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**Origin of electron-hole asymmetry in the scanning tunneling spectrum of  $Bi_2Sr_2CaCu_2O_{8+\delta}$**  A. BANSIL, Northeastern U., JOUKO NIEMINEN, Tampere U. of Tech., Finland and Northeastern U., HSIN LIN, R. S. MARKIEWICZ, Northeastern U. — We have developed a material specific theoretical framework for modelling scanning tunneling spectroscopy (STS) of high temperature superconducting materials in the normal as well as the superconducting state. Results for  $Bi_2Sr_2CaCu_2O_{8+\delta}$  (Bi2212) show clearly that the tunneling process strongly modifies the STS spectrum from the local density of states (LDOS) of the  $d_{x^2-y^2}$  orbital of Cu. The dominant tunneling channel to the surface Bi involves the  $d_{x^2-y^2}$  orbitals of the four neighbouring Cu atoms. In accord with experimental observations, the computed spectrum displays a remarkable asymmetry between the processes of electron injection and extraction, which arises from contributions of Cu  $d_{z^2}$  and other orbitals to the tunneling current. Work supported in part by the USDOE.

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