

## **New approach to statistical description of self-gravitating system**

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A new approach to the statistical description of a self-gravitating system has been proposed. The approach employs a nonequilibrium statistical operator that involves into consideration inhomogeneous distributions of particles and temperature. The states with dominant contributions to the partition function are found in terms of the saddle-point method that yields all the thermodynamic relations for a self-gravitating system. The approach makes it possible to describe new peculiar features in the behavior of the gravitating system under various external conditions; it may be applied to describe the formation of stars and galaxies.