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Atomic and Electronic Structure of Warm Dense Silicon RAHUL SAHA, Laboratory for Laser Energetics, University of Rochester, JACOB TOPP-MUGGLESTONE, GIANLUCA GREGORI, University of Oxford, THOMAS BOEHLY, GILBERT COLLINS, SEAN REGAN, Laboratory for Laser Energetics, University of Rochester, THOMAS WHITE, University of Nevada, RYAN RYGG, Laboratory for Laser Energetics, University of Rochester — We propose experiments to determine the atomic and electronic structure of warm dense silicon using simultaneous spectrally and angularly resolved measurements of the x-ray scattering. A variety of uniform warm dense states spanning the solid–liquid boundary will be generated through laser shock compression of silicon samples. A unified analysis of the x-ray scattering, combining spectral (x-ray Thomson scattering) and angular (x-ray diffraction) scattering data, will reduce the necessary model assumptions used to determine the ion and electron structure factors. This will thereby reduce systematic uncertainties and mitigate inverse problem instabilities arising from simulations with large parameter spaces. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856, the University of Rochester, and the New York State Energy Research and Development Authority.

Rahul Saha
Laboratory for Laser Energetics, University of Rochester

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