

## Topic 2 – Groups and Representations

### Pre-Lecture Reading/Post-Lecture Summary

Time to get rollin...

The idea of symmetry plays a profound role in particle physics and so we will spend several lectures developing a systematic way to treat it. Our approach will seem abstract at first, but in developing powerful machinery, we will suddenly be able to handle many seemingly different contexts with the same methods. What may appear foreign to you at first will eventually be connected to many ideas that you have seen before. We will start by developing the mathematical treatment of transformations in the framework of *group theory*. We will review many different types of groups and lay out quite a bit of vocabulary which we will come across later in the course. An important offshoot of group theory is *group representations theory*. In fact group representations are the de facto language of every physicist whether they know it or not. We will explore these ideas through a simple example before turning to more complicated (but more relevant) cases in the next lecture. Then you will leave and be happy.