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**Abstract**

**Towards High-sensitivity Transparent Piezoelectric-Ultrasound Transducers for Biomedical Applications**

\*S. Khandare<sup>1</sup>, A. Amin<sup>1</sup>, S. Kataria<sup>1</sup>, A. Qushaysh<sup>1</sup>, H. Chen<sup>1</sup>, S. Mirg<sup>1</sup>, M. Osman<sup>1</sup>, S.R. Kothapalli<sup>1,2,3</sup>

<sup>1</sup>Department of Biomedical Engineering, Penn State University  
University Park, PA 16802

<sup>2</sup>Penn State Cancer Institute, Penn State University  
Hershey, PA, 17033

<sup>3</sup>Graduate Program in Acoustics, Penn State University  
University Park, PA 16802

**Abstract:** Imaging diseases in living subjects requires the study of structural, functional, and biochemical features. Since no single imaging method can provide comprehensive information, multimodal imaging techniques have gained clinical importance. To address this issue, we have developed a novel transparent ultrasound transducer (TUT) platform made of transparent lithium niobate piezoelectric material and demonstrated potential biomedical applications ranging from multimodal brain microscopy to multimodal deep tissue imaging and ultrasound modulation of cells. However, the first generation of lithium niobate TUTs exhibited low sensitivity and bandwidth. Here we report our efforts toward further improving the TUT sensitivity using novel transparent matching layers (e.g., matrix with oxide powders and epoxy) and novel transparent piezoelectric material (e.g., PMN-PT).