

X-RAY EMISSION FROM CATAclySMIC VARIABLES

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Many cataclysmic variables have been found to be hard, as well as soft, X-ray sources. Emission from the boundary layer of an optically thick accretion disk extending down to the stellar surface can, at outburst, produce soft X-rays, but the production of hard X-rays from such a disk is difficult to understand. We therefore conjecture that the sources which emit hard X-rays have magnetic fields and are, in general, rotating. We then propose a classification scheme for cataclysmic variables based on the size of the Alfvén radius r_A relative to the stellar radius R of the degenerate dwarf and the separation a of the binary system. We show that many of the varied characteristics displayed by the cataclysmic variable X-ray sources can be understood in terms of this ordering. We suggest that the AM Her Class (AM Her, AN UMa, VV Pup, and 2A0311-23) have $R \ll a \ll r_A$, the DQ Her Class (DQ Her, V533 Her, and AE Aqr) have $R \ll r_A \ll a$, while the SS Cyg Class (SS Cyg, U Gem, EX Hya, and GK Per) have $r_A \lesssim R \ll a$. Although r_A depends on both the magnetic field strength of the degenerate dwarf and the accretion rate, for comparable rates of accretion the ordering that we propose is essentially one of decreasing magnetic field strength.