

High Current HTS Cables - Status and Actual Development

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Abstract — Second generation High Temperature Superconductors (HTS) REBCO are promising for high field application due to the excellent $j_c(B)$ performance at low temperatures and for power transmission at liquid nitrogen temperature. For power transmission with HTS, the formation of high current HTS cables from single HTS tapes is desirable for cable currents of several 10 kA up to more than 100 kA. On the other hand, to avoid high inductances which would cause high voltage problems in case of quench or fast shut-down, high current HTS cables are needed for larger high field magnets, too, typically operated at 4.5 K or lower. In the last years several HTS cable designs have been proposed, like twisted stacked cable (TSTC), CORC cable, Roebel cable and others.

This talk will give an overview of such proposals and highlight actual developments in HTS cable design and REBCO tape optimization, e.g., for highest field. In addition, an optimization of round TSTC strand will be introduced, which is designed for simple fabrication in long lengths for versatile use either for the production of cables to be used at high fields or for power transmission.

Keywords (Index Terms) — High temperature superconductor, HTS, REBCO, high current cable.