



Contribution ID: 74

Type: poster

First Operational Experience and Magnetic Characterization of a Superconducting Transverse Gradient Undulator for the Compact Laser Wakefield Acceleration-Driven FELs

Monday, 16 September 2019 19:00 (1 hour)

The transverse gradient undulator (TGU) scheme is a viable option to compensate for the challenging properties of the LWFA electron beam, in terms of beam divergence and energy spread, to enable FELs amplification. At Karlsruhe Institute of Technology (KIT, Germany), a 40-period superconducting TGU has been designed and built. In this contribution, we report on the first test operation of this superconducting TGU in its own conduction-based cryostat, the quench tests performed in this configuration, first results of the two-dimensional Hall probe mapping of the TGU field. We give an outlook to the preparation of proof-of-principle experiments with this TGU at the SINBAD facility/DESY and at the LWFA-setup at the JETI Laser laboratory operated by the University of Jena, which are aiming to show the potential of applying the TGU scheme to LWFA-driven FELs.

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Session Classification: Cheese and Wine Poster Session 1

Track Classification: WG4 - Application of compact and high-gradient accelerators