Mechanisms and nonlinear waves from topological modes

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Topological protection can arise in mechanical structures such as linkages, frames, or rigid origami. The key ingredients are a balance of degrees of freedom and constraints away from the boundaries. In this setting certain zero energy modes of the system can be made robust against a broad class of perturbations and noise. However, since there are no restoring forces to these modes to linear order, they result in flexes and mechanisms which must be treated as nonlinear waves. I will discuss several simple and concrete examples which illustrate these ideas.