Physics Colloquium

Prof. Seth Aubin
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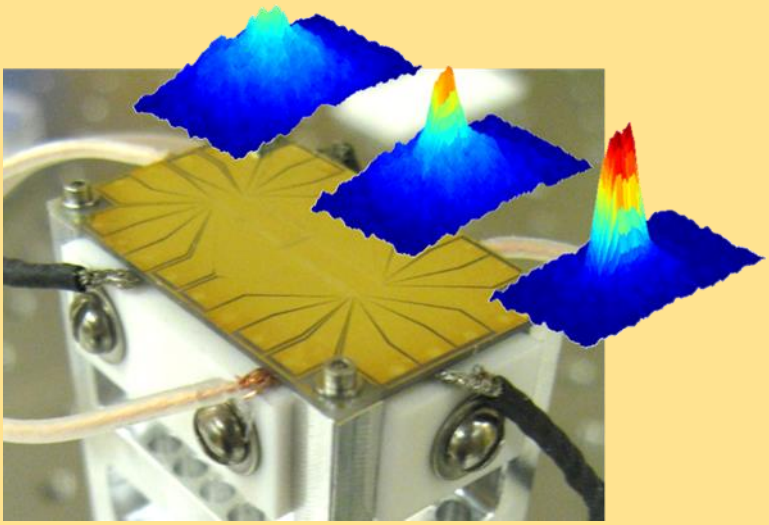
College of William and Mary

"Ultracold Atom Technology for Fundamental Physics"

The ultracold atoms revolution has led to the routine production of sub-microKelvin temperatures and quantum degenerate gases such as Bose-Einstein condensates and degenerate Fermi gases. These ultracold gases are well suited for experiments in quantum sensing and to probe fundamental physics.

In a first part, I will present work towards developing spin-specific microwave traps for ultracold atom interferometry. These traps rely on the AC Zeeman effect and can be used to target independent traps at different spin states simultaneously. In combination with a microwave lattice, a trapped atom interferometer is well suited to applications in inertial force sensing, gravimetry, and probing fundamental forces near a surface.

In a second part, I will describe an experiment to measure parity violation in an ultracold sample of laser-cooled francium. Atomic parity violation provides a sensitive test of the electroweak sector of the Standard Model at very low energies and a unique probe of the weak force inside the nucleus.



Seth Aubin leads a research group that uses ultracold atoms and quantum gases, such as Bose-Einstein condensates, for quantum sensing with atom interferometry. He majored in Mathematics and Physics at Yale University and did a junior year abroad at the Ecole Normal Supérieure in Paris. After graduating in 1995, he joined the Peace Corps and taught mathematics and physics at the Lycée Béhanzin in Dalaba, Guinea, West Africa for two years. He obtained his PhD in atomic physics with the Orozco & Sprouse groups at SUNY Stony Brook in 2003 and worked with quantum gases for his post-doc at the University of Toronto in the Thywissen group. He joined the physics faculty at William and Mary in 2007.

Thursday, February 17, in LL 316 at 4:25 PM
For Zoom participation, please see information below:
Meeting ID: 972 1274 7894
Passcode: 631869