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Study on Data Transmission Through LASERS Advanced Version of LI-FI

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Abstract **- The Internet has revolutionized the computer and communications world like never before. The invention of the telegraph, telephone, radio, and computer set the stage for this unprecedented integration of capabilities. The Internet is at once a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location. Some of the types of internet connections include Wireless, Mobile, Hotspot, Dial up, Broadband, DSL, Cable, Satellite, ISDN etc. These days the usage of Wi-Fi has crossed its boundaries and reached to every nook and corner of the world. There are some serious drawbacks pertaining to the usage of Wi-Fi such as those relating to the speed, limited bandwidth, security and range of its usage. In order to overcome these difficulties we can use the Advanced Version of Li-Fi which is bi-directional, high speed, and fully networked wireless communication, like Wi-Fi, using light. We intend to use "LASERS", in order to produce the Advanced Version of Li-Fi technology where the transfer of information takes place at even higher speeds and reduced losses with an increased amount of bandwidth.**

Keywords **- Internet, Wi-Fi, Li-Fi**

1. INTRODUCTION

Li-Fi is a source of Wireless Communication which is done with the help of light. It can also be considered as a substitute for Optical Wireless Communication (OWC). OWC is a kind of Optical Communication done with the help of visible, infrared, ultraviolet signals used to carry information. OWC generally works in the bandwidth of visible region (390-790 nm). Therefore, it can also be referred to as Visible Light Communication (VLC). Li-fi has a considerable amount of problem with the bandwidth, which can be overcome by using the Advanced Version of Li-Fi involving the utilisation of the phenomena of LASERS. A LASER is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The term "LASER" originated as an acronym for "Light Amplification by Stimulated Emission of Radiation". Spatial coherence and temporal coherence are two basic phenomena of LASERS which allows the LASER light to travel uniformly narrow path and at increased amount of speeds. So we can use the properties of LASER in developing the Advanced Version of Li-Fi using LASERS.

2. IMPLEMENTATION

The phenomenon of Advanced Version of Li-Fi using LASERS primarily includes the collection of data from various sources. The data which is collected, is thereby sent to the Signal Conditioning Circuit which includes the process of Amplification, Filtering, Converting, Range matching, Isolation and other processes which are required to make the sensor output suitable for processing after conditioning.

Op-amps, which are generally designed on large geometric processes to withstand the higher internal voltages, are generally employed in this Signal Conditioning Circuit. The output from the Signal Conditioning Circuit is thereby given to the Analog to Digital Convertor (ADC) which helps in the conversion of the Analog form signals to respective digital form signals.

We take 'n' number of outputs from the Analog to Digital convertor. Here we take "n" value as 4.Here, we give each output from ADC to one of the inputs of AND gate and the other input of the AND gate is connected to the Reference signal generated by a Signal Generator. The outputs from the 4 AND gates is respectively connected to the 4 inputs of Time Division Multiplexer.

The Time Division Multiplexer which is primarily used for transfer of information in the form of bit streams appearing simultaneously as sub channels in one communication channel. The information from the 4 inputs from ADC is transferred through a single channel. An amplifier is used to increase the voltage of the semiconductor which is thereby used to generate the required LASERS.

The time domain is divided into several recurrent time slots of fixed length, one for each sub-channel. A sample byte of data block of sub-channel 1 is transmitted during time slot 1, sub-channel 2 during time slot 2, etc. In the similar way information is transferred to the Semiconductor used to generate LASERS.

Semiconductor LASERS, which consist of complex multilayer structures require nanometre scale accuracy and an elaborate design. Two LASER signals are generated using this semiconductor. If the two LASER signals generated are 180° out of phase, then both the LASER signals can form a bubble which indicates the

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presence of the bit or information. The presence of information is indicated by the value '1'.
The process of the working of Advanced Version of Li-Fi can be represented with the help of a flow diagram as shown in the Fig1.0.

