

KIC 005609986

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})
005609986-01	OBS	No	3.049254	133.820480	7.7	14.233	10.5	2.7	1.93	6523	0.63	2742.82
005609986-02	OBS	No	378.478553	208.044557	108.4	5.029	19.1	3.6	1.93	6523	2.26	4.43
005609986-03	OBS	No	115.249626	228.728750	201.9	5.133	8.0	7.6	1.93	6523	3.62	21.62
005609986-04	OBS	No	136.589499	236.821201	224.9	4.353	13.3	9.4	1.93	6523	2.95	17.24
005609986-05	OBS	No	171.108663	241.869779	246.4	10.702	10.2	10.0	1.93	6523	3.33	12.77
005609986-06	OBS	No	147.568332	252.030473	157.8	5.473	8.0	6.2	1.93	6523	2.72	15.55

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005609986-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
005609986-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
005609986-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
005609986-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

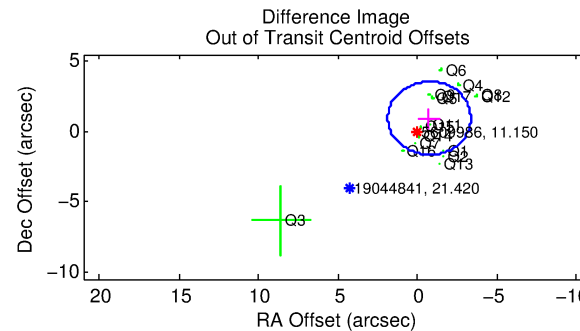
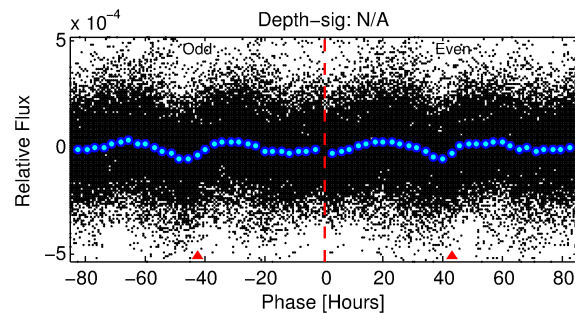
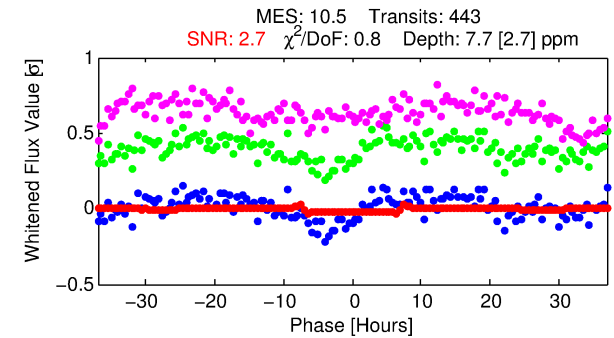
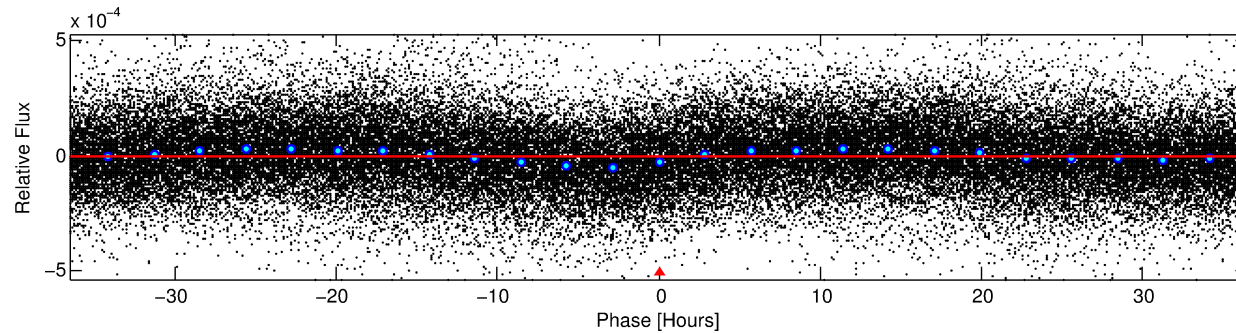
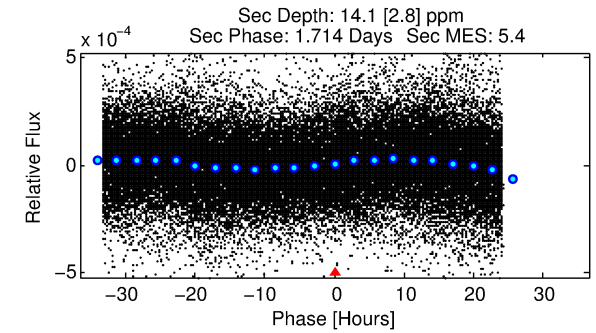
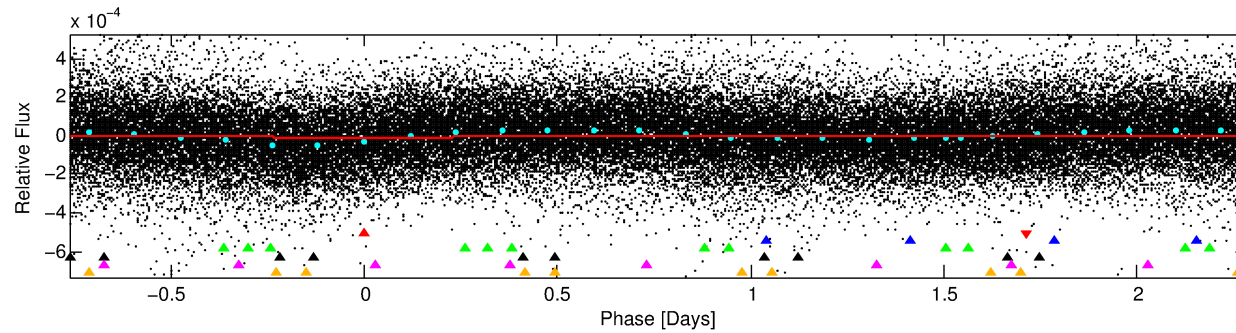
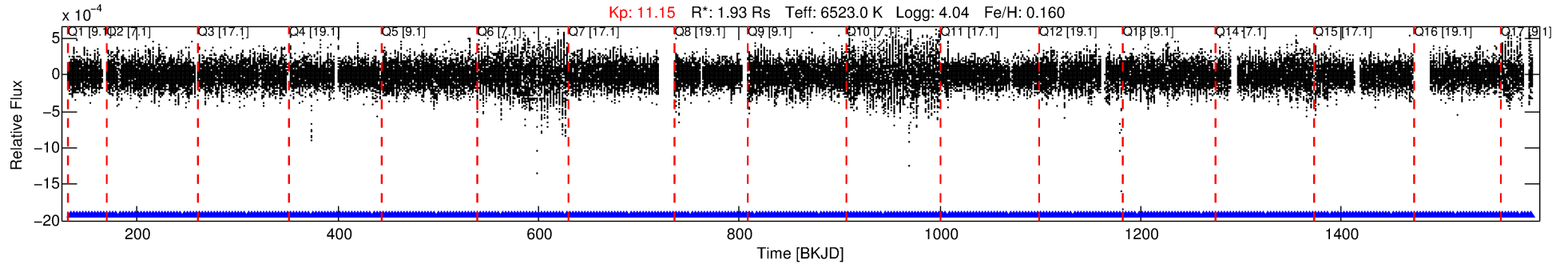
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005609986-01

No Significant Match Found

DV One-Page Summary

KIC: 5609986 Candidate: 1 of 6 Period: 3.049 d



DV Fit Results:

Period = 3.04925 [0.00008] d
Epoch = 133.8205 [0.0147] BKJD
Rp/R* = 0.0030 [0.0009]
a/R* = 1.16 [0.44]
b = 0.91 [0.26]
Seff = 2742.82 [807.23]
Teq = 1845 [136] K
Rp = 0.63 [0.23] Re
a = 0.0468 [0.0086] AU
Ag = 42.45 [30.19] [1.37σ]
Teffp = 7282 [1186] K [4.55σ]

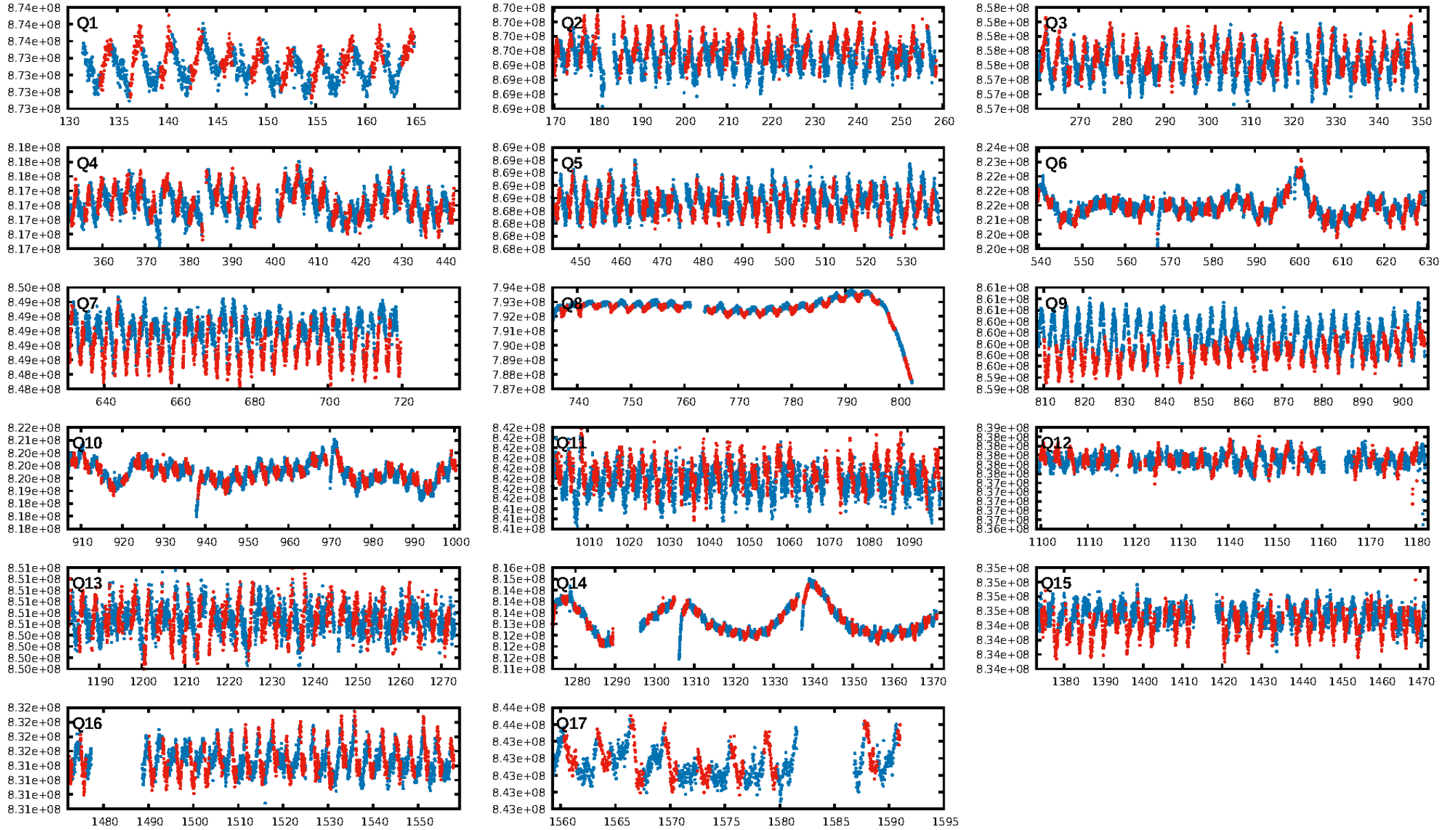
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [177.97σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGoF-sig: N/A
Bootstrap-pfa: 6.50e-13
RollingBand-fgt: 1.00 [424/424]
GhostDiagnostic-chr: 7.244
Centroid-sig: 53.4%
Centroid-so: 1.350 arcsec [0.74σ]
OotOffset-rm: 1.221 arcsec [1.40σ]
OotOffset-st: 3/4/4/5 [16]
KicOffset-rm: 1.502 arcsec [1.61σ]
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DiffImageQuality-fgm: 0.69 [11/16]
DiffImageOverlap-fno: 1.00 [17/17]

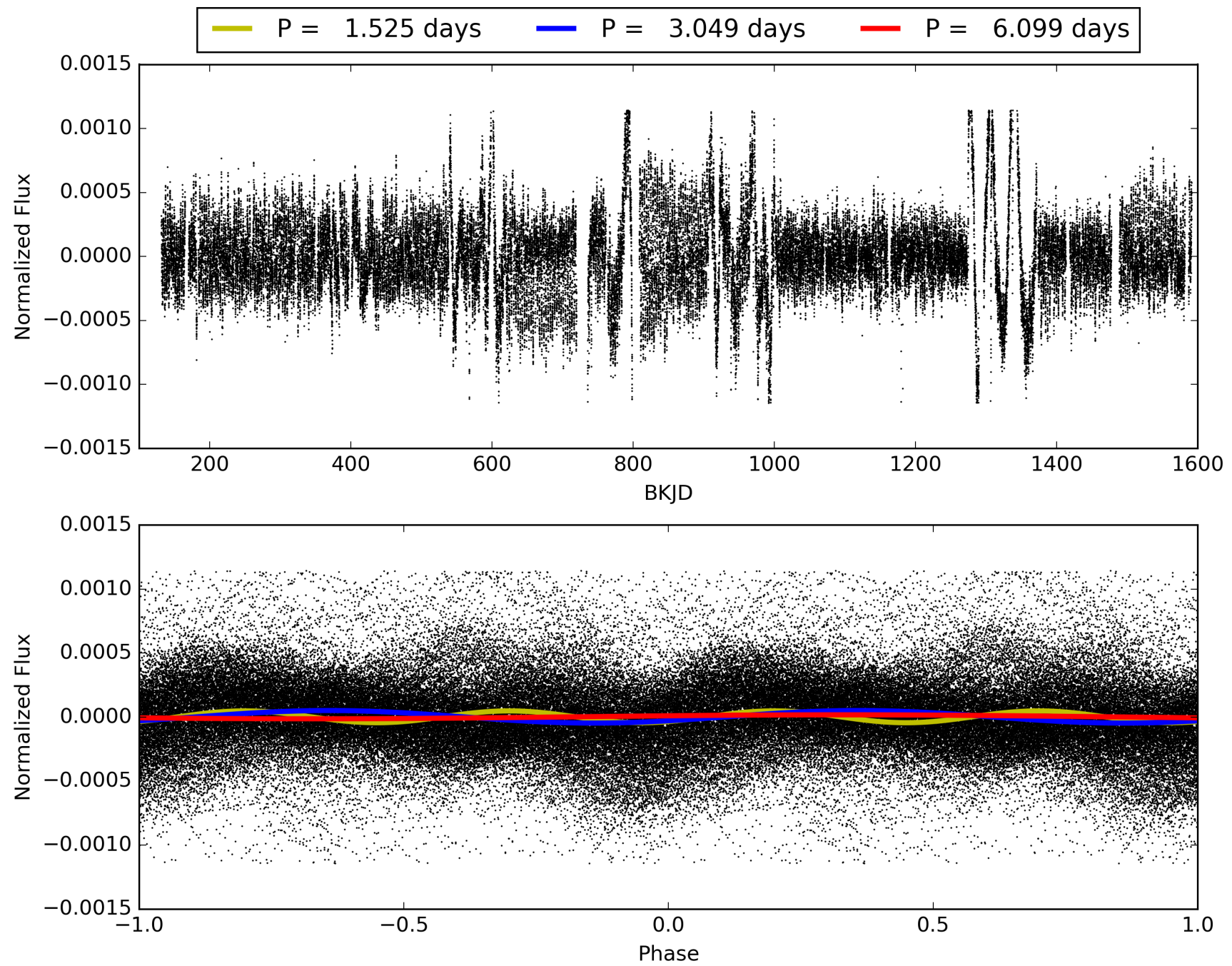
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:50:11 Z

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

TCE 005609986-01, PDC Light Curves

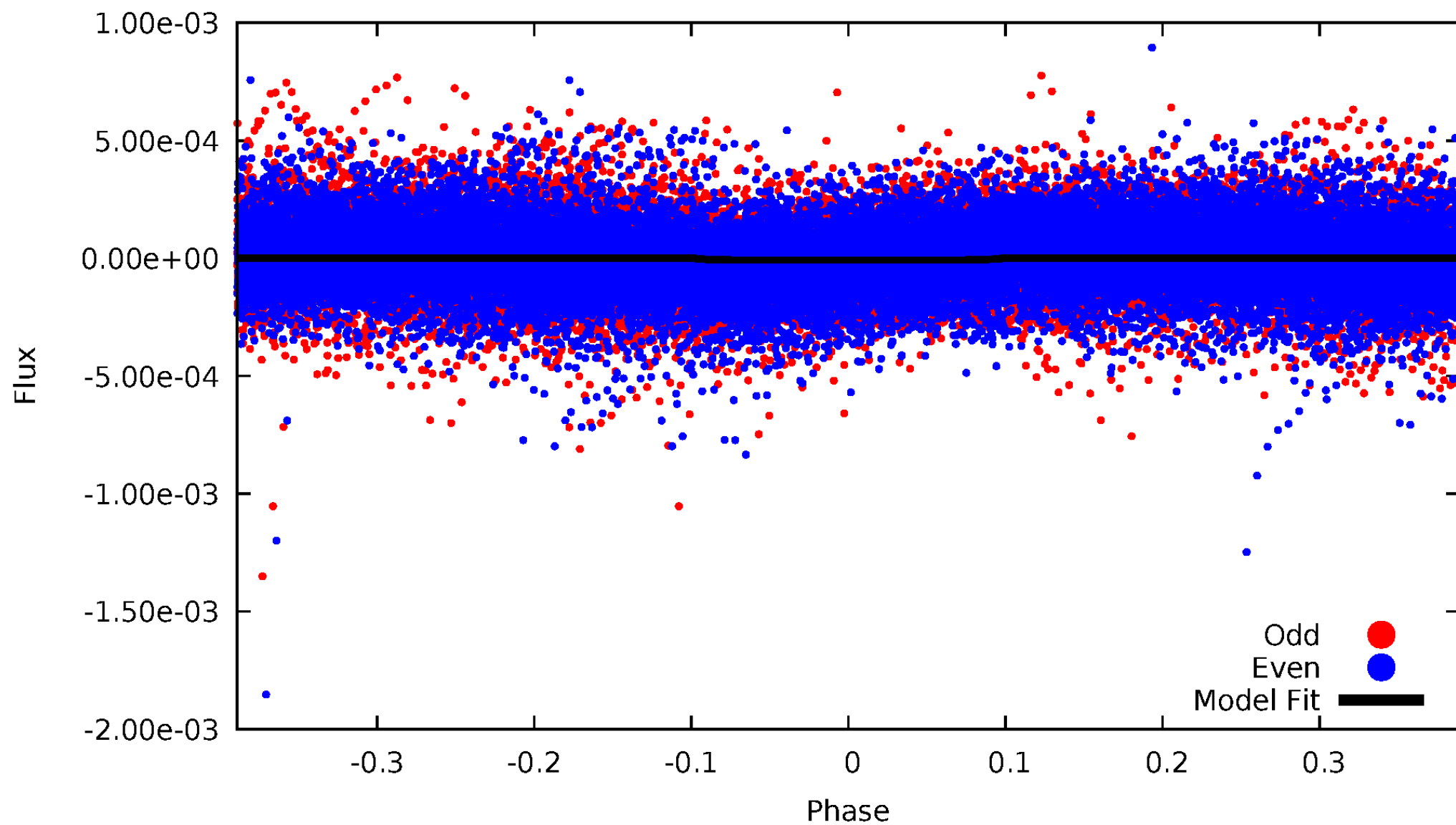


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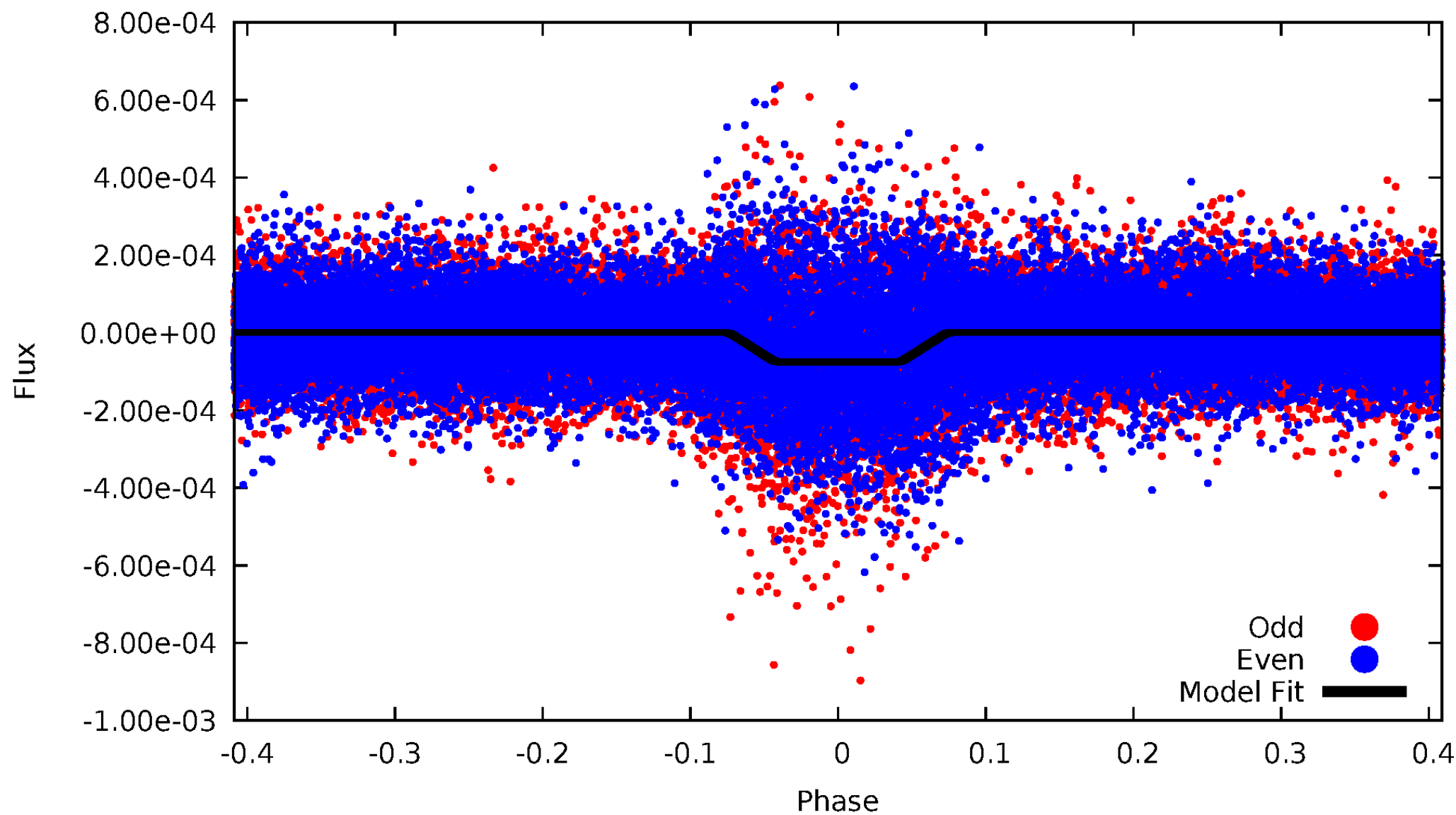
DV Odd/Even

TCE 005609986-01

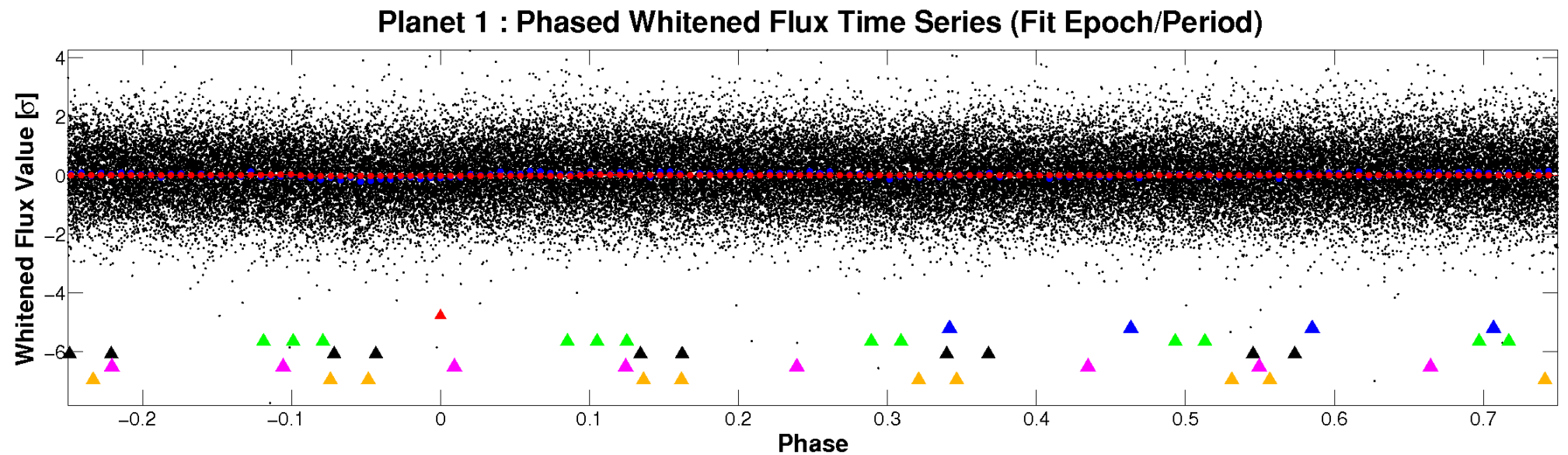
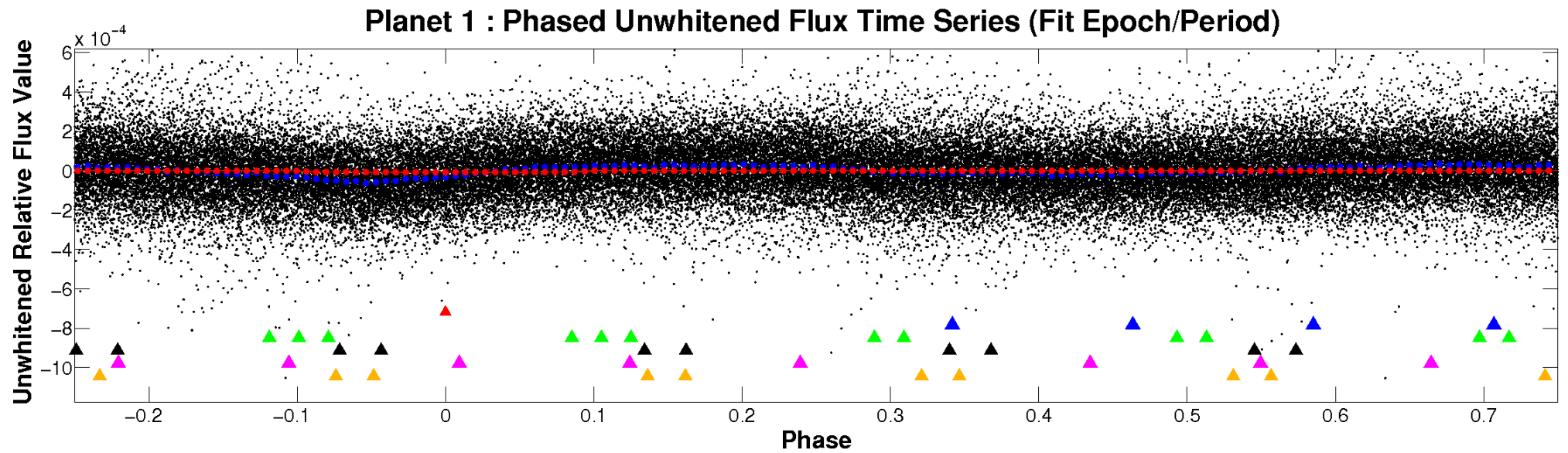


ALT Odd/Even

TCE 005609986-01

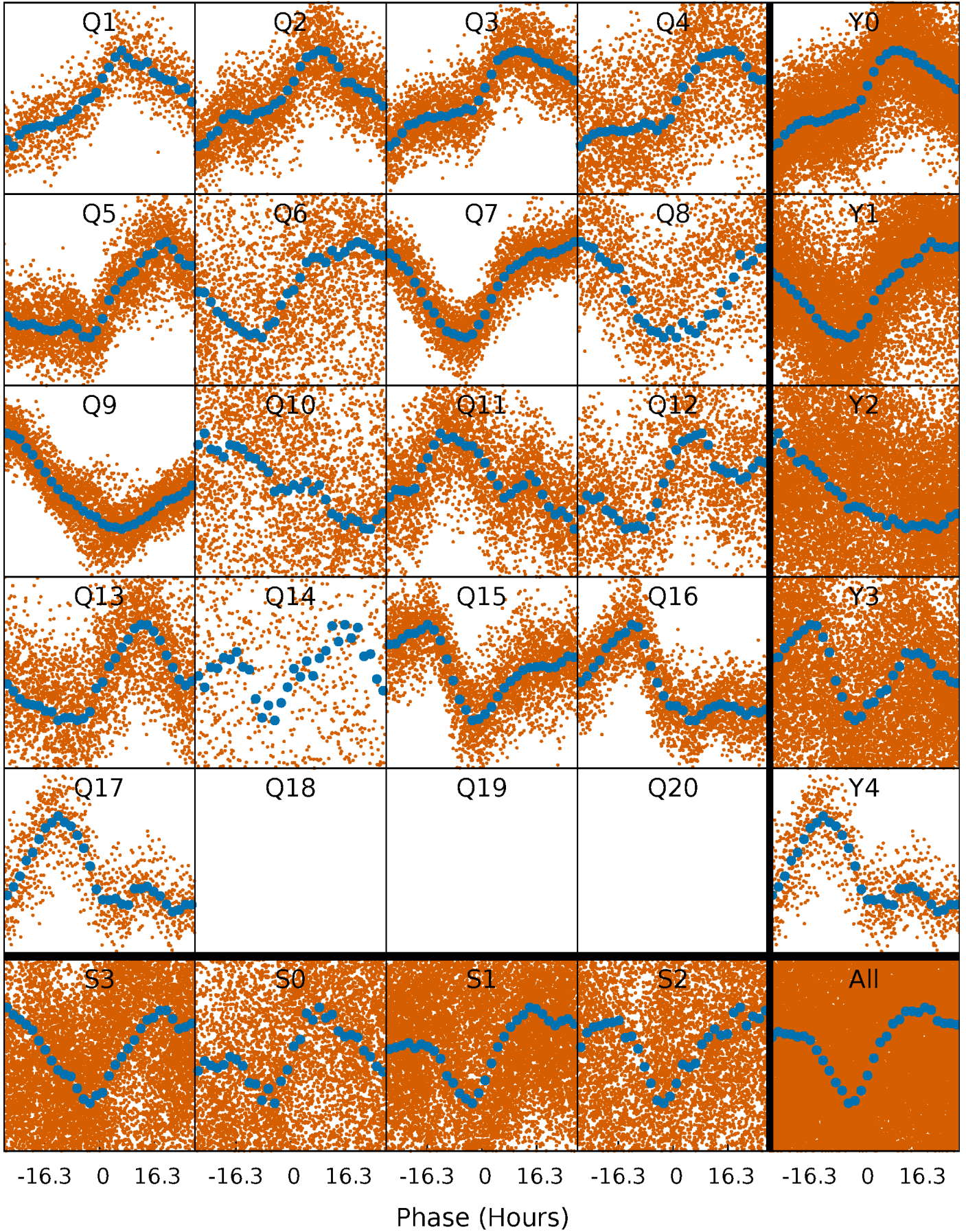


Non-Whitened Vs. Whitened Light Curve



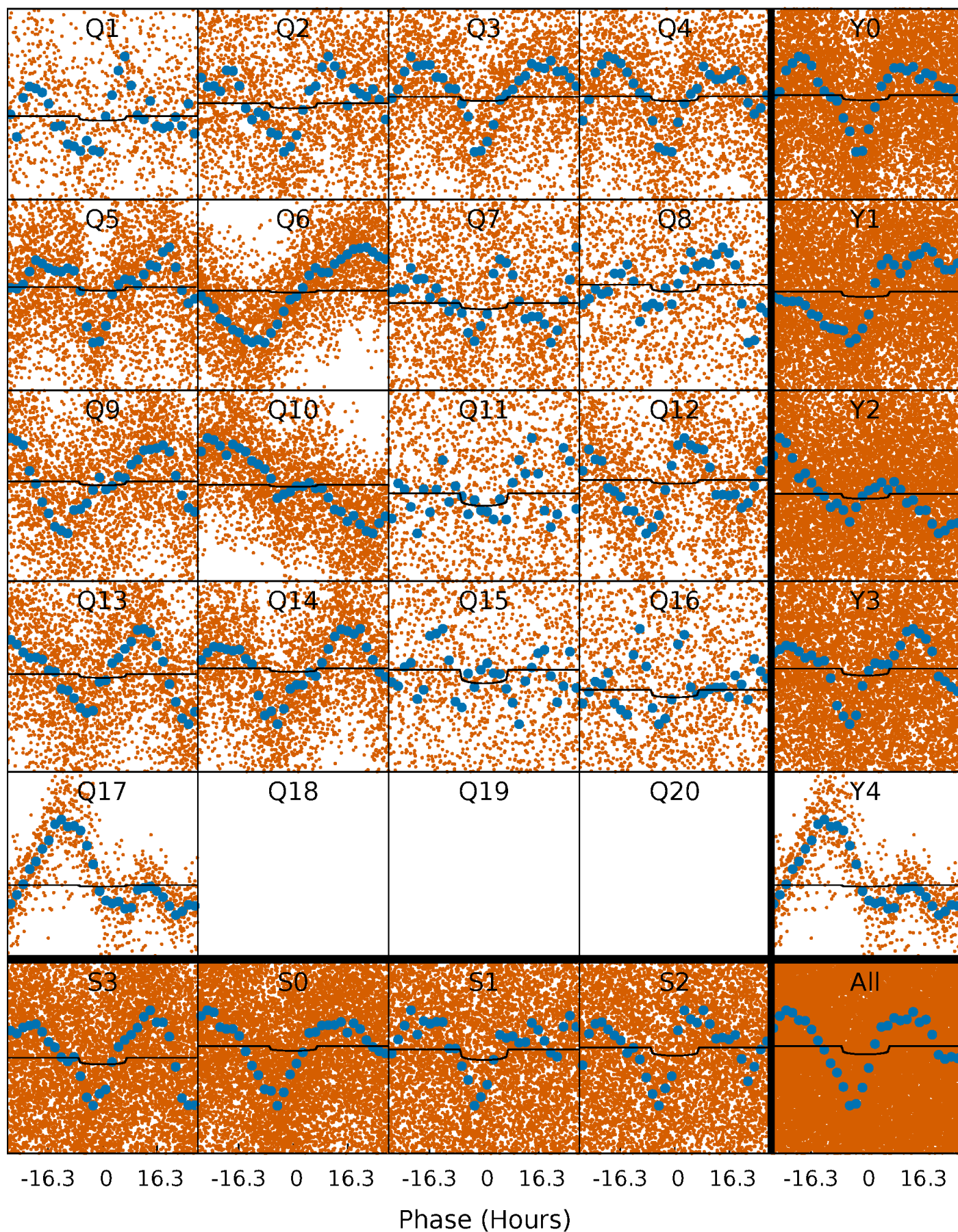
PDC Quarter-Phased Transit Curves

TCE 005609986-01 P= 3.049254 Days $T_0=133.820480$ (BKJD)



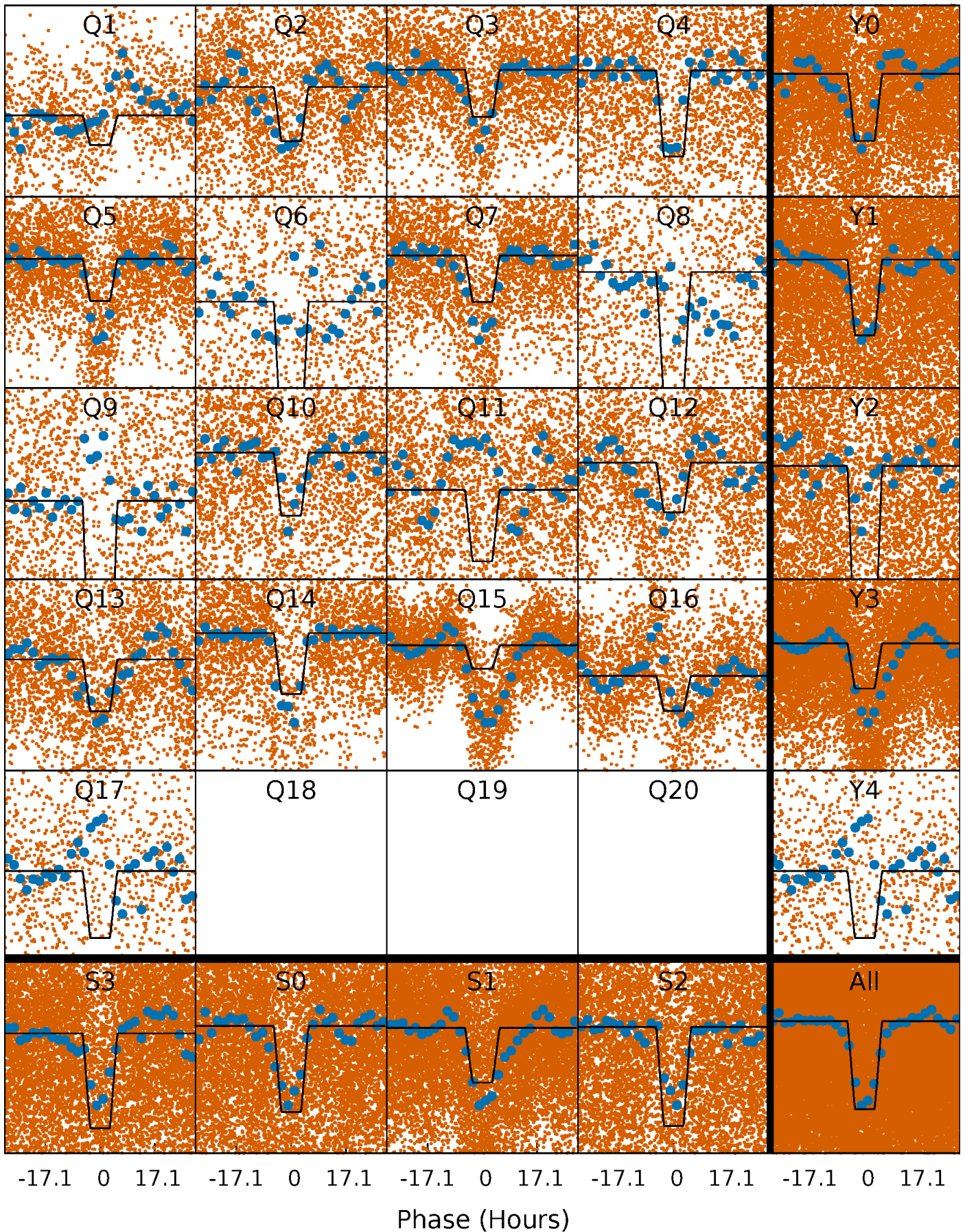
DV Quarter-Phased Transit Curves

TCE 005609986-01 P= 3.049254 Days $T_0=133.820480$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

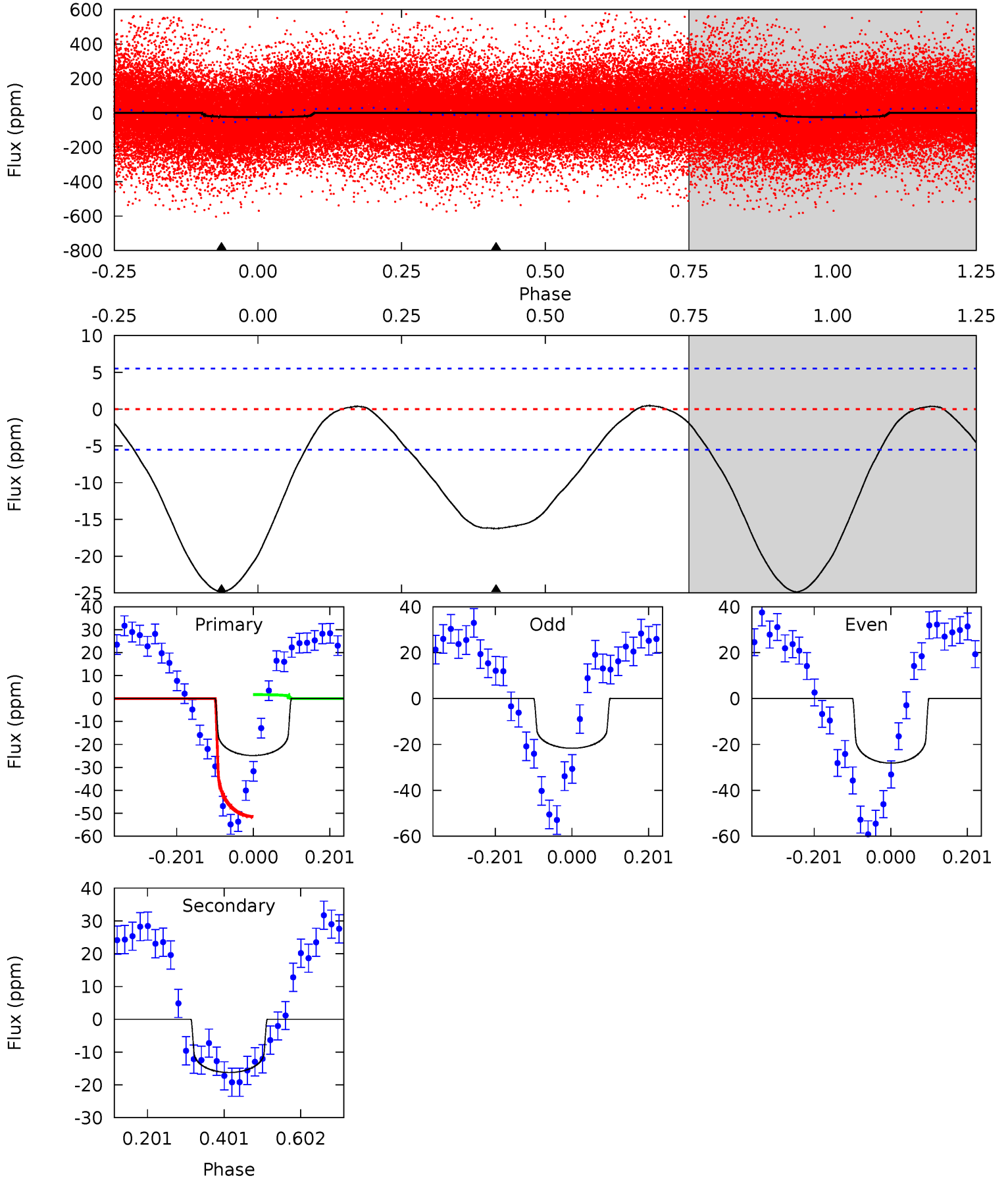
TCE 005609986-01 P= 3.048838 Days $T_0=133.787346$ (BKJD)



DV Model-Shift Uniqueness Test

005609986-01, P = 3.049254 Days, E = 130.771226 Days

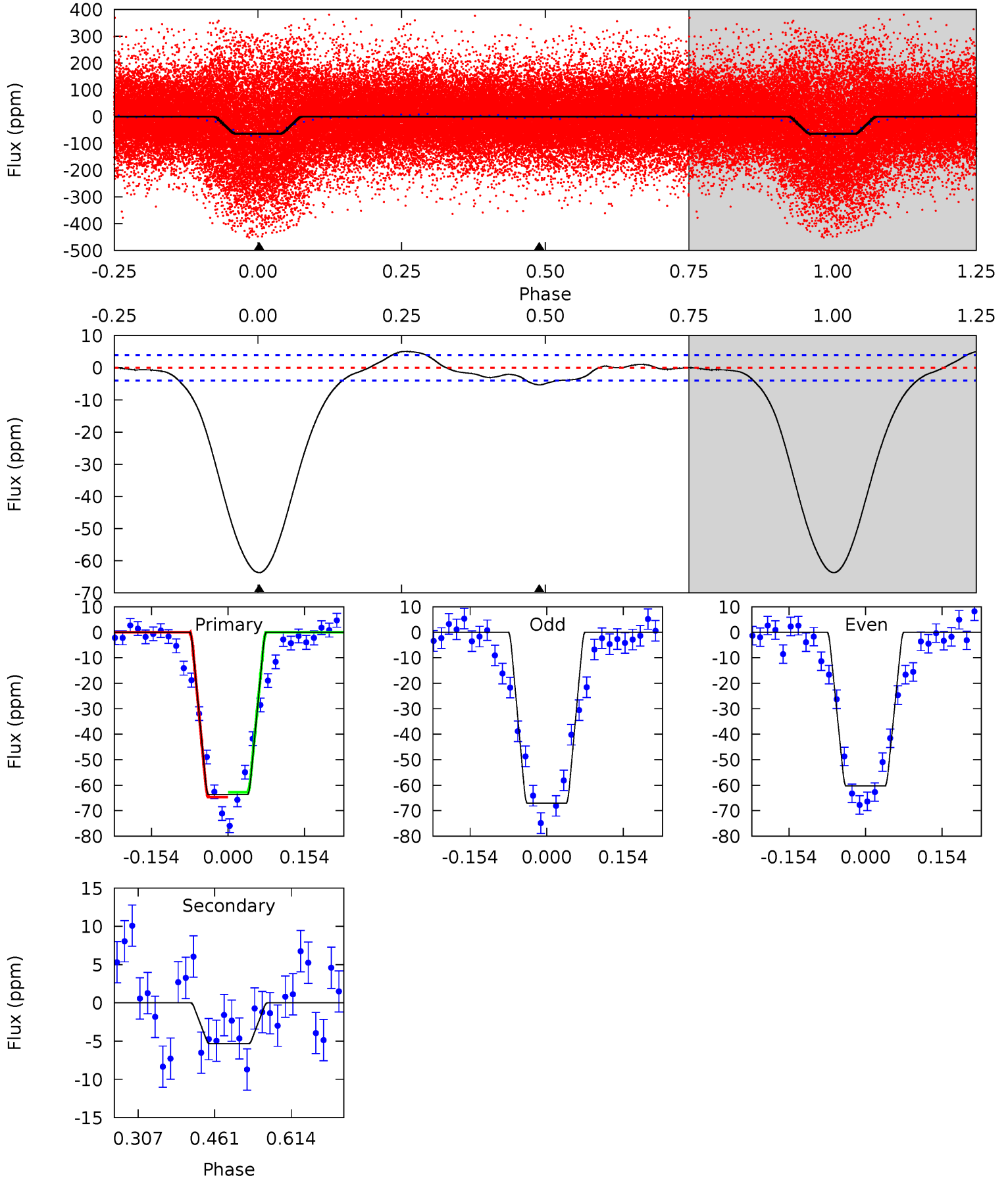
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.9	13.0	0	0	4.42	1.28	0.62	19.9	19.9	13.0	13.0	2.62	1.01	0.02	19.0



Alt Model-Shift Uniqueness Test

005609986-01, P = 3.048838 Days, E = 130.738508 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
71.7	6.00	0	0	4.47	1.43	2.31	71.7	71.7	6.00	6.00	3.79	1.14	0.07	1.02



Stellar Parameters For KIC 005609986

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6523^{+85}_{-78}	$4.037^{+0.168}_{-0.126}$	$0.160^{+0.150}_{-0.150}$	$1.926^{+0.381}_{-0.381}$	$1.471^{+0.128}_{-0.128}$	$0.290^{+0.231}_{-0.111}$
	+1%/-1%	+4%/-3%	+94%/-94%	+20%/-20%	+9%/-9%	+80%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 005609986-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-16 ± 1	$0.63^{+0.21}_{-0.21}$	2582^{+128}_{-137}	7612^{+2251}_{-1028}	49^{+60}_{-21}
Alt.	-5 ± 1	$1.82^{+0.29}_{-0.29}$	2571^{+133}_{-148}	3643^{+203}_{-182}	$1.929^{+0.848}_{-0.538}$

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

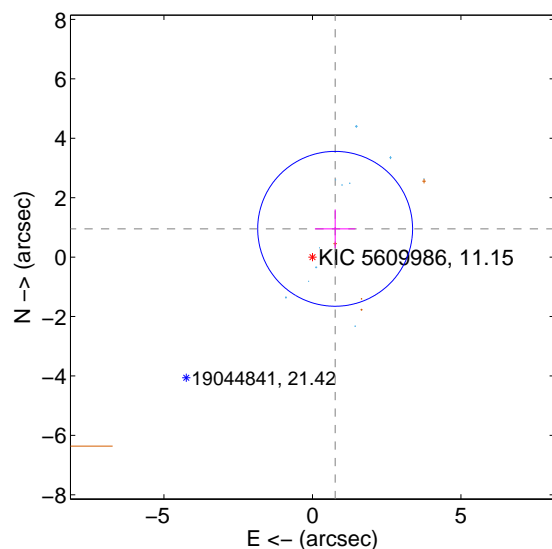
Supplemental centroid analysis for 005609986-01. **Kepler magnitude: 11.15**. Transit SNR 2.74

There are 11 quarters with good PRF difference image offsets

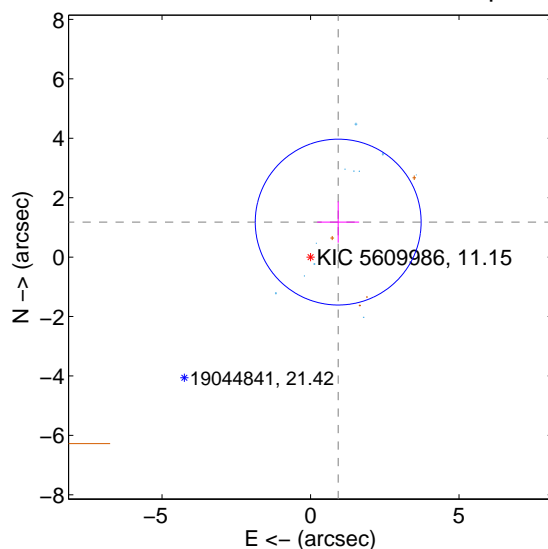
The direct PRF centroid is offset from the target star catalog position by about 0.56 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.221 ± 0.869	1.40	-0.764 ± 0.680	0.952 ± 0.652
PRF-fit source offset from KIC position	1.502 ± 0.930	1.61	-0.931 ± 0.706	1.178 ± 0.696
photometric centroid source offset	1.35 ± 1.81	0.74	-0.99 ± 1.36	0.92 ± 2.23

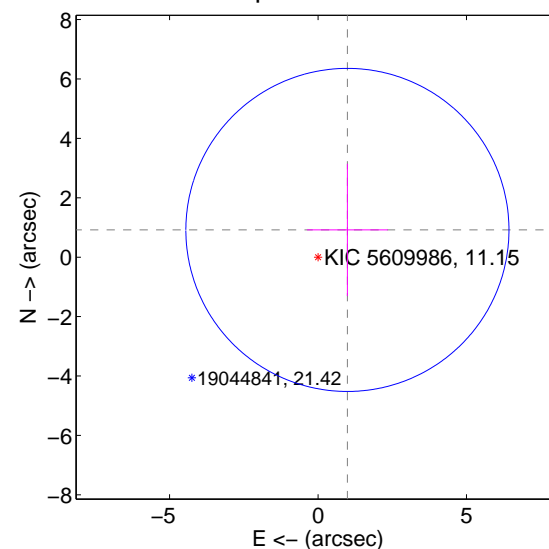
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

