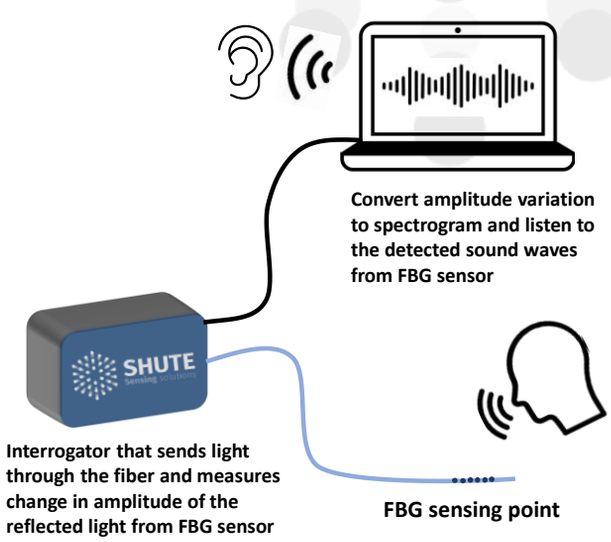
At SHUTE Sensing Solutions A/S we develop and produce micro-structured polymer optical fibers (mPOF). Polymer (plastic) offers unique advantages such as flexibility and elasticity compared to conventional silica (glass) optical fibers. We have developed a novel mPOF sensor system based on Fiber Bragg Gratings (FBGs) which are inscribed into our fibers at pre-determined positions and work as sensing points. This enables SHUTE to real-time monitor **s**train, **hu**midity and **te**mperature.

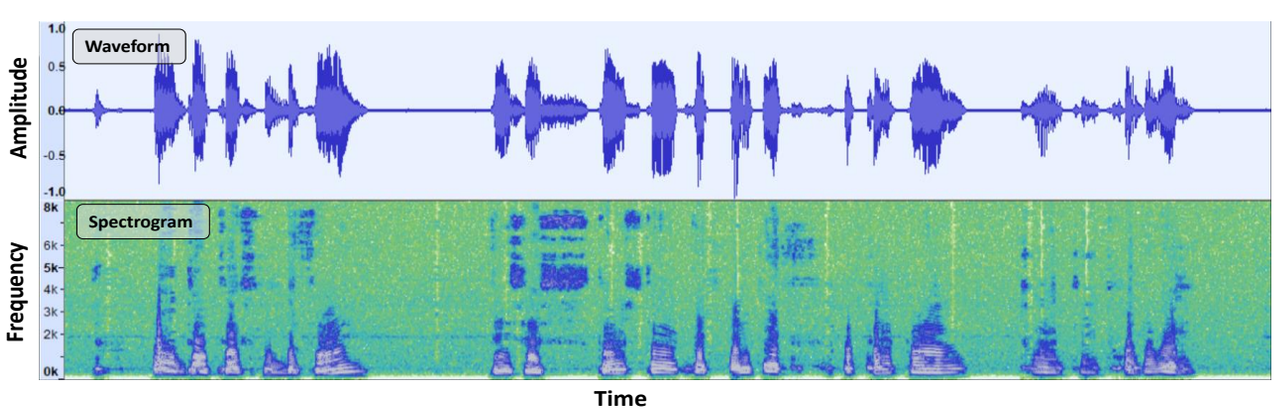
Acoustic Emission Detection System (Optical Microphone)

SHUTE has developed an acoustic emission detection system (optical microphone) consisting of: An mPOF FBG sensor, interrogator and PC. The interrogator consists of a light source, coupler and a photodetector. Light goes through the fiber and the reflected light from the FBG sensing point is measured using a photodetector which is further processed by a PC.

Sound waves or frequencies can be detected by the FBG sensing point due to a wavelength shift caused by an elongation of the grating. The induced spectral shift is measured by the photodetector as intensity amplitude variation which recreates the sound pulse. Acoustic emission frequencies up to 20 kHz are detected using our FBG sensor, however detection of higher frequencies is possible.

We use software to convert the detected acoustic waves from the FBG sensor to a spectrogram. The spectrogram is a visual representation of the frequencies that make up the sound. The recorded sound waves can be played back through the software.





The sensing system is entirely optical and can be used for vibration monitoring embedded in a structure or for structural health monitoring in industrial machinery.

For more information visit www.shute.dk or feel free to call us on +45 2338 6728 to discuss how SHUTE technology can assist you in optimizing your sensing needs.