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Particle-hole asymmetric QPI in the pseudogap phase of underdoped Bi-2212 CHUNG KOO KIM, Cornell, BNL, JHINHWAN LEE, KAIST, KAZUHIRO FUJITA, Cornell, HIROSHI EISAKI, AIST, SHINICHI UCHIDA, Tokyo University, J.C. SEAMUS DAVIS, Cornell, BNL, St. Andrews Univ., JINHO LEE, BNL — Quasi-Particle Interference (QPI) measured by STM revealed many interesting phenomena in Correlated Electron Systems. Particle-hole (p-h) symmetric QPI observed in the superconducting $Bi_2Sr_2CaCu_2O_{8+\delta}$ disappears around the reduced zone boundary [1], while p-h asymmetric QPI's on non-superconducting $Sr_3Ru_2O_7$ [2] and $Ca(Fe_xCo_{1-x})_2As_2$ [3] identified dominant band structures, suggesting electronic nature of the nematic phases. In light of these discoveries, here we report the observation of p-h asymmetric QPI of underdoped $Bi_2Sr_2CaCu_2O_{8+\delta}$ in the pseudogap phase continuously dispersing through E_F. The Fermi velocity measured from this dispersion is $\sim 0.12\times10^6$ m/s. We will discuss the possible origin and implications by comparing its symmetry and dispersion using theoretical model and currently available experimental data from other probes.

[1] Y. Kohsaka et al., Nature 454, 1072 (2008)
[2] Jinho Lee et al., Nature Physics 5, 800 (2009)
[3] Chuang et al., Science 327, 181 (2010)

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