

Local tuning of the electronic properties of ultrathin van der Waals materials

Riccardo Frisenda

Dipartimento di Fisica, Sapienza Università di Roma, Piazzale Aldo Moro 2, 00185 Rome, Italy

Mechanical exfoliation of van der Waals crystals allows to routinely produce high quality two dimensional (2D) materials in a laboratory. Thanks to their ultrathin nature, the electronic properties of these materials are highly susceptible to external stimuli and interaction with the environment.

In this talk I will present a few strategies to tune the electronic properties of 2D materials, specifically by mechanical deformations and by alkali metals adsorption and intercalation. Firstly, I will discuss recent results on local mechanical deformations in MoS₂ studied by a combination of techniques performed in ultra high vacuum such as micro-photoluminescence, micro-Raman spectroscopy performed in-house and micro-XPS performed at ANTARES beamline in Soleil synchrotron. In the second part of the talk I will discuss the dynamic of potassium atoms adsorption and diffusion in few layer graphene, covering the topic of charge donation and strain in graphene.