Department of Physics

Condensed Matter Seminar

Friday, March 28, 2014
3:30 PM, Room 203 Physics

(Refreshments 3:00 PM, Room 242)

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Defects in crystalline solids

The behavior of crystalline materials is not only determined by the structure, defects play an important role in defining the physical and chemical response. Manipulating these defects facilitates the development of improved materials with unique properties. For example, nanocrystalline materials exhibit high yield and fracture strengths, superior wear and radiation damage resistance.

In this seminar I will discuss line (dislocations) and plane defects (grain boundaries and stacking faults), how they nucleate and influence physical properties. I will present numerical simulations of the evolution of crystalline defects to understand their impact in the performance of engineered materials including: nanocrystalline materials, thin films and nanolaminates. The impact of grain boundary deformation, dissociation into partial dislocations, texture and grain structure will be quantified to understand the effect of these different deformation mechanisms.