

Special Issue

Certification and Verification of Quantum Systems

Message from the Guest Editors

In recent years, we have observed a wave of novel quantum technologies that are soon to change the way we process information and communicate: quantum random number generators, quantum annealers or simulators or even the first prototypes of quantum computers. Moreover, companies have even started to commercialize some of them, offering devices, for instance, for random number generation or quantum cryptography. However, should a user trust that the acquired device indeed exploits quantum features? This rapid development points to a very fundamental problem: how to verify and certify that a supposedly quantum device operates in a truly quantum way in the sense that it exploits the quantum effect to perform a given task and cannot be mimicked by purely classical methods. Efficient methods of certification of quantum devices are thus needed.

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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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