



School of Nano Science



IPM Condensed Matter &  
Statistical Physics Group

## Weekly Seminar

### Modeling the Mechanical Behavior of Materials at Small Scales

Invited Speaker:

**Kamyar M. Davoudi**

School of Engineering and Applied Sciences, Harvard University

#### **Abstract**

Detailed and quantitative understanding of the mechanical behavior of materials at small scales is essential for a reliable design of micro and nano devices. Experiments have shown that the plastic response of materials at the micron and sub micron scales can be very different from that of the same material in bulk form. These observations have led to the mantra of “smaller is stronger.” Classical continuum theories do not suffice for describing this size effect due to lack of any length scale in their constitutive equations. Similar to plasticity in bulk materials, plastic flow in crystalline solids at small scales arises mainly from the collective motion of dislocations. In this talk, we model the plastic response of crystalline solids and try to explain why materials at the micro and nano scales are much stronger than the same materials at the macro scale.

Wednesday, 6 Mordad 95 (27 July, 2016), 2-3 pm

Farmaniyeh seminar room