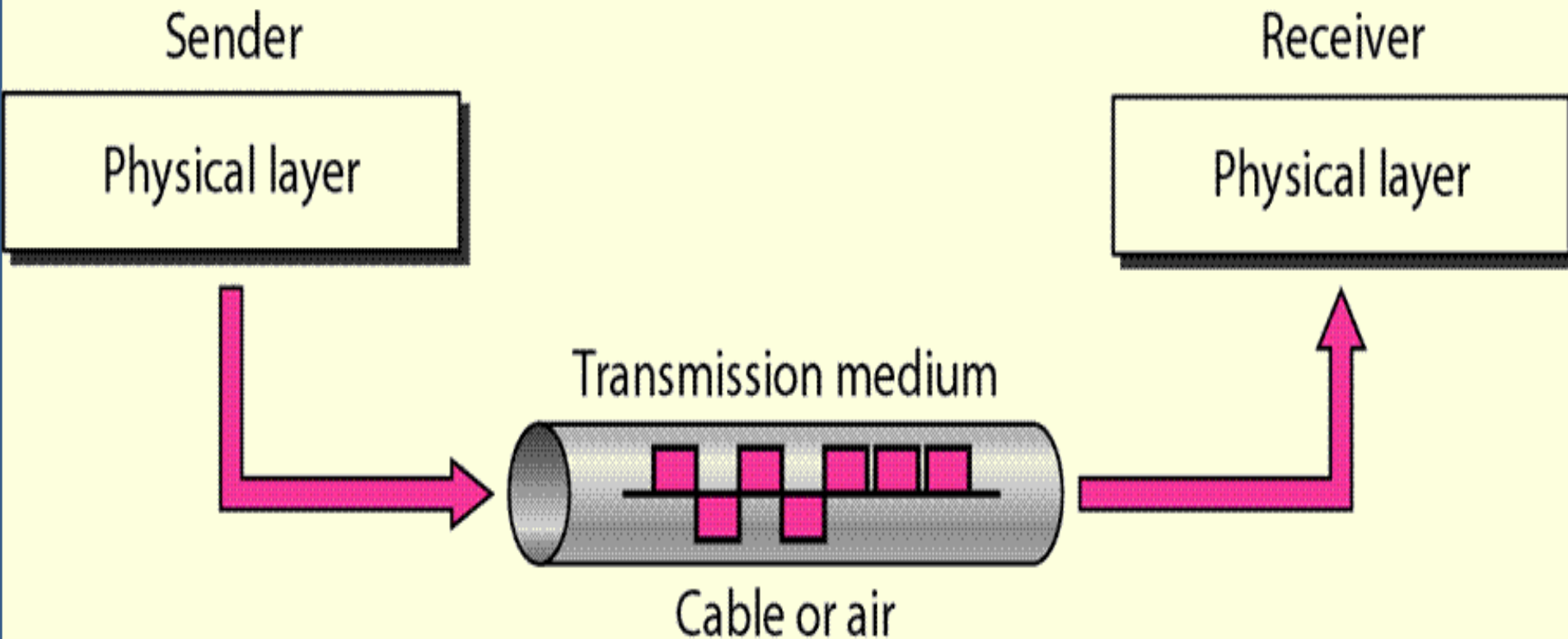


Transmission Media



Transmission
media

```
graph TD; A[Transmission media] --> B[Guided (wired)]; A --> C[Unguided (wireless)]; B --> D[Twisted-pair cable]; B --> E[Coaxial cable]; B --> F[Fiber-optic cable]; C --> G[Free space];
```

Guided
(wired)

Unguided
(wireless)

