

High-energy Pseudogap in Overdoped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$

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In this study, we performed a heating compensated interlayer tunneling spectroscopy on stacks of overdoped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$. The pseudogap onset temperature revealed by hump structure reached up to nearly room temperature in contrast to the ones determined by R_c - T curves. We clarified that the hump structure coexisting with superconducting peak below T_c is a real electronic density of states in CuO_2 plane through temperature dependence of hump-voltage position below T_c . The pseudogap observed in interlayer tunneling spectroscopy is related to the van-Hove-singularity-induced nesting near the antinodal region, *i.e.*, implying that the pseudogap is the high-energy pseudogap.

Keywords: interlayer tunneling spectroscopy, high-energy pseudogap, van Hove singularity, $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$