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Increased X-ray Yield from Femtosecond Laser Irradiation of Vertically Aligned Nanostructures DAVID KEISS, AMANDA TOWNSEND, CLAYTON BARGSTEN, REED HOLLINGER, Colorado State University, MIKE PURVIS, None, CHRIS BENTON, Colorado State University, JORGE ROCCA, Colorado State Engineering Research Center, A. PUKHOV, A. PRIETO, V. SHLYAPTSEV, None, COLORADO STATE UNIVERSITY TEAM[1], HEINRICH-HEINI UNIVERSITAT COLLABORATION[2] — Our purpose is to demonstrate a novel approach for converting optical laser energy pulses into bright picosecond x-ray pulses at a high conversion efficiency. In order to do this, a high contrast, femtosecond Ti:saph laser is used to irradiate vertically aligned nanostructure targets. This allows for the volumetric heating of the nanowire structure, creating multi-KeV temperature, near solid density plasmas with increased X-ray yields due to the greatly decreased cooling lifetime to hydrodynamic lifetime ratio– a key component in conversion efficiency. Using a set of 12 filtered Si diodes and a bent Mica crystal spectrometer, we monitored the x-ray yield and spectra in different regions on a shot by shot basis. We have measured a conversion efficiency of 5% for hv>900eV in 2 pi radians for Au wires irradiated with pulses of 5x10ˆ18Wcmˆ-2.

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