

Space and phase dependence of the local density of states in SNS systems probed with a low temperature AFM-STM

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We have developed an AFM-STM operating at 35 mK. The atomic force mode enables navigating on samples which are not conducting everywhere. The tunneling mode allows accessing the Local Density of electronic States (LDoS) at desired locations, with unprecedented energy resolution. Using this instrument on SNS structures, we observed in great detail how the LDoS depends both on position and on a superconducting phase difference applied across a normal electrode. The quasiclassical theory of superconductivity applied to a simplified model geometry accounts well for the data, in particular regarding the so-called minigap in both N and S.