

Abstract Submitted  
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**Vacuum Pressure Measurements using a Magneto-Optical Trap<sup>1</sup>**

T. ARPORNTHIP, C.A. SACKETT, University of Virginia, K.J. HUGHES, Triad Technology, Inc — We demonstrate that the loading dynamics of an alkali-atom magneto-optical trap (MOT) can be used as a reliable measure of vacuum pressure. This technique could be useful when a conventional pressure gauge is unavailable due to constraints on the vacuum system design. We find that for a MOT loading time  $\tau$ , the vacuum pressure can be estimated as  $(2 \times 10^{-8} \text{ Torr s})/\tau$ . This relation is accurate to within approximately a factor of two over wide variations in trap parameters, background gas composition, and trapped alkali species. At low pressures, the accuracy of the method is limited by losses from two-body elastic collisions within the trap. The loss rate from these collisions varies with the MOT parameters, but typically the method can extend into the  $10^{-10}$  Torr range. We will present theoretical and experimental verification of the technique, based on both our own investigations and previous reports in the literature.

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