

Finite Element Analysis of Stress in Superconducting Coil Stack Exposed to External AC Magnetic Field

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Abstract- An analysis of mechanical stresses under an external AC magnetic field in a coil stack was performed using the finite element method solving "mechanical equilibrium equation" by Comsol Multihysics finite element software. A-V formulation has been used for the solution of the Ampere equation. Plain strain approach was applied for the mechanical part. The numerical calculations were made taking into account the different angles and frequencies for the external magnetic field. The two dimensional radial and axial stress distributions in the coils during the applying external magnetic field are shown. During the whole field activation, the maximum stress along the coil stack were determined. Numerical results showed that the maximum stresses induced by the Lorentz force were well below the permissible values for tapes.

Keywords- *Coil stacks, High temperature superconductor, Stress analysis.*

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