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Level shifting in intense KrF laser-xenon cluster interactions[1] KENNETH WHITNEY, Berkeley Research Associates, JACK DAVIS, TZVETELINA PETROVA, Naval Research Laboratory — A variety of experiments[2] were carried out in which gases composed of xenon clusters were irradiated with 230 fs pulses of 248 nm wavelength laser radiation at intensities, 10^{19} W/cm^2. At these intensities, the laser pulses self-focused and amplified x-ray emissions occurred in the plasma channels that were formed. A significant feature of these emissions was the irreproducibility of their wavelengths, i.e., amplification was seen at wavelengths of 2.71, 2.804, 2.86, and 2.88 Angstroms. A theoretical model of a cluster's expansion and ionization dynamics was subsequently constructed that identified the atomic transition involved in this x-ray amplification, i.e., it was able to reproduce the observed gains. However, the ionization model did not attempt to calculate the observed line shifts. A laser intensity dependent level shift calculation will be described in this talk that, when added to the theoretical model, will allow a comparison to the experimental data to be made.

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[2]Borisov A. B., et. al., J. Phys. B, **41,** 105602 (2008).

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