Special Issue

Opportunities and Challenges in Quantum AI

Message from the Guest Editor

This Special Issue aims to explore and advance the frontiers of the interface of quantum computing and AI by addressing both theoretical and practical challenges. We seek papers that delve into the development of fault-tolerant quantum algorithms, explore the scalability of variational quantum circuits, and investigate new paradigms of computing such as quantum neuromorphic computations as well as the application of AI methods in the enhancement of quantum tasks. Contributions that enhance our understanding of quantum-enhanced learning, bridge the gap between quantum algorithms and applications, or propose innovative quantum architectures for machine learning are particularly welcome. Furthermore, we encourage submissions on the application of quantum machine learning in optimization, quantum chemistry, solving differential equations, and health care and life sciences, where QML can potentially drive significant breakthroughs. We invite researchers to submit their work on these topics, contributing to the ongoing dialogue that will shape the future of quantum machine learning and unlock its full potential.

Guest Editor

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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.

Quantum Reports is an online, open-access journal providing an advanced forum for clarifying foundations of quantum theory and developing its applications in all fields of physics and technology. *Quantum Reports* is inviting innovative and insightful contributions from the growing community of researchers of quantum science.

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