

<< 총회초청 >>

What can we do with scanning probe microscopy?

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Many groups around the world take atomic images of metal and semiconductor surfaces, adsorbed molecules, and even thin insulators. STM gives topographic images and maps local density of states and local vibration. There are commercial STMs which give atomic images with the spatial resolution of < 0.05 nm at the working temperature of < 1 K and spectroscopic data with the energy resolution of < 10 meV. Measured topographic images can be compared with the diffraction results by taking Fourier transformation of the self-correlation function. Dispersion relation of Energy versus momentum can be obtained from position dependent dI/dV . By utilizing a magnetized tip, local spin information can be obtained. By functionalizing the tunneling tip with molecules, we may selectively map local bonds.

STM, however, is not a good tool to measure dynamics of a certain reaction, carrier movement, and tunneling, since high impedance measurement is used with a large displacement current. Light interaction experiment is difficult because of unusual wave guide geometry. If one can resolve these weaknesses, STM may become a general condensed matter experiment tool simply with an atomic resolution. I will discuss what we can do and may do with STM in near future.