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Physics : Quantum Physics

Hall, Michael J. W., Reginalto, Marcel

Ensembles on Configuration Space

Classical, Quantum, and Beyond

- Presents a unified approach to quantum and classical mechanics
- Contributes to a better understanding of decoherence and the quantum measurement problem
- Style is lucid and the authors draw upon many years of experience in the field
-

This book describes a promising approach to problems in the foundations of quantum mechanics, including the measurement problem. The dynamics of ensembles on configuration space is shown here to be a valuable tool for unifying the formalisms of classical and quantum mechanics, for deriving and extending the latter in various ways, and for addressing the quantum measurement problem. A description of physical systems by means of ensembles on configuration space can be introduced at a very fundamental level: the basic building blocks are a configuration space, probabilities, and Hamiltonian equations of motion for the probabilities. The formalism can describe both classical and quantum systems, and their thermodynamics, with the main difference being the choice of ensemble Hamiltonian. Furthermore, there is a natural way of introducing ensemble Hamiltonians that describe the evolution of hybrid systems; i.e., interacting systems that have distinct classical and quantum sectors, allowing for consistent descriptions of quantum systems interacting with classical measurement devices and quantum matter fields interacting gravitationally with a classical spacetime.

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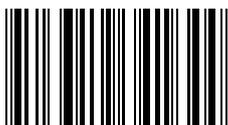
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