Abstract Submitted
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Resistive g-modes and RFP confinement JAN SCHEFFEL, Division of Fusion Plasma Physics, Alfvén Laboratory, Royal Institute of Technology, Association EURATOM-VR, Stockholm, Sweden, AHMED MIRZA, Division of Fusion Plasma Physics, Alfvén Laboratory, Royal Institute of Technology, Stockholm, Sweden — The role of pressure driven resistive modes in the reversed-field pinch remains unclear. It was early shown that unstable resistive g-modes would always exist for an inwardly directed pressure gradient. It now appears that pressure profile smoothing, due to inclusion of heat conductivity terms in the energy equation, enables completely stable RFP states at moderate plasma beta. These calculations, apart from being restricted to linearized perturbations, suffer from the use of rather forced scalings, thus their accuracy can be questioned. Also, they have so far only been applied to conventional RFP states, where confinement-limiting tearing fluctuations maintain the reversed axial magnetic field. In the advanced RFP, current profile control has largely eliminated current driven tearing modes. Fully nonlinear, numerical studies have shown that energy confinement and poloidal beta increase substantially, but that weak residual modes usually remain. The nature of these residual modes, which limit energy confinement, is studied using a novel semi-analytical, spectral scheme for solving the resistive MHD equations; the generalized weighted residual method (GWRM). Results from the analysis as well as comparisons with the competing linear resistive g-mode theories will be presented.

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