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**Vibrational Modes of thin Silicon Membranes** REIMAR WAITZ,  
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Membranes with thicknesses in the range of hundred nanometers and macroscopic  
lateral size are interesting systems to study the mechanical properties of solids on  
various length scales. In our experiment a piezo is used to couple in vibrations, which  
can be observed with a phase-shift interferometer using stroboscopic light. With this  
technique we image transverse modes of frequencies up to 12 MHz. In general, the  
observed wave pattern of the membrane deflection will be a superposition of the  
mode corresponding to the excitation frequency and several higher harmonics. Us-  
ing a Fourier transformation in time, it is possible to separate these contributions.  
This way eigenmodes up to the 8th harmonic of the excitation frequency can be im-  
aged. The influence of strain on the dispersion relation is investigated by applying a  
pressure difference between both sides of the membrane. The results are compared  
to finite-elements simulations.

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