Großes Physikalisches Kolloquium an der Universität zu Köln

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The electric dipole moment of the neutron

A permanent electric dipole moment (EDM) of a particle with spin violates time reversal symmetry. To date no finite EDM has been measured yet despite considerable search efforts world-wide and in various systems. The limits provide severe constraints on the Standard Model of Particle Physics and on theories beyond it. The most sensitive search for the EDM of the neutron is being pursued by the international nEDM collaboration at the Paul Scherrer Institute (PSI) in Switzerland. The high intensity proton accelerator at PSI provides up to 1.4 MW average beam power to targets producing the highest intensities of low momentum pions, muons and ultracold neutrons. After a brief review of the particle physics at PSI, I will give an introduction to the field of EDM research and its present status, including the latest update from the neutron EDM effort at PSI and a new result on oscillating EDM relevant to hypothetical ultra-light axion dark matter.