

SISTEM KOMUNIKASI OPTIK

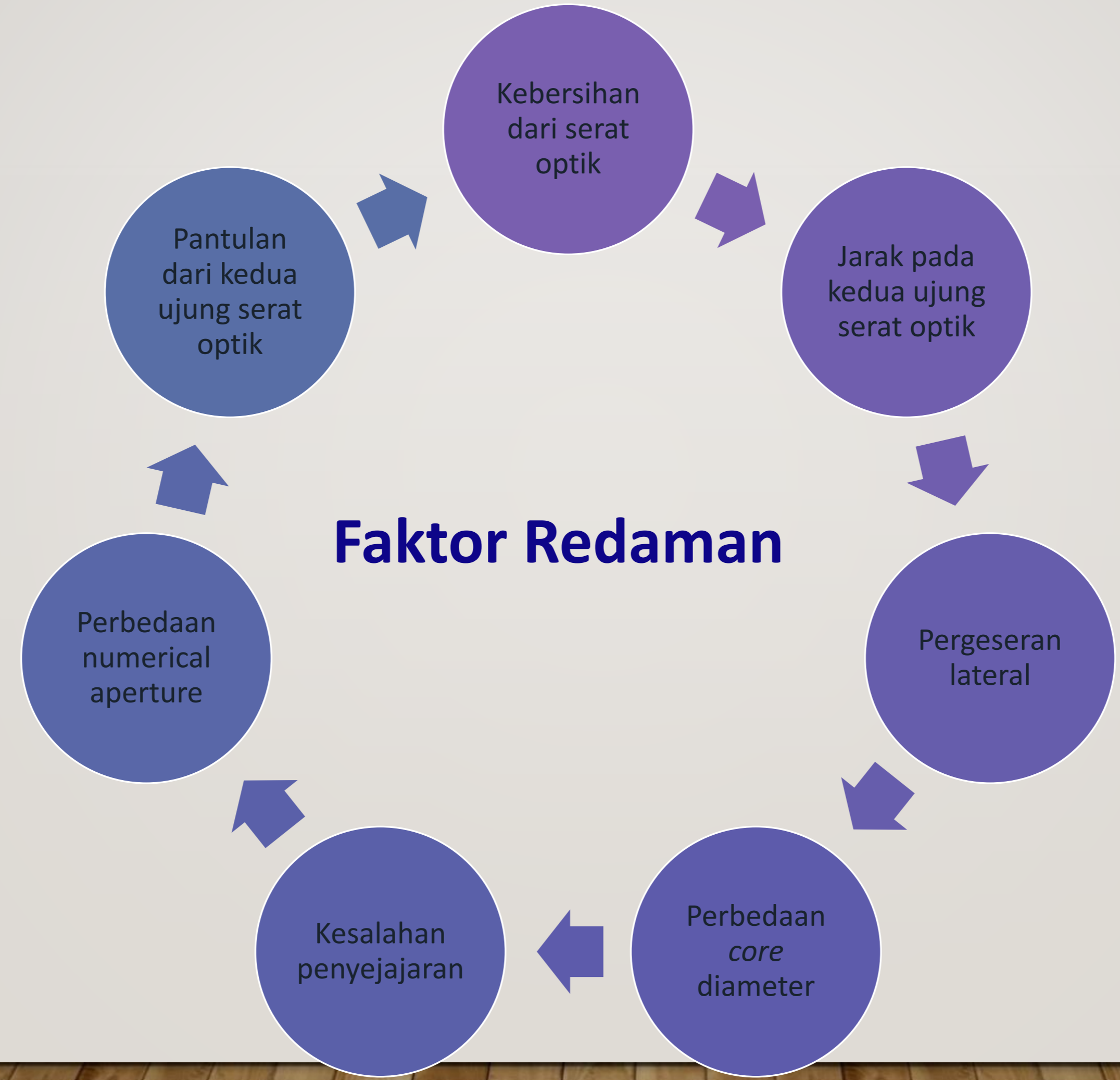
- **MATERI 8**

- **LOSS PENYAMBUNGAN SERAT OPTIK**

- D3 Teknologi Telekomunikasi – Fakultas Ilmu Terapan

