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Self-Diffusion in Dense Plasmas JULIE STERN, MICHAEL MURILLO, Los Alamos National Laboratory — Large angle scattering has been shown to be important in ICF plasmas [Turrell et al. PRL 112, 245002 (2014)]. We use molecular dynamics to obtain effective Coulomb logarithms across coupling regimes through a careful study of self-diffusion in screened ionic systems. Through a theoretical analysis of the MD data, we assess the applicability of the Coulomb logarithm in different regimes, finding three distinct regimes of transport. Although theoretical models of Ornstein-Uhlenbeck typically model Brownian motion processes, they cannot fully capture collective dynamics in all regimes of plasma coupling. Modified memory based theoretical OU models are introduced. In order to make the models more accurate, the role of stochastic charge fluctuations relative to the mean ionization state <Z>is investigated. The Yukawa pair potential is combined with a Stewart-Pyatt continuum-lowered Saha method. Transport coefficients using average charges <Z>are compared with charge state distributions $\{Z_i\}$. We model the time-evolving charge state fluctuations using a discrete stochastic evolution algorithm. Mixtures are investigated and compared to single-species.
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