Dynamo in plasmas: From magnetic islands to thermonuclear fusion reactors

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Dynamos are present in several current-carrying plasmas. Indeed, an e. m. f. due to a self-generated (dynamo) velocity field complements the one generating this current. The simplest case corresponds to the tearing instability of resistive magnetized plasmas, which yields a magnetic island sustained by a self-generated quadrupolar vortex. A similar mechanism is at work in the reversed field pinch (RFP), a toroidal configuration for the magnetic confinement of thermonuclear plasmas. It is striking to note that the equilibrium reached after relaxation in the Von Karman Sodium experiment corresponds to a cylindrical version of the RFP.
