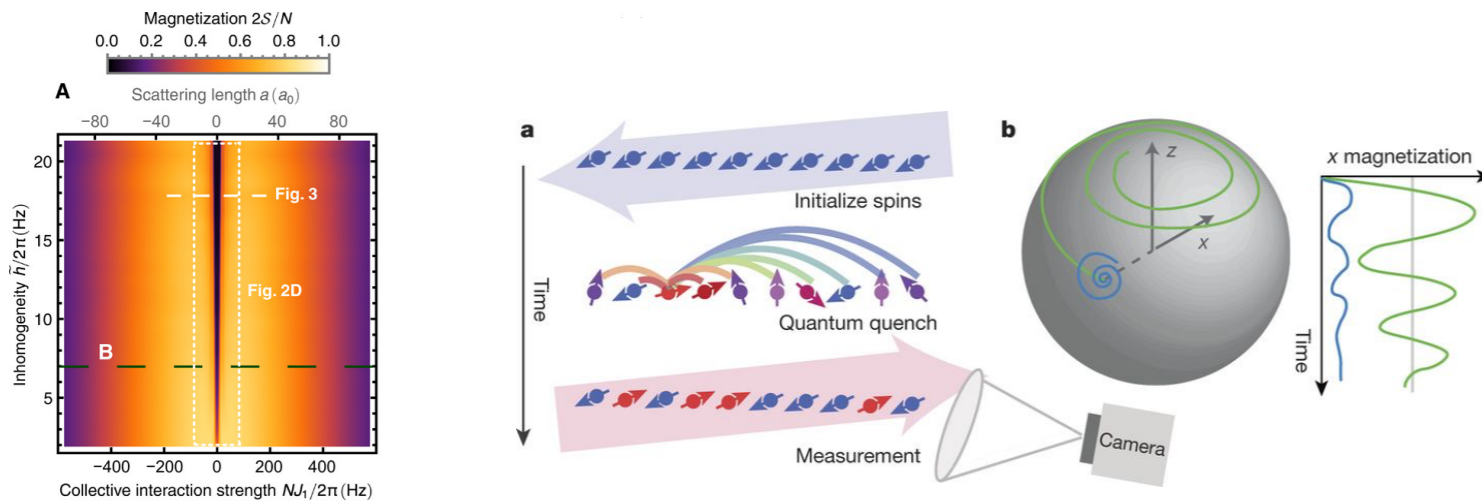


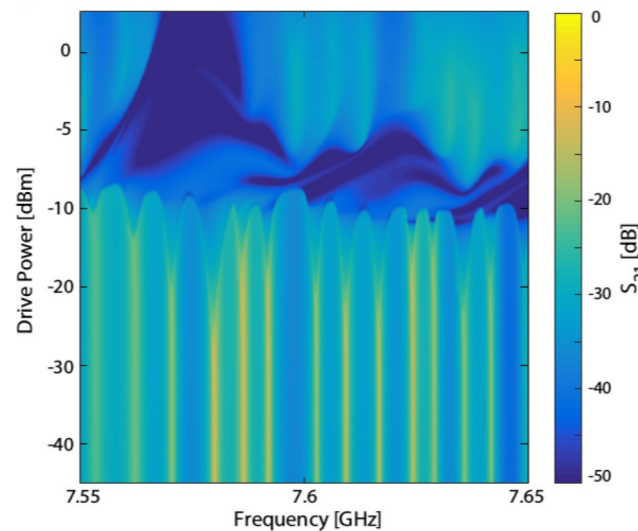
# Non-equilibrium vs equilibrium phase transitions

NEQ phase transitions: novel research field

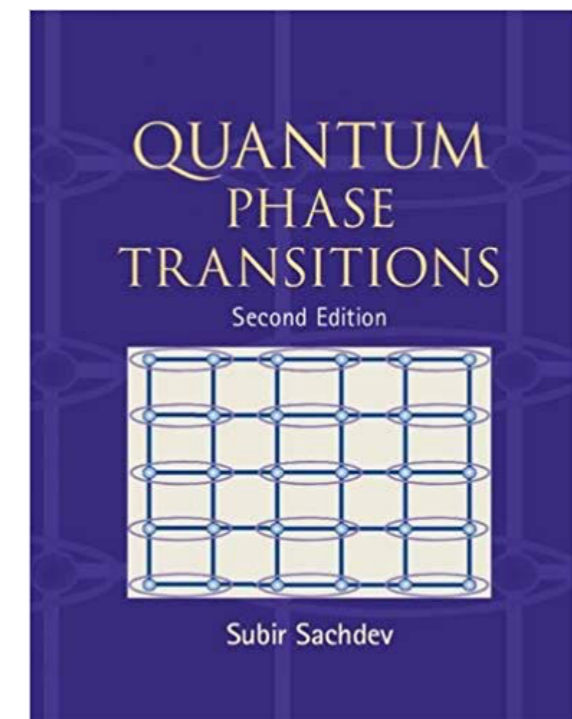
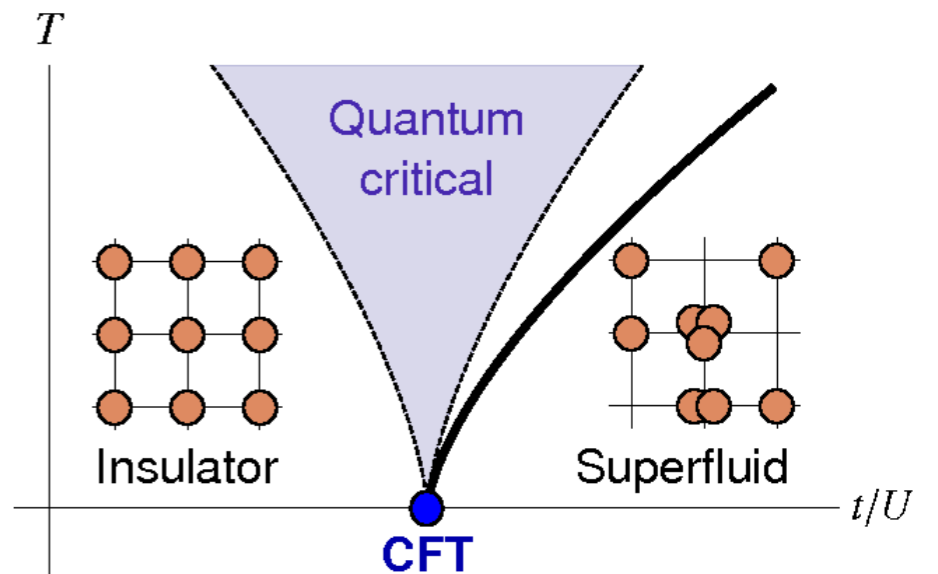
in ultracold fermions and trapped ions!



