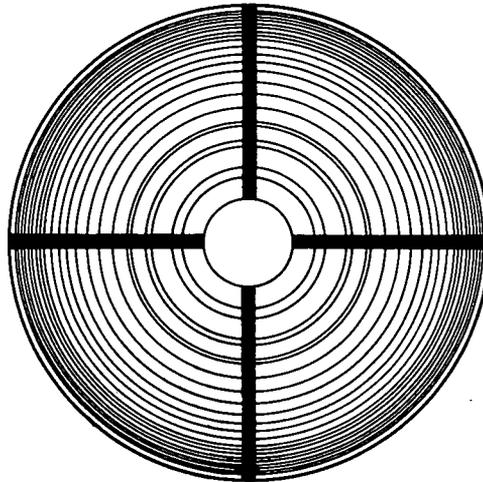


NASA TECH BRIEF



NASA Tech Briefs are issued by the Technology Utilization Division to summarize specific technical innovations derived from the space program. Copies are available to the public from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 22151.

Fresnel Zone Plate Forms Images at Wavelengths Below 1000 Angstroms



The problem: To produce an image forming device that will operate in the vacuum ultraviolet, particularly in the 1000 angstrom to 10 angstrom range. At these wavelengths, normally transparent materials become opaque and mirror materials effectively lose their reflectivity.

The solution: A fresnel zone plate having openings in the areas usually occupied by transparent rings.

How it's done: The zone plate is made by a combination of etching and electrodeposition that places thin layers of gold to form the opaque rings. The rings are supported by four radial ribs to maintain the positioning and spacing in relation to the pattern of the

transparent rings which are actually openings. The concentric opaque and transparent rings have diameters that are the square roots of continuous integral numbers starting with unity at the center of the plate.

Notes:

1. This plate has been successfully used in visible light and the ultraviolet as far as 2537 angstroms. For the shorter wavelengths, the plate must be used in a vacuum since the atmosphere is opaque to radiation below 2000 angstroms.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland, 20771
Reference: B65-10171

(continued overleaf)

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Smithsonian Institution under contract to Goddard Space Flight Center (GSFC-231)