

KIC 005220979

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})
005220979-01	OBS	No	1.525545	131.939085	55.6	3.924	8.8	9.1	1.57	7243	1.34	7247.51
005220979-02	OBS	No	305.657247	337.106427	761.1	7.516	8.7	8.1	1.57	7243	5.13	6.18
005220979-03	OBS	No	4.610258	133.813783	46.3	14.171	7.7	6.4	1.57	7243	1.15	1658.78
005220979-04	OBS	No	122.082853	227.858803	361.0	11.916	8.3	4.5	1.57	7243	3.21	21.02
005220979-05	OBS	No	75.159273	173.397799	414.2	3.164	7.6	6.5	1.57	7243	3.59	40.13

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005220979-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
005220979-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005220979-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005220979-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005220979-05	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

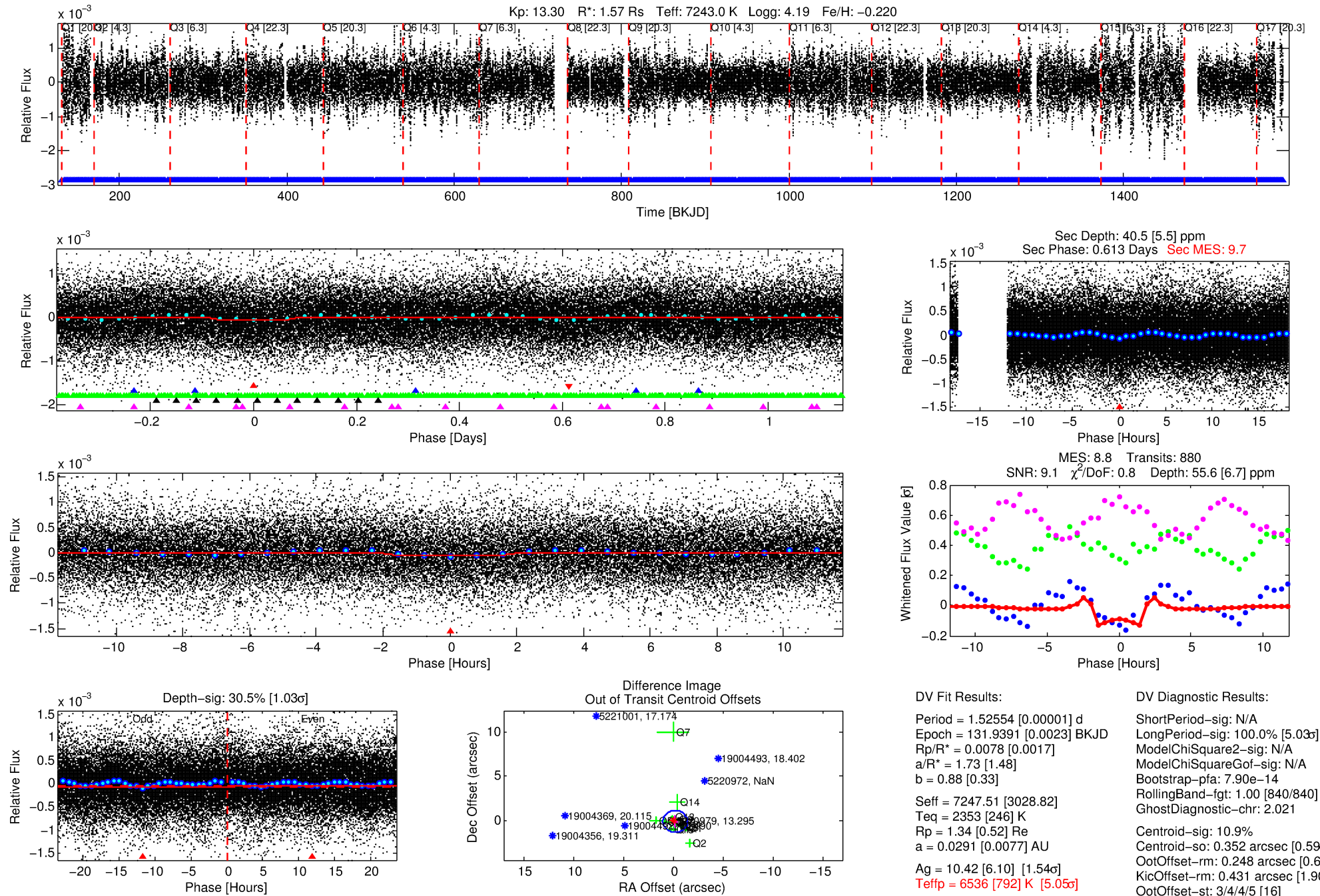
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005220979-01

No Significant Match Found

DV One-Page Summary

KIC: 5220979 Candidate: 1 of 5 Period: 1.526 d



DV Fit Results:

Period = 1.52554 [0.00001] d
Epoch = 131.9391 [0.0023] BKJD
Rp/R* = 0.0078 [0.0017]
a/R* = 1.73 [1.48]
b = 0.88 [0.33]
Seff = 7247.51 [3028.82]
Teq = 2353 [246] K
Rp = 1.34 [0.52] Re
a = 0.0291 [0.0077] AU
Ag = 10.42 [6.10] [1.54 σ]
Teffp = 6536 [792] K [5.05 σ]

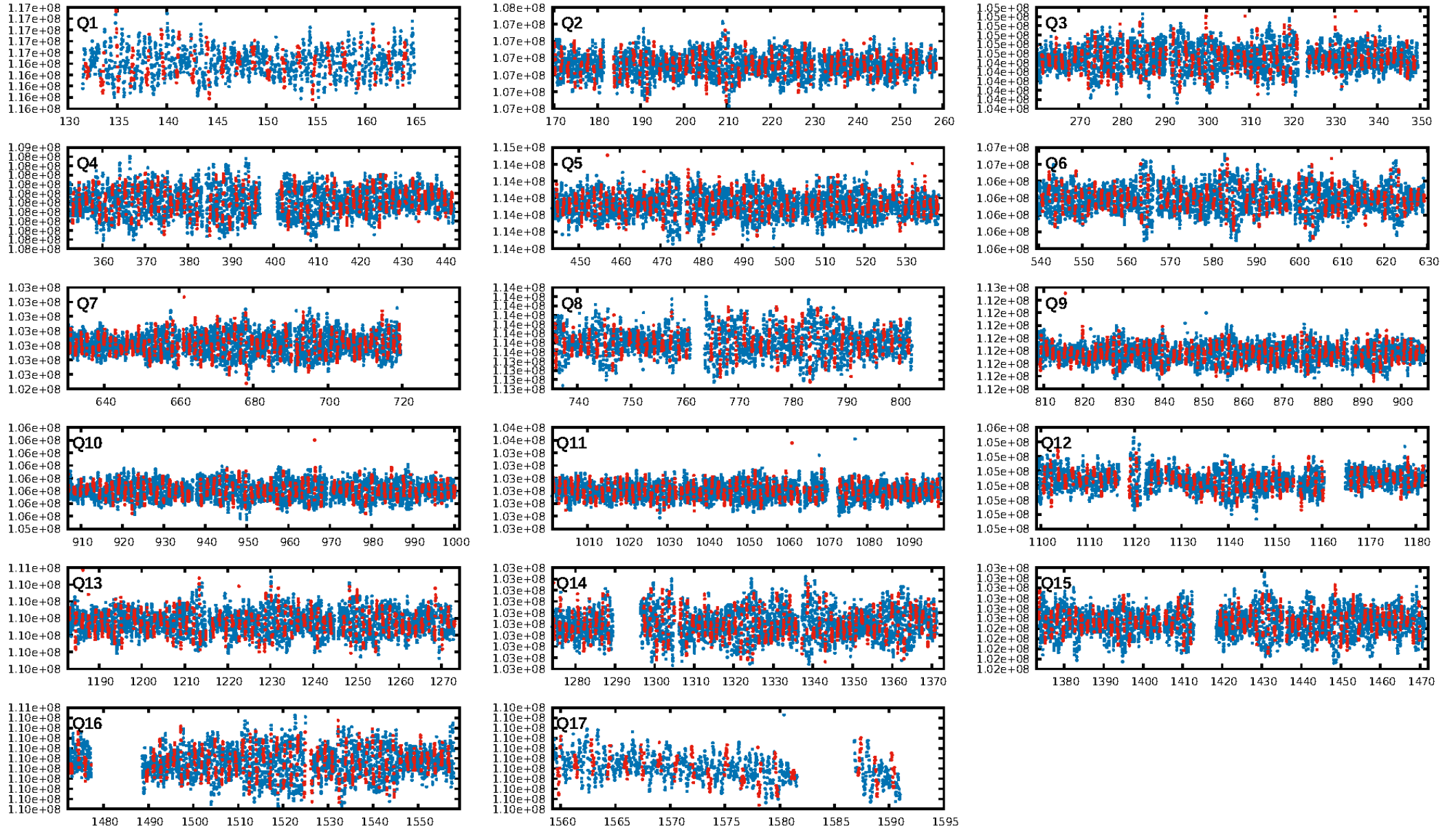
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [5.03 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 7.90e-14
RollingBand-fgt: 1.00 [840/840]
GhostDiagnostic-chr: 2.021
Centroid-sig: 10.9%
Centroid-so: 0.352 arcsec [0.59 σ]
OotOffset-rm: 0.248 arcsec [0.60 σ]
KicOffset-rm: 0.431 arcsec [1.90 σ]
OotOffset-st: 3/4/4/5 [16]
KicOffset-st: 3/4/4/5 [16]
DiffImageQuality-fgm: 0.38 [6/16]
DiffImageOverlap-fno: 1.00 [17/17]

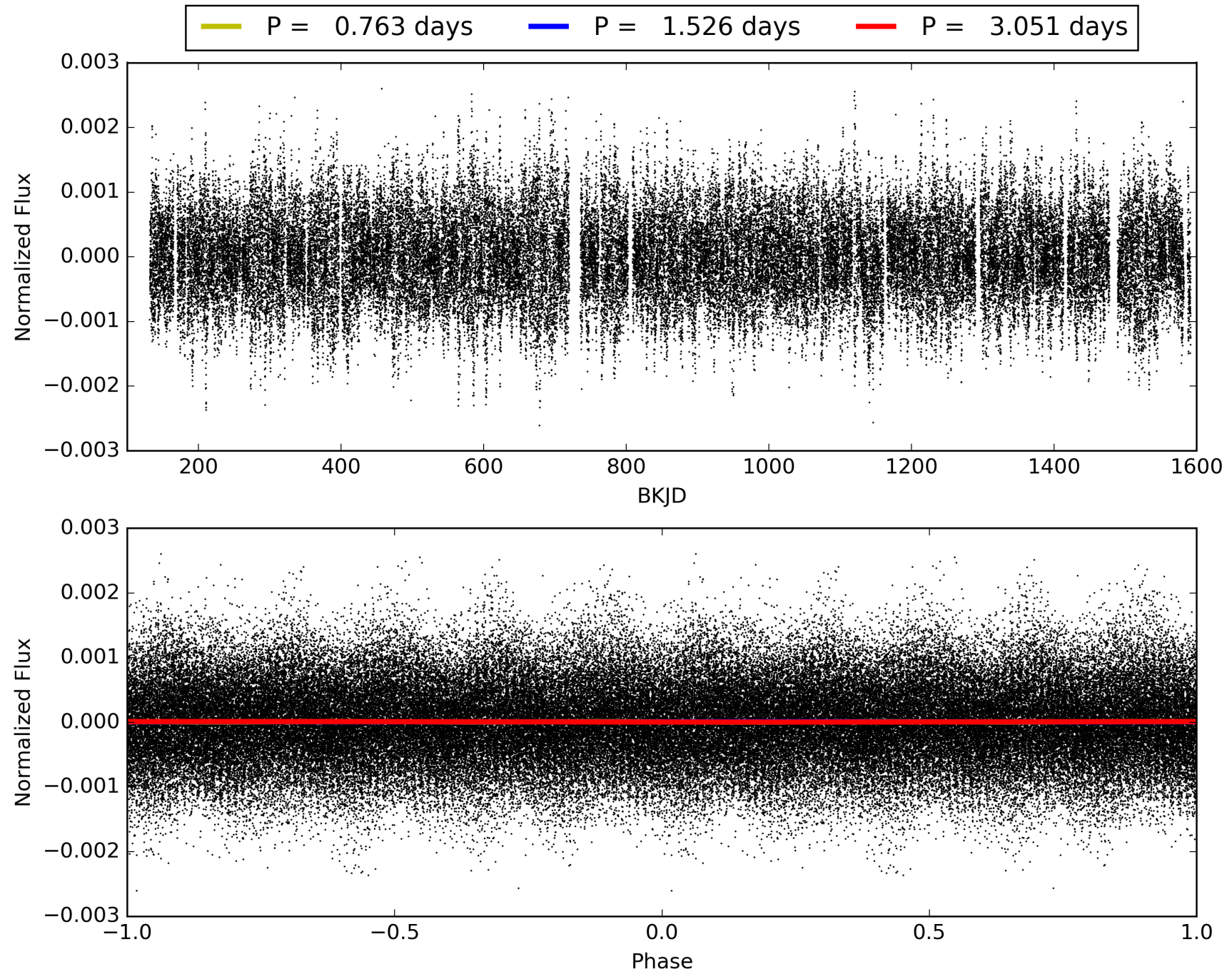
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:37:11 Z

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

TCE 005220979-01, PDC Light Curves

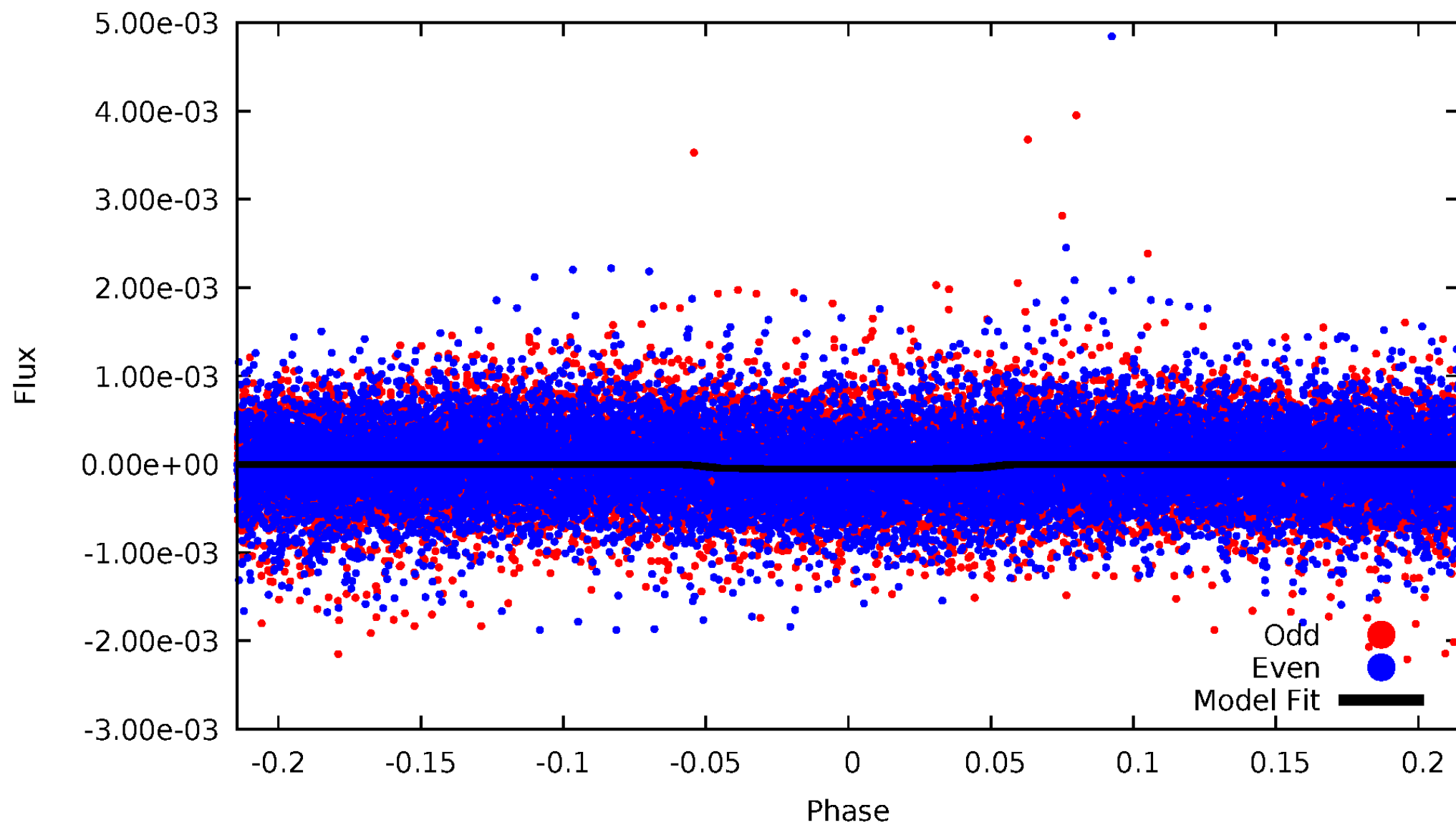


TCE 005220979-01



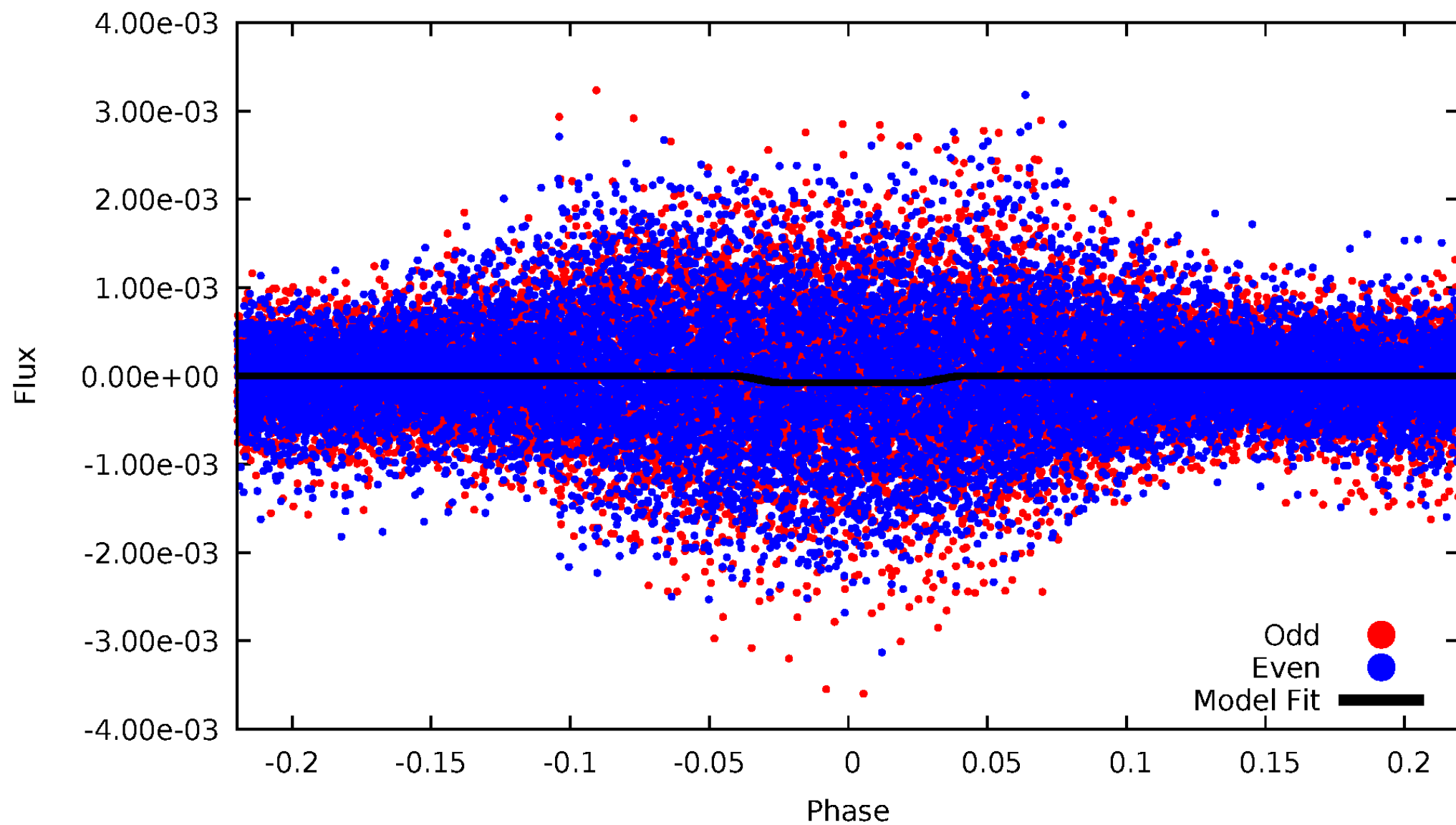
DV Odd/Even

TCE 005220979-01

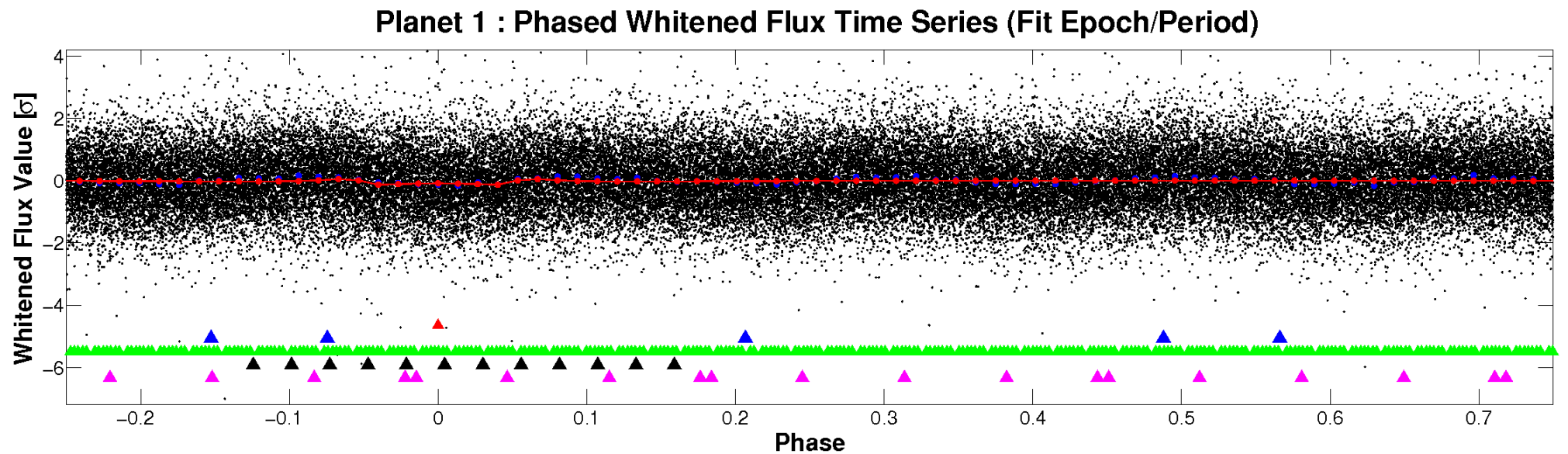
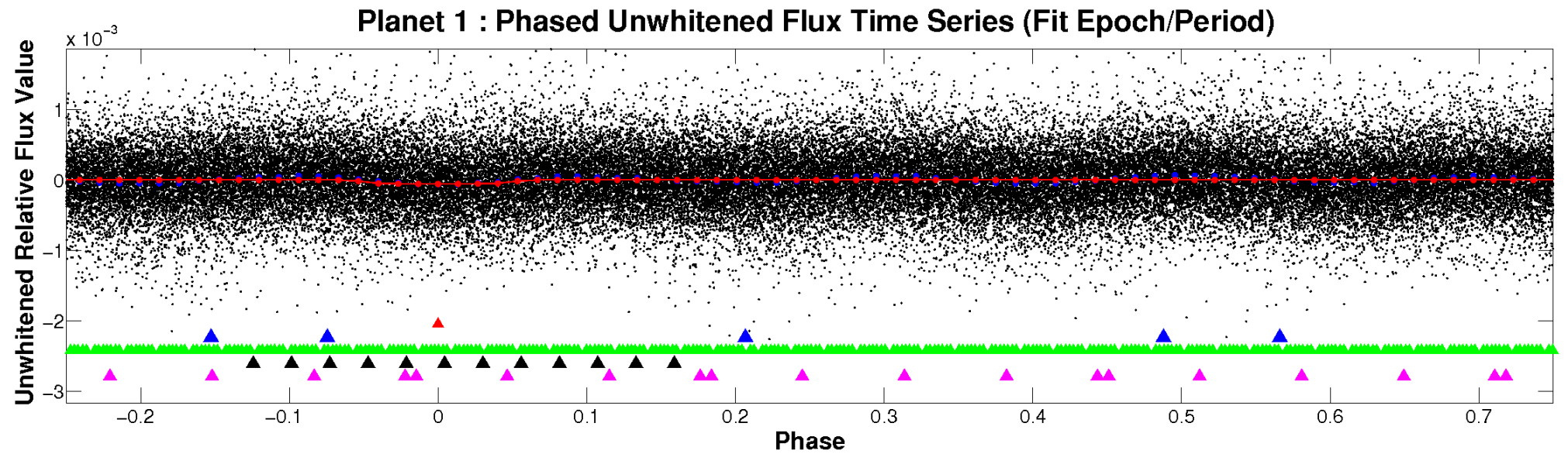


ALT Odd/Even

TCE 005220979-01

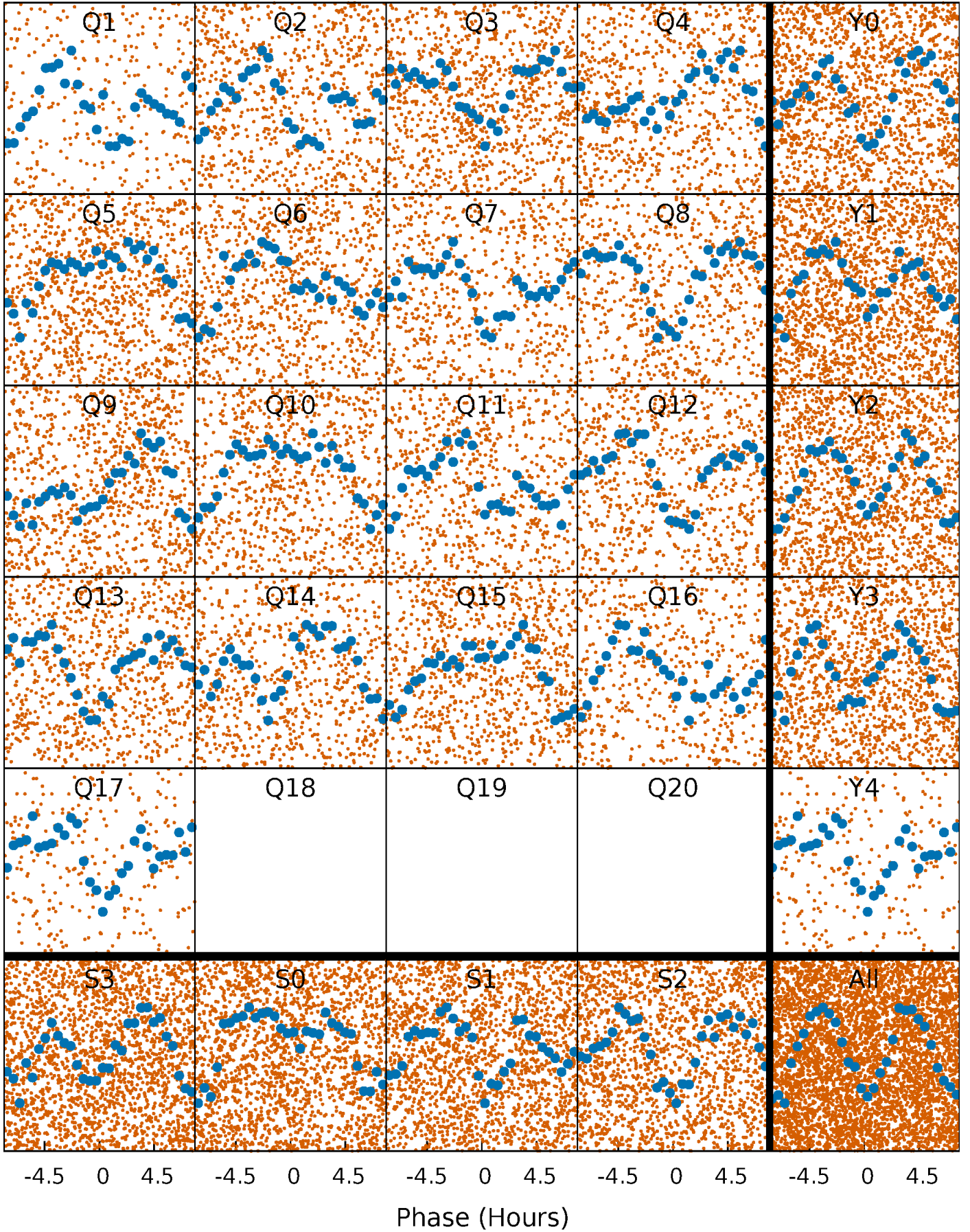


Non-Whitened Vs. Whitened Light Curve



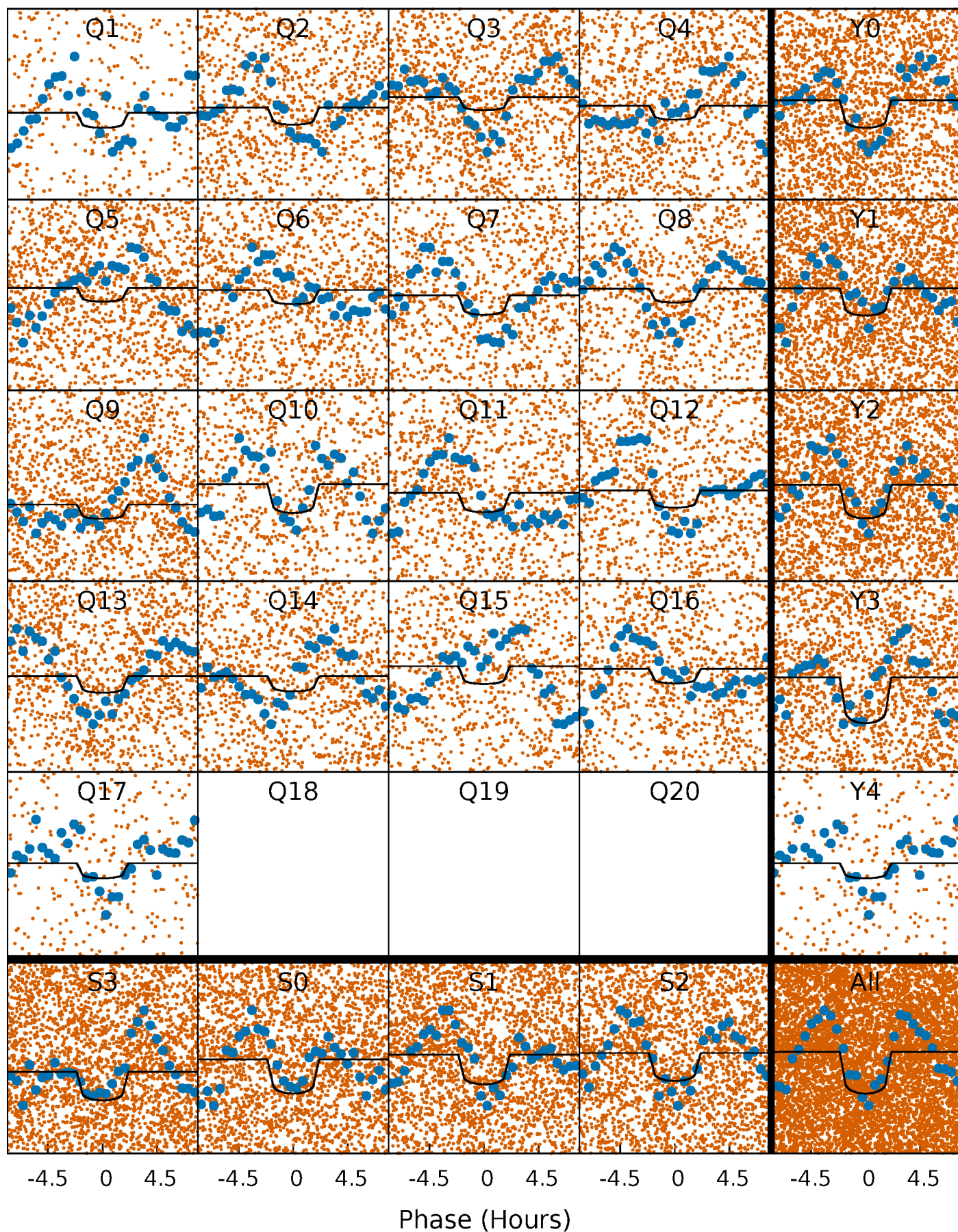
PDC Quarter-Phased Transit Curves

TCE 005220979-01 P= 1.525545 Days $T_0=131.939085$ (BKJD)



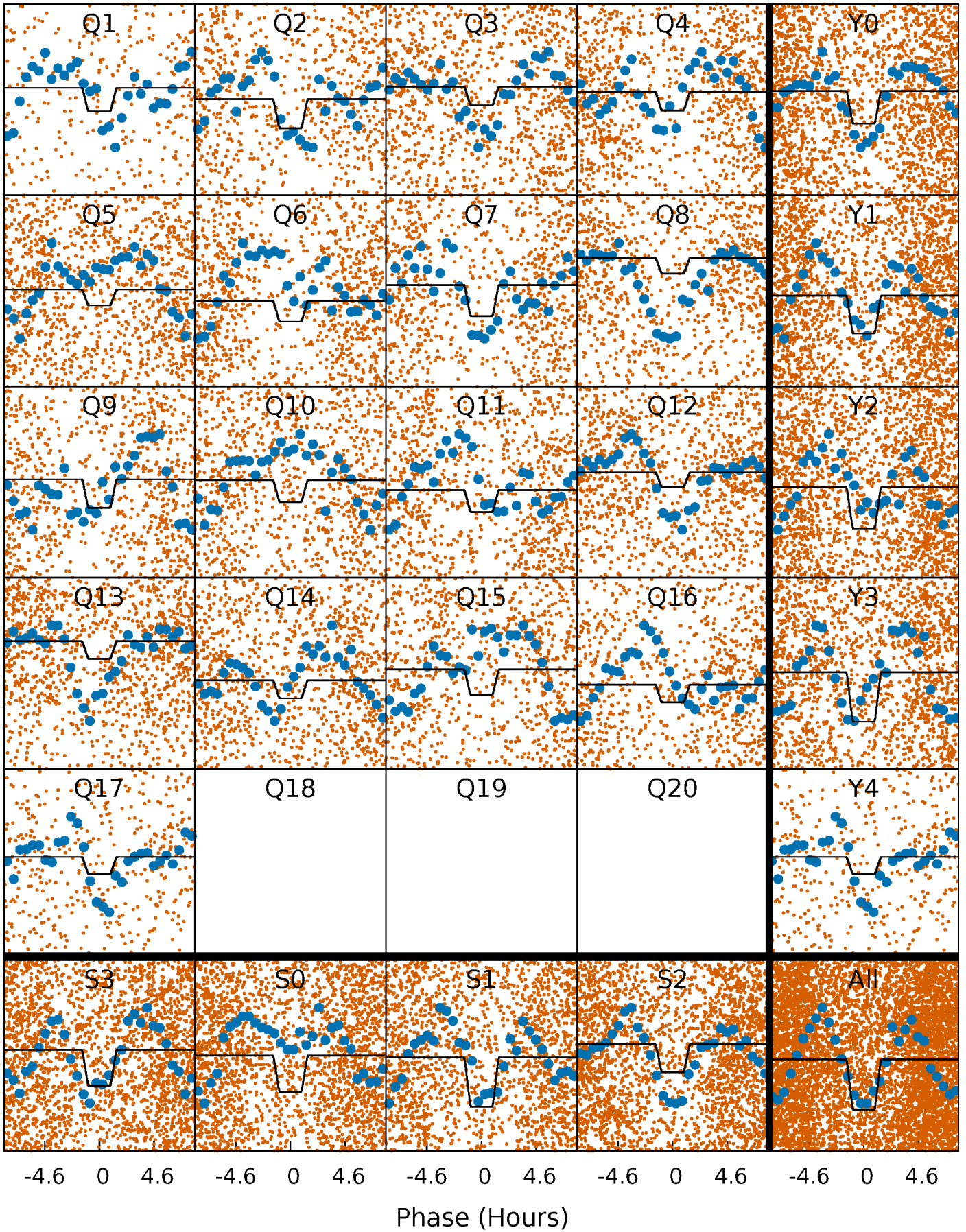
DV Quarter-Phased Transit Curves

TCE 005220979-01 P= 1.525545 Days $T_0=131.939085$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

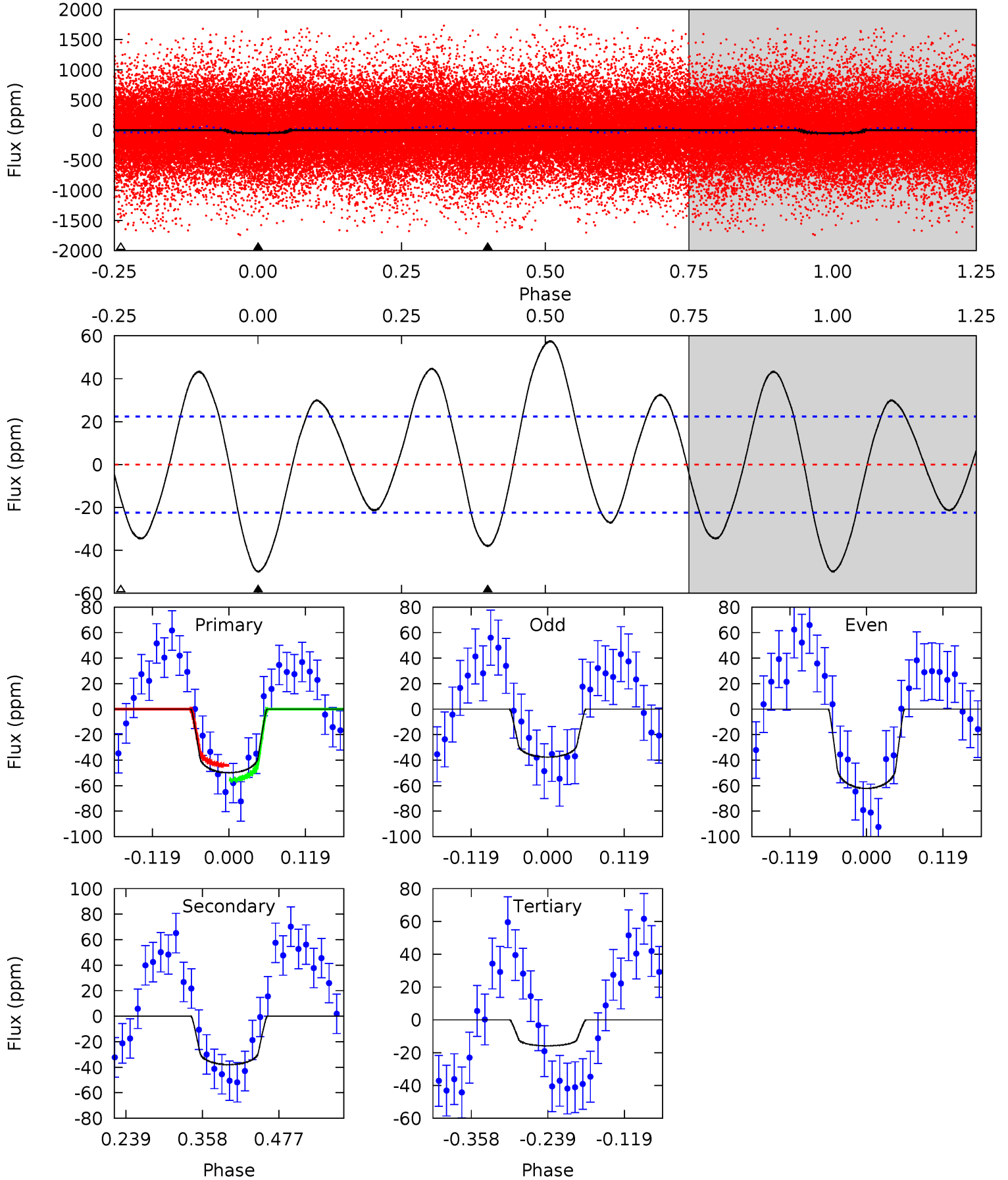
TCE 005220979-01 P= 1.525509 Days $T_0=131.960334$ (BKJD)



DV Model-Shift Uniqueness Test

005220979-01, P = 1.525545 Days, E = 130.413540 Days

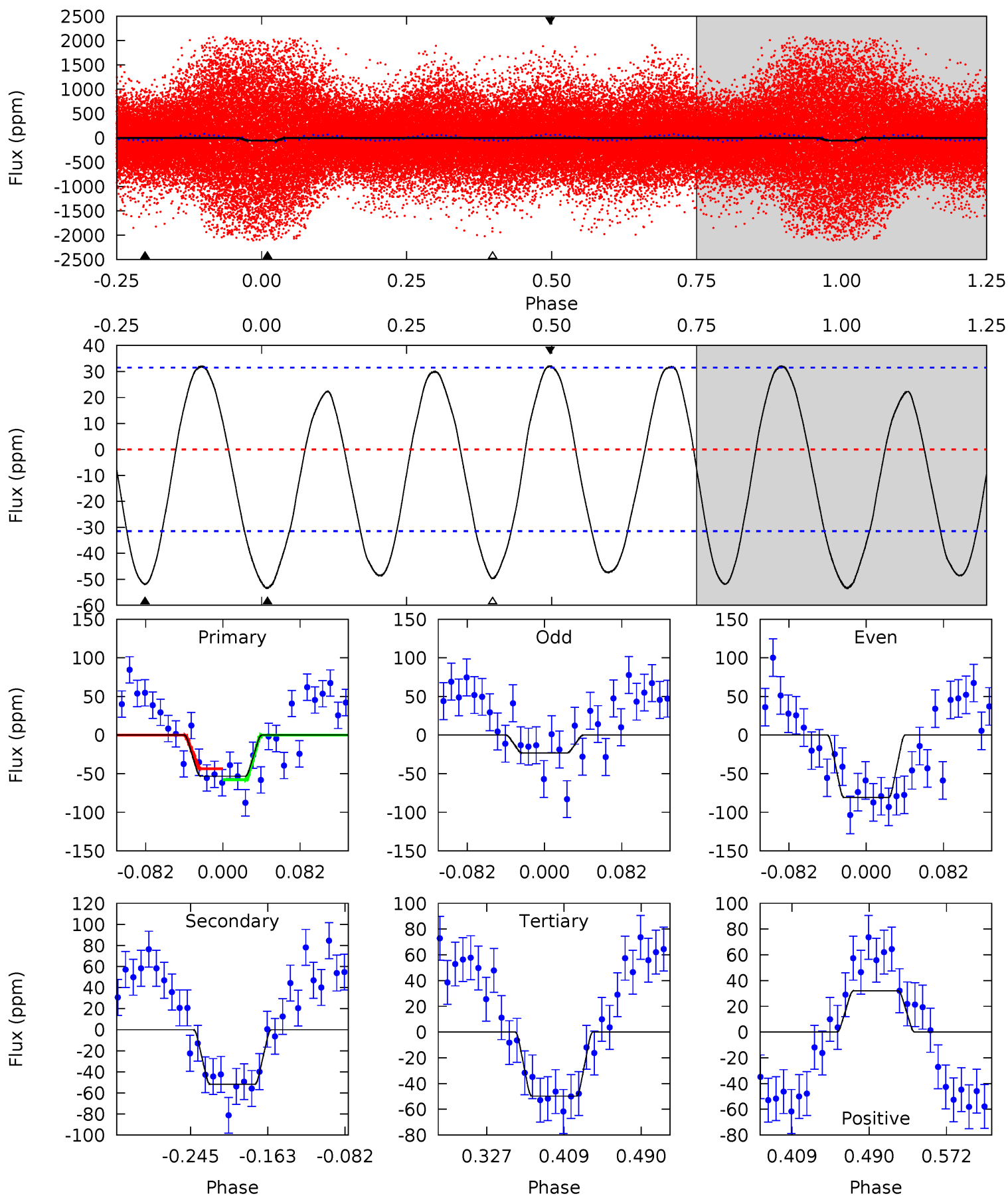
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	7.67	3.20	0	4.53	1.56	4.47	6.89	10.1	4.47	7.67	2.49	1.48	0.53	1.18



Alt Model-Shift Uniqueness Test

005220979-01, P = 1.525509 Days, E = 130.434825 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.81	7.59	7.28	4.68	4.61	1.74	4.14	0.53	3.13	0.31	2.91	4.21	1.28	0.37	1.05



Stellar Parameters For KIC 005220979

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7243^{+228}_{-330}	$4.191^{+0.124}_{-0.201}$	$-0.220^{+0.250}_{-0.350}$	$1.575^{+0.508}_{-0.313}$	$1.409^{+0.219}_{-0.219}$	$0.508^{+0.319}_{-0.266}$
	+3%/-5%	+3%/-5%	+114%/-159%	+32%/-20%	+16%/-16%	+63%/-52%
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 005220979-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-38 ± 5	$1.38^{+0.36}_{-0.35}$	3289^{+278}_{-207}	6243^{+1001}_{-622}	$9.109^{+7.342}_{-3.490}$
Alt.	-52 ± 7	$1.53^{+0.42}_{-0.34}$	3303^{+273}_{-216}	6417^{+852}_{-635}	10^{+6}_{-4}

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

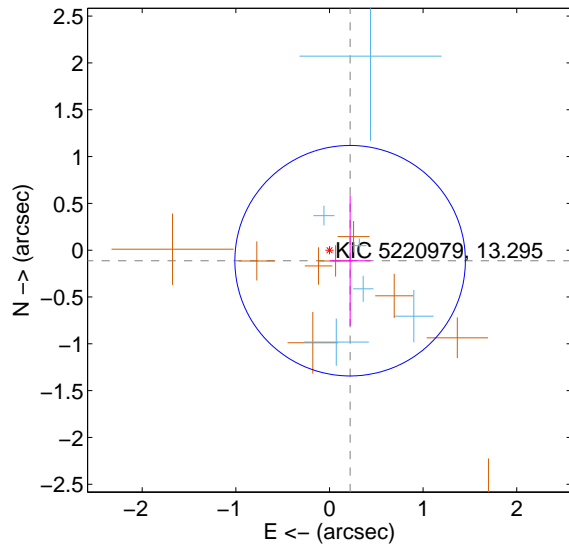
Supplemental centroid analysis for 005220979-01. Kepler magnitude: 13.29. Transit SNR 9.08

There are 6 quarters with good PRF difference image offsets

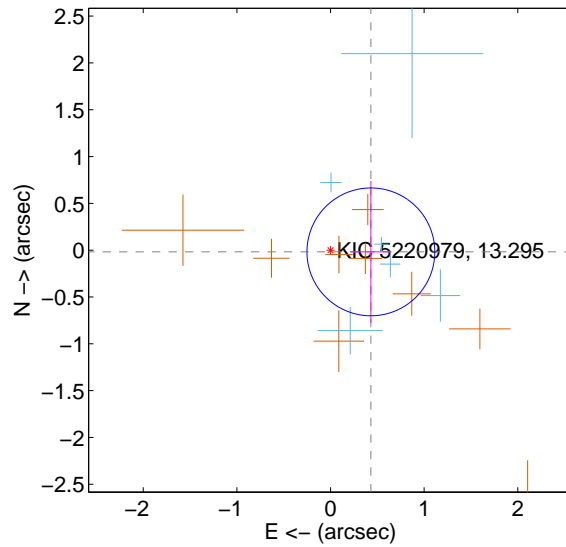
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.248 ± 0.410	0.60	-0.220 ± 0.219	-0.113 ± 0.696
PRF-fit source offset from KIC position	0.431 ± 0.227	1.90	-0.431 ± 0.218	-0.018 ± 0.757
photometric centroid source offset	0.35 ± 0.60	0.59	-0.32 ± 0.62	0.15 ± 0.51

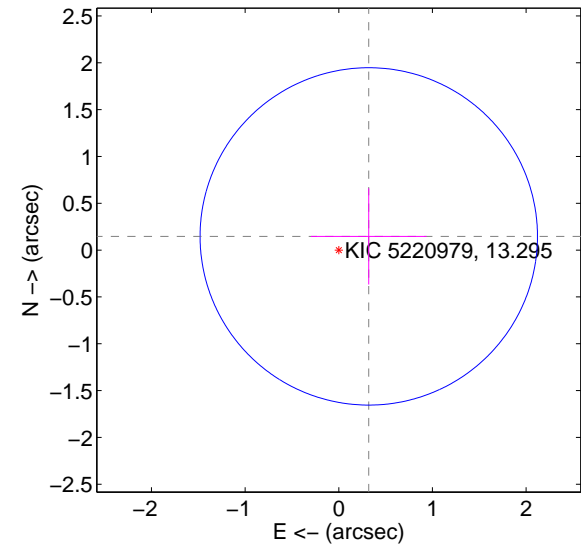
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

