



Heinz H. Barschall Colloquium

Search for Permanent Electric Dipole Moments of Protons and Deuterons using Storage Rings

Frank Rathmann

Institut fuer Kernphysik , Forschungszentrum Juelich, Germany

The Standard Model (SM) of Particle Physics is not capable to account for the apparent matter-antimatter asymmetry of our Universe. Physics beyond the SM is required and is searched for by (i) employing highest energies (e.g., at LHC), and (ii) striving for ultimate precision and sensitivity (e.g., in the search for electric dipole moments (EDMs)). Permanent EDMs of particles violate both time reversal (T) and parity (P) invariance, and are via the CPT-theorem also CP-violating. Finding an EDM would be a strong indication for physics beyond the SM, and pushing upper limits further provides crucial tests for any corresponding theoretical model, e.g., SUSY. Direct searches of proton and deuteron EDMs bear the potential to reach sensitivities beyond 10^{-29} e-cm. For an all-electric proton storage ring, this goal is pursued by the US-based srEDM collaboration, while the newly found Juelich-based JEDI collaboration is in addition pursuing an approach using a combined electric-magnetic lattice which shall allow access to the EDMs of protons, deuterons, and 3He ions in the same machine.

The talk will highlight recent achievements from experimental investigations at COSY toward the search for electric dipole moments of charged hadrons, i.e., proton and deuteron; it will emphasize one of the most spectacular possibilities in modern science: Finding a signal for new physics beyond the Standard Model through the detection of permanent electric dipole moments in a storage ring.



University of Wisconsin-Madison Department of Physics

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3:30 pm | 2241 Chamberlin Hall

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