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THE NUCLEAR SPIN OF 2.3-Hr IODINE-132

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Berkeley, California

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**Hugh L. Garvin, Edgar Lipworth, and William A. Nierenberg**

**May 21, 1959**

**Printed for the U. S. Atomic Energy Commission**

THE NUCLEAR SPIN OF 2.3-hr IODINE-132\*

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The nuclear spin of 2.3-hr iodine-132 has been measured by means of an atomic-beam magnetic-resonance experiment and found to have the value 4. The apparatus used for this measurement has been described elsewhere.<sup>1</sup>

Iodine-132 is conveniently obtained by a milking process from 77-hr tellurium-132 in an iodine generator provided by the Brookhaven National Laboratory.<sup>2</sup> A generator initially charged with 108 millicuries of I<sup>132</sup> provided a sufficient quantity of active material to observe the "flop-in" resonances of the  $F = 11/2$  and  $F = 9/2$  hyperfine states of the  $^2P_{3/2}$  atomic ground state at magnetic field values of 1.42, 2.82, 6.92, and 13.42 gauss. The I<sup>132</sup> beam was detected by collection upon silver-coated buttons which were subsequently counted in continuous-flow proportional counters. Decay half life of both the principal sample and several resonance-maxima samples were used to reaffirm identification of the isotope.

The observed value of 4 for the nuclear spin of I<sup>132</sup> is consistent

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\*Work done under the auspices of the U. S. Atomic Energy Commission.

<sup>1</sup>Garvin, Green, and Lipworth, Phys. Rev. 111, 534 (1958).

<sup>2</sup>Stang, Tucker, Banks, Doering, and Mills, Nucleonics 12, No. 8, 22-24 (1954).

with the single-particle shell model of the nucleus.<sup>3</sup> In this case the last odd proton and neutron can be reasonably assigned to the  $(5g_{7/2})$  and  $(4d_{3/2})$  levels respectively.

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<sup>3</sup>M. G. Mayer and J. H. D. Jensen, Elementary Theory of Nuclear Shell Structure (John Wiley and Sons, New York, 1955) pp 194-196.