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Characterizing MagLIF Preheated Plasmas Using Self-Thomson Scattering[1] D.S. MONTGOMERY, Los Alamos National Laboratory, M. GEISSEL, E.C. HARDING, A.B. SEFKOW, D.B. SINARS, Sandia National Laboratory
— Magnetized Liner Inertial Fusion (MagLIF) is a novel concept where GJ-class fusion yields might be achieved in the laboratory by pulsed-power driven implosions of cylindrical liners onto preheated (100-500 eV), magnetized ($>$ 10 T) deuterium-tritium (D-T) fuel. Preliminary experiments are being planned at the Z-facility to test the MagLIF concept using deuterium-deuterium (D-D) fuel. Analytic calculations and simulations indicate that a cm-scale liner filled with $\sim$3 mg/cc D-D gas can be preheated to 200-500 eV using 5-10 kJ of 527-nm light provided by the Z-beamlet laser. We propose using self-Thomson scattering from the Z-beamlet laser to diagnose electron temperature and density of the preheated plasma. Details of the experimental design and estimates of the Thomson scattered spectrum will be reported. The benefits of trace amounts of Ne or Ar in the D-D fuel for measuring the ion temperature will also be discussed.

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