Entanglement and geometry of states of quantum many-particle systems

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In the talk we review the mathematical methods of the description of the evolution of states of quantum many-particle systems by means of the possible modifications of the density operator (density matrix). In particular, we consider some related problems of entanglement and the geometry of quantum states.

One of the approaches to describing the states of quantum systems of many particles consists in to describe states by means of a sequence of operators determined by the cluster expansions of density operators, which are interpreted as the correlation operators are governed by the hierarchy of the nonlinear evolution equations [1]. Such approach allows us to describe the evolution of correlations of systems in condensed states.

Moreover, we discuss an approach to the description of the evolution of states within framework of the state of a typical particle within a quantum system of many particles, i.e. the foundations of describing the evolution by the nonlinear kinetic equations are considered [2].

References

[1] V. I. Gerasimenko, D. O. Polishchuk. Dynamics of correlations of Bose and Fermi particles. *Math. Meth. Appl. Sci.*, 34 (1): 76-93, 2013.

[2] V. I. Gerasimenko. Processes of creation and propagation of correlations in quantum many-particle systems. *Reports NAS of Ukraine.*, (5): 58-66, 2016.