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Magnetic field simulation of a planar superconducting undulator for the FEL demonstrator

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An Argonne-SLAC collaboration is working on the design of a superconducting undulator (SCU) demonstrator for a free-electron laser (FEL)*. A SCU magnetic structure consisting of a 1.5-m-long planar SCU magnet, and a superconducting phase shifter have been designed. A novel three-groove correction scheme has been implemented for the SCU magnet. A compact four-pole phase shifter with magnetic shields was also designed. This paper presents the calculations of the magnetic performance of the phase shifter and a planar SCU magnet, which include magnetic field and field integrals with end corrections.

Footnotes

- D. C. Nguyen et al., “Superconducting Undulators and Cryomodules for X-ray Free-Electron Lasers” in Proc. 5th North American Particle Accelerator Conf. (NAPAC2022), Albuquerque, NM, USA, August 2022, pp. 870 –873. doi:10.18429/JACoW-NAPAC2022-THYE3

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Primary author: SHIROYANAGI, Yuko (Argonne National Laboratory)

Co-authors: KASA, Matthew (Argonne National Laboratory); IVANYUSHENKOV, Yury (Argonne National Laboratory)

Presenter: SHIROYANAGI, Yuko (Argonne National Laboratory)

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