

Doppler Effect

The Doppler effect is the change in frequency or wavelength of a wave in relation to an observer moving relative to the wave source. It is named after the physicist Christian Doppler, who postulated in 1842 that the perceived frequency of sound waves varies depending on the relative motion between the source and the observer. The effect is most noticeable with sound waves, but it also applies to light waves.

When a source of waves moves toward an observer, the waves are compressed, resulting in a higher frequency (shorter wavelength). Conversely, when a source moves away from an observer, the waves are stretched, resulting in a lower frequency (longer wavelength). This is why the pitch of a siren appears to rise as it approaches and fall as it recedes.

The Doppler effect is a key concept in physics and has numerous applications, including in astronomy (measuring the motion of stars and galaxies), radar (determining the speed of objects), and medical imaging (ultrasound).