

Physics of Ultrasound

Lecture10

Lateral resolution

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Third Stage

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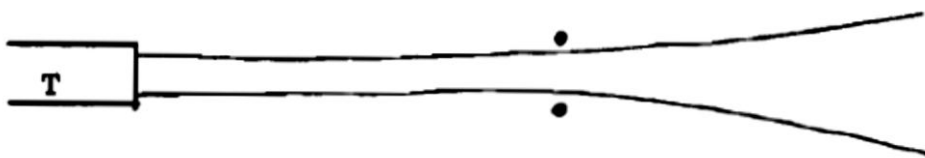
Introduction

In ultrasonic imaging, axial resolution is better than lateral resolution, besides showing less variation. This means that lateral resolution is the more limiting aspect of spatial resolution. It is therefore important that the factors affecting lateral resolution be well understood. These factors include:

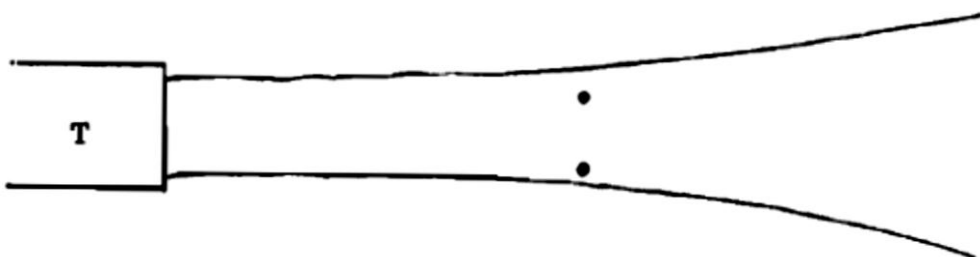
- ✚ beam width
- ✚ beam frequency
- ✚ scan line density.

Effect of beam width

Whereas axial resolution is limited by the length of the ultrasound pulse, the lateral resolution is limited by the width of the pulse. Although it is more common to refer to beam width rather than pulse width, the two are essentially the same, since the ultrasound beam comprises a series of identical pulses released in rapid succession. Lateral resolution is limited by the beam width in the plane of the reflectors being resolved. Reflectors closer to one another than the beam width cannot be resolved. Therefore, the narrower the beam width, the better the lateral resolution.



small beam width, Reflectors farther apart than the beam width are spatially resolved.



Larger beam width.