



Contribution ID: 60

Type: **not specified**

Multi-experiment and multi-era research level LHC Open Data analysis with PUNCH4NFDI

Thursday 3 October 2024 14:20 (20 minutes)

PUNCH4NFDI is a German DFG-funded initiative to promote FAIR and open data management - and the development of the relevant tools - for the fields of particle physics, astrophysics, astroparticle physics, nuclear&hadron physics, and lattice QCD.

In particular, following the FAIR principles, it promotes and works towards cross-community access to data, wherever possible.

Currently a series of PUNCH use cases is being released that give first insights into the PUNCH capabilities. One of these is a HEP demonstrator use case on open data from both CMS and ATLAS, and both LHC Run 1 and Run2. It is based on unified research level data access akin to one that is actually in use within one of the collaborations themselves, within a single workflow.

The workflow is exemplified with an analysis of Higgs-to-four-lepton production, publicly documented on the PUNCH4NFDI portal. The full workflow on initially unfiltered open data and MC samples runs within a few hours and can be adapted by users to their own physics cases.

Only limited by the somewhat condensed information content of the input files, of order 50% of all potential LHC physics topics can be covered with this workflow.

Summary

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Session Classification: The larger landscape