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## Signal versus Background Interference in $H^+ \rightarrow t\bar{b}$ Signals for MSSM Benchmark Scenarios

*Monday 4 November 2019 14:00 (15 minutes)*

In this talk I will present an investigation into sizeable interference effects between a {heavy} charged Higgs boson signal produced via  $gg \rightarrow t\bar{b}H^-$  (+ c.c.) followed by the decay  $H^- \rightarrow b\bar{t}$  (+ c.c.) and the irreducible background given by  $gg \rightarrow t\bar{t}b\bar{b}$  topologies at the Large Hadron Collider (LHC). I will show how such effects could spoil current  $H^\pm$  searches where signal and background are normally treated separately. The reason for this is that a heavy charged Higgs boson can have a large total width, in turn enabling such interferences, altogether leading to very significant alterations, both at the inclusive and exclusive level, of the yield induced by the signal alone. This therefore implies that currently established LHC searches for such wide charged Higgs bosons require modifications. This is shown quantitatively using two different benchmark configurations of the minimal realisation of Supersymmetry, wherein such  $H^\pm$  states naturally exist.

### Consider for promotion

No

**Authors:** ARHRIB, Abdesslam (AbdelMalek Essaadi university); Mr AZEVEDO, Duarte; Dr BENBRIK, Rachid (Cadi Ayyad University); Mr HAROUIZ, Hicham; MORETTI, Stefano (Science and Technology Facilities Council STFC (GB)); PATRICK, Riley (The University of Adelaide); SANTOS, Rui (ISEL)

**Presenter:** PATRICK, Riley (The University of Adelaide)

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