Andreev and Single-Particle Tunneling Spectra of Underdoped Cuprate Superconductors

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— We study tunneling spectroscopy between a normal metal and an underdoped cuprate superconductor modeled by a phenomenological theory in which the pseudogap is a precursor to the undoped Mott insulator. In the low barrier tunneling limit, the spectra are enhanced by Andreev reflection only within a voltage region of the small superconducting energy gap. In the high barrier tunneling limit, the spectra show a large energy pseudogap associated with single particle tunneling. Our theory semi-quantitatively describes the two gap behavior observed in tunneling experiments.