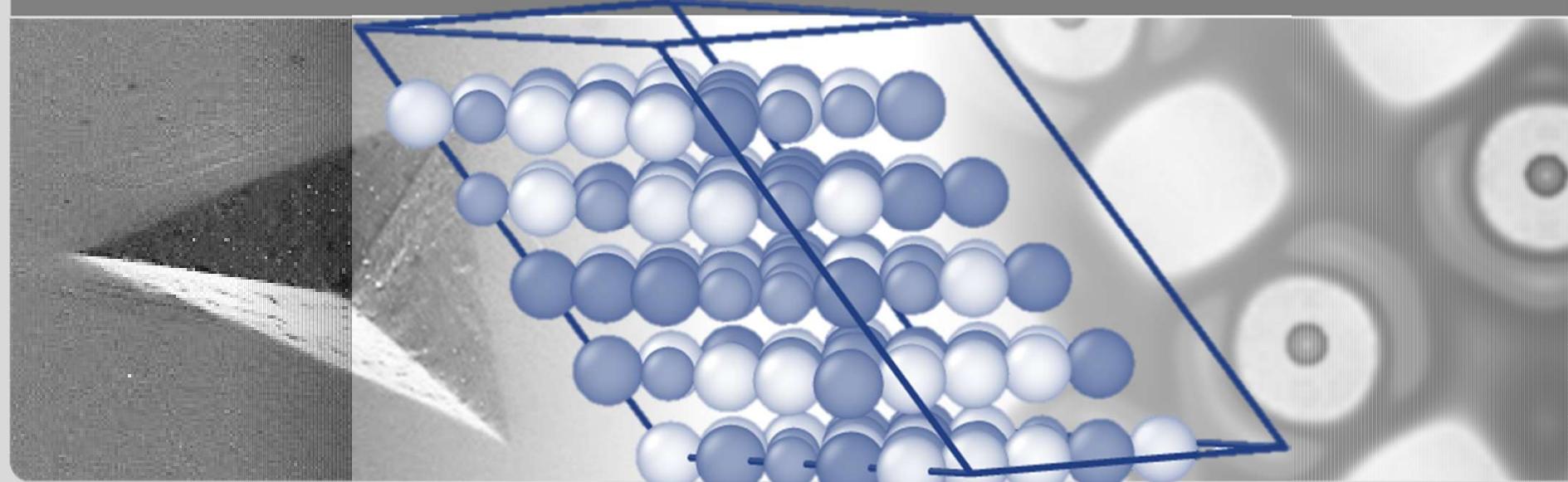


# Identification of the intrinsic deformation mechanisms of single phase body-centered cubic (BCC) High Entropy Alloys (HEAs)

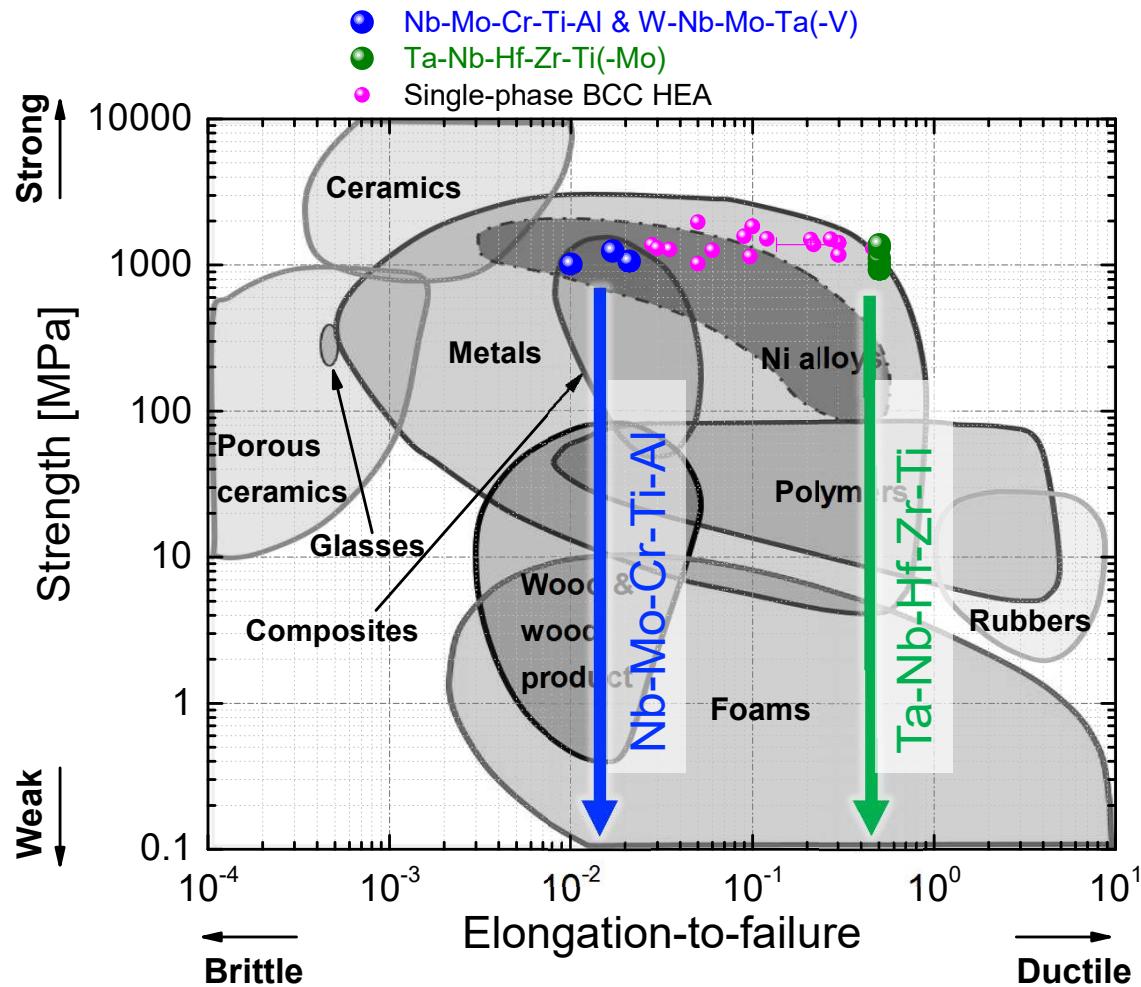
**Christian Brandl**  
**Ruth Schwaiger**

