

The Departments of Geosciences and Physics present:

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A Physicist's View of Earthquakes

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2:30 P.M.

210 Robeson Hall

Earthquakes can cause considerable loss of life and property. Unlike hurricanes, fires and floods earthquakes strike with almost no warning. To forecast earthquakes will require considerable insight into their physics. Tantalizing clues lie in the fact that fault systems appear to be operating near critical points. The evidence for a critical point is in the appearance of scaling laws such as the Gutenberg - Richter power law distribution of the number of earthquakes of magnitude m , and the Omori law for the number of after shocks as a function of time. However, there is also clustering of earthquake events and evidence of an earthquake cycle in which large events cause a lessening of earthquake activity until the system reloads the stress dissipated in the large event.

In order to understand these processes we have studied simple models of earthquake fault systems with some surprising results. In this talk I will discuss the physical properties of a certain class of models and the relation of these models to real fault systems. The models indicate a mechanism that can produce both scaling and an earthquake cycle and can be seen, in the right range of parameters that control the physics, to be in the same universality class as Ising models and simple fluids.