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Flux flow instability for testing superconducting materials in view of applications

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Super conductors can conduct electricity at a very low temperature where no energy is dissipated by resistive heating, so superconductors can carry current with 100% efficiency. Actually the use of superconducting technology can make smaller, lighter and more powerful equipments that can improve a power system's stability, reliability, quality and safety. As far as energy power applications are concerned, the stability of the superconducting state becomes relevant for the operation of these devices. Unfortunately, superconductivity becomes unstable under sufficiently high bias currents. Not only the highest critical currents are required but also quenching phenomena need to be prevented in order to get the best performance of any superconducting device. Typically this instability is observed in the current voltage characteristics as an abrupt voltage jump to the normal state, which turns into a current driving quench event. Therefore such instability study arises as a valuable tool to test the high current carrying capability of a superconductor. Experimental studies are performed in extremely high magnetic fields and low temperatures as a function of the direction of the applied magnetic field in our Advanced Material Science and Technology Research Master Labs. Here it is reported an overall study on different materials from low temperature to high temperature and iron-based superconductors. The present technique can be employed as a direct tool to validate the stability of superconducting materials for energy efficient technology.

Biography

Gaia Grimaldi has completed her PhD at Salerno University in collaboration with ENEA Research Center in Frascati, Rome at Superconductivity Laboratory in 2001. She was a Visiting Researcher at Technical University of Munich, Germany in 2000. Since 2003, she is a Researcher at INFM - National Institute of Matter Physics, then from 2005 at National Council of Research - CNR in the superconducting and other innovative materials and device, SPIN Institute. She has published more than 55 papers in international journals and has been a Referee of many outstanding journals. (Sust, Nature, IEEE).

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