

Generation of Airy beam using optical antenna

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In recent years, nanoantennas have had broad applications, such as super-resolution near-field microscopy imaging, high-efficiency solar cells, and nanolithography. Nanoantennas can efficiently collect light energy and confine it to a subwavelength volume, and their basic principle is surface plasmon polariton resonances [1]. Nanoantennas generally consist of complex two-dimensional or three-dimensional nanostructures. It is relatively expensive and difficult to describe the interaction between it and electromagnetic wave with a simple analytical formula. Therefore, we need to numerically simulate the interaction between nanostructures and electromagnetic waves. The results provide clear guidelines for the fabrication of efficient antenna [2]. Non-diffracting beams, do not spread as they propagate. An Airy beam is a non-diffracting beam, and has the property of self-acceleration [3]. This property is particularly useful in many applications.

In this paper, we will develop an optical antenna to generate an Airy beam. The characteristics of the resulting Airy beam are analyzed, and the effects of vary parameters of the optical antenna on the Airy beam are discussed. And by adjusting the parameters, the optical antenna has potential application for generating other novel non-diffracting beams.

References

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