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Thomson-Scattering from electron plasma waves in a magnetized laser-produced plasma BRADLEY POLLOCK, University of California, San DIego, LAURENT DIVOL, SIEGFRIED GLENZER, JOHN PALASTRO, Lawrence Livermore National Laboratory, JAMES ROSS, GEORGE TYNAN, University of California, San DIego, DUSTIN FROULA, Lawrence Livermore National Laboratory — We present temporally resolved Thomson-scattering measurements of the electron temperature and density of a magnetized laser-produced plasma. Our experiment demonstrates that by applying a 25T external magnetic field parallel to a laser beam in the plasma the electron temperature increases by nearly a factor of 2. Comparison with hydrodynamic modeling indicates the formation of a plasma channel suitable for guiding ultra-short pulse laser beams at conditions for GeV laser wakefield acceleration. This experiment was performed at the Jupiter Laser Facility, Lawrence Livermore National Laboratory, using a 527 nm, 5-ns long, 420 J laser beam focused with a random phase plate to an intensity of 1x 10^{15} W/cm^2. He gas from a 1.5 mm gas jet is ionized to produce a plasma with an initial electron density of 3x10^{18} cm^{-3}. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and was partially funded by the Laboratory Directed Research and Development Program under project tracking code 06-ERD-056.

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