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Plasma Component of Self-gravitating Disks and Relevant Magnetic Configurations[1] G. BERTIN, Universita' di Milano, B. COPPI, MIT — Astrophysical disks in which the disk self-gravity is more important than the gravity force associated with the central object can have significant plasma components where appreciable toroidal current densities are produced. When the vertical confinement of the plasma rotating structures that can form is kept by the Lorentz force rather than by the vertical component of the gravity force, the disk self-gravity remains important only in the radial equilibrium condition, modifying the rotation curve from the commonly considered Keplerian rotation. The equilibrium equations that are solved involve the vertical and the horizontal components of the total momentum conservation equations, coupled with the lowest order form of the gravitational Poisson's equation. The resulting poloidal field configuration can be visualized as a sequence [1] of Field Reverse Configurations, in the radial direction, consisting of pairs of oppositely directed current channels. The plasma density thus acquires a significant radial modulation that may grow to the point where plasma rings can form [2]. [1] B. Coppi, *Phys. Plasmas*, **12**, 057302 (2005) [2] B. Coppi and F. Rousseau, to be published in *Astrophys. J.* (April 2006)

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