Azimuthal anisotropy of heavy-flavour electrons in p-Pb collisions with ALICE

Henrique J. C. Zanoli on behalf of the ALICE Collaboration
henrique.zanoli@cern.ch

Motivation

- Double-ridge structure found in small systems and quantified by its Fourier coefficients:
  \[
  \frac{dN}{d\phi} \propto \left(1 + \sum_{n=1}^{\infty} 2 \nu_n \cos(n \Delta \phi)\right)
  \]
- \(\nu_2\) dominant, as in heavy-ion collisions where it is connected to collectivity
- Double ridge present for heavy flavours?
- Produced in the initial stages
- Production mechanisms involving a large four-momentum transfer
- Study the mass dependence
- Use electrons from beauty and charm decays: easy to tag and B.R. \(\sim 10\%\)

Procedure

- \(\sim 600M\) Min. Bias p-Pb (\(L_{\text{int}} \approx 295 \mu b^{-1}\)) at \(\sqrt{s_{NN}} = 5.02\) TeV recorded by ALICE in 2016
- Measure \(e - \text{ch. part. angular correlation distr.}\)
- Subtract \(e\) from other decays, mainly \(\gamma\) conversions and Dalitz decays of \(\pi^0\) and \(\eta\) (identified by the inv. mass between \(e^+e^-\)):
  \[
  C_{\text{HFe-ch}} = C_{\text{inclusive}} - C_{\text{NonHFe}}
  \]
- Tracking efficiency and event mixing correction

Results

- Jet component subtraction using low-multiplicity collisions
- Heavy-flavour electrons show azimuthal anisotropy in p-Pb collisions at \(\sqrt{s_{NN}} = 5.02\) TeV

Conclusion

- Positive \(\nu_2^{\text{HFe}}\) with more than 5\(\sigma\) significance for \(1.5 < p_T < 4\) GeV/c
- \(\nu_2^{\text{HFe}}\) is smaller than charged particle \(\nu_2\) and similar to inclusive muon \(\nu_2\)
- Provides information to help interpret the double-ridge structures

References


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