

Peer Review

Review of: "Exploring QGP-Like Phenomena with Charmonia in p+p Collisions at $\sqrt{s}=13$ TeV"

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Authors describe a model for exploring QGP-like phenomena with charmonia in pp collisions. The model includes many effects: collisional damping, gluonic dissociation, non-adiabatic evolution of quantum states, and regeneration.

While the article is well-written overall (despite a few typos, e.g., "Gluonic Dissociation" in the title of III.B.), and details the different ingredients of the model and gives some results, I was puzzled by several points. As a start, I did not find it sufficiently clear how the model and results in this paper differ from Ref. 8 (Eur. Phys. J. C. 82: 542). This reference presents similar results (survival probabilities as functions of p_T or multiplicity) for various centre-of-mass energies, but with quantitatively quite different results (comparing e.g., Fig. 8 from Ref. 8 with Fig. 2 from this paper). In addition, I am surprised by the lack of reference to experimental results. Very few experimental papers are cited, and not the most relevant ones (they are about either charmonia or pp, but none of the available experimental literature on charmonium production in small systems as a function of multiplicity, e.g., from the ALICE experiment). There is no comparison with experimental data in the paper (quantitative or even qualitative), which could support the validity of the assumptions made or the values assumed for the various parameters (almost never explicitly given in the text).

All in all, I found the article to be lacking too many important ingredients to make its contents really useful in its current form. Results should be put into more context with respect to previous results from the same group, as well as the experimental and theoretical literature.

Declarations

Potential competing interests: No potential competing interests to declare.