in open quantum circuits!



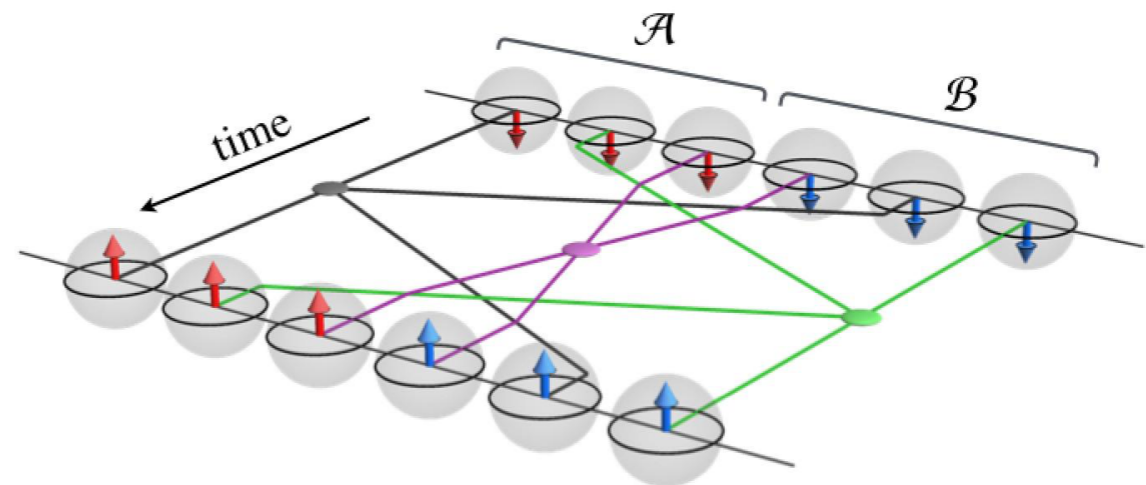
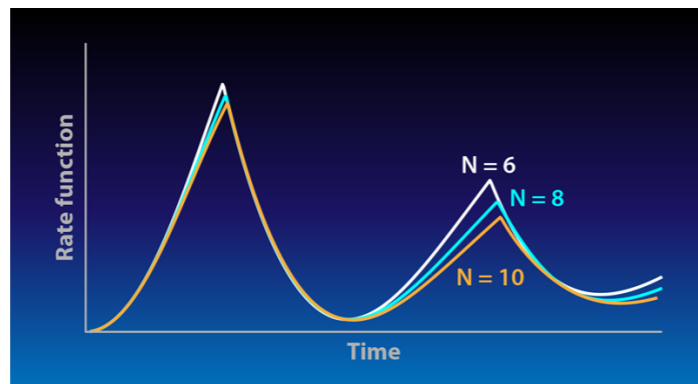
EQ phase transitions  
(textbook knowledge)



# Explore the fundamentals of ...

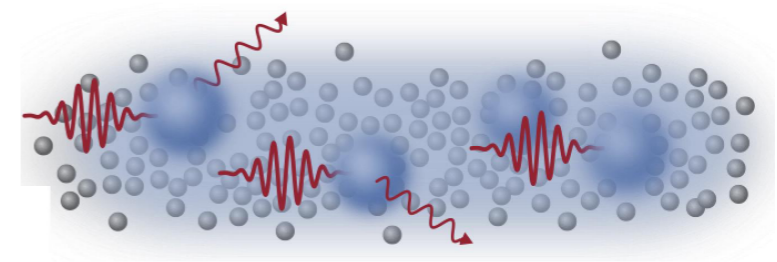
- dynamical phase transitions in interacting quantum spin chains

compare equilibrium and dynamical phases; calculate dynamical order parameter and Loschmidt echo for solvable interacting quantum spin chains; combine analytical and simple numerics to get insight into universal phenomena out-of-equilibrium



- dissipative phase transitions in driven-open quantum matter

learn how dissipation can shape novel phases of matter; simulate the Lindblad quantum master equation to study novel phase transitions in driven-dissipative steady states



$$\partial_t \rho = -i[H, \rho] + \kappa \sum_i L_i \rho L_i^\dagger - \frac{1}{2} \{L_i^\dagger L_i, \rho\}$$