



HELMHOLTZ RESEARCH FOR
GRAND CHALLENGES

Position Profile for Chinese Applicants running for 2019 Helmholtz – OCPC – Program

PART A (Info about the Position)

Title of the project:

In situ observation of metadislocation motion in complex metallic alloys

Helmholtz Centre and institute:

Forschungszentrum Jülich
Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons

Project leader:

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Description of the project (max. half page):

Metadislocations represent a novel type of defect in complex metallic alloys. These defects mediate plastic deformation processes in materials with large lattice parameters in a unique way. In this project, metadislocation movement will be studied *in situ* in the transmission electron microscope at elevated temperature in the ϵ -Al-Pd-Mn and T-Al-Mn-Pd complex metallic alloy phases. In a first step, single crystalline materials will be grown, oriented and characterized, and metadislocations will be classified in the as-grown material. In a second step, the material will be deformed *in situ* in the transmission electron microscope at elevated temperature for direct observation and quantitative evaluation of metadislocation movement. There will be a strong focus on mechanisms of metadislocation motion (glide, climb) and their temperature and stress dependences in different complex alloy phases.

Required qualification of the post-doc:

- PhD in materials science, physics or a related discipline
- Experience with advanced transmission electron microscopy, *in situ* transmission electron microscopy, metallic alloys