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Continuous Propagation of Magnetically Guided Dark State ^{87}Rb
SPENCER OLSON, RAHUL MHASKAR, GEORG RAITHEL, University of Michigan — We demonstrate the coupling of a continuous, cold atomic beam into a 1.8 m long high-gradient (2.4 kGauss/cm) magnetic guide. Atoms are extracted from an LVIS-MOT and injected into the guide using a continuously operating moving optical molasses. By combining field geometries of our guide with that of a moving optical molasses, we estimate reaching coupling efficiencies >50%. Before injection, the atoms are transferred into a dark state, eliminating trap losses due to resonant scattering of stray MOT light. The injection mechanism will be described in detail. After gravitational slowing and magnetic compression, the atomic beam has an average velocity of 50 cm/s. Measurements of the transverse and longitudinal temperatures will be presented. We have found temperature values of 150±30 μK and 950 μK, respectively; the value on the longitudinal temperature represents an upper limit. Further applications, such as continuous evaporative cooling of the beam and cw BEC will be discussed.

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