



## CELOÚSTAVNÍ SEMINÁŘ Ústavu fyziky materiálů AV ČR

dne **25.11.2011** (pátek) v **11:00 h**  
v přednáškovém sále (4. patro)  
Ústavu fyziky materiálů AV ČR, Žižkova 22, Brno

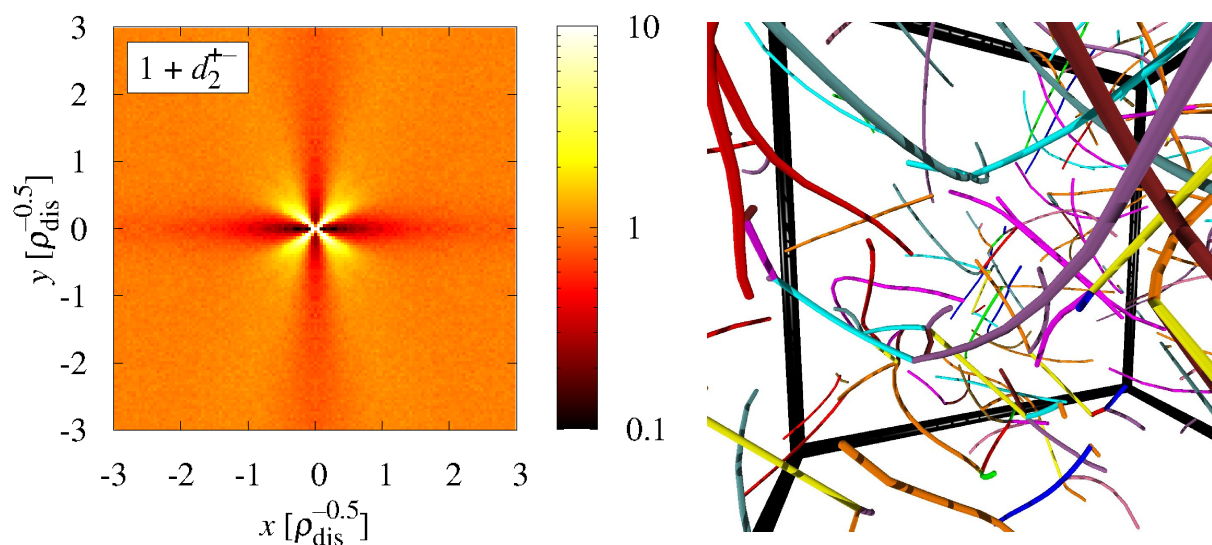
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### Toward a continuum theory of dislocations

Over the past decade, there has been an increasing activity to develop a continuum theory of dislocations applying statistical physics methods. The theoretical investigations are largely motivated by recent experimental findings such as if the characteristic size of a specimen is less than about  $10\ \mu\text{m}$  the plastic response of the crystalline materials depends on the size (size effect). After a short summary of recent different approaches in continuum theory of dislocations, the following issues are discussed:

- Different variational approaches to get the stress state of a material containing topological defects. The concept of “plastic potential”.
- Beyond the classical Volterra theory of dislocation. Incorporating core effects and anharmonicity.
- Can we handle large deformations ?
- Role of dislocation-dislocation correlation. The origin of the “back” stress.
- Stress screening due to induced GND.
- Time evolution of the different dislocation densities. A phase field approach.
- Time evolution of the dislocation velocity distribution. Scaling properties.
- On the dynamics of the dislocation-dislocation correlation function. Linear response theory.
- Role of fluctuations. Long versus short range dislocation-dislocation interaction.



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