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Title: Intrinsic randomness as a measure of quantum coherence

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Based on the theory of quantum mechanics, intrinsic randomness in measurement distinguishes quantum effects from classical ones. From the perspective of states, this quantum feature can be summarized as coherence or superposition in a specific (classical) computational basis. Recently, by regarding coherence asa physical resource, Baumgratz et al. [Phys. Rev. Lett. 113, 140401 (2014)] presented a comprehensive framework for coherence measures. Here, we propose a quantum coherence measure essentially using the intrinsic randomness of measurement. The proposed coherence measure provides an answer to the open question in completing the resource theory of coherence. Meanwhile, we show that the coherence distillation process can be treated as quantum extraction, which can be regarded as an equivalent process of classical random number extraction. From this viewpoint, the proposed coherence measure also clarifies the operational aspect of quantum coherence. Finally, our results indicate a strong similarity between two types of quantumness—coherence and entanglement.