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Experiments and PIC Simulations on the UM Large Area, ECR Electric Propulsion Neutralizer<sup>1</sup> Y. HIDAKA, R.M. GILGENBACH, W.D. GETTY, M.C. JONES, V.B. NECULAES, Y.Y. LAU, Intense Energy Beam Interaction Laboratory, Dept. of Nuclear Eng. and Radiological Sci., University of Michigan, Ann Arbor — We report experimental and simulation results of the Getty ECR plasma source [1, 2], as a plasma neutralizer for electric propulsion. This device generates a uniform plasma over a large ECR area created by rows of permanent magnets placed between a large, S-band microwave horn and a chamber. The metal magnet bars are cross-polarized to minimize microwave reflection. Electron densities are overdense (up to 6E11 /cc) with 2.45 GHz at 100's W. Currents were extracted by biasing a collector positively with both pulsed and DC power supplies. For low DC voltages, electron currents were measured (rather than discharge currents). Experimental parameters: gas pressure, extraction voltage, microwave power, and the position and size of the collector were varied and compared. 2D MAGIC simulations of this source confirmed that most energy transfer from the microwaves into particles occurs near the ECR region, and cross-field diffusion is under investigation with MAGIC.

W.D. Getty and J.B. Geddes, J. Vac. Sci. Tech. B, v.12, pp. 408-415 (1994).
W.D. Getty, US Patent # 5,466,295 (1995).

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