

4.8 Experiments on interference

A.W. Suraj Chandana ¹, W. P. Siripala², Nalin de Silva³

¹National Institute of Sports Science

²Department of Physics, University of Kelaniya

³Department of Mathematics, University of Kelaniya

ABSTRACT

We report a few experiments carried out to demonstrate the formation of interference patterns with thin Aluminium sheets placed along zero probability positions (positions where the probability of finding a particle is zero). The presence of the Aluminium sheets did not destroy the interference patterns though one would have expected the particles to interact with the sheets and wash out the patterns.

In the experiment arrangement, Laser beam (He/Ne gas laser, wave length 633nm, maximum power <1mW), a double-Slit ($a = 0.1\text{mm}$, $b = 1\text{mm}$), digital camera, Aluminium sheets ($0.056\text{cm} \times 3\text{cm} \times 40\text{cm}$), two lenses and traveling microscope were needed.

Eight thin Aluminium sheets of dimensions $0.56\text{cm} \times 3\text{cm} \times 30\text{cm}$ were placed along zero probability positions within the central maxima of interference pattern, and 20 more thin small Aluminium sheets of dimension $0.056\text{cm} \times 3\text{cm} \times 6\text{cm}$ were paced along zero probability positions of the diffraction pattern.

The interference patterns were not changed as can be seen in the figure 1

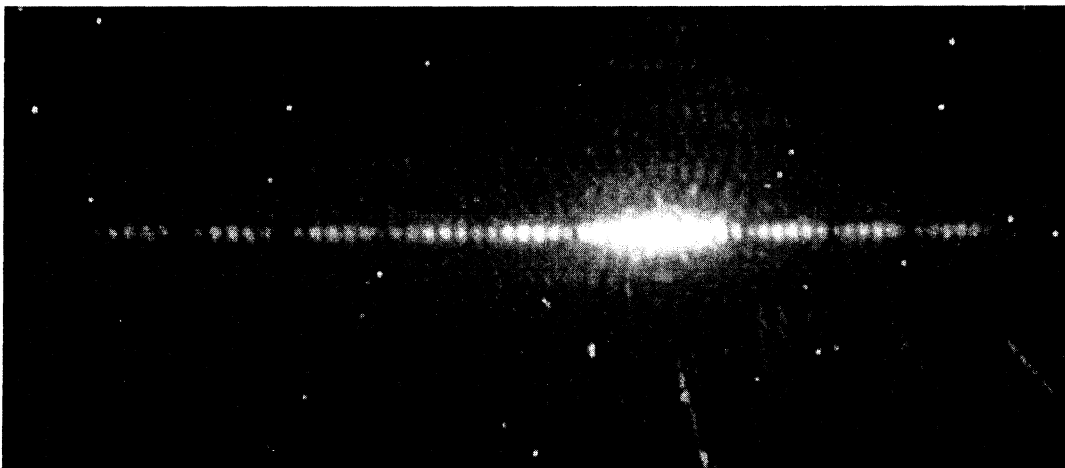


Figure 1: Eight thin Aluminium sheets of dimensions $0.056\text{cm} \times 3\text{cm} \times 30\text{cm}$ placed along zero positions probability within the central maxima.

Now the front edge of the first Aluminium sheet from the left of the eight sheets that were placed within the central maxima was moved through 4mm without moving the rear end of the sheet. The diffraction and interference patterns were washed off as shown in the figure 2.

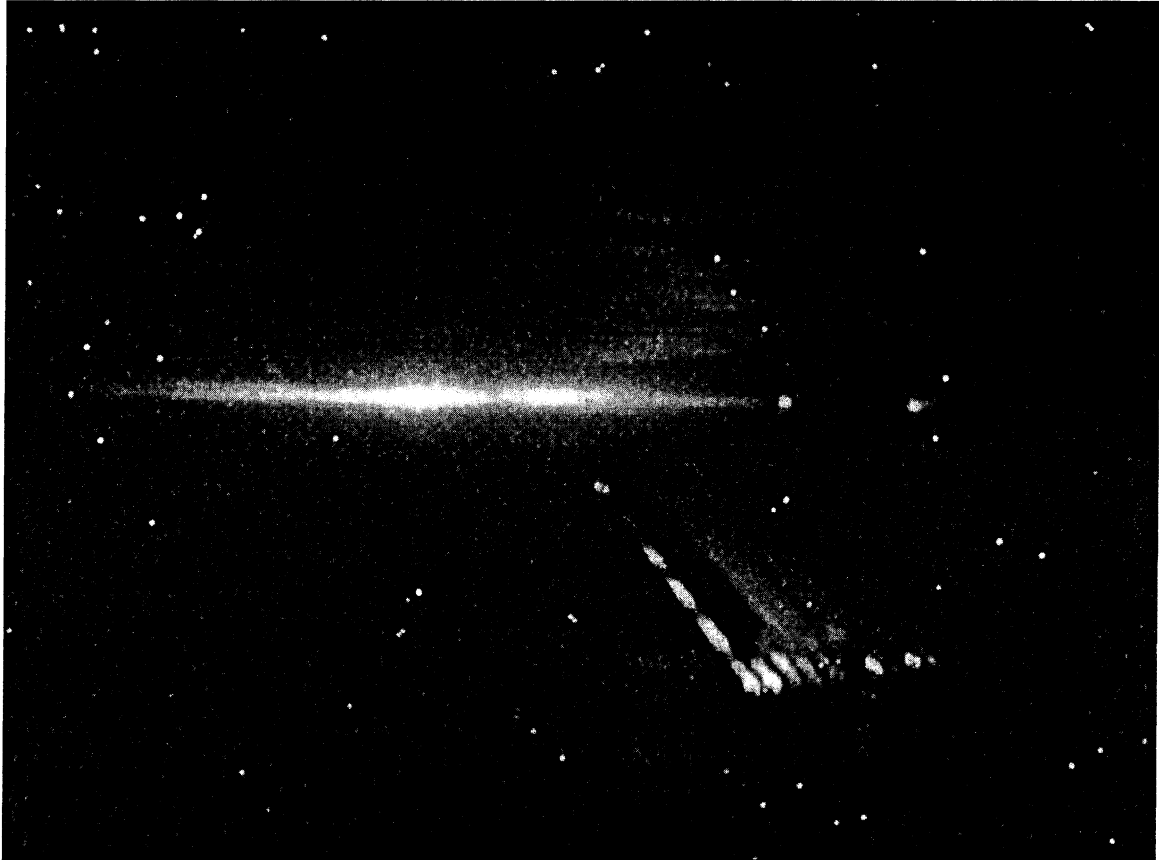


Figure 2: Front edge moved through 4mm