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Magnetic reconnection in kink-unstable jets BART RIPPERDA, ALEXANDER PHILIPPOV, Center for Computational Astrophysics, Flatiron Institute / Department of Astrophysical Sciences, Princeton University, JORDY DAVELAAR, Department of Astrophysics/IMAPP, Radboud University Nijmegen, LORENZO SIRONI, Department of Astronomy, Columbia University — Compact objects like the black holes in the centers of galaxies are known to launch jets that reach highly relativistic speeds. The jet can efficiently accelerate particles to non-thermal energies, yet the acceleration mechanism is still under debate. The kink instability can generate macroscopic reconnecting current sheets which are liable to the plasmoid instability. Magnetic reconnection and subsequent plasmoid formation are conjectured to accelerate particles to non-thermal energies. In magnetohydrodynamics (MHD) models, magnetic reconnection occurs due to a finite resistivity breaking the frozen-in condition. We explore plasmoid formation in kink-unstable jets in the framework of relativistic resistive MHD with the Black Hole Accretion Code (BHAC). We model a simplified configuration by isolating the jet from its launching site. In this way the setup is controllable by setting typical plasma parameters, such that different magnetization and resistivity regimes can be explored. We analyze reconnection properties and compare to both ideal MHD results and full kinetic simulations. We show that the interaction between the kink instability and the reconnecting current sheets results in plasmoid formation and heating of the plasma.

Bart Ripperda
Flatiron Institute; Princeton University

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