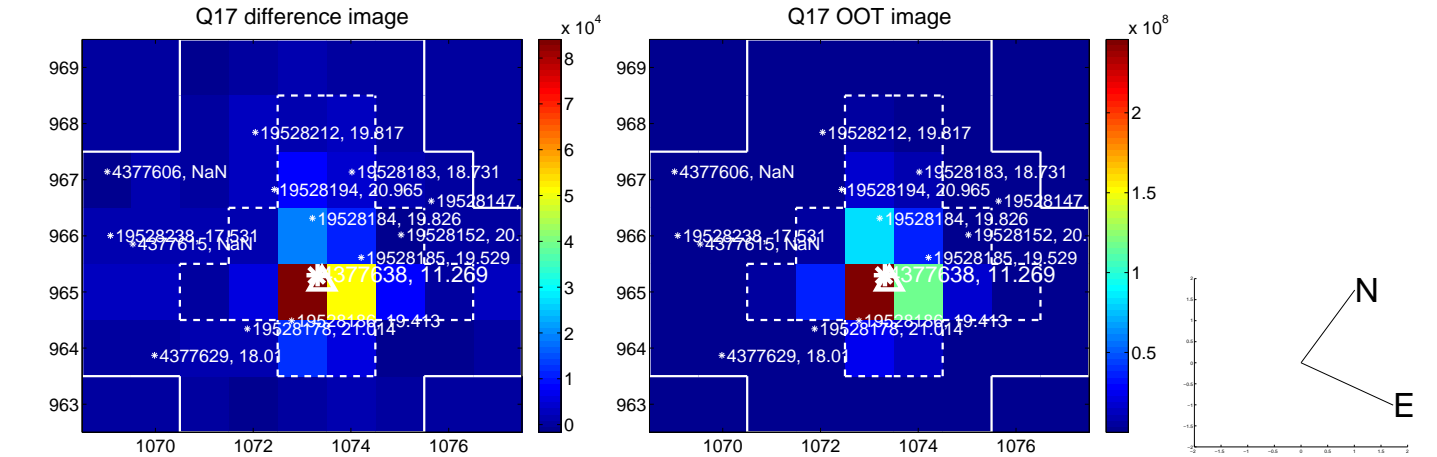
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



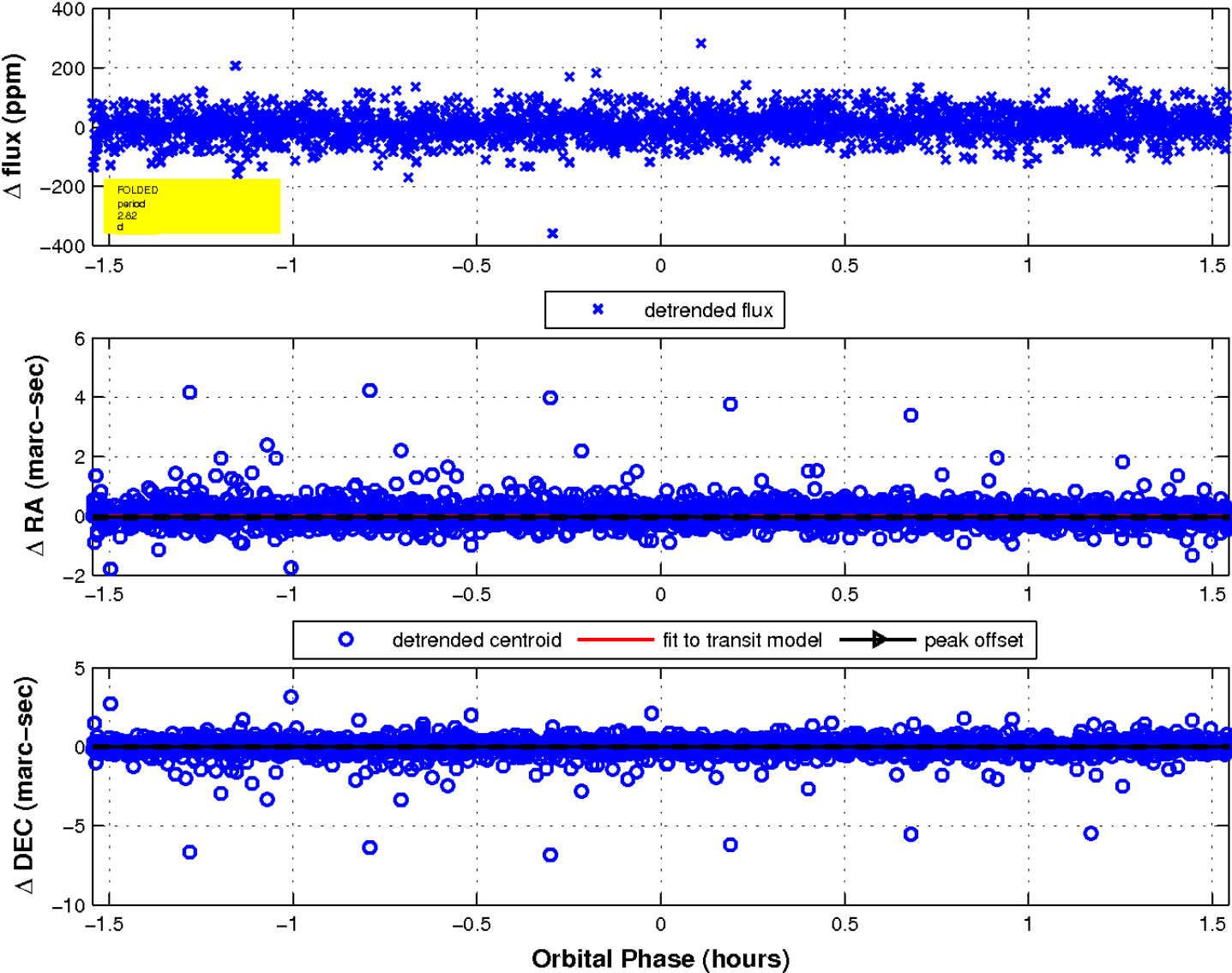
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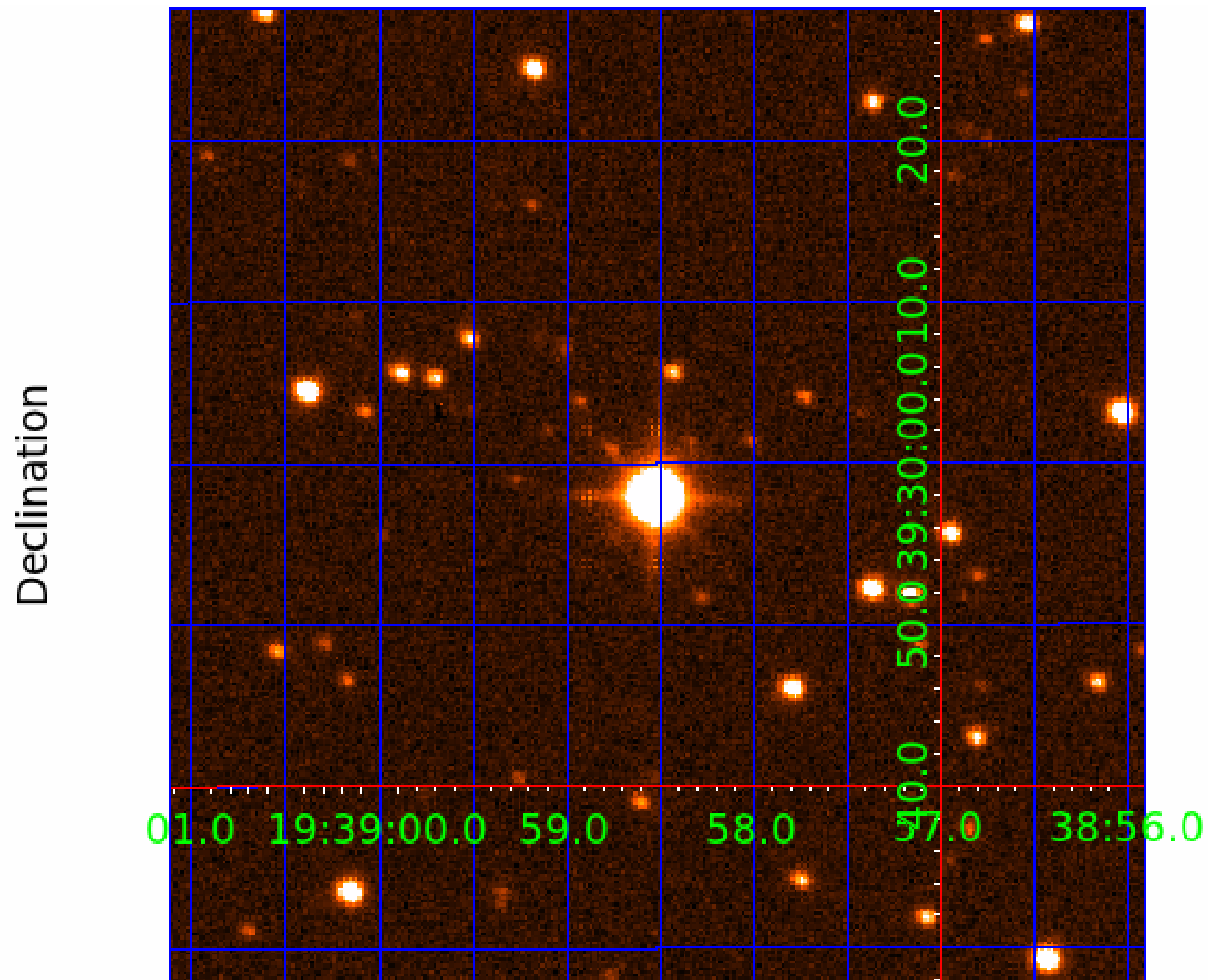
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 3 of 4



UKIRT Image



KIC 004377638

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})
004377638-01	OBS	No	2.821291	131.523948	0.0	10.515	35.6	0.0	3.21	9338	0.00	24324.58
004377638-02	OBS	No	337.036713	193.253677	135.6	13.533	21.8	8.4	3.21	9338	4.16	41.34
004377638-03	OBS	No	2.821679	132.041493	10.5	0.515	7.6	1.7	3.21	9338	1.09	24320.12
004377638-04	OBS	No	441.495510	242.267431	97.5	6.925	8.6	6.4	3.21	9338	3.45	28.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004377638-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
004377638-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_SATURATED
004377638-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—TRANS_GAPPED—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED—HALO_GHOST
004377638-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—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.

