

# QUANTUM FIELD THEORY: PHYS 6433, Spring 2017

Here are the topics I plan to cover in this semester:

1. Relativistic Wave Equations
  - (a). The Klein-Gordon equation
  - (b). The Dirac equation
  - (c). The Lagrangian formulation of field equations
  - (d). The Maxwell equations
2. The Klein-Gordon Field
3. The Dirac Field
4. The Maxwell Field
5. Interacting Fields and Feynman Diagrams
6. Dimensional Regularization and Loop Diagrams
7. Renormalization
  - (a). Renormalization in  $\phi^4$  theory
  - (b). Renormalization in QED
8. Functional Methods
  - (a). Path integral for bosons
  - (b). Path integral for fermions

I will ask you to study two important topics by yourselves:

- Quantum Mechanics with Path Integral
- Lorentz Transformations and the Lorentz Group