

PHYSICS

Chairman: ARNIM HUMMEL, Ball State Teachers' College
R. E. Winn, Purdue University, was elected chairman for 1953

ABSTRACTS

Nuclear Spectra—A Survey. ALLAN C. G. MITCHELL, Indiana University.¹—The general methods of measuring radiations emitted by the nucleus, namely, beta rays and gamma rays, are discussed. Various magnetic spectrometers are described. The examples of the type of results obtained showing energy level schemes and methods of determining spins and parities are presented.

Nuclear Spectra of Rb⁸² and Rb⁸⁴. CHARLES M. HUDDLESTON and ALLAN C. G. MITCHELL, Indiana University.¹—The nuclear spectra of Rb⁸² (6.3 hr) and Rb⁸⁴ (34 day) have been measured with a magnetic lens spectrometer. Rb⁸² emits two positron groups of energies 0.775 and 0.175 Mev. It also decays by orbital electron capture. A large number of gamma-rays accompanies the disintegration. Reasonable agreement with the gamma-rays emitted by Br⁸² has been obtained. Rb⁸⁴ emits three groups of positrons having end-point energies of 1.629, 0.822, and 0.373 Mev. One gamma-ray whose energy is 0.890 Mev has been found. Level diagrams for these disintegrations will be discussed.

The Isomer Rb^{84m}. R. S. CAIRD and ALLAN C. G. MITCHELL, Indiana University.¹—With the help of scintillation counters information on the isomer Rb^{84m} has been obtained. The isomer was produced by an (n, 2n) bombardment of ordinary Rb salts. The half-life has been determined as 21 min. Three gamma-rays have been observed at 0.239, 0.463, and 0.890 Mev. The last gamma-ray occurs in the product Kr⁸⁴. Coincidence measurements show coincidences between the gamma-ray at 0.239 Mev and another of nearly the same energy, while coincidences between the 0.463 and the gamma-rays at 0.239 Mev are essentially negligible. A possible level scheme will be discussed.

The energy dependence of the differential scattering cross section of alpha particles on helium. FREDERICK E. STEIGERT, Indiana University.¹—The differential cross section for the elastic scattering of alpha particles on helium is measured at 21.0, 19.6, 18.3, 16.6, 14.9, and 12.9 Mev, using Kodak NTA emulsions to observe the reaction particles. The angular distributions observed show marked dependence on the incident energy, exhibiting a double minimum at the highest, going through a broad shallow single minimum at intermediate values. This minimum becomes continually narrower and deeper with lower energies.

¹ Supported by the joint program of the ONR and AEC.

Longitudinal vibrations in a hollow metal tube. EARL MARTIN, Hanover College.—When a large gun tube is fired there are vibrations set up in it the nature and frequency of which have hitherto been unexplained. An attempt is made to give this explanation. The effect of these waves has been photographed and their existence has been verified for some time after the disturbance has taken place.

On the theory of bridge transfer in electric contacts. FRANK J. SPAYTH, P. R. Mallory and Co.—A critical resumé of the various existing theories of bridge transfer in electrical contacts is presented. These theories are evaluated in terms of the existing data. New data on low voltage bridge phenomena is presented with reference to its possible influence on the negative transfer of metal. Some basic experiments needed for a more complete evaluation of the problem will be described.

The structure of the $4s^2nf^2F$ -terms of ionized Germanium GeII. K. W. MEISSNER and K. L. ANDREW, Purdue University and Friends University.—The employment of interferometric wavelength measurements of certain germanium spark lines made it possible to determine the fine structure of a few $4s^2nf^2F$ —terms of GeII. All the terms for $n = 4, 5, 6,$ and 7 exhibit inverted term order and the splittings range from 0.47 to 0.75 cm^{-1} .