AE AQUARII IS THE FIRST WHITE DWARF IN THE SUPER-PROPELLER STATE

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AE Aquarii is a low-mass binary which contains a strongly magnetized white dwarf rotating with the period of 33 seconds. Observations give no evidence for accretion of matter onto the surface of the white dwarf and its spin-down power exceeds the bolometric luminosity of the system. We show that the peculiar appearance of the system can be explained provided the white dwarf operates as a spin-powered pulsar. The surface magnetic field of the white dwarf within this scenario is about 50 MG. Numerical simulations of the mass-transfer between the system components suggest the white dwarf to be in the super-propeller state. The material streaming into the Roche lobe of the white dwarf from its companion interacts with the fast rotating magnetosphere and leaves the system without forming a disk. This can explain the peculiar flaring activity of the system observed in the radio, optical, UV and X-rays. The origin of the system is treated in terms of model of an accretion-driven spin-up in a previous epoch in which the screening and re-emerging of the white dwarf magnetic field are incorporated. Possible evolution track of this object is briefly discussed.