Abstract Submitted
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Studies of Collision Dynamics in Rb Spin-Exchange Cells[1] K.J. AHRENDSEN, W.J. BRUNNER, T.J. GAY, University of Nebraska - Lincoln — We report the most recent advances in the development of a novel source of spin-polarized electrons: the Rb spin filter [1]. Polarized electron beams are produced by electrostatically driving an unpolarized beam of thermionically emitted electrons through a cell containing a mixture of optically-pumped Rb vapor (n = ~10^{13} cm^{-3}) and N_2 buffer gas (n = ~10^{16} cm^{-3}). Previous studies of this process produced the unexpected result that the largest quantity of spin-polarized electrons are produced when the unpolarized electrons are incident on the spin-exchange cell at an energy of 50 - 100 eV, as opposed to energies <5 eV [2]. We hypothesize that this occurs because the maximum of the cross section for the ionization of nitrogen by electron impact occurs in this energy range, and that the slow, ionized electrons more effectively exchange spins with the Rb than do slow incident electrons. We report further investigations of this phenomenon, including a Monte-Carlo simulation of the collision cell dynamics. [1] H. Batelaan *et. al.*, Phys. Rev. Lett. **82**, 4216 (1999). [2] M. Pirbhai *et. al.*, Phys. Rev. A **88**, 060701(R) (2013).

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