Doppler, Christian Johann (1803-1853)

Austrian mathematician and physicist. Attempted to explain the coloration of stars in terms of an apparent change in frequency due to motion similar to the pitch-change in sound from moving objects. In fact, this Doppler effect in light is more difficult to detect, because the velocity of light is so great.

That is,

$$\frac{\text{The relative velocity of approach of two objects}}{\text{velocity of sound}} \Rightarrow \text{The corresponding fraction in the case of light}$$

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The principle is applicable to all types of wave motion. Thus, for sound waves it is noticed that the pitch of a whistling train drops suddenly as the train passes an observer standing on the platform of a station. A similar effect occurs when the observer is moving and the source of sound is fixed.

The principle is employed in the use of radar to measure the speed of moving vehicles. In Medicine, an analogous analysis is used to measure the blood flow, in order to identify circulation problems.

The change in wavelength for light, in the case of radial velocity, v, is related by the following equation:

$$\frac{\lambda - \lambda_0}{\lambda_0} = \frac{v}{c}$$

"λ" is the observed wavelength of the spectral line, "λ_0" is the "rest" wavelength measured in the laboratory and "c" is the velocity of light ($3 \times 10^8 \text{ m s}^{-1}$)

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