H2215-086 / FO AQR: THE "KING" OF INTERMEDIATE POLARS SPINS DOWN

M.W. PAKULL and K. BEUERMANN
Institut für Astronomie und Astrophysik
Technische Universität Berlin, Berlin, F.R.G.

ABSTRACT

Our 5-color photometric observations of the intermediate polar H2215-086/FO Aqr which were collected between 1982 and the end of 1985 reveal that the 20.9 min rotational period increases with a spin-down rate of $(1.0\pm0.2)\ 10^{-10}$ ss^{-1}. This is in marked contrast to the spin-up behaviour of other well studied DQ Her systems.

The pulse profile of the optical modulation as a function of wavelength changes drastically across the Balmer jump suggesting the presence of two distinct components of pulsed optical emission which furthermore are shifted in phase with respect to the X-ray maxima observed with EXOSAT.

The UV, optical and IR flux distribution can adequately be accounted for by an accretion disc model with a mass-flow rate $\dot{M} = 10^{17}$ g s^{-1} and an inner boundary which is ≈ 10 times larger than the radius of the white dwarf. Our results support the magnetic accretion torque theory worked out by Ghosh and Lamb which can account for both spin-up and spin-down of the accreting star depending on the value of the fastness parameter ω_s.

We derive a magnetic moment $\mu \simeq 1.0\ 10^{33}$ G cm^3 which will allow H2215-086 to evolve into an AM Her system once it has crossed the 2-3 h period gap.

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