

Abstract Submitted
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Radiative double electron capture (RDEC) for $F^{8,9+}$ ions colliding with N_2 * NUWAN KUMARA, DAVID LA MANTIA, ASGHAR KAYANI, PRASHANTA NIRLA, SHAHID IQBAL, Western Michigan University, ANNA SIMON, University of Notre Dame, JOHN TANIS, Western Michigan University — Radiative double electron capture (RDEC) is a one step atomic process in which two electrons are captured with the simultaneous emission of a single photon. RDEC can be considered as the time reversed process of double photoionization. The first observation of RDEC was reported in 2010 for 38 MeV O^{8+} colliding with a thin carbon foil¹. The purpose of the present work is to observe RDEC for gas targets in which multiple collisions can be avoided. The experiment is performed using the Western Michigan University (WMU) accelerator from which 40 MeV $F^{8,9+}$ projectiles were produced and then collided with nitrogen gas. Events for both F^{8+} and F^{9+} were observed in the calculated RDEC energy region of the spectrum for double capture coincident with x rays. The preliminary RDEC cross section for F^{9+} is consistent with the previously measured cross sections^{1,2} for fully stripped O and F projectiles colliding carbon. The preliminary F^{8+} RDEC cross section is about four times smaller because the capture of two electrons to the F^{8+} K shell is prevented due to the existing electron in the K shell. *Supported in part by NSF Grant PHY-1401429. ¹A. Simon et al., PRL **104**, 123001 (2010) ² T. Elkafrawy et al., Phys. Rev. A **94**, 042705 (2016).

Nuwan Kumara
Western Michigan University

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