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**Strength and surface roughness of Be under laser irradiation** S.N. LUO, E.N. LOOMIS, S.R. GREENFIELD, D.L. PAISLEY, D. SWIFT, T. TIERNEY, R. JOHNSON, N. HOFFMAN, Los Alamos National Lab, H. LORENZANA, Lawrence Livermore National Lab — To examine the microstructure effect on dynamic strength and surface roughness of Be under laser irradiation, we have conducted dynamic loading experiments at the Trident laser facility on rolled foil, single crystal disk, equal channel angular extruded (ECAE) foil with 0.9% atom Cu doping, and sputtered Be with 0.9% atom Cu doping. Direct and confined laser ablation have been applied to Be samples at 532 nm and 1064 nm for 1D strain loading. The drive pulse, ranging from 2 ns to 2000 ns in duration, is shaped temporally as square, Gaussian, half Gaussian (ramping and Taylor-release), etc. The time-resolved diagnostics include point- and line-imaging velocity interferometers (VISARs), and transient imaging displacement interferometer (TIDI) for two-dimensional out-of-plane displacement measurement. Data with simultaneous VISAR and TIDI measurements have been acquired on ECAE Be-Cu, rolled Be foils and (0001) single crystal Be. For example, an ECAE Be-Cu sample with an initial roughness of <30 nm (the surface opposite to the drive side) was loaded into the plastic regime with a peak stress of ∼4.5 GPa during Taylor-release-type confined ablation. The flow stress was found to be about 1.9 GPa from VISAR measurements, and the roughness was about 300 nm shortly after breakout.

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