

# Physics 229A: Gauge theories

Winter quarter, 2007

Instructor: Steve Giddings

Prerequisite: QFT (Physics 221)

Beyond the standard model

The scheduled 2007 startup of the LHC apparently leaves us poised at the edge of a new era of particle physics. The upcoming years should reveal clues regarding the nature of electroweak symmetry breaking, and the next level of physics beyond the standard model. This course will briefly review what we know about the standard model (and, with neutrinos, beyond!), and then overview aspects of some scenarios for new physics whose discovery could begin with the LHC.

Tentative rough outline:

1. The standard model
2. Neutrino masses
3. The physics of  $SU(2) \times U(1)$  breaking
4. Compositeness?
5. Supersymmetry
6. Grand unification
7. Gravity at the TeV scale?