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Leandro BERALDO e SILVA

Universidade de São Paulo / University of Michigan

### THE ARROW OF TIME IN THE COLLAPSE OF COLLISIONLESS SELF-GRAVITATING SYSTEMS

The process that brings a self-gravitating system such as a galaxy from an initial configuration to a nearly universal quasi-stationary state in the dynamical time-scale is the violent relaxation, with a typical particle interacting with the time-changing collective potential. Although observed in N-body simulations, its kinetic description, i. e., in terms of a transport equation, is not clearly understood. In this talk, we will show numerical tests, based on entropy estimation of data from N-body simulations, that we have been doing in order to verify the validity of (supposedly the transport equation for this process), the Vlasov-Poisson equation. Additionally, we will show the results of the long-term entropy evolution, which can be described by a Fokker-Planck equation.