

Searching for new physics after the first two years of LHC Run II



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Exploring Higgs in associated production with a top quark in 2HDM at the LHC

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The production of a Higgs Boson with a single top quark is a channel that allows a direct probe of the top Yukawa coupling. While the SM cross-section for $pp \rightarrow thj$ is small (approx 70fb) due to destructive interference between the W fusion and top emission diagrams as the integrated luminosity of the LHC increases the signal could be extracted from both $hh \rightarrow \gamma\gamma$ and $h \rightarrow b\bar{b}$.

We will discuss how this process could be sensitive to the sign of the top Yukawa coupling and the effect of a change in sign of $t\bar{t}h$ on the overall cross section. Furthermore exploration of the 2HDM allows the inclusion of an additional associated diagram and the possibility of further BSM physics.

Primary authors: Mr JONES, Sam (University of Southampton); MORETTI, Stefano (University of Southampton); SHARMA, Pankaj (CoEPP, Adelaide); RINDANI, Saurabh

Presenter: Mr JONES, Sam (University of Southampton)

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