Interactions via Local Gauge Symmetry (The Abelian Case)

Pre-Lecture Reading/Post-Lecture Summary

This is perhaps the most profound topic (in my opinion) that we will cover. This will be an elementary introduction to the appearance of interactions through a requirement of symmetry. In this lecture we will cover the simplest case of an internal abelian symmetry that is actually secretly already present in the Dirac equation, albeit in a global form. By promoting this to a local symmetry, we will see the need for introducing interactions and in the end arrive at a theory that you know and love (or perhaps hate). We will also make connections to similar constructions in general relativity and pave the way for treating the more advanced cases in the lectures to come. Then you will leave and be very happy.