Joint Annual Meeting of the Swiss and Austrian Physical Society 2023



Contribution ID: 313

Type: Poster

[736] Microstructural Characterization Through Grain Orientation Mapping with Laue Three-Dimensional Neutron Diffraction Tomography

Tuesday 5 September 2023 19:00 (1 minute)

For polycrystalline materials, key material properties depend significantly on the texture of the crystalline microstructure. Conventional assessment of texture is either limited to surface regions or it is destructive, probing small fractions of a specimen. Only high energy X-rays and neutrons enable quantitative studies of bulk texture. Here, we report how transformative progress in Laue three-dimensional neutron diffraction to-mography enables to map several hundred grains and, thus, allows grain orientation assessment in the volume of centimetre-sized samples with statistical significance. The short exposure times and non-destructive nature of Laue3DNDT will support in-situ studies, while future improvements in spatial resolution shall include more accurate grain morphology in corresponding microstructure studies.

Theoretical Work

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Session Classification: Poster Session

Track Classification: Neutron Science