

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Studies of Runaway Electron Confinement in MHD Disruption Simulations¹ V.A. IZZO, E.M. HOLLMANN, A.N. JAMES, UCSD, D.G. WHYTE, G. OLYNYK, MIT, L.L. LAO, GA — Formation of a runaway electron beam during an ITER disruption is a major concern for machine survival, particularly because the avalanche growth of a seed population will be many orders of magnitude larger than in present devices. Enhanced fast-electron losses due to stochastic fields produced during the disruption, or from applied non-symmetric fields, can combat avalanche growth. The confinement of fast electrons is studied in the context of MHD simulations using a newly developed capability in the NIMROD code to track single particle orbits as the magnetic fields evolve. Macroscopic drift-orbit displacements associated with highly relativistic electrons play an important role in confinement by averaging over perturbing fields during a poloidal transit, thus allowing good confinement in the presence of stochasticity. Verification of the model for a small number of electrons compares the orbits with and without drift terms directly. Confinement of fast electrons during a gas-jet-induced disruption on Alcator C-Mod, and during a controlled error field ramp on DIII-D are presented.

¹Supported by US DOE under DE-FG03-95ER54309.

Val Izzo
General Atomics

Date submitted: 18 Jul 2009

Electronic form version 1.4