

Advanced Lecture in Statistical Mechanics and Thermodynamics

2 units (selection)

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Target The first purpose is to understand the fundamentals of the statistical mechanics and thermodynamics. Further, to acquire abilities to apply the statistical mechanics and thermodynamics is the second purpose. In the textbook it is written that thermodynamics, the statistical mechanics, and the kinematics are stems of the statistical physics; and those are the themes of the lecture.

Outline 教科書に従い、「統計熱力学の原理」、「特別な系の平衡統計」、「運動論、輸送係数、ゆらぎ」の3項目を扱う。

Keyword *principle of statistical mechanics, equilibrium statistics, kinetics, transport coefficient, fluctuation*

Notice A two hour pre-study prior to a lecture and a two post-study after that are necessary to understand the lecture and success.

Goal see, "target".

Schedule

1. First law of thermodynamics
2. Gibbs-Boltzmann distribution law
3. Statistical justification of second law
4. Older way to second law
5. Thermodynamic exploitation of second law: mass transfer problem
6. Grand ensemble: classical statistics of independent particles
7. Statistics of perfect molecular gas
8. Examination
9. Thermal properties of crystals
10. Statistics of conduction electron in solids
11. Statistics of magnetism
12. Theory of dilute solutions
13. Transport properties of gases
14. Kinetics of charge carrier in solids and liquids
15. Fluctuation and Brownian motion
16. 試験

Evaluation Criteria Final marks are evaluated on the basis of the examinations or alternatives, to which the evaluations of the exercise are added. Qualifications of candidacy for an examination are lost if there is no attendance of 60% or more.

Textbook Statistical Physics, G. H. Wannier (Dover, New York) ISBN 0-486-65401

Reference Because of the traditional field, there are many textbooks.

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=218257>

Contact

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Note This class is for Double Degree. A supplementary lecture in Japanese will be given on the odd-numbered year; the formal lecture will be given in English on the even-numbered year.