

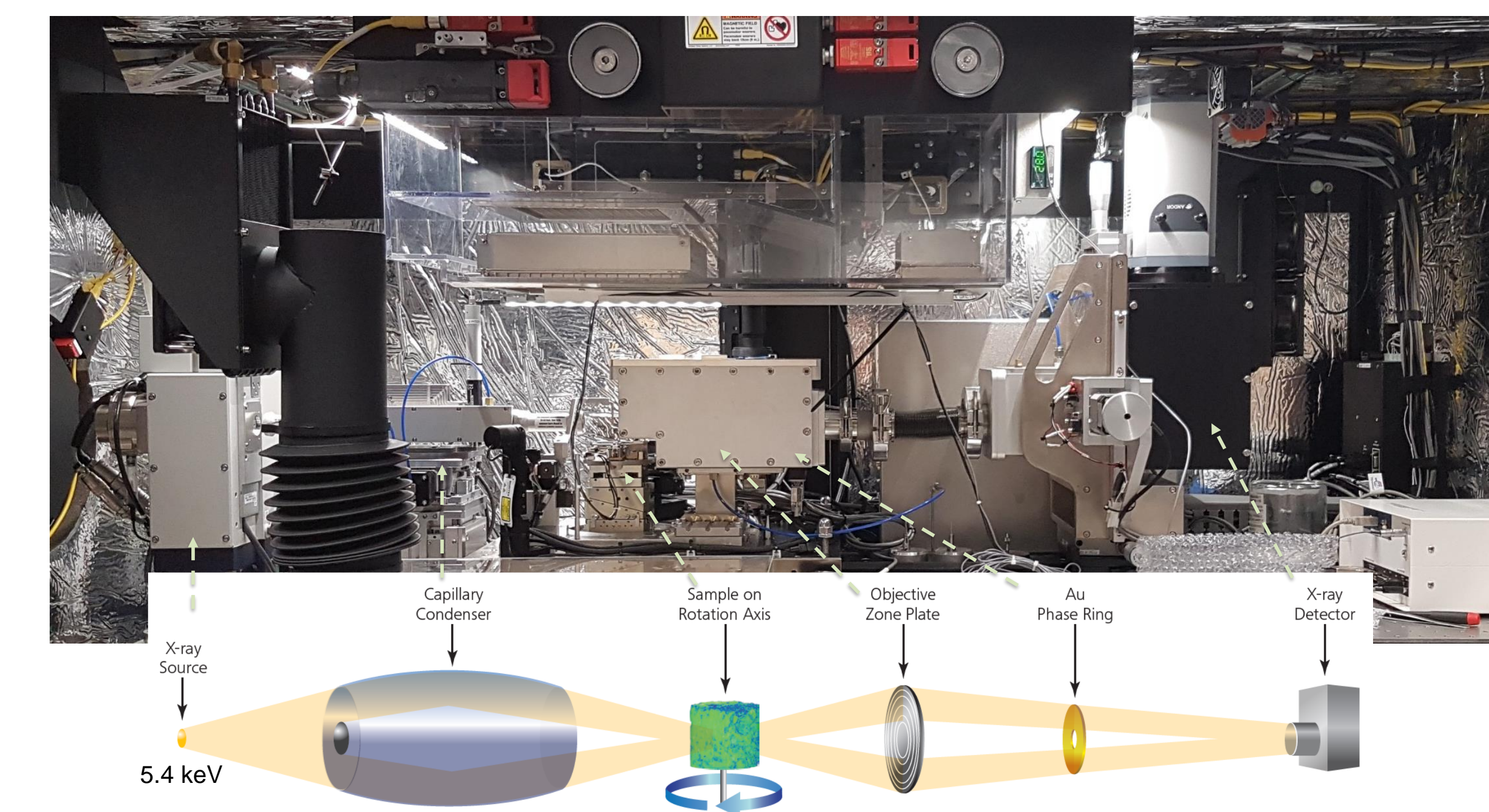
Lab-based *in situ* nanoCT as a tool for the 3D structural and mechanical characterization of metamaterials

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X-ray microscope (nanoCT) with *in situ* mechanical testing



