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Simulation and Modeling of Magnetized Jet Creation using a Hollow Ring of Laser Beams[1] YINGCHAO LU, EDISON LIANG, Department of Physics and Astronomy, Rice University, LAN GAO, Princeton Plasma Physics Laboratory, PETROS TZEFERACOS, University of Chicago, ANDREW BIRKEL, Plasma Science and Fusion Center, Massachusetts Institute of Technology, RUSS FOLLETT, DUSTIN FROULA, Laboratory for Laser Energetics, University of Rochester, WEN FU, LILY HAN, Department of Physics and Astronomy, Rice University, HANTAO JI, Princeton Plasma Physics Laboratory, DON LAMB, Department of Astronomy and Astrophysics, University of Chicago, CHI KANG LI, HONG SIO, RICHARD PETRASSO, Plasma Science and Fusion Center, Massachusetts Institute of Technology, MINGSHENG WEI, General Atomics — Using 20 OMEGA beams to form a ring pattern to irradiate a flat plastic target, we have created strongly magnetized, highly collimated jets. The density, temperature, flow velocity and magnetic field of the supersonic outflows were diagnosed using Thomson scattering, proton radiography, and x-ray imaging. We present 3D FLASH full-physics magneto-hydrodynamics simulations of the experiments, which are in good agreement with the experimental data. These results demonstrate that our experimental configuration of a hollow ring of laser beams can become a versatile new platform to study magnetized jets in the context of laboratory astrophysics.

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