

Evidence of nuclear gluon effects in γ -Pb interactions with CMS

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The quantum fluctuations of the initial state described by the overlap of two highly Lorentz-contracted nuclei traveling on light-cone trajectories are probably imprinted upon the distribution of particles created in the Quark-Gluon Plasma (QGP). Without assessing these quantum fluctuations in nuclei, fundamental properties of the QGP such as its viscosity-to-entropy ratio cannot be determined to a high precision. By studying coherent J/Ψ photoproduction in γ -Pb interactions, and comparing it to that J/Ψ photoproduction off the proton, the CMS data together with that from ALICE, have showed that the no-nuclear shadowing hypothesis at low Bjorken- x and Q^2 values is rejected with a significant larger than 5 sigmas. The neutron dependence and energy dependence of J/Ψ photoproduction off the Pb, and its connection to these nuclear gluon effects, will be presented for the first time. Furthermore, the experience gained analyzing vector meson photoproduction has been used to study other *gamma*-Pb processes such as photonuclear jets, and will be discussed in this talk.

Preferred Track

Initial State Physics and Approach to Equilibrium

Collaboration

CMS

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