1. Record Nr. UNINA9910813732703321 Autore Lipparini Enrico Titolo Modern many-particle physics: atomic gases, quantum dots and quantum fluids / / Enrico Lipparini River Edge, N.J., : World Scientific, c2003 Pubbl/distr/stampa **ISBN** 1-281-95613-9 9786611956134 981-279-674-6 Edizione [1st ed.] Descrizione fisica 1 online resource (x, 431 p.): ill Disciplina 530.144 Many-body problem - Approximation methods Soggetti Solid state physics Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Bibliographic Level Mode of Issuance: Monograph Note generali Nota di bibliografia Includes bibliographical references and index. Nota di contenuto ch. 1. Independent-particle model. 1.1. Introduction. 1.2. Bosons. 1.3. Fermions. 1.4. Matrix elements of one-body operators. 1.5. Matrix elements of two-body operators. 1.6. Density matrices. 1.7. Ideal Bose gas confined in a harmonic potential. 1.8. The Fermi gas. 1.9. Finite temperature and quasiparticles -- ch. 2. The Hartree-Fock theory. 2.1. Introduction, 2.2. The Hartree-Fock method for fermions, 2.3. The Hartree-Fock method for bosons, 2.4. The Gross-Pitaevskii equations. 2.5. Hartree-Fock in second quantization language. 2.6. Hartree-Fock at finite temperature. 2.7. Hartree-Fock-Bogoliubov and BCS -- ch. 3. The Brueckner-Hartree-Fock (BHF) theory. 3.1. Introduction. 3.2. The Lippman-Schwinger equation. 3.3. The Bethe-Goldstone equation. 3.4. The one-dimensional fermion system. 3.5. Numerical results of BHF calculation in different systems. 3.6. The g matrix for the 2D electron gas -- ch. 4. The density functional theory (DFT). 4.1. Introduction. 4.2. The density functional formalism. 4.3. Examples of application of the density functional theory. 4.4. The Kohn-Sham equations. 4.5. The

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## Sommario/riassunto

A study of modern many-particle physics. It describes homogenous systems, such as electron gas in different dimensions, the quantum well in an intense magnetic field, liquid helium and nuclear matter, and addresses finite systems, such as metallic clusters, quantum dots, helium drops and nuclei.