

# Lessons from the RFP on magnetic feedback control of plasma stability

Piero Martin

*Consorzio RFX, Associazione Euratom-ENEA per la fusione - Padova, Italy*

The Reversed Field Pinch (RFP) is a toroidal configuration for magnetic confinement of thermonuclear plasmas.

In the RFP, like in tokamak, a toroidal electric current is driven in a plasma embedded in a toroidal magnetic field; unlike the tokamak, the average magnitude of the toroidal magnetic field in the plasma is similar to the that of the poloidal magnetic field. This means that for a given plasma current the average toroidal magnetic field in the RFP plasmas is about an order of magnitude smaller than in the tokamak.

The RFP is explored as a potential fusion concept, in particular because of the simpler technology due to the low magnetic field approach.

In recent times RFP have given state-of-the-art contributions to the research on active control of MHD stability. Two RFP devices (RFX-mod and EXTRAP T2R) are equipped with the most complete systems of active coils ever realized for a fusion device. RFX-mod, for example, has 192 coils, which cover the whole plasma surface and are independently driven and feedback controlled. Moreover, all RFP devices have tested the possibility of controlling the amplitude of core resonant tearing modes by tailoring the current density profile by means of inductive poloidal current drive, a tool pioneered in MST.

This lecture will review the main achievements on active control of MHD stability in RFPs, highlighting in particular results and tools of general interest for the development of the field and the areas of cross-fertilization with tokamak MHD control.