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Azimuthal anisotropy correlations and fluctuations in PbPb collisions at the LHC energies from HYDJET++ and AMPT model

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Flow correlations and fluctuations are sensitive probes to the initial geometry and the quark-gluon plasma (QGP) in relativistic heavy ion collisions. Model comparisons are essential to decipher the properties of the QGP. In this talk, we study the correlations between flow harmonics v_2, v_3, and v_4 over a wide centrality range with two-particle correlations in PbPb collisions at $\sqrt{s_{\rm NN}} = 2.76$ TeV simulated by the HYDJET++ and AMPT models. We compare the model results to the experimental data from ATLAS and find both models are in good agreement with data for v_2-v_3 correlation. For v_2-v_4 and v_3-v_4 correlations, while AMPT is still in good agreement, HYDJET++ gives stronger slopes in the correlations than the ATLAS data. The AMPT model qualitatively predicts a boomerang-like shape in the correlations as observed in the experimental data, however, they quantitatively disagree. The HYDJET++ model fails completely to reproduce such a boomerang shape. We study flow fluctuations by the v_2 obtained with different Q-cumulant orders, namely $v_2\{2\}, v_2\{4\}, v_2\{6\}$, and $v_2\{8\}$. In particular, we study the skewness, a measure of the asymmetry of the v_2 distribution, by the ratio of
$v_2\{6\} - v_2\{8\}$ and $v_2\{4\} - v_2\{6\}$. The HYDJET++ model
calculation shows good agreement with results reported by the CMS and ALICE
experiments. However, more data statistics are needed in order to draw firm
conclusions.

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