

of W_{BA} in the customary method. In the actual calculation, the sum in (2) includes relativistic states whereas W_{BA} is non-relativistic. Therefore the non-relativistic form of W_{BA} should be so determined that the contribution from a relativistic region in the sum of (2) does not play any role. The method of the present letter satisfies this requirement, whereas the customary method does not. The difficulties of the latter come from the relativistic region in the sum of (2).

¹ C. Møller and L. Rosenfeld, Kgl. Danske Vid. Sels. Math.-Fys. Medd. 17, No. 8 (1940).

² J. Schwinger, Phys. Rev. 61, 387 (1942).

³ G. Araki, Phys. Rev. 74, 985, 986 (1948).

⁴ E. C. Nelson, Phys. Rev. 60, 830 (1941).

⁵ F. J. Dyson, Phys. Rev. 73, 929 (1948).

⁶ H. A. Bethe, Phys. Rev. 57, 260 (1940).

Microwave Spectrum of Methyl Bromide

A. HARRY SHARBAUGH AND JOHN MATTERN
General Electric Research Laboratory, Schenectady, New York
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WE have measured and analyzed the $J=0 \rightarrow 1$ rotational transition of $C^{12}H_3Br^{79}$ and $C^{12}H_3Br^{81}$ and found the molecular and nuclear constants to be in good agreement with those reported by Gordy, Simmons and Smith¹ for the corresponding $J=1 \rightarrow 2$ transition. The measurements were made with a 2K33 Klystron whose low frequency range was extended by increasing the diameter of the external resonant

TABLE I. Observed and calculated absorption frequencies for $J, K = (0, 0) \rightarrow (1, 0)$ transition of methyl bromide. Ground vibrational state.

$F \rightarrow F \pm 1$	Frequency	
	Observed For $C^{12}H_3Br^{79}$	Calculated* $\nu_0 = 19136.73$
$3/2 \rightarrow 1/2$	18992.36 mc/sec.	18992.41
$3/2 \rightarrow 3/2$	19252.13	19252.19
$3/2 \rightarrow 5/2$	19107.97	19107.87
	For $C^{12}H_3Br^{81}$ $\nu_0 = 19064.40$	
$3/2 \rightarrow 1/2$	18943.77	18943.80
$3/2 \rightarrow 3/2$	19160.82	19160.88
$3/2 \rightarrow 5/2$	19040.32	19040.28

* $eQ(\partial^2V/\partial Z^2) = 577.3$ Mc for $C^{12}H_3Br^{79}$
 $eQ(\partial^2V/\partial Z^2) = 482.4$ Mc for $C^{12}H_3Br^{81}$

cavity peculiar to this tube. The Wilson-Hughes stark-modulation scheme was used for detection of the lines. Frequency measurements were made to an accuracy of ± 0.1 Mc by using

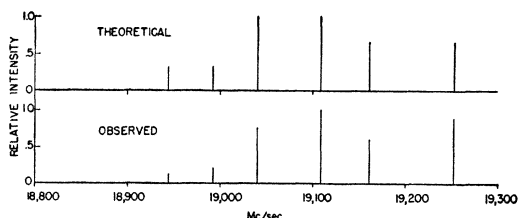


FIG. 1. Microwave absorption spectrum of methyl bromide, $J=0 \rightarrow 1$ transition.

harmonics of a crystal-controlled oscillator which was zero beat with the Bureau of Standards Station WWV.

TABLE II. Frequencies of unsplit rotational lines and calculated moments of inertia.

Molecule	Transition	ν_0 (mc/sec.)	$I_B \times 10^{40}$ (g-cm ²)	$eQ(\partial^2V/\partial Z^2)$
$C^{12}H_3Br^{79}$	$0 \rightarrow 1$	19136.73	87.68 ₁₁	577.3
$C^{12}H_3Br^{79a}$	$1 \rightarrow 2$	38272.40	87.68 ₁₅	577.0
$C^{12}H_3Br^{81}$	$0 \rightarrow 1$	19064.40	88.01 ₃₇	482.4
$C^{12}H_3Br^{81a}$	$1 \rightarrow 2$	38126.97	88.01 _{80}}	482.0

* See reference 1.

In Table I are listed the experimentally observed and calculated absorption frequencies together with the assigned quantum numbers. Second-order quadrupole corrections² were of the same order of magnitude as the experimental error and were neglected. Figure 1 shows graphically the comparison between the observed and calculated spectrum.

The frequencies of the unsplit lines (ν_0), moments of inertia (I_B), and quadrupole coupling constants $eQ(\partial^2V/\partial Z^2)$ are compared with those obtained by Gordy *et al.* for the $J=1 \rightarrow 2$ transition¹ in Table II. The agreement is seen to be quite satisfactory.

¹ W. Gordy, J. W. Simmons, and A. G. Smith, Phys. Rev. 74, 243 (1948).

² J. Bardeen and C. H. Townes, Phys. Rev. 73, 627 (1948).

Erratum: Screening and Relativistic Effects on Beta-Spectra

[Phys. Rev. 75, 264 (1949)]

C. LONGMIRE AND H. BROWN

Physics Laboratories, Columbia University, New York, New York

JUST prior to publication of this article we noted that in our calculations concerning the screening effect, we had overlooked the energy dependence of the free-electron S wave function at the origin. When this is considered, the radicals in Eqs. (4) and (6) must be inverted, i.e., the correct expression is

$$F_c^\pm(Z, W) = F(Z, W \pm D_0) \left(\frac{W - mc^2 \pm D_0}{W - mc^2} \right)^\pm.$$

Therefore, the numbers in the second column of Table I should be *divided* by the numbers in the third column to obtain the fourth column. This modification approximately interchanges the electron and positron corrections. Thus the positron correction is actually the larger of the two. The screening correction for electrons is almost negligible, because of almost complete cancellation of the two factors involved. Even for RaE the correction in the Kurie plot amounts to less than ($-$) one percent at 20 kev. Thus curve (*b*) in Fig. 4 ought to be a horizontal line. The smallness of the effect for electrons was noted correctly long ago by M. E. Rose,¹ with whose result we are now in accord.

We wish to emphasize that correction of this error *improves* the over-all agreement between the Cu^{64} spectra obtained by Wu and Albert² and the theoretical allowed spectra because of the increased magnitude of the screening correction for positrons, particularly at the higher energies. It is nevertheless true that the relative smallness of the deviations found by Wu and Albert, compared to those previously reported, does not depend to an appreciable extent on whether the screening correction is applied, as may be seen from the uncorrected curves of these authors.

¹ M. E. Rose, Phys. Rev. 49, 727 (1936).

² C. S. Wu and R. D. Albert, Phys. Rev. 75, 315 (1949). See also C. S. Wu and R. D. Albert, this issue.

Electronic Eigenfunctions in Ionic Crystals

REIKICHI NOSAWA

Physics Department, Tokyo Institute of Technology, Tokyo, Japan

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THE Wigner-Seitz method of approximation, developed further by Slater and others, has proved very useful when applied to the problem of valence-electrons in metals. It must be noted, however, that the approximation thus far used is valid only in the case where the contribution of surrounding cells to the potential can be assumed zero on account of high symmetry and essentially neutral electrical nature, as in metals having cubic structure. The method is, therefore, applicable strictly neither to the ionic crystal where the neutral nature of surrounding cells is lost, nor to the