



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

OPTICAL AND MICROWAVE ENGINEERING

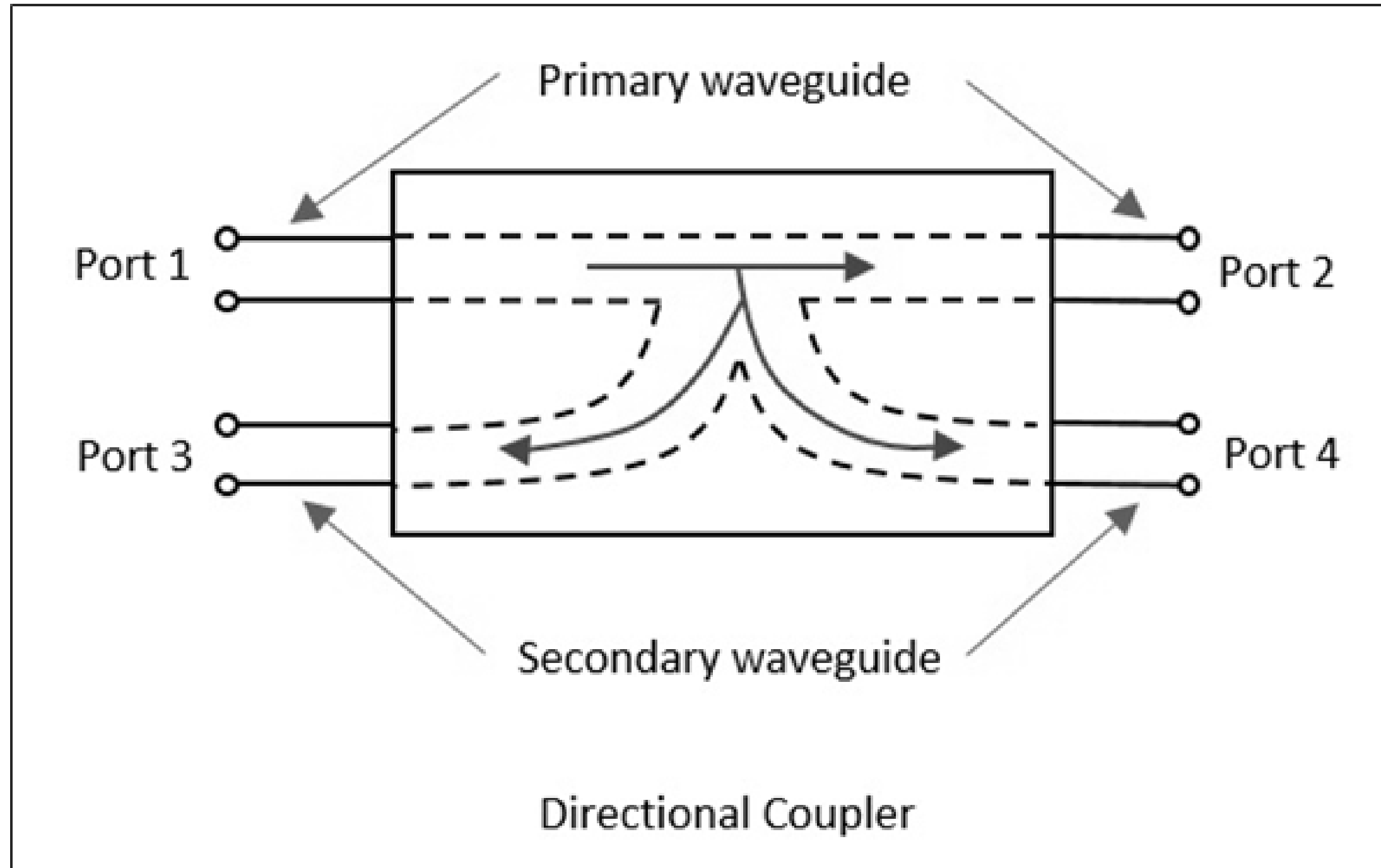
III YEAR/ VI SEMESTER
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UNIT 1 – MICROWAVE PASSIVE ELEMENTS