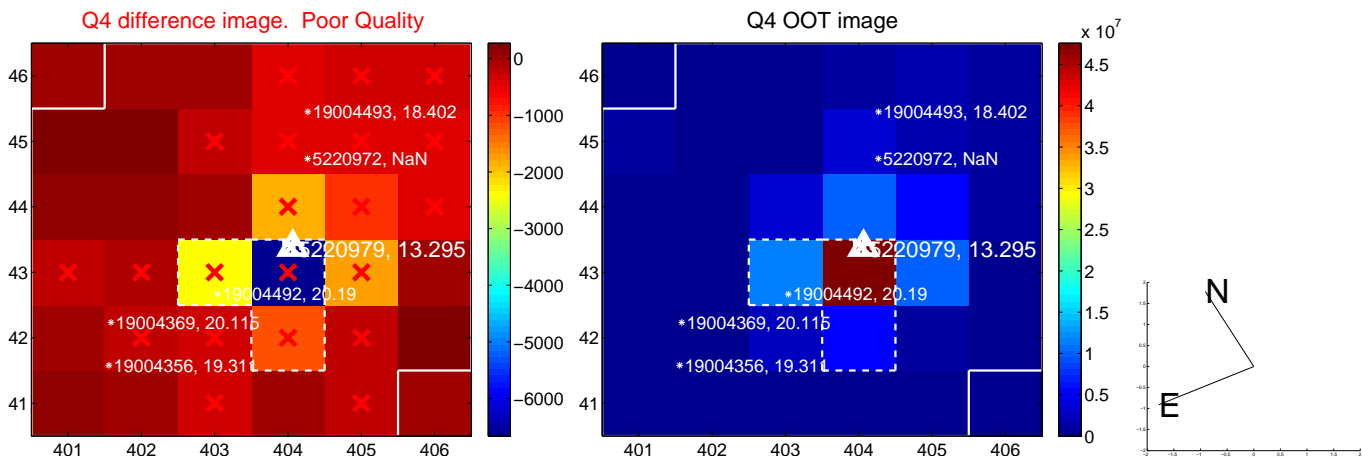
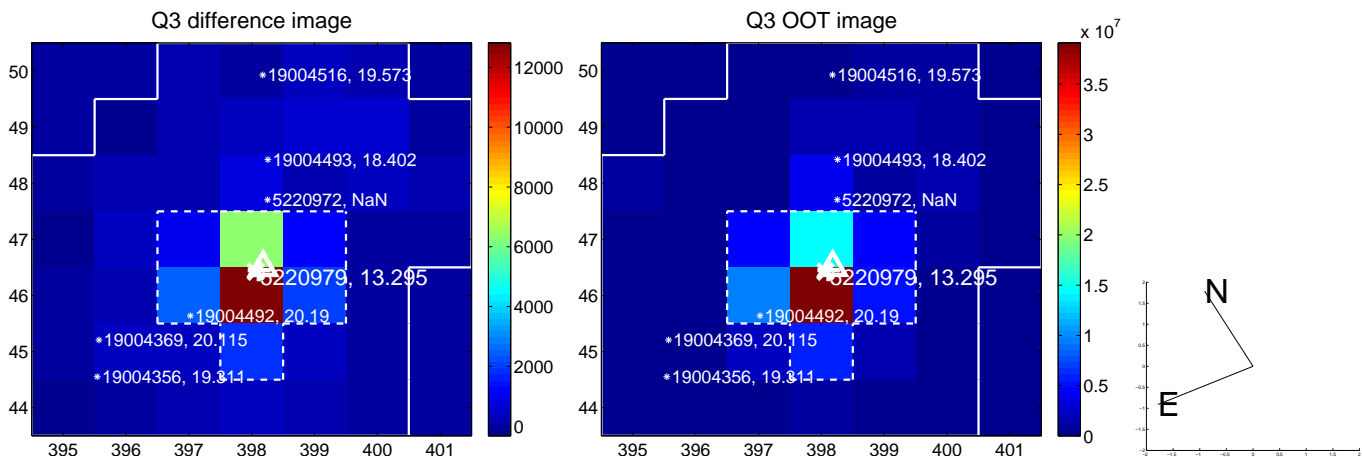
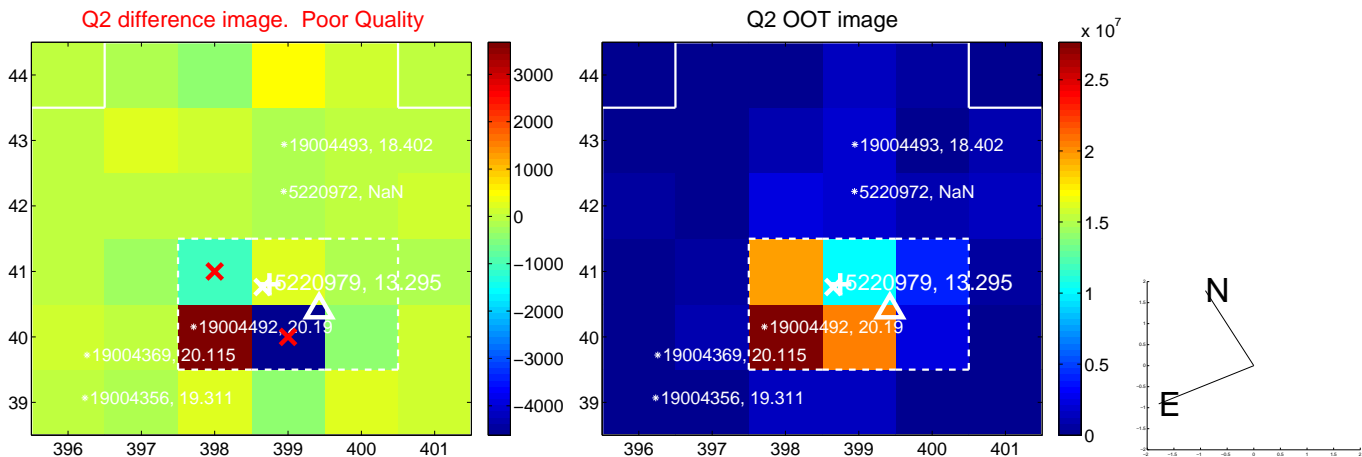
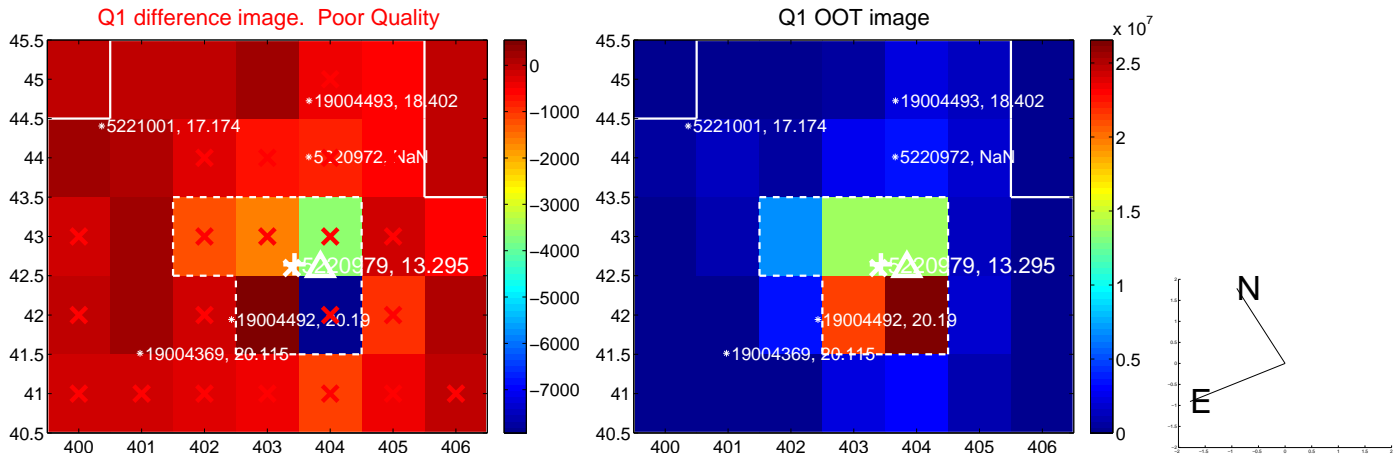


offset from photometric centroids

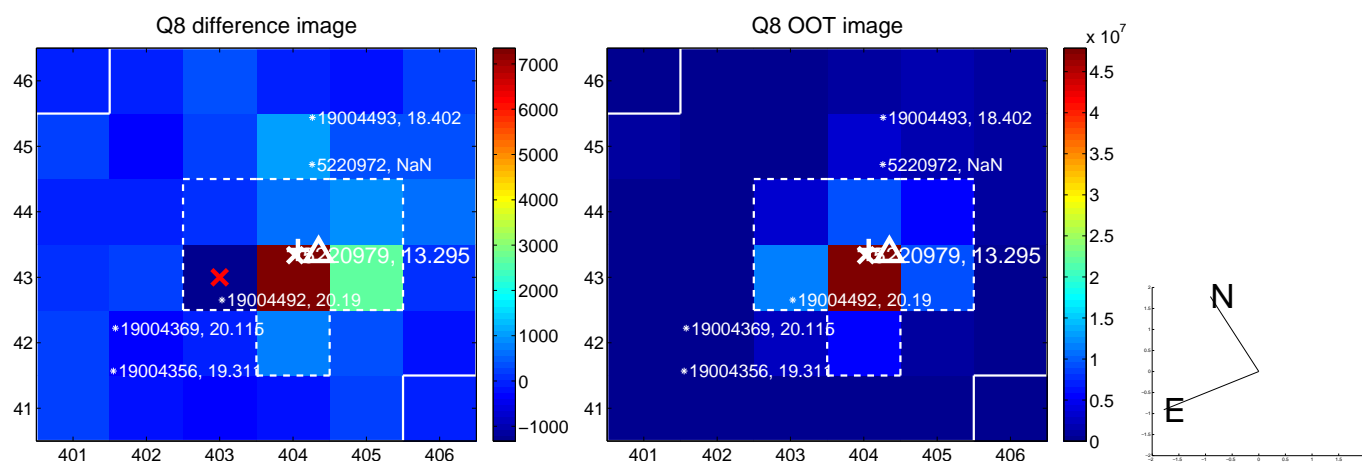
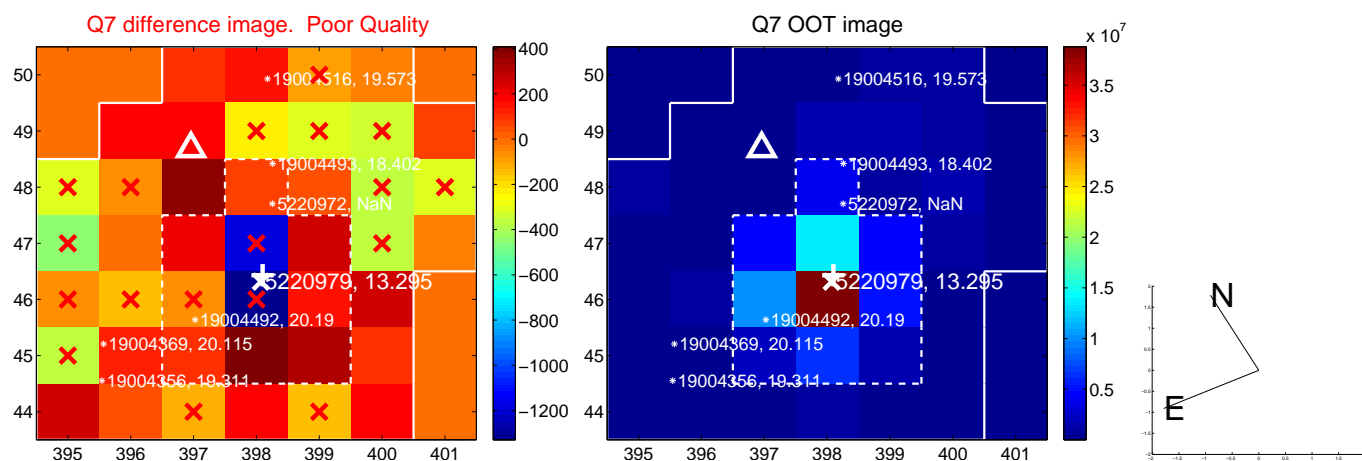
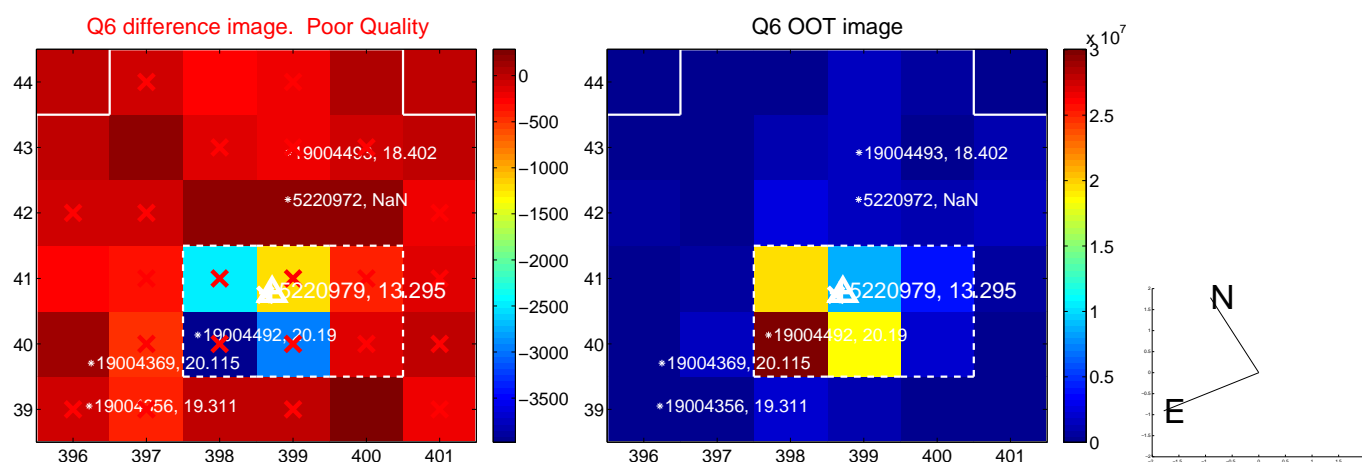
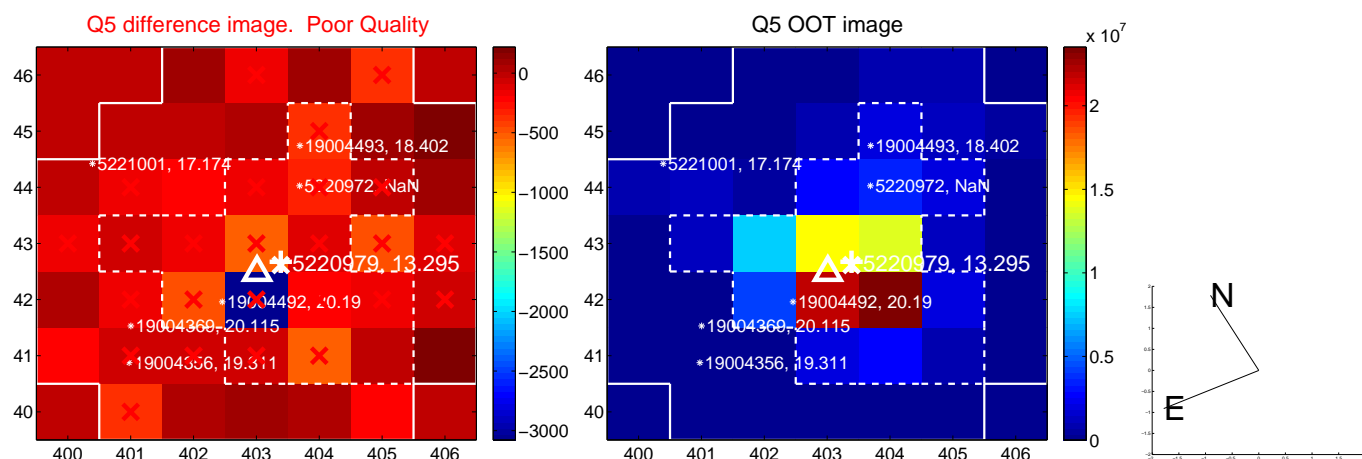


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

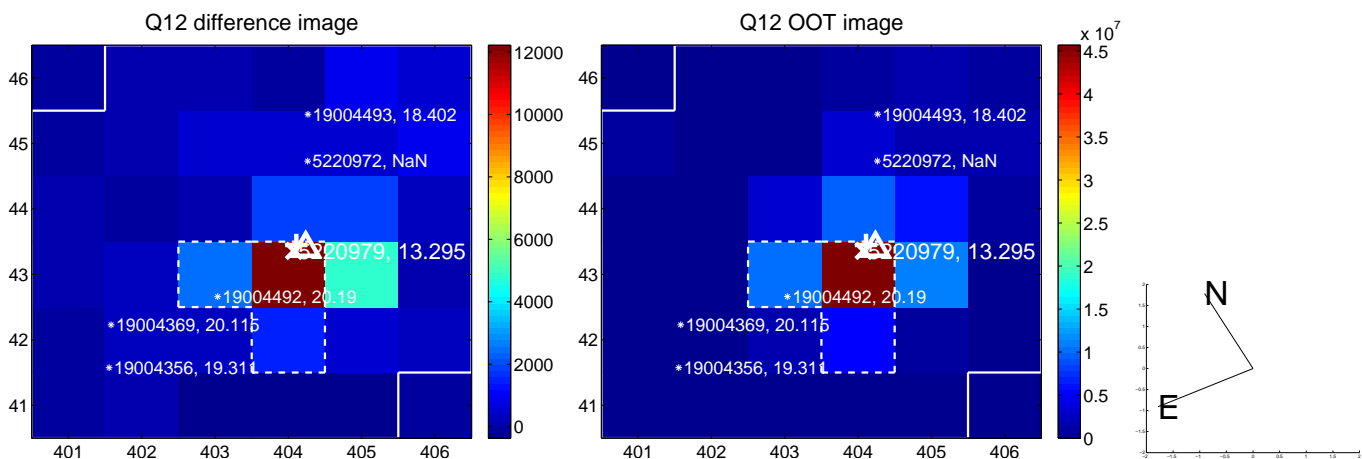
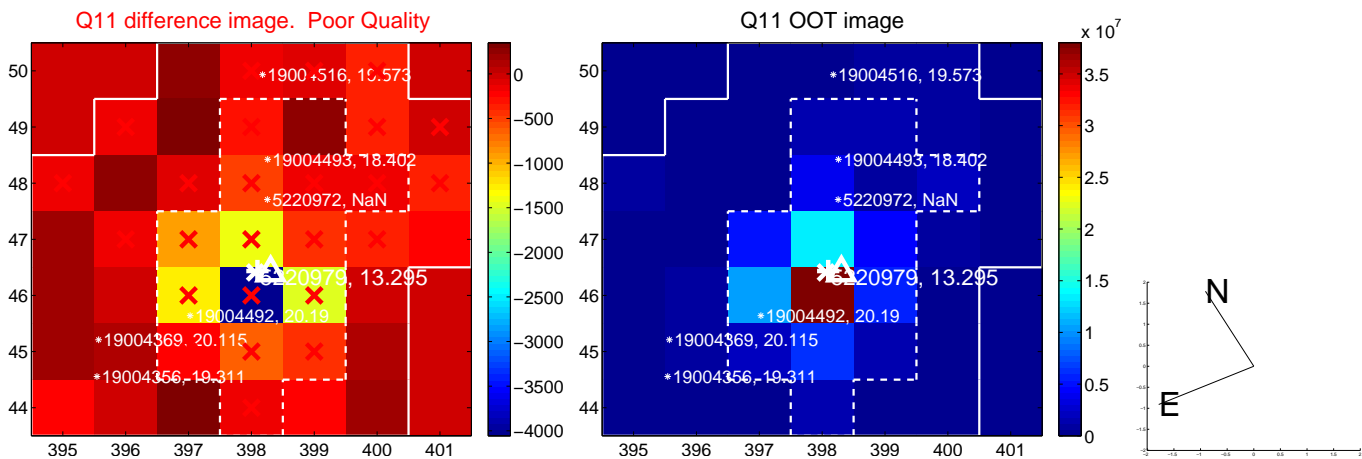
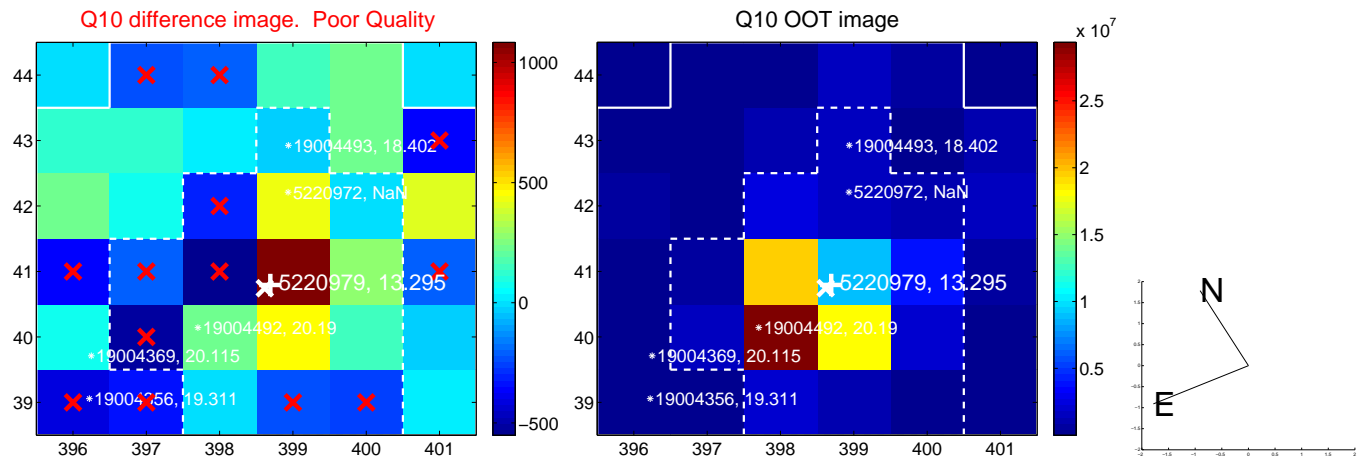
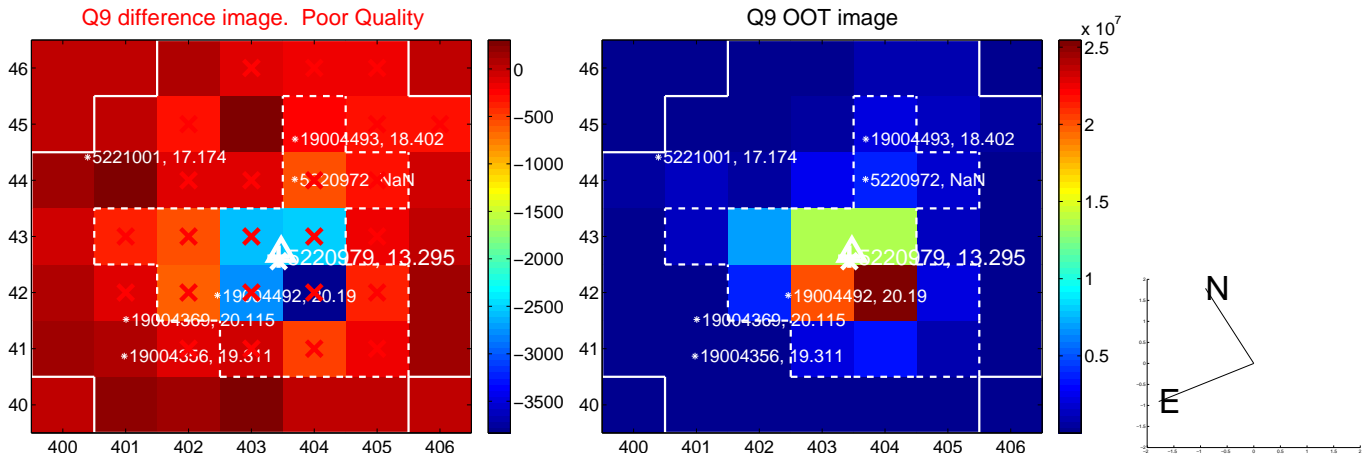
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



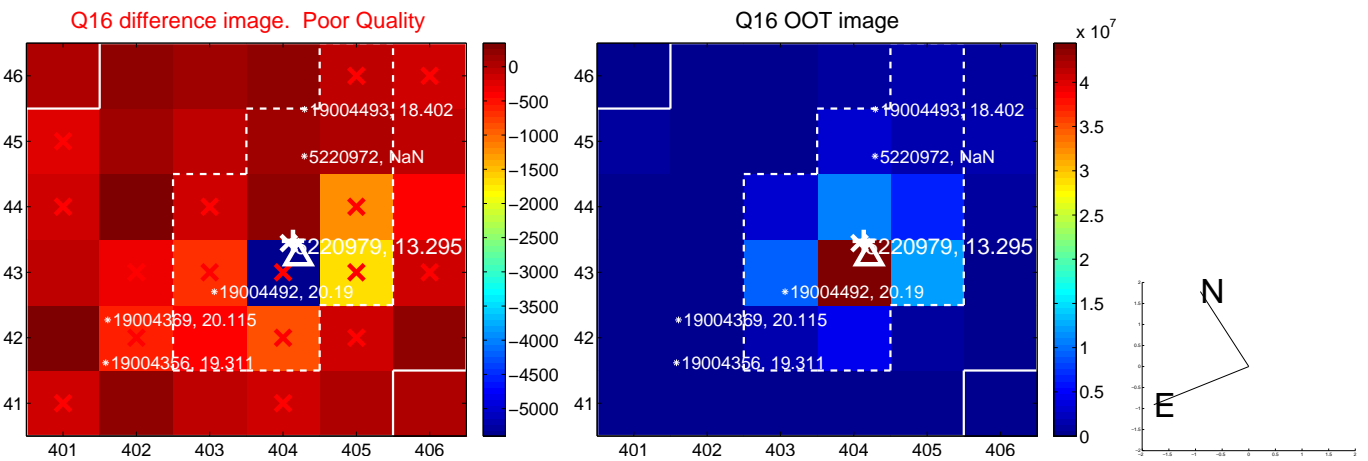
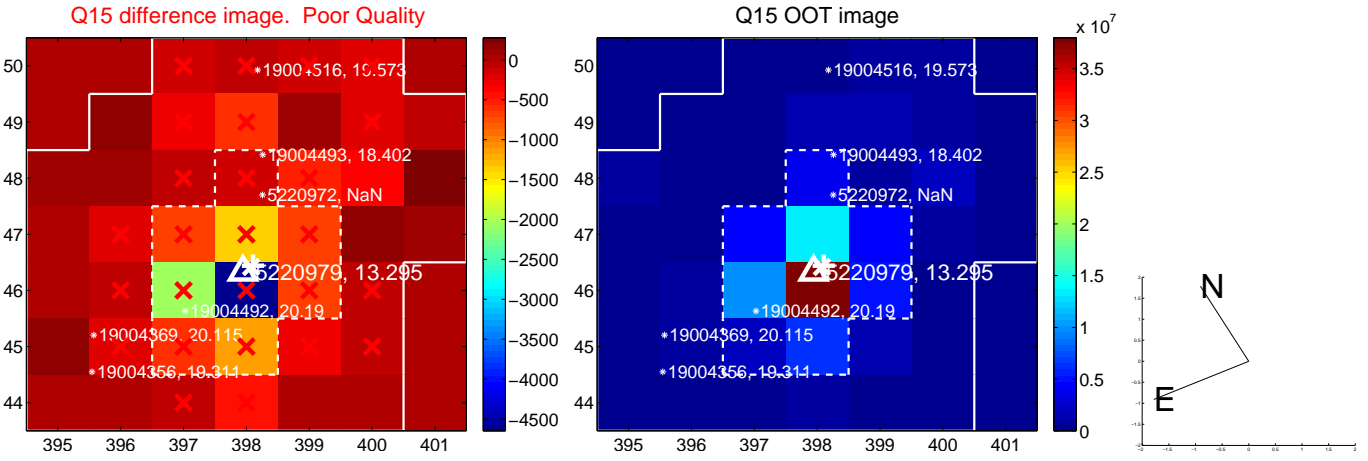
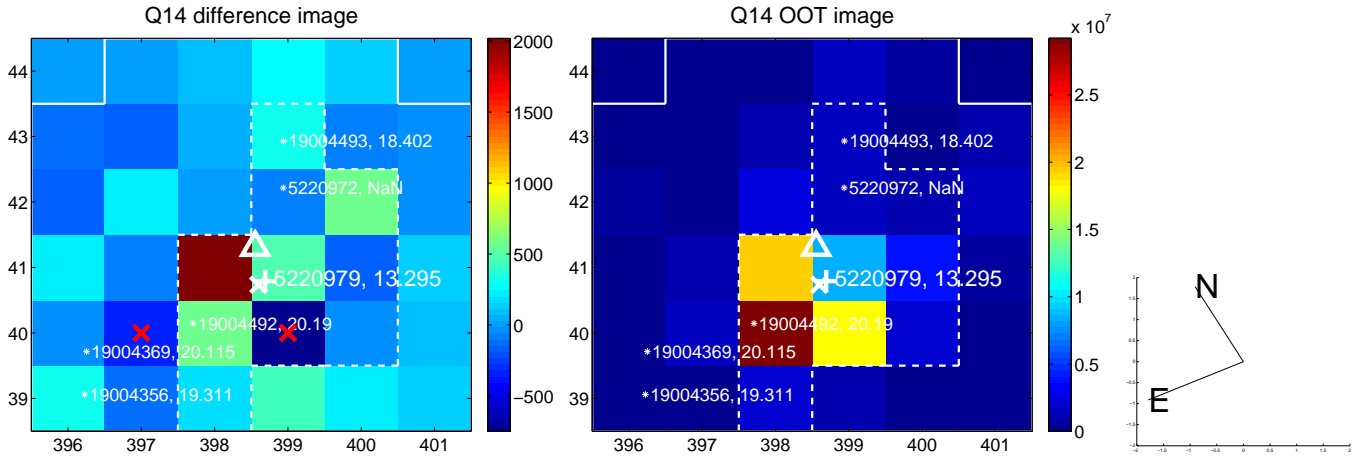
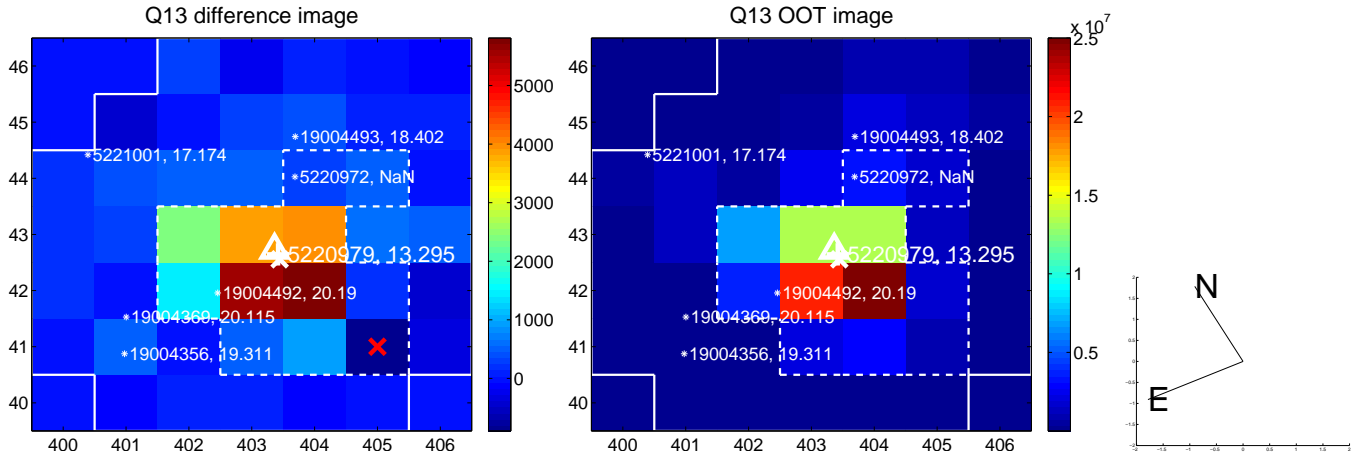
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



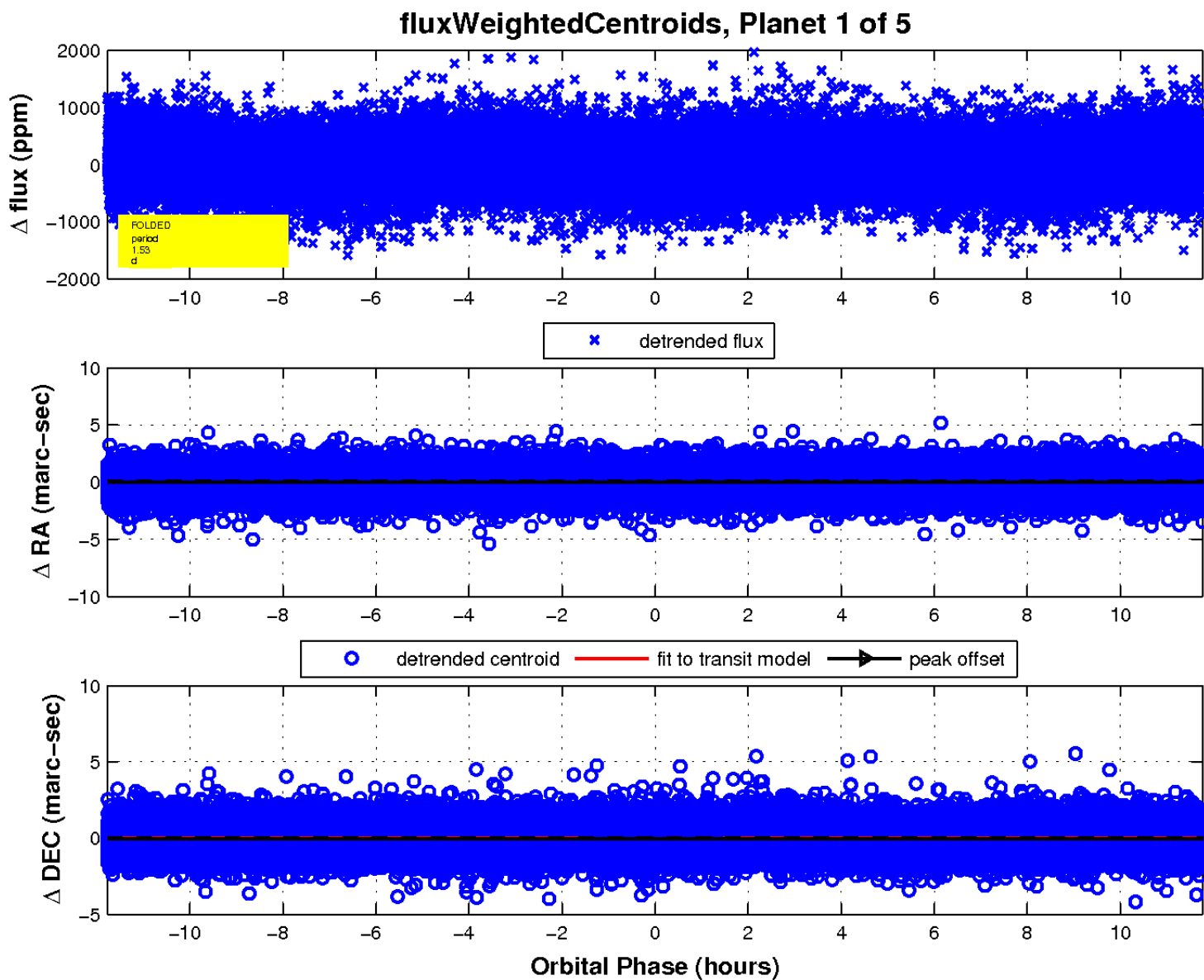
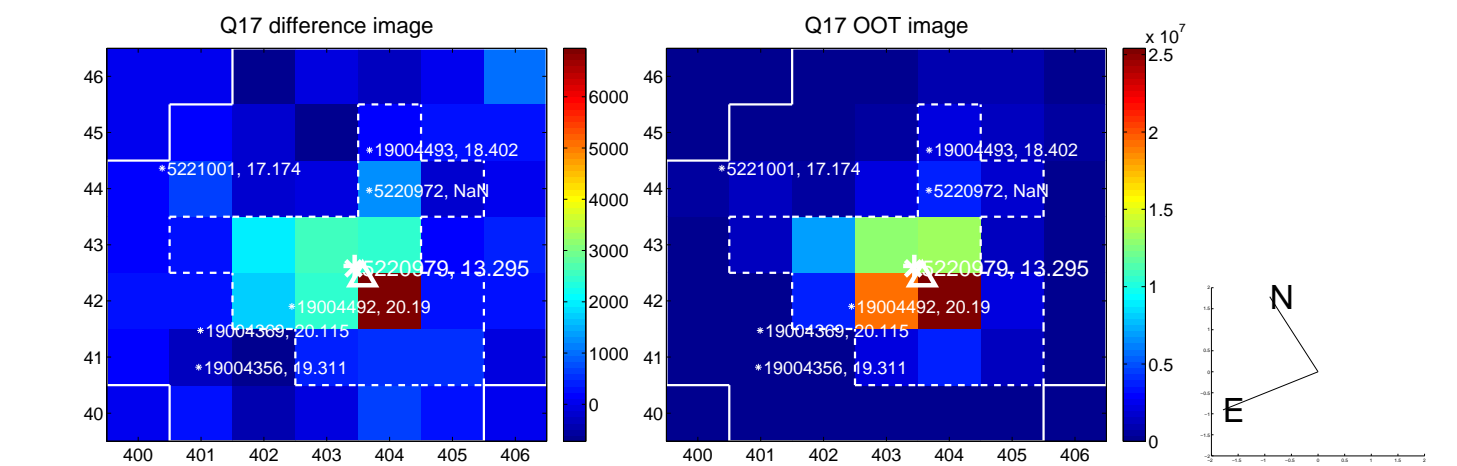
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

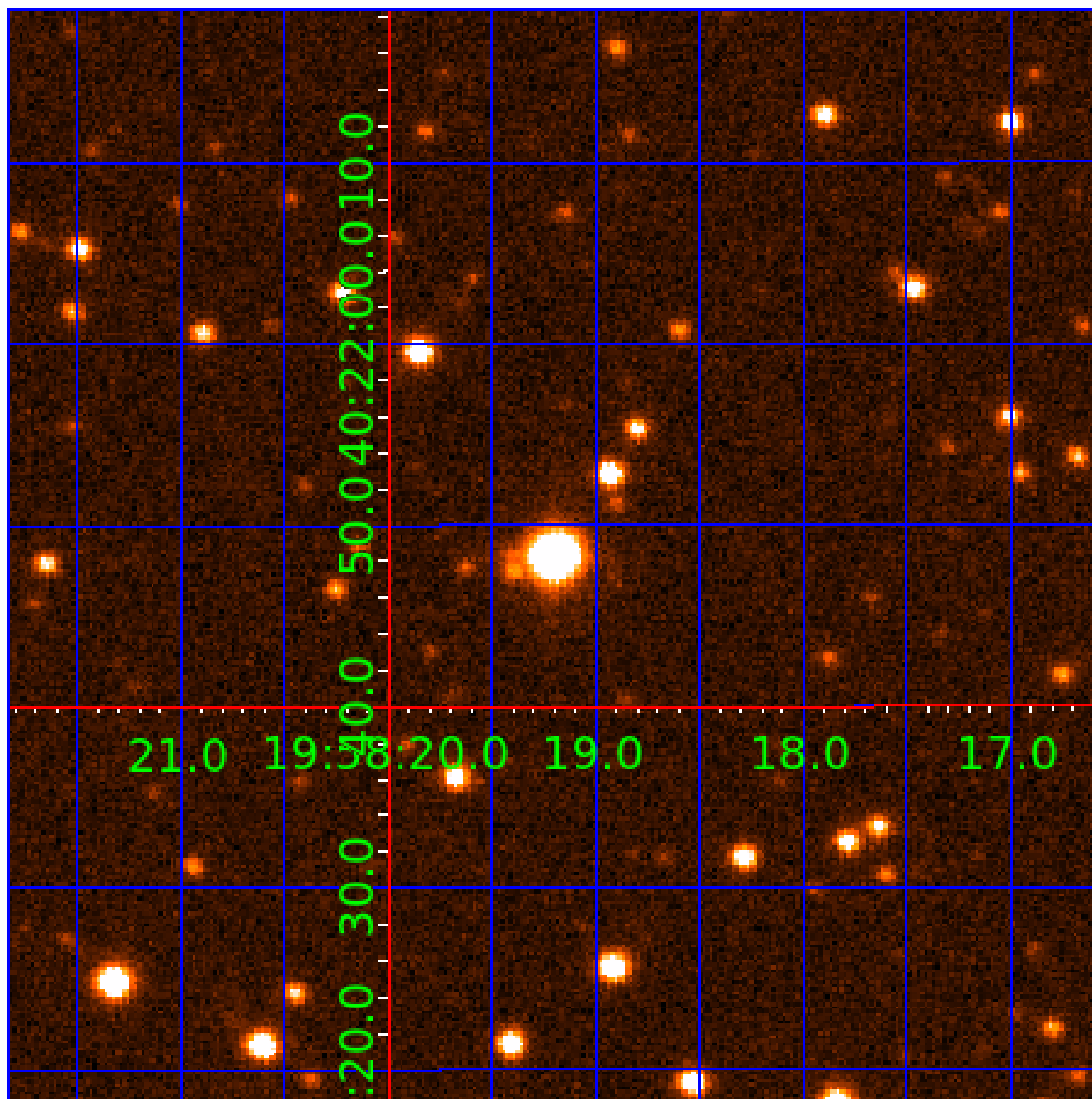


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005220979

Q1-17 DR25 TCE Parameters

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005220979-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005220979-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005220979-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005220979-05	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

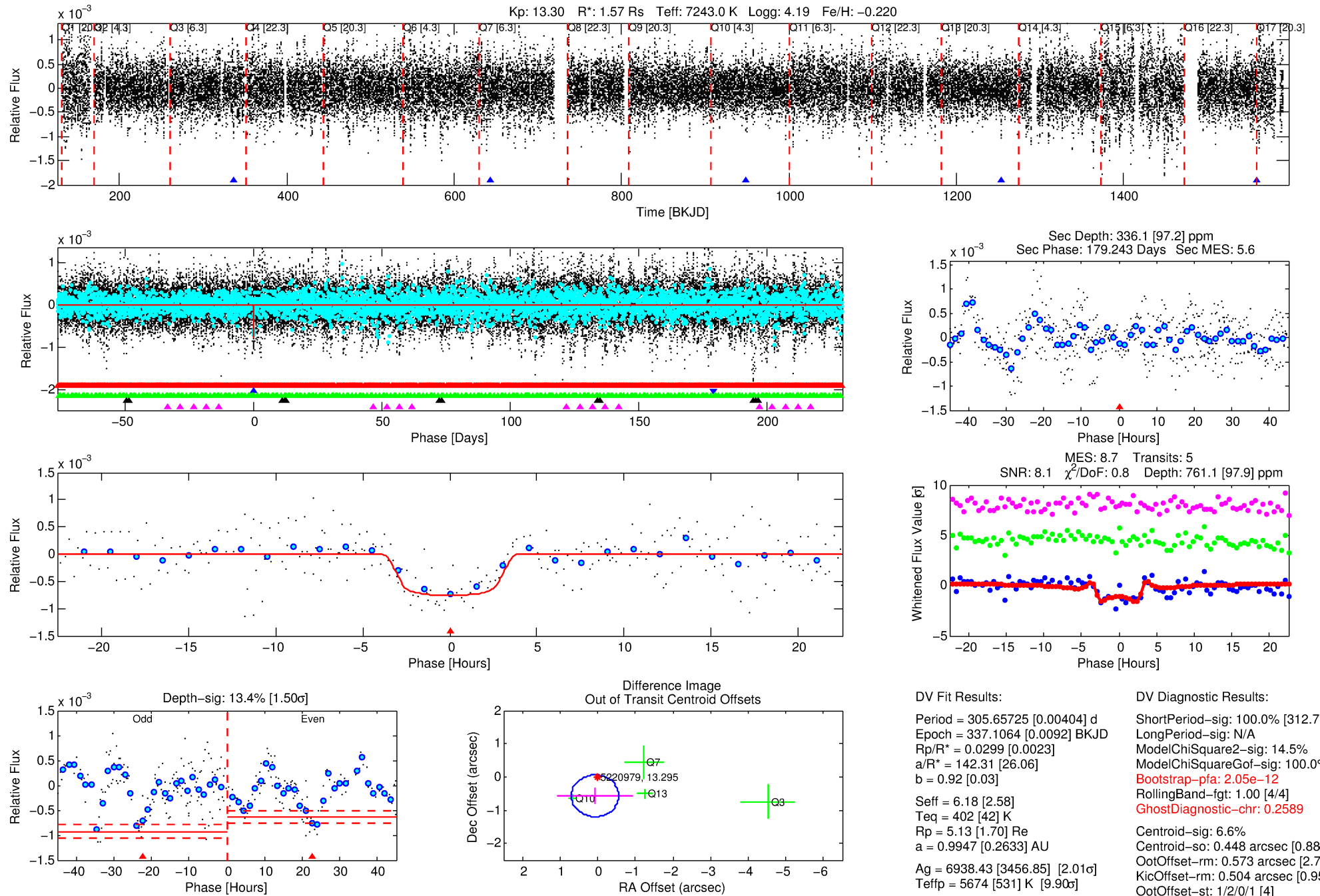
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005220979-02

No Significant Match Found

DV One-Page Summary

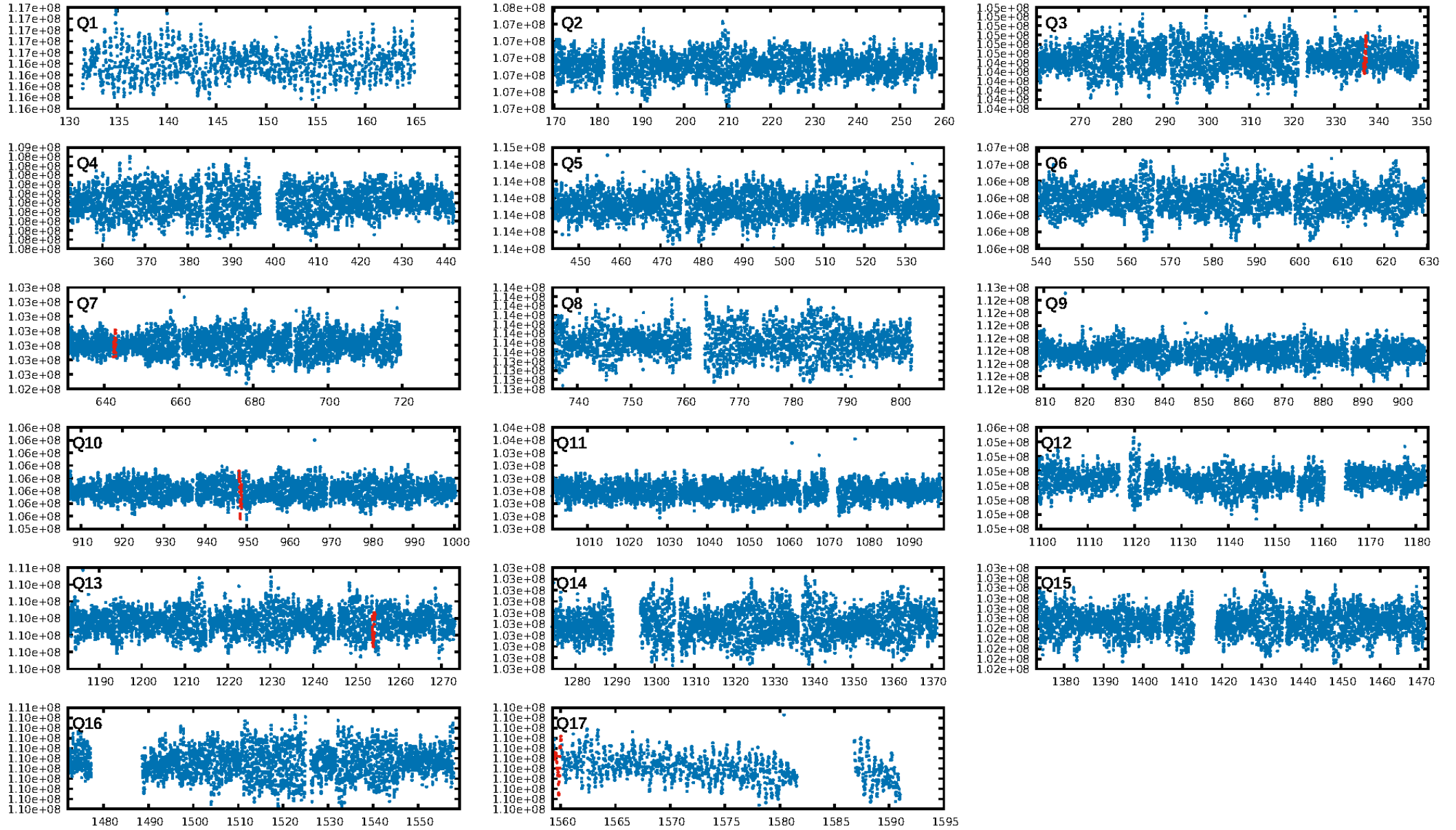
KIC: 5220979 Candidate: 2 of 5 Period: 305.657 d



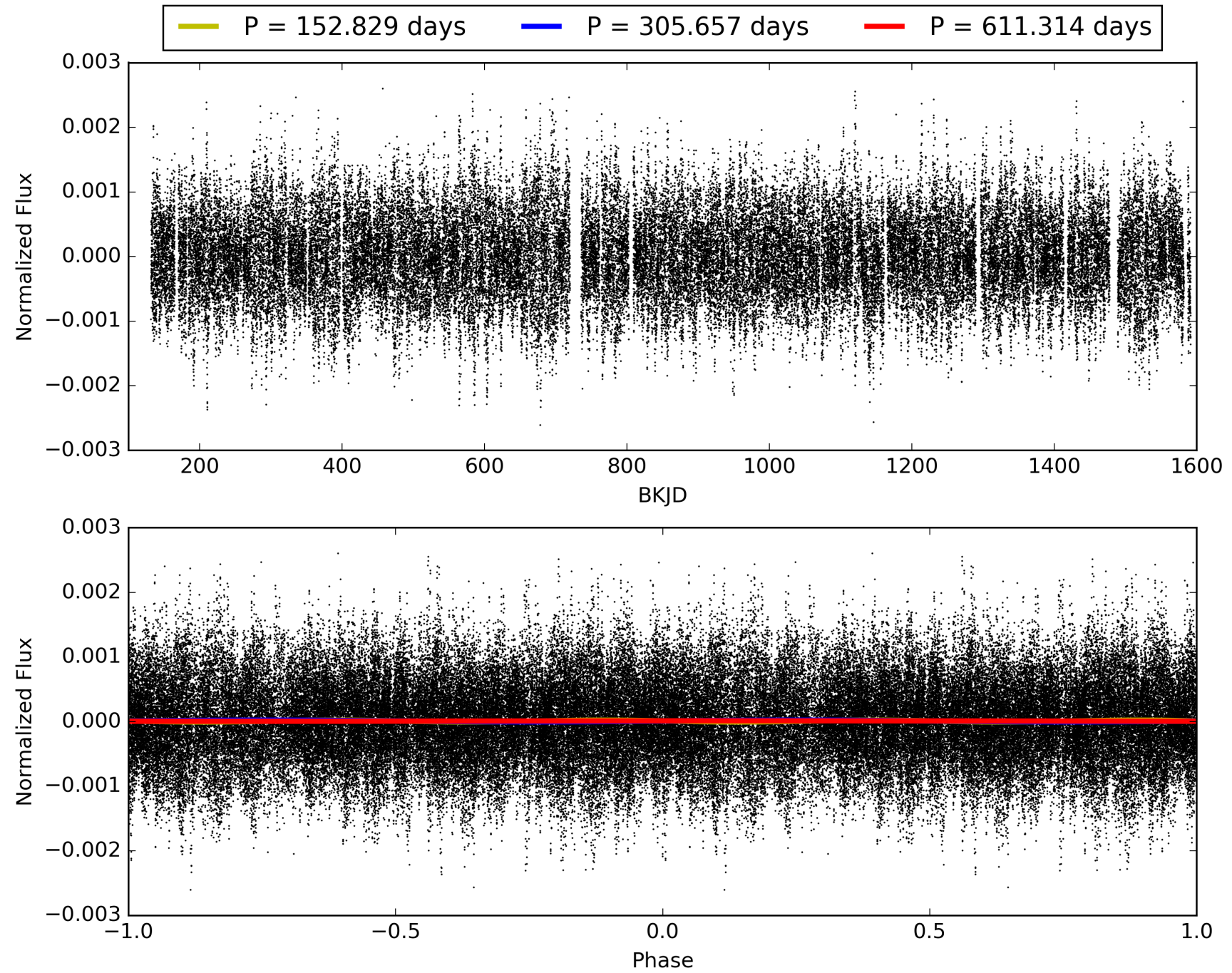
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:37:23 Z

