# MEMS Transient Analysis by DHM$^{®}$

Transient characterization by Digital Holography Microscope (DHM$^{®}$) encompasses:

- **Excitation signal:** User-programmable waveform shapes
- **Time Domain:** Mega-data-points resolution 4D topography time-sequences
- **Frequency Domain:** Mega-pixels vibration maps, bandwidth up to 200 MHz.
- **Environmental control:** Temperature, pressure, humidity, gas, liquid, etc.

Applications: cMUT, pMUT, inertial sensors, optical and mechanical switches, MEMS microphones, etc.

Time Domain: 4D Mega-resolution Topography
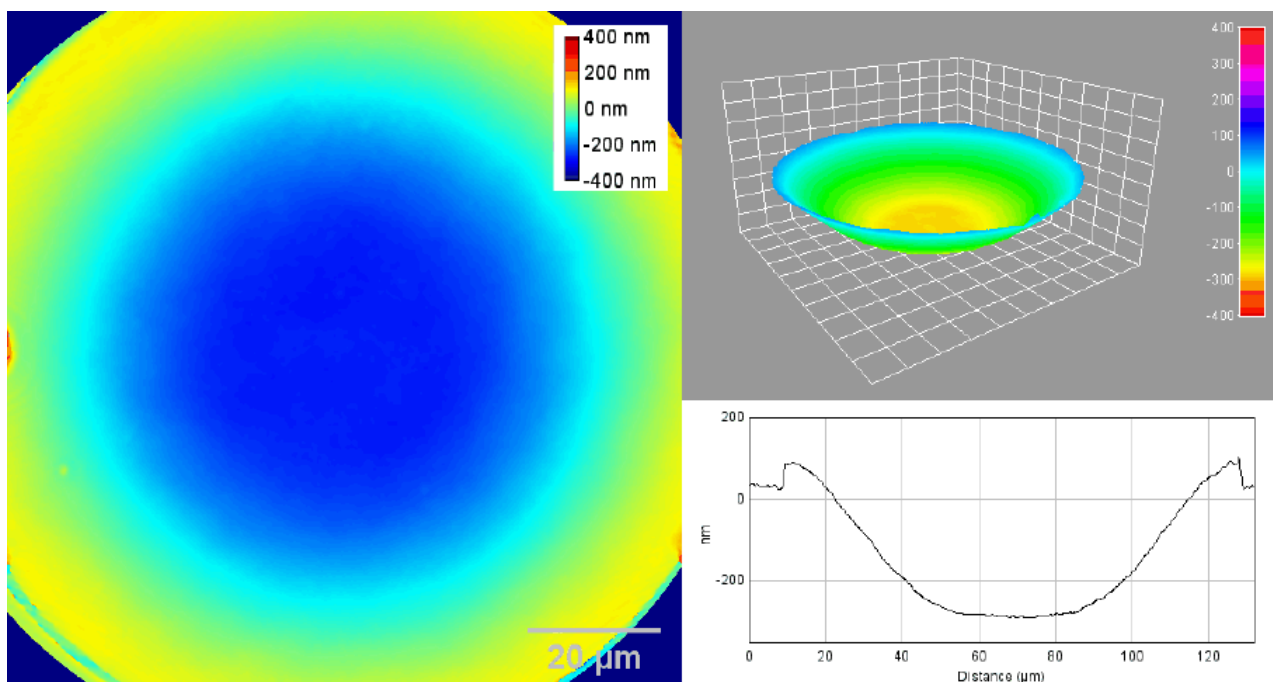
cMUT response to a double period 5 MHz sine burst: *Left: Topography color map time-sequence animation. Upper right: 3D perspective. Bottom right: Animated profile cut. (Courtesy to Philips)*

DHM$^{®}$'s unique non-scanning technique **measures 4D**, i.e. time-sequences of the successive 3D topographies of a MEMS responding to an excitation signal**.**

It provides at each time-point:

- **3D surface topography** with a million of data-point resolution
- **profile cut,** giving precise information of surface deformation
- **absolute vertical position** at any point of the measured surface (no need of pre-defined measurement grid).

Transients and damping characterization

Lyncée's stroboscopic module includes a signal generator allowing users to define any waveform shape, in particular **pulses, bursts**, and **transient oscillations.**

