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Anisotropic Suppression of Superconductivity on Pb(111)/Mn_5Ge_3/Ge(111) HOWON KIM, Institute for Solid State Physics, The Univ. of Tokyo, YUKI NAGAI, CCSE, Japan Atomic Energy Agency, TAKEO KATO, YUKIO HASEGAWA, Institute for Solid State Physics, The Univ. of Tokyo — When a superconductor comes in a good contact to non-superconducting materials, the superconducting pair correlation and its breaking penetrate each other from the interface. In particular, superconductor/ferromagnet(S/F) interface has been of great interests because of emergence of exotic superconducting (inverse) proximity effect on both sides. In spite of extensive efforts for the S/F interfaces, the experimental approach was limited because of difficulties in fabricating the high quality interface and probing it in the nanometer scales. Here, we studied superconductivity of Pb(111) layers which are formed on the ferromagnetic Mn_5Ge_3 island structures grown on a Ge(111) substrate at T˜0.5 K. From our spatially-resolved local tunneling spectra over the top surface of Pb(111) on the ferromagnetic islands, we found that the superconducting property above the magnetic island was strongly suppressed and that the suppression was laterally spread from the strongly suppressed area in an anisotropic manner. By considering the scattering and propagating behaviors of the broken cooper pairs at the fermi surface of Pb(111), we calculate the local density of states at the top of the Pb(111) layer above the Mn_5Ge_3 island, and found that the anisotropic suppression of superconductivity mainly due to the anisotropic shape of the fermi surface of Pb. Possible origins of anisotropic suppression of superconductivity will be discussed.

Howon Kim
Institute for Solid State Physics, The Univ. of Tokyo

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