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Ultracold neutron energy spectrum from magnetic depolarization

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The nEDM Collaboration at PSI presents a novel method for extracting the energy spectrum of ultracold neutrons from magnetically induced spin depolarization measurements using the n2EDM apparatus. This method is also sensitive to the storage properties of the materials used to trap ultracold neutrons, specifically, how specular or diffuse is the surface. We highlight the sensitivity of this new technique by comparing the two different storage chambers of the n2EDM experiment, which, due to the geometry, result in different energy spectra. We validate our extraction by comparing to an independent measurement for how this energy spectrum is polarized through a magnetic-filter, and finally, we calculate the neutron center-of-mass offset, an important systematic effect of nEDM measurements.

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