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Searching for Hˆ+ -> Wˆ+ h at ATLAS

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Charged Higgs bosons Image appear in many Higgs-sector extensions to the Standard Model (SM). Searches for such a singly-charged Higgs scalar have been carried out at ATLAS and other collaborations, but until now the decay into a W boson and SM-like Higgs Image (ImageGeV) remained unexplored.
Here, we present a search for the decay Image with both Image and Image boosted, using the full ATLAS Run 2 dataset. Results are presented alongside a resolved-channel analysis, with a set of combined exclusion limits where the boosted channel provides results in the higher mass region (ImageTeV).
As well as providing an overview of the analysis strategy & results, this presentation will cover some alternative methods which were tested but not included in the final analysis. This includes studies on the use of mass-parametrized neural networks, attention-head networks for improving categorisation efficiency over hand-reconstruction, and adversarial-loss functions to reduce mass sculpting.

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