Abstract Submitted
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Superconducting proximity effects of Pb nano-islands[1] JUNGDAE KIM, GREGORY FIETE, HYOUNGDO NAM, ALLAN MACDONALD, CHIH-KANG SHIH, Department of Physics, The University of Texas at Austin, Austin, Texas 78712 — Superconductivity in systems with spatial dimensions smaller than the coherence length has been the subject of intense interest for decades. We systematically address how superconducting nano-islands interact each other via a detailed scanning tunneling microscopy/spectroscopy (STM/STS). By measuring the spatial mapping of the local superconducting gap, an intriguing lateral proximity effect is observed in an island containing regions of different thicknesses and different superconducting strength which shows a gradual but evident change of local superconductivity at the thickness boundary. This must be due to a lateral proximity effect caused by the tunneling of Cooper pairs with different binding energies across the boundary. We were also able to experimentally determine a proximity length. When an island is smaller than the proximity length, it is found that superconductivity within the island is rather uniform, indicating the rigidity of the order parameter on the scale of proximity length.

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