Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Development of an energetic plasma source for simulating edge localized mode plasma interactions with first wall and diverter materials DAVID RUZIC, TRAVIS GRAY, BENJAMIN MASTERS, University of Illinois, Urbana-Champaign, UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN TEAM — Edge Localized Modes (ELMs) pose a significant problem to current and future fusion reactors. One concern in a device such as ITER is that ELMs may be the limiting factor for successful operation. ITER ELMs are predicted to impart between 1 – 10 MJ/m^2 onto the divertor surface and first wall of the reactor. This may lead to significant erosion of the divertors and possible melting. The ELM Simulating Plasma gun (ESP-gun) in operation at UIUC is intended to produce plasmas similar to those found in TOKAMAK ELM events. ESP-gun operates with several small pulse forming networks (PFN) that are sequentially triggered to produce a ringing, under-damped current waveform with peak currents in excess of 50 kA. Each PFN is connected to the conical theta pinch to produce high T_e, high n_e plasmas similar to ELM events. A Triple Langmuir Probe (TLP) diagnoses and measures the quality of the plasmas produced by the ESP-gun. To date, an n_e of $1(10)^{19}/m^3$ and greater with a T_e greater than 50 eV in the target area have been measured. From these measurements, plasma energies can be calculated. Axial magnetic field measurements during the theta pinch at the location of the coil and at a downstream target are accomplished.

Travis Gray
University of Illinois, Urbana-Champaign

Date submitted: 26 Jul 2005 Electronic form version 1.4