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Probing the width of the Higgs boson through offshell decays

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Since its discovery just over ten years ago we have learned a lot about the Higgs boson. However, some of its fundamental properties have yet to be confirmed experimentally. One such property is its decay width, or equivalently its lifetime. While it was initially never thought that measurements of the Higgs width could actually be made at the Large Hadron Collider (LHC) due to the detector resolutions of its major experiments ATLAS and CMS falling approximately a factor thousand short, a strategy using a clever interpretation of Higgs decays in the offshell regime does appear to make this possible.

In this talk I will explain the technique that makes this possible, and give an overview of a currently ongoing analysis that is nearing its finalisation which aims to measure the Higgs width through this strategy, in particular for the case where it decays into two W-bosons. I will also give an expected sensitivity of this analysis on the LHC's full run 2 dataset, along with future plans for further interpretations in the context of Effective Field Theories (EFT). Finally, looking ahead, we will see what sensitivity we can expect with the full high luminosity LHC run which is expected to finalise towards the end of the next decade.

Primary author: WOLFFS, Zef

Presenter: WOLFFS, Zef

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