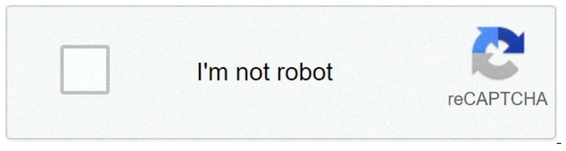

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Loading PreviewSorry, preview is currently unavailable. You can download the paper by clicking the button above. Module code: PX265 Module name: Thermal Physics II Department: Physics Credit: 7.5 Content and teaching | Assessment | Availability Module content and teaching Principal aims The module introduces statistical mechanics and its central role in physics. It should give you an appreciation of Boltzmann's insights into the nature and role of entropy. You will see many of the ideas introduced here used in the description of the properties of matter in solid state, nuclear and astrophysics modules in the third and fourth years. Principal learning outcomes At the end of the module you should: Be familiar with the definition of thermal equilibrium, the ergodic hypothesis and the various ensembles; Know the definition and importance of the partition function and be able to calculate thermodynamic averages from it (this includes the Fermi-Dirac and Bose-Einstein distributions); Understand the structure of statistical mechanics and its relation to classical thermodynamics; Be familiar with the notion of degeneracy and the density of states. Timetabled teaching activities about 18 Lectures + 4 problems classes Departmental link Other essential notes Any macroscopic object we meet contains a large number of particles, each of which moves according to the laws of mechanics (which can be classical or quantum). Yet we can often ignore the details of this microscopic motion and use a few average quantities such as temperature and pressure to describe and predict the behaviour of the object. Why we can do this, when we can do this and how to do it are the subject of this module. The most important idea in the field is due to Boltzmann, who identified the connection between entropy and disorder. The empirical laws of thermodynamics required the existence of entropy, but there was no microscopic definition for it. The module shows how the structure of equilibrium thermodynamics follows from Boltzmann's definition of the entropy and shows how, in principle, any observable equilibrium quantity can be computed. This microscopic theory (now called statistical mechanics) provides the basis for predicting and explaining all thermodynamic properties of matter. Module assessment Assessment group Assessment name Percentage 7.5 CATS (Module code: PX265-7.5) D (Assessed/examined work) Assessed work as specified by department 15% Thermal Physics II (Summer) 85% VA (Visiting students only) 100% assessed (visiting/exchange) PART YEAR 100% Module availability This module is available on the following courses: Core Undergraduate Physics (BSc) (F300) - Year 2 Undergraduate Physics (MPhys) (F303) - Year 2 Undergraduate Physics (BSc MPhys) (F304) - Year 2 Undergraduate Physics and Business Studies (F3N1) - Year 2 Undergraduate Mathematics and Physics (MMathPhys) (FG31) - Year 2 Undergraduate Mathematics and Physics (BSc MMathPhys) (FG33) - Year 2 Undergraduate Mathematics and Physics (BSc) (GF13) - Year 2 Optional Core N/A Optional N/A © 1996-2015, Amazon.com, Inc. or its affiliates 2011: B.SC. (HONS) II PHYSICS PAPER X (THERMAL PHYSICS) 2011 B.Sc.(Hons.) PHYSICS III Sem. PAPER PHHT-309 (Thermal Physics) 2011 2012: BSC (HONS) PHYSICS PART II THERMAL PHYSIES III 2012 2013: B.SC. (Hons.) Physics Thermal Physics (PHHT-309) SEM-III(6209) 2013 2014: Thermal Physics Sem II 2014 FYUP batch DU Physics Hons If the above links were of some help and you liked our work, do comment and subscribe to us. Also browse the site for more Delhi University related stuff. This site provides some exclusive content for Physics Honors students. It would really benefit you. Don’t forget to share it with your friends and class-mates. ‘Sharing is Caring’. A Text book of Statistical and Thermal Physics" has been written with a special focus on the new curriculum provided by the Himachal Pradesh University under new CBCS system. The book is strictly in accordance with the syllabus of Himachal Pradesh University and each and every topic has been elaborated to give the students a clear picture of the phenomena involved. It is our effort to provide a simple and straight forward picture of the ideas and theoretical concepts for the paper point of view as well as understanding point of view of the concepts involved.1. Basic Ideas of Statistical Physics2. Distribution of Particles in Compartments3. Types of Statistics in Physics4. Bose Einstein and Fermi Dirca Statistics5. Law of Thermodynamics and Entropy6. Statistical Interpretation of Entropy7. Maxwell's Thermodynamic Relations8. Applications of Thermodynamic RelationsBasic Ideas of Statistical Physics : Scope of statistical physics, basic ideas about probability, distribution of four distinguishable particles in two compartments of equal sizes. Concept of macro-states, micro-states, thermodynamic probability, effect of constraints on the system. TEXT BOOK QUESTIONS Link1. Basic Ideas of Statistical Physics.pdfDistribution of Particles in Compartments: Distribution of n particles in two compartments, Deviation from the state of maximum probability. Equilibrium state of a dynamic system, distribution of n distinguishable particles in k compartments of unequal sizes. TEXT BOOK QUESTIONS Link2. Distribution of Particles in Compartments .pdfTypes of Statistics in Physics: Phase space and division into elementary cells. Three kinds of statistics. The basic approach in the three statistics. M-B. Statistics applied to an ideal gas in equilibrium, experimental verification of the Maxwell Boltzmann's law of distribution of molecular speeds. Need