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Superconducting Scanning Tunneling Microscope – Josephson effect and High-T_C superconducting cuprate HIKARI KIMURA, ROBERT DYNES, University of California, Berkeley, SHIMPEI ONO, YOICHI ANDO, CRIEPI — We have developed and characterized superconducting scanning tunneling microscope (STM) tips that consist of Pb coated Pt/Ir wires. We have observed the thermally fluctuated Josephson effects between a conventional superconductor and this superconducting STM. STM-based Josephson junctions formed between the superconducting-STM tip and superconducting samples can be a powerful tool to detect both superconducting quasiparticles and the phase of the superconducting condensate via the Josephson effect on a length scale of nanometers. This technique is especially powerful when we study spatially inhomogeneous electronic systems such as High-T_C superconducting cuprates. In this talk we present data of the STM Josephson junctions formed between S-STM tips and both Pb/Ag films and $NbSe_2$ single crystals. The former experiments give us the effective noise temperature T_n and the impedance of the environment around the junction, Z_{env}. The latter is a precursor to the Pb/I/HT$_C$ cuprate Josephson junctions. We have derived the I_CR_N product of $NbSe_2$ junctions using T_n and Z_{env} obtained as described above. Preliminary results of $Bi_2Sr_2CaCu_2O_{8+\delta}$ single crystals by S-STM tips are also discussed. This work is supported by DOE Grant No. FDDE-FG02-05ER46194.

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