

PREPARATION AND CHARACTERIZATION OF 2D MATERIALS FOR ELECTRONICS

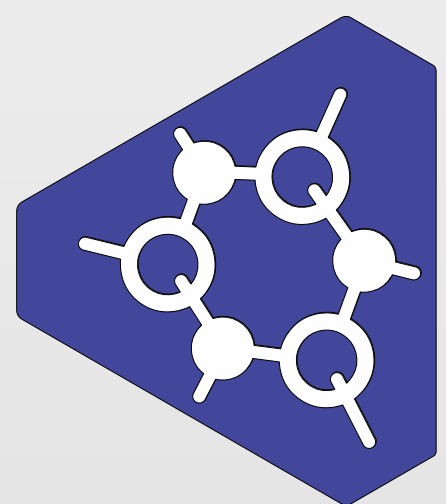
Amelia Dominguez-Celorrio, Daniel McEwen, Liam Watson,
Pablo Resendiz-Vazquez, Michael S. Fuhrer

OUR RESEARCH



TOPOLOGICAL INSULATORS:

Exclusively carry electricity along their edges in a unidirectional manner, eliminating the 'backscattering' that dissipates energy in traditional electronics.



ATOMICALLY THIN MATERIALS:

Consist of just one layer of atoms, which imparts them with distinctive electronic properties, such as exceptional conductivity and quantum confinement effects.



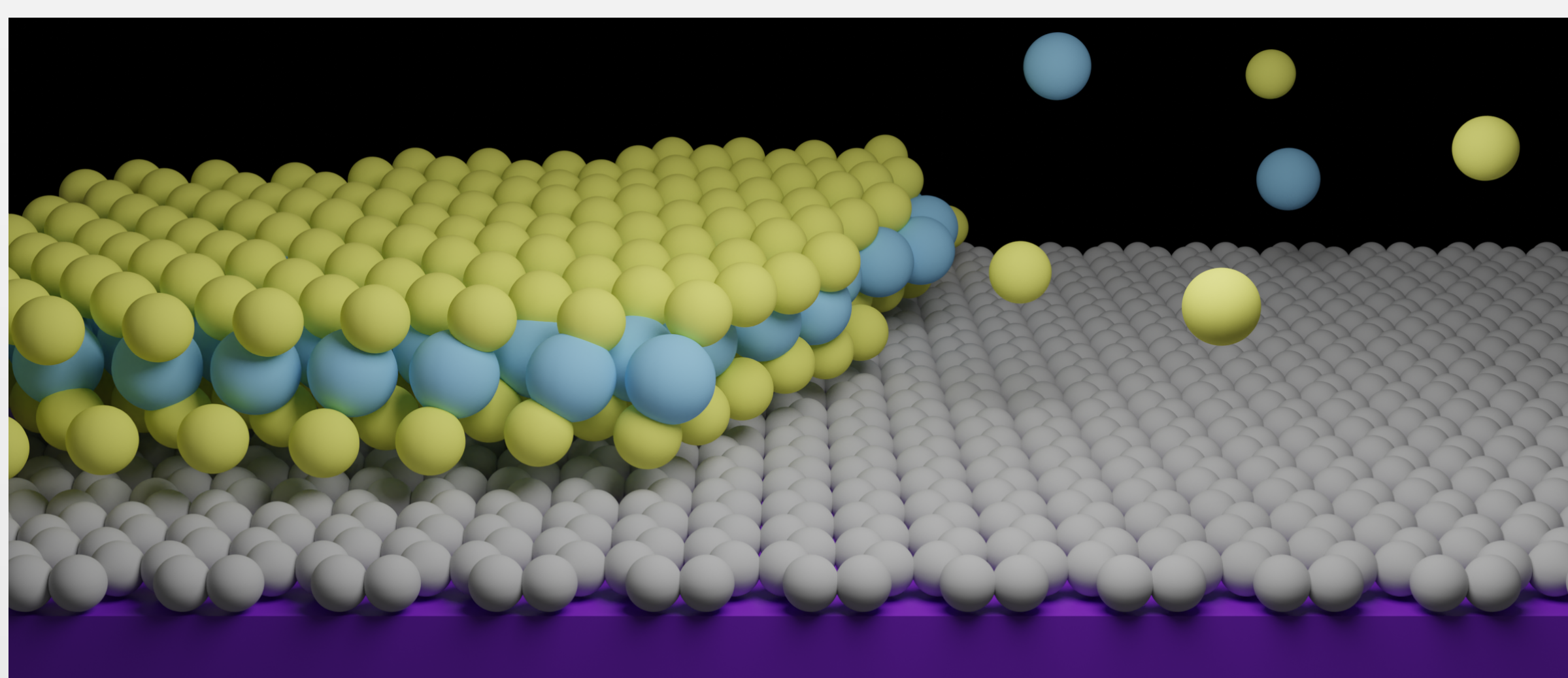
NANODEVICE FABRICATION:

