Scanning tunneling spectroscopy on low- and high-Tc superconductors

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Using some sophisticated modes of scanning tunneling spectroscopy the local density of states on two superconducting compounds in the superconductive state at 4.2 K were analyzed. On NbSe2 which is a type-II low-Tc material, the Abrikosov flux line lattice was imaged for various external magnetic fields up to BC2. The field-induced decrease of the vortex core radius for increasing magnetic field, which was recently predicted by a microscopic theory, could be clearly verified. On sputtered YBa2Cu3O7 – films the measurements yielded some distinct types of the surface density of states involving gaps, being in accordance to the Bardeen–Cooper–Schrieffer theory, unexpectedly large gaps, Coulomb staircases, and zero-bias peaks.