solving time of the coincidence circuit was varied from 1.0 microsecond to 0.035 ± 0.002 microsecond. No loss in the genuine beta-gamma coincidence rate was observed down to the shortest resolving time employed. This result must be regarded as evidence against the existence of a short-lived metastable state in Hg^{198}.

* Assisted by the Office of Naval Research.

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Anomalies in the Hyperfine Structure of CH_3I and ICN*

O. R. Gilliam, H. D. Edwards, and Walter Gordy
Department of Physics, Duke University, Durham, North Carolina
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SIMMONS and Gordy[1] have found that the usual formula for calculating nuclear quadrupole interaction in symmetric top molecules does not agree exactly with the experimentally observed values for the hyperfine structure of ammonia. We have found somewhat larger deviations from this theory in the hyperfine structure of methyl iodide. Certain hyperfine levels have been found to deviate from their theoretically predicted positions by the order of 1 to 3 megacycles. The disagreement with theory is most strikingly illustrated in the cases where theory predicts that because of degeneracy, certain lines in the hyperfine spectrum should fall at the same frequency. Some of these lines are separated by a few megacycles, as may be seen by examination of Fig. 1. Brackets are placed over those lines which, though predicted to fall at the same frequency, are completely resolved. For the $J=3$, $K=2$ rotational term there is, according to theory, no nuclear quadrupole coupling energy because of the vanishing of the factor $(3K^2/J(J+1)-1)$. Our observations, however, show that there is appreciable nuclear interaction for this case.

Deviations from theory in the hyperfine structure of the linear molecule ICN have also been noted. Table I gives a comparison of the nuclear quadrupole coupling of iodine determined by measurements on the different $F_1\rightarrow F_1+1$ lines of the eighth rotational transition occurring in the region of 5.9 mm.

The nitrogen nuclear quadrupole effects, which for this transition are too small to be resolved, do not appear to

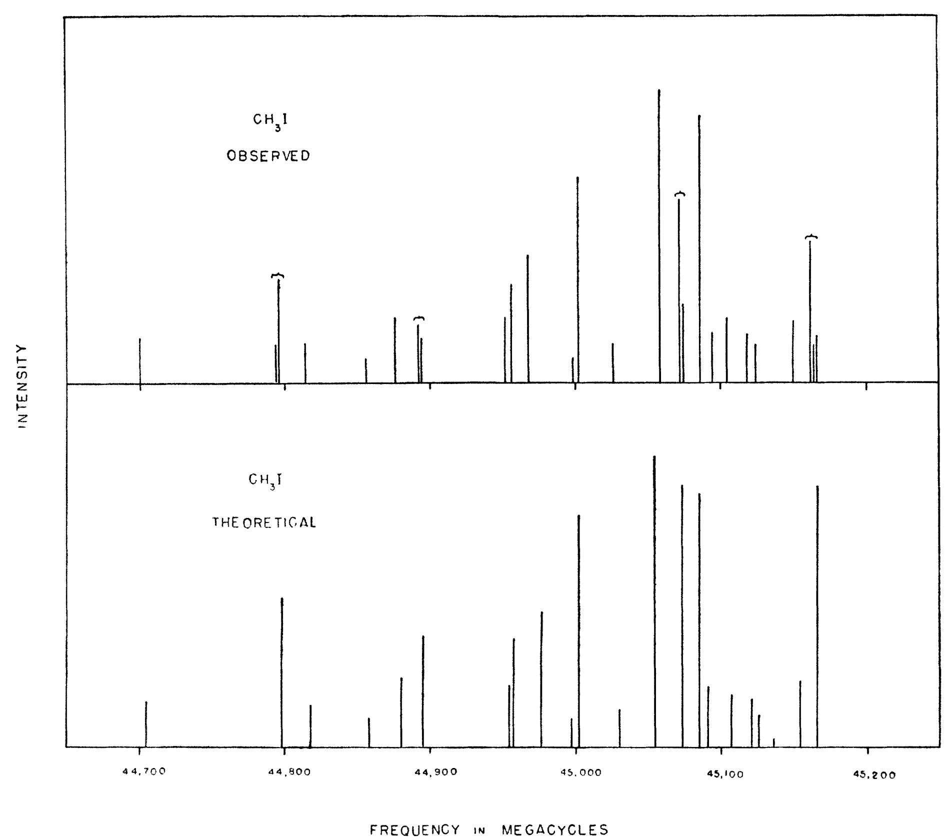

FIG. 1. Hyperfine structure of the $J=2\rightarrow3$ rotational transition of CH_3I.

TABLE I. Nuclear quadrupole coupling of iodine in ICN determined from the $F_1 \to F_1+1$ transitions of the eighth rotational line, ($J=7\to 8$). Here $F_1 = J+I_1, J+I_1-1, \cdots |J-I_1|$, where I_1 is 5/2, the nuclear spin of iodine.

