

Advances in NEMS mass spectrometry in the Leti/Caltech Alliance

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Nano Electro Mechanical Systems (NEMS)-based Mass Spectrometry (MS) holds great promise for point of care applications or air quality monitoring. NEMS mass sensing is performed by monitoring the mass-induced frequency shift of the device in real time. The mass distribution of particles in a mixture can be analyzed if those particles are sent onto the NEMS. NEMS-MS is a new paradigm for high-throughput biological MS with single-molecule level. The significant opportunity of NEMS-MS originates from its combined attributes of mass resolution, compactness and, especially, scalability: the latter can potentially yield extremely fast measurements and the possibility to perform such measurements using a handheld device.

Recent advances in the field, obtained by joint efforts from Prof. Roukes group at Caltech and the NEMS group at LETI will be presented. Demonstration of the first real-time, single-protein NEMS-MS spectrum of IgM antibody¹ will be described. Compared measurements with conventional MS will be discussed, as well as first efforts towards scaling up the technology.

¹ M.S. Hanay *et al*, *Nature Nanotechnology*, vol.7, pp. 602-608, 2012