



Physics Colloquium



Thursday, February 4th at 3:30 pm in **SC 10**

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Testing Time-Reversal Symmetry Using Lasers, a Magic Room, and Pear-Shaped Nuclei

Experimental tests of fundamental symmetries using nuclei and other particles subject to the strong nuclear force have led to the discovery of parity (P) violation, the discovery of charge-parity (CP) violation, and the prediction of a hypothetical particle called the axion, which is currently a leading dark matter candidate. It is believed that additional sources of CP-violation may be needed to explain the apparent scarcity of antimatter in the universe. A particularly sensitive and unambiguous signature of both time-reversal- and CP-violation would be the existence of an electric dipole moment (EDM). The next generation of EDM searches in a variety of complimentary systems will have unprecedented sensitivity to physics beyond the Standard Model. I will describe two new searches using different nuclei and laser techniques. The first uses laser-polarized xenon and helium gases in the world's most magnetically quiet large scale environment located in Munich, Germany. The second uses laser-trapped & -cooled radium atoms in an experiment located at Argonne National Lab. Radium is a particularly attractive choice because its pear-shaped nucleus amplifies the observable effect of CP-violation by several orders of magnitude

Refreshments 3:00-3:20 pm in SC 103