State-of-the-Art Measurement Capability for the Characterisation of Materials for Quantum Technologies

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Abstract

The talk will showcase our measurement capability associated with the 4-probe scanning tunnelling microscope (STM) for the research and applications of materials for quantum technologies, at scales ranging from several micrometres down to individual atoms. In particular, STM work carried out to verify the positional accuracy of individual ions implanted in target substrates for quantum technology applications, electrical transport measurements on monolayer quantum materials, and spatially resolved mapping of electronic properties at the atomic scale will be presented. These studies highlight the multi-probe STM method as a suitable means to investigate a range of material properties, fundamental to the development of quantum devices of the required complexity for quantum technology applications.

Figures

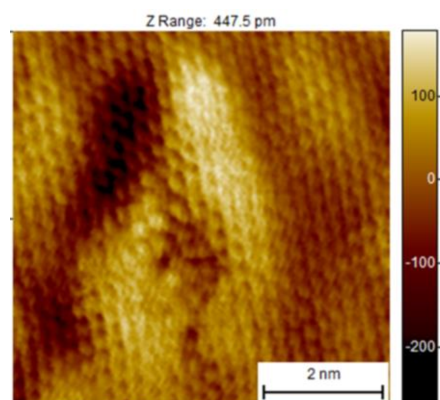

Figure 1: Atomically resolved ion implantation site on graphene on silicon carbide

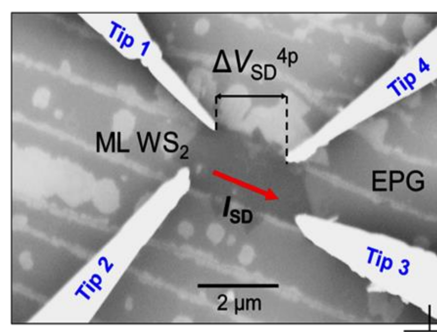

Figure 2: Scanning electron microscope image depicting 4 STM tips on a monolayer tungsten diselenide to measure its resistance