PHYSICAL MATHEMATICS SEMINAR

Pattern Switches in Periodic Structures

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ABSTRACT:

Mimicking the complex patterns of the natural world in manufactured physical devices is a significant challenge. While materials characterized by a microstructure on the millimeter scale have already been intensively used for a long time, structures in which the periodicity is in the sub-micron scale are relatively novel and have attracted increased attention over the last years. However, the demand for higher density, faster speed and lighter devices drives the need for developing new materials with more complex microstructure and responsive to several external stimuli.

Traditionally, instabilities have been viewed as an inconvenience with research focusing on how they might be avoided. The results of this investigation show that instabilities can be used to create a new class of materials with switchable properties.

Periodic porous elastomeric solids and granular crystals are subjected to uniaxial compression and pattern switches are found upon reaching a critical value of the applied load. This behavior provides opportunities for transformative phononic/photonic crystals and materials with tunable negative Poisson's ratio.

TUESDAY, MARCH 2, 2010
2:30 PM
Building 2, Room 105

Refreshments at 3:30 PM in Building 2, Room 290
(Math Department - Common Room)

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