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Nota di contenuto	Condensate dynamics at T = 0 -- Coupled equations for the condensate and thermal cloud -- Green's functions and self-energy approximations -- The Beliaev and the time-dependent HFB approximations -- Kadanoff-Baym derivation of the ZNG equations -- Kinetic equation for Bogoliubov thermal excitations -- Static thermal cloud approximation -- Vortices and vortex lattices at finite temperatures -- Dynamics at finite temperatures using the moment method -- Numerical simulation of the ZNG equations -- Simulation of collective modes at finite temperature -- Landau damping in trapped Bose-condensed gases -- Landau's theory of superfluidity -- Two-fluid hydrodynamics in a dilute Bose gas -- Variational formulation of the Landau two-fluid equations -- The Landau-Khalatnikov two-fluid equations -- Transport coefficients and relaxation times -- General

theory of damping of hydrodynamic modes.

Sommario/riassunto

The discovery of Bose-Einstein condensation (BEC) in trapped ultracold atomic gases in 1995 has led to an explosion of theoretical and experimental research on the properties of Bose-condensed dilute gases. The first treatment of BEC at finite temperatures, this book presents a thorough account of the theory of two-component dynamics and nonequilibrium behaviour in superfluid Bose gases. It uses a simplified microscopic model to give a clear, explicit account of collective modes in both the collisionless and collision-dominated regions. Major topics such as kinetic equations, local equilibrium and two-fluid hydrodynamics are introduced at an elementary level. Explicit predictions are worked out and linked to experiments. Providing a platform for future experimental and theoretical studies on the finite temperature dynamics of trapped Bose gases, this book is ideal for researchers and graduate students in ultracold atom physics, atomic, molecular and optical physics and condensed matter physics.