Contribution ID: **98** Type: **Poster**

Role of color reconnection (CR) in proton - nucleus collisions at relativistic energies

One of the surprises of the results coming from the LHC was the correlation between charge particle multiplicity and the mean transversal momentum. At first, these results in Pb-Pb collisions were attributed to the collective hydrodynamical properties of the Pb-Pb system. Then, for some observables, it was not surprising that the same behavior came out of p-Pb experiments, as similar collective properties were thought to appear. Surprisingly, even p-p collisions showed similar behaviors of those of p-Pb for some observables, which can not be understood in the same base as Pb-Pb. In this regard, a model is discussed treating the proton-nucleus collision, as a proton-in-medium-proton collision by using the PYTHIA Monte Carlo event Generator, changing the parton function distribution (PDF) of one the protons involved in the collision for a nucleus parton function distribution (nPDF). This approach would allow recreating the medium interaction in the primary collision. One of the observables analyzed under this approach is the balance function which was proposed by Bass as a way to determine the correlation of positive and negative charged particles produced during a relativistic heavy-ion collisions.

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Track Classification: STARS2017