Takes advantage of the assembly of van der Waals (vdW) heterostructures, enabling the creation of highly advanced, atomically-thin devices.

SAMPLE PREPARATION

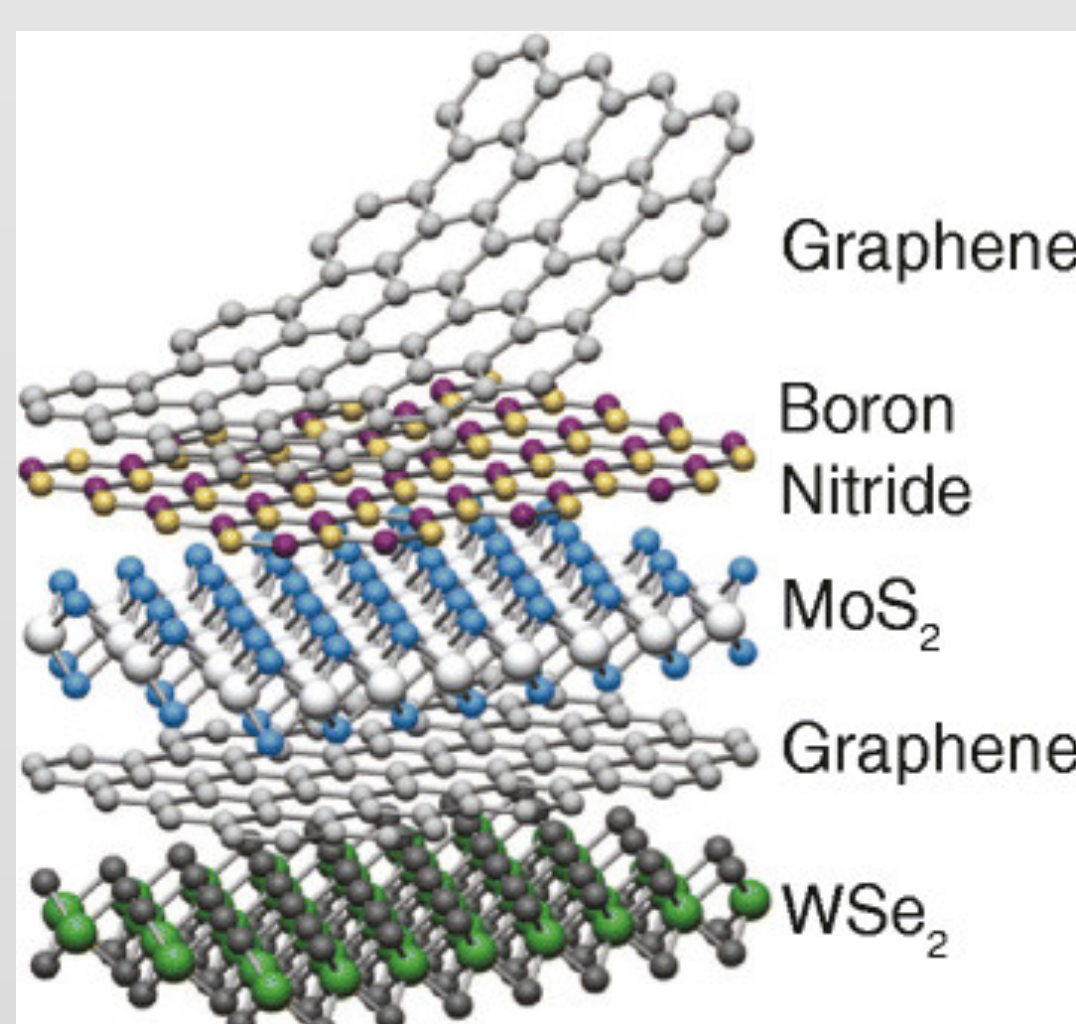
MOLECULAR BEAM EPITAXY (MBE):

