



Introduction to histogramming

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US ATLAS/ IRIS-HEP Analysis Software Training Event

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About me

Natural from Paredes de Coura, Portugal

2015: Joined the ATLAS Experiment working on top FCNC

2016: Master in Experimental Physics with the Universidade do Minho (Portugal)

2021: PhD on the search for new interactions in the top quark sector in UM (Portugal) - Won one of the [ATLAS PhD Grants](#)

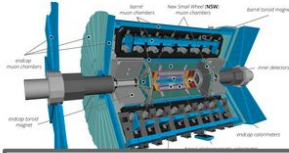
2021-2023: Postdoc in the Laboratoire de Physique Subatomique et de Cosmologie (France)

2023-Present: Postdoc with the University of Washington (United States of America) working mostly with jets and long-lived particles searches

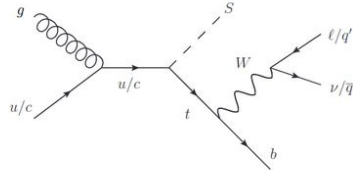


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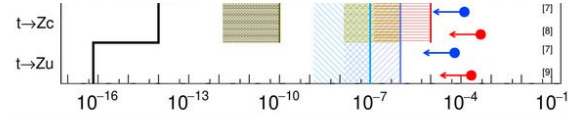
About me



Joined ATLAS Collaboration as a master student on FCNC $t \rightarrow Zq$ search

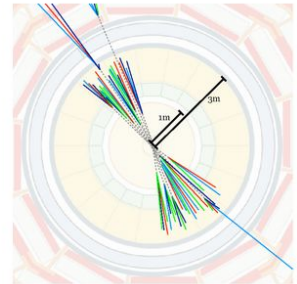


Phenomenological study on FCNC interferences



Most stringent limits on $t \rightarrow Zq$ with ATLAS Run-2 data

Started postdoc at LPSC on jets calibration and dark matter searches



Started PhD in new interactions with the top quark

Theory and phenomenological paper on $t \rightarrow Sq$ search prospects

Pythia validation with dark shower Snowmass project

2015 2016 2019 2020 2021 2023

Besides Physics, I also love listening to Jazz, dancing, practicing Martial arts and reading

Histogramming

Which tools to use?

- Python always sound like the easiest way to go ⇒ **Matplotlib**

Can we do it better? ⇒ **Hist**

- Powerful Histogramming tool for analysis based on boost-histogram (the Python binding of the Histogram library in Boost)
- Analysis-focused project that uses boost-histogram as a backend to do the work, but provides plotting tools, shortcuts and more

Can we do it with a style similar to ROOT? ⇒ **mplhep**

- matplotlib wrapper for easy plotting
- Primarily “prebinned” 1D & 2D histograms and matplotlib style-sheets carrying recommended plotting styles of large LHC experiments

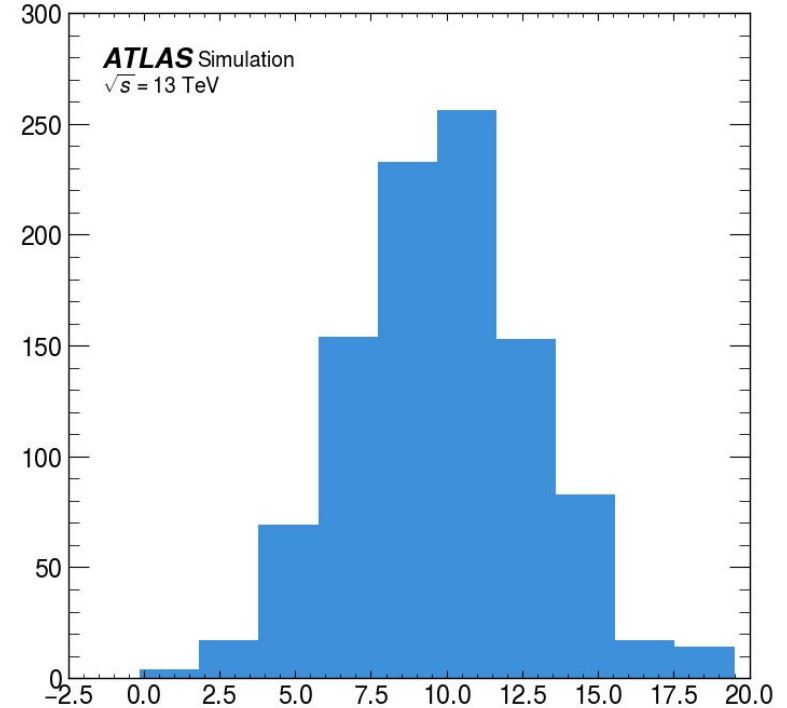
Histogramming tools

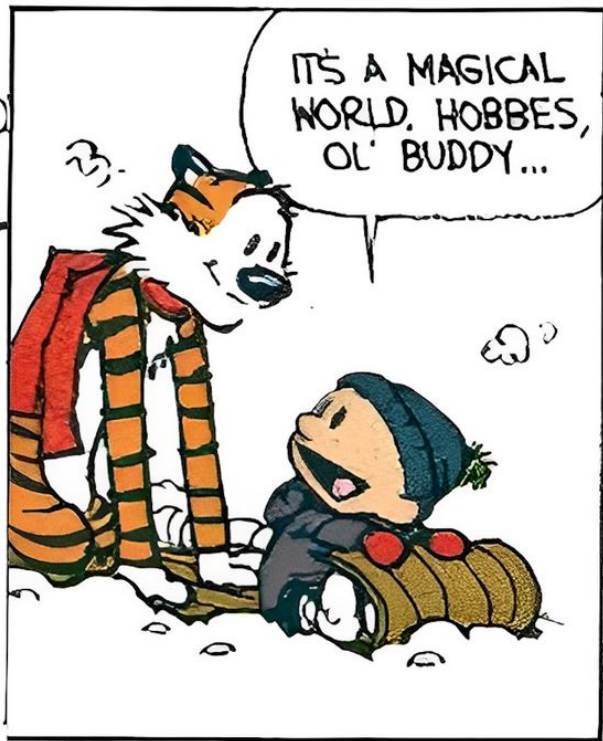
- Matplotlib:
<https://matplotlib.org/>
- Hist:
<https://hist.readthedocs.io/en/latest/>
- Hist 2.0: UHI (Universal Histogramming Interface)
<https://uhi.readthedocs.io/en/latest/>
- mplhep:
<https://mplhep.readthedocs.io/en/latest/>

Histogramming tools and colors schemes

ATLAS has adopted the CMS color style:

- Goal to have a [common accessible color scheme](#)
- Join effort from CMS diversity office, Physics Coordination, etc
- All the details described here: [2107.02270](#)
- Later adopted by ATLAS [here](#) after discussion within the D&I group in ATLAS





And make some plots!