

# *Physics of Ultrasound*

*Sixth lecture*

## *Ultrasound Beam Shape*

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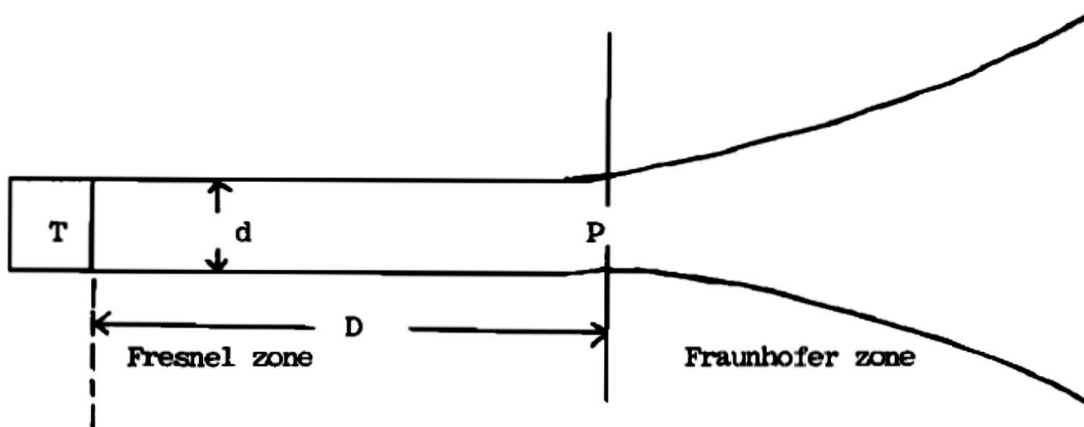
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## 1. Introduction

- ✚ As a beam of ultrasound travels outwards from the surface of the transducer, the distribution in space of the ultrasonic energy undergoes change.
- ✚ Axially, the intensity of the beam diminishes gradually with distance along the central axis of the beam, while
- ✚ Laterally, at any plane perpendicular to the beam direction, the intensity decreases rapidly with distance from the central axis.
- ✚ Generally, the ultrasound beam spreads out, or undergoes divergence, as it moves away from the transducer.
- ✚ The term "ultrasound beam shape" is commonly used to describe the manner in which the spatial distribution of the beam changes with distance from the source.
- ✚ The beam shape has very significant effects on the quality of the ultrasonic image, and on the tissue depths that can be usefully interrogated using a particular beam. This section examines the factors which influence ultrasound beam shape, and the associated implications for ultrasonic imaging.

## 2. General shape of the ultrasound beam

- ✚ The typical manner in which the ultrasound beam spreads out with increasing distance from the transducer, T, is shown in Fig



General shape of the ultrasound beam