

Abstract Submitted
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Unique vortex states on nanosize superconducting islands observed by LT-STM TAKAKI SAKAMOTO, TAKA AKI TOMINAGA, Inst. Solid State Phys., Univ. Tokyo, TAKAHIRO NISHIO, RIKEN, TOYOAKI EGUCHI, JST-ERATO/Keio Univ., YASUO YOSHIDA, YUKIO HASEGAWA, Inst. Solid State Phys., Univ. Tokyo — With rapid progress of fabrication methods for nano-size superconductors, many novel properties of their superconductivity have been studied. Several vortex states unique to the nano superconductors, such as, vortex clustering, giant vortex, and anti-vortex, have been reported/predicted on specific size and shape of the islands. In this study we used Pb island structures with atomically flat surface formed on the Si(111) substrate under ultrahigh vacuum conditions as the superconducting sample. We investigate vortex states formed on the Pb islands under magnetic fields using low-temperature scanning tunneling microscopy (LT-STM), which enable us to observe the surface topograph and the superconducting gap (DOS) at atomic scale spatial resolutions simultaneously in real space. We performed precise tunneling spectroscopy on the Pb islands to take two dimensional DOS mapping at the Fermi level and succeeded in observing several kinds of vortex states (ex. multi vortex state and giant vortex state) in real space. The details will be discussed in the presentation.

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