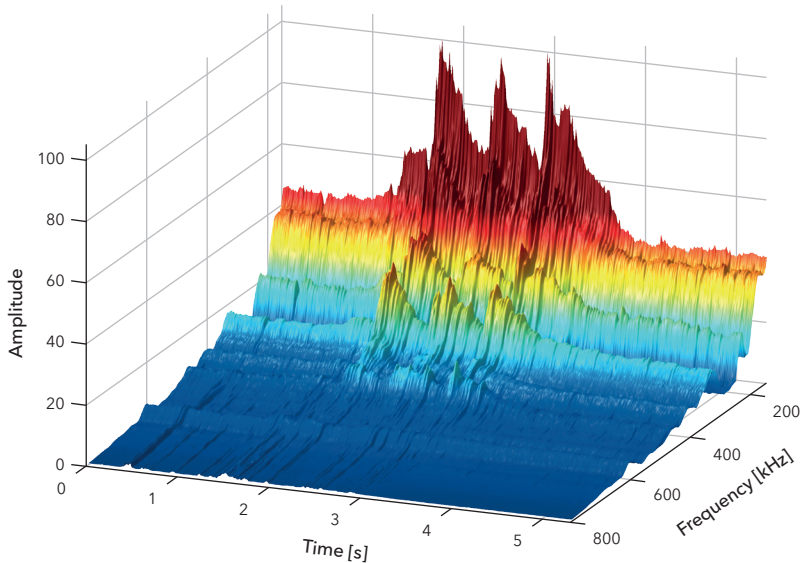


# Industrial Process Control

using laser-based ultrasound sensor technology



Airborne ultrasound spectrogram of a laser welding process

moving sounds without moving parts

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## Non-contact ultrasound sensing up to 1 MHz

The optical microphone enables true non-contact surveillance of industrial processes and machines. It does not require solid or liquid coupling, nor does it rely on direct optical access to vibrating surfaces.

## Clear signals, no background

High frequency acoustic emissions typically travel only a few tens of centimeters in air. Thus, the optical microphone listens directly to processes and machines, while background noise from the environment is strongly suppressed.

## Intelligent in-line monitoring

Acoustic signals feature a slim data stream. This allows the implementation of powerful real-time analysis and machine learning methods. 3D-pattern recognition algorithms can automatically separate "good" from "bad" acoustic signatures, enabling 100% process quality control at every stage in the production line.

## Applications

- ✓ Acoustic process monitoring of laser welding, marking and structuring
- ✓ Wear-monitoring of machining tools
- ✓ Gas leak detection
- ✓ Contact-free crack detection
- ✓ End of line quality inspection using ultrasound

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