ACTIVATION OF NEURAL TISSUE BY FUS IN THE PRESENCE OF A MAGNETIC FIELD GRADIENT

Tech ID: 34303 / UC Case 2026-046-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

The primary challenge in non-invasive brain stimulation, such as Transcranial Focused Ultrasound Stimulation (TFUS), is providing precise, localized, and mechanistically distinct control over neural activity. Standard TFUS is believed to function primarily through mechanical deformation of tissue, limiting the ability to selectively enhance or separate different types of neural modulation. Addressing this, UC Berkeley researchers have developed a novel system for the Activation of Neural Tissue by FUS in the Presence of a Magnetic Field Gradient. This unique mechanism, which generates electromagnetic induction from acoustic motion, provides a new physical mechanism to activate or modulate nervous tissue entirely separate from the mechanical effects of the ultrasound alone, offering a higher degree of experimental control and therapeutic precision compared to conventional FUS.

SUGGESTED USES

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As a new method for non-invasive neuromodulation in the central nervous system (CNS) and peripheral nervous system (PNS).

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To enhance or separately activate nervous tissue for treating neurological and psychiatric disorders, such as essential tremor, Parkinson's disease, or chronic pain.

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For brain mapping and dissecting functional brain circuits in research settings by providing a highly localized and mechanistically distinct form of stimulation.

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Utilized near existing MRI infrastructure (which naturally provides strong magnetic field gradients) to enable image-guided neuromodulation therapies.

ADVANTAGES

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Enhanced/Separated Activation: The potential to generate localized circulating electric fields provides a new physical mechanism to modulate nervous tissue beyond the purely mechanical effects of standard FUS.

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OTHER INFORMATION

KEYWORDS

brain, neuromodulation, ultrasound, electric field, magnetic field gradient

CATEGORIZED AS

» **Medical**

» Devices

» Therapeutics

» **Sensors & Instrumentation**

» Medical

» Scientific/Research

RELATED CASES

2026-046-0

Variable Control: Introduces the strong stray magnetic field gradient as a controllable experimental variable in FUS application, enabling finer tuning of stimulation parameters.

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Novel TFUS Method: Opens a new pathway for non-invasive neuromodulation with superior depth and localization compared to Transcranial Magnetic Stimulation (TMS).

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Compatibility: Leverages existing MRI infrastructure, which can be configured to provide the required strong magnetic field gradients.

RELATED MATERIALS

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