

## THURSDAY COLLOQUIUM

**Department of Physics, Tsinghua University** 

http://www.phys.tsinghua.edu.cn/Colloquium/

## Title The Inverse Ising Problem -- Equilibrium and Kinetic

## **Speaker Prof. Eric Aurell**

Royal Institute of Technology

# Venue ZhengYu-Tong Lecture Hall & Date 16:00, March 10, 2011

#### **Abstract:**

The inverse Ising problem means to reconstruct interactions (external fields and couplings) from observations (magnetizations and correlation functions). It is equivalent to a maximum entropy inference of the probability distribution, given megnetizations and correlation functions, and has applications to diverse fields such as neuroscience, systems biology / genetics. The kinetic inverse Ising Problem means by analogy to reconstruct external fields and couplings from time series data from a kinetic Ising model. I will survey recent developments in the area with an emphasis on connections between statistical physics and machine learning. I will also cover recent results by us on extending the Belief Propagation schemes to non-equilibrium spin systems.

This is joint work with John Hertz, Yasser Roudi, Mikko Alava, Zeng HongfLi and Hamed Mahmoudi.

### Introduction to the Speaker



Erik Aurell recieved his PhD under the guidance of Predrag Cvitanovic in 1989, from University of Goteborg, Sweden. He is Professor of Biological Physics at KTH Royal Institute of Technology, Sweden, and Finland Distinguished Professor at Academy of Finland.