Disk Winds in X-ray Binaries: the future of the microcalorimeter era, from XRISM to NewAthena

○Maxime Parra[1] (1.Ehime University)

The last two decades have seen a series of discoveries of narrow blue-shifted absorption features in transient Low-Mass X-ray Binaries (LMXBs), most notably ionized iron lines from Fe XXV and/or Fe XXVI. Once thought to be marginal components of the accretion phenomenon, photoionization arguments revealed that these features can trace massive equatorial outflows and be dynamically important for the stability and evolution of these systems. Many high-inclination sources exhibit these powerful disk winds, and while highly ionized signatures are traditionally restricted to the soft state, a large variety of wind signatures (generally strongly variable) and behaviors are seen, correlated with the outburst evolution. This hints at a complex connection between winds, jets, and the accretion flow itself. Recent results from XRISM/Resolve have provided the first high-resolution X-ray spectroscopy results of LMXB winds, allowing direct measurements of line profiles, velocity shifts, and ionization structure in unprecedented detail compared to previous instruments. However, many open questions remain, particularly regarding the full dynamical range of these winds, their physical origin, and their interplay with jets and accretion states. We will showcase the decisive breakthroughs in terms of physical diagnostics of wind properties that can be expected from the much higher sensitivity and unprecedented spectral resolution of the NewAthena X-IFU, which will build upon XRISM's pathfinding results, to provide a comprehensive understanding of LMXB winds and their interplay with accretion–ejection processes on various timescales.