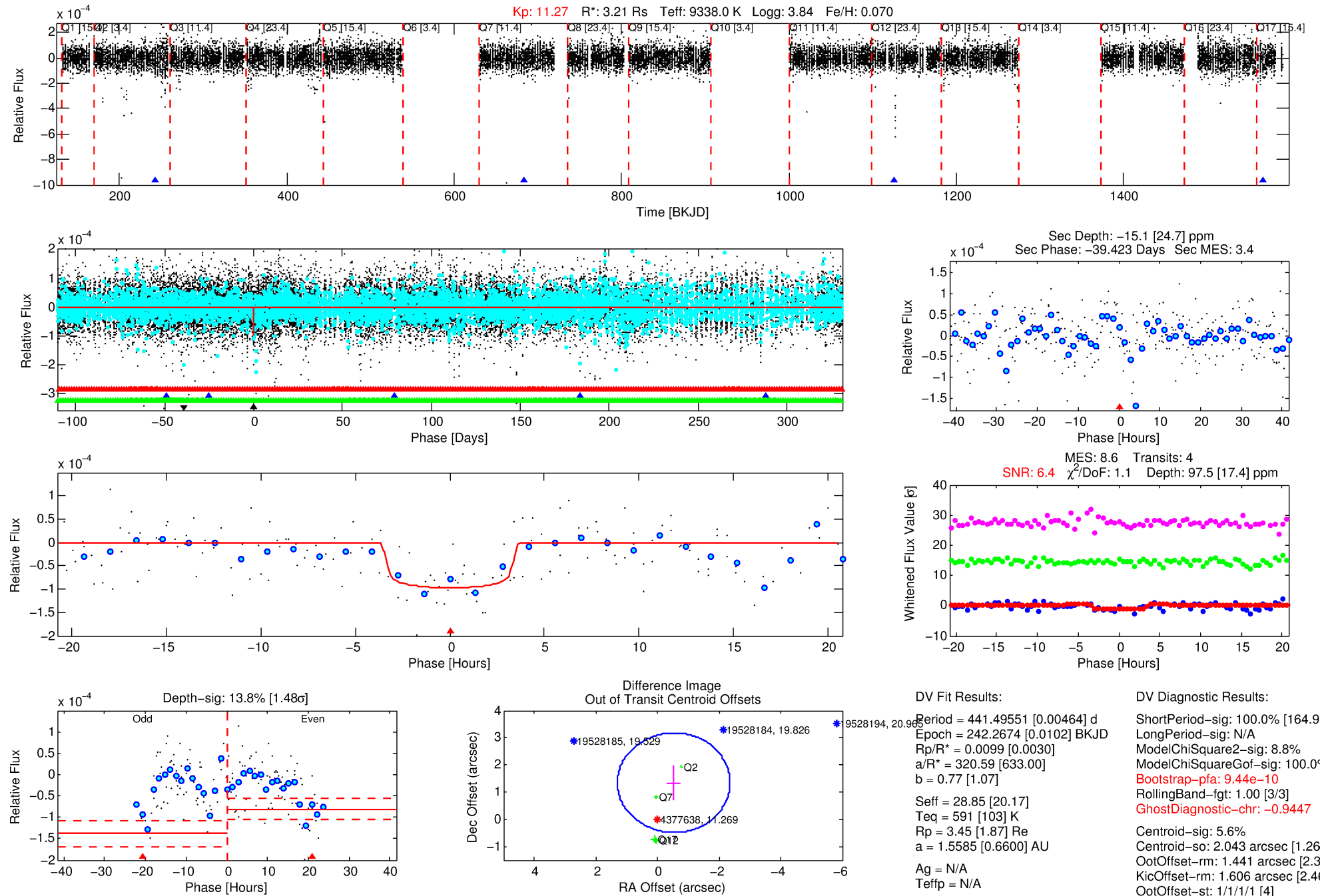
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004377638-04

No Significant Match Found

DV One-Page Summary

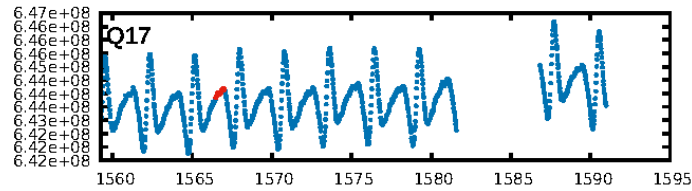
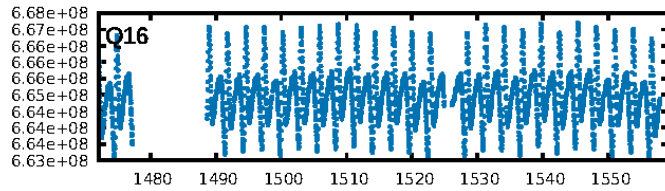
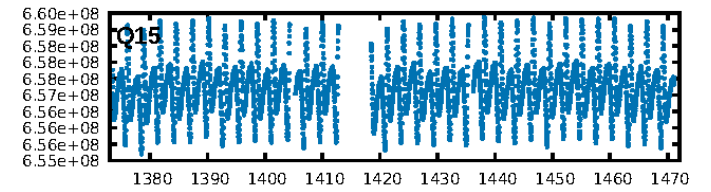
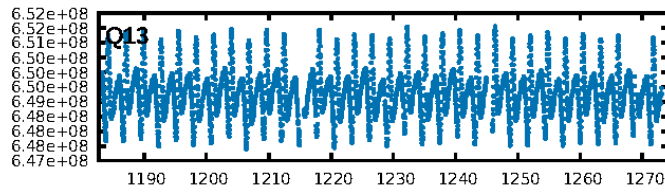
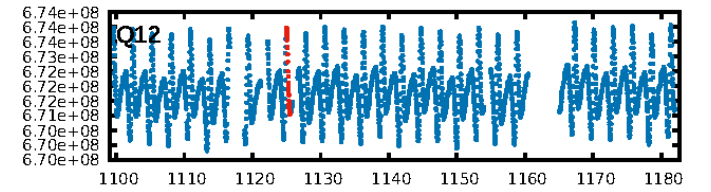
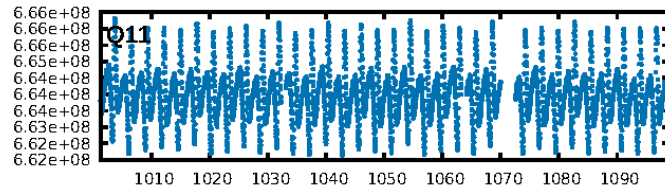
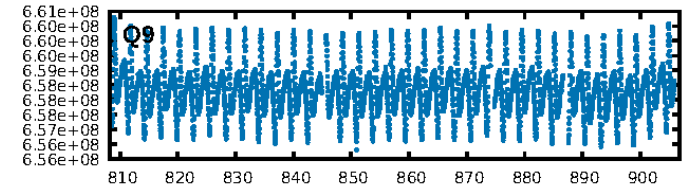
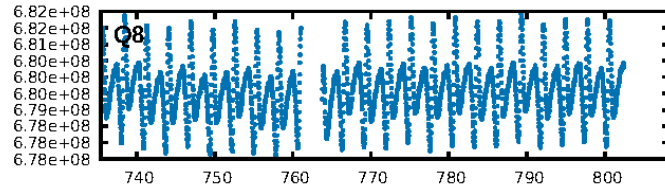
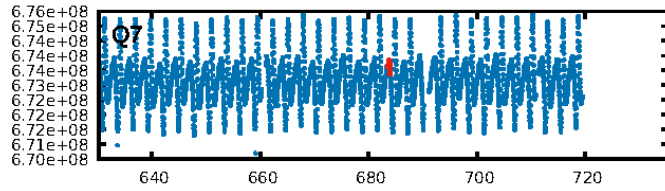
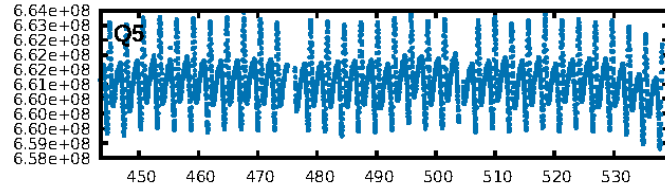
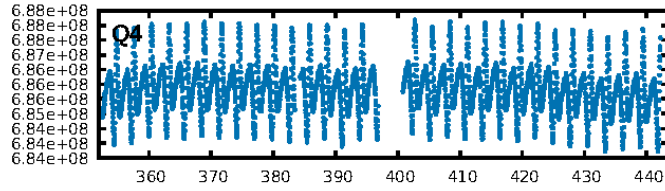
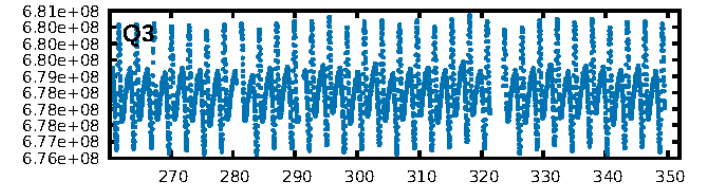
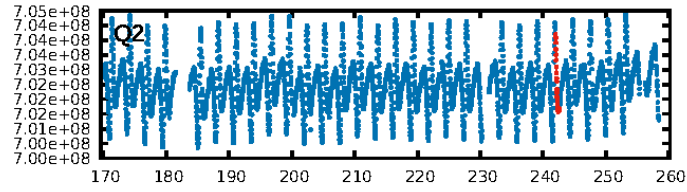
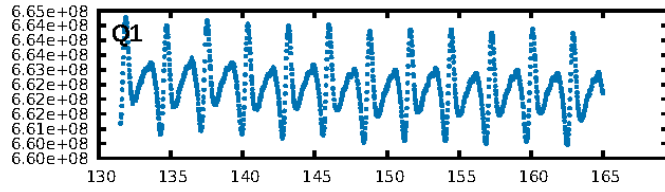
KIC: 4377638 Candidate: 4 of 4 Period: 441.496 d



