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The system-size dependence of the bottom-baryon-to-meson production in high-energy proton-proton collisions

Tuesday, 24 September 2024 09:00 (20 minutes)

The latest measurement of bottom baryon-to-meson production ratio [1], Λ_b/B, in proton-proton collisions at the LHC, shows a continuous evolution from the saturation value toward the small value identified in electron-positron collisions as the system size reduces. We address this in a canonical ensemble statistical hadronization model, and demonstrate that the decreasing trend of Λ_b/B can be quantitatively understood in terms of the canonical suppression on the yield of Λ_b toward small system size caused by exact conservation of baryon number [2]. We have thereby proposed a plausible scenario for the origin of non-universality of heavy quark hadronization currently under hot debates.

[1] LHCb Collab., Phys. Rev. Lett. 132, 081901 (2024).
[2] Yuxuan Dai, Shouxing Zhao, and Min He, arXiv: 2402.03692 (2024).

Category

Theory

Collaboration

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