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Transport coefficients in plasmas spanning weak to strong correlation SCOTT BAALRUD, JEROME DALIGAULT, Los Alamos National Laboratory — Plasmas encountered in several modern research areas can reach strong correlation parameters where the Coulomb potential energy of interacting particles exceeds their kinetic energy. These include dense plasmas (ICF, white dwarfs, giant planets, etc.), dusty plasmas and ultracold plasmas. We have developed two theories of transport coefficients for Coulomb collision processes that span weak to strong correlation. The first of these[1] exploits symmetries of the binary collision process to compute transport coefficients directly from the Boltzmann collision operator, instead of applying the small angle scattering approximation that weakly correlated theories are based on. The second,[2] more general, theory is akin to Lenard-Balescu theory, but with local field corrections that resolve the close interaction limit. Both theories are applied to calculate thermal equilibration rates and friction forces between Maxwellian species, as well as resistivity and thermal conductivity using Spitzer's approach to account for deviations from Maxwellian. The theories are shown to accurately predict coefficients calculated from *ab initio* classical molecular dynamics simulations.

[1]Baalrud, POP **19**, 030701 (2012).
[2]Daligault and Dimonte., PRE **79**, 056403 (2009).

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