

The Technical University of Munich operates the Research Neutron Source Heinz Maier-Leibnitz (FRM II) in Garching near Munich as one of the most powerful and modern neutron sources worldwide. As a service facility for science and a service provider for industry, we occupy a leading position in the field of research with neutrons and their technical use.

Starting spring 2022, the working group “High Density Nuclear Fuels” at the research neutron source Heinz Maier-Leibnitz (FRM II) is looking for a:

B.Sc. student - M.Sc. student - working student - internship (m/f/d) Physics - Engineering - Materials science - Comparable studies

EBSD and XRD Characterization of PVD Zirconium Layers

The research working group “High Density Nuclear Fuels” at the research reactor FRM II is working on the qualification of newly-developed high-density nuclear fuels in Europe. The most promising candidates are a metallic uranium-molybdenum alloy fuel (U-Mo) or high-density uranium silicide (U_3Si_2), both using aluminum-based cladding. Therefore, scientists in the fields of physics, chemistry, engineering, physical technology and computer science are working intensively together on fuel fabrication technologies, the determination of material properties as well as the irradiation behavior of such fuels.

For metallic uranium-molybdenum fuel systems a zirconium diffusion barrier is established using Physical Vapor Deposition (PVD) in order to prevent intermixing. The mechanical properties of these zirconium layers are essentially determined by their growth structure and can be altered with deposition parameters such as deposition power, applied bias voltage to the substrate and heating. Therefore, the scope of this project is to produce zirconium layers with various parameters and to investigate the resulting microstructure and preferred orientation with respect to the used parameters using Electron Backscatter Diffraction (EBSD) and X-ray Diffraction (XRD) measurements. The practical work will also include sample preparation techniques such as ion milling and mechanical polishing.

The tasks typically involve working in radiation protection areas with open handling of radioactive materials such as uranium. The high security standard of FRM II generally requires a security clearance according to the German atomic law.



In case of an online application please send the documents compiled in a PDF file.