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"A Guide to Loudspeakers for Physicists"

The electrodynamic loudspeaker was invented over 100 years ago, but many important aspects are sufficiently subtle that even now it is impossible to deterministically design a speaker, even with detailed multiphysics finite element models. Physicists' deep and thorough understanding of simple and coupled oscillators can make them some of the most valuable scientists at a speaker company like Bose, but physicists will also find that much of the physics that is most important in audio transducers received little or no time in their physics curriculum, particularly ferromagnetics, continuum mechanics, and viscoelasticity. In short, physicists in audio find it amazing how far they can get just by knowing about masses on springs, but are also amazed by all the things that they don’t know that are required to design a good spring. This talk will provide a survey.