

NEW HORIZON IN BIOIMAGING AND BIOMAGNETICS

Shoogo Ueno and Masaki Sekino

Abstract- This paper reviews the recently developed techniques in biomagnetics and bioimaging such as transcranial magnetic stimulation (TMS), magnetic resonance imaging (MRI), and cancer therapy based on magnetic stimulation. A technique of localized and vectorial TMS has enabled us to obtain non-invasive functional mapping of the human brain. The development of new bioimaging technologies such as current distribution MRI and conductivity MRI potentially enables us to understand the dynamics of brain functions, which include millisecond-level changes in functional regions and dynamic relations between brain neuronal networks. These techniques are leading medicine and biology into a new horizon through the novel applications of magnetism. A lecture on current limiter intended specifically for engineering students pursuing specialization with Electrical and Electronics engineering is proposed in this paper. The important information which doesn't appear in text books are presented to the students. A general overview of different techniques of limiting fault current in electric power systems with special emphasis on two types of current limiters based on passive magnetic materials and high temperature superconducting materials have been presented. Simple laboratory experiments are also proposed to validate the theoretical knowledge.