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From Quantum Networks to Quantum Internet: Opportunities and Challenges

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Message from the Guest Editor

Quantum networks include quantum nodes and systems in charge of networking, processing and storing units of quantum information for the end-users. Currently, several international efforts are aiming to define and test protocol stacks for quantum networks and their evolution for the quantum internet: interfaces and protocols must be designed and standardized, beginning with the physical, data linkage and network layers, in order to account for the requirements of quantum technologies.

The aims of this Special Issue include: (1) detailing the state-of-the-art of methods and systems for quantum networks (e.g., software and hardware) in order to forecast the potential socio-economic impacts; (2) proposing architectural principles, abstractions and interfaces for quantum computing and networking; (3) providing critical analysis of experimental use cases in order to identify challenges, roadblocks, services and business opportunities.

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Message from the Editor-in-Chief

We get more and more evidence that quantum theory is the correct description of nature. It was born a century ago by explaining a few paradoxical results that could not be understood in the framework of classical physics. Today, quantum physics leads technological revolution in metrology, communication, computation, and the design of novel materials. Still it needs more solid foundations, and we need to develop a deeper understanding of how it can be used for new applications.

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