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Experimental investigation of adiabatic compression and heating using collision of an MHD-driven jet with a gas target cloud for magnetized target fusion BYONGHOON SEO, Caltech, HUI LI, LANL, PAUL BELLAN, Caltech — We are studying magnetized target fusion using an experimental method where an imploding liner compressing a plasma is simulated by a high-speed MHD-driven plasma jet colliding with a gas target cloud. This has the advantage of being non-destructive so orders of magnitude more shots are possible. Since the actual density and temperature are much more modest than fusion-relevant values, the goal is to determine the scaling of the increase in density and temperature when an actual experimental plasma is adiabatically compressed. Two new-developed diagnostics are operating and providing data. The first new diagnostic is a fiber-coupled interferometer which measures line-integrated electron density not only as a function of time, but also as a function of position along the jet. The second new diagnostic is laser Thomson scattering which measures electron density and temperature at the location where the jet collides with the cloud. These diagnostics show that when the jet collides with a target cloud the jet slows down substantially and both the electron density and temperature increase. The experimental measurements are being compared with 3D MHD and hybrid kinetic numerical simulations that model the actual experimental geometry.

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