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

TCE 005220979-02, PDC Light Curves

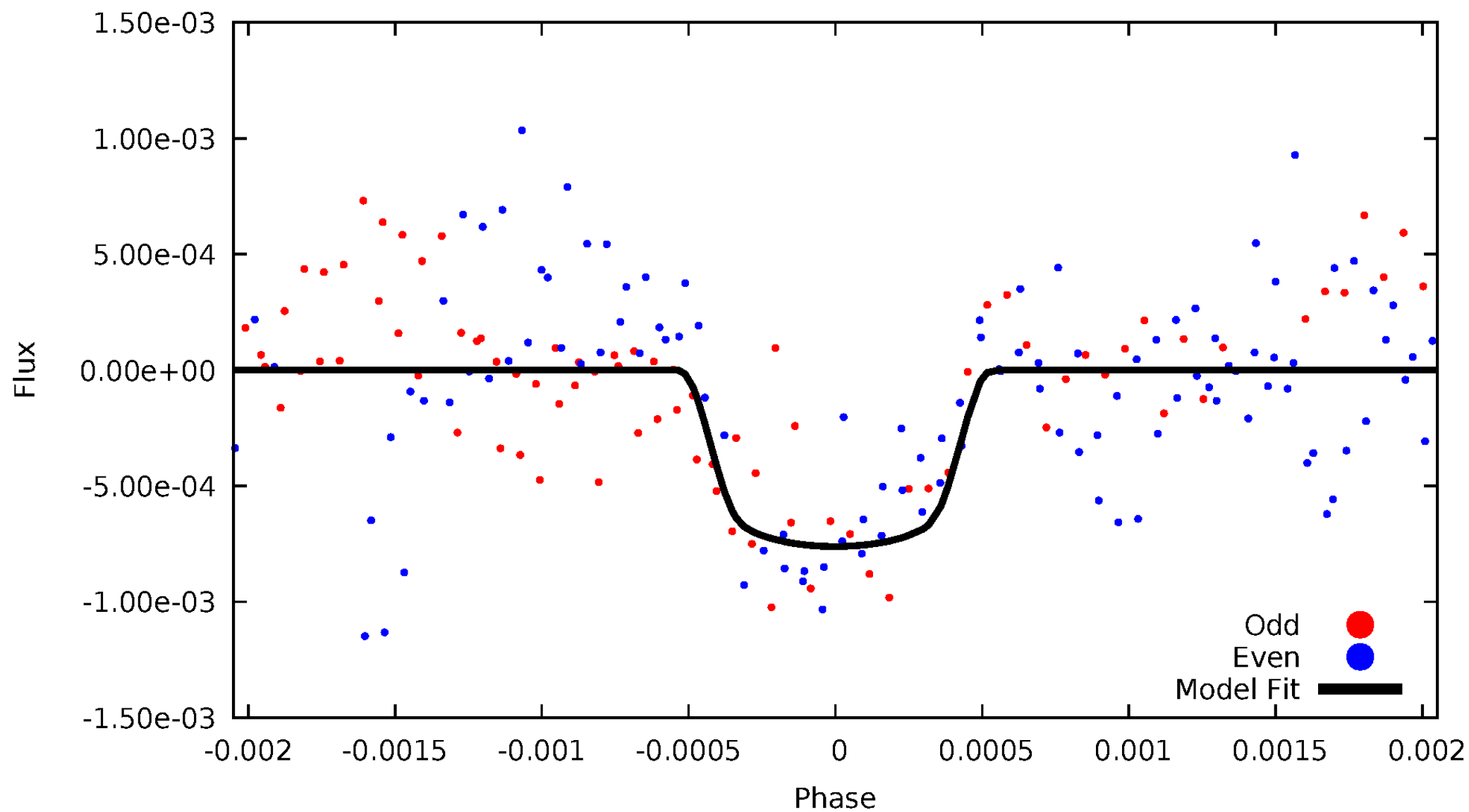


TCE 005220979-02



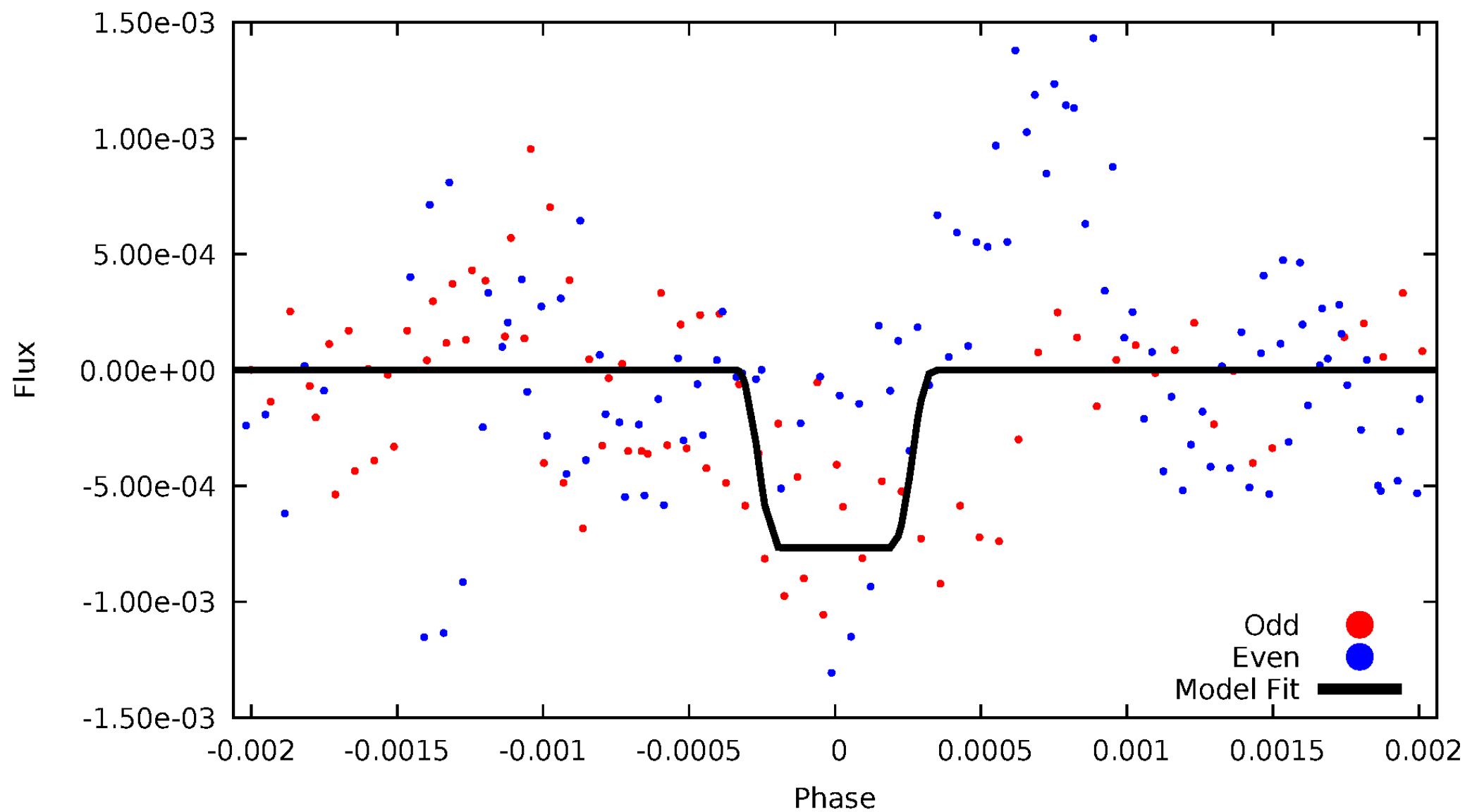
DV Odd/Even

TCE 005220979-02



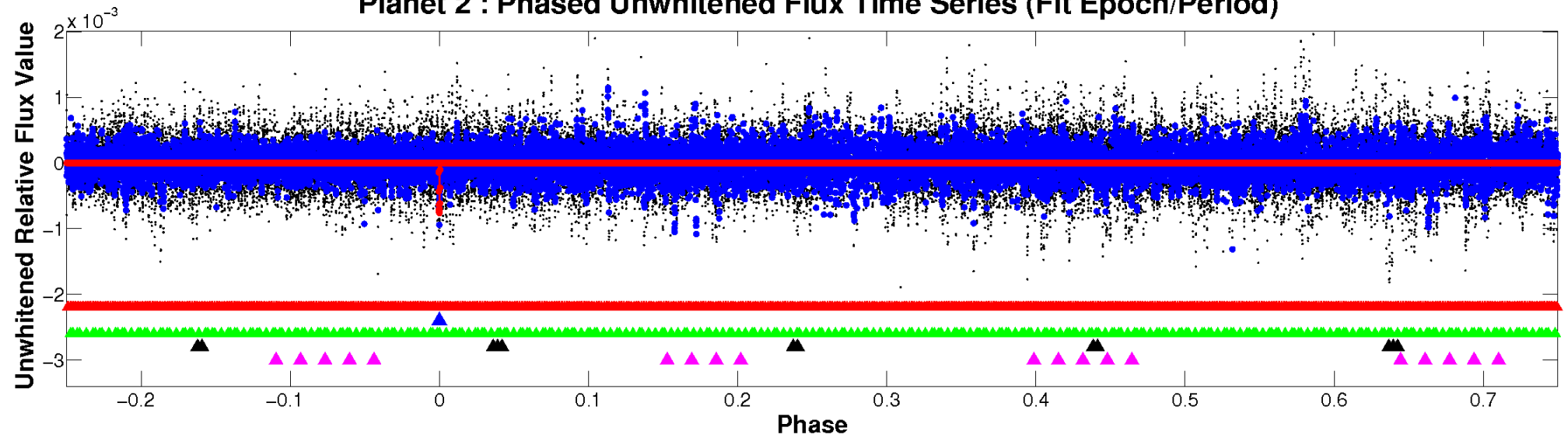
ALT Odd/Even

TCE 005220979-02

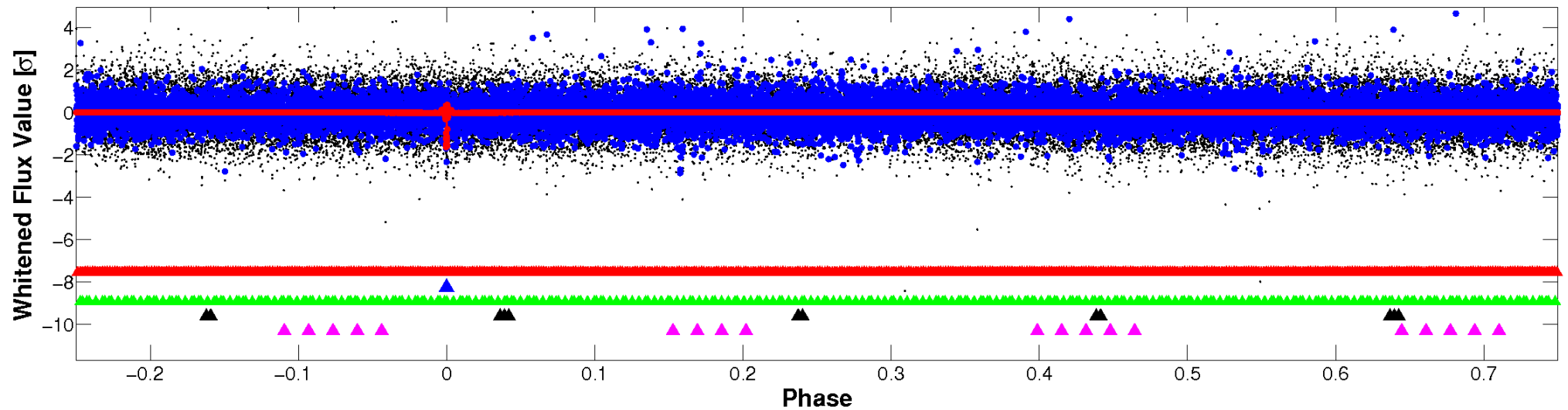


Non-Whitened Vs. Whitened Light Curve

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

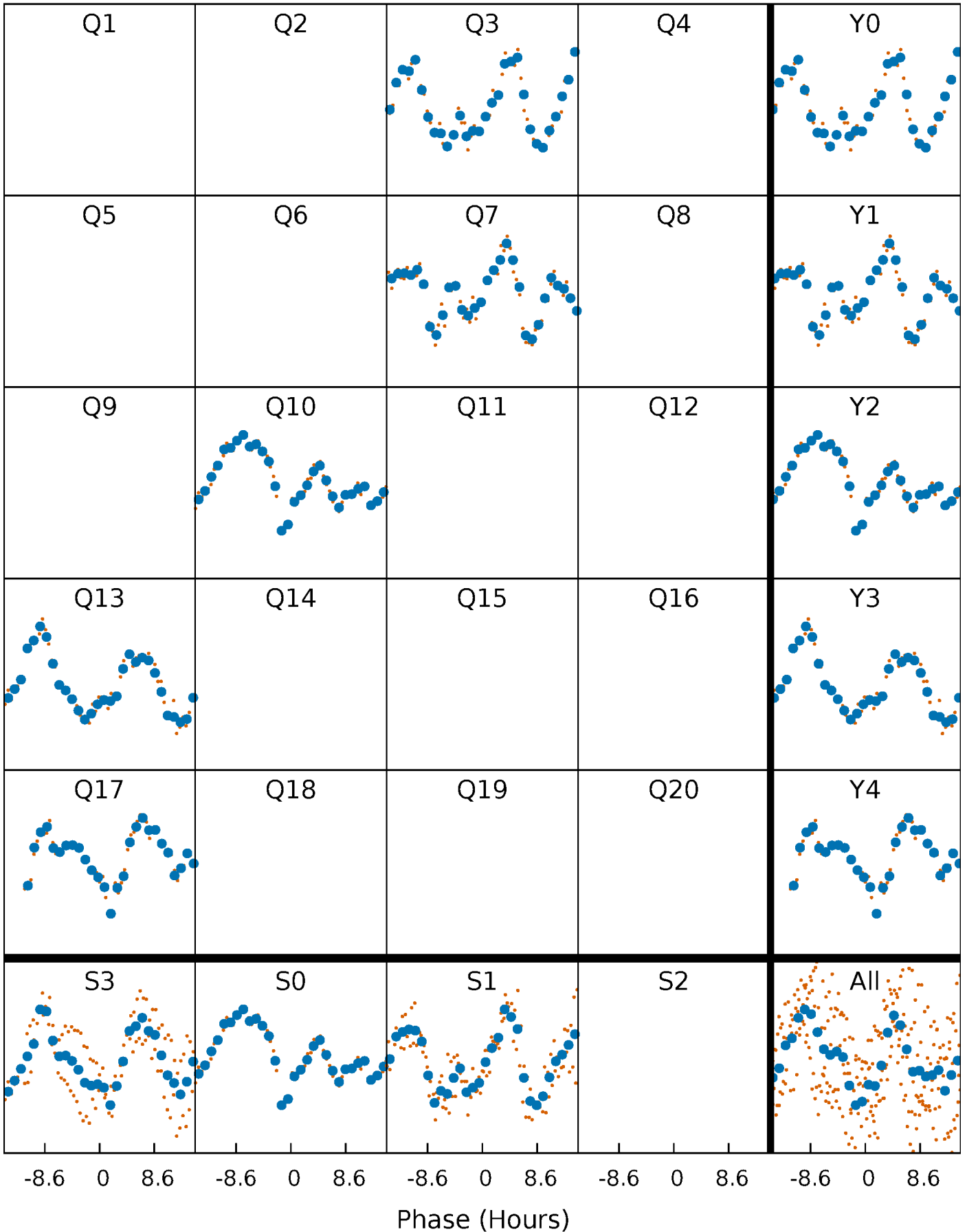


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



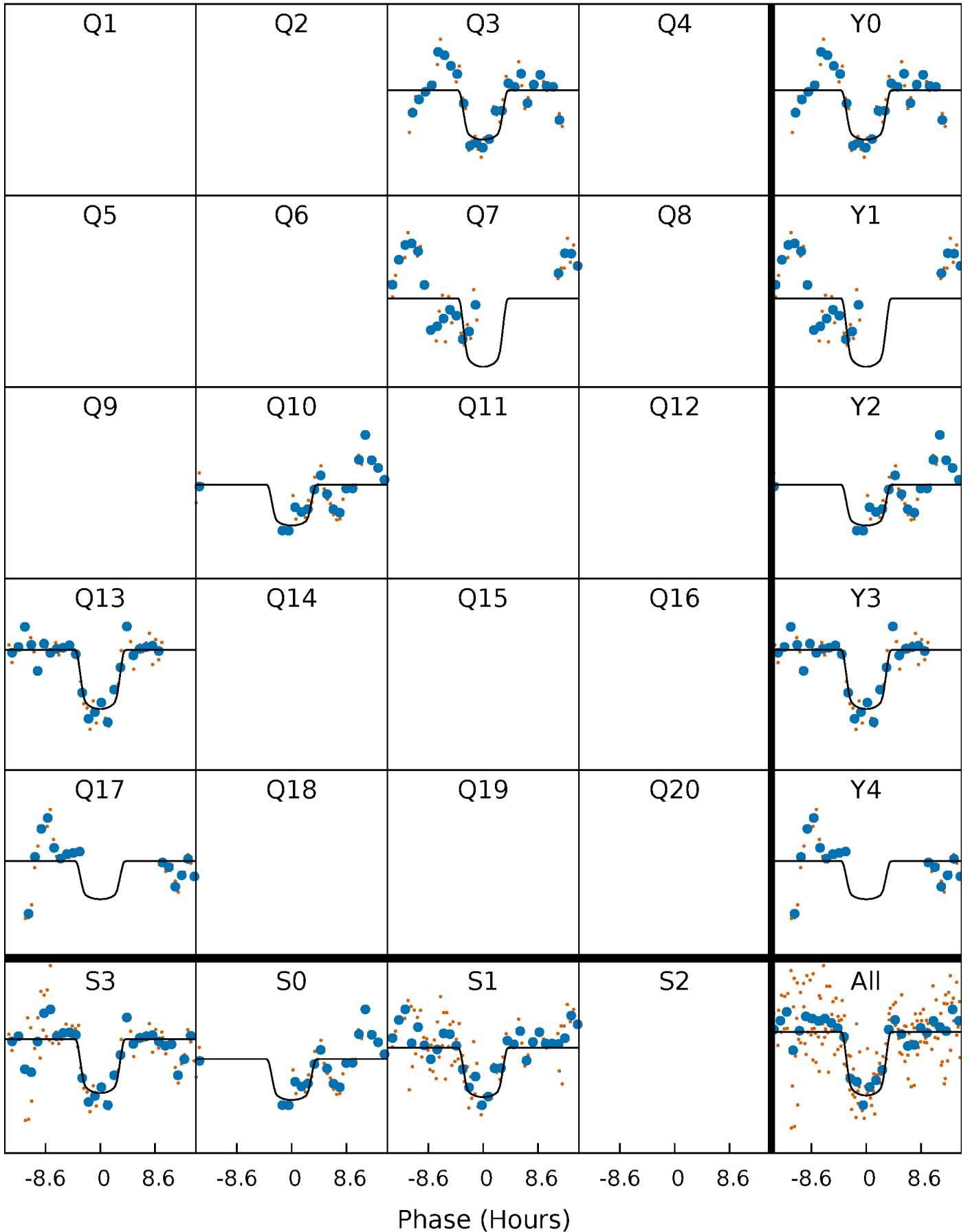
PDC Quarter-Phased Transit Curves

TCE 005220979-02 $P=305.657247$ Days $T_0=337.106427$ (BKJD)



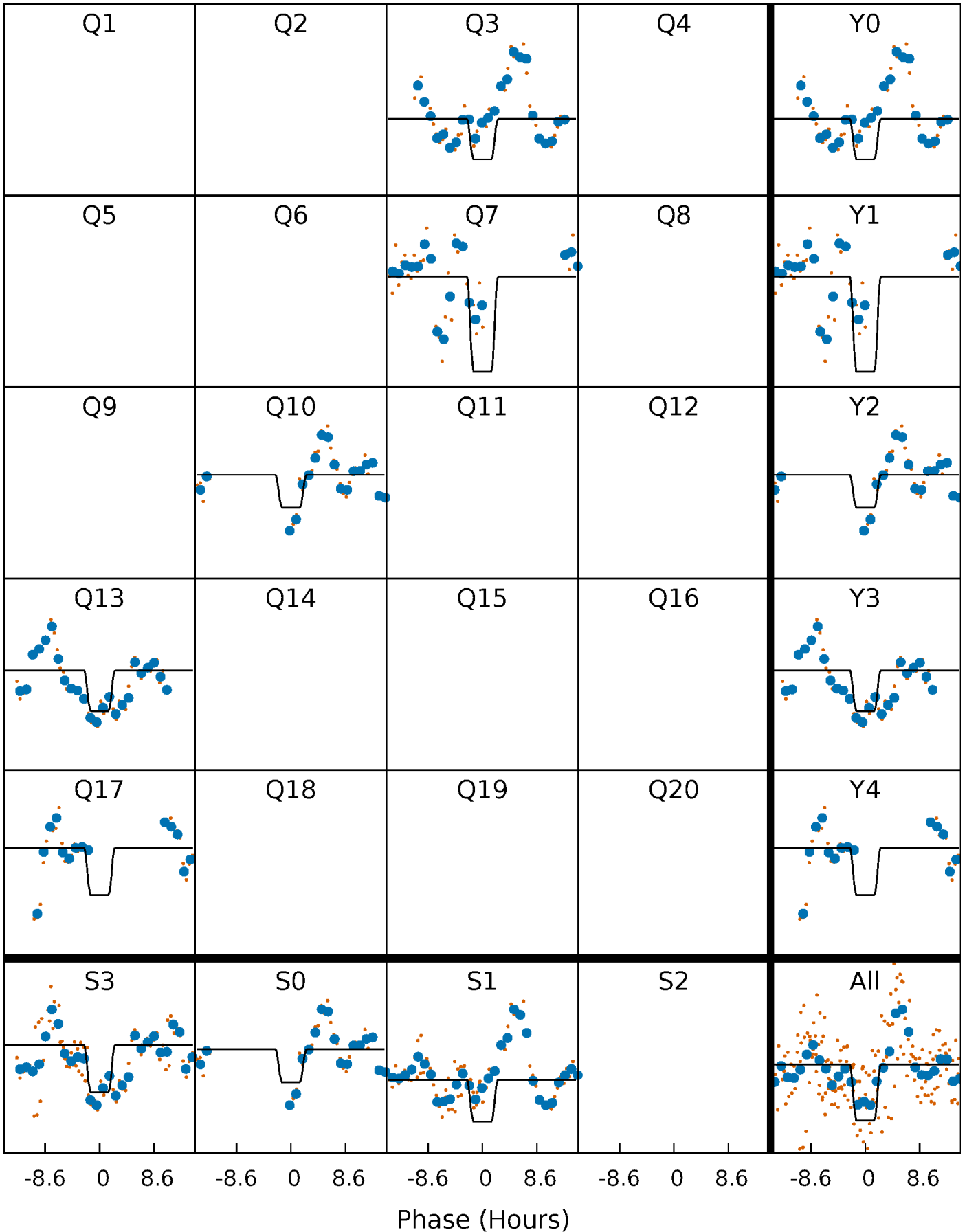
DV Quarter-Phased Transit Curves

TCE 005220979-02 $P=305.657247$ Days $T_0=337.106427$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

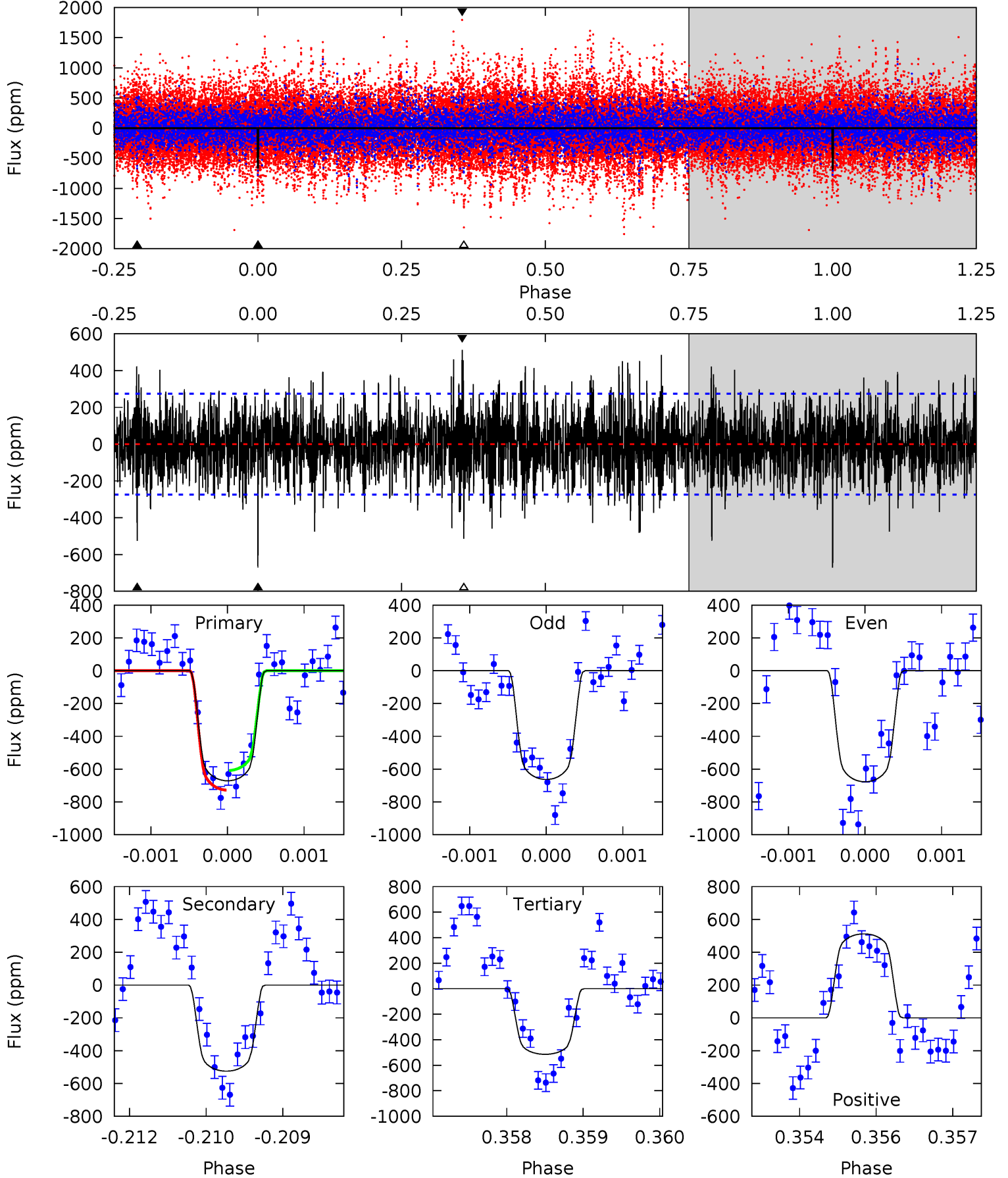
TCE 005220979-02 P=305.652002 Days $T_0=337.067914$ (BKJD)



DV Model-Shift Uniqueness Test

005220979-02, P = 305.657247 Days, E = 31.449180 Days

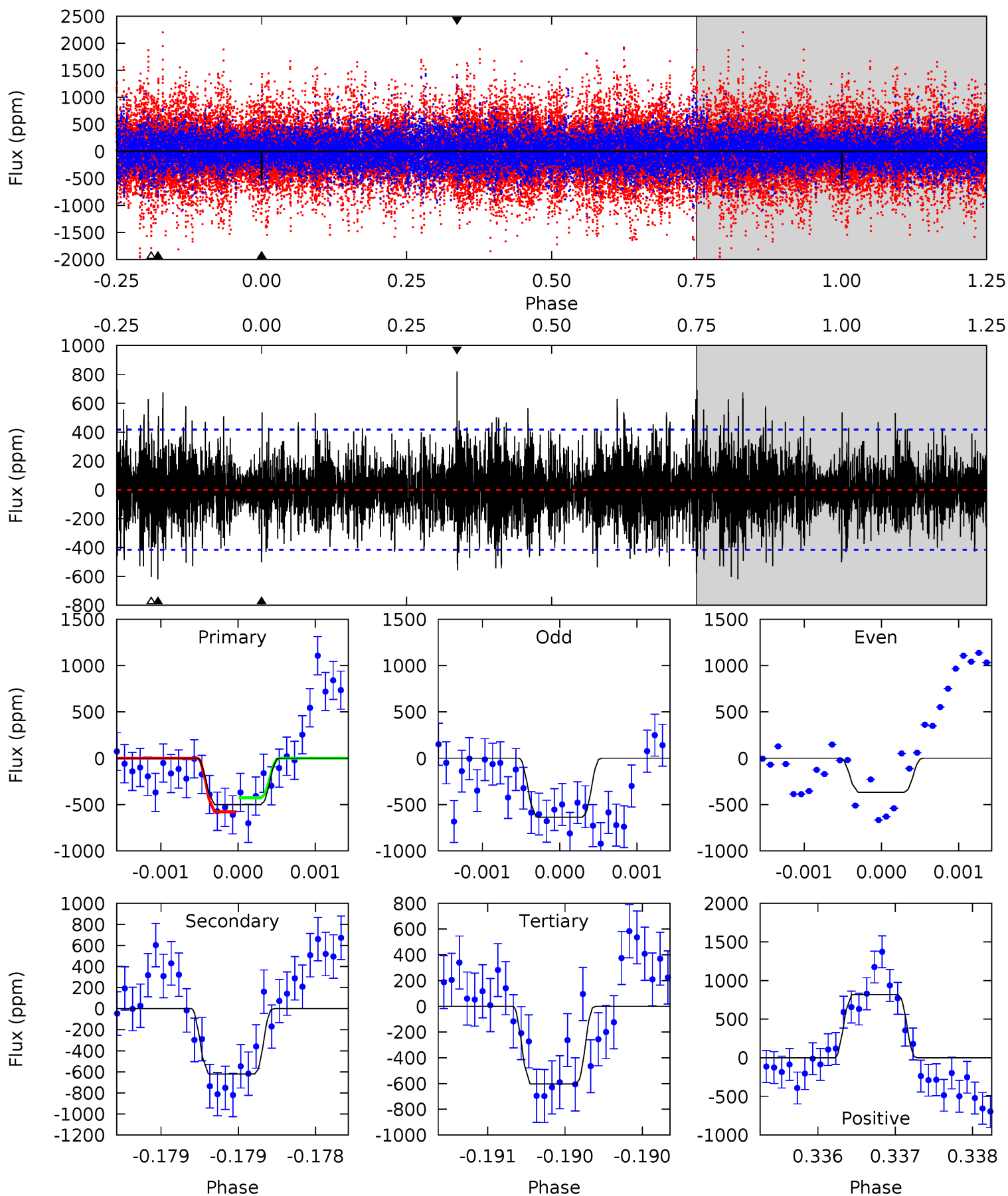
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	10.4	10.2	10.1	5.44	3.27	2.74	3.11	3.16	0.21	0.25	0.14	0.45	0.43	1.18



Alt Model-Shift Uniqueness Test

005220979-02, P = 305.652002 Days, E = 31.415912 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.64	8.24	8.01	10.9	5.53	3.41	2.29	-1.37	-4.23	0.23	-2.64	1.76	0.91	0.57	1.02



Stellar Parameters For KIC 005220979

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7243^{+228}_{-330}	$4.191^{+0.124}_{-0.201}$	$-0.220^{+0.250}_{-0.350}$	$1.575^{+0.508}_{-0.313}$	$1.409^{+0.219}_{-0.219}$	$0.508^{+0.319}_{-0.266}$
	+3%/-5%	+3%/-5%	+114%/-159%	+32%/-20%	+16%/-16%	+63%/-52%
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 005220979-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-525 ± 50	$5.27^{+0.95}_{-0.70}$	569^{+43}_{-40}	6257^{+378}_{-346}	10242^{+3234}_{-2927}
Alt.	-620 ± 75	$4.80^{+0.79}_{-0.60}$	565^{+40}_{-36}	6827^{+460}_{-456}	14489^{+5065}_{-3852}

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

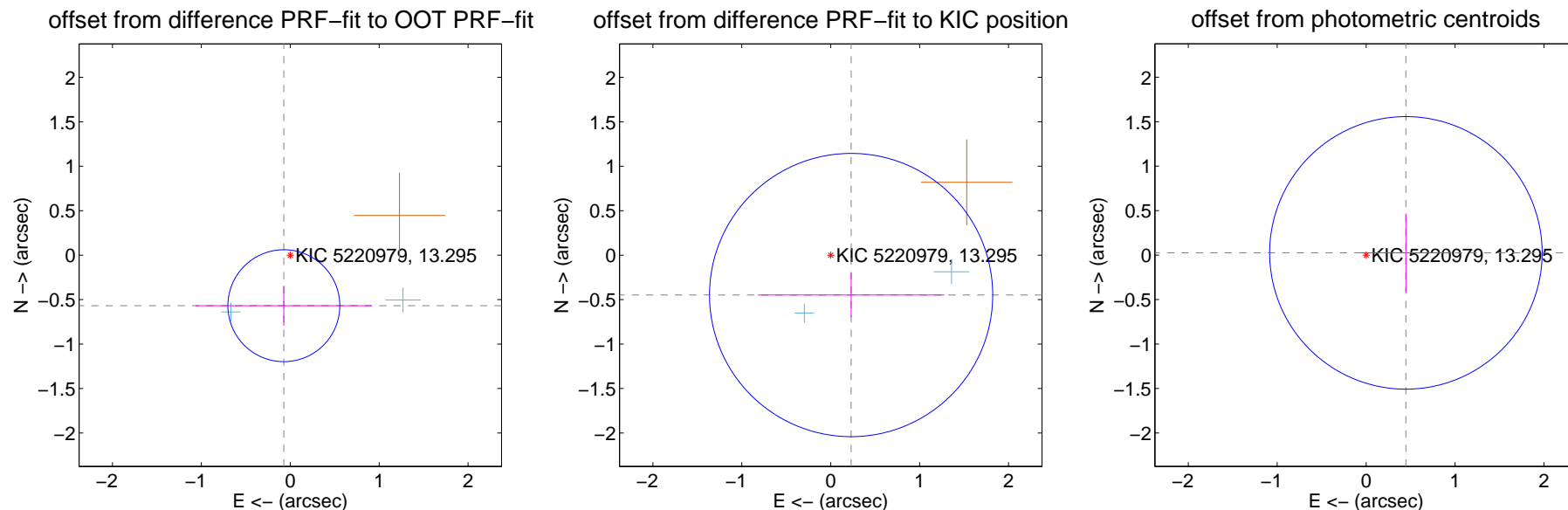
DV Centroid Data

Supplemental centroid analysis for 005220979-02. Kepler magnitude: 13.29. Transit SNR 8.09

There are 2 quarters with good PRF difference image offsets

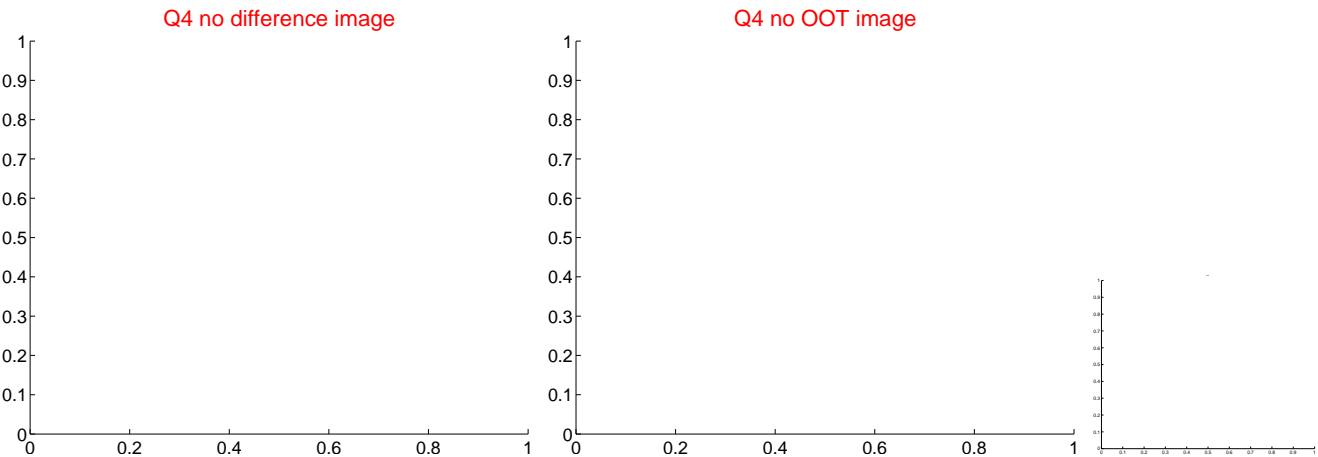
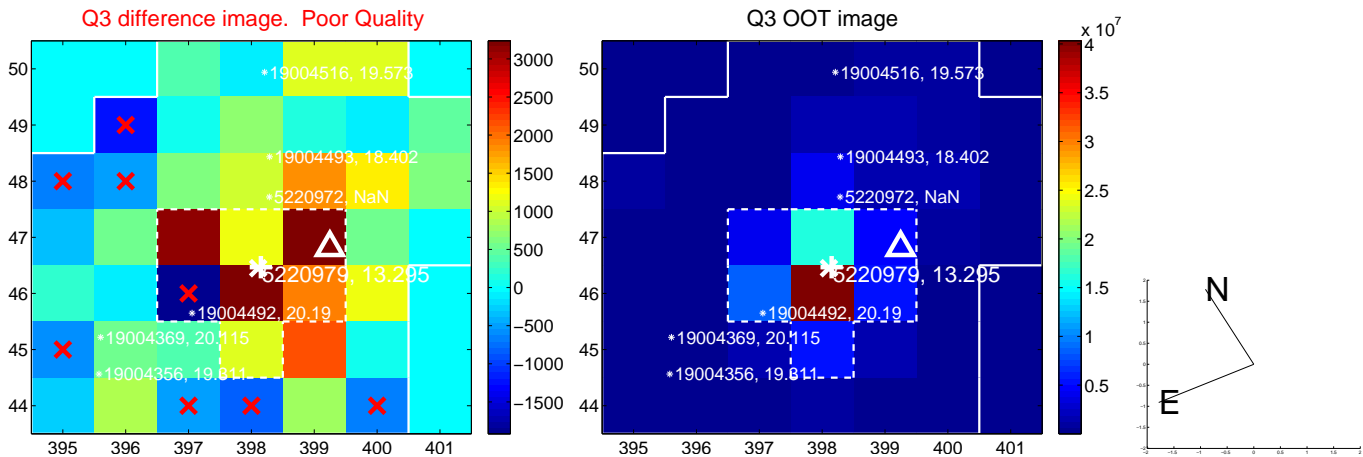
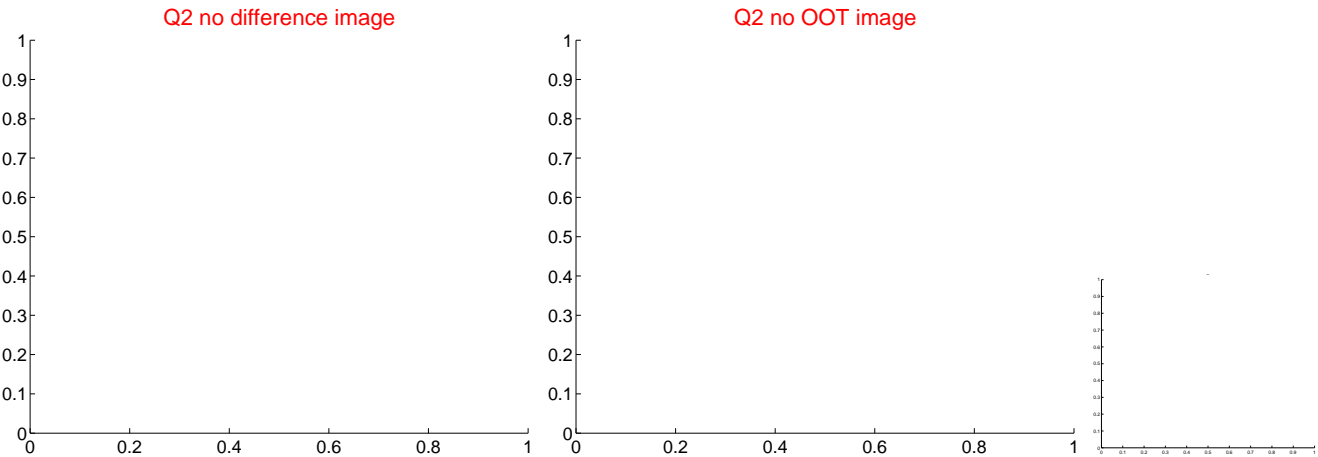
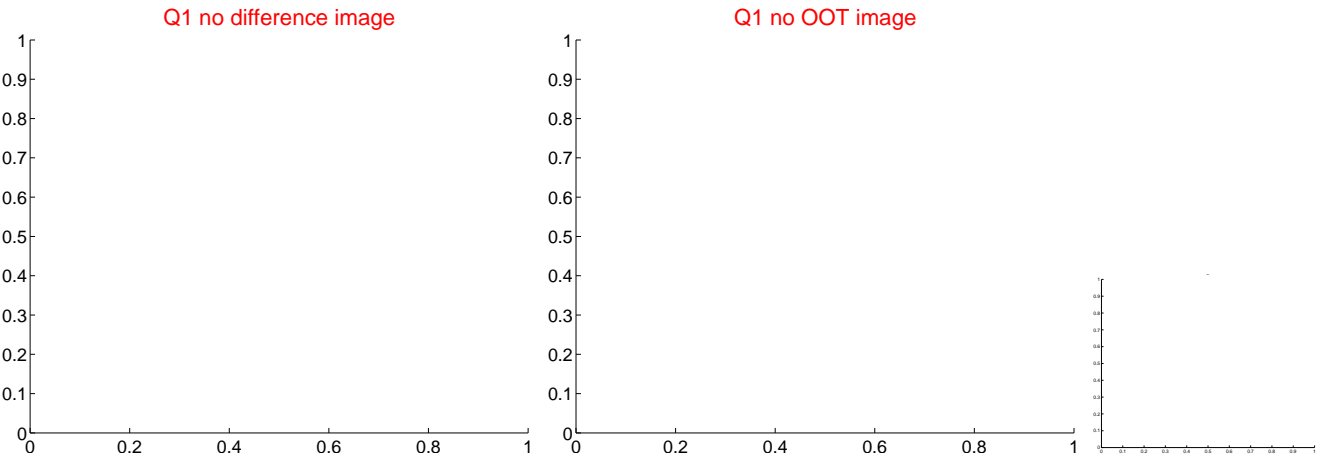
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.573 ± 0.210	2.73	0.072 ± 0.993	-0.569 ± 0.226
PRF-fit source offset from KIC position	0.504 ± 0.531	0.95	-0.229 ± 1.048	-0.449 ± 0.252
photometric centroid source offset	0.45 ± 0.51	0.88	-0.45 ± 0.51	0.02 ± 0.44

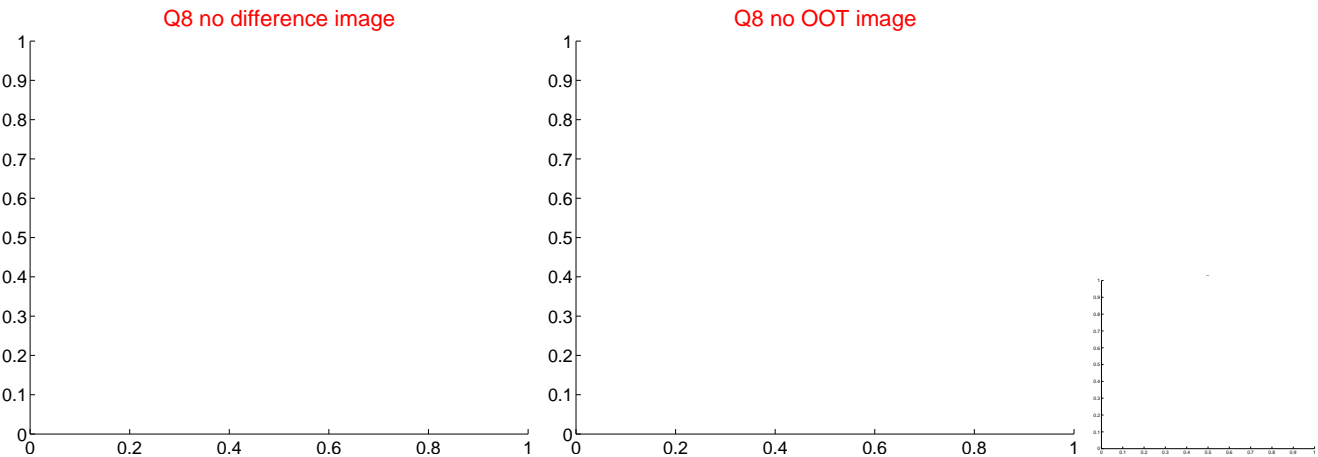
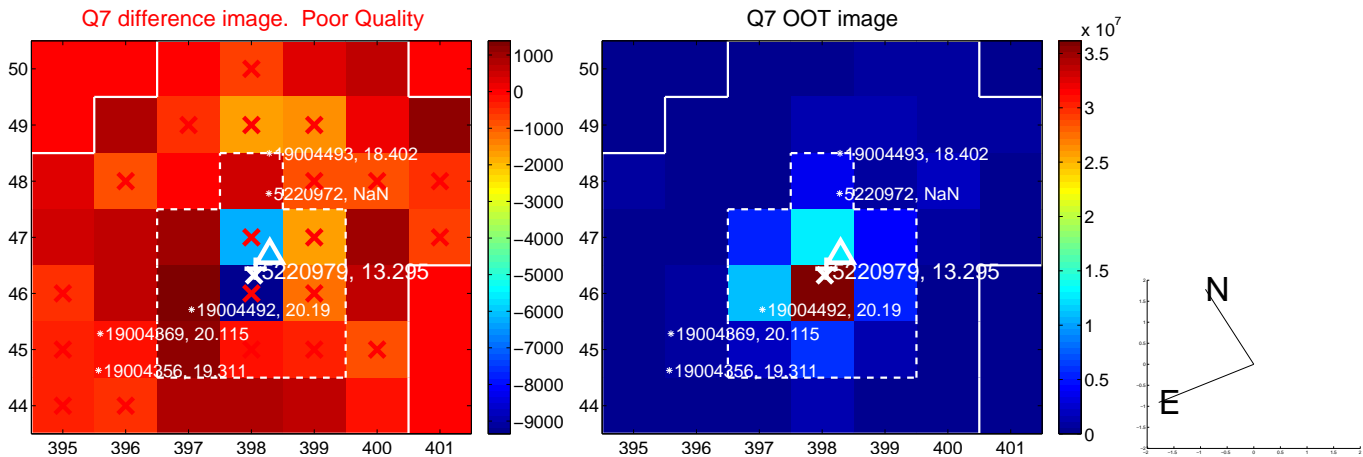
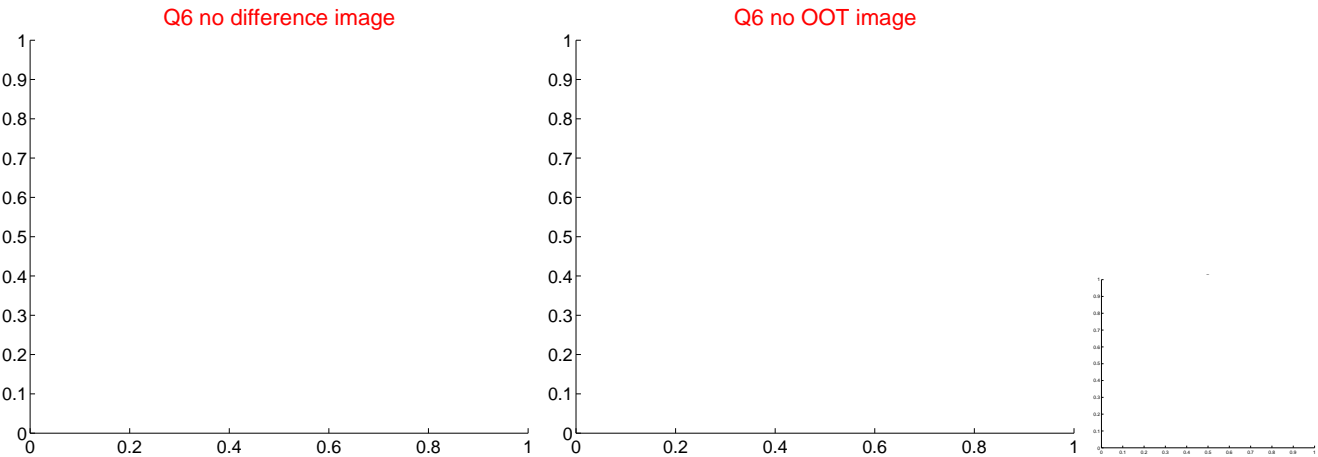
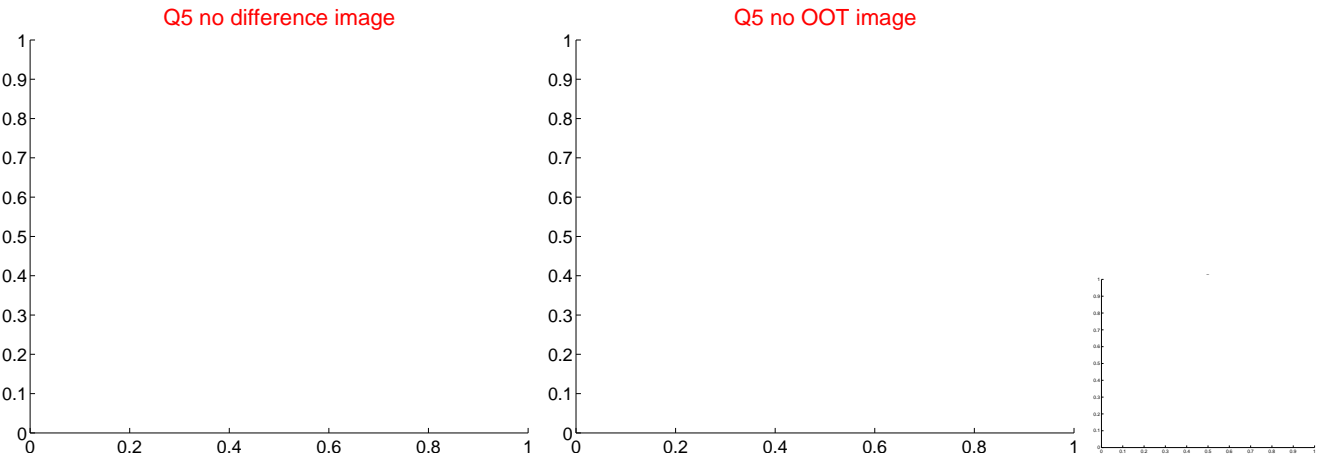


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

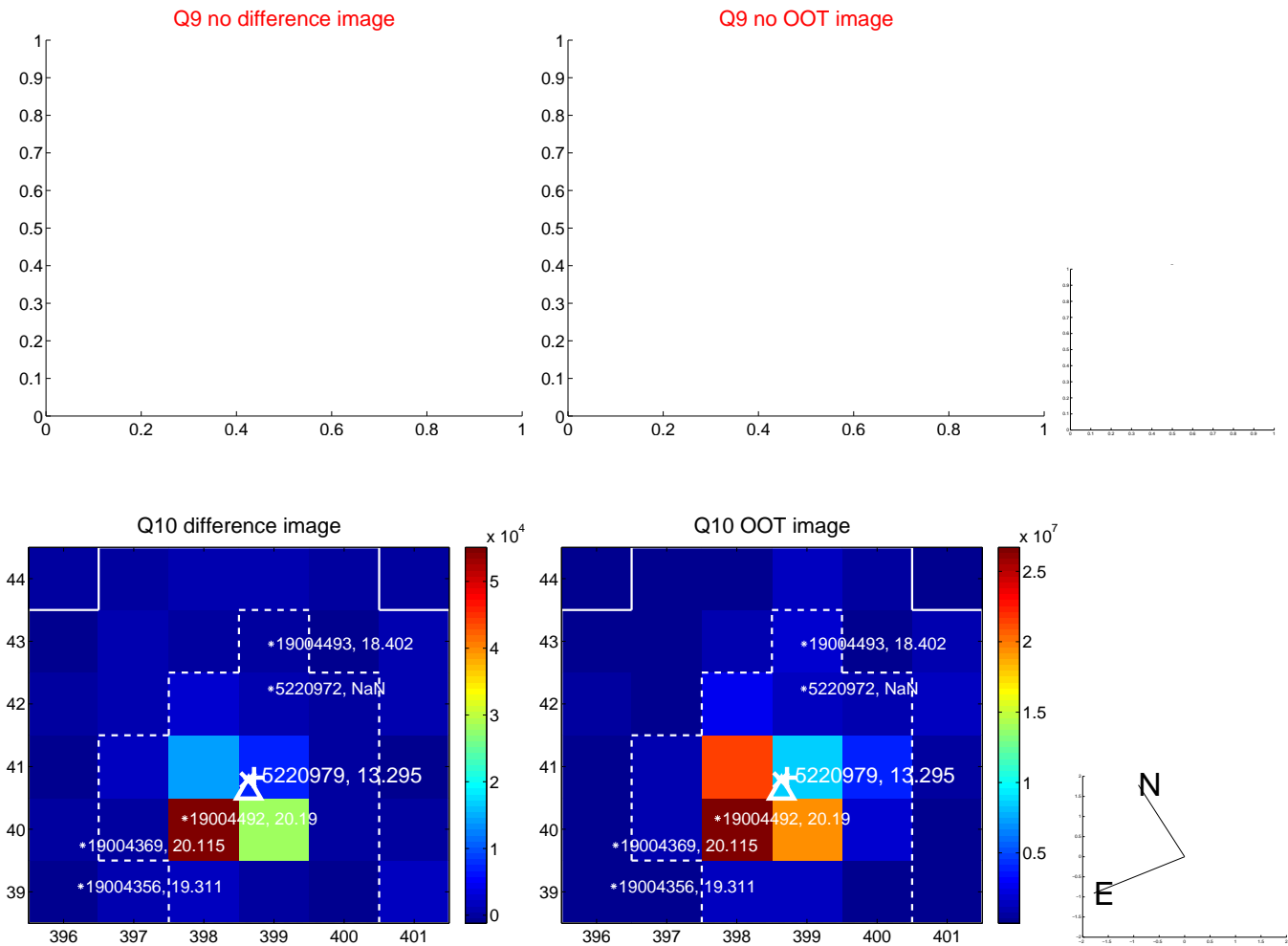
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



