

## **Scanning probe microscopy on superconductors: Achievements and challenges**

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The current status of scanning probe microscopy on superconductors is briefly reviewed. Both tunneling and force microscopy have clearly become valuable tools for topographic surface characterization of superconductors. They have especially contributed to our understanding of growth mechanisms, morphology and surface properties of high-temperature superconductors. Furthermore, scanning tunneling spectroscopy on some special model-type conventional superconductors has provided completely new insight into fundamentals of superconductivity. In the latter respect only moderate success has yet been met for all technically relevant materials and especially for the ceramic materials due to surface quality problems. Very recent results show that magnetic force microscopy may be capable of imaging flux lines in superconductors, even if the surface is non-ideal. Flux-line imaging has already been achieved by employing scanning field probes. Some concrete future challenges concerning the application of scanning probe techniques to the study of superconducting materials and superconductivity are discussed.