VI. ATOMIC BEAM RESEARCH

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A. THE HYPERFINE STRUCTURE OF IODINE

The atomic beam magnetic resonance method has been used to investigate the $^2P_{3/2}$ atomic ground state of the stable isotope of iodine. From observations of the Zeeman frequencies in a known weak magnetic field, the value of 5/2 h for the nuclear spin I has been verified. The zero field intervals have been obtained from measurements of the direct transitions $4, -2 \leftrightarrow 3, -2$, $3, 0 \leftrightarrow 2, 0$, $2, 0 \leftrightarrow 1, 0$.

$$4a + 4/5\ b + 576/5\ c = 4225.92 \pm 0.100 \text{ Mc/sec}$$

$$3a - 9/20\ b - 1458/5\ c = 1965.886 \pm 0.010 \text{ Mc/sec}$$

$$2a - 4/5\ b + 1728/5\ c = 737.483 \pm 0.010 \text{ Mc/sec}$$

where a, b, c, are the magnetic dipole, electric quadrupole, and magnetic octupole interaction constants in the ground state, respectively. From these measurements we obtained the following values:

$$a = 827.228 \pm 0.005 \text{ Mc/sec}$$

$$b = 1146.215 \pm 0.025 \text{ Mc/sec}$$

$$c < 0.0002 \text{ Mc/sec}$$

$$Q = -0.796 \times 10^{-24} \text{ cm}^2$$

Calculations are at present being carried out to study the influence of the neighboring fine structure level, the metastable state $^2P_{1/2}$, on the hyperfine structure in the ground state.

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