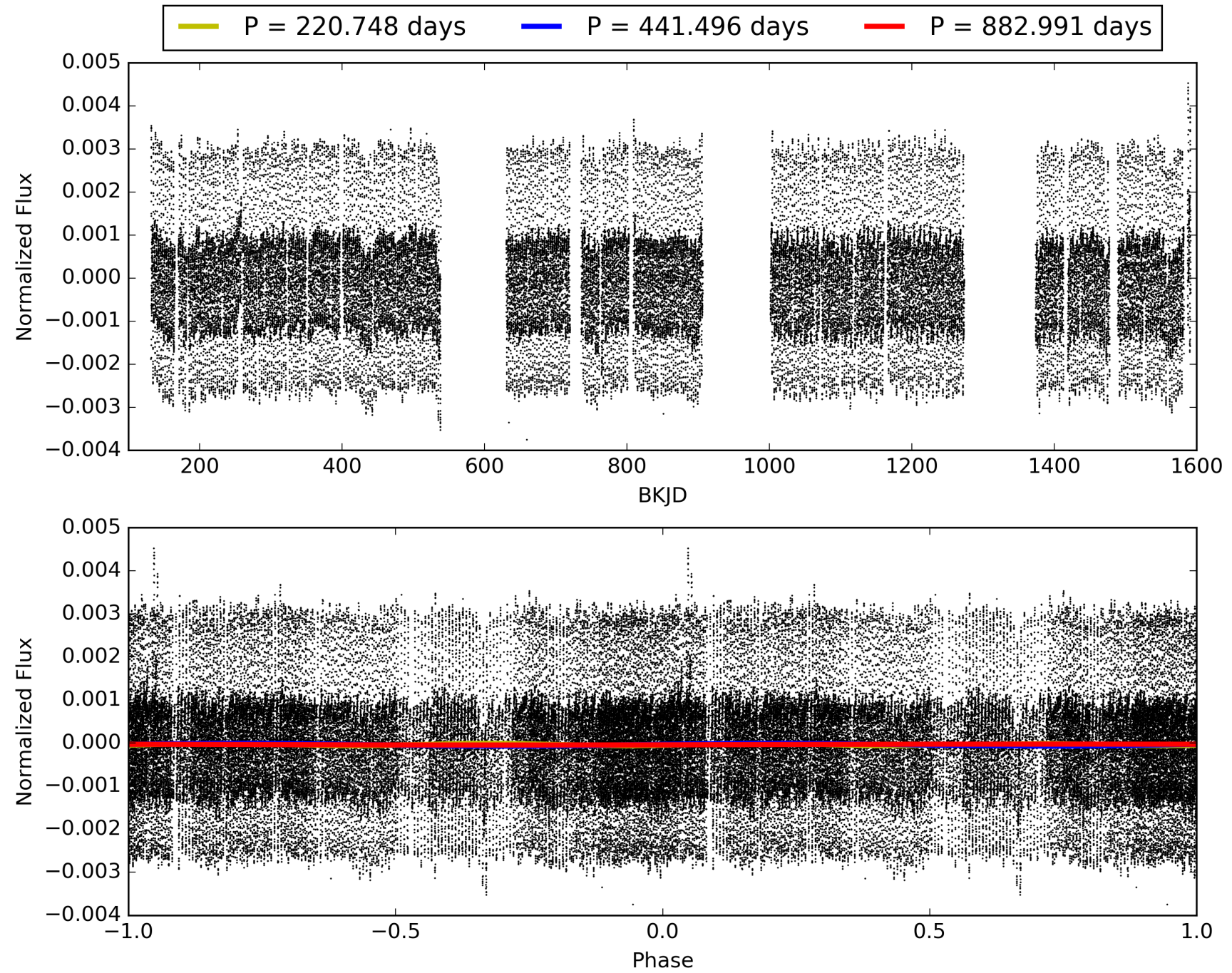
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:31:41 Z

