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Simulating wave-turbulence on thin elastic plates with arbitrary boundary conditions WIM M. VAN REES, L. MAHADEVAN, Harvard University — The statistical characteristics of interacting waves are described by the theory of wave turbulence, with the study of deep water gravity wave turbulence serving as a paradigmatic physical example. Here we consider the elastic analog of this problem in the context of flexural waves arising from vibrations of a thin elastic plate. Such flexural waves generate the unique sounds of so-called thunder machines used in orchestras - thin metal plates that make a thunder-like sound when forcefully shaken. Wave turbulence in elastic plates is typically investigated numerically using spectral simulations with periodic boundary conditions, which are not very realistic. We will present the results of numerical simulations of the dynamics of thin elastic plates in physical space, with arbitrary shapes, boundary conditions, anisotropy and inhomogeneity, and show first results on wave turbulence beyond the conventionally studied rectangular plates. Finally, motivated by a possible method to measure ice-sheet thicknesses in the open ocean, we will further discuss the behavior of a vibrating plate when floating on an inviscid fluid.

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