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NASA TECH BRIEF



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Fresnel Diffraction Plates Are Simple and Inexpensive

The problem:

Previous methods of demonstrating diffraction phenomena have involved the use of monochromatic point sources or lasers, optical benches, and diffraction screens. Much time is needed for the setup and alignment of such sophisticated equipment and it can be used by only one viewer at a time. This has greatly limited the ability to demonstrate diffraction phenomena, particularly at the level of elementary physics.

The solution:

A simple and inexpensive Fresnel plate technique, wherein a large number of identical diffracting apertures are made in a random orientation on a piece of photographic film. When a small source of light is viewed through the plate, the diffraction pattern that is typical of the diffracting aperture is readily seen.

Such plates may also be used to demonstrate the Fraunhofer diffraction pattern from a random array of n identical apertures. This pattern has perfect radial symmetry and it is believed that photographs of it could be used to make an excellent master scatter plate for use in a scatter fringe interferometer.

Notes:

1. These Fresnel diffraction plates enable one to readily see the diffraction patterns produced by different types of diffracting apertures. They should be of particular interest to all institutions of learning engaged in the subject of physics.
2. Photographs of various diffraction patterns using both white light and that from a He-Ne laser are presently being made with these plates. The diffraction patterns seen when monochromatic light is used are of the same form and exhibit excellent contrast.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
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Reference: B67-10297

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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Category 02

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