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Particle-in-cell studies of fast-ion slowing-down rates in cool tenuous magnetized plasma using LSP[1] EUGENE S. EVANS, ELIJAH KOLMES, SAMUEL A. COHEN, Princeton Plasma Physics Laboratory, DALE R. WELCH, Voss Scientific, TOM ROGNLIEN, BRUCE COHEN, Lawrence Livermore National Laboratory, ERIC MEIER, University of Washington — We present particle-in-cell (PIC) simulations of fast-ion slowing down rates in cool, weakly-magnetized plasma (where $\rho_e < \lambda_{De}$ and $v_{fi} > v_{th,e}$) using the fully electromagnetic PIC code LSP. These simulations use explicit algorithms, resolving ρ_e and λ_{De} spatially and the electron cyclotron and plasma frequencies temporally. Scaling studies of the slowing-down time, τ_{sd}, *versus* fast-ion charge and background plasma density are in good agreement with unmagnetized slowing-down theory; a small anisotropy is observed between τ_{sd} in the perpendicular- and parallel-field directions. Furthermore, scaling of the fast-ion charge is confirmed as a viable way to reduce the required computational time for each simulation. The implications of slowing down processes in this regime are described for one magnetic-confinement fusion concept, the small field-reversed configuration device.

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