

Acoustics

Acoustics is the science of sound. Although the basic theory of acoustics is that of wave propagation and vibration, acoustics is a multidisciplinary science, looking not only at the mechanics of sound, but also the production and reproduction of sound and the human response to sound. A scientist that works in the field of acoustics is often called an *acoustician*.

Whilst we only come across many physical phenomena on occasion, acoustics is a constant part of our lives, we can hear sounds all around us, almost all the time that most of us are awake. For an engineer, designing and manufacturing systems, If there is any vibration – whether this is by design, or as a by-product – then the acoustics of the design product will often be of interest.

A scientist may take a dispassionate and analytic view of sound, on the other hand an engineer must also reflect the human response to sound. This tends to divide acoustic engineering into two very distinct camps: audio and noise. The *audio engineer's* role is to reproduce sound as faithfully as possible. The *noise engineer* often regards noise as an unfortunate by-product of his/her system, which has to be reduced or managed. Psychoacoustics is the study of the human response to sound.

Once sound is produced or transmitted indoors a building or architectural acoustician would be interested in how the sound propagates or is absorbed within the building. If a sound is reproduced or transmitted outdoors, an environmental acoustician would be interested in the propagation of and absorption of sound in the open air. Another very important domain for acoustics engineering is the transmission and detection of sound underwater.

The sounds detected in the typical fluid media mentioned – air and water – are the result of sound waves travelling through the media. The acoustic excitation causes fluid particles to vibrate. This vibration is propagated through the acoustic medium.