Pairing Glue in High Tc Cuprates from Tunneling Spectroscopy
JOHN ZASADZINSKI, OMID AHMADI, LIAM COFFEY, Illinois Institute of Technology, LUTFI OZYUZER, Izmir Institute of Technology, NOBUAKI MIYAKAWA, Tokyo University of Science — Break junction tunneling spectroscopy data in Bi2212 over a wide range of doping are fit using a d-wave Eliashberg model. Self consistency is achieved as the electron-boson spectral function, $\alpha^2 F(\omega)$, that fits the tunneling conductance dip feature also leads to the correct superconducting gap. The anomalous negative dI/dV observed in break junctions on optimal doped Bi2212 is also reproduced in the analysis. The diagonal and off-diagonal self energies, $\Sigma(\omega)$ and $\phi(\omega)$, respectively are generated in the analysis and they show trends with doping which are in agreement with numerical simulations of the Hubbard model. The peak in $\alpha^2 F(\omega)$ is consistent with the resonance mode in the spin fluctuation spectrum. Tunneling data of other cuprates are also discussed.

John Zasadzinski
Illinois Institute of Technology

Date submitted: 16 Nov 2010

Electronic form version 1.4