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Jets and disc-winds from magnetically driven flows around black holes

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Relativistic jets and disc-winds are typically observed in BH-XRBs and AGNs. However, many physical details of jet launching and the driving of disc winds from the underlying accretion disc (AD) are still not fully understood. This study will investigate the role of different flow parameters on the launching of jets, driving disc-winds, and the dynamical properties of the disc. We will also explore the connection between jet, wind, and the AD around the central black hole. We have performed axisymmetric ideal and resistive GRMHD simulations of the accretion-ejection system using AMR. Essentially, our simulations were initiated with a thin AD in equilibrium. Our study has found relativistic jets and disc-wind driven by the Blandford & Znajek and Blandford & Payne mechanism, respectively. We have also found that plasmoids are formed due to the reconnection events, and these plasmoids advect with disc-winds. Consequently, the enhanced magnetic tension force results in disc truncation and sporadic oscillation in the inner part of the AD. However, with truncated accretion disc, the sporadic oscillations become periodic. Further, we will also discuss possible applications of our models to understand the observed variabilities in AGNs and BH-XRBs.

Abstract field

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