

Status of High Temperature Superconductor Based Magnets and the Conductors they Depend Upon

J. Schwartz, F. Hunte, W.K. Chan, X.F. Gou, X.T. Liu, M. Phillips,
Q.V. Le, G. Naderi, M. Turenne, L. Ye

Abstract - This paper reviews the status of high temperature superconductors for high field magnets for future devices such as a high energy LHC or a muon collider. Some of the primary challenges faced for the implementation of systems are discussed. Two conductor technologies, $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ and $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$, have emerged as high field conductor options, but their relative advantages and disadvantages for high field magnets are quite different. These are reviewed from an engineering perspective, including coil manufacturing, electromechanical behaviour and quench behaviour. Lastly, the important roles of “system pull” upon conductor and magnet technology development, and of interactions between the materials and magnet communities for accelerating development, are discussed.

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