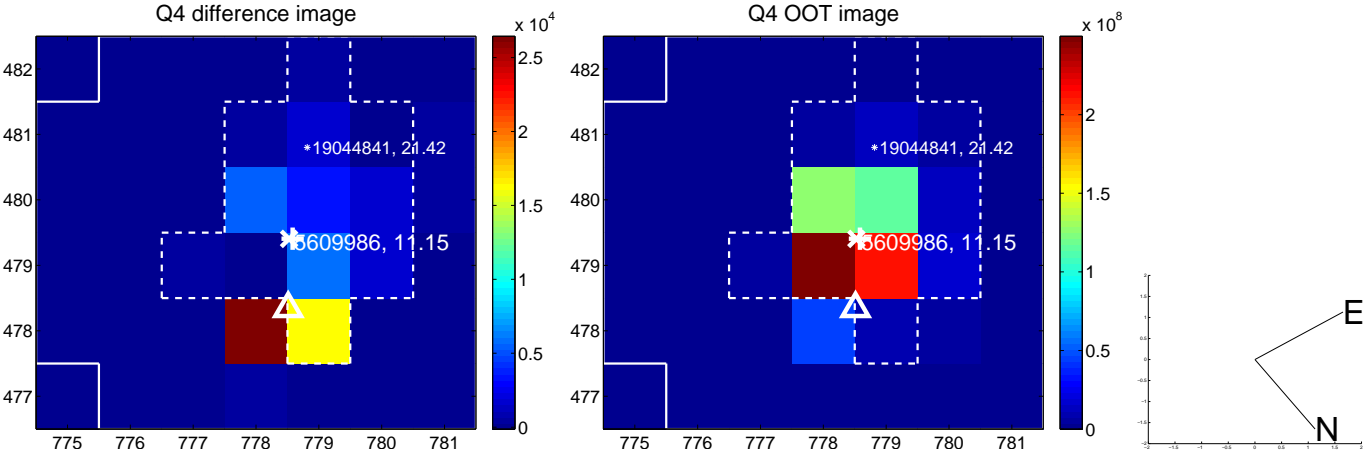
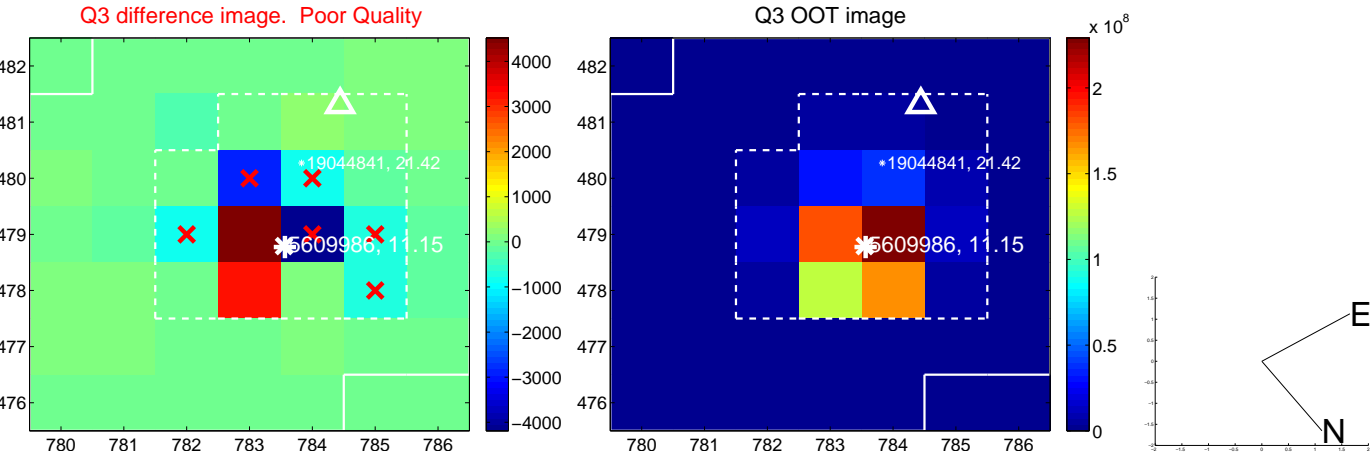
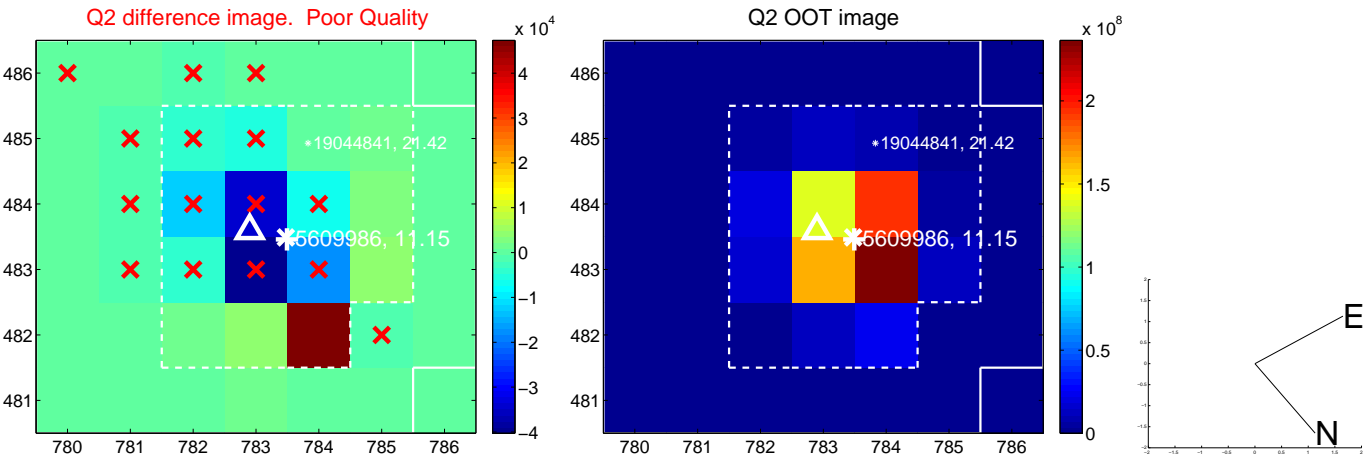
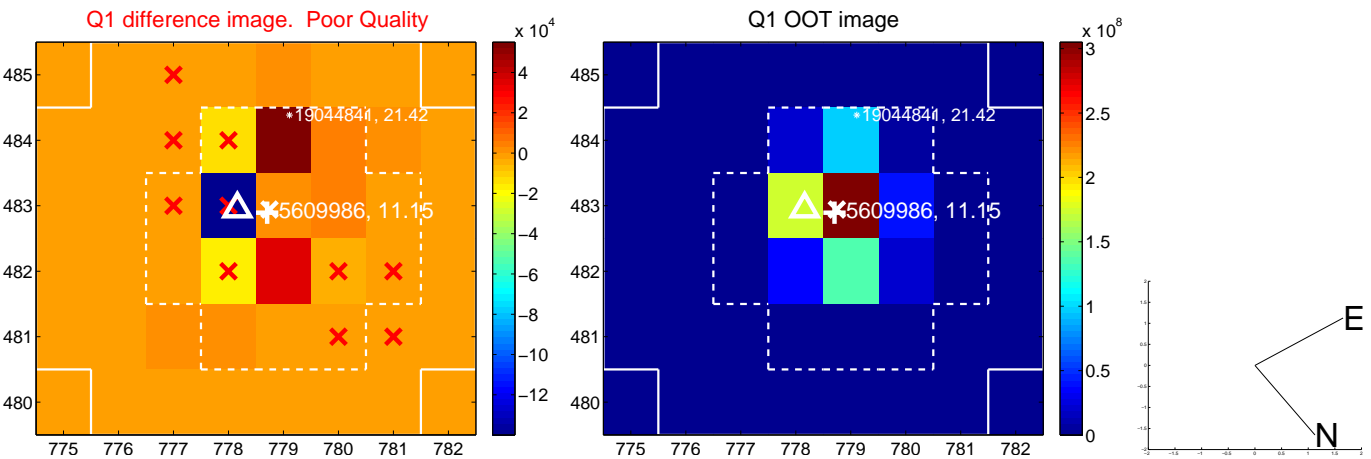


offset from photometric centroids

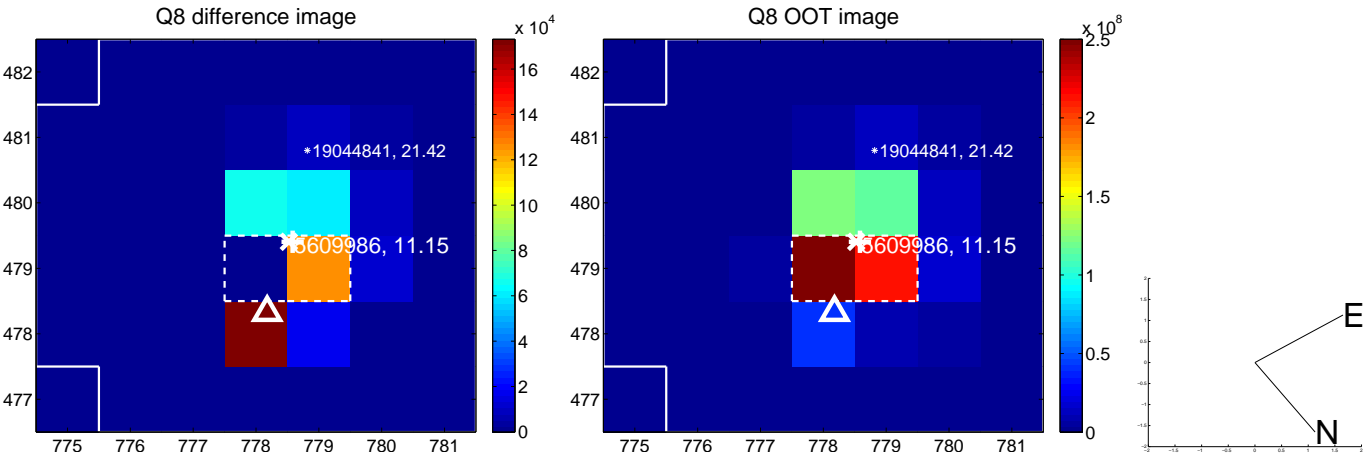
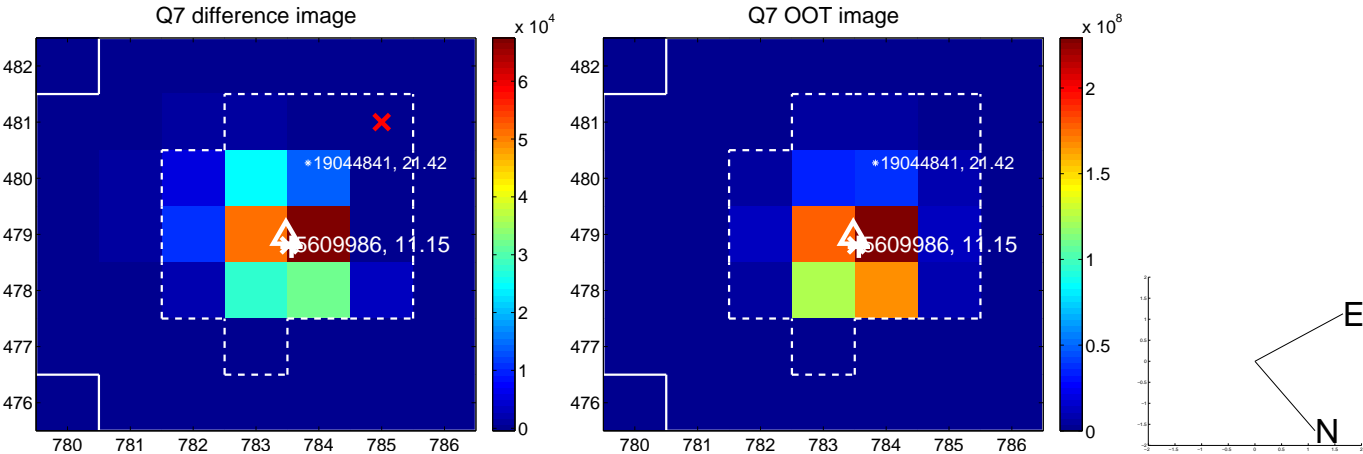
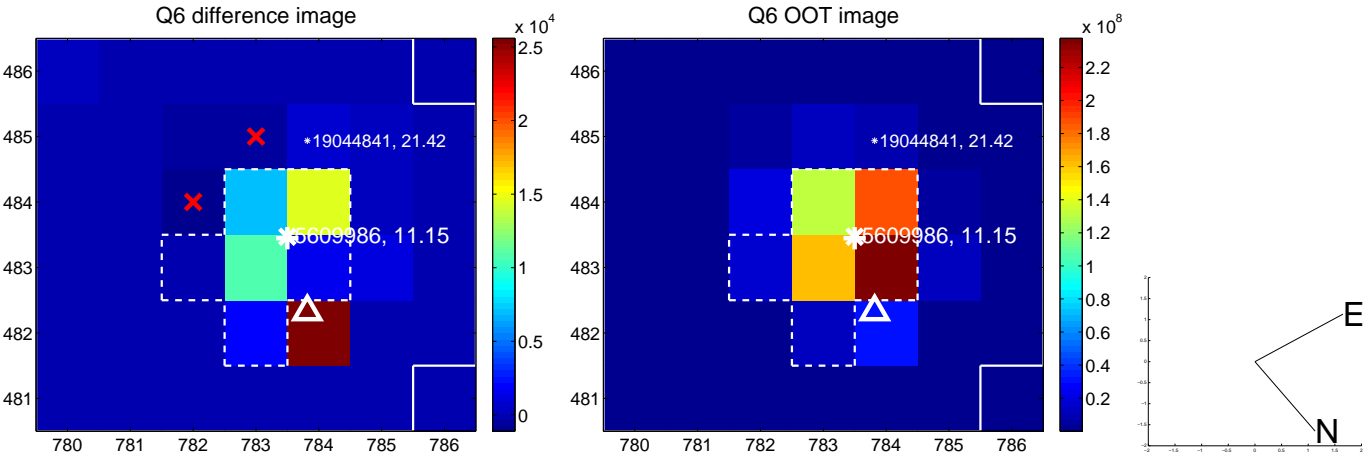
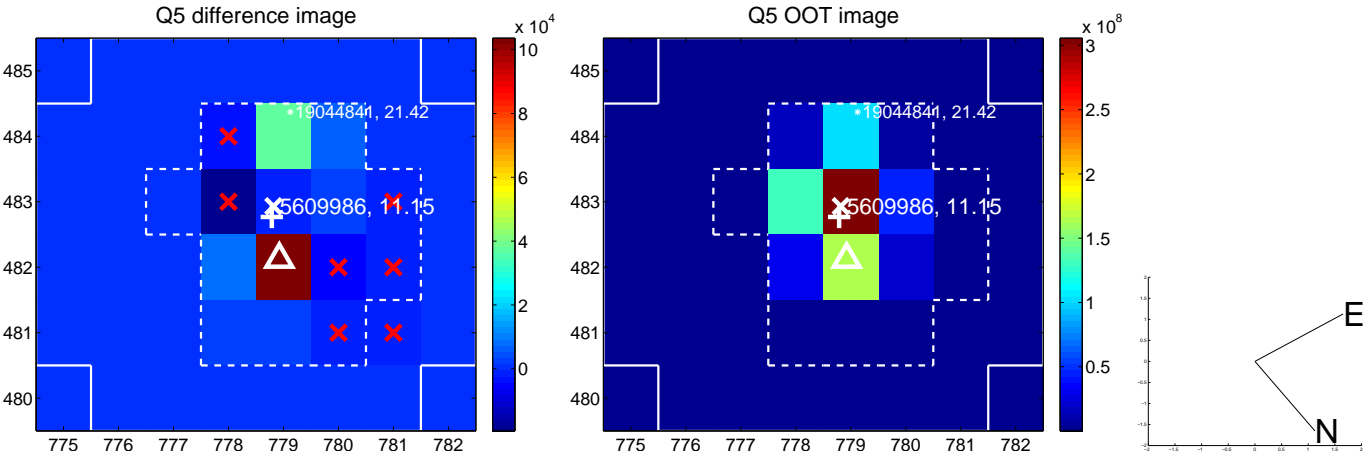


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

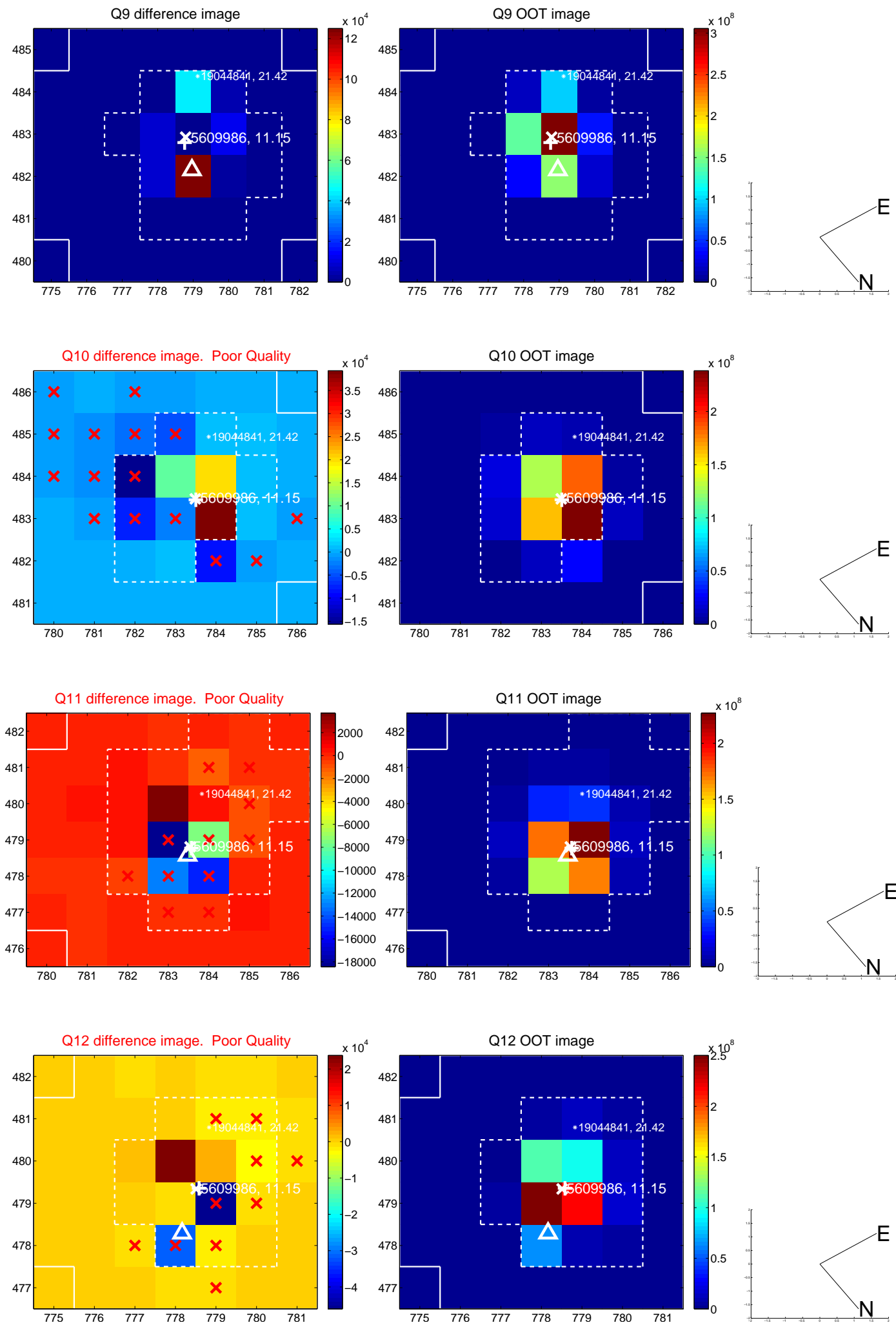
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



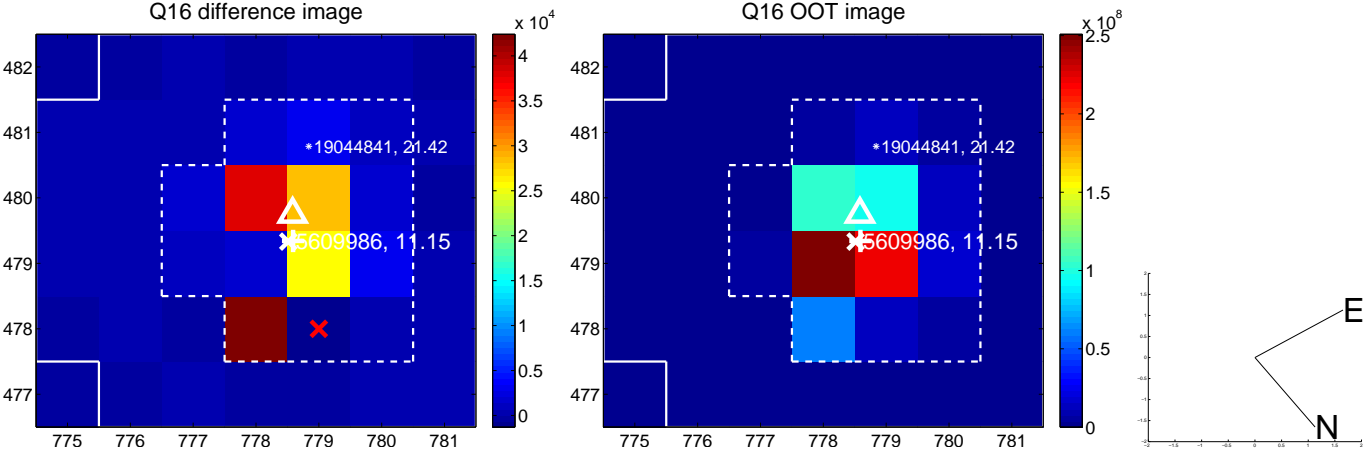
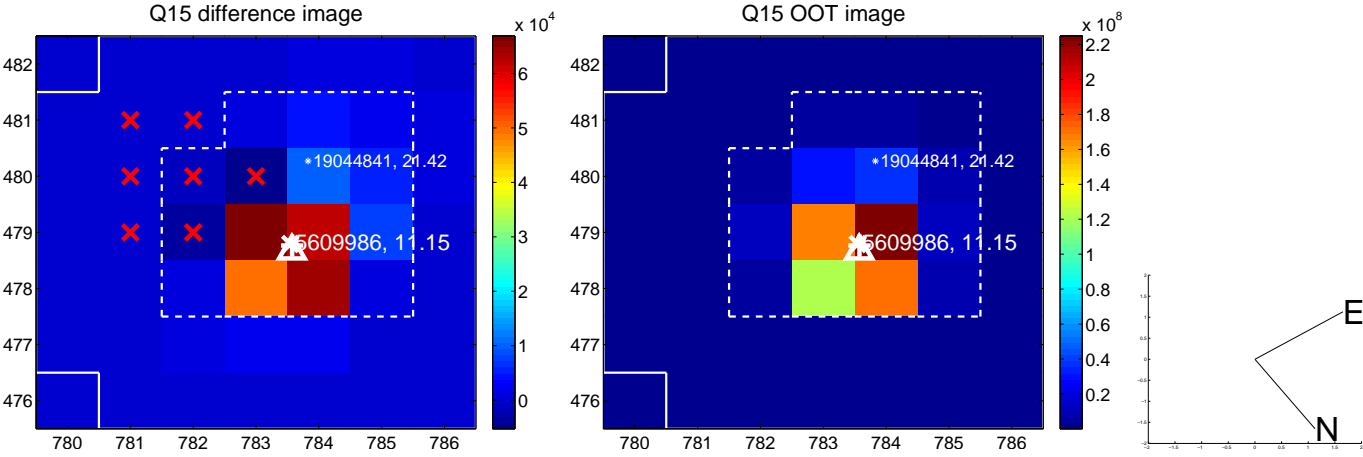
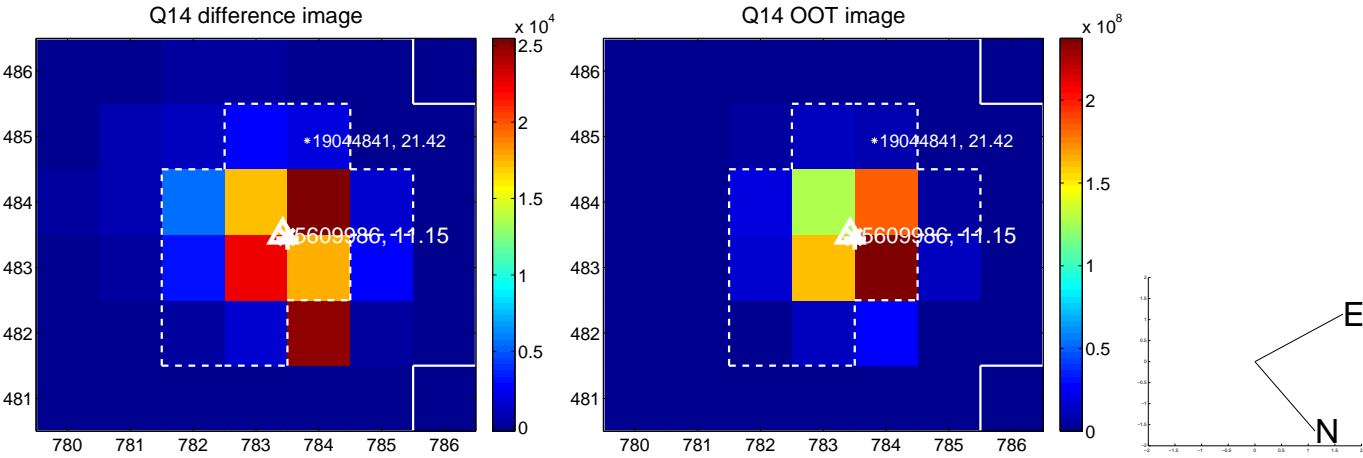
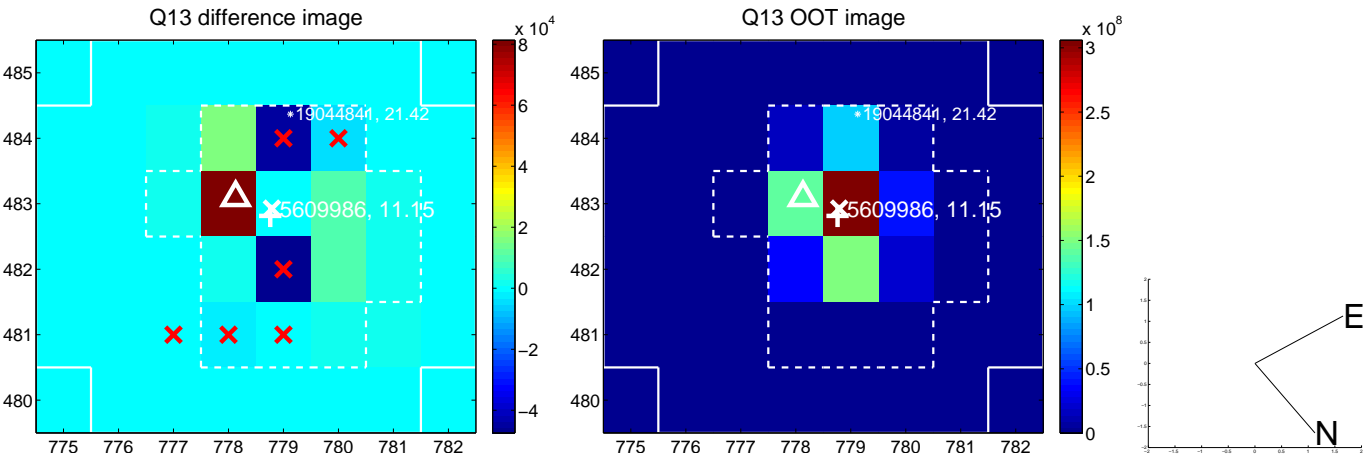
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



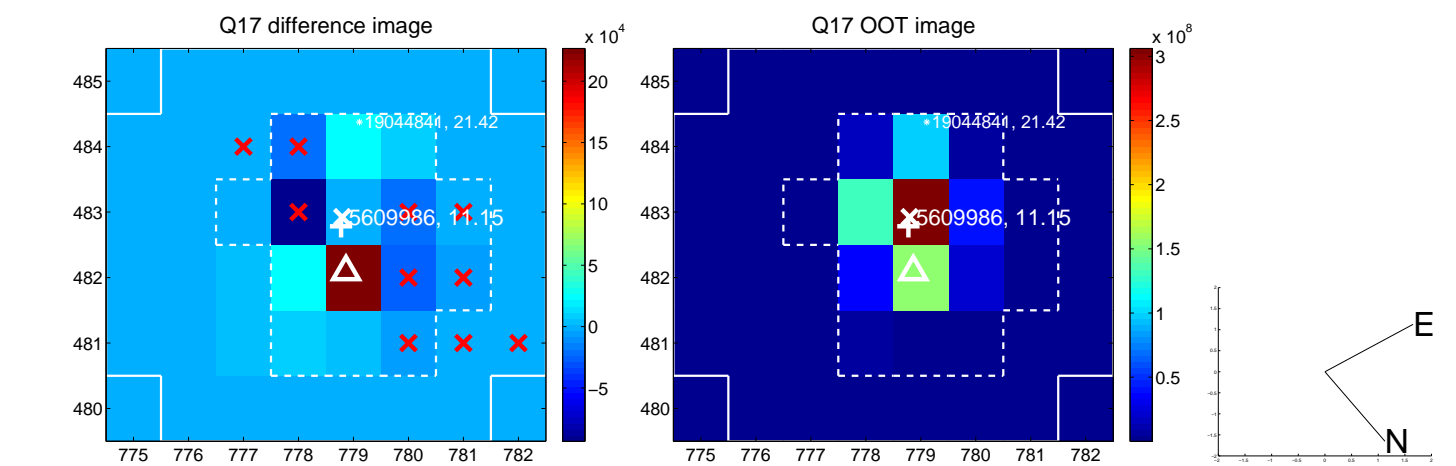
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



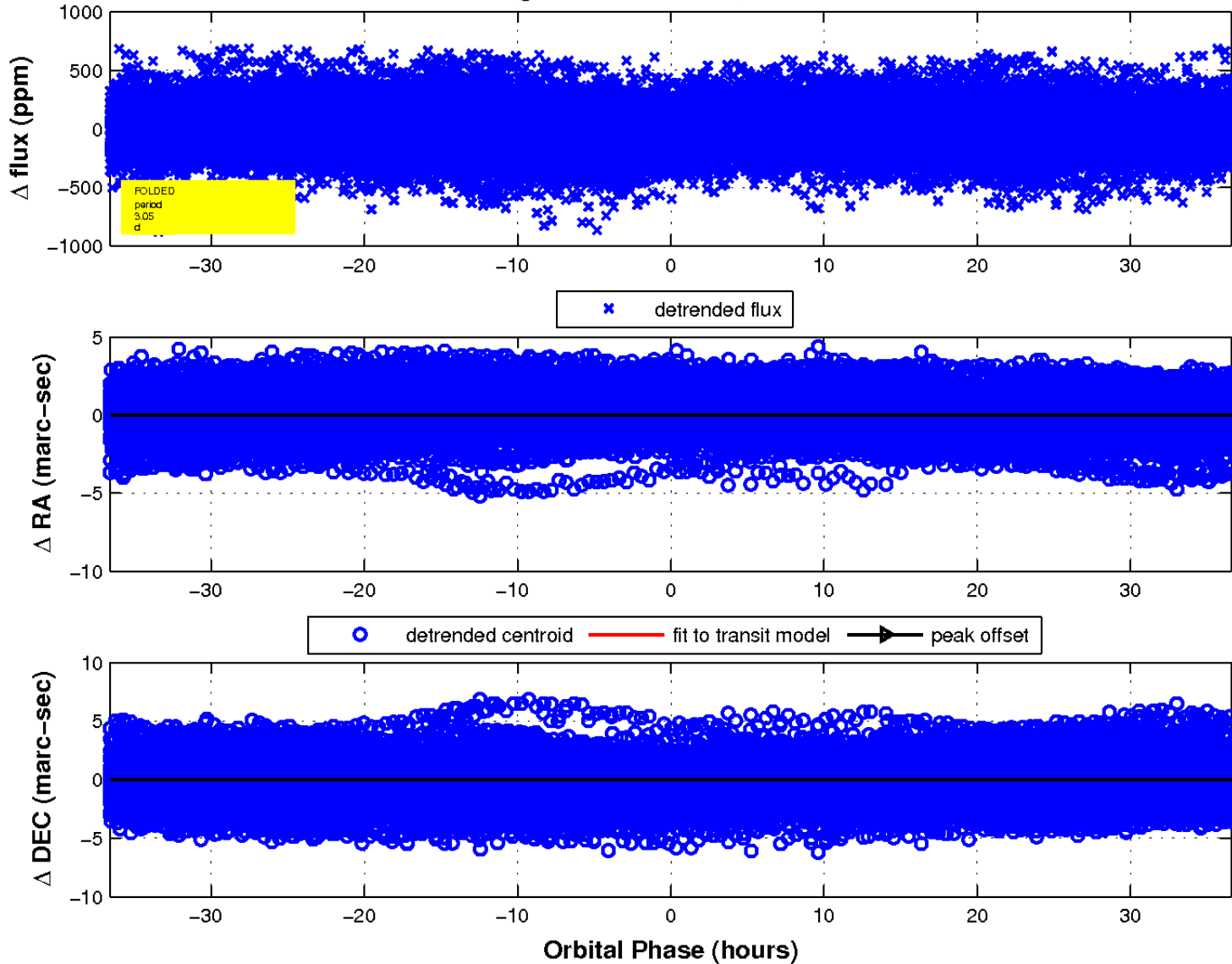
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

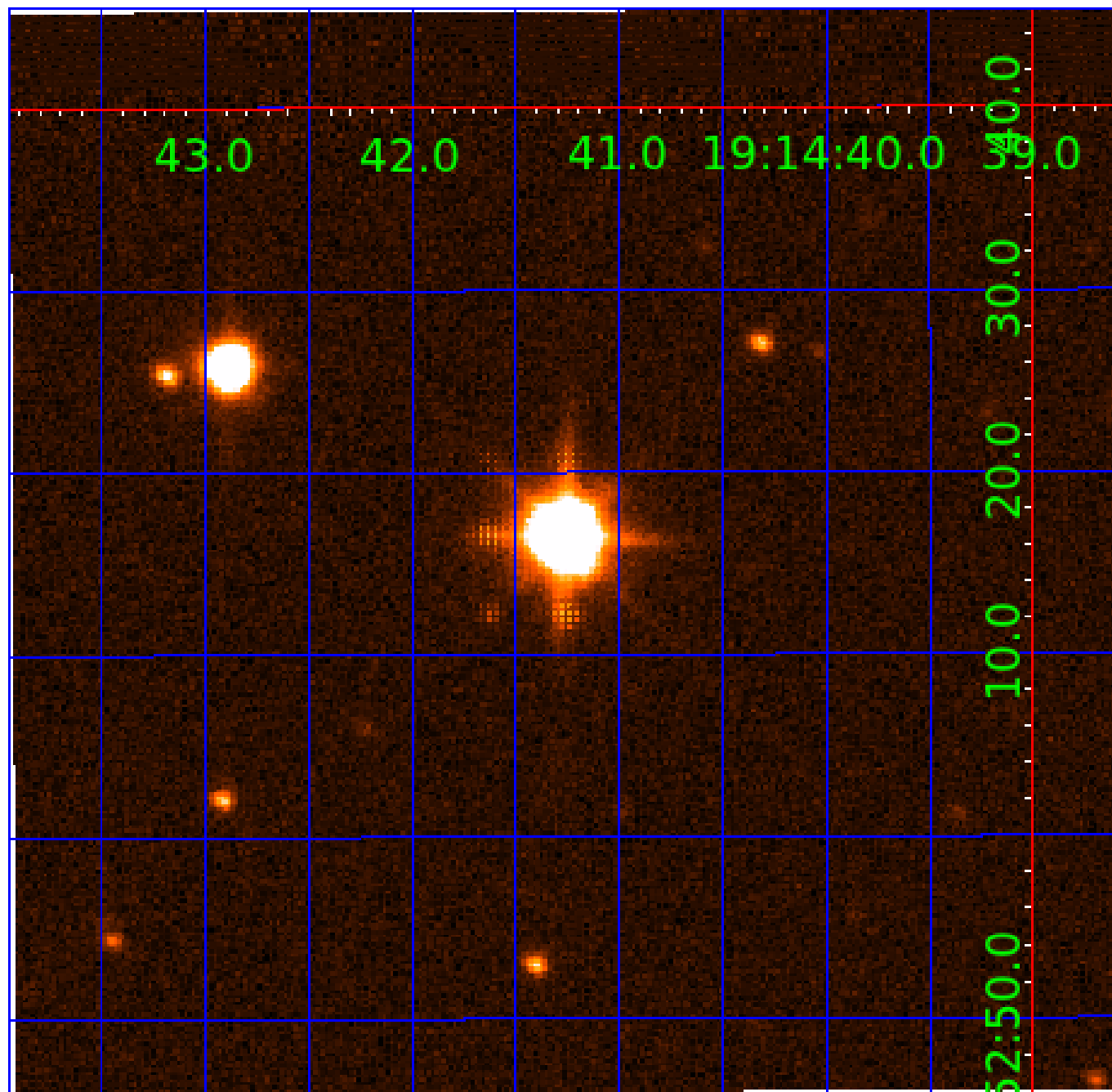


fluxWeightedCentroids, Planet 1 of 6



UKIRT Image

Declination



KIC 005609986

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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005609986-05	OBS	No	171.108663	241.869779	246.4	10.702	10.2	10.0	1.93	6523	3.33	12.77
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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005609986-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
005609986-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
005609986-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

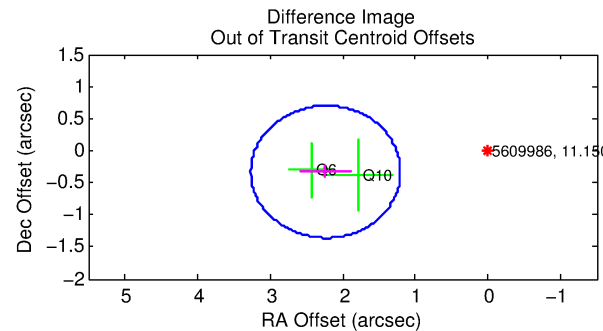
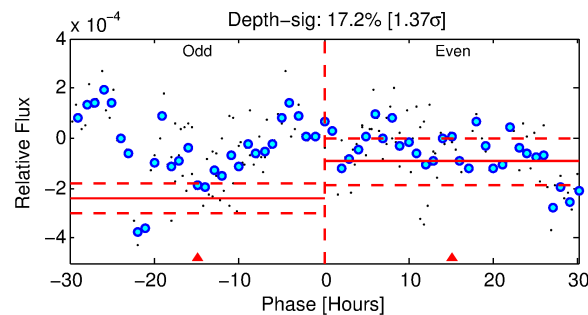
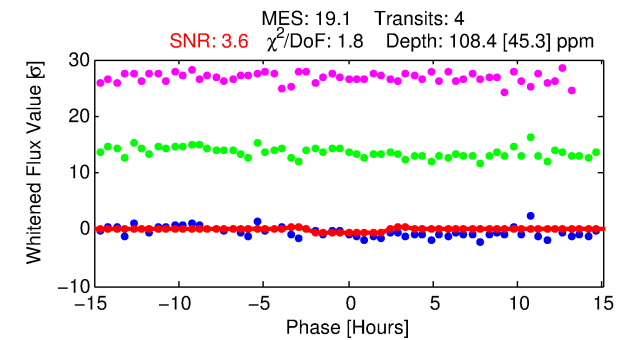
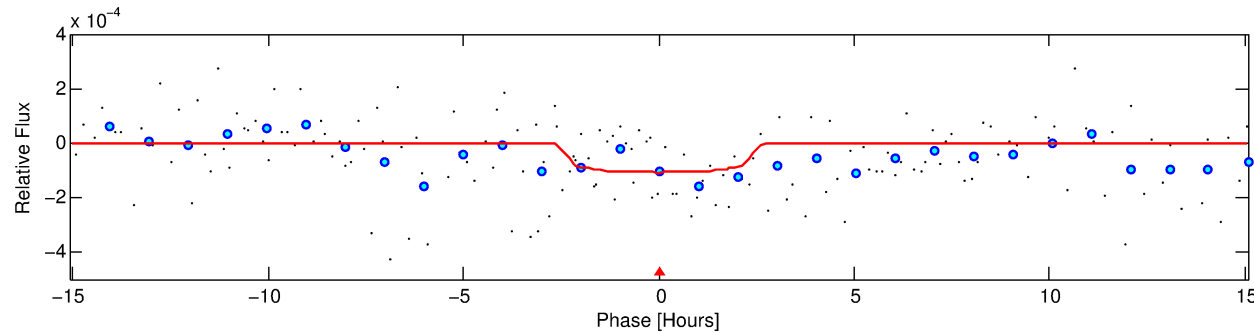
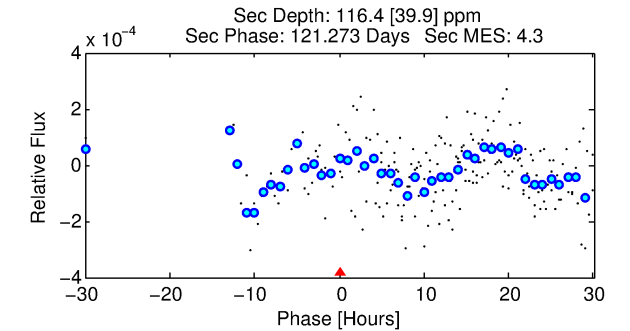
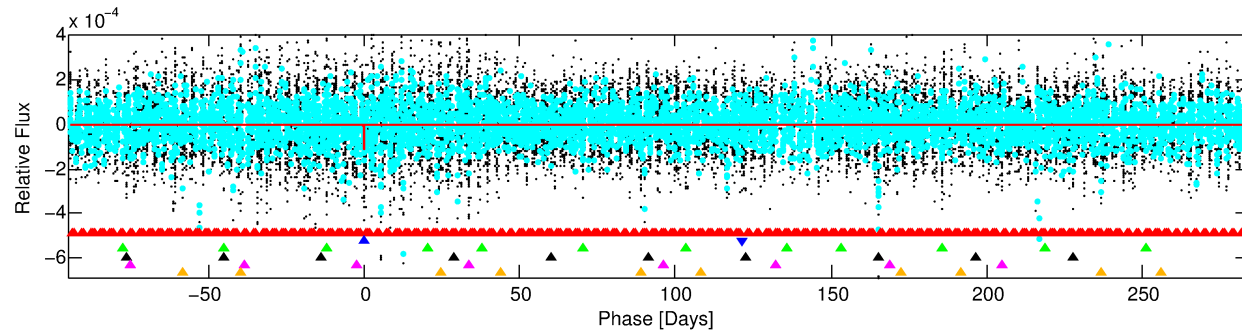
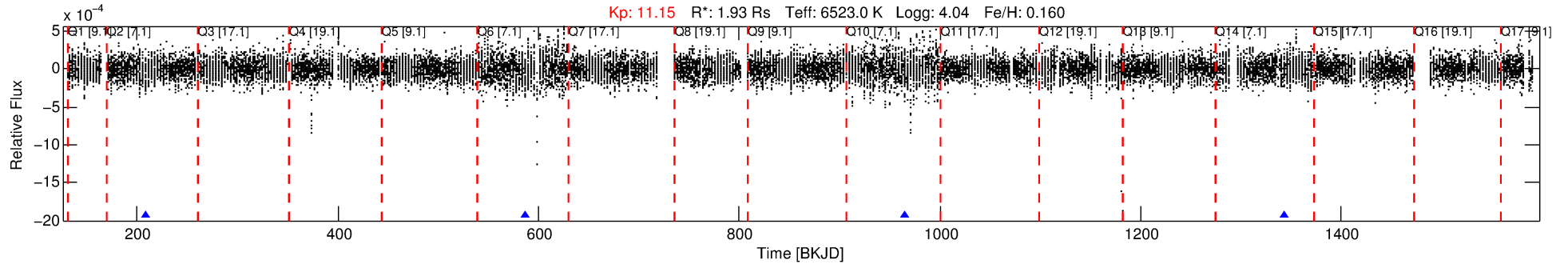
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005609986-02

No Significant Match Found

DV One-Page Summary

KIC: 5609986 Candidate: 2 of 6 Period: 378.479 d



DV Fit Results:

Period = 378.47855 [0.01404] d
Epoch = 208.0446 [0.0201] BKJD
Rp/R* = 0.0108 [0.0112]
a/R* = 320.86 [1747.49]
b = 0.84 [1.89]
Seff = 4.43 [1.30]
Teq = 370 [27] K
Rp = 2.26 [2.40] Re
a = 1.1655 [0.2150] AU
Ag = 17029.65 [36366.31] [0.47σ]
Teffp = 6534 [3457] K [1.78σ]

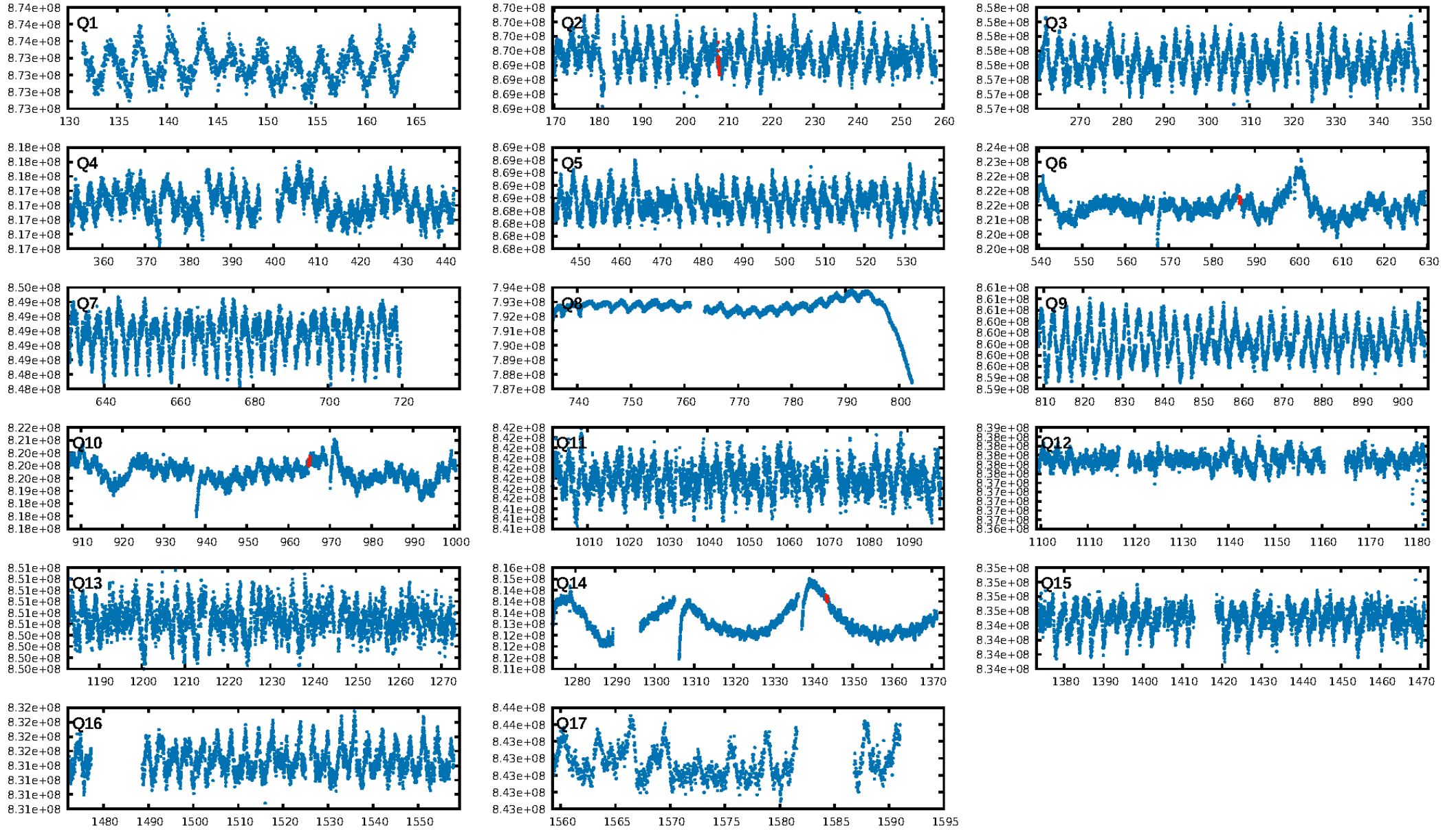
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [420.87σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.7%
ModelChiSquareGof-sig: 71.8%
Bootstrap-pfa: 1.15e-33
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 3.373
Centroid-sig: 71.5%
Centroid-so: 1.408 arcsec [0.57σ]
OotOffset-rm: 2.259 arcsec [6.58σ]
KicOffset-rm: 2.217 arcsec [7.05σ]
OotOffset-st: 2/0/0/0 [2]
KicOffset-st: 2/0/0/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [4/4]

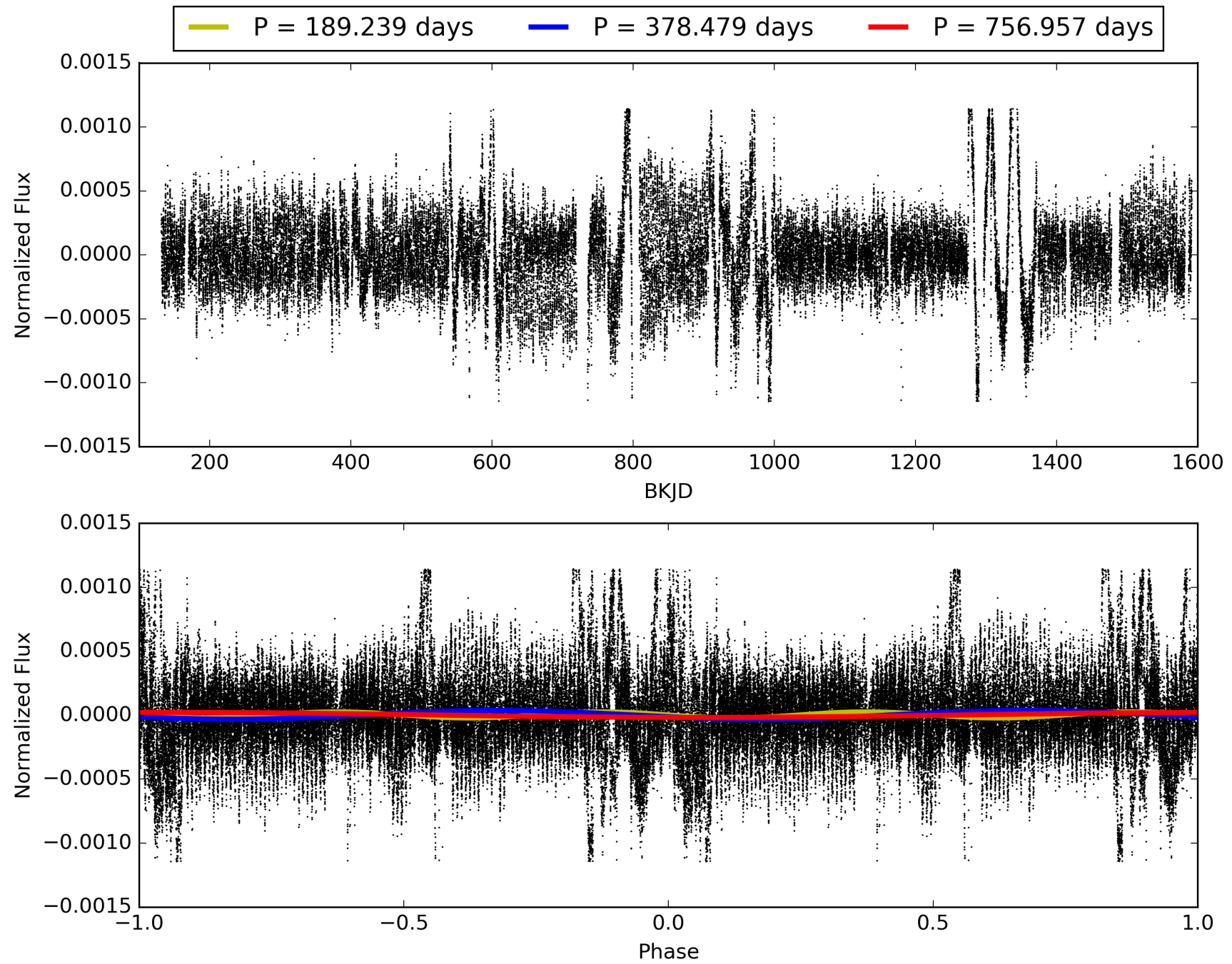
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:50:24 Z

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

TCE 005609986-02, PDC Light Curves

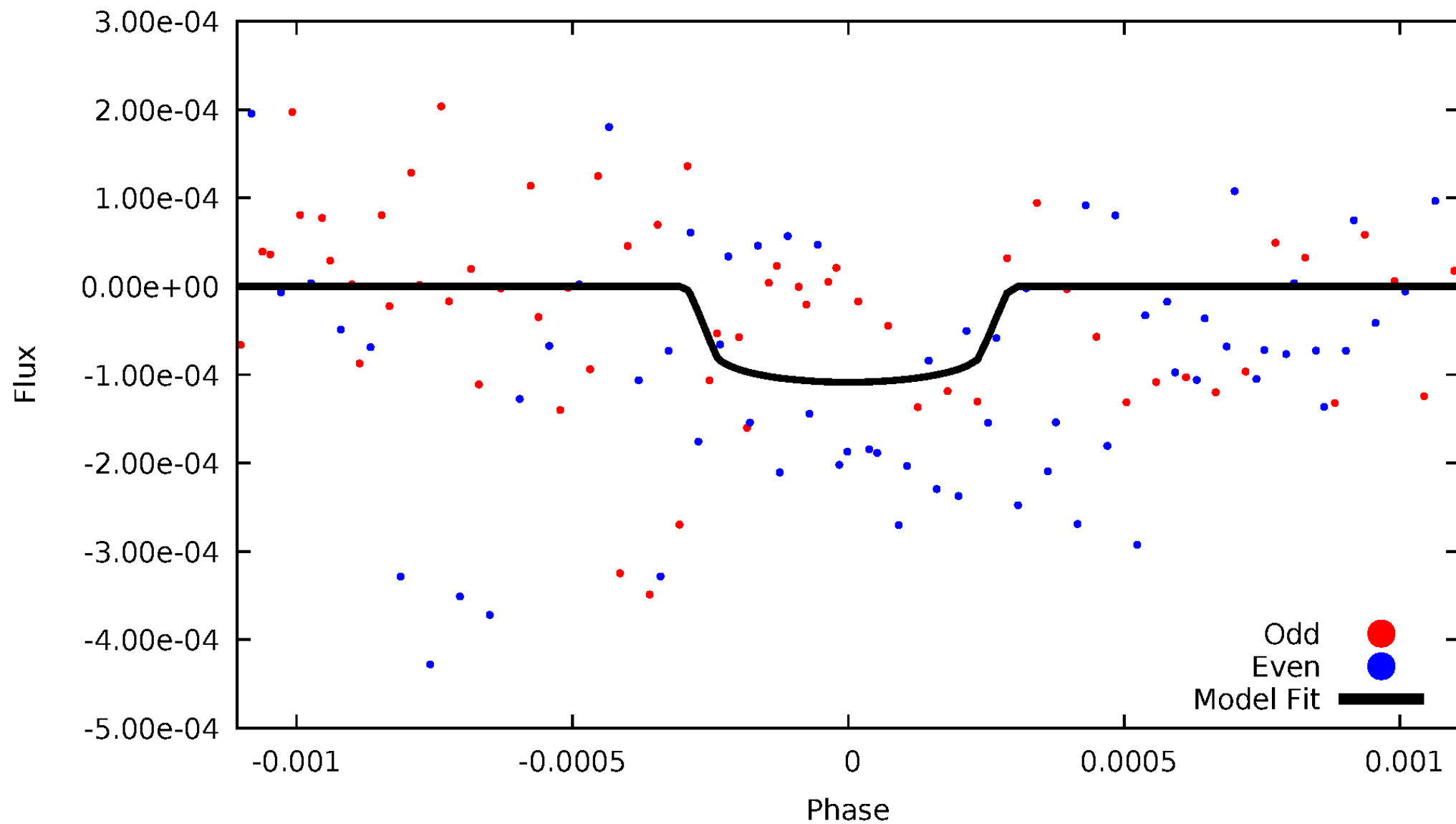


TCE 005609986-02



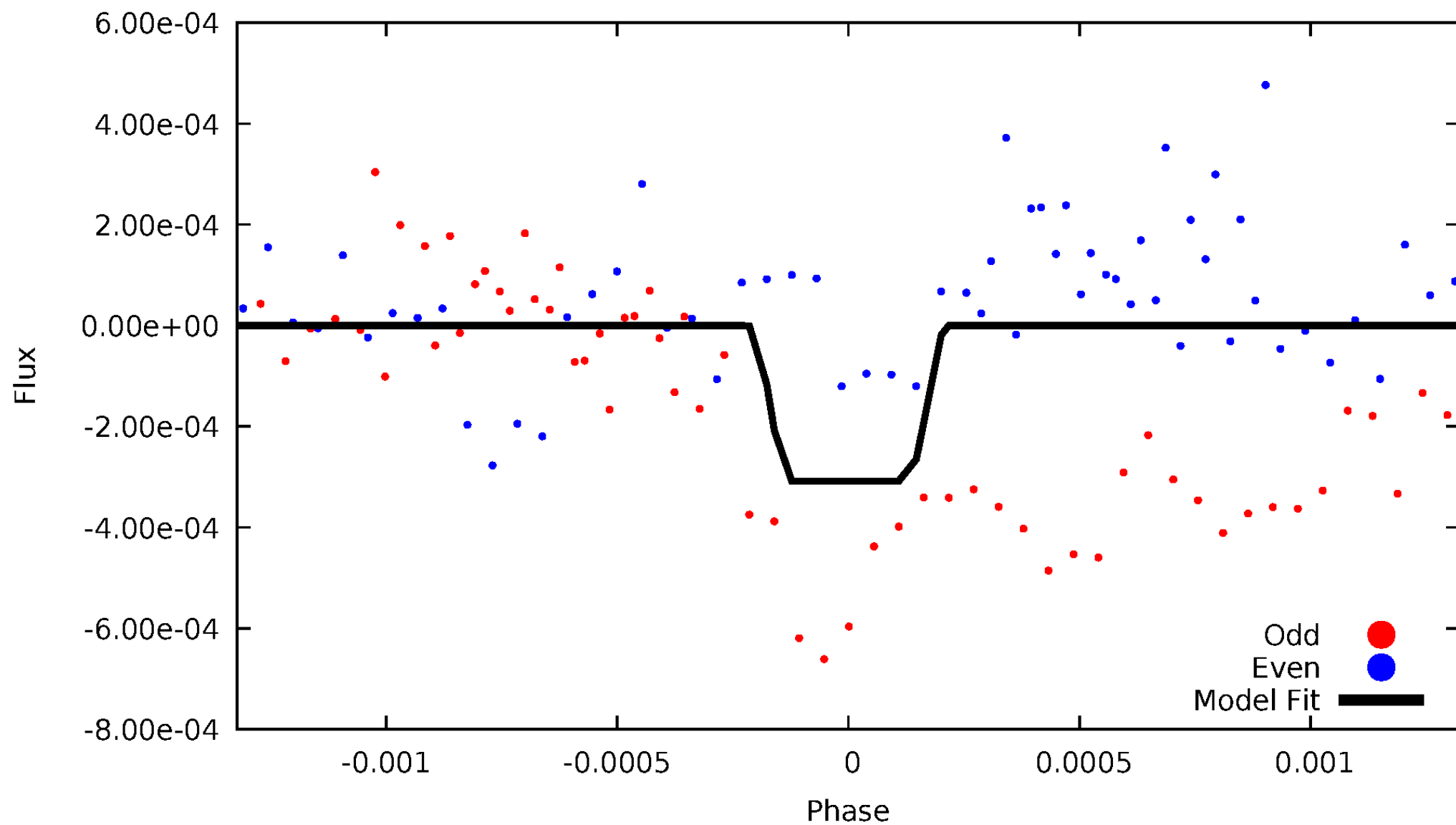
DV Odd/Even

TCE 005609986-02



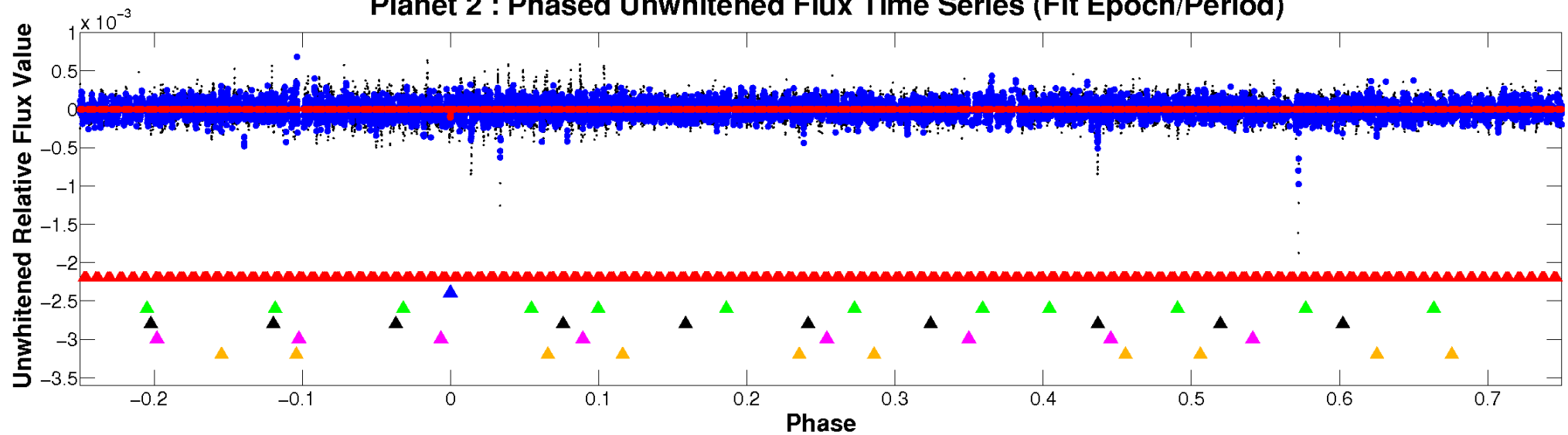
ALT Odd/Even

TCE 005609986-02

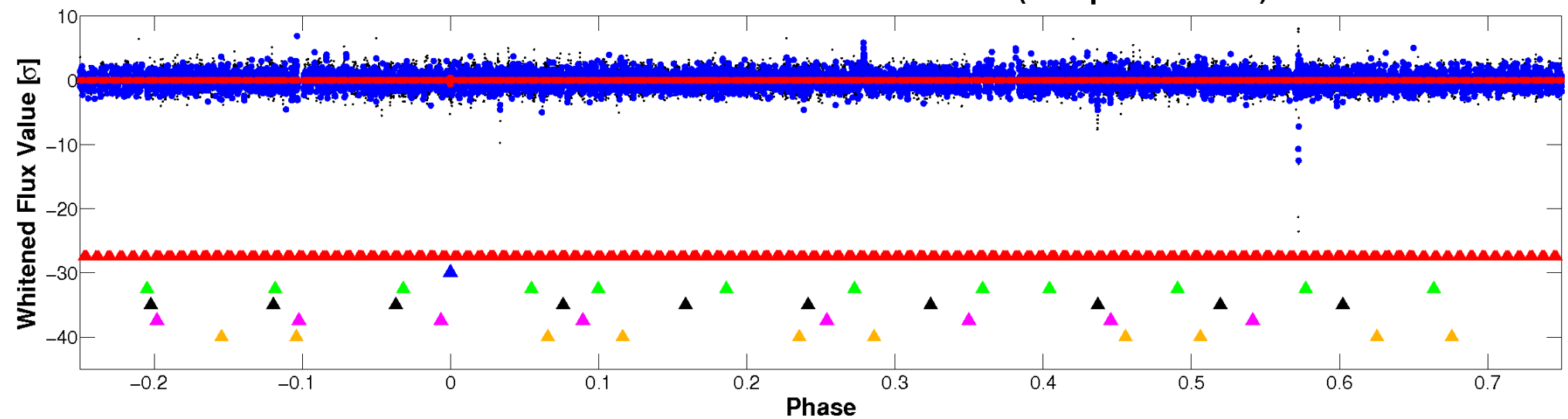


Non-Whitened Vs. Whitened Light Curve

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

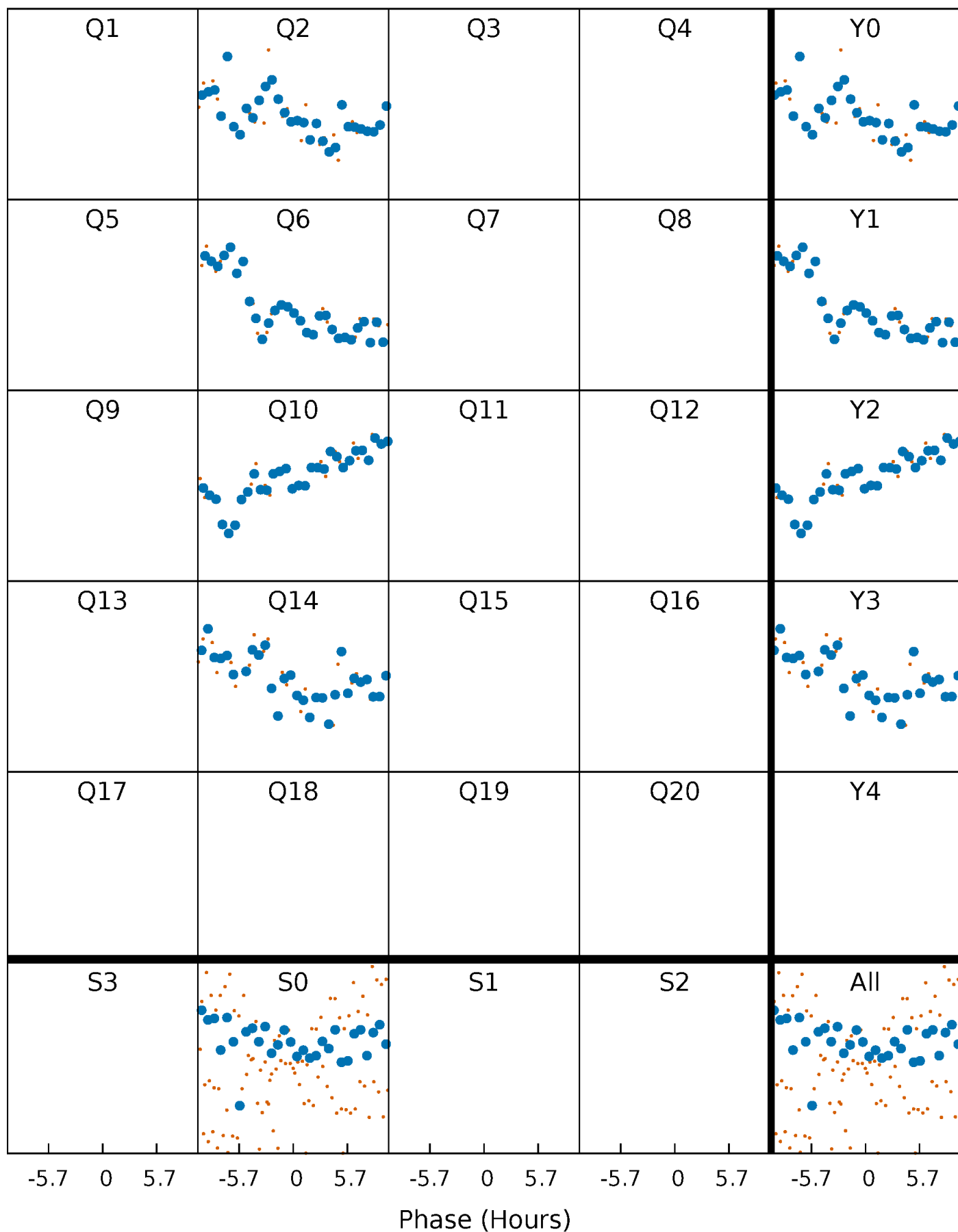


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



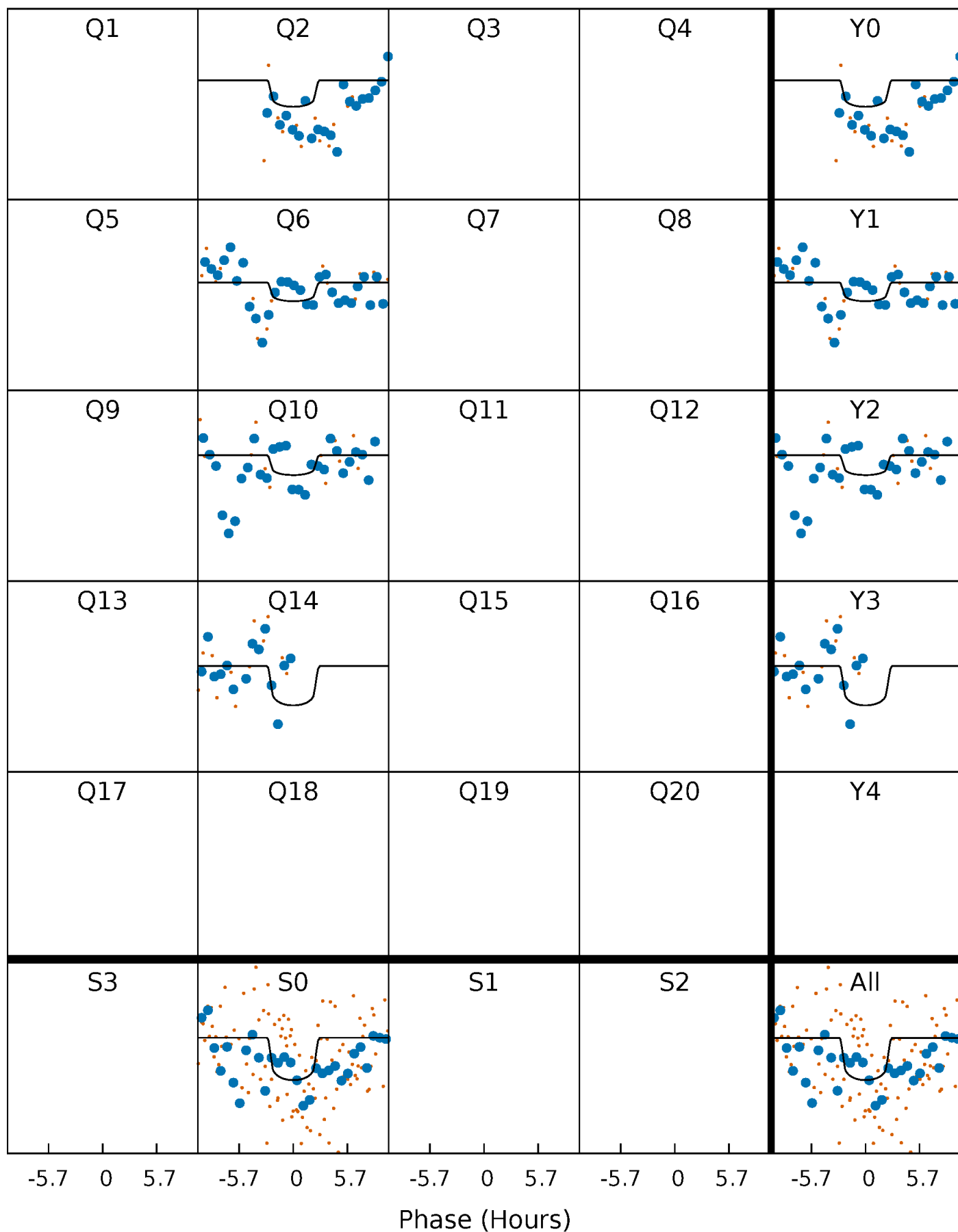
PDC Quarter-Phased Transit Curves

TCE 005609986-02 $P=378.478553$ Days $T_0=208.044557$ (BKJD)