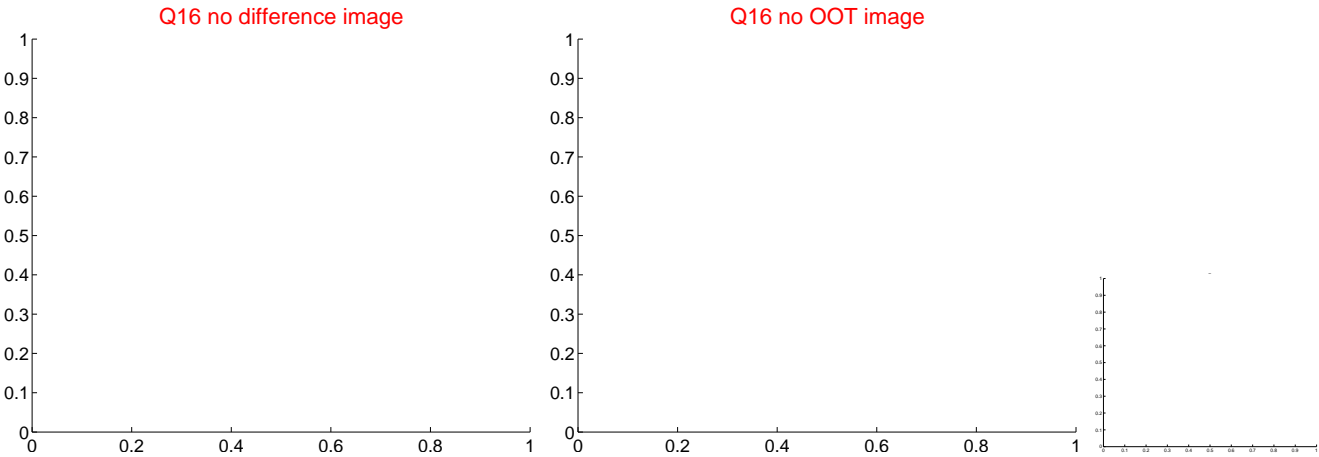
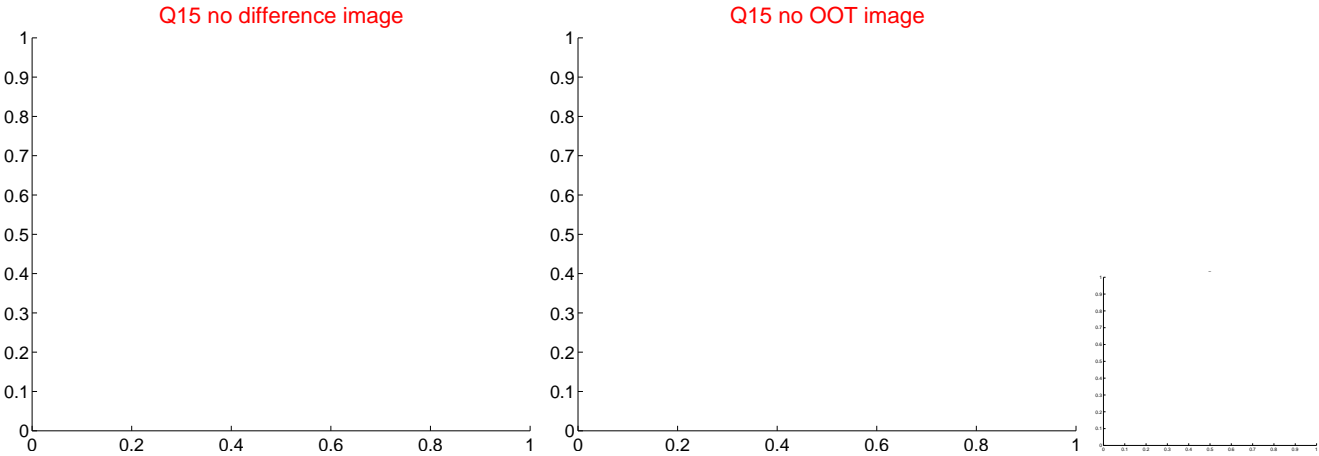
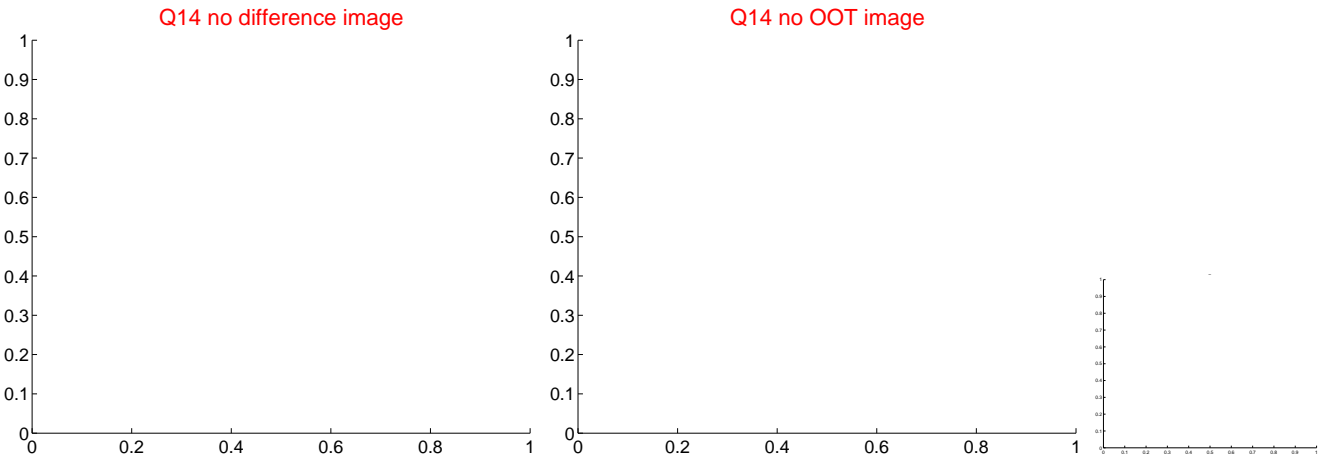
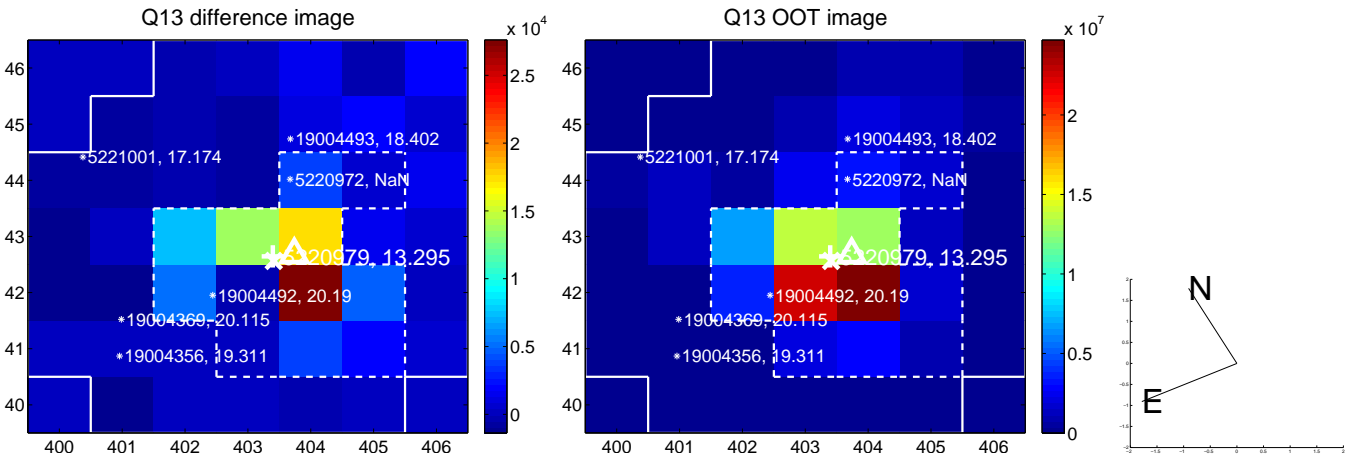
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



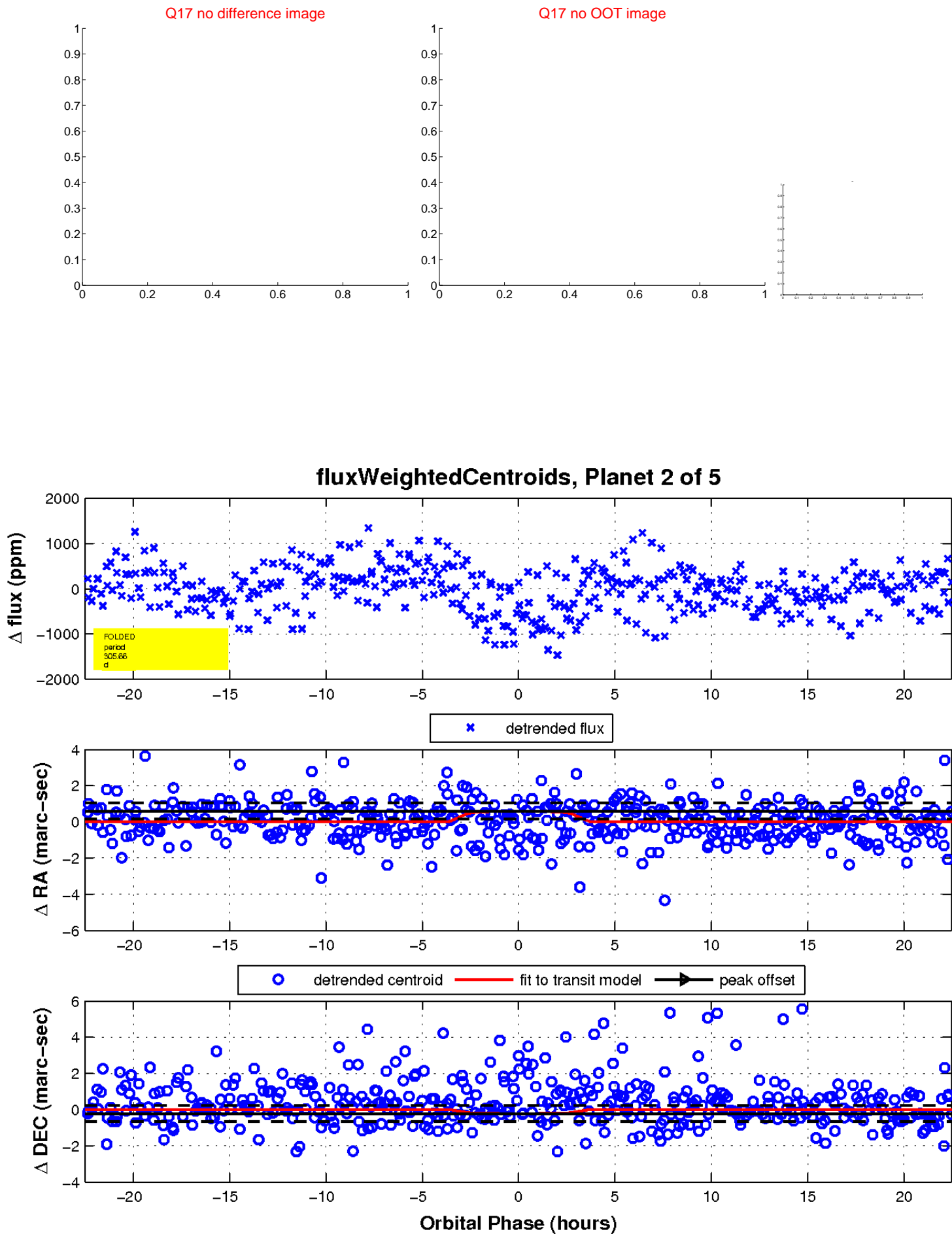
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

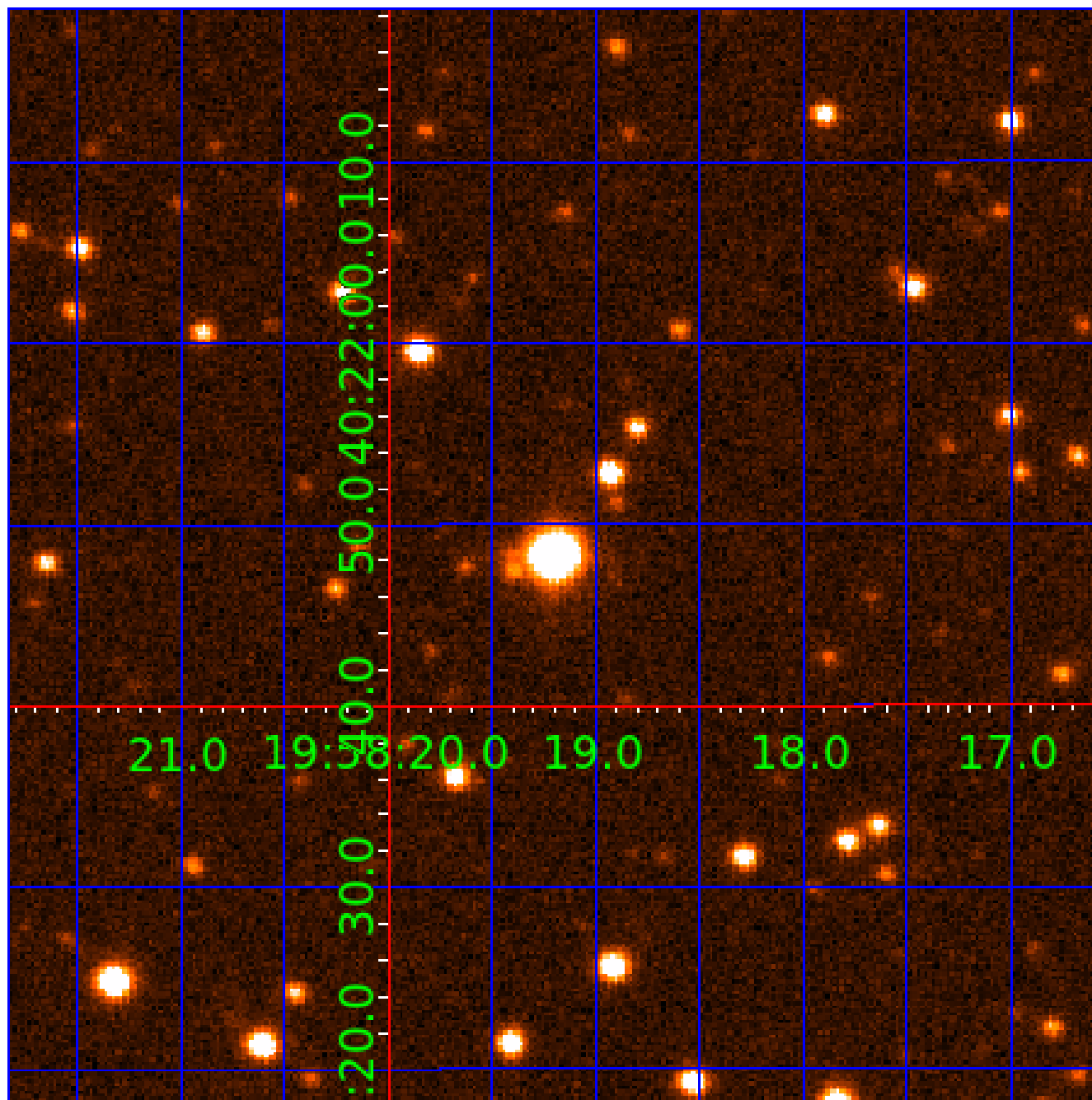


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005220979

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})
005220979-01	OBS	No	1.525545	131.939085	55.6	3.924	8.8	9.1	1.57	7243	1.34	7247.51
005220979-02	OBS	No	305.657247	337.106427	761.1	7.516	8.7	8.1	1.57	7243	5.13	6.18
005220979-03	OBS	No	4.610258	133.813783	46.3	14.171	7.7	6.4	1.57	7243	1.15	1658.78
005220979-04	OBS	No	122.082853	227.858803	361.0	11.916	8.3	4.5	1.57	7243	3.21	21.02
005220979-05	OBS	No	75.159273	173.397799	414.2	3.164	7.6	6.5	1.57	7243	3.59	40.13

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005220979-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
005220979-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005220979-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005220979-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005220979-05	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

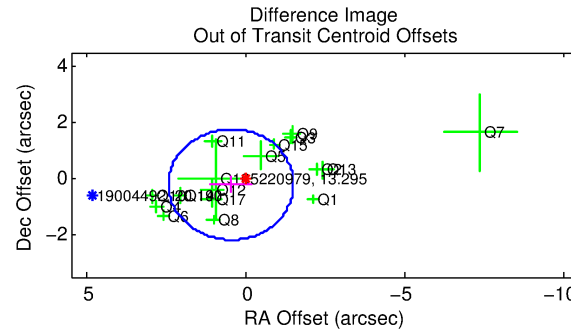
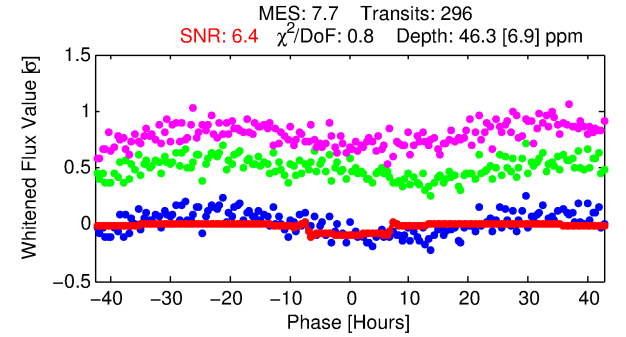
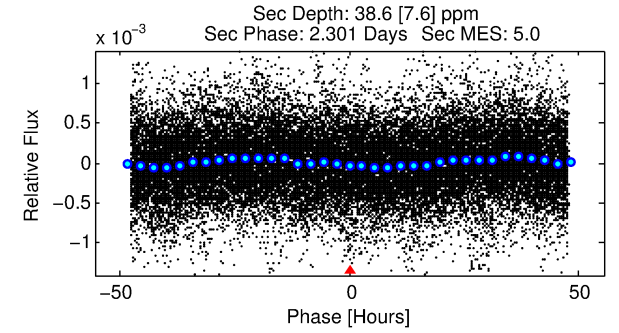
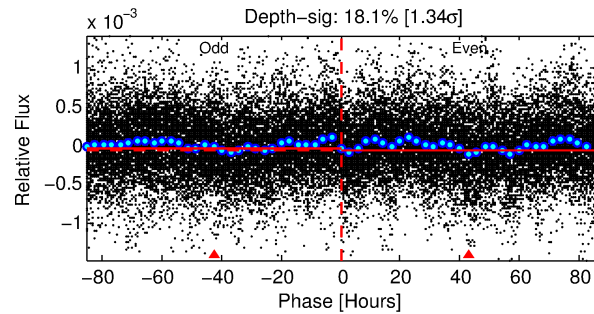
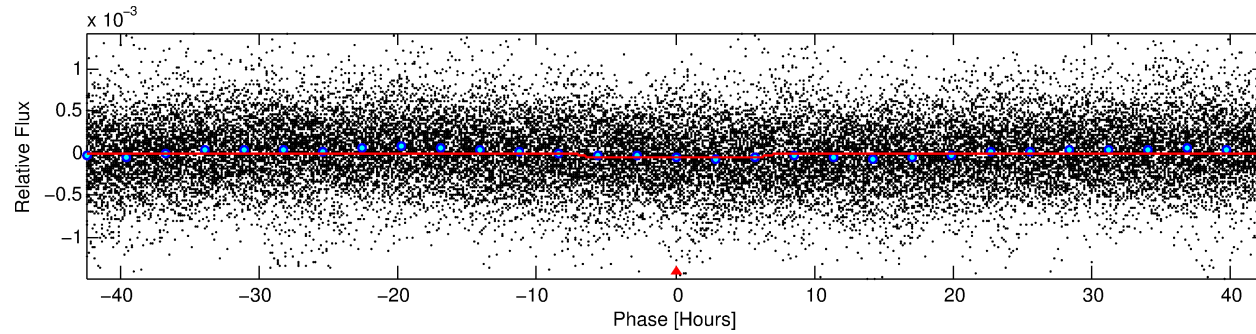
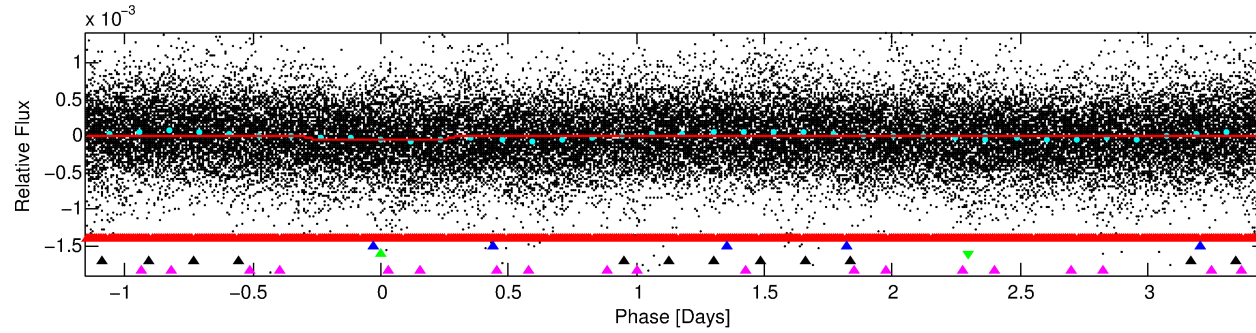
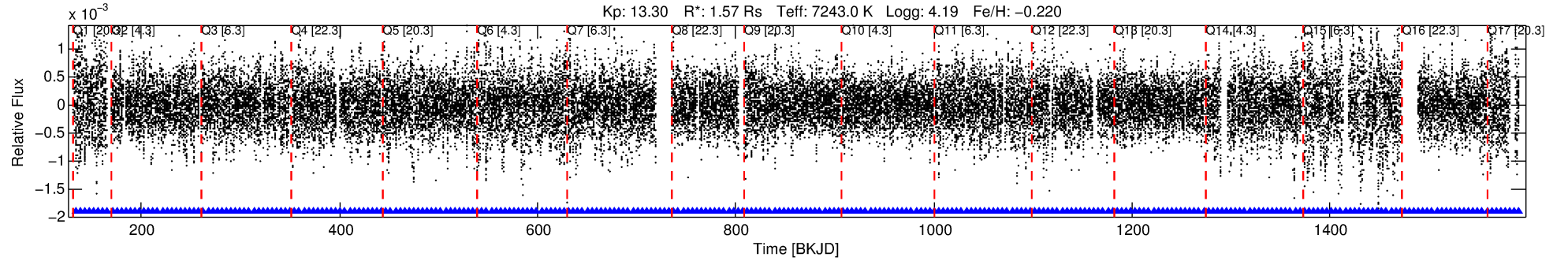
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005220979-03

No Significant Match Found

DV One-Page Summary

KIC: 5220979 Candidate: 3 of 5 Period: 4.610 d



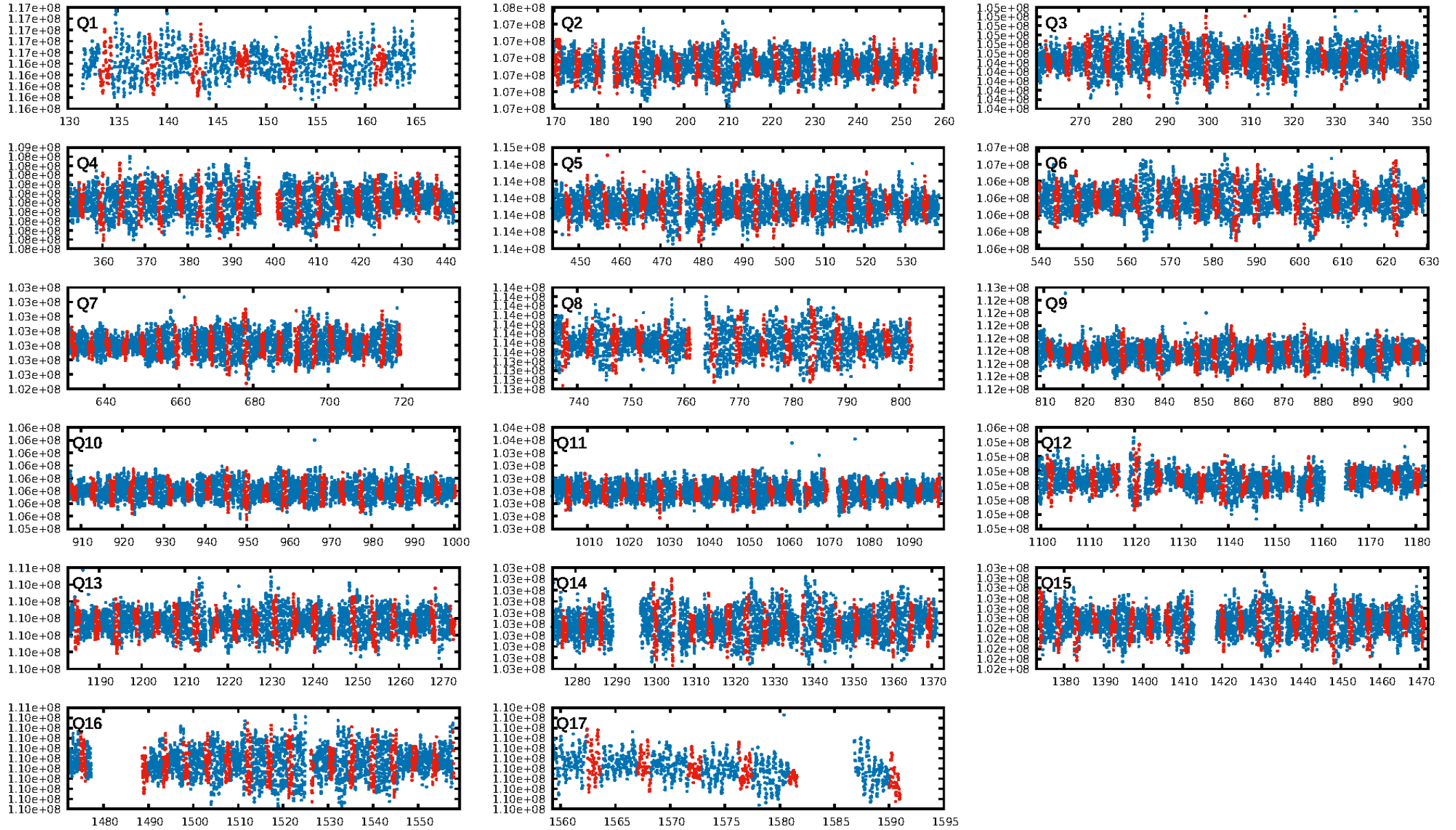
DV Fit Results:

Period = 4.61026 [0.00007] d
Epoch = 133.8138 [0.0097] BKJD
Rp/R* = 0.0067 [0.0017]
a/R* = 1.95 [2.20]
b = 0.71 [1.06]
Seff = 1658.78 [693.22]
Teff = 1627 [170] K
Rp = 1.15 [0.48] Re
a = 0.0607 [0.0161] AU
Ag = 59.05 [39.64] [1.46 σ]
Teffp = 6974 [1020] K [5.17 σ]

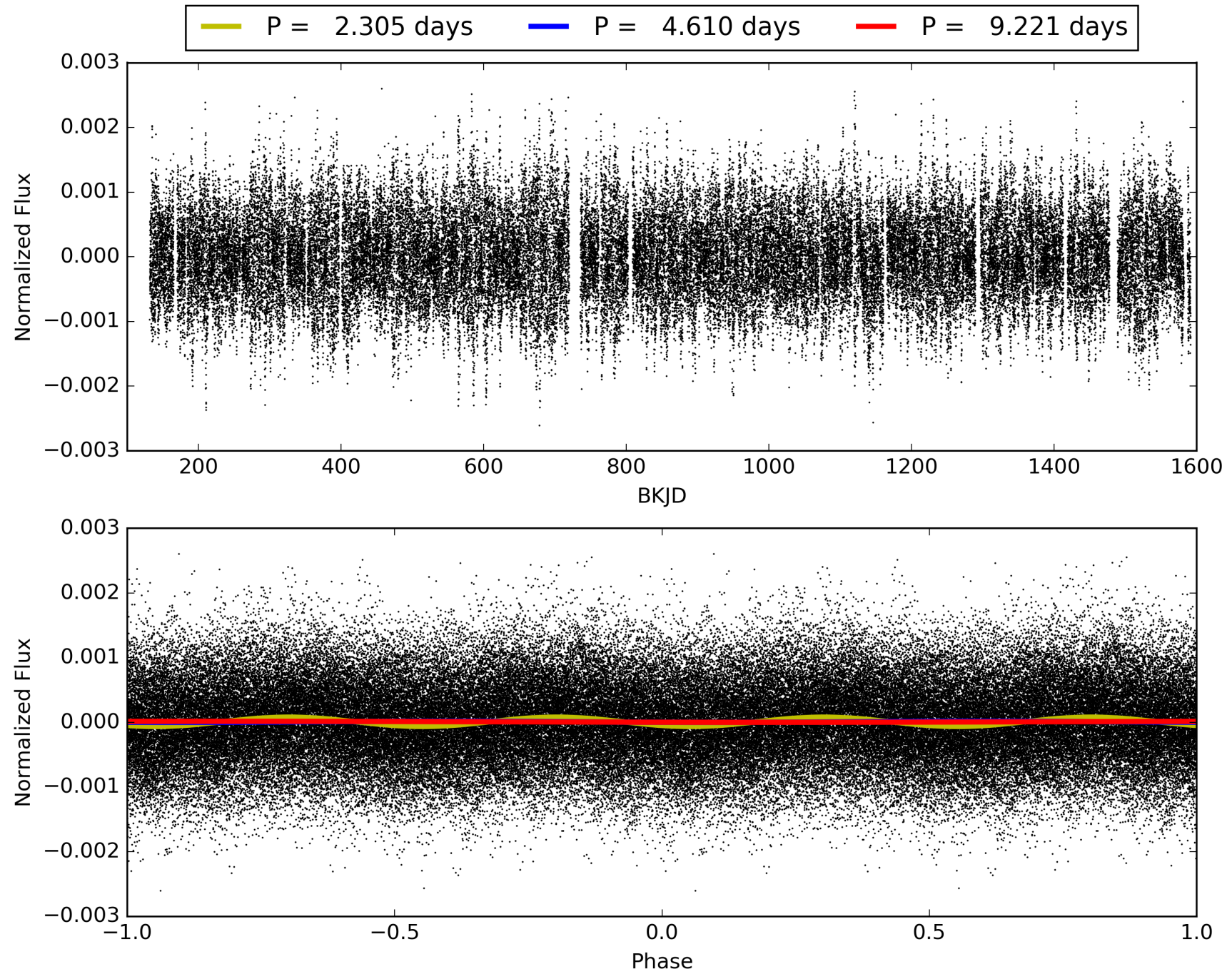
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.03 σ]
LongPeriod-sig: 100.0% [116.61 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.21e-15
RollingBand-fgt: 1.00 [283/283]
GhostDiagnostic-chr: 2.851
Centroid-sig: 63.3%
Centroid-so: 0.742 arcsec [1.07 σ]
OotOffset-rm: 0.514 arcsec [0.78 σ]
KicOffset-rm: 0.250 arcsec [0.41 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.88 [15/17]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 005220979-03, PDC Light Curves

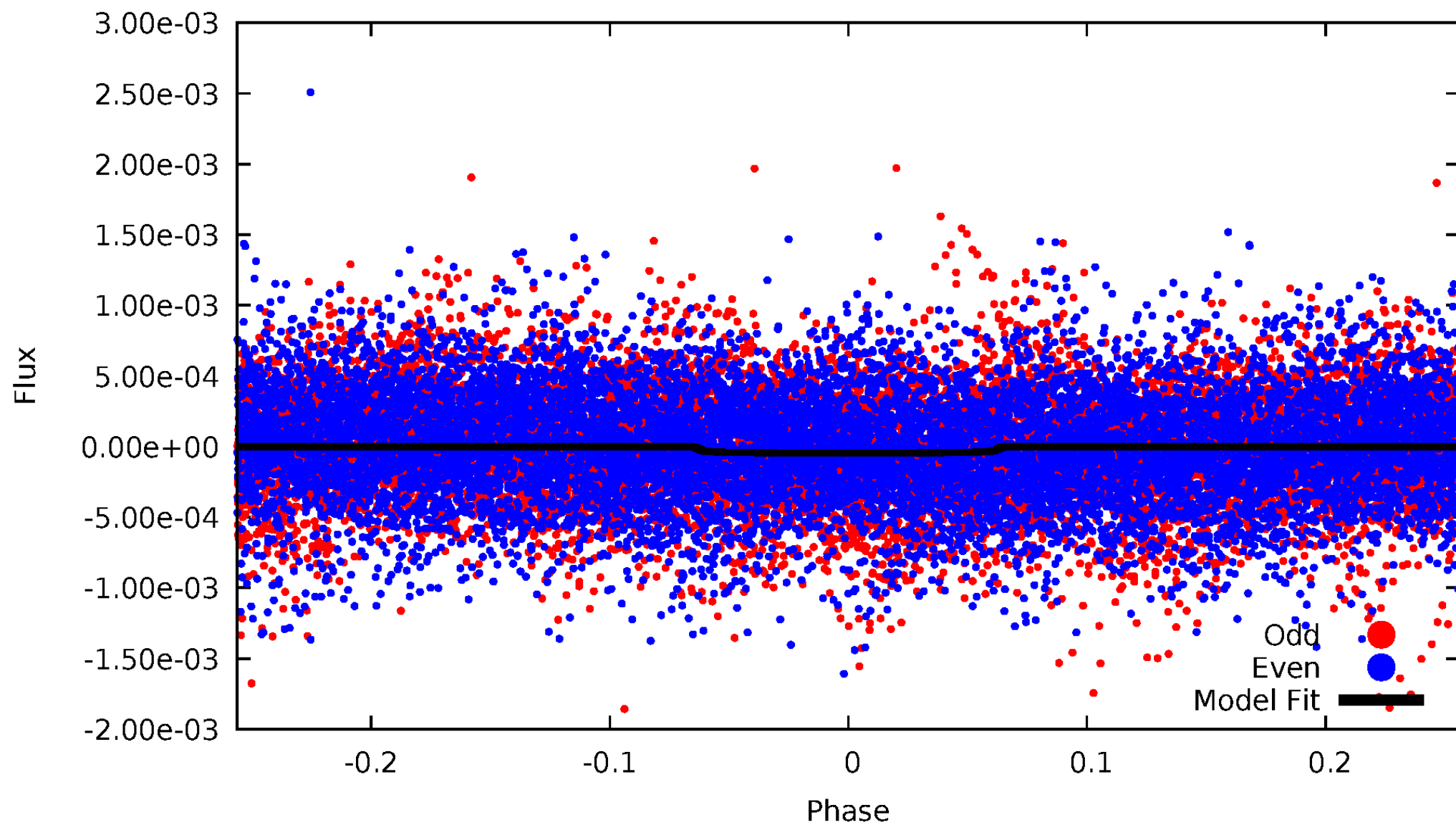


TCE 005220979-03



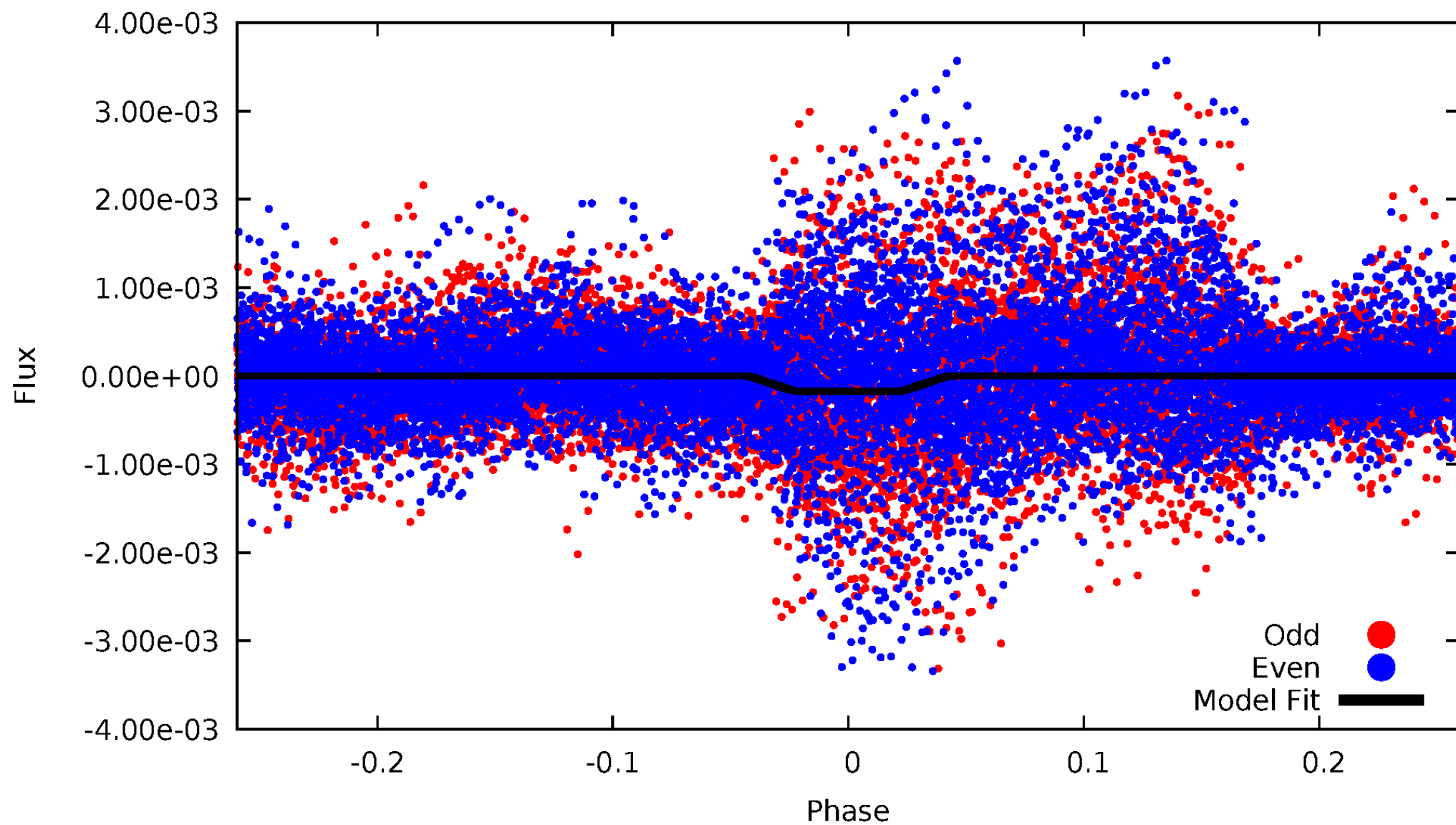
DV Odd/Even

TCE 005220979-03



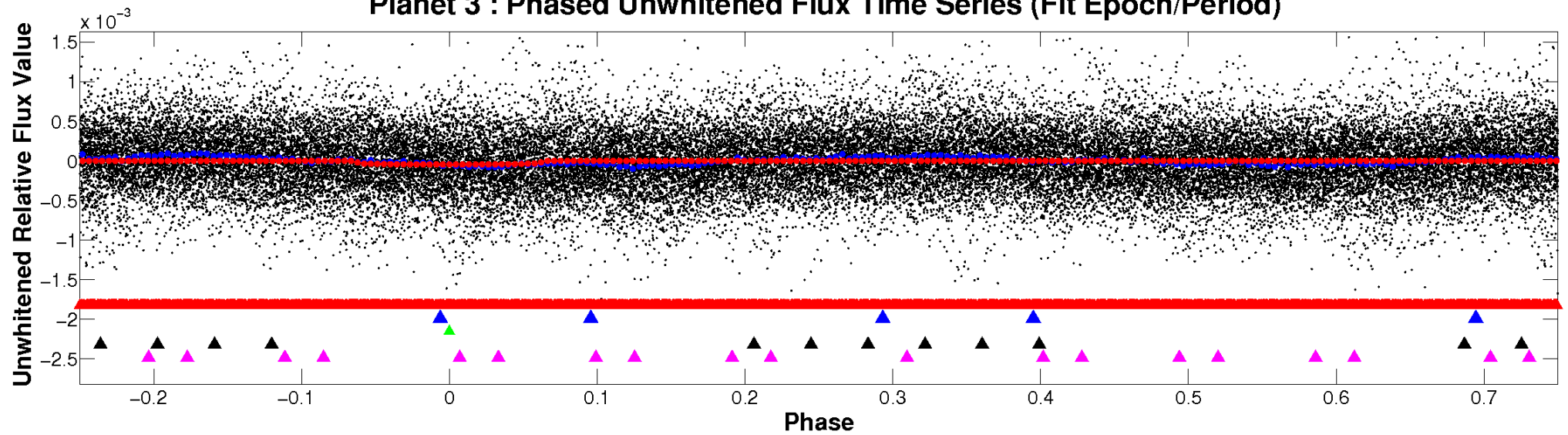
ALT Odd/Even

TCE 005220979-03

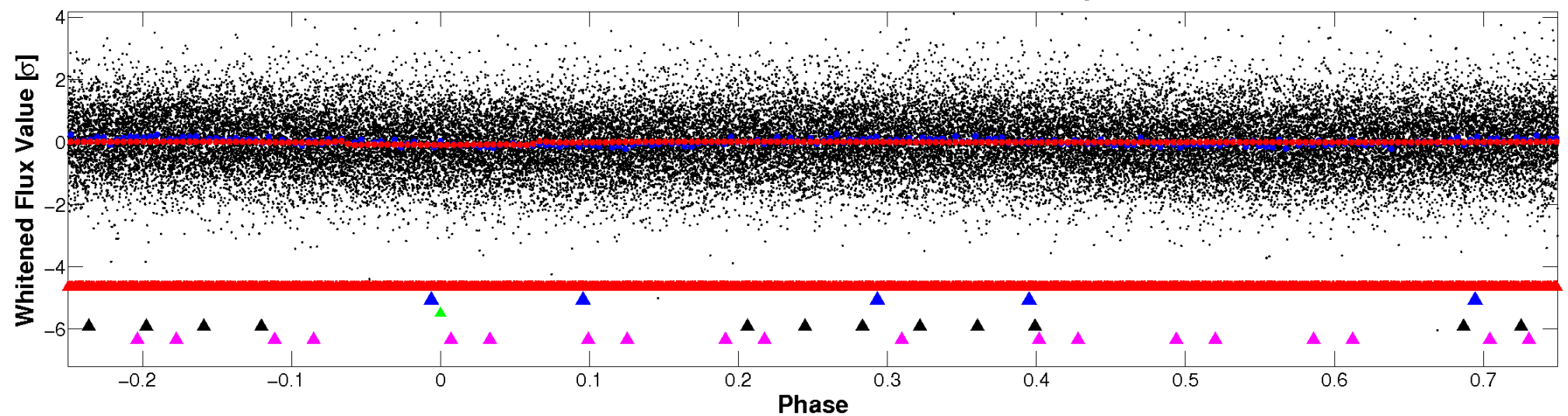


Non-Whitened Vs. Whitened Light Curve

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

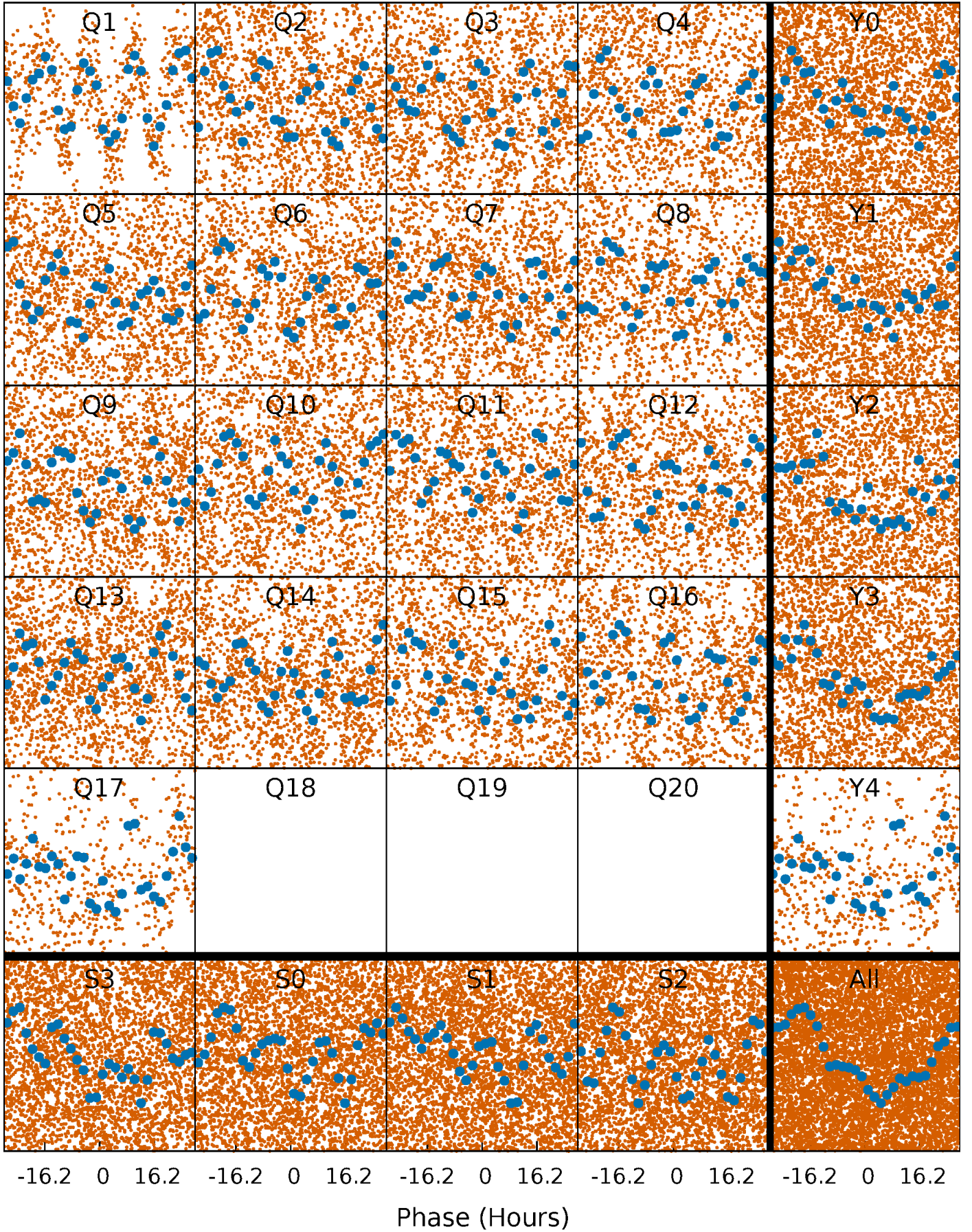


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



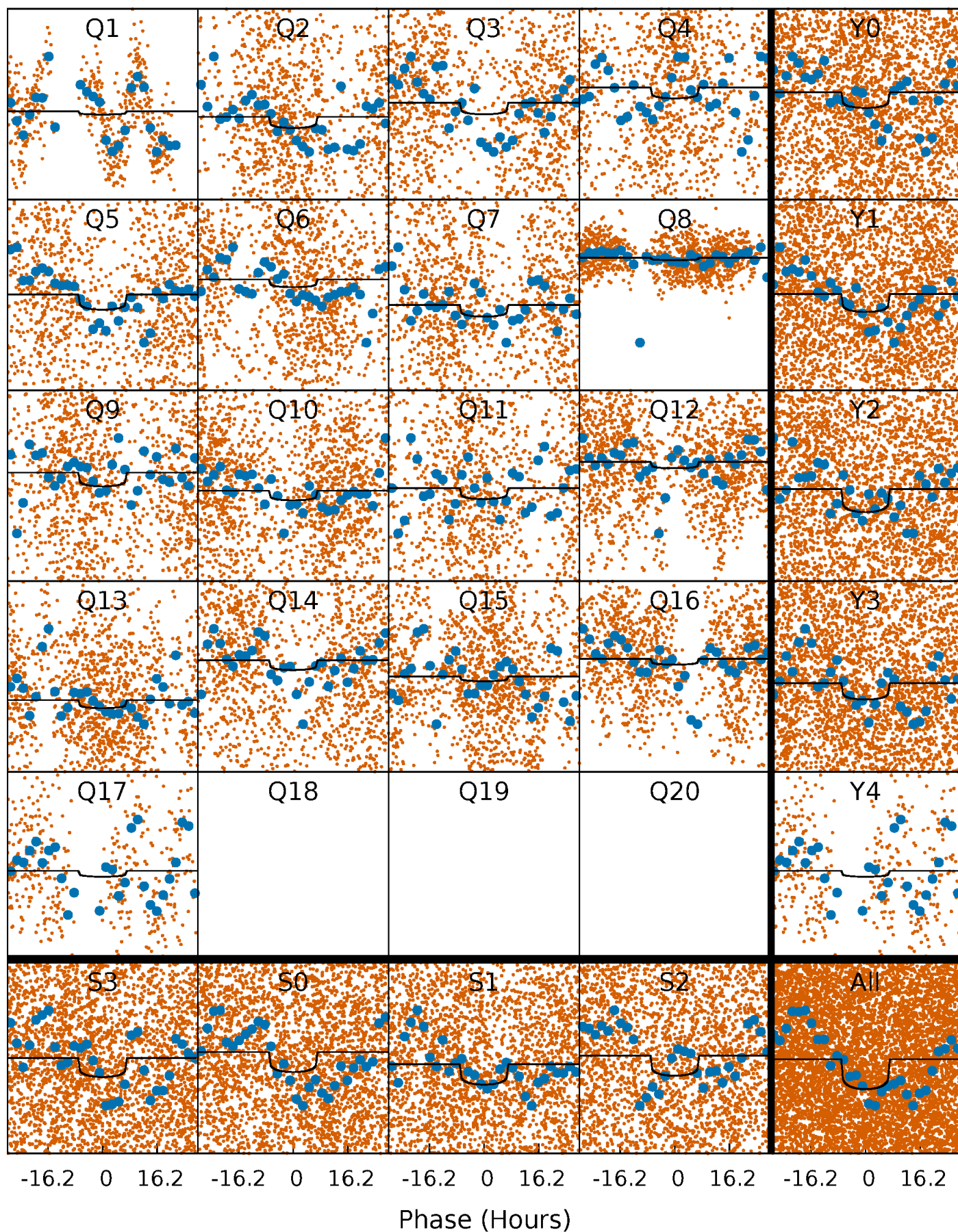
PDC Quarter-Phased Transit Curves

TCE 005220979-03 P= 4.610258 Days $T_0=133.813783$ (BKJD)



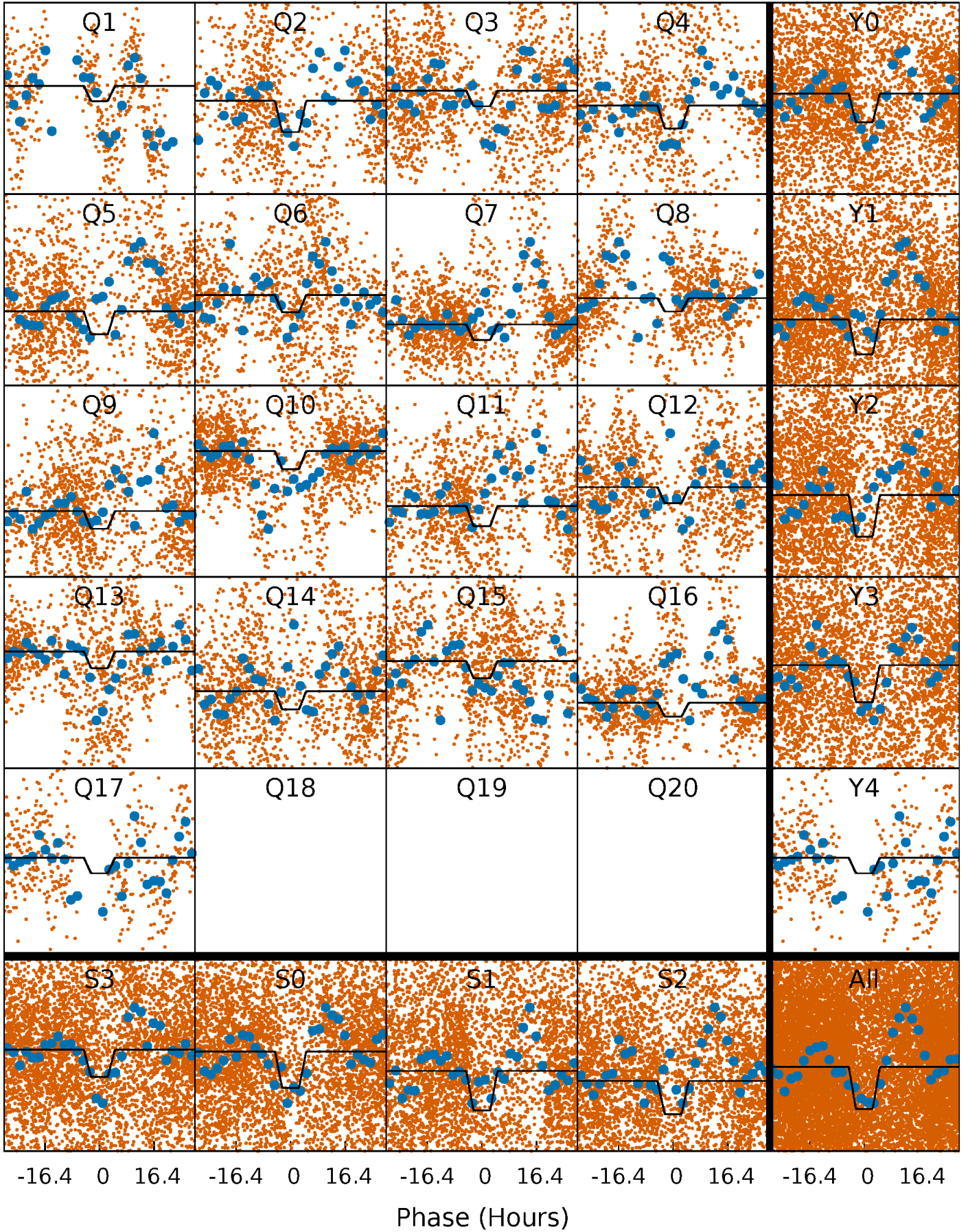
DV Quarter-Phased Transit Curves

TCE 005220979-03 P= 4.610258 Days $T_0=133.813783$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