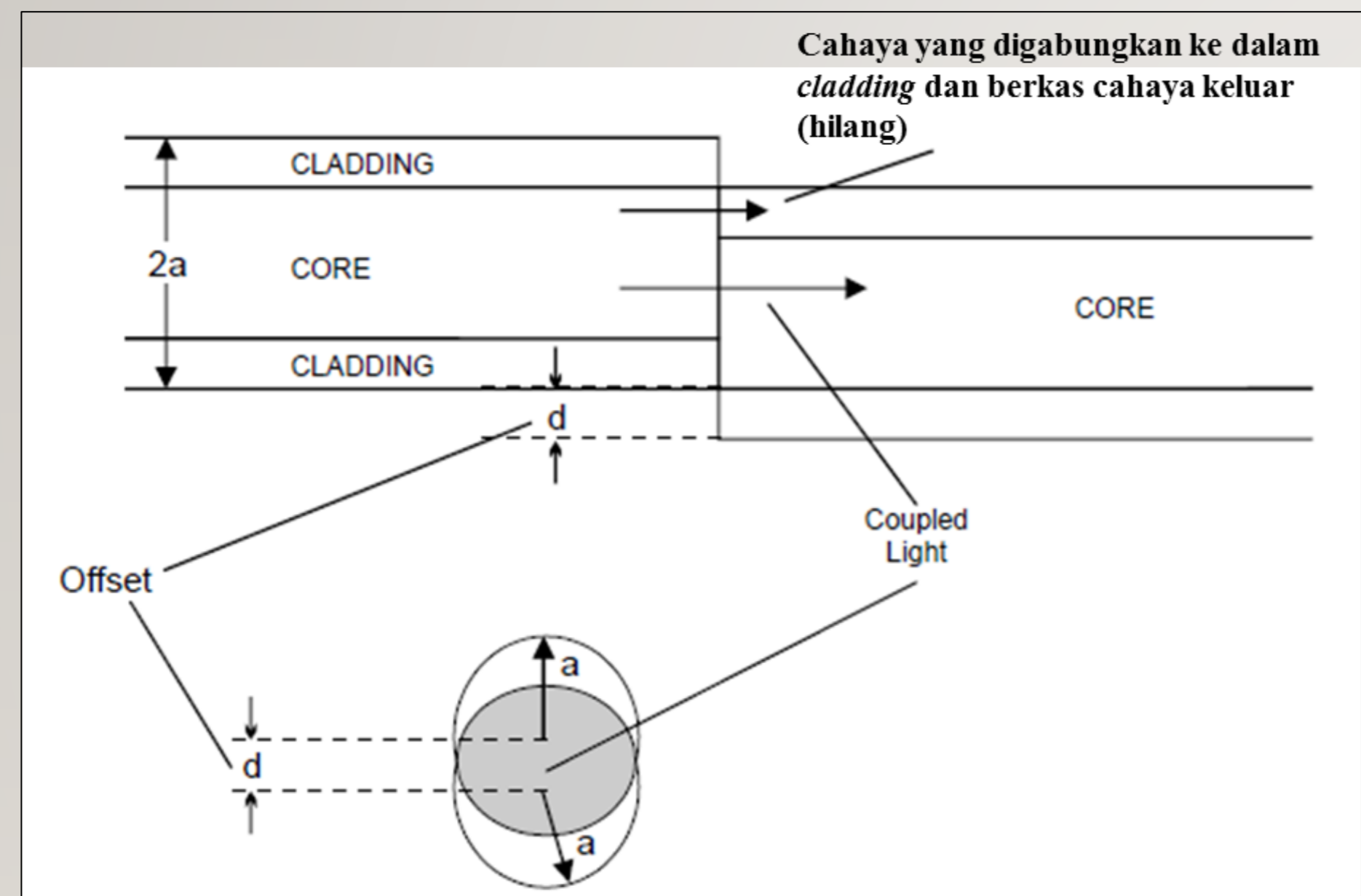


PENYAMBUNGAN SERAT OPTIK



KETIDAKTEPATAN SECARA MEKANIK

▶ 1. Pergeseran Lateral (*Lateral Displacement*)



