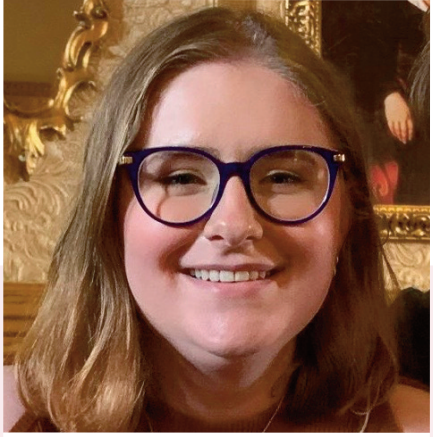
UNIVERSITY OF BIRMINGHAM

Speaker 2

3D lattice strain quantification in neutron irradiated steels for fusion energy



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ABSTRACT:
Iron-chromium (Fe-Cr) steels are top candidates for development as structural materials within Demonstrator fusion reactors, such as the UK designed STEP. The addition of oxide-dispersion strengthened nanoparticles (ODS) such as Y2O3 further improve these alloy's tensile and creep properties at high temperatures and increases radiation damage resistance. Within fusion reactors, structural materials undergo microstructural changes like the formation of precipitates, voids, bubbles, and dislocation loops, caused by high energy neutrons. These microstructural changes generate localised strains within the lattice. To quantify these lattice strains, a nano synchrotron x-ray imaging technique called 3D Bragg Ptychography was utilised on neutron irradiated ODS Fe-Cr steels. In this presentation, I will present the procedures we have developed to prepare samples that are highly irradiated for 3D Bragg Ptychography using a combination of EBSD and FIB-SEM. Then preliminary results collected at the ID01 beamline of ESRF (European Synchrotron Radiation Facility) will be presented.