Abstract Submitted
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Modeling the Effects of Cluster Size on X-ray Amplification at ∼3 Å in Strong Laser Field – Xe Cluster Interactions[1] JACK DAVIS, TZVETELINA PETROVA, Naval Research Laboratory, KENNETH WHITNEY, Berkeley Research Associates, GEORGE PETROV, Naval Research Laboratory — An extensive xenon time-dependent ionization dynamic (TD-ID) model that includes a complex set of lumped excited states in the Ni-, Co- [1], and Fe-like ionization stages, as well as 3 single hole states in Co-like xenon and 16 single and 9 double hole states in Fe-like xenon that are self-consistently coupled to the ionization dynamics. The TD-ID model receives input on the cluster's electron and ion temperatures and densities from a 3D Relativistic Molecular Dynamics Model in which electrons and ions are treated classically according to a coupled set of relativistic equations of motion. One of the important effects found in MD calculations, not seen in hydrodynamic descriptions of laser-matter interactions, is the fast ion heating that occurs during the cluster's explosion. The combined model enables us to study the influence of cluster size and laser intensity (10^{18}-10^{20} W/cm^2) on the cluster's amplified x-ray emissions when they are subject to a 248 nm laser field.

[1] Tz. B. Petrova, *et.al.*, J. Phys. B **43** (2010) 025601.

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