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**Imaging x-ray fluorescence relevant to hydrodynamic mixing experiments at the National Ignition Facility**[1] MICHAEL MACDONALD, ELISEO GAMBOA, CAROLYN KURANZ, PAUL KEITER, R. PAUL DRAKE, University of Michigan — The National Ignition Facility (NIF) is capable of providing enough energy to explore areas of physics that are not possible on any previous laser system. This includes large-volume, geometrically complex hydrodynamic and radiation hydrodynamic experiments in which traditional, line-integrated radiographic techniques limit the quality of the results. As an example, we are involved in divergent hydrodynamic experiments at the NIF, motivated by supernova hydrodynamics, that cannot be diagnosed in detail with transmission radiography. X-ray scattering has been considered for this purpose and appears feasible [1]. Here we consider fluorescence imaging, a better candidate as the cross section of photoabsorption in the several-keV range is roughly 100 times larger than that of scattering. A single layer of the target will be uniformly doped with a fluorescent tracer, which will be pumped by a sheet of x-rays. The fluorescent intensity will be measured to create a density map of the doped material as it mixes with other layers. Developing this diagnostic will create a powerful tool to characterize hydrodynamic experiments with complex geometries.

[1] Huntington et al. High Energy Density Physics 6, 194 (2010).

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Michael MacDonald
University of Michigan

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