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Electron paramagnetic resonance (EPR) imaging without magnet

A method which produces low cost EPR imaging with better receiver isolation and no magnet requirement

IP Status: US Patent Issued; Issued Patent No. 12,078,700

Applications

- In-vivo portable EPR imaging system
- Spectrometer
- Relaxation time measurement – for material science instrumentation, or detecting whether drug-loaded iron oxide nanoparticles (NPs) have reached their target in targeted drug-delivery
- Concentration calibration in cryopreservation – calibration of iron oxide NP concentration in cryopreserved organs
- Magnetic Particle Imaging (MPI) – comparable resolution with 10x less gradient strength. May expand usage to human applications. With appropriate tracer, it may be an alternative to positron emission tomography (PET)
- Dosimetry – both external beam radiotherapy and brachytherapy
- Hyperthymia – higher heating efficiency for cancer therapy or for thawing cryopreserved organs

Technology Overview

This EPR imaging technique is low cost and portable due to the absence of a magnet requirement. This method makes use of geometrical isolation and frequency separation where the receive coil is vertical to the transmit coils, and transmit carrier frequency and receive frequency are tuned to different values. This provides better receiver isolation than the conventional Continuous Wave (CW) EPR systems.

Phase of Development

TRL: 4-5
Working prototype. One-dimensional (1D) imaging system has been built.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- **Michael Garwood, Ph.D.,** Professor, Department of Radiology

References

Technology ID
2020-167

Category
Engineering & Physical Sciences/Design Specifications
Engineering & Physical Sciences/MRI & Spectroscopy
Life Sciences/Diagnostics & Imaging
Life Sciences/Medical Devices
Life Sciences/MRI & Spectroscopy

View online

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