Project Presentation

FYS9429/FYS5429 - lecture 3

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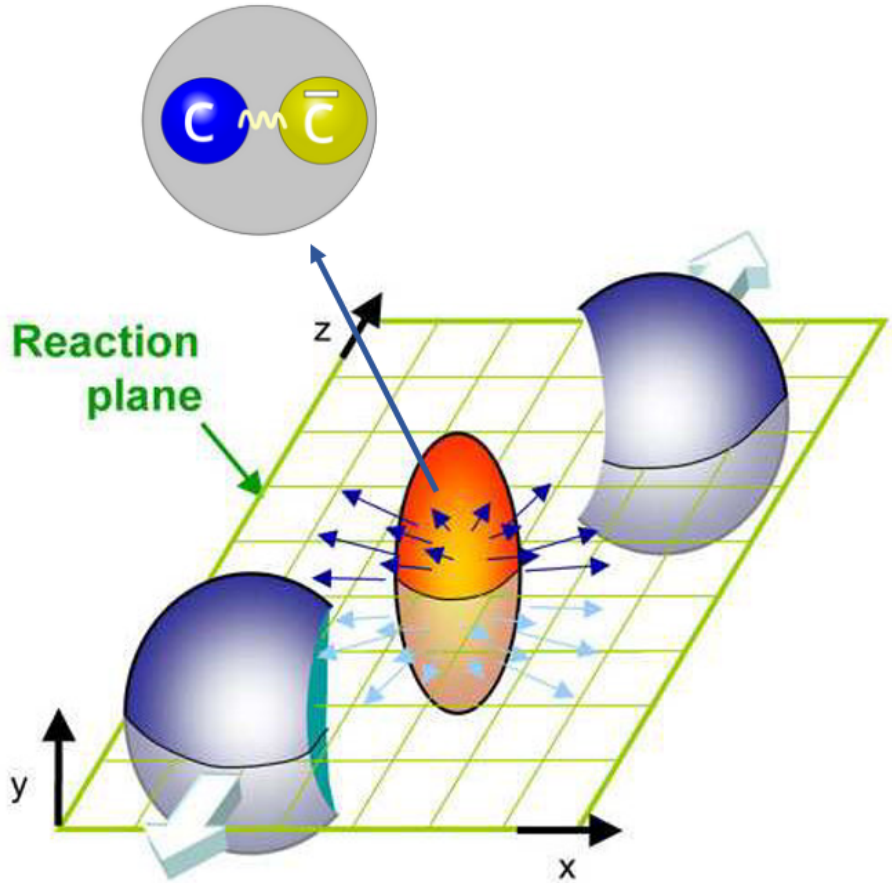
Goals

"Anisotropic flow of J/ψ from different production processes, measured with the ALICE experiment at the LHC"

1. Inclusive J/ψ flow
   - Etsimation of the reaction plane
   - Determine flow magnitude in relation to p_T (v_n vs. p_T)
2. Distinction between prompt and non-prompt J/ψ
   - Interpreted in terms of NCQ scaling picture for flow of charm and beauty quarks.

