

**Dipartimento di Fisica Teorica  
Università di Torino**

# **Seminari comuni**

**Programma Primavera 2010**

Notice room  
change!

**Venerdì 22 Gennaio  
Aula Wick, ore 14:30**

**Antonello Provenzale (CNR – Torino)**

## **Climate-biosphere interaction: a problem in complex systems physics**

Climate is a complex and complicated dynamical system. Complicated, because it includes a large number of different components (atmosphere, oceans, continental and sea ice, biosphere, soil, lithosphere...). Complex, because all these components are characterized by nonlinear interactions and intricate feedback loops. In this talk I shall discuss a few processes that characterise the interaction between biosphere, atmosphere and soil, focussing on how the biosphere can affect, and sometimes control, the climate of our planet. Specific topics include the role of soil moisture and of vegetation cover in the insurgence of summer droughts at continental midlatitudes, the formation of vegetation patterns as a product of nonlinear feedbacks in drylands, the action of the organisms called "ecosystem engineers", capable of heavily modifying the environment in which they live, and finally the possibility that local instabilities in ecosystem dynamics propagate upscale and modify the global climate. I shall focus on simple conceptual models, used in the attempt to understand the main dynamical processes underlying the observed behaviors.