

Chen-Yu Liu – Colloquium seminar February 19, 2026
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Title: Genie in a Bottle: probing TeV physics with neV ultracold neutrons

Abstract: Ultra Cold Neutrons (UCN) are free neutrons with kinetic energies up to several hundred nano-eV and an equivalent temperature of milli-Kelvin. These neutrons experience the four fundamental forces of nature, i.e., the electromagnetic force, gravity, nuclear strong and weak forces, on similar energy scales, making them a unique and versatile tool to test the foundations of physics. In particular, storage of UCN enables precision measurement of many neutron observables, such as the charge distribution, the electric and magnetic moments, and beta-decay energies and correlations. High-precision measurements, confronted with theoretical predictions, probe physics at multi-TeV scales not yet accessible by collider experiments. In this talk, I will discuss two recent measurements using UCN: the lifetime and the electric dipole moment of the neutron, to illustrate the power of precision measurements and symmetry tests using neutrons.