

Development of CW SRF L-band photoinjector for future High-Duty-Cycle EuXFEL

Biography – Dmitry Bazyl:

Dmitry Bazyl completed his Ph.D. research in 2019 at the Technical University of Darmstadt, where he developed a 3 GHz 6-cell SRF cavity for one of the world's first superconducting linear accelerators, S-DALINAC. After his successful defence, he continued his work in accelerator physics as a postdoctoral researcher at DESY, contributing to the European XFEL project. Since 2022, he has been a staff scientist working on the CW photoinjector for the future high duty cycle EuXFEL, focusing on novel photocathode R&D and the diagnostics beam line to evaluate the performance of the SRF CW gun cavity. His expertise and research interests include RF/SRF technology for particle accelerators, electron beam dynamics and nanophotonics.

Biography – Elmar Vogel:

Elmar Vogel received a Diploma in the area of high temperature superconductor field theory from the University of Stuttgart in 1998. His Ph.D. was based at DESY where he built longitudinal beam diagnostics for HERA, helping to keep proton bunches short and increasing luminosity. He moved to CERN in 2003 to work on transverse beam feedback systems, e.g. damping beam oscillations caused by imperfect SPS extraction kickers before the beam is sent to LHC and CNGS. In 2005 Elmar was invited back to DESY to work on digital RF control for XFEL and FLASH. By 2007 he was responsible for the complete 3rd harmonic SRF systems for FLASH and XFEL, and he defined the module arrangement in the XFEL main linac. During the XFEL construction he took also care of the L-band module assembly and testing. In 2016 he was invited to oversee SRF photoinjector developments at DESY, pushing this technology to new limits for a novel CW injector to provide a high duty cycle upgrade of the European XFEL.

Abstract:

The future high repetition rate upgrade of the EuXFEL assumes the implementation of a continuous wave (CW) electron source. A CW photoinjector based on the 1.3 GHz SRF gun cavity is the preferred option for EuXFEL. Recently, we demonstrated the possibility of achieving a peak axial electric field of 55 MV/m with a copper photocathode installed. Further steps include advanced metal photocathode R&D and constructing a test stand facility (ts4i) that will enable 6D phase space characterization. In this talk, we introduce the history of the development of the SRF gun cavity and report on the present status of our R&D efforts.