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Searches for new physics models via the same-sign diboson (SSdB) + $E\!\!\!/_T$ signal and precise measurement of top quark features at the LHC

Till today, although the Standard Model (SM) is the most celebrated theory that explains nature almost completely, there are still some phenomena observed in nature that the SM cannot explain. That is why it is needed to look for theories beyond the Standard Model (BSM). While the ATLAS/CMS experiments discovered a Standard Model-like Higgs boson at the Large Hadron Collider (LHC), no compelling new physics signal has been seen yet. Several searches have been performed at the LHC to look for new physics signal. One such novel signal is the same-sign diboson (SSdB) + $E\!\!\!/_T$ which is a rather clean signal with negligibly small SM background. Such a unique signature can be observed in more than one well-motivated BSM scenarios, namely: (i) natural SUSY models, (ii) type-III seesaw model and (iii) type-II seesaw/Georgi-Machacek model. In the first part of this talk I present the discovery prospects of this signal that has been analyzed in these BSM models in current and future runs of the LHC beside providing ways to distinguish among these different BSM models. Furthermore, the LHC, being a "top quark factory", helps in precise measurement of various properties of the top quark. Deviation from the SM prediction in measuring these properties of the top quark can, very efficiently, shed light on new physics signal. In the second part of this talk I present a work in progress where we aim to show how precise measurement of quantities related to top quark features can indicate towards a new physics signal.

Collaboration / Activity

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