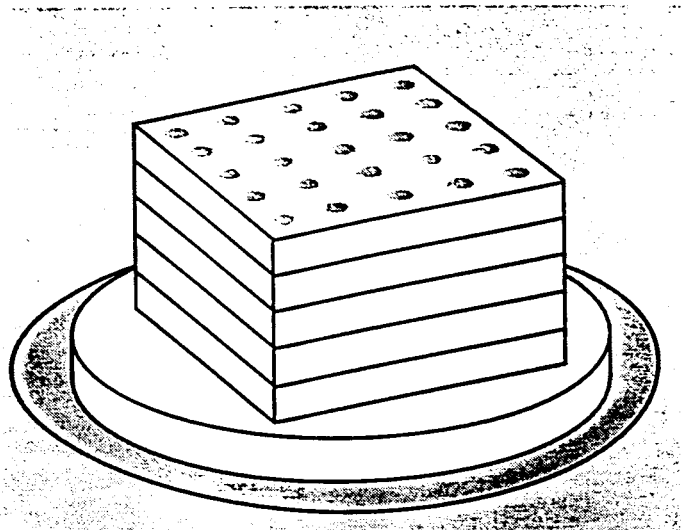
# BRAGG REFLECTION CUBE SET
## No. 36860

## Introduction

The Bragg Reflection Cube Set uses microwaves to simulate x-ray diffraction from the faces of a crystal. Knowing the wavelength of the microwaves, the distance between the Bragg planes, and the angle between the incident and diffracted beams, you can verify the Bragg equation. The set is intended for use with the CENCO 3cm Microwave Apparatus (36811).

The main components of the Bragg Reflection Cube are the 5 layers of 1.9cm (3/4-inch) polyethylene foam, which are virtually transparent to microwaves. The layers have holes to accommodate 125 steel chrome balls that act as scattering centers. Also included are a foam hub assembly with angle indicator for cube positioning, an alignment disk assembly with angular graduations, a rail indicator for angular measurements, and an extension connector block to lengthen the transmitter arm.



Bragg Reflection Cube Set

## Theory

In 1912 Max Von Laue discovered that ordinary crystals could diffract X-rays. A simple interpretation of the diffraction process was given by Sir William H. Bragg a short time later. Bragg showed that the diffraction pattern could be explained in terms of the reflection of the incident beam from planes of atoms within the crystal. For example, in a two-dimensional representation of the atoms in a crystal (Fig.1) the lines along AA, BB, and CC represent planes of atoms from which diffraction could be observed.

In order to derive the Bragg equation for diffraction, consider the diffraction of waves from two adjacent and parallel Bragg planes a distance $d$ apart, as shown in Fig. 2. A wave of wavelength $\lambda$ is incident upon the Bragg planes at an angle of $\theta$ with respect to the planes. The incident wave is partially diffracted at an angle $\theta$, while the transmitted wave is diffracted from the second Bragg plane also in the direction of $\theta$. It is for this reason that the diffraction process appears as reflection.

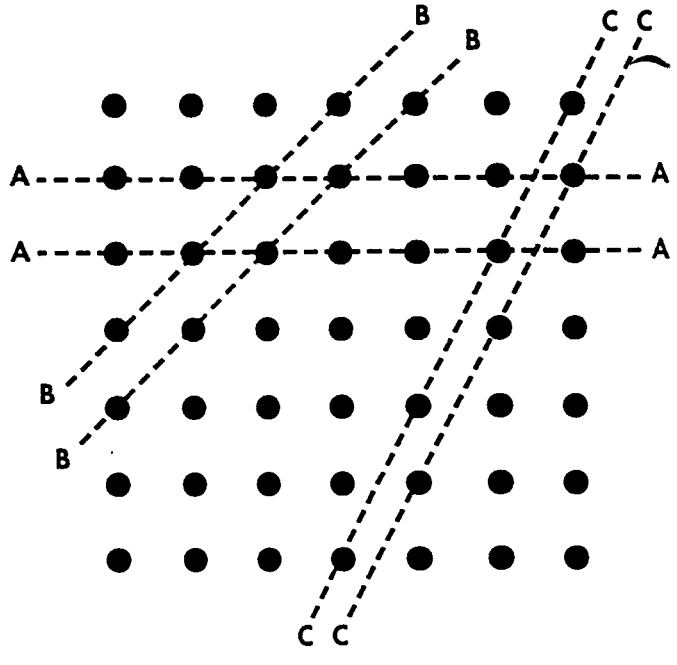



Fig 1: Rows of atoms in different directions

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