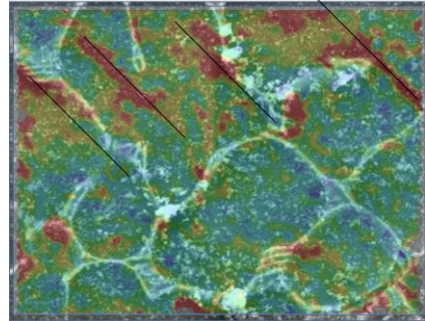
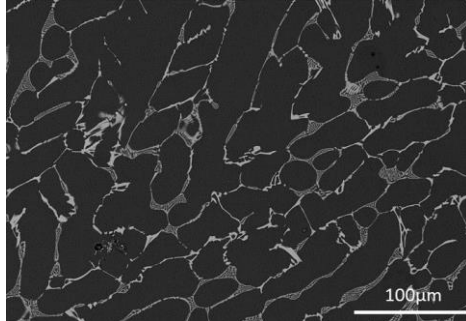


# Master thesis

## Laves-phase reinforced steels with enhanced strength and toughness

### Motivation:



Laves phases are hard but brittle as pure phases, however, when they are added as second phases covering the grain boundaries of metallic materials, they can reinforce the material and substantially increase its strength.

Very recent observations show that a completely interconnected grain boundary skeleton of Laves phases in steels can not only increase the strength but also the toughness through crack blunting at these interfaces. However, the underlying mechanisms are not fully understood yet.

Therefore, the aim of this master thesis is to study the strain partitioning, crack formation and propagation of a Laves phase reinforced steel by means of electron microscopy in conjunction with digital image correlation at the micrometer scale ( $\mu$ -DIC). The master thesis will be done in cooperation between the Institute of Metal Physics and Physical Metallurgy (IMM), RWTH Aachen University, and the Max-Planck-Institut für Eisenforschung (MPIE).

### Tasks:

- Metallographic sample preparation
- Ex-situ and in-situ  $\mu$ -DIC experiments
- Microstructure characterization LM, SEM, EBSD

### What we offer:

- Exciting research topics
- State-of-the-art equipment
- An enthusiastic group of co-researchers

### You should have:

- Excellent background in materials science
- Very good English skills
- High motivation and curiosity

### Earliest starting date:

- May 2019

### Contact:

Dr. Stefanie Sandlöbes (IMM), Prof. Dr. Sandra Korte-Kerzel (IMM)  
[sandloebes@imm.rwth-aachen.de](mailto:sandloebes@imm.rwth-aachen.de) ; [korte-kerzel@imm.rwth-aachen.de](mailto:korte-kerzel@imm.rwth-aachen.de)  
Dr. Martin Palm (MPIE), Dr. Frank Stein (MPIE)  
[palm@mpie.de](mailto:palm@mpie.de) ; [stein@mpie.de](mailto:stein@mpie.de)



Institut für  
Metallkunde und  
Metallphysik

RWTH Aachen University



Max-Planck-Institut  
für Eisenforschung

8. Mai 2019

Institut für Metallkunde  
und Metallphysik

Direktorin:  
Prof. Dr. Sandra Korte-Kerzel

Postanschrift/Mail:  
RWTH Aachen  
52056 Aachen  
Germany

Gebäude/Deliveries:  
Kopernikusstraße 14  
52074 Aachen

Tel.: +49 (0)241 80-26855  
Fax: +49 (0)241 80-22301

[imm@imm.rwth-aachen.de](mailto:imm@imm.rwth-aachen.de)  
[www.imm.rwth-aachen.de](http://www.imm.rwth-aachen.de)