A Laboratory Astrophysical Jet Validation Test of the Radiation Hydrodynamics Capabilities of the FLASH Code CHRIS ORBAN, Ohio State Univ - Columbus, MILAD FATENEJAD, ASC Flash Center for Computational Science, University of Chicago, Chicago, IL, DON Q. LAMB, Department of Astronomy, University of Chicago, Chicago, IL — The potential for laser-produced plasmas to yield fundamental insights into HEDP can be frustrated by uncertainties in modeling these plasmas using radiation-hydrodynamics codes. In an effort to overcome this and to corroborate the accuracy of the HEDP capabilities that have been added to the publicly available FLASH radiation-hydrodynamics code, we present detailed code-to-code comparisons between FLASH and the HYDRA code developed at Lawrence Livermore National Laboratory using previously published HYDRA simulations from Grava et al. 2008. That study describes a laser experiment that produced a jet-like feature that the authors compare to astrophysical jets. Importantly, the Grava et al. 2008 experiment included interferometric measurements of electron number densities. Despite radically different methods for treating the computational mesh, and different equation of state and opacity models, the FLASH results greatly resemble the results from HYDRA and, most importantly, the experimental measurements of electron density. Having validated the FLASH code in this way, we use the code to further investigate and understand the formation of the jet seen in the Grava et al. (2008) experiment and discuss its relation to the Wan et al. (1997) experiment at the NOVA laser.

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