Design and commissioning of a whole-body 0.2 T fast field-cycling MRI magnet

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T_1 relaxometry opens new avenues for medical research and early works by pioneers already showed interesting features at fields lower than 1T by using FFC-NMR methods in breast cancer, multiple sclerosis and others [1,2].

However, their approach was limited to searching for a 'best field' that would maximize the T 1 contrast for a given pathology. This was due to the lack of technological solutions for the application of FFC techniques in vivo.

Figure 1: View of the whole-body 0.2 T FFC MRI scanner with a home-made head coil inside the

Our lab has developed two whole-body scanners [3,4], the first one reaching a field of 59 mT and the most recent reaching up to 0.2 T. The design and commissioning of such scanners pose some original challenges and require particular consideration that are linked with the use of large varying fields. From the magnet design to the cabling or the control of the various units, field-cycling requires various modifications compared with the 'usual' MRI scanner hardware.

This presentation will focus on the various aspects of the design and commission of the 0.2 T whole-body scanner developed in Aberdeen.

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