Egyetemi Kutatói Ösztöndíj Program

First $d^2\sigma/dp_T dy$ measurement of D^0 photoproduction in PbPb UPCs

BALÁZS CSABA KOVÁCS (ELTE) ON BEHALF OF THE CMS COLLABORATION

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EÖTVÖS LORÁND
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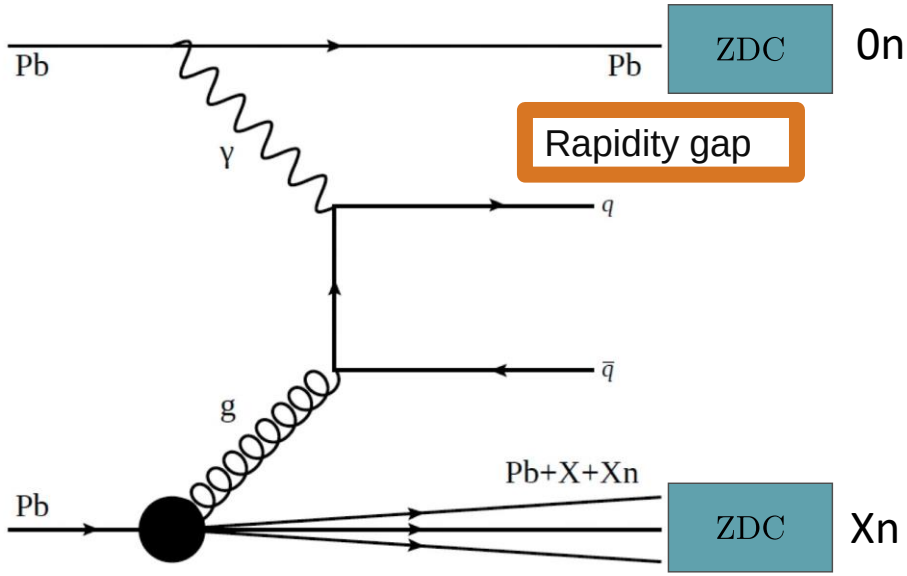
D^0 photoproduction in UPCs

- D^0 mesons produced in scatterings of **quasi-real photons** emitted by one nucleus with **partons** from the other colliding nucleus
- Decay channel: $D^0 \rightarrow K^- \pi^+$ (and charge conj.)

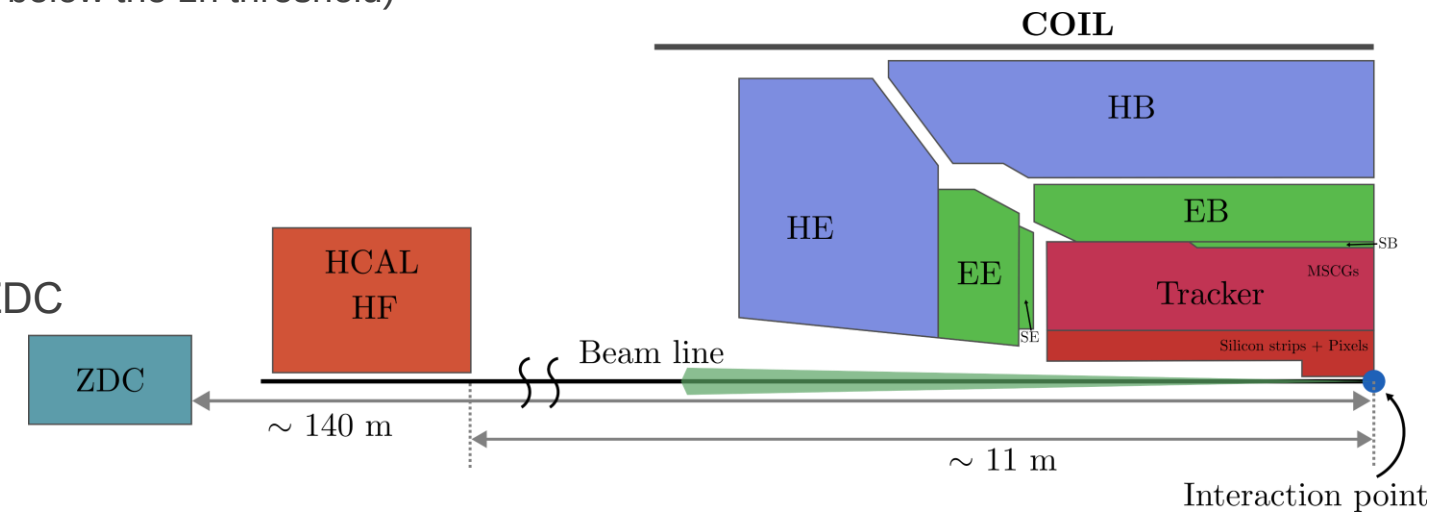


New trigger strategy for photoproduction

- New Level-1 triggers that use **both ZDC and HCAL/ECAL** information to maximize the statistics of D^0 photonuclear events
- D^0 p_T dependent trigger use:
  - **High p_T D^0 → ZDC XOR** (exactly one ZDC above the 1n threshold) **+ Jet trigger**
  - **Low p_T D^0 → ZDC OR trigger** (at least one ZDC below the 1n threshold)

