Transverse energy fluctuations and the pattern of J/ψ suppression in Pb-Pb collisions

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Abstract

A recent analysis of Pb–Pb data by the NA50 collaboration shows that the J/ψ over Drell-Yan ratio as a function of E_T suggests a two-threshold structure: the first threshold, already seen in earlier data, corresponds to the onset of the so-called "anomalous J/ψ suppression", while the second threshold appears at the highest values of E_T, corresponding to the most central collisions.

We present a simple model of anomalous J/ψ suppression which provides a perfect fit to these recent data. This model assumes that the J/ψ disappears gradually when the local energy density increases. At the largest values of E_T, the collision geometry is essentially fixed (impact parameter close to zero). The second decrease of the J/ψ over Drell-Yan ratio is then interpreted as an effect of transverse energy fluctuations: the higher the transverse energy, the larger the region where the J/ψ's disappear. Our results suggest in particular that the J/ψ is completely suppressed at the highest densities achieved in Pb–Pb collisions.

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