Special Issue

Axiomatic Approaches to Quantum Mechanics

Message from the Guest Editors

Dear colleagues, The basic principles of quantum mechanics, which work so well in the lab, have always given rise to intensive conceptual debates. Alongside the search for better understanding of those principles, researchers have tried over the years to ground the mathematical structure of quantum mechanics with a small set of physically plausible assumptions. In recent decades, attempts have been made, for example, at deriving the set of quantum nonlocal correlations and the Born rule from information-theoretic and other sensible axioms. More recently, axiomatic approaches subsumed quantum field theory and the foundations of quantum thermodynamics. In addition, many glimpses have been made beyond the quantum formalism, e.g., attempts to relax some of the axioms of quantum mechanics in order to generalize it, possibly towards a quantum theory of gravity.

Guest Editors

Dr. Avishy Carmi

Center for Quantum Information Science and Tech-nology, Faculty of Engineering Sciences, Ben-Gurion University of the Negev, Beer Sheva, Israel

Dr. Eliahu Cohen

Faculty of Engineering, Institute for Nanotechnology & Advanced Materials, and Center for Quantum Entanglement Science & Technology, Bar-Ilan University, Ramat-Gan 5290002, Israel

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Entropy
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
entropy@mdpi.com

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Editor-in-Chief

Prof. Dr. Kevin H. Knuth
Department of Physics, University at Albany, 1400 Washington Avenue, Albany, NY 12222, USA

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