Abstract:
The talk is based on a joint paper with Irene Gamba and Irina Potapenko.
We discuss some general properties of the Landau kinetic equation. In particular, the difference between "true" Landau equation, which formally follows from classical mechanics, and "generalized" Landau equation, which is just an interesting mathematical object, is stressed. It is shown how to approximate the Landau equation by the Wild sum. It is the so-called quasi-Maxwellian approximation related to Monte Carlo methods. This approximation can be also useful for mathematical problems. A model equation which can be reduced to a "local" nonlinear parabolic equation is also constructed in connection with existence of the strong solution to the initial value problem. The self-similar asymptotic solution to the Landau equation for large v and t is discussed in detail. The solution, earlier confirmed by numerical experiments, describes a formation of Maxwellian tails for a wide class of initial data concentrated in the thermal domain. It is shown that the corresponding rate of relaxation (fractional exponential) is in exact agreement with recent mathematically rigorous estimates.