Semi-inclusive hadron-jet productions in pp collisions
at $\sqrt{s} = 5.02$ TeV with ALICE

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Motivation

Why hadron-jet?
- Observable can be calculated by pQCD
- A probe to study medium effect in nucleus-nucleus collisions
- Provide a good handle on the combinatorial background by varying trigger track intervals → possible low $p_T$, large R jet
- Trigger track close to surface, but no bias on recoil jets

Why study hadron-jet in pp collisions?
- Provide a reference study in nucleus-nucleus collisions.

Analysis Strategy

Measure jet recoiling from trigger hadron
- Choose signal and reference trigger track (TT) $p_T$ intervals
- Divide data into two subsets for statistical independent signal and reference
- Select event if there is a trigger track within the defined $p_T$ interval
- Select all jet candidates with $R = 0.2, 0.4$ and 0.5

Observable $\Delta_{\text{recoil}}$ is defined:

$$\Delta_{\text{recoil}} = \frac{1}{N_{\text{trigger}}} \frac{d^2N_{\text{jet}}}{dp_T^2 d\phi_{\text{jet}}} |_{TT_{\text{sig}}}
- c \cdot \frac{1}{N_{\text{trigger}}} \frac{d^2N_{\text{jet}}}{dp_T^2 d\phi_{\text{jet}}} |_{TT_{\text{ref}}}$$

Unfolding corrections and systematic calculation

Results

Comparison of $\Delta_{\text{recoil}}$ distribution in pp collisions and PYTHIA distribution

Conclusion

- $\Delta_{\text{recoil}}$ distributions in reasonable agreement with PYTHIA8 model calculations for $R = 0.2, 0.4$ and 0.5.
- $\Delta_{\text{recoil}}$ ratio for $R = 0.2$ to $0.4$ reflect jet collimation behavior, which is slightly increasing with jet $p_T$, consistent with Monte Carlo simulation.
- Suppression in Pb-Pb collisions with respect to pp reference, no $R$ dependence of suppression.
- Jet ratio is similar between pp and Pb-Pb collisions, a hint of difference on the ratio at low $p_T$. 

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