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Miniaturized Ultrasonic Transducers for Medical Technology

New Ultrasound Technology for the Prostate: Fraunhofer IPMS Develops Key Components for MaxQ Medical

New possibilities for prostate care are emerging from the collaboration between medical and microsystems technologies. As MaxQ Medical's development partner, the Fraunhofer Institute for Photonic Microsystems IPMS is developing miniaturized ultrasound transducers for the company's technology platform. Following a recent Series A funding round of \$31.5 million, the company intends to accelerate the development of its platform and clinical program. This collaboration exemplifies how microsystems technology can facilitate novel ultrasound applications in medicine.

Ultrasound plays an important role in medicine, particularly in visualizing structures and tissues within the body. In prostate care, there is a need for compact solutions that integrate ultrasound technology directly into medical instruments. It enables imaging and therapeutic applications to be combined into a single system. This is precisely where MaxQ Medical's technology platform comes in. The company is developing a transurethral system that combines ultrasound imaging with therapeutic applications. Initially, the technology is intended for treating benign prostatic hyperplasia (BPH), which is characterized by an enlarged prostate. In the future, the platform is expected to enable other medical applications.

CMUTs make ultrasound compact

CMUTs (Capacitive Micromachined Ultrasonic Transducers) form the technological foundation of compact ultrasonic systems. These tiny structures, manufactured using microsystems technology, can convert electrical signals into ultrasound. Conversely, received ultrasonic signals can be converted back into electrical signals. Due to their small size and integration capabilities, CMUTs are ideal for use in medical instruments with limited installation space. Multiple transducers can be combined into arrays to create compact ultrasonic systems with numerous channels.

Fraunhofer IPMS brings microsystems technology to industrial applications

Fraunhofer IPMS has extensive experience in developing CMUTs. The institute's work includes designing components, developing suitable manufacturing processes, and fabricating as well as characterizing these components. This enables the institute to adapt CMUT technology to the specific requirements of various applications.

Editor

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The development partnership with Orchard Ultrasound Innovation and its first spinout MaxQ Medical is a prime example of Fraunhofer IPMS's technology transfer. The aim is to further develop research results in the laboratory and adapt them to specific requirements in collaboration with industry partners, making them usable for new applications. In addition to miniaturization, factors such as performance, reliability and integration into existing system concepts are important considerations. The development of suitable CMUTs therefore necessitates the integration of micromechanics, semiconductor technology, and systems development.

"We are pleased to support MaxQ Medical as a development partner as it continues to advance its technology platform and to contribute our expertise to this challenging medtech project. Our task is to design the CMUT technology so that it can be reliably integrated into MaxQ Medical's medical device," says Dr. Sandro Koch, head of the Acoustic Sensors and Systems business unit at Fraunhofer IPMS.

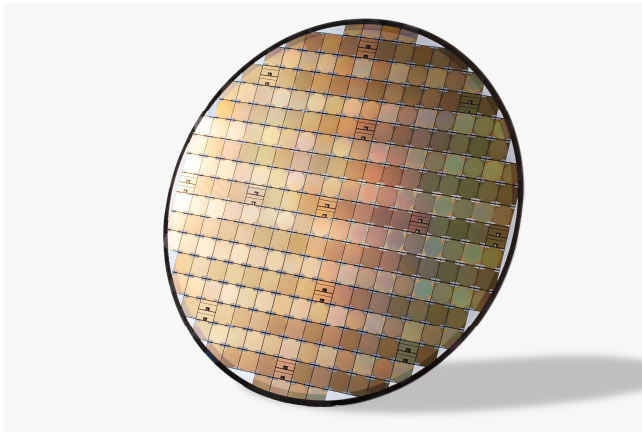
The potential applications of CMUT technology extend beyond the collaboration with MaxQ Medical. In the field of medical technology, for example, Fraunhofer IPMS is developing solutions for medical imaging and photoacoustic systems. Other applications are emerging in contexts where small, compact sensors are needed, such as in wearables, compact sensor systems, and human-machine interaction.

About Fraunhofer IPMS

Fraunhofer IPMS is a world-renowned research and development service provider specializing in electronic and photonic microsystems. Our technologies are used in industries such as mobility, biotechnology, and medical technology. We are also addressing key future fields, such as quantum technologies and neuromorphic computing. Through our research in green microelectronics, we contribute to a sustainable and resource-efficient world. <https://www.ipms.fraunhofer.de/en.html>

About Orchard Ultrasound Innovation

Orchard Ultrasound Innovation is a Sunnyvale, California-based company founded to commercialize breakthrough ultrasound technology developed out of Stanford University. Orchard's work builds on decades of research in semiconductor ultrasound, led by co-founder and Chief Scientific Officer Professor Pierre Khuri-Yakub, inventor of the Capacitive Micromachined Ultrasonic Transducer (CMUT). The company develops and spins out ultrasound-based technology across medical and commercial applications, with MaxQ Medical as its first spinout company. For more information, visit orchardultrasound.com.

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CMUT Wafer of Fraunhofer IPMS

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