Flow Measurements Via Two-Particle Correlations
In Small Systems With ALICE

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1. Motivation

Two-particle correlations in small systems

- Long-range azimuthal correlation has been studied in small collision systems with ALICE.
- Unidentified particle’s $v_2$ was measured in TPC-TPC ($1.6 < |\Delta \eta| < 1.8$) correlations in pp collisions.
- $v_2$ of the identified particles were newly measured using two methods, peripheral subtraction and template fit, in TPC-FMD ($1.4 < |\Delta \eta| < 6.8$) correlations in p–Pb collisions.
2. Analysis Method

Template fit method (TPC-FMD)

- 1D Projection to $\Delta \phi$ direction in long-range
- Template fitting to subtract the non-flow yield

- Collision system: $p$–$Pb$ $\sqrt{s_{NN}} = 5.02$ TeV
- AMPT model with the string melting was used for the comparison of identified hadrons’ $v_2$ with the data.
- AMPT model without rescattering and PYTHIA8 Angantyr model were used for the method verification.
3-a. Results \( v_{22} (\text{vs } \rho_T) \), FMDA : Pb-going direction, FMDC : p-going direction

- \( v_{22} \) is expected to be zero in PYTHIA8 Angantyr and AMPT without rescattering. The closure test is performed for p–Pb collisions at \( \sqrt{s_{NN}} = 5.02 \text{ TeV} \).
- \( v_{22} \) is nearly close to zero when using the template fit method whilst the peripheral subtraction method shows larger \( v_{22} \).
3-b. Results \( v_2 (\text{vs } p_T) \)

- Clear mass ordering is seen both in the data and model.
- The model overestimates the magnitude of \( v_2 \) but describes the trend well.
- \( v_2 \) obtained with the peripheral subtraction method is lower than with the template fit method.
Outlook

- $v_2$ of identified particles using the AMPT model are compared with the ALICE data in p–Pb $\sqrt{s_{NN}} = 5.02$ TeV, and AMPT model overestimates the data.
- $v_2$ in AMPT with the peripheral subtraction method is lower than with the template fit method similarly as seen in data.
- In PYTHIA8 without flow, $v_{22}$ with the peripheral subtraction method is more deviated from zero than the template fit method.
- Clear mass ordering is seen in $v_3$ as well.
- It will be interesting to see the measurement of $v_3$ with the data.