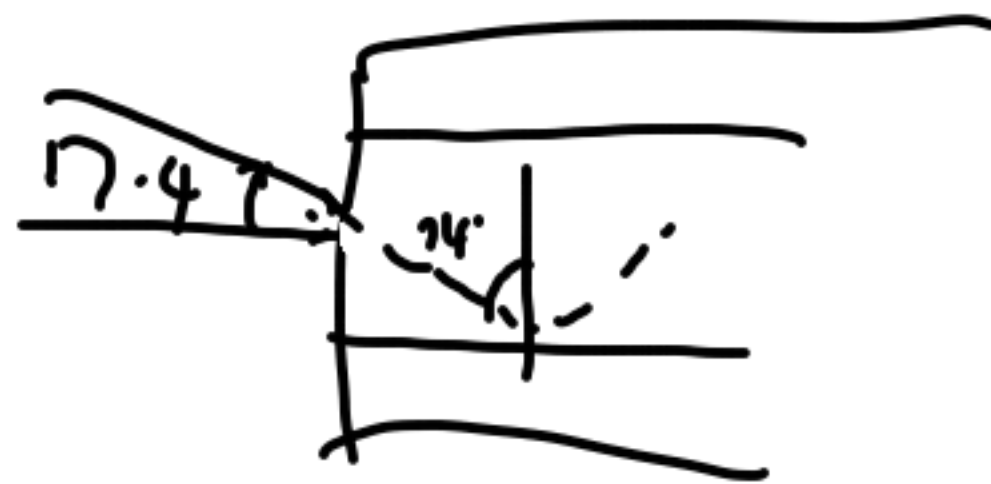


A Silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a ^{core} refractive index of 1.50 and a cladding refractive index of 1.47. Determine the critical angle at the core-cladding interface and the acceptance angle in air for the fiber.

$$n_1 = ? \text{ (core)} \quad n_0 = \text{air} \approx 1$$

$$n_2 = ? \text{ (clad)}$$



$$\phi_c = \sin^{-1}\left(\frac{n_2}{n_1}\right)$$

$$= \sin^{-1}\left(\frac{1.47}{1.5}\right)$$

$$\phi = 78.52^\circ$$

NA = Numerical Aperture

$$NA = (n_2^2 - n_1^2)^{1/2} = 2.26$$

$$\theta_a = \sin^{-1}\left(\frac{NA}{n_0}\right) = \underline{17.4^\circ}$$