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Scaling of Pressure with Intensity in Laser-driven Shocks and Effects of Hot X-ray Preheat[1] JEFFREY COLVIN, DANIEL KALANTAR, Lawrence Livermore National Laboratory — To drive shocks into solids with a laser we either illuminate the material directly, or to get higher pressures, illuminate a plastic ablator that overlays the material of interest. In both cases the illumination intensity is low, $<<10^{13}$ W/cm^2, compared to that for traditional laser fusion targets, so the laser beam creates and interacts with a collisional, rather than a collisionless, plasma. We present scaling relationships for shock pressure with intensity for this low-intensity collisional plasma regime derived from simulations. In addition, sometimes the plastic-ablator targets have a thin flash-coating of Al on the plastic surface as a shine-through barrier; this Al layer can be a source of hot x-ray preheat. We discuss how the preheat affects the shock pressure, with particular application to simulating Visar measurements from a set of experiments conducted on the Omega laser on shock compression of Fe.

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