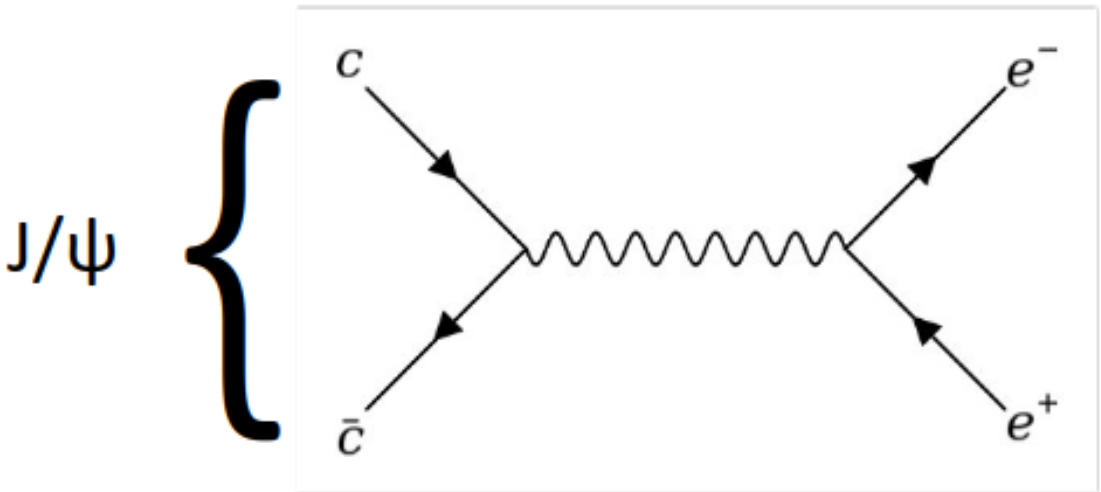


Background

Types of J/ψ

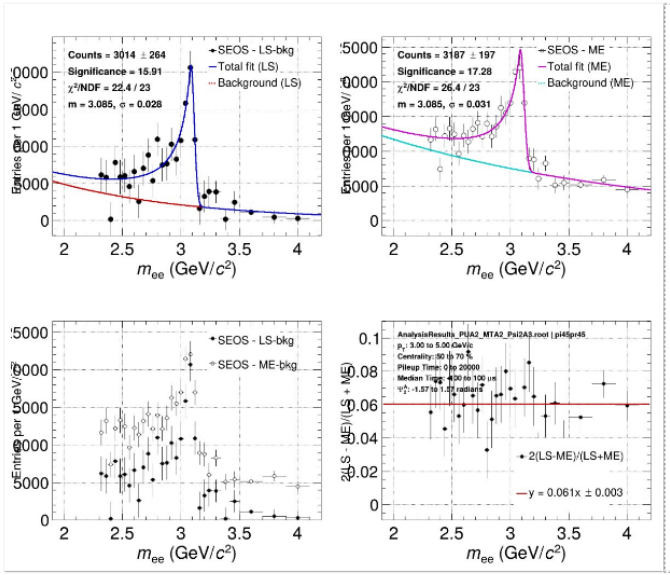
- Propmt:
  Created directly from charm-anticharm ($\sim 0\mu m$)
- Non-prompt:
  Produced from later weak decays of beauty hadrons ($\sim$ 100 - 500μm)

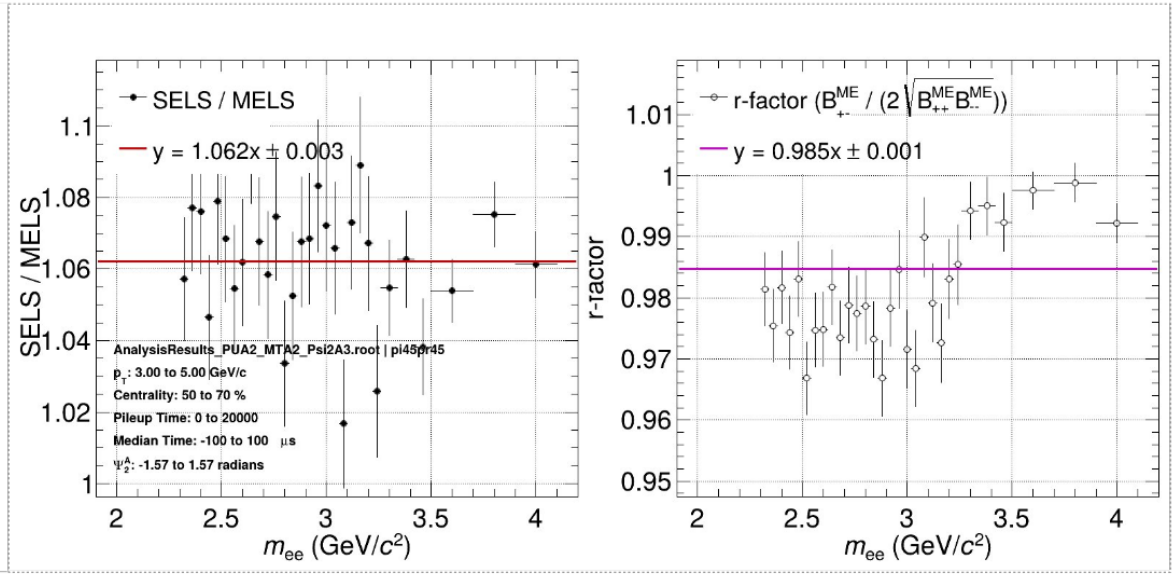
I am working in the e^--channel ($\sim 6\%$)



