The Beams and Applications Seminar Series

HTS solenoids, Undulators and other Superconducting Devices

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Bldg. 401, Room B-2100
Friday August 19, 1:30 pm

Host: Efim Gluskin

Abstract:

The development of High Temperature Superconductor (HTS) technology for high field solenoids at the NHMFL is presented, from its difficult initial years through the successes of the BSCCO's and more recently the YBCO and GdBCO coated conductors. Through analysis of the microstructure, close interaction with conductor manufacturers, modeling of critical parameters on conductor and coil level, extensive experimental work, careful engineering and procedure development for normal and fault modes, HTS magnet technology took shape. After a series of record-setting demonstration coils, the NHMFL is now building the first HTS user magnet. Scheduled for user operations in early 2013, it will represent a transformational increase in superconducting magnet performance from the current state-of-the-art value of 23.5 T using only Nb-based superconductors to 32 T through incorporation of HTS conductors.

At lower magnetic fields, modern Nb3Sn conductors hold promise for applications in undulators. An ANL funded NHMFL project to develop technology for APS is presented. Development of HTS current leads and testing of Cable-in-Conduit conductors, both for 20 kA Series-Connected Hybrids, completes this selection of projects in superconductivity.

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