Observation of the pseudogap features in overdoped Bi$_2$Sr$_2$CaCu$_2$O$_{8+d}$ by breakjunction tunneling spectroscopy

Y. XUAN, H. J. TAO, Z. Z. LI, B. R. ZHAO, Z. X. ZHAO, National Laboratory for Superconductivity, Institute of Physics and Center for Condensed Mater Physics, Chinese Academy of Sciences, China, C.T. LIN, Max-Planck-Institut für Festkörperforschung, 70569 Stuttgart, Germany — Tunneling measurements of Bi$_2$Sr$_2$CaCu$_2$O$_{8+d}$ single crystals with different oxygen doping have been carried out by using break-junction technique to study the pseudogap in the overdoped regime. The normal-state pseudogap has been observed clearly in the three overdoped crystals with $T_c = 90$ K, 82 K, and 72 K, respectively. Furthermore, direct measurements on the pseudogap opening temperature $T^*$, by tracing the disappearance of the tunneling conductance peak, reveal that the relationship of $T^*$ versus hole concentration is linear and its extrapolation just crosses the end of the superconducting phase boundary.

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