

# WAVES

**Mechanical Waves**  
(Requires a medium)

**Electromagnetic Waves**  
(Does not require a medium)

Longitudinal Waves  
- Sound

Transverse Waves  
- Water waves

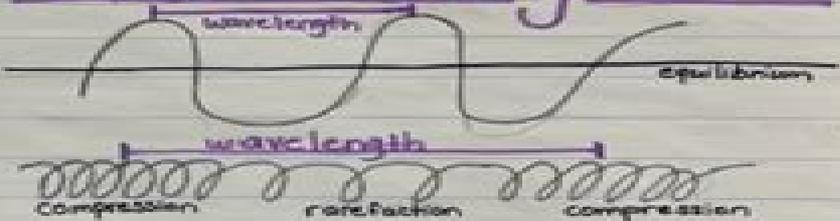
- Light
- Microwaves
- Infrared
- X-rays
- Ultraviolet rays
- Radio waves

## Properties

### Amplitude



### Wavelength



### Frequency

High frequency = High energy

Low frequency = Low energy

Frequency & wavelength have an inverse proportional relationship.

### Speed

$$\frac{\text{distance}}{\text{time}}$$

$$\text{Wave Speed} = \text{frequency} \times \text{Wavelength}$$



# Physics Waves And Vibrations Notes

**University of Illinois (Urbana-  
Champaign campus)**



## Physics Waves And Vibrations Notes:

**Introduction to Vibrations and Waves** H. John Pain, Patricia Rankin, 2015-03-30 Based on the successful multi edition book *The Physics of Vibrations and Waves* by John Pain the authors carry over the simplicity and logic of the approach taken in the original first edition with its focus on the patterns underlying and connecting so many aspects of physical behavior whilst bringing the subject up to date so it is relevant to teaching in the 21st century The transmission of energy by wave propagation is a key concept that has applications in almost every branch of physics with transmitting mediums essentially acting as a continuum of coupled oscillators The characterization of these simple oscillators in terms of three parameters related to the storage exchange and dissipation of energy forms the basis of this book The text moves naturally on from a discussion of basic concepts such as damped oscillations diffraction and interference to more advanced topics such as transmission lines and attenuation wave guides diffusion Fourier series and electromagnetic waves in dielectrics and conductors Throughout the text the emphasis on the underlying principles helps readers to develop their physics insight as an aid to problem solving This book provides undergraduate students of physics and engineering with the mathematical tools required for full mastery of the concepts With worked examples presented throughout the text as well as the Problem sets concluding each chapter this textbook will enable students to develop their skills and measure their understanding of each topic step by step A companion website is also available which includes solutions to chapter problems and PowerPoint slides

Review of *The Physics of Vibrations and Waves* 6e This is an excellent textbook full of interesting material clearly explained and fully worthy of being studied by future contributors *Journal of Sound and Vibration*

*The Physics of Vibrations and Waves* Herbert John Pain, 1983

*Vibrations and Waves in Physics* Iain G. Main, 1993-07-30 For the third edition of this successful undergraduate text the author has made a number of changes to improve the presentation and clarify some of the arguments and has also brought several of the applications up to date The new material includes an elementary descriptive introduction to the ideas behind the new science of chaos The overall objectives of the book are unchanged to lead the student to a thorough understanding of the basic concepts of vibrations and waves to show how these concepts unify a wide variety of familiar physics and to open doors to advanced topics which they illuminate Each section of the book contains a brief summary of its salient contents There are approximately 180 problems to which all numerical answers are provided together with hints for their solution This book is designed both for use as a text for an initial undergraduate course on vibrations and waves and for a reference at later stages when more advanced topics or applications are met

*Vibrations and Waves* A.P. French, 1971-09-30 The MIT Introductory Physics Series is the result of a program of careful study planning and development that began in 1960 The Education Research Center at the Massachusetts Institute of Technology formerly the Science Teaching Center was established to study the process of instruction aids thereto and the learning process itself with special reference to science teaching at the university level Generous support from a number of foundations provided

the means for assembling and maintaining an experienced staff to co operate with members of the Institute s Physics Department in the examination improvement and development of physics curriculum materials for students planning careers in the sciences After careful analysis of objectives and the problems involved preliminary versions of textbooks were prepared tested through classroom use at M I T and other institutions re evaluated rewritten and tried again Only then were the final manuscripts undertaken

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 Popular educator,1852     **A Text-book of Chemistry** Edward Curtis Hill,1903     *English Mechanic and Mirror of Science*  
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**Medical Record** George Frederick Shradly, Thomas Lathrop Stedman,1916     **Journal** ,1916     **Handbook of Physiology** Austin Flint,1905     *Catalogue and Circular (1878/79, 1884/85 "Circular") of the Illinois Industrial University (later "of the University of Illinois")* University of Illinois (Urbana-Champaign campus),1918     The Year-book of Facts in Science and Art ,1876     The Encyclopaedia Britannica Thomas Spencer Baynes,1875

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