

## QUANTUM WORLDS

Quantum theory underpins much of modern physics, and its implications draw the attention of industry, academia, and public funding agencies. However there are many unsettled conceptual and philosophical problems in the interpretation of quantum mechanics, which are a matter of extensive debate. These hotly debated topics include the meaning of the wave function, the nature of the quantum objects, the role of the observer, the nonlocality of the quantum world, and the emergence of classicality from the quantum domain. Containing chapters written by eminent researchers from the fields of physics and philosophy, this book provides interdisciplinary, comprehensive, and up-to-date perspectives of the problems related to the interpretation of quantum theory. It is ideal for academic researchers in physics and philosophy who are working on the ontology of quantum mechanics.

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Edited by Olimpia Lombardi , Sebastian Fortin , Cristian López , Federico Holik

Frontmatter

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# QUANTUM WORLDS

Perspectives on the Ontology of Quantum Mechanics

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## Preface

Developing a research group in philosophy of physics is not an easy task in Argentina, the southernmost country in South America. In addition to language barriers and the lack of a tradition on the matter, distance is the main obstacle to attend the best academic meetings and to visit renowned research centers. For this reason, the Grant 57919 that we were awarded by the John Templeton Foundation (JTF) represented an invaluable support to our work: It allowed us to develop an intense activity manifested in publications and participation in specialized conferences, which gave a qualitative boost to our research development.

In the context of this JTF grant, we organized the International Workshop *Identity, indistinguishability and non-locality in quantum physics*, held in Buenos Aires from June 26 to June 29, 2017. We were proud to welcome some of the most salient international specialists on the interpretation of quantum mechanics, who kindly accepted our invitation to participate in the workshop and to contribute to the present volume: Dennis Dieks, Michael Esfeld, Hans Halvorson, Nathan Harshman, Alejandro Hnilo, Ruth Kastner, Décio Krause, James Ladyman, Wayne Myrvold, Alyssa Ney, Lev Vaidman, and Nino Zanghì. Our first acknowledgment is for them. Those who want to know about the workshop can access to the link [www.filoexactas.exactas.uba.ar/project-ontology/workshop.html](http://www.filoexactas.exactas.uba.ar/project-ontology/workshop.html), which contains the videos of the full talks and of the lively final discussion.

Of course, our most special acknowledgment goes to the John Templeton Foundation, which made possible the successful development of our project. But since institutions do not exist without the people who embody them, we want to particularly thank Alexander Arnold for his continued support during the three years of work.

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the Faculty of Exact and Natural Sciences and in the Faculty of Philosophy and Letters of the University of Buenos Aires: Hernán Accorinti, Guido Bellomo, Martín Bosyk, Mariana Córdoba, María José Ferreira Ruiz, Manuel Herrera, Jesús Jaimes Arriaga, Martín Labarca, Marcelo Losada, Juan Camilo Martínez González, Erick Rubio, Leonardo Vanni, and Alfio Zambon. Their strong commitment and unlimited enthusiasm made the organization of the meeting an enjoyable task.

Although the presentations from the workshop were the basis for this book, we are also grateful to Jonas Arenhart, Otávio Bueno, and Manuel Gadella, who graciously accepted the invitation of the editors to contribute to the present volume in different chapters. Last, but not least, we want to express our gratitude to Cambridge University Press, in the person of Simon Capelin, Editorial Director (physical sciences) and Sarah Lambert, Editorial Assistant, for their support and assistance during all the stages of this project.