Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Enhancement of Edge Stability with Lithium Wall Coatings in NSTX R. MAINGI, ORNL, R.E. BELL, B.P. LEBLANC, R. KAITA, S.M. KAYE, H.W. KUGEL, D.K. MANSFIELD, PPPL, T.H. OSBORNE, GA, NSTX TEAM — ELM reduction or elimination while maintaining high confinement is essential for ITER, which has been designed for H-mode operation. Large ELMs are thought to be triggered by exceeding either edge current density and/or pressure gradient limits (peeling, ballooning modes). Stability calculations show that spherical tori should have access to higher pressure gradients and pedestal heights than higher R/a tokamaks, owing to access to second stability regimes[...1]. An ELM-free regime was recently observed in the NSTX following the application of lithium onto the graphite plasma facing components[.....2]. ELMs were eliminated in phases[.....3], with the resulting pressure gradients and pedestal widths increasing substantially. Calculations with TRANSP have shown that the edge bootstrap current increased substantially, consistent with second stability access. These ELM-free discharges have a substantial improvement in energy confinement, up to the global $\beta_N \sim$ 5.5 limit. * Supported by US DOE DE-FG02-04ER54520, DE-AC-76CH03073, and DE-FC02-04ER54698. [.1] P. B. Snyder, et. al., *Plasma Phys. Contr. Fusion* **46** (2004) A131. [2] H. W. Kugel, et. al., *Phys. Plasma* **15** (2008) #056118. [3] D. M. Mansfield, et. al., *J. Nucl. Materials* (2009) submitted.

Rajesh Maingi
Oak Ridge National Laboratory

Date submitted: 14 Aug 2008 Electronic form version 1.4