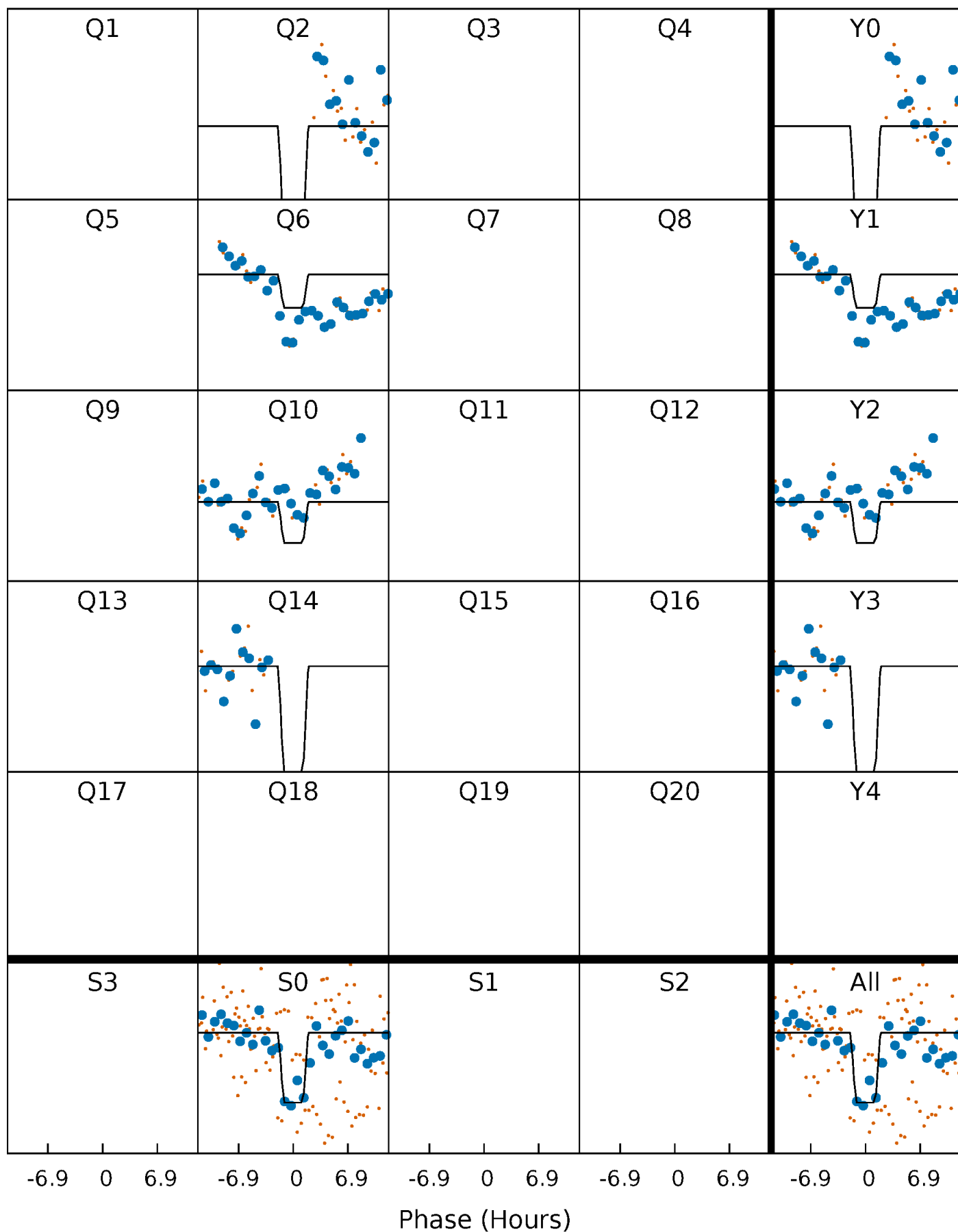
DV Quarter-Phased Transit Curves

TCE 005609986-02 P=378.478553 Days $T_0=208.044557$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

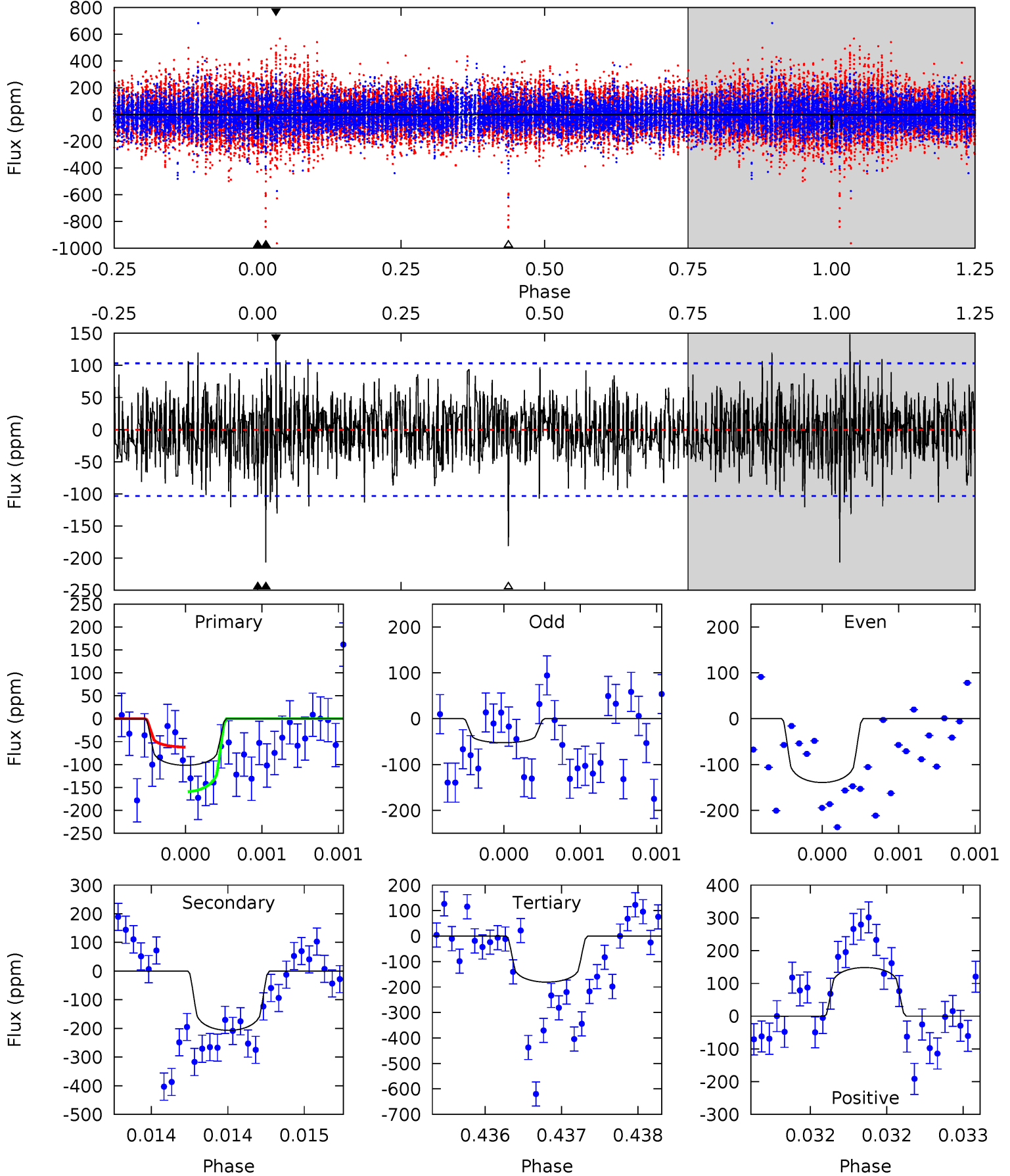
TCE 005609986-02 P=378.599811 Days $T_0=207.806918$ (BKJD)



DV Model-Shift Uniqueness Test

005609986-02, $P = 378.478553$ Days, $E = 208.044557$ Days

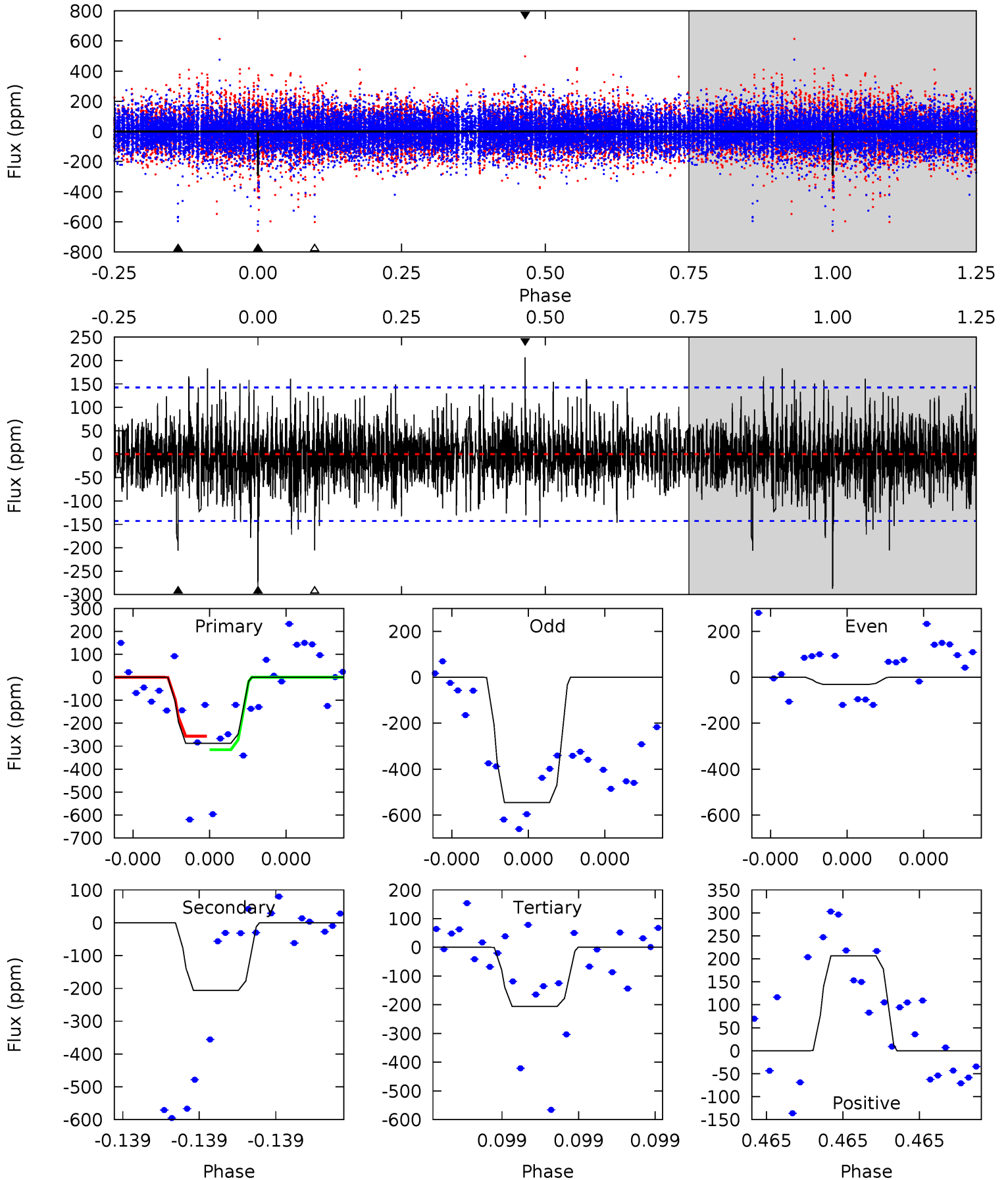
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.47	11.1	9.72	7.98	5.55	3.44	1.86	-4.25	-2.51	1.39	3.13	2.29	1.25	0.42	2.59



Alt Model-Shift Uniqueness Test

005609986-02, P = 378.599811 Days, E = 207.806918 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	8.10	8.09	8.13	5.61	3.54	1.64	3.22	3.18	0.01	-0.03	10.0	1.00	0.42	1.17



Stellar Parameters For KIC 005609986

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6523^{+85}_{-78}	$4.037^{+0.168}_{-0.126}$	$0.160^{+0.150}_{-0.150}$	$1.926^{+0.381}_{-0.381}$	$1.471^{+0.128}_{-0.128}$	$0.290^{+0.231}_{-0.111}$
	+1%/-1%	+4%/-3%	+94%/-94%	+20%/-20%	+9%/-9%	+80%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 005609986-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-207 ± 19	$2.67^{+2.28}_{-1.77}$	516^{+27}_{-28}	6938^{+7605}_{-1825}	$22152^{+165749}_{-16053}$
Alt.	-206 ± 25	$3.79^{+2.33}_{-2.00}$	516^{+28}_{-27}	5798^{+3063}_{-1099}	10590^{+40767}_{-6545}

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

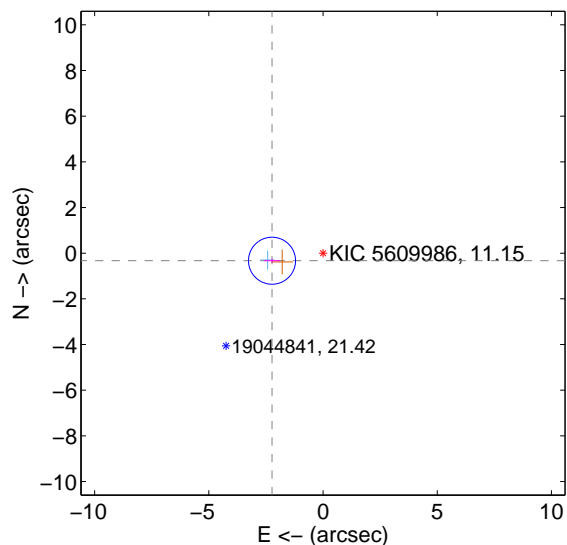
Supplemental centroid analysis for 005609986-02. **Kepler magnitude: 11.15.** Transit SNR 3.56

There are 1 quarters with good PRF difference image offsets

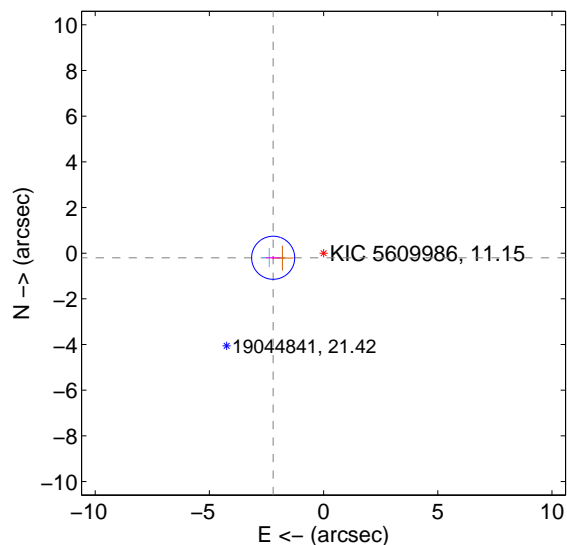
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.259 ± 0.343	6.58	2.234 ± 0.347	-0.331 ± 0.081
PRF-fit source offset from KIC position	2.217 ± 0.314	7.05	2.208 ± 0.316	-0.201 ± 0.068
photometric centroid source offset	1.41 ± 2.47	0.57	-0.93 ± 2.03	1.06 ± 2.76

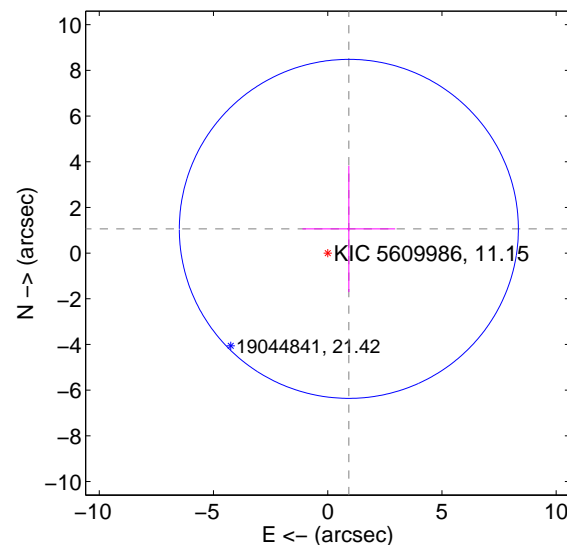
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

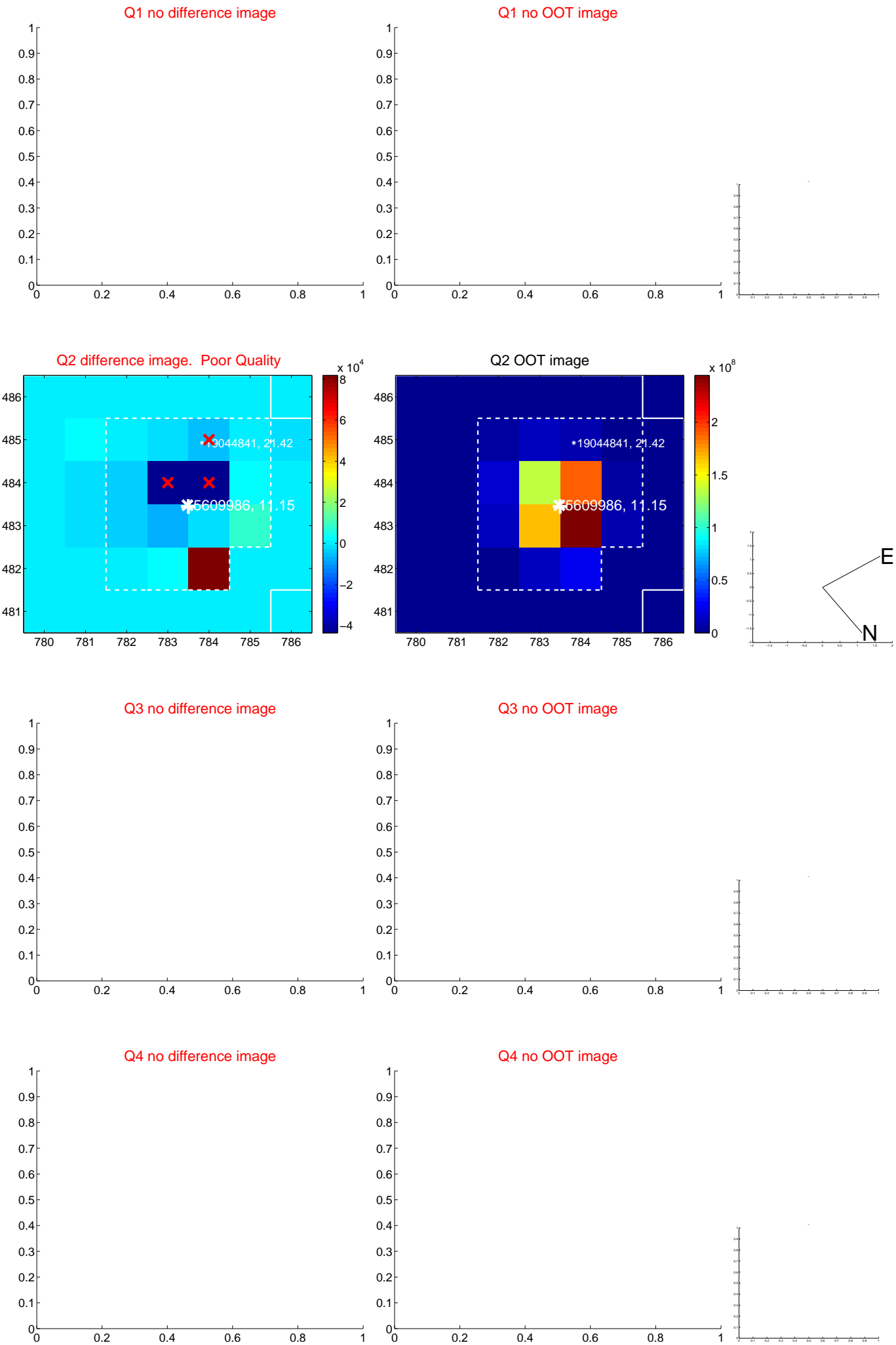


offset from photometric centroids

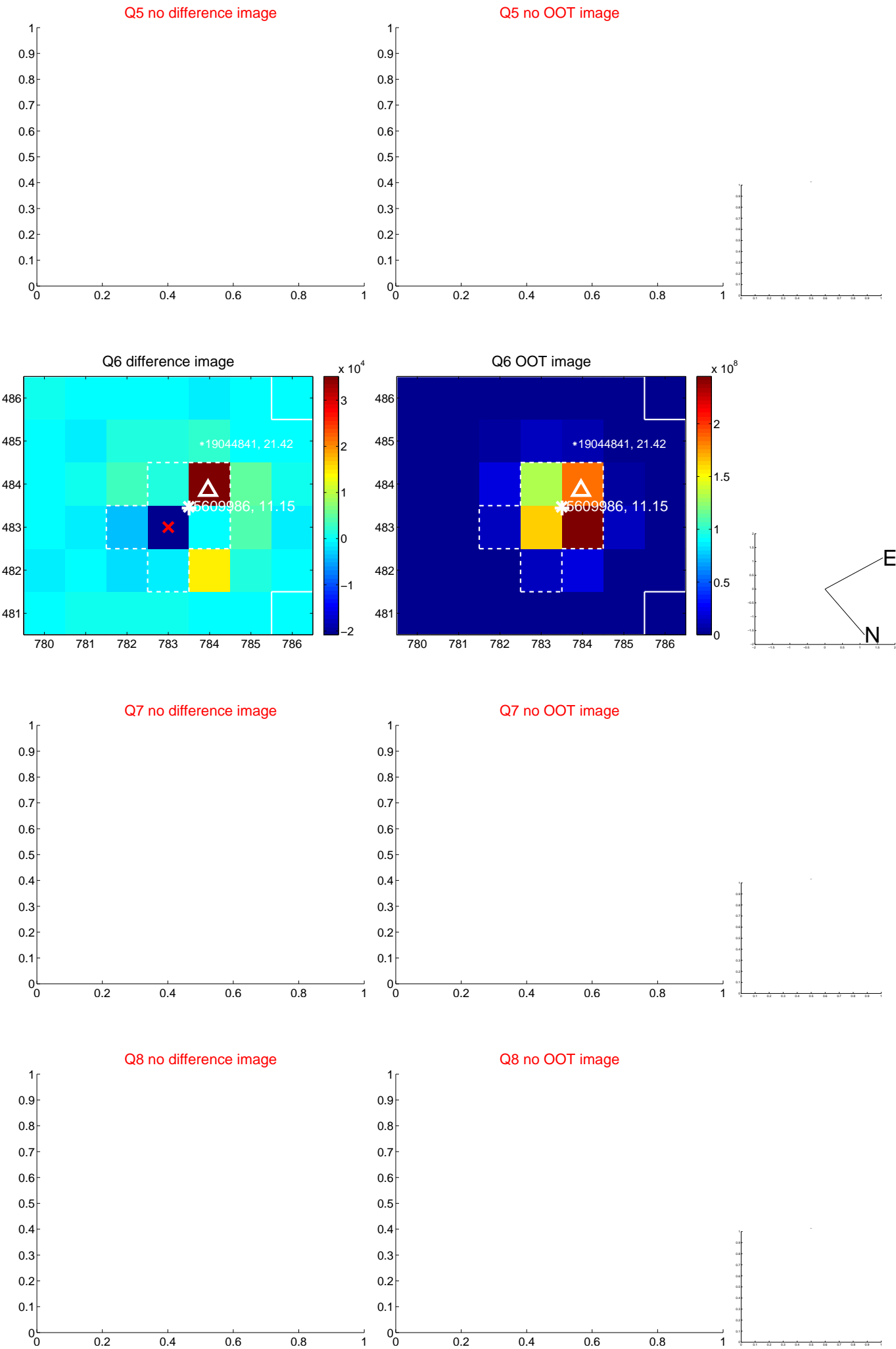


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

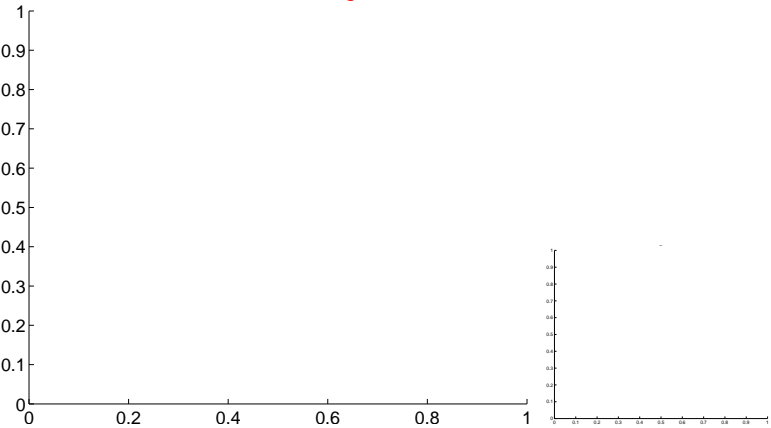


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

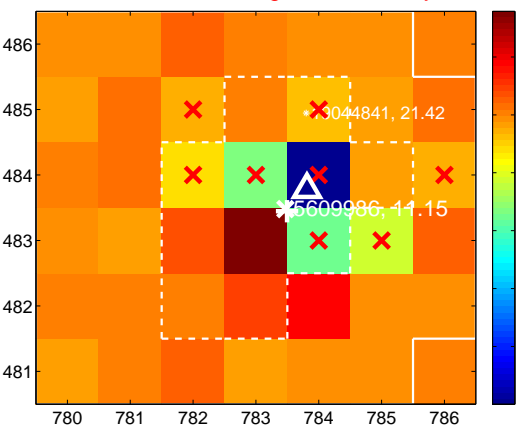
Q9 no difference image



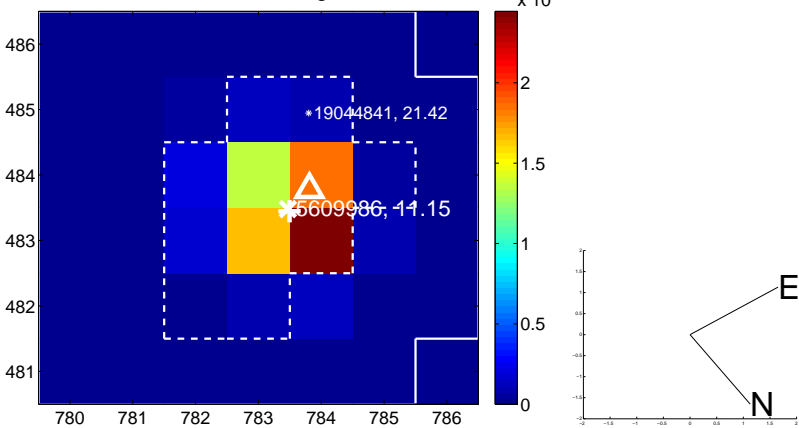
Q9 no OOT image



Q10 difference image. Poor Quality



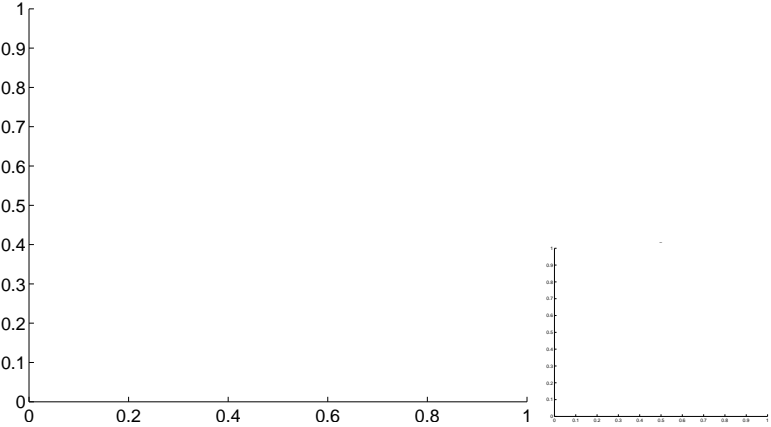
Q10 OOT image



Q11 no difference image



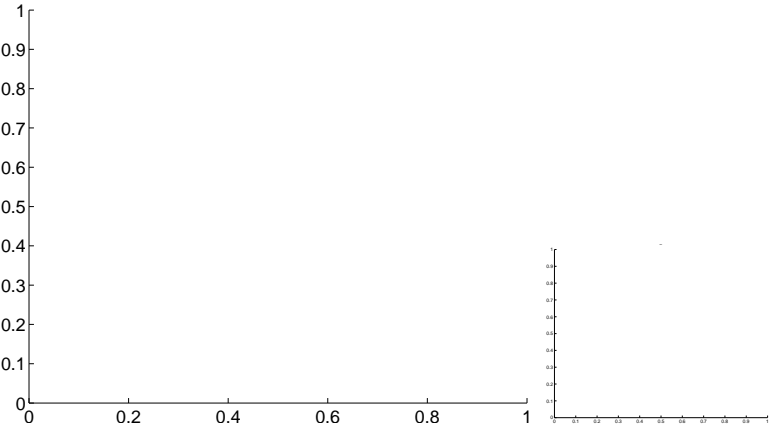
Q11 no OOT image



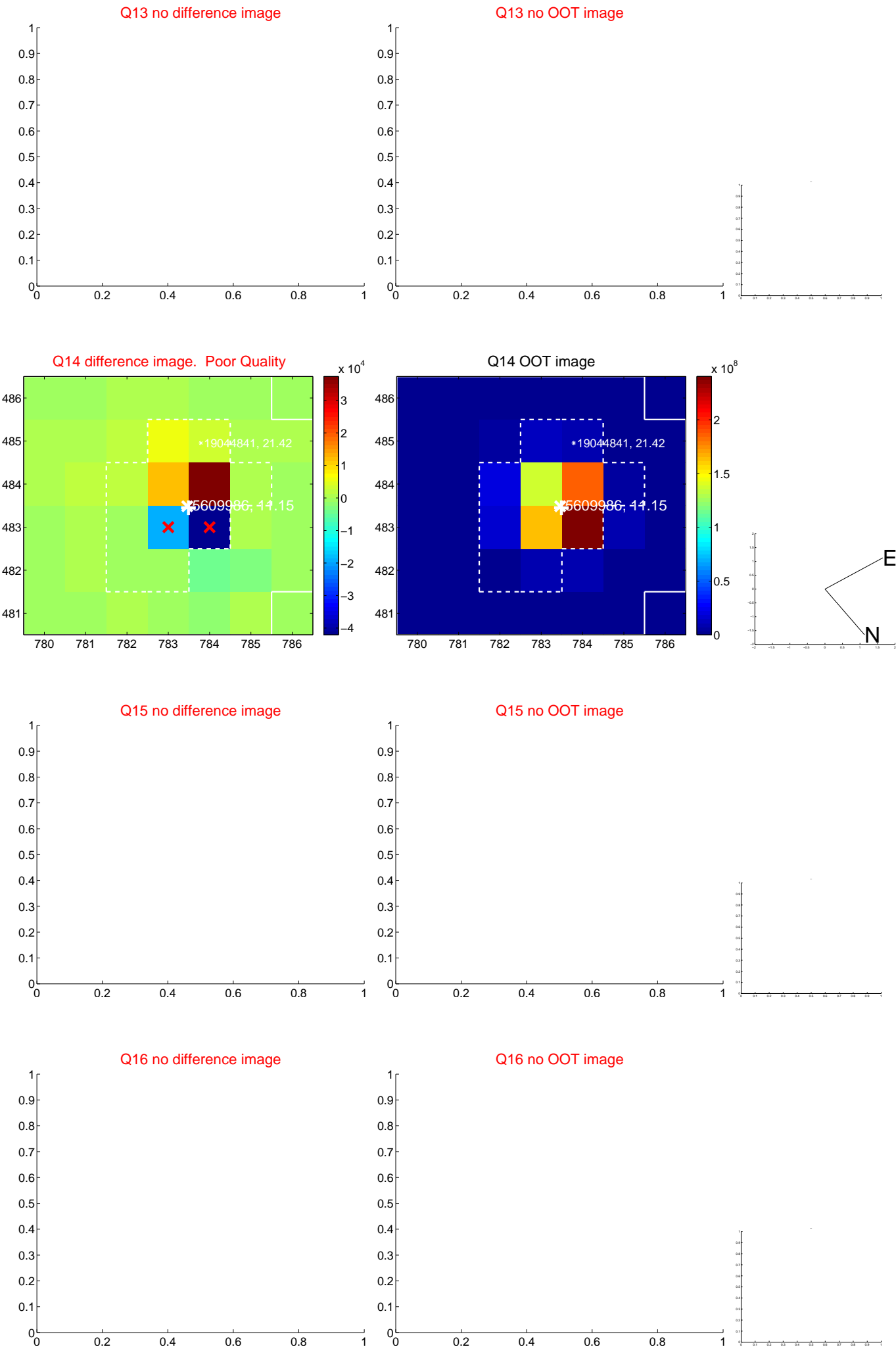
Q12 no difference image



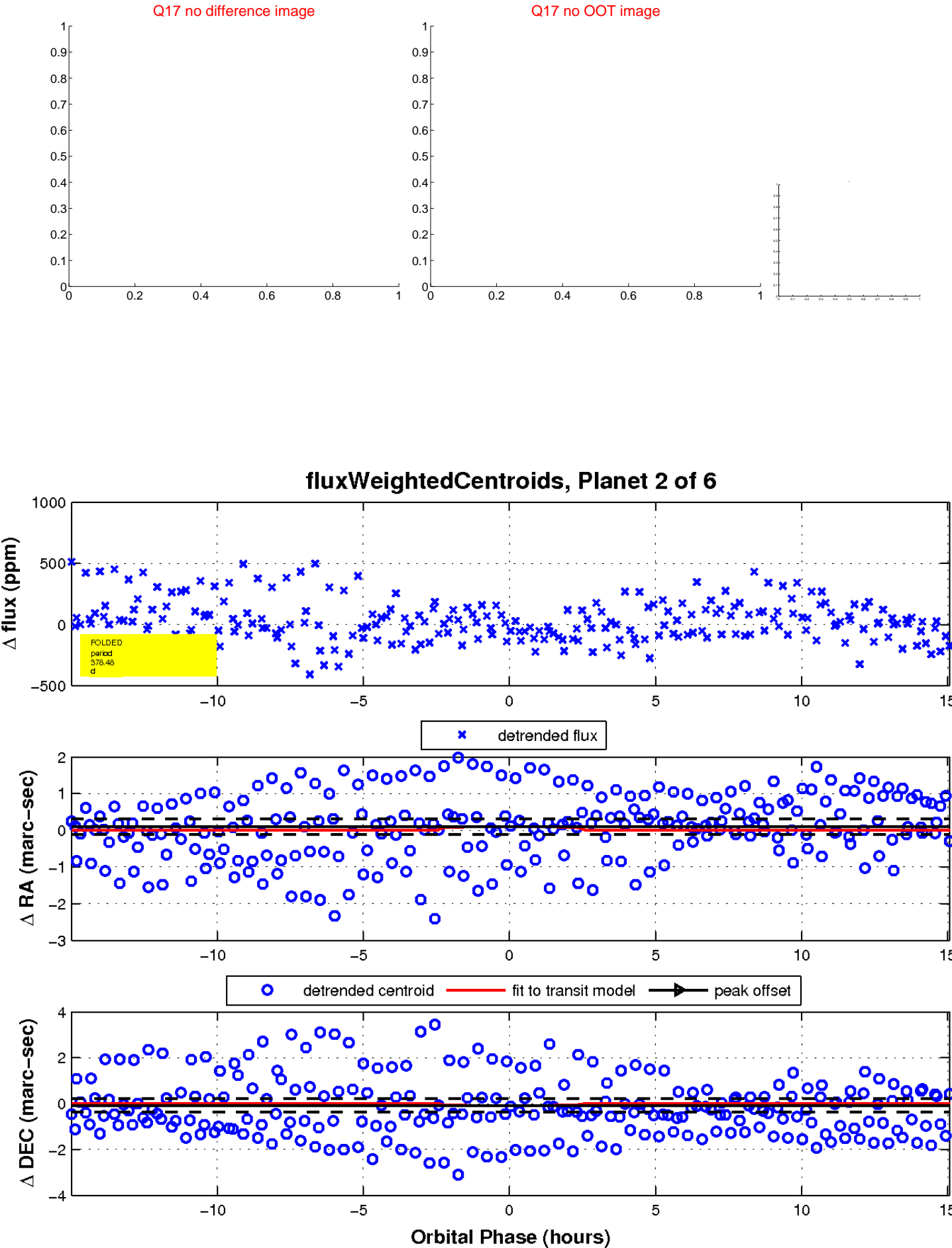
Q12 no OOT image



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

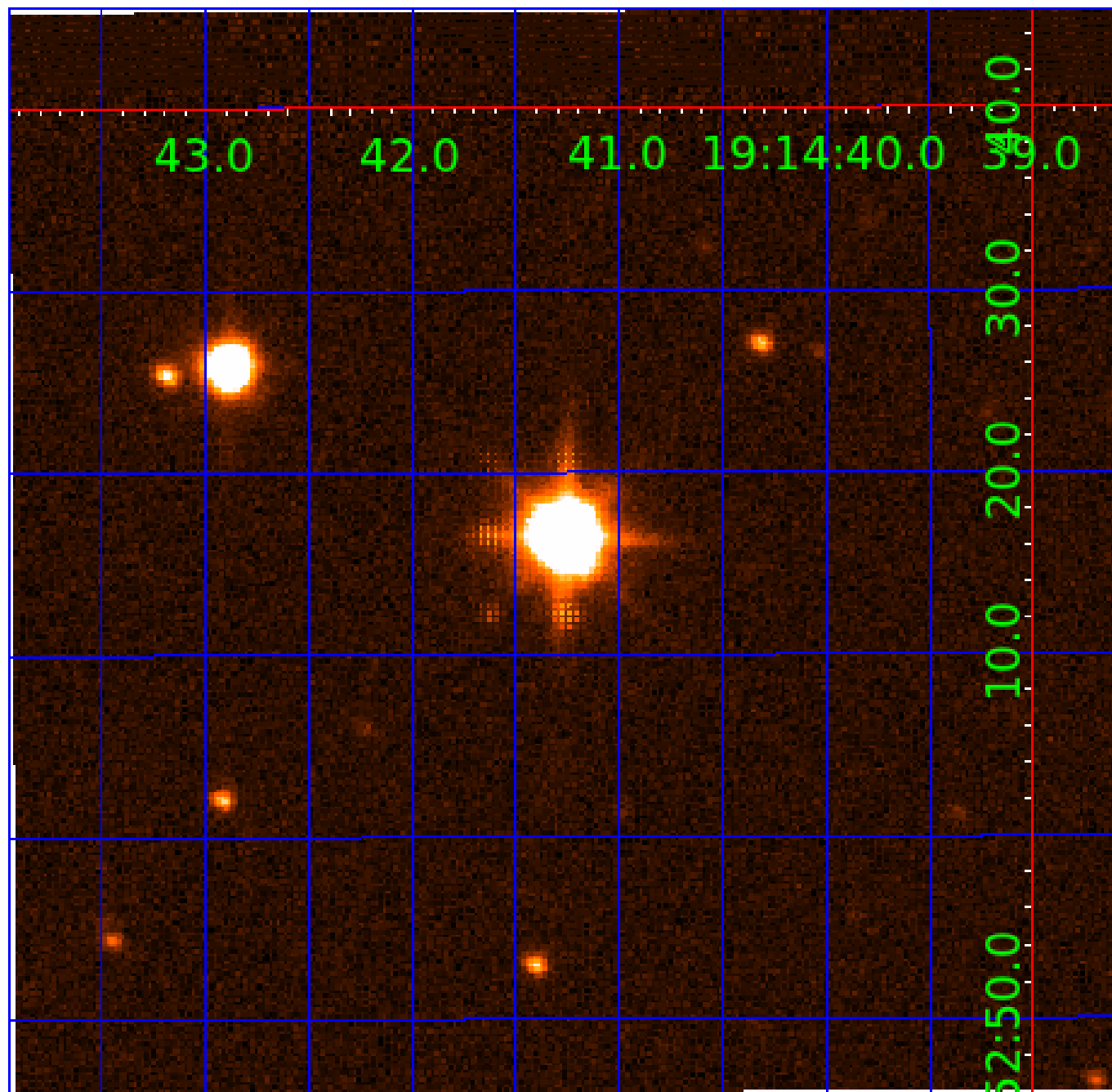


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005609986

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})
005609986-01	OBS	No	3.049254	133.820480	7.7	14.233	10.5	2.7	1.93	6523	0.63	2742.82
005609986-02	OBS	No	378.478553	208.044557	108.4	5.029	19.1	3.6	1.93	6523	2.26	4.43
005609986-03	OBS	No	115.249626	228.728750	201.9	5.133	8.0	7.6	1.93	6523	3.62	21.62
005609986-04	OBS	No	136.589499	236.821201	224.9	4.353	13.3	9.4	1.93	6523	2.95	17.24
005609986-05	OBS	No	171.108663	241.869779	246.4	10.702	10.2	10.0	1.93	6523	3.33	12.77
005609986-06	OBS	No	147.568332	252.030473	157.8	5.473	8.0	6.2	1.93	6523	2.72	15.55

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005609986-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
005609986-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
005609986-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
005609986-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

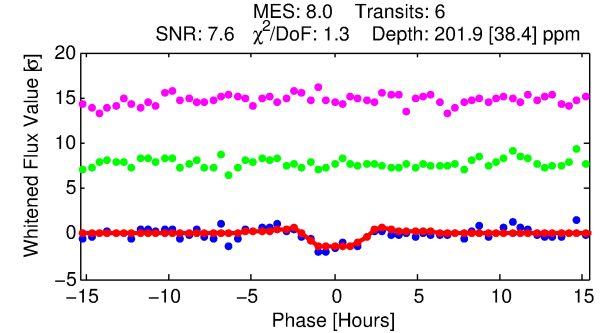
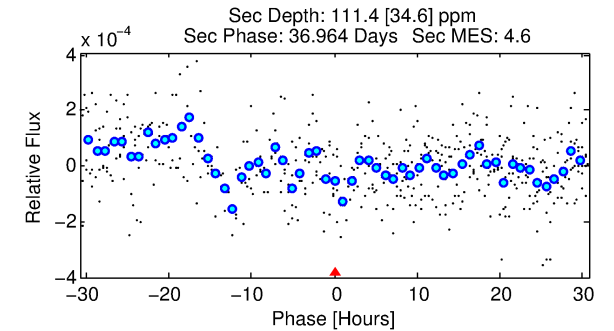
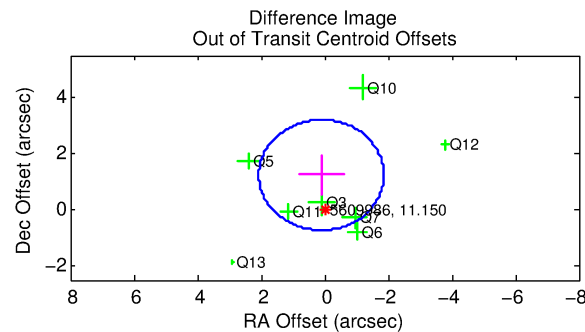
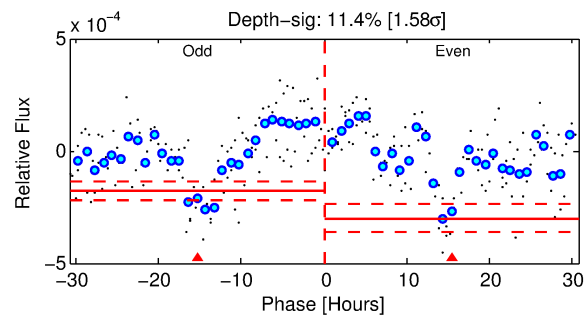
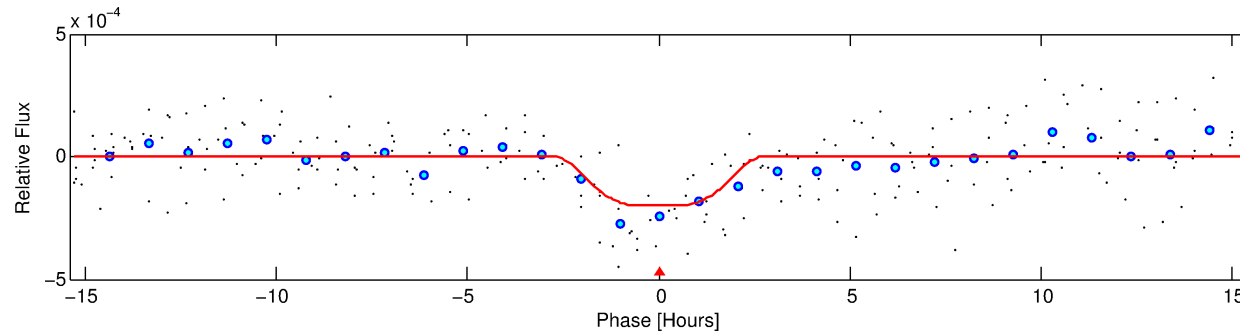
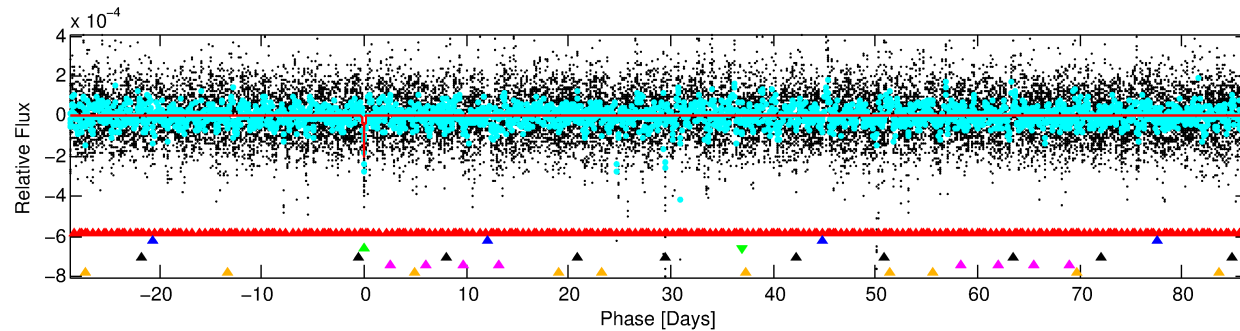
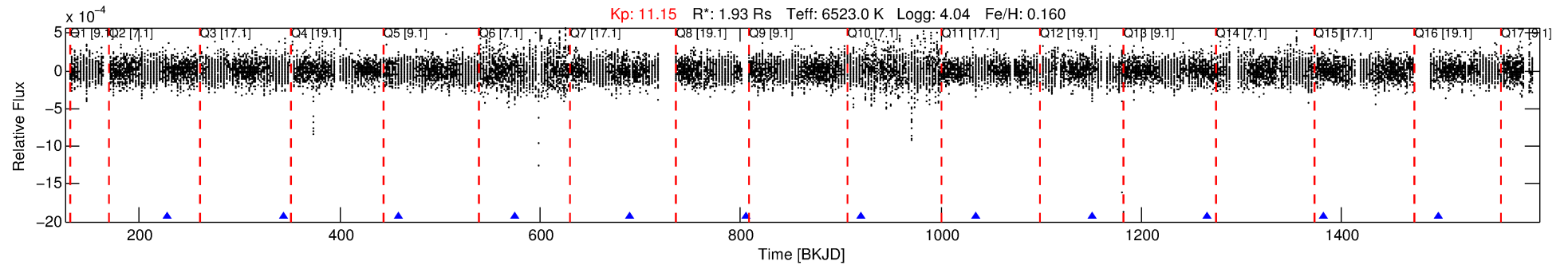
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005609986-03

No Significant Match Found

DV One-Page Summary

KIC: 5609986 Candidate: 3 of 6 Period: 115.250 d



DV Fit Results:

Period = 115.24963 [0.00285] d
Epoch = 228.7287 [0.0185] BKJD
Rp/R* = 0.0172 [0.0020]
a/R* = 48.24 [11.81]
b = 0.98 [0.01]
Seff = 21.62 [6.36]
Teq = 550 [40] K
Rp = 3.62 [0.83] Re
a = 0.5275 [0.0973] AU
Ag = 1303.20 [632.75] [2.06σ]
Teffp = 5108 [502] K [9.05σ]

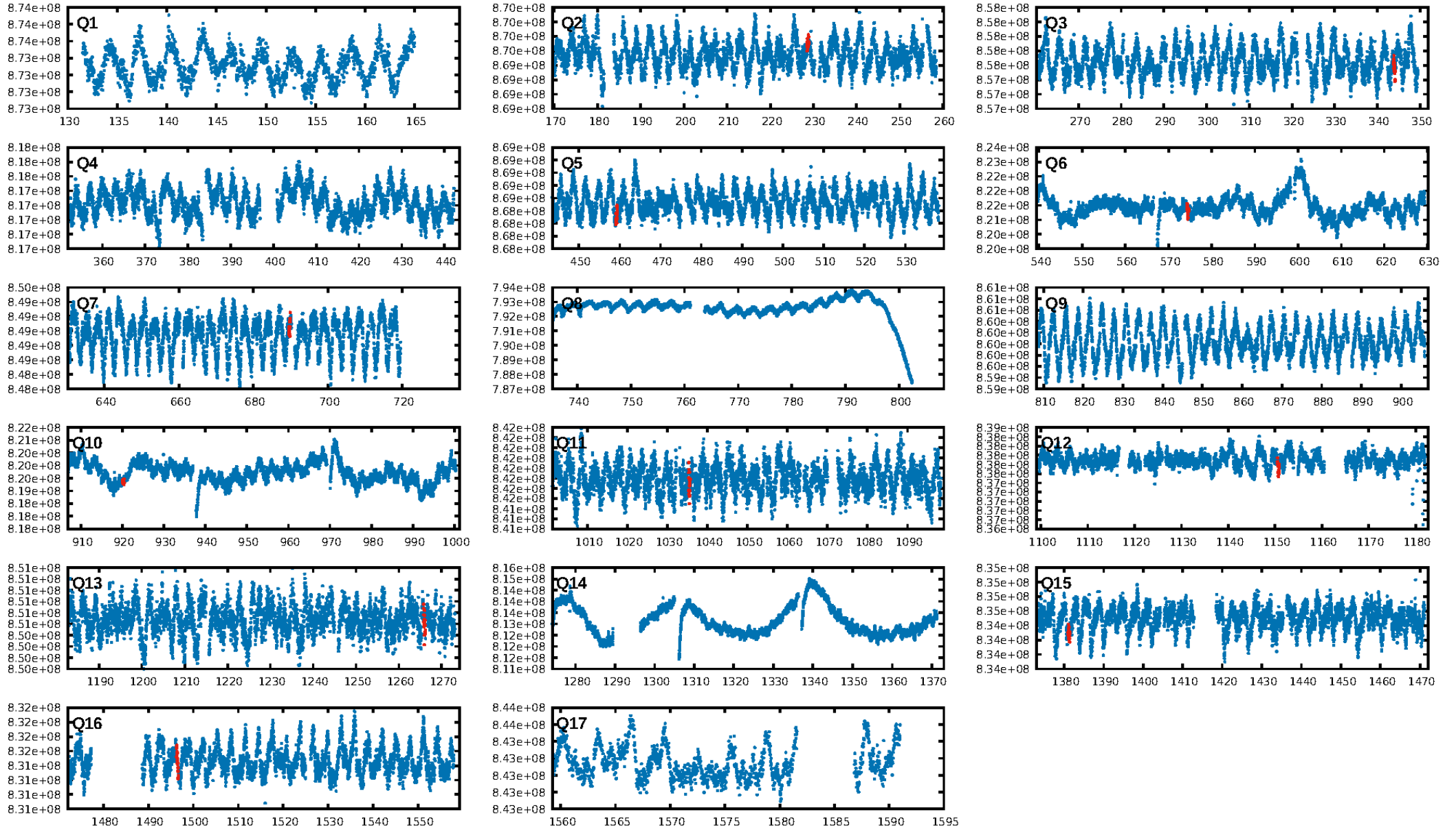
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [177.97σ]
LongPeriod-sig: 100.0% [76.10σ]
ModelChiSquare2-sig: 19.1%
ModelChiSquareGof-sig: 99.6%
Bootstrap-pfa: 3.98e-08
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: -0.6328
Centroid-sig: 62.9%
Centroid-so: 0.165 arcsec [0.37σ]
OotOffset-rm: 1.241 arcsec [1.89σ]
OotOffset-st: 2/3/1/2 [8]
KicOffset-rm: 1.457 arcsec [2.03σ]
KicOffset-st: 2/3/1/2 [8]
DiffImageQuality-fgm: 0.62 [5/8]
DiffImageOverlap-fno: 0.55 [6/11]

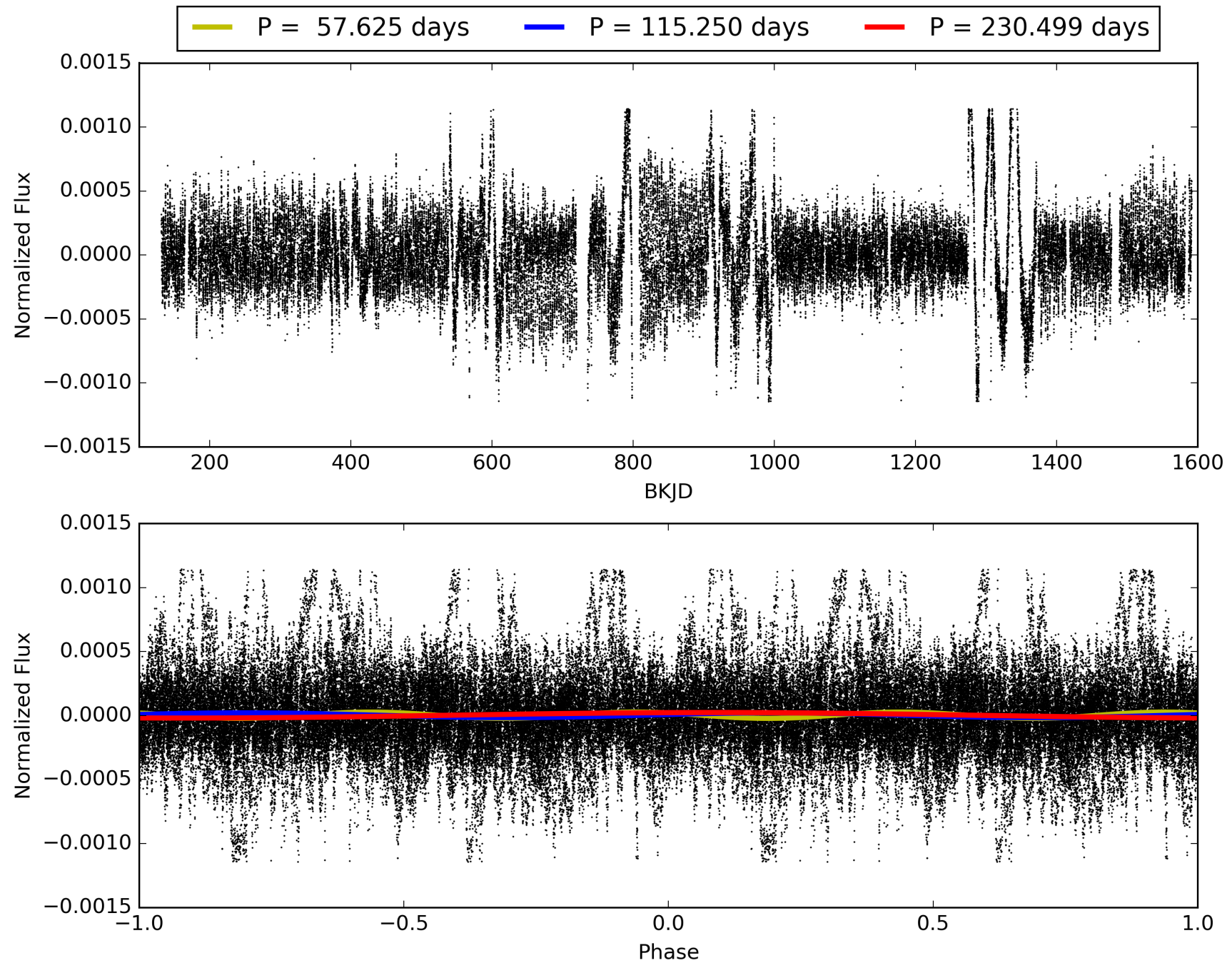
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:50:30 Z