□ Efisiensi kopling :

➤ Serat optik step index :

$$\eta_{F,step} = \frac{2}{\pi} \arccos \frac{d}{2a} - \frac{d}{\pi a} \left(1 - \frac{d^2}{4a^2} \right)^{1/2} \quad \dots\dots \text{Pers. 1}$$

□ Loss akibat pergeseran lateral :

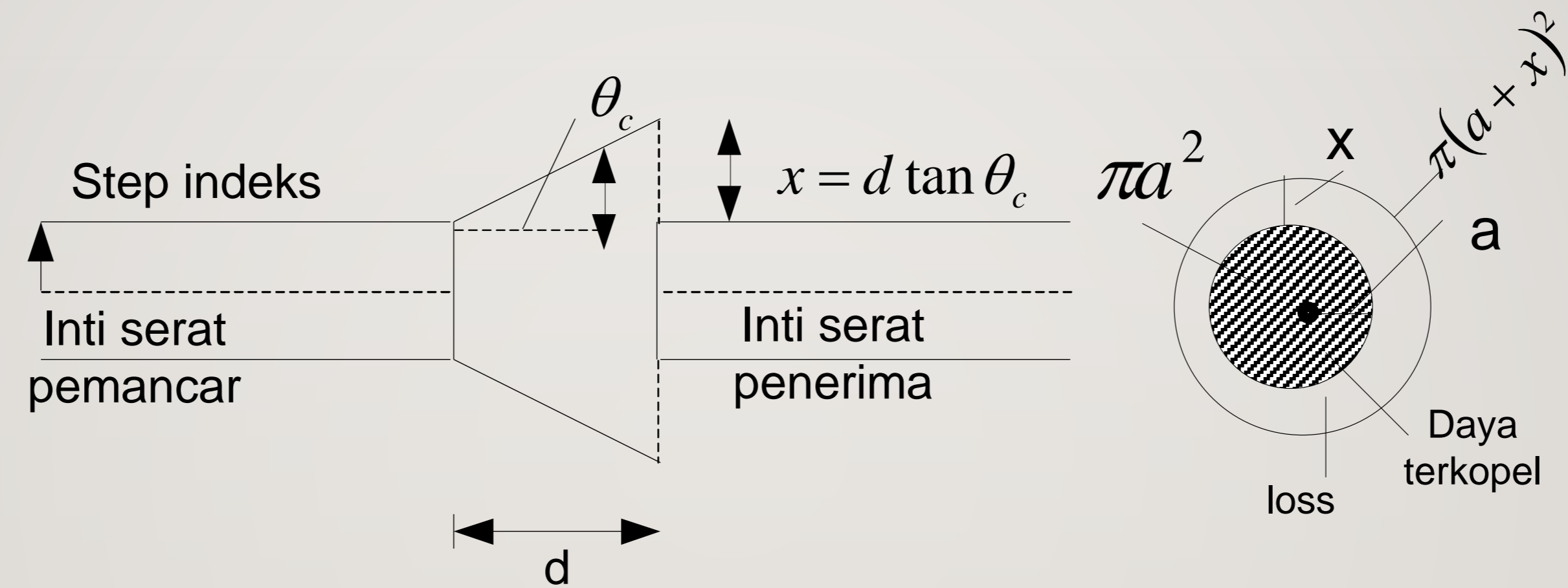
➤ Serat optik step index :

$$L_{step} = -10 \log \eta_{F,step}$$

.....Pers. 2

KETIDAKTEPATAN SECARA MEKANIK

▶ 2. Longitudinal Separation



□ Loss Akibat Terdapat Jarak Pemisah (*Separasi*) :

