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Modelling wind signatures in the optical and infrared spectrum of XRBs

Accretion disc winds are thought to play a significant role in shaping the outbursts of X-ray binaries (XRBs) by extracting mass and momentum from these systems. The study of cold, low-ionisation winds, detected through hydrogen and helium lines at optical and infrared (OIR) wavelengths, has recently provided substantial insights into their properties. The analysis of the optically thick wind regime, identified through blue-shifted absorptions, has offered further evidence for the equatorial geometry of the winds and provided information on the multiphase structure and velocity of the ejecta. Studies of winds detected in the optically thin regime (i.e. broad emission components) have enabled the determination of the ejected mass, providing evidence that winds can deplete a significant fraction of the disc.

By employing radiative transfer and photoionisation models, it is possible to reproduce the OIR signatures of accretion disc winds across both the optically thin and optically thick regimes. In this talk, I will provide a brief overview of the modelling of low-ionisation wind signatures. I will discuss the insights that can be gained from this approach, including the impact of ionisation on the detectability of wind features, the necessity for a clumpy wind structure, and the wind's efficiency in removing mass from the system. I will conclude by exploring the implications of these findings for the underlying wind launching mechanisms.

Contribution

Oral talk

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