SEMINAR

Development of high-frequency ultrasound transducers for biomedical imaging

Abstract: Ultrasound imaging is a popular diagnosis tool for clinical and veterinary medicine attributable to its fast acquisition, non-destructive and non-ionizing radiation characteristic as opposed to other diagnostic modalities. To the preclinical study for small-size animals, the current clinical sequential linear ultrasound transducers are insufficient to obtain intricate features of those targets due to the limited spatial resolution, bulky transducer and large aperture. Therefore, it is highly desirable to make ultrasound transducers with higher spatial resolution, higher sensitivity as well as smaller aperture size for acquiring contour and related biological information of small-scaled organs or tissues. In this seminar, physics and material sciences related to fabrication and characterization of high-frequency (20-MHz) phased-array transducers with high axial and lateral imaging resolutions will be introduced. In vivo ultrasound imaging with phased-array transducers is of great importance for both clinical application and biomedical research. Demonstration the potential application of our developed high-frequency phased-array transducer for biomedical research on small animals such as in vivo fisheye and mouse heart images will also be introduced. Furthermore, our very recent works in 2D array transducer design and fabrication as well as ultrahigh frequency (GHz) transducer development will be presented.

戴吉岩，香港理工大学应用物理系教授，1988 毕业于复旦大学物理系，后获清华大学硕士学位，中科院博士学位。曾在美国西北大学材料科学与工程系做博士后研究，后任新加坡特许半导体公司主任工程师。2001 年开始至今任教于香港理工大学应用物理系。戴吉岩教授是功能薄膜材料结构研究与器件制备方面的国际知名学者，并在新型材料用于医学影像的高频、宽带超声换能器的研制方面有所建树，并获颁多项专利。发表论文 300 余篇，论文被他引 10000 多次，并著有专著《Ferroic Materials for Smart Systems-from Fundamentals to Device Application》。主持完成多项香港政府资助的科技公关项目，并主持国家 973 项目“先进超声探头研制”子课题。曾获得 2020 年广东省自然科学一等奖。现任全国电介质物理学会和全国微纳技术学会理事。

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