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Investigation of in-medium effects of charmonia using azimuthal anisotropy and jet fragmentation function in PbPb collisions at 5.02 TeV with the CMS experiment

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To understand the in-medium effects of quarkonia in heavy ion collisions, it is necessary to perform differential studies of various observables to have a global picture of the quarkonium dynamics in the quark-gluon plasma (QGP). Recent results in proton-proton collisions have suggested that J/ψ mesons are produced with much more jet activity than model predictions, which indicate that the amount of isolated J/ψ mesons with respect to the total production cross section plays an important role in interactions between charmonia and the QGP medium. In this presentation, we present the second-order and third-order Fourier coefficients, v_2 and v_3 for prompt and nonprompt J/ψ , and prompt $\psi(2S)$ mesons, with reporting the v_2 and v_3 for prompt $\psi(2S)$ mesons for the first time in heavy ion collisions. The results are discussed with theoretical calculations and discussed in terms of suppression and recombination effects. Also, we show the final results of the measurement of J/ψ -jets in pp and PbPb collisions. The jet fragmentation function of jets containing a J/ψ meson is studied to probe the dependence of quenching effects on the degree of associated hadro-production inside the jet.

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