

# Imaging an acoustic waveguide from surface data in the time domain

L. Bourgeois

The objective is to identify obstacles in an acoustic waveguide from the measurements of the scattered field at receivers located on a boundary grid due to point sources on the same boundary grid. By applying the Fourier transform to the time domain data, the problem amounts to a family of time harmonic problems for multiple frequencies. The identification at a given frequency is obtained with the help of a sampling method (the Linear Sampling Method) using a modal representation of the acoustic field which is well-adapted to the geometry of the waveguide. The images for all frequencies are then combined in order to obtain the "best" possible image. An important part of the presentation will be focused on the optimization of sources/receivers, which relies on the minimization of the condition number of a Vandermonde matrix with complex entries on the unit circle. Some numerical experiments will illustrate the feasibility of our approach. This is a joint work with Arnaud Recoquillay and Vahan Baronian.