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Autore	Correggi Michele
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Nota di contenuto	Chapter 1. Introduction -- Chapter 2. Many-Body Quantum Mechanics -- Chapter 3. Two Comments on the Derivation of the Time-Dependent Hartree-Fock Equation -- Chapter 4. Bogoliubov Theory for Ultra Dilute Bose Gases -- Chapter 5. Derivation of the Ginzburg-Landau Theory for Interacting Fermions in a Trap -- Chapter 6. Energy expansions for dilute Bose gases from local condensation results: a review of known results -- Chapter 7. Bogoliubov theory for the dilute Fermi gas in three dimensions -- Chapter 8. Uniform in Time Convergence to Bose-Einstein Condensation for a Weakly Interacting Bose Gas with External Potentials -- Chapter 9. Trial states for Bose gases: singular scalings and non-integrable potentials -- Chapter 10. Bogoliubov Transformations Beyond Shale-Stinespring: Generic $v^* v$ for bosons -- Chapter 11. Thermodynamic Game and The Kac Limit in Quantum Lattices -- Chapter 12. Topological Polarization in disordered systems -- Chapter 13. Open Quantum Systems -- Chapter 14. On the Asymptotics Dynamics of Open Quantum Systems -- Chapter 15. Boson quadratic GKLS generators -- Chapter 16. Semiclassical Analysis -- Chapter 17. Some Remarks on Semiclassical Analysis on Two-Steps Nilmanifolds -- Chapter 18. Waves in a Random Medium: Endpoint

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### Sommario/riassunto

This book is the first volume that provides an unique overview of the most recent and relevant contributions in the field of mathematical physics with a focus on the mathematical features of quantum mechanics. It is a collection of review papers together with brand new works related to the activities of the INdAM Intensive Period "INdAM Quantum Meetings (IQM22)", which took place at the Politecnico di Milano in Spring 2022 at Politecnico di Milano. The range of topics covered by the book is wide, going ranging from many-body quantum mechanics to semiclassical analysis, quantum field theory, Schrödinger and Dirac operators and open quantum systems.

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