

Abstract Submitted
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Perfect Broadband Cloaking of shallow water Waves via Nonlinear Medium Transformation AHMAD ZAREEI, M.-REZA ALAM, UC Berkeley
— The major obstacle in achieving a perfect cloaking for shallow water waves is that the linear transformation media scheme (aka transformation optics) requires variations of two independent medium properties. These two medium properties for the case of electromagnetic waves are permittivity and permeability. Designing a medium with a variable permittivity and permeability is difficult to achieve. For gravity waves, the two required spatially variable properties are the water depth and the gravity acceleration, but here changing of the gravity acceleration is simply impossible. Here we present a nonlinear transformation that only requires the change in one of the medium properties, i.e., in the case of shallow water waves just the water depth, and hence enables us to design a perfect cloak for long gravity waves. We show that with this nonlinear transformation an object can be cloaked for any wave satisfying merely the shallow water condition. The presented transformation can as well be applied for the design of non-magnetic optical cloak for electromagnetic waves.

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