Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

X-ray scattering measurements of Plasmons in solid density plasmas[1] SIEGFRIED GLENZER, O.L. LANDEN, P. NEUMAYER, R.W. LEE, K. WIDMANN, S.W. POLLAINE, L-399, Lawrence Livermore National Laboratory, University of California, P.O. Box 808, Livermore, CA 94551, USA, G. GREGORI, CCLRC, Rutherford Appleton Laboratory, Chilton, Didcot OX11 0QX, Great Britain Clarendon Laboratory, , A. HOELL, T. BORNATH, V. SCHWARZ, R. THIELE, W.-D. KRAEFT, R. REDMER, Institut für Physik, Universität Rostock, Universitätsplatz 3, D-18051 Rostock, Germany — We have developed a novel collective x-ray scattering technique to measure the physical properties of dense matter including temperature, density, and ionization state. The forward scattering spectrum of a laser-produced narrow-band x-ray line from isochorically heated solid-density beryllium has shown the plasmon resonance whose frequency position is a sensitive measure of the electron density. Moreover, dynamic structure calculations indicate that collisions, detailed balance, and Landau damping affect the shape of the plasmon spectrum. This technique will enable new applications to determine the equation of state and compressibility of dense matter.

[1]This work was performed under the auspices of the U.S. Department of Energy by University of California Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.

Siegfried Glenzer
Lawrence Livermore National Laboratory

Date submitted: 20 Jul 2006 Electronic form version 1.4