

Recent technology advancements in SPM based electrical probing at low temperatures

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A major challenge in the development of novel devices in nano- and molecular electronics is their interconnection with larger scaled electrical circuits. Local electrical probing by multiple probes with precision on the atomic scale can significantly improve efficiency in analyzing electrical properties of individual structures on the nano-scale without the need of a full electrical integration.

The LT NANOPROBE is a dedicated microscope stage that merges the requirements of a SEM navigated 4-probe STM and at the same time satisfies the needs for high performance SPM. Besides SEM/SPM probe fine navigation, the excellent STM/NC-AFM imaging performance with atomic resolution at $T < 5K$, expands applications to tunneling spectroscopy and even the creation of atomically precise structures. We will present measurements that prove the performance level of the instrument, specifically the low thermal drift, which allows for sufficient measurement time on extremely small structures as well as QPlus AFM measurements, which become important if nanostructures are deposited on an insulating substrate for a better electrical decoupling. We will also show the newest technology improvements and challenges as well as application and scientific drivers for this type of scientific instrumentation.

Figures

