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Rapid Multi-Component HNC Calculations for Modelling Warm Dense Matter MATTHEW CALEF, MICHAEL MURILLO, Los Alamos National Laboratory — X-ray Thomson Scattering (XRTS) can be an extremely accurate diagnostic for a dense plasma. In such settings one is often interested in the structure of the ions, however the incident electromagnetic energy couples more strongly with, and provides more information about, the electrons. One then must then infer the behavior of the ions by modeling their interaction with the electrons. To facilitate this we have developed a multi-component arbitrary-potential HNC code that allows one to examine the physics connecting the electron response to XRTS with the underlying ion structure. In particular, we model the effect of multiple ionization states, effective ion-ion potentials derived from dielectric considerations, and, for certain conditions, explicit electrons interacting with via quantum statistical potentials. We describe and compare several iterative methods for solving the HNC equations rapidly.

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