Low-Power Gas Microbubble Detection Technology based on Acoustic Resonance

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Abstract

A novel approach towards developing a micro-bubble detection technology based on using a PZT transducer to induce an acoustic resonance state within the system under investigation is here presented. The concept, originally proof-of-concept tested in a cylindrical acoustic resonant chamber, has proven to be able to detect single microbubbles with diameters in the range of 390 to 600 μm in a swine thigh, with either saline solution or sheep blood as the medium in the bubble guide. It has shown to be extremely adaptable, capable of accommodating industrial pipes as well as biological specimens, resilient and extremely energy efficient, able to detect micro-bubbles with as little as 0.8 mW and potentially less.

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