

Development of AC and DC Drive Coils for Magnetic Particle Imaging System

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Abstract:

In-vivo imaging system is an important tool in the medical field because it assists in providing accurate diagnosis and treatment process of diseases. It works as a tool to reveal the internal structure of a body by creating visual representation so that abnormalities occurred in the body tissues can be identified. There are several imaging methods used in the medical field such as X-ray radiography, MRI (Magnetic Resonance Imaging), PET and CT scan systems. Recent development in a new imaging modality called Magnetic Particle Imaging (MPI) technique has attracted much interests from researchers where it is expected to provide a higher spatial and temporal resolutions of images. It is also expected to achieve a higher sensitivity compared to the existing imaging systems. The purpose of this study is to develop compact DC and AC excitation coils for an MPI system. The AC and DC excitation coils are designed to utilize the unique behaviour of iron oxide nanoparticles which has relatively high saturation magnetization, making them a perfect tracer material for imaging purposes. The concept, hardware specification and performance evaluation of the DC and AC excitation coils are presented.

Keywords : Coi; Resonance; Low Pass Filter; Magnetic Particle Imaging

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