

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Quantification of MagLIF stagnation morphology using the Mallat Scattering Transformation¹ MICHAEL GLINSKY, MATTHEW WEIS, CHRISTOPHER JENNINGS, DAVID AMPLEFORD, ERIC HARDING, PATRICK KNAPP, MATTHEW GOMEZ, Sandia National Laboratories — The morphology of the stagnated plasma resulting from MagLIF is measured by imaging the self-emission x-rays coming from the multi-keV plasma. Equivalent diagnostic response can be derived from integrated rad-hydro simulations from programs such as Hydra and Gorgon. There have been only limited quantitative ways to compare the image morphology, that is the texture, of the simulations to that of the experiments, to compare one experiment to another, or to compare one simulation to another. We have developed a metric of image morphology based on the Mallat Scattering Transformation, a transformation that has proved to be effective at distinguishing textures, sounds, and written characters. This metric has demonstrated excellent performance in classifying an ensemble of synthetic stagnations images. A good regression of the scattering coefficients to the parameters used to generate the synthetic images was found. Finally, the metric has been used to quantitatively compare simulations to experimental self-emission images.

¹Sandia National Laboratories is a multi-mission laboratory managed and operated by NTESS, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the USDoEs NNSA under contract DE-NA0003525.

Michael Glinsky
Sandia National Laboratories

Date submitted: 14 Jul 2017

Electronic form version 1.4