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Jets evolution in Au+Au nuclear collisions at CBM energies

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The CBM experiment aims the study of the QCD phase diagram at low temperatures and high baryonic densities, mainly to study the phase transition between hadrons and partons under these conditions. There are many signals to detect the phase transition point: fluctuations, hydrodynamics, etc. In previous studies we found as an interesting tool for analyzing of relativistic nuclear collisions: the "nuclear matter jets". Having a nonpartonic origin, the number of jets indicates the centrality of the collision, i.e. the amount of incident energy pumped into the system, and the jet properties allowed us to make assumptions about their origin. A liquid-gas nuclear phase transition was indicated by the disappearance of jets. The cumulative number is another useful variable for detecting phase transitions. Cumulative number, like jets, can be associated with density and temperature fluctuations into the fireball initiated by a nucleus-nucleus collision. At CBM energies we expect a similar behavior for nuclear matter and partonic jets. For this we made jet and cumulative number studies using UrQMD and AMPT simulations (performed at the computing system YaPT from "Nuclear Matter in Extreme Conditions" Research Center – Faculty of Physics, Bucharest University) for Au+Au collisions at 10, 20 and 30 GeV/nucleon. Our purpose is to study the evolution of properties of nuclear matter jets and of cumulative number with projectile energy and with the collision centrality for testing the sensitivity of these variables to the Equation-of-State of nuclear matter at CBM energies.

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