

Topic 16 – The Higgs Mechanism and Spontaneous Symmetry Breaking

Pre-Lecture Reading/Post-Lecture Summary

Last time we saw the Higgs mechanism at work in the Lagrangian formalism. It is now time to connect this to the story of symmetry breaking. We will begin with a simple example that illustrates how a symmetry of a potential can be "spontaneously broke" by a solution to the equations of motion. We then take this insight and turn to the Higgs potential to get a pictorial understanding of what is happening in the Higgs mechanism. In particular, this will give us insight into how we should interpret the new scalar particles and also how we can interpret masses from potential curves. The lingering question of "how did it ever get up there in the first place?" will then be answered by discussing the evolution of effective potentials with temperature/energy scales. Then you will leave and be happy.