

Abstract Submitted
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Turbulent Mixing in High Temperature Laboratory Plasma¹

ANDY LIAO, SHENGTAI LI, KIRK FLIPPO, HUI LI, ALEXANDER RASMUS, CODIE YOSHIKO FIEDLER-KAWAGUCHI, Los Alamos National Laboratory — Turbulent mixing is believed to play a key role in a number of high energy density plasma systems including being the driver of magnetic field amplification in astrophysical dynamos, and having possibly deleterious effect in inertial confinement fusion, etc. Turbulent mixing has also defied direct observation in the high temperature ($>\sim\text{keV}$), long lasting ($>\sim\text{ns}$) and large volume ($>\sim\text{mm}^3$) regimes that overlap these applications. Here, we introduce a new experimental scheme to study turbulent mixing in these conditions that are uniquely accessible on the OMEGA EP laser. Our new scheme extends a proven design to create keV, mm^3 , ns-duration turbulent plasma with the addition of mid-Z tracer elements, e.g., copper; chlorine, etc. to the target. These tracers, once they are entrained into the turbulent plasma following initiation, become strong, and crucially, distinguishable emission sources to x-ray imaging and spectroscopic instrumentation. Synthetic instrumentation of FLASH simulated plasma reveal the onset and progress of turbulent mixing from the structure of the plasma's self emission.

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