PHYS 859D FALL 2022

Instructor: Raman Sundrum, Tu + Thu 11am-12.30pm

SUPERSYMMETRY AND HIGHER DIMENSIONS

This is an advanced graduate course in theoretical particle physics. It is intended for students that have completed a year of quantum field theory (at the level of PHYS 624, 851), or roughly at the level of understanding the basics of Gauge Theory, the Higgs mechanism, Loops and Renormalization. A familiarity with the Standard Model at the level of PHYS 751 will be helpful, as will familiarity with General Relativity.

In these lectures, I will introduce the key extensions of relativistic spacetime, namely supersymmetry and extra dimensions, and show the important roles they may play Beyond the Standard Model, in particular their connection to the emergence of hierarchies in particle physics. Relatedly, I will discuss how these extensions provide valuable insights on non-perturbative and strongly-coupled phenomena, which would otherwise be difficult to understand theoretically.

The requirements for getting course credit will be discussed at the first meeting of class.

I will be making up my own lectures, so there is no text book as such, but I may suggest other reading material as the course progresses.