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Using LLNL's EBIT-I and two Crystal Spectrometers to Search for the Solution to the Iron Emission Problem with Mo XXXIII
TESSIE LUMABAO, Hawaii Department of Education - Waipahu High School, PETER BEIERSDORFER, GREG BROWN, NATALIE HELL, TOM LOCKARD, Lawrence Livermore National Laboratory, DAVID VOGEL, Middle Georgia State University — The purpose of this study was to determine the polarization of lines 3C and 3D for Mo XXXIII to further resolve the Fe XVII emission problem. For Ne-like Fe XVII, the 3d to 2p resonance, 3C, and intercombination, 3D, lines are strong and can be used as a diagnostic tool for determining the temperature and resonant scattering of stellar coronae. However, astrophysical and laboratory measurements, as well as calculations for the intensities of lines 3C and 3D do not agree. One factor that could affect laboratory measurements is polarization. Since polarization does not depend on atomic number, Ne-like Mo XXXIII is an excellent surrogate. To find the polarization values, we used LLNL's EBIT-I electron beam ion trap to create, trap, and excite Mo XXXIII. Subsequent x-ray emission was dispersed using two mutually perpendicular, spherically bent Ge crystal spectrometers and detected using CCDs. From our findings, the measured polarization values and theoretical polarization values agree within systematic error bars, but are not equal. Therefore, the intensity ratio of EBIT's measurements in the Fe XVII emission problem may increase by as much as 5%. This work was performed under the auspices of the Department of Energy by LLNL under Contract No. DE-AC52-07NA27344.

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