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Research and development towards novel spin-selective neutron detectors for fundamental science

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We present developments towards spin-selective *in-situ* detection of ultracold neutrons, motivated by the search for a permanent electric dipole moment. Magnetic fields generated by microstructured superconductors will produce a spin-dependent shift of the neutron-optical potential at a reflecting surface layer. Low-field-seeking neutrons then penetrate to an underlying absorber with increased probability, while high-field-seeking neutrons are more likely to be reflected without absorption. This concept is being tested via polarized cold neutron reflectometry; it could also open further applications as an alternative means of neutron depth profiling.

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