

Wave, Frequency, Amplitude

Waves

A wave is a regularly (periodically) repeating movement about the middle point of that movement. If it is shown as a curve over time, it appears as a typical sine wave. The term “wave” is used in physics especially for all oscillations that propagate through space.

Waves interfere, i.e. they overlap each other. Adding one wave to another produces a new wave with a different waveform.

There are mechanical, electrical, electromechanical, and optical waves.

Frequency and wave length

Frequency is a certain number of **vibrations per second**, in other words, how often the waveform is repeated in a second. The frequency describes the periodicity of an event, in this case, the oscillation of the wave.

Frequencies are measured in “hertz” (Hz), after the German physicist Heinrich Hertz.

At high frequencies, waveforms are tight and repeat themselves quickly; at low frequencies, the waveforms are broader and repeat themselves more slowly.

Looking at a wave under the aspect of its spatial propagation, and if the speed of propagation for a given medium is constant, then the wave length can be determined as follows:

$$\text{wavelength} = \text{speed of propagation} / \text{frequency}$$

Thus, a high frequency means a short wavelength.

Amplitude

Amplitude means the maximum displacement from the rest position. It is a measure for the “wave energy” (for example, for sound the size of the sound pressure).

Form of a wave = curve shape

Oscillations and waves are depicted as mathematical curves; that is why the term “curve form” is used for the form of a wave. In the most simple case, this is a sine wave. However, individual waves often overlap, to create highly complex forms.