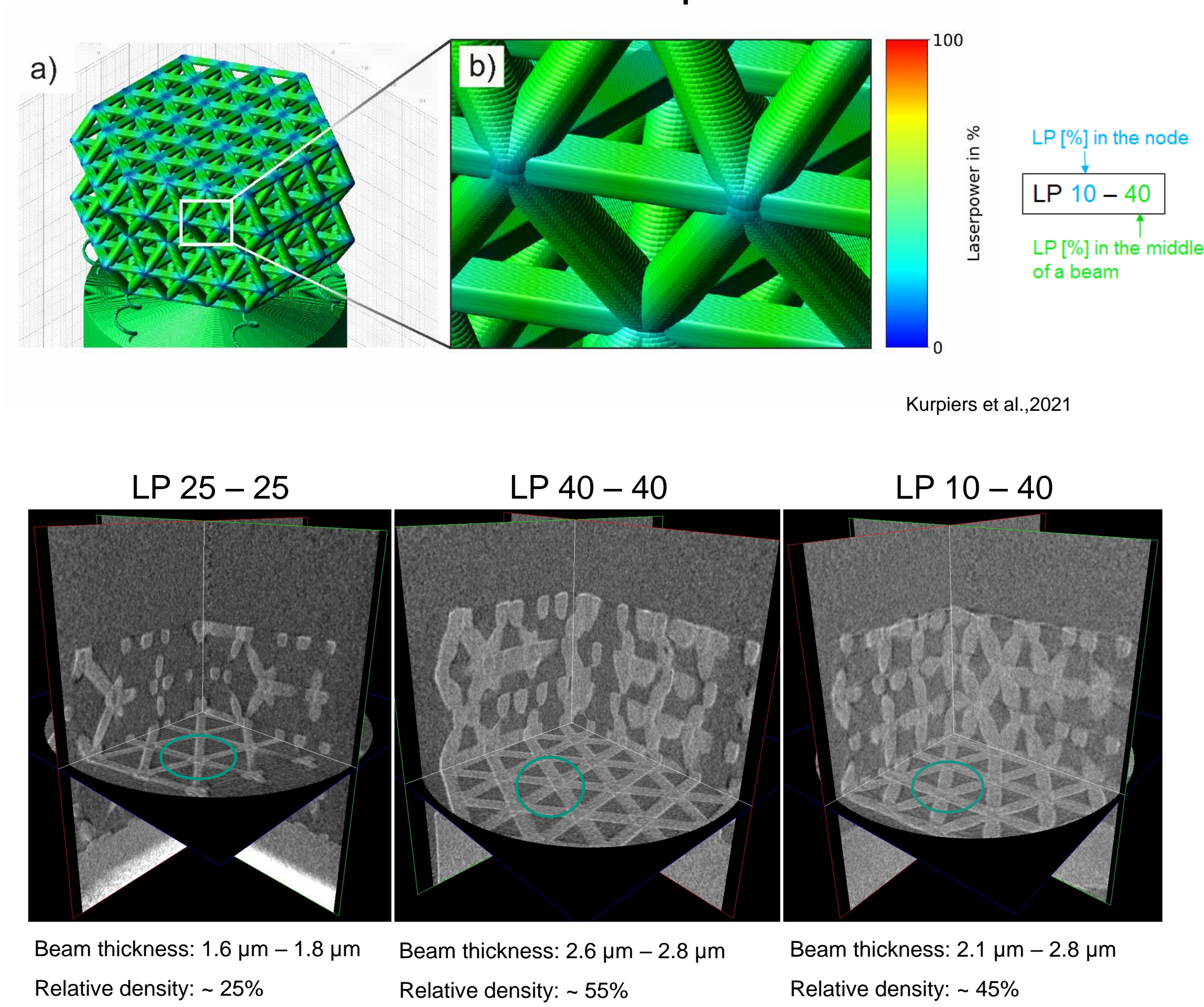
- Absorption contrast
- Zernike phase contrast
- *In situ* mechanical tests
- Force measurement: 0.8 N
- Compression: 100 μm diamond flat
- Tension
- Indentation: 90° cone, cube corner, wedge



