

Abstract Submitted  
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**High- $T_c$  Superconductivity meets a 3+3-Dimensional Spectroscopic Tool** JHINHWAN LEE, KAIST, Korea and LASSP, Cornell U., K. FUJITA, LASSP, Cornell U. and U. of Tokyo, Japan, A. SCHMIDT, C.K. KIM, LASSP, Cornell U., H. EISAKI, AIST, Japan, S. UCHIDA, U. of Tokyo, Japan, J.C. DAVIS, LASSP, Cornell U. and CMPMS, Brookhaven Nat. Lab. — Using a novel high-precision variable-temperature Fourier-transform scanning tunneling spectroscopy (FTSTS) technique, we observed for the first time (Science 325, 1099 (2009)) the complete set of dispersive octet peaks in the pseudogap phase (up to  $1.5 T_c$ ) as well as in the superconducting phase (down to  $0.1 T_c$ ) of the underdoped (UD37K) Bi2212. Looking further into the fine structures of the 3D FTSTS data by a novel cross-sectional analysis technique, we could resolve additional signal components that are key to truly quantitative analyses based on the full many-body Green's function. The high-precision measurement of 3D [2D position(nm), energy(mV)] FTSTS over the entire accessible 3D [T(Kelvin) vs p(doping %) vs B(Tesla)] phase diagram, accompanied by the novel cross-sectional FTSTS analysis based on the full many-body Green's function, will provide one of the most stringent tests for a “complete” many-body theoretical understanding of the high- $T_c$  cuprate superconductivity.

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