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

TCE 004377638-04, PDC Light Curves

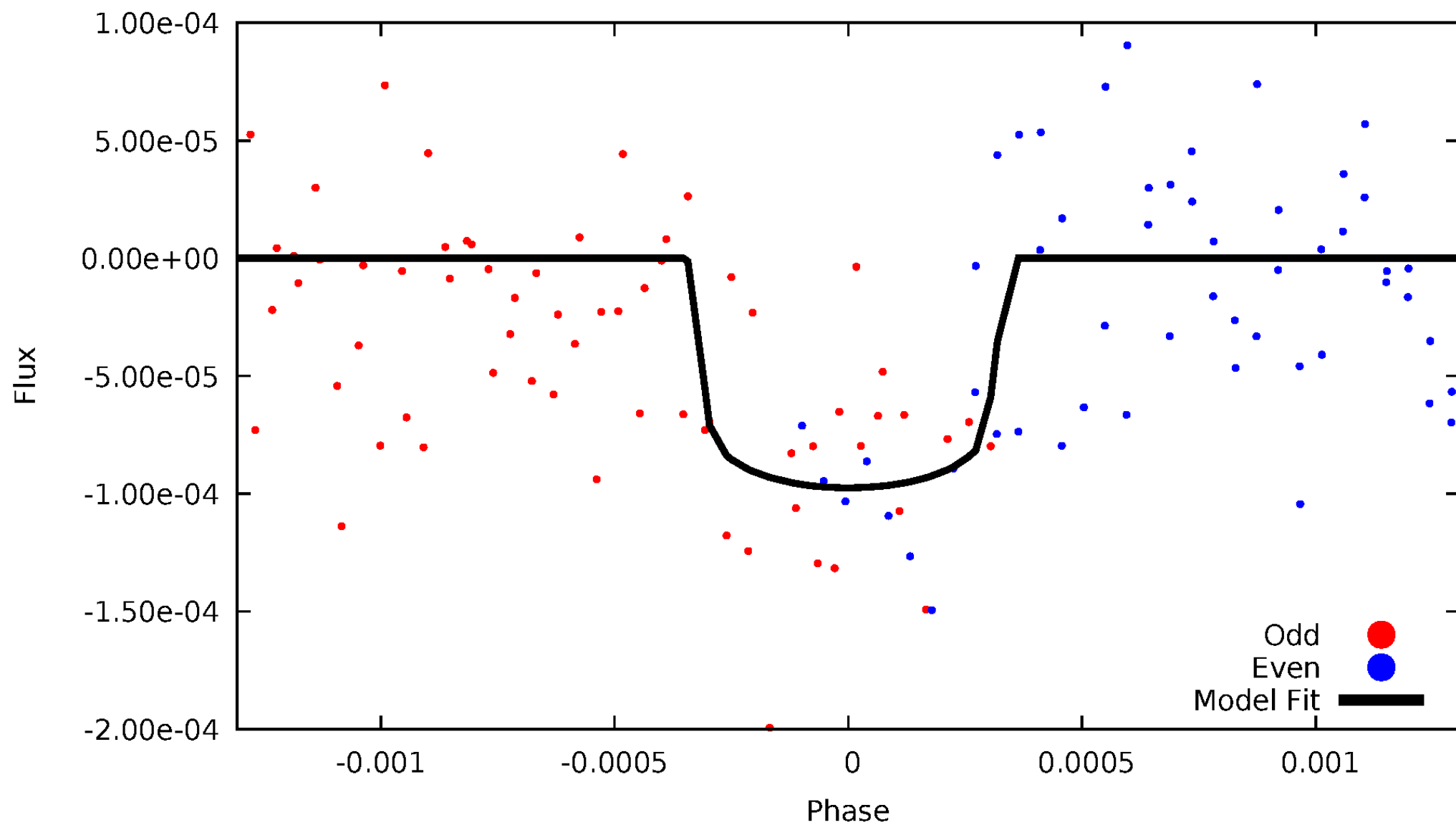


TCE 004377638-04



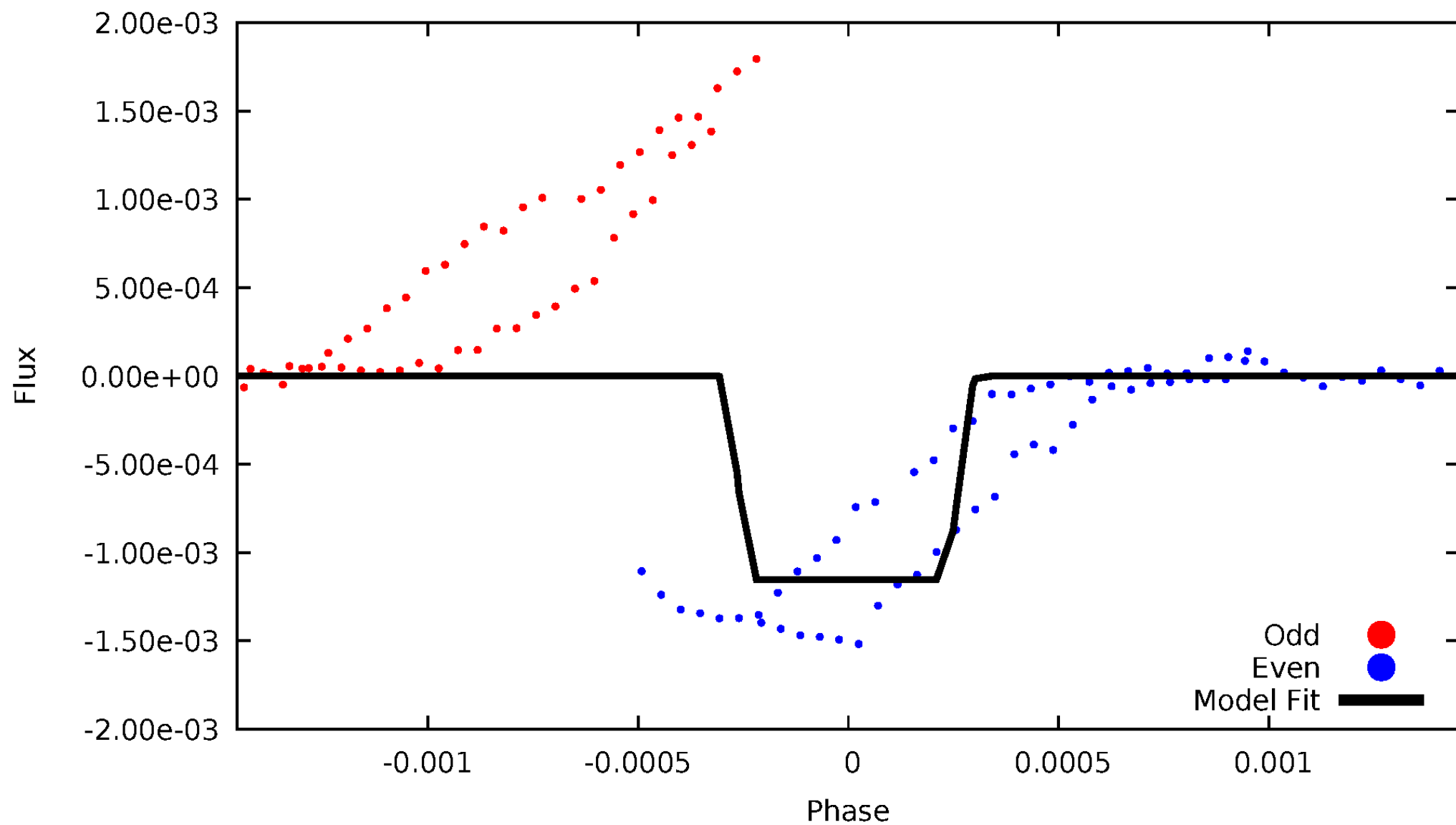
DV Odd/Even

TCE 004377638-04



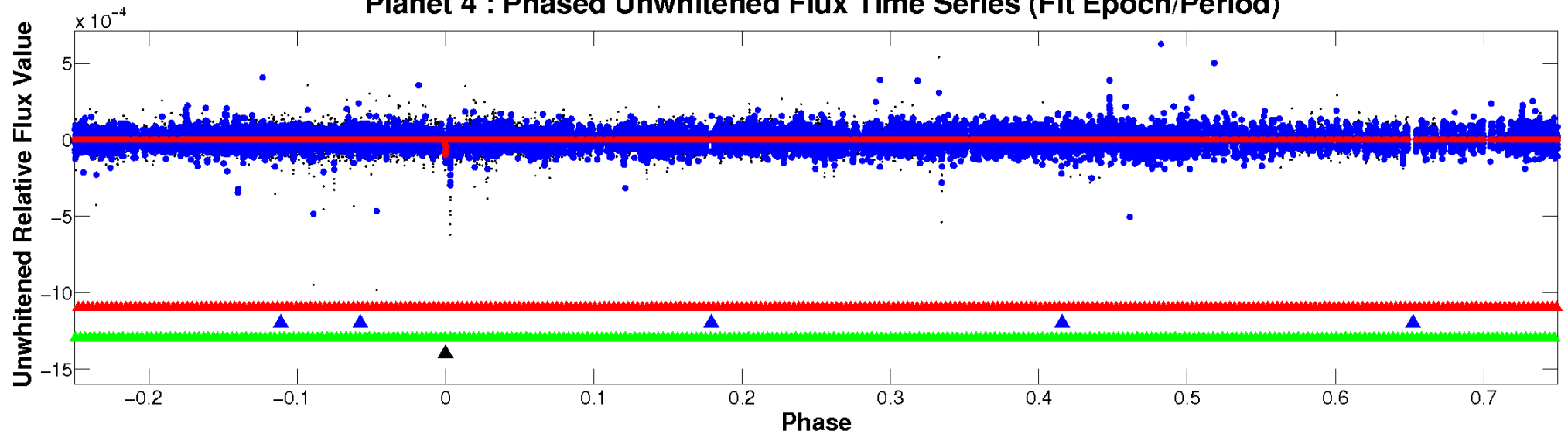
ALT Odd/Even

TCE 004377638-04

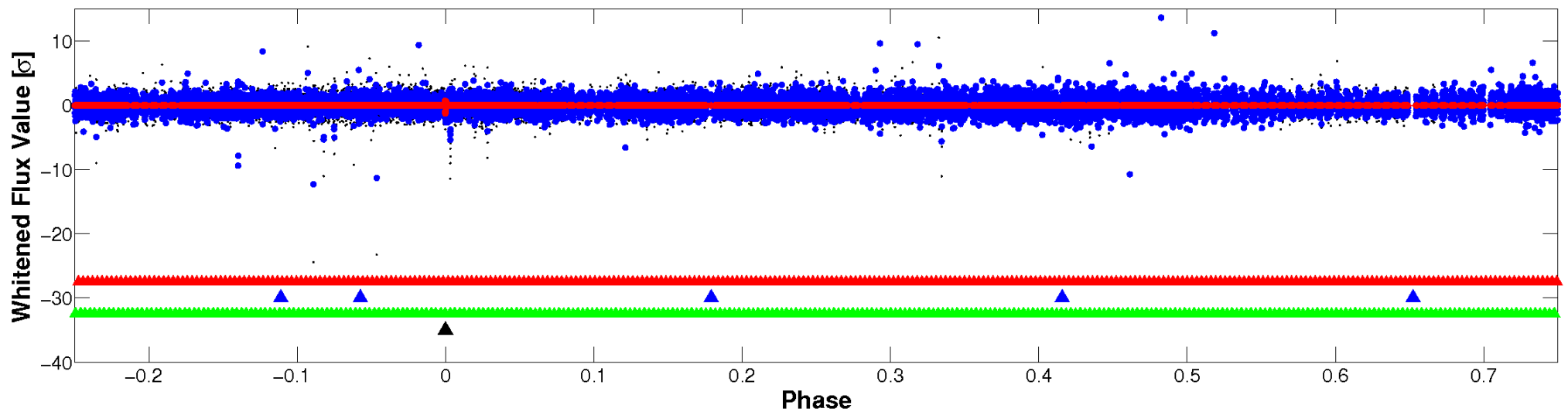


Non-Whitened Vs. Whitened Light Curve

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

