Statistical Physics 2 schedule, 2023-24 / Fall

Column1	Column3	Column4	Column2	Column32	
hét	Tue 16:15-17:45	Tuesday 16:15-17:45	Fri 8:15-10:45	Friday 10:15-11:45	
1	September 5, 2023	**Part 1: Phase transitions** L1: Ferromagnetic transition (revision); conditional free energy, Ginzburg-Landau theory	September 8, 2023		
2	September 12, 2023	SPORTNAP	September 15, 2023	Tutorial: Mean field (from free energy)	**SPORTNAP**
3	September 19, 2023	L2: Scaling exponents, correlations, and connection between critical exponents.	September 22, 2023	T: Ginzburg-Landau theory	
4	September 26, 2023	L3: Scaling and renormalization group	September 29, 2023	L4: Superfluidity I: basic phenomena, Tisza theory, Gross-Pitaevskii theory, healing length, vortices	
5	October 3, 2023	+ Supplemental lecture (L5) on superfluids: rotons, explanation of superfluidity, time dependent Gross-Pitaevskii equation	October 6, 2023	Test 1: Theory + Excercises (Phase transitions)	
6	October 10, 2023	**Part2: Q-statistical physics: Density operator** L6: Density operator: coupled spins, density operators, mixed and pure states	October 13, 2023		
7	October 17, 2023	L7: General structure of density matrix Neumann equation (spin in external field: in tutorial) Time averagres and equilibrium structure of DM.	October 20, 2023	T: Density operator, mutual information, Neumann equation, Lindblad equation	
8	October 24, 2023	L8: Dissipative spin dynamics, spin relaxation, Neumann entropy, and the principle of maximal entropy	October 27, 2023	T: Principle of maximal entropy	
9	October 31, 2023	**Part3: Q-statistical physics: Classical and quantum noise** L9: Prperties of enealized dynamical susceptibility, Linear response theory, Kubo formula.	November 3, 2023	Test 2 (thoery + excercizes): (Density operators and principles of maximal entropy)	
10	November 7, 2023	L10: Noise: Classical noise, quantum noise, and the FDT	November 10, 2023		
11	November 14, 2023	L:11 Classical limit of FDT: Onsager's regression hypothesis, Johnson noise of resistive circuits.	November 17, 2023	**Test 3** (45 minutes, theory only) + handouts for simulation homework + **Short lecture:** Markov-process, Master equation, H-theorem	
12	November 21, 2023	**Part4: Intro to non-equilibrium statistical physics** L12: H-theorem and relaxation to equilibrium Monte Carlo simulations: Detailed balance, MC sampling, Metroplolis algorithm, umbrella sampling.	November 24, 2023	**NYÍLT NAP**	**NYÍLT NAP**
13	November 28, 2023	L13: Brownian motion, diffusion and Langevin equation.	December 1, 2023	Tutorial?: Monte-Carlo simulation	
14	December 5, 2023	L14: Fokker-Planck equation, velocity relaxation and generalized diffusion equation.	December 8, 2023	Tutorial: diffusion equation	
15			December 15, 2023	**Test 4**	**PÓTLÁSI HÉT**