Contribution ID: **517** Type: **not specified**

ATLAS Search for Charged Higgs $H^{\pm\pm}$ and $H^{\pm}$ in context of the GM Model

Tuesday 14 May 2024 15:15 (15 minutes)

The Georgi-Machacek (GM) model is a motivated extension of the Standard Model (SM) that predicts the existence of singly and doubly charged Higgs bosons (denoted H± and H±±). Searches for these types of particles were conducted by the ATLAS collaboration at CERN with 139 fb^{-1} of $\sqrt{s} = 13$ TeV pp collision data (Run 2, collected between 2015 and 2018, see arXiv:2312.00420 and arXiv:2207.03925). Slight excesses were observed in searches utilizing events with vector boson-fusion (VBF) topologies. To further study these excesses, a new combined search for the H± and H±± is underway using additional pp data collected by ATLAS during 2022-2024 (Run 3) at a collision energy of $\sqrt{s} = 13.6$ TeV. The VBF production of the H± and H±± is once again utilized, where the H± decays to a W and Z boson and the H±± decays into two same-sign W bosons. Only the fully leptonic decays of the vector bosons are considered. Improvements over the Run 2 H± and H±± searches are discussed and some preliminary results are presented.

Mini Symposia (Invited Talks Only)

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Session Classification: Electroweak & Higgs Physics

Track Classification: Electroweak & Higgs Physics