1. Record Nr. UNINA9910815613703321

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Titolo	Introduction to relativistic statistical mechanics : classical and quantum / / Remi Hakim
Pubbl/distr/stampa	Hackensack, N.J., : World Scientific, c2011
ISBN	1-283-23472-6 9786613234728 981-4322-45-8
Edizione	[1st ed.]
Descrizione fisica	1 online resource (567 p.)
Disciplina	530.13
Soggetti	Statistical mechanics Relativistic quantum theory Relativistic kinematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 465-528) and index.
Nota di contenuto	Contents; Preface; Notations and Conventions; Introduction; 1. The One-Particle Relativistic Distribution Function; 1.1 The One-Particle Relativistic Distribution Function; 1.1.1 The phase space "volume element"; 1.2 The Juttner-Synge Equilibrium Distribution; 1.2.1 Thermodynamics of the Juttner-Synge gas; 1.2.2 Thermal velocity; 1.2.3 Moments of the Juttner-Synge function; 1.2.4 Orthogonal polynomials; 1.2.5 Zeromass particles; 1.3 From the Microcanonical Distribution to the Juttner-Synge One; 1.4 Equilibrium Fluctuations; 1.5 One-Particle Liouville Theorem 1.5.1 Relativistic Liouville equation from the Hamiltonian equations of motion1.5.2 Conditions for the Juttner-Synge functions to be an equilibrium; 1.6 The Relativistic Rotating Gas; 2. Relativistic Kinetic Theory and the BGK Equation; 2.1 Relativistic Hydrodynamics; 2.1.1 Sound velocity; 2.1.2 The Eckart approach; 2.1.3 The Landau-Lifschitz approach; 2.2 The Relaxation Time Approximation; 2.3 The Relativistic Kinetic Theory Approach to Hydrodynamics; 2.4 The Static Conductivity Tensor; 2.5 Approximation Methods for the Relativistic Boltzmann Equation and Other Kinetic Equations 2.5.1 A simple Chapman-Enskog approximation2.6 Transport

Coefficients for a System Embedded in aMagnetic Field; 3. Relativistic Plasmas; 3.1 Electromagnetic Quantities in Covariant Form; 3.2 The Static Conductivity Tensor; 3.3 Debye-H uckel Law; 3.4 Derivation of the Plasma Modes; 3.4.1 Evaluation of the various integrals; 3.4.2 Collective modes in extreme cases; 3.5 Brief Discussion of the Plasma Modes; 3.6 The Conductivity Tensor; 3.7 Plasma-Beam Instability; 3.7.1 Perturbed dispersion relations for the plasma-beamsystem; 3.7.2 Stability of the beam-plasma system
4. Curved Space-Time and Cosmology4.1 Basic Modifications; 4.2 Thermal Equilibrium in a Gravitational Field; 4.2.1 Thermal equilibrium in a static isotropicmetric; 4.3 Einstein-Vlasov Equation; 4.3.1 Linearization of Einstein's equation; 4.3.2 The formal solution to the linearized Einstein equation; 4.3.3 The self-consistent kinetic equation for the gravitating gas; 4.4 An Illustration in Cosmology; 4.4.1 The two-timescale approximation; 4.4.2 Derivation of the dispersion relations (a rough outline); 4.5 Cosmology and Relativistic Kinetic Theory; 4.5.1 Cosmology: a very brief overview
4.5.2 Kinetic theory and cosmology4.5.3 Kinetic theory of the observed universe; 4.5.4 Statistical mechanics in the primeval universe; 4.5.5 Particle survival; 5. Relativistic Statistical Mechanics; 5.1 The Dynamical Problem; 5.2 Statement of the Main Statistical Problems; 5.2.1 The initial value problem: observations andmeasures; 5.2.2 Phase space and the Gibbs ensemble; 5.3 Many-Particle Distribution Functions; 5.3.1 Statistics of the particles' manifolds; 5.4 The Relativistic BBGKY Hierarchy; 5.4.1 Cluster decomposition of the relativistic distribution functions
5.5 Self-interaction and Radiation

Sommario/riassunto

This is one of the very few books focusing on relativistic statistical mechanics, and is written by a leading expert in this special field. It started from the notion of relativistic kinetic theory, half a century ago, exploding into relativistic statisti