Electronic Structure Laboratory

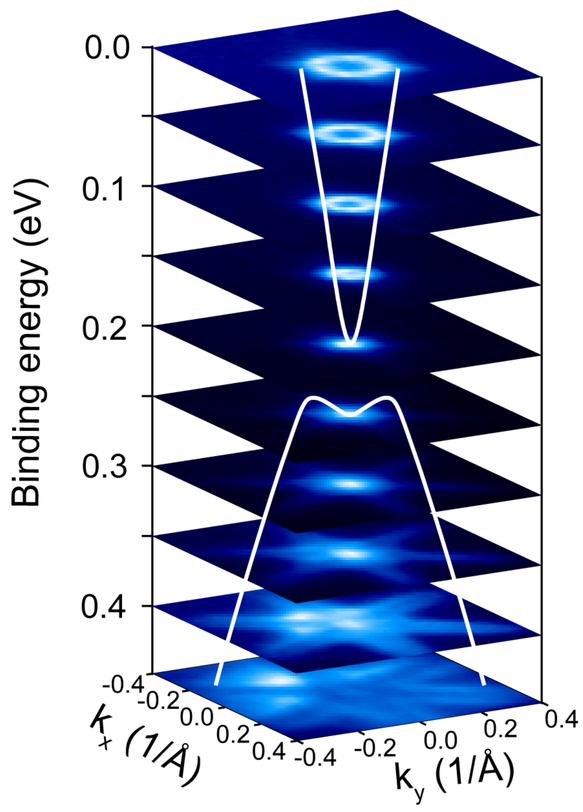
School of Physics and Astronomy, Monash University

"Our goal is to synthesize and characterise the electronic structure of novel 2D materials that possess exciting electronic properties for next generation electronics."

"We grow **Topological Materials** atomic layer by atomic layer via **Molecular Beam Epitaxy**."

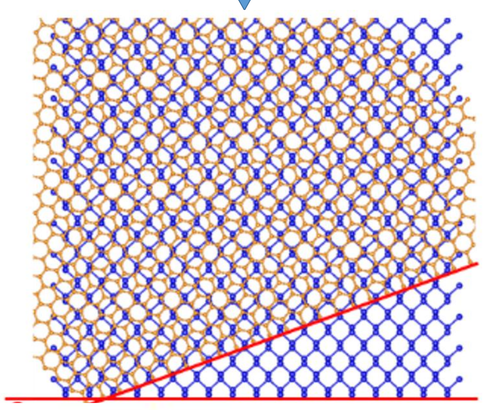
Combined MBE-Glovebox-UHV Suitcase system in our lab.

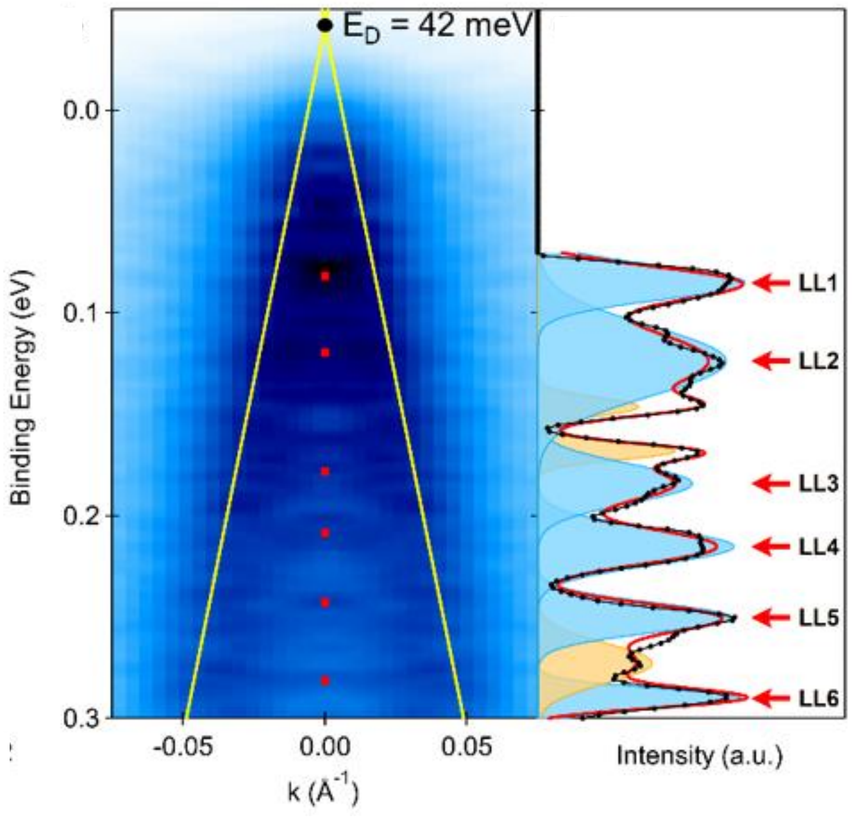
"We utilise **Angle-Resolved Photoelectron Spectroscopy (ARPES)** to directly measure the ***Electronic Bandstructure***"



