

Intrinsic Tunneling Spectroscopy in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ High- T_c Superconductors

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A pseudogap in the normal-state quasiparticle density of states of high- T_c superconductors has been revealed in many different kinds of experiments. The existence of the pseudogap and the superconducting gap, and the correlation between them have attracted considerable attention because they are believed to be a key to understanding the mechanism of the high- T_c superconductivity. The Intrinsic tunneling spectroscopy, excluding the surface-dependent effect, is one of the most accurate means to examine the electron spectral characteristics both in the superconducting and the normal states. In this presentation, a new constant-temperature intrinsic tunneling spectroscopic technique, excluding the overheating effect using the in-situ temperature monitoring combined with the digital proportional-integral-derivative control, will be introduced. The implication on the high- T_c superconductivity of the detailed temperature and magnetic-field dependencies of the observed spectral density in Bi-2212 high- T_c material for different doping levels will then be discussed.

keywords : thermal conductivity, self-heating effect, interlayer tunneling spectroscopy