Quantification of MagLIF stagnation morphology using the Mallat Scattering Transformation[1] 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.

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