

LA-UR-18-22174

A Turbulent Dynamo Experiment on the OMEGA-EP

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We present the design of, and first results from a new experiment to realize turbulent dynamos as a driver for both structure formation and magnetization of astrophysical flows on the OMEGA-EP laser. In our work, we devise an experimental platform that consists of a simple, conical target that concentrates, redirects, and stirs laser ablation plasma that is initially magnetized by the intrinsic Biermann battery mechanism. Numerical modeling of our experimental design using the FLASH code further confirms that we can realize a $Pm \sim 1$, and a $Rm \sim 10^4$ for a characteristic length of ~ 1 mm in a $T \sim 3$ keV, turbulent gas. These results are promising in our ongoing experimental and analytical work to resolve the realized turbulent dynamo as it cascades through ever-smaller size scales unto its saturation above strengths of ~ 1 MG.