

# Fiber-optic communication

光纖通訊

Group 28

member:

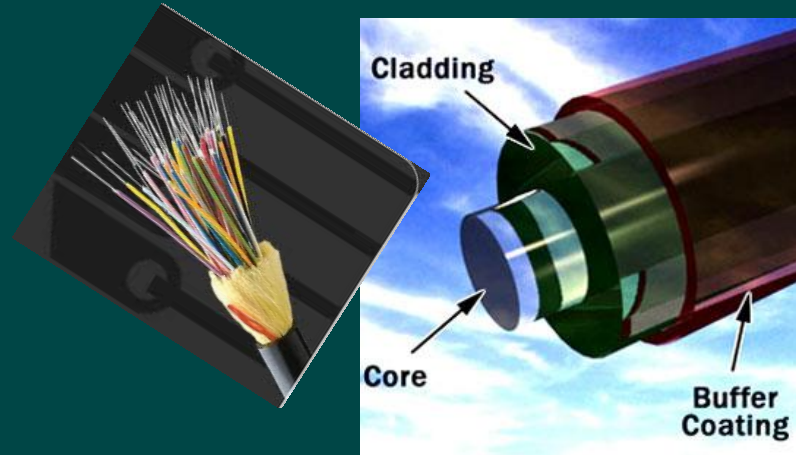
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# Introduction

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- ◇ What advantages does optical fiber communication has?
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# Definition

- ◆ **Fiber-optic communication** is a method of transmitting information from one place to another by sending pulses of light through an optical fiber. The light forms an electromagnetic carrier wave that is modulated to carry information. Because of its advantages over electrical transmission, optical fibers have largely replaced copper wire communications in core networks in the developed world.



# Application

- ◆ Optical fiber is used by many telecommunications companies to transmit telephone signals, Internet communication, and cable television signals. Due to much lower attenuation and interference, optical fiber has large advantages over existing copper wire in long-distance and high-demand applications. However, infrastructure development within cities was relatively difficult and time-consuming, and fiber-optic systems were complex and expensive to install and operate.



# Application

- ◆ Due to these difficulties, fiber-optic communication systems have primarily been installed in long-distance applications, where they can be used to their full transmission capacity, offsetting the increased cost.



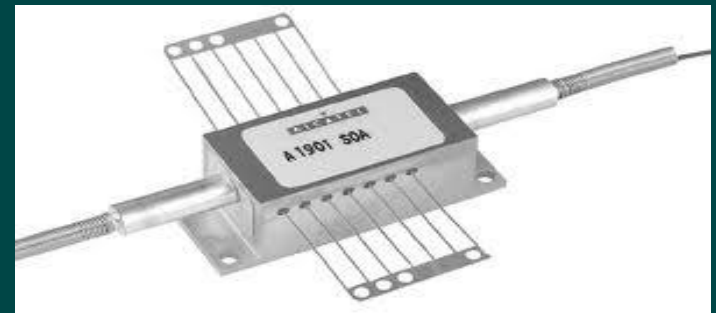
# History†

- ◆ In 1966 Charles K. Kao and George Hockham proposed optical fibers at STC Laboratories at Harlow, England, when they showed that the losses of 1000 dB/km in existing glass was due to contaminants, which could potentially be removed. Optical fiber was successfully developed in 1970 by Corning Glass Works, with attenuation low enough for communication purposes , and at the same time GaAs semiconductor lasers were developed that were compact and therefore suitable for transmitting light through fiber optic cables for long distances.



# History†

- ◆ Soon on 22 April 1977, General Telephone and Electronics sent the first live telephone traffic through fiber optics in Long Beach, California. The second generation of fiber-optic communication was developed for commercial use in the early 1980s. Third-generation fiber-optic systems achieved this despite earlier difficulties with pulse-spreading at that wavelength using conventional InGaAsP semiconductor lasers.



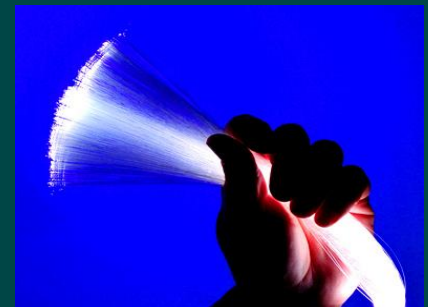
# † What advantages does optical fiber communication has?

- ◆ Compared with systems based on electrical cables, the approach of optical fiber communications (*light wave communications*) has advantages, the most important of which are:
  1. The capacity of fibers for data transmission is huge
  2. The losses for light propagating in fibers are amazingly small
  3. A large number of channels can be preamplifier in a single fiber amplifier, if required for very large transmission distances.



# ‡ What advantages does optical fiber communication has?

- ◆ Due to the huge transmission rate achievable, the cost per transported bit can be extremely low.
- ◆ Compared with electrical cables, fiber-optic cables are very lightweight, so that the cost of laying a fiber-optic cable can be lower.
- ◆ Fiber-optic cables are immune to problems that arise with electrical cables, such as ground loops or electromagnetic interference (EMI).



How the fiber optic processed?  
(Discovery)



*Show time !*

*Discovery of Fiber optic communication*

# Reflection

- ◆ Time for Cherry...
- ◆ Time for Helen...



# Reference



- ◆ [http://en.wikipedia.org/wiki/Fiber-optic\\_communication](http://en.wikipedia.org/wiki/Fiber-optic_communication)
- ◆ [http://www.rp-photonics.com/optical\\_fiber\\_communications.html](http://www.rp-photonics.com/optical_fiber_communications.html)
- ◆ [http://www.youtube.com/watch?v=llI8Mf\\_faVo](http://www.youtube.com/watch?v=llI8Mf_faVo)

*Thanks for  
paying attention!*

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By Cherry 'n' Helen

