Abstract: In this presentation, our advances in the study of the Raman spectroscopy of nanographites will be shown. We will present a Raman study of nanographite ribbons on HOPG, where the existence of quantum confinement of the electrons in their 1D band structure is detected, and a study of step edges in graphite with different atomic arrangements, showing that Raman spectroscopy can be used in the structural analysis of these systems. A systematic analysis of the dependence of the Raman cross sections on the in-plane crystallite size of nanographite (La) and on the excitation laser energy will be also presented. We developed two relations for determination of the crystallite thickness $L_c$ and interlayer distance $c$ of nanographites by Raman spectroscopy. An study about the extension of the D band scattering at the edges of a graphene sheet will be presented.

We will also show our recent progresses in using near-field Raman scattering in order to obtain the spatial detection of coherent phonons in isolated SWNTs. For that, we use a laser-irradiated gold tip as a local light source. The enhanced fields at the tip apex interact with a carbon nanotube and render a local Raman scattering spectrum.

The spatial confinement of the optical interaction depends on the sharpness of the gold tip and is typically on the order of 20nm. This length-scale is comparable with the phonon coherence length. Interestingly, our results reveal that Raman peaks associated with out-of-plane phonons show up much stronger than Raman peaks associated with in-plane phonons.

For information, please contact Young Lee at 617-253-7834 (younglee@mit.edu)