

Peer Review

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

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The authors investigate the evolution of charmonium in ultra-relativistic nuclear collisions at the LHC, focusing on the transition from a pre-equilibrium QCD state to a thermalized medium.

Using a temperature-independent Hamiltonian, the pre-equilibrium phase is analysed through the bottom-up thermalization approach, while the thermalized medium is described via a Gubser-type expansion. Key mechanisms affecting charmonium yield—collisional damping, gluonic dissociation, and regeneration—are examined, with the latter counteracting suppression effects.

The combined impact of these mechanisms on charmonium production as a function of transverse momentum and event multiplicity in proton-proton collisions is explored, providing insights into the possible formation of a thermalized QCD medium in small collision systems.

The manuscript sufficiently meets the standards of quality, robustness, and novelty for Qeios.

Therefore, I recommend it for publication in its current form.

Declarations

Potential competing interests: No potential competing interests to declare.