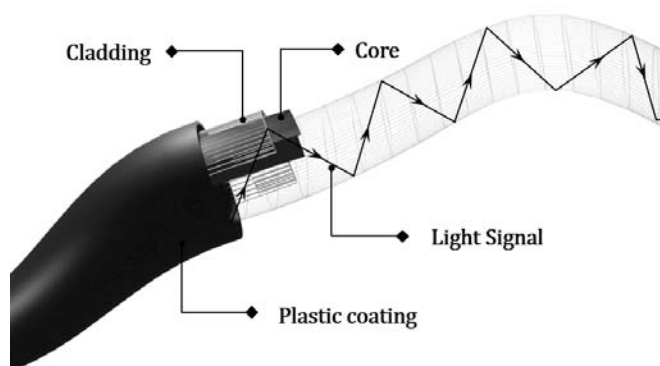THIN PRISM, OPTICAL FIBRE
Prism
Optical Fibre

➢   Signal travels at speed of light.
➢   Signal undergoes TIR at any incident angle.

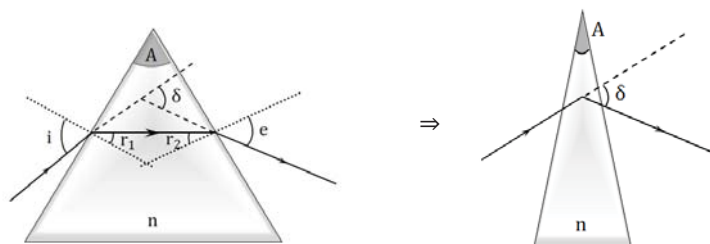## Lag in Signal Transmission

Radius of Earth $= 6400$ km
Speed of Light $= 3 \times 10^8$ m/s
Because satellites typically travel far above the Earth's surface, there's a delay in signal transmission through them. That's why optical fiber is used to transmit signals between mobile towers.
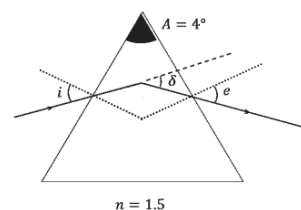
Thin prism

$$A \downarrow \Rightarrow i \downarrow \Rightarrow r_1 \downarrow \Rightarrow r_2 \downarrow \Rightarrow e \downarrow \Rightarrow \delta \downarrow$$

$$\delta = \imath \mp e - A \Rightarrow \delta = nr_1 \mp nr_2 - A \Rightarrow \delta = n(r_1 \mp r_2) - A \Rightarrow \delta = (n - 1)A$$

Ex.   Find the angle of deviation for a thin prism with angle 4° and refractive index 1.5

Sol.   For thin prism, the angle of deviation: $\delta = (n - 1)$ A
$$\delta = (1 \cdot 5 - 1)4° = 2°$$

Shift from a thin prism

$$\tan \delta = \frac{s}{a}$$
$$S = a \tan \delta$$
$$S = a\delta \ [\text{Since } \tan \delta \neq \delta]$$
$$S = a(n - 1)A [\text{Since } \delta = (n - 1)A]$$