Abstract Submitted
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Thermo−Rotational Instability in Plasma Disks Around Compact Objects∗ BRUNO COPPI, M.I.T. — Differentially rotating plasma disks, around compact objects, that are imbedded in a "seed" magnetic field are shown to develop vertically localized ballooning modes that are driven by the combined radial gradient of the rotation frequency and the vertical gradients of the plasma density and temperature [1]. When the electron mean free path is shorter than the disk height and the (vertical) thermal conductivity can be neglected, the vertical particle flows produced by of these modes have the effect to drive the density and temperature profiles toward the "adiabatic condition" where $\eta_T \equiv (dlnT/dz/(dlnn/dz) = 2/3$. Here T is the plasma temperature and n the particle density. The faster growth rates correspond to steeper temperature profiles ($\eta_T > 2/3$) such as those produced by an internal (e.g. viscous) heating process. In the end, ballooning modes excited for various values of η_T can lead to the evolution of the disk into a different current carrying configuration such as a sequence of plasma rings[2].
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[1]B. Coppi, M.I.T. (LNS) Report HEP, 07/02, Cambridge, MA (2007), *Invited Paper at the International Symposium on "Momentum Transport in Jets, Disks and Laboratory Plasmas", Alba, Piedmont, September 2007*, to be published in Europhysical Letters (EPL, IOP)
[2]B. Coppi andF. Rousseau, *Ap. J.*, **641**, 458, (2006)

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