Abstract Submitted for the Forty-Eighth Annual Meeting
Division of Plasma Physics
October 30th-November 3, 2006, Philadelphia, Pennsylvania

Category Number and Subject: 5.6.2. DIII-D Tokamak

[ ] Theory [X] Experiment

Fast-Ion Profiles in MHD-Quiescent Plasmas,* Y. Luo, W.W. Heidbrink, E. Ruskov, *U. California-Irvine*, C.C. Petty, *General Atomics* – The fast-ion distribution is measured using the fast-ion D_α (FIDA) diagnostic [1,2], which has spatial resolution of ~5 cm, time resolution of ~1 ms, and energy resolution of ~10 keV. This paper focuses on the measurements under quiescent discharge conditions (i.e. in the absence of MHD activity and collective particle effects). A weighted Monte Carlo simulation code allows direct comparison of classical calculations of the fast-ion distribution function using either the TRANSP code or a Fokker-Planck code with the FIDA measurements. Pitch angle scattering and slowing down of fast ions are studied by varying the injection energy, beam angle, plasma density and electron temperature; the FIDA signals vary as classically expected in these MHD-quiescent plasmas. In addition, the fast-ion profiles are compared during co- and counter-injection of neutral beam. Neutral particle and neutron diagnostics corroborate the FIDA measurements.

[1] W.W. Heidbrink, et al., Plasma Phys. Control. Fusion **46**, 1855 (2004).
[2] Y. Luo, et al., Rev. Sci. Instrum. **75**, 3468 (2004).

*Work supported by U.S. DOE under SC-G903402 and DE-FC02-04ER54698.