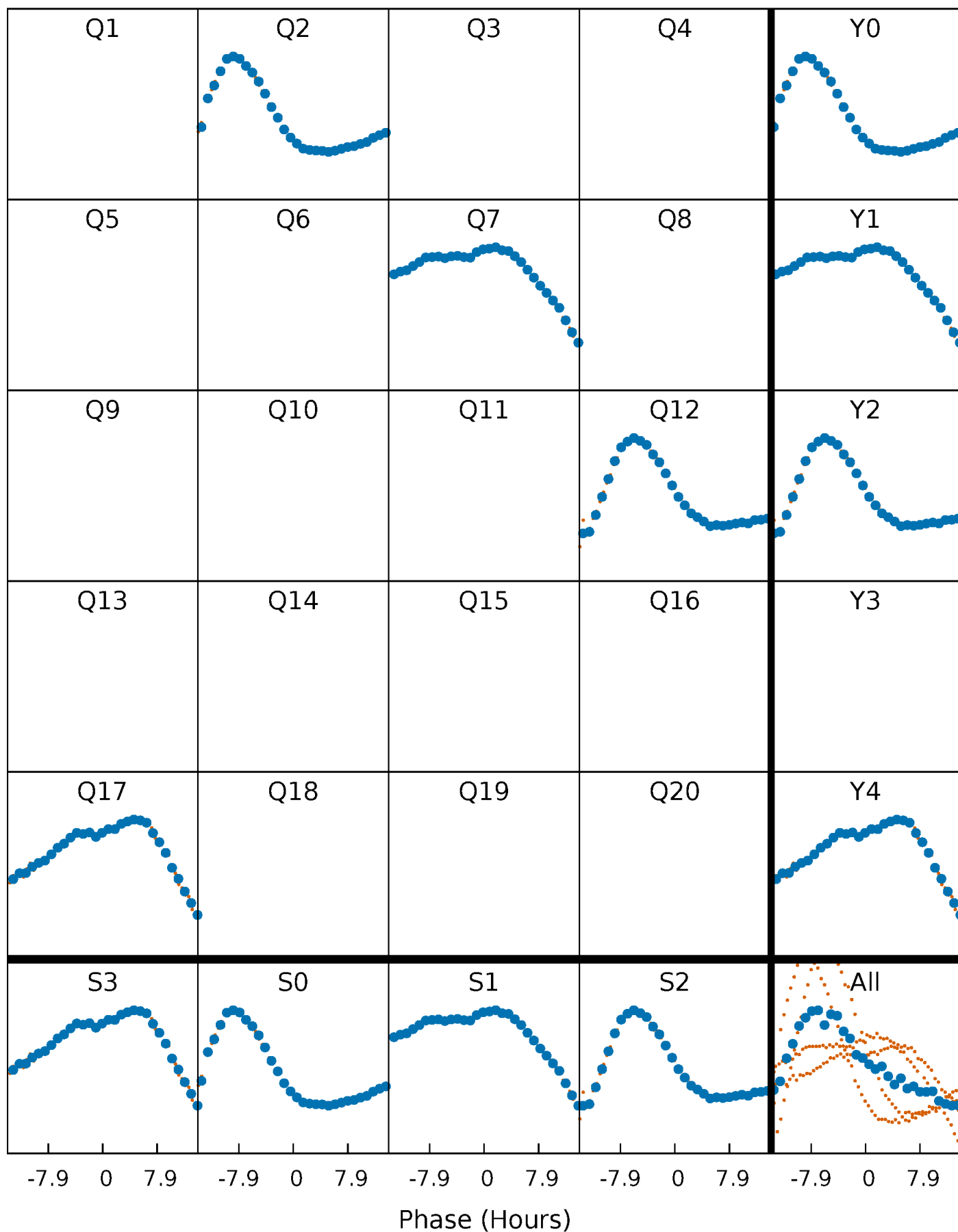


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



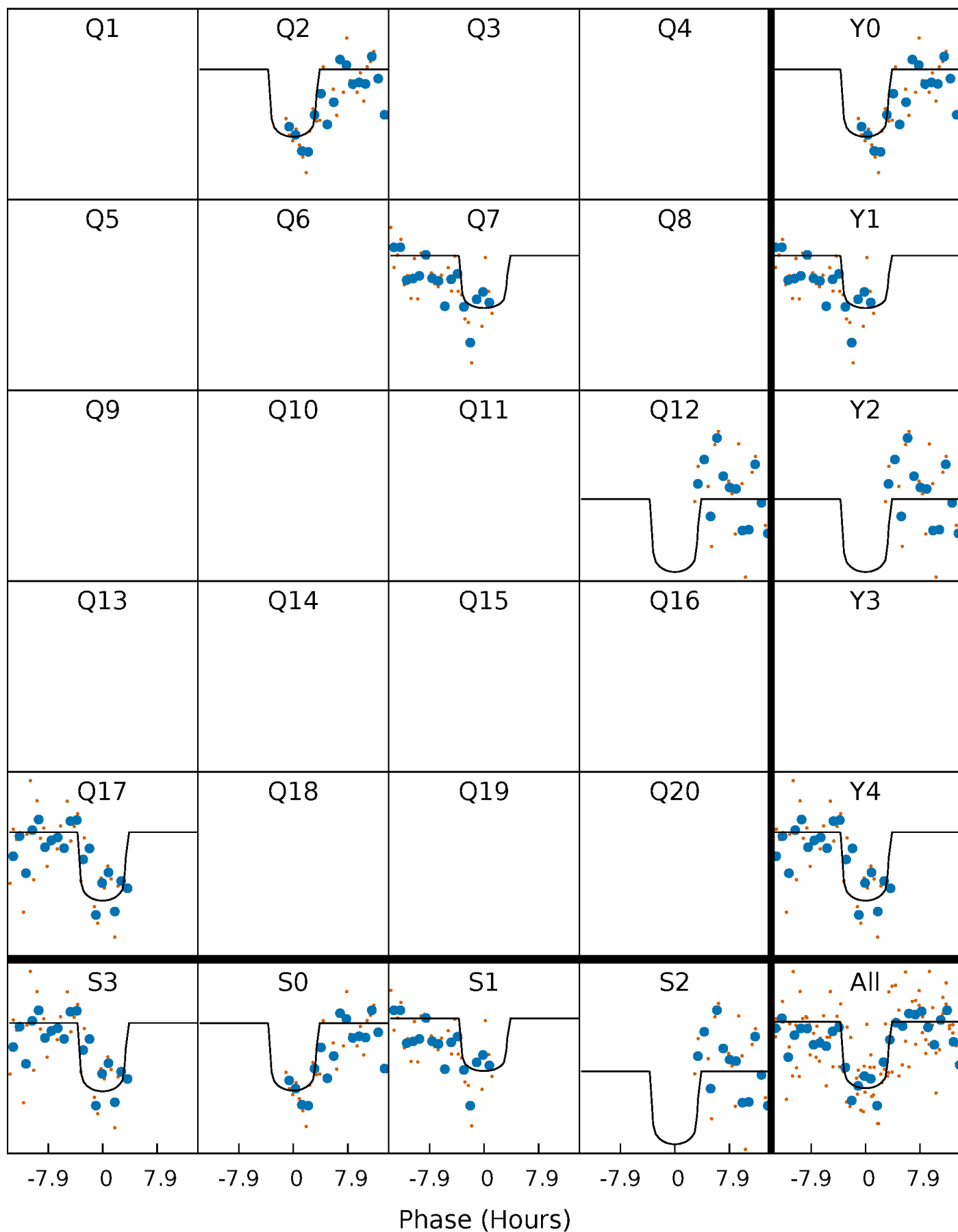
PDC Quarter-Phased Transit Curves

TCE 004377638-04 P=441.495510 Days $T_0=242.267431$ (BKJD)



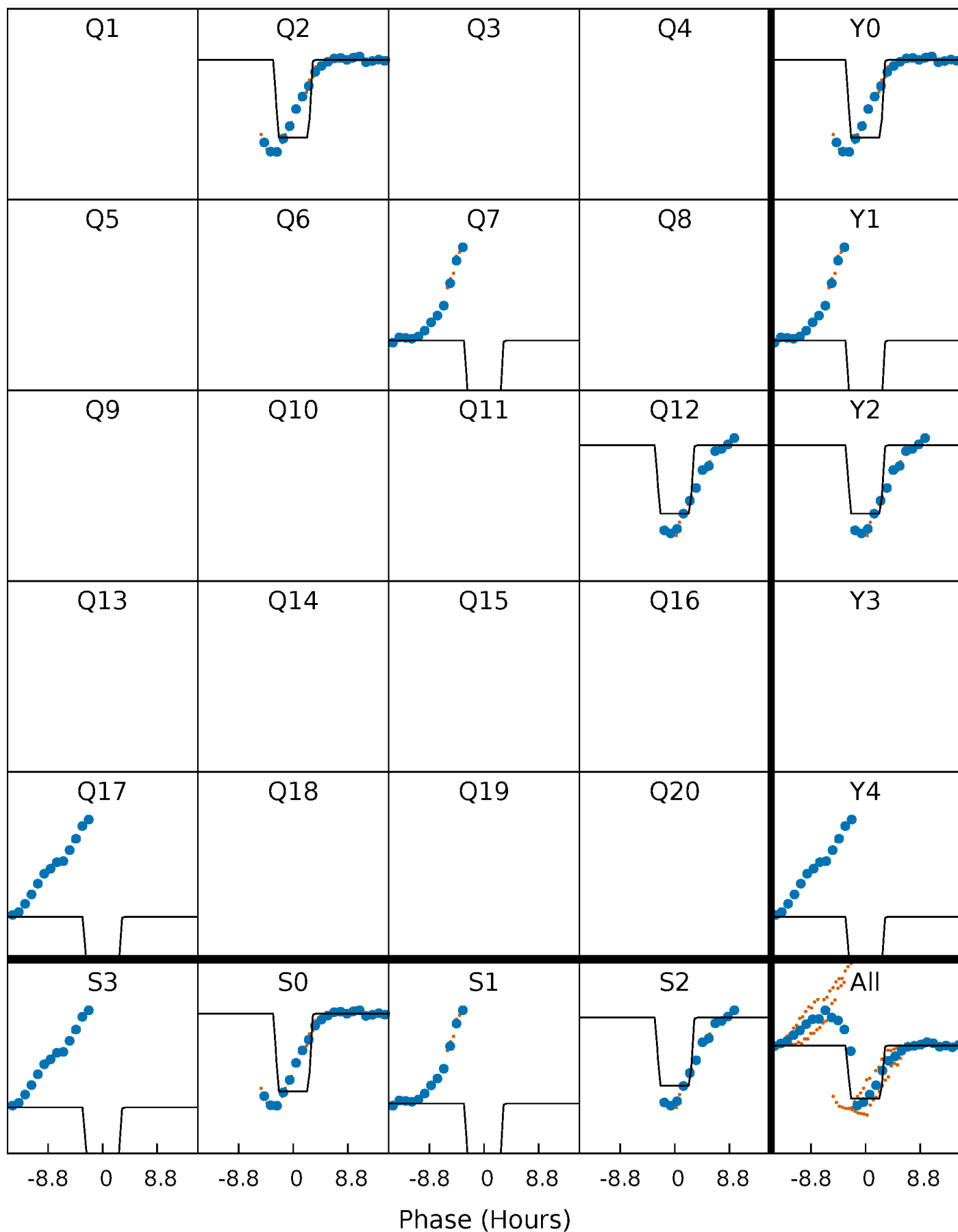
DV Quarter-Phased Transit Curves

TCE 004377638-04 $P=441.495510$ Days $T_0=242.267431$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

