

**Christian Thomsen**, *Technische Universität Berlin*

Organisation: T. Hertel

Phonons and excitons in carbon nanotubes and graphene

**Abstract:** Low-dimensional carbon systems have become interesting for fundamental research as well as technological applications in the last decade. The elementary optical excitations in carbon nanotubes, e.g., have a binding energy large enough for excitons to exist at room temperature, as we show with non-linear spectroscopy. The exciton binding energies may be combined with a particular Vibration of the nanotubes to identify a multitude of different chiralities with resonant Raman spectroscopy.

Graphene has become important because of its strict two-dimensionality and the resulting linear dispersion relations at the K-point of the Brillouin zone, and because of its chemical and physical stability. Cutting graphene into narrow stripes results in the so-called nanoribbons. We present calculated vibrational properties under unstrained and strained lattice conditions.