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Multi-particle cumulant J/ψ v_2 measurement in Pb–Pb with the ALICE experiment

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The quark-gluon plasma (QGP) produced in ultrarelativistic heavy-ion collisions has exhibited properties of a mostly perfect fluid. These properties can be observed through the hydrodynamic expansion of the QGP. Experimentally, this was established by measuring azimuthal anisotropies in the final state, known as elliptic flow (v_2) or higher order harmonics such as triangular flow (v_3). These Fourier harmonic coefficients have been extensively measured in past experiments using inclusive charged particles or identified particles in the soft sector. Interestingly, measuring such coefficients using hard probes, such as quarkonia, brings additional information about heavy-quarks production and thermalization in the QGP. While the suppression of loosely bound quarkonia in QGP was observed back to the first measurements at SPS, using LHC Run 1 and 2 data, the J/ψ flow measurements shed new light on quarkonia production through the existence of regeneration mechanisms. Nevertheless, the existing measurements may suffer from non-flow contamination (such as jets or di-jets). Thanks to the new ALICE data-taking strategy in LHC Run 3, new opportunities for more precise and refined measurements are now possible. In particular, multiparticle cumulant analysis can be carried out to extract J/ψ flow with the advantage of further suppressing non-flow contributions. In this poster, the analysis strategy on Run 3 Pb–Pb is described. In addition, preliminary results on J/ψ v_2 in Pb–Pb collisions at $\sqrt{s_{NN}} = 5.36$ TeV at forward rapidity ($2.5 < y < 4$) will be presented and discussed using various measurement techniques, as multiparticle cumulants.

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