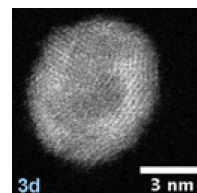


Assembling a cool quantum matryoshka



Our recent work is geared towards the formation of nanoparticles with core-shell structure: Onion-like particles with shells consisting of different materials. Our group has a long tradition in the preparation of nanoparticles in cold superfluid helium nanodroplets at temperatures of only 0.37 K. We are now looking for a motivated master student in order to push our approach to the next step: Adding an additional layer of molecules between a metal shell and a metal core to form particles known in literature as “quantum matryoshkas”. The special plasmonic properties of these particles, based on localized surface plasmon resonances, can locally cause a strong enhancement of electromagnetic radiation. We are planning to exploit this effect in order to perform Raman spectroscopy on the molecular matryoshka layer in-situ, while still inside the helium droplets, as well as with deposited particles.



You will be involved in the setup of a gas pickup-oven in order to introduce gaseous molecular dopants into helium droplets. You will further be involved in the development of an optical LIF spectroscopy setup (LIF – laser induced fluorescence). The experiments will be carried out at our ultra-high vacuum helium droplet machine in ClusterLab III, various different laser systems will be employed.

Compensation: 2640 EUR

For more information please contact Florian Lackner: florian.lackner@tugraz.at

