School of Mathematics

Module MA3444 — Statistical physics II
( JS Theoretical Physics )

Lecturer: Dr. Stefan Sint

Requirements/prerequisites: prerequisite: MA3443

Duration: Hilary term, 11 weeks

Number of lectures per week: 3 lectures including tutorials per week

Assessment:

ECTS credits: 5

End-of-year Examination: This module will be examined jointly with MA3443 in a 3-hour examination in Trinity term, except that those taking just one of the two modules will have a 2 hour examination. However there will be separate results for MA3444 and MA3443.

Description:

Learning Outcomes: On successful completion of this module, students will be able to:

• explain the difference between fermions and bosons and work out the consequences for $N$-particle systems at low temperatures;

• make contact with the classical regime at high temperatures and/or low particle densities;

• apply the formalism of statistical physics to systems without particle number conservation (e.g. photons, phonons);

• apply the formalism of quantum statistical physics to simple model systems;

• apply the formalism of thermodynamics to magnetic/spin systems;

• do a mean field analysis of spin systems;

• solve the 1-dimensional Ising model, and show familiarity with Peierl’s argument in 2 dimensions.

April 21, 2011