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**Magnetic Effects in a Moderate-Temperature, High-Beta, Toroidal Plasma Device** W.F. EDWARDS, A.K. SINGH, E.D. HELD, Utah State University — A small toroidal machine (STOR-1M; minor radius 4.5 cm), on loan from the University of Saskatchewan, has been modified to operate at hydrogen ionization levels  $\sim 0.1\%$ , beta values between 0.1 and 1, electron number density  $\sim 5 \times 10^{16}/\text{m}^3$ , temperature  $\sim 5$  eV, and applied toroidal magnetic field  $\sim 20$  gauss. Plasma is generated using magnetron-produced microwaves. Langmuir and Hall probes determine radial profiles of electron number density, temperature, and magnetic field. For most values of the externally-applied magnetic field, the internal field is the same with or without plasma, however, in a narrow window of B, diamagnetism and other effects are present. The effect is observed with no externally induced current; plasma currents are self generated through some sort of relaxation process. Beta and radius conditions correlate well with similar magnetic structures in the laboratory (eg., plasma focus, Z pinch) and in space (eg., Venus flux ropes, solar coronal loops).

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