



FROM ACOUSTICS TO ART: SOUND GENERATION IN MUSICAL INSTRUMENTS

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Abstract

Being overwhelmed by sounds in our daily life, one might easily forget that sound can be put to many positive uses. If sound in the form of noise is actually critical for the health and well-being of human, it can have in the form of music aesthetic and emotional values that have provided a fertile field of exploration merging arts and sciences. With the rich diversity of musical sounds, it was only natural for physicists to start understanding their physical structure and developing scientific knowledge of how sound production in musical instruments function. Indeed, from a physical approach, musical instruments are remarkable mechanical systems for which complex phenomena, usually unwanted in the field of engineering acoustics, become an essential prerequisite for musical expression: vibrations are indispensable, coupling phenomena are crucial and non-linear effects are welcome. As an antidote to regard vibration and sound as an undesirable by-product, this talk will concern the generation of sounds by musical instruments. It will provide an overview of the physical principles on which musical instruments work, from the description of their functional building blocks to the illustration of some interesting and subtle phenomena, which are responsible for the very essence of music and up to a certain point, for its capacity to affect human life.