**Séminaire**

**Nanotubes and Graphene: Synthesis and Applications**

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**Course description**

The exploration and manipulation of matter at the atomic scale saw the birth of a revolution with exciting prospects. Also, nanoscience and nanotechnology, but also a set of words where the prefix “nano” is attached to the nouns “object”, “material” etc… designate today a grouping of scientific fields under a spatial scale between one and a few hundred nanometers. Carbon nanotubes and graphene are the building blocks of nanoscience and nanotechnology. In addition to their historical importance in the genesis of carbon, they have shaped modern science in fields as varied as fundamental and applied physics, chemistry, materials science and biology. They form a model system for the study of electronic transport in one and two dimensions and also constitute new challenges for the study of interfacial phenomena and the relationships between processes and properties. This course provides a comprehensive understanding combining recent experimental and theoretical approaches for graphene and nanotubes-based nanotechnology and includes a review of key applications. After a brief history behind the discovery of these low dimension materials, the topics addressed are structure, physical and chemical properties, synthesis methods, growth mechanisms, modeling, and simulation. Particular attention will be given to the chemical vapor deposition process used to synthesize not only nanotubes and graphene but also a plethora of other 2D materials as well as their heterostructures.