PDE seminar
University of Minnesota
Wednesday, November 28, 2012

Speaker: **Chongchun Zeng, Georgia Institute of Technology**
Title: **Small BGK waves and Landau damping.**

Abstract: In this talk, we discuss the Landau damping – the asymptotic stability of the linearly stable homogeneous states of the Vlasov-Possion system. It has been proved that solutions to the system linearized at stable homogeneous states decay algebraically in time. In such a Hamiltonian system, this decay is not caused by any dissipation. The nonlinear asymptotic stability is open until recently when Mouhot and Villani proved it of solutions in the Gevery class. The problem in Sobolev spaces remains open. We show that the nonlinear damping does not happen in Sobolev space with too low regularity by constructing BKG waves – traveling waves – arbitrarily close to stable homogeneous states. In the contrary, in Sobolev spaces with higher regularity, we show that there are no invariant structures – including BGK waves – near any stable homogeneous states and thus the same obstacle for the damping as in the rough Sobolev spaces does not appear. Similar results have also been proved for the Euler equation near Couette flow. These are joint works with Zhiwu Lin.