Thin film growth where atoms are deposited one layer at a time, enabling the creation of atomically controlled structures with tailored electronic properties.



SCOTCH TAPE TECHNIQUE:

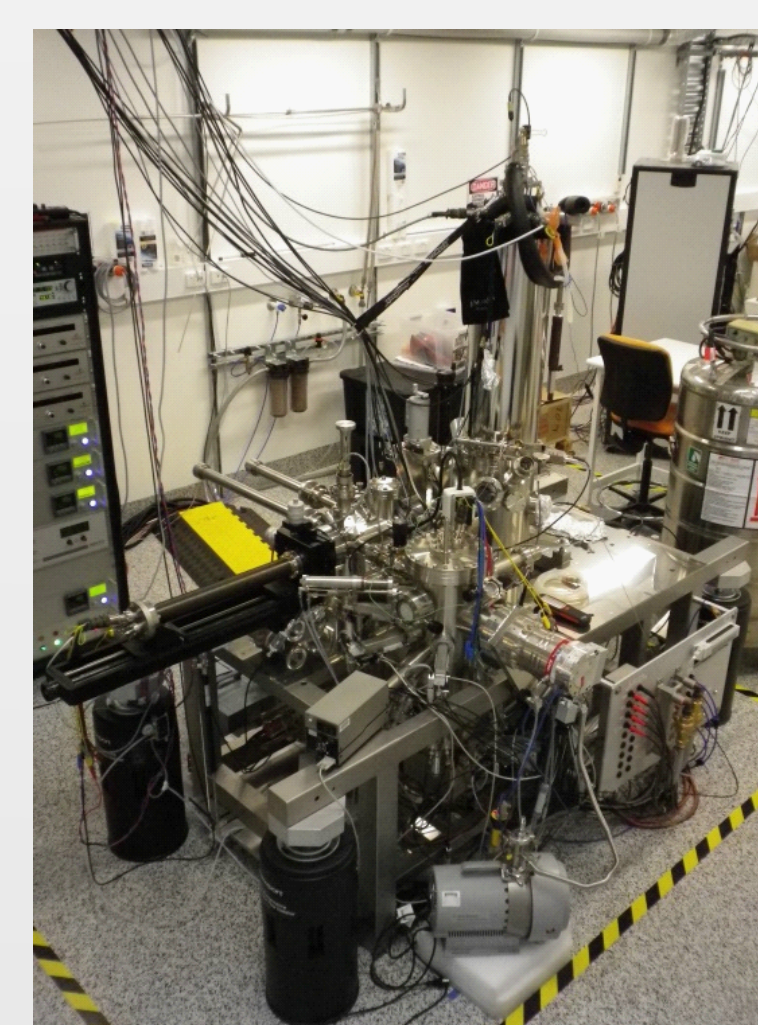
Isolation and stacking of thin layers of materials by using adhesive tape to peel layers from a bulk material.