Twisted-pair
cable

Coaxial
cable

Fiber-optic
cable

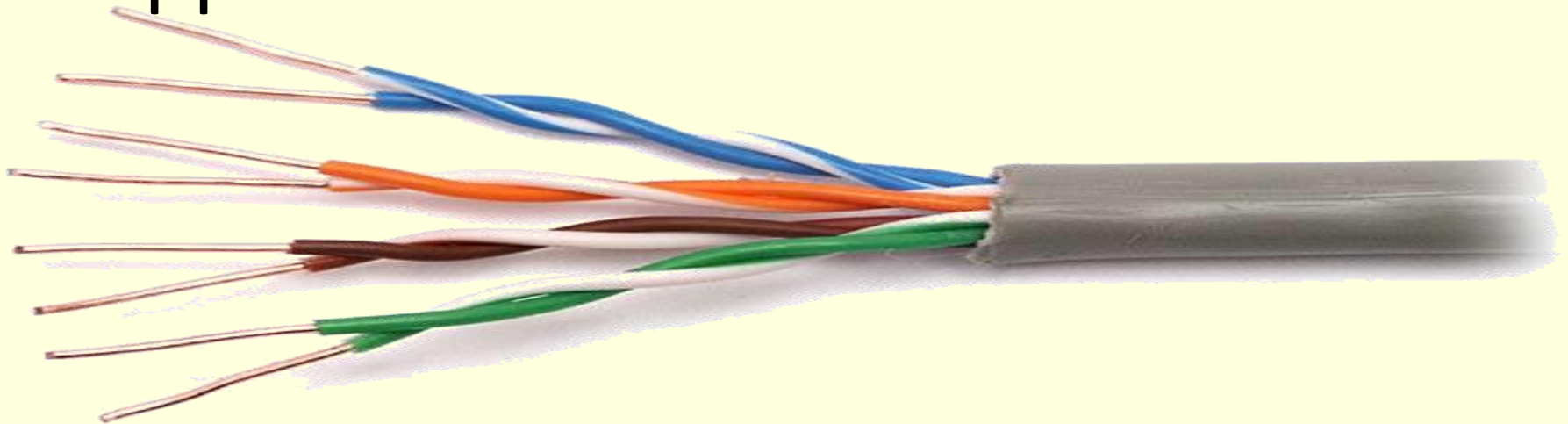
Free space

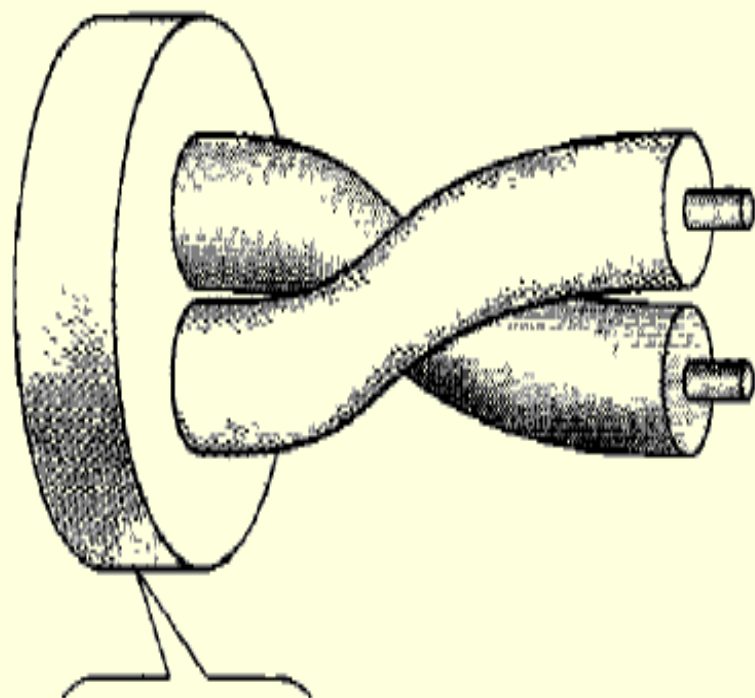
GUIDED MEDIA

- Conduit from one device to another,
- Twisted-pair , coaxial cable & fiber-optic
- Twisted-pair and coaxial cable use metallic
- Optical fiber use light

Twisted-Pair Cable

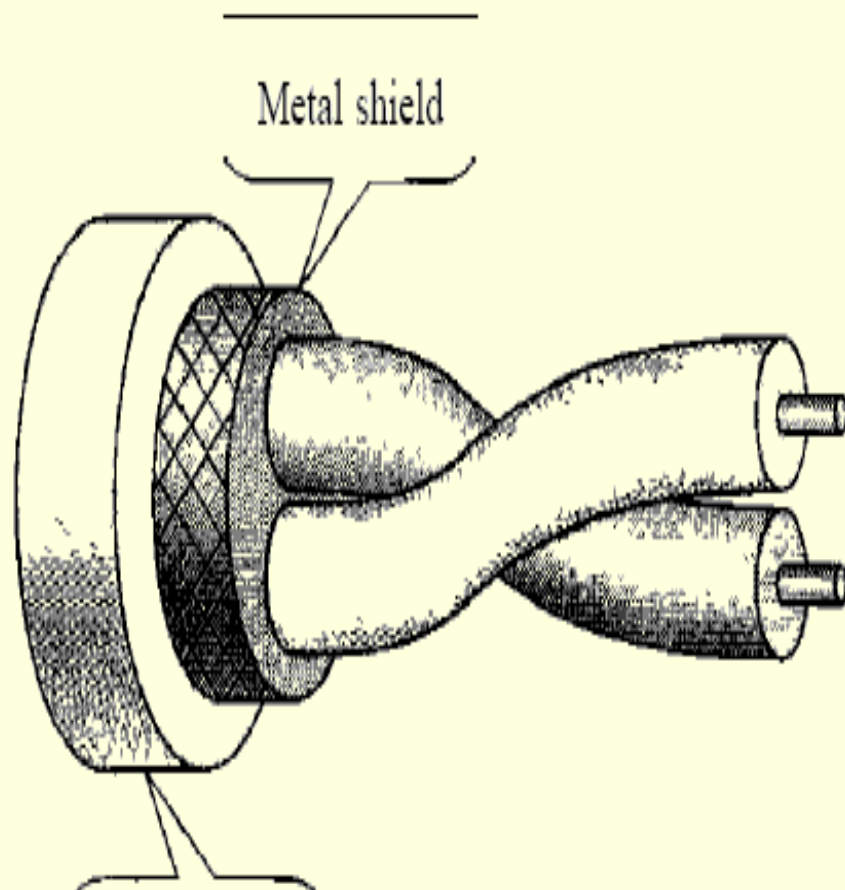
- Twisted pair consists of two conductors
- Each with its own plastic insulation
- Why twisted ?
- UTP & STP
- Performance
- Applications





