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Value of g' for Supermalloy

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The gyromagnetic ratio of supermalloy has been determined by measurements of the Einstein-deHaas effect. The value of 1.905 ± 0.002 obtained for g' is equivalent to a spectroscopic splitting factor g of 2.105. This is in good agreement with values obtained by ferromagnetic resonance experiments.

INTRODUCTION

SUPERMALLOY produces quite sharp peaks in ferromagnetic resonance experiments. Consequently it should be a good material to check the Kittel-Van Vleck relation between the magnetomechanical factor g' and the spectroscopic splitting factor g.

Recently a highly specialized laboratory facility has been made available for making measurements of the Einstein-deHaas effect.[1,2] In order to check the relationship existing between g and g' it was considered advisable to repeat our older gyromagnetic ratio experiments on supermalloy at this new laboratory.

TABLE I. Values of g' for supermalloy obtained for various daily runs.

Magnetizing current (milliamperes)		g'
5.00		1.906
10.00		1.909
10.00		1.911
5.00		1.898
10.00		1.907
10.00		1.904
10.00		1.898
	Average	1.905

RESULTS

The rod used in these experiments[3] was the same one which was used in our earlier experiments on supermalloy for which a g' value of 1.910 was obtained.[4] The experimental arrangements used by us for making measurements of the Einstein-deHaas effect have been previously described.[2] The present series of experiments is summarized in Table I. The resulting value of $g'=1.905\pm0.002$ corresponds to a spectroscopic splitting factor g of 2.105. The most recent ferromagnetic resonance experiments on supermalloy by Young and Uehling[5] give a value of $g=2.10$. Experiments by Bloembergen[6] give a value of 2.12 for the g factor of supermalloy. Hence the Kittel-Van Vleck relation $g=g'/(g'-1)$ appears to be experimentally verified.

[1] Built by the Charles F. Kettering Foundation.
[2] G. G. Scott, Phys. Rev. **119**, 84 (1960).
[3] Furnished by Dr. S. O. Morgan of the Bell Telephone Laboratories.
[4] S. Brown, A. J.-P. Meyer, and G. G. Scott, Compt. rend. **238**, 2504 (1954).
[5] J. A. Young and E. A. Uehling, Phys. Rev. **94**, 544 (1954).
[6] N. Bloembergen, Phys. Rev. **78**, 572 (1950).