



Contribution ID: 675 Contribution code: THU-PO3-608-02

Type: Poster

Dynamic resistance and dynamic loss of the partially coupled quasi-isotropic cable with consideration of the resistance at terminals

Thursday, 18 November 2021 10:00 (20 minutes)

When the HTS tapes in the quasi-isotropic cable are insulated in middle but soldered together at terminals, it is called partially coupled quasi-isotropic cable. There are resistances at soldered parts which would form closed current loops. When the cable is carrying DC current and subjected into AC magnetic field at the same time, it would induce coupling current and change the current density distribution in tapes. So that, it effects on the dynamic resistance and dynamic loss of the cable. To study the characteristic of the dynamic resistance and dynamic loss of the quasi-isotropic cable with consideration of the resistance at terminals, the minimum electromagnetic entropy production (MEMEP) 2D model is proposed. The MEMEP 2D model is much faster than other commonly used methods, so that it is possible to use much better mesh strategy to get more accurate result. In this paper, the magnetic field dependence of the HTS tape will be considered well, and each tape in cable will be mesh into at least 40 and 32 elements in width and thickness directions, so that the dynamic resistance in low field can be calculated well. The dynamic resistance and dynamic loss of the cable are calculated under DC current and AC field with a series of amplitude and frequency, respectively. The dependence of resistance at terminals on the dynamic resistance and dynamic loss is obtained, which is very helpful for fully understanding the loss characteristic of quasi-isotropic cable, and it helps to design high field magnet.

Primary author: Dr LI, Shuo (Northeastern University)

Presenter: Dr LI, Shuo (Northeastern University)

Session Classification: THU-PO3-608 AC Loss in HTS Wires and Cables