Proceedings of the American Physical Society

MINUTES OF THE 1951 FALL MEETING OF THE OHIO SECTION AT ANTIOCH COLLEGE, YELLOW SPRINGS, OHIO

THE regular Fall meeting of The Ohio Section of the American Physical Society convened at Antioch College, in Yellow Springs, Ohio, on November 10, 1951. Fifty members were present. Abstracts of three contributed papers follow. These papers were followed by a discussion on Physics in General Eduction. Papers were presented in the order indicated: *Physics, a Part of General Education at Harvard*, by G. E. Owen of Antioch College; *The Course in Physical Science as General Education at Denison*, by Edward M. Collins of Denison University; *The Course of General Education in Physics and Astronomy at Ohio State University*, by C. E. Hesthal of Ohio State University; and, *Physics in General Education*, by D. W. Bowman, of Bowling Green State University.

The only item of business transacted had to do with the appointment of a Program Committee to be charged with the duty of preparing and arranging programs and meeting places.

LEON E. SMITH, *Secretary*,
Ohio Section,
Denison University,
Granville, Ohio

Vibrational Analysis of Chain Molecules. W. EDWARD DEEDS, *Ohio State University*.—By an extension of a method originally developed by Lagrange, it is relatively easy to solve the classical vibration problem for any chain type molecule which consists of repeating units. The kinetic energy function is considerably simplified if a separate coordinate system satisfying the Eckart conditions is used for each characteristic group of atoms. Application of suitable boundary conditions for chain molecules of finite size leads to expressions for the discrete normal frequencies of vibration. The vibration-rotation bands occur in related sets with intensities which can be calculated in a straightforward manner. The calculated intensities are very helpful in the assignment of the observed band sets, the assignment of the observed bands within a set, and the determination of the end conditions for the chain. The observed vibrational frequencies can be plotted in such a way as to give graphical solutions to the vibrational secular determinant. Comparison of these experimental curves with the corresponding theoretical ones makes it easy to determine the important force constants.

On the Energy Levels of the S^{32} Nucleus.* G. R. GROVE† AND JOHN N. COOPER, *Ohio State University*.—The observed energy levels of the compound nucleus S^{32} resulting from proton capture[1] in P^{31} have been related to predictions of the Wilson spherical shell nuclear model,[2] which suggests levels given by

$$E_{n,j}=0.387[(n-1)(n+2)]^{\frac{1}{3}}+1.44(Z^4A)^{-\frac{1}{3}}j(j+1)\ \text{Mev}.$$

The absolute values of the observed levels of S^{32} are difficult to know accurately, but the relative spacings of the levels are reliably known. It was found that the 17 observed levels can be roughly accounted for with n's of 28, 29, 30, and 31, and low j's. The j's are not always successive; for $n=30$, levels may be assigned to $j=0$, 1, 2, 3, 5, and 6, but none seems to correspond to $j=4$. For several of the levels the predicted and observed energies differ by considerably more than can be explained by experimental errors.

* Assisted by the AEC through a contract with the Ohio State University Research Foundation.
† Formerly AEC Predoctoral Fellow; now at Mound Laboratory, Miamisburg, Ohio.
[1] G. R. Grove and J. N. Cooper, Phys. Rev. **82**, 505 (1951).
[2] H. A. Wilson, Phys. Rev. **77**, 516 (1950).

A Curved Quartz Crystal X-Ray Spectrometer. JOHN E. EDWARDS, *Ohio University*.—A quartz crystal is cut to utilize the 310 and 110 planes for diffraction of x-rays by transmission. The crystal, 0.2 mm thick, is curved to a radius of 15 inches with an effective area variable to 3 cm width and 1.3 cm height. An adjustable slit with attached ionization chamber and FP-54 tube is moved along the focal circle on an arm attached to a shaft at the center of the focal circle. The slit is maintained perpendicular to the x-ray beam by a device similar to that used by Marimer *et al.*[1] Since the sharpest focus of the diffracted beam is obtained at the point on the focal circle, the crystal was cut at such an angle that all spectra up to 2A could be formed within 9° of this point. X-rays up to 0.4A can be diffracted from the 310 planes with the sharpest focus in the region of 0.1A, while x-rays from 0.4A to 2A may be diffracted from the 110 planes with the sharpest focus near 1A. Profiles of the $WL_{\gamma 1}$ line will be shown to illustrate the effect of slit width and crystal opening on the width and intensity of the line. A full width at half-maximum of 1.12 X.U. has been obtained thus far in comparison with 1.01 X.U. obtained by Williams[2] with a double crystal spectrometer.

[1] Marimer, Blaser, Preiswerk, and Scherrer, Helv. Phys. Acta **22** (No. 4) 155–63 (1949).
[2] Williams, Phys. Rev. **45**, 71 (1934).