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M1Or3C-02 [Invited]: Epoxy and quench training of Nb3Sn accelerator magnets

Monday, July 22, 2019 4:25 PM (25 minutes)

In this talk, we will present magnet performance and quench training of LBNL Nb3Sn accelerator magnets and our experience and quests for a better epoxy for reducing quench training in Nb3Sn superconducting magnets. We will present our assessment of properties of CTD-101K, several other epoxies that have been used for superconducting magnets, and new recipes being explored at LBNL, and discuss the training performance and mechanical analysis of the canted cosine-theta magnets recently built at LBNL and impregnated with the widely used CTD-101K and NHMFL-mix 61, a higher toughness epoxy. To examine various hypothesis of root causes of quench training, we will then present our measurement results of epoxy cracking, debonding and interfacial shearing at the interfaces between epoxy and other components of superconducting winding under various loads, including tensile, compression, shear only, a combination of compression and shear, and with various Nb3Sn magnet fabrication treatments, including with or without S-2 glasses going through a Nb3Sn reaction heat treatment, and with or without using the CTD1202, a ceramic binder that is believed to make brittle the S-2 glass fibers.

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