Lectures on Superconducting Magnet Test Stands, Magnet Protections and Diagnostics (as integral part of SMTF & IDSM Workshops)



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## Acoustic diagnostics for superconducting magnets

Friday 9 June 2023 16:30 (1 hour)

About the lecture:

High-field superconducting magnets operate during operation and exhibit transient releases of elastic energy associated with epoxy cracking or conductor motion. These events cause premature magnet quenching and training. Acoustic emission (AE) diagnostics is a unique way of probing transient magnet mechanics in a non-invasive way. It allows for measuring mechanical energy releases during magnet operation and performing localization of quenches and quench precursors.

In this lecture, I will introduce the basics of the AE technique, and discuss AE sensor hardware and data analysis. Examples of AE diagnostics for quench localization in various magnets tested at LBNL will be presented. Besides AE, I will also discuss "active"ultrasonic methods developed recently for monitoring stress and temperature variation in magnets and quench detection.

About the speaker:

Maxim Marchevsky received Ph.D. in Physics (with honors) from Leiden University, Netherlands (1997). He held appointments at NEC Research Institute in Princeton NJ, Syracuse University, and SuperPower, Inc., working on various aspects of general and applied superconductivity. In 2010 he joined LBNL and supervised superconducting magnet testing and analysis for the US LARP. Presently, he leads the diagnostics and instrumentation development effort for the US Magnet Development Program and a number of magnet technology projects.

Presenter: MARCHEVSKY, Maxim (LBNL)