

Abstract Submitted
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Radiative double electron capture (RDEC) in collisions of bare fluorine ions with carbon foils T. ELKAFRAWY, J.A. TANIS, Department of Physics, Western Michigan University, A. SIMON, Michigan State University, NSCL, A. WARCZAK, Institute of Physics, Jagiellonian University, Krakow — Radiative double electron capture (RDEC) is a charge exchange process involving the capture of two target electrons into a bound state of the projectile simultaneously with the emission of a single photon. RDEC is the time reversed process of double photoionization if the target electrons are loosely bound. This approach provides us with a clean tool to explore the problems involved with electron-electron correlations and a proper description of a two-electron-continuum wave function in various atomic systems. In this work, we investigate both radiative electron capture (REC) and RDEC in collisions of 42 MeV singly- and doubly-charge changed fluorine ions with carbon targets. The experiment was performed at the tandem Van de Graaff accelerator of Western Michigan University in which emitted x rays were measured at 90° to the beam line in coincidence with projectile charge-changing of bare and H-like fluorine. The first evidence to see the RDEC process in $O^{8+} + C$ collisions¹ was the motivation to conduct the current work for the sake of the comparison between both observations and with recent theoretical calculations.^{2,3,4}

¹A. Simon *et al.*, Phys. Rev. Lett. **104** (12), 123001 (2010)

²A. I. Mikhailov *et al.*, Phys. Lett. A **328**, 350 (2004)

³A. I. Mikhailov *et al.*, Phys. Rev. A **69**, 032703 (2004)

⁴A. Nefiodov *et al.*, Phys. Lett. A **346**, 158 (2005).

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