

Abstract Submitted
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Miniature, Monolithic Ultra High Vacuum Cells for BEC Applications¹ STERLING MCBRIDE, JOEY MICHALCHUK, Sarnoff Corporation, DANA ANDERSON, EVAN SALIM, KAI HUDEK, University of Colorado at Boulder — We have developed a miniature, monolithic ultra high vacuum cell with integrated atom source, gas and atom getters, ion pump and atom chip for applications in cold atom systems. The vacuum cell is a planar, multi-chamber system, fabricated on a single substrate and arranged to spatially separate a 2D MOT high pressure region containing the atom source, a 3D MOT region and a UHV atom chip region for BEC production. The chambers are fluidically connected by micro-channel structures to provide differential pumping between chambers. The vacuum cell is fabricated using novel planar batch fabrication techniques, which enables miniaturization, permits high bake-out temperature up to 300 °C, shows pressure below 10^{-10} Torr, and allows operation from room temperature to 300 °C. Experiments demonstrate the production of a double MOT in the 2D and 3D MOT regions. Applications include portable and transportable BEC systems for applications in atom interferometry, inertial navigation systems and atomic clocks.

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