Topic 4 – A Catalog of Groups and Special Relativity

Pre-Lecture Reading/Post-Lecture Summary

We will begin with a review of results for counting free parameters of continuous groups and the significance for the specific groups that we will be using to construct the Standard Model. We will touch on the very different roles played by internal and spacetime transformations/symmetries described in terms of these groups and the importance of group representations. We will then begin a more in depth treatment of special relativity as a consequence of spacetime symmetries. This will let us "discover" the Lorentz transformations, identify vectors, dual vectors, scalars and more general tensors. In extending familiar objects in 3D to their 4D counterparts, we will unearth much of the love and mystery of Einstein's first great triumph. Then you will leave and be happy.