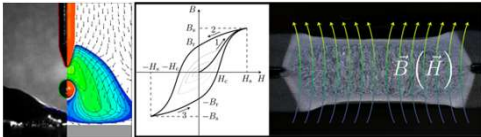
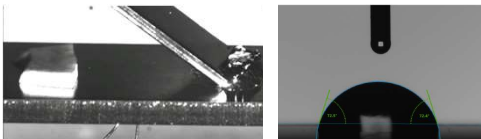


## Fields of Competence

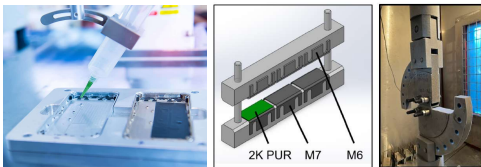
### ■ Arc- and Press Welding



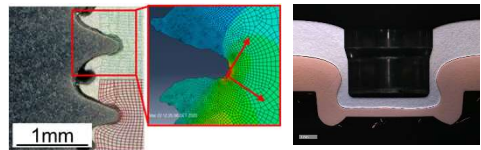
### ■ Brazing and Soldering



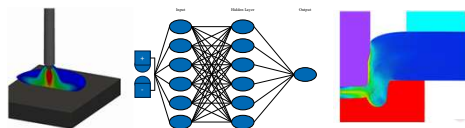
### ■ Adhesive Bonding



### ■ Mechanical Joining



### ■ Numerical & Data driven Simulation

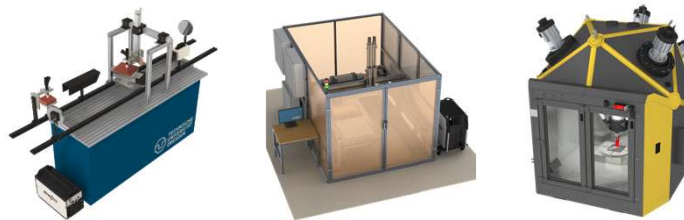


### ■ Assembly, Disassembly & Robotic

## Selection of Equipment

### ■ Laboratory Arc Welding

- GMAW, TIG and plasma welding experimental setup with sensors for process analysis, digitization of welding tests and additive manufacturing (AM)
- Arc diagnostics: High speed imaging, schlieren method, arc pressure and heat flux // Particle image velocimetry (PIV)



### ■ Laboratory Press Welding

- MFDC-, CD- and 50 Hz welding gun equipment, portal and C-modules
- Sensor based process analysis for diagnostics including (non)destructive testing, resistance measurement, high-speed camera analysis



### ■ Laboratory Mechanical Joining

- Screwing & fastening tools: 1 - 5000 Nm torque, incl. micro fitting
- Rivet- & Clinch equipment: max. press force 140 kN & joining speed 120 mm/s
- 4 wire method for conductive joint properties // Binding mechanism analysis



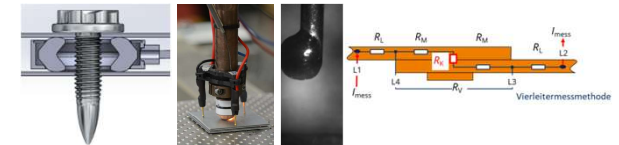
### ■ Equipment for Simulation

- High performance computing (HPC)
- ANSYS Mechanical, Fluent, Maxwell // CALPHAD
- Data-analysis and machine learning with Python

## Core Research Areas

### ■ Joining Process Analysis and Diagnostic

- Welding fume analysis and development for reduction
- Special destructive testing via torque test method
- Mechanical, thermal and electrical properties of joints under environmental influences
- Physical analysis of force-, form- and material-closure in thermal and mechanical joints



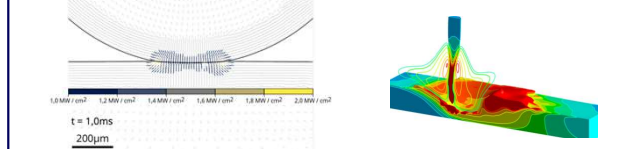
### ■ Joining Process Development and Application

- Wire arc based additive manufacturing
- Automated micro-screwing in electronics
- Combined joining process development
- Non destructive testing of mechanical and thermal joints via ultrasonic, eddy current or passive magnetic flux density
- Process Monitoring via Data-Analysis & Machine Learning (ML)



### ■ Simulation of Joining Processes

- Arc and press welding process simulation
- Real-time simulation as process monitoring



### Kontakt

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