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Progress on a Portable BEC System MATTHEW B. SQUIRES, SHENGWANG DU, Department of Physics and JILA, University of Colorado at Boulder, STEVEN A. LIPP, Sarnoff Corporation, BENJAMIN LUEY, Department of Physics and JILA, University of Colorado at Boulder, STERLING E. MCBRIDE, Sarnoff Corporation, BRIAN MCCARTHY, Department of Mechanical Engineering, University of Colorado at Boulder, DANA Z. ANDERSON, Department of Physics and JILA, University of Colorado at Boulder — Small and portable BEC vacuum systems can simplify atom-chip experiments and allow for more rapid development of cold atom applications such as inertial sensing. This work describes our experimental progress on small ($<30 \times 30 \times 15\,\mathrm{cm}^3$) self-contained BEC vacuum cells. In the system an atom-chip seals the top of the vacuum cell, such that the cold atoms are <1mm from ambient atmosphere. This makes it possible to generate a significant field inside the vacuum using wires outside the vacuum envelope. Additionally, feed-throughs for on-chip electrical connections are made directly on or through the chip, which is much simpler than in standard vacuum systems. In order to allow for higher bakeout temperatures, and thus higher vacuum, we have attached a chip to a glass cell without epoxy. Because conventional alkali metal rubidium dispensers also emit hydrogen, we are developing a new means to dispense rubidium into the cell that will also allow rapid modulation of the rubidium pressure as required in single-chamber ultracold atom-chip experiments.

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