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

TCE 005609986-03, PDC Light Curves

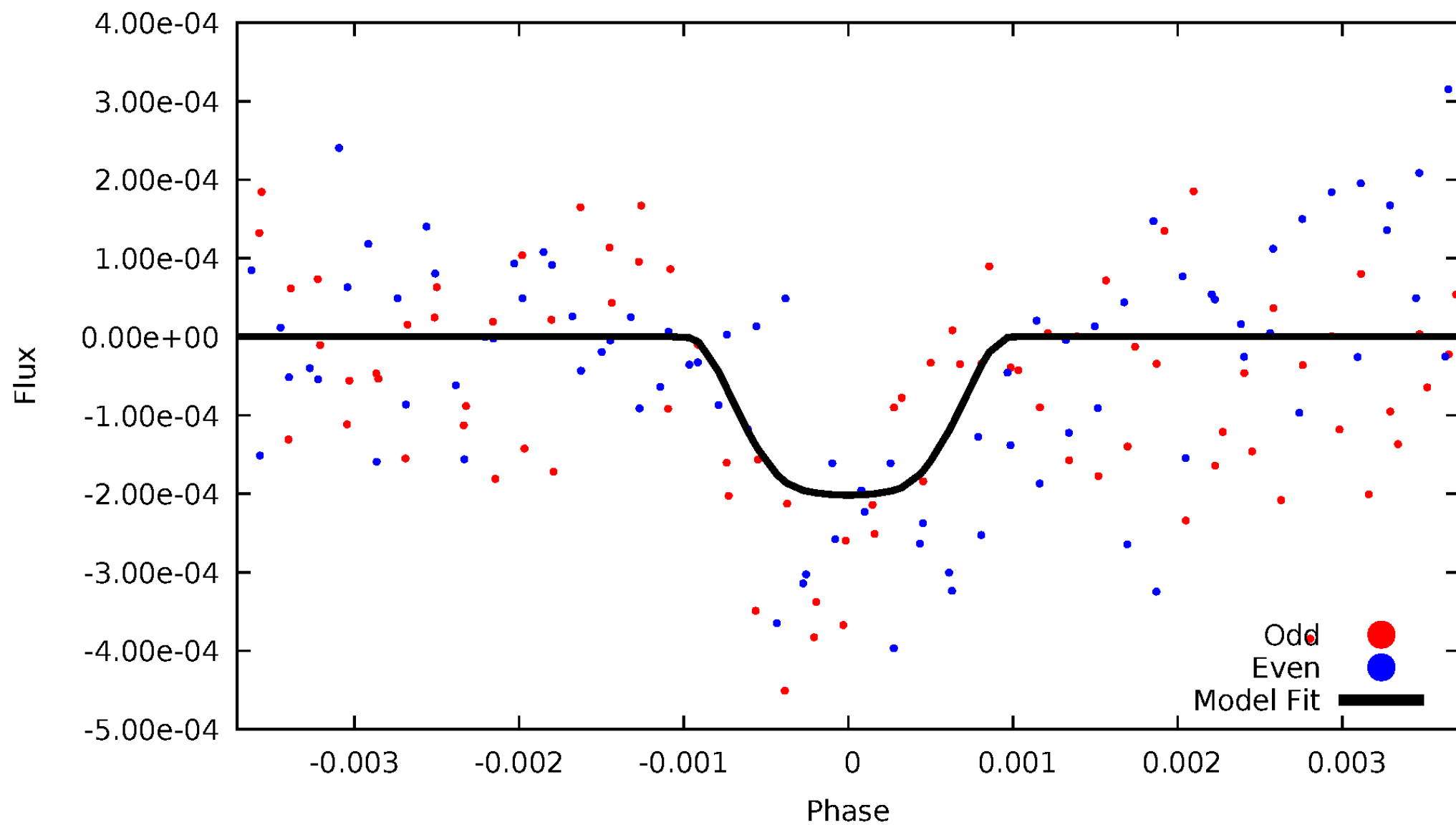


TCE 005609986-03



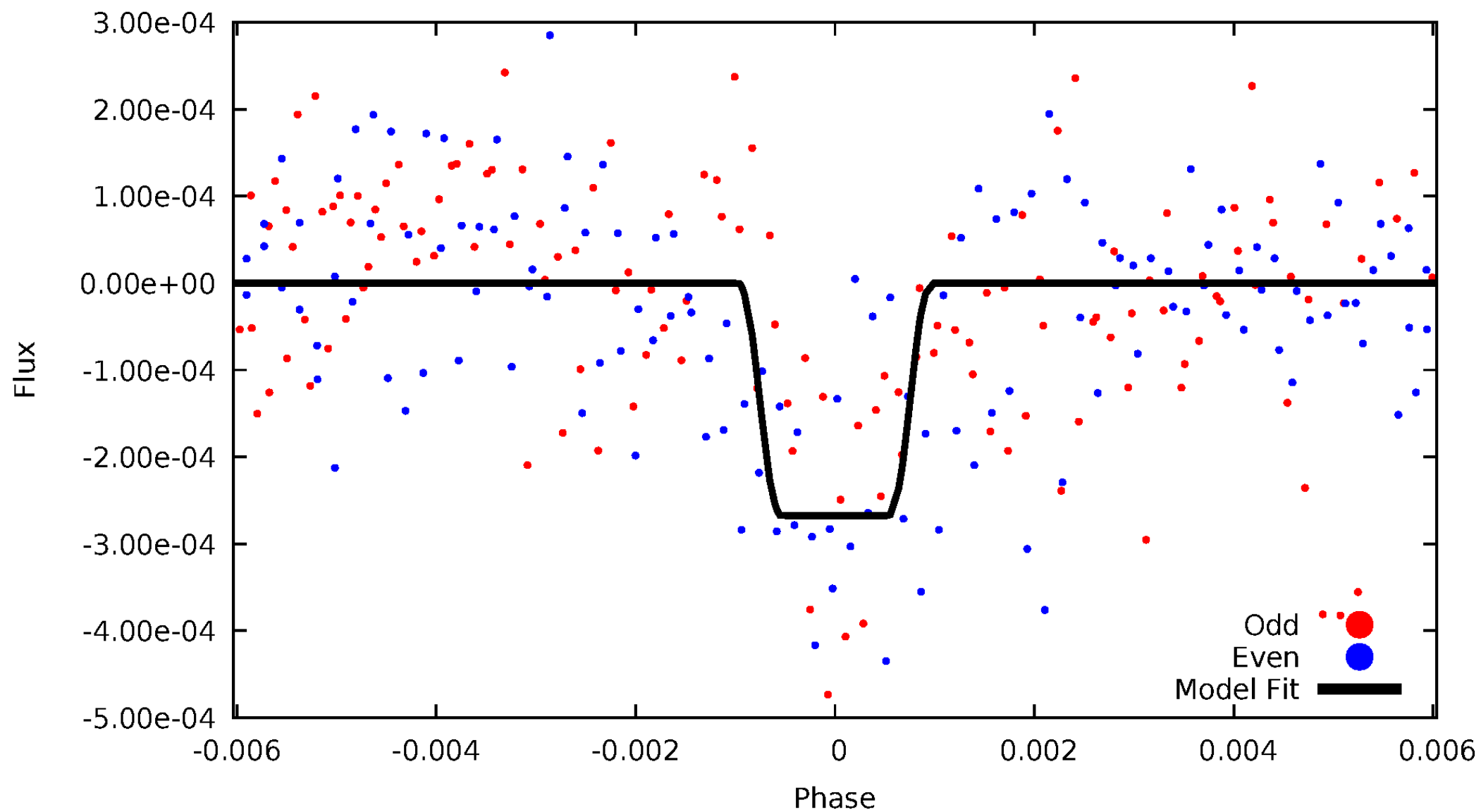
DV Odd/Even

TCE 005609986-03



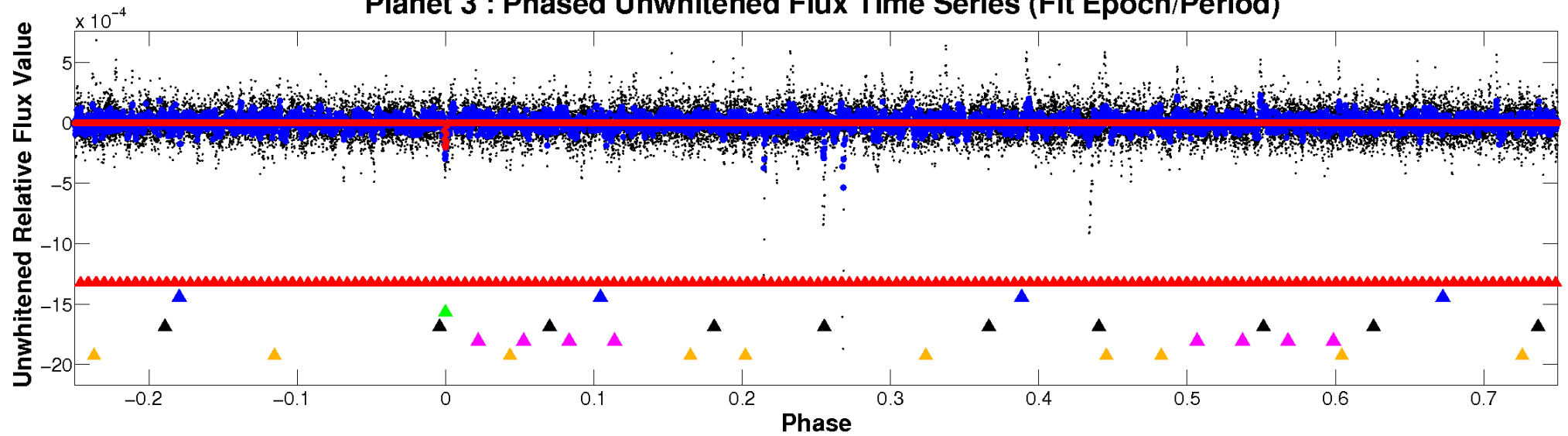
ALT Odd/Even

TCE 005609986-03

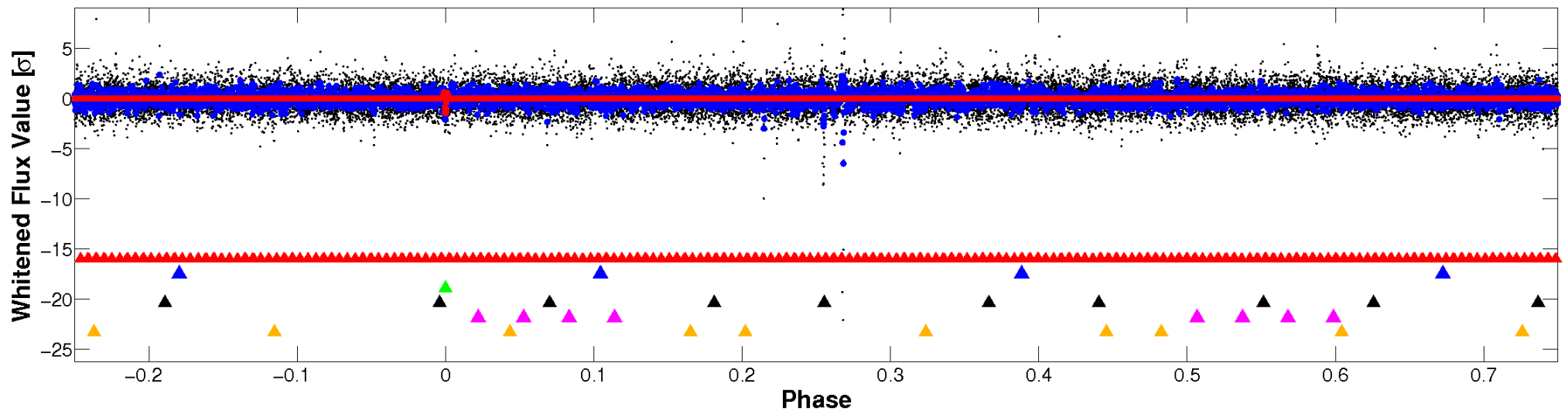


Non-Whitened Vs. Whitened Light Curve

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

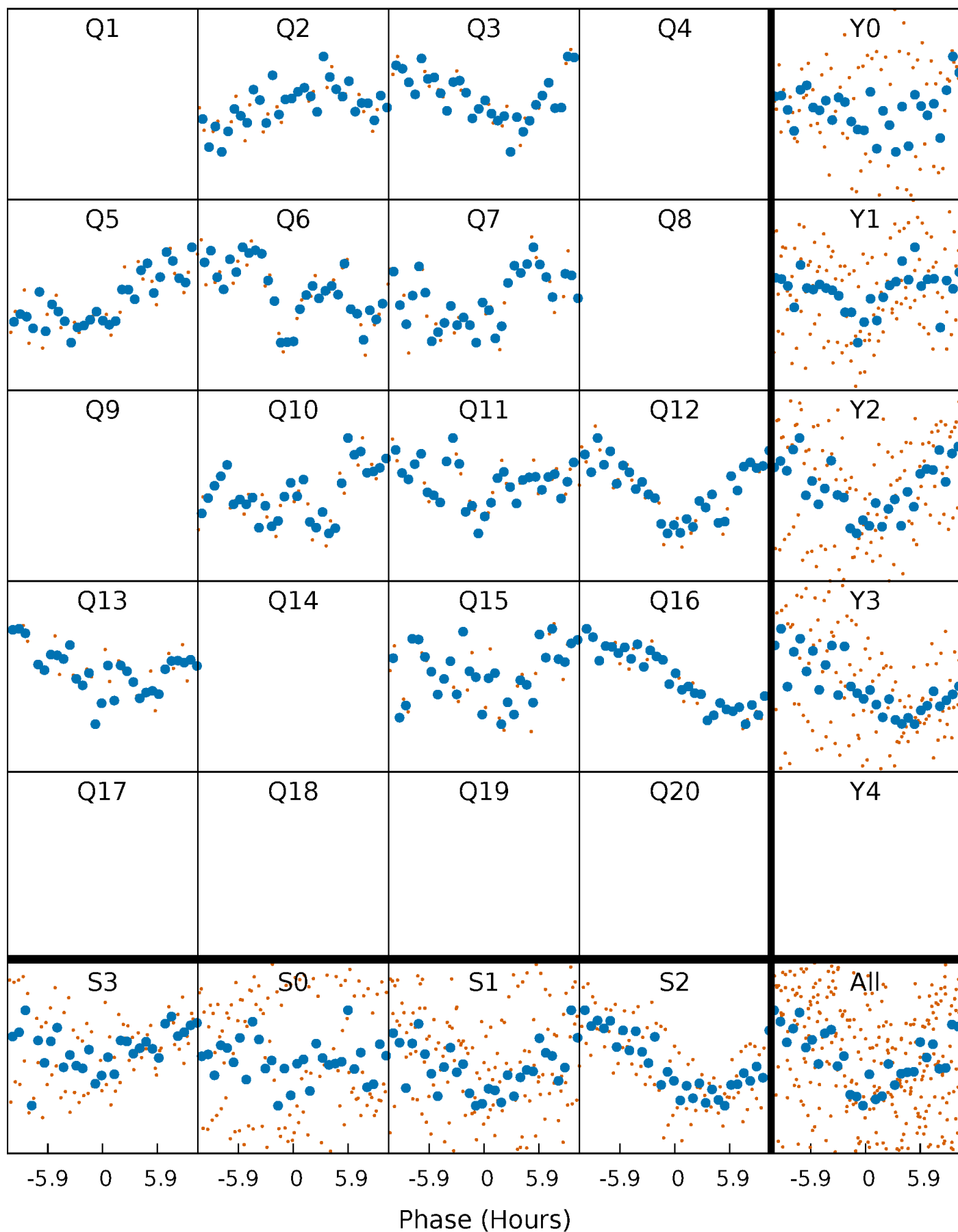


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



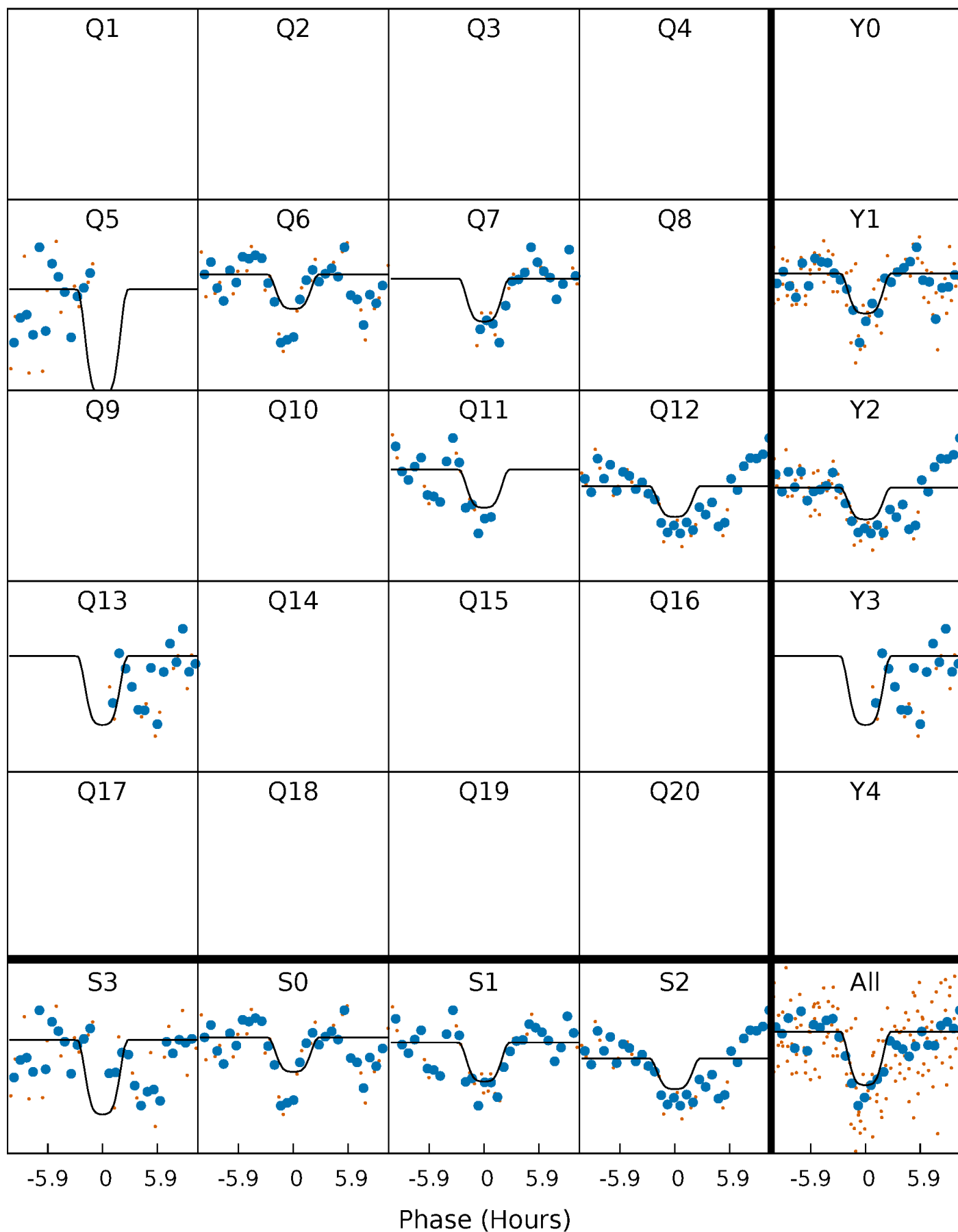
PDC Quarter-Phased Transit Curves

TCE 005609986-03 $P=115.249626$ Days $T_0=228.728750$ (BKJD)



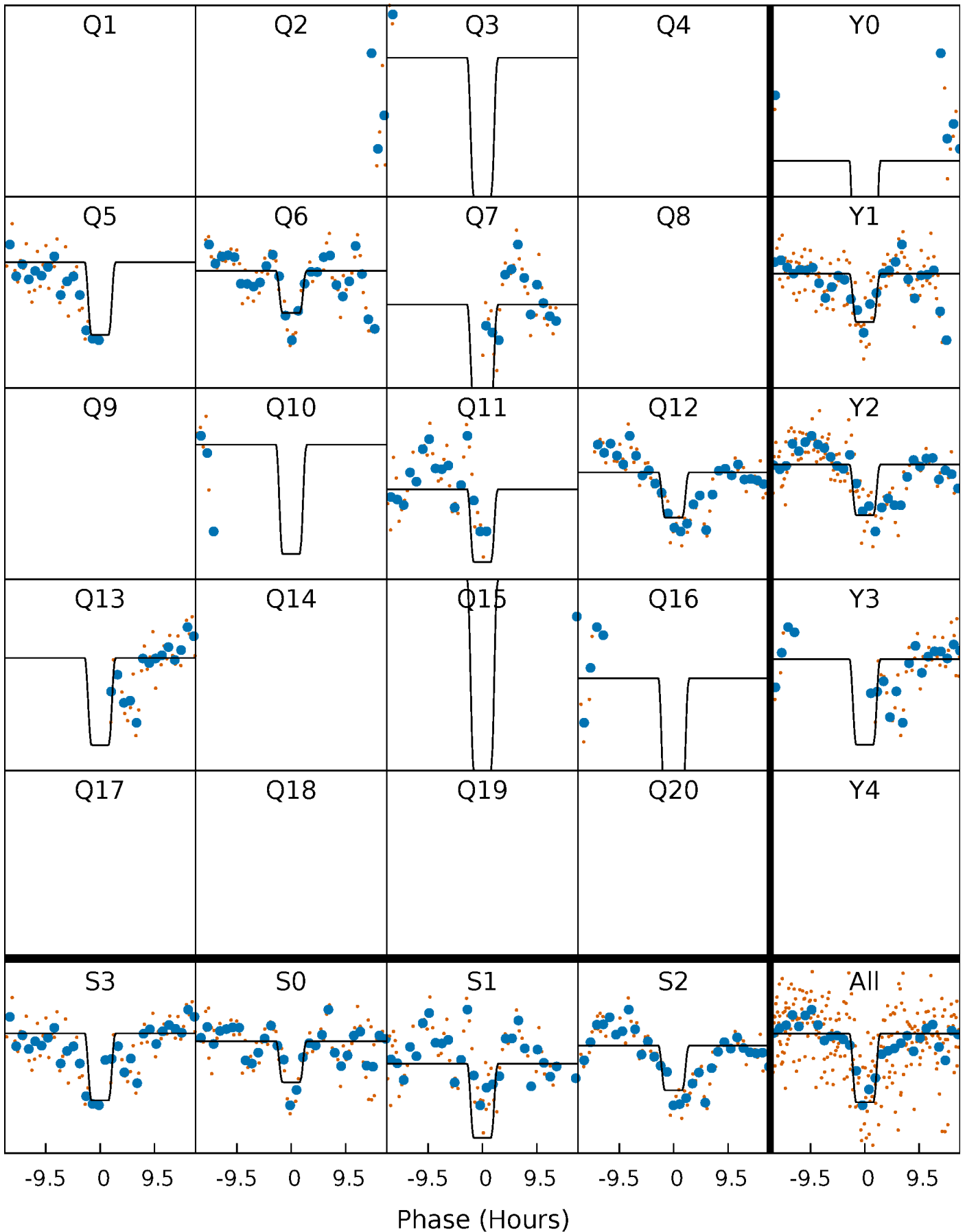
DV Quarter-Phased Transit Curves

TCE 005609986-03 $P=115.249626$ Days $T_0=228.728750$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

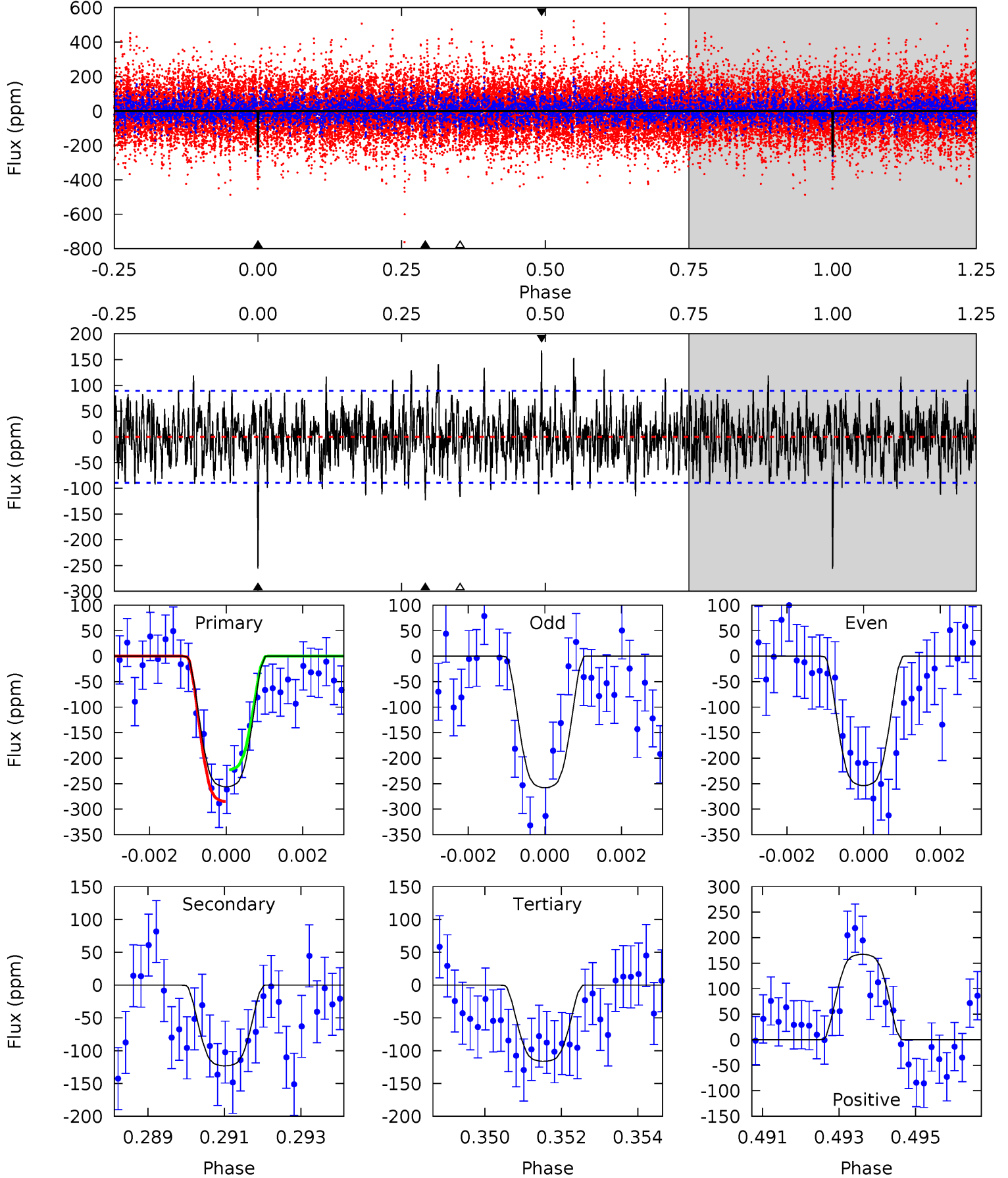
TCE 005609986-03 P=115.251462 Days $T_0=228.687041$ (BKJD)



DV Model-Shift Uniqueness Test

005609986-03, P = 115.249626 Days, E = 113.479124 Days

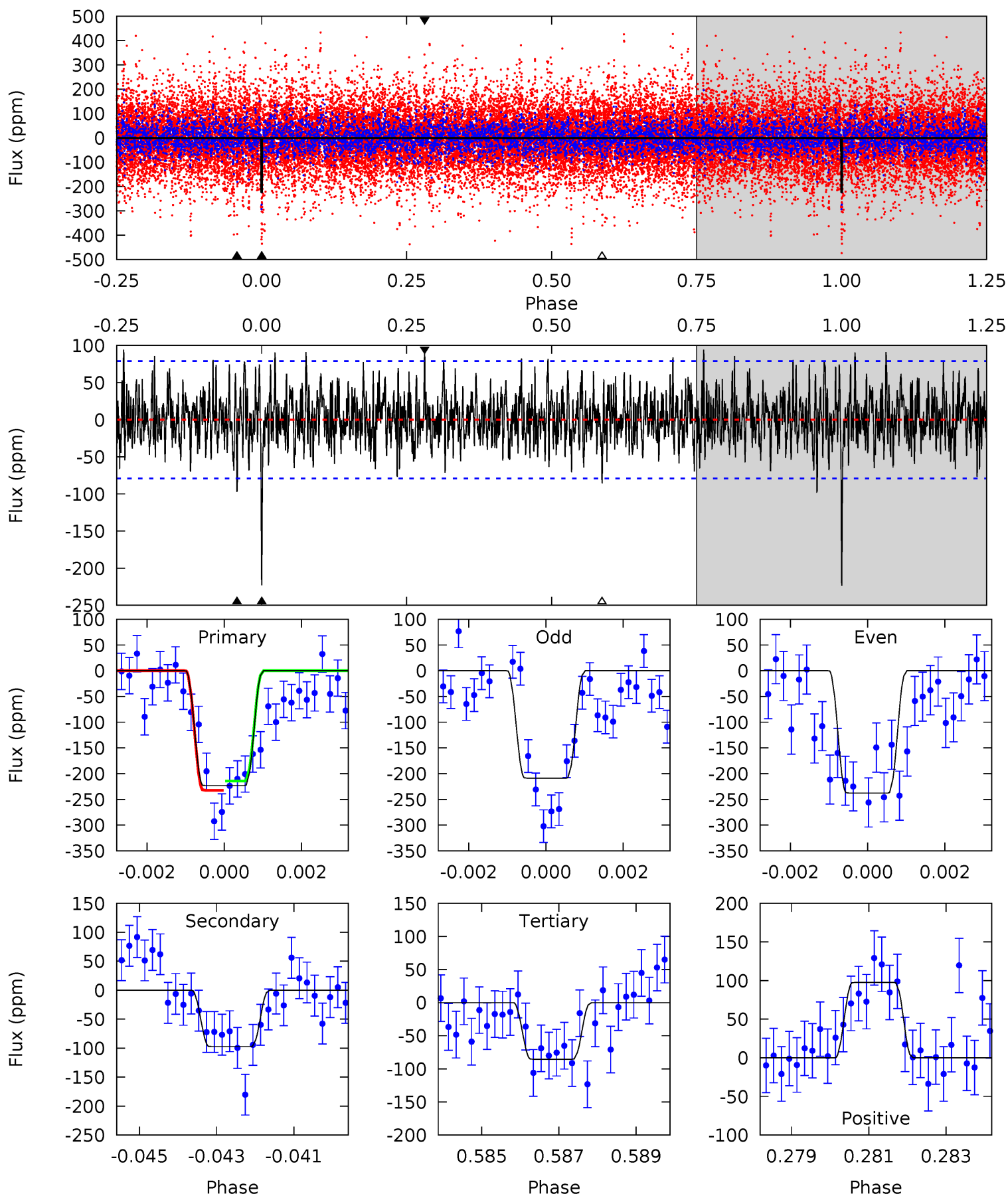
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	7.37	6.96	10.0	5.34	3.10	2.37	8.37	5.31	0.41	-2.65	0.13	0.78	0.40	1.85



Alt Model-Shift Uniqueness Test

005609986-03, P = 115.251462 Days, E = 113.435579 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	6.55	5.76	6.57	5.33	3.10	1.84	9.27	8.46	0.79	-0.02	0.97	0.91	0.30	0.61



Stellar Parameters For KIC 005609986

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6523^{+85}_{-78}	$4.037^{+0.168}_{-0.126}$	$0.160^{+0.150}_{-0.150}$	$1.926^{+0.381}_{-0.381}$	$1.471^{+0.128}_{-0.128}$	$0.290^{+0.231}_{-0.111}$
	+1%/-1%	+4%/-3%	+94%/-94%	+20%/-20%	+9%/-9%	+80%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 005609986-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-123 ± 17	$3.53^{+0.68}_{-0.54}$	765^{+41}_{-43}	5287^{+370}_{-310}	1477^{+673}_{-414}
Alt.	-97 ± 15	$3.39^{+0.59}_{-0.53}$	762^{+43}_{-37}	5128^{+374}_{-296}	1297^{+591}_{-396}

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 $A_{obs} \gg 1.0$

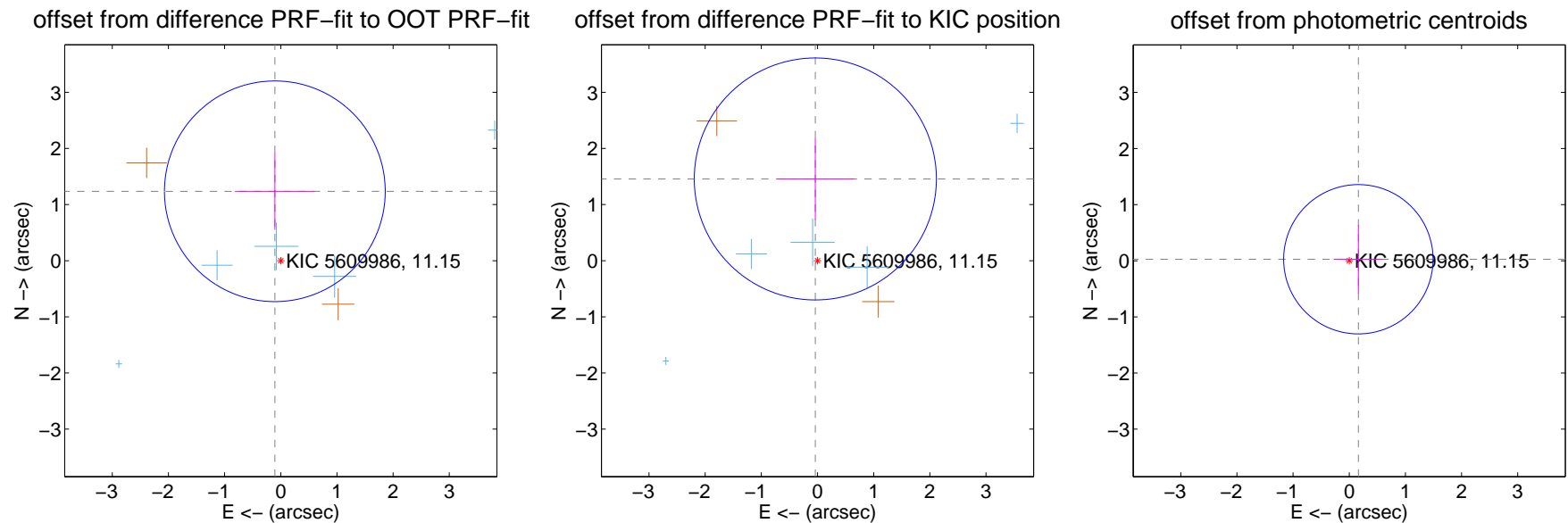
DV Centroid Data

Supplemental centroid analysis for 005609986-03. **Kepler magnitude: 11.15**. Transit SNR 7.56

There are 5 quarters with good PRF difference image offsets

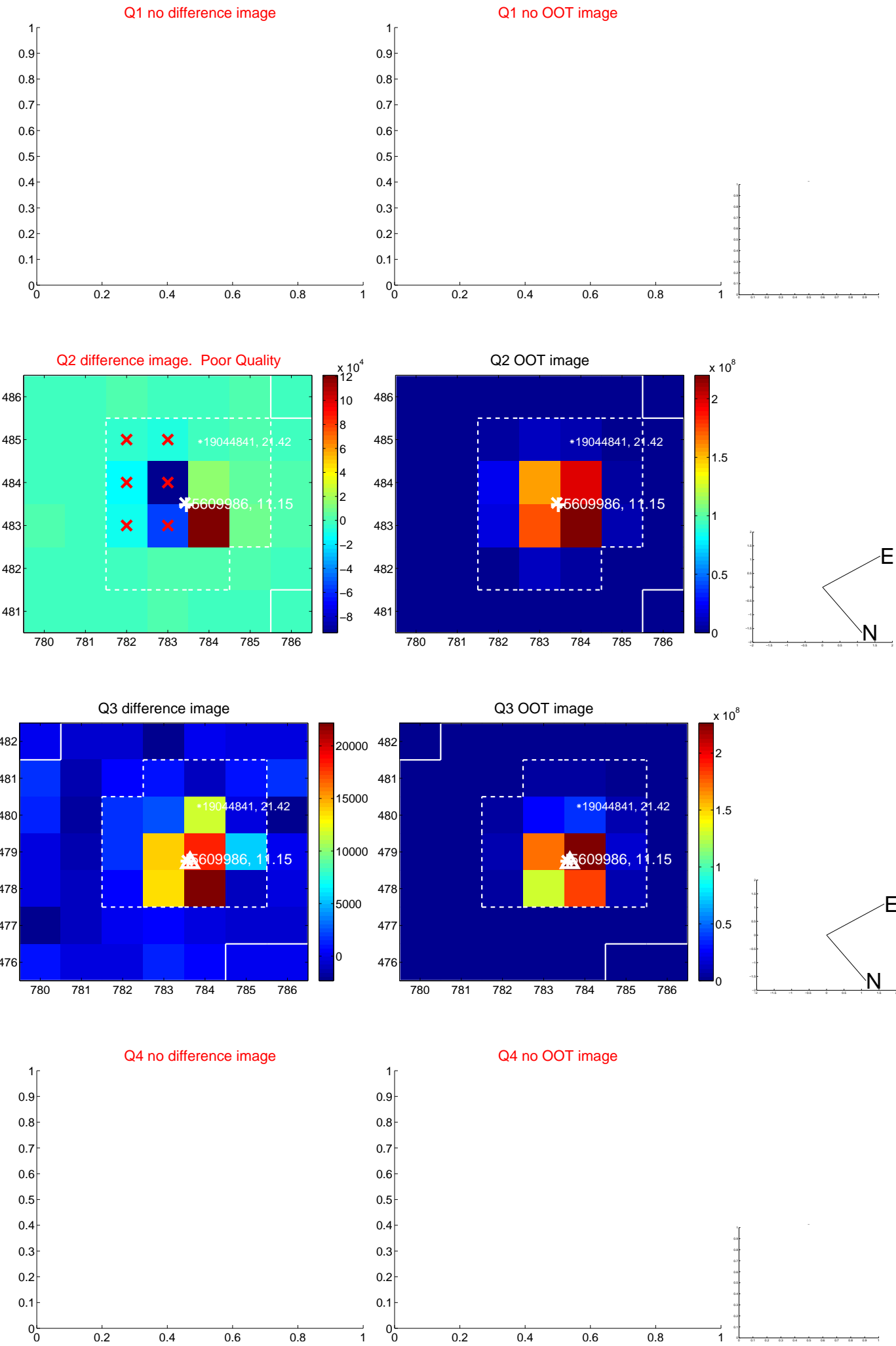
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.241 ± 0.655	1.89	0.106 ± 0.712	1.237 ± 0.688
PRF-fit source offset from KIC position	1.457 ± 0.719	2.03	0.039 ± 0.685	1.456 ± 0.728
photometric centroid source offset	0.16 ± 0.44	0.37	-0.16 ± 0.44	0.03 ± 0.61

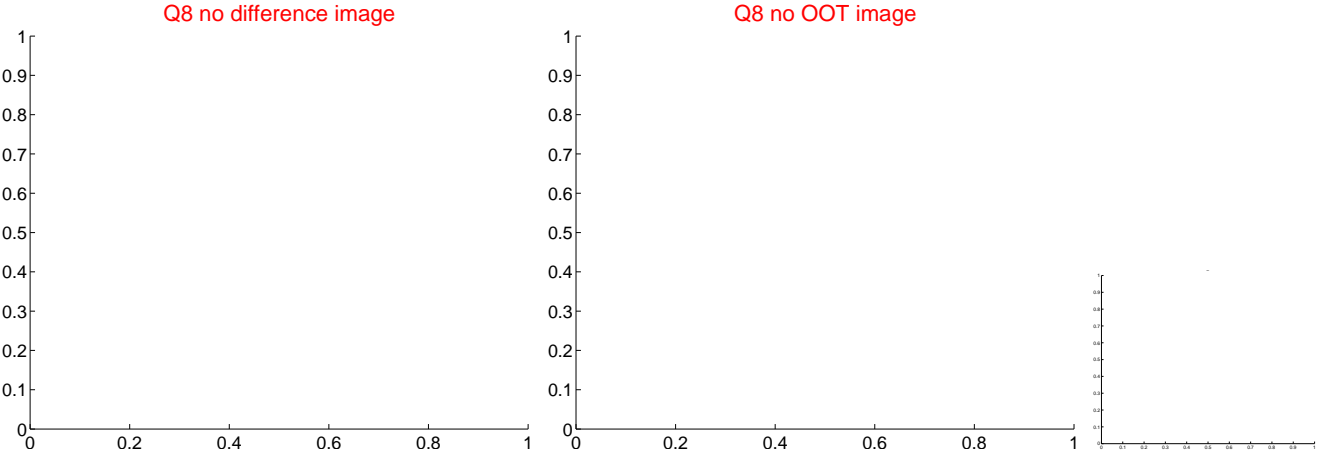
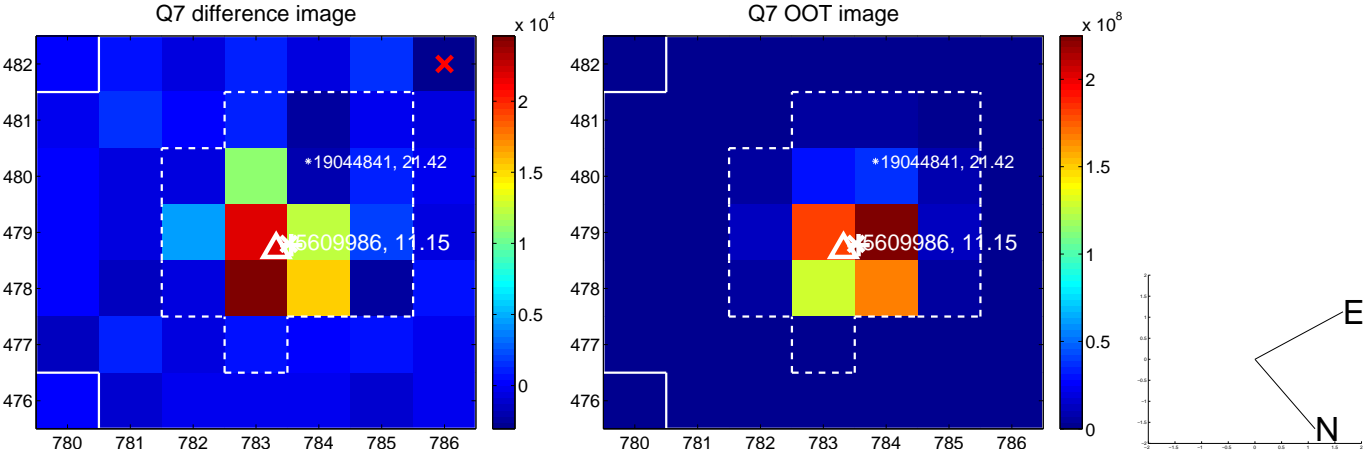
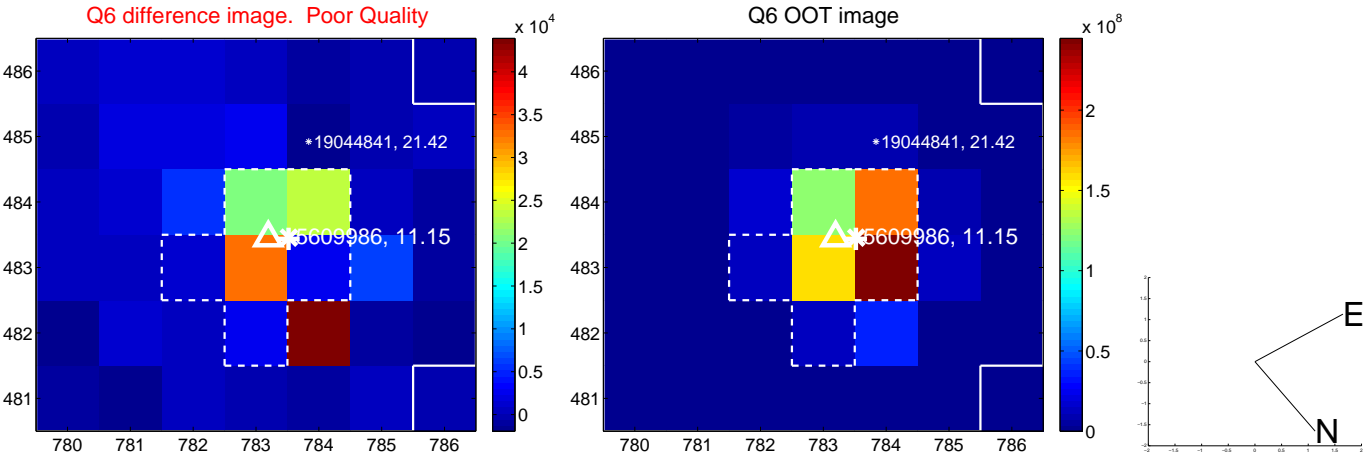
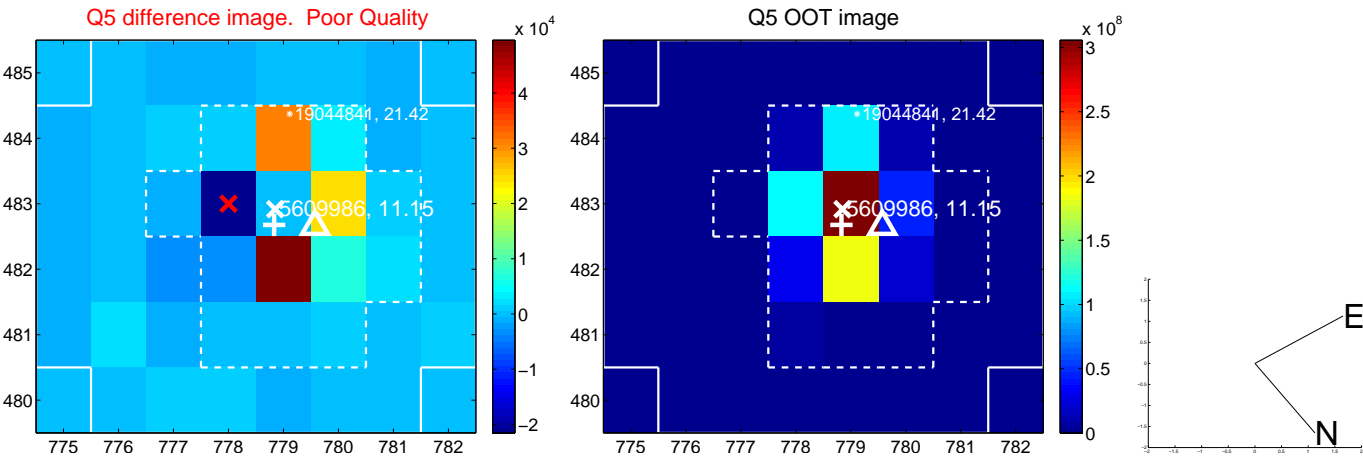


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

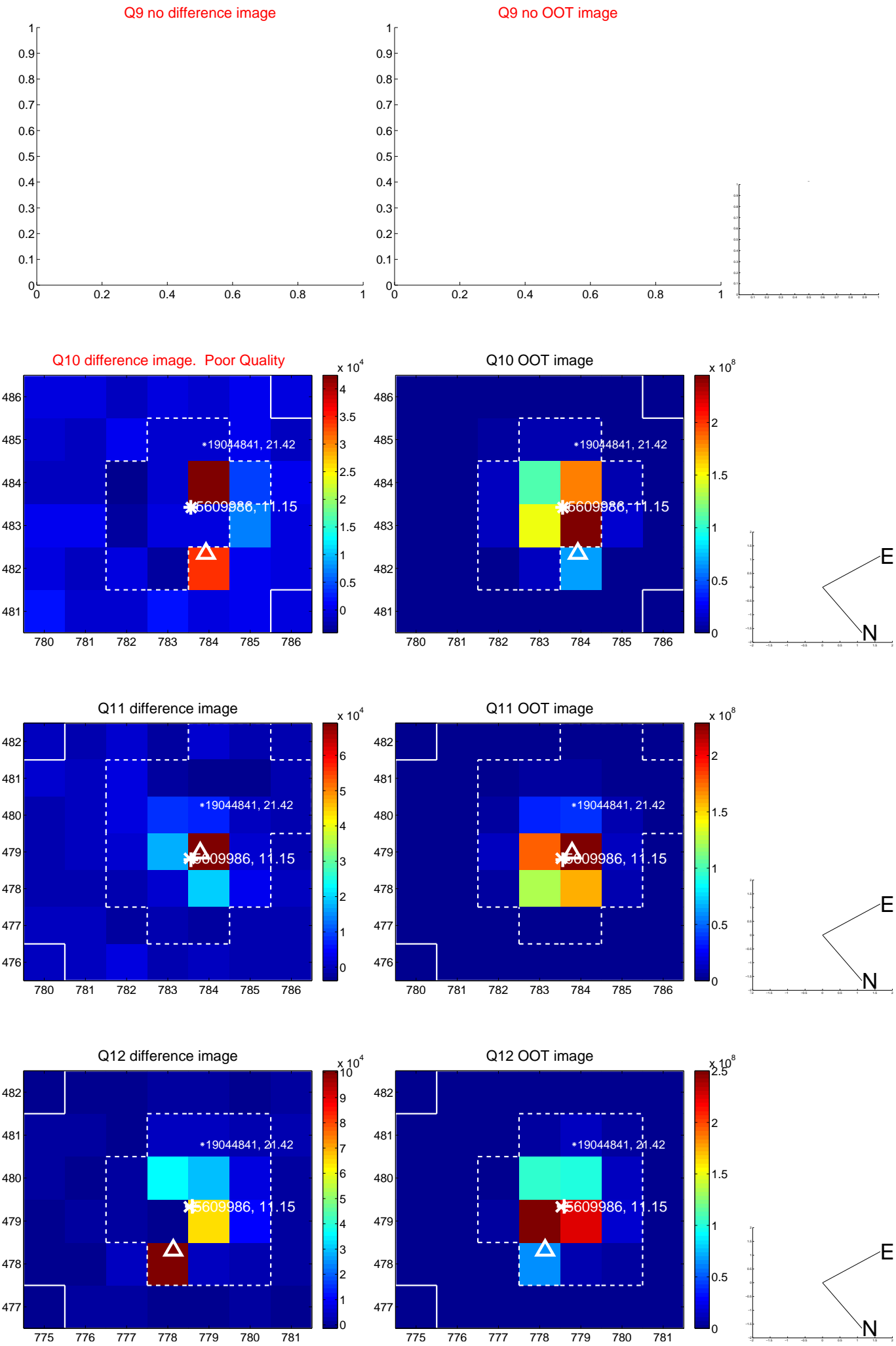
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



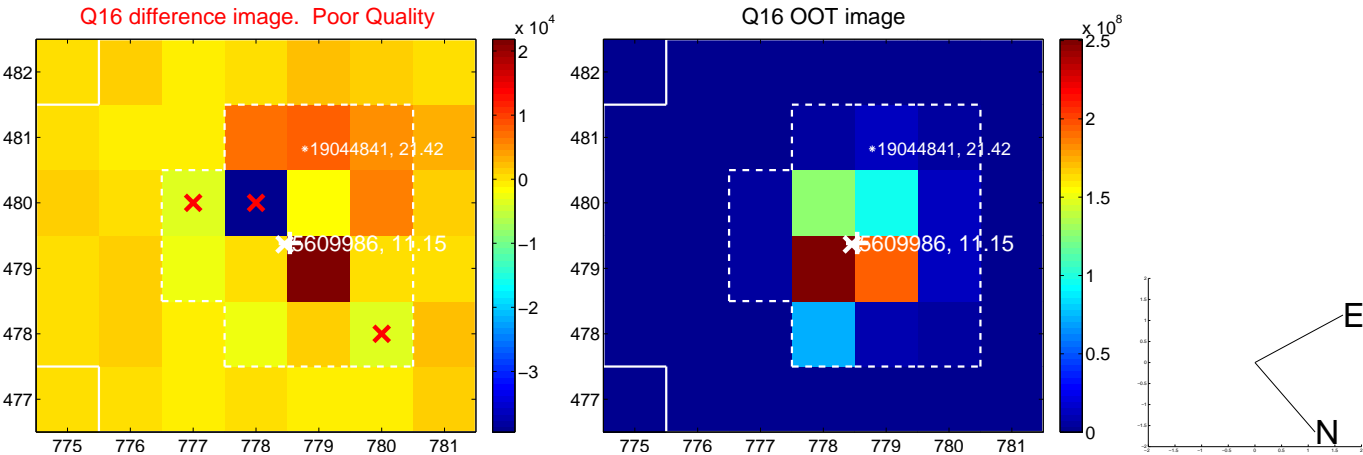
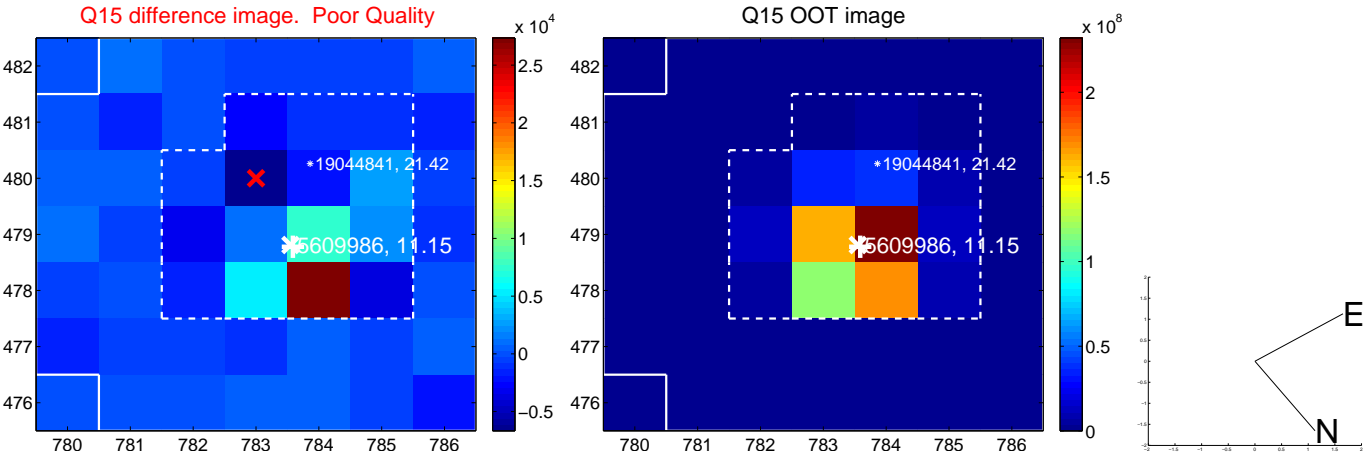
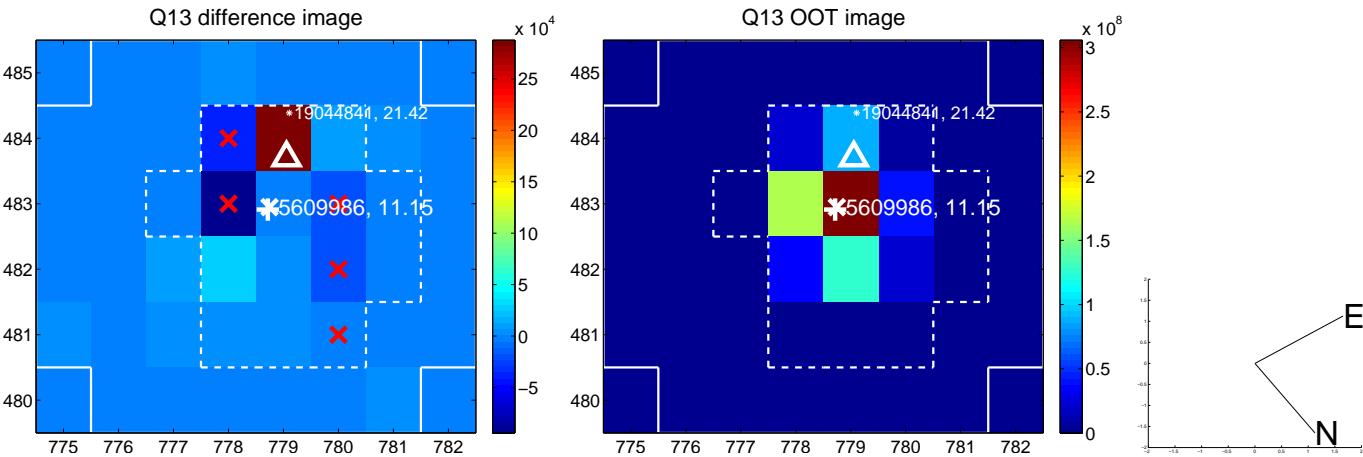
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



