THE TRANSACTIONAL INTERPRETATION OF QUANTUM MECHANICS

A comprehensive exposition of the transactional interpretation of quantum mechanics (TI), this book sheds new light on longstanding problems in quantum theory and provides insight into the compatibility of TI with relativity. It breaks new ground in interpreting quantum theory, presenting a compelling new picture of quantum reality.

The book shows how TI can be used to solve the measurement problem of quantum mechanics, and to explain other puzzles, such as the origin of the "Born Rule" for the probabilities of measurement results. It addresses and resolves various objections and challenges to TI, such as Maudlin's inconsistency challenge. It explicitly extends TI into the relativistic domain, providing new insight into the basic compatibility of TI with relativity and the physical meaning of "virtual particles." This book is ideal for researchers and graduate students interested in the philosophy of physics and the interpretation of quantum mechanics.

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The Reality of Possibility

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Preface

This book came about as a result of my profound dissatisfaction with the existing "mainstream" interpretations of quantum theory and my conviction that the unusual mathematical structure of quantum theory indeed reflects something about physical reality, however subtle or hidden. In my early days as a physics graduate student, I was a "Bohmian"; however, I became dissatisfied with that interpretation for reasons discussed here and there throughout the book. It is my hope that, even if the reader does not come away convinced of the fruitfulness of the present approach, this presentation will serve as an invitation to further far-ranging and open discussion of the interpretational possibilities of quantum theory.

I have attempted to make much of the book accessible to the interested layperson with a mathematics and/or physics background, and to indicate where more technical sections can be omitted without losing track of the basic conceptual picture. For those in the field, I have endeavored to take into account as much as possible of the relevant literature and to use notes where a technical and/or esoteric point seems relevant. Chapters 5 and 6 are the most technical and may be omitted without losing track of the conceptual picture.

I am grateful to many colleagues, friends, and family members who gave generously of their time and energy to critically read drafts of various chapters, to offer comments, and to discuss material appearing herein. In particular, Professor John Cramer offered numerous suggestions for improvement of the manuscript, although we are not in agreement on all aspects of this proposal. His inclusion in the following list of acknowledgments therefore does not imply his endorsement of this formulation. Of course, final responsibility for the contents is mine alone.

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