

WG1: discussion on XS update

LHCHWG WG1 meeting, 3rd February 2022

John Campbell, Alexander Karlberg (TH),
Roberto Di Nardo (ATLAS), Julie Malclès (CMS)

Discussion on XS update

As discussed at the general meeting, we need to fairly quickly update cross sections for the upcoming 13.6 TeV run

- **Interim solution:**

- All sub-groups add interpolated values (with all associated uncertainties) for $m_H=125$ GeV, $m_H=125.09$ [2] (run1 ATLAS + CMS combo) and 125.38 [3] (CMS most recent result). The latest two are the values currently used in ATLAS and CMS publications respectively.

- As a starting point for the interpolation, YR4 cross-sections:

https://twiki.cern.ch/twiki/pub/LHCPhysics/LHCHWG/Higgs_XSBR_YR4_update.xlsx

with a tab with a center-of-mass energy scan for a Higgs boson mass 125 GeV. There are also the cross-section values versus mass for 13 TeV and 14 TeV in other tabs.

Discussion on XS update

As discussed at the general meeting, we need to fairly quickly update cross sections for the upcoming 13.6 TeV run

- **Full update campaign: to be discussed today**

- What to include?
 - What new theoretical developments?
 - What updates of the inputs (PDFs in particular, SM parameters, ...)
 - Include off-shell prediction (not included in YR4, needs a definition of the offshell region)?
 - What about BSM predictions? WG3 duty?
 - What production modes? What mass points or CM energy to include? Should ideally be provided for both 13 TeV and 13.6 TeV for run2 results re-use. Shall a E_{CM} scan for a (couple of?) mH value(s) be provided?
- Roadmap? Form: WG note, arXiv submission, ...?

Useful twiki from previous campaign with all inputs for reference:

<https://twiki.cern.ch/twiki/bin/view/LHCPhysics/LHCHWGCrossSectionsCalc?redirectedfrom=LHCPhysics.LHC HXSWGCrossSectionsCalc>