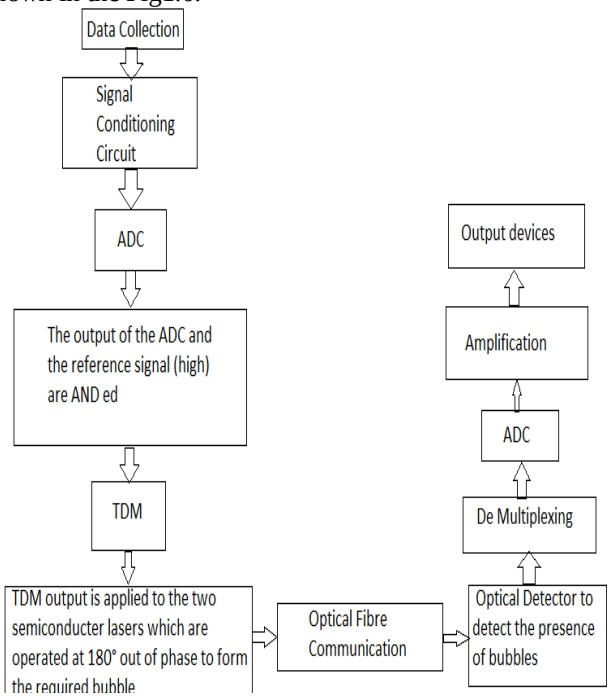

Fig. 1.0: Flow diagram indicating the process of Advanced Version of Li-Fi using LASERS

In this phenomena, photon carries information in the form of a bubble, which is a combination of magnetic bubble theory in which magnetic dipoles form into a bubble and store the information and present day memory transfer technology in which the electrons carries the information. So by this we can achieve our desired output.

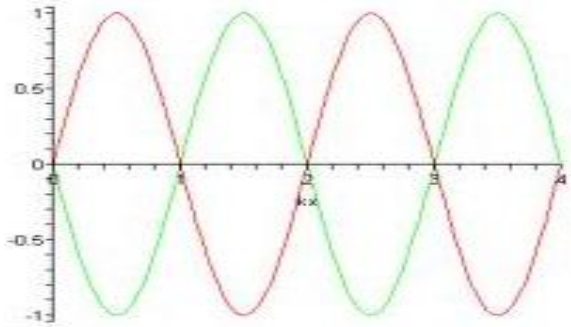

Fig. 1.1: Two LASERS produced with a phase difference of 180° resulting in the formation of bubbles

The two LASER signals generated from the Semiconductor LASER can be shown in the above Fig1.1. The sine waves of both the LASER signals are in pink and blue colour respectively. The formation of bubbles formed with the 2 sine waves generated at a phase difference of 180° can be inferred from the above Fig1.1.
If the two LASER signals have a phase difference of other than 180°, then the bubble is not formed and thereby indicates the absence of information. The absence of information can be indicated by a value '0'. So this information can be transferred through optical cable fibre, as it helps in the transfer of information at reduced number of losses and high amount of speeds.
The information which is transferred through Optical Fibre Cable is detected by the Optical Detector which is thereby used to collect the information. The output from the Optical Detector is thereby connected to the De-Multiplexers, which divides the single channel information into respective number of sub-channels and is connected to the decoders.
These decoders which are used are nothing but the Digital to Analog convertors. These decoders help to convert the Digital information back into the Analog form. The Analog signals are therefore amplified using the amplifiers and finally given to the respective devices.
Therefore, the working of advanced version of Li-Fi takes place as shown in the above phenomena.

3. ADVANTAGES

- It helps in increasing the speed of data to about 1 terabyte per second.
- Security in the transfer of information increases as people cannot hack the information.
- Bandwidth of the transfer of information increases.
- Cost of transfer of information decreases thereby making it economical for the common man.
- Delay in the transfer of information is overcome.

4. ACKNOWLEDGMENT

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5. CONCLUSION

In the present era, the transfer of information at faster rates and reduced number of losses is utmost important. So Advanced Version of Li-Fi using LASERS can be very useful in reaching upon the desired specific targets. The working of Li-Fi technology uses the utilisation of light source which is abundant in nature. As a result it leads to decreased number of losses and helps in making

it economical to be used by the common man. Yet another striking feature of the proposed idea is that it has increased amount of Bandwidth which would open up a Pandora's Box of related issue. In the further investigations, we can achieve communication between gadgets and the LASER diodes which replace the present day routers to replace Wi-Fi in the aspect of speed.

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