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Overview of MST Results and Plans[1] J.A. GOETZ, University of Wisconsin - Madison and the Center for Magnetic Self Organization in Laboratory and Astrophysical Plasmas, MST TEAM — MST progress in producing well-confined high beta plasmas continues. In high current plasmas with improved confinement through current density profile control (transient), the electron temperature is increased to 2 keV and the ion temperature is increased (through reconnection heating) to 1 keV. With pellet injection plasma beta (volume averaged pressure/surface magnetic pressure) increases to 26%, beyond linear stability limits for pressure-driven tearing and Mercier instability. Physics results on ion heating (correlated with reconnection), particle transport from stochastic fields, high frequency turbulence, momentum transport from tearing modes, and two-fluid reconnection are also obtained. In preparation for finer current profile control, lower hybrid (LH) and electron Bernstein waves are injected at about 175 kW, with LH- produced hard x-rays observed. New major projects under development include 1 MW neutral beam injection for auxiliary power deposition, programmable control of the toroidal field and poloidal loop voltage, oscillating field current drive at increased power, and fast Thomson scattering for electron temperature fluctuation measurements.

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