Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Bayesian inference of x-ray diffraction from warm dense matter using the one-component-plasma model JEAN CLEROUIN, NICOLAS DESBIENS, VINCENT DUBOIS, PHILIPPE ARNAULT, CEA, DAM, DIF, 91297 Arpajon, France — We show that the Bayesian inference of recently measured x-ray diffraction spectra from laser-shocked aluminum [L. B. Fletcher *et al.*, Nature Photonics 9, 274 (2015)] with the one-component-plasma (OCP) model performs remarkably well at estimating the ionic density and temperature. This statistical approach requires many evaluations of the OCP static structure factor, which were done using a recently derived analytic fit. The atomic form factor is approximated by an exponential function in the diffraction window of the first peak. The electronic temperature is then estimated from the comparison of this approximated form factor with the electronic structure of an average atom model. Out-of-equilibrium states, with electrons hotter than ions, are diagnosed for the spectra obtained early after the pump, whereas at late time delay the plasma is at thermal equilibrium.

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Date submitted: 12 Jul 2016 Electronic form version 1.4