

Superconducting RF at CERN: Past Achievements and Future Challenges

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Superconducting RF (SC-RF) science and technology is at the heart of modern particle accelerators. At CERN, superconducting cavities were used extensively for the LEP2 collider in the 1990's. The particularity of LEP cavities lies in the innovative technology, which had been proposed and developed at CERN, of using thin niobium films deposited on copper substrates to produce the resonators. The same technology was adopted for the much less demanding RF system of the LHC, and, later on, for the superconducting booster of the ISOLDE radioactive beam facility, which was built for the HIE-ISOLDE project. Conventional manufacturing from bulk niobium, instead, was the choice for the crab cavities which will be an essential part of the HL-LHC presently under construction. Looking forward, the FCC study, and in particular the lepton machines, will rely heavily on SC-RF, and a vast R&D programme is ongoing to address the technical issues and assess the overall feasibility of the required SC-RF systems. After a brief introduction on SC-RF basics, I will describe the SC-RF aspects of the projects mentioned above, with particular emphasis on the developments of the Nb-Cu technology.

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