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”Quantum Sensing for Fundamental Physics”

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A revolution in the tools and techniques making use of quantum mechanics has produced new sensitive measurement techniques that can help the particle physics community to achieve its science objectives in a way highly complementary to traditional particle physics methods. New quantum sensors, for the first time, allow measurements to be made near the intrinsic noise limits imposed by the Heisenberg uncertainty principle, as well as enabling enhancements in sensitivity, resolution, and robustness, thereby accelerating searches for new physics; dark matter and dark sectors, searches for new interactions, probing fundamental symmetries and inflation. Related fields that will also be impacted are gravitational wave cosmology, astrophysics, and fundamental tests of quantum mechanics. This leverage works in the other direction also: bringing the unique resources and expertise of the particle physics community to bear on the development of quantum sensors will lead to rapid technology advances that will benefit the quantum information science community and other areas of science.

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