Tentative schedule I (before the reading break of Feb 20-24, subjected to revisions)

Week one:
L1: general information on the course

L2: Why emergent symmetries/emergent space-time symmetries?
——perspectives from QCP points of view (I.e. space-time symmetries)
——perspectives from Topological point of view (I.e. internal symmetries)

Week two: Emergent space-time symmetries in Quantum Crystals

L3: Emergent Galilean symmetry near Lifshitz points

L4: Emergent Lorentz symmetry in lattices

Week three and four: Emergent space-time symmetries in strongly interacting systems (Two important ideas)

L5: Emergent symmetries in quantum interacting spin models:
From discrete quantum (or classical) lattice models to continuous field theories

A) the imaginary time evolution——the Vac-Vac transition amplitude in Quantum models;
B) the method of Coarse graining spins.

L6: Emergent symmetries in quantum interacting particle models I

A) coarse graining quantum particles;
B) emergent symmetries in Bose-Hubbard models: Galilean invariance vs Lorentz invariance.

L7: Open discussions: Emergent symmetries in quantum interacting particle models II

A) Emergent locality and causality.

L8: Open discussions: Emergent symmetries in quantum interacting particle models III

A) Quantum dynamics of real fermions;
B) Emergent Lorentz symmetries in real fermions.

Week five and six: Emergent Scale and conformal symmetries in strongly interacting systems

L9: Scale symmetries and basic ideas of Wilsonian approaches to scale symmetries

L10: How it works? Ideas of fixed points and anomalous dimensions

L11: Open discussions: Fermions near Lifshitz transitions with emergent SO(2,1) conformal symmetries

L12: Open discussions; Emergent Conformal bootstraps (weak version) and recent applications to quantum N-body dynamics