Plastic cover

a.UTP

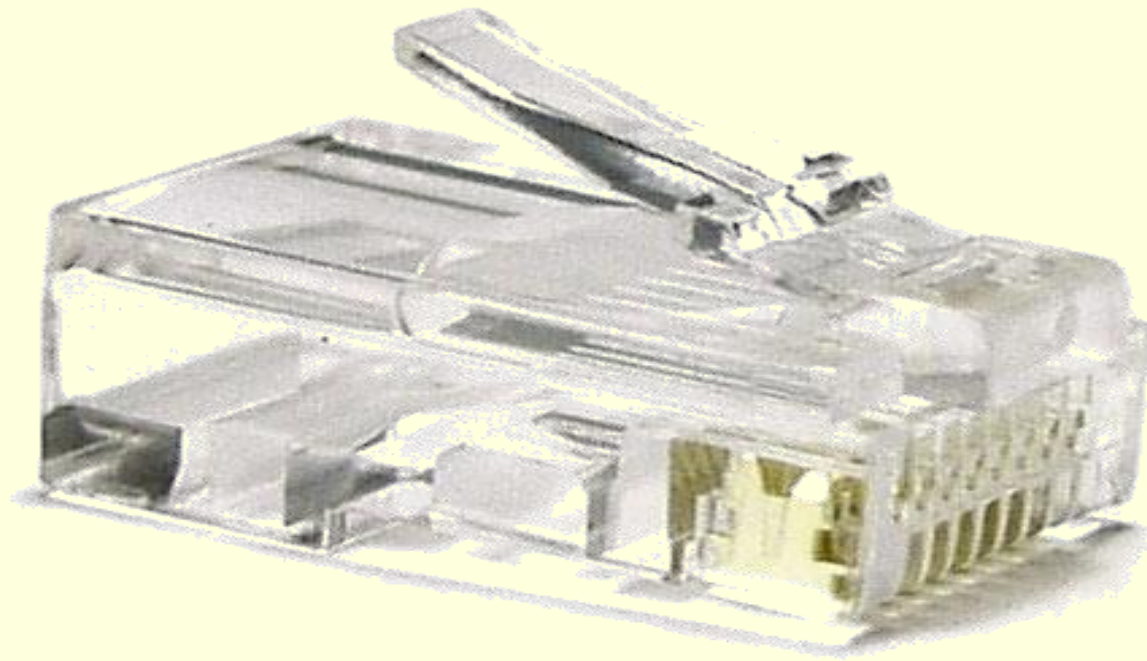


Plastic cover

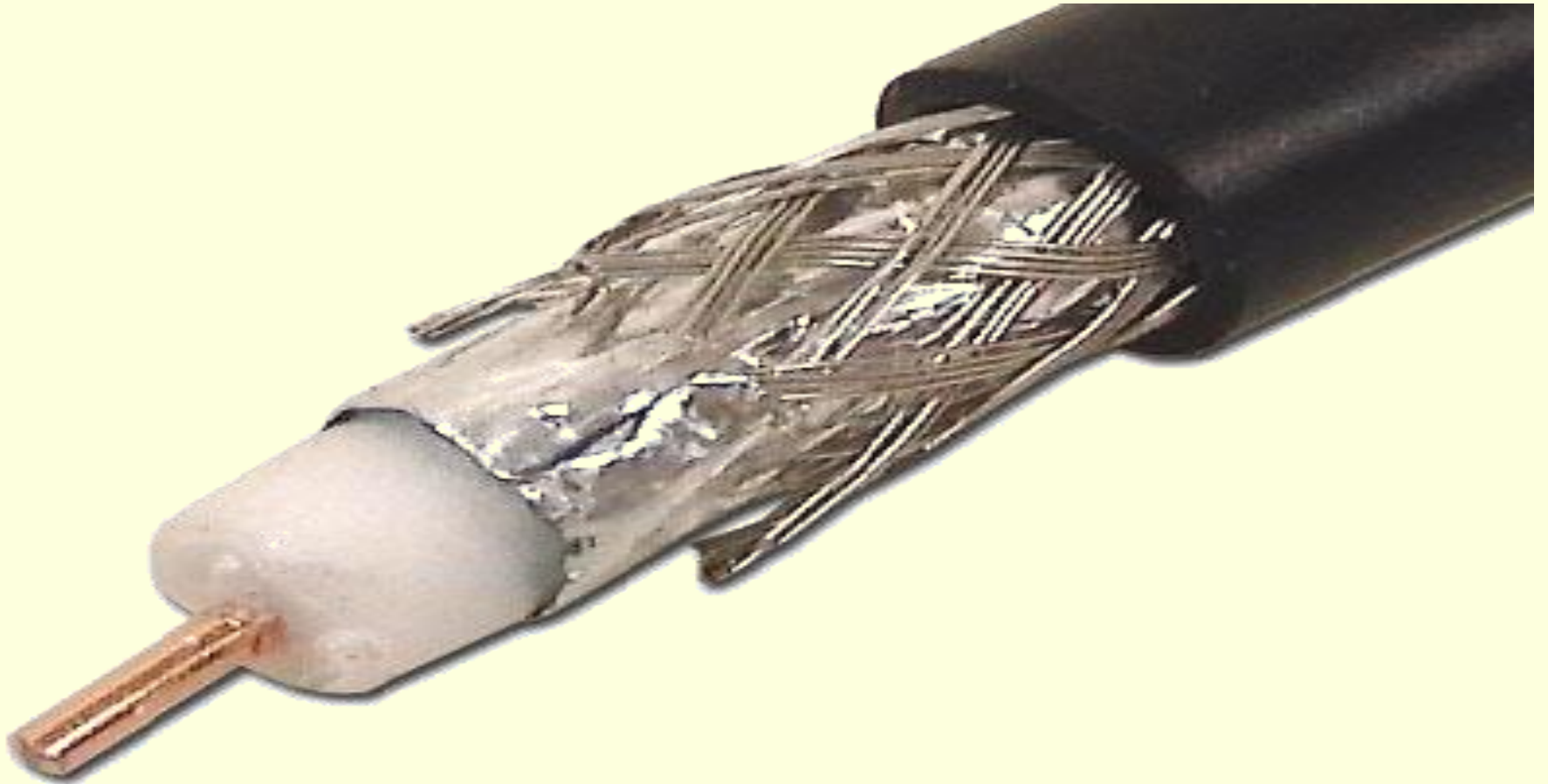
b.STP

Connectors

- Registered jack RJ (RJ45)
- Straight through & crossover cable



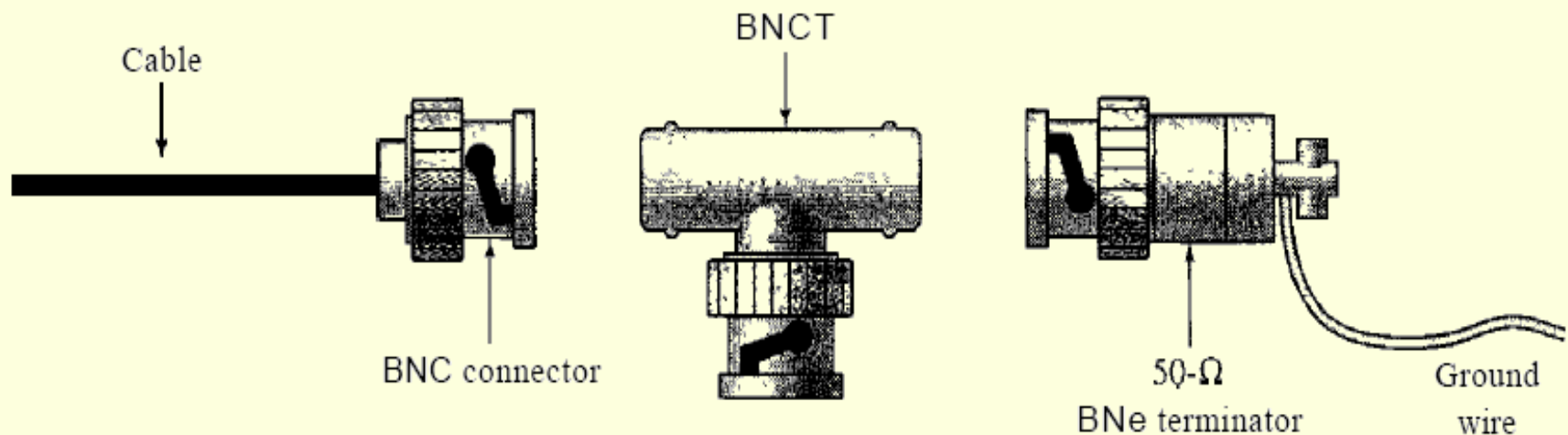
Coaxial Cable (coax)



- Invented by Oliver Heaviside
