oscillators. This will be discussed in greater detail in another article.

The author is indebted to Professor V. L. Ginzburg for comprehensive discussions.

[1] R. H. Dicke, Phys. Rev. **93**, 99 (1954)

[2] R. H. Dicke and R. H. Romer, Rev. Sci. Instr. **26**, 915 (1955)

[3] V. Weisskopf and E. Wigner, Z. Physik **63**, 54 (1930); **65**, 18 (1930)

[4] W. Heitler, *Quantum Theory of Radiation.*

[5] V. M. Fain, Dissertation, Gorkii State University, 1956

[6] L. D. Landau and E. M. Lifshitz, *Classical Theory of Fields*, 2nd Ed., Moscow, 1948

Translated by I. Emin
137

Double Absorption Peaks in Electron Resonance at Saturation

N. S. GARIF'IANOV
Physico-Technical Institute, Kazan Branch, Academy of Sciences, USSR

(Submitted to JETP editor November 24, 1956)
J. Exptl. Theoret. Phys. (U.S.S.R.) **32**, 609 (March, 1957)

SMALLER[1] observed the splitting of nuclear resonance lines when the modulation frequency of the magnitude field was of the order of the line width. We have observed the same type of double peaks of electron resonance absorption in strong fields, when the angle α between the magnetic component H_ν of the radiofrequency field and the static magnetic field H_0 differs from 90°.

Measurements were performed by Zavoiskii's[2] grid current method from 3 to 300 Mc at room temperature. The method is described in detail in Ref. 3. The oscilloscope screen showed twin resonance peaks. The splitting was produced by a 50Mc magnetic field.

For the free radical of $\alpha\alpha$-diphenyl-β-trinitrophenyl-hydrazyl in weak radiofrequency fields when α is changed from 90° to 0° only the ordinary resonance absorption peak is observed with $g_{eff}=h\nu/\beta H_0=2$ (Fig. 1 *a*). This peak has maximum intensity when

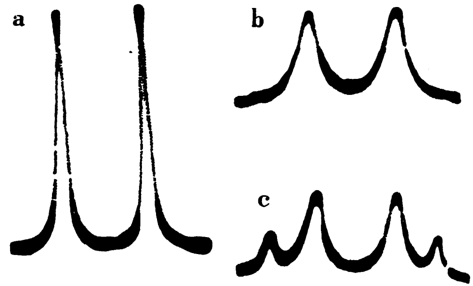

FIG. 1. Twin resonance absorption in the free radical of $\alpha\alpha$-diphenyl-β-trinitrophenyl-hydrazl at $\nu = 30$ Mc and $T = 300$°K. *a)* $\alpha = 90$° with field ($H_\nu \approx 0.1$ oersted) *b)* $\alpha = 90$° and *c)* $\alpha = 45$ with strong field ($H_\nu = 2$ oersteds)

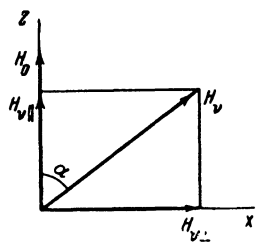

FIG. 2.

α=90° and vanishes when α=0. In strong fields, the free radical with $\alpha \neq 90°$ (Fig. 2) reveals additional absorption peaks (Fig. 1b) which result from modulation of the static magnetic field H_0 by the parallel component $H_{\nu\parallel}$. The number and position of these peaks depend both on the field strength and the angle α; they are given by $\nu_0 = \nu + n\nu$, where n=1, 2, 3.... This is a special case of Smaller's condition[1].

Additional peaks were also observed in anthracite from the Kuznets basin and in metallic lithium.

[1] B. Smaller, Phys. Rev. **83**, 812 (1951)

[2] E. K. Zavoiskii, Dissertation, Physics Institute, Academy of Sciences, USSR, Moscow, 1944

[3] N. S. Garif'ianov and B. M. Kozyrev, J. Exptl. Theoret. Phys. (U.S.S.R.) **30**, 272 (1956); Soviet Phys. JETP **3**, 255 (1956)

Translated by I. Emin
138