UNIVERSITY OF CALGARY

Complexity Science Seminar

Thursday, May 22, 2008

SB 142 11:00AM

Prof. Dr. Holger Kantz

Nonlinear Dynamics and Time Series Analysis Group

Max Planck Institute for the

Physics of Complex Systems

Extreme events: modeling and prediction

Complex systems possess the important capability of generating extreme events, i.e., huge and rare fluctuations. In order to be interesting, such deviations from their normal behavior can either be a reaction to a tiny perturbation or can be generated autonomously. In order to improve our understanding of extreme events in natural systems, one needs simplified models which allow us to gain insight into the dynamical mechanisms behind and the statistical properties of extreme events. In this talk, two model scenarios will be discussed. The main issue, however, will be the prediction of extreme events based on time series recordings. In this context, cost functions or skill scores have to be defined in order to access whether a particular prediction is successful or not, and in order to derive optimal prediction schemes. As a particular such result we will show that there exist classes of processes where events are the better predictable, the more extreme they are.