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Introduction to Quantum Mechanics:Schrödinger Equation and Path Integral

Harald J W Müller-Kirsten

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This text on quantum mechanics begins by covering all the main topics of an introduction to the subject. It then concentrates on newer developments. In particular it continues with the perturbative solution of the Schrödinger equation for various potentials and thereafter with the introduction and evaluation of their path integral counterparts. Considerations of the large order behavior of the perturbation expansions show that in most applications these are asymptotic expansions. The parallel consideration of path integrals requires the evaluation of these around periodic classical configurations, the fluctuation equations about which lead back to specific wave equations. The period of the classical configurations is related to temperature, and permits transitions to the thermal domain to be classified as phase transitions.

In this second edition of the text important applications and numerous examples have been added. In particular, the chapter on the Coulomb potential has been extended to include an introduction to chemical bonds, the chapter on periodic potentials has been supplemented by a section on the band theory of metals and semiconductors, and in the chapter on large order behavior a section has been added illustrating the success of converging factors in the evaluation of asymptotic expansions. Detailed calculations permit the reader to follow every step.

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- Hamiltonian Mechanics
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- Quantum Mechanics of the Harmonic Oscillator
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- The Density Matrix and Polarization Phenomena
- Quantum Theory: The General Formalism
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Readership: Undergraduates and graduate students in physics; researchers in mathematical and particle physics.

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