

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Broadband, slow sound on a glide-symmetric metasurface¹

JOSEPH BEADLE, TIMOTHY STARKEY, J. ROY SAMBLES, ALASTAIR HIBBINS, University of Exeter — The patterning of surfaces to control sound attenuation by the manipulation of a trapped acoustic surface wave has received considerable attention. Here the dispersion of acoustic surface modes on a rigid space-coiled metasurface is studied. A single continuous cavity structure consisting of a 1D periodic labyrinth which forms a glide-symmetric surface, with the property of zero bandgap at the first Brillouin-zone boundary, is explored. Acoustic surface waves supported by such surfaces exhibit constant reduced group velocity, to that of air, over a broad frequency bandwidth. Details of the acoustic surface wave dispersion are obtained experimentally by exciting with a near-field point-like pulsed sound pulse and monitoring the resulting near fields by use of a needle-probe microphone. Results obtained compare very well with the predictions of finite element method model. Such broadband, highly-attenuated surface modes have potential applications in reducing noise created by flow over surfaces.

¹EPSRC (UK) via the Centre of Doctoral Training in Metamaterials, QinetiQ

Joseph Beadle
University of Exeter

Date submitted: 31 Jul 2017

Electronic form version 1.4