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THE KLEIN-GORDON EQUATION WITH DISSIPATION AND ITS APPLICATION TO THE DESCRIPTION OF SECONDARY PARTICLE EMISSION IN HEAVY ION COLLISIONS

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The equations of quantum relativistic hydrodynamics can be obtained from the Klein-Gordon equation [1]. Taking into account dissipation and temperature using additional equations to the effective Klein-Gordon equation allows us to consider the dynamics of the process of collisions of heavy ions and calculate the yields of secondary particles. This allows us to include both light and heavy nuclei into consideration. This makes it possible to more adequately describe the cumulative processes of the formation of high-energy particles in collisions of light heavy ions of intermediate energies [2-4]. The spectra of the resulting cumulative protons, pions, kaons, antiprotons, as well as light fragments, calculated by us using the Klein-Gordon equation, are in agreement with the available experimental data obtained at the U-70 accelerator IHEP (Serpukhov) [5,6] at the collision of carbon nuclei with an energy of 20 GeV per nucleon. Reducing solutions of the Klein-Gordon equation and quantum hydrodynamics equations to solutions in the form of quantum shock waves has not previously been considered. and can be used in other areas of physics when calculating the nonlinear dynamics of oscillations of complex systems.

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Section

Heavy ion collisions at Intermediate and high energies

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