

*PhD Position at the University of Graz, Austria*  
**Light, Sound, and Steel –**  
Next Generation Laser Ultrasonics in Steel Production

### Project

The investigation of steel samples during the production process at temperatures above 1000°C poses a number of challenges and requires the use of non-contact measurement techniques. Laser-ultrasound (LUS) methods, i.e., the generation of ultrasonic acoustic waves in a medium by illumination with a laser, meet these requirements. However, measurements are influenced by naturally varying environmental and surface conditions (e.g. water vapor, dust, scale formation) during steel production. As part of this project, we aim for the development of a novel structured light based experimental LUS technique, which is particularly suited for harsh measurement conditions in steel production. The research will be conducted at the Institute of Physics, University of Graz, as part of the joint Christian Doppler Laboratory for Structured Matter Based Sensing in cooperation with the Technical University of Graz and voestalpine Stahl Donawitz GmbH, one of the world's leading steel producers.

### Requirements

- Master's degree, preferably in physics or advanced materials science.
- Strong interest in experimental optics and acoustics.
- Experience in signal processing as well as programming skills for numerical wave propagation simulations are desired.
- Availability for starting in June/July 2024 (4-year position).

### Your tasks

- Development of a structured light based robust LUS measurement setup.
- Exploration of adaptive optical methods to adjust the illumination pattern to the specific surface topography.
- Simulation of acoustic wave propagation in steel samples with production specific properties.
- Development of signal processing tools.
- Development of camera-image and simulation supported automated measurement strategies.
- Active participation in an exciting research project at the interface between cutting-edge science and industry.



Please send your application documents, including a motivation letter and a detailed CV to: Peter Banzer ([peter.banzer@uni-graz.at](mailto:peter.banzer@uni-graz.at)) and Robert Nuster ([ro.nuster@uni-graz.at](mailto:ro.nuster@uni-graz.at)).

More information: [www.opnaq.uni-graz.at](http://www.opnaq.uni-graz.at), [www.structured-matter.com](http://www.structured-matter.com).

