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Search for a nematic symmetry in the intra-unit-cell pseudogap states of underdoped $Bi_2Sr_2CaCu_2O_{8+\delta}$ K. FUJITA, LASSP, Dept. of Physics, Cornell U., CMPMS Dept, BNL, M.J. LAWLER, Dept. of Physics, Applied Physics and Astronomy, Binghamton U., LASSP, Dept of Physics, Cornell U., A.R. SCHMIDT, LASSP, Dept. of Physics, Cornell U, CMPMS Department, BNL, JHINHWAN LEE, LASSP, Dept. of Physics, Cornell U., CMPMS Dept., BNL, Dept of Physics, Seoul National U., CHUNG KOO KIM, LASSP, Dept. of Physics, Cornell U, CMPMS Department, BNL, H. EISAKI, Institute of Advanced Industrial Science and Technology, S. UCHIDA, Dept. of Physics, U. of Tokyo, J.C. DAVIS, Cornell U., BNL, U. of St. Andrews, U. of British Columbia, J.P. SETHNA, LASSP, Dept. of Physics, Cornell University, EUN-AH KIM, LASSP, Dept. of Physics, Cornell U. — We measure the intra-unit-cell pseudogap states (Y. Kohsaka *et al. Science* **315**, 1380 (2007)) in underdoped $Bi_2Sr_2Ca_{0.8}Dy_{0.2}Cu_2O_{8+\delta}$ (T_c=50K) using the Spectroscopic Imaging STM, and analyze this state using a local nematic order parameter. We search for the rotational symmetry breaking (nematicity) within each CuO_2 unit-cell in subatomic scale STM data with a particular care in correcting for instrumental drift. We investigate the correlation between this electronic nematicity and pseudogap energy scale.We discuss the relationship between the intra-unit-cell electronic structure and a nematicity.

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