

Quantum Theory from Small to Large Scales

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This book collects lecture courses and seminars given at the Les Houches Summer School 2010 on *Quantum Theory: From Small to Large Scales*. Fundamental quantum phenomena appear on all scales, from microscopic to macroscopic. Some of the pertinent questions include the onset of decoherence, the dynamics of collective modes, the influence of external randomness and the emergence of dissipative behaviour. Our understanding of such phenomena has been advanced by the study of model systems and by the derivation and analysis of effective dynamics for large systems and over long times. In this field, research in mathematical physics has regularly contributed results that were recognized as essential in the physics community. During the last few years, the key questions have been sharpened and progress on answering them has been particularly strong. It reviews the state-of-the-art developments in this field and provides the necessary background for future studies. All chapters are written from a pedagogical perspective, making the book accessible to master and PhD students and researchers willing to enter this field.

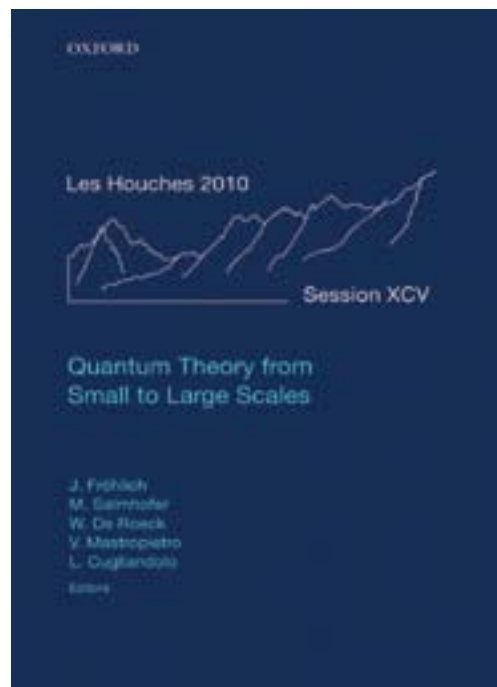
Readership: Graduate and postgraduate students and postdocs in physics, and mature researchers in the field.

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71 black and white line drawings | 15 black and white halftones

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- Addresses fundamental questions of mathematics and physics
- Written from a pedagogical perspective
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- Suggests future lines of research
- Combines different areas of the exact sciences

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