



NYU-ECNU Institute of Mathematical Sciences at NYU Shanghai

WEEKLY SEMINAR

Topic: Ginzburg-Landau Equation and its Many Generalizations

Speaker: Pierre Hohenberg, Professor Emeritus of Physics at NYU

Time: 14:30-16:30, 16 October 2013

Venue: Room 153, Geography Building, 3663 Zhongshan Road North,
Shanghai (华东师范大学中山北路校区, 地理楼 153 室)

ABSTRACT OF THE TALK

The Ginzburg-Landau equation is a nonlinear partial differential equation which is used by physicists to model an immense variety of phenomena. This talk will review two important areas of application:

1. The so-called Ginzburg-Landau-Wilson theory of thermodynamic systems undergoing continuous phase transitions. For this case the model provides a convenient setting to formulate the renormalization group theory of scaling and universality.
2. Pattern formation and dynamics in spatially extended systems. Solutions of general systems of pde's displaying Turing-type linear instabilities can be universally represented in terms of 'time dependent Ginzburg-Landau equations'. These equations display two primary types of behavior:
 - a. Real Ginzburg-Landau equations satisfy so-called 'potential dynamics', in terms of a Lyapunov function which is minimized in the dynamics and which leads to fixed-point behavior at long times.
 - b. The Complex Ginzburg-Landau equation, which is nonpotential and which displays the interesting phenomenon of spatiotemporal chaos.

BIOGRAPHY

Pierre Hohenberg is a Professor Emeritus of Physics at NYU, whose work has spanned many areas of condensed matter physics and statistical physics. He is one of the originators of the Density Functional Theory of electronic structure and of the Dynamic Scaling approach to critical phenomena, for which he has received many honors.