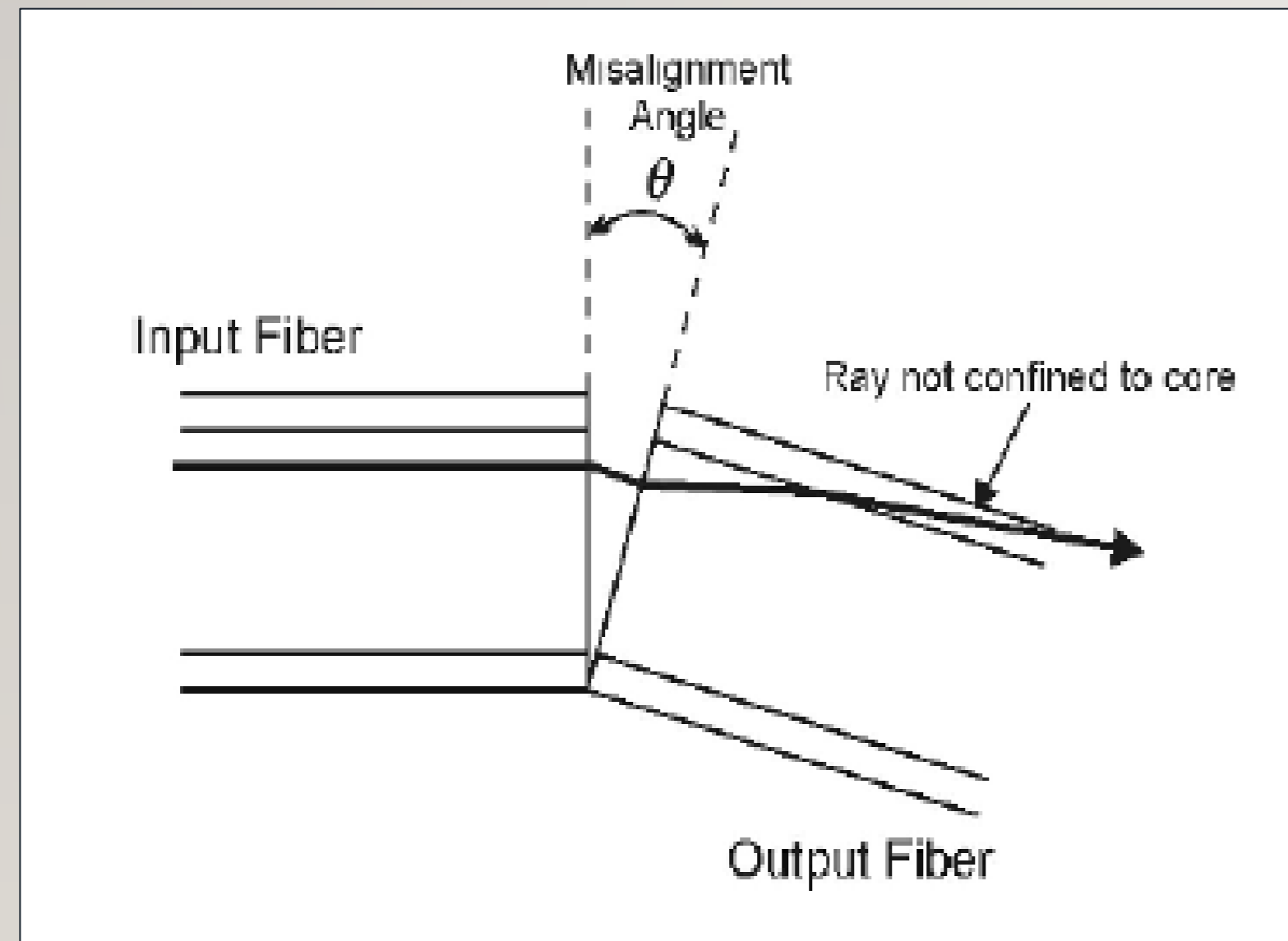
$$\text{Loss} = -10 \log \left(\frac{a}{a+d \tan \theta_c} \right)^2$$

