Proceedings of the American Physical Society

MINUTES OF THE 1954 FALL MEETING OF THE OHIO SECTION OF THE AMERICAN PHYSICAL SOCIETY AT UNIVERSITY OF TOLEDO, TOLEDO, OHIO, OCTOBER 8–9, 1954

THE regular fall meeting of the Ohio Section of The American Physical Society was held at the University of Toledo, Toledo, Ohio, on Friday and Saturday, October 8 and 9, 1954. Invited papers included: "An Introduction to Concepts of Modern Computing Devices," by Dr. Edward S. Foster, University of Toledo; "Analog Computers," by Dr. Reinhart Rosenberg, University of Toledo; "Digital Computers," by Mr. Jack Belzer, Battelle Memorial Institute, Columbus, Ohio; and a brief outline of the program in engineering physics being developed at University of Toledo by Dr. John J. Turin, who is in charge of the Department of Physics, University of Toledo. On Saturday morning, there was presented an invited paper on "Thermal Emissivity of Refractories and its Importance for Glass Furnace Operation," by Dr. Wilhelm Eitel of the Institute of Silicate Research, University of Toledo. Five contributed papers were presented, the abstracts of which follow. At the end of these contributed papers, the Section heard a report by Dr. Arthur Lutz, Wittenberg College, concerning the work of the seminar on the teaching of the natural sciences in relation to religious concepts, which was held during the summer at the Pennsylvania State University.

LEON E. SMITH, *Secretary*
The Ohio Section
American Physical Society
Granville, Ohio

1. A Study of Moisture Condensation Patterns on Glass and Crystalline Surfaces. W. C. LEVENGOOD, *Libbey-Owens-Ford Glass Company.*—A method was devised whereby moisture condensation patterns on glass and crystalline surfaces can be examined under the microscope and photographed. The technique was applied in a detailed study of minute surface fracture patterns or Griffith flaws. Experiments were made showing the type of fracture patterns produced on glass by various mechanical means Variations in the surface structure produced by etching, polishing, and chemical treatments were also studied by this method.

2. Beta Spectrum of Bismuth-210 Using a Diffusion Cloud Chamber.[1] A. A. SILVIDI AND J. G. MAXWELL, *Kent State University.*—Using a diffusion type cloud chamber built at this laboratory 430 pictures were taken of a Pb-210 sample. 326 pictures had 510 measurable tracks. A beta spectrum was constructed. Using standard methods,[2] the end point energy was determined by two different ways A plot of $(N/\eta^2)^{\frac{1}{2}}$ *versus* ϵ gave an error of less than 10 percent but a Fermi-Kurie plot did not produce a straight line. Possible reasons for such deviation and ways to improve the accuracy will be discussed.

[1] Supported by the National Science Foundation.
[2] Natl. Bur. Standards (U. S.) Applied Mathematics Series 13, "Tables for Analysis of Beta Spectra."

3. A New Method for High Precision Studies of Rate Processes. W. HALLER AND G. L. CALCAMUGGIO, *University of Toledo, Institute of Silicate Research.*—A method for the measurement of extremely small forces, acting upon an immersed sample, has been developed using a pressure-controlled hydraulic balance of the "Cartesian Diver" type. The position of a pressure-sensitive glass float, carrying the sample, is observed, while the pressure on the float is adjusted until equilibrium of the forces is reached and movement ceases. Changes in weight or volume of the sample or in density of the liquid result in forces compensated for by a corresponding pressure adjustment. The pressure response of the float has been determined by calibration and, therefore, the magnitude of the forces can be calculated from the pressure readings. The method promises to be useful for the study of rate processes, density-temperature, and density-concentration relations. Applied to rate processes, it was possible to measure continuously the weight loss of silicate glasses due to corrosion by water with an accuracy of 3×10^{-6} of 3 grams, which was the normal total sample weight. The accuracy attained depends upon the design of the compressible float and of a special thermostatic system controlling the temperature of the immersion liquid within ±0.001°C.

4. The Final-State Interaction in the Multiple Production of Mesons in Nucleon-Nucleon Collisions. JULIUS S. KOVACS, *University of Toledo.*—The Fermi statistical model for the multiple production of mesons[1–3] in high energy nucleon-nucleon collisions enables one to predict the relative probability for the production of the various multiplicities of mesons as a function of the incident energy. In recent Brookhaven experiments[4] collisions leading to single and double meson production were observed between cosmotron-produced neutrons and protons in a hydrogen-filled diffusion cloud chamber. The results of these observations give a ratio of double to single meson production which is about twenty times higher than that predicted by the statistical model. A possible modification of the statistical model in which the effect of the final state interactions (which are neglected from the point of view of purely statistical considerations) were taken into account will be discussed. These final state interactions (nucleon-nucleon, meson-nucleon, etc.) which enhance the cross section for all types of production could presumably account for the discrepancy occurring between the experimental results and the predictions of the statistical model.

[1] E. Fermi, Progr. Theoret. Phys. (Japan) 5, 570 (1950).
[2] E. Fermi, Phys. Rev. 92, 452 (1953).
[3] E. Fermi, Phys. Rev. 93, 1434 (1954).
[4] Fowler, Shutt, Thorndike, and Whittemore, Phys. Rev. 95, 1026 (1954).

5. Time of Flight Mass Spectrometer. EARL E. HAYS, *University of Toledo.*—A time of flight mass spectrometer of the Goudsmit type[1] has been constructed at the University of Toledo. Details of construction of the spectrometer and the electron multiplier used as the detector will be given. The instrument has been built to use in research and instruction of undergraduate students.

[1] S. A. Goudsmit, Phys. Rev. 74, 1537 (1948).