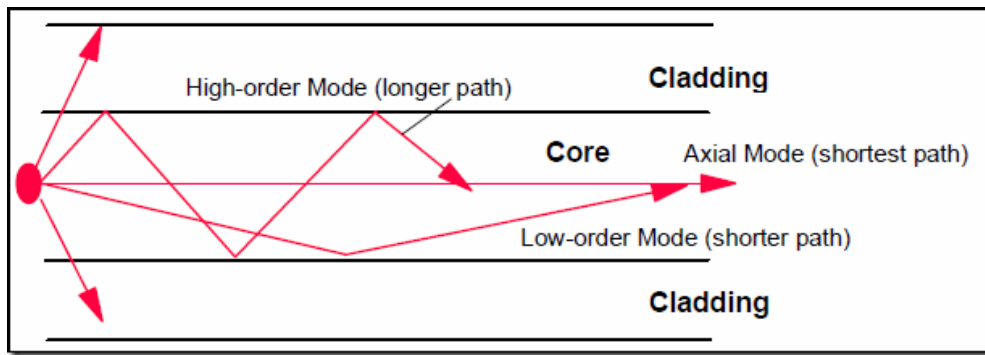An important effect is **mode dispersion**. Imagine, a delta pulse consisting of a single wavelength arrives distorted on the other side because the light rays can travel through different paths, each having a different optical length.

Exercise 1) If information is sent by 7.5-ps-wide square pulses (of 1.5 µm wavelength) every 20 ps ('1' is light, '0' is dark), inserted into a glass fiber (no cladding), $n = 1.44$, at what distance can data arrive wrong on the other side (a 0 interpreted as a 1 and vice versa)?

Assume the following:
- A bit is interpreted as 1 (0) when above (below) 50% intensity.
- The light source is spherical; it emits light equally in all directions.
- The optical fiber is cylindrical.

Simulate the shape of the wave at this distance.