On the origin of pulsing X-ray emission of AE Aquarii

V. I. Globina[1*], N. R. Ikhsanov[1,2†]

[1]Central Astronomical Observatory of RAS at Pulkovo, Pulkovskoe Shosse 65-1, St. Petersburg 196140, Russia

[2]Saint Petersburg State University, Universitetsky pr., 28, Stary Peterhof, St. Petersburg 198504, Russia

Cataclysmic variable AE Aquarii is a low-mass close binary system containing a red dwarf and a very fast rotating ($P_{\rm s} \simeq 33\,{\rm s}$) magnetized white dwarf (pulsar-like white dwarf). The optical, UV and X-ray emission of the system contain pulsing component at the spin period of the white dwarf. In contrast to optical and UV pulsations, X-ray pulsations with $P = 16.5\,{\rm s}$ haven't been detected. UV and optical oscillations are identified with two hot spots located in the regions of magnetic poles on the white dwarf surface. The nature of the X-ray pulsing emission of AE Aqr is not yet understood. X-ray emission of cataclysmic variables is generated due to accretion but this process cannot be applied to AE Aqr. We suggest mechanism of magnetic poles heat by charged particles accelerated into the white dwarf magnetosphere. We assume that the primary acceleration occurs in the current sheet at the magnetospheric boundary. The next phase is particles acceleration in electric field generated due to rotation of magnetized white dwarf. Validity of such assumption is confirmed by estimations of required particles density.

*E-mail: gvi1109@gmail.com

†E-mail: nazar.r.ikhsanov@gmail.com