

Charmonium mass in antiproton-nucleus reactions, how the in-medium gluon condensate can be measured

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The masses of the low lying charmonium states, namely, the J/Ψ , $\Psi(3686)$, and $\Psi(3770)$ are shifted downwards due to the second order Stark effect. In $\bar{p} + \text{Au}$ collisions at 6 – 10 GeV we study their in-medium propagation. The time evolution of the spectral functions of these charmonium states is studied with a Boltzmann-Uehling-Uhlenbeck (BUU) type transport model. We show that their in-medium mass shift can be observed in the dilepton spectrum. Therefore, by observing the dileptonic decay channel of these low lying charmonium states, especially for $\Psi(3686)$, we can gain information about the magnitude of the gluon condensate in nuclear matter. This measurement could be performed at the upcoming PANDA experiment at FAIR.

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