FUDAN UNIVERSITY

Applied Math Ph.D. Seminar

Random batch particle methods for the homogeneous Landau equation

Speaker: Yijia Tang (Shanghai Jiao Tong University)

Time: 2021-11-08, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Shi Jin (Shanghai Jiao Tong University)

Abstract: Landau equation is a fundamental integro-differential equation describing the evolution of the distribution for charged particles in plasma physics. In this talk, I will introduce random batch particle methods for efficiently solving the homogeneous Landau equation. The methods are stochastic variations of the particle methods proposed by Carrillo et al. using the random batch strategy. The collisions only take place inside the small but randomly selected batches so that the computational cost is reduced from $O(N^2)$ to $O(N)$ per time step. Meanwhile, these methods can preserve the conservation of mass, momentum, energy and the decay of entropy.