Metamaterials and Transformation Physics

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Transformation optics is a design tool inspired by the theory of General Relativity. It maps fictitious coordinate transformations (“distortions of space”) onto actual (meta-) material distributions in the laboratory that are generally inhomogeneous and anisotropic. Invisibility cloaking is a benchmark example for these ideas because cloaking was commonly believed impossible just a few years ago. I will give an introduction into the underlying principles and review the state-of-the-art in various systems including optics, mechanics and thermodynamics.