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Extraction of the spatial distribution of electron temperature and density in Magnetized Liner Inertial Fusion implosion plasmas[1] KYLE CARPENTER, ROBERTO MANCINI, Physics Department, University of Nevada, Reno — We are testing polychromatic tomography to extract the spatial distribution of electron temperatures and densities in the cylindrical implosion plasmas created during MagLIF. Motivation for this technique stems from its successful application to spherical implosion core plasmas on Omega through the analysis of spatially resolved spectra (SRS) collected via pinhole imaging. In MagLIF, collections of SRS can be extracted from the images created by the slit imaging CRITR spectrometers. These spectra can be complemented with pinhole monochromatic images and spectra recorded with a spherical crystal spectrometer. One axially resolved and one radially resolved CRITR are field during MagLIF and information extracted from one of these SRS would be spatially integrated over a plane of finite thickness given by the spatial resolution of the instrument. In our method, we couple a model that creates synthetic sets of spectra, like those obtained from an experiment, with a Pareto genetic algorithm which searches in parameter space for the spatial distribution which best simultaneously and self-consistently fits the set of SRS/ Solutions obtained are used as the initial solution for a Levenberg-Marquadt minimization algorithm to provide a final "fine-tuned" solution. We are testing this method by creating synthetic "experimental" data and using the technique to search for the spatial distribution. The results of these feasibility studies will be discussed.

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