

Phase Transitions and Critical Phenomena

Topics for the complex exam

1. Experimental observations
2. Model systems
3. The classical theory (mean-field approximation, Landau theory)
4. Low- and high-temperature expansions
5. The transfer matrix method
6. Computer simulations
7. Phenomenological (scaling) theory
8. The renormalization group method
9. Dynamical critical behavior
10. Nonequilibrium phase transitions

Recommended Literature

- J. Yeomans: *Statistical Mechanics of Phase Transitions*
- J. Cardy: *Scaling and Renormalization in Statistical Physics*