Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Experimental Study of the Effects of Lithium Coated Plasma Facing Components on Energy Confinement Time in the CDX-U Device[1] JEFFREY SPALETA, LEONID ZAKHAROV, RICHARD MAJESKI, ROBERT KAITA, TIMOTHY GRAY, PPPL — The first ever measurements of energy confinement time for spherical tokamak plasmas in the presence of lithium coated plasma facing components (PFC's) have been made in the CDX-U device. The energy confinement time, as derived from power balance considerations using parameters calculated from plasma equilibria, was as large as 6 milliseconds for Ohmic plasmas in the presence of both solid and liquid lithium PFC's. This represents a significant improvement over baseline plasmas, which typically had energy confinement times of 1 millisecond or less. The energy confinement for plasmas with lithium PFC's also showed an improvement over that expected from the ITER98(y,1) confinement scaling. The improvement in confinement over this scaling correlates with the observed increase in density "pump-out", which is indicative of low wall-recycling. Plasma equilibria were calculated using a modified version of the Equilibrium and Stability Code (ESC), and were constrained by measurements made from a collection of magnetic field diagnostics. The ESC was modified to incorporate the first ever implementation of a novel response function technique for in-situ magnetic field diagnostic calibration that is insensitive to toroidal asymmetries and vessel wall currents.

[1]Supported by US DOE contract #DE-AC02-76CH-03073.

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Date submitted: 21 Jul 2006 Electronic form version 1.4