- Higher frequency ranges than twisted pair
- Categorized by their radio government (RG) ratings.
 - Wire gauge
 - Thickness and type of the inner insulator,
 - Construction of the shield,
 - Size and type of the outer casing.

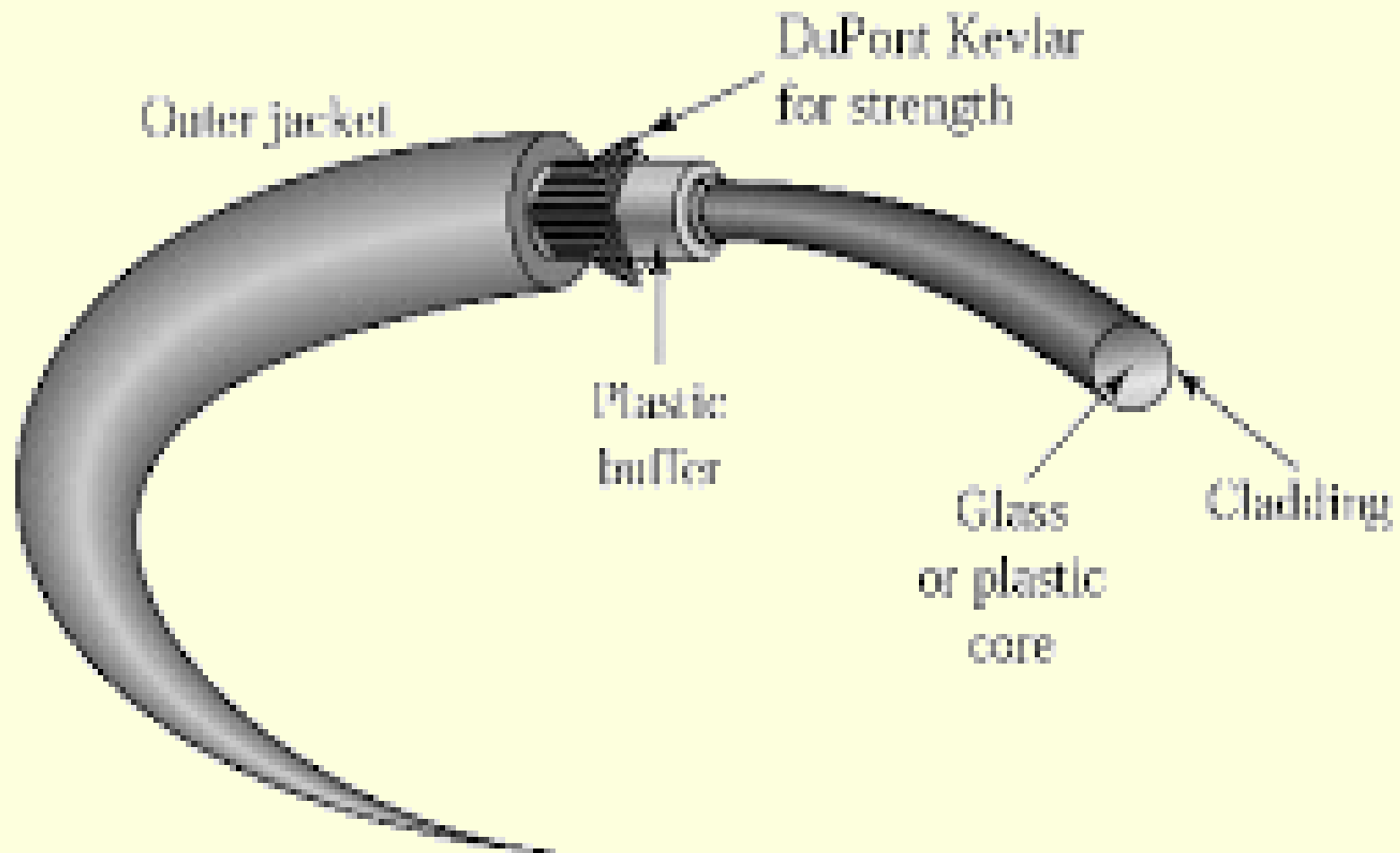
Bayone-Neill-Concelman (BNe)

