215c Final presentation, Spring 2020

- Subtleties with θ periodicity in various systems (Bose vs Fermi, spacetimes without spin structure).
- Witten's old $SU(2)$ anomaly with odd numbers of fundamental Fermions.
- Wang, Wen, Witten's new $SU(2)$ anomaly.
- QFT with a black hole horizon, e.g. Hawking's original calculation of BH radiation.
- Aspects of QFT at non-zero temperature.
- Aspects of phase transitions and the renormalization group (e.g. Goldenfeld's book).
- Large N and baryons.
- Anomalies for discrete groups.
- Instantons and large N.
- Polyakov's theory for confinement in 3d.
- Aspects of discrete group gauge theory.
- $su(N)$ vs $su(N)/\Gamma$ gauge theory: the Wilson and 't Hooft lines.
- $su(3) \times su(2) \times U(1)_Y/\Gamma$ for the Standard Model: aspects of $\Gamma = 1, Z_2, Z_3, Z_6$.