Abstract Submitted
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Plasma Regimes in the Surroundings of Black Holes, Composite Magnetic Field Structures and Associated Radiation Processes* B. COPPI, MIT — In the close vicinity of Binary Black Holes the existence of three characteristic plasma regions is envisioned. The intermediate of these regions exhibits three physical regimes that differ both for the magnetic field structure and the spectrum of the emitted radiation, with jets and High Frequency Periodic Oscillations (HFQPOs) produced in two of these regimes. The excitation of radially localized density spirals co-rotating with the plasma, at a distance related to the radius of the marginally stable orbit is proposed as the explanation for the HFQPOs of non-thermal X-ray emission characterizing the relevant regime. The theory of the composite plasma disk structures[1] and of the relevant magnetic field configurations that can surround black holes is presented, consistently with recent experimental observations indicating that highly coherent magnetic field configurations exist in the core of these structures. The radial gradient of the rotation frequency and the vertical gradient of the plasma pressure are the excitation factors for spirals as well as for axisymmetric modes. These can produce vertical flows of thermal energy and particles in opposing directions that can be connected to the winds emanating from disks in Active Galactic Nuclei (AGNs). *Sponsored in part by the U.S. Department of Energy. [1] B. Coppi *Pl. Phys. Cont. Fus.* **51** (2009).

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