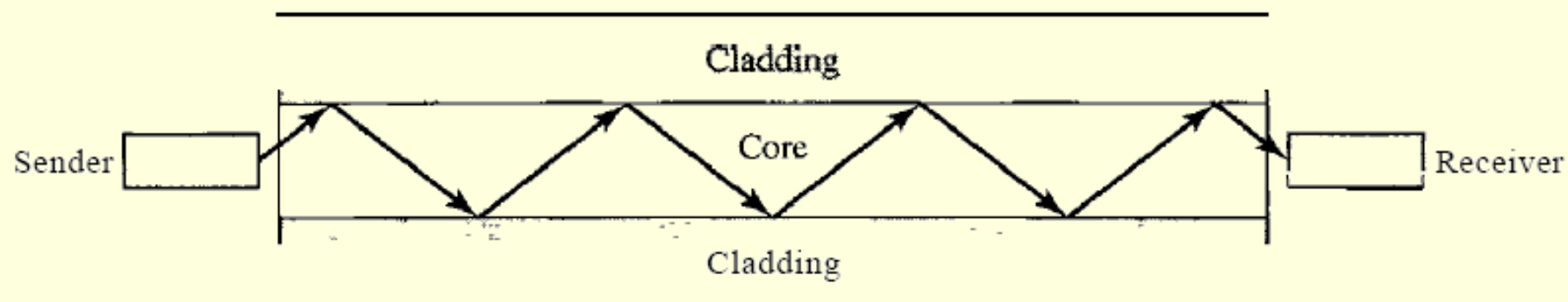
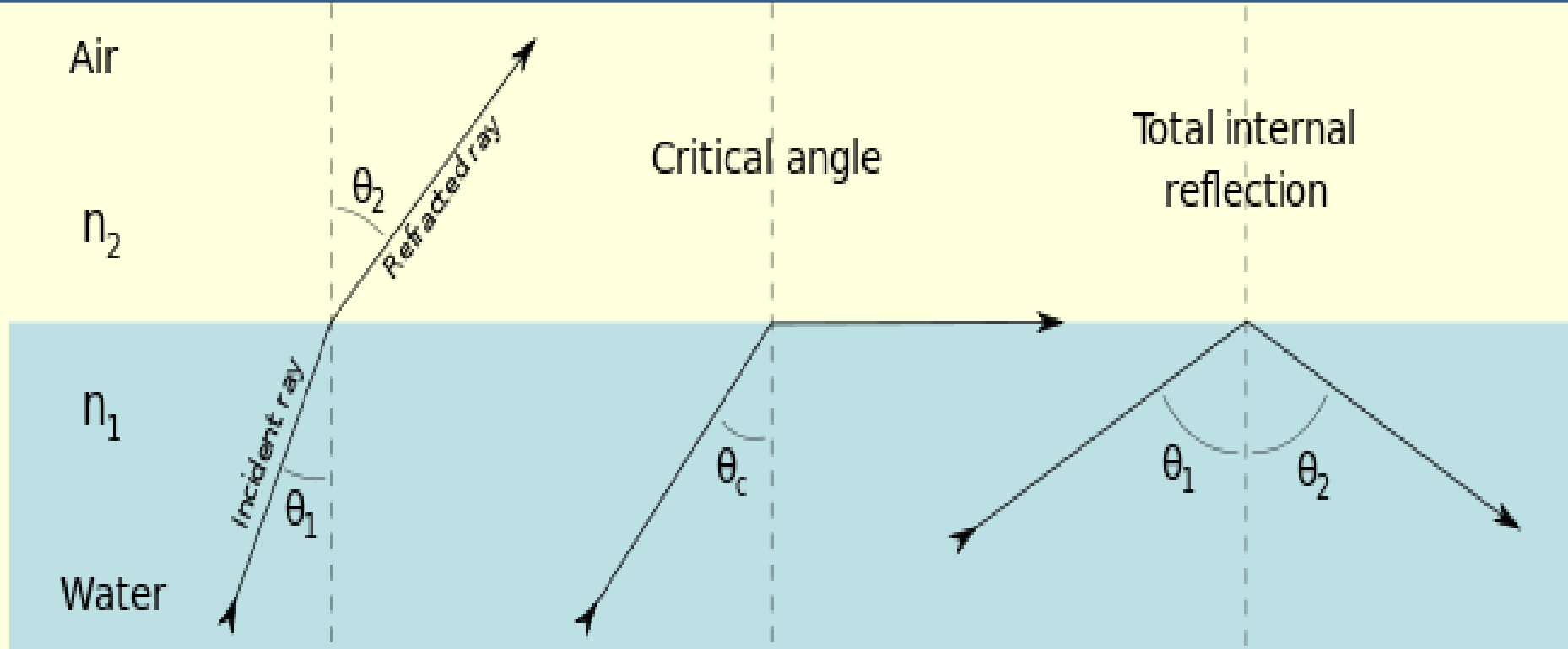
- the BNC connector : TV set
- BNC T connector : Ethernet networks
- the BNC terminator
 - End of the cable to prevent the reflection of the signal.



