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Comparing the three characteristic electronic excitations in the pseudogap state of underdoped $Bi_2Sr_2Ca_{0.8}Dy_{0.2}Cu_2O_{8+\delta}$ K. FUJITA, JHINHWAN LEE, C. K. KIM, A. SCHMIDT, Cornell University, H. EISAKI, NIAIST Tsukuba, S. UCHIDA, University of Tokyo, J. C. DAVIS, Cornell University and Brookhaven National Laboratory — We investigate the quasiparticle interference processes as a function of temperature for heavily underdoped $Bi_2Sr_2Ca_{0.8}Dy_{0.2}Cu_2O_8$ (T_c=42K). We demonstrate that three types of electronic excitations exist in the pseudogap phase: (1) metallic excitations on the Fermi Arc, (2) the Bogoliubov quasiparticle excitations of what appears to be a phase incoherent d-wave superconductor in the confined area in momentum space (Jhinhwan Lee *et al* (2009)) and (3) the high energy pseudogap excitations seen in the anti-nodal region outside the $\sqrt{2}$X$\sqrt{2}$ Brillouin zone (Y. Kohsaka *et al.* Nature 454, 1072 (2008). We discuss the relationship of these three components of the electronic structure to the thermodynamic and transport characterization of this phase.

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