

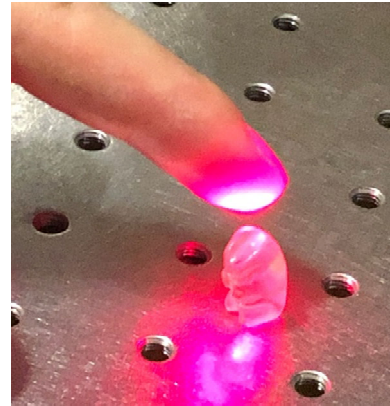
# *Feeling with light: Impulsive stimulated Brillouin scattering for biomedicine*

## Motivation

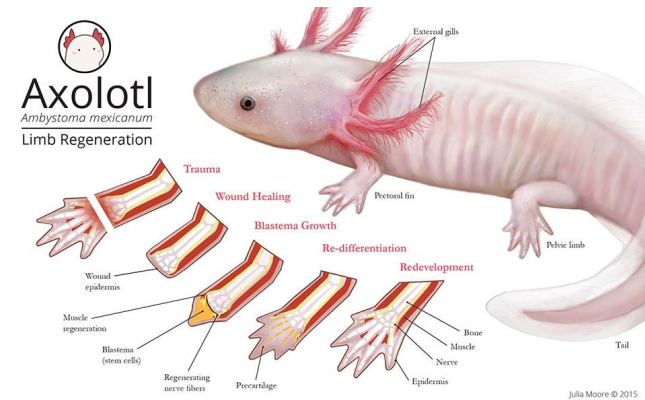
Measurement of mechanical quantities play an increasingly important role in medicine and biology. Currently used methods, such as ultrasound, do not succeed in realizing contactless measurements with high temporal and spatial resolution.

One promising method that can combine these properties is a measurement system based on impulsive stimulated Brillouin scattering (ISBS). The excitation in the measuring volume is achieved by superposition of an ultrashort pulse laser divided into two beams. By electrostriction, the resulting interference fringe pattern excites a standing acoustic wave. This can be read out by a second continuous laser. The frequency is captured with a detector and enables the measurement of the speed of sound and thus of mechanical properties.

One possible field of application is fundamental research. For example, insights into the astounding healing capabilities of the axolotl (see picture right) can be gained. These insights may lead to improvements in medical therapy for humans.



Feeling with light (symbolic image)



Axolotl healing

## Tasks

- Analysis and implementation of signal processing algorithms beyond FFT
  - Analysis of possibilities for imaging (e.g. with galvo mirrors)
  - Development of a fast data acquisition and processing system
- The tasks can be selected flexibly and the extent can be adapted.

## Keywords

Biomedicine, pulsed lasers, Matlab, data processing, optics design

## Contact

- Benedikt Krug, BAR 24,  
E-Mail: [Benedikt.Krug@tu-dresden.de](mailto:Benedikt.Krug@tu-dresden.de)