Physikalisches Kolloquium Universität Kiel
Wintersemester 2019/2020

Dienstag, 03. Dezember 2019

Prof. Dr. Elke Scheer

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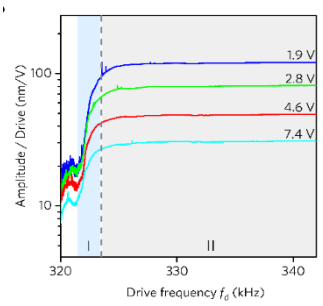
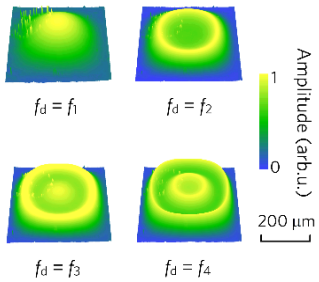
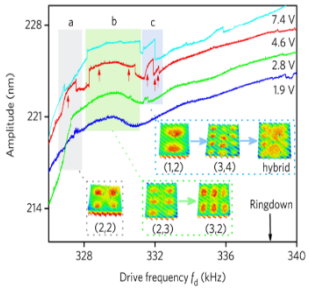
Visualization of spatial modulation and persistent response states of strongly-driven membrane resonators

Micro- and nano-scale mechanical resonators operated in the strongly nonlinear regime exhibit unusual dynamic behavior, including the phenomenon of *persistent response*, which denotes the development of a vibrating state with nearly constant and high amplitude over a wide frequency range. The origin of this persistent response state can be revealed for membrane resonators by optical profilometry. By applying a combination of temporally and spatially resolved methods we show that the rectangular membrane adopts a peculiar ring-shaped pattern I which different parts of the membrane oscillate at different frequencies, a phenomenon that we denote as *spatial modulation* [1]. At even larger driving strength, the persistent response arises as a signature of mode coupling between different flexural modes and their localized overtones.







Finally, we propose a phase diagram for the manifold vibrational states that the membrane can adopt and a model based on the coupling of nonlinear oscillators that qualitatively describes the experimental observations.

[1] F. Yang et al., Phys. Rev. Lett. **122**, 154301 (2019)

Der Vortrag beginnt um **16:15 Uhr** im **Hans-Geiger-Hörsaal (LS13-R.52)** des Physikzentrums.

Ab **16:00 Uhr** werden **Kaffee** und **Tee** angeboten

Bitte Becher mitbringen!

Gastgeber: Prof. Dr. Berndt

Prof. O. Magnussen
für die Dozenten der Physik