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Quantum metrology: Past, present, and future

CARLTON CAVES, Center for Quantum Information and Control, University of New Mexico

The ability to make high-precision measurements lies at the heart of physics and optical science. Ever since quantum mechanics was discovered and became the framework for physical law, it has been understood that quantum effects limit how well physical quantities can be measured. I discuss the development of ideas regarding quantum limits on measurement precision, the accomplishments in achieving quantum-limited measurement precision and in overcoming perceived quantum limits, and the maturation of the field into quantum metrology, a subfield of quantum information science in which researchers rigorously investigate and formulate quantum limits and strategies for achieving those limits.