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Simultaneous lateral force and STM imaging of Si (111) -7x7 surface using sub-Angstrom oscillation amplitude AFM MEHRDAD ATABAK, GOKSEL DURKAYA, H. OZGUR OZER, AHMET ORAL, ORAL TEAM, NANOMAGNETICS INSTRUMENTS TEAM, SFI LAB TCD TEAM — Lateral forces play an important role in friction studies as well as atomic manipulation. We present the design and performance of an nc-AFM which is capable of measuring lateral forces simultaneously with tunneling current. The microscope employs a sensitive fiber interferometer for high resolution force measurements. Home-made Tungsten cantilevers with typical stiffness of about 150 N/m is dithered in lateral directions respect to the sample with sub-Ångstrom oscillation amplitudes (A_0=0.25 Å) at a frequency, well below the resonance frequency and the changes in lateral oscillation amplitudes are recorded using a lock-in amplifier. In addition, the microscope can simultaneously be operated as STM. By changing the tunneling current and bringing the tip closer to the surface, we investigate the lateral forces during STM imaging. The lateral force images will be presented as a function of tunnel current (relative tip-sample distance) on Si(111) (7×7) surface.

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