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The Spectral Energy Distribution of the Supersoft X-ray Source QR Andromedae: Preliminary Analysis of the X-ray Emission

Supersoft X-ray Sources (SSS) are associated with binary systems in which a white dwarf accretes matter from its companion at high rates ($1 - 4 \times 10^{-7}$ M$\odot$ yr^{-1}), enabling steady nuclear burning on its surface. Since the accreted material is not ejected in thermonuclear flashes, as observed in novae events, it is believed that the white dwarfs in SSS can reach masses up to the Chandrasekhar limit ($\sim$ 1.4 M$\odot$), making them potential progenitors of type Ia supernova explosions. QR Andromedae (QR And) is a bright (V $\sim$ 12.2 mag) Galactic SSS, located at a distance of approximately 2 kpc. QR And has an orbital period of 15.85 hr ($\sim$ 0.66 days), and the literature suggests a primary mass of $\sim$ 1.2 M$\odot$ and a low-mass ($\sim$ 0.5 M$\odot$) secondary. The source exhibits an extremely soft X-ray spectrum, with most of its emission below 1 keV, although there are few studies in the literature about its X-ray spectral behavior. To improve our understanding of the system's emitting components —the white dwarf (or the region nearby it), the accretion disk, and the companion star —this work presents an analysis of previously unpublished XMM-Newton observations, complemented by archival ROSAT data. Based on these X-ray data, fiducial to the white dwarf, we present preliminary results from an ongoing study of the spectral energy distribution of QR And. The X-ray spectra are well described by a phenomenological blackbody with temperature $T_{bb} \sim 20$ eV and luminosity $L_X \sim 10^{35}$ erg s^{-1}. Building on these results, we will incorporate a reprocessed disk component and a donor-star template to extend the fit toward longer wavelengths. Preliminary UV and optical points are already included, and additional multiwavelength data will follow in the next phase of the project.

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