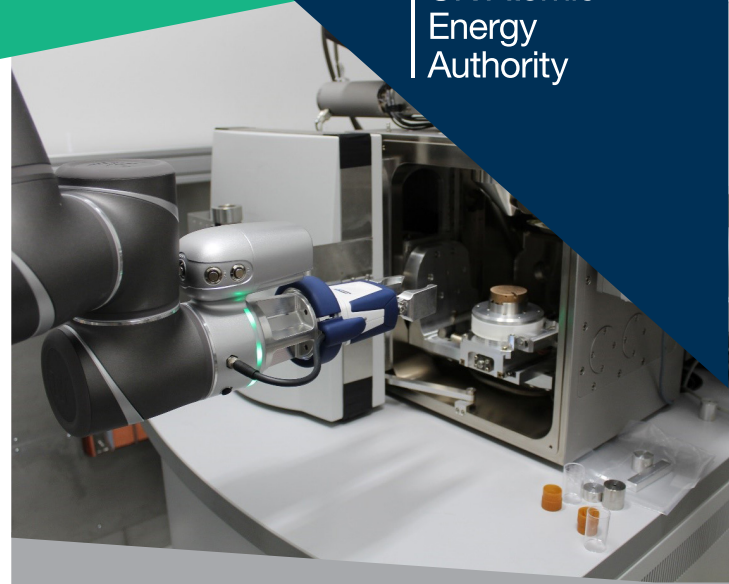




# TESCAN Mira3 XMH Scanning Electron Microscope

The TESCAN MIRA3 is a high-performance scanning electron microscope system which provides high resolution and low-noise imaging.

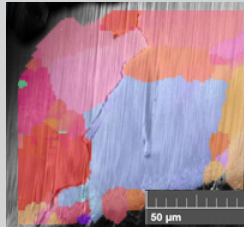
The instrument is equipped with a full range of detectors for multi-scale characterisation of samples: secondary electron detector (SE) sensitive to sample's topography changes; backscattered-electron detector (BSE) which provides imaging that carries information on the sample's composition; energy-dispersive x-ray (EDS) and wavelength-dispersive x-ray (WDS) detectors allowing chemical characterisation of materials, and electron backscatter diffraction detector (EBSD) for microstructural-crystallographic characterisation of samples.



## TECHNICAL SPECIFICATIONS

- High brightness Field Emission Gun (Schottky emitter) for high-resolution/high current/low-noise imaging
- Resolution 1.2nm at 30kV
- Chemical Analysis - Oxford Instruments X-Max 80 EDS detector
- Chemical Analysis - Oxford Instruments WDS detector with less than 10eV resolution and accurate quantitative analysis below 500 ppm
- Microstructural Analysis - Oxford Instruments NordlysNano EBSD Detector, can be both operated in reflection (standard EBSD) and transmission (Transmission Kikuchi Diffraction – TKD)

Inverse pole EBSD map superposed on SEM image demonstrating the crack path of a fractured beryllium window.



The sample is taken from the vacuum-to-air beam 'window' of the "Neutrinos at the Main Injector" (NuMI) beamline at Fermi National Accelerator Laboratory, Batavia, Illinois, USA. At an irradiation damage level of 0.47 dpa, the crack path follows grain boundaries.

Map of the geometrical necessary dislocation (GND) density below a spherical nano indent (radius 8 µm) in CuCrZr. The cross-section through the indent has been prepared by Focussed Ion Beam milling. Kikuchi patterns have been obtained using TKD and CrossCourt4 was used to calculate the GND density.

Total GND Density Map

