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K-alpha X-rays, Hot Electrons and Electron Jets from Sub-millijoule Femtosecond Laser Pulses CRISTINA SERBANESCU, DMITRI ROMANOV, CLARENCE CAPJACK, VALERY BYCHENKOV, WOJCIECH ROZMUS, ROBERT FEDOSEJEVS, University of Alberta — We report a study on the emission of K-alpha X-rays, hot electrons and electron jets in the intermediate intensity range of 10^{16}-10^{17}W/cm^2 generated by 120-fs laser pulses focused to micron spot diameters on solid targets. For this transitional laser intensity range, the hot electrons can be produced by a number of competitive non-linear processes from the interaction of the ultrashort incident laser pulses with the resultant plasma density gradient profile. K-alpha X-rays are produced in turn by these hot electrons when interacting with the solids target. The objective of this study is to better characterize the electron and X-ray emission and the mechanisms contributing to the generation of these hot electrons and their propagation outwards from the small focal spot region. Directional emission of electrons is observed experimentally which is dependent on the laser polarization and target geometry. The angular distribution of these hot electrons depends on polarization and angle of incidence of the incoming radiation. Experimental and PIC modeling results will be presented and compared.

Cristina Serbanescu
University of Alberta

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