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Plasma-Jet-Driven Magneto-Inertial Fusion (PJMIF): Physics and Design for a Plasma Liner Formation Experiment SCOTT HSU, LANL, JASON CASSIBRY, UAHuntsville, F. DOUGLAS WITHERSPOON, HyperV Technologies — Spherically imploding plasma liners are a potential standoff compression driver for magneto-inertial fusion, which is a hybrid of and operates in an intermediate density between those of magnetic and inertial fusion. We propose to use an array of merging supersonic plasma jets to form a spherically imploding plasma liner. The jets are to be formed by pulsed coaxial guns with contoured electrodes that are placed sufficiently far from the location of target compression such that no hardware is repetitively destroyed. As such, the repetition rate can be higher (e.g., 1 Hz) and ultimately the power-plant economics can be more attractive than most other MIF approaches. During the R&D phase, a high experimental shot rate at reasonably low cost (e.g., <$1k/shot) may be achieved with excellent diagnostic access, thus enabling a rapid learning rate. After some background on PJMIF and its prospects for reactor-relevant energy gain, this poster describes the physics objectives and design of a proposed 60-gun plasma-liner-formation experiment, which will provide experimental data on: (i) scaling of peak liner ram pressure versus initial jet parameters, (ii) liner non-uniformity characterization and control, and (iii) control of liner profiles for eventual gain optimization.

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