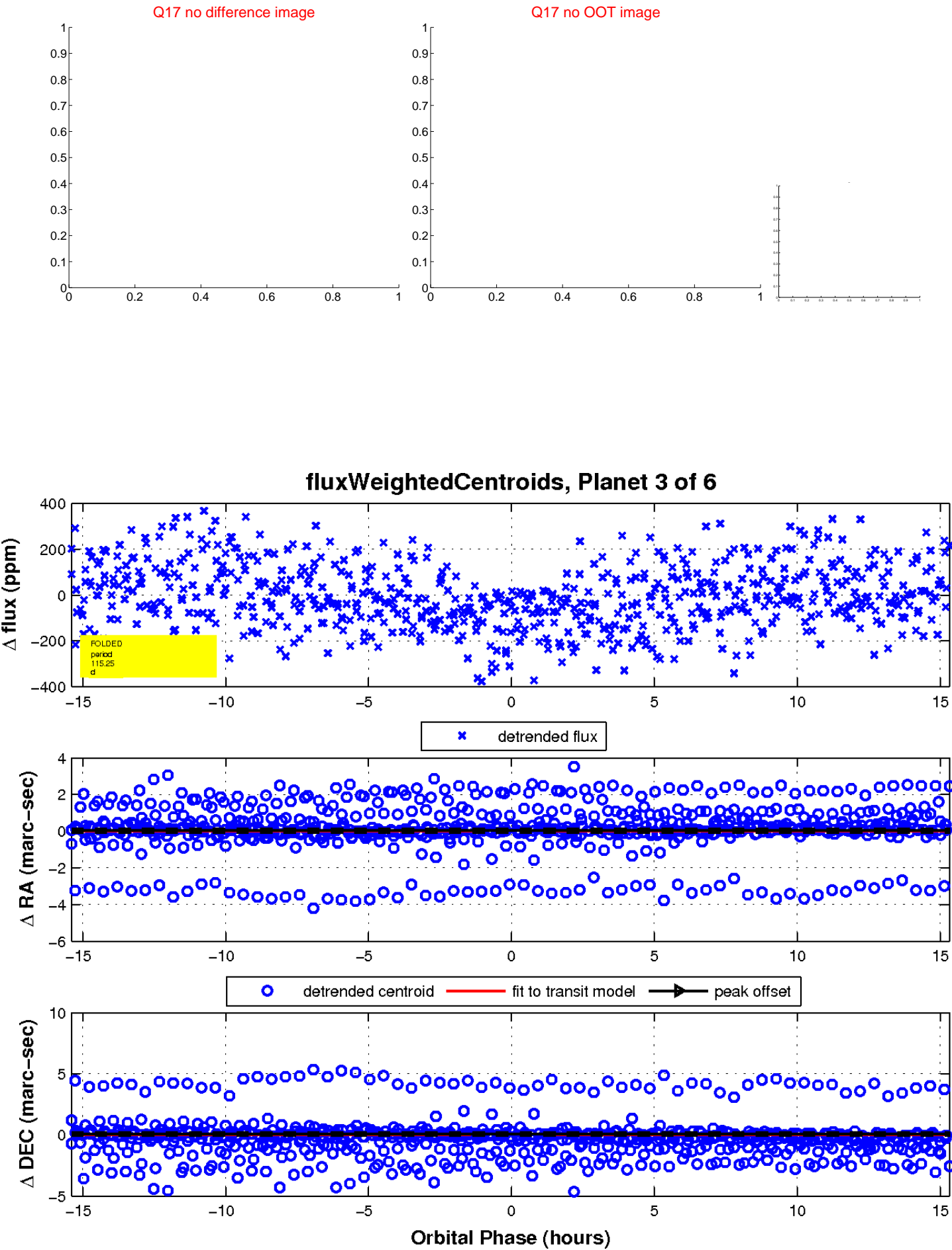
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

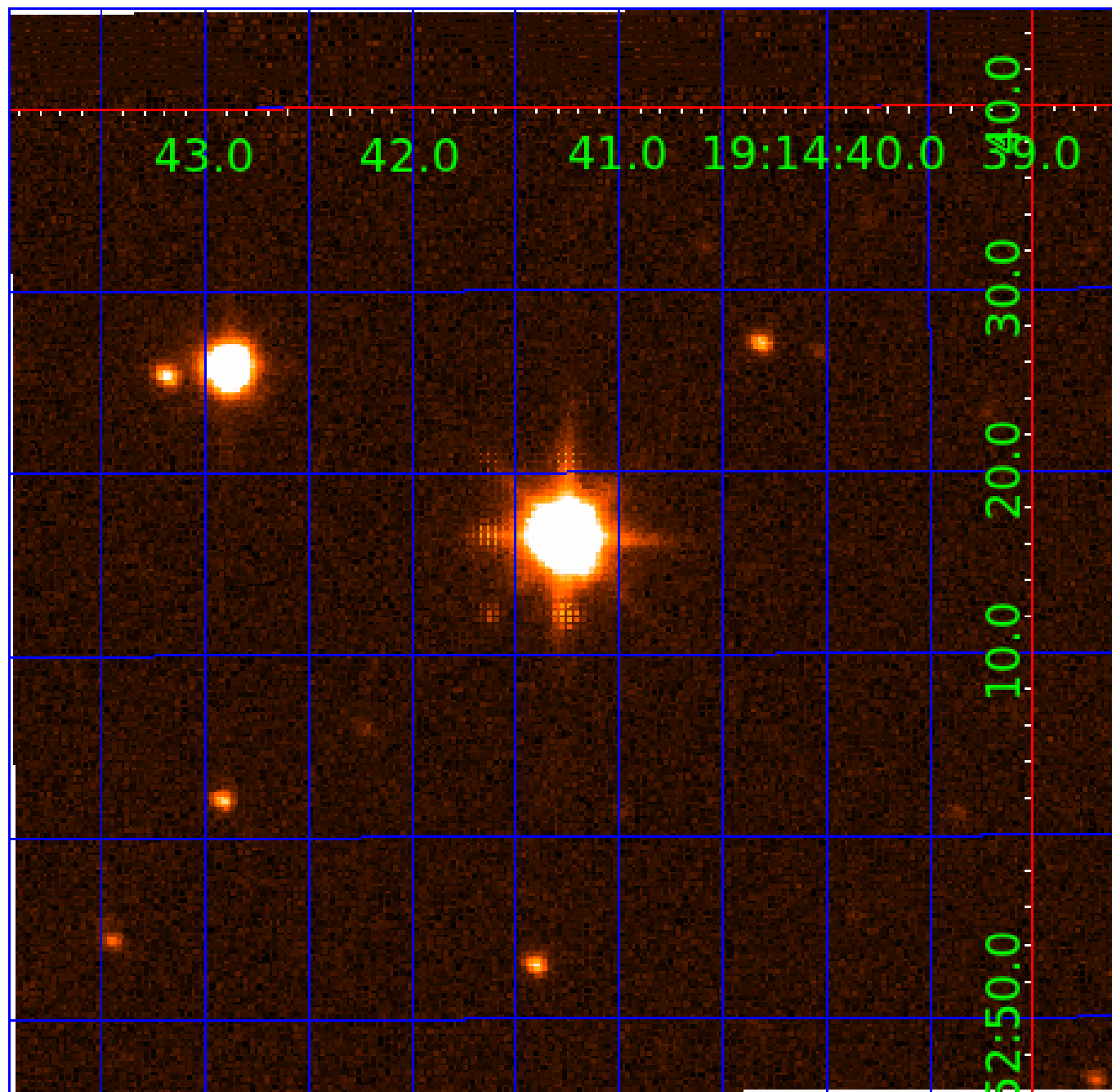


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005609986

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})
005609986-01	OBS	No	3.049254	133.820480	7.7	14.233	10.5	2.7	1.93	6523	0.63	2742.82
005609986-02	OBS	No	378.478553	208.044557	108.4	5.029	19.1	3.6	1.93	6523	2.26	4.43
005609986-03	OBS	No	115.249626	228.728750	201.9	5.133	8.0	7.6	1.93	6523	3.62	21.62
005609986-04	OBS	No	136.589499	236.821201	224.9	4.353	13.3	9.4	1.93	6523	2.95	17.24
005609986-05	OBS	No	171.108663	241.869779	246.4	10.702	10.2	10.0	1.93	6523	3.33	12.77
005609986-06	OBS	No	147.568332	252.030473	157.8	5.473	8.0	6.2	1.93	6523	2.72	15.55

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005609986-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
005609986-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
005609986-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
005609986-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

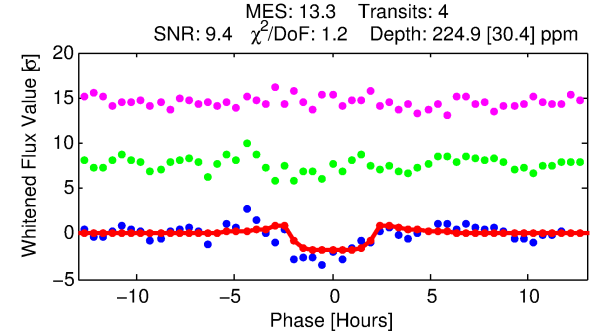
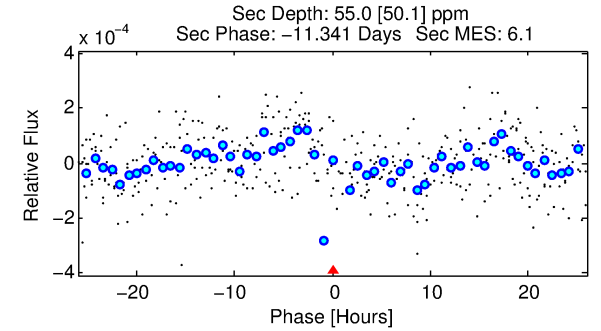
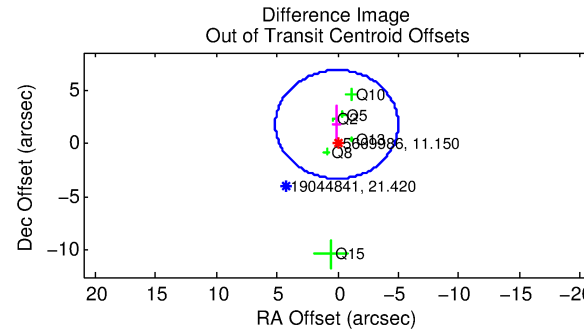
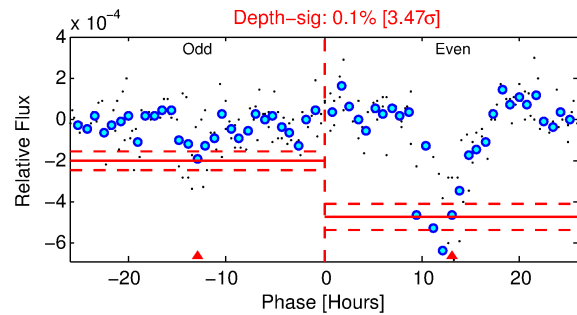
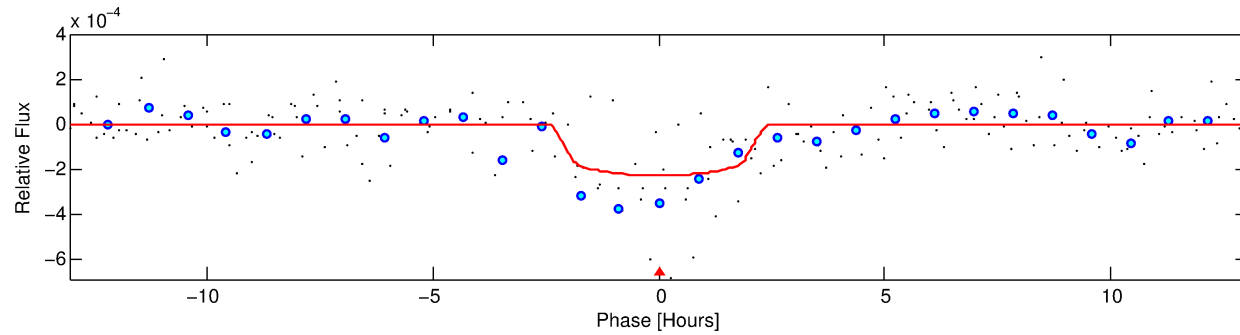
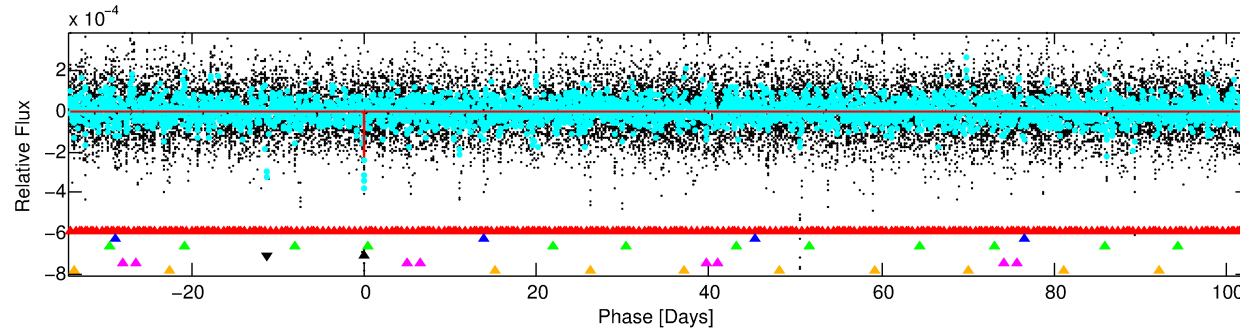
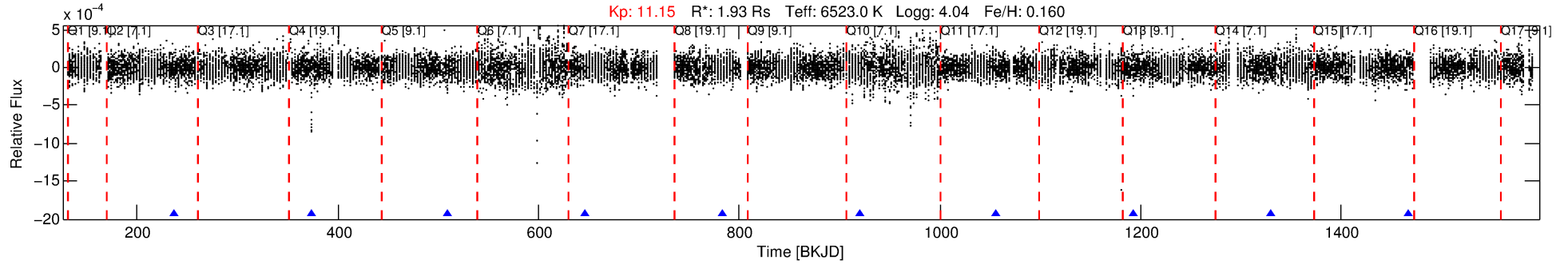
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005609986-04

No Significant Match Found

DV One-Page Summary

KIC: 5609986 Candidate: 4 of 6 Period: 136.589 d



DV Fit Results:

Period = 136.58950 [0.00152] d
Epoch = 236.8212 [0.0081] BKJD
Rp/R* = 0.0141 [0.0320]
a/R* = 221.37 [2634.10]
b = 0.42 [23.58]
Seff = 17.24 [5.07]
Teff = 520 [38] K
Rp = 2.95 [6.74] Re
a = 0.5908 [0.1090] AU
Ag = 1211.06 [5628.92] [0.21σ]
Teffp = 4739 [5496] K [0.77σ]

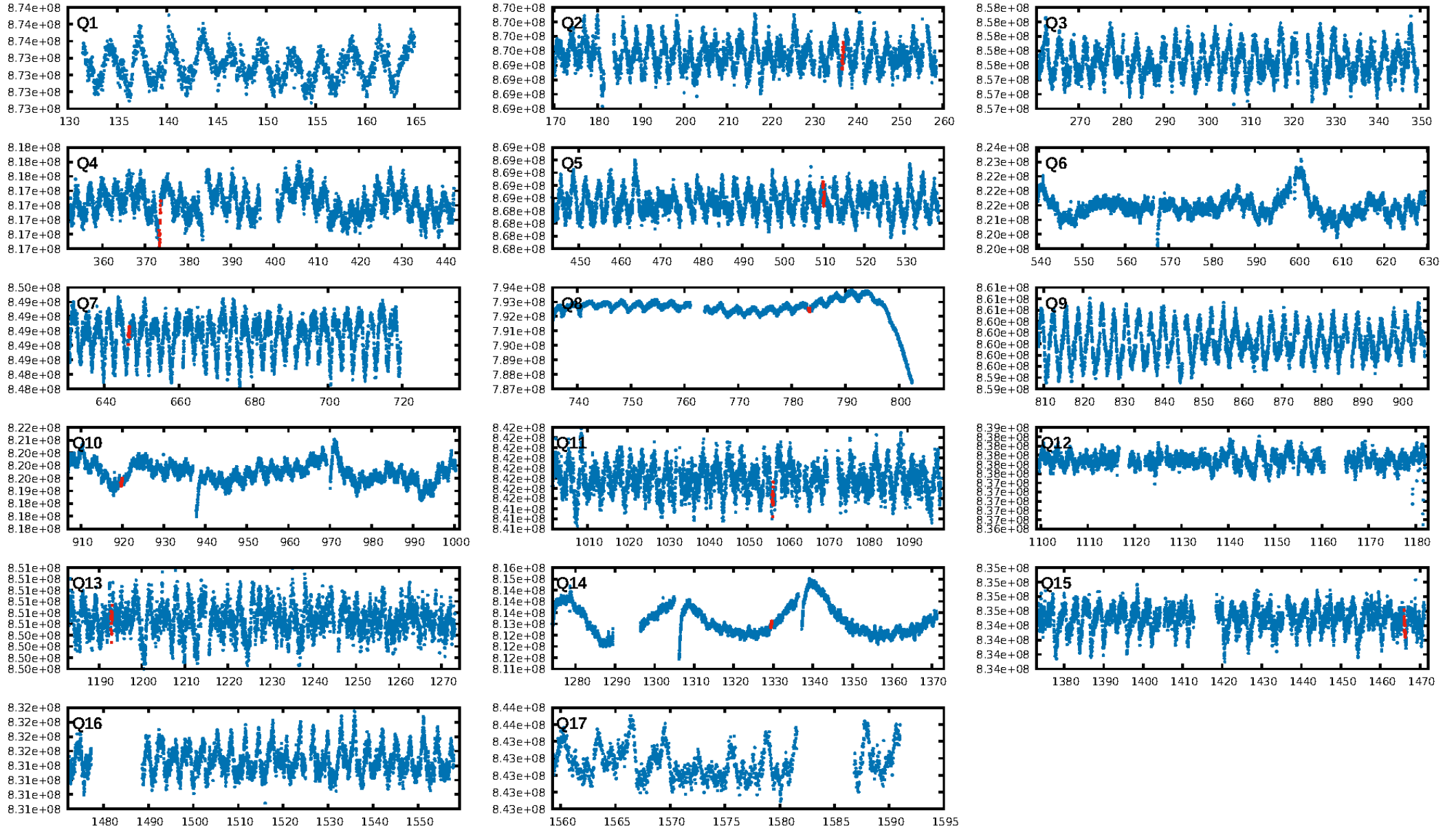
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [76.10σ]
LongPeriod-sig: 100.0% [37.68σ]
ModelChiSquare2-sig: 0.8%
ModelChiSquareGof-sig: 80.7%
Bootstrap-pfa: 1.43e-18
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 2.955
Centroid-sig: 90.3%
Centroid-so: 0.406 arcsec [0.80σ]
OotOffset-rm: 1.763 arcsec [1.04σ]
KicOffset-rm: 2.025 arcsec [0.90σ]
OotOffset-st: 2/1/1/2 [6]
KicOffset-st: 2/1/1/2 [6]
DiffImageQuality-fgm: 0.33 [2/6]
DiffImageOverlap-fno: 0.33 [3/9]

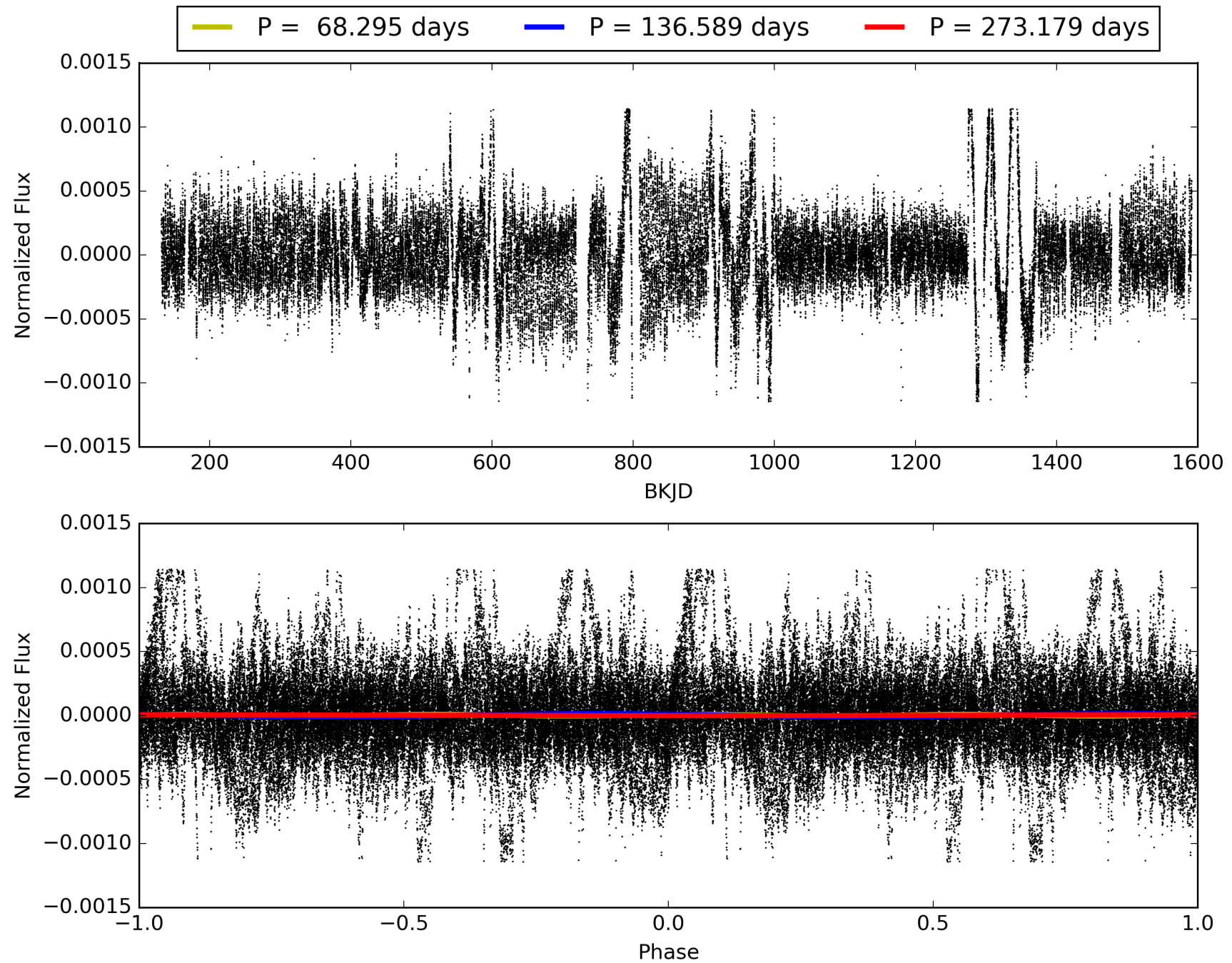
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:50:35 Z

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

TCE 005609986-04, PDC Light Curves

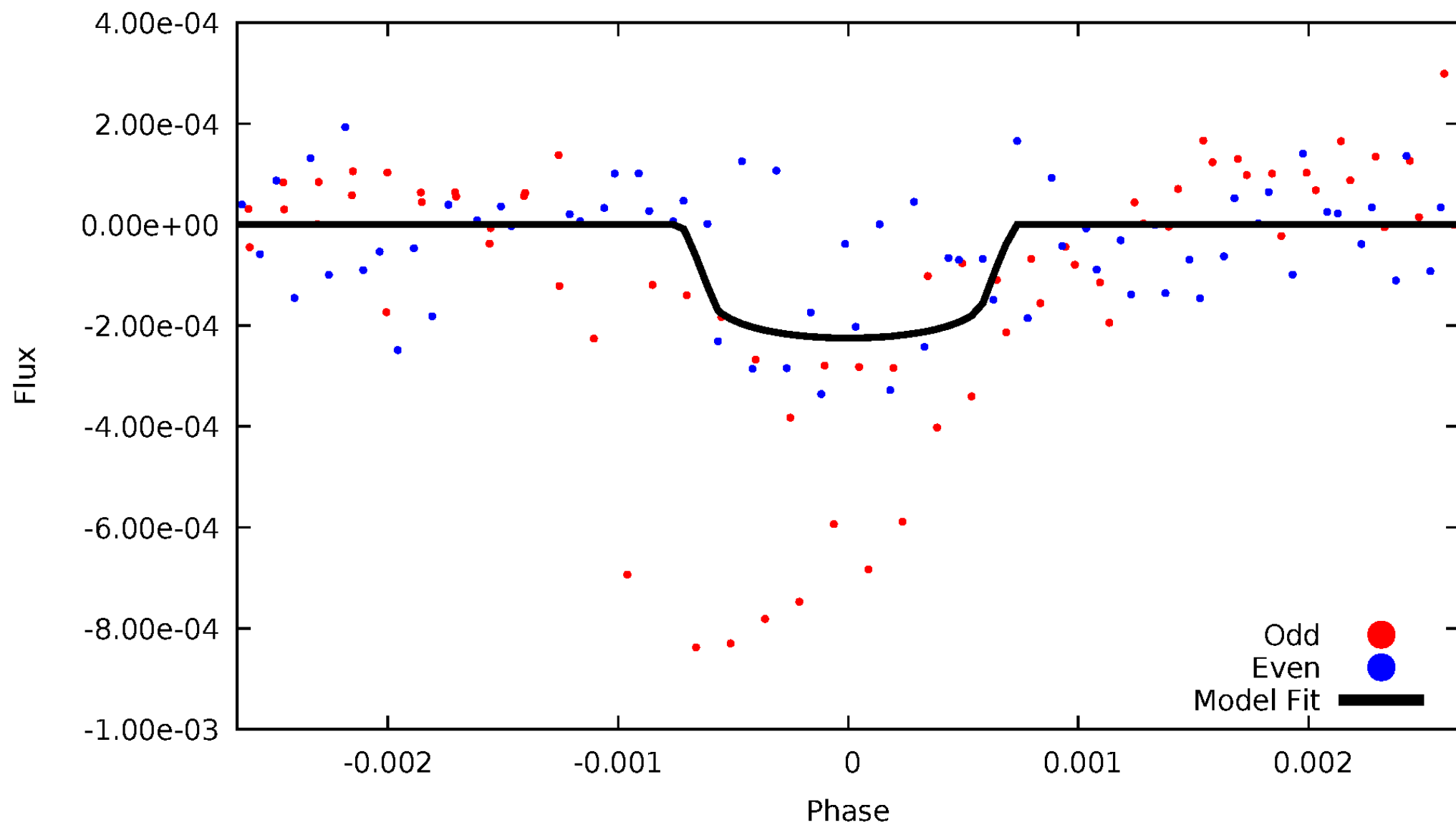


TCE 005609986-04



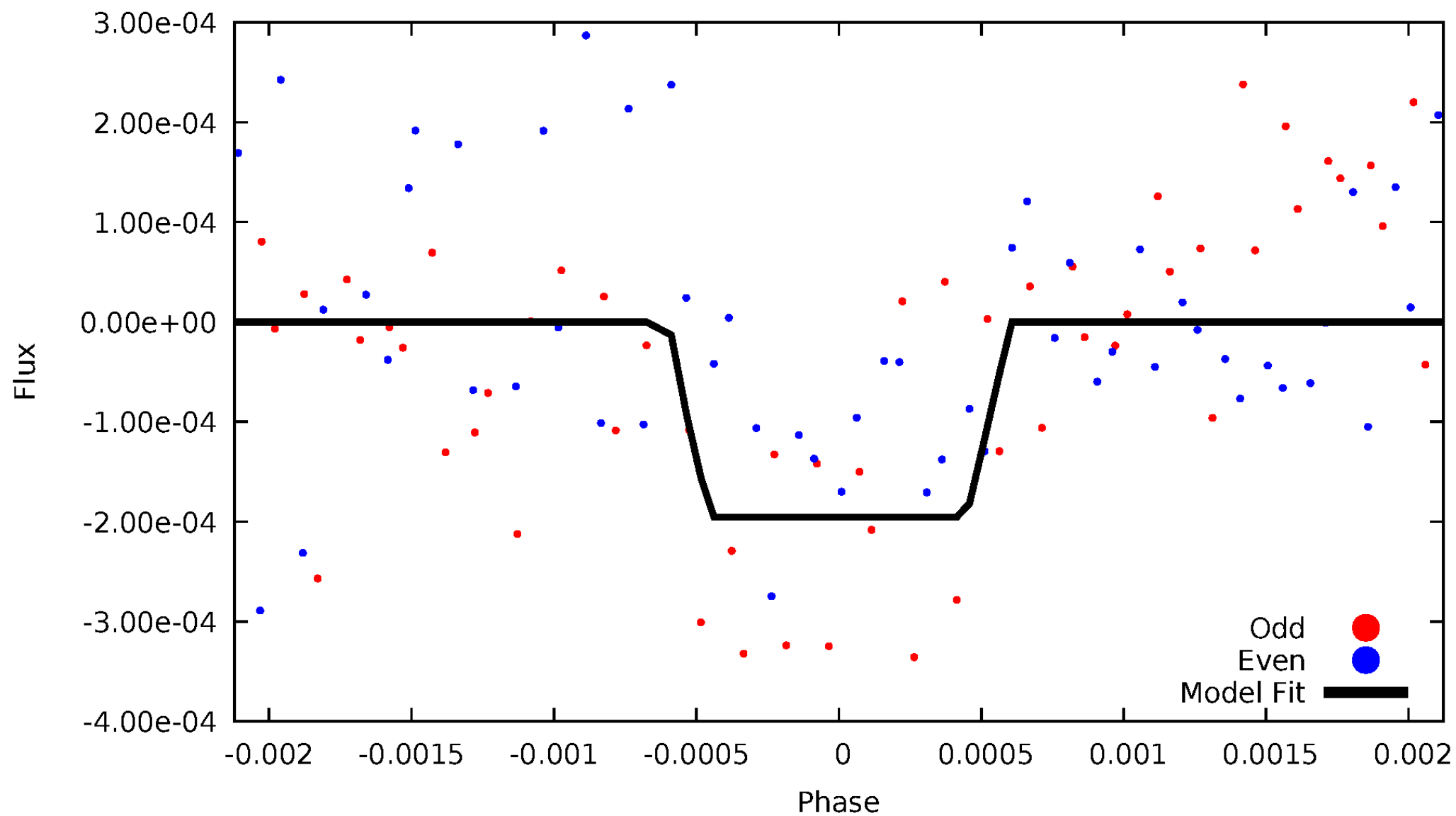
DV Odd/Even

TCE 005609986-04



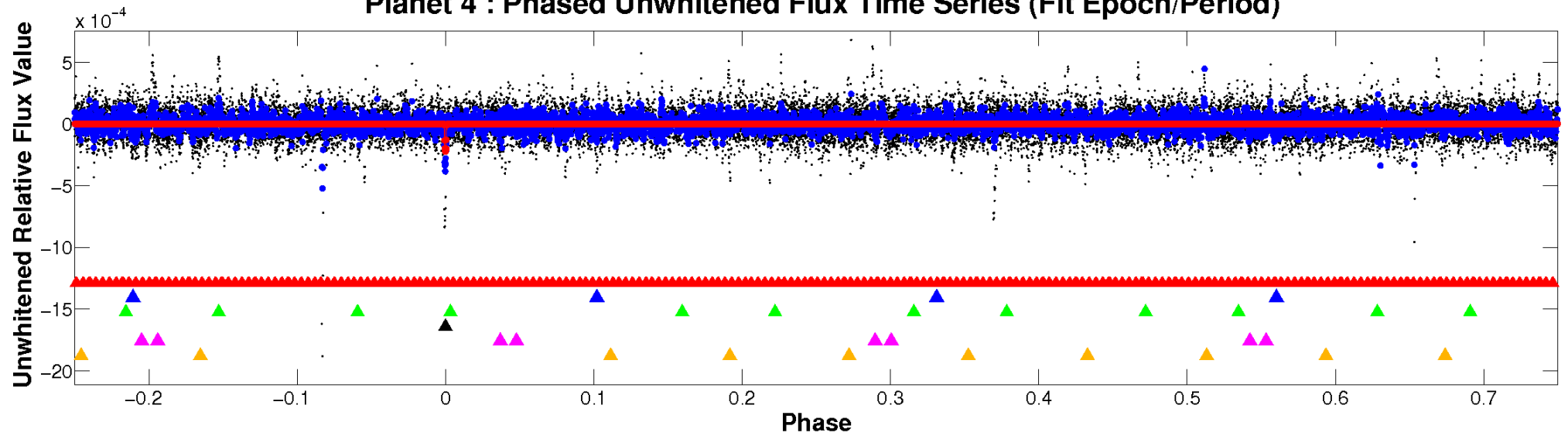
ALT Odd/Even

TCE 005609986-04

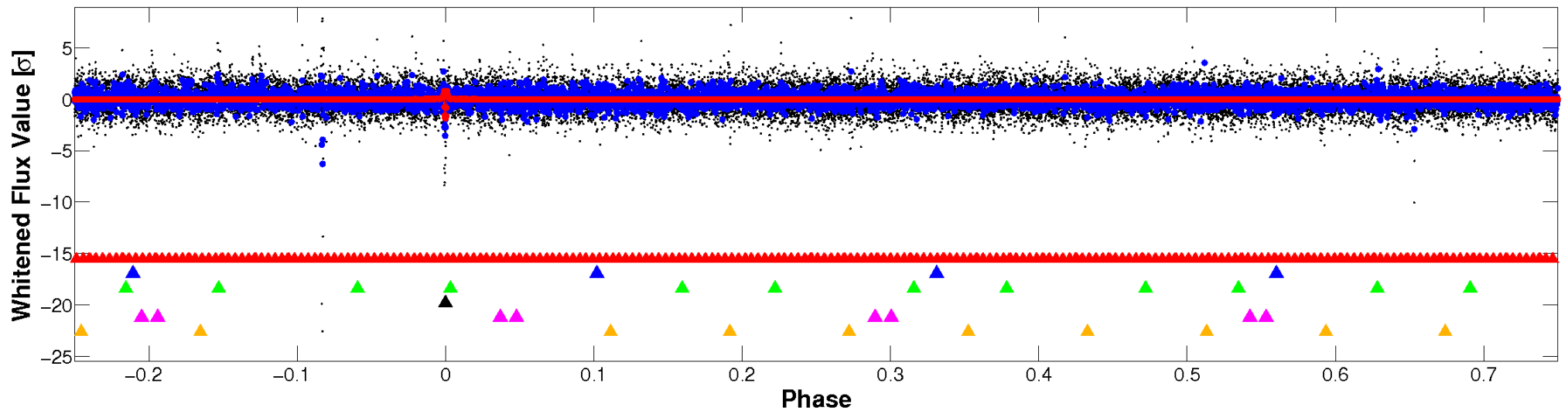


Non-Whitened Vs. Whitened Light Curve

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

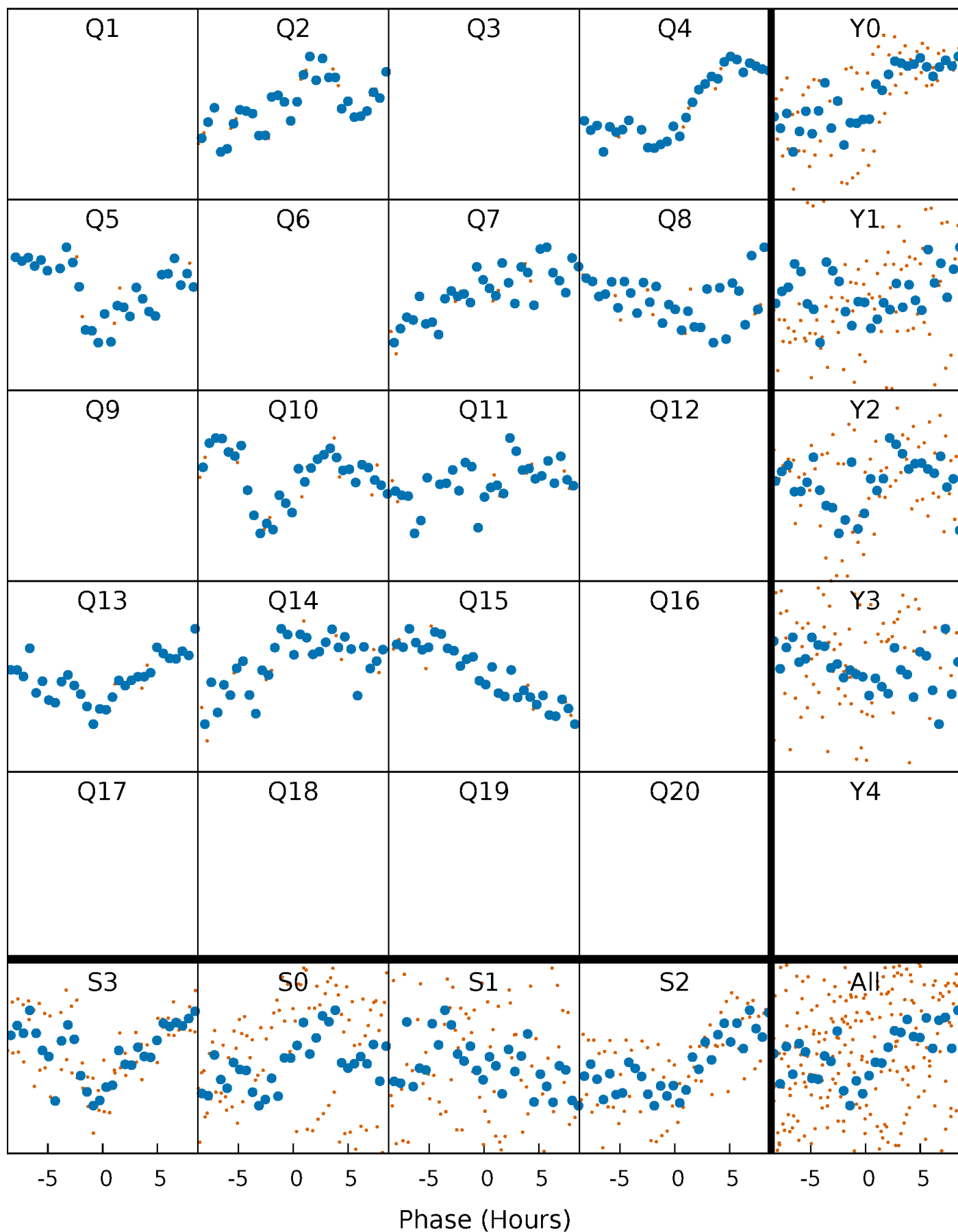


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



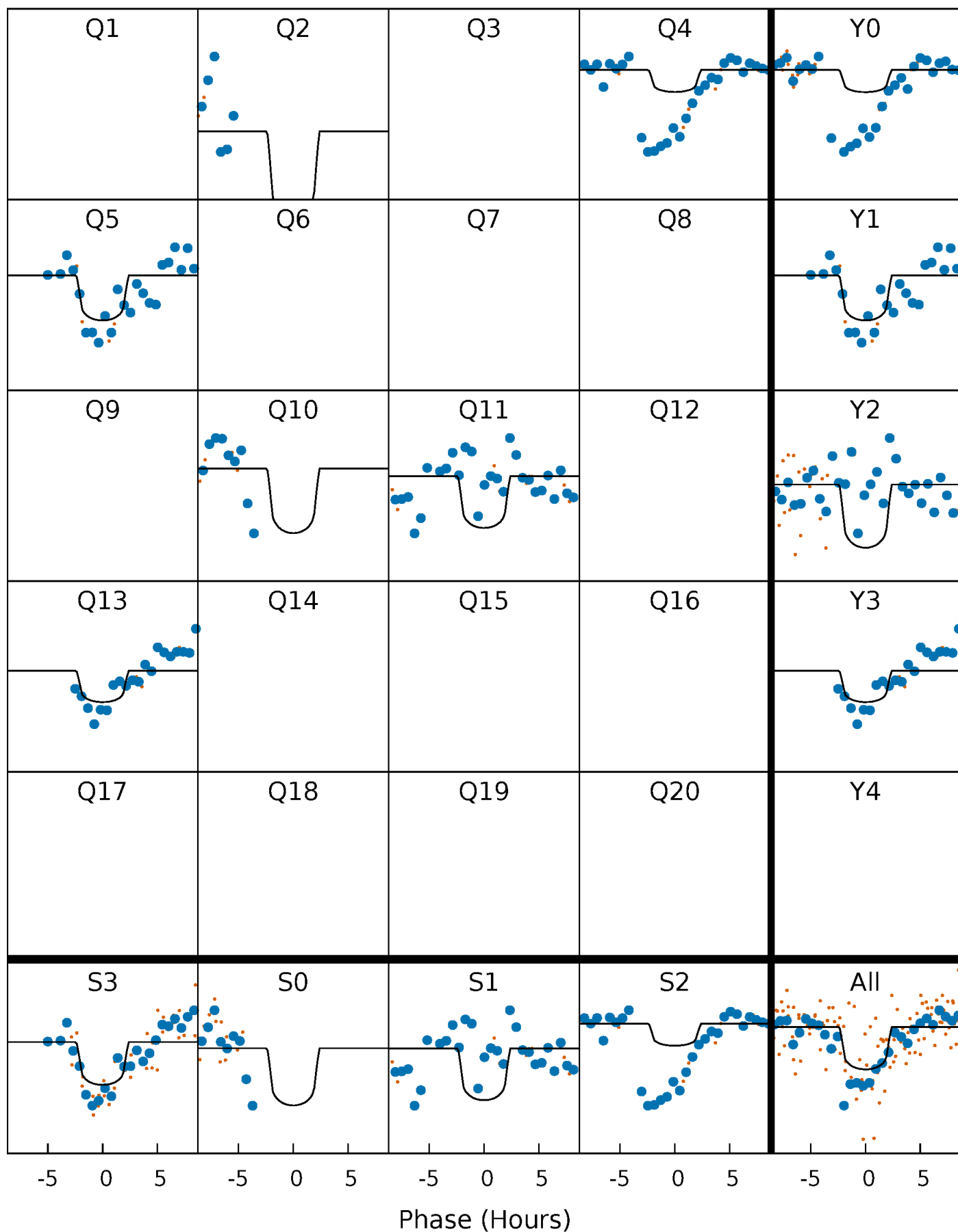
PDC Quarter-Phased Transit Curves

TCE 005609986-04 P=136.589499 Days $T_0=236.821201$ (BKJD)



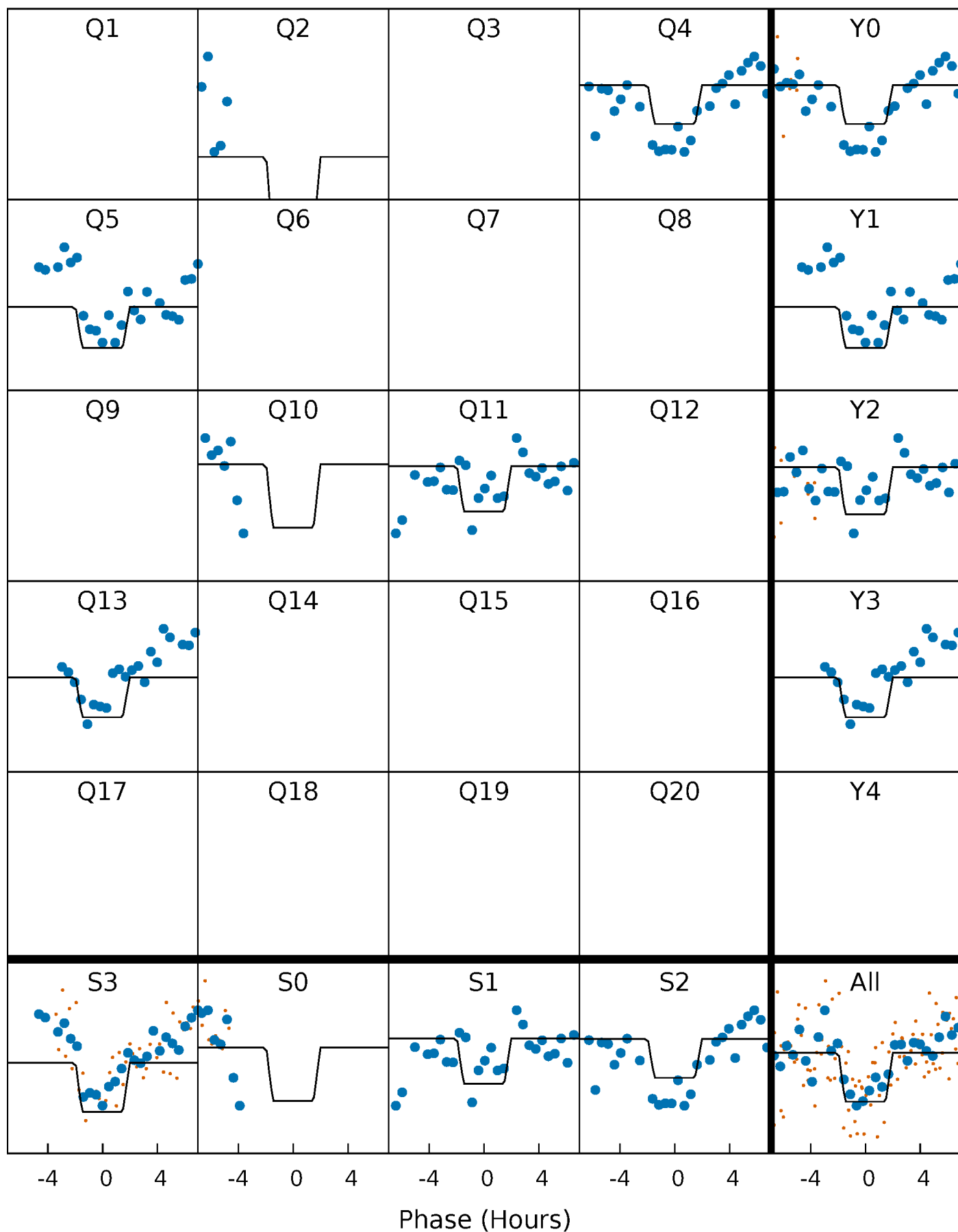
DV Quarter-Phased Transit Curves

TCE 005609986-04 $P=136.589499$ Days $T_0=236.821201$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

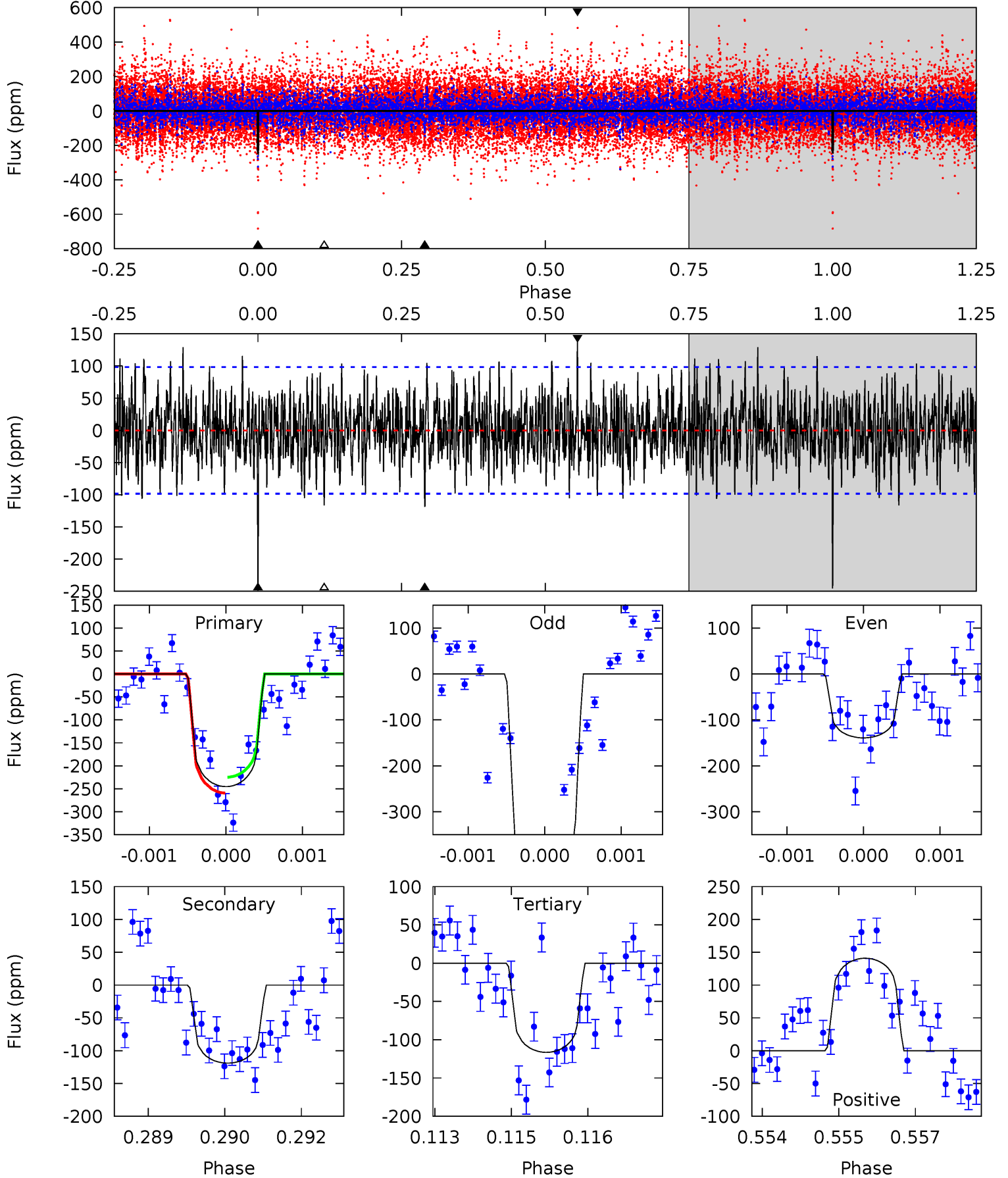
TCE 005609986-04 P=136.596354 Days $T_0=236.790079$ (BKJD)



DV Model-Shift Uniqueness Test

005609986-04, P = 136.589499 Days, E = 100.231702 Days

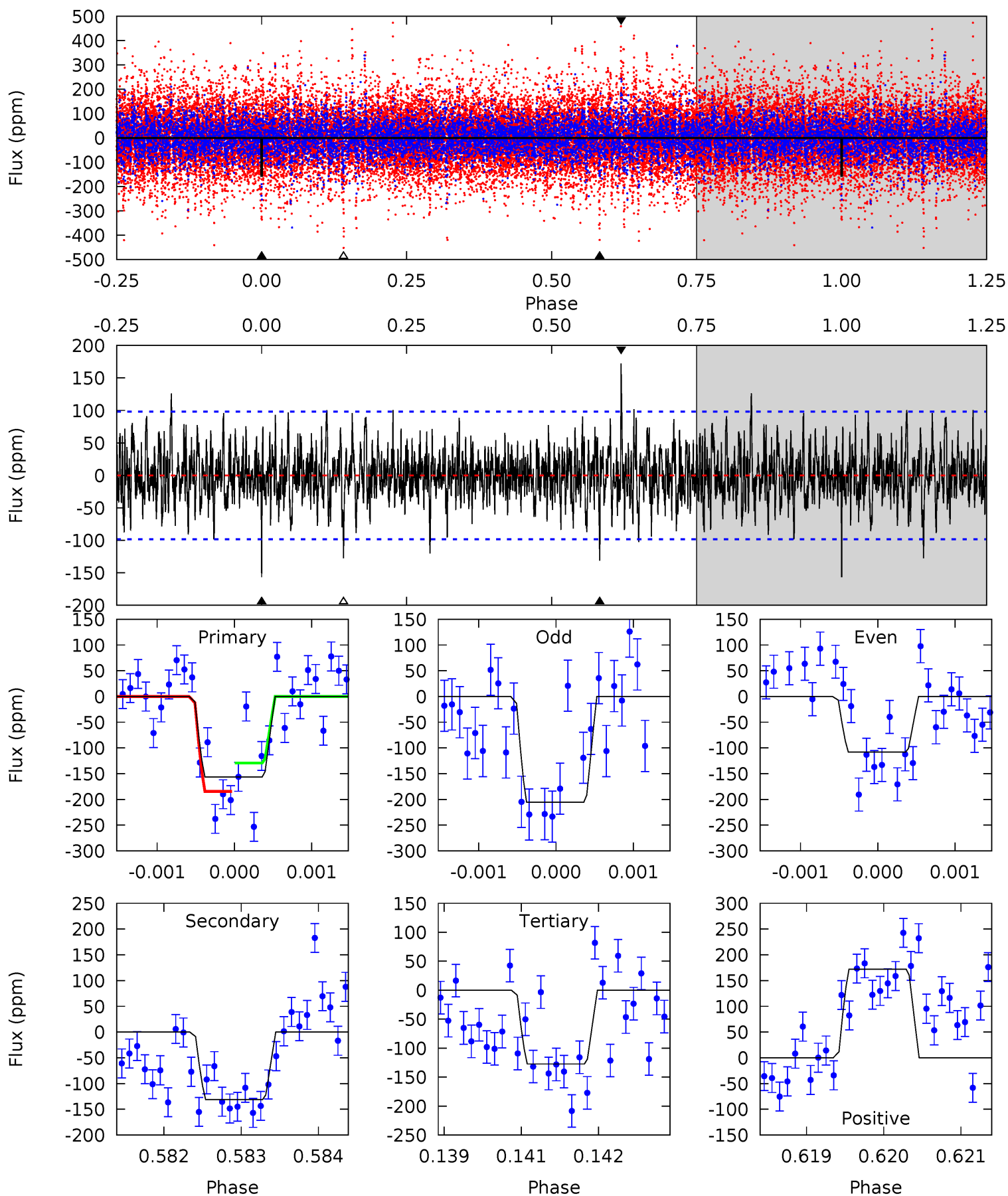
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	6.51	6.37	7.71	5.38	3.18	2.05	7.05	5.71	0.14	-1.20	9.19	1.17	0.36	0.91



Alt Model-Shift Uniqueness Test

005609986-04, P = 136.596354 Days, E = 100.193725 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.64	7.23	7.03	9.50	5.43	3.25	1.83	1.61	-0.86	0.20	-2.27	2.73	1.44	0.52	1.53



Stellar Parameters For KIC 005609986

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6523^{+85}_{-78}	$4.037^{+0.168}_{-0.126}$	$0.160^{+0.150}_{-0.150}$	$1.926^{+0.381}_{-0.381}$	$1.471^{+0.128}_{-0.128}$	$0.290^{+0.231}_{-0.111}$
	+1%/-1%	+4%/-3%	+94%/-94%	+20%/-20%	+9%/-9%	+80%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 005609986-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-119 ± 18	$5.40^{+5.36}_{-3.47}$	723^{+37}_{-37}	4400^{+2777}_{-918}	778^{+5780}_{-587}
Alt.	-131 ± 18	$5.69^{+5.59}_{-3.88}$	721^{+40}_{-36}	4426^{+3002}_{-949}	794^{+6531}_{-603}

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

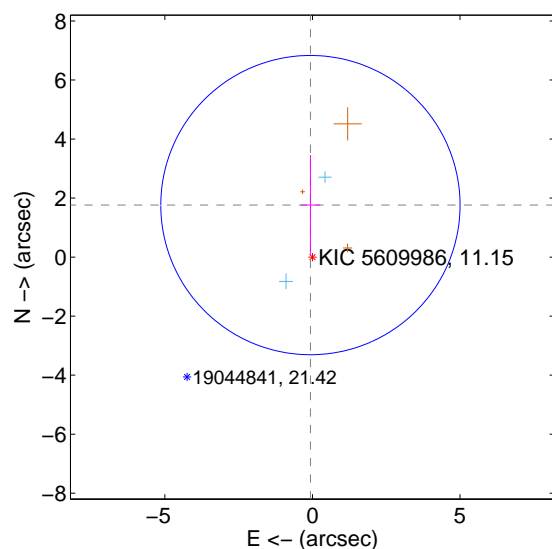
Supplemental centroid analysis for 005609986-04. **Kepler magnitude: 11.15.** Transit SNR 9.36

There are 2 quarters with good PRF difference image offsets

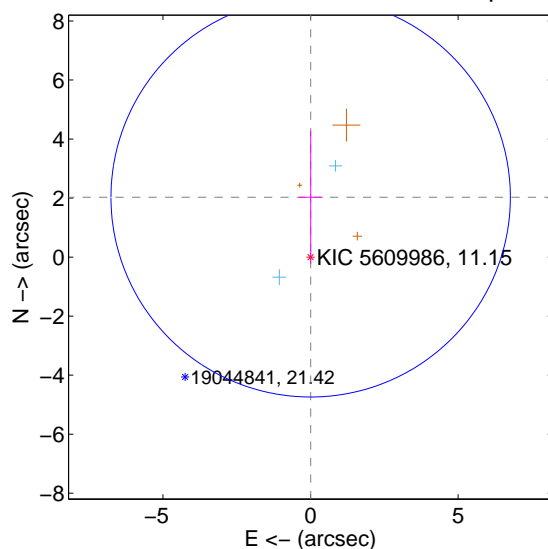
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.763 ± 1.690	1.04	0.068 ± 0.326	1.762 ± 1.698
PRF-fit source offset from KIC position	2.025 ± 2.255	0.90	-0.005 ± 0.402	2.025 ± 2.254
photometric centroid source offset	0.41 ± 0.51	0.80	-0.00 ± 0.38	0.41 ± 0.51

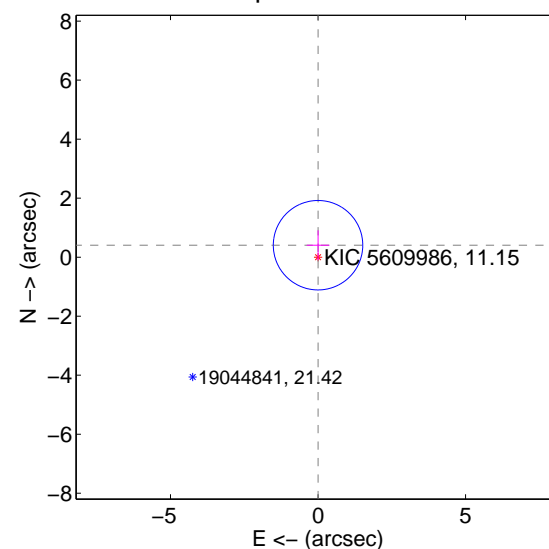
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

