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A thin-film Hugoniot measurement using a laser-driven flyer plate
HIROKI FUJIWARA, KATHRYN BROWN, DANA DLOTT, University of Illinois Urbana-Champaign — A laser-driven flyer plate and a high-speed 8 GHz all-fiber displacement interferometer (DISAR) were used to measure the Hugoniot of polymer thin films (a few micrometers thick) such as PMMA (polymethyl methacrylate) under steady-state shockwave propagation. Results were obtained using conventional methods such as measuring the impact velocity and knowing the Hugoniot of the flyer-plate material, but these were inaccurate. Instead we incorporated nanometer-thick gauge layers in the thin film, whose locations were precisely known. This material is based on work supported by the US Army Research Office under grant W911NF-10-0072, and the US Air Force Office of Scientific Research under award number FAA9550-09-1-0163.

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