Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Improved confinement at high density and high beta in the MST B.E. CHAPMAN, A.F. ALMAGRI, J.K. ANDERSON, K.J. CASPARY, D.J. CLAYTON, D.J. DEN HARTOG, F. EBRAHIMI, G. FIKSEL, J.A. GOETZ, S. KUMAR, R.M. MAGEE, J.A. REUSCH, J.S. SARFF, H.D. STEPHENS, Y.M. YANG, UW-Madison, W.F. BERGERSON, D.L. BROWER, W.X. DING, L. LIN, UCLA, S. COMBS, C. FOUST, ORNL — Improved confinement plasmas in MST are routine using current profile control to reduce tearing instabilities. With pellet injection, the density of these plasmas has been increased to values well above the Greenwald limit. At 0.2 MA, the achieved density exceeds the limit by 50%. At 0.5 MA, an MST-record density of 0.7 x 10^{20} m^{-3} is achieved that exceeds the limit by 10%. While confinement is improved at high density, tearing instabilities are not reduced to the same degree as at lower density. This may be due to the larger beta at high density, with total beta reaching 26%. The central pressure gradient violates the Mercier criterion, and linear stability calculations indicate that pressure-driven tearing could be important. The maximum MST energy confinement time of 12 ms, achieved at well below the density limit, is within a factor of two of expectations for a tokamak of the same size, current, and heating power. Supported by USDOE.

Brett Chapman
UW-Madison

Date submitted: 20 Jul 2010 Electronic form version 1.4