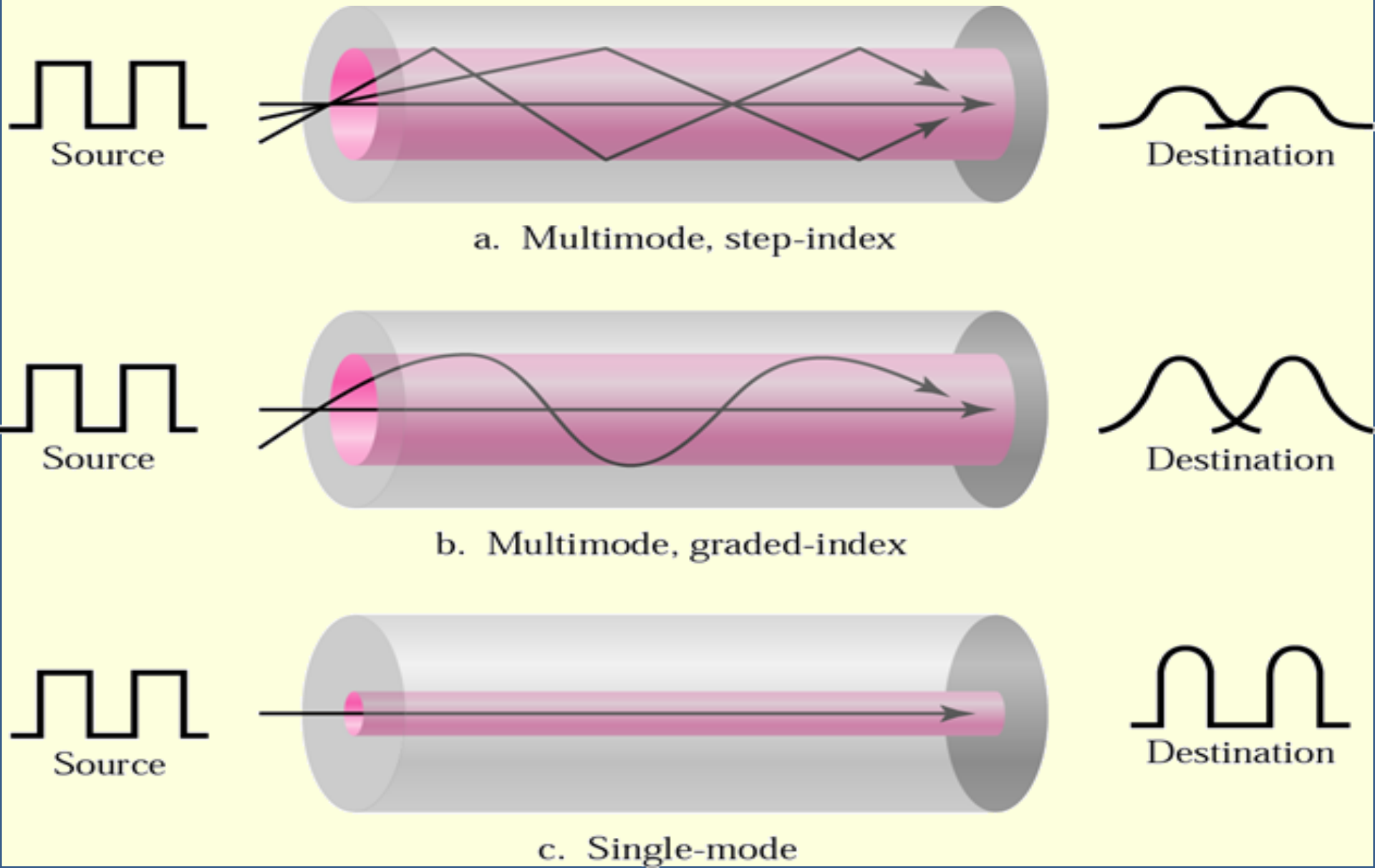
- Performance
- Applications
 - ✓ Analog telephone networks
 - 10,000 voice signals
 - ✓ Digital telephone networks
 - 600 Mbps
 - ✓ Cable TV (RG-59)
 - ✓ Ethernet LANs

