Excitation Cross Section Measurement for n=3 to n=2 Line Emission in Fe\textsuperscript{17+} to Fe\textsuperscript{23+}

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Abstract

We report the measurement of electron impact excitation cross sections for the strong iron L-shell 3 \( \rightarrow \) 2 lines of Fe XVIII to Fe XXIV at the EBIT-I electron beam ion trap using a crystal spectrometer and NASA-Goddard Space Flight Centers 6 \times 6 pixel array microcalorimeter. The cross sections were determined by direct normalization to the well established cross section of radiative electron capture through a sophisticated model analysis which results in the excitation cross section for 48 lines at multible electron energies. This measurement is part of a laboratory X-ray astrophysics program utilizing the Livermore electron beam ion traps EBIT-I and EBIT-II. This work was performed under the auspices of the U.S. DOE by LLNL under contract No. W-7405-Eng-48 and supported by NASA APRA grants to LLNL, GSFC, and Stanford University.

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