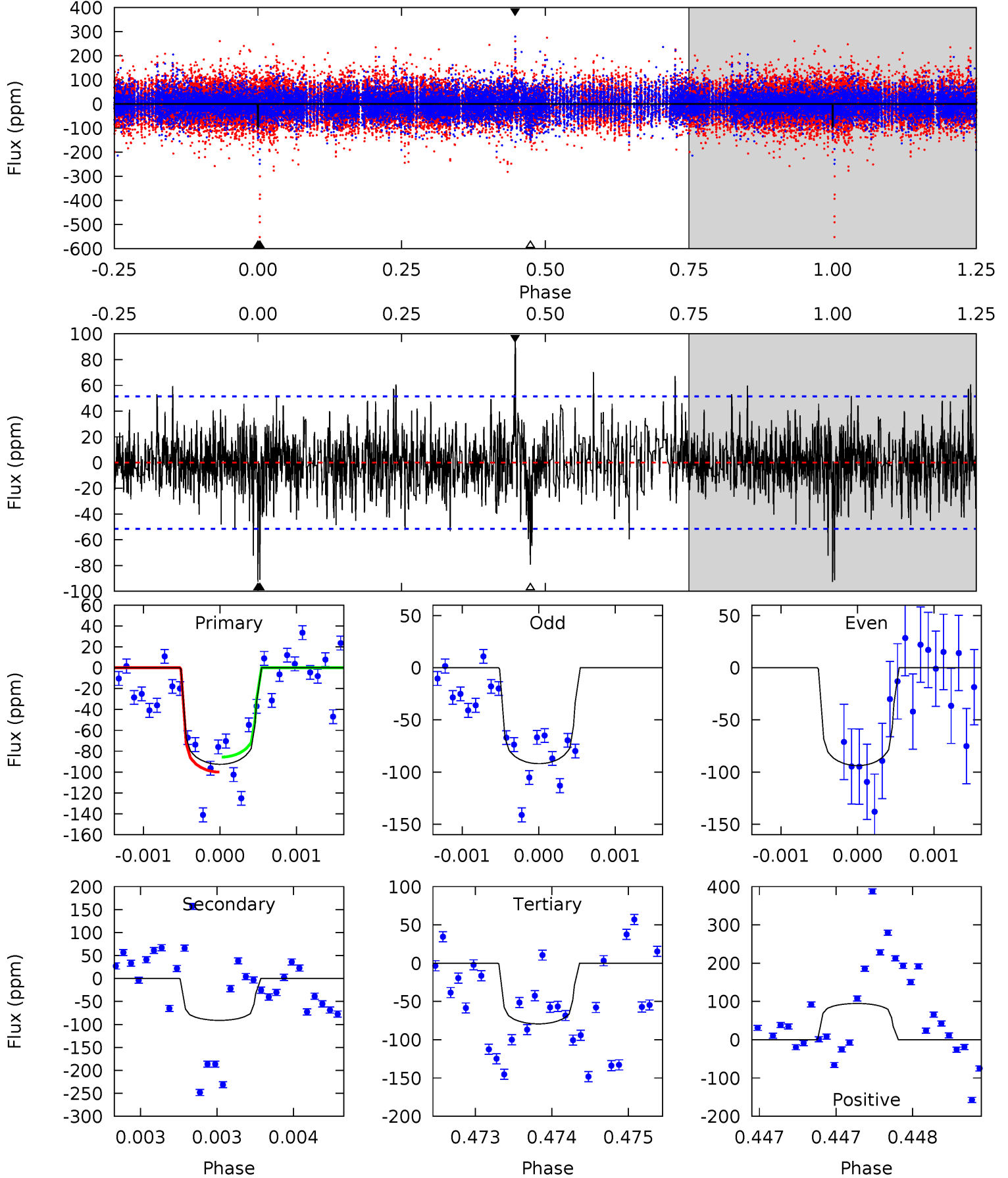
TCE 004377638-04 P=441.514742 Days $T_0=242.440656$ (BKJD)



DV Model-Shift Uniqueness Test

004377638-04, P = 441.495510 Days, E = 242.267431 Days

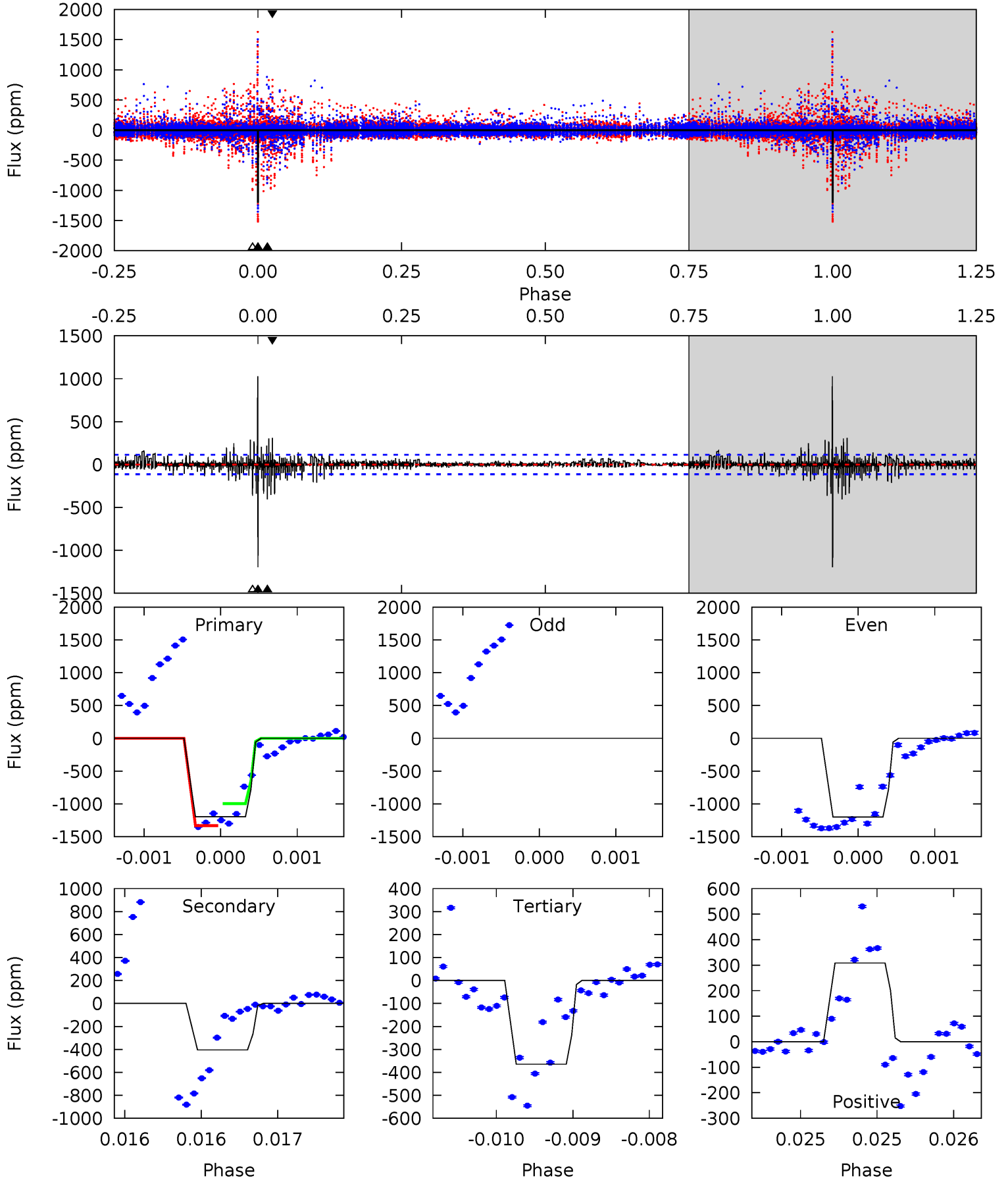
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.93	9.78	8.51	10.2	5.52	3.40	1.83	1.42	-0.23	1.27	-0.38	0.09	0.74	0.51	0.77



Alt Model-Shift Uniqueness Test

004377638-04, P = 441.514742 Days, E = 242.440656 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
57.9	19.6	17.7	14.9	5.53	3.41	1.83	40.2	43.0	1.93	4.64	0	0.05	0.46	7.62



Stellar Parameters For KIC 004377638

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	9338^{+254}_{-471}	$3.839^{+0.390}_{-0.156}$	$0.070^{+0.150}_{-0.750}$	$3.207^{+0.840}_{-1.441}$	$2.587^{+0.316}_{-0.949}$	$0.110^{+0.367}_{-0.052}$
	+3%/-5%	+10%/-4%	+214%/-1071%	+26%/-45%	+12%/-37%	+333%/-47%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004377638-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-91 ± 9	$3.14^{+1.26}_{-1.12}$	801^{+71}_{-85}	9147^{+2745}_{-1545}	11971^{+15082}_{-5905}
Alt.	-404 ± 21	$11.38^{+2.31}_{-2.68}$	808^{+67}_{-91}	6735^{+425}_{-367}	4130^{+2564}_{-1255}

