Mechanical analogues of topological insulators

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Electrons in solids can be characterized by topological quantum numbers. In its simplest form, this can be understood directly in the picture of the corresponding bandstructures, which gives rise to the notion of topological insulators. Stripped down to the properties of bandstructures, the non-trivial topology does not rely on fermionic properties or even on quantum mechanics. This fact was already used to engineer photonic arrays, exhibiting topologically non-trivial features, such as protected edge states. Recently this idea was further extended to systems governed by Newtons equations of motion. I will discuss how the ideas formulated in quantum mechanics can be carried over to classical mechanical meta-materials and point out why this is an exciting new direction.