

RECENT EXPERIMENTS ON NEAR-THRESHOLD ELECTRON-IMPACT EXCITATION OF MULTIPLY CHARGED IONS¹

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Some recent measurements of excitation of multiply charged ions by electrons studied in beam-beam experiments are highlighted. The emphasis is on absolute total cross sections measured with the merged electron-ion beams energy-loss (MEIBEL) technique, although some results obtained with the crossed-beams fluorescence method are also presented. The MEIBEL technique allows the investigation of optically-allowed and forbidden transitions with sufficient energy resolution, typically about 0.2 eV, to resolve resonance structures in the cross sections. Results from the JILA/ORNL MEIBEL experiment on dipole-allowed transitions in several ions demonstrate the success of various theoretical methods in predicting cross sections in the absence of resonances. Comparisons of R-matrix calculations and measured cross sections for spin-forbidden transitions in Mg-like Si²⁺ and Ar⁶⁺, however, show that further refinements to the theory are needed in order to more accurately predict cross sections involving significant contributions from dielectronic resonances and interactions between neighboring resonances.

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