

GrainMapper3D Spotlight

Annealed Cu Coil

Sample Description

- Cold-rolled and annealed Cu coil sample
- Crystal system: face-centered cubic (Fm3m)
- Coil thickness: 46 μm
- Coil diameter: ~ 18 mm
- Annealing at 1040 $^{\circ}\text{C}$ for 30 min
- Coil protected with quartz tube during annealing



Photo: Cu coil sample protected in quartz tube. The sample is scanned as presented in the photo, mounted using a LEGO brick.

Sample Courtesy: Dr. Jing Guo, Department of Materials Science and Engineering, Chongqing University, China

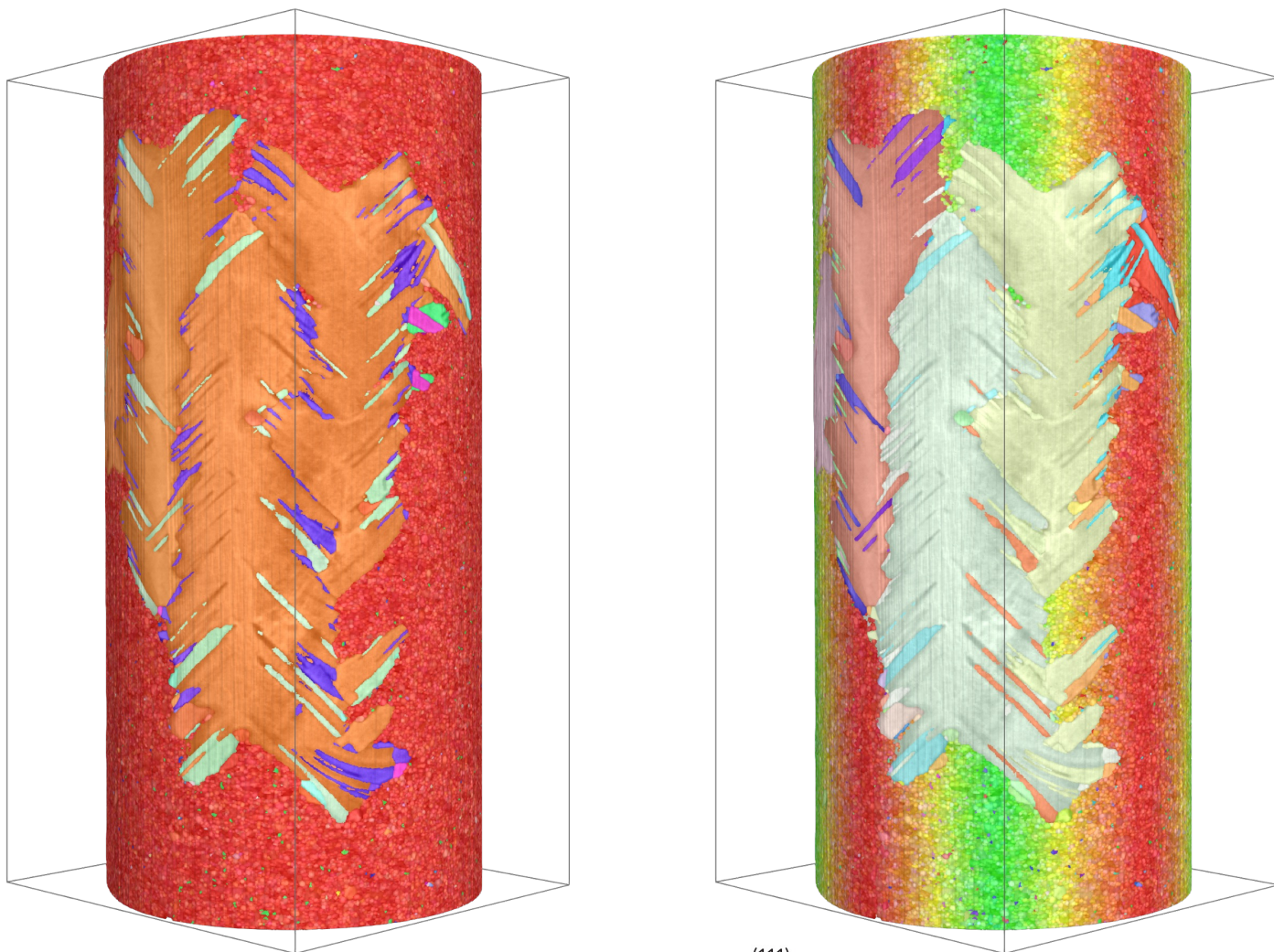
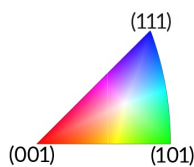


Figure: 3D grain map of Cu coil sample, colored by IPF with respect to the sample rotation axis direction (left) and the coil diameter direction. Dimensions of the bounding box: 36mm \times 18mm \times 18mm



