TBA

Yuan Xu
Physics, Ryerson University
yxu@ryerson.ca

Abstract

We report our theoretical and experimental investigations on a new imaging modality for the electrical impedance of biological tissues, Magneto-Acousto-Electrical Tomography (MAET). In MAET, an ultrasound beam is focused into the sample located in a static magnetic field. The vibration of ions in the sample caused by the ultrasound can induce electric current through the mechanism of Lorentz force. Consequently, a voltage can be measured at the boundary of the sample. This voltage is proportional to the current density that exists at the ultrasound focal point when a unit current is injected into the sample through the measurement electrodes. If the ultrasound beam is scanned throughout the samples, the current density distribution in the sample can be mapped. After that, the electrical impedance of the sample may be reconstructed from the current density distribution. MAET combines the good contrast of electrical impedance tomography with the good spatial resolution of sonography. In the theoretical part, we provide the formulas for both the forward and inverse problems of MAET. In the experimental part, the experiment setup and methods are introduced and the current density image of a gelatin object by means of MAET are presented.