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Modeling High-Energy Backlighters Produced by Intense Laser-Matter Interaction GREGORY POLLAK, Los Alamos National Laboratory — The utility of reasonably monoenergetic, high frequency backlighters for radiographic use in high energy density physics experiments has been understood for a long time. A reasonable approach to generating these xrays is to use a high-intensity laser incident on suitable (typically mid-z) elements. The deposition produces hot (non-thermal) electrons and ions, which ionize and excite inner shell electrons in a highly non-LTE environment. Resulting xray generation often occurs in only a few bound-bound transitions. Because the hot electrons have substantial range, the lines can be optically thick. In this presentation, I use the radhydro code Lasnex to deposit both a prepulse and a main pulse of order 10^{18}—10^{19} watts/cm^2 onto Ag and Sn substrates. The physical situation is then postprocessed using Plaspp, with an embedded DCA package to produce spectra. A unique feature of these simulations are the multiphoton inverse- bremstrallung and photoionization physics for deposition near the critical surface, as well as non-thermal collisional physics for the non-LTE spectra.

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