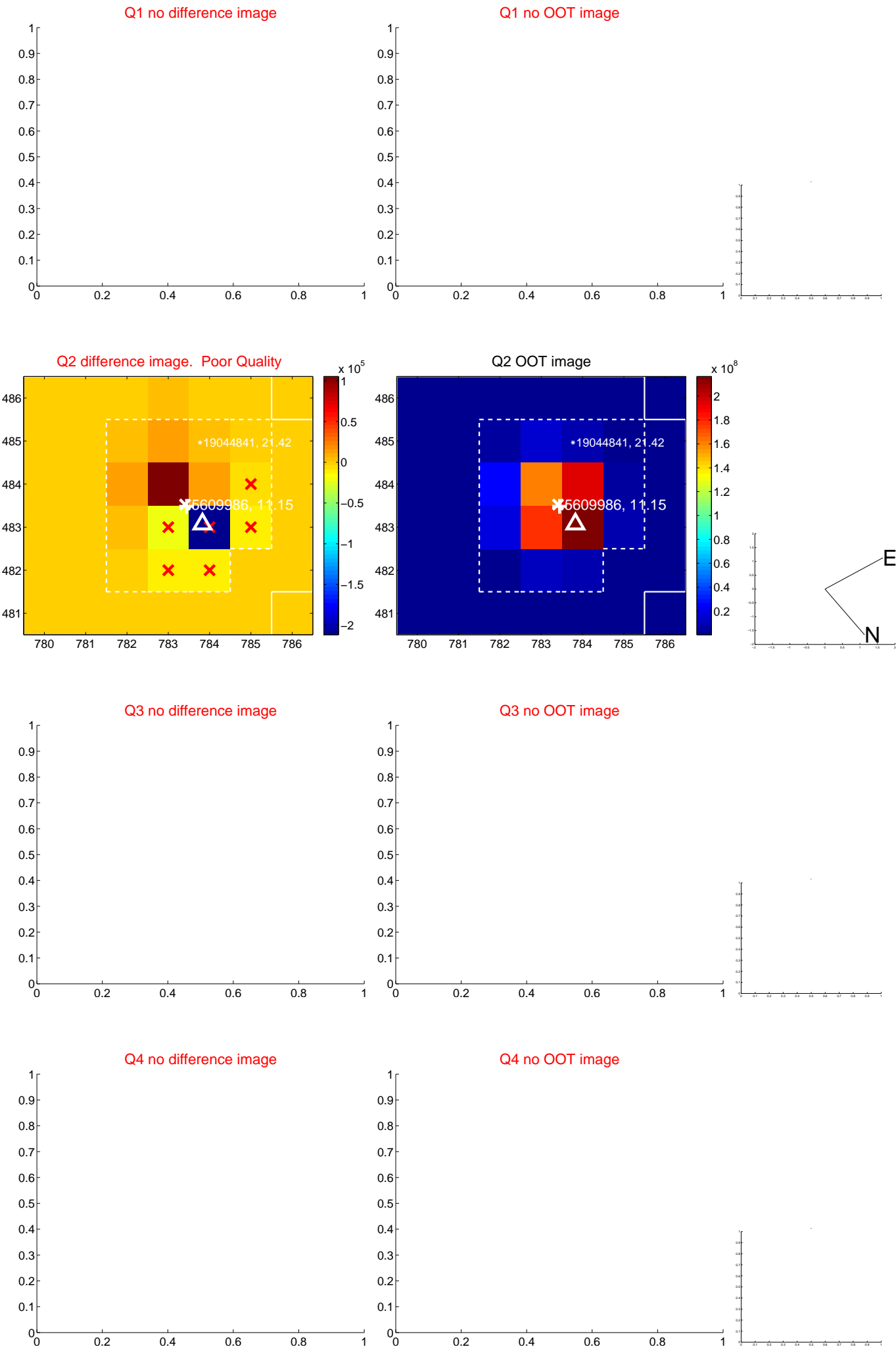


offset from photometric centroids

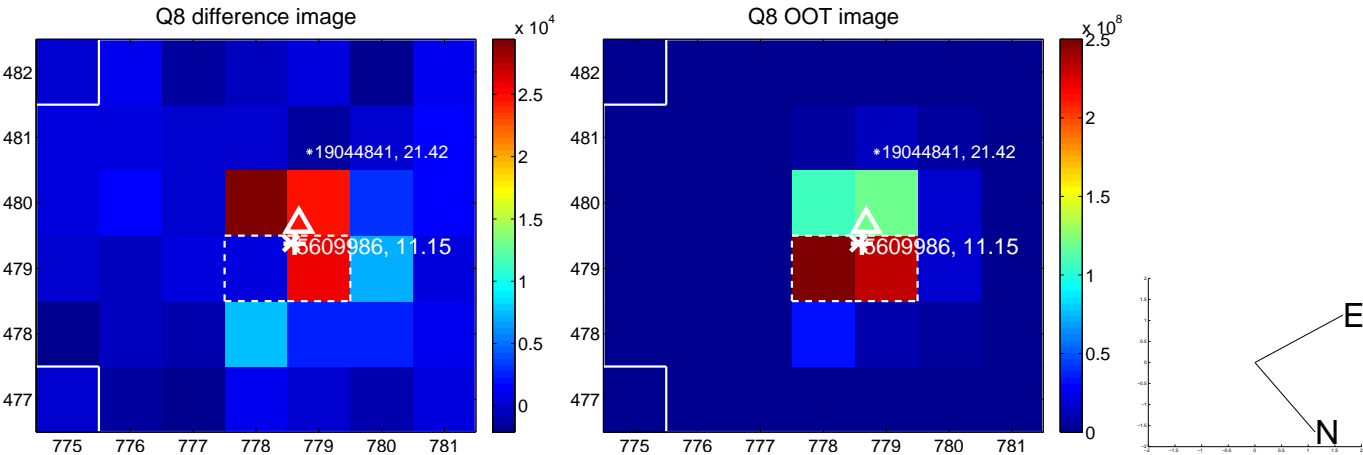
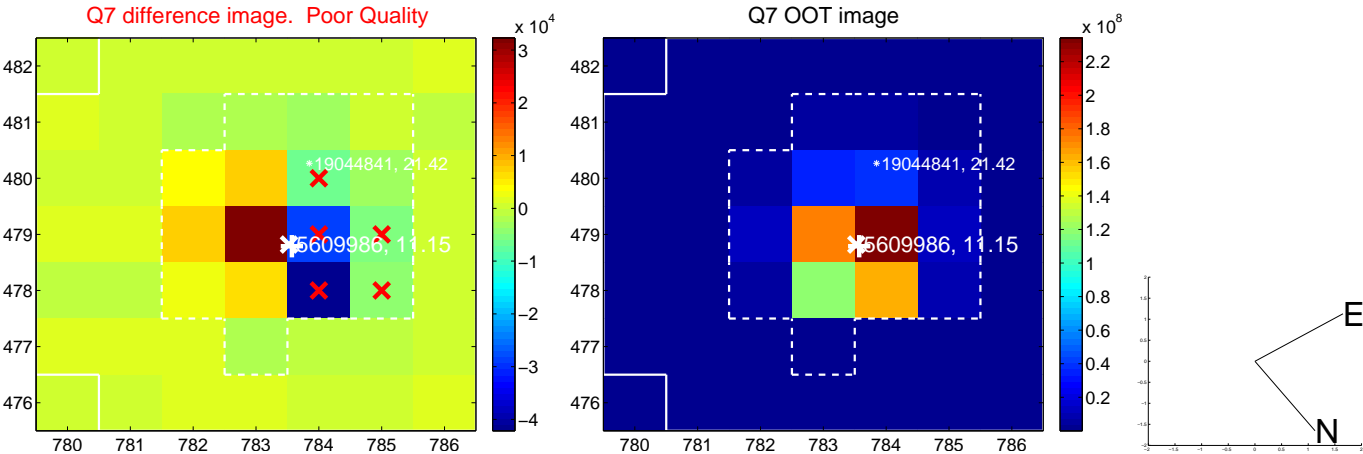
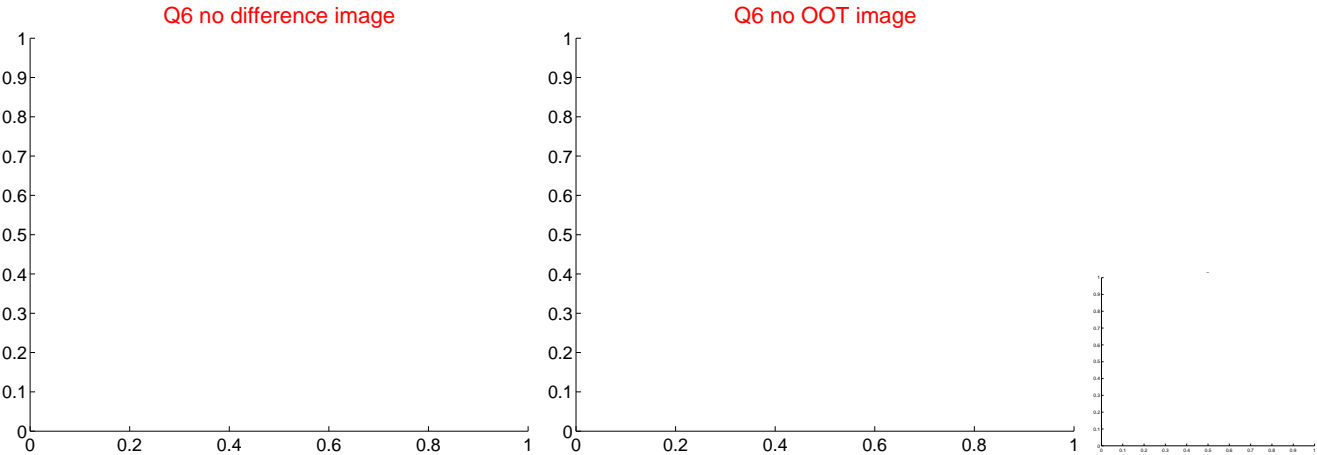
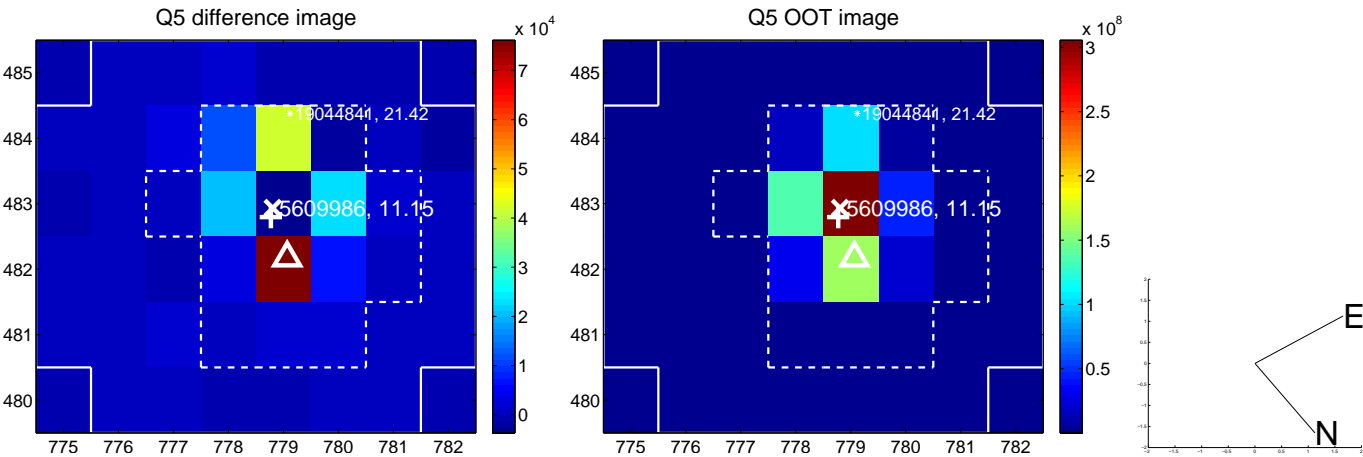


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

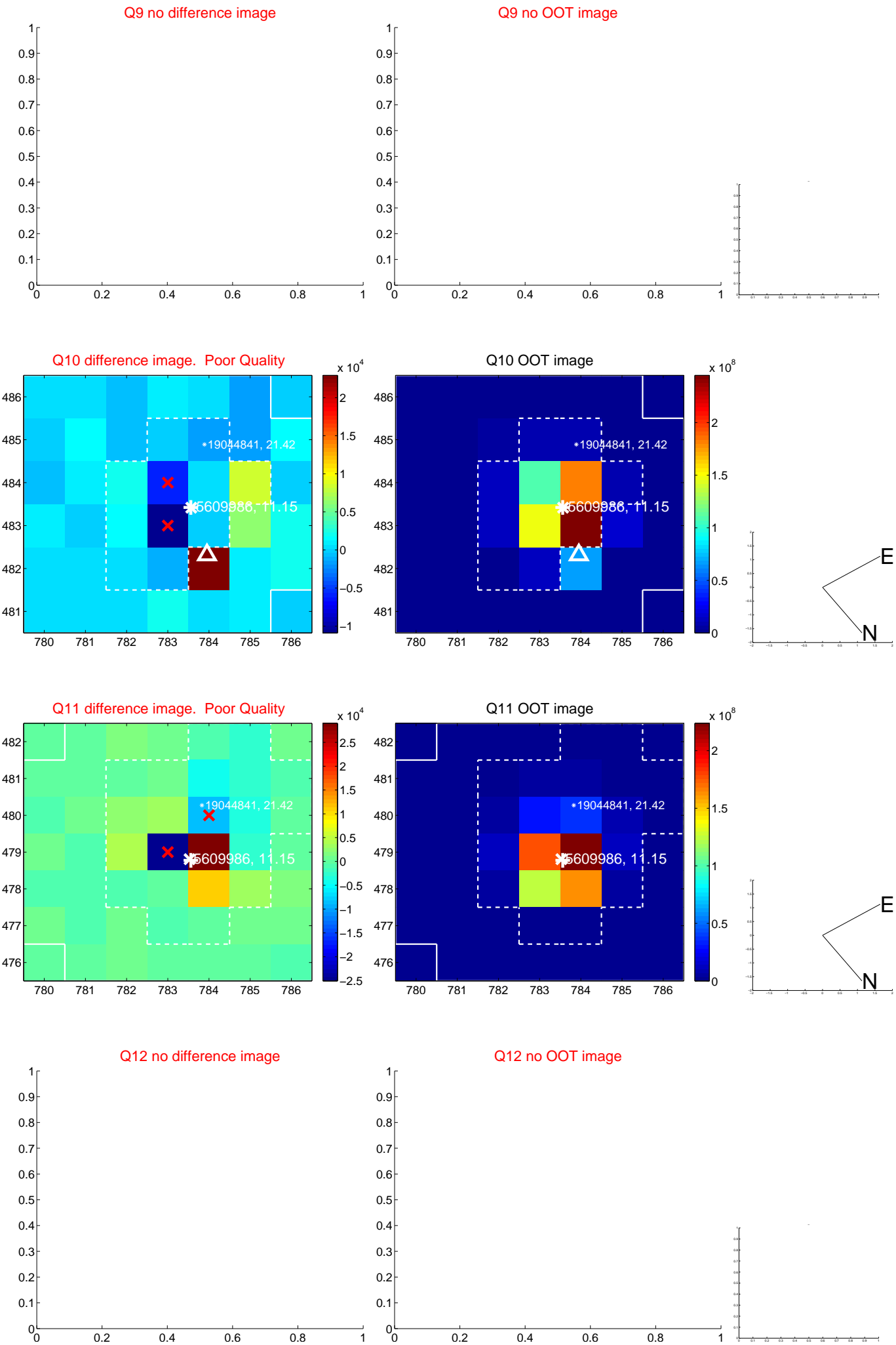
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



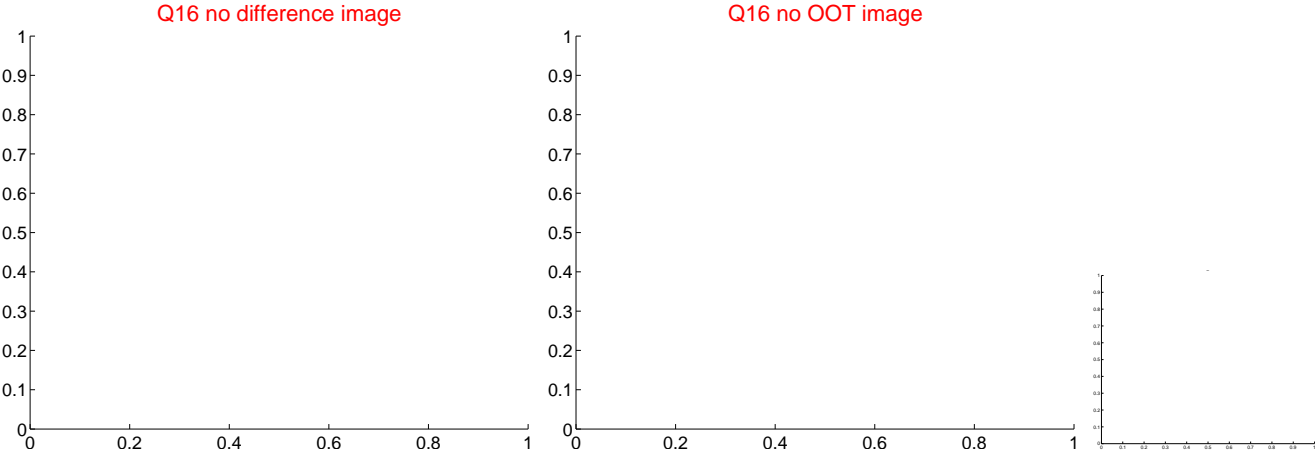
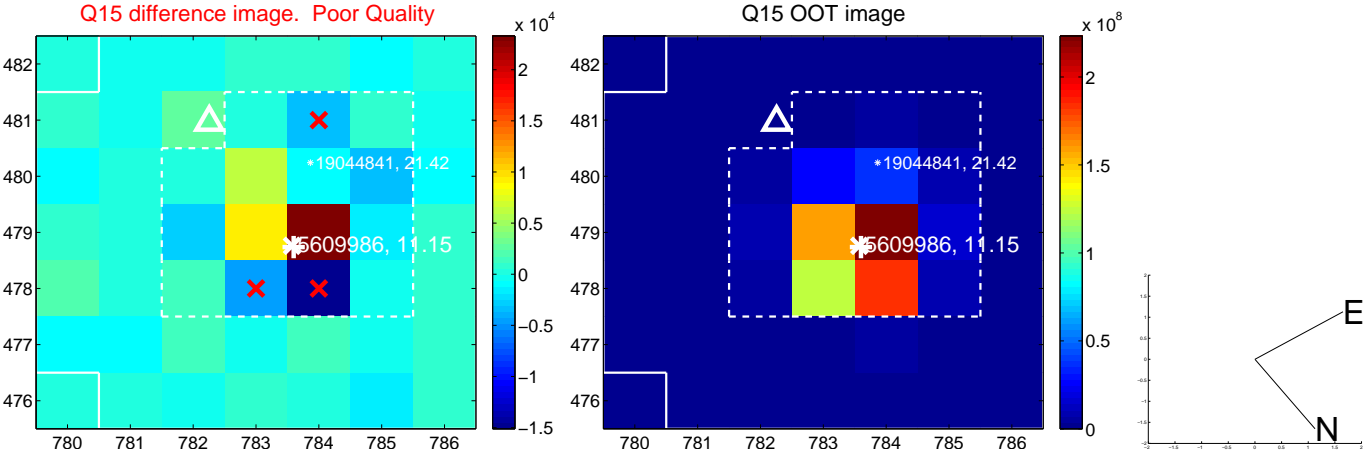
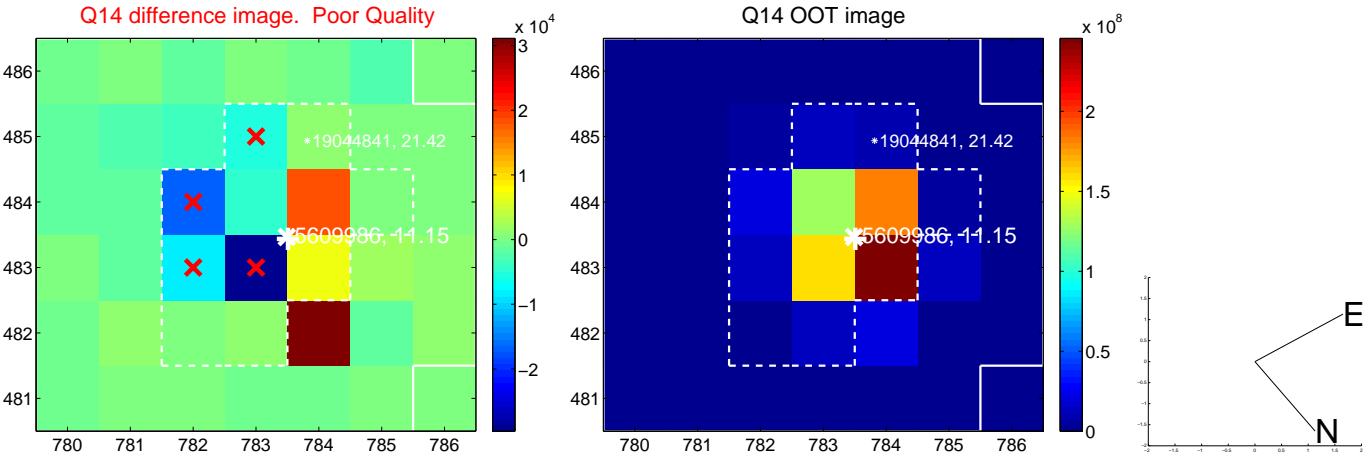
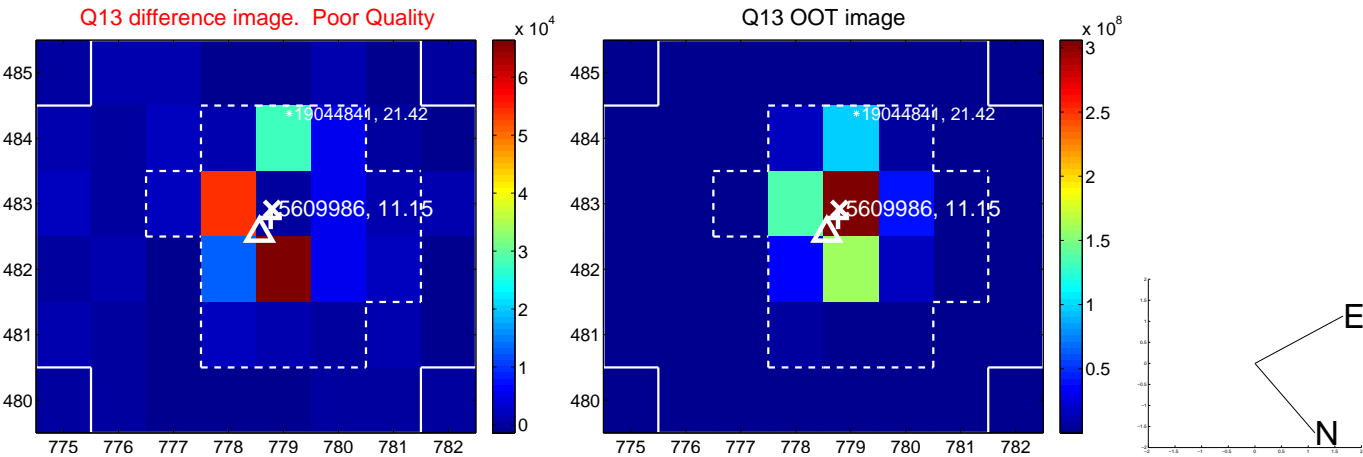
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



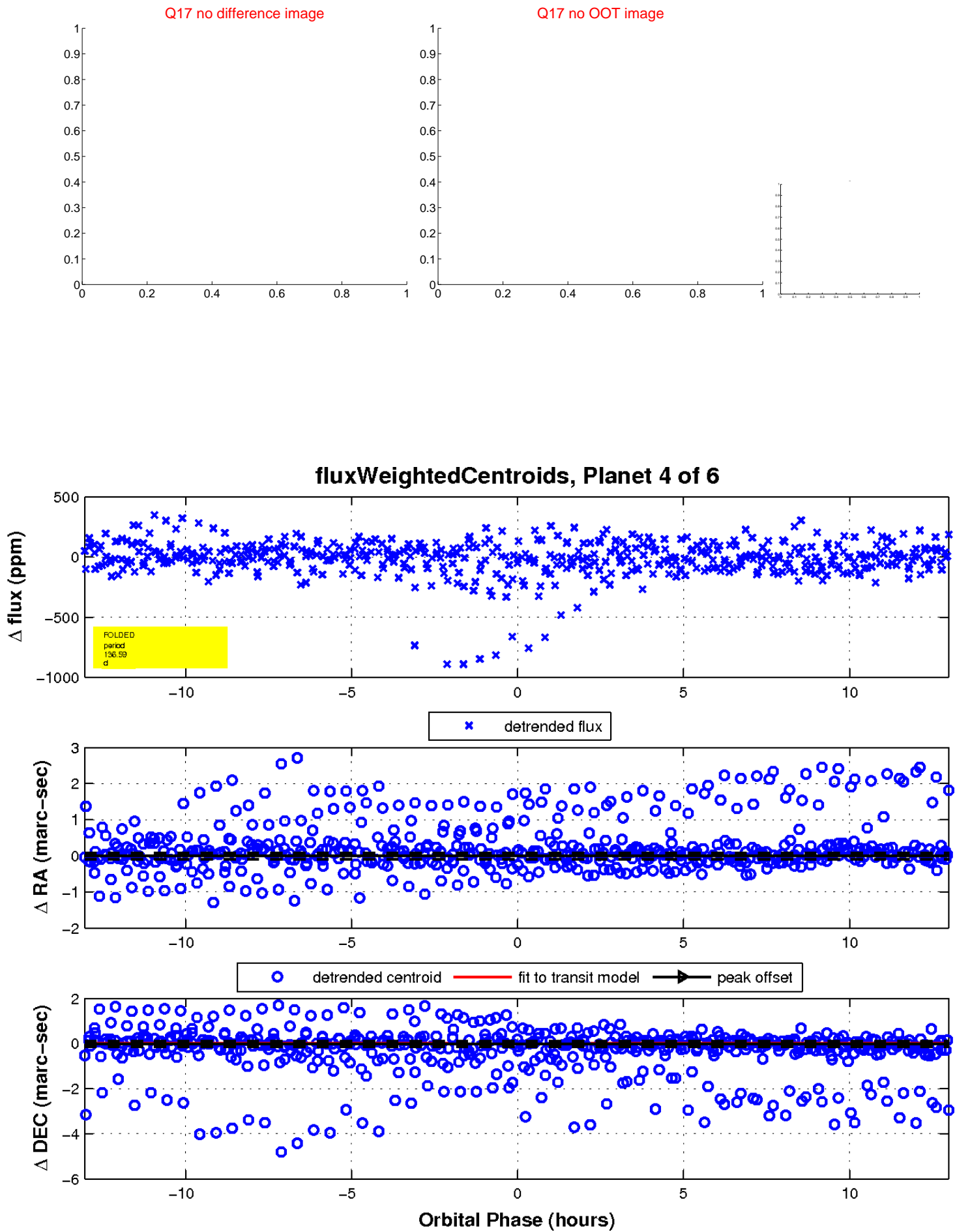
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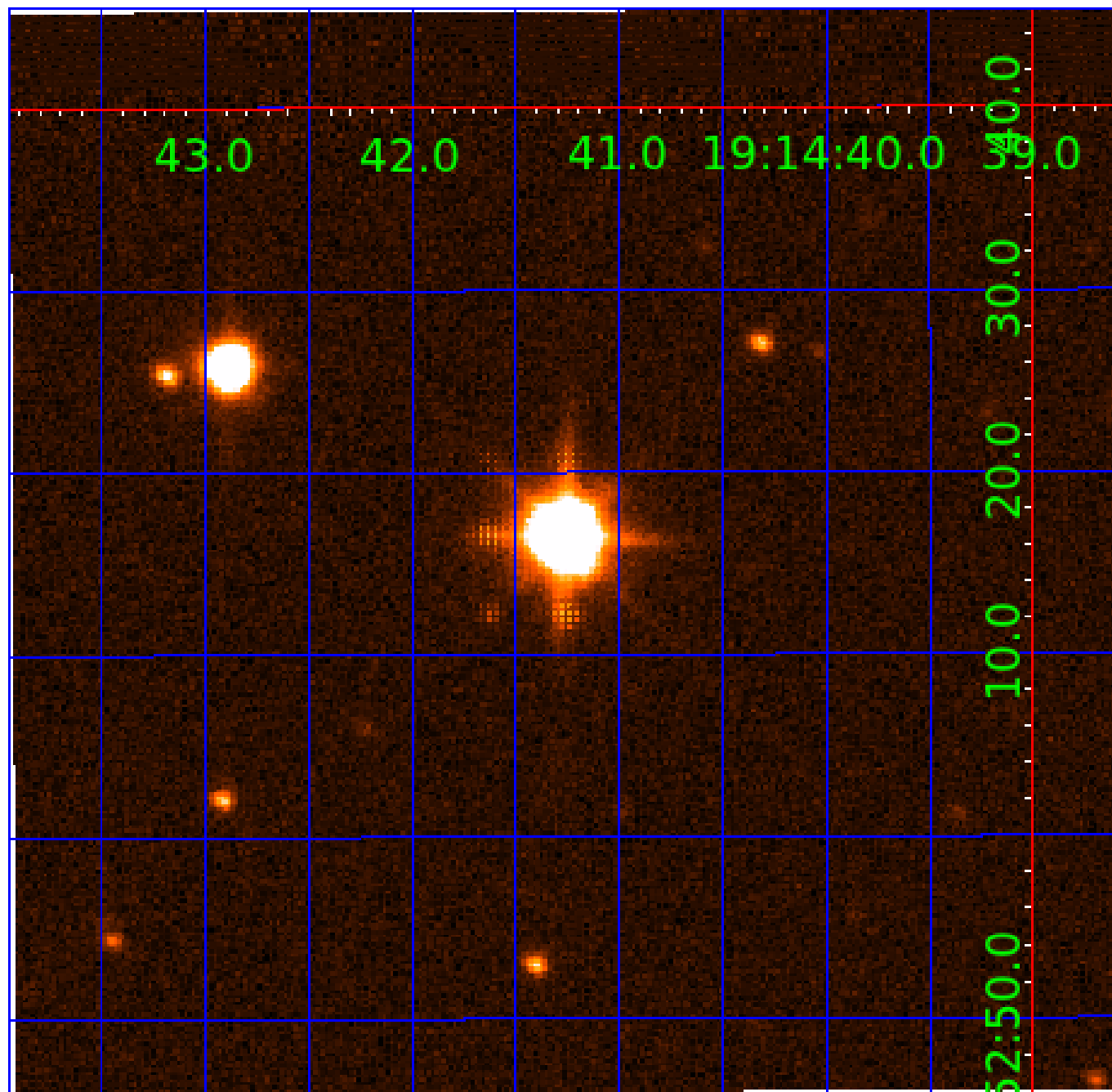


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005609986

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})
005609986-01	OBS	No	3.049254	133.820480	7.7	14.233	10.5	2.7	1.93	6523	0.63	2742.82
005609986-02	OBS	No	378.478553	208.044557	108.4	5.029	19.1	3.6	1.93	6523	2.26	4.43
005609986-03	OBS	No	115.249626	228.728750	201.9	5.133	8.0	7.6	1.93	6523	3.62	21.62
005609986-04	OBS	No	136.589499	236.821201	224.9	4.353	13.3	9.4	1.93	6523	2.95	17.24
005609986-05	OBS	No	171.108663	241.869779	246.4	10.702	10.2	10.0	1.93	6523	3.33	12.77
005609986-06	OBS	No	147.568332	252.030473	157.8	5.473	8.0	6.2	1.93	6523	2.72	15.55

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005609986-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
005609986-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
005609986-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
005609986-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

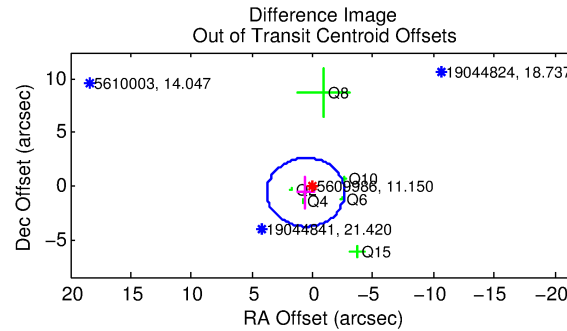
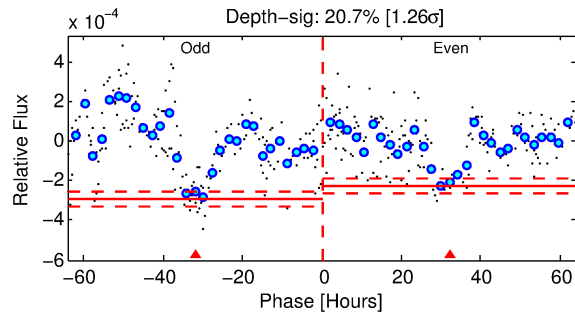
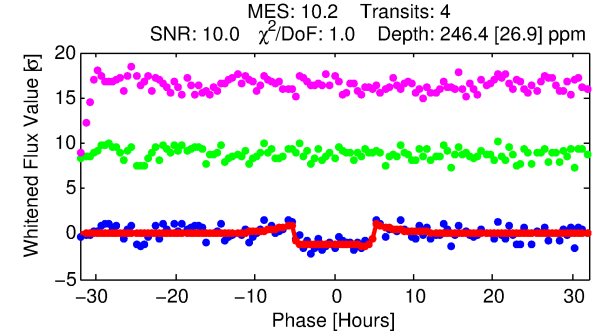
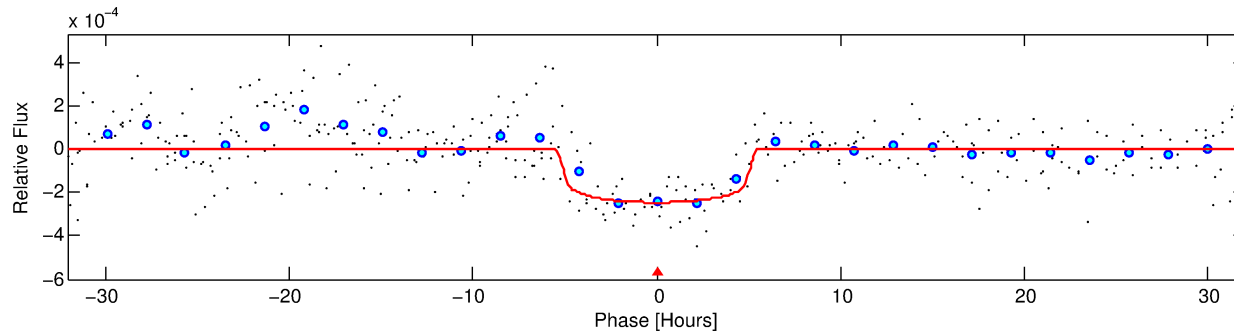
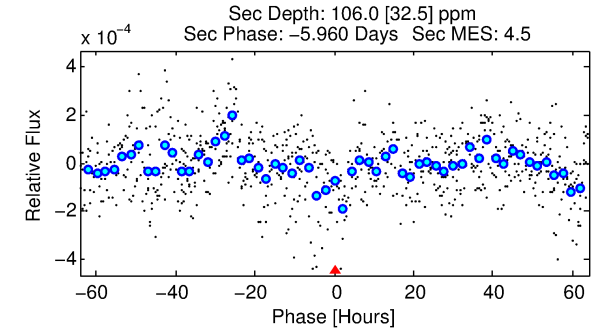
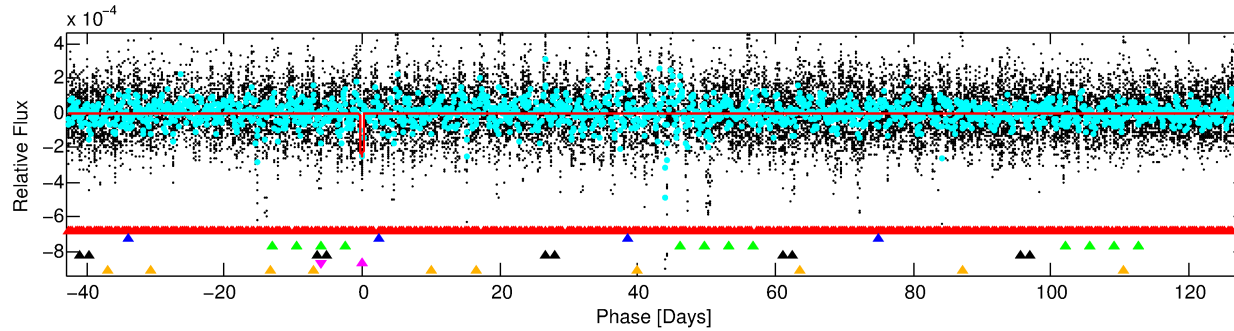
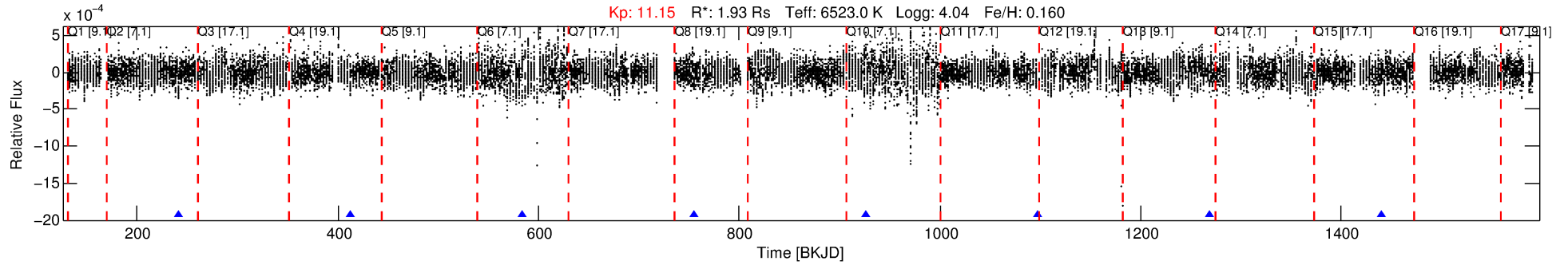
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005609986-05

No Significant Match Found

DV One-Page Summary

KIC: 5609986 Candidate: 5 of 6 Period: 171.109 d



DV Fit Results:

Period = 171.10866 [0.00237] d
Epoch = 241.8698 [0.0063] BKJD
Rp/R* = 0.0158 [0.0027]
a/R* = 77.98 [62.99]
b = 0.79 [0.39]
Seff = 12.77 [3.76]
Teq = 482 [35] K
Rp = 3.33 [0.86] Re
a = 0.6865 [0.1266] AU
Ag = 2483.20 [1338.41] [1.85σ]
Teffp = 5261 [602] K [7.93σ]

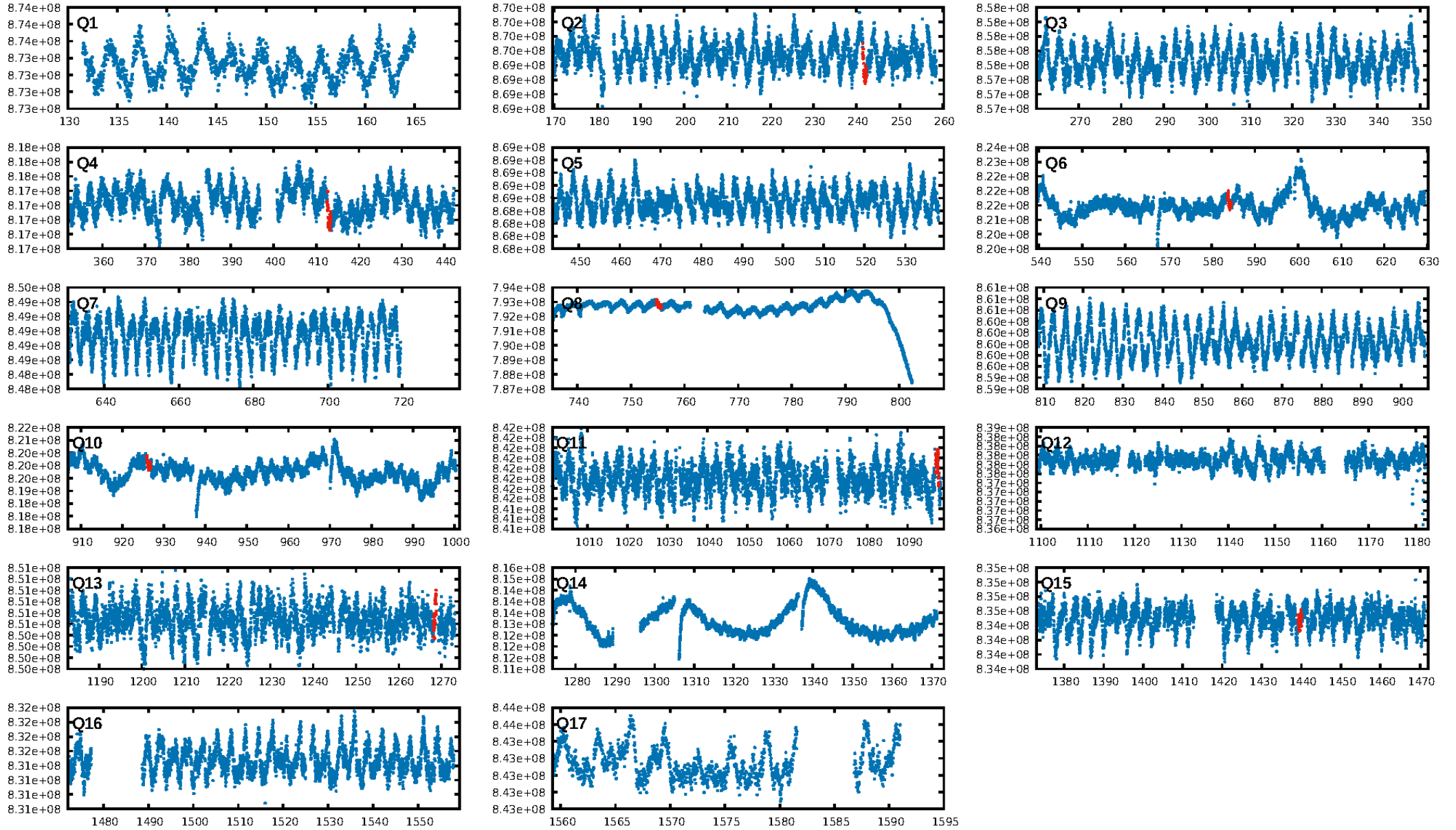
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [47.00σ]
LongPeriod-sig: 100.0% [420.87σ]
ModelChiSquare2-sig: 72.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.18e-11
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.09868
Centroid-sig: 80.6%
Centroid-so: 0.387 arcsec [0.72σ]
OotOffset-rm: 0.818 arcsec [0.77σ]
OotOffset-st: 3/1/2/0 [6]
KicOffset-rm: 0.761 arcsec [0.81σ]
KicOffset-st: 3/1/2/0 [6]
DiffImageQuality-fgm: 0.67 [4/6]
DiffImageOverlap-fno: 0.33 [2/6]

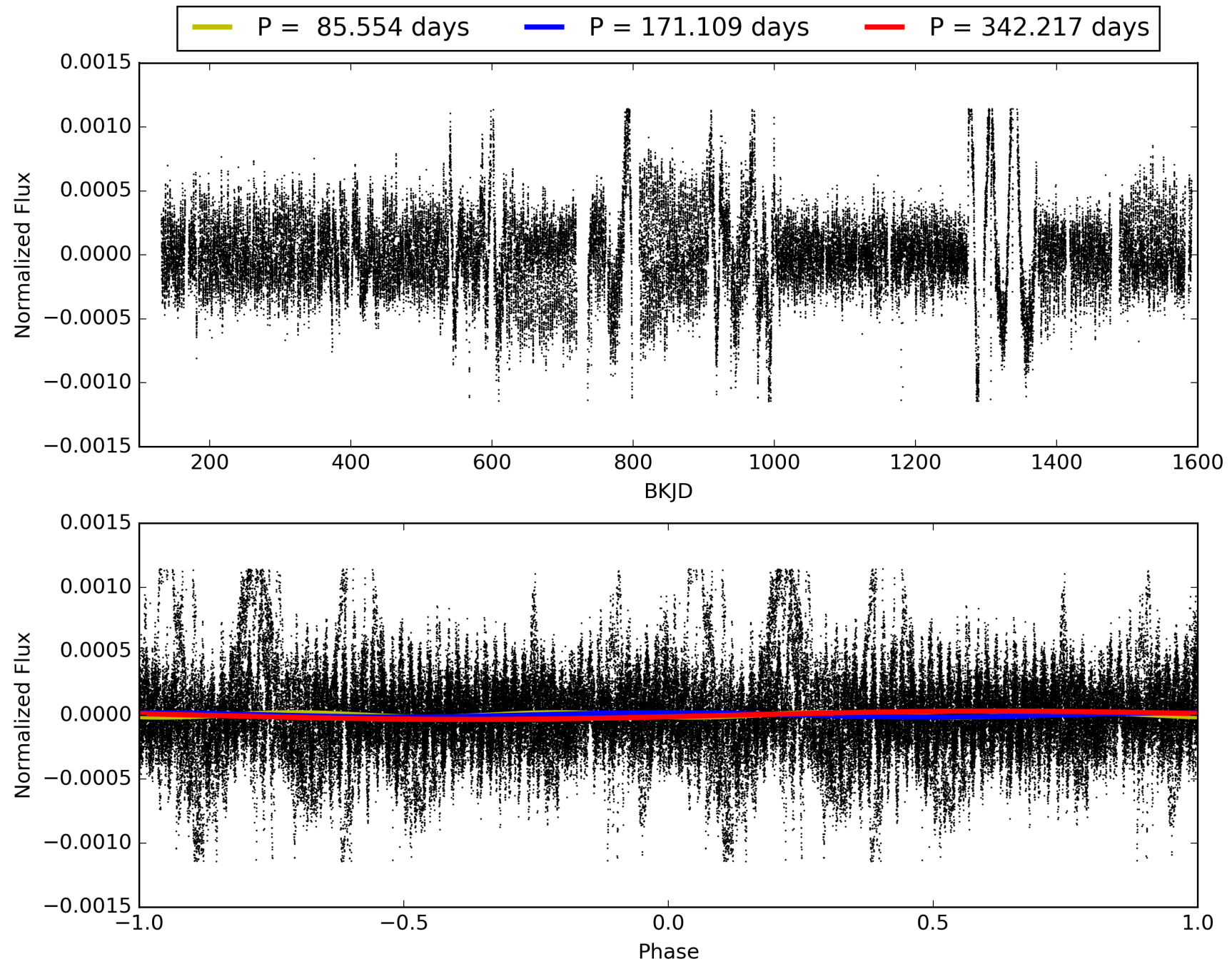
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:50:40 Z

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

TCE 005609986-05, PDC Light Curves

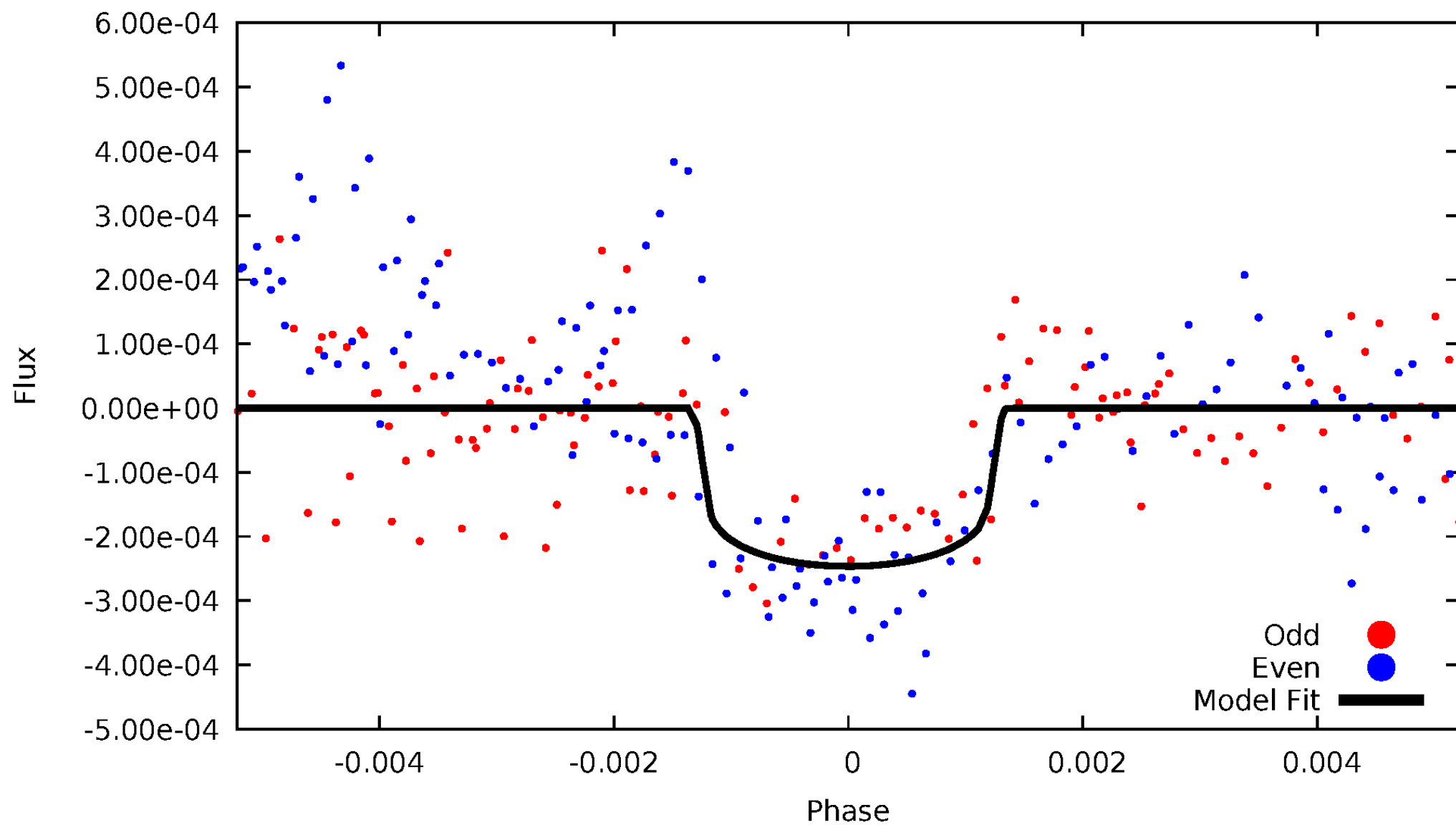


TCE 005609986-05



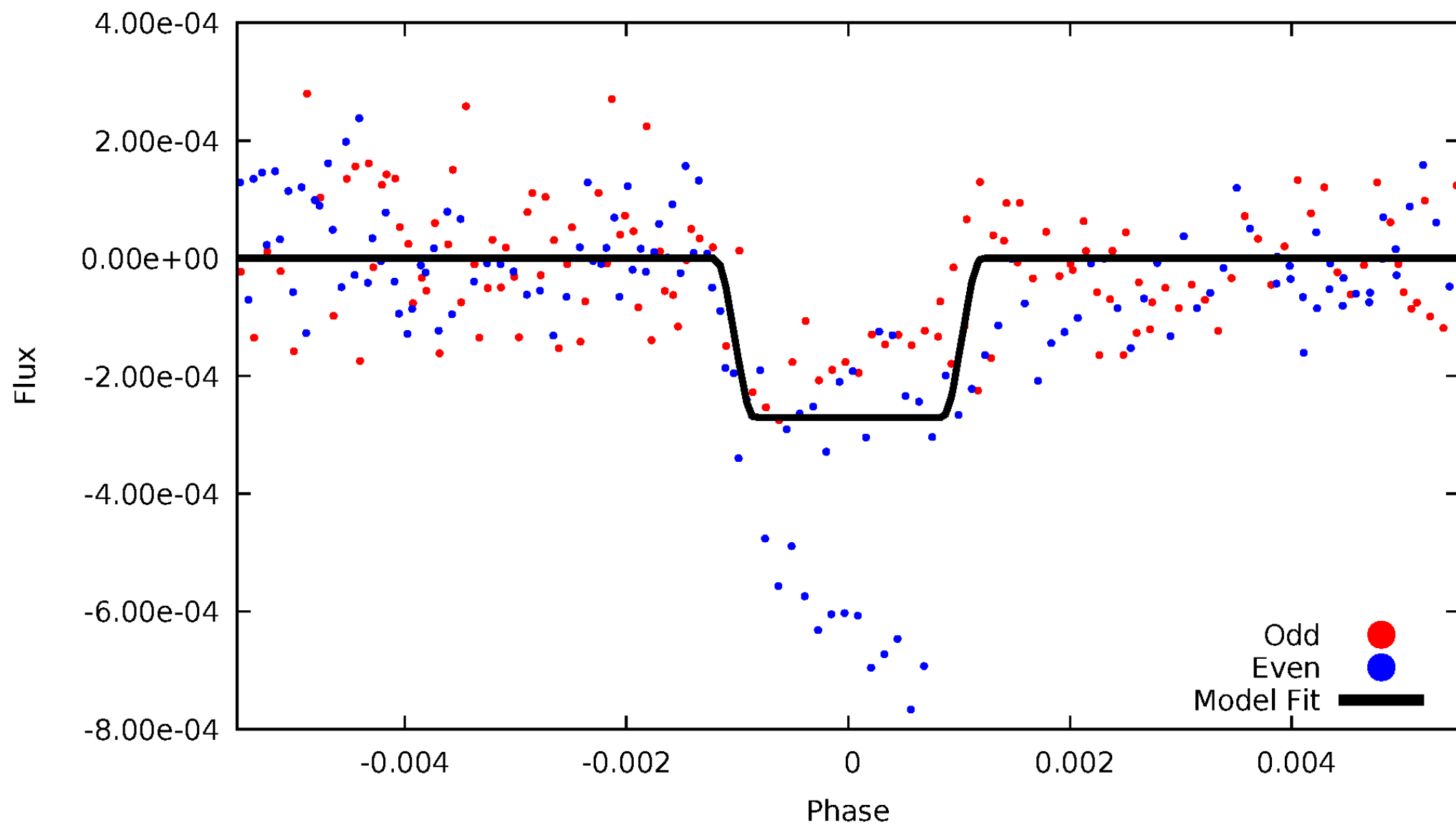
DV Odd/Even

TCE 005609986-05



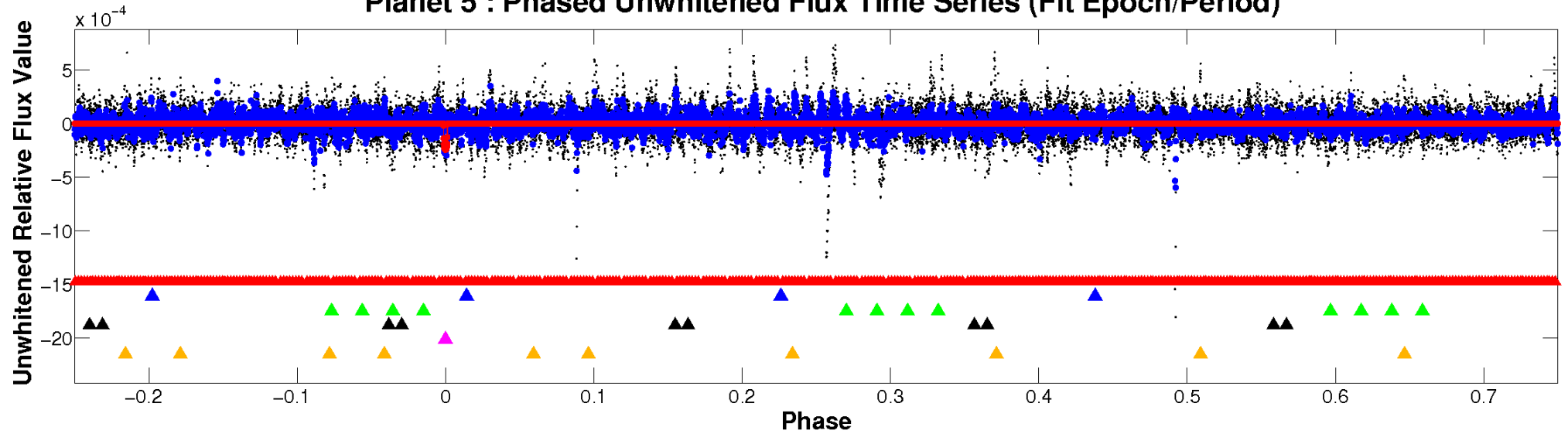
ALT Odd/Even

TCE 005609986-05

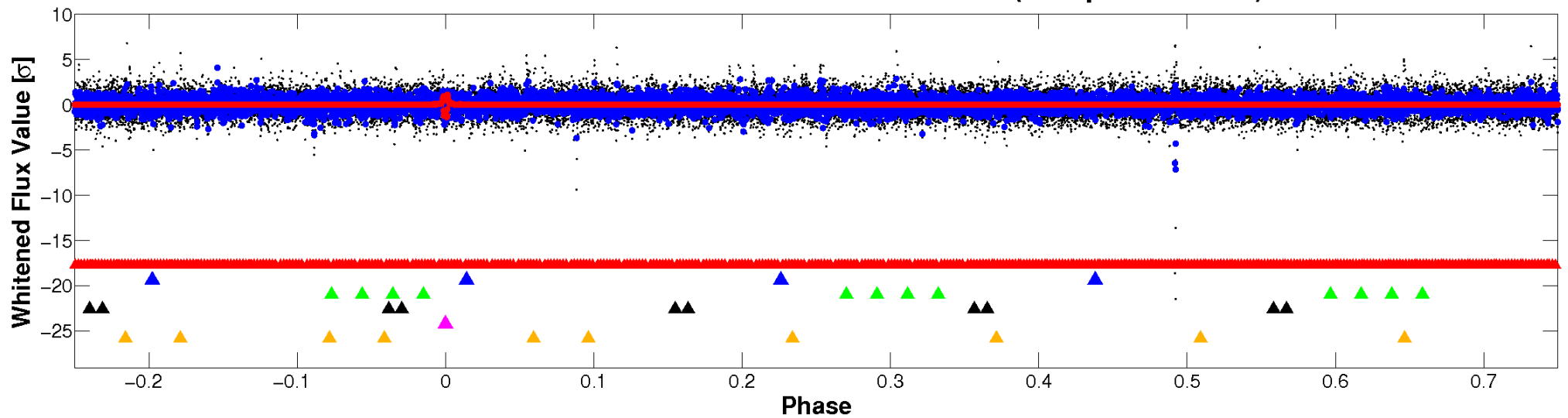


Non-Whitened Vs. Whitened Light Curve

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

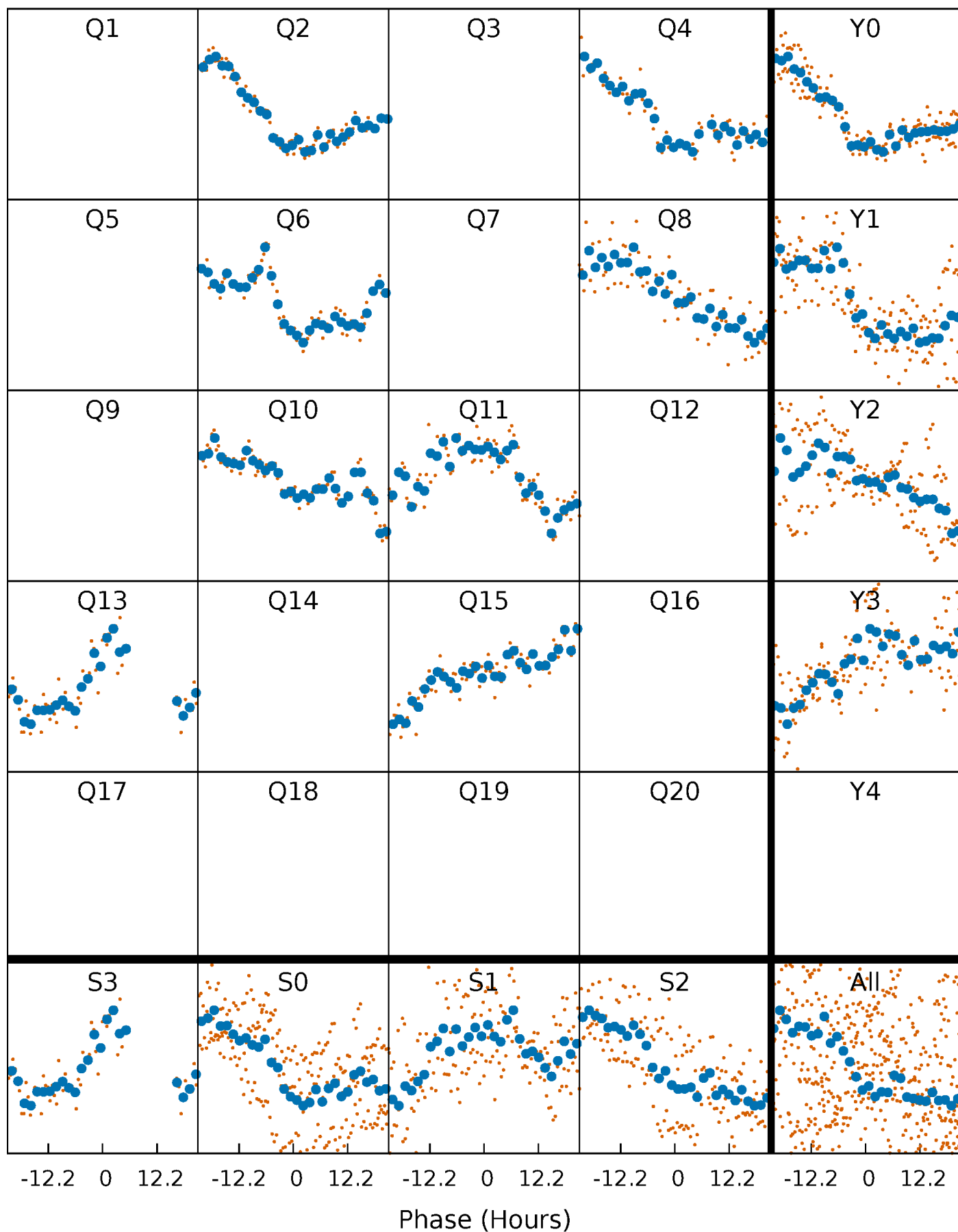


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



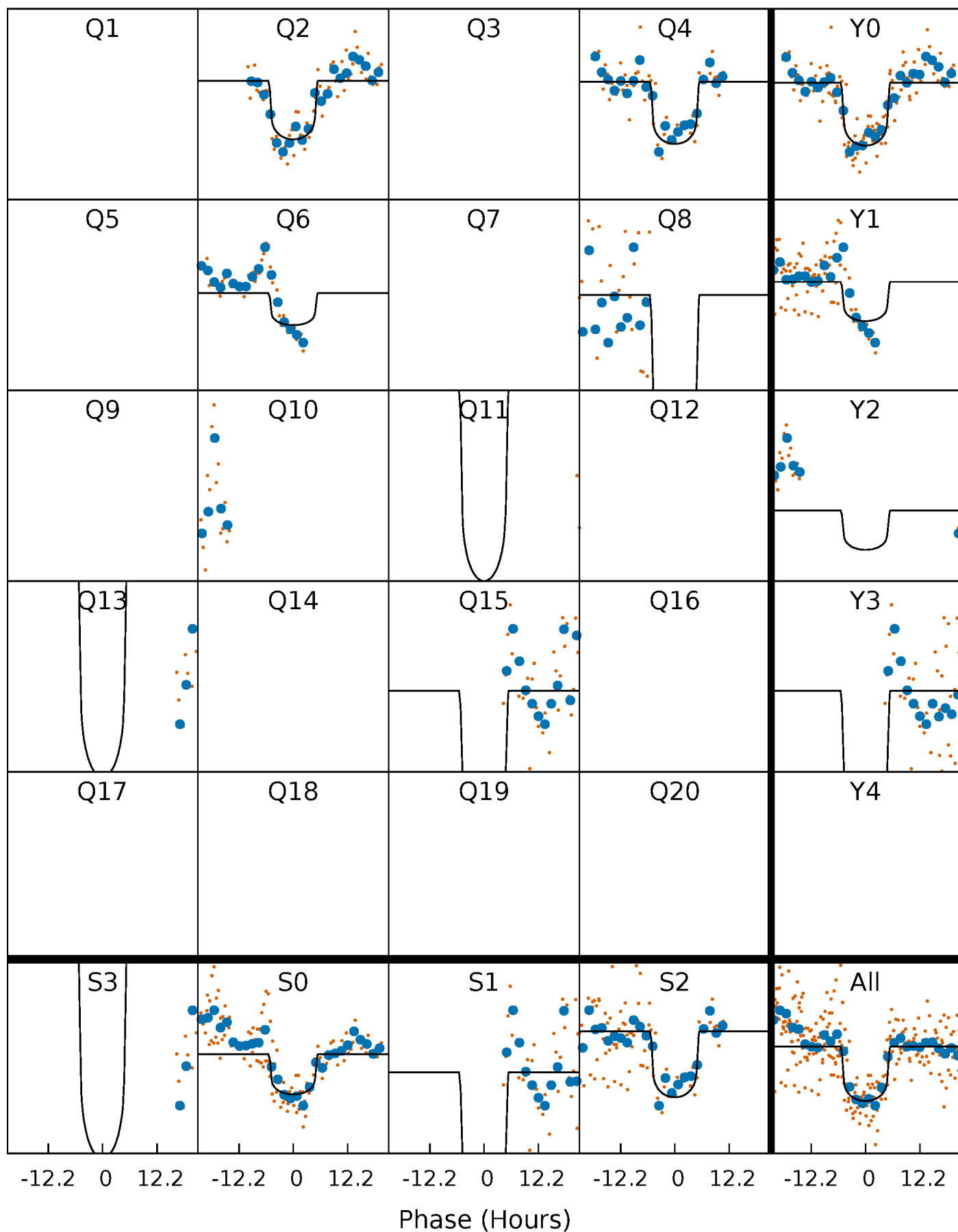
PDC Quarter-Phased Transit Curves

TCE 005609986-05 $P=171.108663$ Days $T_0=241.869779$ (BKJD)



