

Abstract Submitted
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High Energy Plasmas, General Relativity and Collective Modes in the Vicinity of Black Holes* B. COPPI, MIT — Plasmas around black holes can take different equilibrium configurations¹ from those known from fluid theory as the vertical Lorentz compression due to plasma currents can overtake that of the gravitational force. In a disk with a “seed” magnetic field, axisymmetric modes as well as tri-dimensional spirals can be excited by the combined effects of the radial gradient of the plasma rotation frequency and of the plasma pressure gradient². The spirals’ properties depend strongly on their vertical structure³. Axisymmetric modes can produce vertical counter-flows of thermal energy and particles and be candidates for the origin of the winds emanating from disks in Active Galactic Nuclei (AGN’s)². The excitation of radially localized density spirals corotating with the plasma near a black hole can provide an explanation for⁴ the observed Quasi Periodic Oscillations (QPO’s) of the X-ray emission from compact objects. Convective spiral modes³ that are purely oscillatory in time and not localized radially can acquire their amplitudes from coupling to unstable modes and provide transport³ of angular momentum toward the outer region of the disk structure.*Sponsored in part by the U.S. DOE.
¹B. Coppi and F. Rousseau, *Ap. J.*, **641**, 458 (2006). ²B. Coppi, *Europhys. Letters* **82**, 19001 (2008). ³B. Coppi, MIT/LNS Report 08/08, submitted to *A&A* (2008).
⁴B. Coppi and P. Rebusco, Paper P5.154, *E.P.S. Conf. Pl. Phys.* (Crete, 2008).

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