

PHY4523 REPORT

Students will choose one subject out of the suggested topics and write a comprehensive report. Student can form a group with another student and work collectively. Each group should submit one report but both should make comparable contributions to the report. Each report should follow the format and style guide of Physical Review Letters (<http://prl.aps.org/info/infoL.html>) and should be submitted in PDF. If you are not familiar with LaTeX, you can use the Word template provided by the instructor with PRL reference style.

Students can choose a topic from the list below. The references for each topic could be used as a guide or an example of the topic and do not have to be the subject of the paper. But students could also use them as their main subject. If you want to write on a topic not listed below, please contact the instructor.

Bose-Einstein Condensation in Cold Atoms

E.A. Cornell and C.E. Wieman, *Rev. Mod. Phys.* **74**, 875 (2002).

Magnetism in One-Dimensional Spin Chains

M.E. Fisher, *Am. J. Phys.* **32**, 343 (1964).

J.C. Bonner and M.E. Fisher, *Phys. Rev.* **135**, A640 (1964).

Cooper Instability and Superconductivity

L.N. Cooper, *Phys. Rev.* **104**, 1189 (1956).

M. Tinkham, *Introduction to Superconductivity* 2nd ed. (McGraw-Hill, 1996).

Stars in Statistical Mechanics

R. Balian and J. Blaizot, *Am. J. Phys.* **67**, 1189 (1999).

Statistical Mechanics at Negative Temperature

N.F. Ramsey, *Phys. Rev.* **103**, 20 (1956)

Applications of Computational Statistical Mechanics in Biology and other topics

D. Stauffer, *Am. J. Phys.* **67**, 1207 (1999).

V.A. Boomfield, *Am. J. Phys.* **67**, 1212 (1999).

R.N. Mantegna and H.E. Stanley, *An Introduction to Econophysics* (Cambridge, Cambridge, 1999).