PHYSICS COLLOQUIUM:
Novel Atom Interferometers

Frank Narducci
Associate Professor of Physics
Naval Postgraduate School

Date:
10/15/2021

Time:
10:30 AM-11:50 AM

Link:
Please contact snsgradstaff@ucmerced.edu for the Zoom information.

About The Speaker:

Prof. Narducci graduated with top honors in both physics and math from Drexel University in Philadelphia, Pa in 1989. He then went to the University of Rochester to earn a Master of Arts in 1991 and a Ph.D. in 1996. The late Prof. Leonard Mandel supervised his Ph.D. dissertation, entitled Photon correlations in single and multi-atoms systems.

Upon completion of his degree, he joined the Naval Air Systems Command as a staff physicist establishing his own research team to investigate effects in various atomic systems, including cold atom and warm cells. He served as a program manager for the Office of Naval Research from 2000-2003. He was elected a NavAir Associate Fellow in 2006 and a full NavAir Fellow in 2012. He won the Dolores Etter Award for Top Navy Scientist (Individual) in 2013 and become the Senior Science and Technology Manager: Position, Navigation and TimeKeeping. He joined the faculty of the Naval Postgraduate School in July 2017 as Associate Professor of Physics. He continues his research while teaching.

Also, "on the side", he has served as Associate Editor for Physical Review A (currently the longest serving editor) and Associate Editor for Physical Review Letters. He has also guest edited a special issue of the Journal of Modern Optics for the last 10 or so years devoted to the Proceedings of the Conference of The Physics of Quantum Electronics.

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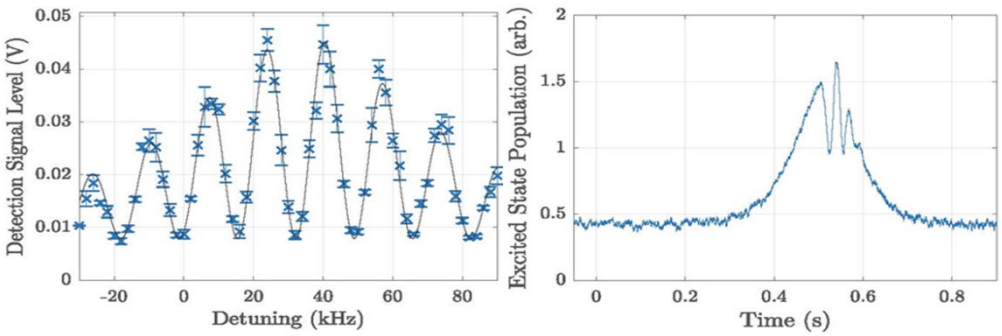
Abstract:

In this talk, I will highlight two novel interferometers currently being developed at the Naval Postgraduate School. The first interferometer utilizes a magnetic field gradient to break the symmetry between the two atomic paths, which leads to a higher scaling in the time T between the atom optic pulses. I will briefly describe details of the theory, including a novel method of understanding interference in atom sensors [1] before discussing the status of our experiments. A typical Ramsey fringe is depicted in figure 1 (left). The second interferometer uses continuous opposing beams of slow atoms originating from a 2-dimensional magneto-optical trap (2D-MOT) and continuous Raman fields for the atom optics. I will discuss the impact of gravity on this interferometer when operated as a gyroscope. I will discuss some novel effects such as the asymmetry notable in the figure depicted in figure 1 (right), as well as the physics of the optimal single photon detuning for
the Raman beams in our system.
beams in our system.



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