Omnidirectional MRI Catheter Resonator for Interventional Procedures

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Technology description

Inventors in the Department of Interventional Radiology and Biomedical Imaging at the University of California, San Francisco have developed a device for use in interventional MRI. The MRI catheter resonator is a completely integrated resonant marker. It is scalable from large introducer sheaths (>9 French) to microcatheters (≤3 French). The resonant marker is integrated seamlessly, which ensures biocompatibility as the marker is completely encapsulated in the inert plastic of the interventional device. Furthermore, the resonant structure may also be modified to change rigidity and flex points without altering resonance, and the angled solenoid and double helices provide direction-independent resonance. Other proposed resonator technologies use discrete, non-scalable capacitors and are limited to operation in one vector relative to the B1 field of the scanner, which limits their use in clinical applications.

This invention describes an orientation-independent device that can create bright and highly localized signal enhancement during magnetic resonance imaging.

Current interventional procedures utilize X-ray fluoroscopy via radiopaque markers to locate catheters and other devices in order to distinguish them from native vasculature. However, this method is limited to visualizing the lumens of blood vessels while patients and medical practitioners are exposed to large doses of ionizing radiation. Therefore, there is a need for an alternative method to improve tissue resolution and reduce radiation exposure during interventional procedures.

Advantages

Provides bright and highly localized signal enhancement.
High-resolution imaging of tissue.
Safe, robust, and fully biocompatible
Real-time navigation.
Suitable for both X-ray fluoroscopy and interventional MRI.

Institution

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