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

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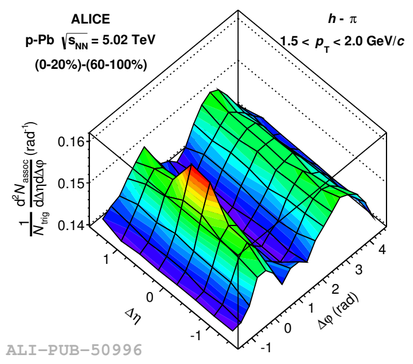
Motivation

- Double-ridge structure found in small systems and quantified by its Fourier coefficients:

$$\frac{dN}{d\varphi} \propto \left(1 + \sum_{i=1}^{\infty} 2\, v_n \cos(n\,\Delta\varphi)\right)$$



Jet subtracted h-π correlations in p-Pb collisions [1]

- v_2 dominant, as in heavy-ion collisions where it is connected to collectivity

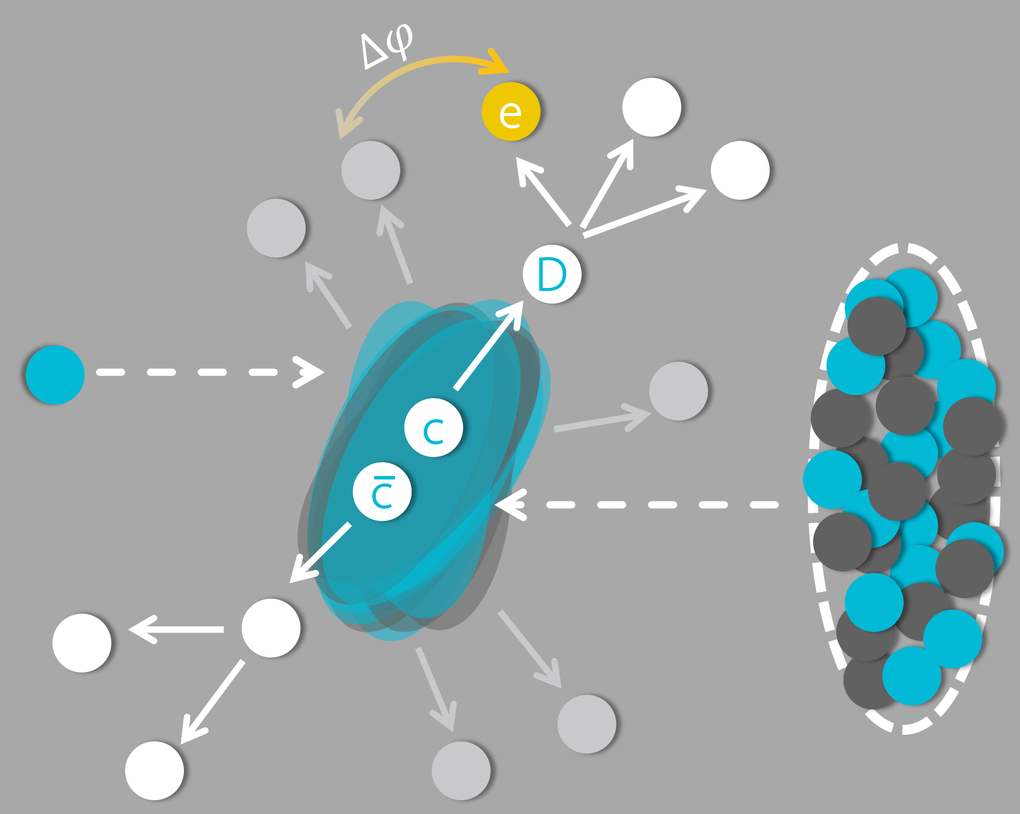
- Double ridge present for heavy flavours?
  - Produced in the initial stages
  - Production mechanisms involving a large four-momentum transfer
  - Study the mass dependence
- Use electrons from beauty and charm decays: easy to tag and B.R. ~10% [2]

Procedure

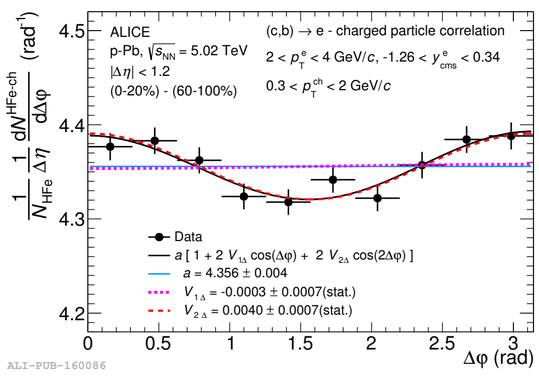
- ~600M Min. Bias p-Pb ($L_{Int} \approx 295\ \mu b^{-1}$) at $\sqrt{s_{NN}} = 5.02$ TeV recorded by ALICE in 2016
- Measure e – ch. part. angular correlation distr.
- Subtract e from other decays, mainly γ conversions and Dalitz decays of π^0 and η (identified by the inv. mass between $e^+ e^-$):

$$C^{HFe\text{-}ch} = C^{inclusive} - C^{NonHFe}$$

- Tracking efficiency and event mixing correction

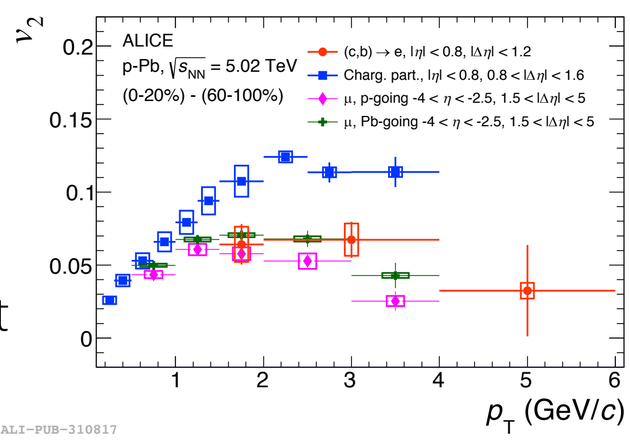


Results



- 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 v_2^{HFe} with more than 5σ significance for $1.5 < p_T < 4$ GeV/c
- v_2^{HFe} is smaller than charged particle v_2 and similar to inclusive muon v_2
- Provides information to help interpret the double-ridge structures

Check the publication
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References

[1] ALICE Collaboration, Long-range angular correlations of π, K and p in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. Phys. Lett. B 726 (2013) 164-177.
[2] M. Tanabashi et al. (Particle Data Group), Phys. Rev. D 98, 030001 (2018).

Acknowledgment : NWO