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RADs-Ringed accretion disks and the influence of magnetic field in multi-accreting events

Abstract

Ringed accretion disks (RADs), are agglomerations of accretion tori orbiting around one central Kerr super-massive Black Hole (SMBH) in AGNs. These disks are constituted by both corotating and counterrotating tori, depending strongly on the spin of the central attractors and the relative rotation of the fluids. Recently, the effects of a toroidal magnetic field have been investigated in the formation of several magnetized accretion tori, composing the RAD aggregate. Constraints on tori formation and emergence of RADs instabilities, accretion onto the central attractor and tori collision emergence, are examined. The analysis provides evidence of a strict correlation between SMBH spin, fluid rotation and magnetic fields in RADs formation and evolution. These studies proved that the role of the toroidal magnetic field together with the central BH spin-mass ratio, and the relative fluid rotation and tori rotation with respect the central BH, are crucial elements in determining the accretion tori features: magnetic field and disks rotation resulted to be strongly constrained, as tori formation and evolution in RADs depend on the toroidal magnetic fields parameters. Eventually the RAD frame investigation constraints specific classes of tori, for restrict ranges of magnetic field parameter, that could be observed around some specific SMBHs identified by their dimensionless spin.