

## Mathematical Physics

# Schrodinger's Hat: Electromagnetic, acoustic and quantum amplifiers via transformation optics

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The advent of transformation optics and metamaterials has made possible devices producing extreme effects on wave propagation. Here we give theoretical designs for devices, Schrödinger hats, acting as invisible concentrators of waves. These exist for any wave phenomenon modeled by either the Helmholtz or Schrödinger equations, e.g., polarized waves in EM, pressure waves in acoustics and matter waves in QM, and occupy one part of a parameter space continuum of wave-manipulating structures which also contains standard transformation optics based cloaks, resonant cloaks and cloaked sensors. For EM and acoustic Schrödinger hats, the resulting centralized wave is a localized excitation. In QM, the result is a new charged quasiparticle, a *quasmon*, which causes conditional probabilistic illusions. We discuss possible solid state implementations.

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