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On-demand Control of Micro Quartz Resonator in Scanning Probe Microscopy[1] JUNGHOON JAHNG, WONHO JHE, BONGSU KIM, Physics and Astronomy, Seoul National University — We demonstrate generalized theoretical analysis and experimental realization of active feedback control for the self-oscillating quartz tuning-fork (QTF) which is a widely used probe for sensing applications in scanning probe microscopy. In this work, we present the damping control, feedback cooling, resonance control and nonlinear dynamics for the QTF by implementing active feedback control scheme. Finally, we suggest the prospect of several novel applications in scanning probe microscopy by using the active feedback control of QTF such as increasing the force sensitivity, reducing the thermal noise and modulating the resonance of the sensor.

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