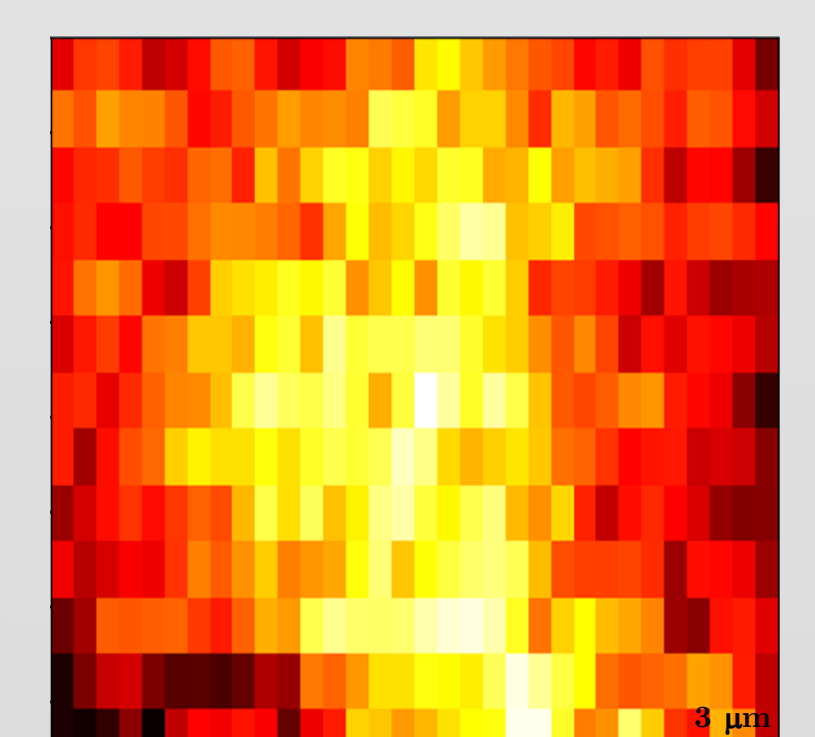
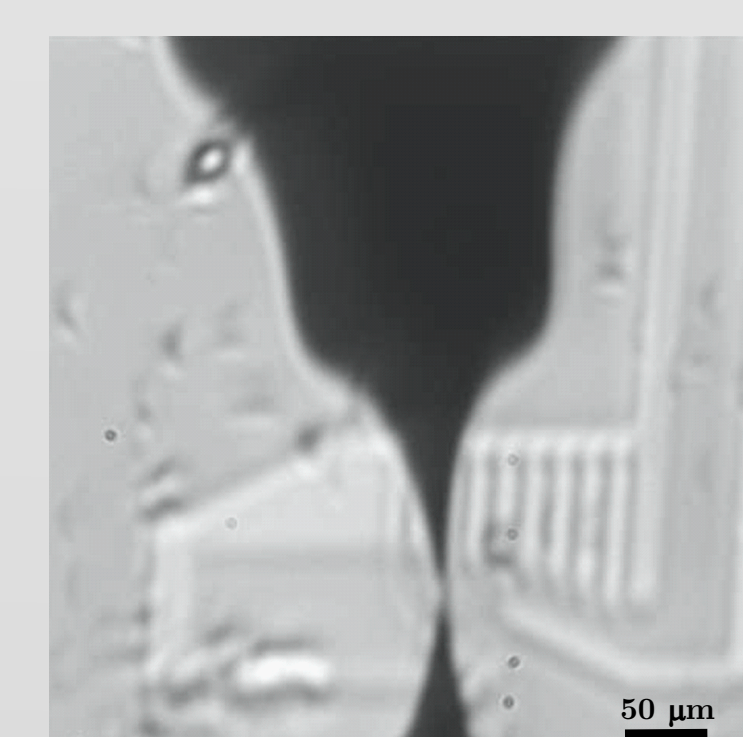
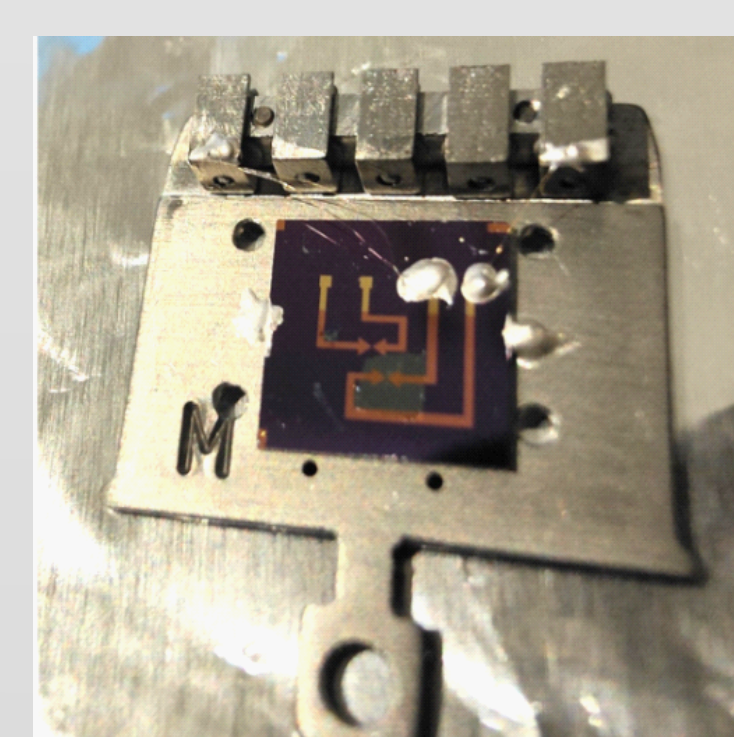
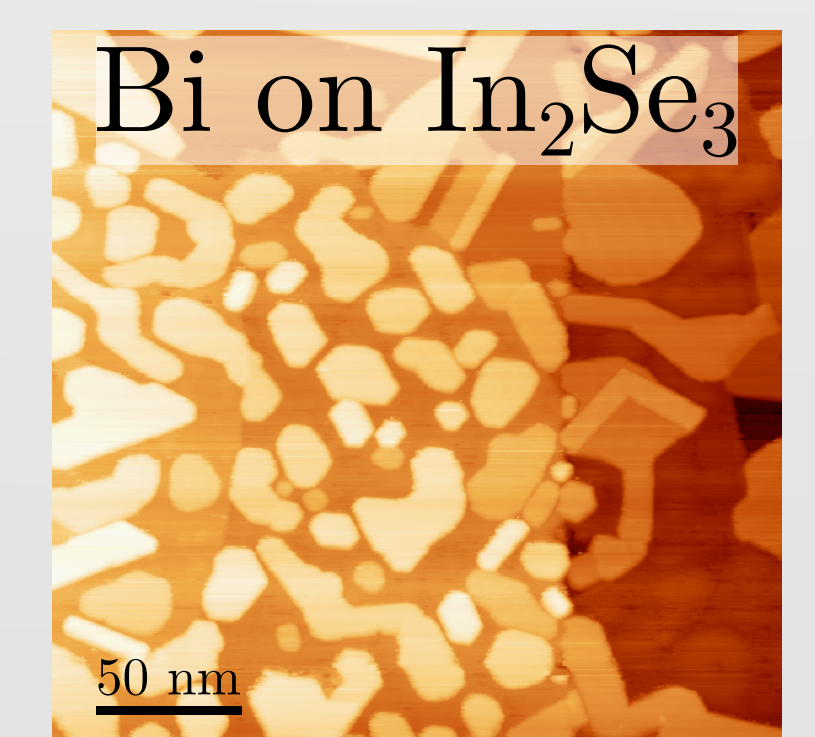
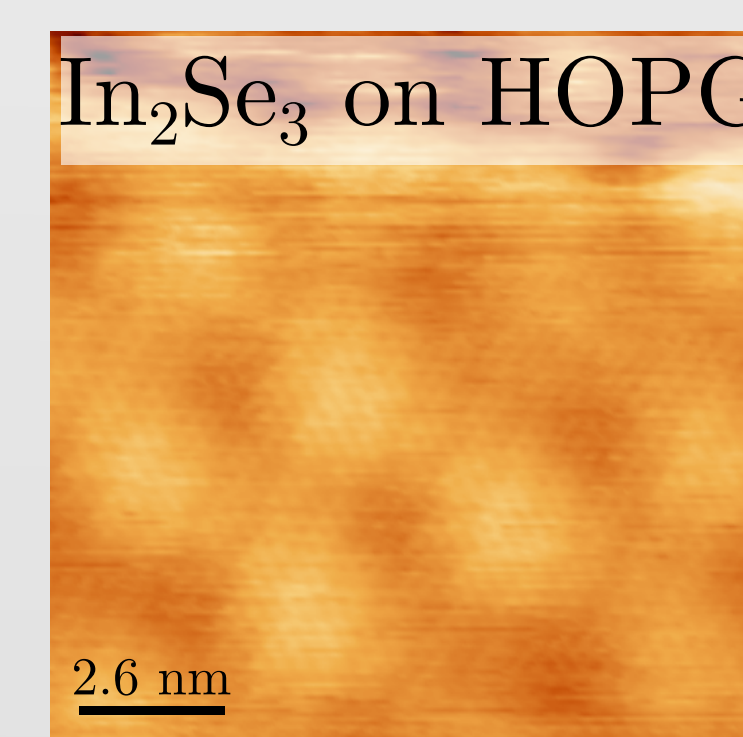
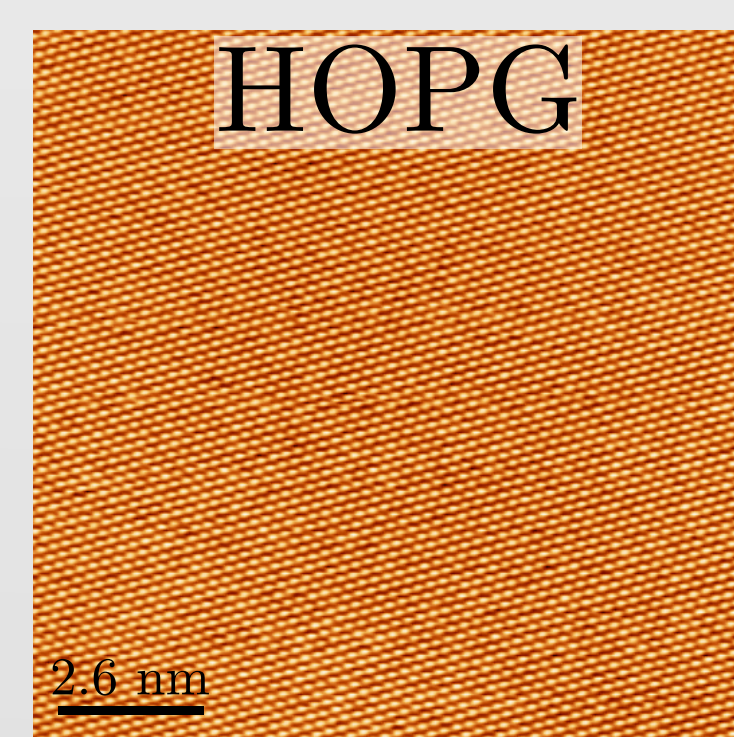
CHARACTERIZATION

SCANNING PROBE MICROSCOPY:

Atomic-resolution imaging techniques that utilize a sharp probe to examine surfaces by measuring tunneling current (STM) or forces (AFM), between the probe and the sample.



- Ultra-high vacuum ($\sim 10^{-10}$ mbar)
- Low temperature (4.5-300 K)
- Magnetic field (up to 2 T)
- 5 electrical contacts
- Combined MBE growth



Join our team!

We're eager to welcome motivated students to our lab, where research thrives!

Amelia.Dominguez@monash.edu