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Progress towards an optically pumped electron spin filter MUNIR PIRBHAI, JONAH KNEPPER, NICK RYAN, University of Nebraska - Lincoln, DALE TUPA, Los Alamos National Laboratory, TIMOTHY GAY, University of Nebraska - Lincoln — Polarized electron beams are an indispensable probe of spin-dependent phenomena in fields of atomic and molecular physics, magnetic materials and biophysics. While their uses have become widespread, the sources producing them remain technically complex. The standard gallium arsenide (GaAs) polarized electron emitters require stringent conditions such as ultrahigh vacuum systems, and challenging activation procedures to operate. Therefore, we are actively seeking alternatives to the GaAs photocathodes. One option involves the production of polarized electron beams by spin exchange collisions with oriented rubidium vapor [1, 2, 3]. We have built a new prototype using this principle. At present, it supplies about 1μA of electron current with 13% polarization. We will report on how the rubidium density and different quenching gases, used in the optical pumping process to orient the alkali vapor, affect the electron beam polarization.

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Munir Pirbhai
University of Nebraska - Lincoln

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