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Studies of the relative suppression of excited quarkonium states in pPb collisions with CMS

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One of the most unexpected findings of the LHC heavy ion program is the observation of stronger suppressions of the excited quarkonium states compared to the ground states in proton-lead (pPb) collisions. Such differences imply dissociation effects occurring at late stages, after the evolution of heavy quark pairs into well-defined physical states. The variety of binding energies within the charmonium and bottomonium families offers an experimental tool to characterize the phenomena at play. Moreover, measuring the excited states is crucial as they represent significant feed-down contributions to the production of the ground states in proton-proton collisions and must be accounted for in the interpretation of proton-nucleus data. We report studies of the relative suppression of quarkonia in pPb collisions performed in CMS. Nuclear modification factors as well as excited-to-ground state cross section ratios are measured as a function of particle transverse momentum and rapidity, and event activity (number of reconstructed tracks). The results are compared with several model calculations incorporating initial- and final-state effects.

Category

Experiment

Collaboration (if applicable)

CMS

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