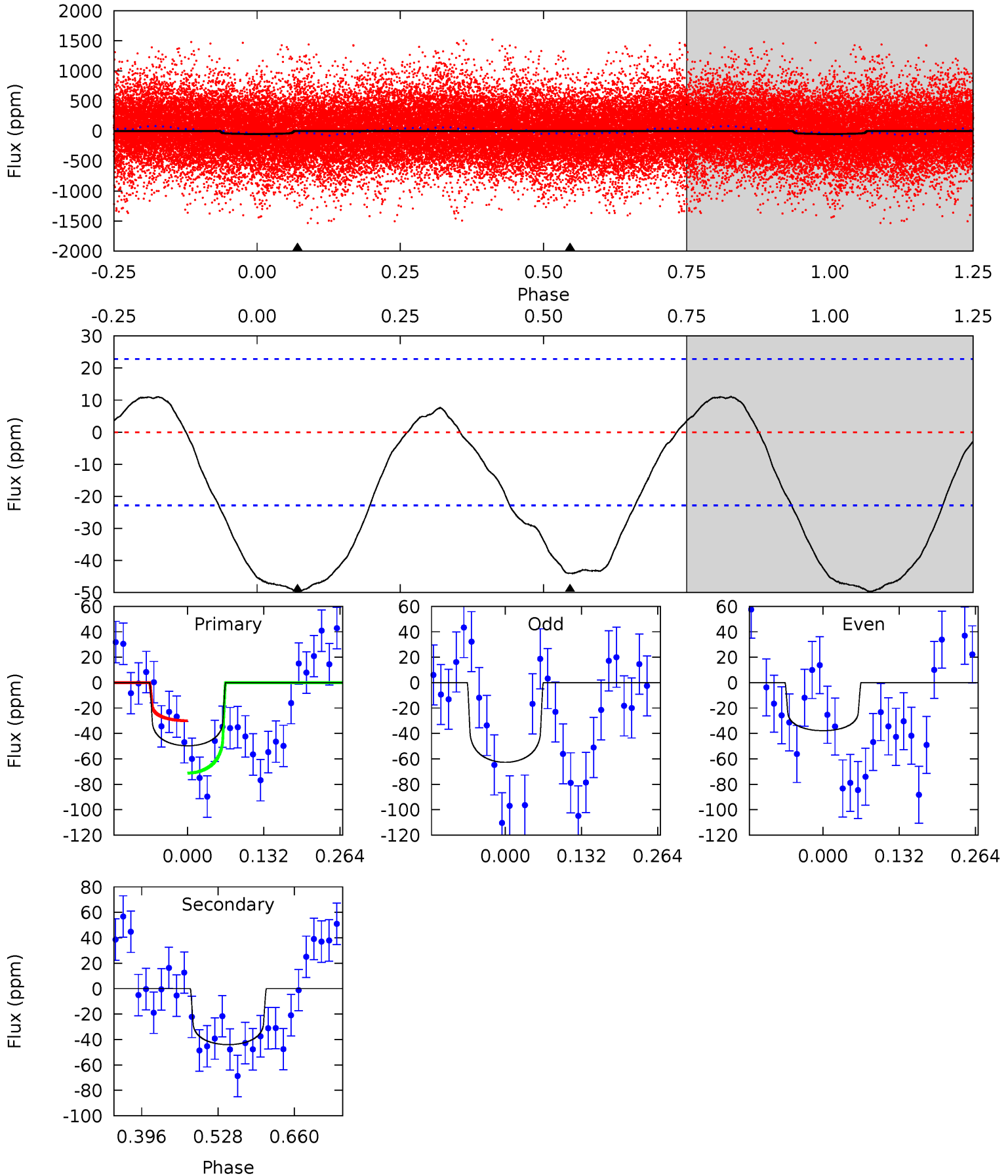
TCE 005220979-03 P= 4.609983 Days $T_0=133.826387$ (BKJD)



DV Model-Shift Uniqueness Test

005220979-03, P = 4.610258 Days, E = 129.203525 Days

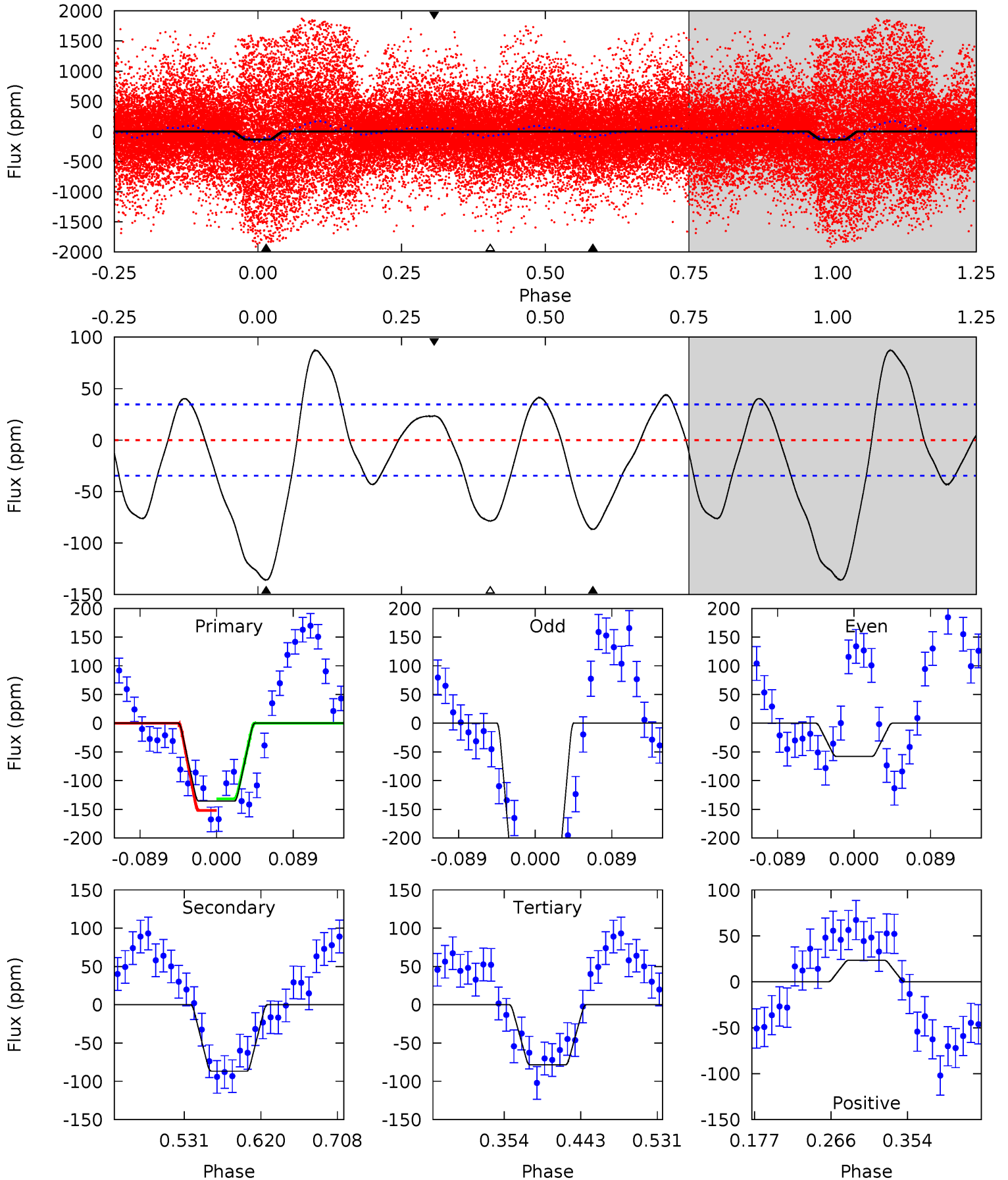
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.80	8.68	0	0	4.51	1.51	1.79	9.80	9.80	8.68	8.68	2.47	1.76	0.18	4.05



Alt Model-Shift Uniqueness Test

005220979-03, P = 4.609983 Days, E = 129.216404 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.1	11.5	10.4	3.12	4.59	1.70	5.44	7.62	14.9	1.09	8.41	18.6	0.88	0.39	1.36



Stellar Parameters For KIC 005220979

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7243^{+228}_{-330}	$4.191^{+0.124}_{-0.201}$	$-0.220^{+0.250}_{-0.350}$	$1.575^{+0.508}_{-0.313}$	$1.409^{+0.219}_{-0.219}$	$0.508^{+0.319}_{-0.266}$
	+3%/-5%	+3%/-5%	+114%/-159%	+32%/-20%	+16%/-16%	+63%/-52%
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 005220979-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-44 ± 5	$1.19^{+0.38}_{-0.34}$	2295^{+194}_{-155}	7195^{+1437}_{-968}	63^{+62}_{-27}
Alt.	-87 ± 8	$2.32^{+0.48}_{-0.43}$	2297^{+187}_{-159}	5996^{+516}_{-427}	32^{+15}_{-10}

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

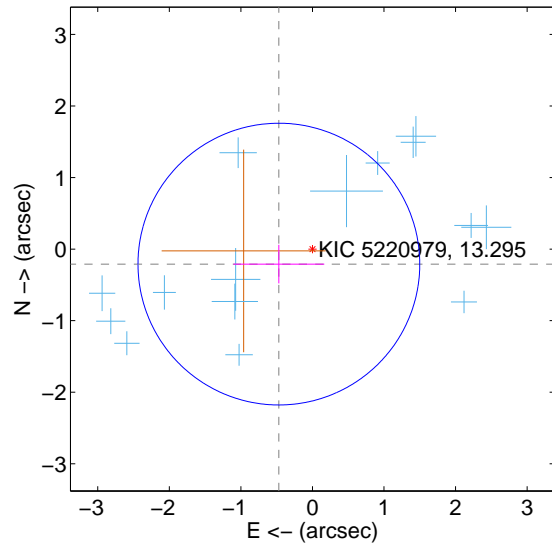
Supplemental centroid analysis for 005220979-03. Kepler magnitude: 13.29. Transit SNR 6.36

There are 15 quarters with good PRF difference image offsets

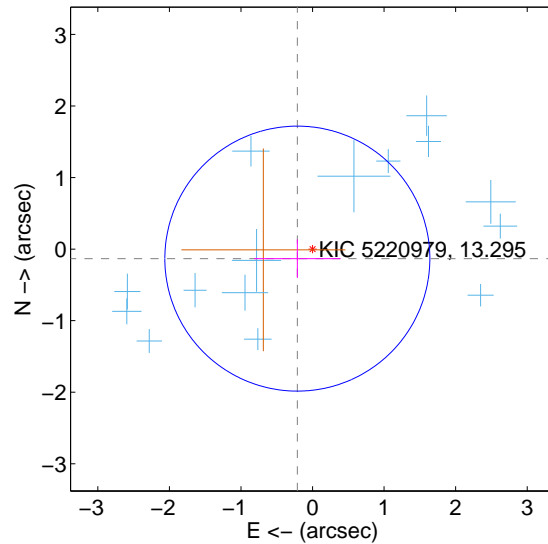
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.514 ± 0.656	0.78	0.469 ± 0.635	-0.210 ± 0.269
PRF-fit source offset from KIC position	0.250 ± 0.617	0.41	0.212 ± 0.605	-0.133 ± 0.269
photometric centroid source offset	0.74 ± 0.69	1.07	0.44 ± 0.79	-0.60 ± 0.63

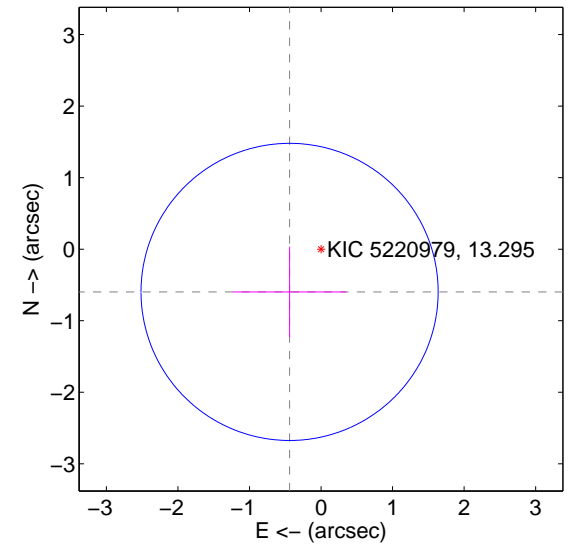
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

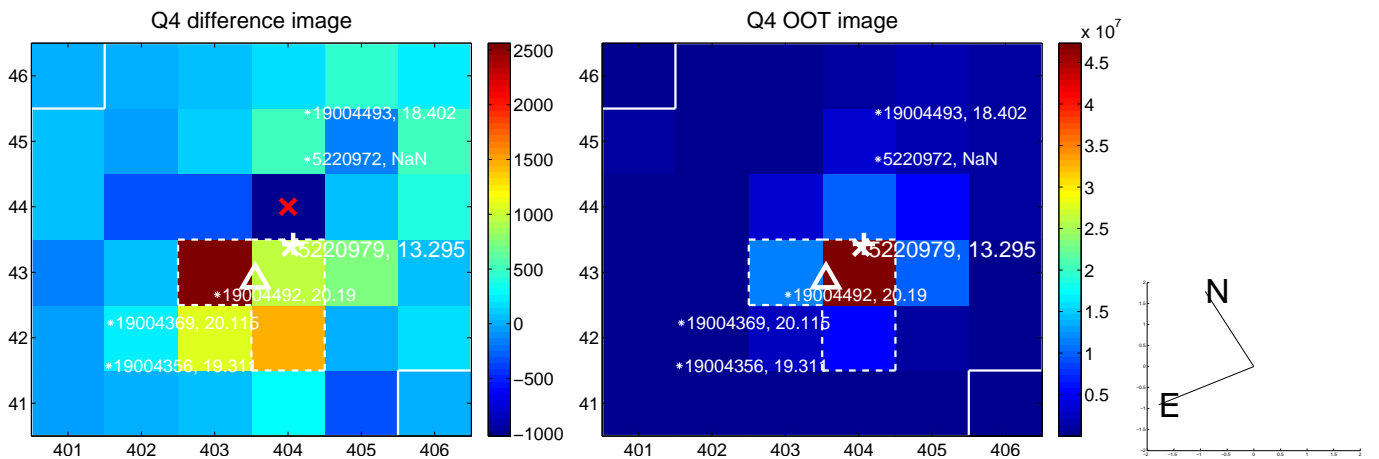
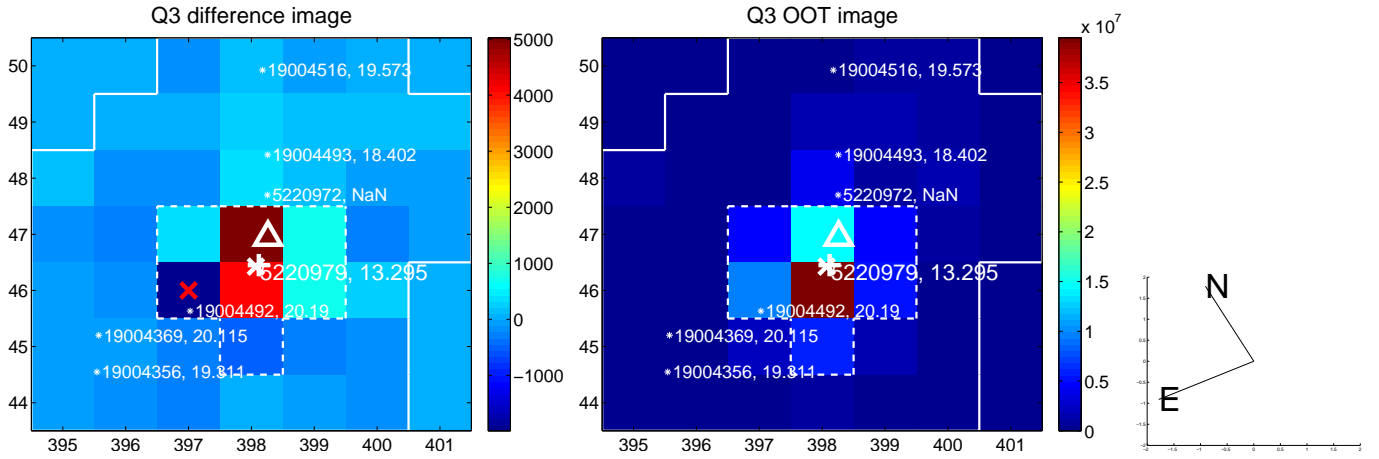
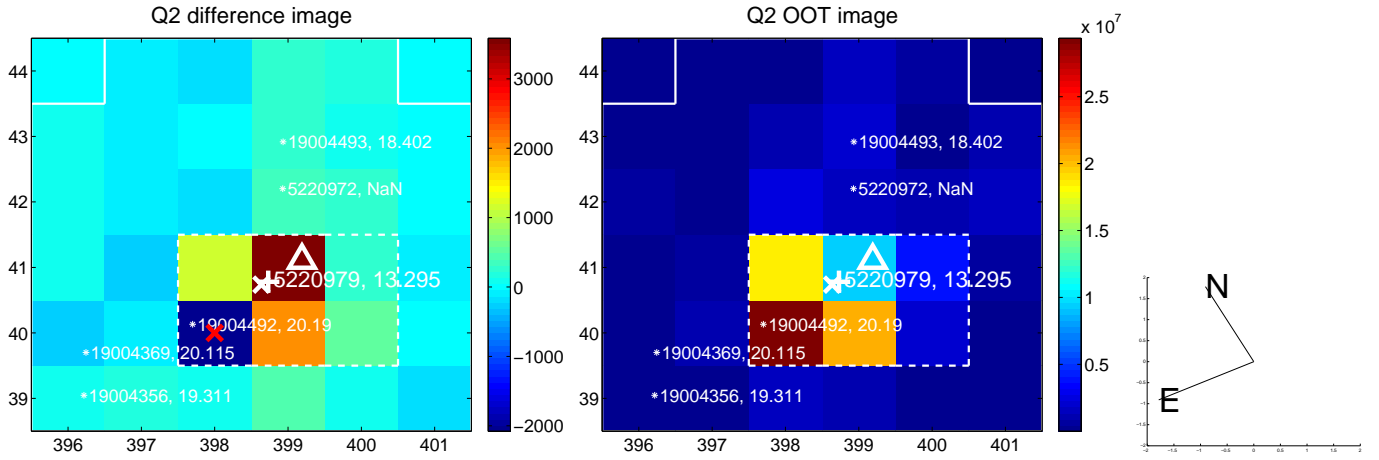
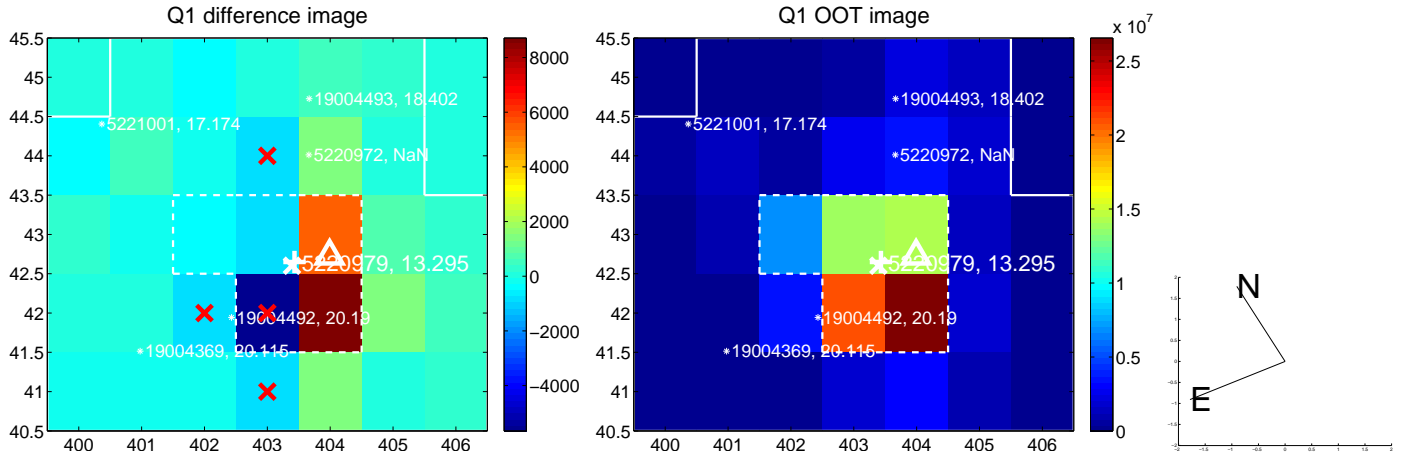


offset from photometric centroids

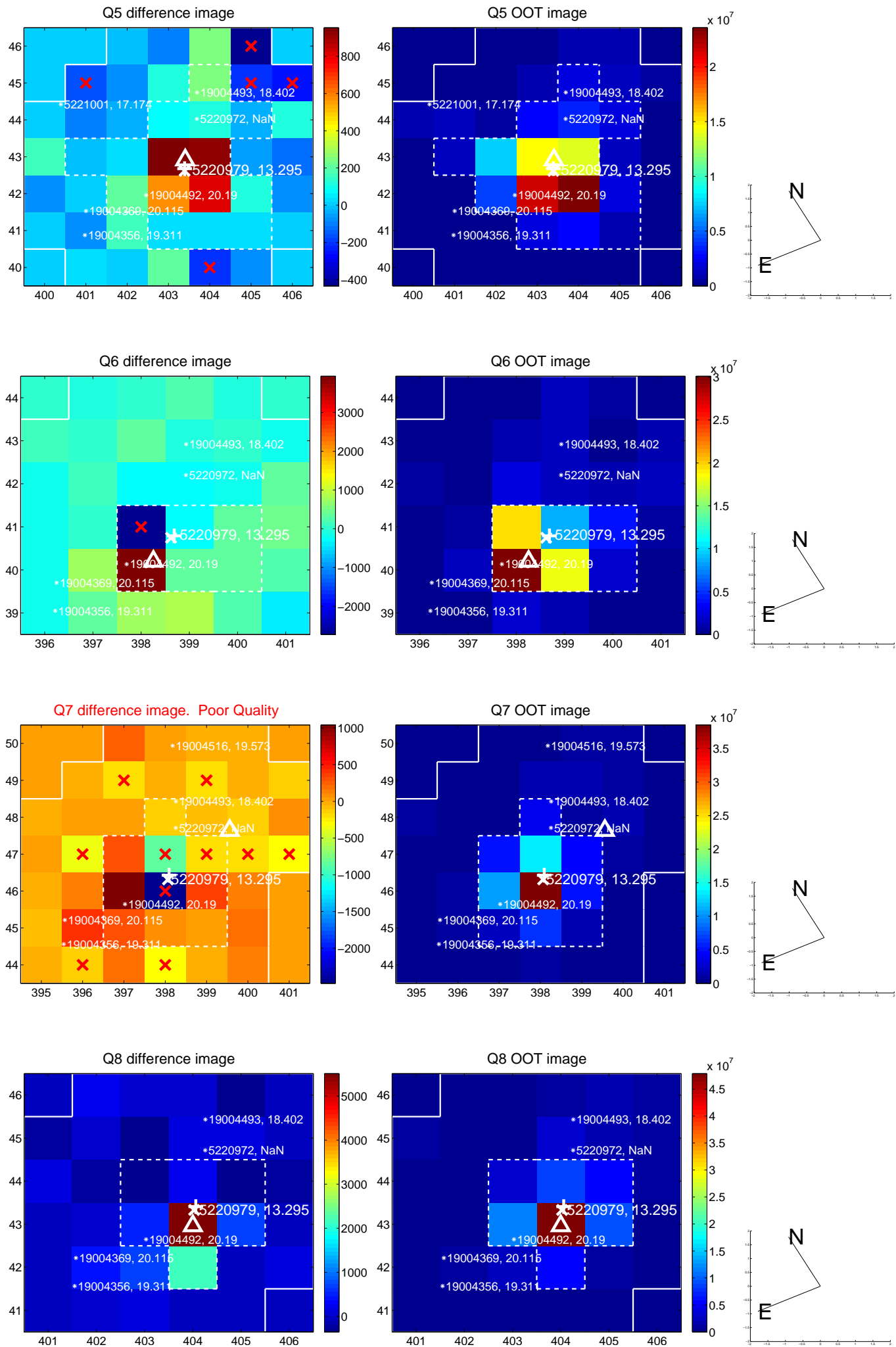


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

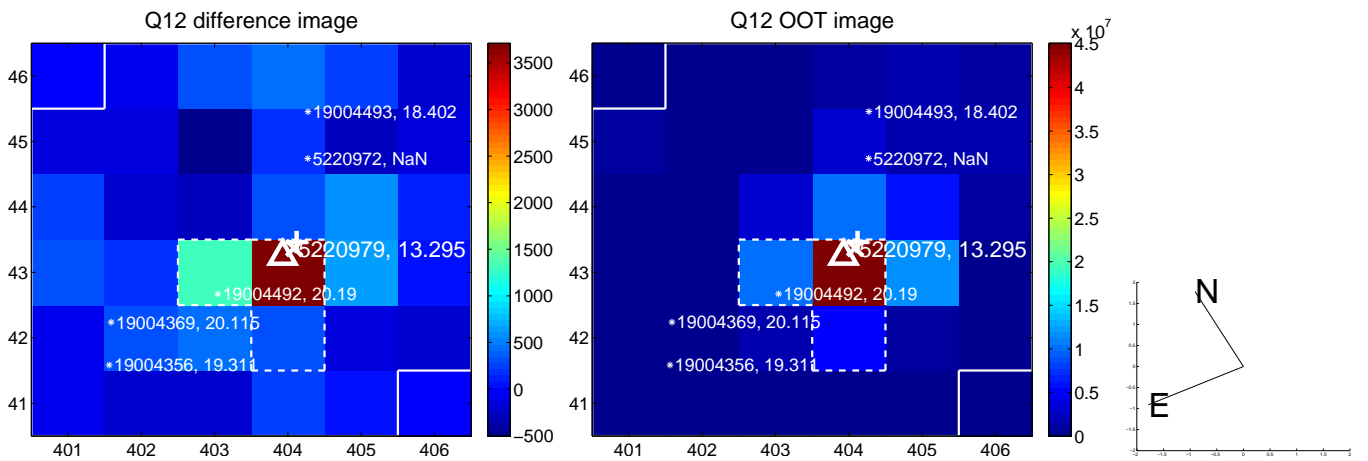
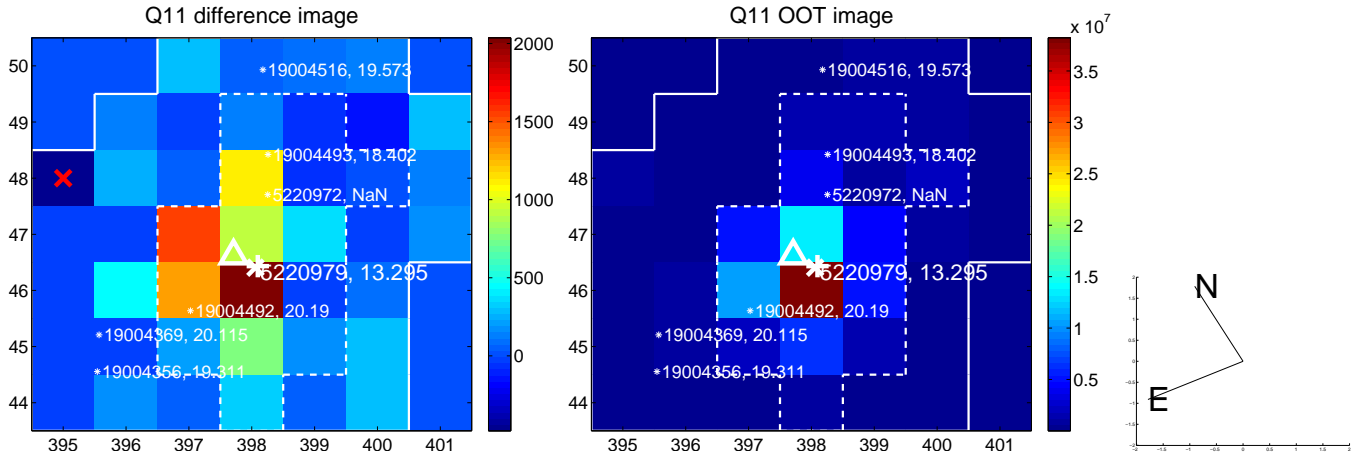
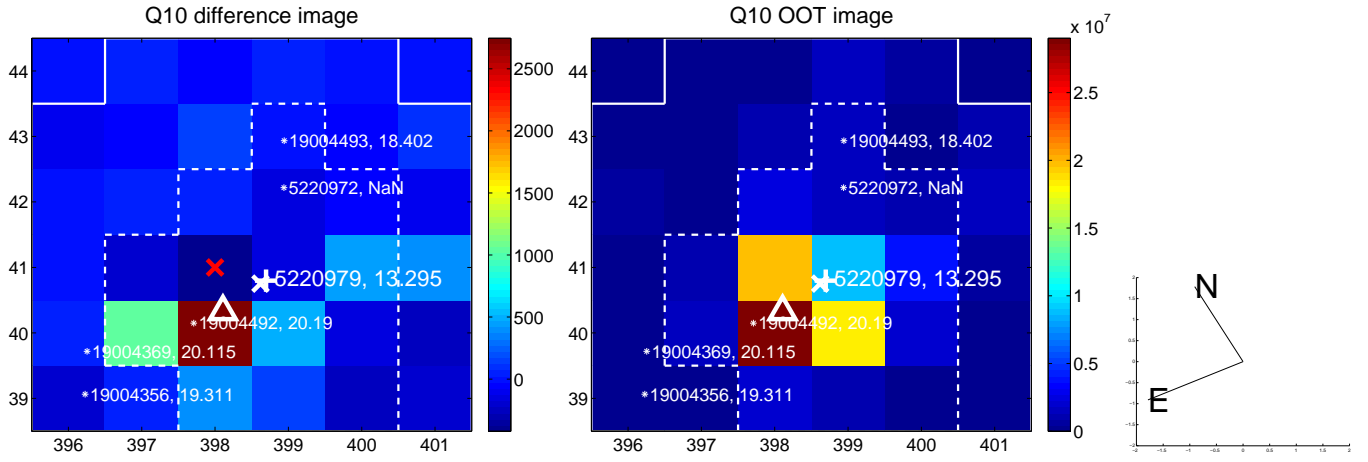
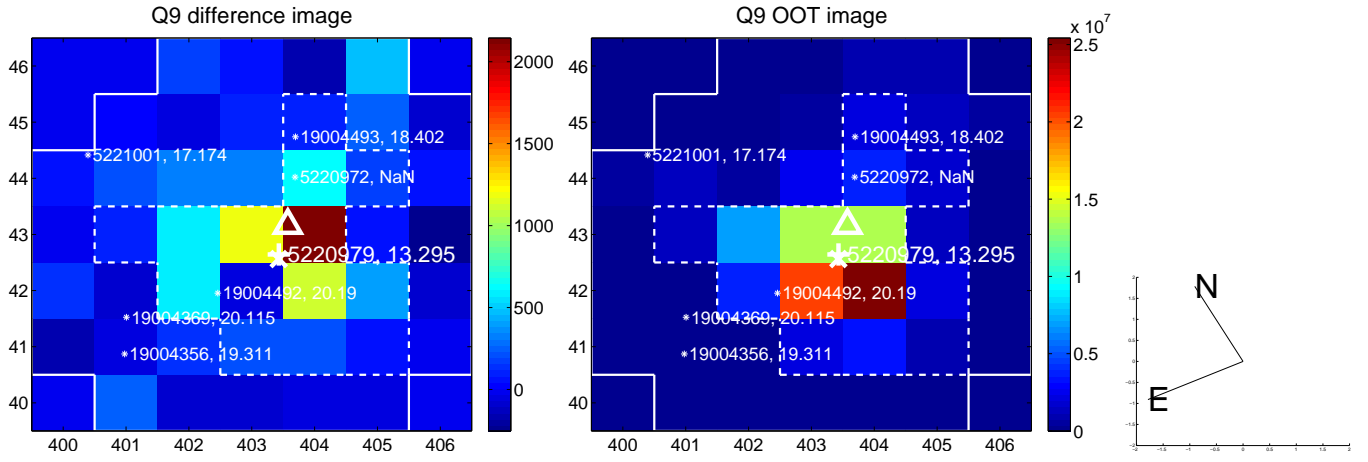
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



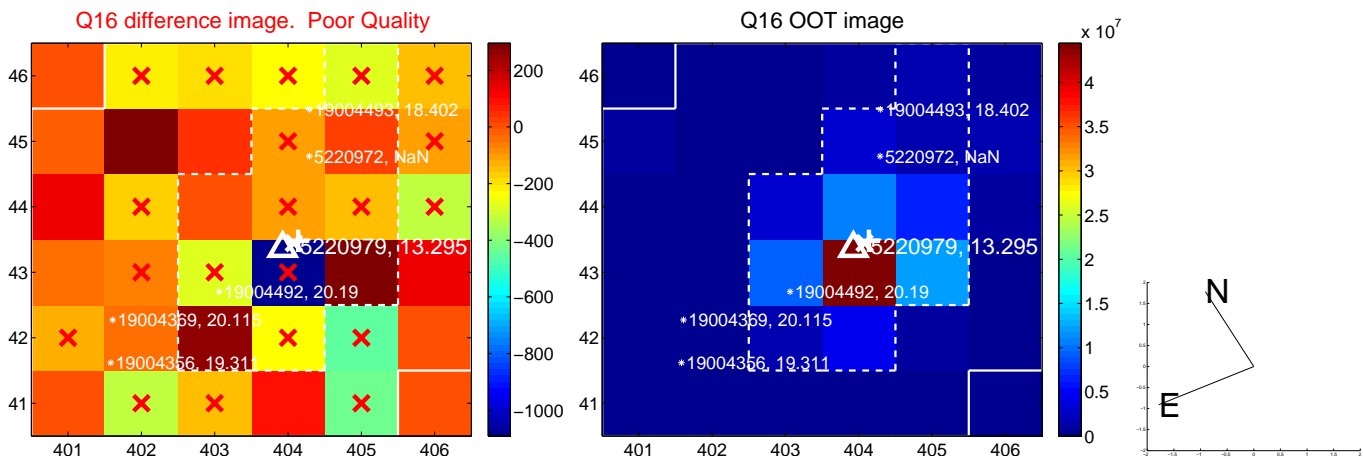
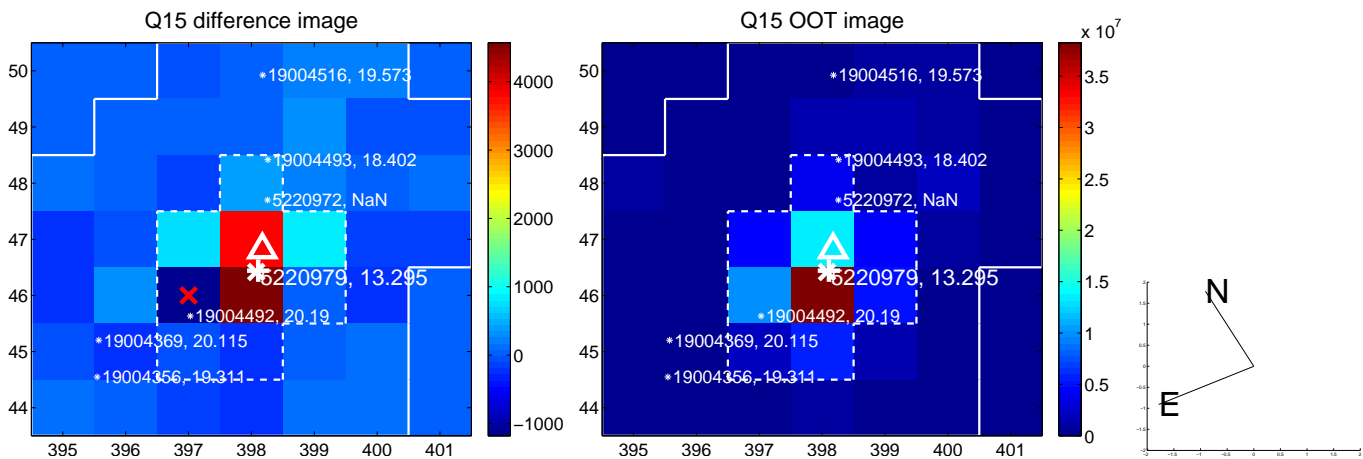
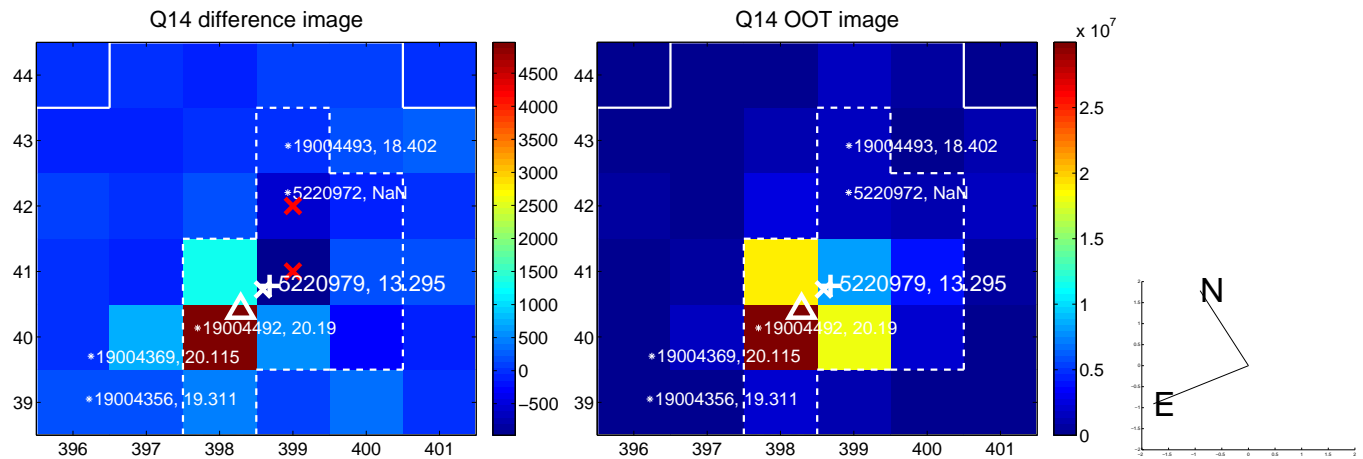
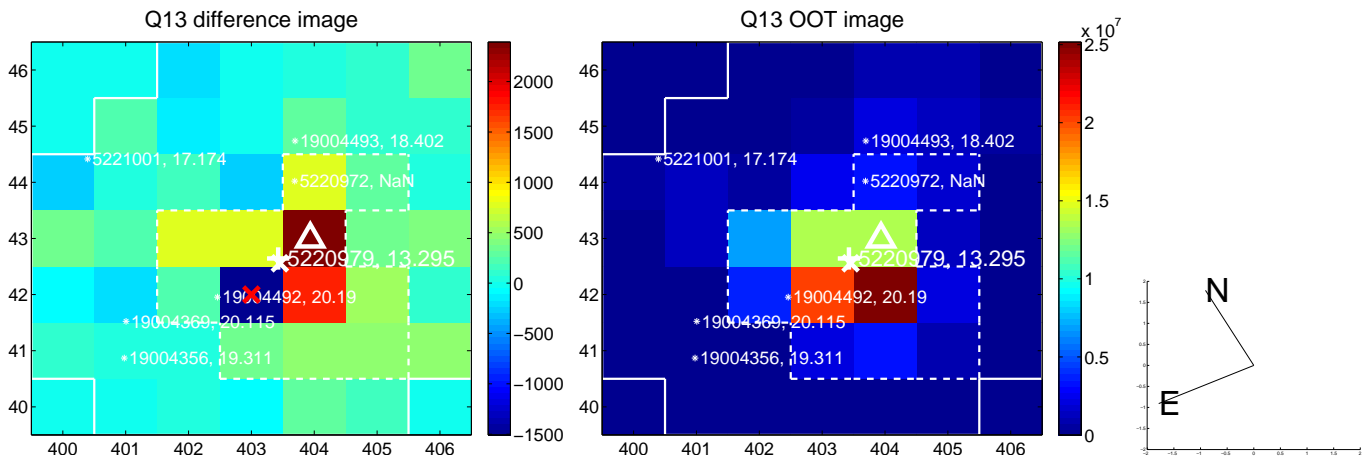
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



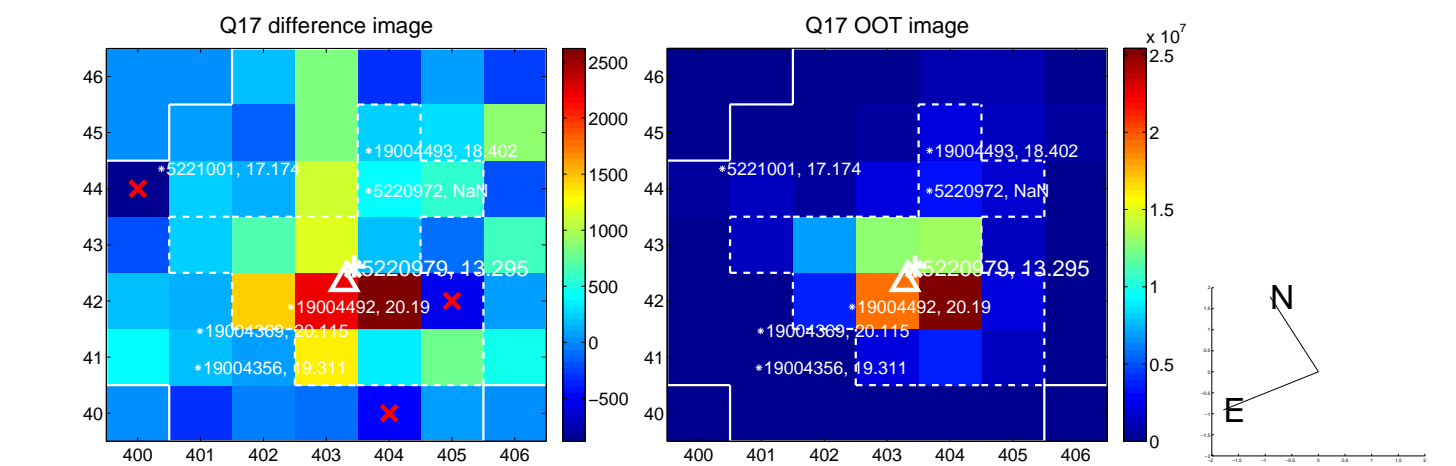
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



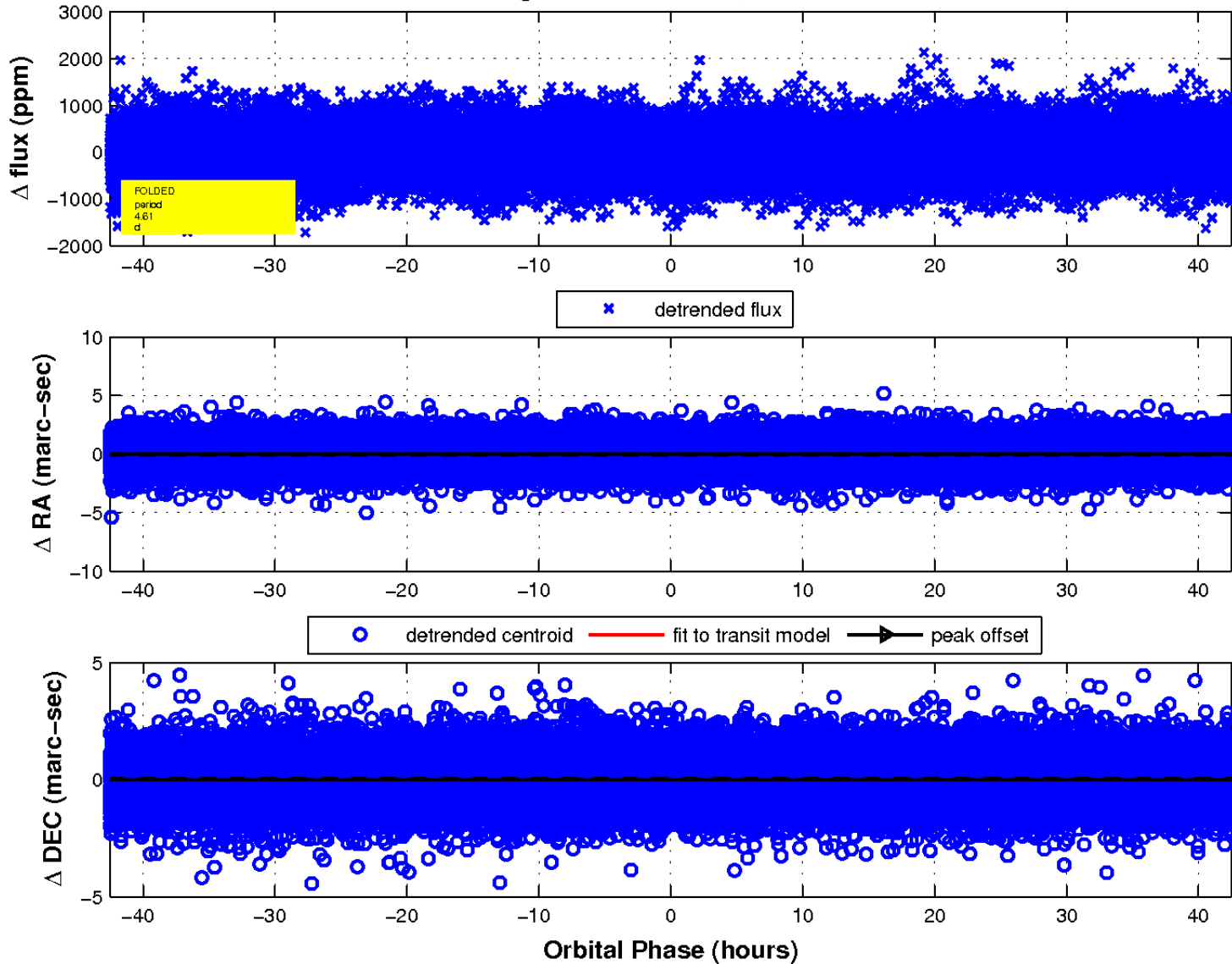
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

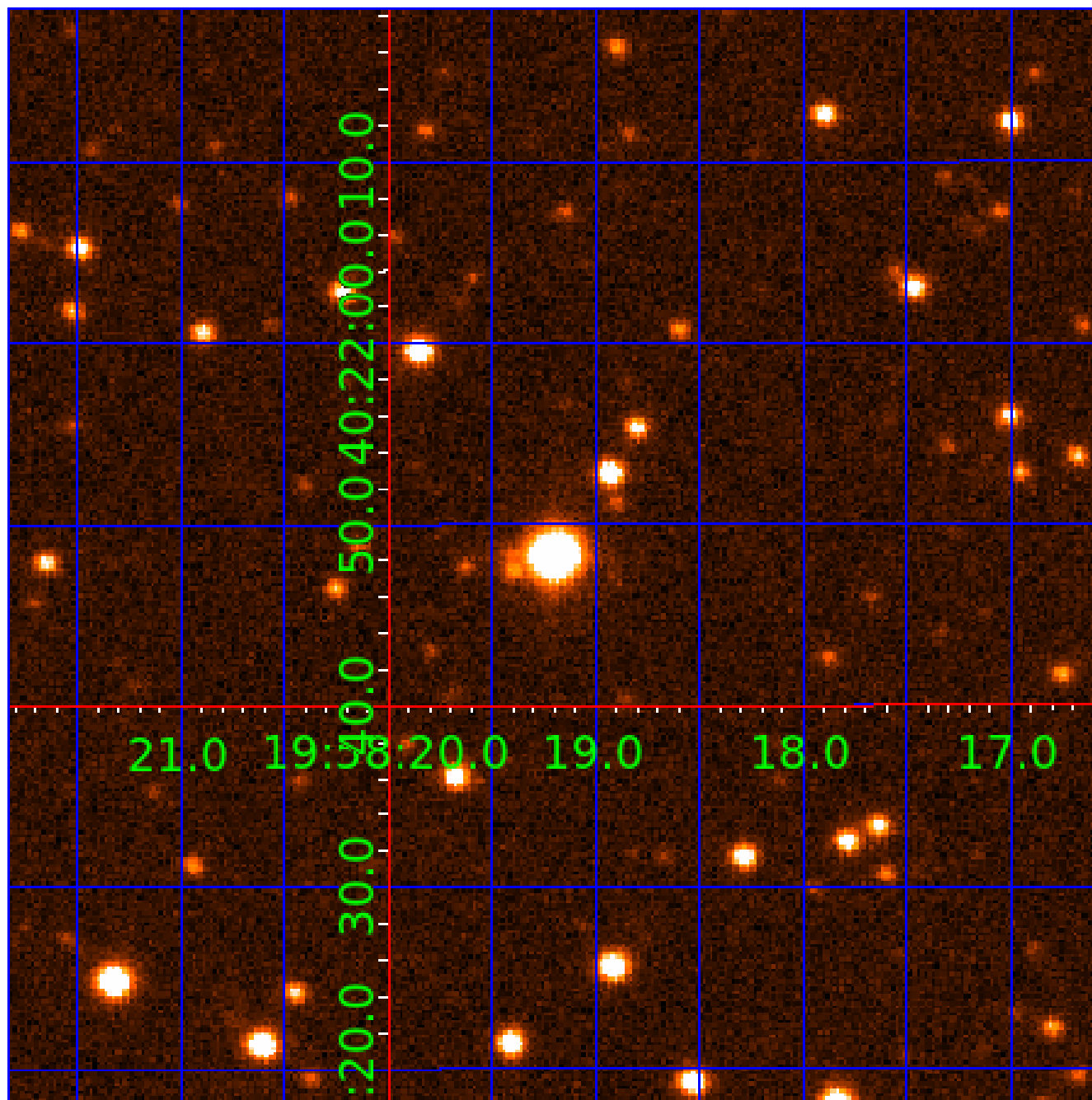


fluxWeightedCentroids, Planet 3 of 5



UKIRT Image

Declination



KIC 005220979

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})
005220979-01	OBS	No	1.525545	131.939085	55.6	3.924	8.8	9.1	1.57	7243	1.34	7247.51
005220979-02	OBS	No	305.657247	337.106427	761.1	7.516	8.7	8.1	1.57	7243	5.13	6.18
005220979-03	OBS	No	4.610258	133.813783	46.3	14.171	7.7	6.4	1.57	7243	1.15	1658.78
005220979-04	OBS	No	122.082853	227.858803	361.0	11.916	8.3	4.5	1.57	7243	3.21	21.02
005220979-05	OBS	No	75.159273	173.397799	414.2	3.164	7.6	6.5	1.57	7243	3.59	40.13

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005220979-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
005220979-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005220979-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005220979-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005220979-05	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

