

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

X-Ray Thomson Scattering Without the Chihara Decomposition RUDOLPH MAGYAR, ANDREW BACZEWSKI, LUKE SHULENBURGER, STEPHANIE B. HANSEN, MICHAEL P. DESJARLAIS, Sandia National Laboratories, SANDIA NATIONAL LABORATORIES COLLABORATION — X-Ray Thomson Scattering is an important experimental technique used in dynamic compression experiments to measure the properties of warm dense matter. The fundamental property probed in these experiments is the electronic dynamic structure factor that is typically modeled using an empirical three-term decomposition (Chihara, J. Phys. F, 1987). One of the crucial assumptions of this decomposition is that the system's electrons can be either classified as bound to ions or free. This decomposition may not be accurate for materials in the warm dense regime. We present unambiguous first principles calculations of the dynamic structure factor independent of the Chihara decomposition that can be used to benchmark these assumptions. Results are generated using a finite-temperature real-time time-dependent density functional theory applied for the first time in these conditions. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Security Administration under contract DE-AC04-94AL85000.

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Date submitted: 06 Nov 2015

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