Linear Response Screening Models for Dense, Strongly-Coupled Plasmas\textsuperscript{1} LIAM STANTON, LLNL, MICHAEL MURILLO, JOHN BENAGE, LANL, FRANK GRAZIANI, LLNL — Needs for accurate EOS and transport models of warm/hot dense matter have increased with the advent of new experiments that are able to more accurately probe these areas of phase-space. Molecular dynamics (MD) methods are often used for this, as they are apt for strongly-coupled systems. Unfortunately, the traditional Coulomb and Yukawa pair-potentials begin to fail at lower temperatures as degeneracy effects of the electron gas arise, and a more sophisticated treatment is required. We present a class of effective ion-ion interactions derived within the framework of linear response, which go beyond screening in the long-wavelength limit. These new potentials not only improve the accuracy of screening effects without contributing to the computational complexity of the model, but they also add physics entirely missing from Yukawa models (such as the onset of Friedel oscillations).

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