

XXV International Baldin Seminar on High Energy Physics Problems
"Relativistic Nuclear Physics and Quantum Chromodynamics"



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on High Energy Physics Problems
Relativistic Nuclear Physics & Quantum Chromodynamics

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NLO pQCD analysis of semi-inclusive pion and kaon production in proton-proton and heavy-ion collisions at the STAR and NICA kinematics. Tests of the parametrizations of Fragmentation Functions.

Friday, 22 September 2023 09:00 (20 minutes)

We test the parametrizations of Fragmentation Functions (FFs) using data on semi-inclusive pion and kaon production in unpolarized pp and heavy-ion collisions at the STAR and NICA kinematics. The calculations are carried out in the next-to-leading order (NLO) of perturbative quantum chromodynamics (pQCD). We show that at the c.m. energy 200 GeV both LSS-15 and DSEHS-14 FFs for pions and DSEHS-17 FFs for kaons provide the best fits to the STAR data. The comparison for lower energy scales, like at NICA, shows that a purely pQCD approach is inadequate and suggests the necessity to take into account also higher-order effects of initial-state soft-gluon radiation. Nevertheless, these data on the p_T spectra of π^+ , K^+ and also the ratios π^-/π^+ and K^-/K^+ seem favour LSS-15 and DSEHS-14 FFs for pions and DSEHS-17 for kaons, similarly as at the energy scale 200 GeV.

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