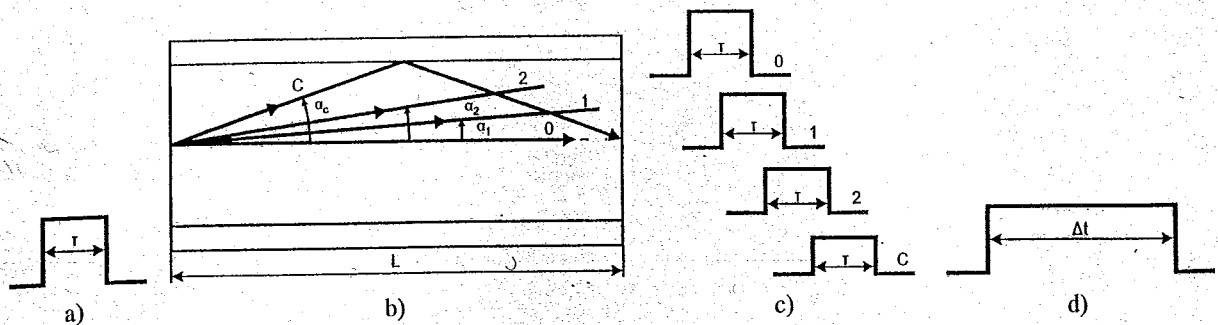
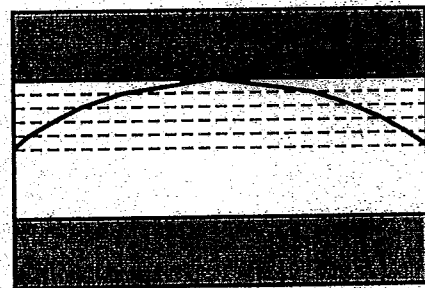
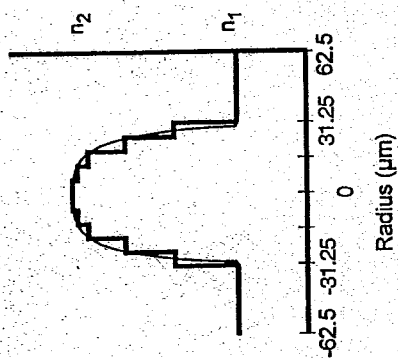
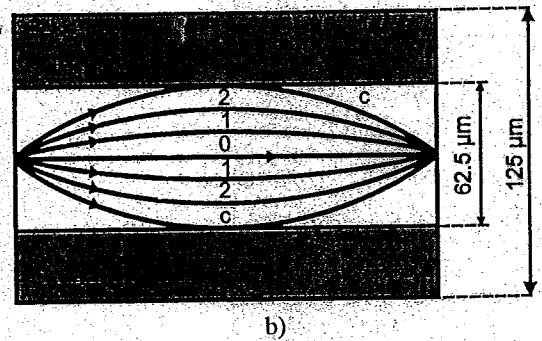
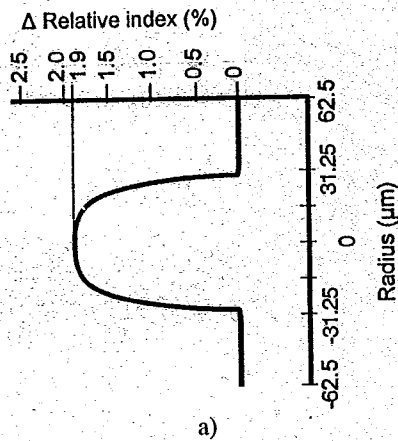


An illustration using the digital bit pattern 1011 of the broadening of light pulses as they are transmitted along a fiber: (a) fiber input; (b) fiber output at a distance  $L_1$ ; (c) fiber output at a distance  $L_2 > L_1$ .

