



# GEMaC

Groupe d'Étude  
de la Matière Condensée

## RAMAN SPECTROSCOPY: PROBING THE STRUCTURE & PHYSICS OF FUNCTIONAL MATERIALS BY ATOMIC VIBRATIONS

**Jens Kreisel Centre de Recherche Public - Gabriel Lippmann, Materials Science  
Department, Luxembourg**

The aim of the presentation will be to provide an overview to the investigation of functional materials by Laser Raman spectroscopy (RS). Raman scattering is the inelastic scattering of light by a material that allows probing fundamental excitations such as phonons (atomic vibrations), magnons (magnetic coupling), electromagnons etc.

Raman Spectroscopy (experimental discovery 1928, Nobel Prize 1930) can be considered as a local probe, as will be described in the talk. A Raman spectrum provides a unique fingerprint for a given material in terms of its chemical composition, crystal structure, but also its electronic and magnetic properties. RS is now extensively used as a non-perturbing probe of functional materials, be it as crystals, ceramics, thin or ultra

thin films, or nano-composites.

After a short introduction to the basic concept and characteristics of RS, I will illustrate the versatility of Raman spectroscopy through examples of various materials at 0D, 1D, 2D & 3D, ranging from Si nanowires and phase change materials to multiferroic nanostructures. A specific emphasis will then be put on the investigation of functional oxides, namely the study of atomic vibrations for the understanding of both structural and physical phase transitions. An outlook into current and future trends in Raman scattering will conclude the presentation.

## INFORMATIONS COMPLÉMENTAIRES

[kreisel@lippmann.lu](mailto:kreisel@lippmann.lu)