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Plasma-Neutrals Physics in Centrifugal Confined Plasma SHEUNG WAH NG, A.B. HASSAM, IREAP, University of Maryland, College Park, IREAP, UNIVERSITY OF MARYLAND, COLLEGE PARK TEAM — A simple model is developed for the penetration of neutrals into plasma for a rotating mirror configuration, for example, the Maryland Centrifugal Experiment (MCX). In such configurations, the inward confining force originating from the centrifugal force competes with the tendency of the plasma to expand in the parallel direction. By including ionization, charge exchange, and recycling in this model, the distribution of neutrals in the centrifuge is calculated. An exponential relation between the centrifugal confining force and the neutral density at the axial wall is demonstrated. The distribution of neutrals at the wall crossfield to the plasma has been considered earlier. The crossfield physics is different from the axial physics and disparate neutral wall densities are found. The combined neutral distribution in 2D is not well understood yet. We have developed a 2D code for this purpose. In the crossfield direction, classical diffusion losses are allowed. All the parameters are set to close to MCX parameters in order to investigate the effects of confinement on the neutral-plasma profiles/interactions. It is of great interest to understand the effect of neutrals on dragging the supersonic rotation (mainly in the mid-plane) and the role they play in the Hartmann layers expected at the axial end-plates.

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