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Production of Lambda hyperons in 4.0 AGeV and 4.5 AGeV carbon-nucleus interactions at the Nuclotron

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The study of relativistic heavy ion collisions provides a unique opportunity to explore nuclear matter under extreme conditions of density and temperature. The optimal energy range for nuclear matter compression is close to 5 AGeV. The Nuclotron at the NICA accelerator complex provides a wide range of ion beams in the energy range $\sqrt{s_{NN}} = 2.3 - 3.5$ GeV. These energies are high enough for the production of strange mesons and (multi)-strange hyperons in nucleus-nucleus collisions close to the kinematic threshold [1,2].
Lambda hyperons containing a single strange quark are important observables in the study of strangeness because their kinematic characteristics carry information about the dynamics of the system, the degree of thermalisation and the role of secondary interactions.
The BM@N experiment is the first fixed-target experiment operated at the NICA accelerating complex.
The BM@N experiment collected data on carbon, argon, krypton and xenon
beams with different solid targets.
This paper presents results of the Lambda hyperon production in
carbon-nucleus interactions (CN run) at the 4.0 and 4.5~AGeV beam kinetic energies with the different solid targets (C, Al, Cu, Pb). Transverse momentum, rapidity spectra and yields of the Lambda hyperons are measured.
The results are compared with theoretical models predictions and with the experimental data on carbon-carbon interactions (Propane Chamber).

1. Exploring strongly interacting matter at high densities - NICA White Paper, Eur.Phys.J. A52 (2016).
2. BM@N Conceptual Design Report: \url{http://nica.jinr.ru/files/BM@N/BMN_CDR.pdf}

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