

XXII Meeting of Physics 2022



Contribution ID : 138

Type : posters

Exploring b-jet properties in Pb+Pb collisions with the ATLAS experiment at the LHC

Saturday, 17 December 2022 16:10 (10)

A few instants after the Big Bang, the universe consisted of a hot soup of elementary particles called quarks and gluons. Immediately after, these particles began cooling to form protons and neutrons, the building blocks of matter. In order to recreate that soup, it is needed to collide nuclei of atoms. One of these attempts is the collision of heavy ions Pb+Pb at LHC that creates a bunch of particles that form jets. These jets are excellent probes of QGP because they provide a tomographic image of the QGP created in these collisions. We prepared a toy event display showing b-Jets in Pb+Pb collisions with a $\sqrt{s_{NN}}=5.02$ TeV Pb+Pb collisions in the ATLAS detector. For that we used Monte Carlo simulation data generated by GEANT4 and Pythia 8.2. We identified and plotted the decay tracks of about 60 different types of particles and antiparticles corresponding to b-hadron, c-hadron particles and their respective children. We plotted b-jets cones and classified chains of b- and c-hadron decay vertices. The most common decay vertices were 1->1, 1->2, 2->2, 2->3 and 2->4, accounting for around 99% of cases. Secondary interactions with the detector material were also found, but were very rare.

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Session Classification : Posters

Track Classification : Nuclear and High Energy Physics