ARPES on a designer heterostructure comprised of a 3D topological insulator sandwiched between 2D ferromagnets to create a Quantum anomalous Hall insulator. Advanced materials 34, 2107520 (2022).

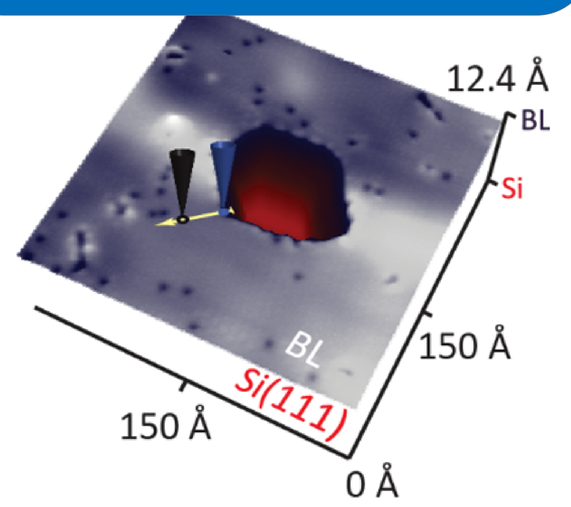
"We stack **2D semiconductors and metals** together with a twist"

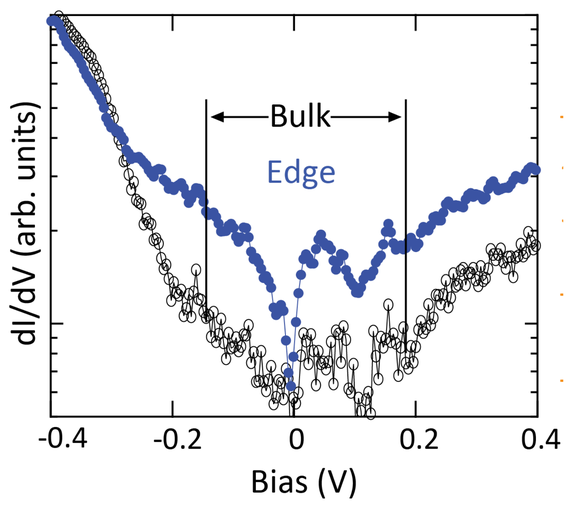




Upper: Schematic of a graphene on black phosphorus heterostructure highlighting the induced Moiré pattern. Lower: ARPES used to visualize Landau Levels caused by the strain-induced pseudo-magnetic field.

"We probe ***Atomic and Electronic Structure*** with **Scanning Tunnelling Microscopy (STM)**."





STM on ultra-thin Na_3Bi confirms 1D non-trivial edge state consistent with a 2D Topological Insulator. Nature 564, 390 (2018)

"Lab Head"

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