

Acoustic and electromagnetic cloaking

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Abstract

In this talk, we shall present our recent progress on acoustic and electromagnetic cloaking of obstacles with transformation media. In wave scattering, an obstacle is an object that waves cannot penetrate inside. With artificially designed transformation media, we show that the obstacle can be virtually reshaped under acoustic or electromagnetic wave detection. These cloaking media are shown to must be anisotropic. Based on certain stability estimates of scattering amplitudes in terms of the diameters of small obstacle, we further show that the limits of virtual minification is the invisibility cloaking. Our study is conducted in both homogeneous and general inhomogeneous background spaces. Finally, our results can be applied to cloak an arbitrary medium with suitable lining of the cloaked region to produce the required obstacle boundary conditions on the exterior cloaking interface.