



Contribution ID: 48

Type: **Poster (including Speed Talk)**

Preparation for an electron diffraction demonstration at the ELBE SRF Gun

Thursday 26 June 2025 10:32 (3 minutes)

Ultrafast electron diffraction (UED) is a unique technique for measuring structural and electronic dynamics with femtosecond time resolution when employed in a pump-probe arrangement. In most state-of-the-art UED setups, beams with keV electron energy are utilized. The project described here aims to step up to MeV electron beams with the help of an SRF Gun. The higher coherence of the beam and the ability to achieve shorter electron pulse lengths will significantly improve the spatial and temporal resolution. An MeV-UED instrument is planned to become a central component of the DALI (Dresden Advanced Light Infrastructure) project, providing an accelerator-based infrastructure for cutting-edge materials science and life science research. At ELBE, HZDR's user facility that provides electron beams as well as various forms of secondary radiation, including gamma rays and terahertz radiation, a first demonstration of an electron diffraction experiment using the ELBE SRF Gun is planned. The experiments will help to evaluate the potential of MeV-UED for future time-resolved studies in condensed matter and materials research. The poster summarizes the SRF Gun parameters and shows the status of the preparation of the electron diffraction setup at the ELBE SRF Gun.

Summary

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Session Classification: Beam Diagnostics

Track Classification: Beam diagnostics