

Phase Transitions schedule, Spring 2023-25

Week	Dates	Topics
	Tue 10:15-11:45	
1	February 11, 2025	1. Mean Field Theory Intro, phase transitions, MF theory, fluctuations, critical exponents, correlations, Ginzburg criterion
2	February 18, 2025	2. Mean Field Theory MF theory, fluctuations, critical exponents, correlations, Ginzburg criterion
2	February 25, 2025	2. Wilsonian Renormalization Group I Blocking transformation, 1D Ising, RG flow, kinks and correlation length
3	March 4, 2025	3. Wilsonian Renormalization Group II higher dimensions, fixed points, critical surface, relevant/irrelevant operators, RG & phase diagrams
4	March 11, 2025	4. Wilsonian Renormalization Group III Critical theory. Correlations, scaling of free energy, finite size scaling
5	March 18, 2025	5. Field theory approach, Hubbard-Stratonovich trf., ϕ^4 theory, continuous RG flows, Wilson-Fisher fixed point
6	March 25, 2025	6. Heisenberg and sigma models vector spin models, large N limit, Mermin-Wagner thm.
7	April 1, 2025	7. Superfluidity and the XY model, Kosterlitz-Thouless transition in 2D.
8	April 8, 2025	8. Quantum criticality I 1D TFIM, Jordan-Wigner trf., phase diagrams
9	April 15, 2025	9. Quantum criticality II quantum-classical mapping, correlation fn's
	April 22, 2025	SPRING BREAK
10	April 29, 2025	10. Topological phase transitions, toric code
11	May 6, 2025	11. Quantum rotors
12	May 13, 2025	12. Large N methods OR Ground state theorems
13	May 20, 2025	13. Surface roughening