Measurements of fully reconstructed jet cross-section and jet structure in pp collisions at \( \sqrt{s} = 2.76 \text{ TeV} \) with ALICE at the LHC

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Jet properties are expected to be modified in the dense, colored medium formed in Pb-Pb collisions at the LHC. To quantify such modifications, the measurement of reference distributions in pp collisions is essential. Jets are reconstructed from charged tracks measured in the ALICE central barrel, as well as the neutral energy measured in the Electromagnetic Calorimeter (EMCal). In this poster, we present a measurement of the inclusive differential jet cross-section in pp collisions at \( \sqrt{s} = 2.76 \text{ TeV} \) by combining Minimum-Bias and EMCal triggered events in ALICE. The bias of the EMCal trigger, which selects events with a shower in the EMCal of energy greater than 3 GeV, is corrected to extract the jet cross-section. Two different jet cone radii \( R=0.2 \) and \( R=0.4 \) are used to reconstruct jets, and the ratio of the cross-sections are reported. This provides first information on the jet energy profile.

**INTRODUCTION**

- Hard scattered parton in pp or AA collisions fragments into a “jet”: a spray of correlated hadrons
- Full jet reconstruction \( \rightarrow \) initial scattering kinematics

**Why measure jets in pp?**

- Test of pQCD calculations on cross-section and jet structure.
- Reference for jet measurements in Pb-Pb at the same \( \sqrt{s_{\text{NN}}} = 2.76 \text{ TeV} \).

**Jet quenching in heavy-ion collisions**

- QCD predicts that highly energetic partons lose energy in a quark-gluon plasma (QGP).
- Jet fragmentation pattern is modified due to parton-medium interactions.
- Probe to QGP properties.

**Jet energy scale (JES):**

- The measured jet energy can shift from the true energy. The JES uncertainty is \(< 4\%\).
- Missing neutrons and K_{L}^{0} s: corrected using models.
- Tracking inefficiency: only a fraction of charged particles can be detected. Corrected via simulation.

**Jet energy resolution:** \(~20\%\)

- Fluctuation (E-by-E) in correction of jet energy scale.
- Tracking resolution: \(~4\%\) at \( p_{T} \sim 40 \text{ GeV} / c \).
- EMCal energy resolution: \(~3\%\) at \( E \sim 40 \text{ GeV} \).

**Summary & Outlook**

- First measurement of jet cross-section for pp at \( \sqrt{s} = 2.76 \text{ TeV} \). Agrees with NLO calculations + hadronization.
- The ratio of jet cross-sections is also reproduced by the NLO calculation within uncertainty.
- A paper to be submitted.

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**References:**
