WAYNE STATE UNIVERSITY

ALICE

– Correlations analysis framework –

(Jan Fiete's seminal `AliAnalysisTaskPhiCorrelations`)

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O2 Analysis tutorial, Third edition, November 9 2023

Correlations “framework”

Jan Fiete’s seminal `AliAnalysisTaskPhiCorrelations`

– **Basic components**

- Correlations containers
- Same and mixed event correlations
- Pair rejection cuts

Correlations containers

- **Reconstructed step based multidimensional histograms**
  - Each configured reconstruction step its own histograms set
  - Single particle magnitudes
  - Two-particle magnitudes
- p_{T} **differential analysis**
- **Trigger – associated analysis**
- **Reconstruction step efficiency extraction**

Mixed events support

- **There are many options**
  - You can check them in
    - `O2Physics/Tutorials/src/eventMixing.cxx` and
    - `O2Physics/Tutorials/src/eventMixingValidation.cxx`
- **All of them allow to classify the objects to mix**
- **All of them provide the mixed objects**
- **We will use one of them that fits our needs**

Pair cuts

Functions which cut on particle pairs
decays, conversions, pair proximity

- **Currently support γ, K^0, Λ, ϕ and ρ**
- **Own set of control histograms in a passed** `HistogramRegistry`
- **Fully configurable**

Your first O2Physics correlations analysis task

- **Starting from the skeleton**

  `O2Physics/Tutorials/PWGCF/TwoParticleCorrelations/src/firstcfcorrelations.cxx`

- **Incorporate, step by step, the different components**
  - Every step works as expected
- **And a lot of details on the way**
- **Overall goal**
  - To have fun!!!

How to keep learning

- **O2 documentation**
  - https://aliceo2group.github.io/analysis-framework/
- **O2Physics tutorials**
  - https://aliceo2group.github.io/analysis-framework/docs/tutorials/
  - `alice/O2Physics/Tutorials`
- **Your colleagues O2Physics tasks**
  - `alice/O2Physics/PWG...`
- **O2 Analysis mattermost channel**
  - https://mattermost.web.cern.ch/alice/channels/o2-analysis
- **Hyperloop Operation mattermost channel**
  - https://mattermost.web.cern.ch/alice/channels/o2-hyperloop-operation