Semester project, Bachelor Thesis, Master thesis

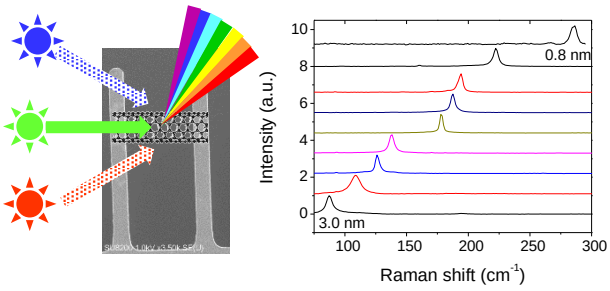
Characterization of Single Walled Carbon Nanotubes by Raman spectroscopy

Motivation

Exceptional properties of Single-Walled Carbon Nanotubes (SWNTs) promote them to be used in a future generation of nanodevices. One challenge on the way to better understand the performance of such nanodevices is detailed knowledge of properties of as-grown SWNTs and the device fabrication process impacts on them. Raman spectroscopy offer excellent characterization possibility to solve this challenge.

Goal

This project will focus on the characterization of SWNTs synthetized by a CVD process by Raman spectroscopy utilizing multiple laser wavelengths. First nondestructive conditions for Raman spectroscopy will be determined. Further, nanotube conductivity type, structural quality, diameter, bundling and chiral indices will be determined. The optimized characterization process for preselection of nanotubes with targeted properties prior to their integration into devices will be developed.



Sketch: SWNT on MEMS irradiated by laser & Raman spectra of SWNTs with different diameters.

Learning Opportunities

Become familiar with SWNTs, CNFETs and Raman spectroscopy. Hands-on experimental work in the BRNC cleanroom. Use of state-of-the-art characterization methods and equipment (Raman spectroscopy, AFM, SEM).

Work Description

1. Characterization of individual SWNTs by Raman spectroscopy
2. Complementary characterization of SWNTs to confirm their conductivity type
3. Optimization of nanotube characterization process prior their integration into electronic devices
4. Writing and defending your scientific report

Your profile

You are a student of micro process engineering, mechanical engineering, material science, physics or chemistry with an interest in carbon nanotubes, nanotechnology and Raman spectroscopy. You should be able to work independently in an organized manner. Creativity, responsibility, eagerness to learn, persistence, and enjoying working in laboratory and with technical equipment are desired personal qualities.

Contact

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