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Transverse Mass Scaling of Heavy Mesons in pp collisions at the LHC Energies

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Transverse mass scaling has been observed for a wide range of particle species in pp collisions at various energies from the SPS to RHIC and the LHC. The observed scaling is different for baryons and mesons, and in this work, we present a comprehensive study of the m_T -scaling at LHC energies also extended to the heavier mesons. The study reveals a systematic pattern in the scaling properties of mesons, which is related to the particle quark content. In particular, light species and ground-state quarkonia obey the same scaling, whereas open flavor particles deviate from it because their spectra are significantly harder. The magnitude of deviation depends on the flavor of the heaviest quark in the meson. Extending the transverse mass scaling assumption to the excited bottomonia states leads to the conclusion that the existing measurements of their cross-section correspond to approximately a factor of two suppression in production of these mesons in pp collisions with respect to expectations from the scaling.

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