$F_1 \to F_1+1$	Separation from $\frac{15}{2}\to\frac{17}{2}$ line $\Delta\nu$ in mc	Nuclear quadrupole coupling in mc $eQ\frac{\partial^2 V}{\partial z^2}$
$\frac{9}{2}\to\frac{11}{2}$	−9.98	−2388
$\frac{11}{2}\to\frac{13}{2}$	−17.46	−2401
$\frac{13}{2}\to\frac{15}{2}$	−11.98	−2430
$\frac{15}{2}\to\frac{17}{2}$	—	—
$\frac{17}{2}\to\frac{19}{2}$	+9.58	−2488
$\frac{19}{2}\to\frac{21}{2}$	+5.10	−2563

cause the observed variations in the coupling coefficients listed in Table I. The probable error in the measurements is less than 1 percent.

Further studies of these effects are being made.

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Delayed Neutrons from U^{235} After Short Irradiation

F. DE HOFFMANN,* B. T. FELD,** AND P. R. STEIN*
University of California, Los Alamos Scientific Laboratory, Los Alamos, New Mexico
February 6, 1948

DURING the spring of 1945 we investigated the delayed neutrons from U^{235} after very short neutron irradiation of about 10-millisecond duration. The decay curve of the delayed neutrons, from 0.2 second to 10 minutes after irradiation, could be resolved into 5 periods and the relative initial activities of these 5 groups of delayed neutrons determined. When these activities are extrapolated, in the conventional manner, to the case of infinite irradiation time, the rate of delayed neutron emission (on the basis of unit initial activity) is given by the following formula,[1] where t is in seconds:

$$N(t) = 0.076e^{-t/0.62}+0.279e^{-t/2.5}+0.297e^{-t/7.9}+0.294e^{-t/32.4}+0.054e^{-t/79.9}.$$

By following the neutron activity during the irradiation and for a period of about 50 milliseconds thereafter we obtained indications of a delayed neutron period of approximately 6 milliseconds. This 6-millisecond period delayed neutron group accounts for only 2 percent of the total yield of delayed neutrons, when the U^{235} is irradiated to saturation. We hope to publish a full account of the above measurements in this journal in the near future.

This letter is based on work performed at the Los Alamos Scientific Laboratory of the University of California under Government Contract No. W-7405-eng-36, and the information contained therein will appear in Division V of the National Nuclear Energy Series (Manhatten Project Technical Section) as part of the contribution of the Los Alamos Laboratory.

* Now at Harvard University, Cambridge, Massachusetts.
** Now at Massachusetts Institute of Technology, Cambridge, Massachusetts.

[1] When these results are compared with the work of Hughes, Dobbs, Cohn, and Hall, Phys. Rev. **73**, 111 (1948), there is substantial agreement in the delayed neutron periods. There are, however, discrepancies in the relative intensities which may be due to the fact that our results are not corrected for the varying efficiency of our neutron counters with the various energies of the different delayed neutron groups.

Perturbation of Steady Uniform Flow by Localized Sources of Heat*

BRUCE L. HICKS
Ballistic Research Laboratories, Aberdeen Proving Ground, Aberdeen, Maryland
January 29, 1948

THE configuration of steady diabatic flow is affected by heat addition in ignition and combustion. For the one-dimensional approximation these effects have been described in the literature.[1] For uniplanar flow a study of diabatic inviscid patterns can be based in the incompressible approximation on the previously developed equations,[2]

$$\nabla^2\varphi = q, \quad \nabla^2\psi = -\omega, \quad u = \varphi_x + \psi_y, \quad v = \varphi_y - \psi_x$$

where

$$\vec{W} = \vec{V}/V_t = u\bar{\imath} + v\bar{\jmath}, \quad \omega = |\nabla x \vec{W}|, \quad q = Q/V_t^3,$$

Q is heat added per unit mass and time, and V_t = limiting velocity (local value). We consider here uniform flow $\vec{W} = u_0 L$ slightly perturbed by a localized heat source q which is coupled to ω through the equation $q_y = \omega_x$.

Solutions of these equations will be discussed for various simple heat source functions, $q(x, y)$. Upon the characteristics of $q(x, y)$ depend the continuity of the perturbation field $\vec{W}'$ and the distribution of vorticity produced. It appears that sources of heat are inherently more complicated in their structure and effects than sources of fluid. In general, a localized heat source will produce an accelerated jet of fluid downstream of the source, and more or less sharply defined regions of vorticity trail downstream from the edges of the source.

* This communication was submitted to the American Physical Society as an abstract for the New York meeting, but because of an oversight it was not included in the bulletin for that meeting.

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Excited States of B^{10}

T. LAURITSEN, W. A. FOWLER, C. C. LAURITSEN, AND V. K. RASMUSSEN
W. K. Kellogg Radiation Laboratory, California Institute of Technology, Pasadena, California
February 2, 1948

THE neutron spectrum from the reaction $Be^9(d, n)B^{10}$ has been studied by Bonner and Brubaker,[1] Staub and Stephens,[2] and Powell and Fertel,[3] all of whom observed transitions to states in B^{10} at 0.6, 2.0, and 3.5 Mev,