

Particle physics with neutrons at the lowest energies

Prof. Dr. Skyler Degenkolb

Physikalisches Institut, Universität Heidelberg

New sources of CP violation are required to explain the observed abundance of matter in the universe. While the new particles or interactions responsible may lie at very high energies, the most stringent constraints can come from low-energy experiments. In particular the neutron is sensitive, through its electric dipole moment, to many sources of CP violation both within and beyond the Standard Model. I will briefly introduce the field of neutron particle physics, and motivate the use of "ultracold neutrons" with the lowest achievable energies to perform precision measurements. Key technologies including neutron sources and detectors will be highlighted, in the context of ongoing efforts and future prospects for improved electric dipole moment measurements at new beamlines and facilities. I will also discuss the interpretation of the present experimental limits, in the context of complementary experimental systems and high-energy physics.