

Limited Diffraction Beams — Their Principles and Potential Applications

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Limited diffraction beams are a new class of beams that in theory have an infinite large depth of field when produced with an infinite aperture. Even if produced with a finite aperture, these beams have a large depth of field. Because of this property, limited diffraction beams may have applications in medical imaging, tissue characterization, and nondestructive evaluation (NDE) of materials.

In this paper, we will present the basic principles of limited diffraction beams. The recent development of these beams including methods to obtain new limited diffraction beams and sidelobe reduction will also be presented. Examples for potential applications of these beams on medical imaging, tissue characterization, Doppler velocity measurement, and NDE will be given. Implementation of these beams with two-dimensional arrays will also be discussed.

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