

# Center for Advanced Manufacturing and Packaging of Microwave, Optical and Digital Electronics (CAMPmode)

University of Colorado at Boulder  
Dr. Roop Mahajan, Director  
Phone: 303-492-7750  
E-mail: roop.mahajan@colorado.edu

---

## Atomic Layer Deposition

Atomic Layer Deposition (ALD) on MEMS contacting surfaces for increased reliability. Work done at CU indicates ALD indicates this will increase the switch life of MEMS devices and it also provides a way of depositing alternating layers of dielectric for a controlled charge bleed-off. For more information, contact Roop Mahajan, University of Colorado at Boulder, 614-688-8233; e-mail: roop.mahajan@colorado.edu.

---

## MEMS for Ultra-Cold Atomic Physics

The ultimate goal of this CAMPmode research has been to create a new generation of devices based on Bose-Einstein Condensation (BEC), such as gyroscopes and gravitational field sensors, that are orders of magnitude more precise than the current state-of-the-art. Like the photons in a laser beams, the atoms in a BEC act coherently, although the coherence of a BEC is significantly better than that of a traditional laser. It is the improvement in coherence that provides the increase in sensitivity of these 'atom lasers' made from BEC. Although BEC was first demonstrated in the laboratory only eight years ago, CU is already moving toward creating and utilizing it in a packageable device.

A  $1 \text{ cm}^2$  chip, intended for BEC production on the microscale has also been used to magnetically and optically trap Rubidium atoms, the first step in BEC production. Finally, a MEMS version of the magneto-optical trap is in fabrication. For more information, contact Roop Mahajan, University of Colorado at Boulder, 614-688-8233; e-mail: roop.mahajan@colorado.edu.

