ROMA TRE UNIVERSITÀ DEGLI STUDI

Dipartimento di Ingegneria

Seminari di superconduttività applicata

IEEE CSC Council on Superconductivity

Martedì 27 novembre, 11:15/12:45, aula N2, Via della Vasca Navale 79

Superconducting devices for electric power grid: FCL e SMES

Dispositivi a superconduttore per la rete elettrica: FCL e SMES

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High temperature superconductors (HTS) own negligible electrical resistance and very high current density (ten to hundreds times the one of the copper). Not merely a scientific curiosity, their exceptional properties allow the development of power electrical devices with unachieved performance as well as new functionalities. Further advantages are the drastic increase of the efficiency, the compact size and the longer life.
The intrinsic non linearity of HTS material (transition to the normal state due to overcurrent) can be exploited for the development of superconducting fault current limiting (SFCL) devices, able to improve the performance (power quality and stability) of the grid in normal condition and to reduce the risk of disturbance, damage or black out due to fault. Furthermore, the lossless DC current flow can be exploited to store magnetic energy in HTS coils which can be rapidly discharged. A superconducting magnetic energy storage (SMES) device with high deliverable power and no limits in the number of charge/discharge cycles can be obtained which can be for assuring power quality, also in combination with energy intensive storage system (batteries).

In this seminar the concepts and the state of the art of Superconducting Fault Current Limiters and SMES are presented and the benefits that they can bring to the power grid are discussed with reference to practical application cases.

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