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Probing accretion disk plasmas in LMXBs with XRISM

Low mass X-ray binaries (LMXBs) are systems composed of a compact object (black hole or neutron star) and a low mass (< mSun) companion star. The compact object accretes matter from the companion, forming an accretion disk. The gas in the disk is ionized by the strong X-ray emission from the inner disk region, leading to the appearance of photoionized plasmas. Characterizing their properties (e.g. plasmas'velocity, column density, and ionization) is essential for fully understanding the accretion disk structure of LMXBs.

X-ray dipping provides an excellent opportunity to study the properties of the plasmas in the accretion disk of these systems. The dipping phenomenon consists of periodic drops in X-ray flux that result from the interaction between the dense stream of colder matter accreted from the companion star and the impact region of the accretion disk. To date, this phenomenon has been observed in about two dozen high-inclination systems, however, the specifics of the structure and plasma properties in this impact region of the accretion disk are not yet understood.

I will present exciting new XRISM Resolve data of the dipping LMXB 4U1624-490, showcasing some of the ongoing analysis of the prominent X-ray dips, which have never been studied at the high spectral resolution that the microcalorimeter of the Resolve instrument allows. With this study, we aim to provide insight into the dipping phenomenon, any potential connection to disk winds, as well as getting a comprehensive picture of the plasmas in the accretion disk of LMXBs.

Contribution

Oral talk

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