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Medical Diagnostic and Surgery Using FemtoSecond Laser Radiation

The Technology

Researchers at the University of Tennessee have developed a non-invasive specialized focusing method to tailor interaction of ultra-short, femtosecond laser radiation for imaging and therapeutic purposes. This method enables finding and mapping the anatomical location and size of the tumorous tissues. Thereby, enabling localizing, diagnosing, and increasing the temperature in targeted area to induce cell necrosis. This method also enables monitoring the temperature distribution in combination with the therapeutic heating, including feedback mechanism for treatment.

This method overcomes limitations posed by current solutions such as Photo-Dynamic Therapy that has restricted acceptance; surgery that may not always offer an option due to the fact that not all carcinogenic tissue can be removed; or radiation that may damage portions of healthy brain.

The Benefits

- Imaging mechanism through thin bone layers, such as skull and targeted treatment for persistent cancer.
- Improved diagnostic and therapeutic delivery of radiation due to the selective delivery and larger focal volume.
- Can be performed as an outpatient procedure.
- Non-invasive method as it does not require a fiber optic cable to deliver laser radiation.

The Inventor

Dr. Christian Parigger

Research areas of interest include experimental and theoretical physics, particularly electromagnetic interactions, quantum optics, non-linear optics, atomic and molecular and optical physics. Christian Parigger shows over thirty years of experience in Academia, including more than twenty five years at the University of Tennessee/ The University of Tennessee Space Institute in research, teaching, service. Holds PhD from University of Otago, Dunedin, New Zealand, and Doctor rer. nat. in Physics from University of Innsbruck, Austria. Experience in science and technology especially in selected areas of spectroscopy, including experiments, theory, and numerical modeling.

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Dr. Jacqueline Johnson

Jacqueline Johnson obtained her B.Sc. and Ph.D. from the University of Liverpool in the United Kingdom. She worked as a professor in Liverpool until 1995 when she came to Argonne National Laboratory in the United States to study the structure of glasses. After a 2-year period as Assistant Division Director of the Materials Science Division she returned full time to science to initiate the mammography project. Other current research projects include solar energy and carbon films. On November 1st 2007 she returned to academia at the University of Tennessee, Laser Research Center to further the mammography and carbon research. She is the author of more than 90 peer-reviewed publications.

Dr. Robert Splinter

Project Manager and Engineering and Technology lead with more than twenty years of device development experience using science and engineering. Provide key recommendations on selection of business opportunities and appropriate engineering requirements. Academic roles include Adjunct Associate Professor as well as lecturer and graduate committee member. Education: Ph. D., Physics and Medical Engineering; VU University of Amsterdam, The Netherlands; MSc., Engineering Physics; TU/e Eindhoven University of Technology, The Netherlands.

Contact

The University of Tennessee Research Foundation (UTRF) is a non-profit corporation responsible for commercializing University of Tennessee technologies and for supporting University research. UTRF is seeking parties interested in learning more about this technology and in exploring possible research and/or commercialization arrangements.

If after reviewing this abstract you would like further information, please phone us at 865.974.1882 or send an email to utrfinnovations@tennessee.edu and reference PD 12092. Dr. Maha Krishnamurthy, our licensing associate, will get in touch with you as soon as possible to make the appropriate arrangements, including discussions with the inventor. Maha will also be glad to discuss possible avenues for commercialization of this technology or answer any questions you may have regarding UTRF.

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