Fiber-Optic Cable



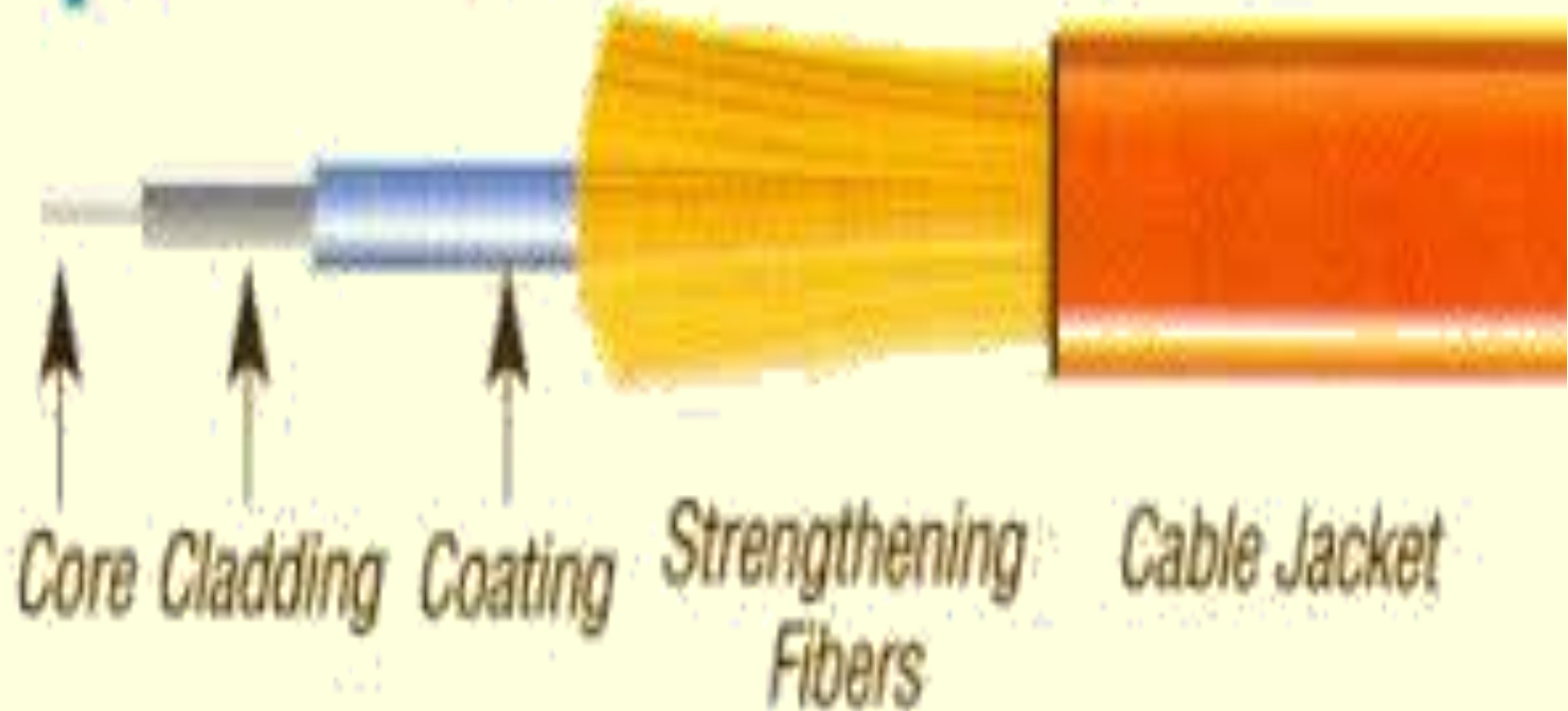


Propagation Modes



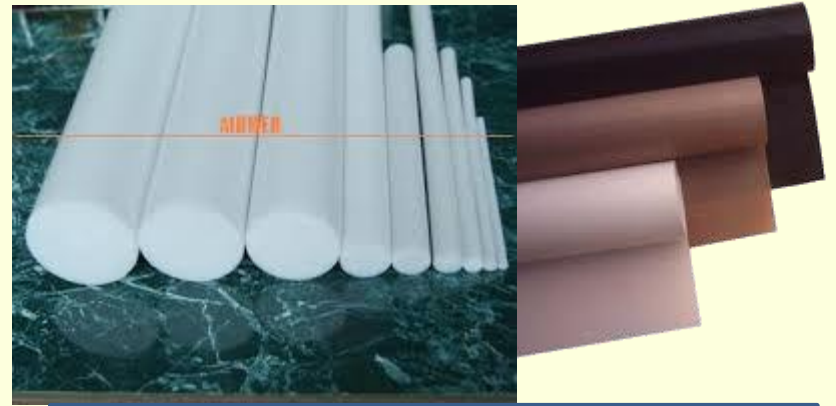
Cable Composition

Fiber optic cable construction.

