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Injectivity and Exact Inversion of Ultrasound Operators in the Spherical Geometry.

In ultrasound tomography an emitter sends acoustic waves through the body, and the reflections of these waves are registered by a receiver. These data measured for various locations of emitter and receiver are then used to reconstruct the acoustic reflectivity function, which represents an image of the interior of the body. Mathematically this procedure is equivalent to the inversion of an operator, which puts into correspondence to the image function, the measured reflections at available receiver locations. The talk discusses the injectivity of ultrasound operators in the spherical geometry of data acquisition, and exact inversion procedures derived for several setups in this geometry. This is joint work with Rim Gouia and Venky Krishnan. (Received January 11, 2012)