Abstract Submitted
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Enhanced Bremsstrahlung Emission in Intense Laser-Cluster Interactions[1] KENNETH WHITNEY, Berkeley Research Assoc., 6551 Mid Cities Ave., Beltsville, MD 20705, USA, TZVETELINA PETROVA, JACK DAVIS, GEORGE PETROV, Radiation Hydrodynamics Branch, Plasma Physics Division, Naval Research Laboratory, 4555 Overlook Ave. SW, Washington, DC 20375, USA — What dynamics ensues when a sub-picosecond, 248 nm, pulse of laser light interacts with a xenon cluster of 10-10^4 atoms at intensities $>10^{19}$ W/cm^2? Measurements in such experiments are difficult to make. However, in them [1], two features stood out. One, a 2 mm long, 1-3 μm diameter channel of self-focused laser light was formed, and two, amplification of $\approx$2.8 Å x-radiation along the channel was observed. A model that would generate the population inversions needed to produce the observed amplifications was recently constructed [2]. It assumed that inner-shell n=2 holes were being generated through inner-shell photoionizations that came about through bremsstrahlung emissions that were being greatly enhanced in the presence of intense laser fields ($>10^{19}$ W/cm^2). In this talk, we present results from quantum electrodynamics calculations [3] that support the production of such enhancements.

[1] Borisov A. B., *et. al.*, J. Phys. B, **41**,105602 (2008). [2] Petrova Tz. B., *et. al.*, J. Phys. B, **43**, 025601 (2010); **44**, 125601 (2011). [3] Lebed A. A. and Roshchupkin S. P., Phys. Rev. A, **81**, 033413 (2010).

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