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Development of a novel variable temperature scanning tunneling microscope and discovery of spectral weight shift between two bands across Tc in underdoped Bi2212. JHINHWAN LEE, K. FUJITA, C.K. KIM, A. SCHMIDT, LASSP, Cornell Univ., H. EISAKI, AIST, Japan, S. UCHIDA, Dept. of Physics, Univ. of Tokyo, Japan, J.C. DAVIS, LASSP, Cornell Univ. — We investigated the quasiparticle interference as a function of temperature for underdoped Bi2212 with Tc=42K, using the newly developed variable temperature STM. Due to increased S/N and resolution, we could observe for the first time the dispersing octet peaks well above Tc. With novel high momentum resolution analysis we also found that each octet peak actually consists of two bands with distinct dispersions and observed clear spectral weight shift from one band, corresponding to the Bogoliubov quasiparticle whose dispersion depends sensitively on the temperature, to the other, with dispersion roughly following the normal state band structure with no significant temperature dependence, as we cross Tc from the superconducting state to the pseudogap state. This new discovery may shed new insight to our understanding of the pseudogap state of the underdoped cuprate superconductor.

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