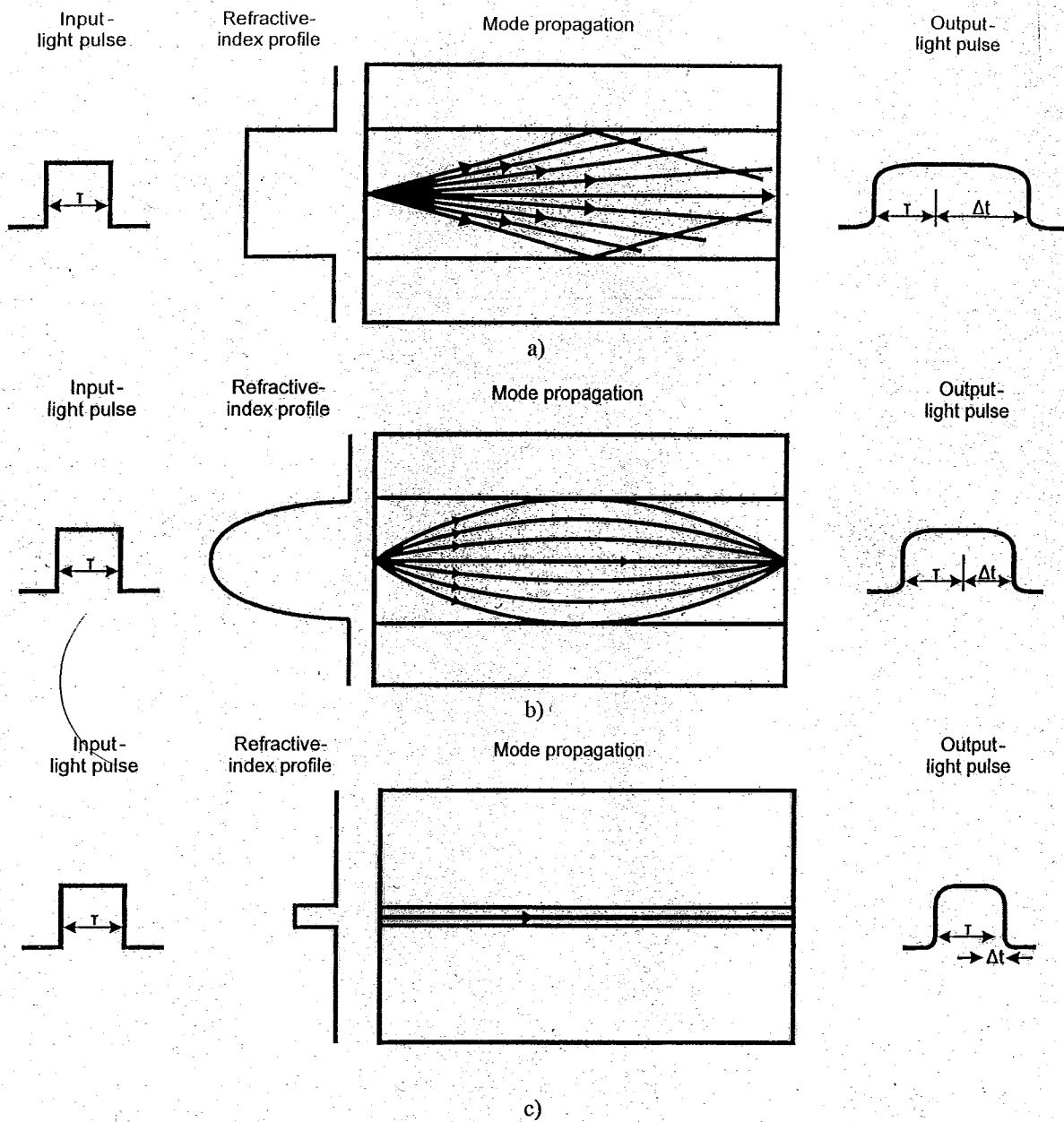


Intermodal (modal) dispersion: (a) Original pulse; (b) modes in an optical fiber; (c) pulses delivered by an individual mode; (d) resulting pulse.

