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A New Technique for Fast Characterization of Intense Laser-Plasma Simulations[1] ROBERT MITCHELL, CHRIS ORBAN, VLADIMIR OVCHINNIKOV, DOUGLASS SCHUMACHER, RICHARD FREEMAN, The Ohio State University, Department of Physics, Columbus, OH 43210 — Many experiments in high energy density physics require modeling with high-resolution, long time scale Particle-In-Cell (PIC) simulations, such as the interaction of ultra-intense laser pulses with mm sized targets currently studied for their relevance to fast ignition fusion. These PIC simulations can take weeks to run on modern-day supercomputers. Using the PIC code LSP we have found that simply by doubling the wavelength and adjusting the intensity of the laser we can produce physically meaningful results while reducing the run time by a factor of eight. We find the basic phenomena preserved and consistent numerical instabilities, allowing inexpensive and fast development at low resolution before performing high-resolution simulations at the correct wavelength and intensity. We treat two examples using a laser incident on mm-scale targets: a slab with pre-plasma and a cone-wire target.

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