



CELOÚSTAVNÍ SEMINÁŘ Ústavu fyziky materiálů AV ČR

dne **8.12.2011** (čtvrtek) v **10:00 h**
v přednáškovém sále (4. patro)
Ústavu fyziky materiálů AV ČR, Žižkova 22, Brno

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Simple models for materials exhibiting complex behaviour

The main characteristic of complex systems is that their behaviour cannot be understood by just looking at the properties of simple elementary constituents. Instead, the complex behaviour of such systems results from the interaction of many elementary constituents. Complexity is relevant to multiple disciplines including sociology, economy, ecology, epidemiology, seismology or material sciences. Within material sciences, complexity has been observed in the magnetisation reversal process, crystal plasticity, fracture, dynamics of dislocations, and martensitic transformations. An interesting fact is that it is possible to describe many features of complex material behaviour using relatively simple mathematical models. My presentation will start with a survey of results on complex material behaviour. I will then present some prototype models for such systems, with emphasis on the magnetisation reversal in ferromagnetic materials and the martensitic transformation in shape memory alloys. More explicitly, I will discuss the complex behaviour predicted by the random-field Ising model (RFIM) and the random snap-spring model which are suitable for description of the magnetisation reversal and the martensitic transformation, respectively.

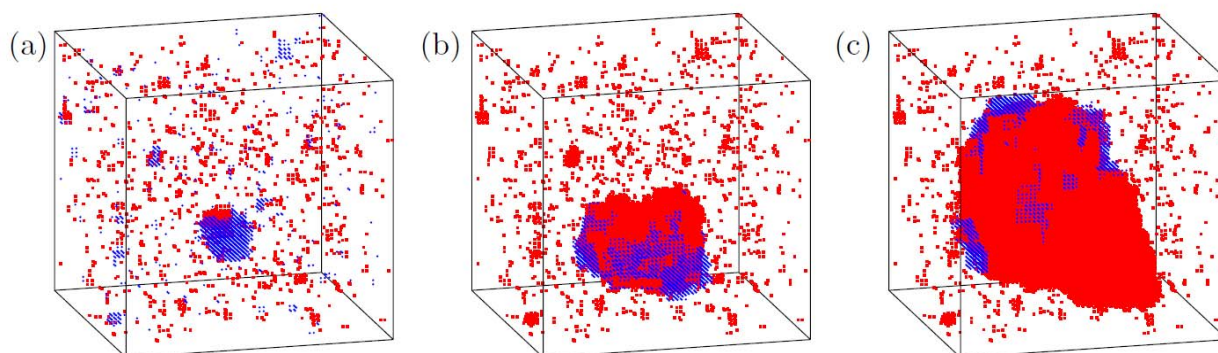


Figure: Red and blue colours indicate the spatial distribution of parts of the material that have transformed to the martensitic phase at the different values of the deformation.