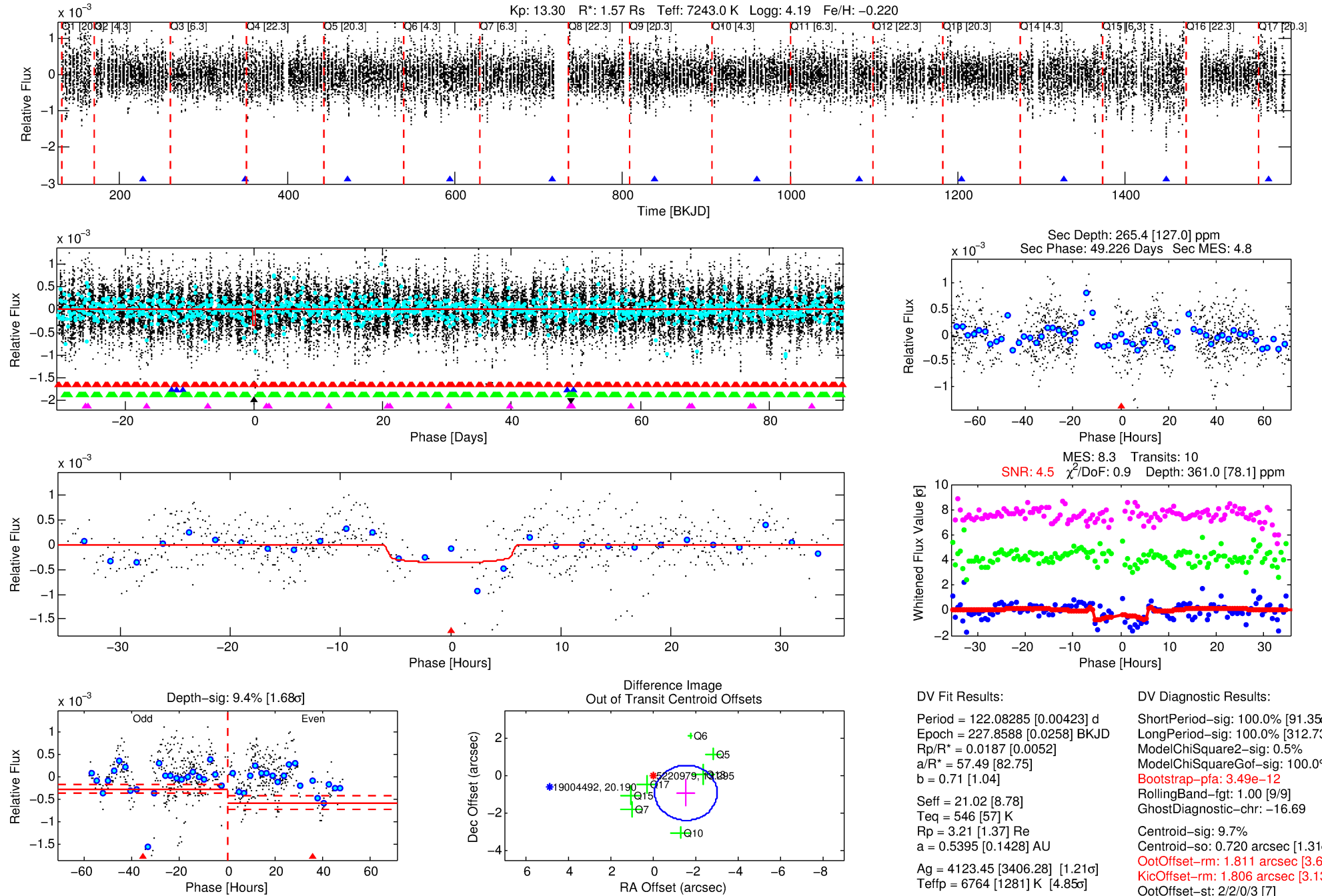
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005220979-04

No Significant Match Found

DV One-Page Summary

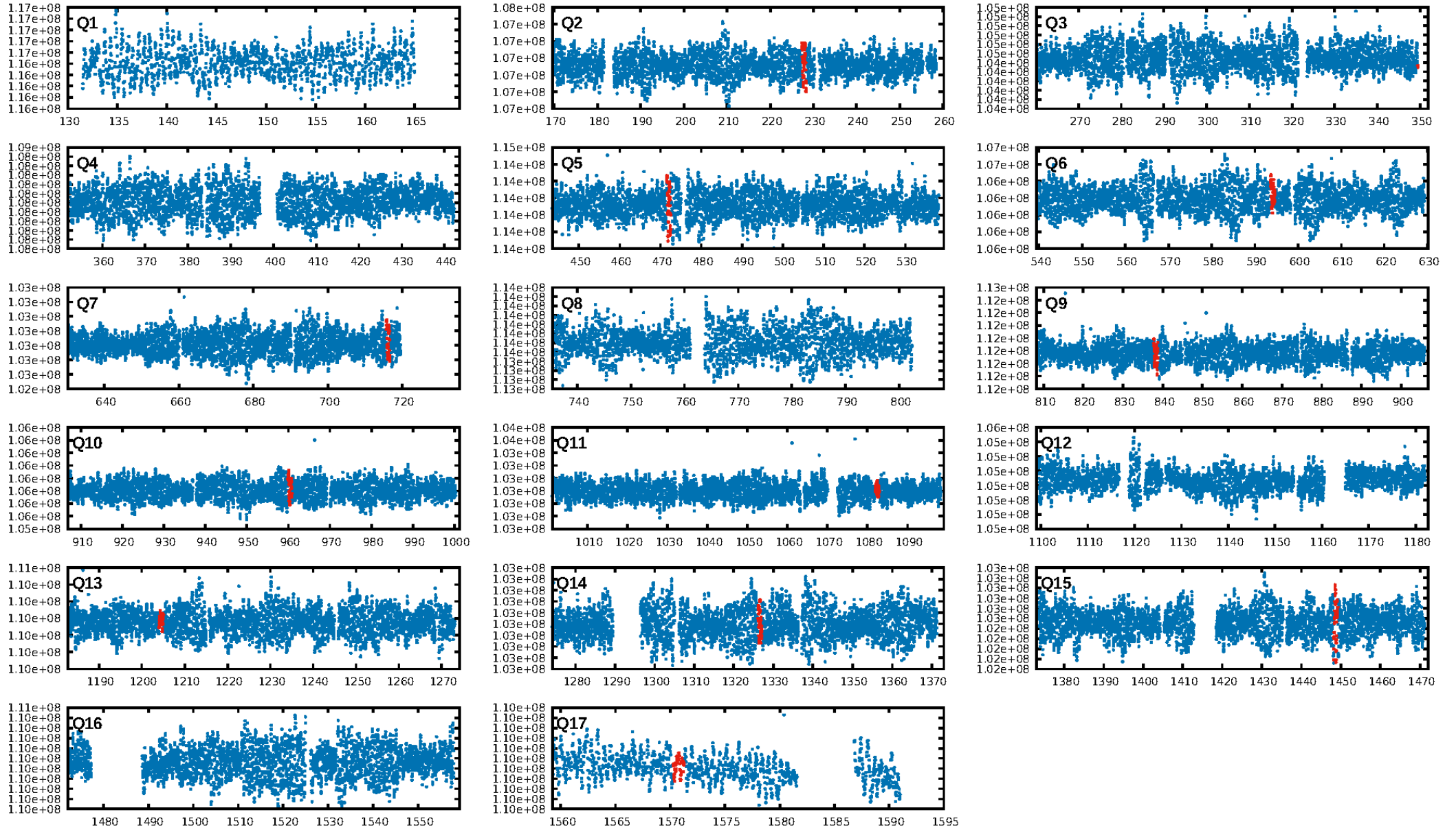
KIC: 5220979 Candidate: 4 of 5 Period: 122.083 d



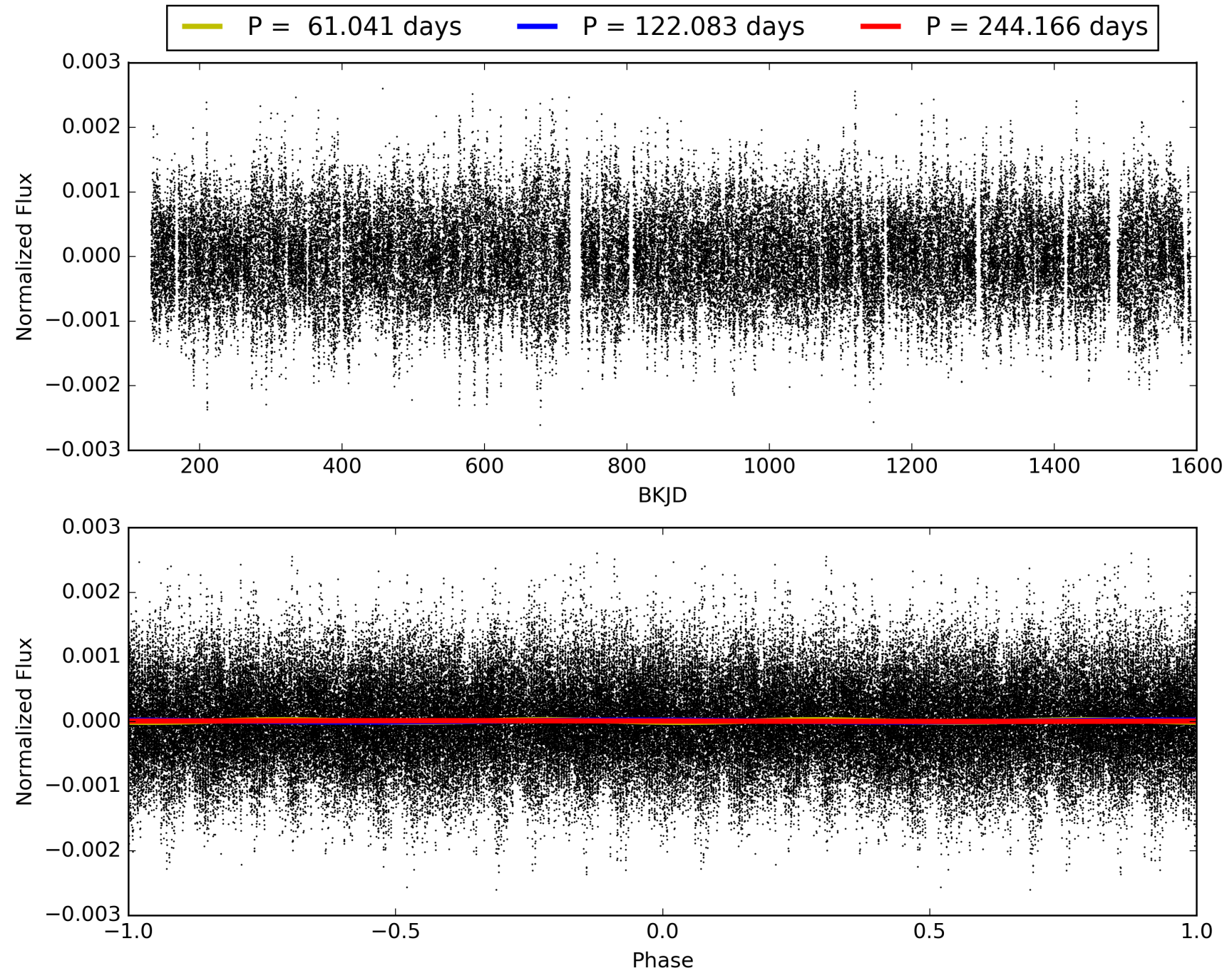
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:37:38 Z

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

TCE 005220979-04, PDC Light Curves

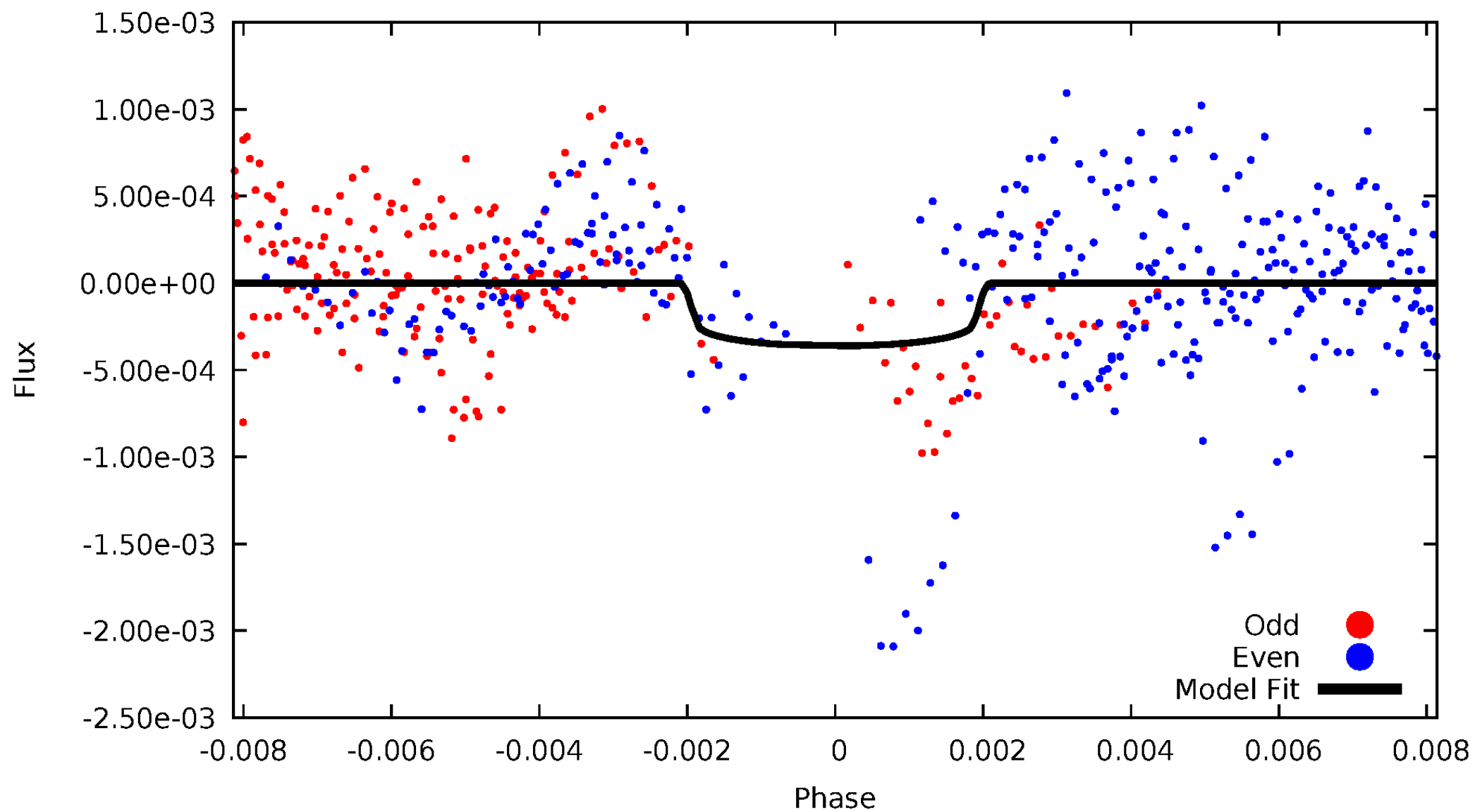


TCE 005220979-04



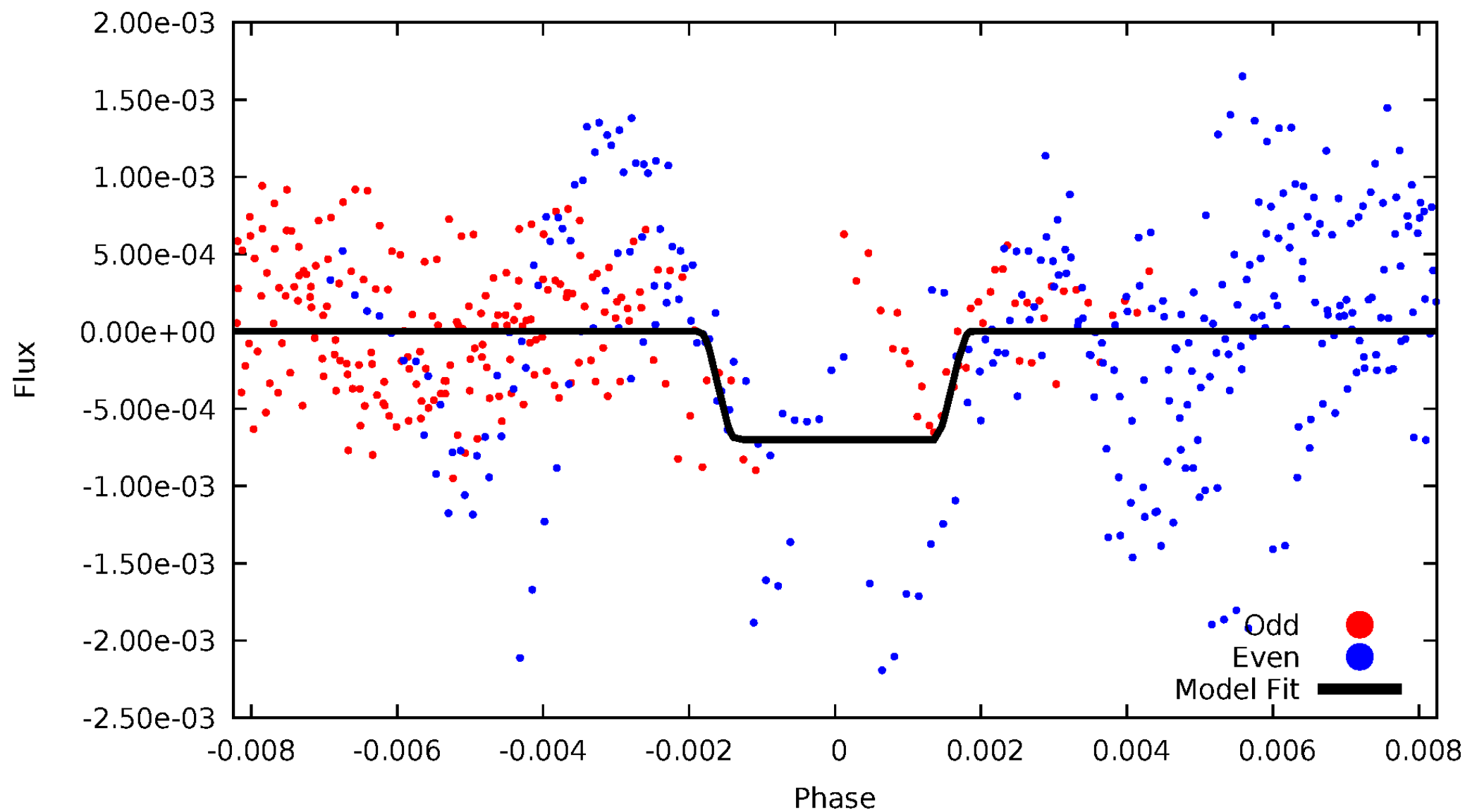
DV Odd/Even

TCE 005220979-04



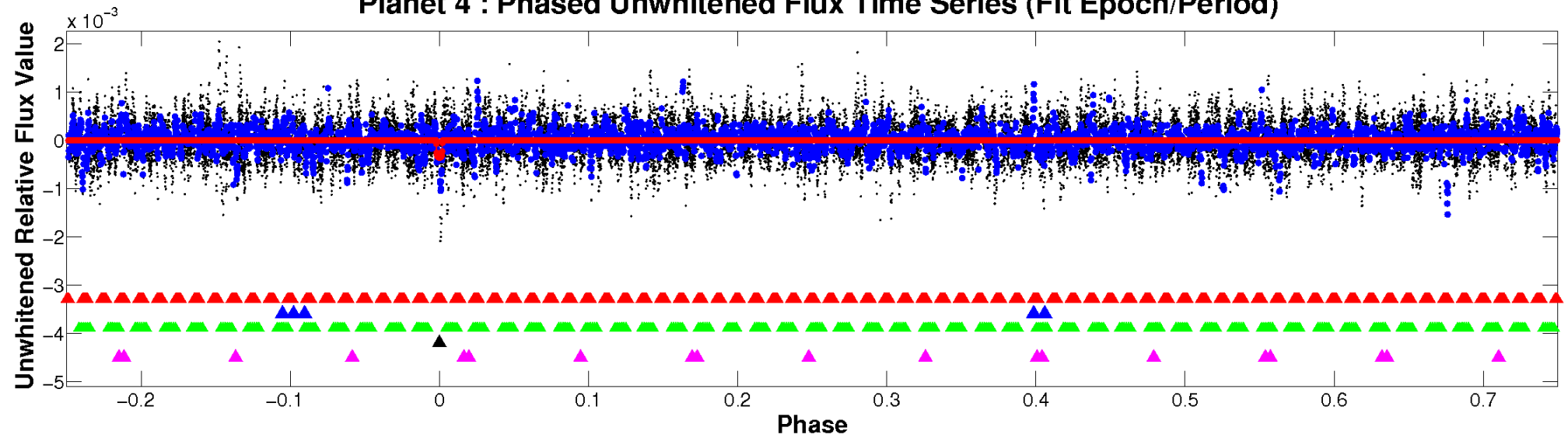
ALT Odd/Even

TCE 005220979-04

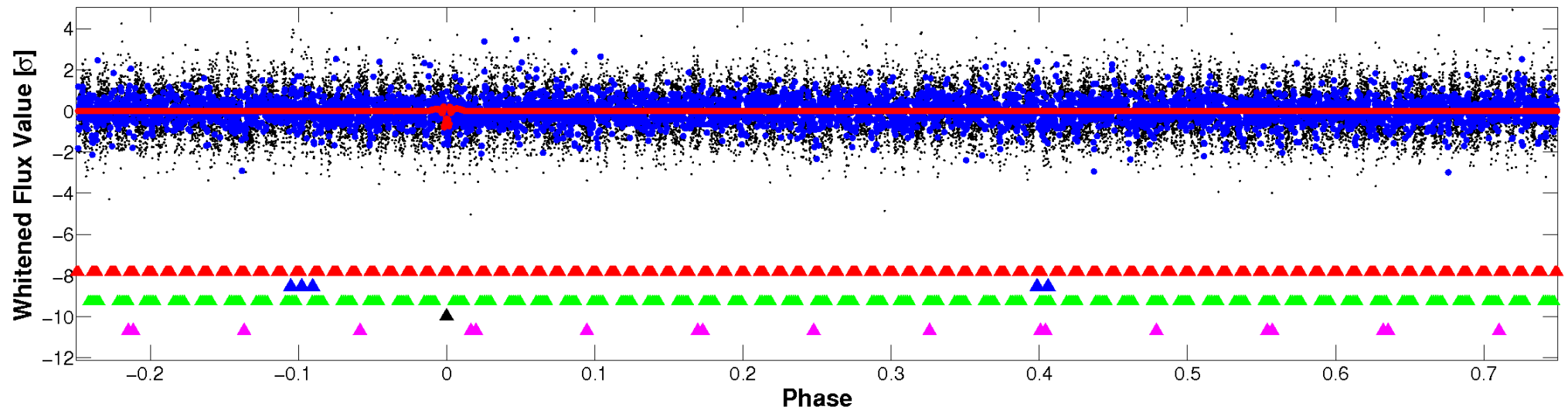


Non-Whitened Vs. Whitened Light Curve

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

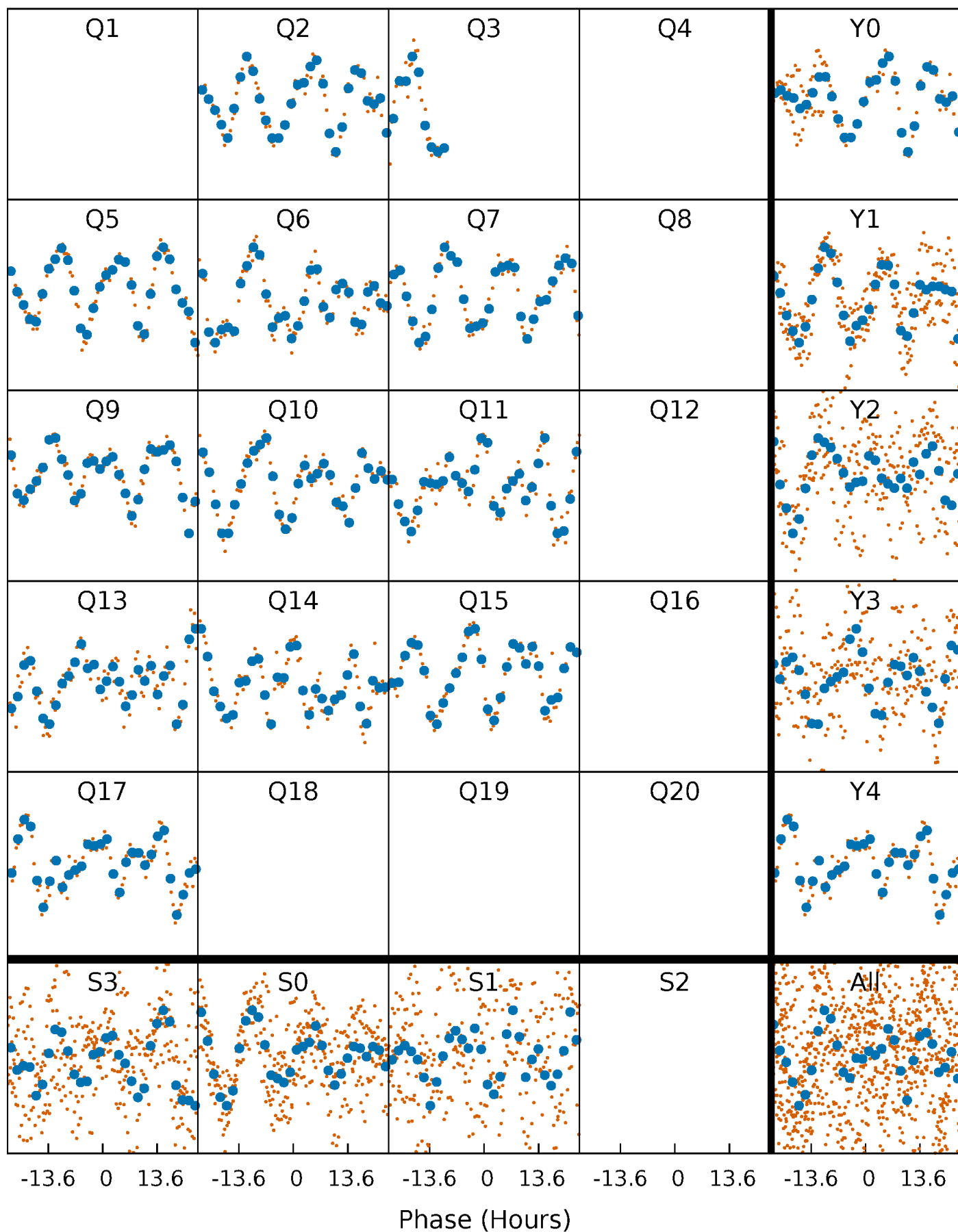


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



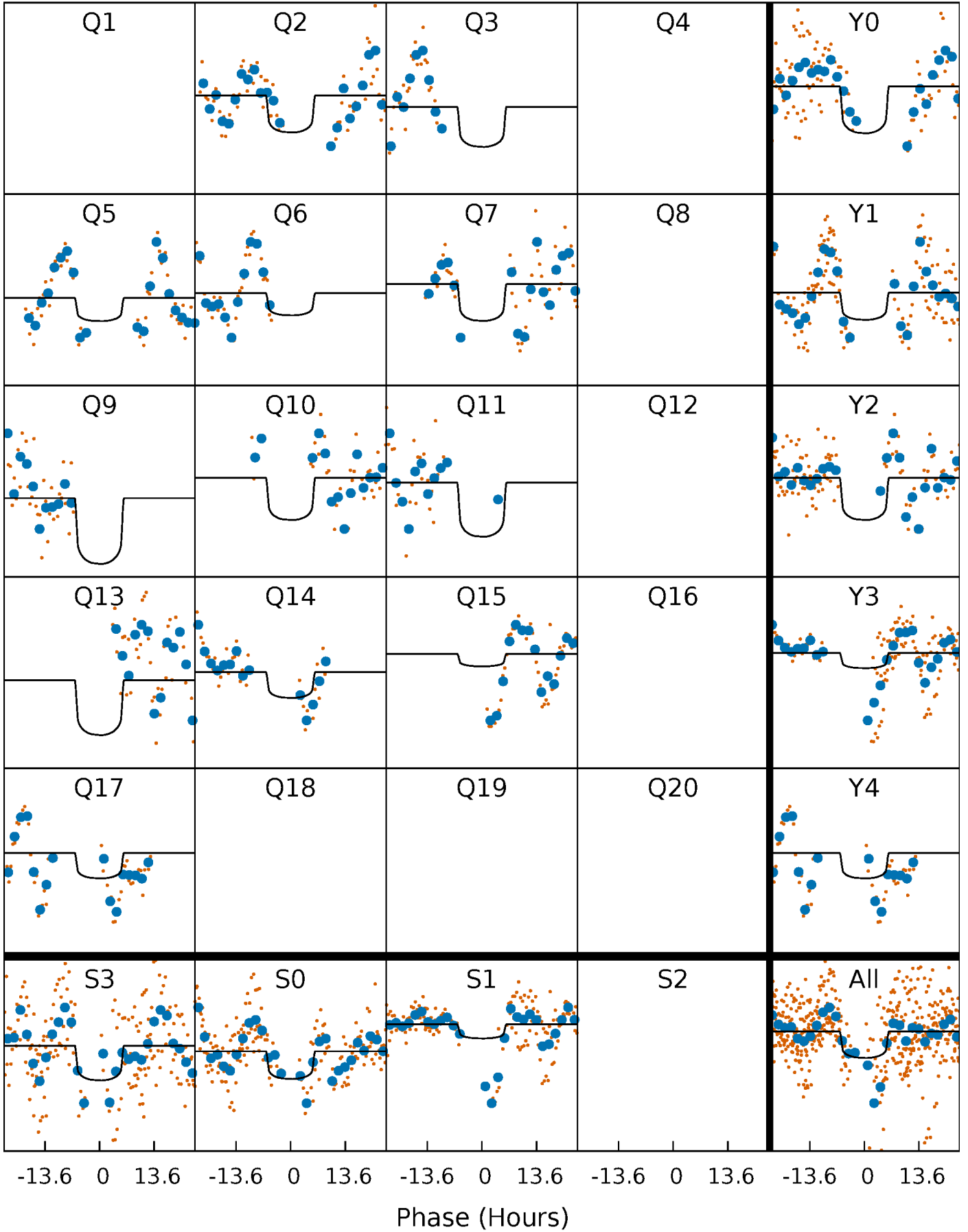
PDC Quarter-Phased Transit Curves

TCE 005220979-04 P=122.082853 Days $T_0=227.858802$ (BKJD)



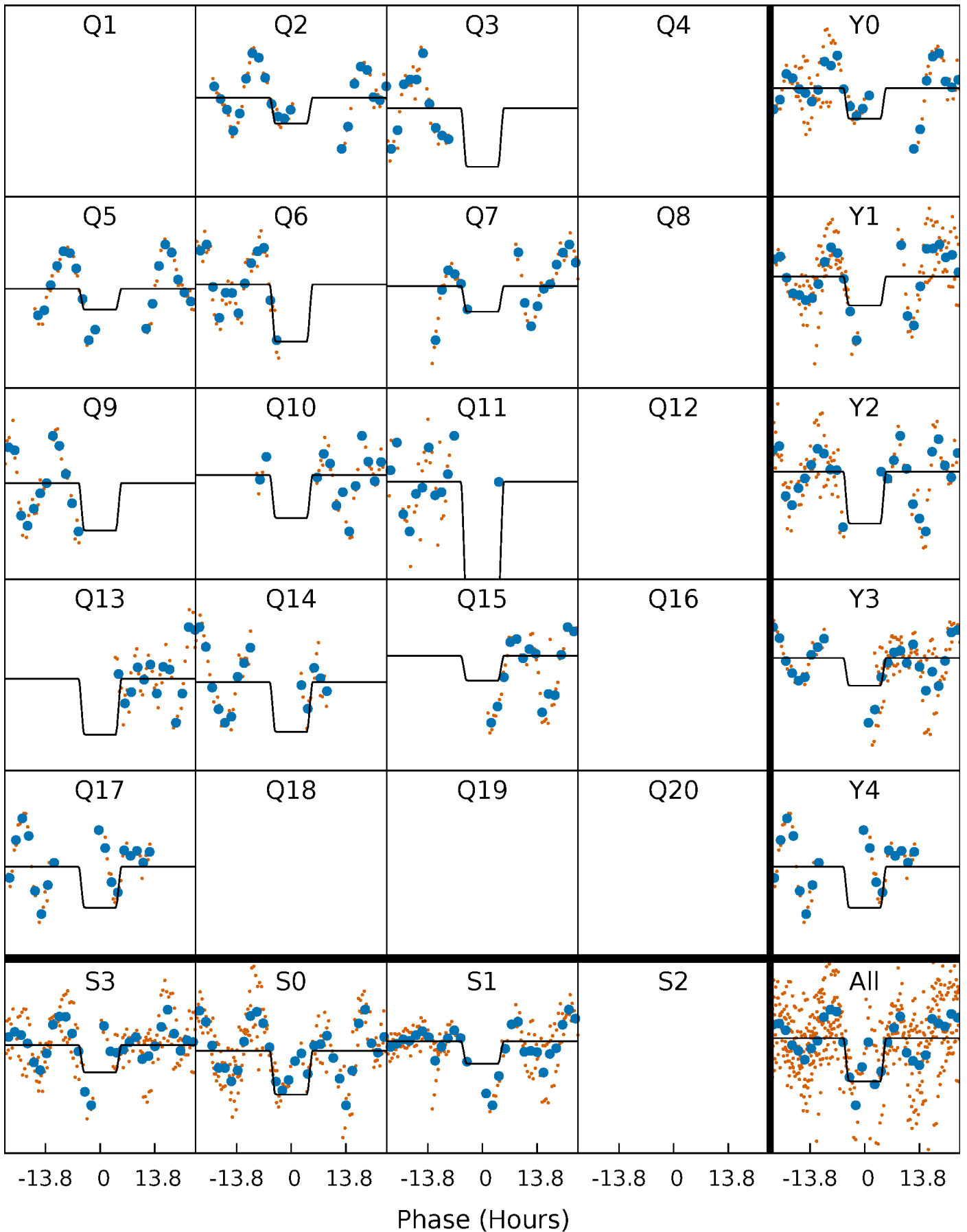
DV Quarter-Phased Transit Curves

TCE 005220979-04 P=122.082853 Days $T_0=227.858802$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

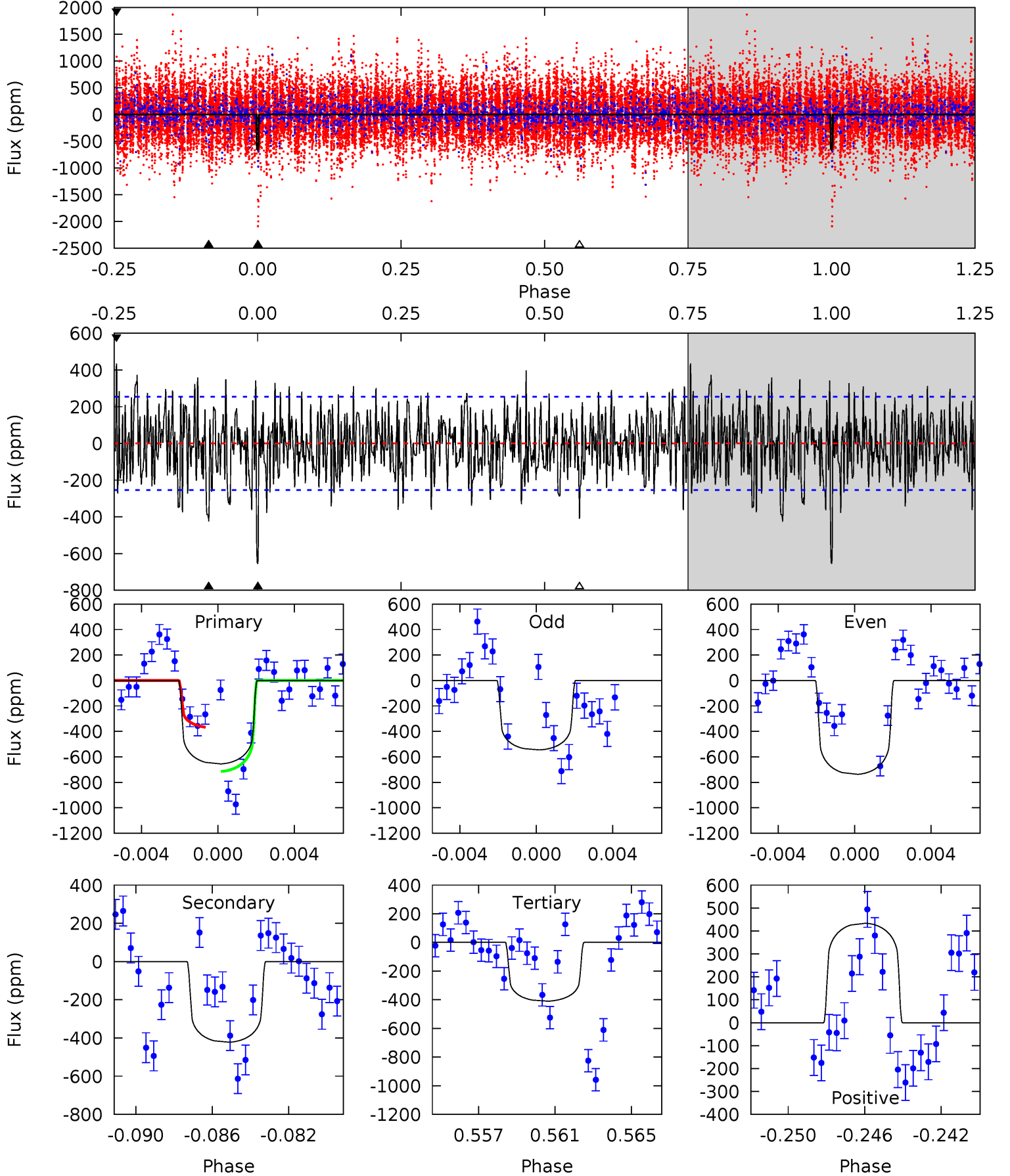
TCE 005220979-04 P=122.092089 Days $T_0=227.763362$ (BKJD)



DV Model-Shift Uniqueness Test

005220979-04, P = 122.082853 Days, E = 105.775949 Days

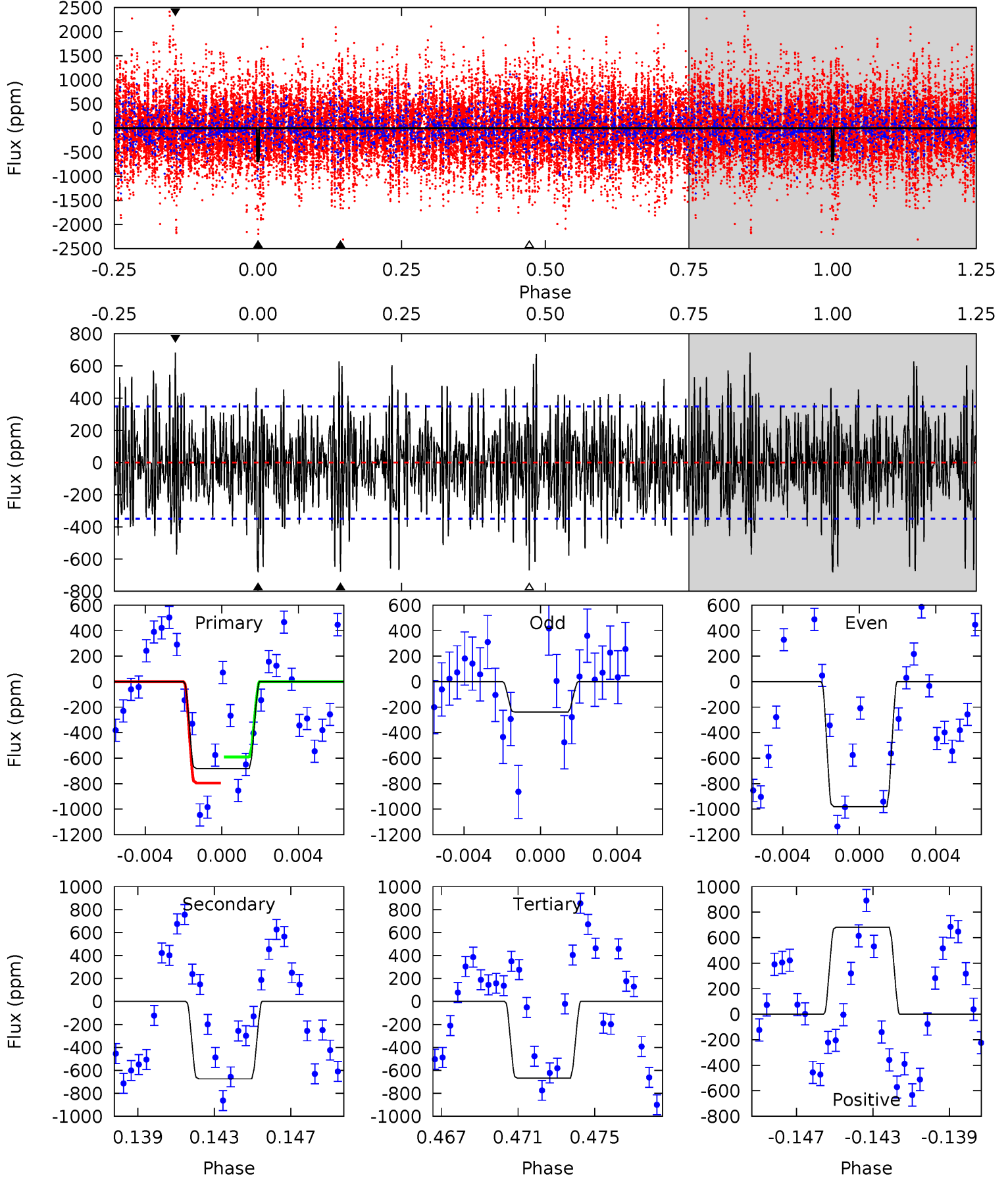
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	8.63	8.38	8.87	5.19	2.87	2.70	5.01	4.53	0.25	-0.24	1.94	0.94	0.40	3.17



Alt Model-Shift Uniqueness Test

005220979-04, P = 122.092089 Days, E = 105.671273 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	10.1	9.98	10.2	5.21	2.90	3.12	0.19	-0.02	0.08	-0.13	5.47	1.22	0.50	1.51



Stellar Parameters For KIC 005220979

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7243^{+228}_{-330}	$4.191^{+0.124}_{-0.201}$	$-0.220^{+0.250}_{-0.350}$	$1.575^{+0.508}_{-0.313}$	$1.409^{+0.219}_{-0.219}$	$0.508^{+0.319}_{-0.266}$
	+3%/-5%	+3%/-5%	+114%/-159%	+32%/-20%	+16%/-16%	+63%/-52%
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 005220979-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-422 ± 49	$3.30^{+1.06}_{-0.94}$	768^{+59}_{-52}	7584^{+1788}_{-1072}	6093^{+5725}_{-2636}
Alt.	-674 ± 67	$4.68^{+1.15}_{-0.98}$	768^{+60}_{-50}	7074^{+1026}_{-697}	4889^{+3083}_{-1745}

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

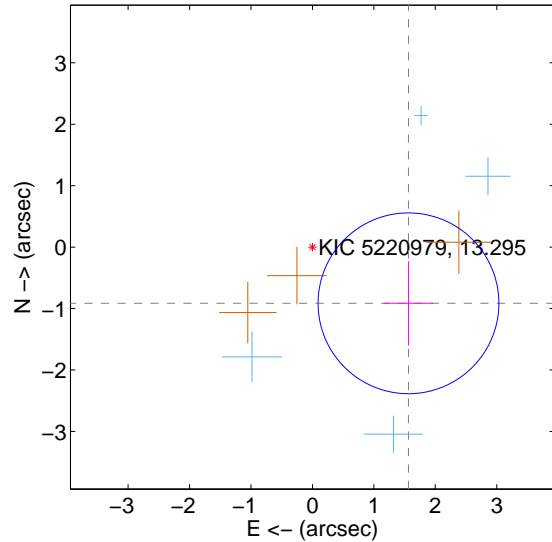
Supplemental centroid analysis for 005220979-04. Kepler magnitude: 13.29. Transit SNR 4.45

There are 4 quarters with good PRF difference image offsets

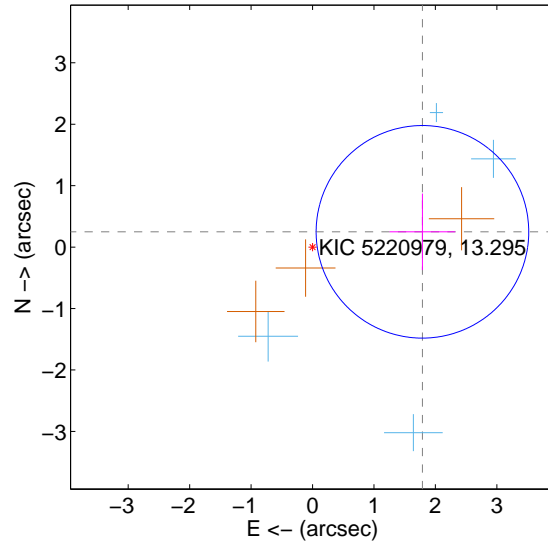
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.811 ± 0.490	3.69	-1.563 ± 0.403	-0.915 ± 0.685
PRF-fit source offset from KIC position	1.806 ± 0.577	3.13	-1.789 ± 0.535	0.249 ± 0.623
photometric centroid source offset	0.72 ± 0.55	1.31	-0.50 ± 0.62	-0.51 ± 0.47

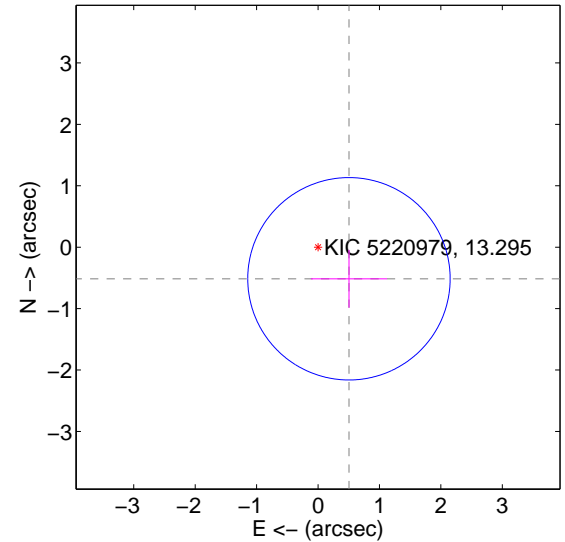
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

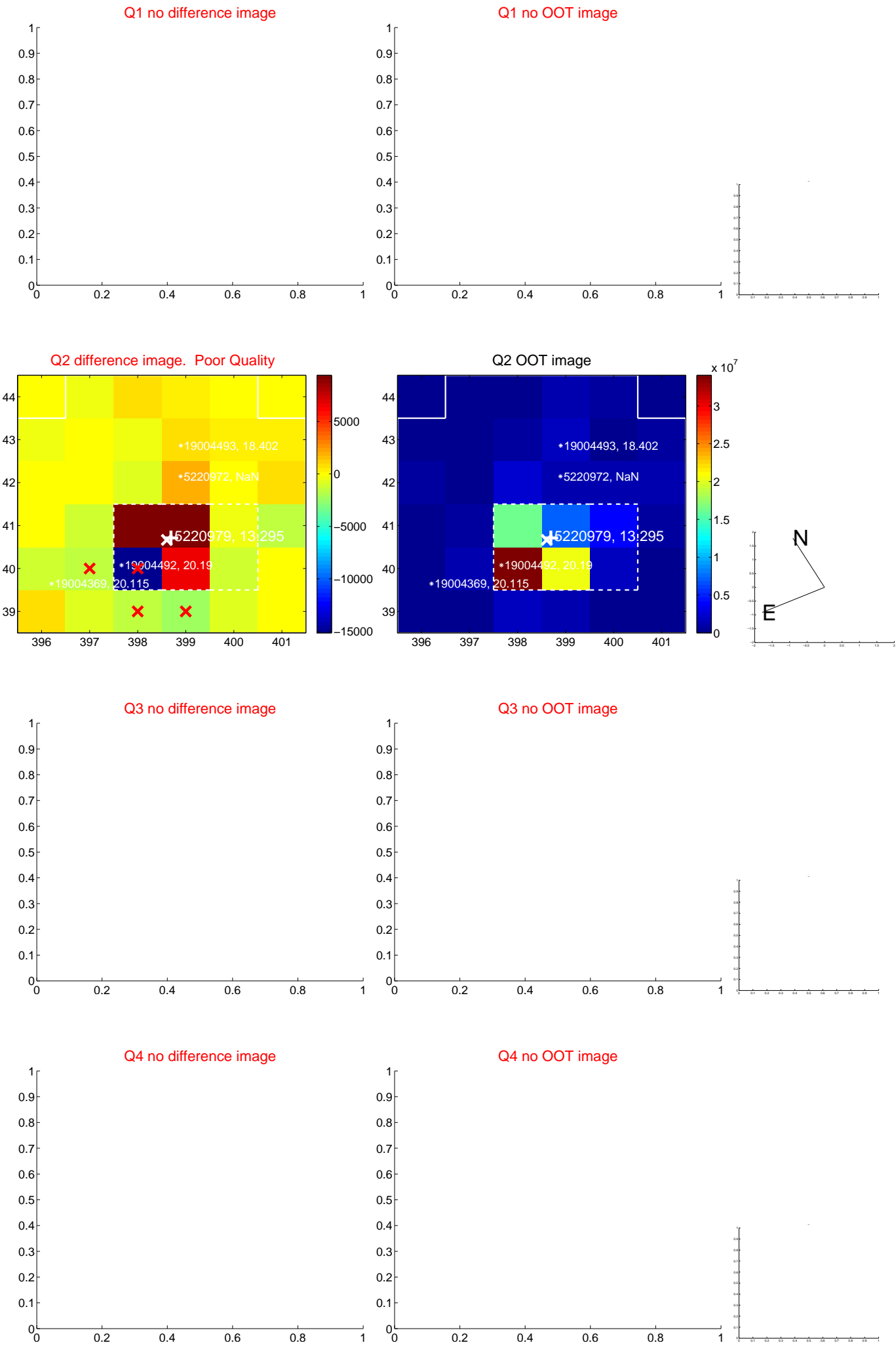


offset from photometric centroids

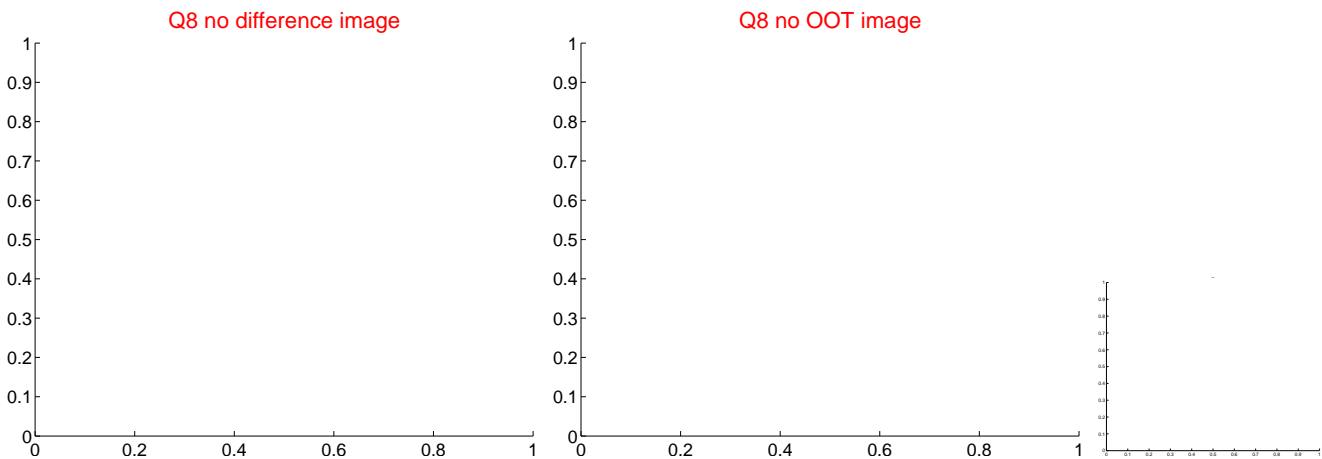
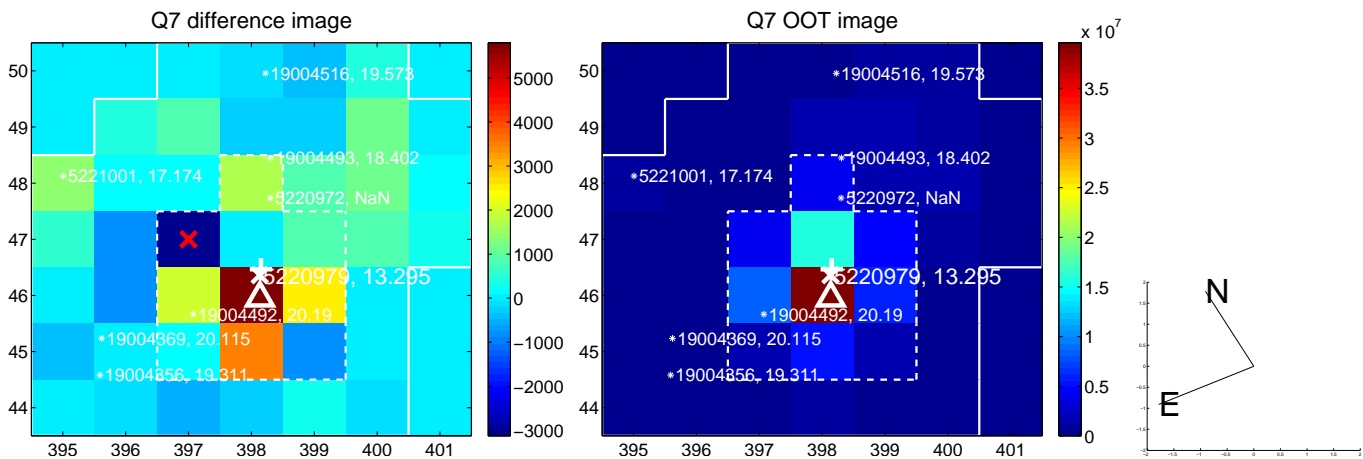
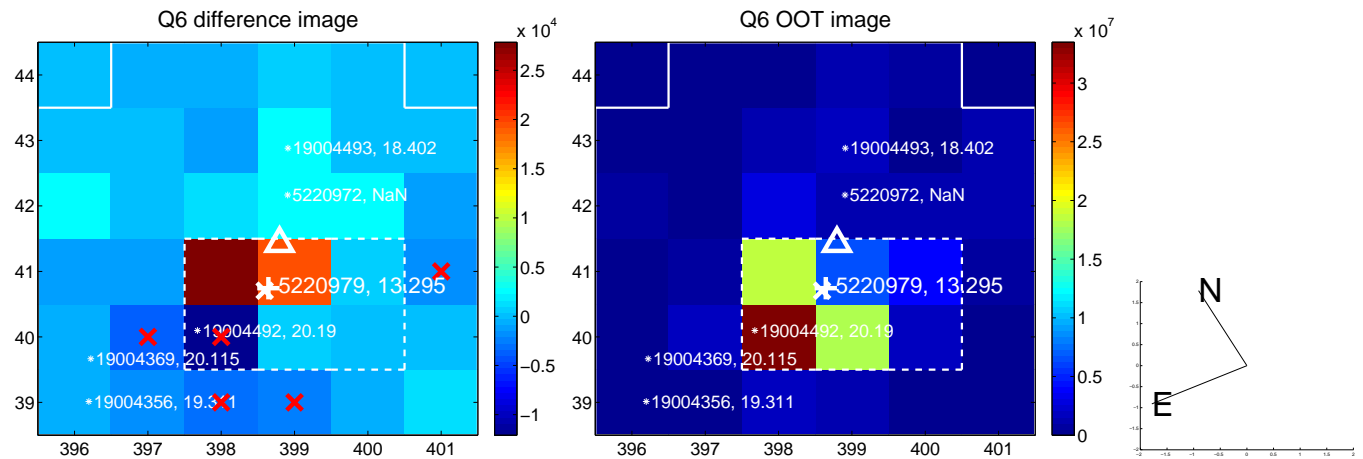
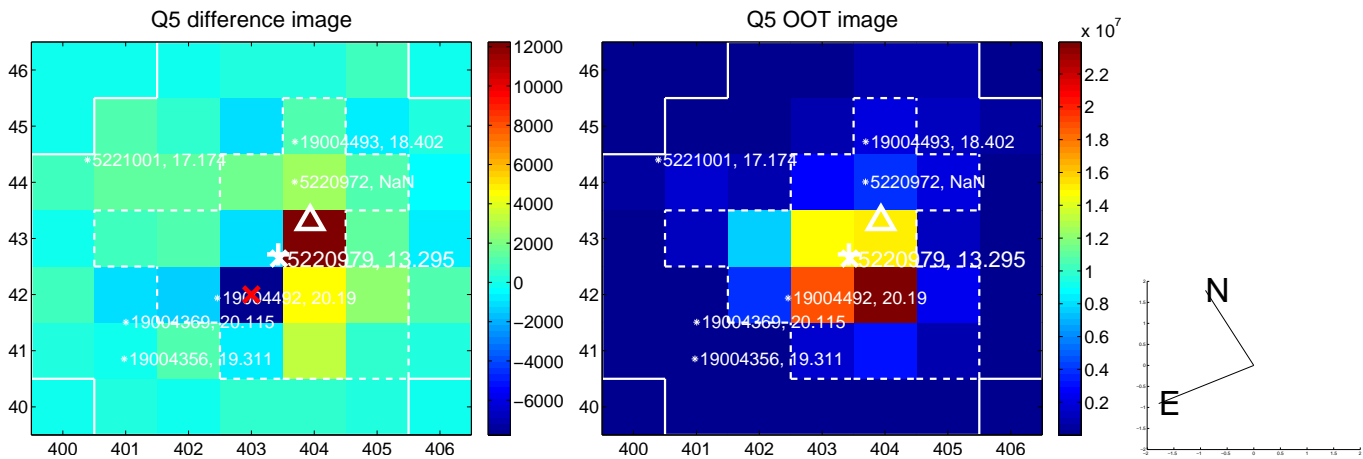


