Statistical Physics
Assignment 13

Lecture: Prof. Dr. Otfried Gühne
Tutorial: Leonardo Novo, Tobias Moroder, Fri 8–10, Room: D115

Discussion: Fri, 13.07

Questions (exemplary list)

1. What are the conditions for a density matrix? Why?
2. Given a density matrix what is its entropy, and what is its interpretation?
3. What is meant if one speaks of an equilibrium state? Which underlying principle determines its precise form and how would you motivate this principle?
4. Which ensembles do you know?
5. Certain Lagrange parameters are called inverse temperature or chemical potential. How would you motivate those names?
6. What is Gibbs' phase rule?
7. What do you know about the laws of thermodynamics?
8. What is a thermodynamic potential? Why are they connected with the names of Maxwell and Legendre?
9. What is a thermodynamic response function, and which ones do you know?
10. What is an ideal gas, and why is the Van-der-Waals-gas more interesting?
11. What is meant by the virial expansion?
12. How does the velocity distribution looks like in an ideal gas?
13. What are fermions and bosons? How does one treat these particles in quantum mechanics?
14. What do you know about the Bose and Fermi-gas (e.g., occupation number, ...)?
15. What are common example systems that follow either Bose or Fermi statistic? Which results can you recall (e.g. Planck's law, ...)?
16. What is a Bose-Einstein condensate?