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Studi di trigger per la ricerca di coppie di Higgs nel canale bbtautau in ATLAS con i dati del Run 3

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The estimation of Higgs self-coupling is possible at the Large-Hadron Collider studying the di-Higgs events. The full Run 2 data-taking period reached an integrated luminosity of 140 fb^-1, that is expected to at least double at the end of the ongoing Run 3 of the LHC, but given the small di-Higgs production cross-section, much higher data statistics is expected to be needed to observe this process from the simple extrapolation of the current results. For this reason, improvements in the signal acceptance and efficiency, starting from improvements in the trigger selections, are crucial to reduce the amount of data needed for this measurement. Thanks to the increased usage of the delayed trigger streams and the Run 3-upgrades of the ATLAS detector, it is possible to explore and add new triggers to increase the signal acceptance for the di-Higgs events.
The results of an ongoing study to find the best tradeoff between acceptance for the di-Higgs signal and the total trigger rate, at both the Level-1 and High Level triggers of the ATLAS experiment will be presented. In particular the latest results for the optimization of the HH->bbtautau channel, and its possible future upgrades, will be discussed, as part of the ATLAS global effort to increase the sensitivity to the Higgs self-coupling measurements.

Author: FIACCO, Davide (INFN Roma 1)

Presenter: FIACCO, Davide (INFN Roma 1)

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