

TRANSMISSION SOUND WAVES BY ELECTROMAGNETIC RADIATION

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1. Introduction

In 1905, Albert Einstein postulated that light is formed of discrete packets of energy (how), later called photons. Schrödinger and Heisenberg changed the way of interpreting the atomic model of Bohr, postulating that electrons are particles that have wave properties. Although the theory was discussed in the early twentieth century, from a commercial point of view, LASERS arrived on the market from the 60 currently, the technology LASER (Light Amplification by Stimulated Emission of Radiation) is present in all sectors of everyday, especially due to a variety of applications, appearing in the medical field in surgery; in physical therapy as anti-inflammatory and analgesic; in the industrial area, for cutting metal, measuring distances; in research laboratories, applied to optical systems in atomic physics, quantum optics; in commercial areas such as barcode reader and as readers of CD and DVD devices. In this work the application of the laser as a data transmitter, converting mechanical waves through the sound emitted in electromagnetic waves. Faced with the endless forms of communication, we propose to create a device that shows the importance of controlling these technologies for economic and cultural development of society.

2. Experimental

The electronic instrumentation was performed with the use of components and devices available in the recovery sector Museum and reuse of equipment DFQ/FEG/UNESP. From the use of electronic components, they were mounted two circuits, known as transmitter and receiver circuit. The transmitter circuit is responsible for converting sound waves (mechanical) for an optical signal sent by the laser. With the use of a mechanical wave microphone is converted into an electrical signal, this turn is converted into an optical signal by the laser diode itself (Figure 1). But the receiver circuit performs the opposite way, being responsible for converting the optical signal into sound waves. Through a photoreceptor the optical signal generated by the laser is turned back into an electrical signal, which from a speaker, regenerates the sound wave emitted initially (Figure 2).

3. Results and Discussions

Mounted circuits were used in shows and community fairs as popular science instrumentation Museum DFQ/FEG. During exposure the application of electromagnetic radiation transmission experiment was performed. Although used in day-to-day students bring many doubts about its working principle and very difficult to interpret the transformation of electromagnetic waves on mechanical waves. The concept shown in the experiment is little used in secondary schools as part of quantum physics phenomena. The students use concepts from other forms of energy to try to answer the questions, trying to answer according to its classical mechanics acquired knowledge. Students have difficulty explaining the concept of stimulated emission when the atoms make a transition from one quantum state to another of lower energy, releasing photons and producing light with high intensity.



Fig. 1. Circuit Transmitter



Fig. 2. Receiver circuit

4. References

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