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Plasma Accretion Disks with Comparable Thermal and Magnetic Energy Densities B. COPPI, M.I.T., F. ROUSSEAU, Ecole Normale Superieure — An important class of plasma accretion disks is that of relatively cold disks where the energy density of the magnetic field in which they are imbedded can be comparable with their thermal energy density (finite-β). We have considered, in particular, the important case where the field produced by currents inside the disk is comparable with the external magnetic field. We have found that the "crystal structure" of the magnetic field, identified in Ref.[1] for weak magnetic energy densities, can persist but that the plasma density becomes strongly modulated in the radial direction with periods that are fractions of that of the plasma current density. The vertical cross section of the magnetic crystal structure can be visualized as a string of spheromak configuration. The difference from real spheromaks is that here each pair of current filaments involves counterstreaming currents around the symmetry axis of the disk rather than by a single current channel streaming around the axis of spheromak. The gradient of the rotation frequency has a key role in determining the structure of this equilibrium configuration and can be considered the source of it as this corresponds to a marginally stable ballooning mode[2] when the linearized approximation is valid.
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[1]B. Coppi, *Phys. Plasmas* **12**, 057302 (2005).
[2]B. Coppi and P.S. Coppi, *Phys. Rev. Letters* **87**, 051101 (2001).

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