

Some insights into the properties probed with Brillouin Light Scattering in biological systems and their medical relevance

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The increased interest in Brillouin Light Scattering (BLS) within the life/biomedical sciences over the last decade can probably be attributed to its extension to a (relatively) fast imaging modality, together with our growing awareness of the multi-faceted role that “mechanical” properties play (and which may be extracted from BLS measurements). The biological significance of the BLS-derived mechanical properties is however still far from clear, which limits us in identifying its scope of potential usefulness. Here I will discuss how the dynamic-structure probed using BLS gives unique information from the mechanics measured using elastography and rheology techniques, its relevance for biological processes, and its potentially novel diagnostic value on account of this. To do so I will introduce several variations of traditional BLS microscopy that we have explored that allow one to probe phonons with different wavevectors and allow us to observe transient changes in the BLS properties on sub-millisecond scales in response to stimuli in biological systems. I will also discuss results from some recent medical studies on biofluids where it shows diagnostic potential.



Short Bio:

Kareem Elsayad received his PhD degree in Condensed Matter Physics and currently leads the Laboratory for High-resolution optical Micro-spectroscopy Applications -LaHoMA, at the Medical University of Vienna. His research centers on advancing and using optical techniques--such as Brillouin Light Scattering--to better understand fundamental biological/biophysical processes, identifying promising biomedical applications and translating these to hospitals and point-of-care applications.

