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Developing Nb3Sn and Bi-2212 conductor s for high field magnet applications

Tuesday, 8 July 2014 12:30 (15 minutes)

Oxford Superconducting Technology (OST) has been continuously improving Nb3Sn and Bi-2212 round wire performance for application in high-field magnets. For particle accelerator applications the Nb3Sn development focus has been to reduce the effective filament diameter while maintaining high Jc and RRR. We will present our latest results on 169 stack distributed barrier strand designs with modified Nb, Sn and Cu ratios to maintain high values of RRR and Jc in strands having subelement diameter of less than 50 μm. We will present results on strands developed through the US Conductor Development Program with thicker diffusion barriers, modified metal ratios, and higher stack counts to improve RRR at smaller effective filament diameters. We will also present of the latest results of strand performance for strand designed specifically for laboratory research magnets, NMR magnets, and cable-in-conduit applications.

Bi2212 round wire development is focused on improving the engineering critical current density (JE) by optimizing initial powder, wire configuration and filament densification. Several wire configurations have been developed to meet different wire diameters, operating current and low ac loss requirements. In order to meet the large scale application requirement, the wire piece-length has been significantly increased by improving our process. The twisting of Bi-2212 wire has been proven to significantly reduce ac loss and effective coupling filament diameter without the critical current degradation. The latest results of Bi-2212 wire development and properties will be presented in detail.

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