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Three-dimensional Modeling of Laboratory Jets that Scale to Astrophysical Jets B.H. WILDE, R.F. COKER, LANL, P.A. ROSEN, J.M. FOSTER, R.J.R. WILLIAMS, AWE, B.E. BLUE, LLNL, P. HARTIGAN, Rice U, A.M. KHOKHLOV, U Chicago, R.P. DRAKE, U Michigan, J.P. KNAUER, A. FRANK, U Rochester — We have fielded hohlraum-driven jet experiments on the Omega laser at the University of Rochester that attempt to scale to astrophysical jets. High-resolution point-projection images show a central collimated jet with complex structure in the shedding of the mushroom that indicates potential turbulence. These jets have Euler and Reynolds numbers similar to those present in models of jet-driven supernova explosions. The jet is created by the acceleration of a plug of titanium through a free-run vacuum region in a titanium washer. The supersonic jet enters a low density RF foam creating a bow shock in front of it. We will present 2- and 3-dimensional calculations of these jets with the continuous-adaptive-mesh-refinement radiation-hydrodynamics code RAGE. 3-dimensional calculations are required since the jet breaks up in the mushroom before going turbulent and since there are typically 3-dimensional driving asymmetries. We will also present results from experiments that have jets interacting with a spherical object that simulate astrophysical jets interacting with stellar clouds.

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