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Prostate cancer ablation with a 4D robotic system using thermal ultrasonic waves under MRI guidance.

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Διαρθρωτικά Ταμεία
της Ευρωπαϊκής Ένωσης στην Κύπρο

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Summited Abstract:

MRI guided positioning device using focused ultrasound for treatment of prostate cancer.

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Abstract

A magnetic resonance imaging (MRI)-positioning device with 2 computer-controlled axes (one linear and one angular) was developed. The positioning device holds a single element focused ultrasound (FUS) endorectal transducer. Four manually driven axes were also developed in order to properly place the transducer close to the rectum. The purpose of this positioning device is to ablate prostate cancer in humans in the future.

The positioning device includes MRI compatible piezoelectric motors, and optical encoders and ABS plastic. All the parts of the positioning device were developed using an industrial 3D printer.

The MRI safety of the device was successfully evaluated in a GE 1.5 T MRI scanner. The positioning device has the ability to accurately move the transducer. The ability of the transducer to cause high temperatures was tested successfully in a water-agar phantom. A reliable, simple, cost effective, portable positioning device has been developed which can be used in virtually any MRI scanner since it can be placed on the scanner's table. The proposed positioning device can be used in the future for clinical trials for prostate cancer treatment using FUS provided that it is evaluated extensively in animal models.

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