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Studies of Spin Transfer Efficiency in a Rb Spin-Exchange Cell¹

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— 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 driving an unpolarized beam of thermionically emitted electrons through a target cell containing a mixture of spin-polarized Rb vapor and a buffer gas- in this experiment either N₂ or ethene. We have studied systematically the density of Rb which optimizes the transfer of the Rb valence electron spin to the unpolarized electron beam. The more Rb present in the system, the more likely a free electron is to collide with a polarized atom. On the other hand, more Rb in the system increases the effects of radiation trapping, reducing the overall polarization of the Rb[2]. We conducted these studies at buffer gas pressures in the sub-Torr regime. The experimental results are compared with Monte-Carlo simulations to better understand the dynamics of the system. [1]M. Pirbhai *et. al.*, Phys. Rev. A **88**, 060701(R) (2013). [2]D. Tupa and L. W. Anderson, Phys. Rev. A **36**, 2142 (1987).

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