Abstract Submitted
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Development magnet for portable MRI device: Investigate skin cancer NURCAN DOGAN, Gebze Institute of Technology — Nuclear magnetic resonance (NMR) is well known from diagnostic medical imaging and analytical chemical spectroscopy. The sample is brought into the laboratory to be investigated with radio-waves inside stationary magnets. This paper describes a new approach useful to reduce the gradient strength of the magnetic field. Despite of the recent progress in magnet design, homogeneity of permenant magnet is still very limited. Fortunately for medical applications usually there is need in high-field homogeneity to obtain the high-resolution spectra that provide the detailed chemical shift and coupling-constant. In this work we discuss various permanent magnet design-without cooling system- for magnetic imaging. The magnet used for the present application consists of two units. The main unit is built from static magnet blocks and generates the main magnetic field. The second one is the shim unit. It consists of smaller movable magnets used to correct in a controlled manner the magnetic field generated by the main unit. By combining the two units, magnetic fields with defined spatial dependence can be generated with high accuracy. The performance of the magnet in terms of resolution and sensitivity is first evaluated and compared with conventional other magnets of higher gradient strength using phantoms of known geometry and relaxation times. After integration of magnet with spectrometer, Our new system is used to profile the structures of healty and unhealthy (cancer) human skins in vivo. To understand the contrast between the different skin type, the distribution of relaxation times T1 is spatially investigated.

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