PHYSICAL MATHEMATICS SEMINAR

Geometric charges in Elastic Solids

MICHAEL MOSHE

Harvard University

ABSTRACT:

The mechanics of many natural systems is governed by localized sources of stresses. Examples include "plastic events" that occur in amorphous solids under external stress, defects formation in graphene, and force-dipoles applied by cells adhered to an elastic substrate. Recent developments in a geometric formulation of elasticity theory paved the way for a unifying mathematical description of such singular sources of stress, as “geometric charges”, accompanied by new techniques for solving the nonlinear elastic problem. In this talk I will review basic results in this field, focusing on the geometry and mechanics of two-dimensional solid bodies. I will demonstrate the applicability of this approach in three different problems: mechanical metamaterials, wrinkle patterns in geometrically-incompatible elastic sheets, and an open problem about melting transition in graphene.

TUESDAY, OCTOBER 23, 2018
2:30 pm
Building 2, Room 136

Reception following in Building 2, Room 290
(Math Dept. Common Room)

http://math.mit.edu/seminars/pms/

Massachusetts Institute of Technology