Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

**Increasing the accuracy of cold Fe opacity measurements to help resolve the Fe solar opacity puzzle**[1] MALIA KAO, GUILLAUME LOISEL, JAMES BAILEY, PATRICK LAKE, PAUL GARD, GREGORY ROCHAU, GEORGE BURNS, BARNEY DOYLE, Sandia National Laboratories — Iron opacity at electron densities and temperatures similar to solar interior conditions was obtained using the Z machine at Sandia National Laboratories. It was found to be 30-400% higher than what is used in standard solar models. In contrast, it is expected that opacity near solar conditions should be lower than the mass attenuation coefficients of x-ray radiation at room temperature (cold opacity). The caveat is that experimental values for opacity at room temperature are reported to within 10% error at best. The present project attempts to reduce these errors. Cold opacity is determined here using transmission measurements of an iron foil at three different characteristic line energies in the soft x-ray 6-13Å range. The required areal density is independently measured using Rutherford Backscattering Spectroscopy with evaluated accuracy using an ion beamline at Sandia. Initial transmission measurements have shown that a few percent error on transmission could be achieved.

[1]Sandia National Laboratories is a multimission laboratory managed and operated by NTESS LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. DOEs NNSA under contract DE-NA0003525.

Malia Kao
Sandia National Laboratories

Date submitted: 01 Jul 2020 Electronic form version 1.4