

VI. ATOMIC BEAM RESEARCH

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A. THE HYPERFINE STRUCTURE OF IODINE

In view of certain interesting irregularities that have appeared, further theoretical and experimental work is being carried out on the hyperfine structure of iodine.

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B. DETECTION TECHNIQUES

1. Various tests are being made of a new type of detector based on differential surface contamination by the atomic beam of an electron-emitting surface.

2. A National Research Council Wessel-Lew universal detector has been constructed from blueprints kindly furnished by Dr. Lew.

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C. THIRD ATOMIC BEAM APPARATUS

We have constructed a new directional oven for the production of beams of radioactive atoms. It permits thorough decontamination of the oven, including the slit system (which consists of five fine hypodermic needles), by having the slit system and the top and bottom of the oven removable from the main oven block. Exposure to radiation in handling the oven is thus expected to be minimized.

New floppy wires were put into the apparatus. They consist of coaxial brass tubing gradually tapered at the ends, eventually becoming parallel strips which fit into the "C" magnet gap. That X-band radiofrequency power can be fed into these wires quite efficiently was indicated by the power picked up at a nearby loop.

Transitions were thus observed in Cs^{133} at approximately 9193 Mc/sec. Since the observed ratio of flop to background is still limited by the frequency stability of the klystron, work is now being done to obtain a stable frequency. In this connection improvements in the frequency standard are being carried out, particularly in the multiplying stages following the 5 Mc/sec standard oscillator.

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