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Fast-Ion Profiles in MHD-Quiescent Plasmas[1] 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 $\sim$5 cm, time resolution of $\sim$1 ms, and energy resolution of $\sim$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).

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