

# Some Funny Yet Relevant Title



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## Introduction

Introduction here

## Adaptive Frequency Hopping

### What Is Frequency Hopping?

Adaptive Frequency Hopping (AFH) is a tehcnique where rather than using one single radiofrequency to transfer data, the frequency is constantly changing between a number of channels. This allows for both faster transfer speeds, and makes it harder for intruders to interfere with the signal.

### Why Is It Adaptive?

The transmitting device is constantly monitoring the different channels to make an estimate of how good quality they are. For example, if one frequency is currently busy or being jammed, then it will simply use another channel.

## Another General Box

Box for another common feature (add more boxes as needed)

## Conclusion

Conclusion here

## References

idk if we need this

- [1] J. M. Smith and A. B. Jones. *Book Title*. Publisher, 7th edition, 2012.
- [2] A. B. Jones and J. M. Smith. Article Title. *Journal title*, 13(52):123–456, March 2013.
- [3] Christopher C Davis. Fiber optic technology and its role in the information revolution. *Retrieved June*, 5:2014, 2013.
- [4] R Paschotta. article on 'Rayleigh Scattering'. *RP Photonics Encyclopedia*. Retrieved on November 8, 2019.

## Acknowledgements

Rito

## Wi-Fi

Wi-Fi box here

## Optical Fibres

**Introduction** Optical fibres rely on total internal reflection to confine pulses light rays within the core as a method of transmitting binary data. Modern fibre technologies are limited by physical phenomena of light travelling in an optical medium.

**Residual Absorption** Fundamental vibration frequencies of the particles that make up the glass absorbs light with matching frequencies.

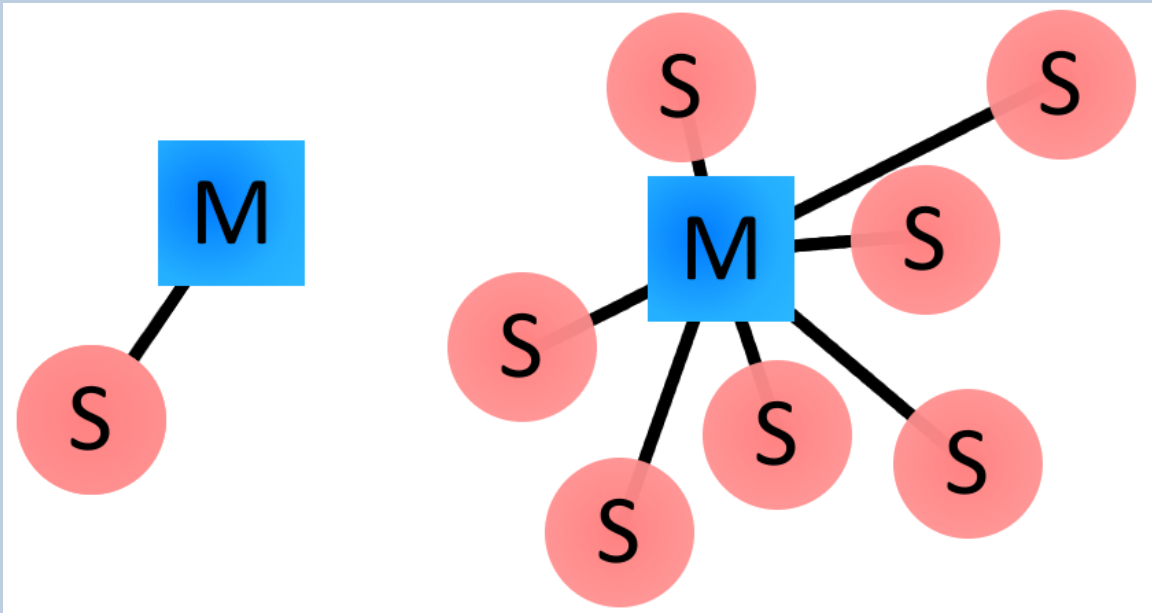
**Dispersion** Dispersion is an optical phenomenon where light of different frequencies travel at different velocities through an optical medium. In optical communications, data is coded in binary form and transmitted as pulses of light. As a single pulse from the laser carries more than one frequency of light, it is critical that the gap in time at the receiving end is not great than the time period ofthe wave group, otherwise the original data would be lost. This limits the maximum length of a single optical fibre, and requires the use of repeaters and/or amplifier to enable long distance communications, such as the trans-Atlantic cables.

**Rayleigh Scattering** An atom or molecule reradiates incident light in any direction except the incident direction. This effect is magnified at shorter wavelengths, and is increased by imperfections in the composition of the silica glass on a molecular level.

## Bluetooth ✖

**History** Bluetooth was developed by the Swedish telephone company Ericsson AB in 1990, and it first hit the commercial markets in 1999

**Master/Slave Topology** Bluetooth follows a master/slave topology where there is a master device broadcasting data to a maximum of seven slave devices. This network of 8 devices is known as a piconet. The master will always default to being the device which initialised the connection, however master and slave roles can be exchanged given that both devices agree upon this.



**AFH** Bluetooth uses a technique known as AFH, which is explained on the left side of this poster.

## Li-Fi

Li-Fi box here

## Near Field Communication

**How It Works** Near Field Communication (NFC) works off of small chips enabling data transfer between devices, of which there are active and passive ones. Active NFC devices are powered by an external source, and are able to both send and receive data. Passive devices can only send data, but do not require a power source of any kind. In close proximity with one another, the electromagnetic field of the active device will induce a small current in the passive one.

### Stats

Max Range = 20cm, Max Speed = 424kbit/s, Transmission Frequency = 13.56MHz

### Advantages

Power Efficiency. The passive devices do not require a power source, only active ones do.

Control. Since the range is small, users will mostly be aware and be able to determine when exactly information transfer occurs.

Convenience. NFC does not require any prior setup or pairing to use, unlike bluetooth or wifi. Data is transferred the moment the devices are within range, making it the best method for quick small transfers.

### Disadvantages

Transfer Speed. The maximum data transfer speed for NFC devices is 424kbit/s. This is significantly lower than other forms of communication.

Short Range. While the maximum range for communication to be established is 20cm, it works more effectively at a closer range like 10cm. However for a lot of current uses of NFC, there is no need for the effective range to be larger. Imagine having your travel card charged just by walking through a station!

## Neutrino

**History** Neutrino messaging is a hypothetical form of communication currently undergoing research. It was first experimentally verified to work in 2012 by researchers from the University of Rochester and North Carolina State University.

**Advantages** Unlike traditional forms of communication which rely on electromagnetic radiation, neutrinos are affected only by the weak force and gravity, meaning they can pass messages through virtually anything. This can be utilised to transmit information across vast expanses in space, or for