Contribution ID : **96** Type : **Oral talk**

FEATURES OF THE NON-EQUILIBRIUM QUANTUM HYDRODYNAMIC APPROACH FOR DESCRIBING THE EMISSION OF SECONDARY PARTICLES IN COLLISIONS OF HEAVY IONS OF HIGH AND INTERMEDIATE ENERGIES

Thursday, 29 October 2026 17:05 (15)

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Based on the effective Klein–Fock–Gordon equation [1], a description is given of the emission of cumulative protons, pions, and fragments (p, π, K, d, t) in heavy-ion collisions at energies of the U-70 accelerator (IHEP, Protvino) [2,3], KI (Moscow) [4,5], and the BM@N collaboration (JINR, Dubna) [6-8]. The advantage of this approach in describing the experimental data of IHEP and KI for the emission of protons, pions, kaons, and fragments of H, ^{2}H, ^{3}H, ^{3}He, ^{4}He, ^{6}Li, ^{7}Li, compared to other theoretical models, is shown.

An explanation for the splitting effect in the momentum spectra of protons and light fragments in the (230 MeV/A)^{56}Fe+^{9}Be→f+X reaction in the FRAGM (KI) experiment [9] is provided. This splitting is explained by the nucleon potential, which depends quadratically on the distance from the particle emission center. The spectrum splitting disappears with increasing ion collision energy and upon transition to heavier fragments.

When describing the available experimental data, it is essential to identify the resulting hot spot, which is compatible with the hydrodynamic model of hot jet separation in heavy-ion collisions [10], and which has recently been developed in elementary particle physics [11].

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Session Classification : Heavy ion physics

Track Classification : Heavy ion physics