Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Dense Plasmas with Highly Tangled Magnetic Field as a Novel Target for Magneto-Inertial Fusion[1] SAMUEL LANGENDORF, TOM BYVANK, Los Alamos National Laboratory — Tangled magnetic fields are prevalent in astrophysical scenarios, including molecular clouds and the solar corona, and can play an important role in the thermal energy transport and pressure balance of such systems. In 2009, Ryutov [1] proposed the use of such a tangled magnetic field for insulation of a plasma target for magneto-inertial fusion. Such a target has the advantage that it could preserve its insulating role in spherical compression geometry, as opposed to more regular magnetic field structures that are best suited to cylindrical compression. Results in the literature find differing results on the effective thermal transport in such plasmas, dependent on the magnetic spectrum. We are currently investigating this concept for use with the plasma-jet-driven magneto-inertial fusion architecture [2], due to its suitability for spherical compression, and will present updates on our investigations to date, and outlook for future development.

1 Ryutov, D. D., Fusion Sci. Tech. 56.4 (2009): 1489-1494.
2 Hsu, Scott C., et al., IEEE Trans. Plasma Sci. 40.5 (2012): 1287-1298.

[1]This work will have been supported by the Advanced Research Projects Agency – Energy (BETHE program), U.S. Dept. of Energy under contract no. DE-AC52-06NA25396.

Samuel Langendorf
Los Alamos National Laboratory

Date submitted: 02 Jul 2020 Electronic form version 1.4