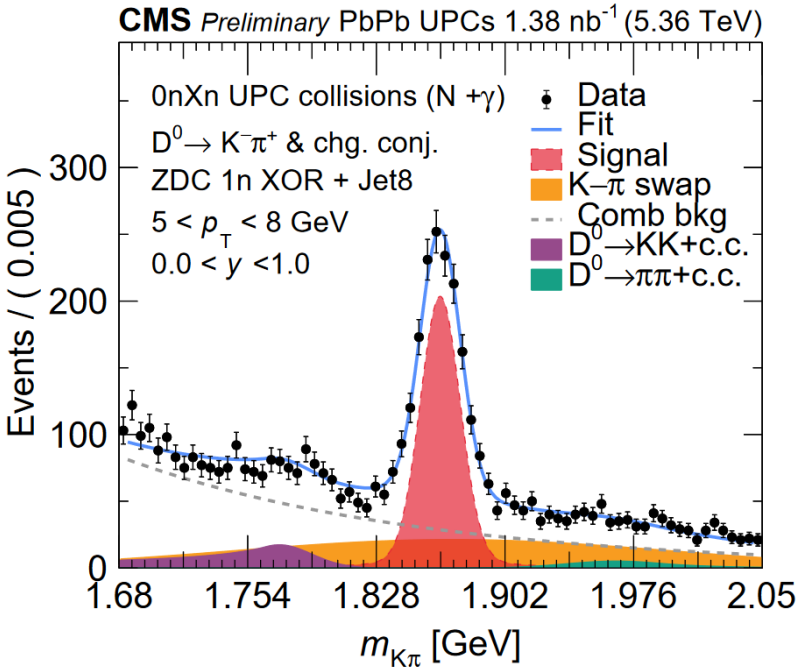
Main offline event selections

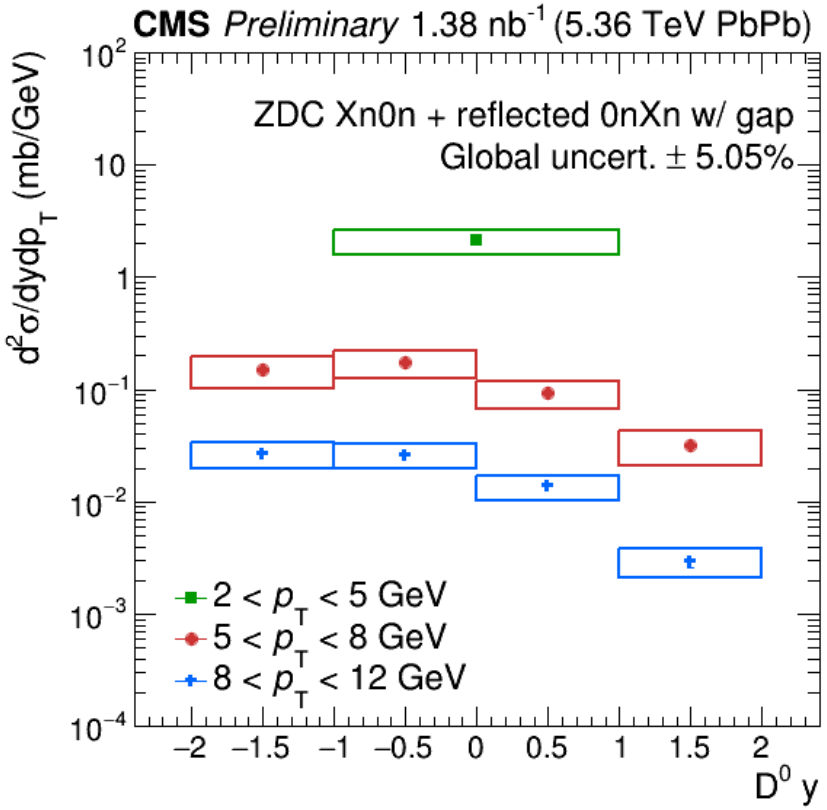
- **ZDC selection:** Xn0n or 0nXn
- **Rapidity gap** ($3 < |\eta| < 5.2$) on the side of „empty” ZDC



Final cross sections

$$\frac{d^2\sigma}{dp_{\mathrm{T}}dy}(\mathrm{D}^0 p_{\mathrm{T}}, \mathrm{D}^0 y) = \frac{1}{2}\frac{1}{\mathcal{L}\mathcal{B}}\frac{N^{\mathrm{raw}}_{\mathrm{D}^0}}{\Delta p_{\mathrm{T}}\Delta y}\ \frac{1}{\epsilon_{\mathrm{evt}}\ \epsilon_{\mathrm{trigger}}\ P_{\mathrm{prescale}}\ (\alpha\ \epsilon_{\mathrm{D}0})\ \epsilon_{\mathrm{EM,pileup}}}$$





- **Conclusions:**
  - New constraints on nuclear matter with open charmed hadrons in UPCs in a large region of x and Q^2
  - Future: improved (x,Q^2) reach with lower p_T measurements, heavy-flavour jets, correlations