Group leader "Computational Nanomechanics of Materials"  
Group leader "Nanomechanics of Materials and Surfaces"

Institute for Applied Materials – Materials and Biomechanics (IAM-WBM)



# Macroscopic mechanical properties of BCC HEAs

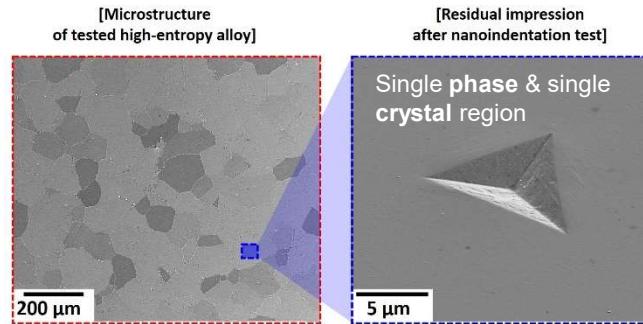
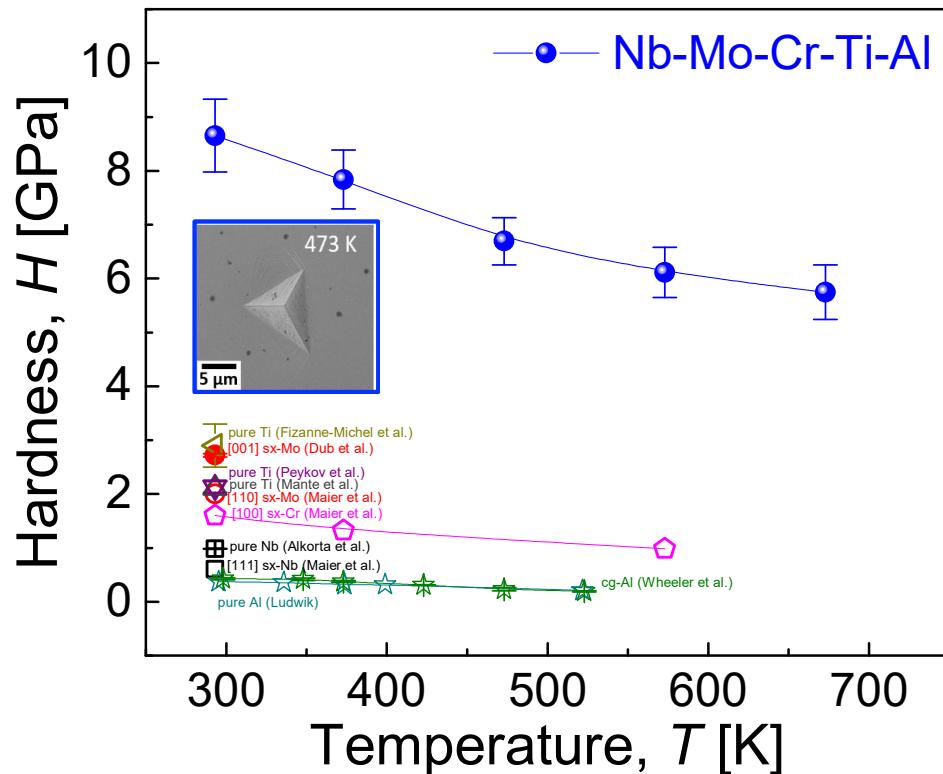