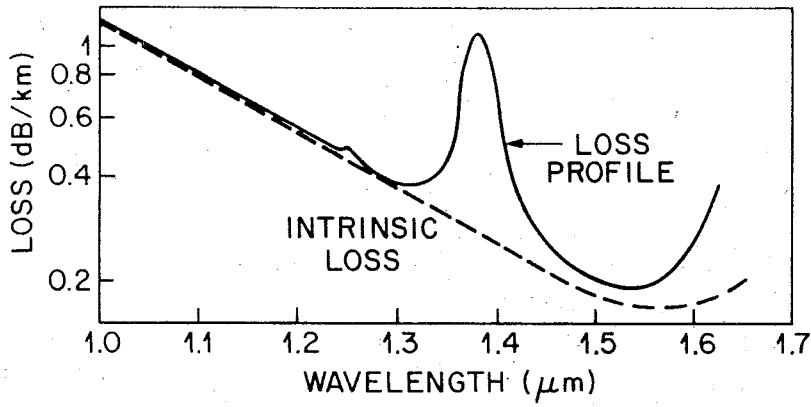


Graded-index (GI) multimode fiber: (a) Refractive-index profile; (b) mode propagation; (c) principle of action of graded-index multimode fiber.

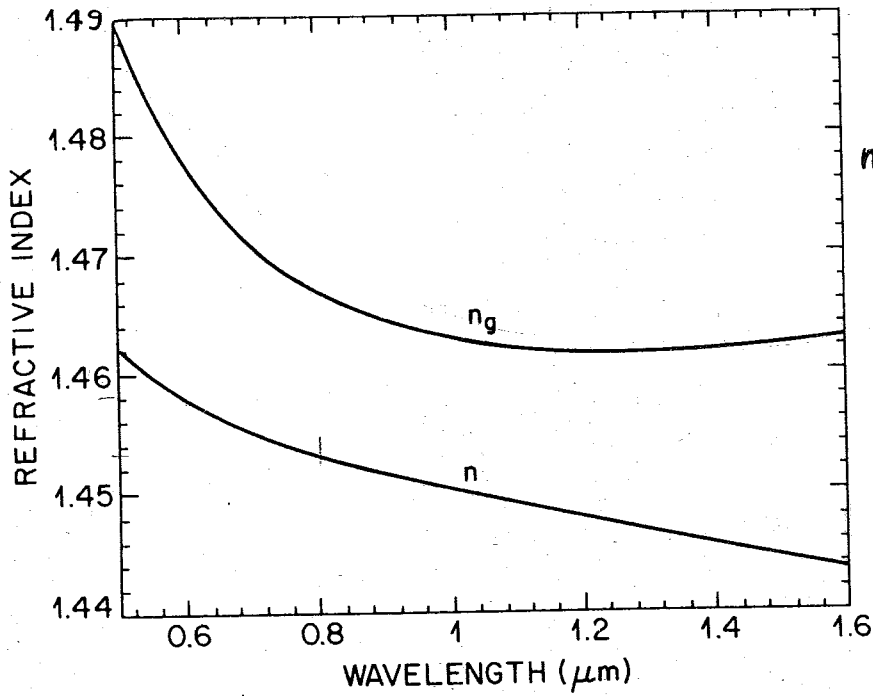
c)



Dispersion in three types of optical fiber: (a) Step-index multimode fiber; (b) graded-index multimode fiber; (c) step-index singlemode fiber.



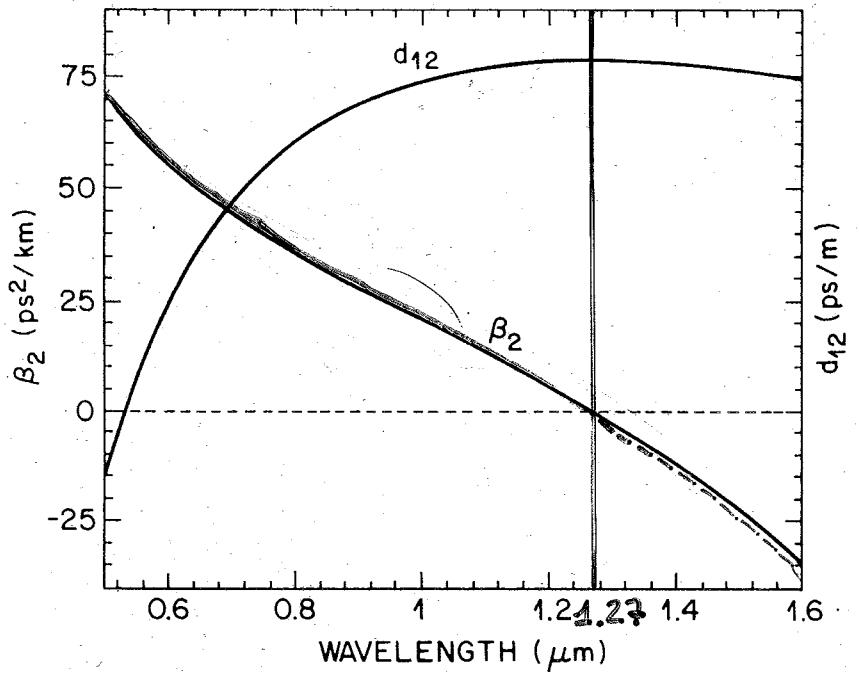
Measured loss profile of a single-mode fiber. Dashed curve shows the intrinsic loss profile resulting from Rayleigh scattering and absorption in pure silica (after Ref. 54).