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

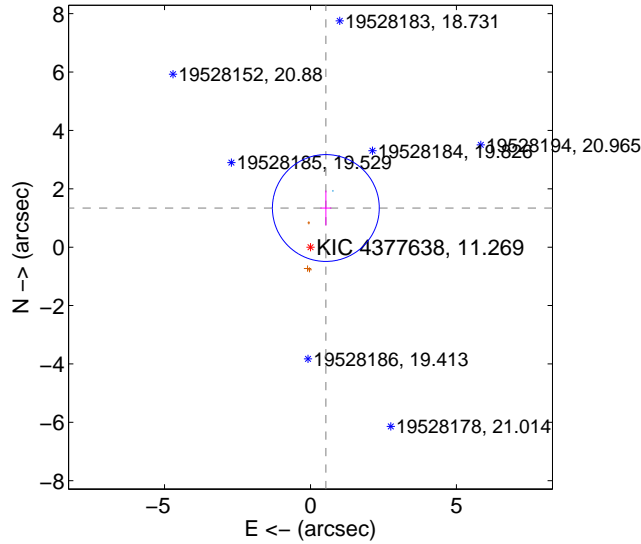
Supplemental centroid analysis for 004377638-04. **Kepler magnitude: 11.27.** Transit SNR 6.35

There are 1 quarters with good PRF difference image offsets

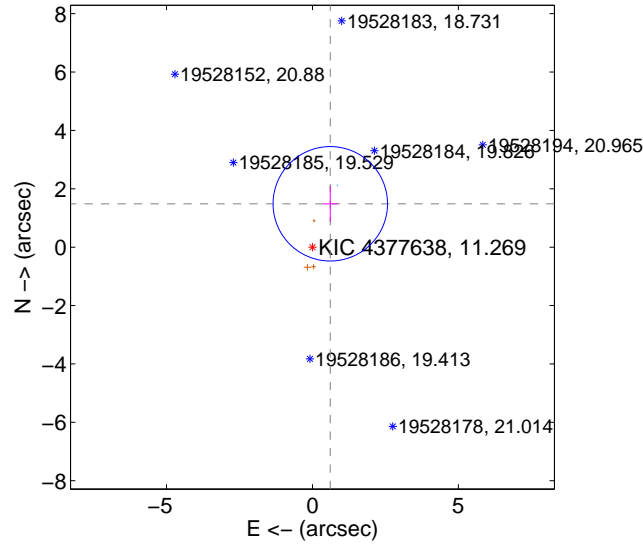
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.441 ± 0.610	2.36	-0.526 ± 0.189	1.341 ± 0.599
PRF-fit source offset from KIC position	1.606 ± 0.653	2.46	-0.611 ± 0.244	1.485 ± 0.616
photometric centroid source offset	2.04 ± 1.62	1.26	-0.55 ± 1.43	1.97 ± 1.63

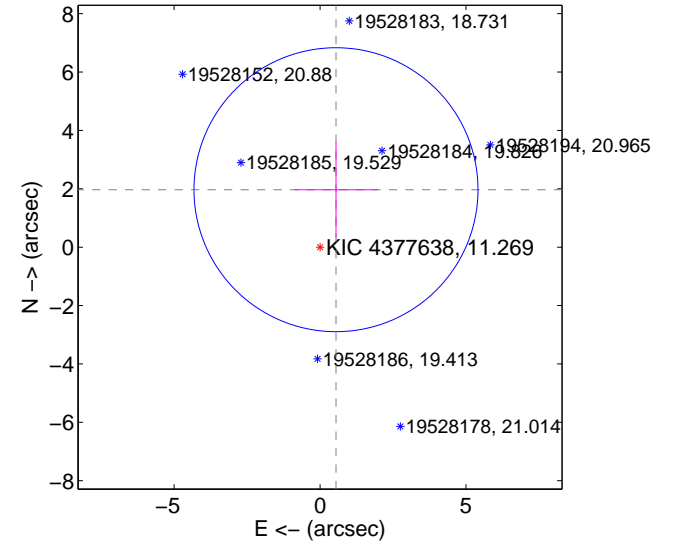
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

