Learning to detect top quark interactions[*]

Abstract

More than twenty years after its discovery, the top quark still plays a central role in looking for new phenomena in order to answer some fundamental questions about nature. Being the heaviest known particle, the top quark is considered as a portal to new theories that are beyond the LHC reach. In fact, in the absence of any statistically significant sign of new particles, modifications in top quark interactions have become one of the main avenues to theories beyond the standard model. In this presentation, I present some of the LHC results on top quark and its interactions, also in the context of the Effective Field Theory. I discuss how the prime opportunity of the highest-ever-reached energy as well as the wealth of the data at the LHC has made the final states with multiple heavy particles as a standard tool for those studies. Also, how the advancements with multivariate techniques help with a clearer picture of top quark couplings.

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[*] Credit of the title to Dr. Nicolas Tonon, DESY