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Absolute atomic collision cross section measurements using Rb atoms confined in magneto-optic and magnetic traps DAVID FAGNAN, Department of Physics & Astronomy, University of British Columbia, J. WANG, B.G. KLAPPAUF, J.L. BOOTH, K.W. MADISON — We present an experimental study of a technique to measure absolute total collision cross sections using laser cooled ^{85}Rb and ^{87}Rb atoms confined in either a magneto-optic or a magnetic quadrupole trap. Atom loss from the trap is caused by collisions with room temperature atoms of either He or Ar introduced into the vacuum cell, and the total collision cross section is inferred from knowledge of the residual gas density. The loss rates from magneto-optic (MOT) and pure magnetic traps are compared and significant differences are found. In contrast to previous work by Matherson *et. al.*[Phys. Rev. A 78, 042712 (2008)], we find that the cross section for trap loss inducing collisions in a MOT depends on the trap laser detuning, casting doubt on the reliability of this technique for traps based on dissipative, radiation pressure forces. The loss inducing collisions in a pure magnetic trap are studied for different low-field seeking spin states, and, unlike for a MOT, we find that the collision rates appear to be independent of trap depth. We also find for He or Ar background gas that the collision cross sections depend on the particular isotope and atomic spin state of the magnetically trapped rubidium.

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