Abstract Submitted
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Two-dimensional MHD simulations of tokamak plasmas with poloidal flow BO HU, R. BETTI, University of Rochester — It has been shown [1] that, according to the ideal MHD equilibrium theory, poloidal flow in a tokamak can give rise to a pedestal structure with the pressure, density and velocity developing sharp discontinuities in their radial profiles. Such a pedestal arises when the poloidal velocity exceeds the poloidal sound speed. Since the poloidal sound speed vanishes at the separatrix, it is conceivable that evena rather slow poloidal flow can become transonic near the plasma edge, thus inducing a pedestal in the hydrodynamic profiles. While equilibrium calculations [1-4] of such a pedestal are well established, only a few two-dimensional time-dependent simulations have been carried out [5]. Here, we show the preliminary results from a two dimensional MHD code that simulates the formation of the pedestal starting from a poloidal velocity profile that becomes supersonic at the plasma edge. This work was supported by US-DOE under Contract DE-FG02-93ER54215. [1] Betti and Freidberg, Phys. Plasmas 7, 2439 (2000). [2] Guazzotto, Betti, Manickam and Kaye, Phys. Plasmas 11, 604 (2004). [3] Guazzotto and Betti, Phys. Plasmas 12, 056107 (2005). [4] Thyagaraja and McClements, Phys. Plasmas 13, 062502 (2006). [5] Gardiner, Betti and Guazzotto, Bull. Am. Phys. Soc. 46, No. 8, 166 (2001).

Bo Hu
University of Rochester

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