Massachusetts Institute of Technology
Physics Department

Physics 8.334 Spring 03

Statistical Mechanics II

Last modified: September 3, 2003

	We 2/5 Long-range order, symmetry and soft modes (PS1 out)	Fr 2/7 Continuous and discontinuous phase transitions. Mean field theory. (PS2 out)
Mo 2/10 *Rec* 1D models: the $e^{-\lambda\|x\|}$ gas, Ising	We 2/12 Symmetry breaking, Landau theory (PS1 due, PS3 out)	Fr 2/14 Universality classes. Susceptibility and fluctuations.
Tu 2/18 *Rec* Snow Day	We 2/19 Fluctuations near phase transition. Renormalization group. (PS2 due, PS4 out)	Fr 2/21 Real space RG. Blocking, decimation, bonds-moving
Mo 2/24 *Rec* The Ising model, exact solution	We 2/26 Scaling theory near a critical point. (PS3 due, PS5 out)	Fr 2/28 Field-theoretic RG. Low dimension. (Choose term paper topic)
Mo 3/3 *Rec* RG for quadratic hamiltonians. Mermin-Wagner thm.	We 3/5 The nonlinear sigma model, the XY model. Topological phase transition. (PS4 due, PS6 out)	Fr 3/7 *Guest Lecture:* Quantum Chromodynamics on a Lattice, by John Negele
Mo 3/10 *Guest Lecture:* Nonequilibrium Critical Phenomena. Turbulence, by G Falkovich	We 3/12 Kosterlitz-Thouless RG; Duality; Coulomb gas, solid-on-solid models; Vortex melting of 2D crystals (PS5 due, PS7 out)	Fr 3/14 Statistical Field Theory; Saddle-point approximation (mean field revisited)
Mo 3/17 *Rec* TBA	We 3/19 The upper critical dimension; Ising model and logarithms in $d = 4$. (PS6 due, PS8 out)	Fr 3/21 Wilson-Fisher fix point. The ϵ-expansion method: $4-\epsilon$ and $2+\epsilon$.
Mo 3/24 *Spring vacation*	We 3/26 *Spring vacation*	Fr 3/28 *Spring vacation*
Mo 3/31 *Rec* TBA	We 4/2 The Onsager problem, exact solution(s) (PS7 due, PS9 out)	Fr 4/4 Other exactly solvable 2D problems: Potts model, etc.
Mo 4/7 *Rec* TBA	We 4/9 Critical dynamics (PS8 due, PS10 out)	Fr 4/11 Critical dynamics;
Mo 4/14 *Rec* TBA	We 4/16 Quantum transitions (PS9 due, PS11 out)	Fr 4/18 Quantum transitions
Mo 4/21 *Patriots Day*	We 4/23 Random systems (PS10 due, PS12 out)	Fr 4/25 Random systems
Mo 4/28 *Rec* TBA	We 4/30 (PS11 due) Glasses, nonergodicity	Fr 5/2 Glass transition
Mo 5/5 *Rec* TBA	We 5/7 Conformal field theory in Stat Mech (PS12 due)	Fr 5/9 Conformal field theory in Stat Mech (Term paper due)
Mo 5/12 *Rec* TBA	We 5/14 Final Exam	