
Forcing the Silence of the Lamb waves: Uni-directional propagation in structured gyro-elastic strips and networks

Michael Nieves^{*1}, Giorgio Carta², and Michele Brun²

¹Keele University – United Kingdom

²University of Cagliari – Italy

Abstract

We consider a gyro-elastic structured strip, formed from rods interconnecting periodically placed masses that are attached to gyroscopes. The presence of the gyroscopes makes the system non-reciprocal. Near bulk resonances of the strip, the medium is capable of supporting uni-directional Lamb waves when subjected to forcing (1). We discuss the solution to this problem and demonstrate how these near-resonance effects can lead to designs of novel waveguides. Namely, we illustrate how we can create a network of structured strips that is capable of channelling the energy supplied by an external source towards any of its endpoints, which can be chosen arbitrarily and in advance.

(1) G. Carta, M.J., Nieves, M. Brun, (2023): Forcing the Silence of the Lamb waves: Uni-directional propagation in structured gyro-elastic strips and networks, *Eur. J. Mec. A-Solid* 101, 105070

^{*}Speaker