

Abstract Submitted
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Evaluation of a lithium magneto-optical trap as a primary pressure gauge DANIEL S. BARKER, Sensor Science Division, National Institute of Standards and Technology, Gaithersburg, MD 20899, ERIC B. NORRGARD, Quantum Measurement Division, National Institute of Standards and Technology, Gaithersburg, MD 20899, JULIA SCHERSCHLIGT, NIKOLAI N. KLIMOV, JAMES A. FEDCHAK, STEPHEN ECKEL, Sensor Science Division, National Institute of Standards and Technology, Gaithersburg, MD 20899 — Preparation and control of extreme-high-vacuum (XHV) environments, as necessary for emerging quantum technologies, has been hindered by the lack of primary pressure gauges. We present preliminary studies of pressure sensing with a lithium magneto-optical trap (MOT). The loss rate from the MOT is compared to semi-classical collision theory to extract the vacuum pressure. We develop a model of the MOT escape velocity since it represents the dominate non-statistical error of the pressure measurement. The robustness of MOTs makes them ideal candidates for deployable sensors and we discuss our efforts to miniaturize a lithium MOT for this purpose.

Daniel Barker
NIST - Natl Inst of Stds
Tech

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