Summary of Lecture 14

- Reduced Density Operator $\rho_A = \mathrm{tr}_B \left[\rho_{AB}\right]$

  [ρ_A can be mixed, even if ρ_{AB} pure]

- Entanglement entropy $S_{ent} = -\,\mathrm{tr}\left[\rho_A \ln \rho_A\right]$

- Thermalization and quantum damping of subsystems

  - Entropy growth
  - Decoherence

This Lecture (15)

- Lie Groups

Summary of Lecture 15

- Lie group of dimension n

$$G(a_1, a_2, \ldots a_n) = \exp\left(-\mathrm{i}\sum_{j=1}^{n} a_j X_j\right)$$

- Lie algebra of generators $\quad [X_j, X_k] = \mathrm{i}\sum_{l=1}^{n} f_{jkl} X_l$

- Generators ⇒ constants of motion

- Irreducible representations ⇒ degenerate multiplets

Next Lecture (16)

- Relativistic QM