arately by Schroedinger[1] and Gordon.[2] Both give the same result. Since Gordon's formulas are readily applicable, his formula is commonly used. In the discussion of Stark effect, Bethe[3] also quotes Gordon's formula. Unfortunately, a factor of 2 was inadvertently omitted from the term $(n_1' - n_2')(n^2 + n'^2)/(n + n')^2$ in Gordon's formula for the intensity of p-component (light polarized parallel to the field). The error becomes evident when one checks through his intermediate formulas (9), (19), (24), and (29').

2. *Statistical Weight.* A particular Stark component is specified by a set of values n_1, n_2, m, n_1', n_2', m'. Each of n_1, n_2, $|m|$, n_1', n_2', and $|m'|$ can take any positive integral value with the following restrictions:

$$n = n_1 + n_2 + |m| + 1, \quad n' = n_1' + n_2' + |m'| + 1,$$

where n, n' are, respectively, the total quantum number of the upper and the lower state of a spectral line in question. Since m, m' can each take a positive or a negative integral value and their difference can have only the value 0 or 1, only the components with both m and m' equal to 0 have a statistical weight 1. Any other component has a statistical weight 2.

In a table for the intensity of Stark components of $H\alpha$, Bethe[3] gave the two cases $\{(1, 1, 0), (0, 0, 1)\}$ and $\{(2, 0, 0), (0, 0, 1)\}$ a weight 1. Both should have a weight 2. Actually, the intensities calculated by Gordon's formula for the two cases are, respectively, 441 and 9, just half of the values given in his table. With a weight 2 for them, the right values are obtained. The reason he gave weight 1 to these two cases might arise from the fact that the initial state of each of them has a m-value 0. Were the weight to depend only on the initial state, the above Stark components in emission would have different intensities in absorption.

3. *Control Check.* Gordon's two formulas for p- and s-component (light polarized perpendicular to the field) are lengthy, each containing four hypergeometric functions. Fortunately, for each set of values of n_1, n_2, m, n_1', n_2', and m' ($m = m'$ for the p-component), the formula can be computed in two ways, i.e., $I_{n_1, n_2, m}{}^{n_1', n_2', m}$ or $I_{n_1', n_2', m}{}^{n_1, n_2, m}$, with different values of the hypergeometric functions and their respectively different coefficients. The agreement of the results obtained by the two methods guarantees the computation to be free from error.

From the nature of the problem, the sum of the intensities of the p-components should be equal to that of the s-components. However, in taking the sum, the value of the intensity of the unshifted component should be taken half of its value, because the unshifted component belongs to both sides of a symmetrical distribution.

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On Low Energy X-Ray Absorption by Nuclei

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DURING the past several months a series of experiments have been performed to determine the possibility of resonance absorption of low energy x-rays by nuclei. In the event this were observed, it would have an application in the unraveling of decay schemes. Several different approaches have been followed in this work.

Guggenheimer[1] proposed that nuclear rotational energy levels existed according to the relationship

$$E = 2.5 B_0 A^{-5/3} K(K+1),$$

where B_0 is 5.06 million electron volts, A is the mass number, and K is a positive integer or zero. Thus nuclei with A greater than 28 should have excited energy levels under one hundred kilovolts. This includes such elements as nickel, copper, iron, zinc, and calcium whose characteristic x-ray spectra do not overlap the regions in question. Early survey experiments[2] using photographic procedures for measuring the absorption of x-rays, passed through these materials as absorbers, seemed to indicate some correlation between experiment and theory. Later measurements with electronic recording did not verify these earlier results.

A second approach was through the use of silver. Ag^{109} exists in nature with an abundance of 48.1 percent and exhibits an isomeric transition of half-life 40.5 sec and energy 0.087 Mev which has previously been excited by x-rays of greater than 1 Mev.[3] Ag^{107} is reported to have a corresponding isomeric transition of 44.3-sec half-life and an energy of 0.093 Mev. In the current experiment, the region from 80 to 100 kilovolts was explored carefully to determine whether a resonance absorption could be detected. If such an absorption exists, it should be small because ΔI in the transition is considered to be 4 and as such the multipole order is 2^4 or 2^5. In addition to the ordinary absorption methods used for most parts of this experiment, the silver specimen was itself examined for radioactivity after a prolonged x-ray exposure. However, none was observed.

Lastly, Rb^{87} and Sr^{87}, both of which exist in nature with abundances of 27.2 percent and 7.02 percent respectively, were surveyed in an attempt to excite the gamma-rays of 0.034, 0.053, and 0.082 Mev which have been associated with Rb^{87} decay. Since the half-lives of these gamma-radiations are so short that they have not been measured, it is assumed that the transitions are more nearly dipolar. No absorption was observed which could be attributed to resonance transitions within the nucleus.

The negative results of the experiment with silver may lend limited credence to the hypothesis that the silver isomeric transitions are not to the ground state, but to an excited state of less than 2 kilovolts above the ground state. This previously has been postulated to make the silver decay scheme agree with allowed transitions predicted from the Meyer nuclear shell model. A similar situation may exist for rubidium.

Statistical probable errors in the above experiments were kept to less than 1 percent. However, fluctuations in the output of the x-ray unit were observed to cause deviations as great as 2 percent. When absorption, other than mass absorption, was indicated by the results, sufficient additional readings were taken at the same wavelengths to dispel errors due to machine behavior.

If one accepts 1 percent error as the limit of the above experiment, it follows that any nuclear resonance absorption which exists must be less than 1 percent of the total absorption. Consequently, for the cases cited above, the cross sections for nuclear resonance absorption are less than fifty barns.

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On the Diurnal Variation of Extensive Air Showers of High Density at 3500 m above Sea Level

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DURING the last year we have included a series of experiments on extensive air showers at the Laboratorio della Testa Grigia (3500 m above sea level; magnetic latitude 47°N), of which the principal results will be communicated later. In this letter we give a brief account of an analysis of the diurnal variation of the rate of extensive showers, based on a series of measurements taken during the period June-August 1950.[1]