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# Polar metamaterials and cloaking

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## Abstract

Resonant metamaterials have long been understood within the context of the standard theory of elasticity albeit with dispersive, possibly negative, constitutive properties. In this talk, we show how resonance, rotational resonance in particular, can modify not only the values of the effective moduli but the very form of the effective elastic behavior by giving rise to chirality and stress asymmetry. Metamaterials with such a rotational resonance-induced behavior are referred to as "polar". We also report on how polar metamaterials can be used to build invisibility cloaks, i.e., coatings that make a region undetectable by sonographic or elastographic imaging techniques.

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