## Open questions (BCC HEAs):

- Intrinsic room-temperature ductility
- Interplay of lattice friction and compositional fluctuations

# Characterization of intrinsic deformation kinetics

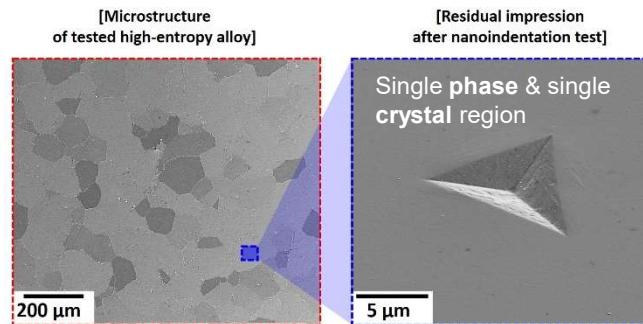
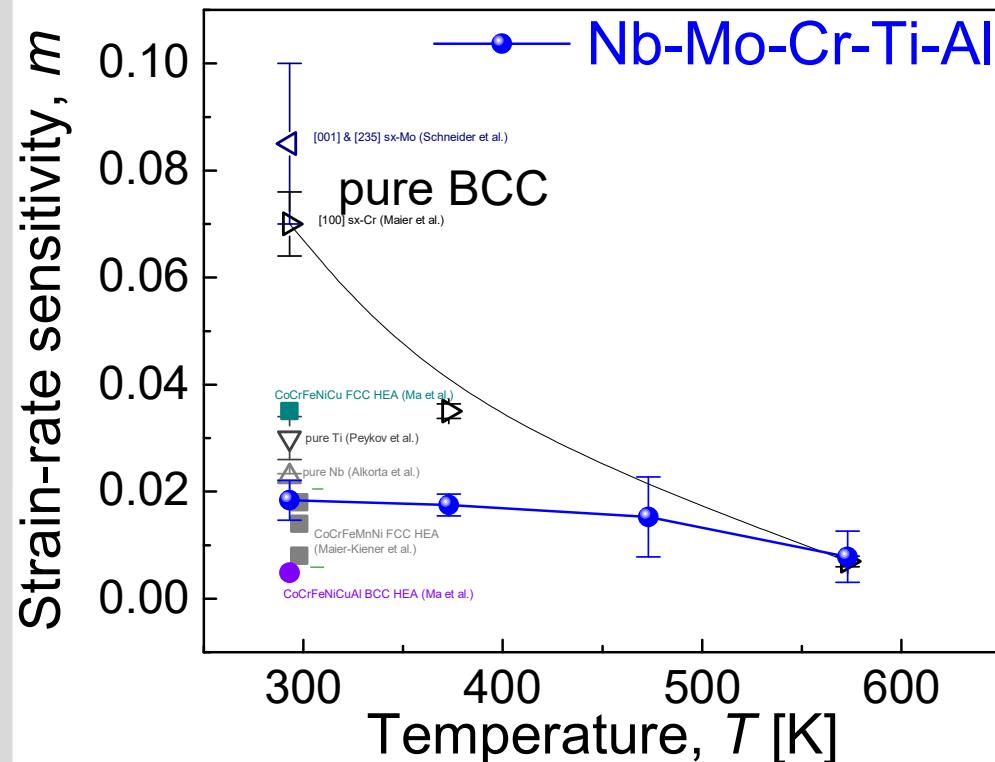
Nb-Mo-Cr-Ti-Al



- Intrinsic mechanical properties by local testing
- Kinetics of the rate-limiting deformation mechanism:
  - Temperature effect
  - Strain-rate effect

