Bachelor's/Master's Thesis, Prof. Böhlke, ITM-KM, 2025/2026

Topic	**Validation of a measurement setup for the quantitative determination of heat generation during the plastic deformation of metals**
Supervisor	Nikola Lalović, M.Sc.; Prof. Thomas Böhlke
Type	BSc thesis: ☒ MSc thesis: ☒
Methodological focus	Theory: ☐ Numerics: ☒ Experiments: ☒
Timeframe for the thesis	available immediately, timeframe generally negotiable
Further remarks	

Themenbeschreibung

Background: During plastic deformation of metallic materials, a fraction of the applied mechanical energy is converted to heat, resulting in heating of the specimens. This thermomechanical effect can provide in-sight into the underlying inelastic processes and the dissipated energy. The ITM is currently developing a test setup consisting of a state-of-the-art (biaxial) tensile testing machine with a digital image correlation system and a high performance thermography camera to measure the surface temperature field. This setup is enhanced by a post-processing algorithm.

The aim of the thesis is to validate the existing measurement setup and the post-processing algorithm to quantitatively determine the heat sources in the metallic specimens during plastic deformation and to estimate the measurement uncertainties.

Abb.: Biaxialprüfmaschine

What we offer:

- Access to a modern experimental setup with high-quality equipment
- Supervision by an experienced team that has already conducted preliminary work in this field
- The opportunity to deepen your experimental and analytical skills in a current research topic

What you should bring:

- Interest in mechanics, materials science, and thermodynamics
- Basic knowledge of measurement technology and data analysis (e.g., MATLAB or Python) is an advantage
- Motivation and enthusiasm for experimental work

If you have any questions or are interested, please don't hesitate to get in touch with me (Nikola Lalović).

References

Chrysochoos, A., Louche, H.: An infrared image processing to analyse the calorific effects accompanying strain localisation. International Journal of Engineering Science 38, 1759–1788 (2000) https://doi.org/10.1016/S0020-7225(00)00002-1