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## Dynamic properties of liquids and solids probed by Dynamic Mechanical Analysis

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Since structural changes in materials usually couple to strain, acoustic spectroscopy provides a very sensitive tool for the study of dynamic properties of solids and liquids. In principle a frequency range from 0.01 Hz up to GHz or even THz can be covered with different methods, including Dynamic Mechanical Analysis (DMA), Resonance techniques, Ultrasonics, Brillouin –and neutron scattering.

Here we present DMA measurements (0.01 –100 Hz) for a broad range of materials, including ferroic crystals [1], iron based superconductors [2], nano –confined molecular glass forming liquids [3] and polymers [4] and show the wealth of information (e.g. on domain wall motion dynamics, nematic precursor fluctuations, confinement effects at liquid –glass transitions, etc.) that can be extracted from measurements of their low frequency elastic response.

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