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Effects of Coulomb Coupling and Plasma Magnetization on Stopping Power[1] DAVID BERNSTEIN, SCOTT BAALRUD, University of Iowa, JEROME DALIGAULT, Los Alamos National Laboratory — Fusion fuel in recent experiments has the potential to exhibit both moderate-to-strong Coulomb coupling and magnetization (e.g. magnetized liner inertial fusion). Therefore, it is important to understand fusion product slowing and dynamics in fuel under such conditions. Here, molecular dynamics simulations are used to assess how Coulomb coupling and plasma magnetization influence the stopping power of the classical one component plasma. With respect to the weakly-coupled limit, strong coupling increases the magnitude of the stopping power, shifts the Bragg peak to higher speeds (with respect to the background plasma thermal speed), and causes the stopping power curve to broaden. Stopping power was split into two components; one associated with one-dimensional friction, and the other with a thermal energy exchange rate. From these two components, in the limit of a massive projectile, stopping power was used to calculate the self-diffusion coefficient and the thermal relaxation rate of the background plasma. The influence plasma magnetization has on projectile dynamics and stopping power was assessed, along with the related potential wake that forms about the projectile as it traverses through the plasma.

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