Devices for Metrology, from microfabrication to measurement: Transition Edge Sensors (TES) and electrostatic MEMS combs - METROLOGY - Quantum application

We present the design and realization of two microstructured devices for metrology.

The first is a MEMS electrostatic comb for generating and sensing nanoforces, fabricated on SOI substrates with deep etching, HF vapor release, and optimized dicing to obtain suspended movable structures. Preliminary tests show micrometer displacements under low voltage actuation, confirming its functionality for use as a calibrated microscale force standard.

The second is a superconductive Transition Edge Sensor (TES), based on thin metallic films cooled to tens of mK. Exploiting the steep transition between superconductive and normal states, it enables highly sensitive energy detection, down to single photons and electrons.