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Toward a New Measurement of the Neutron Electric Dipole Moment at the n2EDM Experiment

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The Standard Model (SM) of particle physics successfully describes most observed phenomena, yet it fails to explain the matter-antimatter asymmetry in the Universe. This discrepancy suggests the existence of new sources of CP violation beyond those present in the SM. The neutron Electric Dipole Moment (nEDM) is a powerful observable for searching for new physics, as it is highly sensitive to CP-violating interactions at energy scales far beyond the reach of current colliders.

The n2EDM experiment, currently under development, aims to improve the sensitivity to the nEDM by one order of magnitude compared to the collaboration's prior measurements. This talk will discuss the motivation for searching for new CP-violating processes, the unique role of the nEDM as a probe of beyond-SM physics, and the current challenges faced by the n2EDM experiment in achieving its ambitious goals.

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