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

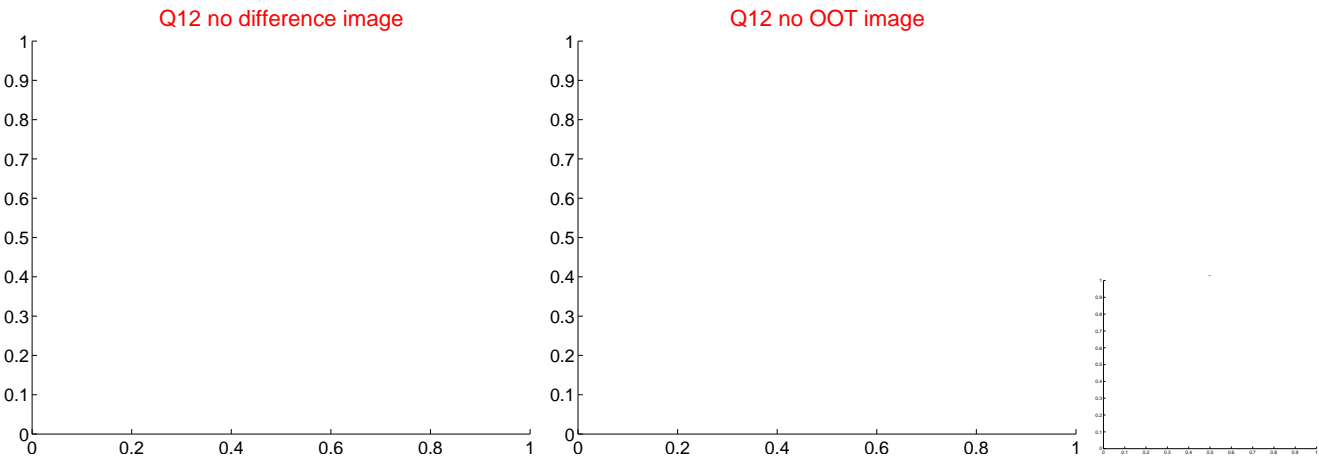
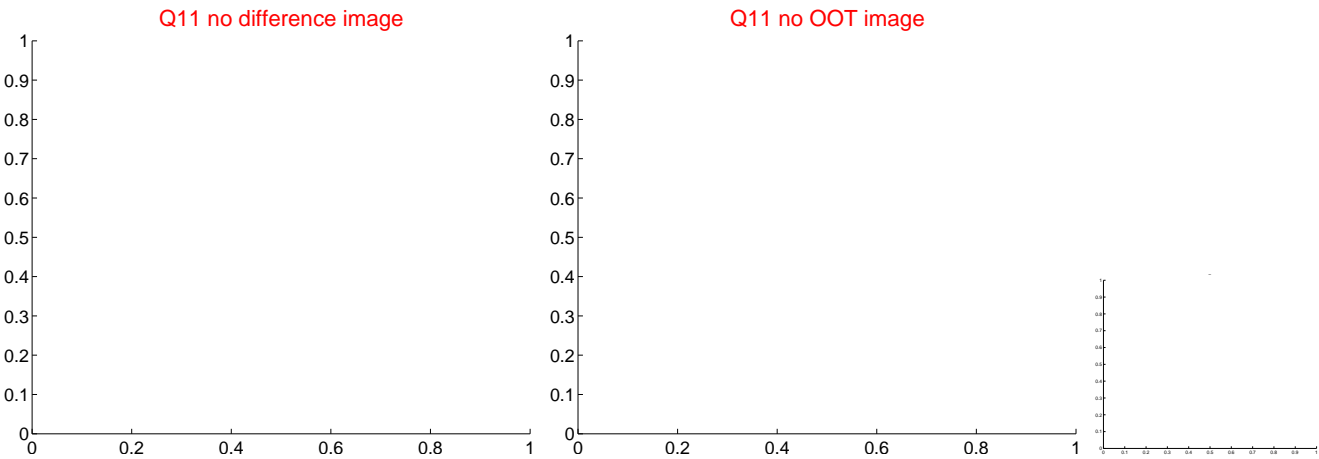
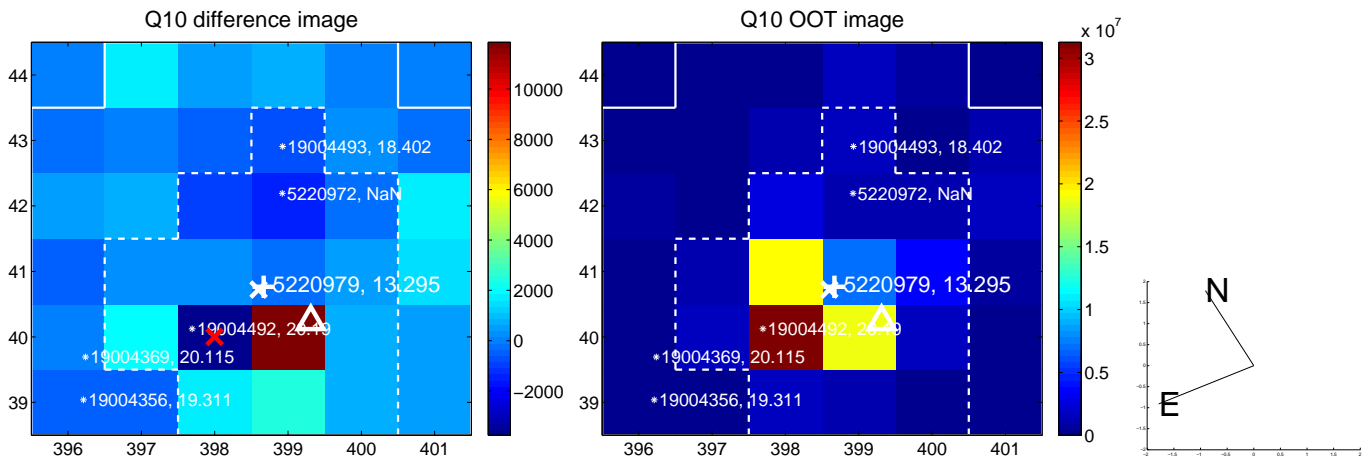
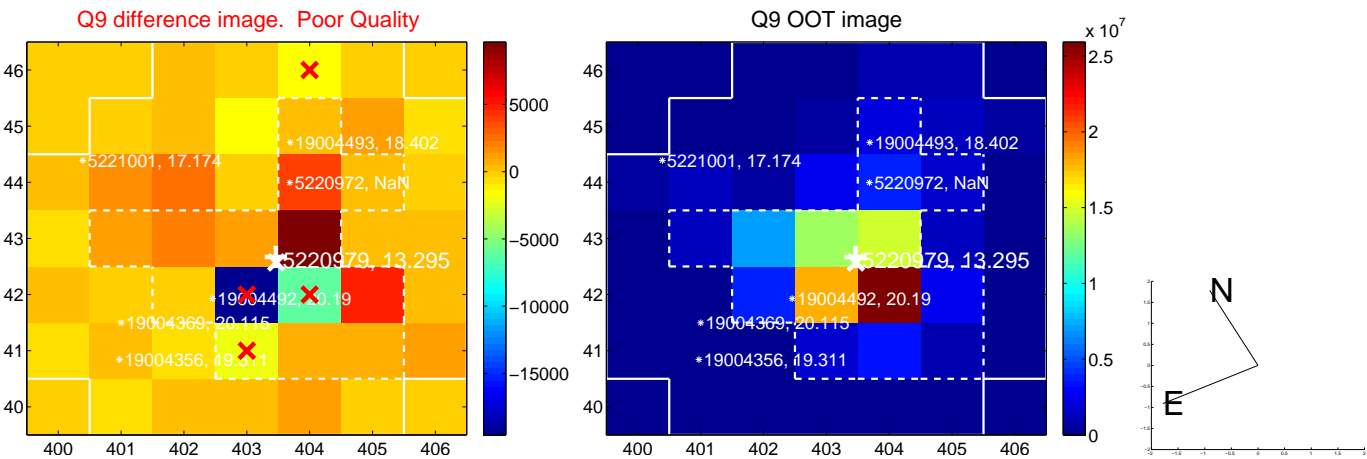
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



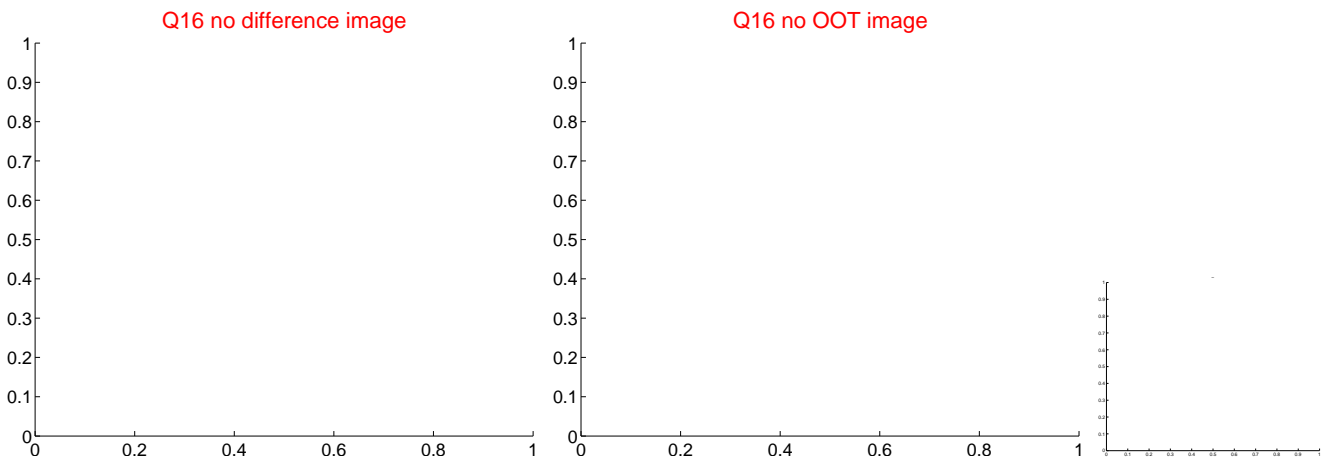
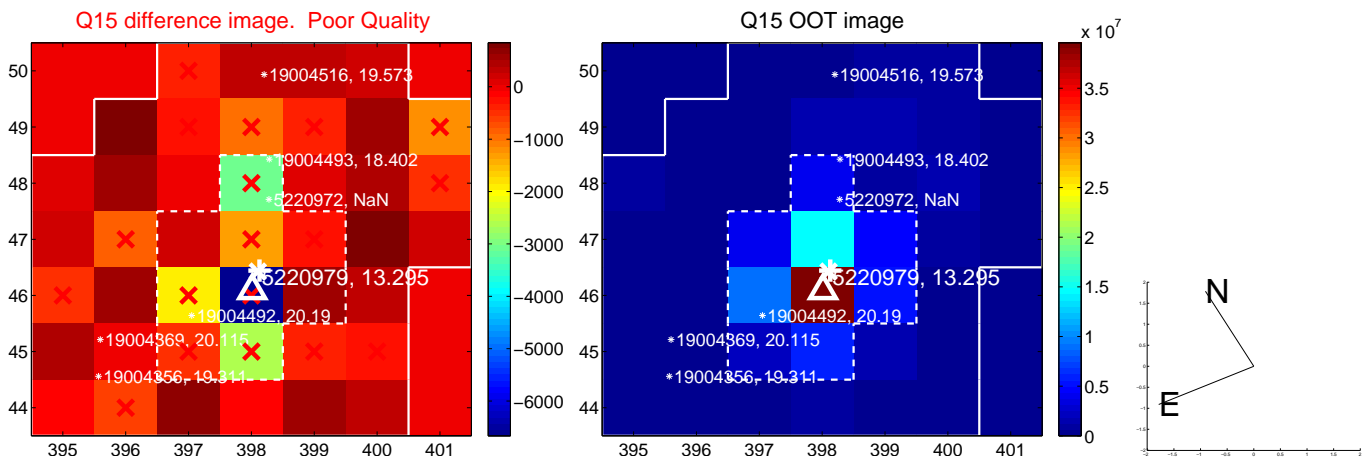
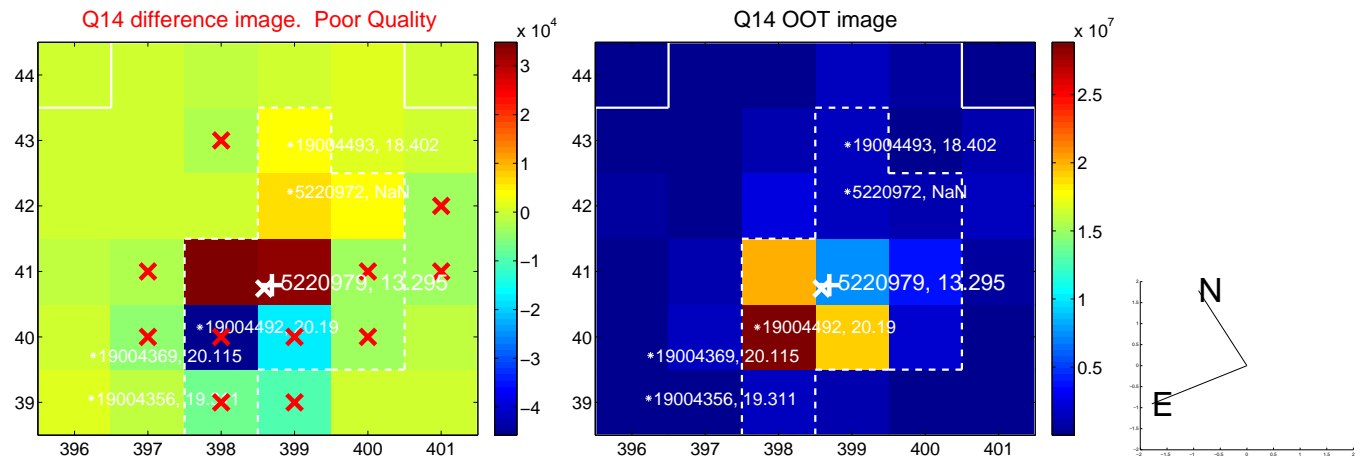
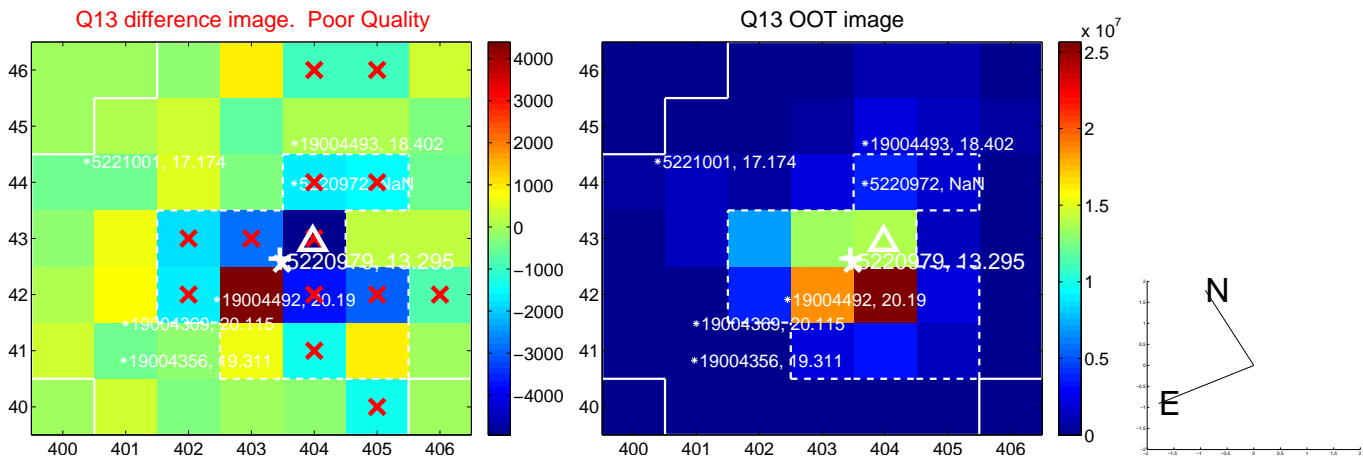
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



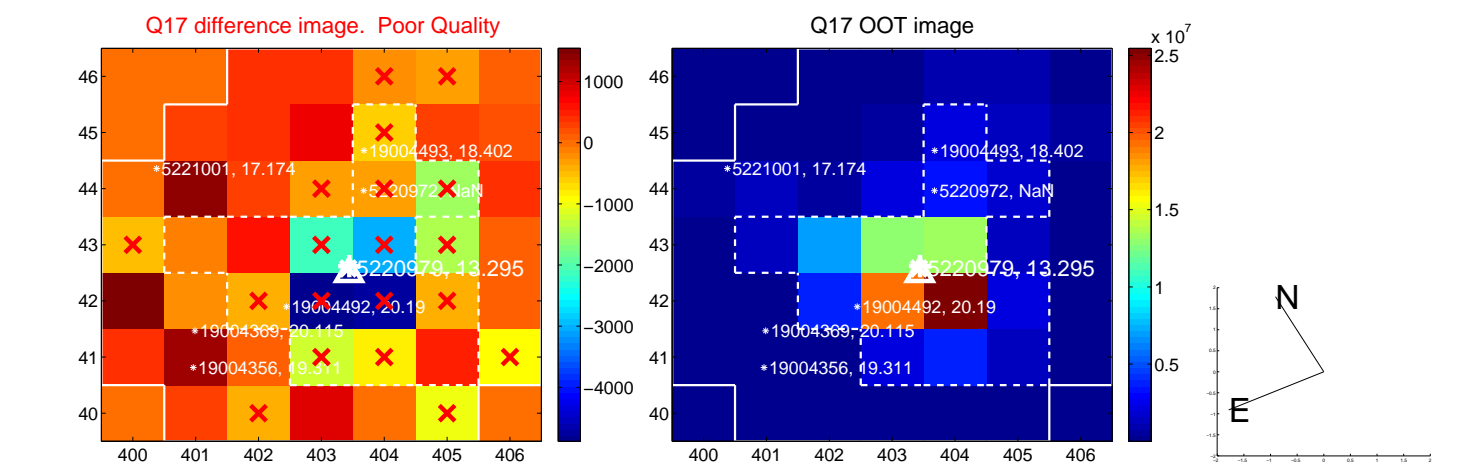
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



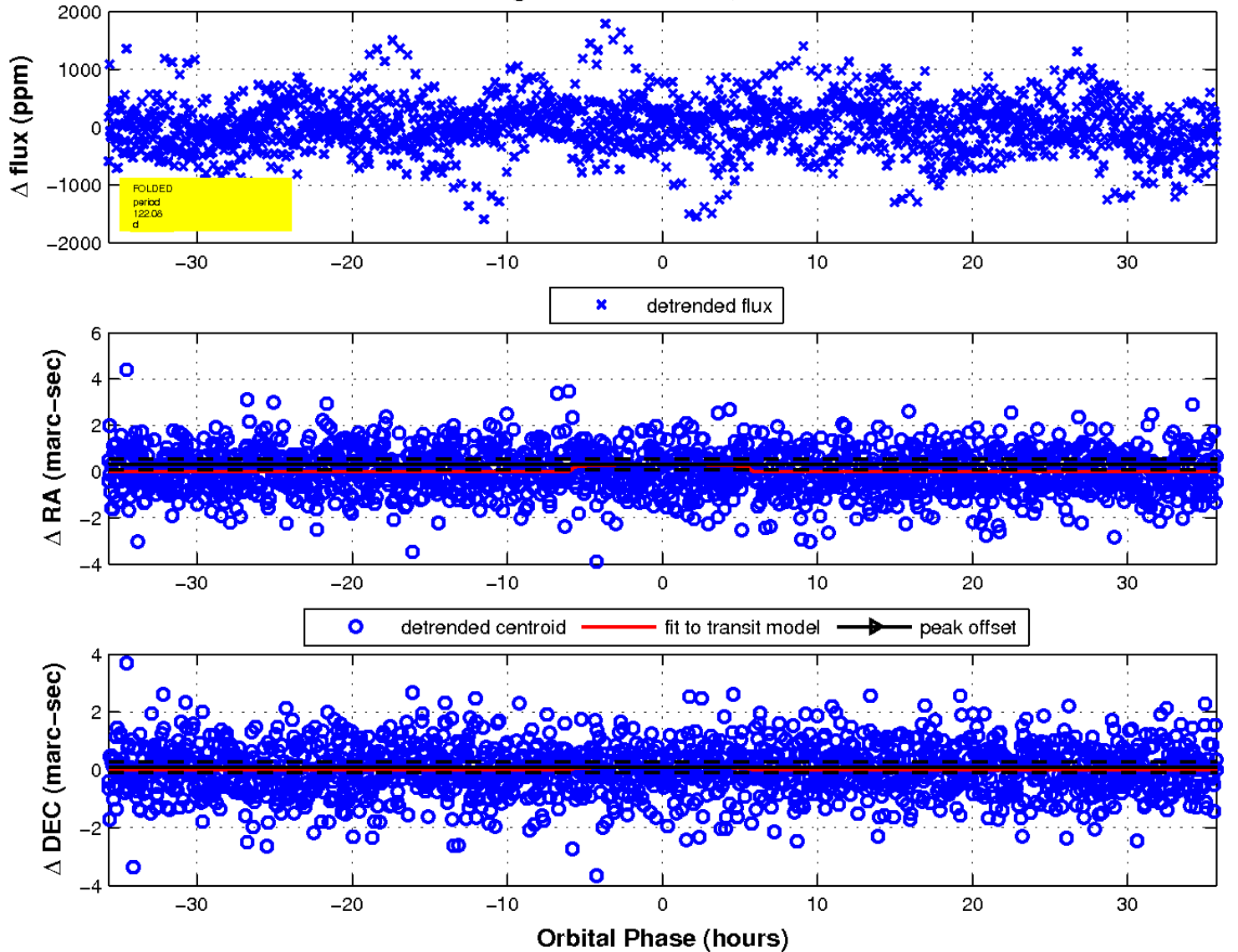
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

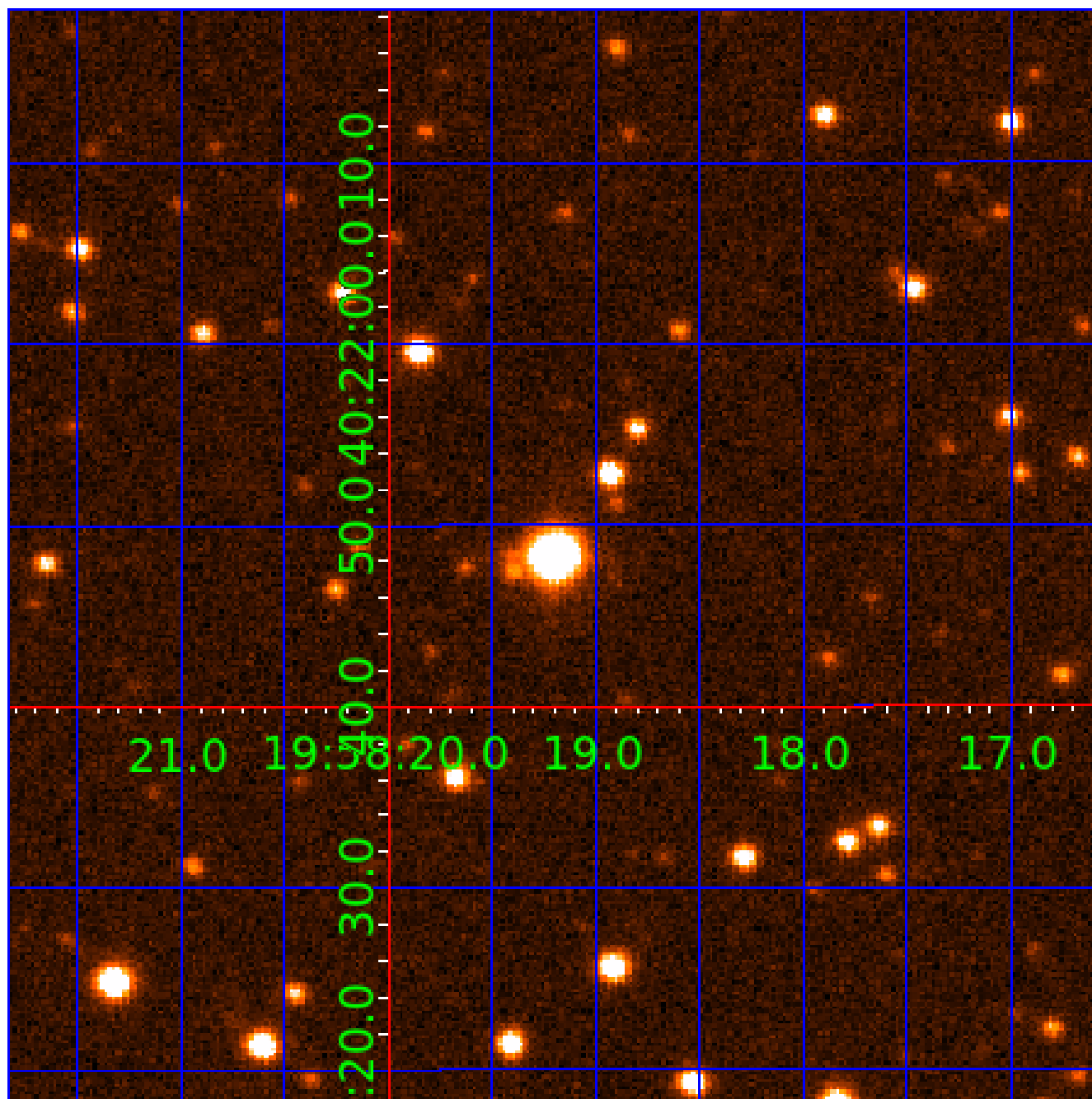


fluxWeightedCentroids, Planet 4 of 5



UKIRT Image

Declination



KIC 005220979

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})
005220979-01	OBS	No	1.525545	131.939085	55.6	3.924	8.8	9.1	1.57	7243	1.34	7247.51
005220979-02	OBS	No	305.657247	337.106427	761.1	7.516	8.7	8.1	1.57	7243	5.13	6.18
005220979-03	OBS	No	4.610258	133.813783	46.3	14.171	7.7	6.4	1.57	7243	1.15	1658.78
005220979-04	OBS	No	122.082853	227.858803	361.0	11.916	8.3	4.5	1.57	7243	3.21	21.02
005220979-05	OBS	No	75.159273	173.397799	414.2	3.164	7.6	6.5	1.57	7243	3.59	40.13

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005220979-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
005220979-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005220979-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005220979-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005220979-05	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

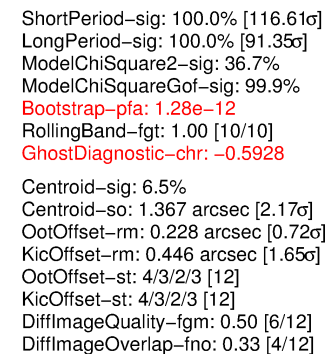
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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

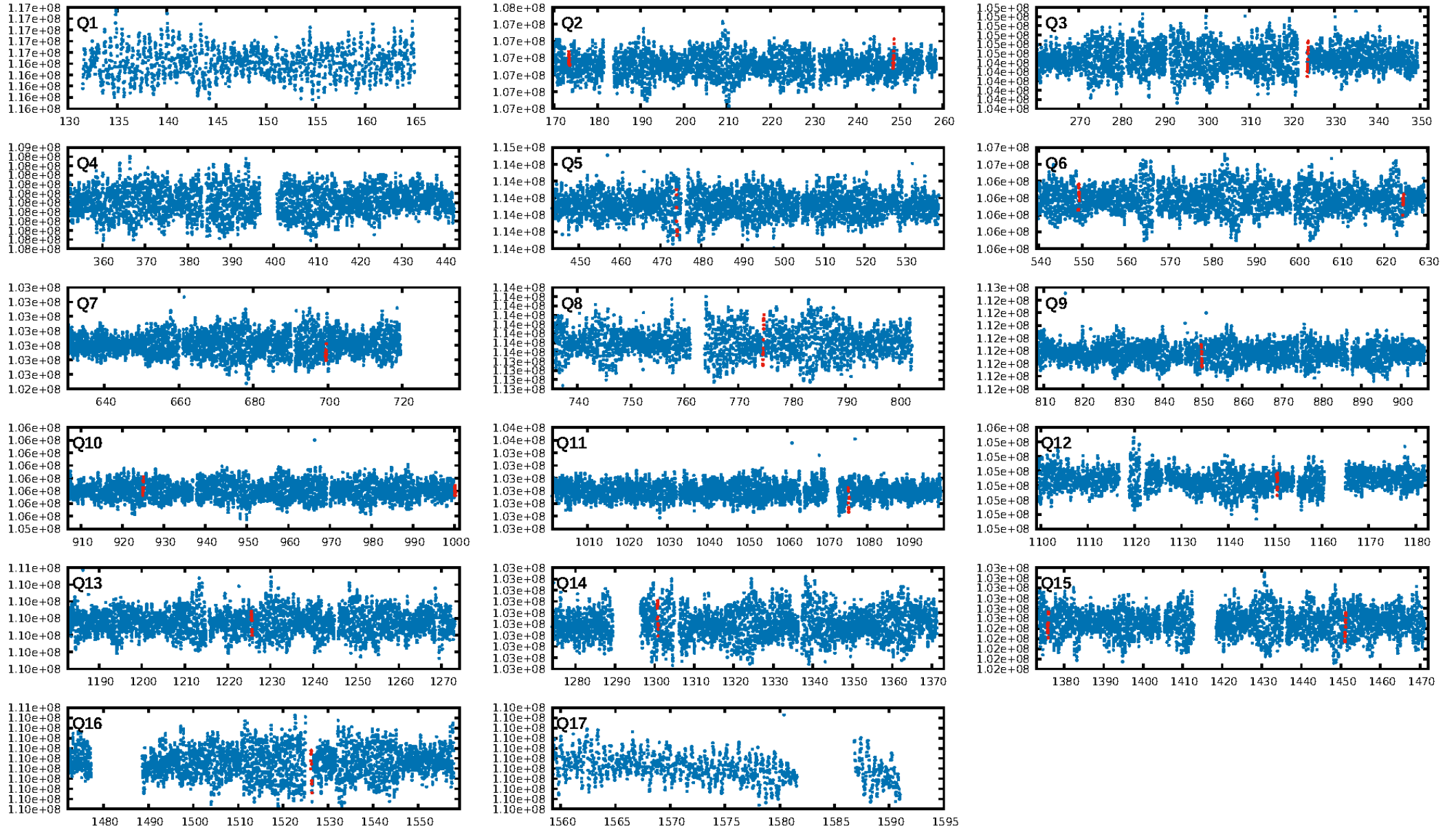
Ephemeris Match Information For 005220979-05

No Significant Match Found

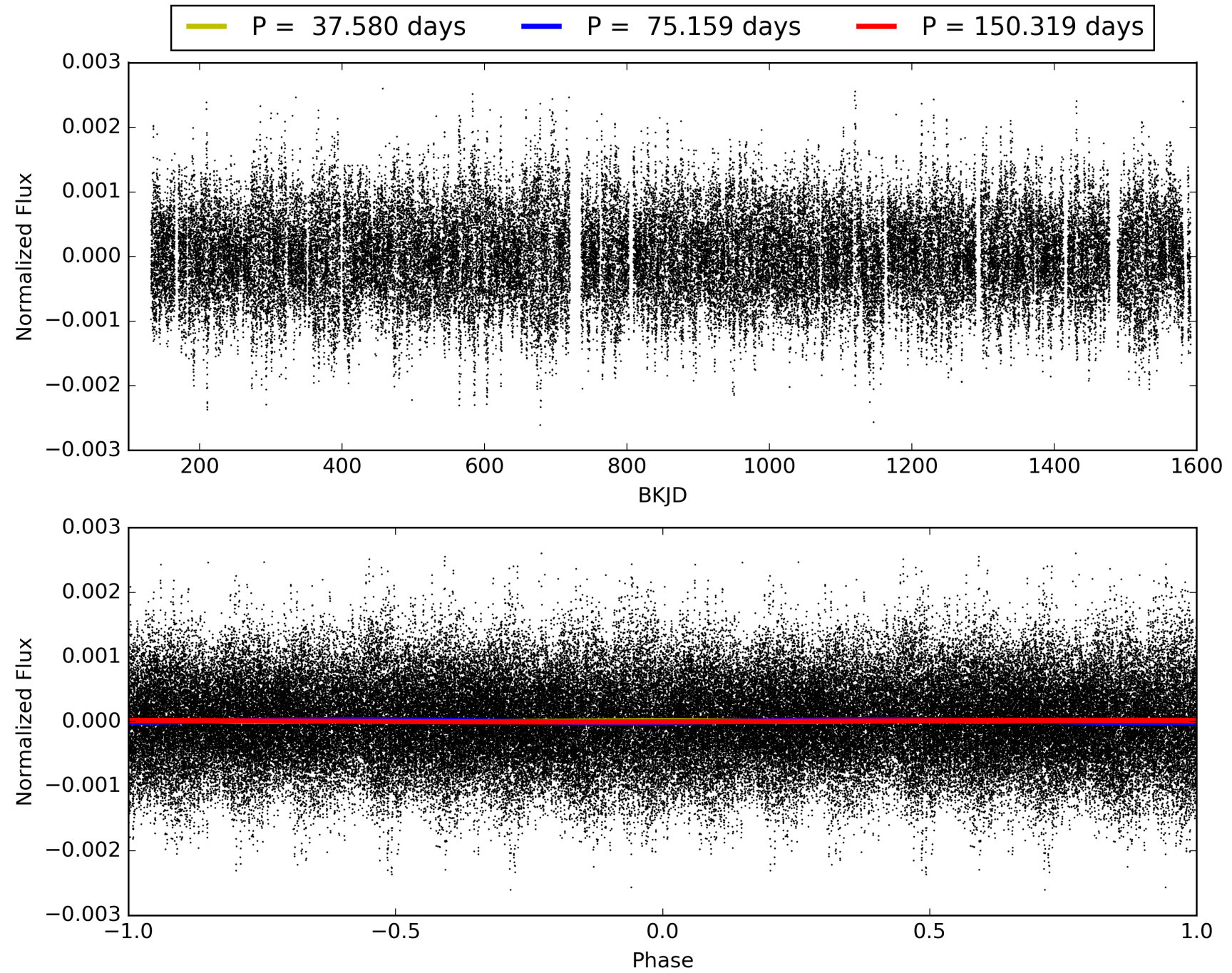
KIC: 5220979 Candidate: 5 of 5 Period: 75.159 d



TCE 005220979-05, PDC Light Curves

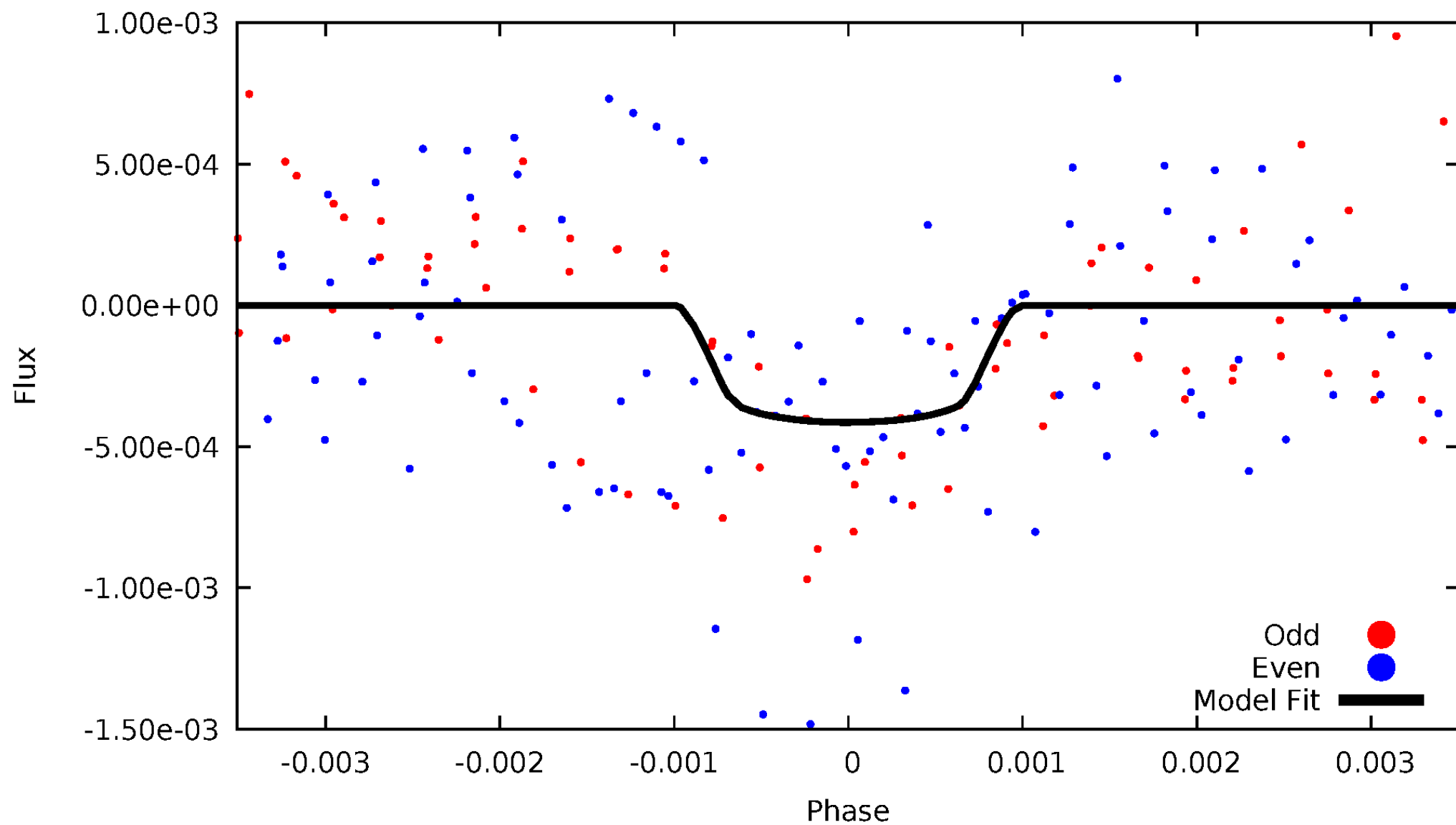


TCE 005220979-05



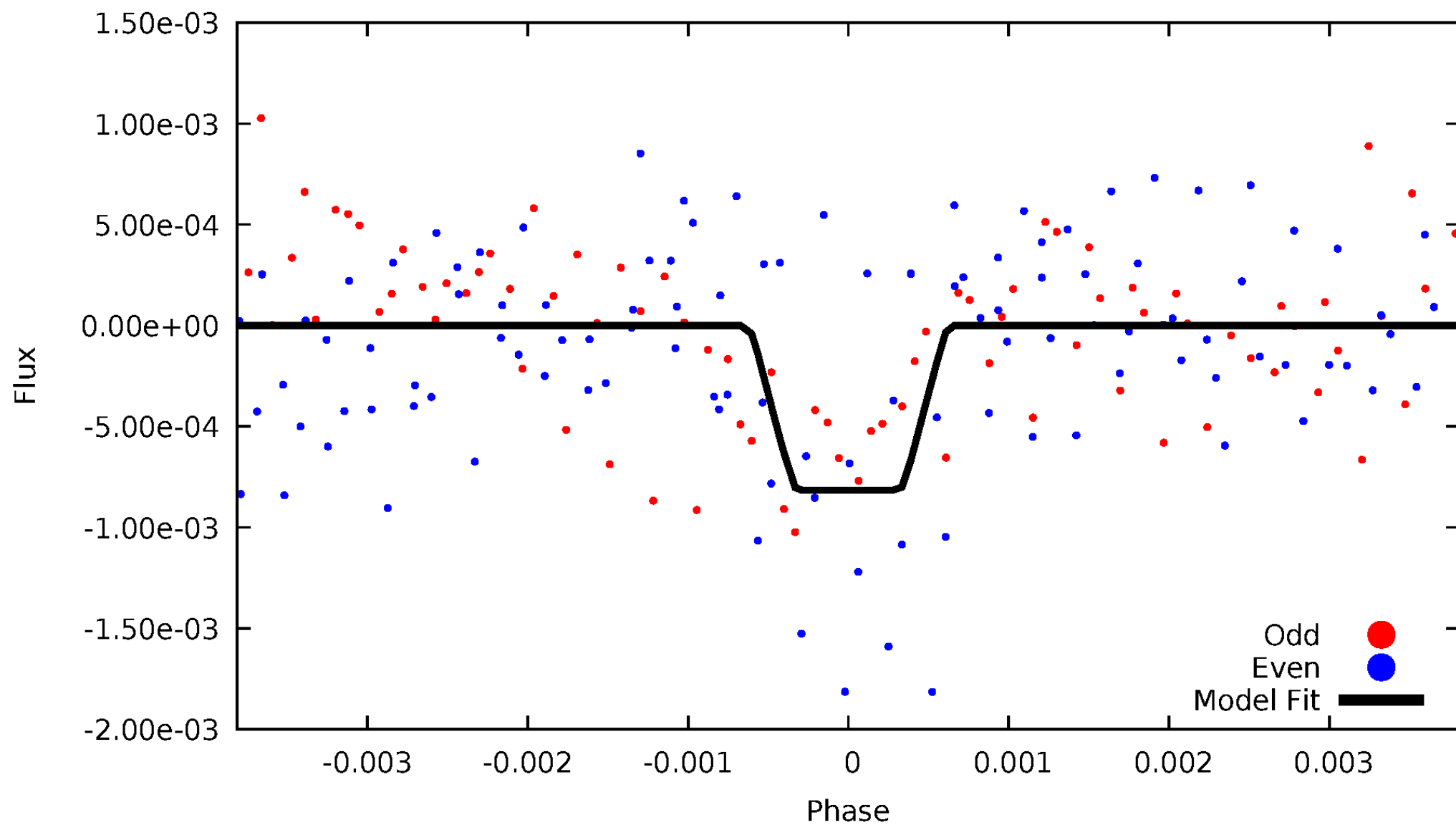
DV Odd/Even

TCE 005220979-05



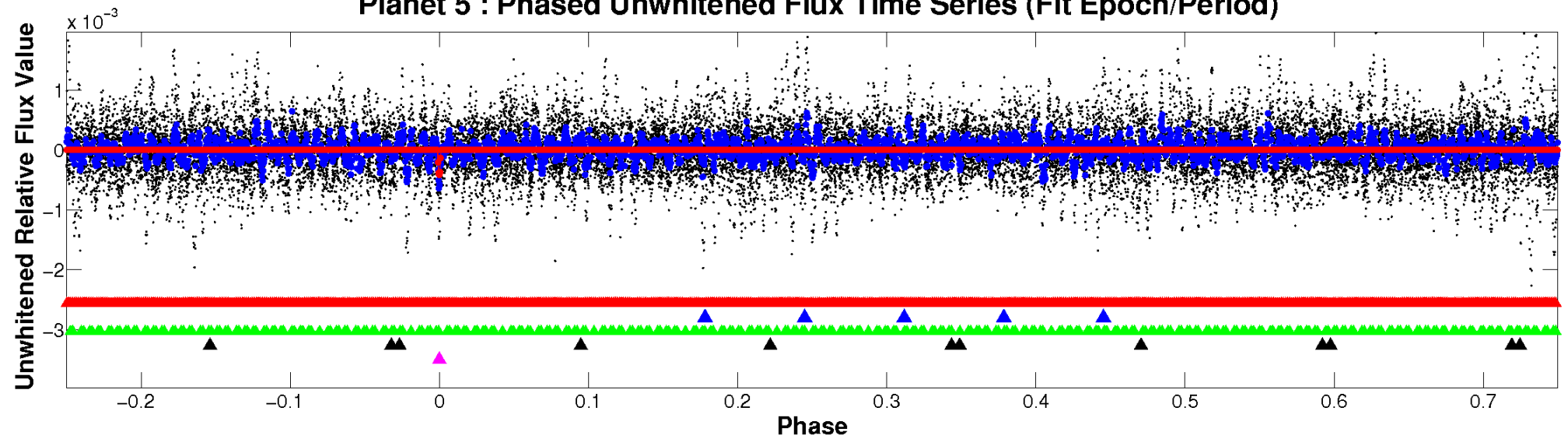
ALT Odd/Even

TCE 005220979-05

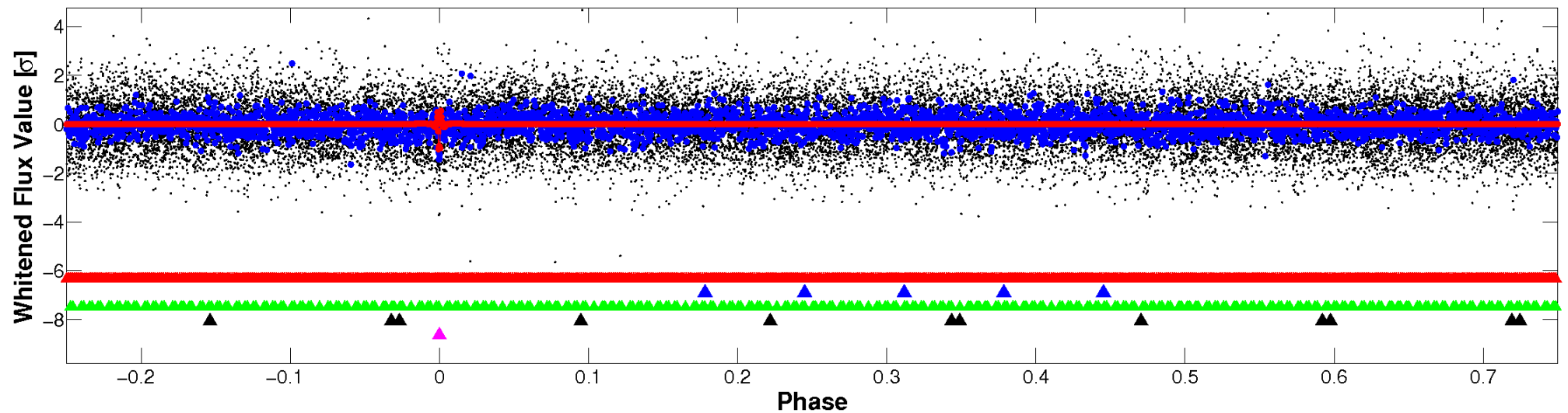


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

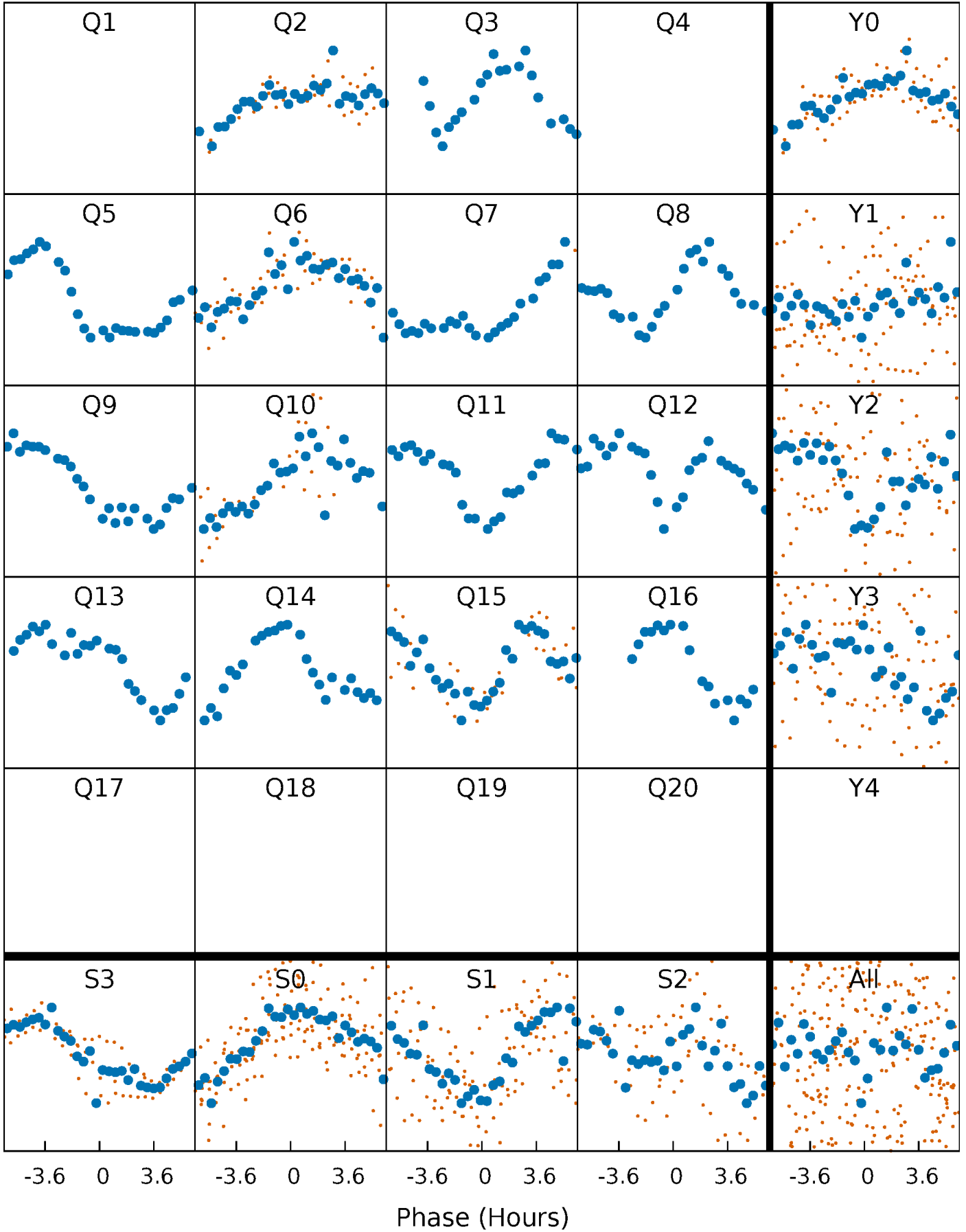


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



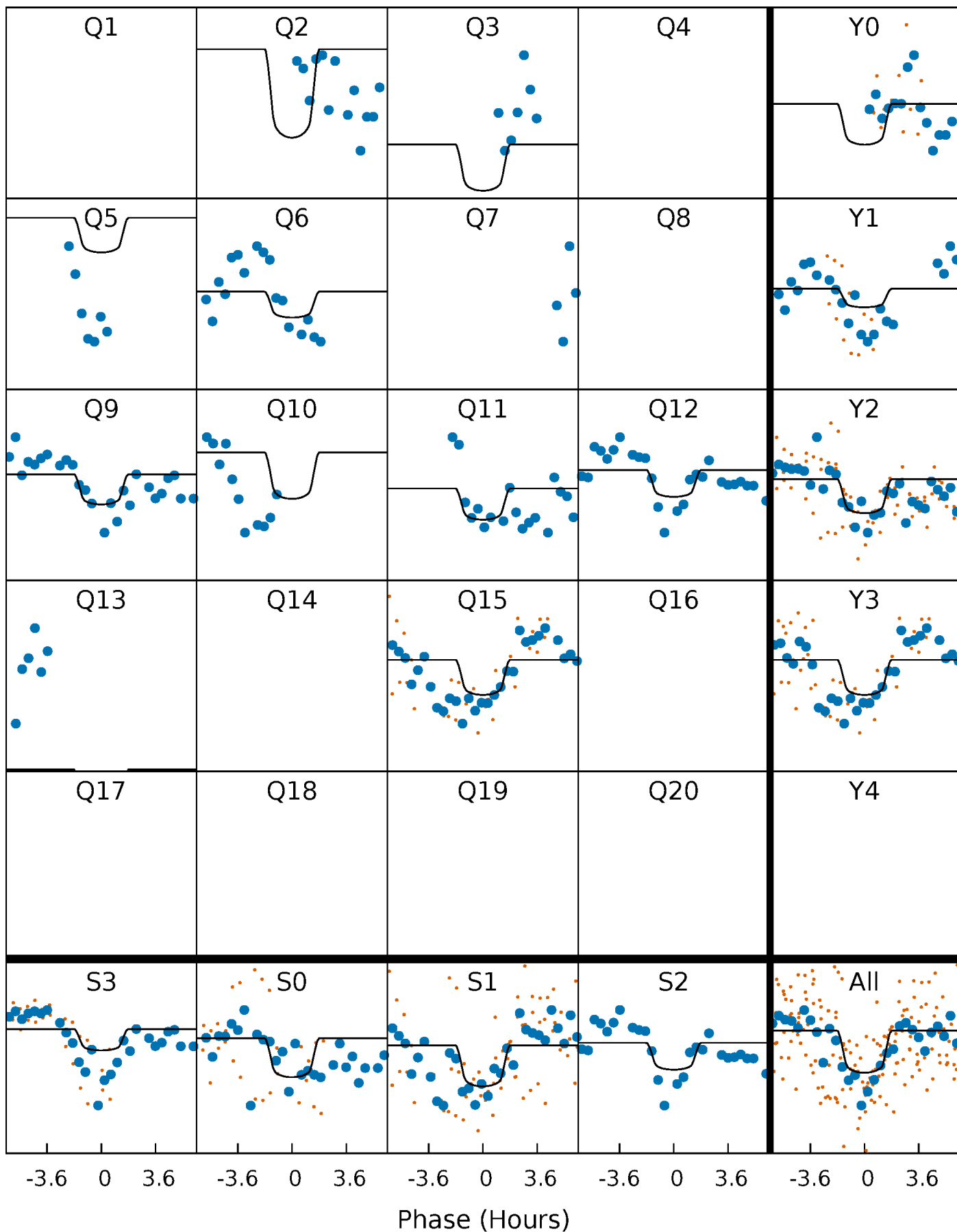
PDC Quarter-Phased Transit Curves

TCE 005220979-05 P= 75.159273 Days $T_0=173.397799$ (BKJD)



