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Entropic error-disturbance relations[1] PATRICK COLES, National University of Singapore, FABIAN FURRER, University of Tokyo — We derive an entropic error-disturbance relation for a sequential measurement scenario as originally considered by Heisenberg, and we discuss how our relation could be tested using existing experimental setups. Our relation is valid for discrete observables, such as spin, as well as continuous observables, such as position and momentum. The novel aspect of our relation compared to earlier versions is its clear operational interpretation and the quantification of error and disturbance using entropic quantities. This directly relates the measurement uncertainty, a fundamental property of quantum mechanics, to information theoretical limitations and offers potential applications in for instance quantum cryptography.

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