Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Studies of runaway electrons during disruptions in Alcator C-Mod[1] R.S. GRANETZ, D.G. WHYTE, MIT Plasma Science and Fusion Center, V.A. IZZO, UCSD — The generation of large relativistic electron populations in ITER during the disruption current quench is of concern due to the potential for damage to the first wall and vacuum vessel. The runaway avalanche process can be quenched by the quick injection of large amounts of gas (Rosenbluth criterion requires $\sim 10^5$ Pa-m^3), which has serious implications for the ITER cryopumps and tritium handling plant. Several present-day experiments suggest that other runaway loss mechanisms exist, implying that large gas injections may not be necessary. A program to study the physics of runaways in Alcator C-Mod disruptions uses LHCD as a tool to produce a seed population of superthermal electrons prior to triggering a disruption. In experiments to date, it is clear that substantial populations of superthermal and relativistic electrons can be produced during the flattop (0.5 MA in a 1 MA discharge), but during gas jet mitigated disruptions their loss rate during the thermal quench precludes any significant avalanching during the current quench phase. Modeling of the formation of ergodic field lines by gas jet injection in C-Mod with the NIMROD code supports these experimental findings.

[1]Supported by USDoE awards DE-FC02-99ER54512 and DE-FG03-95ER54309.

Robert Granetz
MIT Plasma Science and Fusion Center

Date submitted: 11 Jul 2008 Electronic form version 1.4