Abstract Submitted
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**Pellet fueling of axisymmetric and non-axisymmetric MST plasmas** K.J. CASPARY, B.E. CHAPMAN, A.F. ALMAGRI, J.K. ANDERSON, D.J. DEN HARTOG, J.A. GOETZ, J. KO, S. KUMAR, S.T. LIMBACH, S.P. OLIVA, E. PARKE, J.A. REUSCH, J.S. SARFF, UW-Madison, F. EBRAHIMI, University of New Hampshire, D.L. BROWER, W.X. DING, L. LIN, UCLA, S.K. COMBS, C.R. FOUST, ORNL — Deuterium pellet injection into toroidally axisymmetric MST plasmas with a broadband reduction in magnetic tearing fluctuations and improved confinement has resulted in a total $\beta$ of 26% with a pressure gradient that exceeds the Mercier criterion. The density limit has been exceeded by 50% in 200kA discharges and by 20% in 500kA discharges, with the latter case having a density exceeding 7.5e19 $m^{-3}$. Simulations in toroidal geometry with NIMROD reveal that the plasma is linearly unstable to pressure-driven tearing and interchange modes. Pellets have also been injected into a new class of plasmas in which toroidal axisymmetry is broken by a 3D helical structure in the core. This structure emerges when the innermost-resonant tearing mode grows to large amplitude and dominates the mode spectrum. Pellet injection during growth of this mode can trigger a rapid change in that mode's growth rate. Pellet fueling after the mode has saturated leads to substantial density gradients. Supported by USDoE.

K.J. Caspary
UW-Madison

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