**Perspectives on stress management and quench protection of high-field Bi-2212 superconducting magnet**

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The Bi-2212 conductor research in U.S. in the past ten years has been exciting: Long-length multifilamentary Bi-2212 round wires have been commercially available since 2004, the materials science understanding of the melt processing of Ag-sheathed Bi-2212 round wire has been significantly advanced, and the engineering critical current density *J*E of commercial powder-in-tube Ag-sheathed Bi-2212 has been improved several-fold, up to 720 A/mm2 at 4.2 K and 20 T in conductors processed using overpressure processing. Such high *J*E is considered as sufficient for a new high-field magnet technology. However, significant roadblocks still exist confronting the use of Bi-2212 to construct a new class of powerful superconducting magnets that generate magnetic fields above 20 Tesla. In this talk, I will talk about recent progresses in removing these magnet technology roadblocks, including the development of high-strength, kA-class cables for stress management and new measurements and concepts that advance our understanding of quench protection of Bi-2212magnets. Specifically, new materials that are suitable for high-strength, mechanically reinforced Bi-2212 cable will be identified and new concepts of cables will be presented. The talk will also examine the initiation, propagation, and detection of normal zones propagating at cm/s in Bi-2212 magnets and their complex dependence on magnetic field, transport current, conductor *n*-value as well as conductor processing and design. I will also report on results of recent experiments that advance our understanding of the quench degradation behavior and degradation limit found in a large variety of Bi-2212 conductors and potential degradation mechanisms.