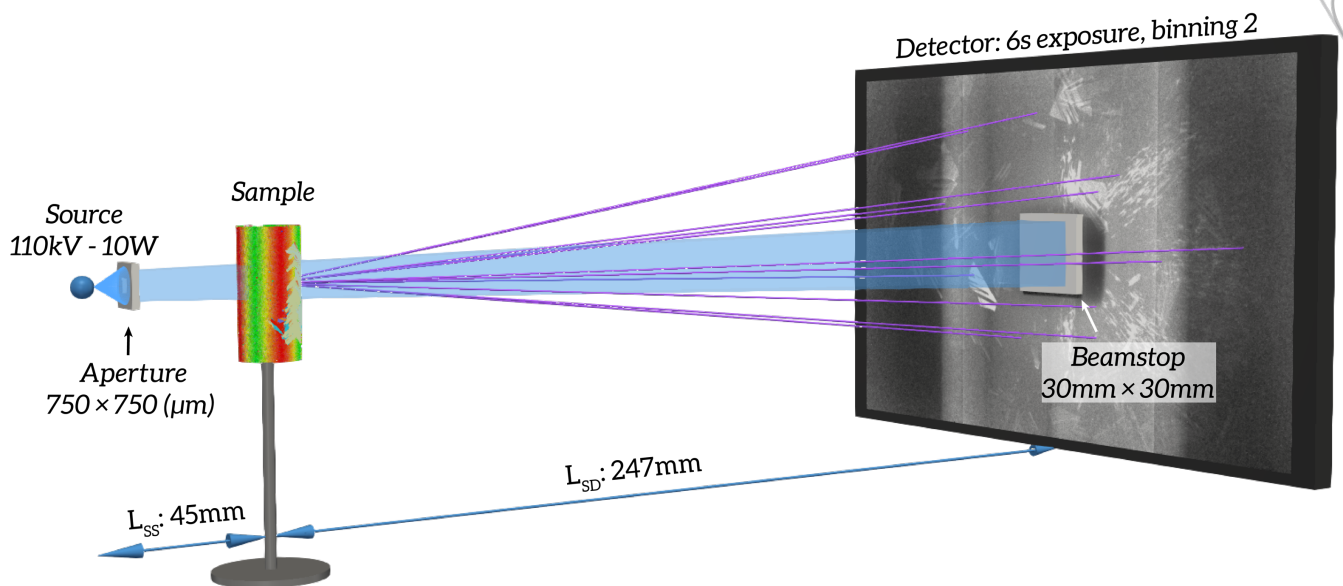


Figure: Schematic illustration of the setup for diffraction contrast tomography data acquisition of the grain-oriented electrical steel samples. Key acquisition parameters are marked. In this case, projection geometry is used with a geometrical magnification factor of 6.5.

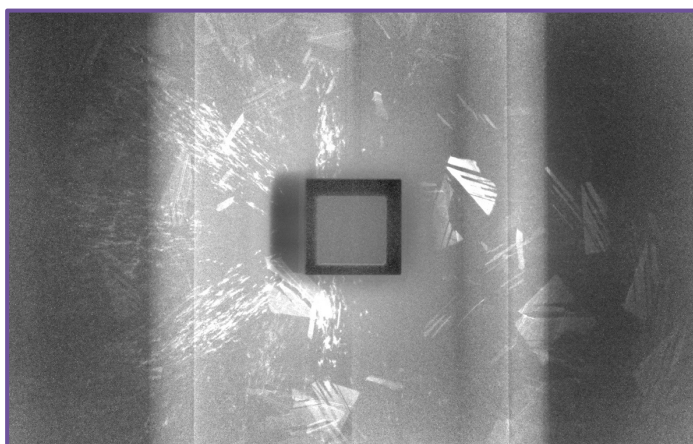


Figure (left): Example diffraction contrast projection at a certain rotation angle from the sample. The sample was scanned with projection geometry, with the shape of the diffraction spots representing the shape of the grains. Large diffraction spots from the abnormal grain is observed with missing bands in the spot due to twinning. The center region of the pattern appears brighter due to the sample interfering with the beam.

Data Acquisition Parameters

System: ZEISS Xradia 520 Versa with LabDCT Pro

Absorption Contrast Tomography

- Voltage: 80kV
- Power: 7 W
- Objective: Flat Panel Detector
- Source - Sample distance: 50 mm
- Sample - Detector distance: 245 mm
- Energy Filter: LE2
- Exposure: 0.1 s / binning 2
- Number of projections: 1600
- Voxel size: 12.68 μm

Diffraction Contrast Tomography

- Data acquisition mode: Helical Phyllotaxis RASTER
- Aperture: DCT 750 \times 750 ($\mu\text{m} \times \mu\text{m}$)
- Voltage: 110 kV
- Power: 10 W
- Objective: Flat Panel Detector
- Source - Sample distance: 45 mm
- Sample - Detector distance: 245 mm
- Exposure: 6s / binning 2
- Number of projections: 15432
- 3D Grain Map voxel size: 20 μm

