Contribution ID: **1637** Type: **Oral**

Simulation of the momentum distributions of the spectator fragments in 124Xe+CsI Collisions at the BM@N with accounting for pre-equiibrium clusterizartion

Tuesday 29 October 2024 16:30 (15 minutes)

Understanding the momentum distributions of the spectator fragments in relativistic nuclear collisions, such as those in the BM@N experiment (NICA), helps to estimate the acceptance of the zero-degree calorimeters and other forward detectors. BM@N is equipped with FHCal and SciWall, which can detect spectator nucleons and at least some spectator fragments [1]. In order to simulate this response, one needs the model which provides realistic momentum distributions of the spectator fragments.

In this work we use the Abrasion-Ablation Monte Carlo for Colliders (AAMCC-MST) model [2] with and without MST clustering as the pre-equilibrium fragmentation model to simulate the production of spectator fragments [3]. The Goldhaber model [4] is used to account for the intranuclear motion of the removed nucleons. The momentum distributions of the spectator fragments were simulated and validated with data from the KLMM collaboration [5, 6]. Then, the momentum distributions of spectator neutrons, protons, hydrogen and helium fragments, light and heavy fragments in 124Xe+CsI collisions at BM@N were calculated for different centrality ranges. It was found that accounting for pre-equilibrium fragmentation increases the mean transverse momentum pT of the spectator fragments and improves agreement with the experimental data.

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Session Classification: High Energy Physics

Track Classification: High Energy Physics