

## Relativistic origin of classical thermodynamics as an alternative to the concept of probability

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The problem of the non-contradictory microscopic foundation of both thermodynamics and kinetics remains unsolved. Thus, statistical mechanics is an ill-posed theory. In addition to internal contradictions, there are several difficult fundamental problems in this theory such as (i) the equivalence criteria for the statistical ensembles are not known, (ii) there are no exact methods or a priori accuracy estimates of approximate methods for calculating partition functions, (iii) the problem of closure of equations for partial distribution functions leads to use uncontrolled additional probabilistic hypotheses such as weakening correlations principle. The purpose of this study is to develop a method for probability-free describing the evolution of many-particle systems with

account relativistic effects. In our papers, a new description of the evolution of a system of particles with retarded interactions is proposed. The qualitative properties of the solutions of this relativistic equation with respect to the microscopic density are investigated. It is proved that the solutions possess the property of irreversibility in time. Therefore, there is no need to use any kind of probabilistic concepts in the microscopic foundation of classical thermodynamics. The further purpose of our research is to construct a microscopic kinetic theory of many-particle systems, including the processes of thermodynamic equilibration at different scales, the calculation of thermodynamic and kinetic properties.

### Biography

A Yu Zakharov has completed his PhD from Donetsk Physico-Technical Institute, Academy of Sciences of Ukrainian SSR and Postdoctoral studies from Donetsk Polytechnical Institute, USSR. He is Professor in Yaroslav-the-Wise Novgorod State University. He has published more than 70 papers in reputed journals and six monographs.

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