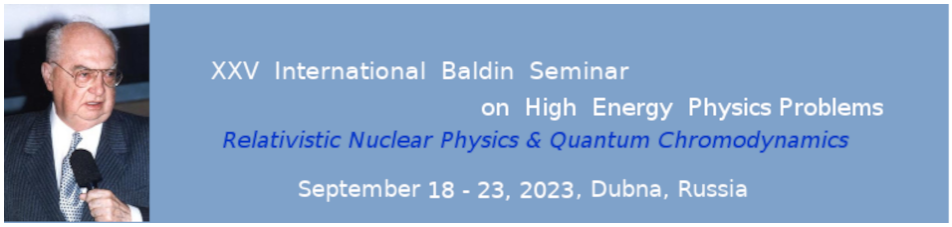

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Cumulative production at central rapidities and large transverse momenta at NICA

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We develop a theoretical description of the production of pions and protons in a new cumulative region of central rapidities and large transverse momenta that can be observed in nuclear collisions by the MPD and SPD detectors of the NICA complex.We suppose that particles in this kinematic region, inaccessible for single nucleon-nucleon interactions, are formed as a result of scattering from the so-called nuclear fluctons, which are considered as clusters of cold quark-gluon matter with a high baryon density.
We calculate particle yields in this new cumulative region due to the interaction of a nucleon of one nucleus with a flucton of another nucleus. To this end, we generalize the microscopic quark approach developed in [1–6] for describing the production of cumulative particles in the fragmentation region of one of the colliding nuclei to the case of particle production in this new region.
We show that there is a change in the ratio of the proton to pion yield in the region of central rapidities and high transverse momenta compared to the cumulative region of nuclear fragmentation. The reason is that, as shown in [4-6], in the case of cumulative pion production, the process of fragmentation of a single flucton quark into a pion dominates, while in the case of cumulative proton production, the mechanism of coherent coalescence (recombination) of three flucton quarks into a proton dominates.
It is also noted that studies of particle production in this new cumulative region are available for experimental study only at relatively low initial energies of colliding nuclei of the NICA collider facility and are not available for experimental study at the RHIC and LHC colliders.
We compare the obtained theoretical results with the results of our preliminary estimates of particle yields in this region based on a more phenomenological approach [7-9].
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