

# “BNC Seminar”

July 11, 2014 @ 2:00pm

BRK, ROOM 1001

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## **Title: KINETIC COLLECTIVE MODEL. APPLICATION TO PHONON TRANSPORT IN SMALL SYSTEMS**

**Abstract:** The role of normal scattering on thermal conductivity has been extensively explored in the recent years. It is widely known that this scattering mechanism can affect the thermal transport but a general theory able to predict the values of thermal conductivity for samples at different temperatures and of different sizes is still not available.

Recently, Kinetic Collective Model has been proposed where thermal conductivity is split in a couple of terms: a Kinetic regime where the phonons behave independently and a Collective regime where all the phonons move solitarily. This model has been applied successfully to predict bulk and nanoscale thermal conductivity of group IV semiconductors.

This separation of regimes has profound consequences on the phonon propagation as both regimes have very different transport properties. This means that phonon collectivity under nonequilibrium can have two different behaviors with very different diffusivities. We study the effects of this separation of regimes depending on the temperature and the sample characteristics.