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Experiments relevant to the interaction of stellar radiation with nearby gas clouds ROBERT VANDERVORT, JOSHUA DAVIS, MATTHEW TRANTHAM, SALLEE KLEIN, R. PAUL DRAKE, CAROLYN KURANZ, University of Michigan, PAUL A. KEITER, Los Alamos National Laboratory — Hot, massive stars emit an abundance of photons with energies that ionize the surrounding interstellar medium. Gas clouds near the star respond to the irradiation in a variety of ways. If the cloud is optically thick to incident photons, then the photons will deposit at the cloud edge and drive a shock into the cloud. Further star formation may result. If the cloud is optically thin, then the photons deposit throughout the cloud, causing cloud heating, expansion and dissipation. Lengthy timescales of evolution make single cloud observations impractical. Simulations and laboratory astrophysics experiments are needed to fully understand these interactions. We replicate these phenomena using optical depth-scaled laboratory astrophysics experiments. A laser-irradiated, thin-gold foil represents the star. A primarily carbon foam sphere represents the cloud. Cloud responses - hydrodynamic limits - are chosen by careful selection of sphere parameters, such as composition, density and diameter. A preliminary comparison between optically thick experimental data and a simple analytic model is presented. This work is funded by the U.S. DOE NNSA Center of Excellence under Cooperative Agreement number DE-NA0003869, and the NLUF Program, grant number DE-NA0002719, and through the LLE, University of Rochester by the NNSA/OIFC under Cooperative Agreement No. DE-NA0003856. This work is funded by the LLNL under subcontract B614207.

Robert VanDervort
University of Michigan

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