

Abstract Submitted
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Electron Excitation out of the Metastable Levels of Ar into Levels of the $3p^55p$ ¹ R.O. JUNG, JOHN B. BOFFARD, L.W. ANDERSON, CHUN C. LIN, University of Wisconsin-Madison — We have measured electron-impact excitation cross sections out of the two metastable levels of the $3p^54s$ configuration into the levels of the $3p^55p$ configuration of Ar by observing fluorescence from the decay of these levels (390-470 nm). Metastable atoms are produced in a hollow cathode discharge. After exiting the discharge, the atoms are excited by a variable energy electron beam and the resulting fluorescence from the decay of excited levels is detected by a PMT. To determine cross sections out of each metastable level (3P_0 and 3P_2) separately, a Ti:Sapphire laser (pumped by an Ar⁺ laser) is used to depopulate the target atoms in the $J = 2$ metastable level. We find that the cross sections have peak magnitudes between 10^{-17} and 10^{-16} cm². These cross sections are one to two orders of magnitude smaller than the corresponding metastable excitation cross sections into $3p^54p$ levels², but are still two orders of magnitude larger than the $3p^55p$ excitation cross sections from the ground state.³

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²G. A. Piech *et al*, Phys. Rev. Lett. **81**, 309 (1998).

³T. Weber *et al*, Phys. Rev. A **68**, 032719 (2003).

John Boffard
University of Wisconsin

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