

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

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February 3, 2006

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 6×6 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 multiple 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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