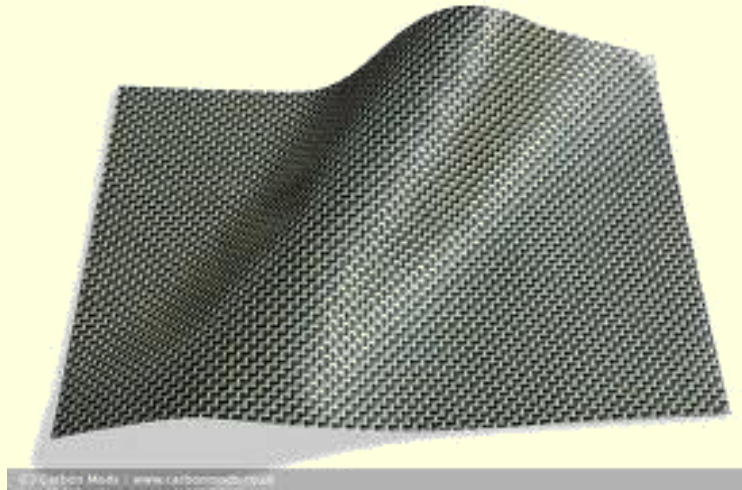




PVC



Teflon



Kevlar

Fiber-Optic Cable Connectors

- Subscriber channel (SC) connector
 - Cable TV
- Straight-tip (ST) connector
 - With networking device
- MT-RJ
 - Same size of RJ45

Advantages

- Higher bandwidth.
- Less signal attenuation
- Immunity to electromagnetic interference.
- Resistance to corrosive materials.
- Light weight.
- Greater immunity to tapping

Disadvantages

- Installation and maintenance.
- Unidirectional light propagation.
- Cost

UNGUIDED MEDIA

- Ground propagation : (low frequency & power in the signal)
- Sky propagation: (higher-frequency)
- Line-or-sight propagation: very high-frequency

Ionosphere



Ground propagation
(below 2 MHz)

Ionosphere



Sky propagation
(2-30 MHz)

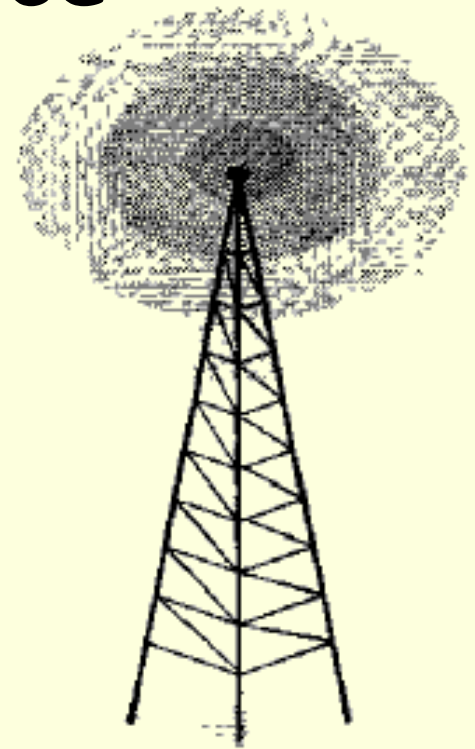
Ionosphere



Line-of-sight propagation
(above 30 MHz)

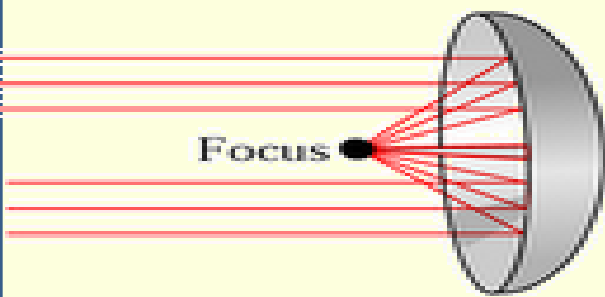
❖ Radio Waves

- Omnidirectional & multicasting
- Susceptible to interference
- Sky mode
- Penetrate walls
- AM , FM radio & paging

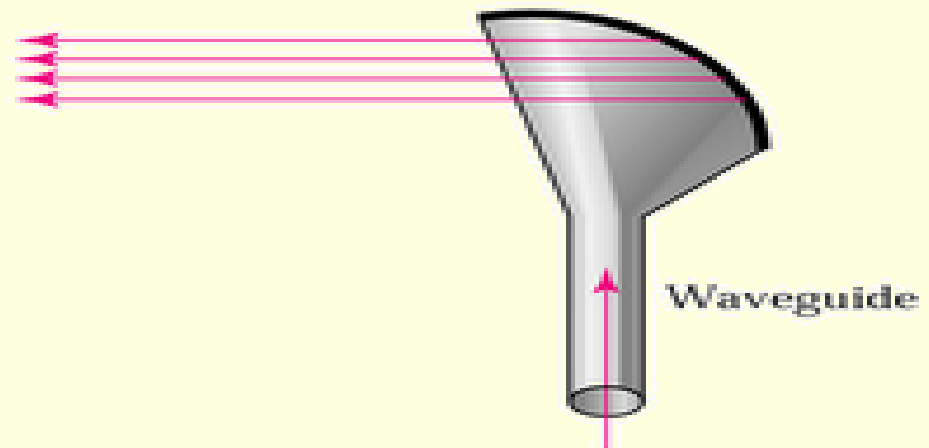


❖ Microwaves

- Unidirectional & unicast
- Line-of-sight
- Very high-frequency microwaves cannot penetrate walls
- Satellite networks



a. Dish antenna



b. Horn antenna

Infrared

- Short-range communication.
- High frequencies
- Cannot penetrate walls