My work so far

So far my focus has mainly been signal-extraction and optimization thereof





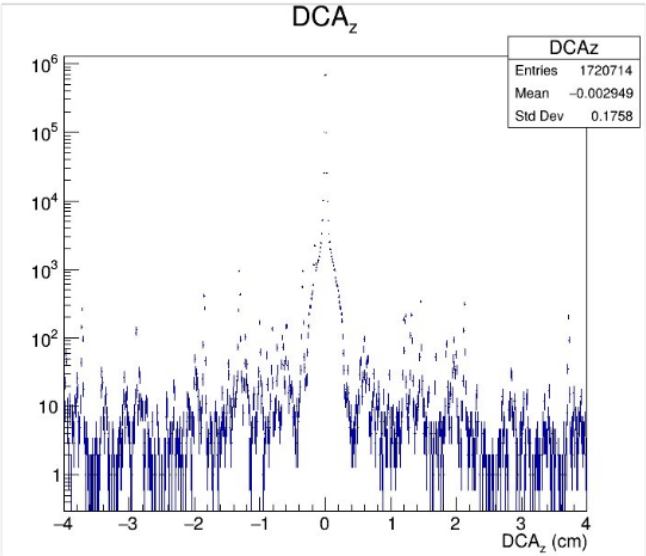
Methods

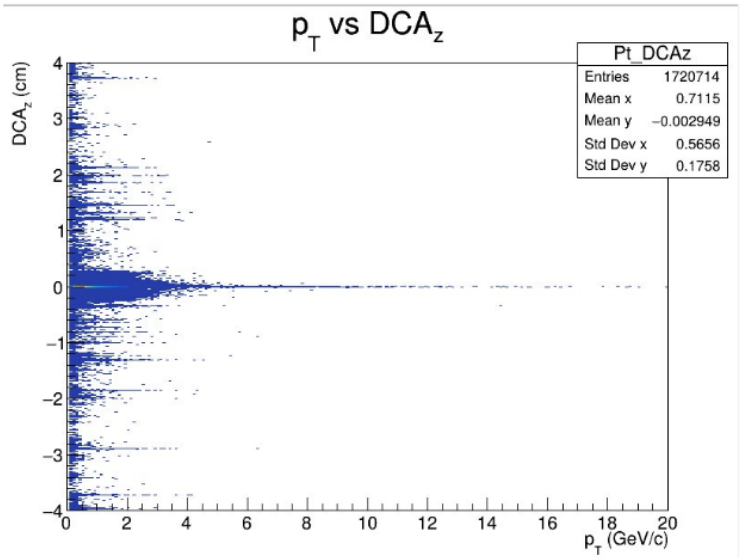
DCA (Distance of Closest Approximation)

- For every event registered, the ALICE-detector will try to determine from where it originated.

How to do this?

- Unimodal vs. Multimodal (Project 1? - Discriminative classifier NN)
- How many peaks + position (Project 2? - Multi-task learning NN)





Why do this

Event-distinction

- Event merging (Same or aligned DCA-values but not related)
- event splitting (Related but misaligned DCA-values)

Currently cuts are made on the basis of Bimodal coefficients
(Statistical measure used to assess if a distribution is bimodal or unimodal)

$$BC = \frac{\gamma^2 + 1}{\kappa + 3\frac{(n-1)^2}{(n-2)(n-3)}} \tag{1}$$

For J/ψ this measure might not be significant, as other methods are used to finetune the data, but other analyses might benefit a lot.

Thank you for your attention!

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