Auburn University

Innovation Advancement & Commercialization

MRI Coil Design Produces Broadband and Stable RF Waves

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Reference: MRI Coil

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Reference

Lu H, Shang S, Wang S.
Magn Reson Med.
2014 Nov 13. (Link)

Overview

Auburn University is seeking a licensee or development partner for a novel MRI coil design that provides radiofrequency waves in a stable and broadband manner, while reducing the cost of expensive tuning components. This invention has the potential to displace current coil technology with its performance advances and low cost design.

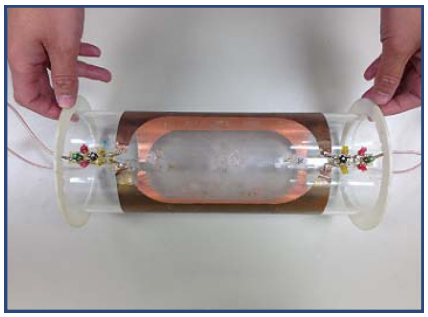
Advantages

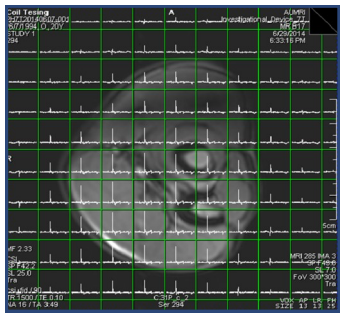
- Coil is based on transmission-line principle, reducing need for expensive tuning components.
- Parallel plates produce stable, broadband radiofrequency waves, enabling self-tuning and operation at various frequencies.
- Design is compact and easier to manufacture than existing coil systems.

Description

MRI scanning has grown into a major diagnostic tool, with MRI instrumentation technology becoming a multi-billion dollar global industry. To perform an MRI scan, a patient must be placed inside a radiofrequency (RF) coil. Current coils are expensive to manufacture, and also require tuning at very specific and discrete frequencies. Such tuning is expensive and time-consuming to implement, and often limit the applicability of a coil to a specific field strength.

For this new coil design, a parallel-plate waveguide was used to produce a different traveling wave structure. These transmission lines consist of two conductors with appropriate terminations that match their wave impedance, which are frequency independent. The use of transmission lines as broadband antennas dates back to the 1930s, and have had a long history of success due to their simplicity and effectiveness. When applied to an MRI application, two actively driven parallel conducting plates can provide RF excitations with high efficiency, in a broad frequency band and in a compact design. This coil is expected to be easier to construct than the traditional birdcage coils. It is also more robust with different loading conditions due to its lack of resonant peaks and reactive components.





Status

- Subject of U.S. Patent 9,952,297
- Imaging of a human forearm demonstrated with a small-scale prototype (see photos)

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities available, including funded research and joint proposals

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