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Office of Technology Management

PHOTON TUNNELING

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Photon tunneling has the potential to guide light to the core of a human body in vivo. Imaging, sensing, and therapy are among the applications for this technology. Light, as opposed to potentially harmful x-rays, is an ideal non-ionizing radiation for imaging and treating biological tissue, however, is subjected to scattering through biological medium. Focusing light into a scattering medium is required for imaging and treatment of biological tissues, such as tumors. A need exists for an enhanced method of focusing light into a scattering medium, such as biological tissue, that is tolerant of dynamic microstructures. In particular, there is a need for an enhanced system and method of penetrating and focusing light beyond the optical transport mean free path within a scattering medium.

Researchers at Washington University have conceived a technology capable of sending light deep into biological tissue along desired tunnels with sub-millimeter resolution and minimum attenuation using time-reverse ultrasonically encoded (TRUE) optical focusing that was previously described. They can potentially achieve unprecedented light penetration, limited only by absorption rather than scattering, with a depth of 100cm.

Benefits:
- Method and device of focusing light within a scattering medium
- Penetration depth of 100cm
- Non-ionizing imaging and therapy