

The Materials Imaging and Dynamics Instrument at XFEL.EU

Anders Madsen

European XFEL GmbH, Albert Einstein Ring 19, Hamburg, Germany

The Materials Imaging and Dynamics (MID) station at the forthcoming European X-Ray Free Electron Laser Facility (XFEL.EU) will allow investigations of materials using wide- and small-angle X-ray scattering (SAXS/WAXS) techniques. The special features of the XFEL radiation allow novel experiments to be conducted, for instance exploiting the temporal structure and coherence properties of the X-rays. Of particular interest is the investigation of fast and ultra-fast dynamics using X-ray speckle correlation techniques (XPCS) and coherent X-ray diffractive imaging (CXDI). The MID station will provide new possibilities for time-resolved scattering in general and the use of very high photon energies (up to the 100 keV range) is also possible. The MID station features appropriate X-ray optics to tailor the beam for the aforementioned experiments and will also be equipped with an optical laser pump system. The instrumentation foreseen comprises in-vacuum SAXS/WAXS setups as well as appropriate sample handling systems. Custom made highly specialized 2D detectors are currently being developed to fulfill the scientific goals of the MID station.