.....Pers. 3

KETIDAKTEPATAN SECARA MEKANIK

▶ 3. Angular Misalignment

□ Loss Angular Misalignment :



$$L_F = -10 \log \left(\cos \theta \left\{ \frac{1}{2} - \frac{1}{\pi} p (1 - p^2)^{1/2} - \frac{1}{\pi} \arcsin p \right. \right. \\ \left. \left. - q \left[\frac{1}{\pi} y (1 - y^2)^{1/2} + \frac{1}{\pi} \arcsin y + \frac{1}{2} \right] \right\} \right)$$

.....Pers. 4

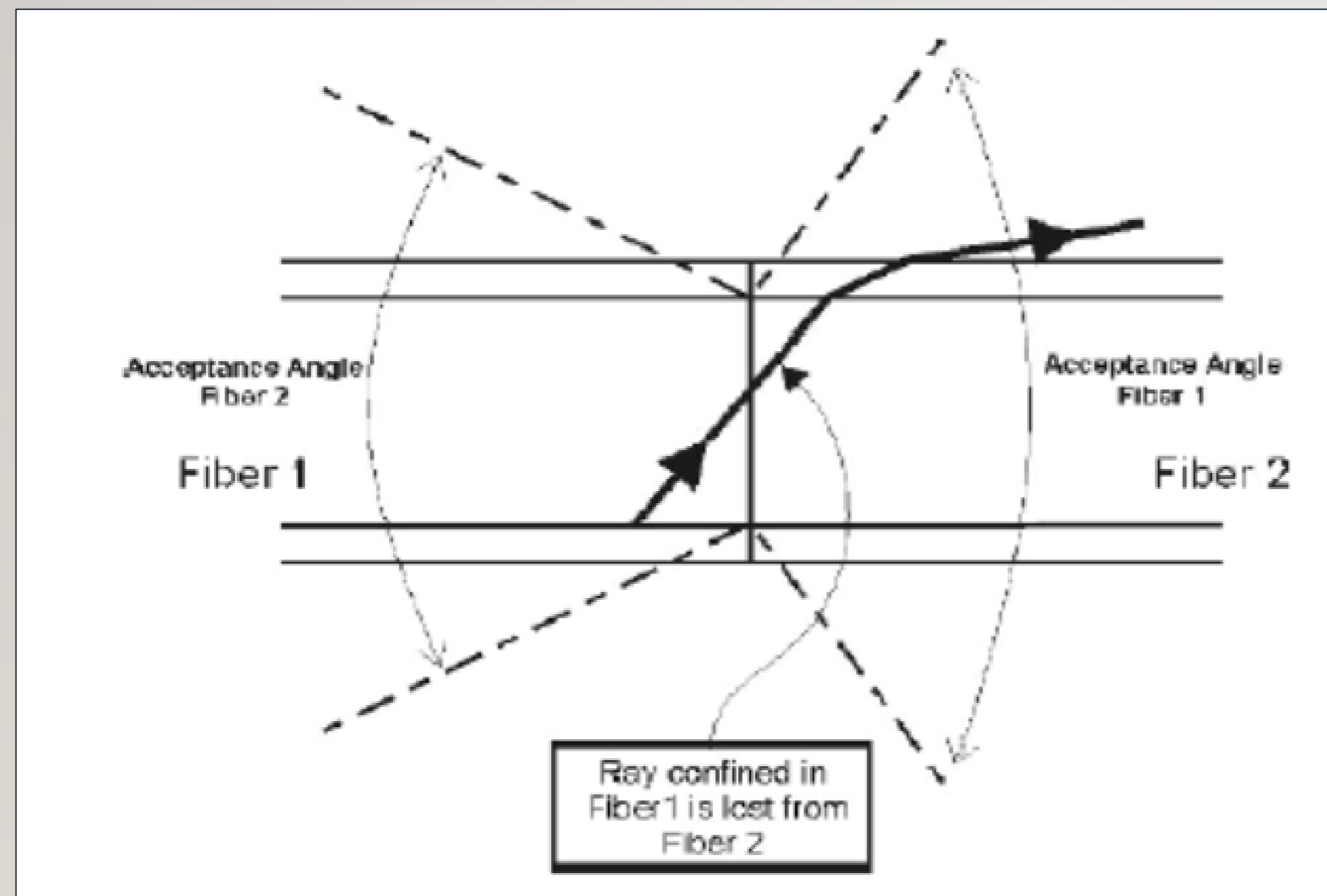
$$p = \frac{\cos \theta_c (1 - \cos \theta)}{\sin \theta_c \sin \theta}$$

