Special Issue

Quantum Resource Theories: From Entanglement to Time Correlations and Measurement-Induced Noise

Message from the Guest Editors

Recently, it has been shown that generalized measurements can produce non-classical time correlations even in the absence of entanglement. This realization has led, for example, to the development of hidden quantum Markov models with applications in quantum metrology. In addition to generalized measurements, there are numerous other quantum resources that are currently being explored. These include causality violations and entanglement in time with applications such as quantum switches and hypothesis testing. In addition, quantum physics poses limitations on measurement uncertainties that are unbreakable and can hide information in quantum noise for quantum communication protocols.

This Special Issue aims to further our understanding of the features of quantum machines that allow them to surpass the capabilities of their classical counterparts by bringing together the scientific community of researchers studying quantum resource theories.

- quantum correlations
- quantum Markov processes
- quantum finite-state machines
- quantum bounds
- causality
- complexity
- hypothesis testing

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The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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