

To: Physics Graduate Students and others

Physics 653: Statistical Physics

Chris Henley, 531 Clark, 255-5056, clh@ccmr.cornell.edu

First lecture Th 8/23/07

Time/place: TuTh 10:10-11:25 Rockefeller xxx

Special ofc. hr. for interested students: Tu 8/21 at 2-3 PM

Prerequisite: P 562 (Stat. Mech.) or equivalent

Topics of (classical) stat physics, from the past 50 years. Rather than focus deeply on a narrow topic, or on my own work, I survey basic knowledge that seminar speakers assume of their (condensed-matter) audience. Some units on **soft** and **biological** physics will be featured. The techniques I hope to convey are *not* advanced: back-of-envelope calculations, reading literature, writing, and collaboration. The detailed outlined from 2003 is on my website (

TOPICS *[order from 2003]*

1. Stochastic dynamics

random walks and diffusion (application to cells?);
Markov process/master equation; telegraph noise;

2. Critical phenomena

Critical exponents and mean-field theory;
rudiments of renormalization group (R.G.)

3. More stochastic dynamics

stochastic differential eqns; detailed balance rule;
fluctuation-response relations; dynamic critical phenomena

4. Polymers and entropic forces

Depletion forces; rudiments of polymers; DNA elasticity;

5. Two-dimensional continuum systems

vortices and Kosterlitz-Thouless R.G.; roughening transition
order due to disorder (?).

6. Disordered systems *[omitted 2003]*

percolation