MATHEMATICS

Chairman: MERRILL E. SHANKS, Purdue University

JOHN YARNELLE, Hanover College, was elected chairman for 1962

No papers or abstracts received.

PHYSICS

Chairman: HOWARD BLACK, Indiana State College

R. T. DUFFORD, Evansville College, was elected chairman for 1962

ABSTRACTS

A Gaseous Atomic Beam Light Source.[1] R. W. STANLEY, Purdue University.—It has recently become possible to observe the light emitted from atoms of a permanent gas which are traveling nearly perpendicular to the line of sight. A beam of neutral atoms, moving through a highly evacuated region, is bombarded with electrons from an electron gun. As a result of the electron bombardment some of the gaseous atoms are excited to higher energy states and subsequently emit optical radiation. The resulting spectrum may be quite different from that observed in an ordinary light source. One important property of the emitted light is that it is highly monochromatic. The gaseous atomic beam apparatus will be described and some recent results will be given.

Machine Literature Searching. H. B. THOMPSON, General Electric Company, Cincinnati 15, Ohio.—The need for a more rapid and discriminating method of locating literature is apparent to those who have made any appreciable state-of-the-art search in recent times. Manual coordinate indexing came into use in the '50's to meet this need. General Electric's Flight Propulsion Division at Cincinnati established such a system in 1953 and converted its manual system to an IBM 704 computer in 1958. Several other firms have made similar moves to make their literature handling effective. With such a system, the searcher obtains in about ½ hr. of machine time, all the references in the particular collection that have been indexed as dealing with the combination of subjects desired. Choices "ors," and negations (but not relationships), can also be used for selection with proper programming. Many are trying to retain the context or usage of the words and in certain cases with appreciable success. No system thus far developed satisfies all desires, but all help greatly in establishing the state-of-the-art in a given field quickly and, thus, in reducing duplication of effort.

Beta-Gamma Directional Correlation in EU^{154}. K. S. R. SASTRY, Indiana University.—The energy dependence of the β-γ directional correlation between the 1.86 Mev outer β-ray group of Eu^{154} and the 123-kev cascade gamma-ray of the daughter Gd^{154} has been measured with a shaped magnetic field β-γ coincidence spectrometer. The correlation coefficient, ϵ, measured to an accuracy of about 5%, is negative and varies from −0.11

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to −0.18 in the energy range 0.80 to 1.60 Mev. The experimental results indicate predominant contribution due to the B_{ij} matrix element. It will be shown that the modified B_{ij} approximation is not consistent with the spectrum shape measurement of Langer and Smith and our directional correlation data. A more general analysis of the data together with the experimental shape factor yields a set of the nuclear parameters x, u, and Y (in Kotani's notation) namely,

$$x = -0.19 \pm 0.08 \qquad u = +0.08 \pm 0.04 \qquad Y = 0.84 \pm 0.08$$

The resulting nuclear matrix elements are considerably reduced relative to the ones expected for a perfect overlap of the initial and final state wave functions indicating that a selection rule effect (probably due to K-for-biddenness) rather than a mutual cancellation of the matrix elements is responsible for the undue retardation of the transition.

Gamma Radiation from Ne^{20}.[2] W. W. EIDSON, Indiana University.—The 22 Mev alpha beam of the Indiana University cyclotron has been used to bombard targets of natural neon gas. Particle-gamma coincidence spectra of the reaction $Ne^{20}(\alpha,\alpha'\gamma)Ne^{20}$ have been studied employing standard fast-slow coincidence techniques. The existence of new gamma-emitting levels in Ne^{20} at 5.88 Mev and 7.93 Mev excitation energy is implied by the data. As these levels are unbound to alpha emission they must have unnatural spin and parity ($J \neq L$) to prevent the favored alpha decay. A 3^+ assignment for both of these levels is consistent with known information. Possible interaction mechanisms for production of such levels will be presented. Qualitative arguments will be discussed concerning possible collective model interpretation of Ne^{20}.

Peaks in Pion Production Reactions. JOHN HIGGINS, Indiana University.—The 600 and 900 Mev peaks in the cross-section for $\pi + N \rightarrow \pi + \pi N$ are examined on the basis of an isobar mechanism. The reaction is assumed to proceed in two steps. First $\pi + N \rightarrow \pi +$ isobar, then the isobar decays into a nucleon and a pion. Describing the isobar decay in terms of the known low energy $\pi + N \rightarrow \pi + N$ amplitude and using given angular momentum and isotopic spin assignments for the peaks the amplitude for the production process can be written down. This amplitude is then symmetrized and from it momentum spectra of the pions and charge ratios are calculated.

The Physics and Mathematics Backgrounds of 350 Indiana High School Physics Teachers. H. T. BLACK and E. D. GORHAM, Indiana State College; and T. PICKETT, Evansville College.—In the spring of 1961 a questionnaire was sent to Indiana high school physics teachers requesting information concerning their training in physics and mathematics, their participation in N. S. F. Institutes, their attitudes concerning P. S. S. C. physics and the enrollment of their schools. The average training of the 350 teachers reporting is 23 Semester Hours in physics and 28 Semester Hours in mathematics. The relation between average physics training and: (1) N. S. F. Institute Attendance; (2) Plans to Teach P. S. S. C. Physics; (3) High School Enrollment, was investigated and will be reported.

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2. Supported in part by the joint program of the Office of Naval Research and the Atomic Energy Commission.