

Abstract Submitted
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Transformation media with negative refractive indices¹ C.T. CHAN, Physics, HKUST, Hong Kong, Y. LAI, H.Y. CHEN, JACK NG, Z.Q. ZHANG, PHYSICS DEPARTMENT, HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY, HONG KONG TEAM — Artificially structured materials with a negative refractive index designed by transformation optics can have interesting properties. Based on merging the concept of complementary media and transformation media, we propose an invisibility cloak operating at a finite frequency that can make an object invisible with a pre-specified shape and size within a certain distance outside the shell. The cloak is comprised of a dielectric core, a negative index metamaterial shell and an “anti-object” embedded inside the shell. The cloaked object is not blinded by the cloaking shell since it lies outside the cloak. Full-wave simulations in two dimensions have been performed to verify the cloaking effect. We also show that a positive index core coated with a negative index shell can result in a frequency selective super-absorber which has an absorption cross section that is significantly higher than the geometric cross section.

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C.T. Chan
Physics, HKUST

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