

PY 541 Problem Set 9: HW Exercises Due on Dec 12th

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Read the assigned material before class. Pre-class questions are due midnight the night before before Tuesday and Thursday classes and noon on Wednesdays when homeworks are not due (usually Thursdays), and otherwise should be turned in with the homeworks.

Welcome to PY 541 Statistical Physics. This is a graduate course that assumes you have taken an undergrad course on these topics (e.g. Thermal Physics, Statistical Physics, etc.). It also assumes some basic familiarity with core mathematical areas: probability, linear algebra, vector calculus as well as rudimentary programming skills (Python, Mathematica, etc.). If you do not feel comfortable with these concepts, please come talk to me.

All exercises are from the second edition of Jim Sethna's book available at:

<https://www.lassp.cornell.edu/sethna/StatMech/index.html>.

There are also hints and code for computational exercises at this website.

Readings and Pre-class questions

Tuesday:

Read Chapter 7 Sethna; Chapter 6 Gould

In-class: Problem 7.2 Are photons and phonons bosons?, Problem 7.13 Bose-Einstein Condensation in a band.

Wednesday:

Read: Chapter 7 Sethna; Chapter 6 Gould

In-class: 7.16 White Dwarf.

Thursday:

Summary and review of class

Homework Exercises

7.1 Ensembles and Quantum Statistics

7.4 Does entropy increase in quantum systems?

7.10 Crystal defects

7.11 Phonons on a string

Honor Code

All students are expected to follow the [BU Honor Code](#). While collaboration is allowed and encouraged on HWs, each student should write up their own solutions. Copying HW is strictly forbidden. The students are allowed to consult all resources and books. However, students are NOT allowed to consult problem solutions from previous years or as found on the web.