

Pulsed high magnetic fields at the High Energy Density instrument of European XFEL

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Pulsed magnets are an economic solution to generate fields exceeding the limits of current superconducting magnet technology. The installation of pulsed magnets at synchrotron facilities around the world has provided unprecedented microscopic insight into the physics at high magnetic fields through the development of various diffraction [1,2,3] and spectroscopy [4,5,6] techniques. At the same time, these experiments remain challenging owing to the limited duty cycle of pulsed magnets and the required high time-resolution. Pioneering experiments have shown the potential of bright FEL sources, in particular for photon hungry experiments and low scattering cross-sections [7]. On this background HIBEF has contributed a dedicated pulsed high magnetic field installation to the HED instrument at European XFEL [8]. The aim is to provide the highest non-destructive fields at x-ray sources in various geometries, and to exploit the unique bunch train structure of European XFEL in combination with MHz area detectors to record up to 352 independent frames of a field dependence. We present the installation consisting of a pulser and the magnet with its coil- and sample-cryostat which are integrated on a 5 circle goniometer and discuss first commissioning efforts to probe structural- and charge order in magnetoelectric materials and superconducting cuprates respectively [9].

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