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Measurements of the Higgs production cross section in the $H \rightarrow \tau\tau$ decay channel with the ATLAS experiment

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Summary

The Higgs to tau tau decay is a considerably important decay channel because it allows to directly measure the Yukawa coupling to fermions and to measure the Higgs boson properties. During the Run 2 of the LHC the energy has increased to $\sqrt{s} = 13$ TeV and the luminosity has increased as well. This improvement leads to more precise measurements and with higher significance, in particular for the $H \rightarrow \tau\tau$ process. In this work the most recent measurements in this channel will be presented, with a focus on the $H \rightarrow \tau\tau$ production cross section measurement using data collected by the ATLAS experiment during 2015 and 2016. Furthermore the separate measurement of the Higgs production through Gluon Fusion and through Vector Boson Fusion has also been possible. The combined measurement with the Run 1 data, which leads to the first observation of $H \rightarrow \tau\tau$ in the ATLAS experiment, will be presented as well.

Presenter: MURRONE, Alessia (Università degli Studi e INFN Milano (IT))

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