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MHD dynamo for the Reversed Field Pinch DANIELE BONFIGLIO, SUSANNA CAPPELLO, Consorzio RFX, DOMINIQUE FRANK ESCANDE, bCNRS-Université de Provence, Marseille, France, GIANLUCA SPIZZO, Consorzio RFX — MHD modelling is believed to provide a good description of large scale dynamics of the Reversed Field Pinch. In particular, 3-dimensional nonlinear simulations in a simple visco-resistive approximation [see Cappello PPCF 2004 and references therein] display many features in reasonable agreement with experiments. In recent times it has been shown that the general and basic tendency of the RFP to develop a more or less regular global kink type deformation of the plasma column forces a corresponding charge separation (consistent with quasi-neutrality) and a related electrostatic field. The ensuing electrostatic drift velocity (nearly) coincides with the dynamo velocity field traditionally considered to sustain the configuration [Bonfiglio,Cappello,Escande PRL 2005; Cappello,Bonfiglio,Escande PHP 2006]. In this presentation we review our present understanding in this subject. In particular we focus on the description of the formation of pure helical laminar RFP solutions, and study the relationship between the electrostatic structure and the topological properties of the magnetic field in the case of the less regular turbulent solutions, where the robustness of a chain of magnetic islands isolating the chaotic core from the edge has been recently highlighted [Spizzo,Cappello, Cravotta, Escande, Predebon, Marrelli, Martin, White, PRL 2006].

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