

The Reversed Field Pinch toward magnetic order: a genuine self-organization

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During the last decade, experimental and theoretical results induced a change of paradigm for the Reversed Field Pinch, (RFP). Indeed, experiments in present generation devices back up the new theoretical understanding of this alternative configuration for magnetic confinement: The basic nature of the system can be described as a self-organized helical state corresponding to the nonlinear saturation of a kink-tearing mode. This perspective was somewhat anticipated by older pioneering 3D nonlinear MHD. Very importantly from a theoretical point of view and with respect to confinement properties, the existence of RFP equilibrium with perfectly conserved helical confining magnetic surfaces comes into play. This is at variance with the previous traditional idea of the RFP as a relaxed axis-symmetric state, which, by theoretical arguments, requires the action of turbulence to accomplish and to maintain relaxation. In this presentation we propose a summary and discussion of the achievements in this subject, including results from 3D nonlinear MHD simulations, related transport effects and present open issues. Major relevant experimental facts are also surveyed.

Some relevant references

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