Physics 8102, Statistical Mechanics Fall Semester 2014

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Office hours: Wednesday and Friday 10:30-11:30 and 1:00-3:00
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The final grade will be based on weekly homework (30% of grade), a midterm exam (30%), and a final exam covering the entire semester's work (40%).

Topics to be considered

1. Review of thermodynamics
2. Kinetic theory, Boltzmann equation, transport theory
3. Statistical definition of entropy, connection with information theory, microcanonical, canonical, and grand canonical ensembles, applications to ideal and dilute gases, fluid phases, magnetic systems
4. Quantum statistics, ideal Bose and Fermi gases, Bose-Einstein condensation, black-body radiation spectrum, Einstein and Debye models of solids, low temperature properties of liquid helium, equilibrium of stars
5. Other topics if time permits: statistics of random walk, phase transitions and critical phenomena, polymer statistics

Recommended References

1. K. Huang, *Statistical Mechanics*
2. R. K. Pathria and P. D. Beale, *Statistical Mechanics*
3. L. D. Landau and E. M. Lifshitz, *Statistical Physics*
4. S.-K. Ma, *Statistical Mechanics*
5. D. A. McQuarrie, *Statistical Mechanics*
6. M. Kardar, *Statistical Physics of Particles*
7. R. H. Swendsen, *An Introduction to Statistical Mechanics and Thermodynamics*

Undergraduate textbook

D. V. Schroeder, *Thermal Physics*