Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Electron beam modeling on LTX[1] GREGORY SZALKOWSKI, Georgia Inst of Tech, RICHARD MAJESKI, JOHN SCHMITT, Princeton Plasma Physics Laboratory — The lithium tokamak experiment (LTX) is a low aspect ratio tokamak with a steel clad copper shell that can be heated to 300-400 °C and coated with lithium. The lithium coating has been shown to decrease impurities in the plasma and decrease the recycling coefficient, improving plasma performance. The coating is applied to the walls by heating the shells, then using an electron beam to evaporate a pool of lithium located at the bottom of the shell. The beam is steered using the magnetic field generated by the field coils. This method allows for rapid evaporation of the lithium, producing a 50-100 nm coating in approximately 5 minutes. The current electron beam system can only coat half of the shell surface. A new electron beam system has been installed on LTX to coat the remaining shell surface. A model of this electron gun has been created using the AMaze program series (Field Precision LCC). The model will be used to find the magnetic fields needed to steer the electron beam produced by the gun to the lithium pool. The model will also show the electropotential produced both at the electron gun head and in the vessel. The model may also be used to find the dispersion of the beam and therefore the effective power density of the beam as it impacts the lithium pool.

[1]Supported by US DOE contracts DE-AC02-09CH11466 and DE-AC52-07NA27344 and in part by the U.S. Department of Energy, Office of Science, Office of Workforce Development for Teachers and Scientists (WDTS) under the Science Undergraduate Laboratory Internship

Gregory Szalkowski
Georgia Inst of Tech

Date submitted: 11 Jul 2014 Electronic form version 1.4