

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Tunneling-mediated Impurity Resonances in Bilayer Cuprate Superconductors DEGANG ZHANG, CHIN-SEN TING, Texas Center for Superconductivity and Department of Physics, University of Houston, TX 77204 — We have studied tunneling-mediated local density of states (LDOS) of the surface layer of a bilayer cuprate, where a Zn impurity is located on the second Cu-O layer. When the tunneling strength between two Cu-O layers is larger than a critical value, the LDOS on the site just above the Zn impurity first exhibits a resonant peak near the Fermi surface. The larger the tunneling strength, the stronger the resonant peak. It is also shown that the height of the resonant peak oscillates decreasingly with the distance from the site just above the Zn impurity. The location of the resonant peak in the surface LDOS depends on doping, energy gap, and the tunneling strength, and has an opposite bias voltage to that on its nearest neighboring sites. The results could be tested by the STM experiments and be used to further understand the electronic properties of high temperature superconductors.

Degang Zhang
Texas Center for Superconductivity and Department of Physics,
University of Houston, TX 77204

Date submitted: 10 Nov 2008

Electronic form version 1.4