

Novel Surface Coil for Higher Quality and Faster fMRI

MCW C1903

Description

MCW inventors have developed a novel receive-only surface coil for functional magnetic resonance imaging (fMRI) with a significantly higher sensitivity compared to a standard fMRI coil of similar size. The invented assembly is an inductively coupled system consisting of a self-resonant spiral (SRS) fabricated from silver foil encompassed by an outer equalization coil.

Problem Solved

In general, MRI scan sensitivity is limited by the existing geometry of receive coil arrays. These limitations lead to long scan times for patients in the clinic and unrealized image resolution when using modern 3T and 7T scanners.

This novel SRS coil design overcomes these geometric limits and produces higher fMRI resolution along with drastically shorter scanning times for an equivalent coil geometry. For example, the SRS can reduce the scanning time from the standard 20 minute scan to less than 1 minute or increase the voxel resolution by a factor of 4.

Application

This novel surface coil design has the potential to be a more effective receiver in clinical surface coil arrays for anatomical and fMRI studies.

Key Advantages

- Reduces scanning time by nearly 100-fold
- Significantly higher image resolution
- Improved signal-to-noise ratio

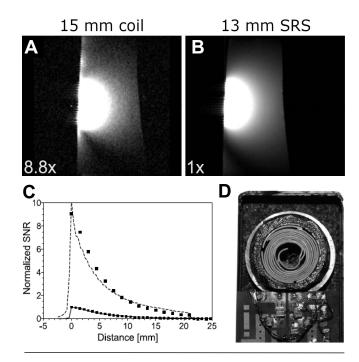


Figure: Data from <u>MCW C1903 publication</u>. **(A-B)** Multi-slice multi-echo MRI sagittal image on a 30% polyacrylamide phantom comparing a 15 mm standard coil and novel SRS coil. **(C)** Normalized SNR plots along the axis of both coils. The 13 mm SRS coil is represented by dashed line (measured data) and **•** (simulated); standard coil represented by solid line (measured) and **•** (simulated). <u>The SNR was 8.8x higher for the SRS coil</u>. **(D) Fabricated SRS design:** 3-turn 13 mm SRS foil structure with 25 mm equalization coil.

Stage of Development:

Prototype tested with 9.4T MRI

Intellectual Property Status: US Patent Issued (11,385,307) Patent pending in Europe (EP17851714)

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