$$q = \frac{\cos^3 \theta_c}{(\cos^2 \theta_c - \sin^2 \theta)^{3/2}}$$

$$y = \frac{\cos^2 \theta_c (1 - \cos \theta) - \sin^2 \theta}{\sin \theta_c \cos \theta_c \sin \theta}$$

PERBEDAAN KARAKTERISTIK SERAT OPTIK

▶ 1. Perbedaan *Numerical Aperture* Pada Kedua Serat Optik

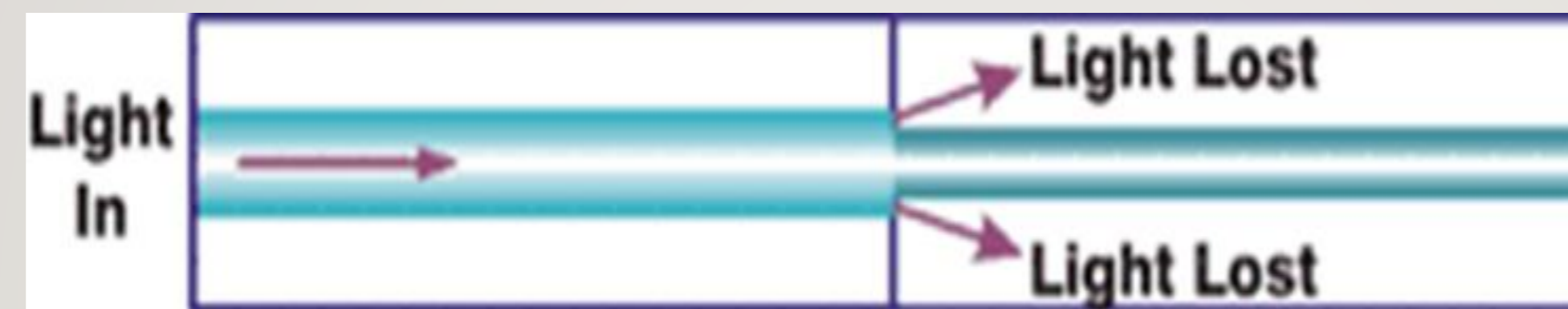


□ **Loss Akibat Perbedaan *Numerical Aperture* Pada Kedua Serat :**

$$L = -10 \log \left(\frac{NA_1}{NA_2} \right)^2 \quad \text{untuk } NA_1 > NA_2 \quad \text{.....Pers. 5}$$

PERBEDAAN KARAKTERISTIK SERAT OPTIK

▶ 2. Perbedaan *Core* Pada Kedua Serat Optik



- *Loss* Perbedaan *Core* Pada Kedua Serat Optik :

$$L = -10 \log \left(\frac{d_1}{d_2} \right)^2$$

.....Pers. 6



TERIMA KASIH



UNITED STATES OFFICE

1243 Barker Cypress
San Francisco, California



EUROPE OFFICE

13 Ave. Ballarta
Barcelona, Spain



SOUTH AMERICA OFFICE

45 Calle Norte
Argentina

