

Abstract Submitted  
for the DAMOP02 Meeting of  
The American Physical Society

Sorting Category: 22 (Theoretical)

**Electron scattering by Rb, Cs, and Fr targets at low energies**<sup>1</sup> C. BAHIM, Dept. of Physics, Kansas State University, Manhattan and Chemistry and Physics Dept., Lamar University, Beaumont, TX, U. THUMM, Dept. of Physics, Kansas State University, Manhattan, I. I. FABRIKANT, Dept. of Physics and Astronomy, University of Nebraska, Lincoln — Within the relativistic Dirac  $R$ -matrix method and a model based on an effective two-electron approach <sup>2</sup>, we analyze the spectra of Rb<sup>-</sup>, Cs<sup>-</sup>, and Fr<sup>-</sup> ions in electron scattering by Rb, Cs, and Fr targets at energies below 2.8 eV. Our calculations predict the same <sup>3</sup>P<sup>o,e</sup>, <sup>3</sup>F<sup>o</sup>, and <sup>1</sup>P<sup>o</sup> resonances for all three anions <sup>3</sup> in calculations of angle-dependent, momentum transfer, and total cross sections. We discuss relativistic effects in the resonance profiles. Our 1<sup>+</sup> partial cross sections show pronounced Ramsauer-Townsend (RT) minima at 41/46/32 meV for Rb/Cs/Fr, caused by the strong atomic polarizability and related to a <sup>3</sup>S<sup>e</sup> virtual state. In the total converged cross section these RT minima are shifted to lower energies (4.6/1.1 meV for Rb/Cs, and below 1 meV for Fr) due to the nearby <sup>3</sup>P<sup>o</sup> resonance. We also discuss our spin-flip and spin-exchange cross sections for e<sup>-</sup> + Rb, Cs, and Fr collisions in comparison with experimental data.

<sup>1</sup>Supported by the Science Division, Office of Fusion Energy, Office of Energy Research, US DOE

<sup>2</sup>U. Thumm and D.W. Norcross Phys.Rev.A 45, 6349 (1992).

<sup>3</sup>C. Bahrim, U. Thumm, and I.I. Fabrikant Phys.Rev.A 63, 042710 (2001).

  

Prefer Oral Session

Prefer Poster Session

Uwe Thumm  
thumm@phys.ksu.edu  
Dept. of Physics, Kansas State University, Manhattan, KS 66502

Date submitted: February 2, 2002

Electronic form version 1.4