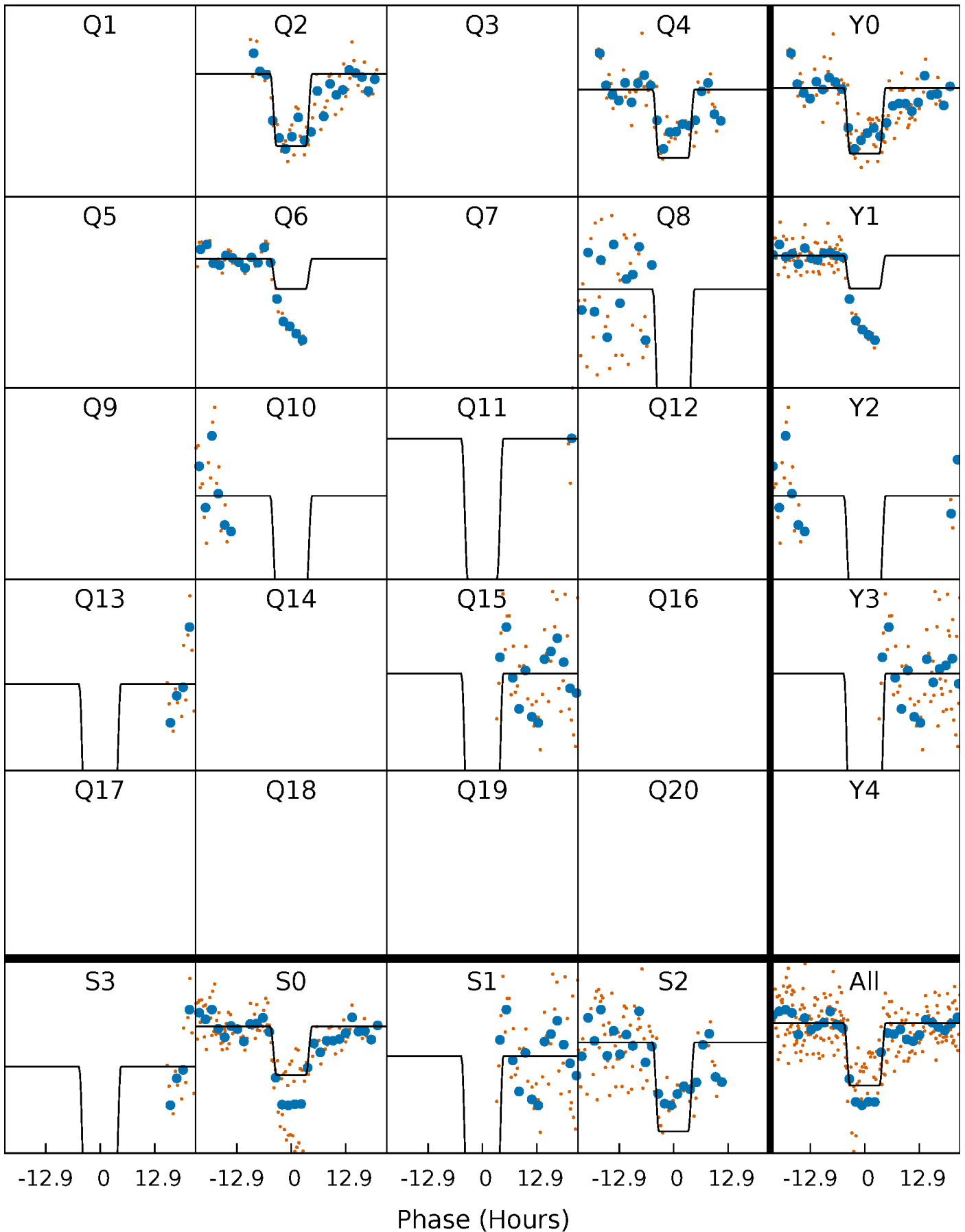
DV Quarter-Phased Transit Curves

TCE 005609986-05 $P=171.108663$ Days $T_0=241.869779$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

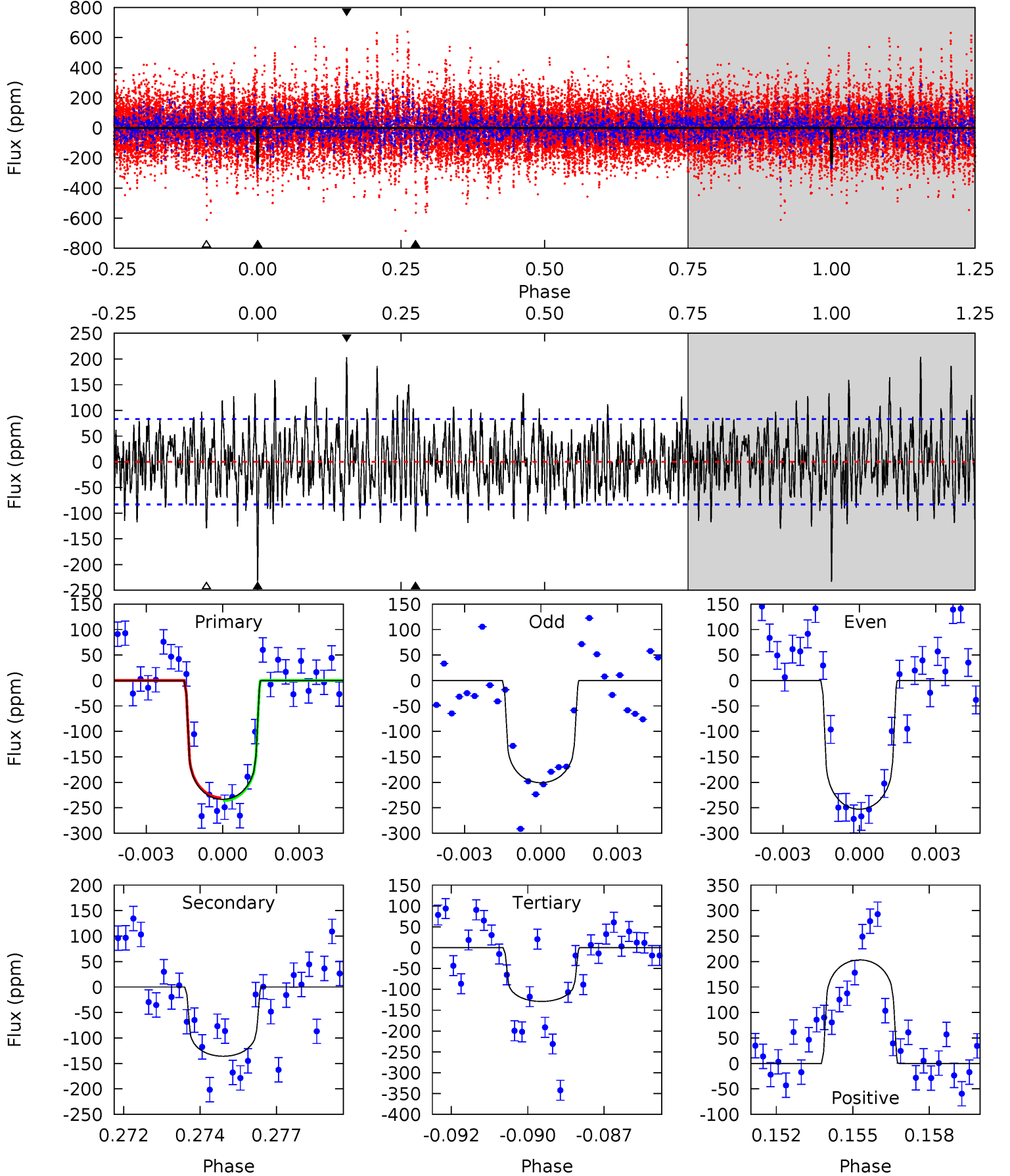
TCE 005609986-05 $P=171.117443$ Days $T_0=241.848816$ (BKJD)



DV Model-Shift Uniqueness Test

005609986-05, $P = 171.108663$ Days, $E = 70.761116$ Days

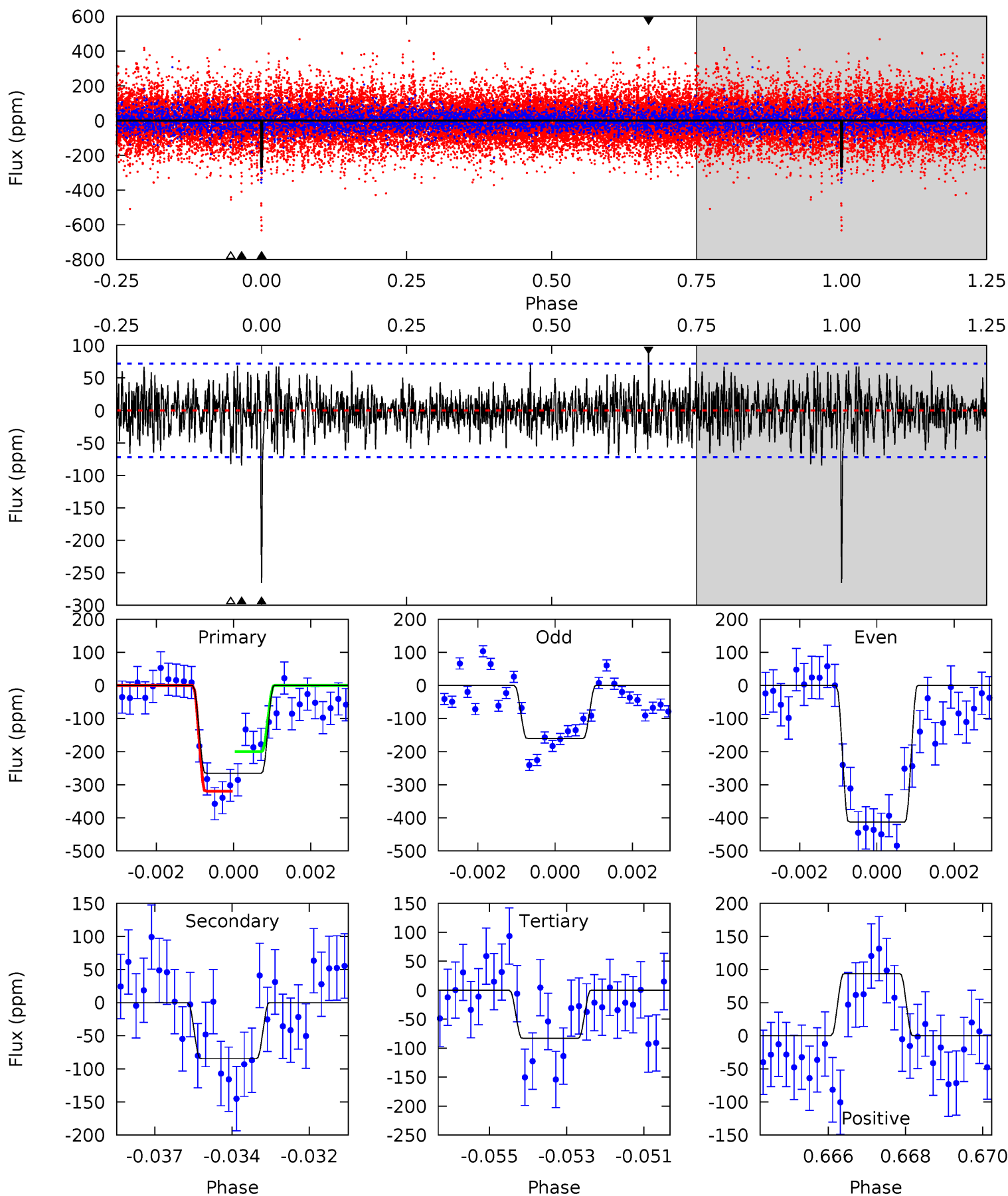
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.8	8.62	8.19	12.9	5.27	3.00	3.11	6.61	1.91	0.43	-4.27	1.63	0.77	0.47	0.17



Alt Model-Shift Uniqueness Test

005609986-05, $P = 171.117443$ Days, $E = 70.731373$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.5	6.21	6.10	6.90	5.30	3.05	1.76	13.4	12.6	0.11	-0.69	9.73	1.25	0.26	4.39



Stellar Parameters For KIC 005609986

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6523^{+85}_{-78}	$4.037^{+0.168}_{-0.126}$	$0.160^{+0.150}_{-0.150}$	$1.926^{+0.381}_{-0.381}$	$1.471^{+0.128}_{-0.128}$	$0.290^{+0.231}_{-0.111}$
	+1%/-1%	+4%/-3%	+94%/-94%	+20%/-20%	+9%/-9%	+80%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 005609986-05 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-136 ± 16	$3.27^{+0.69}_{-0.65}$	669^{+36}_{-36}	5591^{+566}_{-413}	3269^{+1855}_{-1077}
Alt.	-84 ± 14	$3.40^{+0.72}_{-0.67}$	673^{+34}_{-38}	4994^{+400}_{-379}	1928^{+990}_{-713}

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 $A_{obs} \gg 1.0$

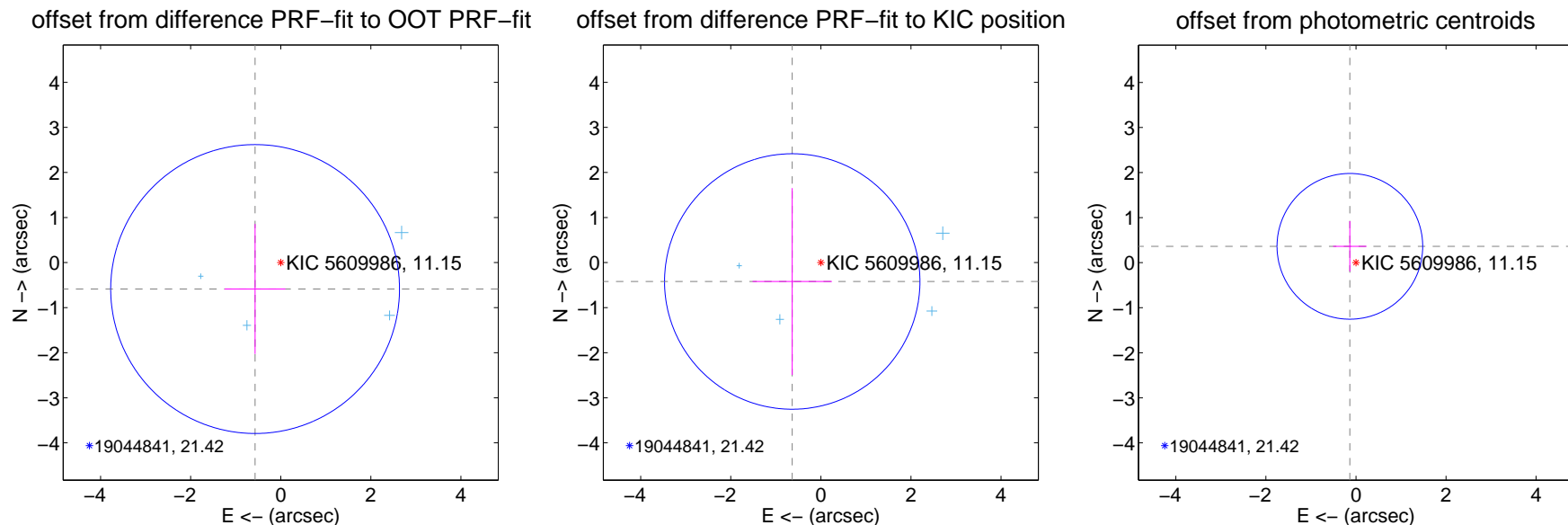
DV Centroid Data

Supplemental centroid analysis for 005609986-05. **Kepler magnitude: 11.15.** Transit SNR 10.04

There are 4 quarters with good PRF difference image offsets

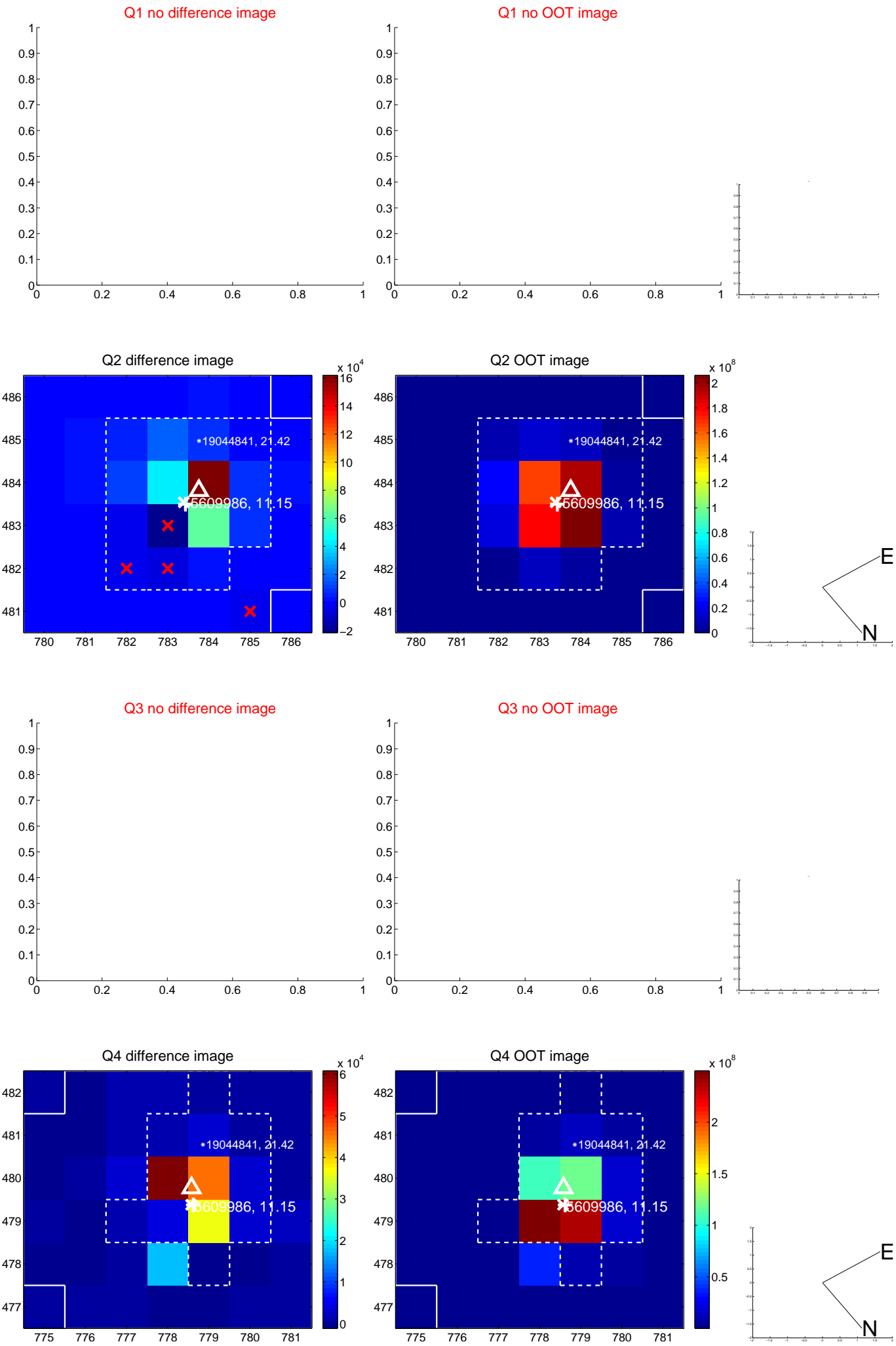
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.818 ± 1.068	0.77	0.569 ± 0.674	-0.587 ± 1.442
PRF-fit source offset from KIC position	0.761 ± 0.945	0.81	0.635 ± 0.881	-0.420 ± 2.072
photometric centroid source offset	0.39 ± 0.54	0.72	0.14 ± 0.37	0.36 ± 0.56

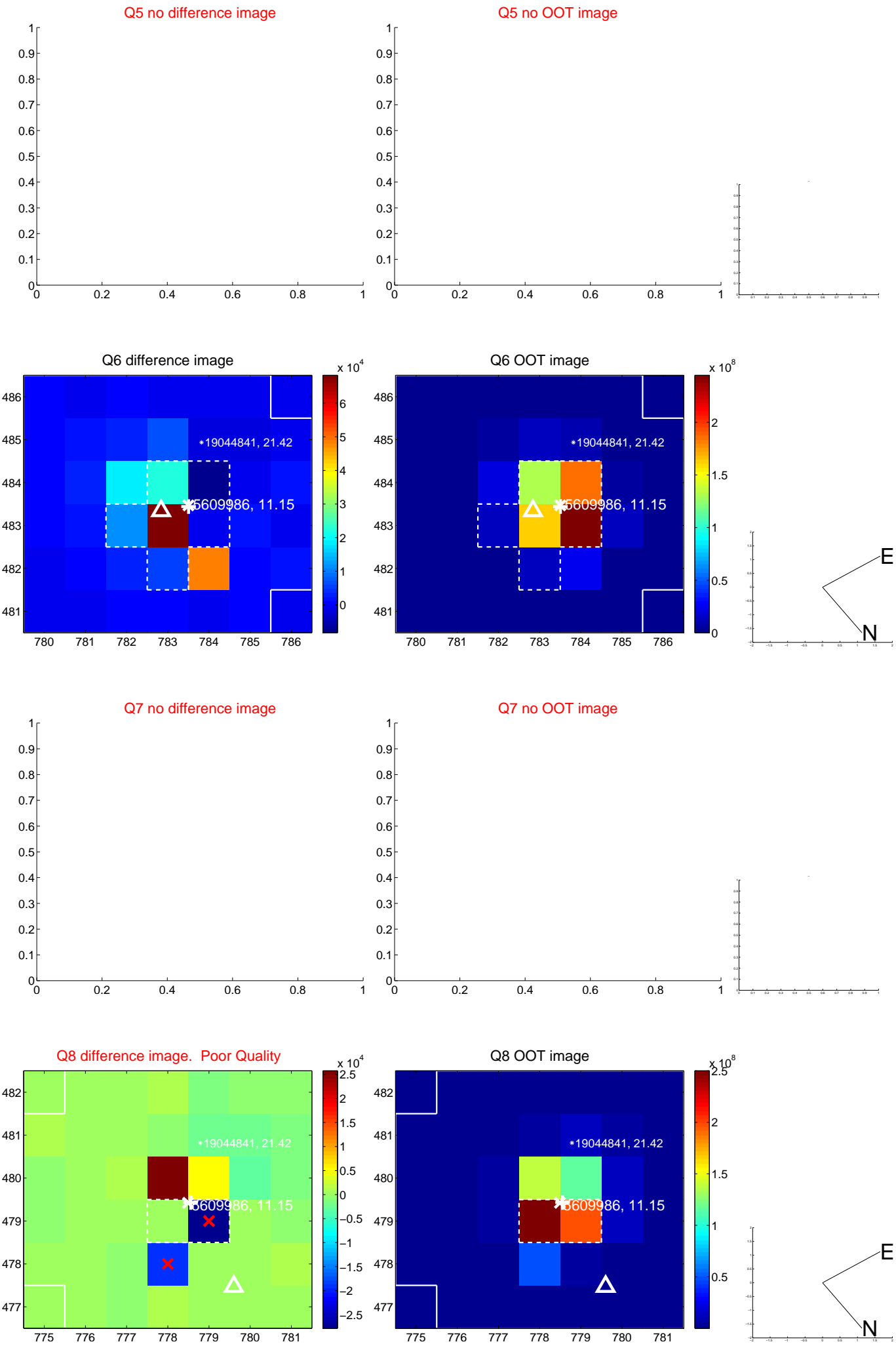


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

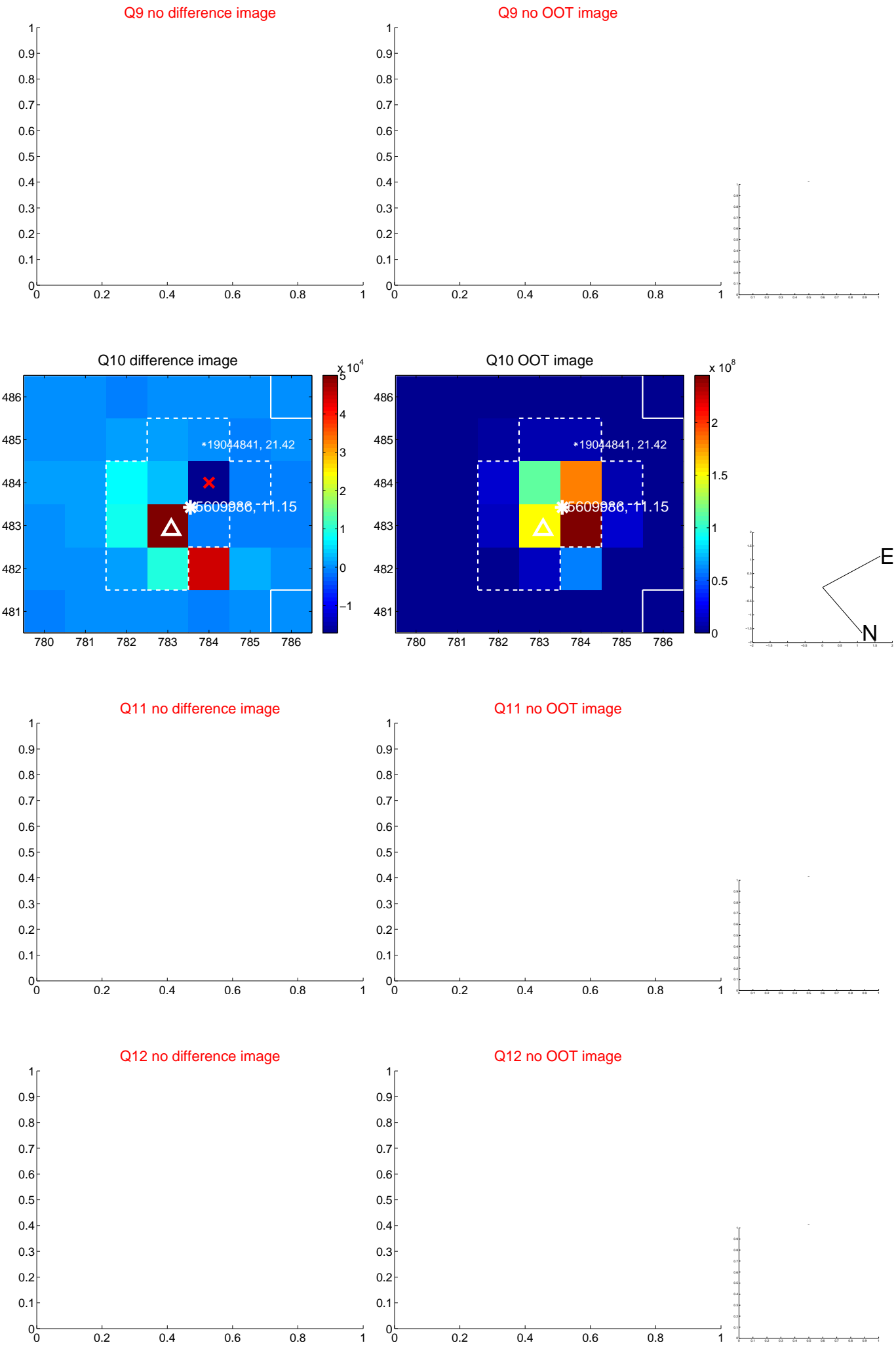
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



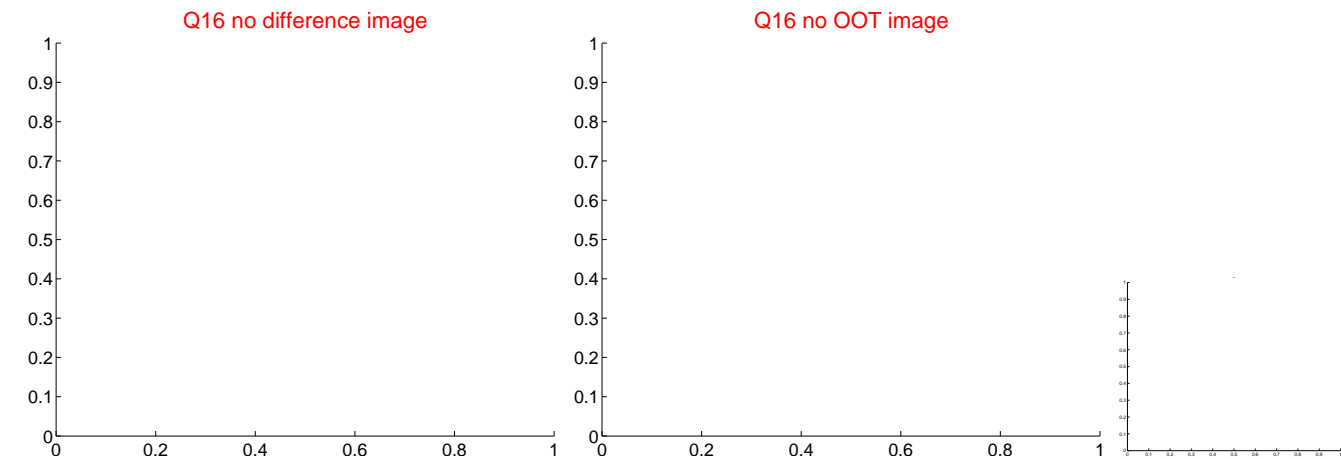
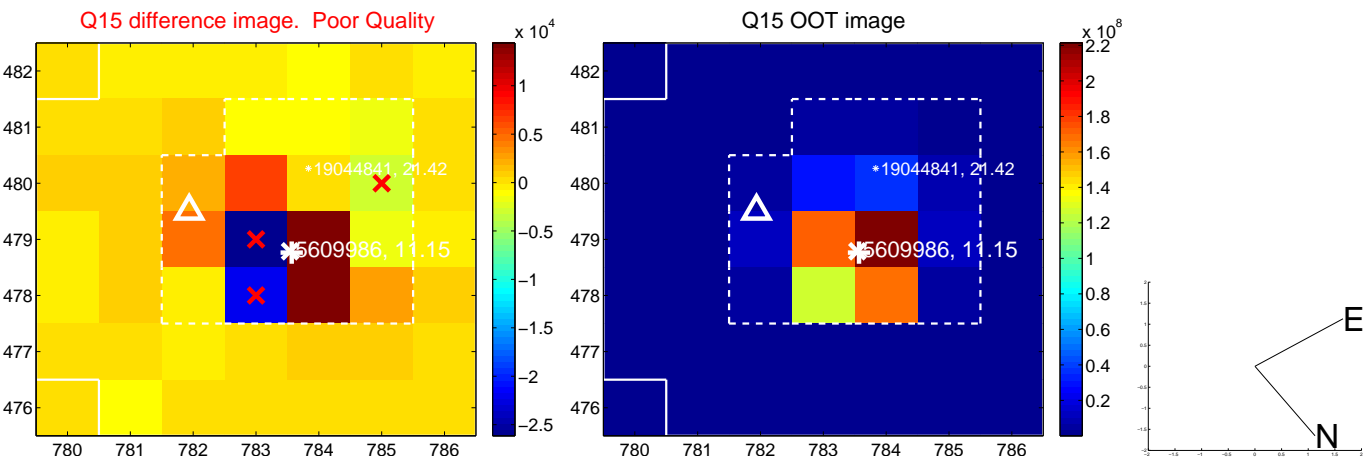
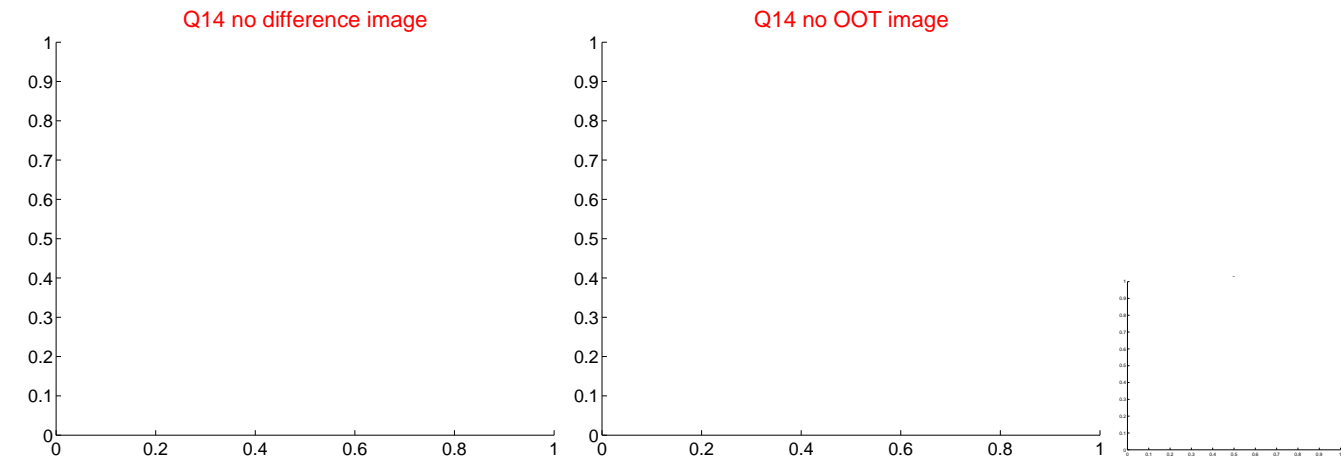
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



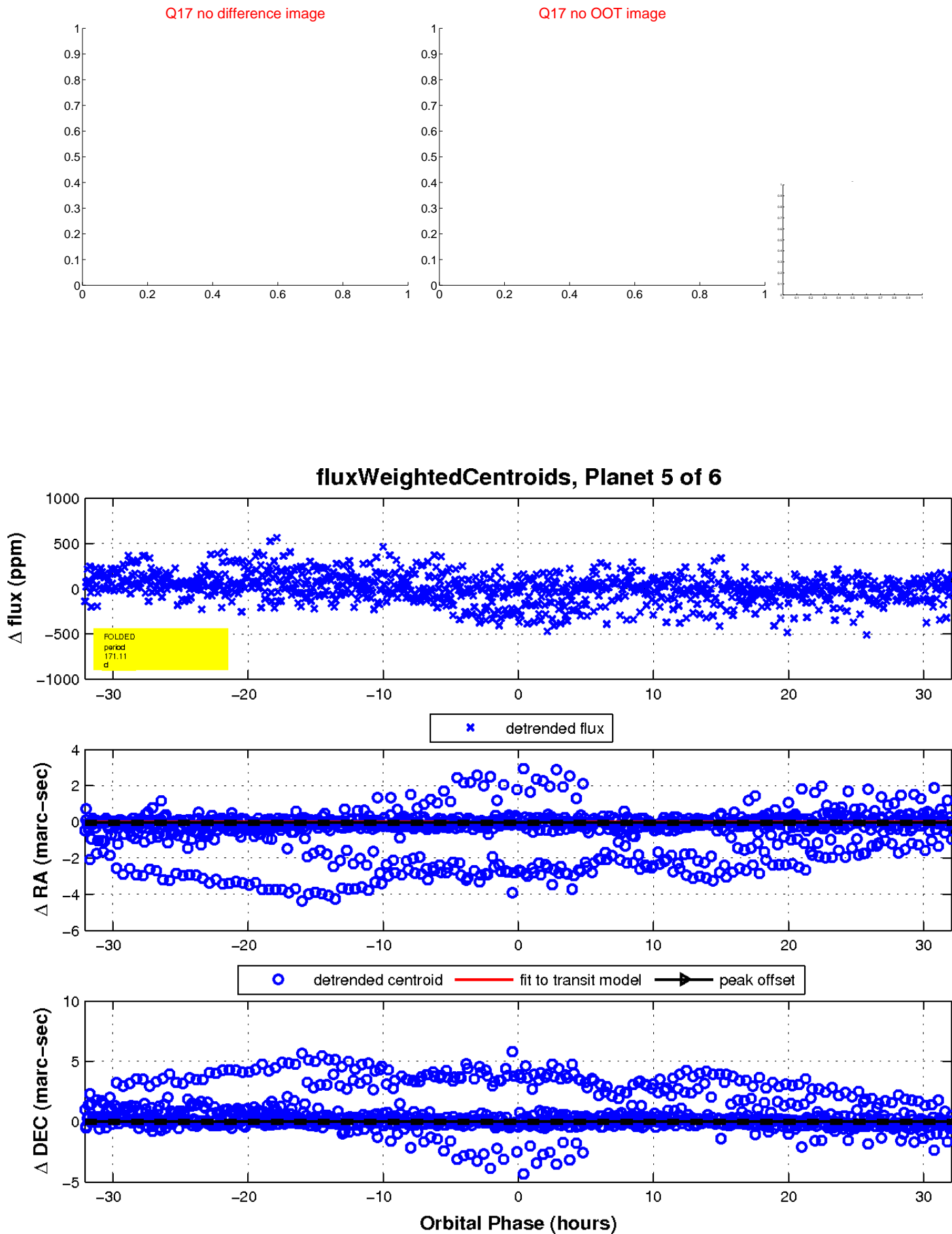
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

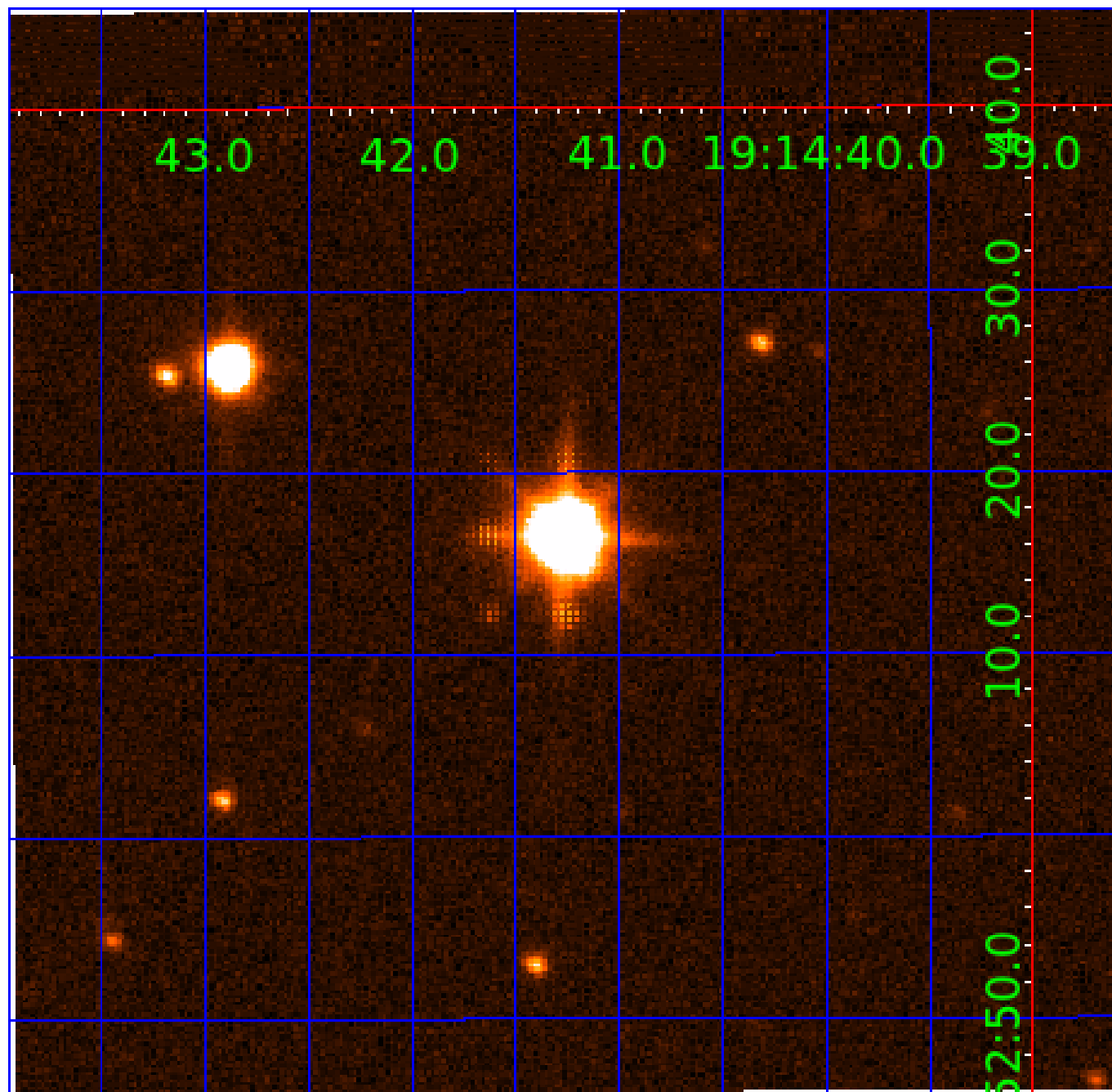


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005609986

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})
005609986-01	OBS	No	3.049254	133.820480	7.7	14.233	10.5	2.7	1.93	6523	0.63	2742.82
005609986-02	OBS	No	378.478553	208.044557	108.4	5.029	19.1	3.6	1.93	6523	2.26	4.43
005609986-03	OBS	No	115.249626	228.728750	201.9	5.133	8.0	7.6	1.93	6523	3.62	21.62
005609986-04	OBS	No	136.589499	236.821201	224.9	4.353	13.3	9.4	1.93	6523	2.95	17.24
005609986-05	OBS	No	171.108663	241.869779	246.4	10.702	10.2	10.0	1.93	6523	3.33	12.77
005609986-06	OBS	No	147.568332	252.030473	157.8	5.473	8.0	6.2	1.93	6523	2.72	15.55

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005609986-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
005609986-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
005609986-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005609986-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
005609986-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

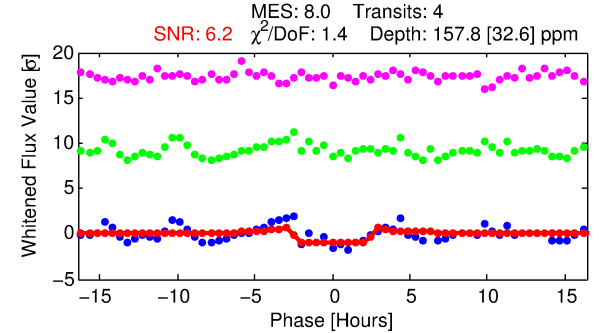
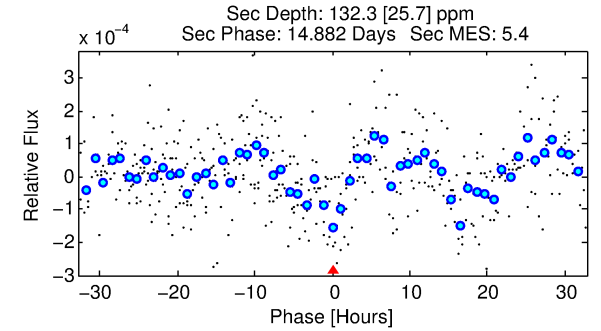
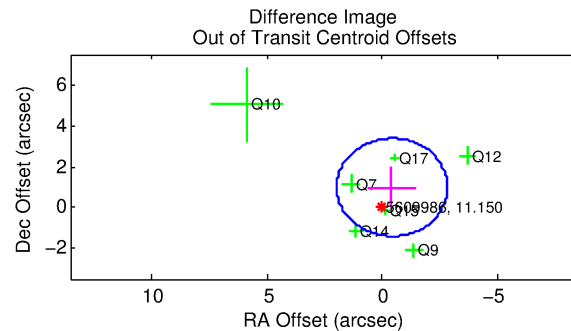
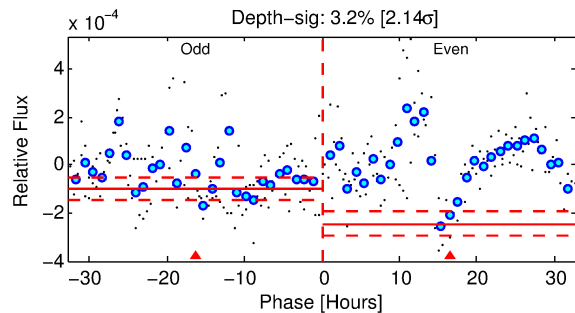
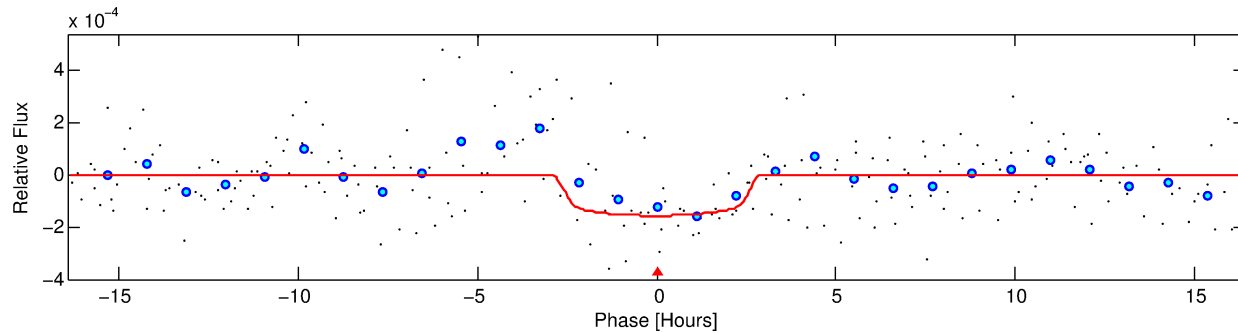
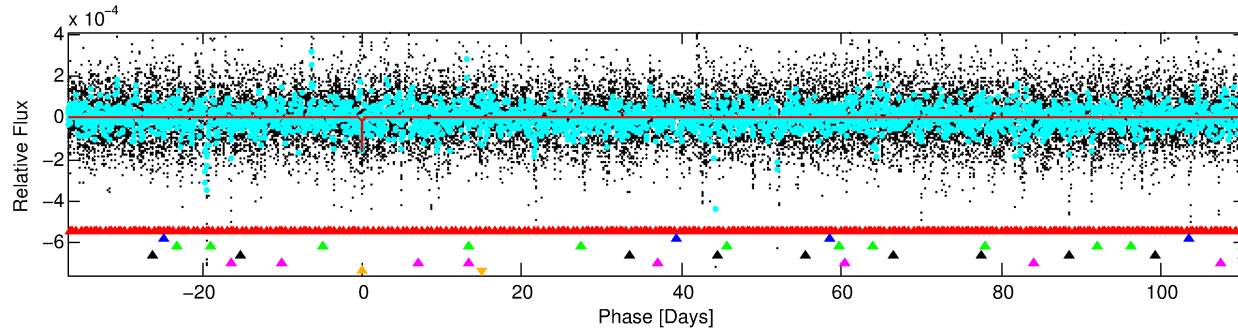
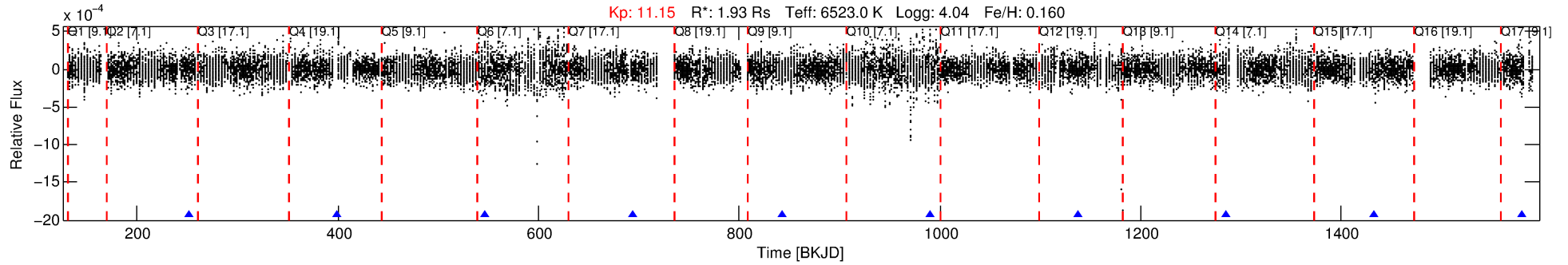
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005609986-06

No Significant Match Found

DV One-Page Summary

KIC: 5609986 Candidate: 6 of 6 Period: 147.568 d



DV Fit Results:

Period = 147.56833 [0.00285] d
Epoch = 252.0305 [0.0157] BKJD
Rp/R* = 0.0130 [0.0124]
a/R* = 116.23 [605.46]
b = 0.84 [1.83]
Seff = 15.55 [4.58]
Teq = 506 [37] K
Rp = 2.72 [2.65] Re
a = 0.6220 [0.1147] AU
Ag = 3794.80 [7359.37] [0.52σ]
Teffp = 6145 [2947] K [1.91σ]

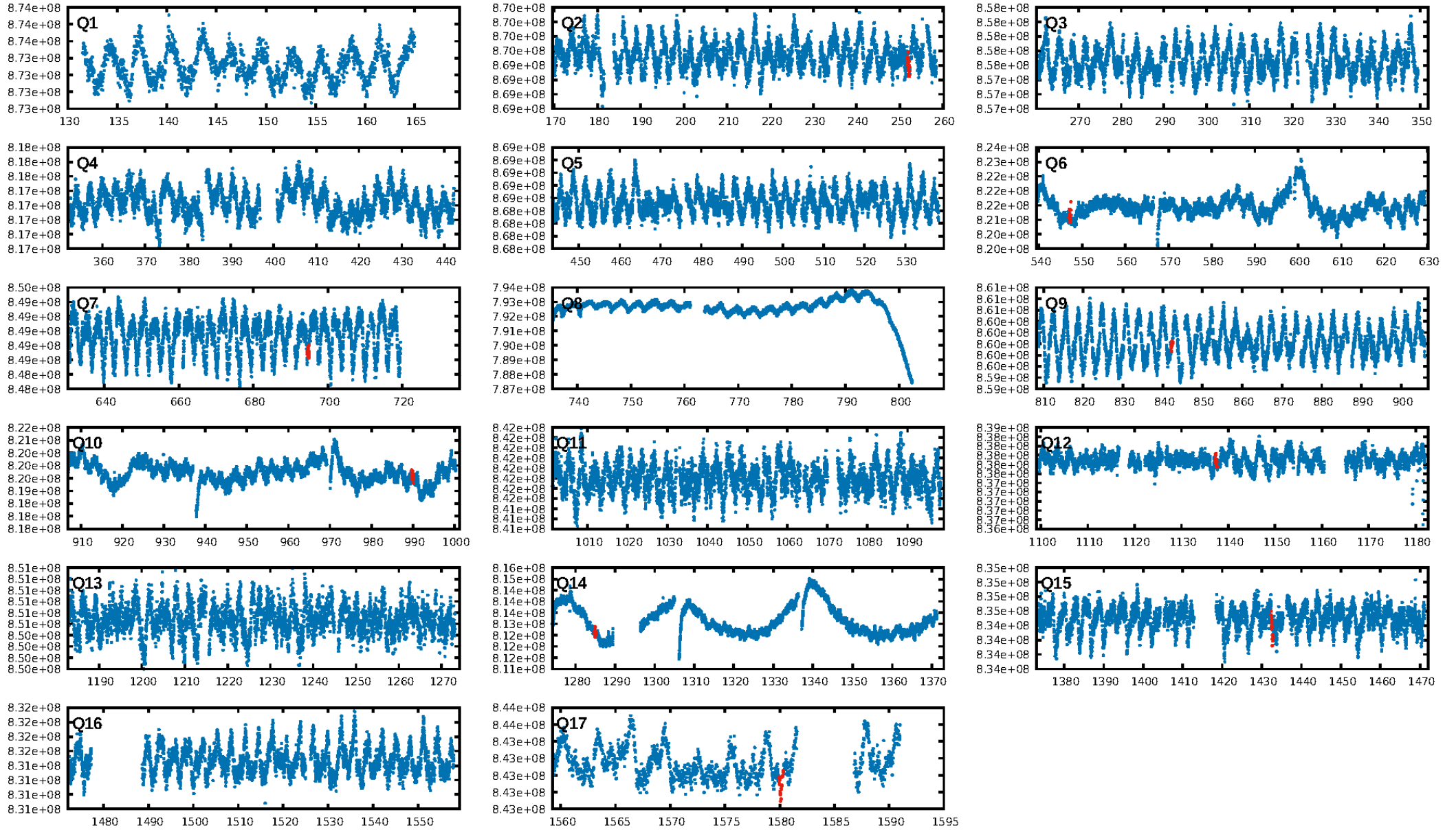
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [37.68σ]
LongPeriod-sig: 100.0% [47.00σ]
ModelChiSquare2-sig: 14.8%
ModelChiSquareGof-sig: 78.1%
Bootstrap-pfa: 1.35e-08
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -1.762
Centroid-sig: 79.3%
Centroid-so: 0.493 arcsec [0.70σ]
OotOffset-rm: 1.071 arcsec [1.34σ]
OotOffset-st: 2/2/1/2 [7]
KicOffset-rm: 1.432 arcsec [1.92σ]
KicOffset-st: 2/2/1/2 [7]
DiffImageQuality-fgm: 0.71 [5/7]
DiffImageOverlap-fno: 0.56 [5/9]

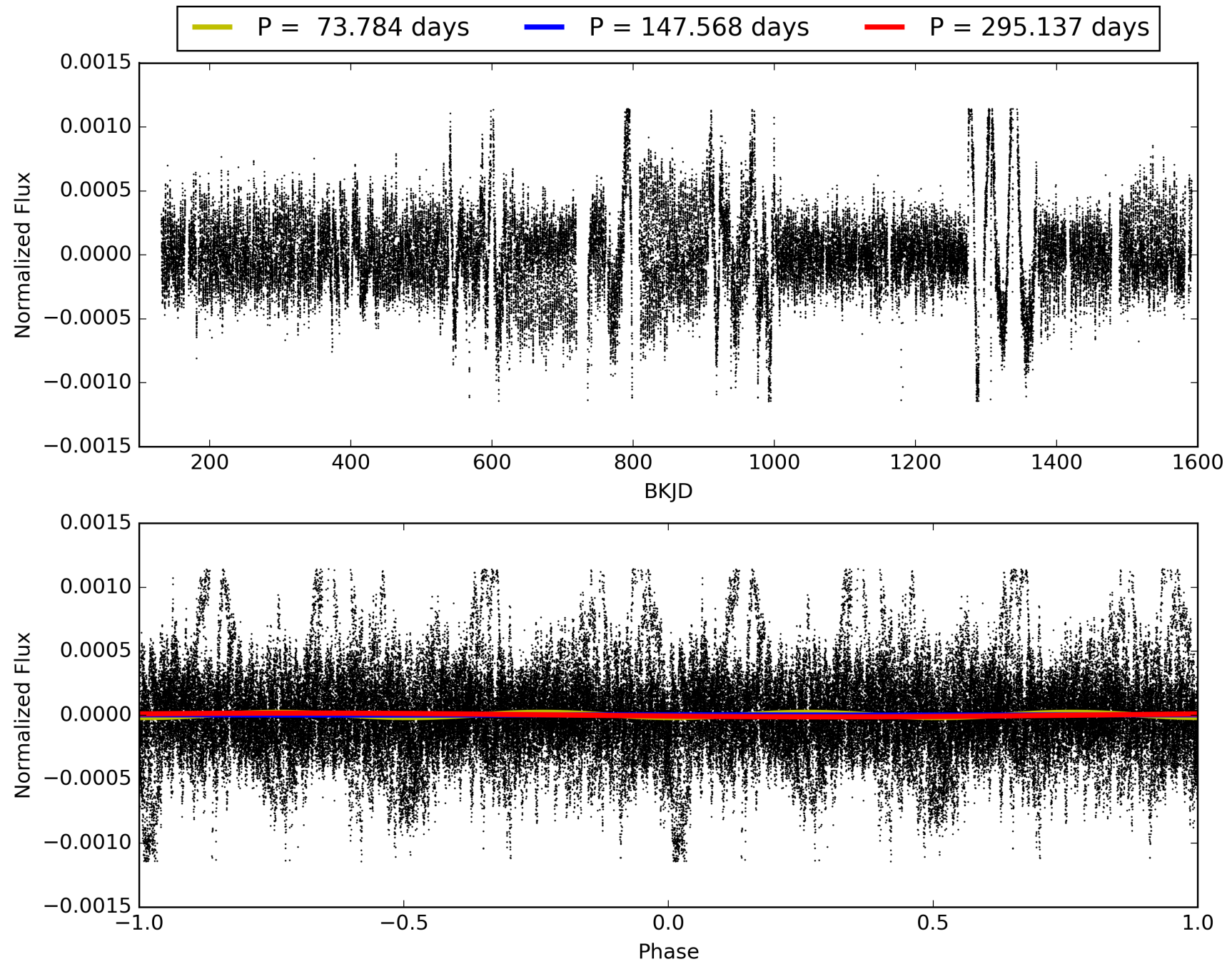
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:50:46 Z

