

ACOUSTICS2008/2415 Combined 2 frequency array for optoacoustics and acoustics

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A combined transducer for optoacoustics and b-mode ultrasound has to be built according to the specific requirements of both modalities. In order to combine the two tasks in one transducer, we have designed a probe consisting of a PZT array and a PVDF array in a sandwich assembly. The 20 MHz PZT array is a linear array with 128 elements bearing a 150 μm pitch. It operates as a high resolution transmit and receive array for the visualization of geometrical structures in biological tissue. A thin piezoelectric polymer film (PVDF) that is structured as receiving array is superposed to the PZT array. The PVDF array allows to detect the small optoacoustic pressure transients resulting of laser irradiation of small biological structures. Its acoustic impedance of approximately 4-4,5 MRayl allows to use it in a double function as optoacoustic receiving array and matching layer for the PZT array. The combined array is driven by a custom made multichannel read-out system supporting sampling frequencies of 80 MHz and combined imaging with b-mode and optoacoustics. This combined probe integrates the benefits of a high resolution PZT array and gives access to the specificity of optoacoustic signal generation.