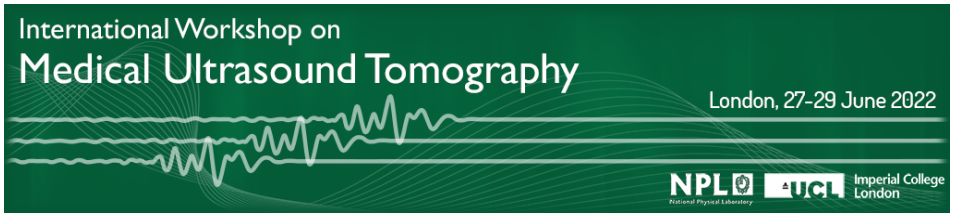

Contribution ID: **29** Type: **not specified**

Reconstructions of experimental low-frequency ultrasound tomography data collected on a circular belt of Tonpilz transducers

Tuesday, June 28, 2022 3:00 PM (20 minutes)

The low-frequency range of 10 to 750 kHz holds promise for pulmonary imaging since it has been shown (Rueter et al. are Ultraschall in der Medizin, 2009) that acoustic waves in this frequency range penetrate lung tissue. An adaptation of the Tonpilz transducer design aimed at an operation frequency between 50 and 200 kHz, a beam angle of at least 38°, and external dimensions of 25 mm diameter by 10 mm of thickness was developed. The novel sensors were calibrated for this application and found optimal efficiency near 125 kHz. A flexible belt of adjustable length that can fit up to 32 transducers was built and used to collect ultrasonic data in a ring array configuration. The data was collected with a Verasonics Vantage 64 Low-Frequency Research Ultrasound system and 32 transducers. For this preliminary study, the system was programmed to transmit a sinusoidal signal of frequency 125 kHz on one transducer at a time while listening to the received signal on the remainder of the transducers. Here we present the transducer belt, experimental configuration, and results from preliminary tests on an agar phantom with inhomogeneities. Two-dimensional transmission travel-time tomography was used to reconstruct the sound velocity. The images demonstrated the ability of this system to detect inhomogeneities accurately.

Preferred Contribution Type

Presentation

Authors: Mr VIEIRA PIGATTO, Andre (Colorado State University); Prof. FURUIE, Sergio (University of Sao Paulo); Prof. MUELLER, Jennifer (Colorado State University)

Presenter: Mr VIEIRA PIGATTO, Andre (Colorado State University)