Quantum Walks for Quantum Technologies

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Deadline for manuscript submissions:
30 April 2024

Message from the Guest Editors

The *first quantum revolution* created all the core technologies of our modern society. Nowadays, the possibility of manipulating individual quantum systems has paved the way for the *second quantum revolution*, which aims to fully harness quantum phenomena to develop radically new quantum technologies.

Quantum walks (QWs)—the quantum counterpart of classical random walks—describe the propagation of a quantum particle over a discrete space subject to given constraints. Their versatility and peculiar quantum features have made them paradigmatic models in quantum technologies. E.g., QWs have been widely used in modelling the transport of excitation and information across networks, and they have proven to be a universal model for quantum computation and to provide speed-up in quantum algorithms.

The present Special Issue focuses on the current theoretical and experimental role of QWs in quantum technologies. Original unpublished research articles and review articles are invited on these topics:

(i) Quantum communication;
(ii) Quantum computation;
(iii) Quantum simulation;
(iv) Quantum metrology, sensing, and imaging;
(v) Quantum control;
(vi) Quantum software and theory.

Special Issue

Message from the Editor-in-Chief

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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