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Atomicscale Investigation of Proximity Effect at a Molecular-Superconductor-Metal Boundary SAJIDA KHAN, KENDAL CLARK, HAO CHANG, KYAN-ZIN LATT, ABDUAL HASSANIEN, NQPI Dept of Physics and astronomy Ohio University, SAW-WAI HLA, NQPI Dept of Physics and astronomy Ohio University, Nanoscience and technology Division Argonne National Lab — Proximity effects of nanoscale molecular clusters, $(BETS)_2$-$GaCl_4$, on Ag(111)have been investigated by using low temperature tunneling spectroscopy and spectroscopic mapping. At a far distance from the superconductor-metal boundary, the dI/dV tunneling spectroscopic data show the surface state on-set of two-dimensional nearly free electrons on Ag(111) surface at -65 mV. Strikingly, the intensity of the surface state rapidly decreases when the dI/dV data are recorded closer to the boundary. At $\sim$ 2nm distance, the surface state is completely quenched. Moreover, the formation of pseudo-gap state is already observed far from the metal-superconductor boundary, which later transform into the superconducting gap. This work provides detailed electronic structure evolution across a metal-superconductor boundary at an atomic scale.

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