Optical Fiber Sensing for Fast Hotspot Detection in Superconducting Fault Current Limiters

Arooj Akbar, Zhisheng Yang, Bertrand Dutoit – Ecole Polytechnique Fédérale de Lausanne

At EPFL a Mach-Zehnder interferometer based optical fiber sensing technique has been developed that is capable of sensing even singular hotspots in the superconductor within 10 ms, allowing action to be taken within 30 ms for the protection of Superconducting Fault Current Limiters (SFCLs). The response achieved is rapid, comprising clearly visible periodic oscillations in response to heating in the superconductor. The setup required for this technique is not only simple but also low cost making it a significant breakthrough for the future of superconducting power applications. However, tests need to be performed on coils comprising longer lengths of superconductor with the goal of technique optimization and integration formulation.