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Application of Gundlach Oscillation in Scanning Tunneling Spectroscopy on Nano-Scale Imaging SHIN-MING LU, Acedemia Sinica Taiwan — Gundlach oscillation observed with scanning tunneling spectroscopy (STS) is a phenomenon of field-emission resonance through standing-wave states in the tip-sample gap. No matter if the sample is the thin film or the bulk, peak characteristic of Gundlach oscillation can always appear in the tunneling spectrum. We use STS to study Gundlach oscillation on Ag/Si(111)7×7 and Au(111) surfaces. It is shown that the spectral intensity of the Gundlach oscillation peaks can vary with observed locations. The spatial mappings of spectral intensities at peaks can reveal the contrasts of the interface structure on Ag/Si(111)7×7 and herringbone reconstruction on Au(111) surfaces. The contrast can be attributed to the local variation of the electron transmissivity which affects the transmission background superposing with Gundlach oscillation in the tunneling spectrum. In our observation, the spatial resolution of the mapping is 1 nm and can be preserved even the tip is away from the sample by 60 angstrom. Gundlach oscillation may be useful for the nano-scale imaging of the soft material.

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