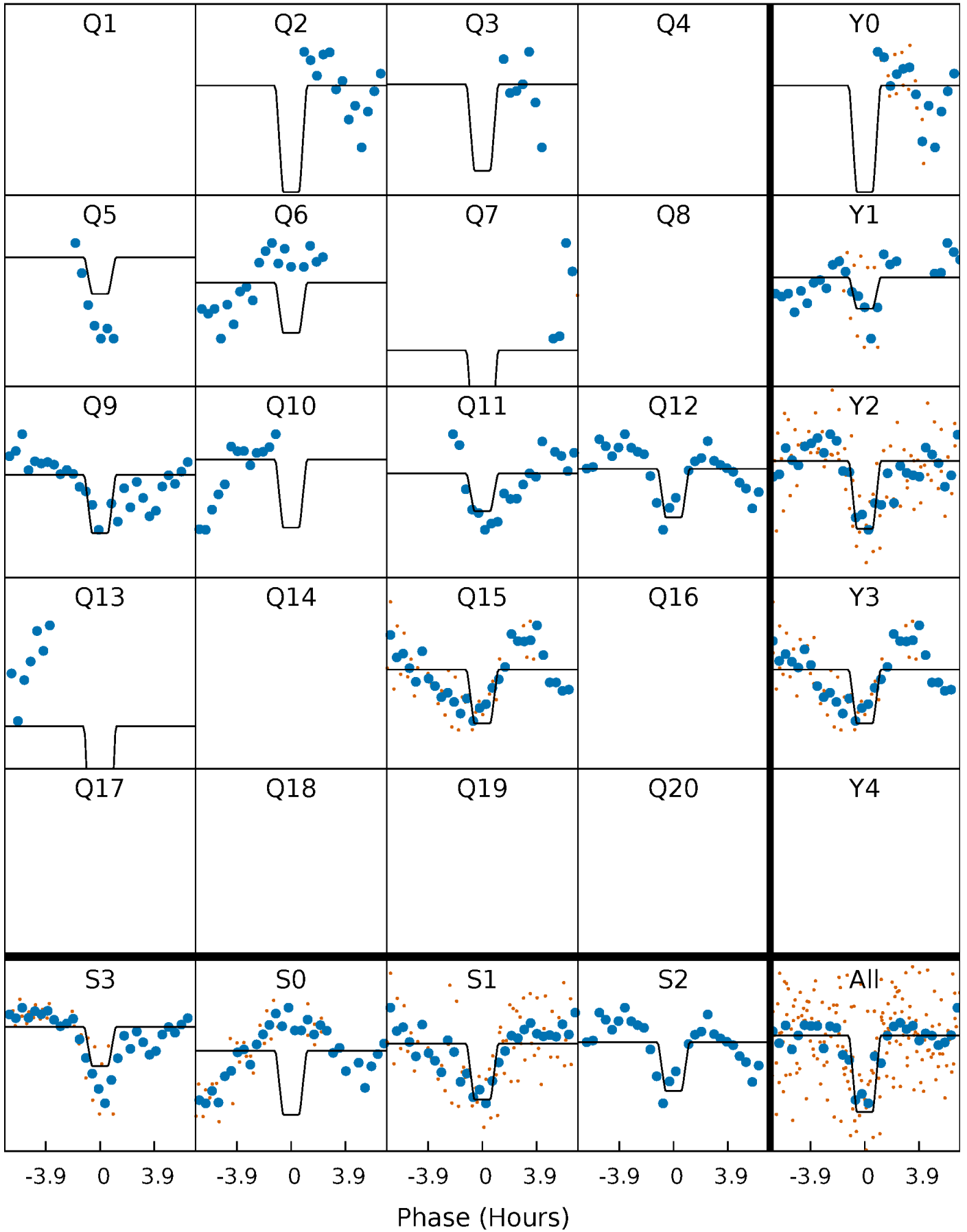
DV Quarter-Phased Transit Curves

TCE 005220979-05 $P = 75.159273$ Days $T_0 = 173.397799$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

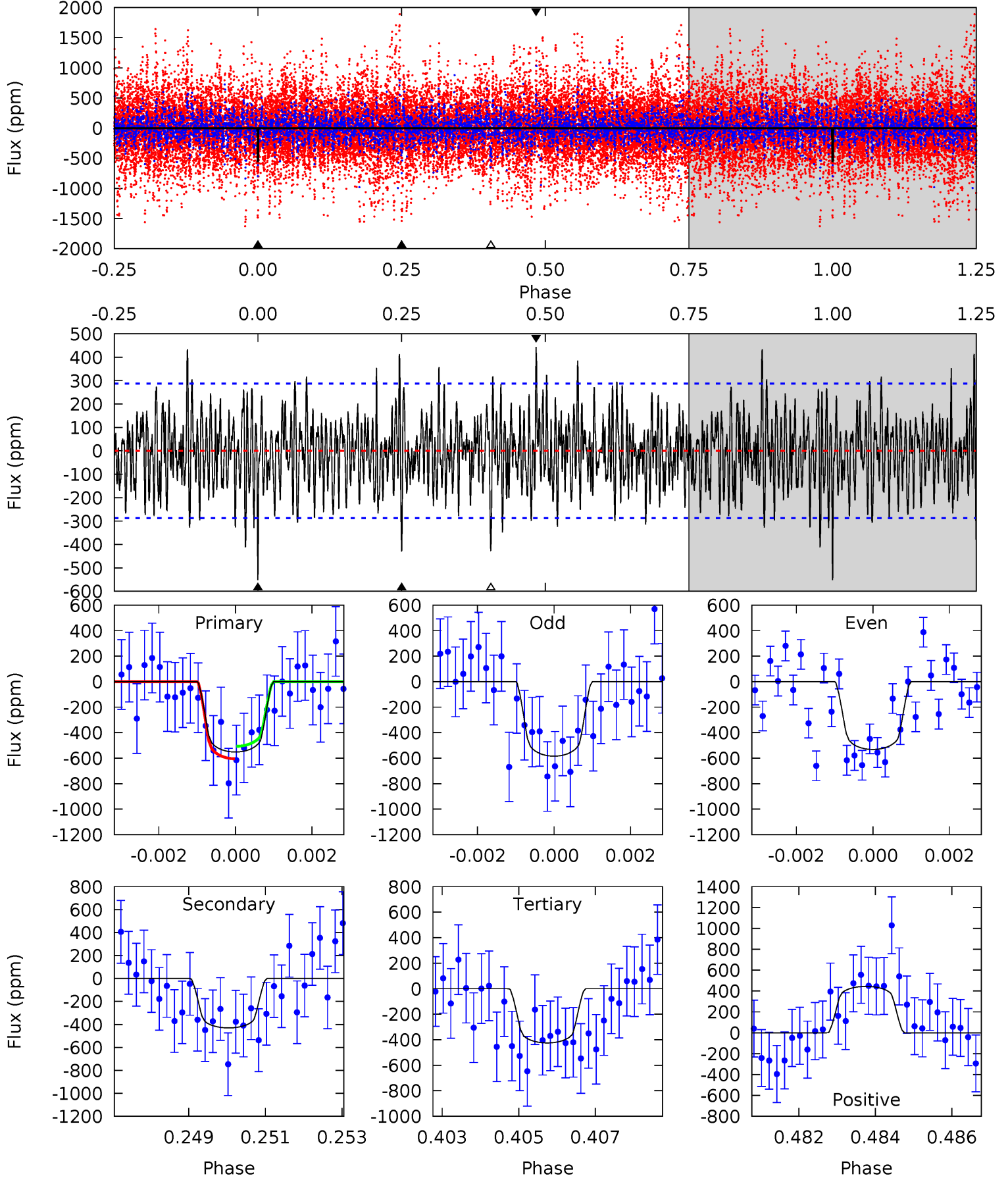
TCE 005220979-05 P= 75.161709 Days $T_0=173.373289$ (BKJD)



DV Model-Shift Uniqueness Test

005220979-05, P = 75.159273 Days, E = 98.238526 Days

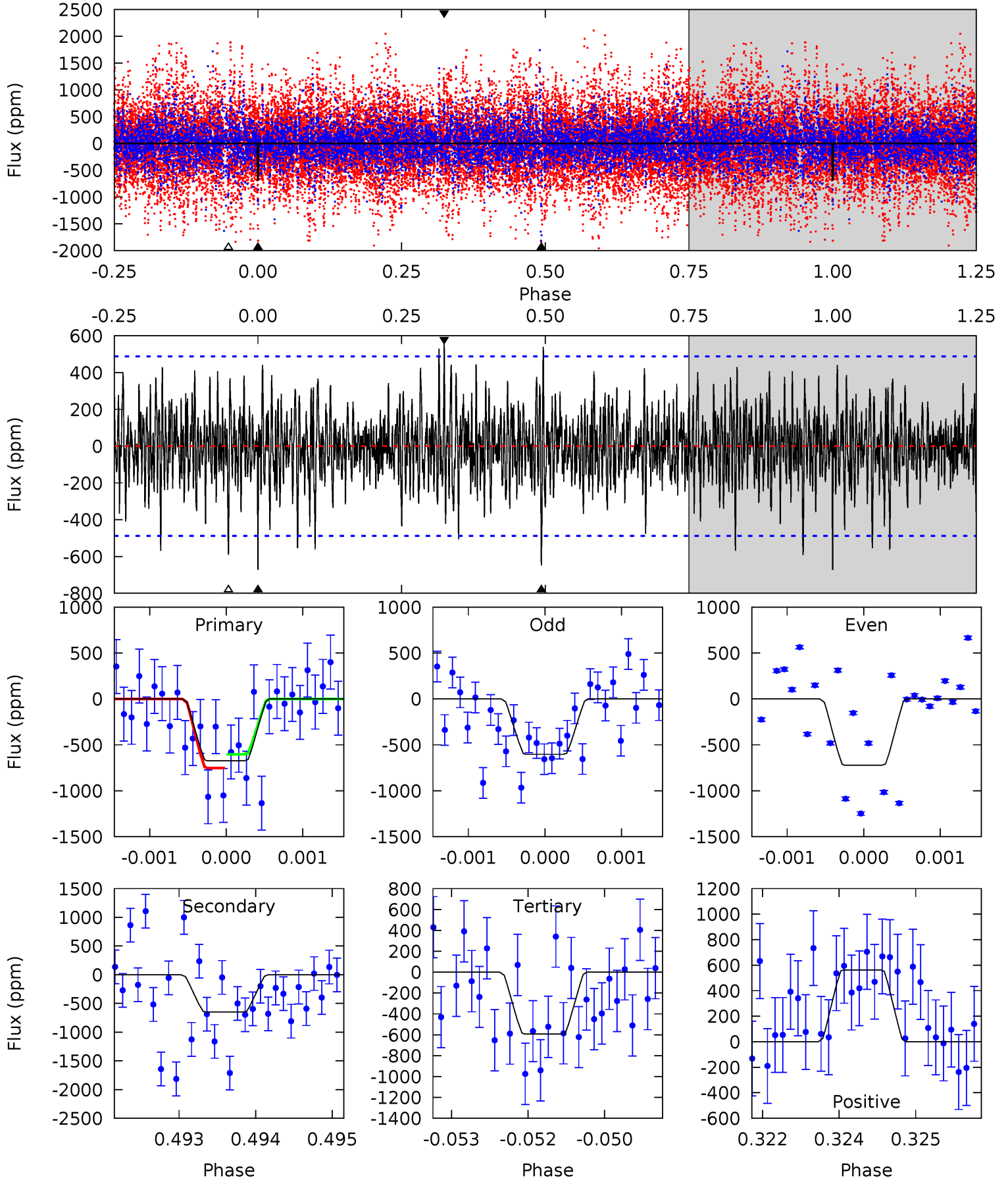
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	7.97	7.88	8.24	5.33	3.09	2.36	2.35	1.99	0.09	-0.26	0.47	1.07	0.45	0.91



Alt Model-Shift Uniqueness Test

005220979-05, P = 75.161709 Days, E = 98.211580 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.48	7.21	6.58	6.25	5.42	3.25	1.73	0.90	1.23	0.63	0.95	0.64	1.16	0.46	0.83



Stellar Parameters For KIC 005220979

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7243^{+228}_{-330}	$4.191^{+0.124}_{-0.201}$	$-0.220^{+0.250}_{-0.350}$	$1.575^{+0.508}_{-0.313}$	$1.409^{+0.219}_{-0.219}$	$0.508^{+0.319}_{-0.266}$
	+3%/-5%	+3%/-5%	+114%/-159%	+32%/-20%	+16%/-16%	+63%/-52%
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 005220979-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-430 ± 54	$3.99^{+2.10}_{-2.19}$	901^{+75}_{-56}	6938^{+4474}_{-1414}	2319^{+8693}_{-1358}
Alt.	-648 ± 90	$5.08^{+2.31}_{-2.17}$	903^{+74}_{-65}	6727^{+2627}_{-1177}	2108^{+4383}_{-1139}

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

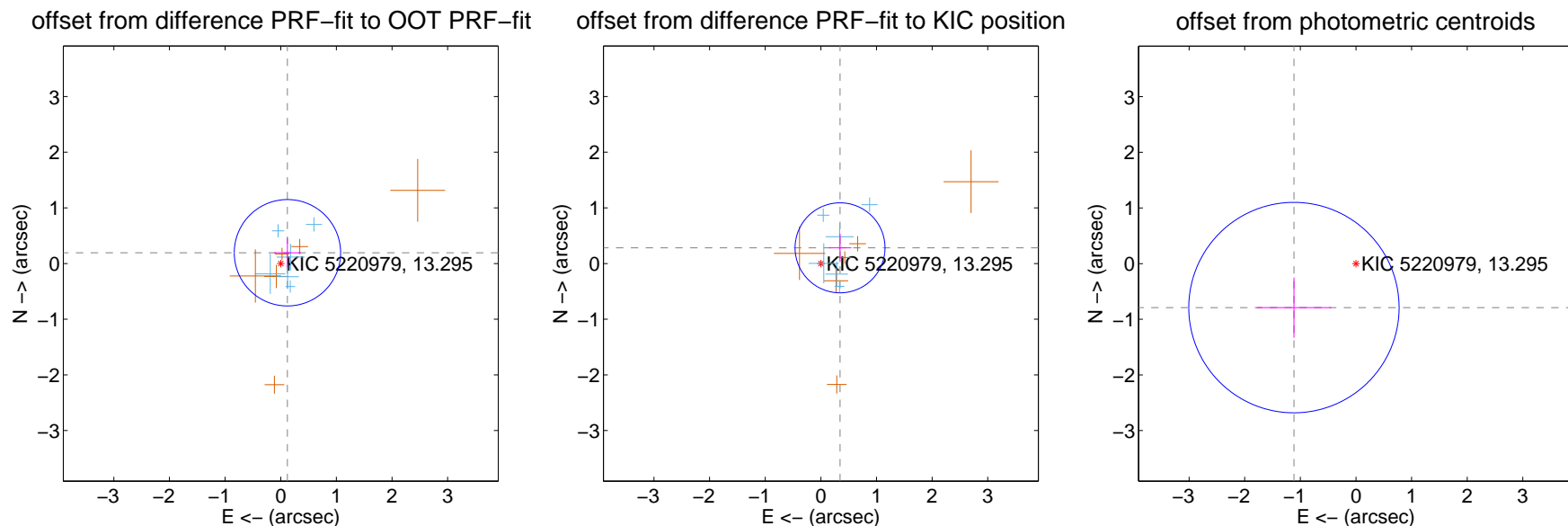
DV Centroid Data

Supplemental centroid analysis for 005220979-05. Kepler magnitude: 13.29. Transit SNR 6.49

There are 6 quarters with good PRF difference image offsets

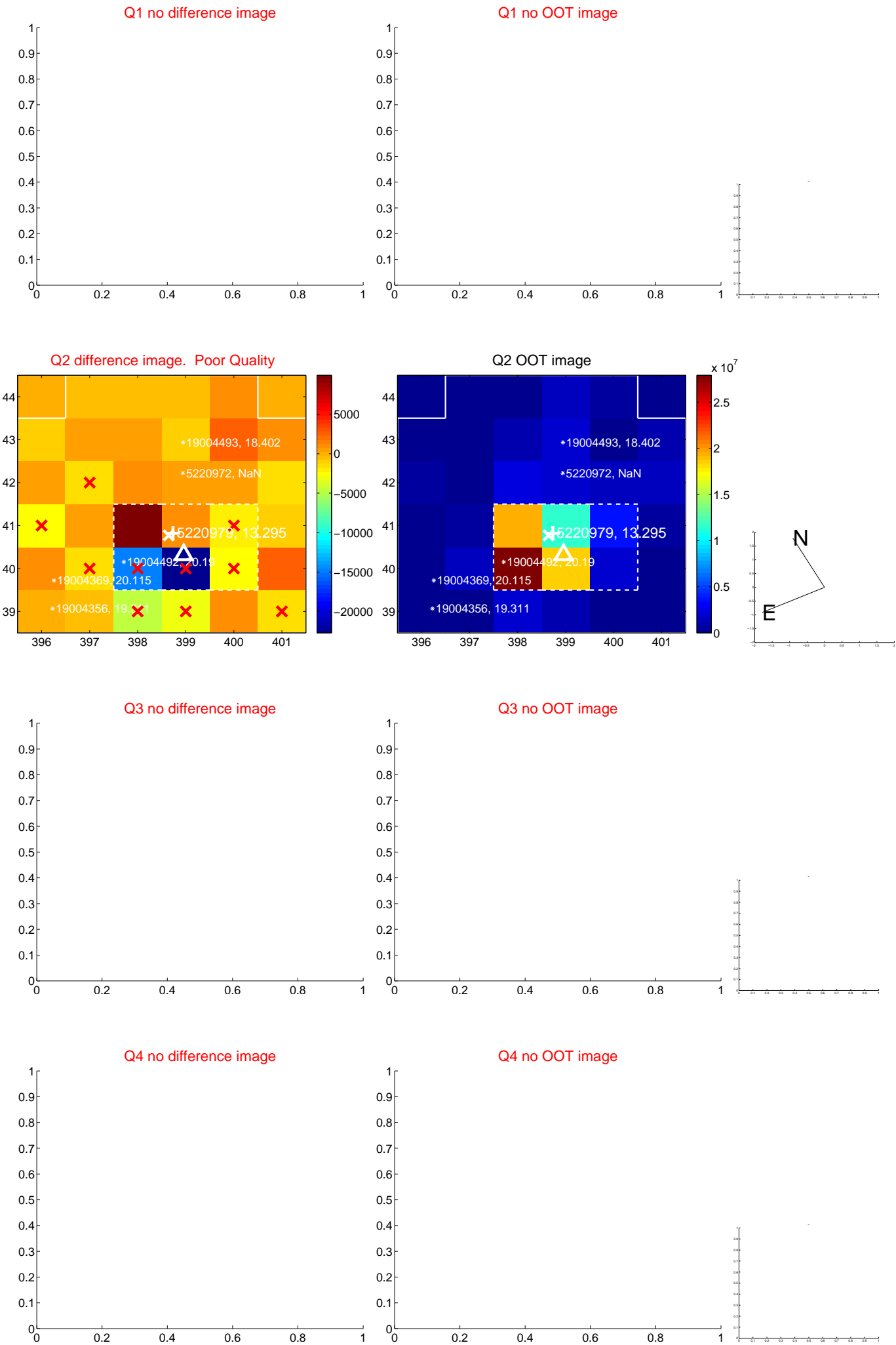
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.228 ± 0.319	0.72	-0.120 ± 0.241	0.194 ± 0.265
PRF-fit source offset from KIC position	0.446 ± 0.269	1.65	-0.345 ± 0.204	0.282 ± 0.253
photometric centroid source offset	1.37 ± 0.63	2.17	1.12 ± 0.67	-0.79 ± 0.54

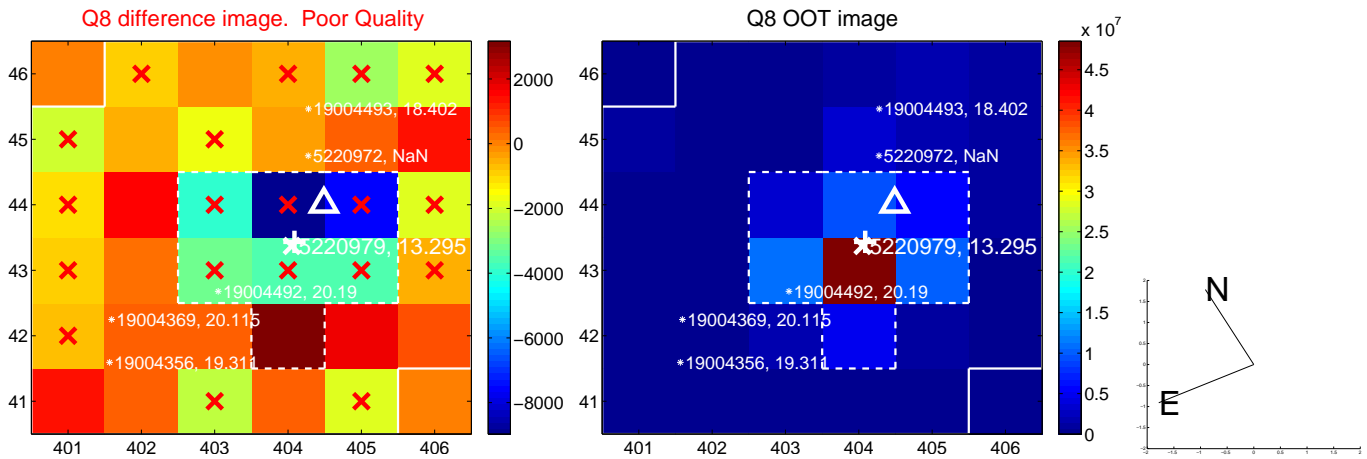
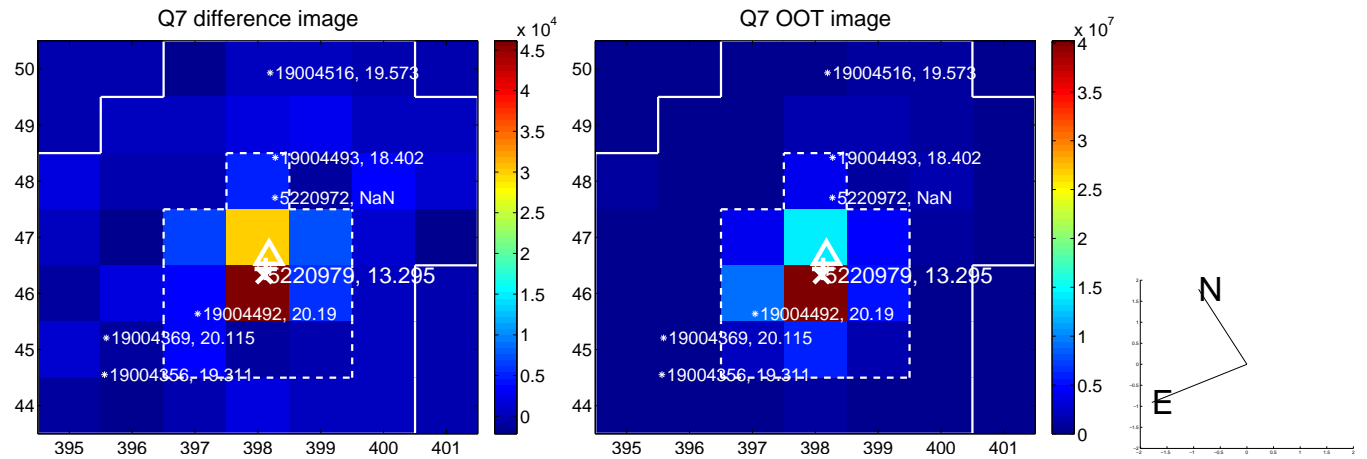
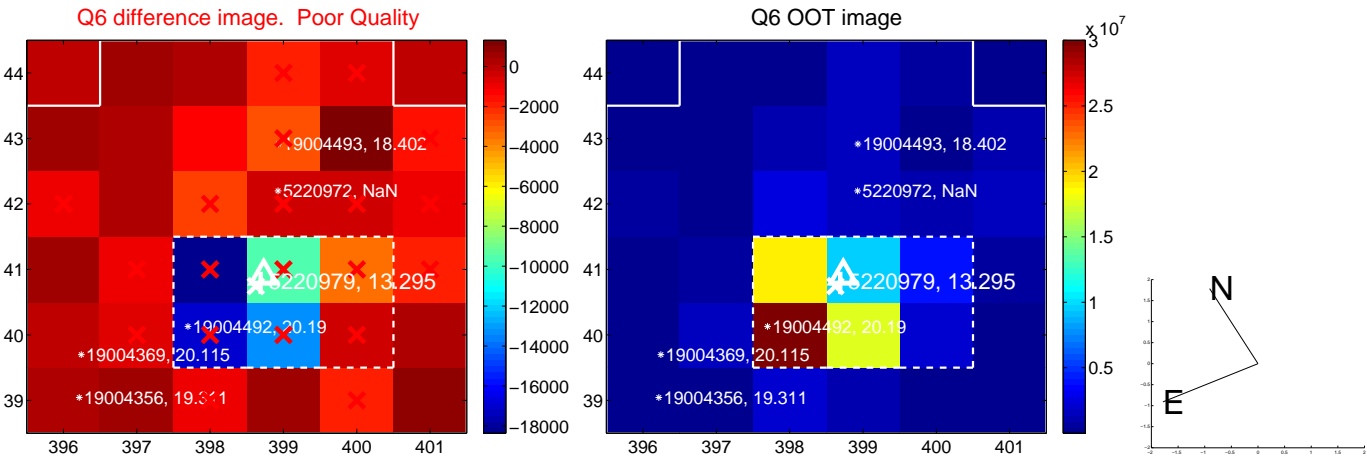
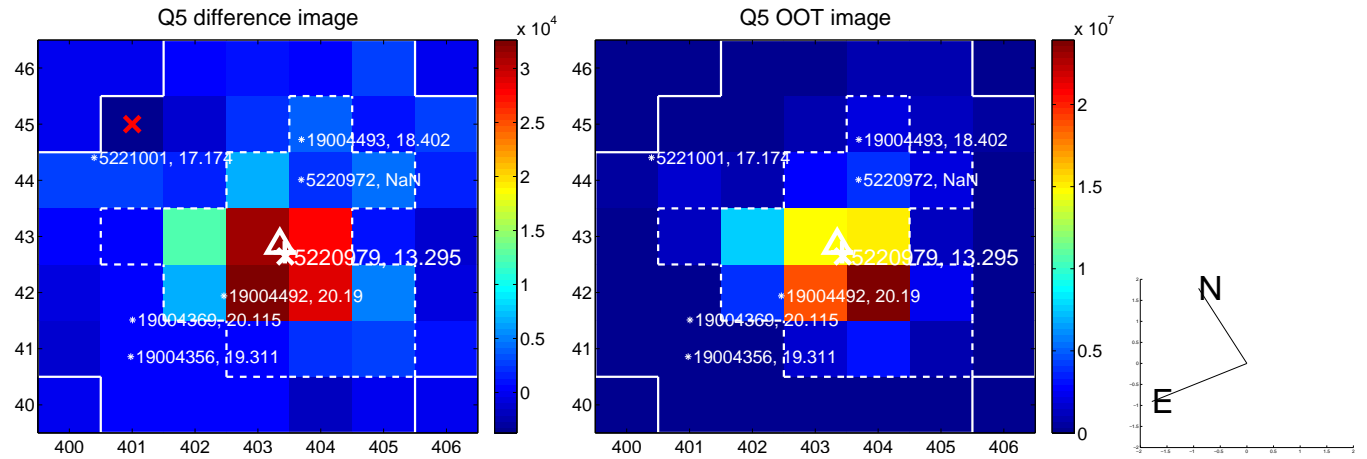


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

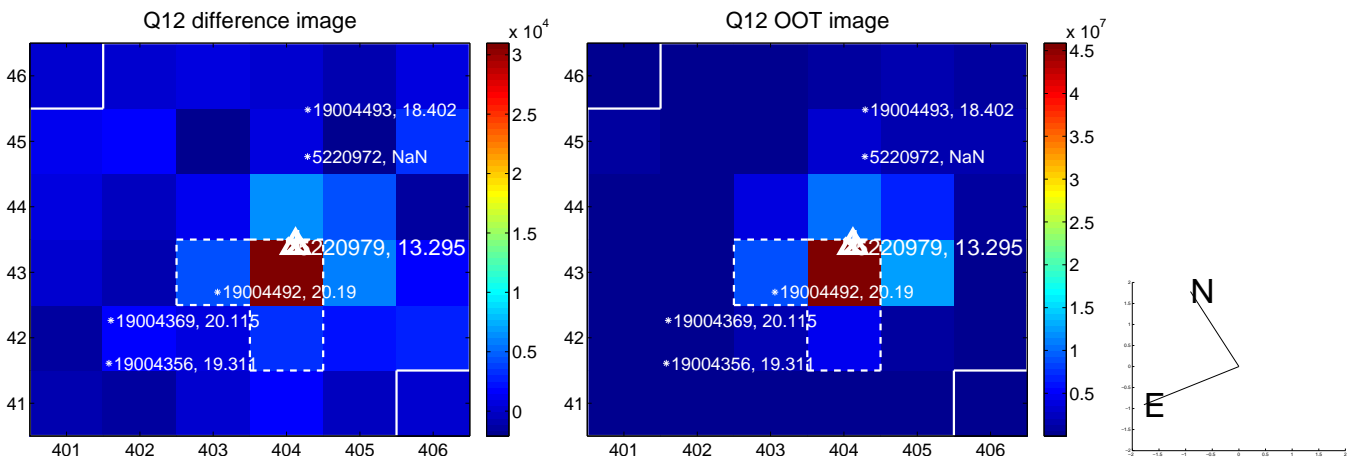
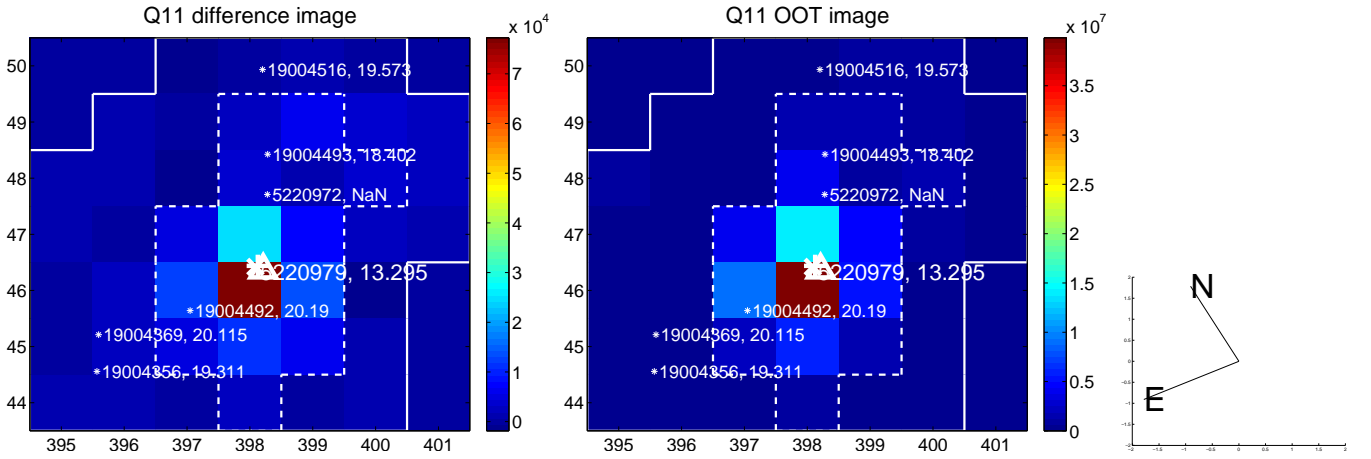
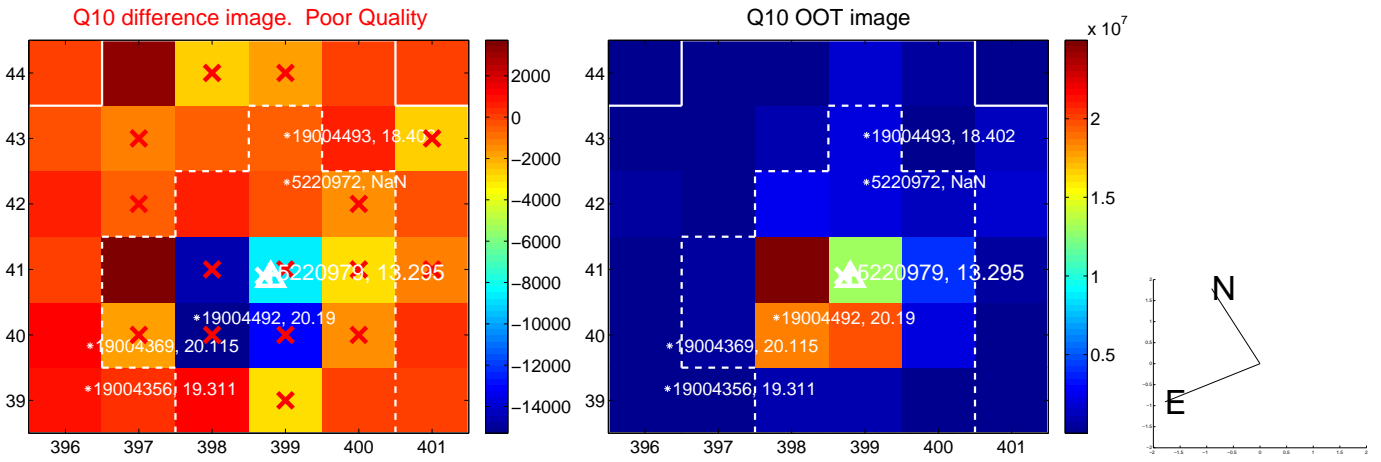
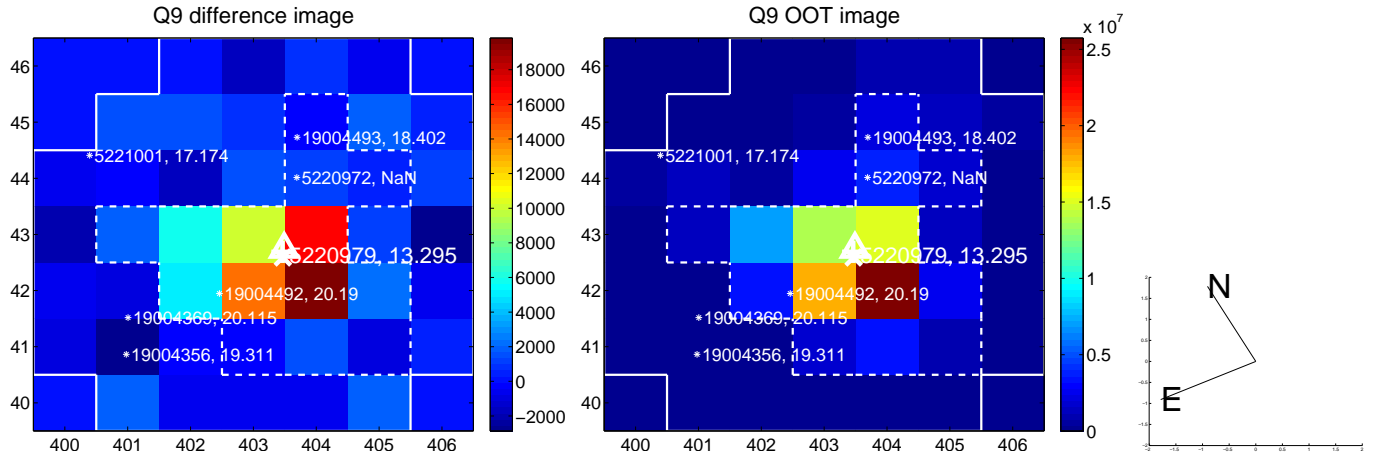
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



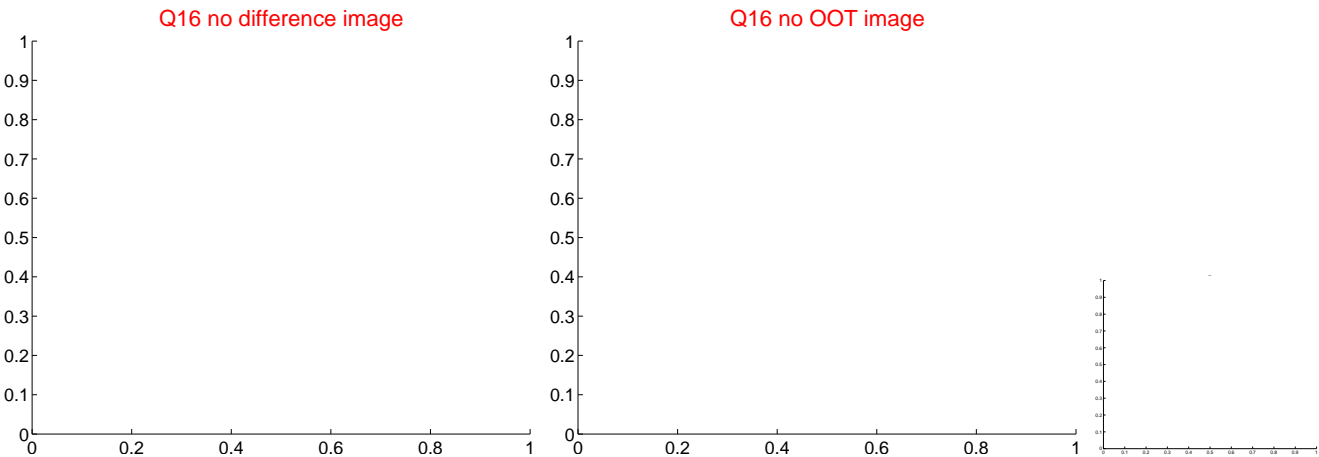
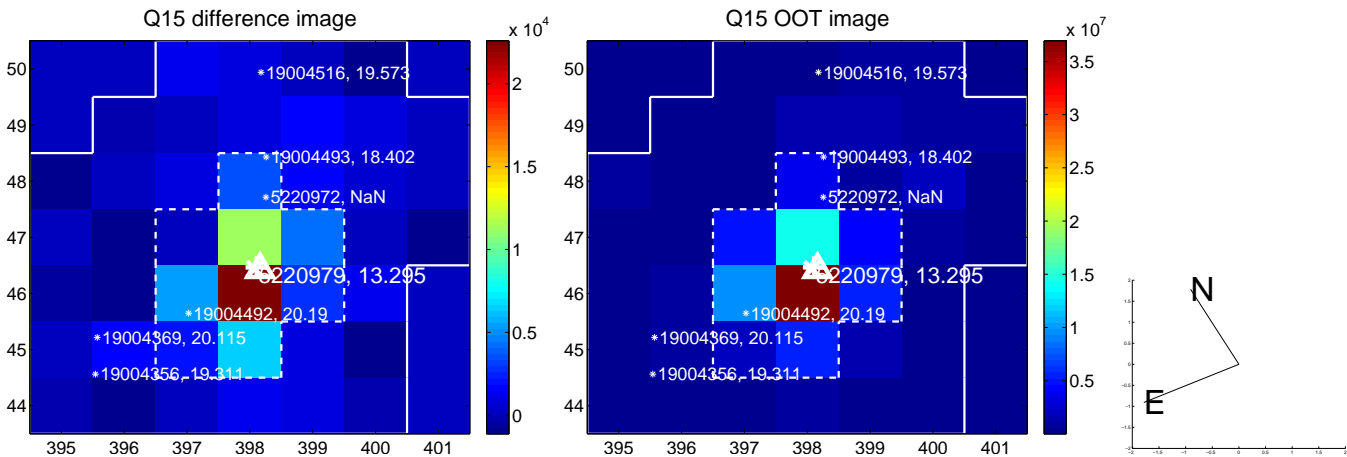
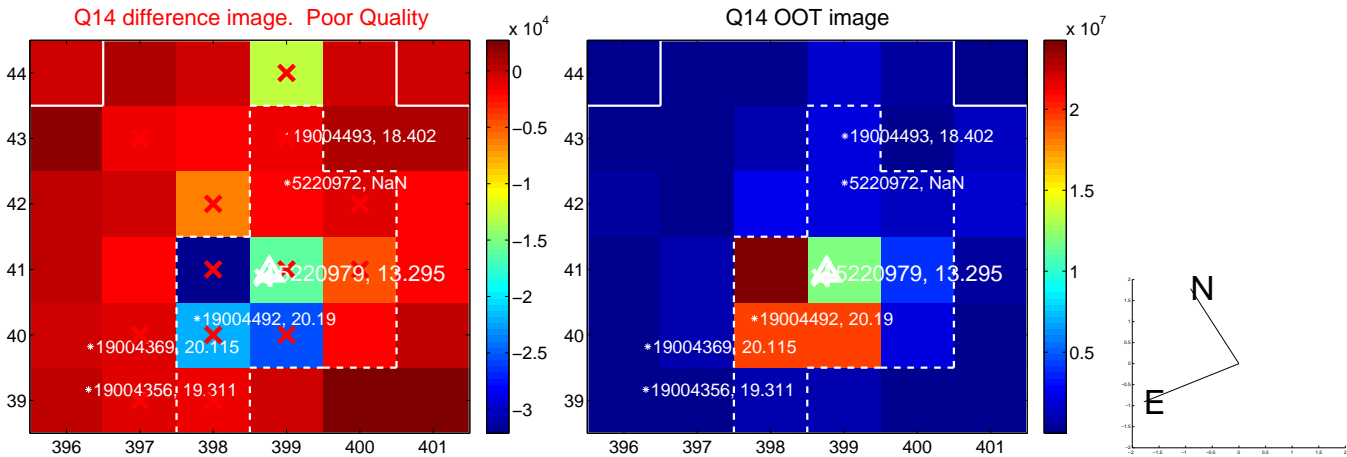
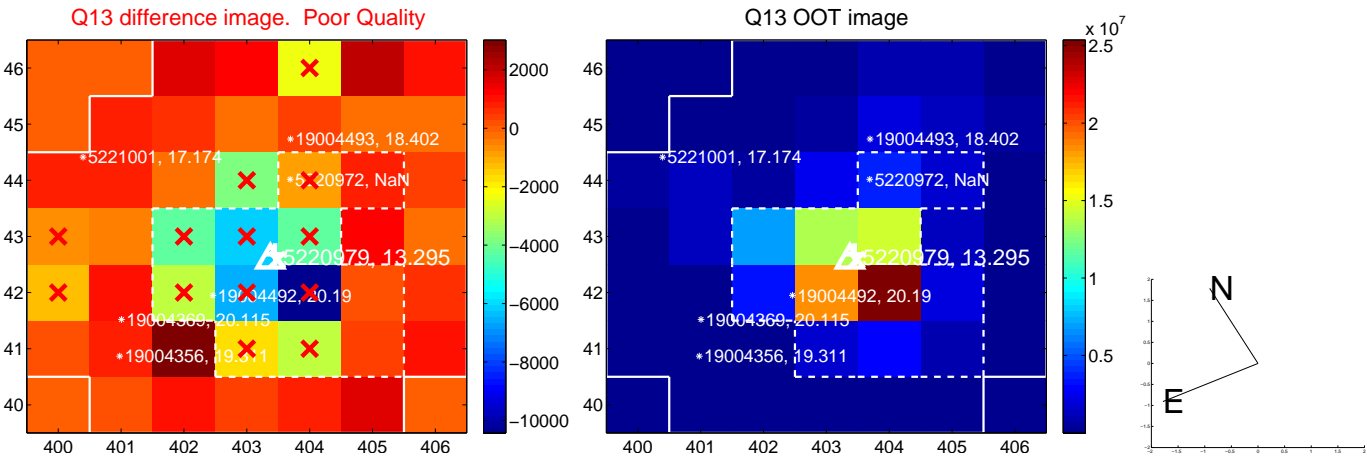
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



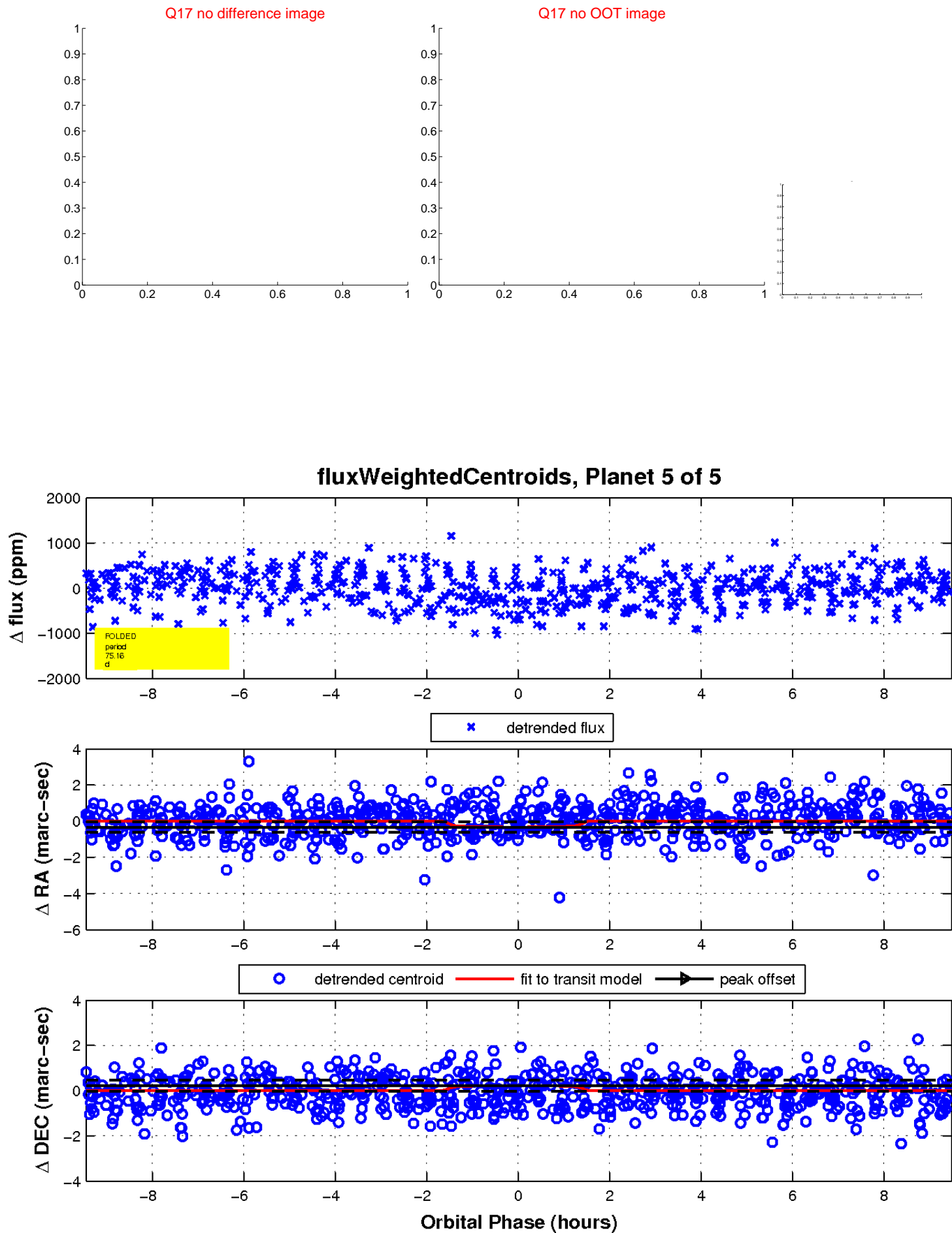
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

Declination

