Analytic Calculation of Magnetized Dynamic Friction for Times less than the Plasma Period[1] DAVID BRUHWILER, ILYA POGORELOV, RadiaSoft LLC — Dynamic friction is used to cool nonrelativistic hadrons via co-propagation with a strongly-magnetized electron beam. Some electron-ion collider designs require cooling at relativistic energies. In the beam frame, particle motion is nonrelativistic, and the essential physics is a single ion drifting briefly through a magnetized electron plasma. Previous analytic work and parametric models are not accurate in this parameter regime. We present simulations of the longitudinal friction force, showing agreement with theoretical calculations in the high- and low-velocity limits. Agreement is found with previous work in the high-velocity limit, as expected. A two-parameter function captures the simulated results and shows a scaling with ion charge number that differs from previously published results.

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