

# D<sup>0</sup>-tagged jets in heavy-ion collisions with ALICE at the LHC



ALICE

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## 1. Physics Motivation

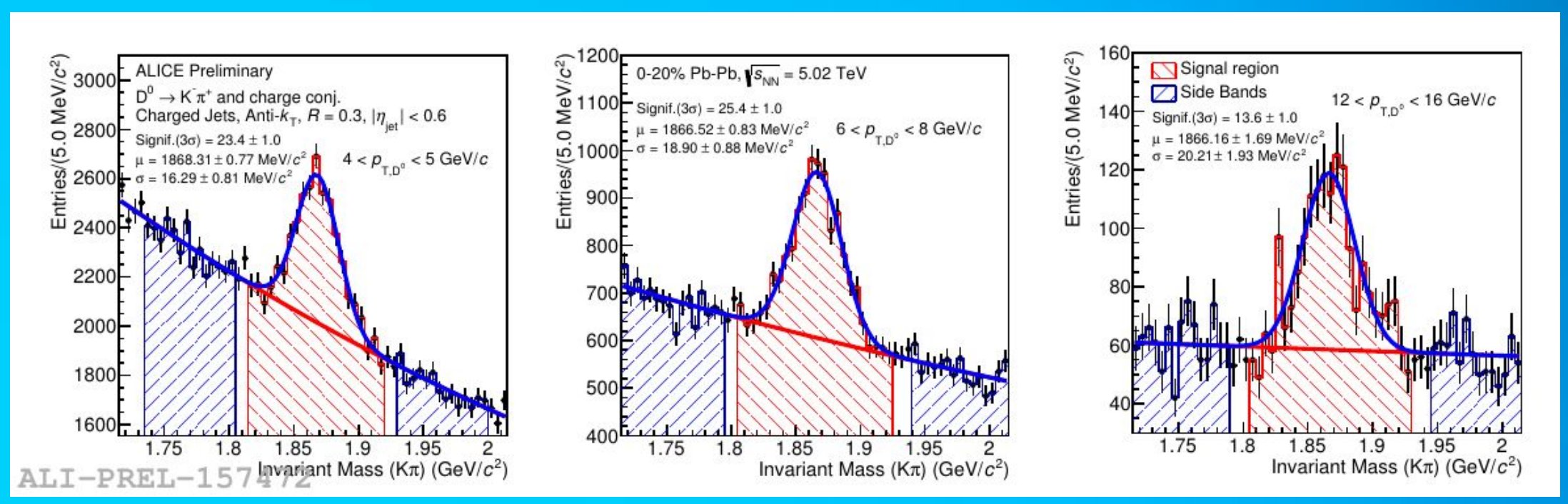
- Charm quarks are ideal probes of the QGP:
  - Produced in **hard scatterings**.
  - $p_T$ -differential cross section calculable with pQCD-based models.
- D<sup>0</sup>-tagged jets
  - Improve **background jets rejection**.
  - Investigation of the jet spectrum **down to low  $p_T$** .
  - Study of the **mass dependence of parton energy loss**.

## 2. Tagging jets with D<sup>0</sup>

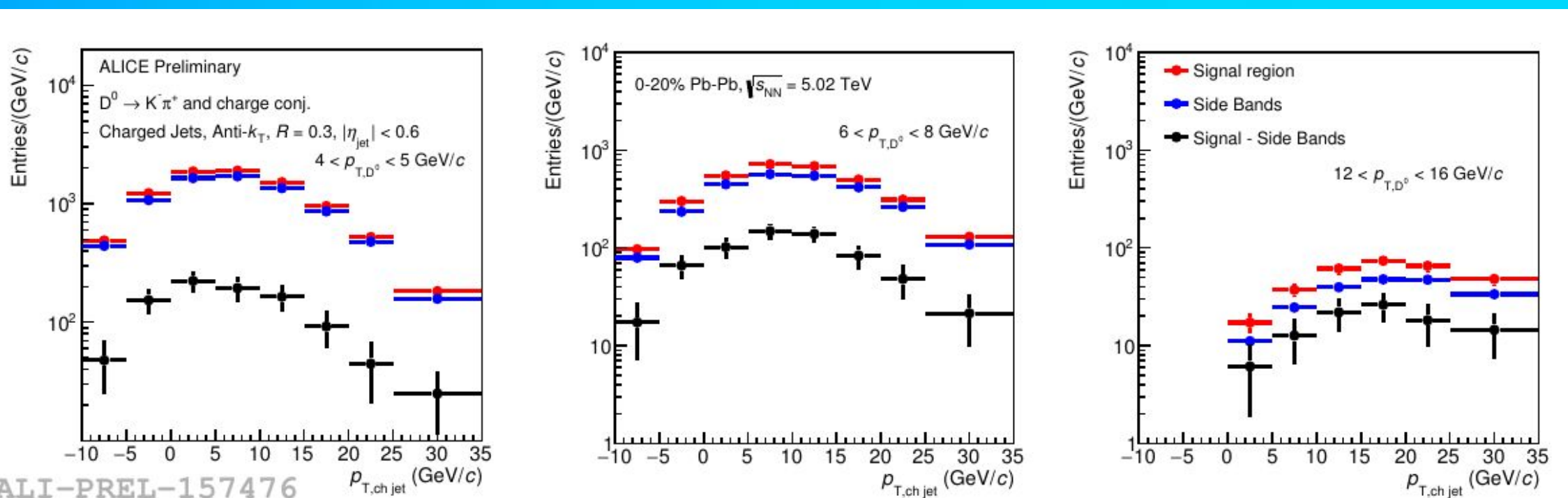
- Exploiting the excellent **particle identification** capabilities of the ALICE detector. Kinematic and topological selections are applied to the D<sup>0</sup> candidates.
  - D<sup>0</sup> particles are reconstructed through the hadronic decay channel **D<sup>0</sup> → Kπ** with an invariant mass analysis.
- Jets are reconstructed using **anti-k<sub>T</sub>** algorithm. D<sup>0</sup> daughters are **replaced by D<sup>0</sup> 4-momentum vector** in jet constituents.

