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Optical Indistinguishability via Twinning Fields[1] GERARD MCCAUL, ALEXANDER KING, DENYS BONDAR, Tulane University — Here we introduce the concept of the twinning field – a driving electromagnetic pulse that induces an identical optical response from two distinct materials. We show that for a large class of pairs of generic many-body systems, a twinning field which renders the systems *optically indistinguishable* exists. The conditions under which this field exists are derived, and this analysis is supplemented by numerical calculations of twinning fields for both the 1D Fermi-Hubbard model, and tight-binding models of graphene and hexagonal Boron Nitride. The existence of twinning fields may lead to new research directions in non-linear optics, materials science, and quantum technologies.

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Gerard McCaul
Tulane University

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