

Superconducting undulator activities at the European XFEL

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For more than 5 years, superconducting undulators (SCUs) have been successfully delivering X-rays in storage rings. The European XFEL (EuXFEL) plans to demonstrate the operation of SCUs in XFELs. For the same geometry, SCUs can reach a higher peak field on the axis with respect to all other available technologies, offering a larger photon energy tunability range. The application of short-period SCUs in a high electron beam energy FEL > 11 GeV will enable lasing at very hard X-rays > 40 keV. The large tunability range of SCUs will allow covering the complete photon energy range of the soft X-ray experiments at the European XFEL without changing electron beam energy, as currently needed with the installed permanent magnet undulators. For a possible CW upgrade under discussion at the EuXFEL with a lower electron beam energy of approximately 7–8 GeV, SCUs can provide the same photon energy range as available at present with the permanent magnet undulators and electron energies. This paper will describe the potential of SCUs for XFELs. In particular, it will focus on the different activities ongoing at the EuXFEL and in collaboration with DESY to allow the implementation of SCUs in the EuXFEL in the upcoming years.

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