

TO THE STATISTICAL DESCRIPTION
OF THE STRUCTURE FORMATION
IN COULOMB-LIKE SYSTEMS

B.I. Lev, A.G. Zagorodny

Bogolyubov Institute for Theoretical Physics,
Nat. Acad. of Sci. of Ukraine
(14b, Metrolohichna Str., Kyiv 03680, Ukraine)

S u m m a r y

A new solution to the problem of the calculation of the partition function for a Coulomb-like system is proposed. The quantum-field-theory approach is used to give a statistical description of a system of interacting particles with due regard to an arbitrary spatially inhomogeneous configuration. The formation of structures in a Coulomb-like system is analyzed and applied to the dusty plasma treatment. A necessary condition for the crystal formation in a three-dimensional system of dust particles is obtained. In the one-dimensional case, an exact solution for the spatial distribution of charged particles is presented.