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Laser-driven Ion Acceleration using Nanodiamonds LUC D'HAUTHUILLE, University of California-Santa Cruz, TAM NGUYEN, FRANKLIN DOLLAR, University of California-Irvine — Interactions of high-intensity lasers with mass-limited nanoparticles enable the generation of extremely high electric fields. These fields accelerate ions, which has applications in nuclear medicine, high brightness radiography, as well as fast ignition for inertial confinement fusion. Previous studies have been performed with ensembles of nanoparticles, but this obscures the physics of the interaction due to the wide array of variables in the interaction. The work presented here looks instead at the interactions of a high intensity short pulse laser with an isolated nanodiamond. Specifically, we studied the effect of nanoparticle size and intensity of the laser on the interaction. A novel target scheme was developed to isolate the nanodiamond. Particle-in-cell simulations were performed using the EPOCH framework to show the sheath fields and resulting energetic ion beams.

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