

Physics of Ultrasound

Fourth lecture

Interaction of Ultrasound with Matter II

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Third Stage

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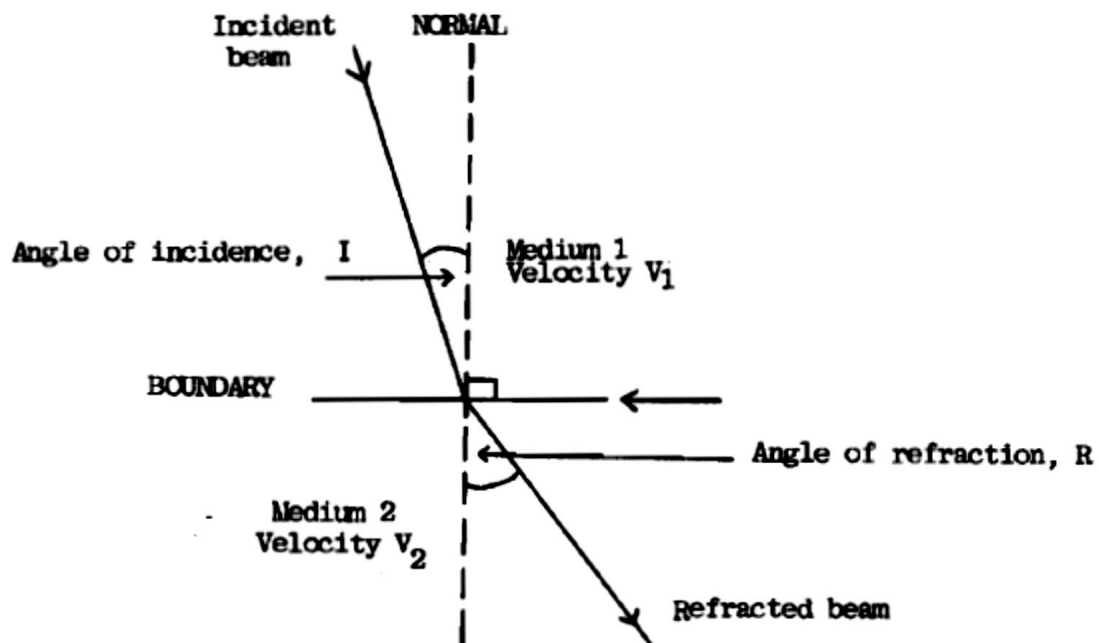
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1. Refraction of ultrasound

- ✚ Refraction is a change of beam direction at a boundary between two media in which ultrasound travels at different velocities.
- ✚ It is caused by a change of wavelength as the ultrasound crosses from the first medium to the second while the beam frequency remains unchanged.

$$\text{Velocity} = \text{frequency} \times \text{wavelength}$$

When velocity changes but frequency remains the same, the wavelength must undergo change.



- ✚ The phenomenon of refraction occurs when the angle of incidence at the boundary is not zero.
- ✚ In the case of normal incidence, part of the beam energy is reflected directly backwards, and the remaining energy is transmitted into the second medium without directional change.
- ✚ At any other angle of incidence, the transmitted beam is deviated from the original direction of the incident beam, either towards or away from