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

TCE 005609986-06, PDC Light Curves

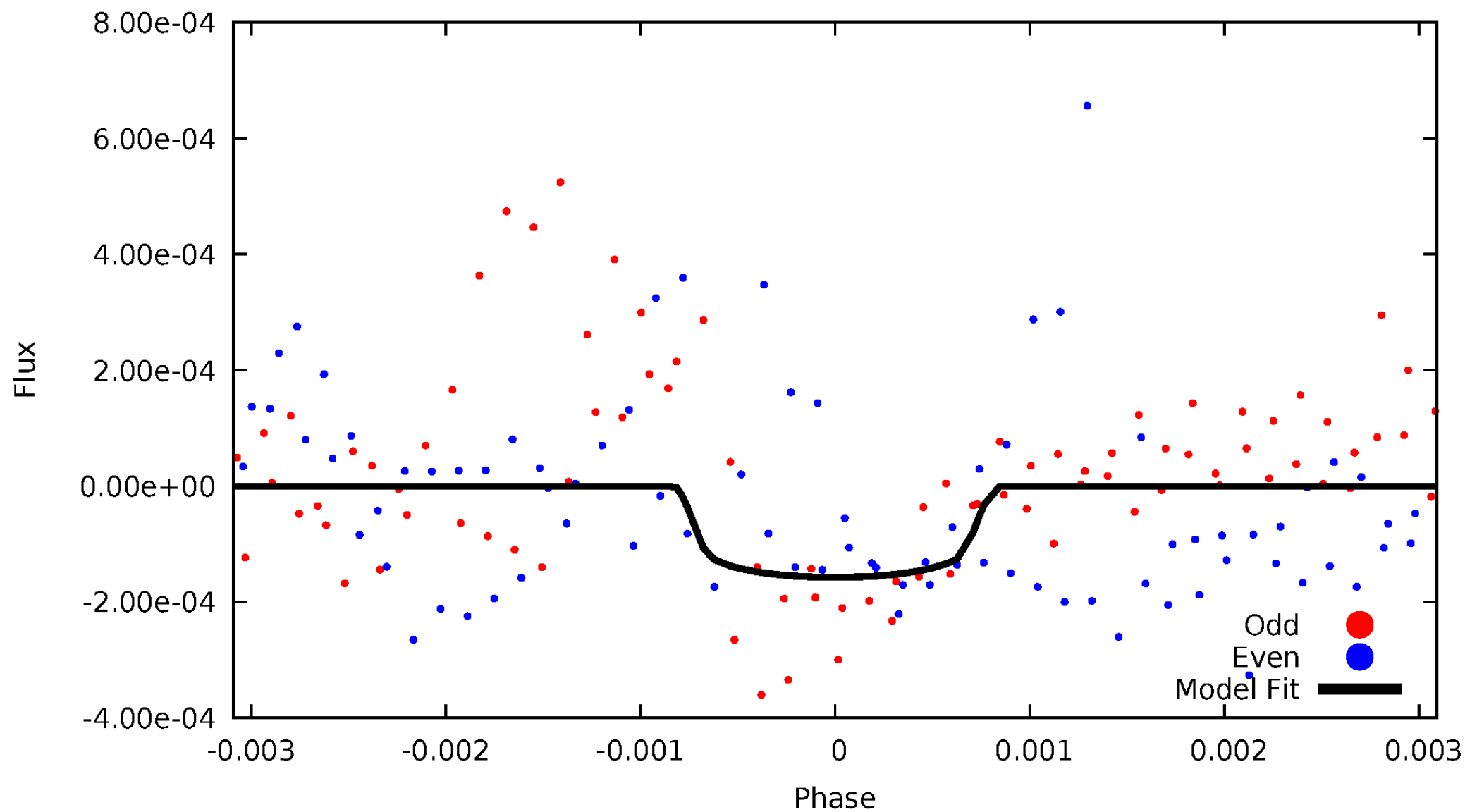


TCE 005609986-06



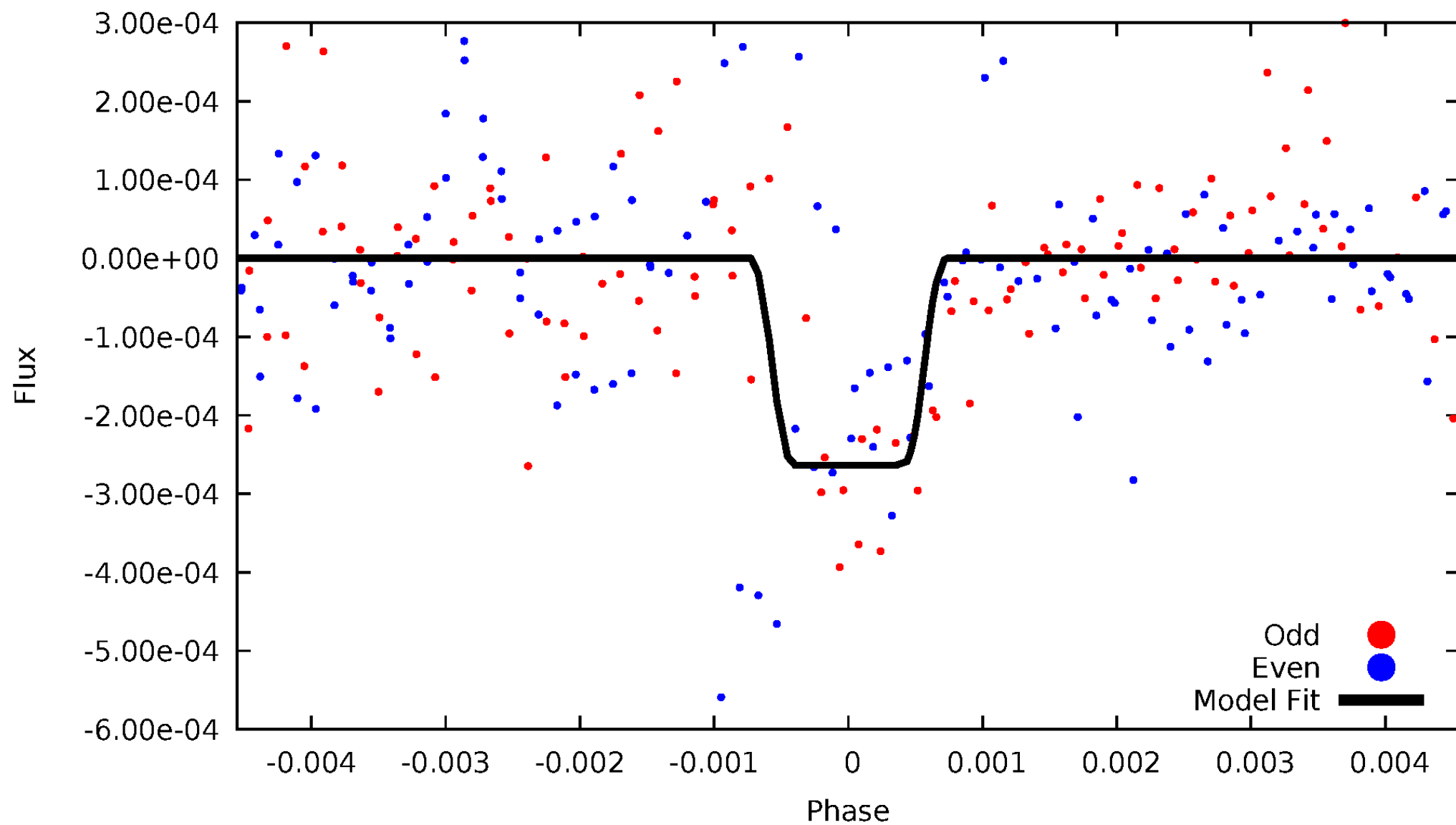
DV Odd/Even

TCE 005609986-06



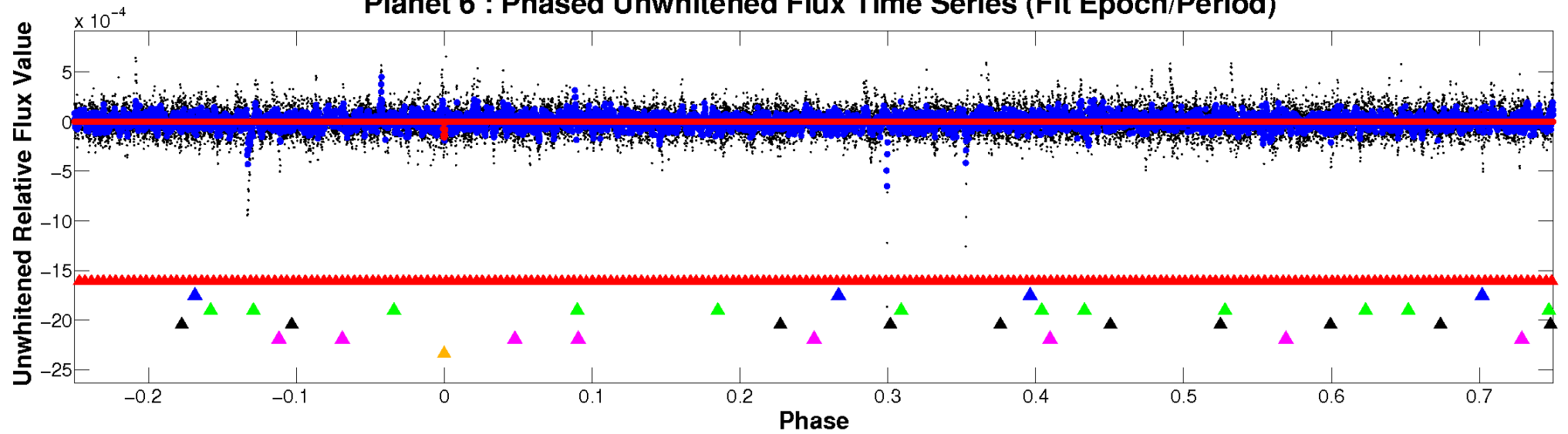
ALT Odd/Even

TCE 005609986-06

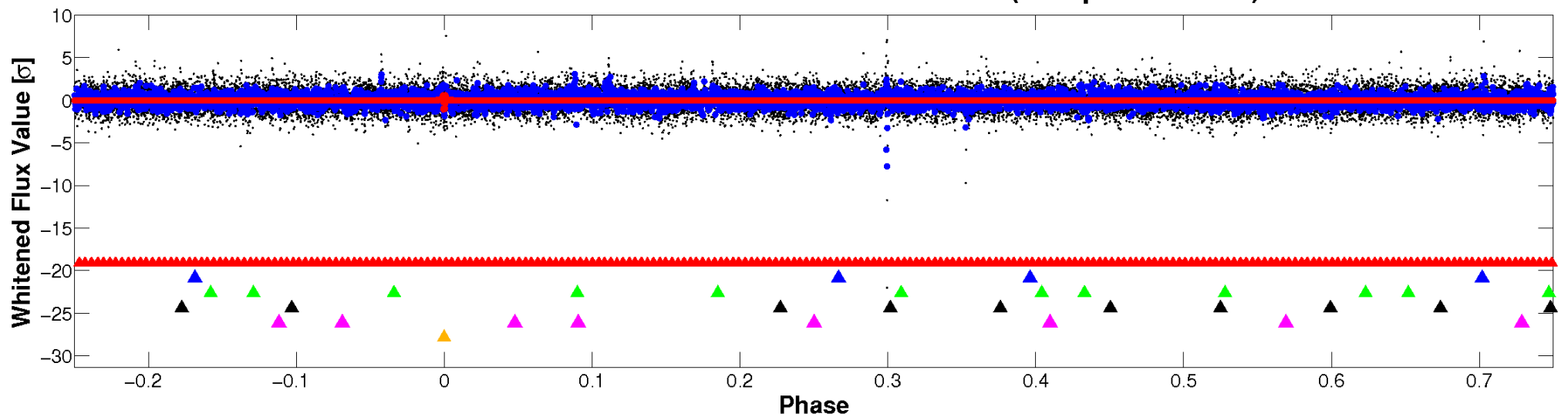


Non-Whitened Vs. Whitened Light Curve

Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

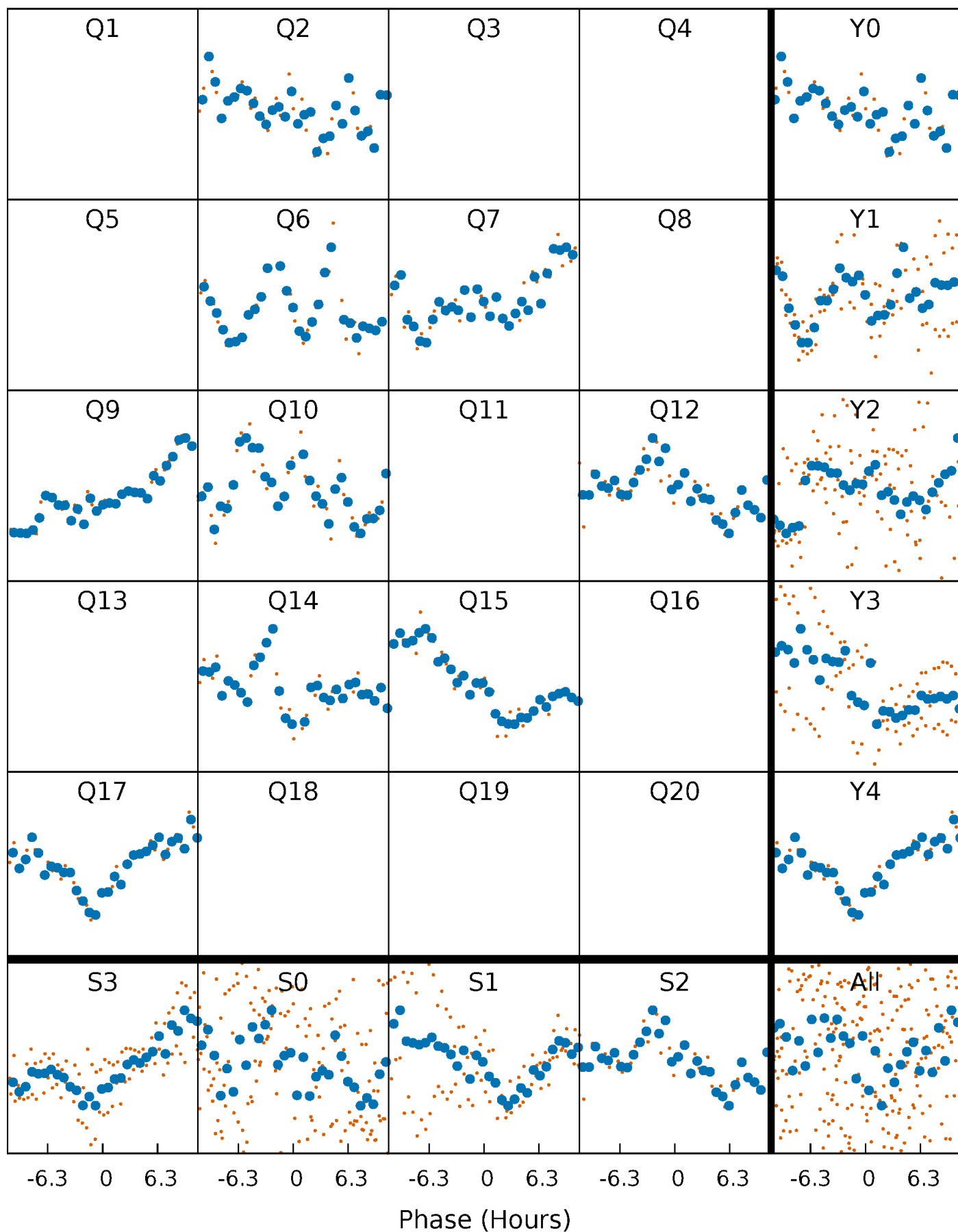


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



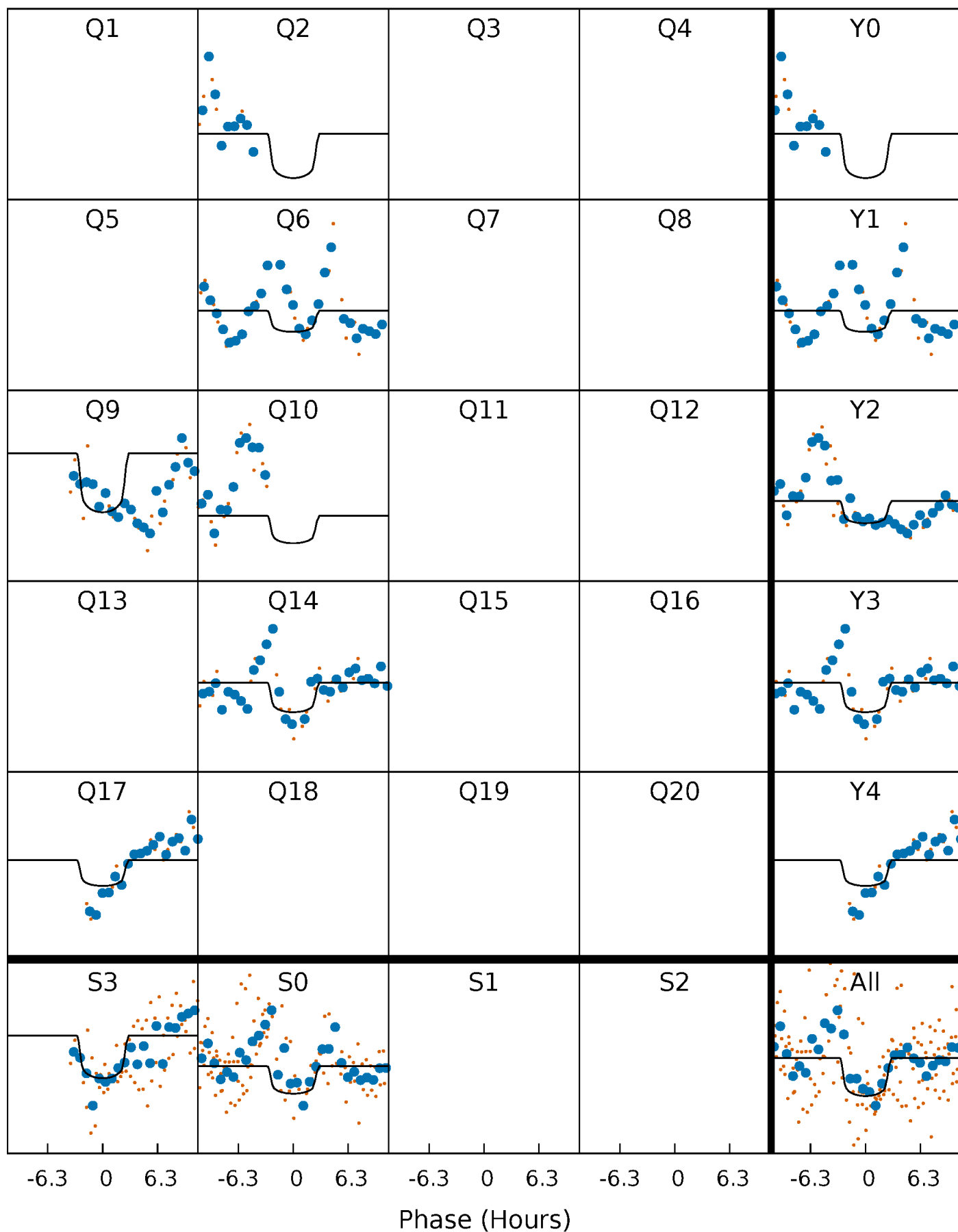
PDC Quarter-Phased Transit Curves

TCE 005609986-06 P=147.568332 Days $T_0=252.030473$ (BKJD)



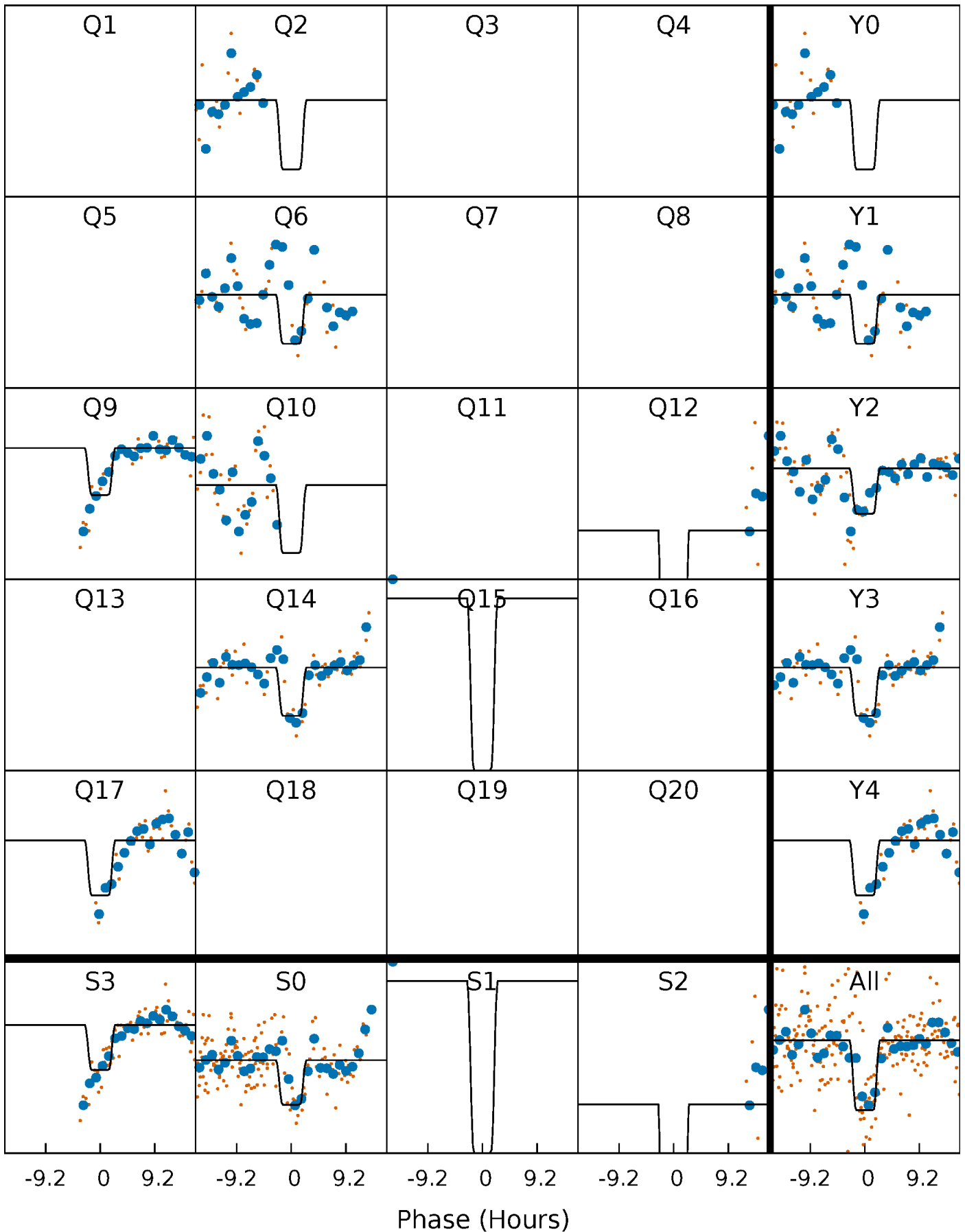
DV Quarter-Phased Transit Curves

TCE 005609986-06 $P=147.568332$ Days $T_0=252.030473$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

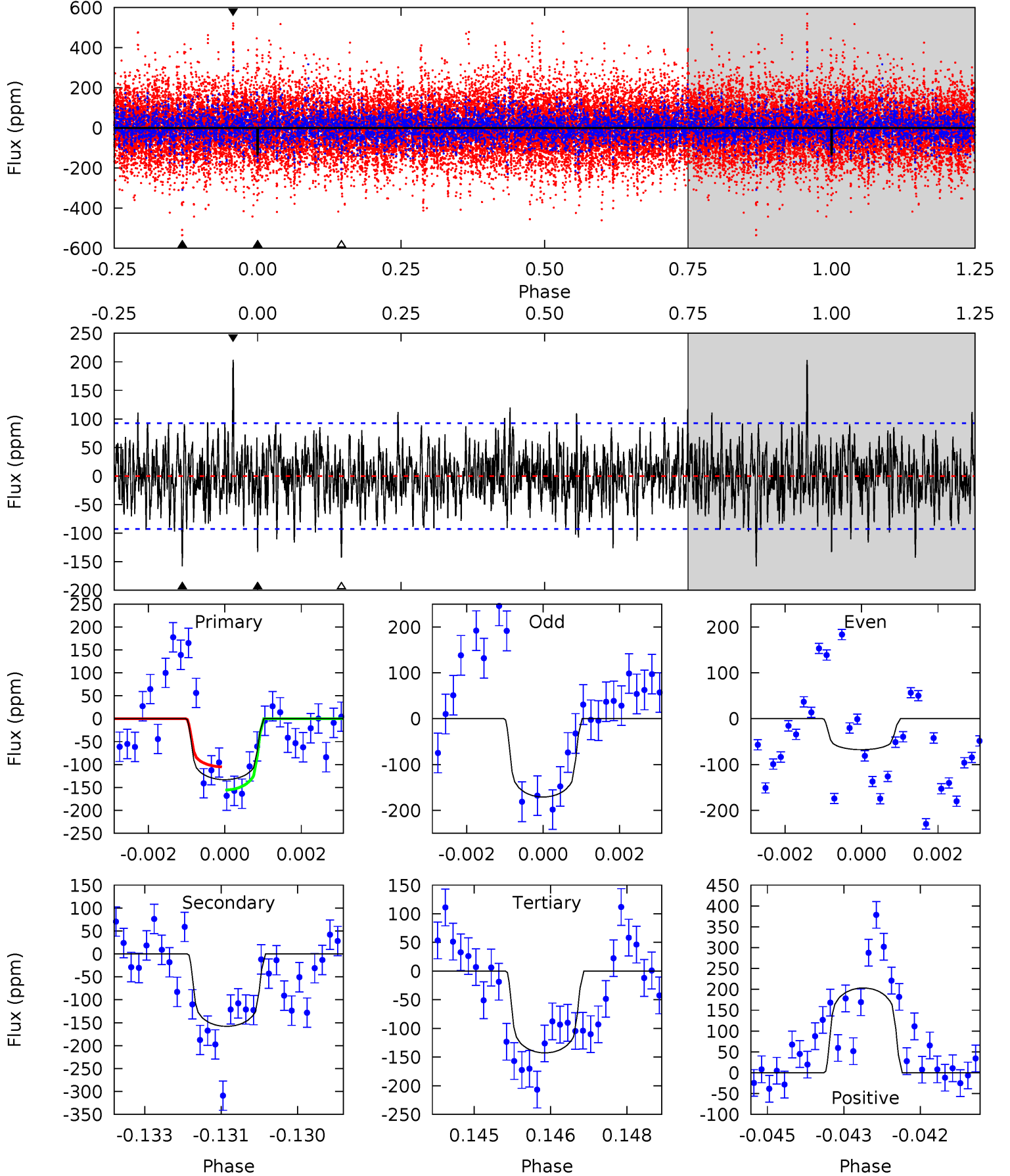
TCE 005609986-06 P=147.561633 Days $T_0=252.044316$ (BKJD)



DV Model-Shift Uniqueness Test

005609986-06, P = 147.568332 Days, E = 104.462141 Days

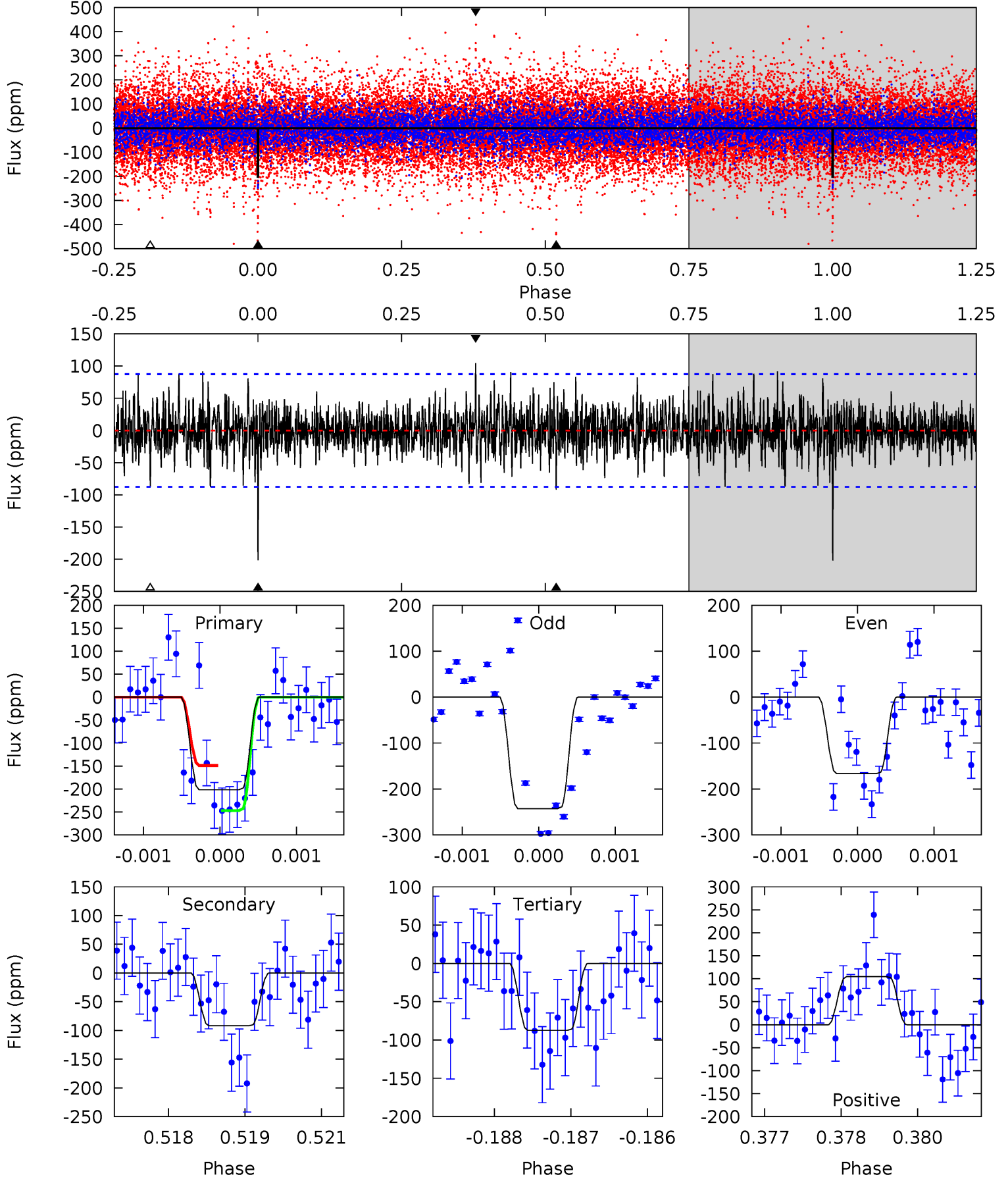
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.70	9.14	8.25	11.8	5.36	3.14	2.20	-0.56	-4.06	0.88	-2.62	2.98	0.91	0.56	1.45



Alt Model-Shift Uniqueness Test

005609986-06, P = 147.561633 Days, E = 104.482683 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.4	5.66	5.38	6.44	5.39	3.19	1.57	7.04	5.97	0.28	-0.79	2.33	0.96	0.34	3.00



Stellar Parameters For KIC 005609986

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6523^{+85}_{-78}	$4.037^{+0.168}_{-0.126}$	$0.160^{+0.150}_{-0.150}$	$1.926^{+0.381}_{-0.381}$	$1.471^{+0.128}_{-0.128}$	$0.290^{+0.231}_{-0.111}$
	+1%/-1%	+4%/-3%	+94%/-94%	+20%/-20%	+9%/-9%	+80%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 005609986-06 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-158 ± 17	$3.09^{+2.53}_{-1.91}$	708^{+36}_{-42}	5989^{+4832}_{-1375}	3361^{+20615}_{-2296}
Alt.	-92 ± 16	$3.52^{+2.57}_{-2.02}$	706^{+37}_{-41}	5037^{+2464}_{-1022}	1590^{+7422}_{-1069}

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

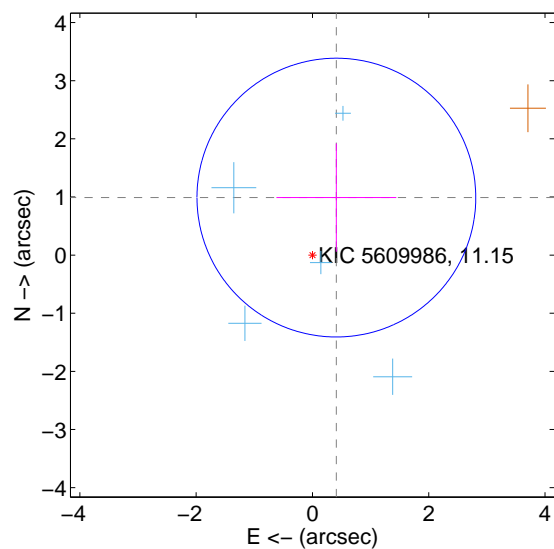
Supplemental centroid analysis for 005609986-06. **Kepler magnitude: 11.15**. Transit SNR 6.15

There are 5 quarters with good PRF difference image offsets

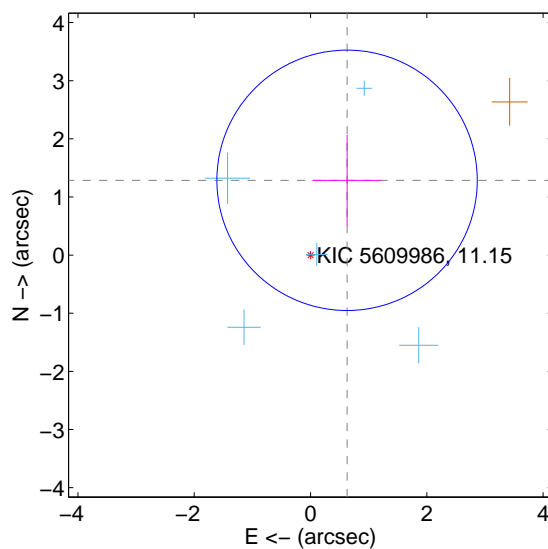
The direct PRF centroid is offset from the target star catalog position by about 0.59 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.071 ± 0.799	1.34	-0.412 ± 1.031	0.989 ± 0.931
PRF-fit source offset from KIC position	1.432 ± 0.746	1.92	-0.629 ± 0.591	1.286 ± 0.779
photometric centroid source offset	0.49 ± 0.71	0.70	-0.29 ± 0.57	0.40 ± 0.77

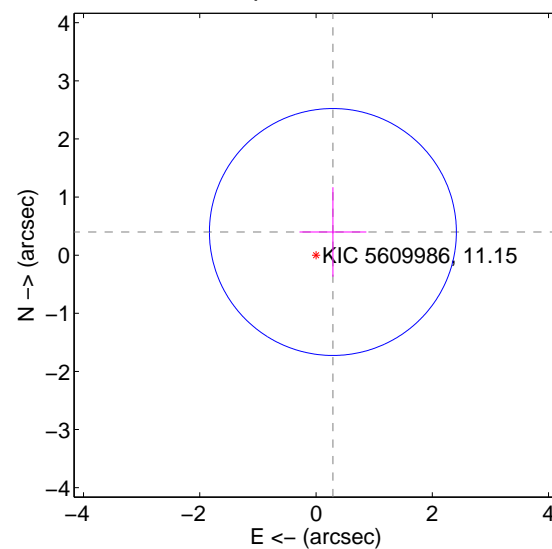
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

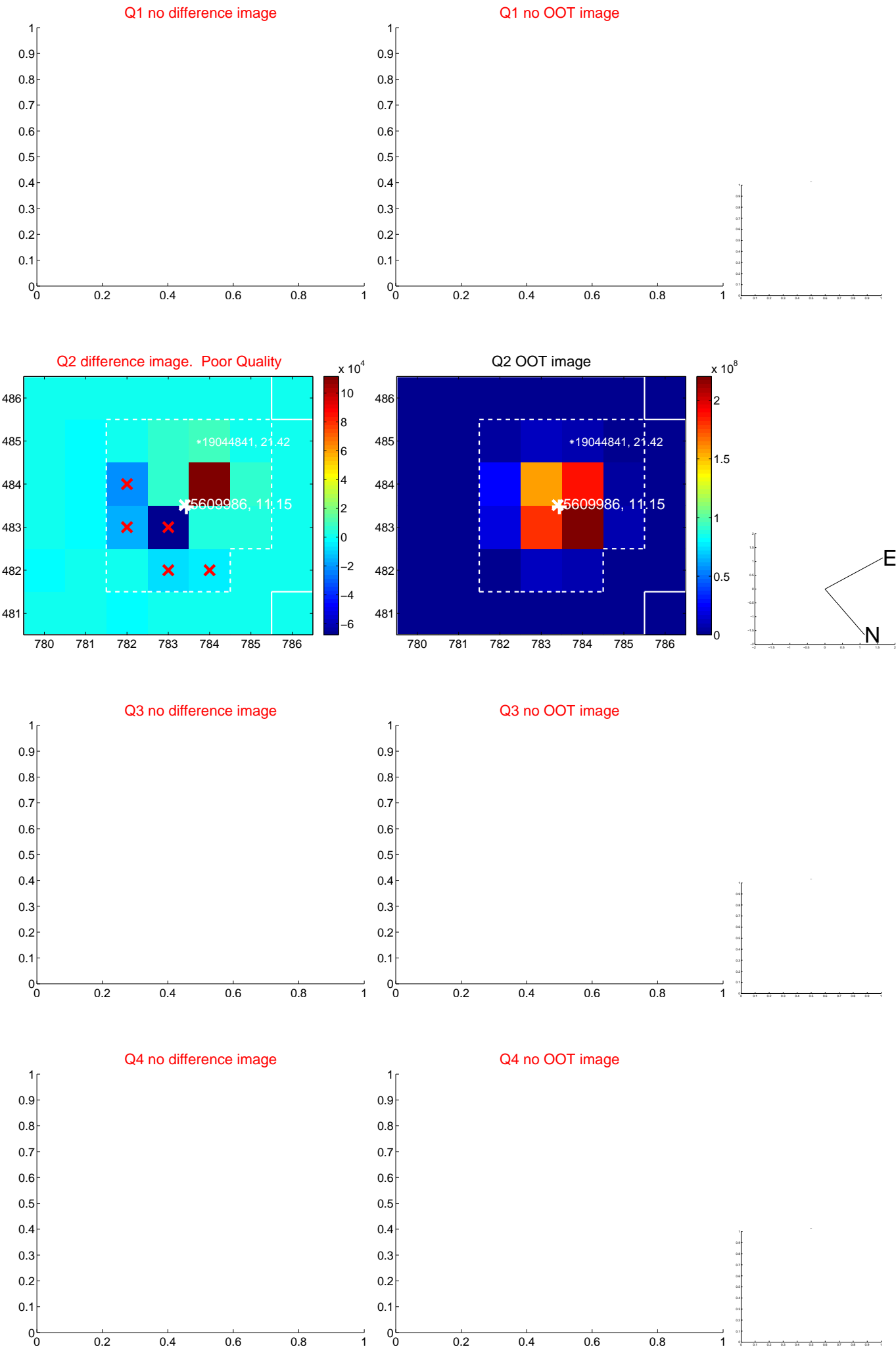


offset from photometric centroids

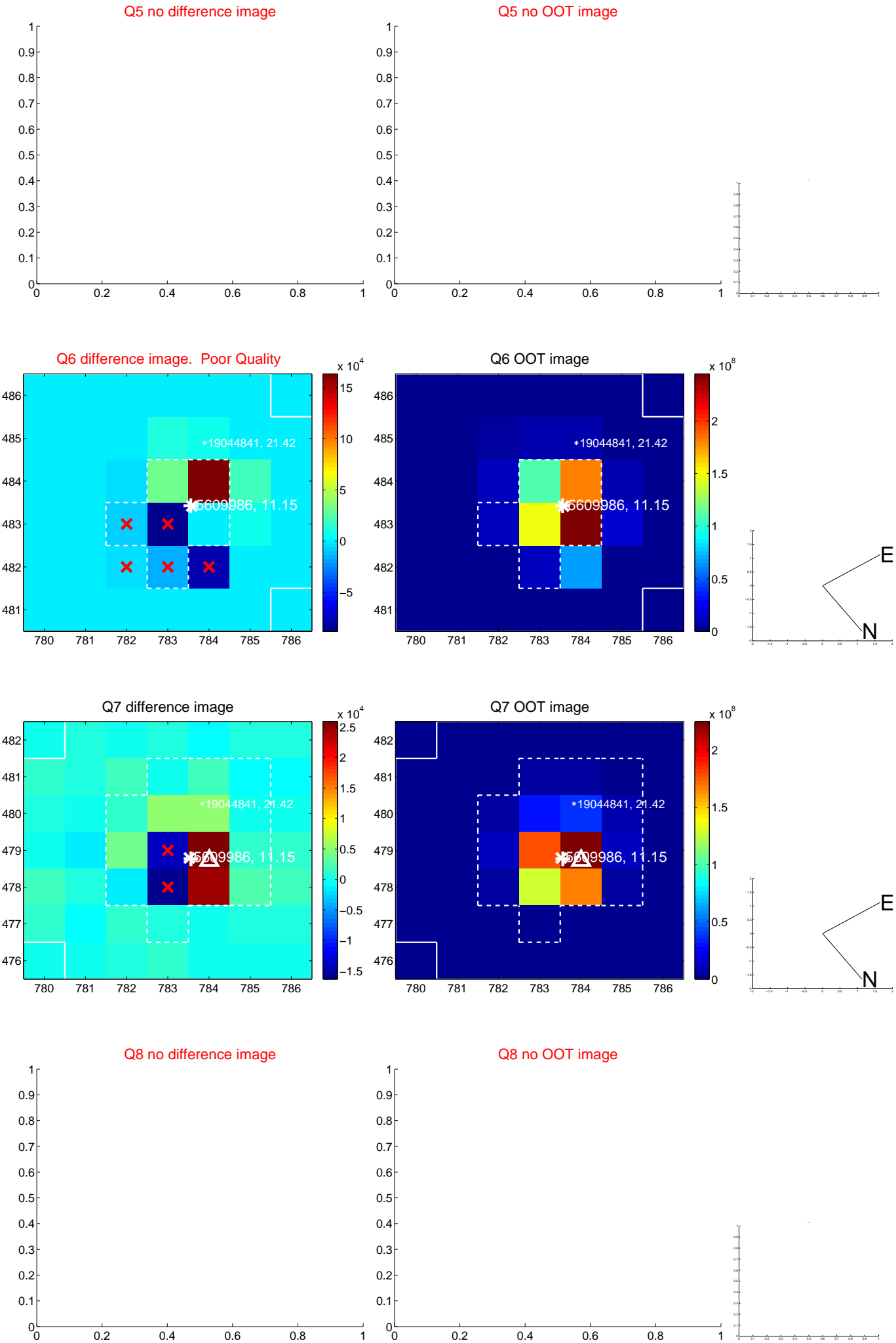


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

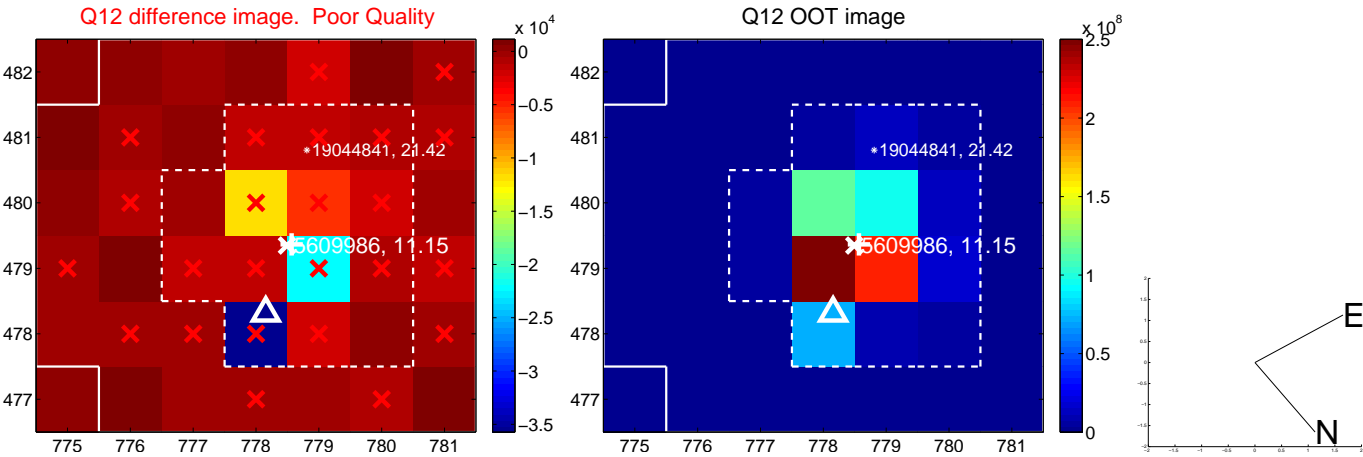
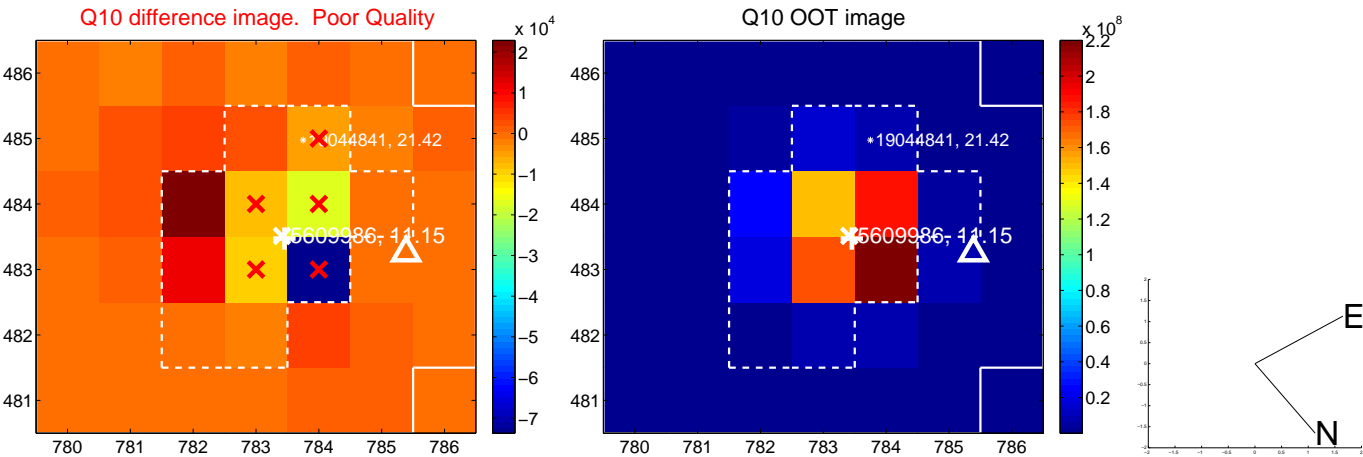
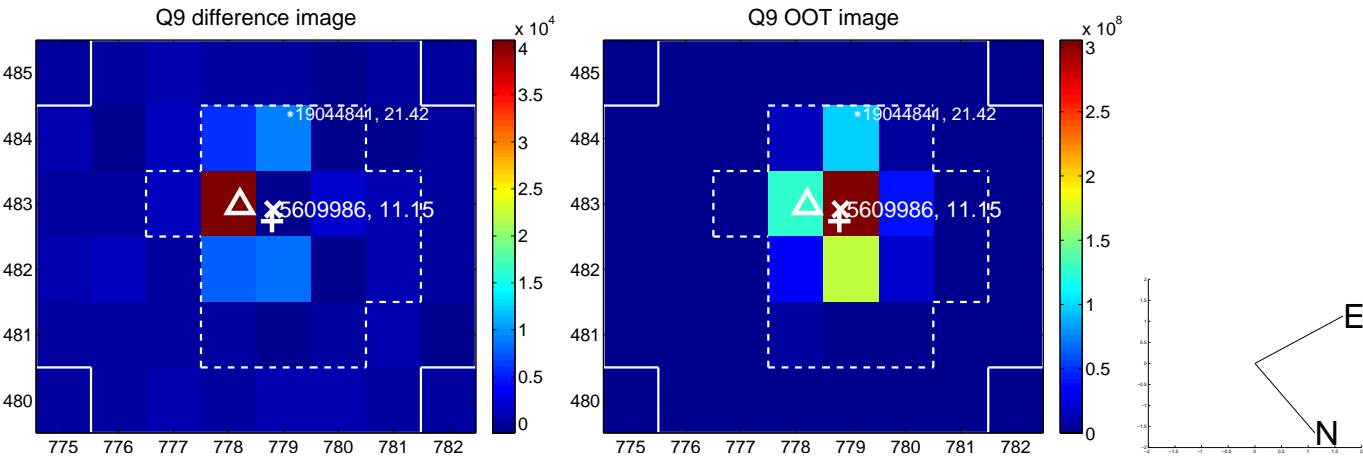
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



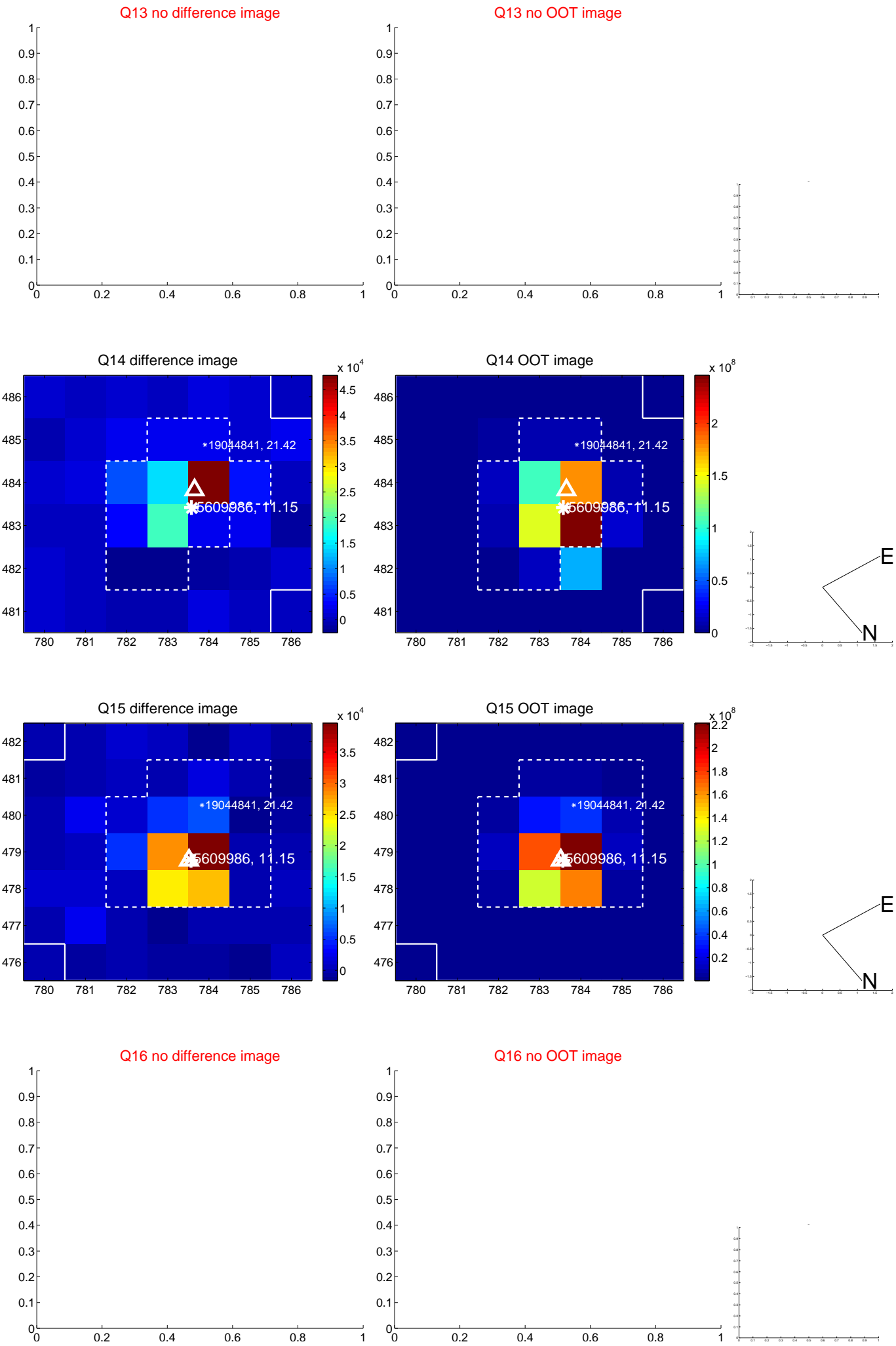
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



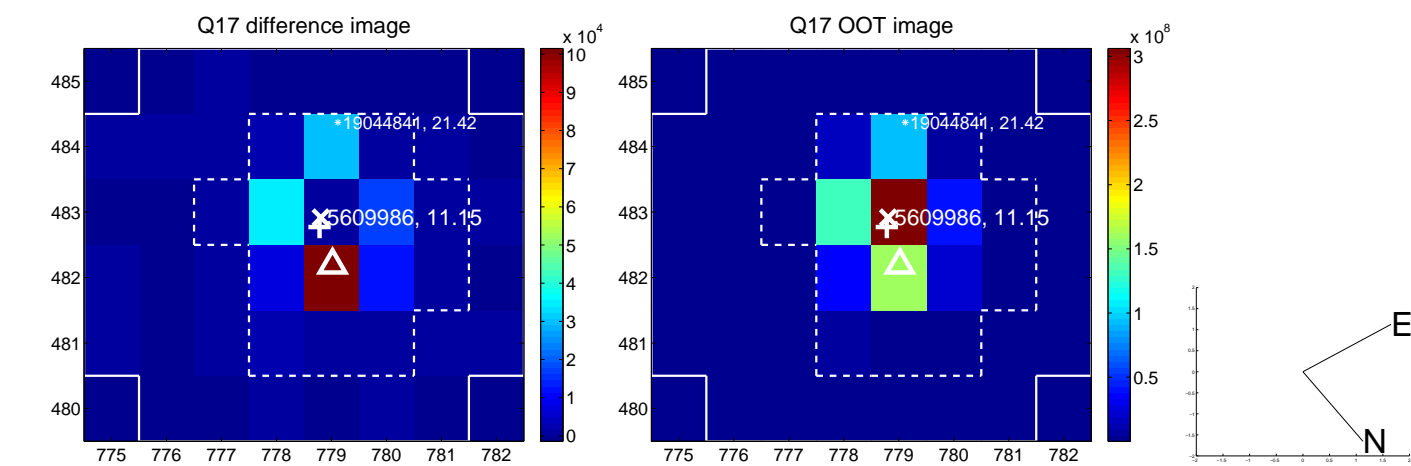
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



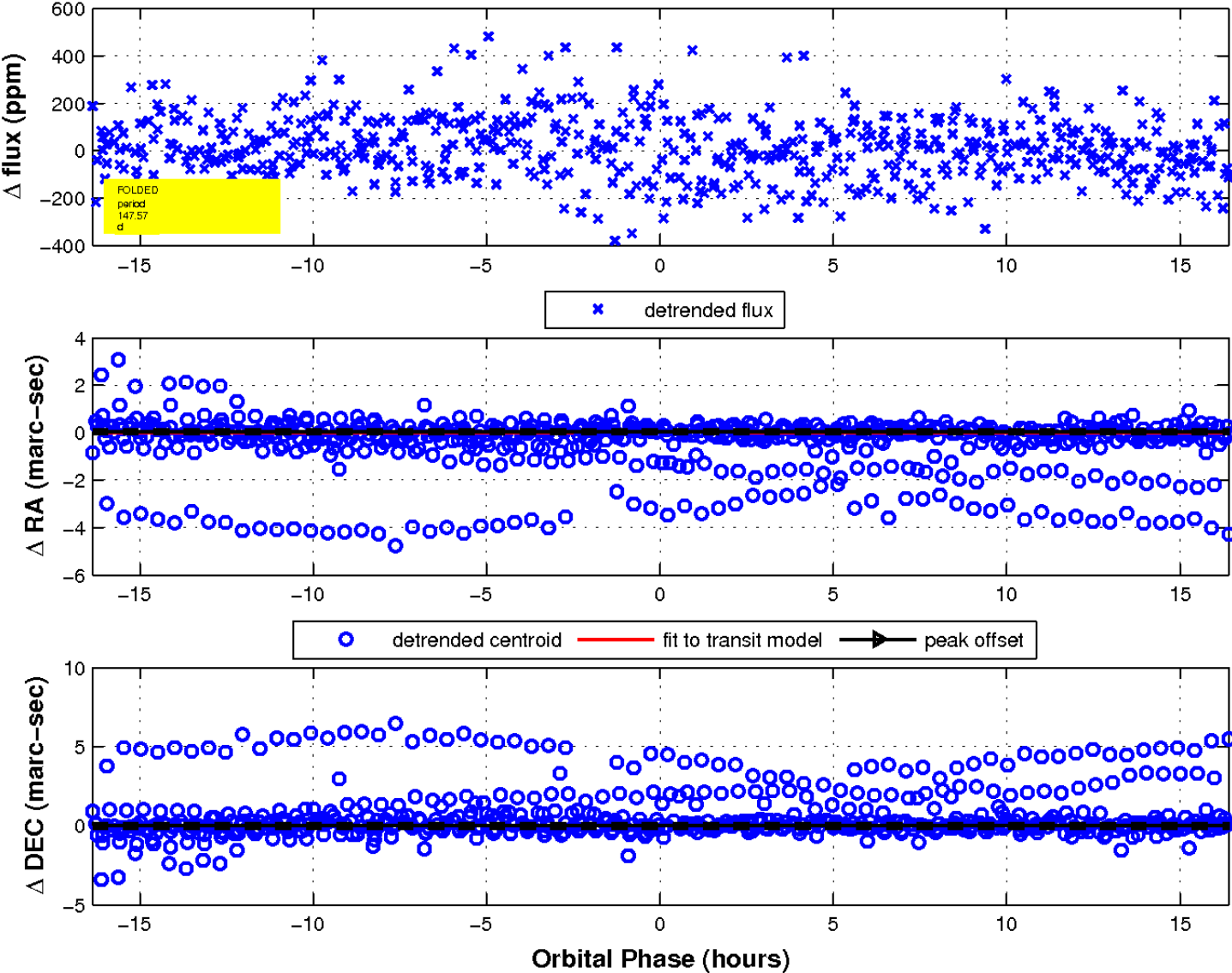
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 6 of 6



UKIRT Image

Declination

