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Can Transverse Mass Scaling Shed Light on the Event-Activity Dependence of Y-Mesons Production at LHC?

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Recent measurements by the CMS and ATLAS experiments reveal a deficit of charged particles in pp collisions with excited $Y(nS)$ states compared to the $Y(1S)$ ground state. This observation is suggested to be a manifestation of excited bottomonia suppression in pp interactions. The analysis presented in this talk is an independent approach, complementary to the CMS and ATLAS analyses, based on first physics principles that finds a significant suppression in the production of excited bottomonia states in pp collisions at the LHC energies. The analysis uses transverse mass scaling as an empirical tool to quantify the magnitude of the suppression. Based on the analysis of shapes of momentum distributions, one can conclude that the $Y(2S)$ production in pp collisions is suppressed by a factor of approximately 1.6 and $Y(3S)$ by a factor of approximately 2.4 from what would be expected from the momentum distribution of $Y(1S)$. Details of the analysis and striking parallels to the findings of ATLAS and CMS experiments would help shed light on the nature of quarkonia production in pp collisions.

Based on <https://arxiv.org/abs/2203.11831>

Experiment/Theory

Theory/Phenomenology

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