

Inverted Scanning Microwave Microscopy (iSMM): a democratizing approach to the microwave microscopy

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Scanning Microwave Microscopy (SMM) is a technique often working in tandem with Atomic Force Microscopy (AFM) or Scanning Tunneling Microscopy (STM), enabling the characterization of sub-surface structures and quantitative measurements of electromagnetic parameters (e.g. dielectric constant or conductivity). The use of SMM is limited to very few laboratories, exploring the technique, while just a couple of commercial solutions are currently available. Recently we have introduced a novel technique, inverted Scanning Microwave Microscopy (iSMM), aimed to broaden the application beyond the current focus on surface physics and semiconductor technology. In the iSMM, a Copernican paradigm shift is adopted, since the characterization is performed by the sample holder, while the AFM or STM only perturbs the electromagnetic field during scan. With a conductive probe, the iSMM can be converted from any existing AFM or STM device, paving the way for using microwave microscopy in a larger number of laboratories and research fields.