TOPIC– Directional Couplers

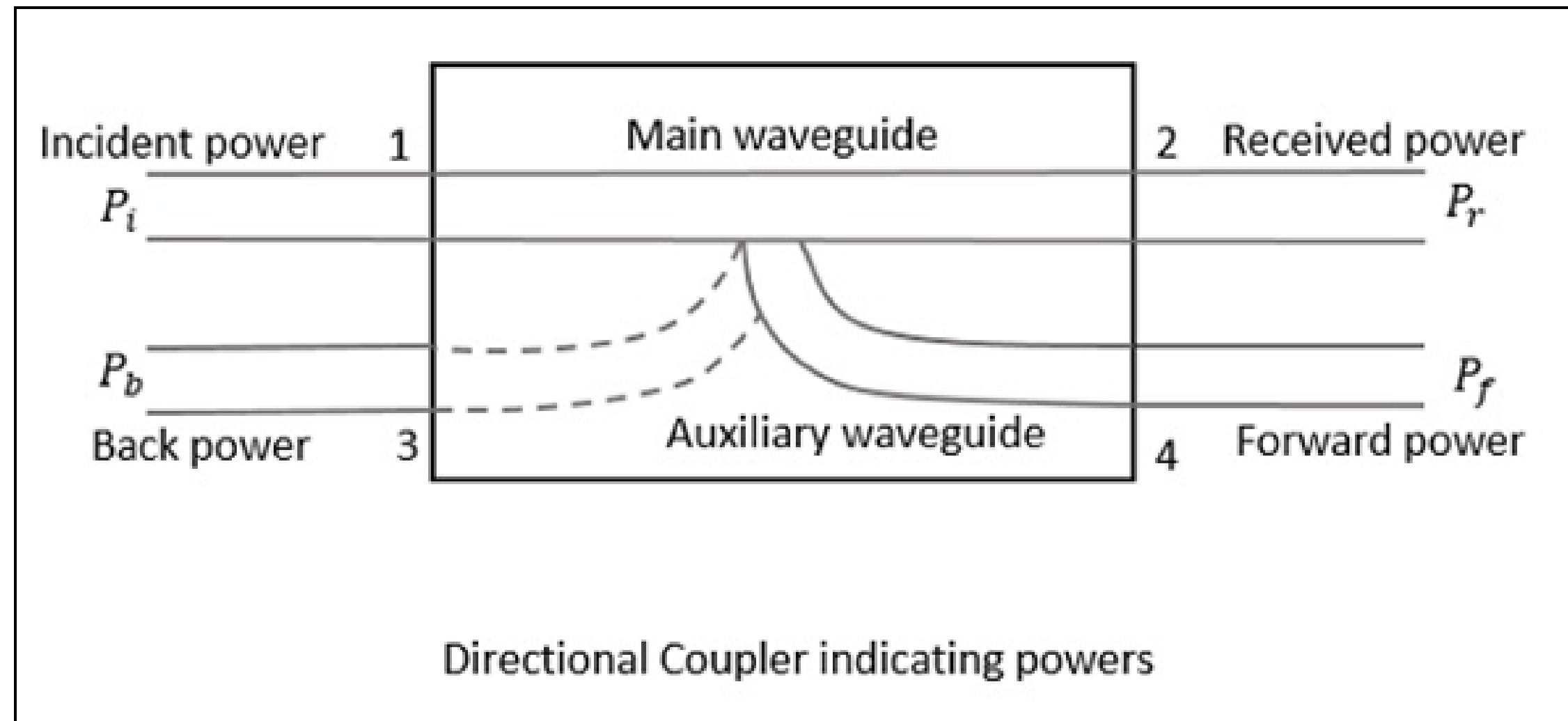


Directional Coupler



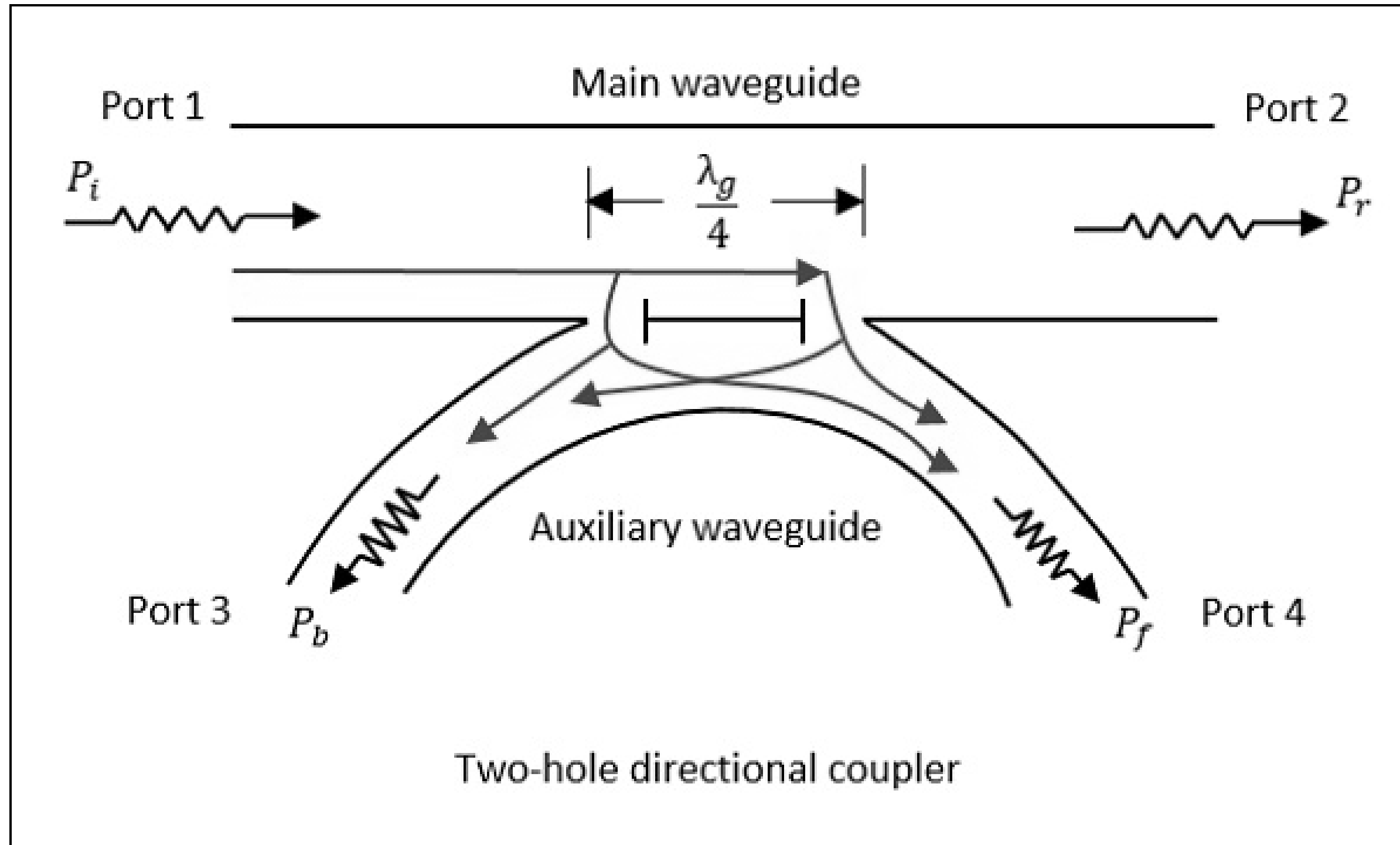


Properties of Directional Coupler





Two Hole Directional Coupler





Directional Coupler Parameter

- The performance of directional coupler is measured in terms of four basic parameters:

1. Coupling Factor (C):

- Measure of how much of power is being sampled.
- Ratio of power levels in main and auxiliary waveguides.

$$C_{(dB)} = 10 \log_{10} \left(\frac{P_1}{P_4} \right)$$

2. Directivity (D):

- Measure of how well the directional coupler distinguishes between forward and reverse travelling power.
- Ratio of forward coupled power level and reverse power level in auxiliary waveguide.

$$D_{(dB)} = 10 \log_{10} \left(\frac{P_4}{P_3} \right)$$



3. Isolation (I):

- Measures the directional properties.
- Ratio of incident power in main waveguide to the reverse power at auxiliary waveguide.
- $I = C.D$
- $I \text{ (dB)} = [C]_{\text{dB}} + [D]_{\text{dB}}$

$$I = 10 \log_{10} \left(\frac{P_1}{P_3} \right) \text{ dB}$$

4. Return/Insertion Loss (R):

- Ratio of power incident to the power transmitted in the primary arm.

$$R_{\text{(dB)}} = 10 \log \left(\frac{P_1}{P_2} \right) \text{ dB}$$



THANK YOU