

# Cambridge Elements

Elements in the Philosophy of Physics

edited by

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## FOUNDATIONS OF QUANTUM MECHANICS

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## Foundations of Quantum Mechanics

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**Abstract:** Quantum mechanics is an extraordinarily successful scientific theory. But more than 100 years after it was first introduced, the interpretation of the theory remains controversial. This Element introduces some of the most puzzling questions at the foundations of quantum mechanics and provides an up-to-date and forward-looking survey of the most prominent ways in which physicists and philosophers of physics have attempted to resolve them. The topics covered include non-locality, contextuality, the reality of the wavefunction, and measurement problem. The discussion is supplemented with descriptions of some of the most important mathematical results from recent work in quantum foundations, including Bell's theorem, the Kochen-Specker theorem, and the PBR theorem.

**Keywords:** quantum foundations, philosophy of physics, non-locality, contextuality, Measurement problem

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