

Jan Steggemann – Lecture Questions

Questions marked in green were answered during the Q&A session. Original questions listed without correction for grammar/spelling. Where a slide number was given it is shown. For answers to questions already addressed at live Q&A please check the ZOOM recording.

Q1 (slide 12) Could you explain what $\tan(\beta)$ is?

Q2 Are there searches for BSM Higgs in the di-Higgs final state?

Q3 (slide 16) Is there an easy way to understand why $Z \rightarrow \tau\tau$ goes up to such high mass?

Q4 (slide 21) CMS Att search had slight excess near threshold in 2018. Anything learned specially resulted in an update for this published result ? What's the prospect for further updates beyond 35 fb^{-1} ?

Q5 (slide 40) Are these plots independent of the model?

Q6 For $h \rightarrow$ invisible searches, what's the current view of systematic floor that may be difficult to go below ?

Answer to Q6: => The $h_{125} \rightarrow$ invisible searches will remain statistically limited at the HL-LHC, as can for example be seen in the HL-LHC projections

<https://e-publishing.cern.ch/index.php/CYRM/article/view/952>. One of the reasons is that the main backgrounds are estimated from sidebands, and the related systematic uncertainties are also reduced with an increase in integrated luminosity. For a possible future very high energy hadron collider like fcc-hh, it appears well possible to achieve constraints that are even much tighter than the branching fraction to neutrinos: <https://link.springer.com/article/10.1007%2FJHEP01%282020%29139>