
S E M I N A R
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Halbleiterphysik und Nanotechnologie

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Imaging the high-frequency viscoelastic properties of living systems: What can they tell us?

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Brillouin Light Scattering (BLS) microscopy allows for the all-optical label-free 3D mapping of the viscoelasticity with sub-micron spatial resolution. Recently there has been a surge of interest in BLS spectroscopy and microscopy, owing to recent developments in spectrometer design, which allow for fast imaging of the viscoelasticity also of live cells and tissue at near physiological conditions. On the one hand this has been heralded as a potentially revolutionary tool for mechanobiology and biomechanics. The details are however not so simple, and care needs to be taken in regard to interpretation of the measured parameters--which are quite distinct from those typically measured with techniques such as AFM, OCT-elastography, etc.. Following an introduction of the underlying physics and practical challenges, I will discuss our current understanding of the significance of what is being measured with BLS in biological samples and some of our recent results to this end. I will also discuss potential applications for life-science research as well as medical diagnostics, and some variations on conventional BLS microscopy we have recently developed that exploit the different degrees of freedom that it offers. I will conclude by giving an outlook of how I believe BLS microscopy can fit into the biophysics research and applications landscape and some "less obvious" applications it may be useful for.