for quantum statistics, h as a natural constant and its implications, indistinguishability of particles and its implications. B-E statistics. TEXT BOOK QUESTIONS Link3. Types of Statistics in Physics.pdfBose Einstein and Fermi Dirac Statistics: Derivation of Planck's law of radiation, deduction of Wien's distribution law and Stefan's law from planck's law. Fermi-Dirac statistics Applications to liquid helium, free electrons gas (Fermi level and Fermi Energy), Comparison of M-B, B-E, F-D statistics. TEXT BOOK QUESTIONS Link4. Bose Einstein and Fermi Dirca Statistics.pdf Entropy and Laws of Thermodynamics: Application of thermodynamics to the thermoelectric effect, change of entropy along a reversible path in a p-v diagram, entropy of a perfect gas, equation of state of ideal gas from simple statistical considerations, heat death of the universe. TEXT BOOK QUESTIONS Link5. Laws of Thermodynamics and Entropy.pdfStatistical Interpretation of entropy: Statistical definition of entropy, change of entropy of system, additive nature of entropy, law of increase of entropy. Reversible and irreversible processes, example of reversible and irreversible processes. Work done in a reversible process ,example of entropy in natural process, entropy and disorder. TEXT BOOK QUESTIONS Link6. Statistical Interpretation of Entropy.pdfMaxwell's Thermodynamic Relations and Their Applications: Thermodynamic Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Derivation of Maxwell's thermodynamic relations. TEXT BOOK QUESTIONS Link7. Maxwell's Thermodynamics Relations.pdfApplications of thermodynamics relations : Cooling produced by adiabatic stretching, adiabatic compression, adiabatic stretching of a wire, stretching of thin films, change of internal energy with volume. Clausius-Clapeyron Equation, Thermodynamical treatment of Joule Thomson effect for liquification of Helium. Production of very low temperatures by adiabatic demagnetization, TdS equations. TEXT BOOK QUESTIONS Link8. Application of Thermodynamics Relations.pdf Thermal Physics | DN Tripathi & RB Singh - Kedar Nath Ram Nath is available at mycoursebook. Buy Thermal Physics | DN Tripathi & RB Singh - Kedar Nath Ram Nath online at the best price. Get fastest shipping and more benefits on Thermal Physics | DN Tripathi & RB Singh - Kedar Nath Ram Nath at mycoursebook. Get best deals, discounts and offers on Thermal Physics | DN Tripathi & RB Singh - Kedar Nath Ram Nath. Notify me when the price drops Continue View Cart Compare Products My Wishlist Faculteit Science and Engineering Jaar 2020/21 Vakcode WBPH002-10 Vaknaam Thermal Physics Niveau(s) bachelor Voertaal Engels Periode semester I ECTS 10 Rooster rooster.rug.nl Uitgebreide vaknaam Thermal Physics Leerdoelen Upon completion of this course, the student is able to:1.derive and apply thermodynamics in the framework of statistical physics;2.solve simple statistical physics problems using the microcanonical, canonical and grand canonical ensemble;3.derive expressions for the density of states, partition function, mean occupation numbers and the thermodynamics for a classical and quantum mechanical particle system;4.analyse and solve more complex problems concerning the application of the theory (phase equilibrium, heat conduction in solids, classical gas, photon gas, quantum gas).5.anticipate and check solutions to problems using e.g. symmetry and limiting case arguments;6.be critical about the presented material and to pose relevant questions during lectures and study groups. Omschrijving The objective of the course is to provide an introduction in thermodynamics and statistical physics. The course starts with the basic concepts of heat, probability, micro and macrostates, temperature and an early introduction of the Boltzmann factor. Thereafter the kinetic theory of gasses is studied. The thermodynamics part of the course is then completed with the first, second and third law and their applications. In the statistical physics part the entropy concept is used to link the microscopic properties of matter (motion of atoms and molecules) and the macroscopic properties of matter (laws of thermodynamics). From the fundamental postulate of statistical mechanics, probabilities are introduced in the description of particle systems using the microcanonical, canonical and grand canonical ensembles. Both classical (Boltzmann distribution) and quantum statistics (Bose-Einstein, Fermi-Dirac distributions) are treated. The theory is applied to study: ideal gases (Maxwell speed distribution), equilibrium between phases (Clausius-Clapeyron equation), heat capacity of solids (Einstein and Debije model), black body radiation (photon gas), free electrons in metals (Fermi gas) and Bose-Einstein condensation (Bose gas) Uren per week Onderwijsvorm Hoorcollege (LC), Werkcollege (T) (Lectures: 64 hours, Tutorials: 64 hours, Self study: 152 hours.) Toetsvorm Schriftelijk tentamen (WE) (The final grade(F) of the course is calculated: 1) On basis of the Tests 1-6 F=0.1*T1+0.15*T2+0.25*T3+0.1*T4+0.15*T5+0.25*T6. 2) On basis of the Re-exam (R): F=R) Vaksoort bachelor Coördinator dr. E.R. van der Graaf Docent(en) dr. T.A. Schlathölter ,dr. E.R. van der Graaf Verplichte literatuur Titel Auteur ISBN Prijs Concepts in Thermal Physics (2010, 2ed) Concepts in Thermal Physics (2010, 2ed) 978-0-19-956210-7 Entreevoorwaarden The course unit assumes some elementary knowledge of classical and quantum mechanics. The course unit is compulsory for the bachelor degree programmes physics, technical physics and astronomy and for the combined bachelor degree programme physics and mathematics. Opmerkingen This course was registered last year with course code WBPH19001 Opgenomen in