

Abstract Submitted
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Neutral depletion in magnetized plasmas¹ AMNON FRUCHTMAN, GENNADY MAKRINICH, H.I.T. - Holon Institute of Technology — The effect of neutral depletion on the steady-state of a low temperature magnetized plasma is studied. The nonlinear cross- field diffusion is assumed ambipolar. The nonlinearity results from the dependence of the transport coefficients on the plasma and neutral densities. Recent results are described. It is shown that when the dominant electron collisions are with neutrals, neutral depletion results in a peaking of the density on-axis. If, however, electrons collide mostly with ions, neutral depletion results in flattening of the radial density profile. The nonlinear dependence of the density on the plasma flux is shown to differ for the two cases. There is a fast exponential increase of the plasma density with an increase of the plasma flux, when electrons collide mostly with neutrals, while the plasma density increases only logarithmically with the plasma flux when electron collisions with ions are dominant [1]. We then show how the 2D transport along and across magnetic field in the presence of neutral depletion result in a hollow cylindrical profile of the plasma density, in which the plasma density has a minimum on the cylinder axis.

[1] A. Fruchtman, Plasma Sources Sci. Technol. **18**, 025033 (2009).

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