## 3. D<sup>0</sup>-tagged jet $p_T$ spectrum

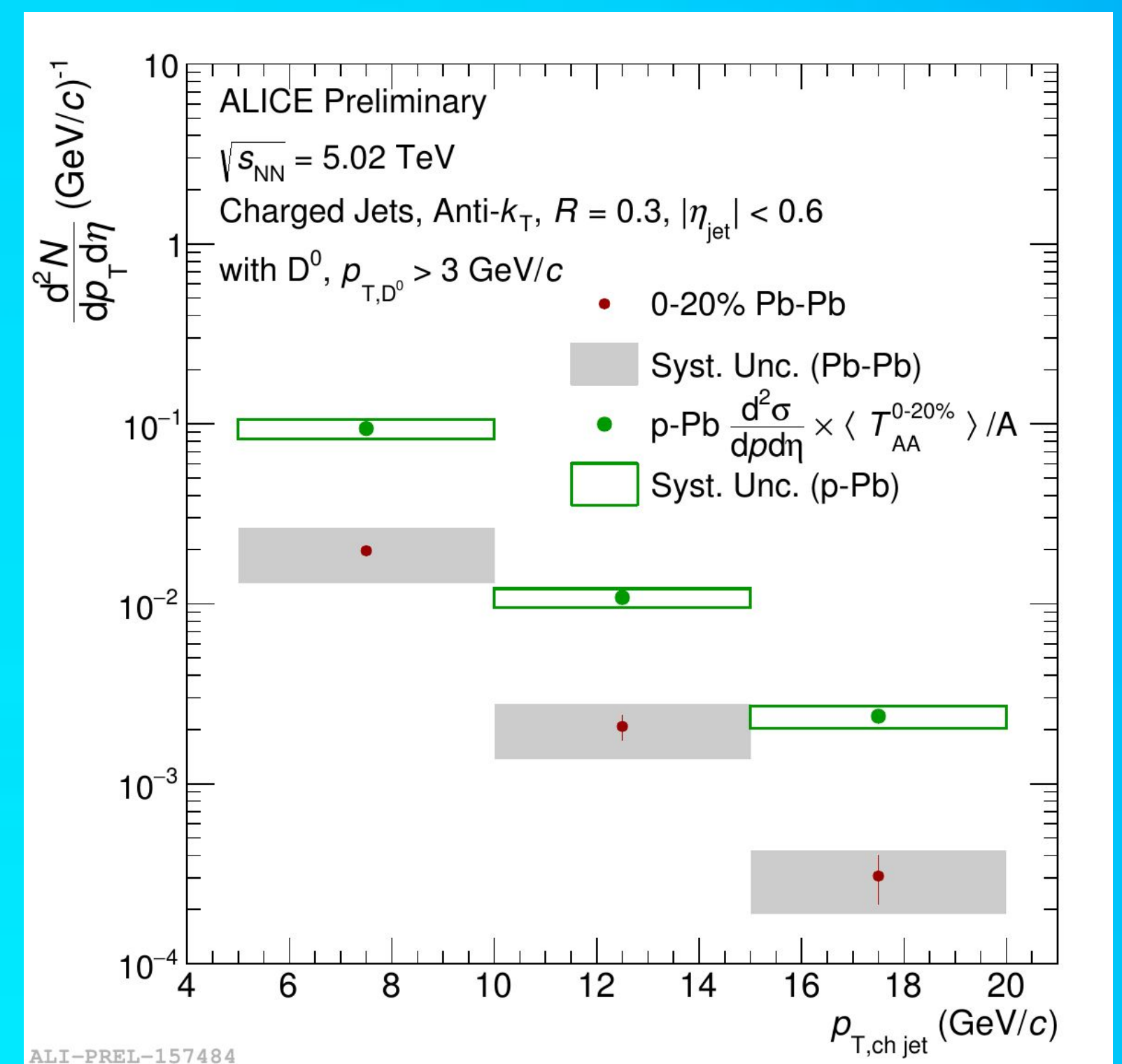
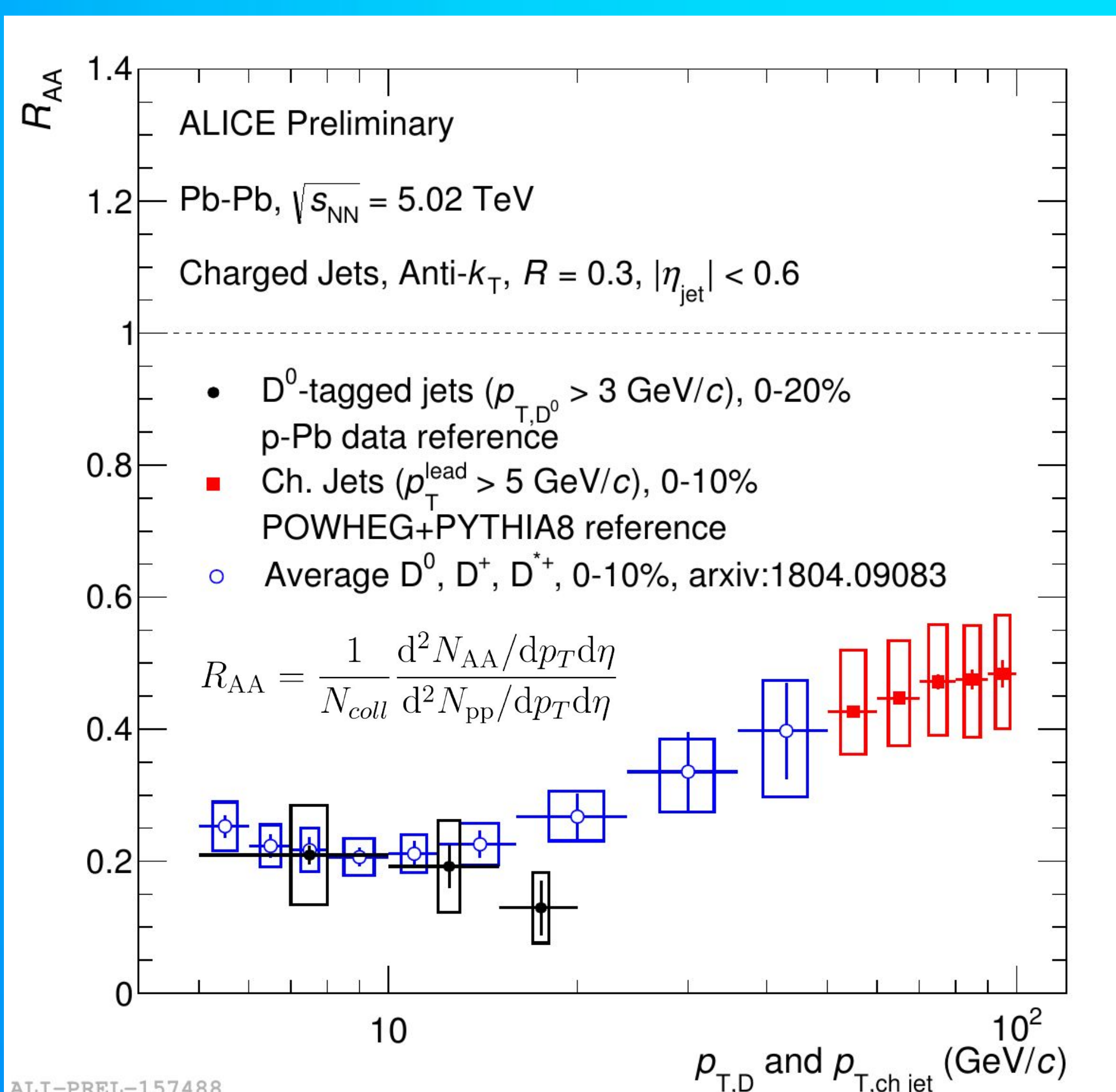
- Obtained by subtracting background from the **signal region** of the D<sup>0</sup> invariant mass analysis using the spectrum from the **side-band region** normalized by the background in the signal region (**N**).
  - Signal<sub>corr</sub> = Signal<sub>raw</sub> - N\*Background**



- POWHEG+PYTHIA6** simulations are used to remove the **feed-down** contribution from bottom quark decays.
- Bayesian unfolding was applied in the **D<sup>0</sup>-tagged jet  $p_T$  spectrum**. The **p-Pb** measurement is used as reference.



## 4. Nuclear modification factor



- Indication of **strong suppression** of **D<sup>0</sup>-tagged jet production** in central Pb-Pb collisions.
- D<sup>0</sup>-tagged jet  $R_{AA}$**  compatible with the  **$R_{AA}$  of average D mesons**. **Inclusive jets** follow similar trend at high  $p_T$ .
- ALICE plans to **extend the kinematic range and precision** in this analysis using the **2018 data**. This work is in progress.