DHM$^®$ precisely samples up to 32'768 measurements along this waveform.
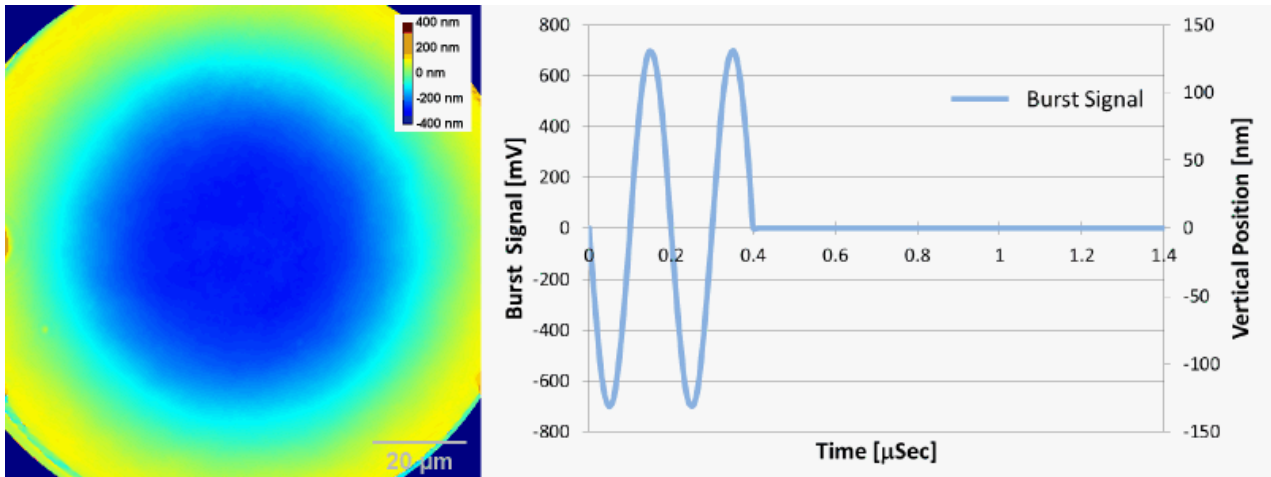
*cMUT membrane response to a **burst waveform composed of two periods of a sine wave at 5 MHz** (in blue). Vertical position versus time of the membrane at three monitoring area (in red, green and yellow) randomly selected over the measurement field of view (Courtesy to Philips).*

## Unique in the Frequency Domain: Mega-pixels Maps !

The Discrete Fourier Transform (DFT) of 3D time-sequences in the frequency domain **generalizes the conventional single point frequency analysis into mega-pixel vibration amplitude maps** calculated for each DFT bins/channels.
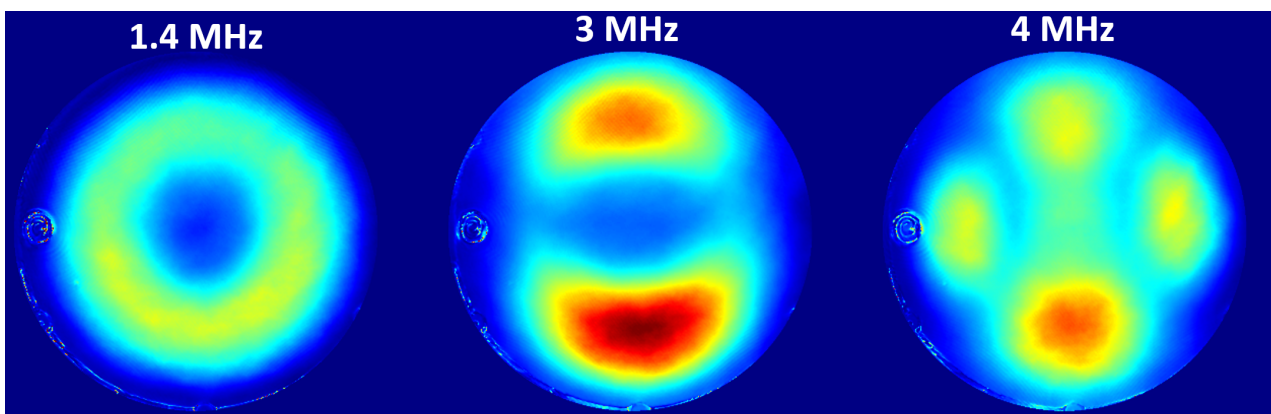
cMUT membrane vibration amplitude map: selection of three maps at 1.4, 3 and 4 MHz, among all those obtained by performing a DFT on each pixel of the 3D topography time-sequence response.

Characterize your MEMS in all environmental condition
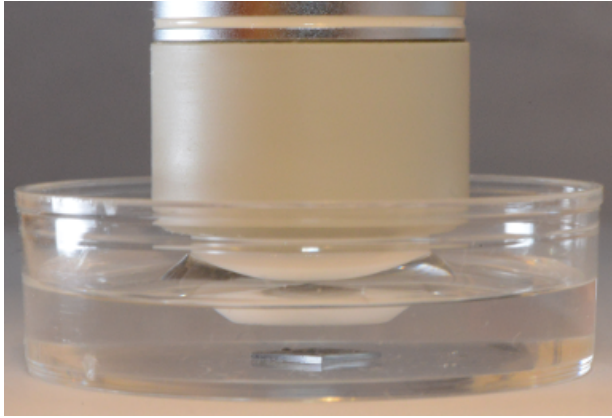
In vacuum, at high or cryogenic temperatures, or in liquids, Lyncée proposes a full range of accessories and solutions ensuring:

- optimal optical imaging quality
- interferometric resolution
- fast and intuitive measurement
- friendly user software interface
- comprehensive data analysis

Check out more

Book a DHM® live-demo and help our forests!

Do you want to discover our product while avoiding unnecessary travels and interaction during the COVID-19 situation?

Until returning to normality, for any stand-alone DHM® purchased based on a **remote live-demo**, Lyncée Tec commits to plant **200** trees through the non-profit organization **OneTreePlanted** and to provide you with a certificate.

Contact us to book a live demo