

## Information for the Exam

- The exam will take place on Friday, February 17th 2012, 12.15pm in Hörsaal A. Paper will be provided. Please take your passport / id-card and your student-id-card with you.
- The exam consists of two parts:  
The first part (15 mins) will test your knowledge with short questions. The full content of lecture and exercises can be relevant for these questions. During this part you are not allowed to use any notes. One sixth of the total points will be awarded in the first part. The second part (75 mins) will consist of three problems in the area thermodynamics, statistical mechanics and quantum statistics. During this part you are allowed to use one double-sided A4 page or two single-sided A4 pages with hand-written notes. The following chapters are relevant for this part:
  - 1.3 Ideal gas law
  - 3.2 Postulate of equal a-priori probability
  - 3.3 Entropy and absolute temperature
  - 3.5 Maxwell-Boltzmann distribution + entropy
  - 3.7 Canonical ensemble
  - 3.8 Ideal gas in the canonical ensemble
  - 3.9 Equipartition theorem
  - 3.10 Heat capacity
  - 3.13 Grand canonical ensemble
  - 3.14 Ideal gas
  - 4.1 Thermodynamic concepts
  - 4.2 Laws of Th.D.
  - 4.3 Reversible versus irreversible expansion
  - 4.4 Conclusions from the 2nd law
  - 4.5 Maxwell Relations
  - 4.6 Adiabatic/isothermal expansion
  - 4.7 Extremal properties
  - 4.8 Entropy gain
  - 4.9 Carnot engine
  - 4.10 Phase transitions, Clausius-Clapeyron-equation, Gibbs-Duhem-equation
  - 5.3 Van der Waals equation
  - 6.1 QM Postulates
  - 6.4 Bose/Fermi general case
  - 6.5 Ideal Fermi Gas
  - 6.6 Ideal Bose Gas, black body radiation, Bose-Einstein condensation
- Have a closer look at the following problems: 4.4, 5.3, 6.2, 6.3, 7.2, 7.3, 8.4, 9.1, 9.2, 13.3, 14.3 and 14.4