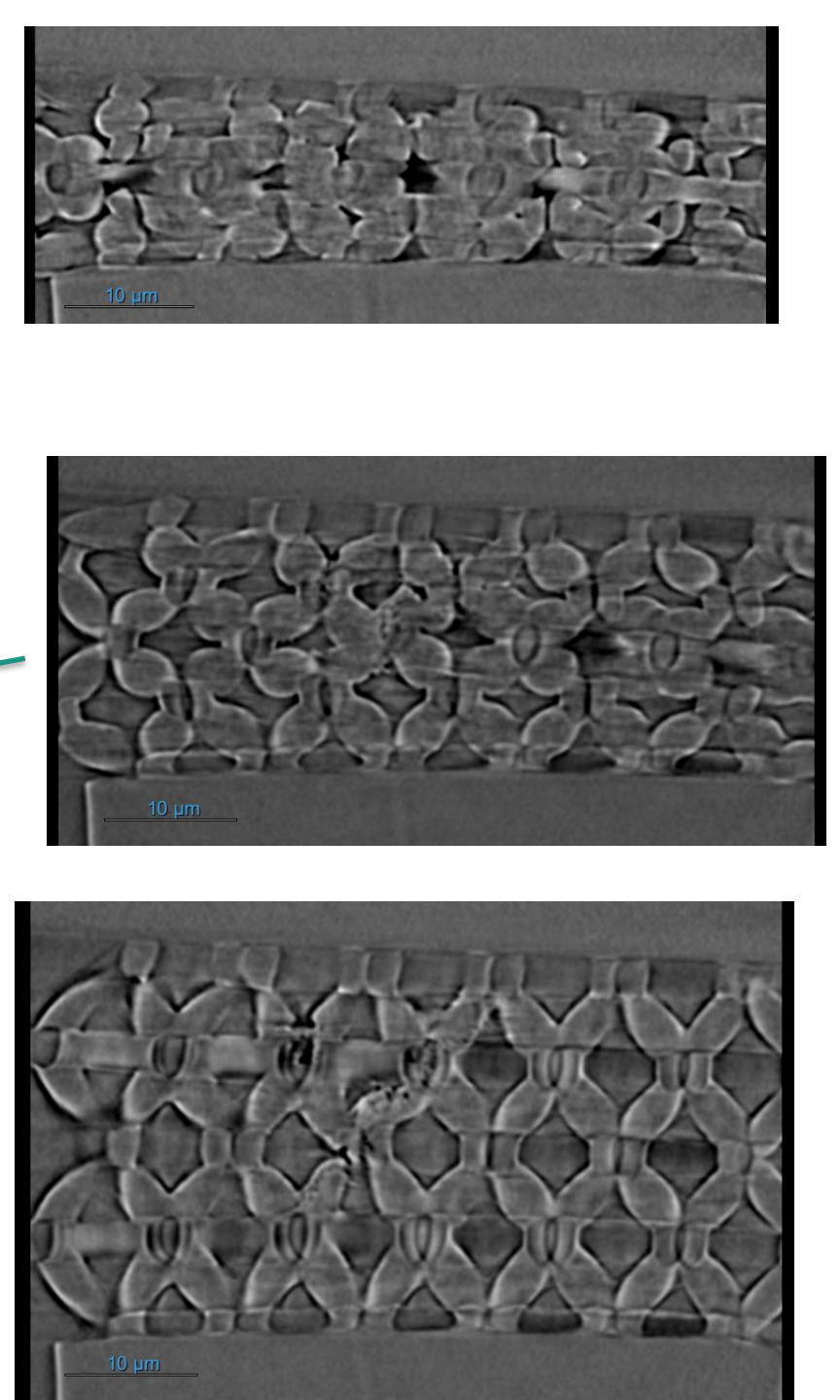
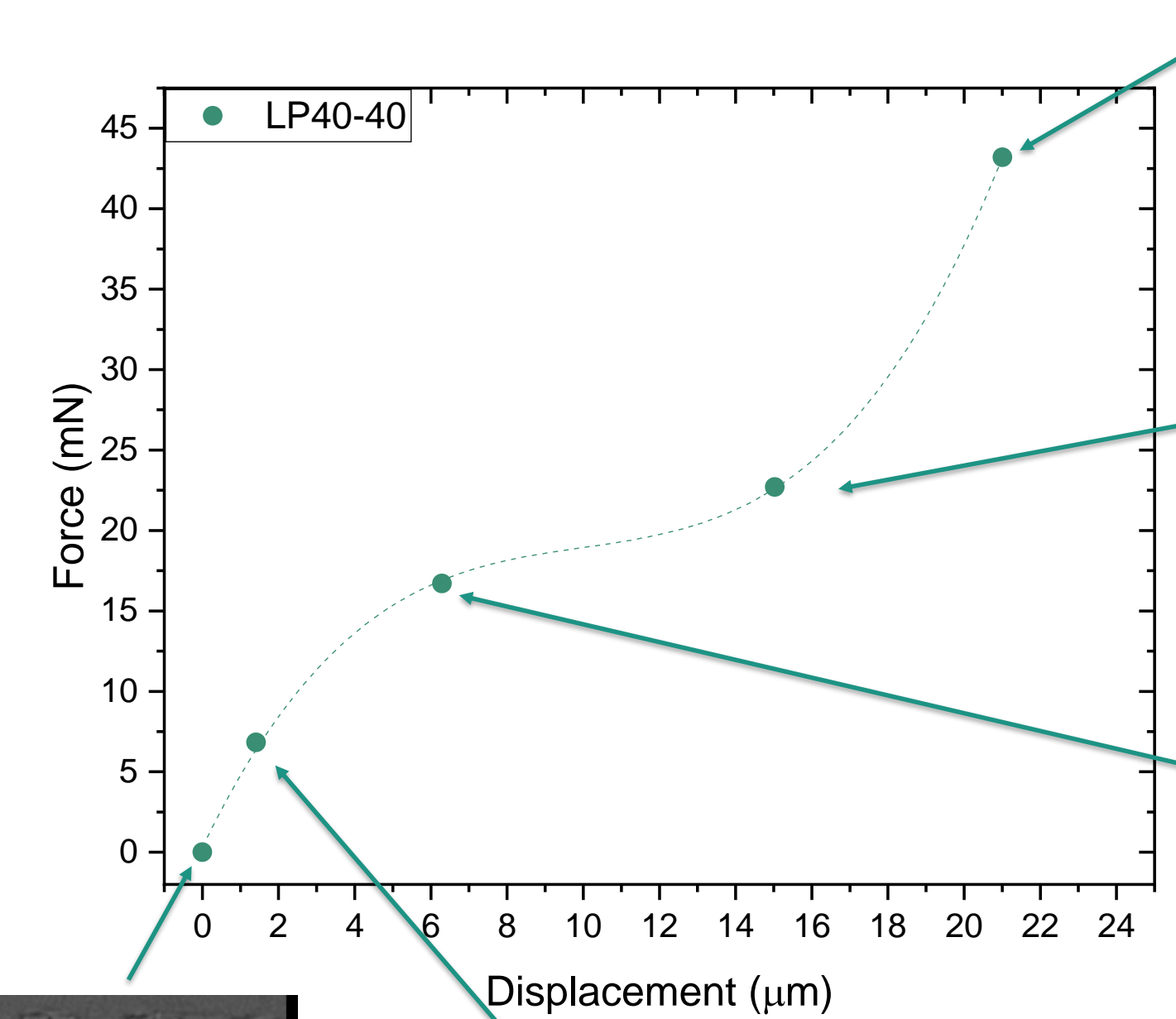
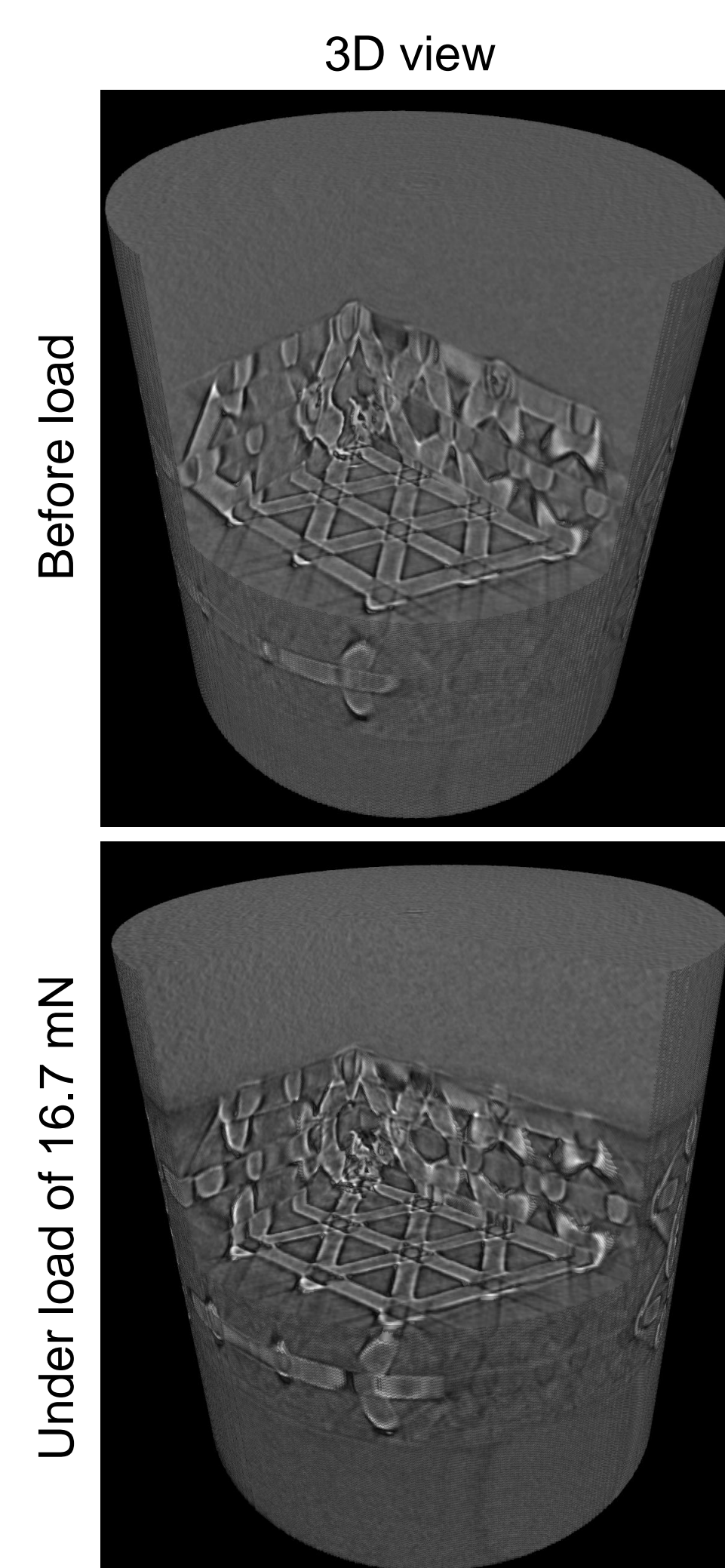
- High Resolution
- Field of view: 16 x 16 μm^2
- Spatial resolution: 50 nm
- Low Resolution
- Field of view: 65 x 65 μm^2
- Spatial resolution: 150 nm

Polymeric tetrahedral metamaterials

3D imaging of tetrahedral metamaterials printed with different laser parameters



In situ mechanical testing



Summary

- Versatile tool for the characterization of 3D additive manufactured samples down to 50 nm resolution
 - Structural characterization
 - Volume fraction
 - Pores and defects
 - ...
- In combination with mechanical tests**
- Phase contrast: ideal for analyzing low density samples
 - Accessible for the scientific community through KNMFi and NFFA.eu

Access to the nanoCT: KNMFi and NFFA.eu

Karlsruhe Nano Micro Facility (KNMFi)

A high-tech platform for information-driven structuring and characterization

Karlsruhe Nano Micro Facility > Technologies > nanoCT

nffa.eu
nanoscience foundries & fine analysis

XRI X-RAY IMAGING

Nano Tomography (nanoCT)

KNMF Laboratory for Microscopy and Spectroscopy

Annual deadlines

January 15
June 15



Fifth call is open until
September 1