

## **VBF simulations in CMS and theory limiting factors in CMS analyses**

This talk focuses on an in-depth review of the Higgs production through Vector Boson Fusion simulation programs used in CMS analyses. A review of both fixed order accuracy programs and Parton Shower uncertainties depending on the final states and the analysis scope will be given. Additionally, the talk intends to go into the details of the hadronization and underlying event modelling currently used in CMS. Details on the limiting factors of parton shower uncertainties will be given as function of the different phase-spaces of the various analyses. The talk will also review the usage and will cover the problems related to the integration of two-point systematic in profile likelihood fits that are widely used in Higgs physics.

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**Session Classification:** Selected topics on VBF and related