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The Internal Optimization of Axisymmetric Mirror M.T. MISSANELLI, Z.H. GUO, X.Z. TANG, LANL — There has been considerable recent interest in the concept of an economical volumetric neutron source based on the axisymmetric magnetic mirror. The stabilization against interchange modes due to the "bad" magnetic curvature is crucial to achieve a MHD stable equilibrium. The axisymmetric mirror is robustly unstable to flute-type modes unless the beta averaged magnetic curvature is positive. The finite Larmor radius effect is later found to be able to prevent the development of small-scale interchange perturbations. Therefore, the magnetic divertor may be introduced into the central cell. It helps to both localize the "bad" curvature and increase the "good" curvature region. In this work, we present a high-beta mirror MHD equilibrium solver. Given various vacuum fields, with or without divertor, and parallel pressure profiles as functions of the magnetic flux and strength, different 2-D MHD equilibriums are numerically calculated and compared. Then, the stabilization effect of magnetic divertors is investigated by evaluating the Rosenbluth-Longmire integral. A scan of control parameters is performed for the internal optimization of the mirror-confined plasma.

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