

A NEW SEARCH FOR THE ELECTRIC DIPOLE MOMENT OF THE NEUTRON AT THE SPALLATION NEUTRON SOURCE

A. Pérez Galván

W. K. Kellogg Radiation Laboratory, California Institute of Technology

The observation of an electric dipole moment of the neutron at the current level of experimental precision would represent new physics beyond the Standard Model of elementary particles and could potentially help elucidate the mechanisms behind the violation of discrete symmetries in Nature. In addition, a non-zero value of the neutron electric dipole moment would also be a new source of CP (charge-conjugation and parity) violation that might explain the mystery behind the matter-antimatter asymmetry of the Universe. Given these far reaching consequences, a new multi-institutional effort using ultra-cold neutrons is currently underway. The experiment will be carried out at the Spallation Neutron Source at Oak Ridge National Laboratory using an array of new techniques that have the potential to improve the current best limit by two orders of magnitude. In this talk I present an overview of the experiment concentrating on the requirements and technical challenges of the subsystem that will provide the magnetic environment for the experiment as well as results from performance tests of a half-scale prototype.