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**Uncertainty Relation for Smooth Entropies** MARCO TOMAMICHEL, RENATO RENNER, ETH Zurich — Uncertainty relations give upper bounds on the accuracy by which the outcomes of two incompatible measurements can be predicted. While the established uncertainty relations apply to cases where the predictions are based on purely classical data (e.g., a description of the system's state before the measurement), an extended relation which remains valid in the presence of quantum information has been proposed recently [Berta et al., *Nature Physics* 6, 659 (2010)]. Here we generalize this uncertainty relation to one formulated in terms of smooth entropies. Since these entropy measures are related to operational quantities, our uncertainty relation has various applications. As an example, we show that it directly implies security of quantum key distribution protocols.

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