# Characterization of intrinsic deformation kinetics

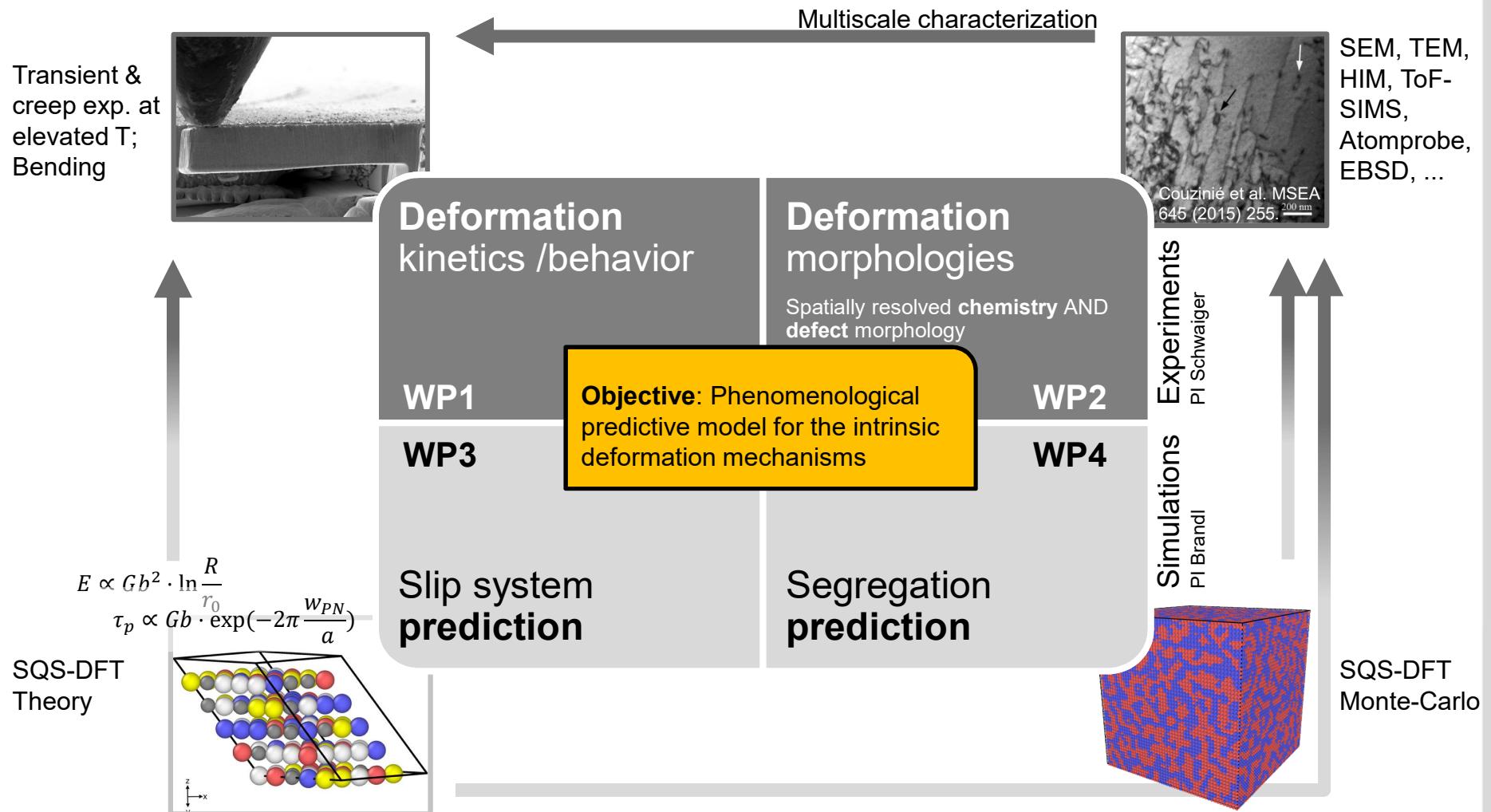
Nb-Mo-Cr-Ti-Al



- Intrinsic mechanical properties by local testing
- Kinetics of the rate-limiting deformation mechanism:
  - Temperature effect
  - Strain-rate effect

# Objectives & Work program

Modell systems: Nb-Mo-Cr-Ti-Al (brittle) Ta-Nb-Hf-Zr-Ti (ductile)



# Collaboration & contribution in SPP



## SPP 2006 (HEA & CCA)

### SPP 2006 (HEA)

- Intrinsic strengthening mechanisms  
(exp. + sim. + theory)
- Thermo-mechanical stability  
(exp. + sim. + theory)

Phenomena

Utilization of  
intrinsic  
properties

### BCC HEAs

Prof. Heilmaier (KIT)  
Dr. Gorr (USiegen)  
Dr. Kauffmann (KIT)  
Dr. Greiner (KIT)

Intrinsic  
properties of  
HEAs