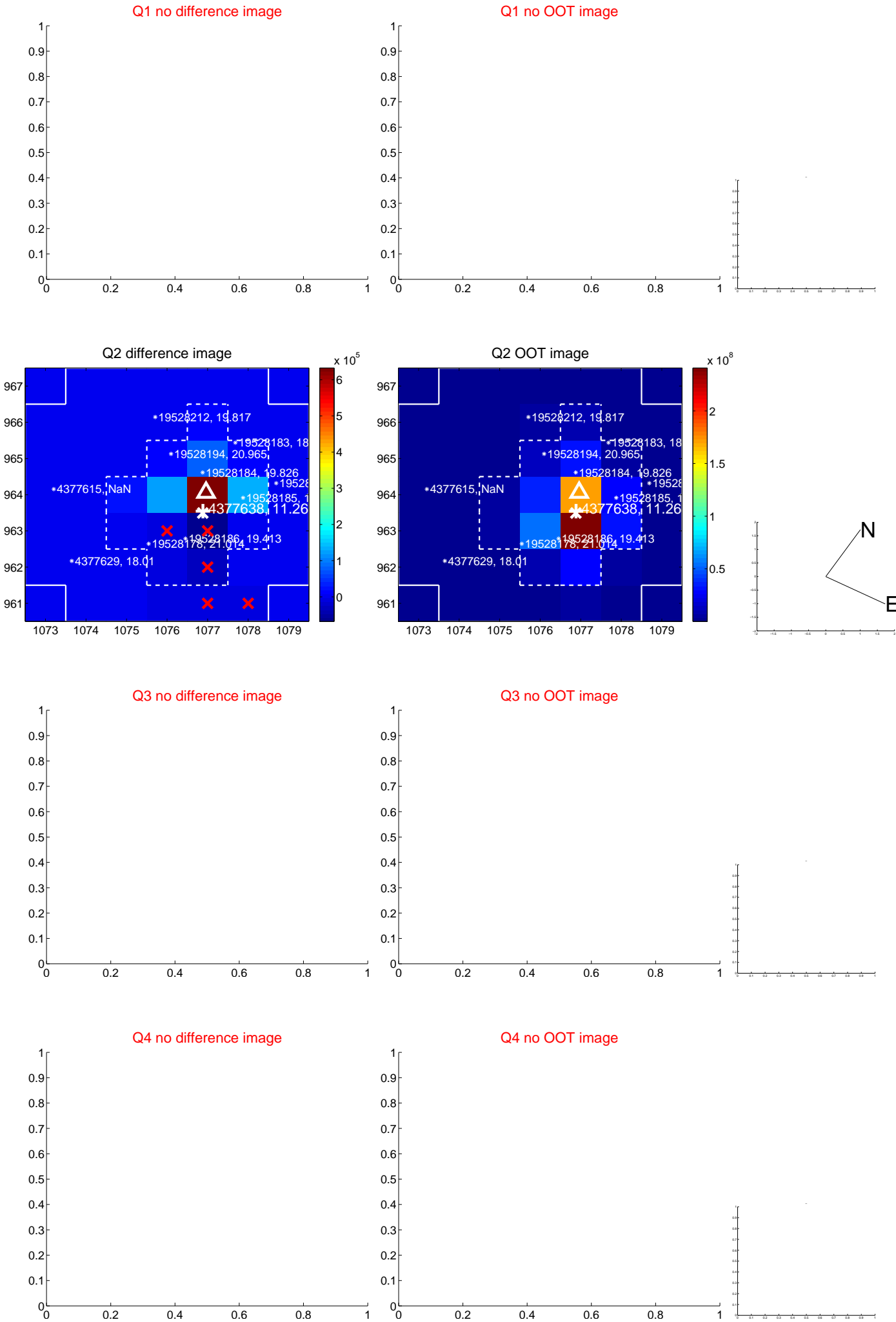


offset from photometric centroids

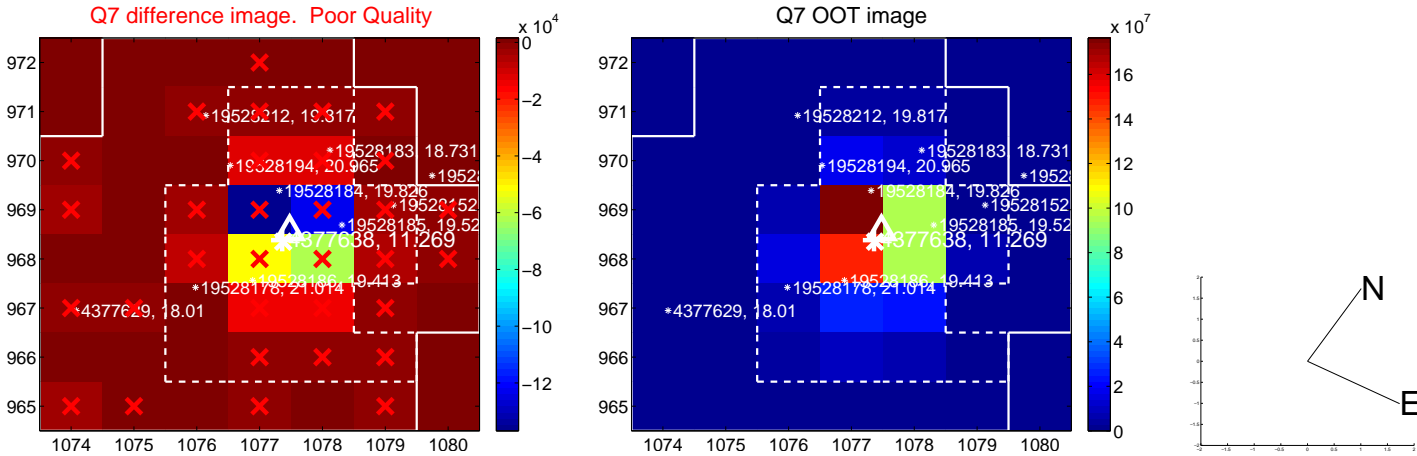


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

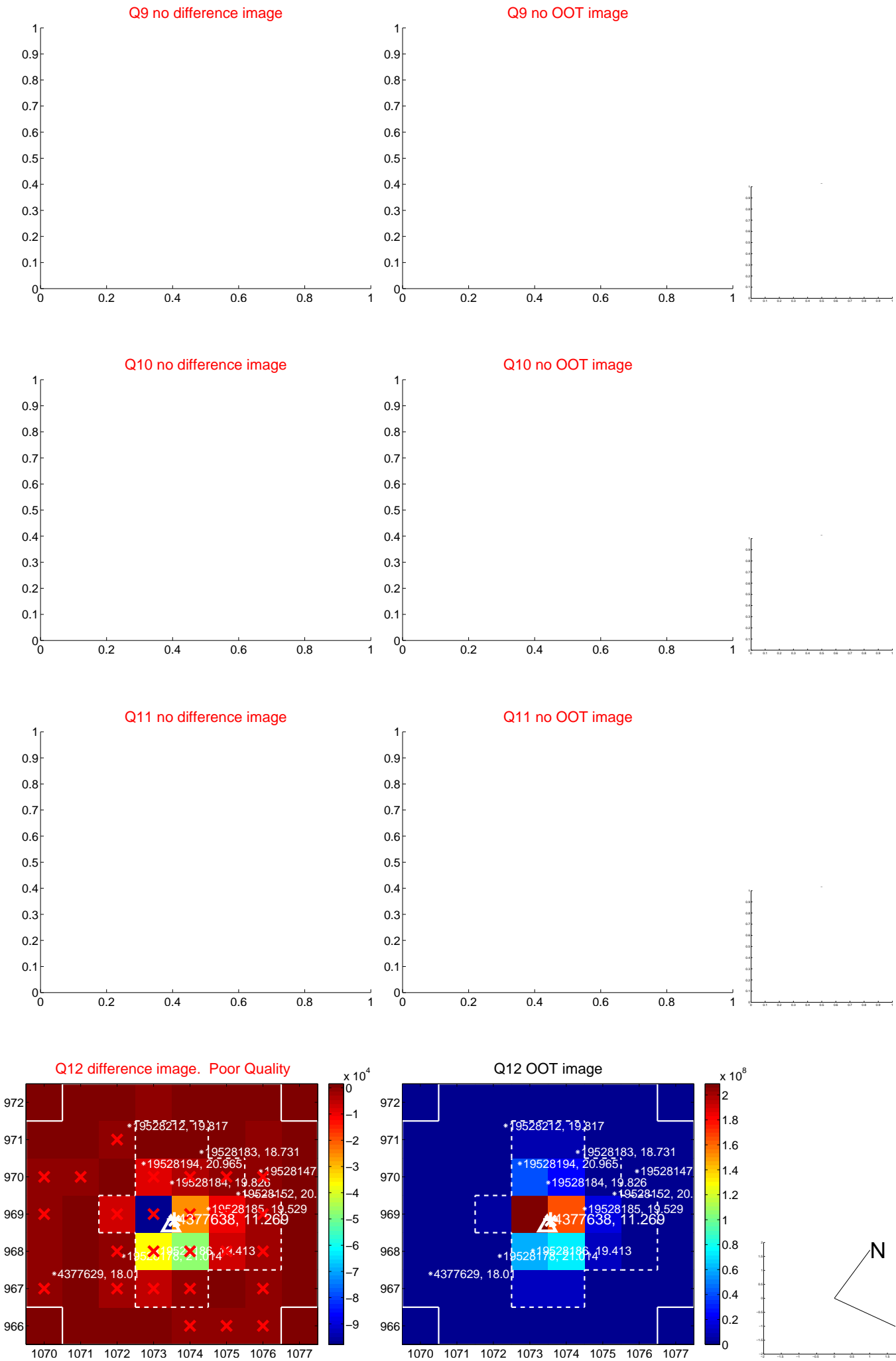
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



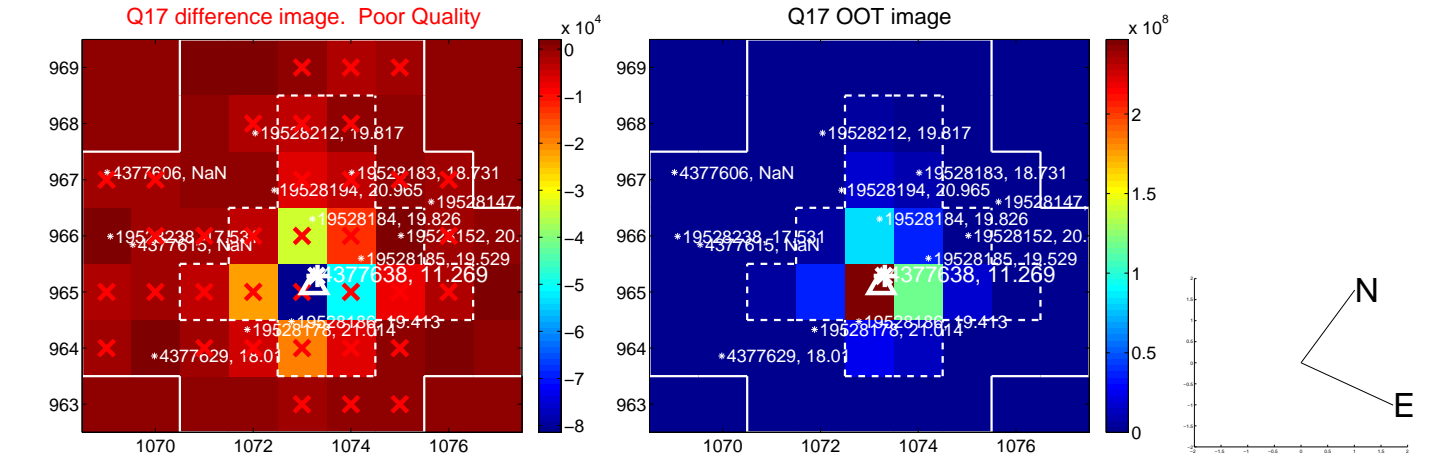
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



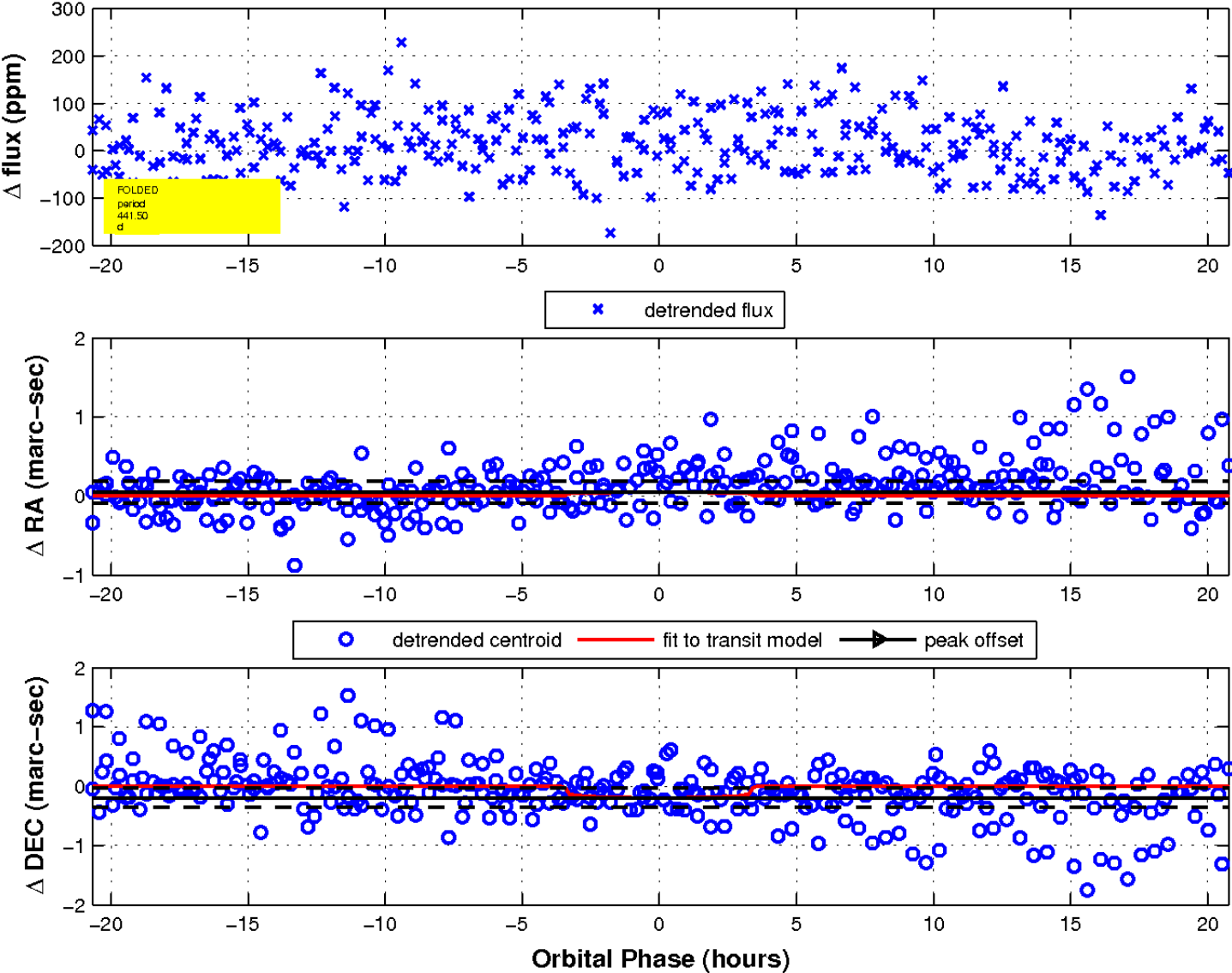
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

