

On the Pulsed X-ray Emission and Rapid Spin-Down of the Magnetic Cataclysmic Variable AE Aquarii

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AE Aqr is a unique nova-like object classified as an intermediate polar or a DQ Hercules type magnetic cataclysmic variable. It consists of a magnetic white dwarf and a late-type companion star with a spectral type of K3 - K5. AE Aqr has the shortest spin period among the known white dwarfs ($P_s = 33.08$ s) with the orbital period of $P_{orb} = 9.88$ hr. It also has an unusually large spin-down rate ($dP_s/dt = 5.64 \times 10^{-14}$ s/s), a clearly pulsed emission from optical to X-ray, and a relatively low quiescent X-ray luminosity ($L_x = 7 \times 10^{30}$ erg/s). However, various observational results, such as soft X-ray spectrum, large pulse fraction in UV, absence of the evidence of the accretion disk, do not fit in a unified view. In this study, we report the results of Ginga and ASCA X-ray observations of AE Aqr. Based on the results, together with those obtained at other wavelengths, we discuss about the nature of unique source AE Aqr.