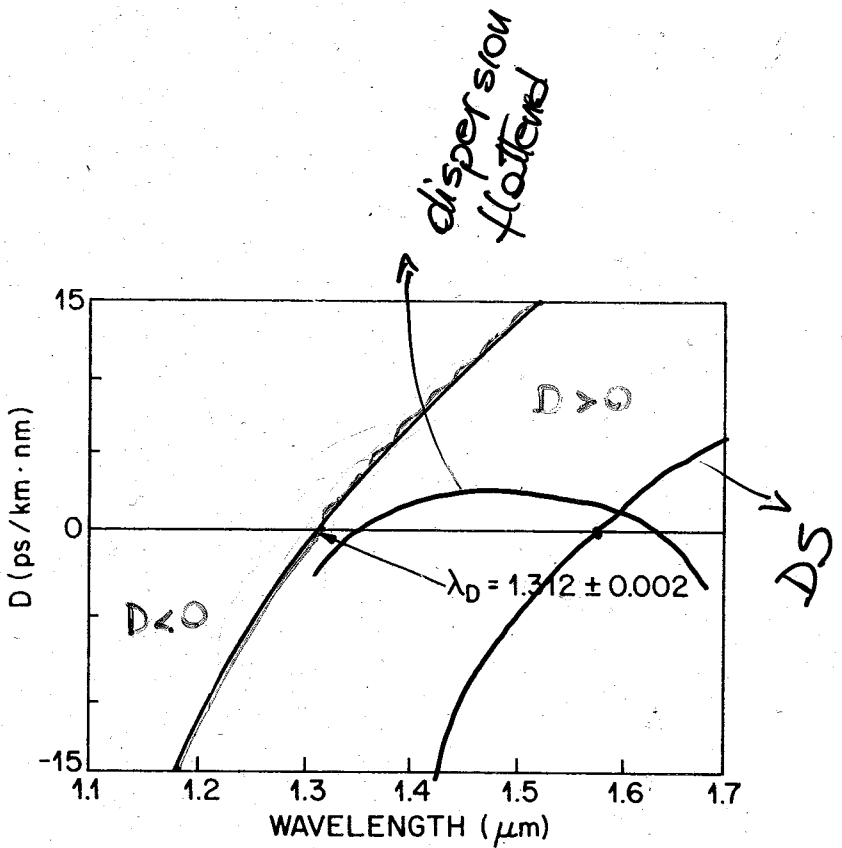
$$n_g = n + \omega \frac{dn}{d\omega} = n - \lambda \frac{dn}{d\lambda}$$

Variation of refractive index  $n$  and group index  $n_g$  with wavelength for fused silica.

