

# LI-FI Future of Wireless Communication

Yashodeep Kacholiya<sup>1</sup>, Ajinkya Agnihotri<sup>2</sup>, Saurabh Kabra<sup>3</sup>

<sup>1</sup>*Yashodeep kacholiya, Government College of Engineering, Aurangabad*

<sup>2</sup>*Ajinkya Agnihotri, Government College of Engineering, Aurangabad*

<sup>3</sup>*Saurabh Kabra, Government College of Engineering, Aurangabad*

**Abstract-** Light – fidelity or very commonly known as Li-Fi, is the most secure and cheap way for communication, in which light is used to transmit data at a very high speed up to several Giga Bytes. Life without internet is hard to imagine nowadays, the internet is the need of the hour and speed has been a concerned issue, so the light will serve as a medium for high speed of internet access at a very cheap rate. Li-Fi is secure due to non-penetrable nature of visible light, that does not pass through the walls, thus it provides more safety and no need for password and security software to protect it. LEDs are used to make the data transmission possible

**Index Terms-** Li – Fi (light fidelity), LED (Light emitting diode), Wi-fi (Wireless fidelity)

## INTRODUCTION

High-speed internet access is the necessary part of one's day, what if Lights in your room are made possible to do this? It will be the best thing ever did. LED bulbs can be imparted to a dual job of lighting the room and providing the high-speed internet access to the people in the room. A stream of bits i.e. 0 and 1 can be transmitted at very high speed and the fluctuation is so high that a human eye cannot see the change and assume the LED light to be glowing continuously. Li-Fi is any easy and effective revolutionizing technology. Currently, Wi-Fi has extensively used for internet access but Li-Fi completely overrules Wi-Fi in every possible way, whether it is speed, security, etc.

## II. LITERATURE REVIEW

Dr. Herald Hass, the professor at the University of Edinburgh firstly demonstrated the Li-Fi (Light Fidelity) technology in a TED talk. And further

research made the transmission speed come up to >500Mbps which can be made possible to be more than several Gbps. VLC(Visual light communication) is taken into consideration for this purpose where white led is used to transmit the data. Li-Fi communicates in a serial way further research is going on to use an array of LEDs that will transmit data in a parallel way. In which each LED represents a Channel.

## III WORKING OF LI-FI

Li-Fi uses light instead of gigahertz radio wave. Working of Li-Fi is very simple, the bit stream coming from internet connection is attached to the LED and the led flickers as the bits, glows for every 1 and off for every 0. The rate of such a flicker is so high that the human eyes cannot detect the change in it, this is all about the the transition. At the receiver end a photo diode or a solar panel is used to detect the incoming signal and then it is amplified using an amplifier circuit of OmpAmp and further the signal can be uses to connect your Personal computers, laptops, mobiles etc. to get connected with internet. As it uses VLC (Visual light communication), spectrum of the signal consists of frequency of visible range which is much wider than the spectrum of the radio waves used in Wi-Fi.



Advancement that can be done is in Parallel Transmission, Parallel Transmission is needed to get much higher speed in communication. It can be done using array of different colored LEDs where each led acts as a channel. Each LED will be connected to a different set of signals used for a different purpose. As the color of LEDs is different, thus it has some unique frequency, thus at the receiving end filters should be applied to pass the unique frequency of the channel and the signal can be processed accordingly.

#### IV ADVANTAGES OF LI-IF AND ITS APPLICATION

1. Li-if uses light in case of radio waves.
2. Underwater communication is possible using Li-Fi.
3. Li-Fi can be used in areas where radio waves are not allowed.
4. Security level is much higher than that of any other present communication technique.
5. Internet access can be made much higher speed and safe.
6. For transmission of audio signal also Li-Fi can be used.
7. LED are seen everywhere, so each of them can be used as access point for data interchange.
8. LED will provide a dual purpose of lighting the room and provide internet access

#### V. CONCLUSION

In this way, Li-Fi can be used to make the future communication speedier and safer. It has some huge benefits over existing technology such Wi-Fi and bluetooth in wireless communication. Li-Fi has provided a step forward invention in the world of growing hunger communication, this is safe to all biodiversity including humans and progressing towards a greener, cheaper and brighter future of technologies. The concept of Li-Fi is currently attracting a great deal of interest, not least because it may offer a genuine and very efficient alternative to radio-based wireless.

#### REFERENCES

- [1] <http://www.digplanet.com/wiki/Li-Fi>
- [2] LI Fi.html

- [3] "Visible-light communication: Tripping the light fantastic: A fast and cheap optical version of Wi-Fi is coming", Economist, dated 28Jan 2012
- [4] A. Sarkar, S. Agarwal, and A. Nath, "Li-Fi Technology: Data Transmission through Visible Light," International Journal, vol. 3, 2015.
- [5] Umalaxmi Sawant, "A Review On Li-Fi Technology" International Journal of Scientific Research Engineering and Technology, November 2015.
- [6] Will Li-Fi be the new Wi-Fi?, New Scientist, by Jamie Condliffe, dated 28 July 2011
- [7] Richard P. Gilliard, Marc DeVincentis, AbdeslamHafidi, Daniel O'Hare, and Gregg Hollingsworth, "Operation of the LiFi Light Emitting Plasma in Resonant Cavity".
- [8] <http://www.dvice.com/archives/2012/08/lifi-ten-ways-i.php>
- [9] <http://www.good.is/posts/forget-wifi-it-s-lifi-internet-through-lightbulbs>