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Absolute Hugoniot measurements for CH foams in the 1.5-8 Mbar range[1] Y. AGLITSKIY, A.L. VELIKOVICH, A. J. SCHMITT, M. KARASIK, V. SERLIN, J.L. WEAVER, J. OH, S.P. OBENSCHAIN, Plasma Physics Division, Naval Research Laboratory — We report the absolute Hugoniot measurements for dry CH foams at 10% of solid polystyrene density. The 400 μm thick, 500 μm wide planar foam slabs covered with a 10 μm solid plastic ablator were driven with 4 ns long Nike KrF laser pulses whose intensity was varied between 10 and 50 TW/cm^2. The trajectories of the shock front and the ablative piston, as well as the rarefaction fan emerging after the shock breakout from the rear surface of the target were clearly observed using the side-on monochromatic x-ray imaging radiography. From these measurements the shock density compression ratio and the shock pressure are evaluated directly. The observed compression ratios varied between 4 and 8, and the corresponding shock pressures – between 1.5 and 8 Mbar. The data was simulated with the FASTRAD3D hydrocode, using standard models of inverse bremsstrahlung absorption, flux-limited thermal conduction, and multi-group radiation diffusion. The demonstrated diagnostics technique applied in a cryo experiment would make it possible to make the first absolute Hugoniot measurements for liquid deuterium or DT-wetted CH foams, which is relevant for designing the wetted-foam indirect-drive ignition targets for NIF.

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