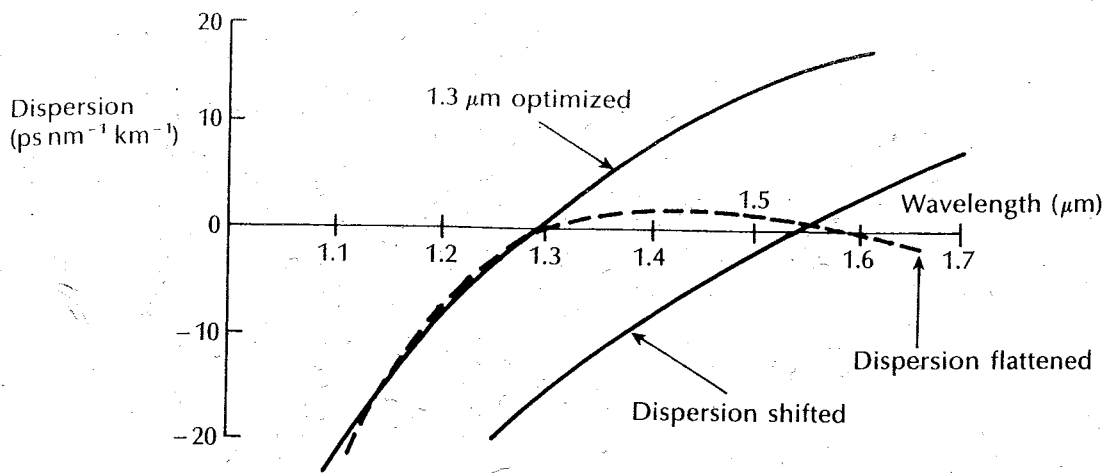
GVD



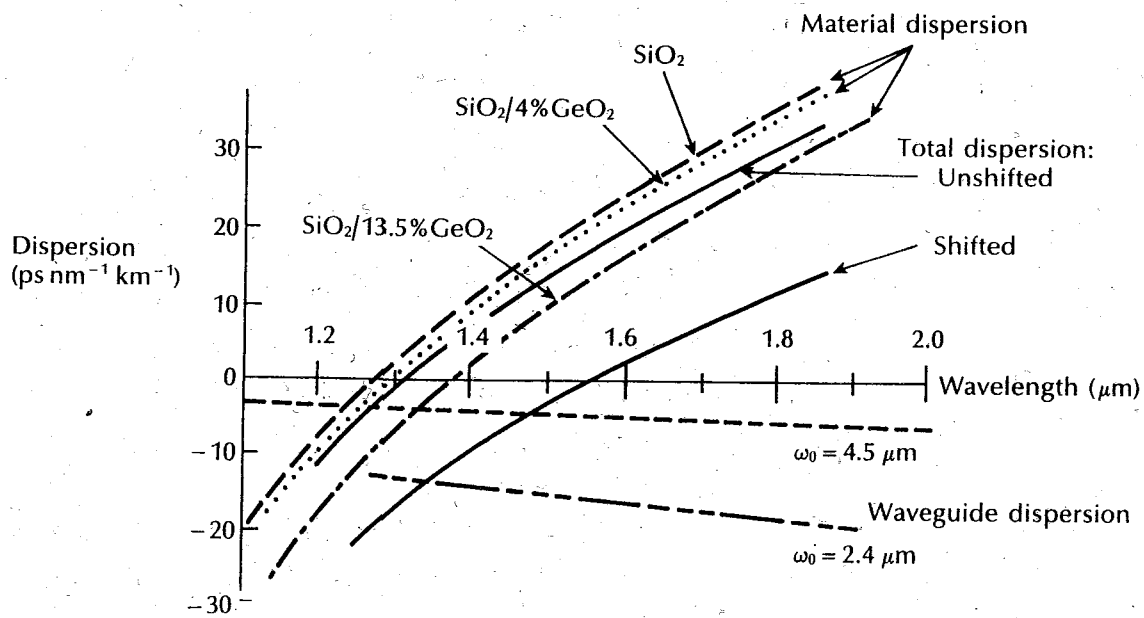
Variation of  $\beta_2$  and  $d_{12}$  with wavelength for fused silica. The dispersion parameter  $\beta_2 = 0$  near  $1.27 \mu\text{m}$ .



Measured variation of dispersion parameter  $D$  with wavelength for single-mode fiber (after Ref. 54).



Total dispersion characteristics for the various types of single-mode fiber.



Material, waveguide and total dispersion characteristics for conventional and dispersion shifted step index single-mode fibers showing variation with composition and spot size ( $\omega_0$ ).