Proceedings of the American Physical Society

MINUTES OF THE MEETING AT STANFORD UNIVERSITY, CALIFORNIA, DECEMBER 29 AND 30, 1949

THE 296th meeting of the American Physical Society was held at Stanford University on December 29 and 30, 1949. About 200 members of the Society registered. Two post-deadline papers were accepted. The first one was a striking 16-mm picture prepared by A. T. Oliver of the Radiation Laboratory of the University of California, Berkeley. The picture, which runs for about 15 minutes, shows tracks in photographic emulsion as seen through the microscope. The emulsion was exposed in connection with experiments using the 335-Mev synchrotron at Berkeley. The second paper was a report on "Meson Induced Fission in Uranium" by S. G. Al-Salam, also from the Radiation Laboratory at Berkeley. The invited paper A1 was not given because the speaker was unable to make the trip to the meeting. Paper C14 was read by title.

The presiding officers at the various sessions were: Dr. W. N. Arnquist of the Office of Naval Research, Professors R. T. Birge, J. Kaplan, F. Bloch, D. L. Webster, Paul Kirkpatric, and L. I. Schiff.

J. KAPLAN, *Local Secretary for the Pacific Coast*
University of California
Los Angeles, California

Invited Papers on the General Programme

Progress in Upper Air Research at N. O. T. S. C. T. ELVEY, *U. S. Naval Ordnance Test Station, Inyokern.*

The Near-Infra-Red Spectrum of the Night Sky and Aurora. A. B. MEINEL, *Lick Observatory.*

The Study of High Polymer Molecules by Light Scattering. BRUNO H. ZIMM, *University of California, Berkeley.*

The Stanford University Microwave Laboratory. MARVIN CHODOROW, *Stanford University.*

The Fine Structure of Singly Ionized Helium. MIRIAM SKINNER, *Columbia University.*

Application of Magneto-Hydrodynamics to Cosmic-Ray Physics and Geomagnetism. EDWARD TELLER, *University of Chicago.*

Contributed Papers

A4. Infra-Red Spectra of the Night Sky, Aurora and Afterglows.* JOSEPH KAPLAN, *University of California, Los Angeles.*—Meinel's recent spectroscopic studies of night sky and aurora in the infra-red made with a grating spectrograph and hypersensitized Eastman I-N plates are discussed in the light of infra-red studies of nitrogen and oxygen afterglows by Kaplan. The most significant result of this comparison is the suggestion that the atmospheric system of O_2, first observed in emission in the night sky by Meinel, and in a laboratory afterglow by Kaplan, originates below 100 km at a level where recombination of normal oxygen atoms can proceed rapidly enough to account for these bands. This is based on the high intensity of the atmospheric bands which originate on $v=0$, in both night sky and afterglow and the proposal that the remarkable enhancement of $v=0$ in the laboratory is a criterion for excitation by atomic recombination. It is also suggested that diffuse bands due to NO_2, also observed in the laboratory afterglow, will account for other unidentified radiations in the night sky between λ4000 and λ9000.

* Work done under contract with ONR

B2. The Differential Equations of Nuclear Induction.[1] F. BLOCH AND R. K. WANGSNESS,* *Stanford University.*—The phenomenon of nuclear induction has been originally[2] described by a system of differential equations, intended to give the qualitative features of the observed signals in terms of two characteristic relaxation times. A rigorous quantum-statistical method has been devised to investigate the limits of validity of these equations. Based upon the generally valid Boltzmann equation for the density matrix, it is shown that the simpler original equations for the components of the nuclear polarization are likewise generally valid for nuclei with spin ½ and valid for higher spin if the coupling of the nucleus with the surroundings at temperature T is due to its magnetic dipole and if $H\mu \ll hT$. Other cases of the validity of these equations, as well as cases, where they are not applicable, are discussed.

[1] Work assisted by the Joint Program of the ONR and AEC.
* AEC Predoctoral Fellow.
[2] F. Bloch, Phys. Rev. **70**, 460 (1946).

B3. Coincidence Studies on the Decay of Hf^{181}.* W. C. BARBER, *Stanford University.*—In spite of a considerable amount of work on the decay scheme of (Hf^{181}),[1-4] there is no general agreement as to the assignment of the excited states of the product nucleus, Ta^{181}. In the present work coincidence measurements, employing anthracene and stilbene scintillation counters, have been made on the Hf^{181} radiations in the hope of making a fairly complete description of the Ta^{181} levels. The results of these measurements to date include the following: (1) Energetic electrons ($E_0>0.25$ Mev), having the absorption properties of nuclear β-rays, are found in coincidence with hard γ-rays ($E\sim 0.4$ Mev). Experiments employing delayed coincidences show these radiations to be time coincident to within 10^{-8} second, thus ruling out the decay scheme proposed by Wiedenbeck and Chu,[2] where the β-decay of Hf^{181} leads directly to the 22 μsec. metastable state first detected by DeBenedetti and McGowan.[1] (2) γ-rays of energy