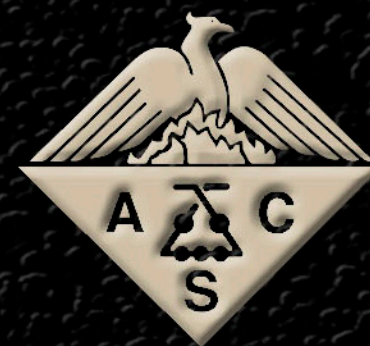




Division of the History of Chemistry
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Citation for Chemical Breakthrough

First observation of spin-spin couplings in liquids,
a crucial step in transforming NMR spectroscopy
into one of the most powerful tools in chemical science.

Physical Review 1951, 84, 589-590.

Coupling among Nuclear Magnetic Dipoles in Molecules*

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MULTIPLE nuclear magnetic resonance lines have been reported in several liquids, such as the Sb resonances¹ in aqueous NaSbF₆, and the P³¹ and F¹⁹ resonances² in POCl₂F, POClF₂, and CH₃OPF₂. Suggested interpretations of these effects include hindrance to molecular rotation¹⁻³ and second-order magnetic dipolar interactions.⁴ We feel that new measurements of ours, together with the previously published results,² exclude both of the above suggestions, in general, and we would like to propose the hypothesis that the splittings come from a second-order interaction between the nuclear magnetic moments and some magnetic field internal to the molecule.

The interaction that we propose is of the form $A\mathbf{u}_1 \cdot \mathbf{u}_2$, where A is a constant independent of temperature and H_0 . Such a form can actually be obtained from arguments of rotational invariance alone, and thus would result from any form of coupling through molecular magnetic fields.

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