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## On the probability-free mechanism of macroscopic irreversibility and microscopic foundation of thermodynamics

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It is shown that retardation of the interactions between particles leads to the non-existence of potential energy and the Hamiltonian of the particle system. This leads to the impossibility of calculating the thermodynamic functions of the system by the methods of statistical mechanics. The dynamics of a system of particles with delayed interactions is described by a system of functional differential equations. The qualitative properties of the solutions of this system of equations are investigated. The solutions are irreversible with respect to time reversal. The number of degrees of freedom of even a finite system with retarded interactions is infinite.

**Keywords:** Thermodynamics, many particle systems.