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Tue-Mo-Po2.09-03 [65]: Design and electromagnetic characteristics study of YBCO cable for fast cycled accelerator magnet applications

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The development of second generation high temperature superconductors (HTS) cable with larger current capacity and lower AC loss are very promising for building fast cycled accelerator magnets. In order to enhance the properties of HTS cable under the different physical fields, several HTS cable structure suitable for magnet application have been proposed by twisting, transposition, stacking, narrowing techniques. Compared to the existing HTS cable composed of the original wire with 4mm-12mm width, we utilize several narrow wires with width under 2mm to manufacture HTS cable. A novelty HTS cable comprised of stacked tapes wound on a helically slotted core has been proposed. Firstly, the critical current and n-value of HTS cable under the various mechanical force will be presented and discussed. Also,a numerical method introduced in this paper are based on H-formulation, and is used to calculate the current distribution and electromagnetic fields in HTS cable.

Index Terms: YBCO, Cables, critical current, H-formulation, Ac loss

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