

# The Large, the Small and the Human Mind

ROGER PENROSE

WITH

ABNER SHIMONY

NANCY CARTWRIGHT

AND STEPHEN HAWKING

EDITED BY MALCOLM LONGAIR



**CAMBRIDGE**  
UNIVERSITY PRESS

## Contents

Notes on the Contributors IX

Foreword by Malcolm Longair XI

CHAPTER 1 Space-time and Cosmology 1

CHAPTER 2 The Mysteries of Quantum Physics 50

CHAPTER 3 Physics and the Mind 93

CHAPTER 4 On Mentality, Quantum Mechanics and the  
Actualization of Potentialities ABNER SHIMONY 144

CHAPTER 5 Why Physics? NANCY CARTWRIGHT 161

CHAPTER 6 The Objections of an Unashamed  
Reductionist STEPHEN HAWKING 169

CHAPTER 7 Response by Roger Penrose 173