

Abstract

Superconductivity at DESY P. Schmüser DESY and University of Hamburg

DESY has more than three decades of experience with large superconducting (sc) installations. The proton-electron collider HERA was designed and built in the 1980s. The 920 GeV proton storage ring of HERA consists of more than 400 sc dipoles of 9 m length and 5.3 Tesla nominal field, and more than 200 sc quadrupoles of 2 m length. In addition, a large number of sc correction magnets was needed to compensate the field distortions caused by persistent magnetization currents in the niobium-titanium filaments of the sc cable. The design principles, properties and performance of the HERA magnets will be discussed.

Since about 1990 DESY has assumed a leading role in the research and development of high-gradient multicell sc niobium cavities for electron acceleration. In the framework of the TESLA Collaboration the accelerating field in nine-cell 1.3 GHz cavities could be raised from less than 10 MV/m to above 30 MV/m. Based on this success the decision was taken by an international committee to base the International Linear Collider (ILC) project on the sc TESLA technology. The ultraviolet and soft x-ray free-electron laser FLASH at DESY and the x-ray free-electron laser XFEL, which is under construction in Hamburg, make use of the cavities developed for TESLA and ILC.

