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Corona effect in AA collisions at LHC and RHIC

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Following our earlier finding based on RHIC data about the dominant jet production from nucleus corona region, we reconsider this effect in nucleus-nucleus collisions at LHC energy. Our hypothesis was based on the experimental data, which raised the idea of a finite formation time for the produced medium. At RHIC energy and in low density corona region this time reaches about $2\text{ fm}/c$. In the center of interaction region it's about $0.7\text{ fm}/c$. All observed high p_t particles are produced in the corona region and have a chance to escape during this $2\text{ fm}/c$. After that, the formed high density matter absorbs all jets. Following this hypothesis, the nuclear modification factor R_{AA} should be independent on particle momentum and be flat versus p_t . At the same time, we can describe at RHIC the finite azimuthal anisotropy of high p_t particles, v_2 . A separate prediction held that, at LHC energy, the formation time in the corona region should be two times smaller, about $1\text{ fm}/c$. New data at LHC show that R_{AA} is not flat and is rising with p_t . We add to our original hypothesis an assumption that a fast parton traversing the produced medium loses the fixed portion of its energy. A shift of about 7 GeV from the original power law p^{-6} production cross section in pp explains well all the observed R_{AA} dependencies at all centrality. The shift of about 7 GeV is also valid at RHIC energy, where the cross section follows a power law with about p^{-8} and this shift explains a very slow rise of R_{AA} seen for neutral pions with p_t above $15\text{ GeV}/c$. We also show that the observed at LHC dependence of v_2 at high p_t and our previous predictions agree. It is very attractive to call this value of 7 GeV as a parton binding energy.

Content type

Experiment

Collaboration

Centralised submission by Collaboration

Presenter name already specified

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