

# Enhancing Single-Wall Carbon Nanotube Properties Through Alignment

## Overview

Bill Rice's group at the University of Wyoming is investigating the physical properties of unique and interesting materials. One of their research projects involves Carbon Nanotubes. These small, 1D crystals of rolled up graphene sheets come with a wide variety of physical properties (depending on the roll direction) and research has made great advances in purifying unique nanotubes which would be ideal for real world applications. However, a common nanotube characteristic is that their behavior is very different along their axis showing enhanced physical effects in comparison to the perpendicular direction showing reduced physical effects.

The group is building films of highly aligned nanotubes for optimal amplification of their physical properties and they are researching for robust, fast methods to monitor the quality of alignment. As is often the case for carbon materials, Raman spectroscopy plays a crucial role in determining the orientation of crystals by using polarized Raman signals which are strong if the polarization direction is parallel to the nanotube axis. The results of polarized Raman measurements build the reference to characterize other methods for process control and monitoring. The Raman spectroscopy setup is realized using an Isoplan320 spectrograph and liquid nitrogen cooled PyLoN camera.

**Featured Paper/ Publication:** <https://arxiv.org/abs/1907.09499>

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