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HTS Potential and Needs for Future Accelerator Magnets

HTS has the potential of a game changer for many applications of superconductivity, not last in the field of particle accelerators and detectors. This paper explores the potential of HTS, with a focus on REBCO-coated conductors, in relation to the evolving demands of superconducting magnets for accelerators. HTS already have a spectacular current carrying ability at high field, demonstrated and available on relevant lengths. Recent advances in non-conventional winding techniques for solenoids, in particular non-insulated windings, have shown that it is possible to reach engineering current densities in the coil exceeding by far those of LTS . This approach seems to offer an extended field reach, as well as solutions to the challenges associated with magnet mechanics, quench management and cost. Most important, beyond the ability to reach a field range higher than what is possible with LTS, HTS offers an extended range of operating temperature, with large margin. This can be exploited to obtain higher availability and better cryogenic efficiency, a must for the future of sustainable large scale research infrastructures such as particle accelerators.

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