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Assessing the Quality of Quantum Sensors PAUL A. LOPATA, U.S. Army Research Laboratory, THOMAS B. BAHDER, U.S. Army Aviation and Missile Research, Development and Engineering Center — A general sensor can be modeled in the following way: a well-characterized physical system is prepared in some initial state, the system then interacts with a classical field through a well-understood mechanism, and then a measurement is made on the original system. From this procedure it is possible to infer the characteristics of the classical field. A number of proposals have been made to develop *quantum sensors*, whose physical systems (which are prepared, interact with the classical field, and are then measured) are quantum mechanical in nature. In this talk I introduce this general description of quantum sensors and demonstrate how the unitary (interacting) dynamics and probabilistic measurements afforded by quantum mechanics can be used to infer the value of a classical field using a Bayesian statistical analysis. I also discuss the use of the mathematical measure of mutual information to compare different sensors.

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