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Radial Distribution Functions of Strongly Coupled Two-Temperature Plasmas[1] NATHANIEL R. SHAFFER, SANAT KUMAR TIWARI, SCOTT D. BAALRUD, University of Iowa — We present tests of three theoretical models for the radial distribution functions (RDFs) in two-temperature strongly coupled plasmas. RDFs are useful in extending plasma thermodynamics and kinetic theory to strong coupling, but they are usually known only for thermal equilibrium or for approximate one-component model plasmas. Accurate two-component modeling is necessary to understand the impact of strong coupling on inter-species transport, e.g., ambipolar diffusion and electron-ion temperature relaxation. We demonstrate that the Seuferling-Vogel-Toeppfer (SVT) extension[2] of the hypernetted chain equations not only gives accurate RDFs (as compared with classical molecular dynamics simulations), but also has a simple connection with the Yukawa OCP model. This connection gives a practical means to recover the structure of the electron background from knowledge of the ion-ion RDF alone. Using the model RDFs in Effective Potential Theory[3], we report the first predictions of inter-species transport coefficients of strongly coupled plasmas far from equilibrium.

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[2]P. Seuferling, J. Vogel, and C. Toepffer, Phys. Rev. A **40** (1989).
[3]S. D. Baalrud and J. Daligault, Phys. Rev. Lett. **100** (2013)

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