ITU-CMS Group Meeting

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BAMBOO – an analysis library for ROOT::RDataFrame

What is Bamboo?

- **Typical LHC analysis**: a number of steps to go from fully reconstructed events to TTrees, then lots of histograms

For what will we be using Bamboo?

- An automated framework to compare Delphes and FullSim validation

Where to get it?

- [https://gitlab.cern.ch/cp3-cms/bamboo](https://gitlab.cern.ch/cp3-cms/bamboo)

Root’s RDataFrame is an interface for analyses of data stored in TTrees and some other data formats.
Using BAMBOO

- **Example analysis module (python based):** producing plots from 5k $t\bar{t}$ event from a NanoAOD – (with the great help of Pieter David from UCLouvain)

  ```bash
  bambooRun -m \
  ~davidp/public/bamboo_phase2sim/phase2_example.py:CMSPhase2SimTest \
  ~davidp/public/bamboo_phase2sim/phase2_test.yml \
  -o test
  ```

- **Python analysis module** for .yml format and base modules for making plots and skims

- **samples configuration – YAML file –**
Output of BAMBOO

Leading jet PT

Number of jets

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Output of BAMBOO

![Histogram of Number of Electrons](chart1.png)

- Number of Electrons:
  - 0
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- CMS HL-LHC 3000.00 fb⁻¹ (13 TeV)

- Uncertainty

![Histogram of Number of Muons](chart2.png)

- Number of Muons:
  - 0
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- CMS HL-LHC 3000.00 fb⁻¹ (13 TeV)

- Uncertainty
Summary

• An introductory study of Bamboo is made. Future studies will be the real use case of the Bamboo with different types of objects.

• The aim for RTB is an automated framework providing tables and plots to compare object validations for both Delphes and FullSim.
References

- https://gitlab.cern.ch/cp3-cms/bamboo
- https://cp3.irmp.ucl.ac.be/~pdavid/bamboo/
- https://indico.cern.ch/event/833895/timetable/#9-readable-and-efficient-hep-d