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Probing the microscopic state of warm dense matter G. GREGORI, Oxford University, B. BARBREL, A. BENUZZI-MOUNAIX, Ecole Polytechnique, C. BROWN, AWE, plc, R. CLARKE, Rutherford Appleton Laboratory, E. GARCIA SAIZ, Queens University, S. GLENZER, Lawrence Livermore National Laboratory, F. KHATTAK, Kohat University, D. NEELY, M. NOTLEY, Rutherford Appleton Laboratory, A. PELKA, TU Darmstadt, D. RILEY, Queens University, M. ROTH, TU Darmstadt, C. SPINDLOE, Rutherford Appleton Laboratory, M. KOENIG, Ecole Polytechnique — We have performed spectrally and angularly resolved x-ray scattering measurements in solid density plasmas produced by shock compression with a high power laser. The experiments have been performed at the VULCAN laser facility and at the LULI2000 facility. We have investigated warm and dense low-Z materials with particular regards to the regime where electron-ion correlation becomes important (i.e., the hydrodynamic regime). In these experiments, we used a secondary plasma to generate an intense source of x-ray radiation that is then scattered across the sample and observed in a forward scattering geometry and dispersed using a graphite Bragg spectrometer. The shock properties have been monitored with a dual color VISAR and streaked optical pyrometry, as well as with a XUV flat-field spectrometer. The inferred properties of the dense plasma from the scattering data are discussed and detailed comparison with statistical models of strongly coupled plasmas is reported.

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