

Abstract Details

Title: Eddy current induced stress analysis of 1.5 t superconducting mri system

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Abstract: A 1.5 T whole body clinical MRI magnet is under development at IUAC, New Delhi. The total stored magnetic energy of the magnet is 4.5 MJ that releases during a quench which adversely affects the magnet by raising its temperature and voltage. The quench in the magnet also induces eddy current in the electrically conductive parts of the cryostat. MRI magnet will be wound on the bobbin which will be made with aluminium alloy. MRI cryostat consists of liquid helium vessel (SS304L) thermal radiation shield (aluminium alloys) and vacuum jacket (SS 304L). During a quench, current decays down to zero within a short duration of time (<10 s), which causes change in the magnetic field and induces eddy current that generates the stress on various components of the cryostats. The OPERA-FEA software has been used to simulate quench induced eddy current and associated mechanical stresses on the various components. This paper briefly discusses the quench induced eddy current and associated mechanical stresses on various components of the cryostat.

Keywords: MRI, Eddy Current.