Abstract

Superconducting Radio Frequency Cavities (SCRF) are being used in modern accelerators because of their high acceleration gradient and efficiency. Field emission threshold and quench however, limit the accelerating gradient thus degrading their performance. Quench is specific to superconductors and is dependent on temperature and magnetic field strength. In order to reduce the quench limitation and to support higher field gradients, the residual magnetic field in the SCRF has to be kept minimum. The cavities are magnetically shielded to prevent magnetic flux from being trapped in the cavities during cool down. The cryomodules vessel shields the cavities from the earth's magnetic field. In addition, each cavity is shielded by an independent mu-metal shield. To ensure that the residual magnetic field inside the vessel is acceptable, we develop a LabVIEW measurement program to measure the residual magnetic field along the length of the inside of the vessel where the SCRF cavities will be mounted. The LabVIEW program reads Bartington's Mag-03MC1000 Flux-Gate magnetometer using National Instrument's Data Acquisition hardware to measure the magnetic field inside the cryomodule.

Keywords: Cryomodule, Magnetic field, Magnetometer, LabVIEW, Superconducting RF cavities.